NATIONAL SERVICE DATA

NATIONAL AUTOMOTIVE SERVICE

1962 FINAL NATIONAL SERVICE DATA

ARRANGEMENT OF INFORMATION

The CAR MODEL SECTION is arranged for ease in using the great amount of manufacturers and service data as follows:

1) Car makes are arranged in groups by Manufacturer: American Motors, Chrysler Corporation, Ford Motor Co., General Motors, Studebaker-Packard Corporation, and Willys Motors.

2) Similar car models are consolidated to provide a maximum amount of service data without duplication. Individual specifications and differences are clearly listed on each of the car model pages, consequently no confusion can result.

3) Each car model is indexed separately and in proper alphabetical order in the CAR MODEL INDEX on Page 1.

The EQUIPMENT SECTIONS—Carburetion, Electrical, Brakes, Clutches, Rear Axles, Suspension & Wheel Alignment, Steering, Transmissions, and Miscellaneous—have each type of equipment covered individually.

See separate EQUIPMENT INDEXES on Pages 4 through 9.

▶**DISCARD ADVANCE DATA.** The Final Data contains all information given in the Advance Data plus many important changes.

TIGHTENING SPECIFICATIONS

1954-55 ENGINES

Cylinder Head Stud Nuts	50-60
Con. Rod Cap Nuts	27-30
Main Bearing Cap Screws	66-70
Piston Pin Clamp Screw	18-22
Flywheel Retaining Cap Screw	100-110
Camshaft Sprocket Screw	50-55
Vibration Dampener Retaining Screw	65-70

1956-57 ENGINES

Cylinder Head Stud Nuts	60-65
Con Rod Cap Nuts	27-30
Main Bearing Cap Screws	66-70
Flywheel Retaining Cap Screw	100-110
Camshaft Sprocket Screw	50-55
Vibration Damper Retaining Screw	70-80

1958-60 6 CYL. ENGINES

	Ft. Lbs.
Cylinder Head (Amer.)	57-60
Cylinder Head (Six)	60-65
Intake Manifold Cover-5/16" (Six)	15-20
Intake Manifold Cover-1/4" (Six)	8-11
Exhaust Manifold - End Nuts (Six)	8-10
Exhaust Manifold - Center Nuts (Six)	20-25
Exhaust Manifold (Amer.)	20-25
Oil Pan	8-11
Main Bearing Caps	66-70
Flywheel	100-110
Vibration Damper Retaining Screw	70-80
Con Rod Caps	27-30
Camshaft Sprocket	50-55
Camshaft Thrust Plate	21-25
Rocker Arm Cover (Six)	3-5
Engine Front Cover	21-25
Water Manifold	8-12
Oil Pump Mounting	20-25

1957-60 ENGINES

	Ft. Lbs.
Cylinder Head	60-65
Int. & Exh. Manifold	20-25
Oil Pan	8-11
Main Bearing Caps (Exc. Rear)	80-85
Main Bearing Cap (Rear)	50-55
Flywheel	100-110
Vibration Damper	70-80
Con Rod Caps	(Oiled) 46-50
Camshaft Sprocket	50-55
Camshaft Thrust Plate	21-25
Rocker Arm Cover	(Inch Lbs) 30-40
Cylinder Head Cover	3-5
Engine Front Cover	18-22
Water Pump Mounting	8-12
Oil Pump Mounting	28-32

ENGINE

1954-58 ENGINES

ENGINE REMOVAL: Engine is removed from below car Place car on lift or place two high jacks under body sills just behind the rear engine support crossmember Remove hood top and radiator core Disconnect fuel line at fuel pump, and remove fuel line to carburetor Disconnect wires at generator and oil and heat indicator engine units. Disconnect throttle linkage Remove exhaust manifold and fasten out of the way against the side panel Disconnect steering cross tie rod, shift rods at transmission, clutch linkage to clutch beam, speedometer cable (and Overdrive wiring if used) Place lifting fixture to head studs and lift engine just enough to support it Remove four bolts holding front crossmember to side sills Remove rear engine diagonal mounting braces and the four bolts holding the rear engine support crossmember to body sills Engine will now be supported by the lifting device Lower the engine slightly and move forward enough to slide the front universal off the transmission Engine can now be lowered and removed from beneath the car

1959-60 6 CYL. ENGINES

ENGINE REMOVAL: 1) Remove hood assembly, drain cooling system and engine oil Remove air cleaner, starter and radiator core. Disconnect exhaust pipe at manifold and remove flywheel housing screws and flywheel mud pan.

2) On Auto Trans Cars, drain converter and transmission and remove flywheel drive plate-to-converter assembly screws

3) Remove front engine support upper nuts Disconnect all wiring, lines, and hoses from engine and power steering assembly Remove Air Conditioning compressor and bracket assembly *NOTE* - DO NOT DISCHARGE system

4) Attach lifting hook, lift engine upward and forward to clear clutch shaft pilot bushing

1959-60 V8 ENGINES

ENGINE REMOVAL: 1) Remove battery and hood assembly Drain oil and cooling system On Auto Trans Cars, drain transmission and disconnect cooler lines at radiator and straps on engine oil pan On Air Conditioned Cars, remove air compressor and mounting bracket from engine and move compressor and hoses to one side

2) Remove water pump upper and lower hoses and hoses at fuel pump, heater control valve and cylinder head Remove radiator core and loosen exhaust pipes at mufflers and exhaust manifolds at cylinder heads and push them out toward wheel house panels.

3) Disconnect all wiring and hose connections from engine, coil primary, heat sending unit, oil sending unit, vacuum safety switch, generator, etc

4) Remove starter Loosen flywheel housing and remove flywheel mud pan

5) On Auto. Trans. Cars, drain torque converter and loosen flywheel drive plate from converter

6) Attach lifting fixture to engine, loosen rear engine support cushions at rear crossmember Support transmission and torque tube and remove rear crossmember. Loosen front engine support cushions, raise engine upward and forward through hood opening

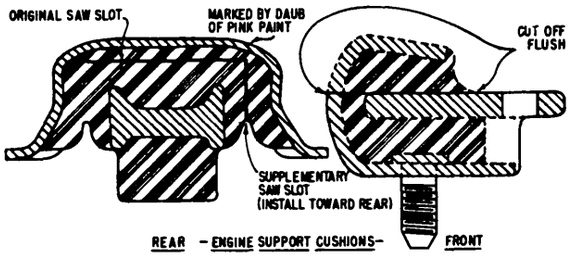
1958 AMERICAN

►*ENGINE VIBRATION CORRECTION* This vibration occurs with automatic transmission in "Drive" range and engine idling, and is caused by misalignment of engine mounts Mounts were modified in production at different times and early cars should be modified as follows

Front Mount Bfr Srial No M-14218 - Cut off top of mount as shown in illustration

Rear Mount Bfr Engin No E-4292 Cut a vertical slot in rear of mount to join existing horizontal slot, as shown in illustration

Identification - Production modified front mounts identified visually, rear mounts by daub of pink paint on top of mount



RAMBLER AMERICAN ENGINE MOUNT MODIFICATION

CYLINDER HEAD & MANIFOLD

1956 ENGINES

►*RELOCATION OF VACUUM BOOSTER PUMP OUTLET CONNECTION (To eliminate rough ngin idle when windshield wipers turned "ON").* Remove carbruetor, plug intake manifold with greased shop cloth to catch drill chips. Mark and drill 21/64" hole in left rear side of carburetor mounting pad and tap hole for 1/8" pipe thread. *NOTE* - Coat drill and tap with grease to prevent chips from falling into intake manifold. Remove vacuum outlet fitting from rear of intake manifold cover (plug opening with 1/8" pipe plug), and reinstall it in new location. Cut 4" section from flared end of vacuum line, and install this piece in newly located fitting. Connect line with 10" piece of windshield wiper hose. Reinstall carburetor and reroute line to clear throttle linkage.

ALL 6 CYL. ENGINES

CYLINDER HEAD INSTALLATION: Use torque indicating wrench to tighten cylinder head stud nuts in sequence shown in cylinder head diagram Torque specifications are for engine at operating temperature

Cast Iron Heads—Tighten heads COLD, then recheck after engine has been run and thoroughly warmed up

Aluminum Heads—Tighten heads at room temperature, recheck again after period of operation, with engine at room temperature

Cylinder Head Gasket—Always use new gasket Coat gasket with very light application of Perfect Seal Gasket Paste to insure tight seal between cylinder head and block

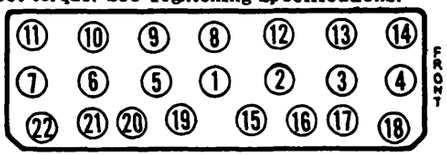
ALL V8 ENGINES

CYLINDER HEAD INSTALLATION: Cylinder block has two sleeve locating dowels to assist in lining up cylinder head and gasket during installation. Coat gasket

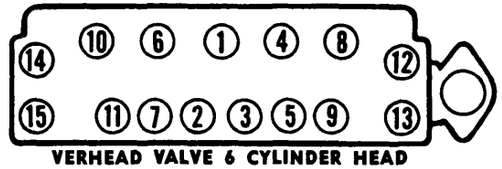
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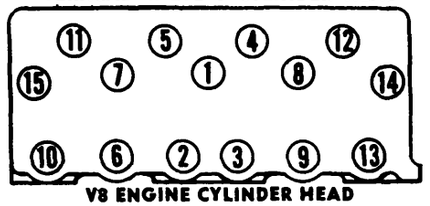
with non-hardening gasket paste, install gasket with marks "AM" and "TOP" upward. Install cylinder head, pushrods, and rocker arm assembly (*CAUTION* - Special drilled capscrew must be installed in rear rocker arm support bracket to provide lubrication for rocker arms). Tighten head bolts in sequence shown in diagram to correct torque. See Tightening Specifications.



6 CYL. "L-HEAD" CYLINDER HEAD



VERHEAD VALVE 6 CYLINDER HEAD



V8 ENGINE CYLINDER HEAD

ORIGINAL BORE & PISTONS

ALL ENGINES

ORIGINAL BORE & CRANKSHAFT LETTER CODE: A three letter code stamped adjacent to engine number indicates as follows:

Letter Sequence Code

First letter ..... Size of Bore
Second letter ..... Size of Main Bearings
Third letter ..... Size of Con. Rod Bearings

Letter Size Code

Letter "A" ..... Standard
Letter "B" ..... .010" Undersize
Letter "C" ..... .010" Oversize
Letter "D" ..... .001" Undersize

ENGINES NOT MARKED ARE STANDARD.

PISTON PINS

1956-60 ENGINES
ALL ENGINES

PISTON PIN: Pin is press fit in connecting rod and no clamp bolt or locking rings are used to retain the pin. Piston pin must be removed and installed as detailed below to prevent distortion or damage to piston.

Removal - Remove pins with special Piston Pin Remover J-6360 and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver.

Installation - Place piston pin pilot in support, insert piston and connecting rod. This aligns piston and connecting rod piston pin bores. Press piston pin into connecting rod and piston assembly until lower pilot bottoms in support which will properly center rod on pin.

► *CAUTION:* Pin must be tight press fit in connecting rod.

ORIGINAL BEARING SIZES

ALL ENGINES

ORIGINAL BORE & CRANKSHAFT LETTER CODE: A three letter code stamped adjacent to engine number indicates as follows:

Letter Sequence Code

First letter ..... Size of Bore
Second letter ..... Size of Main Bearings
Third letter ..... Size of Con. Rod Bearings

Letter Size Code

Letter "A" ..... Standard
Letter "B" ..... .010" Undersize
Letter "C" ..... .010" Oversize
Letter "D" ..... .001" Undersize

ENGINES NOT MARKED ARE STANDARD.

CRANKSHAFT & MAIN BEARINGS

1954-60 ENGINES
6 CYL. ENGINE

MAIN BEARING REMOVAL & INSTALLING: Upper bearing halve may be 'rotated' out by inserting pin in oil hole in crankshaft and turning shaft in the direction of locating tongue on bearing. Bearings can be installed by reversing removal procedure.

Fitting Bearings—Use Plastigage across full length of bearing insert and tighten cap to 66-70 ft. lbs.

6 CYL. ENGINE

CRANKSHAFT END THRUST PLATE: Crankshaft end thrust taken by flanged edges of front bearing. A steel thrust plate is assembled between rear face of timing chain sprocket and flanged face of front bearing. Plate keyed to shaft by Woodruff key which also secures sprocket on shaft. When plate installed, chamfered edge on inner diameter should face toward the rear for tight fit against bearing journal.

Adjustment—If endplay not correct with all parts correctly assembled, replace front main bearings or thrust plate.

6 CYL. ENGINE

REAR OIL SEAL: Install new oil seal with rear main bearing cap off (crankshaft out of engine when replacing upper half). Packing in groove in block and cap behind oil slinger on crankshaft. Cap sealed with rubber plugs in groove on each side where cap fitted in the recess in the block. Use Tool J-1610 to install packing in groove in block and cap. Place packing in groove (with bearing shell removed), place small diameter of tool over packing, hit end of tool with lead hammer to seat packing, cut ends of packing flush with bearing cap seat, remove tool. Repeat operation for groove in block. Install rubber seal plugs on each side of bearing cap (where angle seal used, make certain that seal also seated in horizontal groove in block).

ALL V8 ENGINES

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Install hemp packing in block and in bearing cap using Tool J-3048-A to seat packing in groove. Trim excess packing off flush with face of cap. Rubber seals are installed in side grooves of bearing cap.

VIBRATION DAMPENER

1954-56 6 CYL. ENGINES

REMOVAL & INSTALLATION: Non-adjustable, rubber cushioned type. To install hub assembly: Lock hub on shaft with woodruff key, install large lockwasher with notches on inner edge, cork seal ring, rubber seal ring and hub retainer in recess in hub. Install hex head lock screw with helical lockwasher under it in screw hole in end of crankshaft and tighten screw to 65-70 ft. lbs. torque. Rubber block retaining bolt nuts on front face of dampener hub must be drawn up tight.

1957-59 6 CYL. ENGINES

INSTALLATION: To install hub assembly, install large lockwasher with notches on inner edge, cork seal ring, rubber seal ring and hub retainer in recess in hub. Install hex head lockscrew with helical lockwasher under it, in screw hole in end of crankshaft and tighten screw securely. Rubber block retaining bolt nuts on front face of damper hub are drawn up until shoulders bottom on hub (30-35 ft. lbs. torque). *CAUTION* - When installing vibration damper on hub, timing marks must be aligned with hub key-way and on same side.

1957-59 V8 ENGINES

REMOVAL: (*NOTE* - Vibration damper can be removed without removing radiator core). Remove fan blade assembly and pull vibration damper with a suitable puller. A puller may be fabricated in the shop by threading a 1" x 5" (N.C. Thread) jack screw into a steel plate ½" thick, with a 13/32" wide slot in each end of plate. Use two screws 3½" long with 2" of 3/8 x 16 U.N.C. 2B-T thread in the slots. Stake a ½" ball bearing in end of jack screw.

INSTALLATION: Installation procedures are the same as for 6 cyl. engine (above).

ENGINE FRONT COVER

ALL 6 CYL. ENGINES

ENGINE FRONT COVER: Removal - Remove fan blade assembly, vibration damper and cover retaining screws. Remove cover.

Installation - *See "Crankshaft Front Oil Seal" below.*

CRANKSHAFT FRONT OIL SEAL: Drive out old seal from rear. Drive in new seal from front. To prevent damage to seal when installing cover, leave cover screws loose until vibration damper is installed to properly center cover, then tighten cover screws to specifications.

1957-60 V8 ENGINES

ENGINE FRONT COVER: Removal - Remove water pump, fuel pump assembly and vibration damper. Remove cover-to-cylinder block screws and remove cover.

Installation - Locate dowels in cylinder block and leave cover screws loose until vibration damper is partially installed. This prevents damage to oil seal and aligns cover properly. Then tighten cover screws and install fuel and water pumps.

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CRANKSHAFT FRONT OIL SEAL: Oil seal is installed in timing chain cover at vibration damper hub. To replace seal, remove cover (see above), old seal, and install new seal.

CAMSHAFT & BEARINGS

1954-56 6 CYL. ENGINES

REMOVAL: *Engine must be removed from chassis.* Remove fan assembly and cylinder head. Remove valve tappet covers and vibration dampener. Remove valves and valve springs, retain tappets with wire. Remove timing chain cover and oil slinger. Position engine with timing marks adjacent and in line across camshaft and crankshaft centers. Remove camshaft sprocket retaining screw and remove timing chain and sprockets. Sprockets can be pried off shafts.

End Play—Check endplay with dial indicator or feeler gauge placed between the rear of the camshaft sprocket and front face of camshaft thrust plate.

1957 6 CYL. ENGINES

CAMSHAFT REMOVAL: Camshaft bearings are "step-bored", being larger at front bearing than at rear, to permit easy removal and installation of camshaft. To simplify camshaft removal, remove radiator and grille assemblies. Then raise front of engine slightly.

1957-60 V8 ENGINES

CAMSHAFT REMOVAL: Remove spark plug wires, cylinder head covers, and rocker arm assemblies. Remove intake manifold and carburetor. Remove all pushrods and hydraulic valve lifters (*CAUTION* - Keep these parts in order so they can be installed in same relative positions). Remove fuel pump. Remove vibration dampener and timing chain cover. Remove water pump and cylinder head water distribution manifold. Crank engine until timing marks on chain sprockets line up on vertical line through shaft centers. Remove fuel pump eccentric, remove both sprockets and timing chain as an assembly. Remove camshaft retainer thrust plate and thrust spacer. Carefully withdraw camshaft through front of engine.

1960 6 CYL. & V8 ENGINES

CAMSHAFT LOBE LIFT: Remove rocker arm covers and install dial indicator with contact arm directly over pushrod end of rocker arm to register upward movement of pushrod. Zero dial indicator with all lash removed on Rambler 6 Cyl. and Rebel engines or with hydraulic lifter collapsed on Ambassador engine. Rotate engine to point where maximum upward pushrod movement occurs and note dial indicator reading. Reading should be as shown in table (plus or minus .006").

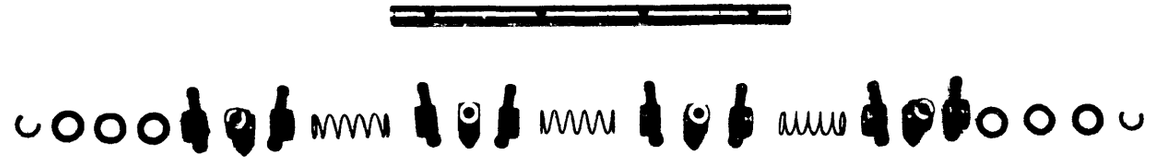
Cam Lobe Lift	
Rambler Six & Rebel V8 (Intake)	.262"
Rambler Six & Rebel V8 (Exhaust)	.263"
Ambassador V8 (All Valves)	.254"

VALVE SYSTEM

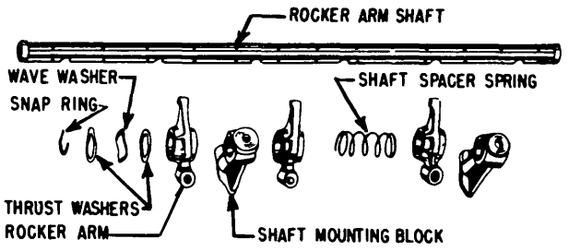
ROCKER ARMS

6 CYL. OVERHEAD VALVE ENGINE

ROCKER ARM ASSEMBLY: Rocker arm shaft is one piece type and entire rocker arm assembly can be removed after taking out mounting bolts in shaft brackets.



V8 ENGINE ROCKER ARM ASSEMBLY



6 CYL. ROCKER ARM ASSEMBLY

Disassembly & Inspection: Remove snap ring on end of shaft, slide thrustwashers, wave washer, rocker arms, mounting brackets, and springs off shaft. Inspect all parts for wear, see that end plugs are tight in shaft.

Reassembly & Installation: Install all parts in same relative positions (*CAUTION - Rocker arms are "Right" and "Left" and must not be exchanged).* Install assembly with rocker arm lubricating holes in shaft down or toward cylinder head. Oil is supplied through front rocker arm shaft support block.

1957-60 V8 ENGINES

ROCKER ARM ASSEMBLY: Complete assembly mounted on cylinder head by four long cylinder head retaining capscrews (*CAUTION* - Rear bolt is special hollow type for rocker arm lubrication). Assembly can be removed by taking out the retaining screws.

Disassembly & Inspection: Remove snap ring on end of shaft and slide all parts off shaft. Keep all parts in order so they can be reassembled in same relative positions. Clean and inspect all parts for wear. Inspect rocker arm radius at valve stem end for wear and replace worn rocker arms. Make certain that plugs are tight in ends of shaft.

Reassembly & Installation: Install all parts in same relative positions. *CAUTION - Rocker arms are "Right" and "Left" and will not contact valve stem properly if interchanged. However, rocker arm assemblies are interchangeable from bank to bank.* When installing assembly, make certain that special hollow bolt is installed in rear support bracket (necessary for correct rocker arm lubrication).

HYDRAULIC LIFTERS

1957-60 V8 ENGINES

HYDRAULIC VALVE LIFTERS: Removal—Remove valve rocker covers and rocker arm shaft mounting bracket bolts and lift off rocker arm assembly. Remove upper valve tappet cover and breather tube and then remove lower tappet cover. Remove pushrods and hydraulic valve lifters keeping pushrods and lifters in sequence so they can be replaced in same relative position.

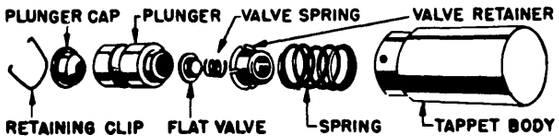
Disassembly: Press down on valve pushrod socket and use a pair of needle nose pliers to remove the lock ring. Remove pushrod socket, plunger, and plunger spring. Remove check valve assembly from plunger being careful not to lose the small flat valve and coil spring. *(CAUTION—Disassembl on lift r at a time to avoid mixing plungers and bodies. These parts are selectively fitted and must not be interchanged).* Use clean solvent and thoroughly wash all parts. Remove all varnish and gum deposits.

Inspection: Inspect the plunger and wall of body for scratches (if plunger or body is scratched, replace complete unit). Try the plunger for fit in body. If check valve removed from plunger, inspect flat disc valve, spring and seat.

Reassembly: Reverse disassembly procedure. See illustration for correct sequence.

Testing: Fill body with kerosene and install plunger return spring, plunger assembly, and pushrod socket (do not install snap ring). Place lifter between jaws of Checking Tool J-5790 and check leak-down by depressing tool. A decided resistance should be felt. If lifter leaks down rapidly, or collapses immediately, it should be rechecked and/or replaced with a complete new lifter assembly. Normal lifter should require 10-45 seconds to leak down when filled with kerosene (.125" travel with 50 lb. load).

Installation: Lifters should be pre-lubricated and installed in engine WITHOUT being filled with oil. They will normally charge themselves in 3 to 8 minutes of engine operation.



V8 HYDRAULIC VALVE LIFTER

OILING SYSTEM

ENGINE LUBRICATION

6 CYL. ENGINES

▸*OVERHEAD VALVE & "L" HEAD (AMERICAN) ENGINE NOTE:* Oiling systems for both engines are similar except for cylinder head rocker arm and valve lubrication used on Overhead Valve Engines only.

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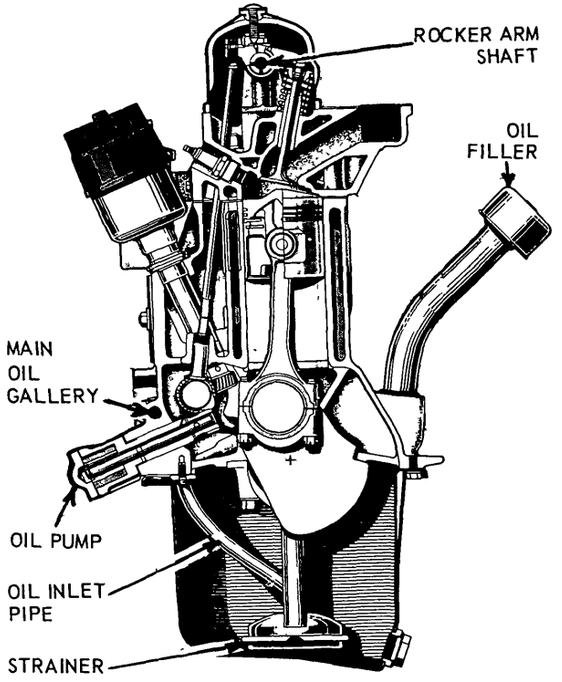
ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve mechanism on cylinder head (Overhead Valve Engines only). All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage around pump body hub to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve (under plug on right side of crankcase) regulates pressure by bypassing oil from main oil gallery back into oil pan. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects lower part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).



RAMBLER 6 CYL. ENGINE OILING SYSTEM

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Valve Lifters, Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings.

Rocker Arms, Pushrods & Valve Stems (Overhead Valve Engine) - Oil tube connected to main oil gallery (at front of engine) and to fitting on side of cylinder head (at forward end directly above No. 1 spark plug) supplies oil to passage in cylinder head and through front rocker arm shaft support block to hollow rocker shaft. Rocker shafts have drilled oil holes at each rocker arm. Rocker arms are drilled (upper hole in arm allows oil to run down flat machined surface to each end of arm for pushrod and valve stem lubrication).

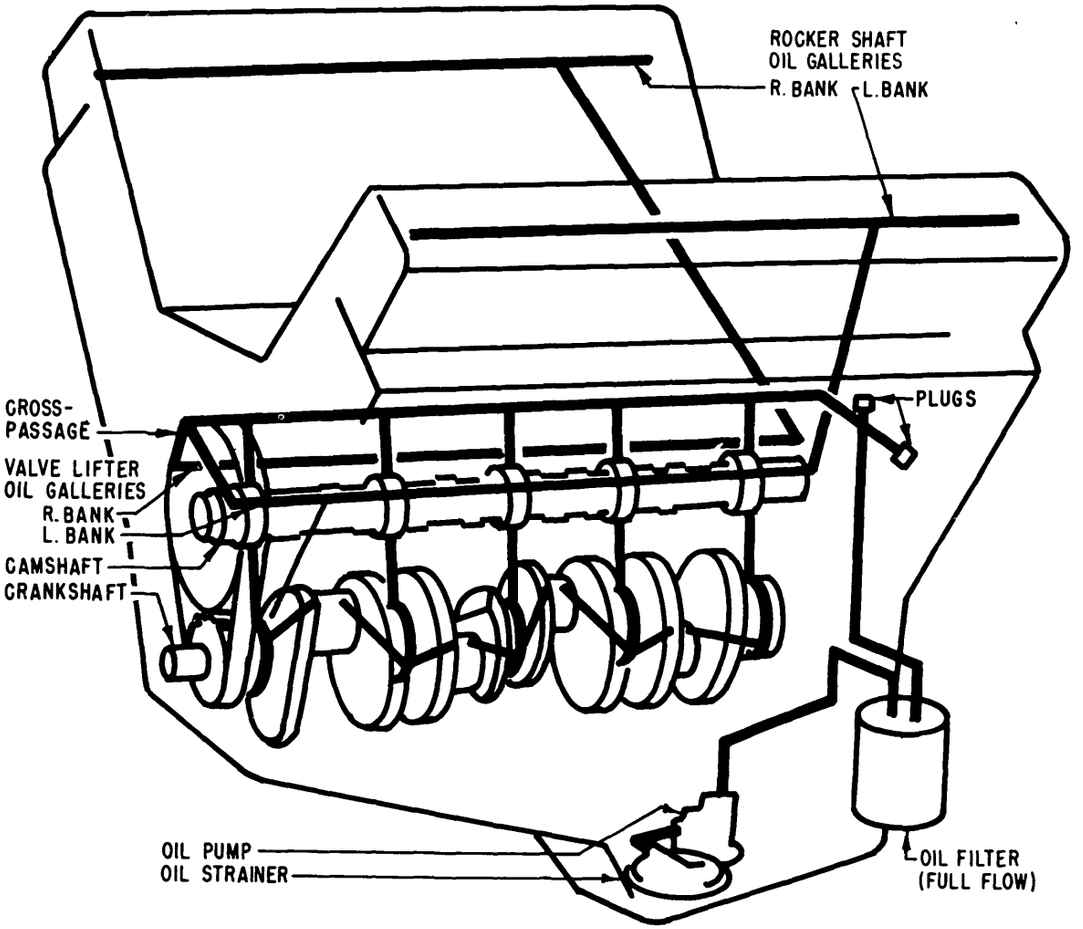
OIL FILTER: Partial flow type mounted on bracket on engine. Intake pipe is connected to main oil gallery and return pipe is connected to fitting on crankcase.

V8 ENGINES

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arm and valve mechanism on cylinder head. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed strainer and intake pipe assembly mounted on pump cover. Oil pressure regulator is located in pump body with oil pipe through which oil is bypassed back into oil pan. Pump delivers oil through passage in bearing cap and block to full flow type oil filter mounted externally on left side of engine block. From the filter, oil flows through transverse and vertical passages in block to main oil gallery extending full length of block directly above camshaft. Main gallery feeds two lifter

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RAMBLER V8 ENGINE OILING SYSTEM

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galleries (on either side of main gallery and extending full length of block) through grooved channel in rear face of camshaft thrust plate which serves as a cover for the galleries on front face of engine block. Oil is distributed through these galleries as follows:

Crankshaft & Camshaft Bearings - Oil passage in each crankcase web connects main oil gallery with camshaft bearing and corresponding main bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from grooved passage in bearing cap of rod for opposite bank of cylinders (groove in rod must be upward or toward center of engine for this cross-lubrication).

Timing Chain & Sprockets - Lubricated through drilled passage in camshaft front bearing journal. This oil is metered by camshaft bearing.

Valve Lifters - Lifter oil galleries intersect lifter bores for direct oil supply to the hydraulic lifters.

Rocker Arms, Pushrods & Valve Stems - Oil passage in block at rear end of each lifter oil gallery connects with rear cylinder head and rocker shaft bracket bolt hole in block. Special drilled bolts used in these holes which permit oil to flow upward, through and around undercut bolt stem, and through bracket to hollow rocker arm shaft. Shaft is drilled at each rocker arm. Rocker arms have drilled oil hole on upper side which permits oil to flow over top of arm for pushrod and valve stem lubrication. Drain holes in lower corners of cylinder head provide a return passage to oil pan.

OIL FILTER: Full flow type mounted on pad on left side of engine block. Two types of bypass relief valves have been used as follows:

Early Engines - Bypass valve incorporated in filter. This type filter mounted directly on filter pad.

Later Engines - Bypass valve located in filter adapter mounted on filter pad (bypass valve allows oil to flow directly to outlet passage).

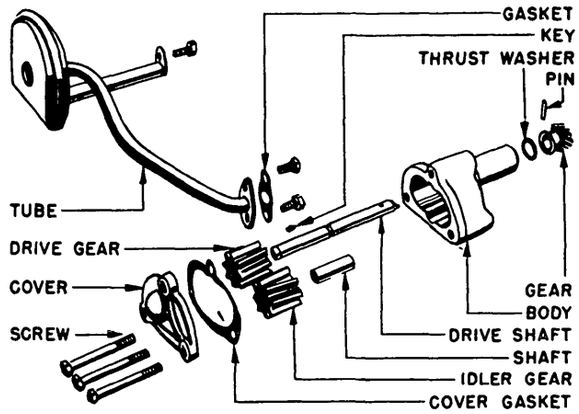
►*OPTIONAL FILTER NOTE:* On engines where filter was optional equipment, a cover with a grooved channel connecting the inlet and outlet ports on the filter pad was installed on engine block when a filter was not used.

OIL PUMP

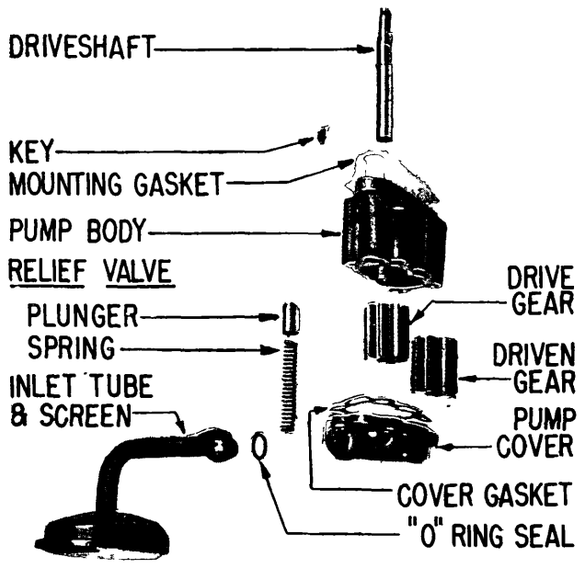
ALL 6 CYL. ENGINES

OIL PUMP: Pump mounted externally on right side of engine. Remove pump by taking out three cap screws in pump cover.

Overhaul: Remove pump cover and gasket. Lift out pump drive gear, idler gear, and idler gear shaft. Remove key from keyway in shaft. Remove shaft and driving gear assembly through upper end of pump body (*NOTE* - Driving gear is held on shaft by a pin). Remove thrustwasher from shaft. Reassemble pump by reversing this disassembly procedure.



6 CYL. ENGINE OIL PUMP



V8 ENGINE OIL PUMP

Installation: Note position of pump drive gear keyway before removing oil pump and install in same position to retain distributor timing. Engine is properly timed when No. 1 cylinder is at TDC in firing position and the oil pump drive gear keyway is approximately at three-thirty o'clock position when viewed from lower section of pump body.

1957-60 V8 ENGINES

OIL PUMP: R m val - Remove oil pan and screws retaining oil pump to rear main bearing cap, remove oil pump. *NOTE* - Oil pump is driven by distributor drive shaft so removal of oil pump does not affect ignition timing.

Disass mbly - Remove inlet tube and screen assembly from pump cover. Remove cover retaining screws, cover, pump gears, relief valve spring and plunger.

Inspection - Check gear to cover clearance by placing straight edge across pump body with gears in operational cavity. Clearance should not exceed .004". A clearance of .008" maximum should exist between gears and walls of gear cavity opposite point of gear mesh.

Reassembly & Installation - Reverse disassembly procedure. Before installing pump on engine, check for free operation.

COOLING SYSTEM
WATER PUMP

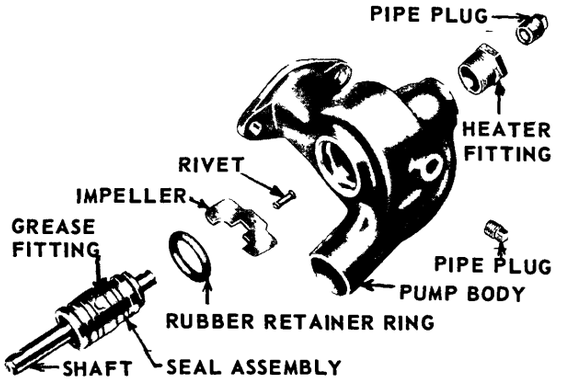
1954-56 6 CYL. ENGINES

DESCRIPTION: Centrifugal blade type, with a sealed-in shaft sealing assembly (cartridge type, factory sealed and lubricated. Cannot be dismantled). Held in pump body by flexible rubber ring.

OVERHAUL: Disassembly - Remove plug from pump body and drill or drive out rivet holding impeller to shaft. Support shaft through water outlet hole during this operation. Seal and shaft assembly can then be removed from pump body.

Assembly - Insert new rubber retainer in pump body, then apply a small amount of soapy water to the inner part of the rubber ring. Install new shaft and seal assembly. Install impeller using new rivet to fasten impeller to shaft. Lubricate with chassis lubricant.

►*1957-60 6 CYL. & V8 NOTE:* Water pump serviced by replacement. No parts furnished.



6 CYL. ENGINE WATER PUMP

►*AIR CONDITIONING CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

Model	Model Designation
1954	5410
1955	5510

SERIAL NUMBER: Stamped on plate located on right side of cowl under hood

Model	Starting Serial Numbers Kenosha	El Segundo
1954	D-171501	DC-12301
1955	D-205001	DC-15001

ENGINE NUMBER: Stamped on machined surface on right side of cylinder block above exhaust pipe Starting numbers as follows:
1954 (4" Stroke Engine)—F-17001
1955 (4½" Stroke Engine)—H-12001
1955-H-45001

►*ENGINE NUMBER NOTE:* Three code letters adjacent to engine number indicates special bore or bearing sizes. *See "ORIGINAL BORE & PISTONS AND ORIGINAL BEARING SIZES" in Rambler Special Data.*

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. at cranking speed. Variation limit 10 lbs

VACUUM READING: Steady 18-21" at idling speed

VALVE TAPPET CLEARANCE: .015" Hot, All Valves

►*VALVE SEQUENCE (For Tappet Clearance Adjustment): See "Valve System" in Rambler Special Data*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030".

Spark Plug—Auto-Lite A7 Tighten to 30 ft lbs

COIL: Delco-Remy 1115380.
Ignition Current—2 3 amps idling, 5 amps stopped

DISTRIBUTOR: Delco-Remy 1112382.
Condenser—Delco-Remy 1869704 **Capacity.** 18- 23 mfd
Contact Point Set—Delco-Remy 1855720
Breaker Gap— 018-.024".
Cam Angle—31-37°
Breaker Arm Spring Tension—17-21 ozs.
Rotation—Counter-clockwise viewed from above.

►*DISTRIBUTOR REMOVAL CAUTION Align timing mark on crankshaft vibration damper with indicator on timing chain cover before removing distributor. Damage to No. 3 & 4 pistons may result if this is not done.*

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	325	0-4	650
3.5-5.5	400	7-11	800
7-9	950	14-18	1900
10-12	1400	20-24	2800

Vacuum Spark Control: Delco-Remy 1116072
Plunger Travel—13/64-¼".

Vacuum Advance

Distr. Degrees	Engine Degrees	Vacuum (" of Hg)
Start -	0	4-6
5.5	11	11

IGNITION TIMING

Setting—TDC (4" Stroke Engine) **4° ATDC** (4½" Stroke Engine)

Timing Mark—Groove on damper aligned with pointer on chain cover

CARBURETOR

Carter YF 2014S—Single barrel downdraft with automatic choke

Idle Setting—½-1½ turns open Turn screw out for richer mixture

Idle Speed (1954 Without Air Conditioning)—550 RPM (Synchro-mesh & O D) 475 RPM (Hydra-Matic in "N")

Idle Speed (1955 Without Air Conditioning)—500-550 RPM (Synchro-mesh & O D) 450 RPM (Hydra-Matic, in "N")

Idle Speed (With Air Conditioning)—500 RPM with compressor operating (All transmissions, Hydra-Matic in neutral).

Float Level—½". Measure from under side of bowl cover to top of float with bowl inverted and weight of float on needle valve.

Accelerating Pump—No seasonal adjustment,

Fast Idle: .054" between throttle valve and bore of carburetor (side opposite port). Remove thermostatic coil housing and baffle plate. Adjust by bending connector link at lower end.

Automatic Choke Setting: One point lean

Throttle Linkage Adjustment (Hydra-Matic): Adjust engine idle speed at 450 RPM (with air conditioning, 500 RPM compressor running) with engine temperature at 150-160°F , transmission warm and selector lever in neutral Disconnect throttle rod, at throttle lever at side of transmission Clean machined surface at back of transmission case and place throttle lever checking gauge J-2545-C flush against surface with edge of gauge against transmission side cover The throttle lever stud should fit freely in notch of gauge If gauge does not pass over throttle lever stud freely, use bending tool J-3310 and bend to proper location Gauge notch must slide freely on stud pin Adjust transmission throttle rod (which is threaded into upper throttle rod yoke) to fit freely on throttle lever stud, then shorten rod approximately two turns Install rod on stud and replace wave washer, flat washer and cotterkey

►*OTHER DATA: See "Carter YF Carburetor" in Carburetor Section.*

Fuel Pump Pressure: 3½-5¼ lbs. at 500 RPM

CARB. EQUIPMENT

Fuel Pump: Carter M-774S (Fuel only), M-797SA (Fuel & Vacuum)

Fuel Pump Pressure—3½-5¼ lbs. at 500 RPM
See "Fuel Pumps" in Carburetion Equipment Section.

Gas Line Gauge: King-Seeley Electric (Not "CV").
Dash Unit—King-Seeley 46321.
Tank Unit—King-Seeley 42760
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Auto-Lite 1M-100. 6 volt 15 plate, 100 Ampere hour capacity (20 hr. rate).
Battery Ground—Positive. Battery to cylinder head.
Engine Ground—Flywheel housing to frame cross-member, right side

►*ENGINE GROUND NOTE (1954 Convertible)* Engine ground is from timing chain cover to front engine support bolt

STARTER

Delco-Remy Numbers	Starter	Armature
Std. Trans. (LHD)	1107119	1923018
Std Trans (RHD)	1107120	1923018
Hydra-Matic Trans.	1107136	1925939

Drive—Delco-Remy Automatic Drive or Bendix "Folo-thru" type

Synchro-mesh & OD Cars—Delco-Remy 1923008 or Bendix A3283
Hydra-Matic Cars—Delco-Remy 1923043 or Bendix A3338

Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—24-28 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	.5.65	70
11 0 ft. lbs.	Lock	3.25 .	550

Starting Switch: Two types used as follows:
Synchro-mesh & Overdrive Cars—Delco-Remy 1996478. Mounted on toeboard, actuated by fully depressing clutch pedal

Hydra-Matic Cars—Rambler No. 3137192 Magnetic Switch mounted on left fender apron, actuated by Delco-Remy Control Switch 1996077 mounted on steering column and operated by lifting Hydra-Matic Selector lever in "N" position
Control Switch Adjustment—*See "Hydra-Matic Drive Linkage Adjustment" in Transmission Section.*

GENERATOR

Delco-Remy Numbers	Generator	Armature
1954-55 (Std)	1100021	1925960
1954-55 (Air Cond)①	1102777	1921981
1955 (Air Cond)②	1102815	1921981

①—Used before 1955 Serial No H-56919
②—Used after 1955 Serial No H-56919

Performance Data—Cold

Generator No	Amperes ①	Volts	RPM
1100021	35	8 0	2650
1102777	45	8 0	2450
1102815	45	8 0	2450

①—Maximum output controlled by regulator
Brush Spring Tension—28 ozs
Field Current—1 85-2 03 amps (1100021), 1 87-2 0 amps (1102777 & 1102815) All at 6 0 volts

Rotation—Counter-clockwise at commutator end
Belt Adjustment: ½" deflection in belt midway between fan and generator pulleys with an application of 25 lbs pressure.

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REGULATOR

Delco-Remy 1118841 (Gen 1100021), **1118828**(Gen 1102777 & 1102815)

►*REGULATOR NOTE. Checking procedure is different than for previous models. See "Delco-Remy 1118825 Series Regulators" in Electrical Equipment Section. All Specifications are "Normal" Settings.*

Cutout Relay

Cuts In–6 4 volts (Hot).
Contact Gap–.020"
Air Gap– 020" (With contacts just closed)

Voltage Regulator

Setting–7.3 volts (Hot)
Air Gap–.075" with armature pressed down to point where contacts just touching
Checking & Adjusting–See *Electrical Equip. Section*

Current Regulator

Setting–34-39 amps (1118841), 42-47 amps (1118828)

Air Gap–.075" with armature pressed down to point where contacts just touching
Checking & Adjusting–See *Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps· Sealed Beam. *See Electrical Equip. Section.*
Directional Signals: *See Electrical Equip. Section.*
Lighting Switch Removal: Disconnect instrument switch panel from dash panel. With switch in full "ON" position insert stiff wire in hole on side of switch to release switch shaft and knob Remove (French) nut
Stop Light Switch: Located at tee fitting in front brake line
FUSES· Located as follows:
Main Lights–30 Ampere at light switch
Stop & Directional–30 Ampere on left front wheelhouse panel
Overdrive–30 Ampere on Overdrive relay
Radio–10 Ampere, lower left hand corner of radio chassis
HORNS: Jubilee. Rambler No. (Left side) 3117124, (Right side) 3117125
Horn Relay–Rambler No. 3113989

ENGINE

►*AIR CONDITIONING CAR SERVICE CAUTION. Before disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section*

►*1954 ENGINE OIL CLEARANCE PRODUCTION CHANGE: Crankpin journal diameter increased 0005" beginning with Engine No H-20966 (Synchro-mesh), H-20995 (Hydra-Matic)*

►*1954 ENGINE PRODUCTION CHANGE: 4" Stroke Engin us d on early cars with Synchro-mesh or Ov r-drive Transmission 4½" Strok Engin us d on all oth r mod ls*

ENGINE SPECIFICATIONS: 6 Cyl "L" head Two engines as follows:

Engine	Bore	Stroke	Displacement
"F" ①	3 1/8"	4"	184 0 cu ins
"H" ②	3 1/8"	4½"	195 6 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
"F" ①	7 25-1	. 23 44	85 at 3800 RPM
"H" ②	7 32-1	23 44	90 at 3800 RPM

①–4" Stroke Engine "F" Engine Number Prefix
②–4½" Stroke Engine "H" Engine Number Prefix.

Compression & Vacuum Reading–See *TUNE-UP.*
ENGINE REMOVAL: *See "Engine" in Rambler Special Data*

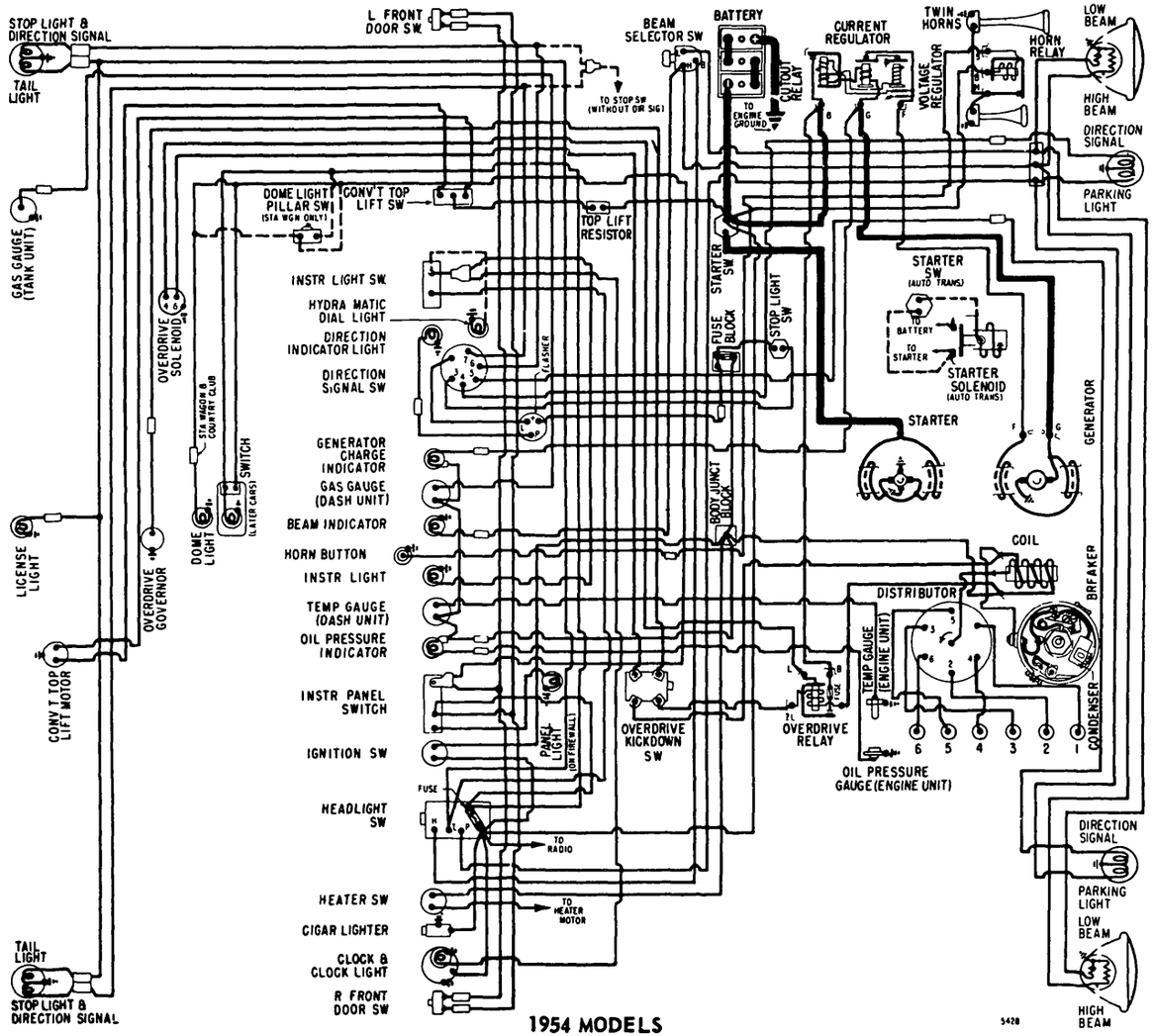
OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan
TIGHTENING TORQUES: *See "Tightening Sp cifications" in Rambler Special Data*
CYLINDER HEAD & MANIFOLD: *S "Cylinder H ad & Manifold" in Rambler Special Data.*

PISTONS

Cam ground, aluminum alloy, tin-plated with steel strut and solid skirt

►*CYLINDER BORE OVERSIZE CAUTION: Cod lett r adjacent to engine nymb r indicat s cylinder bores .010' oversize. See "Original Bor & Pistons" in Rambler Special Data.*

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1954 MODELS

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Weight–13.59 ozs.
Rem val–Pistons & rods removed from above

Fitting N w Pistons: Piston to bore clearance .0006"-.0012". Piston properly fitted should support its own weight with piston and bore dry.

Replacem nt Pistons: Standard, .002", .005", .010" .020", .030" and .040" oversize.

Installing Pistons: Install piston with notch on top perimeter toward front of engine.

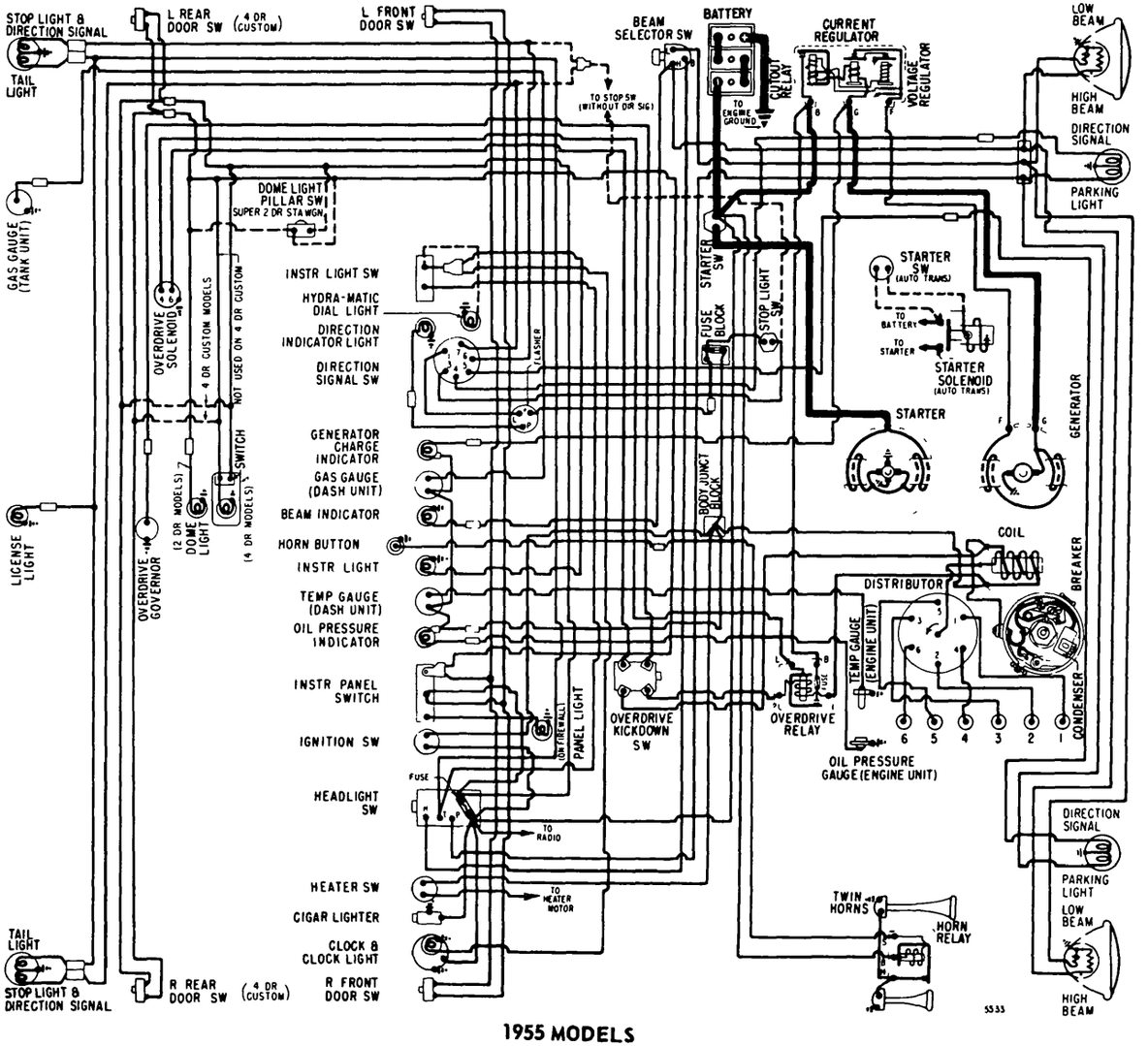
PISTON PINS

Locked in connecting rod by means of locking bolt.
Diameter– .8598-.8595". Length 2.755".
Clearance in Piston–.0002" maximum. Thumb push fit at 70°F.
Replacement Pins: Std., .001", .003" Oversize.
NOTE–Fitted pins furnished with pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1&2)	.0930-.0935"	.010-.020"	.002-.004"
Oil (#3)	.1545-.1550"	.010-.020"	.002-.004"
Oil (#4 U-flex)	1545-.1550"		.002-.004"

Replacement Rings: Sets of Std. & .020" oversize.
Installing Rings: Stepped inner edges of both compression rings must be up.



1955 MODELS

CONNECTING RODS

►*1954 OIL CLEARANCE PRODUCTION CHANGE: Crankpin diameter increased .0005" on later engines to reduce oil clearance. See Journal Diameters below.*

►*CONNECTING ROD JOURNAL UNDERSIZE CAUTION: Code letter adjacent to engine number indicates journals are undersize. See "Original Bearing Sizes" in Rambler Special Data.*

Length–6.625" center-to-center. **Weight**–25 ozs.
Crankpin Journal Diameter–**2.0943-2.095"** (Before 1954 Eng. No. H-20966, Synchro-mesh, and H-20995, Hydra-Matic). **2.0948-2.0955"** (After above Eng. Nos.).

Original Bearing Sizes–*See "Original Bearing Sizes" in Rambler Special Data.*
Bearings–Steel-backed babbitt. No shims.
Clearance–.001"-.0015". **Side Play**–.005"-.015".
Replacement Bearings: Std., .001", .002", .010", .012" Undersize.
Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

►*CRANKSHAFT JOURNAL DIAMETER CAUTION: Code letter adjacent to engine number indicates main & connecting rod journals undersize. See "Original Bearing Sizes" in Rambler Special Data.*

Journal Diameter–2.4791"-2.4798". Four Bearing.
Original Bearing Sizes–*See "Original Bearing Sizes" in Rambler Special Data.*
Bearings–Steel backed babbitt. No shims.
Clearance–.001"-.0015".
Replacement Bearings: Std., .002", .010", .012" Undersize.
End Thrust: Taken by flanged front main bearing.
End Play–.003"-.008".
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*
FLYWHEEL REPLACEMENT: *See "Flywheel" in Rambler Special Data.*
VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Rambler Special Data.*

CAMSHAFT

Bearings–Steel-backed babbitt bushings.
Clearance–.002".
Camshaft Removal–*See "Camshaft & Bearings" in Rambler Special Data.*
End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket. Endplay controlled by sprocket on shaft. (Press fit on shaft). **Endplay** .004-.006".
Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.
Camshaft S tting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

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Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: Hot .015', Intake and Exhaust. Cold .016" Intake, .018" Exhaust

Valve	Head Diameter	Stem Diameter	Length
Intake	1.594"	.3407-.3412"	4 25/32"
Exhaust	1.343"	.3407-.3412"	4 25/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° ①	340"	0018- 0033"
Exhaust	45° ①	340"	0018- 0033'

①—Valve face angle 44° (Intake & Exhaust)

►*VALVE GRINDING CAUTION:* Replace valve when refacing reduces distance from top of valve face to top of valve to 1/32"

Valve Springs: Install springs with closed coil end up against cylinder block and seated in counterbore in block.

Valve Spring Specifications

Valve	Lbs. Press.	Length
Closed	37-41	1 3/4"
Open	75-82	1 7/16"

Valve Guides: Use Tool J-2814 to remove guides, Tool J-1429-A to install guides. Drive guides flush with opening of guide bore in block

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 10° BTDC, close 58° ALDC.

Exhaust Valves—Open 49° BLDC, close 19° ATDC

NOTE—Above readings with .019" valve lash

Valve Timing Check—Set valves on No. 1 cylinder at .003" lash With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC mark.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. (refill).

Normal Oil Pressure: 30 lbs. at 20 MPH, 12 lbs. minimum at 600 RPM.

Pressure Regulator Valve—Non-adjustable spring loaded release valve located under plug near oil pump. Opens at 50-58 P.S.I.

Oil Pressure Indicator—Light goes on when Ignition switch is turned "ON". Goes out as oil pressure reaches 5-8 lbs. Electric Switch Rambler No. 3142826 is located on right side of crankcase

Oil Pump: Gear type mounted on right side of engine driven by inclined shaft.

Oil Pump Installation—*See "Oil Pump" in Rambler Special Data*

Oil Filter: Partial flow type. Replace element every 5000 miles or less as needed

Replacement Filter Element—Rambler No. 3113312

Crankcase Ventilation: Breather pipe in Valve Cover and filter in crankcase filler cap

COOLING

Water Capacity: 11 qts (1954), 12 qts (1955) Add 1 qt for heater

Pressure Valve: 7 lb radiator filler cap (std.) Rambler No. 3142965 14 lb. cap Rambler No. 3141371, used on cars equipped with Air Conditioning

Thermostat: Choke type Rambler No 3131817 (167-173°F), No. 3132708 (150°F), 3131985 (177-182°F) for use with Permanent Type Anti-freeze only

Water Pump: Sealed packing and bushing type

►*WATER PUMP LUBRICATION CHANGE:* Starting engine number H-57911 water pump lubrication fitting was eliminated and prelubricated water pump seal cartridge was used

See "Water Pump" in Rambler Special Data

Pump Removal—Drain cooling system, remove distributor, disconnect pump drive coupling (take out rear bolt), disconnect inlet hose, remove pump mounting screws

Temperature Gauge: King-Seeley Electric (not "CV")

Dash Unit—King-Seeley 46325

Engine Unit—King-Seeley 45780

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8A7. Assembly No. 987. Single plate

See "Borg & Beck" in Clutch Section

Clutch Disc Nos.	Borg & Beck No.	Nash No.
1954 (Std Trans.)	381770	3133046
1954 (Overdrive Trans.)	381926	3133048
1955 (Std & O D)	382347	3142241

Pedal Adjustment: Pedal free travel ½-¾". Adjust by loosening locknut and turning adjusting nut on connector link **at clutch fork.**

►*CAUTION: The pedal to beam rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project ½" from beam toward the rear to provide proper leverage

Removal: Remove transmission (see below), disconnect clutch pedal linkage, remove clutch housing and pan, punch mark flywheel, clutch cover and pressure plate (Reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner AS35-T96. 3 speed, helical gear type

See "Warner Transmissions" in Transmission Section

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: (100" wheelbase cars and 108" wheelbase cars with Hydra-Matic Drive)—Move rear axle back, see "Removal" under REAR AXLE below, sliding propellor shaft universal joint from transmission. (108" wheelbase cars with Std. & Overdrive transmissions)—Disconnect center bearing crossmember from side rails, lower propeller shaft sufficiently to separate front section from transmission main shaft. Disconnect shift levers and speedometer cable, remove two upper transmission to bell housing bolts and install guide bolts in their place. Remove lower bolts and slide transmission out.

OVERDRIVE

Warner R10—*See "Warner R10" in Transmission Section.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

HYDRA-MATIC DRIVE

Dual Range four speed automatic transmission with fluid coupling.

See "Hydra-Matic Drive" in Transmission Section.

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid every 1000 miles, drain and refill at 25,000 mile intervals

Capacity—8½ qts (9½ qts after overhaul)

Checking Fluid Level—Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located under right front floor plate). Add fluid to bring level to "F" mark.

►*CAUTION:* Do not check oil level when transmission is excessively hot and do not fill above "F" mark on dipstick.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section*

UNIVERSALS

Spicer, Mechanics, or Detroit—Two used on 100" wheelbase and 108" with Hydra-Matic transmission. Three used with 108" wheelbase with Synchro-mesh and Overdrive. (Two propeller shafts).

REAR AXLE

Own. Semi-floating, hypoid type with Hotchkiss drive.

See "Rambler Rear Axles" in Rear Axle Section.

Axle Ratio—Std. 3.8-1 (9-34), Overdrive 4.4-1 (8-35) Hydra-Matic 3.3-1 (13-43).

Backlash— 002-.006". Shim adjustment.

Axle Shaft Removal: Remove wheel, pull drum (use hub puller J-1644) Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims. Withdraw axle using puller J-2498. Do not drag shaft on inner oil seal.

Rear Axle Assembly Removal: Raise and support rear end of body. Remove rear wheels, axle shaft nut and rear hub and drum. Disconnect parking brake cables at rear wheels, brake hose and shock absorbers Remove rear spring clips and rear spring front eye brackets. Move axle to rear which will pull the front

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universal off the transmission mainshaft spline. *NOTE*–On 108" wheelbase cars with two propeller shafts, remove the rear propeller shaft coupling nut from the coupling and tap the coupling off the splines of the pinion shaft with a soft hammer. The rear axle assembly in both cases may now be removed.

Wheel Bearing Adjustment: Shims behind brake backing plate.

SHOCK ABSORBERS

Delco. Direct acting type. Serviced by replacement. **Front**–Rambler No. 3117361. **Rear**–3117362.

FRONT SUSPENSION

►*FRONT SUSPENSION NOTE:* Heavier spring for air conditioned cars. See "Rambler" in Front Suspension.

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheel house panel.
See "Rambler" in Front Suspension.

King Pin Inclination–8½°.
Caster–Pos. 1° desired (limits Pos. ¾° to Pos. 1¼°).
Camber–Pos. ½° desired (limits Pos. ¼° to Pos. ¾°).
Toe-in–¼" (1/8" to 1/4").
Toe-in Adjustment Nut–Turn adjusting tubes in opposite directions to change toe-in. Turn adjusting tubes in same direction to align steering wheel when toe-in is correct. In either case turn adjusting tubes equally.
Toe-out on Turns–Outer wheel 20°, Inner wheel 22½° +½° or -0°.

STEERING

►*INTERMITTANT HORN OPERATION NOTE:* Horn button retainer plate ground wire can be installed between steering wheel nut and lower spring retainer attaching screw. Use a piece of No. 14 wire, with the insulation removed.

Gemmer. Worm & Roller with push-pull adjustments. *See "Gemmer Worm & Roller" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*
Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix (Lockheed) Hydraulic. Self centering (floating shoe) type. Hand lever applies rear wheel service brakes.
See "Bendix (Lockheed) Self-centering" in Brake Section.

►*1955 BRAKE SQUEAK CORRECTION: See "Bendix (Lockheed) Self-Centering" in Brake Section.*

►*1954 BRAKE PRODUCTION CHANGE (100" Wheelbase Synchro-mesh & Overdrive Trans. Cars):* Front wheel brake drums increased from 8" to 9" in diameter, beginning with Serial No. D-185770.
Drum Diameter–(Front Wheels) 9" (8" diameter on some early cars. See Production Change above).
Rear Wheels–8" (All Cars).
Wheel Cylinder Diameter–1" (front); 13/16" (rear).

	Lining Width x Length	
Primary Shoes	**Front Wheels**	**Rear Wheels**
Early 100" WB. ①	1¾" x 8 27/64"	1¼" x 8 27/64"
Other Cars ②	2" x 9 7/8"	1¼" x 8 27/64"
Secondary Shoes	**Front Wheels**	**Rear Wheels**
Early 100" WB. ①	1½" x 8 27/64"	1" x 8 27/64"
Other Cars ②	1¾" x 7 11/16"	1" x 8 27/64"

①–Synchro-mesh & Overdrive Cars only (see Production Change above).
②–Includes Early Hydra-Matic Drive & 108" WB. Cars, and all later cars.
Lining Thickness–.214" (All Cars).
Braking Power–(Early 100" WB. with 8" Front Drums) 60.2% Front, 39.8% Rear. (All Cars with 9" Front Drums) 63.7% Front, 36.3% Rear.
Clearance–All shoes just free of drag with brakes centralized (by hard application and releasing pedal). Eccentric adjustment for each shoe.

Standard Master Cylinder: In engine compartment under steering column.
Checking Fluid–Raise hood and fill from engine compartment. Check at 1000 mile intervals.
Removal–Remove from beneath car. Not necessary to disturb other parts.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*
Air Conditioning: Nash-Hudson Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. Switch has two positions "LOW" and "HIGH".
See "Nash-Hudson Air Conditioning" in Miscellaneous Section.

Power Operated Top (Convertible Models): Electric type with reversible motor.
See "Power Operated Tops" in Miscellaneous Section.

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment. Equipment for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to center of cowl panel under hood.

Starting Serial No.—D-276101 (Domestic), DKD-5601 (Unassembled Export), DT-5401 (Canada).

ENGINE NUMBER: Stamped on machined surface at upper left front corner of cylinder block.

Starting Engine No.—B-1001.

TUNE-UP

►*BURNED BREAKER POINTS OR HIGH SPEED MISS CORRECTION:* **May be caused by incorrect ignition primary resistor. Use only resistor with Delco-Remy trademark.** *See Resistor data below.*

COMPRESSION PRESSURE: 120 lbs. at cranking speed.

VACUUM READING: 18-21" at idling speed

VALVE TAPPET CLEARANCE: .012" Int., .016" Exh. hot & running.

►*VALVE SEQUENCE (For Tappet Clearance Adjustment): See "Valve System" in Rambler Special Data.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030".

Spark Plug—Auto-Lite AL-7. Torque to 30 ft. lbs.

COIL: Delco-Remy 1115393. *12 Volt*

Resistor—Delco-Remy No. 1927809. 1 40-1 62 ohm.

►*COIL RESISTOR NOTE:* Connected in series between battery and coil. Resistor is by-passed during cranking by solenoid or magnetic starter switch, making direct lead from battery to coil.

DISTRIBUTOR: Delco-Remy No. 1110242. *12 Volt*

Condenser—Delco-Remy 1869704 **Capacity** .18- 23 mfd.

Contact Point Set — Delco-Remy No. 1918148.

Breaker Gap—.016".

Cam Angle—28°-35°.

Breaker Arm Spring Tension—19-23 ozs

Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start .	350	0-4	700
6.5-8.5	550	13-17	1100
11-13	1100	22-26	2200
15-17	1600	30-34	3200

Vacuum Spark Control: Delco-Remy No. 1116099.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg)
Start	0	6-8
5	10	11-12

IGNITION TIMING

Setting—TDC. (Supersedes original specification of 4° ATDC).

►*IGNITION TIMING CHANGE:* Starting with engine number B-2461, ignition timing was changed from 4° ATDC to TDC. On engines prior to above number, paint mark vibration dampers and set ignition to new specification "TDC".

Timing Mark—Vibration Damper.

CARBURETOR

Carter AS No. 2349S. Single barrel downdraft.

►*CARBURETOR FLOAT PRODUCTION CHANGE: Carburetors with Brass Tag date B-6 or higher have split floats. See "Float Level" for adjustment of split type float carburetors.*

►*ROUGH ENGINE CORRECTION (Exhaust gas leakage into Intake Manifold):* May be caused by corrosion of of intake manifold cover. *For corrective procedure, see "Cylinder Head & Manifold" in Rambler Special Data.*

►*ROUGH ENGINE IDLE (Windshield Wipers Operating) CORRECTION:* For relocation of vacuum booster pump outlet connection, *See "Cylinder Head & Manifold" in Rambler Special Data.*

►*CARBURETOR FLOODING (Date Prior to B-6) CORRECTION:* If flooding is eliminated by loosening the needle seat, (gas line to carburetor fitting), it indicates a bind or interference between the float hinge and inner end of float needle seat. To correct, install needle and seat assembly Carter No. 25-313S, included in Repair Kit 1916A.

Idle Setting—¼-1½ turns open. Turn screw out for richer mixture.

Idle Speed—550 RPM (Std. & O.D. Trans.), 475 RPM (Hydra-Matic in Neutral), 500 RPM (Hydra-Matic in Neutral with Air Conditioning turned on)

Float Level — With cover gasket and float pin retainer removed, hold lip of float arm against seated needle with float pin at bottom of guide slots. Distance from top of casting to top of float should be ¼" (Gauge T-109-282). Adjust by bending lip on float arm. After adjusting floats, check clearance between overlapping tangs of float levers as follows: Replace pin retainer, invert carburetor to seat intake needle, check tang clearance with feeler gauge. Clearance should be .010-.015". Adjust by bending long tang of left hand float.

Fast Idle: .043" (T109-158) between throttle valve and bore of carburetor (side opposite idle port) with choke fully closed and fast idle cam in fast idle position.

Automatic Choke: 1 point lean.

Throttle Linkage Adjustment (Hydra-Matic Cars): Adjust engine idle speed to 450 RPM (with air conditioning 500 RPM, compressor running), with engine temper-150-160°F, transmission warm and selector lever in neutral. Disconnect throttle rod at throttle lever at side of transmission. Clean back of transmission case, place checking Gauge J-2545-D flush against machined surface with edge of gauge against transmission side cover. Throttle lever stud should fit freely in notch of gauge. Use bending Tool J-3310 to correct throttle lever position. Gauge notch must be in alignment with pin through hole in T.V. lever with lever held against its stop to the rear. When properly adjusted, connect throttle rod to T.V. lever. Remove upper end of throttle rod at bellcrank. Disconnect carburetor to bellcrank rod at carburetor throttle rod. Insert an aligning pin in holes of the bell crank and bracket. Adjust carburetor to bellcrank rod. Fasten rod in place with clip fasteners. Adjust T.V. rod at bellcrank to fit freely with the hole in lever. Then shorten T.V. rod thr full turns. Connect T.V. rod at bellcrank; remove aligning pin.

NOTE—Gauge 2545-C can be reworked by adding another notch behind original notch so that distance from center of notch to rear inside surface of gauge is 6½".

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

Fuel Pump Pressure: 3½ - 5¼ lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel and vacuum.

Replacement Pump — Carter No. M-797S (Fuel only), No. M-2379S (Fuel & Vacuum).

Pressure — 3½ -5¼ lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator, King-Seeley No. 46439.

Dash Unit — King-Seeley No. 49474.

Tank Unit — King-Seeley No. 44606.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Standard — Auto-Lite 11-HS-45. *12 Volt,* 11 plate, 45 ampere hour capacity (20 hr. rate).

Air Conditioned Cars — Auto-Lite 11-HS-60. *12 Volt,* 11 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground — Negative.

►*CAUTION:* This is reversed from previous models.

Engine Ground — Battery to engine with body ground from transmission to rear engine cross member.

STARTER

Delco-Remy No. 1107647. *12 V lt.* **Armatur** — 1926626.

Starter Switch: Delco-Remy No. 1119793 solenoid switch located on starter, actuated by combination ignition and starter switch (Std. and Overdrive cars), by Delco Remy No. 1996084 switch operated by raising shift lever upward (Hydra-Matic Drive).

Drive—Overrunning clutch (solenoid pinion shift).

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—35 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5 8	435

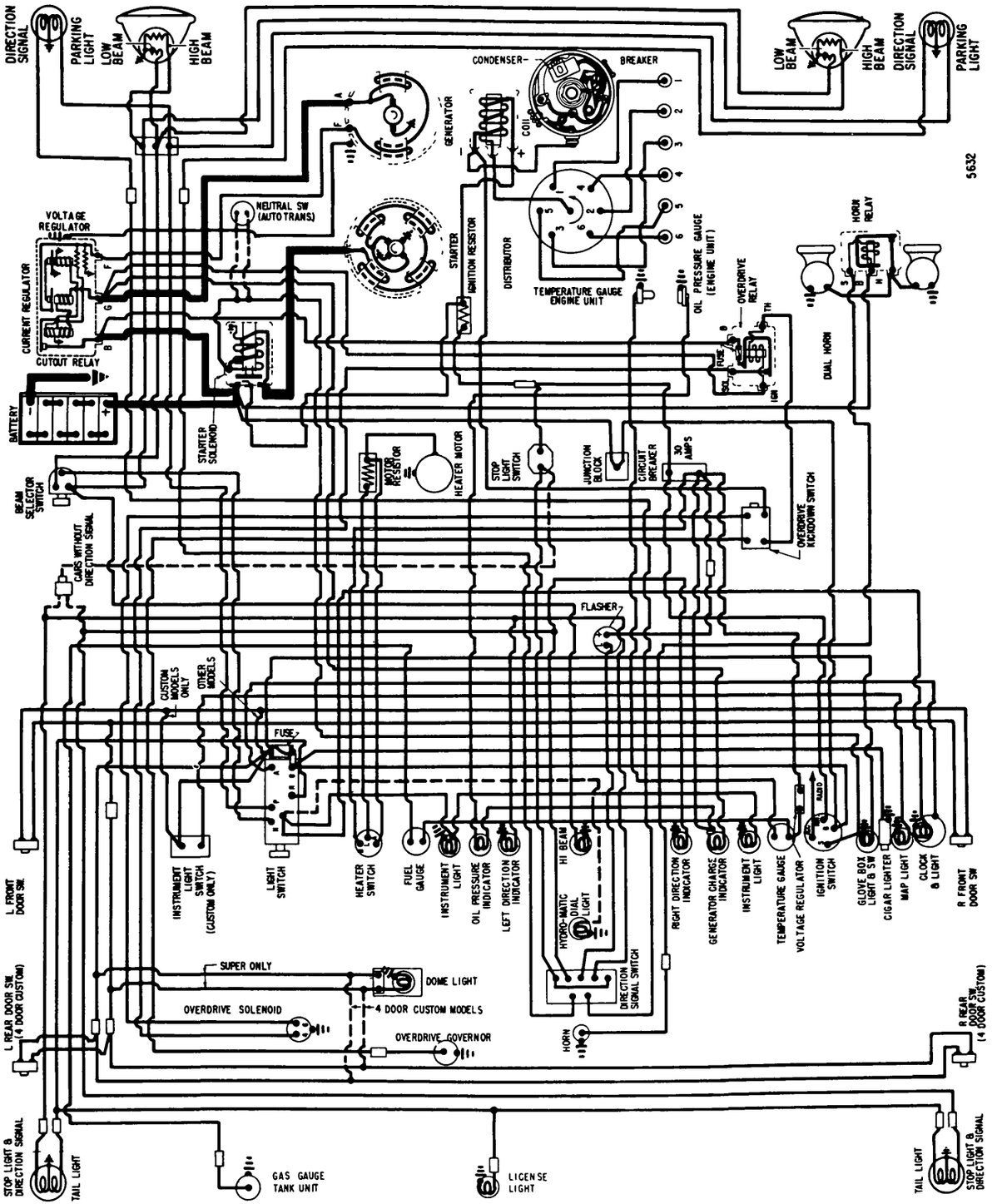
GENERATOR

Delco-Remy. *12 Volt.* **Used as follows:**

Application	Generator	Armature
Without Air Cond.	1100323	1933352
With Air Cond.	1102049	1934326

►*GENERATOR ARMATURE SHAFT PRODUCTION CHANGE:* Generators with tag code stamped 5K-20 or later have heavier brazing of water pump drive extension on armature shaft to prevent breaking. Brazing should withstand 25 ft. lb. torque applied to generator pulley (belt released) with pump shaft coupling held stationary.

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P rf rmanc Data

	Amperes	Volts	RPM
Standard	25	14.0	2780
Air Cond.	30	14.0	2150

Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—28 ozs.
Field Current—1.50-1.62 amperes (1100323), 1.48-1.62 amperes (1102049), 12 volts at 80°F.
Belt Adjustment: ½" deflection with 25 lbs. pressure applied midway between fan and generator pulleys.

REGULATOR

Delco-Remy No. 1119122 (1100323 Gen.), 1119003 (1102049 Gen.), 12 Volt. *NOTE – Specifications are "Normal" settings.*

Cut-Out Relay

Cuts-In—11.8-13.5 volts.
Contact Gap—.020".
Air Gap—.020" with contacts just closed.

Voltage Regulator

Setting—13.8-14.8 Volts (hot).
Air Gap—.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting—*See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

Current Regulator

Setting (1119122)—23-27 amperes (hot).
Setting (1119003)—27-33 amperes (hot).
Air Gap—.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting—*See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signals: *See Electrical Section.*
Light Switch Removal: Disconnect battery. With switch in "OFF" position, press button release on top of light switch assembly, and pull knob and shaft clear of switch. Remove slotted nut, pull switch to rear of instrument panel.
Stop Light Switch: Located at tee fitting in line to left front brake.

FUSES: 7.5 Ampere. On lighting switch for Courtesy and Glove Box Light.
15 Ampere. Located on overdrive relay.
5 Ampere. Located in Radio wire back of instrument panel.

CIRCUIT BREAKERS: Three used as follows:
12 Ampere. On light switch for Instrument, Tail and Dome Lights.

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12 Amper . On light switch for Head and Parking Lights.
30 Amper . For Stop Light, Instruments and Indicators, Heater and Directional Signals. Located back of Instrument panel.

HORNS: Auto-Lite No. HAD-4741. (Low Pitch), **HA.D-4742** (High Pitch).
Horn Relay – Nash No. 3145684.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*ENGINE NOISE (Similar to bearing noise) CORRECTION:* A noise usually diagnosed as a bearing noise may come from improperly assembled Vibration Damper. Reassemble Cushions, Disc and Rubber correctly on engines built prior to Engine No. B-3597.

►*WATER PUMP LUBRICATION CHANGE:* Lubrication fitting now included. Use hand pressure lubrication gun to lubricate at 5,000 mile intervals.

ENGINE SPECIFICATIONS: 6 Cyl. valve-in-head.

Bore	Stroke	Displacement
3 1/8"	4¼"	195.6 cu. ins.
Compr Ratio	**Rated HP**	**Developed HP**
7.47-1	23.44	120 at 4200 RPM

Compression & Vacuum Reading–*See TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Cam ground, aluminum alloy, tin-plated with steel strut and solid skirt.
Original Bore & Piston Sizes–*See "Original Bore & Pistons" in Rambler Special Data.*
Weight–13.59 ozs.
Removal–Pistons & rods removed from above.,

Fitting New Pistons: Piston to bore clearance .0006"-.0012". Piston properly fitted should support its own weight with piston and bore dry.

Replacement Pistons: Standard, .002", .005", .010" .020", .030" and .040" oversize.

Installing Pistons: Install piston with notch on top perimeter toward front of engine

PISTON PINS

Press fit in connecting rod. No locking device.
Diameter – .8597". **Length** – 2¾".
Clearance in Piston–.0002" maximum. Thumb push fit at 70°.
Pin Removal & Installation – *See "Piston Pins" in Rambler Special Data.*

Replacement Piston Pins: Standard & .003", .005" Oversize.
NOTE – Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1&2)	.0930-.0935"	.010-.020"	.002-.004"
Oil (#3)	.1545-.1550"	.010-.020"	.002-.004"
Oil (#4 U-flex)	.1545-.1550"		.002-.004"

Replacement Rings: Sets of Std. & .020" oversize.
Installing Rings: Stepped inner edges of both compression rings must be up.

CONNECTING RODS

Length–6.625" center-to-center. **Weight**–25 ozs.
Crankpin Journal Diameter–2.0948"-2.0955".
Original Bearing Sizes–*See "Original Bearing Sizes" in Rambler Special Data.*
Bearings–Steel-backed babbitt. No shims.
Clearance–.001"-.0015". **Side Play**–.005"-.015".
Replacement Bearings: Std., .001", .002", .010", .012" Undersize.
Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

Journal Diameter–2.4791"-2.4798". Four Bearing.
Original Bearing Sizes–*See "Original Bearing Sizes" in Rambler Special Data.*
Bearings–Steel backed babbitt. No shims.
Clearance–.001"-.0015".
Replacement Bearings: Std., .001", .002", .010", .012" Undersize.
End Thrust: Taken by flanged front main bearing.
End Play–.003"-.008".
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*
VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Rambler Special Data.*

CAMSHAFT

Bearings–Steel-backed babbitt bushings.
Clearance–.002".
End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.
Endplay–.004-.006".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.
Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: Intake .012", Exhaust .016" (Running Hot).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45° ①	.383"	.0015-.0035"
Exhaust	45° ①	.385"	.002-.004"

① Valve face angle 44°.

►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32".
Valve Seat Width – 5/64-3/32".
Valve Stem Oil Seal – Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Valve springs may be removed without removing cylinder head by maintaining 90 lb. air pressure in combustion chamber to hold valve against valve seat.
Free Length – 2 3/8".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	65-70	1.13/16"
Open	115-125	1 7/16"

Valve Guides: Use Tool J-1429-A to remove and replace guides. Guides should extend ¾" above cylinder head.
Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valve – Open 12°30' BTDC, Close 51°30'ALDC.
Exhaust Valve – Open 53°30' BLDC, Close 10°30'ATDC.
Valve Timing Check – Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*
Crankcase Capacity: 4 qts. refill.
Normal Oil Pressure: 30 lbs. at 20 MPH. 12 lbs. minimum at 600 RPM.
Pressure Regulator Valve – Non-adjustable spring loaded valve located in cylinder block where oil enters oil distribution channel.
Oil Pressure Indicator: Light goes on when Ignition switch is turned on, goes out as oil pressure reaches 6½ lbs. ± 1½ lbs. Sending unit Rambler No. 3142826 located on right rear side of engine block.
Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*
Oil Filter – **Partial Flow type. Replace element every 5000 miles or less as needed.**

Replacement Filter Unit – **Rambler No. 8990068.**
Crankcase Ventilation: Filter in crankcase filler cap, and vent in rocker arm cover.

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COOLING

Water Capacity: 11 quarts.

Pressure Valve: 7 lb. Radiator Filler Cap Rambler No. 3142965 (less Air Conditioning), 13 lb. No. 3141371 (with Air Conditioning).

Thermostat: Choke type. (Std.) 170° type Rambler No. 3131817, (Opti.) 180° type Rambler No. 3131985 for use with permanent anti-freeze.

Water Pump: Sealed packing and bushing type. *See "Water Pump" in Rambler Special Data.*

Pump Removal – Drain cooling system, disconnect coupling, hoses, and pump mounting screws.

Temperature Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge voltage regulator, King-Seeley No. 46439.

Dash Unit – King-Seeley 49476.

Engine Unit – King-Seeley 44200.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8.5A7. Assy. No. 1391. Single plate. *See "Borg & Beck" in Clutch Section.*

Clutch Disc No.	Borg & Beck	Nash No.
Standard	382394	3144937
Overdrive	382490	3147133

Pedal Adjustment: Free play should be ½"-¾". Adjust at connecting link between throwout lever and release idler shaft assembly. Lengthening link reduces free play.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan, punch mark flywheel, clutch cover and pressure plate, (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner. 3 speed, helical gear type. *See "Warner Transmissions" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect brake tube at bracket underside of body, torque tube at rear of transmission, hand brake cable at bell crank and brake cable housing at the rear brake cable bracket. Move rear axle to rear to remove universal joint from transmission shaft. Disconnect speedometer cable and shifter rods. On overdrive cars, disconnect wires at solenoid, governor and overdrive cable at lever. Use two guide pins in place of two upper capscrews to guide transmission back to clear pilot bearing and clutch disc.

OVERDRIVE

Warner R10–*See "Warner R10" in Transmission Section.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

HYDRA-MATIC DRIVE

Dual Range four speed automatic transmission with fluid coupling.

See "Hydra-Matic Drive" in Transmission Section.

►*HYDRA-MATIC REVERSE GEAR SLIP-OUT CORRECTION:* Caused by incorrect adjustment of back-up light switch or manual linkage, or need for increased detent plunger spring tension. *See "Dual-Range Hydra-Matic Drive" in Transmission Section.*

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication–Check fluid every 1000 miles, drain and refill at 25,000 mile intervals

Capacity–8½ qts. (9½ qts. after overhaul).

Checking Fluid Level–Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located at right side of engine). Add fluid to bring level to "F" mark.

►*CAUTION:* Do not check oil level when transmission is excessively hot and do not fill above "F" mark on dipstick.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer or Mechanics – One used at transmission end.

Torque Tube Bracket Adjustment–*See "Hudson & Nash Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid type with torque tube drive. *See "Hudson & Nash Hypoid" in Rear Axle Section.*

Axle Ratio – Std. 3.8-1 (9-34), Overdrive 4.4-1 (8-35), Hydra-Matic 3.3-1 (13-43). *NOTE* – 3.58-1 (12-43) used in Hydra-Matic Cars with Air Conditioning or Outside Wheel Carrier to Serial No. D-325171.

Backlash – .002 - .006". Shim Adjustment.

Axle Shaft Removal: Remove wheel, pull drum (use hub puller J-1644-B or J-736-B). Remove brake support plate, slide plate, oil seal, and shims off axle. Attach special puller J-2498-A to axle shaft and remove shaft from housing.

Rear Suspension: *See "Hudson & Nash" in Suspensions & Wheel Alignment Section.*

Rear Axle Assembly Removal: Drain lubricant, raise and support rear of body. Disconnect hand brake cable at bellcrank, and hand brake cable housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube. Roll axle free from car.

Wheel Bearing Adjustment: Shims behind brake backing plate.

SHOCK ABSORBERS

Delco. Direct acting type. Serviced by replacement.

Front – Rambler No. 3119821. **Rear** – 3147605 (Before Serial No. D-287222), No. 3119822 (beginning Serial No. D-287222).

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheel house panel.

See "Rambler" in Suspensions & Wheel Alignment Sect.

►*FRONT SUSPENSION SPRING NOTE:* Heavier spring used for Air Conditioned cars. *See "Rambler" in Front Suspension Section.*

King Pin Inclination – 6½°.

Caster (Std.) – ½° desired. Limits 0° to ½°.

(Pwr. Strg.) – 1° desired. Limits ½° to 1°.

Camber - 0° desired. Limits ¼° Neg. to ¼° Pos.

Toe-In – 1/16" to 3/16". *CAUTION* –When adjusting toe-in on Power Steering Cars, operate engine to supply oil pressure which will center spool in power cylinder valve.

Toe-Out on Turns – Outer wheel 22°, inner wheel 25°.

STEERING

Manual: Gemmer. Worm & Roller with push pull adjustments. *See "Gemmer Worm & Roller" in Steering Section.*

Power Steering: Monroe "Power Guide". Linkage type. *See "Monroe Power Guide" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Sect.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix (Lockheed) Hydraulic. Self centering (floating shoe) type. Hand lever applies rear wheel service brakes. *See "Bendix (Lockheed) Self-centering" in Brake Sect.*

Drum Diameter – 9".

Wheel Cylinder Diameter – 1 1/16" (Front) 7/8"(Rear).

Replacement Linings & Shoes – Linings and shoes with linings furnished in standard size only.

	Lining Width & Length	
	Front Wheel	Rear Wheel
Primary Shoes	2½" x 9 7/8"	2" x 9 7/8"
Secondary Shoes	2¼" x 7 21/32"	1¾" x 7 21/32"

Clearance – All shoes just free of drag with brakes centralized (with slight drag on shoes rotate wheel in both directions). Eccentric adjustment for each shoe.

Standard Master Cylinder: In engine compartment under steering column.

Checking Fluid – Raise hood and fill from engine compartment. Check at 1000 mile intervals.

Removal – Remove from beneath car. Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit. *See "Bendix Power Unit" in Brake Section.*

Checking Fluid – Same as for standard master cylinder

Removal – Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Nash-Hudson Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Nash-Hudson Air Conditioning" in Misc. Section.*

MODEL IDENTIFICATION

Model	Model Identification
6 Cyl.	5710

SERIAL NUMBER: Stamped on plate attached to right side of dash under hood.
Starting Serial No.- D-341001 (U.S.), DT-8501 (Canada).
ENGINE NUMBER: (Exc. with A.C.) Right side, front of block. (With A.C.) Left side, front of block.
Starting Engine No. - B-73001 (Single Throat Carb.), CB-2001 (Dual Throat Carb.).
►*ENGINE NUMBER LETTERS (Following Engine Number): Identified as follows:* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects.
"A" - Standard. "C" - .010" Oversize.
"B" - .010" Undersize. "D" - .001" Undersize.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. at cranking speed.
VACUUM READING: 18-21" at idling speed.
VALVE TAPPET CLEARANCE: .012" Int., .016" Exh., hot and running.
►*VALVE SEQUENCE (For Tappet Clearance Adjustment). See "Valve System" in Rambler Special Data*

IGNITION

FIRING ORDER: 1–5–3–6–2–4.
SPARK PLUG GAP: .035".
Spark Plug - Auto-Lite AL-7 or Champion H-10 14 mm Torque to 30 ft lbs
COIL: Delco-Remy 1115087.
Resistor - Delco-Remy 1927809. 1.4-1.65 Ohms at 75°F.
►*COIL RESISTOR NOTE.* Connected in series between battery and coil. Resistor is by-passed during cranking by solenoid, making direct lead from battery to coil.
►*RESISTOR SHORTING CORRECTION:* Beginning Serial No D-371199, reinforcement and friction washer, Part No 8000165, added to primary resistor mounting to prevent shorting to ground Screw No 8000103 also used
DISTRIBUTOR: Delco-Remy No. 1110244.
Condenser - Delco-Remy 1879604. **Capacity** - .18-.23 mfd.
Contact Point Set - Delco-Remy 1918148.
Breaker Gap - 016".
Cam Angle - 28-35° (Set to 30°).
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		425	0-4		850
9-11		1000	18-22		2000
12-14		1700	24-28		3400

Vacuum Spark Control: Delco-Remy No. 1116121.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	6-8
7.5	15	16¾

IGNITION TIMING

Setting - TDC. *NOTE* - 5° BTDC optional with Automatic Transmission or where local fuel octane permits.
Timing Mark - On vibration damper.

CARBURETOR

►*CARBURETOR APPLICATION: Carter AS Single Barrel Carburetor is Standard, Carter WCD Dual Barrel Carburetor is Optional.*
Throttle Linkage Adjustment (Hydra-Matic Cars): Adjust engine idle speed to 475 RPM (500 RPM on Air Conditioned Cars with compressor operating) With engine temperature at 150-160°F, transmission warm, and selector lever in Neutral, adjust as follows.
1) Disconnect throttle rod at throttle lever on side of transmission case Clean back face of transmission case, place Gauge J-2545-D flush against machined surface of case with edge of gauge against transmission side cover Throttle lever stud should fit freely in notch in gauge Adjust by using Bending Tool J-3310 to bend lever as necessary Remove gauge reconnect throttle rod (install wave washer flat washer and cotter pin)
2) Disconnect transmission throttle rod at bellcrank on bracket on cylinder head, disconnect carburetor-to-bellcrank rod at bellcrank Install aligning pin through hole in bellcrank and bracket (Pin can be made from piece of 3/16" diameter rod)
3) Adjust carburetor-to-bellcrank rod so that rod can be connected with carburetor throttle valve closed to hot or slow idle speed position Connect rod
4) Adjust transmission throttle rod so that forward end fits freely in hole in bellcrank then **shorten rod 3 full turns,** connect rod to bellcrank remove aligning pin Road test car and check test patterns *NOTE* - Shifting points can be changed by further adjustment of transmission throttle rod (shorten rod if shift points too low, lengthen rod if shift points too high)
Throttle Linkage Adjustment (Flash-O-Matic Cars): None required Transmission shift points controlled by Vacuum & Solenoid Unit on transmission case

CARTER AS

Carter AS No 2580S or 2665S (Std. & O.D. Trans.), No. 2564S or 2664S (Auto. Trans.). Single barrel downdraft type *NOTE* - Only 2564S & 2664S furnished for replacement
►*ENGINE SURGE CORRECTION (AS-2580S CARB.)* Surge condition may be encountered at steady throttle speed of 25-60 MPH., on cars equipped with above carburetor date coded "J-6" or prior. To alleviate condition, install metering rod, Part No. 3200432 (Carter No. 75-1366). Rods must just bottom in the jet wells with throttle valve wide open.
Idle Setting - ¼-1¼ turns open. Turn screw out for richer mixture.
Idle Speed - 550 RPM (Std. & O.D.), 475 RPM (Auto. Trans. in Neutral), 500 RPM (With Air Conditioning turned "ON").
Float Level - ¼" (Gauge T109-282) from top of each float (at free end) to top of casting. To adjust, bend float lip. There should be .010-.015" clearance between overlapping tangs on float levers. To adjust, bend long tang on left hand float.
Accelerating Pump - No seasonal adjustment.
Fast Idle - 030" (Gauge T109-29) between lower edge of valve and bore with fast idle link on high step of cam, To adjust bend choke connector rod.
Automatic Choke: Set 2 points rich.
►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section*

CARTER WCD

Carter WCD No. 2350S (Power Pack, Std. & O.D. Trans.), 2586S (Power Pack, Aut. Trans.). Dual downdraft type
►*MANIFOLD FUEL DISTRIBUTION: Both barrels feed all cylinders.*
Idle Setting - ½-1½ turns open. Turn screws out for richer mixture.
Idle Speed - 550 RPM (Std. & O.D.), 475 RPM (Auto. Trans. in Neutral), 500 RPM (With Air Conditioning turned "ON").
Float Level - 5/32" (Gauge T109-196). Distance from top of each float and machined surface of casting.
Accelerating Pump - No seasonal adjustment.
Fast Idle: .020" (Gauge T109-29) between throttle valve and bore (side opposite idle port) with choke fully closed.
Automatic Choke: Centered (at Index).
►*OTHER DATA: See "Carter WCD Carburetors" in Carburetion Section*
FUEL PUMP PRESSURE: 3½-5¼ lbs at 500 RPM

CARB. EQUIPMENT

Fuel Pump: Carter M2379SA Fuel & Vacuum
Pressure - 3½-5¼ lbs at 500 RPM
See "Fuel Pumps" in Carburetion Section
Gasoline Gauge: King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator King-Seeley No 46439
Dash Unit - King-Seeley No 49474
Tank Unit - King-Seeley No 44606
See "Fuel Gauges" in Carburetion Section

BATTERY

Standard - Auto-Lite. 11-HS-45. 12 Volt 11 plate 45 ampere hour capacity (20 hr rate)
Air Conditioned Cars - Auto-Lite 11-HS-60. 12 Volt 11 plate 60 ampere hour capacity (20 hr rate)
Battery Ground - Negative
Engine Ground - Transmission case to rear engine crossmember right side

STARTER

Delco-Remy No 1107647. Armature 1926626.
Drive - Overrunning clutch (solenoid pinion shift)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 35 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	6900	10 3	75
10 5 ft lbs	Lock	5 8	435

Starter Switch: Delco-Remy Solenoid Switch 1119793 mounted on starter and controlled by combination Ignition & Starter Switch (Std & Overdrive Cars), or by Delco Remy Switch 1996085 mounted on lower end of steering column and actuated by raising selector lever upward in "Neutral" (Hydra-Matic Cars) in "Neutral" or "Park" (Flash-O-Matic Cars)

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GENERATOR

D lc -R my 1100304 (Std.), 1102018 (Air C nd.Cars).

Armatur - Delco-Remy 1928952 (1100304 Gen), 1923535 (1102018 Gen)

►*NOTE* Replacement generator without pulley 1100313 (Std), 1102012 (Air Cond)

P rforman c Data (Cold)

Generator	Amperes	Volts	RPM
1100304	25	14 0	2570
1102018	30	14 0	2210

R tati n - Counterclockwise at commutator end

Brush Spring T nsi n - 28 ozs

Fi ld Curr nt - 1 50-1 62 amperes (1100304), 1 48-1 62 amperes (1102018), 12 volts at 80°F

B lt Adjustm nt: ½" deflection with 25 lbs pressure applied midway between fan and generator pulleys

REGULATOR

D lc -R my N . 1119122 (1100304 Gen.), 1119003 (1102018 G n.) *NOTE - Specifications are "Normal" s ttings*

Cut-Out Relay

Cuts In - 11 8-13 5 volts

C ntact Gap - 020"

Air Gap - 020" with contacts just closed

V ltag Regulator

S tting - 13 8-14 8 volts (hot)

Air Gap - 075" with armature pressed down to point where contacts just touch

Ch cking & Adjusting - *Se "Delco-Remy 12 Volt Regulators" in El ctrical Section*

Curr nt R gulator

S tting (1119122) - 23-27 amperes (Hot)

S tting (1119003) - 27-33 amperes (Hot)

Air Gap - 075" with armature pressed down to point where contacts just touch

Ch cking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*

Dir cti nal Signals: *See Electrical Section*

Light Switch R m val: Disconnect battery With switch in "OFF" position press button release on top of light switch assembly and pull knob and shaft clear of switch Remove slotted nut pull switch to rear of instrument panel

St p Light Switch: Located at tee fitting in line to left front brake

FUSES: Ov rdriv , 15 ampere on Overdrive Relay

D m , Glov B x, C urt sy Lights, 7 5 amperes on rear of headlight switch

CIRCUIT BREAKERS: Three used as follows

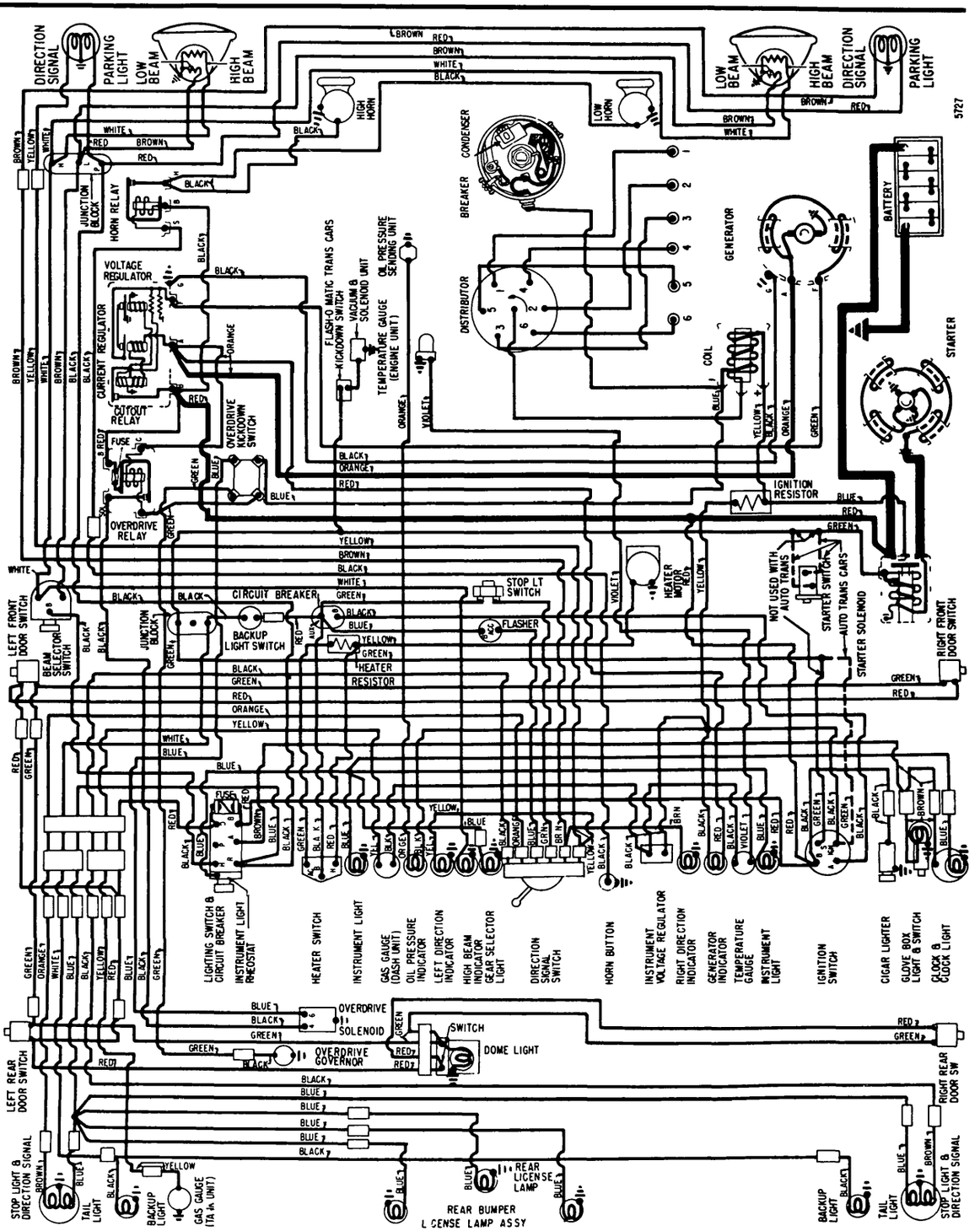
H adlights - 12 ampere Part of headlight switch

Park, Tail, Lic nse & Instrument Lights - 12 ampere Part of headlight switch

Stop, Turn Signals, Map, Oil Pressure, & Generator Charg Indicator - 30 ampere Auxiliary circuit breaker inside body cowl on left side

H rn R lay· Rambler No 3145684

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 6 Cyl. valve-in-head.

Bore	Stroke	Displacement
3 1/8"	4¼"	195.6 cu. ins.

Compr Ratio	Rated HP	Developed HP
7.47-1	23.44	120 at 4200 RPM

Compression & Vacuum Reading—See *TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, tin plated type with contoured top. *NOTE* - Pistons are new three-rmg type.

Original Bore & Piston Sizes - *See "Original Bore & Pistons" in Rambler Special Data.*

Removal - Pistons & rods removed from above.

Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry.

R placement Pistons: Standard, .002", .005" and .010" oversize. Furnished with fitted pins.

Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PINS

Press fit in connecting rod. No locking device.

Diameter - .8597". **Length** - 2¾".

Clearance in Piston - Palm press fit in piston at room temperature.

Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data.*

NOTE - Fitted pins furnished with new pistons.

PISTON RINGS

NOTE - Two compression rings and one three-piece oil control ring used. Supersedes four rings previously used.

Ring	Width	End Gap	Side Clearance
Compr. #1	.0933"	.010-.020"	.003-.005"
Compr. #2	.0930"	.010-.020"	.003-.005"
Oil #3①	.0245"	.015-.055"	.0001-.0084"

①Three-piece steel rail.

R placement Rings: Sets of Standard & .020" oversize.

Installing Rings: Stepped inner edges of both compression rings must be up.

CONNECTING RODS

Length—6.625" center-to-center. **Weight—**25 ozs.

Crankpin Journal Diameter—2.0948"-2.0955".

Original Bearing Sizes—*See "Original Bearing Sizes" in Rambler Special Data.*

B arings—Steel-backed babbitt. No shims.

Cl aranc —.001"-.0015". **Sid Play—**.005"-.015".

R plac ment B arings: Std., .001", .002", .010", .012" Undersize.

Installing R ds: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

J urnal Diam t r—2.4791"-2.4798". Four Bearing.

Original B aring Siz s—*See "Original Bearing Siz s" in Rambler Special Data.*

Bearings—Steel backed babbitt. No shims.

Clearance—.001"-.0015".

Replacement Bearings: Std., .001, .002", .010", .012" Undersize.

End Thrust: Taken by flanged front main bearing.

End Play—.003"-.008".

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Rambler Special Data.*

CAMSHAFT

Bearings - Steel-backed babbitt bushings.

Clearance - .001"-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.

Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: Intake .012", Exhaust .016" (Running Hot).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°①	.372"	.002-.0035"
Exhaust	45°①	.369"	.0025-.004"

①Valve face angle 44°.

►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32".

Valve Seat Width — 5/64-3/32".

Valve Stem Oil Seal — Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Free Length — 2 3/8".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	65-70	1.13/16"
Open	115-125	1 7/16"

Valve Guides: Use Tool J-1429-A to remove and replace guides. Guides should extend ¾" above cylinder head.

Rocker Arm Ass mbly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft S tting" und r CAMSHAFT abov .

Intak Valv — Open 12°30' BTDC, Close 51°30'ALDC.

Exhaust Valve — Open 53°30' BLDC, Close 10°30'ATDC.

Valve Timing Check — Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill, 1 qt. addt'l with filter change.

Normal Oil Pressure: 30 lbs. at 20 MPH. 12 lbs. minimum at 600 RPM.

Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block where oil enters oil distribution channel.

Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge.

Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambl r Special Data.*

Oil Filter: Partial Flow type. Replace element every 5000 miles or sooner as needed.

Replacement Filter Element - Rambler No. 8990068.

Crankcase Ventilation: Filter in crankcase filler cap, and vent in front valve chamber side plate.

COOLING

Water Capacity: 10 qts., with heater 11 qts.

Pressure Valve: 7 lb. Radiator Filler Cap Rambler No. 3142965 (less Air Conditioning), 13 lb. No. 3141371 (with Air Conditioning).

Thermostat: Choke type. 170° (Std.) Rambler No. 3131817. 180° (Optl.) No. 3131985 for use with permanent antifreeze.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type.

Dash Unit - K-S No. 49476 (Rambler No. 3119196).

Engine Unit - K-S No. 44200 (Rambler No. 5304502).

NOTE - Rambler No. 3200062 used on Air Cond. Cars. *See "Temperature Gauges" in Misc llaneous S ction.*

CLUTCH

Borg & Beck 8.5A7. Assy No. 361416. Singl Plat . *See "Borg & Beck" in Clutch Secti n.*

Clutch Disc No.	Borg & B ck	Rambler N .
Standard	382394	3144937
Overdrive	382490	3147133

►*1957 CLUTCH BEAM INNER PIVOT CAUTION:* High pressure lubrication of clutch beam inner pivot may force fabrica insulated bearing support off inner pivot. To correct, remove inner pivot from clutch beam and grind a flat on outside diameter of pivot. Diameter should be .462-.465". This condition corrected at Serial No. D-342820.

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

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SYNCHRO-MESH TRANSMISSION

►*LIMITED PRODUCTION TRANSMISSION CHANGE NOTE:* Effective Serial No. D-354549 through Serial No. D-356529, 1956 transmission Part No. 3145434 and propeller shaft Part No. 3119151 were used.

Warner. 3 speed, helical gear type.

See "Warner Transmissi ns" in Transmission Section.

Transmissi n Contr ls: *See "Transmission Controls" in Transmissi n Section.*

Rem val: Disconnect brake tube at bracket underside of body, torque tube at rear of transmission, hand brake cable at bell crank and brake cable housing at the rear brake cable bracket. Move rear axle to rear to remove universal joint from transmission shaft. Disconnect speedometer cable and shifter rods. On overdrive cars, disconnect wires at solenoid, governor and overdrive cable at lever. Use tw guide pins in place of two upper capscrews to guid transmission back to clear pilot bearing and clutch disc.

OVERDRIVE

Warn r R10–S *"Warn r R10" in Transmission Section.*

Ov rdrive C ntr l: S *"Warner R10-R11 Overdrive Controls" in Transmission Section.*

HYDRA-MATIC DRIVE

Dual Rang four speed automatic transmission with fluid coupling.

See "Hydra-Matic Drive" in Transmission Section.

►*1957 APPLICATION & MODIFICATION NOTE:* Hydra-Matic transmission used through Serial No. D-367710. Modified units identified by letter "V" after transmission serial number used between Serial Nos. D-362700 and D-367485.

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: S "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Driv " in Transmission S ction.*

Lubrication - Check fluid every 1000 miles, drain and refill at 25,000 mile intervals, using Automatic Transmission Fluid Type "A".

Checking Fluid L v l - Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located at right side of engine). Add fluid to bring level to "F" mark.

Throttl Linkag Adjustment: See *CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Driv " in Transmissi n Section.*

FLASH-O-MATIC TRANSMISSION

Warner Aut matic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. **Throttl linkage** adjustment controlled by vacuum and solenoid unit at rear of transmission.

►*1957 APPLICATION NOTE:* Effective Serial No. D-367711 this transmission supersedes Hydra-Matic Drive.

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Flash-O-Matic Transmission" in Transmission S ction.*

►*TESTING & TROUBLE SHOOTING: See "Flash-O-Matic Transmission" in Transmissi n S cti n.*

Lubrication - Check fluid every 1000 miles, drain and refill at 15,000 mile intervals, using Automatic Transmission Fluid Type "A".

Capacity - 8½ quarts.

Checking Fluid Level - Place selector lever in "P" position and set hand brake. Start engine and operate until engine and transmission reach operating temperature. Move selector lever from "P" to "R" and then to "D-2" positions. Check fluid level with dipstick (located at right side of engine). Add fluid to bring level to "F" mark. (Approximately 1½ pints fluid required between "L" and "F" marks).

►*OTHER FLASH-O-MATIC SERVICE DATA: See "Flash-O-Matic Transmission" in Transmission Section.*

UNIVERSALS

Detroit or Mechanics - One used at transmission end.

Torque Tube Bracket Ad justment (Std. & O.D. Transmission Cars Only) - *See "Hudson & Nash Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid type with torque tube drive.

See "Hudson & Nash Hypoid" in Rear Axle Section.

►*5710 SERIES AXLE SHAFT REPLACEMENT CAUTION:* Serrated axle shafts and hubs used in later production. Special removal and installation procedures required. *See 1958 Rambler pages for data.*

Axle Ratio - Std. 3.8-1 (9-34), **Overdrive** 4.4-1 (8-35), **Auto. Trans.** 3.3-1 (13-43).

Backlash - .002-.006". Shim Adjustment.

Axle Shaft Removal: Remove wheel, pull drum (use hub puller J-1644-B or J-736-B). Remove brake support plate, slide plate, oil seal, and shims off axle. Attach special puller J-2498-A to axle shaft and remove shaft from housing.

Rear Suspension: *See "Hudson & Nash" in Suspensions & Wheel Alignment Section.*

Rear Axle Assembly Removal: Drain lubricant, raise and support rear of body. Disconnect hand brake cable at bellcrank, and hand brake cable housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube. Roll axle free from car.

SHOCK ABSORBERS

Delco. Direct acting type. Serviced by replacement.

Front - Rambler 3119821. **Rear** - Rambler 3119822.

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs

See "Rambler" in Suspensions & Wheel Alignment Sect.

►*FRONT SUSPENSION SPRING NOTE:* Heavier spring used for Air Conditioned cars. *See "Rambler" in Suspension & Wheel Alignment Section.*

King Pin Inclination - 6½°.

Caster (Std.) - ½° desired. Limits 0° to ½°.

(Pwr. Strg.) - 1° desired. Limits ½° to 1°.

Camb r - 0° desired. Limits ¼° Neg. to ¼° Pos.

Toe-In - 1/16" to 3/16". *CAUTION* - When adjusting toe-in on Power Steering Cars, operate engine to supply oil pressure which will center spool in power cylinder valve.

Toe-Out n Turns - Outer wheel 22°, inner wheel 25°.

STEERING

Manual: Gemmer. Worm & Roller with push pull adjustments.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Monroe "Power Guide". Linkage type.

See "Monroe Power Guide" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix (Lockheed) Self-Centering (prior to Serial N . D-360492). Self-centering type with non-adjustable anchor ramps for each shoe.

See "Bendix (Lockheed) Self-Centering" in Brake Sect.

Drum Diameter - 9".

Wheel Cylinder Diameter - 1 1/16" (Front), 7/8" (Rear).

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only.

Lining Width & Length	Front Wheel	Rear Whe l
Primary Shoes	2½" x 9 7/8"	2" x 9 7/8"
Secondary Shoes	2¼" x 9 21/32"	1¾" x 7 21/32"

Clearance - All shoes just free of drag with brakes centralized (with slight drag on shoes rotate wheel in both directions). Eccentric adjustment for each shoe.

Wagner-Lockheed Self-Centering (effective Serial N . D-360492). Self-centering type with Bendix type shoes. Star wheel adjusting screw for each wheel.

See "Wagner-Lockheed Self-Centering" in Brake Sect.

Drum Diameter - 9".

Wheel Cylinder Diameter - 1" (Front), 13/16" (Rear).

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only.

Lining Width & Length	Front Wheel	Rear Whe l
Primary Shoes	2¼" x 6 31/32"	2" x 7¼"
Secondary Shoes	2½" x 9 1/16"	2" x 9 11/32"

Clearance - Adjusting screw backed off 8 notches from shoes locked against drum until free of drag.

Standard Master Cylinder: In engine compartment under steering column.

Checking Fluid - Fill from engine compartment. Check at 1000 mile intervals.

Removal - Remove from beneath car. Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit, Hydraulic Reaction Type. *See "Bendix Power Unit" in Brake Section.*

Checking Fluid - Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshi ld Wipers" in Misc llan ous S ction.*

Air C nditi ning: Nash-Huds n Air C nditi ning. Thermostatic control with magnetic clutch on compressor unit. *See "Nash-Hudson Air Conditioning" in Misc. S ction.*

MODEL IDENTIFICATION

M d l	Model Id ntificati n
V8	5720
Rebel	5730

SERIAL NUMBER: Stamped on plate attached to right side of cowl under hood

Starting Serial No. - V8 - A-1001 (U S), AT-1001 (Canada), **Rebel** - F-1001 (U S), FT-1001 (Canada)

ENGINE NUMBER: Stamped on lower right front corner of block

Starting Engine No. - V8 (2-Bbl. Carb.) - G-7501, **V8 (4-Bbl Carb.)** - CG-1001 **Rebel** - CN-1001

TUNE-UP

COMPRESSION PRESSURE· 140 lbs. at cranking speed,

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: .012" Intake, .014" Exhaust, hot and running.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between left bank exhaust manifold and exhaust cross-over pipe (exhaust gases diverted through heat passages in manifold when valve closed).

IGNITION

►*V8 DISTRIBUTOR PRODUCTION CHANGE. Delco-Remy Distributor No 1110884, external adjustment "Window" type replaced No 1110863 effective at Eng No G-11925, EXCEPT between Eng Nos G-17522 and G-17842*

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders -RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035"

Spark Plug - Auto-Lite AL-7 or Champion H-10 14 mm Torque to 30 ft lbs

COIL: Delco-Remy 1115087.

Resistor - Delco-Remy 1927809.

►*COIL RESISTOR NOTE:* Connected in series between battery and coil. Resistor is by-passed during cranking by solenoid, making direct lead from battery to coil.

►*RESISTOR SHORTING CORRECTION:* Effective Serial Nos A-12537 and F-1062, reinforcement and friction washer Part No 8000165, added to primary resistor mounting to prevent shorting to ground Screw, Part No 8000103, also required

DISTRIBUTOR: Delco-Remy No. 1110863 (Before Eng. No. G-11925 & between Eng. Nos. G-17522 & G-17842), No. 1110884 (Effective Eng. No. G-11925) - V8; No. 1110887 - Rebel. *NOTE* - Nos 1110884 and 1110887 are "window type" with external adjustment *See "Delco-Remy Window Distributor" in Electrical Section*

Condenser - Delco-Remy 1869704 (1110863 Distr), 1932004 (1110884 & 1110887 Distr) **Capacity** - 18- 23 mfd

Contact Point Set - Delco-Remy 1918148 (1110863 Distr), 1931988 (1110884 & 1110887 Distr)

Cam Angle - (1110863) 28-35°, (1110884 & 1110887) 28-32° Set to 30°

►*BREAKER GAP AND CAM ANGLE NOTE (WINDOW DISTRIBUTORS) Setting cam angl at 30° will provid .016" break r gap*

Br ak r Arm Spring T nsi n - 19-23 ozs

R tati n - Counterclockwise viewed from above

Aut matic Advanc - 1110863

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Automatic Advance - 1110884

Start	375	0-4	750
2-4	450	4-8	900
9-11	1000	18-22	2000
18-20	1700	36-40	3400

Automatic Advance - 1110887

Start	350	0-4	700
7 5-9 5	775	15-19	1550
12-14	1300	24-26	2600
17-19	1900	34-38	3800

Vacuum Spark Control: Delco-Remy No 1116095 (1110863 Distr), No 1116113 (1110884 Distr), No 1116117 (1110887 Distr)

Vacuum Advance - 1116095

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	5-7
10	20	11 5-13 5

Vacuum Advance - 1116113

Start	0	5 5-7 5
12	24	13 25-15 50

Vacuum Advance - 1116117

Start	0	5-7
10	20	14.25-15 75

IGNITION TIMING

Setting - 5° BTDC *NOTE* - 7° BTDC with overdrive, 10° BTDC with automatic transmission or where fuel octane permits

Timing Mark - Timing indicator on front cover and 5° mark on vibration damper

CARBURETOR

►*CARBURETOR APPLICATION: Carter 2 and 4-barrel used as follows*

Model	Carburetor
V8	WGD 2352S,SA
V8 (Power Pack)	WCFB 2593S,SA
"Rebel" (Std)	WCFB 2593S,SA
"Rebel" (Optional)	Bendix Electrojector

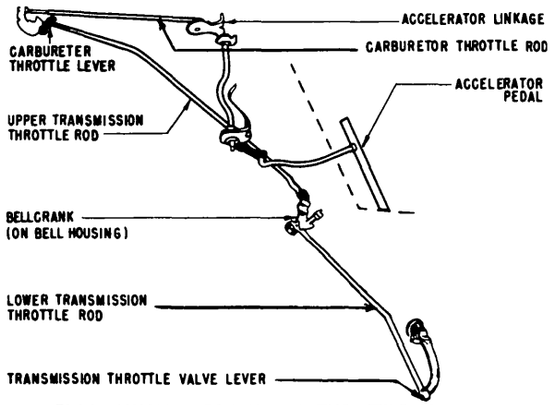
►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE· Special cleaning procedure required See AIR CLEANER below*

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC CARS): Make adjustments in the following order:

1) – Disconnect throttle valve rod from throttle valve lever on transmission case, disconnect vent pipe at lower left of case. Hold throttle lever to rear against stop. Distance from machined surface on rear of case to center of pin on throttle lever should be 5 9/16". Bend lever to correct position.

2) – Measure length of lower throttle valve rod from center of lower hole to outer surface of upper end. Length should be 16 1/8" (plus 0", minus 1/32"). Adjust by bending rod.

3) – Set carburetor throttle at slow idle (closed throttle). Adjust upper throttle rod at carburetor throttle rod bracket so that rod enters hole in bracket freely, then



FLASHAWAY HYDRA-MATIC THROTTLE LINKAGE

lengthen rod by turning adjusting end one full turn to left, tighten locknut and connect rod.

CARTER WGD

Carter WGD 2352S, SA. Dual downdraft type

►*CARBURETOR PRODUCTION CHANGE: Carburetor 2352SA has the following new parts: M tering Rod No 75-1285, Pump Plunger Rod & Ch ck Assy. No. 64-181S, Upper Pump Spring No. 61-413.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2–3–5–8, LEFT barrel 1–4–6–7.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required See AIR CLEANER below*

Idle Setting - ½-1½ turns open. Turn screws out for richer mixture.

Idle Speed - (Std. & O.D.) 550 RPM, (Auto. Trans.) 425 RPM in Neutral, 450 RPM (With Air Conditioning "ON").

Float Level - 7/32" (Gauge T109-106) between top of float and bowl cover, gasket removed, cover inverted and needle seated. Adjust by bending float arm.

Fast Idle: .023" between throttle valve and bore (side opposite idle port), with choke valve fully closed (Gauge T109-189). Adjust by bending choke connector rod at lower angle. *NOTE* - This fast idle setting will provide 1700-1800 RPM engine fast idle speed.

Automatic Choke: Centered (at index).

►*OTHER DATA· See "Carter WGD Dual Carbur tors" in Carburetion Section*

CARTER WCFB

Carter WCFB 2593S,SA. 4 barrel carburetor with automatic choke

►*ROUGH ENGINE IDLE.* May be caused by air leak in left primary throttle bore *See "Carter WCFB Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels Cyl 1-4-6-7*

Idle Setting - ¼ 1¼ turns open Turn screws out for richer mixture

Idle Sp d - 550 RPM (Std & O D) 425 RPM (Auto Trans. in Neutral) 475 RPM (Auto Trans & A C "ON")

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►*OTHER DATA: S e "Cart r WCFB Carburetors" in Carbur tion S ction.*

CARB. EQUIPMENT

Fu l Pump: Fuel and vacuum.
R placem nt Pump - Carter No. M2433SA.
Pr ssur - 4-5½ lbs. maximum.
S "Fu l Pumps" in Carburetion Section.
Gas line Gauge: King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator, King-Seeley No. 46439.
Dash Unit - King-Seeley No. 49474.
Tank Unit - King-Seeley No. 44606.
Se "Fuel Gaug s" in Carburetion Section.
AIR CLEANER: Oil bath and DRY FILTER ELEMENT types used. Clean every 5,000 miles, replace every 15,000 miles.
►*DRY TYPE CLEANING CAUTION:* Clean element by tapping and shaking to remove dirt particles. *DO NOT wash l m nt in solv nt or other liquids and DO NOT oil or lubricat .*

BATTERY

V8 Standard - Aut -Lit 11-HS-50. 12 Volt, 11 plate, 50 ampere hour capacity (20 hr. rate).
V8 Air C nditi n d & "R bel" - Auto-Lite 11-HS-60. 12 Volt, 11 plate, 60 ampere hour capacity (20 hr. rate)
Batt ry Gr und - Negative.
Engin Gr und - Transmission case to rear engine crossmember right side.

STARTER

D lc -Remy N . 1107648 Armature 1926626.
Driv - Overrunning clutch (solenoid pinion shift)
Rotati n - Counterclockwise at commutator end.
Brush Spring T nsion - 35 ozs

P rformance Data

Torque	RPM	Volts	Amperes
0 ft. lbs..	6900	10.3	75
10.5 ft. lbs. .	Lock	5 8	435

Starter Switch: Delco-Remy Solenoid Switch 1119760 mount ed on starter and controlled by combination Ignition & Starter Switch (Std. & Overdrive Cars), or by Delco-Remy Switch 1996085 mounted on lower end of steering column and actuated by raising selector lever upward in "Neutral" (Hydra-Matic Cars), in "Neutral" or "Park" (Flash-O-Matic Cars).

GENERATOR

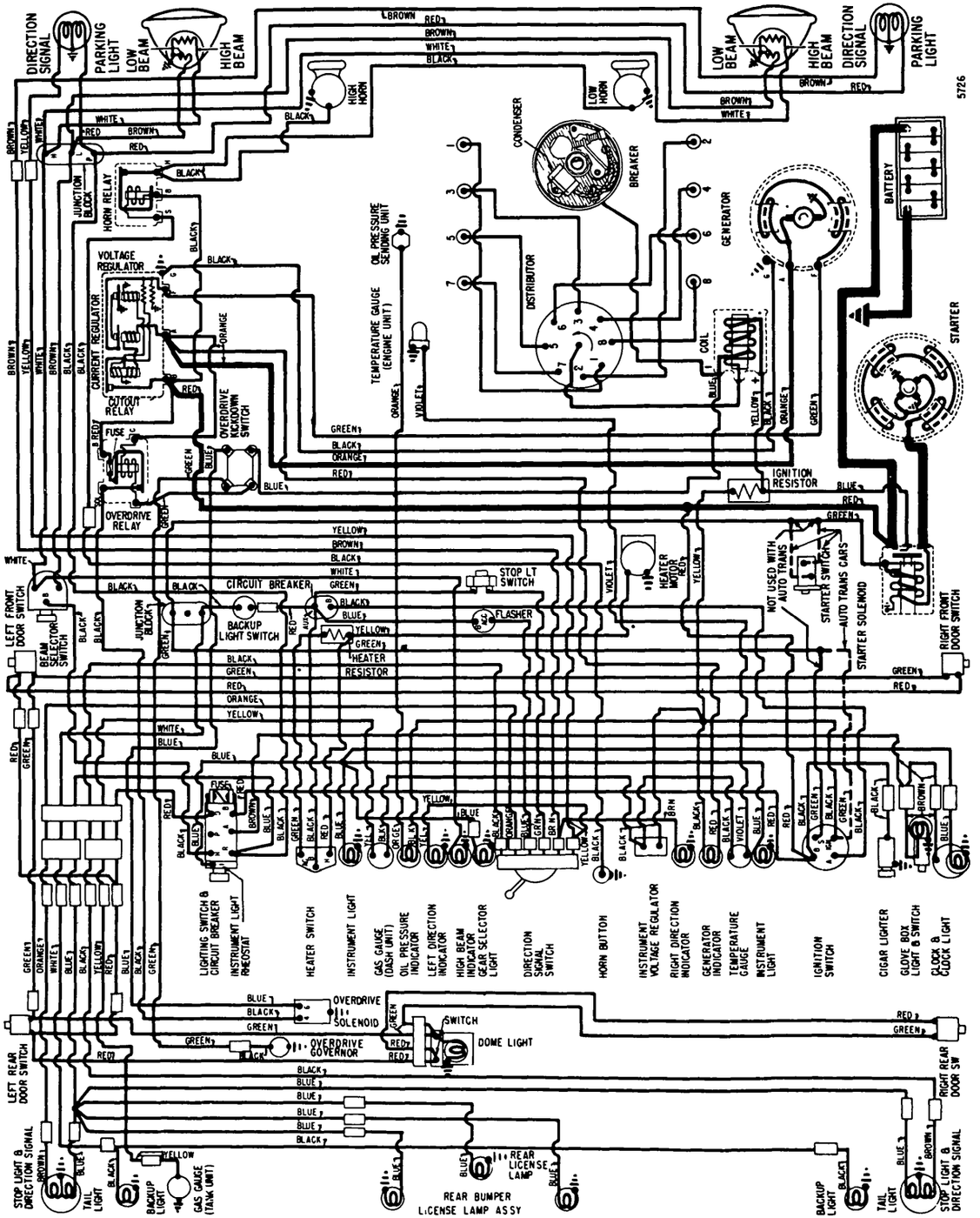
D lc -R my 1100304 (V8 Std.), 1102018 (Rebel & V8 Air Cond. Cars).
Armatur - Delco-Remy 1928952 (1100304 Gen.), 1923535 (1102018 Gen.)
►*NOTE:* Replacement generator without pulley 1100313 (1100304 Gen.), 1102012 (1102018 Gen.).

P rformanc Data (Cold)

Generator	Amperes	Volts	RPM
1100304	25	14 0	2570
1102018	30	14 0	2210

Rotati n - Counterclockwise at commutator end
Brush Spring T nsi n - 28 ozs.

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Fi ld Curr nt - 1 50-1 62 amperes (1100304), 1 48-1 62 amperes (1102018), 12 volts at 80°F

B lt Adjustment: ½" deflection with 25 lbs pressure applied midway between fan and generator pulleys

REGULATOR

Delco-Remy No. 1119122 (1100304 Gen.), 1119003 (1102018 Gen.). *NOTE - Specifications are "Normal" s ttings*

Cut-Out Relay

Cuts In - 11 8-13 5 volts
Contact Gap - 020"
Air Gap - 020" with contacts just closed

Voltage Regulator

Setting - 13 8-14 8 volts (hot)
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

Current Regulator

S tting (1119122) - 23-27 amperes (Hot)
S tting (1119003) - 27-33 amperes (Hot)
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

H adlamps: Sealed Beam *See Electrical Section*
Directional Signals: *See Electrical Section*
Light Switch Removal: Disconnect battery With switch in "OFF" position press button release on top of light switch assembly, and pull knob and shaft clear of switch Remove slotted nut, pull switch to rear of instrument panel
Stop Light Switch: Located at tee fitting in line to left front brake
FUSES: Overdrive, 15 ampere, on Overdrive Relay
Dome, Glove Box, Courtesy Lights, 7 5 amperes, on rear of headlight switch
CIRCUIT BREAKERS: Three used as follows:
Headlights - 12 ampere Part of headlight switch
Park, Tail, License & Instrument Lights - 12 ampere Part of headlight switch
Stop, Turn Signals, Map, Oil Pressure, & Generator Charge Indicator - 30 ampere Auxiliary circuit breaker inside body cowl on left side
H rn Relay: Rambler No 3145684

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use xtreme care when disconnecting any part of air conditioning system or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own V8 Valve in head

Model	Bore	Stroke	Displacement
V8	3½"	3¼"	250 cu ins
"Rebel"	4"	3¼"	327 cu ins

Model	Compr. Ratio	Rated HP	Developed HP
V8 Std	8 0-1	39 2	190 at 4900 RPM
V8 Pwr Pk	8 0-1	39 2	203 at 4900 RPM
Rebel①	9 5-1	51 2	255 at 4700 RPM
Rebel②	9 5-1	51 2	288 at 4700 RPM

①Standard ②Fuel Injection

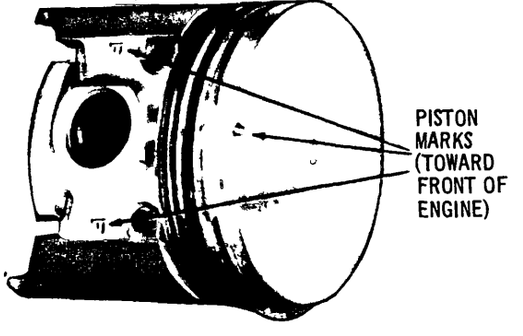
C mpr ssi n & Vacuum R ading - *Se TUNE-UP*

CYLINDER HEAD INSTALLATION: *S "Cylind r H ad & Manifolds" in Rambl r Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset toward thrust side of piston.
Weight - 18 ozs (V8), 23 45 ozs ("Rebel")
Removal - Piston and rods removed from above
Clearance . 0009- 0025" (Skirt Top) 0009- 0015" (Skirt Bottom)
Replacement of Pistons: Std.,.002",.005",.010",.020",.030",.040" Oversize.
Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward front of engine.



PISTON PINS

Press fit in connecting rod. No locking device.
Diameter - 9307" **Length** - 3 1870"
Pin Fit in Piston – Palm press fit at room temperature.
Pin Removal & Installation – *See "Piston Pins" in Rambler Special Data.*
Replacement Pins: Std., .003", .005" Oversize.

PISTON RINGS

Three rings (two compression & one oil) used. Upper ring is chrome plated. Oil control ring is three piece type (two oil control wiper rails with a segmented steel spacer between them).

Ring	Width	End Gap	Side Clearance
Compr #1	0778"	010- 020"	002 - 006"
Compr #2	0778"	010- 020"	002 006"
Oil #3	0245"	015- 055"	0001- 0079"

Replacement Rings: Sets of Std , 020" & 030" oversize
Installing Rings: Stepped inner edges of both compression rings must be up

CONNECTING RODS

Crankpin Journal Diameter – 2.2483-2.2490".
Length - 6 3750" center-to-center **Weight** - 27 6 ozs
Lower Bearing – Precision, steel-backed, babbitt.
Clearance – .0007-.0028". Side Clearance – 004-.012".
Replacement Bearings: Std , 001", 002", 010 ' & 012" Undersize
Installing R ds: Assemble connecting rod with notch in piston and connecting rod identification mark to front of engine. Cylinder numbers on connecting rod should be toward outside of bank in which they are installed.

CRANKSHAFT

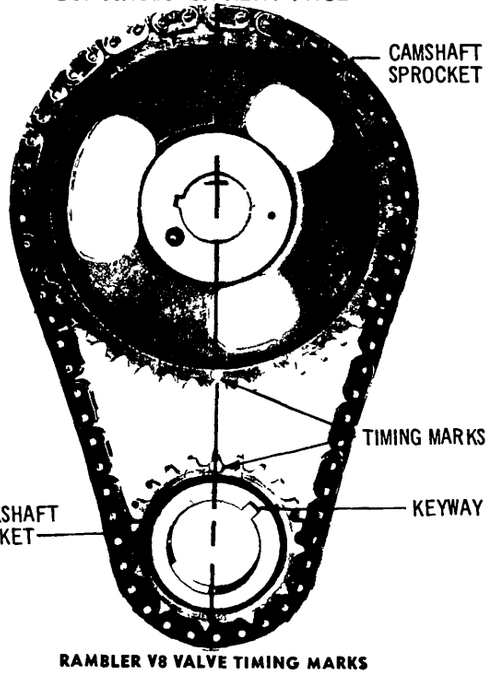
J urnal Diam t r – 2.4983" - 2.4990". Five bearings.
B arings – Precision, steel-backed, babbitt.
Clearance – .0006"-.0032".
Replacement Bearings: Std,, 001", 002", 010" & 012" Undersize
End Thrust: Taken by No. 1 flanged bearing.
Endplay – .003-.007".
Crankshaft Rear Main Bearing Oil Seal: *See Crankshaft & Main Bearings" in Rambl r Special Data.*
Crankshaft Front Oil Seal: *S "Engine Front Cov r" Rambler Special Data.*

VIBRATION DAMPER REMOVAL & INSTALLATION: *See "Vibration Damper" in Rambl r Sp cial Data*

CAMSHAFT

►*1957 CAMSHAFT REPLACEMENT CAUTION* Camshafts designed for use with mechanical lifters not interchangeable with those designed for hydraulic lifters Mechanical lifter shafts identified by white paint on area ahead or oil pump and distributor drive gear Hydraulic lifter shafts have no identifying marks
Bearings - Five steel-backed babbitt lined bushings pressed in block and line reamed
Clearance - 001- 003"
End Thrust: Taken by thrust plate behind camshaft sprocket
End Play - 003- 006"
Timing Chain: Morse non-adjustable type **Width** 875", **Pitch** 375" **Length** 23¼" or 62 links
Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers To check assembly rotate crankshaft until tim-

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RAMBLER V8 VALVE TIMING MARKS

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ing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: .012" (Intake), .014" (Exhaust) Hot.

►*1957 RAMBLER V8 TAPPET NOTE: Either mechanical or hydraulic valve lifters used on cars between Engine Serial Nos. G-9401 and G-9550.*

Valve	Head Diameter	Stem Diameter
Intake	1.787"	.3412"- .3417"
Exhaust	1.406"	.3407"- .3412"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°①	③	.0013"- .0028"
Exhaust	45°②	④	.0018"- .0033"

①- Face Angle 29°. ②- Face Angle 44°.
③- .381" (V8), .375" (Rebel)
④- .380" (V8), .375" (Rebel)

Valve Seat Width – .078-.093" (Intake), .093-.104" (Exhaust).

Valve Stem Seals – Rubber deflector installed on valve stem and over top of guide on all valves.

Valve Springs: Install springs with closed coil end against cylinder head. **Free Length - 2.20".**

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85 - 91 lbs.	1 13/16"
Open	150 -160 lbs.	1 7/16"

Valve Guides: Drive old guides out, drive new guides in to height of ¾" ± 1/64" above cylinder head (measure from top of guide to flat machined surface of lower spring retainer on head). Ream all guides to I.D. of .3430-.3440" after installation.

Valve Lifters: Mechanical Barrel type. *NOTE - Either mechanical or hydraulic lifters used between Engine Serial Nos. G-9401 and G-9550 on V8*

Valve Lifters: Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing – *See "Valve System" in Rambler Special Data.*

Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 12°30' BTDC. Close 51°30' ALDC.

Exhaust Valves– Open 53°30' BLDC. Close 10°30' ATDC.

Valve Timing Check: Remove valve compartment cover and spark plugs. Crank engine until #6 piston in right bank is on TDC of compression stroke (#1 piston will be on TDC of exhaust stroke in overlap position). Rotate crankshaft 90° counter-clockwise. Install dial indicator on #1 intake rocker arm pushrod end. Crank engine in a clockwise direction until dial indicator dicates pushrod movement, (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* – If more than ½" variance in either direction, remove timing chain cover and inspect installation. Replace if deflection exceeds 1/2".

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 5 qts. refill, 1 qt. addt'l with filter change.

Crankcase Capacity: 5 qts. refill, 1 qt. addt'l with filter change.

Normal Oil Pressure: 10 lbs. minimum at 600 RPM

Pressure Regulator - In oil pump. Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge. Sending unit Nash No. 3142826 (6½ lbs.) or No. 3200422 (4 lbs.), located on left rear side of engine block.

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft. *NOTE* - Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul & Installation - *See "Oiling System" in Rambler Special Data.*

Oil Filter: Partial Flow type. Replace element every 4000 miles or sooner as needed.

Replacement Filter Element - Rambler No. 8990050 or No. 8990346.

Crankcase Ventilation: Filter element in oil filler cap (air inlet) and outlet pipe in valve tappet cover.

COOLING

Water Capacity: 20 quarts, add 1 quart for heater (V8)

Pressure Valve: Radiator filler cap. 7 lbs. (Std.) 13 lbs. (Air Cond.)

Thermostat: Choke type. Rambler No. 3132708 (150°), No 3131817 (167°-173°) *NOTE* - No. 3131985 (177°-182°) for use with permanent anti-freeze only.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV". Electric type.

Dash Unit - K-S No. 49476 (Rambler No. 3119196)

Engine Unit - K-S No. 44200 (Rambler No. 5304502)

NOTE - Rambler No. 3200062 used on Air Cond. Cars. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Borg & Beck. Single plate. Used as follows:

Car Model	Clutch Model	Assy. No.
V8 (Std.)	10A7	361436
V8 (Heavy Duty)	10A7	361407
"Rebel" (Std)	10 5A6	361442
"Rebel" (Hvy Dty.)	10 5A6	361449

See "Borg & Beck" in Clutch Section.

Clutch Disc No.	Borg & Beck	Rambler No.
V8 (Std.)	CD752	3125822
V8 (Heavy Duty)	381806	3147552
"Rebel" (All)	382574	3150449

►*1957 CLUTCH BEAM INNER PIVOT CAUTION:* High pressure lubrication of clutch beam inner pivot may force fabrica insulated bearing support off inner pivot. To correct remove inner pivot from clutch beam and grind a flat on outside diameter of pivot Diameter should be 462-.465". This condition corrected at Serial No. D-342820

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly. Lengthening link reduces freeplay.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner. Three-speed, helical gear type.

See "Warner Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect hydraulic brake tube bracket on underside of body, torque tube at rear of transmission, hand brake cable and housing, speedometer cable, and shifter rods. Disconnect overdrive control cable and electrical control wires from solenoid and governor where so equipped. Move rear axle to rear to separate universal joint. Remove two upper transmission-to-bell housing bolts and install special guide pins (Tool J-1434) in their place. Remove lower bolts slide transmission out

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10 & R11 Overdriv Control" in Transmission Section.*

HYDRA-MATIC DRIVE

"Flashaway" Hydra-Matic. New four speed, hydraulically controlled transmission with two fluid couplings. *See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication – Check fluid every 1,000 miles. Drain and refill every 25,000 miles (remove oil pan and clean oil screen). Use Automatic Transmission Fluid type "A" ("AQ-ATF").

Checking Fluid Level – Bring transmission to normal operating temperature. Idle engine to 425 RPM, with selector lever in "P" (Park) position, with car on level floor. Remove fluid level indicator, wipe clean, reinsert it, then remove it again and note reading.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Driveshaft: One universal used at front end of propeller shaft

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REAR AXLE

Own. Semi-floating hypoid gear with torque tube drive

►*1957 REAR AXLE PRODUCTION CHANGE NOTE* Spicer type rear axles used beginning Serial No A 11296 Cutoff point Serial No A-12139 (Standard Transmission), Serial No A-11429 (Overdrive Transmission) Identified by number "44" cast on housing

See "Hudson & Nash Hypoid" and "Spicer Hypoid" in Rear Axle Section

V8	Spicer - Axle Ratios - Own	
Standard	4 1-1 (11-45)	4 1-1 (10-41)
Overdrive	4 5-1 (11-50)	4 4-1 (9-40)
Hydra-Matic	3 5-1 (13-46)	3 5-1 (11-39)
"Rebel"		
Standard		4 1-1 (10-41)
Overdrive		4 1-1 (10-41)
Hydra-Matic		3 15-1 (13-41)

Axle Shaft Removal: Remove wheel, pull drum (use Hub Puller J-1644). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims (check thickness of shims, and replace same amount when reassembling). Withdraw shaft using Puller J-2498; do not drag on inner seal.

Rear Axle Assembly Removal: Raise and support rear end of car. Disconnect rear brake cables at center equalizer. Disconnect torque tube at rear of transmission. Disconnect brake hose and shock absorbers at axle end (let hang from body). Roll axle free.

Wheel Bearing Adjustment: Shims behind brake backing plate. *NOTE* - Adjust axle shaft endplay on **Right Hand Side Only.**

SHOCK ABSORBERS

V8 - Delco. Direct acting type Serviced by replacement

Front - Rambler 3119821 **Rear** - Rambler 3119822

"Rebel" - Gabriel Adjustomatic type Serviced by replacement **Front** - Rambler No 3152754 **Rear** - Rambler No 3152753.

Shock Absorber Adjustment ("Rebel") - Disconnect shock absorber Compress by hand completely and rotate until internal couplings are mated Match arrow of cylinder with desired arrow of dust cover Extend shock absorber and reconnect

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheel house panel

See "Rambler" in Suspensions & Wheel Alignment Section

►*FRONT SUSPENSION SPRING NOTE*· Heavier springs used for Air Conditioned cars *See "Rambler" in Suspensions & Wheel Alignment Section*

King Pin Inclination - 6½°

Caster (Std.) - ½° desired Limits ½° Pos to 0°

Caster (Power Steering) - 1° desired Limits ½° Pos to 1° Pos

Camber - 0° desired Limits ¼° Neg to ¼° Pos

Toe-In - 1/16" to 3/16" *CAUTION* - When adjusting toe-in on Power Steering Cars operate engine to supply oil pressure which will center spool in power cylinder valve

Toe-Out on Turns - Outer wheel 22° inner wheel 25°

STEERING

Manual: Gemmer. Worm & Roller with push pull adjustments

See "Gemmer Worm & Roller" in Steering Section

Power Steering: Monroe "Power Guide". Linkage type

See "Monroe Power Guide" in Steering Section

►*1957 STEERING GEAR PRODUCTION CHANGE*· Effective Serial No A-9035 cross shaft needle bearings and thrust bearings on either side of cross-shaft roller were incorporated

►*POWER STEERING NOISE CORRECTION See "Monroe Power Guide" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section*

BRAKES

Wagner-Lockheed Self-Centering. Self-centering type with Bendix type shoes Star wheel adjusting screw for each wheel Hand lever applies rear wheel service brakes

See "Wagner-Lockheed Self-Centering" in Brake Section

Drum Diameter - 9" *NOTE* - "Rebel" has special flanged drums for increased heat dissipation

Wheel Cylinder Diameter - 1" (Front), 13/16" (Rear)

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only

	Lining Width & Length	
	Front Wheel	Rear Wheel
Primary Shoes	2¼" x 6 31/32"	2" x 7¼"
Secondary Shoes	2½" x 9 1/16"	2" x 9 11/32"

Clearance - Adjusting screw backed off 8 notches from shoes locked against drum until free of drag

Standard Master Cylinder: In engine compartment under steering column

Checking Fluid - Fill from engine compartment Check at 1000 mile intervals

Removal - Remove from beneath car Not necessary to disturb other parts

Power Brakes: Bendix Power Unit, Hydraulic Reaction Type. *See "Bendix Power Unit" in Brake Section*

Checking Fluid - Same as for standard master cylinder

Removal - Same as for standard master cylinder

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type *See "Windshield Wipers" in Miscellaneous Section*

Air Conditioning· Nash-Hudson Air Conditioning: Thermostatic control with magnetic clutch on compressor unit *See "Nash-Hudson Air Conditioning" in Misc Section*

MODEL IDENTIFICATION

Model	Model Series
Rambler American	5801
Rambler 6	5810

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel.

Starting Serial Nos. - (5801) M-1001, (5810) D-409001.

ENGINE NUMBER: Stamped on pad on upper left front of cylinder block above generator.

Starting Engin Nos. - (5801) E-1001, (5810 - 1-barrel carb) B-145001, (5810 - 2-barrel carb.) CB-9001.

►*ENGINE NUMBER LETTER CODE (Following Engine Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects "A" - Standard "B" - 010" Undersize "C' - 010" Oversize *See "Original Bore & Pistons" and "Original Bearing Sizes" in Rambler Special Data*

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. at cranking speed; maximum variation between cylinders 10 lbs.

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: (5801) .016" Intake, .018" Exhaust COLD. (5810) .012" Intake, .016" Exhaust HOT and running.

►*VALVE SEQUENCE (For Tappet Clearance Adjustment): See "Valve System" in Rambler Special Data.*

IGNITION

FIRING ORDER: 1-5-3-6-4-2.

SPARK PLUG GAP: .033-.037".

Spark Plugs (5801) - Auto-Lite AL-7, Champion H-10, or AC No. 45L. 14 mm. Torque to 30 ft. lbs.

Spark Plugs (5810) - Auto-Lite AL-7J or AL-82, or Champion H-10-64D 14 mm Torque to 30 ft lbs

COIL: Delco-Remy 1115047 (5801), 1115094 (5810).

Ignition Current - (5801) 1.1-1.8 amps. idling, 2.4-3.1 amps. stopped. (5810) 1.7 amps. idling, 3.75 amps. stopped.

Resistor - Delco-Remy No 1927809 (1115094 Coil)

NOTE - Resistor not used on 5801 Series,

►*COIL RESISTOR NOTE:* Resistor connected in series between ignition switch and coil. By-passed during cranking by direct lead from starter lead to coil.

DISTRIBUTOR: Delco-Remy No. 1112426 (5801), 1110246 (5810).

Condenser - Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1918148 (1110246 Distr.)

Breaker Gap - .016".

Cam Angle - 28-35°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1112426

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	525	0-4	1050
1.5-3.5	700	3-7	1400
4-6	1425	8-12	2850
6-8	2100	12-16	4200

Automatic Advance - 1110246

Degrees Distr.	RPM	Degrees Eng.	RPM
5-2.5	600	1-5	1200
5-7	900	10-14	1800
7.5-9.5	1500	15-19	3000
10-12	2100	20-24	4200

Vacuum Spark Control: Delco-Remy 1116072 Separate Type (1112426 Distr.), 1116139 Integral Type (1110246 Distr.).

Vacuum Advance - 1112426 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start -	0	4-6
2 1/6 - 4 1/2	4 1/3 - 9	8
4 1/2 - 6 1/2	9-13	11

Vacuum Advance - 1110246 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
10.25-11.75	20.5-23.5	16-17

IGNITION TIMING

Setting - 3° BTDC (5801), 5° BTDC at 500 RPM (5810).

Timing Mark - Align timing mark on vibration damper with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF carburetor used on 5801 Series, Carter AS or WCD used on 5810 Series.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid Unit on transmission case.

CARTER YF

Carter YF 2014S (Synchro-mesh & O.D.), 2757S (Flash-O-Matic). Single barrel, downdraft type.

Idle Setting - ½-1½ turns open Turn screw out for richer mixture

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic) in Neutral.

Float Level - ½" from top of float at ffee end to the top surface of the bowl cover (air horn and float assembly inverted and gasket removed).

Fast Idle: .054" throttle valve opening (Gauge T109-193) with choke valve tightly closed. Adjust by bending fast idle connector link at lower angle.

Choke Setting: One notch lean.

►*OTHER DATA· See "Carter YF Carburetors" in Carburetion Section*

CARTER AS

Carter AS 2665S, 2749S (Synchro-mesh & O.D.), 2664S, 2748S (Flash-O-Matic). Single barrel, downdraft type.

NOTE - 2748S can be used to replace the others.

►*HARD HOT START CORRECTION* Caused by fuel percolation while car is standing May be corrected by installing 3/16" gasket, Part No 3147641, between carburetor gasket and intake manifold *CAUTION* - On Flash-O-Matic cars do not remove original gasket as vacuum port operation will be affected

►*PRODUCTION CHANGES FOR IMPROVED PERFORMANCE* Later carburetors, identified by Production Code D-8 or later, have idle port opening increased and new choke assembly requiring different choke setting (see "Choke Setting" below) *See "Carter AS Carburetors" in Carburetion Section*

Idle Setting - ¼-1¼ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Float Level - ¼" (Gauge T109-282) from top of each float (at free end) to top of casting. To adjust, bend float lip. There should be .010-.015" clearance between overlapping tangs on float levers. To adjust, bend long tang on left hand float.

Accel rating Pump - No seasonal adjustment.

Fast Idle: .030" (Gauge T109-29) between lower edge of valve and bore with fast idle link on high step of cam. To adjust, bend choke connector rod.

Automatic Choke Setting: 2 points rich (170T-61S - early choke), centered on index (170AE-61S - later choke)

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section*

CARTER WCD

Carter WCD 2350S (Synchro-mesh & O.D.), 2586S (Flash-O-Matic). 2-barrel, downdraft type.

►*MANIFOLD FUEL DISTRIBUTION: Both barrels fed all cylinders.*

►*STUMBLE ON LIGHT THROTTLE ACCELERATION CORRECTION.* Install new metering rods *See "Carter WCD Carburetors" in Carburetion Section*

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Float Level - 5/32" (Gauge T109-196). Distance from top of each float and machined surface of casting.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .020" (Gauge T109-29) between throttle valve and bore (side opposite idle port) with choke fully closed.

Automatic Choke: Centered at index.

►*OTHER DATA. See "Carter WCD Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: AC No 4654 (5801), Carter No M2379SA (5810), Fuel & Vacuum

Pressure - 3½-5¼ lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge voltage regulator, King-Seeley No 56075

Dash Unit - King-Seeley No 56105 (5801), No 54964 (5810)

Tank Unit - King-Seeley No 44664 (All Models)

See "Fuel Gauges" in Carburetion Section

AIR CLEANER: Oil wetted, Oil bath,and Dry Filter Element types used

►*PAPER ELEMENT AIR CLEANER CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT blow out with compressed air*

BATTERY

5801 Series - Auto-Lite 11-MS-45 (Std. Up to Serial No. M-27698). 12 volt, 7 plate, 45 ampere hour capacity **Auto-Lite 11-MS-40 (Std Effective Serial No. M-27698).** 12 volt, 7 plate, 40 ampere hour capacity

5810 Series - Auto-Lite 11-HS-45 (Std.). 12 volt, 7 plate, 45 ampere hour capacity **Auto-Lite 11-HS-60 (Air Cond.).** 12 volt, 11 plate, 60 ampere hour capacity

Battery Ground - Negative, to cylinder head

Engine Ground - (5801) Flywheel housing to right rear engine mount (5810) From engine to rear crossmember

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STARTER

►*STARTER RELAY CORROSION CORRECTION:* Moisture condensation may corrode relay points. To correct, drill 1/8" hole above gasket flange of cover in lowest corner when relay mounted. After Serial Numbers D-433423 & D-439786, hole drilled or part of insulating fiber cut away

Delco-Remy No 1107647 Armature 1926626

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	6900	10 3	75
10 5 ft lbs	Lock	5 8	435

Starter Switch: Delco-Remy Solenoid Switch 1119793 mounted on starter and controlled by combination Ignition & Starter Switch Neutral Safety Switch mounted on steering column (5801), on Pushbutton Control housing (5810)

Neutral Safety Switch Adjustment (American) - *See Rambler Automatic Transmission in Transmission Section*

GENERATOR

Delco-Remy 1100304 (Std.), 1102018 (Air Cond.Cars)

Armature - Delco-Remy 1928952 (1100304 Gen) 1923535 (1102018 Gen)

►*NOTE* Replacement generator without pulley 1100313 (Std), 1102012 (Air Cond)

Performance Data (Cold)

Generator	Amperes	Volts	RPM
1100304	25	14 0.	2710
1102018	30	14 0	2310

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs

Field Current - 1 50-1 62 amperes (1100304), 1 48-1 62 amperes (1102018) 12 volts at 80°F

Belt Adjustment: ½" deflection midway between fan and generator pulleys with 25 lbs. pressure, or use Tool J-6733 as follows Place gauge on longest accessible span of belt between two pulleys Move generator on its mounting bracket until index mark on spring loaded plunger lines up with upper edge of gauge. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

REGULATOR

Delco-Remy No. 1119122 (1100304 Gen.), 1119003 (1102018 Gen.). *NOTE - Specifications are "Normal" settings*

Cut-Out Relay

Cuts In - 11 8-13 5 volts

Contact Gap - 020"

Air Gap - 020" with contacts just closed

Voltage Regulator

Setting - 13 8-14 8 volts (hot)

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

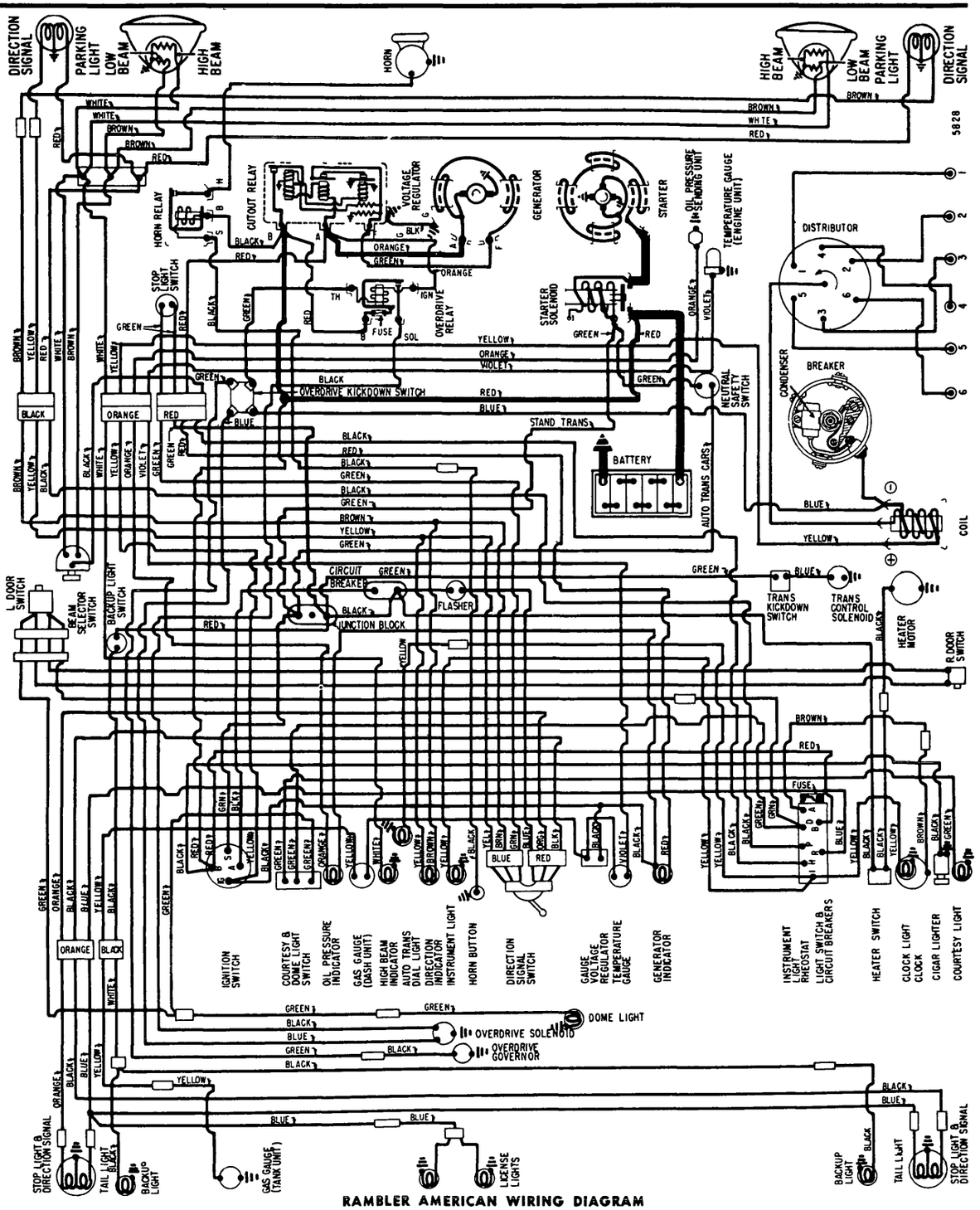
Current Regulator

Setting (1119122) - 23-27 amperes (Hot)

Setting (1119003) - 27-33 amperes (Hot)

Air Gap - 075" with armature pressed down to point where contacts just touch

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RAMBLER AMERICAN WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Checking & Adjusting - S "Delco-Remy 12 V It R gulat rs" in El ctrical S ction.

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. on 5810 Series. Single headlights on 5801 Series. See "4-Headlight Syst m" in Electrical Section.

Directi n Signals: S El ctrical Section

Light Switch R moval: Disconnect battery With switch in "OFF" position, press button release on top of light switch assembly, and pull knob and shaft clear of switch. Remove slotted nut, pull switch to rear of instrument panel

St p Light Switch: Located at rear of master cylinder (5801), at tee fitting in line to left front brake (5810).

CIRCUIT BREAKERS: Used as follows:

18 Amp r - Protects headlights & high beam indicator. Located in headlight switch.

12 Amper - Protects parking, tail, instrument, clock, and glove box lights. Located on headlight switch.

30 Amp r - Protects direction signals, stop & back-up lights, heater and air conditioner. Located inside body cowl on left side.

FUSES: Used as follows:

15 Ampere - Protects overdrive circuit. Located on overdrive relay (4-terminal relay), in lead to "B" terminal of relay (3-terminal relay).

7.5 Amper - Protects body lights. Located on headlight switch.

H rn Relay: Rambler No 3153958

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use xtreme care wh n disconnecting any part of air conditioning syst m or lines for access to engine. See "Air C nditi ning Servic Cautions" in Miscellaneous S cti n.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., "L" head (5801), valve-in-head (5810).

B r	Str k	Displacement
3 1/8" .	4 1/4"	195.6 cu. ins.
Compr. Rati	**Rated HP**	**Developed HP**
8.0-1 (5801)	23.4	90 at 3800 RPM
8.7-1 (5810, 1-bbl. carb.)	23.4	127 at 4200 RPM
8.7-1 (5810, 2-bbl. carb.)	23.4	138 at 4500 RPM

C mpr ssi n & Vacuum R ading - See TUNE-UP

►*ENGINE VIBRATION AT IDLE WITH TRANSMISSION IN "DRIVE" RANGE (5801 Series):* Caused by engine mount misalignment. *See "Engine Mountings" in Rambler Special Data for correctiv procedures and production changes.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambl r Special Data.*

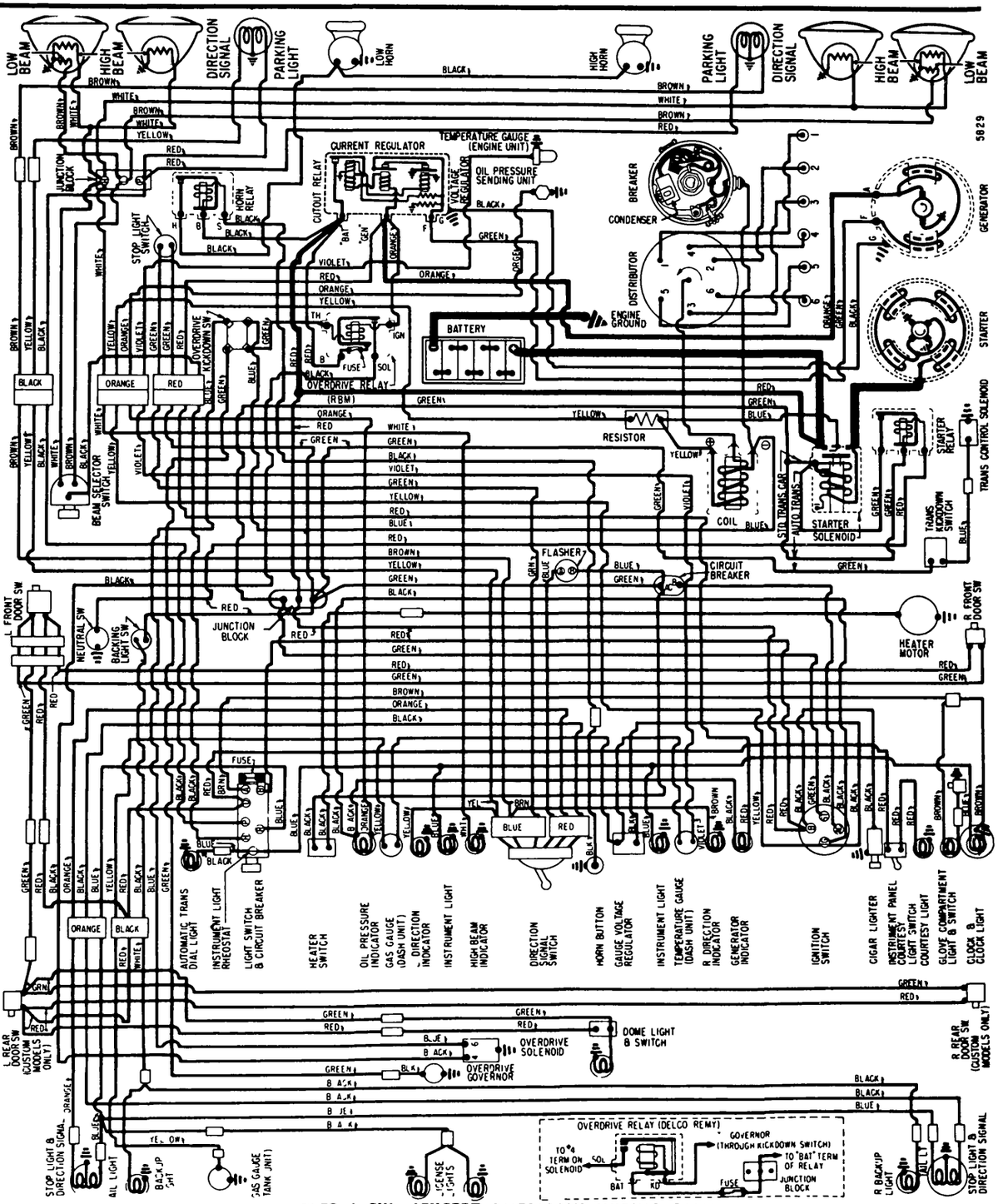
CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, tin plated type with flat top (5801), contoured top (5810)

Original B r & Piston Sizes - S "Original Bor & Pist ns" in Rambl r Special Data.

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RAMBLER 6 CYL. (EXCEPT AMERICAN) WIRING DIAGRAM

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Removal - Pistons and rods removed from above
Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom) Piston properly fitted should support its own weight with piston and bore dry
Replacement Pistons: Std., .002", .005", .010", and .020" Oversize Furnished with fitted pins
Installing Pistons: Notch in perimeter must be to front of engine

PISTON PINS

Press fit in connecting rod No locking device
Diameter - .8595-.8598" **Length** - 2.75"
Clearance in Piston - Palm press fit in piston at room temperature
Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data*
Replacement Pins: Fitted pins furnished with new pistons

PISTON RINGS

Two compression rings and one oil ring used No. 1 compression ring is alloy iron, chrome plated No. 2 compression ring is iron alloy, parco-lubrite Oil ring is three-piece, steel rail, with rail faces chrome plated

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0930-.0935"	.010-.020"	.003-.005"
Compr. (2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3) Ⓒ	.0245"	.015-.055"	.0001-.0084"

Ⓒ - Three-piece steel rail
Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter "Up"
Replacement Rings: Sets of Standard and .020" Oversize

CONNECTING RODS

Length - 6.625" center-to-center **Weight** - 23 ozs
Crankpin Journal Diameter—2.0948"-2.0955"
Original Bearing Sizes—*See "Original Bearing Sizes" in Rambler Special Data*
Bearings—Steel-backed babbitt. No shims
Clearance—.001"-.0015". **Side Play**—.005"-.015"
Replacement Bearings: Std., .001", .002", .010", .012" Undersize
Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

Journal Diameter—2.4791"-2.4798". Four Bearing.
Original Bearing Sizes—*See "Original Bearing Sizes" in Rambler Special Data*
Bearings—Steel backed babbitt. No shims.
Clearance - .0006-.0018"
Replacement Bearings: Std., .001", .002", .010" .012" Undersize
End Thrust: Taken by flanged front main bearing
Endplay - .003-.007"
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data*
VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Rambler Special Data*

CAMSHAFT

Bearings - Steel-backed babbitt bushings
Clearance - .001"-.003"
End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket
Endplay - .004-.008"
Timing Chain: Morse non-adjustable type **Width** 1" **Pitch** 3/8" **Length** 22½" or 60 links
Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data*
Engine Front Cover Removal. *See "Engine Front Cover" in Rambler Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data*

VALVES

Tappet Clearance: (5801) .016" Intake, .018" Exhaust COLD (5810) .012" Intake, .016" Exhaust HOT and running

5801 Series

Valve	Head Diam.	Stem Diam.	Length
Intake	1.469"	.3407-.3412"	4.781"
Exhaust	1.281"	.3407-.3412"	4.781"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° Ⓒ	.340"	.002-.0035"
Exhaust	45° Ⓒ	.340"	.002-.0035"

5810 Series

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° Ⓒ	.372"	.002-.0035"
Exhaust	45° Ⓒ	.369"	.0025-.004"

Ⓒ - Valve Face Angle 44°
►*VALVE GRINDING CAUTION* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32"
Valve Seat Width - 5/64"-3/32"
Valve Stem Oil Seal (5801) - None used
Valve Stem Oil Seal (5810) - Rubber deflectors mounted on all valve stems at upper end of guide
Valve Springs: Single spring used on each valve Specifications as follows

5801 Series

Valves	Lbs. Pressure	Length
Open	75-82	1.44"
Closed	37-41	1.75"

5810 Series

Valves	Lbs. Pressure	Length
Open	115-125	1.7/16"
Closed	65-70	1.13/16"

Valve Guides (5801): Use Tool J-1429-1 to remove and replace guides Guides should be flush with guide bore opening in block
Valve Guides (5810): Use Tool J-1429-B to remove and replace guides Guides should extend ¾" above cylinder head
Rocker Arm Assembly (5810): *See "Valve System" in Rambler Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

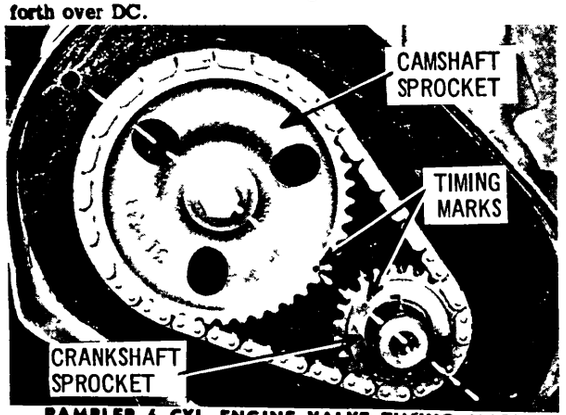
5801 Series

Intake Valves - Open 10° BTDC, Close 58° ALDC
Exhaust Valves - Open 49° BLDC, Close 19° ATDC

5810 Series

Intake Valves - Open 12°30' BTDC, Close 51°30' ALDC
Exhaust Valves - Open 53°30' BLDC, Close 10°30' ATDC

Valve Timing Check — Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.



RAMBLER 6 CYL. ENGINE VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM* *See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data*
Crankcase Capacity: 4 qts refill 1 qt addt'l with filter change
Normal Oil Pressure: 50 lbs at 3000 RPM (10 lbs min at 600 RPM)
Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block
Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge Sending unit located on right rear side of engine block
Oil Pump: Gear type Mounted on right side of engine *See "Oiling System" in Rambler Special Data*
Oil Filter: Partial Flow type Replace element every 4000 miles or sooner if needed
►*OIL FILTER NOTE* Oil pressure line should be connected to outer fitting on filter, and return line to center fitting If lines found reversed, connect properly and install new filter.
Replacement Filter Element - Rambler No. 8990068
Crankcase Ventilation: Filter in crankcase filler cap, and breather tube in valve chamber front side plate

COOLING

Water Capacity (5801): 11 qts., with heater 12 qts
Water Capacity (5810): 10 qts., with heater 11 qts
Pressure Valve: 13 lb Radiator Filler Cap, Rambler No. 3141371

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Form 2A

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Thermostat (5801): Choke type. 170° (Rambler No. 3131817) Std. early cars; 180° (No. 3131985) Std. later cars, Optl. early cars; 150° (No.3132708) Optl. all cars.

Thermostat (5810): Choke type. 170° (Rambler No. 3154748) Std. early cars; 180° (No. 3155882 - Dole, No. 3155881 - Thompson) Std. later cars, Optl. early cars.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gaug : King-Seeley "CV" electric type. **Dash Unit** - (5801) K-S No. 56107, (5810) K-S No. 54966.

Engin Unit - K-S No. 44250 (All Models).

See "T mperature Gaug s" in Miscellaneous Section.

CLUTCH

B rg & B ck. Used as follows:

	Borg & Beck Clutch Nos.		
Seri s	Mod l	Cover Assy.	Disc No.
5801 S.M. & O.D.	8A7	360987	382347
5810 S.M. (Early)	8.5A7	361391	382394
5810 S.M. (Later)	8.5A7	361416	382394
5810 O.D. (Early)	8.5A7	361391	382490
5810 O.D. (Later)	8.5A7	361416	382490

C - S.M. - Synchro-mesh, O.D. - Overdrive.

S "Borg & B ck Clutch s" in Clutch Section.

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warn r. Three-speed, helical gear type.

S Transmission Section.

►*SHIFTING MECHANISM VIBRATION OR RATTLE CORRECTION:* Install Spacer Washer, Part No. 3200973, above second and high shift lever to space lever and lube fitting away from bearing bracket. Gear Shift Operating Shaft Vibration Damper, Part No. 3104619, may be installed over steering gear jacket tube and gear shift operating shaft midway between instrument panel and firewall in some cases.

Transmission C ntr ls: *S e "Transmission Controls" in Transmission Secti n.*

R m val (5801): Disconnect rear spring front eye brackets from body floor pan, rear shock absorbers at axle tubes, rear brake hose bracket and hand brake cable at equalizer. Slide rear axle assembly rearward to remove front universal joint from transmission. Remove transmission attaching screws and use two Guide Pins (Tool J-1434) in place of two upper capscrews so transmission main shaft will clear clutch disc bearing and disc.

Removal (5810): Disconnect brake tube bracket from underside of body, torque tube from rear of transmission, parking brake cable from equalizer and cable housing from torque tube bracket. Move rear axle assembly to rear to remove front universal joint from transmission main shaft. Disconnect speedometer cable, shift rods and overdrive wires and cable (if so equipped). Remove transmission attaching screws and use two Guide Pins (Tool J-1434) in place of two upper capscrews so transmission main shaft will clear clutch bearing and disc.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

►*OVERDRIVE RELAY PRODUCTION CHANGE:* Three-terminal relay used from Serial No. D-423987 through D-432266, and from No. D-433701 through D-435482. *See Car Wiring Diagram for control circuits.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

Removal: Overdrive and transmission removed from car as a unit. *See "Synchro-mesh Transmission Removal" above.*

FLASH-O-MATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. *NOTE* - Vacuum and solenoid unit at rear of transmission control shift speeds (no throttle linkage).

►*PUSH BUTTON STICKING CORRECTION:* Forward or reverse button remains pushed in with neutral button pushed in. To correct install a clip, Part No. 3201142, on neutral slide of gear selector control. *See "Rambler Flash-O-Matic Transmission" in Transmission Section for procedure.*

►*OIL LEAKAGE CORRECTION:* To correct erratic shifting and oil leakage into vacuum and solenoid control assembly, install new rubber boot, Part No. 3151107, identified by raised letter "W" at forward end.

►*TESTING & TROUBLE SHOOTING: See "Flash-O-Matic Transmission" in Transmission Section.*

Lubrication - Check fluid every 1000 miles, drain and refill at 15,000 mile intervals, using Automatic Transmission Fluid Type "A".

Capacity - 10 quarts.

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature, push selector buttons "D-2", "D-1", "L", "R" and then "D-2" **(5810 Series);** move selector lever from "P" to "R" and then to "N" **(5801 Series).** Remove dipstick and check fluid level. Maintain fluid at "F" mark. Approximately 1½ pints required to raise level from "L" mark to "F" mark.

►*OTHER DATA: See "Flash-O-Matic Transmission" in Transmission Section.*

UNIVERSALS

Mechanics. Two used on 5801 Series, One used at transmission end on 5810 Series.

Torque Tube Bracket Adjustment - Std. & O.D. Transmission Cars (5810 Series) - *See "Rambler Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Semi-floating hypoid type with Hotchkiss Drive (5801), Torque Tube Drive (5810).

S "Rambl r Hypoid" in Rear Axl S ction.

Axl Rati s - Used as follows:

5801 S ri s		
Transmissi n	Std. Rati	Optl. Rati
Synchro-mesh	3.78-1 (9-34)	3.31-1 (13-43)
Overdrive	4.11-1 (9-37)	3.78-1 (9-34)
Flash-O-Matic	3.31-1 (13-43)	

5810 Series		
Transmission	Std. Ratio	Optl. Ratio
Synchro-mesh	3.78-1 (9-34)	4.38-1 (8-35)
		4.11-1 (9-37)
Overdrive	4.38-1 (8-35)	4.11-1 (9-37)
Flash-O-Matic	3.31-1 (13-43)	3.78-1 (9-34)

Backlash - .002-.006". Shim adjustment.

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together. On early cars punch mark hub to match punch mark on axle shaft when removing hub (later cars marked in production).* Remove wheel and drum, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable and remove brake support plate and slide plate, oil seal and shims off axle. Attach Special Puller J-2498-B to axle shaft and remove shaft from housing.

Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION - Punch marks on hub and shaft must match.* Tighten axle shaft nut to 250 ft. lbs. (supersedes previous specification of 150-200 lbs. on 5810). Bleed and adjust brakes.

►*REPLACEMENT HUB AND AXLE NOTE:* New hubs are not serrated; serrations are cut when hubs and shafts are assembled. DO NOT install an old hub on a new axle shaft since the serrations will not match. A new hub may be installed on an old shaft, but be sure to punch mark new hub after assembly. When installing a new hub and/or shaft, tighten nut until distance from outside face of hub to taper of axle shaft is 3/16".

►*REAR BRAKE DRUM CONTACT WITH SUPPORT PLATE CORRECTION:* May be caused by high torque specification of axle shaft nut which may shorten 3/16" distance from hub to taper of shaft, or removal of shims during axle shaft endplay adjustment. To correct, install 1/16" spacer, Part No. 3200966, between hub and drum. Mount spacer on wheel studs of hub and and hold in place by drum and speed nuts.

Rear Axle Assembly Removal (5801): Raise and support rear of body. Remove rear wheels and hubs (Puller J-1644-B or J-736-B). Disconnect propeller shaft at rear universal using Coupling Nut Wrenches J-4486. *(NOTE* - Place one wrench on universal joint yoke and one on coupling nut; nut holds yoke to rear axle pinion shaft.) Remove shaft. Disconnect rear shock absorbers, rear brake lines and rear springs from body. Remove axle and springs as an assembly.

Rear Axle Assembly Removal (5810): Drain lubricant, raise and support rear of body. Disconnect hand brake cable at bellcrank, and hand brake cable housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube. Roll axle free from car.

Axl Shaft Endplay - .002-.004". Adjusted by shims behind brake backing plate.

CONTINUED ON NEXT PAGE

Form 2B

CONTINUED FROM PRECEDING PAGE

Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted.

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type. Serviced by replacement.

Shock Absorber Application

Series	Front - Rambler No. -	Rear
5801	3200842	3200843
5810 Std. Susp.	3119821	3119822
5810 Air Susp.	3200980	©

© - No. 3200981 (Sedans & Hard Top), No. 3200982 (Station Wagons).

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel.
See "Rambler" in Suspension & Wheel Alignment Section.

►*STEERING EFFORT IMPROVEMENT:* To improve steering effort, and reduce road shock, install needle bearings, Part No. 3133514, at upper control arm trunnion on **5801 Series;** install upper control arm trunnion assemblies, Part No. 3155439, on **5810 Series,** as required.

Kingpin Inclination - 8° (5801), 6½° (5810).
Caster (5801, 5810 Manual Steering) - 0° to Pos.½°. ½° preferred.
Caster (5810 Power Steering) - Pos. ½° to Pos. 1°. 1° preferred.
Camber (All) - Neg. ¼° to Pos. ¼°. 0° preferred.
Toe-In - 1/16-3/16"
Toe-Out on Turns - Inner wheel 20°, outer wheel 17°40' (5801), 17°17' (5810).

REAR SUSPENSION

Rear Suspension (5810): *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Neoprene air springs mounted within rear coil springs. Optional on 5810 Series *See "Rambler Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual (5801): Gemmer. Worm & Roller type.
See "Gemmer Worm & Roller" in Steering Section.

Manual (5810): Saginaw. Recirculating ball type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

►*5810 SERIES STEERING WHEEL ROAD SHOCK CORRECTION:* To eliminate road shock install Kit, Part No. 3209508, which provides a spring load on pitman arm ball stud seat at inner end

Power Steering: Monroe Linkage Type.
See "Monroe Linkage Type" in Steering Section.

►*POWER STEERING PUMP PRODUCTION CHANGE:* Effective Serial No D-418421, Eaton Roll Type pumps replaced rotor type previously used

►*POWER STEERING PUMP OIL LEAK CORRECTION:* On Eaton Roll Type pumps before Serial No D-458536 (except between D-454782 to D-457800), an oil leak at reservoir cover can be corrected by installing full width cover gasket, Part No 3201079.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" or "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" or "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Wagner (Lockheed) Self-Centering. Self-centering type with Bendix type shoes Star wheel adjusting screw for each wheel Hand lever or "Park" bar apply rear wheel service brakes
See "Wagner (Lockheed) Self-Centering" in Brake Section.

►*5815 SERIES PARKING BRAKE INTERFERENCE CORRECTION:* If parking brake cable bellcrank interferes with adjusting rod, install new rod, Part No 3155108. Install offset section of rod with outside radius of bend toward left side of car

Drum Diameter - 9" front and rear.
Wheel Cylinder Diameter - 1" front, 13/16" rear
Braking Power - 60 2% front, 39 8° rear.
Replacement Linings & Shoes-Linings and shoes with linings furnished in standard size only.
Lining Thickness - .1875" (5801), .20" (5810).

Lining Width & Length - 5801 Series

Shoe	Front & Rear Wheels
Primary	2" x 7.62"
Secondary	2" x 9.82"

Lining Width & Length - 5810 Series

Shoe	Front Wheel	Rear Wheels
Primary	2.25" x 7.31"	2" x 7.62"
Secondary	2.5" x 9.52"	2" x 9.82"

Clearance - Adjusting wheel backed off eight notches after wheels tight against drum, or until wheels just begin to turn.

Standard Master Cylinder: In engine compartment under steering column.
Checking Fluid - Fill from engine compartment. Check at 1000 mile intervals
Removal - Remove from beneath car Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit, Hydraulic Reaction Type. *See "Bendix Power Unit (Hydraulic Reaction Type)" in Brake Section.*
Checking Fluid - Same as for standard master cylinder

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door. *See "Rambler Electric Window Controls" in Miscellaneous Section.*

Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Seri s	Series Identification
Rebel V8	5820
Ambassador V8	5880

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood.
Starting Serial Nos. - 5820 - A-16001, 5880 - V-27001.
ENGINE NUMBER: Stamped on lower left front corner of engine block, also on generator bracket.
Starting Engin Nos. - 5820 - G-24001, 5880 - N-17001.
►*ENGINE NUMBER LETTERS (Following Engine Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize *See "Original Bore & Pistons" and "Original Bearing Siz s" in Rambler Special Data*

TUNE-UP

COMPRESSION PRESSURE: 140 lbs. minimum at 315 RPM (cranking speed).
VACUUM READING: 18-21" at idle.
VALVE TAPPET CLEARANCE: 5820 Series Only - .012" (Intake), .014" (Exhaust) HOT and running. **5880 Series** - Hydraulic lifters used.
MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between left bank exhaust manifold and exhaust crossover pipe (exhaust gases diverted through heat passages in manifold when valve closed).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylind rs - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs - Auto-Lite AL-7J or Champion H-10-64D or Champion H-18Y. 14 mm. Torque to 30 ft. lbs.

COIL: Delco-R my 1115105.
Ignit n Curr nt - 2.3 amps. idling, 3.75 amps. stopped.
R sist r - Delco-Remy 1927809. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE.* Connected in series between battery and coil. Resistor is bypassed during cranking by solenoid, making direct lead from battery to coil.

DISTRIBUTOR: D lc -Remy 1110923 (5820), 1110887 (5880). External adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section*

►*HYDRAULIC VALVE LIFTER (RIGHT BANK) NOISE CORRECTION:* Manufacturing groove in steady rest surface of distributor may be within 45° of oil hole for right tappet oil gallery, causing oil leakage, noisy lifters, low oil pressure To correct, rotate distributor **1 tooth clockwise** so boss in cap for rear hold-down clamp is to left of centerline. Reform vacuum line. Reset timing *NOTE* - Groove located 180° to rear after Serial Nos. N-20388 and G-26233, and above correction not required.
Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd
Contact P int S t - Delco-Remy 1931988.
Breaker Gap - Gap is correct when cam angle correctly set - (see below).
Cam Angl - 28-32°, set to 30°, gives .016" point opening
Br ak r Arm Spring T nsion - 19-23 ozs.
Rotation - Counterclockwise viewed from above

Automatic Advanc - 1110923

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	1-5	750
8-5-10.5	625	17-21	1250
13-15	1350	26-30	2700
17-19	2000	34-38	4000

Automatic Advance - 1110887

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0-4	700
7.5-9.5	775	15-19	1550
12-14	1300	24-28	2600
17-19	1900	34-38	3800

Vacuum Spark Control: Delco-Remy 1116117 (1110887 Distr.), 1116113 (1110923 Distr.).

Vacuum Advance - 1116113

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5.5-7.5
11-13	22-26	13.25-15.50

Vacuum Advance - 1116117

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
10	20	14.25-15.75

IGNITION TIMING

Setting - 5° BTDC at 500 RPM.
Timing Mark - Timing indicator on front cover and 5° mark on vibration damper (center notch).

CARBURETOR

►*CARBURETOR APPLICATION: One Holley 4-barrel carburetor used.*

HOLLEY 4-BARREL

Holley Model 4150C. 5820 - No. R-1748A Early, R-1748-1 Later.
5880 - No. R-1312A Early, R-1312-1 Later.

►*ABNORMAL TRANSMISSION OPERATION, THROTTLE SURGE, ROUGH ENGINE OPERATION CORRECTION* May be caused by air leak from throttle body to intake manifold Correct by installing additional gasket between throttle body and spacer

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2-3 5-8, LEFT barrels 1-4-6-7*

Idle Setting - Initial setting 1 turn open Turn screws out for richer mixture
Idle Speed - 550 RPM (Synchro-mesh & O D), 475 RPM (Flash-O-Matic in "N") 450 RPM (Air Conditioning "ON", Flash-O-Matic in "N")

Throttle Linkage Adjustment (Flash-O-Matic Trans.): None required

►*OTHER DATA See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Fuel and vacuum
Replacement Pump - Carter No M2433SA
Pressure - 4-5½ lbs maximum
See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: King-Seeley Electric Constant-Voltage "CV" type with gauge voltage regulator, King-Seeley No 56075
Dash Unit - King Seeley No 54964 (5820), No 54944 (5880)
Tank Unit - King-Seeley No 44664 (All Models)
See "Fuel Gauges" in Carburetion Section

AIR CLEANER: Dry type element used
►*DRY TYPE CLEANING CAUTION* Clean filter element every 5 000 miles by tapping and shaking to remove dirt particles Replace every 15,000 miles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Auto-Lite 11-HS-50 (Std.): 12 volt, 9 plate, 50 ampere hour capacity **Auto-Lite 11-HS-60 (Air Cond.).** 12 volt, 11 plate, 60 ampere hour capacity Both at 20 hr rate
Battery Ground - Negative
Engine Ground - Battery to engine with body ground from engine to rear crossmember

STARTER

Delco-Remy. Used as follows

Series	Starter N .
5820 (Early)	1107648
5820 (Late)	Ⓒ 1107704
5880 (Early)	1107714
5880 (Late)	Ⓒ 1107717

Ⓒ - "Enclosed Shift" type
Armature - Delco-Remy 1926626 (1107648 Starter).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107648

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Performance Data - 1107704

Torque	RPM	Volts	Ⓓ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

Performance Data - 1107714

Torque	RPM	Volts	Ⓓ Amperes
0 ft. lbs.	3240	10.6	112
	Lock	3.5	320-385

Performance Data - 1107717

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Ⓒ - Includes Solenoid.
►*STARTER RELAY FAILURE CORRECTION (FLASH-O-MATIC CARS):* Moisture condensation in relay may cause failure. To correct, drill 1/8" hole above gasket flange section of cover at lowest point Later cars have vent or insulating fiber cut away
Starter Switch: Delco-Remy Solenoid Switch 1119760 mounted on starter and controlled by combination Ignition & Starter Switch Neutral Safety Switch mounted on Push Button Control

GENERATOR

Delco-Remy Used as follows

Series	Generator N .
5820 (Standard)	Ⓒ 1100304
5820 (Air Cond.)	Ⓖ 1102018
5880 (Standard)	Ⓖ 1102018
5880 (Air Cond.)	Ⓖ 1102070

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Replac ment G n rat r (Less Pull y) - ℂ 1100313 ℂ 1102012 ℂ 1102055

Armatur - Delco-Remy 1928952 (1100304 Gen.), 1923535 (1102018 Gen.), 1932900 (1102070 Gen.).

Performance Data

Generator	Amperes	Volts	RPM
1100304	25	14.0	2710
1102018	30	14.0	2310
1102070	35	14.0	2510

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.50-1.62 amperes (1100304 Gen.), 1.48-1.62 amperes (1102018 Gen.), 1.69-1.79 amperes (1102070 Gen.), 12 volts at 80° F.

B lt Adjustment: ½" deflection midway between fan and generator pulleys with 25 lbs. pressure, or use Tool J-6733 as follows Place gauge on longest accessible span of belt between two pulleys Move generator on its mounting bracket until index mark on spring loaded plunger lines up with upper edge of gauge. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

REGULATOR

D lco-Remy No. 1119122 (1100304 Gen.), 1119003 (1102018 Gen), 1119168 (1102070 Gen).

NCTE - Specifications below are "Normal" settings

Cutout Relay

Cuts In - 11 8-13 5 volts

C ntact Gap - 020"

Air Gap - 020" with contacts just closed

Voltage Regulator

Setting - 13 8-14 8 volts (hot)

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco Remy 12-Volt Regulators" in Electrical Section*

Current Regulator

Setting - 23-27 amps (1119122), 27-33 amps (1119003), 32-37 amps (1119168), Hot

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 12-Volt Reg ulators" in Electrical Section*

MISC. ELECTRICAL

H adlamps: Dual headlights (4-Headlight System) Std S e *"4-Headlight System" in Electrical Section*

Dir ction Signals: *See Electrical Section*

Light Switch Removal: Disconnect battery With switch in "OFF" position, press button release on top of light switch assembly, pull knob and shaft clear of switch Remove slotted nut, pull switch out at rear of panel

St p Light Switch: Located at tee fitting in line to left front brake

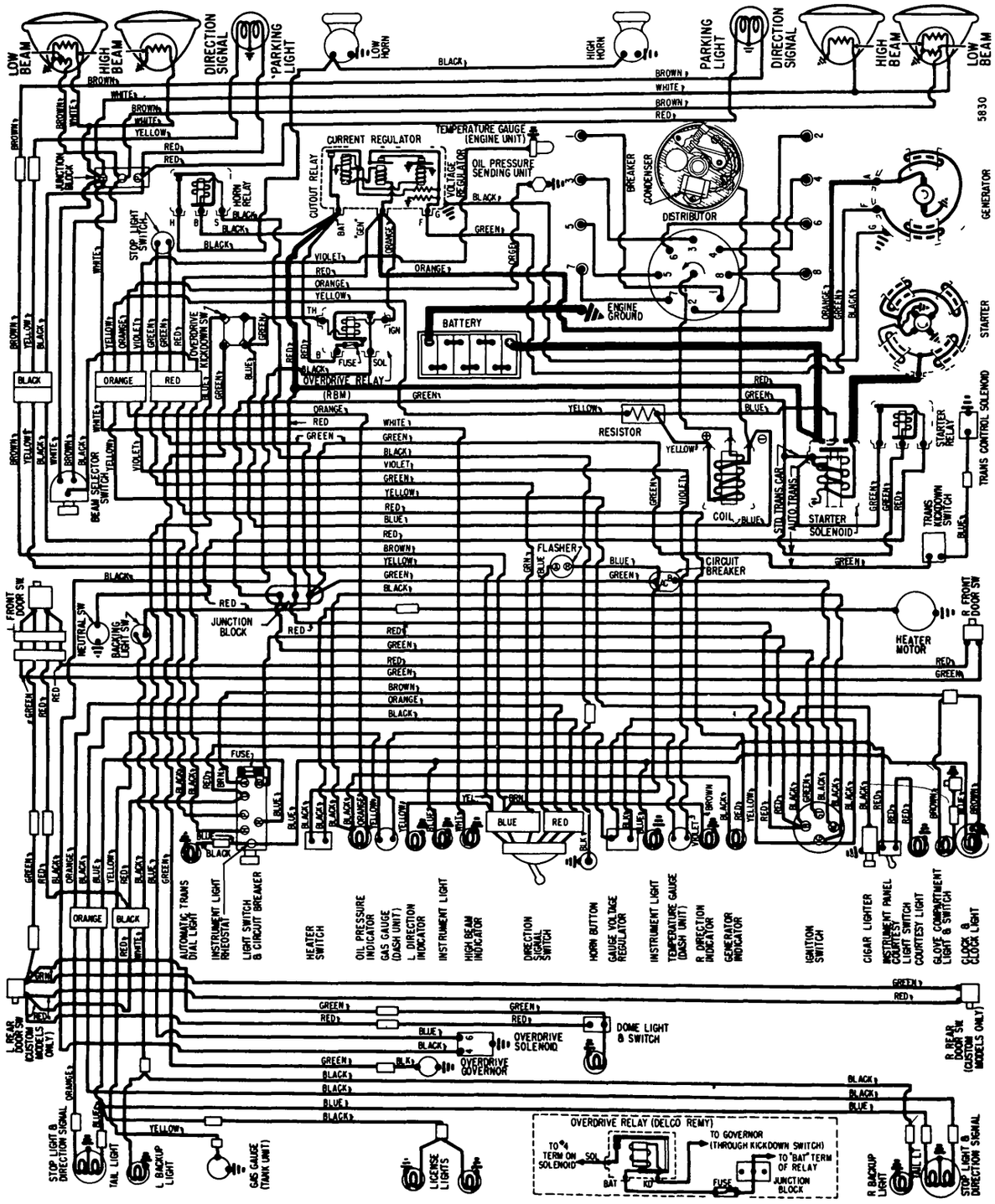
CIRCUIT BREAKERS: Used as follows

18 Ampere - Protects headlights and high beam indicator. Located in headlight switch.

12 Ampere - Protects parking, tail, instrument, clock, and glove box lights. Located in headlight switch.

30 Amp r - Protects direction signals, stop and backup lights, heater and air conditioner. Located inside body cowl on left side.

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FUSES: Used as follows:

15 Amp re - Protects overdrive circuit Located on overdrive relay (4-terminal relay), in lead to "B" terminal of relay (3-terminal relay)

7.5 Ampere - Protects body lights Located on headlight switch

Horn Relay: Rambler No 3153958

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extrem care when disconnecting any part of air conditioning system or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own V8. Valve-in-head.

S ries	Bor	Stroke	Displacement
5820	3½"	3¼"	250 cu. ins.
5880	4"	3¼"	327 cu. ins.
Seri s	**Compr. Ratio**	**Rated HP**	**Developed HP**
5820	8.7-1	39.2	215 at 4900 RPM
5880	9.7-1	51.2	270 at 4700 RPM

C mpression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD INSTALLATION: *See "Cylinder H ad & Manifolds" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifica-ti ns" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset toward thrust side of piston.

Original B r & Pist n Sizes - *See "Original Bore & Pistons" in Rambler Special Data.*

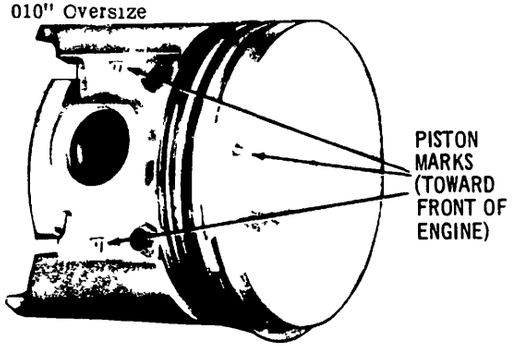
W ight - 18 ozs (5820), 23 45 ozs (5880)

R moval - Piston and rods removed from above

Cl aranc - 0009 0015" (Skirt Bottom)

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward forward front of engine

R plac ment Pistons: Furnished Std , 002", 005" & 010" Oversize



PISTON PINS

Press fit in connecting rod. No locking device.

Diam t r - 9307" **L ngth** - 3 1870"

Pin Fit in Pist n – Palm press fit at room temperature.

Pin Rem val & Installation – *See "Piston Pins" in Rambler Special Data.*

R plac m nt Pins: Std., .003", .005" Oversize.

PISTON RINGS

Three rings (two compression & one oil) used. Upper ring is chrome plated. Oil control ring is three piece type (two oil control wiper rails with a segmented steel spacer between them).

Ring	Width	End Gap	Sid Cl aranc
Compr. (1)	.0775-.0780"	.010-.020"	①
Compr. (2)	.0775-.0780"	.010-.020"	②
Oil (3)	.0245"	.015-.055"	.0001-.0079"

① - (5820) .002-.0035", (5880) .002-.006".

② - (5820) .002-.004", (5880) .002-.006".

Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter "UP".

Replacement Rings: Sets of Std , 020" and 030" Oversize

CONNECTING RODS

Crankpin Journal Diameter – 2.2483-2.2490".

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data.*

Length - 6 3750" center-to-center **Weight** - 27 6 ozs

Lower Bearing – Precision, steel-backed, babbitt.

Clearance – .0007-.0028". Side Clearance –.004-.012".

Replacement Bearings: Std , 001", 002", 010" & 012" Undersize

Installing Rods: Assemble connecting rod with notch in piston and connecting rod identification mark to front of engine. Cylinder numbers on connecting rod should be toward outside of bank in which they are installed.

CRANKSHAFT

Journal Diameter - 2.4983-2 4990" (To Eng. No. G-28562 & N-25554), 2.4988-2.4995" (After above Nos.).

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data.*

►*MAIN BEARING NOISE CORRECTION:* If main bearing noise similar to fuel pump diaphragm noise occurs at idle speed, install 001" or 002" undersize bearing, especially at No 1 & No 5 bearings On later cars, journal diameter has been increased to eliminate this condition *(see "Journal Diameter" above)*

Bearings – Precision, steel-backed, babbitt.

Clearance – .0006"-.0032".

Replacement Bearings: Std,, 001", 002", 010" & 012" Undersize

End Thrust: Taken by No. 1 flanged bearing.

Endplay – .003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" Rambler Special Data.*

VIBRATION DAMPER REMOVAL & INSTALLATION: *See "Vibration Damper" in Rambler Special Data*

CAMSHAFT

Bearings - Five steel-backed babbitt lined bushings pressed in block and line reamed

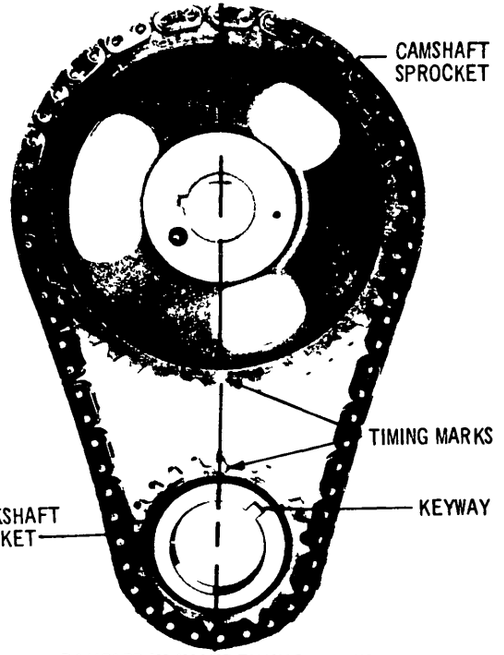
Clearance - 001- 003"

End Thrust: Taken by thrust plate behind camshaft sprocket

End Play - 003- 006"

Timing Chain: Morse non-adjustable type **Width** 875", **Pitch** 375", **Length** 23¼" or 62 links

Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers To check assembly, rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position There should be 10 links or 20 pins between timing marks



RAMBLER V8 VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data*

Engine Front Cover Oil Seal (Crankshaft Front S al): *See "Engine Front Cover" in Rambler Special Data*

VALVES

Tappet Clearance: 5820 Series Only - 012" (Intake), 014" (Exhaust) HOT and running **5880 Series** - Zero lash, hydraulic lifters

►*HYDRAULIC VALVE LIFTER NOISE CORRECTION See DISTRIBUTOR above*

Valve	Head Diam.	Stem Diam.	L ngth
Intake	1.787"	.3412-.3417"	4:827"
Exhaust	1.406"	.3407-.3412"	4.827"
Valve	**Seat Angle**	**Lift**	**Stem Clearanc**
Intake	30° ①	.375"	.0013-.0028"
Exhaust	45° ②	.375"	.0018-.0033"

① - Valve face angle 29°. ② - Valve face angle 44°.

Valve Seat Width – .078-.093" (Intake), **.093-.104"** (Exhaust).

Valve Stem Seals – Rubber deflector installed on valve stem and over top of guide on all valves.

►*EXHAUST VALVE OIL DEFLECTOR PRODUCTION CHANGE* New oil deflector, Part No 3155892, used beginning Engine No G-31292 (5820), N-28352 (5880) to improve valve stem lubrication and reduce noise New deflector is 7/16" long

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Valv Springs: Install springs with closed coil end against cylinder head. **Fr L ngth - 2.20".**

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85 - 91 lbs.	1 13/16"
Open	150 -160 lbs.	1 7/16"

Valve Guides: Drive old guides out, drive new guides in to height of ¾" ± 1/64" above cylinder head (measure from top of guide to flat machined surface of lower spring retainer on head). Ream all guides to I.D. of .3430-.3440" after installation.

Valve Lifters: Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing – *See "Valve System" in Rambler Special Data.*

Rocker Arm Assembly: *"Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 12°30' BTDC. Close 51°30' ALDC.

Exhaust Valves– Open 53°30' BLDC. Close 10°30' ATDC.

Valve Timing Check: Remove valve compartment cover and spark plugs. Crank engine until #6 piston in right bank is on TDC of compression stroke (#1 piston wil' be on TDC of exhaust stroke in overlap position). Rotate crankshaft 90° counter-clockwise. Install dial indicator on #1 intake rocker arm pushrod end. Crank engine in a clockwise direction until dial indicator dicates pushrod movement, (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* – If more than ½" variance in either direction, remove timing chain cover and inspect installation. Replace if deflection exceeds 1/2".

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts refill Add 1 qt. with filter change

Normal Oil Pressure - 55 lbs at 3000 RPM (10 lbs min at 600 RPM)

►*INACCURATE OIL LEVEL READING CORRECTION:* Effective Engine No G-30842 (5820), N-28006 (5880) new dipstick, Part No 3155893, superseded Dipstick, Part No. 3154370 New dipstick has "Add Oil" mark 23/32" from bottom of stick Use new dipstick if oil level reading inaccurate

Pressure Regulator - In oil pump Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge Sending unit located on left rear side of engine block.

Oil Pump: Gear type Mounted on rear main bearing cap and driven by distributor drive shaft. *NOTE* - Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul & Installati n - *See "Oiling System" in Rambler Special Data.*

Oil Filter: Full Flow, Disposable type Replace filter every 4000 miles or sooner if needed.

►*OIL FILTER OIL LEAK CORRECTION:* To correct oil seepage during engine warm-up on early cars, install new rubber seal mounting gasket, Part No 3201145, identified by white paint on outside diameter

►*OIL FILTER INSTALLATION CAUTION:* Install new filter and turn **by hand** until gasket contacts seat Then tighten ½-turn *Do not overtighten.*

Replacement Filter - Rambler No 8990499

Crankcase Ventilation: Filter element in oil filler cap (air inlet) and breather pipe in valve tappet cover.

COOLING

Water Capacity: 20 qts (5820), 19 qts (5880) Add 1 qt with heater.

Pressure Valve: Radiator filler cap, 13 lbs

►*"POWR-SAVER" FAN PRODUCTION CHANGE AND NOTE:* This fluid fan standard on all Air Conditioned 5880 Series cars effective Serial No V-35446, Engine No N-25888. Fan will operate up to 2600 RPM ± 100 RPM and will then slip to maintain this speed Service is by replacement only with Viscous Fan Drive Assembly, Part No 3155139

Thermostat: Choke type 170° (Rambler No 3154748) Std early cars, 180° (No 3155882 - Dole, No 3155881 - Thompson) Std later cars, Optl early cars

Water Pump: Centrifugal, double row ball bearing type Requires no lubrication Serviced as an assembly

Temperature Gauge: King-Seeley "CV" Electric type.

Dash Unit - K-S No 54966 (5820), No 54946 (5880)

Engine Unit - K-S No. 44250 (All Models)

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. Used as follows:

Series	Model	Cover Assy.	Disc No.
5820 Std	10A7	361436	CD752
5820 Hvy Dty	10A7	361407	381806
5880 Std	10 5A6	361442	382574
5880 Hvy Dty	10 5A6	361449	382574

See "Borg & Beck" in Clutch Section.

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly. Lengthening link reduces freeplay.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange

SYNCHRO-MESH TRANSMISSION

Warner. Three-speed, helical gear type.

See Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*TRANSMISSION CHANGE FOR IMPROVED SHIFTING: See "Warner Transmission" in Transmission Section.*

►*SHIFTING MECHANISM VIBRATION OR RATTLE CORRECTION:* Install Spacer Washer, Part No. 3200973, above second and high shift lever to space lever and lube fitting away from bearing bracket. Gear Shift Operating Shaft Vibration Damper, Part No. 3104619, may be installed over steering gear jacket tube and gear shift operating shaft midway between instrument panel and firewall in some cases.

R m val: Disconnect hydraulic brake tube bracket on underside of body, torque tube at rear of transmission, hand brake cable and housing, speedometer cable, and shifter rods. Disconnect overdrive control cable and electrical control wires from solenoid and governor where so equipped. Move rear axle to rear to separate universal joint. Remove two upper transmission-to-bell housing bolts and install special guide pins (Tool J-1434) in their place. Remove lower bolts slide transmission out.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

►*OVERDRIVE RELAY PRODUCTION CHANGE:* Three terminal relay used from Serial No A-18814 through No A-20061 (5820), and from Serial No V-31831 through No V-34359 (5880) *See Car Wiring Diagram for control circuits.*

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section*

Removal: Overdrive and transmission removed from car as a unit *See "Synchro-mesh Transmission Removal" above.*

FLASH-O-MATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. *NOTE* - Vacuum and solenoid unit at rear of transmission control shift speeds (no throttle linkage).

►*OIL LEAKAGE CORRECTION:* To correct erratic shifting and oil leakage into vacuum and solenoid control assembly, install new rubber boot, Part No 3151107, identified by raised letter "W" at forward end

►*2-3 UPSHIFT SLIPPAGE CORRECTION:* Install new pressure regulator valve spring *See "Flash-O-Matic Transmission" in Transmission Section.*

►*PUSH BUTTON STICKING CORRECTION:* Forward or reverse button remains pushed in with neutral button pushed in To correct install a Clip, Part No 3201142, on neutral slide of gear selector control *See "Rambler Flash-O-Matic Transmission" in Transmission Section for procedure.*

Lubrication - Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A"

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature push selector buttons "D-2", "D-1", "L", "R" and then to "D-2" Remove dipstick and check level Maintain at "F" mark

"OTHER DATA: See "Flash-O-Matic Transmission" in Transmission Section.

UNIVERSALS

Detroit or Mechanics. One universal used at front end of propeller shaft

REAR AXLE

Own *(See note below).* Semi-floating, hypoid type "Powr-Lok" optional on both series in same axle ratios *See "Rambler Hypoid" and "Spicer Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

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►*5820 SERIES REAR AXLE NOTE:* Spicer type rear axles used on 5820 Series with Flash-O-Matic from beginning of production to Serial No. A-17647 and from Serial Nos. A-17701 to A-18257.

►*"POWR-LOK" DIFFERENTIAL IDENTIFICATION NOTE:* Identified by lubricant caution tag attached to filler plug.

Axl Ratios - Used as follows:

5820 Series

Transmissi n	Standard	Optional
Synchro-mesh	4.10-1 (10-41)	4.44-1 (9-40)
Overdrive	4.44-1 (9-40	4.10-1 (10-41)
Flash-O-Matic	3.55-1 (11-39)	3.15-1 (13-41)

5880 S ri s - Synchro-mesh & Overdrive 4.10-1 (10-41), Flash-O-Matic 3.15-1 (13-41).

Backlash - .002-.006".

Axl Shaft Rem val: *CAUTION - Hub and axle shaft are s rrated to mate and fit together. On early cars punch mark hub to match punch mark on axle shaft when removing hub (later cars marked in production).* Remove wheel and drum. Pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable and remove brake support plate. Slide plate, oil seal and shims off axle. Attach Special Puller J-2498-B to axle shaft and remove shaft from housing.

Axl Shaft Installati n: Reverse removal procedure and note the following: *CAUTION - Punch marks on hub and shaft must match.* Tighten axle shaft nut to 250 ft. lbs. (supersedes previous specifications of 150-200 lbs.). Bleed and adjust brakes.

►*REPLACEMENT HUB AND AXLE NOTE:* New hubs are not serrated; serrations are cut when hubs and shafts are assembled. DO NOT install an old hub on a new axle shaft since the serrations will not match. A new hub may be installed on an old shaft, but be sure to punch mark new hub after assembly. When installing a new hub and/or shaft, tighten nut until distance from outside face of hub to taper of axle shaft is 3/16".

►*REAR BRAKE DRUM CONTACT WITH SUPPORT PLATE CORRECTION:* May be caused by high torque specification of axle shaft nut which may shorten 3/16" distance from hub to taper of shaft, or removal of shims during axle shaft endplay adjustment. To correct, install 1/16" spacer, Part No. 3200966, between hub and drum. Spacer must be aligned with three small screw holes used to hold drum to hub.

R ar Axle Ass mbly R m val: Drain lubricant, raise and support rear of body. Disconnect handbrake cable at bellcrank, and hand brake cable housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube. Roll axle free from car.

Axl Shaft Endplay - .002-.004". Adjusted by shims behind brake backing plate.

Wh l B aring Adjustment - Will be correct when axle shaft endplay adjusted.

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type. Serviced by replacement.

Shock Absorber Application

Series	Front - Rambler No. -	Rear
Std.	3119821	3119822
Air Susp.	3200980	Ⓒ

Ⓒ - No. 3200981 (Sedans & Hard Top), No. 3200982 (Station Wagons).

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel.

See "Rambler" in Suspension & Wheel Alignment Section.

Kingpin Inclination - 6½°

Caster (Manual Steering) - 0° to Pos. ½°. 0° preferred.

Caster (Power Steering) - Pos. ½° to Pos, 1°. 1° preferred.

Camber - Neg. ¼° to Pos. ¼°. 0° preferred.

Toe-In - 3/16".

Toe-Out on Turns - Inner wheel 20°, outer wheel 17° 14' (5820), 17° 28' (5880).

REAR SUSPENSION

Rear Suspension: *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Neoprene air springs mounted within rear coil springs. Optional on both series. *See "Rambler Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw. Recirculating ball type.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Monroe Linkage Type. *See "Monroe Linkage Type Power Steering" in Steering Section.*

►*POWER STEERING PUMP PRODUCTION CHANGE:* Effective Serial Nos. A-17038, A-17041, V-29678 and V-29725, Eaton Roll Type pumps replaced rotor type previously used.

►*POWER STEERING PUMP OIL LEAK CORRECTION:* On Eaton Roll Type pumps before Serial No. A-22474 and V-37452, an oil leak at reservoir cover can be corrected by installing full width cover gasket, Part No. 3201079.

St ring Linkage: *Se "Steering Linkag " in Ste ring S ction.*

Steering Wh l & H rn Butt n R m val: *S "Saginaw Ball B aring Worm & Nut" in Steering S ction.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm and Nut" in Steering Section.*

BRAKES

Bendix Hydraulic Single Anchor (Without Eccentric). Early type requires hand adjustment, **Later type** has automatic adjustment.

See "Bendix Hydraulic Single Anchor (Without Eccentric)" and "Bendix Automatic Brake Adjusters" in Brake Section.

Drum Diameter- 10" Front and Rear.

Wheel Cylinder Diameter - 1 1/8" Front, 7/8" Rear.

Braking Power - 62.4% Front, 37.6% Rear.

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only.

Lining Thickness - .214".

Lining Width & Length

	Front Wheels	Rear Wheels
Primary Shoes	2" x 8.96"	1.75" x 8.48"
Secondary Shoes	2.5" x 11.06"	1.75" x 10.89"

Clearance (Without Adjusters) - Adjusting wheel backed off 8 or more notches from point where shoes are tight against drum.

Clearance (With Adjusters) - *See "Bendix Automatic Brake Adjusters" in Brake Section.*

Standard Master Cylinder: In engine compartment under steering column.

Checking Fluid - Fill from engine compartment. Check at 1000 mile intervals.

Removal - Remove from beneath car. Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit, Hydraulic Reacti n Type. *See "Bendix Power Unit (Hydraulic Reaction Type)" in Brake Section.*

Checking Fluid - Same as for standard master cylinder.

Removal - Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link and Arm Type. *S "Windshield Wipers" in Miscellaneous Section.*

Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door. *See "Rambler Electric Window Controls" in Miscellaneous Section.*

Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Mdl	Series
Rambler American	5901
Rambler 6 Cylinder	5910

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel.

ENGINE NUMBER: Stamped on pad on upper left front of cylinder block above generator.

►*ENGINE NUMBER LETTER CODE (Following Engine Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engine not so marked are standard in all respects.

"A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize. *See "Original Bore & Pistons" and "Original Bearing Sizes" in Rambler Special Data.*

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. min. at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VACUUM READING: 20½" idling in Neutral.

VALVE TAPPET CLEARANCE: (5901) .016" Intake, .018" Exhaust COLD..(5910). .012" Intake,..016" Exhaust HOT and running.

►*VALVE SEQUENCE (For Tappet Clearance Adjustment):* *See "Valve System" in Rambler Special Data.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite AL-7 or Champion H-10. 14 mm. Torque to 30 ft. lbs.

COIL: Delco-Remy 1115047 (5901), 1115094 (5910).

Ignition Current - (5901) 1.1-1.8 amps. idling, 2.4-3.1 amps. stopped. (5910) 1.7 amps. idling, 3.75 amps. stopped.

Resistor - Delco-Remy 1927809 (1115094 Coil).

►*NOTE: Resistor not used on 5901 Series.*

►*COIL RESISTOR NOTE:* Resistor connected in series between ignition switch and coil. Bypassed during cranking by direct lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy 1112426 (5901), 1110246 (5910).

Condenser - Delco-Remy 1928111 (5901), 1869704 (5910).

Capacity - .18-.23 mfd. (All).

Contact Point Set - Delco-Remy 1918148 (1110246 Distr.).

Breaker Gap - .016".

Cam Angle - 28-35°

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1112426

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	525	0-4	1050
1.5-3.5	700	3-7	1400
4-6	1425	8-12	2850
6-8	2100	12-16	4200

Automatic Advance - 1110246

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	600	1-5	1200
5-7	900	10-14	1800
7.5-9.5	1500	15-19	3000
10-12	2100	20-24	4200

Vacuum Spark Control: Delco-Remy 1116072 Separate Type (1112426 Distr.), 1116139 Integral Type (1110246 Distr.).

Vacuum Advance - 1112426 Distr.

Distr: Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
5.5	11	11

Vacuum Advance - 1110246 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11	22	16-17

IGNITION TIMING

Setting - 3° BTDC (5901), 5° BTDC (5910) at 500 RPM.

Timing Mark - Align mark on vibration damper with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF carburetor used on 5901 Series, Holley "Visi-Flo" (1-barrel) standard on 5910 Series, Carter WCD (2-barrel) optional on 5910.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

CARTER YF

Carter YF 2014S. Single barrel, downdraft type.

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Syhchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral).

Float Level - ½" (Gauge T109-83) from top of float at free end to top surface of bowl cover (air horn and float assembly inverted and gasket removed). To adjust, bend float lip.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .054" throttle valve opening (Gauge T109-193) with choke valve tightly closed. Adjust by bending fast idle connector link at lower angle.

Automatic Choke Setting: One notch lean.

►*OTHER DATA: See "Carter YF" Carburetors in Carburetion Section.*

HOLLEY "VISI-FLO"

Holley "Visi-Flo" Model 1904FC, No. 1598. Single barrel, downdraft type.

►*LIGHT PART THROTTLE LEANNESS CORRECTION (After Cold Start):* Caused by variations in automatic choke operation. Set choke 1 or 2 notches rich as necessary.

Idle Setting - Initial setting 1¼ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idl Sp d - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Fu l L v l - Measure wet fuel level through economizer diaphragm hole. Use 6" scale with depth gauge on machined face of opening. Distance should be 23/32"±1/32".

Accelerating Pump - No seasonal adjustment.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Automatic Choke Setting: 1 Point Rich (supersedes Centered setting). *See Light Part Throttle L anness Correction.*

►*OTHER DATA: See "Holley Visi-Flo" Carburetors in Carburetion Section.*

CARTER WCD

Carter WCD 2887S. 2-barrel, downdraft type.

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Float Level - 5/32" (Gauge T109-196). Distance from top of each float and machined surface of casting.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .020" (Gauge T109-29) between throttle valve and bore (side opposite idle port) with choke fully closed.

Automatic Choke Setting: Centered on index.

►*OTHER DATA: See "Carter WCD" Carburetors in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4654 (5901), 4363 (5910), Fuel and vacuum.

Pressure - 3½-5½ lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge Voltage regulator, King-Seeley No. 56787.

Dash Unit - King-Seeley 56105 (5901), 56578 (5910).

Tank Unit - King-Seeley No. 44664 (All models).

See "Fuel Gauges" in Carburetion Section..

Air Cleaner: Oil wetted, Oil Bath, and Dry Filter Element types used.

►*PAPER ELEMENT AIR CLEANER CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT blow out with compressed air, and DO NOT oil or lubricate. DO NOT wash l ment in solvent or other liquids.*

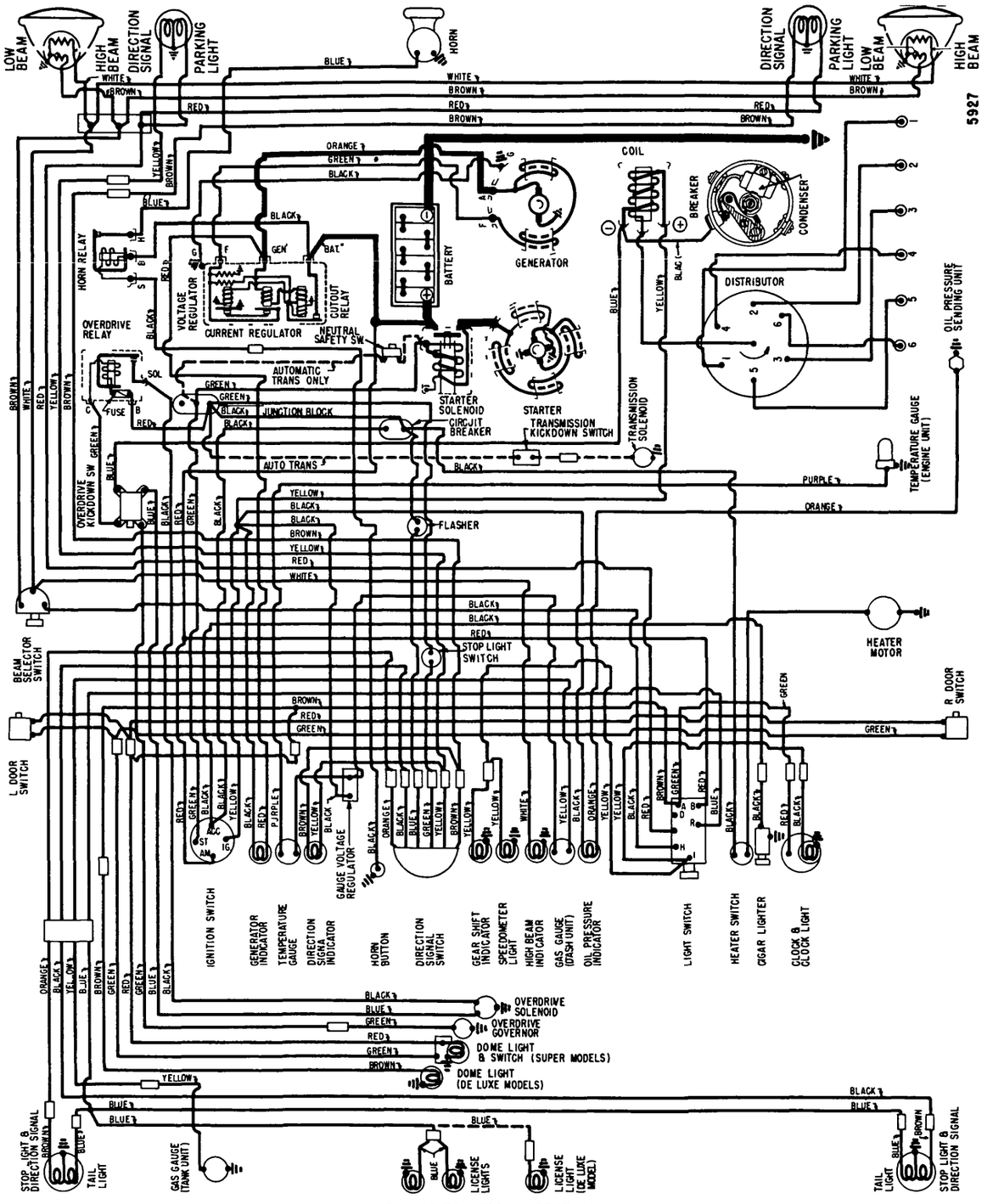
►*NOTE:* Dry type air cleaners with daub of red paint have improved sleeve and stud assembly, Part No. 3201563, installed to prevent breakage.

BATTERY

5901 Series - Auto-Lite 11-MS-40: 12 volt, 7 plate, 42 ampere hour capacity. (20 hour rate).

5910 Series - Auto-Lite 11-MS-45 (Std.). 12 volt, 7 plate, 45 ampere hour capacity. **Auto-Lit 11-HS-60 (Air C nd.).** 12 volt, 11 plate, 60 ampere hour capacity. (20 hour rate).

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RAMBLER 5901 AMERICAN

CONTINUED FROM PRECEDING PAGE

►*NOTE* Willard batteries used on some cars (5910 series)

Battery Ground - Negative to cylinder head

Engine Ground - (5901) Flywheel housing to right rear engine mount (5910) From engine to rear crossmember

STARTER

Delco-Remy 1107731. Armature No. 1935851.

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs minimum

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	6200-9400	10 6	49-76
	Lock	4 25	270-310

Ⓒ - Includes Solenoid

Starter Switch: Delco-Remy Solenoid No 1119919 mounted on starter and controlled as follows **(All Cars - Synchro-mesh Trans.)** - Controlled by combination Ignition & Starter Switch with "key starting" **(5901 - Auto. Trans.)** - Same as for Synchro-mesh Cars with Neutral Safety Switch, Delco-Remy 1998127, mounted on steering column so that starter operative only with selector lever in Park or Neutral **(5910 - Auto.Trans.)** - Controlled by "Neutral-Start" button of transmission control

Neutral Safety Switch Adjustment (American) - S *"Rambler Automatic Transmission" in Transmission Section*

GENERATOR

Delco-Remy 1100304 (Std.), 1102018 (Air Cond. Cars), 1102123 (Fleet Cars).

Replacement Generator (Less Pulley) - 1100313 (1100304 Gen), 1102012 (1102018 Gen)

Armature - Delco-Remy 1928952 (1100304 Gen), 1923535 (1102018 Gen)

Performance Data (Cold)

Generator	Amperes	Volts	RPM
1100304	25	14 0	2710
1102018	30	14 0	2310
1102123 Ⓒ	45	14 0	2600

Ⓒ - Supplied as special fleet equipment

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs

Field Current - 1 50-1 62 amperes (1100304), 1 48-1 62 amperes (1102018), 2 66-2 86 amperes (1102123), 12 volts at 80°F

Belt Adjustment: ½" deflection midway between fan and generator pulleys with 25 lbs pressure, or use Tool J-6733 as follows Place gauge on longest accessible span of belt between two pulleys Move generator on its mounting bracket until index mark on spring loaded plunger lines up with upper edge of gauge *NOTE* - When using gauge on notched belt, finger of gauge should be in notch

REGULATOR

Delco-Remy 1119122 (1100304 Gen.), 1119003 (1102018 Gen.), 1119600 (1102123 Gen.). *NOTE - Regulator 1119600 is "Double Contact" typ*

NOTE - Specifications below are "Normal' settings

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Cut ut R lay

Cuts In - 11 8-13 5 volts (1119003, 1119122), 11 8-13 0 volts (1119600)

Contact Gap - 020"

Air Gap - 020" with contacts just closed

Voltage Regulator

Setting (1119003, 1119122) - 13 8-14 8 volts at ambient temperature of 125°F

Setting (1119600) - 13 8-14 6 volts at ambient temperature of 125°F operating on upper contacts 1-3 volts lower operating on lower contacts

Air Gap - 075" (1119003, 1119122), 067" (1119600) with armature pressed down to point where contacts just touch

Contact Gap (1119600) - 016"

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section*

Current Regulator

Setting (1119003) - 27-33 amperes (Hot)

Setting (1119122) - 23-27 amperes (Hot)

Setting (1119600) - 38-45 amperes at ambient temperature of 125°F

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std on 5910 Series Single headlights on 5901 Series *See "4-Headlight System" in Electrical Section*

Direction Signals: *See Electrical Section*

Light Switch Removal: Disconnect battery With switch in "OFF" position, press button release on top of light switch assembly, and pull knob and shaft clear of switch Remove slotted nut, pull switch to rear of instrument panel

Stop Light Switch: Located at rear of master cylinder (5901), at tee fitting in line to left front brake (5910)

CIRCUIT BREAKERS: Used as follows

18 Ampere - Protects headlights and high beam indicator Located in headlight switch

12 Ampere - Protects parking, tail, instrument, clock and glove box lights Located in headlight switch

30 Ampere - Protects direction signals, stop and back-up lights, heater and air conditioner Located inside body cowl on left side

30 Ampere - Protect power windows Two used

FUSES: Used as follows

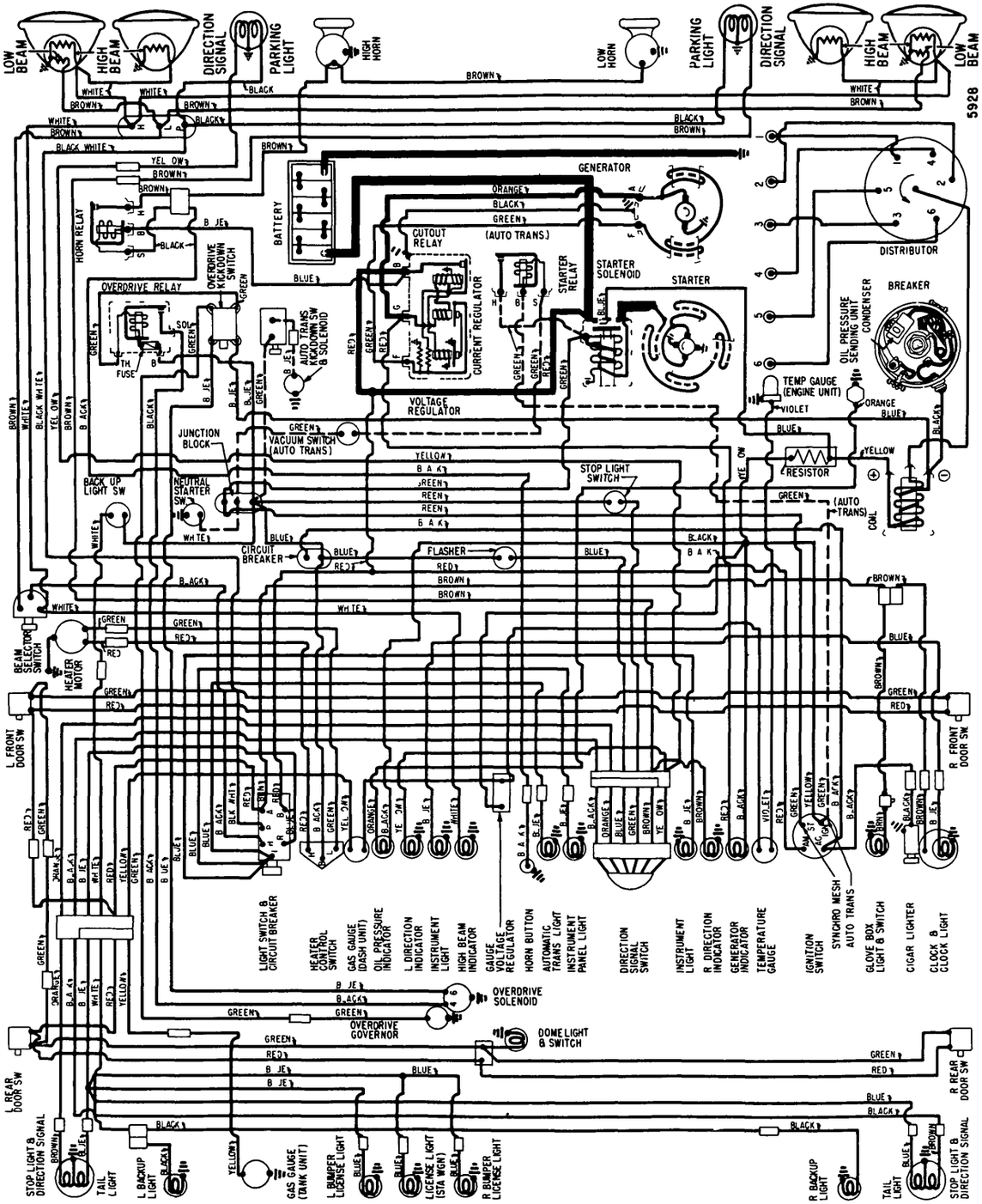
7.5 Ampere - Protects body lights On headlight switch

15 Ampere - Protects overdrive circuit On overdrive relay

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconn cting any part of air conditioning system or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

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RAMBLER 5910 SIX

CONTINUED FROM PRECEDING PAGE

ENGINE SPECIFICATIONS: Own 6 Cyl, "L" head (5901), Valve-in-head (5910)

Bore	Stroke	Displacement
3 1/8"	4 1/4"	195.6 cu ins

Compression Ratio	Rated HP	Developed HP
8.0-1 (5901)	23.4	90 at 3800 RPM
8.7-1 (5910, 1 bbl carb.)	23.4	127 at 4200 RPM
8.7-1 (5910, 2 bbl carb.)	23.4	138 at 4500 RPM

Compression & Vacuum Reading - *See TUNE-UP*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data*

PISTONS

Aluminum alloy, solid skirt, tin plated type with flat top (5901), contoured top (5910)

Original Bore & Piston Sizes - *See "Original Bore & Pistons" in Rambler Special Data*

Clearance - .0006-.0012" at bottom of skirt

Removal - Pistons and rods removed from above

Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom) Piston properly fitted should support its own weight with piston and bore dry

Replacement Pistons: Std., .002", .005", .010", and .020" Oversize Furnished with fitted pins

Installing Pistons: Notch in perimeter must be to front of engine

PISTON PINS

Press fit in connecting rod No locking device

Diameter - .8595-.8598" **Length** - 2.75"

Clearance in Piston - Palm press fit in piston at room temperature

Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data*

Replacement Pins: Fitted pins furnished with new pistons

PISTON RINGS

Two compression rings and one oil ring used No 1 compression ring is alloy iron, chrome plated No 2 compression ring is iron alloy, parco-lubrite Oil ring is three-piece, steel rail, with rail faces chrome plated

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0930-.0935"	.010-.020"	.003-.005"
Compr. (2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3) Ⓒ	.0245"	.015-.055"	.0001-.0084"

Ⓒ - Three-piece steel rail

Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter "Up"

Replacement Rings: Sets of Standard and .020" Oversize

CONNECTING RODS

Length - 6.625" center-to-center **Weight** - 23 ozs

Crankpin Journal Diameter - 2.0948"-2.0955"

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data*

Bearings - Steel-backed babbitt. No shims

Clearance - .001"-.0015". **Side Play** - .005"-.015"

Replacement Bearings: Std., .001", .002", .010", .012" Undersize

Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

Journal Diameter - 2.4791"-2.4798". Four Bearing.

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data*

Bearings - Steel backed babbitt. No shims.

Clearance - .001-.0015"

Replacement Bearings: Std., .001", .002", .010", .012" Undersize

End Thrust: Taken by flanged front main bearing

Endplay - .003-.008"

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data*

VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Rambler Special Data.*

CAMSHAFT

Bearings - Steel backed babbitt bushings

Clearance - .001"-.003"

End Thrust: Thrust plate on front face of engine between No 1 bearing and camshaft sprocket

Endplay - .004-.008"

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data*

VALVES

Tappet Clearance: (5901) .016" Intake, .018" Exhaust COLD (5910) .012" Intake, .016" Exhaust (HOT and idling)

5901 Series

Valve	Head Diam.	Stem Diam.	Length
Intake	1.469"	.3407-.3412"	4.781"
Exhaust	1.281"	.3407-.3412"	4.781"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° Ⓒ	.340"	.002-.0035"
Exhaust	45° Ⓒ	.340"	.002-.0035"

5910 Series

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° Ⓒ	.372"	.002-.0035"
Exhaust	45° Ⓒ	.369"	.0025-.004"

Ⓒ - Valve Face Angle 44°

►*VALVE GRINDING CAUTION* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32"

Valve Seat Width - 5/64"-3/32"

Valve Stem Oil Seal (5910) - Rubber deflectors mounted on all valve stems at upper end of guide

Valve Springs: Single spring used on each valve Specifications as follows

5901 Series

Valve	Lbs. Pressure	Length
Open	75-82	1.7/16"
Closed	37-41	1.3/4"

5910 Series

Valve	Lbs. Pressure	Length
Open	115-125	1.7/16"
Closed	65-70	1.13/16"

►*5910 VALVE SPRING INSTALLATION CAUTION* Beginning Engine No B-234719 & CB-37234, lower valve spring retainer was eliminated (cylinder head machining changed so that retainer not required)

Valve Guides (5901): Use Tool J-1429-1 to remove and replace guides Guides should be flush with guide bore opening in block

Valve Guides (5910): Use Tool J-1429-B to remove and replace guides Guides should extend 3/4" above cylinder head

Rocker Arm Assembly (5910): *See "Valve System" in Rambler Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

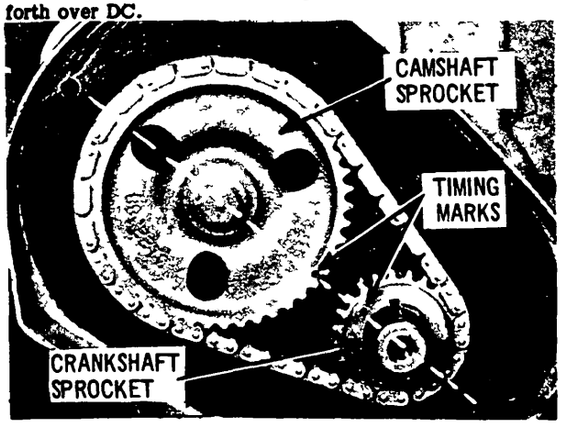
5901 Series

Intake Valves - Open 10° BTDC Close 58° ALDC
Exhaust Valves - Open 49° BLDC Close 19° ATDC

5910 Series

Intake Valves - Open 12°30' BTDC, Close 51°30' ALDC.
Exhaust Valves - Open 53°30' BLDC, Close 10°30' ATDC

Valve Timing Check – Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.



RAMBLER 6 CYL. ENGINE VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM:* *See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

►*LOW OIL PRESSURE AT IDLE SPEED (Early Cars)* On engines before No. E-102484 (5901), B-384311 (5910 1-Bbl Carb.), CB-56751 (5910 Dual Carb.), low oil pressure at idle speed may be caused by a poor seal at the oil pump inlet tube flange due to a distorted flange or insecure mounting of the tube Correct by truing up flange surface using crocus cloth on a piece of plate glass or other smooth surface Later engines have an "O" ring seal and a different clamping method to retain the inlet tube in the crankcase.

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Crankcase Capacity: 4 qts. refill, 1 qt. addt'l with filter change.

Normal Oil Pressure: 50 lbs. at 3000 RPM (10 lbs. min. at 600 RPM).

Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block

Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge. Sending unit located on right rear side of engine block.

Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*

Oil Filter: Partial Flow type. Replace element every 4000 miles or sooner if needed.

►*OIL FILTER NOTE:* Oil pressure line should be connected to outer fitting on filter, and return line to center fitting. If lines found reversed, connect properly and install new filter.

Replacement Filter Element - Rambler No. 8990068.

Crankcase Ventilation: Filter in crankcase filler cap, and breather tube in valve chamber front side plate.

COOLING

Water Capacity: (5901) 11 qts., (5910) 10 qts. *NOTE* - 1 qt. additional with heater.

Pressure Valve: 13 lb. Radiator Filler Cap, Rambler No. 3141371.

Thermostat (5901): Choke type. 180° (No. 3131985) Std. 150° (No. 3132708) Optl. all cars.

Thermostat (5910): Choke type. 180° (No. 3155882 - Dole, No. 3155881 - Thompson) Std.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 56787.

Dash Unit - King-Seeley 56107 (5901), 54946 (5910).

Engine Unit - King-Seeley 44255 (All Models).

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8.5A7 (Std. & Heavy Duty), 9A7 (5910 Heavy Duty Fleet Use). Single plate, dry disc type. *See "Borg & Beck" in Clutch Section.*

Pedal Adjustment: Freeplay should be 1/2-3/4". Adjust at connecting link between throwout lever and release idler shaft assembly.

►*PEDAL HEIGHT CHANGE NOTE:* On later cars, pedal height reduced approximately 1" by shortening the link connected to the clutch idler arm. *NOTE* - Brake pedal height changed similarly by shortening link connecting pedal to brake master cylinder.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner Model T96. Three-speed, helical gear type.

►*5910 HEAVY DUTY (FLEET) TRANSMISSION NOTE:* This transmission has heavy duty bearings and spur gear type Low & Reverse and will not be as quiet when low or reverse gear being used.

See "Warner Transmission" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal (5901): Disconnect rear spring front brackets from body floor pan, rear shock absorbers at axle tubes, rear brake hose bracket and hand brake cable at equalizer. Slide rear axle assembly rearward to remove front universal joint from transmission. Remove transmission attaching screws and use two Guide Pins (Tool J-1434) in place of two upper capscrews so transmission main shaft will clear clutch pilot bearing and disc.

Removal (5910): Disconnect brake tube bracket from underside of body, torque tube from rear of transmission, parking brake cable from equalizer and cable housing from torque tube bracket. Move rear axle assembly to rear to remove front universal joint from transmission main shaft. Disconnect speedometer cable, shift rods and overdrive wires and cable (if so equipped). Remove transmission attaching screws and use two Guide Pins (Tool J-1434) in place of two upper capscrews so transmission main shaft will clear clutch bearing and disc.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

Removal: Overdrive and transmission removed from car as a unit. *See "Synchro-mesh Transmission Removal" above.*

FLASH-O-MATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. *NOTE* - Vacuum and solenoid unit at rear of transmission control shift speeds (no throttle linkage).

►*PUSHBUTTON INDICATOR LIGHT PRODUCTION CHANGE:* To reduce bulb failure, new 18 volt bulb, Part No. 3441593, is used on later cars and can be used for replacement on early cars.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flash-O-Matic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Flash-O-Matic Transmission" in Transmission Section.*

Lubrication - Check fluid every 1000 miles, drain and refill at 15,000 mile intervals, using Automatic Transmission Fluid Type "A".

Capacity - 10 quarts.

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature, push selector buttons "D-2", "D-1", "L", "R" and then "D-2" (5910); move selector lever from "P" to "R" and then to "N" (5901). Remove dipstick and check fluid level. Maintain fluid at "F" mark on dipstick. Approximately 1½ pints required to raise level from "L" to "F" mark.

►*OTHER DATA: See "Flash-O-Matic Transmission" in Transmission Section.*

UNIVERSALS

Mechanics. Two used (5901), one used at transmission end of drive shaft (5910).

Torque Tube Bracket Adjustment (5910 Std. & Overdrive Transmission Cars) - *See "Rambler Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss Drive (5901), Torque Tube Drive (5910).

See "Rambler Hypoid" in Rear Axle Section.

►*"TWIN-GRIP" DIFFERENTIAL:* This special limited slip or locking differential is optional on 1958-59 models (not same as type used on V8 Cars). *See "Rambler Twin-Grip Differential" in Rear Axle Section.*

5901 Series

Transmission	Std. Ratio	Optl. Ratio
Synchro-mesh	3.31-1 (13-43)	3.78-1 (9-34)
Overdrive	3.78-1 (9-34)	4.11-1 (9-37)
Flash-O-Matic	3.31-1 (13-43)	

5910 Series

Transmission	Std. Ratio	Optl. Ratio
Synchro-mesh	3.78-1 (9-34)	4.38-1 (8-35) 4.11-1 (9-37)
Overdrive	4.11-1 (9-37)	4.38-1 (8-35)
Flash-O-Matic	3.31-1 (13-43)	3.78-1 (9-34)

Backlash - .002-.006". Shim adjustment.

►*AXLE SHAFT REPLACEMENT CAUTION (Cars with "Twin-Grip" Differential): Do not rotate axle shaft with opposite shaft out (will cause misalignment of cone and side gear splines and prevent entry of second shaft).*

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly when ever hub is removed.* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable. Remove brake support plate by sliding plate, oil seal, and shims off axle shaft. Use special Puller J-2498-B to remove shaft from housing.

Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations. Tighten axle shaft nut to 250 ft. lbs. torque.

►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in hub when it is assembled on axle shaft. New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft (serrations will not match). Tighten axle shaft nut to 250 ft. lbs. torque and check distance from outside face of hub to end of taper on shaft (hub overhang on threaded portion of shaft). This distance must be 3/16". Punch mark new hub in line with mark on shaft.

Rear Axle Assembly Removal (5901): Raise and support rear of body. Remove rear wheels and hubs (Puller J-1644-B or J-736-B). Disconnect propeller shaft at rear universal using Coupling Nut Wrenches J-4486. *(NOTE* - Place one wrench on universal joint yoke and one on coupling nut; nut holds yoke to rear axle pinion shaft.) Remove shaft. Disconnect rear shock absorbers, rear brake lines and rear springs from body. Remove axle and springs as an assembly.

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Rear Axle Assembly Removal (5910): Drain lubricant, raise and support rear of body Disconnect hand brake cable at bellcrank, and hand brake cable housing at bracket Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube Roll axle free from car

Axle Shaft Endplay - 002-.004". Adjusted by shims behind brake backing plate.

Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted

SHOCK ABSORBERS

Manufacturer. Direct acting, hydraulic type Serviced by replacement

Shock Absorber Application

Series	Front - Rambler No.	- Rear
5901	3200842	3200843
5910 Std Susp	3119821	3119822
5910 Air Susp.	3200980	©

© - No. 3200981 (Sedans & Hard Top), No 3200982 (Station Wagons)

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel
See "Rambler" in Suspension & Wheel Alignment Section

Kingpin Inclination - 8° (5901), 6½° (5910)

Caster (5901 & 5910 Manual Steering) - 0° to Pos ½° ½° preferred

Caster (5910 Power Steering) - Pos ½° to Pos. 1° 1° preferred

Camber - Neg ¼° to Pos ¼° 0° preferred

Toe-In - 1/16-3/16"

Toe-Out on Turns - With inner wheel at 25°, outer wheel should be 21½° (5901), 22° (5910)

REAR SUSPENSION

Rear Suspension (5910): *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section*

AIR SUSPENSION

Neoprene air springs mounted within rear coil springs Optional on 5910 Series *See "Rambler Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual (5901): Gemmer. Worm & Roller type
See "Gemmer Worm & Roller" in Steering Section

Manual (5910): Saginaw. Recirculating ball type
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Monroe Linkage Type - *See "Monroe Linkage Type" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" or "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Gemmer Steering Gears" or "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

THREE DIFFERENT BRAKE SYSTEMS USED AS FOLLOWS:

1) Wagner (Lockheed) Self-centering. Std on all cars except for limited production (see 2 following) Self-centering type with Bendix type star wheel adjusting screw. Hand lever applies rear wheel service brakes
See "Wagner (Lockheed) Self-centering" in Brake Section.

2) Bendix (Lockheed) Self-centering. Std on certain cars in production as listed below. Self-centering type eccentric cam adjuster for each shoe. Hand lever applies rear wheel service brakes.
See "Bendix (Lockheed) Self-centering" in Brake Section.

Bendix Brakes

Car Model	Serial Number
5901	M-50238 & Up
5910	D-528770 to D-531230
5910	D-552591 to D-563452

3) Bendix Automatic Adjuster Type. Optl Bendix single anchor type with automatic adjuster on the star wheel adjusting screw. Hand lever applies rear wheel service brake. *See "Bendix Automatic Adjuster" in Brake Section*

►*PEDAL HEIGHT CHANGE NOTE:* On later cars, brake pedal height reduced approximately .1" by shortening the link connecting the pedal to the brake master cylinder *NOTE* - Clutch pedal height changed similarly by shortening link connected to clutch idler arm

Drum Diameter - 9" front and rear

Wheel Cylinder Diameter - 1" front, 13/16" rear.

Braking Power - 60.2% Front, 39.8% Rear.

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only

Lining Thickness - 1875" (5901), 20" (5910).

Lining Width & Length - 5901 Series

Shoe	Front & Rear Wheels
Primary	2" x 7.62"
Secondary	2" x 9.82"

Lining Width & Length - 5910 Series

Shoe	Front Wheel	Rear Wheel
Primary	2.25" x 7.30"	2" x 7.62"
Secondary	2.50" x 9.50"	2" x 9.82"

Clearance (Wagner Self-centering) - Adjusting screw backed off 8 or more notches from point where shoes tight against drum.

Clearance (Bendix Self-centering) - Adjusting cam for each shoe backed off just enough to relieve all drag from point where slight drag evident when wheel is turned.

Clearance (Bendix Automatic Adjuster) - No adjustment required in service. *See "Bendix Automatic Adjuster" in Brake Section for initial adjustment*

Standard Master Cylinder: Mounted in engine compartment under steering column.

Checking Fluid - Check at 1000 mile intervals. Fill from engine compartment

Removal - Remove from beneath car. Not necessary to disturb other parts.

Power Brakes (5910): Bendix Power Unit Two types used (First Cars) Hydraulic Reaction Type, (Later Cars) Hydraulic (Disc) Reaction Type
See "Bendix Hydraulic Reaction Type Power Unit" or "Bendix Hydraulic (Disc) Reaction Type Power Unit", in Brake Section

Checking Fluid - Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door. *See "Rambler Electric Window Controls" in Miscellaneous Section*

Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Series Designation
Rebel V8	5920
Ambassador V8	5980

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood.

ENGINE NUMBER: Stamped on plate attached to generator support bracket..

►*ENGINE NUMBER LETTERS (Following Engine Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings..Engines not so marked are standard. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize. *See "Original Bore & Pistons" and "Original Bearing Sizes" in Rambler Special Data.*

TUNE-UP

COMPRESSION PRESSURE: 140 lbs. minimum at 315 RPM (cranking speed) with throttle wide open.

VACUUM READING: 18½" idling in Neutral.

VALVE TAPPET CLEARANCE: 5920 Series Only - .012" Intake, .014" Exhaust, HOT and running. **5980 Series** - Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between left bank exhaust manifold and exhaust crossover pipe (exhaust gases diverted through heat passages in manifold when valve closed).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite AL-7 or Champion H-10.14 mm. Torque to 30 ft. lbs.

COIL: Delco-Remy 1115105.

Ignition Current - 2.3 amps. idling, 3.75 amps. stopped.

Resistor - Delco-Remy 1927809. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE:* Connected in series between battery and coil. Bypassed during cranking by solenoid, making direct lead from battery to coil.

DISTRIBUTOR: Delco-Remy 1110923 (5920), 1110887 (5980). External adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - Gap (.016") is correct when cam angle correctly set.

Cam Angle - 28-32°, set to 30°, gives .016" point opening.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110923

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	1-5	750
8.5-10.5	625	17-21	1250
13-15	1350	26-30	2700
17-19	2000	34-38	4000

Automatic Advance - 1110887

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0-4	700
7.5-9.5	775	15-19	1550
12-14	1300	24-28	2600
17-19	1900	34-38	3800

Vacuum Spark Control: Delco-Remy 1116117 (1110887 Distr.), 1116113 (1110923 Distr.).

Vacuum Advance - 1116113

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5.5-7.5
11-13	22-26	13.25-15.50

Vacuum Advance - 1116117

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
10	20	14.25-15.75

IGNITION TIMING

Setting - TDC (5920), 5° BTDC (5980).

Timing Mark - Timing indicator on front cover and three notches on vibration damper. Longest notch is TDC, center notch is 5° BTDC.

CARBURETOR

►*CARBURETOR APPLICATION: One Holley 4-barrel carburetor used.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid Unit on transmission case.

HOLLEY 4-BARREL

Holley Model 4150C, No. 1748-1 (5920), 1312-1 (5980).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - Initial setting 1 turn open. Turn screws out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Fuel and vacuum.

Replacement Pump - Carter No. M2433S.

Pressure - 4-5½ lbs. maximum.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-Voltage "CV" type with gauge voltage regulator, King-Seeley No. 56787.

Dash Unit - King-Seeley 56578 (All Models).

Tank Unit - King-Seeley 44664 (All Models).

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Oil wetted, Oil bath, and Dry Filter element types used.

►*DRY TYPE CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate nor blow out with compressed air.*

BATTERY

Aut-Lit 11-HS-50 (Std.): 12 volt, 9 plate, 50 ampere hour capacity. **Aut-Lit 11-HS-60 (Air. Cond.).** 12 volt, 11 plate, 60 Amp. Hr. (20 hr. rate).

Battery Ground - Negative, to cylinder block.

Engine Ground - From engine to rear crossmember.

STARTER

Delco-Remy 1107704 (5920), 1107717 (5980). "Enclosed Shift" type.

Armature - Delco-Remy 1935851 (All Models).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107704

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

Performance Data - 1107717

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Ⓒ - Includes Solenoid.

Starter Switch: Delco-Remy Solenoid No. 1118816 mounted on starter and controlled by combination Ignition & Starter Switch with "key starting" (Std. Cars), or by "Neutral-Start" button of transmission control (Auto. Trans. Cars).

GENERATOR

Delco-Remy. Used as follows:

Series	Generator No.
5920 Standard	Ⓒ 1100304
5920 Air Cond.	② 1102018
5980 Standard	② 1102018
5980 Air Cond.	③ 1102070
All (Fleet Cars)	1102123

Replacement Generator (Less Pully) - Ⓒ 1100313. ② - 1102012. ③ - 1102055.

Armature - Delco-Remy 1928952 (1100304 Gen.), 1923535 (1102018 Gen.), 1932900 (1102070 Gen.).

Performance Data (Cold)

Generator	Amperes	Volts	RPM
1100304	25	14.0	2710
1102018	30	14.0	2310
1102070	35	14.0	2510
1102123	45	14.0	2600

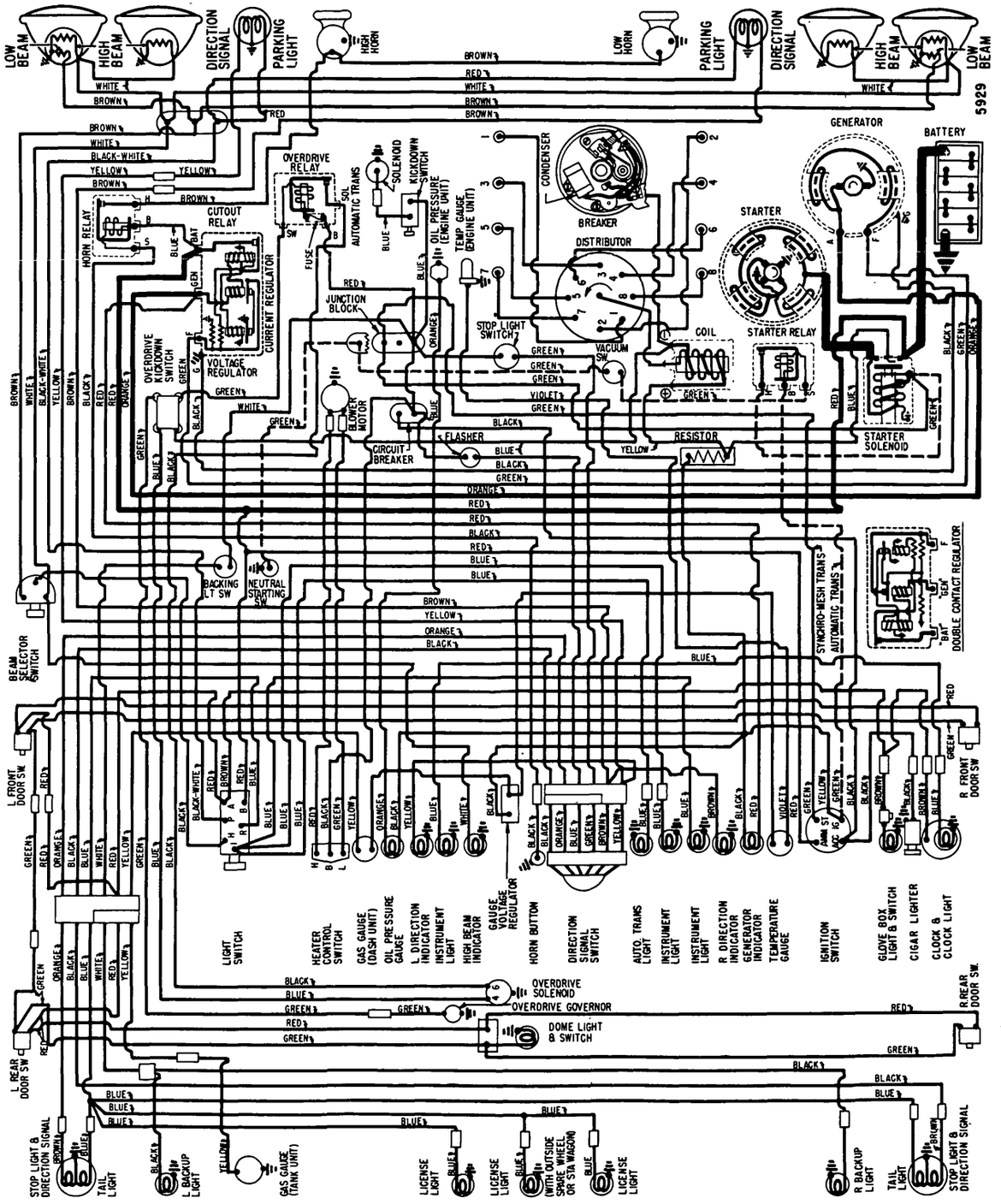
Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.50-1.62 amperes (1100304 Gen.), 1.48-1.62 amperes (1102018 Gen.), 1.69-1.79 amperes (1102070 Gen.), 2.66-2.86 amperes (1102123 Gen.), all at 12 volts at 80°F.

Belt Adjustment: ½" deflection midway between fan and generator pulleys with 25 lbs. pressure; or use Tool J-6733 as follows: Place gauge on longest accessible span of belt between two pulleys. Move generator on its mounting bracket until index mark on spring loaded plunger lines up with upper edge of gauge. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

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RAMBLER 5920 REBEL V8

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REGULATOR

Delco-Remy No. 1119122 (1100304 Gen.), 111.003 (1102018 Gen.), 1119168 (1102070 Gen.), 1119600 (1102123 Gen.).

NOTE - Regulator 1119600 is "double contact" type.

NOTE - Specifications below are "Normal" settings.

Cutout Relay

Cuts In - 11.8-13.0 volts (1119600), 11.8-13.5 volts (Others).

Contact Gap - .020" (All).

Air Gap - .020" (All) with contacts just closed.

Voltage Regulator

Setting (1119600) - 13.8-14.6 volts at ambient temperature of 125°F. Operating on upper contacts. .1-.3 volts lower operating on lower contacts.

Setting (Others) - 13.8-14.8 volts (hot).

Air Gap - .067" (1119600), .075" (Others) with armature pressed down to point where contacts just touch.

Contact Gap (1119600) - .016".

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section.*

Current Regulator

Setting (1119122) - 23-27 amperes (hot).

Setting (1119003) - 27-33 amperes (hot).

Setting (1119168) - 32-37 amperes (hot).

Setting (1119600) - 38-45 amperes at ambient temperature of 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Light Switch Removal: Disconnect battery. With switch in "OFF" position, press button release on top of light switch assembly, pull knob and shaft clear of switch. Remove slotted nut, pull switch to rear of instrument panel.

Stop Light Switch: Located at tee fitting in line

CIRCUIT BREAKERS: 18 Ampere - Headlights & High beam indicator. In headlight switch.

12 Ampere - Parking, Tail, Instrument, Clock, and Glove box lights. In headlight switch.

30 Ampere - Direction signals, Stop & Back-up lights, Heater and Air Conditioner. Inside cowl on left side.

FUSES: 15 Ampere - Overdrive circuit. In lead to "B" terminal of relay.

7.5 Ampere - Body lights. On headlight switch..

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION:* Use extreme care when disconnecting any part of air conditioning system or lines for access to engine. *See "Air Conditioning Service Cautions" in Miscellaneous Section.*

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ENGINE SPECIFICATIONS: Own V8. Valve-in-head.

Series	Bore	Stroke	Displacement
5920	3½"	3¼"	250 cu. ins.
5980	4"	3¼"	327 cu. ins.

Series	Compr. Ratio	Rated HP	Developed HP
5920	8.7-1	39.2	215 at 4900 RPM
5980	9.7-1	51.2	270 at 4700 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*EXHAUST PIPE VIBRATION CORRECTION AND PRODUCTION CHANGE:* Effective Serial Nos. A-40656 and V-62806, an exhaust pipe strap and clamp was added to prevent pipe vibration occurring at 28 to 35 MPH with single exhaust and automatic transmission cars. Strap attached to transmission adapter-to-torque tube lower right attaching bolt and to crossover exhaust pipe. Available in Kit Part No. 3202080.

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset toward thrust side of piston.

Original Bore & Piston Sizes - *See "Original Bore & Pistons" in Rambler Special Data.*

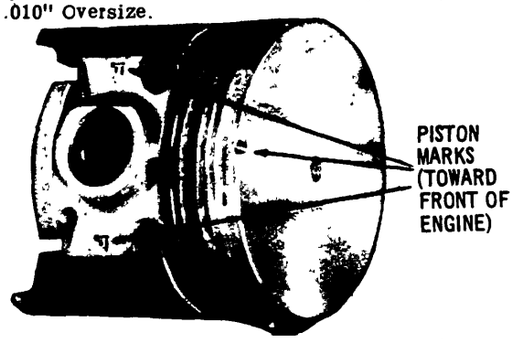
Weight - 18 ozs. (5920), 23.45 ozs. (5980).

Removal - Piston and rods removed from above.

Clearance - .0009-.0015" (Skirt Bottom).

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward forward front of engine.

Replacement Pistons: Furnished Std., .002", .005" & .010" Oversize.



RAMBLER V8 PISTON & ROD ASSEMBLY

PISTON PINS

Press fit in connecting rod. No locking device.

Diameter - .9307". **Length** - 3.1870".

Pin Fit in Piston – Palm press fit at room temperature.

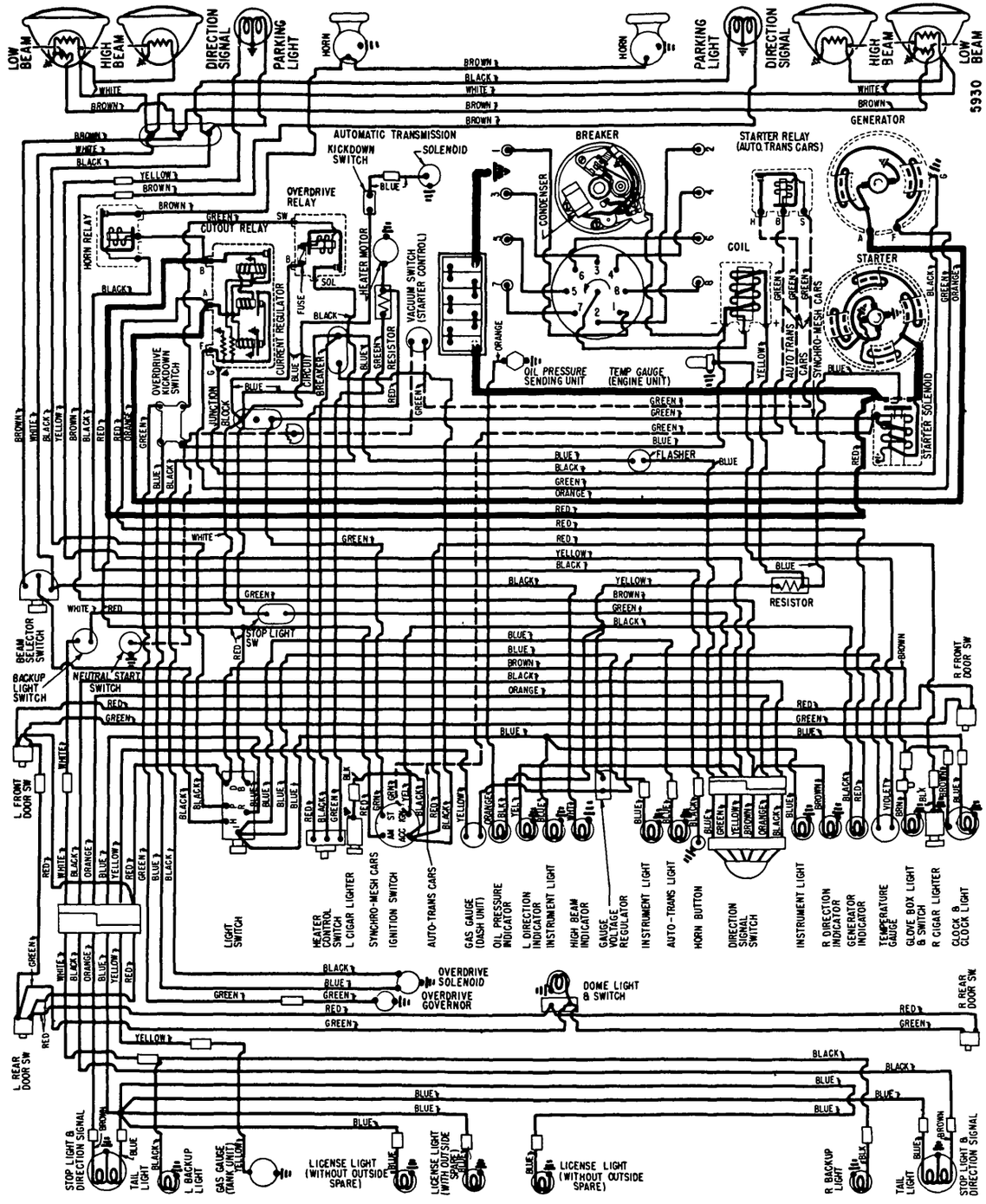
Pin Removal & Installation – *See "Piston Pins" in Rambler Special Data.*

Replacement Pins: Std., .003", .005" Oversize.

PISTON RINGS

Three rings (two compression & one oil) used. Upper ring is chrome plated. Oil control ring is three piece type (two oil control wiper rails with a segmented steel spacer between them).

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RAMBLER 5980 AMBASSADOR V8

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Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.010-.020"	①
Compr.(2)	.0775-.0780"	.010-.020"	②
Oil (3)	.0245"	.015-.055"	.0001-.0059"

① - (5920) ,002-.0035", (5980) .002-.006".
② - (5920) .002-.004", (5980) .002-.006".

Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter up.

Replacement Rings: Sets of Std. and .020", .030" Oversize.

CONNECTING RODS

Crankpin Journal Diameter – 2.2483-2.2490".

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data.*

Length - 6.3750" center-to-center. **Weight** - 27.6 ozs.

Lower Bearing – Precision, steel-backed, babbitt.

Clearance – .0007-.0028". **Side Clearance** – .004-.012".

Replacement Bearings: Std., .001", .002", .010" & .012" Undersize.

Installing Rods: Assemble connecting rod with notch in piston and connecting rod identification mark to front of engine. Cylinder numbers on connecting rod should be toward outside of bank in which they are installed.

CRANKSHAFT

Journal Diameter - 2.4988-2.4995".

Original Bearing Sizes - *See "Original Bearing Sizes" in Rambler Special Data.*

Bearings – Precision, steel-backed, micro-babbitt.

Clearance - .0006-.0025".

Replacement Bearings: Std,, .001", .002", .010" & .012" Undersize.

End Thrust: Taken by No. 1 flanged bearing.

Endplay – .003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" Rambler Special Data.*

VIBRATION DAMPER REMOVAL & INSTALLATION: *See "Vibration Damper" in Rambler Special Data.*

CAMSHAFT

Bearings - Five, steel-backed, babbitt lined bushings pressed in block and line reamed

Clearance - .001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket.

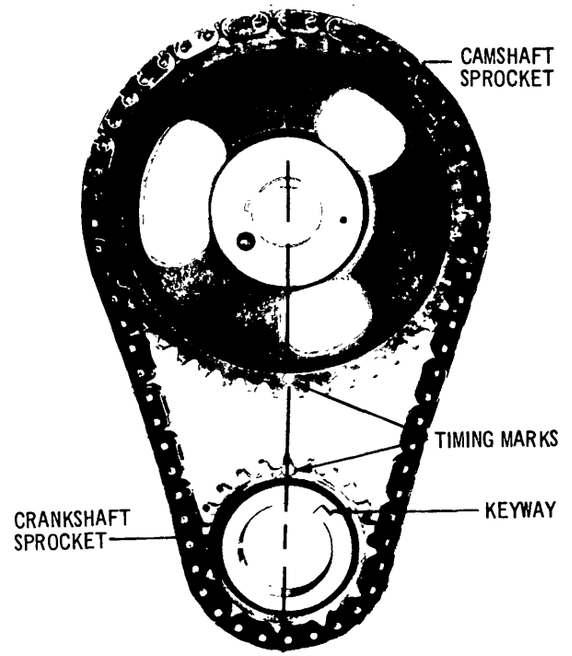
End Play - .003-.006".

Timing Chain: Morse non-adjustable type **Width** .875", **Pitch** .375", **Length** 23¼" or 62 links.

Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. To check assembly, rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*



RAMBLER V8 VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: 5920 Series - .012" Intake, .014" Exhaust HOT and running. **5980 Series** - Zero lash. Hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.787"	.3715-.3725"	4.859"
Exhaust	1.406"	.3715-.3725"	4.859"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30° ①	.375"	.001-.003"
Exhaust	45° ②	.375"	.001-.003"

① - Valve face angle 29° ② --Valve face angle 44°.

Valve Seat Width -.078-.093" (Int.), .093-.104" (Exh.).

Valve Stem Seals - Rubber deflector installed on valve stem and over top of valve guide on all valves.

Valve Springs: Install springs with closed coil end against cylinder head. **Free Length** - 2.20".

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85 - 91 lbs.	1 13/16"
Open	150 -160 lbs.	1 7/16"

Valve Guides: Drive old guides out, drive new guides in to height of ¾" ± 1/64" above cylinder head (measure from top of guide to flat machined surface of lower spring retainer on head). Ream all guides to I.D. of .3430-.3440" after installation.

Valve Lifters (Amb. V8): Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing – *See "Valve System" in Rambler Special Data.*

Rocker Arm Assembly: *"Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 12°30' BTDC. Close 51°30' ALDC.

Exhaust Valves– Open 53°30' BLDC. Close 10°30' ATDC.

Valve Timing Check: Remove valve compartment cover and spark plugs. Crank engine until #6 piston in right bank is on TDC of compression stroke (#1 piston will be on TDC of exhaust stroke in overlap position). Rotate crankshaft 90° counter-clockwise. Install dial indicator on #1 intake rocker arm pushrod end. Crank engine in clockwise direction until dial indicator indicates pushrod movement, (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure - 55 lbs. at 3000 RPM (10 lbs. min. at 600 RPM).

Pressure Regulator - In oil pump. Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator: Light on instrument panel goes on when ignition switch is turned on, goes out as oil pressure reaches pressure of gauge. Sending unit located on left rear side of engine block.

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft. *NOTE* - Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul & Installation: *See "Oiling System" in Rambler Special Data.*

Oil Filter: Full flow, disposable type. Replace filter every 4000 miles or sooner if needed.

►*FULL-FLOW OIL FILTER PRODUCTION CHANGE & REPLACEMENT ELEMENT CAUTION:* Beginning Engine Nos. G-50371 & N-55756, new filter mounting Adapter, Part No. 3157846, with oil bypass used in production. Filter element used with this adapter does NOT have bypass and correct filter element must be used with each type adapter (filter connector in adapter is different size in each type to prevent use of wrong element). *NOTE* - This new adapter can be installed in earlier engines without changing mounting studs by omitting flat washer under stud nuts and using gasket No. 3153143 between adapter and cylinder block (in production, ¼" longer studs are used to mount new type adapter and flat washers should be used under stud nuts).

Replacement Filter Element - *CAUTION - Two types used (see Production Change Note above).* **First Type** - Rambler No. 8990499 WITH Oil Bypass (3/4" connector), **Later Type** - Rambler No. 8990688 WITHOUT Oil Bypass (13/16" connector).

►*OIL FILTER INSTALLATION CAUTION:* When installing new filter, turn by hand until gasket contacts seat, then tighten additional 1/2 turn. *Do not overtighten.*

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Crankcase Ventilation: Filter element in oil filler cap and breather pipe in valve chamber cover

COOLING

Water Capacity: 20 qts (5920), 19 qts (5980) Add 1 qt with heater
Pressure Valve: AC No RC-19 13 lb type Radiator filler cap
Thermostat: Choke type 180° type Std (opens178-183°F)
Water Pump: Centrifugal, double row ball bearing type Requires no lubrication Serviced as an assembly
Temperature Gauge: King-Seeley "CV" Electric type with Gauge Voltage Regulator, King-Seeley No 56787
Dash Unit - King-Seeley 54946 (All Models)
Engine Unit - King-Seeley 44255 (All Models)
See "Temperature Gauges" in Miscellaneous Section
"Powr-Saver" Fan (5980 Air Cond. Cars): Fan operates normally up to 2600 RPM±100 RPM and then the viscous-fluid clutch will slip to maintain maximum speed of 2600 RPM Serviced as an assembly

CLUTCH

Borg & Beck Model 10A7 (5920), 10.5A6 (5980). Single plate, dry disc type. *NOTE* - Heavy Duty clutches are same model but have heavier total plate pressures
See "Borg & Beck" in Clutch Section
Pedal Adjustment: Freeplay should be 1/2-3/4" Adjust at connecting link between throwout lever and release idler shaft assembly
►*PEDAL HEIGHT CHANGE NOTE* On later cars, pedal height reduced approximately 1" by shortening the link connected to the clutch idler arm *NOTE* - Brake pedal height changed similarly
Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange

SYNCHRO-MESH TRANSMISSION

Warner Model T86 (5920), T89 (5980). Three-speed synchro-mesh, helical gear type
See "Warner" in Transmission Section
Transmission Control: *See "Transmission Controls" in Transmission Section.*
►*TRANSMISSION CHANGE FOR IMPROVED SHIFTING· See "Warner Transmission" in Transmission Section.*
Removal: Disconnect hydraulic brake tube bracket on underside of body torque tube at rear of transmission hand brake cable and housing speedometer cable and shifter rods Disconnect overdrive control cable and electrical control wires from solenoid and governor where so equipped Move rear axle to rear to separate universal joint Remove two upper transmission-to-bell housing bolts and install special guide pins (Tool J-1434) in their place Remove lower bolts slide transmission out

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*
Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*
Removal: Overdrive and transmission removed from car as a unit. *See "Synchro-mesh Transmission Removal" above.*

FLASH-O-MATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system and dual forward driving range **Throttle linkage adjustment** controlled by vacuum and solenoid unit at rear of transmission

►*PUSHBUTTON INDICATOR LIGHT PRODUCTION CHANGE* To reduce bulb failure, new 18 volt bulb, Part No 3441593 is used on later cars and can be used for replacement on early cars

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Flash-O-Matic Transmission" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Flash-O-Matic Transmission" in Transmission Section*
Lubrication: Check fluid level every 1000 miles, drain and refill every 15,000 miles Use only Automatic Transmission Fluid Type A

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature push selector buttons "D-2", "D-1" "L" "R" and then to "D-2" Remove dipstick and check level Maintain at "F" mark

►*OTHER DATA: See "Flash-O-Matic Transmission" in Transmission Section*

UNIVERSALS

Detroit or Mechanics One universal used at front end of propeller shaft

REAR AXLE

Own. Hypoid gear, semi-floating type with Torque Tube Drive "Power-Lock" Differential optional

See "Rambler Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section

►*POWER-LOCK DIFFERENTIAL IDENTIFICATION NOTE* Identified by lubricant caution tag attached to filler plug

Axle Ratios		
	5920 Series	
Transmission	Std. Ratio	Optl. Ratio
Std & Overdrive	4 10-1 (10-41)	4 44-1 (9-40)
Flash-O-Matic	3 15-1 (13-41)	3 55-1(11-39)
	5980 Series	
Std & Overdrive	3 54-1 (11-39)	4 10-1 (10-41)
Flash-O-Matic	3.15-1 (13-41)	2 87-1 (15-43)

Backlash - 002- 006" Shim adjustment

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly whenever hub removed* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable Remove brake support plate by sliding plate, oil seal, and shims off axle shaft Use special Puller J-2498-B to remove shaft from housing

Axle Shaft Installation: Reverse removal procedure and note the following *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations Tighten axle shaft nut to 250 ft lbs torque

►*REPLACEMENT HUB & AXLE SHAFT CAUTION* New hubs are not serrated and serrations will be cut in hub when it is assembled on axle shaft New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft (serrations will not match) Tighten axle shaft nut to 250 ft lbs torque and check distance from outside face of hub to end of taper on shaft (hub overhang on threaded portion of shaft) This distance must be 3/16" Punch mark new hub in line with mark on shaft

Rear Axle Assembly Removal: Drain lubricant, raise and support rear of body Disconnect hand brake cable at bellcrank, and hand brake cable housing at bracket Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from brackets and rear axle stabilizer bar at rear axle tube Roll axle free from car
Axle Shaft Endplay - 002- 004" Adjusted by shims behind brake backing plate
Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type Serviced by replacement

Shock Absorber Application		
Series	Front - Rambler No. -	Rear
Std	3119821	3119822
Air Susp	3200980	Ⓒ

Ⓒ - No 3200981 (Sedans & Hard Top) No 3200982 (Station Wagons)

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel
See "Rambler" in Suspension & Wheel Alignment Section
Kingpin Inclination - 6½°
Caster (Manual Steering) - 0° to Pos ½° 0° preferred
Caster (Power Steering) - Pos ½° to Pos, 1° 1° preferred
Camber - Neg ¼° to Pos ¼° 0° preferred
To -In - 1/16" to 3/16" 3/16" preferred
To -Out on Turns - With inner wheel at 25°, outer wheel should be 22°

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REAR SUSPENSION

Rear Suspension: *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Neoprene air springs mounted within rear coil springs. Optional on both series. *See "Rambler Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw. Recirculating ball type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Monroe Linkage Type. *See "Monroe Linkage Type Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm and Nut" in Steering Section.*

BRAKES

Bendix Hydraulic Singl Anchor. "Bendix Automatic Adjuster" type brakes are optional.
See "Bendix Hydraulic" and "Bendix Automatic Adjuster" in Brak Section.

►*PEDAL HEIGHT CHANGE NOTE:* On later cars, pedal height reduced approximately 1" by shortening link connecting pedal to brake master cylinder. *NOTE* - Clutch pedal height changed similarly.

Drum Diameter - 10" Front and Rear.

Wheel Cylinder Diameter - 1 1/8" Front, 7/8" Rear.

Braking Power - 62.4% Front, 37.6% Rear.

Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only.

Lining Thickness - 7/32" (All Models).

Shoe	Lining Width & Length Front Wheels	Rear Wheels
Primary	2.5" x 8.90"	1.75" x 8.46"
Secondary	2.5" x 11.06"	1.75" x 10.88

Clearance (Without Adjusters) - Adjusting wheel backed off 8 or more notches from point where shoes are tight against drum.

Clearance (With Adjusters) - *See "Bendix Automatic Brake Adjusters" in Brake Section.*

Standard Master Cylinder: In engine compartment under steering column.

Checking Fluid - Fill from engine compartment. Check at 1000 mile intervals.

Removal - Remove from beneath car. Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit. TWO types used.
See "Bendix Power Unit (Hydraulic Racti n) Type" and "Bendix Power Unit Hydraulic (Disc) Racti n Type" in Brake Section.

Checking Fluid - Same as for standard master cylinder.

Removal - Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link and Arm Type. *See "Windshield Wipers" in Miscellaneous Section.*

Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door. *See "Rambler Electric Window Controls" in Miscellaneous Section.*

Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

►*AIR CONDITIONING COMPRESSOR VIBRATION CORRECTION:* Correct by installing brace on compressor. Attach brace to compressor base at rear left hand corner mounting hole and to existing tapped hole in left hand cylinder head.

►*AMERICAN CUSTOM SERIES NOTE:* This model has 6 Cyl. Overhead Valve Engine and Delco-Remy electrical equipment. *See "Rambl r American Custom & Rambler Six" (following) for all data on this model.*

MODEL IDENTIFICATION

Model	Series
Rambler American (Deluxe & Super)	6001

NOTE - "L" Head engine used in these models.

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel.

Starting Serial Number - B-100001.

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar post. Indicates date of manufacture, not used for licensing.

Engine Code Number: Stamped on machined pad on upper left front corner of cylinder block below cylinder head. Indicates date of manufacture, not used for licensing.

►*ENGINE NUMBER LETTERS (Adjacent to Engine Code Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" - Standard. "B" - .010" Undersize.. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. min. at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: .016" Intake, .018" Exhaust. Cold.

►*VALVE SEQUENCE (For Tappet Clearance Adjustment): See "Valve System" in Rambler Special Data.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Spark Plugs - Autolite AL-7 or Champion H-10. 14 mm. Torque to 30 ft. lbs.

COIL: Autolite No. 200574.

Resistor - None used.

DISTRIBUTOR: Autolite IAT-4402-1. Pivoted breaker plate type with centrifugal and vacuum advance.

Condenser - Autolite No. 2-32. **Capacity** .21-.25 mfd.

Contact Point Set - Autolite No. 1-47.

Breaker Gap - .018-.022". *NOTE* - Set gap with engine stopped and use feeler gauge or dial indicator.

Cam Angle - 36-42°. *CAUTION -Use breaker gap setting only, see above.*

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance.

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		420	0		840
1		540	2		1080
2.5		700	5		1400
6		1700	12		3400
7		2000	14		4000

Vacuum Spark Control: Autolite integral type.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5
1	2	5 7/8
2	4	6 3/4
4	8	9
5.5	11	11

IGNITION TIMING

S tting - 3° BTDC.

Timing Mark - Align timing mark on vibration damper with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF single barrel carburetor used.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

CARTER YF

Carter YF 2014S. Single barrel, downdraft type.

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in "N"), 500 RPM (Air Cond. "ON").

Float Level - ½" (Gauge T109-83) from top of float at free end to top surface of bowl cover (air horn and float assembly inverted and gasket removed). To adjust, bend float lip.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .054" throttle valve opening (Gauge T109-193) with choke valve tightly closed. Adjust by bending fast idle connector link at lower angle.

Automatic Choke Setting: One notch lean.

►*OTHER DATA: See "Carter YF Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4654. Fuel & vacuum.

Pressure - 4-5½ lbs. maximum, measured 16" above pump outlet with engine running at 1250 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge Voltage Regulator, King-Seeley No. 56787.

Dash Unit - King-Seeley 56105.

Tank Unit - King-Seeley 59040.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Oil Bath and Dry Filter Element types used. Dry filter element type should be removed every 1,000 miles for cleaning and replaced every 6 months or 10,000 miles whichever occurs first.

►*PAPER ELEMENT AIR CLEANER CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate or blow out with compressed air.

BATTERY

Autolite 11-MS-40. 12 volt, 7 plate, 40 ampere hour capacity (20 hr. rate).

Battery Ground - Negative to cylinder head.

Engine Ground - Flywheel housing to right rear engine mount.

STARTER

Autolite MEC-6002. Armature - Autolite No. 16-77.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 42-53 ozs.

Shunt Fi ld Curr nt Draw - 4.4-5.1 amps. at 10 volts

P rformanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	48
6.5 ft. lbs.	Lock	4.0	285

Start r Switch: Autolite Solenoid No. SAJ-4001 mounted on starter and controlled by combination Ignition & Starter Switch Rambler No. 3146191, and Neutral Safety Switch (Auto. Trans.) Delco-Remy No. 1998127.

Neutral Safety Switch Adjustment (Am rican) - *Se "Rambler Automatic Transmissi n" in Transmissi n Section.*

GENERATOR

Autolite GJO-7101A. Armatur - Aut lit N . 10-72.

►*CHARGING CIRCUIT CAUTION: "B" type circuit us d with generator field ground d in g n rator. For wiring diagrams and testing cautions, s "Autolit B Circuit Regulators" in Electrical S ction.*

Performance Data - C ld (70°F)

Amperes	Volts	RPM
13.0	15.0	1750
25.0	15.0	2300

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amperes at 10.0 volts.

Motoring Current - 2.9-3.3 amps. at 10.0 volts.

Belt Adjustment: 110-120 lbs. (new belt), 70-80 lbs. (used belt) strand tension using a belt tension gauge. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

REGULATOR

Autolite VBO-6201C-1. New "B" circuit type.

►*CHARGING CIRCUIT CAUTION: "B" typ circuit us d with generator field grounded in g n rator. For wiring diagrams and testing cautions, s "Autolit B Circuit Regulators" in Electrical S ction.*

Cut ut R lay

Cuts In - 12.5-13.5 volts.

Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.

Contact Gap - .015".

Air Gap - .025-.027".

Voltag R gulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes, or with .25 ohm resistor in series with regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *S "Autolit B Circuit R gulators" in Electrical Section.*

Current R gulat r

►*SETTING CAUTION: "T mp ratur Comp nsat d" type. Set to following specifications at 70 F.*

Test A	Operating Amp r s	Test B
32 max.		25 (23-27)

Test A - After 15 minutes operation charging at 7 amps.

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

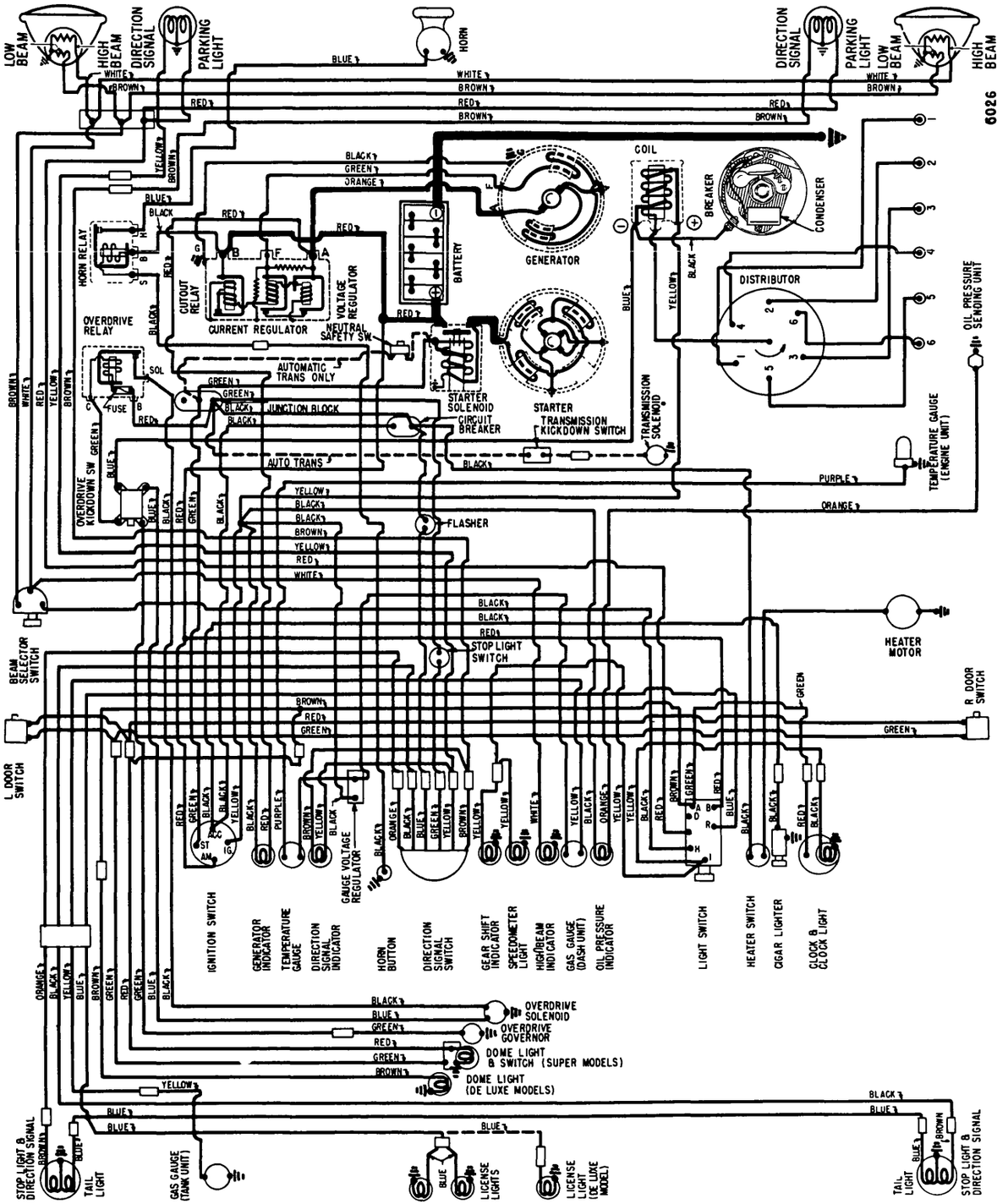
Checking & Adjusting - *See "Autolite B Circuit R gulators" in Electrical Section.*

MISC. ELECTRICAL

H adlamps: Two headlights, one in each fender. Sealed beam. *S e Electrical S ction.*

Dir cti nal Signals: *S El ctrical S ction.*

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Light Switch Removal: Disconnect battery. Depress switch button on top of switch to release knob and shaft. Remove slotted nut and pull switch out rear of dash panel. Identify wire location on switch before disconnecting for accurate installation on new switch.

Stop Light Switch: Located at rear of master cylinder and can be replaced without bleeding brakes. Use thread sealer on new switch.

CIRCUIT BREAKERS: Used as follows:

18 Ampere - Protects headlights and high beam indicator. Located in headlight switch.

12 Ampere. Protects parking, tail, instrument, clock and glove box lights. Located in headlight switch.

30 Ampere. Protects stop light and directional signal circuits. Located on dash panel cowl adjacent to directional signal flasher.

FUSES: 15 Ampere. Protects overdrive relay. Located on Relay on Dash Panel under hood.

5 Ampere. Protects Radio. Located in line to radio.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own, 6 cyl. "L" head.

Bore	Stroke	Displacement
3 1/8"	4 1/4"	195.6 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0-1	23.4	90 at 3800 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, tin plated type with flat top.

Original Bore & Piston Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification, above.*

Clearance - .0006"-.0012" at bottom of skirt.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry.

Replacement Pistons: Std., .002", .005", .010", and .020" Oversize. Furnished with fitted pins.

Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .8595-.8598". **Length** - 2.75".

Clearance in Piston - Palm press fit in piston at room temperature.

Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data.*

Replacement Pins: Furnished Std. and .001", .003", .005" Oversize.

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PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0930-.0935"	.010-.020"	.003-.005"
Compr.(2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3) ①	.0245"	.015-.055"	.0001-.0059"

① - Three-piece steel rail.

Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

Length - 6.625" center-to-center. **Weight** - 23 ozs.
Crankpin Journal Diameter - 2.0948-2.0955".
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*
Bearings - Steel-backed babbitt. No shims.
Clearance - .001-.0015". **Side Play** - .005-.015".
Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.
Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

Journal Diameter - 2.4791-2.4798". Four bearing.
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*
Bearings - Steel-backed babbitt. No shims.
Clearance - .001-.0015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

End Thrust: Taken by flanged front main bearing.
Endplay - .003-.008".

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

►*CRANKSHAFT OIL SHEDDER NOTE:* Oil shedder, Part No. 3102770, installed on crankshaft with concave section toward the front, beginning with engine Code No. 20107.

CAMSHAFT

Bearings - Steel-backed babbitt bushings.
Clearance - .001-.003".
End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.
Endplay - .004-.008".
Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.
Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: .016" Intake, .018" Exhaust.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.469"	.3407-.3412"	4.781"
Exhaust	1.281"	.3407-.3412"	4.781"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° ①	.340"	.002-.0035"
Exhaust	45° ①	.340"	.002-.0035"

① - Valve Face angle 44°.

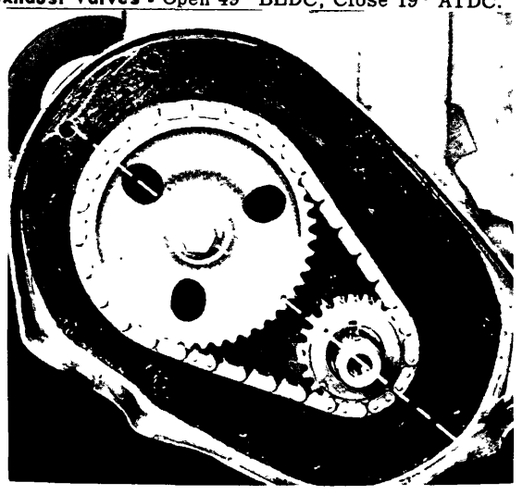
►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top valve to less than 1/32".
Valve Seat Width - 5/64-3/32".
Valve Stem Oil Seal - None used.
Valve Springs: Single spring used on each valve. Specifications as follows:

Valve	Lbs. Pressure	Length
Open	75-82	1 7/16"
Closed	37-41	1 3/4"

Valve Guides: Use Tool J-1429-1 to remove and replace guides. Guides should be flush with guide bore opening in block. Finish ream all guides after installation.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves - Open 10° BTDC, Close 58° ALDC.
Exhaust Valves - Open 49° BLDC, Close 19° ATDC.



RAMBLER AMERICAN VALVE TIMING MARKS

Valve Timing Check - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.
Normal Oil Pressure: 12 lbs. minimum at 600 RPM.
Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block just ahead of oil pump.
Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on right side of block to rear of fuel pump.
Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*

Oil Filter: Partial flow type. Replace element every 4000 miles or sooner as needed.
►*OIL FILTER NOTE:* Oil pressure line should be connected to outer fitting on filter, and return line to center fitting. If lines found reversed, connect properly and install new element.
Replacement Filter Element - Rambler No. 8990508.
Crankcase Ventilation: Filter in crankcase filler cap and breather tube in valve chamber front side plate.

COOLING

Water Capacity: 11 qts. Add 1 qt. for heater.
Pressure Valve: 13 lb. radiator cap, Rambler No. 3141371.
Thermostat: Dole or Thompson. 180°F standard, Part No. 3201250 or 3155883. 150°F No. 3201251, 167-173°F No. 3201249 Optional.
Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.
Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 56787.
Dash Unit - King-Seeley No. 56107.
Engine Unit - King-Seeley No. 44255.
See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*FOR DATA ON CLUTCH, SYNCHRO-MESH TRANSMISSION, OVERDRIVE, FLASH-O-MATIC TRANSMISSION, UNIVERSALS, REAR AXLE, SHOCK ABSORBERS, FRONT SUSPENSION, STEERING, BRAKES, MISC. MECHANICAL, see "Rambler American Custom & Rambler 6 Cyl. (following).*

►*AMERICAN DELUXE & SUPER NOTE:* These models have "L" Head engine and Autolite electrical equipment. *See "Rambler American (Deluxe & Super)" for all data.*

MODEL IDENTIFICATION

Model	Series
Rambler American Custom	6001
Rambler Six	6010

NOTE - "OHV" Overhead valve engine used in these models. Data below covers both series.

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel

Starting Serial Number - B-100001 (American Custom), C-100001 (6 Cyl.).

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar post. Number indicates date of manufacture but is not used for licensing.

Engine Code Number: Stamped on machined pad on upper left front corner of cylinder block below cylinder head. Indicates date of manufacture but is not used for licensing.

►*ENGINE NUMBER LETTERS (Adjacent to Engine Code Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" – Standard. "B" – .010" Undersize. "C" – .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. min. at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18–21" at idling speed.

VALVE TAPPET CLEARANCE: .012" Intake, .016" Exhaust with engine hot and running.

►*VALVE SEQUENCE (For Tappet Clearance Adjustment): See "Valve System" in Rambler Special Data*

IGNITION

FIRING ORDER: 1–5–3–6–2–4

SPARK PLUG GAP: .035"

Spark Plugs - Autolite AL-7, ARL-82 or AL-82, Champion H-10 or H-13-Y. 14 mm. Torque to 30 ft. lbs.

COIL: Delco-Remy No. 1115094.

Ignition Current – 1.7 amps. idling, 3.75 amps. stopped.

Resistor – Delco-Remy 1927809. 1.40–1.62 ohms at 80°F.

►*COIL RESISTOR NOTE:* Resistor connected in series between ignition switch and coil. Bypassed during cranking by direct lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy 1112434.

Condenser - Delco-Remy 1928111. **Capacity** 18–23 mfd.

Contact Point Set - Delco-Remy No. 1924571 or 1944375.

Breaker Gap – .016".

Cam Angle – 28–35°.

Breaker Arm Spring Tension – 17–21 ozs.

Rotation – Counterclockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
5–2.5		600	1–5		1200
5–7		900	10–14		1800
7.5–9.5		1500	15–19		3000
10–12		2100	20–24		4200

Vacuum Spark Control: Delco-Remy 1116166, or 1116174

Vacuum Advance

Dist. Degrees	Eng. Degrees	Vacuum (" of Hg)
1	2	6.5
11	22	16.5

IGNITION TIMING

Model	Std. Ignition Setting
American Custom (Synchro-mesh & O.D.)	8° BTDC
American Custom (Auto. Trans.)	10° BTDC
Rambler 6 Cyl.	5° BTDC

Timing Mark - Align correct slot in vibration dampener rim with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Holley "Visi-Flo" Std. on all models, Carter WCD Optl. on Six.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission.

HOLLEY "VISI-FLO"

Car Model	Holley Carb. No.
Custom Synchro-mesh	R-2168-2
Custom Auto. Trans.	R-2166-A
Six All Trans.	R-1598-1A (Early), R-1598-2A (Late)

Idle Setting – Initial setting 1¼ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idle Speed – 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Fuel Level – Measure wet fuel level through economizer diaphragm hole. Use 6" scale with depth gauge on machined face of opening. Distance should be 23/32"±1/32".

Accelerating Pump – No seasonal adjustment.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Automatic Choke Setting: Centered on index.

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARTER WCD

Carter WCD 2887S, SA. 2–barrel downdraft type.

Idle Setting – ½–2 turns open. Turn screw out for richer mixture.

Idle Speed – 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

Float Level – 5/32" (Gauge T109–196). Distance from top of each float and machined surface of casting.

Accelerating Pump – No seasonal adjustment.

Fast Idle: .010" (Gauge T109-200) clearance between lip on fast idle cam and boss on body with choke valve closed (loosen clampscrew and adjust lever on choke shaft) .020" (Gauge T109-29) between throttle valve and bore (side opposite idle port) with choke fully closed (adjust fast idle screw).

►*OTHER DATA: See "Carter WCD Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: (Amer. Custom) - AC No. 4654. Fuel & Vacuum **(6 Cyl.)** New Carter MPF-3011S or 3025S. Fuel & Vacuum, with piston type vacuum pump.

Pressure - (Amer. Custom) - 4-5½ lbs. maximum measured 16" above pump outlet with engine running at 1250 RPM **(6 Cyl.)** - 4½-5½ lbs. measured not more than 6" above carburetor.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge Voltage Regulator, King-Seeley No. 56787 (Amer. Custom) No. 57603 (6 Cyl.).

Dash Unit - King-Seeley (American Custom) No. 56105, (6 Cyl.) No. 57592.

Tank Unit - King-Seeley No. 59040 (Exc. 6 Cyl. 9-Pass. Sta. Wgn.). No. 59050 (6 Cyl. 9-Pass. Sta. Wgn.). *See "Fuel Gauges" in Carburetion Section.*

Air Cleaner: Oil Bath and Dry Filter Element types used. Dry filter element type should be removed every 1,000 miles for cleaning and replaced every 6 months or 10,000 miles whichever occurs first.

►*PAPER ELEMENT AIR CLEANER CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate or blow out with compressed air.

BATTERY

Autolite. (Std.) 11-HS-45. 12 volt, 7 plate, 45 ampere ampere hour capacity (20 hr. rate).

(Air Cond.) 11-HS-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).

(H.D. Fleet) 11-HS-70. 12 volt, 13 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - From engine to rear crossmember.

STARTER

Delco-Remy 1107731. Armature 1935851.

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum

Performance Data

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

① - Includes solenoid

Starter Switch: Delco-Remy Solenoid No. 1119919 mounted on starter and controlled by combination Ignition & Starter Switch Rambler No. 3146191 for key starting (Synchro-mesh Cars). Automatic Trans. Cars controlled as follows:

Amer. Custom - Same as synchro-mesh above with Neutral Safety Switch Delco-Remy No. 1998127. Starter operative only in "N" or "P".

Neutral Safety Switch Adjustment (American) - *See "Rambler Automatic Transmission" in Transmission Section.*

6 Cyl. - Neutral Starter Switch mounted on gear shift control and operated by pressing in "Neutral Button" with ignition turned "ON". Vacuum Switch Autolite No. 15269A prevents starter operation with engine running.

GENERATOR

Delco-Remy. Application as follows:

Model	Generator	Armature
Standard	1100304 (Early), 1100324 (Later) ①	1928952
Air Cond.	1102018 (Early), 1102113 (Later) ①	1923535
H.D. Fleet	1102123	

① - Later type has new end plate with improved oiler.

NOTE - For Autolite Generators, see Rambler Rebel & Ambassador V8.

Performance Data

Generator	Amperes	Volts	RPM
1100304	25	14.0	2710
1102018	30	14.0	2310
1102123	45	12.0	2600

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.50-1.62 amperes (1100304), 1.48-1.62 amperes (1102018), 2.66-2.86 amperes (1102123), at 12 volts and 80°F.

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Belt Adjustment: 110-120 lbs. (New), 70-80 lbs. (Used) tension using belt tension gauge. Adjust by moving generator. *NOTE* - When using gauge on notched belt, gauge finger should be in notch of belt.

REGULATOR

Delco-Remy. Used as follows:

Regulator No.	Generator No.
1119122	1102304 & 1102324
1119003	1102018 & 1102113
1119600	1102123

►*DOUBLE CONTACT REGULATOR NOTE:* Regulator 1119600 has double contacts for voltage regulation. *NOTE* - Specifications below are for "NORMAL" settings.

►*REGULATOR ADJUSTMENT NOTE (1119003, 122):* "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment.

Cutout Relay

Cuts In - 11.8-13.5 volts (1119003, 122), 11.8-13.0 volts (1119600).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119003, 122) - 13.8-14.8 volts at 125°F.
Setting (1119600) - 13.8-14.6 volts operating on upper contacts, .1-.3 volts lower on lower contacts. At ambient temperature of 125°F.
Contact Gap (1119600) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .075" (1119003, 122), .067" (1119600) with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119122) - 23-27 amperes (hot).
Setting (1119003) - 27-33 amperes (hot).
Setting (1119600) - 38-45 amperes (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

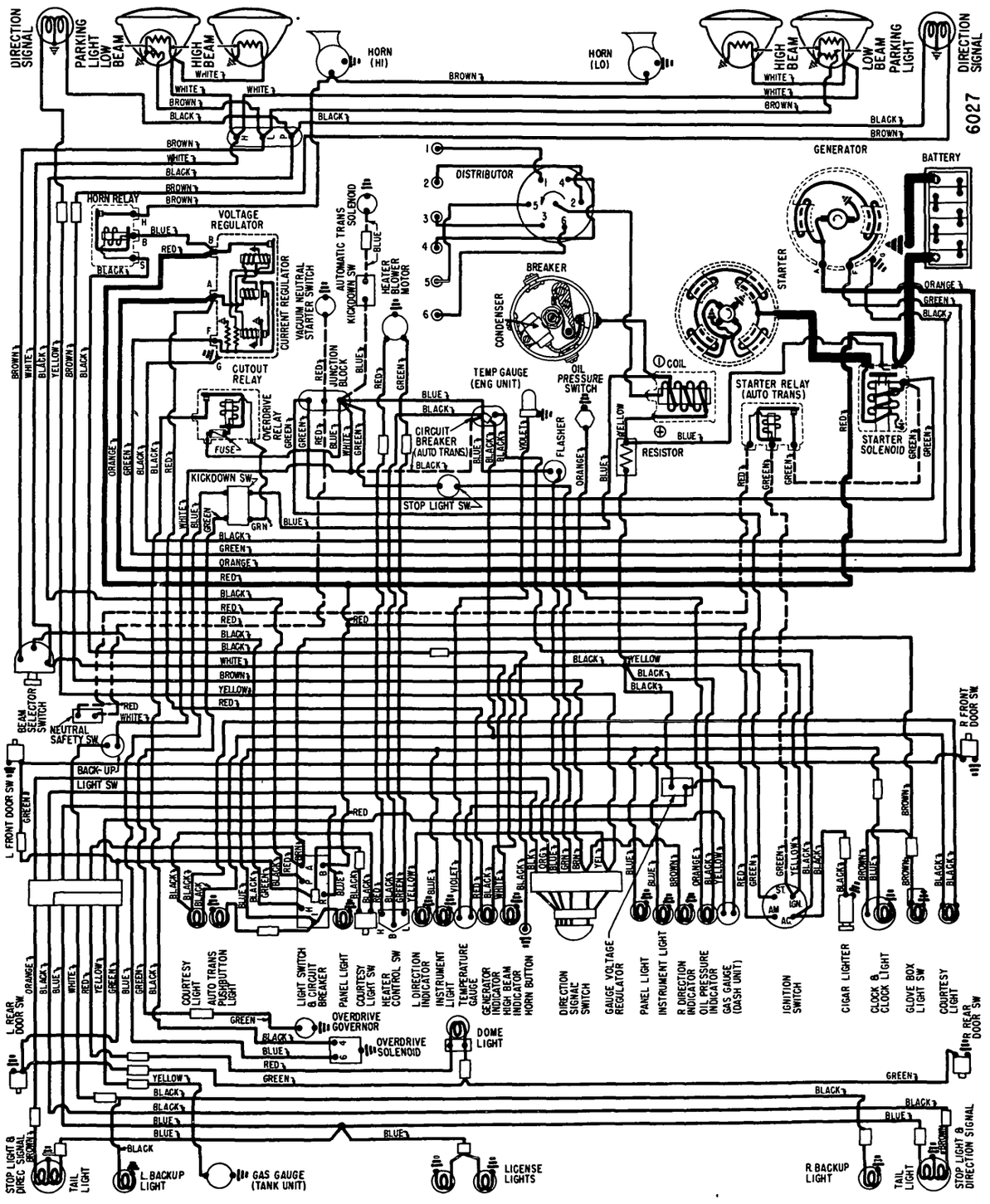
Headlamps: (Amer. Custom) - Two headlights (one in each fender). Sealed Beam type. *See Electrical Section.* **(Rambler 6 Cyl.)** - Dual headlights (4-Headlight System). *See Electrical Section.*

Directional Signals: *See Electrical Section.*

►*DIRECTIONAL SIGNAL CANCELLING TOO SOON CORRECTION:* May be caused by bent or improperly aligned switch arm. To correct, bend arm at small hole where spring protrudes so arm roller is bottomed in center (neutral) detent without detent spring in place.

Light Switch Removal: Disconnect battery, depress switch button on top of switch to release knob and shaft. Remove slotted nut and pull switch free out rear of dash panel. Identify wire location on switch before disconnecting for accurate installation on new switch.

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Stop Light Switch: Located on master cylinder under front floor (Amer. Custom), on front face of firewall (6 Cyl.). Use thread sealer when installing new switch.

CIRCUIT BREAKERS: Used as follows:

18 Ampere. Protects headlights and high beam indicator. Located in headlight switch.

12 Ampere. Protects parking, tail, instrument, clock and glove box lights. Located headlight switch.

30 Amp r - Protects stop light and directional signal circuits. Located on dash panel cowl adjacent to direction signal flasher.

FUSES: 15 Amp r - Protects overdrive relay. Located on relay on dash panel under hood.

5 Amp re - Protects radio. In-line fuse.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head.

Bore	Stroke	Displacement
3 1/8"	4 1/4"	195.6-cu. ins.
C mpr. Ratio	**Rated HP**	**Developed HP**
8.7-1 (1-Bbl. Carb.)	23.4	127 at 4200 RPM
8.7-1 (2-Bbl. Carb.)	23.4	138 at 4500 RPM

C mpression & Vacuum Reading – See *TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

ENGINE REMOVAL: *S e "ENGINE" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambl r Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Soecial Data.*

PISTONS

Aluminum alloy, solid skirt, steel strut, tin plated type with contoured top.

Original Bore & Pistons - *See "ENGINE NUMBER LETTER" under Model Identification, above.*

Clearanc - .0006-.0012" at bottom of skirt.

R m val - Pistons and rods removed from above.

Fitting N w Pistons: Piston to bore clearance .0006-.0017" (Skirt Top),.0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry

R plac m nt Pistons: Std., .002", .005", .010" and .020" Oversize. Furnished with fitted pins.

Installing Pist ns: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .8595-.8598". **L ngth** - 2.75".

Clearance in Piston - Palm press fit in piston at room temperature.

Pin R m val & Installati n - *See "Piston Pins" in Rambler Special Data.*

Replac ment Pins: Furnished Std. and .001", .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring per piston.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0930-.0935"	.010-.020"	.003-.005"
Compr. (2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3)①	.0245"	.015-.055"	.0001-.0059"

① - Three-piece steel rail.

Installing Rings: *NOTE* - Top compression ring outer edges beveled. Install both compression rings with inner notched edge up.

Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

Length - 6.625" center-to-center. **Weight** - 23 ozs.

Crankpin Journal Diameter - 2.0948-2.0955".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed babbitt. No shims.

Clearance - .001-.0015". **Sideplay** - .005-.015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Install rods in respective cylinders with cylinder numbers on rods and caps toward camshaft side of engine and notch in top of piston to front of engine.

CRANKSHAFT

Journal Diameter - 2.4791-2.4798". Four Bearing.

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed babbitt. No shims.

Clearance - .001-.0015".

End Thrust: Taken by flanged front main bearing.

Endplay - .003-.008".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

►*CRANKSHAFT OIL SHEDDER NOTE:* Oil shedder Part No. 3102770 installed on crankshaft with concave section toward the front, beginning with engine Code No. 20107.

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*

Bearings - Steel-backed babbitt bushings.

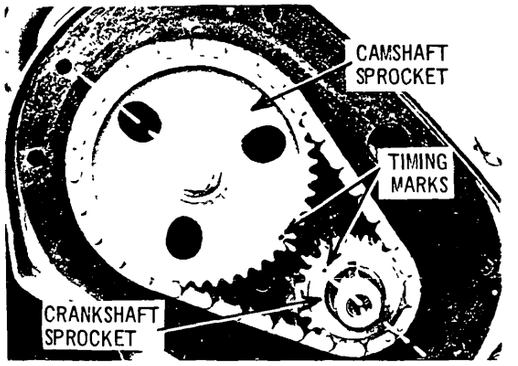
Clearance - .001"-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.

Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.



RAMBLER SIX VALVE TIMING MARKS

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: .012" Intake, .016" Exhaust, with engine hot and running.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°①	.372"	.002-.0035"
Exhaust	45°①	.369"	.0025-.004"

① - Valve Face Angle 44°.

►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32".

Valve Stem Oil Seals - Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Single spring used on each valve. Specifications as follows:

Valve	Lbs. Pressure	Length
Open	115-125	1 7/16"
Closed	65-70	1 13/16"

Valve Guides: Use Tool J-1429-B to remove and install all guides. Install guide so it extends 23/32" above surface of cylinder head. Finish ream all guides after installation.

Rocker Arm Assembly: *See "Valve System" in Rambler Spr cial Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves - Open 12°30' BTDC, Close 51°30' ALDC.

Exhaust Valves - Open 53°30' BLDC, Close 10°30' ATDC.

Valve Timing Check - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

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OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 12 lbs. minimum at 600 RPM.

Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on right side of engine block.

Oil Pump: Gear type, mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*

Oil Filter: Partial flow type. Replace element every 4000 miles or sooner as needed.

►*OIL FILTER NOTE:* Oil pressure line should be connected to outer fitting on filter, and return line to center fitting. If lines found reversed, connect properly.

Replacement Filter Element - Rambler No. 8990508.

Crankcase Ventilation: Filter in crankcase filler cap and breather tube in valve tappet cover.

COOLING

Water Capacity: 10 qts. Add 1 qt. for heater.

Pressure Valve: 13 lb. radiator cap, Rambler No. 3141371.

Thermostat: (Amer. Custom) - Dole. 195°F Rambler No. 3202389. **(6 Cyl.)** - Dole or Thompson. 180°F used in production, 167-172°F Optional.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 56787 (Amer. Custom), No. 57603 (6 Cyl.).

Dash Unit - King-Seeley. (Amer. Custom) No. 56107, (6 Cyl.) No. 57596.

Engine Unit - King-Seeley No. 44255.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Models 8.5A6, 8.5A7, 8A7, 9A7. *See table below.* Single plate, dry disc type. *See "Borg & Beck" in Clutch Section.*

	Cover Assy.	Driven Plate
American (Exc. Custom)		
Std. & O.D. 8A7	361531	382347
Hvy. Duty 8.5A6	361360	382248
Fleet O.D. 8.5A6	361360	382490
American Custom & 6 Cyl.		
Std. 8.5A7	361530	382394
Overdrive 8.5A7	361530	382490
Hvy. Duty Std. 8.5A7	361416	382394
Hvy. Duty O.D. 8.5A7	361416	382494
Hvy Duty Fleet 9A7	361494	382828

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), and take out clutch fork. Remove clutch cover mounting screws uniformly to relieve spring tension and remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Warner Mod l T96. Three-speed, helical gear type.

►*6 CYL. HEAVY DUTY (FLEET) TRANSMISSION NOTE:* This transmission has heavy duty bearings and spur gear type Low & Reverse and will not be as quiet when low and reverse gear being used.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal (Rambler American): Disconnect rear spring front brackets from floor pan, shock absorbers at lower mounting, brake hose bracket, and hand brake cable at equalizer. Slide rear axle assembly rearward to remove front universal joint from transmission. Remove transmission attaching screws and use two guide pins (Tool J-1434) in place of two upper capscrews so transmission main shaft will clear clutch pilot bearing and disc.

Removal (6 Cyl.): Disconnect brake tube bracket from underside of body. Disconnect shock absorbers at lower bracket, and torque tube at rear of transmission. Disconnect parking brake cable at equalizer and brake cable housing at torque tube bracket. Move rear axle assembly to rear to remove front universal joint from transmission main shaft. Disconnect speedometer cable, shifter rods, overdrive cable, and overdrive wires from solenoid and governor. Install guide pins (J-1434) in place of two upper transmission mounting capscrews, remove lower mounting capscrews, slide transmission out far enough to clear clutch pilot bearing and driven member, remove transmission.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

Removal: Overdrive and transmission removed from car as a unit. *See "Synchro-mesh Transmission Removal" above.*

AUTOMATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. *NOTE* - Vacuum and solenoid unit at rear of transmission control shift speeds (no throttle linkage).

►*VACUUM & SOLENOID UNIT CORROSION PREVENTION:* Install an overdrive governor boot, Part No. 3131032, over solenoid by cutting a small hole in center of closed rear section to fit over connector fitting and pull boot over solenoid as far as possible. Route kickdown switch wire between boot and solenoid and out through end of boot.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Rambler Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Rambler Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A".

Capacity - 10 qts.

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature, move gearshift lever through all positions (American), press all selector buttons in turn (6 Cyl.). With transmission in Neutral "N" remove dipstick and check fluid level. Maintain level at "F" mark on dipstick. Approximately 1½ pints required to raise level from "L" to "F" mark.

►*OTHER DATA: See "Rambler Automatic Transmission" in Transmission Section.*

UNIVERSALS

Mechanics. Two used (American Models), one used at transmission end of drive shaft (6 Cyl.).

Torque Tube Bracket Adjustment (6 Cyl. Std. & Overdrive Transmission Cars) - *See "Rambler Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss Drive (American Models), Torque Tube Drive (Rambler 6 Cyl.). "Twin-Grip" limited slip differential Optional (identified by metal tag on filler plug).

See "Rambler Hypoid" and "Rambler (Twin-Grip) Differential" in Rear Axle Section.

►*"TWIN-GRIP" LUBRICATION NOTE:* Use only "Twin-Grip" lubricant in this type differential.

Transmission	Std. Ratio	Optl. Ratio
American (Custom)		
Std. & O.D.	3.31-1 (13-43)	3.78-1 (9-34)
Auto. Trans.	2.87-1 (15-43) ①	3.31-1 (13-43)
American (Deluxe & Super)		
Synchro-mesh	3.31-1 (13-43)	3.78-1 (9-34)
Overdrive	3.78-1 (9-34)	4.11-1 (9-37)
Auto. Trans.	3.31-1 (13-43)	
Rambler (6 Cyl.)		
Synchro-mesh	3.78-1 (9-34)	4.38-1 (8-35) 4.11-1 (9-37)
Overdrive	4.11-1 (9-37)	4.38-1 (8-35)
Auto. Trans.	3.31-1 (13-43)	3.78-1 (9-34)

① - "Twin-Grip" differential not available in this ratio.

►*DIFFERENTIAL SIDE GEAR BREAKAGE NOTE (Auto. Trans. Cars):* Replace rear axle parts as necessary and install Kit Part No. 3202486 in Automatic Transmissions built prior to No. 12606 (Rambler American), No. 127233 (Rambler 6 Cyl,). *See "Rambler Automatic Transmission" in Transmission Section.*

►*AXLE SHAFT REPLACEMENT CAUTION (Cars with "Twin-Grip" Differential): Do not rotate axle shaft with opposite shaft out (will cause misalignment of cone and side gear splines and prevent entry of second shaft).*

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly when removed* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable. Remove brake support plate by sliding plate, oil seal, and shims off axle shaft. Use special Puller J-2498-B to remove shaft from housing.

Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations. Tighten axle shaft nut to 250 ft. lbs. torque.

►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in

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hub when it is assembled on axle shaft New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft(serrations will not match) Tighten axle shaft nut to 250 ft lbs torque and check distance from outside face of hub to end of taper on shaft (hub overhzng on threaded portion of shaft) This distance must be 3/16" Punch mark new hub in line with mark on shaft

Rear Axle Assembly Removal (American Models): Raise and support rear of body Remove rear wheels and hubs (Puller J-1644-B or J-736-B). Disconnect propeller shaft at rear universal joint using Coupling Nut Wrenches J-4486. *(NOTE* - Place one wrench on universal joint yoke and one on coupling nut holding yoke to rear axle pinion shaft) Remove shaft Disconnect rear shock absorbers, rear brake lines and rear springs from body Remove axle and springs as an assembly.

Rear Axle Assembly Removal (Rambler 6 Cyl.): Drain lubricant, raise car and support rear of body Disconnect hand brake cable at equalizer and hand brake cable housing at bracket Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from mountings and rear axle stabilizer bar at rear axle tube Roll axle free from car

Axle Shaft Endplay - 004- 008" (006" desired) Adjusted by shims behind brake backing plate *NOTE* - On later cars, adjust endplay at **left** side only

Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted

SHOCK ABSORBERS

Manufacturer. Direct acting, hydraulic type Serviced by replacement.

Shock Absorber Application

Model	Front	Rear
American	3200842	3200843
Six (Reg & H.D.)	3119821①	3119822
Six (Air Susp)	3200980	② 3200981

① - No 3200857 also used for export
② - No 3200982 used for Station Wagon

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel
See "Rambler" in Suspension and Wheel Alignment Section.

Kingpin Inclination - 8° (American), 6½° (Rambler 6 Cyl)

Caster (American & Rambler 6 Cyl. Manual Steering) - 0° to Pos ½° Pos ½° preferred

Caster (American Power Steering) - Pos 1½° to Pos 2°. Pos 2° preferred

Caster (Rambler 6 Cyl. Power Steering) - Pos ½° to Pos. 1° Pos 1° preferred

Camber (All Models) - Neg ¼° to Pos ¼° 0° preferred

Toe-In - 1/16-3/16"

Toe-Out on Turns - With inner wheel at 25°, outer wheel should be 21½° (American), 22° (Rambler 6 Cyl)

Wheel Bearing Adjustment: Tighten adjusting nut while rotating wheel until all parts firmly seated and drag is felt, then back off adjusting nut one castellation until slot in nut is aligned with hole in spindle, install cotter pin

REAR SUSPENSION

Rear Suspension (Rambler 6 Cyl.): Coil spring type. *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Optl on Rambler 6 Cyl. Neoprene air springs mounted within rear coil springs.
See "Rambler Air Suspension" in Suspension & Wheel Alignment Section.

STEERING

Manual (American): Gemmer. Worm & Roller type
See *"Gemmer Worm & Roller" in Steering Section*

Manual (Rambler 6 Cyl.): Saginaw. Recirculating ball type
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Monroe Linkage Type. *See "Monroe Linkage Type" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

►*DIFFERENT BRAKE SYSTEMS USED AS FOLLOWS:*

American (Std.) - Bendix (Lockheed) Self-Centering
See "Bendix (Lockheed) Self-Centering Brakes" in Brake Section

American (Optl.) - Bendix "Automatic Adjuster" *See "Bendix Automatic Adjuster Brakes" in Brake Section.*

Six (Std.) - Wagner (Lockheed) Self-Centering *See "Wagner (Lockheed) Self-Centering Brakes" in Brake Section*

Six (Optl.) - Wagner "Automatic Adjuster" *See "Wagner Automatic Adjuster Brakes" in Brake Section*

►*BENDIX AUTOMATIC ADJUSTER BRAKE PRODUCTION CHANGE AND EXCESSIVE CABLE WEAR CORRECTION (Rambler 6 Cyl.): New type cable, cable guide and tubing used See "Bendix Automatic Adjuster Brakes" in Brake Section.*

Drum Diameter - 9" front and rear.

Wheel Cylinder Diameter - 1" front, 13/16" rear.

Braking Power - 60 2% front, 39 8% rear.

Replacement Linings & Shoes: Shoes with linings furnished in sets (2 front or 2 rear) in standard size only.

Lining Width & Length (American)

Shoe	Front & Rear Wheels
Primary	2" x 7.62"
Secondary	2" x 9.82"

Lining Width & Length (Rambler 6 Cyl.)

Shoe	Front Wheel	Rear Wheel
Primary	2 25" x 7 62"	2" x 7.62"
Secondary	2 50" x 9.82"	2" x 9.97"

Clearance (Wagner Self-centering) - Adjusting screw backed off 8 or more notches from point where shoes tight against drum

Clearance (Bendix Self-centering) - Adjusting cam for each shoe backed off just enough to relieve all drag from point where slight drag evident when wheel is turned

Clearance (Bendix Automatic Adjuster) - No adjustment required in service *See "Bendix Automatic Adjuster" in Brake Section for initial adjustment.*

Standard Master Cylinder: Mounted on left side under front floor (American), on engine side of firewall under steering column (Rambler 6 Cyl)

Checking Fluid - Filler plug accessible through hole in front compartment floor (American), in engine compartment (Rambler 6 Cyl) Check at 1000 mile intervals Maintain fluid level within ½" of top.

Removal - Remove from beneath car (American), from engine compartment (Rambler 6 Cyl.)

Power Brakes: (Rambler 6 Cyl.) - Moraine Hydraulic (Diaphragm) Reaction Type
See "Moraine Hydraulic (Diaphragm) Reaction Type Power Unit" in Brake Section.

Checking Fluid - Master cylinder mounted on power brake unit in engine compartment Check at 1000 mile intervals Maintain fluid level within ½" of top

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door *See "Rambler Electric Window Controls" in Miscellaneous Section.*

Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Series
Rebel V8	6020
Ambassador V8	6080

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood.

Starting Serial Numbers - A-100001 (Rebel), H-100001 (Amb.).

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar post. Number indicates date of manufacture but is not used for licensing.

Engine Code Number: Stamped on plate attached to generator support bracket. Number indicates date of manufacture but is not used for licensing.

►*ENGINE NUMBER LETTERS (Adjacent to Engine Code Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 140 lbs. minimum at 315 RPM (cranking speed) with throttle wide open.

VACUUM READING: 18-21" at idle speed.

VALVE TAPPET CLEARANCE: Rebel - .012" Intake, .014" Exhaust, HOT and running. **Amb.** - Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between left bank exhaust manifold and exhaust crossover pipe (exhaust gases diverted through heat passages in manifold when valve closed).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Autolite AL-7, AL-82, ARL-82 (ARL-8 Govt. Cars), or Champion H-10, H-18Y, 14 mm. Torque to 30 ft. lbs.

COIL: Autolite No. 200575.

Resistor - Autolite No. PU-5003.

►*COIL RESISTOR NOTE:* Connected in circuit between positive terminal of coil and ignition switch. *Resistor must be in circuit when testing coil output.*

DISTRIBUTOR: Autolite IBP-4104A (Rebel) IBP-4104 (Amb.).

Condenser - Autolite No. 2-32. **Capacity** - .21-.25 mfd.

Contact Point Set - Autolite No. 1-47.

Breaker Gap – .015–.018". Set at .017".

Cam Angle – 26–32°.

Breaker Arm Spring Tension – 17–20 ozs.

Rotation – Counterclockwise viewed from above.

Automatic Advance – IBP–4104

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	350	2	700
8	750	16	1500
17	1775	34	3550
18	1900	36	3800

Automatic Advance – IBP–4104A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325	0	650
1	350	2	700
9	615	18	1230
17	1830	34	3660
18	2000	36	4000

Vacuum Spark Control: Autolite integral type.

Vacuum Advanc – IBP–4104

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10 3/8
9	18	14
10	20	15

Vacuum Advance – IBP–4104A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6 1/2
1	2	7
5	10	9 1/8
11	22	13 3/8
12	24	14

IGNITION TIMING

Setting - See table below.

Model	Setting
Rebel (Std. & O.D. Trans.)	TDC
Rebel (Auto. Trans.)	5° BTDC
Ambassador (Std. & O.D. Trans. 2-Bbl. Carb.)	TDC
Ambassador (Std. & O.D. Trans. 4-Bbl. Carb.)	5° BTDC
Ambassador (Auto. Trans.)	5° BTDC

Timing Mark - Timing indicator on front cover and three grooves on vibration damper. Groove painted white is TDC, other grooves indicate 5° BTDC and 10° BTDC.

CARBURETOR

►*CARBURETOR APPLICATION: Holley 2-Barrel carburetor standard, Holley 4-Barrel optional.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid Unit on transmission case.

HOLLEY 2 & 4-BARREL

2-BARREL CARBURETOR	Holley Carb. No.
Rebel & Amb. (Std.)	Model 2300, No. 2040A
4-BARREL CARBURETOR	
Rebel (Optl.) Early	Model 4150C, No. 1958
Rebel (Optl.) Later	Model 4150C, No. 1958-1
Amb. (Optl.) Early	Model 4150C, No. 1957
Amb. (Optl.) Later	Model 4150C, No. 1957-1

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - Initial setting 1 turn open. Turn screws out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON").

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: New Carter MPF-2988S. Fuel & Vacuum, with piston type vacuum pump.

Pressure - 4½-5½ lbs. measured not more than 6" above carburetor.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with Gauge Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57592.

Tank Unit - King-Seeley No. 59040 (Exc. Sta. Wgn.), No. 59050 (Sta. Wgn.).

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type. Clean every 1,000 miles, replace element every 10,000 miles.

►*DRY TYPE CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate or blow out with compressed air.

BATTERY

Autolite. (Std.) 11-HS-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

(Air Cond.) 11-HS-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).

Battery - Negative to cylinder block.

Engine Ground - Transmission case to rear crossmember.

STARTER

Autolite. (Rebel) MEC-6001. (Amb.) MDY-6002.

Armature - Autolite 16-77.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 42-53 ozs.

Performance Data - MEC-6001

Torque	RPM	Volts	Amperes
0 ft. lbs,	5300	10.0	48
6.5 ft. lbs.	Lock	4.0	285

Performance Data - MDY-6002

Torque	RPM	Volts	Amperes
0 ft. lbs.,	4200	10.0	60
9.0 ft. lbs.	Lock	4.0	405

Starter Switch: Autolite Solenoid No. SAJ-4001 mounted on starter and controlled, by combination Ignition and Starter Switch Rambler No. 3146191 and Neutral Safety Switch (Auto. Trans.) Delco-Remy No. 1998127. Vacuum Switch Autolite No. 15269A prevents starter operation with engine running.

GENERATOR

Autolite. Application as follows:

Model	Generator	Armatur
Rebel (Std.)	GJO-7101A	10-72
Rebel (Air Cond.)	GJP-7101A	10-53
Ambassador (All)	GJP-7101A	10-53

►*CHARGING CIRCUIT CAUTION: "B" typ circuit us d with generator field ground d in g n rator. For wiring diagrams and testing cautions, s "Autolit B Circuit Regulators" in Electrical S ction.*

Performance Data - GJO (Cold-70°F)

Amperes	Volts	RPM
13 min.,	15.0	1750
25 "	15.0	2300
30	15.0	2700

Performance Data - GJP (C ld-70°F)

Amperes	Volts	RPM
16 min.	15.0	1750
30	15.0	2300
35	15.0	2600

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs.

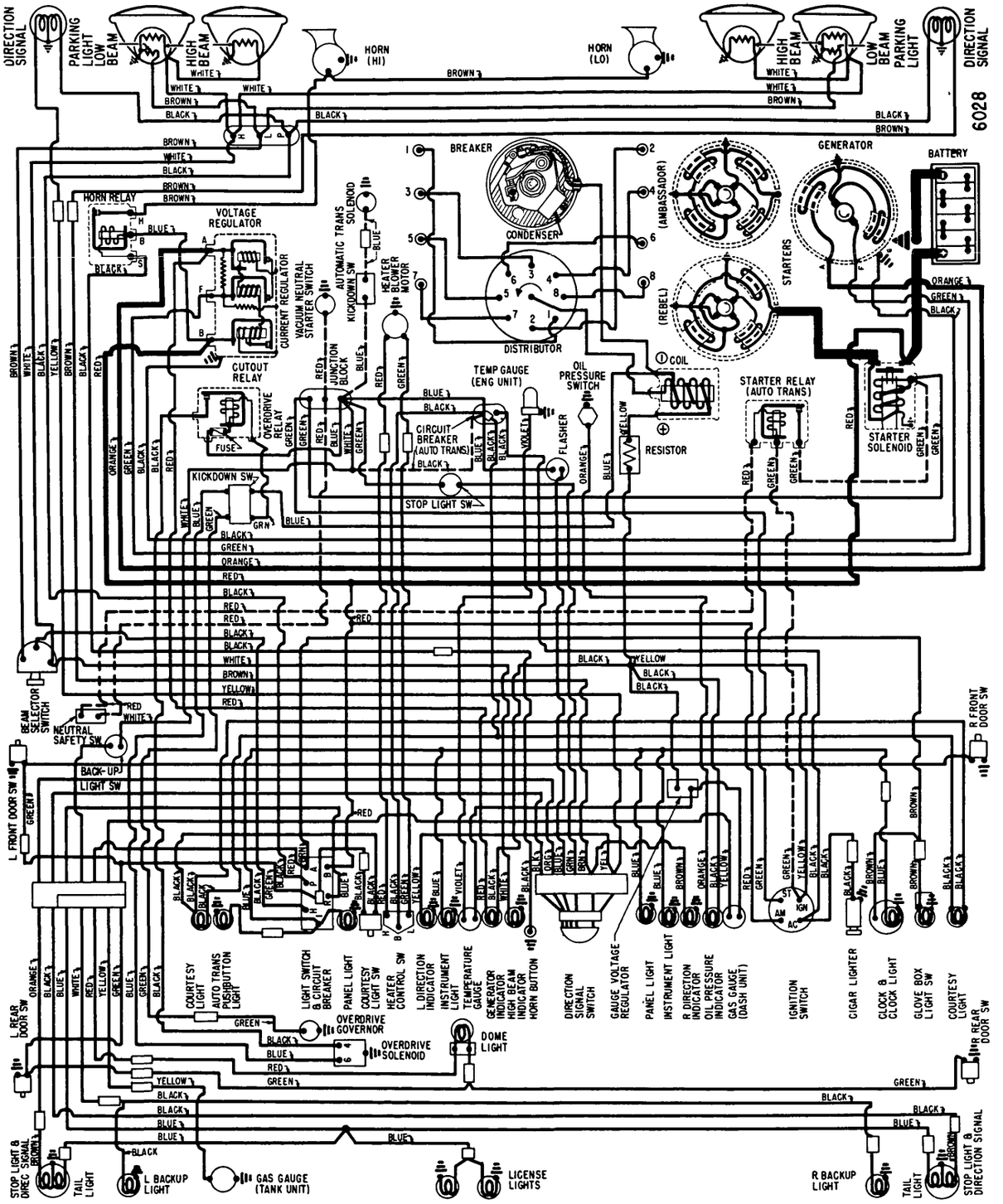
Field Current - 1.6-1.7 amperes at 10.0 volts.

Motoring Current (GJO) - 2.9-3.3 amperes at 10.0 volts.

Motoring Current (GJP) - 3.1-3.5 amperes at 10.0 volts.

B lt Adjustm nt: 110-120 lbs. (New), 70-80 lbs. (Used) tension using belt tension gauge. Adjust by moving generator. *NOTE* - When using gauge on notched belt, gauge finger should be in notch of belt.

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REGULATOR

Autolite VBO-6201B-1,2 (GJO Gen.), VBO-6201A-1,2 (GJP Gen.).

►*CHARGING CIRCUIT CAUTION: "B" type circuit us d with generator field grounded in generator. For wiring diagrams and testing cautions, see "Autolite B Circuit Regulators" in Electrical Section.*

Cutout Relay

Cuts In - 12.5-13.5 volts.
Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.
Contact Gap - .015".
Air Gap - .025-.027".

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes, or with a .25 ohm resistor in series with regulator and battery.
Air Gap - .048-.052" (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite B Circuit Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" typ . Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes - Test B
VBO-6201A-1	44 Max. 35 (33-37)
VBO-6201B-1	37 Max. 30 (28-32)

Test A - After 15 minutes operation charging at 7 amps.
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite B Circuit R gulators" in Electrical Section.*

MISC. ELECTRICAL

Directional Signals: *See Electrical Section.*

►*DIRECTIONAL SIGNAL CANCELS TOO SOON COR-RECTION:* May be caused by bent or improperly aligned switch arm. To correct, bend arm at small hole where spring protrudes so arm roller is bottomed in center (Neutral) detent without detent spring or roller in place.

Light Switch Removal: Disconnect battery. Depress switch button on top of switch to release knob and shaft. Remove slotted nut and pull switch free out rear of dash panel. Identify wire location on switch before disconnecting for accurate installation on new switch.

Stop Light Switch: Located at rear of master cylinder and can be replaced without bleeding brakes. Use thread sealer on new switch.

CIRCUIT BREAKERS: Used as follows:
18 Ampere. Protects headlights and high beam indicator. Located in headlight switch.
12 Ampere. Protects parking, tail, instrument, clock and glove box lights. Located in headlight switch.
30 Ampere. Protects brake and directional signal circuits. Located on dash panel cowl adjacent to directional signal flasher.

FUSES: 15 Amp r . Protects overdrive relay. Located on Relay Dash Panel under hood.
5 Amp r . Protects Radio. Located in line.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own, V8, valve-in-head.

Series	Bore	Stroke	Displacement
Rebel	3½"	3¼"	250 cu. ins.
Amb.	4"	3¼"	327 cu. ins.

Series	Compr. Ratio	Rated HP	Developed HP
Rebel (2-Bbl. Carb.)	8.7-1	39.2	200 at 4900 RPM
Rebel (4-Bbl. Carb.)	8.7-1	39.2	215 at 4900 RPM
Amb. (2-Bbl. Carb.)	8.7-1	51.2	250 at 4700 RPM
Amb. (4-Bbl. Carb.)	9.7-1	51.2	270 at 4700 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE OIL LEVEL DIPSTICK & TUBE PRODUCTION CHANGE:* New Dipstick No. 3159965 & Tube Part No. 3159966 used starting with Engine Code 20212.

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset to thrust side of piston.

Original Bore & Piston Sizes - *See "ENGINE NUMBER LETTER" under Model Identification, above.*

►*AMBASSADOR LOW COMPRESSION (8.7-1) PISTON IDENTIFICATION:* This piston has two notches in piston head.

Weight - 18 ozs. (Rebel), 23.45 ozs. (Amb.).

Removal - Pistons and rods removed from above.

Clearance - .0009-.0015" (skirt bottom).

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward front of engine. *See Rod Installation.*

Replacement Pistons: Furnished Std. and .002", .005", .010", .020" (All), plus .030" (Amb. with 4-Bbl. Carb.).

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .9307". **Length** 3.1870".

Pin Fit in Piston - Palm press fit at room temperature.

Pin Fit in Connecting Rod - Tight press fit, no locking device used.

Piston Pin Removal & Installation - Tool Set 6360 should be used to prevent damage to piston. *See "Piston Pins" in Rambler Special Data.*

Replacement Pins: Std. and .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	①
Compr. (2)	.0775-.0780"	.010-.020"	②
Oil (3)	.0245"③	.015-.055"	.0001-.0079"

① - (Rebel) .002-.0035". (Amb.) .002-.006".
② - (Rebel) .002-.004". (Amb.) .002-.006".
③ - Each rail.

Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter up.

Replacement Rings: Sets of Std. and .020", .030" Oversize.

CONNECTING ROD

Length - 6.3750" center-to-center. **Weight** - 27.6 ozs.

Crankpin Journal Diameter - 2.2483-2.2490".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Lower Bearing - Steel-backed, sintered copper lead alloy precision type.

Clearance - .0007-.0028". **Side Clearance** - .004-.012".

Replacement Bearings: Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Assemble connecting rod to piston with notch in piston to front of engine. Cylinder numbers on connecting rod and cap should be toward outside bank in which they are installed.

CRANKSHAFT

Journal Diameter - 2.4983-2.4990".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed, sintered copper lead alloy, precision type.

Clearance - .0006-.0032".

Replacement Bearings: Std., .001", .002", .010", .012" Undersize.

End Thrust: Taken by No. 1 flanged bearing.

Endplay - .003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*

Bearings - Steel-backed babbitt lined bushings.

Clearance - .001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket.

Endplay - .003-.006".

Timing Chain: Non-adjustable side guide type. **Width** .875". **Pitch** .375". **Length** 23¼" or 62 links.

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. To check assembly, rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Rambler Special Data.*

VALVES

Tappet Clearance: Rebel - .012" Intake, .014" Exhaust, Hot and running. **Amb.** - Zero lash, Hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.787"	.3715-.3725"	4.859"
Exhaust	1.406"	.3715-.3725"	4.859"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°①	.375"	.0015-.0025"
Exhaust	45°②	.375"	.0015-.0025"

① - Valve face angle 29°. ② - Valve face angle 44°.

Valve Seat Width - .078-.093" (Int.), .093-.140" (Exh.).

Valve Stem Seals - Rubber deflector installed on valve stem and over top of valve guide on all valves.

Valve Springs: Install springs with closed coil end against cylinder head. **Free Length** - 2.20".

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85-91 lbs.	1 13/16"
Open	150-160 lbs.	1 7/16"

Valve Guides: Drive old guides out, drive new guides in to a height of 3/4"±1/64" above cylinder head (measured from top of guide to flat machined surface for lower spring retainer on head). Finish ream all guides after installation.

Valve Lifters: Amb. - Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing - *See "Valve System" in Rambler Special Data.*

Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valve - Open 12°30'BTDC. Close 51°30' ALDC.

Exhaust Valves - Open 53°30'BLDC. Close 10°30'ATDC.

Valve Timing Check: Remove rocker arm cover and spark plugs. Turn crankshaft to bring No. 6 piston to TDC of compression stroke (No. 1 will be on exhaust stroke in overlap position). Rotate crankshaft 90° **counterclockwise.** Install dial indicator on No. 1 intake rocker arm pushrod end. Crank engine in a **clockwise** direction until dial indicator indicates pushrod movement (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* - If more than ½" variation in either direction, remove timing chain cover and inspect timing chain for stretch. Chain deflection should not exceed ½". Replace as necessary.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure - 55-60 lbs. 12 lbs. minimum at 600 RPM.

Pressure Regulator - In oil pump. Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on engine block.

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft. Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul & Installation: *See "Oiling System" in Rambler Special Data.*

Oil Filter: Full flow, disposable type. Replace filter every 4,000 miles. *NOTE* - Full flow type filter Part

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No. 8990688 used in production as standard equipment on Rebel with Car Code No. 11017. Bypass valve incorporated in filter adapter.

Crankcase Ventilation: Filter element in oil filler cap and breather pipe attached to valve lifter cover.

COOLING

Water Capacity: Rebel - 20 qts. Amb. - 19 qts. Add 1 qt. for heater.

Pressure Valve: AC No. RC-19. 13 lb. type. Radiator cap.

Thermostat: Dole or Thompson. 180°F used in production. 167-172°F Optional.

Water Pump: Centrifugal. double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 57603.
Dash Unit - King-Seeley No. 57596.
Engine Unit - King-Seeley No. 44255.
See "Temperature Gauges" in Miscellaneous Section.

"Power-Saver" Fan (Amb. with Air Cond.): Fan operates normally up to 2600 RPM±100 RPM and then the viscuous fluid clutch will slip to maintain maximum speed of 2600 RPM. Serviced as an assembly.

CLUTCH

Borg & Beck Model 10A7 (Rebel), 10.5A6 (Amb.). Single plate dry disc type. *NOTE* - Heavy Duty Clutches are same model but have greater total plate area. *See "Borg & Beck" in Clutch Section.*

Model	Borg & Beck Numbers Cover Assy.	Disc Assy.
Rebel, Std.	361436	CD752
Rebel H.D.	361407	381806
Amb., Std.	361442	383036
Amb., H.D.	361449	383036

Pedal Adjustment: Freeplay should be ½-¾". Adjust at connecting link between throwout lever and release idler shaft assembly.

Removal: Remove transmission (see below), disconnect linkage, remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate (reassemble to same marks), and take out clutch fork. Remove clutch cover mounting screws uniformly to relieve spring tension and remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Warner T86 (Rebel), T89 (Amb.). Three-speed synchromesh, helical gear type.
See "Warner" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

►*TRANSMISSION CHANGE FOR IMPROVED SHIFTING: See "Warner Transmission" in Transmission Section.*

Removal (Rebel & Amb.): Disconnect brake tube bracket from underside of body. Disconnect shock absorbers at lower bracket, and torque tube at rear of transmission. Disconnect parking brake cable at equalizer and brake cable housing at torque tube bracket. Move rear axle assembly to rear to remove front universal joint from transmission main shaft. Disconnect speedometer cable and shifter rods and overdrive wires from solenoid, governor and overdrive cable at lever. Use guide pins (J-1434) in place of upper two transmission mounting screws so that clutch shaft will clear clutch pilot bearing and clutch disc.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10-R11 Overdrive Controls" in Transmission Section.*

Removal: Overdrive and transmission removed from car as a unit. *See "Synchro-mesh Transmission Removal" above.*

FLASH-O-MATIC TRANSMISSION

Warner Automatic Transmission with torque converter, 3-speed planetary gear system, and dual forward driving range. *NOTE* - Vacuum and solenoid unit at rear of transmission control shift speeds (no throttle linkage).

►*VACUUM & SOLENOID UNIT CORROSION PREVENTION:* Install an overdrive governor boot, Part No. 3131032, over solenoid by cutting a small hole in center of closed rear section to fit over connector fitting and pull boot over solenoid as far as possible.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Rambler Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Rambler Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Run engine to bring transmission to operating temperature. With engine running, move selector buttons through all drive ranges and return to "N-START" position, then remove dipstick and check fluid level. Maintain fluid level at "F" mark. Approximately 1½ pints required to raise level from "L" to "F" mark.

►*OTHER DATA: See "Rambler Automatic Transmission" in Transmission Section.*

UNIVERSALS

Mechanics. One universal used at front end of propeller shaft.

REAR AXLE

Own. Semi-floating hypoid gear type with torque tube drive. "Twin-Grip" limited slip type differential optional and identified by metal tag on filler plug.

See "Rambler Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*"TWIN-GRIP" LUBRICATION NOTE: Use only "Twin-Grip" lubricant in this type differential.*

►*AMBASSADOR "TWIN-GRIP" AXLE RATIO PRODUCTION CHANGE:* Effective Car Code No. 11123, cars with "Twin-Grip" axle and Flash-O-Matic will have 2.87-1 (15-43) axle ratio (supersedes previous ratio of 3.15-1).

►*"TWIN-GRIP" DIFFERENTIAL RATIO NOTE: All standard ratios available in this type differential.*

Axle Ratios: Transmission	Rebel Std. Ratio	Optl. Ratio
Std. & Overdrive	4.10-1 (10-41)	4.44-1 (9-40)
Flash-O-Matic	3.15-1 (13-41)	3.55-1 (11-39)

	Amb.	
Std. & Overdrive	3.54-1 (11-39)	4.10-1 (10-41)
Flash-O-Matic ①	2.87-1 (15-43)	3.15-1 (13-41)
Flash-O-Matic ②	3.15-1 (13-41)	2.87-1 (15-43)

① - 2-Bbl. Carb. ② - 4-Bbl. Carb.

Backlash - .002-.006". Shim adjustment.

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly whenever hub removed.* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable. Remove brake support plate by sliding plate, oil seal, and shims off axle shaft. Use special Puller J-2498-B to remove shaft from housing.

Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations. Tighten axle shaft nut to 250 ft. lbs. torque.

►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in hub when it is assembled on axle shaft. New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft (serrations will not match). Tighten axle shaft nut to 250 ft. lbs. torque and check distance from outside face of hub to end of taper on shaft (hub overhang on threaded portion of shaft). This distance must be 3/16". Punch mark new hub in line with mark on shaft.

Axle Shaft Endplay - .004-.008" (.006" desired). Adjusted by shims behind brake backing plate. *NOTE* - On later cars, adjust endplay at **left** side only.

Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted.

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Rear Axle Assembly Removal: Drain lubricant, raise car and support rear of body. Disconnect hand brake cable at equalizer and hand brake cable housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, shock absorbers from mountings and rear axle stabilizer bar at rear axle tube. Roll axle free from car.

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type. Serviced by replacement.

Shock Absorber Application

Model	Front	Rear
Reg.& H.D.	©3119821	3119822
Air Susp.(Exc.Sta.Wgn.)	3200980	3200981
Air Susp. (Sta. Wgn.)	3200980	3200982

© - 3200857 also used for export.

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheelhouse panel.
Kingpin Inclination - 6½°.
Caster (Manual Steering) - 0° to Pos. ½°. ½° preferred.
Caster (Power Steering) - Pos. ½° to Pos. 1°. 1° preferred.
Camber - Neg. ¼° to Pos. ¼°. 0° preferred.
Toe-In - 1/16-3/16", 3/16" preferred.
Toe-Out on Turns - With inner wheel at 25°, outer wheel should be at 22°.

REAR SUSPENSION

Rear Suspension: *See "Rambler Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Neoprene air springs mounted within rear coil springs. Optional on both series. *See "Rambler Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw. Recirculating ball type. *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*
Power Steering: Monroe Linkage Type. *See "Monroe Linkage Type Power Steering" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*
Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic Single Anchor. "Bendix Automatic Adjuster" type brakes are optional.

See "Bendix Single Anchor" and "Bendix Automatic Adjuster" in Brake Section.

Drum Diameter - 10" Front and Rear.
Wheel Cylinder Diameter - 1 1/8" Front, 7/8" Rear.
Braking Power - 62.4% Front, 37.6% Rear.
Replacement Linings & Shoes - Linings and shoes with linings furnished in standard size only.
Lining Thickness - 7/32" (All Models).

Lining Width & Length

Shoes	Front Wheels	Rear Wheels
Primary	2.5" x 8.90"	1.75" x 8.46"
Secondary	2.5" x 11.06"	1.75" x 10.88"

Clearance (Without Adjusters) - Adjusting wheel backed off 8 or more notches from point where shoes are tight against drum.
Clearance (With Adjusters) - *See "Bendix Automatic Adjuster Brakes" or "Wagner Automatic Adjuster Brakes" in Brake Section.*

Standard Master Cylinder: In engine compartment under steering column.
Checking Fluid - Fill from engine compartment. Check at 1000 mile intervals.
Removal - Remove from beneath car. Not necessary to disturb other parts.

Removal - Remove from engine compartment.
Power Brakes: Moraine Power Unit. *See "Moraine Hydraulic (Diaphragm) Reaction Type Power Unit" in Brake Section.*
Checking Fluid Level - Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link and Arm Type. *See "Windshield Wipers" in Miscellaneous Section.*
Electric Window Controls: Electric motor in each door. Separate control switches in each door and master switch in left front door. *See "Rambler Electric Window Controls" in Miscellaneous Section.*
Air Conditioning: Rambler Air Conditioning. Thermostatic control with magnetic clutch on compressor unit. *See "Rambler Air Conditioning" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

HUDSON 6 CYL. MODELS

	Foot Lbs. Hornet	Wasp
Cylinder Head ①	② 85-90	60-65
Intake Manifold	12-15	12-15
Exhaust Manifold	20-35	20-30
Oil Pan	15-20	15-20
Main Bearing Caps	75-80	75-80
Flywheel	40-45	40-45
Vibration Dampener	100-120	80-90
Con Rod Caps	40-45	40-45
Camshaft Sprocket	20-30	20-30
Engine Front Cover	15-20	15-20

①—Aluminum heads tightened at room temperature. Cast Iron heads at operating temperature

② - Supersedes original specification of 75-80 ft. lbs.

NASH 6 CYL. MODELS

	Foot Lbs. Stsm.	Amb. 6
Cylinder Head	57-60	65 70
Main Bearing Caps	66-70	① 66-70
Flywheel	100 110	100-110
Vibration Dampener	65 70	90-100
Con Rod Caps	27-30	52 56
Piston Pin Clamp Bolts	18-22	22-26
Camshaft Sprocket	50-55	35 40

①—Special hollow center main bearing capscrew (oil pump screw) 70-75 ft lbs

1955-56 HORNET & AMB. V8

	Ft. lbs.
Cylinder Head	55-60
Intake Manifold	25-30
Exhaust Manifold	25-30
Oil Pan	15-18
Main Bearing Caps	90-95
Flywheel	55-60
Vibration Dampener	130-150
Con Rod Caps	40-45
Camshaft Sprocket ①	25-30
Rocker Arm Support Bracket	55-60
Upper Valve Tappet Cover	15-18
Rocker Arm Cover	15-18
Water Pump Manifold	25-30
Water Pump Mounting	15 18
Oil Pump Mounting	25-30

①—Fuel pump eccentric retaining screw

1956-57 HORNET & AMB. SPEC. V8

	Ft. Lbs.
Cylinder Head	**60-65**
Main Bearing Cap (Rear)	**50-55**
Main Bearing Cap (Others)	**80-85**
Con Rod Caps (Oiled Threads)	**46-50**

CYLINDER HEAD & MANIFOLD

HUDSON 6 CYL. MODELS

CYLINDER HEAD INSTALLATION: Use torque indicating wrench to tighten cylinder head capscrews in sequence shown in diagram

CYLINDER HEAD GASKET INSTALLATION: Inspect the mating surfaces of cylinder head and block for cleanliness and squareness with a straight edge ·Use guide pins 3" x ½"-13 (Hornet) 3" x 7/16"-14 (Wasp) to properly locate gasket on cylinder block Use non-hardening gasket paste on gasket and a sealing compound on all cylinder head capscrews

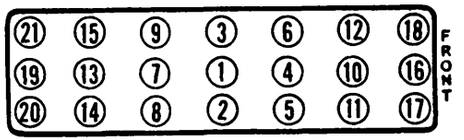
INTAKE & EXHAUST MANIFOLD ASSEMBLY REMOVAL (Wasp, With Twin -H-Power, and Hornet 6 Cyl. Models): Remove nut from top of front engine supports and loosen rear engine supports. Disconnect fuel and vacuum lines to carburetors and intake manifold. Disconnect throttle linkage (leave carburetors mounted). Remove exhaust pipe at attaching point to manifold. Remove all manifold-to-engine attaching nuts and clamps. Place a porto-power or suitable jack between front and right hand corner of block or on water pump casting and just below upper wheelhouse-to wheelhouse crossmember and wheelhouse panel. Move engine upward and to the left to provide clearance to remove manifold assembly

NASH 6 CYL. MODELS

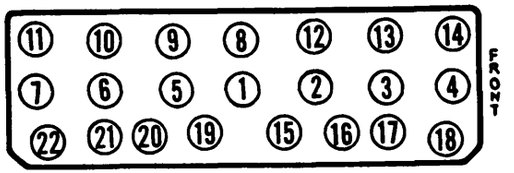
INSTALLING CYLINDER HEAD· Use torque indicating wrench to tighten cylinder head stud nuts in sequence shown in cylinder head diagram

Cast Iron Heads—Torque to specifications with engine at normal operating temperature

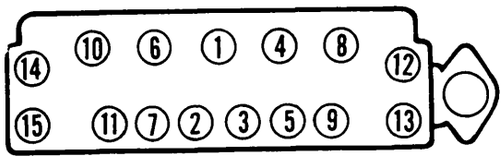
Cylinder Head Gasket—Always use new gasket Coat gasket with non-hardening gasket paste



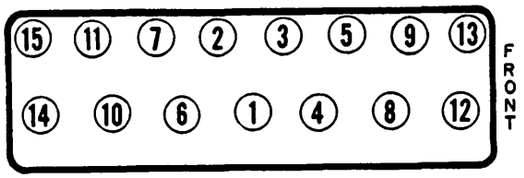
HUDSON 6 CYL. CYLINDER HEAD



1954-55 STATESMAN CYLINDER HEAD



1956 NASH STATESMAN CYLINDER HEAD

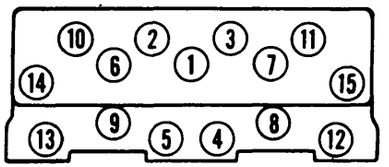


NASH AMBASSADOR 6 CYLINDER HEAD

Tightening Torque—See Tightening (Torque Wrench) Specifications above

1955-56 HORNET & AMB. V8

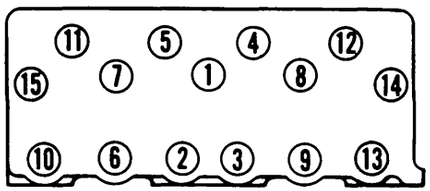
CYLINDER HEAD INSTALLATION· Cylinder block has two sleeve locating dowels to assist in lining up and holding position of cylinder head and gasket during installation Coat gasket with a non-hardening gasket compound Install Cylinder Head Lifter J-4159 in the front and rear spark plug holes and install head over dowels (dowels are drilled for oil return from rocker arm chamber) Install pushrods, rocker arm assembly, and the cylinder head capscrews Tighten all head bolts in the sequence indicated in diagram



1955-56 HORNET & AMB. V8 CYLINDER HEAD

1956-57 HORNET & AMB. SPEC. V8

CYLINDER HEAD INSTALLATION· Cylinder block has two sleeve locating dowels to assist in lining up cylinder head and gasket during installation Coat gasket with non-hardening gasket paste, install gasket with marks "AM' and 'TOP upward Install cylinder head, pushrods, and rocker arm assembly *(CAUTION* - Special drilled capscrew must be installed in rear rocker arm support bracket to provide lubrication for rocker arms) Tighten head bolts in sequence shown in diagram to correct torque See Tightening Specifications



1956-57 HORNET & AMB. SPEC. V8 CYLINDER HEAD

1956 NASH STATESMAN

► *INTAKE MANIFOLD COVER CORRECTION (For exhaust leak into Intake Manifold)* To correct exhaust leakage due to excessive corrosion, causing rough engine operation, remove intake manifold cover and tap and install Two Nash Part No 3125657 Allen Head pipe plugs in lower side of cover blocking off heat passages These plugs should be flush with intake manifold gasket surface

1956 HORNET & AMB. V8

► *INTAKE MANIFOLD GAS PASSAGE CORRECTION* Poor automatic choke operation can be traced to either a stuck manifold heat control valve or restrictions in the exhaust gas passages of intake manifold Free up or replace stuck manifold heat control valve Remove any

CONTINUED ON NEXT PAGE

Form 3B

CONTINUED FROM PRECEDING PAGE

casting fins that extend into exhaust passages of intake manifold If found they can be removed or broken out with a small rod When intake manifold is not discolored in center section, from passage of exhaust gases it indicates that restrictions or fins are blocking the passage of exhaust gases

ORIGINAL BORE & PISTONS

HUDSON 6 CYL. MODELS

ORIGINAL BORE & REPLACEMENT PISTON SIZES: Original production (new engines) bore size indicated by code mark (see below) stamped on lower edge of valve chamber opposite cylinder. A code letter (see below) and the piston weight is stamped on the head of each piston (weight is indicated in ounces and quarter ounces; top figure ounces, lower figure quarters).

►*NOTE: See Replacement Pistons (following) for code marks and oversizes.*

ORIGINAL BORE LETTER CODE: A three letter code stamped adjacent to engine number indicates as follows:

Letter Sequence Code

First letter	Size of Bore
Second letter	Size of Main Bearings
Third letter	Size of Con Rod Bearings

Letter Size Code

Letter "A"	Standard
Letter "B"	010" Undersize.
Letter "C"	010"Oversize.
Letter "D"	001" Undersize

► *ENGINES MARKED "AAA" OR UNMARKED ARE STANDARD.*

NASH 6 CYL. MODELS

ORIGINAL BORE LETTER CODE· A three letter code stamped adjacent to engine number indicates as follows

Letter Sequence Code

First letter	Size of Bore
Second letter	Size of Main Bearings
Third letter	Size of Con Rod Bearings

Letter Size Code

Letter "A"	Standard
Letter "B"	010 ' Undersize
Letter "C"	010 Oversize
Letter "D"	001 Undersize

► *ENGINES MARKED "AAA" OR UNMARKED ARE STANDARD*

HUDSON 6 CYL. MODELS

►***PISTON NON-INTERCHANGEABILITY CAUTION—Pistons are not interchangeable between engines due to difference of piston height between pin center and top of piston. See Car Model pages for dimensions.***

REPLACEMENT PISTONS: Standard and oversize pistons furnished for service replacement in the following finished sizes (see table below).

Code	Oversize	Code	Oversize	Code	Oversize
(B)	Std.	(P)	.007"	(BB)	.020"
(D)	001"	(BO)	010"	(DD)	021"
(F)	002"	(DO)	011"	(FF)	022"
(J)	004"	(FO) ①	0115"	(B000)	030"
(L)	.005"	(LO) ②	0145"	(E000)	0315"

①—(Wasp) Hornet 012" ②—(Wasp) Hornet 015"

Piston Markings: Code marks stamped on head of piston indicate the following: **Letter** indicates piston size (see table below). **Number** Indicates piston weight in ounces (if two numbers used—one over the other—top number indicates weight in ounces, bottom number indicates additional weight in ¼ ounces). All pistons in one engine should be of same weight (carry same weight marks on head). **NOTE**—Original factory installed pistons have two additional numbers indicating which cylinder piston installed. and cylinder block number.

►**Piston Measuring Note**—Piston size given above is the major diameter at top of skirt just below chamfer under No. 3 ring, at right angles to pin.

PISTON PINS

1955-56 HORNET & AMB. V8

PISTON PIN BUSHING (IN CONNECTING ROD) INSTALLATION: After pressing old bushing out with an arbor press, install new bushing so that it is flush with both sides of rod Position Burnisher Tool J-6055 in bushing, then applying plate of tool under rod, push burnisher through bushing with an arbor press Make sure oil hole in bushing lines up with oil hole in rod *NOTE*–If bushing not drilled for an oil hole, drill a 3/16" hole before reaming bushing

1956 NASH 6 CYL. MODELS
1956-57 HORNET & AMB. SPEC. V8

PISTON PIN: Pin is press fit in connecting rod and no clamp bolt or locking rings are used to retain the pin. Piston pin must be removed and installed as detailed below to prevent distortion or damage to piston.

Removal - Remove pins with special Piston Pin Remover J-6360 and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver.

Installation - Place piston pin pilot in support, insert piston and connecting rod. This aligns piston and connecting rod piston pin bores. Press piston pin into connecting rod and piston assembly until lower pilot bottoms in support which will properly center rod on pin

► *CAUTION* Pin must be tight press fit in connecting rod

ORIGINAL BEARING SIZES

NASH 6 CYL. MODELS

HUDSON 6 CYL. MODELS

ORIGINAL BEARING LETTER CODE: A three letter code stamped adjacent to engine number indicates as follows

Letter Sequence Code

First letter	Size of Bore
Second letter	Size of Main Bearings
Third letter	Size of Con Rod Bearings

Letter Size Code

Letter "A"	Standard
Letter "B"	010" Undersize
Letter "C"	010" Oversize
Letter "D"	001" Undersize

ENGINES MARKED "AAA" OR UNMARKED ARE STANDARD

CRANKSHAFT & MAIN BEARINGS

1954-56 NASH STATESMAN

CRANKSHAFT END THRUST PLATE: Crankshaft end thrust taken by flanged edges of front bearing. A steel thrust plate is assembled between rear face of timing chain sprocket and flanged face of front bearing. Plate keyed to shaft by Woodruff key which also secures sprocket on shaft When plate installed, chamfered edge on inner diameter should face toward the rear for tight fit against bearing journal

HUDSON 6 CYL. MODELS

CRANKSHAFT FRONT & REAR MAIN BEARING SEALS: Metal backed neoprene lined seal (two identical halves), plus cotton waste for vertical and horizontal packing holes in cap

Removal–Upper half can be removed without removing crankshaft by using ¼" brass rod to drive old seal from around shaft while rotating shaft

Installation–Coat groove of seal with non-hardening sealer Use 4" punch with diameter smaller than vertical holes to force cotton waste into vertical holes, leaving enough waste protruding to seal between pan gasket and bearing cap

1954-56 NASH STATESMAN

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Packing in groove in block and cap behind oil slinger on crankshaft Cap sealed with rubber plugs in groove on each side where cap fitted in recess in block. Use Tool J-1610 to install packing in groove in block and cap Place packing in groove (with bearing shell removed), place small diameter of tool over packing, hit end of tool with lead hammer to seat packing, cut ends of packing flush with bearing cap seat, remove tool. Repeat operation for groove in block Install rubber seal plugs on each side of bearing cap (where angle seal used, make certain that seal also seated in horizontal groove in block)

1954-56 NASH AMBASSADOR 6

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Steel backed synthetic rubber seal Install upper half in block, lower half in bearing cap, make certain that seal fits snugly over edge of rear bearing oil return groove See that surface on crankshaft to rear of oil slinger (on which seal rides) is rough **NOTE**–Manufacturer now recommends roughing seal position on crankshaft with No 240 grit emery cloth **DO NOT** create spiral scratches which may conduct oil against and under seal lip Check depth of bearing cap seal groove (.050-.055') Insufficient depth will prevent crankshaft seal from contacting crankshaft Install rubber seal strips on either side of bearing cap (three strips overlap bearing cap and seal sides and end surfaces of bearing cap in crankcase)

1955 HORNET & AMB. V8

►*CRANKSHAFT REAR MAIN BEARING OIL LEAK CORRECTION (Cars before Engine No P-15629)*· If seepage of oil exists between milled surface of rear

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main bearing cap and crankcase, file a notch approximately 3/32" deep, with a three cornered file, on the top outer edge of each side of the bearing cap approximately 1/8" forward of the oil pan gasket seal groove. Install a new oil seal as indicated below.

ALL V8 MODELS

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Apply Lubriplate to groove in bearing cap and install oil seal, using Oil Seal Installer J-3048-A and a hammer, drive seal into place. With seal installed and tool still in place, trim ends of seal flush with surface of cap. To install upper half of seal in crankcase, remove crankshaft and install seal in same manner as for bearing cap. **NOTE**–At time of pan installation, place a generous bead of non-hardening Permatex along edge of bearing cap and crankcase to insure a perfect seal.

VIBRATION DAMPENER

HUDSON 6 CYL. MODELS

VIBRATION DAMPENER: Removal–Remove radiator core for puller clearance, remove retaining capscrew. **Hornet** vibration dampener has two punch marks for alignment to maintain proper balance when dampener is disassembled for replacement of rubber discs. **Wasp** vibration dampener has an offset screw location to insure proper reassembly for balance. Use pulley Remover J-676-C and Replacer J-483 for **Hornet** and Remover J-5371 and Replacer J-5369 for **Wasp.** Tighten retaining screw to specifications shown in table above.

1954-55 NASH 6 CYL. MODELS

INSTALLATION: Non-adjustable, rubber cushioned type. To install hub assembly, install large lockwasher with notches on inner edge, cork seal ring, rubber seal ring and hub retainer in recess in hub, install hex head lock screw with helical lockwasher under it, in screw hole in end of crankshaft and tighten screw securely. On Ambassador 6 models, dampener hub retained by a special nut shake-proof lockwasher (no seal installed behind hub). On both models, rubber block retaining bolt nuts on front face of dampener hub must be drawn up tight. *CAUTION*–When installing vibration dampener on hub, timing marks must be aligned with hub key-way and on same side.

1956 NASH 6 CYL. MODELS

INSTALLATION: Non-adjustable, rubber cushioned type. To install hub assembly, install large lockwasher with notches on inner edge, cork seal ring, rubber seal ring and hub retainer in recess in hub, install hex head lock screw with helical lockwasher under it, in screw hole in end of crankshaft and tighten screw securely. On Ambassador 6 models, dampener hub retained by a special nut shake-proof lockwasher (no seal installed behind hub). On both models, rubber block retaining bolt nuts on front face of dampener hub must be drawn up tight. *CAUTION*–When installing vibration dampener on hub, timing marks must be aligned with hub key-way and on same side.

1955-56 HORNET & AMB. V8

VIBRATION DAMPENER: Removal–Drain cooling system. Remove radiator core and fan assembly. Remove vibration dampener retainer screw and lockwasher and if car is equipped with Power Steering or Air Conditioning, remove the drive pulleys by prying them off dampener assembly. Install center adapter J-5992-2 in threads of crankshaft. Install screw assembly J-5992-3 in remover body J-5992-1 and remove dampener.

Installation: Lubricate oil seal in engine front cover and position dampener over crankshaft and tap it into place with a rawhide hammer. Assemble Vibration Dampener Installer J-5992 by placing the ¾" nut on screw assembly J-5992-3 and slide spacer J-5992-4 over screw assembly. Start screw in end of crankshaft and tighten until it bottoms in the threads. With one end of spacer against dampener, turn nut on screw until dampener hub bottoms the crankshaft oil slinger against a shoulder on crankshaft. Install Power Steering and/or Air Conditioning pulleys, retainer washer, and screw. Tighten retainer screw to 130-150 ft. lbs.

1956-57 HORNET & AMB. SPEC. V8

REMOVAL: *(NOTE* - Vibration damper can be removed without removing radiator core). Remove fan blade assembly and pull vibration damper with a suitable puller A puller may be fabricated in the shop by threading a 1" x 5" (N.C. Thread) jack screw into a steel plate ½" thick, with a 13/32" wide slot in each end of plate. Use two screws 3½" long with 2" of 3/8 x 16 U N. C. 2B-T thread in the slots. Stake a ½" ball bearing in end of jack screw to prevent damage to crankshaft.

INSTALLATION: To install hub assembly, install large lockwasher with notches on inner edge, cork seal ring, rubber seal ring and hub retainer in recess in hub Install hex head lockscrew with helical lockwasher under it, in screw hole in end of crankshaft and tighten screw securely. Rubber block retaining bolt nuts on front face of damper hub are drawn up until shoulders bottom on hub (30-35 ft. lbs. torque). *CAUTION* - When installing vibration damper on hub, timing marks must be aligned with hub key-way and on same side.

ENGINE FRONT COVER

HUDSON 6 CYL. MODELS

ENGINE FRONT COVER: Removal–Remove Vibration Dampener (see above), remove retaining screws attaching cover to block and remove cover.

Installation: Reverse removal procedure, cover alignment is automatically made during assembly.

ENGINE FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Remove engine front cover (see above). Use Tool J-2776 to remove and install seal. Insert collar so that slot in collar engages depression in cover. Support cover when driving out seal with straight side of driver. Use tapered side of driver for installing seal. *NOTE*–Apply coating of white or red lead in well in timing cover and recheck to make sure that lip of leather is in good condition and not curled over.

NASH 6 CYL. MODELS

CRANKSHAFT FRONT OIL SEAL: A felt oil seal is fitted in the timing chain cover which bears against vibration dampener hub. Seal seat in hub has inner edge turned up to form a shedder on inside of cover. An oil slinger is assembled behind vibration dampener hub which extends over outer edge of oil shedder. Use Tool J-1430 installed on end of crankshaft when tightening timing chain cover screws to align seal properly. **NOTE**–On Statesman a cork seal and rubber seal is assembled behind vibration dampener to seal front end of crankshaft. See Vibration Dampener above.

1956-57 HORNET & AMB. SPEC. V8

ENGINE FRONT COVER: Removal - Remove water pump, fuel pump assembly and vibration damper. Remove cover-to-cylinder block screws and remove cover.

Installation - Locate dowels in cylinder block and leave cover screws loose until vibration damper is partially installed. This prevents damage to oil seal and aligns cover properly. Then tighten cover screws and install fuel and water pumps.

1955-56 HORNET & AMB. V8

ENGINE FRONT COVER: Removal–Remove vibration dampener (see above), and water pump manifold assembly. Disconnect and remove fuel pump. Remove screws attaching front cover to block and remove cover.

Installation: Using a new gasket, install engine front cover in place and start capscrews in threads, **but do not tighten.** Lubricate oil seal in cover and install vibration dampener assembly, using hub on dampener as a pilot to align front cover. Complete installation by reversing removal procedure.

1955-56 HORNET & AMB. V8

ENGINE FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Remove engine front cover (see above), drive out old seal with a hammer and punch, being careful not to damage cover. Install a new seal using tool J-5983, pressing seal into place with an arbor press.

► *FRONT OIL SEAL LEAK CORRECTION:* Caused by seal assembly rotating with crankshaft. To correct, remove front cover, pry out old seal assembly. Before installing new seal, drill two 11/64" holes through seal opening flange on inside of cover locating the holes approximately 35° on each side of upper end of vertical line through seal opening. When new seal installed, upset seal material into these holes with a blunt punch so that seal is secured in place.

1956-57 HORNET & AMB. SPEC. V8

CRANKSHAFT FRONT OIL SEAL: Oil seal is installed in timing chain cover at vibration dampener hub. To replace seal, remove water pump, fuel pump assembly, vibration dampener, and timing chain cover. Remove old seal from cover. Install new seal in cover. *NOTE* - When installing timing chain cover, place cover on locating dowels but leave cover-to-block screws loose until vibration dampener is installed, then tighten cover screws.

CAMSHAFT & BEARINGS

HUDSON 6 CYL. MODELS

CAMSHAFT REMOVAL: Remove radiator, radiator grille, fan assembly, intake and exhaust manifolds. Remove vibration dampener, (see above). Remove engine front

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cover, (see above). Cut sprocket mounting bolt safety wire, rotate engine to bring timing marks on chain to marks on sprockets, remove camshaft sprocket and chain assembly (Puller J-471). Remove valve side covers, raise valves and install tools J-1612-3-A to hold lifters out of way. Remove oil spout on Wasp, spout and chain silencer on Hornet. Remove thrust plate and camshaft.

1954-56 NASH STATESMAN

CAMSHAFT REMOVAL NOTE: Special valve tappet retaining clips supplied in sets of 16(Tool No. J-1612). Clips should be installed on upper ends of valve lifters to hold lifters up out of the way while the camshaft is being removed.

1954-56 NASH AMBASSADOR 6

CAMSHAFT REMOVAL: Remove pushrods. Remove valve cover on side of engine, lift up each valve lifter and use rubber bands to hold lifters up out of the way while camshaft is being withdrawn.

1955-56 HORNET & AMB. V8

CAMSHAFT: Removal–Remove cylinder head covers, ignition wires, rocker arm assemblies, intake manifold, and carburetor. Remove water pump and manifold assembly. Remove upper oil breather and tappet assembly cover. Remove inner oil baffle cover. Remove pushrods, keeping them in their relative operational positions. Remove hydraulic tappets and keep in their relative operational positions. Remove fuel pump, vibration dampener, and engine front cover. Crank engine until timing marks on camshaft and crankshaft sprockets line up with shaft centers. Remove oil shedder from crankshaft and fuel pump eccentric from camshaft. Timing chain, camshaft, and crankshaft sprockets can be pried off. Remove camshaft retainer and thrust plate and end plate thrust spacer. Remove camshaft.

Installation: Reverse removal procedure and note the following: Install camshaft gear about 1/16" beyond a position flush with camshaft end to allow mounting of fuel pump eccentric.

1956-57 HORNET & AMB. SPEC. V8

CAMSHAFT REMOVAL: Remove spark plug wires, cylinder head covers, and rocker arm assemblies. Remove intake manifold and carburetor. Remove all pushrods and hydraulic valve lifters (*CAUTION* - Keep these parts in order so they can be installed in same relative positions). Remove fuel pump. Remove vibration dampener and timing chain cover. Remove water pump and cylinder head water distribution manifold. Crank engine until timing marks on chain sprockets line up on vertical line through shaft centers. Remove fuel pump eccentric, remove both sprockets and timing chain as an assembly. Remove camshaft retainer thrust plate and thrust spacer. Carefully withdraw camshaft through front of engine.

TIMING CHAIN

1955-56 HORNET & AMB. V8

TIMING CHAIN: Removal–Remove engine front cover (see above). Pry off oil slinger from end of crankshaft and remove fuel pump eccentric. Rotate engine to line up marks on sprockets with marks adjacent and in line across shaft centers. Remove sprockets by alternately prying on them and slide chain and sprocket assembly off the shafts.

Installation: Install camshaft and crankshaft sprocket keys being sure that they are properly seated in keyways. Rotate engine or crankshaft to bring No. 1 cylinder to firing position. Slide crankshaft sprocket part way on the crankshaft and assemble camshaft sprocket in chain, locating and lining up the "O" marks on the sprockets in line with camshaft and crankshaft centers. Position chain on crankshaft sprocket and start camshaft sprocket on camshaft. Using a rawhide hammer, alternately tap both sprockets into proper position. Camshaft gear must be installed about 1/16" beyond a position flush with end of camshaft for installation of fuel pump eccentric. Complete installation by reversing removal procedure.

VALVE SYSTEM

1955-56 HORNET & AMB. V8

VALVE SPRING BAFFLE INSTALLATION (For Improved Oil Control): Beginning at Engine No. P-25889, valve spring baffles, Nash No. 6480914, were installed in production. Baffles are installed under springs with flange extending upward on high side of spring. *These baffles can be installed on earlier engines if valve system disassembled (for Valve Grinding etc.) or special type baffles can be installed WITHOUT disassembling valve system as follows:*

Service Installation of Special Baffles (Without disassembling Valves) - Install Baffle Kit, Nash No. 6484-396 (Four No. 6489127 Valve Spring Baffles, Eight No. 6489048 Lockwashers) as follows: Remove cylinder head covers, loosen rocker arm shaft bolts and lift off rocker arm shaft assemblies. Place baffles in position on rocker arm assemblies using two baffles on each cylinder head assembly (baffle should circle springs on rocker arm shaft side and mounting lugs should rest on top of shaft brackets). Install rocker arm shaft assembly on cylinder head, replace original lockwashers with new type square lockwashers, tighten bolts to correct torque (*CAUTION* - See that lockwashers do not turn with bolts and distort baffles).

VALVE TAPPET ADJUSTMENT

1955-56 HORNET & AMB. V8

VALVE TAPPET ADJUSTMENT: *(NOTE–Checking must be done with no oil in compression chamber of tappet and plunger completely bottomed, with tappet on base circle of cam).* With piston on compression stroke and both valves closed, press downward on the pushrod end of rocker arm to compress plunger spring and force plunger to bottom position. While still holding down on rocker arm, measure the lash. The clearance between valve stem end and rocker arm tip should be .050" to .210".

VALVE STEM SEALS

1954-56 NASH AMBASSADOR 6

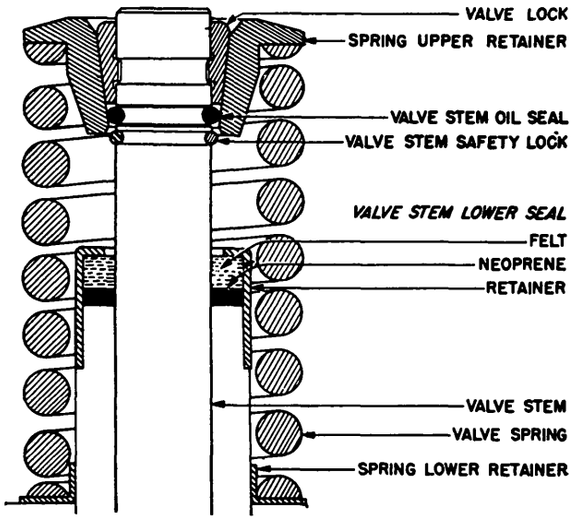
►*1955 AMBASSADOR 6 INTAKE & EXHAUST VALVE PRODUCTION CHANGE:* Starting with Engine No. R-744962, the safety lock ring has been eliminated as the rubber "O" ring seal prevents the valve from dropping into the cylinder bore. When using the later type valve, the "O" ring seal must be used.

VALVE STEM OIL SEAL: Consists of a neoprene valve stem seal and a felt seal under metal retainer, which is mounted over top of valve guide. The neoprene seal prevents excessive oil passage past valve stem while felt seal provides initial starting lubrication. An upper seal is also provided in the form of a neoprene ring installed below valve locks.

NOTE–A safety lock is mounted below upper seal on valve stem to prevent valve from dropping below top of valve guide during assembly.

NASH STATESMAN & ALL V8 MODELS

VALVE STEM OIL SEAL: Consists of a rubber deflector installed on valve stem of all valves. Install deflector on valve stem with cupped side down over upper end of valve guide before installing valve spring and locks. Use new deflector whenever valves ground or replaced.



NASH AMBASSADOR 6 VALVE SEAL ASSY.

VALVE GUIDES

1955-56 HORNET & AMB. V8

VALVE GUIDE REAMING: Four oversize reamers are available in Valve Guide Set J-6042 which will provide the desired clearance of .001-.002" (Intake), and .002-.003" (Exhaust) between stem and guide. After checking clearance, select the proper oversize reamer and pilot for the oversize valve to be installed.

ROCKER ARMS

1954-56 NASH AMBASSADOR 6

ROCKER ARM ASSEMBLY: See illustration for sequence of assembly.

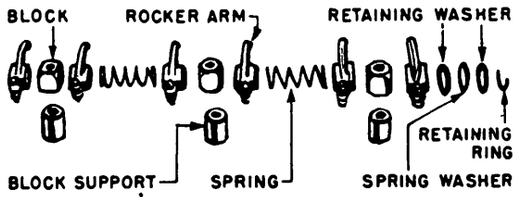
►*ROCKER ARM & LUBRICATION CAUTION:* Hollow bolt must be in front mounting bolt hole of rocker arm assembly for proper lubrication.

1956 NASH STATESMAN

ROCKER ARM ASSEMBLY: Rocker arm shaft is one piece type and entire rocker arm assembly can be removed after taking out mounting bolts in shaft brackets.

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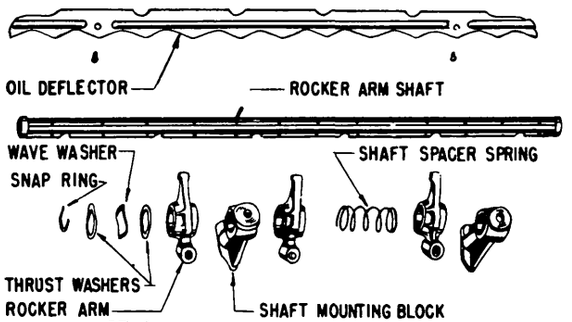
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NASH AMBASSADOR 6 ROCKER ARM ASSY.

Disass mbly & Inspecti n: Remove snap ring on end of shaft, slide thrustwashers, wave washer, rocker arms, mounting brackets, and springs off shaft. Inspect all parts for wear, see that end plugs are tight in shaft.

R ass mbly & Installati n: Install all parts in same relative positions (*CAUTION* - Rocker arms are "Right" and "Left" and must not be interchanged). Install assembly with rocker arm lubricating holes in shaft down or toward cylinder head. Make certain that baffle installed on rocker shaft supports does not interfere with rocker arm.



NASH STATESMAN ROCKER ARM ASSEMBLY

1955 HORNET & AMB. V8

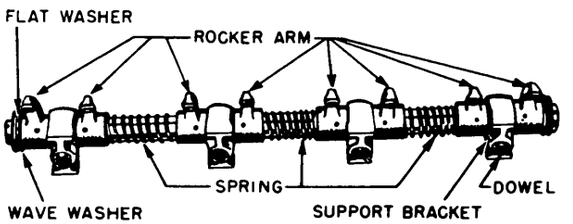
►*IMPROVED OIL CONTROL ROCKER ARM SHAFT PRODUCTION CHANGE & CORRECTION ON EARLY CARS:* For improved oil control at the intake valve stems. THREE types of rocker arm shafts have been used in production with different number and size of rocker arm oil holes as follows:

1) First Cars b for Engine No. P-9038—All oil holes in shafts were .094" diameter. On some cars, the eight holes in each shaft **toward the pushrod** were plugged in the field with 3/32" x 9/16" pins made from brass welding rod and swedged in place. If trouble experienced on these cars, install third type rocker shaft (below).

2) Cars fr m Engin N . P-9038 to P-17288—Rocker arm shafts did not have the eight holes **toward the pushrod** (holes omitted in production). If trouble experienced on these cars, install third type rocker shaft (following).

3) Cars b ginning Engine No. P-17288—Rocker arm shafts have the eight holes **toward the pushrod** but these holes are .062" diameter (reduced from .094" diameter size used on first type shaft). All other holes in shaft were .094" prior to Engine No. P-17830 when ALL holes in shaft were changed to .062" diameter. *This latest type shaft is furnished for s rvic on all cars and should b install d if troubl xperi nc d with ither previous typ shaft.*

►*ROCKER ARM SQUEAK CORRECTION (Caused by insufficient oil reaching rocker arm shafts):* Determine if sufficient oil is getting to the rocker arm shaft by removing rocker arm covers and examining shaft for presence of oil while engine is running. If no oil is found it will be necessary to remove the cylinder head and drill out the oil passages as follows: Remove the 1/8" pipe plug at rear end of right hand cylinder head (or oil filter connection at front of left hand cylinder head). Using a 21/64" drill, drill out the oil passage to intersect the rocker shaft support bracket **rear** attaching bolt hole **(right hand head)**, or the rocker shaft support bracket **front** attaching bolt hole **(left hand head)**. Make sure that all chips are removed from holes and passages.



ALL V8 ENGINE ROCKER ARM ASSEMBLY

1955-56 HORNET & AMB. V8

ROCKER ARM AND SHAFT DISASSEMBLY: Remove rocker arm and shaft assembly from cylinder head. Remove pins and wave washers from end of shaft. Remove rocker arms, springs and supports, keeping all parts in order so they can be reassembled in original position.

Inspection: Clean and inspect all parts for wear. Inspect rocker arm radius at valve stem ends, and if worn replace the rocker arm. Inspect plugs at each end of shaft for tightness.

Reassembly: Reverse disassembly procedure and note the following: Rocker arm shaft must be assembled with the grooved oil hole in the downward position.

►*CAUTION: There is a right and left rocker arm and if reversed in assembly they will not contact the valve stem properly.*

1956-57 HORNET & AMB. SPEC. V8

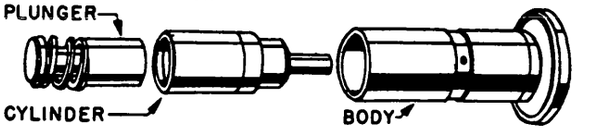
ROCKER ARM ASSEMBLY: Complete assembly mounted on cylinder head by four long cylinder head retaining capscrews (*CAUTION* - Rear bolt is special hollowtype for rocker arm lubrication). Assembly can be removed by taking out the retaining screws.

Disassembly & Inspection: Remove snap ring on end of shaft and slide all parts off shaft. Keep all parts in order so they can be reassembled in same relative positions. Clean and inspect all parts for wear. Inspect rocker arm radius at valve stem end for wear and replace worn rocker arms. Make certain that plugs are tight in ends of shaft.

Reass mbly & Installation: Install all parts in same relative positions (*CAUTION* - Rocker arms are "Right" and "Left" and will not contact valve stem properly if interchanged). When installing assembly, make certain that special hollow bolt installed in rear support bracket (necessary for correct rocker arm lubrication).

HYDRAULIC LIFTERS
1956 HORNET

HYDRAULIC VALVE LIFTERS: Removal - Remove Cylinder head, valve cover, valve springs and valves. Cylinder assembly of lifter may now be removed from lifter body without removing camshaft. *NOTE* - To clean or replace lifter body (Mushroom type) it is necessary to remove camshaft.



HUDSON HORNET 6 HYDRAULIC LIFTER

Disassembly: Remove plunger from cylinder assembly by twisting plunger and spring (in spring windup direction), while pulling on plunger. If plunger sticks, release oil from compression chamber by raising ball check off of seat with small round rod. With oil released, plunger will drop down and it will be possible to remove carbon ring usually found between plunger and spring. Remove plunger. *CAUTION* - Keep parts of each lifter together as components are selectively fitted. Only complete assemblies supplied for service.

Inspection: Clean all parts in solvent to remove engine oil, soft carbon, or varnish deposits. Inspect for scratches, nicks, or plugged oil passages. Plunger must be free fit in cylinder.

Testing: Clean unit completely, removing all traces of oil. Hold cylinder in one hand and start plunger in cylinder. Depress plunger and release quickly. Plunger should bounce. If plunger does not bounce, it indicates air leakage through ball check or past plunger. To check for **ball check** leakage, hold finger over inlet hole and depress plunger and release quickly. If plunger now bounces it indicates that plunger fit is proper but leakage occurs at ball check. However if plunger will not bounce, it indicates leakage occurs past plunger (fit is defective), and lifter must be replaced. *NOTE* - Always repeat above check several times (cleaning cylinder assembly before each check) before replacing lifter.

Reassembly: Reinstall plunger in cylinder and engage spring by pushing "IN" and twisting plunger and spring in direction of spring windup.

ALL V8 MODELS

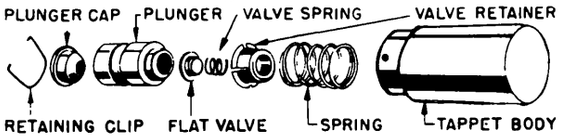
HYDRAULIC VALVE LIFTERS: Removal—Remove valve rocker covers and rocker arm shaft mounting bracket bolts and lift off rocker arm assembly. Remove upper valve tappet cover and breather tube and then remove lower tappet cover. Remove pushrods and hydraulic valve lifters keeping pushrods and lifters in sequence so they can be replaced in same relative position.

Disassembly: Press down on valve pushrod socket and use a pair of needle nose pliers to remove the lock ring. Remove pushrod socket, plunger, and plunger spring. Remove check valve assembly from plunger

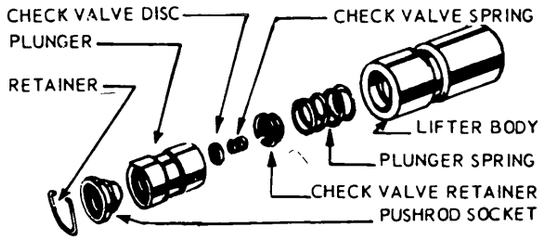
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being careful not to lose the small flat valve and coil spring. *(CAUTION–Disass mbl on lift r at a tim to avoid mixing plungers and bodies. These parts are selectively fitted and must not be interchanged).* Use clean solvent and thoroughly wash all parts. Remove all varnish and gum deposits.



1956-57 SPECIAL V8 HYD. LIFTER



1955-56 HORNET & AMB. V8 HYD. LIFTER

Inspection: Inspect the plunger and wall of body for scratches (if plunger or body is scratched, replace complete unit). Try the plunger for fit in body. If check valve removed from plunger, inspect flat disc valve, spring and seat.

R assembly: Reverse disassembly procedure. See illustration for correct sequence.

T sting: Fill body with kerosene and install plunger return spring, plunger assembly and pushrod socket (do not install snap ring). Place lifter between jaws of checking tool (see Note below), and check leak-down by depressing tool. A decided resistance should be felt. If plunger collapses immediately lifter should be rechecked. Normal lifter will take 10-45 seconds to leak down with kerosene (.125" travel with 50 lb. load).

Tool Note - Use altered Tool J-5978 with Adapter J-5978-6 or New Tool J-5978-A on late 1956 or later lifters. To use adapter with Tool J-5978, grind bottom face of lower jaw back 5/8" to reduce thickness of jaw to .150-.160".

Installation: Lifters should be pre-lubricated and assembled in engine without a charge. They will normally charge themselves in 3 to 8 minutes of engine operation.

OILING SYSTEM
OIL PUMP
HUDSON 6 CYL. MODELS

OIL PUMP: Removal– Lift off distributor cap, rotate engine crankshaft until distributor is in firing position for No. 6 cylinder. **Do not** disturb this position of engine while oil pump is removed. Remove oil pump to block attaching screws, remove oil pump.

Ov rhaul: Remove pump cover and mark one lobe of inner rotor and corresponding point on outer rotor to insure reassembling in same relative position. With rotors meshed in this position, measure clearance between inner and outer rotors at point diametrically opposite marks. Replace rotors and shaft if clearance exceeds .010". Rotor end clearance (measure between rotors and straightedge laid across cover flange on body) must not exceed .004" Outer rotor clearance in body (press rotor against body and measure clearance on opposite side) must not exceed .008". Inner surface of cover must not be worn more than .002".

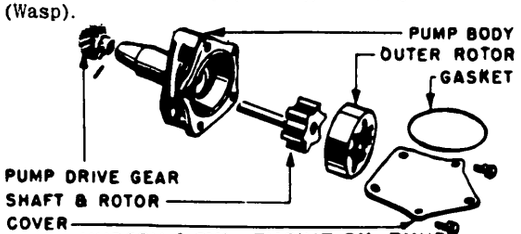
Installation: If crankshaft inadvertently turned while pump removed, install pump as follows to insure correct timing:

1) Hornet–Crank engine to TDC position (exhaust stroke No. 1 Cyl., firing position No. 6 Cyl.). **Other Models–**Crank engine to TDC position (firing position No. 1 Cyl.).

2) Install Aligning Tool J-2794 in distributor mounting hole so that guide pin indexes with distributor mounting screw hole.

3) Install oil pump, turn pump shaft so that slot in shaft indexes with tang on aligning tool (tool will be pushed out as pump installed).

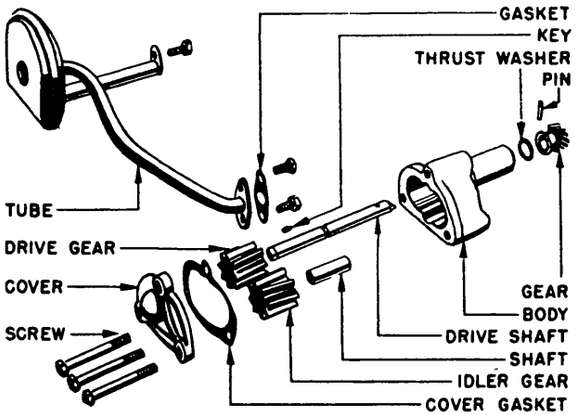
4) Install distributor with rotor turned to No. 6 cylinder terminal in cap (Hornet), No. 1 cylinder terminal (Wasp).



HUDSON 6 CYL. ENGINE OIL PUMP

1954-56 NASH STATESMAN

REMOVAL: Note position of pump drive gear keyway before removing oil pump and install in same position to retain distributor timing Engine is properly timed when No. 1 cylinder is at TDC in firing position and the oil pump drive gear keyway is approximately at three-thirty o'clock position when viewed from lower section of pump body



NASH STATESMAN OIL PUMP

OVERHAUL: Remove capscrews, cover and gasket, then drive gear (in pump) and idler gear and their shafts. Remove key from keyway on drive shaft. Remove drive shaft and drive gear (camshaft end) assembly from pump body. (NOTE–Drive gear (camshaft end) is held on drive shaft by a pin). Remove thrust washer from drive shaft. To assemble, reverse disassembly procedures.

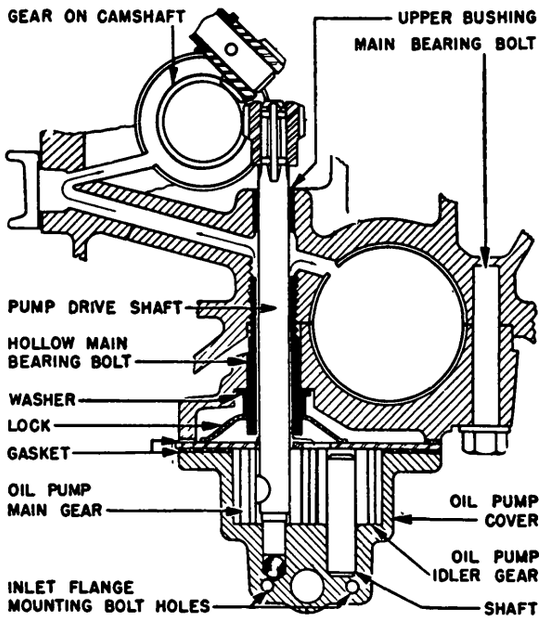
1954-56 NASH AMBASSADOR 6

OIL PUMP: Removal–Pump is mounted on center main bearing cap and must be dismantled for removal as follows: Take out pump mounting screws, withdraw pump body and idler gear assembly (shaft will remain in engine). Withdraw shaft from below disengaging drive gear from splines on upper end of shaft as shaft is withdrawn. Gear is free fit on shaft splines and can be lifted out after it is freed from the shaft. Pump shaft operates in thin wall bushing pressed in block (upper), in pump body (lower). Remove and replace bushing from beneath with pump and shaft out of engine. Ream bushing to diameter of .500" after installation.

►*CAUTION: Excessive clearanc of shaft in bushing will result in low oil pressure (pump oil d liv ry is up along shaft to oil channel in block–upp r bushing pr • vents oil leakage from chann l).*

Installation: Make certain that loose thrust ball is installed in pump body at lower end of pump shaft. Install pump in reverse order of disassembly and removal above.

CAUTION–Maintain a tight connection between inlet flange and pump body.



NASH AMBASSADOR 6 OIL PUMP

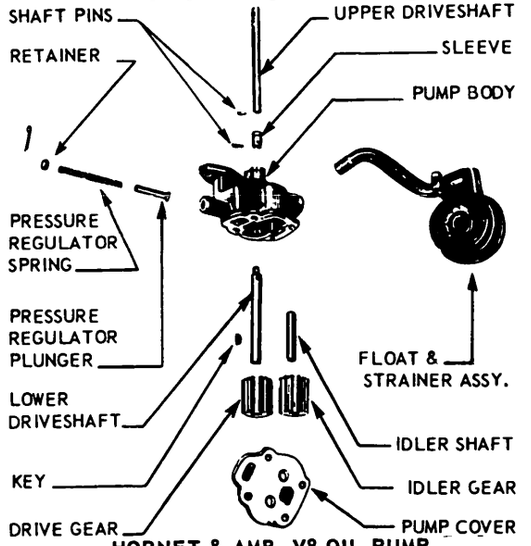
1955-56 HORNET & AMB. V8

OIL PUMP: R moval–Remove engine oil pan and remove the two screws attaching oil pump to rear main bearing cap and remove oil pump and strainer assembly.

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Disassembly: Remove screws attaching pump cover to pump and remove the cover. Remove idler gear. Remove pin from shaft and drive off sleeve. Remove upper and lower oil pump driving shafts and gear. If necessary, press shaft out of gear. If necessary to remove the float assembly, the tube can be unscrewed from pump.



HORNET & AMB. V8 OIL PUMP

Inspection: Wash all parts in clean solvent and blow dry with air. Inspect float for leaks. Inspect strainer. Inspect pump shaft for wear, scores or pits. Check clearance between pump housing and gears (opposite point of gear mesh). This clearance should not be greater than .008". Check gear endplay using a straightedge across gears and housing. Endplay should not exceed .004". Inspect relief valve piston for scores.

Reassembly & Installation: Reverse disassembly and removal procedure indicated above.

1956-57 HORNET & AMB. SPECIAL V8

OIL PUMP: Removal - Remove oil pan and screws retaining oil pump to rear main bearing cap, remove oil pump.

NOTE - Oil pump is driven by distributor drive shaft so removal of oil pump does not affect ignition timing.

Disassembly - Remove inlet tube and screen assembly from pump cover. Remove cover retaining screws, cover, pump gears, relief valve spring and plunger.

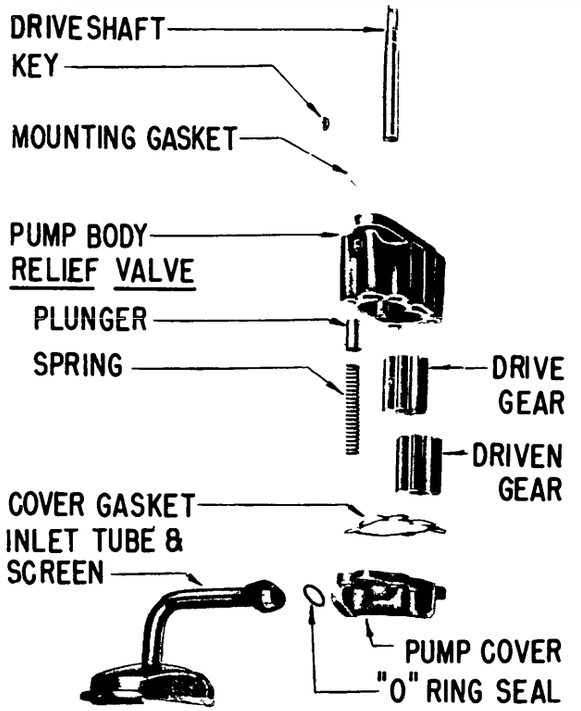
Inspection - Check gear to cover clearance by placing straight edge across pump body with gears in operational cavity. Clearance should not exceed .004". A clearance of .008" maximum should exist between gears and walls of gear cavity opposite point of gear mesh.

Reassembly & Installation - Reverse disassembly procedure. Before installing pump on engine, check for free operation.

CLUTCH NOTES

1956 NASH 6 CYL. MODELS

CLUTCH LINKAGE: Linkage consists of a beam lever, with a support mounted at one end in a hook plate on



HORNET & AMB. SPECIAL V8 OIL PUMP

engine (later models use a flexible link) and the other end held in position by a fulcrum plate and guide fastened to a steering gear housing boss bolt which also bolts steering gear to frame. The outer end of the beam lever connects to the clutch pedal with a rod, and the inner end connected by rod to the release bearing fork arm. Both rods are adjustable. Only the latter rod must be used when making clutch pedal free play adjustments. The fulcrum plate guide centers the beam support. If the beam support is not centered it will climb out of the hook and cause chattering. The beam is held in position by the beam anchor spring, and the pedal return spring.

►*CAUTION: Do not disturb the length of the pedal to beam rod (All Models).*

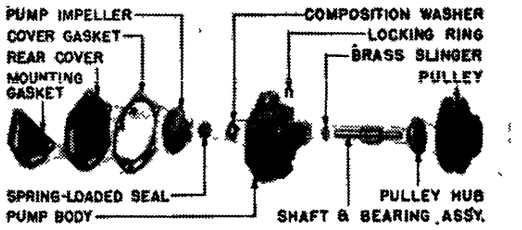
Clutch Linkage Adjustment: Pedal free play adjustment is made by lengthening or shortening the beam to release bearing fork arm rod. Do not disturb the pedal to beam rod setting. In the event it is necessary to adjust the pedal to beam rod the adjustment is made so that the outer end of the beam lever projects (½" on "Statesman" and 5/16" on "Ambassador") from the beam, toward the rear, with the clutch pedal against the floorboard.

WATER PUMP

HUDSON 6 CYL. MODELS

TYPE: Packless type with special double-row sealed ball-bearing shaft held by locking ring in housing. Bearing and shaft must be replaced as an assembly.

OVERHAUL: Disassembly. Remove locking ring from slot in housing, pump rear cover and gasket. Place pump assembly in "Water Pump Holding Fixture J-2778," and using shaft driver, press out pump shaft and bearing assembly with pulley hub attached. Check pump body bore with an inside micrometer. If this dimension greater than 1.1015", replace water pump body. Also check pump body and if impeller has been scraping body, it indicates excessive end thrust (replace complete pump).

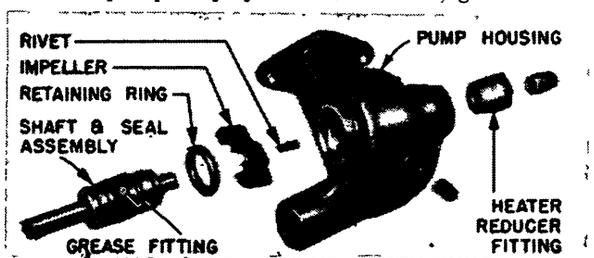


HUDSON 6 CYL. ENGINE WATER PUMP

Reassembly: Assemble the shaft and bearing in pump body. Bearing should be slight press fit into pump body, and assembled so that the groove on outer race is aligned with locking ring slot in pump body bore. When pressing bearing and shaft in housing, press against face of outer race, not against shaft. Install fan pulley hub. Proper pulley spacing should be: 5 5/32" (less Pwr. Strg.), 5 5/16" (Pwr. Strg.); from front face of **HUB** to cover face on rear of pump body. Assemble seal, combination washer and brass slinger in impeller and install impeller. **Impeller must extend out .007-.017" beyond cover face of pump body.** Install bearing locking ring, new cover gasket and install pump cover.

NASH 6 CYL. MODELS

DESCRIPTION: Centrifugal blade type, with a sealed-in shaft sealing assembly (cartridge type, factory sealed and lubricated. Cannot be dismantled). Held in pump body by flexible rubber ring.



NASH 6 CYL. ENGINE WATER PUMP

OVERHAUL: Disassembly. Remove plug in pump body and drill or drive out rivet holding impeller to shaft. Support shaft through water outlet hole during this operation. Seal and shaft assembly can then be removed from pump body.

Assembly. Insert new rubber retainer in pump body, then apply a small amount of soapy water to the inner part of the rubber ring. Install new shaft and seal assembly. Install impeller using a new rivet to fasten impeller to shaft. Lubricate with chassis lubricant.

MODEL IDENTIFICATION

Model
4D ..... Wasp
5D ..... Super Wasp
7D ..... Hornet

SERIAL & ENGINE NUMBERS: Stamped on plate on right front door body hinge post and also on top of right frame side rail near dash panel: Engine number which is the same as serial number is read downward and located on the front face of the cylinder block at top right corner.

Starting Serial Number—269069 for all models and runs consecutively. A digit preceeding this number designates the model: 4—Wasp, 5—Super Wasp, 7—Hornet.

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. min. at cranking speed. Allowable variation between cylinders 10 lbs.

VACUUM READING: Steady 17-20" at idling speed.

VALVE TAPPET CLEARANCE: Intake .008", Exhaust .010" hot.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. No Adj. Valve must operate freely.

IGNITION

FIRING ORDER: 1-5-3-6-2-4. See diagram.

SPARK PLUG GAP: .032".

Spark Plug—(4D, 5D) Champion H10, (7D) Champion H11. 14 mm.

COIL: Auto-Lite 6012-A.

Ignition Current—2.5 amps. idling, 4.5 amps. stopped.

DISTRIBUTOR: Auto-Lite IAT-4009 (4D with 232" engine), **Auto-Lite IAT-4009-B** 4D, 5D, 7D (with 262" & 308" engine).

Condenser—Auto-Lite IAT-3076R. **Capacity** .21-.25 mfd.

Contact Point Set—Auto-Lite IAT-3028BS.

Breaker Gap—.020".

Cam Angle—39°.

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Clockwise viewed from above.

►*DISTRIBUTOR INSTALLATION NOTE:* Engine rotation while oil pump removed affects timing. *See "Oil Pump Removal" under Oil Pump in Hudson Special Data.*

Automatic Advance (IAT-4009)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	333	2	666
3	400	6	800
9	1100	18	2200
10	1200	20	2400

(IAT-4009-B)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	500	0	1000
1	675	2	1350
4	1150	8	2300
8	1825	16	3650
9	2000	18	4000

Vacuum Spark Control: Auto-Lite integral type.

Vacuum Advanc (IAT-4009)

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	9½
1	2	10
3	6	11
5	10	12

(IAT-4009-B)

Start	0	9-1/4
1	2	10
2	4	10-1/2
3	6	11
3.75	7.5	11-1/2

IGNITION TIMING

Setting—TDC (Long line before "1UDC" on flywheel).

►*IGNITION TIMING CAUTION:* When setting timing with timing light, disconnect vacuum line from distributor and plug line to prevent disturbing engine performance.

Timing Mark—Long line before "UDC1" on flywheel. Timing is correct when the long line ahead of "UDC1" appears in line with pointer at opening of rear engine support plate.

CARBURETOR

►*CARBURETOR APPLICATION:* Single carburetors used on all models or two carburetors used with Twin-H Power, all models.

WASP

Carter WA1 749S—Single barrel downdraft with automatic choke.

Idle Setting—1/2—1-1/2 turns open. Turn screw out for richer mixture.

Idle Speed—550 RPM (Std. & O.D. Trans.), 500 RPM (Hydra-Matic or Automatic Trans. in "DR" range).

Float Level—1/2" distance from top of seam on float to tip on lower edge of float chamber, when needle is seated.

Accelerating Pump—Outer hole normal, inner hole if less charge required.

Fast Idle: 5/8" clearance between choke valve and air horn with throttle valve closed and stop screw against (not on) first step of fast idle cam. Adjust by bending link at lower offset.

Automatic Choke Setting: Set at index.

Hydra-Matic & Automatic Throttle Linkage Adjustment: *See "Hydra-Matic Drive" and "Studebaker Automatic Transmission" in Transmission Section.*

►*OTHER DATA: See "Carter WA1 Carburetor" in Carburetor Section.*

Fuel Pump Pressure: 3-1/2—5-1/2 lbs. (Std.), 4-5 lbs. (Combination).

SUPER WASP & HORNET

Carter WGD 2115S—Dual downdraft type with automatic choke.

Idle Setting—3/4—1-3/4 turns open. Turn screws out for richer mixture.

Idle Speed—550 RPM (Std. & O.D. Trans.), 500 RPM (Hydra-Matic & Automatic Trans. in "DR" range).

Float Level—3/16" between top of float and bowl cover with cover inverted and gasket removed.

Acc l rating Pump—No seasonal adjustment required.

Fast Idle: .026" throttle opening with choke valve closed. Check with thermostatic coil housing, gasket and baffle removed. Crack throttle valve, hold choke valve closed, move throttle toward closed position as far as possible. If throttle opening not exactly .026" bend connector link at lower angle.

Aut matic Ch k S tting: Set 2 points lean.

Hydra-Matic & Automatic Thr ttl Linkag Adjustm nt: *See "Hydra-Matic Drive" & "Studebak r Aut matic Transmission" in Transmissi n Section.*

►*OTHER DATA: See "Cart r WGD Carbur tors" in Carburetor Section.*

Fuel Pump Pressure: 3-1/2—5-1/2 lbs. (Std.), 4-5 lbs. (Combination).

TWIN H-POWER (ALL)

Carter WA1 2114S (4D, 5D), Carter WA1 2113S (7D). Two used. Single barrel downdraft with automatic choke.

►*TWIN-H POWER CARBURETOR ADJUSTMENT CAUTION:* Proceed as follows:

Idle Setting—For correct equalization of both carburetors: Remove air cleaners, install adjusting pin J-2544-1 through accelerator pedal link bellcrank lever and in hole in cylinder block to lock lever. On 5D, adjust throttle shaft rod trunnion to 1-25/32" from top face of bracket to center of clevis pin hole in cross shaft lever. Connect tachometer, but before warming up engine, remove clevis pin from ends of both throttle shaft to carburetor rods, position fast idle cam on each carburetor "off" position and turn each throttle stopscrew in until it just touches the cam. Set idle mixture screws exactly 2 turns open (7D), 1-1/4 turns open (4D, 5D). Warm engine, then adjust for correct idle speed (see below). Adjust each idle mixture adjusting screw for maximum increase in idling speed and readjust throttle stop screws for correct idling speed (*CAUTION*—turn stopscrew on each carburetor an equal amount). Adjust front and rear throttle shaft-to-carburetor rod clevises so that clevis pins can be installed freely, connect rods. On Hydra-Matic cars adjust throttle linkage (see Hydra-Matic Drive & Studebaker Automatic Trans. Linkage adjustment in Transmission Section). Remove linkage adjusting pin, adjust accelerator pedal to bellcrank rod to get 1/64-1/16" clearance between pedal and pedal stop at wide open throttle, reinstall air cleaners.

Idle Speed—540-560 RPM (Std.), 490-510 RPM (Hydra-Matic & Automatic), 575 RPM (Overdrive).

Float Level—1/2" from top of float seam to tip on lower edge of float chamber cover.

Accelerating Pump—Outer hole normal, inner hole if less charge required.

Fast Idle—1/2" (2114S), 5/8" (2113S) clearance between choke valve and air horn with throttle valve closed and stopscrew against (not on) first step of fast idle cam. Adjust by bending at lower offset.

Automatic Choke—Set 1 point lean.

Hydra-Matic & Automatic Trans. Thr ttl Linkag Adjustment: *See "Hydra-Matic Drive" & "Stud baker Automatic Trans." in Transmissi n S ction.*

►*OTHER DATA: See "Cart r WA1 Carburet rs" in Carburetor Section.*

Fu l Pump Pr ssure: 3-1/2—5-1/2 lbs. (Std.), 4-5 lbs. (Combination).

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CARB. EQUIPMENT

Fu l Pump: Carter M-729SZ Std., AC No. 4057 (Optl. Fuel & Vacuum).

Pr ssur –3-1/2–5-1/2 lbs. (Carter), 4-5 lbs. (AC).

S *"Fu l Pumps" in Carburetion Equipment Section.*

Gas lin Gaug : King-Seeley Electric CV (constant voltage) type with voltage regulator.

Dash Unit–King-Seeley 46379.

Tank Unit–King-Seeley 44513.

Se *"Fu l Gaug s" in Carburetion Equipment Section.*

BATTERY

Nati nal 2LS-100–6 volt, 17 plate, 100 ampere hour (20 hr. rate).

Battery Gr und–Positive (+) terminal.

Engin Gr und–Left front engine mount and frame.

STARTER

Auto-Lit	Start r	Armatur
4D, Synchro-mesh	MZ-4167	MZ-2312
5D, 7D Synchro-mesh	MCH-6109	MCH-2084
4D, 5D, 7D Auto. Trns.	MCH-6204	MCH-2088

Drive–Bendix A1806 (Std. Trans.), A1792 (Auto. Trans.).

Rotation–Counter-clockwise at commutator end.

Brush Spring Tension–42-53 ozs.

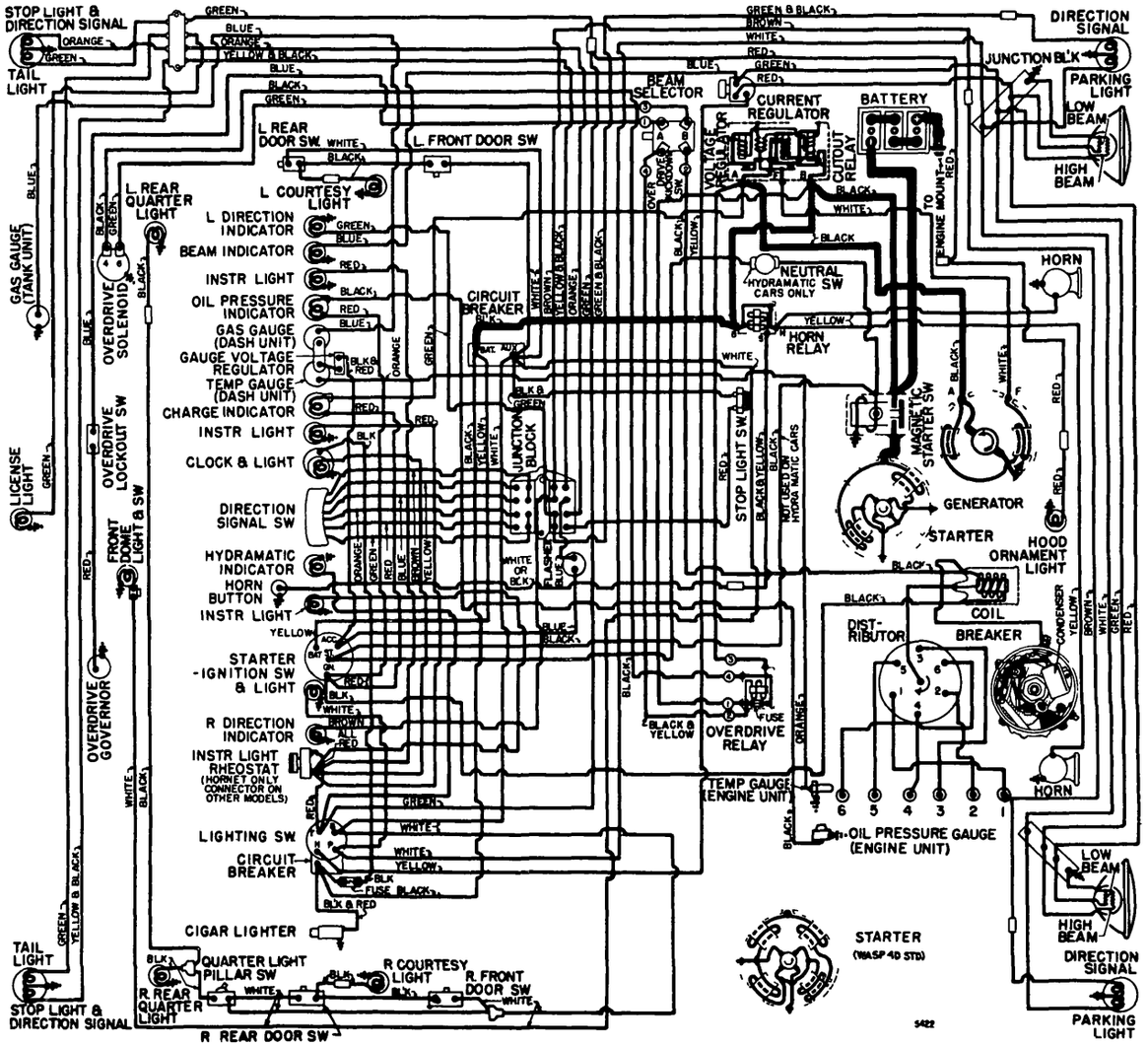
Performance Data

MZ-4167

Torque	RPM	Volts	Amperes
0 ft. lbs.	4000	5.0	68
4.4 ft. lbs.	Lock	2.0	[illegible] 280

MCH-6109 & 6204

0 ft. lbs.	4300	5.0	65
6.0 ft. lbs.	Lock	2.0	335



Starting Switch: Auto-Lite Magnetic type **SS-4030** or **RBM-2201-15.** Controlled by combination starting and ignition switch.

Neutral Safety Switch: Hudson No. 304524 located at lower end of steering column. Connected in starter control circuit so that starter operates only when selector lever is in "N" Neutral.

Adjustment–*See "Hydra-Matic Drive" or "Automatic Transmission" in Transmission Section.*

GENERATOR

Auto-Lite GGW-4801B (Std.), GGJ-6101E (Optl.).

Armature Number–GGW-2006F (GGW-4801-B).

Performance Data

(GGW-4801-B)

Amperes	Volts	Cold – RPM –	Hot
0	6.4	870-900	950-1050
40	8.0	1800-2000	2150-2350
45	8.0	1925-2125	2350-2550

(GGJ-6101-E)

0	6.0	600-700	650-750
50	8.0	1400-1600	1550-1750
55	8.0	1500-1700	1650-1850

Brush Spring Tension–35-53 ozs.

Field Current–1.4-1.5 Amperes at 5.0 volts. (GGW-4801-B), 1.4-1.6 Amperes at 5.0 volts (GGJ-6101-E).

Rotation–Counter-clockwise at commutator end.

Belt Adjustment: 3/4" belt deflection midway between generator and water pump pulleys.

REGULATOR

Auto-Lite VBE-6104A (GGW-4801-B Gen.) VBF-6003A (GGJ-6101-E Gen.). Voltage and Current type with "Temperature Compensated" current regulation.

Cutout Relay

Cuts In–6.3-6.8 volts (set to 6 4-6.6 volts).

Cuts Out–4.1-4.8 volts.

Contact Gap–.015" Minimum.

Air Gap–.031-.034" at hinge end of core with contacts just closed.

Voltage Regulator

Setting–7.2-7.5 volts (VBE-6104A), 7.1-7.4 volts (VBF-6003A) in normal operation charging at 1/2 maximum rate.

Air Gap–.048-.052" with contacts just opening.

Checking & Adjusting–*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°.*

	Test A	Operating Amperes	Test B
VBE-6104A	52 Max.		45 (43-47)
VBF-6003A	66 Max.		55 (53-57)

Test A–After 15 minutes operation charging at one-half maximum output.

Test B–After additional 15 minutes operation with current regulator operating (with load applied to hold voltage down to 6.7-6.9 volts on "VBE" or 6.7-7.0 volts on "VBF").

Air Gap–.048-.052" with contacts just opening.

Checking & Adjusting–*See Electrical Equip. Section.*

MISC. ELECTRICAL

Head Lamps: Sealed Beam. *See Electrical Equipment S ction.*

Dir cti nal Signals: *S El ctrical Equip. S ction.*

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Lighting Switch Removal: Disconnect Negative battery cable, loosen screw and remove control knob, remove escutcheon nut and escutcheon, remove switch and wires from switch.

Stop Light Switch Location: At rear of Master Cylinder (Std. Brakes) ahead of Master Cylinder (Power Brakes).

FUSES: Located as follows:

Clock–SFE-3 ampere in fuse case at back of clock.
Weather Control–SFE-14 ampere in fuse case at left side.
Radio–SFE-14 ampere in fuse case at left side of radio.
Overdrive–SFE-30 ampere mounted on overdrive relay.

CIRCUIT BREAKERS: Main Circuit Breaker (25 ampere) mounted on lighting switch. **Auxiliary Circuit Breaker** (30 ampere) mounted on instrument structural brace.

HORNS: Auto-Lite (High Pitch) HAB-4626A, (Low Pitch) HAB-4625A.

ENGINE

ENGINE SPECIFICATIONS: 6 cyl. "L" head type.

Model	Bore	Stroke	Displmnt.	Rated HP
4D	3-9/16"	3-7/8"	232 cu. ins.	30.4
5D	3-9/16"	4-3/8"	262 cu. ins.	30.4
7D	3-13/16"	4-1/2"	308 cu. ins.	34.9

Model	Comp. Ratio	Developed HP
4D	① 7.0-1	126 at 4400 RPM
4D	② 7.5-1	129 at 4400 RPM
5D	① 7.0-1	140 at 4000 RPM
5D	② 7.5-1	143 at 4000 RPM
5D	② 7.5-1 ③	149 at 4000 RPM
7D	① 7.0-1	156 at 3800 RPM
7D	② 7.5-1	160 at 3800 RPM
7D	② 7.5-1 ③	170 at 4000 RPM

① Cast Iron Head.
② Aluminum Head.
③ Twin-H Power.

Compression & Vacuum Reading–*See Tune Up.*

ENGINE REMOVAL: *See Hudson Special Data.*

OIL PAN REMOVAL: Support car on jack stands placed under #2 cross-member. Take out three bolts attaching center steering arm support bracket on this cross-member and drop steering arm and tie rods. Remove flywheel dust cover. Remove pan.

►*LOCATING HOLE PLUG CAUTION: Plug in locating hole in pan flange at left rear of block (behind starter) must be tight fit to prevent oil leakage or contamination of oil by dirt or water.*

CYLINDER HEAD GASKET: Used as follows:

Model	Cast Iron Hd.	Aluminum Hd.
4D	309112	309114
5D	309116	309118
7D	309120	309122
7D (Exc. 6.8-1)		307408
7D (7X Eng.) Severe Usage		309390

Cylinder Head & Gasket Installation–*See Hudson Special Data.*

TIGHTENING TORQUES: *See Hudson Special Data.*

PISTONS

►*CAUTION:* Pistons NOT INTERCHANGEABLE between engines due to different height from pin hole to top as follows: 4D–2.310-2.314", 5D–2.060-2.064", 7D–1.967-1.971".

Aluminum alloy, cam ground, four ring type.

Original Bore & Piston Size & Markings–*See "Original Bore" in Hudson Special Data.*

Weight–18-1/8 ozs. (4D, 5D), 18-5/8 ozs. (7D).

Removal–Pistons & Rods removed from above.

►*PISTON WEIGHT CAUTION:* Piston weight stamped on head of piston. Use same weight piston when replacing pistons.

Fitting New Pistons: Use ribbon feeler 1/2" wide .002" thick and scale with cylinder and piston both at 70° F. Piston is properly fitted when 3-4 lbs. pull required to remove feeler.

Replacement Pistons: *See "Pistons" in Hudson Special Data.*

Installing Pistons: Slot away from camshaft.

PISTON PINS

Floating type with locking ring at each end.

Diameter–.968". **Length**–2.937".

Clearance in Piston–From .000 to .0003" at 70° F.

Clearance in Rod–Hand push fit at 70° F.

Replacement Pins: Available in the following oversizes and identified by a spot of paint on end of pin. Color denotes oversize. Std. not painted, .001" yellow, .002" orange, .005" white, .010" blue.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Comp.	.0775"	.006-.014"	.001"
Oil (#3)	.186"	.006-.014"	.001"
Oil (#4)	.1545"	.006-.014"	.001"

Replacement Rings: Supplied in Standard & .010" Oversize.

CONNECTING RODS

Length–Center to center 8-1/8". **Weight**–34.24 ozs.

Crankpin Journal Diameters–2.125". Out of round limit .0015".

►*CRANKSHAFT SIZE CODE: See Hudson Special Data.*

Bearings–Steel-backed Babbitt. (Upper & lower halves interchangeable). No shims.

Clearance–.0005-.0015".

Side Play–.007-.013".

Replacement Bearings: Standard, .001", .002", .010", .012" Undersize.

Installing Rods: Not offset. Oil spit hole in lower end of rod must be toward camshaft side of engine.

CRANKSHAFT

Journal Diameter–2.4988-2.4998".

►*CRANKSHAFT SIZE CODE: See Hudson Special Data.*

Bearings–Steel-backed, Babbitt-lined. Upper and Lower halves of bearings alike. No shims.

Clearance–.0005-.0015".

Replacement Bearings: Standard, .001", .002", .010", .012" Undersize.

End Thrust: On No. 3 bearing.

End Play–.003-.009".

Rear Bearing Oil Seal Installation: *See Hudson Special Data.*

CAMSHAFT

Journal Diameters–(1) 2.375", (2) 1.997", (3) 1.965", (4) 1.497".

Bearings–Steel-backed, Babbitt-lined bushings.

Clearance–.0015-.002".

End Thrust: Controlled by thrust plate behind camshaft sprocket.

End Play–.003-.005".

Timing Chain: Link Belt. Width 1.250". Pitch .375". Length 60 Links.

Camshaft Setting: Timing chain has two marked links, six full links apart. Both crankshaft and camshaft sprockets have a marked tooth. With crankshaft sprocket installed and turned to TDC position, install one marked link over crankshaft sprocket marked tooth, insert camshaft into chain with marked link over marked tooth, rotate camshaft until screw holes line up and install screws.

VALVES

Tappet Clearance: Intake .008", Exhaust .010" hot.

Valve	Head Diameter	Stem Diameter	Length
Intake	1.831"	.3417"	5.815"
Exhaust	1.561"	.3407"	5.815"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.346"	.0015-.003"
Exhaust	45°	.346"	.002-.004"

Valve Seat Width–Intake .054". Exhaust .075".

►*VALVE GRINDING CAUTION:* Replace valve when grinding reduces distance from upper edge of valve seat to top of valve to less than 1/16".

Valve Springs: Install valve springs with closely coiled end of spring up.

Free Length–2.500".

Valve Spring Specifications

Valve	Lbs. Press.	Length
Closed	77	2 3/16"
Open	160	1 27/32"

Valve Guides: Remove Tappet adjusting screws and drive out guides with tool J-267. Use tool J-883-A Installer and tool J-883-10 Pilot to replace guide. Insert guide to a depth of 1 9/32" from top of guide to top of valve seat.

Valve Lifters: Mushroom type fitted directly in crankcase. Removed from below with camshaft out. Serviced by installing oversize lifter.

Clearance–.00075-.0015".

Replacement Lifters–.002", .004", .010" Oversize.

►*VALVE LIFTER NOTE*–Replace tappet (excessive oil consumption) when oil is expelled in squirts from around tappet. Check for out of round bore in block. Oversize available .002", .004" & .010".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 33.7° BTDC. Close 80.1° ALDC.

Exhaust Valves–Open 73.9° BLDC. Close 28.4° ATDC.

Valve Timing Check–Set No. 1 Intake Valve Tappet at .010" clearance (hot) and insert .002" feeler between tappet and valve stem. Rotate engine clockwise until a slight drag is felt on feeler gauge. The engine is properly timed when the first of the five timing marks on the flywheel is 5/8" above the pointer in timing hole. Reset valve tappet to specifications.

OILING SYSTEM

Crankcase Capacity: 7 qts. refill, 7-1/2 qts. dry.

Normal Oil Pressure: 40 lbs. at 30 MPH.

Pressure Regulator Valve–Non-adjustable relief valve and spring under plug in left side of engine.

Oil Pressure Indicator–Hudson "Teleflash" with Oil Pressure Warning Switch. Consists of light on instrument panel operated by switch as follows:

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Oil Pressure Warning Switch—King-Seeley No. 47170. On right side of engine above oil pump. Contacts open at 11-15 lbs. Switch is sealed (not adjustable).

Oil Pump: Rotor type. Angle mounted on right side of engine and driven from camshaft.

Pump Overhaul—*See "Oil Pump" in Hudson Special Data.*

Oil Filter: Fram or Hudson. Replace filter cartridge at 5000 mile intervals.

Replacement Filter Element—Hudson No. SP-302496.

Crankcase Ventilator: Oil-wetted type filter element in oil filler cap (air intake). Outlet pipe in rear valve compartment cover on right side of engine.

COOLING

Water Capacity: 19-1/2 qts. *NOTE*—Capacity without heater 18-1/2 qts.

Pressure Valve: Hudson No. 302265. Radiator filler cap pressure type.

Thermostat: Hudson No. 166272 (Std.), 161664 (High type for permanent Anti-Freeze). Standard type opens 150-155° F, High type opens 165-170° F.

Water Pump: Centrifugal, belt driven, packless type. Shaft mounted on sealed duplex ball bearing. *See "Water Pump" in Hudson Special Data.*

Pump Removal—Remove generator adjusting bracket, remove fan blade as assembly and pump mounting bolts. Remove pump from engine.

Temperature Gauge: King-Seeley Electric "CV" type (constant voltage) with gauge voltage regulator.

See "Temperature Gauges" in Miscellaneous Section.

Dash Unit—King-Seeley 46372.

Engine Unit—King-Seeley 44200.

Gauge Voltage Regulator—King-Seeley 46377.

CLUTCH

Own. Single plate fluid cushioned type (cork insert driven member) operating in Hudsonite oil. 9" on 4D (less Overdrive), 10" 4D (with Overdrive), 5D, 7D.

►*CLUTCH STICKING CORRECTION: See "Clutch Notes" in Hudson Special Data for Flushing instructions.*

See "Hudson Clutches" in Clutch Section.

Clutch Lubrication: S "CLUTCH SERVICING" *in Hudson Special Data.*

Clutch Disc N.—Hudson 303342 (9"), 304885 (10").

Pedal Adjustment: 1-1/2" between floor board and rear face of pedal. Adjust by loosening locknut above clevis and turn clevis in or out as required.

Removal: Remove transmission (see Transmission Removal following). Drain clutch oil by turning engine over until plug on flywheel is accessible through timing inspection hole in rear engine support plate behind starter, remove plug, turn engine over 1/3 revolution until star on flywheel visible through timing hole (drain hole then at bottom), allow lubricant to drain. Unhook clutch pedal lever return spring, remove two clutch cross shaft bracket bolts and remove the bracket. Remove clutch control link clevis pin and disconnect the clevis. Install engine holding fixture J-4651 (position "U" shaped section around oil pan and engage adjusting hooks in holes provided on each side of frame). Remove flywheel dust pan by taking out two attaching screws. Take out two engine rear mounting bolts and nuts at No. 3 cross member. Raise engine rear support approximately 1/2" off cross member by adjusting the holding fixture hooks (*NOTE*—If holding fixture not available, use hydraulic jack with block of wood to prevent damage to pan to raise engine). Take out two top screws attaching clutch housing to engine rear end plate (use universal socket and extension). Remove breather pipe bracket, remove bolt attaching breather pipe and rear valve chamber cover, remove breather pipe. Remove flywheel pointer, remove starter. Take out two lower attaching screws and remove clutch housing assembly (*CAUTION*—Take care that throw-out collar and bearing does not drop out of clutch cover bore). Loosen all clutch cover-to-flywheel screws evenly to relieve spring pressure, take out screws and remove clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model AS63-T86E (4D, 5D) Without Overdrive. AS65-T86E (7D) Without Overdrive. AS64-T86E (4D, 5D, 7D) With Overdrive. Three speed, all helical gear type.

See "Warner Transmission" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: (*NOTE—This transmission removed from underneath car. Not necessary to remove floor mat and cover).* Drain lubricant and disconnect front universal joint (retain universal joint bearing cups with tape to hold bearings in place). Loosen nut on propeller shaft center bearing support nut, disconnect propeller shaft by sliding shaft rearward, disconnect shift rods, speedometer cable (if car is equipped with overdrive, disconnect control cable and wiring from overdrive at transmission), and remove speedometer pinion. Remove nut from front end of brake pivot brace at No. 3 cross-member and remove clevis pin at rear end of brace and move linkage to left side of car. With universal socket on a 10" extension, remove two top bolts attaching transmission-to-clutch housing. Insert in their place, guide studs J-2969 to guide transmission during removal. Remove the two lower transmission-to-clutch housing bolts and lower transmission out of car.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10 & R11 Overdrive Controls" in Transmission Section*

HYDRA-MATIC DRIVE

Dual Range. Four-Speed Planetary type automatic transmission with Modulated Throttle Pressure and Hydraulically operated reverse.

See "Hydra-Matic Drive" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 1000 miles of operation, drain and refill every 25,000 miles. Use only Hydra-Matic Drive fluid.

Capacity—8-1/2 qts.

Checking Fluid Level—Set hand brake and allow engine to idle with selector lever in "DR4" position for two minutes. Place selector lever in "N" position. Roll back floor mat and remove oil level indicator (after cleaning all lint and dirt from around indicator). Wipe indicator dry and check fluid level. Fluid level must be to "F" mark.

►*CAUTION: Do not check fluid level when transmission is excessively hot and do not fill above "F" mark on dip stick.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

AUTOMATIC TRANSMISSION

Detroit—Torque Converter and 3 speed automatic planetary transmission with hydraulic control.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Studebaker Automatic Transmissions" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Studebaker Automatic Transmissions" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 25,000 miles. Use "Hydra-Matic Drive" or "Automatic Trans." fluid type A.

Checking Fluid Level—Apply Parking Brake, place Selector Lever in "L" position, operate engine at idling speed to obtain normal operating temperature. Roll back left floor mat, remove access hole cover, clean area around gauge cap and withdraw gauge. Oil level should be tested with engine idling and Selector Lever in "L" position. Add oil to bring level to full mark.

Capacity—11 qts. (Place 6 qts. in transmission, operate at idle with Selector lever in "L" position and add fluid to bring level to full mark).

►*OTHER AUTOMATIC TRANS. SERVICE DATA: See "Studebaker Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. One at each end of propeller shaft.

See Universals Section for complete data.

►*ASSEMBLY CAUTION:* The tack welded tie-bar or the welded spots where the bar was attached must be located in the relief of the companion flanges when assembling the universal.

REAR AXLE

Spicer 44-2. Semi-floating, hypoid gear type with Hotchkiss drive.

See "Spicer Hypoid" in Rear Axle Section.

Axle Ratio		
Synchro-mesh	**Overdrive**	**Automatic**
4.09-1 (Std.)	4.55-1 (Std.)	3.07-1 (Std.)
4.55-1 (Opt.)	4.09-1 (Std.)	

Severe Usage Ratios—4.55-1, 4.27-1, 3.92-1, 3.54-1, 3.31-1, 3.07-1.

Gear & Pinion Teeth—4.09 (45-11), 4.55 (50-11), 3.07 (43-14).

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Rear Axle Ratio Nut—Ratio is marked on metal tag attached to rear axle by rear axle cover bolt. A tag marked 43 over 14 would mean an axle ratio of 3.07 to 1.
Back Lash—.003-.006".

Axle Shaft Removal: Raise rear end of car off floor and place jack stands under axle assembly. Disconnect brake cables at toggle and unhook brake cables from parking brake levers. Disconnect brake hose at frame connection and brake lines from wheel cylinder. Remove wheel & hub. Remove backing plate bolts and backing plate, wheel bearing oil seal caps and axle shims (shims only on right side). Tie shims together for reinstallation. Use Puller J-352-B to remove axle shaft and Puller J-943 to remove seal.

Rear Axle Assembly Removal: Place jack stands under frame just ahead of rear springs. Disconnect brake cables at toggles and unhook from parking brake levers, brake hose from frame connection, brake line from wheel cylinders. Remove wheels, brake cylinders, backing plate and pull axle shafts. Disconnect propeller shaft at rear companion flange (tape rollers and caps to prevent falling off). Remove nuts from spring clip "U" bolts and lower shock absorber studs. Disconnect stabilizer. Lower assembly and roll from beneath car.

Wheel Bearing Adjustment: Controlled by shims (.003", .005" & .015") between backing plate (right side only) and end of axle housing. To adjust, remove wheel and backing plate (see Axle Shaft Removal), add or remove shims for endplay adjustment.
End Play—.001-.004".

SHOCK ABSORBERS

Monroe & Delco—Direct acting hydraulic type. Units are sealed (serviced by replacement).

Hudson Shock Absorber Nos.

Control	Front	Rear
Light 4D, 5D	① 304700	① 304701
Light 7D	① 303060	① 300351
Light 7D		② 301241
Heavy All	① 303061	① 301768
Heavy All		② 301770
Ex. Hvy. All	① 302430	① 302341
Severe Usage All	① 306707	① 309683

① Monroe. ② Delco.

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs and lateral stabilizer.
See "Hudson" in Front Suspension Section.
King Pin Inclination—3° 36" crosswise.
Caster—1/2° to 1-1/2°. Pos.
Camber—1/2° to 1-1/2°. Pos.
Maximum variation between right and left wheel caster or camber 1/2°.
Toe-In—0" to 1/16".
Toe-out on Turns—Inner wheel 30°, outer wheel 25°. Variation between wheels 1/2°.

STEERING

Manual: Gemmer Model 335. Three-tooth Worm & Roller with "push-pull" adjustments.
See "Gemmer Steering Gears" in Steering Section.
Power Steering: Two types used as follows:
(4D, 5D)—Monroe Linkage Type. *See "Monroe Power Steering" in Steering Section.*
(7D)—Saginaw Linkage Type. *See "Saginaw Linkage Type Power Steering" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*
Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix Hydraulic, Duo-Servo, Single Anchor. Without eccentric adjustment. Parking lever applies rear service brakes.
See "Bendix Hydraulic" in Brake Section.
Drums—Diameter 11".
Wheel Cyl. Diameter—Front 4D, 1 1/16", 5D, 7D 1 1/8". Rear All 15/16".
Replacement Lining & Shoes—Linings & shoes with linings come in Std. & .030" Oversize.

Lining Width & Thickness

Model	Front	Rear
4D	1-3/4" x .177"	1-3/4" x .177"
5D, 7D	2-1/4" x .177"	1-3/4" x .177"

Clearance—.015" at each end of secondary shoe with primary shoe out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.
Mechanical Follow-up (Pedal Pushrod) Adjustment—Adjust pedal pushrod (linking pedal to lever on frame cross-member) for clearance of 1 1/4" between rear side of retaining pin in lever and rear end of slot in slide link.

Standard Master Cylinder: On frame to left of transmission.
Checking Fluid—Access hole in floor pan. Roll back floor covering, remove access hole cover, clean lint and dirt from filler plug, remove plug. Fluid should be 1/2 to 1" below the top of filler opening.
Removal—Remove from beneath car. Not necessary to disturb other parts.

Power Brakes: Bendix Power Unit—Combination vacuum power unit and hydraulic master cylinder. Replaces conventional master cylinder.
See "Bendix Power Unit" in Brake Section.

Checking Fluid—Raise hood, clean surface around filler plug and remove plug. Maintain fluid level not lower than 1/4" below the bottom of reservoir filler opening.

Removal—Remove key lock washer and pin from pedal bell crank under instrument panel and remove rod from pedal. Raise hood and disconnect hose assembly by removing outlet fitting bolt to the master cylinder.

NOTE—Do not remove stop light switch, wires, or hose assembly from outlet fitting. Loosen clamp and remove manifold vacuum hose at the check valve on the power unit. Loosen the reserve tank hose from the fitting on the check valve. Remove the four cap screws securing the assembly to the dash bracket.

MISC. MECHANICAL

Windshield Wipers: Vacuum operated type. *See "Windshield Wipers" in Miscellaneous Section.*

Window Regulators: Hydro-Lectric, with single action hydraulic window cylinders. *See "Hydro-Lectric Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric, with double acting hydraulic top operating cylinders. *See "Hydro-Lectric Power Tops" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disc nnecting any part of air conditioning equipment or lines See "Air Conditioning S rvic Cauti ns" in Misc llaneous Section.*

MODEL IDENTIFICATION

M d l	Model No.
Wasp (1955)	35540
Hornet (1955)	35560
Wasp (1956)	35640
Hornet (1956)	35660

SERIAL NUMBER: Stamped on plate attached to cowl under hood.

1955 Starting Numb r - (Wasp) - Kenosha W-1001, El Segundo WC-1001, Unassembled Fxport WKD-1001 **(H rnet)** - Kenosha X-1001, El Segundo XC-1001, Unassembled Export XKD-1001.

1956 Starting Numb r - (Wasp) - Domestic W-8101, Unassembled Export WKD-1201, Canada WD-1401 **(Hornet)** - Domestic X-7601, Unassembled Fxport XKD-1401

ENGINE NUMBER: Stamped on machined surface on left side of cylinder block at No. 2 cylinder.

Starting Engin Numb r—(Wasp) M-8701, (Hornet) F-8601

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed. Allowable variation limit 10 lbs.

VACUUM READING: 17-20" at idling speed

VALVE TAPPET CLEARANCE: Wasp—Intake 010" (Go), 011" (No Go), Exhaust 014" (Go), 015" (No Go), COLD **1956 H rnet** - None (hydraulic lifters)

►*1955 VALVE TAPPET ADJUSTMENT NOTE:* Manifold & carburetor assembly must be removed for access to valve compartment. On Wasp Twin H-Power & Hornet (All Cars), engine must be jacked over to permit manifold removal as follows:

1) Disconnect fuel and vacuum lines at carburetors and manifold, disconnect exhaust pipe at manifold, disconnect throttle linkage.

2) Remove top nut on front engine supports and loosen rear engine supports.

3) Place jack between front right hand corner of cylinder block and point just below upper wheelhouse-to-wheelhouse crossmember and wheelhouse panel, move engine up and to left for clearance to remove manifold (not necessary to drain cooling system—hoses will permit this movement).

MANIFOLD HEAT CONTROL: Automatic thermostatic type No adjustment Valve must operate freely

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: (Wasp) 032", (Hornet) 030".

Spark Plug—(Wasp)-Champion H-10, torque to 30 lbs. (Cast Iron Head), 25 ft. lbs. (Aluminum Head).

(H rnet) – Champion H-11. Torque to 25 ft. lbs.

COIL: Autolite - (1955) CR-6012A, 6 Volt. (1956) CAF. 4003, 12 Volt. *NOTE - C il circuit (N r sistor).*

Ignition Current - (1955) 2 5 Amps idling, 4 5 Amps stopped **(1956)** 2.75 Amps. stopped.

►*IGNITION COIL POLARITY CAUTION:* Negative (–) coil primary terminal must be connected to distributor breaker terminal (misfiring and short breaker point life will result if coil terminals reversed).

DISTRIBUTOR: (Wasp) Auto-Lite IAT-4202, (Hornet) Auto-Lite IAT-4203A.

Condenser—Auto-Lite IAT-2015R. **Capacity**—21-.25 mfd.

Contact Point Set—Auto-Lite IGW-3028BS

Breaker Gap— 020"±.002"

Cam Angle – 39° ± 3°.

Breaker Arm Spring Tension—17-20 ozs

Rotation—Clockwise viewed from above.

Automatic Advance (IAT-4202)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		350	2		700
4.5		500	9		1000
12		1325	24		2650
13.5		1500	27		3000

(IAT-4203A)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		500	0		1000
1		670	1		1340
4		1150	8		2300
8		1825	16		3650
9	.	2000	18		4000

Vacuum Spark Control: Auto-Lite integral type.

Vacuum Advance (IAT-4202)

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	5 1/4
1	2	5 3/4
4	8	7 1/2
6	12	8 3/4
7.5	15	9 1/2

(IAT-4203A)

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	9 1/2
1	2	10
2	4	10 3/8
3	6	10 7/8
3.75	7.5	11 1/4

IGNITION TIMING

Setting—TDC at idle speed.

Timing Mark—(Wasp)—Long line before "1UDC" on damper. (Hornet)—Long line before "UDC1" on flywheel

CARBURETOR

►*CARBURETOR APPLICATION NOTE: One or two (Twin-H-Power) Carburetors used as follows:*

Model	Carter No.
Wasp (HI-TORQUE)	WA1 2009SA
Wasp (TWIN-H-POWER)	WA1 2013S
Hornet (CHAMPIONSHIP 6)	WGD 2252S
Hornet (TWIN-H-POWER)	WA1 2113S

Thr ttl Linkage Adjustm nt (Hydra-Matic): Adjust idle speed at 490-510 RPM (with compressor running), engine at normal operating temperature, transmission warm and selector lever in neutral position.

Wasp—Use aligning pins J-2544 at rear upper throttle lever and lower bell crank. One pin to adjust carburetor rods to rear upper throttle lever, one pin to adjust vertical rod between upper carburetor control lever and lower bell crank. Adjust rods so that both pins index at rear upper throttle lever and lower bell crank, and hole in boss on cylinder block.

Hornet—Aligning pin J-2544 should fit freely in bell crank lever and hole in boss in cylinder block. If pin does not index with lever and hole in boss, remove carburetor to throttle rod lever clevis pins and adjust carburetor idle adjusting screws.

All Models—Disconnect throttle rod at left side of transmission case Clean machined surface at back of transmission case and check lever using Tool J-2195 flush against the transmission side of cover. Gauge rod should fit freely in hole of throttle valve lever. Use bending Tool J-3310 to bend lever as necessary. Loosen two locking nuts on throttle valve rod trunnion (Wasp), at bell crank (Hornet) and adjust trunnion so that rod fits freely in hole in trunnion, then shorten throttle rod 1/16" or approximately two turns. Reconnect throttle rods.

CARTER WA1 (Wasp HI-TORQUE) (2009SA Single Carb).

Idle Setting—½-1½ turns open Turn screw out for richer mixture

Idle Speed (Without Air Conditioning)—540-560 RPM (Standard Trans), 575 RPM (Overdrive), 490-510 RPM (Hydra-Matic in Neutral)

Idle Speed (With Air Conditioning)—Same as above with compressor running.

Float Level—7/16" from tip of cover projection to soldered edge of seam on float with cover inverted.

Accelerating Pump—Outer hole normal, inner hole if less charge is required

Fast Idle: 5/8" clearance between choke valve and air horn with throttle valve closed and stop screw against (not on) fast idle cam Adjust by bending link at lower offset.

Unloader Adjustment: Use Gauge T109-84 (9/16") to check choke valve opening or clearance between lower edge of valve and air horn wall Adjust by bending cam on throttle using Tool T109-41

Automatic Choke Setting: Set at Index

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Carter WA1" carburetors in Carburetion Section.*

Fuel Pump Pressure: (1955) 3½-4½ lbs. (Single Action), 3½-5 lbs (Fuel & Vacuum), at 500 RPM. **(1956)** 3½-5½ lbs. Maximum.

CARTER WGD (Hornet Championship 6) (2252S Single Carb.)

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-2-3, LEFT barrel 4-5-6.*

Idle Setting—1¾-2¾ turns open. Turn screw out for richer mixture.

Idle Speed (Without Air Conditioning)—540-560 RPM (Standard Trans.), 575 RPM (Overdrive), 490-510 RPM (Hydra-Matic in Neutral).

Idl Spe d (With Air Conditi ning)—Same as above with compressor running.

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Float Level—¼" between top of float and bowl cover (gasket removed) and cover inverted.

Accelerating Pump—No seasonal adjustment.

Fast Idle: .030" clearance between throttle valve and bore of carburetor (side opposite idle port) with choke valve closed.

Unloader Adjustment: Use Gauge T109-106 (7/32") to check choke valve opening or clearance between lower edge of valve and air horn wall. Adjust by bending choke shaft unloader arm with Tool 109-105.

Automatic Choke Setting: Set at Index.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter Dual WGD" carburetors in Carburetion Section.*

Fuel Pump Pressure: (1955) 3½-4½ lbs. (Single Action), 3½-5 lbs. (Fuel & Vacuum), at 500 RPM. **(1956)** 3½-5½ lbs. Maximum.

Carter WA1 (TWIN H-POWER) (2013S & 2113S)

►*MANIFOLD FUEL DISTRIBUTION: An internal manifold compensator port incorporated in twin carburetor manifolds.*

Idle Setting—For correct synchronization of both carburetors: Remove clevis pins from throttle shaft to carburetor rod clevis. Connect vacuum gauge and tachometer. Hold fast idle cam in normal idle position and adjust idle speed screws until throttle valves just seated in closed position. Adjust idle mixture screws (½-1½ turns out (Wasp), 1¼-2¼ turns out (Hornet). Run engine until temperature normalized. Hold front carburetor throttle valve closed and adjust rear carburetor idle speed 25-40 RPM less than specified. After rear carburetor mixture for best operation. Adjust front carburetor idle speed to where an increase of 10-15 RPM is noted (Idle mixtures). Readjust the rear carburetor until the specified RPM is obtained and then adjust the front carburetor until a slight increase in RPM is noted. Readjust idle mixture to obtain best mixture and manifold vacuum. Adjust throttle shaft to carburetor rod clevis, retaining the throttle valves in idle position and accelerator linkage in released position. Reinstall clevis pins.

Idle Speed (Without Air Conditioning)—540-560 RPM (Standard Trans.), 575 RPM (Overdrive), 490-510 RPM (Hydra-Matic in Neutral).

Idle Speed (With Air Conditioning)—Same as above with compressor running.

Float Level—¼" (2013S), ½" (2113S) from tip on lower edge of cover to seam on float with cover inverted.

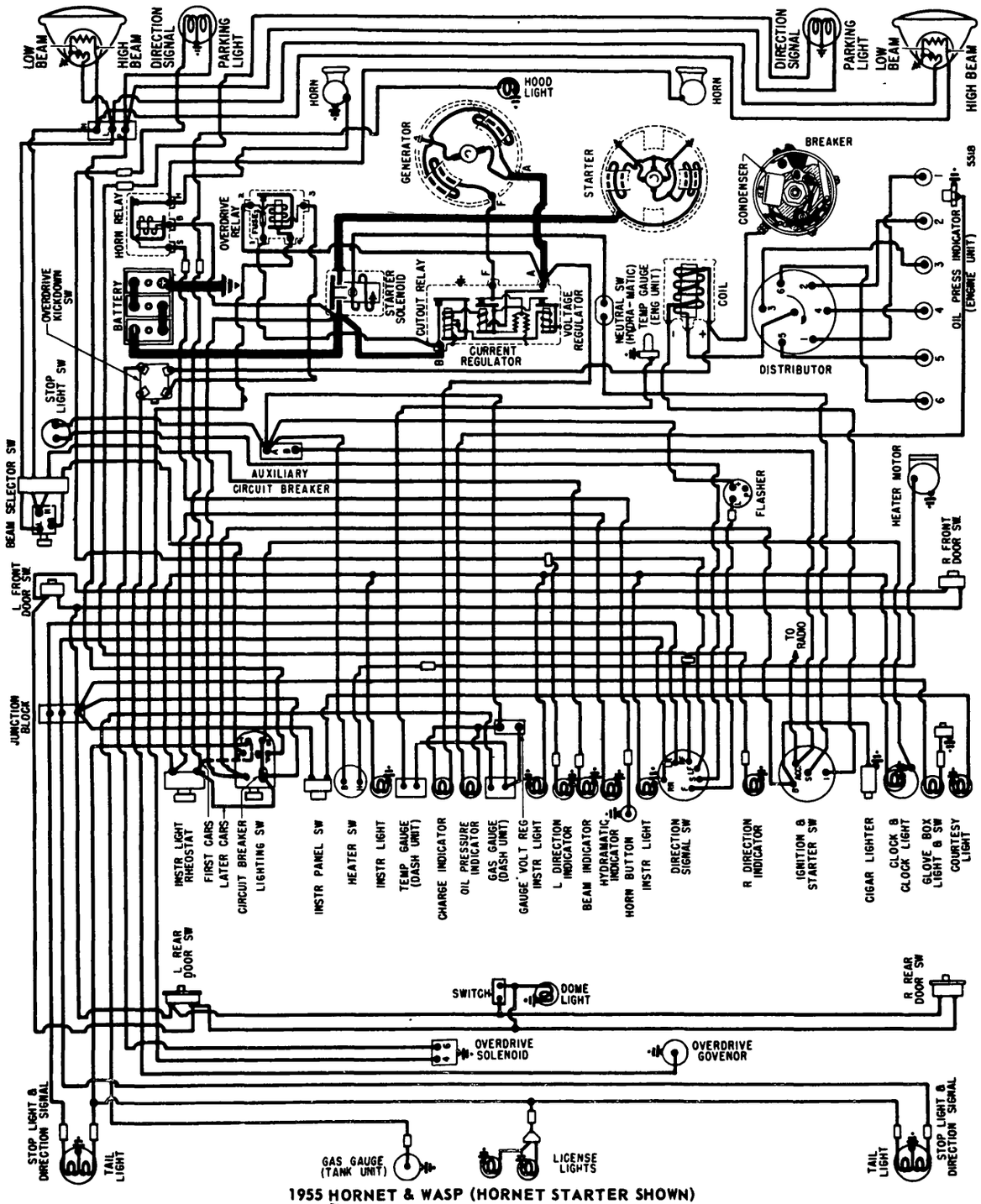
Accelerating Pump—Outer hole normal, inner hole if less charge is desired.

Fast Idle: ½" (2013S), 5/8" (2113S) clearance between choke valve and air horn with throttle valve closed and stop screw against (not on) first step of fast idle cam. Adjust by bending link at offset portion.

Unloader Adjustment: Use Gauge T109-84 (9/16") to check valve opening or clearance between lower edge of valve and air horn wall. Adjust by bending cam on throttle lever using Tool 109-41.

Automatic Ch ke Setting: Set one point lean.

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1955 HORNET & WASP (HORNET STARTER SHOWN)

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Throttle Linkage Adjustment: See CARBURETOR above.

► OTHER DATA: See "Carburetors in Carburetion Section.

Fuel Pump Pressure: **(1955)** 3½-4½ lbs. (Single Action), 3½-5 lbs. (Fuel & Vacuum), at 500 RPM. **(1956)** 3½-5½ lbs. Maximum.

CARB. EQUIPMENT

Air Cleaner: *DRY TYPE - DO NOT WASH.* Clean at 1,000 mile intervals by removing cartridge and shaking thoroughly to remove dirt. Replace cartridge every 10,000 miles or six months.

Fuel Pump: (Wasp) Carter M-729SZ (Std. Trans. Single Action). (Wasp & Hornet) AC 4250 (With Overdrive & Twin Carb.), or (With Hydra-Matic Drive & Single Carb.). Fuel & Vacuum. (Hornet) Carter M-2033S. Fuel & Vacuum.

Pressure - **(1955)** 3½-4½ lbs. (Single Action), 3½-5 lbs. (Fuel & Vacuum), at 500 RPM. **(1956)** 3½-5½ lbs. Maximum. See *"Fuel Pumps" in Carburetion Section.*

Gasoline Gauge: **(1955)** King-Seeley Electric "CV" (constant voltage) type with voltage regulator. **(1956)** Stewart Warner & Autolite. Electric.

Dash Unit - King-Seeley 46375 **(1955).** Hudson 3119655 **(1956).**

Tank Unit - King-Seeley 44558 **(1955).** Hudson 3146814 **(1956).**

See *"Fuel Gauges" in Carburetion Section.*

6-VOLT ELECTRICAL SYSTEM
1955 MODELS

BATTERY

Auto-Lite 1-M-100 (Wasp). 1H-105-D (Hornet). 6 volt, 15 plate, 100 ampere hour (Wasp), 105 ampere hour (Hornet) capacity (20 hr. rate).

Battery Ground—Positive, to cylinder head.

Engine Ground—Rear engine mount crossmember to transmission.

STARTER

Auto-Lite No.	Starter	Armature
Wasp (Std. Trans.)	MZ-4167	MZ-2312
Wasp (Hydra-Matic)	MZ-4172	MZ-2211
Hornet (Std. Trans.)	MCH-6109	MCH-2084
Hornet (Hydra-Matic)	MCH-6306	MCH-2088

Drive—Bendix No. A1806 (Std. Trans.), A1792 (Hydra-Matic).

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—42-53 ozs.

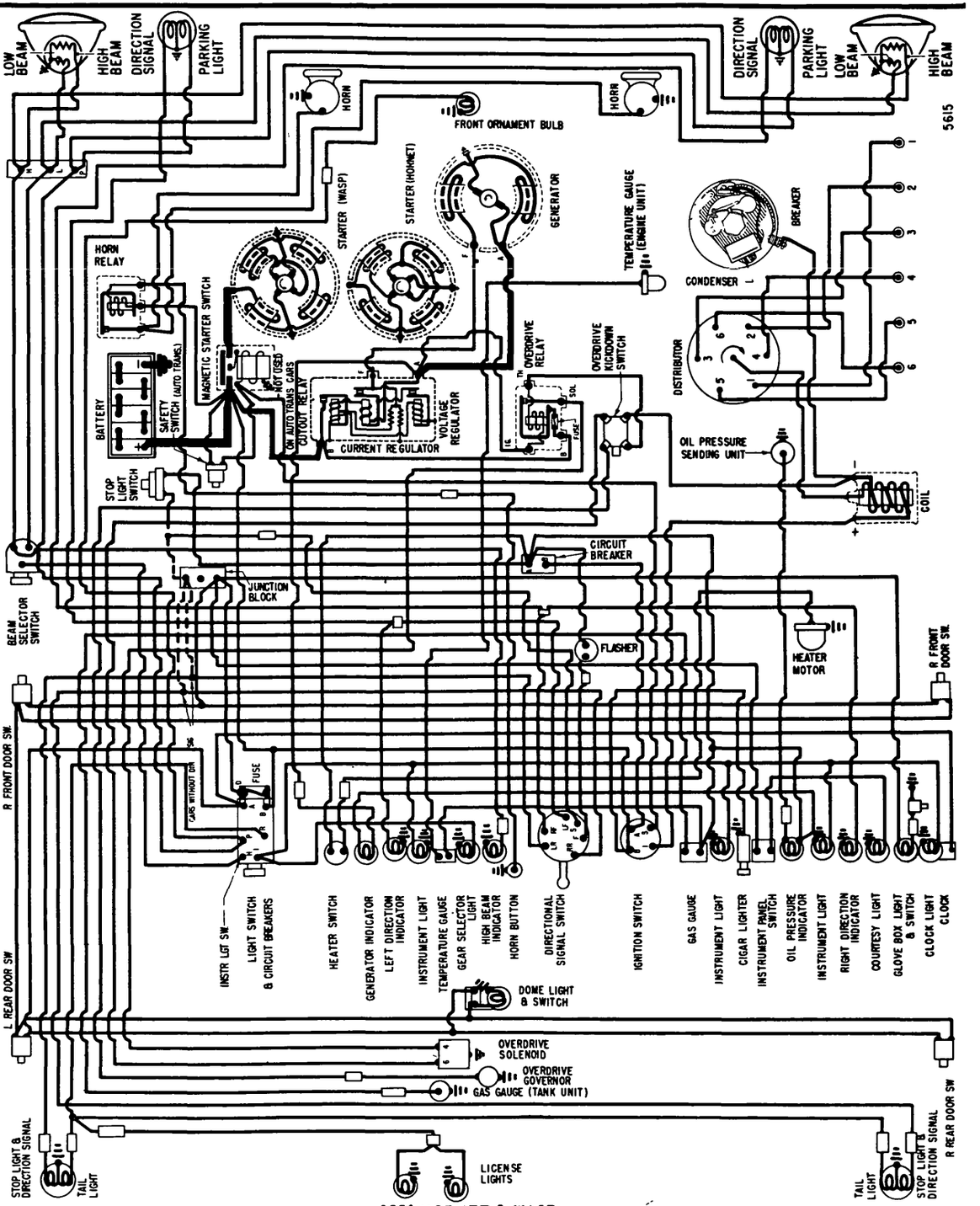
Performance Data
(MZ-4167 & 4172)

Torque	RPM	Volts	Amperes
0 ft. lbs.	4000	5.0	68
4.4 ft. lbs.	Lock	2.0	280

(MCH-6109 & 6306)

0 ft. lbs.	4300	5.0	65
6.0 ft. lbs.	Lock	2.0	335

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1956 HORNET & WASP

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Starter Switch: Magnetic type, controlled by combination Ignition and Starting Switch. Turn key full right against spring tension to start.

Neutral Safety Switch (Hydra-Matic Cars): Hudson No. 3143998. Permits starter operation only with selector lever in Neutral "N" position.

GENERATOR

Auto-Lite GGW-4802B. Armature—GGW-2006F.

Performance Data

Amperes	Volts	Cold – RPM – Hot
0	6.4	870-970 — 950-1050
40	8.0	1800-2000 — 2150-2350
45	8.0	1925-2125 — 2350-2550

Brush Spring Tension—35-53 ozs.
Field Current—1.6-1.7 amperes at 5.0 volts at 70°F.
Rotation—Counter-clockwise at commutator end.
Belt Adjustment: ¾" deflection midway between water pump & generator pulleys.

REGULATOR

Auto-Lite VBE-6101-A. Voltage & Current type with "Temperature Compensated" current regulation.

Cutout Relay

Cuts In—6.3-6.8 volts. (Set to 6.4-6.6 volts)
Contact Gap—.015" minimum.
Air Gap—.031-.034" (with contacts just closed).

Voltage Regulator

Setting—7.2-7.5 volts at 70°F.
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amperes	Test B
52 Max.		45(43-47)

Test A—After 15 minutes operation charging at one-half maximum output.
Test B—After additional 15 minutes operation with current regulator operating (with load applied to hold voltage down to 6.7-6.9 volts).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

12-VOLT ELECTRICAL SYSTEM
1956 MODELS
BATTERY

(Std.) – Auto-Lite 11-HS-50. *12 Volt,* 11 Plate, 50 Ampere hour capacity (20 hr. rate).
(Air Cond. Cars) – Auto-Lite 11-HS-60. *12 Volt,* 11 Plate, 60 Ampere hour capacity (20 hr. rate).
Battery Ground – Negative. Grounded to engine.
►*CAUTION:* This is reversed from previous models.
Engine Ground – Transmission to rear engine crossmember.

STARTER

Auto-Lite. *12 Volt.* Used as follows:

Auto-Lite No.	Starter	Armature
Wasp (Std. & O.D. Trans.)	MBG-4101	MZ-2312A
Wasp (Hydra-Matic)	MBG-4102	MZ-2023
Hornet (Std. & O.D. Trans.)	MDF-6011	MDF-2026
Hornet (Hydra-Matic)	MDF-6012	MDF-2088

Drive – Bendix.
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 42-53 ozs.

Performance Data
(MBG-4101 & 4102)

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10	50
5.2 ft. lbs.	Lock	4	235

(MDF-6011 & 6012)

0 ft. lbs.	3200	10	60
6.5 ft. lbs.	Lock	4	240

GENERATOR

Auto-Lite. *12 Volt.* Used as follows:

Auto-Lite No.	Generator	Armature
Standard	GJC-7008A	GJC-2030 F
Air Cond. Cars	GJC-7008B	

Maximum Charging Rate – *See Voltage Regulator.*

Performance Data (Cold)

Volts	Amperes	Max. RPM
15.0	20.0	1750
15.0	30.0	2050-2250

Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 18-36 ozs.
Field Current – 1.2-1.3 Amps. at 10 volts, at 70° F.

REGULATOR

Auto-Lite VRX-6008A. *12 Volt.*

Cutout Relay

Cuts In - 12.6-13.6 volts
Cuts Out – 8.2-9.3 Volts.
Contact Gap – .015" minimum.
Air Gap – .031-.034".

Voltage Regulator

Setting – 14.5 volts at 80° F. charging at 10 amps.
Air Gap – .048-.052" with contacts just opening.
Checking & Adjusting – *See "Auto-Lite Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

Test A	Operating Amperes	Test B
36 max.		30 (28-32)

Test A – After 15 minutes run at 10 amps. output.
Test B – After additional 15 minutes operation with current regulator operating.
Air Gap – .048-.052".
Checking & Adjusting – *See "Auto-Lite Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*BACK-UP LIGHT WIRING CIRCUIT CAUTION (Early Cars): Incorrect assembly of wire to back-up light switch and circuit breaker causes back-up light to operate incorrectly. See "Electrical Notes" in Hudson Special Data.*

Head Lamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Light Switch Removal: Disconnect battery. With Switch in "OFF" position, press button release on top of light switch assembly, pull knob and shaft clear of switch. Remove slotted nut, pull switch out to rear of instrument panel.

Stop Light Switch: Located at tee fitting in line to left front brake.

FUSES: 7.5 Ampere. On lighting switch for Courtesy and Glove Box lights.
15 Ampere. Located on overdrive relay.
5 Ampere. Located in radio wire back of instrument panel.

CIRCUIT BREAKERS: Used as follows:

30 Ampere - (1955) Main light circuit attached to headlight switch.
20 Ampere - (1955) Ignition switch, heater motors and stop light switch located behind dash panel on left side of cowl.
12 Ampere - (1956) On light switch for Instrument, Tail, and Dome lights, and also located on light switch for head and parking lights.
30 Ampere - (1956) Located on back of Instrument panel for Stop lights, Instruments and Indicators, Heater, and Directional lights.
Horn Relay - (1955) Hudson 3141308. **(1956)** Nash 3145684.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 6 cylinder "L" head.

Model	Bore	Stroke	Displacement
Wasp	3"	4¾"	202 cu. ins.
Hornet	3 13/16"	4½"	308 cu. ins.

Model	Compr. Ratio	Rated HP	Dev. HP & RPM
Wasp	7.5-1	21.6	120 at 4000
(Twin Carb.)	7.5-1	21.6	130 at 4000
Hornet	Ⓒ 7.5-1	34.88	165 at 3800
(Twin Carb.)	Ⓒ 7.5-1	34.88	175 at 4000

Ⓒ – Optional Ratio 8.0-1.

Compression & Vacuum Reading – *See TUNE-UP.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Hudson Special Data.*

►*CYLINDER HEAD TORQUE CHANGE (1955-56 Hornet):* Tightening torque for ½" cylinder head capscrews has been increased to 85-90 ft. lbs. Cold (was 75-80 ft. lbs.) to prevent corrosion and leakage at cylinder head.

TIGHTENING TORQUES: *See "Tightening Specifications" in Hudson Special Data.*

PISTONS

Aluminum alloy, cam ground, with taper ground skirt.
Original Bore & Pistons—*See "Original Bore & Pistons" in Hudson Special Data.*
Weight—10.4 ozs. (Wasp), 18.5 ozs. (Hornet).
Removal—Pistons & rods removed from above.

Fitting New Pistons: Use ribbon feeler .002" thick and scale with both piston and cylinder bore at 70°F. Pull required to remove feeler 3-4 lbs.

Replacement Pistons: *See "Original Bore & Pistons" in Hudson Special Data.*

Installing Pistons: Notch in top of piston must be toward front of engine.

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PISTON PINS

Floating type with locking ring at each end

	L ngth	Diameter
Wasp	2.4375"±.005"	.7499"+ 000" - 00025"
Hornet	2 942-2 932"	9687- 96845"

Cl aranc in Pist n—Hand push fit with piston heated to 200°F

Cl aranc in Rod—.0003" Rod should turn in piston under its own weight

R plac m nt Pins: (Wasp) Std. & .002", .005", .010", .015 , .020 Oversize. (Hornet) Std. & .002", .005", 010" Oversize

PISTON RINGS

	Width	End Gap	Side Clearance
Compr.	.0775"	.004-.009"①	.002-.004"
Oil #3	.186"	004- 009"①	001- 003"
Oil #4	1514"	004- 009'①	001- 003"

①—Wasp, (Hornet 006- 014")

R plac m nt Rings: Sets of Std and 020" Oversize

Installing Rings: Rings are pinned in piston to prevent rotation Ring clearance on pin must be same as end gap

CONNECTING RODS

Crankpin J urnal Diameter—1 937-1 938" (Wasp), 2 1244-2 1254" (Hornet)

Original B aring Siz s—See *"Original Bearing Sizes" in Hudson Sp cial Data*

B arings—Steel backed babbitt. No shims.

Cl aranc — 0005- 0015" **Side Play**— 007- 013"

R plac ment B arings: Std 001", 002", 010", 012" Undersize

Installing Rods: Notch in top of piston toward front of engine Spit hole in rod to thrust or camshaft side of engine

CRANKSHAFT

J urnal Diam t r—2.4988-2.4998" Four bearings

Original B aring Siz s—See *"Original Bearing Sizes" in Hudson Sp cial Data*

B arings- Steel-backed babbitt No Shims

Cl aranc — 0005- 0015"

R plac m nt B arings: Std., .001", .002", .010", .012" Undersize

End Thrust: Taken by No. 3 main bearing.

End Play—.003- 009"

Crankshaft Fr nt & R ar B aring Oil Seals: *See "Crankshaft & Main Bearings" in Hudson Special Data*

Crankshaft Fr nt Oil Seal: *See "Engine Front Cover" in Hudson Special Data.*

VIBRATION DAMPENER: *See "Vibration Dampener" in Hudson Sp cial Data*

CAMSHAFT

B arings—Steel-backed babbitt-lined bushings

Cl aranc —.0005-.0015" (Wasp), .0015-.002" (Hornet).

Camshaft R m val—S *"Camshaft & Bearings" in Hudson Sp cial Data*

End Thrust: Controlled by thrust plate behind camshaft sprocket

End Play—.003-.005"

Timing Chain: Link Belt **Width** 1.000" (Wasp), 1.250" (Hornet). **Pitch** .375" **L ngth** 60 links

Camshaft Setting: Timing chain has two marked links, six full links apart Both crankshaft and camshaft have a marked tooth With crankshaft sprocket installed and turned to TDC position, install one marked link of chain over crankshaft marked tooth, insert camshaft sprocket into chain with marked link over marked tooth, rotate camshaft until screw holes line up and install screws

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Hudson Special Data.*

VALVES

Tappet Clearance: **(Wasp)** Intake .010" (Go), .011" (No Go), Exhaust .014" (Go), .015" (No Go).

(Hornet) — None in service (Hydraulic lifters).

Wasp Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	1 495-1 505"	3412- 3422	5 045'
Exhaust	1 390-1 400	3412- 3422'	5 043"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	346	001- 003"
Exhaust	46°	346'	002- 004"

Hornet Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	1 831/"	3412- 3422'	5 815'
Exhaust	1 556'	3402- 3412	5.815'

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	346'	.0015- 003"
Exhaust	.45°	346'	002- 004"

NOTE—Valve face and valve seat angle are the same

►*VALVE GRINDING CAUTION.* Replace valve when grinding reduces distance from upper edge of valve seat to top of valve to less than 1/16'

Valve Springs: Install springs with closed coils toward head of valve

Valve Spring Specifications

Wasp	Pressure	Length
Open	116-124 lbs	1 19/32'
Closed	40-48 lbs.	1 61/64'

Free Length—2 3/16" approximately

Hornet	Pressure	Length
Open	153-165 lbs	1 27/32'
Closed	73-81 lbs	2 3/16"

Free Length— 2½' approximately

Valve Guides: Remove old guides through valve seat opening using Tool J-2814 Install new guides as follows **Wasp**—Use Tool J-883-A with Pilot J-883-10 to install guides to depth of 1 9/32' from top of guide to top face of block **Hornet**—Use Tool J-883-A with Pilot J-883-8 or 9 and install guides to depth of 1 7/16' (Intake), 1 3/32' (Exhaust) from top of guide to top face of block

Valve Lifters (Wasp): Mushroom type fitted directly in crankcase. Remove from below with camshaft out.

Valve Lifters (Hornet): Hydraulic with mushroom type body.

Hydraulic Valve Lifter Removal, Overhaul, & Testing: *See "Valve System" in Hudson Special Data.*

VALVE TIMING

S *"Camshaft Setting" under CAMSHAFT abov .*

Wasp Valv Timing ℄

Intak Valv s—Open 26.8° BTDC. Close 99.7° ALDC

Exhaust Valv s—Open 64.9° BLDC. Close 45.7° ATDC.

H rnet Valv Timing

Intak Valv s—Open 33.7° BTDC. Close 80.1° ALDC.

Exhaust-Valv s—Open 73.9° BLDC. Close 28.4° ATDC.

℄ - Valve lash .008" Intake. .010" Exhaust.

Valve Timing Check (Wasp)—Crank engine to TDC, exhaust stroke of No. 1 cylinder. Install dial indicator on No. 1 exhaust valve head through spark plug opening. Crank engine until indicator indicates valve seated. Chalk mark edge of vibration damper directly below pointer. Valve timing will be correct when distance from chalk mark around perimeter of damper to TDC is 1¾" ± 1/8" with cold valve lash of .015". *NOTE*—For one tooth off, dimension will be affected 19/32" (Camshaft sprocket), 1 3/16" (Crankshaft sprocket).

OILING SYSTEM

Crankcase Capacity: 5 qts (Wasp) 7 qts (Hornet) Add ½ qt for dry engine

Normal Oil Pressure: 40 lbs at 30 MPH

Pressure Regulator Valve—Non-adjustable spring loaded, located on left side of cylinder block

Oil Pressure Indicator Switch: King-Seeley 47185 (Wasp), 47170 (Hornet). On right side of engine above oil pump Contacts open at 11-15 lbs Switch is sealed (not adjustable)

Oil Pump: Rotor type Angle mounted on right side of engine and driven by camshaft

Pump Overhaul, Removal & Installation—See *"Oiling System" in Hudson Special Data*

Oil Filter Fram or Hudson Replace filter cartridge at 5000 mile intervals

Replacement Filter Element—Hudson No 8990183

Crankcase Ventilation: Oil-wetted type filter element in oil filler cap (air intake) Outlet pipe in rear valve compartment cover on right side of engine

COOLING

►*RADIATOR TO FAN BLADE CLEARANCE CAUTION (Wasp).* There should be ½' clearance between radiator core and fan blades on cars equipped with standard or overdrive transmissions Starting with Serial No W-5886 all cars with standard and overdrive transmissions are equipped with Rear Engine Support Plate Hudson No 3146059 to provide this ½' clearance

Water Capacity: 13 qts. (Wasp), 18.5 qts. (Hornet). Add 1 qt. for heater.

Pressure Valve: Radiator filler cap. 7 lb. standard, 13 lb. with air conditioning.

Thermostat: Hudson No. 5325066 Std. (157-162°), No. 3131817 (167-173°) or No. 3131985 (177-182°) for Permanent anti-freeze. Located in cylinder head water outlet housing.

Water Pump: Centrifugal type with non-adjustable packless type seal. *NOTE*—**Water pump discharges into brass water distributing tube to provide uniform circulation around valves.**

See "Water Pump" in Hudson Special Data

Pump Removal - Remove generator adjusting bracket, fan blade assembly, then pump mounting bolts

Temp ratur Gaug : (1955) King-Seeley Electric "CV" type (constant voltage) with gauge voltage regulator

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(1956) Stewart Warner & Autolite, Electric.
See "Temperature Gauges" in Miscellaneous Section.
Dash Unit - (1955) King-Seeley 46372. **(1956)** Hudson 3119681.
Engine Unit - (1955) King-Seeley 44200. **(1956)** Hudson 3144585.

CLUTCH

Borg & Beck. (Wasp) 9A7, (Hornet) 10A6.
Assembly No.—(Wasp) 1361, (Hornet) 1385.
Clutch Disc. No.—(Wasp) 382118 Std., 382191 Overdrive.
Clutch Disc. No.—(Hornet) 382372 Std., 382215 Overdrive.

Pedal Adjustment: Pedal free travel ½-¾". Adjust length of beam to throw-out lever rod. Lengthening rod reduces free play. *NOTE*—Do not disturb clutch pedal to beam rod adjustment.

►*CAUTION:* Pedal-to-beam rod should not be disturbed in service. This rod can be checked (with pedal against floor board) as follows: **Wasp**—Clearance between flat surface of beam lever and rear edge of bracket should be 7/8". **Hornet**—Outer end of beam lever should project 5/16" from beam toward the rear.

►*WASP CLUTCH BEAM INSULATOR DISTORTION CORRECTION:* To correct this condition, reinforce the new insulator with .015" shim made up to same dimensions as insulator.

Removal: Remove transmission (see below), disconnect clutch pedal linkage, remove housing and pan, punch-mark flywheel, clutch cover, and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange. Remove clutch and driven disc.

SYNCHRO-MESH TRANSMISSION

Warner. 3 Speed Std. Transmission & Overdrive Optl.
See "Warner Transmissions" in Transmission Section.

►***TRANSMISSION REAR BEARING SNAP RING BREAKAGE CORRECTION:*** **Caused by heavy duty operation or maladjustment of torque tube trunnion. For installation of sleeve and adjustment of trunnion See "Nash Transmission" in Transmission Section.**

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect brake tube bracket on underside of body. Disconnect torque tube (see Rear Axle Removal below). Disconnect hand brake cable at bellcrank and brake cable housing at bellcrank bracket. Move rear axle to rear to disconnect front universal joint from transmission mainshaft. Disconnect speedometer cable and shift rods (On Overdrive Cars, disconnect overdrive control and wiring). Remove two upper transmission mounting screws, install guide pins (Tool J-1434) in these holes, remove two lower mounting screws, slide transmission straight back to clear clutch pilot bearing, remove transmission from beneath car.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdriv Control: *See "Warner R10 Overdrive Controls" in Transmission Section.*

HYDRA-MATIC DRIVE

Dual Rang four speed automatic transmission with fluid coupling.
See "Hydra-Matic Drive" in Transmission Section.

►***HYDRA-MATIC REVERSE GEAR SLIP-OUT CORRECTION:*** **To check and correct this condition, first disconnect back-up light switch at manual control lever on side of transmission, and operate transmission in reverse. If condition not corrected, adjust back-up light switch to proper tension by placing control lever in reverse, and adjusting switch cable just enough to allow spring to pull switch to the contact position.**

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid every 1000 miles, drain and refill at 25,000 mile intervals.
Capacity—8½ qts. (9½ qts. after overhaul).
Checking Fluid Level—Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of two minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located under right front floor plate). Add "AQ-ATF" Hydra-Matic fluid to bring level to "F" mark.

►*CAUTION:* Do not check fluid level when transmission is excessively hot and do not fill above "F" mark on dipstick.

►*OTHER HYDRA-MATIC DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer (Wasp—Std.), Detroit (Hornet—Std.), Mechanics (All Models - Hydra-Matic). One used on forward end of driveshaft.

REAR AXLE

Own. Semi-floating, hypoid gear type with torque tube drive.
See "Hudson Rear Axles" in Rear Axle Section.

Axle Ratio	Standard	Overdrive	Hydra-Matic
Wasp ①	4.1-1 (9-37)	4.4-1 (8-35)	3.6-1 (12-43)
Wasp ②	4.4-1 (9-40)	4.9-1 (8-39)	3.6-1 (12-43)
Hornet	4.1-1 (10-41)	4.4-1 (9-40)	3.2-1 (13-41)

① - 1955 Models. ② - 1956 Models.

Backlash—.002-.006". Shim adjustment.

Axle Shaft Removal: Remove wheel. Pull drum (use hub puller J-736-B). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims. Withdraw axle shaft with puller J-2498. Do not drag shaft splines on inner oil seal.

Rear Axle Assembly Removal: Raise and support rear of body. Disconnect hand brake cable at bell crank and cable housing at bracket. Disconnect torque tube at transmission, rear brake hose at bracket on body floor pan, rear springs and shock absorbers from axle tube, and stabilizer bar at tube. Roll assembly from beneath car.

Wh l Bearing Adjustment: Shims behind brake backing plate.

R ar Suspensi n: *See "Huds n & Nash" in Suspensions & Wheel Alignment Secti n.*

SHOCK ABSORBERS

Direct acting hydraulic type. Serviced by replacement.

Front - Hudson No. 3118500 (1955) & 3140879 (1956).
Rear - Hudson No. 3117364 (1955) & 3140406 (1956).

►***REAR SHOCK ABSORBER NOISE CORRECTION (Early Cars):*** **Before replacing a rear shock absorber for being noisy, check for damaged shock absorber grommetspacer or limit sleeve, (caused by incorrect retainer with oversize hole). If grommet spacer damaged, discard it. When reassembling without grommet spacer, do not use retainer Hudson No. 3136432; however, do not compress shock absorber grommets excessively.**

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper end of steering knuckle pin and seat in outer wheel house panel.
See "Hudson" in Suspensi ns & Wheel Alignment S ct.

►*CASTER & CAMBER LOSS OF ADJUSTMENT CORRECTION:* Beginning engine No. X-1152 (Hornet), W-1200 (Wasp), improved eccentric bolt nut (deeper counter-bore) provides more positive locking of eccentric adjusting bolt. If necessary, 5/8" I.D. washer may be installed to insure locking of the bolt and eccentric washers.

►*FRONT CROSSMEMBER INSTALLATION CAUTICN:* When installing front crossmember the distance between centers of either front or rear mounting bracket bolt holes must be 19½" to insure maintaining front wheel alignment.

►***EXCESSIVE TIRE WEAR (Early Cars) CAUTION:*** **Set stop screws on pitman arms to limit turning radius to 36°. Should tires still contact brake hose brackets, trim rear corner of brackets approximately 1/8".**

►***TOE-IN ADJUSTMENT (POWER STEERING) CAUTION:*** **Operate engine so that power steering pump will supply oil pressure to center spool in power cylinder valve.**

King Pin Inclination—3°36'.
Caster—(Without Power Steering) Pos. ½° desired, limits 0° to Pos. ½°. (With Power Steering) 1° desired, limits Pos. ½° to Pos. 1°.
Camber—0° desired, limits Neg. ¼° to Pos. ¼°.
Toe-In—1/16-3/16".
Toe-Out on Turns—Outer wheel 20°, Inner wheel 24° (Wasp), 26° (Hornet).

STEERING

Gemmer. Worm & Roller with push-pull adjustments.
See "Gemmer Worm & Roll r" in Ste ring Section.

Power Steering: Monroe Linkage type. *S e "Monroe Linkage Power Steering" in St ering Section.*

Steering Linkag : *See "Steering Linkage" in St ering Section.*

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Steering Wh el & Horn Butt n R moval *See "Gemmer Worm & Roller" Steering Gear in Steering Section*

Steering Gear Removal *See "Gemmer Worm & Roller" St ering Gear in Steering Section*

BRAKES

B ndix Hydraulic, Singl Anchor (without Eccentric). Service brake system has "Mechanical Follow-up" linkage (between pedal and parking brake linkage) Hand lever applies rear wheel service brakes

See "Bendix Hydraulic, Single Anchor" in Brake Section

►*WASP BRAKE CHATTER CORRECTION (Caused by Un ven Wheel to Hub Contact Ledges) See "Bendix Hydraulic, Single Anchor" in Brake Section*

►*SOFT OR SPONGY BRAKE PEDAL CORRECTION*

When correct bleeding of brake system does not eliminate soft or spongy brake pedal, check master cylinder to pedal shaft brace. When pedal shaft flexes at this point (due to poor engagement of slot in pedal shaft with elongated hole in brace), it is advisable to elongate the two mounting bolt holes at rear of brace, move brace back so slot in shaft engages small hole in keyhole slot in brace Use Bite Washer Hudson No 3138264 in place of lockwashers to retain brace in proper location Late production cars have above correction completed

►*REAR WHEEL BRAKE CYLINDER PRODUCTION CHANGE:* Beginning with Serial No. W-9403 (Wasp), No. X-9204 (Hornet), the diameter of the rear wheel brake cylinder was decreased to 7/8" from 15/16" to improve brake distribution.

Drum Diameter – 10" (Wasp), 11" (Hornet).

Wheel Cylinder Diameter – 1 1/8" Front, 15/16" (Early Cars), 7/8" (Later Cars) Rear.

Replacement Linings & Shoes – Shoes with linings, or linings only, furnished in Std. size only.

1955 Lining Width & Length

Wasp	Front	Rear
Primary	2¼ x 8½'	1¾ x 8½
Secondary	2¼" x 11'	1¾' x 11"
Hornet	**Front**	**Rear**
Primary	2½' x 9 3/8'	2' x 9 3/8"
Secondary	2½' x 12'	2' x 12"

1956 Lining Width & Length

Wasp	Front	Rear
Primary	2" x 8 7/8"	1¾" x 8 7/16"
Secondary	2½" x 10 31/32"	1¾" x 10 25/32"
Hornet	**Front**	**Rear**
Primary	2½" x 9 3/8"	2" x 9 5/16"
Secondary	2½" x 12"	2" x 12"

Clearance – .015" heel and toe of secondary shoe with primary shoe out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.

Mechanical Follow-up Cable Adjustment—Depress brake pedal against 3½ spacer block on floor (with pedal cable and pushrod disconnected), adjust mechanical follow-up cable length at clevis end so that clevis pin can be installed freely with no slack in cable

Standard Master Cylinder Under front floor at left of transmission

Checking Fluid—Roll back floor mat, remove access hole cover in floor pan, maintain fluid ½-1' below filler opening

Removal—Remove from beneath car Not necessary to disturb other parts

Power Brakes· Bendix Power Unit. *See "Bendix Power Unit" in Brake Section*

Checking Fluid—Check every 1,000 miles Maintain fluid to within ½' of filler opening

MISC. MECHANICAL

Windshield Wipers Vacuum operated type *See "Windshield Wipers" in Miscellaneous Section*

Air Conditioning: Nash-Hudson Air Conditioning Thermostatic control with magnetic clutch on compressor unit

See "Nash-Hudson Air Conditioning" in Miscellaneous Section

Power Window Regulators· Electric Reversible motor in each door

See "Power Window Regulators" in Miscellaneous Section.

►*AIR CONDITICNED CAR SERVICE CAUTICN: B for disconnecting any part of air conditioning quipment or lin s for access to ngin , s "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate located under hood, right side, body cowl.

ENGINE NUMBER: Stamped on machined surface on right side, at center of block.

►*MODEL IDENTIFICATION NOTE: Powerflyte Models have one carburetor. Dual Powerflyte Models have two carburetors.*

SERIAL NUMBER: Stamped on plate located under hood on cowl panel.

Starting Serial Number

Model	Kenosha	El Segundo
1954	K-615501	KC-47201
1955	K-635001	KC-48101

ENGINE NUMBER: Stamped on machined surface on right side of cylinder block above exhaust pipe.

Starting Engine Numbers

Model	Powerflyte	Dual Powerflyte
1954	①S-430001	J-1001
1955	S-440001	②J-30001

①—Canadian cars with single carburetor.
②—"JJ" prefix used on later cars.

►*ENGINE NUMBER SUFFIX CODE NOTE: A three letter code stamped adjacent to engine number indicates as follows:*

Letter Sequence Code

First Letter	Size of Bore
Second Letter	Size of Main Bearings
Third Letter	Size of Con Rod Bearings

Letter Size Code

Letter "A"	Standard
Letter "B"	.010" Undersize
Letter "C"	.010" Oversize
Letter "D"	.001" Undersize

ENGINES MARKED "AAA" OR UNMARKED ARE STANDARD.

TUNE-UP

COMPRESSION PRESSURE: At cranking speed, as follows:

Model	Powerflyte	Dual Powerflyte
1954	150 lbs.	
1955	120 lbs.	130 lbs.

VACUUM READING: Steady 18-21" at idling speed.

VALVE TAPPET CLEARANCE: All, .015" hot.

MANIFOLD HEAT CONTROL: None used.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030".

Spark Plug—Auto-Lite. A-7 (1954-55 Powerflyte); AL-5 (1954 Dual Powerflyte); AL-7 (1955 Dual Powerflyte). Tighten to 30 ft. lbs. (Powerflyte); 25 ft. lbs. (Dual Powerflyte).

COIL: D lc -R my 1115380.

Igniti n Curr nt—2.3 amps. idling, 5 amps. stopped.

DISTRIBUTOR: D lc -R my 1112401 (1954 Dual P w r-flyt); 1112382 (1955 P w rflyt); 1112409 (Dual P w rflyt).

Condenser—Delco-Remy 1869704 (Distr. 1112401 & 1112382); No. 1928111 (Distr. 1112409).

Capacity—.18-.23 mfd.

Contact Point S et—1855720 (Distr. 1112401 & 1112382); No. 1924571 (Distr. 1112409).

Breaker Gap—.018-.024".

Cam Angle—31-37° at .022" gap.

Breaker Arm Spring Tension—17-21 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance—1112382

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	325	0-4	650
3.5-5.5	400	7-11	800
7-9	950	14-18	1900
10-12	1400	20-24	2800

Automatic Advance—1112401 & 1112409

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
1-3	400	2-6	800
5.5-7.5	1100	11-15	2200
10-12	1800	20-24	3600

Vacuum Spark Control: Delco-Remy 1116072 (All).

Plunger Travel—13/64-¼".

Vacuum Advance—All

Distr. Degrees	Engine Degrees	Vacuum (" of Hg.)
Start	0	4-6
5.5	11	11

IGNITION TIMING

Setting—4° ATDC at idling speed.

Timing Mark—Groove on damper aligned with pointer on timing chain cover above damper.

CARBURETOR

►*CARBURETOR APPLICATION NOTE: One carburetor used on Powerflyte models, two carburetors used on Dual Powerflyte models.*

►*1955 CARBURETOR FLOODING CORRECTION & PRODUCTION CHANGE: Changes were made in production and can be incorporated in earlier production cars to eliminate flooding. See "Carter YF" in Carburetion Section.*

Hydra-Matic Throttle Linkage Adjustment: Adjust engine to correct idle speed (see Idle Speed Settings below) with engine at normal operating temperature. Disconnect throttle rod at transmission throttle lever. Clean machined surface at back of transmission case and place Throttle Lever Checking Gauge J-2545-C flush with surface with edge of gauge against side cover. The throttle lever stud should fit freely in notch in gauge. If gauge does not pass over throttle lever stud freely, use bending tool J-3310 and bend to proper location. Gauge notch must slide freely on stud pin. Adjust transmission throttle rod (which is threaded into upper throttle rod yoke) to fit freely on throttle lever stud; **th n sh rt n rod appr ximat ly 2 turns.** Install rod on stud and replace wave washer, flat washer and cotter pi n.

CARTER WCD
(1955 P werflyt)

Carter N . 2061S. Dual downdraft type with automatic choke control.

Idle Setting—½-1½ turns open. Turn screw out for richer mixture.

Idle Speed (Without Air C nditi ning)—500-550 RPM (standard & overdrive transmissions). 450 RPM (Hydra-Matic in neutral).

Idle Speed (With Air C nditi ning)—500 RPM with compressor operating. (All transmissions, Hydra-Matic in neutral).

Float Level—5/32". With bowl cover inverted and weight of float on needle valve, measure from top of float to machined surface of casting.

Accelerating Pump—No seasonal adjustment.

Fast Idle: .026" between throttle valve and bore of carburetor (side opposite idle port). With choke valve tightly closed and fast idle adjusting screw on high step of cam, tighten screw until proper throttle valve opening secured.

Automatic Choke Setting: Set at index.

Hydra-Matic Throttle Linkag Adjustm nt: *S CARBURETOR above.*

►*OTHER DATA: See "Cart r WCD Carbur tors" in Carburetion Section.*

Fuel Pump Pressure: 3½-5¼ lbs. at 500 RPM.

CARTER YF (Tw Carbs.)
(1954-55 Dual P w rflyt)

Carter No.	Starting Engin N .
2098S (1954)	J-1001
2137S (1954)	J-4697
2137SA (1954)	J-7511
2163S (1954)	J-11186
2258S (1955)	J-30001

►*CARBURETOR INSTALLATION CAUTION: Both carburetors must be sam part numb r t liminat any differences in specificati ns.*

Idle Setting—½-1¾ turns open. Turn screw out for richer mixture.

Idle Speed (1954 Without Air C nditi ning)—550 RPM (Synchro-mesh); 475 RPM (Hydra-Matic—in "N"). *See "Throttle Synchronizati n" bel w.*

Idle Speed (1955 Without Air C nditi ning)—500-550 RPM (Synchro-mesh); 450 RPM (Hydra-Matic—in "N"). *See "Throttle Synchronizati n" b low.*

Idle Speed (Air Conditi n d Cars)—500 RPM with compressor operating (All Models). *See "Thr ttl Synchronization" below.*

Float Level (1954)—*CAUTION—Diff rent s tting required for each type Needl Valv (Se "Flooding Correction" above).* 3/8" (Solid needle). 1/4" (spring loaded needle). Measured from bowl cover to top of float at free end with gasket removed and bowl cover inverted. Use Gauge T109-80 (3/8"); T109-31 (1/4").

Float Level (1955)—5/16" measured from bowl cover to top of float at free end with gasket removed and bowl cover inverted. Use Gauge T109-220.

Acc lerating Pump—No seasonal adjustment.

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Fast Idl : .024" throttle opening with choke valve closed and fast idle screw on high step of fast idle cam. Adjust by turning fast idle screw.

Aut matic Ch k S tting: Two points lean.

Thr ttl Synchr nizati n (Dual Powerflyte Models): To insure correct synchronization, make idle adjustments in following sequence:

1) Remove air cleaner assemblies from carburetor air horns.

2) Start with rear carburetor and adjust throttle stop screw until valve is seated in closed position. While doing this, the choke valve must be held in the open position to insure throttle stop screw contacting low speed stop in the fast idle cam mechanism. Turn throttle stop screws about two turns to crack valves slightly.

3) Start engine and run to obtain operating temperature. Attach tachometer to engine and observe RPM. Adjust rear carburetor to maintain correct idle speed. See above.

4) By means of the connecting throttle linkage between carburetors adjust front carburetor to synchronize with rear, maintaining rear carburetor throttle on idle stop position while checking.

5) During adjustment, reference must be made to the tachometer because it will indicate when front carburetor throttle is opened beyond rear throttle. Point at which further opening of the front carburetor throttle would cause an increase in RPM is the point of throttle synchronization. At this time, the air inlet noise of each carburetor will be identical.

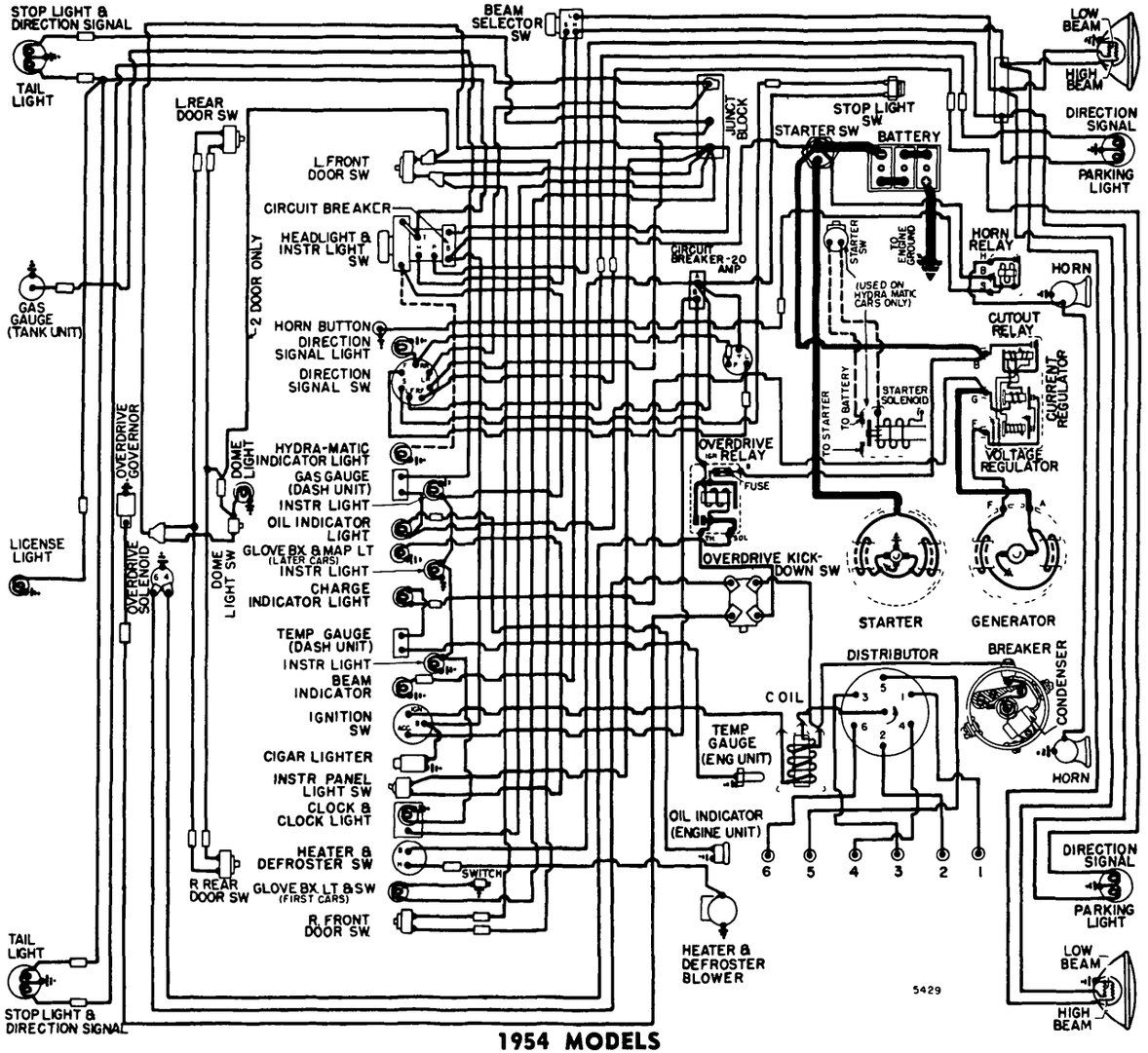
6) To make idle mixture adjustment, replace air cleaner. Turn rear carburetor mixture adjustment screw in (lean) until engine operation becomes rough, then open ¼ turn out (rich). Repeat this on front carburetor.

7) Another idle speed throttle synchronization adjustment may be required because of improved idle mixture. Adjust to correct idle speed. See above.

Hydra-Matic Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter YF Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 3½-5¼ lbs. at 500 RPM.



1954 MODELS

CARB. EQUIPMENT

Fuel Pump: Fuel only (Std.) Fuel & Vacuum (OD. & Hydra-Matic).

Replacement Pump–(Fuel) AC No. 532 (with glass bowl) or No. 9801 (without glass bowl). **(Fuel & Vacuum)** AC No. 9800 or Carter M-797SA.

Pressure–3-1/2–5-1/4 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: Auto-Lite Electric type.

Dash Unit–Auto-Lite 13520A (1954); No. 13380A (1955).

Tank Unit–Auto-Lite 12642A.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite 1M-100. 6 Volt, 15 Plate, 100 Ampere Hour Capacity (20 hour rate).

Grounded Terminal–Positive (+) grounded to engine.

Engine Ground–From transmission to rear cross-member.

STARTER

Delco-Remy Numbers:	Starter	Armatur
Synchro-mesh & O.D. (LHD)..	1107119	1923018
Hydra-Matic Drive	1107136	1925939
RHD. Cars	1107120	1923018

Drive–Delco-Remy Automatic Drive or Bendix "Folo-thru" type. **Synchro-mesh & OD. Cars**–Delco-Remy 1923008 or Bendix A3283. **Hydra-Matic Cars**–Delco-Remy 1923043 or Bendix A3338.

Rotation–Counter-clockwise at commutator end.

Brush Spring Tension–24-28 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
11.0 ft. lbs.	Lock	3.25	550

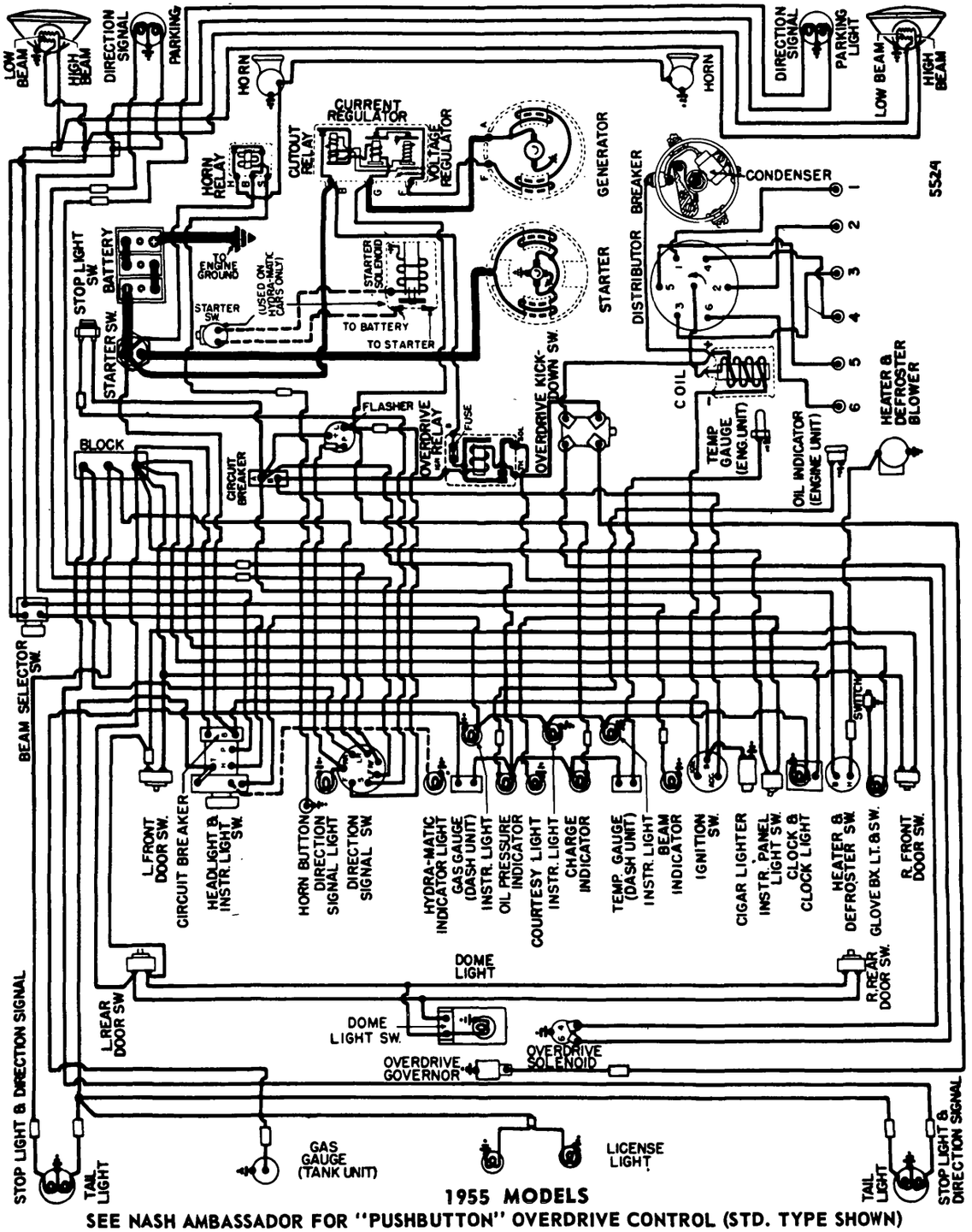
Starting Switch: Two types used.

Synchro-mesh & Overdrive Cars–Delco-Remy 1996478. Mounted on toeboard, actuated by fully depressing clutch pedal.

Hydra-Matic Drive Cars–Nash 3137292 Magnetic Switch on left front fender apron and Delco-Remy 1996077 Control Switch mounted on steering column. Actuated by lifting Hydra-Matic selector lever in Neutral "N" position.

Control Switch Adjustment: *See "Hydra-Matic Linkage Adjustment" in Transmission Section.*

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1955 MODELS

SEE NASH AMBASSADOR FOR "PUSHBUTTON" OVERDRIVE CONTROL (STD. TYPE SHOWN)

CONTINUED FROM PRECEDING PAGE

GENERATOR

Delco-Remy No.	Generator	Armature
Without Air Cond.	1102777	1921981
With Air Cond.	1102815	1921981

Performance Data Cold (1102777 & 1102815)

Amperes	Volts	R.P.M.
45 ①	8.0	2450

① —Not maximum. See Regulator Data.

Brush Spring Tension—28 ozs.

Field Current—1.87-2.0 Amperes at 6 volts.

Rotation—Counter-clockwise at commutator end.

Belt Adjustment: 1/2" deflection in belt midway between fan and generator pulleys with an application of 25 lbs. pressure.

REGULATOR

Delco-Remy 1118828. *NOTE—Regulator is "1118825 Series". Specifications below are "Normal" Settings.*

Cutout Relay

Cuts In—6.4 volts (hot).
Contact Gap—.020".
Air Gap—.020" (With contacts just closed).

Voltage Regulator

Setting—7.3 volts (hot).
Air Gap—.075" (With armature pressed down to point where contacts just touching).
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—47 Amperes.
Air Gap—.075" (with armature pressed down to point where contacts just touching).
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section*

Directional Signals: *See Electrical Equip. Section.*

Light Switch Removal: Loosen Allen screw and remove knob. Remove retaining nut. Push switch back and lower to remove wires.

Stop Light Switch: Located at tee fitting in line to front brakes.

FUSES: Located as follows:
Radio—SFE-14 in line.
Overdrive Relay—AGC-30 on Overdrive Relay.

CIRCUIT BREAKERS: Two used as follows:
30 ampere on light switch (main lighting).
20 ampere behind dash panel on left side of cowl (Ignition, heater motors and stop light).

Horn Relay: Nash No. 3135335 (1954), 3141308 (1955).

ENGINE

▶*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning quipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 6 cyl. "L" Head.

Bore	Stroke	Displ.	Rated HP
3-1/8"	4-1/4"	195.6 cu. ins.	23.44

Engine	Compr. Ratio	Dev. HP
Powerflyte	7.45-1①	100 at 3800
Dual Powerflyte (1954)	8.5-1②	110 at 4000
Dual Powerflyte (1955)	8.0-1②	110 at 4000

①—Cast Iron head. ②—Aluminum head.

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Compression & Vacuum Reading—See *TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie-rod before removing pan.

CYLINDER HEAD: See *"Cylinder Head & Manifold" in Nash Special Data.*

TIGHTENING TORQUES: See *"Tightening Specifications" in Nash Special Data.*

PISTONS

Cam ground, aluminum alloy, tin plated with steel strut and solid skirt.

►*CYLINDER BORE OVERSIZE CAUTION: Code letter adjacent to engine number indicates cylinders bored .010" oversize. See "Original Bore & Pistons" in Nash Special Data.*

Weight—13.59 ozs.

Removal—Remove from above.

Fitting New Pistons: Clearance .0006-.0012". Pistons should just support own weight at any point in cylinder bore (piston and bore dry and clean)

Replacement Pistons: Standard, 002", .005", .010", .020", .030", .040" Oversize.

Installing Pistons: Piston pin is offset in piston. Piston is marked with notch that should face front of engine when installed. See *Rod Installation.*

PISTON PINS

Locked in rod by means of a locking bolt.

Diameter—55/64". **Length**—2.750".

Clearance in Piston—.0003" Maximum loose at 70°F. Thumb push fit.

Replacement Pins: Standard, .001" & .003" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr	.0930-.0935" ①	.010-.020"	.002-.004"
Oil #3	1545-1550"	.010-.020"	.002-.004"
Oil #4	.1545-.1550"	②	.002-.004"

①—1955 Dual Powerflyte 07750-07800", ②—U-flex

Replacement Rings: Standard & .020" Oversize in sets.

Installing Rings: Stepped inner edge of both compression rings must be UP.

CONNECTING RODS

►*1954 OIL CLEARANCE PRODUCTION CHANGE:* Crankpin journal diameter changed on later engines to decrease clearance. See Journal Diameter below.

►*CONNECTING ROD JOURNAL UNDERSIZE CAUTION: Code letter adjacent to engine number indicates journals ground undersize. See "Original Bearing Sizes" in Nash Special Data.*

Length—6.625" center-to-center. **Weight**—25 ozs.

Crankpin Journal Diameter—*NOTE—Journal diameter increased during 1954 production.* 2.0943-2.095" (Before 1954 Engine No. J-10765). 2.0948-2.0955" (After 1954 Engine No. J-10765, and 1955 models).

Original Bearing Sizes—See *"Original Bearing Sizes" in Nash Special Data.*

Bearings—Steel-backed babbitt. No shims.

Clearance—.0010-.0015". **Side play**—.005-.015".

Replacement Bearings: Std. & .001", .002", .010" and .012" Undersize.

Installing Rods: Identification marks (raised section on center of rod and bearing cap) toward front of engine.

CRANKSHAFT

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Code letter adjacent to engine number indicates main and connecting journals undersize. See "Original Bearing Sizes" in Nash Special Data.*

►*1954 CRANKSHAFT PRODUCTION CHANGE:* Crankpin journal diameter increased .0005" on later engines to reduce connecting rod oil clearance. See CONNECTING RODS above.

Journal Diameter—2.4791-2.4798". Four bearing.

Original Bearing Sizes—See *"Original Bearing Sizes" in Nash Special Data.*

Bearings—Steel-backed babbitt. No shims.

Clearance—.001-.0015".

Replacement Bearings: Std. & .002", .010", .012" Undersize.

End Thrust: Taken by front main bearing. See *"Crankshaft & Main Bearings" in Nash Special Data.*

Endplay—.003-.008".

Crankshaft Rear Main Bearing Oil Seal: See *"Crankshaft & Main Bearings" in Nash Special Data.*

Crankshaft Front Oil Seal: See *"Engine Front Cover" in Nash Special Data.*

VIBRATION DAMPENER REMOVAL: See *"Vibration Dampener" in Nash Special Data.*

CAMSHAFT

Bearings—Steel backed babbitt bushings.

Clearance—.002"

Camshaft Removal—See *"Camshaft & Bearings" in Nash Special Data.*

End Thrust: Thrust plate on front of engine between No. 1 bearing and camshaft sprocket. End play controlled by position of sprocket on shaft (press fit on shaft).

Endplay—.004-.006"

Timing Chain: Morse **Width** 1". **Pitch** 3/8". **Length** 22-1/2" or 60 links

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across center line of sprockets.

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Nash Special Data.*

VALVES

Tappet Clearance: .015" All Valves Hot (with engine running) or .016" Intake, .018" Exhaust Cold.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3407-.3412"	4 25/32"
Exhaust	1.343"	.3407-.3412"	4 25/32"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45° ①	.340"	.0018-.0033"
Exhaust	45° ①	.340"	.0018-.0033"

① Valve Face Angle 44° (Intake & Exhaust).

►*VALVE GRINDING CAUTION:* Replace valve when refacing reduces distance from top of valve face to top of valve to 1/32".

Valve Springs: Install springs with closed coil end up against cylinder block and seated in counter-bore in block.

Free Length—2-5/32".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	37-41	1-3/4"
Open	75-82	1-7/16"

Valve Guides: Use Tool J-2814 to remove guides and Tool J-1429-A to replace guides. Drive guides flush with the guide bore opening in the block.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 10° BTDC, Close 58° ALDC.

Exhaust Valves—Open 49° BLDC, Close 19° ATDC.

NOTE—Above readings with .019" valve lash.

Valve Timing Check—Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same abount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

OILING SYSTEM

Crankcase Capacity: 4 qts. refill.

Normal Oil Pressure: 30 lbs. at 20 MPH. 12 lbs. minimum at 600 RPM.

Pressure Regulator Valve—Non-adjustable spring loaded valve located under plug near oil pump.

Oil Pressure Indicator—Light goes on when Ignition switch is turned on, goes out as oil pressure reaches 5-8 lbs. Carter Switch A-954S, Nash 3134704, located on right side of crankcase

Oil Pump: Gear type mounted on right side of engine, driven by inclined shaft.

Oil Filter: Partial Flow type. Replace element every 8000 miles or less as needed.

Replacement Filter Unit—Nash No. 3113312.

Crankcase Ventilation: Breather pipe in Valve Cover and filter in crankcase filler cap.

COOLING

Water Capacity: 15 qts (with heater)

Pressure Valve: (Exc. Air Conditioned Cars)—Radiator cap, Nash No 3136627, 7 lb. (1954) No 3142965, 7 lb (1955) **Air Conditioned Cars**—Nash No 3141371, 14 lb (1954-55)

Thermostat: Choke type, Nash No. 3131817 (167-173°) Use 3131985 (177-182°) for permanent anti-freeze.

Water Pump: Sealed packing and bushing type See *See "Water Pump" in Nash Special Data.*

Pump Removal—Drain cooling system, remove distributor, disconnect pump drive coupling (remove rear bolt), disconnect inlet hose, remove pump mounting screws.

►*1955 WATER PUMP LUBRICATION CHANGE:* Starting with Engine No S-440115, the water pump lubrication fitting was eliminated and a prelubricated water seal cartridge used

Temperature Gauge: Auto-Lite Electric type

Dash Unit—Auto-Lite No 13521A (1954), No 13881A (1955)

Engine Unit—Auto-Lite No 11528A (1954-55)

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8A7. Assy No. 987. Single plate.

See "Borg & Beck" in Clutch Section.

Pedal Adjustment: Pedal free play 1/2-3/4". Adjust by loosening locknut and turning adjusting nut on connector link **at clutch fork.**

►*CAUTION: The pedal to beam rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project 1/2" from beam toward the rear.

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Clutch Linkag –S *"Clutch Not s" in Nash Special Data.*

R moval: Remove transmission (see below), disconnect clutch pedal linkage, remove clutch housing and pan, punch mark flywheel, clutch cover and pressure plate. (Reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Own. 3 speed, all helical gear type.
S e "Nash Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

R moval: Disconnect brake tube bracket at body, and torque tube at rear of transmission. Disconnect brake cable at bell crank and cable housing at bell crank bracket. Move rear axle assembly to rear off transmission main shaft splines. Disconnect speedometer cable and shifter rods, (if overdrive equipped, disconnect wires at solenoid and overdrive cable at lever). Use guide pins, Tool J-1434, in two upper cap screw positions and slide transmission free of pilot bearing and clutch disc.

OVERDRIVE

Warner R10. Used with Nash transmission.
See "Warner R10 Overdrive" in Transmission Section.

Ov rdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section NOTE -* "Pushbutton Control" Overdrive is Optl This type has kick-down pushbutton on steering wheel *(see wiring diagram)*

HYDRA-MATIC DRIVE

Dual Range. Four speed automatic transmission with fluid coupling.

►*1955 HYDRA-MATIC ROUGH 2-3 UPSHIFT CORRECTION:* If rough 2-3 upshift cannot be eliminated by proper linkage and internal band adjustment, install Service Spring, Part No. 3119206 in front servo body 4-3 downshift valve. *See "Hydra-Matic Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING. See "Hydra-Matic Drive" in Transmission Section.*

Lubrication–Check fluid every 1,000 miles, drain and refill at 25,000 mile intervals.

Capacity–8-1/2 qts. (9-1/2 qts. after overhaul).

Checking Fluid Level–Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located under right front floor plate). Add fluid to bring level up to "F" mark.

▲*CAUTION:* Do not check oil level when transmission is excessively hot and do not fill above the "F" mark on dipstick.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

D tr it–Cross type. One used at forward end of propeller shaft

REAR AXLE

Own. Semi-floating, hypoid gear type with torque tube drive. *See "Nash Rear Axles" in Rear Axle S ction.*

Rear Axle Ratios

Model	Standard	Optional
1954-55 Synchro-mesh	4 4-1 (8-25)	4 1-1 (9-37)
1954-55 Overdrive	4 9-1 (8-39)	4 4-1 (8-35)
1954-55 Hydra-Matic	3 58-1 (10-43)	

Backlash– 002-.006". Shim adjustment.

Axle Shaft Removal: Remove wheel, pull drum (use hub puller J-1644) Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate, and wheel bearing adjusting shims. Withdraw axle shaft using puller J-2498.

Rear Axle Assembly Removal: Jack up and support rear end of body. Disconnect rear brake cable at equalizer, torque tube at rear of transmission, brake hose and shock absorbers at rear axle end (allow shocks and brake hose to hang from body). Roll axle assembly out from under car.

Wheel Bearing Adjustment: Shims behind brake backing plate

Rear Suspension: *See "Nash Rear Suspension" in Rear Axle Section.*

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Serviced by replacement. **Shock Absorber Application**

Model	Front	Rear
1954 (Std)	3117363	3117371
1954 (Heavy Duty)		① 3117364
1955	3118500	3117364

①–Use with Continental Kit, and Heavy Duty rear spring Part No. 3140400.

FRONT SUSPENSION

►*FRONT SUSPENSION ADJUSTMENT NOTE· Camber & Caster adjusted by shims between lower control pivot arm and support (1954 Models), and by lower control arm eccentric bolts (1955 Models)*

►*1955 FRONT CROSSMEMBER INSTALLATION CAUTION·* When installing front crossmember, distance between centers of either front or rear mounting bracket bolt holes must be 19½" to insure maintaining front wheel alignment

►*1955 CASTER & CAMBER LOSS OF ADJUSTMENT CORRECTION:* Beginning with Engine No 635286, improved eccentric bolt nut (deeper counter-bore) provides more positive locking of eccentric adjusting bolt If necessary a 5/8" L D washer may be installed between nut and eccentric washer to insure locking of bolt and eccentric washer

Independent. Linked parallelogram type with coil springs located between upper ends of steering knuckle pin and seat in outer wheel house panel.
See "Nash" in Front Suspension Section.

King Pin Inclination–6-1/2°.

Caster (Manual Steering)–Pos. 1/2° desired (limits 0° to Pos 1/2°). **(Power Steering)** Pos. 1° desired (limits Pos. 1/2° to Pos. 1°).

Camb r–0° desired (limits Neg 1/4° to Pos 1/4°)

Toe-In–1/16"-3/16".

Toe-Out on Turns–Outer wheel 20-3/4°, Inner wheel 25°

STEERING

Manual: Gemm r. Worm & Roller with "push-pull" adjustments.
See "Gemmer Worm & Roller" in Steering S ction.

Power Steering: Monroe "Pow r Guid ". Linkage type *See "Monroe Power Guide" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Butt n R m val: *S "G mm r Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer St ring Gears" in Steering Section.*

BRAKES

1954 MODELS

Bendix (Lockheed) Self-C nt ring. Hydraulic type with floating self-centering shoes (no anchor pin adjustment). Hand lever applies rear wheel service brakes.
See "Bendix (Lockheed) Self-C ntering" in Brak Section.

Drums–Diameter 9" (front & rear).

Wheel Cylinder Diameter–1 1/16" (front), 7/8" (rear).

Lining Width & L ngth

Brake Shoe	Front Wh l	Rear Wh el
Primary	2¼" x 9 7/8"	2" x 9 7/8"
Secondary	2" x 7 11/16"	1¾" x 7 11/16"

Braking Power–55 5% (front), 44 5% (rear)

Clearance–All shoes free of drag with brakes centralized (by hard application and releasing pedal). Eccentric adjustment for each shoe

1955 MODELS

►*BRAKE CHATTER CORRECTION (Caus d by Unev n Wheel to Hub Contact Ledges): S "Bendix Hydraulic Single Anchor" in Brake Section.*

Bendix Hydraulic, Single Anchor. Hand lever applies rear wheel service brakes.
See "Bendix Hydraulic, Single Anchor" in Brake Section.

Drums–Diameter 10" (front & rear).

Wheel Cylinder Diameter–1-1/8" (Front), 15/16" (Rear).

Lining Width & Thickn ss

	Front Wh l	R ar Wheel
Primary Shoes	2-1/4" x 8-1/2" x 1-3/4" x 8-1/2"	
Secondary Shoes	2-1/4" x 11"	1-3/4" x 11"

Clearance–.015" heel & toe of secondary shoe with primary out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.

1954-55 MODELS

Power Brakes: Bendix Power Unit. Replaces standard master cylinder.
See "Bendix Power Unit" in Brake S ction.

Checking Fluid–Same as for standard master cylinder.

Removal–Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *Se "Windshield Wipers" in Miscellaneous Section.*

Air C ndi ning: Nash-Hudson Air Conditioning.
S "Nash-Hudson Air Conditioning" in Misc llan ous Section.

Wind w R gulat rs: Electric with reversible motor. *S e "Nash Window R gulators" in Misc llan ous S ction.*

►*AIR CONDITIONED CAR SERVICE CAUTION. Before disconnecting any part of air conditioning equipment or lines for access to engine, See "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

►*MODEL IDENTIFICATION NOTE: Super Jetfire Models have one carburetor. LeMans Dual Jetfire Models have two carburetors.*

SERIAL NUMBER: Stamped on plate located under hood on cowl panel

Starting Serial Number

Model	Kenosha	El Segundo
1954	R-722501	RC-22001
1955	R-742901	RC-23001

ENGINE NUMBER: Stamped on machined surface on right side at front of block

Starting Engine Number

Model	Super Jetfire	LeMans Dual Jetfire
1954	A-246001	LMA-246001
1955	A-270001	LMA-270001

►*ENGINE NUMBER SUFFIX CODE NOTE: A three letter code stamped adjacent to engine number indicates as follows:*

Letter Sequence Code

First Letter	Size of Bore
Second Letter	Size of Main Bearings
Third Letter	Size of Con Rod Bearings

Letter Size Code

Letter "A"	Standard
Letter "B"	010" Undersize
Letter "C"	010" Oversize
Letter "D"	001" Undersize

ENGINES MARKED "AAA" OR UNMARKED ARE STANDARD.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs (Exc 1954 Dual Jetfire) 130 lbs (1954 Dual Jetfire) All at cranking speed

VACUUM READING· 18-21" at idling speed.

VALVE TAPPET CLEARANCE: Intake .012" hot, Exhaust 016" hot

MANIFOLD HEAT CONTROL None used

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP· 030'

Spark Plug—Auto-Lite A-7 (Exc 1954 Dual Jetfire) Auto-Lite AL-5 (1954 Dual Jetfire) Tighten to 30 ft lbs (Cast Iron Head), 25 ft lbs (Aluminum Head)

COIL: Delco-Remy 1115380

Ignition Current—2.5 amps idling, 4.5 amps stopped

DISTRIBUTOR: Delco-Remy 1110227 (1954), No. 1110241 (1955).

Condenser—Delco-Remy 1869704 **Capacity**—.18-.23 mfd

Contact Point Set—Delco-Remy 1916636 (Distr 1110227), No 1924499 (Distr 1110241)

Breaker Gap—.018-.024"

Cam Angle (Distr. 1110227)—31-37° (with .022" Gap)

Cam Angle (Distr. 1110241)—38-45° (with .016" Gap).

Breaker Arm Spring Tension—17-21 ozs (1110227), 19-23 ozs (1110241)

Rotation—Clockwise viewed from above

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	350	0-4	700
6-8	650	12-16	1300
10-12	1050	20-24	2100
13-15	1350	26-30	2700

Vacuum Spark Control: Delco-Remy 1116044 (1954), 1116092 (1955)

Plunger Travel—7/64"

Vacuum Advance

Distr Degrees	Engine Degrees	Vacuum (" of HG)
Start	0	4-6
5-7	10-14	15

IGNITION TIMING

Setting—TDC (1954), 4° ATDC (1955)

Timing Mark—Groove on dampener aligns with pointer on timing chain cover

CARBURETOR

►*CARBURETOR APPLICATION NOTE: One carburetor used on Super Jetfire, two carburetors used on LeMans Dual Jetfire.*

►*1954 HARD STARTING OR PERCOLATION CORRECTION*· Heat Deflector, Insulated Fuel Line, and Drain Tube & Hole provided in production. These parts may be installed on earlier cars. *See "Carter YH Carburetor" in Carburetion Section*

Throttle Linkage Adjustment (Hydra-Matic)· Adjust engine idle speed at 450 RPM (with air conditioning, 500 RPM compressor running) with engine temperature at 150-160° F., transmission warm and selector lever in neutral. Disconnect throttle rod, at throttle lever at side of transmission. Clean machined surface at back of transmission case and place throttle lever checking gauge J-2545-C flush against surface with edge of gauge against transmission side cover. The throttle lever stud should fit freely in notch of gauge. If gauge does not pass over throttle lever stud freely, use bending Tool J-3310 and bend to proper location. Gauge notch must slide freely on stud pin. Adjust transmission throttle rod (which is threaded into upper throttle rod yoke) to fit freely on throttle lever stud, **then shorten rod approximately two turns (Exc 1954 Dual Jetfire), 3 turns (1954 Dual Jetfire)**. Install rod on stud and replace wave washer, flat washer and cotter pin.

CARTER YH (Super Jetfire) (895SA)

Idle Setting—½-1½ turns open. Turn screw out for richer mixture.

Idle Speed (Without Air Conditioning)—550 RPM (1954 Std & O.D. Trans.) 500-550 RPM (1955 Std & O.D.) 450 RPM (1954-55 Hydra-Matic in "N")

Idle Speed (With Air Conditioning)— 500 RPM with compressor operating (All transmissions, Hydra-Matic in neutral.)

Float Level—3/8'. With bowl cover inverted and weight of float on needle valve, measure distance from bowl cover (gasket removed) to top of float.

Accelerating Pump—No seasonal adjustment.

Fast Idle· .030' clearance between throttle valve and bore of carburetor (side opposite idle port) with choke valve closed and fast idle adjusting screw on high step of cam.

Unloader Adjustment· After fast idle adjusted, hold throttle valve wide open, close choke valve as far as possible. Clearance between lower edge of choke valve and air horn wall should be 5/8' (Gauge T109-85).

Automatic Choke Setting: 1 point rich. *NOTE—On Early 1954 Models with one-piece choke piston, set choke 1 point lean.*

Hydra-Matic Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA*· *See "Carter YH Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 3½-5¼ lbs at 500 RPM

CARTER YH (LeMans Dual Jetfire) (973S Front, 974S Rear)

Idle Setting— ¾-1¾ turns open. Turn screw out for richer mixture.

Idle Speed (1954 All Models)—550-650 RPM. *(NOTE—*Selector lever in "N" on Hydra-Matic Models) *See "Throttle Synchronization" below.*

Idle Speed (1955 Models Without Air Conditioning)—500-550 RPM (Std & O.D.), 450 RPM (Hydra-Matic in "N"). *See "Throttle Synchronization" below.*

Idle Speed (1955 Models With Air Conditioning)— 500 RPM with compressor operating (All transmissions Selector lever in "N" on Hydra-Matic). *See "Throttle Synchronization" below.*

Float Level—7/16". Distance from bowl cover (gasket removed) and top of float at free end. Use Gauge T-109-81.

Accelerating Pump—No seasonal adjustment.

Fast Idle: .015" clearance between throttle valve and bore of carburetor (side opposite idle ports) with choke valve closed and idle screw on high step of fast idle cam.

Unloader Adjustment After fast idle adjusted, hold throttle valve wide open, close choke valve as far as possible. Clearance between lower edge of choke valve and air horn should be 5/8" (Gauge T-109-85). Adjust by bending shaft unloader arm using tool T109-105.

Automatic Choke Setting: Set two points lean.

Throttle Synchronization (LeMans Dual Jetfire Models)..

To insure correct synchronization make idle adjustments in following sequence.

1) Remove air cleaner, boots and "Tee" from carburetor airhorns.

2) Adjust throttle stop screw on rear carburetor as follows: Hold choke valve open, back off throttle stop screw until throttle valve is just closed, then turn screw in approximately 2 turns to crack throttle valve slightly. Adjust front carburetor similarly.

3) Start engine and allow it to idle until normal temperature reached. Attach Tachometer.

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4) Adjust rear carburetor stop screw for minimum idle speed (See above)
5) While noting idle speed, synchronize front carburetor by adjusting connecting throttle linkage between carburetors, opening front carburetor throttle just to the point where further opening begins to increase engine speed. At this point, air suction noise in both carburetors should be identical.
6) Replace air cleaner boots and "Tee" connections.
7) Adjust idle mixture on rear carburetor by turning adjusting screw in (to lean mixture) until engine begins to be rough, then turn screw out ¼ turn. Adjust idle mixture for front carburetor similarly.
8) Recheck idle speed. If not within limits (see above) repeat synchronization (1 thru 5).

Hydra-Matic Throttle Linkage Adjustment: *See CARBURETOR above.*

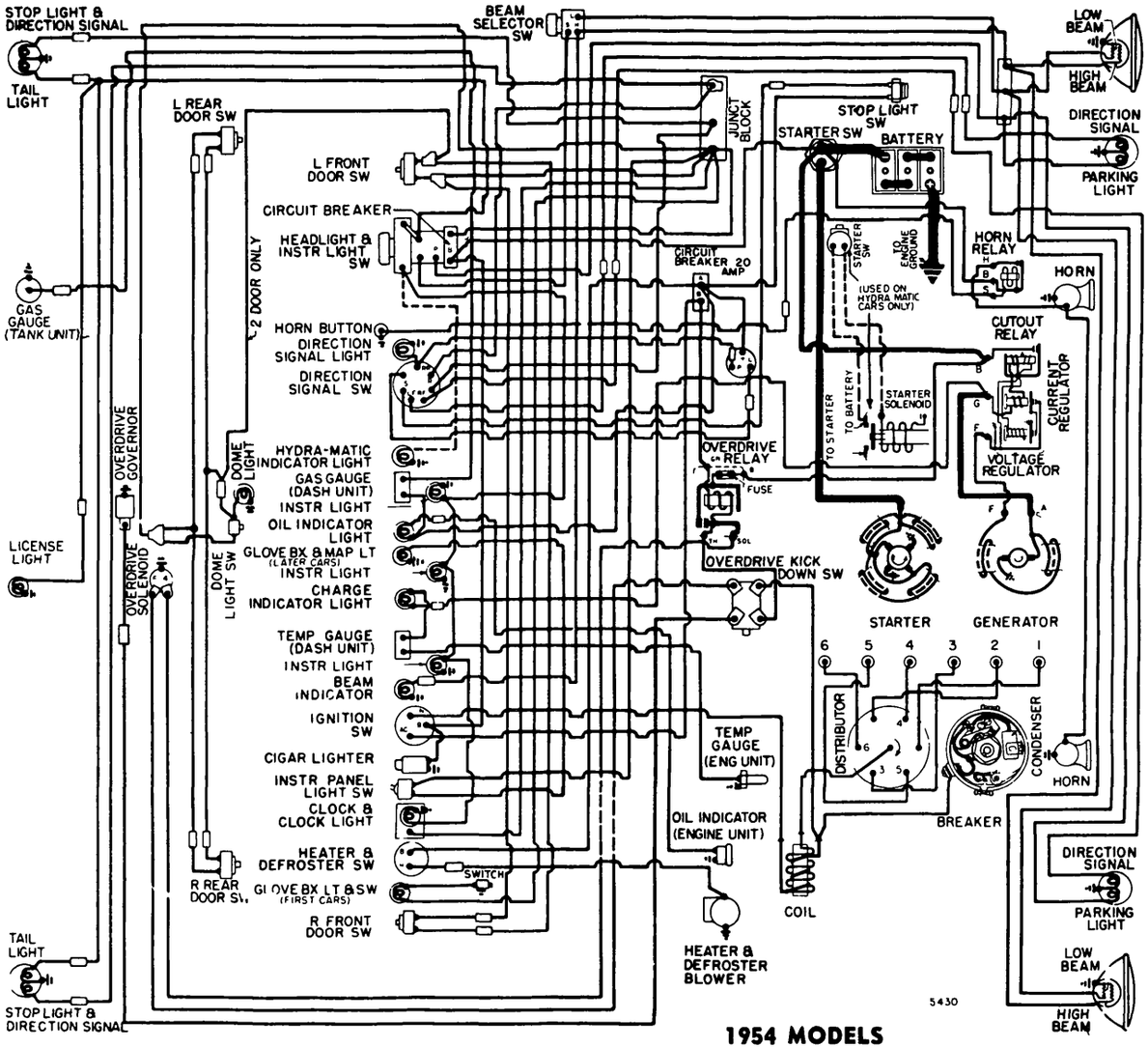
►*OTHER DATA: See "Carter YH Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 3½-5¼ lbs at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Fuel only (Std.), Fuel & Vacuum (OD. & Hydra-Matic).

Replacement Pump (Fuel)—AC No. 533 (with glass bowl) or 9802 (without bowl).



1954 MODELS

Fuel & Vacuum—AC No. 9799 or Carter M798S.
Pressure—3-1/2-5-1/4 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Equip. Section.

Gasoline Gauge: Auto-Lite Electric Type.
Dash Unit—Auto-Lite 13520A (1954); No. 13380A (1955).
Tank Unit—Auto-Lite 12642A.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite 1H-105D. 6 volt, 15 plate, 105 Ampere hour capacity (20 hr. rate).
Grounded Terminal—Positive (+).
Engine Ground—Battery to engine with body ground from transmission to rear cross member.

STARTER

Delco-Remy No.	Starter	Armature
Std. Trans. LHD	1107950	1911832
Std. Trans. RHD	1107959	1911832
Hydra-Matic	1108029	1878077

Drive—Delco-Remy Automatic Drive or Bendix "Folo-thru" type. **Synchro-mesh & OD. Cars**—Delco-Remy 1882549 or Bendix A2033. **Hydra-Matic Cars**—Delco-Remy 1922266 or Bendix A3281.
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—24-28 ozs.

Performance Data

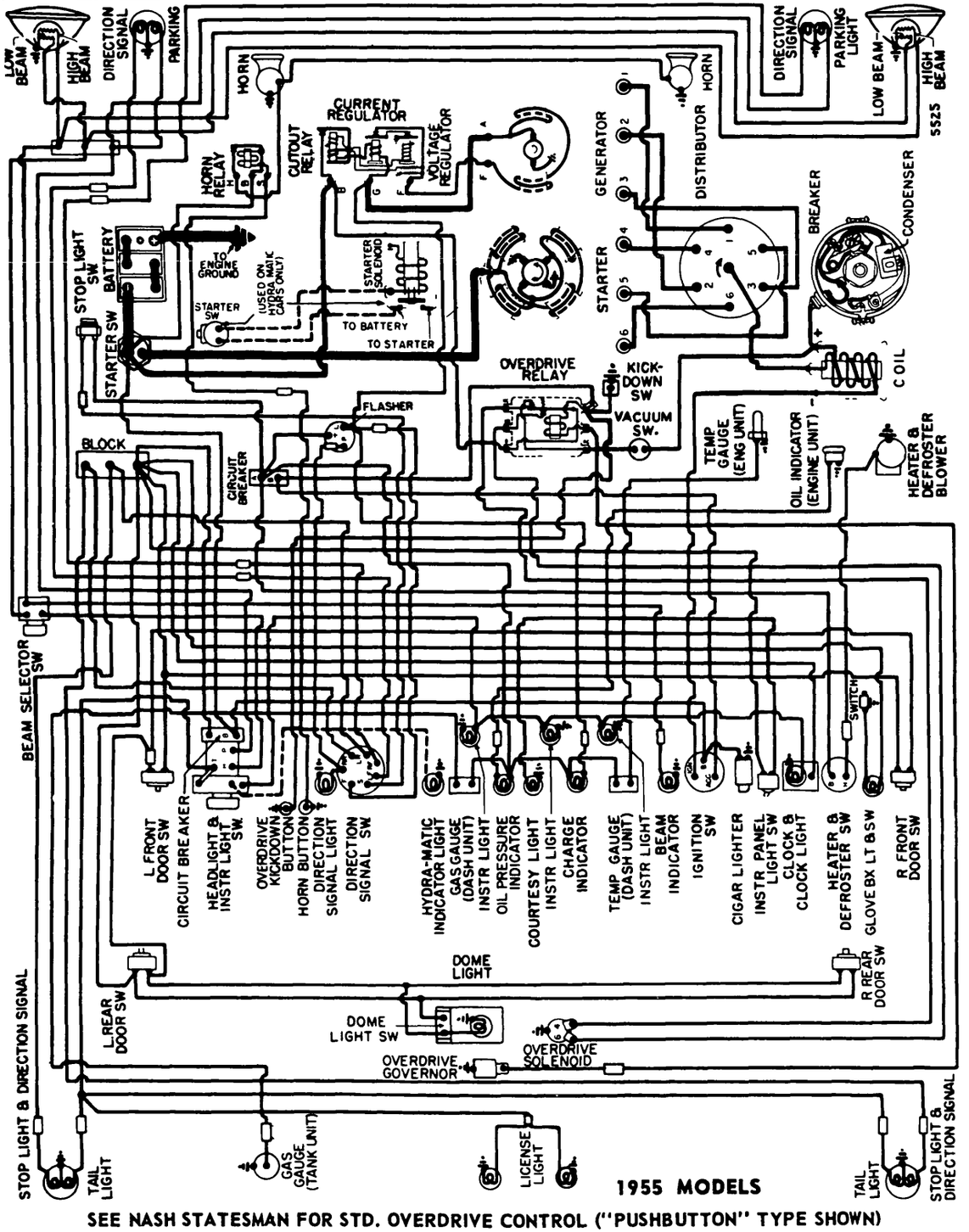
(1107950)			
Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
13.5 ft. lbs.	Lock	3.15	570
(1107959)			
Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.67	80
15 ft. lbs.	Lock	3.0	600
(1108029)			
Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.67	80
14 ft. lbs.	Lock	3.0	600

Starting Switch: Two types used.
Std. & Overdrive Transmissions—Delco-Remy 1996478. Mounted on floor board, actuated by fully depressing clutch pedal.
Hydra-Matic Transmission—Nash No. 3137292. Mounted on left front fender apron, controlled by Control Switch Delco-Remy 1996074. Control switch mounted on steering column and operated by Hydra-Matic selector lever (operative in "N" by lifting lever).
Control Switch Adjustment—*See "Hydra-Matic Linkage Adjustment" in Transmission Section.*

GENERATOR

Delco-Remy No.	Generator	Armature
Without Air Cond.	1102777	1921981
With Air Cond.	1102815	1921981

CONTINUED ON NEXT PAGE



SEE NASH STATESMAN FOR STD. OVERDRIVE CONTROL ("PUSHBUTTON" TYPE SHOWN)

CONTINUED FROM PRECEDING PAGE

P rf rmanc Data C ld (1102777 & 1102815)

Amperes	Volts	RPM
45 ①	8.0	2450

① Not maximum. See Regulator data.

Brush Spring Tension–28 ozs.

Field Current–1.87-2.00 amperes (at 80°F) at 6 volts.

Rotation–Counter-clockwise at commutator end.

Belt Adjustment: 1/2" deflection in belt halfway between fan and generator pulleys with an application of 25 lbs.

REGULATOR

Delco-Remy 1118328. *NOTE–Regulator is "1118825 Series". Specifications are for "Normal" settings.*

Cutout Relay

Cuts In–6.4 volts, hot.

Contact Gap–.020".

Air Gap–.020" (with contacts just closed).

Voltage Regulator

Setting–7.3 volts, hot.

Air Gap–.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting–*See Electrical Equip. Section.*

Current Regulator

Setting–47 Amperes.

Air Gap–.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting–*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*

Directional Signals: *See Electrical Equip. Section.*

Light Switch Removal: Loosen Allen screw and remove knob. Remove retaining nut. Push switch back and lower to remove wires.

Stop Light Switch Location: At tee fitting in line to front brakes.

FUSES: Located as follows:

Radio–14 ampere. Located under cowl to right of steering column. Remove storage bin for access.

Overdrive–30 ampere. Under hood on left side on relay.

CIRCUIT BREAKERS: Two used as follows:

30 ampere on light switch (main lighting).

20 ampere behind dash panel on left side of cowl (Ignition, heater motors and stop light).

HORNS (1954): Delco-Remy 1999641 (low note), 1999642 (high note).

HORNS (1955): Nash No 3141323 (low note), 3141324 (high note)

Horn Relay– Nash No 3135335 (1954), 3141308 (1955)

ENGINE

►*AIR CONDITIONING CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 6 cyl. valve in head.

	B re	Str k	Displac m nt
All engines	3-1/2"	4-3/8"	252.6 cu. ins.

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	Comp. Ratio	Rated HP	Developed HP
Super Jetfire	7.6-1	29.4	130 at 3700 RPM
Lemans Dual Jetfire	7.6-1	29.4	140 at 4000 RPM

Compression & Vacuum Reading—*See TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage, cross tie-rod before removing pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Nash Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Nash Special Data.*

PISTONS

Cam ground, aluminum alloy, tin plated with steel strut and solid skirt

►*CYLINDER BORE OVERSIZE CAUTION: Code letter adjacent to engine number indicates cylinders bored .010" oversize See "Original Bore & Pistons" in Nash Special Data.*

Weight—19.57 ozs.
Removal—Remove from above.

Fitting New Pistons: Clearance .0009-.0015". Fit piston so that it will support itself in any part of cylinder bore (dry piston & bore).

Replacement Pistons: Std., .002", .005", .010", .020", .030" & .040" Oversize.

Installing Pistons: Notch on front edge of piston must be toward front of engine. *See Rod Installation.*

PISTON PINS

1954 Models—Floating type pin used before Engine No. A-254478. Locked in rod after above engine number
1955 Models—Locked in rod (same as Late 1954 Models)
Diameter—15/16" **Length**—3.000"
Clearance in Piston—.0002" max
Clearance in Rod (Floating Type Pin)—.0002"

Replacement Pins: (Floating Type)—Std., .001", .003", .005" Oversize (Locked-in-Rod Type)—Std., .001", .003" Oversize

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.0930-.0935"	.007"	.002-.004"
Oil #3	.1545-.1550"	.007"	.002-.004"
Oil #4	.1545-.1550"	②	.002-.004"

② No end gap with U-flex ring.

Replacement Rings: Std. & .020" Oversize. In sets.
Installing Rings: Stepped inner edges of both compression rings must be up.

CONNECTING RODS

►*CONNECTING ROD JOURNAL UNDERSIZE CAUTION: Code letter adjacent to engine number indicates journals are undersize See "Original Bearing Sizes" in Nash Special Data*

Length—8.750" center to center. **Weight**—29 ozs.
Crankpin Journal Diameter—2.0010-2.0003".
Original Bearing Sizes—*See "Original Bearing Sizes" in Nash Special Data.*
Bearings—Steel backed babbitt. No shims.
Clearance—.001-.0015" **Side play**—.005-.015"
Replacement Bearings: Std., .001", .002", .010", .012" Undersize.
Installing Rods: The identification boss on center of rod is installed to front of engine.

CRANKSHAFT

►*CRANKSHAFT JOURNAL DIAMETER CAUTION: Code letter adjacent to engine number indicates main and connecting rod journals undersize See "Original Bearing Sizes" in Nash Special Data.*

Journal Diameter—2.4791-2.4798". Seven main bearings.
Original Bearing Sizes—*See "Original Bearing Sizes" in Nash Special Data.*
Bearings—Steel backed babbitt.
Clearance—.001-.0015".
Replacement Bearings: Std., .002", .010", .012" Undersize.
End Thrust: Taken on center No. 4 main bearing.
End Play—.003-.008".
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Nash Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Nash Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Nash Special Data.*

VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Nash Special Data.*

CAMSHAFT

Bearings—Steel-backed babbitt bushings (except #1 Cast Iron with babbitt lining).
Clearance—.002".
Camshaft Removal—*See "Camshaft & Bearings" in Nash Special Data.*
End Thrust: Controlled by position of chain sprocket & No. 1 bearing.
End Play—.004-.006".
Timing Chain: Morse. **Width**—1". **Pitch**—3/8". **Length**—22-1/2" or 60 links.
Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across center line of sprockets.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Nash Special Data.*

VALVES

►*1955 INTAKE & EXHAUST VALVE PRODUCTION CHANGE:* Starting with Serial No. R-744962, the safety lock ring has been eliminated as the rubber "O" ring seal prevents the valve from dropping into cylinder bore. When using the later type valve, the "O" ring seal must be used.

Tappet Clearance: Intake .012" Hot. Exhaust .016" Hot.

Valve	Head Diameter	Stem Diameter	Length
Intake	1.787"	.3720-.3730"	5-31/64"
Exhaust	1.468"	.3725-.3735"	5-31/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30° ①	.393"	.002-.004"
Exhaust	45° ②	.3945"	.002-.004"

① —Valve face 29°. ② —Valve face 44°.

►*VALVE GRINDING CAUTION:* Replace valve when refacing reduces distance from top of valve face to top of valve to 1/32".
Valve Stem Oil Seal: *See "Valve System" in Nash Special Data.*
Valve Springs: Install springs with closed-coil end toward valve seat. **Free Length**—2-1/16".

Valve Spring Specifications

Valve	Lbs. Press.	Length
Closed	53-58	1-13/16"
Open	144-154	1-7/16"

Valve Guides: Pressed in. Use Tool J-4687 to replace guides. *NOTE*—Before removing guides, check height of guide and install guide to same height.
Rocker Arm Assembly: *See "Valve System" in Nash Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves—Open 12-1/2° BTDC. Close 51-1/2° ALDC.
Exhaust Valves—Open 53-1/2° BLDC. Close 10-1/2° ATDC.
Valve Timing Check—With No. 6 piston on TDC in firing position, set tappet clearance on No. 1 Intake & Exhaust at .003". Rock engine back and forth over TDC. Timing is correct if the Exhaust valve opens before TDC same amount that the Intake opens after the TDC mark.

OILING SYSTEM

Crankcase Capacity: 6 qts.
Normal Oil Pressure: 30 lbs. at 20 MPH, 12 lbs. minimum at 600 RPM.
Pressure Regulator Valve—Non adjustable, located in pump body. Opens at 50-58 lbs.
Oil Pressure Indicator—Light goes on when Ignition Switch is turned on, goes out as oil pressure reaches 5-8 lbs. Carter Switch A 954S, Nash No. 3134704 located on right side of crankcase.
Oil Pump: Gear type, driven off camshaft, mounted on center main bearing cap.
Oil Pump Removal Note—Pump must be dismantled for removal.
Pump Overhaul—*See "Oiling System" in Nash Special Data*
Oil Filter—Partial Flow type. Replace element every 8000 miles or less as needed.
Replacement Filter Element—Nash No. 3113750.
Crankcase Ventilation: Breather pipe in valve cover and filter in crankcase filler cap.

COOLING

Water Capacity: 17 qts. Add 1 qt. for heater.
Pressure Valve: 7 lb. Radiator Filler Cap Nash No. 3142965 (less Air Conditioning), 14 lb. No. 3141371 (with Air Conditioning).
Thermostat: Choke type, Nash No. 3131817 (167-173°), Use 3131985 (177-182°) for permanent anti-freeze.
Water Pump: Sealed packing and bushing type.
See "Water Pump" in Nash Special Data.
Pump Removal—Drain cooling system, disconnect pump drive coupling (remove rear bolt), disconnect inlet hose, remove pump mounting screws.
►*1955 WATER PUMP LUBRICATION CHANGE:* Starting with Engine Number A-270049, water pump lubrication

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fitting was eliminated and a prelubricated pump seal cartridge was used.

T mperatur Gaug : Auto-Lite Electric.

Dash Unit—Auto-Lite No. 13521A (1954), No. 13881A (1955).

Engin Unit—Auto-Lite No. 11528A (1954-55).

S "T mp ratur Gaug s" in Miscellaneous Section.

CLUTCH

B rg & B ck 10A7 Assy. No. 950. Single plate.

S "Borg & Beck" in Clutch Section.

Clutch Disc No.—Borg & Beck CD 752. Nash No. 3125822.

P dal Adjustment: Pedal free travel 1/2-3/4". Adjust by loosening locknut and turning adjusting nut on control link at clutch fork.

►*CAUTION: The pedal to beam rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project 5/16" from beam toward the rear, to provide proper leverage.

Clutch Linkag —*See "Clutch Notes" in Nash Special Data.*

R moval: Remove transmission (see below), disconnect clutch pedal linkage, remove clutch housing and pan. Punch mark flywheel clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warn r AS25-T86E (Standard), AS46-T86E (With Overdrive). Three speed, helical gear type.

See "Warner Transmissions" in Transmission Section.

Transmissi n Contr ls: *See "Transmission Controls" in Transmission Section.*

R m val: Move rear axle back (see Universals for procedure) to slip front universal joint off transmission. Disconnect shift levers and speedometer cable, remove two upper transmission to bell housing bolts, and install special guide bolts in their place. Remove lower bolts slide transmission out.

OVERDRIVE

Warn r R10. *See "Warner R10 Overdrive" in Transmission Section.*

Ov rdriv C ntr l: *S "Warner R10 & R11 Overdrive Control" in Transmission Section. NOTE* - "Pushbutton Control" Overdrive is Optl This type has kick-down pushbutton on steering wheel *(s ee wiring diagram).*

HYDRA-MATIC DRIVE

Dual Rang . Four speed automatic transmission with fluid coupling.

►*1955 HYDRA-MATIC ROUGH 2-3 UPSHIFT CORRECTION:* If rough 2-3 upshift cannot be eliminated by proper linkage and internal band adjustment, install Service Spring, Part No. 3119206 in front servo body 4-3 downshift valve. *S e "Hydra-Matic Drive" in Transmission S ction.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid every 1,000 miles, drain and refill at 25,000 mile intervals.

Capacity—11 qts. 12 qts. after disassembly.

Checking Fluid Level—Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position remove dipstick and check fluid level (dipstick located under right front floor plate). Add fluid to bring level up to "F" mark.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Detroit—Cross type. One used at rear of transmission.

REAR AXLE

Own. Semi-floating, hypoid gear type with torque tube drive.

See "Nash Hypoid" in Transmission Section.

Axle Ratio—4.1-1 (10-41) Std., 4.4-1 (9-40) with Overdrive, 3.2-1 (13-41) with Hydra-Matic.

Backlash—.002-.006" shim adjusted.

Axle Shaft Removal: Remove wheel, pull drum (use Hub Puller J-1644). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims (check thickness of shims, and replace same amount when reassembling). Withdraw shaft using puller J-2498, do not drag on inner seal.

Rear Axle Assembly Removal: Raise and support rear end of car. Disconnect rear brake cables at center equalizer. Disconnect torque tube at rear of transmission. Disconnect brake hose and shock absorbers at axle end (let hang from body). Roll axle free.

Wheel Bearing Adjustment: Shims behind brake backing plate

Rear Suspension: *See "Nash Rear Suspension" in Rear Axle Section.*

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Serviced by replacement.

Shock Absorber Application

Model	Front	Rear
1954 (Std.)	3117363	3117371
1954 (Heavy Duty)		©3117364
1955	3118500	3117364

©—Use with Continental Kit, and Heavy Duty Rear Spring, Part No. 3140400.

FRONT SUSPENSION

►*FRONT SUSPENSION ADJUSTMENT NOTE: Camber & Caster adjusted by shims between lower control pivot arm and support (1954 Models), and by lower control arm eccentric bolts (1955 Models).*

►*1955 FRONT CROSSMEMBER INSTALLATION CAUTION:* When installing front crossmember, distance between centers of either front or rear mounting bracket holes must be 19½" to insure maintaining front wheel alignment

►*1955 CASTER & CAMBER LOSS OF ADJUSTMENT CORRECTION:* Beginning with Engine No. R-743047, improved eccentric bolt (deeper bore) provides more positive locking of eccentric adjusting bolt. If necessary, a 5/8" I D. washer may be installed between nut and eccentric washer to insure locking of bolt.

Ind p nd nt. With coil springs located between upper ends of steering knuckle pin and seat in outer wheelhouse panel.

See "Nash" in Front Suspension Section.

King Pin Inclination—6-1/2°.

Caster—(Std.) Pos ½° desired (limits 0° to Pos. ½°). **(Power Steering)** Pos. 1° desired (limits Pos. ½° to Pos 1°)

Camber—0° desired with 1/4° Neg. to 1/4° Pos. Limit.

Toe-In—1/16-3/16".

Toe-Out on Turns—Outer wheel 20-1/4°. Inner 25°.

STEERING

Manual: Gemmer Model 305. Worm & Roller with "push-pull" adjustments.

See "Gemmer Steering Gears" in Steering Section.

Power Steering: Bendix Linkage type.

See "Bendix Linkage Type" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix Hydraulic Single Anchor. Hand lever applies rear wheel service brakes.

See "Bendix Hydraulic, Single Anchor" in Brake Section.

Drums—10" (1954), 11" (1955) Front & Rear.

Wheel Cylinder Diameter—Front 1 1/8" Rear 15/16"

1954 Lining Width & Length

Shoe	Front	Rear
Primary	2" x 9"	2" x 9"
Secondary	2½" x 11 3/32"	2" x 11 3/32"

1955 Lining Width & Length

Shoe	Front	Rear
Primary	2½" x 9 3/8"	2" x 9 3/8"
Second ary	2½" x 12"	2" x 12"

Thickness—7/32" (1954-55).

Braking Power—52 8% Front, 47.2% Rear (1954). 56% Front, 44% Rear (1955).

Clearance—.015" heel & toe of secondary shoe with primary out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.

Standard Master Cylinder: Mounted on support under floor pan to left of transmission.

Checking Fluid—Roll back floor mat, remove access hole cover, maintain fluid 1/2-1" below filler opening.

Removal—Remove from below without disturbing other parts.

Power Brakes: Bendix Power Unit. Replaces standard master cylinder.

See "Bendix Power Unit" in Brake Section.

Checking Fluid—Same as for standard master cylinder.

Removal—Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Nash-Hudson Air Conditioning.

See "Nash-Hudson Air Conditioning" in Miscellaneous Section.

Power Window Regulators: Electric with reversible motor. *See "Nash Window Regulators" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconn cting any part of air conditioning quipm nt or lin s for acc ss to ngin , s "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to center of cowl panel under hood

Starting Serial Number - Kenosha-V-1001 (Nash), Y-1001 (Hudson). **El Segundo-**VC-1001 (Nash), YC-1001 (Hudson) **Unassembled Export -** 8KD-1001 (Nash), YKD-1001 (Hudson)

ENGINE NUMBER: Below right exhaust manifold

Starting Engine Number–P-1001

TUNE-UP

►*HARD STARTING CORRECTION (CARS BEFORE ENGINE NO. P-14763) & CARBURETOR PRODUCTION*

►*CHANGE: See "Carter WGD" in Carburetion Section for installation of Atmospheric Vent.*

►*POOR WARM-UP CORRECTION & CARBURETOR PRODUCTION CHANGE: See "Carter WGD" in Carburetion Section for recommended changes on carburetors date-coded before tag date "M-5" or Engine No. P-24900.*

►*SLOW COLD STARTING CORRECTION:* Check spark plugs, breaker points, all electrical connections, and ignition timing. See that carburetor choke valve has .005" clearance in all positions and that choke valve and shaft operate freely. Choke vacuum piston must operate freely in cylinder and there must be no bind between unloader arm on choke lever and fast idle link. *NOTE–*Automatic choke may be set one point rich or lean from standard setting to improve starting and warming up performance.

COMPRESSION PRESSURE: 140 lbs , at cranking speed (150 RPM), with wide open throttle

VACUUM READING: 19 ′ at 1500 RPM 17 25 ′ at 425 RPM

VALVE TAPPET CLEARANCE: None in service (hydraulic)

MANIFOLD HEAT CONTROL: Thermostatic type Located at left manifold outlet

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders–RIGHT BANK 2-4-6-8, LEFT BANK 1 3-5-7

SPARK PLUG GAP· 035 ′

Spark Plug–(Before Engine No P-6001) Champion H-10 or Auto-Lite AL-7 (After Engine No P-6001) Champion N-8 or Auto-Lite AG-5 Tighten plugs to 30 ft. lbs

COIL: Auto-Lite CR-6001.

Ignition Current–2 30 amps. (idling)

DISTRIBUTOR· (Before Engine No. P-6001) Auto-Lite IBK-4001. (After Engine No. P-6001) Auto-Lite IBK-4001-B.

Condenser–Auto-Lite IBB-2015L **Capacity** 25- 28 mfd

C ntact P int S t–Auto Lite IGW-3028JS

Br ak r Gap–.017"± 002"

Cam Angl –33°-39°

Br ak r Arm Spring T nsion–17-20 ozs

R tati n–Counter-clockwise viewed from above

Aut matic Advanc –IBK-4001

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start	-	300	0	-	600
1		325	2		650
11		600	22		1200
19	-	1135	38	-	2270
20		1200	40		2400

Automatic Advance-IBK-4001-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start	-	300	0		600
1		375	2 -		750
8		850	16 - -		1700
15 -		1650	30 -		3300
16		1750	32		3500

Vacuum Spark Control· Auto-Lite. Integral type.

Vacuum Advance–IBK-4001

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6′
1	2	6 3/4"
3	6	8 1/4"
4 -	8	8 7/8"
5.5	11	- 10

Vacuum Advance–IBK-4001-B

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6 1/4′
1	2	6 5/8′
6	12	9′
11	22	12 1/8′
12 -	24	13′

IGNITION TIMING

Setting–5° BTDC

Timing Mark–Timing indicator on chain cover marked 0 - 5 - 10 - 15. Align groove in vibration dampener with correct mark on indicator

CARBURETOR

Carter WGD, No. 2231S (Early), 2231SA (Later). Dual downdraft type with automatic choke

►*HARD STARTING CORRECTION (CARS BEFORE ENGINE NO. P-14763) & CARBURETOR PRODUCTION CHANGE.* An atmospheric vent has been incorporated in later carburetors and can be installed on early cars to correct a hard starting condition *See "Carter WGD Carburetor" in Carburetor Section*

►*POOR WARM-UP CORRECTION & CARBURETOR PRODUCTION CHANGE: See "Carter WGD" in Carburetion Section for recommended changes on carburetors date-coded before tag date "M-5" or Engine No. P-24900.*

►*SLOW COLD STARTING CORRECTION: See TUNE-UP (above).*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting–½-1½ turns open. Turn screws out for richer mixture.

Idle Speed–425 RPM with transmission in "N" (Air Conditioning turned on)

Float L v l–¼" from underside of bowl cover to top of float at center with needle valve seated. Measure with bowl cover and float assembly inverted. *NOTE–This ¼" setting sup rs d s original sp cification of 3/16".*

S *also "Hard Starting Corr ction" abov .*

Fast Idl · 030′ throttle opening or clearance between valve and wall on side opposite idle ports with choke valve tightly closed Adjust by bending choke rod at lower angle

Unloader Adjustment–With fast idle adjustment completed, hold throttle valve wide open and close choke valve as far as possible. **Do n t f rc ch k valv cl sed.** Clearance between upper edge of choke valve and inner wall of air horn should be 3/16′ (Gauge T109-28) Adjust by bending choke shaft unloader arm

Automatic Choke: 1 point rich

►*OTHER DATA See "Carter WGD Carbur tor" in Carburetor Section*

THROTTLE LINKAGE ADJUSTMENT: *CAUTION–Control rod dimensions should b ch cked and l ngth adjusted before linkage adjustm nt is made.*

Control Rod Dimensions: Check and adjust each rod as follows:

Carburetor Throttle Rod (from carburetor throttle lever to accelerator pedal lever)–Over-all length of rod from center of ball pivot at carburetor end to "L" bend at rear end of rod must be 15½". Adjust by loosening locknut near forward end and turning end fitting in or out of rod.

Adjuster Rod (Upper throttle rod from carburetor throttle rod to cross-shaft lever)–Over-all length between centers of rod ends must be 6 9/16". Adjust by bending rod at existing bend near center

Throttle Valve Rod (Lower throttle rod from cross-shaft to control lever on transmission case)–Length between center of pins at ends of rod must be 26 1/8" (measured in straight line). Adjust by bending rod.

THROTTLE LINKAGE ADJUSTMENT (1955-56): The carburetor throttle rod from carburetor to lever at the vertical rod must be 15½" from center of ball pivot at carburetor to "L" bend at rear end of rod. The adjuster rod that is connected to carburetor throttle rod and to the lever of the cross-shaft must be 6 9/16" from center-to-center of ends of rod To change dimension, bend rod at present bend to obtain 6 9/16" The TV rod from cross shaft lever to the TV lever at the transmission must be 26 1/8" from center of pins Bend rod to correct measurement The TV lever must be adjusted so that taper on end of lever should contact a straight edge held against the machined surface at rear of transmission case. If necessary to adjust, loosen lever clamp screw nut and turn shaft counter-clockwise until valve has reached its stop Hold shaft in this position and rotate lever on shaft so that taper on lever lines up with milled surface on rear of case After measurements have been corrected, warm up engine set carburetor idle to 400 RPM Stop engine and loosen two locknuts at front and rear end of adjuster on rod PLACE REAR END OF ROD IN CENTER HOLE OF THE CROSS SHAFT LEVER Tighten two locknuts so that adjuster rod fits freely in lever

CARB. EQUIPMENT

Fu l Pump: Cart r M2256S (Fuel & Vacuum)

Pr ssur –3½-5 lbs at 500 RPM

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S *"Fu l Pumps" in Carburetion Equipment Section.*

Gas lin Gaug : Auto-Lite Electric type

Dash Unit—Auto-Lite 13380A

Tank Unit—Auto-Lite 12642A

S *"Fu l Gaug s" in Carburetion Equipment Section.*

BATTERY

Aut -Lit 1H-105D. 6 volt, 105 ampere hour capacity (20 amp. rate)

Battery Gr und—Positive

Engine Gr und—Battery to engine with body ground from transmission to rear crossmember

STARTER

Aut -Lite MCL-6132. Armature—MCH-2122.

Driv —Overrunning clutch (solenoid pinion shift)

R tati n—Counter-clockwise at commutator end.

Brush Spring T nsi n—42-53 ozs

P rformance Data

Torque	RPM	Volts	Amperes
0 ft lbs.	4900	5 0	65
8.0 ft lbs	Lock	2.0	410

Starting Switch: Nash - Auto-Lite Solenoid SSX-4003 mounted on starter with SEPARATE relay (Magnetic Switch), Nash No 3118899, on left fender apron. Controlled by selector lever operated switch, No. 3143978, located on steering column. Starter operative only with selector lever in "P" or "N" position.

Huds n - Auto-Lite Solenoid SSX-4003 mounted on starter with SFP ARATE relay (Magnetic Switch), No 3118899 on left fender apron Controlled by combination Ignition & Starter Switch, Nash No 308595 Turn key full right to start engine.

See "Auto-Lite Solenoid Starter Switch (No Relay)" in Electrical Section.

N utral Saf ty Switch (Huds n): Nash No. 3143999 On steering column. Permits starter operation with selector lever in "P" or "N" only

GENERATOR

Aut -Lit GGW-4801F. Armature—GGW-2006F.

Maximum Charging Rat —S *Voltage Regulator*

P rf rmance Data

Amperes	Volts	Cold — RPM — Hot
0	.....6.4 ...	870-970 950-1050
45	8 0	1925-2125 2350-2550

R tati n—Counter-clockwise at commutator end

Brush Spring T nsi n—35-53 ozs

Fi ld Curr nt—1.6-1.7 amps at 5.0 volts

B lt Adjustm nt: ½" belt deflection midway between water pump and generator pulleys

REGULATOR

Aut -Lit VBE-6101-A

Cutout Relay

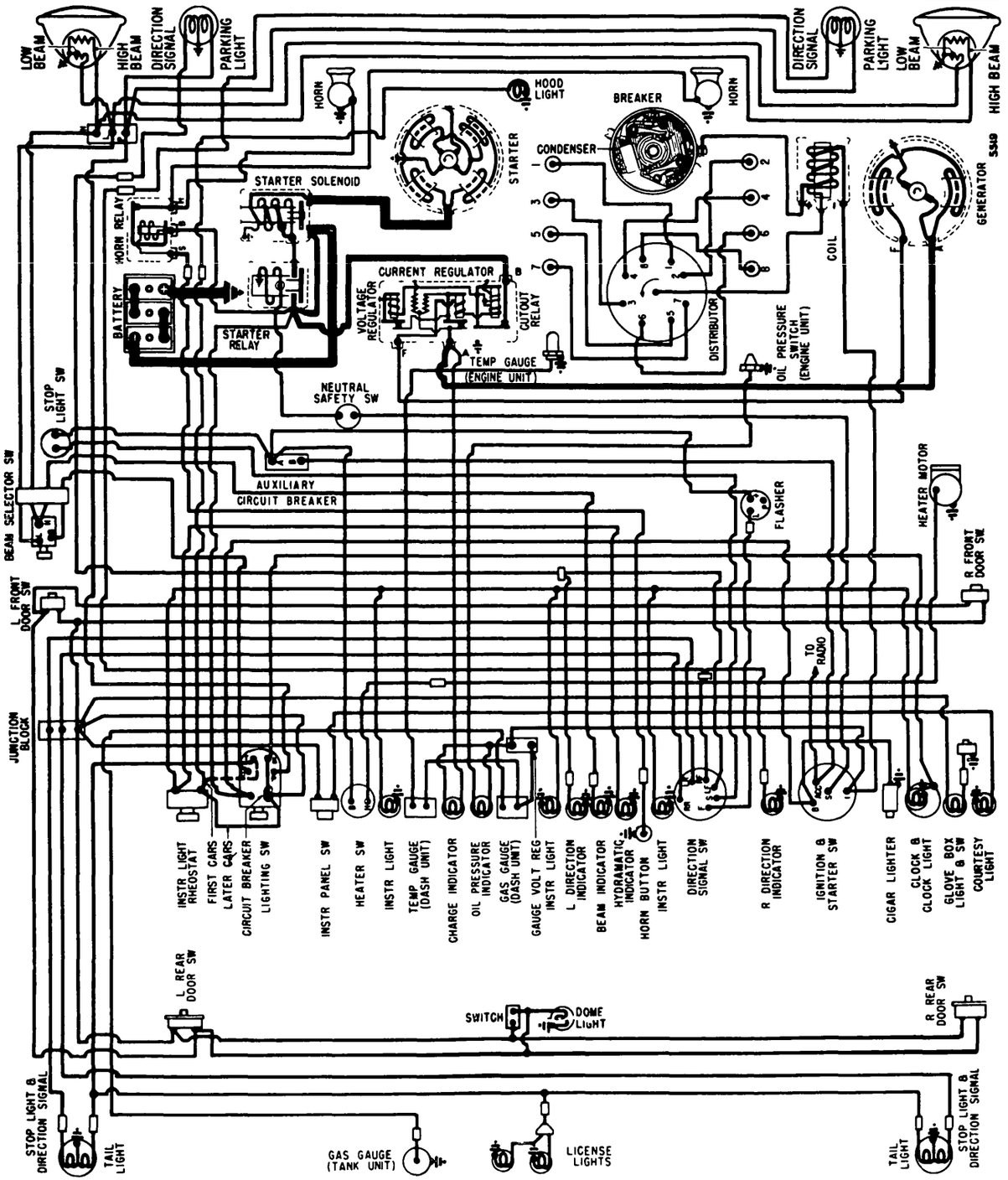
Cuts In—6.3-6.8 volts

Cuts Out—4.1-4.8 volts

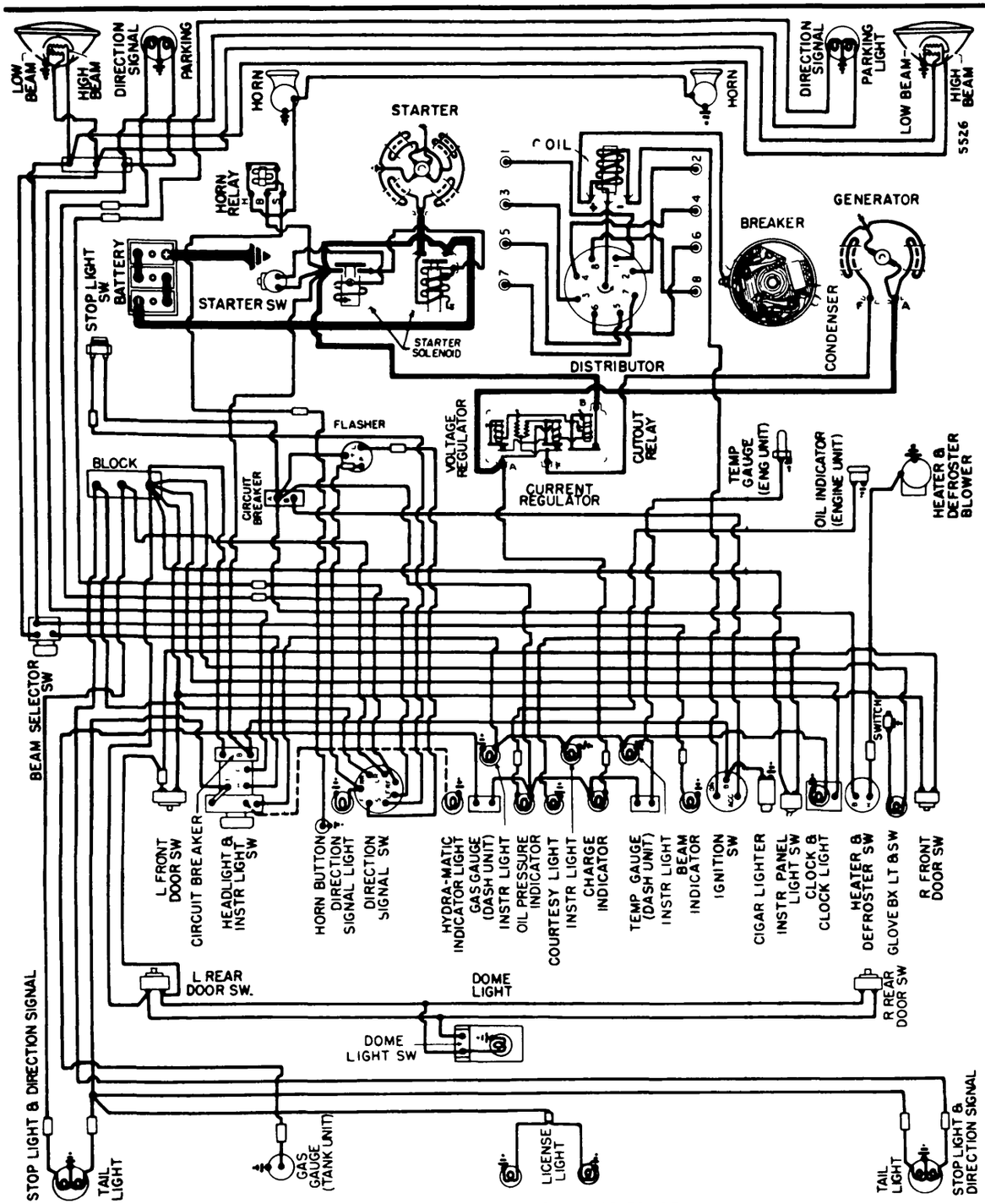
C ntact Gap—.015" minimum

Air Gap— 031-.034" with contact open (check at hinge end of core).

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HUDSON HORNET V8 WIRING DIAGRAM



NASH AMBASSADOR V8 WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Voltag R gulat r

S tting—7.2-7.5 volts at 70°F. After 15 minutes operation charging at one-half maximum rate.

Air Gap—.048-.052" with contacts opening

Checking & Adjusting—*See Electrical Equip. Section.*

Current R gulator

►*SETTING CAUTION: "Temp rature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amp r s	Test B
52	.	45 (43-47)

Test A—After 15 minutes operation charging at ½ maximum rate

Test B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7-6.9 volts)

Air Gap—.048-.052" with contacts just opening

Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See El ctrical Equip. S ction.*

Direction Signals: *See El ctrical Equipment Section*

Light Switch Removal: Loosen Allen screw and remove retaining nut Push switch back and remove from dash

Stop Light Switch: Located at tee fitting in line to front brakes

FUSES: Radio—SFE-14 (14 amp.) in lead wire to radio

CIRCUIT BREAKERS: Two used. 30 amp. in main light switch protects headlights, tail, instrument and interior lights. 20 amp located on rear side of dash just forward of steering column protects stoplights, direction signal, Weather Eye blowers and accessory lights.

HORNS: Sparton. Nash No 3141323 (Low Note). 3141324 (High Note)

Horn Relay: Nash No. 3141308

Current Draw—13-17 amps. (low note), 12-16 amps. (high note), at 5-7 volts.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: B fore disconnecting any part of air conditioning equipment or lines for access to engine, se "Air Conditi ning Service Cautions" in Misc llaneous S ction*

ENGINE SPECIFICATIONS: V8 valve-in-head.

Bore	Stroke	Displac m nt
3 13/16"	3⅛'	320 cu ins
Compression Ratio	**D v l ped HP**	**Rat d HP**
8 25-1①	208' at 4200 RPM	46 5

①—After Engine No P-6001 7 8-1, before Engine No P-6001

Compression & Vacuum Reading: S *TUNE-UP.*

►*OTHER ENGINE DATA: See "1956 NASH AMBASSADOR V8 & HUDSON HORNET V8" car model pages.*

MECHANICAL

►*FOR ALL ULTRAMATIC DRIVE, REAR AXLE, FRONT SUSPENSION, STEERING, BRAKES, & MISC. MECHANICAL DATA, SEE "1956 NASH AMBASSADOR V8 & HUDSON HORNET V8" CAR MODEL PAGES.*

Form 4A

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to center of cowl panel under hood.
Starting Serial Number—K-649201 (Domestic), 4KD-5701 (Unassembled Export), KT-11101 (Canada).

ENGINE NUMBER: Stamped on machined surface at upper left front corner of cylinder block.
Starting Engine Number—DB-1001.

TUNE-UP

►***BURNED BREAKER POINTS OR HIGH SPEED MISS CORRECTION:*** **May be caused by use of incorrect ignition primary resistor. Use only resistor with Delco-Remy trademark. See Resistor data below.**

COMPRESSION PRESSURE: 120 lbs. at cranking speed.

VACUUM READING: 18-21" at idling speed

VALVE TAPPET CLEARANCE: .012" Int., .016" Exh. hot & running.

MANIFOLD HEAT CONTROL: None used.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030".
Spark Plug—Auto-Lite AL-7. Torque to 30 ft lbs

COIL: Delco-Remy 1115393. *12 Volt.*
Ignition Current — 1.7 amperes idling, 3.75 stopped.
Resistor—Delco-Remy No. 1927809. 1.40-1.62 ohm.

►*COIL RESISTOR NOTE:* Connected in series between battery and coil. Resistor is by-passed during cranking by solenoid or magnetic starter switch, making direct lead from battery to coil.

DISTRIBUTOR: Delco-Remy No. 1110242. *12 Volt*
Condenser—Delco-Remy 1869704. **Capacity** .18-.23 *mfd.*
Contact Point Set — Delco-Remy No. 1918148.
Breaker Gap—.016".
Cam Angle—28°-35°.
Breaker Arm Spring Tension—19-23 ozs.
Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0-4	700
6.5-8.5	550	13-17	1100
11-13	1100	22-26	2200
15-17	1600	30-34	3200

Vacuum Spark Control: Delco-Remy No. 1116099.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg.)
Start	0	6-8
5	10	11-12

IGNITION TIMING

Setting—TDC (Supersedes original specification of 4° ATDC)

►*IGNITION TIMING CHANGE:* Starting with engine number DB-1598 ignition timing was changed from 4° ATDC to TDC. On engines prior to above number paint mark vibration dampers and set ignition to new specification "TDC".

Timing Mark—Vibration Damper

CARBURETOR

►***ROUGH ENGINE CORRECTION (Exhaust gas leakage into Intake Manifold):*** **May be caused by corrosion of intake manifold cover. For corrective procedure, *see "Cylinder Head & Manifold" in Nash Special Data.***

Carter WCD No. 2350S. Dual type with automatic choke.

►*MANIFOLD FUEL DISTRIBUTION: Both barrels feed all cylinders.*

Idle Setting—½-1½ turns open. Turn screws out for richer mixture.
Idle Speed—550 RPM (Standard & Overdrive Trans.), **475 RPM** (Hydra-Matic in Neutral), **500 RPM** (Hydra-Matic in Neutral with Air Conditioning turned on)
Float Level—5/32" (Gauge T109-196). Distance from top of each float to gasket seat on cover (cover inverted)
Accelerating Pump—No seasonal adjustment
Fast Idle: 020" between throttle valve and bore (side opposite idle port) with choke fully closed
Automatic Choke: Centered (At Index)

Throttle Linkage Adjustment (Hydra-Matic Cars): Adjust engine idle speed to 450 RPM (with air conditioning 500 RPM, compressor running), with engine temperature 150-160°F, transmission warm and selector lever in neutral. Disconnect throttle rod at throttle lever at side of transmission. Clean back of transmission case, place checking Gauge J-2545-D flush against machined surface with edge of gauge against transmission side cover. Throttle lever stud should fit freely in notch of gauge. Use bending Tool J-3310 to correct throttle lever position. Gauge notch must be in alignment with pin through hole in T.V. lever with lever held against its stop to the rear. When properly adjusted, connect throttle rod to T.V. lever. Remove upper end of throttle rod at bellcrank. Disconnect carburetor to bellcrank rod at carburetor throttle rod. Insert an aligning pin in holes of the bell crank and bracket. Adjust carburetor to bellcrank rod. Fasten rod in place with clip fasteners. Adjust T.V. rod at bellcrank to fit freely with the hole in lever. Then shorten T.V. rod **three full turns.** Connect T.V. rod at bellcrank; remove **aligning pin.**
NOTE—Gauge 2545-C can be reworked by adding another notch behind original notch so that distance from center of notch to rear inside surface of gauge is 6½".

►***OTHER DATA: See "Carter Dual WCD" in Carburetion Section.***
Fuel Pump Pressure: 3½-5¼ lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Carter. Fuel and vacuum.
Replacement Pump — Carter No. M-2379S.
Pressure — 3½ - 5¼ lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: Auto-Lite Electric type.
Dash Unit — Auto-Lite 14159A.
Tank Unit — Auto-Lite 14165A.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Standard — Auto-Lite 11-HS-50. ***12 V lt.*** 11 plate, 50 Ampere Hour Capacity (20 Hr. rate).
Air Conditioned Cars — Auto-Lite 11-HS-60. ***12 Volt.*** 11 plate, 60 Ampere Hour Capacity (20 Hr. rate).
Battery Ground — Negative.
►***CAUTION: This is reversed from previous models.***
Engine Ground — Battery to engine with body ground from transmission to engine rear crossmember.

STARTER

Delco-Remy 1107647. *12 Volt.* Armature - 1926626.
Drive—Overrunning clutch (solenoid pinion shift).
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—35 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	6900	10.3	75
10.5 ft lbs	Lock	5.8	435

Starter Switch: Delco-Remy No. 1119793 solenoid switch located on starter, actuated by combination ignition and starter switch (Std. and Overdrive cars), by Delco-Remy No. 1996084 switch operated by raising shift lever upward (Hydra-Matic).

GENERATOR

Delco-Remy. *12 Volt.* Used as follows:

Application	Generator	Armature
Without Air Cond.	1100323	1933352
With Air Cond.	1102049	1934326

►*GENERATOR ARMATURE SHAFT PRODUCTION CHANGE:* Generators with tag code stamped 5K-20 or later have heavier brazing of water pump drive extension on armature shaft to prevent breaking. Brazing should withstand 25 ft lb. torque applied to generator pulley (belt released) with pump shaft coupling held stationary.

Performance Data

	Amperes	Volts	RPM
Standard	25	14.0	2780
Air Cond.	30	14.0	2150

Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—28 ozs.
Field Current—1.50-1.62 amperes (1100323), 1.48-1.62 amperes (1102049), 12 volts at 80°F
Belt Adjustment: ½" deflection with 25 lbs. pressure applied midway between fan and generator pulleys.

REGULATOR

Delco-Remy 1119122 (1100323 Gen.), 1119003 (1102049 Gen.). *12 Volt.* *NOTE*—Specifications are "Normal" Settings.

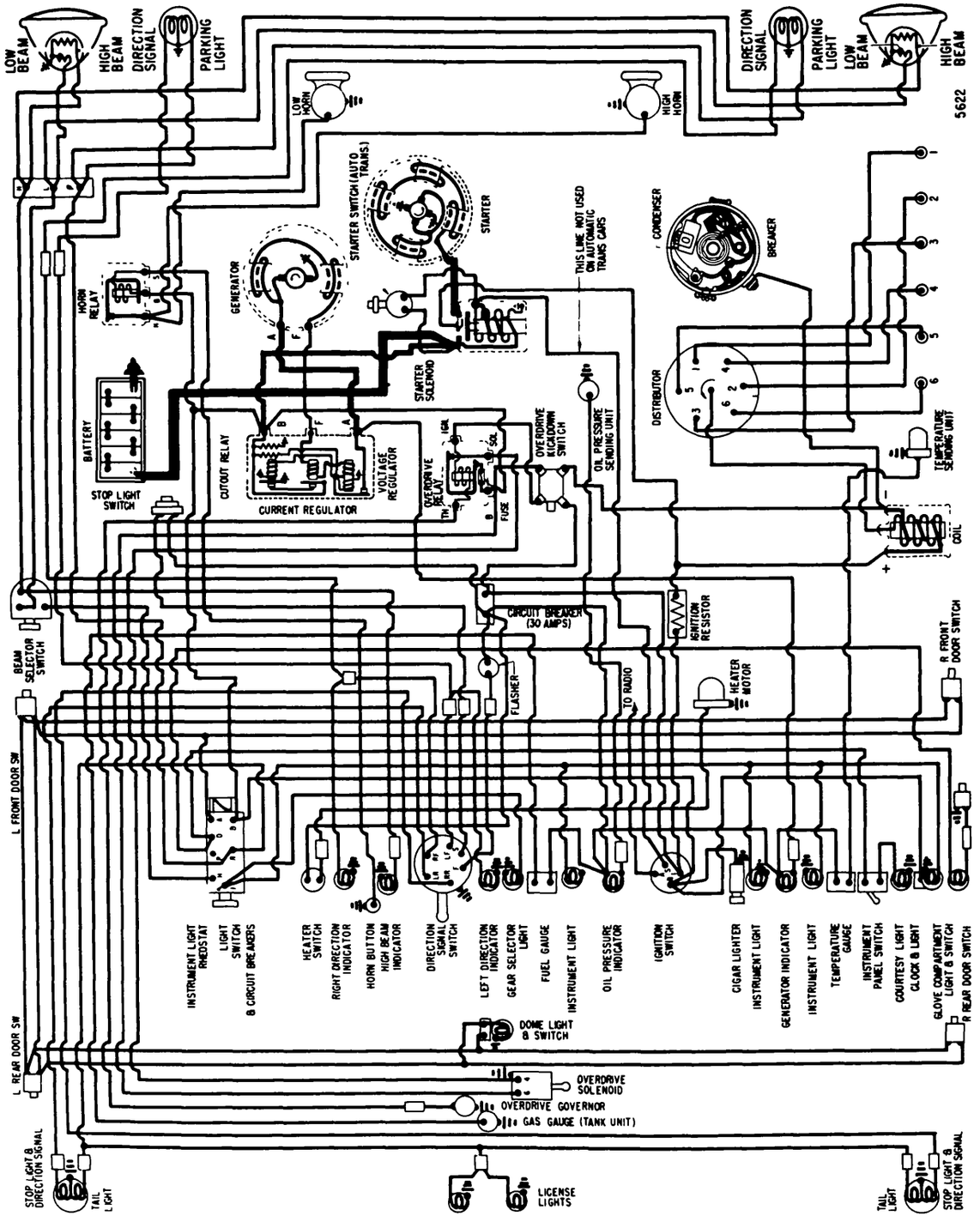
Cut-Out Relay

Cuts-In—11.8-13.5 volts.
Contact Gap—.020".
Air Gap—.020" with contacts just closed.

Voltage Regulator

Setting—13.8-14.8 Volts (hot).
Air Gap—.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting—*See "Delco-Remy 1119000*

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Series Regulators" in El ctrical Secti n.

Curr nt R gulator

S tting (1119122)–23-27 amperes (hot).
Setting (1119003)–27-33 amperes (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–*See "D lco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *S El ctrical Secti n.*
Directional Signals: *See Electrical Secti n.*
Light Switch Removal: Disconnect battery. With switch in "OFF" position, press button release on top of light switch assembly, and pull knob and shaft clear of switch. Remove slotted nut, pull switch to rear of instrument panel.
Stop Light Switch: Located at tee fitting in line to left front brake.

FUSES: 7.5 Ampere. On lighting switch for Courtesy and Glove Box Light.
15 Ampere. Located on overdrive relay.
5 Ampere. Located in Radio wire back of instrument panel.

CIRCUIT BREAKERS: Three used as follows:
12 Ampere. On light switch for Instrument, Tail and Dome Lights.
12 Ampere. On light switch for Head and Parking Lights.
30 Ampere. For Stop Light, Instruments and Indicators, Heater and Directional Signals. Located back of Instrument panel.

HORNS: Auto-Lite HAD-4737 (Low Pitch), HAD-4738 (High Pitch). 12 Volt.
Horn Relay – Nash No. 3145684.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Us extreme care when disconnecting any part of air c nditioning system or lines f r acc ss to engine. See "Air Conditioning Service Cauti ns" in Misc. Sect.*

►*ENGINE NOISE (Similar to bearing noise) CORRECTION:* A noise usually diagnosed as a bearing noise may come from improperly assembled Vibration Damper. Reassemble Cushions, Disc and Rubber correctly on engines built prior to Engine No. DB-2567.

►*WATER PUMP LUBRICATION CHANGE:* Lubrication fitting now included. Use hand pressure lubrication gun to lubricate at 5,000 mile intervals.

ENGINE SPECIFICATIONS: 6 Cyl. valve-in-head.

Bore	Stroke	Displac ment
3 1/8"	. 4¼"	195.6 cu. ins.
Compr Ratio	**Rated HP**	**Dev lop d HP**
7.47-1	23.44	130 at 4500 RPM

C mpr ssi n & Vacuum R ading–S *TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross

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tie-rod before removing pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Nash Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Nash Special Data.*

PISTONS

Cam ground, aluminum alloy, tin plated, with steel strut and solid skirt

Original Bor & Piston Sizes–See *"Original Bore & Pistons" in Nash Special Data.*

Weight–13.59 ozs

Removal–Remove from above.

Fitting New Pistons Clearance 0006-.0012". Pistons should just support own weight at any point in cylinder bore (piston and bore dry and clean)

Replacement Pistons: Standard, 002", .005", 010", 020", 030", 040" Oversize.

Installing Pistons: Piston pin is offset in piston. Piston is marked with notch that should face front of engine when installed. *See Rod Installation.*

PISTON PINS

Press fit in connecting rod. No locking device.

Diameter – .8597". Length – 2¾".

Clearance in Piston – .0002" maximum. Thumb push fit at 70°.

Pin Removal & Installation – See *"Piston Pins" in Nash Special Data.*

Replacement Pins: Standard, .003", .005" Oversize.

NOTE – Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.0930-.0935"	.010-.020"	.002-.004"
Oil #3..	..1545-.1550"	.010-.020"	.002-.004"
Oil #4 .	.1545-.1550"	."U Flex"	.002-.004"

Replacement Rings: Standard & 020" Oversize in sets.

Installing Rings: Stepped inner edges of both compression rings must be up

CONNECTING RODS

Length–6 625" center-to-center. **Weight–**25 ozs.

Crankpin Journal Diameter–2.0948-2.0955".

Original Bearing Sizes–*See "Original Bearing Sizes" in Nash Special Data.*

Bearings–Steel-backed babbitt. No shims

Clearance–.0010-.0015" **Sideplay–** 005-.015".

Replacement Bearings: Std & 001", .002", .010" and .012" Undersize.

Installing Rods: Identification marks (raised section on center of rod and bearing cap) toward front of engine.

CRANKSHAFT

Journal Diameter–2.4791-2.4798". Four bearing.

Original Bearing Sizes–*See "Original Bearing Sizes" in Nash Special Data.*

Bearings–Steel-backed babbitt No shims.

Clearance – 001-.0015"

Replacement Bearings: Std & 002", 010", 012" Undersize

End Thrust: Taken by front main bearing *See "Crankshaft & Main Bearings" in Nash Special Data.*

Endplay– 003-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Nash Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Nash Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Nash Special Data.*

VIBRATION DAMPENER REMOVAL: *See "Vibration Dampener" in Nash Special Data.*

CAMSHAFT

Bearings–Steel backed babbitt bushings.

Clearance– 002"

End Thrust: Thrust plate on front of engine between No 1 bearing and camshaft sprocket.

Endplay–.004-.006"

Timing Chain: Morse **Width** 1". **Pitch** 3/8". **Length** 22-1/2" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across center line of sprockets.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Nash Special Data.*

VALVES

Tappet Clearance: Intake .012", Exhaust .016" (Running Hot).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.3412-.3417"	4.759"
Exhaust	1.343"	.3407-.3412"	4.759"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45° ①	.383"	.0015-.0035"
Exhaust	45° ①	.385"	.002-.004"

① Valve face angle 44°.

►*VALVE GRINDING CAUTION.* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32".

Valve Seat Width – 5/64-3/32".

Valve Stem Oil Seal – Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Valve springs may be removed without removing cylinder head by maintaining 90 lb. air pressure in combustion chamber to hold valve against valve seat.

Free Length – 2 3/8".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	65-70	1 13/16"
Open	115-125	1 7/16"

Valve Guides: Use Tool J-1429-A to remove and replace guides. Guides should extend ¾" above cylinder head.

Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valve – Open 12°30' BTDC, Close 51°30'ALDC

Exhaust Valve – Open 53°30' BLDC, Close 10°30'ATDC

Valve Timing Check – Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

OILING SYSTEM

Crankcase Capacity: 4 qts. refill.

Normal Oil Pressure: 30 lbs. at 20 MPH. 12 lbs. minimum at 600 RPM.

Pressure Regulator Valve – Non-adjustable spring loaded valve located in cylinder block where oil enters oil distribution channel.

Oil Pressure Indicator: Light goes on when Ignition switch is turned on, goes out as oil pressure reaches 6½ lbs. ± 1½ lbs. Sending unit Rambler No. 3142826 located on right rear side of engine block.

Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*

Oil Filter – Partial Flow type. Replace element every 5000 miles or less as needed.

Replacement Filter Unit – Rambler No. 8990068.

Crankcase Ventilation: Filter in crankcase filler cap, and vent in rocker arm cover.

COOLING

Water Capacity: 11 quarts.

Pressure Valve: 7 lb. Radiator Filler Cap Rambler No. 3142965 (less Air Conditioning), 14 lb. No. 3141371 (with Air Conditioning).

Thermostat: Choke type. (Std.) 170° type Rambler No. 3131817, (Optl.) 180° type Rambler No. 3131985 for use with permanent anti-freeze.

Water Pump: Sealed packing and bushing type. *See "Water Pump" in Nash Special Data.*

Pump Removal – Drain cooling system, disconnect coupling, hoses, and pump mounting screws.

Temperature Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge voltage regulator, King-Seeley No. 46439.

Dash Unit – King-Seeley 49476.

Engine Unit – King-Seeley 44200.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8.5A7. Assy. No. 1391. Single plate. *See "Borg & Beck" in Clutch Section.*

Clutch Disc No.	Borg & Beck	Nash No.
Standard	382394	3144937
Overdrive	382490	3147133

Pedal Adjustment: Pedal free play 1/2-3/4". Adjust by loosening locknut and turning adjusting nut on connector link **at clutch fork.**

►*CAUTION. The pedal to beam rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project 1/2" from beam toward the rear.

Clutch Linkag –*See "Clutch Notes" in Nash Special Data.*

Removal: Remove transmission (see below), disconnect

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clutch pedal linkage, remove clutch housing and pan, punch mark flywheel, clutch cover and pressure plate. (Reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Own. 3 Speed, All helical gear type.
See "Nash Transmission" in Transmission Section.

►*TRANSMISSION REAR BEARING SNAP RING BREAKAGE CORRECTION:* Caused by heavy duty operation or maladjustment of torque tube trunnion. For installation of sleeve or adjustment of trunnion, *See "Nash Transmission" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect brake tube bracket at body, and torque tube at rear of transmission. Disconnect brake cable at bell crank and cable housing at bell crank bracket. Move rear axle assembly to rear off transmission main shaft splines. Disconnect speedometer cable and shifter rods, (if overdrive equipped, disconnect wires at solenoid and overdrive cable at lever). Use guide pins, Tool J-1434, in two upper cap screw positions and slide transmission free of pilot bearing and clutch disc.

OVERDRIVE

Warner R10. Used with Nash transmission.
See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 Transmission Control" in Transmission Section.*

HYDRA-MATIC DRIVE

Dual Range. Four speed automatic transmission with fluid coupling.
See "Hydra-Matic Drive" in Transmission Section.

►*HYDRA-MATIC REVERSE GEAR SLIP-OUT CORRECTION:* To check and correct this condition, first disconnect back-up light switch at manual control lever on side of transmission, and operate transmission in reverse. If condition not corrected, adjust manual control linkage. If condition corrected adjust back-up light switch to proper tension by placing control lever in reverse, and adjusting switch cable just enough to allow spring to pull switch to the contact position.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* See *"Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING:* See *"Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid every 1,000 miles, drain and refill at 25,000 mile intervals.

Capacity—8-1/2 qts. (9-1/2 qts. after overhaul).

Checking Fluid Level—Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position, remove dipstick and check fluid level (dipstick located in engine compartment on right side). Add fluid to bring level up to "F" mark.

▲*CAUTION:* Do not check oil level when transmission is excessively hot and do not fill above the "F" mark on dipstick.

►*OTHER HYDRA-MATIC SERVICE DATA:* See *"Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Detroit—Cross type. One used at forward end of propeller shaft.

REAR AXLE

Own. Semi-floating, hypoid gear type with torque tube drive.
See "Nash Rear Axles" in Rear Axle Section.

Axle Ratios	Standard	Optional
Synchro-mesh	4.4-1 (9-40)	4.4-1 (9-40)
Overdrive	4.9-1 (8-39)	
Hydra-Matic	3.6-1 (12-43)	

Rear Suspension: *See "Nash" in Suspensions & Wheel Alignment Section.*

Backlash—.002-.006". Shim adjustment.

Axle Shaft Removal: Remove wheel, pull drum (use hub puller J-1644). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate, and wheel bearing adjusting shims. Withdraw axle shaft using puller J-2498. Do not drag shaft on inner oil seal.

Rear Axle Assembly Removal: Jack up and support rear end of body. Disconnect rear brake cable at equalizer, torque tube at rear of transmission, brake hose and shock absorbers at rear axle end (allow shocks and brake hose to hang from body). Roll axle assembly out from under car.

Wheel Bearing Adjustment: Shims behind brake backing plate.

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Serviced by replacement.

Front — Nash No. 3140879. **Rear** — Nash No. 3140406.

►*REAR SHOCK ABSORBER NOISE CORRECTION (Cars before Serial No. K-651528):* Before replacing a rear shock absorber for being noisy, check for damaged shock absorber grommet spacer or limit sleeve, (caused by incorrect retainer with oversize hole). If grommet spacer damaged discard it. When reassembling without grommet spacer, do not use retainer Nash No. 3136432, however, do not compress shock absorber grommets excessively.

FRONT SUSPENSION

Independent. Linked parallelogram type with coil springs located between upper ends of steering knuckle pin and seat in outer wheel house panel.
See "Nash" in Suspensions & Wheel Alignment Section.

King Pin Inclination—6-1/2°.

Caster (Manual Steering)—Pos. 1/2° desired (limits 0° to Pos. 1/2°). **(Power Steering)** Pos. 1° desired (limits Pos. 1/2° to Pos. 1°).

Camber—0° desired (limits Neg. 1/4° to Pos. 1/4°).

Toe-In—1/16"-3/16".

►*TOE-IN ADJUSTMENT (POWER STEERING) CAUTION:* Operate engine so that power steering pump will supply oil pressure to center spool in power cylinder valve.

Toe-Out on Turns—Outer wheel 20-3/4°, Inner wheel 25°.

►*FRONT CROSSMEMBER INSTALLATION CAUTION:* When installing front crossmember, distance between centers of either front or rear mounting bracket bolt holes must be 19-1/2" to insure maintaining front wheel alignment.

STEERING

Manual: Gemmer. Worm & Roller with "push-pull" adjustments.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Monroe "Power Guide". Linkage type.
See "Monroe Power Guide" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix Hydraulic, Single Anchor. Hand lever applies rear wheel service brakes.
See "Bendix Hydraulic, Single Anchor" in Brake Sect.

Drums — Diameter 10" (Front and Rear).

Wheel Cylinder Diameter — 1 1/8" (Front), 7/8" (Rear).

►*REAR WHEEL BRAKE CYLINDER PRODUCTION CHANGE:* Beginning with Car Serial Number K-652321 the diameter of the rear wheel brake cylinder was decreased to 7/8" from 15/16" to improve brake distribution.

Replacement Linings & Shoes — Linings and shoes with linings furnished standard size only.

	Lining Width & Length	
	Front Wheel	Rear Wheel
Primary Shoes	2" x 8 7/8"	1¾" x 8 7/16"
Secondary Shoes	2½" x 10 31/32"	1¾" x 10 25/32"

Clearance - .015" heel & toe of secondary shoe with primary out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.

Standard Master Cylinder: Mounted on support under floor pan.

Checking Fluid — Roll back floor mat, remove access hole cover, maintain fluid level ½-1" below filler opening.

Removal — Remove from below without disturbing other units.

Power Brakes: Bendix Power Unit. Replaces standard master cylinder.
See "Bendix Power Unit" in Brake Section.

Checking Fluid—Same as for standard master cylinder.

Removal—Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Nash-Hudson Air Conditioning. Thermostatic control with magnetic clutch on compressor unit.
See "Nash-Hudson Air Conditioning" in Miscellaneous Section.

Window Regulators: Electric with reversible motor. *See "Nash Window Regulators" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to center of cowl panel under hood

Starting Serial Number—R-757901 (Domestic), 6KD-4601 (Unassembled Export)

ENGINE NUMBER: Stamped on machined surface at upper right hand, front corner of cylinder block.

Starting Engine No.—A-279001 (Super Jet Fire-one carburetor), LMA-277001 (LeMans—two carburetors).

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. at cranking speed

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: .012" (Intake), .016" (Exhaust) Running Hot.

MANIFOLD HEAT CONTROL: None used.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030".

Spark Plug—Auto-Lite A-7 Torque to 30 ft. lbs.

COIL: Auto-Lite CAF-4003. *12 Volt.*

NOTE - No resistor used in primary circuit.

DISTRIBUTOR: Auto-Lite IAT-4301. *12 Volt.*

Condenser—Auto-Lite IAT-2015R **Capacity** 21-25 mfd.

Contact Point Set—Auto-Lite IGW-3028BS

Breaker Gap—.020"±.002".

Cam Angle—36-42°

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
3	450	6	900
7	650	14	1300
10	950	20	1900
14	1350	28	2700

Vacuum Spark Control: Integral type.

Vacuum Advance

Distr. Degrees	Eng Degrees	Vacuum (" of Hg.)
Start	0	5
1	2	6½
3	6	9½
5	10	12½
6	12	14

IGNITION TIMING

Setting—4° ATDC.

Timing Mark—Vibration damper.

CARBURETOR

►*CARBURETOR APPLICATION NOTE:* One carburetor (Carter YH 2368S) used on Super Jet Fire Engine, two carburetors (Carter YH 2369S) used on LeMans Engine.

►*WARM-UP & ACCELERATION STUMBLE CORRECTION (Carter YH-2368S):* Improved body castings used on carburetors bearing Code "L-5" or higher (Nov. 1955) on brass tag. Porous main body castings and imperfect sealing between bowl cover and main body near accelerating pump passage (early carburetors) resulted in too lean mixture causing poor warm-up and acceleration. Install carburetor with date tag "L-5" or later

Throttle Linkage Adjustment: Adjust engine idle speed to 450 RPM (with air conditioning 500 RPM, with compressor running), with engine temperature at 150-160°F, transmission warm and selector lever in Neutral. Disconnect throttle rod at throttle lever at side of transmission. Clean back of transmission case, place checking Gauge J-2545-D flush against machined surface with edge of gauge against transmission side cover Throttle lever stud should fit freely in notch of gauge. Use bending Tool J-3310 to correct throttle lever position. Gauge notch must be in alignment with pin through hole in T.V. lever, with lever held against its stop to the rear. When properly adjusted, connect throttle rod to T.V. lever. After checking adjustment of T.V. lever at transmission disconnect T.V. rod at Carburetor throttle shaft lever. Adjust T.V. rod to fit freely in hole of throttle shaft lever. Then shorten T.V. rod three full turns. *NOTE*—Gauge 2545-C can be reworked by adding another notch behind the original notch so that distance from center of notch to rear inside surface of Gauge is 6½".

CARTER YH-2368S

Idle Setting— ½-1½ turns open. Turn screw out for richer mixture

Idle Speed—550 RPM (Standard & Overdrive), 475 RPM (Hydra-Matic in Neutral), 500 RPM (Hydra-Matic in Neutral with Air Conditioning turned on)

Float Level—5/16" (T-109-107). Distance from bowl cover to top of float with cover inverted and gasket removed.

Fast Idle: .030" between throttle valve and bore (side opposite idle port) with choke fully closed.

Automatic Choke: 1 point rich.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter YH" in Carburetion Sect.*

Fuel Pump Pressure: 3½ - 5¼ lbs. at 500 RPM.

CARTER YH-2369S (Two Used)

Idle Setting—½-1½ turns open. Turn screws out for richer mixture

Idle Speed—550 RPM (Standard & Overdrive Trans.), 475 RPM (Hydra-Matic in Neutral), 500 RPM (Hydra-Matic in Neutral with Air Conditioning turned on).

Idle Adjustment—*To insure proper synchronization make idle adjustments in following sequence:*

1) Remove air cleaner boots and "Tee" from carburetor airhorns.

2) Adjust throttle stop screw on rear carburetor as follows Hold choke valve open, back off throttle stop screw until throttle valve is just closed, then turn screw in approximately 2 turns to crack throttle valve slightly Adjust front carburetor similarly.

3) Start engine and allow it to idle until normal temperature reached Attach Tachometer.

4) Adjust rear carburetor stop screw for minimum idle speed (See above).

5) While noting idle speed, synchronize front carburetor by adjusting connecting throttle linkage between carburetors, opening front carburetor throttle just to the point where further opening begins to increase engine speed. At this point, air suction noise in both carburetors should be identical.

6) Replace air cleaner boots and "Tee" connections.

7) Adjust idle mixture on rear carburetor by turning adjusting screw in (to lean mixture) until engine begins to be rough, then turn screw out ¼ turn. Adjust idle mixture for front carburetor similarly.

8) Recheck idle speed. If not within limits (see above) repeat synchronization (1 thru 5).

Float Level—7/16". Distance from bowl cover (gasket removed) and top of float at free end. Gauge T-109-81.

Accelerating Pump—No seasonal adjustment.

East Idle: .018" between throttle valve and bore (side opposite idle port) with choke fully closed.

Automatic Choke Setting: 2 points lean.

►*OTHER DATA: See "Carter YH" in Carburetion Sect.*

Fuel Pump Pressure: 3½ - 5¼ lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: AC. Fuel and vacuum pump.

Replacement Pump — AC No. 4309.

Pressure — 3½ to 5¼ lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite. Electric type.

Dash Unit — Auto-Lite 14159A.

Tank Unit — Auto-Lite 14165A.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Standard — **Auto-Lite 11-HS-50.** *12 Volt.* 11 plate, 50 Ampere hour capacity (20 hour rate).

Air Conditioned Cars — **Auto-Lite 11-HS-60.** *12 Volt.* 11 plate, 60 Ampere hour capacity (20 Hr. rate).

Grounded Terminal — Negative.

►*CAUTION: This is reversed from previous models.*

Engine Ground — Battery to engine with body ground from transmission to rear crossmember.

STARTER

Auto-Lite. *12 Volt.* Used as follows:

Auto-Lite No.	Starter	Armature
Std. & O.D. Trans.	MDF-6010	MDF-2037
Hydra-Matic	MDF-6009	MDF-2088

Drive—Bendix A2033 (Std. Trans.), A3281 (Hydra-Matic).

Rotation — Counter-clockwise from commutator end.

Brush Spring Tension — 42-53 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60 Max.
6.5 ft. lbs.	Lock	4.0	240 Max.

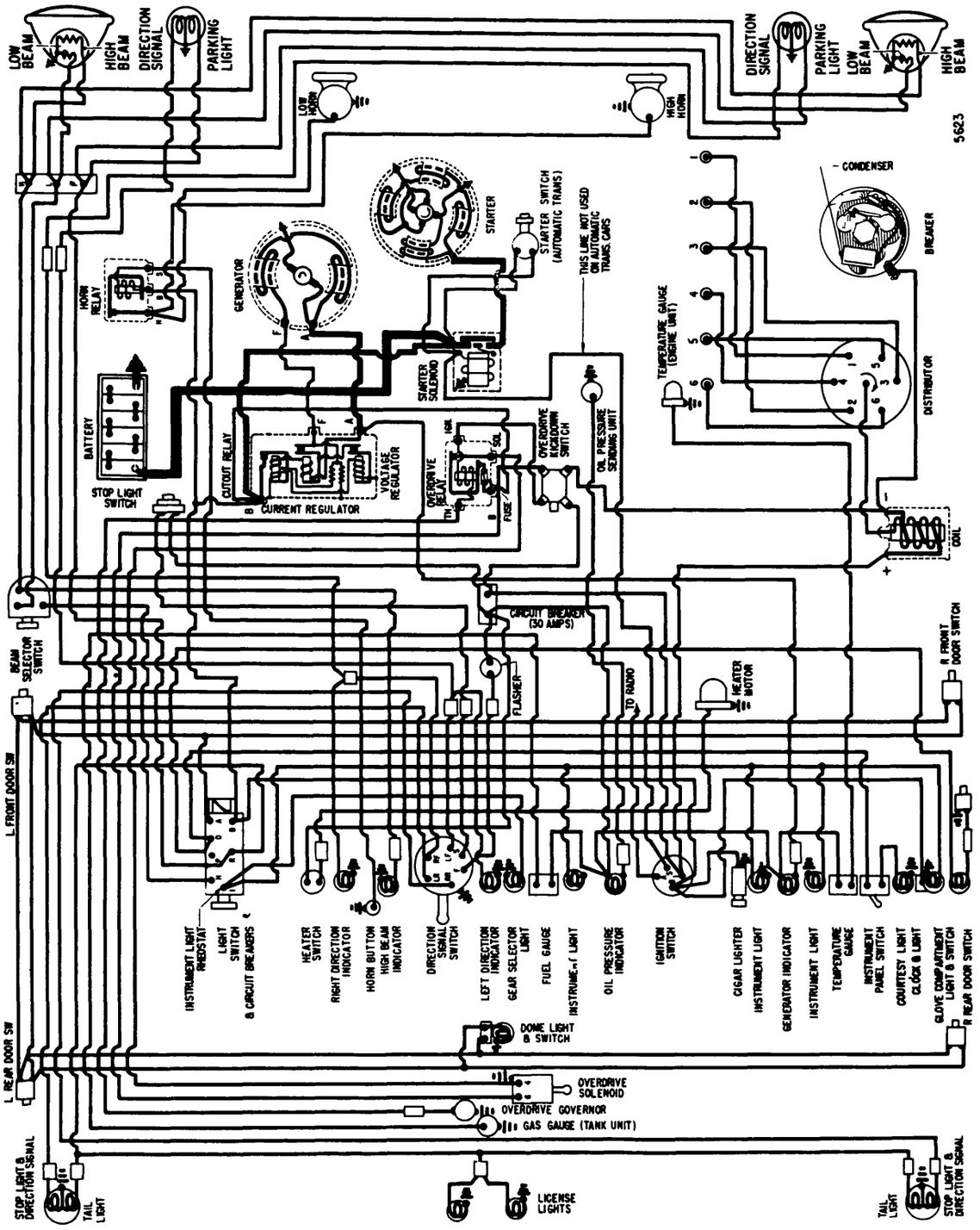
Starter Switch: Nash No. 3146189 magnetic switch located on starter, actuated by combination Ignition and Starter Switch (Standard and Overdrive), by Delco-Remy 1996085 Switch (Hydra-Matic), by raising shift lever while in Neutral position.

GENERATOR

Auto-Lite. *12 Volt.* Used as follows:

Auto-Lite No.	Generator	Armature
Standard	GJC-7007A	GJC-2052F
Air Cond.	GJC-7007B	GJC-2052F

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Performance Data—Cold

Amperes	Volts	RPM
20	15.0	1750
30	15.0	2250

NOTE—Do not operate at high output without ventilating fan for any length of time as to do so may result in burned armature or fields.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—18-36 ozs.

Field Current—1.23-1.32 amperes at 10 volts at 70°F.

Belt Adjustment: ½" deflection upon application of 25 lb. pressure applied midway between fan and Generator pulleys.

REGULATOR

Auto-Lite VRX-6008A. *12 Volt.*

Checking & Adjusting – *See Electrical Section.*

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - Discharge amperage 3-5 amperes.

Contact Gap—.015" min.

Air Gap—.031-.034", with contact open (check at hinge end of core).

Voltage Regulator

Setting—14.5 volts (80°F), charging at 10 amperes or with .25 ohm resistor between regulator and battery.

Air Gap—.048-.052" with contacts just opening.

Current Regulator

▶*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amperes	Test B
36 max.		30 (28-32)

Test A—After 15 minutes operation at 10 amperes.

Test B—After an additional 15 minutes operation on current regulator (with load to give 13.6-13.8 volts).

Air Gap—.048-.052" with contact just opening.

Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Light Switch Removal: Disconnect battery. With switch in "OFF" position, press button release on top of light switch assembly, pull knob and shaft clear of switch. Remove slotted nut, pull switch out to rear of instrument panel.

Stop Light Switch: Located at tee fitting in line to left front brake.

FUSES: **7.5 Ampere** on lighting switch for Courtesy and Glove Box Light.

15 Ampere. Located on overdrive relay.

5 Ampere. Located in radio wire back of instrument panel.

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CIRCUIT BREAKERS: Three used as follows:
12 Amp r – On light switch for Instrument, Tail and Dome lights.
12 Ampere – On light switch for Head and Parking lights.
30 Amper – For Stop Light, Instruments and Indicators, Heater and Directi nal Signals. Located back of Instrument panel.

HORNS: Auto-Lit HAD-4737 (Low Pitch), HAD-4738 (High Pitch).
H rn R lay – Nash No. 3145684.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTIONS: Use extrem car wh n disc nnecting any part of air conditi ning quipm nt r lines for access to engine.* **See *"Air C nditioning Service Cautions" in Misc. Sect.***

►*ENGINE NOISE (Similar to Bearing Noise) CORRECTION:* A noise usually diagnosed as a bearing noise may be caused by improperly assembled Vibration Damper, Reassemble cushions, Disc, and Rubber correctly on cars built prior to Engine No. A-280018.

►*WATER PUMP LUBRICATION CHANGE:* Lubrication fitting now used on pump. Lubricate at 5000 mile intervals using hand pressure gun.

ENGINE SPECIFICATIONS: 6 Cyl. Valve in head. **Super Jet Fir** (1 carburetor) & **LeMans** (2 carburetors).

	B r	Stroke	Displacement
All Engines	3½"	4 3/8"	252.6 cu. ins.

	C mpr. Rati	Rated HP	Developed HP
Super Jet Fire	7.6-1	29.4	135 at 3700 RPM
LeMans	7.6-1	29.4	145 at 4000 RPM

Compressi n & Vacuum R ading–*See TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie-rod before removing pan.

CYLINDER HEAD: *S "Cylinder Head & Manifold" in Nash Sp cial Data.*

TIGHTENING TORQUES: *See "Tightening Specificati ns" in Nash Sp cial Data.*

PISTONS

Cam ground, aluminum alloy, tin plated, with steel strut and solid skirt.
Original Bor & Pist n Sizes–*See "Original Bore & Pistons" in Nash Sp cial Data.*
Weight–19.57 ozs.
Rem val–Remove from above.

Fitting N w Pistons: Clearance .0009-.0015". Fit piston so that it will support itself in any part of cylinder bore (dry piston & bore).

R plac m nt Pist ns: Std., .002", .005", .010", .020", .030" & .040" Oversize.

Installing Pistons: Notch on front edge of piston must be toward front of engine. *See Rod Installation.*

PISTON PINS

Press fit in connecting rod. No locking device.
Diameter – .9308". Length – 3 3/16".
Clearanc in Piston – .0002" maximum. Thumb push fit at 70°
Pin Removal & Installati n – *See "Piston Pins" in Nash Special Data.*
Replacement Pins: Standard & .003", .005" Oversize.
NOTE – Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.0930-.0935"	.007"	.002-.004"
Oil #3	.1545-.1550"	.007"	.002-.004"
Oil #4	.1545-.1550"	②	.002-.004"

② No end gap with U-flex ring.

Replacement Rings: Std. & .020" Oversize. In sets.
Installing Rings: Stepped inner edges of both compression rings must be up.

CONNECTING RODS

Length–8.750" center to center. **Weight**–29 ozs.
Crankpin Journal Diameter–2.0010-2.0003".
Original Bearing Sizes–*See "Original Bearing Sizes" in Nash Special Data.*
Bearings–Steel backed babbitt. No shims.
Clearance - .001-.0015". **Sideplay** - .005-.015".
Replacement Bearings: Std., .001", .002", .010", .012" Undersize.
Installing Rods: The identification boss on center of rod is installed to front of engine.

CRANKSHAFT

Journal Diameter–2.4791-2.4798". Seven main bearings.
Original Bearing Sizes–*See "Original Bearing Sizes" in Nash Special Data.*
Bearings–Steel backed babbitt.
Clearance–.001-.0015".
Replacement Bearings: Std., .002", .010", .012" Undersize.
End Thrust: Taken on center No. 4 main bearing.
End Play–.003-.008".
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Nash Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Nash Special Data.*
FLYWHEEL REPLACEMENT: *See "Flywheel" in Nash Special Data.*
VIBRATION DAMPENER REMOVAL & INSTALLATION: *See "Vibration Dampener" in Nash Special Data.*

CAMSHAFT

Bearings–Steel-backed babbitt bushings (except #1 Cast Iron with babbitt lining).
Clearance–.002".
Camshaft Removal: *See "Camshaft & Bearings" in Nash Special Data.*
End Thrust: Controlled by position of chain sprocket & No. 1 bearing.
End Play–.004-.006".
Timing Chain: Morse. **Width**–1". **Pitch**–3/8". **Length**–22-1/2" or 60 links.
Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across center line of sprockets.
Engin Fr nt C v r Oil S al (Crankshaft Fr nt Seal): *See "Engine Front Cov r" in Nash Sp cial Data.*

VALVES

Tapp t Cl aranc : Intake .012" Hot. Exhaust .016" Hot.

Valv	H ad Diamet r	St m Diam t r	Length
Intake	1.787"	.3720-.3730"	5-31/64"
Exhaust	1.468"	.3725-.3735"	5-31/64"

Valve	Seat Angle	Lift	Stem Clearanc
Intake	30° ①	.393"	.002-.004"
Exhaust	45° ②	.3945"	.002-.004"

① –Valve face 29°. ② –Valve face 44°.

►*VALVE GRINDING CAUTION:* Replace valve when refacing reduces distance from top of valve face to top of valve to 1/32".
Valve Stem Oil Seal: *See "Valve System" in Nash Special Data.*
Valve Springs: Install springs with closed-coil end toward valve seat. **Free Length**–2-1/16".

Valve Spring Specifications

Valve	Lbs. Press.	Length
Closed	53-58	1-13/16"
Open	144-154	1-7/16"

Valve Guides: Pressed in. Use Tool J-4687 to replace guides. *NOTE*–Before removing guides, check height of guide and install guide to same height.
Rocker Arm Assembly: *See "Valve System" in Nash Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves–Open 12-1/2° BLDC. Close 51-1/2° ALDC.
Exhaust Valves–Open 53-1/2° BLDC. Close 10-1/2° ATDC.
Valve Timing Check–With No. 6 piston on TDC in firing position, set tappet clearance on No. 1 Intake & Exhaust at .003". Rock engine back and forth over TDC. Timing is correct if the Exhaust valve opens before TDC same amount that the Intake opens after the TDC mark.

OILING SYSTEM

Crankcase Capacity: 6 qts.
Normal Oil Pressure: 30 lbs. at 20 MPH, 12 lbs. minimum at 600 RPM.
Pressure Regulator Valve–Non adjustable, located in pump body. Opens at 50-58 lbs.
Oil Pressure Indicator–Light goes on when Ignition Switch is turned on, goes out as oil pressure reaches **5-8 lbs. Pressure Switch, Nash No. 3142826, located on right side of crankcase.**
Oil Pump: Gear type, driven off camshaft, mounted on center main bearing cap.
Pump Overhaul – *See "Oiling System" in Nash Special Data.*
Oil Filter: Partial flow type. Replace element every 8000 miles or less as needed.
Replacement Filter Element – Nash No. 3137443.
Crankcase Ventilation: Breather pipe in valve cover and filter in crankcase filler cap.

COOLING

Wat r Capacity: 17 qts. Add 1 qt. for heater.

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Pressure Valve: 7 lb. Radiator Filler Cap Nash No. 3142965 (less Air Conditioning), 14 lb. No. 3141371 (with Air Conditioning).

Thermostat: Choke type, Nash No. 3131817 (167-173°), Use 3131985 (177-182°) for permanent anti-freeze.

Water Pump: Sealed packing and bushing type.
See "Water Pump" in Nash Special Data-

Pump Removal—Drain cooling system, disconnect pump drive coupling (remove rear bolt), disconnect inlet hose, remove pump mounting screws.

Temperature Gauge: Auto-Lite. Electric type.
Dash Unit – Auto-Lite 14158A.
Engine Unit – Auto-Lite 13550A.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 10A7 Assy. No. 950. Single plate.
See "Borg & Beck" in Clutch Section.

Clutch Disc No.—Borg & Beck CD 752. Nash No. 3125822.

Pedal Adjustment: Pedal free travel 1/2-3/4". Adjust by loosening locknut and turning adjusting nut on control link at clutch fork.

►*CAUTION: The pedal to beam rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project 5/16" from beam toward the rear, to provide proper leverage.

Clutch Linkage—*See "Clutch Notes" in Nash Special Data.*

Removal: Remove transmission (see below), disconnect clutch pedal linkage, remove clutch housing and pan. Punch mark flywheel clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner AS25-T86E (Standard), AS46-T86E (With Overdrive). Three speed, helical gear type.
See "Warner Transmissions" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Move rear axle back (see Universals for procedure) to slip front universal joint off transmission. Disconnect shift levers and speedometer cable, remove two upper transmission to bell housing bolts, and install special guide bolts in their place. Remove lower bolts slide transmission out.

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: ***See "Warner R10 Overdrive Controls" in Transmission Section.***

HYDRA-MATIC DRIVE

Dual Range. Four speed automatic transmission with with fluid coupling.
See "Hydra-Matic Drive" in Transmission Section.

►*HYDRA-MATIC REVERSE GEAR SLIP-OUT CORRECTION. See "Hydra-Matic Drive" in Trans. Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Hydra-Matic Drive" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid every 1,000 miles, drain and refill at 25,000 mile intervals.

Capacity—11 qts. 12 qts. after disassembly.

Checking Fluid Level—Set hand brake, place selector lever in "N" position, start engine and idle for a minimum of 2 minutes after transmission has reached normal operating temperature. With selector lever in "N" position remove dipstick and check fluid level (dipstick located in engine compartment on right side). Add fluid to bring level up to "F" mark.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Detroit—Cross type. One used at rear of transmission

REAR AXLE

Own. Semi-floating, hypoid gear type with torque tube drive. *See "Nash Hypoid" in Transmission Section.*

Axle Ratio—4.1-1 (10-41) Std., 4.4-1 (9-40) with Overdrive, 3.2-1 (13-41) with Hydra-Matic.

Backlash—.002-.006" shim adjusted.

Axle Shaft Removal: Remove wheel, pull drum (use Hub Puller J-1644). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims (check thickness of shims, and replace same amount when reassembling). Withdraw shaft using puller J-2498, do not drag on inner seal.

Rear Axle Assembly Removal: Raise and support rear end of car. Disconnect rear brake cables at center equalizer. Disconnect torque tube at rear of transmission. Disconnect brake hose and shock absorbers at axle end (let hang from body). Roll axle free.

Wheel Bearing Adjustment: Shims behind brake backing plate.

Rear Suspension: ***See "Nash" in Suspensions & Wheel Alignment Section.***

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Serviced by replacement.

Front – Nash No. 3140879. Rear – Nash No. 3140406.

►***REAR SHOCK ABSORBER NOISE CORRECTION (Cars before Serial No. R-759717):*** **Before replacing a rear shock absorber for being noisy, check for damaged shock absorber grommet spacer or limit sleeve, (caused by incorrect retainer with oversize hole). If grommet spacer damaged, discard it. When reassembling without grommet spacer, do not use a retainer (Nash No. 3136432), however, do not compress shock absorber grommets excessively.**

FRONT SUSPENSION

Independent. With coil springs located between upper ends of steering knuckle pin and seat in outer wheelhouse panel.
See "Nash" in Suspensions & Wheel Alignment Section.

►***FRONT TIRE WEAR CORRECTION (Early Cars):*** **Wear due to tire contact with brake hose bracket can be corrected as follows: Set stopscrews on pitman arm to limit turning radius to 36°. If tire still contacts bracket, trim rear corner of bracket approximately 1/8" Cars built after April 11, 1956 have reworked brackets.**

King Pin Inclination—6-1/2°.

Caster—(Std.) Pos ½° desired (limits 0° to Pos ½°). (Power Steering) Pos 1° desired (limits Pos ½° to Pos 1°)

Camber—0° desired with 1/4° Neg. to 1/4° Pos. Limit.

Toe-In – 1/16" to 3/16". *CAUTION* – When adjusting toe-in on power steering cars, operate engine so that pump will supply oil pressure to center spool in power cylinder valve.

Toe-Out on Turns – Outer wheel 20¼°. inner wheel 25°.

STEERING

Manual: Gemmer Model 305. Worm & Roller with "push-pull" adjustments.
See "Gemmer Steering Gears" in Steering Section.

Power Steering: Bendix Linkage type.
See "Bendix Linkage Type" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix Hydraulic Single Anchor. Hand lever applies rear wheel service brakes.
See "Bendix Hydraulic, Single Anchor" in Brake Section.

Drums—11" front & rear.

Wheel Cylinder Diameter – Front 1 1/8". Rear 7/8".

►***REAR WHEEL BRAKE CYLINDER PRODUCTION CHANGE:*** **Rear brake cylinder reduced to 7/8" (was 15/16") beginning with Serial No. R-760903 to improve brake distribution.**

Lining Width & Length

Shoe	Front	Rear
Primary	2-1/2" x 9-3/8	2" x 9 5/16"
Secondary	2-1/2" x 12"	2" x 12"

Clearance—.015" heel & toe of secondary shoe with primary out against drum, or adjusting screw backed off 14 notches or clicks from point where wheel can just be turned by hand.

Standard Master Cylinder: Mounted on support under floor pan to left of transmission.

Checking Fluid—Roll back floor mat, remove access hole cover, maintain fluid 1/2-1" below filler opening.

Removal—Remove from below without disturbing other parts.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Nash-Hudson Air Conditioning. Thermostatic control with magnetic clutch on compressor unit.
See "Nash-Hudson Air Conditioning" in Miscellaneous Section.

Power Window Regulators: Electric with reversible motor. *See "Nash Window Regulators" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Hudson Hornet V8 ..... Model 35680
Nash Ambassador V8 ..... Model 5680

SERIAL NUMBER: Stamped on plate attached to center of cowl panel under hood.

Starting Serial Number (Hudson): Y-7201 (Domestic), YKD-1001 (Unassembled Export).

Starting Serial Number (Nash): V-11501 (Domestic), 8KD-1001 (Unassembled Export).

ENGINE NUMBER: Stamped on machined surface on top of cylinder block.

Starting Engine Number – P-21001.

TUNE-UP

►*DETONATION OR PRE-IGNITION CORRECTION: See Distributor Conversion Data below.*

►*SLOW COLD STARTING & POOR WARM-UP CHANGE & CORRECTION: See CARBURETOR below.*

►***POOR ENGINE PERFORMANCE (Automatic Choke) CORRECTION:*** Restrictions in exhaust gas passages of intake manifold affects automatic choke operation. *See "Cylinder Head & Manifold" in Nash Special Data.*

COMPRESSION PRESSURE: 140 lbs. Min. at 150 RPM with wide open throttle.

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: None in service (Hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic type. Located at left manifold outlet.

IGNITION

►***BURNED BREAKER POINTS OR HIGH SPEED MISS CORRECTION:*** May be caused by incorrect ignition primary resistor. Use only resistor with Auto-Lite trade mark. *See Resistor Data below.*

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders–RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033"-.037".

NOTE – Champion N-8 used up to Eng. No. P-21543 with .035-.037" gap. Use Champion N-18 for replacement.

COIL: Auto-Lite CAD-4004. *12 Volt.*

Ignition Current – 2.2 amperes (Idling, Hot).

Resistor – Auto-Lite PU-4001 (.665-.735 ohms).

DISTRIBUTOR: Auto-Lite IBK-4001B (Through Eng. No. P-25305), IBJ-4001D (Eng. No. P-25306 to P-28608), IBJ-4001C (Eng. No. P-28609 & Later), IBJ-4001E (Replacement of IBJ-4001D & C - see below). Double Breaker type (IBK-4001B). Single Breaker type (All others).

►***DISTRIBUTOR CONVERSION TO CORRECT PRE-IGNITION (IBJ-4001D & IBJ-4001C):*** If pre-ignition occurs when using premium fuel, and this cannot be corrected by retarding ignition, removing carbon, or other corrective procedures, distributors can be converted as detailed below. Install new IBJ-4001E nameplate (in kit) after conversion. *NOTE* - Complete IBJ-4001E furnished for replacement.

IBJ-4001D Conversion – Install all parts furnished in Conversion Kit Nash No. 6484607 (Vacuum Advance Chamber, Vacuum Spring, Governor Weight Spring, and small parts). Automatic and Vacuum advance will be the same as IBJ-4001E below.

IBJ-4001C Conversion – Install all parts furnished in Conversion Kit Nash No. 6484609 (Distributor Stop & Cam plate, Governor Weight Spring, Vacuum Spring, and small parts). Automatic & Vacuum advance will be the same as IBJ-4001E below.

Condenser–Auto-Lite IBB-2015L (IBK & IBJ Distributors). **Capacity** .25-.28 mfd.

Contact Point Set–Auto-Lite IGW-3028JS (IBK Distributor), IGW-3028 HS (IBJ Distributor).

Breaker Gap–.017" ± .002".

Cam Angle–38°±3° (IBK Distr.-both sets of contacts operating together), 31°±3° (IBJ Distr.).

Breaker Arm Spring Tension–17-20 ozs.

Rotation–Counter-clockwise viewed from above.

Automatic Advance–IBK-4001B

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
8	850	16	1700
15	1650	30	3300
16	1750	32	3500

Automatic Advance – IBJ-4001C

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
10	850	20	1700
15	2000	30	4000

Automatic Advance–IBJ-4001D

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	350	2	700
10	850	20	1700
13	1485	26	2970
14	1700	28	3400

Automatic Advance – IBJ-4001E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
8	900	16	1800
12	2000	24	4000
14	2550	28	5100

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance–IBK-4001B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6 1/4
1	2	6 5/8
6	12	9
11	22	12 1/8
12	24	13

Vacuum Advance – IBJ-4001C

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7
10	20	13

Vacuum Advance–IBJ-4001D

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6
1	2	6 3/8
6	12	8 5/8
11	22	11 5/8
12	24	12 1/2

Vacuum Advance – IBJ-4001E

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	8
1	2	8 5/8
6	12	12
9	18	14 3/4
10	20	16

IGNITION TIMING

Setting–5° BTDC.

Timing Mark–Timing indicator on chain case cover marked 0-5-10-15. Align groove in vibration dampener with "5" mark on indicator.

CARBURETOR

►***POOR WARM-UP PRODUCTION CHANGE & CORRECTION:*** *See "Carter WGD" in Carburetion Section for installation of parts furnished in Unitized Package as follows:*

1) Vacuum Piston Spring Change – Install on carburetors tag-dated before "M-5" (later carburetors have new spring installed).

2) Metering Rod Change – Install on cars before Eng. No. P-24900 (later engines have new rods).

►*SLOW COLD STARTING CORRECTION:* To correct, check spark plugs, ignition points, engine timing, and electrical connections. Choke valve must have .005" clearance in all positions, choke valve and shaft must operate freely, choke piston must be free in cylinder, and operate freely with no bind between unloader arm on choke lever and fast idle link. *NOTE*–Climatic control may be set one notch either rich or lean from standard setting.

THROTTLE LINKAGE ADJUSTMENT (1955-56): The carburetor throttle rod from carburetor to lever at the vertical rod must be 15½" from center of ball pivot at carburetor to "L" bend at rear end of rod. The adjuster rod that is connected to carburetor throttle rod and to the lever of the cross-shaft must be 6 9/16" from center-to-center of ends of rod. To change dimension, bend rod at present bend to obtain 6 9/16". The TV rod from cross shaft lever to the TV lever at the transmission must be 26 1/8" from center of pins. Bend rod to correct measurement. The TV lever must be adjusted so that taper on end of lever should contact a straight edge held against the machined surface at rear of transmission case. If necessary to adjust, loosen lever clamp screw nut and turn shaft counter-clockwise until valve has reached its stop. Hold shaft in this position and rotate lever on shaft so that taper on lever lines up with milled surface on rear of case. After measurements have been corrected, warm up engine, set carburetor idle to 400 RPM. Stop engine and loosen two locknuts at front and rear end of adjuster on rod. PLACE REAR END OF ROD IN CENTER HOLE OF THE CROSS SHAFT LEVER. Tighten two locknuts so that adjuster rod fits freely in lever. *NOTE*–Early production 1956 cars had adjuster rod in bottom hole of cross shaft lever. Relocate to center hole to improve shift characteristics.

CARTER WGD 2231S, SA

►*MANIFOLD FUEL DISTRIBUTION: Carbutor RIGHT barrels Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

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Idle Setting—½-1½ turns open. Turn screws out for richer mixture.

Idle Speed—425 RPM with transmission in "N" (Air Conditioning turned on).

Float Level—¼" from underside of bowl cover to top of float at center with needle valve seated. Measure with bowl cover and float assembly inverted.

Fast Idle: .030" throttle opening or clearance between valve and wall on side opposite idle ports with choke valve tightly closed. Adjust by bending choke rod at lower angle.

Automatic Choke: 1 point rich.

Ultramatic Throttle Linkage Adjustment: *See "Carburetor" above.*

▶*OTHER DATA: See "Carter WGD" in Carburetion Sect.*

Fuel Pump Pressure: 3½-5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Carter M2256S (Fuel & Vacuum).
Pressure – 3½-5 lbs. Max. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Stewart Warner (Hudson) or Auto-Lite (Nash). Electric type.
Dash Unit – Hudson 3119655 (Stewart Warner 441168), Nash 3119503 (Auto-Lite 14159A).
Tank Unit—Hudson & Nash 3146814 (Auto-Lite 14165A).
See "Fuel Gauges" in Carburetion Section.

BATTERY

(Std.) Auto-Lite 11-HS-50. *12 Volt.* **11 plate, 50 ampere hour capacity (20 hr. rate).**
(Air-Cond. Cars) Auto-Lite 11-HS-60. *12 Volt.* **11 plate, 60 ampere hour capacity (20 hr. rate).**
Battery Ground – Negative.
NOTE – This is reversed from previous models.
Engine Ground – Battery to engine with body ground from transmission to rear crossmember.

STARTER

Auto-Lite MDF-6008. *12 Volt.* **Armature MDF-2122.**
Drive – Overrunning Clutch (solenoid pinion shift).
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 42-53 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.5 ft. lbs.	Lock	4.0	240

Starting Switch: Auto-Lite Solenoid SAD-4101 on starter and control switch, Hudson & Nash No. 3146490, on steering column. Operated by lifting selector lever in "P" or "N" position.

GENERATOR

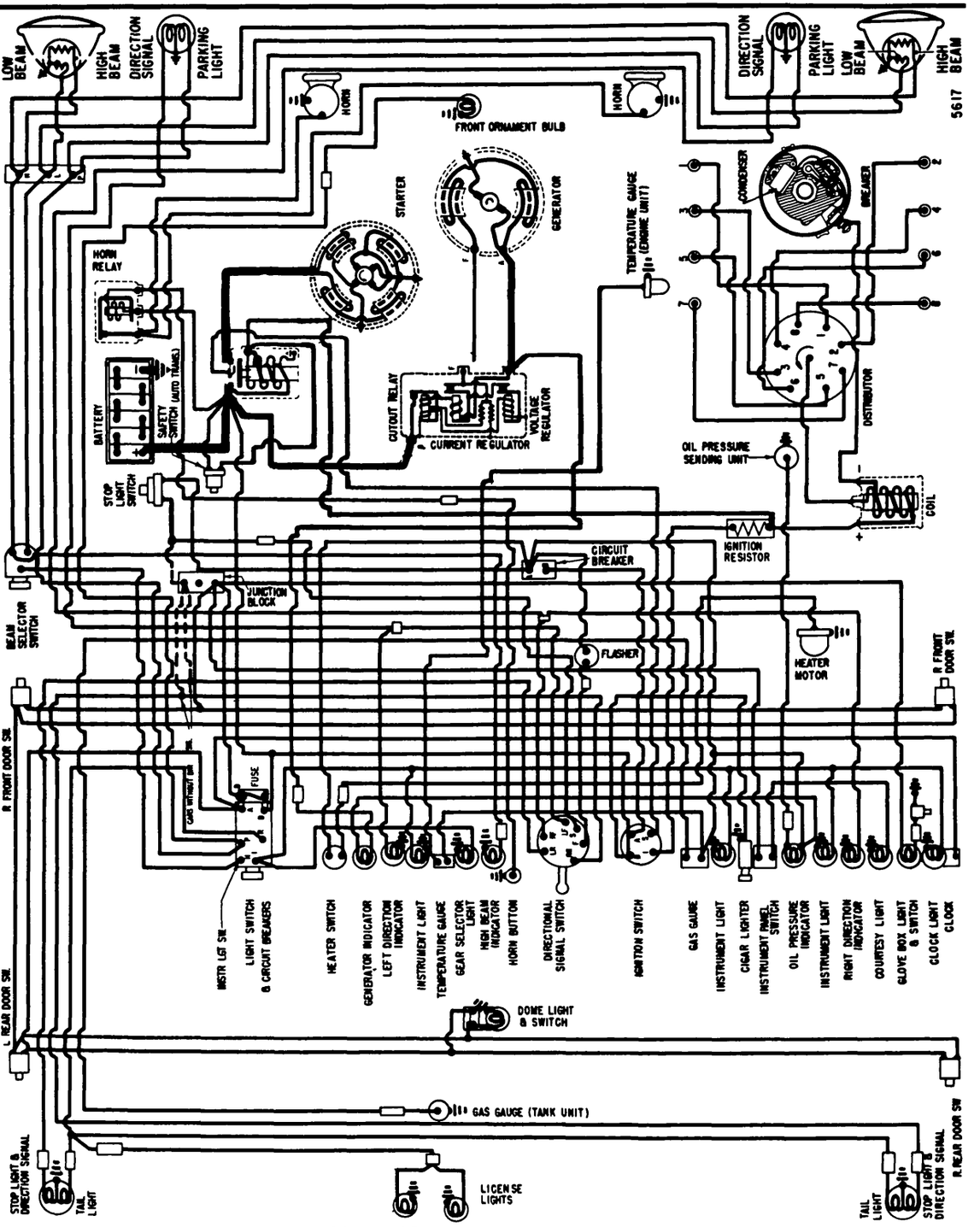
Auto-Lite GJC-7002F. *12 Volt.*
Armature—Auto-Lite GJC-2030J.
Maximum Charging Rate—*See Voltage Regulator.*

Performance Data—Cold

Amperes	Volts	RPM
20	15.0	1750
30	15.0	2250

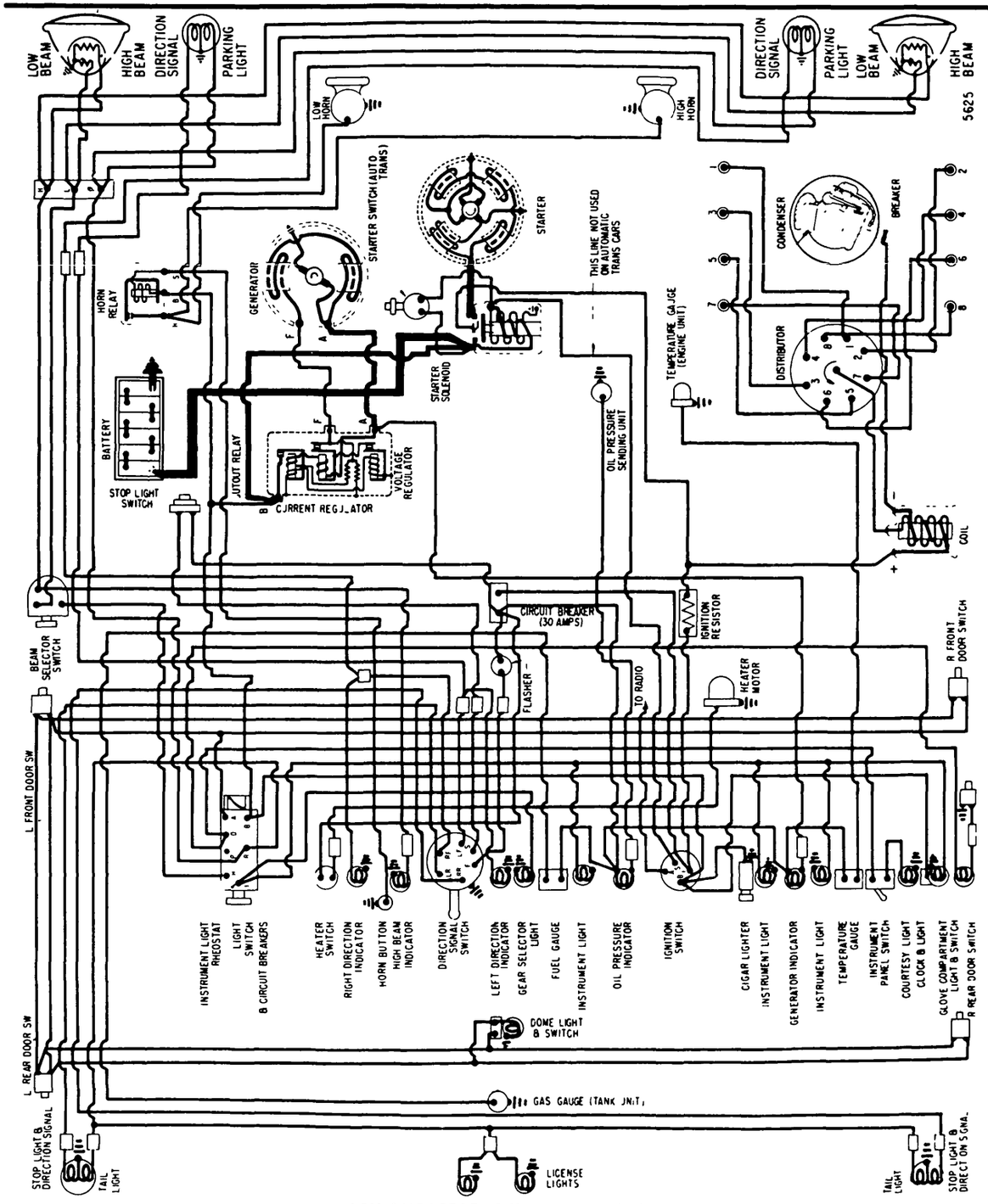
NOTE—Do not operate at high output without ventilating fan for any length of time as to do so may result in burned armature or fields.

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HUDSON HORNET V8 WIRING DIAGRAM

NASH AMBASSADOR V8 & HUDSON HORNET V8 1956



NASH AMBASSADOR V8 WIRING DIAGRAM

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Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—18-36 ozs.
Field Current—1.2-1.3 amperes at 10.0 volts (70°F).

Belt Adjustment: ½" deflection midway between water pump and generator pulleys.

REGULATOR

Auto-Lite VRX-6008A. *12 Volt.*

Cutout Relay

Cuts In - 12.6-13.6 volts.
Cuts Out - Discharge amperage 3-5 amperes.
Contact Gap—.015" min.
Air Gap—.031-.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting—14.5 volts (80°F), charging at 10 amperes or with .25 ohm resistor between regulator and battery.
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting —*See Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amperes	Test B
36		30 (28-32)

Test A—After 15 minutes operation at 10 amperes.
Test B—After an additional 15 minutes operation on current regulator (with load to give 13.6-13.8 volts).
Air Gap—.048-.052" with contacts just opening.

Checking & Adjusting — *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signals: *See Electrical Section.*

Light Switch Removal: Disconnect battery. With switch in "OFF" position, press button release on top of light switch assembly, pull knob and shaft clear of switch. Remove slotted nut, pull switch out to rear of instrument panel.

Stop Light Switch: Located at tee fitting in line to left front brake.

FUSES: **Lighting** — 7.5 ampere. On lighting switch. Protects Courtesy Light and Glove Box Light.
Overdrive — 15 ampere. On overdrive relay.

CIRCUIT BREAKER: Three used as follows:

12 Ampere — On light switch. Protects instrument lights, tail lights, and dome light.
12 Ampere — On light switch. Protects head lights and parking lights.
30 Ampere — On dash behind instrument panel. Protects Stop Light, Directional Signals, Instrument Gauges and Indicators, and Heater.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*IMPROVED OIL CONTROL PRODUCTION CHANGES & CORRECTION (1955 Cars before Engine No. P-17288):* For improved oil control at intake valve stems, THREE types of rocker arm shafts were used

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in production and latest type should be installed whenever trouble experienced with previous type shafts. *See Rocker Arms under "Valve System" in Hudson & Nash Special Data.*

►***IMPROVED OIL CONSUMPTION CHANGE (1955-56 Cars before Eng. No. 0-25589):*** **Valve spring baffles (as used on later engines) can be installed (Two types available for field installation).** ***See "Valve System" in Nash Special Data.***

►***ENGINE FRONT COVER OIL SEAL LEAK CORRECTION: See "Engine Front Cover" in Nash Special Data.***

►*INTAKE VALVE STEM OIL DEFLECTOR PRODUCTION CHANGE (1955 Cars before Engine No. P-13664).* Intake Valve Stem Oil Deflector, No. 6476056, used on later engines and can be installed on earlier engines for improved oil control. Deflector is a rubber cap installed on valve stem and over top section of valve guide.

ENGINE SPECIFICATIONS: V8 Valve-in-head type.

	Bore	Stroke	Displacement
1955	3 13/16"	3 1/2"	320 cu ins
1956	4"	3 1/2"	352 cu ins
	Compr. Ratio	**Rated HP**	**Developed HP**
1955	8 25-1 ℂ	46.5	208 at 4200 RPM
1956	9 55-1	51.2	220 at 4600 RPM

ℂ - 7 8-1 before Engine No. P-6001.

Compression & Vacuum Reading: *See TUNE-UP.*

OIL PAN REMOVAL: Remove steering idler arm attaching bolts and drop steering linkage. Remove exhaust crossover pipe

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Nash Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Nash Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset toward thrust side of piston

Removal–Pistons and rods removed from above

Clearance–.001-.0015" (top of skirt), 000-0015" (bottom of skirt)

Fitting New Pistons; Use .0015" x ½" feeler gauge between piston and cylinder wall (insert inverted piston in bore with pin hole parallel to crankshaft, push piston down until bottom of skirt slightly below top of block). Pull to withdraw feeler should be 6-11 lbs.

Replacement Pistons: Furnished Std. size, 010", .020". 030" oversize

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward front of engine

PISTON PINS

Full floating type. Retained in piston by lock rings at each end. **Diameter–**.9803"

Pin Fit in Piston - Palm press fit with piston heated to 200 °F in water

Pin Fit in Connecting Rod–Palm press fit at room temperature

Replacement Pins: Std. size, .003", .006" oversize

Piston Pin Bushing (In Connecting Rod) Installation: *See "Piston Pins" in Nash Special Data*

PISTON RINGS

Three rings (two compression & one oil) used. Upper compression ring is chrome plated.

Ring	Width	End Gap	Side Clearance
Compr.	.078'	.010-.018"	0015-005"
Oil	186"	.010-018"	.0015-005"

Installing Rings: Install upper compression ring and oil ring with gap toward camshaft side of engine. Install lower compression ring with gap toward opposite side from camshaft. All gaps should be midway between piston pin bosses

CONNECTING RODS

Length–6 25/32" (center-to-center)

Crankpin Journal Diameter–2.250"

Lower Bearing–Replaceable precision type

Clearance–.0005-.0025" **Sideplay** .003-.011"

Replacement Bearings: Std. size, .001", 002", 020" undersize

Installing Rods: Install odd numbered rods in left bank and even numbered rods in right bank, with numbers on rods facing down and away from block and milled oil groove in connecting rod cap upward and toward crankshaft

CRANKSHAFT

►*1955 CRANKSHAFT REAR MAIN BEARING OIL LEAK CORRECTION: See "Crankshaft & Main Bearings" in Hudson & Nash Special Data.*

Journal Diameter–2.500" Five bearings

Bearings–Precision type. The four front crankshaft bearings are interchangeable.

Clearance–.0005-.0025"

Replacement Bearings: Std. size, .001", .002", .020". undersize

End Thrust: Taken by No. 5 (rear) main bearing.

Endplay–.0035-.0085"

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Nash Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Nash Special Data*

Vibration Dampener: *See "Vibration Dampener" in Nash Special Data*

CAMSHAFT

Bearings–Five, steel-backed babbitt lined precision bearings.

Clearance–.0005-.0045"

End Thrust: Taken by thrust plate behind camshaft sprocket.

Endplay–.004-.006"

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Nash Special Data*

Timing Chain: Morse. **Width–**1" **Pitch–**.375". **Length–**64 links.

Timing Chain & Sprocket Removal– *See "Timing Chain" in Nash Special Data*

Engine Front Cover Removal: *See "Engine Front Cover" in Nash Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Nash Special Data*

Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. ***NOTE*** **– Install camshaft sprocket 1/16" beyond position flush with end of camshaft to permit installation of fuel pump drive eccentric.**

VALVES

►***VALVE SPRING BAFFLE INSTALLATION (Cars before Eng. No. P-25589): Will improve oil consumption. See "Valve System" in Nash Special Data.***

Tappet Clearance: Hydraulic lifters. Adjustment not required unless cylinder head removed or valve lifters replaced. ***See "Valve Tappet Adjustment" in Nash Special Data.***

1955 Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	1.937"	3725"	5.712'
Exhaust	1 687"	3715"	5 690"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	374"	001-002'
Exhaust	45°	374"	002-003"

1956 Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	2.000"	.3725"	5.712"
Exhaust	1.687"	.3715"	5.690"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	.398"	.001-.002"
Exhaust	45°	.388"	.002-.004"

Valve Seat Width – 3/64" (Intake), 5/64" (Exhaust).

Valve Stem Seals (Intake Valves) – Consist of a rubber deflector installed on intake valve stems and over top of valve guides.

Valve Springs: Single springs used Install springs with two closely wound coils against cylinder head

Valve Spring Specifications

Valves	Spring Pressur	Spring Length
Closed	78-86 lbs.	1¾"
Open	.158-172 lbs	1 3/8"

►***SPECIAL VALVE SPRING SEAT (For High Speed):*** **Special hardened Upper Valve Spring Seat, Nash No. 6492077 (identified by daub of red paint), is furnished for use where valve spring retainer (split lock) has pulled through upper spring seat. Recommended for replacement on cars operated at extreme high speeds.**

Valve Guides· Integral with cylinder head Ream valve guide holes for oversize valves if valve stem clearance excessive. Valves are furnished with 003", 010", .020", 030" oversize stems.

Checking Valve Stem Clearance and Reaming Guides for Oversize Valve Stems – *See "Valve System" in Nash Special Data.*

Valve Lifters: Hydraulic type.

►***LIFTER PRODUCTION CHANGE:*** **Hydraulic Lifter, Nash No. 6476060, has been changed for slower leakdown and improved noise level on initial start.**

Hydraulic Lifter Removal, Overhaul & Testing – *See "Valve System" in Nash Special Data.*

Rocker Arm Assembly: ***See "Valve System" in Nash Special Data.***

►*1955 ROCKER ARM SHAFT PRODUCTION CHANGES (For Improved Oil Control) & ROCKER ARM SQUEAK CORRECTION (Caused by insufficient oil reaching rocker arm shafts). See "Valve System" in Hudson & Nash Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

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1955 Valve Timing

Intake Valves - Open 14° BTDC. Close 56° ALDC.
Exhaust Valves - Open 52° BLDC. Close 18° ATDC.

1956 Valve Timing

Intake Valves – Open 14° BTDC. Close 62° ALDC.
Exhaust Valves – Open 54° BLDC. Close 18° ATDC.

Valve Timing Check – Remove left bank rocker arm cover. Turn engine until No. 1 cylinder intake valve is open. Let engine stand for several minutes, until hydraulic lifter has leaked down completely. Then hold pressure against the top of the pushrod to keep lifter arm from refilling, and turn engine until valve closes. Insert tip of a screwdriver between end of valve stem and rocker arm to keep plunger in lifter bottomed, and turn engine until just before mark on timing gear reaches the 15° mark on the timing chain case cover as No. 6 cylinder comes up on compression stroke. Attach a dial indicator to the flange on cylinder head so that it will read any movement of the No. 1 intake valve rocker arm at the pushrod end of the arm. Turn engine very slowly until rocker arm just starts to move. At this point, mark on damper should be just 14° BTDC. *NOTE*– Maximum deflection of timing chain should be ½". If deflection is greater, it will cause a variation in the valve timing.

OILING SYSTEM

Crankcase Capacity: 5 qts. (refill).

Normal Oil Pressure: 45 lbs. at 40 MPH. 10 lbs. at idle speed.

Pressure Regulator–In oil pump. Not adjustable.

Oil Pressure Indicator: Red light on instrument panel. Lighted when engine oil pressure low.

Oil Pressure Switch–King-Seeley 47195.

Oil Pump: Gear type. On rear main bearing cap, driven through distributor drive and camshaft gear.

Oil Pump Removal, Overhaul and Installation–*See "Oiling System" in Nash Special Data.*

Crankcase Ventilation: Filter element in oil filler cap (air intake). Outlet pipe in valve tappet cover.

COOLING

Water Capacity: **(1955)** 21 qts. (with heater), 20 qts. (without heater). **(1956)** 28 qts. (with heater), 27 qts. (without heater).

Pressure Valve Radiator filler cap. 7 lbs. (Std.), 14 lbs. (with Air Cond.).

Thermostat: (Std.) 170°, (Optl.) 150° for alcohol anti-freeze, 180° for permanent anti-freeze.

Water Pump: Packless type with sealed ball bearing. Pump is serviced by replacement as an assembly.

Temperature Gauge: Autolite, King-Seeley, & Stewart-Warner units used as follows:

Dash Unit - King-Seeley No. 46372 (1955 Hudson), Stewart-Warner type, Hudson No. 3119681 (1956 Hudson), Autolite No. 13881A (1955 Nash), No. 14158A (1956 Nash).

Engine Unit - King-Seeley No. 44215 (All 1955), Autolite No. 13550A (All 1956).

See "Temperature Gauges" in Miscellaneous Section.

ULTRAMATIC DRIVE

Packard "Twin-Ultramatic". Torque converter (with hydraulic operated direct speed clutch) and hydraulic operated planetary unit.

►*1955 ULTRAMATIC HIGH CLUTCH & LOW RANGE BAND FAILURE CORRECTION: See "Twin-Ultramatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Twin-Ultramatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level–*(CAUTION–Fluid level must be checked at normal operating temperature and after engine has been idling at 800 RPM for at least one minute to completely fill system).* Run engine at low idle speed while fluid level is being checked, using dipstick located in engine compartment. Add fluid as required to bring level to "Full" mark on dipstick.

Capacity–22 pints. Use only Automatic Transmission Fluid Type A having an AQ-ATF number on can.

Throttle Linkage Adjustment - *See CARBURETOR above.*

►*OTHER TWIN-ULTRAMATIC DATA: See "Twin-Ultramatic" in Transmission Section.*

UNIVERSALS

Mechanics: One universal joint used at front end of propeller shaft.

REAR AXLE

►*1955 PROPELLER SHAFT NOISE CORRECTION & PRODUCTION CHANGE:* Noise at 58-62 MPH with light throttle (pull or coast - similar to rear axle gear noise) may be caused by drive shaft. Install Two-piece Shaft No. 3145400. *NOTE* - This shaft used in production beginning Serial No. V-8235 (Nash), Y-5887 (Hudson).

Own. Semi-floating, Hypoid Gear with Torque Tube drive. *See "Nash Hypoid" in Rear Axle Section.*

Axle Ratio - (Early 1955) 3.54-1 (11-39), (Later 1955 & 1956) 3.2-1 (13-41).

Backlash - .002-.006".

Rear Axle Assembly Removal: Raise rear of body. Disconnect hand brake cable at bellcrank and the housing at bracket. Disconnect torque tube from transmission, rear brake hose at bracket on body floor pan, rear springs, shock absorbers and rear axle stabilizer bar at axle tube. Roll axle from under car and remove truss rods, torque tube and propeller shaft from rear axle.

Axle Shaft Removal: Remove wheel, pull drum (use Hub Puller J-1644-B). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims (check thickness of shims and replace same amount when reassembling). Withdraw shaft using Puller J-2498, do not drag on inner seal.

Axle Shaft Endplay - .002-.004". Adjusted by shims behind brake backing plate.

Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted.

Rear Suspension: *See "Nash" in Suspensions & Wheel Alignment Section.*

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Service by replacement.

Front - Nash No. 3118500 (1955), 3140879 (1956).
Rear - Nash No. 3117364 (1955), 3140406 (1956).

►*REAR SHOCK ABSORBER NOISE CORRECTION (Cars before Serial No. V-13160):* Before replacing a rear shock absorber for being noisy, check for damaged shock absorber grommet spacer or limit sleeve (caused by incorrect retainer with oversize hole). If grommet spacer damaged, discard it. When reassembling without grommet spacer, do not use retainer (Nash No. 3136432), however, do not compress shock absorber grommets excessively.

FRONT SUSPENSION

►*1955 CAMBER & CASTER ECCENTRIC BOLT NUT BOTTOMING CORRECTION:* If nut bottoms on bolt shoulder, install 5/8" I.D. washer under nut. Nut on later cars has increased counterbore to prevent this bottoming.

Independent. Coil springs located between upper ends of steering knuckle pin and seat in upper wheelhouse panel.

See "Hudson & Nash" in Suspension & Wheel Alignment Section.

►*FRONT TIRE WEAR CORRECTION (Early Cars):* Wear due to tire contact with brake hose bracket can be corrected as follows: Set stopscrews on pitman arm to limit turning radius to 36°. If tire still contacts bracket, trim rear corner of bracket approximately 1/8".

Kingpin Inclination – 3° 36' (Hudson), 6½° (Nash).
Caster –**(Std.)** ½° Pos. desired. Limits 0-½° Pos.
(Power Steering) 1° Pos. desired. Limits ½ - 1° Pos.
Camber – 0° desired. Limits ¼° Neg. to ¼° Pos.
Toe-In – 1/16" to 3/16". *CAUTION* – When setting toe-in on Power Steering Cars, operate engine so that pump oil pressure will center spool in power cylinder valve.
Toe-Out on Turns – **(Hudson)** Outer wheel 20°, Inner wheel 26°. **(Nash)** Outer wheel 20¼° (Std.), 21¾° (Power Steering), Inner wheel 25° (All).

STEERING

Manual: Gemmer Model 305. Worm & Roller with "push-pull" adjustments.
See "Gemmer Steering Gears" in Steering Section

Power Steering: Monroe "Linkage Type". *See "Monroe Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Steering Gears" in Steering Section.*

Steering Gear Removal: *See "Gemmer Steering Gears" in Steering Section.*

BRAKES

Bendix. Hydraulic duo-servo single anchor type without eccentric adjustment. Hand lever applies rear wheel service brakes.

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See "Bendix Hydraulic" in Brake Section.

Drum Diameter - 11".

Wheel Cyl. Diameter – 1 1/8" (Front), 7/8" (Rear).

►*REAR WHEEL BRAKE CYLINDER PRODUCTION CHANGE:* Beginning with car Serial Number Y-9019 (Hudson), V-13514 (Nash), diameter of rear wheel brake cylinder was decreased to 7/8" from 15/16" to improve brake distribution.

Lining Width & Length

	Front	Rear
Primary	2½" x 9 3/8"	2" x 9 5/16"
Secondary	2½" x 12"	2" x 12"

Clearance–Back off adjusting screw 14 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: Mounted on support under floor pan to left of transmission.

Checking Fluid–Remove access cover under floor mat on left side. Maintain level ½-1" below filler top.

Removal–Remove from below without disturbing other parts.

Power Brakes: Bendix Power Unit. Replaces standard cylinder.
See "Bendix Power Unit" in Brake Section.

Removal of Power Unit–Remove vacuum and air cleaner hoses at inlet tubes. Remove hydraulic line. Disconnect pushrod from brake pedal linkage. Remove unit from mounting brackets.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Own. Compressor clutch controlled magnetically. Inoperative unless control knob turned "ON". *See "Nash Air Conditioning" in Miscellaneous Section.*

►*1955 AIR CONDITIONING COMPRESSOR VIBRATION CORRECTION & COMPRESSOR BRACE PRODUCTION CHANGE: See "Nash Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric. Individual motors in each window. *See "Power Window Regulators" in Miscellaneous Section.*

► *AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Hudson Hornet Spec V8 (1956)	Model 35650
Nash Ambassador Spec V8 (1956)	Model 5650
Hudson Hornet (1957)	Model 35780
Nash Ambassador (1957)	Model 5780

SERIAL NUMBER: Stamped on plate attached to center of dash, under hood

Starting Serial N . . (1956) Hudson Z-1001 (Domestic) ZKD-1001 (Unassembled Export) Nash U-1001 (Domestic), UKD-1001 (Unassembled Export)

(1957) V-16501 (Amb V8) & Y-10501 (Hornet V8)

ENGINE NUMBER: Stamped in block at lower right front corner of engine

Starting Engin N . . G-1001 (1956), N-1001 (1957)

TUNE-UP

► *BURNED BREAKER POINTS OR HIGH SPEED MISS CORRECTION:* Caused by use of incorrect ignition primary circuit resistor. Use only resistor with Delco-Remy trademark. *See Resistor data below.*

COMPRESSION PRESSURE: 140 lbs. at cranking speed of 315 RPM (throttle wide open).

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between left bank exhaust manifold and exhaust cross-over pipe (exhaust gases diverted through heat passages in manifold when valve closed).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders – RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plug - Auto-Lite AL-7 or Champion H-10 14mm Torque to 30 ft lbs

COIL: Delc -R my 1115084 (1956), 1115087 (1957).

R sistor - Delco-Remy 1927809 1 4-1 65 Ohms

► *COIL RESISTOR NOTE* Connected in series between battery and coil Resistor is bypassed during cranking by solenoid or magnetic starter switch, making direct lead from battery to coil

DISTRIBUTOR: D lc -Remy 1110863 (1956), 1110887 (1957).

Condens r - Delco-Remy 1869704 (1956), 1932004 (1957)

Capacity - 18- 23 mfd

Contact P int Set - Delco-Remy 1918148 (1956), 1931988 (1957)

Br ak r Gap - 016"

Cam Angl - 26-33° (1956), 28-32° (1957) Set to 30°

Br ak r Arm Spring T nsi n – 19-23 ozs.

Rotati n – Counter-clockwise viewed from above.

1956 Automatic Advance - 1110863

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.5		350	1-5		700
2-4		400	4-8		800
7-9		800	14-18		1600
11-13		1125	22-26		2250

1957 Automatic Advanc - 1110887

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		350	0-4		700
7 5-9 5		775	15-19		1550
12-14		1300	24-28		2600
17-19		1900	34-38		3800

Vacuum Spark Control: D-R 1116095(1956), 1116117(1957)

1956 Vacuum Advance - 1116095

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
10	20	11.5-13.5

Plunger Travel – 7/32-15/64".

1957 Vacuum Advance - 1116117

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	5-7
10	20	14 25-15 75

IGNITION TIMING

Setting – 5° BTDC, at idling speed.

Timing Mark – Timing indicator on front cover and 5° mark on vibration damper.

► *DISTRIBUTOR INSTALLATION CAUTION:* When distributor installed and correctly timed (5° BTDC), upper distributur oil cap must be in center toward front of engine or few degrees to right side. If oil cap is to left of center, oil supply to right bank hydraulic lifter oil gallery may by-pass back to pan and cause noisy lifter operation.

CARBURETOR

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC CARS): Make adjustments in the following order

1) – Disconnect throttle valve rod from throttle valve lever on transmission case, disconnect vent pipe at lower left of case. Hold throttle lever to rear against stop. Distance from machined surface on rear of case to center of pin on throttle lever should be 5 9/16". Bend lever to correct position.

2) – Measure length of lower throttle valve rod from center of lower hole to outer surface of upper end. Length should be 16 1/8" (plus 0", minus 1/32"). Adjust by bending rod.

3) – Set carburetor throttle at slow idle (closed throttle). Adjust upper throttle rod at carburetor throttle rod bracket so that rod enters hole in bracket freely, then lengthen rod by turning adjusting end one full turn to left, tighten locknut and connect rod.

CARTER WCFB 2593S, SA

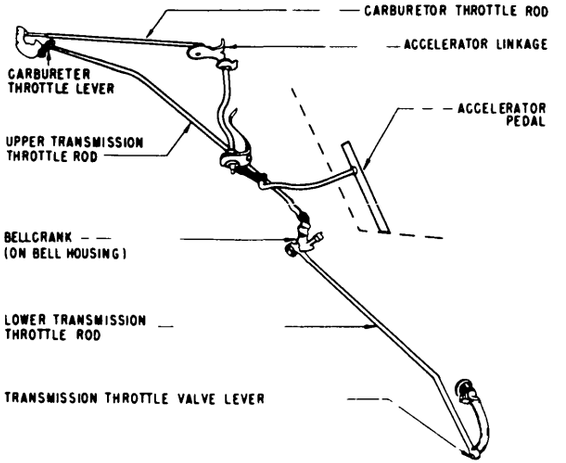
► *VAPOR LOCK OR LOW PRESSURE CORRECTION (Early Cars)* Carburetor-to-fuel tank return tube elbow, Part No 3152259 on some cars prior to Car Serial Number V-18114 (Nash), Y-11786 (Hudson) did not conform to specifications Affected part must have No 65 drill (034- 036") diameter hole drilled from male end to provide a correct metered opening If hole not drilled through vapor lock may result If drilled to 3/16" low fuel pressure may result To correct, install new fitting, Part No 3152259, with correct 034- 036" restriction

► *ROUGH ENGINE IDLE* May be caused by air leak in left primary throttle bore *See 'Carter WCFB Carburetors' in Carburetion Section*

► *MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barr ls f ed Cyl 2–3–5–8, LEFT barrels Cyl 1–4–6–7*

Idl S tting - ¼-1¼ turns open Turn screws out for richer mixture

Idl Sp ed - 550 RPM (Std & O D), 425 RPM (Auto Trans in Neutral), 475 RPM (Auto Trans & A C "ON")



1957 HUDSON & NASH AMBASSADOR THROTTLE LINKAGE

► *NOTE 1956 Models use 2-Bbl carburetors and 1957 Models use 4-Bbl carburetors See below for data*

CARTER WGD 2352S

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting – ½-1½ turns open. Turn screws out for richer mixture.

Idle Speed – (Std. & O.D.) 550 RPM, (Hydra-Matic) 425 RPM in Neutral, (Hydra-Matic & Air Cond.) 450 RPM in Neutral with Air Conditioning turned on.

Float Level – 7/32" (Gauge T109-106) between top of float and bowl cover, gasket removed, cover inverted and needle seated. Adjust by bending float arm.

Fast Idle: .023" between throttle valve and bore (side opposite idle port), with choke valve fully closed. Gauge T109-189. Adjust by bending choke connector rod at lower angle. *NOTE* – This fast idle setting will provide 1700-1800 RPM engine fast idle speed.

Automatic Choke: Centered (At Index).

Hydra-Matic Throttle Linkage Adjustment: *See Carburetor above.*

► *OTHER DATA· See "Carter Dual WGD" in Carb.Sect.*

► *OTHER DATA See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump· (1956) Carter M-2433S (before Serial No Z-1227), (1956-57) Carter M-2433SA (after Serial No Z-1227)

Pressure - 4-5½ lbs Maximum

See Fuel Pumps in Carburetion Section

Gasoline Gauge: Stewart Warner (Hudson) or Auto-Lite (Nash) Electric type

Dash Unit (1956) Stewart-Warner 441168 (Hudson) Auto-Lite 14159A (Nash)

(1957) Stewart-Warner 441168 (Hudson) Auto-Lite 14420A (Nash)

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Tank Unit - Auto-Lite No 14165A
See 'Fuel Gaug s in Carburetion Section

BATTERY

1956 (Std. Models) - Auto-Lite 11-HS-50 12 Volt, 11 Plate, 50 amp hour capacity (20 hr rate)
1956 (Air Cond.) & 1957 (All) - Auto-Lite 11-HS-60 12 Volt, 11 Plate, 60 amp hour cap (20 hr rate)
Battery Ground – Negative.
Engine Ground – Battery to engine with body ground from transmission to engine rear cross member.

STARTER

Delco-Remy 1107648. *12 Volt.* **Armature** 1926626.
Drive – Overrunning clutch (solenoid pinion shift)
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 35 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft.lbs.	Lock	11.3	435

Starter Switch: Delco-Remy No. 1119760 solenoid switch located on starter, actuated by combination ignition and starter switch (Std. and Overdrive cars), by Delco-Remy No 1996084 (1956) 1996085 (1957) Switch operated by raising shift lever upward (Hydra-Matic)

GENERATOR

Delco-Remy	Generator	Armature
1956 (Std)	1100324	1928952
1956 (Air Cond)	1103011	1923535
1957 (Std)	1102018	1923535
1957 (Air Cond)	1102070	1932900

Performance Data

Generator	Amperes	Volts	RPM
1100324	25	14	2780
1103011	30	14	2150
1102018	30	14	2210
1102070	35	14	2510

Rotation - Counter-clockwise at commutator end
Brush Spring Tension - 28 ozs
Field Current - 1 50-1 62 amps (1100324), 1 48-1 62 amps (1103011 & 1102018), 1 69-1 79 amps (1102070) 12 Volts at 80°F
Belt Adjustment: ½" deflection with 25 lbs pressure applied midway between fan and generator pulleys

REGULATOR

Delco-Remy 1119122 (1100324 Gen.), 1119003 (1103011 & 1102018 Gen.), 1119168 (1102070 Gen.). 12 Volt
NOTE - Specifications are "Normal" settings.

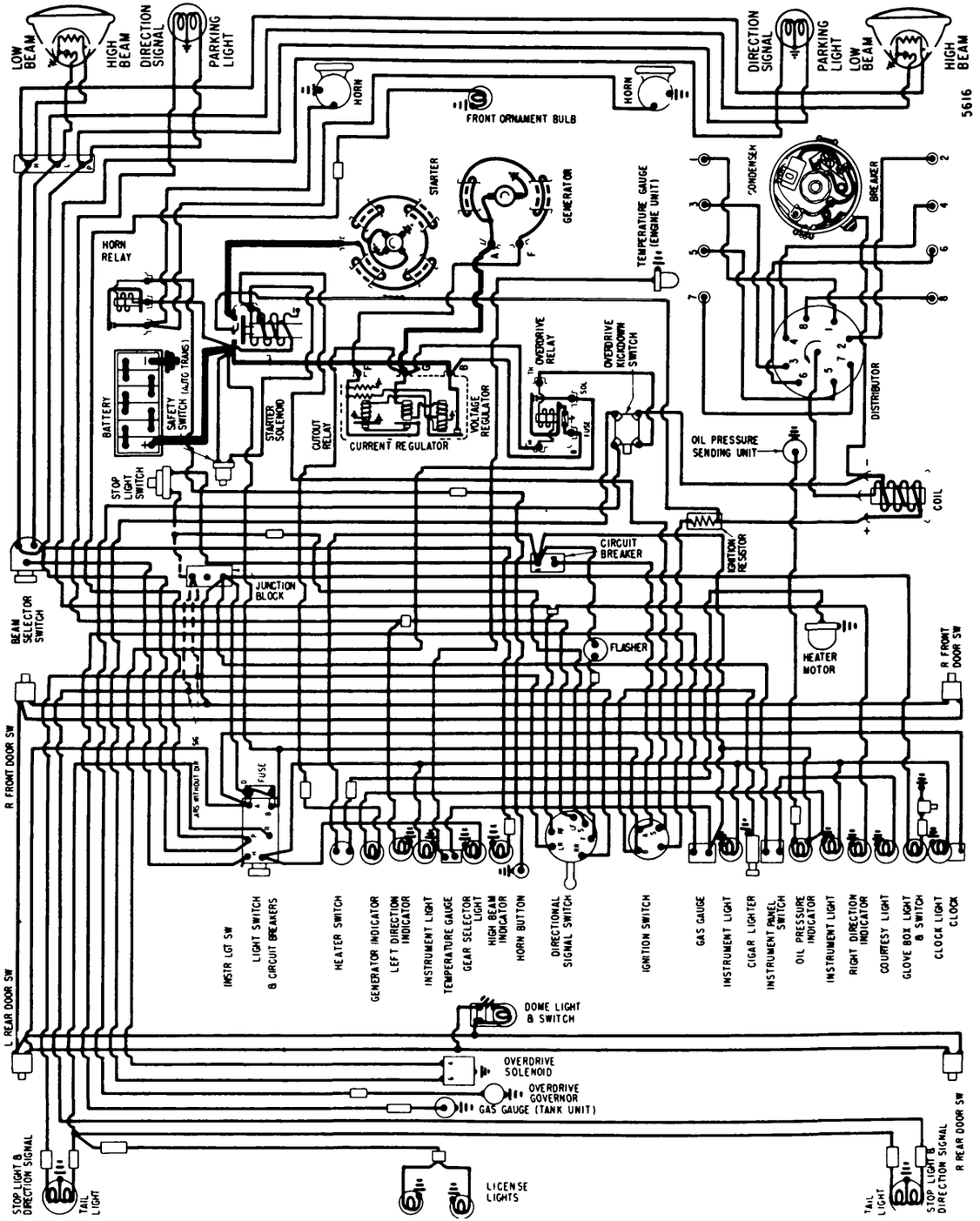
Cut-Out Relay

Cuts-In – 11.8-13.5 volts.
Contact Gap – .020".
Air Gap – .020" with contacts just closed.

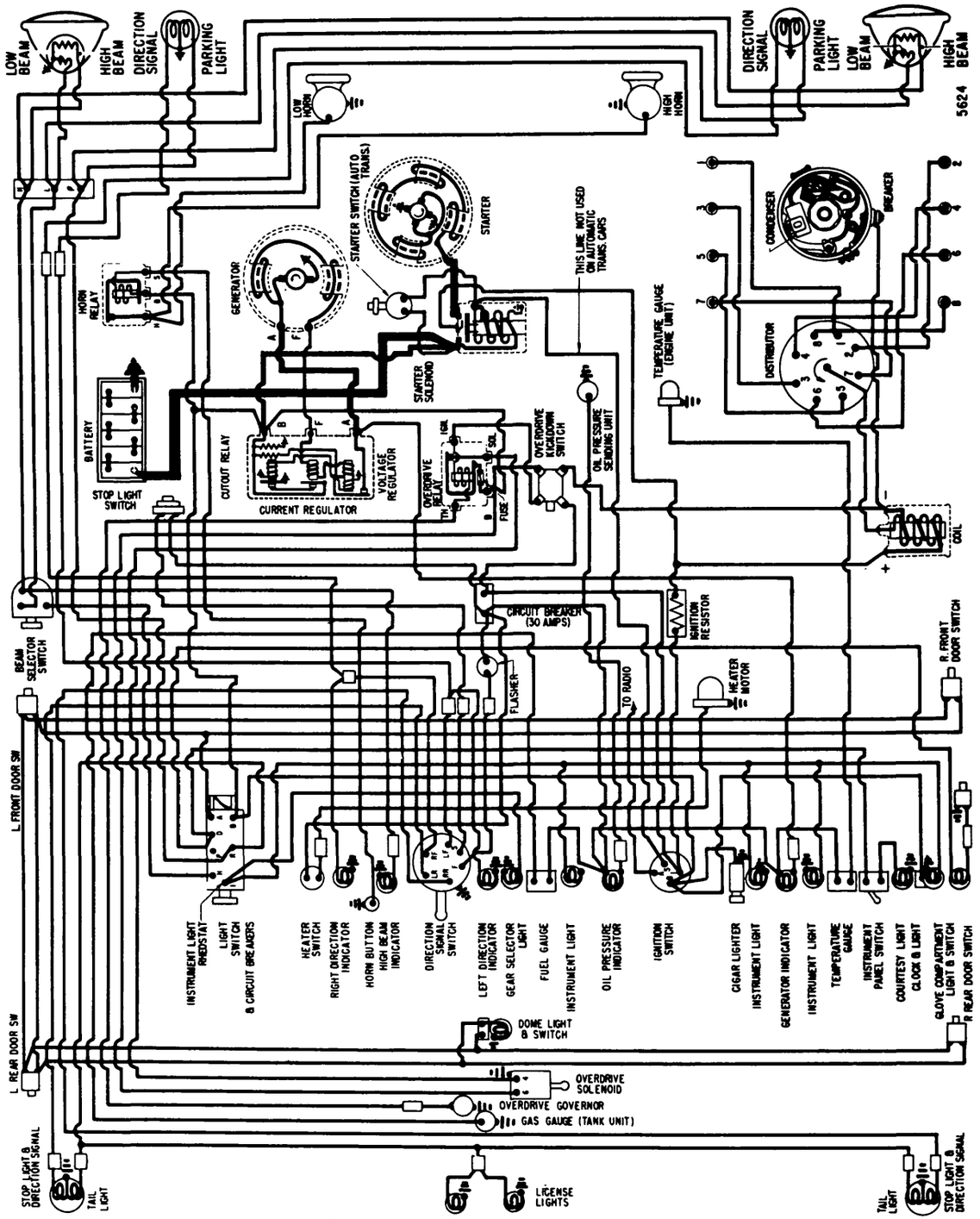
Voltage Regulator

Setting – 13.8-14.8 volts (Hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

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1956 HUDSON HORNET SPECIAL V8



1956 NASH AMBASSADOR SPECIAL V8

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Current Regulator

Setting (1119122) - 23-27 amperes (Hot).
Setting (1119003) - 27-33 amperes (Hot).
Setting (1119168) - 32-37 amperes (Hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam (All Exc. 1957 Nash). *See Electrical Section.* 4-Headlight System Standard on 1957 Nash. *See "4-Headlights" in Electrical Section.*

Directional Signals: *See Electrical Section.*

Light Switch Removal: Disconnect battery. With switch in "OFF" position, press release on top of light switch assembly, and pull knob and shaft clear of switch. Remove slotted nut, pull switch out to rear of instrument panel.

Stop Light Switch: Located in tee fitting in line to left front brake.

FUSES: 7.5 Ampere. On lighting switch for Courtesy and Glove Box lights.
15 Ampere. Located on overdrive relay.
5 Ampere. Located in Radio wire back of instrument panel.

CIRCUIT BREAKERS: Three used as follows:
12 Ampere. On light switch for Instrument, Tail and Dome lights.
12 Ampere - Head & Parking lights (Exc. 1957 Nash), located on light switch.
18 Ampere - 1957 Nash Head & Parking lights located on light switch.
30 Ampere. For Stop Light, Instruments and Indicators, Heater and Directional Signals. Located back of Instrument panel.

HORNS: Auto-Lite HAD-4737 (Low Pitch), **HAD-4738** (High Pitch). *12 Volt.*
Horn Relay – Nash No. 3145684.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Sect.*

►*NOISY VALVE LIFTER OPERATION (Right Cylinder Bank Only):* May be caused by incorrect distributor installation allowing oil to by-pass back to pan. *See Distributor Installation Caution under Ignition Timing.*

►*REAR MAIN BEARING CAP TORQUE CHANGE:* Rear bearing cap screws should be tightened to 50-55 ft.lbs. to avoid possibility of distorting cap (changed from 80-85 ft. lbs.). All other main bearing caps should be tightened to 80-85 ft. lbs.

►*1957 EXHAUST RUMBLE CORRECTION:* On cars prior to Serial No. Y-11460 (Hudson), V-17650 (Nash), reversed front tail pipe supports may cause an exhaust rumble. Correct by installing both supports with fabric side toward front of car.

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ENGINE SPECIFICATIONS: Own V8. Valve in head.

Bore	Stroke	Displacement
3½" (1956)	3½"	250 Cu.Ins.
4" (1957)	3¼"	327 Cu.Ins.

Compression Ratio	Rated HP	Developed HP
8.0-1 (1956)	39.2	190 (4900 RPM)
9.0-1 (1957)	51.2	255 (4700 RPM)

Compression & Vacuum Reading – *See TUNE-UP.*

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Nash Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Nash Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset toward thrust side of piston.

Removal – Piston & Rods removed from above.

Clearance - .001-.0015" (1956), .0009-.0025" (1957) Top of skirt. .0009-.0015" (1956-57) Bottom of skirt.

Replacement of Pistons: Std., .002", .005", .010", .020", .030", .040" Oversize.

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward front of engine.

PISTON PINS

Press fit in connecting rod. No locking device.

Pin Fit in Piston – Palm press fit at room temperature.

Pin Removal & Installation – *See "Piston Pins" in Nash Special Data.*

Replacement Pins: Std., .003", .005" Oversize.

PISTON RINGS

Three rings (two compression & one oil) used. Upper ring is chrome plated. Oil control ring is three piece type (two oil control wiper rails with a segmented steel spacer between them).

Ring	Width	End Gap	Side Clearance
Compr. #1	.0778"	010- 020"	002 - .006"
Compr. #2	.0778"	.010- 020"	.002 - 006"
Oil #3	0245"	015- 055"	0001- 0079"

CONNECTING RODS

Crankpin Journal Diameter – 2.2483-2.2490".

Lower Bearing – Precision, steel-backed, babbitt.

Clearance – .0007-.0028". **Side Clearance** –.004-.012".

Replacement Bearings: Std., .001", .002", .010", .012" Undersize.

Installing Rods: Assemble connecting rod with notch in piston and connecting rod identification mark to front of engine. Cylinder numbers on connecting rod should be toward outside of bank in which they are installed.

CRANKSHAFT

Journal Diameter – 2.4983" - 2.4990". Five bearings.

Bearings – Precision, steel-backed, babbitt.

Clearance – .0006"-.0032".

Replacement Bearings: Std., .001", .002", .010", .012" Undersize.

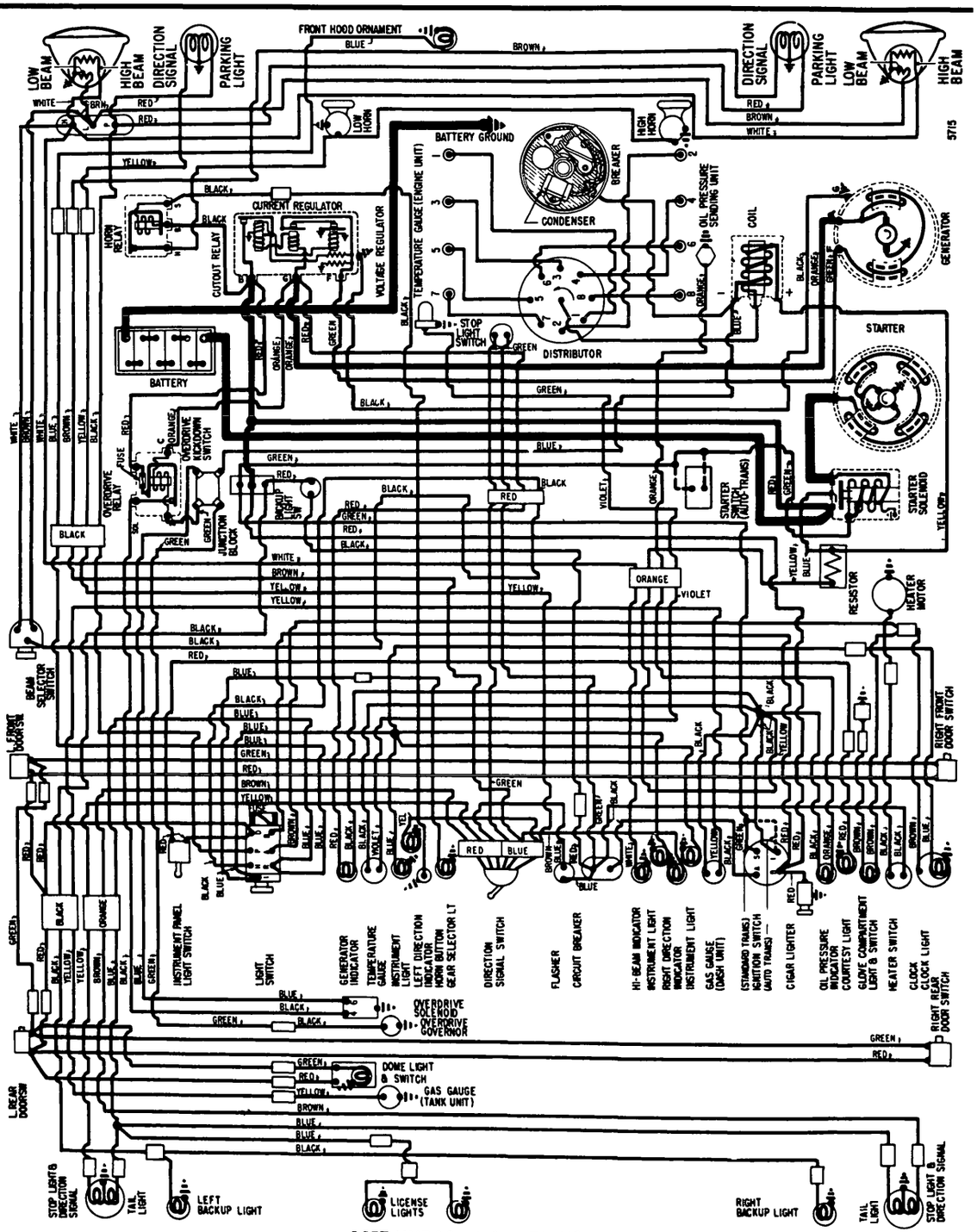
End Thrust: Taken by No. 1 flanged bearing.

Endplay – .003-.007".

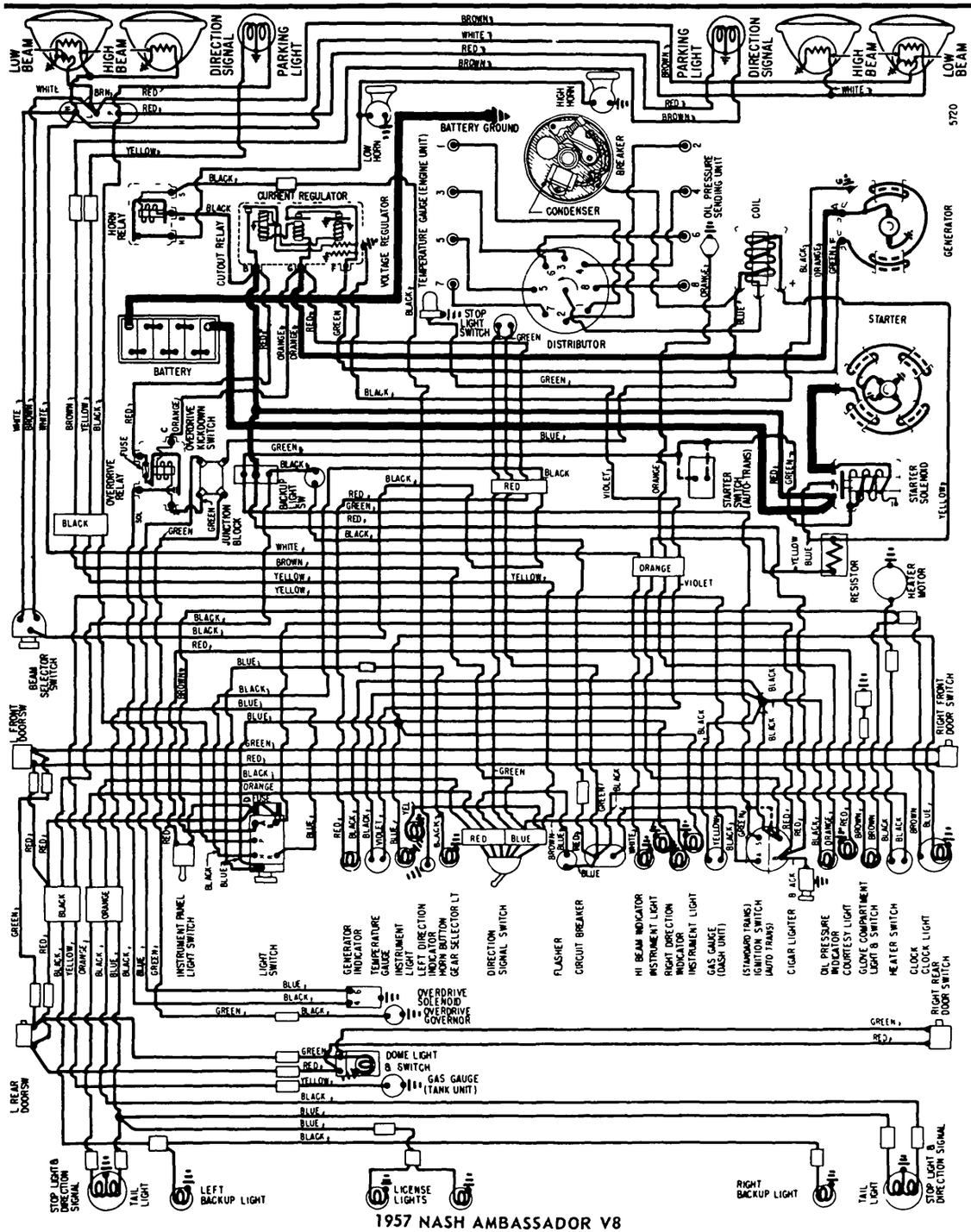
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Nash Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Nash Special Data.*

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1957 HUDSON HORNET V8



1957 NASH AMBASSADOR V8

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VIBRATION DAMPER REMOVAL & INSTALLATION: *See "Vibration Damper" in Nash Special Data*

CAMSHAFT

►1957 *CAMSHAFT REPLACEMENT CAUTION:* Camshafts designed for use with mechanical lifters not interchangeable with those designed for hydraulic lifters. Mechanical lifter shafts identified by white paint on area ahead of oil pump and distributor drive gear. Hydraulic lifter shafts have no identifying marks.

Bearings – Five, steel-backed, babbitt lined bushings pressed in block and line reamed.
Clearance – .001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket.
End Play – .003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Nash Special Data.*

Timing Chain: Morse non-adjustable type. **Width** .875" **Pitch** .375" **Length** 23¼" or 62 links.

Engine Front Cover Removal: *See "Engine Front Cover" in Nash Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Nash Special Data.*

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. To check assembly – Rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.

VALVES

Tappet Clearance – None in service (Hydraulic).

Valve	Head Diameter	Stem Diameter
Intake	1.787"	.3412-.3417"
Exhaust	1.406"	.3407-.3412"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30° ①	.375"	.0013-.0028"
Exhaust	45° ②	.375"	.0018-.0033"

① - Face Angle 29° ② Face Angle 44°.

Valve Seat Width – .078-.093" (Intake), .093-.104" (Exhaust).

Valve Stem Seals – Rubber deflector installed on valve stem and over top of guide on all valves.

Valve Springs: Install springs with closed coil end against cylinder head. **Free Length** - 2.20".

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85 - 91 lbs.	1 13/16"
Open	150 -160 lbs.	1 7/16"

Valve Guides. Drive old guides out, drive new guides in to height of ¾" ± 1/64" above cylinder head (measure from top of guide to flat machined surface of lower spring retainer on head). Ream all guides to I.D. of .3430-.3440" after installation.

Valve Lifters: Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing – *See "Valve System" in Nash Special Data.*

Rocker Arm Assembly: *See "Valve System" in Nash Special Data.*

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VALVE TIMING

See "Camshaft Setting" und r CAMSHAFT abov .

Intake Valves–Open 12°30' BTDC. Close 51°30' ALDC.
Exhaust Valves– Open 53°30' BLDC. Close 10°30' ATDC.

Valve Timing Check: Remove valve compartment cover and spark plugs. Crank engine until #6 piston in right bank is on TDC of compression stroke (#1 piston will be on TDC of exhaust stroke in overlap position). Rotate crankshaft 90° counter-clockwise. Install dial indicator on #1 intake rocker arm pushrod end. Crank engine in a clockwise direction until dial indicator dicates pushrod movement, (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* – If more than ½" variance in either direction, remove timing chain cover and inspect installation. Replace if deflection exceeds 1/2".

OILING SYSTEM

Crankcase Capacity – 5 quarts.

Normal Oil Pressure: 10 lbs. minimum at 600 RPM.

Pressure Regulator – In oil pump. Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator – Light on instrument panel controlled by pressure switch, Nash No. 3142826, (6½ lbs) or No 3200422 (4 lbs) (1957) located on left rear side of engine block

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft. *NOTE* – Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul and Installation – *See "Oiling System" in Nash Special Data.*

Crankcase Ventilation: Filter element in oil filler cap (air inlet) and outlet pipe in valve tappet cover.

COOLING

Water Capacity: 21 qts (1956), 19 qts (1957) Add 1 qt for heater

Pressure Valve: Radiator filler cap. 7 lbs. (Std.), 13 lbs. (Air Cond.).

Thermostat: Choke type, Nash No. 3132708 (150°), No. 3131817 (167 - 173°), No. 3131985 (177 - 182°) for use with permanent anti-freeze.

Water Pump - Service as assembly Requires no lubrication

Temperature Gauge: Stewart Warner (Hudson) or Auto-Lite (Nash). Electric type.

Dash Unit – Hudson 3119681, Nash 3119504 (Auto-Lite 14158A).

Engine Unit – Hudson & Nash 3144585 (Auto-Lite 13550A).

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 10A7 Assy. No. 950 or 1436 (1956), and Borg & Beck 10.5A6 Assy. No. 361442 (Std.) & 361449 (H avy Duty) (1957). Single Plate *See "Borg & Beck" in Clutch Section.*

Clutch Disc - Borg & Beck CD-752 (1956), 382574 (1957)

P dal Adjustment: Pedal free travel ½ - ¾". Adjust by loosening locknut and turning adjusting nut on control link at clutch fork.

►*CAUTION: The pedal to b am rod should never be disturbed in service.* With pedal against floor board, outer end of beam lever should project 3/8" forward of the rear edge of beam bracket,to provide proper leverage.

Removal: Remove transmission (see below), disconnect clutch pedal linkage, remove clutch housing and pan. Punch mark flywheel clutch cover and pressure plate (reassemble to same marks), take out clutch fork and mounting screws in cover flange.

SYNCHRO-MESH TRANSMISSION

Warner. Three speed, helical gear type.
See "Warner Transmissions" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect hydraulic brake tube bracket on underside of body torque tube at rear of transmission hand brake cable and housing speedometer cable, and shifter rods Disconnect overdrive control cable and electrical control wires from solenoid and governor where so equipped Move rear axle to rear to separate universal joint Remove two upper transmission-to-bell housing bolts and install special guide pins (Tool J-1434) in their place Remove lower bolts slide transmission out

OVERDRIVE

Warner R10. *See "Warner R10 Overdrive" in Transmission Section.*

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

HYDRA-MATIC DRIVE

"Flashaway" Hydra-Matic. New four speed, hydraulically controlled transmission with two fluid couplings. *See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication – Check fluid every 1,000 miles. Drain and refill every 25,000 miles (remove oil pan and clean oil screen). Use Automatic Transmission Fluid type "A" ("AQ-ATF").

Checking Fluid Level – Bring transmission to normal operating temperature. Idle engine to 425 RPM, with selector lever in "P" (Park) position, with car on level floor. Remove fluid level indicator, wipe clean, reinsert it, then remove it again and note reading.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual Coupling Hydra-Matic Drive" in Transmission S ction.*

UNIVERSALS

D tr it r M chanics. One universal used at front end of propeller shaft.

REAR AXLE

Spicer. Semi-floating, hypoid gear with torque tube drive.
See "Spicer Hypoid" in Rear Axl S ction.

Axle Ratios (1956) - Std. 4 1-1 (11-45), **Ov r-drive** 4 5-1 (11-50), **Hydra-Matic** 3 5-1 (13-46)
(1957) - Std. & Overdrive 4 1-1 (10-41), **Hydra-Matic** 3 2-1 (13-41)
Backlash – .002-.006".

Axle Shaft Removal: Remove wheel, pull drum (use Hub Puller J-1644). Disconnect brake line and cable. Remove backing plate mounting bolt nuts, take off oil seal retainer, backing plate and wheel bearing adjusting shims (check thickness of shims, and replace same amount when reassembling). Withdraw shaft using Puller J-2498; do not drag on inner seal.

Rear Axle Assembly Removal: Raise and support rear end of car. Disconnect rear brake cables at center equalizer. Disconnect torque tube at rear of transmission. Disconnect brake hose and shock absorbers at axle end (let hang from body). Roll axle free.

Axle Shaft Endplay - 002- 004" Adjusted by shims behind brake backing plate *NOTE* - Adjust endplay at right side only
Wheel Bearing Adjustment - Will be correct when axle shaft endplay adjusted

Rear Suspension: *See "Nash" in Susp nsi ns & Wheel Alignment Section.*

SHOCK ABSORBERS

Delco or Monroe. Direct acting type. Serviced by replacement.

Front - Nash No 3140879 (1956), 3200285 (1957)
Rear - Nash No 3140406 (1956), 3119751 (1957)

FRONT SUSPENSION

Independent. With coil springs located between upper ends of steering knuckle pin and seat in outer wheelhouse panel.

See "Nash" in Suspensions & Whe l Alignm nt S ction.

King Pin Inclination – 3°36' (Hudson), 6½° (Nash).
Caster – **(Std.)** ½° Pos. desired. Limits 0-½° Pos.
(Power Steering) 1° desired. Limits ½° - 1° Pos.
Camber – 0° desired. Limits ¼° Neg. to ¼° Pos.
Toe-In – 1/16" to 3/16". *CAUTION* – When adjusting toe-in on Power Steering Cars, operate engine so that pump will supply oil pressure to center spool in power cylinder valve.

Toe-Out on Turns - (1956) (Hudson) Outer wheel 20°, inner wheel 24° (Nash) Outer wheel 20¾°, inner 25° **(1957)** Outer wheel 20¼°, inner wheel 25° **(Std.),** Outer wheel 21¾, inner wheel 25° **(P w r Steering).**

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STEERING

Manual: G mm r Mod l 305. Worm & Roller with "push-pull" adjustment.
Se "G mm r Steering G ars" in Steering Section.

Power Steering: Monroe Power Guide. Linkage type.
S "Monro Pow r Guid " in Steering Section.

St ering L i n k a g : *S "Steering Linkage" in Steering S cti n.*

Steering Wh l & H rn Button Removal: *See "Gemmer St ring G ars" in St ring Section.*

St ering G ar R m v a l: *See "Gemmer Steering Gears" in St ering S ction.*

BRAKES

B ndix Hydraulic, Singl Anchor. Hand lever applies rear wheel service brakes.

S e "B ndix Hydraulic, Singl Anch r" in Brake S ct.

Drums – Diameter 10". (Front and Rear).

Wh l Cylind r Diam t r – 1 1/8"(Front), 7/8" (Rear).

R plac m nt Lining & Sh s: Linings and shoes with linings furnished standard size only.

Lining Width & Length	Front Wheel	Rear Wheel
Primary Shoes	2" x 8 7/8".....	1¾" x 8 7/16"
Secondary Shoes....	2½" x 10 31/32"...	1¾" x 10 25/32"

Clearance – .015" heel and toe of secondary shoe with primary shoe out against drum, or adjusting screw backed off 14 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: Mounted on support under floor pan.

Checking Fluid – Roll back floor mat, remove access cover. Maintain fluid level ½ - 1" below top of filler opening.

R m val – Remove from below without disturbing other units.

P w r Brak s: B ndix P w r Unit. Replaces standard master cylinder.
See "Bendix Power Unit" in Brake Section.

Checking Fluid – Same as for standard master cylinder.

Removal – Same as for standard master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link & Arm type. *Se "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Nash-Hudson Air Conditioning. Thermostatic control with magnetic clutch on compressor unit.
See "Nash-Hudson Air Conditioning" in Misc. Sect.

Window Regulators: Electric with reversible motor. *Se "Nash Window Regulators" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

1954-59 6 CYL. MODELS

	Ft. Lbs.
Cyl. Head Nuts 7/16"	52-57
Cyl. Head Nuts 1/2"	85-90
Cyl. Head Capscrews	70
Manifolds	20
Main Bearing Caps	85
Con. Rod Nuts 3/8"	45-50
Con Rod Nuts 7/16"	50-75
Flywheel	60
Oil Pan Screws	15
Engine Front Cover	15
Water Pump Mounting	30
Fuel Pump Mounting	17
Oil Filter	25
Oil Pump Mounting	30
Camshaft Sprocket	20
Camshaft Thrust Plate	200 in. lbs.

1960 6 CYL. MODELS

	Inch-Lbs.	Ft. Lbs.
Cylinder Head		①65
Int. & Exh. Manifold		10
Intake-to-Exhaust Manifold		15
Oil Pan	200	
Main Bearing Cap		85
Rear Main Bearing Seal Retainer		30
Connecting Rod Cap		45
Camshaft Sprocket		35
Rocker Shaft Support Bracket		30
Rocker Arm Cover	40	
Engine Front Cover	200	
Water Pump		30
Oil Pump	200	
Oil Filter		30
Clutch Housing		30
Transmission Mounting		50
Engine Front Mount-to-Frame		85
Engine Front Mount-to-Block		45
Engine Rear Mount		35

① - Tighten all bolts twice in sequence when installing cylinder head.

1954-60 V8 MODELS (EXC. 350", 361", 383" & 413")

	Ft. Lbs.
Cylinder Head	85
Intake Manifold	30
Exhaust Manifold	25-30
Oil Pan	15
Main Bearing Caps	①85
R.M. Bearing Seal Retainer	30
Flywheel	50-60
Vibration Dampener or Pulley	135
Crankshaft Pulley to Dampener	15
Con Rod Bolts (Plain)	45
Con Rod Bolts (Black)	40
Camshaft Sprocket Nut	125
Camshaft Sprocket Screw	35
Camshaft Sprocket Hub Thrust Plate	②15
Rocker Support Bracket (Single Shaft)	③30
Rocker Support Bracket (Double Shaft)	85
Rocker Arm Cover	④
Engine Front Cover (Stamped)	15
Engine Front Cover (Cast)	35
Water Manifold	30
Water Pump Mounting	30
Oil Pump Mounting	35

① - Use of lockwashers discontinued during 1956. Be sure to use lockwashers on reassembling of bearing caps which had lockwashers to prevent bottoming of screws.
② - 17.5 ft. lbs. (318" & 325").
③ - 27 ft. lbs. (325").
④ - 36 in. lbs. (End), 26 in. lbs. (Center) (318"); 40 in. lbs. (350"); 30 in. lbs. (Others).

1958-60 V8 MODELS (350", 361", 383" & 413")

	Ft. Lbs.
Cylinder Head	70
Intake Manifold	40-50
Exhaust Manifold	30
Oil Pan	15
Main Bearing Caps	85
Main Bearing Seal Retainer	30
Vibration Damper or Pulley	135
Crankshaft Pulley to Damper	15
Con Rod Bolt (Plain)	45
Con Rod Bolt (Black)	40
Camshaft Sprocket Screw	35
Rocker Arm Support Bracket	30
Rocker Arm Cover	40 in. lbs.
Engine Front Cover	15
Water Manifold	30
Water Pump Mounting	30
Oil Pump Mounting	35

ENGINE

1954-59 6 CYL. MODELS

ENGINE ASSEMBLY REMOVAL: Engine, clutch, and transmission assembly can be removed from car as an assembly, as follows: Remove hood and radiator core. Disconnect propeller shaft at transmission. Disconnect transmission controls at transmission (wires to overdrive controls), and speedometer cable. Disconnect clutch linkage at clutch housing. Disconnect fuel pump flexible line at pump, throttle and choke controls at carburetor, heat indicator tube at head. Disconnect wires from generator and starter, coil and distributor. Disconnect exhaust pipe at manifold. Disconnect oil gauge tube at flexible line. Remove crankcase breather pipe, and the front and rear engine support bolts. Disconnect hand brake linkage. Remove carburetor air cleaner. Connect hoist to engine and lift assembly out of chassis.

1960 6 CYL. MODELS

REMOVAL: Remove hood, drain cooling system, remove battery and air cleaner. Remove radiator (plug transmission oil cooler lines). Remove crankcase vent pipe and disconnect all lines, wires, cables and linkage from engine. Disconnect exhaust pipe from manifold. Remove clutch torque shaft, brake cables and rods, speedometer cable, gear shift rods, transmission oil cooler lines and filler tube (drain transmission and torque converter), and push button cable. Support rear of engine (Support Tool C-3806). Remove synchro-mesh transmission (see *Car Model Pages*), or automatic transmission and torque converter assembly (see *"TorqueFlite Six" in Transmission Section*). Attach Lifting Fixture C-3804 to cylinder head and disconnect engine front mounts. Remove engine.

1954-60 V8 MODELS

ENGINE ASSEMBLY REMOVAL: Drain cooling system, remove battery. Remove fan shroud, radiator, and hood. (*NOTE* - Before removing hood, scribe outline of hinge brackets to insure proper adjustment when reinstalling.) Disconnect fuel lines and wires attached to engine units. Remove air cleaner and carburetor. Attach an engine lifting Tool to the carburetor flange studs on intake manifold and attach chain hoist to fixture eyebolt. Raise car and disconnect propeller shaft at transmission. Disconnect wires and linkage at transmission. Remove exhaust pipe (make sure exhaust system is supported while engine is removed). Drain engine and transmission oil. Remove rear crossmember-to-transmission support attaching bolts. (*NOTE* - Place a roll-away jack under transmission to relieve weight from crossmember. Place a wood block between head of jack and transmission to avoid damaging transmission oil pan. Jack must support weight of rear of engine and must be able to roll with engine as engine is removed). Remove crossmember-to-frame bracket attaching bolts. Remove crossmember and rear engine support. Lower car to convenient working height, then remove engine front support mounting bolts. With chain hoist, raise engine and, at same time, work engine out of chassis toward left front fender.

ENGINE MOUNTINGS

1955 PLYMOUTH MODELS

►***HARSH ENGINE VIBRATION CORRECTION (Due to Short Insulator Spacer):*** To obtain proper clearance of engine support, install washer 1⅛" diameter, 1/16-3/32" thick with ½" hole, Part No. 446221, between lower end of insulator spacer assembly and large washer. A washer should be installed on both right and left engine rear mounts. Rubber washer on left engine mount should be installed above extra washer (if car model so equipped). Make sure that correct type rubber insulator is used. Use of harder insulator will cause transfer of engine vibration to car.

1955-56 PLYMOUTH MODELS

ENGINE MOUNTINGS: On some models, a rubber insulating washer 3/32" thick is provided for left mount only, and should be installed between frame and lower flat washer. This washer eliminates transfer of noise on rapid acceleration. Washer must not be compressed between frame and flat washer. *CAUTION*—Do not over-tighten rear engine mounting bolts. Over-tightening these bolts may collapse insulator spacer. ***For "Harsh Engine Vibration Correction (Due to Short Insulator Spacer)" see above.***

1957 PLYMOUTH MODELS

ENGINE FRONT MOUNT (V8 ENGINES): Front engine mounts are spool type with rubber insulator to absorb normal engine torque impulses. The mounting stud is off center. When installing late type mounting the larger section of insulator should be positioned next to engine. On late type mount assembly the rib on insulator must be in line with engine bracket having one mounting hole.

►*ENGINE VIBRATION CORRECTION:* Use only late type engine mount consisting of Insulator Part No. 1828237 and Bracket Assembly Part No. 1828233 (right), No. 1828234 (left) and install as described above to eliminate excessive engine impulse vibration.

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OIL PAN

1954-58 6 CYL. MODELS

OIL PAN REMOVAL: Drain oil, replace oil pan drain plug. Remove clutch cover housing underpan to avoid damaging oil pan gaskets or underpan dust shield. Remove oil level indicator, drop oil pan to tie rod. Pan can then be removed by reaching in under crankcase and raising oil strainer to clear baffle while sliding pan out to rear.

Installation—(6 Cylinder Engines)—When installing new gaskets, end gaskets should extend ¼" to ⅛" above level of oil pan (these ends must not be cut off). Side gaskets installed with ends resting on top of protruding end gaskets. Gaskets will be compressed into place when oil pan screws tightened.

CYLINDER HEAD & MANIFOLD

CYLINDER HEAD INSTALLATION: Use Torque Indicating Wrench to tighten cylinder head bolt nuts and capscrews, tighten in correct sequence as shown in diagram for each car.

Tightening Torque—See Tightening (Torque Wrench) Specifications above

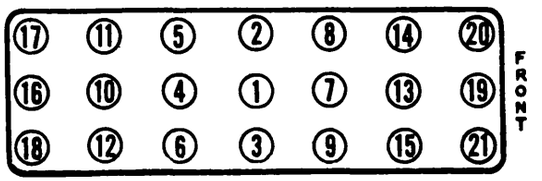
1954-59 6 CYL. MODELS

CYLINDER HEAD INSTALLATION: When installing cylinder head, use new gasket. Coat threads of capscrews with sealer except the three screws that lead into intake manifold ports. If sealer used on these capscrews, there is a possibility that it will be drawn into carburetor or valves. Use torque indicating wrench to tighten cylinder head bolt nuts and capscrews. Tighten in sequence shown in diagram.

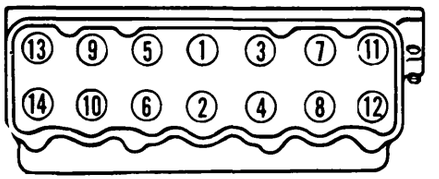
1960 6 CYL. MODELS

CYLINDER HEAD: R m val - Drain cooling system, disconnect all lines and wires on cylinder head *(CAUTION - Disconnect spark plug cables by pulling straight out in line with plug).* Remove carburetor air cleaner, disconnect exhaust pipe at exhaust manifold flange, remove carburetor as a unit with intake and exhaust manifolds. Remove rocker arm cover. Remove rocker arm assembly by taking out bolts in rocker shaft support pedestals. Remove pushrods *(CAUTION - Keep pushrods in order and reinstall in same positions).* Take out bolts and remove cylinder head.

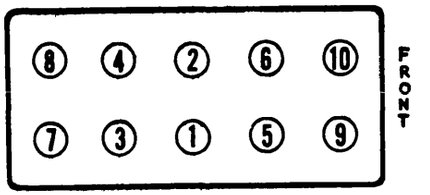
Installati n: Coat new head gasket with suitable sealer, install gasket and head over dowels in block *(CAUTION - Rocker arm oil feed hole at right rear corner of head must register with oil hole in block).* Tighten all cylinder head bolts in sequence shown in diagram



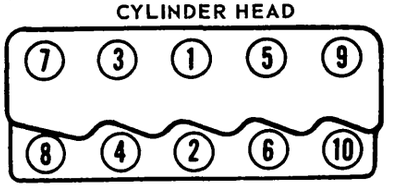
1954-59 6 CYL. ENGINE CYLINDER HEAD



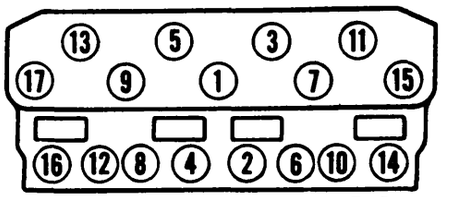
1960 6 CYL. ENGINE CYLINDER HEAD



V8 DOUBLE ROCKER SHAFT ENGINE CYLINDER HEAD



V8 SINGLE ROCKER SHAFT ENGINE CYL. HEAD (EXC. 350", 361", 383", 413")



V8 ENGINE CYLINDER HEAD (350", 361", 383", 413" ENGINES)

1954-59 6 CYL. MODELS

INTAKE & EXHAUST MANIFOLD INSTALLATION: Install the new gasket between intake and exhaust manifold (make sure that heat valve is free and operates freely), and insert the four bolts through exhaust manifold and into intake manifold. Draw bolts down snug but DO NOT TIGHTEN. Install thermostatic coil spring and counter-weight. Install manifold-to-engine block gaskets and install assembled manifolds. While holding manifold and gaskets evenly against engine block, install long center bolts and draw down snugly. (If bolts show signs of water leakage, coat threads with suitable sealer). Install remaining washer and nuts. *(CAUTION*—Be sure to install the four conical, brass washers and nuts on the extreme ends of exhaust manifold). Tighten manifold nuts and bolts, starting from center and working out towards ends.

1960 6 CYL. MODELS

MANIFOLD ASSEMBLY: Installati n - *CAUTION - Loosen 3 intake manifold-to-exhaust manifold bolts before installing assembly (necessary to maintain corr ct alignment) and also note "Manifold Stud Replacem nt" n t bel w.* Install manifold and carburetor assembly on cylinder head with cup side of conical bolt washers against manifold. Tighten nuts to 15 ft. lbs.. then tighten intake manifold-to-exhaust manifold bolts to 15 ft. lbs.

►*MANIFOLD STUD REPLACEMENT NOTE:* On engines before Sept. 18, 1959 with **brass** studs at front and rear end of exhaust manifold, it is recommended that these brass studs be removed and replaced with **steel** studs, Part No. 2121585. To install these steel studs, use Mopar Sealer No. 1057794 on stud threads, tighten studs to 10 ft. lbs

1954-60 V8 MODELS (SINGLE ROCKER SHAFT ENGINE)

►***1957-58 CYLINDER HEAD GASKET LEAK CORRECTION (Red Ram Engine):*** **Install black fibre head gasket, Part No. 1852191 (1957), No. 1944627 (1958). Tap cylinder head bolt holes (½-13NC Tap) if necessary to extend deep enough to compress gasket.** ***NOTE*** **- Gasket surfaces of block and head must be within .007" of being true and flat.**

CYLINDER HEAD INSTALLATION (Single Rocker Shaft): Install all cylinder head bolts except those that hold rocker arm brackets to cylinder head. Install pushrods in their original positions, then install rocker arm assemblies with cylinder head bolts in position. On models with fixed rocker arm brackets, install all cylinder head bolts except those at rocker arm bracket positions, install pushrods then feed rocker arm shaft through each fixed bracket inserting the rocker arms in their correct position. Install cylinder head bolts through each fixed rocker shaft bracket and shaft. All cylinder head bolts should be tightened with a torque wrench to specifications shown above and in sequence shown in diagram. *CAUTION* - Cylinder head bolts holding rocker arm brackets should be tightened slowly to permit time for hydraulic lifters to bleed down.

V8 ENGINES – DOUBLE ROCKER SHAFT

CYLINDER HEAD INSTALLATION (Double Rocker Shaft): Install cylinder head bolts into rocker arm support brackets with short bolts toward intake side. Insert pushrods in holes in cylinder head with short rods in intake holes. Place rocker arm assemblies into position on heads (lining up each pushrod with its respective rocker arm), then tighten each bolt to specifications and in sequence shown in diagram. *CAUTION - Tighten cylinder head bolts slowly to permit hydraulic lifters to bleed down.*

1958 V8 RED RAM ENGINE

EXHAUST MANIFOLD INSTALLATION: Coat exhaust manifold mounting bolts with a sealing compound before installation. Tighten to specified torque.

►***EXHAUST MANIFOLD ATTACHING BOLT PRODUCTION CHANGE & INSTALLATION CAUTION (Red Ram Engine):*** **Later cars have hex head bolts in place of studs and nuts. Use a non-hardening sealer when installing bolts as they extend into water jacket.**

1954-55 V8 MODELS

MANIFOLD HEAT CONTROL VALVE: Attached to right cylinder block exhaust manifold, and can be removed and repaired without removing manifold.

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Removal: Remove the two exhaust manifold flange bolts and nuts and apply pressure to exhaust pipe to separate and remove the heat control valve. Remove counter-weight tightening bolt and nut and remove counter-weight. Remove thermostatic spring, spacer washer, then remove horseshoe lock and remove the anti-rattle spring.

►***CAUTION—Do not operate the engine without heat control valve in the manifold.***

Installation: Install the anti-rattle spring and horse shoe lock, and secure lock to shaft by squeezing end of horseshoe lock together. Check valve and shaft for free movement. Install spacer washer and place inner tongue of coil spring in shaft slot with outer tongue of spring toward forward side of valve and in a down position. Install bumpers on each side of counter-weight, and insert the counter-weight shaft key into counter-weight, securing it in position with the lock bolt. Hold heat control valve in the open position, and move the outer end of thermostatic spring around and up ¾ of a turn, hooking end of spring under forward stop screw. Hold valve in closed position and install counter-weight assembly on shaft. Center butterfly valve in valve body and line up bumpers to clear stop pin, then press counter-weight all the way onto the shaft, with the anti-rattle spring adjusted so that when the valve shaft is pulled up against anti-rattle spring there will be about 1/16" tensional drag on the shaft. Install manifold heat control valve assembly on exhaust manifold. Check assembly for free operation

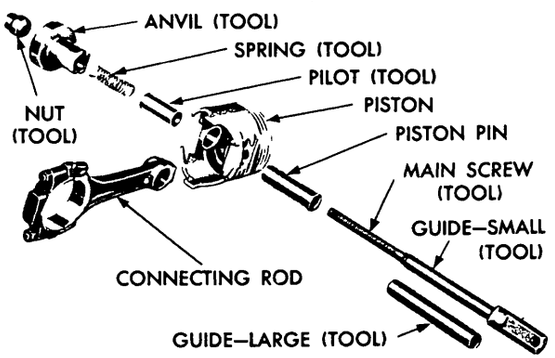
PISTON PINS

6 CYL. 225" & V8 350", 361", 383", 413"

PISTON PIN REMOVAL: Use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration to remove pin from piston and rod. *CAUTION* - When pin falls freeof rod, stop press to prevent damage to anvil of tool.

PISTON PIN INSTALLATION: *CAUTION - DO NOT ream pistons or connecting rods.* Lubricate pin bores in piston and rod and use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration. Notch or "front" on piston must face upwards when assembled in tool and with connecting rod properly positioned (see below), press piston pin in until pin bottoms on pilot.

►*CONNECTING ROD POSITION:* **6 Cyl.** - With notch on piston to front of engine, oil hole in rod must be to left side of engine. **V8** - For right bank cylinders, large chamfer on lower end of connecting rod must be opposite to notch in piston head (rod facing downward in tool). For left bank cylinders, large chamfer on rod must be on same side as piston head notch (rod facing upward in tool).



PISTON PIN INSTALLATION

Testing For Proper Fit - Assemble piston and rod with tool in same manner as for pin removal (see illustration). Clamp screw shaft end of tool in a vise. With torque wrench at nut (anvil end of tool), apply 15 ft. lbs. torque. If pin does not move, fit is correct. If pin moves in rod, fit is incorrect and rod should be replaced.

CRANKSHAFT & MAIN BEARINGS

6 CYL. MODELS

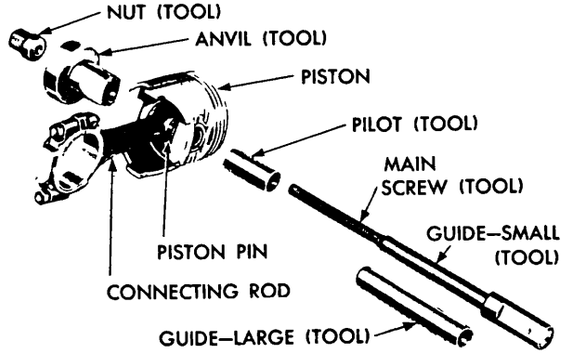
CRANKSHAFT OIL SEALS: Car manufacturer recommends that new oil seals be installed when chain cover or rear main bearing cap removed.

1954-55 6 CYL. MODELS

Rear Oil Seal (1-Piece Type—6 Cyl.)—Seal is one-piece type with lip on forward edge engaging shoulder in crankcase and bearing cap to rear of crankcase oil slinger. This seal is split at top. To install new seal, remove oil pan, and back off all main bearing cap screws three turns. Remove rear main bearing cap and pull out old seal with pliers. Coat one end of new seal with tire soap or cup grease (avoid getting any grease between seal ends). Insert one end of seal over shoulder in crankcase, work up until end approximately at top, then work other end in same manner on other side until ends come together at top. Coat lower lip of seal so that bearing cap will seat on seal easily. Check rear bearing cap for holes (either sand holes or tapped holes). If holes extend through oil slinger groove shoulder, weld up the sand holes or plug the tapped holes by installing screws that have been coated with sealing compound. Re-install main bearing caps.

Rear Oil Seal (2-Piece Type—6 Cyl.)—Located at rear main bearing. Consists of oil seal packing assembled on rear face of bearing cap and crankcase (upper half held by retainer assembled on rear face of crankcase, lower half by retainer assembled on rear face of bearing cap). Gaskets used on top face of bearing cap at each side, around oil slinger grooves and along shoulder across cap. Install new packing in retainer on crankcase and cap, place new gaskets on cap and install on engine without disturbing position of gaskets.

NOTE—Some models equipped with two piece (additional) oil gasket. This gasket assembled between seal retainer and crankcase (upper half), between retainer and bearing cap (lower half).



PISTON PIN REMOVAL

1956-59 6 CYL. MODELS

REAR MAIN BEARING SEAL: Neoprene type seal. When replacing seal, both upper and lower halves should be replaced. Remove oil pan, clutch housing pan, and rear main bearing cap. Remove seal from cap, and then remove upper seal by pushing one end of seal until opposite end protrudes about 3/8" from block. Pull out with long nosed pliers. Install new seal in lower half so tabs of gaskets fit in cap seal channel. Coat contacting lip of upper seal with grease and insert in block with a rolling motion. *CAUTION* - Install the seals with contacting lip pointing toward front of engine.

►*REAR MAIN BEARING SEAL NOTE:* Use New Seal Package Part No. 2084325 for replacement. This new seal is of thicker stock, softer and more pliable for better sealing.

1960 6 CYL. MODELS

REAR MAIN BEARING OIL SEAL: *NOTE - Bearing clearance must be within specifications and upper bearing half must NOT be chamfer d.* Place new seal in block with both ends extending evenly. Tap seal into position with Tool C-3743 (with bridge removed), until tool is seated in bearing bore. While holding tool in this position, cut extending portion of seal flush with block. Install new seal in seal retainer with both ends extending evenly above retainer. Place bridge on tool and tap seal down until tool is seated. Trim off seal even with retainer. Install two side seals.

1954-60 V8 MODELS

REAR OIL SEAL: Rope type seal of braided asbestos. Install new seal in cylinder block so both ends of seal protrude. Tap seal into position with Tool shown in table below until Tool is seated in bearing bore. Cut off protruding ends flush with block. Use same procedure for cap seal. Install the two cap side seals. *NOTE* - Side seals are not interchangeable between models and the long seal must go on oil filter side of engine.

MAIN BEARING SEAL TOOL

Model	Tool
1954-55 All	C-3131
1956-60 ①	C-3511
1957-58 392 Block	C-3574
1957-58 354 Block	C-3020
1957-58 354, 392 Cap	C-3511
1958-60 ②	C-3625

① -Exc. 350, 354, 361, 383, 392, 413.

② - 350, 361, 383, 413.

ENGINE FRONT COVER

1954-59 6 CYL. MODELS

FRONT COVER INSTALLATION: Use new gasket and position cover in place. Install screws but do not tighten. Install Tool C-522 over crankshaft with tapered end against seal housing. Install and tighten crankshaft nut. Tighten cover bolts, while tightening crankshaft nut (to hold tension on seal), to proper specifications.

Front Oil Seal (6 Cyl.)—Oil seal located in timing chain cover. Consists of spring backed composition

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seal in stamped steel housing pressed in chain case cover with composition gasket installed between seal and cover. To install proceed as follows: Insert new composition gasket in chain case cover, drive new seal in place with drift or similar tool slightly larger than seal (seal is press fit in cover). Center seal on crankshaft when installing chain case cover as follows: Install chain case cover on engine with cover screws tightened just enough to hold cover in place, install Centering Tool C-522 on end of crankshaft and hold it in place by tightening crankshaft starting jaw finger tight, tighten chain case cover screws and as cover is being compressed, tighten crankshaft starting jaw nut so as to maintain slight tension between centering tool and seal. Remove tool after chain case cover screws secured.

1960 6 CYL. MODELS

ENGINE FRONT COVER: Removal - Drain cooling system and remove radiator and fan. Remove vibration damper (Puller Tool C-3732). Loosen oil pan attaching bolts to provide clearance. Remove engine front cover.

Installation: Place crankshaft oil slinger on shaft with flange away from sprocket. Make sure mating surfaces of cover and block are free from burrs and clean, then place new gasket and cover over locating dowels and tighten cover bolts to specifications.

1960 6 CYL. MODELS

FRONT OIL SEAL: Removal - Use Tool C-3506. With inside of cover up, put puller screw through seal and position puller blocks directly opposite each other under flange of seal retainer. With washer and nut on puller screw tighten nut so puller blocks distort seal retainer lip. Place sleeve over retainer and place removing and installing plate into sleeve. Place flat washer and nut on puller screw, hold center screw and tighten nut to remove seal.

Installation: Insert puller screw through removing and installing plate so thin shoulder faces up. Insert assembly through seal opening in front cover (inside of cover up), and place seal in opening with neoprene part of seal down. Place seal installing plate into seal with protective recess toward lip of seal retainer. With flat washer and nut on puller screw, hold screw and tighten nut until neoprene is tight against face of front cover. If a .0015" feeler gauge **cannot** be inserted between neoprene and cover, seal is installed correctly.

1954-58 V8 MODELS
(DOUBLE ROCKER SHAFT ENGINE)

ENGINE FRONT COVER (Double Rocker Shaft Engines): Proceed as follows:

Removal: Remove water pump. Remove vibration dampener retainer bolt and washer. Remove two of the vibration dampener pulley bolts and install puller Tool C-3033. Remove crankshaft pulley and vibration dampener as an assembly. Remove felt dust seal and vibration dampener hub key from crankshaft slot. Remove left cylinder bank exhaust pipe. Disconnect fuel lines at fuel pump, remove fuel pump. Remove oil level indicator. Remove starter using Tool C-455. Drain engine oil and remove oil pan. Remove chain case cover bolts and lockwashers. Drive chain case cover off two dowel pins using a soft hammer.

►*CAUTION:* One cover bolt is inside the pump opening.

Installation: Be sure mating surfaces of cylinder block and cover are clean. Apply moderate coat of sealing compound to block and cover faces, install new gasket. Make sure crankcase oil slinger is in proper position (flange end pointing toward seal). Position cover on two dowel pins and gently tap cover in place. Install cover bolts and lockwashers and tighten to 30 ft. lbs. Install other items be reversing removal procedure.

1954-56 V8 MODELS
(SINGLE ROCKER SHAFT ENGINE)

ENGINE FRONT COVER (Single Rocker Shaft Engines): Proceed as follows:

Removal: Drain and remove radiator. Disengage fan belt and remove generator. Install Tool C-3033 over pulley and force pulley off end of crankshaft. Support engine with suitable chain hoist fastened to intake manifold. Remove motor support "U" bolts and nuts. Remove fan blades and hub, then remove bolts that hold water pump housing to cylinder block and heads. Lift water pump housing, water pump, front motor support and insulator up and away from front of engine. Discard gaskets. Loosen bolts that hold oil pan to cylinder block. Drop pan slightly to clear chain case cover. Disconnect inlet and outlet fuel lines at fuel pump. Remove bolts that hold pump to chain case cover. Slide pump out and away from engine. Discard gasket. Remove bolts and washers from cover. Disengage cover from locating dowels, remove from engine. Discard gasket.

Installation: Be sure mating surfaces of cover and cylinder block are clean and free of burrs. Install new gasket and position cover locating dowels. Coat screws with suitable sealer and tighten to 15 ft. lbs. *NOTE*—Coat four center screws with sealer suitable for water. Coat other screws (upper and lower) with sealer suitable for oil.

1957-60 V8 MODELS
(SINGLE ROCKER SHAFT ENGINE)

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator. *(NOTE* - On Air Cond. cars remove upper half of fan shroud). Loosen power steering pump idler pulley and generator and remove belts. Remove fan, spacer and pulley. *(NOTE* - On Air Cond. cars remove pulley from water pump fan hub, remove fluid fan drive). Remove water pump body-to-housing bolts and remove pump. Pull damper off end of crankshaft using Puller C-3033. Remove front cover and gasket.

Installation: Be sure mating surfaces are clean and free of burrs. Use new gaskets, reverse removal procedure, tightening chain cover bolts to correct torque specifications.

1954-60 V8 MODELS

FRONT OIL SEAL: To replace seal, proceed as follows:

1954-55 Models - Drive out old seal with Tool C-3050 and remove gasket. Place new gasket in position and drive new seal into place with Tool C-3051 with projecting flange facing inside cover.

1956-60 Models - Use Puller screw of Tool C-3506 with blocks, sleeve, and removing plate to remove old seal. Install new seal with screw of Tool C-3506 and installing plate to force seal into position. *NOTE* - Installing plate must have **thick** shoulder facing up (Cast Cover), **thin** shoulder facing up (Stamped cover). Seal is installed properly into position when a .0015" feeler will not enter between neoprene and casting.

CAMSHAFT & BEARINGS

1954-56 6 CYL. MODELS

CAMSHAFT REMOVAL: Remove Front End Assembly as a unit. Remove cylinder head, fuel pump, oil pump, valve tappet cover plates, crankshaft pulley, front motor support (with front of engine jacked up), timing chain cover, camshaft sprocket and timing chain. If valves and valve springs are not to be removed, prop valves up by inserting wooden wedges at opposite sides under valve head. Raise tappets and hold in this position (use spring type clothes pins or similar tool to hold tappets up). Withdraw camshaft (rotate shaft to clear any obstructions).

1957-59 6 CYL. MODELS

CAMSHAFT REMOVAL: Remove radiator grille and core. Remove cylinder head, fuel pump, oil pump, valve lifter cover plates, crankshaft pulley. Jack up engine and remove front engine support. Remove front cover, camshaft sprocket and timing chain. If valves and springs are not to be removed, prop valves up by inserting wedges under opposite sides of valve head. Raise tappets and hold out of camshaft lobe contact, while withdrawing camshaft (rotate camshaft to clear any obstructions).

1960 DODGE & PLYMOUTH 6 CYL. MODELS

►*OIL LEAK AT CAMSHAFT CORE PLUG & INSUFFICIENT VALVE TRAIN LUBRICATION CORRECTION:* Make sure rear camshaft bearing has not turned in bearing bore. Inspect drilled passages in rear of camshaft to make sure they are clean and not obstructed. Core plug relief passage is a drilled hole in rear end of camshaft opening into drain hole ahead of rear bearing journal. Valve train lubrication passage is a transverse hole drilled in rear camshaft bearing journal.

CAMSHAFT REMOVAL: Remove engine. Remove valve lifters with Lifter Removing Tool C-3661 (after removing rocker arm shaft assembly and pushrods). Remove engine front cover, timing sprockets, distributor, oil pump, and fuel pump. Remove camshaft carefully.

Bearing Installation: Use Tool C-3132A to install bearings. No. 1 bearing must be installed 3/32" in from front face of cylinder block. Make sure oil holes in bearings index with oil holes in block. Use Tool C-897 to install rear welch plug.

1960 VALIANT MODELS

►*OIL LEAK AT CAMSHAFT CORE PLUG & INSUFFICIENT VALVE TRAIN LUBRICATION CORRECTION:* Make sure rear camshaft bearing has not turned in bearing bore. Inspect drilled passages in rear of camshaft to make sure they are clean and not obstructed. Core plug relief passage is a drilled hole in rear end of camshaft opening into drain hole ahead of rear bearing journal. Valve train lubrication passage is a transverse hole drilled in rear camshaft bearing journal.

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CAMSHAFT REMOVAL: 1) Remove grille upper center molding screws and cap, remove upper moldings. Remove lower molding center cap attaching bolts (from under bumper) and remove cap. Remove molding attaching nuts and washers from deflector shield. Remove side molding upper attaching screws. Remove grille attaching screws and remove grille.
2) Drain cooling system and remove radiator and fan.
3) Remove engine from cover, *see "Engine Front Cover" above.* Take out camshaft sprocket bolt and remove timing chain and sprocket. Remove rocker arms and pushrods, *see "Cylinder Head Removal" above.* Remove valve lifters through pushrod openings in cylinder head using Tool C-3661.
4) Remove oil pump, *see "Oiling System" below.* Remove distributor. Slide camshaft out through front of engine.

CAMSHAFT BEARING REPLACEMENT: Use Tool C-3132A to install bearings. *CAUTION - Align oil holes in bearings with oil passages in block.* No. 1 bearing must be installed 3/32" in from front face of cylinder block. Use Tool C-897 to replace welch plug at rear of block.

1954-58 V8 MODELS

(DOUBLE ROCKER SHAFT ENGINE)

CAMSHAFT REMOVAL: Remove valve tappet cover, cylinder head cover and rocker arm assemblies and push rods. Remove valve tappet assemblies, remove distributor. Remove timing chain cover case *(CAUTION*—One cover attaching bolt located in case back of water pump), timing chain and camshaft sprocket. Camshaft sprocket and timing chain can be removed by taking off the camshaft hub nut, fuel pump eccentric and dowel assembly. Chain and sprocket can then be removed. Remove four camshaft thrust plate screws, distributor and oil pump drive gear. Pull out the camshaft being careful not to damage camshaft bearings.

1954-56 V8 MODELS

(SINGLE ROCKER SHAFT ENGINE)

CAMSHAFT REMOVAL: Drain radiator, remove radiator and crankshaft pulley. Support engine with chain hoist attached to intake manifold. Remove engine support U-bolts. Remove fan, water pump, and water pump housing assembly. Loosen oil pan bolts sufficiently in order that oil pan clears chain case cover, camshaft gear hub nut, fuel pump eccentric and dowel. Then remove camshaft gear and timing chain. Support engine at front of oil pan. Then remove intake manifold, distributor, distributor drive gear, tappet chamber cover, rocker cover, rocker shaft assemblies and push rods. Use Tool C-3158 to pull out hydraulic tappets. If varnish build-up is excessive, use puller part of Tool C-3158 and work tappet out of bore. Remove four camshaft thrust bolts, then remove camshaft.

1957-60 V8 MODELS

(SINGLE ROCKER SHAFT ENGINE)

CAMSHAFT REMOVAL: Drain coolant and remove radiator and crankshaft pulley. Remove fan, water pump, and water pump housing as an assembly. Loosen oil pan bolts so pan will clear front end cover. Remove fuel pump, front end cover, camshaft gear and timing chain. Remove intake manifold, distributor, distributor drive gear, rocker cover and valve pushrods. Pull out valve lifters and withdraw camshaft.

CAMSHAFT INSTALLATION: Lubricate cam lobes and bearing journals and install camshaft. When shaft within 1¾-1½" of final position, install Tool C-3509 (modified, see Note below) to prevent disturbing welch plug at rear of block and causing oil leak, as follows: Install in place of distributor drive gear and against rear side of cam gear, and attach with distributor retainer plate bolt. Now push camshaft in to final position and leave tool in place until sprockets and timing chain are installed.

►*TOOL C-3509 MODIFICATION NOTE:* For use on V8 350", 361", 383", & 413" Engines, it will be necessary to grind off index lug holding upper arm on tool and rotate arm 180°. Sliding bar will then extend outward in direction opposite to fixed tongue.

VALVE SYSTEM

►*VALVE PUSHROD & LIFTER REMOVAL NOTE (277", 301", 318" Integral Rocker Arm Bracket Engines):* The above items can be removed without removing cylinder head by backing off all tappet adjusting screws until screw is clear of pushrod socket, or using Compressor Tool C-3695 to raise rocker arm to secure pushrod clearance. *CAUTION* - Lifter must be on low point of camshaft.

1954-59 6 CYL. MODELS

EXHAUST VALVE SEAT INSERTS (Refacing): Exhaust valve seat inserts must be reground with special high speed grinding tool MTH-JB-41, using the correct size valve guide pilot. Check concentricity of valve seat using a dial indicator. Total runout should not exceed .002". Check valve seat with prussian blue to get seat centralized on valve face. Use a 20° stone at the top or a 60° stone at the bottom, whichever is necessary to centralize the valve seat. Width of valve seat should be 3/64" to 1/16".

1956-58 MODELS

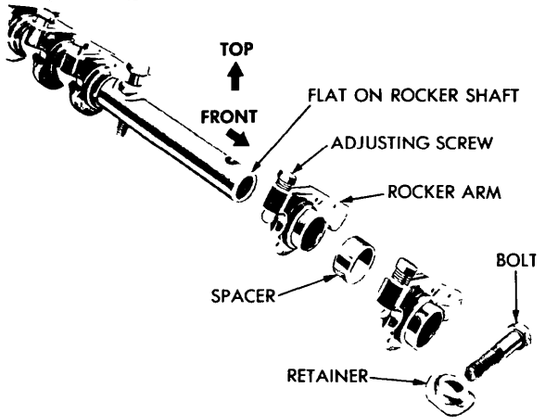
EXHAUST VALVE SEAT INSERT REPLACEMENT: Furnished Std. and .010" oversize. Use Tool C-732 (6 Cyl.), C-3140 (V8) to remove inserts. After inserts have been removed from engine, smooth any roughness of seat with a blunt drift. Valve seat insert should be .002-.004" larger than counterbore to insure correct fit. If inserts are found to be loose, enlarge counterbore with Tool MH-N-1 and install oversize insert. Place inserts in dry ice for approximately 10 minutes. Clean counterbore thoroughly and install a chilled insert with valve seat up, and drive it into place with installing tool C-767.

ROCKER ARMS

1960 6 CYL. MODELS

►*SPECIAL ENGINE ROCKER ARM INSTALLATION CAUTION:* Engines with build date of 2-17 (see *"Engine Serial Number" on Car Model Page)* have special rocker arms with smooth side surface and different rocker arm shaft installation. Rocker arm shaft on these engines, must be installed with identification notch at bottom and to rear of engine. *NOTE* - Rocker arms for these engines are not replaceable. Install complete set of service rocker arms (identified by "T" on side of arm) if one is damaged, and install rocker arm shaft as for standard engine (see below).

ROCKER ARM SHAFT ASSEMBLY: Installation - Install assembly with flat on end of rocker shaft upward and toward front of engine. *CAUTION - This is necessary to provide correct lubrication of rocker arms.* Make certain that shaft retainers are seated on shaft between extended bushings of adjacent rocker arms. Long rocker shaft retainer bolt is at rear of engine. Tighten bolts to specifications.



1960 6 CYL. ROCKER ARM ASSEMBLY

1954-58 V8 MODELS

DOUBLE ROCKER SHAFT ENGINE

Removal: Remove rocker arm covers. Place cotter pins in holes of first and last rocker arm brackets to prevent springs on rocker from pushing assembly apart when cylinder bolts removed. Completely loosen ten bolts on each bank that attach rocker arm support brackets to cylinder head and block. Grasp support bracket at each end of head, pull rocker assemblies and bolts directly away from heads, then remove push rods and place in respective slots in holder C-3068. *CAUTION—Use care when removing rocker assemblies in order not to jerk cylinder heads off locating dowels which would allow them to drop and become damaged.*

Installation: Insert cylinder head bolts in brackets, with short bolts in intake side. Insert push rods through push rod holes in heads (short rods in upper intake holes, long rods in lower exhaust holes). Place rocker arm assemblies in position on heads, lining up all push rods to their respective rocker arms. Starting at top center tighten all cylinder head bolts to torque indicated in Tightening Specifications above. *When tappets are full, extreme care must be taken when tightening head bolts so that tappets have time to bleed down to their operating length.* Bulged tappet bodies and permanent noisy operation will result if tappets forced down too rapidly.

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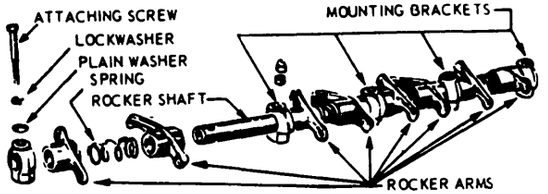
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V8 SINGLE ROCKER SHAFT ENGINE (SEPARATE ROCKER ASSEMBLY)

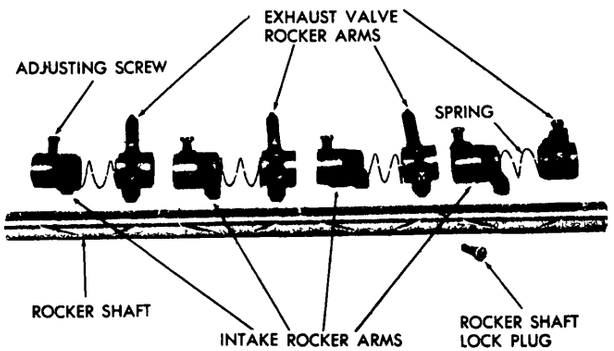
ROCKER ARM ASSEMBLY: Three cylinder head capscrews and two cylinder head studs with nuts, secure rocker arm assembly to cylinder head. Stud nuts must go in positions shown in illustration, for rocker cover screws. To reassemble, install all parts in sequence shown in illustration. Place rocker arm assembly over cylinder head stud bolts and down on locating studs Install flatwashers, nuts and cylinder head capscrews.

V8 SINGLE ROCKER SHAFT ENGINE (INTEGRAL ROCKER BRACKETS)

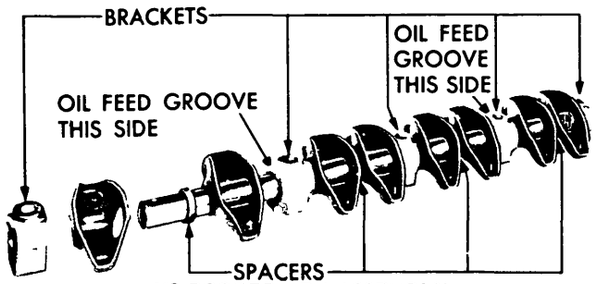
ROCKER ARM ASSEMBLY: Slide rocker arm shaft into bore of strut, engage intake rocker arm. Install spring and engage exhaust rocker arm. Repeat this operation until all intake and exhaust rocker arms are installed. Make sure that rocker shaft bolt grooves align with



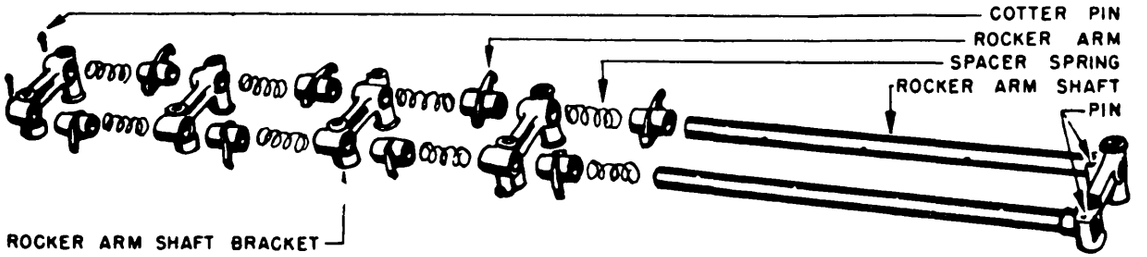
V8 ROCKER ARM ASSEMBLY (SEPARATE BRACKETS)



V8 ROCKER ARM ASSEMBLY (INTEGRAL BRACKETS)



V8 ROCKER ARM ASSEMBLY (350", 361", 383", 413" ENGINES)



V8 ROCKER ARM ASSEMBLY (DOUBLE ROCKER ARM SHAFT)

head bolt holes in rocker shaft struts. *NOTE* - The plug hole in strut must align with hole in rocker shaft. Install new rocker shaft plug.

1958-60 V8 MODELS (Stamped Rocker Arms) (SINGLE ROCKER SHAFT ENGINE)

ROCKER ARM ASSEMBLY (Stamped Rocker Arms):

Removal: Remove all cylinder head bolts except the two at front and rear of rocker shaft. Remove these just enough to free assembly from cylinder head yet hold rocker arm assembly intact. Remove rocker arm assembly.

Installation: Reassemble rocker arm assembly as shown in illustration and install on cylinder head so 3/16" diameter lubrication holes in shafts point downward into rocker arm and so that the 15° angle of these holes points toward valve end of rocker arms. *NOTE* - 15° angle of rocker arm lubrication holes is determined from centerline of bolt holes through shaft which are used to attach shaft and brackets assembly to cylinder head.

HYDRAULIC VALVE LIFTER

V8 MODELS

HYDRAULIC VALVE LIFTERS (One-Piece Integral Type) Barrel type. Unit consists of plunger and valve assembly operating within a cylinder formed by valve lifter body.. Oil is introduced to this unit through hole in side of lifter plunger.

Removal (Single Rocker Arm Shaft Engine): Drain radiator, remove intake manifold and carburetor as an assembly. Remove rocker arm assemblies, lift out pushrods and lifters. If lifters stick in bores, use Tool C-3035, C-3128, C-3216, C-3631, or C-3661 hooked into lifter and a twisting motion to break varnish from lifter. *NOTE* - Keep pushrods and lifters in proper order for reinstallation in original positions.

Removal (Double Rocker Arm Shaft Engine): Drain cooling system to below intake manifold level. Remove carburetor air cleaner, disconnect fuel and vacuum lines, accelerator linkage at carburetor, coil wires, heat indicator wire at intake manifold, and heater hose. Remove intake manifold, carburetor, and coil as an assembly (*NOTE* - Cover intake ports with masking tape). Remove crankcase ventilator pipe, lift off cover. Remove rocker arm cover. Turn crankshaft so that lifter is on low side of cam lobe (see Note below), use Tool C-3024 over rocker arm to compress valve spring sufficiently to slide rocker arm sideways off pushrod, remove pushrods. Remove lifters by hooking Tool C-3216 into hole in lifter body and pulling lifter straight out. *NOTE* - If lifter sticks in bore, use tool as a puller (insert through pushrod hole) and pull lifter out with a twisting motion.

Low Side of Cam Lobe Note - To place lifter on low side of cam lobe for pushrod and lifter removal, turn crankshaft to correct position as follows:

1) - With vibration dampener mark "TDC" at indicator and distributor rotor at **No. 1 cyl.** position, remove #2, 7, 8 Intake Lifters, and #2, 4, 8 Exhaust Lifters.
2) - Turn crankshaft ¼ turn clockwise from above position, remove #1 Intake and #1 Exhaust Lifters.
3) - With vibration dampener mark "TDC" at indicator and distributor rotor at **No. 6 Cyl.** position, remove #3, 4, 5 Intake Lifters, and #3, 5, 7 Exhaust Lifters.
4) - Turn crankshaft ¼ turn clockwise from above position, remove #6 Intake and #6 Exhaust Lifters.

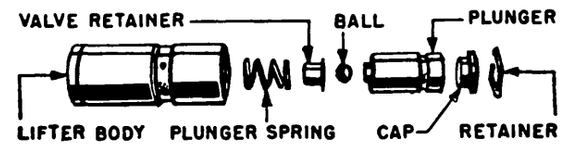
Disassembly: ***CAUTION - Disassemble one lifter at a time to avoid intermixing parts (parts not interchangeable between lifters).*** Pry out plunger retainer spring clip. Invert body and remove plunger cap, plunger, check valve, check valve spring, check valve retainer and plunger spring. Separate plunger, check valve retainer, and check valve spring.

Inspection: Clean all parts in solvent and check for nicks, scratches or wear. Replace entire lifter if any parts damaged.

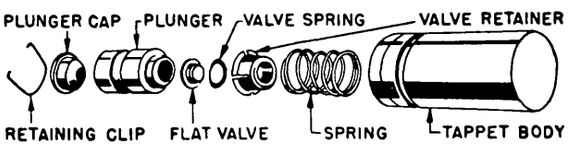
Reassembly: Reverse disassembly procedure making sure lifter is assembled as shown in illustration.

Testing: With cap removed from plunger, submerge upright lifter completely in a pan of clean kerosene and allow to fill. Replace cap. Place lifter upright in Lifter Testing Pliers C-3160 and check leakdown. If lifter collapses immediately, disassemble, clean and test again. If leakdown persists, replace lifter.

Installation: Lubricate lifters and reverse removal procedure.



1954-55 V8 HYDRAULIC VALVE LIFTER



1956-60 V8 HYDRAULIC VALVE LIFTER

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OILING SYSTEM

ENGINE LUBRICATION

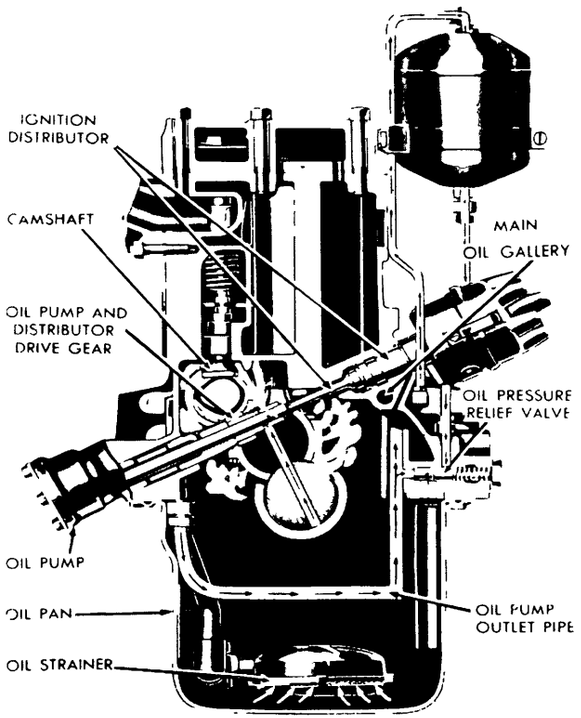
1954-59 6 CYL. ENGINES

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod, and camshaft bearings and to camshaft thrust bearing surface and to timing chain. All other points are lubricated by splash or oil mist in crankcase.

OPERATION: Rotor type oil pump mounted externally on right side of crankcase draws oil from oil pan through floating strainer and intake pipe terminating at fitting in crankcase adjacent to pump mounting pad. Pump delivers oil through outlet pipe (in crankcase) to lower end of vertical oil channel in block on left side of crankcase. Oil pressure regulator (under plug on left side of crankcase) is located in cross passage connecting with this vertical channel. Upper end of vertical channel connects with main oil gallery extending along left side of crankcase through which oil is distributed as follows:

Crankshaft & Camshaft Bearings - A horizontal oil channel in each crankcase web furnishes oil from main gallery to each camshaft bearing. A vertical channel intersecting each of these horizontal channels furnishes oil to each crankshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provides continuous flow of oil to crankshaft passages.



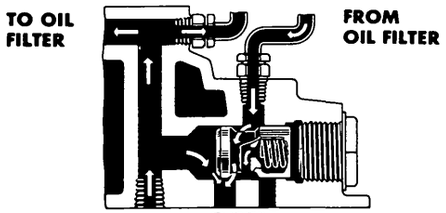
ENGINE OILING SYSTEM (1954-59 6 CYL. ENGINES)

Pistons & Pins - Lubricated by spray from metering hole on camshaft side of connecting rod when this hole registers with oil passage in rod journal.

Camshaft Thrust Surface & Timing Chain - Drilled passage in front camshaft journal supplies oil from front bearing to face of thrust plate. A tube and nozzle extending down from the front camshaft bearing supplies oil to sprockets and timing chain.

Valve Lifters - Connecting rod oil spray in valve chamber is collected in troughs adjacent to lifter bosses and is supplied to lifters through oil hole in side of each lifter guide.

OIL FILTER: Bypass type with filter flow controlled by engine oil pressure regulator valve so that oil flows through filter only when regulator valve is open (see illustration). Filter outlet line is connected to channel directly above pressure regulator valve and this channel is closed off by regulator plunger when valve is closed.



1960 6 CYL. ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied to all crankshaft, connecting rod, and camshaft bearings, and to valve mechanism on cylinder head (metered by rear camshaft bearing). All other points are lubricated by spray or oil mist in crankcase.

OPERATION: Rotor type oil pump mounted externally on right side of crankcase (assembly consists of oil pump, oil filter, and oil pressure regulator). Pump draws oil from oil pan through fixed strainer and intake pipe screwed into crankcase wall at pump mounting pad. Pump delivers oil directly into main oil gallery extending along right side of crankcase (slot in gallery registers with pump outlet port when pump installed). Oil is distributed through main oil gallery as follows:

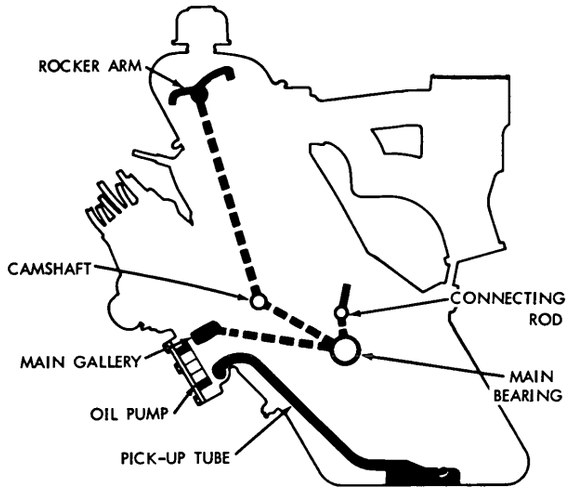
Crankshaft & Camshaft Bearings - Oil channel in each crankcase web furnishes oil from main oil gallery to each crankshaft and camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provides continuous flow of oil to crankshaft passages.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on left (upper) side of connecting rod when this hole registers with oil passage in connecting rod journal.

Timing Chain & Sprockets - Lubricated by oil from front main bearing (bearing is chamfered to provide this oil spray).

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows up through vertical channel in block and head, and through rear rocker shaft bracket to hollow rocker shaft. Rocker arms are lubricated through oil hole in shaft and each rocker arm has trough on upper surface (for adjusting screw and pushrod lubrication) and oil hole (for valve tip lubrication). Excess oil drains down through pushrod chamber to valve lifters and returns to crankcase.



ENGINE OILING SYSTEM (1960 6 CYL. ENGINES)

Valve Lifters - Lubricated by connecting rod oil spray and oil drainage from rocker arm chamber on head.

OIL FILTER: Full flow type mounted on oil pump body. Integral relief valve permits oil to bypass filter if element is clogged.

1954-58 DOUBLE ROCKER SHAFT ENGINE

►*FULL FLOW FILTER BYPASS VALVE LOCATION CHANGE CAUTION:* Location of valve changed from filter base to engine block on later engines. Valves located as follows:

Early Engines - Bypass valve assembly located in hole in base mounting face of filter assembly. Check valve assembly is located under plug on side of filter base.

Later Engines - Bypass valve assembly and anti-drain back valve located in main oil channel in engine block directly above rear main bearing cap. *These valves are accessible after rear main bearing cap removed.*

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic valve lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, and valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted on rear main bearing cap in crankcase draws oil through floating oil strainer and intake pipe mounted on pump cover and delivers oil through a channel in the pump body and rear bearing cap to the oil filter intake port (filter is mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross channel and vertical channel connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward

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end of this gallery, a "V" channel connects to the front main bearing and the forward end of the left main oil gallery which extends back the full length of the engine. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical channel connecting to an extension of the horizontal cross channel leading from the oil filter outlet port (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (an additional channel at the front crankshaft bearing supplies oil to the left main oil gallery).

Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod bearing is lubricated by passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of rod bearing cap of the rod for opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Each lifter supplied with oil from short passage leading up from main gallery at point directly below lifter.

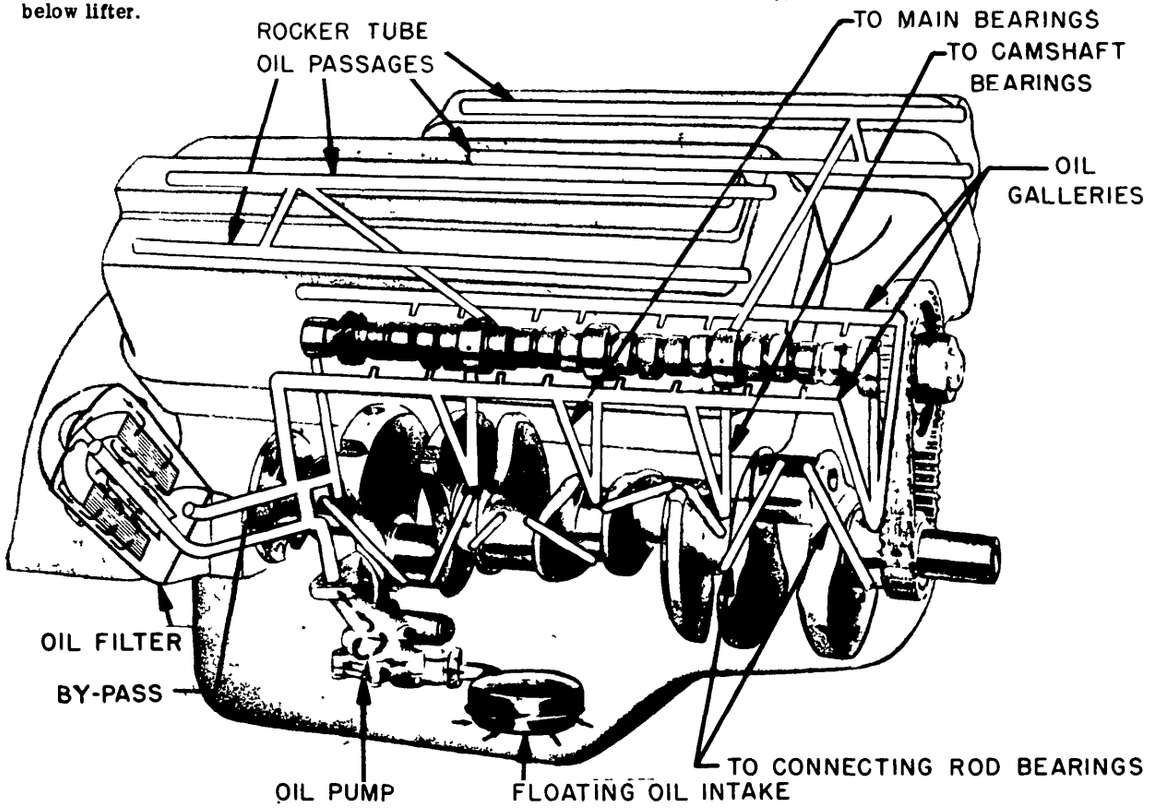
Rocker Arms, Pushrods & Valves - Hollow rocker arm shafts are supplied with oil through channel in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank), channel in head, and drilled hole in rocker shaft support bracket (No. 2 bracket, left head; No. 4 bracket, right head). A cross channel in the bracket supplies both rocker shafts. Rocker shaft and rocker arm are drilled to provide pushrod and valve stem lubrication. *NOTE* - Oil flow to rocker arm shaft is metered by camshaft bearing (flows only when hole in journal lines up with oil hole in bearing which leads to channel in block).

Timing Chain & Sprockets - Lubricated by oil from front camshaft bearing which is collected in trough on engine front plate (between sprockets) and directed to chain and crankshaft sprocket.

OIL FILTER: Full flow and shunt types used.

Full Flow Type - Mounted on pad on right side of crankcase at rear of engine. First type (extended base) has bypass valve in base. Later type (short base) is used with bypass valve in block. *See Valve Location Caution above.*

Shunt Type - Mounted similarly to full flow type (above). Bypass feature consists of a passage between inlet and outlet ports which controls oil flow to engine and through filter. *See "Bypass Valve Location" illustration*



ENGINE OILING SYSTEM (V8 DOUBLE ROCKER SHAFT ENGINES)

V8 SINGLE ROCKER SHAFT ENGINE (SEPARATE ROCKER ASSEMBLY)

►*ENGINE IDENTIFICATION:* These engines have removable rocker arm shaft brackets retained by separate bolts or studs and nuts (cylinder head bolts not located at these brackets).

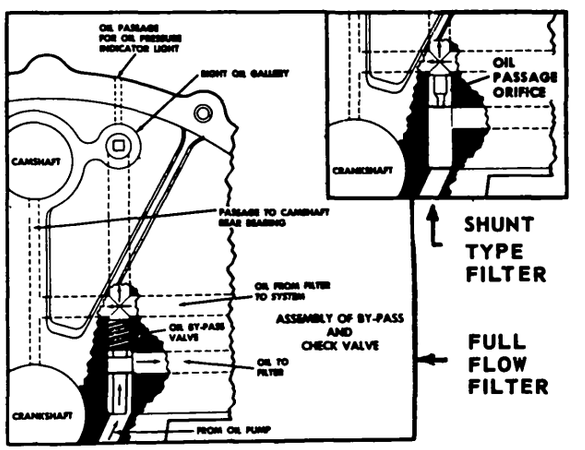
ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Oiling system operates in same manner as for V8 Double Rocker Shaft Engines (see above) except for use of Shunt Type Filter (some engines) and different rocker arm oil leads as detailed below.

Rocker Arms, Pushrods & Valves - Hollow rocker arm shaft on each head is supplied with oil through channel in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank). These passages terminate in drilled holes in the head leading to the rocker arm bracket stud hole for the extended studs which also retain the rocker arm cover (Nos. 2 & 4 in each head). These studs are drilled and one stud feeds oil to the hollow rocker arm shaft. Shaft and rocker arms are drilled for rocker arm, pushrod, and valve stem lubrication. *NOTE* - All rocker arms have drilled passage to pushrod socket end. Intake arms have drilled passage terminating at end of arm directly above valve stem contact point. This passage not used on exhaust arms and valve stem is lubricated by gravity from a hole in the rocker arm bushing.

OIL FILTER: Shunt Type - Mounted on pad at right rear corner of crankcase. Bypass passage between filter inlet and outlet channels ensures engine lubrication if filter element clogged.

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ENGINE OILING SYSTEM BYPASS VALVE LOCATION

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V8 SINGLE ROCKER SHAFT ENGINE (INTEGRAL ROCKER BRACKETS)

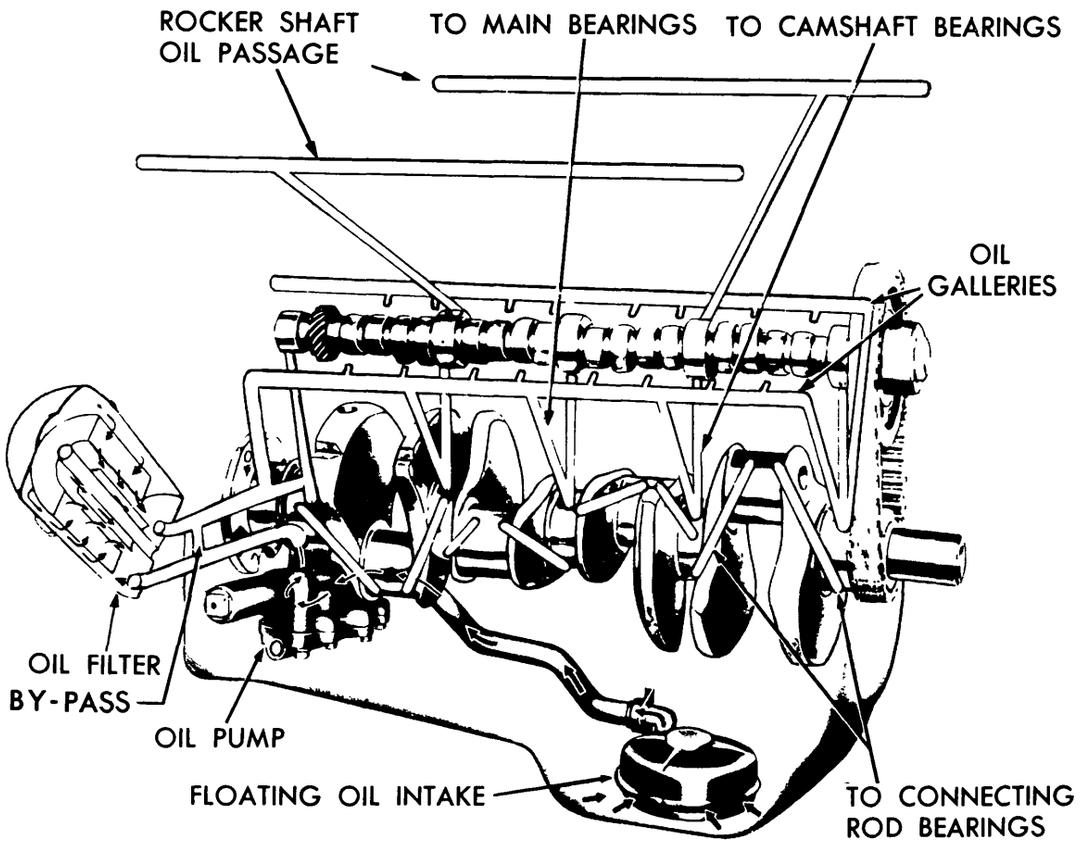
►*ENGINE IDENTIFICATION:* These engines have integral rocker arm shaft brackets (Dodge & Plymouth 277", 301", 318" Engine, Etc.) or separate brackets retained by cylinder head bolts.

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray. Both Full Flow and Shunt type filters are used.

OPERATION: Oiling system operates in same manner as for V8 Double Rocker Shaft Engine (see above) except for different rocker arm oil leads as detailed below. On these engines, right and left main oil galeries intersect hydraulic lifter bores so that separate oil passage to each lifter is not required.

Rocker Arms, Pushrods & Valves - On these engines, oil channel from No. 4 camshaft bearing (for right bank), No. 2 camshaft bearing (for left bank), connect with cylinder head bolt holes in block (Nos. 3 & 5 bolts as shown in Cylinder Head Diagram). These bolt holes in block and head are oversize so that oil passes up around bolts to angle passage in shaft bracket and through this drilled hole into the hollow rocker arm shaft *(NOTE - A setscrew in the shaft bracket positions shaft and aligns these oil holes).* All rocker arms have drilled passage to pushrod socket end. Intake arms have drilled passage terminating at end of arm directly above valve stem contact point. Exhaust arms have drilled hole from rocker arm bushing to upper surface of arm and valve stems are lubricated by gravity flow of oil from this oil hole.

OIL FILTER: Full flow and shunt types used. Filter mounted on pad at right rear of engine crankcase. **Full Flow Type** - Bypass and check valve assembly located in main oil channel in engine block above rear main bearing (controls oil flow in bypass passage between oil filter inlet and outlet channels). Valve is accessible after rear main bearing cap removed. *See "Bypass Valve Location" illustration.* **Shunt Type** - Bypass passage in block has restriction or metering orifice which controls oil flow directly into engine or through oil filter.



ENGINE OILING SYSTEM (V8 SINGLE ROCKER SHAFT ENGINE)

1958-60 V8 ENGINES (350", 361", 383", 413")

►*ENGINE IDENTIFICATION:* These engines may be identified by distributor mounting (at front of engine) and oil pump and filter assembly mounted externally at left front corner of engine block.

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted externally on left front corner of block draws oil through fixed oil strainer and intake pipe in crankcase. From the pump, oil flows through filter (Filter, bypass valve, and oil pressure regulator valve are located in pump body) and then through transverse channels in front end of block to the right main oil gallery extending the full length of engine block just below right bank valve lifters. At rear end of right main oil gallery, two angled transverse channels connect the right and left main oil galleries. Left main oil gallery extends full length of engine block just below left bank valve lifters. Oil is distributed from these main oil galeries as follows:

Crankshaft & Camshaft Bearings - Front crankshaft and camshaft bearings are lubricated by a vertical channel intersecting the transverse channel in the front of the block (feed to right main oil gallery). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the corresponding camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod is lubricated by passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap for rod of opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Right and left main oil galleries intersect lifter bores for direct oil supply to lifters.

Rocker Arms, Pushrods, & Valves - Hollow rocker arm shaft on each head is supplied with oil through channel in block leading from No. 4 camshaft bearing (both banks - camshaft journal is drilled and registers with each channel in turn as camshaft rotates). Channel in block registers with drilled hole in head which terminates at rocker shaft support bracket pad on head (oil holes provided at Nos. 2 and 4 brackets - one hole and oil lead in head will register with channel in block when head installed). Nos. 2 and 4 (wider) rocker shaft support brackets have oil passage connecting oil lead in head with rocker arm shaft *(CAU-*

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TION - These brackets must be installed with oil passage toward center of engine to align with oil hole in head). Rocker arms are stamped steel with channel section which forms oil reservoir. Oil flows from valve tip end of arm to lubricate valve stem and through hole at pushrod end of arm to lubricate pushrod seat.

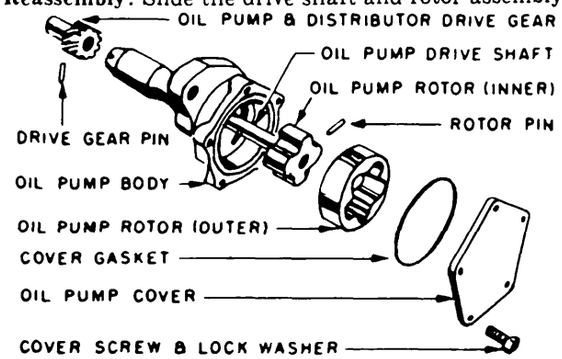
OIL FILTER: Full flow and shunt types used. Filter has bypass valve (full flow type), bypass passage (shunt type), which ensures engine lubrication if filter element is clogged.

OIL PUMP
1954-59 6 CYL. MODELS

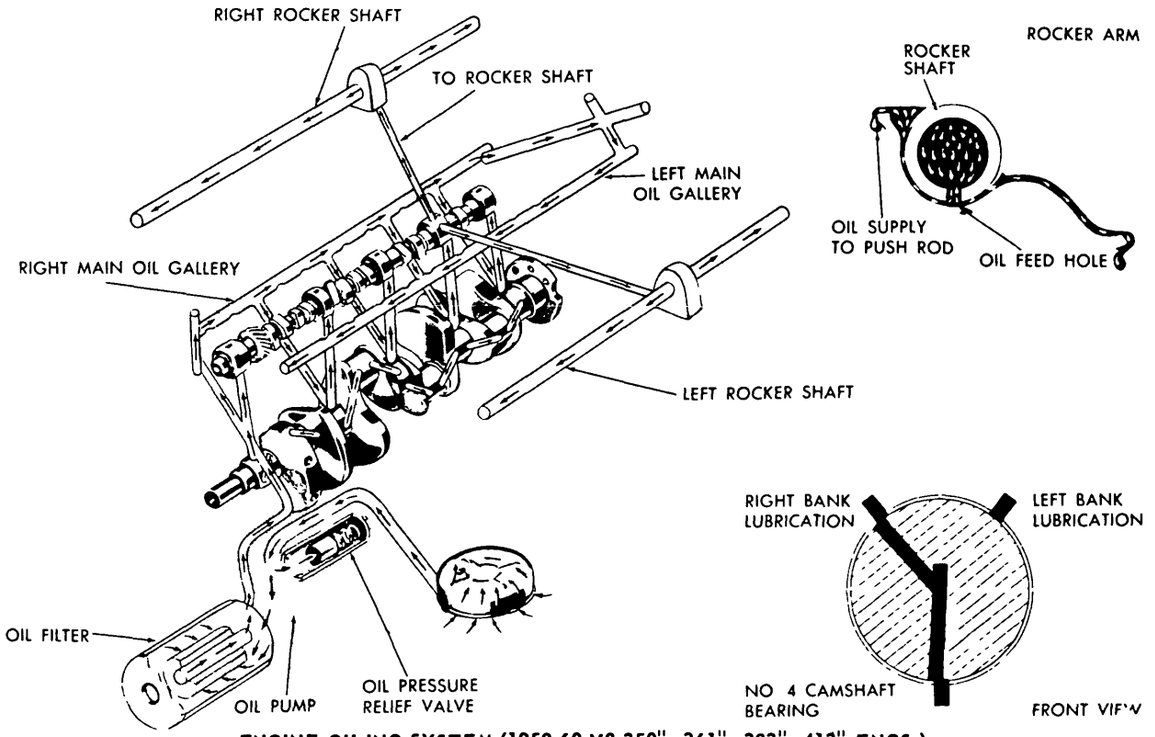
ROTOR TYPE OIL PUMP: Removal - Rotate crankshaft to bring distributor to firing position on No. 1 cylinder. DO NOT rotate engine with oil pump removed. *NOTE* - On 1957-59 models it will be necessary to remove two front motor support "U" bolts, and to loosen two rear motor support bolts and pry engine over a sufficient amount to provide clearance for removal of pump.

Disassembly & Inspection: Remove the oil pump cover and gasket Hold hand over cover opening and with pump upside down, turn drive shaft until outer rotor slips out Drive out the straight pin holding pump drive gear to shaft Press the shaft out of drive gear and slide shaft and inner rotor assembly out of pump body Wash all parts and dry with air Inspect all parts and replace as necessary, then measure clearance between opposite lobe of inner rotor and outer rotor Clearance should be 010" or less If clearance is greater replace both rotors Measure thickness and diameter of outer rotor If thickness is 748" or more and diameter is 2 245" or more, rotor is satisfactory Thickness of inner rotor should be 748' or more If either rotor is less than these dimensions, replace BOTH rotors Insert both rotors into pump body and place a straight edge across pump body between bolt holes Clearance between straight-edge and rotor should be 004" maximum If greater replace pump body Press outer rotor to one side against pump body and measure clearance between rotor and body on opposite side Maximum clearance should be 008 If greater, replace pump body Cover should be smooth and flat If it is scratched or grooved, replace cover Check flatness by placing a straight-edge across inner surface of cover If it is possible to insert a 001" feeler between cover and straight-edge, replace cover

Reassembly: Slide the drive shaft and rotor assembly into pump body Press drive gear on shaft until end play of shaft is from 003" to 010" Press rotor down in body with hand and measure clearance with feeler gauge Install pin and peen over both ends If pin holes do not line up drill a new pin hole through gear and shaft, using a 5 32' drill Slide outer rotor into place in pump body Install new cover gasket and install cover.



1954-59 6 CYL. ENGINE OIL PUMP



ENGINE OILING SYSTEM (1958-60 V8 350", 361", 383", 413" ENGS.)

OIL PRESSURE RELIEF VALVE: Three types of springs are available. Replace with correct color spring as follows:

1958-59 Relief Valve Spring Specifications

Color	Free Height	Load Height	Lbs. Pressure
Red	1 13/16"	1 1/4"	12 4-13.8
No Color (Std)	1 13/16"	1 1/4"	14.4-15.8
Green	1 13/16"	1 1/4"	16.2-17 8

1960 6 CYL. MODELS

Removal - Dodge & Plymouth - Remove attaching bolts and remove oil pump and filter assembly.

Removal - Valiant - Disconnect battery ground cable. Remove oil filter from pump body and disconnect oil pressure indicator sending unit wire. Move alternator toward engine and disengage throttle rod from carburetor throttle lever. Disconnect exhaust pipe at manifold. Disconnect all tubes, hoses, or wires that might be damaged by raising front end of engine. Remove engine support bolts at "K" member, place block of wood under forward end of oil pan (over bolt heads) and use jack under block to raise engine approximately 2". *CAUTION* - Do not raise engine by placing jack under vibration damper. Place short wood blocks between engine supports and "K" member and lower engine onto blocks. Remove oil pump cover and outer rotor. Remove oil pump.

Disassembly: Remove cover seal ring. Press off drive gear (support gear to keep load off aluminum pump housing). Remove inner rotor and shaft. Remove pressure relief valve plug and valve assembly. *Remove oil pressure indicator sending unit.*

Inspection: Clean all parts thoroughly. Check all parts for scratches, scores or wear. Pump cover must be flat, smooth and free from scoring or wear. Replace cover if .0015" feeler can be inserted between inner face of cover and straightedge placed across cover. Replace inner and outer rotors if thickness is less than .649", or outer rotor if diameter is less than 2.469". Install outer rotor in pump body and check clearance between rotor and body while pressing rotor against opposite side of body. Replace pump body if clearance more than .012". Install inner rotor and shaft assembly in pump body. Shaft should turn freely but without side-play. Check clearance between inner and outer rotor at adjacent teeth. Replace both rotors if clearance greater than .010". Measure rotor end clearance by placing straightedge across pump body over rotors and checking clearance with a feeler. If .004" feeler can be inserted between straightedge and rotors, replace pump body. Check oil pressure relief valve for scratches or scoring and see that valve is free fit in bore. Check relief valve spring (see below). If spring replaced, use same color spring.

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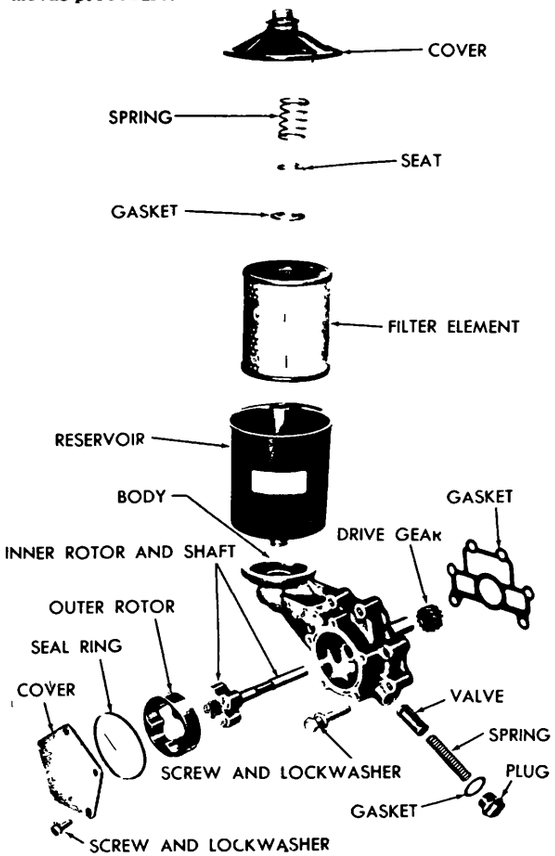
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1960 Pressure Relief Valve Spring

Color	Free Length	Load Length
Grey (Light)	2 3/16"	1 39/64" at 11.85-12.85 lbs.
Red (Medium)	2 19/64"	1 39/64" at 14.85-15.85 lbs.
Brown (Heavy)	2 25/64"	1 39/64" at 17.90-18.90 lbs.

Reassembly: Reverse disassembly procedure. Press drive gear on rotor shaft so that it is flush with end of shaft. Install new seal ring in body groove and install cover, tighten cover bolts to 130 in. lbs. Test pump for free turning.

Installation: After reassembly and testing, remove pump cover and outer rotor. Install pump by reversing removal procedure.



1960 6 CYL. ENGINE OIL PUMP

1954-58 V8 MODELS
(DOUBLE ROCKER SHAFT ENGINE)

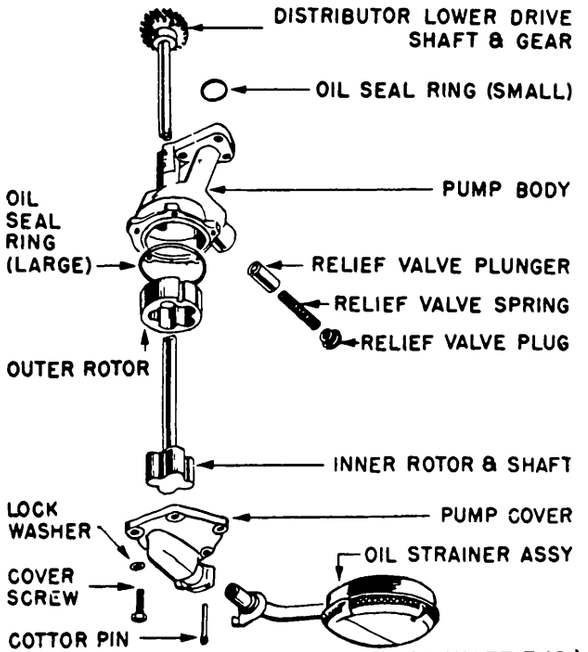
ROTOR TYPE OIL PUMP: Removal - Drain engine oil, remove oil pan. Remove pump mounting bolts and lower pump straight down.

Disassembly & Inspection: Remove pump cover and oil seal ring, pump rotor, and shaft, oil pressure relief valve plug, lift out spring and plunger.

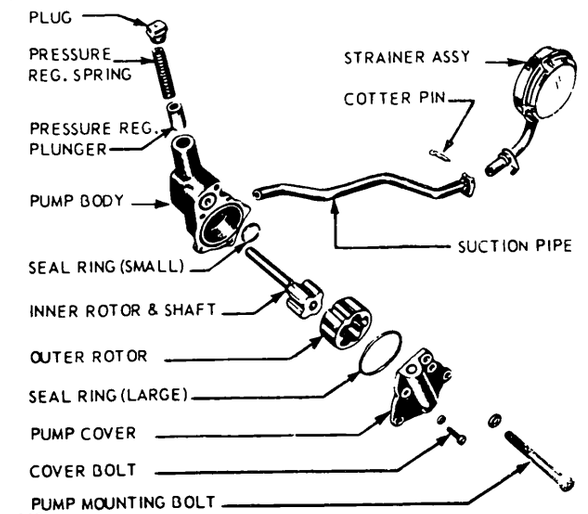
Cover - Place straightedge across cover. Replace cover when clearance between straightedge and cover is .0015" or greater.

Outer Rotor - Measure diameter and thickness of rotor with micrometer. If diameter less than 2.244" or thickness less than .998", replace outer rotor.

Inner Rotor & Shaft - Measure thickness of rotor with micrometer. If thickness is less than .998", replace inner rotor and shaft.



V8 ENGINE OIL PUMP (DOUBLE ROCKER SHAFT ENG.)



V8 ENGINE OIL PUMP (SINGLE ROCKER SHAFT ENG.)
(EXCEPT 350", 361", 383", 413")

Rotor Depth - Slide outer rotor and rotor with shaft into pump body. Place straightedge across pump body (between bolt holes). If clearance between straightedge and top of rotors is .004" or greater, replace pump body.

Outer Rotor to Pump Body Clearance - Place outer rotor in pump body and hold to one side. If clearance at opposite side is .012" or greater, replace pump body.

Clearance between Rotors - With inner rotor bottomed in outer rotor, clearance between opposite lobes of rotors should not exceed .010". When clearance excessive, replace both inner and outer rotors.

Reassembly: Replace relief plunger if scored or not free in bore. Relief plunger spring must meet specification for that color spring. Change color of original spring only when changing oil pressure up or down. Use new oil seal ring between cover and body. Tighten cover bolts to 10 lbs.

Distributor-Oil Pump Drive Shaft Bushing: *See "Ignition Notes" below.*

1954-60 V8 MODELS (Internally Mtd. Pump)
(SINGLE ROCKER SHAFT ENGINE)

ROTOR TYPE OIL PUMP: Removal—Drain engine oil, remove oil pan. Remove oil pump mounting bolts and lower pump straight down.

Disassembly & Inspection: Remove cotter pin holding oil strainer to oil pump suction pipe, then remove pipe Remove cover bolts and cover. Discard oil seal ring Remove pump rotor shaft and lift out pump outer rotor Remove oil pressure relief valve plug and lift out spring and plunger. Wash all parts in a suitable solvent and inspect for damage or excessive wear. Check all pump parts as follows:

Outer Rotor—Measure diameter and thickness of rotor with micro-calipers If diameter less than 2.244" or thickness less than .998", replace both inner and outer rotors

Inner Rotor—Measure thickness of inner rotor with micro-calipers If thickness measures less than .998", replace both inner and outer rotors

Rotor Depth—Slide rotors in pump body Place a straightedge across pump body Use a feeler gauge and measure clearance between top of rotors and straightedge If clearance in excess of .004", replace pump body

Outer Rotor to Pump Body Clearance—To check rotors for excessive wear, measure clearance between lobes of inner and outer rotors If clearance in excess of .010", replace both inner and outer rotors

Reassembly: Use new oil seal ring between cover and body Tighten cover bolts to 10-15 ft lbs Prime pump and then install new oil seal ring in pump mounting face

Distributor-Oil Pump Drive Shaft Bushing: *See "Ignition Notes" below.*

OIL PRESSURE RELIEF VALVE: Three types of springs are available Replace with correct color spring as follows:

Relief Valve Spring Specifications

Color	Free Height	Load Height	Lbs. Pressure
Gray (Lt.)	3 1 32"	2 1/16"	16 1 17-1
Red (Std.)	2 27/32"	2 1/16"	19 5-20 5
Brown (Hvy.)	2 31/32"	2 1 16"	22 9-23 9

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Form 5A

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1958-60 V8 MODELS (Externally Mtd. Pump) (SINGLE ROCKER SHAFT ENGINE)

ROTOR TYPE OIL PUMP: Removal - Remove pump attaching bolts and remove pump and filter assembly.

Disassembly & Inspection: Remove filter base and oil seal ring. Remove rotor and shaft and lift out rotors. Remove oil pressure relief valve plug and lift out spring and plunger. Wash all parts thoroughly. Mating surface of cover should be smooth and free from scratches or grooves. Replace if necessary. Check pump for wear as follows:

Outer Rotor - Replace rotor if thickness is less than .943" and diameter less than 2.469".

Inner Rotor & Shaft - Replace rotor if thickness is less than .943".

Pump Body - Place both inner and outer rotors in pump body. Place straightedge across body between bolt holes. If clearance between rotors and straightedge is not between .003-.006", replace pump body.

Outer Rotor Clearance - If clearance is more than .012" between outer rotor and pump body, replace pump body.

Outer Rotor to Inner Rotor Clearance - Place both rotors in pump body. With inner rotor bottomed in outer rotor, if clearance between opposite lobe of inner rotor and lobe of outer rotor is more than .010", replace both rotors.

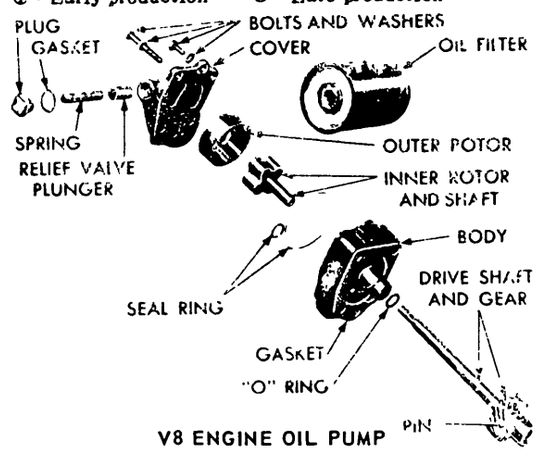
Oil Pump Cover - Place straightedge across pump cover. If clearance between straightedge and cover is .0015" or more, replace cover.

Reassembly: Use new "O" ring seal and note the following:

OIL PRESSURE RELIEF VALVE: Three types of springs are available Replace with correct color spring as follows:

Color	Free Height	Load Height	Lbs. Pressure
Relief Valve Spring Specifications			
Gray (Lt.) ①	2 29"	1 60"	14 85-15 85
Gray (Lt.) ②	2 19"	1.60"	11 85-12 85
Red (Std.)	2 29"	1 60"	14 85-15 85
Brown (Hvy.)	2 39"	1.60"	17.90-18.90

① - Early production ② - Late production



V8 ENGINE OIL PUMP
(350", 361", 383", 413" ENGS.)

►*OIL PUMP INSTALLATION CAUTION:* Pump alignment to prevent breakage of pump drive shaft should be checked as follows: Fashion a tool from an oil pump-distributor drive shaft with gear removed and an extension suitable for a torque wrench welded on. Insert through distributor opening and engage oil pump. Rotate pump shaft at least 10 times and note torque reading Reading should not exceed 10 inch-ounces. If greater torque required, reposition pump.

Distributor-Oil Pump Drive Shaft Bushing: *See "Ignition Notes" below.*

COOLING SYSTEM

1954-59 6 CYL. MODELS

WATER DISTRIBUTION TUBE: Replace whenever engine completely overhauled. If tube becomes rusted or corroded, overheating of engine may occur due to failure of water to circulate properly through cylinder block. To replace tube, remove radiator core and water pump. Pull tube out of block with stiff hooked rod. Install tube with slots up and be sure tube is inserted far enough into block so that water pump will seat properly

WATER PUMP

1954-56 6 CYL. & V8 MODELS PACKLESS, TWO BUSHING TYPES

SERVICING: Lubrication - Fitting for maintaining full reservoir (at 2000 mile intervals), located at lower left side of pump body.

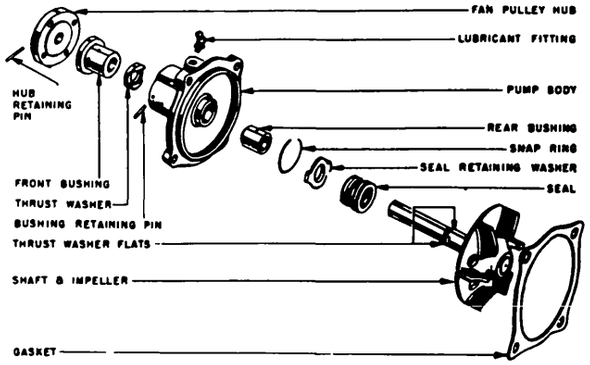
OVERHAUL: Disassembly - Drive out hub retaining pin and pull hub from shaft. On 6 Cyl. models, remove cover and pull impeller and shaft assembly out of pump body. On all models, remove impeller retaining pin, then remove impeller and disassemble seal. Use Tool C-373 (6 Cyl.), C-3208 (V8) to remove and replace bushings, after removing front bushing pin.

Reassembly - When special tools not available, proceed as follows: Drive front bushing retainer pin into bore and press bushings out at forward end. When replacing bushings, press rear bushing into bore .130-.150" beyond seal seat surface (6 Cyl.& V8) then press front bushing (6 Cyl.) in until outer surface of bushing to rear seat of pump face is 2.782-2.787", (V8) until shoulder contacts housing. *NOTE - Use washer to prevent damage to face of bushing. Use No. 13 drill (.185") to drill front bushing pin hole, then remove drill burr from bushing and install pin flush with pump body.*

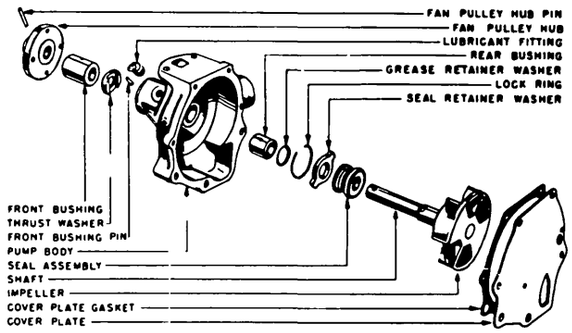
Seal Reassembly - Assemble as follows: Thrust spring (with large end toward impeller), seal retainer (not used with bellows type seal), seal, seal retainer washer (with ears engaging notches in hub), and locking ring. Place grease retainer washer against rear bushing.

Seal Note - Solid end of seal retainer should be toward spring and cupped end toward seal.

Impeller and Shaft Reassembly - Press impeller on shaft until flush with end (temporary location) of shaft. Install seal assembly and slide shaft with impeller into pump body aligning shaft and washer. With spring compresssed (look through water inlet hole),distance from retainer washer and lock ring in impeller hub should be 3/32". Adjust by changing position of impeller on shaft, then drill shaft and install pin. Install new hub (marking position of pin hole in shaft) until endplay of shaft is .0005-.005" (.003" preferred), then drill hub and shaft at right angles to old hole and install pin. Use a No. 22 drill.



1954-56 6 CYL. ENGINE WATER PUMP



1954-56 V8 ENGINE WATER PUMP

1955 V8 MODELS SEALED DOUBLE ROW BALL BEARING TYPES

TYPE: Packless type. Double row ball bearing and pump shaft serviced as a unit.

NOTE—Replace shaft with bearing when overhauling as shaft removal operation usually damages bearing.

SERVICING: Disassembly—Remove bearing lock spring, cover plate screws, plate and gasket. Press pump shaft and bearing (down) out through impeller and housing, using arbor press to support housing with impeller side up. ***CAUTION—To press shaft and bearing out in opposite direction will cause damage to housing.*** Lift out impeller, remove seal retaining washer lock ring, washer and seal assembly.

Assembly—*NOTE*—Always replace seal and seal washer, pump shaft and bearing, whenever disassembling water pump. Install fan pulley hub on new pump shaft (Hub must be tight fit), install water thrower. Install seal assembly in impeller with lock ring, place impeller in housing. Support housing (impeller side down) on press and press shaft and bearing into impeller with tool C-3468. Install cover using new gasket. Special sealing washers are used on cover plate.

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Form 5B

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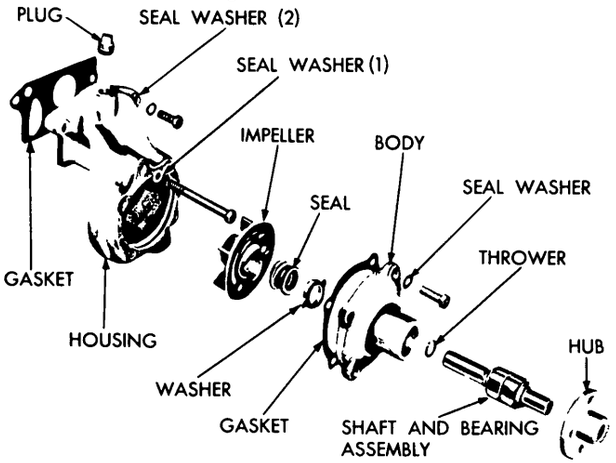
1954-55 V8 MODELS
REMOVABLE BALL BEARING TYPE

TYPE: Packless, Ball bearing type. Bearings can be removed from shaft and serviced. Seal is bellows type.

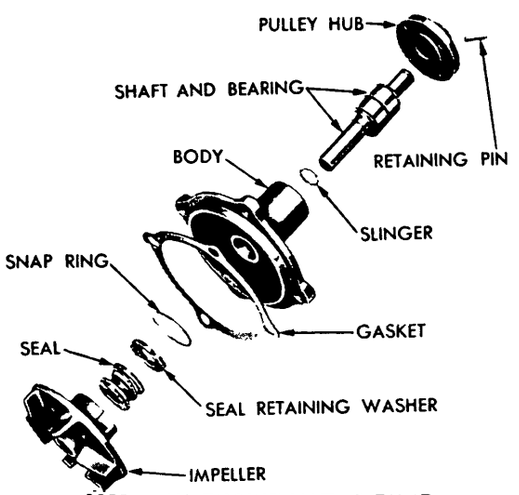
LUBRICATION: Pump is lubricated through a grease fitting in housing, using water pump lubricant.

OVERHAUL: With pump removed from engine, disassemble and overhaul pump as follows:

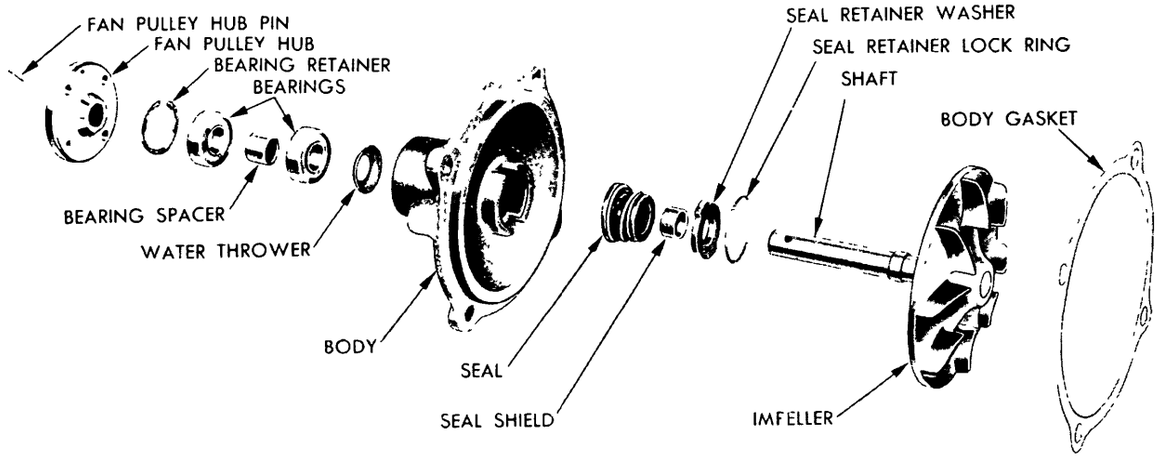
Disassembly: Drive out the fan hub pin and remove fan hub using Tool C-412. Remove bearing retainer with snap ring pliers and remove the impeller and shaft assembly through rear of body. Remove seal retainer washer lock ring, seal retainer washer and seal. Withdraw the outer shaft bearing, spacer, inner shaft bearing and water thrower.



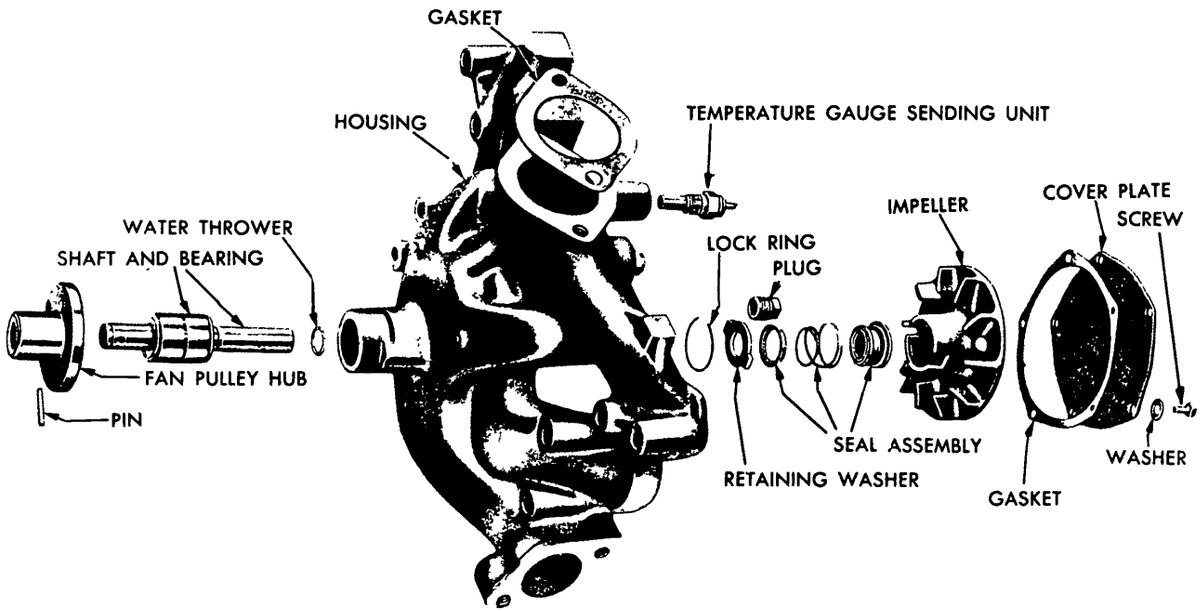
1957-59 6 CYL. ENGINE WATER PUMP



1955-56 V8 ENGINE WATER PUMP
(WITH BALL BEARING & SHAFT ASSY.)



1954 V8 ENGINE WATER PUMP (BALL BEARING TYPE)



1956 CHRYSLER V8 ENGINE WATER PUMP

Checking Pump Seal—Distance between shoulder on shaft & impeller hub face should be 1⅛-1 3/16". If not within these measurements, or if impeller seal face is scored or damaged, replace impeller.

Reassembly: Install seal, retainer, and lock ring. Install impeller shaft. Install water thrower, inner bearing, spacer, outer bearing and bearing retainer. Drill hole through fan hub and shaft and insert new pin. (If the old shaft has been used, drill a new hole at right angles to the old hole.) Remove all traces of old gasket and install a new one. Lubricate with water pump lubricant and check pump shaft for free rotation.

1956-59 6 CYL. & V8 MODELS
SEALED DOUBLE ROW BALL BEARING TYPES

►*1956 CHRYSLER APPLICATION NOTE:* Some early 1956 Chrysler cars use 1955 water pump. This pump differs from 1956-57 models in that it has a cast iron impeller and a shaft bearing lock spring.

DESCRIPTION: Centrifugal, packless type with double row ball bearing and pump shaft serviced as a unit. Same type used on previous models with the addition of molded plastic impeller with a steel insert molded in center to accommodate shaft. Water pump shaft lock spring has been eliminated.

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LUBRICATION: Water pump bearings and shaft are permanently lubricated and require no further lubrication.

REMOVAL: *See Car Model pages for removal procedures.*

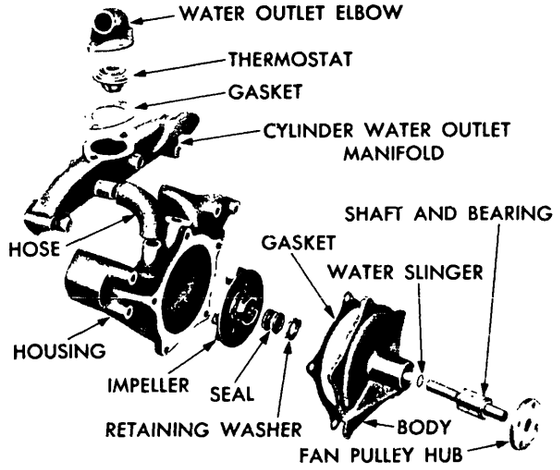
OVERHAUL: With pump removed from engine, disassemble and overhaul pump as follows (*NOTE* - Shaft and bearing assembly do not have to be removed to service a leaking pump):

Disassembly: Drive pulley hub retaining pin (if so equipped) out of hub. Remove fan hub from shaft with puller Tool C-412 (1957 Chrysler use Tool C-3028). Support pump body on hub and in arbor press. *CAUTION - Equal pr ssure should be applied completely around gasket surface of mounting flange to protect housing from breaking.* On 1955-56 Chryslers press out bearing and shaft assembly from impeller. On all other models, remove impeller by breaking plastic (start near metal insert). Remove seal by sliding it over shaft and insert. Remove impeller metal insert with Tool C-3476. With a drift smaller than shaft, press pump shaft and bearing assembly out of impeller and front of pump housing. *CAUTION - Shaft and bearing assembly must be removed in this direction or housing will be damaged.* Clean and inspect parts thoroughly, replace as necessary.

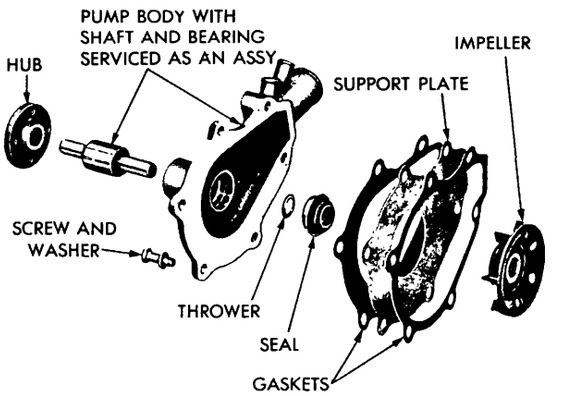
Refacing S al S at: Place Tool C-551 over pump shaft. Turn tool in an even continuous clockwise motion until smooth surface is obtained. Remove tool and install abrasive disc SP-1527 over end of tool and down against cutters. Polish seat surface to a high polish. **Turn by hand in a cl ckwise direction. Do not use m t r.** Blow out with compressed air.

R assembly: *NOTE - Bearing and shaft assemblies removed for any reason should not be used again as bearings are damaged during removal. Use a new hub on press fit hubs.* Place pump body in arbor press supported as close as possible to center bore. Press shaft and bearing assembly into body until outer surface of outer rim of seal retainer is .090" inside front edge of pump housing, using Tool C-3468 (1956 Chrysler use Tool C-3469). Install new seal assembly into impeller with ears of retaining washer engaged in slots of impeller. Press impeller on shaft with sleeve exerting pressure on metal insert only. *CAUTION - Do not apply pressure to pump body.* Impeller shouldbe flush with end of shaft (except 1956 Dodge, .060" between impeller and pump body). Support pump body on impeller end of shaft and press on fan pulley hub until shaft projects beyond hub (see table below), to provide correct hub to pump housing clearance.

Pinn d Hub Not : Drill .156" diameter hole into new shaft and at right angle to old hole in hub, using drill fixture Tool C-783. Drive new pin below surface of hub, peen both ends.



1957-58 V8 ENGINE WATER PUMP



1960 6 CYL. ENGINE WATER PUMP

Fan Pulley Hub Clearances

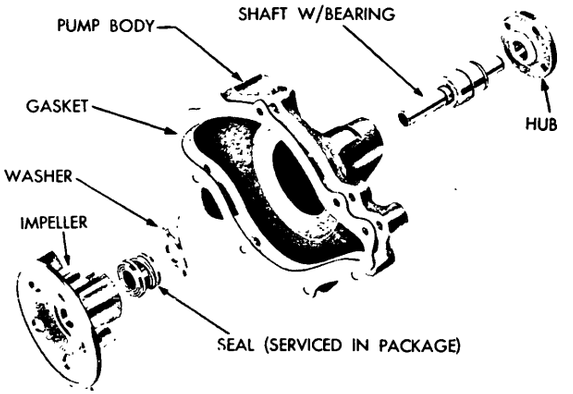
Car Model	Shaft Projection
Chrysler, 1956	℄.380"
Chrysler 1957-59	.330"
DeSoto 1956	
DeSoto, 1957, S-25, S-26	.370"
DeSoto, 1957, S-27	.330"
DeSoto, 1958-59	.330"
Dodge, 1956	Flush
Dodge, 1957-59 6 Cyl.	Flush
Plymouth, 1956, 270" Eng.	Flush
Plymouth, 1956, 277" Eng.	.328"
Plymouth, 1957-59 6 Cyl.	Flush
Plymouth, 1957-59 8 Cyl.	.328"

℄ - Hub projects beyond shaft.

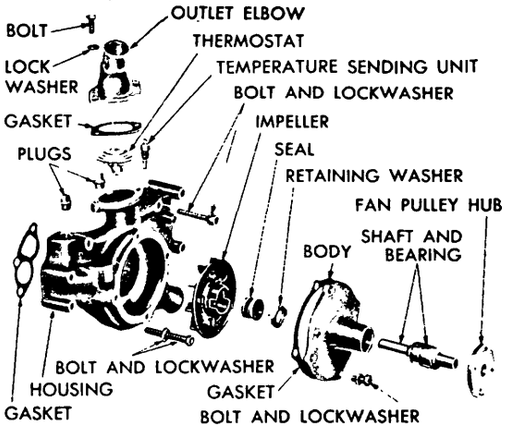
1960 6 CYL. MODELS

WATER PUMP: Removal - Drain cooling system and loosen belt by moving generator towards water pump. Remove fan, spacer and pulley. Remove water pump.

►*SERVICE NOTE:* Water pump body and shaft and support plate are serviced as an assembly only. Only impeller, seal, and hub are replaceable.



V8 277", 301", 318", ENG. WATER PUMP



V8 350", 361", 383", 413" ENGINE WATER PUMP

Hub Replacement: Use Puller Tool C-412 to remove hub from shaft. To install hub, support pump body on impeller end of shaft to avoid damage to body and press hub on shaft until shaft projects 13/32" beyond front face of hub.

Impeller & Seal Replacement: Support pump at hub end and remove impeller by breaking it away from metal insert. With Splitter C-3773, split metal insert and remove from shaft. Remove rubber part of shaft seal. Use Puller C-3753 to pull retainer part of seal (do not pry from pump body), then remove thrower. Install new thrower over shaft and press new seal into body with Seal Installer C-3775. Support pump body on shaft, use a sleeve which will bear on impeller metal insert only and press impeller in until it is flush with end of shaft.

Installation: Reverse removal procedure.

1960 V8 MODELS

WATER PUMP: Removal - Drain cooling system and remove fan shroud. Loosen belt by moving generator or idler pulley towards water pump. Remove fan, spacer, and pulley. Remove water pump.

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Disassembly: Remove fan hub with Puller C-412. Support hub end of pump and remove impeller by breaking it away from metal insert. Remove seal by sliding over shaft and insert. With Splitter C-3476, split metal insert and remove from shaft. Support hub end of pump body and press shaft and bearing through front of pump.

Reassembly: With pump body supported as close to center bore of pump as possible, press shaft and bearing assembly into body with Sleeve C-3468 and a press. **Distance from shoulder of seal retainer to front face of pump body must be .090".** Reface pump seal seat of housing (see below). Install new seal into impeller with ears on retaining washer engaged in slots in impeller. Support shaft at hub end and press impeller on shaft until it is flush with end of shaft. Support impeller end of shaft and press hub on shaft until shaft projects .330" beyond front face of hub.

Refacing Seal Seat - Place Tool C-551 over pump shaft. Turn tool in an even continuous clockwise motion until smooth surface is obtained. Remove tool and install abrasive disc SP-1527 over end of tool and down against cutters. Polish seat surface to a high polish. **Turn by hand in a clockwise direction. Do not use motor.** Blow out with compressed air.

Installation: Reverse removal procedure.

FLUID FAN DRIVE
(AIR CONDITIONED CARS)

FLUID FAN DRIVE: Consists of a rotor driven by a shaft secured to water pump flange. Rotor is enclosed in housing, mounted on the shaft through two single row permanently sealed ball bearings and is free to float along the axis of shaft. Housing is partially filled with fluid. Drag of fluid between housing and rotor provides driving force rotating fan.

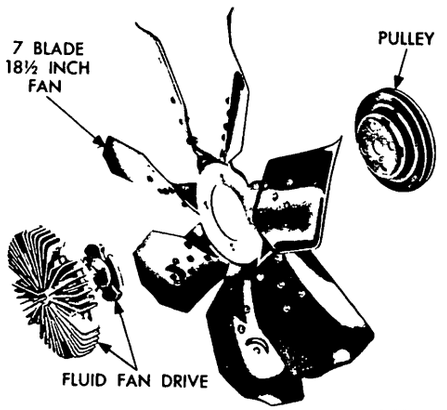
Checking Drive Unit: Check all belt drive units and adjust to specifications. With tachometer and timing light connected and engine operating at normal temperature, direct timing light at fan hub. Fan and crankshaft pulley speed are the same if both parts are stopped by timing light at minimum speed (or higher) shown in table below. If motion is stopped at less than minimum speed shown in table, drive is operating below minimum speed and must be replaced. Turn fan by hand. There should be a marked decrease in turning effort after fan has turned through several revolutions. If fan cannot be rotated relative to pump pulley, or if there is excessive noise, replace drive. *CAUTION - Do not attempt to service unit.*

Model	RPM
Chrysler (1959)	1400
DeSoto (1959)	2200
Chrysler (1960)	2000
DeSoto, Dodge, Plymouth (1960)	1665

IGNITION NOTES
V8 MODELS

DISTRIBUTOR-OIL PUMP DRIVE SHAFT BUSHING: Removal—Insert Tool C-3052 and thread it into bushing. Holding puller head with wrench, tighten puller bolt and pull bushing out of bore in block.

Installation: Slide new bushing over burnishing end of Tool C-3053. Insert tool and bushing into bore of block. Drive bushing and tool down into position,



FLUID FAN DRIVE ASSEMBLY

using a soft hammer. As the burnisher is pulled through the bushing by pressure applied to puller nut, tool will wedge bushing tight in its bore and will burnish bore to correct size. *DO NOT REAM THE BUSHING.*

V8 MODELS

DISTRIBUTOR BASIC TIMING: Before installing distributor-oil pump drive shaft, it will be necessary to time engine as follows: Rotate crankshaft until No. 1 piston is at TDC (firing position). When piston is in this position, pointer on chain case cover should be over "DC" mark on vibration damper. Position oil pump shaft so that it lines up with slot in drive gear. Coat shaft of drive gear with engine oil. Install gear and shaft so that after gear spirals into place it will index with oil pump shaft and slot in top of drive gear will point to first (front) intake manifold bolt on left side of engine (241, 260, 270, 277, 301 & 318") or will be parallel with centerline of crankshaft (all other engines).

PROPELLER SHAFT
1954 EIGHT PASS. MODELS

PROPELLER SHAFT CENTER BEARING: Used on all passenger car models with two propeller shafts. Consists of ball-bearing mounted on rear end of front propeller shaft with an oil seal assembled to front and to rear of bearing, and this assembly (bearing and oil seals) enclosed in a housing which is flange mounted on rear side of frame cross-member. An insulator is assembled on front end of housing. To remove assembly, remove nuts and lockwashers from differential and transmission companion flanges to free propeller shafts at front and rear, take out 4 center bearing housing-to-frame cross-member mounting bolts, remove propeller shaft and center bearing as an assembly.

1956-60 MODELS (EXC. IMPERIAL)

REAR UNIVERSAL JOINT OPERATING ANGLE: Rear universal joint operating angle must be within range of 1-3° (2° preferred). Check and adjust as follows:

►*CHECKING CAUTION:* Car weight must be on wheels (use drive-on type hoist or platform) and there must be no extra weight in trunk.

Checking Rear Universal Joint Angle: 1) On early models, measure angle of companion flange by placing spirit level vertically on back of flange. On later models, remove rebound plate and bumper from top of differential housing, and place spirit level protractor on bosses. On all models, center bubble and note reading.

2) Place protractor on underside of propeller shaft near rear universal joint. Note reading. Add this reading and the pinion angle reading (above). Total should be 2° (1-3°).

►*NOTE: Carrier housing should incline downward slightly.*

Adjusting - To adjust, install a tapered shim between rear spring pad and seat on axle housing with thick end toward front of car. Recheck angle.

1956-60 IMPERIAL MODELS

►*DRIVE LINE SHUDDER OR VIBRATION AT 15-20 MPH: May occur under certain passenger load conditions and can be corrected by the following procedure:*

1) Engine Tune-Up - Engine must operate smoothly with no hesitation or stumble on acceleration. A rough engine may cause this shudder or add to it.

2) Propeller Shaft Alignment - Shaft alignment and "working angle" of center and rear universals must be adjusted and held within limits. *See "Propeller Shaft Alignment" below. CAUTION* - When installing propeller shaft, make certain that letter "O" on front end of spline shaft is aligned with key slot at rear end of front propeller shaft. This is necessary to place all universal joints in correct relationship.

REAR AXLE CONTROL STRUT: This strut consists of a single spring leaf anchored to bracket on rear axle housing and bracket on frame side rail adjacent to front end of rear spring. Strut is designed to control rear axle carrier movement and prevent nose of carrier rising under passenger loading conditions. *See "Propeller Shaft Alignment" below for strut shimming adjustment.*

PROPELLER SHAFT: Removal - Remove front universal joint clamps from transmission yoke (unnecessary to remove bushings if retainer strap used). Remove rear universal joint clamp in same manner. Remove center bearing housing bolts and shims from under housing. Remove front and rear propeller shaft and center bearing as an assembly.

Installation: Insert front propeller shaft over body crossmember and tighten front universal joint-to-transmission yoke bolts to 170 inch-lbs. Connect rear universal joint to rear axle pinion yoke and tighten bolts to 170 inch-lbs. Place same number of shims as removed under center bearing housing, install housing and tighten bolts to 30 ft. lbs.

CENTER BEARING: Disassembly - After propeller shaft assembly removed, clean bearing housing and note the index marks on rear of front shaft and shoulder of sliding yoke. Straighten tab of star washer and unscrew cap from front shaft. Slide star washer and slinger from center bearing housing. Pull sliding yoke, cap, and seal from front shaft. Remove bearing housing from front shaft and press bearing from housing.

►*BEARING SERVICE NOTE:* Bearing is permanently sealed and no lubrication or service required except replacement.

Reassembly: Repack internal splines of front shaft with multi-purpose grease and install slinger on shaft. Press bearing into housing and install on front shaft. Install slinger and star retaining washer. Lubricate

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inside of seal and install cap and seal on sliding yoke using care not to damage seal on splines of yoke. Align index marks of front shaft and yoke and install yoke. Tighten retaining cap enough to compress seal firmly on shaft of yoke but free enough to permit free back and forth movement of yoke in front shaft. Lock retaining cap by bending tab of washer into notch in cap.

PROPELLER SHAFT ALIGNMENT: *NOTE* - Working angle of rear universal joint must be maintained at 1-3° with correct corresponding working angle at center universal joint as listed below.

►*CHECKING CAUTION:* Place car on platform or wheel aligning machine so that car weight is resting on wheels. Fuel tank should be at least ¾ full and car should be empty (no passenger load). Check either with Tool Set J-6845 or with spirit level protractor as given below.

Universal Joint Working Angles

Rear Universal	Center Universal
1°-1½°	1½°
2°-2½°	1¼°
3°-3½°	1°

Checking & Adjusting: Tool Set J-6845. 1) - Remove differential carrier rebound bumper plate. Remove shims from rear axle control strut frame brackets. Place aligning Gauge J-6845 on machined pads of differential carrier and center the bubble. *NOTE - Level of gauge must be on same side of propeller shaft each time gauge is used.* Place gauge on rear propeller shaft near rear universal joint. Entire bubble should be within three graduations from center of gauge. If edge of bubble is ahead of the third graduation, change rear axle pinion angle as follows: Install 2° tapered shims between both rear springs and axle housing pads with thick edge of shim toward front of car. Tighten spring U-bolt nuts and install shims behind control strut brackets so space is filled. Tighten brackets. Install differential carrier rebound bumper plate.

2) - Place tool gauge on rear propeller shaft at rear of universal joint and adjust gauge to center bubble. Install gauge adapter part of Tool J-6845 on front propeller shaft near universal joint. Attach gauge to pins on adapter. For each graduation, leading edge of bubble is forward of center, add one shim under center bearing housing bracket. For each graduation trailing edge of bubble is to rear of center, remove one shim from under center bearing housing bracket.

Checking (Spirit Level Protractor): Proceed as follows:

Rear Universal Joint - Measure angle of front face of pinion shaft companion flange by placing spirit level vertically on flange face (propeller shaft must be disconnected at rear universal joint to make this measurement). Measure angle of rear propeller shaft by placing spirit level lengthwise on underside of shaft. Add these two readings which will be working angle of rear universal joint (*NOTE* - Readings should be added if rear propeller shaft slopes down toward rear which is normal position; if shaft sloped up toward rear, readings should be subtracted). This working angle should be 2° and must be within limits of 1-3°. *See Adjustment below.*

Center Universal Joint - Measure angles of front and rear propeller shafts by placing spirit level lengthwise on lower side of each shaft. Add these two readings which will be working angle of center universal joint (*NOTE* - Readings should be added if both shafts slope differently up or down when viewed in same direction which is normal position; if shafts slope in same direction readings should be subtracted). See table for desired center universal joint working angle in accordance with rear universal joint angle (between 1-3°). *See Adjustment below.*

Adjusting Universal Joint Working Angle: If rear universal joint angle is not 1-3° or if center universal joint angle is not correct for the particular rear joint angle adjust as follows:

Rear Universal Joint - Install a 2° taper shim between rear axle housing and rear spring (install thick end of shim toward front of car). After installing shim loosen control strut bracket attaching bolts and install shims between frame bracket and frame so that control struts are free and not loaded. This will allow nose of carrier to assume correct angularity.

Center Universal Joint - Remove or install shims between center bearing support and frame crossmember (add shim to increase center universal working angle, remove shim to decrease angle). Recheck working angle. A 1/8" thick shim will change working angle approximately ½°. *CAUTION* - If a large adjustment is made at center bearing, recheck rear universal joint working angle to make certain it has not changed too much from desired 2° angle.

BRAKE NOTES

ALL MODELS

►*HIGH PEDAL EFFORT, BINDING OR "CRUNCHY" FEELING CORRECTION:* Make sure there are no kinks or sharp bends in cable. Cable hole in forewall may be misaligned. Correct by elongating hole in necessary direction.

►*INSUFFICIENT HOLDING CORRECTION:* Make sure "V" nut at top end of cable is 3 turns tighter than finger tight and make correct brake adjustment (below).

HAND BRAKE ADJUSTMENT (External Type): Shoe Adjustment - Raise rear wheels and make sure control lever is in fully released position. *NOTE - Freeplay between anchor bracket on center of band and sides of brake support must not exceed .005" (compress anchor bracket in a vise or tap gently with hammer against anvil).* Remove lockwire and adjust anchor screw so clearance between band and drum at anchor is .015-.020". Lock anchor screw. Adjust guide bolt so both upper and lower halves of band have equal clearance (adjustment of bolt nut controls upper half of band). Do not draw lockwire up tight as uneven wear of band will result. Turn adjusting bolt nut until there is a slight drag on drum (upper and lower halves having an equal amount of clearance).

Cable Adjustment - After shoe adjustment properly made (above), pull firmly on threaded cable end with 5-9 lbs. force to take up all slack. Tighten cable adjusting nut so it is properly seated in trunnion without any additional pull on cable.

HAND BRAKE ADJUSTMENT (Internal Type): Shoe Adjustment - With adjusting screw cover plate removed, turn adjusting nut until slight drag is felt on drum, then back off adjusting nut at least one full notch or until drum is free. *NOTE - Two raised shoulders on adjusting nut must be seated in grooves on adjusting sleeve.* Adjust brake lever total travel so it is not more than 3½". Install adjusting screw cover plate.

Cable Adjustment - After shoe adjustment completed (above) and with brake lever in fully released position, cable adjusting nut must be seated in trunnion without any additional pull of cable through firewall.

►*1954 AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Chrysler, DeSoto, Dodge Air-temp" Air Conditioning in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
Windsor DeLuxe	C-62

SERIAL NUMBER: On metal plate attached to left front door hinge post.
Starting Serial Number—70,141,001 **(Detroit), 65,014,001 (Los Angeles).**

ENGINE NUMBER: Stamped on boss on left front side of cylinder block.

►*ENGINE NUMBER LETTERS (Following Engine Number): Identified as follows:*
"A"—All Cylinders .020" oversize.
"B"—All Crankshaft Journals .010" undersize.
"AB"—BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed of 150 RPM. Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18-21" idling at 6 MPH.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. See that valve operates freely. When installing coil, wind free end up approximately 3/4 turn, hook end on stop stud.

VALVE TAPPET CLEARANCE: .008" Intake. .010" Exhaust. Engine must be hot and idling. *NOTE*—Tappet screws are self locking. Remove right front wheel and lower wheel housing for access to valves.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for **exhaust** tappets is desirable.

IGNITION

FIRING ORDER: 1-5-3-6-2-4. See diagram.
SPARK PLUG GAP: .035"
Plugs—Auto-Lite Resistor 4S-140. 14 mm.

COIL: Auto-Lite CR-4001 (U.S. Cars), CR-6007B (Canada).
Ignition Current—2.25 amps idling, 5.0 stopped.

DISTRIBUTOR: Auto-Lite No. IAT-4102 (U.S. Cars), **IAT-4012** (Canada).
Condenser—Auto-Lite IAT-3076RA. **Capacity**—.250-.285 microfarad.
Contact Point Set—Auto-Lite IGW-3028BS.
Breaker Gap—.018-.020".
Cam Angle—36-42°. DO NOT exceed breaker gap limits to obtain dwell.
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance - IAT-4012, 4102

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		450	2		900
5		800	10		1600
9		1300	18		2600
10		1425	20		2850

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IAT-4012, 4102

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5
2	4	7¼
4	8	9 3/8
6	12	11 5/8
9	18	15

►*DISTRIBUTOR REMOVAL CAUTION: To avoid damage to No. 3 & No. 4 pistons when removing distributor, make sure that No. 3 & No. 4 pistons are at the top of their stroke.*

IGNITION TIMING

Setting—2° BTDC
Timing Mark—On crankshaft vibration damper.

►*IGNITION TIMING CAUTION: For accurate reading, be sure engine is at operating temperature and carburetor is at slow idle.*

CARBURETOR

Carter (Ball & Ball)—Model E9C1 (Synchro-mesh Trans. Cars), Model E9B1 (PowerFlite Trans. Cars).
Idle Setting—1½-1½ turns open. For richer mixture turn screw out. Idle engine at 450-500 RPM. (E9C1), 500 RPM (E9B1)
Idle Speed—450-500 RPM (Synchro-mesh), 500 RPM. (PowerFlite).
Float Level—5/64" plus or minus 1/64" from top surface of body casting to top of float.
Accelerating Pump—(E9C1) Inner hole summer, center hole normal, outer hole winter (E9B1) Long stroke for cold weather, short stroke for hot weather.

Fast Idle: .015-.019" clearance between throttle valve and bore of carburetor, side opposite idle port, with choke valve held closed and throttle stop screw backed off.

Slow Closing Throttle (Dashpot): (E9B1) Adjustment screw located on top of carburetor on side opposite thermostatic coil housing. To adjust, tighten adjustment screw, then turn counterclockwise 5 turns. Further adjustment outward will increase action of dashpot and lengthen its retarding effect.

Throttle Linkage Adjustment (E9B1): *See "PowerFlite Transmission" in Transmission Section for data.*

►*OTHER DATA: See "Carter (B&B)" in Carburetor Section for complete data.*

Fuel Pump Pressure: 3½-5 lbs.

CARB. EQUIPMENT

Fuel Pump: Carter M-639-S Vacuum diaphragm type. **Pressure**—3½-5 lbs.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: Auto-Lite Electric Type.
Dash Unit—Auto-Lite 13463A (Exc. Sub. & Estate Wgn.), 13466A (Sub. & Estate Wgn.).
Tank Unit—Auto-Lite 12617A (Exc. Sub. & Estate Wgn.), 12195A (Sub. & Estate Wgn.).

NOTE—Gauge on Suburban is "Two Wire" thermostatic type. Gauge on other models is "One Wire" type.

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Auto-Lite 2H-120-D or Willard HW-2-120-C. 6 Volt, 17 plate, 120 ampere hour capacity.
Grounded Terminal—Positive.
Engine Ground—Left front of engine.

STARTER

Auto-Lite MCL-6117. Armatur MCH-2070.
Drive—Solenoid pinion shift & overrunning clutch.
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—42-53 ozs, (new brushes).

Performanc Data

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4900	5.0	65
8.0 ft. lbs.	Lock	2.0	410

Starting Switch: Auto-Lite SSX-4003 combination starting switch and solenoid pinion shift. Controlled by starter-ignition switch. PowerFlite cars have Neutral Safety Switch and Starter Relay. *See Chrysler V8 wiring diagram and starter data.*

Starter Relay (PowerFlite Cars): Auto-Lite HRW-4001A. *See "Auto-Lite Starter Controls" in Electrical Equipment Section.*

GENERATOR

Auto-Lite Generator No.	Armatur No.
GGW-6001K (U.S. S-M) ①	GGW-2006F
GGW-6001J (Can. S-M) ①	GGW-2006F
GGW-6008G (U.S. Pow. St.) ②	GGW-2045F
GGW-6008FA (Can. Pow St.) ②	
GGW-6008D (U.S. Pow. St. & A.C.) ③	GGW-2045F
GGU-6006B (U.S. Pow. St. & A.C.) ③	GGU-2042F
GGW-6008BA (Can. Pow. St. & A.C.) ③	
GCW-6008GA (Can. Pow. St.) ②	
GGU-6006G (U.S. Pow St.) ②	GGU-2042F
GGU-6006GA (Can. Pow. St.) ②	
GGU-6001G, H (Police)	GGU-2006F
GGJ-6001F, G (Police)	GGJ-2101F
GGW-6001Q (Special)	GGW-2006F
GGU-6001R, V (Special)	GGU-2006F

①—Synchro-mesh.
②—Power Steering
③—Power Steering & Air Conditioning

Performance Data - GGJ

Amperes	Volts	Cold — R.P.M. — Hot
0	6.4	600-700 650-750
50	8.0	1400-1600 1550-1750
55	8.0	1500-1700 1650-1850

Performance Data - GGU

Amperes	Volts	Cold — R.P.M. — Hot
0	6 4	750-850 800-900
45	8 0	1450-1650 1650-1850
50	8 0	1550-1750 1750-1950

Performance Data - GGW

Amperes	Volts	Cold — R.P.M. — Hot
0	6 4	870-970 950-1050
40	8.0	1800-2000 2150-2350
45	8.0	1925-2125 2350-2550

Brush Spring Tension—(GGU, GGW) 35-53 ozs, (GGJ) 30-37 ozs., with new brushes

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Field Current—(GGW) 1.4-1 5 amperes, (GGJ, GGU) 1 4-1.6 amperes, all at 5 0 volts.
Motoring Current—(GGJ) 4 1-4.6 amperes,(GGU)5.0-6.0 amperes, (GGW) 4.8-5.3 amperes, all at 5 0 volts
Rotation—Counter-clockwise at commutator end

B lt Adjustment: Approximately ½" slack (when pushed from a straight line, midway between fan and generator pulley).

Gen rator Charge Indicator Light: In lower cluster of instrument panel Light glows when ignition turned on, goes out when generator charging properly.

REGULATOR

Auto-Lit R gulat r No.	G n rat r
VBF-6001A	GGJ
VBF-6002A (Neg Gd)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg Gd.)	GGU
VBE-6001A	GGW

Cutout Relay

Cuts In—6 3-6 8 volts
Cuts Out—4 1-4 8 volts
Contact Gap— 015" minimum.
Air Gap— 031- 034" with contacts open (check at hinge end of core)

Voltag Regulat r

S tting—7.1-7.4 volts *after 15 minutes operation charging at 1/2 maximum rate.*
Air Gap—.048- 052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A — Operating Amperes —	Test B
VBF-6001A, 2A	66	55 (53-57)
VAV-6001B, 2B	55	50 (48-52)
VBE-6001A	52	45 (43-47)

Test A—After 15 minutes operation charging at ½ maximum rate
Test B— After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6 7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF)

Air Gap-.048"-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Directional Signal: *See Electrical Equip. Section.*

Lighting Switch Removal: Remove knob (use small screwdriver to raise up small clip in knob or remove small cross-head screw depending on method used to hold knob). Remove hexagonal headed nut and collar holding assembly in place, remove switch (switch has threaded sleeve with two flat sides and sleeve is snug fit in switch hole in panel).

Stop Light Switch Location: In brake line fitting on left frame side rail.

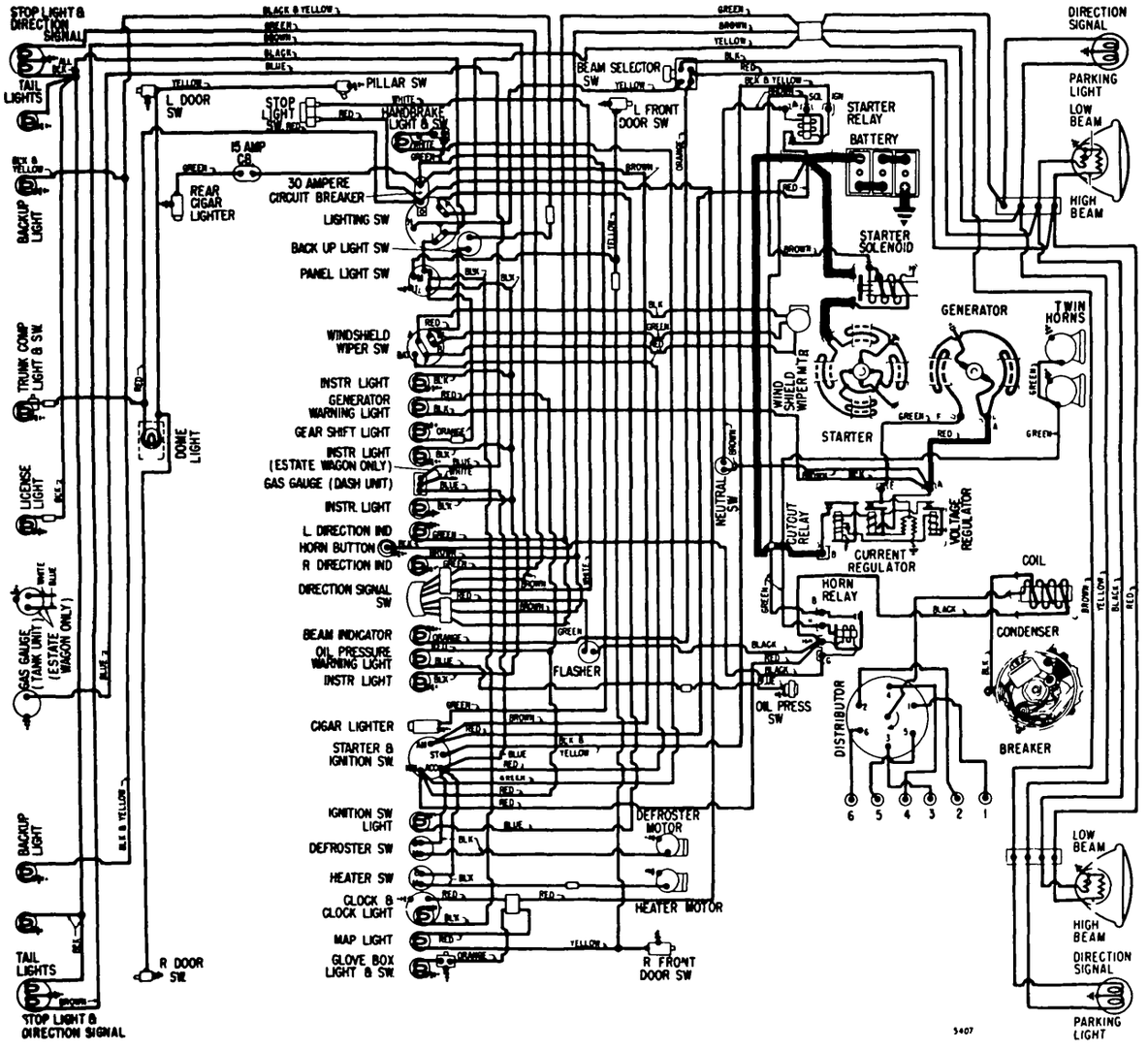
►*IGNITION STARTER SWITCH CAUTION:* When installing accessories, use accessory terminal *only* on ignition starter switch and *not* the ammeter terminal post.
Removal & Installation of Ignition Lock Cylinder—Turn ignition key clockwise to "ON" position. Loosen set screw holding switch in instrument panel Pull switch assembly out from dash towards firewall enough to allow lock cylinder locking pin to clear instrument panel With ignition key in "ON" position, use pointed punch to push in on cylinder locking pin, while pulling on cylinder. Remove ignition lock cylinder. To install lock cylinder in switch, line up locking pin with slot in housing Press in on cylinder lock assembly. Install switch in instrument panel and tighten locking screw.

FUSES: Clock—3 amperes In clock lead wire.
Radio—14 amperes Behind instrument panel.

CIRCUIT BREAKERS: Lighting System—One 30 ampere and one 20 ampere to protect lighting circuits. On lighting switch.
Windshield Wiper—10 ampere. On wiper switch. Backup lights protected by windshield wiper circuit breaker.

HORNS: Auto-Lite (Low Pitch) HAB-4659, (High Pitch) HAB-4664.

Horn Relay: Auto-Lite HRL-4104.
Contacts Cl s —1.5-3.0 volts (seal to core with 4.0 volts maximum).



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C ntacts Op n—.5 volts min. (open from seal).
C ntact Gap—.026". **Air Gap**—016-.020" (armature air gap with contacts closed but not sealed), .015-.018" (gap between armature leg and yoke with armature sealed to core).

ENGINE

►*AIR-CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air-conditioning system. See "Chrysler, DeSoto, Dodge Airtemp" Air Conditioning in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Six cylinder "L" head.
Bore—3 7/16". **Stroke**—4 3/4".
Displacement—264.5 cu. in. **Rated HP**—28.36.
Developed Horsepower—119 at 3600 RPM.
Compression Ratio—7.0-1.
Compression & Vacuum Reading—*See Tune-up.*

ENGINE REMOVAL: *See Chrysler Special Data.*

OIL PAN REMOVAL: Drain engine oil. Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal. Remove oil level indicator and drop pan on tie rod. Lift up oil strainer so it clears baffle inside pan. With strainer lifted, slide pan to rear and remove. NOTE—New end gaskets should protrude 1/4" to 1/8" above oil pan. *Ends must not be cut off.*

CYLINDER HEAD & TIGHTENING TORQUES: *See Chrysler Special Data.*

►*MANIFOLD (Intake & Exhaust) INSTALLATION CAUTION—See "Manifolds" in Chrysler Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.

►*CYLINDER BORE OVERSIZE CAUTION—Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*
Weight—18.5 ozs. (stripped).
Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance .0002-.0012" 1½" from bottom of skirt. Check piston size with micrometer across large diameter at bottom of skirt. Insert .002 x 1/2" feeler between cylinder wall and piston (piston inverted, and pin removed) on side opposite slot. Pull to remove feeler should be 6-9 lbs., at room temperature (70°F.)

Replacement Pistons: Std., .005", .020", .030", .040", .060" Oversize.

►*NOTE:* Cylinder recondition limits .0005" taper and .0005" out-of-round. Badly scored bores or with taper over .030" or out-of-round over .004" requires reboring and honing to above limits.

Installing Pistons: Slot away from camshaft.

PISTON PINS

Full floating type.
Diameter—55/64". **Length**—2 7/8".
Pin Fit in Pist n—.0000-.0005". DOUBLE THUMB push fit at room temperature (70°F.)
Pin Fit in R d Bushing—.0001-.0004". Tight thumb push fit at room temperature (70°F.).
R plac ment Pins: .003", .008" oversize.

PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compr. (#1)	3/32"	.007-.017"	.0025-.004"
Compr. (#2)	3/32"	.007-.017"	0020-.0035"
Oil (#3,4)	5/32"	.007-.017"	0010-.0025"

Installing Rings—#1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down if step on outer edge).

Replacement Rings: Std., .005", .020", .030", .040", .050", .060" Oversize.

CONNECTING RODS

Length (Center to Center)—7¾". **Weight**—32.4 ozs. with bolts, less bearings. *NOTE*—Piston pin hole is bronze bushed.
Crankpin Journal Diameter—2.124-2.125". Maximum out-of-round and taper limits—.001".

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE journals machined UNDERSIZE)—See "CRANKSHAFT" below.*
Lower Bearings—Removable, precision type, thin babbitt on steel. No shims.
Clearance—.0005-.0015" desired. Maximum—.0025".
Sideplay—.003-.007" desired. Maximum—.010".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std., .001", .002", .010", .012", .020", .030", .040" Undersize.

Installing Rods: Oil metering hole toward camshaft.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Four bearing.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*
.010" UNDERSIZE (All Main & Connecting Rod Journals)—Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8") stamped on the machined surface at the upper right hand corner of the block (adjacent to front cylinder exhaust port) to signify that ONE OR MORE crankshaft main and connecting rod journals are machined. 001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the crankshaft center counter-weight in the following manner: "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).
Bearing Type—Removable, precision type, thin babbitt on steel. No shims.
Clearance—.0005-.0015".

Replacement Bearings: Std., 001", .002", .003", .010", .012", .020", .030", .040" undersize. Upper and lower halves of Nos. 1, 2 and 3 are alike and interchangeable, Upper and Lower No. 4 are interchangeable.

Crankshaft Oil S als: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

End Thrust: Taken by flanged faces on rear (#4) main bearing. **Endplay**—.003-.007".

CAMSHAFT

J urnal Diam t rs—**(1)** 2", **(2)** 1 31/32", **(3)** 1 15/16", **(4)** 1 1/4".
Bearing Type—Steel-backed babbitt.
Clearance—.0015-.0035". NOTE—If clearance exceeds .005"(measure with dial indicator placed against cam lobe and pry cam toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain: Width 1". Pitch .500". Length 24" or 48 links.

Camshaft Setting: Sprockets marked. Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers.

VALVES

Tappet Clearance: .008" Intake. .010" Exhaust. Engine must be hot and idling.

Valve	Head Diam.	St m Diam.	L ngth
Intake	1 23/32"	..3405-.3415"	. 4 27/32"
Exhaust	1 1/2".	.3395-.3405"	4 27/32"

Valve	Seat Angle	Lift	St m Cl aranc
Intake	45°	.379"	.001-.003"
Exhaust	45°	.379"	.002-.004"

Valve Seat Width—7/64" maximum.

►*VALVE SEAT INSERT CAUTION: See "Valve System" in Chrysler Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance. (See Valve Stem Clearance above). *CAUTION*—Guides must be installed with counterbore end UP for exhaust valves and with counterbore end DOWN for intake valves.

Valve Springs: Install with closely coiled end up.
Free Length—2"

Valve Spring Sp cificati ns		
	Spring Pressur	L ngth
Valve Closed	40-45 lbs.	1 3/4"
Valve Open	110-120 lbs.	. 1 3/8"

Valve Lifters: Mushroom type (remove from below).
Stem Diameter—.6235-.6240". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".
Lifter Clearance in Block—.000-.002".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing

Intake Valves—Open 12° BTDC. Close 44° ALDC.
Exhaust Valves—Open 50° BLDC. Close 6° ATDC.
Valve Timing Check—With .014" (cold) tappet clearance, No. 6 intake valve should open with No. 6 piston within range of 5° to 17° or .011" to .122" BTDC with 5th to 17th graduation before DC mark on impulse neutralizer aligned with pointer on timing chain cover case. Reset tappet clearance at .008". Intake, ..010" Exhaust (hot and idling). *See "Camshaft Setting" under CAMSHAFT above.*

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OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" and "OILING SYSTEM" in Chrysler Special Data*

Crankcase Capacity—5 qts. refill. Add 1 additional quart when filter changed.

Normal Oil Pressure—40-60 lbs at 40-50 MPH with warm oil (40-65 lbs. with PowerFlite)

►*OIL PRESSURE CAUTION—Oil pressure will drop to 25-40 lbs. WHEN FILTER ELEMENT IS CLOGGED. Replace filter element.*

Oil Pressure Relief Valve—Oil pressure relief valve opens at 40-60 lbs Under plug on left side of crankcase ahead of oil line to provide additional oil at idling speeds Adjustable by replacing spring (3 types) **(1)** Standard spring painted BLUE **(2)** Lighter than standard painted RED **(3)** Heavier than standard painted GREEN *CAUTION—Replace spring with new spring of same color.*

Oil Pressure Warning Light: In lower cluster of instrument panel Light glows when ignition turned on, goes out when oil pressure reaches 10 lbs

Oil Pressure Switch—Auto-Lite No 13411A

Oil Pump: Rotor type on right side of crankcase.

Oil Pump Overhaul & Installation—*See Chrysler Special Data.*

Oil Filter: "Full-flow" type. All oil delivered under full pressure to working parts goes through the filter before entering oil passages in engine. Safety valve in filter opens if element is clogged, allowing oil to pass directly to engine.

Servicing—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required)

►*OIL FILTER CAUTION—If oil pressure drops to 25-40 lbs., FILTER IS CLOGGED. Replace filter element.*

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe

COOLING

Water Capacity: 15 quarts (16 quarts with heater)

Pressure Valve: Chrysler No 1373136 Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cyl head water outlet Starts to open 157-162°F

Water Pump Packless type Grease fitting for lubrication

See "Water Pump" in Chrysler Special Data

Pump Removal: Drain cooling system, remove fan belt and disconnect water pump hose Remove bolts holding water pump to engine block and lift out water pump and fan assembly

Temperature Gauge · Auto-Lite No 13464A

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	1331	382151
Heavy Duty	11A6	1330	381850
Police, Taxi	11A6	929	381850

Clutch Disc No.—See clutch listing above

See Clutch Sec. . or complete data.

Pedal Adjustment: Adjust stop screw on lower end of pedal and adjusting nut on connector link at fork. **Pedal Free Play (at outer end of clutch fork)**—1/8" to 5/32". **(At Pedal Pad)**— 1" to 1 1/8".

Removal: Remove release fork pull-back spring Remove Transmission (See Synchro-Mesh Transmission), and housing underpan Pull out clutch release bearing and sleeve Mark cover and flywheel Take out cover screws Remove clutch assembly and clutch disc assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own Make. *See "Chrysler Synchro-mesh" Transmission in Transmission Section.*

Transmission Control· *See "Transmission Controls" in Transmission Section*

Removal: Jack up front of car, disconnect front universal (loosen companion flange nut if disassembling transmission - See Chrysler Special Data for Propeller Center Bearing Removal on 8-pass) Disconnect speedometer cable, hand brake cable, gear shift rods Remove transmission-to-clutch housing cap screws and nuts Pull unit to rear, down, and out of car NOTE—Use pilot studs when installing assembly

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary Transmission

See "PowerFlite" Transmission in Transmission Section for complete data

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite" Transmission in Transmission Section for data.*

►*TESTING & TROUBLE SHOOTING See "PowerFlite" Transmission in Transmission Section.*

Lubrication· *Check* fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A)

Checking Fluid Level—Apply hand brake and place selector lever in neutral position Allow engine to idle until normal operating temperature is reached Shift selector lever through all ranges. Shift selector lever through all ranges Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator.

Oil Filler Tube (Location)—At right rear of engine compartment

Capacity—12 qts (refill) 13 qts (after overhaul)

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Drive Universal. Cross type with roller bearings

Propeller Shaft Center Bearing Used on 8-Passenger

See "Propeller Shaft" in Chrysler Special Data.

REAR AXLE

Own Make. Semi-floating types with hypoid gear and Hotchkiss Drive Two types used as follows

Model	Rear Axle Type
Synchro-mesh (Exc 8-Pass & Est Wgn)	Cage
Synchro-mesh (8 Pass & Est Wgn)	Barrel
PowerFlite	Barrel

See "Chrysler Hypoid" in Rear Axle Section.

Ratios	Exc. 8 Pass. & Est. Wgn.	8 Pass. & Est. Wgn.
Synchro-mesh	3 9-1 (39-10)	4 1-1 (41-10)
PowerFlite	3 73-1 (41-11)	3 91-1 (43-11)

REAR AXLE NOTE—Thrust pad, screw and nut, has been eliminated on PowerFlite equipped cars.

Backlash— 006- 010"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), and carrier assembly capscrews Withdraw carrier assembly from housing

Axle Shaft Removal—Remove wheel, hub, and drum assembly (use screw type hub puller - Tool C-675), block brake pedal, disconnect brake line at brake cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (Use C-499 puller) NOTE—Use puller C-293-C to remove bearing from shaft, puller C-748 or C-358 to remove inner oil seal, drift C-201 to install seal

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed, check endplay with dial indicator To adjust, remove backing plate (see above), add or remove shims (furnished 010", 0125", 015", 030" thick) equally at both wheels Endplay— 003- 008"

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type Serviced by replacement

Standard Shock Absorbers

Car Model	Chrysler Part No. Front	Rear
4-Door Sedan, Club Cpe	1450630	1450633
Others	1450631	
8-Pass Sedan, Est. Wgn.		1450635
Club Cpe Conv		1450634

Heavy Duty Shock Absorbers

8-Pass. Sedan, Est. Wgn.	1450346	
Others	1450041	1450635
All (Special)		1450075

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers

See Front Suspension Section for complete data.

Kingpin Inclination—5° to 6½° with 0° camber.

Camber—Neg 3/8° to Pos 3/8° (left 1/4° greater than right within limits)

Caster—Neg 1° to Neg 3° (Neg 2° preferred)

Toe-In—0" to 1/16" (0" preferred).

Turning Out on Turns—Inner wheel 21½°, plus or minus 1°, with outer wheel turned 20°

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STEERING

Manual Steering Gear: Gemmer. Worm and three-tooth roller.
See Steering Gear Section for complete data.

Power Steering: Hydraulic steering unit with engine driven hydraulic pump. Two types used as follows:

Power Steering Unit	Type
Gemmer Hydraguide (Early)	Internal Oil Passage
Chrysler Full Time (Later)	Coaxial

See "Power Steering" in Steering Section for complete data.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Chrysler "Safe-Guard" Lockheed hydraulic. *See "Chrysler Safe-Guard" Brakes in Brake Section for complete data.*

Drums—Centrifuse. Diameter 12".

Wh l Cylind rs—1 1/8" bore. Single acting (front), double acting (rear wheels).

Replacement Linings & Shoes—Linings or shoes with linings come in Standard and .030" oversize.

Linings—Molded asbestos (bonded to shoe). Length-12.57" per shoe. Width—2". Thickness—13/64".

Braking Power—60% Front. 40% Rear.

Clearance— 006" at each end of all shoes.

Master Cylinder: On frame bracket at base of brake pedal.

Checking Fluid—Access hole at left of front floor pan

Removal—Remove floor mat and toe board. Disconnect push rod. Remove horse shoe clip and slide brake pedal off shaft. Disconnect brake line tubes at master cylinder fittings. Remove bolts from master cylinder body. Cylinder can then be lifted off frame bracket. When re-installing use new horse shoe clip.

Power Brakes: Chrysler "Vacu-Ease". Available on 8-Passenger and Town & Country Wagon.
See "Chrysler Vacu-Ease" Power Brakes in Brake Section.

Parking Brake: On shaft at rear of transmission. 6" external contracting band type used with Synchro-mesh Trans. 7" internal expanding used with Auto. Trans.

Adjustment–S "Hand Brak N tes" in Chrysl r Sp cial Data.

Lining	Width	Thickn ss	L ngth
6" Ext. Type	2"	5/32"	15 3/8"
7" Int Type	2"	5/32"	13 1/16"

Clearance (External Type)—.015-.020" around band.
Internal Type—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMG-4102. Electric Type.
See "Auto-Lite" Electric Windshi ld Wip rs in Miscellaneous Section.

Air Conditioning: Chrysler "Airtemp". S "Airtemp" *Air Conditioning in Miscellaneous S cti n.*

Window Regulators: Auto-Lite Electric Type.
See "Auto-Lite Window Regulators" in Miscellan us Section.

Convertible Top Control: Hydro-Lectric Type.
See "Hydro-Lectric" Pow r Operat d T ps in Miscellaneous Section.

►*MODEL C66 ELECTRICAL SYSTEM CAUTION: 12 VOLT syst m us d n this mod l and sp cial 12-volt units us d as not d belo w.*

►*1954 AIR-CONDITIONED CAR SERVICE CAUTION: Use xtr m car wh n disconnecting any part of air conditi ning quipm nt or lines. See "Chrysler, DeSoto, Dodg Airf mp" Air C nditioning in Miscellaneous S ction.*

MODEL IDENTIFICATION

SERIAL NUMBER: On metal plate attached to left front door hinge post.

Starting S rial N s.	Detroit	Los Angeles
C-63-1 New Yorker	76,591,001	66,510,001
C-63-2 New Yorker DeLuxe	7,249,001	69,005,001
C-64 Custom Imperial	7,775,001	
C-66 Crown Imperial	7,817,001	

ENGINE NUMBER: Stamped on boss on top front side of cylinder block just back of water pump.
Starting Engine Numb r—C54-8-1001.

►*ENGINE NUMBER LETTERS & MARKS (Following Numb r): Id ntifi d as f ll ws:*
"A"—All Cylinders .020" oversize.
"B"—All Crankshaft Journals .010" undersize.
"AB"—BOTH above conditions exist.
"MALTESE CROSS"(3/8" high)— ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting R ds" and "Crankshaft" (b low).*
"DIAMOND"—(3/8" high)—All Valve Lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 135-165 lbs. at cranking speed of 150 RPM. Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18-21" idling.

VALVE TAPPET CLEARANCE: No adjustment required, except when valves are reconditioned (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatically controlled valve in exhaust manifold of right cylinder block Valve must operate freely. When installing coil, move outer end of thermostatic spring around and up ¾ turn, hooking end of spring under stop stud. *See Chrysler Sp cial Data.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2. See diagram.

SPARK PLUG GAP: .035".
Spark Plug—Auto-Lite Resistor 4GS-150. 14 mm.

COIL: Auto-Lit (C-63, C-64 *6 Volt)* **CR-6015, (C-66** *12 Volt)* **CZ-4001.**
Igniti n Curr nt—(CR-6015) 2.25 amperes idling, 5.0 amperes stopped. (CZ-4001) 1.8 amperes idling, 3.0 amperes stopped.

DISTRIBUTOR: Aut -Lit IAZ-4001C.
C nd ns r—Auto-Lite IBB-2015R. **Capacity**—.25-.28 microfarad.
C ntact P int Set—Auto-Lite IGP-3028ZS.
Br ak r Gap—.015-.018".
Cam Angl —26-28° (one set of points), 32 36° (total dwell). Set both points alike.
Br ak r Arm Spring T nsi n—17-20 ozs.
R tati n—Clockwise viewed from above.

Aut matic Advanc

Degrees Distr.	RPM	Degrees Eng.	RPM
Start .	350	0	700
1	425	2	850
6	825	12	1650
11	1900	22	3800
12	2100	24	4200

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance

Dist. Degrees	Eng. Degrees	Vacuum(" of HG)
Start .	0.	5¼
1	2	6
5	10	9¼
10	20	14 7/8
11.5	23	17

IGNITION TIMING

Setting—4° BTDC.

►*IGNITION TIMING CAUTION: For accurate reading, be sure engine is at operating temperature and carburetor is at slow idle.*

►*IGNITION SETTING CAUTION: Optional setting is up to 8° BTDC depending on octane rating of fuel being used. Do not exceed 8° limit to prevent harmful preignition.*

Timing Mark—On crankshaft vibration damper.

CARBURETOR

►*CARBURETOR APPLICATION: Carter WCD 2039SA, 2-Barrel Carburetor used on C-63-1. Carter WCFB 2041S, 4-Barrel Carburetor used on C-63-2, C-64, and C-66.*

CARTER 2-BARREL

Carter WCD 2039SA. Dual downdraft type with automatic choke.

►*1954 POPPING BACK ON ACCELERATION (Between 5-50 MPH. after hard run at high speed):* If not corrected by regular tune-up procedure, install special Vacuum Piston Spring No. 61-485. *See "Carter WCD" in Carburetor Section.*
Idle Setting: ½ to 1 turn open. Turn screws out for richer mixture. Set both screws alike.
Idle Speed—500 RPM.
Float Level—11/64" distance between top of floats and machined surface of casting (Gauge T109-205). Adjust by bending arms of floats. Floats should have a free movement of ½" at free end of float. Adjust by bending lip of float bracket
Accelerating Pump—Install connector link in outer hole of pump arm for long stroke.
Fast Idle: *CAUTION—Two different settings required:*
1) Loosen choke lever clamp screw on choke shaft. Insert .040" feeler gauge (T109-193) between lip of fast idle cam and boss of flange casting Hold choke valve tightly closed and take slack out of linkage by pressing choke lever toward closed position. Hold in place and tighten clamp screw
2) With choke valve tightly closed, tighten fast idle adjusting screw until there is an .017-.021" opening (wire gauge T109-44 may be used) between throttle valve and bore of carburetor (side opposite idle port) Be sure fast idle adjusting screw is on high step of cam while making this adjustment.
Aut matic Ch k Setting: Centered (at index).
Sl w Cl sing Thr ttl (Dashp t): Distance from end of diaphragm stud to diaphragm bracket should be 3/8". To adjust, loosen lock nut, turn diaphragm to specified amount and tighten lock nut. With dashpot operating lever adjusting screw backed out and throttle valves seated, fully depress diaphragm by pressing against dashpot operating lever. Tighten screw until it just contacts throttle shaft arm, then back out ¼ turn. With throttle valves in wide open position there should be 3/64" clearance between dashpot operating lever and stop. Adjust by bending stop (Tool T109-22).
Throttle Linkage Adjustment (PowerFlite Cars): *See "PowerFlite" Transmission in Transmission Section for data.*

►*OTHER DATA: See "Carter WCD" in Carburetor Section for complete data.*

Fuel Pump Pressure: 3½-5½ lbs.

CARTER 4-BARREL

Carter WCFB 2041S. Four barrel downdraft type with automatic choke.
Idle Setting: 1 to 2 turns open. For richer mixture, turn screws out. Do not idle engine below 500 RPM., with shift lever in neutral position.
Idle Speed—500 RPM.

►*OTHER DATA: See "Carter WCFB" in Carburetor Section for complete data.*

Fuel Pump Pressure: 3½-5½ lbs.

CARB. EQUIPMENT

Fuel Pump: Carter M-840-S. Vacuum diaphragm type.
Pressure: 3½-5½ lbs.
See "Fuel Pumps" in Carburetion Equipment Section.
Gasoline Gauge: Auto-Lite Electric Type.

Car Model	Dash Unit	Tank Unit
C63 (Exc.Sub. & Est. Wgn)	13463A	12618A
C63 (Sub. & Est. Wgn.)	13466A	12195A
C64	13463A	12618A
C66 (12V.)	13465A	13089A

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

►*NOTE: 12 Volt battery used on C66.*
C63 & C64 —Auto-Lite 2H-135-RD or Williard MW-2-135-R- 6 volt, 19 plate, 135 ampere hour capacity.
C66—Auto-Lite 12H-65-R. 12 volt, 13 plate, 65 ampere hour capacity.
Grounded Terminal—Positive.
Engine Ground—Left front of engine.

STARTER

►*NOTE: 12 Volt starter used on C66.*

Car Model	Auto-Lite Starter	Armature
C63, C64 .	MCL-6121A	MCH-2110
C66 (12 V.)	MDB-6001A	MDB-20006F

Drive—Overrunning clutch (solenoid pinion shift).
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—42-53 ozs. (new brushes)

P rf rmanc Data—MCL

Torque	R.P.M.	Volts	Amperes
0 ft lbs.	4900	5.0	65
8 0 ft. lbs.	Lock	2.0	410

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Performance Data—MDB

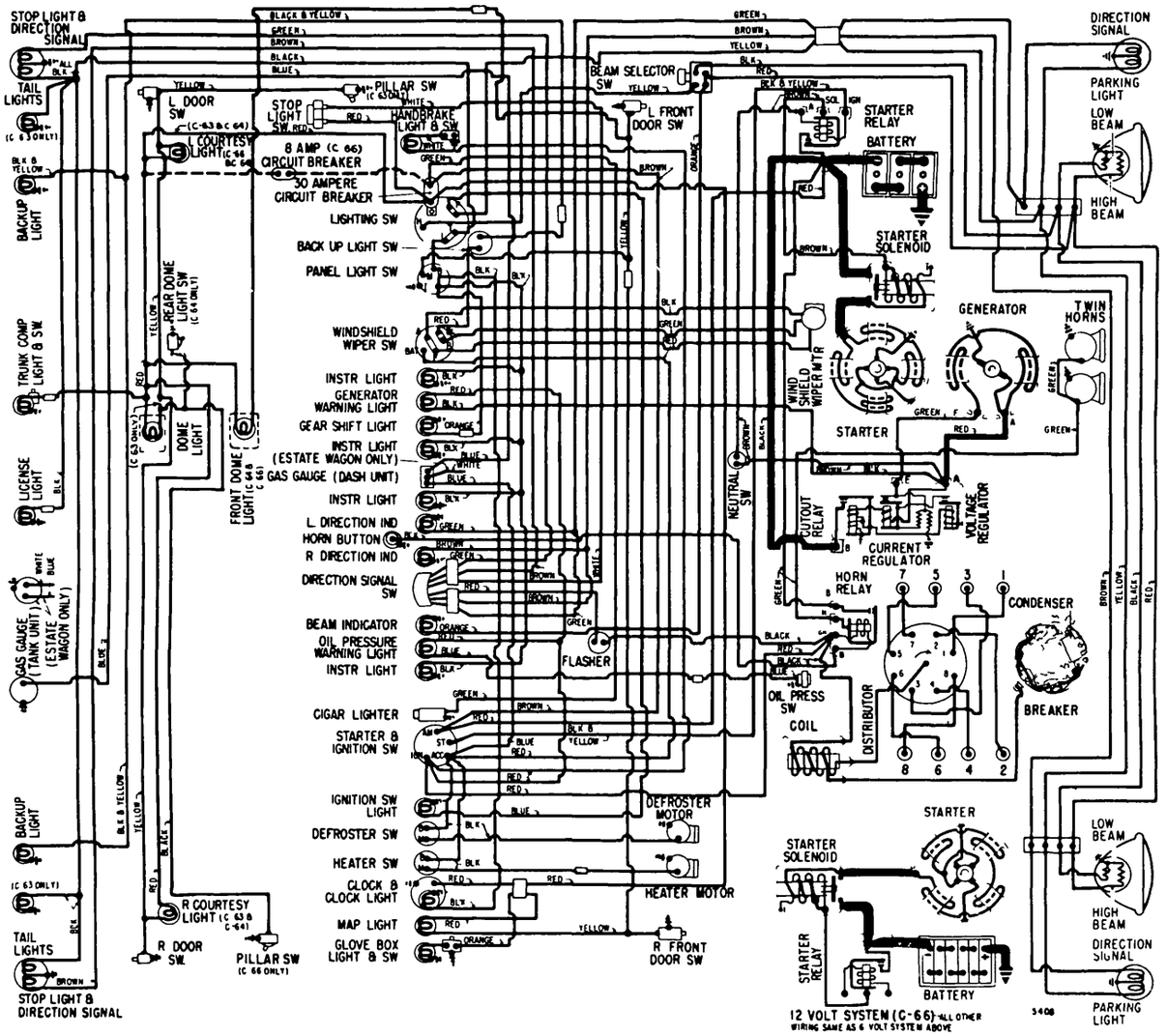
Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	3600	10.0	31
4.0 ft. lbs.	Lock	4.0	145

Starting Switch: Auto-Lite SSX-4004 (MCL-6121A Starter), SSY-4002 *12 Volt* (MDB 6001A Starter). Solenoid pinion shift and starting switch used with neutral safety switch (on Transmission) and SEPARATE relay Auto-Lite HRW-4001 (6 volt), RAA-4001 (12 volt). *See "Starter Controls" in Electrical Equip. Section.*

Neutral Safety Switch Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

GENERATOR

Car Model	Auto-Lite Generator	Armature
C63, 64	GGW-6001K (S-M)①	GGW-2006F
C63, 64	GGW-6001J (S-M)①	GGW-2001F
C63, 64	GGW-6008G (P.S.)②	GGW-2045F
C63, 64	GGW-6008FA (P.S.)②	
C63, 64	GGU-6006G (P.S.)②	GGU-2042F
C63, 64	GGW-6008GA (P.S.)②	
C63, 64	GGU-6006GA (P.S.)②	
C63, 64	GGW-6008BA (P.S. & A.C)③	
C63, 64	GGW-6008D (P.S. & A.C.)③	GGW-2045F
C63, 64	GGU-6006B (P.S. & A.C.)③	GGU-2042F
C63, 64	GGU-6001G, H (Police)	GGU-2006F
C63, 64	GGJ-6001F, G (Police)	GGJ-2101F



Car Model	Auto-Lite Generator	Armature
C63, 64	GGW-6001Q (Special)	GGW-2006F
C63, 64	GGU-6001R, V (Special)	GGU-2006F
C66 (12 V.).	GHM-6002A, E	GHM-2042F

①—Synchro-mesh. ②—Power Steering.

③—Power Steering & Air Conditioning.

Performance Data—GGJ

Amperes	Volts	Cold - R.P.M.- Hot	
0	6.4	600-700	650-750
50	8.0	1400-1600	1550-1750
55	8.0	1500-1700	1650-1850

Performance Data - GGU

Amperes	Volts	Cold - R.P.M.- Hot	
0	6.4	750-850	800 900
45	8.0	1450-1650	1650-1850
50	8.0	1550-1750	1750-1950

Performance Data - GGW

Amperes	Volts	Cold - R.P.M.—Hot	
0	6.4	870-970	950-1050
40	8.0	1800-2000	2150-2350
45	8.0	1925-2125	2350-2550

Performance Data—GHM—12 V It

Amperes	Volts	R.P.M. — Cold
5.0	14.0	875
25.0①	14.0	1325
25.0①	15.0	1350

①—Do not operate at higher outputs and do not operate at this output without ventilating fan for any length of time. To do so may result in burned armature and fields.

Brush Spring Tension—(GGU, GGW, GHM) 35-53 ozs., (GGJ) 30-37 ozs. New brushes.

Field Current—(GGW) 1.4-1.5 amperes, (GGJ, GGU) 1.4-1.6 amperes, all at 5.0 volts. (GHM) 1.1-1.3 amperes at 10.0 volts.

Motoring Current—(GGJ) 4.1-4.6 amperes, (GGU) 5.0-6.0 amperes, (GGW) 4.8-5.3 amperes, all at 5.0 volts. (GHM) 3.0-3.5 amperes at 10.0 volts with field terminal grounded to frame.

Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Approximately ½" slack (when pushed from a straight line midway between pulleys).

Generator Charge Indicator Light: In lower cluster of instrument panel. Light glows when ignition turned on, goes out when generator charging properly.

REGULATOR

Auto-Lite Regulator No.	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A	GGW
VRX-6003A (12 V.)	GHM

Cutout Relay

Cuts In (VAV, VBE, VBF)—6.3-6.8 volts

Cuts In (VRX)—13.0-13.75 volts

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Cuts Out (VAV, VBE, VBF)—4.1-4.8 volts (approx. 4-6 amps. disch.)
Cuts Out (VRX)—8.2-9.3 volts (approx. 3-5 amps.disch.)
Contact Gap (All)—.015" minimum.
Air Gap (All)—.031-.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting—7.1-7.4 volts (VAV, VBE, VBF), 14.2-14.8 volts (VRX), *after 15 minute stabilization charging at ½ maximum rate.*
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set following specifications at 70° F.*

	Test A - Operating Amperes	Test B
VAV-6001B, 2B	55	50 (48-52)
VBE-6001A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VRX-6003A	29	23 (21-25)

Test A—After 15 minutes operation charging at 10 amperes (VRX), ½ maximum rate (VAV, VBE, VBF).
Test B—After 15 minutes additional operation with current regulator operating (load applied to hold voltage to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF), 13.6-13.8 volts (VRX).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equip. Section.*
Lighting Switch Removal: Remove knob (use small screwdriver to raise up special clip in knob, or remove small cross-head screw, depending on method used to hold knob). Remove hex nut and collar that holds assembly in place. Pry out switch (switch has threaded sleeve with two flat sides. Sleeve fits snugly in switch hole in panel).
Stop Light Switch Location: In brake line fitting on frame left side rail.
►*IGNITION STARTER SWITCH CAUTION:* When installing accessories, use accessory terminal **only** on ignition-starter switch and not the ammeter terminal post.
FUSES: Clock—3 amperes. In clock lead wire.
Radio—(6 Volt) 14 amperes, (12 Volt) 9 amperes. Behind instrument panel.
CIRCUIT BREAKERS: Lighting System—(6 Volt) One 30 ampere protects lighting circuits. (12 Volt) One 15 ampere protects lighting circuits. On lighting switch.
Windshield Wiper—(6 Volt) 10 ampere, (12 Volt) 6 ampere. On wiper switch. Backup lights protected by windshield wiper circuit breaker.
HORNS: Auto-Lite. *12 V. Hi type used on C66.*

	Auto-Lite Horn No.	
Car Model	Low Pitch	High Pitch
C63, C64	HAB-4659	HAB-4664
C66 (12 V.)	HAA-4103	HAA-4104

►*NOTE:* Horns have resistance unit connected across circuit breaker points. Resistance for 6 volt horns should be 2.5-2.8 ohms, 12 volt horns 5.7-6.3 ohms.
Horn Relay: (6 Volt) HRL-4104, (12 Volt)RAB-4001.

Performance Data—HRL 4104

Contacts Close—1.5-3.0 volts (seal to core with 4.0 volts maximum).
Contacts Open—.5 volts min. (open from seal).
Contact Gap—.026". **Air Gap**—.016-.020" (armature air gap with contacts closed but not sealed), .015-.018" (gap between armature leg and yoke with armature sealed to core).

ENGINE

►*AIR-CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system. See "Chrysler, DeSoto, Dodge Airtemp" Air Conditioning in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 (All Models).
Bore—3 13/16". **Stroke**—3 5/8".
Displacement—331.1 cu. ins. **Rated HP**—46.51.
Developed Horsepower—(C63-1) 195 at 4400 RPM., (C63-2, C64, C66) 235 at 4400 RPM.
Compression Ratio—7.5-1.
Compression & Vacuum Reading—*See "Tune-Up".*
ENGINE REMOVAL: *See Chrysler Special Data.*
OIL PAN REMOVAL: Remove oil level indicator, drain engine oil. Remove starting motor and exhaust pipe cross-over. Remove oil pan attaching bolts and drop oil pan straight down and away from engine.
CYLINDER HEAD & TIGHTENING TORQUES: *See Chrysler Special Data.*

PISTONS

Aluminum alloy, steel strut, slipper type, cam ground and tin plated.
►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*
Weight—20.8 ozs.
Removal—Pistons and rods removed from above.
Fitting New Pistons: Clearance .0005-.0015" measured 1½" from bottom of piston between thrust face and cylinder wall. Check piston size with micrometer across large diameter at bottom. Insert .002" x ½" feeler between cylinder wall and piston (piston inverted, and pin removed) on side opposite slot. Pull to remove feeler should be 5-12 lbs. at room temperature of 70° F.
►*NOTE:* Cylinder recondition limits .0005" taper and .0005" out-of-round. Badly scored bores or with taper over .020" or out-of-round over .005" require reboring and honing to above limits.
Replacement Pistons: Standard, .010", .020", .030", .040", .060" oversize. Fitted pins are included with new pistons.
Installing Pistons: Letter "F" embossed on side of piston near piston pin hole must face front of engine. *See "Connecting Rods (Installation)" below.*

PISTON PINS

Floating type with lock ring in each end.
NOTE—Pin is offset in piston toward right side of engine.
Diameter—63/64". **Length**—3 9/64".
Clearance in Piston—.0000-.0005" or thumb press fit at 70° F.
Clearance in Rod—.0001-.0004". Selective fit.
Replacement Pins: Standard, .003", .008" oversize.
NOTE—Fitted pins are furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	5/64"	.010-.020"	.002-.0035"
Compr. (#2)	5/64"	.010-.020"	.001-.0025"
Oil (#3)	3/16"	.010-.020"	.001-.0030"

Replacement Rings: Furnished in sets Standard, .010", .020", .030", .040", .060" oversize.
Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length—6 5/8". **Weight** 25.2 ozs.
Crankpin Journal Diameter—2.249-2.250". Out-of-round and taper limits .001".
►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals machined UNDERSIZE). See "Crankshaft" below.*
Bearings (Lower)—Removable precision type, steel-backed babbitt. No shims.
Clearance—.0005-.0015".
Endplay—.006-.014" (total for both rods).
Replacement Bearings: Standard, .001", .002", .003", .010", .012" undersize.
Installing Rods: *See "Pistons (Installation)" above.* Rods are chamfered on one side at bearing insert and must be installed with chamfer toward crankshaft fillet. "V" slot across one bolt hole of each bearing cap is an oil passage for lubricating the opposite cylinder wall and piston pin. When installing bearing cap make certain "V" slot oil passage is toward top of engine.
►*CAUTION:* Rods are **interchangeable.** However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangeable** with the other bank.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Five bearings. Out-of-round limit .001".
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*
.010" UNDERSIZE (Main & Connecting Rod Journals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the center (No. 3) counterweight in following manner "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).
Bearings—Removable, precision type, steel-backed, babbitt lined. No shims.
Clearance—.0005-.0015"

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Replacement Bearings: Std., .001", .002", .003", .010", .012" undersize. Upper and lower halves of bearings Nos. 1, 2, and 4 are alike and interchangeable, Upper No. 3 is interchangeable with Lower No. 3, Upper & Lower No. 5 are **not interchangeable.**

End Thrust: Taken by center (#3) main bearing.

Endplay: .002-.007".

Crankshaft Oil Seals: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

CAMSHAFT

Journal Diameters—(Nos. 1, 2, 3, 4) 1.998-1.999. (No.5) 1.4355-1.4365".

Bearings—Removable, steel-backed, babbitt lined bushings.

Clearance—.001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

Endplay—.002-.006".

Timing Chain: Width 1 1/8". **Pitch** .375". **Length** 68 links.

Camshaft Setting: Place crankshaft "Zero" mark exactly in line with the center of the camshaft. Temporarily install camshaft sprocket, less chain, and line up dowel pin hole in hub with sprocket dowel pin hole, while at the same time positioning the camshaft "Zero" mark exactly in line with center of crankshaft. (Use straightedge to check accuracy of alignment). Remove Remove camshaft sprocket and position it in timing chain and re-install assembly, positioning timing chain on crankshaft sprocket. When properly installed, "Zero" marks should be in line with shaft center Install fuel pump eccentric and camshaft nut. Tighten to 130 ft. lbs. torque.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

►*TIMING CASE COVER REMOVAL CAUTION. Remove water pump before removing timing case cover. (Cover attaching bolt behind water pump).*

VALVES

Tappet Clearance: None in service (hydraulic).

Valves	Head Diameter	Stem Diameter	Length
Intake	1 15/16"	.372-.373"	5 1/32"
Exhaust	1 3/4"	.371-.372"	5 1/32"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.375"	.001-.003"
Exhaust	45°	.358"	.002-.004"

Valve Seat Width—1/16-3/32" (In.), 3/64-1/16" (Ex.)

►*VALVE SEAT INSERT CAUTION: See "Valve System" in Chrysler Special Data.*

Intake Valve Stem Oil Seal—Seal ring installed in bore of spring seat on all intake valves (install rings after assembling springs and seat but before installing valve locks).

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from the valve spring seat in the head to the tip of the valve should be checked with gauge C-3061. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

Valve Springs: Two springs used for each valve Install with closed coil toward cylinder head.

Free Length—Outer 2 3/64". Inner 2 1/16".

Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	20-23	1 9/16"	52-58	1 11/16"
Open	40-45	1 3/16"	122-130	1 5/16"

►*CAUTION: Spring ends must be square within 1/16" (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION* If valves or seats are reground, check **installed** height of spring If height is 1 23/32" or greater install a 1/16" spacer (Part No. 1400482) in the head counter-bore to bring height back to a nominal 1 5/8-1 11/16"

►*VALVE SPRING LOAD CAUTION: Hydraulic lifter "pump up" will restrict engine speed and cause valves to burn if valve spring loads are not maintained.*

Valve Guides: Remove old guides by driving them out through top of head using tool C-3150. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3150 is flush with face of cylinder head To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to 374- 375" with tool C-741

►*CAUTION: Oil hole in top of exhaust guide must face up.*

NOTE—If Valve Guide Tool C-3150 is not available, drive guides in, measuring from top of valve seat as follows: Intake—31/32" Exhaust—1 7/32"

Hydraulic Valve Lifters: Integral flat-valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize

Diameter— 9040- 9045" **Clearance in Block**— 0005-.0015"

Lifter Overhaul & Testing—*See "Valve System" in Chrysler Special Data.*

►*VALVE GRINDING CAUTION:* See Valves (above).

Rocker Arm Assembly: *See "Valve System" in Chrysler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing

Intake Valves—Open 15° BTDC Close 57° ALDC.

Exhaust Valves—Open 49° BLDC Close 15° ATDC

Valve Timing Check—Turn crankshaft until #1 intake valve closed. Insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle. Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid). Set dial indicator at "Zero", turn crankshaft until dial indicator shows that valve has lifted .020". Pointer on cover should indicate between 5° BTDC to 7° ATDC if timing correct. Then turn crankshaft **counter-clockwise** until lifter is back down to the valve closed position. Remove spacer from between rocker arm and valve stem. *See "Camshaft Setting" under CAMSHAFT above.*

►*CAUTION Do not turn crankshaft further than indicated above, which might bottom spring and damage valve mechanism.*

►*TIMING CASE COVER REMOVAL CAUTION—On cover attaching bolt located in case back of water pump. Remove water pump before attempting to remove timing case cover.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chrysler Special Data.*

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE NOTE* Due to interference from fender skirt or air conditioning lines immediately above filter cover, filter assembly must be removed from engine to change filter cartridge.

Crankcase Capacity: 5 qts (refill) Add one additional quart when filter changed.

Normal Oil Pressure: 40-65 lbs with warm oil operating at 40-50 MPH

►*OIL PRESSURE CAUTION: Oil pressure will drop to 25-45 lbs. when FILTER ELEMENT IS CLOGGED. Replace filter element.*

Oil Pressure Relief Valve—Mounted in oil pump.

Oil Pressure Warning Light: Located in lower cluster of instrument panel. Light glows when ignition turned on, goes out when oil pressure reaches 10 lbs

Oil Pressure Switch—Auto-Lite 13411A

Oil Pump: Rotary type. In crankcase at rear end Driven by lower distributor drive shaft

Oil Pump Overhaul—*See "Oil Pump" in Chrysler Special Data.*

Oil Filter: Full-flow At right rear engine All oil enters lubrication system of engine through filter at full pump pressure Safety valve in block opens if element is clogged, allowing oil to pass into lubrication system under a reduced pressure of 25-45 lbs

Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required) Change oil at same time filter element is changed

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE See Note above.*

►*OIL LEAK AT FILTER BASE CORRECTION* A new Oil Filter-to-Block Gasket, Part No. 1617786, is available to correct this condition on steel reservoir type Full-Flow filters *CAUTION*—Both faces of aluminum adapter must be smooth

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 25 qts. (26 qts. with heater).

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Pressure Valve: Chrysler 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cylinder head water outlet Starts to open 157-162° F.

Water Pump: Packless type. Grease fitting for lubrication. *See "Water Pump" in Chrysler Special Data.*

Pump Removal—Drain cooling system, remove fan belts and belt pulley. Remove four bolts attaching pump to water manifold and remove pump.

Temperature Gauge: Auto-Lite 13464A. Not electric.

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section for complete data.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section for data.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Dashpot Setting: See "Tune-Up".

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake and place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator.

Oil Pan Filler Tube (Location)—At right rear of engine compartment.

Capacity—12 qts. (refill). 13 qts. (after overhaul).

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section for data.*

UNIVERSALS

Driveline Universals. Cross and Ball & Trunnion types used as follows

Car Model	Front	Rear
C63-1 (Twn. & Ctry., 8-Pass.)①	Cross	Cross
C63-1 (Others)	Ball & Trunnion	Cross
C63-2	Ball & Trunnion	Cross
C64	Ball & Trunnion	Cross
C66①	Cross	Cross

①—Have center universal that is ball and trunnion type.

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Chrysler Special Data.*

REAR AXLE

Type. Semi-floating type with hypoid gear with Hotchkiss Drive. Barrel type differential with adjustable ring gear thrust pad used.

See "Chrysler Hypoid" in Rear Axle Section.

Axle Ratios: (C63) 3.36-1 (37-11), (C64, C66) 3.54-1 (39-11).

Backlash—.006-.010". Screw adjustment.

Ring Gear Thrust Pad Setting—Loosen locknut on left side of carrier housing, tighten thrust pad screw finger tight, back screw off 1/8 turn, tighten locknut.

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller—Tool C-675), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller). NOTE—Use puller C-293-C to remove bearing from shaft, puller C-748 or C-358 to remove inner oil seal, drift C-241 to install seal

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick) equally at both wheels.

Endplay—.003-.008"

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic, non-adjustable. Serviced by replacement.

Standard Shock Absorbers

Car Model	Chrysler Part No. Front	Rear
4-Door Sedan, Club Cpe	1450630	1450633
Others	1450631	
Club Cpe, Conv.		1450634
8-Pass, Est. Wgn., Limo		1450635

Heavy Duty Shock Absorbers

8-Pass., Est. Wgn, Limo. (exc C66)	1450346	
Others	1450041	1450635
All (Special)		1450075

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers.

See "Chrysler" in Front Suspension Section for complete data.

Kingpin Inclination—(C63, C64) 5-6½°, (C66) 6½-8° with 0° Camber.

Camber—Neg. 3/8° to Pos. 3/8° (¼-½° higher on left)

Caster—Neg. 1° to Neg 3° (Neg. 2° preferred).

Toe-In—0" to 1/16"" (0" preferred).

Toe-Out on Turns—Inner wheel 20°, outside wheel 18¼°.

STEERING

Manual Steering Gear: Gemmer. Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Hydraulic steering unit with engine driven hydraulic pump Two types used as follows.

Power Steering Unit	Type
Gemmer Hydraguide (Early)	Internal Oil Passage
Chrysler Full Time (Later)	Coaxial

See "Gemmer Hydraguide" & "Chrysler Full Time" Power Steering in Steering Section for data.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Starting Gear Removal: *See "Gemmer Worm & Roller" Steering Section.*

BRAKES (SAFEGUARD)

Service: (C63, C64) Chrysler "Safe-Guard" Lockheed hydraulic.

See "Chrysler Safe-Guard" Brakes in Brake Section for data.

Drums—Centrifuse. Diameter 12".

Wheel Cylinder Diameter—1 1/8" bore. Single acting (front), double acting (rear wheels)

Replacement Linings & Shoes—Linings or shoes with linings furnished in Standard & .030" oversize.

Lining—Molded asbestos (bonded to shoe). Length—12.57" per shoe. Width 2". Thickness 13/64".

Braking Power—60% Front. 40% Rear.

Clearance—.006" at end of all shoes.

Master Cylinder—On frame bracket at base of brake pedal.

Checking Fluid—Access hole at left of front floor pan.

Removal—Remove floor mat and toe board. Disconnect push rod. Remove horse shoe clip and slide brake pedal off shaft. Disconnect brake line tubes at master cylinder fittings. Remove bolts from master cylinder body. Cylinder can then be lifted off frame bracket. When reinstalling use new horse shoe clip.

Power Brakes: Chrysler "Vacu-Ease". *See "Chrysler Vacu-Ease" Power Brakes in Brake Section.*

Parking Brake: On shaft at rear of transmission. Internal expanding type.

Adjustment— *See "Hand Brake Notes" in Chrysler Special Data.*

Lining—Width 2". Thickness 5/32". Length 13 1/16".

Clearance—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

BRAKES (DISC)

Service: (C66) Hydraulic, self-energizing, two-shoe, DISC type. *NOTE*—No power booster used.

See "Chrysler Disc Brakes (Without Spider)" in Brake Section for data.

Pressure Plate Diameter—I.D. 9½". O.D. 12".

Wheel Cylinder Diameter—1¼" (front), 1" (rear).

Lining—Molded asbestos segments (6 on each plate) bonded to disc.

Bleeding Disc Type Brakes—Manufacturer recommends bleeding all four lower wheel cylinders first, then all four upper cylinders.

Parking Brake: On shaft at rear of transmission. *See C63 & C64 (above) for data,*

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMG-4102 (C63, C64), EMK-4101 (C66). Electric type.

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: Chrysler "Airtemp". *See "Airtemp" Air Conditioning in Miscellaneous Section.*

Window Regulators: Auto-Lite Electric type *See "Auto-Lite Window Regulators" in Miscellaneous Section.*

Convertible Top Control: Hydro-Lectric type *See "Hydro-Lectric" Power Operated Tops in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: B - fore disconnecting any part of air conditioning quipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
Windsor Deluxe	C67
New Yorker DeLuxe	C-68
Imperial	C-69
Crown Imperial	C-70
"300"	C-300

SERIAL NUMBER: On plate attached to left front door hinge post.

►*SERIAL NUMBER NOTE: 1955 Serial Numbers (example N551001) include the following information:*

Model - W Windsor. **N** New Yorker. **C** Imperial. **3N** Chrysler "300".

Year Built - 55 (1955).

Starting Serial Number - 1001. *NOTE* - Los Angeles built cars will have an "L" following the year.

Starting Serial Numbers	Detroit	Los Angeles
Windsor Deluxe	W551001	W55L1001
C-68	N551002	N55L1001
C-69	C551001	
C-70	C551001	
C-300	3N551001	

ENGINE NUMBER: On boss on top front side of cylinder block just back of water pump.

►*ENGINE NUMBER NOTE: 1955 Engine Numbers (example NE551001) include the following information:*

Model - W Windsor. **N** New Yorker. **C** Imperial. **3N** Chrysler "300".

Year Built - 55 (1955)

Starting Serial Number - 1001.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*

"A"—ALL Cylinders .020" oversize.

"B"—ALL Crankshaft Journals .010" undersize.

"AB"—BOTH above conditions exist.

"MALTESE CROSS" (3/8" high)—ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*

"DIAMOND" (3/8" high)—ALL Valve Lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 130-160 lbs. (Windsor), 140-170 lbs. (Others) at cranking speed of 150 RPM. Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18-21" idling.

VALVE TAPPET CLEARANCE: (C-300 Models only)—.015" (Intake), .024" (exhaust), with engine hot. Set as follows for COLD engine: .015" (Intake), .028" (Exhaust). *Hydraulic valve lifters used on all other models and adjustment not required in service.*

MANIFOLD HEAT CONTROL: Thermostatically controlled valve in exhaust manifold of right cylinder block. Valve must operate freely. When installing coil, move outer end of thermostatic spring around and up ¾ turn (counter-clockwise), hooking end of spring under right stop stud. *See Chrysler Special Data.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite Resistor 4S-165 (C67), 4GS-200 (C-300), 4GS-175 (Others). 14mm. Torque to 30 ft. lbs.

COIL: Auto-Lite CZ-4001 (Early C-70 *12 V.*) **CAE-4001** (Later C-70 *12 V.*), **CAC-4001** (Others *6 V.*).

Ignition Current—1.8 amperes idling, 3.0 amperes stopped (CZ, CAE), 2.25 amperes idling, 5.0 amperes stopped (CAC).

DISTRIBUTOR: Auto-Lite IAZ-4001D (U.S. & Early Can.), IAZ-4001E (Later Can.) (C67); IAZ-4001G (C-300); IAZ-4001E,F,G (Others).

Condenser—Auto-Lite IBB-2015R. **Capacity** .25-.28 microfarad.

Contact Point Set—Auto-Lite IGP-3028ZS.

Breaker Gap—.015-.018". Set maximum gap to .017".

Cam Angle—34°±3° with both sets of contacts. Do not adjust gap outside limits to obtain specified cam dwell.

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance—IAZ-4001D

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	365	2	730
6	450	12	900
16	2125	32	4250
17	2300	34	4600

Automatic Advance—IAZ-4001E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
4	450	8	900
13	1900	26	3800
14	2050	28	4100

Automatic Advance—IAZ-4001F

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
4	450	8	900
11	1575	22	3150
12	1725	24	3450

Automatic Advance—IAZ-4001G

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	370	2	740
2.5	400	5	800
7	725	14	1450
8	800	16	1600

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IAZ-4001D,E,F

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/4
1	2	6
5	10	9 1/4
10	20	14 7/8
11.5	23	17

Vacuum Advanc —IAZ-4001G

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/4
1	2	6 1/8
4	8	8 1/2
6	12	10 1/8
7	14	11 1/4

Distributor Basic Timing & Driv Shaft Bushing: Se *"Ignition Notes" in Chrysler Special Data.*

IGNITION TIMING

Setting (C67) - 7° BTDC.

Setting (C68,69,C70) - 6° BTDC.

Setting (C-300)—10° BTDC.

Timing Mark—On crankshaft vibration dampener.

►*C-300 TIMING CAUTION: Wh n s tting ignition timing, reduce engine idle speed t 500 RPM. Aft r timing completed, reset idle speed t 600 RPM.*

Manual Adjustment—Timing may be advanced with some premium fuels. Range of timing should not exceed plus or minus 4° from recommended factory setting.

CARBURETOR

►*CARBURETOR APPLICATION: Cart r BBD and 4-Barrel WCFB Carburetors us das follows:*

Car Model	Cart r Carb. No.
C-67 (Std. Trans.)	BBD-2180S,SA,SB
C-67 (Auto. Trans.)	BBD-2162S,SA,SB
C-68, C-69., C-70	WCFB-2126S
C-300	(Two) WCFB-2317S

►*HESITATION OR SAG ON LIGHT ACCELERATION* (BBD-2162S Carb.): *See "Cart r BBD" in C rbur t r Section for unitized Pkg. installati n data.*

►*CARBURETOR CHANGE FOR IMPROVED GAS MILEAGE: See "Carter BBD" in Carbur tor Section for Unitized Pkg. installation data.*

►*IDLE SPEED (AIR CONDITIONED CARS): Summer and winter Idle Speed Adjustm nts are different and must be made as follows:*

Winter Setting (Air Conditi n r not in Op ration)—Back off round adjusting nut on diaphragm shaft away from pawl to prevent interference with idle adjustment. Start engine, attach tachometer and with transmission control in neutral ("N") position and engine at operating temperature adjust engine idle to 475-500 RPM.

Summer Setting (Air Condition r in Operati n)—Adjust engine idle as for winter operation, then adjust fast idle device as follows:

Idle Speed-Up Control Adjustm nt (Cars with Air Conditioning)—Turn blower control switch to first position, temperature control switch to second position. Adjust round adjusting nut on fast idle diaphragm shaft to increase engine RPM to from 700 to 800 RPM. With hand brake on, move transmission control lever to drive ("Dr") range then back to neutral ("N") position. Readjust fast idle if necessary. Lock round nut with hex nut.

CARTER 4-BARREL WCFB
(C-68, C-69, C-70) N . 2126S
(C-300) Two N . 2317S

►*C-300 CARBURETOR NOTE:* Two 4-barrel carburetors used (front and rear). Linkage should be adjusted for balanced operation of both carburetors.

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►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—¾-1¾ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed—500 RPM (Exc. C-300), 600-650 RPM (C-300). *For "Idle Speed Setting" and "Idle Speed-Up Control Adjustment" on Air Conditioned Cars see CARBURETOR above.*

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

►*OTHER DATA: See Carter "WCFB" in Carburetor Section.*

Fuel Pump Pressure: 5-6½ lbs

CARB. EQUIPMENT

Fuel Pump: Auto-Lite FB-4006 Mechanical type.
Pressure—5-6½ lbs.
See "Fuel Pumps" in Carburetion Equip. Section.

Gasoline Gauge: Auto-Lite Electric Type.

Car Model	Dash Unit	Tank Unit
C67,68 (Exc.Est.Wgn.)	13703A	13795A
C67,68 (Est. Wgn.)	13705A	13872A
C69	13703A	13795A
C70 (12V)	13704A	13886A
C300	13703A	13795A

See "Fuel Gauges" in Carburetion Equipment Section

BATTERY

►*NOTE: 12 volt battery used on the C70 models.* **Auto-Lite 2H-120-D or Willard MW-2-120-C (C67).** 6 volt, 17 Plate, 120 ampere hour capacity (20 hr. rate) **Auto-Lite 2H-135-RD or Willard MW-2-135-R (C68, C69, C300).** 6 volt, 19 plate, 135 ampere hour capacity (20 hr. rate). **Auto-Lite 12H-65-R (C70).** 12 volt, 13 plate, 65 ampere hour capacity (20 hr. rate).
Ground Terminal—Positive
Engine Ground—Left front of engine

STARTER

►*NOTE: 12 Volt starter used on C70*

Car Model	Auto-Lite Starter	Armature
C67,C68,C69,C300	MCL-6304	MCH-2110
C68 (Canada)	MCL-6121A	MCH-2110
C70 (12V)	MDC-6301	MDC-2006

Drive—Overrunning clutch (solenoid pinion shift).
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—42-53 ozs. (new brushes).

Performance Data—MCL

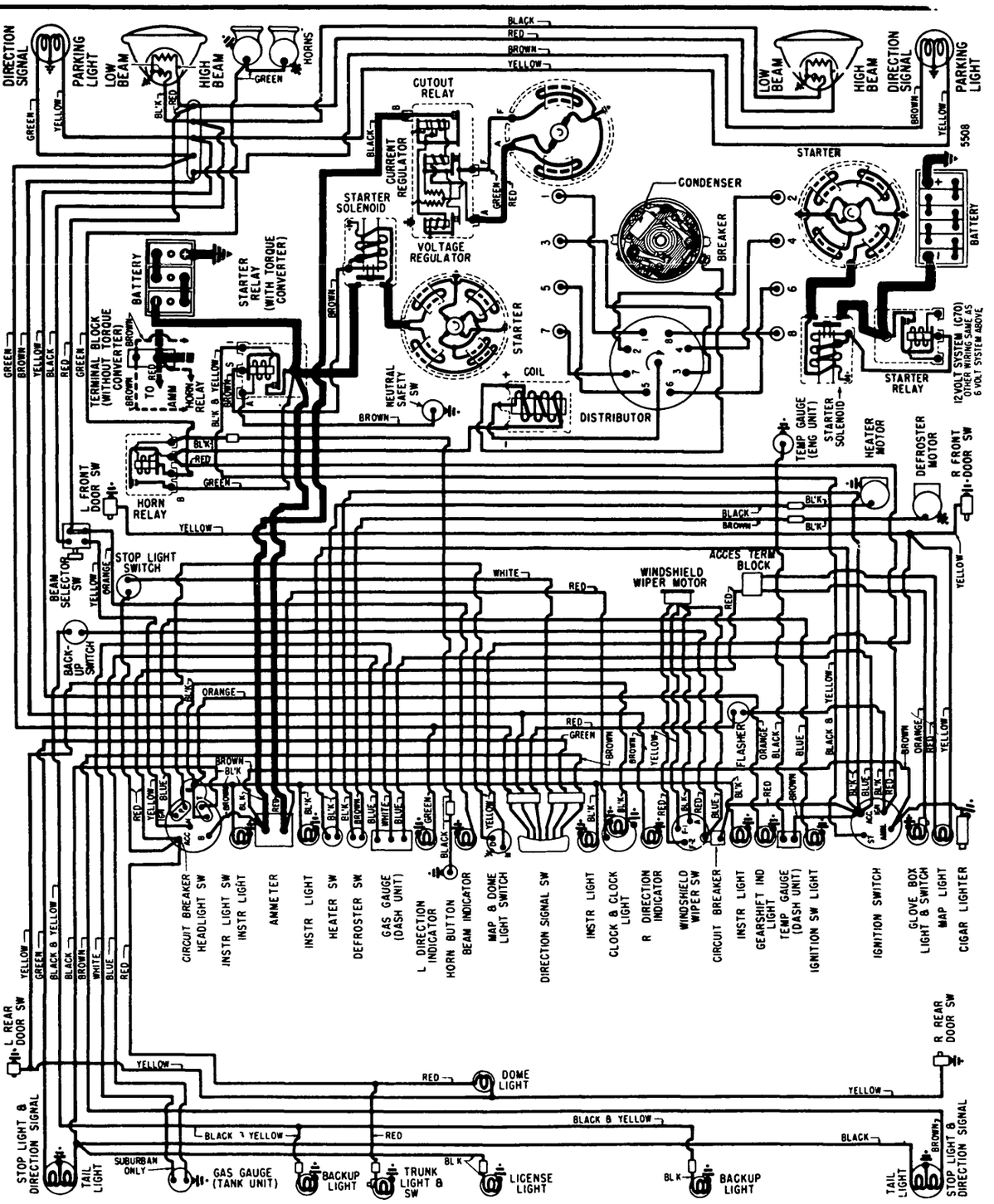
Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4900	5.0	65
8.0 ft. lbs.	Lock	2.0	410

Performance Data-MDC-6301

Torque	RPM	Volts	Amperes
0 ft. lbs.	5000	10.0	42
3 ft. lbs. min.	Lock	4.0	150

Starting Switch: Auto-Lite SSX-4004 (MCL Starters), SSY-4002 (MDC Starter) Solenoid pinion shift and starting switch used with neutral safety switch (on Transmission) and SEPARATE relay, Auto-Lite HRW-4001 (6 volt), RAA-4001A (12 volt). *See "Starter Controls" in Electrical Equip. Section.*

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GENERATOR

Car Model	Auto-Lite Generator	Armature
C67,C 68,C300 (Std)	GGW-6001K	GGW-2006F
C67,C68,C300 (Pow St)	GGW-6016D	GGW-2090F
C68 (Can Std)	GGW-6001J	GGW-2006F
C67,C68, (Can Pow St)	GGW-6016F	GGW-2090F
C69 (Pow St)	GGU-6013B	GGU-2071F
C70 (Pow St -12V)	GHM-6003A	GHM-2071F
C67,C68 (Air Cond)	GGW-6017B	GGW-2098F
C69 (Spec Equip)	GGJ-6008A	GGJ-2107F

►*GENERATOR BRACKET INTERFERENCE WITH GENERATOR WIRING HARNESS CAUTION* It is possible that edge of generator bracket may interfere with generator wiring harness, causing a "short" in this wiring If visual inspection shows this interference, re-route harness to rear of generator and generator bracket Late production cars have this change made

►***SPECIAL GENERATOR NOTE:* GGJ. GGU, GGW and GHM type generators used. Performance specifications below apply equally to all generators, within any one of the four groups specified.**

Performance Data—GGJ

Amperes	Volts	Cold - R.P M- Hot	
0	6.4	600-700	650-750
50	8.0	1400-1600	1550-1750
55	8.0	1500-1700	1650-1850

Performance Data - GGU

Amperes	Volts	Cold - R.P M.- Hot	
0	6.4	750-850	800 900
45	8.0	1450-1650	1650-1850
50	8.0	1550-1750	1750-1950

Performance Data - GGW

Amperes	Volts	Cold - R.P.M.—Hot	
0	6.4	870-970	950-1050
40	8 0	1800-2000	2150-2350
45	.8 0	1925-2125	2350-2550

Performance Data—GHM—12 Volt

Amperes	Volts	R.P.M. - Cold
5.0	14.0	875
25.0①	14.0	1325
30 0①	15.0	. 1350

①—Do not operate at higher outputs and do not operate at this output without ventilating fan for any length of time. To do so may result in burned armature and fields.

Brush Spring Tension—(GGJ) 34-41 ozs ,(GGU, GGW, GHM) 35-53 ozs., with new brushes

Field Current—(GGJ) 1 4-1 7 amperes, (GGU) 1 4-1.6 amperes, (GGW) 1 6-1.7 amperes, all at 5.0 volts (GHM) 1.1-1.3 amperes at 10.0 volts

Motoring Current—(GGJ) 4.1-4 6 amperes, (GGU) 5 0-6 0 amperes, (GGW) 5 0-5 5 amperes, all at 5.0 volts. (GHM) 3 0-3 5 amperes at 10.0 volts

Rotation—Counter-clockwise at commutator end

B lt Adjustment: Approximately ½" slack (when pushed from a straight line midway between pulleys)

REGULATOR

Aut -Lite R gulat r N .	Gen rat r
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A (Early)	GGW
VBE-6201A (Late)	GGW
VRX-6003B (12 V.)	GHM

Cutout Relay

Cuts In (VAV, VBE, VBF)—6.3-6.8 volts.

Cuts In (VRX)—13.0-13.75 volts.

Cuts Out (VAV, VBE, VBF)—4.1-4.8 volts (approx 4-6 amps. disch)

Cuts Out (VRX)—8.2-9.3 volts (approx 3-5 amps disch)

Contact Gap (All)—.015" minimum.

Air Gap (All)— 031- 034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting (VAV. VBF)—7 1-7 4 volts (at 70°), *after 15 minutes operation charging at ½ maximum rate*

Setting (VBE)—7 1-7 4 volts (at 70°) Test with regulator in operation at 10 amperes output

Setting (VRX)—14 2-14 8 volts (at 80°) Test with regulator in operation at 10 amperes output, or with a 25 ohm resistor between regulator and battery

Air Gap— 048- 052" with contacts just opening

Checking & Adjusting—*See Electrical Equip Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 70°F (VAV, VBF, VBE), 80° (VRX)*

Regulator	Test A—Operating Amperes	Test B
VAV-6001B, 2B	55	50 (48-52)
VBE-6001A, 6201A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VRX-6003B	36	30 (28-32)

Test A—After 15 minutes operation charging at 10 amperes (VRX), ½ maximum rate (VAV, VBE, VBF)

Test B—After 15 minutes additional operation with current regulator operating (load applied to hold voltage to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF), 13.6-13.8 volts (VRX).

Air Gap— 048- 052" with contacts just opening

Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*

Direction Signal: *See Electrical Equip. Section.*

Lighting Switch Removal: Remove knob (use small screwdriver to raise up special clip in knob, or remove small cross-head screw, depending on method used to hold knob). Remove hex nut and collar that holds assembly in place. Pry out switch (switch has threaded sleeve with two flat sides. Sleeve fits snugly in switch hole in panel).

St p Light Switch Locati n: On forward end of master cylinder

►*IGNITION STARTER SWITCH CAUTION:* When installing accessories, use accessory terminal nly on ignition-starter switch and n t the ammeter terminal post.

FUSES: Cl ck—3 amperes In clock lead wire

Radi —(6 Volt) 14 amperes, (12 Volt) 9 amperes Behind instrument panel

CIRCUIT BREAKERS: Located in headlight switch assembly Three in number, as follows

27 Ampere Circuit Break r—Protects headlights, high beam indicator light, and parking lights

10 Ampere Circuit Break r—Protects tail lights, license plate lights, clock light, and instrument panel light

10 Ampere Circuit Breaker—Protects stop lights, map light, dome light, glove box light, courtesy light, and trunk compartment light

Windshield Wiper: (6 volt) 10 ampere, (12 volt) 6 ampere On wiper switch

HORNS: Auto-Lite. (C67,68,300) Dual horns with relay, (C69, C70) Triple horns with relay *12 v lt type used on C70*

Horn Relay: (6 volt) RAF-4001, (12 volt) RAH-4002.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION. B for disconnecting any part f air c nditi ning quipment or lines for access to engine, s "Air C nditi ning Service Cautions" in Misc llane us S cti n*

►*ENGINE NOTE: Engines hav hemisph rical c mbustion chamber together with d ubl rock r shaft valv mechanism and laterally inclined valv s*

ENGINE SPECIFICATIONS: 90° V8 (All Models) "Fire-Power" Engine

Model	Bore	Str k	Displac m nt
C67	3 5/8"	3 5/8"	300 cu in
Others	3 13/16"	3 5/8"	331 1 cu in

Model	Compr. Ratio	Rated HP	D v l p d HP
C67	8 0-1	. 37 8	188 at 4400 RPM
C300	8 5-1	46 51	300 at 5200 RPM
Other Models	8 5-1	46 51	250 at 4600 RPM

Compression & Vacuum R ading - *S TUNE-UP*

ENGINE REMOVAL: *See "Engin " in Chrysl r Special Data*

OIL PAN REMOVAL: Remove oil level indicator Remove crankcase plug and drain lubricating oil Disconnect steering linkage at idler arm support bracket, and allow linkage to settle away from bottom of oil pan Remove bolts that hold oil pan to cylinder block Slide pan out and down away from engine

CYLINDER HEAD: *See "Cylind r H ad & Manifolds" in Chrysler Special Data*

TIGHTENING TORQUES: *S "Tight ning Specifications" in Chrysler Special Data*

PISTONS

Aluminum alloy, steel strut, slipper type, elliptically turned, tin plated Pin offset to right 06'

►*CYLINDER BORE OVERSIZE CAUTION: Engin s with letter "A" following ngin numb r indicat s that cylinder bore .020" oversiz*

Weight - 20 1 oz (C67), 20 8 oz (Others)

Removal—Pistons and rods removed from above

Fitting N w Pist ns: Clearance 0005- 0015" measured 1½" from bottom of piston between thrust face and cylinder wall. Check piston size with micrometer across

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large diameter at bottom Insert 002" x ½" feeler between cylinder wall and piston (piston inverted, and pin removed) on side opposite slot Pull to remove feeler should be 5-12 lbs. at room temperature of 70° F

►*NOTE* Cylinder recondition limits 0005" taper and .0005" out-of-round Badly scored bores or with taper over .020" or out-of-round over 005" require reboring and honing to above limits.

Replac ment Pist ns: Standard, .005", 020", 030", 040", 060" oversize Fitted pins included with new pistons

Installing Pist ns: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod On left bank (1-3-5-7) assemble with indent on same side as large chamfer at insert end of connecting rod *See Rod Installation*

PISTON PINS

Floating type with lock ring in each end.

NOTE—Pin is offset in piston toward right side of engine.

Diam t r - (C67) 9841- 9843" **(Others)** 9841- 9842"

L ngth - (C67) 3 040-3 050" **(Others)** 3 140-3 150"

Clearanc in Pist n— 0000-.0005" or thumb press fit at 70° F

Cl arance in Rod—.0001-.0004". Selective fit.

R plac m nt Pins: Standard, .003", .008" oversize.

NOTE—Fitted pins are furnished with new pistons

PISTON RINGS

Model C67

Ring	Width	End Gap	Side Clearance
Compr (#1)	0775- 0780"	010-.020'	0015- 003"
Compr (#2)	0775- 0780"	010- 020'	001-.0025'
Oil (#3)	140- 150'	010- 020"	001- 0025"

Model C68, 69, 70, 300

Ring	Width	End Gap	Side Clearance
Compr #1	0775- 0780"	010- 020"	002- 0035"
Compr #2	0775- 0780"	010- 020"	002- 0035"
Oil	.1860- 1865"	010- 020"	001- 0025"

Replac m nt Rings: Furnished in sets Standard, 010", 020", 030", 040", 060" oversize

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

L ngth—6 5/8". **W ight** 25 2 ozs.

Crankpin J urnal Diamet r—2 249-2 250" Out-of-round and taper limits 001'

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals machined UNDERSIZE). See "Crankshaft"* below

Bearings (L w r)—Removable precision type, steel-backed babbitt No shims

Cl aranc — 0005- 0015"

Endplay— 006- 014" (total for both rods).

Replacement B arings. Standard, 001", 002", 003", 010", 012 undersize

Installing Rods *(NOTE*—Connecting rod bores are chamfered more on one side than other This larger chamfer must be installed toward crankshaft fillet) When installing lower bearing shell, make certain that "V" groove in shell is in line with "V" groove in cap This allows lubrication of cylinder wall Bearing shells should always be installed so that small formed tang fits into machined grooves of rod Oil ring expander gap should be toward outside of "V" of engine Oil ring gap should be toward inside of "V" of engine *See Piston Installation above*

►*CAUTION:* Rods are **interchangeable.** However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangeable** with the other bank.

CRANKSHAFT

Journal Diameter—2.4995-2 5005" Five bearings Out-of-round limit 001".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals)— Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined 001" UNDERSIZE The position of undersize journals are stamped on the machined surface of the center (No 3) counterweight in following manner "R" indicates connecting rod journal, "M" indicates main bearing journal The number following letter indicates main or connecting rod journal number (counting from front of engine)

Bearings—Removable, precision type, steel-backed, babbitt lined No shims

Clearance— 0005- 0015"

Replacement Bearings: Std , 001", 002", 003", 010", 012" undersize Upper and lower halves of bearings Nos 1, 2, and 4 are alike and interchangeable, Upper No 3 is interchangeable with Lower No. 3, Upper & Lower No 5 are **not interchangeable.**

End Thrust: Taken by center (#3) main bearing

Endplay: .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Special Data.*

CAMSHAFT

Journal Diameters—(Nos 1, 2, 3, 4) 1 998-1 999. (No.5) 1 4355-1 4365

Bearings—Removable, steel-backed, babbitt lined bushings

Clearance— 001- 003"

End Thrust: Taken by thrust plate behind camshaft sprocket hub

Endplay— 002-.006".

Timing Chain: Width 1 1/8". **Pitch** .375". **Length** 68 links

Camshaft Setting: Place crankshaft "Zero" mark exactly in line with the center of the camshaft Temporarily install camshaft sprocket, less chain, and line up dowel pin hole in hub with sprocket dowel pin hole, while at the same time positioning the camshaft "Zero" mark exactly in line with center of crankshaft. (Use straightedge to check accuracy of alignment). Remove Remove camshaft sprocket and position it in timing chain and re-install assembly, positioning timing chain on crankshaft sprocket When properly installed, "Zero" marks should be in line with shaft center Install fuel pump eccentric and camshaft nut. Tighten to 130 ft. lbs torque

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Chrysler Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data.*

►*C67 TIMING CASE COVER INSTALLATION CAUTION* **Install short bolt at oil filler pipe location.** Install bolts and washers after coating two top and four bottom bolts with suitable sealer for oil, and four center bolts with suitable sealer for water

►*C68,69,70,300 TIMING CASE COVER REMOVAL CAUTION* Remove water pump before removing timing case cover (Cover attaching bolt behind water pump)

VALVES

Tappet Clearance: None in service (hydraulic)

Model C67

Valves	Head Diam.	Stem Diam.	Length
Intake	1 13/16'	372- 373" ①	4 25/32
Exhaust	1 1/2'	371- 372' ①	4 3/4'

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	381"	001- 003
Exhaust	45°	365	002- 004

①—Standard *See Valve Guides below*

Model C68,69,70, 300

Valves	Head Diameter	Stem Diameter	Length
Intake	1 15/16"	.372-.373"	5 1/32"
Exhaust	1 3/4"	.371-.372"	5 1/32"

Valves	Seat Angle	Lift	Stem Clearanc
Intake	45°	.375"	.001-.003"
Exhaust	45°	358"	.002-.004"

Valve Seat Width—1/16-3/32" (In.), 3/64-1/16" (Ex.)

►*VALVE SEAT INSERT CAUTION: See "Valve System" in Chrysler Special Data*

Intake Valve Stem Oil Seal—Seal ring installed in bore of spring seat on all intake valves (install rings after assembling springs and seat but before installing valve locks)

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from the valve spring seat in the head to the tip of the valve should be checked with gauge C-3061. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge) Improper valve clear-

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ance at high speed will result if this condition is not corrected.

Valve Springs: Single valve spring used on C67, inner and outer springs used on all other models Install springs with closed coil toward cylinder head
Free Length - 2" (C67), Outer 2 3/64", Inner 2 1/64" (Other Models)

C67 Valve Spring Specifications

Specifications—Both intake and exhaust valve springs should have 134-146 lbs pressure when compressed to 1 5/16" Discard springs that test less than 130 lbs at 1 5/16'

C68,69,70,300 Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	20-23	1 9/16"	52-58	1 11/16"
Open	40-45	1 3/16"	122-130	1 5/16"

►*CAUTION: Spring ends must be square within 1/16" (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION* If valves or seats are reground, check **installed** height of spring If height is 1 23/32" or greater install a 1/16" spacer (Part No. 1400482) in the head counter-bore to bring height back to a nominal 1 5/8-1 11/16".

►*VALVE SPRING LOAD CAUTION: Hydraulic lifter "pump up" will restrict engine speed and cause valves to burn if valve spring loads are not maintained.*

Valve Guides (C67): Cast integral with cyl head. Service as follows: When valve stem clearance excessive, use Reamer Tool Set to ream guides for NEXT OVERSIZE Valve as follows Tool C-3433 (.005" O S), Tool C-3430 (.015' O S), Tool C-3427 (.030" O S) Valves furnished Std and .005", .015', .030" Oversize

Valve Guides (C68,69,70,300): Use Tool C-3150 to drive the old guides out top of head Install the new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3150 is flush with face of cylinder head To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to 374-.375" with tool C-741

►*CAUTION Oil hole in top of exhaust guide must face up.*

NOTE—If Valve Guide Tool C-3150 is not available, drive guides in, measuring from top of valve seat as follows. Intake—31/32" Exhaust—1 7/32"

Hydraulic Valve Lifters: Integral flat-valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize

Diameter—.9040-.9045" **Clearance in Block**—.0005-.0015"

Lifter Overhaul & Testing—*See "Valve System" in Chrysler Special Data.*

►*VALVE GRINDING CAUTION:* See Valves (above).

Rocker Arm Assembly: *See "Valve System" in Chrysler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing - C67

Intake Valves—Open 15° BTDC. Close 57° ALDC
Exhaust Valves—Open 49° BLDC Close 15° ATDC

Valve Timing—C68, C69, C70

Intake Valves—Open 15° BTDC, Close 57° ALDC
Exhaust Valves—Open 49° BLDC. Close 15° ATDC

Valve Timing—C300

Intake Valves—Open 35° BTDC. Close 65° ALDC
Exhaust Valves—Open 65° BLDC Close 25° ATDC

Valve Timing Check (Exc. C-300)—With No. 1 intake valve closed. Insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle. Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid) Set dial indicator at "Zero", turn crankshaft until dial indicator shows that valve has lifted .024" (C67), .020" (Others) Pointer on cover should indicate between 5° BTDC to 7° ATDC if timing correct. Then turn crankshaft counter-clockwise until lifter is back down to the valve closed position

►*CAUTION. Do not turn crankshaft further than indicated above, which might bottom spring and damage valve mechanism.*

►*TIMING CASE COVER REMOVAL CAUTION—One cover attaching bolt located in case back of water pump. Remove water pump before attempting to remove timing case cover.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chrysler Special Data.*

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE NOTE* Due to interference from fender skirt or air conditioning lines immediately above filter cover, filter assembly must be removed from engine to change filter cartridge

Crankcase Capacity: 5 qts. (refill) Add one additional quart when filter changed.

Normal Oil Pressure: 40-65 lbs with warm oil operating at 40-50 MPH

►*OIL PRESSURE CAUTION Oil pressure will drop to 25-45 lbs. when FILTER ELEMENT IS CLOGGED. Replace filter element.*

Oil Pressure Relief Valve—Mounted in oil pump Adjustable. *NOTE*—When replacing relief valve spring, use same color spring

Oil Pressure Gauge—Auto-Lite 13700A Not Electric

Oil Pump: Rotor type In crankcase at rear end Driven by lower distributor drive shaft

Pump Overhaul—*See "Oiling System" in Chrysler Special Data.*

Oil Filter: Full-flow. At right rear engine All oil enters lubrication system of engine through filter at full pump pressure. Safety valve in block opens if element is clogged, allowing oil to pass into lubrication system under a reduced pressure of 25-45 lbs.

Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE NOTE:* Due to interference from fender skirt or air conditioning lines immediately above filter cover, filter assembly must be removed from engine to change filter cartridge.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 24 qts (C67), 25 qts. (Others) Add 1 qt for heater

Pressure Valve: Chrysler 1373136 (Opens at 7 lbs) Radiator filler cap 14 lb type used with Air Conditioning

Thermostat: Choke type in cylinder head water outlet Starts to open 159-165°F

Water Pump: Ball bearing type No lubrication required *See "Water Pump" in Chrysler Special Data.*

Pump Removal—Drain cooling system Remove radiator shroud assembly, fan belt, pulley and fan Remove radiator outlet hose from thermostat housing Remove wire from temperature gauge sending unit Remove pump housing-to-cylinder block attaching bolts, remove pump housing assembly

Temperature Gauge: Auto-Lite. Electric type

Dash Unit - (C67, C68, C69, C300) 13701A, (C70 12V) 13702A

Engine Unit—(All) 13550A Mounted in pump housing assembly

CLUTCH

C67 MODELS

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	361376	382366

See "Borg & Beck" Clutches in Clutch Section

Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free play at outer end of clutch fork is obtained This adjustment will give necessary 1" free play at pedal

Over-Center Spring Adjustment: With clutch pedal in fully released position, and with over-center spring eyebolt finger tight, hold spring eyebolt, spring and bracket assembly as a single unit and with an adjusting wrench tighten adjusting nut seven full turns

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable and gearshift control rods Remove transmission (See Synchro-mesh Transmission) Mark clutch cover and flywheel Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

C67 MODELS

Own. Three speed synchro-mesh
See "Chrysler Synchro-mesh" in Transmission Section

Transmission Controls: *See "Transmission Controls" in Transmission Section*

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Removal Jack up car at front and place floor jacks under lower control arms Disconnect propeller shaft at front end If transmission is to be disassembled, loosen companion flange nut Disconnect speedometer cable, and hand brake cable at brake band Disconnect gearshift and gearshift selector control rods at transmission Remove capscrews and nuts which attach transmission to clutch housing Remove transmission assembly by pulling it back, down and out of car

NOTE–When installing transmission use pilot studs to avoid springing clutch disc

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission

See "PowerFlite" Transmission in Transmission Section for complete data

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite" Transmission in Transmission Section for data.*

►*TESTING & TROUBLE SHOOTING· See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level–Apply hand brake and place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator

Oil Pan Filler Tube (Location)–At right rear of engine compartment.

►*CAUTION* To prevent dirt from entering transmission, make sure oil level indicator is properly seated in filler tube

Linkage Adjustments: *See "PowerFlite" Transmission in Transmission Section*

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section for data*

UNIVERSALS

Driveshaft Universals. (C67,68,69, 300) Ball and Trunnion type used at front, Cross type used at rear (C70) Cross type used at front rear and center bearing.

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Chrysler Special Data.*

REAR AXLE

Own. Semi-floating type with hypoid gear and Hotchkiss Drive C67 Models have Cage Type with synchromesh trans Barrel type used on C67 with Powerflite and on all other models *NOTE* - Axle gear thrust screw and pad no longer used

See "Chrysler Hypoid" in Rear Axle Section

Axle Ratios	Est. Wgn.	Standard
C67 (SM Trans)	3 91-1 (43-11)	3 9-1 (39-10)
C67 (Auto Trans)	3 73-1 (41-11)	3 54-1 (39-11)
C68	3 54-1 (39-11)	3 36-1 (37-11)
C69		3 54-1 (39-11)
C69 Optl		3 36-1 (37-11)
C70		3 54-1 (39-11)
C300		3 54-1 (39-11)

Backlash– 006- 008

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller–Tool C-675), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller)

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed, check endplay with dial indicator To adjust, remove backing plate (see above) add or remove shims (furnished 005 010 0125 015 030 thick) equally at both wheels

Endplay– 003- 008

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic, non-adjustable.

Serviced by replacement Car Model	Chrysler Part No. Front	Rear
C67, 68 Conv	1614406	1450919
C67, 68 4-Door	1614405	1450918
C67, 68 Est Wgn	1614406	1450920
C69	1614406	1450919
C70	1614406	1450920
C300	1614406	1450920
Others	1614406	1450918
Heavy Duty (Exc C70)		1450920
Heavy Duty (Spec -Exc C70)		1450037

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers

See "Chrysler" in Front Suspension Section for complete data

Kingpin Inclination - 5½° (C67), 6½-8° (C70), 5-6½° (Others)

Caster–Neg 2° to 0° (Neg 2° preferred with Manual Steering, 0° with Power Steering Left side should be 0° to ¾° greater than right side within these limits)

Camber–Neg 1/8° to Pos 5/8° (Left side Pos 1/2°, Right side 0° preferred)

Toe-In–0 to Pos 1/16' (0' preferred)

Toe-Out on Turns–With outer wheel at 20° inner wheel should be 21½°±1°

STEERING

Manual· Gemmer. Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section

Power Steering· "Coaxial"

See "Coaxial" Power Steering in Steering Section

Steering Linkage· *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section*

Steering Gear Removal. *See "Gemmer Worm & Roller" Steering Section*

BRAKES (SAFEGUARD)

Service: (C67, C68, C69, C300) Chrysler "Safe-Guard" Lockheed hydraulic

See "Chrysler Safe-Guard" Brakes in Brake Section for data

Drums–Centrifuse Diameter 12"

Wheel Cylinder Diameter–1 1/8" bore. Single acting (front), double acting (rear wheels)

Replacement Linings & Shoes–Linings or shoes with linings furnished in Standard & 030" oversize

Lining–Molded asbestos (bonded to shoe) Length– 12 57" per shoe Width 2" Thickness 13/64"

Braking Power–60% Front 40% Rear

Clearance– 006 at each end of all shoes

Master Cylinder On engine side of dash panel opposite base of brake pedal

Checking Fluid–Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal–Disconnect pushrod Disconnect brake line tubes at master cylinder fittings Remove four stud nuts from studs, remove master cylinder

Power Brakes· Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder *See "Chrysler Power Unit" in Brake Section*

Removal of Power Unit–Same as for standard master cylinder

Parking Brake: On shaft at rear of transmission 6" external contracting type used with Synchro-mesh Trans 7"internal expanding type is used with PowerFlite.

Adjustment–*See "Hand Brake Notes" in Chrysler Special Data*

Lining–	Width	Thickness	Length
6' Ext Type	2"	5/32"	16 11/16'
7" Int Type	2"	5/32"	13 1/16"

Clearance–Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately 010"

BRAKES (DISC)

Service· (C70) Hydraulic, self-energizing, two-shoe DISC type *NOTE*–No power booster used.

See "Chrysler Disc Brakes (Without Spider)" in Brake Section for data

Pressure Plate Diameter–I.D. 9½" O D 12"

Wheel Cylinder Diameter–1¼" (front), 1" (rear)

Lining–Molded asbestos segments (6 on each plate) bonded to disc

Parking Brake· On shaft at rear of transmission *See C68, C69, C300 (above) for data*

MISC. MECHANICAL

Windshield Wipers: Auto-Lite (C67,C68,C69,C300) EMZ-4001, (C70-12V.) EPF-4001. Electric type *See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section*

Air Conditioning: Chrysler "Airtemp". *See "Airtemp Air Conditioning in Miscellaneous Section.*

Power Window Regulators· Auto-Lite. Electric type Reversible type motor in each window Controlled by switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters· Auto-Lite. Electric type *See "Power Seat Adjusters" in Miscellaneous Section*

Convertible Top Control· Auto-Lite. Electrical-Hydraulic type *See "Chrysler Top Control" in Miscellaneous Section*

►*1956 AIR CONDITIONED CAR SERVICE CAUTION* *Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Identification
Windsor	C-71
New Yorker	C-72
Chrysler 300B	C-72-300
Imperial	C-73
Crown Imperial	C-70

SERIAL NUMBER: Stamped on metal plate attached to left front door hinge post

Starting Serial Nos	Detroit	Los Angeles
Windsor V8	W 56 1001	W 56 L 1001
New Yorker V8	N 56 1001	N 56 L 1001
Imperial & Crown Imp	C 56 1001	
Chrysler 300B	**3N 56 1001**	

ENGINE NUMBER Stamped on boss on top of cylinder block just back of water pump

Starting Engine Nos W E 56 1001 (Windsor) N E 56 1001 (New Yorker), C E 56 1001(Imperial & Crown Imp) 3 N E 56 1001 (Chrysler 300B)

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number) Identified as follows*

"A"—All Cylinders .020" oversize

"B"—All Crankshaft Journals .010" undersize

"AB"—Both above conditions exist

"MALTESE CROSS" (3/8" high)—ONE OR MORE crankshaft Journals .001" undersize *See "Connecting Rods" and "Crankshaft" below*

"DIAMOND" (3/8" high)—ALL valve lifters .008" oversize

TUNE-UP

COMPRESSION PRESSURE 140-170 lbs (C-71) 150-180 lbs (Others) at 150 RPM with plugs removed Variation limit 15 lbs

VACUUM READING: 18-21" idling

VALVE TAPPET CLEARANCE: (C-70, C-71, C-72, C-73) No adjustment required in service (hydraulic lifters)

(C72-300) Intake .015", Exhaust .024", HOT Intake .015" Exhaust .028", COLD

MANIFOLD HEAT CONTROL: *NOTE* - Before installing valve on engine, lubricate valve shaft with graphite grease

(C71 Standard): Single exhaust on right cylinder block with thermostatically controlled valve Install heat control valve with counterweight toward front of engine and small anti-rattle spring retaining pin toward rear and adjacent to cylinder block

(C70, C71 with Power Pack, C72, C73, C-72-300): Dual exhaust system used Heat control valve is in right exhaust pipe

Coil Spring Installation - Position valve shaft in extreme counter-clockwise position Place coil spring in position over shaft slot, with outer end of tongue of spring in upper left hand position Press inner end of coil into slot of shaft and seat firmly Move outer end tongue of spring around and hook under pin (left pin when facing coil end of valve)

Counterweight Installation - Place counterweight over shaft (shield upward) and insert lock in shaft slot Center counterweight on shaft and turn weight on shaft until seated Install stop, and tighten nut securely with tool T-109-173

►*DUAL EXHAUST NOTE* When valve is closed most exhaust gases are discharged through the left exhaust pipe

IGNITION

FIRING ORDER 1-8-4-3 6-5-7-2

Cylinders—RIGHT BANK 2-4 6-8 LEFT BANK 1-3-5-7

SPARK PLUG GAP: .035"

Spark Plugs-Auto-Lite AR-52 (C71), AGR-42 (C70, C72, C73), AGR-41 (C-72-300), AGR-31 (C-72-300 with 10 to 1 optional head) 14 mm Tighten plugs to 30-32 ft lbs

COIL: Auto-Lite CAD-4002, CAD 4003, CAH-4001. *12 Volt.*

Ignition Current—2.5 Amps idling 3.1 stopped

Resistor—Auto-Lite PU-4002 Connected in circuit between "IGN" terminal of Horn Relay and (+) terminal of coil *Resistor must be in circuit when testing coil output*

DISTRIBUTOR Auto-Lite *12 Volt* As follows

Model	Auto-Lite No
C71 (Std.) Early --	①IBJ-4303A
C71 (Std.) Later	①IBJ-4303C
C71 (Power Pack - To Eng WE-56-13366)	②IBK-4301A
C71 (Power Pack - After Eng WE-56-13366)	①IBJ-4303C
C70, C72, C73	②IBK-4301A
C72-300	②IBK-4301C

①- Single breaker distributor

②-Double breaker distributor

Condenser - Auto-Lite IBB-2015R **Capacity** .25-.28 mfd

Contact Point Set - Auto-Lite IGW-3028MS (IBJ Distr.) IGW-3028KS (IBK Distr.)

Breaker Gap - .017" ± .002"

Cam Angle (IBJ) - 31° ± 3° Do not set contact gap outside limits to obtain specified cam dwell

Cam Angle (IBK) - 38° ± 3° with both sets of contacts Do not set contact gaps outside limits to obtain specified cam dwell

Breaker Arm Spring Tension—17-20 ozs

Rotation—Clockwise viewed from above

Automatic Advance (IBJ-4303A)

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		350	0		700
1		375	2		750
5.5		475	11		950
13		1850	26		3700
14		2025	28		4050

Automatic Advance (IBJ-4303C)

Degrees	Distr	RPM	Degrees	Eng	RPM
Start -		300-400	0		600-800
0-4.5		400	0-9 -		800
4.5-6.7		500	9-13.4		1000
13-15		2025	26-30		4050

Automatic Advanc (IBK-4301A)

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		350	0		700
1		430	2		860
5		750	10		1500
8		1850	16		3700
9.5		2400	19		4800

Automatic Advanc (IBK-4301C)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		415	2		830
3.5		450	7		900
7		1025	14		2050
8		1200	16		2400

Vacuum Spark Control: Auto-Lite Integral type

Vacuum Advanc (IBJ-4303A)

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6 3/8
1	2	7 1/8
5	10	9 3/4
10	20	14 1/8
11	22	15 1/2

Vacuum Advanc (IBJ-4303C)

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6-7
2	4	7.25 - 8.25
6.5	13	10-12
10.5-12.5	21-25	17

Vacuum Advance (IBK-4301A)

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	7 1/2"
1	2	8 1/8"
5	10	10 7/8"
10	20	15 1/8"
11.5	23	17"

Vacuum Advanc (IBK-4301C)

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	7 1/2
1	2	8 1/4
4	8	10 1/2
7	14	12 3/4
8	16	13 1/2

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Chrysler Special Data*

IGNITION TIMING

Model	Std Setting
C71 (Std.)	2° BTDC
C71 (Powerpack-To Eng WE56-13366)①	10° BTDC
C71 (Powerpack After Eng WE56-13366)②	4° BTDC
C70 C72 C73	4° BTDC
C72 300	8° BTDC

①—With Distributor No IBK-4301-A

②—With distributor No IBJ-4303C

►*TIMING CAUTION (C72-300)* Disconnect distributor vacuum line set ignition at 8° BTDC and reset engine idle back to 650 RPM

CONTINUED ON NEXT PAGE

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Timing Mark - On vibration damper with pointer on left side of front cover.

CARBURETOR

Car Mod l	Carter Carburetor No.
C70, C72, C73	WCFB 2314S, SA
C71 (Std. Trans.)	BBD 2312S
C71 (PowerFlite)	BBD 2313S
C71 (Power Package)	WCFB 2367S, SA
C72-300	WCFB 2444S (Front), 2445S (Rear)

►*CARBURETOR PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: Later "SA" Carburetors have different sp cifications. See Carter WCFB 4-Barrel" Carburetors in Carburetion Section.*

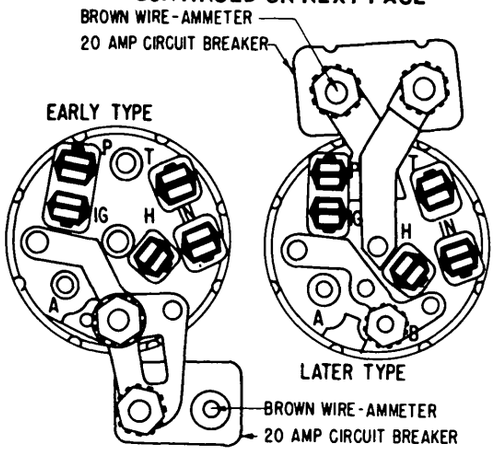
►*IDLE SPEED (AIR CONDITIONED CARS): Summer and winter Idle Speed Adjustments are different and must be made as follows:*

Winter S tting (Air C nditioner `not in Operation)—Back off round adjusting nut on diaphragm shaft away from pawl to prevent interference with idle adjustment. Start engine, attach tachometer and with transmission control in neutral ("N") position and engine at operating temperature adjust engine idle to 475-500 RPM.

Summ r Setting (Air Conditioner in Operation)—Adjust engine idle as for winter operation, then adjust fast idle device as follows:

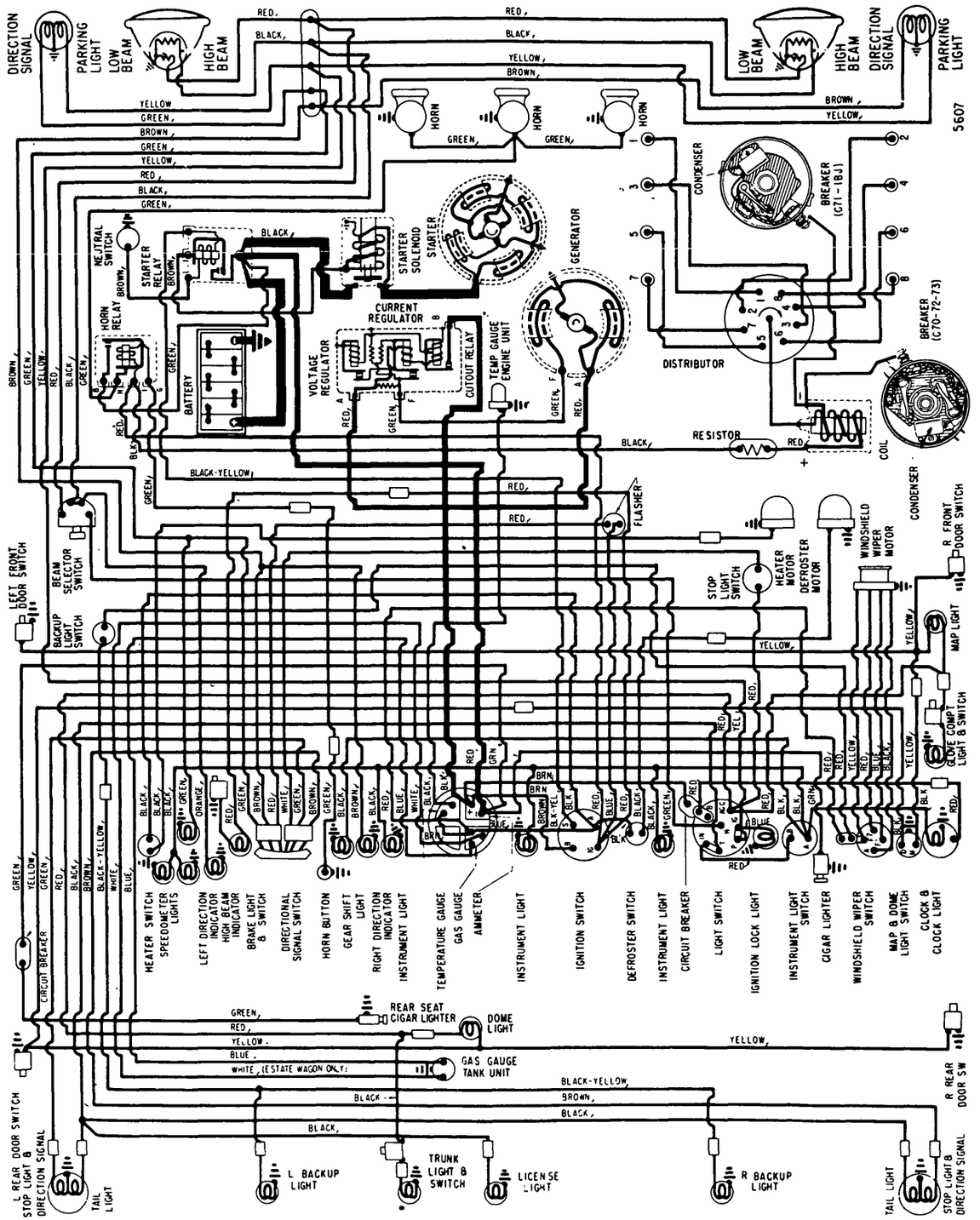
Idl Sp d-Up C ntr l Adjustment (Cars with Air Conditi ning)—Turn blower control switch to first position, temperature control switch to second position. Adjust round adjusting nut on fast idle diaphragm shaft to increase engine RPM to from 700 to 800 RPM.

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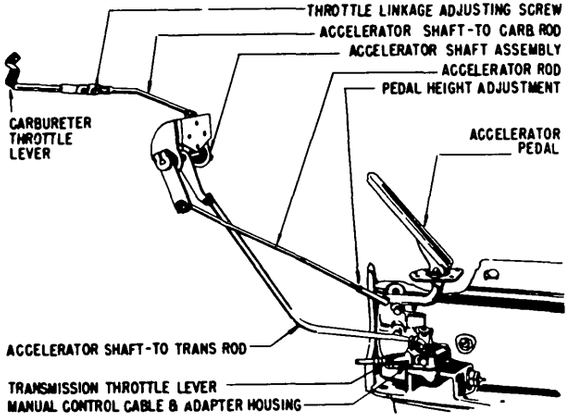
P-YELLOW WIRE TO PARKING LIGHTS
T- BLACK WIRE TO TAIL LIGHTS
IG-BLUE WIRE TO IGNITION LOCK LIGHT
H- GREEN WIRE TO FOOT DIMMER SWITCH
IN-RED WIRE TO INSTRUMENT LIGHT SWITCH.
A-RED WIRES TO GLOVE COMPT, TURN SIGNAL & GEARSHIFT LGTS

FIRST & LATER TYPE LIGHT SWITCH



CONTINUED FROM PRECEDING PAGE

With hand brake on, move transmission control lever to drive ("Dr") range then back to neutral ("N") position Readjust fast idle if necessary Lock round nut with hex nut



POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT Check and remove any binding condition in throttle linkage bring engine up to operating temperature remove air cleaner to make sure choke is fully opened (off fast idle cam), connect tachometer, adjust idling adjusting screw to give 650 RPM (C72-300B), 475-500 RPM (Others) with transmission in neutral Loosen throttle linkage screw located on accelerator shaft to carburetor rod move rear portion of accelerator to carburetor rod rearward until it is stopped by the idle stop on the transmission throttle cam With rods in line and rear portion of rod lightly pre-loaded lock throttle linkage adjusting screw to 15 ft lb torque

CARTER BBD 2312S, 2313S
C71 (Exc. Power Package)

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl 2-3-5 8, LEFT barrel feeds 1 4 6 7*

Idle Setting—¼-1¼ turns open Turn screws out equally for richer mixture

Idle Speed - 500 RPM ***For "Idle Speed Setting" and "Idle Speed-Up Control Adjustment" on Air Conditioned Cars, see CARBURETOR above***

Float Level - 1/4" (Gauge T109-282) between top of each float and top surface of body casting *NOTE* - This supersedes previous 7/32' setting

Accelerating Pump—Install throttle connector rod in center hole (medium stroke) of throttle lever and inner hole of pump arm

Fast Idle Cam Setting- 020' (Gauge T109-29) between lip of fast idle cam and boss on casting with choke valve closed and lip on inner choke shaft lever contacting lug on outer lever Adjust by bending lip on inner choke shaft lever On late carburetors align index mark on cam with adjusting screw

Fast Idle Thr ttl Cl arance 015' (Gauge T109-44) between lower edge of valve and bore of carburetor with adjusting screw on high step of cam

Aut matic Chok S tting: (2312S) Centered - set at index (2313S) Set 1 point rich

Slow Cl sing Throttle (Dashp t) Adjustm nt: 1/16" between shaft and operating lever with throttle valves closed and plunger shaft bottomed Adjust by loosen lock nut and turning dashpot unit in or out

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter BBD" Carburetors in Carburetion Section*

Fuel Pump Pressure: 6-7 lbs

CARTER WCFB 4-BARREL

No. 2314S, SA (C70, C72, C73)
No. 2367S, SA (C71 Power Package)

►*ENGINE CUTTING OUT ON LEFT TURN CORRECTION See Carter WCFB 4-Barrel Carburetor in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels feed 1-4-6-7*

Idle Setting - (2314S SA) 1-2 turns open, (2367S SA) 3/4-1 3/4 turns open Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 500 RPM in neutral

Throttle Linkage Adjustment-See *CARBURETOR above*

►*OTHER DATA See "Carter WCFB 4-Barrel" Carburetors in Carburetion Section*

Fuel Pump Pressure: 6-7 lbs

CARTER WCFB 4-BARREL
No 2444S (Front), 2445S (Rear)
(C72-300)

Idle Setting - 1/4-1 1/4 turns open Adjust both screws alike Turn screws out for richer mixture

Idle Speed—650 RPM Selector lever in neutral

Idle Adjustment—Connect tachometer to engine and set hand brake Place selector lever in neutral warm up engine to operating temperature with choke fully released and carburetor on slow idle adjust both idle screws until a smooth engine idle is obtained at 600-650 RPM **To synchronize both carburetors,** remove throttle control rod and throttle connector rod Install connector rod studs and return springs Starting with closed throttle valves open each an equal amount open all four mixture screws **one turn** Start engine and adjust speed of 600-650 RPM Install connector rod adjusting length so there is slight end play and no binding with both carburetors at idle Attach throttle control rod making sure it is adjusted so that the carburetor position is not disturbed

Throttle Linkage Adjustment *See CARBURETOR above.*

►*OTHER DATA See "Carter WCFB 4 Barrel" Carburetor in Carburetion Section*

Fuel Pump Pressure- 6 - 7 lbs

CARB. EQUIPMENT

Fuel Pump: Carter M961S (Early) M2413S (Later) Mechanical type

Pressure - 6-7 lbs

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Auto-Lite Electric Type

Dash Unit - 14046A (Exc Sub & Est Wgn) 13705A (Sub & Est Wgn)

Tank Unit - 13970A (Exc Sub & Est Wgn) 13872A (Sub & Est Wgn)

S e "Fu l Gauges" in Carbur tion Section

BATTERY

(C71) Aut -Lit 11-HS-60 r Willard HO-11-60. *12V lt.* 11 plate, 60 ampere hour capacity

(Others) Auto-Lite 12H-70. *12 v lt,* 13 plate, 70 ampere hour capacity

Grounded Terminal - Negative

►*CAUTION:* This is reversed from previous models

Engine Ground - Left front of engine

STARTER

Auto-Lite MDF-6001. *12 V lt.* **Armature** - MDF-2006.

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counter-clockwise at commutator end

Brush Spring Tension - 42-53 ozs. (new brushes)

Performance Data - MDF

Torque	RPM	Volts	Amperes
0 ft lbs	3200	10 0	60 max
6 5 ft lbs min	Lock	4 0	240 max

Starting Switch- Auto-Lite SAD-4001 Solenoid pinion shift and starting switch used with neutral safety switch (on transmission - Auto.Trans. cars) and SEPARATE relay, Auto-Lite RAJ-4001, mounted on fender splash shield *See "Starter Controls" in Electrical Secti n*

Neutral Safety Switch Adjustm nt: *See "P w rFlit" or "Torque-Flite" Transmissi n in Transmissi n Section*

GENERATOR

Car Model	Auto-Lite Gen rat r	Armature
C70 (Pow St)	GGA-6002B	
C70 (Pow St & A C)	GGA-6002B, C	
Others (Std)	GJC-7002A, B	GJC-2030 F
Others (Pow St)	GJC-7003A, C	GJC-2090 F
Others (Air Cond)	GJC-7006A, B	
Others (Air Cond)	GHM-6004C	
Others (P S & A C)	GJC-7003A, C	GJC-2090F
Others (P S & A C)	GHM-6003B	

►*SPECIAL GENERATOR NOTE:* GGA, GHM, and GJC type generators used Performance specifications below apply equally to all generators, within any one of the three groups specified

Performance Dat - GGA - 12 V lt

Amperes	Volts	RPM 70° F.
4 0	14 6	950 max
40 0 Ⓒ	14 6	1600 max
40 0 Ⓒ	15 0	1600 max

Performance Data - GHM - 12 V lt

Amperes	Volts	RPM C ld
5 0	14 0	875 max
25 0 Ⓒ	14 0	1325 max
30 0 Ⓒ	15 0	1350 max

Performance Data - GJC - 12 V lt

Amperes	Volts	RPM C ld
20 0 Ⓒ	15 0	1750 max
30 0 Ⓒ	15 0	2050-2250

Ⓒ - Do not operate at high output without ventilating fan for any length of time

Field Current - (GGA GHM) 1 1-1 3 amperes at 10 0 volts (GJC) 1 2-1 3 amperes at 10 0 volts Readings at 70° F

Mot ring Curr nt - 2 3-2 6 amps (GGA), 3 0-3 5 amps (GHM) 3 4-3 9 amps (GGJ) all at 10 0 volts

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R tati n - Counter-clockwise at commutator end

Belt Adjustment: Adjust generator so belt deflection midway between pulleys is ¼" with 9-12 lbs pressure

REGULATOR

Auto-Lit . 12 Volt Used with generators as follows:

Aut -Lit R gulat r N .	Generator Type
VAT-6201A	GGA
VRX-6003B	GHM
VRX-6201A	GJC

►*VRX-6201A REGULATOR PRODUCTION CHANGE* Two resistors used on early 1956 regulators, three resistors (see wiring diagram) on later regulators *See "Auto-Lite 12-Volt Regulators" in Electrical Section*

Cut ut Relay

Cuts In - 12 6-13 6 volts (All models)

Cuts Out - 3 0-5 0 amps discharge current after charging at 10 amps (VAT), 7 amps (VRX)

Contact Gap - 015" minimum

Air Gap - 031-034" with contacts open (measure at hinge end of core)

V ltage Regulator

S tting - 14 5 volts at 80° F while charging at 10 0 amperes or with 25 ohm resistor in series between regulator and battery

Air Gap - 048-052" with contacts just opening

Ch cking & Adjusting - *See Electrical Section*

Curr nt Regulator

►*SETTING CAUTION: "T mperature Compensated" type S t t following specifications at 70° F*

	Test A - Operating Amperes - Test B
VRX	36 Max 30 (28-32)
VAT	46 Max 40 (38-42)

T st A - After 15 minutes operation charging at 10 amps

T st B - After additional 15 minutes operation on current regulator (with load applied to hold voltage at 13 7-13 9 volts (VAT), 13 6-13 8 volts (VRX)

Air Gap - 048-052" with contacts just opening

Ch cking & Adjusting - *S Electrical Section*

MISC. ELECTRICAL

H adlamps: Sealed Beam *See Electrical Section*

Dir cti n Signal: *See El ctrical Section*

H adlight & Pan l Light Switch Removal: Remove knob on headlight switch after removing recessed head screw, then remove panel light switch control (indexed on its shaft by lugs in tab plate and slots in shaft) Remove hex nut from threaded sleeve, then remove switch (switches) from instrument panel

St p Light Switch L cati n· On forward end of master cylinder

CIRCUIT BREAKERS· Lighting - Three circuit breakers on back of lighting switch Protect circuits as follows

15 Amp r (Early), 20 Ampere (Later) - Protects Head and Beam Indicator Lights

6 Amp r - Protects Parking Tail License Plate Instrument Ignition and Clock Lights

6 Amp r - Protects Stop Map Dome Glove Compartment Courtesy and Trunk Compartment Lights

Windshi ld Wiper & Back-Up Lights 5 Ampere Mounted on rear of windshield wiper switch

Window Lifts 20 Ampere Mounted behind left front kick panel

F ur Way S at: 15 Ampere Mounted behind left front kick panel

HORNS: Aut -Lit , Jubil , or Spart n. Dual horns with relay *12 Volt*

Auto-Lite - (High Pitch) HAD-4717, (Low Pitch) HAD 4029

Horn Relay: Auto-Lite RAH-4002. *12 Volt*

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

►*ENGINE NOTE: Two types of engines used Spitfire (single rocker shaft engine) used on C71 Windsor models Fire Power (double rocker shaft engine) used on other models*

ENGINE SPECIFICATIONS· 90° V8 (All Models)

Model	Bore	Stroke	Displacement
C71	3 81"	3 63"	331 cu ins
Others	3 94"	3 63"	354 cu ins

Model	Compr. Ratio	Rated HP	Dev. HP & RPM
C71	8 5	46 5	. 225 at 4400
C71 (Pwr Pkg)	8 5	46 5	250 at 4600
C72-300	9 0	49 7	340 at 5200
C72-300 (Optl Hd)	10 0	49 7	355 at 5200
C70, C72, C73	9 0	49 7	280 at 4600

Compression & Vacuum Reading - *See TUNE-UP*

OIL PAN REMOVAL: Remove the oil lever indicator, crankcase plug and drain lubricating oil Disconnect steering linkage at idler arm support bracket, and allow linkage to settle away from bottom of oil pan Remove bolts that hold oil pan to cylinder block, slide pan out and down away from engine

►*C71 NOTE:* On C71 (with single exhaust), disconnect crossover and "Y" pipe at exhaust manifolds and at clamp to exhaust extension so that crossover and "Y" pipe can be moved out of way Make sure remainder of exhaust system is sufficiently supported

ENGINE REMOVAL: *See "Engine" in Chrysler Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chrysler Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Special Data*

PISTONS

Two types used as follows:

C-71 Aluminum Alloy thermally controlled by steel band horizontal slot elliptically turned, tin plated

C-70, C-72, C-72-300B, C-73 Aluminum Alloy slipper type thermally controlled by steel strut, elliptically turned tin plated

►*CYLINDER BORE OVERSIZE CAUTION· Engines with letter "A" following engine number indicates that cylinder bore is 020" oversize*

Weight - (C71) 21 ozs (Others) 22 8 ozs

Removal - Pistons and rods removed from above

Cl aranc - (C71) .00075-.00125" at top of skirt (Oth rs) 00075 00125" measured 1 5" from bottom of skirt

Fitting N w Pist ns Insert piston in bore upside down with 002" x 1/2" feeler stock between thrust face of piston and cylinder wall Pull required to withdraw feeler stock should be 8-12 lbs at room temperature of 70° F

Replacement Pistons: Standard, 005", 020", 030", 040", 060" oversize Fitted pins included with new pistons

Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod On left bank (1-3-5-7) assemble with indent on same side as large chamfer at insert end of connecting rod *See Rod Installation*

PISTON PINS

Floating type with lock ring at each end *NOTE* - Pin offset in piston toward right side of engine

►*PISTON PIN CAUTION:* 1956 pins have thicker wall section and must not be interchanged with 1955 type (will affect engine balance)

Diameter - 9841-9843" Length - 3 140-3 150"

Clearance in Piston— 0000-0005" or thumb press fit at 70° F

Clearance in Rod—.0001-.0004". Selective fit.

Replacement Pins: Standard, .003", .008" oversize. *NOTE*—Fitted pins are furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr (#1)	.0775-0780"	010-020"	Ⓓ 002-0035"
Compr (#2)	.0775-0780"	010-020"	Ⓓ 002-0035"
Oil (#3)	.1860-1865"	101-020"	Ⓓ 001-0025"

Ⓓ-C-71 Side Clearance #1 0015-0030", #2 .0010-0025, #3 0010-003"

C-72-300 RING NOTE - Top compression ring is chrome

Replacement Rings: Furnished in sets Standard, 010", 020", 030", 040", 060" oversize

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length—6 5/8". **Weight** 25.2 ozs.

Crankpin Journal Diameter—2 249-2.250". Out-of-round and taper limits 001"

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals machined UNDERSIZE). See "Crankshaft"* below

Bearings (Lower) - Steel-backed babbitt (except C72-300 which are Tri-Metal)

C72-300 NOTE - Crankshaft special hardened type

Clearance— 0005-0015"

Endplay—.006-014" (total for both rods)

Replacement Bearings: Standard, 001", 002", 003", 010", 012 undersize

Installing Rods· (*NOTE*—Connecting rod bores are chamfered more on one side than other This larger chamfer must be installed toward crankshaft fillet) When installing lower bearing shell, make certain that "V" groove in shell is in line with "V" groove in cap This allows lubrication of cylinder wall Bearing shells should always be installed so that small formed tang fits into machined grooves of rod Oil ring expander gap should be toward outside of "V" of engine

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Oil ring gap should be toward inside of "V" of engine. *See Piston Installation above*

►*CAUTION:* Rods are **interchangeable.** However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangeable** with the other bank.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Five bearings. Out-of-round limit .001".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the center (No. 3) counterweight in following manner: "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings - Steel-backed babbitt (except C72-300 which are Tri-Metal)

Clearance - 0005-0015" (except C72-300 Rear Main Bearing - **.0015-.0025"**).

Replacement Bearings: Std., .001", 002", .003", .010", .012" undersize. Upper and lower halves of bearings Nos. 1, 2, and 4 are alike and interchangeable, Upper No. 3 is interchangeable with Lower No. 3, Upper & Lower No. 5 are **not interchangeable.**

End Thrust: Taken by center (#3) main bearing.

Endplay: .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Special Data.*

CAMSHAFT

Journal Diameters—(Nos. 1, 2, 3, 4) 1.998-1.999. (No.5) 1.4355-1.4365".

Bearings—Removable, steel-backed, babbitt lined bushings

Clearance—.001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

Endplay—.002-.006".

Timing Chain: Width 1 1/8". **Pitch** .375". **Length** 68 links.

Camshaft Setting: Timing Check: Marks on gears should be adjacent and in line with straightedge across shaft centers **Chain Installation:** Install chain and gears as an assembly Mesh crankshaft gear in chain with keyway out toward chain mesh camshaft gear in chain with keyway toward crankshaft gear and mark on gear in line with **23rd chain pin** clockwise from pin at mark on crankshaft gear Install assembly on engine, turning camshaft and crankshaft to line up keys with gear keyways, install fuel pump eccentric (must engage camshaft key), tighten camshaft cupwasher and bolt to 35 ft lbs Check timing as above

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Chrysler Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data*

VALVES

Tappet Clearance: (C72-300) 015" Intake, 024" Exhaust, HOT 015" Intake, 028" Exhaust, COLD **(Others)** None in service (hydraulic)

Valves	Head Diam.	Stem Diam.	Length
C71 Intake	1 13/16"	372-373"	4 25/32"
C71 Exhaust	1 1/2"	371-372"	4 3/4"
Others Int	1 15/16"	372-373"	5 1/32"
Others Exh	1 3/4"	371-372"	4 63/64"

Valves	Seat Angle	Lift	Stem Clearance
C73-300 Int	45°	444"	001-003"
C72-300 Exh	45°	435"	002-004"
Others Int	45°	381"	001-003"
Others Exh	45°	357"	002-004"

Valve Seat Width - 1/16-3/32" (Int.), 3/64-1/16" (Exh.)

►*C71 OVERSIZE VALVE STEM NOTE:* Valves with oversize stems are available in 005", .015", 030" oversize *See Valve Guides below*

►*C72-300 EXHAUST VALVE SEAT INSERT CAUTION: See "Valve System" in Chrysler Special Data*

Intake Valve Stem Oil Seal - Seal installed on intake valve stem after valve is inserted in head and before installation of springs Seal will seat itself in correct position on guide

►*VALVE GRINDING CAUTION:* Valve and seat grinding should not change position of valve in head more than 1/32" from original position Use Gauge C-3436 (C-71), C-3061 (Others) to check distance stem extends through cylinder head If valve tip exceeds maximum allowable on gauge, grind tip as necessary (do not go below minimum allowable on gauge) Improper valve clearance at high speed will result if condition not corrected

Valve Springs: One used on all except C72-300 which used Inner and Outer springs (same as previous models)

Free Length-2" (Except 300B) 1 7/8" Outer, 1 25/32" Inner (300B)

Valve Spring Specifications (C-70, C-71, C-72, C-73)

Valve	Lbs. Pressure	Length
Open	166	1 31"
Closed	72	1 69"

(C 72-300)

	Inner Spring		Outer Spring	
Valve	Lbs.Press.	Length	Lbs.Press.	Length
Open	66	1 09"	158	1 22"
Closed	28	1 53"	60	1 66"

►*CAUTION Spring ends must be square within 1/16" (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION* If valves or seats are reground, check installed height of spring If height is 1 23/32" or greater install a 1/16" spacer (Part No. 1400482) in the head counter-bore to bring height back to a nominal 1 5/8-1 11/16".

►*VALVE SPRING LOAD CAUTION: Hydraulic lifters "pump up" will restrict engine speed and cause valves to burn if valve spring loads are not maintained.*

Valve Guides (C71 Spitfire): Cast integral with cylinder head When valve stem clearance excessive, use reamer tool set to ream guides for next oversize valve as follows: C-3433 (.379-.380" - .005" O.S.), C-3430 (.389-.390" - .015" O.S.), C-3427 (.404-.405" - .030" O.S.)

Valve Guides (Others) - Drive old guides out through top of head using tool C-3150 Install new guides by driving them up through valve port opening To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3150 is flush with face of cylinder head To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole Ream guide to .374-.375" with tool C-741

►*CAUTION Oil hole in top of exhaust guide must face up*

NOTE—If Valve Guide Tool C-3150 is not available, drive guides in, measuring from top of valve seat as follows: **Intake 31/32", Exhaust 1 3/64"**

Hydraulic Valve Lifters: Integral flat-valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008 oversize

Diameter—.9040-.9045" **Clearance in Block**—.0005-.0015"

Lifter Overhaul & Testing—*See "Valve System" in Chrysler Special Data.*

►*VALVE GRINDING CAUTION:* See Valves (above).

Rocker Arm Assembly: *See "Valve System" in Chrysler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing (C71)

Intake Valves - Open 5° BTDC, Close 67° ALDC

Exhaust Valves - Open 39° BLDC, Close 25° ATDC

Valve Timing (C70, C72, C73)

Intake Valves - Open 15° BTDC, Close 57° ALDC

Exhaust Valves - Open 49° BLDC, Close 15° ATDC

Valve Timing (C72-300)

Intake Valves—Open 35° BTDC Close 65° ALDC

Exhaust Valves—Open 65° BLDC Close 25° ATDC

Valve Timing Check (Exc. C-300)—With No 1 intake valve closed Insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid) Set dial indicator at "Zero", turn crankshaft until dial indicator shows that valve has lifted .021" Pointer on cover should indicate between 5° BTDC to 7° ATDC if timing correct Then turn crankshaft **counter-clockwise** until lifter is back down to the valve closed position Re-

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move spacer from between rocker arm and valve stem *See "Camshaft Setting" under CAMSHAFT above*

►*CAUTION Do not turn crankshaft further than indicated abov , which might bottom spring and damage valve mechanism*

Valv Timing Check (C72-300) - Turn crankshaft until No 1 intake valve is closed and No 1 piston is on TDC Install a dial indicator so that pointer contacts valve spring retainer as nearly at right angle as possible Adjust valve rocker screw to provide zero clearance Set dial indicator to zero and turn crankshaft **clockwis** (normal running direction) until dial indicator shows valve has lifted 081" Timing marks on vibration damper should read 5° BTDC to 7° ATDC If reading not within specified limits check gear index marks and inspect timing chain for wear After valve timing checked reset valve lash to specified operating limits S *"Camshaft Setting" under CAM SHAFT abov*

OILING SYSTEM

►***ENGINE OILING SYSTEM· See "Engine Lubrication" und r OILING SYSTEM in Chrysler Special Data.***

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE NOTE* Due to interference from fender skirt or air conditioning lines immediately above filter cover, filter assembly must be removed from engine to change filter cartridge

Crankcase Capacity 5 qts (refill) Add one additional quart when filter changed

N rmal Oil Pr ssur · 40-65 lbs with warm oil operating at 40-50 MPH

►*OIL PRESSURE CAUTION*· Oil pressure will drop 15-20 lbs when FILTER ELEMENT IS CLOGGED Replace element

Oil Pr ssure R lief Valve—Mounted in oil pump Adjustable. *NOTE*—When replacing relief valve spring use same color spring

Oil Pr ssure Gaug —Auto-Lite 13700A Not Electric

Oil Pump Rotor type In crankcase at rear end Driven by lower distributor drive shaft

Pump Ov rhaul—S e *"Oiling System" in Chrysler Special Data*

Oil Filter. Full-flow At right rear engine All oil enters lubrication system of engine through filter at full pump pressure Safety valve in filter opens if element is clogged, allowing oil to pass into lubrication system under a reduced pressure of 25-45 lbs

Filter Elem nt—Install new block element and cover gasket at 5000 mile intervals (or earlier if required) Change oil at same time filter element is changed

►*AIR-CONDITIONED CAR FILTER CARTRIDGE CHANGE NOTE* Due to interference from fender skirt or air conditioning lines immediately above filter cover, filter assembly must be removed from engine to change filter cartridge

Crankcas Ventilation Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe

COOLING

Wat r Capacity· (C71) 24 qts (Others) 25 qts One additional quart on all models with heater

Pressure Valve Chrysler 1373136 (Opens at 7 lbs) Radiator filler cap 14 lb type used with Air Conditioning

Thermostat Choke type in cylinder head water outlet Starts to open at 160-165° F

Water Pump Ball bearing type No lubrication required ***See "Water Pump" in Chrysler Special Data.***

Pump Removal—Drain cooling system Remove radiator shroud assembly fan belt pulley and fan Remove radiator outlet hose from thermostat housing Remove wire from temperature gauge sending unit Remove pump housing-to-cylinder block attaching bolts, remove pump housing assembly

Temperature Gauge Auto-Lite. Electric type

Dash Unit - Auto-Lite 14145A

Engine Unit - Auto-Lite 13550A In pump housing

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	361376	382366

See "Borg & Beck" Clutches in Clutch Section

Pedal Adjustment· Turn clutch release fork rod adjusting nut until 3/16 free play at outer end of clutch fork is obtained This adjustment will give necessary 1 free play at pedal

Over-Center Spring Adjustment With clutch pedal in fully released position, and with over-center spring eyebolt finger tight, hold spring eyebolt, spring and bracket assembly as a single unit and with an adjusting wrench tighten adjusting nut seven full turns

Removal Disconnect propeller shaft speedometer cable parking brake cable and gearshift control rods Remove transmission (See Synchro-mesh Transmission) Mark clutch cover and flywheel Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh

See "Chrysler Synchro-mesh" in Transmission Section

Transmission Controls *See "Transmission Controls" in Transmission Section*

Removal Jack up car at front and place floor jacks under lower control arms Disconnect propeller shaft at front end If transmission is to be disassembled, loosen companion flange nut Disconnect speedometer cable and hand brake cable at brake band Disconnect gearshift and gearshift selector control rods at transmission Remove capscrews and nuts which attach transmission to clutch housing Remove transmission assembly by pulling it back down and out of car

NOTE—When installing transmission use pilot studs to avoid springing clutch disc

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission

See "PowerFlite" Transmission in Transmission Section for complete data

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite" Transmission in Transmission Section for data*

►*TESTING & TROUBLE SHOOTING See "PowerFlite" Transmission in Transmission Section*

Lubrication Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A)

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section for data*

TORQUE-FLITE TRANSMISSION

Wide range torque converter and automatically operated planetary gear transmission

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Torque-Flite" Transmission in Transmission Section for data*

►*TESTING & TROUBLE SHOOTING See "Torque-Flite" Transmission in Transmission Section*

Lubrication· Check fluid level every 1000 miles drain and refill every 20 000 miles with Automatic Transmission Fluid (Type A)

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

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H t Transmissi n (After being driv n s v ral mil s) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment· See *CARBURETOR* above.

►*OTHER "TORQUE-FLITE" SERVICE DATA: See "Torque-Flite" Transmission in Transmission Section*

UNIVERSALS

Detroit Universals. (C71, C72, C72-300) Ball & Trunnion used at front, cross type used at rear (C70, C73) Cross type used at front, rear, and center bearing joints

PROPELLER SHAFT

►*CHRYSLER IMPERIAL DRIVE LINE SHUDDER OR VIBRATION AT 15-20 MPH· See "Propeller Shaft' in Chrysler Special Data*

Propeller Shaft Alignment - Shaft alignment and working angle of universal joints must be checked and adjusted *See "Propeller Shaft" in Chrysler Special Data*

Propeller Shaft Center Bearing: See "Propeller Shaft" in Chrysler Special Data

REAR AXLE

Own. Semi-floating type with hypoid gear and Hotchkiss Drive Barrel type *NOTE* - Axle gear thrust screw and pad no longer used

See "Chrysler Hypoid" in Rear Axle Section

Axle Ratios	Standard Trans.	Auto. Trans.
C70		3 54 (39-11)
C71 Pass	3 73 (41-11)	3 54 (39-11)
C71 T & C Wgn	3 91 (43-11)	3 73 (41-11)
C72 Pass	3 07 (40-13)	3 36 (37-11)
C72 T & C Wgn	...	①3 54 (39-11)
C73		②3 07 (40-13)
C72-300	③	③

① - Optional Ratios 3 07 (40-13), 3 36 (37-11)
② - Optional Ratios 3 36 (37-11), 3 54 (39-11)
③ - 12 optional ratios available ranging from 3 07 (40-13) to 6 17 (37-6)

Backlash - 006- 008"

Rear Axle Control Strut (Imperial) *See 'Propeller Shaft in Chrysler Special Data*

Carrier Removal: Disconnect rear universal remove axle shafts,(see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller - Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller)

Wheel Bearing Adjustment Shims between backing plate and axle housing With wheel and hub removed, check endplay with dial indicator To adjust, remove backing plate (see above) add or remove shims (furnished 005 010 0125 015 030 thick) equally at both wheels

Endplay– 003- 008"

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic, non-adjustable. Serviced by replacement

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers

See "Chrysler" in Front Suspension Section for complete data

Kingpin Inclination - (C70) 7° (Others) 5 5° At 0° camber

Caster–Neg 2° to 0° (Neg 2° preferred with Manual Steering, 0° with Power Steering Left side should be 0° to ¾° greater than right side within these limits)

Camber–Neg 1/8° to Pos 5/8° (Left side Pos 1/2°, Right side 0° preferred)

Toe-In - 1/8" preferred

Toe-Out on Turns-Inner wheel 21½°±1°, outer wheel 20°

STEERING

Manual· Gemmer. Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section

Power Steering· "Coaxial" Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column

See "Coaxial" Power Steering in Steering Section

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal *See "Gemmer Worm & Roller" in Steering Section*

Steering Gear Removal *See "Gemmer Worm & Roller" Steering Section*

BRAKES

►*BRAKE "SQUEAK" CORRECTION· See Chrysler "Center Plane" Brakes in Brake Section*

Service: Center Plane (Floating Shoe) hydraulic type *See Chrysler "Center Plane" Brakes in Brake Section*

Drums–Centrifuse Diameter 12"

Wheel Cylinder Diameter–1 1/8" bore Single acting (front), double acting (rear wheels)

Replacement Linings & Shoes–Linings or shoes with linings furnished in Standard & 030" oversize

Lining–Molded asbestos (bonded to shoe) Length–12 57 per shoe Width - 2½" Thickness - 13/64"

Braking Power - 60% front, 40% rear

Cl aranc - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt

R ar Wheels - Same as front wheels except that on rear wh els forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder· On engine side of dash panel opposite base of brake pedal

Checking Fluid–Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal–Disconnect pushrod Disconnect brake line tube at master cylinder Disconnect stop light switch leads, remove four stud nuts from studs, remove master cylinder

Power Brakes: "Bellows or "Piston" Assist type Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder) *S Chrysler, DeSoto, Dodge, Plymouth B II ws Type" or "Piston Type" power brakes in Brak Secti n*

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket *(NOTE* - If pedal linkage is allowed to extend through hole in dash panel trigger arm may be damaged) Disconnect vacuum hose at power unit Remove complete power unit and bracket assembly by removing four nuts and lockwashers Carefully withdraw unit from dash panel

Parking Brake: On propeller shaft at rear of transmission 6" External contracting type used with standard transmission 7" Internal expanding type used with Automatic Transmission

Adjustment - *See "Hand Brak Not s" in Chrysl r Special Data*

Lining - Width - 2" Thickness - 5/32" Length - 13 06" (Int Exp), 15 38" (Ext Contr)

Clearance (Internal Expanding) - Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately 010"

Clearance (External Contracting) - Adjust anchor screw so clearance between band and drum at anchor is 015-020"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPF-4001. Electric type

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section

Air Conditioning Chrysler "Airt mp". *See "Airtemp" Air Conditioning in Miscellaneous Section*

Power Window Regulators Aut -Lit . Electric type Reversible type motor in each window Controlled by switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters Aut -Lit Electric type *See "Power Seat Adjusters" in Miscellaneous Section*

C nv rtibl T p C ntr l Auto-Lit Electrical Hydraulic type *See "Chrysler Top Control" in Miscellaneous Section*

► *CHRYSLER "300C": This model has special "Firepower" engine (Hemispherical combustion chamber and double rocker arm shafts). Special specifications and service data for this model are included below.*

MODEL IDENTIFICATION

Model	Model Identification
Chrysler Windsor	C-75-1
Chrysler Saratoga	C-75-2
Chrysler New Yorker	C-76
Chrysler 300C	C-76-300
Imperial	IM-1
Imperial Crown	IM-2
Imperial LeBaron	IM-4

SERIAL NUMBER: Stamped on metal plate attached to left front body hinge post.

Starting Serial Nos.	Detroit	Los Angeles
Windsor	W571001	W57L1001
Saratoga	L571001	L57L1001
New Yorker	N571001	N57L1001
Imperial	C571001	

ENGINE NUMBER: Stamped on a boss on top side of cylinder block just back of water pump.

Car Model	Starting Engine Nos.
Windsor	WE571001
Saratoga	LE571001
New Yorker	NE571001
Imperial	CE571001

► *ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*
"A" - All Cylinders .020" oversize.
"B" - All Crankshaft Journals .010" undersize.
"AB" - Both above conditions exist.
"MALTESE CROSS" (3/8" high) - ONE OR MORE crankshaft Journals .001" undersize. See *"Connecting Rods" and "Crankshaft" below.*
♦ (3/8" high) - ALL valve lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: (C-75-1, 2) 140-170 lbs., (Others) 150-180 lbs., at idling speed of 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 20 lbs.

VALVE TAPPET CLEARANCE: **(All exc. 300C).** None in service (hydraulic lifters).
C-76-300 (Mechanical Lifters) - .015" Intake, .024" Exhaust, HOT.

MANIFOLD HEAT CONTROL: *NOTE* - Before installing valve on engine, lubricate valve shaft with graphite grease.
(C-75-1 Standard) - Single exhaust on right cylinder block with thermostatically controlled valve. Install valve with counterweight toward front of engine and small anti-rattle spring retaining pin toward rear and adjacent to cylinder block.
(C-75-1 with Power Pack, C-75-2, C-76, C-76-300, IM-1, 2, 4) - Dual exhaust system used. Heat control valve is in right exhaust pipe.
Coil Spring Installation - Position valve shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer end of tongue of spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end tongue of spring around and hook under pin (left pin when facing coil end of valve).

► *DUAL EXHAUST NOTE:* When valve is closed most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - Auto-Lite AR-42 (C-75-1, 2), AGR-42 (Others). 14 mm. Torque to 30-32 ft. lbs. *NOTE* - Auto-Lite AGR-32 recommended for High Speed operation on C-76-300

COIL: Auto-Lite CAH-4001B.
Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.
Resistor - Auto-Lite PU-4003. .665-.735 ohms (70-80°F).

► *COIL RESISTOR NOTE:* Connected in circuit between "IGN" terminal of horn relay and positive terminal of coil. *Resistor must be in circuit when testing coil output.*

DISTRIBUTOR: Auto-Lite IBP-4002A (C-75-1, 2), IBK-4304 (Others). *NOTE* - "IBK" Distributor is double breaker.
Condenser - Auto-Lite IAT-2015RA (IBP-4002A), IBB-2015R (IBK-4304). **Capacity** - .25-.285 mfd.
Contact Point Set - Auto-Lite IBP-3028AS (IBP-4002A), IGW-3028KS (IBK-4304).
Breaker Gap - .015-.018".
Cam Angle (IBP Distr.) - 27-32°

► *CAUTION:* Cam angle should be checked with vacuum line **disconnected**. Angle may decrease as much as 10° when vacuum line reconnected but must not decrease more than 12°

Cam Angle (IBK Distr.) - 29-32° (single set of points), 36-39° (both sets operating together).
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - IBP-4002A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	425	2	850
6.5	750	13	1500
12	1835	24	3670
13	2050	26	4100

Automatic Advance - IBK-4304

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
5	875	10	1750
9	2000	18	4000
10	2250	20	4500

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4002A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	10
1	2	10 3/8
5	10	12 1/4
9	18	14 7/8
10.5	21	16

Vacuum Advance - IBK-4304

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8¾
6	12	12½
10	20	16¾
11	22	18

IGNITION TIMING

Model	Std. Setting
C-75-1, 2; C-76; IM-1,2,4	6° BTDC at 500 RPM
C-76-300	4° BTDC at 500 RPM

Timing Mark - Vibration dampener marked at TDC point with graduations indicating advance. Align correct mark with pointer on right side of timing chain cover.

CARBURETOR

Model	Carter Carburetor No.
C-75-1	BBD 2527S
C-75-2(Early) ℂ	WCFB 2589S
C-75-2 (Later) ℂ	AFB 2686S
C-75; IM-1,2,4 (Early)	WCFB 2590S
C-75; IM-1,2,4 (Later)	AFB 2448S
C-76-300	WCFB 2534S(front), 2535S (rear)

ℂ - Power Pack on C-75-1

► *CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

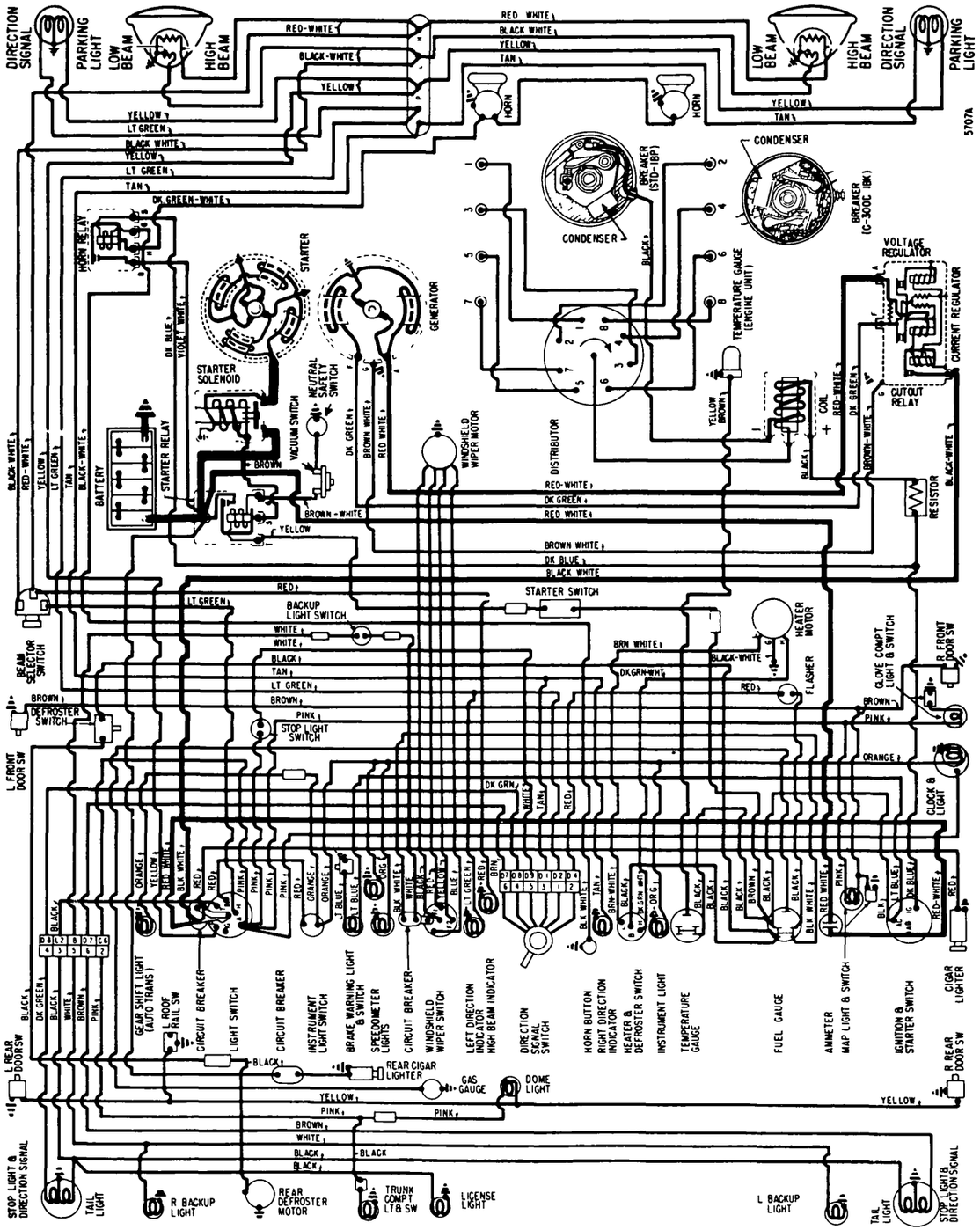
THROTTLE LINKAGE ADJUSTMENT: *NOTE* - Accelerator pedal angle should be 118° to the horizontal in closed throttle position. To adjust, disconnect pedal end of bellcrank-to-pedal rod, adjust rod length by turning swivel end on rod, tighten locknut after adjusting. Then proceed as follows: Make certain engine idle speed correctly set at 475-500 RPM with selector in Neutral and engine at normal operating temperature. On 2-Barrel Carburetor Models, loosen adjusting screw located on accelerator shaft-to-carburetor rod. On 4-Barrel Carburetor models, loosen adjusting screw on accelerator shaft assembly-to-intermediate shaft assembly rod. On all models, move rear portion of rod to rear until it is stopped by idle stop on transmission throttle cam, align rods and tighten adjusting screw to 7-9 ft. lbs. torque. Recheck engine idle speed.

CARTER BBD 2-BARREL

Carter BBD, No. 2527S. Dual downdraft type.

► *CARBURETOR METERING JET CHANGE:* New jet calibration used on later cars as follows: **Main Metering Jet** No. 120-214S (superseding No. 120-213S which is now 1 Size Lean), **Step-up Rod** No. 75-1370 (superseding No. 75-1177).

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CHRYSLER C-75-1,2; C-76 MODELS

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► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT Barrel feeds Cyl. 2-3-5-8, LEFT Barrel 1-4-6-7.*

Idle Setting - ½-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (Synchro-mesh), 475-500 RPM (TorqueFlite in Neutral).

Float Level - 9/32" (Gauge T109-239) between top of each float ridge (at center of float) and top surface of body casting. To adjust, bend lip on float arm.

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever and inner hole of pump arm.

Fast Idle: .015" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on high step of cam.

Fast Idle Cam Clearance - With choke valve closed and lip on inner choke shaft lever contacting lug on outer lever, index mark on cam should align with fast idle adjusting screw. Adjust by bending lip on inner choke shaft lever.

Automatic Choke Setting: Set 1 point rich.

Throttle Linkage Adjustment: *See CARBURETOR above.*

► *OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL (Except C-76-300)

Carter WCFB, 2589S (C-75-2), 2590S (Oth rs).

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT Barrels feed Cyl. 2-3-5-8, L ft Barrels 1-4-6-7.*

Idle Setting - (2589S) ¾-1¾ turns open, (2590S) 1-2 turns open. For richer mixture, turn screws out.

Idle Speed - 475-500 RPM with TorqueFlite in Neutral.

Throttle Linkage Adjustment: *See CARBURETOR above.*

► *OTHER DATA: See "Carter WCFB Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB 2686S (C-75-2), 2448S (Oth rs).

► *CARBURETOR FLOODING CORRECTION: See "Carter AFB Carburetors" in Carburetion Section*

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels 1-4-6-7*

Idle Setting - ¼-1¾ turns open Turn screw out for richer mixture

Idle Speed - 500 RPM with Neutral button pushed in

Throttle Linkage Adjustment: *Se CARBURETOR above*

► *OTHER DATA: See "Carter AFB Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL (C-76-300)

Carter WCFB 2534S (Front), 2535S (R ar). These carburetors have "Idle Air Bypass Screws" used for idle speed adjustment except on reworked carburetors with recommended changes (following).

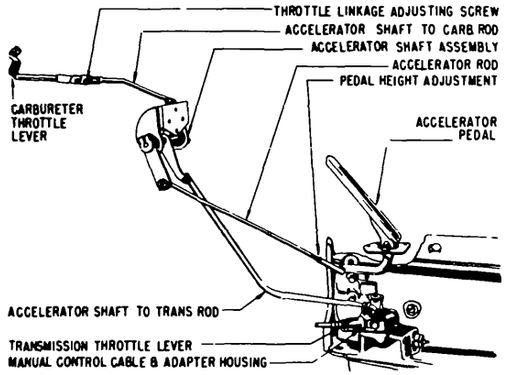
► *FOOR IDLE, STUMBLE ON ACCELERATION, STALLING ON STOPS OR SUDDEN TURNS CORRECTION: For recommended changes (including New Idl Adjustment Procedure), see "Carter WCFB Carburetors" in Carburetion S ction*

► *MANIFOLD FUEL DISTRIBUTION. RIGHT barrels feed right bank cylinders, LEFT barrels feed left bank*

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►*CARBURETOR SYNCHRONIZATION NOTE·* Before adjusting idle mixture and idle speed, the carburetor inter-connecting rod must be adjusted as follows Hold rear carburetor throttle in wide open position (choke off) and adjust rod at slotted end so front carburetor



T RQUEFLITE THROTTLE LINKAGE

throttle valve will be in wide open position. Tighten locknut and check linkage operation. Make sure rod can rotate slightly on pivots and not bind

Idle Mixtur & Sp d Adjustment: *CAUTION - DO NOT use this proc dure on carburetors reworked to correct Poor Idl , Stumble, tc See "Carter WCFB Carburetors" in Carburetion Section for recommended procedure on reworked carburetors On other carburetors, proceed as follows* **1)** Set all idle mixture screws (2 per carburetor) 1 turn open set idle air bypass screws (1 per carburetor) 1 turn open **2)** With engine at normal operating temperature connect tachometer for accurate determination of engine idle speed **3)** Adjust idle speed to approximately 600 RPM by adjusting idle air bypass screw on **b th** carburetors equally **4)** Adjust idle mixture screws on **rear** carburetor for maximum RPM **5)** Adjust idle mixture screws on **front** carburetor for maximum RPM readjust rear carburetor if necessary **6)** Re set idle speed to 600 650 RPM by readjusting idle air bypass screw on **b th** carburetors

FUEL PUMP PRESSURE· 6-7 lbs.

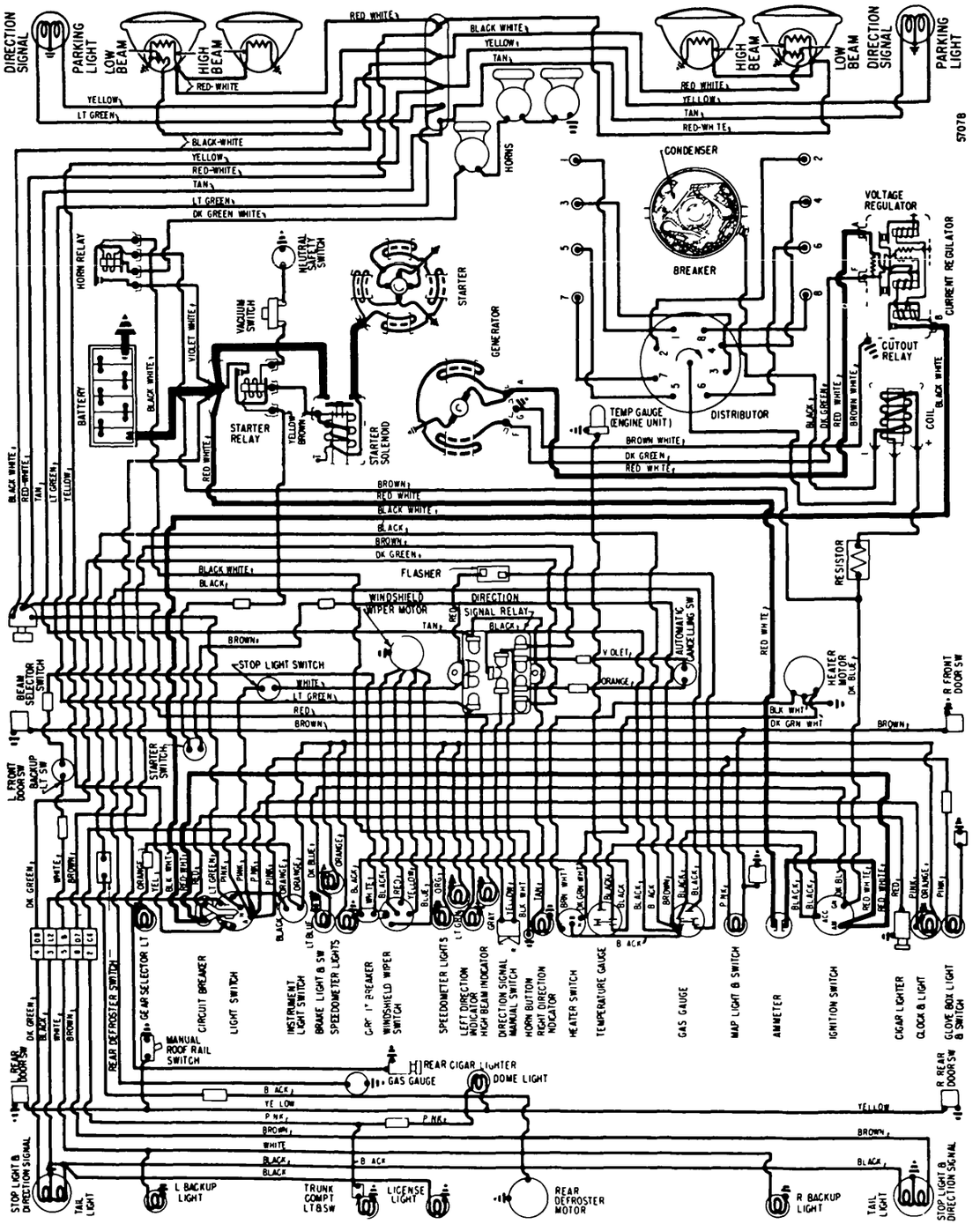
CARB. EQUIPMENT

Fu l Pump· Carter M2503S Mechanical type
Pressure – 6 – 7 lbs
Se "Fuel Pumps" in Carburetion Section
Gas line Gaug Auto Lite Electric Type
Dash Unit – Auto-Lite 14296A (C'75 C'76) Auto-Lite 14263A (1M–1 2 4)
Tank Unit – Auto Lite 14380A (Sub & Est Wgn) Auto-Lite 14381A (Others)
See 'Fuel Gaug s" in Carburetion Section

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION* Clean filter element by tapping

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CHRYSLER IMPERIAL IM-1,2,4 MODELS

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and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

(C-75-1, 2) Auto-Lite 12H-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).
(Others) Auto-Lite 12H-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Grounded Terminal – Negative.
Engine Ground – Engine to body.

STARTER

Auto-Lite MDL-6001. Armature MDL-2006.
NOTE – Auto-Lite MDL-6002 used on first 13000 cars (except C-75-1, 2).
Drive – Overrunning clutch (solenoid pinion shift).
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 31-47 oz.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Starting Switch: Auto-Lite Solenoid SAD-4301 with separate Auto-Lite Relay RAJ-4001 (Relay not used on C-75-1 with Synchro-mesh Transmission). Controlled as follows: **Synchro-mesh Cars** – Combination Ignition & Starter Switch. **TorqueFlite Cars** – Neutral pushbutton switch (operated by fully depressing Neutral Button). Vacuum Switch, Auto-Lite 14406A, on Intake Manifold (prevents starter actuation with engine running), and Neutral Switch on transmission case (prevents starter actuation except when transmission in neutral).
See "Auto-Lite Starter Controls" in Electrical Section.
►*VACUUM SWITCH CORRECTION (Inoperative Starter caused by open circuit in Vacuum Switch):* May be due to pressure build-up in upper cavity of switch. Correct by drilling 1/64" hole on side at top of switch assembly (directly below terminal plate). *CAUTION* – Do not drill beyond thickness of metal or diaphragm may be damaged.
Neutral Safety Switch Adjustment: *See "TorqueFlite Transmission" in Transmission Section.*

GENERATOR

GENERATOR: Auto-Lite. Application as follows:

Model	Generator	Armature
All (Exc. 300) Early	GJC-7002H	GJC-2030F
C-75-1,2 Later	GJC-7012A	GJC-2030F
C-76, IM1, 2, 4 Later	GHM-6001E	GHM-2006F
C-76-300 Std.	GHM-6010A	GHM-2006F
C-76-300 Air Cond.	GHM-6011A	GHM-2006F
C-76-300 Special	GGA-6007A	GFY-2101F
C-75-1-2 Special	GHM-6001E	GHM-2006F
All Air Cond. Cars	GHM-6004C	GHM-2059F

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950 max.
40.0	14.6	1600 max.
40.0	15.0	1600 max.

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5.0	14.0	875 max.
25.0	15.0	1350 max.
30.0	15.0	1500 max.

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Brush Spring Tension - (GGA) 34-41 ozs., (GHM) 35-53 ozs., (GJC) 18-36 ozs., with new brushes.
Field Current - (GGA, GHM) 1.1-1.3 amperes, (GJC) 1.2-1.3 amperes, at 10.0 volts (70°F).
Motoring Current - (GGA) 2.3-2.6 amperes, (GHM) 3.0-3.5 amperes, (GJC) 3.4-3.9 amperes. All at 10.0 volts (70°F).
Rotation - Counter-clockwise at commutator end.
Belt Adjustment: 1/8" deflection midway between generator and water pump pulleys with 5 lbs. pressure (Std.), 3/8" deflection midway between generator and compressor pulleys with 5 lbs. pressure (Air Cond. Cars).

REGULATOR

Auto-Lite - Used with generators as follows:

Auto-Lite Regulator	Generator Type
VRX-6201A	GJC & GHM Gen.
VAT-6201A	GGA Gen.

Cutout Relay
Cuts In - 12.6-13.6 volts (All models).
Cuts Out - 3-5 amps. discharge current after charging at 10 amps. (VAT), 7 amps. (VRX).
Contact Gap - .015" minimum.
Air Gap - .031-.034" with contacts open (measure at hinge end of core).

Voltage Regulator
Setting - 14.5 ± .3 volt charging at 10 amperes (80°F) or with .25 ohm resistor in series between regulator and battery.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator
►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. **4-Headlight System** Std. on IM-2, 4 and optional on other models. *See "4-Headlights" in Electrical Section.*
Directional Signal: *See Electrical Section.*
Headlight & Panel Light Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hexnut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.
Stop Light Switch Location: On forward end of master cylinder.
CIRCUIT BREAKERS: Used as follows:
20 Ampere – Protects headlights and beam indicator. On back of lighting switch.
6 Ampere – Protects Parking, Tail, License plate, Instrument, Ignition and Clock lights. On back of light switch.
6 Ampere – Protects Stop, Map, Dome, Glove Compartment, Courtesy and Trunk Compartment lights. On back light switch.
6 Ampere – Protects Windshield Wiper and Back-up Lights. On back of wiper switch.
8 Ampere – Protects rear cigar lighter. Behind left front kick panel on side cowl.
20 Ampere – Protects window lift circuits. Located behind left front kick panel.
40 Ampere – Protects 6-way seat circuits. Located behind left front kick panel.
Horn Relay: Auto-Lite RAH-4002.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*
ENGINE SPECIFICATIONS: 90° V8 (All Models).
Spitfire (C-75-1, 2) - Single rocker arm shaft.
FirePower (Others) - Hemispherical combustion chamber and Double Rocker Arm Shaft.
►*C-76-300 NOTE:* Special full race camshaft used in connection with mechanical lifters, special pushrods and rocker arms with adjusting screws in pushrod end (for tappet adjustment), and high load inner and outer valve springs.

Model	Bore	Stroke	Displacement
C-75-1, 2	3.94"	3.63"	354 cu. ins.
Others	4.00"	3.90"	392 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
C-75-1	9.25-1	49.7	285 at 4600 RPM
C-75-1, 2 Ⓒ	9.25-1	49.7	295 at 4600 RPM
C-76	9.25-1	51.2	325 at 4600 RPM
C-76-300 (Std.)	9.25-1	51.2	375 at 5200 RPM
C-76-300(Opt'l)	10.0-1	51.2	390 at 5400 RPM
IM -1,2,4	9.25-1	51.2	325 at 4600 RPM

Ⓒ - 4Bbl. Carb. (Power Pkg. on C-75-1).
Compression & Vacuum Reading - *See TUNE-UP.*
OIL PAN REMOVAL: Drain oil, remove starter, and on cars with single exhaust disconnect cross-over and "Y" pipe at manifold and at extension clamp. Move exhaust out of the way and support in place. Loosen front engine mounts and raise engine ¾". Disconnect steering linkage at idler arm support bracket, then rotate crankshaft so front counterweight is up (timing mark on dampener 180° from pointer), then remove oil pan.
ENGINE REMOVAL: *See "Engine" in Chrysler Special Data.*
CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chrysler Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Special Data.*

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PISTONS

Aluminum Alloy, thermally controlled by steel strut, elliptically turned, tin plated.

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number indicates that cylinder bore is .020" oversize.

W ight – 22.8 ozs. (C75–1, 2; C–76); 24.7 (Others).

R m val – Piston & Rods removed from above.

Clearanc – .0005–.0015" measured 1½" from bottom of skirt. Check clearance with .002" ribbon feeler ½" wide. Pull to withdraw feeler should be 8–12 lbs. with feeler. at right angles to piston pin.

R plac m nt Pist ns: Std. and .005", .020", ..040" Oversize. *NOTE* – 060" Oversize also for C–75–1, 2.

Installing Pist ns: Install pistons on connecting rods so indent on head of piston is toward front of engine. Indent will be on large chamfer side of connecting rod (1–3–5–7) and opposite side (2–4–6–8). *See Rod Installati n.*

PISTON PINS

Floating type with lock ring at each end. *NOTE* – Pin offset in piston toward right side of engine.

Diam t r – .9841–.9843". **Length –** 3.140–3.150".

Clearanc in Piston – .0005–.0015". Thumb press fit at 70° F.

Clearanc in R d – .0001–.0004". Selective fit.

R plac m nt Pins: Standard, .003", .008" oversize. *NOTE* – Fitted pins are furnished with new pistons.

PISTON RINGS

C-75-1, 2 Engines

Ring	Width	End Gap	Side Clearance
Compr. (1,2)	.0775-.078"	.010-.020"	.002-.0035"
Oil (3)	.186-.1865"	.010-.020"	.001-.0025"

All Other Engines

Ring	Width	End Gap	Side Clearance
Compr.(1,2)	.0775-.078"	.013-.025"	.002-.0035"
Oil (3)	.186-.1865"	.013-.025"	.001-.0025"

R plac m nt Rings: Furnished in Sets: Std. and .010", .020", .030", .040" Oversize. *NOTE* – .060" oversize also for C–75–1, 2.

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

L ngth – 6.625" (C–75–1, 2); 6.951" (Others).

W ight – 25.2 oz. (C–75–1, 2); 27.6 oz. (Others).

Crankpin J urnal Diam t r – 2.2507" (C–75–1, 2). 2.375" (Others).

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals machined (UNDERSIZE). See "Crankshaft" b low.*

Bearings (Low r) – Lead Base Babbitt on Steel Exc. C–76–300 which is Tri-Metal (Babbitt on Copper Lead Alloy on Steel Back).

Cl aranc – .0005–.0015".

End Play – .006–.014" (Two rods).

Replac m nt B arings: Std. and .001", .002", .003", .010", .012" undersize.

Installing R ds: Install piston and rod assemblies with indent on piston head toward front of engine (all cylinders) and large chamfer on lower end of rod toward nearest crankshaft journal fillet. Install bearing caps so that "V" groove in cap is in line with similar groove in rod (this is oil spit hole for cylinder wall lubricatcn).

CRANKSHAFT

Journal Diameter - 2.4995-2.5005" (C-75-1, 2); 2.687-2.688" (Others).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the center (No. 3) counterweight in following manner: "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings – C–75–1, 2; C–76; IM–1,–2,–4. Tin Base Babbitt on Steel (#3), Lead Base Babbitt on Steel (Others). **C–76–300.** Tri-Metal (Babbitt on Lead Alloy on Steel Back).

Clearance – .001–.0025" (C–76–300), .0005–.0015" (Others).

Replacement Bearings: Furnished Standard, .001", .002", .003", .010", .012" undersize. *NOTE* – No. 1, 2, and 4 upper and lower bearings are interchangeable. No. 3 upper and lower are interchangeable. No. 5 upper and lower bearings are **not** interchangeable.

End Thrust – Taken by center (#3) main bearing.

End Play – .002–.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Special Data.*

CAMSHAFT

Journal Diameters – 1.998–1.999" (#1,2,3,4), 1.4355–1.4365" (#5).

Bearings – Removable, steel-backed, Babbitt-lined bushings.

Clearance – .001–.003".

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

End Play – .002–.006".

Timing Chain: Width 1 1/8". **Pitch** .375". **Length** 68 links.

Camshaft Setting: Camshaft timing is correct when timing marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

Engin Front C v r (R moval & Installation): *S e "Engin Front Cover" in Chrysler Special Data.*

Engin Fr nt C v r Oil S al (Crankshaft Front S al): *See "Engin Front Cover" in Chrysler Special Data.*

VALVES

Tappet Cl aranc : C–76–300 Intake .015", Exhaust .024" Hot. **Oth rs** Zero lash – hydraulic lifters.

C-75-1, 2 Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	1 15/16"	.372-.373"	4.78"
Exhaust	1½"	.371-.372"	4.74"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.389"	.001-.003"
Exhaust	45°	.389"	.002-.004"

All Other Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	2"	.372-.373"	5.09"
Exhaust	1¾"	.371-.372"	5.05"

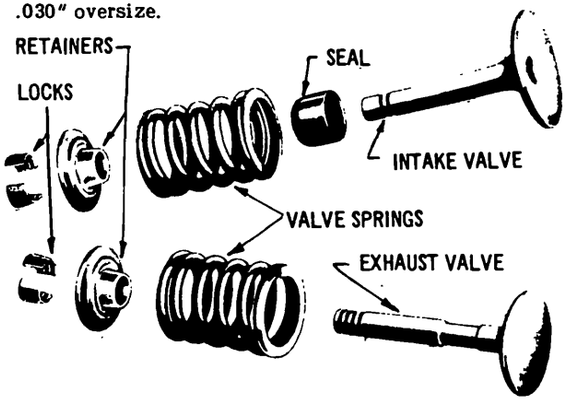
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.001-.003"
Exhaust	45°	②	.002-.004"

① - .389" (Exc. 300), .444" (C-76-300 - Std. Camshaft), .455" (C-76-300 - Optl. Camshaft.).

② - .389" (Exc. 300), .435" (C-76-300 - Std. Camshaft), .455" (C-76-300 - Optl. Camshaft.).

Valve Seat Width - 1/16-3/32" Int., 3/64-1/16" Exh.

►*C–75–1,2 OVERSIZE VALVE STEM NOTE:* Valves with oversize stems are available in .005", .015", .030" oversize.



CHRYSLER V8 VALVE ASSY.

►*C–76–300 EXHAUST VALVE SEAT INSERT: See "Valve System" in Chrysler Special Data.*

Intake Valve Stem Oil Seal - Cup seal installed on intake valve stem with cup extending down over top of valve guide.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3436 (C-75-1,2), C-3061 (Others). If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

VALVE SPRINGS: (Exc. 300) Single springs. Free Length 2". **(C-76-300)** Double springs. Free Length 1 7/8" (Outer), 1 25/32" (Inner).

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Form 6B

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Valv Spring Sp cifications

Inner Spring C-76-300 Engine		Outer Spring	
Pressure	Length	Pressure	Length
Closed ..... 28 lbs.	....1.53"	60 lbs.	1.66"
Open ..... 66 lbs.	....1.09"	158 lbs.	1.22"

All Other Engines

Valve	Lbs. Pressure	Length
Closed	78-88 lbs.	1.69"
Open	170-184 lbs.	1.31"

►*CAUTION: Spring ends must be square within 1/16".*

►*VALVE SPRING INSTALLED HEIGHT:* Check installed height of spring after grinding valves (from face of counterbore in head to bottom face of spring retainer). If height greater than 1 11/16", install 1/16" Spacer to bring spring back to normal height of 1 5/8-1 11/16"

Valve Guides: (C–75–1,2) Cast integral with cylinder head. When valve stem clearance excessive, use reamer tool set to ream guides for next oversize valve as follows: C–3433 (.379–.380" – .005" O.S.), C–3430 (.389–.390" – .015" O.S.), C–3427 (.404–.405" – .030" O.S.).

(Others) – Drive old guides out through top of cylinder head with Tool DD–883. With combustion chamber up, drive new guides into cylinder head until distance from upper edge of valve seat to guide is 31/32" (Intake), 1 3/64" (Exhaust). Ream each guide to .374–.375" with Tool C–741.

Hydraulic Valve Lifters: Integral flat-valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "Diamond" 3/8" high stamped on engine number indicates that all lifters are .008" oversize.

Diameter – .9040–.9045". Clearance in Block – .0005–.0015".

Lifter Overhaul & Testing – *See "Valve System" in Chrysler Special Data.*

►*VALVE GRINDING CAUTION:* See Valves (above).

Rocker Arm Assembly: *See "Valve System" in Chrysler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

C-75-1, 2

Intake Valves - Open 13° BTDC. Close 59° ALDC.
Exhaust Valves - Open 59° BLDC. Close 17° ATDC.

C-76 & IM1-1, 2, 4

Intake Valves - Open 15° BTDC. Close 57° ALDC.
Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

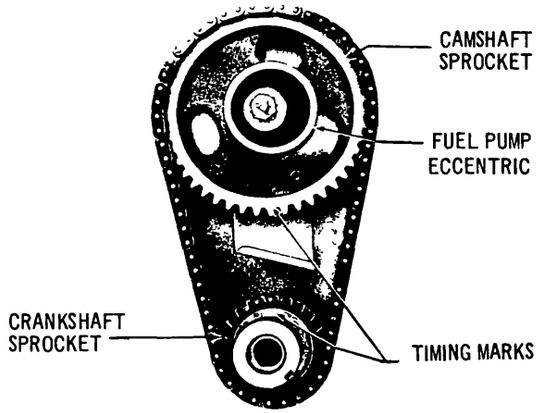
C-76-300 - Std. Camshaft

Intake Valves - Open 35° BTDC. Close 65° ALDC.
Exhaust Valves - Open 65° BLDC. Close 25° ATDC.

C-76-300 - Optional Camshaft

Intake Valves - Open 20° BTDC. Close 55° ALDC.
Exhaust Valves - Open 60° BLDC. Close 20° ATDC.

Valve Timing Check (Exc. C-76-300) - With No. 1 intake valve closed, insert .210" feeler between rocker arm and No. 1 intake valve stem, mount dial indicator directly over this valve with indicator button contacting valve spring retainer. When retainer stops moving (hydraulic lifter plunger bottomed so that lifter is solid), set dial indicator at zero. Turn crankshaft **clockwise** until dial indicator shows valve lifted .020" (C-75-1,2), .024" (Others). Timing mark on vibration dampener should read between 5° BTDC and 7° ATDC. Turn crankshaft **counter-clockwise** until valve back to closed position,.remove feeler.



CHRYSLER V8 VALVE TIMING MARKS

►*CAUTION:* Do not turn crankshaft further than indicated above with feeler in place (spring may bottom and damage valve mechanism).

Valve Timing Check (C–76–300): Turn engine to TDC for No. 1 Piston (use dial indicator arm in spark plug hole) with #1 intake valve closed. Check accuracy of TDC mark on vibration dampener. Install dial indicator to read valve spring retainer movement. Adjust rocker arm adjusting screw to zero clearance. Zero indicator, turn crankshaft (clockwise) until dial indicator reads .081" valve lift.

Mark on vibration dampener under pointer should read 5° BTDC to 7° ATDC. If reading incorrect, check gear index marks and timing chain for stretch.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chrysler Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one quart when filter changed.

Normal Oil Pressure: 40–65 lbs. at 40–50 MPH.

►*OIL PRESSURE CAUTION:* With full flow filter (Optional on C–75–1, Std. all other models), oil pressure will drop 15–20 lbs. when FILTER ELEMENT CLOGGED. Replace element.

Oil Pressure Relief Valve – Mounted in oil pump. Use correct color spring, *see Spring Specification Table.*

Relief Valve Spring Specifications

Color	Free Height	Load Pressure & Height
Gray (Lt.)	3½"	16.1–17.1 lbs. at 2 1/16"
Red (Std.)	2 27/32"	19.5–20.5 lbs. at 2 1/16"
Brown (Hvy.)	2 31/32"	22.0–23.9 lbs. at 2 1/16"

Oil Pressure Gauge – Auto-Lite 14297A (C–75–1,2; C–76, C–76–300), 14264A (IM–1, 2, 4). Not electric.

Oil Pump: Rotor type. In crankcase at rear end. Driven by lower distributor drive shaft.

Pump Overhaul – *See "Oiling System" in Chrysler Special Data.*

Oil Filter: Full flow (Std. all models exc. C–75–1, Optl. C–75–1). All oil enters lubrication system of engine through filter at full pump pressure. By-pass valve held in place by rear main bearing cap.

►*OIL FILTER REMOVAL (Firepower Engine):* Remove air cleaner and loosen oil filter, raise car and remove oil filter from below car.

Filter Element – Install new filter element at 5000 mile intervals (or earlier if required). Change oil with filter element replacement.

Crankcase Ventilation: Filter Element in oil filler cap and (Export only) air cleaner in crankcase outlet pipe. Clean oil filler pipe element with kerosene at 5,000 mile intervals.

COOLING

Water Capacity: (C–75–1,2) 21 qts., (Others) 24 qts. Add 1 quart with heater installed.

Pressure Valve: 14 lb. radiator filler cap used on all models.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.*

Thermostat: Pellet type. 158–162°F (Std.), 177–182°F (Air Cond.).

Water Pump: Ball bearing type. No lubrication required. *See "Water Pump" in Chrysler Special Data.*

Pump Removal – Drain cooling system. Loosen generator and power steering pump or idler pulleys, remove all belts. Remove fan, spacer, and pulley (NOTE – On Air Cond. Cars, remove upper half of fan shroud, then remove fan hub pulley, loosen fan, remove fluid fan drive). Remove water pump body to housing bolts and remove water pump.

Fluid Fan Drive: Standard on Air Conditioned Cars and C–76–300. *See "Cooling System" in Chrysler Special Data.*

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit – Auto-Lite 14298A (C–75–1,2; C–76, C–76–300), 14266A (IM–1,2,4).

Engine Unit – Auto-Lite 14405A (All Models).

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10A8 No. 361417 (C–75–1), 11A8 No. 361447 (C–76–300). Single plate.

See "Borg & Beck" in Clutch Section.

Clutch Disc – Borg & Beck No. 382531 (10A8), 382626 (11A8).

Pedal Adjustment: Turn release fork rod adjusting nut for 5/32" free play at release fork outer end. This will give 1" free pedal movement and 6" pedal travel.

Over-center Spring Adjustment: Release clutch pedal release rod by removing spring washer and back off over-center spring adjusting nut to free "C" link. Depress clutch pedal, turn adjusting nut until nut just contacts "C" link, then tighten nut 7 full turns. Install clutch release rod and retaining washer.

Removal: Remove release fork pull-back spring, fork rod from fork at rear end, dust seal, and clutch release fork. Remove transmission, clutch housing pan, release bearing. *CAUTION* – Do not force bearings and pull-

CONTINUED ON NEXT PAGE

CONTINUED FROM PRECEDING PAGE

back spring off fork prongs Mark clutch cover and flywheel for reassembly Loosen retaining bolts evenly to release spring tension, remove clutch cover assembly

SYNCHRO-MESH TRANSMISSION

Own (C–75–1 & C–76–300). Three-speed synchro-mesh type with new design gearshift mechanism

S e "Chrysl r Synchro-mesh" in Transmission Section

Transmissi n C ntrols: *See "Transmission Controls" in Transmission S ction*

R m val: Disconnect propeller shaft speedometer cable, and gearshift control rods Remove speedometer drive pinion and back-up light switch If transmission to be overhauled apply hand brake to hold mainshaft and loosen flange nut remove flange nut and washer disconnect hand brake cable remove brake drum and flange assembly (Puller C–452) remove oil seal (Puller C–748) Pull transmission straight back until drive gear shaft clears clutch disc lower transmission and remove from beneath car *NOTE* – Use pilot studs when reinstalling transmission and use care not to spring clutch disc

TORQUEFLITE TRANSMISSION

Wide range torque converter and automatically operated planetary gear transmission

See "Torqu Flite" Transmission in Transmission Section

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION See "TorqueFlite" Transmission in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "TorqueFlite" Transmission in Transmission Section*

Lubricati n· Check fluid level every 1 000 miles drain and refill every 20 000 miles Use only Automatic Transmission Fluid type 'A"

Ch cking Fluid Lev l - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows

Cold Transmissi n (Aft r standing and before being driv n for s v ral mil s) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Thr ttl Linkag Adjustm nt· *See CARBURETOR above.*

►*OTHER DATA Se "TorqueFlite" Transmission in Transmission Section*

UNIVERSALS

D troit Univ rsals. (C–75–1 2, C–76 C–76–300) Ball & Trunnion used at front Cross type used at rear (IM–1 2 4) Cross type used front center and rear

PROPELLER SHAFT

►*CHRYSLER IMPERIAL DRIVE LINE SHUDDER OR VIBRATION AT 15-20 MPH S e Propeller Shaft in Chrysler Sp cial Data*

Pr p ll r Shaft Alignm nt· Shaft alignment and working angle of universal joints must be checked and adjusted *See Propeller Shaft in Chrysler Special Data*

Propellor Shaft Center Bearing· *See "Propellor Shaft" in Chrysler Special Data*

REAR AXLE

Own. Semi-floating hypoid gear, Hotchkiss Drive

See "Chrysler Cage Type Hypoid" in Rear Axle Section

►*REAR AXLE LUBRICATION LEVEL CAUTION* Recommended lubrication capacity (3½ pints) will bring fluid level to 1" below filler opening DO NOT add to bring level to opening

Axle Ratios

C-75-1, 2	①②3.18-1 (35-11)
C-76	2.93-1 (41-14)
IM1-1, 2, 4	3.18-1 (35-11)
C-76-300	③3.36-1 (37-11)

① - C-75-1 with Synchro-mesh Trans. 3.73-1 (41-11).
② - C-75-2 Optl. Ratio 2.93-1 (41-14).
③ - Optl. Ratios 2.92 (38-13), 3.18 (35-11), 3.54 (39-11), 3 73 (41-11), 3.91 (43-11), 4.1 (41-10), 4.3 (43-10), 4.56 (41-9), 4.89 (44-9), 5.38 (43-8), 5.83 (35-6), 6.17 (37-6).

Backlash - 006- 008"

Rear Axle Control Strut (Imperial)· *See 'Propeller Shaft' in Chrysler Special Data*

Carrier Removal: Disconnect rear universal, remove axle shafts,(see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller - Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller)

Wheel Bearing Adjustment Shims between backing plate and axle housing With wheel and hub removed, check endplay with dial indicator To adjust, remove backing plate (see above) add or remove shims (furnished 005 010 0125 015 030 thick) equally at both wheels **Endplay -** 013- 018"

SHOCK ABSORBERS

"Oriflow" Direct acting, hydraulic, non-adjustable Serviced by replacement

FRONT SUSPENSION

Independent. New "Torsion Aire"type with ball joints and torsion bar springing

See "Torsion Aire" in Front Suspension & Wheel Alignment Section

Steering Axis Inclination - 5-7° at 0° camber.

Caster - (Manual Steering) Neg. ¾° ±¾°. **(Power Steering)** Pos. ¾° ±¾° *NOTE* - Caster should be equal as nearly as possible on both sides of the car.

Camber - (Left Wheel) Pos ¼° preferred (limits Pos ½° to 0°). **(Right Wheel)** 0° preferred (limits Pos. ¼ to Neg. ¼°)

Toe-In - 1/8' preferred (limits 3/32' to 5/32')

Toe-Out on Turns - With outer wheel 20°, inner wheel should be 21°45'.

STEERING

Manual G mm r. Worm and three-tooth roller

Se "Gemmer Worm & Roller" in Ste ring Section

P wer Steering· "Coaxial"

See "Coaxial" Pow r Steering in Ste ring Section

St ring Linkag · *See "Steering Linkage" in St ering S cti n.*

St ering G ar R moval *See "Gemmer Worm & Roll r" Steering Section*

BRAKES

►*1957-58 BRAKE SQUEAK CORRECTION:* A terminal squeak (noticeable at the termination of a stop) can be corrected by installing Wheel Brake Dampener Package, Part No. 1879511 which contains the necessary parts for servicing all wheels.

Service: Center Plane (Floating Shoe) hydraulic type *See Chrysler "Center Plane" Brakes in Brake Section*

Drums Centrifuse Diameter 12"

Wheel Cylinder Diameter–1 1/8" bore Single acting (front), double acting (rear wheels)

Lining–Molded asbestos (bonded to shoe) Length–**12 57 per shoe Width - 2½" Thickness - 13/64"**

Braking Power - 60% front, 40% rear

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt

Rear Wheels - Same as front wheels

Master Cylinder On engine side of dash panel opposite base of brake pedal

Checking Fluid–Filler plug at top of master cylinder (on dash panel in engine compartment)

Power Brakes Bellows Assist type Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder)

See "Chrysler, Desoto, Dodge, Plymouth Bellows Typ Power Unit" in Brake Section

Removal of Power Unit – Use Pedal depressor to depress pedal to prevent trigger arm extending beyond end of bracket (to prevent damage to trigger arm) Disconnect vacuum hose Remove nuts on four mounting studs and withdraw unit from firewall *CAUTION* – Do not lose nylon bushing on pedal linkage cross pin

Parking Brake Independent type on propellor shaft at rear of transmission

Adjustment – *See "Hand Brake Notes" in Chrysler Special Data*

Lining – Width – 2" Thickness – 5/32"

MISC. MECHANICAL

Windshield Wipers. Auto-Lite EPV–4001A (C–75–1 2, C–76 C–76–300) EPV–4001 (IM–1 2 4) Electric type *See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section*

Air Conditioning Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section*

Power Window Regulators Auto-Lite Electric type Reversible type motor in each window Controlled by switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters Electric 6–Way type *See "Power Seat Adjust rs" in Miscellan ous Section*

Conv rtibl Top C ntr l Aut -Lite. Electric Hydraulic type *See "Chrysl r Top Control" in Miscellaneous Section*

►*CHRYSLER "300D": This mod l has special "Fire-Pow r" ngin (h misph rical combustion chamber and doubl rocker arm shafts). Sp cial sp cifications and service data for this model are includ d b low.*

MODEL IDENTIFICATION

Model	Model Identification
Chrysler Windsor	LC1-L
Chrysler Saratoga	LC2-M
Chrysler New Yorker	LC3-H
Chrysler 300D	LC3-S
Imperial	LY1-L
Imperial Crown	LY1-M
Imperial LeBaron	LY1-H

SERIAL NUMBER: Stamped on metal plate attached to left front door body hinge post.

Starting Serial Nos.	Detroit	Los Angeles
Windsor	LC-1 1001	LC-1 L 1001
Saratoga	LC-2 1001	LC-2 L 1001
New Yorker	LC-3 1001	LC-3 L 1001
300D	LC-4 1001	
Imperial	LY-1 1001	

ENGINE NUMBER: Stamped on a boss on top side of cylinder block just back of water pump.

Car Model	Starting Engine No.
Windsor	58 W 1001
Saratoga	58 S 1001
New Yorker	58 N 1001
300D	58 N3 1001
Imperial	58 C 1001

►*ENGINE NUMBER MARKS (Following Engine Number): Identified as follows:*

"A" - All cylinders .020" oversize.

"B" - All crankshaft journals .010" undersize.

"AB" - Both above conditions exist.

"MALTESE CROSS" (3/8" high) - ONE OR MORE crankshaft journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*

♦ (3/8" high) - ALL valve lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 150-200 lbs. at 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 20 lbs.

VALVE TAPPET CLEARANCE: (All exc. 300D) - None in service, hydraulic.

300D (Mechanical Lifters) - .015" Intake, .024" Exhaust, HOT with engine idling.

MANIFOLD HEAT CONTROL: (LC-1) Single exhaust on right cylinder block with thermostatically controlled valve. Install valve with counterweight toward front of engine and small anti-rattle spring retaining pin toward rear and adjacent to cylinder block.

(Others) - Dual exhaust system used, Heat control valve is in right exhaust manifold.

Coil Spring Installation - Position valve shaft in extreme counterclockwise position. Place coil spring in position over shaft slot, with outer end of tongue of spring in lower right hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end tongue of spring around and hook under pin.

►*DUAL EXHAUST NOTE:* When valve is closed most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035"

Spark Plugs - Auto-Lite AR-42 (LC-1, 2), AGR-42 (Others). 14 mm. Torque to 30-32 ft. lbs. *300D NOTE* - Use AGR-32 for Standard Driving and AGR-2 for High Speed.

COIL: Auto-Lite CAH-4001-B.

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-4003. .665-.735 ohms (70-80°F).

►*COIL RESISTOR NOTE:* Connected in circuit between "IGN" terminal of horn relay and positive terminal of coil. *Resistor must be in circuit when testing coil output.*

DISTRIBUTOR: Auto-Lite. Used as follows:

Car Model	Distributor No.
Windsor, Saratoga	IBP-4002F
New Yorker, Imperial	IBS-4007A
300D (Two Carbs)	IBS-4007
300D (Fuel Inj.)	IBS-4008

NOTE - "IBS" Distributors are double breaker type.

Condenser - Auto-Lite IBB-2042SS-1 (All Models).

Capacity - .25-.285 mfd.

Contact Point Set - Auto-Lite IBP-3028AS (IBP-4002F). IGW-3028KS (Others).

Breaker Gap - .015-.018".

Cam Angle (IBP Distr.) - 29-32°.

►*CAM ANGLE SETTING CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.

Cam Angle (IBS Distr.) - 29-32° (single set of points), 36-39° (both sets operating together).

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - IBP-4002F

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	460	2	920
7	1100	14	2200
9	1660	18	3320
10	2100	20	4200

Automatic Advance - IBS-4007, 8.

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
4	450	8	900
5	700	10	1400
6.5	1050	13	2100

Automatic Advance - IBS-4007A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	480	2	960
4.5	950	9	1900
9	2125	18	4250
10	2400	20	4800

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4002F

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0	0	8 1/2
1	2	9 1/8
6	12	12 3/8
10	20	15 1/4
11	22	16

Vacuum Advanc - IBS-4007, 7A, 8

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 1/2
6	12	11 1/2
10	20	14 7/8
11	22	16

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Chrysler Special Data.*

IGNITION TIMING

Windsor - 8° BTDC, **All Oth rs** - 6° BTDC. All at 500 RPM.

Timing Mark - Vibration damper marked at TDC point with graduations indicating advance. Align correct mark with pointer on right side of timing chain cover.

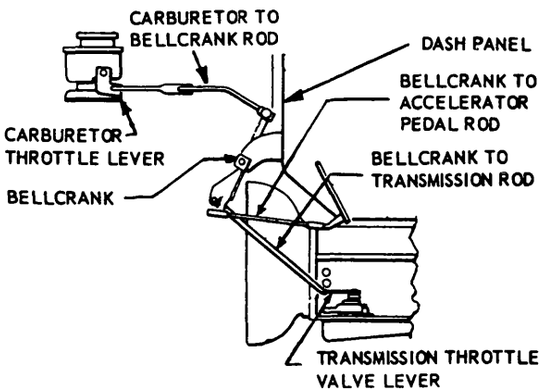
CARBURETOR

►*CARBURETOR APPLICATION: Cart r 2-Barr l carburetor used on Windsor mod is; Cart r AFB 4-Barr l carburetor used on Saratoga, N w York r & Imperial models; two Carter WCFB 4-Barr l carbur tors or Fu l Injection used on 300D mod ls.*

►*HESITATION OR STUMBLE ON ACCELERATION (AFTER WARMUP) CORRECTION:* May be due to leanness in main metering system. *S e "Cart r BBD" and "Carter AFB" in Carburetion S ction.*

AUTO PILOT: Optional on all models. *S "Chrysl r Auto Pilot" in Carburetion Section.*

THROTTLE LINKAGE ADJUSTMENT (EXC. 300D): With engine at normal operating temperature and idling at 475-500 RPM, loosen throttle linkage adjusting nuts on carburetor-to-bellcrank rod, and on bellcrank-to-transmission rod. Adjust carburetor-to-bellcrank rod to position bellcrank lever 1/2" from cowl dash panel, then tighten adjusting nut. Hold slight preload rearward on bellcrank-to-transmission rod while holding transmission throttle valve lever forward against the stop, and tighten adjusting nut. *(NOTE* - Make sure correct bellcrank-to-transmission rod is installed. This rod should measure 8½" between hole centers). Accelerator pedal should be at an angle of 115° to the horizontal. To adjust, remove pedal end of bellcrank-to-pedal rod and rotate swivel as necessary.



CHRYSLER TORQUEFLITE THR TTLE LINKAGE

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THROTTLE LINKAGE ADJUSTMENT (300D): With engine at normal operating temperature and idling at 650 RPM, disconnect bellcrank-to-carburetor rod at rear carburetor throttle lever. Move rod rearward until rod is stopped by idle stop on transmission idle cam. With a slight rearward pressure on rod, adjust threaded end of rod until ball point is in alignment with ball joint clip. then reconnect rod to throttle lever. Accelerator pedal should be at an angle of 115° to the horizontal. To adjust, remove pedal end of bellcrank-to-pedal rod and rotate swivel as necessary. *NOTE* - When linkage correctly installed, there should be a clearance of ¾-1 1/8" between center clevis pin on upper bellcrank lever and firewall.

CARTER BBD 2-BARREL

Carter BBD, No. 2685S (Std.), No. 2733S (Air Cond.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT Barrels Cyl. 2-3-5-8, LEFT Barrel 1-4-6-7.*

Idle Setting - ½-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (TorqueFlite in Neutral).

Float Level - 9/32" (Gauge T109-239) between top of each float ridge (at center of float) and top surface of body casting. To adjust, bend lip on float arm.

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever and inner hole of pump arm.

Fast Idle : .015" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on high step of cam.

Fast Idle Cam Clearance - With choke valve closed and lip on inner choke shaft lever contacting lug on outer lever, index mark on cam should align with fast idle adjusting screw. Adjust by bending lip on inner choke shaft lever.

Automatic Choke Setting: Set 1 notch rich.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Model	Carter Carburetor No.
Saratoga	2650S (Early), 2805S (Late), 2836S (Later)
New Yorker & Imperial	2651S (Early), 2806S (Later)

►*STALLING & UNSATISFACTORY WARM-UP PERFORMANCE CORRECTION: (Cars with Carter AFB 2650S & 2651S Carburetors):* To correct poor warm-up performance or frequent stalling during warm-up, first check and adjust Carburetor Idle mixture and speed, Ignition Timing, and operation of Manifold Heat Control. If condition not corrected, and if fully warmed up engine performance satisfactory, adjust choke linkage. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT Barrels feed Cyl. 2-3-5-8, LEFT Barrels 1-4-6-7.*

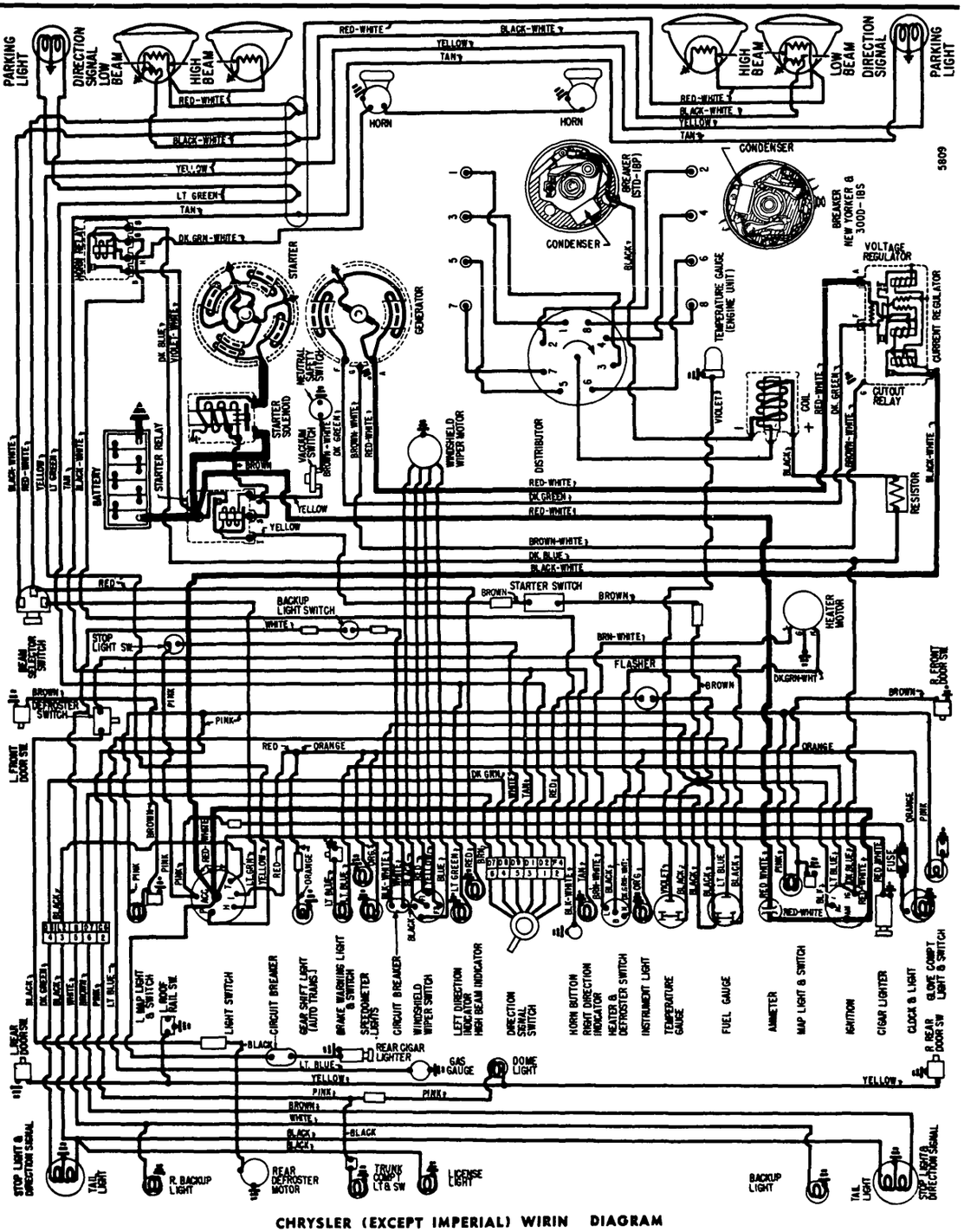
Idle Setting - ¼-1¾ turns open. Turn screws out for richer mixture.

Idle Speed - 500 RPM with TorqueFlite in Neutral.

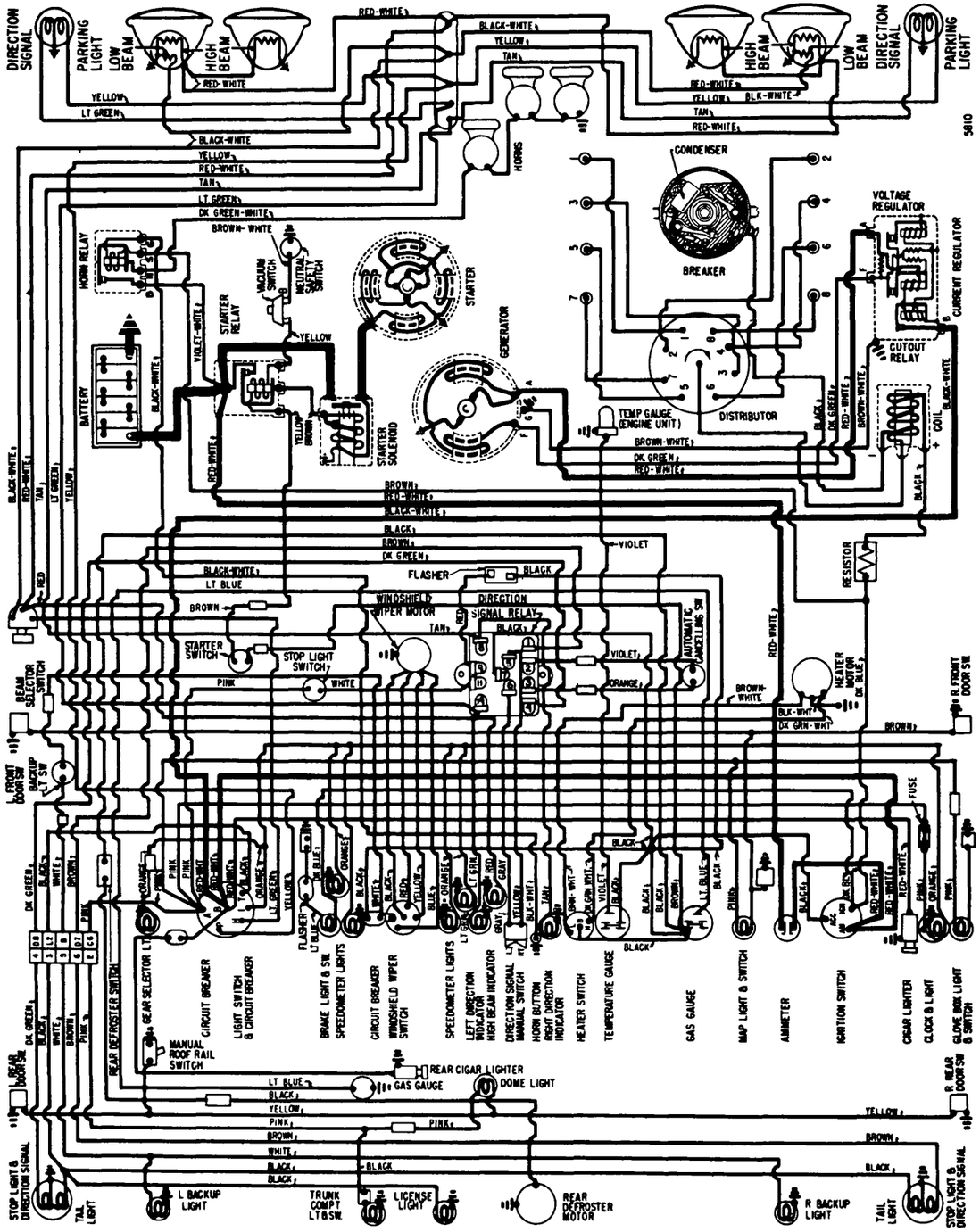
Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB Carburetors" in Carburetion Section.*

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CHRYSLER (EXCEPT IMPERIAL) WIRING DIAGRAM



CHRYSLER IMPERIAL WIRING DIA RAM

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CARTER WCFB 4-BARREL

(Tw Carbur t r Installati n n 300D)

Cart r N . WCFB 2741S (Fr nt), N . 2742S (R ar).

►*MANIFOLD FUEL DISTRIBUTION: RIGHT barr ls f d right bank cylinders, LEFT barrels f ed l ft bank.*

►*CARBURETOR SYNCHRONIZATION NOTE:* Before adjusting idle mixture and idle speed, carburetor interconnecting rod must be adjusted as follows: Hold rear carburetor throttle in wide open position (choke off) and adjust rod at slotted end so front carburetor throttle valve will be in wide open position. Tighten locknut and check linkage operation. Make sure rod can rotate slightly on pivots and not bind.

Idle Mixture & Speed Adjustm nt - *S "Cart r WCFB Carburetors" in Carburetion S ction for sp cial adjustment procedure. NOTE - Idl Air Bypass Screws are NOT used when making idle sp d adjustments.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Cart r WCFB 4-Barr l Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M-2663S. Mechanical type.

Pressure - 6-7 lbs.

►*FUEL FILTER NOTE:* Superfine filter (pink or blue in color) used at fuel pump. Requires more frequent cleaning to prevent flooding, stalling.

See "Fuel Pumps" in Carbur tion S ction.

Gasoline Gauge: Auto-Lite Electric Type.

Dash Unit - Auto-Lite No. 14612A (exc. Imperial), 14263A (Imperial).

Tank Unit - **Aut -Lit N .**

Windsor ..... ① 14673A, ② 14676A

Others (exc. 300D Fuel Inj.) .... ② 14674A, ③ 14675A

300D (Fuel Injection) ..... ② 14687A, ③ 14688A

① - 22" lead. ② - 4½" lead. ③ - 37" lead.

See "Fuel Gauges" in Carbur tion S ction.

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5,000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent and DO NOT oil or lubricate.*

BATTERY

LC1, 2, 3-H - Auto-Lite 11-HS-60 r Willard HO-11-60.

12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Left front of engine.

STARTER

Auto-Lite MDT-6003. Armature - MDL-2006.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 32-48 ozs.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800 min.	11.0	80
8.5 ft. lbs. min.	Lock	4.0	350

Starting Switch: On TorqueFlite cars, starter control switches and circuits used as follows: **Start r Switch -** Mounted on back of Pushbutton Control Box position, **Vacuum Switch -** Mounted on intake manifold prevents starter actuation when engine is running, **Neutral Switch -** Mounted on transmission and operates in same manner

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as on previous models (prevents starter actuation except when transmission in neutral).

Neutral Safety Switch Adjustment: *See "Torqueflite Transmission" in Transmission Section.*

GENERATOR

Auto-Lite. Application as follows:

Model	Generator	Armature
LC1,2,3 (Std.)	GJC-7012A	GJC-2030F
LC3-S (Std.)	GJC-7013B	GJC-2030F
LY1 (Std.)	GHM-6001E	GHM-2006F
LC1,2,3, LY1 (Special)	GGA-6001AC	GFY-2101F
LC1,2,3 (Gas Heater)	GHM-6001E	GHM-2006F
LC1,2,3, LY1 (Air Cond.)	GHM-6001C	GHM-2006F
LC1,2,3, LY1 (Air Cond.)	GGA-6001N	GFY-2101F
LC3-S (Special)	GGA-6007C	GFY-2010F
LC3-S (Gas Heater)	GHM-6010C	GHM-2006F
LC3-S (Air Cond.)	GHM-6011A	GHM-2059F
LC3-S (Air Cond.)	GGA-6007B	GFY-2101F

Armature - Auto-Lite GJC-2030F (GJC-7012A Gen.), GHM-2006F (GHM-6001E, GHM-6011A Gen.).

Performance Data - GGA (Cold - 70°F.)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data - GHM (Cold - 70°F.)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Performance Data - GJC (Cold - 70°F.)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Brush Spring Tension - (GGA) 34-41 ozs., (GHM) 35-53 ozs., (GJC) 18-38 ozs., with new brushes.

Field Current - (GGA,GHM) 1.1-1.3 amperes, (GJC) 1.2-1.3 amperes, at 10.0 volts (70°F).

Motoring Current - (GGA) 2.3-2.6 amperes, (GHM) 3.0-3.5 amperes, (GJC) 3.4-3.9 amperes. All at 10.0 volts

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Torque Method - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket. Then, with torque wrench, apply specified torque (see below) and tighten mounting bolts. On idler pulley, insert torque wrench in square hole in adjusting bracket and tighten to 40 ft. lbs. (new belt), 25 ft. lbs. (used belt).

Belt Torque Specifications - (Ft. Lbs.)

Generator	Used	New
Without Air Cond.	35	50
With Air Cond.	40	70

Deflection Method - Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull. Idler pulley belt deflection is 1/8" used, 1/16" new.

Generator Belt Deflection Specifications

Model	Used	New
LC1 (Without Air Cond.)	15/32"	5/16"
LC1 (With Air Cond.)	3/8"	5/16"
Others (Without A.C.)	3/8"	5/16"
Others (With Air Cond.)	3/16"	3/32"

REGULATOR

Auto-Lite. Used as follows:

	Generator Type
VRX-6201A	GJC & GHM Gen.
VAT-6201A	GGA Gen.

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - Discharge amperage 3-5 amperes.

Contact Gap - .015" minimum.

Air Gap - .031-.034" with contacts open (measure at hinge end of core).

Voltage Regulator

Setting - 14.5± .3 volt charging at 10 amperes (80° F) or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

► *SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps - Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Directional Signal: *See Electrical Section.*

Headlight & Panel Light Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hexnut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Used as follows:

22.5 Ampere - Protects Headlights & Parking lights. In lighting switch.

15 Ampere - Protects Tail, Stop, and all instrument lights. In lighting switch.

6 Ampere - Protects windshield wiper. On wiper switch (Imperial), on bracket near clock (Others).

8 Ampere - Rear cigar lighter. Back of left front kick panel.

Horn Relay: Auto-Lite RAH-4003.

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 (All Models).

SpitFire (LC1,2) - Single rocker arm shaft.

Fire Power (Others) - Hemisperical combustion chamber and double rocker arm shaft.

Model	Bore	Stroke	Displacement
LC1,2	3.94"	3.63"	354 cu. ins.
Others	4.00"	3.90"	392 cu. ins.

Model	Compr. Ratio	Rated HP	Developed NP
LC1	10.0-1	49.7	290 at 4600 RPM
LC2	10.0-1	49.7	310 at 4600 RPM
LC3,LY1	10.0-1	51.2	345 at 4600 RPM
300D (2 Carbs.)	10.0-1	51.2	380 at 5200 RPM
300D (Fuel Inj)	10.0-1	51.2	390 at 5200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Disconnect battery, remove distributor cap, drain crankcase and remove oil dipstick. On cars with single exhaust, disconnect crossover and "Y" pipe at exhaust manifolds and at exhaust extension clamp, move crossover and "Y" pipe out of way (*CAUTION* - Rest of exhaust system must be supported). Remove starter. Remove steering gear arm, idler arm, and relay link as an assembly. Remove converter dust shield. On Windsor, loosen, BUT DO NOT REMOVE, rear engine mounting capscrews. Take off nuts on front engine mounts and raise front of engine ¾" (2" Windsor) and support in this position. Rotate crankshaft until front counterweight is up and No. 1 crankpin is down (timing mark 180° from pointer). Take out pan bolts and remove pan.

ENGINE REMOVAL: *See "Engine" in Chrysler Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chrysler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Special Data.*

PISTONS

Aluminum Alloy, thermally controlled by steel strut, elliptically turned, tin plated.

► *CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number indicates that cylinder bore is .020" oversize.

Weight - 23.3 ozs. (SpitFire Eng.), 25.3 ozs. (Fire-Power Eng.).

Removal – Piston & Rods removed from above.

Clearance – .0005–.0015" measured 1½" from bottom of skirt. Check clearance with .002" ribbon feeler ½" wide. Pull to withdraw feeler should be 8–12 lbs. with feeler. at right angles to piston pin.

Replacement Pistons: Std. and .005", .020", .040" Oversize. *NOTE* - .060" Oversize also for SpitFire Eng.

Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at large end of connecting rod. On left bank (1-3-5-7), assemble with indent on same side as large chamfer at large end of connecting rod. *See Rod Installation.*

PISTON PINS

Floating type with lock ring at each end. *NOTE* – Pin offset in piston toward right side of engine.

Diameter – .9841–.9843". **Length** – 3.140–3.150".

Clearance in Piston - .0000-.0005". Tight thumb press fit at 70°F.

Clearance in Rod – .0001–.0004". Selective fit.

Replacement Pins: Standard, .003", .008" oversize. *NOTE* – Fitted pins are furnished with new pistons.

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PISTON RINGS

SpitFire Engines

Ring	Width	End Gap	Side Clearance
Compr. (1,2)	.0775-.0780"	.010-.020"	.002-.0035"
Oil (3)	.1860-.1865"	.010-.020"	.002-.0035"

FirePower Engine

Ring	Width	End Gap	Side Clearance
Compr. (1,2)	.0775-.0780"	.013-.025"	.002-.0035"
Oil (3)	.1860-.1865"	.013-.025"	.002-.0035"

Replacement Rings: Furnished in Sets: Std. and .010", .020", .030", .040" Oversize. *NOTE* – .060" oversize also for SpitFire Engine.

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length - 6.625" (SpitFire), 6.951" (FirePower).

Weight - 25.2 ozs. (SpitFire), 27.6 ozs. (FirePower).

Crankpin Journal Diameter - 2.2507" (SpitFire), 2.375" (FirePower).

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals machined UNDERSIZE): See CRANKSHAFT below.*

Bearings (Lower) - Lead Base Babbitt on Steel except 300D which is Tri-Metal (Babbitt on Copper Lead Alloy on Steel Back).

Clearance - .0005-.0015".

Endplay - .006-.014" (2 rods).

Replacement Bearings: Std. and .001", .002", .003", .010", .012" Undersize.

Installing Rods: Install piston and rod assemblies with indent on piston head toward front of engine (all cylinders) and large chamfer on lower end of rod toward nearest crankshaft journal fillet. Install bearing caps so that "V" groove in cap is in line with similar groove in rod (this is oil spit hole for cylinder wall lubrication).

CRANKSHAFT

Journal Diameter - SpitFire 2.4995-2.5005", FirePower 2.687-2.688"

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.010" UNDERSIZE (Main & Connecting Rod Journals)** - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize. **.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)** - A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the center (No. 3) counterweight in following manner: "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings - Tin base babbitt on steel (No. 3), lead base babbitt on steel (Others) except 300D. 300D has Tri-Metal (babbitt on lead alloy on steel back) bearings.

Clearance - .0005-.0015" (exc. 300D), .001-.0025" (300D).

Replacement Bearings: Furnished Standard, .001", .002", .003", .010", .012" undersize. *NOTE* – No. 1, 2, and 4 upper and lower bearings are interchangeable. No. 3 upper and lower are interchangeable. No. 5 upper and lower bearings are **not** interchangeable.

End Thrust – Taken by center (#3) main bearing.

End Play – .002–.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Special Data.*

CAMSHAFT

Journal Diameters – 1.998–1.999" (#1,2,3,4), 1.4355–1.4365" (#5).

Bearings – Removable, steel-backed, Babbitt-lined bushings.

Clearance - .001-.003". Maximum allowable before reconditioning .005".

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

End Play – .002–.006".

Timing Chain: Width 1 1/8". **Pitch** .375". **Length** 68 links.

Camshaft Setting: Camshaft timing is correct when timing marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Chrysler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data.*

VALVES

Tappet Clearance: 300D Intake .015", Exhaust .024" Hot and idling. **Others** Zero lash - hydraulic lifters.

SpitFire Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	1 15/16"	.372-.373"	4 23/32"
Exhaust	1 1/2"	.371-.372"	4 3/4"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.388"	.001-.003"
Exhaust	45°	.388"	.002-.004"

FirePower Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	2"	.372-.373"	5 1/32"
Exhaust	1 3/4"	.371-.372"	5 1/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.001-.003"
Exhaust	45°	②	.002-.004"

① - .388" (Exc. 300D), .435" (300D).

② - .388" (Exc. 300D), .442" (300D).

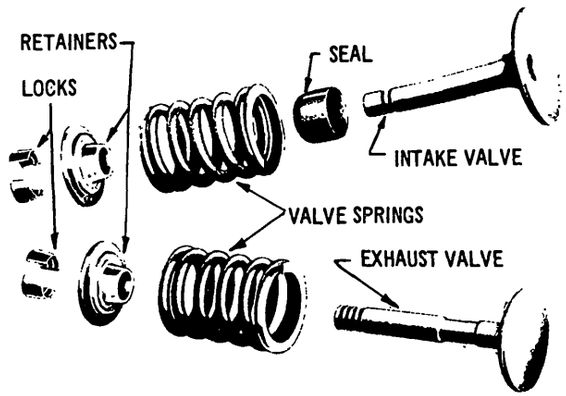
Valve Seat Width - 1/16-3/32" Int., 3/64-1/16" Exh.

►*SPITFIRE ENGINE OVERSIZE VALVE STEM NOTE:* Valves with oversize stems are available in .005", .015", .030" oversize.

300D Exhaust Valve Seat Insert Replacement: *See "Valve System" in Chrysler Special Data.*

Intake Valve Stem Oil Seal - Cup seal installed on intake valve stem with cup extending down over top of valve guide.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3436 (SpitFire), C-3061 (FirePower). If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).



CHRYSLER V8 VALVE ASSY.

VALVE SPRINGS: (Exc. 300D) Single springs. Free Length 2". **(300D)** Double springs. Free length 1 15/16".

Valve Spring Specifications

300D Engine

	Inner Spring		Outer Spring	
Valve	Pressure	Length	Pressure	Length
Closed	26-30 lbs.	1 17/32"	60-65 lbs.	1 21/32"
Open	64-69 lbs.	1 3/32"	154-166 lbs.	1 7/32"

Other Engines

Valve	Pressure	Length
Closed	79-88 lbs.	1.69"
Open	170-184 lbs.	1.22"

►*CAUTION: Spring ends must be square within 1/16".*

►*VALVE SPRING INSTALLED HEIGHT:* Check installed height of spring after grinding valves (from face of counterbore in head to bottom face of spring retainer). If height greater than 1 11/16", install 1/16" spacer to bring spring back to normal height of 1 5/8 - 1 11/16".

Valve Guides: (SpitFire) Cast integral with cylinder head. When valve stem clearance excessive, use reamer tool set to ream guides for next oversize valve as follows: C–3433 (.379–.380" – .005" O.S.), C–3430 (.389–.390" – .015" O.S.), C–3427 (.404–.405" – .030" O.S.).

(Others) – Drive old guides out through top of cylinder head with Tool DD–883. With combustion chamber up, drive new guides into cylinder head until distance from upper edge of valve seat to guide is 31/32" (Intake), 1 3/64" (Exhaust). Ream each guide to .374–.375" with Tool C–741.

Hydraulic Valve Lifters: Integral flat-valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "Diamond" 3/8" high stamped on engine number indicates that all lifters are .008" oversize.

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Diam t r – .9040–.9045". Clearanc in Bl ck – .0005–.0015".

Lifter Overhaul & T sting – S "Valv Syst m" in Chrysl r Special Data.

►VALVE GRINDING CAUTION: See Valves (above).

R cker Arm Ass mbly: S e "Valve System" in Chrysler Sp cial Data.

VALVE TIMING

Se "Camshaft Setting" under CAMSHAFT above.

SpitFire

Intak Valves - Open 13° BTDC, Close 59° ALDC.
Exhaust Valv s - Open 59° BLDC, Close 17° ATDC.

Fir P w r (Exc. 300D)

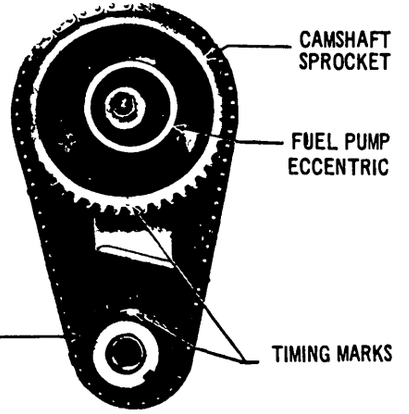
Intake Valv s - Open 15° BTDC, Close 57° ALDC.
Exhaust Valves - Open 57° BLDC, Close 15° ATDC.

Fir P wer 300D

Intak Valves - Open 32° BTDC. Close 64° ALDC.
Exhaust Valv s - Open 73° BLDC. Close 23° ATDC.

Valve Timing Check (Exc. 300D) - With No. 1 intake valve closed, insert .210" feeler between rocker arm and No. 1 intake valve stem, mount dial indicator directly over this valve with indicator button contacting valve spring retainer as near right angle as possible. When retainer stops moving (hydraulic lifter plunger bottomed so that lifter is solid), set dial indicator at zero. Turn crankshaft cl ckwise until dial indicator shows valve lifted .020" (SpitFire), .024" (FirePower). Timing mark on vibration damper should read between 5° BTDC and 7° ATDC. Turn crankshaft counterclockwise until valve is back to closed position. Remove feeler and indicator.

Valv Timing Ch ck (300D Engine) - With No. 1 intake valve closed and No. 1 piston on TDC, turn valve lash adjusting screw down until valve train is solid, then continue turning n full turn. Install dial indicator so contact button contacts valve spring retainer, parallel to valve stem. Turn crankshaft clockwise (normal running direction) until valve lifts .110". Timing on vibration damper should read 5° BTDC to 7° ATDC. Turn crankshaft c untercl ckwis until valve is reseated, then reset valve lash. CAUTION: - Do not turn crankshaft clockwise with valve train solid (further than to open valve .110").



CHRYSLER V8 VALVE TIMING MARKS

OILING SYSTEM

►ENGINE OILING SYSTEM: S "Engin Lubrication" und r OILING SYSTEM in Chrysler Sp cial Data.

Crankcas Capacity: 4 qts. (SpitFire), 5 qts. (FirePower) for refill. Add additional quart when filter changed.

Normal Oil Pressure: 40-65 lbs. at 40-50 MPH.

►OIL PRESSURE CAUTION: Pressure drop of 15-20 lbs. indicates clogged filter. Replace filter element.

Oil Pressure Relief Valve – Mounted in oil pump. Use correct color spring, see Spring Specification Table below.

Relief Valve Spring Specifications

Color	Free Height	Load Pressure & Height
Gray (Lt.)	3½"	16.1–17.1 lbs. at 2 1/16"
Red (Std.)	2 27/32"	19.5–20.5 lbs. at 2 1/16"
Brown (Hvy.)	2 31/32"	22.0–23.9 lbs. at 2 1/16"

Oil Pressure Gauge - Auto-Lite 14264A (Imperial), 14609A (Others). Not electric.

Oil Pump: Rotor type. In crankcase at rear end. Driven by distributor lower drive shaft.

Pump Overhaul - See "Oiling System" in Chrysler Special Data.

Oil Filter: Full flow type. All oil enters lubrication system of engine through filter at full pump pressure. Bypass valve held in place by rear main bearing cap.

►OIL FILTER REMOVAL (Firepower Engine): Remove air cleaner and loosen oil filter, raise car and remove oil filter from below car.

Filter Element – Install new filter element at 5000 mile intervals (or earlier if required). Change oil with filter element replacement.

Crankcase Ventilation: Filter Element in oil filler cap and (Export only) air cleaner in crankcase outlet pipe. Clean elements with kerosene at 5,000 mile intervals.

COOLING

Water Capacity: 21 qts. (SpitFire Eng.), 24 qts. (FirePower Eng.). Add 1 quart with heater installed.

Pressure Valve: 14 lb. radiator filler cap used on all models.

►AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.

Thermostat: Pellet type. 158–162°F (Std.), 177–182°F (Air Cond.).

Water Pump: Ball bearing type. No lubrication required. See "Water Pump" in Chrysler Special Data.

Pump Removal – Drain cooling system. Loosen generator and power steering pump or idler pulleys, remove all belts. Remove fan, spacer, and pulley (NOTE – On Air Cond. Cars, remove upper half of fan shroud, then remove fan hub pulley, loosen fan, remove fluid fan drive). Remove water pump body to housing bolts and remove water pump.

"Silent Flite" Fluid Fan: Standard on Air Conditioned cars and 300D. See "Cooling System" in Chrysler Special Data.

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14266A (Imperial), 14611A (Others).

Engin Unit - Auto-Lite 14405A (All Models).

S "T mp ratur Gaug s" in Misc llan ous S cti n.

TORQUEFLITE TRANSMISSION

Wide range torque converter and automatically operated planetary gear transmission.

See "TorqueFlite" Transmission in Transmission Section.

►PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section.

►TESTING & TROUBLE SHOOTING: See "TorqueFlite" Transmission in Transmission Section.

Lubrication: Check fluid level every 1,000 miles, drain and refill every 20,000 miles. Use only Automatic Transmission Fluid type "A". NOTE - Under heavy duty operation, drain and refill transmission at 10,000 mile intervals.

Checking Fluid Level - CAUTION - Following procedur and fluid level supersede previous recommendations.

Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark. Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: See CARBURETOR abov .

►OTHER DATA: See "TorqueFlite" Transmission in Transmission Section.

UNIVERSALS

Detroit Universals. (Imperial) Cross type used, front, center and rear. (Others) Ball & Trunnion used at front, Cross type at rear.

Propeller Shaft Center Bearing: See "Propeller Shaft" in Chrysler Special Data.

Rear Axle Control Strut: See "Propeller Shaft" in Chrysler Special Data.

REAR AXLE

Own. Semi-floating, hypoid gear, Hotchkiss Drive. See "Chrysler Cage Type Hypoid" in Rear Axle Section.

►"SURE GRIP" AXLE NOTE: Optional on all models and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut.

S "Pow r-Lock Differ ntial (Plat Clutch Typ)" in R ar Axl S ction.

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►*AXLE SHAFT INNER OIL SEAL LEAK CORRECTION:* May be due to raised metal on shaft approximately 8" from tapered end and 6" from splined end. Remove this metal and also to be sure that splines are not excessively sharp.

Model	"Conventional" Axle Synchro-mesh	Axle Ratio
LC1		3.73-1 (41-11)
	TorqueFlite	
All (exc. T. & C. and 300D) Std.	①	2.93-1 (41-14)
All (exc. T. & C. and 300D) A.C.		3.15-1 (41-13)
Town & Country (Std.)	②	3.15-1 (41-13)
Town & Country (A.C.)		3.31-1 (43-13)
300D (Std. & A.C.)	③	3.31-1 (43-13)

① - Optional ratios: 3.15-1 (41-13), 3.31-1 (43-13), Only 3.31-1 (43-13) used on LY1 with Air Cond.
② - Optional ratios: 2.93-1 (41-14), 3.31-1 (43-13), 3.54-1 (39-11).
③ - Optional ratios: 2.93-1 (41-14), 3.54-1 (39-11), 3.73-1 (41-11).

Model	"Sure-Grip" Axle	Axle Ratios
All (exc. 300D)		3.15-1 (41-13)
300D	3.31-1 (43-13),	3.73-1 (41-11)

Backlash - .006-.008"

Carrier Removal: Disconnect rear universal, remove axle shafts,(see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller - Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", 010", .0125", .015", 030" thick) equally at both wheels.

Endplay - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic, non-adjustable. Serviced by replacement.

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joints and torsion bar front springs. *See "Torsion-Aire" in Suspension & Wheel Alignment Section.*

Steering Axis Inclination - 5-7° at 0° camber.
Caster - **(Manual Steering)** Neg. ¾° ± ¾°. **(Power Steering)** Pos. ¾° ± ¾°. *NOTE* - Caster should be equal as nearly as possible on both sides of the car.
Camber - **(Left Wheel)** Pos. ¼° preferred (limits Pos. ½° to 0°). **(Right Wheel)** 0° preferred (limits Pos. ¼° to Neg. ¼°).
Toe-In - 1/8" preferred (limits 1/8" ± 1/32").
Toe-Out on Turns - With inner wheel 20°, outer wheel should be 18°46'.

STEERING

Manual: Gemmer. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: New "Constant Control Full Time" power steering.

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.

►*POWER STEERING LACK OF ASSIST OR "LUMPY" FEEL CORRECTION: See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.*

►*POWER STEERING TAPPING NOISE CORRECTION: See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller in Steering Section.*

BRAKES

Service: "Total Contact" (Floating Shoe) hydraulic type.

See "Chrysler, DeSoto, Dodge & Plymouth Center Plane &Total Contact Brakes" in Brake Section.

►*BRAKE TERMINAL SQUEAK CORRECTION:* Drill a ¼" hole through shoe web and dust shield, and install Brake Dampener Package, Part No. 1879511, at heel of each brake shoe. Retainer should be 1/8" from edge of hole in shoe and 1/8" from edge of support plate. Make sure axle housing-to-spring U-bolt torque is 70 ft. lbs., and brake support plate-to-axle housing or knuckle bolts is 55 ft. lbs.

Drum Diameter - (LC1 exc. T. & C.) 11" front and rear, (Others) 12" front and rear.

Wheel Cylinder Diameter - 1 1/8" bore. Two single acting cylinders on front, one double acting cylinder on rear.

Lining - Molded asbestos bonded to shoe.

Width 2½".

Length 11½" (LC1), 12.6" (Others).

Thickness .020" (all shoes).

Braking Power - 60° front, 40° rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

Rear Wheels - Same as front wheels except that on rear wheels forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid—Filler plug at top of master cylinder (on dash panel in engine compartment).

Power Brakes: Bellows Assist type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Chrysler, Desoto, Dodge, Plymouth B llows Typ Power Unit" in Brake Section.

Removal of Power Unit – Use Pedal depressor to depress pedal to prevent trigger arm extending beyond end of bracket (to prevent damage to trigger arm). Disconnect vacuum hose. Remove nuts on four mounting studs and withdraw unit from firewall. *CAUTION* – Do not lose nylon bushing on pedal linkage cross pin.

Parking Brake: Independent type on propeller shaft at rear of transmission. 7" internal expanding type.

Adjustment - *See "Hand Brak N t s" in Chrysl r Special Data.*

Lining - Width 2", Thickness 5/32", Length 13.06".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPV-4001 (Imperial), EPV-4001A (Others). Electric type.

See "Auto-Lite Electric Windshi ld Wipers" in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Auto-Lite. Electric type. Reversible type motor in each window. Controlled by switch and master control switch. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Electric, 6—Way type. *See "Power Seat Adjusters" in Miscellaneous Section.*

Convertible Top Control: Auto-Lite. Electric-Hydraulic type. *See "Chrysler Top Control" in Miscellaneous Section.*

Electric Door Locks: *See "Electric Door Locks" in Misc. Section.*

MODEL IDENTIFICATION

Model	Model Identification
Chrysler Windsor	MC1-L
Chrysler Saratoga	MC2-M
Chrysler New Yorker	MC3-H
Chrysler 300E	MC3-H
Imperial Custom	MY1-L
Imperial Crown	MY1-M
Imperial LeBaron	MY1-H

SERIAL NUMBER: Stamped on plate attached to left cowl under hood (Detroit Cars), or left front door "A" post (Los Angeles Cars). *NOTE* - Number (example below) includes identification data as follows:

①②③④ ⑤
M 5 5 1 - 100001

① - Year model - 1959.
② - Car make. **5** - Chrysler, **6** - Imperial
③ - Model Series. **1** - Windsor & Imperial Custom; **3** - Saratoga & Imperial Crown; **5** - New Yorker & Imperial LeBaron; **7** - All Station Wagons (Windsor or New Yorker) ; **9** - 300E.
④ - Assembly Plant. **1** - Jefferson Ave. Plant (Detroit); **4** - Los Angeles Plant; **7** - Imperial Plant (Detroit).
⑤ - Beginning vehicle number.

ENGINE NUMBER: On machined boss on cylinder block in front of leading edge of right cylinder head.
Starting Engine Number - MR383-1001 (Windsor & Saratoga), MR413-1001 (All Others).
►*ENGINE NUMBER MARKS (Following Engine Number): Identified as follows:*
"A" - All cylinders .020" oversize.
"B" - All crankshaft journals .010" undersize.
"AB" - Both above conditions exist.
"MALTESE CROSS" (3/8" high) - ONE OR MORE crankshaft journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*
♦ (3/8" high) - ALL valve lifters .008" oversize.

TUNE-UP

►*COLD WEATHER HARD STARTING CORRECTION:* When caused by "Blued" ignition points in operation at temperatures of 20°F or less, *see "Regulator Replacement Note" under REGULATOR below.*
COMPRESSION PRESSURE: 150-180 lbs. at 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 25 lbs.
VACUUM READING: 19.5" at idling speed.
VALVE TAPPET CLEARANCE: None in service, hydraulic lifters.
MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with Special Lubricant, Part No. 1879318). To install coil spring, position shaft in extreme counterclockwise position. Place coil spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud.
►*DUAL EXHAUST NOTE:* When valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

►*IGNITION SWITCH FAILURE CORRECTION:* In cases of ignition switch failure on early cars, be sure that Switch, Part No. 1838984-P is used.

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs - Auto-Lite A42 (Exc. 300E), A32 (300E). 14 mm. Torque to 30 ft. lbs. *Do not use resistor type plugs. See note below.*
►*SPARK PLUG WIRE NOTE:* Resistance type cables (marked RADIO) used, having a non-metallic core with terminal pins pushed into ends of cable to make contact. DO NOT crimp terminals so tight that excessive force is required to remove them as this will cause core to stretch or wire pins to come out. *CAUTION - Use same length and type of cables for replacement. Do not use resistor type spark plugs.*

COIL: Auto-Lite CAH-4001. (CAH-4002 Service Coil).

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-5001.

►*COIL RESISTOR NOTE:* Connected in circuit between "IGN" terminal of horn relay and positive terminal of coil. *Resistor must be in circuit when testing coil output.*

DISTRIBUTOR: Auto-Lite. Used as follows:

Car Model	Distributor No.
Windsor, Saratoga	IBP-4006
Saratoga (Canada)	IBP-4005B
New Yorker, Imperial	IBS-4010A
300E	IBS-4010

NOTE - "IBS" Distributors are double breaker type.

Condenser - Auto-Lite IBB-2042-SS1. **Capacity** .25-.285 mfd.

Contact Point Set - Auto-Lite IBP-3028BS (IBP Distr.), IGW-3028JS (IBS Distr.).

Breaker Gap - .015-.018".

Cam Angle (IBP Distr.) - 27-32°.
►*CAM ANGLE SETTING CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.

Cam Angle (IBS Distr.) - 26-32° (single set of points), 31-37° (both sets operating together).

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - IBP-4005B

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	435	2	870
5	800	10	1600
8	1700	16	3400
9.5	2150	19	4300

Automatic Advance - IBP-4006

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	535	2	1070
3	800	6	1600
6	1825	12	3650
7.5	2350	15	4700

Automatic Advance - IBS-4010

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	425	2	850
4	500	8	1000
5	725	10	1450
6.5	1050	13	2100

Automatic Advance - IBS-4010A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	485	2	970
4.5	800	9	1600
8	1850	16	3700
9.5	2300	19	4600

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4005B, 4006

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8 5/8
6	12	12
10	20	15 1/4
11	22	16 1/8

Vacuum Advance - IBS-4010, A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	12
12	24	17
13	26	18 1/8

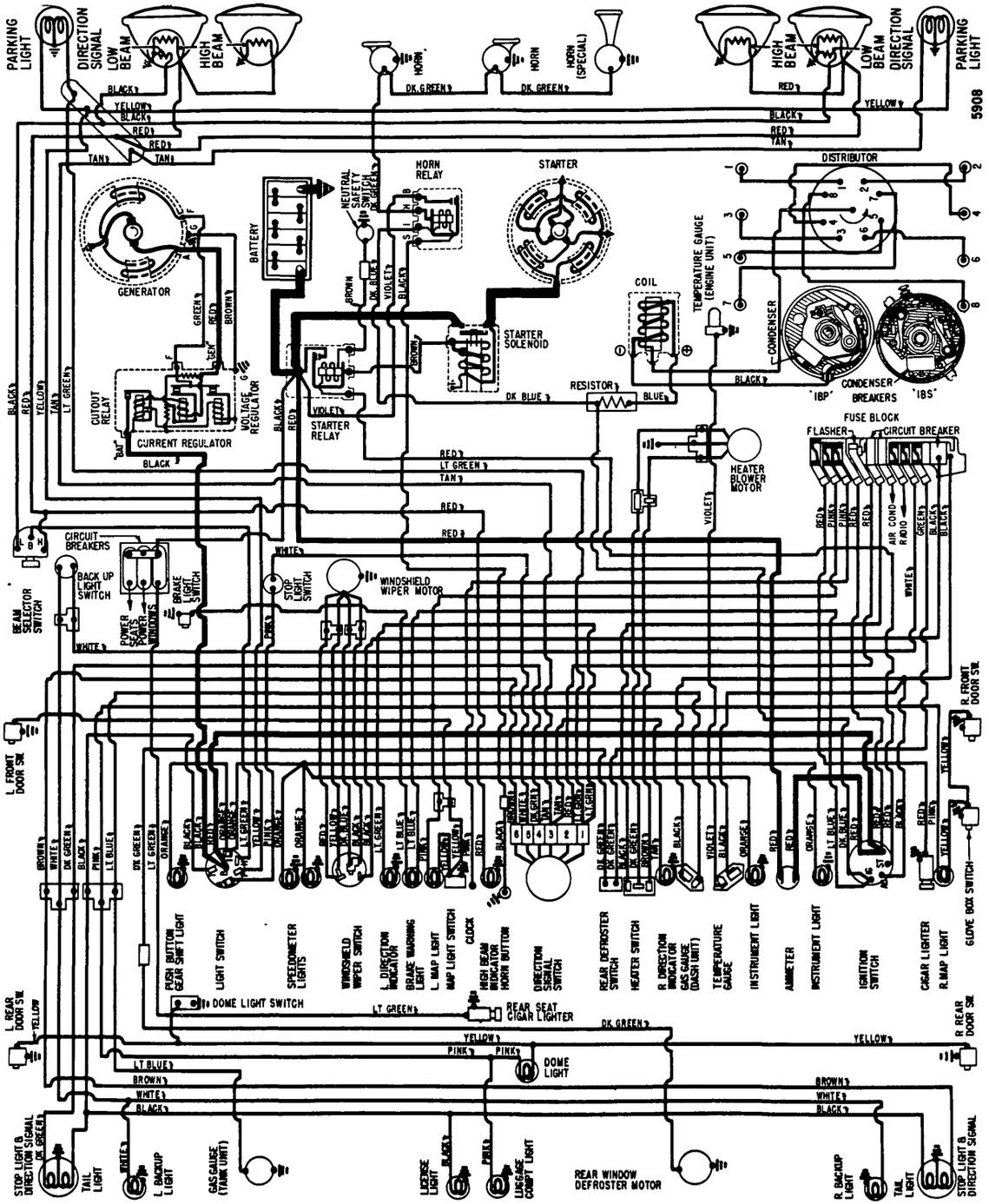
Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Chrysler Special Data.*

IGNITION TIMING

Setting - 10° BTDC at 500 RPM (Exc. 300E), 10° BTDC at 700 RPM (300E).

Timing Mark - Timing line on vibration dampener and graduations on timing indicator on right side of timing chain cover. Align mark on dampener with correct mark on indicator.

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CHRYSLER WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Car Model	CARBURETOR Carburetor
Windsor	One Carter 2-Barrel
Saratoga, New Yorker, Imperial	One Carter 4-Barrel
300E	Two Carter 4-Barrel

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and can be corrected by squirting carburetor cleaner, lacquer thinner or alcohol through piston link opening in air horn. Operate valve back and forth to flush out gum formation.

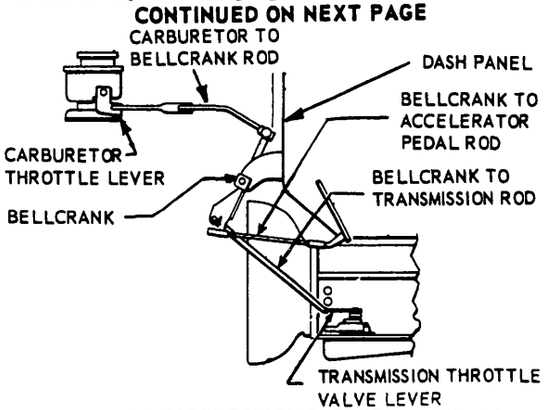
►*STUMBLE OR HESITATION ON ACCELERATION (AFTER ENGINE AT NORMAL OPERATING TEMPERATURE) CORRECTION:* If this condition exists after engine is properly tuned, manifold heat control valve and engine cooling thermostat operating properly, accelerating pump connector rod installed in outer hole of throttle lever (Windsor), inner hole of pump arm (Others), fuel filter bowl cleaned and filtering element replaced if necessary, proceed as follows:

Windsor - Replace step-up rods with Carter No. 75-997 or 75-999.

Other Models (Exc. 300E) - Replace step-up rods with Carter No. 16-44 (Power Jet Rods).

THROTTLE LINKAGE ADJUSTMENT (EXC. 300E): Insert a 3/16" diameter rod through holes in bellcrank and lever to aid in accurate adjustment. With engine at normal operating temperature and idling at 500 RPM, loosen throttle linkage adjusting nuts on carburetor-to-bellcrank rod, and on bellcrank-to-transmission rod. Adjust carburetor-to-bellcrank rod to position bellcrank lever 1/2" from cowl dash panel, then tighten adjusting nut. Hold slight preload rearward on bellcrank-to-transmission rod while holding transmission throttle valve lever forward against the stop, and tighten adjusting nut. *NOTE - Make sure correct bellcrank-to-transmission rod is installed. This rod should measure 8½" between hole centers.* Accelerator pedal should be at an angle of 115° to the horizontal. To adjust, remove pedal end of bellcrank-to-pedal rod and rotate swivel as necessary. Remove gauge rod.

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CHRYSLER TORQUEFLITE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

THROTTLE LINKAGE ADJUSTMENT (300E): With engine at normal operating temperature and idling at 650 RPM, disconnect bellcrank-to-carburetor rod at rear carburetor throttle lever. Move rod rearward until rod is stopped by idle stop on transmission idle cam. With a slight rearward pressure on rod, adjust threaded end of rod until ball joint is in alignment with ball joint clip, then reconnect rod to throttle lever. Accelerator pedal should be at an angle of 115° to the horizontal. To adjust, remove pedal end of the bellcrank-to-pedal rod and rotate the swivel as necessary. *NOTE - When linkage correctly installed, there should be a clearance of 3/4-1 1/8" between center clevis pin on upper bellcrank lever and firewall. Upper bellcrank lever length is 3¼" between hole centers.*

AUTO PILOT: Automatic speed control, optional on all models, *see "Auto Pilot" in Carburetion Section.*

CARTER BBD 2-BARREL

Carter BBD No. 2872S or 2795S.

Idle Setting - ¾-2¼ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM with TorqueFlite in Neutral.

Float Level - 5/16" (Gauge T109-280) between top of each float ridge (at free end of float) and top surface of body casting. To adjust, bend lip of float arm.

Accel erating Pump - Install connector rod in center hole (medium stroke) of throttle lever.

Fast Idle : .018" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on high step of cam.

Fast Idle Cam Clearance - With choke valve closed and lug on fast idle cam contacting lip on choke shaft lever, align center of fast idle screw with index mark on cam. To adjust, bend lip on choke shaft lever.

Automatic Choke Setting (Cross-Over Type): Centered on index. *NOTE - Choke is "Cross-Over" type mounted in manifold and linked to choke valve. Choke assembly must be removed from manifold well for checking and adjusting.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Single Carburetors)

Carter AFB No. 2797S.

►*AUTOMATIC CHOKE NOTE:* "Cross-Over" type choke used on all models. *See "Cross-Over Choke" in Carburetion Section.*

►*STALLING AFTER COLD START CORRECTION (2797S): See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

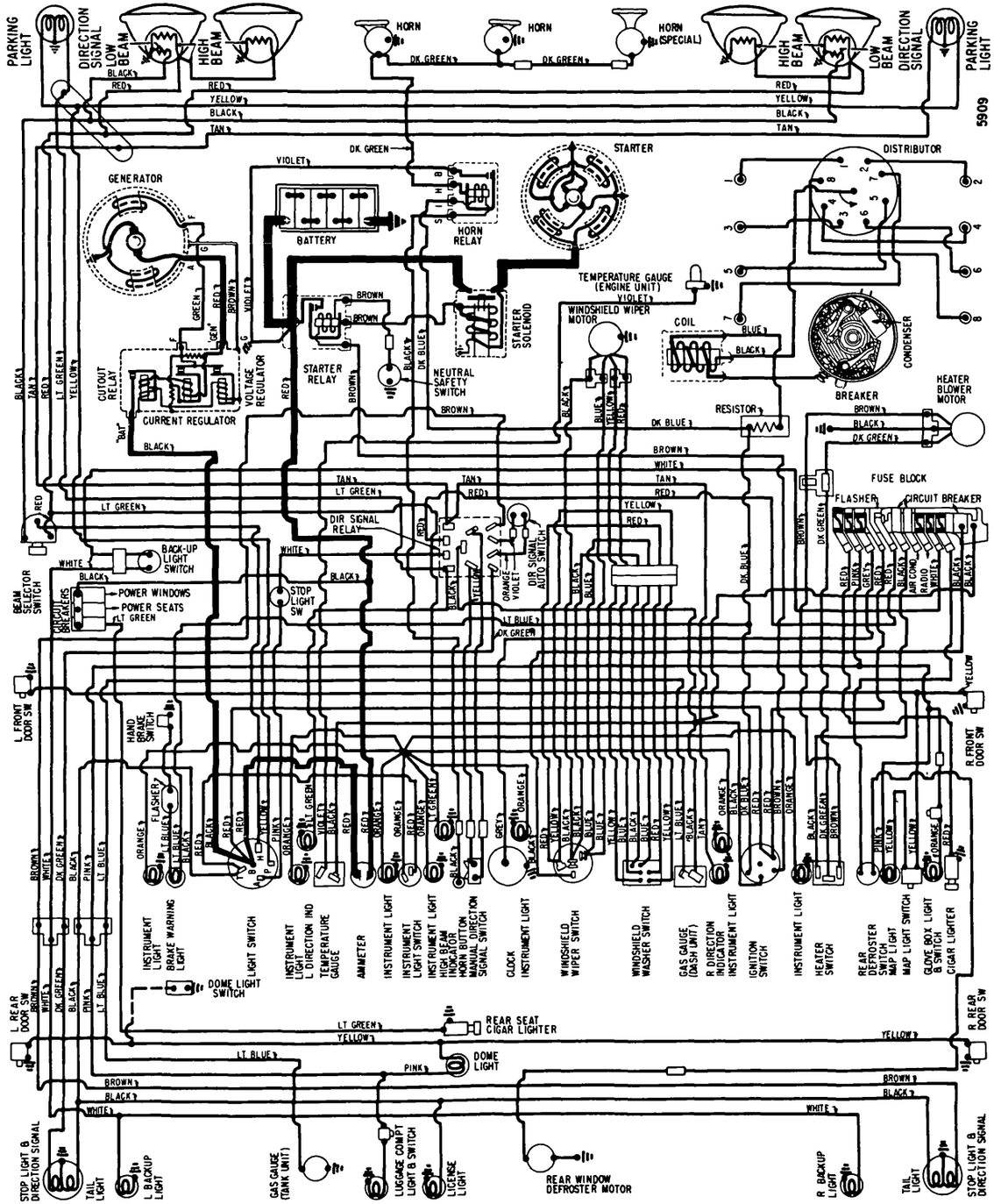
Idle Setting - ½-2 turns open. Turn screws out for richer mixture.

Idle Speed - 500 RPM with TorqueFlite in Neutral.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

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IMPERIAL WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

CARTER AFB 4-BARREL
(Tw Carbur tor Installati n on 300E)
Carter AFB No. 2798S (Front), 2799S (Rear).

►*IDLE SPEED ADJUSTMENT NOTE Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed on slow idle*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Interconnecting Linkage Adjustment: Slotted end of rod must be in **lower** hole of throttle lever on **front** carburetor, and other end of rod in **top** hole on **rear** carburetor Hold **rear** carburetor throttle in wide open position (choke off) and adjust slotted end of rod so **front** carburetor throttle valves will be wide open Tighten locknut, check operation

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter 2769S Mechanical type
Pressure - 5-7 lbs

►*FUEL FILTER NOTE* Plastic filter in fuel tank and ceramic filter integral with fuel pump *See "Fuel Pumps" in Carburetion Section*

Gasoline Gauge: Auto-Lite Electric type
Dash Unit - Auto-Lite No 14798A All models
Tank Unit – Auto-Lite No 14684A (Suburban), 14674A (Others)
See "Fuel Gauges" in Carburetion Section

AIR CLEANER: DRY FILTER ELEMENT TYPE Clean every 5,000 miles, replace element every 15,000 miles or sooner if needed

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent and DO NOT oil or lubricate*

BATTERY

Auto-Lite 12-H-70 or Willard HO-12-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr rate)
Battery Ground - Negative
Engine Ground - Left front of engine

STARTER

Auto-Lite MDT-6002. Armature - Auto-Lite MDL-2006
Drive - Overrunning clutch (solenoid pinion shift)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

Starting Switch: Auto-Lite SAD-4301 Solenoid Pinion Shift used with separate relay, Auto-Lite RAM-4001 (Windsor), RAM-4002 (Others), and Neutral Safety Switch on transmission Controlled by Ignition and Starting Switch (key starting)

Neutral Saf ty Switch Adjustment: *See "Torqu Flite Transmission" in Transmission Section*

GENERATOR

Auto-Lit . Application as follows

Model	Generator
Standard (All Models)	GJM-8001A
Spec Equip (All Models)	GGA-6003E
Air Cond 2 unit (All Models)	GHM-8001A
Spec Equip (Windsor)	GHM-8005A
Air Cond 2 unit (Windsor)	GHM-8006B
Air Cond Hvy Duty (Windsor)	GGA-6007A
Air Cond , 1 Unit,(Saratoga, New Yorker)	GJM-8002A
Air Cond & Heavy Duty(Sarat & N Y 'er)	GGA-6001N

Armature - Auto-Lite As follows

Generator	Armature No.
GJM-8001A	GJC-2058F
GJM-8002A	
GGA-6003E, 6007A, 6001N	GFY-2101F
GHM-8001A	GHM-2034F
GHM-8005A	GHM-2045F
GHM-8006B	

►*GENERATOR DRIVE PULLEY INSTALLATION CAUTION (Cars with GHM & GJM Generators):* Pulleys are press fit on shaft and care must be used when installing pulley so shaft and other internal parts are not damaged To install, remove generator rear end cap and support shaft DO NOT use more than 6800 lbs pressure to press pulley on shaft Pressure over 7000 lbs will bend shaft

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4 0	14 6	950
40-0	14 6	1600
40 0	15 0	1600

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12 8	1150
35 0	15 0	2100

Brush Spring Tension - 34-41 ozs. (GGA), 35-53 ozs (GHM), 18-36 ozs (GJM)
Field Current - 1 1-1 3 amps (GGA & GHM), 1 6-1 7 amps (GJM) All at 10 0 volts (70°F)
Motoring Current - 2 3-2 6 amps (GGA), 3 0-3 5 amps (GHM), 3 9-4 3 amps (GJM) All at 10 0 volts (70°F)
Rotation - Counterclockwise at commutator end

Belt Adjustment: Torque Method - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket Then, with torque wrench apply specified torque (see below) and tighten mounting bolts

Belt Torque Specifications - (Ft Lbs.)

Generator	Used	New
All, without Air Cond	20	30
Windsor, with Air Cond	10	15
Others, with Air Cond.	35	65
All, with Air Susp	30	40

D fl cti n M th d – Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull

Generator Belt Defl cti n Sp cificati ns

Generator	Us d	N w
All, without Air Cond	1/4"	1/8"
Windsor, with Air Cond	1/4"	1/8"
Others, with Air Cond	3/8"	1/4"
All, with Air Susp	9/16"	5/16"

REGULATOR

Auto-Lite. Used as follows

Regulator	G n rat r Typ
VAT-6201A	GGA
VRX-6201A	GHM
VRX-6301A	GJM

►*NOTE Regulator VRX-6301A has diff r nt int rnal wiring than other VRX models*

►*VRX-6301A REGULATOR REPLACEMENT NOTE:* When hard starting at temperatures of 20°F or less are experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has Code 11-N, 2-P or higher stamped on base

Cutout R lay

Cuts In - 12 6-13 6 volts
Cuts Out - 3-5 amps discharge current after charging at 7 amps (VRX), 10 amps (VAT)
Contact Gap - 015" minimum
Air Gap - 031-034" with contacts open (measure at hinge end of core)

Voltag R gulat r

Setting – 14 5± 3 volts charging at 10 amps (VAT), 7 amps (VRX) at 80°F or with 25 ohm resistor in series between regulator and battery
Air Gap - 048-052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - See *Auto-Lite 12-Volt R gulators" in Electrical Section*

Current R gulat r

►*SETTING CAUTION "T mp ratur Comp nsat d" type Set to following specifications at 70°F*

Regulator	Test A - Op rating Amper s	Test B
VAT-6201A	46	40 (38-42)
VRX-6201A	37	30 (28-32)
VRX-6301A	44	35 (33-37)

Test A - After 15 minutes operation charging at 10 amperes (VAT), 7 amperes (VRX)
Test B - After additional 15 minutes operation with current regulator operating - load applied to hold voltage to 13 7-13 9 volts (VAT), 13 6-13 8 volts (VRX).
Air Gap - 048-052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps - Dual headlights (4-Headlight System) *See "4-Headlight System" in Electrical System*
Automatic B am Chang r - *S e El ctrical Section*
El ctronic Rear Vi w Mirr r - *S e Electrical Section*
Dir ctional Signals - *See El ctrical Section*

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Headlight & Panel Light Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hex nut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: 22.5 Ampere. Headlights, high beam indicator, parking lights. Part of headlight switch.
15 Amp re - Tail, Stop, License, Instrument & Clock lights. Part of headlight switch.
6 Amp re - Windshield Wiper. On fuse block.

FUSES: Fuse block located on driver's side of instrument panel to left of radio. All fuses are at block.
20 Amp re - Heater.
14 Amper - Cigar lighter.
6 Amp re - Back-up lights.
6 Amper - Dome, Glove Box, Trunk & Map lights.
6 Amper - Rear defroster.
1 Amper - Clock.

Horn Relay: Aut -Lit RAH-4003.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use xtrem car when disc nnecting any part of air conditioning quipment or lines for access to engine. See "Air C nditioning S rvic Cautions" in Miscellaneous S cti n.*

ENGINE SPECIFICATIONS: 90° V8 with overhead valves. This is a new engine having a single rocker arm shaft on each head. The engine block has been recessed at front to form an integral timing chain case. Engine-to-transmission adapter at rear of engine not used.

►*300E ENGINE NOTE:* This engine is the same as standard 413" engines except for a high performance camshaft (different valve timing), intake manifold, distributor. and uses two carburetors.

Engin	B r	Stroke	Displacement
Windsor,Saratoga	4.031"	3.75"	383 cu. in.
Others	4.188"	3.75"	413 cu. in.

Engin	Compr.Rati	Rated HP	Developed HP
383" (Windsor)	10.0-1	52.0	① 305 at 4600 RPM
383"(Saratoga)	10.0-1	52.0	② 325 at 4600 RPM
413"(N.Y.& Imp.)	10.0-1	55.9	② 350 at 4600 RPM
413" (300E)	10.0-1	55 9	③ 380 at 5000 RPM

① - One 2-barrel carburetor.
② - One 4-barrel carburetor.
③ - Two 4-barrel carburetors.

C mpr ssi n & Vacuum R ading - *See TUNE-UP.*

►*ENGINE "GRINDING", "GROWLING", OR "BUZZING" NOISE CORRECTION: See "Oiling System" for data.*

OIL PAN REMOVAL: Remove dipstick and drain oil. Disconnect steering linkage from steering arm and pull linkage down and away from oil pan. On single exhaust system cars, remove crossover pipe making sure rest of exhaust system is supported. *NOTE - It may be n c ssary t pull brak line, running across the crossm mber, slightly forward t all w clearanc .* On Windsor, remove oil pan bolts and remove oil pan. On other cars, disconnect throttle linkage at transmission and at carburetor. Rotate crankshaft until centerline of front counterweight of crankshaft is in 10 o'clock position. Remove front engine mount nuts and raise engine 1". Remove oil pan bolts and remove pan.

Installation - *NOTE - Bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block.*

ENGINE REMOVAL: *See "Engine" in Chrysler Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chrysler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Special Data.*

PISTONS

Aluminum Alloy, thermally controlled by steel strut, elliptically turned, tin plated.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore is .020" Oversize.*

Weight - 25.7 ozs. (383"), 27.5 ozs. (413").

Removal - Pistons & Rods removed from above.

Clearance - .0005-.0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston and halfway down cylinder wall, crosswise to engine.

Replacement Pistons: Std., .005", .020", .040" Oversize.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side pposite large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8). *See "Rod Installation" below.*

PISTON PIN

Sliding fit in piston and tight press fit in connecting rod. Pin offset to right .09".

Diameter - 1.093". **Length** - 3.56".

Clearance in Piston - .00045-.00075". Light thumb press fit at 70°F.

Clearance in Rod - .0007-.0012" **interference fit.**

Replacement Pins: Furnished Std. with pistons.

Piston Pin Removal & Installation: *See "Piston Pins" in Chrysler Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.013-.025"	.0015-.003"
Compr. (2)	.0775-.0780"	.013-.025"	.0015-.003"
Oil	.1860-.1865"	.013-.025"	.0010-.003"

Replacement Rings: Furnished in sets. Std., .020" & .040" Oversize.

Installing Rings: "Top" mark on compression ring must be toward top of piston.

CONNECTING ROD

Length - 6.77" (center-to-center). **Weight** - 29.8 ozs.

Crankpin Journal Diameter - 2.374-2.375".

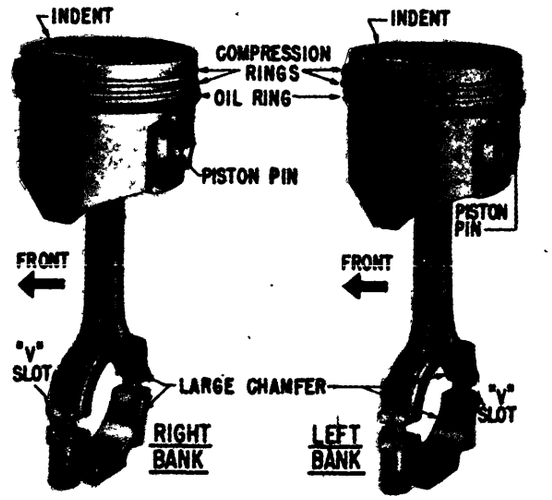
►*JOURNAL DIAMETER CAUTION (ONE OR MORE JOURNALS MACHINED UNDERSIZE): See CRANKSHAFT below.*

Bearings - Lead Base Babbitt on Steel.

Cl arance - .0005-.0015". Wear limit .0025".

Endplay - .009-.017". Total both rods.

Replac ment Bearings: Std. and .001", .002", .003", .010", .012" Undersize.



CHRYSLER PISTON & ROD ASSEMBLY

Installing Rods: Install piston and rod assemblies with indent on piston head toward front of engine (all cylinders) and large chamfer on lower end of rod toward nearest crankshaft journal fillet. Install bearing caps so that "V" groove in cap is in line with similar groove in rod (this is oil spit hole for cylinder wall lubrication).

CRANKSHAFT

Journal Diameter - 2.7495-2.7505".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*
.010" UNDERSIZE (ALL Main & Connecting R d Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) stamped on engine numb ering pad indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize journals is stamped on a machined surface of a counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Tin Base Babbitt on Steel.

Clearance - .001-.002" (300E), .0005-.0015" (Others).

Endplay - .002-.007".

End Thrust - Taken by No. 3 (center) main bearing.

Replacement Bearings: Furnished Std., .001", .002", .010" Undersize. *NOTE* - No. 1, 2, 4, 5 bearing pairs are identical. Upper and lower halves of No. 3 flanged bearing are interchangeable.

Crankshaft R ar Main B aring Oil Seal: *See "Crankshaft & Main B arings" in Chrysler Special Data.*

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Crankshaft Front Oil Seal: See "Engine Front Cover" in Chrysler Special Data.

CAMSHAFT

►*CAMSHAFT NOTE: Special high performance camshaft used on 300E.*

Journal Diameters - (1) 1.998-1.999", (2) 1.982-1.983", (3) 1.967-1.968", (4) 1.951-1.952", (5) 1.748-1.749".

Bearings - Removable, steel-backed, babbitt lined bushings.

Clearance - .001-.003". Maximum allowable before reconditioning .005".

End Thrust: Taken by camshaft sprocket hub. Helical oil pump and distributor drive gear and camshaft lobe taper cause rearward thrust.

Timing Chain: Width - .88". **Pitch** - .50". **Length** - 50 links.

Camshaft Setting: Marks on sprockets should be adjacent and in line across shaft centers.

Camshaft Removal & Installation: See "Camshaft & Bearings" in Chrysler Special Data.

Engine Front Cover Removal & Installation: See "Engine Front Cover" in Chrysler Special Data.

Engine Front Cover Oil Seal (Crankshaft Front Seal): See "Engine Front Cover" in Chrysler Special Data.

VALVES

Tappet Clearance: None in service, hydraulic lifters.

383" Engine

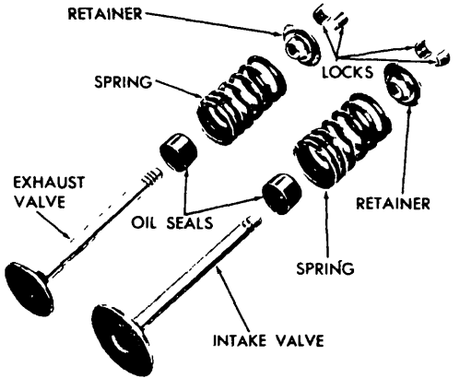
Valve	Head Diam.	Stem Diam.	Length
Intake	1.95"	.372-.373"	4.87"
Exhaust	1.60"	.371-.372"	4.87"

413" Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	2.08"	.372-.373"	4.89"
Exhaust	1.60"	.372-.373"	4.89"

All Engines

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.390"	.001-.003"
Exhaust	45°	.390"	.002-.004"



CHRYSLER VALVE ASSEMBLY

Valve Seat Width - .060-.085" (Intake), .040-.060" (Exhaust).

Valve Stem Oil Seal - Cup type seals used on all valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area in gauge).

Valve Springs: Single springs used on all engines.

Spring Specifications

	Pressure	Length
Valve Closed	100 lbs.	1.86"
Valve Open	195 lbs.	1.47"

Spring Free Length - 2.34".

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 57/64", install spacer under spring to bring height within limits (1 53/64-1 57/64").

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

►*CAUTION:* Spring ends must be square within 1/16".

Valve Guides: Cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems.

Hydraulic Valve Lifters: Integral, flat valve type.

►*OVERSIZE LIFTER NOTE: A "♦" mark on engine number pad indicates .008" oversize lifters.*

Diameter - .9040-.9045". **Clearance in Block** - .0005-.0015".

Lifter Overhaul & Testing - See "Valve System" in Chrysler Special Data.

►*VALVE GRINDING CAUTION:* See valves (above).

Rocker Arm Assembly: See "Valve System" in Chrysler Special Data.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

℄ Valve Timing Specifications

(Exc. 300E)

Intake - Open 15° BTDC. Close 57° ALDC.

Exhaust - Open 57° BLDC. Close 15° ATDC.

(300E)

Intake - Open 20° BTDC. Close 60° ALDC.

Exhaust - Open 58° BLDC. Close 22° ATDC.

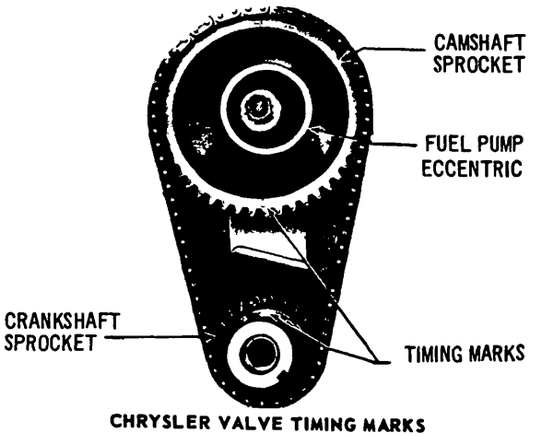
℄ - With valve train solid.

Valve Timing Check: Rotate crankshaft until No. 1 intake valve is closed and No. 1 piston is on TDC. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed tappet down (providing a solid tappet). Turn crankshaft in normal running direction until valve has lifted .025" (300E), .013" (Others). Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning engine any further in normal direction.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chrysler Special Data.*

►*ENGINE GROWLING, BUZZING, OR GRINDING NOISE (Early Cars):* When vibration can be felt in engine oil pan, it is recommended that new Relief Valve Spring & Damper Assembly, Part No. 2202845, be installed before other measures are taken. *NOTE* - This new spring and damper assembly used in production beginning Engine Nos. PR-38-6-27 and P-41-6-27.



CHRYSLER VALVE TIMING MARKS

►*OIL FILTER BASE ASSEMBLY PRODUCTION CHANGE & LOSS OF OIL PRESSURE CORRECTION:* New Filter Base and New Oil Pressure Relief Valve Plunger (in oil pump assembly) used in production starting with Engine No. MR-383-20101 and MR-413-19367. New Filter Base Assembly Part No. 2120866 should be used in cases of oil pressure loss.

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-70 lbs. at 40-50 MPH. *NOTE* - Pressure drop due to clogged filter 7-9 lbs.

Oil Pressure Relief Valve - Mounted in oil pump. Use use correct color spring, see "Oiling System" in Chrysler Special Data.

Oil Pressure Gauge - Auto-Lite No. 14800A. Not electric.

Oil Pump: New rotor type, mounted externally at front of engine.

Pump Overhaul - See "Oiling System" in Chrysler Special Data.

Oil Filter: Full flow disposable type. All oil enters lubrication system of engine through filter

Filter Element - Install new filter element every 5,000 miles. Use Tool C-3654 to unscrew filter from base. Screw filter on base until gasket contacts base then tighten ½ turn more by hand.

Crankcase Ventilation: Filter element in oil filler cap (clean with kerosene every 5,000 miles), and breather pipe on right valve rocker cover.

COOLING

Water Capacity: 16 qts. Add 1 qt. with heater.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.*

Thermostat: Pellet type. Starts to open 177-182°F, fully open at 202°F.

►*THERMOSTAT IDENTIFICATION CAUTION:* Some 180° thermostats stamped "160" on gasket flange with CORRECT "180" mark stamped on bottom of pellet. When checking thermostat for installation of alcohol

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type antifreeze, check mark on bottom of pellet and replace thermostat with 160° type (recommended for cars without Air Conditioning when this type antifreeze installed)

Water Pump: Ball bearing type. No lubrication required. *See "Water Pump" in Chrysler Special Data.*

Pump Removal - Drain cooling system. Loosen generator and power steering pump or idler pulleys, remove all belts. Remove fan, spacer, and pulley. *NOTE* - On Air Cond. Cars, remove upper half of fan shroud, then remove fan hub pulley, loosen fan, remove fluid fan drive. Remove water pump body to housing bolts and remove water pump.

"Silent Flite" Fluid Fan: Standard on Air Conditioned cars and 300E, optional on all other models. *See "Cooling System" in Chrysler Special Data.*

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite No. 14801A.

Engine Unit - Auto-Lite No. 14405A.

See "Temperature Gauges" in Miscellaneous Section.

TORQUEFLITE TRANSMISSION

Wide range torque converter and automatically operated planetary gear transmission.

See "TorqueFlite Transmission" in Transmission Section.

►*TORQUEFLITE SCRAPING NOISE CORRECTION (Early Trans.):* Caused by interference between converter hub bore and front pump drive sleeve "O" ring lands. *See "TorqueFlite Transmission" in Transmission Section.*

►*TORQUEFLITE BUZZING NOISE CORRECTION:* Install new Control Valve Part No. 2124247. *See "TorqueFlite Transmission" in Transmission Section*

►*TORQUEFLITE 2-3 UPSHIFT NOISE CORRECTION:* Caused by incorrect assembly of clutch pack. Reassemble with pressure plate at front of pack next to snap ring. *See "TorqueFlite Transmission" in Transmission Section.*

►*TORQUEFLITE HARSH, DELAYED, OR ERRATIC SHIFT CORRECTION (Early Cars):* May be caused by loose accelerator shaft lever located at engine cross shaft bracket on firewall. To correct, file 1/16" of stock from each side of slotted end of lever to provide more clamping distance and tighten clamp bolt to 10-12 ft. lbs.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "TorqueFlite Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING:* See *"TorqueFlite Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles. Drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A". *NOTE - This supersedes previous drain interval of 20,000 miles*

Checking Fluid Level - Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling and transmission in "N". Maintain level as follows:

Hot Transmission (After Driving on Normal Mileage) - Level should be between "F" and "Add 1 Pint" marks Add or remove fluid to bring level between these marks.

Cold Transmission (Below 100°F) - Level should be between "Add 1 Pint" mark and ½" below this mark. Add or remove fluid to bring level between these positions.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "TorqueFlite Transmission" in Transmission Section.*

UNIVERSALS

Detroit Universals. (Imperial) Cross type used, front, center and rear. (Others) Ball & Trunnion used at front, Cross type at rear.

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Chrysler Special Data.*

►***DRIVE DISTURBANCE OR BEAT AT 60-80 MPH CORRECTION: See "Propeller Shaft" in 1960 Chrysler car pages.***

Rear Axle Control Strut: *See "Propeller Shaft" in Chrysler Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear, Hotchkiss Drive. *See "Chrysler Cage Type Hypoid" in Rear Axle Section.*

►*"SURE GRIP" AXLE NOTE:* Optional on all models and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*CHRYSLER REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION: See "Chrysler Hypoid" in Rear Axle Section.*

►*CREAKING NOISE ON TURN CORRECTION:* When tightening strut bushing bolts to 65 ft. lbs. does not correct noise, install new Strut Bushing Assemblies (with hardened inner sleeve with serrated ends) Part No 1635600.

Rear Axle Ratios

Model	Standard	Optional
300E	3.31-1 (43-13)	2.93-1 (41-14)
Others	ℂ 2.93-1 (41-14)	3.31-1 (43-13)

ℂ - Early. Later cars have 2.89-1 ratio. Use 2.89-1 to replace 2.93-1.

Backlash - .006-.008"

Carrier Removal: Disconnect rear universal, remove axle shafts, (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller --Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", 015", .030" thick) equally at both wheels.

Endplay - .003-.008"

SHOCK ABSORBERS

"Orifl w". Direct acting, hydraulic, non-adjustable. Serviced by replacement.

Shock Absorber

Model	Front	Rear
MC1,2,3 Exc. Sub. 1" Std.	1881774	1879305
Suburban 1" Std.	1881774	1879306
MY1 1" Std.	1881774	1843142
MC2 1" Hvy. Dty.	1881775	1879306
MY1 1" Hvy. Dty.	1981775	1752511
MC1,2,3 1 3/8" H.D.	ℂ	1881877
MY1 Air Susp.	②	1979305

ℂ - 1" H.D. Part No. 1881775.

② - Either Std. or H.D. Front.

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joint and torsion bar front spring. *See "Torsion-Aire" in Suspension & Wheel Alignment Section.*

►*CASTER & CAMBER ADJUSTMENT NOTE* Caster and camber adjustment is controlled by eccentric adjusting bolts at inner ends of upper control arm instead of shims.

Steering Axis Inclination - 5-7° at 0° camber.

Caster - (Manual Steering) Neg ¾°±¾°. **(Power Steering)** Pos. ¾°±¾°. *NOTE* - Caster should be as equal as possible on both sides of car.

Camber (Left Wheel) - Pos. ¼°±¼°. 3/8° preferred.

Camber (Right Wheel) - 0°±¼°. 0° preferred.

Toe-In - 1/8"±1/32". 1/8" preferred.

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46' (Windsor), 18°26' (Others).

AIR SUSPENSION

Used at the rear only. Air springs are used in conjunction with conventional leaf springs Optional on all models.

See "Chrysler Air Suspension" in Suspension & Wheel Alignment Section.

►*COMPRESSOR KNOCKING NOISE CORRECTION.* Caused by end float in crankshaft. Correct by installing Air Suspension Compressor Kit No 2084466. *See "Chrysler Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual: Gemmer. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: "Constant Control Full Time" power steering.

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.

►*POWER STEERING "LUMPY FEELING" CORRECTION* Caused by recirculating balls crowding or jamming. *See "Chrysler, DeSoto, Dodge & Plymouth Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Power Steering" in Steering Section.*

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BRAKES

Service: Two types "Total Contact" (Floating Shoe) hydraulic, and "Three Platform Total Contact" *See "Chrysler Center Plane & Total Contact Brakes" or "Three Platform Total Contact Brakes" in Brake Section.*

►*BRAKE PRODUCTION CHANGE:* "Three Platform Total Contact Brakes" in production on later cars These Brakes have important design changes, and parts from early and later brakes are **not** interchangeable

►*CHRYSLER "THREE PLATFORM" BRAKE DRAGGING, PULLING, OR IMPROPER RELEASE CORRECTION: See "Chrysler Three Platform Total Contact Brakes" in Brake Section*

Drum Diameter - 11" front & rear (Windsor), 12" front and rear (Others) 12" brakes optional on Windsor

Wheel Cylinder Diameter: 1 1/8" bore Two single acting cylinders on front, one double acting cylinder on rear

Lining - Molded asbestos bonded to shoe

Width - 2 5", **Length** - 11 5" (Windsor), 12 6" (Others), **Thickness** - 20"

Braking Power - 60% front, 40% rear

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked Turn adjusting cam slowly in opposite direction (each cam a little at a time) until no drag is felt

Rear Wheels - Same as for front wheels except that on rear wheels the forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation

Master Cylinder: On engine side of dash panel opposite base of brake pedal

►*MASTER CYLINDER NOTE* Master cylinder with Power Brakes has adjustable pushrod New master cylinder used with conventional brakes has non-adjustable pushrod-and-piston stop which is permanently attached to piston *DO NOT disassemble this pushrod and piston*

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment)

Power Brakes: "Bellows" or "Oval Piston" Assist Types used Mounted on firewall and linked to upper end of brake pedal Adjustable type pushrod master cylinder used

See 'Chrysler, DeSoto, Dodge, Plymouth (Bellows or Oval Piston) Type Power Unit" in Brake Section

Removal of Power Unit - Use pedal depressor to depress pedal to prevent trigger arm extending beyond end of bracket (to prevent damage to trigger arm) Disconnect vacuum hose Remove nuts on four mounting studs and withdraw unit from firewall *CAUTION-* DO NOT lose nylon bushing on pedal linkage cross pin

Parking Brake: Independent type on propeller shaft at rear of transmission. 7" internal expanding type

Adjustment - *See "Hand Brake Notes" in Chrysler Special Data*

Lining - Width 2", **Thickness** - 5/32", **Length** - 13 06", **Clearance** - 015- 020"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPV-4001G. Electric type *See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section*

Air Conditioning: Heater-Air Conditioning. *See "Chrysler Air Conditioning" in Miscellaneous Section*

►*AIR CONDITIONER FEED FUSE FAILURE CORRECTION:* If air conditioner main feed fuse fails after one-half hour continuous operation, replace Fuse Block Male Terminal and Fuse Clip Assembly on fuse block with Part No 2197136

Power Window Regulators: Auto-Lite Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters: Electric, 6-way type *See "Power Seat Adjusters" in Miscellaneous Section*

Electric Door Locks: *See "Electric Door Locks" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Mdl	Model Designation
Chrysler Windsor	PC1-L
Chrysler Saratoga	PC2-M
Chrysler New Yorker	PC3-H
Chrysler 300F	PC3-300
Imperial Custom	PY1-L
Imperial Crown	PY1-M
Imperial LeBaron	PY1-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post Number (example below) includes identification data

① ② ③ ④ ⑤
8 3 0 3 100001

① - Car Make **8** Chrysler, **9** Imperial
② - Model Series **1** Windsor & Imperial Custom **2** Saratoga & Imperial Crown **3** New Yorker & Imperial LeBaron **4** Chrysler 300F **5** Windsor Station Wagon **7** New Yorker Station Wagon **9** Special
③ - Year **0** 1960
④ - Assembly Plant **3** Jefferson (Detroit) **4** Imperial (Detroit) **5** Los Angeles **9** Canadian Plant
⑤ - Beginning vehicle number *NOTE - Imperial starting serial number is 100026*

ENGINE NUMBER: Stamped on boss on top right side of cylinder block just behind water pump Number (example below) includes identification data

① ② ③ ④ ⑤ ⑥
P R 38 ... 8 4

① Year **P** 1960
② - Raised block designation (383" Eng Only)
③ - Displacement **38** - 383 cu in **41** - 413 cu in
④ - If this space blank, engine is standard *For identifying marks see b low*
⑤ - Month Assembled **8** August, etc
⑥ - Day Assembled **4** 4th day, etc

►*ENGINE NUMBER MARKS. Identified as follows*
"**A**" - All cylinders 020" oversize
"**B**" - All crankshaft journals 010" undersize
"**AB**" - Both above conditions exist
"**Maltes Cr ss**" **(3/8" high)** - ONE OR MORE crank shaft journals 001" undersize *See "Connecting Rods' and "Crankshaft" below*
♦ (3/8" high) - One or more valve lifters 008" oversize

TUNE-UP

►*ENGINE HUNTING OR SURGING WHILE IDLING IN GEAR (300F).* May be caused by incorrect Anti-stall adjustment Readjust using NEW procedure (Step 5 under Throttle Linkage Adjustment below)

►*SPARK PLUG FOULING, LOADING, & ROUGH ENGINE CORRECTION (EARLY 300F)* May occur during engine warm-up period Check and correct following points
1) Manifold H at C ntr l - Make certain latest type 5-coil spring installed (supersedes 7-coil type) and that control operates freely *See MANIFOLD HEAT CONTROL*
2) Manifold Balanc Tub & Coupling - Inspect hose and replace if cracked, softened, or collapsed
3) Aut matic Chok & Ch k Piston Setting - *See "Choke Piston Index Adjustment" under CARTER AFB CARBURETOR in Carburetion Section*
4) Spark Plugs - Use only Autolite A-32 Spark Plugs Do not use plugs of higher heat range

COMPRESSION PRESSURE: 150-180 lbs at 150 RPM (plugs removed, throttle wide open) Maximum variation between cylinders 20 lbs

VACUUM READING: 19 5" at idle speed

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters *NOTE* - Optional mechanical lifters on 300F, 016" intake 028" exhaust, COLD

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine Valve must operate freely (lubricate with special lubricant, Part No 1879318) Coil spring should have approximately ¾ turn wrap (except 300F with new type coil - see below) with manifold heat control in closed position

►*RAM MANIFOLD HEAT CONTROL VALVE NOTE* Two heat control valves used, one in each cylinder bank exhaust manifold outlet When valve is closed, exhaust gases are diverted through bypass pipe around hot spot in intake manifold

►*THERMOSTATIC COIL SPRING CHANGE TO CORRECT SPARK PLUG FOULING, LOADING, ROUGH ENGINE (EARLY 300F).* Replace original 7-coil type coil spring with new 5-coil type, Part No. 2128933, Coil should have approximately 182° wrap or wind-up (counterclockwise on right manifold, clockwise on left manifold) with heat control in closed position

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035"
Spark Plugs - Autolite A42 (Exc 300F), Autolite A32, A201 or Champion J-79 (300F) 14mm Torque to 30 ft lbs *CAUTION* - Do not use higher heat range spark plugs to correct spark plug fouling on 300F (severe engine damage may result)

COIL: Autolite No. 200575.
Ignition Current - 2 5 amps idling, 3 1 amps stopped
Resistor - Autolite 201000 Connected in lead between ignition switch and coil Bypassed during cranking by second lead from ignition switch

►*RESISTOR BYPASS NOTE (Early Cars):* Early production cars with 4-terminal ignition switch have resistor bypass wire in harness but it is not connected *See "Ignition Switch Replacement Note" in MISC. ELECTRICAL.*

DISTRIBUTOR: Autolite IBP-4006C (Exc. 300F), IBS-4011 (300F). *NOTE* - "IBS" distributor is double breaker type
Condenser - Autolite IAT-3076LA **Capacity** 25- 285 mfd
Contact Point Set - Autolite IBP-2040L (IBP Distr), IAZ-2040LS (IBS Distr)
Breaker Gap - 015- 018" Set at 017"
Cam Angle (IBP Distr.) - 26-32°

►*CAM ANGLE SETTING CAUTION (IBP Distributor):* Cam Angle should be set with vacuum line disconnected
Cam Angle (IBS Distr.) - 26-32° (single set of points), 31-37° (both sets operating together)
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - IBP-4006C

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		485	2		970
4 5		800	9		1600
8		1850	16		3700
9 5		2300	19		4600

Automatic Advance - IBS-4011

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		440	2		880
5 5		600	11		1200
9		2000	18		4000
10		2400	20		4800

Vacuum Spark Control: Autolite integral type

Vacuum Advance - IBP-4006C

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	8 1/8
1			2	8 5/8
4			8	10 1/2
8			16	13 1/2
9 5			19	15

Vacuum Advance - IBS-4011

Distr	Degrees	Eng.	Degrees	Vacuum (" of Hg)
Start			0	8
1			2	8 5/8
5			10	11 3/8
8			16	13 3/4
9			18	14 1/2

IGNITION TIMING

Setting (Exc. 300F) - 10° BTDC at 475-500 RPM with vacuum line disconnected
Setting (300F) - 5° BTDC (TorqueFlite), 10° BTDC (Synchro-mesh) Set timing with vacuum line disconnected and engine idling below 600 RPM (transmission in neutral and air conditioning compressor off) After timing correctly set, readjust engine idle speed to 725-750 RPM
Timing Mark - Mark on vibration damper and pointer on chain case cover Align vibration damper mark with correct mark on pointer

CARBURETOR

►*CARBURETOR APPLICATION As follows*

Car Model	Carburetor
Windsor	One Carter 2-Barrel
Saratoga, New Yorker, Imperial	One Carter 4-Barrel
300F	Two Carter 4-Barrel

►***HARD COLD STARTING (Cars with cross-over choke carburetors)*** **May be caused by choke vacuum unloader piston sticking and can be corrected by squirting carburetor cleaner, lacquer thinner or alcohol through piston link opening in air horn Operate valve back and forth to flush out gum formation.**

►*FUEL INLET NEEDLE & SEAT ASSY PRODUCTION CHANGE & CARBURETOR FLOODING CORRECTION (Early Carbs) See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

THROTTLE LINKAGE ADJUSTMENT (EXC. RAM INDUCTION): With engine at operating temperature and idling at 475-500 RPM (carburetor off fast idle and transmission in "N"), stop engine, loosen locknuts on transmission throttle lever and on carburetor throttle rod Insert a 3/16" diameter rod through holes in bellcrank and lever, hold transmission throttle lever forward against its stop and tighten locknut Remove 3/16" diameter rod Make sure carburetor throttle lever is off fast idle cam and against idle stopscrew and move carburetor throttle rod rearward until stopped by internal stop in transmission Tighten locknut Accelerator pedal should be at an angle of 114° to horizontal To adjust, remove pedal end of bellcrank-to-pedal rod and adjust length of rod by loosening locknut at swivel end and rotating swivel

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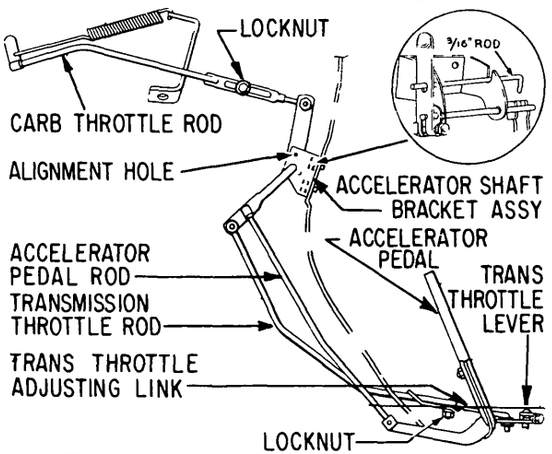
THROTTLE LINKAGE ADJUSTMENT (300F & CARS WITH RAM INDUCTION): Bring engine to normal operating temperature with carburetor off fast idle and transmission in "N", **then proceed exactly as follows:**

1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod. Insert a 3/16" diameter rod into holes in accelerator shaft bracket and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut.

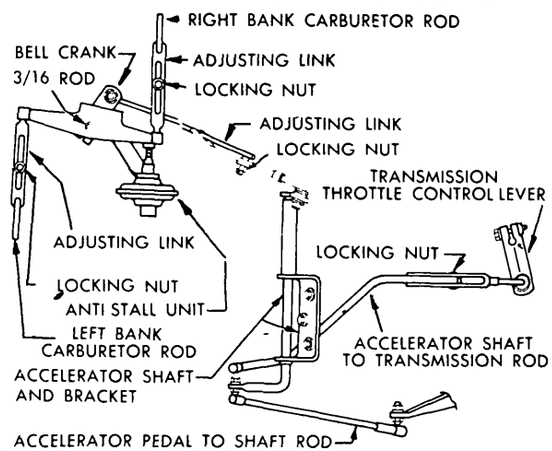
2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator pedal. Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket.

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficently so bellcrank will pivot (hold dashpot push-rod when turning setscrew to prevent damage to diaphragm). Pivot bellcrank so 3/16" diameter rod can be

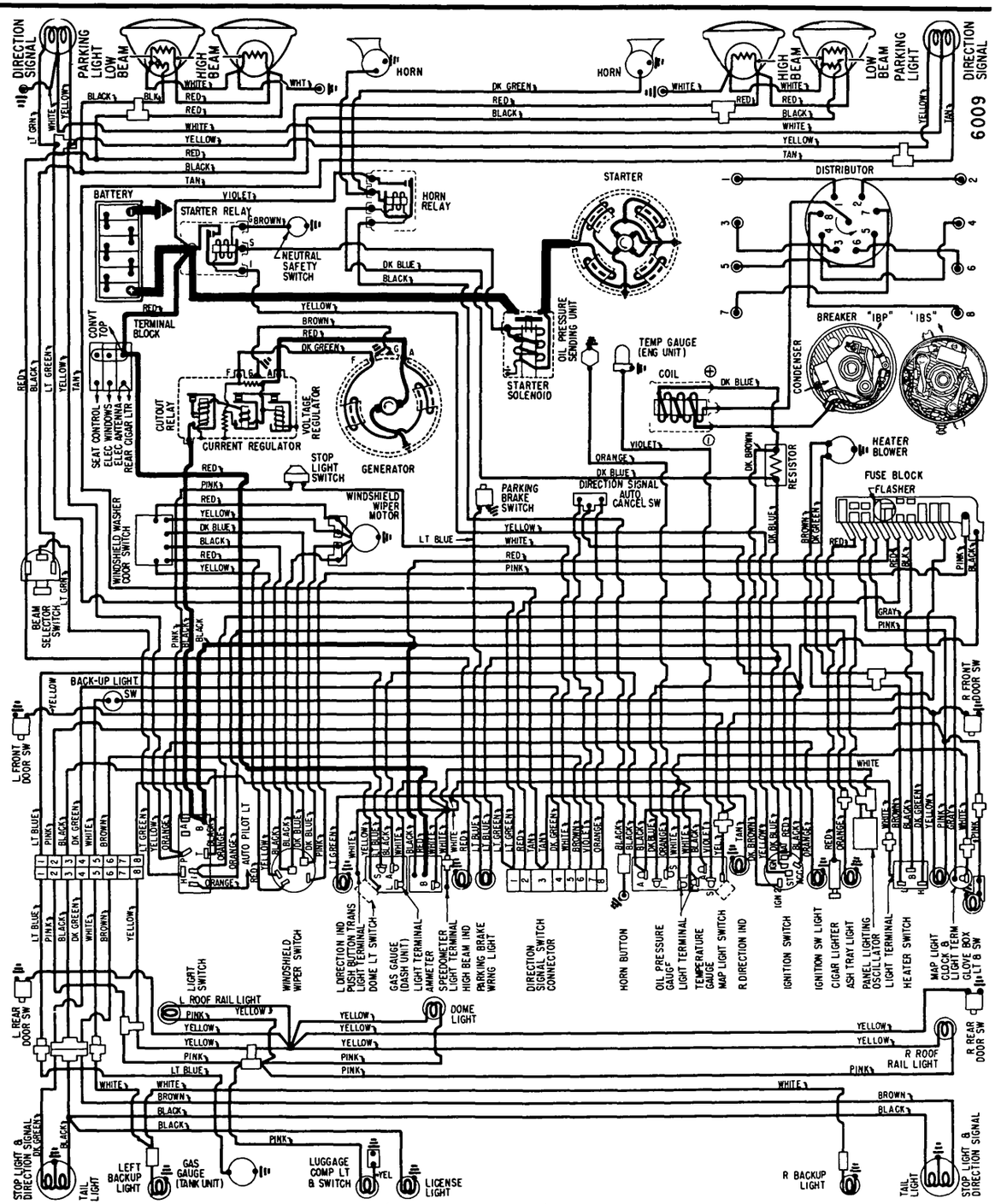
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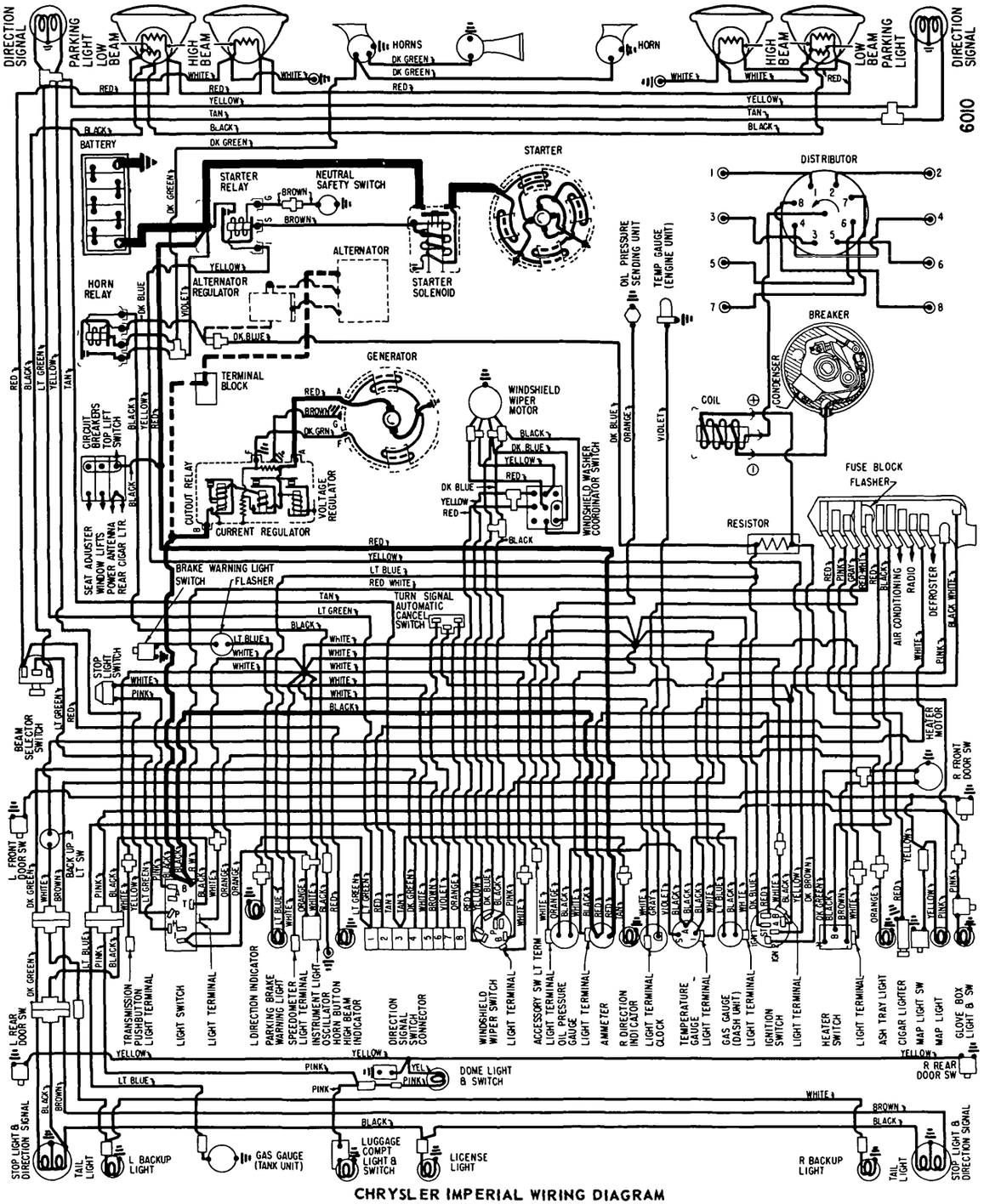
THROTTLE LINKAGE (EXC. RAM INDUCTION)



THROTTLE LINKAGE WITH RAM INDUCTION



CHRYSLER (EXCEPT IMPERIAL) WIRING DIAGRAM



CHRYSLER IMPERIAL WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

inserted through hole in bellcrank and into locating hole in intake manifold Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten adjusting link locknut

4) Start engine and adjust idle speed to 725-750 RPM with engine warm and transmission in neutral

5) Adjust anti-stall dashpot as follows *(NOTE - This procedure supersedes original recommendations)* Disconnect vacuum tube to anti-stall dashpot and tape open end of tube to prevent air leaks Anti-stall plunger will extend and increase engine speed Adjust plunger length so that engine speed is not higher than 1500 RPM Reconnect vacuum tube (engine idle speed should return to 725-750 RPM)

CARTER BBD 2-BARREL

Carter BBD No. 2924S.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7,*

Idle Setting - 1/8-1 1/2 turns open Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 500 RPM (575 RPM on Air Cond Cars) in Neutral "N" position

Float Level - 5/16" (Gauge T109-280) from top of each float at free end to top surface of body casting Bend lip of float arm to adjust level

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever With throttle valves closed distance between top of pump shaft and bottom of air horn should be 1"±1/64" To adjust, bend connector rod at lower angle (Tool T109-213)

Fast Idle Speed: 1375-1425 RPM with engine at operating temperature and fast idle cam rotated so index mark is in line with adjusting screw.

Automatic Choke: "Cross-Over" type Set on index

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Carter BBD Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL
(Single Carburetor)

Carter AFB No. 2927S.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - 1-2 turns open Turn screws out for richer mixture

Idle Speed - 500 RPM with TorqueFlite in "N" 550 RPM on Air Cond cars with TorqueFlite in "D" or "R" and air conditioning compressor "ON"

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Ram Manifold on 300F)

Carter AFB No. 2903S (TorqueFlite), No 3084S (Synchro-mesh). Two carburetors used, one at each side of engine

►*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor feeds left bank cylinders, LEFT carburetor feeds right bank cylinders*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barr l Carburetors" in Carburetion Section.*

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Thr ttl Linkag & Carbur t r Int rconn cting Linkag Adjustm nts: S *CARBURETOR abov*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. No. M2769S.
Fuel Pump Pressure - 3½-5 lbs
See "Fuel Pumps" in Carburetion Section

Fuel Filter: Disposable type located in carburetor inlet line Replace every 10,000 miles or if clogged Do not attempt to clean

Gasoline Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial)

►*GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE AND SERVICE REPLACEMENT CAUTION· See "1960 Chrysler Fuel Gauge" in Carburetion Section*

Dash Unit - Chrysler No 2096578 (Chrysler), No 1971105 (Imperial)
Tank Unit - Chrysler No 2084272 (Town & Country), No 2084063 (Others)
See "Fuel Gauges" in Carburetion Section

Air Cleaner: Paper element type Clean every 5000 miles, replace element every 15,000 miles Service more often under severe operating conditions

►*CLEANING CAUTIONS:* Clean filter element by blowing out with compressed air from the inside surface of element Hold air nozzle 2" from element to avoid damage DO NOT oil, lubricate or wash element

Auto Pilot: Automatic speed control unit *See "Auto Pilot" in Carburetion Section*

BATTERY

Autolite 12-H-70 or Willard HO-12-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr rate)
Battery Ground - Negative

STARTER

►*STARTER PRODUCTION CHANGE NOTE·* Autolite starter used on early cars, Chrysler-built starter used on later cars *See data below for specifications*

AUTOLITE

Autolite No. MDT-6002. Armature - MDL-2006.
Drive - Overrunning clutch (solenoid pinion shift)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs.	Lock	4 0	350

CHRYSLER

Chrysler No. 1889200. Armature - No. 1899079.
Drive - Overrunning clutch (solenoid pinion shift)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 32-48 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3800 Min	11 0	80 Max
8 5 ft lbs	Lock	4 0	350

Starting Switch: Autolite SAD-4501 Solenoid Pinion Shift used with separate relay, Autolite RAM-4001 (Windsor), RAM-4002 (Others) and Neutral Safety Switch, Chrysler No 1704283, mounted on transmission (Auto Trans Cars) Controlled by Ignition & Starter Switch, Chrysler No 2097628
S e "Autolite Starter Controls" in Electrical Section
N utral Saf ty Switch Adjustm nt - *See "TorqueFlite" in Transmission S ction*

ALTERNATOR

►*BATTERY CHARGING OR STARTING CAR WITH AUXILIARY AND JUMPER LEADS CAUTION (CARS WITH ALTERNATOR). Damaged circuits will result from reversed polarity or excessive voltage See "Chrysler Alternator" in Electrical Section*

►*EXCESSIVE OR CONTINUOUS AMMETER FLUCTUATION (Cars with Alternators) See 'Chrysler Alternator" in Electrical Section for tests and corrections*

►*INTERCHANGEABILITY NOTE* To replace conventional generator with alternator, correct regulator and different exhaust manifold, cylinder head, and wiring harness are required

Alternator: Own. Chrysler No. 2095100 (Imperial - Later Cars & 300F). Three-phase A C unit with full-wave rectifier *NOTE* - Rectifier units built in the alternator
Rotation - Clockwise at drive end
Rated Output - 40 amperes
Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section*

Regulator: Own. Chrysler No. 1889960. Field control type No Cutout Relay or Current Regulator
Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section*

GENERATOR

Autolite. Used as follows

Model	Generator
Standard	GJM- 8201A
Low Cut-In	GHM-8001B
Single Unit Air Cond	GJM- 8202A
Dual Unit Air Cond	GHM-8002A
Heavy Duty Air Cond	GGA-6003F
Heavy Duty Without Air Cond	GGA-6003E

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12 8	1150
35	15 0	2100

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4 0	14 6	950
40 0	14 6	1600
40 0	15 0	1600

Brush Spring Tension - 18-36 ozs (GJM), 35-53 ozs (GHM), 34-41 ozs (GGA)
Field Current - 1 6-1 7 amps (GJM), 1 1-1 3 amps (GHM & GGA) All at 10 0 volts and 70°F
Motoring Current - 3 3-3 7 amps (GJM), 3 0-3 5 amps (GHM), 2 3-2 6 amps (GGA) All at 10 0 volts and 70°F
Rotation - Counterclockwise at commutator end

Belt Adjustment: Torque Method - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket Then, with torque wrench, apply specified torque (see below) and tighten mounting bolts

Belt Torque Specifications - (Ft. Lbs.)

Bolt	Used	New
Generator (No Air Cond)	20	30
Generator (With Air Cond)	35	65
Fan Idler (Water Pump)	35	50

D fl cti n M th d - Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull

B lt D fl cti n Sp cificati ns

B lt	Us d	N w
Generator (No Air Cond)	1/4"	1/8"
Generator (With Air Cond)	3/8"	1/4"
Fan Idler (Water Pump)	1/8"	1/16"

REGULATOR

Autolite. Used as follows

Regulator	G n rator Typ
VBO-4202C	GHM (30 Amp)
VBO-4202B	GJM (35 Amp)
VBO-4202A	GGA (40 Amp)

Cutout R lay

Cuts In - 12 5-13 5 volts
Cuts Out - 3-5 amps discharge current after charging at 7 amps
Contact Gap - 015" minimum **Air Gap** - 025- 027"

Voltage R gulat r

Setting - 14 3-14 8 volts charging at 7 amperes and 80°F or with a 25 ohm resistor in series between regulator and battery
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - Se *"Autolit 12-Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION "Temperature Compensated" type Set to following specifications at 70°F*

Regulator	Test A - **Operating Amperes**	Test B
VBO-4202C	37	30 (28-32)
VBO-4202B	44	35 (33-37)
VBO-4202A	49	40 (38-42)

Test A - After 15 minutes operation charging at 7 amps
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13 6-13 8 volts
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See 'Autolite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

►*IGNITION SWITCH REPLACEMENT NOTE (Early Cars)* Early cars used 4-terminal switch with coil resistor bypass wire **not** connected When replacing this switch with later production 5-terminal switch, bypass wire (dark brown) must be connected to IGN-2 terminal

►*DIRECTION SIGNAL CANCELS TOO SOON CORRECTION* Caused by reversed wires at cancelling switch To correct, reverse orange and violet wires at switch so wires plug into opposite color connector

Headlights: 4-Headlight System *See "4-Headlight Systems" in Electrical Section*

Direction Signals: *See Electrical Section*

Automatic Beam Changer: *See Electrical S ction*

Electronic Rear View Mirror: *See Electrical Section*

Instrument Panel Lighting: "Panelescent" type *See "Chrysler & Imperial Panelescent Lighting" in Electrical Section*

Stop Light Switch Location: On forward end of brake master cylinder

Instrument Cluster & Speedomet r (Chrysl r): R moval - Disconnect battery ground cable Remove steering wheel and steering jacket tube cover Disconnect all wires from terminals on instrument ground wire Remove instrument cluster bezel (access to stud nuts from behind instrument cluster over top of steering jacket tube) Disconnect speedometer cable Remove steer-

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ing tube collar Remove the two long screws and spacers holding dome and cluster assembly to dome support (screws located behind steering tube collar attaching screws) Remove dome-to-instrument panel screws and release base of dome from side supports With a pointed instrument, carefully move dome away from instrument panel opening so top of dome and cluster can be tipped outward to allow access to parking brake warning lamp socket Snap lamp socket and bulb out of center of center of cluster Remove dome and cluster assembly *NOTE - If dome fits tightly in support, remove screws attaching cluster to dome and push cluster up into the dome Then carefully compress dome to clear supports for removal* Remove attaching screws and remove speedometer assembly

Installation: Reverse removal procedure, entering right corner of dome base into dome supports and carefully moving assembly with a rocking motion until assembly is in position (spring down slightly on dome supports)

Instrument Cluster & Speedometer (Imperial): *NOTE - Speedometer can be removed in same manner as instrument cluster (below) after cable disconnected* **Removal** - Disconnect battery ground cable Remove retainer ring screw at bottom of retainer and pull bottom of retainer forward and upward to release upper tab Remove instrument cluster retaining screws Disconnect all wires from cluster Remove cluster

CIRCUIT BREAKERS: 22 5 Ampere - Headlights, Parking lights, High beam indicator & Ignition switch light On headlight switch
15 Amp - Tail, Stop, License lights & Instrument Light Oscillator On headlight switch
6 Amp - Windshield wiper On wiper switch

FUSES: *All fuses are in fuse block behind instrument panel to left of radio*

20 Amp - Heater & Air Conditioning
14 Amper - Cigar lighter **10 Ampere** - Auto Pilot
6 Amp - Glove Box Trunk Map & Body lights
6 Ampere - Back-up lights
6 Amp - Rear Window Defroster
2 Amper - Mirror-Matic **1 Ampere** - Clock

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION. Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 90° V8 valve-in-head

►*300F ENGINE NOTE:* Engine used on this model is same as standard 413" engine except for Ram Induction Manifold (two carburetors) and High Performance Camshaft (different valve specifications)

►*CHRYSLER WINDSOR & SARATOGA ENGINE PRODUCTION CHANGE & SERVICE NOTE* Different engines used on later cars as follows **Windsor** - On cars with Serial No 81-03167320 to 81-03168115 inclusive, Engine is PS-3 (383" type) *Refer to DeSoto 383" engine data for all specifications and service data on this model* **Saratoga** - On cars with Serial No 82-03161884 to 82-03168116 (No Air Cond), and No 82-03166499 to 82-03168117 inclusive (Air Cond), Engine is PC-3 (413" type) *Refer to 413" engine specifications and service data below for this model*

Engin	Bor	Str k	Displacem nt
Windsor (Early ⑤)	4 031"	3 75"	383 cu ins
Saratoga (Early ⑤)	4 031"	3 75"	383 cu ins
Others	4 188"	3 75"	413 cu ins

Engine	Compr. Ratio	Rated HP	Developed HP
383" Windsor ⑤	10 1-1	52 0	① 305 at 4600 RPM
383" Saratoga ⑤	10 1-1	52 0	② 325 at 4600 RPM
413" N Y & Imp	10 1-1	55 9	② 350 at 4600 RPM
413"(300F) ③	10 1-1	55 9	375 at 5000 RPM
413"(300F) ⑩	10 1-1	55 9	400 at 5200 RPM

① - 2-Bbl Carburetor ② - 4-Bbl Carburetor
③ - Two 4-Bbl Carburetors & TorqueFlite
⑩ - Two 4-Bbl Carburetors & Synchro-mesh

⑤ - For later engines, see Engine Production Change & Service Note above

Compression & Vacuum Reading - *See TUNE-UP*

►*ENGINE "GRINDING", "GROWLING", OR "BUZZING" NOISE CORRECTION See "Oiling System" for data.*

ENGINE REMOVAL: *See "Engine" in Chrysler Special Data*

CYLINDER HEAD & MANIFOLD : *See "Cylinder Head & Manifold" in Chrysler Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Special Data*

OIL PAN REMOVAL: Remove dipstick, drain crankcase, disconnect battery ground cable and remove No 6 spark plug Raise car and disconnect steering linkage from idler and pitman arms Remove outlet breather pipe and disconnect exhaust pipe branches from manifolds Remove exhaust pipe and converter dust shield On Windsor and Saratoga remove engine front mount retaining nuts and raise engine about 2" Remove oil pan bolts Rotate crankshaft so front counterweight and connecting rods are at highest position and lower pan, turning counterclockwise to clear oil screen and suction pipe *NOTE* When installing bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel struts

►*CYLINDER BORE OVERSIZE NOTE Letter "A" within engine number indicates that cylinder bores are 020" oversize*

Weight - 25 7 ozs (383"), 27 5 ozs (413")
Removal - Pistons and rods removed from above

Fitting New Pistons: Clearance - 0005- 0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston and halfway down cylinder wall, crosswise to engine

Installing Pistons: Notch in piston head must be toward front of engine Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8) *See Rod Installation*

Replacement Pistons: Furnished Std , 005", 020" & 040" Oversize with fitted pins

PISTON PIN

Pin is tight press fit in connecting rod and special removal and installation procedures are required Piston pins are available only with new pistons

Diameter - 1 0935-1 0937"
Length - 3 555-3 575"
Clearance in Piston - 00045- 00075" Light thumb press fit at 70°F
Clearance in Rod - 0007- 0012" **interference fit.**
Piston Pin Removal & Installation - *See "Piston Pins" in Chrysler Special Data*

Replacement Pins: Furnished standard size only with new pistons

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr (1 & 2)	0775- 0780"	013- 025"	0015- 0030"
Oil (3)	1860- 1865"	013- 025"	0010- 0030"

Installing Rings: Install compression rings with "Top" mark toward top of piston

Replacement Rings: Furnished for oversize ranges of Std to 009", 020" to 029", 040" to 049"

CONNECTING ROD

Length (Center-to-Center) - 6 766-6 770"
Weight - 29 4 ozs
Crankpin Journal Diameter - 2 374-2 375"

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE) See CRANKSHAFT below*

Lower Bearing - Removable precision type Lead base babbitt on steel
Clearance - 0005- 0015" Wear limit 0025"
Sideplay - 009- 017" Total for both rods

Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet Oil grooves in rod and bearing cap must be together

Replacement Bearings: Std , & 001", 002", 003", 010", 012" Undersize

CRANKSHAFT

Journal Diameter - 2 7495 2 7505"

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION Engines with undersize journals identified as follows*
010" UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" within engine number and on a crankshaft counterweight indicates that ALL Main & Connecting Rod Journals are 010" Undersize
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) within engine number indicates that one or more connecting rod and main bearing journals are machined 001" undersize Position of undersize Main Journals is stamped on No 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No 3 counterweight Connecting rod journals will be identified by letter "R" and main journals by letter "M" The number following letter "R" or "M" indicates journal number

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B arings - Removable precision type. Tin based babbitt on steel (No. 3 thrust bearing), lead based babbitt on steel (Others).

Clearance - .001-.002" (300F), .0005-.0015" (Others). Wear limit .0025" (All).

Replacement Bearings: Std.,& .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves of **any** bearing are **not** interchangeable. No. 3 bearing is not interchangeable with other bearings.

End Thrust: Taken by flanged No. 3 (center) mainbearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Special Data.*

CAMSHAFT

►*NOTE: Special "High Performance" camshafts used on 300F.*

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.748-1.749".

Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.750-1.751".

Bearings - Removable, lead base babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust: Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain: Width .88". **Pitch** .50". **Length** 50 links.

Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Chrysler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data.*

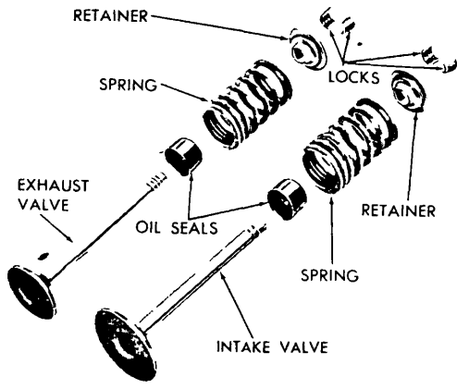
VALVES

Tappet Clearance: Zero lash, hydraulic lifters. *NOTE* - On 300F with Mechanical Lifters, .016" Intake, .028" Exhaust, Cold.

Valve	Head Diam.	Stem Diam.	Length
Intake	①	.372-.373"	4.87"
Exhaust	1.60 ②	.371-.372"	4.89"

① - 1.95" (383" Eng.), 2.08" (413" Eng.).

② - 1.74" on 300F with mechanical lifters.



CHRYSLER VALVE ASSEMBLY

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①.389"	③.001-.003"
Exhaust	45°	②.389"	.002-.004"

① - .430" (300F with Hydraulic lifters), .449" (300F with Mechanical lifters).

② - .430" (300F with Hydraulic lifters), .454" (300F with Mechanical lifters).

③ - .002-.004" on 300F.

Valve Seat Width - .060-.085" Intake, .040-.060" Exhaust.

Valve Stem Oil Seal - Cup type used on all valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

Valve Springs: Damper spring used inside valve spring on 300F.

Spring Specifications (Exc. 300F)

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	187-203 lbs.	1.47"

① Spring Specifications (300F)

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	197-213 lbs.	1.43"

① - Includes damper.

Spring Free Length - 2.38" (300F), 2.34" (Others).

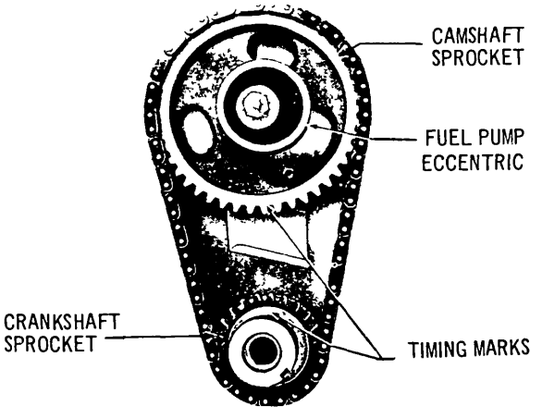
►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 57/64", install 1/16" spacer under under spring to bring height within limits of 1 53/64-1 57/64".

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation: Install all springs with closed coil end toward cylinder head.

►*CAUTION:* Spring ends must be square within 1/16".

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005"), C-3430 (.015"), and C-3427 (.030") to ream guides in progressive steps of .005", .015" & .030".



CHRYSLER VALVE TIMING MARKS

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

Hydraulic Valve Lifters: Used on all engines except special mechanical lifter option on 300F.

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" Oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Diameter - .9040-.9045". **Clearance** - .0005-.0018".

Replacement Lifters - Furnished Std. & .001", .008", .030" Oversize.

Lifter Overhaul & Testing - *See "Valve System" in Chrysler Special Data.*

Rocker Arm Assembly: *See "Valve System" in Chrysler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

① Valve Timing Specifications (Except 300F)

Intake Valves - Open 15° BTDC. Close 57° ALDC.

Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

(300F With Hydraulic Lifters)

Intake Valves - Open 20° BTDC. Close 68° ALDC.

Exhaust Valves - Open 60° BLDC. Close 28° ATDC.

(300F With Mechanical Lifters)

Intake Valves - Open 25° BTDC. Close 79° ALDC.

Exhaust Valves - Open 74° BLDC. Close 30° ATDC.

① - With valve train solid.

Valve Timing Check: Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted .034" (300F), .017" (Others). Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning crankshaft any further in normal direction.*

OILING SYSTEM

►*ENGINE GROWLING, BUZZING, OR GRINDING NOISE (Early Cars):* When vibration can be felt in engine oil pan, it is recommended that new Relief Valve Spring & Damper Assembly, Part No. 2202845, be installed before other measures are taken. *NOTE* - This new spring and damper assembly used in production beginning Engine Nos. PR-38-6-27 and P-41-6-27.

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chrysler Special Data.*

Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.

Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, *see "Oiling System" in Chrysler Special Data.*

Oil Pressure Indicator: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial).

►*GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE AND SERVICE REPLACEMENT CAUTION: See "1960 Oil & Temperature Gauges" in Miscellaneous Section.*

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Dash Unit - Chrysler No. 2096580 (Chrysler), No. 1971106 (Imperial).
Engine Unit - Chrysler No. 1972241 (All).
See "Oil Pressure Gauges" in Miscellaneous Section.

Oil Pump: Rotor type mounted on cylinder block at lower left front side of engine.
Pump Overhaul - *See "Oiling System" in Chrysler Special Data.*

Oil Filter: Full flow disposable type. Replace filter every 4000 miles to coincide with engine oil change.
►*OIL FILTER INSTALLATION CAUTION:* Before installing, make sure drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base. Screw new filter on base until gasket contacts base. **Tighten ½-turn additional by hand.** DO NOT overtighten

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap at every oil change or sooner under heavy dust conditions.

COOLING

Water Capacity: 16 qts. Add 1 qt. for heater.
►*AIR CONDITIONING OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

Thermostat: Pellet type. Located in water outlet housing. Standard 180° thermostat, Part No. 1674602, starts to open at 178-182°F. Designed for use with permanent type anti-freeze. Optional 160° thermostat, Part No. 1734957, also available.

Water Pump: Sealed ball bearing type. No lubrication required.
Water Pump Removal & Overhaul - *See "Water Pump" in Chrysler Special Data.*

Fluid Fan Drive: Used on air conditioned cars and standard on all 300F models. *See "Cooling System" in Chrysler Special Data.*

Temperature Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial).
►*GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE AND SERVICE REPLACEMENT CAUTION:* *See "1960 Oil & Temperature Gauges" in Miscellaneous Section.*
Dash Unit - Chrysler No. 2096577 (Chrysler), No. 1971104 (Imperial).
Engine Unit - Chrysler No. 2084459 (All).
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 11A8WW. Semi-centrifugal type. Used on Windsor and 300F with synchro-mesh.
Cover - Borg & Beck No. 361527.
Disc. - Borg & Beck No. 383039.
See "Borg & Beck" in Clutch Section.

Pedal Free play Adjustment: Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This will provide correct 1-1¼" pedal freeplay.

Over-Center Spring Adjustment: Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off over-center spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 5 turns tighter with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort too high, tighten adjusting nut; if too low, loosen nut. Initial effort required to start pedal moving should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Clutch Removal: Remove transmission (see below) and clutch housing pan. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to relieve tension. Remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Warner Model T-85. Used on Windsor. Three-speed constant mesh, all helical gear type.
See "Warner Synchro-mesh Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Lubricant Capacity - 3½ pints.

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable and housing and gearshift rods. Disconnect parking brake cable. Disconnect back-up light switch wires. Install Engine Support Fixture C-3487 so hooks are firmly in holes in frame side member with support against underside of oil pan flange. With fixture supporting engine, raise engine slightly and disconnect rear support. Support transmission and remove transmission attaching bolts. Remove transmission by sliding to rear so pinion shaft clears clutch. *NOTE* - Crossmember is removed with transmission

TORQUEFLITE TRANSMISSION

TorqueFlite automatic transmission of same design used previously.
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" in Transmission Section.*
►*TESTING & TROUBLE SHOOTING: See "TorqueFlite" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 10,000 miles or sooner if used in heavy duty service.

Checking Fluid Level - Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Maintain fluid level at (or slightly below) "F" mark on dipstick. *NOTE* -- If fluid checked with transmission cold, maintain fluid level at (or slightly below) "L" mark. **Use only Automatic Transmission Fluid Type "A", Suffix "A".**

Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "TorqueFlite" in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear (Chrysler); Cross type at front, center & rear (Imperial).

PROPELLER SHAFT

Single propeller shaft used on Chrysler, two-piece shaft with center bearing support used on Imperial.
►*DRIVE LINE DISTURBANCE OR BEAT AT 60-80 MPH CORRECTION (Early Cars):* Install improved rear spring interliners (see below for part nos. and application) to replace original liners. Install only same number of liners as originally used. Interliners are a friction control and need no lubrication. Improved type used in production on later cars.

Rear Spring Interliners

Model	Part No.	Quantity Per Car
1959-60 Windsor ①	2240314	1
1959-60 Saratoga & N.Y. ②	2240314	2
1959 Imperial	2240314	2
1960 Imperial	2240315	2

① - Except Town & Country.
② - Including Windsor Town & Country.

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chrysler Special Data.*

Propeller Shaft Removal (Imperial): *See "Propeller Shaft Notes" in Chrysler Special Data.*

Center Bearing Overhaul (Imperial): *See "Propeller Shaft Notes" in Chrysler Special Data.*

REAR AXLE

Own. Semi-floating hypoid gear with Hotchkiss Drive.
NOTE - "Sure-Grip" differential optional.
See "Chrysler Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.
►*REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION (Early Cars): See "Chrysler Hypoid" in Rear Axle Section.*
►*DIFFERENTIAL TYPE & RATIO IDENTIFICATION NOTE:* Ratio stamped on identification pad on carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad or by a metal tag marked "Use Sure-Grip Lube" attached to a carrier housing bolt.

Axle Ratios (Except 300F): 3.54-1 (39-11) Windsor with Synchro-mesh. 2.93-1 (41-14) All Others.

Axle Ratios (300F): 2.93-1 (41-14), 3.15-1 (41-13), 3.23-1 (42-13), 3.31-1 (43-13), 3.54-1 (39-11), 3.73-1 (41-11).
Backlash - .006-.008".

Axle Shaft Removal: Remove wheel and hub and drum assembly (use Puller C-845). *CAUTION - Do not strike end of axle shaft or use "knock-off" type puller.* Block brake pedal and disconnect brake line at wheel cylinder. Remove axle shaft key. Remove brake support and dust shield (use Oil Seal Installing Sleeve C-745 to protect outer seal). Remove shim pack. Remove axle shaft with Puller C-499. *NOTE* - Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637 and brake dust shield outer seal with Driver C-3565.

Carrier Assembly Removal: Remove axle shafts (see above). Disconnect propeller shaft at rear universal joint. Drain lubricant. Remove attaching bolts and remove carrier.

Wheel Bearing Adjustment: Controlled by axle shaft endplay adjustment. *See "Chrysler Hypoid" in Rear Axle Section.*
Axle Shaft Endplay - .013-.018" (.023" permissible).

SHOCK ABSORBERS

Oriflow. Direct acting, hydraulic. Serviced by replacement.
►*SHOCK ABSORBER MOUNTING NOISE CORRECTION:* On front shock absorber, lower mounting bolt may have short threads preventing "U" mounting bracket from gripping lower bushing. To correct, install a washer between bracket and nut and tighten nut to 55 ft. lbs. On rear shock absorber, upper mounting stud may be loose at body attachment. To correct, inspect stud and nut threads for damage and tighten nut to 70 ft. lbs. *NOTE - If above procedure does not correct noise, install new type shock absorbers (see below).*

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►*SHOCK ABSORBER REPLACEMENT NOTE Us only shock absorbers list d b low for servic replac ment and to correct noise*

Replacement Shock Absorbers

Model	Front	Rear
Chrysler Std.	2240355	2240358
Chrysler H D (300F Std)	2240356	Ⓒ
Imperial Std	2240353	2240359
Imperial H D	2240356	2240361

Ⓒ - No 2240360 (1" diameter), No 2240362 (1 3/8" diameter)

FRONT SUSPENSION

"Torsion-Aire" type of same design used previously with eccentric cam adjustment for caster and camber *See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section*

Steering Axis Inclination - 5½-7½°.
Caster (Manual Steering) - Neg ½°±½°
Caster (Power Steering) - Pos ¾°±½°
Camber (Right Wheel) - Pos 1/8°±1/4° Pos 1/8° preferred **(Left Wheel)** - Pos. 3/8°±1/4° Pos 3/8° preferred
Toe-In - 3/32-5/32" 1/8" preferred
Toe-Out on Turns - With outer wheel at 20°, inner wheel should be at 20½-22½°

Wheel Bearing Adjustment: Tighten adjusting nut to 90 **inch-lbs.** torque while rotating wheel Position nut lock on nut with slot in line with cotter pin hole in spindle and then back off nut and nut lock ½ slot (cotter pin hole will be covered). Remove nut lock and reposition on nut so slot lines up with cotter pin hole and install cotter pin *CAUTION - Do not turn adjusting nut*

STEERING

Manual: Gemmer. Worm & three-tooth roller
See "Gemmer Worm & Roller" in Steering Section

►*STEERING GEAR PRODUCTION CHANGE:* Later cars have flexible coupling in steering gear tube *See "Gemmer Worm & Roller" in Steering Section*

►*HARD STEERING OR GEAR BINDING CORRECTION (Manual Steering)* May be caused by cross shaft adjusting screw retaining snap ring being unseated *See "Gemmer Worm & Roller" in Steering Section*

Pow r St ring: Constant Control Full Time type of same design used previously
See "Chrysler Constant Control Power Steering" in Steering Section

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Chrysler Constant Control Power Steering" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Chrysler Constant Control Power Steering" in Steering Section*

BRAKES

Service: Three Platform Total Contact type of same design used previously
See "Chrysler Three Platform Total Contact Brakes" in Brake Section

►*BRAKE DRAGGING, IMPROPER RELEASE OR PULL CORRECTION:* May be caused by lining contacting drum (burrs or paint on dust shield platforms) or improper return spring tension *See "Chrysler Three Platform Total Contact Brakes" in Brake Section*

►*OVAL PISTON TYPE POWER UNIT "THUMP" CORRECTION (Early Cars)* Noise occurs when brakes released *See "Chrysler Oval Piston Power Unit" in Brake Section*

Drum Diameter - 11" front & rear (Windsor), 12" front & rear (Others) 12" brakes used on Windsor Town & Country

Wheel Cylinder Diameter - 1 1/8" front & rear Two single acting cylinders used on front, one double acting cylinder used at rear

Lining - Molded asbestos bonded to shoe **Width** 2 5", **Length** 11 5" (11" brakes), 12 6" (12" brakes), **Thickness** 11/64" All shoes

►*BRAKE LINING REPLACEMENT NOTE* 12" brakes except those used on Imperial have red stripe on edge of lining Use only this type for service

Braking Power - 60% front, 40% rear

Clearance - With wheel locked against drum, back off adjusting cam until no drag is felt

Master Cylinder: On engine side of firewall opposite base of brake pedal

►*MASTER CYLINDER NOTE (Cars Without Power Brakes)* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder eliminating need for adjustment No pedal return spring is used A service package consisting of piston-collar-rod-retainer and boot assembly is available

►*BRAKE PEDAL & PUSHROD CAUTION* Never pull brake pedal back beyond piston stop in master cylinder A pull of 50 lbs could pull pushrod off piston

Checking Fluid Level - Master cylinder cover is used as a filler cap

Removal: Disconnect pushrod, brake tube and stop light switch wires Remove attaching bolts and remove cylinder

Power Brakes: "Oval Piston" or "Bellows" type power units used Mounted on firewall and linked to upper end of brake pedal Used with adjustable pushrod type master cylinder
See "Chrysler Bellows Power Unit" or "Chrysler Oval Piston Power Unit" in Brake S ction
Pedal Freeplay Adjustment - S e *"Chrysler Bellows Power Unit' or "Chrysler Oval Piston Power Unit" in Brake Section*

Removal: Place a wedge between power lever and bracket to prevent damage to trigger arm Scribe mark power unit and mounting bracket, and mounting bracket and firewall Disconnect vacuum hose from power unit Remove master cylinder (see above) Remove mounting bracket attaching bolts and remove power unit and bracket assembly

Parking Brake: Transmission mounted 7" internal expanding type used Foot-operated lever applies brake
Adjustment - *See "Brake Notes" in Chrysl r Special Data*
Lining - Width 2", Thickness 5/32", Length 6 53" per shoe (2 shoes)

MISC. MECHANICAL

Windshield Wiper: Autolite electric variable speed *See "Windshield Wipers" in Miscellaneous Section*

Air Conditioning: Heater-Air Conditioning *Se "Chrysler Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Electric type *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjuster: 6-Way electric type *See "Power Seat Controls" in Miscellaneous S ction*

Door Locks: Vacuum type (Chrysler), Electric type (Imperial) *See "Vacuum Door Locks" or "Electric Door Locks" in Miscellaneous S ction*

►*1954 AIR-CONDITIONED CAR SERVICE CAUTION Us extreme care wh n disconnecting any part of air conditioning equipment or lines. See "Chrysler, DeSoto, Dodge Airtemp" Air Conditioning in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Designation
Powermaster Six	S-20

SERIAL NUMBER: On left front door hinge post.

Starting Serial N s.	Detroit	Los Angeles
S-20 (Exc. Taxi)	50306001	62043001
S-20 (Taxi)	5126001	

ENGINE NUMBER: Stamped on boss on left side of cylinder block between Nos. 1 and 2 cylinders.
Starting Engin Numb r–S20-1001.
►*ENGINE NUMBER LETTERS & MARKS (Following Engine Numbers). Identified as follows:*
"A"–All Cylinders 020" oversize
"B"– All Crankshaft Journals 010' undersize.
"AB"– BOTH above conditions exist

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed of 150 RPM. Maximum variation between cylinders 10 lbs.
VACUUM READING: Steady 18-20" idling.
VALVE TAPPET CLEARANCE. .008" Intake. .010" Exhaust. Engine must be hot and idling. *NOTE*–Tappet screws are self locking. Remove right front wheel and lower wheel housing for access to valves.
►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE.* An additional .002" clearance for **exhaust** tappets is desirable.
MANIFOLD HEAT CONTROL: Automatic thermostatic type. See that valve operates freely. When installing coil, wind free end up **approximately** ¾ turn, not over one turn or under ½ turn, hook end on stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4. See diagram.
SPARK PLUG GAP: .035".
Spark Plug–Auto-Lite 4S-140. Resistor type. 14 mm.
COIL. Aut -Lite CR-4001 (U.S.), CR-6007B (Canada).
Ignition Curr nt–2.25 amperes idling, 5.0 stopped.
DISTRIBUTOR: Auto-Lite IAT-4102 (U.S. Cars), IAT-4012 (Canada).
Condenser–Auto-Lite IAT-3076RA. **Capacity**–.25–.285 microfarad.
C ntact Point S t–Auto-Lite IGW-3028BS.
Br aker Gap–.018–.020".
Cam Angl –36–42°. DO NOT exceed breaker gap limits to obtain dwell.
Br ak r Arm Spring Tension–17–20 ozs.
R tation–Clockwise viewed from above.

Aut matic Advance–IAT-4012, 4102

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	450	2	900
5	800	10	1600
9	1300	18	2600
10	1425	20	2850

Vacuum Spark C ntrol: Auto-Lite. Integral type.

Vacuum Advance–IAT-4012, 4102

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5
2	4	7¼
4	8	9-3/8
6	12	11-5/8
9	18	15

►*DISTRIBUTOR INSTALLATION CAUTION: Make sure that No. 1 piston is at TDC on compression stroke and that distributor rotor is in No. 1 firing position.*

IGNITION TIMING

Setting– 20° BTDC.
Timing Mark–On crankshaft vibration damper.
►*IGNITION TIMING CAUTION: For accurate reading, be sure engine is at operating temperature and carburetor is at slow idle.*

CARBURETOR

Carter (Ball & Ball)–Model E9C1 (Synchro-mesh Trans. Cars), Model E9B1 (PowerFlite Trans. Cars).
Idle Setting–½–1 ½ turns open. For richer mixture turn screw out.
Idle Speed–450-500 RPM. (Synchro-mesh), 500 RPM. (PowerFlite).
Float Level–5/64" plus or minus 1/64" from top surface of body casting to top of float.
Accelerating Pump–(E9C1) Inner hole summer, center hole normal, outer hole winter. (E9B1) Long stroke for cold weather, short stroke for hot weather.
Fast Idle .015-.019" clearance between throttle valve and bore of carburetor, side opposite idle port, with choke valve held closed and throttle stop screw backed off.
Automatic Choke Setting Centered (at Index).
Slow Closing Throttle (Dashpot (E9B1)· Adjustment screw located on top of carburetor on side opposite thermostatic coil housing. To adjust, tighten adjustment screw, then turn counter-clockwise 5 turns. Further adjustment outward will increase action of dashpot and lengthen its retarding effect.
Throttle Linkage Adjustment (E9B1) *See "PowerFlite" Transmission in Transmission Section.*
►*OTHER DATA See "Carter (B & B)" in Carburetor Section.*
Fuel Pump Pressure 3½-5 lbs.

CARB. EQUIPMENT

Fuel Pump Carter M-639-S. Vacuum diaphragm type.
Pressure–3½-5 lbs.
See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge Auto-Lite Electric type.
Dash Unit–Auto-Lite 13392A (Exc. Estate Wgn.), 13531A (Estate Wgn).
Tank Unit–Auto-Lite 12617A (Exc. 8-Pass.), 11538A (8-Pass).
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Auto-Lit 2H-120-B or Willard HW-2-120-C. 6 volt, 17 plate, 120 ampere hour capacity.
Grounded Terminal–Positive.
Engine Ground–Left front of engine.

STARTER

Auto-Lite No.	Armature No.
MCL-6117 (Exc. Taxi)	MCH-2070
MCL-6121A (Taxi)	MCH-2110

Drive–Solenoid pinion shift and overrunning clutch.
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–42-53 ozs. (new brushes).

Performance Data

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4900	5.0	65
8.0 ft. lbs.	Lock	2.0	410

Starting Switch: Auto-Lite SSX-4003 (MCL-6117 Starter), SSX-4004 (MCL-6121A Starter). Combination starting switch and solenoid pinion shift. PowerFlite Cars have Neutral Safety Switch and SEPARATE starter relay Auto-Lite HRW-4001A. *See "Starter Controls" in Electrical Equip. Section.*
Neutral Safety Switch Adjustment. *See "PowerFlite" Transmission in Transmission Section.*

GENERATOR

Auto-Lite Generator No.	Armature No.
GGW-6001J, K (U.S. Std.)	GGW-2006F
GGW-6008F, G (U.S. Pow. St.)	GGW-2045F
GGU-6006G (Spec. Pow. St.)	GGU-2042F
GGU-6008D (Air Cond.)	
GGU-6006B (Air Cond. & Pow. St.)	GGU-2042F
GGW-6008FA (Can. Pow. St.)	
GGU-6006GA (Can. Pow. St.)	
GGW-6001L, Q (Special)	GGW-2006F
GGU-6001G, H, R (Special)	GGU-2006F
GGU-6005A (Taxi)	

Performance Data–GGU

Amperes	Volts	Cold – R.P.M. – Hot
0	6.4	750-850 800-900
45	8.0	1450-1650 1650-1850
50	8.0	1550-1750 1750-1950

Performance Data–GGW

Amperes	Volts	Cold – R.P.M. – Hot
0	6.4	870-970 950-1050
40	8.0	1800-2000 2150-2350
45	8.0	1925-2125 2350-2550

Brush Spring Tension–35-53 ozs. with new brushes.
Field Current–(GGU) 1.4–1.6 amperes at 5 volts. (GGW) 1.4–1.5 amperes at 5 volts
Motoring Current–(GGU) 5.0–6.0 amperes at 5 volts, (GGW) 4.8–5 3 amperes at 5 volts
Rotation–Counter-clockwise at commutator end.
Belt Adjustment Approximately ½" slack (when pushed from a straight line midway between pulleys).

REGULATOR

Auto-Lite Regulator No.	Generator
VBE-6001A	GGW
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU

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Cutout Relay

Cuts In–6.3–6.8 volts.
Cuts Out–4.1–4.8 volts.
Contact Gap–.015" minimum.
Air Gap–.031–.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting–7.1–7.4 volts *after 15 minutes operation charging at ½ maximum rate.*
Air Gap–.048–.052" with contacts just opening.
Checking & Adjusting–*See Electrical Equip. Section.*

Current Regulator

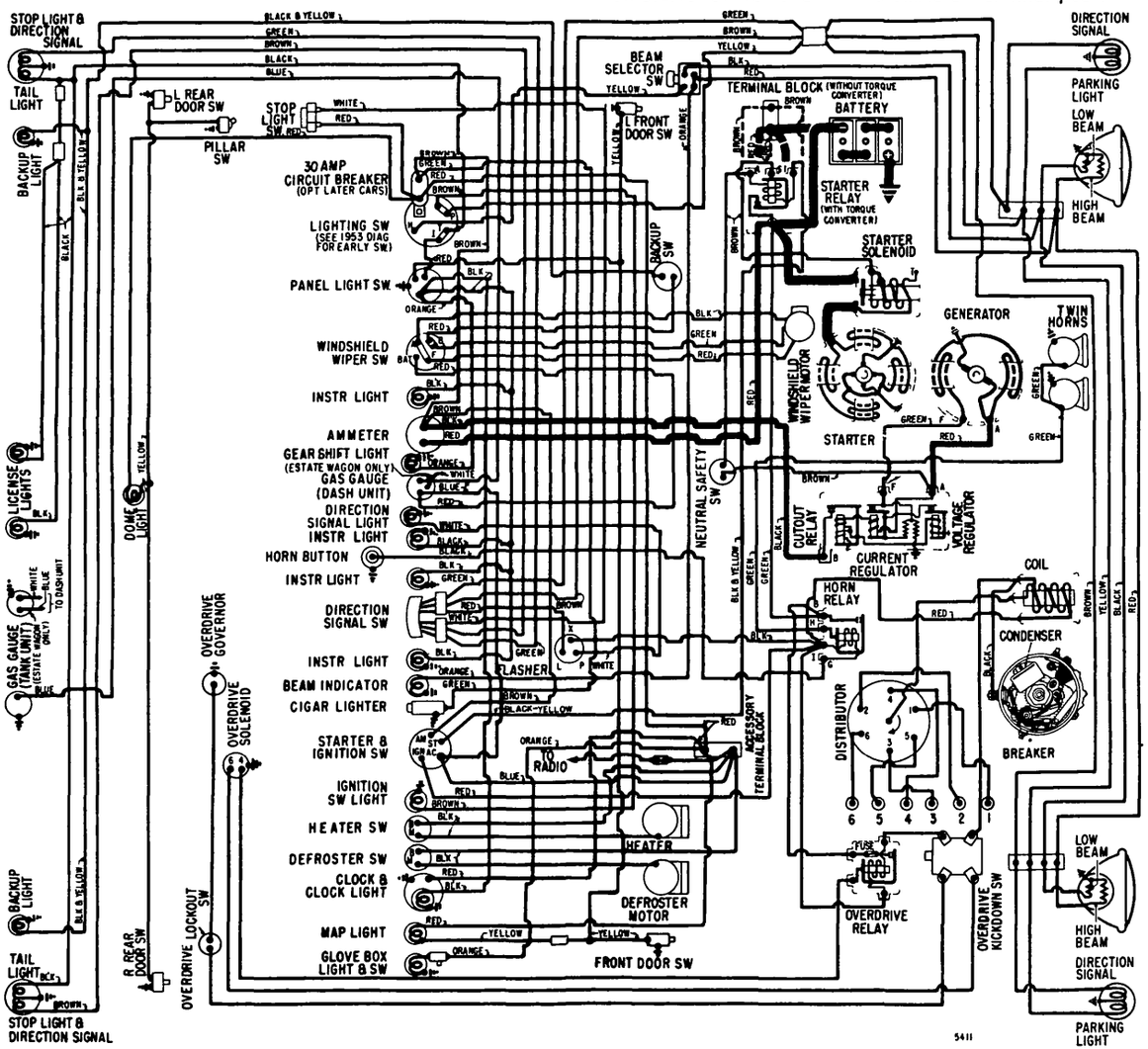
►*SETTING CAUTION*–*"Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A–Operating Amperes	Test B
VBE-6001A	52	45(43-47)
VAV-6001B, 2B	50	50(48-52)

Test A–After 15 minutes operation charging at ½ maximum rate.
Test B–After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7–6.9 volts).
Air Gap–.048–.052" with contacts just opening.
Checking & Adjusting–*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equip. Section.*
►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal* **only** *on ignition-starter switch and* **not** *the ammeter terminal post.*



Lighting Switch Removal: Remove knob (use small screwdriver to raise up special clip in knob, or remove small cross-head screw, depending on method used to hold knob). Remove hex nut and collar that holds assembly in place. Pry out switch (switch has threaded sleeve with two flat sides. Sleeve fits snugly in switch hole in panel).
Stop Light Switch Location: In brake line fitting on frame left side rail.

FUSES: Clock–3 amperes. In clock lead wire.
Overdrive–20 amperes. On overdrive relay.

CIRCUIT BREAKERS: *NOTE–Two types of headlamp switches used.*
Early Type–Located in headlamp switch assembly. Consist of two 10 ampere and one 20 ampere circuit breakers, protecting headlight, tail and stop light, accessory, and interior lighting circuits. Back-up lights protected by 10 ampere circuit breaker in windshield wiper switch.
Later Type–One 30 ampere circuit breaker protects lighting circuits. Located to right of ammeter. 10 ampere circuit breaker, located in windshield wiper switch, protects back-up lights.

Horn Relay: Auto-Lite HRL-4104.
Contacts Close–1.5–3.0 volts (seal to core with 4.0 volts maximum).
Contacts Open–.5 volts minimum (open from Seal).
Contact Gap–.026". **Air Gap**–.016–.020" (armature air gap with contacts closed but not sealed).

ENGINE

►*AIR-CONDITIONED CAR SERVICE CAUTION. Use extreme care when disconnecting any part of air conditioning system. See "Chrysler, DeSoto, Dodge Airtemp" Air Conditioning in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Six Cylinder "L" head.
Bore–3-7/16". **Stroke**–4½".
Displacement–250.6 cu. ins. Rated HP–28.36.
Developed Horsepower–116 at 3600 RPM.
Compression Ratio–7.0–1.
Compression & Vacuum Reading–*See TUNE-UP.*

ENGINE REMOVAL: *See DeSoto Special Data.*

OIL PAN REMOVAL: Drain engine oil. As soon as oil is drained, install drain plug and tighten securely. Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal. Remove oil level indicator and drop pan on tie rod. Lift up oil strainer so it clears baffle inside pan. With strainer lifted, slide pan to rear and remove. NOTE–New end gaskets should protrude 1/4" to 1/8" above oil pan. *Ends must not be cut off.*

CYLINDER HEAD & TIGHTENING TORQUES: *See DeSoto Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.
►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*
Weight–18.5 ozs. (stripped).
Removal–Pistons and rods removed from above.
Fitting New Pistons: Clearance .0005–.001" between thrust face of piston and cylinder bore. With piston

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pin and rings removed, cylinder wall and piston dry and clean, insert piston, upside down, into cylinder bore. Piston is properly fitted when it has slight drag in bore, but is still free enough to travel slowly through bore of its own weight.

Replacements Std., .005", .020", .030", .040", .060' oversize.

Installing Pistons Slot away from camshaft.

Full floating type.

PISTON PINS

Diameter–55/64". **Length**–2.87".

Pin Fit in Piston–.0000"–.0005". DOUBLE THUMB push fit at room temperature (70° F.)

Pin Fit in Rod Bushing–.0001–.0004". Tight thumb push fit at room temperature (70° F.). Selective.

Replacements. .003", .008" oversize.

NOTE–Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.007–.015"	.0025–.004"
Compr. (#2)	3/32"	.007–.015"	.002–.0035"
Oil (#3, 4)	5/32"	.007–.015"	.001–.0025"

Replacement Rings Std., .010", .020", .030", .040", .050", .060" oversize.

Installing Rings· #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center to Center)–7-7/8". **Weight**–32.4 ozs.

Crankpin Journal Diameter–2.124–2.125".

Maximum out-of-round and taper limits–.001".

Lower Bearings–Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below.*

Clearance–.0005–.0015" desired. Maximum–.0025".

Endplay–.006–.011".

Bearing Adjustment None. Replace bearings.

Replacement Bearings Std., .001", .002", .003", .010", .012", .020", .030", .040" undersize.

Installing Rods. Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter–2.4995–2.5005". Four bearing.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION*

Engines with undersize journals identified as follows .010" UNDERSIZE (All Main & Connecting Rod Journals)–Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)–A "Maltese Cross" (3/8" high) stamped on the machined surface at the upper right hand corner of the block (adjacent to front cylinder exhaust port) to signify that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE The position of the undersize journals are stamped on the machined surface of the crankshaft center counter-weight in the following manner "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings–Removable, precision type, thin babbitt on steel. No shims.

Clearance–.0005–.0015" desired.

Replacement Bearings· Std., .001", .002", .003", .010", .012", .020", .030", .040" undersize. Upper and lower halves of Nos. 1, 2, and 3 are alike and interchangeable, Upper and Lower No. 4 are interchangeable.

Crankshaft Oil Seals· *See "Crankshaft & Main Bearings" in DeSoto Special Data.*

End Thrust Taken by flanged faces on rear (#4) main bearing. **Endplay**–.003–.007".

CAMSHAFT

Bearing Diameters–**(1)** 2", **(2)** 1-31/32", **(3)** 1-15/16", **(4)** 1-1/4".

Bearings–Steel-backed babbitt.

Clearance–.0015–.0035". *NOTE*–If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry cam toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

End Thrust Taken by thrust plate behind camshaft hub. **Endplay**–.002–.006".

Timing Chain Width 1". Pitch .500". Length 24" or 48 links.

Camshaft Setting Sprockets marked. Mesh chain with sprockets so that "O" marks on sprocket are adjacent and in line with a straightedge across shaft centers.

VALVES

Tappet Clearance· .008" Intake. .010" Exhaust (hot and idling).

Valves	Head Diam.	Stem Diam.	Length
Intake	1.718"	.341"	4-27/32"
Exhaust	1.501"	.340"	4-27/32"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	.002"
Exhaust	45°	.365"	.003"

Valve Seat Width–(Intake) 1/16–3/32". (Exhaust) 3/64–1/16".

Valve Guides· Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance. (See Valve Stem Clearance above). *CAUTION–Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*

Valve Springs. Install with closely coiled end up.

Free Length–2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40–45 lbs	1-3/4"
Valve Open	110–120 lbs	1-3/8"

Valve Lifters· Mushroom type (remove from below).

Stem Diameter–.6235–.6240". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".

Lifter Clearance in Block–.000–.001".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 12° BTDC. Close 44° ALDC.

Exhaust Valves–Open 50° BLDC. Close 6° ATDC.

Valve Timing Check–With .014" (cold) tappet clearance, No. 6 intake valve should open with No. 6 piston within range of 5° to 17° or .011" to .122" BTDC with 5th to 17th graduation before DC mark on impulse neutralizer aligned with pointer on timing chain cover case. Reset tappet clearance to .008" hot running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM· See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data* ◄

Crankcase Capacity: 5 qts. (refill). Add one additional quart when filter changed.

Normal Oil Pressure· 50 lbs. at 30 MPH.

Oil Pressure Relief Valve–Oil pressure relief valve opens at 40-60 lbs. Under plug on left side of crankcase ahead of oil line to provide additional oil at idling speeds. Adjustable by replacing spring (3 types). **(1)** Standard spring is not painted. **(2)** Lighter than Standard painted RED. **(3)** Heavier than Standard painted GREEN. When replacing springs, same color springs should be used.

Oil Pressure Gauge–Auto-Lite 13389A. Not electric.

Oil Pump Rotor type on right side of crankcase.

Oil Pump Overhaul–*See "Oil Pump" in DeSoto Special Data.*

Oil Filter. "By-pass" type (Full-flow cannot be used).

Servicing–Install new filter element and cover gasket at 5000 mile intervals (more often in dusty areas). Change oil at same time filter is changed.

Crankcase Ventilation: Air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 15 quarts (16 quarts with heater).

Pressure Valve: DeSoto No. 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cylinder head water outlet. Starts to open 157-162° F.

Water Pump· Packless type. Grease fitting for lubrication.

See "Water Pump" in DeSoto Special Data

Pump Removal–Drain cooling system, remove fan belt, disconnect hoses at pump, remove pump mounting studs. Remove pump.

Temperature Gauge Auto-Lite 13390A. Not electric. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	930	CD728
Overdrive	10A7	930	382235
Taxi	11A6	1330	381850
Heavy Duty	11A6	929	381850

See "Borg & Beck" Clutches in Clutch Section.

Pedal Adjustment: Adjust stop screw on lower end of pedal and adjusting nut on connector link at fork. **Pedal Free Play (At outer end of clutch fork)**–1/8–3/32". **(At Pedal Pad)**–1".

Over-Center Spring Adjustment: Tighten adjusting nut until within 1/4" of end of adjusting screw (end of screw visible about half way through nut). Depress clutch pedal 1" and finish adjusting until over-center spring is on dead center.

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R m val: Remove release fork pull-back spring. Remove transmission (See Synchro-mesh Transmission) and housing underpan. Pull out clutch release bearing and sleeve. Mark cover and flywheel. Take out cover screws, remove assembly.

SYNCHRO-MESH TRANSMISSION

Own. *See "DeSoto Synchro-mesh Transmission" in Transmission Section.*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Jack up front of car, disconnect front universal (loosen companion flange nut if disassembling transmission—See DeSoto Special Data for Propeller Center Bearing Removal on 8-pass.). Disconnect speedometer cable, hand brake cable, gear shift rods. Remove transmission-to-clutch housing cap screws and nuts, Pull unit to rear, down and out of car. NOTE—Use pilot studs when installing assembly.

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.
See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake and place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator.

Oil Pan Filler Tube (Location)—At right rear of engine compartment.

Capacity—12 qts. (refill). 13 qts. (after overhaul).

►*CAUTION: To prevent dirt from entering transmission make sure oil level indicator is properly seated in filler tube.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit. Cross type with roller bearings. *NOTE*—Rear universal on PowerFlite Cars is heavy duty type.

►*CAUTION: Horse shoe clips which retain bearing cap assemblies on heavy duty rear universals (PowerFlite cars) must be driven into place properly and bent over axle flange to prevent loss during operation.*

Pr p ll r Shaft Cent r Bearing: Used on 8-Passenger. *See "Propeller Shaft" in DeSoto Special Data.*

REAR AXLE

Own. Cage type. Semi-floating, hypoid gear with Hotchkiss Drive.
See "D Soto Hypoid" in Rear Axle Section.

Rear Axle Ratios

Synchro-mesh	Standard	Optional
4-Dr., Cl. Cpe	3.9—1	3.73—1, 4.1—1
Estate Wagon	4.1—1	3.9—1, 4.3—1
8-Pass	4.3—1	4.1—1, 4.89—1

Overdrive (All) – (Std.) 4.3—1, **(Optl.)** 4.1—1.

PowerFlite	Standard	Optional
4-Dr., Cl. Cpe	3.73—1	3.9—1, 4.1—1
Estate Wagon	3.91—1	4.1—1, 4.3—1
8-Pass	4.1—1	3.91—1, 4.3—1

Backlash—.006-.010"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), and carrier assembly capscrews. Withdraw carrier assembly from housing.

Axle Shaft Removal: Remove wheel, hub, and drum assembly (use screw type hub puller—Tool C-675), block brake pedal, disconnect brake line at brake cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (Use C-499 puller). NOTE—Use puller C-293-C to remove bearing from shaft, puller C-748 or C-358 to remove inner oil seal, drift C-201 to install seal.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick) equally at both wheels. **Endplay**—.003—.008".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

DeSoto Part No. Standard Shock Absorbers

Car Model	Front	Rear
4-Door & Club Coupe	1450630	1450633
Others	1450631	
Club Cpe, Conv		1450634
8-Pass. Sedan, Est. Wgn.		1450635
Heavy Duty Shock Absorbers		
8-Pass. Sedan, Esq. Wgn.	1450346	
Others	1450041	1450635
All (Special		1450075

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers.
See "DeSoto" in Front Suspension Section.

Kingpin Inclination—5-6½°.

Camber—Neg. 3/8° to Pos. 3/8° (Left 1/4-1/2° higher than right).

Caster—Neg. 1° to Neg. 3° (Neg. 2° preferred).

Toe-In—0" to 1/16" (0" preferred).

Toe-Out on Turns—Inner wheel 21½° plus or minus 1° with outer wheel at 20°.

STEERING

Manual St ring G ar: Gemm r. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Hydraulic steering unit with engine driven hydraulic pump. Two types used as follows

Power Steering Unit	Typ
Gemmer Hydraguide (Early)	Internal Oil Passage
DeSoto Full Time (Later)	Coaxial

See "Gemmer Hydraguide" & DeSoto "Full Time" Power Steering in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button R moval: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "G mm r Worm & Roll r" in Steering Section.*

BRAKES

Service: DeSoto "Safe-Guard" Lockheed hydraulic.
See "DeSoto Safe-Guard" Brakes in Brake Section.

Drums—Centrifuse. Diameter 12".

Wheel Cylinder Diameter—1-1/8" bore. Single acting (front), double acting (rear wheels).

Replacement Linings & Shoes—Linings or shoes with linings are furnished Standard & .030" oversize.

Lining—Molded asbestos (bonded to shoe). Length—12.57" per shoe. Width—2". Thickness—13/64".

Braking Power—60% Front. 40% Rear.

Clearance—.006" at end of all shoes.

Master Cylinder: On frame bracket at base of brake pedal.

Checking Fluid—Access hole at left of front floor pan.

Removal—Remove floor mat and toe board. Disconnect push rod. Remove horse shoe clip and slide brake pedal off shaft. Disconnect brake line tubes at master cylinder fittings. Remove bolts from master cylinder body. Cylinder can then be lifted off frame bracket. When re-installing use new horse shoe clip.

Power Brakes: DeSoto "Vacu-Ease". *See "DeSoto Vacu-Ease" Power Brakes in Brake Section.*

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with PowerFlite.

Adjustment—*See "Hand Brake Notes" in DeSoto Special Data.*

Lining—	Width	Thickness	Length
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (External Typ)—.015—.020" around band.
Internal Type—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMG-4102A. Electric type. *See "Auto-Lite" Electric Windshi ld Wipers in Miscellaneous Section.*

Air Conditioning: DeSoto "Airtemp". *S e "Airtemp" Air Conditioning in Miscellaneous Section.*

Window Regulators: Auto-Lite Electric Type. *See "Auto-Lite" Window Regulators in Miscellaneous S ction.*

C nvertible Top C ntr l: Hydro-Lectric Type. *See "Hydro-Lectric" Power Operated Tops in Misc llaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

Model	Model Designation
1954 Firedome	S-19
1955 Fireflite	S-21
1955 Firedome	S-22

SERIAL NUMBER: On metal plate attached to left front door hinge pillar post.

Starting Serial Numbers	Detroit	Los Angeles
S-19	55130001	64017001
S-21	50330001	62045001
S-22	55185001	64022001

ENGINE NUMBER: Stamped on boss on top front side of cylinder block just back of water pump.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number) Identified as follows:*

"A"—ALL Cylinders .020" oversize

"B"—ALL Main & Connecting Rod Bearings .010" undersize.

"AB"—BOTH above conditions exist.

"MALTESE CROSS" (3/8" high)—ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods & Crankshaft" (below).*

"DIAMOND" (3/8" high)—ALL tappet bodies are .008" oversize

TUNE-UP

COMPRESSION PRESSURE: 135-165 lbs. at cranking speed of 150 RPM. Maximum variation between cylinders 15 lbs

VACUUM READING: Steady 18-21" idling.

VALVE TAPPET CLEARANCE: No adjustment required, except when valves are reconditioned (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatically controlled valve in exhaust manifold of right cylinder block. Valve must operate freely When installing coil, move outer (tongue) end around (clockwise) ¾ turn, hooking end of spring under right (toward front of engine) stop stud See *"Manifold Heat Control" in DeSoto Special Data*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: 035"

Plugs—Auto-Lite 4S-140 (S-19 & S-22); 4S-165 (S-21). Resistor type, 14mm. Tighten to 30-32 ft. lbs.

COIL: Aut-Lit CR-6015 (1954), CR-6012C (1955). Ignition Current—2.25 amps. idling. 5.0 amps. stopped.

DISTRIBUTOR: Aut-Lit. As follows:

Model	Auto-Lite No.
S-19 (Early)	IAZ-4002A
S-19 (Late)	IAZ-4002B
S-21	IAZ-4002D
S-22	IAZ-4002C

Condenser—Auto-Lite IBB-2015R. **Capacity**—.25-.28 microfarad.

Contact Point Set—Auto-Lite IGP-3028ZS.

Breaker Gap—015-.018". Set maximum gap to .017".

Cam Angle—34° ± 3° with both sets of contacts. Do not adjust contact gap outside limits to obtain specified cam dwell.

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance-IAZ-4002A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		500	2		1000
5		1075	10		2150
10		1775	20		3550
11		1925	22		3850

Automatic Advance—IAZ-4002B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
3		400	6		800
6		950	12		1900
9		1500	18		3000
11		1850	22		3700

Automatic Advance—IAZ-4002C

Degrees	Distr.	R P.M.	Degrees	Eng.	R P M.
Start		350	0		700
1		370	2		740
2 5		400	5		800
7		725	14		1450
8		800	16		1600

Automatic Advance—IAZ-4002D

Degrees	Distr.	R.P.M.	Degrees	Eng.	R.P.M.
Start		350	0		700
1		370	2		740
5		450	10		900
11		1615	22		3230
12		1800	24		3600

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance—IAZ-4002C

Distr. Degrees	Eng. Degrees	Vacuum ("of HG)
Start	0	5.25
1	2	6.125
4	8	8.50
6	12	10.125
7	14	11.00

Vacuum Advance—IAZ-4002A, B, D

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	5.25
1	2	6.00
5	10	9.25
10	20	14.875
11 5	23	17.00

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in DeSoto Special Data*

IGNITION TIMING

Setting—(S19, S21) 4° BTDC. (S22) 10° BTDC.

Timing Mark—On crankshaft vibration damper.

Manual Adjustment—Timing may be advanced with some premium fuels Range of timing should not exceed plus or minus 4° from recommended factory setting.

CARBURETOR

►*CARBURETOR APPLICATION: Carter 4-Barrel carburetor used on S21 Fireflite. Carter 2-Barrel used on other models.*

►*1954 V8 HESITATION OR STALLING ON ACCELERATION (WITH HOT ENGINE): May be noted on warm days when accelerating after prolonged idling or in heavy traffic. See "Carter BBD Dual" Carburetor in Carburetor Section.*

CARTER BBD 2-BARREL

Transmission	Carter Carburetor No.
S-19 Synchro-mesh (Early)	2067S
S-19 Overdrive (Early)	2068S
S-19 Powerflite (Early)	2070S
S-19 Synchro-mesh (Late)	2129S
S-19 Overdrive (Late)	2130S
S-19 Powerflite (Late)	2131S
S-22 Synchro-mesh	2176S, SA
S-22 Overdrive	2177S, SA
S-22 Powerflite	2178S, SA

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—1/4—1-1/4 turns open. Adjust both screws alike. Turn screw out for richer mixture.

Idle Speed—475-500 RPM (With selector lever in neutral).

Float Level—(1954) 9/32" (flat top floats), 7/32" (curved top floats). **(1955)** 7/32". Measure between top of each float and top surface of body casting. Use Gauge T109-239 for correct adjustment (gauge has both 9/32" & 7/32" dimensions). Equalize floats by bending lip on float arm.

Accelerating Pump—Install throttle connector rod in outer hole (medium stroke) of throttle lever and inner hole of pump arm.

Fast Idle: .022-.026" throttle opening (Gauge T109-44) with choke valve tightly closed. Adjust by bending choke connector rod at lower angle.

Unloader Adjustment: With throttle wide open there should be 1/4" clearance (Gauge T109-31) between upper edge of choke valve and inner wall of air horn. Adjust by bending arm on choke trip lever (use tool T109-214).

Automatic Choke Setting: Centered (at index).

Slow Closing Throttle (Dashpot): Loosen locknut and adjust dashpot unit so that dashpot plunger shaft can be moved inward approximately 1/16" with throttle valve tightly closed. Tighten locknut

Overdrive Kick-down Switch Adjustment: With throttle valves in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kick-down lever and switch stem guide.

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section*

►*OTHER DATA See Carter "BBD" in Carburetor Section*

Fuel Pump Pressure: 3½-5 lbs.

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CARTER 4-BARREL WCFB
No. 2210S

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*
Idle Setting–1-2 turns open. Set both screws alike. Turn screws out for richer mixture
Idle Speed–500 RPM. (With selector lever in neutral).
Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section*

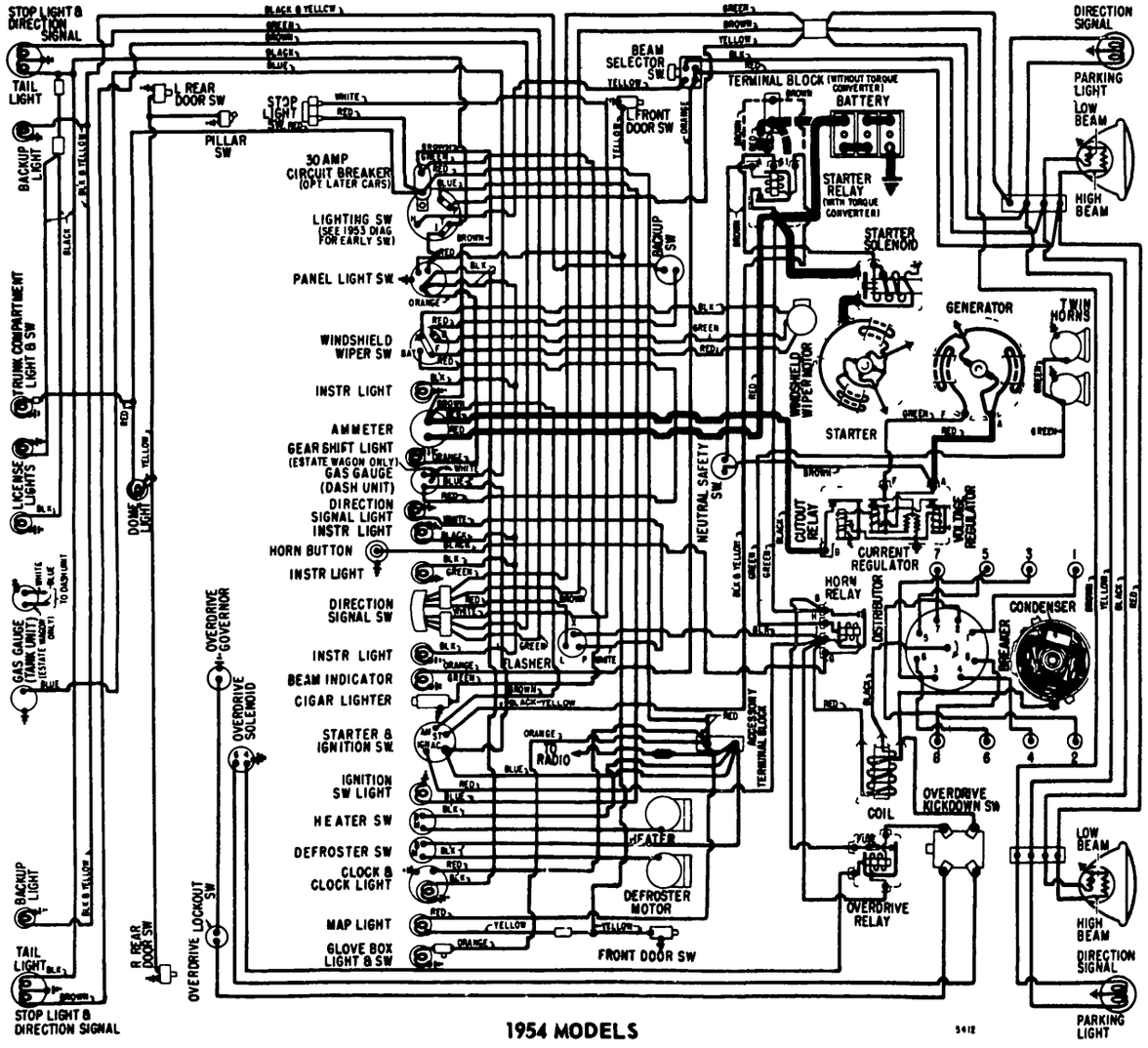
►*OTHER DATA: See "Carter WCFB 4-Barrel" in Carburetor Section.*
Fuel Pump Pressure: 3½-5 lbs.

CARB. EQUIPMENT

Fuel Pump: Carter M840S (1954 & Early 1955), M2241S (Late 1955). Vacuum diaphragm type
Pressure–3½-5 lbs.
See "Fuel Pumps" in Carburetion Equipment Section.
Dash Unit–**(1954)** Auto-Lite 13392A (Exc. Estate Wagon), 13531A (Estate Wagon). **(1955)** Auto-Lite 13728A.
Tank Unit–**(1954)** Auto-Lite 12617A (Exc. 8-Pass. & Est. Wgn.) 11538A (8-Pass.), 13535A (Est. Wgn.). **(1955)** Auto-Lite 13795A.
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Auto-Lite 2H-120-B or Willard HW-2-120-C. 6 volt, 17 plate, 120 ampere hour rate.



1954 MODELS

Ground d Terminal–Positive.
Engin Gr und–Left front of engine.

STARTER

Auto-Lite MCH-6113A (1954), MCL-6304 (1955).
Armature–Auto-Lite MCH-2110.
Drive–Solenoid pinion shift and overrunning clutch.
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–42-53 ozs. (new brushes).

Performance Data–MCH-6113A

Torque	RPM	Volts	Amperes
0 ft. lbs.	4300	5.0	65
6.0 ft. lbs.	Lock	2.0	335

Performance Data–MCL-6304

Torque	RPM	Volts	Amperes
0 ft. lbs	4900	5.0	65
8.0 ft. lbs.	Lock	2.0	410

Starting Switch: Auto-Lite SSX-4004. Solenoid pinion shift and starting switch combined. PowerFlite Cars have Neutral Safety Switch and SEPARATE starter relay Auto-Lite HRW-4001A. *See "Starter Controls" in Electrical Equip. Section.*

GENERATOR

1954 MODELS

Auto-Lite Generator No.	Armatur No.
GGW-6001J, K (Std.)	GGW-2006F
GGW-6008F, G (Pow. St.)	GGW-2045S
GGU-6006G (Spec. Pow. St.)	GGU-2042F
GGU-6008D (Air. Cond.)	GGU-2063F
GGU-6006B (Air. Cond. & Pow. St.)	GGU-2042F
GGW-6008FA (Canada Pow. St.)	GGW-2045F
GGU-6006GA (Canada Pow. St.)	GGU-2042F
GGW-6001L, Q (Special)	GGW-2006F
GGU-6001G, H, R (Special)	GGU-2006F

1955 MODELS

GGW-6001J (Std)	GGW-2006F
GGU-6001G (Spec Equip.)	GGU-2006F
GGJ-6001-F (Spec Equip.)	GGJ-2101AF
GGW-6016A (Pow St)	GGW-2090F
GGU-6013D (Pow St)	GGU-2071F
GGW-6016E (Can Pow St)	GGW-2090F
GGW-6017A (Air Cond)	GGW-2098F
GGU-6008C (Air Cond)	GGU-2063F
GGJ-6001K (Air Cond)	GGJ-2101AF
GGW-6016C (A C & Pow St.)	GGW-2090F
GGU-6013C (A C & Pow St)	GGU-2071F
GGW-6016F (Can A C & P S)	GGW-2090F

►*SPECIAL GENERATOR NOTE* GGJ, GGU, and GGW type generators used Performance specifications below apply equally to all generators, within any one of the three groups specified

Performance Data–GGJ

Amperes	Volts	Cold – RPM –	Hot
0	6 4	600 700	650-750
50	8 0	1400 1600	1550 1750
55	8 0	1500 1700	1650 1850

Performance Data–GGU

Amperes	Volts	Cold –R.P.M.–	Hot
0	6.4	750-850	800-900
40	8.0	1450-1650	1650-1850
45	8.0	1550-1750	1750-1950

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Performance Data—GGW

Amperes	Volts	Cold —R.P.M.—	Hot
0	6.4	870-970	950-1050
40	8.0	1800-2000	2150-2350
45	8.0	1925-2125	2350-2550

Brush Spring Tension—(GGJ) 34-41 ozs (GGU GGW) 35-53 ozs with brushes

Field Current—(GGJ) 1 4-1 7 amperes (GGU) 1 4-1 6 amperes, (GGW) 1 6-1 7 amperes all at 5 0 volts

Motoring Current—(GGJ) 4 1 4 6 amperes (GGU) 5 0-6 0 amperes, (GGW) 5 0-5 5 amperes all at 5 0 volts

Rotation—Counter-clockwise at commutator end

Belt Adjustment Approximately ½ slack (when pushed from a straight line midway between pulleys)

REGULATOR

Auto-Lite Regulator No.	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VBE-6001A	GGW
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU

Cut out Relay

Cuts In—6.3-6.8 volts.

Cuts Out—4.1-4.8 volts.

Contact Gap—.015" minimum.

Air Gap—.031-.034" with contacts open (check at hinge end of core

Voltage Regulator

Setting (VAV, VBF)—7.1-7.4 volts (at 70°), *after 15 minutes operation charging at ½ maximum rate.*

Setting (VBE)—7.1-7.4 volts (at 70°). *Test with regulator in operation at 10 amperes output.*

Air Gap—.048-.052" with contacts just opening.

Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A—Operating Amperes	—Test B
VBE 6001A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VAV-6001B, 2B	55	50 (48-52)

Test A—After 15 minutes operation charging at 1/2 maximum rate.

Test B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF)

Air Gap—.048-.052" with contacts just opening.

Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

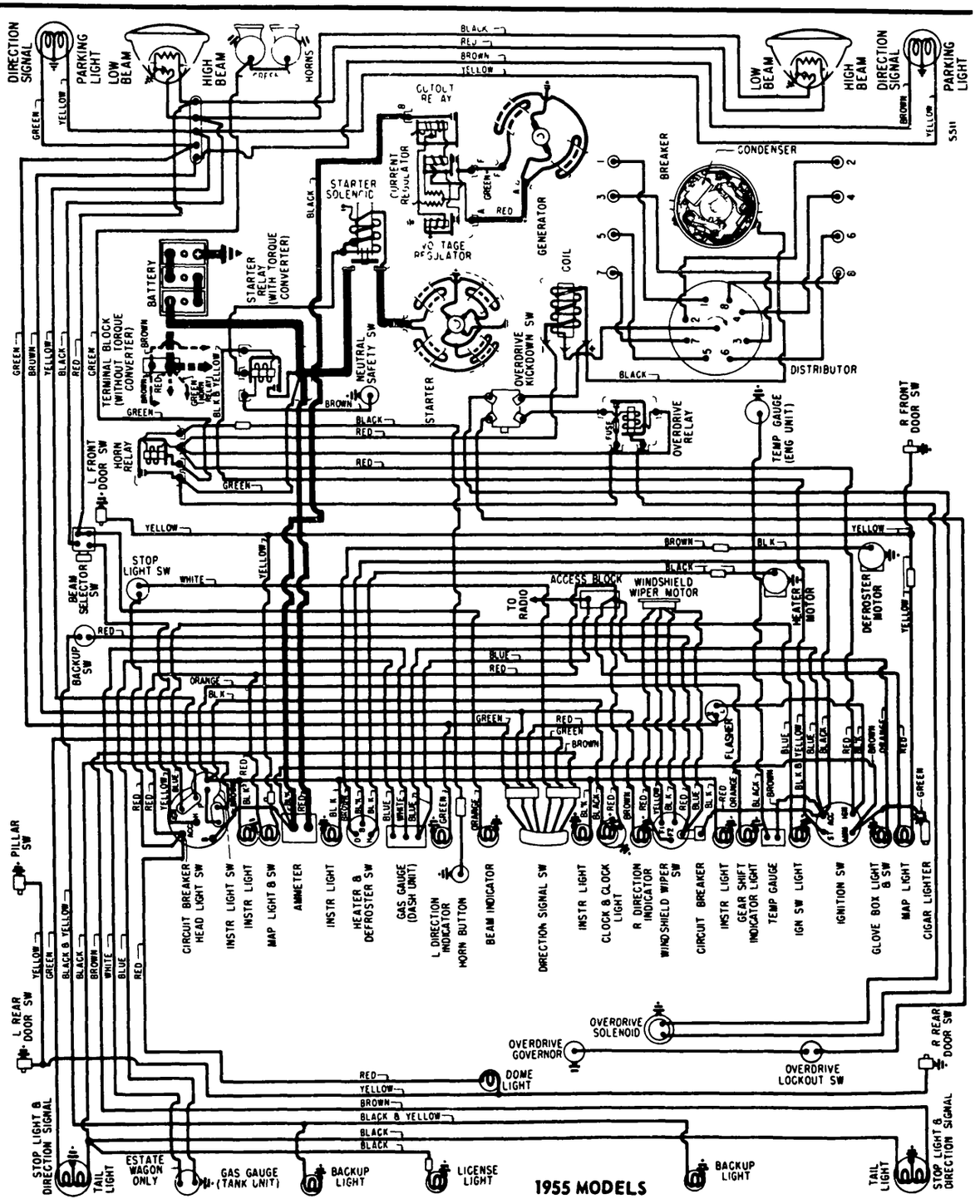
Headlamps: Sealed Beam. *See Electrical Equip. Section.*

Direction Signal: *See Electrical Equip. Section.*

►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not the ammeter terminal*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft Headlamp

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knob is held on its shaft by means of a recessed hex screw

Stop Light Switch Location: On forward end of master cylinder

CIRCUIT BREAKERS: (1954)–One 30 amps. circuit breaker located in headlight switch protects all lighting circuits. *NOTE–Some early 1954 models used the same headlight switch (with three circuit breakers) as 1953 models. See 1953 Wiring Diagram.*

CIRCUIT BREAKERS: (1955)–Three circuit breakers located in headlight switch as follows:
25 Amperes–Protects headlights
10 Amperes–Protects tail lights, license lights, parking, clock, and instrument panel lights.
10 Amperes–Protects stop, map, dome, glove box, courtesy and trunk compartment lights.

FUSES: Clock–3 amperes. In clock lead wire.
Radio–14 ampere. Behind instrument panel.
Overdrive–20 amperes. On overdrive relay.

HORNS: (1954)–Auto-Lite HAB-4659 (Low Pitch), HAB-4664 (High Pitch). **(1955)**–HAB-4704 (High Pitch), HAB-4703 (Low Pitch).

Horn Relay: HRL-4104 (1954), RAF-4001 (1955).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 (All Models)

Model	Bore	Stroke	Displacement
S19 (1954)	3 5/8"	3 11/32"	276.1 cu. ins.
S21, S22 (1955)	3.720"	3.344"	291 cu. ins.

Model	Compr. Ratio	Rated HP	Dev. HP
S19 (1954)	7.5-1	42.05	170 at 4400
S21 (1955)	7.5-1	44.3	200 at 4400
S22 (1955)	7.5-1	44.3	185 at 4400

Compression & Vacuum Reading–*See TUNE-UP.*

ENGINE REMOVAL: *See DeSoto Special Data*

OIL PAN REMOVAL: Remove oil level indicator, drain engine oil. Remove starting motor and exhaust pipe cross-over. Remove oil pan attaching bolts, and drop pan straight down and away from engine.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in DeSoto Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in DeSoto Special Data*

PISTONS

Aluminum alloy, T-slot, steel band, slipper type, cam ground, and tin-plated.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bores are .020" oversize.*

Weight–18.3 ozs. (stripped).

Removal–Pistons and rods removed from above.

Fitting New Pistons: .001" clearance at top desired. Check piston size with micrometer across large diameter at bottom of skirt. Insert .002" x 1/2" feeler between cylinder wall and piston (piston inverted, and pin removed) on side opposite slot. Pull to withdraw feeler should be 5-12 lbs. at 70° F.

►*NOTE–* Cylinder recondition limits .0005" taper and .0005" out-of-round. Badly scored bores or with taper over .020" or out-of-round over .005" require reboring and honing to above limits.

Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.

Installing Pistons: Install with piston slot toward left side of engine (thrust side).

►*PISTON INSTALLATION CAUTION: Pistons must be assembled to the rods on the right hand cylinder bank (2-4-6-8) with the "V" slot in the rod aligned with the "T" slot in the piston. On left hand cylinder bank (1-3-5-7), assemble with "V" slot in rod opposite the "T" slot in piston.*

PISTON PINS

Floating type with lock ring at each end.

Diameter–.9216-.9218". **Length**–3-1/16".

NOTE–Piston pin is offset in piston toward right side of engine.

Clearance in Piston–.0000-.0005" or thumb press fit at 70° F.

Clearance in Rod–.0001-.0004". Selective fit.

Replacement Pins: Standard, .003", .008" oversize.

NOTE–Fitted pins are furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	.0775-.0780"	.010-.020"	.002-.0035"
Compr. (#2)	.0775-.0780"	.010-.020"	.0015-.003"
Oil (#3)	.1860-.1865"	.010-.020"	.001-.003"

Replacement Rings: Furnished in sets Standard, .010", .020", .030", 040", .060" oversize.

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length (Center to Center)–6-1/16". **Weight**–22.8 ozs.

Crankpin Journal Diameter–2.0615-2.0625".

Maximum out-of-round and taper limits–.001".

Lower Bearings–Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below*

Clearance–.0005-.0015" desired. Maximum–.0025".

Endplay–.006-.014".

Bearing Adjustment–None. Replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", .012" undersize.

Installing Rods: *See "Pistons (Installation)" above.* Rods are chamfered on one side at bearing insert and must be installed with chamfer toward crankshaft fillet. "V" slot across one bolt hole of each bearing cap is an oil passage for lubricating the opposite cylinder wall and piston pin. When installing bearing cap make certain "V" slot oil passage is toward top of engine.

►*CAUTION:* Rods are **interchangeable**. However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangeable** with the other bank.

CRANKSHAFT

Journal Diameter–2.3745-2.3755". 5 bearings.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals)–Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)–A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of the undersize journals are stamped on the machined surface of the center (#3) counterweight in the following manner "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings–Removable, precision type, steel-backed, babbitt lined. No shims.

Clearance–.0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .010", .012" undersize. Upper and lower halves of bearings Nos. 1, 2, and 4 are alike and interchangeable. Upper No. 3 is interchangeable with Lower No. 3, Upper & Lower No. 5 are **not interchangeable**.

End Thrust: Taken by center (#3) main Bearing.

Endplay–.002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in DeSoto Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in DeSoto Special Data*

CAMSHAFT

Journal Diameters–**(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952", **(5)** 1.4355-1.4365".

Bearings–Removable, steel-backed, babbitt lined bushings.

Clearance–.001-.003"

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

Endplay–.002-.006".

Timing Chain: **Width**–1-1/8". **Pitch**–.375". **Length**–68 links.

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Camshaft S tting: Place crankshaft "Zero" mark exactly in line with center of camshaft. Temporarily install camshaft sprocket less chain, and line up dowel pin hole in hub with sprocket dowel pin hole, while at the same time positioning the camshaft "Zero" mark exactly in line with center of crankshaft. (Use straightedge to check accuracy of alignment). Remove camshaft sprocket and position it in timing chain and reinstall assembly, positioning timing chain on crankshaft sprocket. When properly installed, "Zero" mark should be in line with shaft centers. Install fuel pump eccentric and camshaft nut. Tighten to 120-130 ft. lbs.

Camshaft R m val: S *"Camshaft & Bearings" in DeSoto Special Data.*

Engine Fr nt C v r (R moval & Installation): *See "Engine Front Cover" in DeSoto Special Data*

Engine Front Cov r Oil Seal (Crankshaft Front Seal): *S e "Engine Front Cover" in DeSoto Special Data.*

VALVES

Tapp t Clearance: None in service (hydraulic).

Valv s	H ad Diamet r	Stem Diameter	Length
1954 Intake	1.75"	.372-.373"	4 55/64"
1955 Intake	1.84"	.372-.373"	4.81"
1954 Exhaust	1.407"	.371-.372"	4 13/16"
1955 Exhaust	1.50"	371-.372"	4.80"

Valv s	Seat Angl	Lift	Stem Clearance
Intake	45°	.361"	.001-.003"
Exhaust	45°	.361"	.002-.004"

Valv S at Width—1/16-3/32"(In.), 3/64-1/16"(Ex.)

►*VALVE SEAT INSERT CAUTION: See "Valve System" in DeSoto Special Data.*

Intak Valv St m Oil Seal—Seal ring installed in bore of spring seat on all intake valves (install rings after assembling springs and seat but before installing valve locks).

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3061. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

Valv Springs: Two springs used for each valve. Install with closed coil toward cylinder head.

Valv Spring Sp cifications

1954 Models

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	13	1.5625"	40.5	1.6875"
Open	37.5	1.875"	105	1.3125"

1955 Models

Valve	Lbs. Press.	Length	Lbs. Press	Length
Closed	22	1.56"	28	1.69"
Open	42	1.19"	92	1.31"

►*CAUTION: Spring ends must be square within 1/16". (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are reground, check **installed** height of spring. If height of spring is 1-23/32" or greater, install a 1/16" spacer (Part No. 1400482) in the head counterbore to bring spring height back to normal 1-5/8—1-11/16".

►*VALVE SPRING LOAD CAUTION: Hydraulic lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.*

Valve Guides: Remove old guides by driving them out through top of head using tool C-3150. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3150 is flush with face of cylinder head. To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to .374-.375" with tool C-741.

►*CAUTION: Oil hole in top of exhaust guide must face up. Oil hole must face toward intake guide.*

►*VALVE GUIDE INSTALLATION NOTE:* If Valve Guide Tool C-3150 is not available, drive guide in, measuring from top of valve seat as follows: **Intake**—1". **Exhaust**—1 3/32".

Hydraulic Valve Lifters: Diameter—.9040-.9045". **Clearance**—.0005-0015".

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize.

Lifter Overhaul & Testing—*See "Valve System" in DeSoto Special Data.*

Rocker Arm Assembly: *See "Valve System" in DeSoto Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

S19 & S21 Valve Timing

Intak Valves—Open 12° BTDC. Close 52° ALDC.
Exhaust Valv s—Open 50° BLDC Close 14° ATDC

S22 Valv Timing

Intak Valv s—Open 4° BTDC, Close 76° ALDC
Exhaust Valves—Open 54° BLDC Close 10° ATDC

Valve Timing Check—Turn crankshaft until #1 intake valve closed. Insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle. Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid). Set dial indicator at Zero, turn crankshaft until dial indicator shows that valve has lifted .016". Pointer on chain cover should indicate between 5° BTDC to 7° ATDC if timing correct. Then turn crankshaft **counterclockwise** until lifter backed down and valve closed, remove spacer from valve stem.

►*CAUTION: Do not turn crankshaft further than indicated above, which might bottom spring and damage valve mechanism.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one additional quart if filter changed.

Normal Oil Pressure: 40-65 lbs. with warm oil operating at 40-50 MPH.

Oil Pressure Regulator—In pump. Not adjustable.

Oil Pressure Gauge—Auto-Lite 13389A (1954), 13727A (1955).

Oil Pump: Rotary type. In crankcase at rear end. Mounted on rear bearing cap.

Overhaul—*See "Oiling System" in DeSoto Special Data*

Priming Oil Pump (After Overhaul)—Before installing oil pump and strainer to rear main bearing cap, prime pump.

Oil Filter: Shunt type. A portion of oil from oil pump is directed through this filter and the remainder flows directly into engine lubricating system.

Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is replaced.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 22 quarts (23 with heater).

Pressure Valve: DeSoto 1373136. Radiator filler cap. Opens at 7 lbs. 14 lb type used with Air Cond

Thermostat: By-pass type in cylinder head water outlet. Starts to open at 157-162° F.

Water Pump: Packless type. Grease fitting for lubrication.

See "Water Pump" in DeSoto Special Data.

Pump Removal—Drain cooling system, remove fan belts and belt pulley. Remove four bolts attaching pump to water manifold and remove pump.

T mp ratur Gauge: Auto-Lite 13390A (1954), 13730A (1955).

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CLUTCH

Borg & Beck	Model	Assy.No.	Disc No.
Std. & O.D. (S19, S21)	10A6	361353	382349
Std. & O.D. (S22)	10A7	361368	382346
Heavy Duty (S22)	11A6	361330	381850

See "Borg & Beck" Clutches in Clutch Section

Pedal Adjustment: Adjust fork rod to secure 1/16 free movement of clutch fork outer end This adjustment will provide necessary 1" free play at pedal

Over-Center Spring Adjustment: (*NOTE*—Over-center spring located above brake pedal and attached to pedal mounting bracket) Adjustment of over-center spring should not be disturbed

Removal: Remove transmission (See Synchro-mesh Transmission). Remove clutch housing pan. Pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove cap screws, which hold clutch cover to flywheel, loosening each cap screw a few turns (in succession) until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "DeSoto Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission to be disassembled) Disconnect speedometer cable, hand brake cable, gear shift rods Remove nuts holding transmission to clutch housing Then remove transmission by pulling it back, down, and out of car

►*1954 8 PASS. CAR NOTE: See DeSoto Special Data for propeller shaft center bearing removal.*

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.
See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake, place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator.

Oil Filler Tube (Location)—At right rear of engine compartment.

►*CAUTION:* To prevent dirt from entering transmission make sure oil level indicator is properly seated in filler tube.

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit. Ball & Trunnion type (Exc S22 Est Wgn.) Ball & Trunnion—front, Cross type—rear (S22 Est Wgn)

REAR AXLE

Own. Barrel Type. Semi-floating, Hypoid gear with Hotchkiss Drive.
See "DeSoto Hypoid" in Rear Axle Section.

Rear Axle Ratios

Model	①S.M.	② O.D.	PowerFlite
S19 Est. Wgn	③⑩3.73-1	⑨⑤4.1-1	⑥⑦3.54-1
S19 8 Pass.	③⑩3.73-1	⑨⑤4.1-1	⑥⑦3.54-1
S19 Exc. above	⑨⑤ 4.1-1	⑧4.3-1	③⑩3.73-1
S21 All Models	③⑩3.73-1	⑨⑤4.1-1	⑥⑦3.54-1
S22 Exc. Est. Wgn	⑥⑧3.9-1	⑧ 4.3-1	⑩⑧ 3.73-1
S22 Est. Wgn.	⑨⑤ 4.1-1	⑧ 4.3-1	⑥⑥3.91-1

①—Synchro-mesh. ②—Overdrive. ③—3.54-1 Optl ⑨—3.91-1 Optl. ⑤—4.3-1 Optl. ⑥—3.73-1 Optl. ⑦—3.36-1 Optl. ⑧—4.1-1 Optl.

Backlash—.006-.010"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel hub, and drum assembly (use screw type hub puller—Tool C-675), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-757) in oil seal, remove brake support (oil seal mounted in brake support), pull shaft and bearing (use C-499 puller). NOTE—Use puller C-293-C to remove bearing from shaft, puller C-748 or C-358 to remove inner oil seal, drift C-241 to install seal.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick) equally at both wheels. **Endplay**—.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

	DeSoto Part N .	
Car Model	**Front**	**Rear**
1954 4-Dr. & Cl. Cpe	1450630	1450633
1954 8-Pass. & Est. Wgn.	1450631	1450635
1954 Others	1450631	1450635
1954 Heavy Duty ①	1450041	1450075
1954 Heavy Duty ②	1450346	1450075
1955 Sp.Cl. & Conv.Cpe	1614406	1450919
1955 4-Door	1614405	1450918
1955 Estate Wagon	1614406	1450920
1955 Others	1614406	1450918
1955 Heavy Duty		1450920
1955 Heavy Duty (Special)		1450037

①—Except 8-Pass. & Estate Wagon.
②—8-Pass. & Estate Wagon.

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers.
See "DeSoto" in Front Suspension Section.

Kingpin Inclination—5-6½°.
Caster (1954)—Neg. 1° to Neg. 3° (Neg. 2° preferred)
Caster (1955)—0° to Neg. 2° (0° preferred with Power Steering. 2° preferred with Manual Steering).
Camber (1954)—Pos. 3/8° to Neg. 3/8°. Left side ¼° to ½° higher than right side within these limits.
Camber (1955)—Pos. ¼°±3/8° (Pos. ½° left side, 0° right side preferred).
Toe-In—0" to 1/16" (0" preferred)
Toe-Out on Turns—Inner wheel 21½°±1° with outer wheel at 20°.

STEERING

Manual Steering Gear: Gemm r. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering (Early 1954): Gemmer Hydraguide (Internal Oil Passage Type). *See "Gemmer Hydraguide (Chrysler & DeSoto) Internal Passage Type" in Steering Section.*

Power Steering (Late 1954 & 1955): Co-axial type. *See "Chrysler, DeSoto, Dodge, Plymouth C -axial" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button R m val: *See "Gemmer Worm & Roller" in Steering Section.*
Steering Gear Removal: *See "Gemm r Worm & Roll r" in Steering Section.*

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BRAKES

Service: DeSoto "Safe-Guard" Lockheed hydraulic. *See "DeSoto Safe-Guard" in Brake Section.*

Drums—Centrifuse. Diameter 12".

Wheel Cylinder Diameter—1-1/8" bore. Single acting (front), double acting (rear wheels).

Replacement Linings & Shoes—Linings or shoes with linings are furnished Standard and .030" oversize.

Lining—Molded asbestos (bonded to shoe). Length—12.57" per shoe. Width—2". Thickness—13/64".

Braking Power—60% Front. 40% Rear.

Clearance—.006" at each end of all shoes

Master Cylinder: On engine side of dash panel opposite base of brake pedal

Checking Fluid—Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal—Disconnect pushrod Disconnect brake line tubes at master cylinder fittings Remove four stud nuts from studs, remove master cylinder

Power Brakes: Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder. *See "DeSoto Power Unit" in Brake Section*

Removal of Power Unit—Same as for standard master cylinder, after hydraulic lines and stop light wires removed

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with PowerFlite.

Adjustment—*See "Hand Brake Notes" in DeSoto Special Data.*

Lining—	Width	Thickness	Length
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (External Type)—.015-.020" around band. **Internal Type**—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMG-4102A (1954), EMZ-4001 (1955). Electric type. *See "Auto-Lite Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: DeSoto "Airtemp". *See "Airtemp" Air Conditioning in Miscellaneous Section.*

Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: Electric type. *See "Power Seat Adjusters" in Miscellaneous Section.*

Convertible Top Control: Electrical-hydraulic type. *See "Power Top Control" in Miscellaneous Section.*

►*DESOTO "ADVENTURER" NOTE* This model has Special High Compression Engine with TWO 4-Barrel Carburetors and other special equipment as listed below

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Identification
Firedome	S-23
Fireflite	S-24
Fireflite Adventurer	S-24A

SERIAL NUMBER: Stamped on metal plate attached to left front door body hinge post

Starting Serial Nos.	Detroit	Los Angeles
Firedome S-23	55258001	64028001
Fireflite S-24	50366001	62048001
Fireflite S-24A ©		

© - Assembled at Detroit only

ENGINE NUMBER: Stamped on machined boss on top of front side of cylinder block just behind water pump

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*

"A"–All cylinders .020" oversize.

"B"–All Main & Connecting Rod Bearings 010" undersize.

"AB"–BOTH above conditions exist.

"MALTESE CROSS" symbol (3/8" high)–ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" & "Crankshaft" under ENGINE below.*

"DIAMOND" symbol (3/8" high)–ALL Tappet Bodies are 008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 115-145 lbs. (S-23), 145-175 lbs. (S-24), 160-190 lbs. (S-24A) at cranking speed of 150 RPM.(plugs removed, wide open throttle). Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18-21" idling.

VALVE TAPPET CLEARANCE: None in service (hydraulic)

MANIFOLD HEAT CONTROL: *NOTE* - Lubricate valve shaft with graphite grease before installing valve.

(C23, C24 Standard): Single exhaust on right cylinder block with thermostatically controlled valve Install heat control valve with counterweight toward front of engine, with small anti-rattle spring retaining pin toward rear and adjacent to cylinder block

(C24A Standard, Optl. Others): Dual exhaust system. Heat control valve is in right exhaust pipe

Coil Spring Installation - Position valve shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer end tongue of spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly Move outer end tongue of spring around and hook under pin (left pin when facing coil end of valve)

Counterweight Installation - Place counterweight over shaft (shield upward) and insert lock in shaft slot. Center counterweight on shaft and turn weight on shaft until seated Install stop, and tighten nut securely with Tool T-109-173.

►*DUAL EXHAUST NOTE:* When valve is closed, most exhaust gases are discharged through the left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders–RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite AR-51 (S-23), AR-52 (S-24), AR-31 or AS-250 (S-24A) Resistor type. 14 mm. Tighten to 30-32 ft lbs.

COIL: Auto-Lite CAD-4002. *12 Volt*

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-4002. Mounted on left fender splash shield

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil When testing coil, include resistor with coil

DISTRIBUTOR: Auto-Lite IBJ-4302A (S-23), IBJ-4302 (S24 Early), IBJ-4302B (S24 Later), IBK-4303 (Adventurer). *12 Volt. NOTE:* IBK-4303 "double breaker".

Condenser - Auto-Lite IBB-2015R **Capacity** 25-.28 mfd.
Contact Point Set - Auto-Lite IGW-3028MS (IBJ Distr.), IGW-3028KS (IBK Distr.).
Breaker Gap - 017" ± 002"

Cam Angle–28-34° (IBJ Distr.), 35-41° with both sets of contacts operating together (IBK Distr.)
Breaker Arm Spring Tension–17-20 ozs.
Rotation–Clockwise viewed from above.

Automatic Advance–IBJ-4302

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
6.5	550	13	1100
7	1000	14	2000
8.5	2200	17	4400

Automatic Advance–IBJ-4302A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	425	2	850
3	575	6	1150
5	725	10	1450
6	800	12	1600

Automatic Advance - IBJ-4302B, IBK-4303

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	400	2	800
4	525	8	1050
7	660	14	1320
8	700	16	1400

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance–IBJ-4302, B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5½
1	2	6
5	10	8 3/8
10	20	13¼
12.5	25	15

Vacuum Advance–IBJ-4302A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5½
1	2	6
5	10	8½
10	20	13
11.5	23	15

Vacuum Advance - IBK-4303

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6 1/2
1	2	7
6	12	10 3/8
10	20	14 1/4
11 5	23	16 1/4

Distributor Basic Timing & Driv Shaft Bushing: *See "Ignition Notes" in DeSoto Sp cial Data.*

IGNITION TIMING

Model	Standard Setting
S-23	8° BTDC
S-24	4° BTDC
Adventurer	6° BTDC

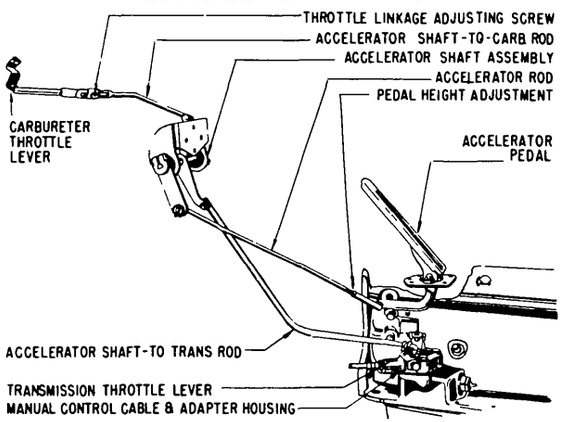
Timing Mark–On crankshaft vibration damper. Aligned with pointer on engine front cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter BBD 2-Barrel Carburetors used on Firedome S-23 Models, Carter WCFB Carburetor used on Fireflite S-24 Models. TWO Carter WCFB carburetors used on Adventurer.*

THROTTLE LINKAGE ADJUSTMENT (PowerFlit Cars): Correct any binding conditions Run engine until normal operating temperature is reached. Remove air cleaner to make certain choke is in the fully open position Connect tachometer leads to coil and ground. Adjust engine idle to 475-500 RPM (transmission in neutral position) Stop engine and loosen throttle linkage adjusting screw (located on accelerator shaft-to-carburetor rod). Move rear portion of accelerator shaft or carburetor rod rearward until it is stopped by idle stop on transmission throttle cam. With rods in line and front portion of rod pre-loaded by its spring,

CONTINUED ON NEXT PAGE



POWERFLITE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

lock throttle linkage adjusting screw by applying 10-15 ft. lbs. torque. Start engine and recheck idle setting (475-500 RPM), with transmission in neutral and hand brake set. Stop engine and remove tachometer.

Pressure Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

CARTER 2-BARREL BBD

Transmission	Carter No.
Standard	BBD 2308S
Overdrive	BBD 2309S
PowerFlite	BBD 2310S

►***MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.***

Idle Setting - 1/4-1 1/4 (2250S), 1/2-1 1/2 (Others) turns open. Adjust both screws alike. Turn screws for richer mixture.

Float Level - 1/4" (Gauge T109-282) from top of each float to top surface of body casting. *NOTE* - This supersedes previous 7/32" setting.

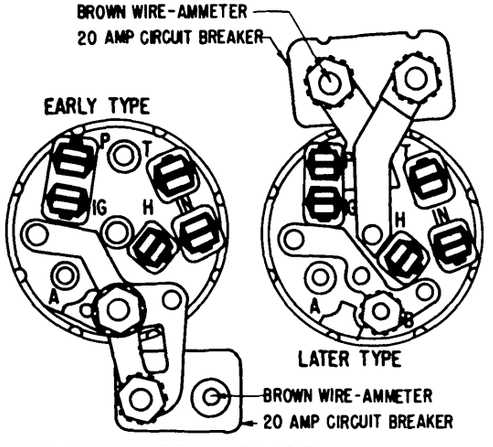
Accelerating Pump - Center hole (medium stroke) of throttle lever, and inner hole of pump arm.

Fast Idle Cam Clearance : .020" (Gauge T109-29) between lip on fast idle cam and boss on casting with choke valve closed and lip on inner choke shaft lever contacting lug on outer lever. Adjust by bending lip on inner choke shaft lever. On late carburetors, align index mark on cam with adjusting screw.

Fast Idle Throttle Clearance: .015" (Gauge T109-44) between lower edge of throttle valve and carburetor bore with adjusting screw on high step of cam.

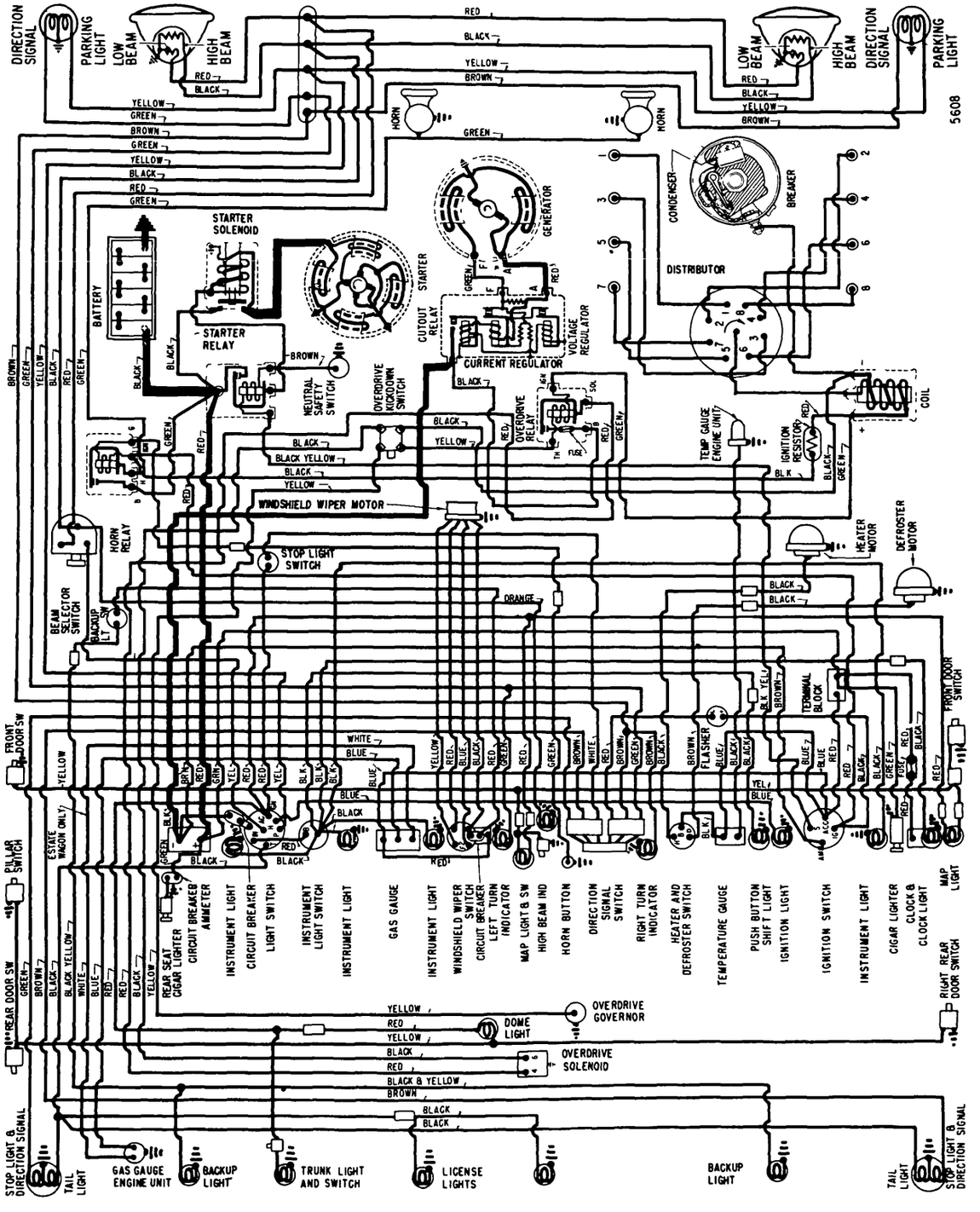
Automatic Choke Setting: (2308S, 9S) Centered - At Index, (2310S) 1 Point Rich.

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P-YELLOW WIRE TO PARKING LIGHTS
T- BLACK WIRE TO TAIL LIGHTS
IG-BLUE WIRE TO IGNITION LOCK LIGHT
H- GREEN WIRE TO FOOT DIMMER SWITCH
IN-RED WIRE TO INSTRUMENT LIGHT SWITCH
A-RED WIRES TO GLOVE COMPT, TURN SIGNAL & GEARSHIFT LGTS

FIRST & LATER TYPE LIGHT SWITCH



CONTINUED FROM PRECEDING PAGE

Dashpot Adjustment: Close throttle valves and bottom plunger shaft with 1/16" gauge between shaft and operating lever To adjust, loosen locknut and turn dashpot in or out

Overdrive Kickdown Switch Adjustment: With throttle valves wide open there should be 1/64-3/64" between kickdown lever and switch stem guide To adjust, loosen locknuts and adjust switch

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter BBD" Carburetors in Carburetion Section*

Fuel Pump Pressure: 3½ - 5½ lbs

CARTER 4-BARREL WCFB
S-24 No. 2311S, SA

►*ENGINE CUTTING OUT ON LEFT TURN CORRECTION See "Carter WCFB 4-Barrel" Carburetor in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels 1-4-6-7*

Idle Setting - 1-2 turns open Set both screws alike Turn screws out for richer mixture

Idle Speed - 450-500 RPM (transmission in neutral)

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter WCFB 4-Barrel" Carburetors in Carburetion Section*

CARTER 4-BARREL WCFB
S-24A Adventurer

►*NOTE. Carburetors changed in production as follows*

First Cars	TWO Carter 2317S
Later Cars	Carter 2476S (Frt), 2445S (Rear)

Carburetor Adjustment. *Adjust all carburetors exactly as follows for balanced operation*

1) **Connector Rod**—Open both carburetor throttles to wide open position If either front or rear carburetor throttle valves do not open fully adjust length of connector rod Rod must not bind on pivot studs

2) **Idle Speed**—With engine at normal operating temperature disconnect accelerator shaft rod at rear carburetor set idle speed to 600 RPM (use tachometer) as follows Back off front idle speed screw adjust speed with rear carburetor screw turn front carburetor screw up to point where it contacts stop

3) **Idle Mixture**—Turn rear carburetor idle mixture screws in until lightly seated then back screws out ½ turn Repeat with front carburetor Trim front carburetor idle mixture screws only to obtain smoothest engine idle Connect accelerator shaft rod

►*OTHER DATA: See "Carter WCFB 4-Barrel" Carburetors in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter M2241S. Vacuum diaphragm type

Pressure - 3½ - 5½ lbs

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Auto-Lite Electric type

Dash Unit - 14032A (Exc Sub & Est Wgn), 14035A (Sub & Est Wgn)

Tank Unit - 13970A (Exc Sub & Est Wgn), 13872A (Sub & Est Wgn)

See "Fuel Gauges" in Carburetion Section

BATTERY

Auto-Lite 11-HS-60 or Willard HO-11-60. *12 Volt*, 11 plates, 60 ampere hour capacity

Ground Terminal - Negative

►*CAUTION: This is reversed from previous models*

Engine Ground - Left front of engine

STARTER

Auto-Lite MDF-6001. *12 Volt* **Armature** - MDF-2006

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counter-clockwise at commutator end

Brush Spring Tension - 42-53 ozs (with new brushes)

Performance Data - MDF

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10 0	60 max
6 5 ft lbs min	Lock	4 0	240 max

Starting Switch: Auto-Lite SAD-4001 Solenoid pinion shift and starting switch used with neutral safety switch (on transmission - PowerFlite cars) and SEPARATE relay Auto-Lite RAJ-4001, mounted on fender splash shield *See "Starter Controls" in Electrical Section*

Neutral Safety Switch Adjustment: *See "PowerFlite" Transmission in Transmission Section*

GENERATOR

Auto-Lite Generator No.	Application
GJC-7002A or GGA-6001K, L	Standard
GJC-7003B or GGA-6002A	Power Steering
GJC-7006B or GGA-6001N	Air Cond
GJC-7003C or GJC-6002C	Pwr Strg & Air Cond

►*SPECIAL GENERATOR NOTE:* GJC & GGA type generators used Performance specifications below apply equally to all generators, within either of the groups specified

Performance Data - GGA - 12 Volt

Amperes	Volts	RPM 70° F.
4 0	14 6	950 max
40 0①	14 6	1600 max
40 0①	15 0	1600 max

Performance Data - GJC - 12 Volt

Amperes	Volts	RPM Cold
20 0①	15 0	1750 Max
30 0①	15 0	2050-2250

① - Do not operate at high output without ventilating fan for any length of time To do so may result in burned armatures and fields

Brush Spring Tension - (GGA) 34-41 ozs , (GJC) 18-36 ozs with new brushes

Field Current - (GGA) 1 1-1 3 amperes, (GJC) 1 2-1 3 amperes, at 10 0 volts (70° F)

Motoring Current - (GGA) 2 3-2 6 amperes 3 1-3 5 amperes with felt oil seal in drive end head (GJC) 3 4-3 9 amperes all at 10 0 volts (70° F)

Rotation - Counter-clockwise at commutator end

Belt Adjustment: Adjust deflection so there is 1/4" slack (when pushed with a force of 9-12 lbs from a straight line midway between pulleys)

REGULATOR

Auto-Lite Regulator No.	Generator
VAT-6201A	GGA
VRX-6201A	GJC

►*VRX-6201A REGULATOR PRODUCTION CHANGE*

Two resistors used on early 1956 regulators, three resistors (see diagram) on later regulators *See "Auto-Lite 12-Volt Regulators" in Electrical Section*

Cutout Relay

Cuts In - 12 6-13 6 volts (All models)

Cuts Out - 3 0-5 0 amps discharge current after charging at 10 amps (VAT), 7 amps (VRX)

Contact Gap - 015"

Air Gap - 030- 034"

Voltage Regulator

Setting - 14 5 volts at 80° F while charging at 10 0 amperes or with 25 ohm resistor in series between regulator and battery

Air Gap - 048- 052" with contacts just opening

Checking & Adjusting - *See Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 70° F*

	Test A - Operating Amps - Test B	
VRX	36 Max	30 (28-32)
VAT	46 Max	40 (38-42)

Test A - After 15 minutes operation charging at 10 amps

Test B - After additional 15 minutes operation on current regulator (with load applied to hold voltage at 13 7 -13 9 volts (VAT) 13 6-13 8 volts (VRX)

Air Gap - 048- 052" with contacts just opening

Checking & Adjusting - *See Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*

Direction Signals: *See Electrical Section*

►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not the ammeter terminal post.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft Headlamp knob is held on its shaft by means of a recessed hex screw

Stop Light Switch Location: On forward end of master cylinder

CIRCUIT BREAKERS: Lighting - Three circuit breakers on back of lighting switch Protect circuits as follows:

15 Ampere - Protects Head and Beam Indicator Lights

6 Ampere - Protects Parking Tail, License Plate Instrument, Ignition and Clock Lights

6 Ampere - Protects Stop Map, Dome, Glove Compartment, Courtesy and Trunk Compartment Lights

Windshield Wiper & Back-Up Lights - 5 Ampere Mounted on rear of windshield wiper switch

Window Lifts - 20 Ampere Mounted behind left front kick panel

Four Way Seat - 20 Ampere Mounted behind left front kick panel

HORNS: Auto-Lite, Jubilee, or Spartan. Dual horns with relay

Horn Relay: Auto-Lite RAH-4002 *12 Volt*

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: 90° V8 (All Models)

Model	Bore	Stroke	Displmnt	Rated HP
S23, S24	3.72"	3.80"	330 cu.ins.	44.3
S24A	3.78"	3.80"	341.4 cu.ins.	45.7

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Mod l	C mpr. Rati	D v l p d HP
S23	8 5-1	230 at 4400 RPM
S24	8 5-1	255 at 4400 RPM
S24A	9 25-1	320 at 5200 RPM

C mpr ssi n & Vacuum Reading - *See TUNE-UP*

ENGINE REMOVAL: *See "Engine" in DeSoto Special Data*

OIL PAN REMOVAL (Singl Exhaust): Drain oil and remove oil level indicator Disconnect crossover and "Y" pipe at exhaust manifolds and at clamp to exhaust extension so that crossover and "Y" pipes can be moved out of way *(NOTE* - Make sure remainder of exhaust system is sufficiently supported) Disconnect steering linkage at idler arm support bracket, and allow linkage to settle away from bottom of pan Remove oil pan attaching bolts, remove pan

OIL PAN REMOVAL (Dual Exhaust): Same as for single exhaust except that crossover and "Y" pipes not used

CYLINDER HEAD: *S "Cylinder Head & Manifolds" in DeSot Special Data*

TIGHTENING TORQUES: *See "Tightening Specificati ns" in D Sot Sp cial Data*

PISTONS

Aluminum alloy, horizontal slot, elliptically turned, tin plated, thermally controlled by steel belt

►*CYLINDER BORE OVERSIZE CAUTION· Engines with l tter "A" f ll wing ngine number indicates that cylind r bor s ar .020" ov rsize*

Weight - 19 9 ozs (stripped)

R m val - Pistons and rods removed from above

Fitting N w Pist ns: Clearance. .029-.036" at top land, .0005-.0015" at top of skirt. Pull required to remove .002" x 1/2" feeler inserted between cylinder wall and piston (piston inverted, pin removed) should be 8-12 lbs. at 70°F.

R plac m nt Pist ns: Std , 010", 020", 030", 040", 050", 060" oversize *NOTE* - 005", 020" O S only on S24A

Installing Pist ns: Install pistons with marking on top of piston toward front of engine

►*PISTON INSTALLATION CAUTION:* Pistons must be assembled to rods on right cylinder bank (2-4-6-8) with indent on piston head opposite to larger chamfer on large end of connecting rod On left hand cylinder bank (1-3-5-7) assemble rods to pistons with indent on piston head on same side as larger chamfer on large end of connecting rod

PISTON PINS

Floating type with lock ring at each end.

Diamet r—.9216-.9218". **L ngth**—3-1/16".

NOTE—Piston pin is offset in piston toward right side of engine.

Clearance in Pist n—.0000-.0005" or thumb press fit at 70° F.

Clearanc in R d—.0001-.0004". Selective fit.

R plac ment Pins: Standard, .003", .008" oversize.

NOTE—Fitted pins are furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compr (#1)	0775- 0780"	010- 020"	0015- 003"
Compr (#2)	0775- 0780"	010- 020"	001- 0025"
Oil (#3)	1860- 1865"	010- 015"	001- 003"

Replacement Rings: Furnished in sets Standard, 010" 020", 030", 060" oversize

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed

CONNECTING RODS

Length (Center to Center) - 6 621-6 625" **Weight**-25 1 ozs

Crankpin Journal Diameter - 2 249-2 250"

Maximum out-of-round and taper limits—.001".

Lower Bearings—Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below*

Clearance—.0005-.0015" desired. Maximum—.0025".

Endplay—.006-.014".

Bearing Adjustment—None. Replace bearings.

Replacement Bearings: Std., .001", .002", .010", .012" undersize.

Installing Rods *See "Pistons (Installation)" above.* Larger chamfer of connecting rod bore must be installed toward crankshaft journal fillet When installing lower bearing shell, make certain that "V" groove in shell is in line with "V" groove in cap Install shells so that small formed tang fits into machined grooves of rods

CRANKSHAFT

Journal Diameter - 2 4995-2 5005" 5 bearings

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION. Engines with undersize journals identified as follows.*

.010" UNDERSIZE (Main & Connecting Rod Journals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8" high) stamped on the machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of the undersize journals are stamped on the machined surface of the center (#3) counterweight in the following manner "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings—Removable, precision type, steel-backed, babbitt lined. No shims.

Clearance—.0005-.0015".

Replacement Bearings Std., .001", .002", .003", .010", .012" undersize. Upper and lower halves of bearings Nos. 1, 2, and 4 are alike and interchangeable, Upper No. 3 is interchangeable with Lower No. 3, Upper & Lower No. 5 are n t int rchang abl .

End Thrust Taken by center (#3) main Bearing.

Endplay—.002-.007".

Crankshaft R ar Main B aring Oil S al *See "Crankshaft & Main Bearings" in DeSoto Special Data*

Crankshaft Fr nt Oil S al *See "Engine Front Cover" in DeSoto Special Data*

CAMSHAFT

Journal Diameters - (1) 2 000-2 001", **(2)** 1 984-1 985" **(3)** 1 969-1 970", **(4)** 1 953-1 954", **(5)** 1 4375-1 4385"

Bearings—Removable, steel-backed, babbitt lined bushings.

Clearance—.001-.003"

End Thrust. Taken by thrust plate behind camshaft sprocket hub.

Endplay—.002-.006".

Timing Chain: Width—1-1/8". **Pitch**—.375". **Length**—68 links.

Camshaft Setting: Timing Check: Marks on gears should be adjacent and in line with straightedge across shaft centers **Chain Installation:** Install chain and gears as an assembly Mesh crankshaft gear in chain with keyway out toward chain, mesh camshaft gear in chain with keyway toward crankshaft gear and mark on gear in line with 23rd chain pin clockwise from pin at mark on crankshaft gear Install assembly on engine, turning camshaft and crankshaft to line up keys with gear key ways, install fuel pump eccentric (must engage camshaft key), tighten camshaft cupwasher and bolt to 35 ft lbs Check timing as above

Camshaft Removal: *See "Camshaft & Bearings" in DeSoto Special Data.*

Engine Front Cover (Removal & Installation) *See "Engine Front Cover" in DeSoto Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in DeSoto Special Data*

VALVES

Tappet Clearance: None in service (hydraulic)

Valves	Head Diameter	Stem Diameter	Length
Intake	1 9325-1 9425"	372- 373"	4 84"
Exhaust	1 745-1 755"	371-.372"	4 86"

Valves	Seat Angle	Lift	Stem Clearance
Int S23, S24	45°	381"	001- 003"
Int S24A	45°	357"	001- 003"
Exh S23 S24	45°	431"	002- 004"
Exh., S24A	45°	.413"	.002-.004"

Valve Seat Width - 1/16-3/32" (Int) 3/64-1/16" (Exh.)

Intake Valve Stem Oil Seal - Seal installed on intake valve stem after valve is inserted in head and before installation of springs Seal will seat itself in correct position on guide

►*VALVE GRINDING CAUTION* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3061. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

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Valv Springs: Single springs used on S-23 & S-24 Double springs used on each valve on S-24A Install with closed coil toward cylinder head **Free Length - 2"** (S-23, S-24), 1 7/8" Outer, 1 25/32" Inner (S-24A)

Valve Spring Specifications - S-23, S-24

Valve	Lbs. Pressure	Length
Open	166	1 31"
Closed	72	1 69"

Valve Spring Specifications S-24A

	Inner Spring			Outer Spring	
Valve	Lbs.Press.	Length	Valve	Lbs.Press.	Length
Open	66	1 09"	Open	158	1 22"
Closed	28	1 53"	Closed	60	1 66"

►*CAUTION: Spring ends must be square within 1/16". (Use steel square on surface plate–revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION.* If valves or seats are reground, check **installed** height of spring. If height of spring is 1-23/32" or greater, install a 1/16" spacer (Part No. 1400482) in the head counterbore to bring spring height back to normal 1-5/8–1-11/16".

►*VALVE SPRING LOAD CAUTION: Hydraulic lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.*

Valve Guides: Remove old guides by driving them out through top of head using tool C-3150. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3150 is flush with face of cylinder head. To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to .374-.375" with tool C-741.

►*CAUTION. Oil hole in top of exhaust guide must face up. Oil hole must face toward intake guide.*

NOTE–If Valve Guide Tool C-3150 is not available, drive guide in, measuring from top of valve seat as follows **Intake–1". Exhaust–1-3/32".**

Hydraulic Valve Lifters: Diameter–.9040-.9045". Clearance–.0005-0015".

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve lifters used on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize.

Lifter Overhaul & Testing–*See "Valve System" in DeSoto Special Data.*

Rocker Arm Assembly: *See "Valve System" in DeSoto Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Firedome S-23 Valve Timing
Intake Valves - Open 4° ATDC Close 76° ALDC
Exhaust Valves - Open 54° BLDC Close 10° ATDC

Fireflite S-24 Valve Timing
Intake Valves - Open 15° BTDC Close 57° ALDC
Exhaust Valves - Open 49° BLDC Close 15° ATDC

Fireflite S-24A (Adventurer) Valve Timing
Intake Valves - Open 35° BTDC Close 65° ALDC
Exhaust Valves - Open 65° BLDC Close 25° ATDC.

Valve Timing Check–Turn crankshaft until #1 intake valve closed. Insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle. Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid). Set dial indicator at Zero, turn crankshaft until dial indicator shows that valve has lifted .016". Pointer on chain cover should indicate between 5° BTDC to 7° ATDC if timing correct. Then turn crankshaft **counterclockwise** until lifter backed down and valve closed, remove spacer from valve stem.

►*CAUTION. Do not turn crankshaft further than indicated above, which might bottom spring and damage valve mechanism.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data*

Crankcase Capacity: 4 qts. (refill). Add one additional quart if filter changed.

Normal Oil Pressure: 40-65 lbs. at 2000 RPM.

Oil Pressure Relief Valve - Mounted in oil pump. Adjustable. *NOTE* **- When replacing relief valve spring, use same color spring.**

Oil Pressure Gauge - Auto-Lite 14033A

Oil Pump: Rotary type. In crankcase at rear end. Mounted on rear bearing cap.

Overhaul–*See "Oiling System" in DeSoto Special Data*

Priming Oil Pump (After Overhaul)–Before installing oil pump and strainer to rear main bearing cap, prime pump.

Oil Filter: Shunt type. A portion of oil from oil pump is directed through this filter and the remainder flows directly into engine lubricating system.

Filter Element–Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is replaced.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 23 qts. (24 with heater).

Pressure Valve: DeSoto 1373136. Radiator filler cap. Opens at 7 lbs. 14 lb. type used with Air Conditioning.

Thermostat: By-pass type in cylinder head water outlet. Starts to open at 160-165° F.

Water Pump: Centrifugal type.

See "Water Pump" in DeSoto Special Data

Pump Removal - Drain cooling system, remove radiator inlet hose and upper half of fan shroud. Loosen idler pulley and generator adjusting lock bolts, remove drive belts. Remove fan, spacer, and pulley. Remove pump.

Temperature Gauge: Auto-Lite. Electric type.
Dash Unit - 14034A.
Engine Unit - 13550A.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Std. & O.D. (S-23)	10A7	361376	382366
Heavy Duty (S-23)	11A6	361382	381850

See "Borg & Beck" Clutches in Clutch Section.

Pedal Adjustment: Adjust fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: With clutch pedal in fully released position, and with over-center spring finger tight, hold spring eyebolt, spring, and bracket assembly as a single unit and tighten adjusting nut seven full turns.

Removal: Remove transmission (See Synchro-mesh Transmission). Remove clutch housing pan. Pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove cap screws, which hold clutch cover to flywheel, loosening each cap screw a few turns (in succession) until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "DeSoto Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission to be disassembled) Disconnect speedometer cable, hand brake cable, gear shift rods Remove nuts holding transmission to clutch housing Then remove transmission by pulling it back, down, and out of car

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down. *See "Warner R10" Overdrive in Transmission Section.*

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

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►*OVERFILLING CAUTION:* High engine speed or high temperature operating conditions may cause transmission oil to expand to point where transmission is, in effect, overfilled, causing governor pressure to drop to point to cause a high speed downshift in transmission. *See "Checking Fluid Level" below.*

►*TRANSMISSION DIPSTICK PRODUCTION CHANGE & FLUID LEVEL CHECKING CAUTION:* At Engine Number S-25-11235, S-26-7821, & S-27-34758, "FULL" mark on dipstick was lowered ½" (Distance from "Full" to "Add" mark is 1-5/8" on first type dipstick, 1-1/8" on later type dipstick). When checking fluid level, maintain level on each type dipstick as listed below.

Checking Fluid Level (Transmission Cold) - Check COLD whenever possible. Idle engine and operate transmission in all ranges (press all buttons in turn), then check level with engine idling and transmission in Neutral. Fluid level should be between "Low" mark and bottom of dipstick (First & Later type dipsticks—See Production Change & Checking Caution above). Add or drain fluid as necessary to maintain this level.

Checking Fluid Level (Transmission Hot): If fluid level must be checked after normal highway driving, proceed as for Cold Check (above) but maintain level on each type dipstick as follows (See Dipstick Production Change & Checking Caution above): **First Type Dipstick**—Level should be between "Full" mark and ½" below this point. **Later Type Dipstick**—Level must not be above "Full" mark. Add or drain fluid as necessary to maintain this level.

►*FLUID LEVEL CAUTION:* Overfilling or too high fluid level in transmission may cause foaming under high speed and high operating temperature conditions (if level reaches gear train as fluid expands). This may result in drop in governor pressure and permit transmission to downshift.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit. Ball & Trunion type (front), Cross type (rear).

REAR AXLE

Own. (S-23 Exc. Sta. Wgn.) Cage type, (Others) Barrel type. Hypoid gear with Hotchkiss drive.
See "D Soto Hypoid" in Rear Axle Section.

Rear Axle Ratios

Model	Synchro-mesh	Overdrive	PowerFlite
S23 Sta.Wgn.	4.1,3.91,4.3-1	4.3,4.1-1	
S23 (Others)	3.9,3.73,4.1-1	4.3,4.1-1	
S23 (All)			3.73,3.9,4.1-1
S24 Sta.Wgn.			3.54,3.73,3.36-1
S24 (Others)			3.91,4.1,3.73-1
S24A			①

① 5 Optional ratios available ranging from 3.07 (40-13) to 3.91 (43-11).

Backlash - .006-.008".

Carrier Removal: Drain lubricant. Back off brake adjusting cams (See Brakes) before removing hubs and drums. Remove wheel hub and drum assemblies, using wheel puller C-845. Remove axle shafts (see below). Disconnect rear universal joint and drop propeller shaft. Remove carrier assembly from axle housing.

Axle Shaft Removal: Block brake pedal and disconnect brake lines at wheel cylinders. To protect axle bearing outer oil seal, remove rear axle drive shaft keys and install Tool C-745. Remove axle shaft seals, brake supports and bearing shims. Remove rear axle shaft oil seal from brake support with Tool C-839. *(NOTE* - When removing axle bearing shims from ends of axle housing, keep each set of shims separate to assure proper reassembly). Remove axle drive shaft and bearings with Puller C-499.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay** - .003-.008".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers.
See "DeSoto" in Front Suspension Section.

Kingpin Inclination—5-6½°

Caster—Neg. 2° to 0° (Neg. 2° preferred with Manual Steering, 0° preferred with Power Steering). Left side should be between 0° and ¾° more negative than right right side.

Camber—Pos. 1/4°±3/8° (Left side Pos. 1/2°, Right side 0° preferred).

Toe-In - 1/8" ± 1/32" (1/8" preferred).

Toe-Out on Turns —Inner wheel 21½° plus or minus 1° with outer wheel at 20°.

STEERING

Manual Steering Gear: Gemmer. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: "Coaxial". Components encased in tubular housing which is located at bottom of and concentrically around axis of steering column.
See "Coaxial" Power Steering in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

►*BRAKE "SQUEAK" CORRECTION: See DeSoto "Center Plane" Brakes in Brake Section.*

Service: Center Plane (Floating Shoe) hydraulic type.
See DeSoto "Center Plane" Brakes in Brake Section.

Drums—Centrifuse. Diameter 12".

Wheel Cylinder Diameter—1-1/8" bore. Single acting (front), double acting (rear wheels).

Replacement Linings & Shoes—Linings or shoes with linings are furnished Standard and .030" oversize.

Lining—Molded asbestos (bonded to shoe). Length—12.57" per shoe. Width - 2.5". Thickness - 13/64".

Braking Power - 60% Front, 40% Rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

Rear Wheels - Same as front wheels except that on rear wheels forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid—Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal—Disconnect pushrod. Disconnect brake line tube at master cylinder. Disconnect stop light switch leads, remove four stud nuts from studs, remove master cylinder.

Power Brakes: "Bellows" or "Piston" Assist type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder). *See "Chrysler, DeSoto, Dodge, Plymouth Bellows Type" or "Piston Type" Brakes in Brake Section.*

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket *(NOTE* - If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Reomve complete power unit and bracket assembly by removing four nuts and lockwashers.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with PowerFlite.

Adjustment—*See "Hand Brake Notes" in DeSoto Special Data.*

Lining—	Width	Thickness	Length
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (Internal Expanding) - Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

Clearance (External Contracting) - Adjust anchor screw so clearance between band and drum at anchor is .015-.020".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPF-4001. Electric type.
See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: DeSoto "Airtemp". *See "Airtemp" Air Conditioning in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: Electric type. *See "Power Seat Adjusters" in Miscellaneous Section.*

Convertible Top Control: Electrical-hydraulic type. *See "Power Top Control" in Miscellaneous Section.*

►*ADVENTURER NOTE* This model has special Fire-Flite Engine (Larger Bore, Racing Camshaft, Dual Breaker Distributor, Double Valve Springs, and special Carburetors) Complete data is included below.

MODEL IDENTIFICATION

Model	Model Designation
Firedome	S-25
Fireflite	S-26
Adventurer	S-26
Firesweep	S-27

SERIAL NUMBER: Stamped on plate attached to left front door body hinge post.

Starting Serial Numbers

Model	Detroit	Los Angeles
S-25 Firedome	55332001	
S-26 Fireflite	50396001	
S-27 Firesweep	58001001	60014001

ENGINE NUMBER: Stamped on machined boss on top of front side cylinder block just behind water pump.

Starting Engine Numbers

Model	Detroit	Los Angeles
S-25 Firedome	S25-1001	
S-26 Fireflite	S26-1001	
S-26 Adventurer	S26A-1001	
S-27 Firesweep	KDS-1001	KDS-1001

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number) Identified as follows*
"A" – All cylinders .020" oversize.
"B" – All Main & Connecting Rod Bearings .010" undersize.
"AB" – BOTH above conditions exist.
"MALTESE CROSS" symbol (3/8" high)—ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" & "Crankshaft" under ENGINE below.*
"DIAMOND" symbol (3/8" high)—ALL Lifter Bodies are .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: (S-25, S-26) 145-175 lbs., (S-26 Adventurer) 160-190 lbs., (S-27) 90-155 lbs All at cranking speed of 150 RPM (plugs removed, wide open throttle). Maximum variation between cylinders 20 lbs. (S-26 Adventurer), 15 lbs. (All others).

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Automatic thermostatic type located between right hand exhaust manifold and exhaust pipe. *NOTE* – Single exhaust pipe with cross-over Std., Dual Exhaust Optl.
Thermostatic Coil Installation – Outer end of coil should be hooked under right hand stop stud. An anti-rattle spring is hooked between valve shaft and stud on opposite side of valve housing.

►*DUAL EXHAUST NOTE* When valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders – RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: 035".
Spark Plugs – Auto-Lite AR-42 (Std.). Resistor type. 14 mm. Torque to 30-32 ft. lbs. *NOTE* – On Adventurer, Auto-Lite AR-32 recommended for sustained high speed.
COIL: Auto-Lite CAH-4001C (S-25, S-26), CAH-4001B (S-27).
Ignition Current – 2.5 amps. idling, 3.1 amps. stopped.
Resistor – Auto-Lite PU-4003, .665-.735 Ohms.

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil. When testing coil, include resistor with coil.

DISTRIBUTOR: Auto-Lite. Distributors are single breaker type (IBP), double breaker type (IBS).

Car Model	Auto-Lite No.
S-25	IBP-4001
S-26	IBP-4001A
S-26 Adventurer	IBS-4004
S-27 (Std.)	IBP-4002
S-27 (Power Pak)	IBP-4002B

Condenser – Auto-Lite IAT-2015RA. **Capacity** .25-.28 mfd.
Contact Point Set – Auto-Lite IBP-3028AS (IBP Distr.).
Breaker Gap – 015-.018"
Cam Angle - (IBP Distr.) 27 32° (IBS Distr.) 29 32° for single set of points 36 39° for both sets of points

►*CAM ANGLE SETTING CAUTION (IBP DISTR.)* Cam angle should be checked with vacuum line **disconnected** Cam angle may decrease as much as 10° with maximum vacuum advance but must not decrease more than 12°

Breaker Arm Spring Tension – 17-20 ozs.
Rotation – Clockwise viewed from above

Automatic Advance – IBP-4001

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		440	2		880
4 5		750	9		1500
9		1525	18		3050
10		1700	20		3400

Automatic Advance – IBP-4001A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		435	2		870
5 5		800	11		1600
8		1875	16		3750
9		2300	18		4600

Automatic Advance – IBP-4002

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0		900
1		535	2		1070
4		800	8		1600
6		1200	12		2400
8.5		1700	17		3400

Automatic Advance – IBP-4002B

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		350	0		700
1		370	2		740
5		450	10		900
7		720	14		1440
8		850	16		1700

Automatic Advance - IBS-4004

Degrees	Distr.	RPM	Degrees	Eng	RPM
0		350	0		700
1		400	2		800
4		525	8		1050
7		660	14		1320
8		700	16		1400

Vacuum Spark Control: Auto-Lite. Integral Type.

Vacuum Advance – IBP-4001, 1A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	10½
1	2	11
8	16	14-1/8
14	28	17-3/8
15	30	18

Vacuum Advance - IBP-4002, 2B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	7-1/8
1	2	7-5/8
7	14	11-7/8
12	24	16-3/4
13	26	18

Vacuum Advance - IBS-4004

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	9 1/8
1	2	9 7/8
5	10	12 7/8
9	18	16 1 2
10 25	20 50	18

IGNITION TIMING

Setting – 6° BTDC (All Models). NOTE – Setting should not be varied more than 4° before or after the standard setting of 6° BTDC
Timing Mark – Vibration marked "DC" with 2° graduations before and after this point. Align correct mark with pointer on chain case cover.

CARBURETOR

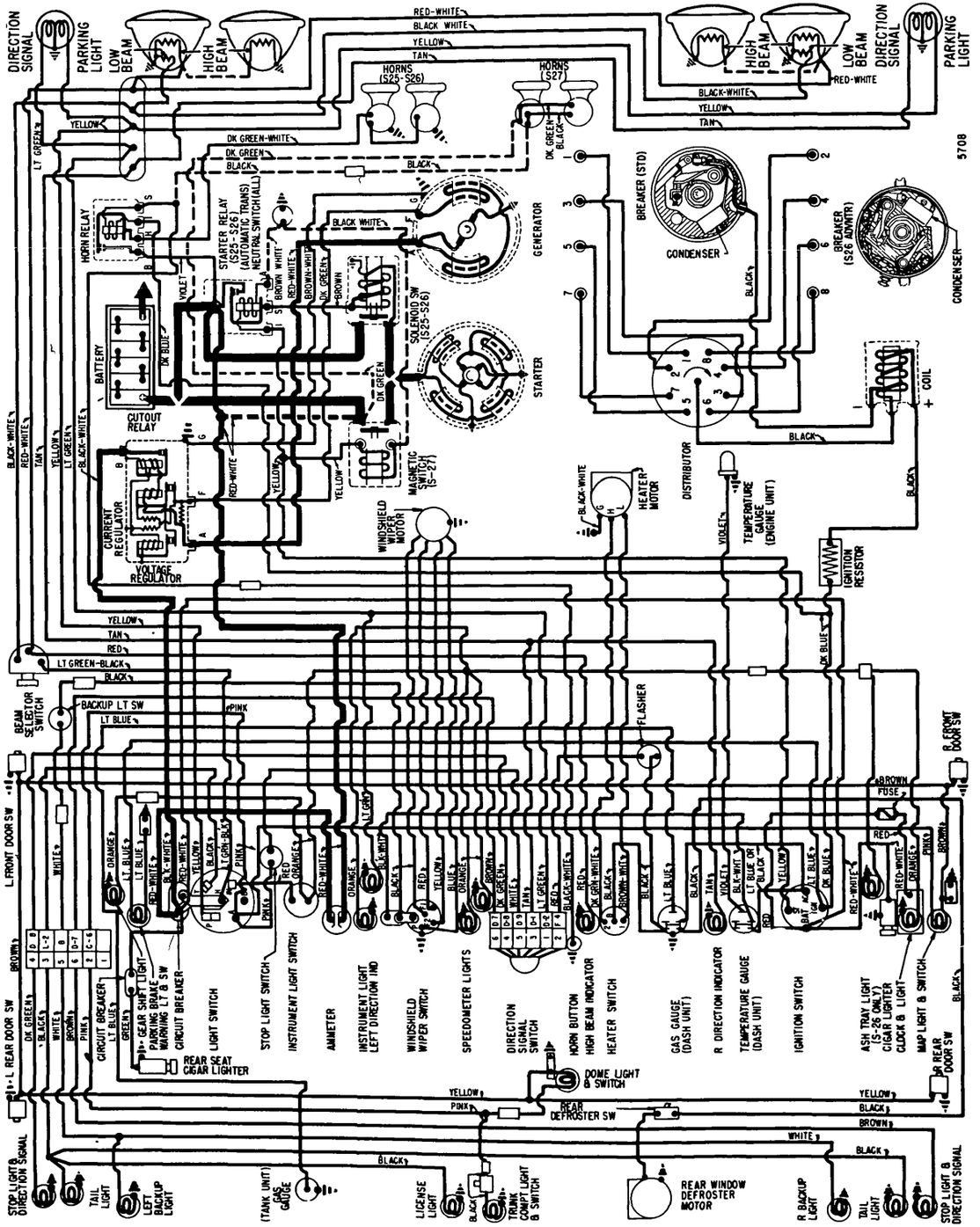
►*CARBURETOR APPLICATION Carter & Stromberg (2 and 4 barrel types) used as follows*

Model	Carburetor Type & No.
S-25 (Std.)	Carter BBD 2522S SA
S-25 (Power Pak)	Carter WCFB 2532S
S-26 (Std.)	Carter WCFB 2588S
S-26 Advntr	Carter WCFB 2635S (Frt), 2636S (Rear)
S-27 (Std.)	Stromberg WW 3-149, 3 150
S-27 (Power Pak)	Carter WCFB 2532S

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE Special cleaning procedure required. See AIR CLEANER below.*

►*S-27 POWERFLITE & TORQUEFLITE LINKAGE ADJUSTMENT CAUTION & NO-KICKDOWN CORRECTION* Different Bellcrank-to-Transmission Throttle Valve Rods used with each transmission. If TorqueFlite throttle linkage cannot be adjusted, or if kickdown does not operate, make certain correct rod installed. Identify rods as follows
PowerFlite Rod – No 1735024. Straight portion of rod (from bellcrank end to center of bend) should be 6½" or 1" shorter than corresponding TorqueFlite rod

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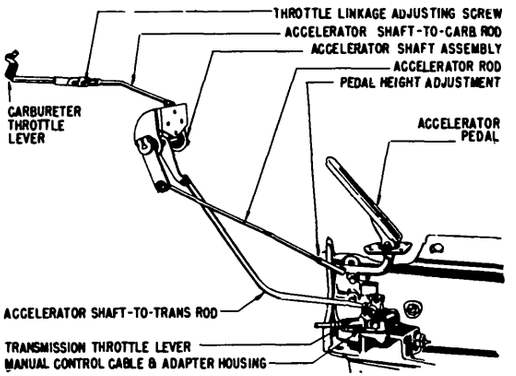
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Torqu Flit R d–No. 1734979. Straight portion of rod (from bellcrank end to center of bend) should be 7½".

THROTTLE LINKAGE ADJUSTMENT: *NOTE* – Accelerator pedal angle should be 118° to horizontal in closed throttle position. To adjust, disconnect pedal end of bellcrank-to-pedal rod, shorten or lengthen rod by turning swivel end on rod, tighten locknut after adjusting. Then proceed as follows:

1) Make certain engine idle speed correctly set at 475-500 RPM with transmission in neutral and engine at normal operating temperature.

2) On 2-Barrel carburetor models, loosen adjusting screw located on accelerator shaft-to-carburetor rod. On 4-Barrel carburetor models, loosen adjusting screw on accelerator shaft assembly-to-intermediate shaft assembly rod. On all models, move rear portion of rod to rear until it is stopped by idle stop on transmission throttle cam. Align rods and tighten adjusting screw to 7-9 ft.lbs. torque. Recheck engine idle speed.



POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

CARTER BBD

Carter BBD, No. 2522S, SA. Std. on Model S25.

► *FLAT SPOT OR HESITATION (2522S Carburetor):* If this not corrected by complete tune-up (including Ingition Timing, Manifold Heat Control operation check, and Carburetor adjustment including Float Level and Pump Stroke check), check pump valves and make changes in carburetor as detailed below. *NOTE* - These new parts installed in 2522SA carburetors in production.

Accelerating Pump Check Valves - Check for leakage by holding discharge check ball at bottom of pump discharge cluster hole while operating pump (Discharge Cluster removed). If leakage noted at discharge ball check or at intake ball check, reseat balls. Use brass rod to tap ball down if new balls not available.

Venturi Cluster Screws (Main Idle Air Bleed) - Install new screws, No. 101-434 (supersedes 101-433).

Step-up Rods - Install new rods, No. 75-1145 (supersedes 75-1177).

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel f ds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

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Idle S tting – 1-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed – 450-500 RPM (Synchro-mesh). 475-500 RPM with transmission in Neutral (TorqueFlite).

Float Level - 5/16 (Gauge T109-220) between top ridge of each float and top edge of bowl casting with needle valve closed (float lip held against needle valve). Adjust by bending lip on float arm.

Accelerating Pump – Install connector rod in center hole of throttle lever and inner hole of pump arm Pump stroke (travel of pump piston rod) should be 1 1/32" plus or minus 1/64" Adjust by bending throttle connector rod

Fast Idle: 015" (Gauge T109-44) between lower edge of of throttle valve and bore with fast idle adjusting screw on high step of cam.

Fast Idle Cam Clearance – With choke valve closed and lip on inner choke shaft lever contacting lug on outer lever, index mark on cam should align with fast idle adjusting screw Adjust by bending lip on inner choke shaft lever

Automatic Choke Setting: 1 Point Rich.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Carter BBD" Carburetor in Carburetion Section*

STROMBERG WW

Stromberg WW, Code 3-149 (Synchro-mesh), 3-150 (PowerFlite & TorqueFlite). Std. on Model S-27.

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting – 3/4 - 1-3/4 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed – 450-500 RPM (Synchro-mesh), 475-500 RPM with transmission in Neutral (PowerFlite & TorqueFlite).

Float Level – 7/32" (Gauge T-26019) from top of float at center to top edge of bowl casting with needle valve seated (hold float arm lip against needle valve). Adjust by bending lip.

Accelerating Pump – Install connector rod in center hole of throttle lever.

Fast Idle: With throttle stopscrew backed out so that throttle valves completely closed, back out fast idle adjusting screw, close choke valve so that fast idle screw in line with first step of fast idle cam, turn fast idle screw in until initial contact is made with cam, then turn screw in additional 5½ turns. With fast idle screw in position, close choke valve against a #12 drill (3-149 Carb), #24 drill (3-150 Carb.) placing drill between upper edge of valve and air horn wall. If fast idle screw is not on first step and against shoulder on cam, adjust by bending fast idle rod at upper end.

Automatic Choke Setting: *NOTE* – Choke is "Crossover" type mounted in well in manifold and linked to choke lever by a rod. Adjustment is not required but can be checked by disconnecting rod and removing choke assembly. Index mark on thermostatic coil plate should be midway between "L" and "R" marks.

Throttl Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Stromberg "WW" (Dodge & Plymouth) Carburetor" in Carburetion Section*

CARTER WCFB 4-BARREL

Carter WCFB No. 2588S (S-26), 2532S (S-25 & S-27 Power Pak).

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting – ½-1½ turns open (primary only). Turn screws out for richer mixture.

Idle Speed – 450-500 RPM (Synchro-mesh), 475-500 RPM with transmission in Neutral (PowerFlite & TorqueFlite).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Carter WCFB 4-Barrel" Carburetors in Carburetion Section*

CARTER WCFB 4-BARREL
Two Carburetor Installation
(Adventurer)

Carter WCFB, No. 2635S (Frt), 2636S (Rear).

►*MANIFOLD FUEL DISTRIBUTION RIGHT barrels feed right bank cylinders, LEFT barrels feed left bank*

►*CARBURETOR IDLE ADJUSTMENT CHANGE NOTE· The following idle speed & mixture adjustment procedure supersedes previous instructions.*

Linkage Adjustment· Before adjusting idle mixture and idle speed the carburetor inter-connecting rod must be adjusted as follows Hold rear carburetor throttle in wide open position (choke off) and adjust rod at slotted end so front carburetor throttle valve will be in wide open position Make sure rod can rotate slightly on pivots and is not binding A binding condition can result in a loose throttle lever which may fall off shaft and leave throttle wide open

►*LOOSE THROTTLE LEVER CORRECTION* Remove carburetor and place in a vise so that end of throttle shaft away from lever is firmly supported Place lever on shaft and peen shaft to tighten securely

Idle Speed & Mixture Adjustment· Screw the 'idle by-pass" screw (7/16" slotted hex head screw located on left rear side of each carburetor body flange) against its seat *(NOTE - This "by-pass screw" is no longer used for idle speed adjustment and must remain in the closed position).* Adjust engine idle speed to 650 RPM (transmission in neutral) by screwing in the **idle speed screw** (throttle stop screw at throttle shaft lever) on the front carburetor only. Adjust all four (two on each carburetor) idle mixture screws 1 turn open from a lightly seated position. Obtain the smoothest possible idle speed by further adjusting idle mixture screws on **front** carburetor *(NOTE - It may also be necessary to re-adjust idle mixture screws on rear carburetor if adjustment of front carburetor does not provide proper engine idle speed).*

Throttle Linkage Adjustment (Automatic Transmission Cars)· *See CARBURETOR above*

►*OTHER DATA See "Cart r WCFB 4-Barrel Carburetor" in Carburetion S ction*

FUEL PUMP PRESSURE: 6-7 lbs.

CARB. EQUIPMENT

Fuel Pump: **Carter** M2502S (S-27), M2501S (S-25, S-26 Std.), M2504S (S-25, S-26 Air Cond.).
Pressure - 6-7 lbs.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge. Auto-Lite Electric Type.
Dash Unit - Auto-Lite 14322A
Tank Unit - Auto-Lite 14380A (Est. Wgn), 14381A(Others)
See "Fuel Gauges" in Carburetion Section.

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

(S-25, S-26) Auto-Lite 11-HS-60 r Willard HO-11-60. 12 volt, 11 plate, 60 ampere hour (20 hr. rate).
(S-27) Auto-Lite 11-HS-50 or Willard HO-11-50. 12 volt 9 plate, 50 ampere hour (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front of engine.

STARTER

Auto-Lite Used as follows

Model	Starter No.	Armatur No.
S-25, S-26	MDL-6001	MDL-2006
S-27	MDL-6003	MDL-2088

►*S-27 NOISY OR ERRATIC STARTER DRIVE CORRECTION* Check for excessive dust or water on drive shaft Lubricate with No. 10W oil. In extreme cases, remove starter and lubricate Bendix drive unit.

Drive – (MDL-6001) Overrunning clutch & solenoid pinion shift. (MDL-6003) Bendix "Folo-Thru" No. A3596.

Rotation – Counter-clockwise at commutator end.

Brush Spring Tension – 31-47 ozs. with new brushes.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200 min	10.0	60 max.
6.0 ft. lbs.	Lock	4 0	225 max.

Starting Switch· **(S-25, 26)** - Auto-Lite SAD-4301 Solenoid Pinion Shift used with separate relay, Auto-Lite RAJ-4001, and Neutral Safety Switch on transmission (Auto Trans Cars) Controlled by Ignition and Starting Switch (key starting)

(S-27) - Auto-Lite SAE-4001 (Synchro-mesh), SAE-4002 (Auto Trans.) magnetic switch used with Neutral Safety Switch on transmission (Auto. Trans.). Controlled by Ignition & Starter Switch (key starting).

See "Auto-Lite Starter Controls" in Electrical S ction

N utral Safety Switch Adjustm nt *S e "PowerFlite" or "TorqueFlit " Transmission in Transmission Section.*

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GENERATOR

Autolite. 12 volt. Used as follows:

Generator No.	Armature No.	Application
GJC-7002H	GJC-2030F	S-25,26,27 (Early)
GJC-7012A	GJC-2030F	S-25,26,27 (Later)
GJC-7013A	GJC-2030F	S-26 Advntr.
GJC-7006B		Air Cond.
GHM-6004C	GHM-2059F	① Air Cond.
GHM-6001E	GHM-2006F	② Air Cond.
GGA-6001AC	GFY-2101F	Special

① — With 4-Headlight System.
② — With 4-Headlights and Gasoline Heater.

►*SPECIAL GENERATOR NOTE:* GGA, GHM, and GJC Generators used. Performance specifications apply equally to all generators within group specified.

Performance Data — GGA (Cold)

Amperes	Volts	RPM
4.0	14.6	950 max.
40.0	14.6	1600 max.
40.0	15.0	1600 max.

Performance Data — GHM (Cold)

Amperes	Volts	RPM
5	14.0	875 max.
25	15.0	1350 max.
30	15.0	1500 max.

Performance Data — GJC (Cold)

Amperes	Volts	RPM
0	12.8	1225-1325
30	15.0	2050-2250

Brush Spring Tension — (GGA) 34-41 ozs., (GHM) 35-53 ozd., (GJC) 18-36 ozs., with new brushes.

Field Current — (GGA, GHM) 1.1-1.3 amperes, (GJC) 1.2-1.3 amperes, at 10 volts (70° F.).

Motoring Current — (GGA) 2.3-2.6 amperes, (GHM) 3.0-3.5 amperes, (GJC) 3.4-3.9 amperes. All at 10.0 volts (70° F.).

Belt Adjustment: **(Exc. Air Cond. Cars)** - 3/16" deflection midway between generator and water pump pulleys. **(Air Cond. Cars)** - 1/8" deflection midway between generator and Air Compressor pulleys. All with 5 lbs. force.

REGULATOR

Autolite VRX-6201A (GJC & GHM Gen.), VAT-6201A (GGA Gen.).

Cut-out Relay

Cuts In - 12.6-13.6 volts (All models).
Cuts Out - 3.0-5.0 amps. discharge current after charging at 10 amps. (VAT), 7 amps. (VRX).
Contact Gap — .015" minimum.
Air Gap — .031-.034" with contacts open (check at hinge end of core).

Vibrator Regulator

Setting — 14.5±.3 volts charging at 10 amperes (80° F.) or with .25 ohm resistor in series between regulator and battery.
Air Gap — .048-.052" with contacts just opening.
Checking & Adjusting — *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION:* *"Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A	Operating Amperage - Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A — After 15 minutes operation charging at 10 amperes.
Test B — After additional 15 minutes operation with current regulator operating (load applied to hold voltage to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).
Air Gap — .048-.052" with contacts just opening.
Checking & Adjusting — *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. 2-Headlights standard, 4-Headlights optional. *See "4-Headlights" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Used as follows:

20 Ampere — Protects headlights and beam indicator. On back of lighting switch.

6 Ampere — Protects parking lights, tail lights, license plate lights, instrument lights, and clock light. On back of light switch.

6 Ampere — Protects stop light, map light, dome light, glove compartment light, courtesy light and trunk compartment light. On back of light switch.

5 Ampere — Windshield wiper & back-up light. On back of wiper switch. *NOTE* — 6 ampere circuit breaker with variable speed wiper.

8 Ampere — Rear cigar lighter. Behind left front kick panel on side cowl.

FUSES: Clock - 2 ampere in clock lead.

HORN RELAY: Auto-Lite RAH-4002 (S-25, 26 only).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8, Overhead Valves.

►*ENGINE NOTE:* Three different engines used as follows:

S-25 & S-26 — Overhead lateral valve type with double rocker shaft.

S-26 Adventurer — Larger S-26 engine with increased bore, special racing camshaft, double valve springs, and other special specifications as listed below.

S-27 — Overhead lateral valve type with single rocker shaft.

Engine	Bore	Stroke	Displacement
S-25, S-26	3.78"	3.80"	341 cu. ins.
S-26 Advntr	3.80"	3.80"	345 cu. ins.
S-27	3.69"	3.80"	325 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
S-25	9.25-1	45.7	270 at 4600 RPM
S-26	9.25-1	45.7	295 at 4600 RPM
S-26 Advntr	9.25-1	46.2	345 at 5200 RPM
S-27	8.5-1	42.2	245 at 4400 RPM
S-27 Pwr.Pak	8.5-1	42.2	260 at 4400 RPM

Compression & Vacuum Reading — *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in DeSoto Special Data.*

OIL PAN REMOVAL: (S-27) - Remove negative battery terminal, throttle linkage, distributor cap, oil dip stick and starter. Remove flywheel housing dust shield, steering arm at steering gear cross shaft, idler arm at idler arm bracket, engine front mounts and raise engine 1½". Disconnect exhaust pipe at manifold and front of muffler (Single Exhaust) and tie out of way. Drain engine, remove oil pan screws, lower oil pan, rotate crankshaft to bring No. 1 crank to approximately 8 o'clock position and remove oil pan.

(S-25, 26) - Remove dipstick. (Single Exhaust) remove starter, disconnect exhaust pipe at manifolds and at clamp to exhaust extension and move pipe out of way. (Dual Exhaust) remove starter, disconnect tie rod at idler arm and pull downward and out of way. Lower oil pan and turn crankshaft until No. 1 crankpin is at 8 o'clock position and remove oil pan.

►*CYLINDER HEAD GASKET PRODUCTION CHANGE & CAUTION:* On S-27 models a new cylinder head gasket Part No. 1827891 entered production with engine No. KDS-38504. When replacing head gasket, check depth of cylinder bolt thread in block by chalking cylinder head bolt and screwing it in block without a cylinder head. When bolt bottoms before removing 1" of chalk from bolt, increase depth of threads with ½-13 UNC2B tap. *NOTE* - On S-25 & S-26, cylinder head, Gasket No. 1827703 supersedes No. 1827285.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in DeSoto Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in DeSoto Special Data.*

PISTONS

Aluminum alloy, eliptically turned, tin plated, thermally controlled by steel strut (S-27), by steel belt or band (Other models).

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bores are .020" oversize.*

Weight - 18.6 ozs. (S-27), 20.7 (Others), piston only.
Removal - Piston & rods removed from above.

Fitting New Pistons: Clearance - .0005-.0015" at top of skirt (.00075-.00125" desired). Use .002" X ½" ribbon feeler to check fit. Pull to withdraw feeler should be 8-12 lbs. (S-25 & S-26), 5-10 lbs. (S-27).

Replacement Pistons: Furnished Std., .005", .020" (S-26 Adventurer only), plus .040", .060" oversize (Other models) with pins and retainers.

Installing Pistons: Install pistons in right bank (2, 4, 6, 8) with indent on piston head opposite larger chamfer on connecting rod, left bank (1, 3, 5, 7), with indent on same side as larger chamfer. The indent will be to front of engine on all pistons. *See Connecting Rods.*

PISTON PINS

Floating type with lock ring at each end.
Diameter - .922". **Length** - 3.060-3.070".
NOTE - Piston pin offset .060" toward right side of engine.

Clearance in Piston - .0000-.0005" or tight thumb press fit at 70°F.
Clearance in Rod - .0001-.0004" or tight thumb press fit.

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Replacement Pins: Furnished Std. .003", .008" oversize. *NOTE* - Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	.0780"	.010-.020"	.0015-.003"
Compr. #2	.0780"	.010-.020"	.001-.0025"
Oil #3	.1860-.1865"	.010-.020" ①	.001-.003"

① - .007-.017" on S-27 with Muskegon Rings.

Replacement Rings: Furnished Standard, .010", .020", .030", .060" oversize.

Installing Rings: Install with mark "Top" on compression ring to top of piston.

CONNECTING RODS

Journal Diameter - 2.249-2.250". Maximum out of round limits .001".

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE) - See "CRANKSHAFT" below.*

Length (Center to Center) - 6.621-6.625".

Weight - 22.5 ozs. (S-27), 23.6 ozs. (Others).

Lower Bearings - Removable precision type, bimetallic Copper Lead Grid, Steel backed (S-26 Adventurer), lead based babbit on steel (Others).

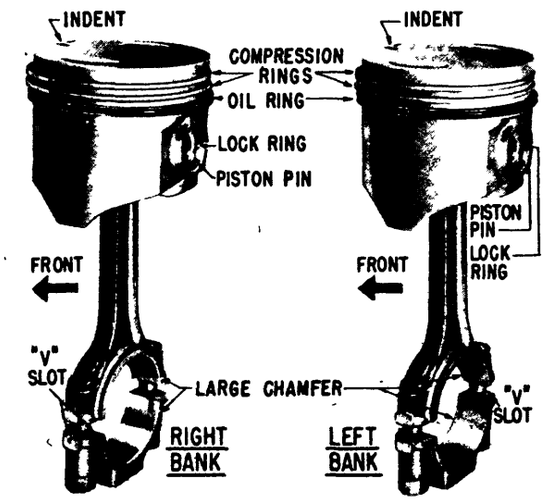
Clearance - .0002-.0022" (.0005-.0015" desired).

Side Clearance - .009-.017" (2 rods).

Bearing Adjustment - None, replace bearings.

Replacement Bearings: Furnished Std. .001",.002",.003", .012" undersize.

Installing Rods: Assemble pistons on rods with indentation on piston head opposite to larger chamfer on lower end of rod (Cyl. 2-4-6-8); on same side as larger chamfer (Cyl. 1-3-5-7). Install assemblies in engine with indentation on piston head toward front of engine (all pistons) and larger chamfer side of rod toward nearest crankshaft journal fillet.



DE SOTO V8 PISTON & ROD ASSY.

CRANKSHAFT

Journal Diameter - 2.4995-2.5005".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.010" UNDERSIZE (Main & Connecting Rod Journals)**—Letter "B" following engine number indicates ALL Main & Connecting Rod Journals .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese" Cross (3/8" high) stamped on machined surface following engine number indicates ONE OR MORE crankshaft main and connecting rod journals .001" Undersize. Position of undersize journals stamped on machined surface of No. 3 (center) counterweight as follows: "R" designates connecting rod journal, "M" designates main bearing journal. The number following this letter indicates the particular journal (numbered from front-to-rear of engine).

Bearings - Removable, precision type, Tin Based Babbitt on Steel (S-26 Adventurer), Lead Based Babbitt on Steel (Others).

Clearance - .0002-.0022" (.0005-.0015" desired).

End Thrust - Taken by center (#3) main bearing.

End Play - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in DeSoto Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in DeSoto Special Data.*

CAMSHAFT

Journal Diameters - (1) 2.000-2.001", (2) 1.984-1.985", (3) 1.969-1.970", (4) 1.953-1.954", (5) 1.4375-1.4385".

Bearings—Removable, steel-backed, babbitt lined bushings.

Clearance—.001-.003"

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

Endplay—.002-.006".

Timing Chain: Width—1-1/8". **Pitch**—.375". **Length**—68 links.

Camshaft Setting: Timing Check: Marks on gears should be adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in DeSoto Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in DeSoto Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in DeSoto Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

S-25 & S-26 (Incl. Adventurer)

Valve	Head Diameter	Stem Diameter	Length
Intake	1.94"	.372-.373"	4.90"
Exhaust	1.75"	.371-.372"	4.92"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.001-.003"
Exhaust	45°	②	.002-.004"

①—.389" (S-25 & S-26), .431" (S-26 Adventurer).
②—.389" (S-25 & S-26), .413" (S-26 Adventurer).

S-27 (Firesweep)

Valve	Head Diameter	Stem Diameter	Length
Intake	1.84"	.372-.373"	4.31"
Exhaust	1.47"	.371-.372"	4.31"

Valve	Seat Angle	Lift	Stem Clearanc
Intake	45°	.389"	.001-.003"
Exhaust	45°	.389"	.002-.004"

►*S-27 OVERSIZE VALVE STEM NOTE:* Valves with oversize stems are available in .005", .015", .030" oversize.

Valve Seat Width—1/16-3/32" (Int.), 3/64-1/16" (Exh.).

Intake Valve Stem Oil Seal—Cup seal installed on valve stem after valve installed in head and before installing springs and retainers.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3061 (S-25 & S-26), C-3436 (S-27). If valve tip exceeds maximum height (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

VALVE SPRINGS: Single springs (S-25, S-26, S-27), Double springs on all valves (S-26 Adventurer).

►*SPRING INSTALLATION (ADVENTURER):* Install all springs with closed-coil end toward head.

Spring Specifications
S-25 & S-26 (Exc. Adventurer)

	Pressure	Length
Valve Closed	68-76 lbs.	1-11/16"
Valve Open	160-172 lbs.	1- 5/16"

S-26 (Adventurer)

	Inner Spring		Outer Spring	
	Pressure	Length	Pressure	Length
Closed	26-30 lbs.	1-17/32"	58-63 lbs.	1-21/32"
Open	64-69 lbs.	1- 3/32"	156-161 lbs.	1-7/32"

S-27 (Firesweep)

	Pressure	Length
Valve Closed	49-57 lbs.	1-11/16"
Valve Open	134-146 lbs.	1- 5/16"

►*CAUTION:* Spring ends must be square within 1/16"

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats reground, check installed height of spring (from bottom of counterbore to top surface of spring retainer). If height is 1-23/32" or greater (1-41/64" on S-26 Adventurer), install 1/16" spacer in head counterbore to bring spring height back to normal 1-5/8—1-11/16".

►*VALVE SPRING LOAD CAUTION: Hydraulic lifters "Pumpup" will restrict engine speed and cause valves to burn if spring loads are not maintained.*

Valve Guides: (S-25, S-26) - Remove old guides by driving them out through the top of head using Tool C-3150. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place steel scale across combustion chamber and drive guide in until punch mark on Tool C-3150 is flush with face of cylinder head. To install, EXHAUST guide, drive it in until flush with machined surface of hole. Ream guide to .374-.375" with Tool C-741. *NOTE* - If valve guide Tool C-3150 not available drive guides in, measuring from top of valve seat, as follows: **Intake** - 1", **Exhaust** - 1 3/32".

(S-27) - Valve guides cast integral with cylinder head. Valves with oversize stems available .005", .015", .030" oversize. Use Reamer Tool C-3433 (.379-.380"), C-3430 (.389-.390"), C-3427 (.404-.405") to ream for next larger oversize.

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Hydraulic Lift rs: Integral, flat valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valv Lifters us d on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize.

Lift r Ov rhauling & T sting: *See "Valve System" in D Soto Special Data.*

R cker Arm Ass mbly: *Se "Valve System" in DeSoto Sp cial Data.*

VALVE TIMING

Se "Camshaft S tting" under CAMSHAFT above.

Valv Timing

S-25 & S-26 (Exc. Adventurer)

Intake Valv s – Open 15° BTDC Close 57° ALDC
Exhaust Valves – Open 57° BLDC. Close 15° ATDC

S-26 (Adventurer)

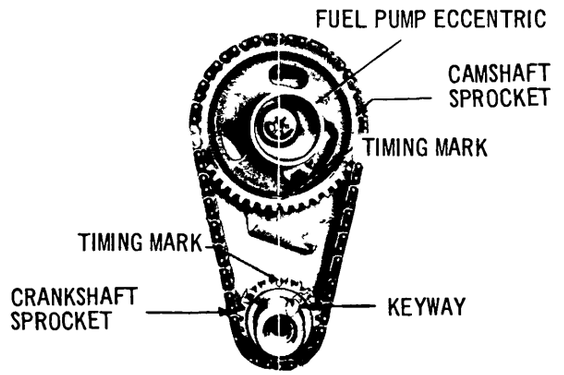
Intak Valv s – Open 35° BTDC. Close 65° ALDC.
Exhaust Valves – Open 65° BLDC. Close 25° ATDC.

S-27 (Firesweep)

Intake Valv s – Open 10° BTDC. Close 58° ALDC.
Exhaust Valves – Open 56° BLDC Close 16° ATDC.

Valve Timing Check – With No. 1 Intake Valve closed, insert .210" spacer between rocker arm and stem of No. 1 intake valve Mount dial indicator directly over valve with contact button on and at right angles to spring seat Set dial indicator at Zero after seat stops moving indicating all oil bled out of hydraulic lifter and that valve train solid. Turn crankshaft clockwise (normal direction of rotation) until dial indicator shows valve has lifted 016" (S-25 & S-26 exc Adventurer), .025" (S-27 Firesweep). Pointer on chain case cover should be between 5° BTDC and 7° ATDC mark on vibration dampener Turn crankshaft **counter-clockwise** until valve is closed, remove spacer from between rocker arm and valve stem

►*CAUTION – DO NOT turn crankshaft further in clockwise direction than indicated above (spacer may cause valve spring to bottom and damage valve system).*



DE SOTO V8 VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM: S "Engine Lubricati n" und r OILING SYSTEM in D Sot Sp cial Data.*

Crankcase Capacity: 5 quarts (refill). Add 1 quart when filter changed.

Normal Oil Pressure: 50-60 lbs. at 1500 RPM.

Oil Pressure Relief Valve - Mounted in oil pump body. Use correct color spring. *See specifications below.*

Relief Valve Spring Specifications

Color	Free Height	Load Height	Lbs. Pressure
Gray (Lt.)	3½"	2 1/16" .	16.1-17.1
Red (Std.)	2 27/32"	2 1/16"	19.5-20.5
Brown(Hvy)	2 31/32"	2 1/16"	22.0-23.9

Oil Pressure Gauge - Auto-Lite 14323A. Not electric.

Oil Pump: Rotor type, mounted on rear bearing cap, with oil strainer parallel with surface of cylinder block.

Overhaul - *See "Oiling System" in DeSoto Special Data.*

Oil Filter: Shunt type, replaceable element.

Filter Element - Install new element and cover gasket every 5,000 miles or earlier as required. Change oil with filter element change.

Crankcase Ventilation: Filter element in oil filler cap (clean with kerosene every 5,000 miles), and breather pipe for crankcase ventilation.

COOLING

Water Capacity - 20 quarts. Add 1 quart for heater.

►*AIR CONDITIONED CAR OPERATING CAUTION: Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.*

Pressure Valve: 14 lb. radiator filler cap.

Thermostat: Pellet type. Opens 157-162°.

Water Pump: Centrifugal type.

See "Water Pump" in DeSoto Special Data.

Pump Removal: Drain cooling system, remove radiator inlet hose and upper half of fan shroud. Loosen idler pulley and generator adjusting lock bolts, remove drive belts. Remove fan, spacer, and pulley. Remove pump.

►*WATER LEAK CORRECTION:* Correct water leaks at two upper front cover screws (Power Steering Cars) by replacing present lockwasher with copper washer Part No. 446219. On cars not equipped with Power Steering, coat upper left screw with sealer compound Part No. 1057794 and insert copper washer under upper right screw.

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14308A.

Engine Unit - Auto-Lite 14405A.

See "Temperature Gauges" in Misc. Section.

CLUTCH

Borg & Beck. 10A8 No. 361417 (Std.), 11A8 No. 361428 (H.D.). Disc No. 382531 (Std.), 381850 (H.D.).

See "Borg & Beck" Clutches in Clutch Section.

Pedal Adjustment: Adjust fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: *(NOTE* - Over-center spring located above brake pedal and attached to pedal mounting bracket). Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully released, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch. Reinstall clutch rod to clutch pedal.

R m val: Remove transmission (See Synchro-mesh Transmission). Remove clutch housing pan. Pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove cap screws, which hold clutch cover to flywheel, loosening each cap screw a few turns (in succession) until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "DeSoto Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal· Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission to be disassembled) Disconnect speedometer cable, hand brake cable, gear shift rods Remove nuts holding transmission to clutch housing Then remove transmission by pulling it back down. and out of car

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level - *See TORQUEFLITE below.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA. See "PowerFlite" Transmission in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque converter, and **Three Speed** hydraulically operated planetary transmission.

See "TorqueFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "TorqueFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING· See "TorqueFlite" Transmission in Transmission Section.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

Lubrication: Check the fluid level every 1000 miles, drain and refill every 20,000 miles Use Automatic Transmission Fluid, Type A.

►*TRANSMISSION DIPSTICK PRODUCTION CHANGE & FLUID LEVEL CHECKING CAUTION:* At Engine Number S-25-11235, S-26-7821, & S-27-34758, "FULL" mark on dipstick was lowered ½" (Distance from "Full" to "Add" mark is 1-5/8" on first type dipstick, 1-1/8" on later type dipstick). When checking fluid level, maintain level on each type dipstick as listed below

Checking Fluid Level (Transmissi n C ld) - Check COLD whenever possible. Idle engine and operate transmission in all ranges (press all buttons in turn), then check level with engine idling and transmission

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in Neutral Fluid level should be between "Low" mark and bottom of dipstick (First & Later type dipsticks—See Production Change & Checking Caution above) Add or drain fluid as necessary to maintain this level

Checking Fluid (Transmission Hot): If fluid level must be checked after normal highway driving, proceed as for Cold Check (above) but maintain level on each type dipstick as follows (See Dipstick Production Change & Checking Caution above) **First Type Dipstick**—Level should be between "Full" mark and ½" below this point **Later Type Dipstick**—Level must not be above "Full" mark Add or drain fluid as necessary to maintain this level

►*FLUID LEVEL CAUTION* Overfilling or too high fluid level in transmission may cause foaming under high speed and high operating temperature conditions (if level reaches gear train as fluid expands) This may result in drop in governor pressure and permit transmission to downshift

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER "TORQUEFLITE" SERVICE DATA* See *"TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion type front, Cross type rear.

Rear Universal Operating Angle - See *"Propellor Shaft Notes" in DeSoto Special Data for checking and adjusting.*

REAR AXLE

►*REAR AXLE LUBRICATION LEVEL NOTE* Recommended lubrication capacity 3½ pints will bring fluid level to ½" below filler opening DO NOT add to bring level to opening

Own. Semi-floating Hypoid with Hotchkiss Drive.
See *"DeSoto Hypoid" in Rear Axle Section.*

Rear Axle Ratios

Model	Synchro-mesh	Auto. Trans.
S-25	3.91-1 (43-11)	3.36-1 (37-11)
S-26		3.36-1 (37-11)
S-26 Advntr.		① 3.54-1 (39-11)
S-27	3.91-1 (43-11)	3.54-1 (39-11)

① - Optl. ratios available.

Backlash - .006-.008".

Carrier Removal: Drain lubricant. Back off brake adjusting cams (See Brakes) before removing hubs and drums. Remove wheel hub and drum assemblies, using wheel puller C-845. Remove axle shafts (see below). Disconnect rear universal joint and drop propeller shaft. Remove carrier assembly from axle housing.

►*BANJO HOUSING INSTALLATION NOTE:* Check rear universal joint operating angle. See *"Propellor Shaft Notes" in DeSoto Special Data.*

Axle Shaft Removal: Block brake pedal and disconnect brake lines at wheel cylinders. To protect axle bearing outer seal, remove rear axle drive shaft keys and install Tool C-745. Remove axle shaft seals, brake supports and bearing shims. Remove rear axle shaft oil seal from brake support with Tool C-839. *(NOTE* - When removing axle bearing shims from ends of axle housing, keep each set of shims separate to assure proper reassembly). Remove axle drive shaft and bearings with Puller C-499.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels **Endplay** - 013- 018"

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type Serviced by replacement.

FRONT SUSPENSION

Independent. New "Torsion-Aire" type with ball joints and torsion bar springing.
See *"Torsion-Aire Suspension" in Front Suspension & Wheel Alignment Section.*

Steering Axis Inclination—5½-7°

Caster—(Manual Steering) Neg 3/4° ± 3/4° (Power Steering) Pos 3/4° ± 3/4° *NOTE*—Caster should be equal as nearly as possible on both sides of car

Camber—(Left Wheel) Pos 3/8° preferred (0° to Pos 1/2°) (Right Wheel) 0° preferred (0° ± 1/4°)

Toe-In—1/8" preferred (1/8" ± 1/32")

Toe-Out on Turns—With outer wheel at 20° inner wheel should be 21°45' (S25, 26), 21°37' (S27)

STEERING

Manual Steering Gear: Gemmer. Worm & three-tooth roller.
See *"Gemmer Worm & Roller" in Steering Section.*

Power Steering: "Co-Axial". Components encased in tubular housing which is located at bottom of and concentrically around axis of steering column.
See *"Co-Axial" Power Steering in Steering Section.*

Steering Linkage: See *"Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: See *"Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: See *"Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Center Plane (Floating Shoe) hydraulic type.
See *"DeSoto Center Plane" Brakes in Brake Section.*

Drums - 11" Composite (S-27), 12" Centrifuse (Others).

Wheel Cylinder Diameter - 1 1/8" bore. Single acting (front), double acting (rear wheels).

Replacement Lining & Shoes - Linings or shoes with lining furnished Standard and .030" oversize.

Lining - Molded asbestos (bonded to shoe).

Length - 11.5" (S-27), 12.6" (Other).

Width - 2.5" (All). **Thickness** - .20" (All).

Braking Power - 60% Front, 40% Rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

Rear Wheels - Same as front wheels except that on rear wheels forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pushrod. Disconnect brake line tube at master cylinder. Disconnect stop light switch leads, remove four stud nuts from studs, remove master cylinder.

Power Brakes: New "Oval Piston" type (S-25, 26, 27), "Bellows" Assist type (S-26 Adventurer).
See *"DeSoto, Dodge, Oval Piston" or "Chrysler, DeSoto, Dodge, Plymouth Bellows" Power Units in Brake Section.*

►*POWER BRAKE UNIT HISSING OR POPPING NOISE CORRECTION* Release pushrod from power lever. Press pedal to floor to extend piston rod and yoke, and apply Silcon type lubricant to shaft. Operate shaft and repeat lubrication several times. *CAUTION* - Do not use Lubriplate or Neatsfoot Oil (not temperature lubricants).

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket *(NOTE* - If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Auto. Trans.

Adjustment - See *"Hand Brake Notes" in DeSoto Special Data.*

Lining	Width	Thickness	Length
6" Ext. Type	2"	5/32"	15 38"
7" Int. Type	2"	5/32"	13 44"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPV-4001A (Std. S-25, S-26. Special Equipment S-27). EPW-5001 (S-27 Std.). Electric type.
See *"Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.*

Air Conditioning: Heater-Air Conditioner unit.
See *"Air Conditioning" in Misc. Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.
See *"Electric Window Regulators" in Misc. Section.*

Power Seat Adjusters: Electric 6-Way type. See *"Power Seat Adjusters" in Misc. Section.*

Convertible Top Control: Electric-Hydraulic type.
See *"Power Top Control" in Misc. Section.*

MODEL IDENTIFICATION

Model	Model Identification
Firesweep	LS1-L
Firedome	LS2-M
Fireflite	LS3-H
Adventurer	LS3-S

SERIAL NUMBER: Stamped on plate attached to left front door hinge post.

Starting Serial Numbers

Model	Detroit	Los Angeles
Firesweep	LS1-1001	LS1L-1001
Firedome	LS2-1001	LS2L-1001
Fireflite	LS3-1001	LS3L-1001
Adventurer	LS3-1001	LS3L-1001

ENGINE NUMBER: Stamped on machined boss of cylinder block at right hand side behind water pump.

Starting Engine Numbers

Model	① Engine Number
Firesweep	L-350-1001
Firedome	L-360-1001
Fireflite	L-360-1001
Adventurer	L-360-1001

① - Detroit & Los Angeles Cars.

►*ENGINE NUMBER LETTERS & MARKS (Following Engin Number): Identifi d as follows:*

"A" - All Cylinders .020" oversize.

"B" - All Crankshaft Journals .010" undersize.

"AB" - Both above conditions exist.

"MALTESE CROSS" (3/8" high) - ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*

"♦" (3/8" high) - All Valve Lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 150-180 lbs. At cranking speed of 150 RPM (plugs removed, wide open throttle). Maximum variation between cylinders 25 lbs.

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely. To install coil spring, position shaft in extreme counterclockwise position. Place coil spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud.

►*DUAL EXHAUST NOTE:* When valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite AR-42 (Std.). 14 mm. Tighten to 30-32 ft. lbs.

►*ADVENTURER SPARK PLUG NOTE: For sustained high speed driving, use Auto-Lite AR-32 plugs.*

COIL: Auto-Lite CAH-4001A.

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-4008.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch to coil. When testing coil, include resistor with coil.*

DISTRIBUTOR: Auto-Lite IBP-4005 (Exc. Adventurer), IBS-4006B (Adventurer with two 4-Barrel Carbs.), IBS-4009 (Adventurer with Fuel Injection).

NOTE - "IBS" distributors are double breaker type.

►*SPARK KNOCK CORRECTION (Under Part Throttle Acceleration):* Install .065" washer, Part No. 691710, in distributor vacuum advance. Road test car and use additional washers as necessary. *CAUTION* - Do not use more than 7 washers on Adventurer models, or more than 3 washers on other models. Washers will change advance curve slightly but will not affect engine performance.

Condenser - Auto-Lite IBB-2042SS-1. **Capacity.**25-.28 mfd.

Contact Point Set - Auto-Lite IBP-3028AS (IBP Distr.), IGW-3028JS (IBS Distr.).

Breaker Gap- .015-.018".

Cam Angle - 26-32° (Single Breaker). 31-37° (Double Breakers). Double breaker distributors must be checked with both sets of breakers operating. Do not set gap outside limits to obtain specified cam dwell.

►*CAM ANGLE SETTING CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above

Automatic Advance - IBP-4005, IBS-4006B, 4009

Distr. Degrees	Distr. RPM	Eng. Degrees	Eng. RPM
Start	350	0	700
1	425	2	850
5.5	750	11	1500
9	1725	18	3450
10	2000	20	4000

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4005, IBS-4006B, 4009

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7 1/8
1	2	7 5/8
7	14	11 1/4
12	24	15 1/2
13	26	16 1/2

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in DeSoto Special Data.*

IGNITION TIMING

Setting - 6° BTDC at 450-500 RPM (exc. Adventurer).

►*ADVENTURER TIMING SETTING NOTE:* With engine at normal operating temperature and idle speed adjusted to 550-650 RPM, disconnect distributor vacuum tube from **rear** carburetor and seal opening. With timing light, set timing to 8° BTDC. Reconnect vacuum tube and **disregard any timing changes.** Readjust engine idle to 600 RPM.

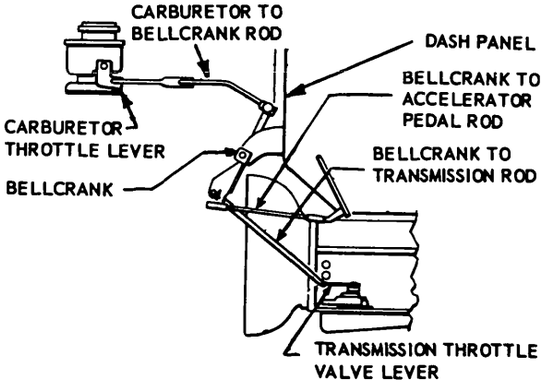
NOTE - On all cars a variation of ±4° allowable for atmospheric conditions and fuels available.

Timing Mark - Vibration damper marked "DC" at TDC point with 2° graduation marks before and after this mark. Align correct graduation with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter BBD 2-barrel carburetor standard on LS1, LS2. Carter AFB 4-barrel carburetor standard on LS3 and optional on LS1. Two AFB 4-barrel carburetors standard on Adventurer, Fuel Injection optional.*

►*POOR HIGH SPEED PERFORMANCE, LACK OF POWER IN KICKDOWN CORRECTION: See "Low Fuel Pump Pressure Correction" under CARB. EQUIPMENT below.*



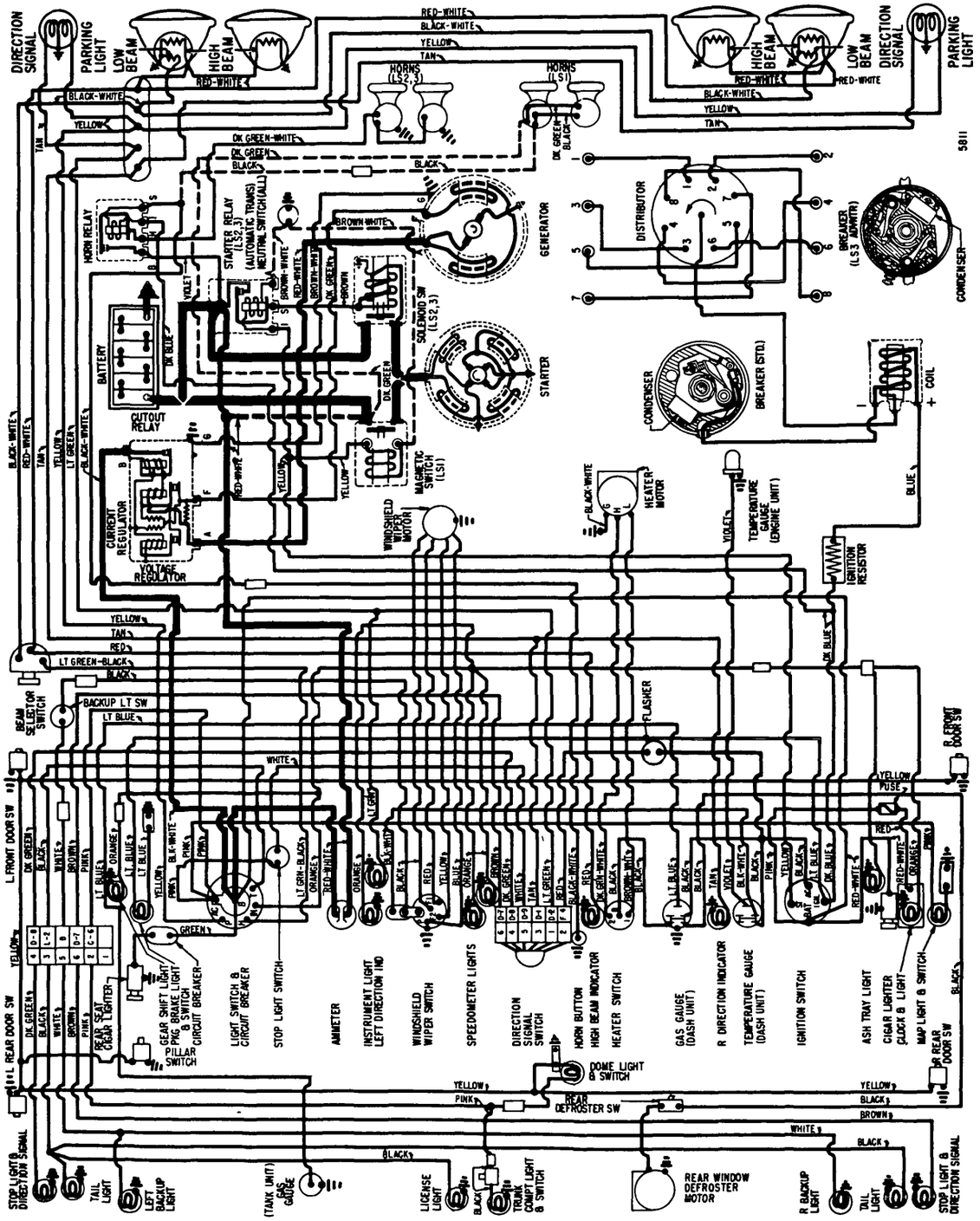
POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT (Auto. Trans.)

Except Adventurer: With engine at normal operating temperature and carburetor off fast idle cam, adjust idle speed to 475-500 RPM. Loosen throttle linkage adjusting nuts on carburetor to bellcrank rod, and on bellcrank to transmission rod. Adjust carburetor to bellcrank rod to position the lever ½" from cowl dash panel and tighten adjusting nut. *(NOTE* - On TorqueFlite cars, check to make sure that correct bellcrank to transmission rod has been installed. This rod should be 8½" long). Hold slight preload rearward on bellcrank to transmission rod while holding transmission throttle valve lever forward against its stop, then tighten adjusting nut. Accelerator pedal should be at an angle of 118° to horizontal. If necessary, adjust pedal angle by removing accelerator pedal end of bellcrank to pedal rod, and shortening or lengthening the rod by rotating swivel.

THROTTLE LINKAGE ADJUSTMENT (Adventurer): *Make the following checks and adjustments before making final adjustment (below).* Disconnect accelerator shaft at throttle lever on rear carburetor. With throttle lever in extreme forward position check and adjust (at throttle lever) position of upper arm of accelerator shaft bellcrank (accelerator rod to rear carburetor linked to arm with bushing and pin) so that distance from center of pin to firewall is 7/8-1 1/8". Adjust accelerator pedal rod to length of 11 7/8-12" which will give proper accelerator pedal angle of 115° to horizontal. **Final Adjustment** - With engine at normal

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operating temperature set idle speedat 650 RPM. Disconnect carburetor to bellcrank rod and move rearward until transmission throttle lever contacts forward stop. Adjust ball socket end so it will slip over stud on throttle lever with slack removed.

CARTER BBD

Carter BBD, No. 2772S (Synchro-M sh), 2637S (Aut . Trans.), 2822S (All Trans.).

►*HESITATION OR FLAT SPOT ON ACCELERATION CORRECTION (2637S):* Change step-up rods. S *"Carter BBD Carburetors" in Carbur tion S ction.*

Idle Setting - ½-1½ turns open (2772S, 2637S), ¼-1¼ turns open (2822S). Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM with transmission in neutral.

Float Level - 5/16" (Gauge T109-280) between top ridge of each float and top edge of bowl casting with needle valve closed (float lip held against needle valve). Adjust by bending lip on float arm.

Accelerating Pump - Install connector rod in center hole of throttle lever and in hole in pump arm. Distance from top of pump plunger to top of bowl cover should be 1" with throttle valves fully closed. Adjust by bending throttle connector rod.

Fast Idle: .020" (Gauge T109-29) between lower edge of throttle valve and bore with fast idle adjusting screw on index mark of cam.

Fast Idle Cam Clearance - With choke valve closed and lip on inner choke shaft lever contacting lug on fast idle cam, align center of fast idle screw with index mark on cam. To adjust, bend lip on choke shaft lever using Tool T109-22.

Automatic Choke Setting: Centered on index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Cart r BBD Carbur tors" in Carburetion Section.*

CARTER AFB 4-BARREL (Singl Carb.)

Carter AFB, No. 2773S (Synchr -Mesh), 2642S, 2823S (Auto. Trans,).

►*HESITATION OR FLAT SPOT ON ACCELERATION CORRECTION (2773S, 2642S):* Change primary metering jets. *See "Carter AFB Carbur tors" in Carburetion Section.*

►*ENGINE DIES AFTER COLD START CORRECTION: See "Carter AFB Carburetors" in Carburetion Section.*

Idle Setting - ¾-2¼ turns open. Turn screws out for richer mixture.

Idle Speed - 500 RPM with transmission in neutral.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL (Two Carbs.)

Carter AFB, No. 2652S (Front), 2653S (Rear).

Interconnecting Linkage Adjustm nt - Remove air cleaners and throttle pull-back springs from both carburetors. With r ar carburetor at wide open throttle, adjust nut on fr nt carburetor control shaft until front carburetor throttle is wide open.

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Idl Sp d & Mixtur Adjustm nt - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB Carburetors" in Carbur tion Section.*

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Cart r. M2662S (with filter), M2769S (without filter)

Pr ssure - 5-7 lbs. at 500 RPM.

►*FUEL PUMP PRODUCTION CHANGE NOTE (LS3):* Early type pumps have filter bowl, later type do not.

►*LOW FUEL PUMP PRESSURE CORRECTION:* Remove and inspect pushrod for abnormal wear or peening. Overall length must be 3.210". Replace if necessary with Part No. 1737745 and then drain and flush oil pan, replace oil filter element and refill with new oil. *NOTE* - Camshaft replacement is unnecessary.

►*FUEL FILTER NOTE:* Ceramic filter elements must be changed at approximately 5,000 mile intervals to prevent stalling or low fuel output.

S e "Fuel Pumps" in Carburetion Section.

Gas lin Gaug : Auto-Lite electric type.

Dash Unit - Auto-Lite No. 14322A.

Tank Unit -	Auto-Lite No.
LS1 (exc. Sta. Wgn.)	①14673A, ②14676A
LS2,3,Adv,2 Carbs.(exc. Sta.Wgn,)	②14674A, ③14675A
Station Wagons	②14683A, ②14684A
Adventurer (Fuel Inj.)	③14688A

① - 22" lead Female. ② - 4½" lead male.

③ - 37" lead Female.

See "Fuel Gauges" in Carburetion Section.

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5,000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Auto-Lit HS-11-60 r Willard HO-11-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).

Batt ry Gr und - Negative.

Engin Ground - Left front of engine.

STARTER

Auto-Lit MDT-6001 (LS1), MDT-6002 (Others).

Armatur - MDL-2088 (MDT-6001), MDL-2006 (MDT-6002).

Driv - Bendix "Folo-Thru" No. A3596 (MDT-6001), Overrunning clutch & solenoid pinion shift (MDT-6002).

Rotati n - Counterclockwise at commutator end.

Brush Spring T nsi n - 32-48 ozs.

Performance Data - MDT-6001

Torque	RPM	Volts	Amperes
0 ft lbs.	3800	11.0	58
8.5 ft. lbs.	Lock	4.0	350

Performanc Data - MDT-6002

Torque	RPM	Volts	Amperes
0 ft lbs.	3800	11.0	80
8.5 ft. lbs.	Lock	4.0	350

Starting Switch: (LS2, 3) - Auto-Lite SAD-4301 Solenoid Pinion Shift used with separate relay, Auto-Lite RAJ-4001, and Neutral Safety Switch on transmission (Auto. Trans. Cars). Controlled by Ignition and Starting Switch (key starting).

(LS1) - Auto-Lite SAE-4001 (Synchro-mesh), SAE-4002 (Auto. Trans.) magnetic switch used with Neutral Safety Switch on transmission (Auto. Trans.). Controlled by Ignition & Starter Switch (key starting).

See "Auto-Lite Starter Controls" in Electrical Section.

Neutral Safety Switch Adjustment: *See "PowerFlite" or "TorqueFlite" Transmission in Transmission Section.*

GENERATOR

Auto-Lite. 12 volt. Used as follows:

Application	Generator No.
Standard	GJC-7012A
Taxi	GHM-6007A
Spec. Equip.	GGA-6001N
Spec. Equip.	GGA-6003E
Spec. Equip.	GHM-6014A
Air Cond.	GHM-6004C
Air Cond.	GHM-6004A
Air Cond. (Two 4-Bbl Carbs)	GHM-6007C
Air Cond. (Two 4-Bbl. Carbs.)	GGA-6003F

►*GENERATOR NOTE:* Performance specifications apply to all generators within the following groups.

Performance Data - GJC (Cold-70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold-70°F)

Amperes	Volts	RPM
4.0	14.0	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data - GHM (Cold-70°F)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

Field Current - 1.2-1.3 Amps. (GJC); 1.1-1.3 Amps. (GGA & GHM) at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 Amps. (GJC); 2.3-2.6 Amps. (GGA); 3.0-3.5 Amps. (GHM) at 10.0 volts (70°F).

Belt Adjustment: Torque Method - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket. Then, with torque wrench, apply 95 lbs. (new belt), 70 lbs. (used belt) torque on air. cond.cars, and tighten mounting bolts.

Deflection Method - Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull.

Belt Deflection Specifications

Generator	Used	New
Without Air Cond.	1/4"	1/8"
With Air Cond.	3/8"	1/4"

REGULATOR

Aut -Lit VAT-6201A (GGA G n.), VRX-6201A (GJC & GHM G ns.).

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amps.

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 10.0 amps. (80°F) or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052". (Check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes	Test B
VAT-6201A	46	40 (38-42)
VRX-6201A	37	30 (28-32)

Test A - After 15 minutes operation charging at 10 amperes.

Test B- After additional 15 minutes operation with current regulator operating - load applied to hold voltage down to 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).

Air Gap - .048-.052" (Check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Stop Light Switch Location: On forward end of brake master cylinder.

CIRCUIT BREAKERS: Used as follows:

22.5 Ampere - Protects headlights and high beam indicator. Located in headlight switch.

15 Ampere - Protects all other lighting circuits (exc. direction signals). Located in headlight switch.

6 Ampere - Protects windshield wiper (variable speed). In wiper switch.

5 Ampere - Protects windshield wiper (single speed). In wiper switch.

FUSES: 2 Ampere - Protects clock. In clock lead.

HORN RELAY: Auto-Lite RAH-4003 (LS1).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 with overhead valves. This is a new engine having a single rocker arm shaft on each head. The engine block has been recessed at front to form an integral timing chain case. Engine-to-transmission adapter at rear of engine has been eliminated.

►*ADVENTURER ENGINE NOTE:* This engine is the same as standard 361" engines except for the follow-

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ing: High performance camshaft (different valve timing), valve springs with surge dampers, intake manifold, and distributor.

Engine	Bore	Stroke	Displacement
LS-1L	4.0625"	3.375"	350 cu. in.
LS-2M, LS-3H,S.	4.125"	3.375"	361 cu. in.

Engine	Compr. Ratio	Rated HP	Dev. HP & RPM
LS-1L ①	10.0-1	52.7	280 at 4600
LS-1L ②	10.0-1	52.7	295 at 4600
LS-2M	10.0-1	54.3	295 at 4600
LS-3H ②	10.0-1	54.3	305 at 4600
LS-3S ③	10.25-1	54.3	345 at 5000
LS-3S ④	10.25-1	54.3	355 at 5000

① - 2-Bbl. Carb. ② - 4-Bbl. Carb.
③ - Two 4-Bbl. Carbs. ④ - Fuel Injection.

Compression & Vacuum Reading - *See TUNE-UP.*

►*HIGH OIL CONSUMPTION CORRECTION:* May be caused by leak at intake manifold allowing oil to be drawn in from valve chamber. To correct, coat new gasket, Part No. 1737709, with Sealing Compound, Part No. 1057794, and install gasket and manifold. Then install two Gasket End Reinforcements, Part No. 1737710, at each end and hold down with 1/4-20 hex head bolts (in place of Phillips head screws) torqued to 8 ft. lbs.

ENGINE REMOVAL: *See "Engine" in DeSoto Special Data.*

OIL PAN REMOVAL: Remove dipstick and drain oil. Disconnect steering linkage from steering arm and pull linkage down and away from oil pan. On single exhaust system cars, remove crossover exhaust pipe making sure rest of exhaust system is supported carefully. *(NOTE* - It may be necessary to pull brake line, running across the crossmember, slightly forward to allow clearance). Remove oil pan bolts, then lower rear of pan, turning it sideways to clear crossmember.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in DeSoto Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in DeSoto Special Data.*

PISTONS

Aluminum alloy, elliptically turned, tin plated with horizontal slot, thermally controlled by steel band.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number have cylinder bores .020" oversize.*

►*PISTON & PIN PRODUCTION CHANGE & REPLACEMENT CAUTION:* When replacing piston and pin assemblies in **L-350 engine** up to and including No. L-350-6308 and between Nos. L-350-6710 to L-350-7071, and in **L-360 engine** up to and including No. L-360-9053, **all** pistons and pins must be replaced. On other engines replace only as needed. *See table below for sizes & part nos. See also "Crankshaft Replacement Note" under CRANKSHAFT below.*

Piston & Pin Replacement Assemblies

Engin	Std.	.005"O.S.	.020"O.S.	.040"O.S.
L-350 ①	1879472	1879473	1879474	1879475
L-350 ②	1879480	1879481	1879482	1879483
L-360 ③	1879476	1879477	1879478	1879479
L-360 ④	1879484	1879485	1879486	1879487

① - Up to Engine No. L-350-6308 and between Engine Nos. L-350-6710 to L-350-7071.
② - Beginning Engine No. L-350-6309 through No. L-350-6709, and beginning No. L-350-7072.
③ - Up to and including Engine No. L-360-9053.
④ - Beginning Engine No. L-360-9054.

Weight - 24.5 ozs. (LS1), 24.4 ozs. (Others).

Removal - Piston and rods removed from above.

Fitting New Pistons: Clearance - .0005-.0015" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine.

Replacement Pistons: Furnished Std., .005", .020" & .040" Oversize. *See "Replacement Caution" above.*

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders 2-4-6-8). *See "Rod Installation" below.*

PISTON PINS

Piston pins are a tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diameter - 1.0935-1.0937". **Length** - 3.4440-3.450".

Clearance in Piston - .00045-.00075". Sliding fit at 70°F.

Clearance in Rod - .0007-.0012" interference fit.

Piston Pin Removal & Installation - *See "Piston Pins" in DeSoto Special Data.*

Replacement Pins: Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, tin plated. Oil rings are cast iron, single piece units.

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0775-.0780"	.013-.025"	.002-.0035"
Compr. (Lower)	.0775-.0780"	.013-.025"	.002-.0035"
Oil	.1860-.1865"	.013-.025"	.001-.0025"

Replacement Rings: Furnished Std., .010", .020", .030", & .060" Oversize.

Installing Rings: Install with mark "Top" on compression rings to top of piston.

CONNECTING RODS

Journal Diameter - 2.374-2.375". Maximum out-of-round limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Length - 6.358" (center-to-center).

Weight - 28.6 ozs.

Lower Bearings - Removable precision type, bimetallic Copper Lead Grid, Steel backed (LS3 & Adventurer), lead based babbitt on steel (Others).

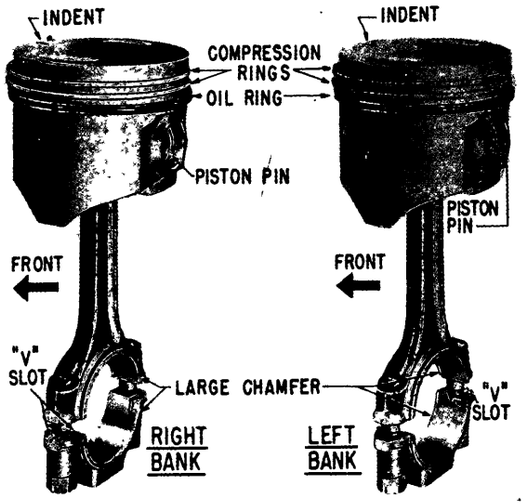
Clearance - .0005-.0015". Maximum allowable before reconditioning .0025".

Side Clearance - .009-.017" (2 rods).

Bearing Adjustment - None, replace bearings.

Replacement Bearings: Furnished Std., .001", .002", .003", .010" & .012" Undersize.

Installing Rods: With piston correctly installed on connecting rod *(see PISTONS above)* larger chamfer on lower end of rod should be installed toward nearest crankshaft fillet. Oil grooves in rod and bearing cap must be together.



DE SOTO V8 PISTON & ROD ASSY.

CRANKSHAFT

Journal Diameter - 2.6245-2.6255".

►*CRANKSHAFT REPLACEMENT NOTE:* On L-350 engine up to No. L-350-6308 and starting No. L-350-6710 through No. L-350-7071, and on L-360 engine up to No. L-360-9053, use crankshaft No. 1737641. Other engines use crankshaft No. 1855589. *See "Piston & Pin Replacement Caution" under PISTONS above.*

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals)— Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—A "Maltese Cross" (3/8" high) stamped on machined surface following the engine number indicates that ONE OR MORE crankshaft main and connecting rod journals are machined .001" UNDERSIZE. The position of undersize journals are stamped on the machined surface of the center (No. 3) counterweight in following manner; "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following letter indicates main or connecting rod journal number (counting from front of engine).

Bearings - Removable precision type. Tin-based babbitt on steel (Thrust Bearing), Lead-based babbitt on steel (Other Bearings).

Clearance - .0005-.0015".

Replacement Bearings: Furnished Std., .001", .002", .003", .010" & .012" Undersize. *NOTE* - Lower bearing halves of 1, 2, 4 & 5 are interchangeable; upper

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bearing halves of 1, 2, 4 & 5 are interchangeable. Upper and lower halves are not interchangeable, nor are No. 3 bearing halves interchangeable with other bearings.

End Thrust - Taken by center (No. 3) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in DeSoto Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in DeSoto Special Data.*

CAMSHAFT

NOTE - Special "high performance" camshaft used on LS3-S (Adventurer).

Journal Diameters - (1) 1.998-1.999" **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952", **(5)** 1.748-1.749".

Bearings - Removable, steel-backed, babbitt lined bushings.

Clearance - .001-.003". Maximum allowable before reconditioning .005".

Timing Chain: Width - .88". **Pitch** - .5". **Length** - 50 links.

Camshaft Setting: Marks on both sprockets should be adjacent and in line with a straightedge across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in DeSoto Special Data.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in DeSoto Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in DeSoto Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diameter	Stem Diameter	Length
Intake	1.95"	.372-.373"	4.81"
Exhaust	1.60"	.371-.372"	4.82"

Valve	Seat Angle	Lift	Side Clearance
Intake	45°	.390"	.001-.003"
Exhaust	45°	.390"	.002-.004"

Valve Seat Width - 1/16-3/32" (Intake), 3/64-1/16" (Exhaust).

Intake Valve Stem Oil Seal - Cup type oil seals used on all intake valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area in gauge).

►*OVERSIZE VALVE STEM NOTE.* Valves with oversize stems are available in .005", .015" & .030" oversize.

VALVE SPRINGS: *NOTE* - Single springs used on all models. A "surge damper" is used with valve springs on Adventurer.

Spring Specifications
(Exc. Adventurer)

Pressure	① Length
Valve Closed ..... 75-85 lbs	1.860"
Valve Open ..... 173-187 lbs.	1.470"

① - Free Length 2.312".

Adventurer

Pressure	Length
Valve Closed ..... 95-105 lbs.	1 55/64"
Valve Open ..... 187-203 lbs.	1 15/32"

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 55/64", install spacer under spring to bring height within limits.

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

►*SPRING INSTALLATION (ADVENTURER):* Install all springs with closed-coil end toward head.

►*CAUTION:* Spring ends must be square with 1/16".

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive (over .004"), ream guides and install oversize valves.

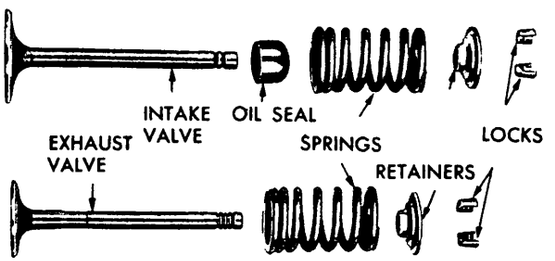
Hydraulic Lifters: Integral, flat valve type.

►*VALVE LIFTER OVERSIZE CAUTION: .008" OVERSIZE Valve Lifters used on some engines.* A "DIAMOND" 3/8" high stamped on engine number pad following engine number indicates that all lifters are .008" oversize.

Lifter Overhauling & Testing: *See "Valve System" in DeSoto Special Data.*

Rocker Arm Assembly: *See "Valve System" in DeSoto Special Data.*

►*PUSHROD INSTALLATION CAUTION:* Small (1/4" diam.) end of pushrod must seat in lifter, large (5/16" end must contact rocker arm. Improper installation will cause valves to be partially held open.



DE SOTO V8 VALVE ASSY.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

① Valve Timing
(Exc. Adventurer)

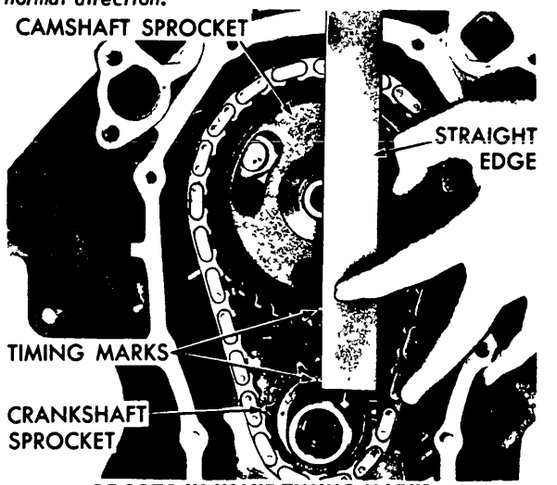
Intake - Open 15° BTDC. Close 57° ALDC.
Exhaust - Open 57° BLDC. Close 15° ATDC.

(Adventurer)

Intake - Open 20° BTDC. Close 60° ALDC.
Exhaust - Open 58° BLDC. Close 22° ATDC.

① - With valve train solid.

Valve Timing Check: Rotate crankshaft until No. 1 intake valve is closed and No. 1 piston is on TDC (compression stroke). Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed tappet down (providing a solid tappet). Turn crankshaft in normal running direction until valve lifted .024". Timing on vibration dampener should read 5° BTDC to 7° ATDC. *CAUTION - Remove spacer before turning engine any further in normal direction.*



DE SOTO V8 VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data.*

Crankcase Capacity: 4 qts. refill, additional quart when filter changed.

Normal Oil Pressure: 45-70 lbs. at 40-50 MPH.

►*DIPSTICK CAUTION:* "Add Oil" mark should be 2 5/8" from bottom of stick. If not, replace with Part No. 1737737.

Oil Pressure Relief Valve - Mounted in oil pump body. *See "Oiling System" in DeSoto Special Data.*

Oil Pressure Gauge - Auto-Lite 14323A. Not electric.

Oil Pump: Rotor type. Mounted on cylinder block on lower left side near crankshaft sprocket.

►*OIL PUMP PRODUCTION CHANGE & INSTALLATION CAUTION:* Later type pumps have "0" ring seal groove in rotor shaft housing. Pump mounting gaskets are **not** interchangeable, and loss of engine oil pressure may result if improper gasket used. Use gasket No. 1737730 for early pumps, and gasket No. 1855327 with "0" ring No. 1855328 for later pumps.

Overhaul - *See "Oiling System" in DeSoto Special Data.*

Oil Filter: Full flow type. Disposable type. Replace every 5,000 miles or sooner if needed.

►*OIL FILTER INSTALLATION CAUTION:* Screw new filter on base until gasket on filter contacts base. **Tighten ½ - turn by hand.** *Do not overtighten.*

Crankcase Ventilation: Filter element in oil filler cap (clean with kerosene every 5,000 miles), and breather pipe on right valve rocker cover (special equipment).

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COOLING

Water Capacity - 16 quarts. Add 1 quart for heater.

►*AIR CONDITIONED CAR OPERATING CAUTION:* *Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.*

Pressure Valve: 14 lb. radiator filler cap.

Thermostat: Pellet type. Opens 179-182°.

Water Pump: Centrifugal type.

See "Water Pump" in DeSoto Special Data.

Pump Removal: Drain cooling system, remove radiator and fan shroud (on cars so equipped). Remove fan, spacer, pulley and pump attaching bolts. Remove pump

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14324A.

Engine Unit - Auto-Lite 14405A.

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Borg & Beck. 10.5A8 No. 361461. *See "Borg & Beck" Clutches" in Clutch Section.*

Pedal Adjustment: Adjust fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" freeplay at pedal.

Overcenter Spring Adjustment: *(NOTE* - Overcenter spring located above clutch pedal and attached to pedal mounting bracket). Release clutch rod at clutch pedal. Back off adjusting nut to release overcenter spring Hold clutch pedal fully released, adjust nut until it just touches "C" link of spring, then turn nut in 7 full turns. Reinstall clutch rod to clutch pedal

Removal: Remove transmission (see Synchro-Mesh Transmission), and clutch housing pan. Pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove capscrews which hold clutch cover to flywheel, loosening each screw a few turns in succession until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. See "DeSoto Synchro-Mesh Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission, disconnect propeller shaft, speedometer cable and gearshift control rods, and remove back-up light switch and speedometer pinion sleeve assembly. If transmission to be disassembled or rear oil seal replaced, loosen and remove companion flange nut with Tool C-3281 Disconnect hand brake cable and remove brake band, then remove drum and flange assembly with Puller C-452. Remove engine rear support bolts from crossmember and support engine with Fixture C-3487 (or Kit C-3488 to adapt Fixture C-3245). Remove crossmember but **do not disturb torsion bars.** Remove transmission-to-clutch housing bolts, pull transmission straight back until drive shaft clears clutch housing and lower transmission

POWERFLITE TRANSMISSION

Torque converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A". *NOTE* - Under severe operating conditions drain and refill at 10,000 mile intervals.

Checking Fluid Level - *See TORQUEFLITE below.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque converter, and **Three Speed** hydraulically operated planetary transmission.

See "TorqueFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "TorqueFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A". *NOTE* - Under severe operating conditions drain and refill every 10,000 miles.

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" **below** "L" mark. Add or drain fluid as necessary.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral, fluid level should be between ½" **above** "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

►*FLUID LEVEL CAUTION.* Overfilling or too high fluid level in transmission may cause foaming under high speed and high operating temperature conditions (if level reaches gear train as fluid expands). This may result in drop in governor pressure and permit transmission to downshift

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "TORQUEFLITE" SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion type front, Cross type rear.

Rear Universal Operating Angle - *See "Propeller Shaft Notes" in DeSoto Special Data for checking and adjusting.*

REAR AXLE

Own. Semi-floating hypoid with Hotchkiss Drive. *See "Desoto Hypoid" in Rear Axle Section.*

►*"SURE GRIP" AXLE NOTE:* Optional on all models and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*AXLE SHAFT INNER OIL SEAL LEAK CORRECTION:* May be due to raised metal on shaft approximately 8" from tapered end and 6" from splined end. Remove this metal and also be sure that splines are not excessively sharp

Rear Axle Ratios

Car Model	S.M. Trans. ③	PowerFlit ④	Torqu Flit ④
LS1-L ①	3.54 (39-11)	3.31 (43-13)	3.15 (41-13)
LS1-L ②	3.73 (41-11)	3.54 (39-11)	3.31 (43-13)
LS2-M ①	3.54 (39-11)		3.15 (41-13)
LS2-M ②	3.73 (41-11)		3.31 (43-13)
LS3-H			3.15 (41-13)
LS3-H			3.31 (43-13)
LS3-S			3.31 (43-13)

① - Except Station Wagon. ② - Station Wagon

③ - 3.31 (43-13), 3.54 (39-11), 3.73 (41-11), 3.91 (43-11), Optional.

④ - 2.93 (41-14), 3.15 (41-13), 3.31 (43-13), 3.54 (39-11), 3.73 (41-11), 3.91 (43-11), Optional.

Backlash - .006-.008".

Carrier Removal: Drain lubricant, remove axle shafts (see below), disconnect rear universal joint and drop propeller shaft. Remove carrier from housing.

►*BANJO HOUSING INSTALLATION NOTE:* Check rear universal joint operating angle. *See "Propeller Shaft Notes" in DeSoto Special Data.*

Axle Shaft Removal: Block brake pedal and disconnect brake lines at wheel cylinders. Back off brake adjusting cams and remove hubs and drums with Tool C-845. *CAUTION - Do not hammer on end of axle shaft to remove hubs and drums as damage to bearings and thrust block will result.* Remove brake support plates as assemblies. Remove axle shaft keys and install Tool C-745 to protect outer seals. Remove shim packs. Remove axle shafts and bearings with Puller Tool C-499, being careful not to damage inner seals.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay** - .013-.018". Hold to high limit.

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

"Torsion-Aire" suspension with ball joint mounted steering knuckle and torsion bar front springs.

See "Torsion-Aire Suspension" in 1957 Annual Data.

Steering Axis Inclination - 5¾-7¼° at 0° Camber.

Caster - (Manual Steering) Neg. ¾°±¾°. (Power Steering) Pos. ¾°±¼°. *NOTE* - Both sides should be set at same dimension.

Camber (Right Wheel) - 0°±¼°. 0° preferred.

Camber (Left Wheel) - Pos. ¼°±¼°. Pos. 3/8° preferred.

Toe-In - 1/8±1/32". 1/8" preferred.

Turning Out on Turns - With inner wheel at 20°, outer wheel should be 18°46' (LS1), 18°30' (Others).

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STEERING

Manual Steering: Gemmer. Worm & three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: New "Constant Control Full Time" power steering.
See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: "Total Contact" (Floating Shoe) hydraulic type.
See "Chrysler, DeSoto, Dodge & Plymouth Center Plane & Total Contact Brakes" in Brake Section.

►*BRAKE TERMINAL SQUEAK CORRECTION:* Drill a ¼" hole through shoe web and dust shield, and install Brake Dampener Package, Part No. 1879511, at heel of each brake shoe. Retainer should be 1/8" from edge of hole in shoe and 1/8" from edge of support plate. Make sure axle housing-to-spring U-bolt torque is 70 ft. lbs., brake support plate-to-axle housing bolt torque is 35 ft. lbs., and brake support plate-to-knuckle bolt torque is 45 ft. lbs.

Drum Diameter - (LS1) 11" front & rear, (Others) 12" front & rear. *NOTE* - 12" brakes optional on LS1

Wheel Cylinder Diameter - 1 1/8" bore. Two single acting cylinders on front, one double acting cylinder on rear.

Lining - Molded asbestos bonded to shoe. **Width** 2½", **Length** 11½" (LS1), 12.6" (Others), **Thickness** .20" (all shoes).

Braking Power - 60% front, 40% rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt

Rear Wheels - Same as front wheels except that on rear wheels forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal - Disconnect pushrod. Disconnect brake line tube at master cylinder. Disconnect stop light switch leads, remove four stud nuts from studs, remove master cylinder.

Power Brakes: "Oval Piston Assist" type. *See "DeSoto & Dodge Oval Piston Type Power Unit" in Brake Section.*

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket (*NOTE* - If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Auto. Trans.

Lining	Width	Thickness	Length
6" Ext. Type	2"	5/32"	16.68"
7" Int. Type	2"	5/32"	①13.06"

① - Total both shoes.

HAND BRAKE ADJUSTMENT (External Type): Free play between anchor bracket on center of band and sides of hand brake support should not exceed .005". Correct by compressing bracket in vise or by tapping with a hammer before attempting brake adjustment. Adjust anchor screw to obtain .015-.020" clearance between band and drum at anchor. Adjust guide bolt to obtain uniform clearance for upper and lower halves of band. Guide bolt controls position of lower end of band, nut controls upper end of band.

HAND BRAKE ADJUSTMENT (Internal Type): Disconnect front end of propeller shaft and remove adjusting screw cover plate. Turn adjusting nut to decrease shoe-to-drum clearance until drum drags, then back off nut at least one full notch to give .010" clearance (use Spanner Tool C-3014). Shoulders on nut must be seated in grooves on adjusting sleeve. Adjust hand brake lever cable so there will be 3-5 notches visible on lever beyond face plate when brake applied.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite. EPW-4001 (LS1 - Single Speed), EPV-4001A (Others - Variable Speed). Electric type.
See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioner unit.
See "Air Conditioning" in Misc. Section.

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.
See "Electric Window Regulators" in Misc. Section.

Power Seat Adjusters: Electric 6-Way type. *See "Power Seat Adjusters" in Misc. Section.*

Convertible Top Control: Electric-Hydraulic type.
See "Power Top Control" in Misc. Section.

MODEL IDENTIFICATION

M d l	M d l Id ntification
Firesweep	MS-1
Firedome	MS-2
Fireflite	MS-3
Adventurer	MS-3

SERIAL NUMBER: Stamped on plate attached to right cowl under hood (Detroit-built MS-1 Cars), or left front door "A" post (All other cars) *NOTE* - Number (example below) includes identification data as follows

①②③④ - ⑤
M 4 5 1 - 100001

① - Year model - 1959
② - Car make **4** - DeSoto
③ - Model Series **1** - Firesweep, **3** - Firedome, **5** - Fireflite, **7** - Station Wagons, **8** - Taxi, **9** - Adventurer
④ - Assembly Plant **1** - Jefferson Ave Plant (Detroit), **2** - Dodge Plant (Detroit), **4** - Los Angeles Plant
⑤ - Beginning vehicle number

ENGINE NUMBER: On machined boss on cylinder block in front of leading edge of right cylinder head
Starting Engine Number - ML-361-1001 (Firesweep MS-1), ML-383-1001 (All Others)
►*ENGINE NUMBER MARKS (Following Engine Number)* Identified as follows
"**A**" - All cylinders 020" oversize
"**B**" - All crankshaft journals 010" undersize
"**AB**" - Both above conditions exist
"**MALTESE CROSS**" (3/8" high) - ONE OR MORE crankshaft journals 001" undersize *See "Connecting Rods" and "Crankshaft" below*
♦(3/8" high) - ALL valve lifters 008" oversize
►*COLD WEATHER HARD STARTING CORRECTION* When caused by "Blued" ignition points in operation at temperatures of 20°F or less, *see "Regulator Replacement Note' under REGULATOR below*

TUNE-UP

COMPRESSION PRESSURE: 150-180 lbs at cranking speed of 150 RPM (plugs removed, wide open throttle) Maximum variation between cylinders 25 lbs
VACUUM READING: 19 5" at idling speed
VALVE TAPPET CLEARANCE: None in service (hydraulic lifters)
MANIFOLD HEAT CONTROL· Thermostatically controlled valve located at exhaust manifold outlet on right side of engine Valve must operate freely To install coil spring, position shaft in extreme counterclockwise position Place coil spring in upper left hand position Press inner end of coil into slot of shaft and seat firmly Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud
►*DUAL EXHAUST NOTE* When valve is closed, most exhaust gases are discharged through left exhaust pipe

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7,
SPARK PLUG GAP: 035"
Spark Plugs - Auto-Lite A42 (Exc Adventurer), A32 (Adventurer) 14 mm Torque to 30 ft lbs *NOTE - AR32 (resistor type) plugs used on Adventurer between Engine Nos ML383-10707 and ML383-15513*
►*SPARK PLUG WIRE NOTE* Resistance type cables (marked RADIO) used, having a non-metallic core with terminal pins pushed into ends of cable to make contact DO NOT crimp terminals so tight that excessive force required to remove them as this will cause core to stretch or wire pins to come out *CAUTION - Use same length and type of cables for replacement*
COIL: Auto-Lite CAH-4001
Ignition Current - 2 5 amps idling, 3 1 amps stopped-
Resistor - Auto-Lite PU-5001
►*COIL RESISTOR NOTE* Connected in circuit between positive terminal of coil and ignition switch *Resistor must be in circuit when testing coil output*
DISTRIBUTOR: Auto-Lite IBP-4005B (Std exc Adventurer), IBS-4006C (Std Adventurer, Optl All Others)
NOTE - IBP-4005B Distr used on Adventurer between Engine Nos ML383-11698 and ML383-16579
NOTE - "IBS" Distributor is double breaker type
Condenser - Auto-Lite IBB-2042-SS1 **Capacity** 25- 285 mfd
Contact Point Set - Auto-Lite IBP-3028BS (IBP Distr), IGW-3028JS (IBS Distr)
Breaker Gap - 015- 018"
Cam Angle (IBP Distr) - 27-32°
►*CAM ANGLE SETTING CAUTION (IBP Distributors)* Cam angle should be checked with vacuum line disconnected Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°
Cam Angle (IBS Distr) - 26-32° (single set of points), 31-37° (Both sets operating together)
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - IBP-4005B

Degrees Distr	RPM	Degrees Eng	RPM
Start	350	0	700
1	435	2	870
5	800	10	1600
8	1700	16	3400
9 5	2150	19	4300

Automatic Advance - IBS-4006C

Degrees Distr	RPM	Degrees Eng	RPM
Start	450	0	900
1	500	2	1000
6 5	800	13	1600
8	1400	16	2800
9 5	2000	19	4000

Vacuum Spark Control· **Auto-Lite** Integral type

Vacuum Advance - IBP-4005B

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8 5/8
6	12	12
10	20	15 1/4
11	22	16 1/8

Vacuum Advance - IBS-4006C

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	12
12	24	17
13	26	18 1/8

Distributor Basic Timing & Driv Shaft Bushing· *See "Ignition Notes" in DeSoto Special Data*

IGNITION TIMING

Setting - 10° BTDC at 500 RPM (Exc Adventurer), 10° BTDC at 700 RPM (Adventurer)
Timing Mark - Timing line of vibration dampener and graduations on timing indicator on right side of timing chain cover Align mark on dampener with correct mark on indicator

CARBURETOR

Car Model	Carbur tor
Firesweep & Firedome	One Carter 2-Barrel
Fireflite	One Carter 4-Barrel
Adventurer	Two Carter 4-Barrel

►*HARD COLD STARTING (Cars with cross- v r ch k carburetors):* May be caused by choke vacuum unloader piston sticking Squirt carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn Operate valve to flush out gum formation

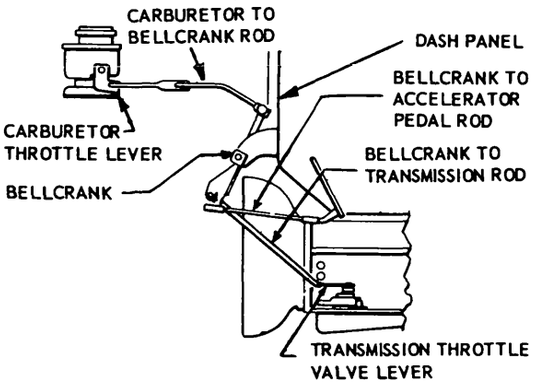
►*TORQUEFLITE HARSH OR ERRATIC SHIFT CORRECTION* May be caused by accelerator lever turning on accelerator shaft "D" slot on shaft may be too large To correct, build up flat on lever and insert a shim between lever and shaft to secure a tight fit Tighten clamp bolt so lever cannot turn

THROTTLE LINKAGE ADJUSTMENT (EXC. ADVENTURER)· Set engine to correct idle speed with engine at normal operating temperature and carburetor off fast idle cam On cars having accelerator lever and bracket assembly **without** slot and holes for gauge rod, loosen adjusting nuts on carburetor-to-bellcrank rod and adjust rod so distance from lever to cowl dash panel is 1/2" On cars having accelerator lever and bracket assembly **with** slot and holes, insert 3/16" diameter gauge rod through slot and holes to establish correct throttle lever position Tighten adjusting nuts Hold slight preload rearward on bellcrank-to-transmission rod while holding transmission throttle valve lever forward against its stop, then tighten adjusting nut Accelerator pedal should be at an angle of 118° to horizontal If necessary, adjust pedal angle by removing accelerator pedal end of bellcrank-to-pedal rod, and shortening or lengthening rod by rotating swivel
THROTTLE LINKAGE ADJUSTMENT (ADVENTURER): *Making the following checks and adjustments b fore making final adjustment (below)* Disconnect accelerator

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shaft at throttle lever on rear carburetor. With throttle lever in extreme forward position check and adjust (at throttle lever) position of upper arm of accelerator shaft bellcrank (accelerator rod to rear carburetor linked to arm with bushing and pin) so that distance from center of pin to firewall is 7/8-1 1/8". *NOTE - On cars having accelerator lever and bracket assembly with slot and holes for gauge rod, insert 3/16" diameter*



POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

rod through holes and slot. This will establish proper throttle lever position and obtain correct distance from firewall when adjustment made. Adjust accelerator rod to length of 11 7/8-12" which will give proper accelerator pedal angle of 115° to horizontal. **Final Adjustm nt** - Disconnect carburetor-to-bellcrank rod and move rearward until transmission throttle lever contacts forward stop. Adjust ball socket end so it will slip over stud on throttle lever with slack removed.

CARTER BBD 2-BARREL

Cart r BBD N . 2822S (Early MS-1), 2870S (Later MS-1); 2793S (Early MS-2), 2871S (Later MS-2).

►*FLAT SPOT OR SURGE AT LOW SPEED CORRECTION (Carb. No. 2871S):* Install two Step-Up Rods, Carter No. 75-999. Enlarge inside diameter of venturi cluster screws to .055" (No. 54 drill). *See "Carter BBD Carbur tors" in Carburetion Section.*

Idl Setting - ¼-1¼ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Sp d - 500 RPM with transmission in neutral.

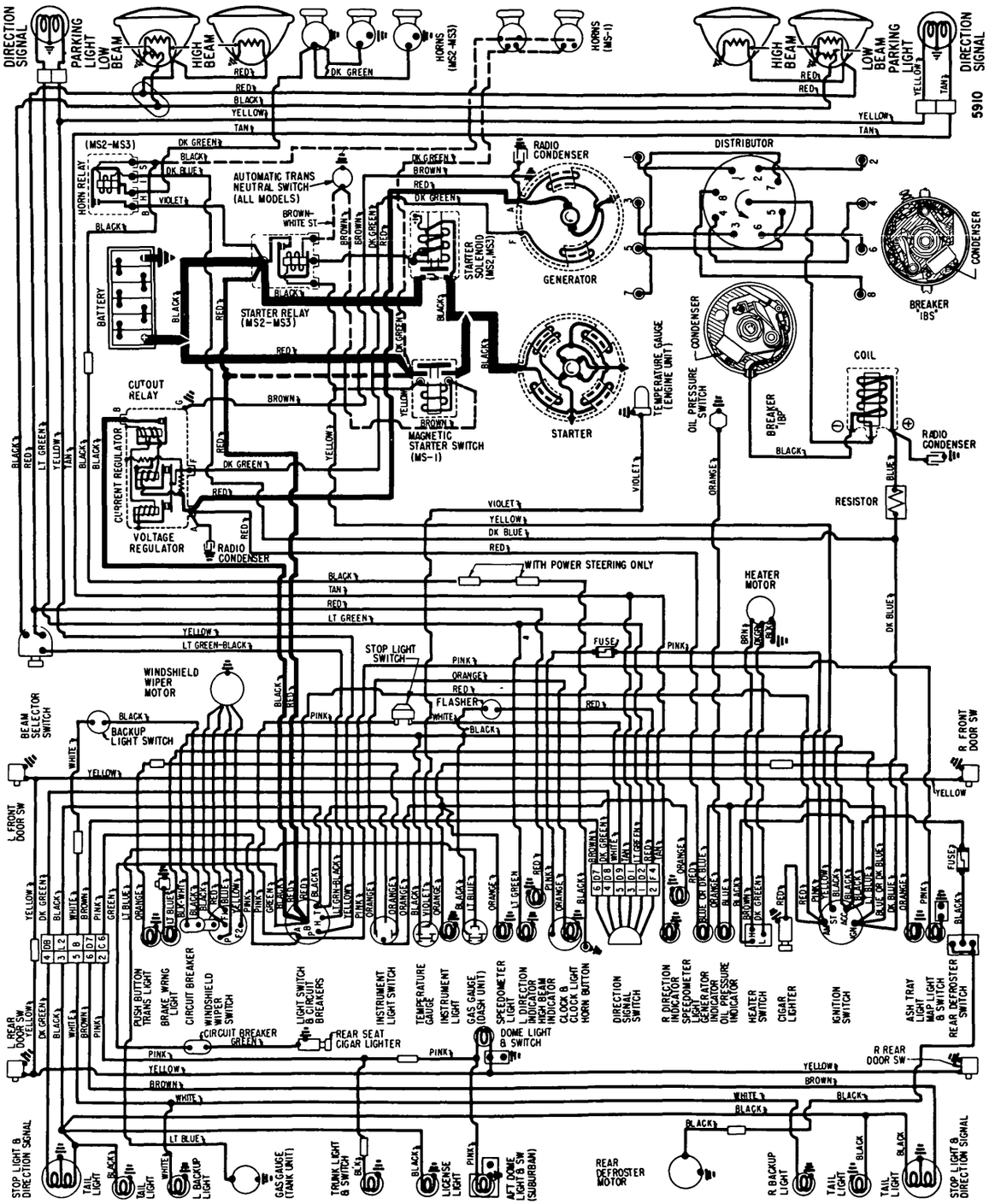
Float L v l - 5/16" (Gauge T109-280) between top of each float ridge (at free end of float) and top surface of body casting. To adjust, bend lip on float arm.

Acc lerating Pump - Install connector rod in center hole (medium stroke) of throttle lever.

Fast Idl : .018" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on index mark of cam.

Fast Idl Cam Cl arance - With choke valve closed and lug on fast idle cam contacting lip on choke shaft

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lever, align center of fast idle screw with index mark on cam To adjust, bend lip on choke shaft lever

Automatic Choke Setting (Cross-Over Type): Centered on index *NOTE - Choke is "Cross-Over" type mounted in manifold and linked to choke valve Choke assembly must be removed from manifold well for checking and adjusting*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See Carter BBD Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Single Carburetors)

Carter AFB No. 2794S, 2773S, 2787S

►*FLAT SPOT OR SURGE AT LOW SPEED CORRECTION (Carb No 2794S)* Replace standard metering rods, Carter No 16-45 with Carter No 16-70 *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Idle Setting - ½-1 (2794S), ¾-2½ (2773S, 2787S) turns open Turn screws out for richer mixture

Idle Speed - 500 RPM with transmission in neutral

Throttle Linkage Adjustment· *See CARBURETOR above*

►*OTHER DATA See 'Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Two Carburetor Installation)

Carter AFB No. 2790S (Front), 2791S (Rear).

►*IDLE SPEED ADJUSTMENT NOTE Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed at slow idle*

Idle Mixture & Speed Adjustment - Special procedure required to insure correct mixture and speed (idle air) screw setting *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Interconnecting Linkage Adjustment· Slotted end of rod must be in **lower** hole of throttle lever on **front** carburetor, and other end of rod in **top** hole on **rear** carburetor Hold **rear** carburetor throttle in wide open position (choke off) and adjust slotted end of rod so **front** carburetor throttle valves will be wide open Tighten locknut, check operation

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors' in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter 2769S Mechanical type

Pressure - 5-7 lbs

►*FUEL FILTER NOTE·* Ceramic filter elements must be cleaned at approximately 5,000 mile intervals to prevent stalling or low fuel output

See 'Fuel Pumps" in Carburetion Section

Gasoline Gauge: Auto-Lite electric type

Dash Unit - Auto-Lite No 14874A

Tank Unit	Auto-Lite No.
MS-1	14676A
MS-2,3 Exc Sub	14675A
Suburbans	14684A

S "Fu l Gaug s" in Carbur tion S ction.

AIR CLEANER: DRY FILTER ELEMENT type Clean every 5,000 miles, replace element every 15,000 miles

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Auto-Lite 11-HS-60 or Willard HO-11-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Left front of engine

STARTER

Auto-Lite MDT-6001 (MS-1), MDT-6002 (Others).

Armature - MDL-2088 (MDT-6001), MDL-2006 (MDL-6002)

Drive - Bendix "Folo-Thru" No A3596 (MDT-6001), Overrunning clutch-solenoid pinion shift (MDT-6002)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 31-47 ozs

Performance Data - MDT-6001,2

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

Starting Switch: (MS-2, MS-3) Auto-Lite SAD-4301 Solenoid Pinion Shift used with separate relay, Auto-Lite RAM-4002 and Neutral Safety Switch on transmission (Auto Trans Cars) Controlled by Ignition and Starting Switch (key starting)

(MS-1) - Magnetic switch used with Neutral Safety Switch on Transmission (Auto Trans) Controlled by Ignition & Starting Switch (key starting)

See 'Auto-Lite Starter Controls" in Electrical Section

Neutral Safety Switch Adjustment: *See "PowerFlite or "TorqueFlite" Transmissions in Transmission Section*

GENERATOR

Auto-Lite Application as follows

Model MS-1	Generator
Standard	GJM-8001A
1 Unit Air Cond	GJM-8001A
2 Unit Air Cond	GHM-8004A
Heavy Duty Air Cond	GGA-6007A
Gas Heater	GHM-8005A
Heavy Duty	GGA-6003E
Air Suspension	GJM-8002A

Model MS-2,3	Generator
Standard	GJM-8001A
1 Unit Air Cond	GJM-8002A
2 Unit Air Cond	GHM-8001A
Heavy Duty Air Cond	GGA-6001N
Gas Heater	GHM-8005A
Heavy Duty	GGA-6003E
Air Suspension	GGA-6001N

Armatur - Auto-Lite As follows

Gen rator	Armature N
GJM-8001A	GJC-2058F
GJM-8002A	
GHM-8001A	GHM-2034F
GHM-8004A, 8005A	GHM-2045F
GGA-6001N, 6003E, 6007A	GFY-2101F

►*GENERATOR DRIVE PULLEY INSTALLATION CAUTION* Pulleys are press fit on shaft and care must be used when installing pulley so shaft and other internal parts are not damaged To install, remove generator rear end cap and support shaft DO NOT use more than 6800 lbs pressure to press pulley on shaft Pressure over 7000 lbs will bend shaft

►*GENERATOR NOTE·* Performance specifications apply to all generators within the following groups

Performance Data - GGA (C ld - 70°F)

Amperes	Volts	RPM
4 0	14 6	950
40 0	14 6	1600
40 0	15 0	1600

Performance Data - GHM (C ld - 70°F)

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Performance Data - GJM (C ld - 70°F)

Amperes	Volts	RPM
0	12 8	1150
35 0	1510	2100

Brush Spring Tension - 34-41 ozs (GGA), 35-53 ozs (GHM), 18-36 ozs (GJM)

Field Current - 1 1-1 3 amps (GGA & GHM), 1.6-1 7 amps (GJM) All at 10 0 volts (70°F)

Motoring Current - 2 3-2 6 amps (GGA), 3 0-3 5 amps (GHM), 3 9-4 3 amps (GJM) All at 10 0 volts (70°F)

Rotation - Counterclockwise at commutator end

Belt Adjustment: Torque M th d - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket. Then, with torque wrench, apply 95 lbs (new belt), 70 lbs (used belt) torque on air cond cars, and tighten mounting bolts..

Deflection Method - Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull

Belt Deflection Sp cificati ns

Generator	Us d	N w
Without Air Cond	1/4"	1/8"
With Air Cond	3/8"	1/4"

REGULATOR

Auto-Lite. Used with generators as follows

Auto-Lite Regulator	Generator Typ
VAT-6201A	GGA
VRX-6201A	GHM
VRX-6301A	GJM

►*NOTE· R gulator VRX-6301A has differ nt int rnal wiring than oth r VRX mod ls*

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►*VRX-6301A REGULATOR REPLACEMENT NOTE:* When hard starting at temperatures of 20°F or less is experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has Code 11-N or higher stamped on base.

Cut ut Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3-5 amps. discharge current after charging at 10 amps. (VAT), 7 amps. (VRX).

C ntact Gap - .015" minimum.

Air Gap - .031-.034" with contacts open (measure at hinge end of core).

V ltag Regulator

Setting - 14.5±.3 volts charging at 10 amps. (VAT), 7 amps. (VRX) at 80°F or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Ch cking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Curr nt Regulator

►*SETTING CAUTION: "Temperature Compensated" type. S t to following sp cifications at 70°F.*

R gulator	Test A - Operating Amperes	Test B
VAT-6201A	46	40 (38-42)
VRX-6201A	37	30 (28-32)
VRX-6301A	44	35 (33-37)

T st A - After 15 minutes operation charging at 10 amperes (VAT), 7 amperes (VRX).

T st B - After additional 15 minutes operation with current regulator operating - load applied to hold voltage down to 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Ch cking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical S ction.*

MISC. ELECTRICAL

H adlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight Systems" in Electrical Section.*

Automatic B am Chang r: *S e Electrical Section.*

Electr nic R ar Vi w Mirror: *See Electrical Section.*

Dir ctional Signals: *See Electrical Section.*

Stop Light Switch L cation: On forward end of master cylinder.

CIRCUIT BREAKERS: 22.5 Ampere - Headlights, high beam indicator, parking lights. Part of headlight switch.

15 Amp r - Tail, Stop, License plate, Instrument, Dome, Clock and Glove Compartment lights. Part of headlight switch.

6 Amp r - Back-up lights and variable speed windshield wiper. Part of windshield wiper switch.

5 Amp r - Single speed windshield wiper. Part of windshield wiper switch.

FUSES: 20 Amp r - Heater.

7.5 Amp r - Rear window defroster. In feed wire.

1 Amp r - Clock. At rear of clock..

HORN RELAY: Aut -Lit RAH-4003.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own, 90° V8 with overhead valves and single rocker arm shaft on each head.

►*ADVENTURER ENGINE NOTE:* Adventurer engine package optional on all models. This engine is same as standard 383" engines except for a high performance camshaft (different valve timing), intake manifold, distributor, and uses two carburetors.

Engine	Bore	Stroke	Displacement
MS-1	4.125"	3.375"	361 cu. in.
Others	4.250"	3.375"	383 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
361"	10.0-1	54.3	290 at 4600 RPM
383"①	10.0-1	57.8	305 at 4600 RPM
383"②	10.0-1	57.8	325 at 4600 RPM
383"③	10.0-1	57.8	350 at 5000 RPM

① - 2-Barrel Carb. Firedome MS-2 Models.

② - 4-Barrel Carb. Fireflite MS-3 Models.

③ - Two 4-Barrel Carbs. Adventurer Models.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in DeSoto Special Data.*

OIL PAN REMOVAL: Remove dipstick and drain oil. Disconnect steering linkage from steering arm and pull linkage down and away from oil pan. On single exhaust system cars, remove crossover exhaust pipe making sure rest of exhaust system is supported. *NOTE - It may be necessary to pull brake line, running across the crossmember, slightly forward to allow clearance.* On MS-1 cars disconnect throttle linkage at carburetor and transmission, remove front engine mount nuts and raise engine approximately 1". Remove pan. On other cars, rotate crankshaft until centerline of front counterweight is in 10 o'clock position. Remove pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in DeSoto Special Data.*

►*CYLINDER HEAD TIGHTENING CAUTION: Tighten all bolts to 70 ft. lbs. once, and DO NOT retighten as steel embossed gasket may be damaged.*

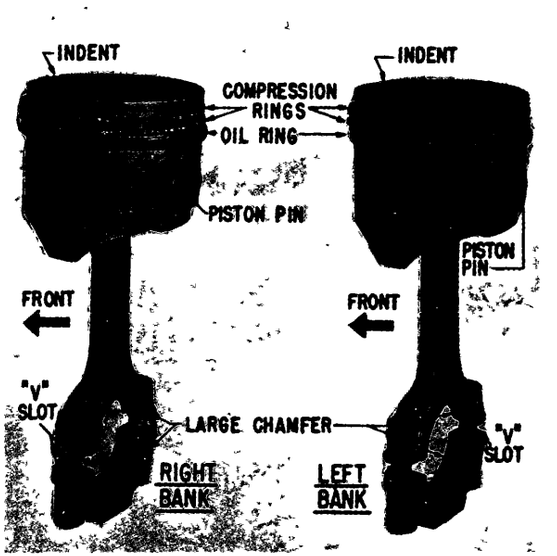
TIGHTENING TORQUES: *See "Tightening Specifications" in DeSoto Special Data.*

PISTONS

Aluminum Alloy, thermally controlled by steel strut, eliptically turned, tin plated.

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number indicates that cylinder bores are .020" Oversize.

W ight - 25.6 ozs. (MS-1), 27.2 ozs. (MS-2,3 Exc. Adv.), 27.5 ozs. (MS-3 Adv.).



DE SOTO PISTON & ROD ASSEMBLY

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance - .0005-.0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston and half-way down cylinder wall, crosswise to engine.

Replacement Pistons: Std. and .005", .020", .040" Oversize.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8). *See Rod Installation below.*

PISTON PIN

Piston pins are a tight press fit in connecting rods and special removal and installation procedures are required. Piston pins are available only with new pistons. Pin is off set .09" to right.

Diameter - 1.093". **Length** - 3.56".

Clearance in Piston - .00045-.00075". Light thumb press fit at 70°F.

Clearance in Rod - .0007-.0012" **interference fit.**

Piston Pin Removal & Installation: *See "Piston Pins" in DeSoto Special Data.*

Replacement Pins: Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, tin plated. Oil rings are cast iron, single-piece units.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.013-.025"	.0015-.0030"
Compr. (2)	.0775-.0780"	.013-.025"	.0010-.0025"
Oil	.1860-.1865"	.013-.025"	.0015-.0030"

R plac m nt Rings: Furnished Std., and .010", .030", .050" Oversize.

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Installing Rings: Install with mark "Top" on compression rings to top of piston.

CONNECTING ROD

Journal Diameter - 2.374-2.375".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE JOURNALS MACHINED UNDERSIZE): See CRANKSHAFT below.*

Length - 6.77" (MS-3 Adv.), 6.36" (Others).

Weight - 29.8 ozs. (MS-3 Adv.), 28.6 (Others).

Lower Bearings - Lead Base Babbitt on Steel. Removable precision type.

Clearance - .0005-.0015". Wear limit .0025".

Side Clearance - .009-.017" (2 Rods).

Bearing Adjustment - None, replace bearings.

Replacement Bearings: Furnished Std. and .001", .002" .003", .010", .012" Oversize.

Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.

CRANKSHAFT

Journal Diameter - 2.625-2.6255".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE(ALL Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) stamped on engine numbering pad indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize journals is stamped on a machined surface of a counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Removable precision type. Tin Base Babbitt on Steel (No. 3 Thrust Bearing), Lead Base Babbitt on Steel (Others).

Clearance - .0005-.0015".

Replacement Bearings: Furnished Std. and .001", .002", .010" Undersize. *NOTE* - No. 1,2,4,5 bearing pairs are identical. Upper and lower halves of No. 3 flanged bearing are interchangeable.

End Thrust - Taken by center (No. 3) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in DeSoto Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in DeSoto Special Data.*

CAMSHAFT

►*NOTE: Special "High Performance" Camshaft used in Adventurer*

Journal Diameters - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952", **(5)** 1.748-1.749".

Bearings - Removable, steel-backed, babbitt lined bushings.

Clearance - .001-.003". Maximum allowable before reconditioning .005".

End Thrust: Taken by camshaft sprocket hub. Helical oil pump and distributor drive gear and camshaft lobe taper cause rearward thrust.

Timing Chain: Width - .88". **Pitch** - .50". **Length** - 50 links.

Camshaft Setting: Marks on sprockets should be adjacent and in line across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in DeSoto Special Data.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in DeSoto Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in DeSoto Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	③ Stem Diam.	Length
Intake	①	.372-.373"	4.87"
Exhaust	1.60"	.371-.372"	4.78"

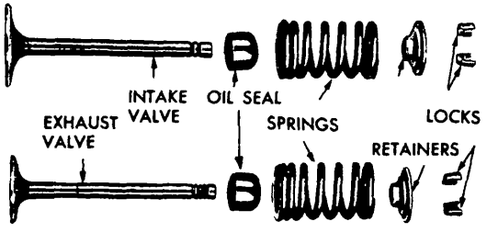
① - 1.95" (361" Eng.), 2.08" (383" Eng.).

③ - Std. Valve. Also .005", .015", .030" Oversize.

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.390"	.001-.003"
Exhaust	45°	.390"	.002-.004"

Valve Seat Width - 1/16-3/32" Intake, 3/64-1/16" Exhaust.

Valve Stem Oil Seal - Cup type oil seal used on all valve stems.



DE SOTO VALVE ASSEMBLY

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding, using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach but do not go below minumum height (slotted area in gauge).

►*OVERSIZE VALVE STEM NOTE:* Valves with oversize stems are available in .005", .015" & .030" Oversize.

VALVE SPRINGS: Single springs used on all engines.

Spring Specifications	Pressure	Length
Valve Closed	95-105 lbs.	1.86"
Valve Open	188-202 lbs.	1.47"

Spring Free Length - 2.34"

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 55/64", install a spacer under spring to bring height within limits.

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "Fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

►*CAUTION:* Spring ends must be square within 1/16".

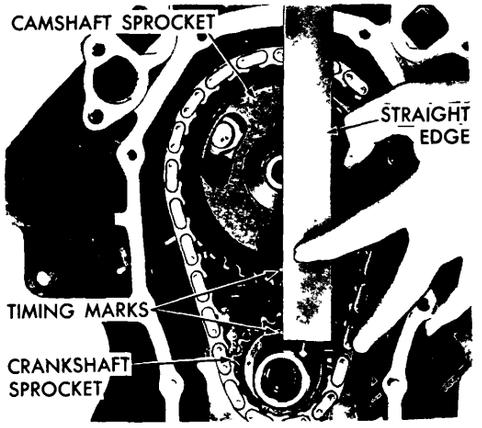
Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install oversize valves.

Hydraulic Lifters: Integral, flat valve type.

►*OVERSIZE LIFTER NOTE:* A "♦" mark on engine numbering pad indicates .008" Oversize lifter bodies. **Diameter** - .9040-.9045". **Clearance** - .0005-.0015".

Lifter Overhauling & Testing: *See "Valve System" in DeSoto Special Data.*

Rocker Arm Assembly: *See "Valve System" in DeSoto Special Data.*



DE SOTO VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

①Valve Timing Specifications (Exc. Adventurer)

Intake - Open 15° BTDC. Close 57° ALDC.

Exhaust - Open 57° BLDC. Close 15° ATDC.

(Adventurer)

Intake - Open 20° BTDC. Close 60° ALDC.

Exhaust --Open 58° BLDC. Close 22° ATDC.

① - With valve train solid.

Valve Timing Check: Rotate crankshaft until No. 1 intake valve is closed and No. 1 piston is on TDC. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed tappet down (providing a solid tappet). Turn crankshaft in normal running direction until valve has lifted .013". Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning engine any further in normal direction.*

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OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data.*

►*OIL FILTER BASE ASSEMBLY PRODUCTION CHANGE & LOSS OF OIL PRESSURE CORRECTION:* New Filter Base and New Oil Pressure Relief Valve Plunger (in oil pump assembly) used in production starting with Eng. No. 18056. New Filter Base Assembly Part No. 2120866 should be used in cases of oil pressure loss.

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-65 lbs at 2000 RPM.

Oil Pressure Relief Valve - Mounted in oil pump. Use correct color spring. *See "Oiling System" in DeSoto Special Data.*

Oil Pressure Gauge - Indicator lamp in Instrument Panel operated by low oil pressure switch.

Oil Pump: Rotor type, mounted externally at front of engine.

Pump Overhaul - *See "Oiling System" in DeSoto Special Data.*

Oil Filter: Full flow disposible type. All oil enters lubrication system of engine through filter at oil pump pressure.

Filter Element - Install new filter element every 5,000 miles. Use Tool C-3654 to unscrew filter from base. Screw filter on base until gasket contacts base, then tighten ½ turn more by hand.

Crankcase Ventilation: Filter element in oil filler cap (clean with kerosene every 5,000 miles), and breather pipe on right valve rocker cover.

COOLING

Water Capacity: 17 qts. (361" Eng.), 16 qts. (383" Eng.). Add 1 qt. with heater.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap.

►*AIR CONDITIONER OPERATION CAUTION: Engine cooling system must be protected to a temperature of 15 F (above zero) for summer operation.*

Thermostat: Pellet type. Starts to open 178-182°F, fully open at 202°F.

►*THERMOSTAT IDENTIFICATION NOTE:* Disregard the 160° mark shown on top surface of gasket flange on some thermostats. Correct 180° mark is located on bottom of pellet. This applies to double coil spring type thermostats.

Water Pump: Ball bearing type. No lubrication required. *See "Water Pump" in D S to Special Data.*

Pump Removal - Drain cooling system. Loosen generator and power steering pump or idler pulleys, remove all belts. Remove fan, spacer, and pulley. *NOTE* - On Air Cond. Cars, remove upper half of fan shroud, then remove fan hub pulley, loosen fan, remove fluid fan drive. Remove water pump body to housing bolts and remove water pump.

"Silent Flite" Fluid Fan: Standard on Air Conditioned Cars. *See "Cooling System" in DeSoto Special Data.*

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite No. 14873A.

Engine Unit - Auto-Lite No. 14405A.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10.5A8 (Std.), 11A8 (Heavy Duty). Single plate dry disc type *See "Borg & Beck" in Clutch Section*

Pedal Adjustment: Adjust fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" freeplay at pedal.

Overcenter Spring Adjustment: *(NOTE* - Overcenter spring located above clutch pedal and attached to pedal mounting bracket). Release clutch rod at clutch pedal. Back off adjusting nut to release overcenter spring. Hold clutch pedal fully released, adjust nut until it just touches "C" link of spring, then turn nut in 7 full turns. Reinstall clutch rod to clutch pedal.

Removal: Remove transmission (see Synchro-Mesh Transmission), and clutch housing pan. Pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove capscrews which hold clutch cover to flywheel, loosening each screw a few turns in succession until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. See "DeSoto Synchro-Mesh Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission, disconnect propeller shaft, speedometer cable and gearshift control rods, and remove back-up light switch and speedometer pinion sleeve assembly. If transmission to be disassembled or rear oil seal replaced, loosen and remove companion flange nut with Tool C-3281. Disconnect hand brake cable and remove brake band, then remove drum and flange assembly with Puller C-452. Remove engine rear support bolts from crossmember and support engine with Fixture C-3487 (or Kit C-3488 to adapt Fixture C-3245). Remove crossmember but **do not disturb torsion bars.** Remove transmission-to-clutch housing bolts, pull transmission straight back until drive shaft clears clutch housing and lower transmission.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles. Drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A" Suffix "A". *NOTE - This supersedes previous drain interval of 20,000 miles.*

Checking Fluid Level - *See TORQUEFLITE below.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque converter, and Three Speed hydraulically operated planetary transmission.

See "Torque Flite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Torque Flite" Transmission in Transmission Section.*

►*TORQUEFLITE ERRATIC SHIFT PATTERN CORRECTION:* When this occurs at light throttle on 1-2 upshift (25-30 MPH) or 2-3 upshift, look for bent throttle valve lever. *See "TorqueFlite Transmission" in Transmission Section.*

►*TORQUEFLITE BUZZING NOISE IN REVERSE CORRECTION:* Install new Torque Converter Control Valve Part No. 2124247. *See "TorqueFlite Transmission" in Transmission Section.*

►*TORQUEFLITE 2-3 UPSHIFT RATCHETING NOISE CORRECTION:* Caused by incorrect assembly of clutch pack. Reassemble with pressure plate at front of pack next to snap ring. *See "TorqueFlite Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles. Drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A" Suffix "A". *NOTE - This supersedes previous drain interval of 20,000 miles.*

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" **below** "L" mark. Add or drain fluid as necessary.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral, fluid level should be between ½" **above** "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

►*FLUID LEVEL CAUTION:* Overfilling or too high fluid level in transmission may cause foaming under high speed and high operating temperature conditions (if level reaches gear train as fluid expands). This may result in drop in governor pressure and permit transmission to downshift

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "TORQUEFLITE" SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion type front, Cross type rear.

Rear Universal Operating Angle - *See "Propeller Shaft Notes" in DeSoto Special Data for checking and adjusting.*

REAR AXLE

Own. Semi-floating hypoid with Hotchkiss Drive.

See "DeSoto Hypoid" in Rear Axle Section.

►*"SURE GRIP" AXLE NOTE:* Optional on all models and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut.

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See "Pow r-Lock Diff r ntial (Plate Clutch Typ)" in R ar Axl S ction

Rear Axle Ratios

Car Model	S.M.Trans.	PowerFlite	TorqueFlite
MS-1 (Std.)	3.54-1(39-11)	3 31-1(43-13)	3 31-1(43-13)
MS-1(Optl)		2 93-1(41-14)	2 93-1(41-14)
Others (Std.)			3 31-1(43-13)
Others(Optl)			2 93-1(41-14)

►*NOTE "Sure-Grip" axle available only in 3 31-1 ratio*

Backlash - .006-.008".

Carrier Removal: Drain lubricant, remove axle shafts (see below), disconnect rear universal joint and drop propeller shaft. Remove carrier from housing.

►*BANJO HOUSING INSTALLATION NOTE:* Check rear universal joint operating angle. *See "Propeller Shaft Notes" in DeSoto Special Data.*

Axle Shaft Removal: Block brake pedal and disconnect brake lines at wheel cylinders. Back off brake adjusting cams and remove hubs and drums with Tool C-845. *CAUTION - Do not hammer on end of axle shaft to remove hubs and drums as damage to bearings and thrust block will result.* Remove brake support plates as assemblies. Remove axle shaft keys and install Tool C-745 to protect outer seals. Remove shim packs. Remove axle shafts and bearings with Puller Tool C-499, being careful not to damage inner seals.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay** - .013-.018". Hold to high limit.

SHOCK ABSORBERS

Oriflow" Direct acting, hydraulic type Serviced by replacement.

Shock Absorbers

Model	Front	Rear
MS1 1" Std.	1881774	1879307
MS1 2" Std.	1881774	1879305
MS3 1" Std. Exc Sub.	1881774	1879305
MS3 1" Std. Sub.	1881774	1879306
MS1,2 1" Hvy Dty.	1881775	1879306
MS3 1" Hvy. Dty. Exc. Sub	1881775	1879306

FRONT SUSPENSION

"Torsion-Aire" suspension with ball joint mounted steering knuckle and torsion bar front springs
See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section

Steering Axis Inclination - 6½° at 0° camber

Caster - (Manual Steering) Neg ¾°±¾°, -¾° preferred **(Power Steering)** Pos ¾°±¾°, +¾° preferred *NOTE* - Caster should be equal as nearly as possible on both sides of car

Camber (L ft Wh l) - Pos ¼°±¼°, 3/8° preferred

Camber (Right Wh el) - 0°±¼°, 0° preferred

T -In - 3/32-5/32", 1/8" preferred

Toe-Out n Turns – With inner wheel at 20°, outer wheel should be 18°46' (MS-1), 18°30' (Others)

AIR SUSPENSION

At rear only Air springs used in conjunction with conventional leaf springs Optional on all models *See "DeSoto Air Suspension" in Suspension & Wheel Alignment Section*

►*COMPRESSOR KNOCKING NOISE CORRECTION* Caused by end float in crankshaft Correct by installing Air Suspension Compressor Kit No 2084466 *See "DeSoto Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual Steering: Gemmer. Worm & three-tooth roller *See "Gemmer Worm & Roller" in Steering Section*

Power Steering: "Constant Control Full Time" power steering
See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering in Steering Section

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

BRAKES

Service: Two types "Total Contact" (Floating Shoe) hydraulic, and "Three Platform Total Contact" *See "DeSoto Center Plane & Total Contact Brakes" or "Three Platform Total Contact Brakes" in Brake Section*

►*BRAKE PRODUCTION CHANGE NOTE:* "Three Platform Total Contact Brakes" in production on later cars These brakes have important design changes, and parts from early and later brakes **not** interchangeable

►*"THREE PLATFORM" BRAKE DRAGGING, PULLING OR IMPROPER RELEASE CORRECTION: See "DeSoto' Three Platform Total Contact Brakes" in Brake Section.*

►*BRAKE LINING REPLACEMENT CAUTION* When replacing new type brake lining (identified by 2" red stripe on edge of lining) use Mopar Lining Package Part No 1879396, or Shoe & Lining Assembly No 1857045 (identified by Blue & White stripes) *NOTE* - Opposite wheel must have identical lining

Drum Diameter - 11" MS1, 12" MS2,3 and MS1 & 3 Sta Wgn

Wheel Cylinder Diameter 1 1/8" bore Two single acting cylinders on front, one double acting cylinder on rear

Lining - Molded asbestos bonded to shoe

Width - 2 5", **Length** - 11 5" MS1 16 6" (Others)

Thickness - 20"

Braking Power - 60% front, 40% rear

Cl arance - Fr nt Wh ls - Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt

Rear Wh els - Same as for front wheels except that on rear wheels the forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation

Master Cylinder· On engine side of dash panel opposite base of brake shoe

►*MASTER CYLINDER NOTE* Master cylinder with Power Brakes has adjustable pushrod New master cylinder used with conventional brakes has non-adjustable pushrod-and-piston stop which is permanently attached to to piston *DO NOT disassemble this pushrod and piston*

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment)

Power Brakes "Bellows" Assist type used Mounted on firewall and linked to upper end of brake pedal Adjustable type pushrod master cylinder used
See 'Chrysler, DeSoto, Dodge, Plymouth (Bellows) Type Power Unit in Brake S ction

Removal of Power Unit - Disconnect master cylinder pushrod, use pedal depressor to depress pedal to prevent trigger arm extending beyond end of bracket (to prevent damage to trigger arm) Disconnect vacuum hose Remove nuts on four mounting studs and withdraw unit from firewall *CAUTION - DO NOT los nylon bushing on pedal linkage cross pin*

Parking Brake 6" external used on MS1 with synchro-mesh transmission, 7" internal used on all others On shaft at rear of transmission

Adjustment - *See 'Hand Brake Notes" in D Soto Special Data*

Lining - Width - 2" **Thickn ss** - 16" **L ngth** - 16 68" (MS1 with Synchro-mesh), 6 53" (Others) **Cl arance** - *See "Hand Brake Notes' in DeSoto Sp cial Data*

MISC. MECHANICAL

Windshield Wipers· Auto-Lit . EPW-4001C (MS1 - Single Speed), EPV-4001G (Others - Variable Speed) Electric type
See "Auto-Lite Electric Windshi ld Wip rs" in Miscellaneous Section

Air Conditioning: Heater-Air Conditioner Unit
See "DeSoto Air Conditioning" in Miscellaneous Section

►*AIR CONDITIONING COMPRESSOR CLUTCH NOISE CORRECTION* Caused by compressor bearing To correct, replace old bearing with Bearing Assembly Part No 1769318P *See 'DeS to Heater-Air Conditioning" in Miscellaneous Section*

►*AIR CONDITIONER FAILURE TO COOL CORRECTION (Early Cars)* Caused by underhood temperatures affecting expansion valve sensing bulb To correct, install Air Conditioning Refrigerant Tubing Insulation & Mounting Clamp Package Part No 2084287, *see "D Soto Heater-Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Aut -Lit . Electric type Reversible type motor in each window Controlled by door switch and master control switch
See 'Electric Window Regulators" in Miscellaneous Section

P wer Seat Adjusters· Electric, 6-Way type *See "Power Seat Adjusters' in Miscellaneous Section*

C nv rtibl T p C ntr l Electric-Hydraulic type
See 'Power Top Control" in Misc llaneous Section

Form 8A

►*JACKING & HOISTING CAUTION Befor jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Susp nsion & Wheel Alignment Section*

MODEL IDENTIFICATION

Model	Model Designation
Fireflite	PS1-L
Adventurer	PS3-M

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post Number (example below) includes identification data

① ② ③ ④ ⑤
7 1 0 3 100001

① - Car Make **7** DeSoto
② - Model Series **1** Fireflite **2** Adventurer
③ - Year **0** 1960
④ - Assembly Plant **3** Jefferson (Detroit)
⑤ - Beginning vehicle number

ENGINE NUMBER: Stamped on boss on right side of cylinder block just behind water pump Number (example below) includes identification data

① ② ③ ④ ⑤
P 36 ... 8 4

① - Year **P** 1960
② - Displacement **36** 361 cu in **38** 383 cu in
③ - If this space blank, engine is standard *For identifying marks see below*
④ - Month Assembled **8** August, etc
⑤ Day Assembled **4** 4th day etc

►*ENGINE NUMBER MARKS Identified as follows*
"**A**" - All cylinders 020" oversize
"**B**' - All crankshaft journals 010" undersize
"**AB**" - Both above conditions exist
"**Malt s Cross**" **(3/8" high)** - ONE OR MORE crank shaft journals 001" undersize *See "Connecting Rods and "Crankshaft below*
♦ (3/8") high)- One or more valve lifters 008" oversize

TUNE-UP

COMPRESSION PRESSURE: 150-180 lbs at 150 RPM (plugs removed throttle wide open) Maximum variation between cylinders 20 lbs
VACUUM READING: 19 5" at idle speed
VALVE TAPPET CLEARANCE· Zero lash hydraulic lifters
MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine Valve must operate freely (lubricate with Special Lubricant Part No 1879318) To install coil spring position shaft in extreme counter clockwise position Place coil spring over shaft slot with outer end tongue in lower right hand position Press inner end of coil into slot of shaft and seat firmly Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud
►*RAM MANIFOLD HEAT CONTROL VALVE NOTE* Two heat control valves used one in each cylinder bank exhaust manifold outlet When valve is closed exhaust gases are diverted through bypass pipe around hot spot in intake manifold
►*THERMOSTATIC COIL SPRING CHANGE TO CORRECT SPARK PLUG FOULING See 'Spark Plugs' below*

IGNITION

FIRING ORDER: 1 8 4 3 6 5 7 2
Cylinders - RIGHT BANK 2 4 6 8 LEFT BANK 1 3 5 7

SPARK PLUG GAP: 035"
Spark Plugs - Autolite A42 (2-Bbl Carb), A32 (4-Bbl Carbs) 14mm Torque to 30 ft lbs
►*SPARK PLUG FOULING CORRECTION (Early 2 Carb Cars)* Condition may occur under extended idle and low speed operations To correct install new later production manifold heat valve thermostatic spring, Part No 2128933 New spring has approximately 5 coils *CAUTION - DO NOT use higher heat range spark plugs to correct this condition as severe engine damage will result*
COIL: Autolite No. 200575.
Ignition Current - 2 5 amps idling 3 1 amps stopped
Resistor - Autolite 201000 Connected in lead between ignition switch and coil Bypassed during cranking by second lead from ignition switch
►*RESISTOR BYPASS NOTE (Early Cars)*· Early production cars with 4-terminal ignition switch have resistor bypass wire in harness but it is not connected *See "Ignition Switch Replacement Note" under ELECTRICAL below*
DISTRIBUTOR: Autolite IBP-4005C (361" Eng. 2-Bbl Carb), IBP-4005D (383" Eng. 2-Bbl Carb), IBS-4006D (383" Eng. 4-Bbl Carb.), IBS-4006E (383" Eng Ram Induction with 2 Carbs.). *NOTE - "IBS" Distributor is double breaker type*
Condenser- Autolite IAT-3076LA **Capacity** 25- 285 mfd
Contact Point Set - Autolite IBP-2040L (IBP Distr) IGW 3028JS (IBS Distr)
Breaker Gap - 015-018" Set at 017"
Cam Angle (IBP Distr) - 26-32°
►*CAM ANGLE SETTING CAUTION (IBP Distributor)* Cam Angle should be set with vacuum line disconnected
Cam Angle (IBS Distr) - 26-32° (single set of points) 31-37° (both sets operating together)
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - IBP-4005C

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		350	0		700
1		450	2		900
4 5		800	9		1600
7		1800	14		3600
8		2200	16		4400

Automatic Advance - IBP-4005D

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		350	0		700
1		385	2		770
4		500	8		1000
10		1915	20		3830
11		2150	22		4300

Automatic Advance - IBS-4006D

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		450	0		900
1		515	2		1030
5 5		800	11		1600
8		1800	16		3600
9 5		2400	19		4800

Automatic Advance - IBS-4006E

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		400	0		800
1		440	2		880
5 5		600	11		1200
9		2000	18		4000
10		2400	20		4800

Vacuum Spark Control: Autolite integral type

Vacuum Advanc - IBP-4005C, D

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8 5/8
4	8	10 1/2
8	16	13 1/2
9 5	19	15

Vacuum Advance - IBS-4006D

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	11 7/8
10	20	15
11	22	16

Vacuum Advance - IBS-4006E

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 5/8
5	10	11 3/8
8	16	13 3/4
9	18	14 1/2

IGNITION TIMING

Setting (2-Bbl. Carb.) - 10° BTDC at 475-500 RPM with vacuum line disconnected
Setting (4-Bbl. Carb.) - 12 5° BTDC at 500 RPM with vacuum line disconnected
Setting (Ram Induction) - 7 5° BTDC Set timing with vacuum line disconnected and engine idling below 600 RPM (transmission in "N" and air conditioning compressor off) After timing correctly set readjust engine idle speed to 725-750 RPM
Timing Mark - Mark on vibration damper and pointer on chain case cover Align vibration damper mark with correct mark on pointer

CARBURETOR

►*CARBURETOR APPLICATION Carter carburetors used as follows*

Engine	Carburetor
361" Engine	One Carter 2 Bbl
383" Engine (Std)	One Carter 2 Bbl
383" Engine (Optl)	One Carter 4 Bbl
383" Engine (Ram Induction)	Two Carter 4-Bbl

►*HARD COLD STARTING (Cars with cross-over chok carburetors)* May be caused by choke vacuum unloader piston sticking Squirt carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn Operate valve to flush out gum formation

THROTTLE LINKAGE ADJUSTMENT (EXC RAM INDUCTION)· With engine at operating temperature and idling at 475 500 RPM (carburetor off fast idle and transmission in "N") stop engine loosen locknuts on transmission throttle lever and on carburetor throttle rod Insert a 3/16" diameter rod through holes in bellcrank and lever hold transmission throttle lever forward against its stop and tighten locknut Remove 3/16" diameter rod Make sure carburetor throttle lever is off fast idle cam and against idle stopscrew and move carburetor throttle rod rearward until stopped by internal stop in transmission Tighten locknut Ac

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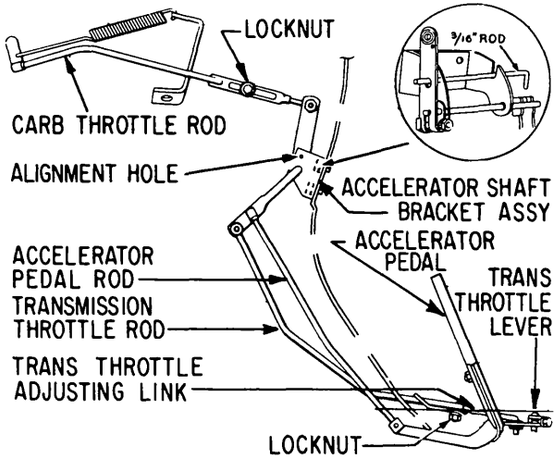
celerator pedal should be at an angle of 114° to horizontal To adjust, remove pedal end of bellcrank-to-pedal rod and adjust length of rod by loosening locknut at swivel end and rotating swivel

THROTTLE LINKAGE ADJUSTMENT (WITH RAM INDUCTION): With engine at normal operating temperature (carburetor off fast idle and transmission in "N"), **proceed exactly as follows:**

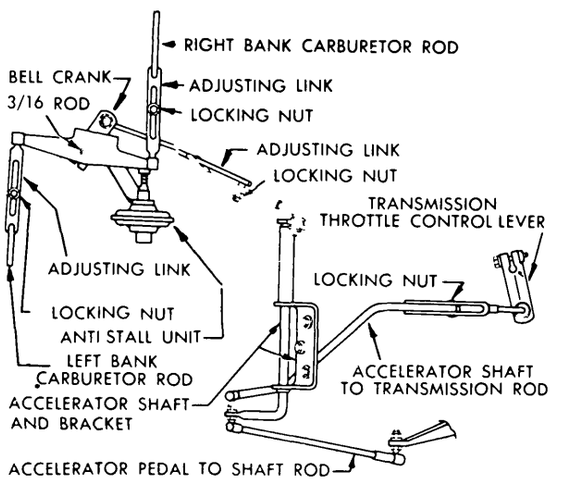
1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod Insert a 3/16" diameter rod into holes in accelerator shaft bracket and lever Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut

2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator

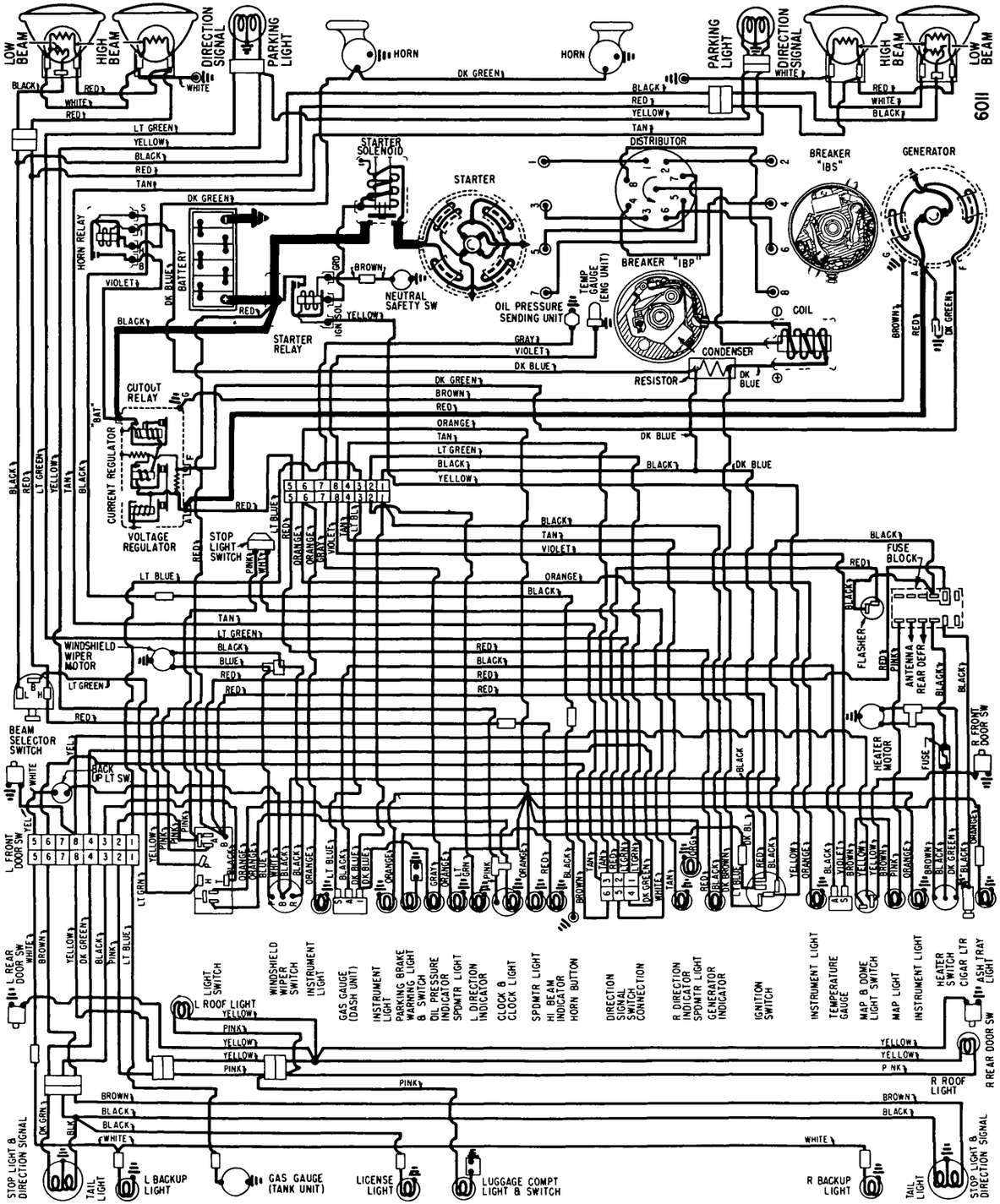
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THROTTLE LINKAGE (EXC RAM INDUCTION)



THROTTLE LINKAGE WITH RAM INDUCTION



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pedal Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficently so bellcrank will pivot (hold dashpot push-rod when turning setscrew to prevent damage to diaphragm) Pivot bellcrank so 3/16" diameter rod can be inserted through hole in bellcrank and into locating hole in intake manifold Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten adjusting link locknut

4) Start engine and make sure idle speed of 725-750 RPM correctly set with transmission in "N" and air conditioning compressor "ON" Put transmission in "D" with parking brake applied and adjust anti stall dashpot plunger so there is 010" clearance between dashpot plunger and bellcrank

CARTER BBD 2-BARREL

Carter BBD, No. 2923S (361" Eng. Early), No. 2924S (361" Eng. Late & 383" Eng.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7,*

Idle Setting - 1/8-1 1/2 turns open Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 500 RPM (575 RPM on Air Cond Cars)', with Auto Trans in "N"

Float Level - 5/16" (Gauge T109-280) from top of each float at free end to top surface of body casting To adjust, bend lip of float arm

Accel rating Pump - Install connector rod in center hole (medium stroke) of throttle lever With throttle valves closed, distance between top of pump shaft and bottom of air horn should be 1"±1/64" To adjust, bend connector rod at lower angle (Tool T109-213)

Fast Idle: 1375-1425 RPM with engine at operating temperature and fast idle cam rotated so index mark is in line with adjusting screw

Automatic Choke: "Cross-Over" type Set on index.

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter BBD Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB, No. 2950S (Fireflite), 2968S (Adventurer).

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

►*FUEL INLET NEEDLE & SEAT ASSY PRODUCTION CHANGE & CARBURETOR FLOODING CORRECTION (Early Carbs) See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Idle Setting - ½-2 turns open (2950S), ¼-1¾ turns open (2968S). Turn screws out for richer mixture

Idle Speed - 500 RPM with TorqueFlite in "N" 550 RPM on Air Cond cars with TorqueFlite in "D" or "R" and air conditioning compressor "ON"

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL
(Ram Manifold Installation)

Carter AFB No. 2903S. Two carburetors used, one at each side of engine

►*MANIFOLD FUEL DISTRIBUTION RIGHT carburetor feeds left bank cylinders, LEFT carburetor feeds right bank cylinders*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed on slow idle*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage & Carburetor Interconnecting Linkage Adjustments: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. No. M2769S.
Fuel Pump Pressure - 3½-5 lbs
See 'Fuel Pumps" in Carburetion Section

Fuel Filter: Disposable type located in carburetor inlet line Replace every 10,000 miles or if clogged Do not attempt to clean

Gasoline Gauge: Constant Voltage type with voltage regulator inside dash unit
Dash Unit - Chrysler No 2096097
Tank Unit - Chrysler No 2084063
See "Fuel Gauges' in Carburetion Section

Air Cleaner: Paper element type Clean every 5000 miles, replace element every 15,000 miles Service more often under severe operating conditions

►*CLEANING CAUTION* Clean filter element by blowing out with compressed air from the inside surface of element Hold air nozzle 2" from element to avoid damage DO NOT oil, lubricate or wash element

Auto Pilot: Automatic speed control unit *See "Auto Pilot" in Carburetion Section*

BATTERY

Autolite 11-HS-60 or Willard HO-11-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)
Battery Ground - Negative

STARTER

►*STARTER PRODUCTION CHANGE NOTE:* Autolite starter used on early cars, Chrysler-built starter used on later cars *See data below for specifications*

AUTOLITE

Autolite No. MDT-6002. Armature - MDL-2006.
Drive - Overrunning clutch (solenoid pinion shift)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

CHRYSLER

Chrysler No. 1889200. Armature - No. 1889079.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 32-48 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3800 Min	11 0	80 Max.
8 5 ft lbs	Lock	4 0	350

Starting Switch: Autolite SAD-4501 Solenoid Pinion Shift used with separate relay, Autolite RAM-4001, and Neutral Safety Switch, Chrysler No 1704283, mounted on transmission (Auto Trans Cars) Controlled by Ignition & Starter Switch, Chrysler No 2097628
See "Autolite Starter Controls" in Electrical Section
Neutral Safety Switch Adjustment - *See "PowerFlit" or "TorqueFlite" in Transmission Section*

GENERATOR

Autolite. As follows

Model	Generator
Standard	GJM-8201A
Low Cut-In	GHM-8001B
Single Unit Air Cond	GJM-8202A
Dual Unit Air Cond	GHM-8002A
Heavy Duty Air Cond	GGA-6003F
Heavy Duty Without Air Cond	GGA-6003E

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12 8	1150
35	15 0	2100

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4 0	14 6	950
40 0	14 6	1600
40 0	15 0	1600

Brush Spring Tension - 18-36 ozs (GJM), 35-53 ozs (GHM), 34-41 ozs (GGA)
Field Current - 1 6-1 7 amps (GJM), 1 1-1 3 amps (GHM & GGA) All at 10 0 volts and 70°F
Motoring Current - 3 3-3 7 amps' (GJM), 3 0-3 5 amps (GHM), 2 3-2 6 amps (GGA) All at 10 0 volts and 70°F
Rotation - Counterclockwise at commutator end
Belt Adjustment: Torque Method - Loosen all mounting bolts and position Tool C-3379 over generator adjusting bracket Then, with torque wrench, apply specified torque (see below) and tighten mounting bolts

Belt Torque Specifications - (Ft. Lbs.)

Belt	Used	New
Generator (No Air Cond)	20	30
Generator (With Air Cond)	35	65
Fan Idler (Water Pump)	35	50

Deflection Method - Measured in inches (see below) at midpoint of longest belt segment under a five-pound push or pull

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B lt D fl cti n Sp cificati ns

B lt	Us d	New
Generator (No Air Cond)	1/4"	1/8"
Generator (With Air Cond)	3/8"	1/4"
Fan Idler (Water Pump)	1/8"	1/16"

REGULATOR

Autolite. As follows

Regulator	Generator Type
VBO-4202C	GHM (30 Amp)
VBO-4202B	GJM (35 Amp)
VBO-4202A	GGA (40 Amp)

Cutout Relay

Cuts In - 12 5-13 5 volts
Cuts Out - 3-5 amps discharge current after charging at 7 amps
Contact Gap - 015" minimum
Air Gap - 025- 027"

Voltage Regulator

Setting - 14 3-14 8 volts charging at 7 amperes and 80°F or with a 25 ohm resistor in series between regulator and battery
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See 'Autolite 12-Volt Regulators' in Electrical Section*

Current Regulator

►*SETTING CAUTION "Temperature Compensated" type Set to following specifications at 70°F*

Regulator	Test A - Operating Amperes	Test B
VBO-4202C	37	30 (28 32)
VBO-4202B	44	35 (33-37)
VBO-4202A	49	40 (38-42)

Test A - After 15 minutes operation charging at amps
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13 6-13 8 volts
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlights: 4-Headlight System *See "4-Headlight Systems" in Electrical Section*
Direction Signals: *See Electrical Section*
Automatic Beam Changer: *See Electrical Section*
Electronic Rear View Mirror: *See Electrical Section*
Stop Light Switch Location: On forward end of brake master cylinder
Lighting Switch Removal: Disconnect battery Pull switch knob out and rotate until flat on shaft is down Push knob all the way in Disconnect switch wires, press spring-loaded release button on top center of switch, and pull shaft and knob out of switch Remove switch mounting bezel on instrument panel and remove switch
Speedometer Removal: Disconnect battery and speedometer cable from speedometer Remove transmission push button bezel, push buttons and push button housing Disconnect instrument panel lights Remove steering column dash support-to-cowl panel brace Disconnect horn and direction signal wires from steering column at connector under dash Remove self-tapping screws holding speedometer lens hood to dash and remove hood Remove odometer shield-to-odometer hood attaching screw (if equipped) by loosening instrument panel odometer shield attaching screws Remove screws holding speedometer to instrument panel *CAUTION - Hold speedometer to prevent falling and scratching lens* To remove speedometer, tilt base toward firewall, lower speedometer until lens clears instrument panel opening, move in direction of parking brake and at same time roll end toward parking brake downward until lens is vertical Turn speedometer 180° until base is toward firewall, lower and remove
Installation - Place speedometer in vertical position at parking brake side of steering column with numbers facing column and base facing firewall Raise speedometer straight up and at same time turn 180° clockwise as base passes lower edge of instrument panel Then, in the same motion, rotate lens to the left and lower the base so lens and dial face are in position to be inserted through instrument panel opening Place speedometer in this position with an upward rolling motion and install attaching screws Complete reassembly by reversing removal procedure
CIRCUIT BREAKERS: 22.5 Ampere - Headlights & high beam indicator light In headlight switch
15 Ampere - Other lights In headlight switch
6 Ampere - Variable speed windshield wiper & back-up lights In wiper switch
5 Ampere - Single speed windshield wiper & back-up lights In wiper switch
FUSES: 20 Ampere - Heater In feed wire
20 Ampere - Front Air Cond Unit In feed wire
20 Ampere - Rear Air Cond Unit In feed wire
10 Ampere - Auto Pilot In feed wire
7.5 Ampere - Radio In feed wire
7 5 Ampere - Rear Defroster In feed wire
2 Ampere - Clock

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head
►*RAM INDUCTION ENGINE NOTE:* This engine same as standard 383" engine except for Ram Induction Manifold (two carburetors) and High Performance Camshaft (different valve specifications)

Model	Bore	Stroke	Displacement
PS-1	4 125"	3 375"	361 cu ins
PS-3	4 250"	3 375"	383 cu ins

Engine	Compr. Ratio	Rated HP	Developed HP
361"(2-Bbl)①	10 1-1	54 3	295 at 4600 RPM
383"(2-Bbl)②	10 1-1	57 8	305 at 4600 RPM
383"(4-Bbl)③	10 1-1	57 8	325 at 4600 RPM
383"(Two 4-Bbl)④	10 1-1	57 8	330 at 4800 RPM

① - Standard on Fireflite
② - Standard on Adventurer
③ - Optional on All Models
④ - Optional on Adventurer

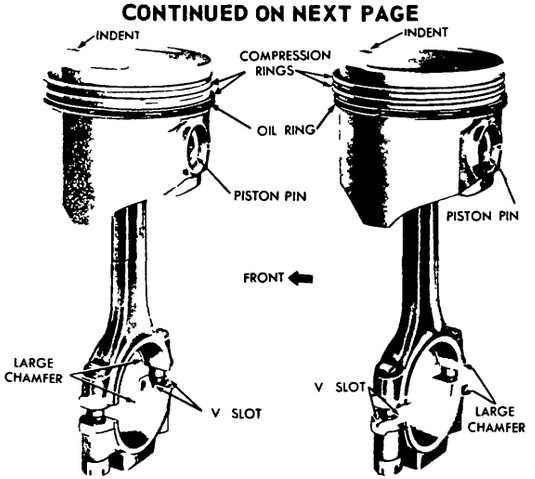
C mpr ssion & Vacuum R ading - *See TUNE-UP*
ENGINE REMOVAL: *See "Engine" in DeSoto Special Data*
CYLINDER HEAD & MANIFOLD: *See "Cylinder H ad & Manifold" in DeSoto Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications" in DeSoto Special Data*
OIL PAN REMOVAL: Remove dipstick, drain crankcase, disconnect battery ground cable and remove No 6 spark plug Raise car and disconnect steering linkage from idler and pitman arms Remove outlet breather pipe and disconnect exhaust pipe branches from manifolds Remove the exhaust pipe and the dust shield from the converter housing Remove engine front mount retaining nuts and raise engine about 2" Remove oil pan bolts Rotate crankshaft so front counterweight and connecting rods are at highest position and lower pan, turning counterclockwise to clear oil screen and suction pipe *NOTE* - When installing, bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel struts

►*CYLINDER BORE OVERSIZE NOTE: L tt r "A" within engine number indicates that cylinder b res are 020" Oversize*
Weight - 25 6 ozs (361"), 27 2 ozs (383")
Removal - Pistons and rods removed from above
Fitting New Pistons: Clearanc - 0005- 0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, cross-wise to engine
Installing Pistons: Notch in piston head must be toward front of engine Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8) *See Rod Installation*
Replacement Pistons: Furnished Std , 005", 020" & 040" Oversize with fitted pins

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DE SOTO PISTON & ROD ASSEMBLY

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PISTON PIN

Pin is tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diam t r - 1.0935-1.0937".

L ngth - 3.555-3.575".

Cl aranc in Pist n - .00045-.00075". Light thumb press fit at 70°F.

Cl aranc in R d - .0007-.0012" interference fit.

Pist n Pin R m val & Installation - *See "Piston Pins" in D Soto Special Data.*

R placem nt Pins: Furnished standard size only with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0775-.0780"	.013-.025"	.0015-.0030"
Oil (3)	.1860-.1865"	.013-.025"	.0010-.0030"

Installing Rings: Install compression rings with "Top" mark toward top of piston.

R placem nt Rings: Furnished for oversize ranges of: Standard to .009", .020" to .029", .040" to .049".

CONNECTING ROD

L ngth (C nt r-t -C nt r) - 6.356-6.360".

W ight - 29.8 ozs.

Crankpin J urnal Diamet r - 2.374-2.375":

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machin d UNDERSIZE): See CRANKSHAFT below.*

L w r B aring - Removable precision type. Lead base babbitt on steel.

Cl aranc - .0005-.0015". Wear limit .0025".

Sid play - .009-.017". Total for both rods.

Installing R ds: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.

R plac m nt B arings: Std., & .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

J urnal Diam ter - 2.6245-2.6255".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (ALL Main & Connecting Rod J urnals) - Letter "B" within engine number and on a crankshaft counterweight indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting R d J urnals) - A "Maltese Cross" (3/8" high) within engine number indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following the letter indicates journal number.

B arings - Removable precision type. Tin based babbitt on steel (No. 3 thrust bearing), lead based babbitt on steel (Others).

Clearance - .0005-.0015". Wear limit .0025".

Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves of any bearing are not interchangeable. No. 3 bearing is not interchangeable with other bearings.

End Thrust: Taken by flanged No. 3 (center) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in DeSoto Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in DeSoto Special Data.*

CAMSHAFT

►*CAMSHAFT USAGE NOTE: Various camshafts used depending on carburetion or other equipment. See "Valves" and "Valve Timing" below for lift, spring and valve timing specifications.*

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.748-1.749".

Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970" (4) 1.953-1.954". (5) 1.750-1.751".

Bearings - Removable, lead base babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust: Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain: Width .88". **Pitch** .50". **Length** 50 links.

Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge cross shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in DeSoto Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in DeSoto Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in DeSoto Special Data.*

VALVES

Tappet Clearance: Zero lash. hydraulic lifters.

Valve	Head Diam.	③ Stem Diam.	Length
Intake	①	.372-.373"	4.87"
Exhaust	1.60"	.371-.372"	4.89"

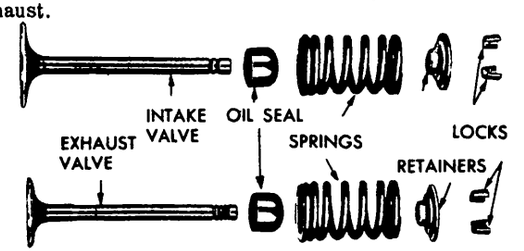
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	②	.001-.003"
Exhaust	45°	②	.002-.004"

① - 1.95" (361"), 2.08" (383").

② - .389" with 2-Bbl. Carb. .430" with 4-Bbl. Carb. or Ram Induction.

③ - Std. Valve. Also .005", .015", .030" Oversize.

Valve Seat Width - .060-.085" Intake, .040-.060" Exhaust.



DE SOTO VALVE ASSEMBLY

Valv St m Oil Seal - Cup type seals used on stems of all valves.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip of valve down to approach, but do not go below minimum height (slotted area of gauge).

Valve Springs: Damper spring used inside valve spring on 383" engines with 4-Bbl. Carb. or Ram Induction.

Spring Specifications - 2-Bbl. Carb.

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	187-203 lbs.	1.47"

① Spring Specifications - 4-Bbl. or Ram Ind.

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	205 lbs.	1.43"

① - Includes damper.

Spring Free Length - 2.34".

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 57/64", install 1/16" spacer under spring to bring height within limits of 1 53/64-1 57/64".

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation: Install all springs with closed coil end toward cylinder head.

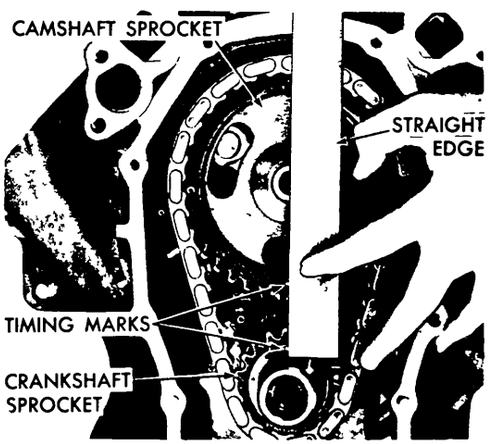
►*CAUTION:* Spring ends must be square within 1/16".

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005"), C-3430 (.015"), and C-3427 (.030") to ream guides in progressive steps of .005", .015" & .030".

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

Hydraulic Valve Lifters: Used on all engines.

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DE SOTO VALVE TIMING MARKS

CONTINUED FROM PRECEDING PAGE

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" Oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Diameter - .9040-.9045". **Clearance** - .0005-.0018".

Replacement Lifters - Furnished Std. & .001", .008", .030" Oversize.

Lifter Overhaul & Testing - *See "Valve System" in DeSoto Special Data.*

Rocker Arm Assembly: *See "Valve System" in DeSoto Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

361" & 383" Engines - 2-Bbl. Carb.

Intake Valves - Open 15° BTDC. Close 57° ALDC.

Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

383" Engine - 4-Bbl. Carb.

Intake Valves - Open 24° BTDC. Close 64° ALDC.

Exhaust Valves - Open 64° BLDC. Close 24° ATDC.

383" Engine - Ram Induction

Intake Valves - Open 20° BTDC. Close 68° ALDC.

Exhaust Valves - Open 60° BLDC. Close 28° ATDC.

►*NOTE:* Check valve timing with valve train solid.

Valve Timing Check: Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted as shown in table below. Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning crankshaft any further in normal direction.*

Valve Timing Check Specifications

Engine	Valve Lift
361" & 383" (2-Bbl.)	.017"
383" (4-Bbl.)	.025"
383" (Ram Induction)	.025"

OILING SYSTEM

►*ENGINE OILING SYSTEM:* *See "Engine Lubrication" under OILING SYSTEM in DeSoto Special Data.*

►*OIL PRESSURE RELIEF VALVE OR OIL PAN NOISE CORRECTION:* Noise may be a chattering or tapping noise heard or felt in oil pan. If loosening oil pressure relief valve retaining nut or removing valve spring affects noise, install new oil filter element, Part No. 1851658, and make sure drain-back valve is free *(see "Oil Filter" below).*

Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.

Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, *see "Oiling System" in DeSoto Special Data.*

Oil Pressure Indicator: Warning light on instrument panel operated by Oil Pressure Switch, Part No. 1818830 (Autolite No. 14272A).

Oil Pump: Rotor type mounted on cylinder block at lower left front side of engine.

Pump Overhaul - *See "Oiling System" in DeSoto Special Data.*

Oil Filter: Full flow disposable type. Replace filter every 4000 miles to coincide with engine oil change.

►*OIL FILTER REPLACEMENT CAUTION:* Use only Filter, Part No. 1851658, for service replacement. Before installing, make sure drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base.

►*OIL FILTER INSTALLATION CAUTION:* Screw new filter on base until gasket contacts base. **Tighten ½-turn additional by hand.** DO NOT overtighten.

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap at every oil change or sooner under heavy dust conditions.

COOLING

Water Capacity: 16 qts. Add 1 qt. for heater.

►*AIR CONDITIONING OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

Thermostat: Pellet type. Located in water outlet housing. Standard 180° thermostat, Part No. 1674602, starts to open at 178-182°F. Designed for use with permanent type anti-freeze. Optional 160° thermostat, Part No. 1734957, also available.

Water Pump: Sealed ball bearing type. No lubrication required.

See "Water Pump" in DeSoto Special Data

Fluid Fan Drive: Used on air conditioned cars. *See "Cooling System" in DeSoto Special Data.*

Temperature Gauge: Constant Voltage type with voltage regulator inside gasoline gauge dash unit for both instruments.

Dash Unit - Chrysler No. 2096095.

Engine Unit - Chrysler No. 2084459.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 11A8WW. Semi-centrifugal type.

See "Borg & Beck" in Clutch Section.

Pedal Freeplay Adjustment: Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This will provide correct 1-1¼" pedal freeplay.

Over-Center Spring Adjustment: Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off overcenter spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 5 turns tighter with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort too high, tighten adjusting nut; if too low, loosen nut. Initial effort required to start pedal moving should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Clutch Removal: Remove transmission (see below) and clutch housing pan. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to relieve tension. Remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Warner Model T-85. 3-speed constant mesh, all helical gear type.

See "Warner Synchro-mesh Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Lubricant Capacity - 3½ pints.

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable and housing and gearshift rods. Disconnect parking brake cable. Disconnect back-up light switch wires. Install Engine Support Fixture C-3487 so hooks are firmly in holes in frame side member with support against underside of oil pan flange. With fixture supporting engine, raise engine slightly and disconnect rear support. Support transmission and remove transmission attaching bolts. Remove transmission by sliding to rear so pinion shaft clears clutch. *NOTE* - Crossmember is removed with transmission.

AUTOMATIC TRANSMISSION

PowerFlite and TorqueFlite automatic transmissions of same designs used previously.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* *See "PowerFlite" or "TorqueFlite" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING:* *See "PowerFlite" or "TorqueFlite" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 10,000 miles or sooner if used in heavy duty service.

Checking Fluid Level - Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Maintain fluid level at (or slightly below) "F" mark on dipstick. *NOTE* -- If fluid checked with transmission cold, maintain fluid level at (or slightly below) "L" mark. **Use only Automatic Transmission Fluid Type "A", Suffix "A".**

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA:* *See "PowerFlite" or "TorqueFlite" in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear.

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in DeSoto Special Data.*

REAR AXLE

Type. Semi-floating, hypoid gear with Hotchkiss Drive. *NOTE* - "Sure-Grip" differential optional.

See "DeSoto Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION (Early Cars):* *See "DeSoto Hypoid" in Rear Axle Section.*

►*DIFFERENTIAL TYPE & RATIO IDENTIFICATION NOTE:* Ratio stamped on identification pad on carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad or by a metal tag marked "Use Sure-Grip Lube" attached to a carrier housing bolt.

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Axl Rati s: As follows:

Transmission	Standard Rati	Optional Rati
Synchro-mesh	3.54-1 (39-11)	
PowerFlite	3.31-1 (43-13)	
TorqueFlite ℂ	2.93-1 (41-14)	3-31-1 (43-13)
TorqueFlite ②	3.31-1 (43-13)	2.93-1 (41-14)

ℂ - 2-Bbl. Carb. ② - 4-Bbl. Carb. or Ram Induction.

Backlash - .006-.008".

Axl Shaft R m val: Remove wheel and hub and drum assembly (use Puller C-845). *CAUTION - Do not strike nd of axle shaft or use "knock-off" type puller.* Block brake pedal and disconnect brake line at wheel cylinder. Remove axle shaft key. Remove brake support and dust shield (use Oil Seal Installing Sleeve C-745 to protect outer seal). Remove shim pack. Remove axle shaft with Puller C-499. *NOTE* - Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637 and brake dust shield outer seal with Driver C-3565.

Carri r Ass mbly R m val: Remove axle shafts (see above). Disconnect propeller shaft at rear universal joint. Drain lubricant. Remove attaching bolts and remove carrier.

Wh l B aring Adjustm nt: Controlled by axle shaft endplay adjustment. *See "DeSoto Hypoid" in Rear Axle Section.*

Axl Shaft Endplay - .013-.023".

SHOCK ABSORBERS

Orifl w. Direct acting, hydraulic. Serviced by replacement.

►*SHOCK ABSORBER MOUNTING NOISE CORRECTION:* On front shock absorber, lower mounting bolt may have short threads preventing "U" mounting bracket from gripping lower bushing. To correct, install a washer between bracket and nut and tighten nut to 55 ft. lbs. On rear shock absorber, upper mounting stud may be loose at body attachment. To correct, inspect stud and nut threads for damage and tighten nut to 70 ft. lbs. *NOTE - If above procedure does not correct noise, install new type shock absorbers (see below).*

►*SHOCK ABSORBER REPLACEMENT NOTE: Use only shock absorbers listed below for service replacement and to correct noise.*

Replac m nt Shock Absorbers

Sh ck Abs rber	Package No.	ℂIdentification No.
Front Std. ②	2240353	2206506
Rear Std. ②	2240358	2206508
Front Heavy Duty	2240356	2206504
Rear Heavy Duty	2240360	2206510

ℂ - Stamped on shock absorber base.
② - Includes Suburbans.

FRONT SUSPENSION

"Torsion-Aire" type of same design used previously with eccentric cam adjustment for caster and camber. *See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section.*

Steering Axis Inclinati n - 5½-7½°
Cast r (Manual St ring) - Neg. ½°± ½°.
Cast r (P w r St ring) - Pos. ¾°±½°.
Camb r (Right Wh l) - Pos. 1/8°±1/4°. Pos. 1/8° preferred. **(L ft Whe l)** - Pos. 3/8°±1/4°. Pos. 3/8° preferred.

T -In - 3/32-5/32". 1/8" preferred.
T -Out n Turns - With outer wheel at 20°, inner wheel should be at 20½-22½°.

Wheel Bearing Adjustment: Tighten adjusting nut to 90 inch-lbs. torque while rotating wheel. Position nut lock on nut with slot in line with cotter pin hole in spindle and then back off nut and nut lock ½ slot (cotter pin hole will be covered). Remove nut lock and reposition on nut so slot lines up with cotter pin hole and install cotter pin. *CAUTION - Do not turn adjusting nut.*

STEERING

Manual: Gemmer. Worm & three-tooth roller.
See "Gemmer Worm & Roller" in Steeri ng Section.

►*STEERING GEAR PRODUCTION CHANGE:* Later cars have flexible coupling in steering gear tube. *See "Gemmer Worm & Roller" in Steering Section.*

►*HARD STEERING OR GEAR BINDING CORRECTION (Manual Steering):* May be caused by cross shaft adjusting screw retaining snap ring being unseated. *See "Gemmer Worm & Roller" in Steering Section.*

Power Steering: Constant Control Full Time type of same design used previously.
See "DeSoto Constant Control Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "DeSoto Constant Control Power Steering" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "DeSoto Constant Control Power Steering" in Steering Section.*

BRAKES

Service: Three Platform Total Contact type of same design used previously.
See "DeSoto Three Platform Total Contact Brakes" in Brake Section.

►*BRAKE DRAGGING, IMPROPER RELEASE OR PULL CORRECTION:* May be caused by lining contacting drum (burrs or paint on dust shield platforms) or improper return spring tension. *See "DeSoto Three Platform Total Contact Brakes" in Brake Section.*

►*OVAL PISTON TYPE POWER UNIT "THUMP" CORRECTION (Early Cars):* Noise occurs when brakes released. *See "DeSoto Oval Piston Power Unit" in Brake Section.*

Drum Diameter - 11" front & rear (Std., Exc. Ram Induction), 12" front & rear (Std. on Ram Induction, Optl. on others).

Wh l Cylind r Diam t r - 1 1/8" front & rear. Two single acting cylinders used on front, one double acting cylinder used at rear.

Lining - Molded asbestos bonded to shoe. **Width** 2.5"; **L ngth** 11.5" (11" brakes), 12.6" (12" brakes); **Thickn ss** 11/64". All Shoes.

Braking Power - 60% front, 40% rear.

Clearance - With wheel locked against drum, back off adjusting cam until no drag is felt.

Master Cylinder: On engine side of firewall opposite base of brake pedal.

►*MASTER CYLINDER NOTE (Cars Without Pow r Brakes):* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder eliminating need for adjustment. No pedal return spring is used A service package consisting of piston-collar-rod-retainer and boot assembly is available.

►*BRAKE PEDAL & PUSHROD CAUTION:* Never pull brake pedal back beyond piston stop in master cylinder A pull of 50 lbs. could pull pushrod off piston.

Checking Fluid Level - Master cylinder cover is used as a filler cap.

Removal: Disconnect pushrod, brake tube and stop light switch wires. Remove attaching bolts and remove cylinder.

Power Brakes: "Oval Piston" or "Bellows" type power units used. Mounted on firewall and linked to upper end of brake pedal. Used with adjustable pushrod type master cylinder.

See "DeSoto Bellows Power Unit" or "DeSoto Oval Piston Power Unit" in Brake Section.

Pedal Freeplay Adjustment: *See "DeSoto Bellows Power Unit" or "DeSoto Oval Piston Power Unit" in Brake Section.*

Removal: Place a wedge between power lever and bracket to prevent damage to trigger arm. Scribe mark power unit and mounting bracket, and mounting bracket and firewall. Disconnect vacuum hose from power unit. Remove master cylinder (see above). Remove mounting bracket attaching bolts and remove power unit and bracket assembly.

Parking Brake: Transmission mounted type. 6" external contracting and 7" internal expanding types used. Foot-operated lever applies brake.

Adjustment - *See "Brake Notes" in DeSoto Special Data.*

Lining	Width	Thickness	Length
External Type	2"	5/32"	16.68"
Internal Type	2"	5/32"	ℂ 6.53"

ℂ - Per shoe (2 shoes).

MISC. MECHANICAL

Windshield Wiper: Autolite electric, single or variable speed. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Heater-Air Conditioning. *See "DeSoto Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. *See "Electric Window Regulators" in Miscellaneous Section.*

P w r Seat Adjust r: 6-Way electric type. *See "Power Seat Controls" in Miscellaneous S ction.*

D r L cks: Vacuum type. *See "Vacuum Door Locks" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Caution" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
1954 Meadowbrook	D-51-1
1954 Meadowbrook	D-51-1A
1954 Coronet	D-51-2
1954 Coronet	D-52
1955 Coronet	D-56-1

SERIAL NUMBER: On left front door hinge post

Starting Serial Nos.	Detroit	San Leandro
D-51-1	32,160,001	45,110,001
D-51-1A	34,635,801	42,508,001
D-51-2	32,160,001	45,110,001
D-52	37,227,001	48,015,001
D-56-1	32,192,661	①48,016,001

①–Los Angeles Assembly plant

ENGINE NUMBER: Stamped on left side of engine block between No 2 and 3 cylinders

Starting Engine Numbers–D51-1001 (1954); D56-1001 (1955)

►*ENGINE NUMBER LETTERS: (Following Engine Number)–Identified as follows:*

"A"–ALL cylinders .020" oversize.

"B"–ALL Main & Connecting Rod Bearings .010" undersize.

"AB"–BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed of 150 RPM.

VACUUM READING: Steady 18-20" at idling speed.

VALVE TAPPET CLEARANCE: .010" Intake. .010" Exhaust. Engine must be hot and idling. NOTE–Tappet screws are self-locking type.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for **exhaust** tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil type. See that valve operates freely. When installing coil, place new coil spring in position over shaft slot, with outer end (tongue) of spring in the upper left hand position (10 o'clock). Press inner end of coil into slot and seat firmly. Move outer end of spring down (counter-clockwise), around and up over stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: .035".

Plugs–Auto-Lite Resistor Type 4S-140 14mm. Torque to 30-32 ft lbs

COIL: Auto-Lite CR-6012C.
Ignition Current–2.25 amperes idling, 5.0 stopped.

DISTRIBUTOR: Auto-Lite IAT-4101B (U.S.), IAT-4012A (Can. 1954), IAT-4012 (Can. 1955).

Condenser–IAT-3076RA. **Capacity**–.250-.285 mfd.
Contact Point Set–Auto-Lite IGW-3028BS.
Breaker Gap–.018-.022".
Cam Angle–36-42°. DO NOT exceed breaker gap limits to obtain dwell.
Breaker Arm Spring Tension–17-20 ozs.
Rotation–Clockwise viewed from above.

Automatic Advance–IAT-4101B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		525	2		1050
4		875	8		1750
7		1225	14		2450
8		1350	16		2700

Automatic Advance–IAT-4012

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		450	2		900
5		800	10		1600
9		1300	18		2600
10		1425	20		2850

Automatic Advance-IAT-4012A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
3		400	6		800
6		850	12		1700
9		1300	18		2600
12		1750	24		3500

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance–IAT-4101B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-3/4
1	2	5-7/8
4	8	9-3/8
7	14	12-7/8
8	16	14

Vacuum Advance–IAT-4012

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-1/4
2	4	6-3/4
4	8	8-5/8
6	12	10-3/4
9	18	15

Vacuum Advance-IAT-4012A

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	5
1	2	6½
3	6	9¼
5	10	12 1/8
7	14	15

►*DISTRIBUTOR INSTALLATION CAUTION: Make sure that No. 1 piston is at TDC on compression stroke and that distributor rotor is in No. 1 firing position.*

IGNITION TIMING

Setting–2° BTDC.
Timing Mark–On crankshaft vibration damper.

Manual Adjustment–Timing may be advanced with some premium fuels Range of timing should not exceed plus or minus 4° from recommended factory setting

CARBURETOR

►*CARBURETOR APPLICATION: Carter "B&B" (Single Barrel) used in Early 1954. Carter "BBS" (Single Barrel) Late 1954. Stromberg "WW" (Dual) used in 1955.*

CARTER "B&B" (EARLY 1954)

Transmission	Carter No.
Synchro-mesh	E9T1
Overdrive	E9N1
Gyro-Matic	E9V1
PowerFlite	E9U1

Idle Setting–½-1½ turns open For richer mixture turn screw out
Idle Speed–450-500 RPM
Float Level–(E9U1) 1/16", **(Others)** 5/64" from top surface of body casting to top of float
Accelerating Pump–Long stroke for cold weather, short stroke for hot weather
Fast Idle: No adjustment required
Automatic Choke Setting: Insert gauge pin through hole in automatic choke shaft, and hole in base flange to position shaft, loosen choke valve screw and position choke so that valve is tightly closed
Slow Closing Throttle (Dashpot) (E9U1): Tighten adjustment screw, then turn counter-clockwise 4½ turns Further adjustment outward will increase action of dashpot and lengthen its retarding effect
Overdrive Kick-down Switch Adjustment (E9N1): With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kick-down lever and switch stem guide
Throttle Linkage Adjustment (E9U1): *See "PowerFlite" Transmission in Transmission Section*
►*OTHER DATA: See "Carter BB" in Carburetor Section*
Fuel Pump Pressure: 4-5½ lbs

CARTER "BBS" (LATE 1954)

Transmission	Carter No.
Synchro-mesh	2063S, SA
Overdrive	2062S, SA
PowerFlite	2116S, SA

Idle Setting–½-1½ turns open For richer mixture turn screw out
Idle Speed–450-500 RPM
Float Level–7/32" from top surface of body casting to top of each float
Accelerating Pump–Center hole Distance from top of bowl cover to top of plunger shaft should be 54/64" Adjust by bending throttle connector rod at lower angle

Fast Idle: 022-026" clearance between throttle valve and bore of carburetor (side opposite idle port), with choke valve held closed and throttle stop screw backed off
Automatic Choke Setting: Set on index

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Sl w Cl sing Throttl Dashpot (2116S, SA): Maximum dashpot action is obtained by loosening locknut and adjusting dashpot unit so that dashpot plunger shaft can be moved inward approximately 3/32" with throttle valve tightly closed

Ov rdriv Kickdown Switch Adjustment (2062S, SA): With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide

Thr ttl Linkage Adjustment (2116S, SA): *See "PowerFlit" Transmission in Transmission Section*

►*OTHER DATA: S "Carter BBS" in Carburetor Section*

Fu l Pump Pr ssur : 4-5½ lbs

STROMBERG "WW"
1955 MODELS

Transmissi n	Stromberg Carb. No.
Standard	WW3-124
Overdrive	WW3-125
PowerFlite	WW3-126

►*MANIFOLD FUEL DISTRIBUTION: Each barrel feeds all cylind rs.*

Idl Setting—1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idl Sp d—450-500 RPM.

Fl at L v l—3/16" from top of main body to top of float measured at center of float, with float lip held firmly against needle valve. Use depth gauge or Tool T-25569 to measure float level. To reset float level, bend float lever next to float (use Tool T-24733).

Acc l rating Pump—Normal setting, center hole, for less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idl : With throttle valves in fully closed position, turn throttle stop screw in until it just contacts throttle lever and then turn stop screw in 5-1/8 turns When properly adjusted a #59 drill gauge should just pass between throttle valve and wall of throttle body. With choke valve closed and throttle lever held against throttle stop screw, a #48 drill gauge should just fit clearance between ear on contact lever and first step of fast idle cam. To adjust, bend cam contact ear

Aut matic Chok S tting: Centered (indicator mark on cover coincides with center mark on housing).

Unload r Adjustm nt: Apply light closing pressure to choke valve, then open throttle valve to wide open position Choke valve should open just enough to insert a #19 drill gauge between choke valve and wall of air horn. To adjust, bend ear of cam contact lever with long nose pair of pliers.

Kickd wn Switch Adjustment (3-125): With throttle valves in wide open position, there should be 1/64-1/32" clearance between ear on throttle lever and threaded section of switch housing. To adjust, loosen adjusting nuts and adjust to correct position.

Sl w Closing Throttl (Dashpot) Adjustment (3-126): With throttle stop screw set for normal idle speed, there should be a 1/16-1/32" clearance between end of dashpot plunger and ear of throttle lever when dashpot plunger is pushed into end of its stroke.

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section*

►*OTHER DATA. See Stromberg "WW" in Carburetor Section*

Fuel Pump Pressure: 4-6½ lbs

CARB. EQUIPMENT

Fuel Pump: Auto-Lite FA-4003 (1954) FA-4005 (1955) Vacuum diaphragm type
Pressure—4½-5½ lbs (FA-4003), 5-6 lbs (FA-4005)
Gasoline Gauge: Auto-Lite. Electric type

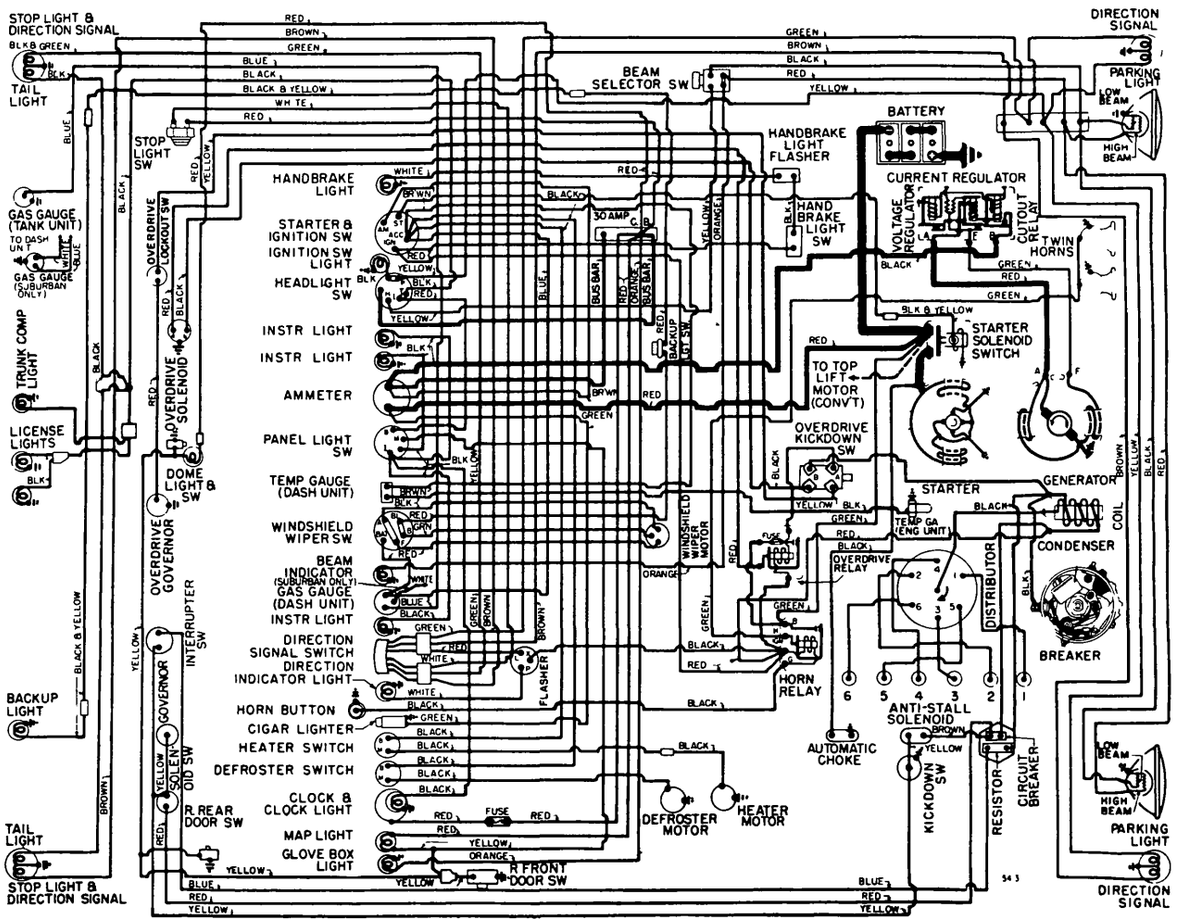
►**1954 SUBURBAN GAS GAUGE NOTE:** *"One-Wire" and "Two-Wire" (Thermostatic) types used Dash units No 13513A, 13529A, 13586A, and Tank unit No 13514A are "Two-Wire" Others are "One-Wire"*

Dash Unit (1954)—(Except Suburban) Auto-Lite No 13454A (Early) 13484 (Late) (Suburban) Auto-Lite No 13457A & 13529A (Early), 13586A (Late)
Dash Unit (1955)—Auto-Lite No 13792A (Exc Suburban) 13816A (Suburban)
Tank Unit (1954)—(Except Suburban) Auto-Lite No 12617A (Suburban—"One-Wire") Auto-Lite No 12904A (Suburban-"Two-Wire") Auto-Lite No 13514
Tank Unit (1955)—(Except Suburban) Auto-Lite No 13794A (Suburban) Auto-Lite No 13905A
See "Fuel Gauges" in Carburetion Equipment Section

BATTERY

Auto-Lite 1H-105-D or Willard HW-1-105-C. 6 Volt, 15 plate, 105 ampere hour capacity.
With PowerFlite—Auto-Lite 2H-120-D 6 volt, 120 ampere hour capacity
Grounded Terminal—Positive.
Engine Ground—Left front of engine.

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1954 MODELS

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STARTER

Model	Auto-Lite No	Armature No
1954 (U S)	MCH-6205	MCH 2088
1954 (Can Early)	MCH-6206	MCH 2088
1954 (Can Late)	MCH-6305	MCH 2088
1955 (U S)	MCH-6305	MCH 2088
1955 (Can Early)	MCL-6204	MCH 2088
1955 (Can Late)	MCL-6133	MCH-2088

Drive—Bendix A3274 "Folo-thru" type
Rotation—Counterclockwise at commutator end
Brush Spring Tension—42-53 ozs (with new brushes)

Performance Data—MCH

Torque	RPM	Volts	Amperes
0 ft lbs	4300	5 0	65
6 0 ft lbs	Lock	2 0	335

Performance Data—MCL

Torque	RPM	Volts	Amperes
0 ft lbs	4900	5 0	65
8 0 ft lbs	Lock	2 0	410

Starting Switch: Auto-Lite SST-4006A (1954 All Models) SST 4006 (1955 Exc PowerFlite) SST 4013 (1955 PowerFlite) Magnetic type switch controlled by ignition switch (combination starter & ignition) Neutral Safety Switch mounted on transmission (PowerFlite cars)

See "Starter Controls" in Electrical Equipment Section

GENERATOR

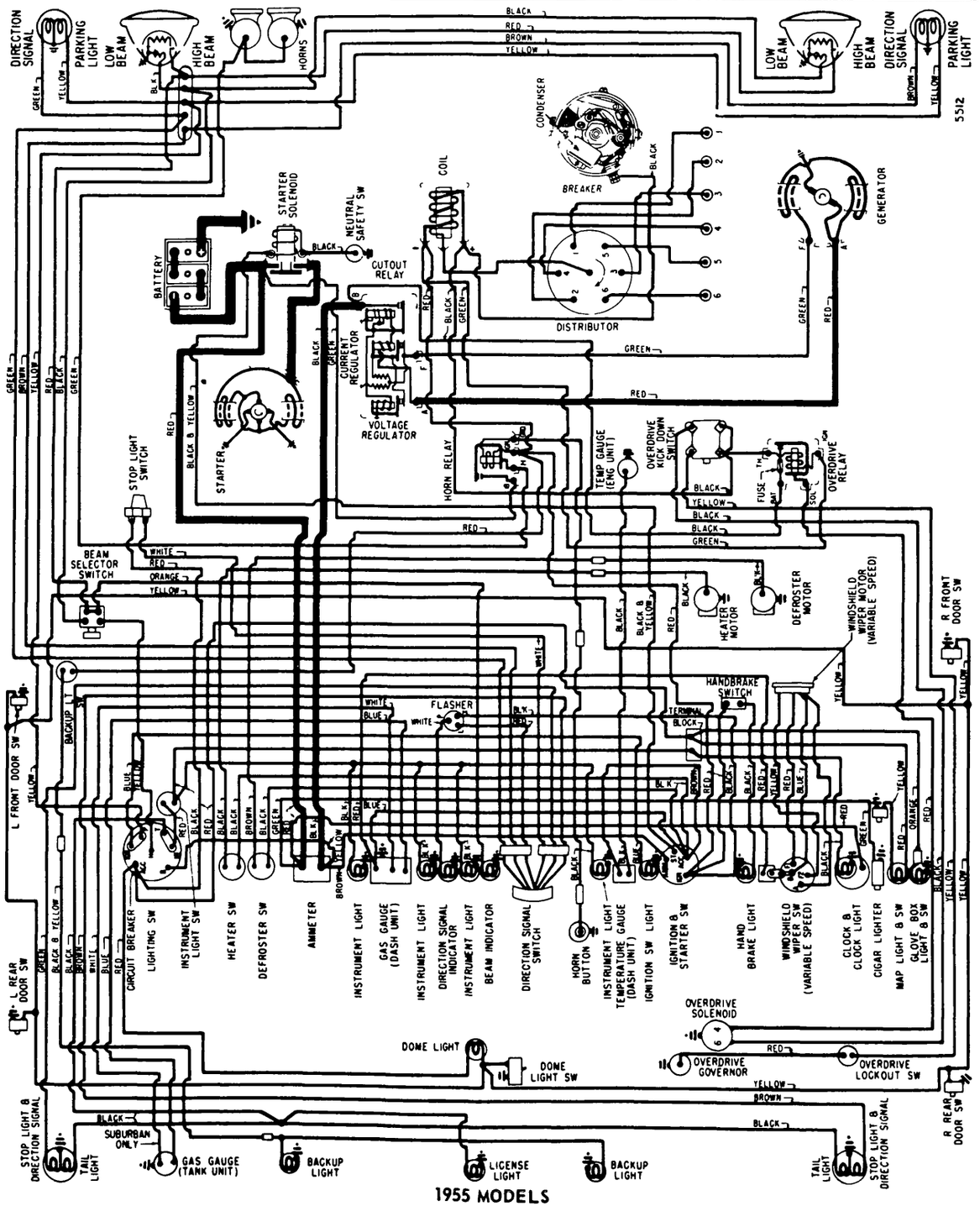
1954 MODELS

Auto-Lite Generator No	Armature No
GGW-6001J, K (Std)	GGW-2006F
GGW-6001L, Q (Special)	GGW-2006F
GGW-6008F, G (Power Steering)	GGW-2045F
GGU-6001G (Special)	GGU-2006F
GGJ-6001F,G (Special)	GGJ 2101F
GGU-6001R (Canada Special)	GGU 2006F
GGU-6008A, B (Special)	GGU 2063F
GGU-6006A, C (Power Steering)	GGU-2042F
GGU-6006GA, BA (Canada Pow St)	GGU 2042F

1955 MODELS

Auto-Lite Generator No.	Armature No.
GGW-6001J (Std.)	GGW-2006F
GGU-6001G (Spec Equip)	GGU-2006F
GGJ-6001F (Spec Equip)	GGJ-2101AF
GGW-6016A (Pow St)	GGW-2090F
GGU-6013D (Pow St)	GGU-2071F
GGW-6016E (Can Pow St)	GGW-2090F
GGW-6017A (Air Cond)	GGW-2098F
GGU-6008C (Air Cond)	GGU-2063F
GGJ-6001K (Air Cond.)	GGJ-2101AF
GGW-6016C (A.C & Pow St.)	GGW-2090F
GGU-6013C (A.C & Pow. St.)	GGU-2071F
GGW-6016F (Can A.C. & P.S.)	GGW-2090F

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1955 MODELS

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►*SPECIAL GENERATOR NOTE:* GGJ, GGU, and GGW type generators used Performance specifications below apply equally to all generators, within any one of the three groups specified

Performance Data—GGJ

Amperes	Volts	Cold —R.P.M.—	Hot
0	6.4	600-700	650-750
50	8.0	1400-1600	1550-1750
55	8.0	1500-1700	1650-1850

Performance Data—GGU

Amperes	Volts	Cold —R.P.M.—	Hot
0	6.4	750-850	800-900
45	8.0	1450-1650	1650-1850
50	8.0	1550-1750	1750-1950

Performance Data—GGW

Amperes	Volts	Cold —R.P.M.—	Hot
0	6.4	870-970	950-1050
40	8.0	1800-2000	2150-2350
45	8.0	1925-2125	2350-2550

Brush Spring Tension—(GGJ) 34-41 ozs., (GGU, GGW) 35-53 ozs., with new brushes
Field Current—(GGJ) 1.4-1.7 amperes, (GGU) 1.4-1.6 amperes, (GGW) 1.6-1.7 amperes, all at 5.0 volts
Motoring Current—(GGJ) 4.1-4.6 amperes, (GGU) 5.0-6.0 amperes, (GGW) 5.0-5.5 amperes, all at 5.0 volts
Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Loosen generator adjusting strap and generator-to-generator bracket mounting bolts. With Tool C-3379 hooked over generator and a torque wrench attached to tool, apply torque of 45 ft. lbs. (new belt), 27 ft. lbs. (old belt), to pull generator outward. While holding generator outward at required torque, securely tighten generator mounting bolts and adjusting strap

REGULATOR

Auto-Lite Regulator No.	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A	GGW
VBE-6201A (Late 1955)	GGW

Cut-out Relay

Cuts In—6.3-6.8 volts.
Cuts Out—4.1-4.8 volts.
Contact Gap—.015" minimum.
Air Gap—.031-.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting (VAV, VBF)—7.1-7.4 volts (set at 70°F), *after 15 minutes operation charging at ½ maximum rate*
Setting (VBE)—7.1-7.4 volts (at 70°F). Test with regulator in operation at 10 amperes output
Air Gap—.048-.052" with contacts just opening
Checking & Adjusting—*See Electrical Equip. Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 70°F (VAV, VBE, VBF)*

Regulator	Test A—Operating Amperes—Test B
VAV-6001B, 2B	55 . 50 (48-52)
VBE-6001A, 6201A	52 45 (43-47)
VBF-6001A, 2A	66 55 (53-57)

Test A—After 15 minutes operation charging at 1/2 maximum rate.
Test B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF)).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equip. Section.*
►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not the ammeter terminal post.*
Lighting Switch Removal: Remove knob (use small screwdriver to raise up special clip in knob, or remove small cross-head screw, depending on method used to hold knob). Remove hex nut and collar that holds assembly in place. Pry out switch (switch has threaded sleeve with two flat sides. Sleeve fits snugly in switch hole in panel).
Stop Light Switch Location: On forward end of brake master cylinder
FUSES Clock—3 amperes Located on clock
Radio—14 amperes. At ignition terminal feed.
Overdrive—20 amperes. On overdrive relay.

CIRCUIT BREAKERS: (1954)—One 30 amp. circuit breaker located to right of ammeter, protects lighting circuits
CIRCUIT BREAKERS: (1955)—Located in headlight switch assembly. Three in number as follows:

25 Ampere Circuit Breaker—Protects headlights, high beam indicator light, and parking lights
10 Ampere Circuit Breaker—Protects tail lights, license plate lights, clock light, and instrument panel light
10 Ampere Circuit Breaker—Protects stop lights, map light, dome light, glove box light, courtesy light, and trunk compartment light

HORNS: (1954)—Auto-Lite HAB-4656 (High Pitch), HAB-4655 (Low Pitch) **(1955)**—HAB-4708 (High Pitch) HAB-4707 (Low Pitch)
Horn Relay: Auto-Lite HRL-4104 (1954), RAF-4001 (1955)

ENGINE

Model	Bore	Stroke	Displacement
1954-55	3¼"	4 5/8"	230.2 cu.in.

Model	Compr. Ratio	Rated HP	Developed HP
1954	7.25-1	25.35	110 at 3600 RPM
1955	7.40-1	25.35	123 at 3600 RPM

Compression & Vacuum Reading—*See TUNE-UP*

ENGINE REMOVAL: *See "Engine" in Dodge Special Data*
►*MANIFOLD INSTALLATION CAUTION:* Two long capscrews extend into cylinder block water passage. Before installing, apply sealer to these capscrews. It is important that conical washers at flange ends of exhaust manifold be installed to permit expansion and contraction without loosening
OIL PAN REMOVAL: Drain engine oil. As soon as oil is drained, install drain plug and tighten securely. Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal. Remove oil level indicator and drop pan on tie rod. Lift up oil strainer so it clears baffle inside pan. With strainer lifted, slide pan to rear and remove. NOTE—New end gaskets should protrude 1/4" to 1/8" above oil pan. *Ends must not be cut off.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.
►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*
Weight—16 ozs. (stripped).
Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance .0015-.002" between thrust face of piston and cylinder bore. With piston pin and rings removed, cylinder wall and piston dry and clean, insert piston, upside down, into cylinder bore, with feeler stock, .002" x 1/2", inserted between cylinder wall and piston, on high spot of piston contour. Pull to withdraw feeler should be 6-10 lbs.

Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.
Installing Pistons: "U" slot away from valves.

PISTON PINS

Full floating type.
Diameter—55/64". **Length**—2-3/4".
Pin Fit in Piston—.0000-.0005". DOUBLE THUMB push fit at room temperature (70° F.)
Pin Fit in Rod Bushing—.0001-.0002". Tight thumb push fit at room temperature (70° F.)
Replacement Pins: Std., .003", .008" oversize.
NOTE—Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (#3)	5/32"	.010-.020"	.001-.0025"
Oil (#4)	5/32"	.010-.020"	.001-.003"

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Replacement Rings: Std., .010", .020", .030", .040", .050", .060" oversize.

Installing Rings: #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center to Center)—7-13/16". **Weight**—27.9 ozs.
Crankpin Journal Diameter—2.0625".
Maximum out-of-round and taper limits—.001"
Lower Bearings—Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION. (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below.*

Clearance—.0005-.0015".
Endplay—.006-.011".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std., .001", .002", .010", .012" undersize.

Installing Rods: Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Four bearing.
Bearing Type—Removable, precision type, thin babbitt on steel. No shims.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows **.010" UNDERSIZE (All Main & Connecting Rod Journals)**—Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" undersize.
Clearance—.0005-.0015" desired.

Replacement Bearings: Std., .001", .002", .010", .012" undersize.

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data*

End Thrust: Taken by flanged faces on rear (#4) main bearing. **Endplay**—.003-.007".

CAMSHAFT

Journal Diameters—(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".
Bearings—Removable, steel-backed babbitt lined bushings (exc. #4—machined in crankcase).
Clearance—.001-.003". NOTE—If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain: Width—1". **Pitch**—.500". **Length**—24" or 48 links.

Camshaft Setting: Sprockets marked. Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Dodge Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data*

VALVES

Tappet Clearance: .010" Intake. .010" Exhaust (engine hot and idling). NOTE—.002" additional clearance on exhaust tappets if car driven at continuous high speed.

Valves	Head Diam.	Stem Diam.	Length
Intake	1-17/32"	.340-.341"	4-27/32"
Exhaust	1-13/32"	.340-.341"	4-25/32"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	23/64"	.001-.003"
Exhaust	45°	23/64"	.003-.005"

Valve Seat Width—1/16-3/32". Runout .0015" maximum.

►*VALVE SEAT INSERT CAUTION See "Valve System" in Dodge Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance (See Valve Stem Clearance above). *CAUTION—Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*

Valve Springs: Install with closely coiled end up.
Free Length—2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1-3/4"
Valve Open	110-120 lbs.	1-3/8"

Valve Lifters: Mushroom type (remove from below).
Stem Diameter—5/8". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".
Lifter Clearance in Block—.000-.001".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves—Open 12° BTDC. Close 44° ALDC.
Exhaust Valves—Open 50° BLDC. Close 6° ATDC.
Valve Timing Check—With .014" (Cold) tappet clearance, No. 6 intake valve should open with No. 6 piston 12-13° BTDC or .0766-.0770" BTDC. Reset tappet clearance to .010" HOT running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one additional quart when filter changed.

Normal Oil Pressure: 40-50 lbs. at 25-30 MPH.
Oil Pressure Relief Valve—Oil pressure relief valve opens at 45-55 lbs. Under plug on left side of crankcase below starting motor. Provides additional oil at idling speeds. Adjustable by replacing springs (3 types). (1) Standard spring is not painted. (2) Lighter than standard painted RED. (3) Heavier than standard painted GREEN. When replacing springs, same color springs should be used.

Oil Pressure Gauge—Auto-Lite 13451A (Early 1954), 13587A (Late 1954), 13790A (1955). Not electric

Oil Pump: Rotor type on right side of crankcase
Overhaul—*See "Oiling System" in Dodge Special Data*

Oil Filter: By-pass type. On left side of engine above starter.
Servicing—Install new filter element and cover gasket at 8000 mile intervals (more often in dusty areas). Change oil at same time filter is changed.

Crankcase Ventilation Filter in oil filler tube and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 14 qts (1954), 13 qts (1955) Add one quart if equipped with heater

Pressure Valve: Dodge No. 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cylinder head water outlet. Starts to open at 159-165° F.

Water Pump: Packless type. Grease fitting for lubrication.
See "Water Pumps" in Dodge Special Data.
Pump Removal—Drain cooling system, remove fan belt, disconnect hoses at pump, remove pump mounting studs. Remove pump.

Water Distribution Tube: *See "Cooling System" in Dodge Special Data*

Temperature Gauge—Auto-Lite 13452A & 13588A (Early 1954), 13591A (Late 1954), 13791A (1955) *NOTE*—Early 1954 types are not electric Late 1954 & 1955 are electric type

CLUTCH

►*CLUTCH PEDAL CLICKING SOUND OR CLUTCH SLIPPAGE CORRECTION (When Due to Interference Between Rear End of Clutch Release Fork Rod & Clutch Release Fork)* To correct, rod end should be reworked to eliminate shoulders of rod end forward of attaching eyelet

1954 Clutch Application

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	957	CD728
Overdrive	10A7	957	382139
Gyro-Matic	9A7	952	CD756
Heavy Duty	11A6	931	381850

1955 Clutch Application

Borg & Beck	Model	Assy. No.	Disc No.
Standard	9A7	361373	382237
Heavy Duty	10A7	361368	381758
Heavy Duty (Spl)	11A6	929	381850

See "Borg & Beck" & "Auburn" Clutches in Clutch Section.

Pedal Free Play Adjustment: Adjust fork rod to secure 1/8-5/32" free movement of clutch fork outer end This adjustment will provide 1" free pedal movement at pedal pad

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Ov r-C nt r Spring Adjustm nt (1954 Models): Adjust clutch pedal stop screw and rear mounting of over-center spring so as to locate the centerline of the over-center spring at 5/16-11/32" above centerline of clutch pedal shaft when pedal stop screw is in contact with the stop Adjust over-center spring so as to obtain 12-15 lbs pedal pressure required to hold clutch in released position after approximately 1" return of the clutch pedal pad from a full clutch release pedal travel position

Ov r-C nt r Spring Adjustm nt (1955 Models): *(NOTE*—Over-Center spring located above brake pedal and attached to pedal mounting bracket) Disconnect clutch pedal pushrod Remove over-center eyebolt adjusting nut Reinstall adjusting nut, tighten finger tight then further tighten four complete turns This adjustment will require 12-15 lbs pressure to hold clutch pedal down when it is 1" from fully released position

Removal: Remove transmission or transmission and overdrive (See Synchro-mesh Transmission). Remove clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. Se *"Dodge Synchro-mesh" Transmission in Transmission Section.*

Transmission Contr ls: *See "Transmission Controls" in Transmission Section.*

►*HARD SHIFTING CORRECTION* Check for interference between gear shift lever and transmission cover If found, replace manual remote gearshift lever shaft screw, Part No 853877 *(NOTE*—Before installing screw, it should be tested for proper hardness with a standard mill file Only screws which are **not** file soft should be installed) If interference not found at point indicated above, check for interference between gearshift rod and lower edge of instrument panel In most cases, condition can be corrected by realignment of steering column jacket In some cases it may be necessary to provide adequate clearance by filing out lower edge of instrument panel

Rem val: Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission to be disassembled). Disconnect speedometer cable, hand brake cable, gear shift rods. Remove nuts holding transmission to clutch housing. Then remove transmission by pulling it back, down, and out of car.

OVERDRIVE

Warn r Typ R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.
See "Warner R10" Overdrive in Transmission Section.

Ov rdrive Controls: *See "Ov rdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

GYROMATIC TRANSMISSION

Own. Semi-automatic, 4-speed transmission with hydraulic actuation and electrical control
See "Dodge Gyro-Matic" Transmission in Transmission Section

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dodge Gyro-Matic" Transmission in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Dodge Gyro-Matic" Transmission in Transmission Section*

Lubrication: Check oil level in transmission every 1000 miles or 30 days, drain and refill every 10,000 miles or once a year, maintain oil level even with bottom of filler plug hole **Capacity**—3 pints
Recommended Oil—SAE 10-W

►*OTHER "DODGE GYRO-MATIC" SERVICE DATA: See "Dodge Gyro-Matic" Transmission in Transmission Section*

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake, place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator

Oil Filler Tube (Location)—At right rear of engine compartment.

CAUTION. To prevent dirt from entering transmission make sure oil level indicator is properly seated in filler tube.

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball and Trunnion Type.

►*UNIVERSAL JOINT BOOT NOTE* A new, larger boot is used on the rear universal joint and can be identified by a daub of white paint on it In service, larger boot can be used on both front and rear joints, but small boot should **nev r** be used on rear universal joint as boot failure is very likely to result

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive.
See "Dodge Hypoid" in Rear Axle Section.

Transmission	Rear Axle Ratios
Standard	3.9-1 (39-10)
Overdrive	4.3-1 (43-10)
PowerFlite	3.73-1 (41-11)
Gyro-Matic	3 9-1 (39-10)

Backlash—.006-.010".

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-675), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller). *NOTE*—Use Puller C-293-E to remove bearing from shaft, Puller C-748 or C-358 to remove inner oil seal, Drift C-201 to install seal.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick (equally at both wheels). **Endplay**—.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement.

Model	Front	Rear
1954 (Exc D51-A)	1450630	1450633
1954 (D51-A)	1326164	1326166
1954 (Heavy Duty)	1450041	1450635
1954 (Sp Hvy Duty)		1450075
1955 (All Models)	1614404	1450918
1955 (Heavy Duty)	1617004	1450920
1955 (Sp Hvy Duty)		1450037

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers
See "Dodge" in Front Suspension Section

Kingpin Inclination—5° to 6½° (1954) 5½° (1955), at 0° Camber

Caster (1954)—Neg 1° to Pos 1° (0° preferred)

Caster (1955)—Neg 2° to 0° (Neg 2° preferred with Manual Steering, 0° preferred with Power Steering)

NOTE—On Power Steering Cars, **left side** should be 0° to ¾° more negative than right side

Camber (1954)—Pos 3/8° to Neg 3/8° (Left side ¼° to ½° greater than right side within these limits)

Camber (1955)—Pos ¼°±3/8° (Left side Pos ½°, Right side 0° preferred)

Toe-In—0" to 1/16" (0" preferred)

T -out n Turns—With outer wheel at 20° inner wheel should be 21½°±1°

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STEERING

Manual: Gemmer. Worm & Roller
See "Gemmer Worm & Roller" in Steering Section

P wer Steering (1954): Linkage type, used with standard steering gear
See "Monroe Power Steering (Linkage Type)" in Steering Section

P wer Steering (1955): "Co-axial" type with combined steering gear and power unit
See "Dodge Co-Axial Power Steering" in Steering Section.

►*1955 JERKY OPERATION OF POWER STEERING GEAR CORRECTION:* Adjust generator drive belt (see Generator), then adjust fan drive belt so that a maximum of ¼" belt deflection is obtained when applying a 10 lb pull with spring scale at middle of widest belt span

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

►*LOOSE OR SQUEAKY BRAKE PEDAL OR PAD CORRECTION.* Change location of attachment of brake pedal return spring from right side of pedal bracket to left side (Standard & Overdrive), left side to right side (PowerFlite), and attach in hole provided in bracket. On PowerFlite cars, if excessive movement or squeak is encountered in pedal pad, remove brake pedal and make several prick punch marks on pedal at pedal pad mounting bracket location to improve clamping action, re-install pad, tighten retaining bolt to 20 ft lbs

S rvice: Dodge "Safe-Guard" Lockheed Hydraulic
See "Dodge Safe-Guard" in Brake Section.

Drums– Cast iron (1954) Diameter 10"(Exc-D51-2), 11" (D51-2) (1955) 11" (All models)

Wheel Cylinder Diameter–1-1/8". Single acting (front), double acting (rear wheels).
Replacement Linings & Shoes–Lining or shoes with linings are furnished Standard and .030" Oversize.
Lining–Molded asbestos (bonded to shoe).

	Lining Length			
	Front Wheel		Rear Wheel	
Model	Pri.	Sec.	Pri.	Sec.
1954(Exc D51-2)	10 5"	10 5"	10 5"	8 0"
1954 (D51-2)	11 5"	11 5"	11 5"	8 8"
1955 (All Models)	11 5"	11 5"	11 5"	8 8"

Width–2" Thickness– 200"
Braking Power–60% Front 40% Rear
Clearance– 006" at end of all shoes

Master Cylinder: On frame at base of brake pedal (1954) On engine side of dash panel opposite base of brake pedal (1955)
Checking Fluid–Access hole at left of front floor pan (1954) At top of master cylinder on dash in engine compartment (1955).
Removal (1954)–Remove floor mat and toe board and disconnect pushrod Remove horseshoe clip and slide brake pedal off shaft Disconnect brake line tubes at master cylinder fittings Remove bolts from master cylinder body Cylinder can then be lifted off frame bracket

Removal (1955)–Disconnect pushrod Disconnect brake line tubes at master cylinder fittings Remove four stud nuts and remove cylinder

Power Brakes· Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder *See "Dodge Power Unit" in Brake Section*

Removal of Power Unit–Same as for standard master cylinder, after hydraulic lines and stop light wires removed

Parking Brak : On shaft at rear of transmission. 6" external-contracting type used with Synchro-mesh Trans. 7" internal expanding type used with PowerFlite Transmission

Adjustment–*See "Hand Brake Notes" in Dodge Special Data.*

Lining–	Width	Thickn ss	Length
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (External Type)–.015-.020" around band.
Internal Type–Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite electric type as follows·

Model	Aut -Lit N .
1954 (D51)	①EMD-4003A
1954 (D51)	②EMG-4102A
1954 (D52)	①EMD-4003
1954 (D52)	②EMG-4102A
1955 (Early)	①EMU-4101
1955 (Early)	③EMZ-4001
1955 (Late)	①EMU-4101A
1955 (Late)	③EMZ-4001A

①–Single Speed ②–Two Speed ③–Variable Speed
See "Auto-Lite" Electric Windshield Wipers in Misc l-laneous Section.

Air Conditioning: Dodge "Airtemp". *Se "Airtemp" Air Conditioning in Miscellaneous S ction.*

Power Window Regulators: Electric type Reversible type motors in each window Controlled by door switch and master switch *See "El ctric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters: Electric type. *S "P w r S at Adjusters" in Miscellaneous S ction.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

1954 MODELS

Series	Model
Meadowbrook	D50-1, D50-1A
Coronet	D50-2
Royal	D50-3, D53-3
Sierra	D53-2

1955 MODELS

Series	Model Identification
Coronet	D-55-1
Royal	D-55-2
Custom Royal	D-55-3

SERIAL NUMBER: On left front door hinge post

1954 Starting Serial Numbers

Model	Detroit	San Leandro
D-50-1A	32,152,901	45,105,801
D-50-1	34,642,001	42,510,001
D-50-2	34,642,001	42,510,001
D-50-3	34,642,001	42,510,001
D-53-2	38,525,001	47,003,001
D-53-3	38,525,001	47,003,001

1955 Serial Nos.

Mod l	Detroit	Los Angeles
D-55-1,2,3	34740001	42518001

ENGINE NUMBER: Stamped on boss on top front side of block just back of water pump

Starting Engin Number - D50-1001 (1954), D55-1-1001 & D55-3-1001 (1955)

►*ENGINE NUMBER LETTERS. (Following Engine Number)–Identified as follows.*

"A"–ALL cylinders .020" oversize.

"B"–ALL Main & Connecting Rod Bearings .010" undersize.

"AB"–BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 135-165 lbs. at cranking speed of 150 RPM

VACUUM READING: Steady 18-21" idling.

VALVE TAPPET CLEARANCE: No adjustment required, except when valves are reconditioned (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic coil type, located in exhaust manifold of right cylinder block. Valve must operate freely When installing coil, position shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer (tongue) end of spring below shaft, horizontal and facing front of engine Press inner end of coil into slot and seat firmly Now move outer (tongue) end up, around (counter-clockwise) and hook under left stud (toward rear of engine)

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders–RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plug - Auto-Lite resistor type No. 4S-140 (1954), 4S-165 (1955). 14 mm. Torque to 30 ft lbs

COIL: Auto-Lite No. CR-6015 (1954), CR-6012C (1955).

Ignition Current - 2.25 amps idling, 5.0 amps stopped

DISTRIBUTOR: Auto-Lite No IAZ-4003A (Early 1954), IAZ-4003B (Late 1954), IAZ-4003C (D-55-1,2) & IAZ-4003D (D-55-3)

Condenser–Auto-Lite IBB-2015R. **Capacity**–.25-.28 microfarad.

Contact Point Set–Auto-Lite IGP-3028ZS.

Breaker Gap–.015-.018". Set maximum gap to .017".

Cam Angle–34° ± 3° with both sets of contacts. Do not adjust contact gap outside limits to obtain specified cam dwell.

Breaker Arm Spring Tension–17-20 ozs.

Rotation–Clockwise viewed from above.

Automatic Advance–IAZ-4003A

Degrees	Distr. R.P.M.	Degrees	Eng. R.P.M.
Start	350	0	700
1	425	2	850
2	500	4	1000
10	1500	20	3000
11	1625	22	3250

Automatic Advance–IAZ-4003B

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	375	2	750
3.5	450	7	900
14	1550	28	3100
15	1650	30	3300

Automatic Advance–IAZ-4003C

Degrees	Distr. R.P.M.	Degrees	Eng. R.P.M.
Start	350	0	700
1	370	2	740
5	450	10	900
17	1800	34	3600
18	1900	36	3800

Automatic Advance–IAZ-4003D

Degrees	Distr. R.P.M.	Degrees	Eng. R.P.M.
Start	350	0	700
1	375	2	750
4	450	8	900
11	1475	22	2950
12	1625	24	3250

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IAZ-4003A,B,C,D

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-1/4
1	2	6
5	10	9-1/4
10	20	14-7/8
11.5	23	17

Distributor Basic Timing & Drive Shaft Bushing: See *"Ignition Notes" in Dodge Special Data*

IGNITION TIMING

Setting–4° BTDC See Manual Adjustment below.

Timing Mark–On fan drive pulley Marks are 2° apart.

Manual Adjustment–Timing may be advanced with some premium fuels. Range of timing should not exceed plus or minus 4° from recommended factory setting.

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg 2-Barrel Carburetor is standard equipment. Carter 4-Barrel Carburetors used as special equipment.*

STROMBERG 2-BARREL WW

►*CARBURETOR PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. Later carburetors ("A", "B", "C" Coding) have different jet calibration and specifications See "Stromberg WW (Dodge)" in Carburetor Section*

Model	Stromberg No.
1954 Synchro-mesh	3-108A
1954 Overdrive②	3-109A
1954 PowerFlite①	3-105A

① - Slow closing throttle dashpot.

② - Kick-down switch

D-55-1, 2	
Synchro-mesh	WW-3-131, 131A
Overdrive	WW 3-132, 132A
PowerFlite	WW 3-133, 133A, 133B
D-55-3	
Synchro-mesh	WW 3-120, 120A, 120B
Overdrive	WW 3-121, 121A, 121B
PowerFlite	WW 3-122, 122A, 122B, 122C

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting–1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed–450-500 RPM (Std & O.D.) 475-500 RPM (PowerFlite) with selector lever in Neutral.

Float Level–3/16" from top of main body to top of float measured at center of float, with float lip held firmly against needle valve. Use depth gauge or tool T-25569 to measure float level. To reset float level, bend float lever next to float (use Tool T-24733).

Accelerating Pump–Normal setting, center hole, for less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle (1954): To make adjustment, insert gauge T-25570 (1st Step) between short side of choke valve and air horn. Hold choke valve lightly against gauge and slowly close throttle. Top end of fast idle lever should just enter first step on fast idle cam. To adjust, place thumb on counterweight and bend fast idle cam lever ear as required.

Fast Idle (1955): With throttle valves fully closed turn throttle stop screw in until it just contacts throttle lever and then turn stop screw in 4-1/2 turns. When properly adjusted, a #59 drill gauge should just pass between throttle valve and wall of throttle body With choke valve closed and throttle lever held against throttle stop screw, a #48 drill gauge should just fit clearance between ear on contact lever and first step of fast idle cam. To adjust, bend cam contact ear.

Automatic Choke Setting: (1954) Centered (arrow on edge of cover aligned with boss on air cleaner end of housing). **(1955)** 2 Points Lean.

Kickdown Switch Adjustment (1954 Overdrive): Adjust switch position on bracket by backing off one locknut

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on mounting stem and tightening opposite nut until "B" contacts (Terminals on opposite end from plunger) are closed with throttle valves wide open (use test lamp connected to switch terminals to check operation).

Kickdown Switch Adjustment (1955 Overdrive): With throttle valves in wide open position, there should be 1/64-1/32" clearance between ear on throttle lever and threaded section of switch housing. To adjust, loosen adjusting nuts and adjust to correct position.

Slow Closing Throttle (Dashpot) Adjustment (PowerFlite): With throttle stop screw set for normal idle speed, clearance between end of dashpot plunger and ear on throttle lever should be 1/16-3/32" with dashpot plunger pushed in to the end of its stroke Adjust by loosening locknut and turning dashpot assembly in or out of the bracket

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section*

►*OTHER DATA: See "Stromberg WW (Dodge)" in Carburetor Section*

Fuel Pump Pressure: 3½-5½ lbs. (1954), 5-6½ lbs. (1955).

CARTER 4-BARREL WCFB NOS. 2181S, 2191S, 2253S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting–1/2–1-1/2 turns open. For richer mixture, turn screws out.

Idle Speed–450-500 RPM (Std & O D), 475-500 RPM (PowerFlite) with selector lever in Neutral

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

►*OTHER DATA: See Carter "WCFB 4-Barrel" in Carburetor Section*

CARB. EQUIPMENT

Fuel Pump: AC or Auto-Lite. Diaphragm type

Replacement Pump - Auto-Lite No FB-4002 (1954), AC No. 4280 or Auto-Lite No. FB-4006 (1955).

Pressure - 3½-5½ lbs (1954), 5-6½ lbs (1955).

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite. Electric. 1 & 2 wire types

Model	Dash Unit No.	Tank Unit No.
1954 (Exc. Suburban)	① 13454A	12617A
1954 (Suburban)	② 13457A & 13529A	③ 12904A
1955 (Exc. Suburban)	13792A	13974A
1955 (Suburban)	13816A	13905A

① - Early Models only. Later No. 13584A.

② - Early Models only. Later No. 13586A.

③ - Early Models only. Later No. 13514A

NOTE - All Suburbans are 2 wire (thermostatic) types

See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite 1H-105-D or Willard HW-1-105-C. 6 volt, 15 plate, 105 ampere hour rate.

Grounded Terminal–Positive.

Engine Ground–Left front of engine.

STARTER

Auto-Lit MCH-6206 (1954), MCH-6305 (1955).

Armatur - Auto-Lite MCH-2088

Drive–Bendix "Folo-thru" type.

Rotati n–Counter-clockwise at commutator end.

Brush Spring T nsion–42-53 ozs. (with new brushes).

Performance Data

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4300	5.0	65
6 ft. lbs.	Lock	2.0	335

Starting Switch: Auto-Lite SST-4006A (1954), SST-4006 (1955 Std.), SST-4013 (1955 PowerFlite). Magnetic switch controlled by ignition switch. Neutral safety switch mounted on transmission of automatic transcars. *See "Starter Controls" in Electrical Section.*

Neutral Safety Switch Adjustment: *See "PowerFlite Transmission" in Transmission Section.*

GENERATOR

1954 Models

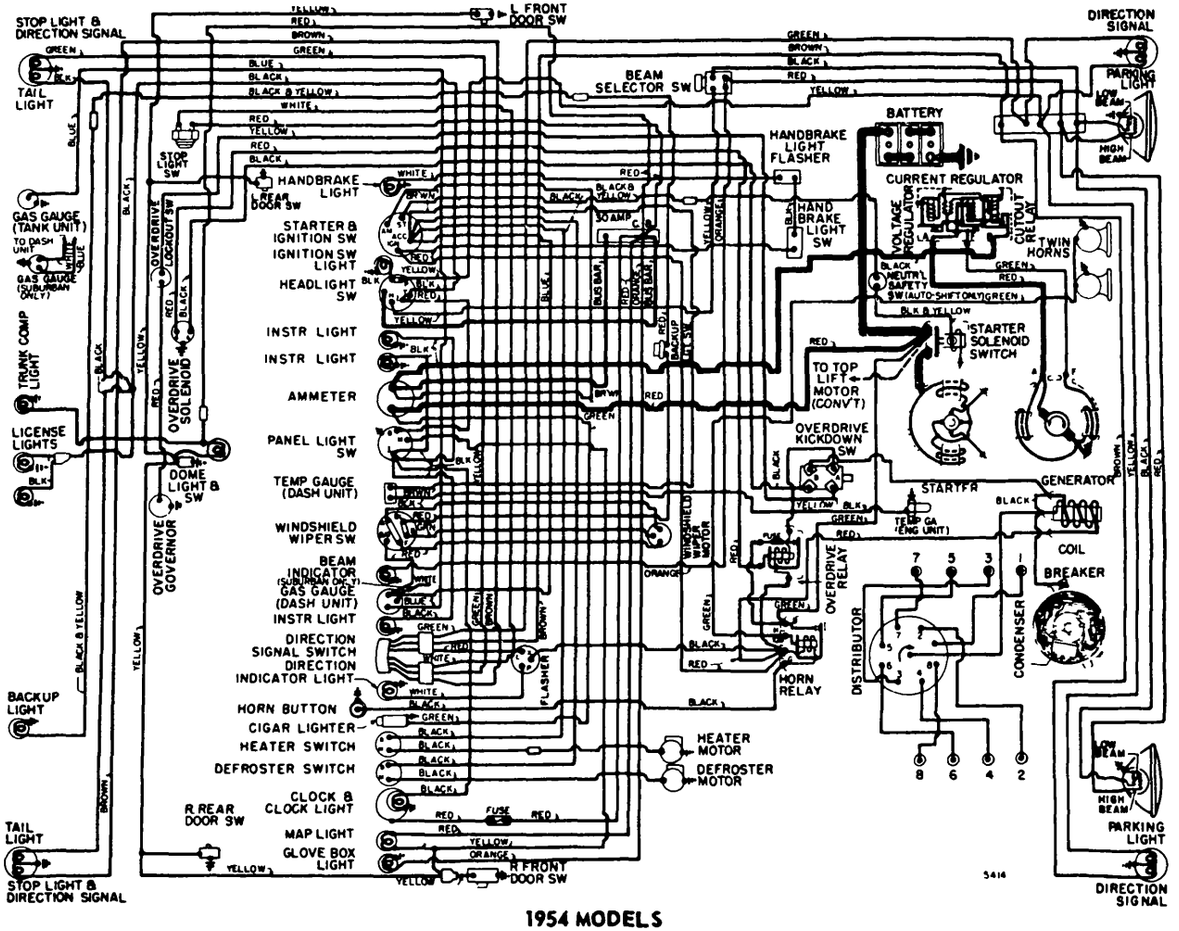
Auto-Lite Generator No.	Armature No.
GGW-6012A, B (Standard)	GGW-2006F
GGW-6014A, B (Power Steering)	GGW-2045F
GGU-6008A, B (Special)	GGU-2063F
GGU-6006A, C (Special Power Steering)	GGU-2042F
GGU-6010B (Special Power Steering)	GGU-2042F
GGJ-6005A (Special)	GGJ-2101AF

1955 Models

Auto-Lite Generator No.	Armature No.
GGW-6012-B (D55-1, 2 Std)	GGW-2006F
GGW-6001-J (D53 Std)	GGW-2006F
GGJ-6005-A, D (D55-1, 2 Spec Equip)	GGJ-2101AF
GGU-6001-G (D53 Spec Equip)	GGU-2006F
GGJ-6001-F (D53 Spec. Equip)	GGJ-2101AF
GGW-6016-A (Pow St.)	GGW-2090F
GGU-6013-D (Pow St)	GGU-2071F
GGW-6016-E (Pow St Can)	GGW-2090F
GGW-6017-A (Air Cond)	GGW-2098F
GGU-6008-C (Air Cond)	GGU-2063F
GGJ-6001-K (Air Cond.)	GGJ-2101AF
GGW-6016-C (A.C & Pow St)	GGW-2090F
GGU-6013-C (A C. & Pow St)	GGU-2071F
GGW-6016-F (A.C. & Pow St Can)	GGW-2090F

►*SPECIAL GENERATOR NOTE.* GGJ, GGU, and GGW type generators used Performance specifications below apply equally to all generators, within any one of these groups

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1954 MODELS

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Performance Data—GGJ

Amperes	Volts	Cold – R.P.M. – Hot
0	6.4	600-700 — 650-750
50	8.0	1400-1600 — 1550-1750
55	8.0	1500-1700 — 1650-1850

Performance Data—GGU

Amperes	Volts	Cold – R.P.M. – Hot
0	6.4	750-850 — 800-900
45	8.0	1450-1650 — 1650-1850
50	8.0	1550-1750 — 1750-1950

Performance Data—GGW

Amperes	Volts	Cold – R.P.M. – Hot
0	6.4	870-970 — 950-1050
40	8.0	1800-2000 — 2150-2350
45	8.0	1925-2125 — 2350-2550

Brush Spring Tension—(GGJ) 34-41 ozs., (GGU, GGW) 35-53 ozs., with new brushes.

Field Current—(GGJ) 1.4-1.7 amperes, (GGU) 1.4-1.6 amperes, (GGW) 1.6-1.7 amperes, all at 5.0 volts.

Motoring Current—(GGJ) 4.1-4.6 amperes, (GGU) 5.0-6.0 amperes, (GGW) 5.0-5.5 amperes, all at 5.0 volts.

Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Loosen generator adjusting strap and generator-to-generator bracket mounting bolts. With Tool C-3379 hooked over generator and a torque wrench attached to tool, apply torque of 45 ft. lbs. (new belt), 27 ft. lbs. (old belt), to pull generator outward. While holding generator outward at required torque, securely tighten generator mounting bolts and adjusting strap.

REGULATOR

Auto-Lite Regulator No.	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A	GGW

Cut out Relay

Cuts In—6.3—6.8 volts.

Cuts Out—4.1—4.8 volts.

Contact Gap—.015" minimum.

Air Gap—.031—.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting—7.1—7.4 volts at 70° F. *after 15 minutes operation charging at 1/2 maximum rate.*

Air Gap—.048—.052" with contacts just opening.

Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A—Operating Amperes	Test B
VBE-6001A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VAV-6001B, 2B	50	50 (48-52)

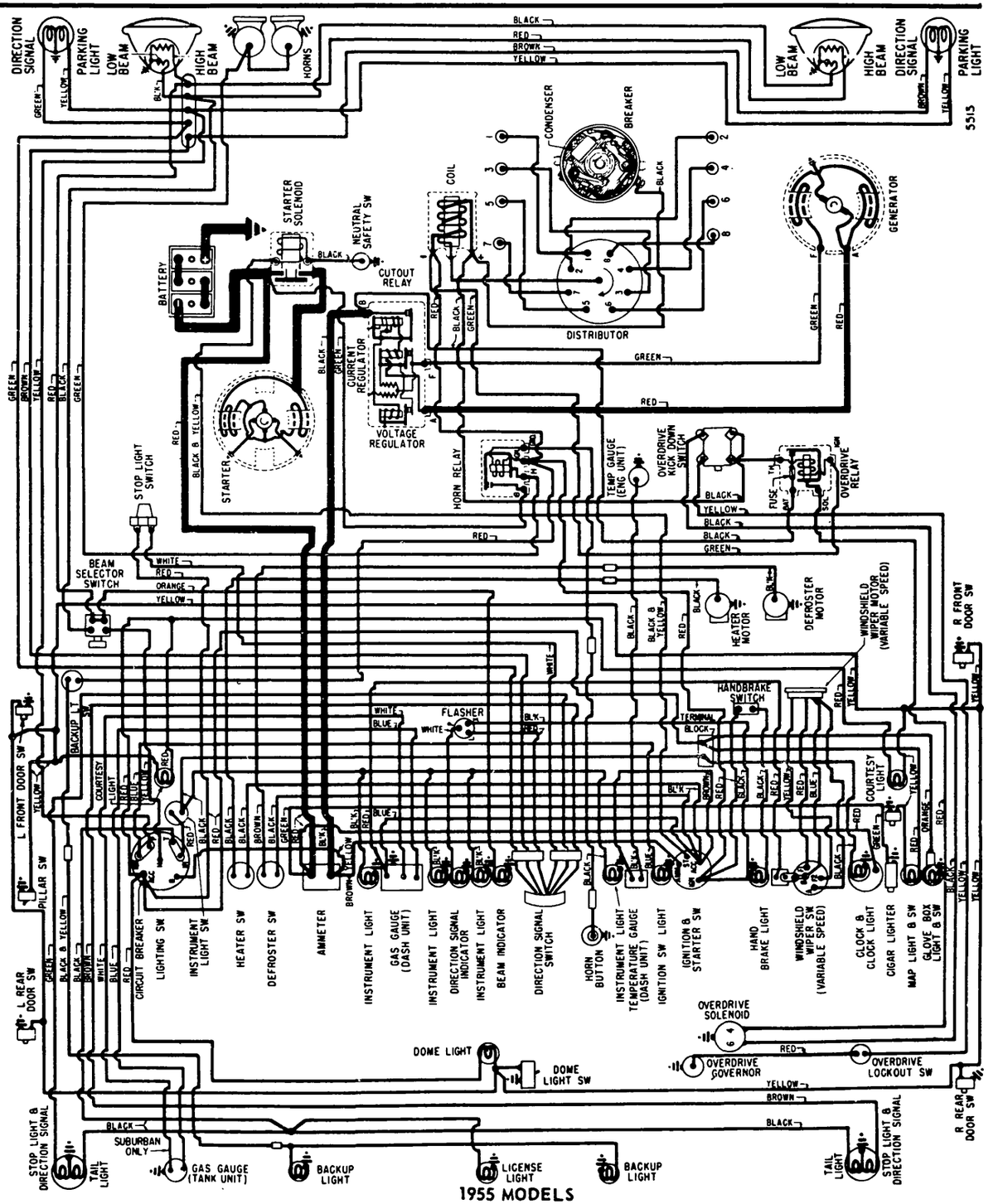
Test A—After 15 minutes operation charging at 1/2 maximum rate.

Test B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7—6.9 volts (VAV, VBE), 6.7—7.0 volts (VBF).

Air Gap—.048—.052" with contacts just opening.

Checking & Adjusting—*See Electrical Equip. Section.*

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MISC. ELECTRICAL

Headlamps: Sealed Beam. See *Electrical Equip. Section.*
Direction Signal: See *Electrical Equip. Section.*

►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal* **only** *on ignition-starter switch and* **not** *the ammeter terminal post.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft Headlamp knob is held on its shaft by means of a recessed hex screw

Stop Light Switch Location: (1954) In brake line fitting on frame left side rail
(1955) On forward end of master cylinder
FUSES: Clock - 3 amperes Located on clock
Radio - 14 amperes At ignition terminal feed
Overdrive - 20 amperes. On overdrive relay
CIRCUIT BREAKERS: Lighting - (1954) 30 ampere, located to right of ammeter, protects lighting circuits
(1955) Located in headlight switch assembly Three in number as follows
25 Ampere - Protects headlights, high beam indicator light, and parking lights
10 Ampere - Protects tail lights, license plates lights, clock light, and instrument panel light
10 Ampere - Protects stop lights, map light, dome light, glove box light, courtesy light, and trunk compartment light and windshield wiper (latter located on wiper switch and also protects back-up lights)
HORNS: Auto-Lite. Twin horns with relay
Horn Relay - Auto-Lite No HRL-4104 (1954), RAF-4001 (1955)

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

►*TWO ENGINES USED AS FOLLOWS* **D-55-1, 2 Red Ram**—Polyspherical combustion chamber with lateral valves (single rocker arm shaft)
D-55-3 Super Red Ram— Hemispherical combustion chamber with laterally inclined valves (double rocker arm shafts)

ENGINE SPECIFICATIONS: 90° V8 (All Models)

Model	Bore	Stroke	Displacement
1954	3 4375"	3 25"	241 3 cu in
1955	3 6300"	3 256"	270 0 cu in

Model	Compr. Ratio	Rated HP	Dev. HP ①
1954 Meadowbrook	7 1-1	37 8	140
1954 Coronet, Royal	7 5-1	37 8	150
D-55-1, 2 Red Ram	7 6-1	42 2	175
D-55-3 Super Red Ram	7 6-1	42 2	183
D-55-3 Sup Red Ram ②	7 6-1	42 2	193

① - At 4400 RPM
② - Special Power Pkg. (Carter 4-Bbl Carburetor and special intake manifold, and dual exhaust system)

Compression & Vacuum Reading - *See TUNE-UP*

►*1955 ENGINE PARTS INTERCHANGEABILITY NOTE* Engine parts are interchangeable on both engines with exception of Cylinder Heads, Valve Train parts, Water Pump Housing, and Hydraulic Valve Lifters as explained below

►*D-55-3 EXHAUST MANIFOLD INSTALLATION CAUTION (To Prevent Poor Gas Mileage, Carburetor Flooding or Difficulty in Restarting)* Check to see that the portion of the right bank exhaust manifold gasket that seals off the preheat chamber does NOT extend down below the exhaust manifold at choke heat tube cavity (on engine side of manifold at point opposite heat control valve)

ENGINE REMOVAL: *See "Engine" in Dodge Special Data*

OIL PAN REMOVAL: Remove oil level indicator, drain oil, disconnect steering linkage at idler arm support bracket, and allow linkage to drop. Remove bolts that hold oil pan to cylinder block and slide pan out, down, and away from engine.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data*

TIGHTENING TORQUES *See "Tightening Specifications" in Dodge Special Data*

PISTONS

Aluminum alloy, T-slot, cam ground, with skirts relieved below piston pins, and tin coated.

►*CYLINDER BORE OVERSIZE CAUTION. Engines with letter "A" following engine number indicates that cylinder bores are .020" Oversize.*

Weight - 16 4 ozs (1954), 16 2 ozs (1955) stripped
Removal - Pistons and rods removed from above
Fitting New Pistons: Clearance 00075- 00175" (1954) 001" (1955) between thrust face of piston and cylinder wall Coat bore with light engine oil (SAE 10) Insert piston in bore upside down with feeler stock 0015" x ½" between thrust face of piston and cylinder wall Pull to withdraw feeler should be 5-10 lbs at 70°F

Replacement Pistons. Std., .010", .020", .030", .040", .060" Oversize.

Installing Pistons: The notch on top of piston must point toward front of engine. NOTE—Assemble pistons to the rod on right hand cylinder bank with the "V" slot in connecting rod aligned with the "T" slot in piston. On left hand cylinder bank "V" slot in rod must be opposite "T" slot in piston.

PISTON PINS

Floating type with lock ring at each end.
Diameter—.8591—.8593". **Length**—2.880—.2.890".
Pin Fit in Piston—.0000—.0005". Tight thumb press fit at 70° F.
Pin Fit in Rod Bushing—.0001—.0004". Tight thumb press fit at 70° F. Selective fit.
Replacement Pins: Std., .003", .008" Oversize.
NOTE—Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	.0775—.0780"	.007—.015"	.0015—.0030"
Compr. (#2)	.0775—.0780"	.007—.015"	.0010—.0025"
Oil (#3)	.1860—.1865"	.007—.015"	.001—.003"

Replacement Rings: Furnished in sets Standard, .010", .020", .030", .040", .060" Oversize.
Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length (Center to Center)—5.9335—5.9375". **Weight**—21.14 ozs. (600 grams).
Crankpin Journal Diameter—1.9365—1.9375".
Maximum out-of-round and taper limits—.001".
Lower Bearings—Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below.*

Clearance—.0005—.0015". Maximum—.0025".
Endplay—.006—.014".
Bearing Adjustment—None. Replace bearings.
Replacement Bearings: Std., .001", .002", .003", .010", .012" Undersize.
Installing Rods: *See "Pistons (Installation)" above.* Rods are chamfered on one side at bearing insert and must be installed with chamfer toward crankshaft fillet. "V" slot across one bolt hole of each bearing cap is an oil passage for lubricating the opposite cylinder wall and piston. When installing bearing cap make certain "V" slot oil passage is toward top of engine.

►*CAUTION* Rods are **interchangeable**. However, when rods are assembled to piston, the assemblies of one engine bank **are not interchangeable** with the other bank.

CRANKSHAFT

Journal Diameter—2.3745—2.3755".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION. Engines with undersize journals identified as follows.*
.010" UNDERSIZE (Main & Connecting Rod Journals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.
Bearings—Removable, precision type, steel-backed, babbitt lined. No shims.
Replacement Bearings: Std., .001", 002", .003", .010", .012" Undersize. Halves of Nos. 1, 2, and 4 bearings are interchangeable with one another (caps are not interchangeable), upper and lower halves of No. 3 bearing are interchangeable, No. 5 halves are NOT INTERCHANGEABLE.
End Thrust: Taken by center (#3) main Bearing.
Clearance— 0005- 0015"
Endplay— 002- 007" Maximum 010"
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data*

CAMSHAFT

Journal Diameters—(1) 1.998—1.999", (2) 1.982—1.983", (3) 1.967—1.968", (4) 1.951—1.952", (5) 1.4355—1.4365".
Bearings—Removable, steel-backed, babbitt lined bushings.
Clearance—.001—.003". Maximum—.005".
End Thrust: Taken by thrust plate behind camshaft sprocket hub.

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Endplay—.002—.006". Maximum—.010".

Timing Chain: Width—1-1/8". **Pitch**—.375". **Length**—68 links.

Camshaft Setting: Place crankshaft "Zero" mark exactly in line with center of camshaft. Temporarily install camshaft sprocket less chain, line up dowel pin holes in hub and gear, while at the same time positioning camshaft gear "Zero" mark exactly in line with center of crankshaft. (A straightedge should be used to check accuracy of this alignment). Remove camshaft gear and engage with timing chain. Place timing chain over crankshaft gear and at the same time, slide the camshaft gear over end of camshaft, keeping timing mark in position. With timing marks aligned, push gear on camshaft, install fuel pump eccentric. Install nut and tighten to 120-130 ft. lbs. torque.

Camshaft Removal. *See "Camshaft & Bearings" in Dodge Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Dodge Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data*

VALVES

Tappet Clearance. None in service (hydraulic).

►*CAUTION Different Valves, Valve Seals, Springs, Valve Guides, Pushrods, and Lifters used on each engine*

1954 Models & D-55-3

Valves	Head Diameter	Stem Diameter	Length
Intake	1-21/32"	.372-.373"	4-13/16"
Exhaust	1-13/32"	.371-.372"	4-3/4"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.360"	.001-.003"
Exhaust	45°	.364"	.002-.004"

D-55-1, 2 Red Ram

Valve	Head Diameter	Stem Diameter	Length
Intake	1 72"	℄ 372-.373"	4 25"
Exhaust	1 47"	℄ 371-.372"	4 20"

℄ - Std Valve *See Valve Guides below*

Valve Seat Width—.060-.085" (Intake), .040-.060" Exhaust).

Valve Stem Seals—*New type seals used on D-55-1, 2 Red Ram Engine as follows.*

D-551,2 Intake Valve Seals—"Umbrella" type rubber seal installed on valve stem inside valve spring (install seal with cup side down BEFORE installing spring retainer)

D-55-1, 2 Exhaust Valve Seals—On FIRST Cars (with two-bead locks), lubricate and install the "O" ring seal on valve stem AFTER valve retainer installed but BEFORE installing valve locks (position seal approximately 1/8 below lower valve stemlock groove) On LATER cars (with four-bead locks), seals will not be required

D-55-3 Valve Seal Nut—Seal ring used on Intake Valve stems only (same as 1954 Dodge V8)

►*VALVE SEAT INSERT CAUTION See "Valve System" in Dodge Special Data*

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3061. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

Valve Springs: Double springs used on all models with exception of D-55-1, 2 Red Ram (Single spring)

Valve Spring Specifications

D-55-1, 2

Valve	Lbs. Press	Length
Closed	53 lbs	1 69'
Open	140 lbs.	1.31"

1954 Models & D-55-3

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	20-23	1-9/16"	38-43	1-11/16"
Open	40-45	1-3/16"	100-110	1-5/16"

►*CAUTION. Spring ends must be square within 1/16". (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION.* If valves or seats are reground, check installed height of spring. If height of spring is 1-11/16" or greater, install a 1/16" spacer under valve spring

►*VALVE SPRING LOAD CAUTION Hydraulic lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.*

Valve Guides: D-55-1, 2—Guides are integral with head If valve stem clearance excessive, use tool set to ream hole to NEXT oversize and install valve with OVERSIZE stem Valves are furnished Std and 005", 015", 030" oversize

1954 and D-55-3 Models - Guides are separate pressed-in parts and serviced by replacement, reaming to size for standard valve Remove guides by driving out through top of head using tool C-3159. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3159 is flush with face of cylinder head. To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to .374-.375" with tool C-741.

►*CAUTION. Oil hole in top of exhaust guide must face up.*

NOTE—If Valve Guide Tool C-3159 is not available, drive guide in, measuring from top of valve seat as follows **Intake**—15/16". **Exhaust**—1-3/32".

Hydraulic Valve Lifters: *CAUTION—All valve lifters are hydraulic type but are not fully interchangeable on all engines*

D-55-1, 2 Lifters—Three types used Lifters identified by groove on body (groove is directly below large "V" groove at upper end of body or in land between this "V" groove and relieved section at upper end of body) *DO NOT use D-55-3 Lifters in this engine*

D-55-3 Lifters—Two types used Lifters do not have identifying grooves used on D-55-1, 2 types (above), *however, all D-55-1, 2 lifters can be used in this engine*

Diameter— 9040- 9045 **Clearance**— 0005- 0015'

Lifter Overhaul & Testing—*See "Valve System" in Dodge Special Data.*

Rocker Arm Assembly *See "Valve System" in Dodge Special Data*

VALVE TIMING

See "Camshaft Setting" under Camshaft above

1954 Models

Intake Valves - Open 17° BTDC Close 47° ALDC
Exhaust Valves - Open 55° BLDC Close 9° ATDC

1955 Models

Intake Valves—Open 14° BTDC Close 50° ALDC
Exhaust Valves—Open 52° BLDC Close 12° ATDC

Valve Timing Check: *See "Camshaft Setting" under CAMSHAFT above*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one additional quart if filter changed.

Normal Oil Pressure: 50-65 lbs with warm oil and engine operating at 1500 RPM

Oil Pressure Relief Valve - Mounted in oil pump

►*OIL PRESSURE RELIEF VALVE NOTE· Springs identified as follows*

1954 Models

Three types used in replacement or adjustment as follows 1) Standard spring painted RED 2) Lighter than standard painted GRAY 3) Heavier than standard painted BROWN

1955 Models

Three types used in replacement or adjustment as follows 1) Standard Spring painted BLACK 2) Lighter than standard painted RED 3) Heavier than standard painted GREEN

Oil Pressure Gauge: Auto-Lite No 13451A (Early 1954), 13587A (Late 1954), 13790A (1955) Not Electric

Oil Pump: Rotary type. In crankcase at rear end. Mounted on rear bearing cap.

Overhaul—*See "Oiling System" in Dodge Special*

Priming Oil Pump (After Overhaul): Prime pump before installing oil pump and strainer to rear main bearing cap.

Oil Filter: Shunt type. A portion of oil from oil pump is directed through this filter and the remainder flows directly into engine lubrication system.

Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 19 quarts (20 with heater).

Pressure Valve: Dodge 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cylinder head water outlet. Starts to open at 159-165° F.

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Water Pump: Packless type. Grease fitting for lubrication on early type only. *See Water Pump Note below. See "Water Pump" in Dodge Special Data.*

Pump Removal—Drain cooling system, remove fan, belt, and pulley. Remove four water pump attaching bolts and remove water pump.

►*WATER PUMP NOTE:* Three types used. Early pump was bushing type with lubrication fitting. Two later types are ball-bearing, which are pre-lubricated and require no additional lubrication (have no lubrication fitting).

Temperature Gauge: Auto-Lite No. 13455A (Early 1954), 13589A (Late 1954), 13791A (1955). Electric type.

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
1954	10A7	1331	382102
1955	10A7	361368	382346
Heavy Duty	11A6	929	381850

See "Borg & Beck" Clutches in Clutch Section.

►*CLUTCH PEDAL CLICKING SOUND OR CLUTCH SLIPPAGE CORRECTION (When Due to Interference Between Rear End of Clutch Release Fork Rod & Clutch Release Fork):* To correct, rod end should be reworked to eliminate shoulders of rod end forward of attaching eyelet.

Pedal Adjustment: Adjust fork rod to secure 1/8-5/32" (1954), 1/16" (1955) free movement of clutch fork outer end. Adjustment provides necessary 1" free play at pedal.

Over-Center Spring Adjustment: (*NOTE*—Over-center spring located above brake pedal and attached to pedal mounting bracket). Disconnect clutch pedal pushrod. Remove overcenter eyebolt adjusting nut. Reinstall adjusting nut, tighten finger tight, then further tighten four complete turns. This adjustment will require 12-15 lbs. pressure to hold clutch pedal down when it is 1" from fully released position.

Removal: Remove transmission or transmission and overdrive (See Synchro-mesh Transmission). Remove clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel; loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section.*

►*HARD SHIFTING CORRECTION:* Check for interference between gearshift lever and transmission cover. If found, replace manual remote gearshift lever shaft screw, Part No. 853877. (*NOTE*—Before installing screw, it should be tested for proper hardness with a standard mill file. Only screws which are not file soft should be installed). If interference not found at point indicated above, check for interference between gearshift rod and lower edge of instrument panel In most cases, condition can be corrected by realignment of steering column jacket. In some cases it may be necessary to provide adequate clearance by filing out lower edge of instrument panel

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission is to be disassembled). Disconnect speedometer cable, hand brake cable, gear shift rods. Remove nuts holding transmission to clutch housing. Then remove transmission by pulling it back, down, and out of car.

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down. *See "Warner R10" Overdrive in Transmission Section.*

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 10,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake, place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator.

Oil Filler Tube Location: At right rear of engine compartment.

►*CAUTION:* To prevent dirt from entering transmission make sure oil level indicator is properly seated in filler tube.

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball and Trunnion Type.

►*UNIVERSAL JOINT BOOT NOTE:* A new, larger boot is used on the rear universal joint and can be identified by a daub of white paint on it. In service, larger boot can be used on both front and rear joints, but small boot should **never** be used on rear universal joint as boot failure is very likely to result

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE*—"Barrel Type" differential assembly used on cars with Automatic Transmission.
See "Dodge Hypoid" in Rear Axle Section.

Transmission	Rear Axle Ratios
Std., Exc. Suburban	3.73-1
Suburban Std.	3.9-1
Overdrive	4.1-1
PowerFlite	3.54-1

Backlash—.006-.010".
Thrust Pad Clearance (Barrel Type)—.006-.008".

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, hub and drum assembly (Use puller C-845). *(CAUTION—Do not strike end of axle shaft to loosen hub; otherwise, possible damage to axle shaft bearings and thrust block might result).* Block brake pedal, disconnect brake line at wheel cylinders, remove axle shaft key, install sleeve C-757 in axle bearing outer oil seal before removing brake support plate from axle housing. Remove shims from each end of axle housing. (Each set should be kept separate so that at reassembly, central location of axle shafts, wheels and thrust block, will be assured). Remove axle shafts and bearings from housing (Use puller C-293-C to remove bearings from axle shafts, puller C-637 to remove inner oil seal, drift C-241 to install seal.

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay**—.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

Dodge Part No. (Standard)

Model	Front	Rear
1954 (4-Dr., Cl.Cp.)	1326164	1450633
1954 (Others)	1450630	
1955 (All)	1614404	1450918

Dodge Part No. (Heavy Duty)

Model	Front	Rear
1954 (Exc. Est. Wgn.)	1450041	1450635
1954 (Special)		1450075
1955	1617004	1450920
1955 (Special)		1450037

FRONT SUSPENSION

Independent - Coil Springs and direct-acting shock absorbers.
See "Dodge" in Front Suspension Section.
Kingpin Inclination - 5-6½° (1954), 5½°(1955) at 0° camber.
Caster - **(1954)** Neg. 1° to Pos. 1° (0° preferred). **(1955)** Neg. 2° to 0° (Neg. 2° preferred with manual steering, 0° preferred with Power Steering). Left side should be between 0° and ¾° more negative than right side.
Camber - **(1954)** Pos. 3/8° to Neg. 3/8° (Left side ¼-½° greater than right side within these limits).

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(1955) Pos 1/4° ± 3/8° (Left side Pos 1/2°, Right side 0° preferred)
T e-Out n Turns - With outer wheel turned 20°, inner wheel should be 21½° ± 1°

STEERING

Manual: G mm r. Worm and three-tooth roller
See "Gemmer Worm & Roller" in Steering Section

P w r Steering: (1954) R ss "Full-Time". Linkage type Used with standard steering gear *See "Ross Power Steering (Linkage Type)" in Steering Section*
(1955) C axial. Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column *See "Coaxial Power Steering" in Steering Section*

►*JERKY OPERATION OF POWER STEERING GEAR CORRECTION.* Adjust generator drive belt (See Generator), then adjust fan drive belt so that a maximum of ¼" deflection is obtained when applying a 10 lb pull with spring scale at middle of widest belt span

Steering Linkag · *See "Steering Linkage" in Steering Section.*
St ering Whe l & Horn Butt n Removal: *See "Gemmer Worm & Roller" in Steering Section.*
Steering Gear Removal: *S e "Gemmer Worm & Roller" in Steering Section.*

BRAKES

S rvic : Dodge "Safe-Guard" Lockheed hydraulic.
See "Dodge Safe-Guard" in Brake Section.

►*LOOSE OF SQUEAKY BRAKE PEDAL OR PAD CORRECTION* Change location of attachment of brake pedal return spring from right side of pedal bracket to left side (Standard & Overdrive), left side to right side (PowerFlite), and attach in hole provided in bracket On PowerFlite cars, if excessive movement or squeak is encountered in pedal pad, remove brake pedal and make several prick punch marks on pedal at pedal pad mounting bracket location to improve clamping action, re-install pad, tighten retaining bolt to 20 ft lbs

Drums–Cast Iron. Diameter–11".
Wheel Cylinder Diameter–1-1/8". Single acting (front), double acting (rear wheels).
Replacement Linings & Shoes–Linings or shoes with linings are furnished Standard and .030" Oversize.
Lining–Molded asbestos (bonded to shoe).
Length–(Primary, Front & Rear) 11.5", (Secondary, Front) 11.5", (Secondary, Rear) 8.8".
Width–2". **Thickness**–.200".
Braking Power–60% Front, 40% Rear.
Clearance– 006 at each end of all shoes

Master Cylinder· On engine side of dash panel opposite base of brake pedal

Master Cylinder: (1954) On frame at base of brake pedal **(1955)** On engine side of dash panel opposite brake pedal base

Checking Fluid–Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal–Disconnect brake line tubes at master cylinder fittings Remove four stud nuts from studs, remove master cylinder

Power Brakes: Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder. *See "Dodge Power Unit" in Brake Section*
Removal of Power Unit–Same as for standard master cylinder, after hydraulic lines and stop light wires removed

Parking Brake· On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Automatic Transmissions.
Adjustm nt–*S "Hand Brak Not s" in Dodg Sp cial Data.*

Lining–	Width	Thickness	Length
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (External Type)–.015-.020" around band.
Internal Type–Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

MISC. MECHANICAL

Windshield Wipers· **Auto-Lite.** Electric

Car Model	Auto-Lite No.
1954 (D50)	EMD-4003A
1954 (D53)	EMD-4003
1954 (Two-speed)	EMG-4102A
D-55-1 Std.	EMU-4101
D-55-1 Spec (2-Speed)	EMZ-4001
D-55-2, 3 Std (2-Speed)	EMZ-4001

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning· **Dodge "Airtemp".** *See "Airtemp" Air Conditioning in Miscellaneous Section.*

Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Misc. Section*

Power Seat Adjuster· Electric type *See "Power Seat Adjusters" in Miscellaneous Section*

Convertible Top Control· Electrical-hydraulic type. *See "Power Top Controls" in Miscellaneous Section*

MODEL IDENTIFICATION

Model	Model Identification
Coronet (1956)	D-62-1
Coronet (1957)	D-72-1
Custom Coronet (1957)	D-72-2

SERIAL NUMBER: Stamped on plate on left front door hinge pillar

	Starting Serial Numbers	
	Detroit	Los Angeles
1956	32227001	48016501
1957	32255001	

ENGINE NUMBER: Stamped on boss on left front section of cylinder block.

► *ENGINE NUMBER LETTERS (Following Engine Number) Identified as follows*

"A" - ALL cylinder bores .020" oversize.

"B" - ALL Main & Connecting Rod Bearings .010" undersize.

"AB" - BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed (150 RPM min.) Maximum variation between cylinders 15 lbs

VACUUM READING· Steady 18-20" at idling speed.

VALVE TAPPET CLEARANCE· .010" Intake and Exhaust (Hot and idling). *NOTE* - Tappet screws are self-locking.

► *CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for **exhaust** tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type with counterweight. Valve should operate freely. When installing coil, place coil spring in position over shaft slot, with outer end (tongue) of spring in the upper left hand position (10 o'clock). Press inner end of coil into slot and seat firmly. Move outer end of spring down (counter-clockwise), around and up over stop stud.

IGNITION

FIRING ORDER· 1-5-3-6-2-4.

SPARK PLUG GAP· .035'.

Plugs - Auto-Lite Resistor Type AR80 (1956), AR51 (1957) 14 mm Torque to 30-32 ft lbs

COIL: Auto-Lite CAF-4002 (Early 1956), CAG-4001A (Late 1956 & 1957). No resistor used with these coils **Ignition Current** - 1 8 amps idling, 2 4 amps stopped

DISTRIBUTOR: Auto-Lite IAT-4101B (Early 1956), IAT-4103 (Late 1956), IBR-4001 (1957).

Condenser - Auto-Lite IAT-3076RA (1956), IAT-2015RA (1957) **Capacity** - 25- 285 mfd

Contact Point Set - Auto-Lite IGW-3028BS.

Break r Gap - .020". Limits .018-.022".

Cam Angl - 36-42°. DO NOT exceed breaker gap limits to obtain dwell.

Br aker Arm Spring T nsion - 17-20 ozs.

R tation - Clockwise viewed from above.

Aut matic Advanc - IAT-4101B, 4103

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		525	2		1050
4		875	8		1750
7		1225	14		2450
8		1350	16		2700

Automatic Advance - IBR-4001

Degrees	Distr.	RPM	Degreesm	Eng.	RPM
Start		350	0		700
1		460	2		920
6.5		1050	13		2100
7.5		1425	15		2850
8 5		1800	17		3600

Vacuum Spark Control Integral type

Vacuum Advance - IAT-4101B, 4103

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	4 3/4
1	2	5 7/8
4	8	9 3/8
7	14	12 7/8
8	16	14

Vacuum Advance - IBR-4001

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10½
8	16	13¾
9.5	19	16

IGNITION TIMING

Setting - 2° BTDC.

Timing Mark - 2° BTDC mark on vibration damper under pointer on front cover.

CARBURETOR

Stromberg WW. Dual downdraft type with automatic choke Used as follows

Model	Stromberg Code No.
1956 Synchro-mesh Cars	WW 3-124
1956 Overdrive Cars	WW 3-125
1956 PowerFlite Cars	WW 3-126
1957 Synchro-mesh Cars	WW 3-159
1957 PowerFlite Cars	WW 3-160

► *MANIFOLD FUEL DISTRIBUTION Each barrel feeds all cylinders.*

Idle Setting - 1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 450-500 RPM with transmission in neutral.

Float Level - 3/16' from top of main body (gasket removed) to top of float, with gauge (Tool T-25569) at center of float and float lip held firmly against fuel inlet needle. To adjust, bend float lip (Tool T-24733).

Accelerating Pump - Normal setting, center hole, for less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Speed· With choke cover removed, place one cover screw through Spring Tool T-25906 and attach Tool to housing above choke lever. Hook other end of spring to long tang of Thermostat lever Remove spring from throttle stopscrew and replace screw only. Close throttle valves, turn stopscrew in until it contacts lever, then continue to turn screw in 5 1/8 turns. Hold choke valve closed and bend cam contact ear so that No. 48 drill rod will just go between ear end of contact lever and first step of fast idle cam. *NOTE* - Ear must be parallel to throttle shaft after bending. Replace throttle stopscrew spring.

Fast Idle Cam Setting· Open throttle valve to clear fast idle cam, close choke valve lightly. Force throttle closed against tension of cam positioning spring. Ear on cam contact lever should just clear high step of fast idle cam (Max. .020"). Bend fast idle rod as necessary.

Choke Positioning Spring Setting· With spring tool T-25906 in position, attach weight tool T-25864 on choke lever between rod and end of shaft, hold carburetor vertical, close throttle, making sure cam contact lever ear rests on high step of fast idle cam (If necessary rotate fast idle cam to get this position). Apply light closing pressure on throttle valve which should open choke valve against choke positioning spring tension just enough to insert correct size drill rod between choke valve and wall of air horn. Adjust by bending ear of choke lever as required.

Automatic Choke Setting Centered (At Index).

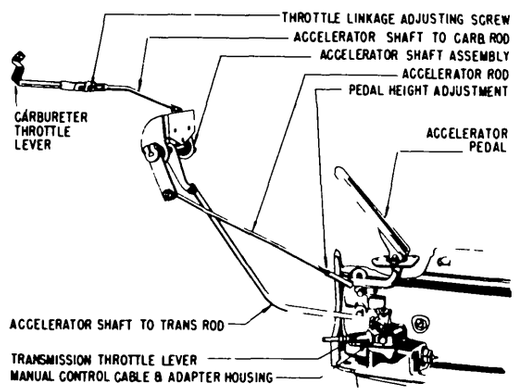
Dashpot Adjustment Push plunger in to end of its stroke. With throttle stopscrew set at normal idle speed, there should be 1/16-3/32' clearance between end of dashpot plunger and ear of throttle lever. Adjust by loosening locknut and turning dashpot in bracket.

Kickdown Switch Adjustment (1956): With throttle valves wide open, clearance between kickdown lever and switch stem guide should be 1/64-3/64" Adjust by loosening mounting nuts and moving switch in or out

Throttle Linkage Adjustment (P werFlit Cars) Adjust engine idle to 475-500 RPM with transmission in neutral. Loosen throttle linkage adjusting screw (located on throttle control rod from bellcrank to-carburetor). While holding throttle control rod against closed throttle stop, move bellcrank arm just enough to start extending accelerator return spring. **(Do n t ext nd spring mor than 1/8" in opposite direction).** With control rods in line and preloaded lightly, lock throttle control rod adjusting screw by applying from 10-15 lbs. torque.

► *OTHER DATA. See "Stromberg WW Carburetors" in Carburetion Section*

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POWERFLITE TRANSMISSION LINKAGE

CONTINUED FROM PRECEDING PAGE

CARB. EQUIPMENT

Fu l Pump: (1956) Auto-Lite FA-4005, (1957) Carter M2494S. **Pr ssur** - 4-6 lbs.
See "Fu l Pumps" in Carburetion Section.

Gas lin Gaug : Auto-Lite. Electric type.
Dash Unit -- Auto-Lite 14010A (Early 1956), 14201A (Late 1956), 14375A (1957).
Tank Unit - Auto-Lite 13969A (1956), 14382A (1957).
S "Fuel Gaug s" in Carburetion Section.

Air Cl an r (1957): DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.
► *CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT* wash *element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Aut -Lit 11-HS-50 **r** Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)
Batt ry Gr und - Negative
Engine Ground . Left front of engine

STARTER

Aut -Lit	Starter No.	Armature No.
1956 (Synchro-mesh)	MDG-6001	MDF-2088
1956 (PowerFlite)	MDF-6002	MDF-2088
1957 (Synchro-mesh)	MDM-6001	MDL-2088
1957 (PowerFlite)	MDL-6004	MDL-2088

Driv - Bendix "Folo-Thru" A3274 (1956), A3596 (1957).
R tati n - Counterclockwise at commutator end.
Brush Spring T nsi n - 42-53 ozs. (MDF & MDG), 31-47 ozs. (MDL & MDM) with new brushes.

P rf rmance Data - MDF

Torque	RPM	Volts	Amperes
0 ft lbs.	3200	10.0	60
6.5 ft lbs..	Lock	4.0	240

Performance Data - MDL

Torque	RPM	Volts	Amperes
0 ft lbs	3200	10 0	60
6 0 ft lbs	Lock	4 0	225

P rformance Data - MDG & MDM

Torque	RPM	Volts	Amperes
0 ft lbs	4400	10 0	50
5 0 ft lbs	Lock	4 0	210

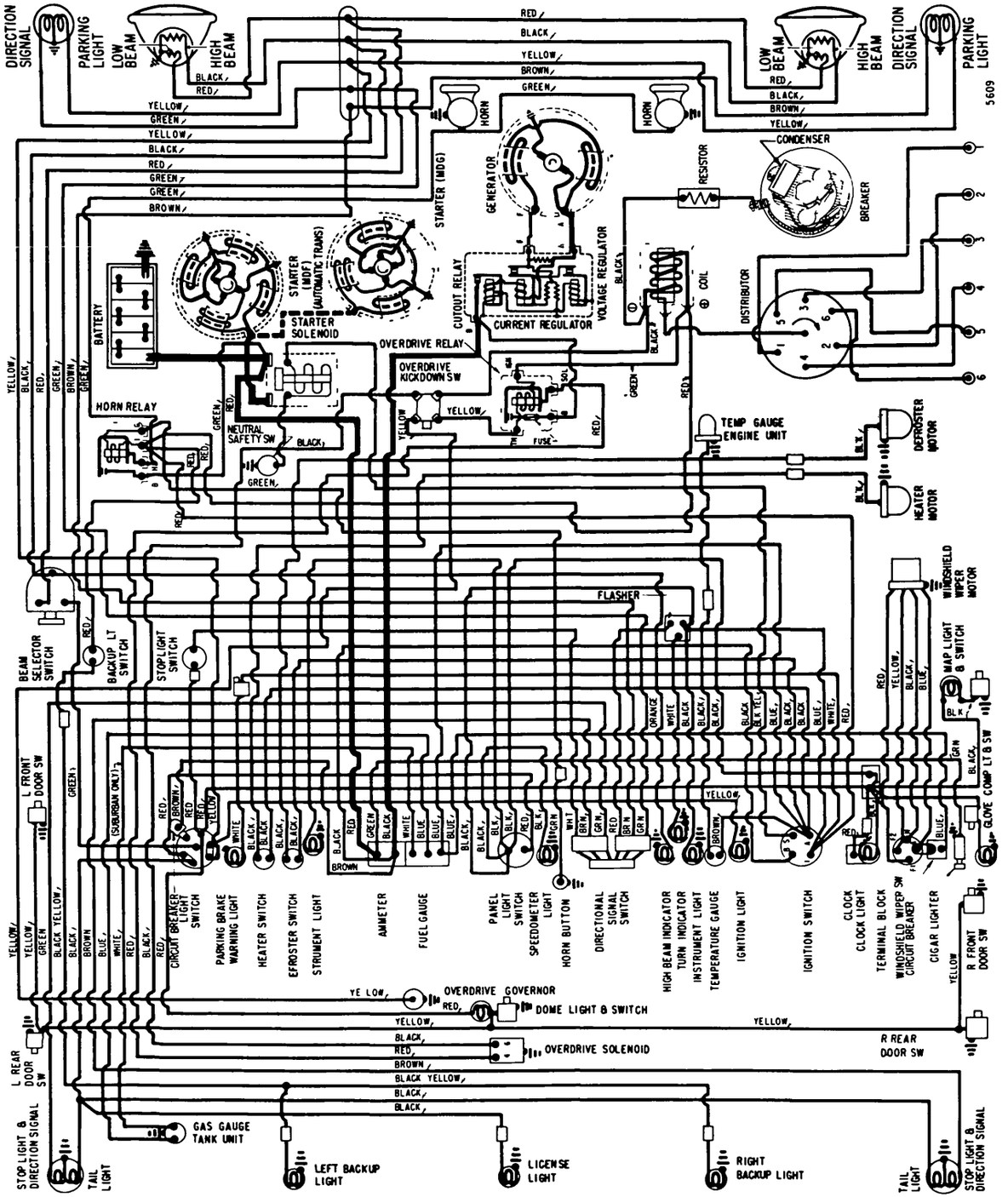
Starting Switch: Auto-Lite SAE-4001 (Std), SAE-4002 (Auto Trans) Magnetic switch controlled by ignition switch Neutral safety switch mounted on transmission on Automatic Transmission cars *See "Starter Controls" in Electrical Section*

Neutral Saf ty Switch Adjustment: *See "PowerFlite" in Transmission Section*

GENERATOR

Auto-Lite	Generator	Armature
1956 Std	GJC-7002A	GJC-2030F
1957 Std.	GJC-7012A	GJC-2030F
1957 Taxicab	GHM-6004A	GHM-2059F
1956-57 Pwr Strg.	GJC-7003B	GJC-2090F
1957 Pwr Strg.	GHM-6003C	GHM-2071F
Special Equipment	GGA-6001AC, K, L, N GJC-700EH 6B	

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1956 DODGE SIX CYLINDER MODELS

CONTINUED FROM PRECEDING PAGE

►*SPECIAL GENERATOR NOTE* GJC, GGA, & GHM types generators used. Performance specifications apply equally to all generators within the three groups specified.

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data GHM (Cold - 70°F) -

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counter-clockwise at commutator end

Brush Spring Tension - 18-36 ozs. (GJC-7000), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

Field Current - 1.2-1.3 Amps. (GJC), 1.1-1 3 Amps. (GGA & GHM), at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 Amps. (GJC), 2 3-2.6 Amps. (GGA), 3.0-3.5 Amps. (GHM) at 10 volts (70°F).

B lt Adjustment ¼" deflection with 10 lbs. pull applied midway of longest belt span.

REGULATOR

Auto-Lite VRX-6201A (GJC & GHM Gen.), VAT-6201A (GGA Gen.).

►*VRX-6201A REGULATOR PRODUCTION CHANGE:* **Two resistors used on early 1956 regulators, three resistors (see wiring diagram) on later regulators. *See "Auto-Lite 12-Volt Regulators" in Electrical Section***

Cutout Relay

Cuts In - 12 6-13.6 volts

Cuts Out - 3 0-5 0 amps. discharge current after charging at 10 amps. (VAT). 7 amps. (VRX).

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 10.0 amperes (80°F) or with .25 Ohm resistor in series between regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

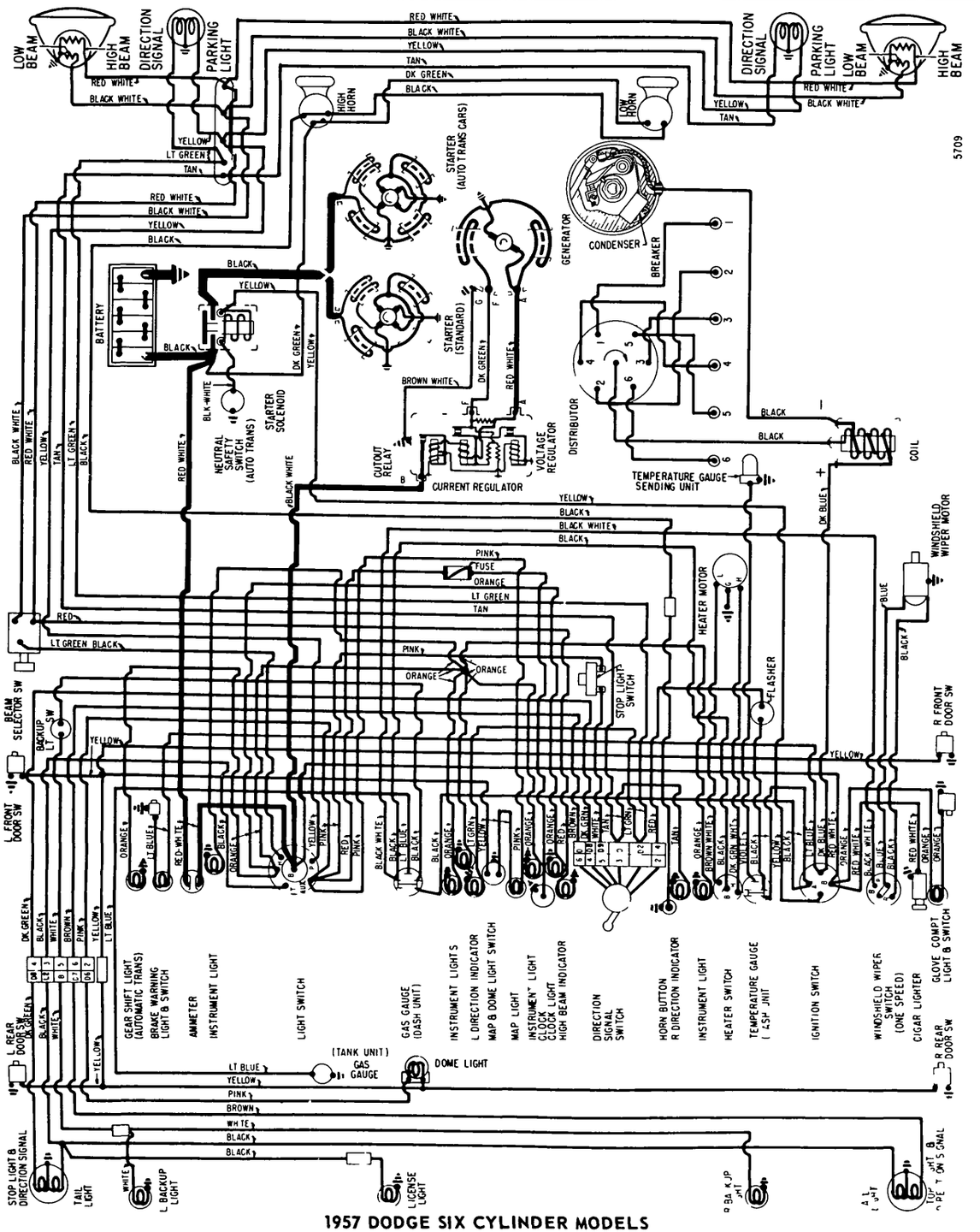
Test A - After 15 minutes operation charging at 10 amps.

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lit 12 V lt Regulat rs" in El ctrical S ction*

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1957 DODGE SIX CYLINDER MODELS

CONTINUED FROM PRECEDING PAGE

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*

Direction Signals: *See Electrical Section*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by means of a recessed hex screw.

Stop Light Switch Location: On forward end of master cylinder.

LIGHTING CIRCUIT BREAKERS: Used as follows:

20 Amp. Protects Headlights, Parking lights, and Ignition light.

15 Amp. Protects Tail, Stop, License plate, Instrument, Map, Dome, Clock, Glove Compartment and Courtesy lights.

5 Amp. Protects Windshield Wiper (Std.)

6 Amper. Protects Windshield Wiper (Variable Speed).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc. Section.*

ENGINE SPECIFICATIONS: Six Cylinder 'L' head.

Bore	Stroke	Displacement
3.25"	4.63"	230.2 Cu. ins.

	Compr. Ratio	Rated HP	Developed HP
1956	7.4-1	25.35	123 at 3600 RPM
1957	8.0-1	25.35	138 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Dodge Special Data.*

►*MANIFOLD INSTALLATION CAUTION:* Two long capscrews extend into cylinder block water passage. Before installing, apply sealer to these capscrews. It is important that conical washers at flange ends of exhaust manifold be installed to permit expansion and contraction without loosening.

OIL PAN REMOVAL: Drain engine oil. As soon as oil is drained, install drain plug and tighten securely. Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal. Remove oil level indicator and drop pan on tie rod. Lift up oil strainer so it clears baffle inside pan. With strainer lifted, slide pan to rear and remove. NOTE—New end gaskets should protrude 1/4" to 1/8" above oil pan. *Ends must not be cut off.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*

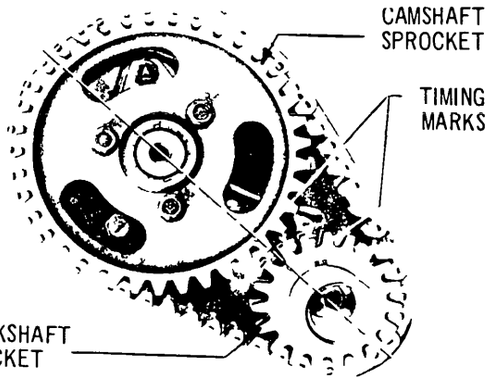
Weight—16 ozs. (stripped).

Removal—Pistons and rods removed from above.

Fitting New Pistons: 0008' clearance 1/2-3/4' from bottom of skirt. Pull to withdraw ribbon feeler 1/2' wide, 002" thick, placed at right angles to piston pin (piston inverted) should be from 6-10 lbs.

Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.

Installing Pistons: "U" slot away from valves.



DODGE 6 CYL. VALVE TIMING MARKS

PISTON PINS

Full floating type.

Diameter—55/64". **Length**—2-3/4".

Pin Fit in Piston—.0000-.0005". DOUBLE THUMB push fit at room temperature (70° F.)

Pin Fit in Rod Bushing—.0001-.0002". Tight thumb push fit at room temperature (70° F.)

Replacement Pins: Std., .003", .008" oversize.

NOTE—Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (#3)	5/32"	.010-.020"	.001-.0025"
Oil (#4)	5/32"	.010-.020"	.001-.003"

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" oversize.

Installing Rings: #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center to Center)—7-13/16". **Weight**—27.9 ozs.

Crankpin Journal Diameter—2.0625".

Maximum out-of-round and taper limits—.001"

Lower Bearings—Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below.*

Clearance—.0005-.0015".

Endplay—.006-.011".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std. and .001", .002", .003", .010", .012", .020", .030", .040" undersize.

Installing Rods: Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Four bearing.

Bearing Type—Removable, precision type, thin babbitt on steel. No shims.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows.

.010" UNDERSIZE (All Main & Connecting Rod Journals)—Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

Clearance—.0005-.0015" desired.

Replacement Bearings: Std. and .001", .002", .003", .010", .012", .030", .040" undersize.

End Thrust: Taken by flanged faces on rear (#4) main bearing. **Endplay**—.003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

Journal Diameters—(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".

Bearings—Removable, steel-backed babbitt lined bushings (exc. #4—machined in crankcase).

Clearance—.001-.003". NOTE—If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain: **Width**—1". **Pitch**—.500". **Length**—24" or 48 links.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Camshaft Setting: Sprockets marked. Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Dodge Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data.*

VALVES

Tappet Clearance: .010" Intake. .010" Exhaust (engine hot and idling). NOTE—.002" additional clearance on exhaust tappets if car driven at continuous high speed.

Valves	Head Diam.	Stem Diam.	Length
Intake	1-17/32"	.340-.341"	4-27/32"
Exhaust	1-13/32"	.340-.341"	4-25/32"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	23/64"	.001-.003"
Exhaust	45°	23/64"	.003-.005"

Valve Seat Width—1/16-3/32". Runout .0015" maximum.

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►*VALVE SEAT INSERT CAUTION: See "Valve System" in Dodge Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance (See Valve Stem Clearance above). *CAUTION–Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*

Valve Springs: Install with closely coiled end up.

Free Length - 2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1 3/4"
Valve Open	110-120 lbs.	1 3/8"

Valve Lifters: Mushroom type (remove from below).

Stem Diameter - 5/8". Ream holes from above (pilot in guide). Furnished .001", .008", .030" Oversize.

Lifter Clearance - .0002-.001".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: The following valve opening and closing points are with .014" lifter clearance*

Intake Valves - Open 12° BTDC. Close 44° ALDC

Exhaust Valves - Open 50° BLDC. Close 6° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 quarts. Add 1 quart when changing filter element.

Normal Oil Pressure: 40-45 lbs. at 1500 RPM

Oil Pressure Relief Valve - Located on left side of block below starting motor.

►*RELIEF VALVE SPRING NOTE:* Three types of spring available. Replace with correct color spring as follows:

Relief Valve Spring Specifications

Spring Color	Lbs. Pressure	Length
Red	12.4-13.8	1 1/4"
Std. (No color)	14.4-15.8	1 1/4"
Green	16.2-17.8	1 1/4"

Free Length - 1 13/16".

Oil Pressure Gauge: Mechanical.

Oil Pump: Rotor type on right side of crankcase.

Overhaul–*See "Oiling System" in Dodge Special Data.*

Oil Filter: By-pass type. On left side of engine above starter.

Servicing–Install new filter element and cover gasket at 8000 mile intervals (more often in dusty areas). Change oil at same time filter is changed.

Crankcase Ventilation: Filter in oil filler tube and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 13 qts. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.*

Pressure Valve: 7 lb. type (1956), 14 lb. type (1957) Radiator filler cap.

Thermostat: Pellet type. In water outlet connection on cylinder head. Starts to open at 157-162°F.

Water Pump: Packless type. Ball bearing type. No lubrication required.

See "Water Pumps" in Dodge Special Data.

Pump Removal - Drain cooling system, remove fan belt, disconnect hoses at pump, remove pump mounting studs, remove pump.

Water Distributing Tube: *See "Cooling System" in Dodge Special Data*

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14009A (Early 1956), 14203A (Late 1956), 14377A (1957).

Engine Unit - Auto-Lite 13550A (1956), 14405A (1957).

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck or Auburn. Single plate types. Used as follows:

Borg & Beck Clutches

Application	Cover Assy.	Clutch Disc
1956 Std. - 9A7	361373	381237
1956 Sta.Wgn. - 10A7	361368	382358
1957 Std. - 9A7	361384	382349
1957 H.D. - 10A7	361376	381758
1957 H.D. - 10.5A8	361418	382621

Auburn Clutches

Application	Cover Assy.
1956 Std.	100052-2
1957 Std.	100131-1

See "Borg & Beck" & "Auburn" Clutches in Clutch Sect.

Pedal Adjustment: Adjust the fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: *NOTE* - Over-center spring located above brake pedal and attached to pedal mounting bracket. Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut in an additional 4 turns max. (1956), 5 turns (1957 Std. 9A7), 7 turns (1957 H.D. 10A7). Reinstall clutch rod to clutch pedal.

Removal: Remove transmission, clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession) to release spring tension until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain lubricant, disconnect propellor shaft, speedometer cable, gear shift control rods. Remove back-up light switch (if so equipped) and speedometer drive pinion. For transmission overhaul or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281). Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748) Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission

OVERDRIVE

1956 MODELS

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.

See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear.

Rear Universal Joint Operating Angl (1957) – *See "Propeller Shaft Notes" in Dodge Special Data.*

REAR AXLE

Own. Semi floating, hypoid gear type with Hotchkiss drive

See "Dodge Hypoid" in Rear Axle Section

Rear Axle Ratios

Synchro-mesh	3.9-1 (39-10)
Overdrive (1956)	4.3-1 (43-10)
PowerFlite	3.73-1 (43-11)

Backlash - .006-.010"

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►*REAR AXLE LUBRICANT LEVEL CAUTION (1957):* Recommended lubricant capacity of 3½ pints will bring level to ½" below bottom of filler plug opening. DO NOT ADD lubricant to bring level up to filler plug opening.

►*REAR AXLE HOUSING INSTALLATION NOTE (1957): Check rear universal joint operating angle. See "Propeller Shaft Notes" in Dodge Special Data.*

Carrier Removal: Remove axle shafts (see below), disconnect rear universal joint, remove differential carrier cap screws, lift out carrier assembly.

Axle Shaft Removal: Jack up car, remove wheels, hub and drum assembly (Tool C-845). Block brake pedal, disconnect brake line at wheel cylinders, remove axle key, brake and dust shield. Note number and remove shims from each axle housing, use puller Tool C-499 to remove axle shaft and bearing, remove inner oil seal (Tool C-637).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels.

Endplay - .003-.008" (1956), .013-.018" (1957).

SHOCK ABSORBERS

"Orifice". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

1956 MODELS

Independent. Coil springs and direct-acting shock absorbers.

See "Dodge" in Front Suspension Section.

Kingpin Inclination—5-1/2° at 0° camber.

Caster—Neg. 2° to 0° (Neg. 2° preferred with Manual Steering, 0° preferred with Power Steering). Left side should be between 0° and ¾° more negative than right side.

Camber—Pos. 1/4°±3/8° (Left side Pos. ½°, Right side 0° preferred).

Toe-In — 1/8" preferred.

Toe-Out on Turns — With outside wheel at 20°, inside wheel should be 21½°±1°.

1957 MODELS

Independent. New "Torsion-Aire" suspension, with ball joint mounted steering knuckles and torsion bar front springs.

See "Torsion-Aire" in Front Suspension & Wheel Alignment Section.

Steering Axis Inclination - 6½° at 0° Camber.

Caster - (Manual Steering) Neg. ¾°±¾°, (Power Steering) Pos. ¾°±¾°. NOTE - Both sides should be set at same dimension.

Camber (Right Wheel) - 0°±¼°, 0° preferred.

Camber (Left Wheel) - Pos. ¼°±¼°, Pos. 3/8° preferred.

Toe-In - 3/32-5/32", 1/8" preferred.

Toe-Out on Turns - With outer wheel at 20°, Inner wheel should be 21°37'.

STEERING

Manual: Gemmer. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Coaxial. Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column.

See "Coaxial" Power Steering in Steering Section.

►*JERKY OPERATION OF POWER STEERING GEAR CORRECTION:* Adjust generator drive belt (See Generator), then adjust fan drive belt so that a maximum of ¼" deflection is obtained when applying a 10 lb. pull with spring scale at middle of widest belt span.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

1956 MODELS

Service: Dodge "Safe-Guard" Lockheed hydraulic type. *See "Dodge Lockheed Safe-Guard" in Brake Section.*

Drum Diameter - 11".

Wheel Cylinder Diameter - 1 1/8". Single acting (front), double acting (rear).

Replacement Linings & Shoes - Linings or shoes with linings furnished Standard and .030" Oversize.

Lining - Molded asbestos (bonded to shoe).

Width - 2". **Length** 11.5" (primary—all wheels), 11.5" (secondary - front), 8.8" (secondary - rear). **Thickness**-.200".

Braking Power - 60% front, 40% rear.

Clearance - .006" at each end of all shoes.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder on dash panel in engine compartment.

Removal - Disconnect pedal return spring, pushrod, brake tube, and stop light switch leads. Remove master cylinder-to-dash bolts, slide master cylinder straight forward and lift out.

Power Brakes: "Integral", "Bellows" or "Piston" Assist types used. "Integral" type replaces regular master cylinder and is mounted on engine side of firewall. "Bellows" and "Piston" Assist types are mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Dodge Power Unit (Integral Type)" or Chrysler, DeSoto, Dodge, Plymouth "Bellows" or "Piston" Type Power Brakes in Brake Section.

Removal of Integral Type Power Unit—Same as for standard master cylinder, after stop light wires and hydraulic lines are removed.

Removal of "Bellows" & "Piston" Type Power Units—Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket (*NOTE*—If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly.

Parking Brake: *Same as 1957 (below).*

1957 MODELS

Service: Dodge Total-Contact (Floating Shoe) type.

See "Chrysler, De Soto, Dodge, Plymouth Center-Plane & Total Contact" Brakes in Brake Section.

Drum Diameter - 11" (All models).

Wheel Cylinder Diameter - 1 1/8". Single acting (front), double acting (rear).

Replacement Linings & Shoes - Linings or shoes with linings are furnished Standard and .030" Oversize.

Lining - Molded asbestos (bonded to shoe).

Width - 2½" Front, 2" Rear (2 ½" rear on 4-door Hardtop, Suburban and Convertible).

Length - 11.5" (All). **Thickness** - .200" (All).

Braking Power - 65% front, 35% rear.

Clearance - Front Wheels - .006". Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked. Turn cams in opposite direction until no drag is felt.

Rear Wheels - .006". Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pedal return spring, push rod, brake tube, and stop light switch leads. Remove master cylinder to dash bolts, slide master cylinder straight out from dash.

Power Brakes: New "Oval Piston Assist" type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "De Soto, Dodge Oval Piston Type Power Unit" in Brake Section.

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm). Mark across power unit adjacent to vacuum test port and mounting bracket; and beween mounting bracket and firewall. Disconnect vacuum hose, remove bolts securing bracket to firewall, slide unit and bracket straight forward.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Automatic Trans.

Adjustment - *See "Brake Notes" in Dodge Special Data.*

Lining	Width	Thickness	Length
6" Ext. type	2"	5/32"	15.38"
7" Int. type	2"	5/32"	13.44"

MISC. MECHANICAL

Windshield Wiper: Auto-Lite. Electric type. Single speed Std., Two-speed Optl.

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: Electric type. *See "Power Seat Controls" in Miscellaneous Section.*

Convertible Top Control: Electric-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

►*DODGE "500" NOTE:* This model has a special High Compression Engine with different Valve Timing (Adjustable Tappet Clearance), Ignition Setting, Spark Plugs, and Carburetor (Carter 4-Barrel). See Data below.

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Identification
Coronet V8	D-63-1
Royal V8	D-63-2
Custom Royal V8	D-63-3
Dodge "500" V8	D-500

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Starting Serial Nos.	Detroit	Los Angeles
D-63-1, 2, 3	34972001	42608001

ENGINE NUMBER: Stamped on boss at center of cylinder block directly behind water pump and next to oil filler tube.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*
"A"—All cylinders .020" oversize.
"B"—All Main & Connecting Rod Bearings .010" undersize.
"AB"—BOTH above conditions exist.
"DIAMOND" symbol (3/8"high)—ALL tappet bodies are .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 90–155 lbs. at cranking speed of 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18–21" at idling speed

VALVE TAPPET CLEARANCE: (D63-1, 2, 3). None in service (hydraulic).

D-500 – .012" Intake, .022" Exhaust (Hot & Idling).

MANIFOLD HEAT CONTROL: Application as follows:

(D-63-1, 2, 3 Standard): Single exhaust on right cylinder block with thermostatically controlled valve. Install heat control valve with counterweight toward front of engine, with small anti-rattle spring retaining pin toward rear and adjacent to cylinder block.

(D-500 Std., D-63-2, 3 with Power Package): Dual exhaust. Heat control valve is in right exhaust pipe.

Coil Spring Installation – Position valve shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer end tongue of spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end tongue of spring around and hook under pin (left pin when facing coil end of valve).

Counterweight Installation – Place counterweight over shaft (shield upward) and insert lock in shaft slot. Center counterweight on shaft and turn weight on shaft until seated. Install stop, and tighten nut securely with Tool T-109-173.

►***DUAL EXHAUST NOTE:*** **When valve is closed, most exhaust gases are discharged through left exhaust pipe.**

IGNITI N

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: 035".

Spark Plugs—(D-63-1, 2, 3) Auto-Lite AR-52, ("500") 4S-250. 14 mm. Resistor type. Torque to 30-32 ft. lbs.

COIL: Auto-Lite CAD-4002, 3. *12 Volt.* from negative terminal of coil to distributor breaker arm terminal. When testing coil, include resistor with coil. Test without resistor will show coil to be defective.

DISTRIBUTOR: Auto-Lite IBJ-4301A (D-63-1), IBJ-4303 (D-63-2, 3 Std.), IBJ-4303B (D-63-2, 3 Power Pack). ("500") IBK-4301A. *12 Volt. NOTE*—IBK-4301A is "Double Breaker" type.

Condenser—Auto-Lite IBB-2015R. **Capacity** .25-.28 microfarad.

Contact Point Set—Auto-Lite IGW-3028MS (All "IBJ" Distr.), IGW-3028KS ("IBK" Distr.).

Breaker Gap— 015-.019". Set gap to .017".

Cam Angle – 28-34° ("IBJ" Single Breaker), 35-41° ("IBK" Double Breaker with both sets operating together) Do not set gap outside limits to obtain specified cam dwell.

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance—IBJ-4301A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	400	2	800
6.5	700	13	1400
14	1975	28	3950
15	2150	30	4300

Automatic Advance—IBJ-4303

Degrees Distr.	RPM	Degrees Eng	RPM
Start	350	0	700
1	415	2	830
3.5	575	7	1150
15	2200	30	4400
16	2350	32	4700

Automatic Advance—IBJ-4303B

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	410	2	820
7	775	14	1550
14	2150	28	4300
15	2350	30	4700

Automatic Advance—IBK-4301A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	430	2	860
5	750	10	1500
8	1850	16	3900
9.5	2400	19	4800

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance—IBJ-4301A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/2
1	2	6
5	10	8 3/8
11	22	13¼
12.5	25	15

Vacuum Advance—IBJ-4303

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6 3/8
1	2	7 1/8
5	10	9 3/4
10	20	14 1/8
11	22	15 1/2

Vacuum Advance—IBJ-4303B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/4
1	2	6
4	8	8 1/4
7	14	11
8	16	12

Vacuum Advance—IBK-4301A

Distr. Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	7 1/2
1	2	8 1/8
5	10	10 7/8
10	20	15 1/8
11.5	23	17

Distributor Basic Timing & Driv Shaft Bushing: *See "Ignition Notes" in Dodge Special Data.*

IGNITION TIMING

Model	Std. Setting
D-63-1	4° BTDC
D-63-2, 3	6° BTDC
D-500	2° BTDC

Timing Mark - Correct mark on crankshaft pulley or vibration dampener aligned with pointer on chain case cover.

Manual Adjustment – Timing may be advanced or retarded depending on fuel used or altitude. Range of timing should not exceed plus or minus 6° from recommended factory setting.

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CARBURETOR

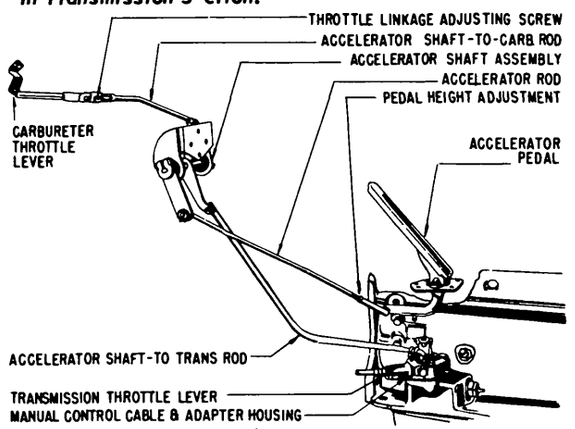
► *CARBURETOR APPLICATION: Stromberg WW 2-barrel Carbur tors us d as standard equipment on all models. Cart r WCFB 4-barrel Carburetor used on D-63-2, 3 Sup r Red Ram with Power Package & D-500. D-500 with P w r Packag us d TWO Carter WCFB Carburetors.*

THROTTLE LINKAGE ADJUSTMENT (PowerFlite Cars): Correct any binding corrections. Run engine until normal operation temperature is reached. Remove air cleaner to make sure choke is fully open. Connect tachometer leads to coil and ground. Adjust engine idle speed to 475-500 RPM with transmission in neutral. Stop engine. Loosen throttle linkage adjusting screw located on accelerator shaft-to-carburetor rod.

V8 Engin s – Mov rear portion of accelerator shaft-to-carburetor rod rearward until it is stopped by the idle stop on transmission throttle cam.

All Engin s – With control rods in line and pre-loaded lightly, lock throttle linkage adjusting screw by applying 10-15 ft. lbs. torque. Start engine and recheck idle speed (475-500 RPM) with transmission in neutral and hand brake set. Stop engine and remove tachometer.

Pr ssur Adjustment: *See "PowerFlite" Transmission in Transmission S ction.*



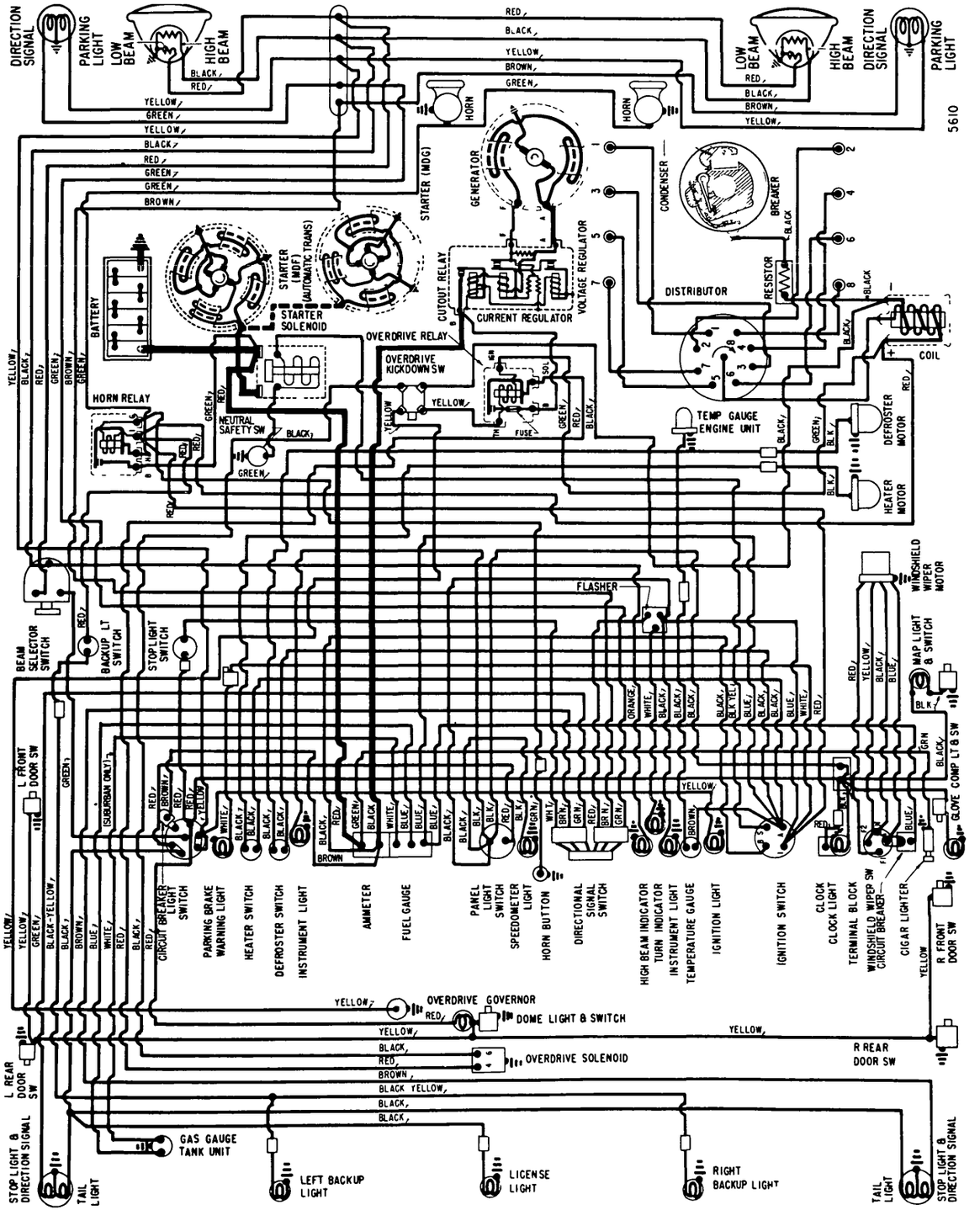
POWERFLITE THROTTLE LINKAGE

STROMBERG 2-BARREL WW

Transmissi n	Stromberg No.
Synchro-mesh (D-63-1)	WW3-135
Overdrive (D-63-1)	WW3-136
PowerFlite (D-63-1)	WW3-137
Synchro-mesh (D-63-2, 3)	WW3-138
Overdrive (D-63-2,3)	WW3-139
PowerFlite (D-63 2,3)	WW3-140

► *V8 MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr ls f d Cyl. 2-3-5-8, LEFT barr ls 1-4-6-7.*

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Idle Setting - ¾-1¾ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed (V8) – 450-500 RPM (Std. & O.D.), 475-500 RPM (PowerFlite) with selector button in neutral.

Float Level–3/16" from top of main body (gasket removed) with gauge (T-25569) at center of float and float lip held firmly against fuel inlet needle, To adjust, bend float lip (Do not force float) with Tool T-24733.

Accelerating Pump– Normal setting, center hole; for less fuel install rod in inner hole; for more fuel install rod in outer hole. Pump travel should be 7/32 to ¼". Adjust by bending pump rod.

Fast Idle: With throttle valves in fully closed position, turn fast idle stop screw in so it just contacts throttle lever, then turn adjusting screw in 4½ turns. With choke valve closed and throttle lever held against fast idle screw, insert a No. 48 drill between tang on contact lever and first step of fast idle cam. Drill should just fit. Adjust by bending tang on cam contact lever using Tool T-26863.

Fast Idle Cam–Open throttle valves sufficiently to clear fast idle cam. With choke valve tightly closed and throttle valves forced closed, tang on cam contact lever should just clear high step of fast idle cam. This clearance should not exceed .020". Adjust by bending fast idle rod (at angle), using Tool T-109-213.

Automatic Choke Setting: Centered (indicator mark on cover coincides with center mark on housing).

Dashpot Adjustment: With idle speed adjusting screw set for normal idle speed, there should be 1/16-3/32" clearance between end of dashpot plunger and ear on throttle lever when plunger is pushed to end of its travel. To adjust, loosen locknut and turn dashpot in bracket to obtain correct clearance.

Kickdown Switch Adjustment: With throttle valves in wide position, there should be 1/64-1/32" clearance between ear on throttle lever and threaded portion on switch housing. To adjust, loosen adjusting nuts and move switch in or out until correct clearance has been obtained.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 4½ - 6½ lbs.

CARTER 4-BARREL WCFB

D-63-2, 3 (Power Pack) Early	2303S, SA, SB
D-63-2, 3 (Std. & O.D.) Later	2474S
D-63-2, 3 (PowerFlite) Later	2432S
"500" (Standard)	2443S, SA
"500" (Power Pack)	(front) 2476S, (rear) 2445S

►*ENGINE CUTTING OUT ON LEFT TURN CORRECTION: See "Carter WCFB 4-Barrel" Carburetor in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting – ½-1½ turns open (2432S; 2474S; 2303S, SA, SB), ¾-1¾ turns open (2443S, SA), ¼-1¼ turns open (2445S, 2476S). Turn screws out for richer mixture.

Carburetor Adjustment (2476S & 2445S): *Adjust carburetors exactly as follows for balanced operation:*

1) Connector Rod – Open both carburetor throttles to wide open position. If either front or rear carburetor throttle valves do not open fully, adjust length of connector rod. Rod must not bind on pivot studs.

2) Idle Speed – With engine at normal operating temperature, disconnect accelerator shaft rod at rear carburetor, set idle speed to 500 RPM (use tachometer) as follows: Back off idle speed screw, turn front carburetor screw up to point where it contacts stop.

3) Idle Mixture – Turn rear carburetor idle mixture screws in until lightly seated, then back screws out ½ turn. Repeat with front carburetor. Trim front carburetor idle mixture screws only to obtain smoothest engine idle. Connect accelerator shaft rod.

Idle Speed–450-500 RPM (Std. & O.D.), 475-500 (PowerFlite) with transmission in neutral.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See Carter "WCFB" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 4½-6½ lbs.

CARB. EQUIPMENT

Fuel Pump: Auto-Lite FA-4006 (Early), Carter M2414 (Later).

Pressure - 4½ - 6½ lbs.

See "Fuel Pumps" in Carburetion Section of Manual.

Gasoline Gauge: Auto-Lite. Electric.

Dash Unit - 14007A (Sub. & Est. Wgn.), 14010A (Others).

Tank Unit - 13905A (Sub. & Est. Wgn.), 13969A (Others).

See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite 11-HS-60 or Willard HO-11-60 (D-63-2, 3 & D-500). *12 Volt,* 11 plate, 60 ampere hour capacity.

Auto-Lite 11-HS-50 or Willard HO-11-50 (Others). *12 volt,* 9 plate, 50 ampere hour capacity.

Warm Climate Option (Exc. Air Conditioned Cars) – Auto-Lite 11-MS-45 or Willard MO-11-45. *12 volt,* 7 plate, 45 ampere hour capacity.

Grounded Terminal – Negative.

►*CAUTION: This is reversed from previous models.*

Engine Ground – Left front of engine.

STARTER

Auto-Lite. *12 Volt.* Application as follows:

Model	Auto-Lite Starter No.
Std. (D-63-1, 2, 3, D-500)	MDG-6002
PowerFlite (D-63-1, 2, 3, D-500)	MDF-6007

Armature (All) – Auto-Lite MDF-2088.

Drive - Bendix "Folo-Thru" No. A3274.

Rotation – Counter-clockwise at commutator end.

Brush Spring Tension – 42-53 ozs. (new brushes).

Performance Data - MDF

Torque	RPM	Volts	Amperes
0 ft.lbs.	3200 Min.	10.0	60 Max.
6.5 ft.lbs.Min.	Lock	4.0	240 Max.

Performance Data - MDG

Torque	RPM	Volts	Amperes
0 ft.lbs.	4400 Min.	10.0	50 Max.
5 ft.lbs.Min.	Lock	4.0	210 Max.

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission Cars. *See "Starter Neutral Safety Switch Adjustment" in Transmission Section.*

GENERATOR

Auto-Lite *12 Volt.* Application as follows:

Auto-Lite Generator No.	Application
GJC-7001A, C or 7002A	V8 Std.
GJC-7003B or GGA-6002A	Pow. St.
GJC-7006B or GGA-6001N	Air Cond.
GJC-7003C or GGA-6002C	Air Cond. & Pow. St.
GGA-6003A	Special

►*SPECIAL GENERATOR NOTE:* GGA and GJC type generators used. Performance specifications below apply equally to all generators within either of the two groups specified.

Performance Data - GJC

Amperes	Volts	RPM Cold
20.0 ①	15.0	1750 Max.
30.0 ①	15.0	2050-2250

Performance Data - GGA

Amperes	Volts	RPM (70° F.)
4.0	14.6	950 Max.
40.0 ①	14.6	1600 Max.
40.0 ①	15.0	1600 Max.

① - Do not operate generator for any length of time in excess of controlled output setting. To do so may result in burned armatures and fields.

Brush Spring Tension - (GGA) 34-41 ozs., (GJC) 18-36 ozs., with new brushes.

Field Current - (GGA) 1.1-1.3 amperes, (GJC) 1.2-1.3 amperes, all at 10.0 volts (70° F.)

Motoring Current - (GGA) 2.3-2.6 amperes. 3.1-3.5 amperes with felt oil seal in drive end head. (GJC) 3.4-3.9 amperes. All at 10.0 volts.

Rotation - Counter-clockwise at commutator end.

Belt Adjustment: Loosen generator adjusting strap and generator-to-generator bracket mounting bolts. With Tool C-3379 hooked over generator and a torque wrench attached to tool, apply torque of 45 ft. lbs. (new belt), 27 ft. lbs. (old belt), to pull generator outward. While holding generator outward at required torque, securely tighten generator mounting bolts and adjusting strap.

REGULATOR

Auto-Lite. *12 Volt.* Used with generators as follows:

Auto-Lite Regulator No.	Generator
VAT-6201A	GGA
VRX-6201A	GJC

►*VRX-6201A REGULATOR PRODUCTION CHANGE:* Two resistors used on early regulators, three resistors (see wiring diagram) on later regulators. *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

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Cutout Relay

Cuts In - 12.6-13.6 volts

Cuts Out - 3.0-5.0 amps. discharge current after charging at 10 amps. (VAT), 7 amps. (VRX).

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltage Regulator

Setting – 14.5 volts at 80° F. while charging at 10.0 amperes or with .25 ohm resistor in series between regulator and battery.

Air Gap – .048-.052" with contacts just opening.

Checking & Adjusting – *See Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set following specifications at 70° F.*

	Test A – Operating Amperes	Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A – After 15 minutes operation charging at 10 amps.

Test B – After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT), 13.6-13.8 (VRX).

Air Gap – .048-.052" with contacts just opening.

Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Direction Signal: *See Electrical Section.*

►*IGNITION-STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not the ammeter terminal post.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by means of a recessed hex screw.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Lighting – Three circuit breakers on back of lighting switch. Protect circuits as follows:

15 Amp – Protects Head & Beam Indicator Lights.

6 Amp – Protects Parking, Tail, License Plate, Instrument, Ignition and Clock lights.

6 Amp – Protects Stop, Map, Dome, Glove Compartment, Courtesy and Trunk Compartment lights.

Windshield Wiper & Back-Up Lights: 5 Ampere. Mounted on rear of windshield wiper switch.

Window Lifts: 20 Ampere. Mounted behind left front kick panel.

Power Seat: 15 Ampere. Mounted behind left front kick panel.

HORNS: Auto-Lite Sparton. Dual horns with Relay. *12 Volt.*

Horn Relay: Auto-Lite RAH-4002. *12 Volt.*

ENGINE

►*TWO ENGINES USED AS FOLLOWS:* **D-63-1, 2, 3** – Polyspherical combustion chamber with lateral valves (single rocker arm shaft).

D-500 – Hemispherical combustion chamber with laterally inclined valves (double rocker arm shafts).

ENGINE SPECIFICATIONS: 90° V8 (All Models).

Model	Bore	Stroke	Displmnt
D-63-1	3.625"	3.256"	270 cu. ins.
D-63-2, 3	3.63"	3.80"	315 cu. ins.
D-500	3.63"	3.80"	315 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
D-63-1	8.0-1	42.2	189 at 4400 RPM
D-63-2, 3	8.0-1	42.2	218 at 4400 RPM
D-63-2, 3 ①	8.0-1	42.2	230 at 4400 RPM
D-500	9.25-1	42.2	260 at 4800 RPM
D-500 ②	9.25-1	42.2	

① – With Power Package (Carter WCFB 4-Barrel Carburetor and Dual Exhaust System).

② – With Power Package (Two Carter WCFB 4-Barrel Carburetors).

Compression & Vacuum Reading – *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Dodge Special Data.*

OIL PAN REMOVAL: Remove oil level indicator, drain oil, disconnect steering linkage at idler arm support bracket, and allow linkage to drop. Remove bolts that hold oil pan to cylinder block and slide pan out, down, and away from engine.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, horizontal slot, elliptically turned, tin plated, thermally controlled by steel band.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bores are .020" oversize.*

Weight – 16.2 ozs. (D-63-1), 17.2 ozs. (D-63-2, 3), 18.0 ozs. (D-500).

Removal – Pistons and rods removed from above.

Clearance – .0005-.0015" at top of skirt.

Fitting New Pistons: Insert piston in bore, upside down, with .0015" x ½" feeler stock between thrust face of piston and cylinder wall. Pull required to withdraw feeler stock should be 5-10 lbs. at 70° F.

Replacement Pistons: Std., .005", .020", .030", .040", .060" Oversize.

Installing Pistons: Notch on head of piston must point toward front of engine and larger chamfer of connecting rod bore must be installed toward crankshaft journal fillet. *See Rod Installation below.*

PISTON PINS

Floating type with lock ring at each end.

Diameter – .8591-.8593" (D-63-1), .9215-.9218" (Others).

Length – 2.880-.2.890" (D-63-1), 3.065-3.075" (Others).

Pin Fit in Piston – .0000–.0005". Tight thumb press fit at 70° F.

Pin Fit in Rod Bushing – .0001–.0004". Tight thumb press fit at 70° F. Selective fit.

Replacement Pins: Std., .003", .008" Oversize.

NOTE – Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Sid Clearanc
Compr. (#1)	.0775-.0780"	.010-.020"	.0015-.0030"
Compr. (#2)	.0775-.0780"	.010-.020"	.0010-.0025"
Oil (#3)	.1860-.1865"	.010-.020"	.001-.003"

Replacement Rings: Furnished Std., .005", .020", .030", .040", .060" Oversize.

Installing Rings: "Top" mark on each compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length (Center to Center) – 5.9335-5.9375" (D-63-1), 6.616-6.620" (Others).

Weight – 21.2 ozs. (D-63-1), 24.0 ozs. (Others).

Crankpin Journal Diameter -1.9365-1.9375" (D-63-1), 2.2495-2.2505" (Others).

Maximum out-of-round and taper limits .001".

Lower Bearings – Removable, precision type, thin babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below.*

Clearance – .0005–.0015". Maximum–.0025".

Endplay – .006–.014".

Bearing Adjustment – None. Replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", .012" Undersize.

Installing Rods: *(NOTE* – Connecting rod bores are chamfered more on one side than other. This larger chamfer must be installed toward crankshaft fillet). When installing lower bearing shell, make certain that "V" groove in shell is in line with "V" groove in cap. This allows lubrication of cylinder wall. Bearing shells should always be installed so that small formed tang fits into machined grooves of rod. Oil ring expander gap should be toward outside of "V" of engine. Oil ring gap should be toward inside of "V" of engine. *See Piston Installation above.*

►*CAUTION:* Rods are **interchangeable.** However, when rods are assembled to piston, the assemblies of one engine bank ***are not interchangeable*** with the other bank.

CRANKSHAFT

Journal Diameter – 2.3745-2.3755" (D-63-1), 2.5" (Others).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (Main & Connecting Rod Journals) – Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

Bearings – Removable, precision type, steel-backed, babbitt lined. No shims.

Clearance – .0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .010", .012" Undersize. Halves of Nos. 1, 2, and 4 bearings are interchangeable with one another (caps are not interchangeable); upper and lower halves of No. 3 bearing are interchangeable; No. 5 halves are NOT INTERCHANGEABLE.

End Thrust: Taken by center (#3) main Bearing.

Endplay – .002-.007". Maximum .010"

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Crankshaft R ar Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.998—1.999", (2) 1.982—1.983", (3) 1.967—1.968", (4) 1.951—1.952", (5) 1.4355—1.4365".

Bearings—Removable, steel-backed, babbitt lined bushings.

Clearance—.001—.003". Maximum—.005".

End Thrust: Taken by thrust plate behind camshaft sprocket hub.

Endplay—.002—.006". Maximum—.010".

Timing Chain: Width—1-1/8". **Pitch**—.375". **Length**—68 links.

Camshaft Setting: Timing Check: Mark on gears should be adjacent and in line with straightedge across shaft centers. **Chain Installation:** Install chain and gears as an assembly. Mesh crankshaft gear in chain with keyway out toward chain, mesh camshaft gear in chain with keyway toward crankshaft gear and mark on gear in line with **23rd chain pin** clockwise from pin at mark on crankshaft gear. Install assembly on engine, turning crankshaft and camshaft to line up keys with gear keyways, install fuel pump eccentric (must engage camshaft key), tighten camshaft cupwasher and bolt to 35 ft. lbs. Check timing as above.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Dodge Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data*

VALVES

Tappet Clearance (D-500) .012" Intake, .022" Exhaust, with engine hot and idling.

(D-63-1, 2, 3) None in service (hydraulic).

►*CAUTION: Valve train on D-500 different than on other engines.*

D-63-1, 2, 3

Valve	Head Diameter	Stem Diameter	Length
Intake	1.72"	① 371-.372"	4.25
Exhaust	1.47"	① 372-.373"	4.20"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.360"	.002"
Exhaust	45°	.360"	.003"

D-500

Valve	Head Diameter	Stem Diameter	Length
Intake	1.87"	① .371-.372"	4.83"
Exhaust	1.53"	① .372-.373"	4.85"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.400"	.002"
Exhaust	45°	.409"	.003"

① — Standard Valve. *See Valve Guides (below).*

Intake Valve Stem Oil Seal—Seal installed on intake valve stem after valve is inserted in head and before installation of springs. Seal will seat itself in correct position on guides.

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length by 1/32" or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3436. If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

Valve Springs: *SINGLE springs used on D-63-1, 2, 3, DOUBLE springs used on D-500.*

Valve Spring Specifications

D-63-1, 2, 3

Valve	Lbs. Pressure	Length
Closed	53 lbs.	1.69"
Open	140 lbs.	1.31"

D-500

	Inner Springs		Outer Springs	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	28	1.53"	61.5	1.66"
Open	66.5	1.09"	158.5	1.22"

►*CAUTION: Spring ends must be square within 1/16". (Use steel square on surface plate—revolve spring against square noting alignment of top coil).*

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are reground, check installed height of spring. If height of spring is 1-11/16" or greater, install a 1/16" spacer under valve spring

►*VALVE SPRING LOAD CAUTION: Hydraulic lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.*

Valve Guides: D-63-1, 2, 3— Guides are integral with head. If valve stem clearance excessive, use tool set to ream hole to NEXT oversize and install valve with OVERSIZE stem. Valves are furnished .005", .015", .030" oversize.

►*OVERSIZE VALVE STEM REAMING NOTE:* Before reaming valve guides, check rocker cover gasket boss at one end of cylinder head for either a stamped "E" (exhaust) or "I" (Intake). If a letter is found, all guides in the head (either intake or exhaust, depending on letter) will be oversize. Standard production reaming of both intake and exhaust is .374-.375". Use reamer C-3433 to ream to .379-.380", C-3430 to ream to .389-.390", C-3427 to ream to .404-.405".

D-500 — Guides are separate pressed-in parts and are serviced by installing new guide and reaming to size for standard valve Remove guides by driving out through top of head using tool C-3159. Install new guides by driving them up through valve port opening. To install INTAKE valve guide, place a steel scale across combustion chamber and drive valve guide in until punch mark on tool C-3159 is flush with face of cylinder head. To install EXHAUST valve guide, drive it in until it is flush with the machined face of the hole. Ream guide to .374-.375" with tool C-741.

►*CAUTION: Oil hole in top of exhaust guide must face up.*

NOTE—If Valve Guide Tool C-3159 is not available, drive guide in, measuring from top of valve seat as follows: **Intake**—15/16". **Exhaust**—1-3/32".

Hydraulic Valve Lifters: *NOTE* — Not used on D-500.

Diameter—.9040-.9045" **Clearance**—.0005-.0015"

Lifter Overhaul & Testing—*See "Valve System" in Dodge Special Data.*

Rocker Arm Assembly: *See "Valve System" in Dodge Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

V8 D-63-1

Intake Valves — Open 14° BTDC. Close 50° ALDC.
Exhaust Valves — Open 52° BLDC. Close 12° ATDC.

V8 D-63-2, 3

Intake Valves — Open 11° BTDC. Close 53° ALDC.
Exhaust Valves — Open 49° BLDC. Close 15° ATDC.

D-500

Intake Valves — Open 12° BTDC. Close 60° ALDC.
Exhaust Valves — Open 54° BLDC. Close 18° ATDC.

Valve Timing Check (D-63-1, 2, 3) — With No. 1 intake valve closed, insert a .210" spacer between rocker arm and #1 intake valve stem, install dial indicator over this valve so that pointer contacts valve spring at a right angle. Wait until seat stops moving (indicating that plunger bottomed so that lifter is solid). Set dial indicator at "Zero", turn crankshaft until dial indicator shows that valve has lifted .024". Pointer on cover should indicate between 5° BTDC and 7° ATDC if timing correct. Then turn crankshaft counter-clockwise until lifter is back down to the valve closed position. Remove spacer from between rocker arm and valve stem. *See "Camshaft Setting" under CAMSHAFT above.*

►*CAUTION: Do not turn crankshaft further than indicated above. To do so might bottom spring and damage valve mechanism.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one additional quart if filter changed.

Normal Oil Pressure: 50-65 lbs with warm oil and engine operating at 1500 RPM

Oil Pressure Relief Valve —Mounted in oil pump. Adjustable by replacing springs (3 types). (1) Standard spring painted RED. (2) Lighter than standard spring painted GRAY. (3) Heavier than standard spring painted BROWN. When replacing relief valve spring use same color spring.

Oil Pressure Gauge: Auto-Lite 14008A. Not electric.

Oil Pump: Rotary type. In crankcase at rear end. Mounted on rear bearing cap.

Overhaul — *See "Oiling System" in Dodge Special Data.*

Priming Oil Pump (After Overhaul): Prime pump before installing oil pump and strainer to rear main bearing cap.

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Oil Filter: Shunt type. A portion of oil from oil pump is directed through this filter and the remainder flows directly into engine lubrication system.
Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.
Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 19 qts. (D-63-1), 20 qts. (Others). One additional quart with heater.
Pressure Valve: Radiator filler cap. Opens at 7 lbs (D-63-1), 14 lbs. (Others).
Thermostat: Choke type. In water pump to radiator connector. Starts to open at 157-162° F.
Water Pump: Packless, ball bearing type. No lubrication required.
See "Water Pumps" in Dodge Special Data.
Temperature Gauge: Auto-Lite. Electric type.
Dash Unit – Auto-Lite 14009A.
Engine Unit – Auto-Lite 13550A.
See "Temperature Gauges" in Misc. Section.

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Std. (D-63-2,	10A7	361376	382366
Hvy. Duty	11A6	361382	381850

See "Borg & Beck" Clutch s in Clutch Section.
Pedal Adjustment: Adjust the fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.
Overcenter Spring Adjustment: (*NOTE*—Over-center spring located above brake pedal and attached to pedal mounting bracket). Disconnect clutch pedal pushrod. Remove overcenter eyebolt adjusting nut. Reinstall adjusting nut, tighten finger tight, then further tighten four complete turns. This adjustment will require 12-15 lbs. pressure to hold clutch pedal down when it is 1" from fully released position.
Removal: Remove transmission or transmission and overdrive (See Synchro-mesh Transmission). Remove clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel; loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section.*
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: Jack up front end of car, disconnect front universal (loosen companion flange nut if transmission is to be disassembled). Disconnect speedometer cable, hand brake cable, gear shift rods. Remove nuts holding transmission to clutch housing. Then remove transmission by pulling it back, down, and out of car.

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.
See "Warner R10" Overdrive in Transmission Section.
Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*
Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:
Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.
Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.
Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball & Trunnion (D-63-1 Front & Rear, Front only on other models). Cross type (D-63-2, & D-500 Rear only).

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE* – **"Barrel" type differential assembly used on V8 Cars with PowerFlite (four differential pinion and two side gears); others use differential assembly with two pinion and two side gears.**
See "Dodge Hypoid" in Rear Axle Section.

Standard ..... **© 3.73-1 (41-11), 3.9-1 (39-10)**
Overdrive ..... **4.1-1 (41-10), 4.3-1 (43-10)**
PowerFlite.....**©3.54-1 (39-11), 3.73-1 (41-11)**
© – D-500 has six optional ratios ranging from 3.54-1 to 4.78-1 available for use with 8¾" Pinion Ring Gear, and ten optional ratios ranging from 3.07-1 to 4.89-1 for use with 8¾" Pinion Ring Gear.
Backlash–.006-.010".
Thrust Pad Clearance (Barrel Type)–.006-.008".
Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, hub and drum assembly (Use puller C-845). *(CAUTION–Do not strike end of axle shaft to loosen hub; otherwise, possible damage to axle shaft bearings and thrust block might result).* Block brake pedal, disconnect brake line at wheel cylinders, remove axle shaft key, install sleeve C-757 in axle bearing outer oil seal before removing brake support plate from axle housing. Remove shims from each end of axle housing. (Each set should be kept separate so that at reassembly, central location of axle shafts, wheels and thrust block, will be assured). Remove axle shafts and bearings from housing (Use puller C-293-C to remove bearings from axle shafts, puller C-637 to remove inner oil seal, drift C-241 to install seal.
Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay**–.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. Coil springs and direct-acting shock absorbers.
See "Dodge" in Front Suspension Section.
Kingpin Inclination–5-1/2° at 0° camber.
Caster–Neg. 2° to 0° (Neg. 2° preferred with Manual Steering, 0° preferred with Power Steering). Left side should be between 0° and ¾° more negative than right side.
Camber–Pos. 1/4° ±3/8° (Left side Pos. ½°, Right side 0° preferred).
Toe-In – 1/8" preferred.
Toe-Out on Turns – With outside wheel at 20°, inside wheel should be 21½° ±1°.

STEERING

Manual: Gemmer. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.
Power Steering: Coaxial. Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column.
See "Coaxial" Power Steering in Steering Section.

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Form 9B

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►*JERKY OPERATION OF POWER STEERING GEAR CORRECTION:* Adjust generator drive belt (See Generator), then adjust fan drive belt so that a maximum of ¼" deflection is obtained when applying a 10 lb. pull with spring scale at middle of widest belt span.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Dodge "Safe-Guard" Lockheed hydraulic (Except D-500). Center Plane (Floating Shoe) hydraulic (D-500).

See Dodge "Safe-Guard" or "Center Plane" Brakes in Brake Section.

Drum Diameter – 12" (D-500), 11" (Others).

Wheel Cylinder Diameter–1-1/8". Single acting (front), double acting (rear wheels).

Replacement Linings & Shoes–Linings or shoes with linings are furnished Standard and .030" Oversize.

Lining–Molded asbestos (bonded to shoe).

Length (D-500) – 12.57" per shoe.

Length (Others)–(Primary, front & rear) 11.5", (Secondary, front) 11.5", (Secondary, rear) 8.8".

Width – (D-500) 2.5", (Others) 2".

Thickness – (D-500) 13/64", (Others) .200".

Braking Power – 60% front, 40% rear.

Clearance (Exc. D-500)–.006" at each end of all shoes.

Clearance (D-500)–Front Wheels – Turn each adjusting cam in direction of forward wheel rotation until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

Rear Wheels – Same as front wheels except on rear wheels forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

►*BRAKE "SQUEAK" CORRECTION:(CENTER PLANE BRAKES): See Dodge "Center Plane" Brakes in Brake Section.*

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid–Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal – Disconnect brake line tube at master cylinder. Disconnect stop light switch leads, remove four stud nuts from studs, remove master cylinder.

Power Brakes: "Integral", "Bellows" or "Piston" Assist types used. "Integral" type replaces regular master cylinder and is mounted on engine side of firewall. "Bellows" and "Piston" Assist types are mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Dodge Power Unit (Integral Type)" or Chrysler, DeSoto, Dodge, Plymouth "Bellows" or "Piston" Type Power Brakes in Brake Section.

Removal of Integral Type Power Unit – Same as for standard master cylinder, after stop light wires and hydraulic lines are removed.

Removal of "Bellows" & "Piston" Type Power Units – Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket *(NOTE* – If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers. Carefully withdraw unit from dash panel.

Parking Brak : On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Automatic Transmissions.

Adjustment–*See "Hand Brake Notes" in Dodg Special Data.*

Lining–	Width	Thickn ss	L ngth
6" Ext. Type	2"	5/32"	15-3/8"
7" Int. Type	2"	5/32"	13-1/16"

Clearance (Internal Expanding) – Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

Clearance (External Contracting) – Adjust anchor screw so clearance between band and drum at anchor is .015-.020".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite. Electric.

Car Model	Aut -Lit N .
D-63-1 Std.	EPH-4101-A
Others Std., D-63-1 Optl. (2-Speed)	EPF-4001-A

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: Dodge "Airt mp". *S e "Airtemp" Air Conditioning in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. *S "El ctric Window R gulators" in Misc. Section.*

Power Seat Adjuster: Electric type. *S e "Pow r S at Adjusters" in Miscellaneous S ction.*

Convertible Top Control: Electrical-hydraulic type. *Se "Power Top Controls" in Misc llan ous S cti n.*

►*DODGE ENGINE & EQUIPMENT NOTE:* "Red Ram" and "Super Red Ram" engines are Std. on all models. Specifications for these engines are alike and listed as "Std. V8" unless otherwise indicated.

►*OPTIONAL "500" & "500-1" ENGINES:* "500" Engine is Optl. on all models, "500-1" Engine is Optl. on Coronet only. Specifications and service data for these engines which differ from standard engines are indicated below.

MODEL IDENTIFICATION

Model	Std. Model	"500" Eng. Model
Coronet	D-66-1,2	D-500
Coronet "501"		D-500-1
Royal	D-67-1	D-500
Custom Royal	D-67-2	D-500
Suburban & Sierra	D-70	D-500
Custom Sierra	D-71	D-500

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.

Starting Serial Number - As follows.

Car Model	Detroit	Los Angeles
Coronet & Custom Coronet	35,172,001	42,620,001
Royal & Custom Royal	37,240,001	45,540,001
Sierra 6 Pass.	38,001,001	
Custom Sierra	38,535,001	

ENGINE NUMBER: Stamped on boss at center of cylinder block directly behind water pump and next to oil filler pipe.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number) Identified as follows*
"A" - All cylinders .020" Oversize.
"B" - All Main & Connecting Rod Bearings .010" Undersize.
"AB" - BOTH above conditions exist.
"♦" symbol (3/8" high) - All tappet bodies are .008" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 90-155 lbs. at cranking speed of 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 15 lbs.

VALVE TAPPET CLEARANCE: (Std. V8 & D-500) None in service (hydraulic lifters).
(D-500-1) - .015" Intake, .024" Exhaust, HOT.

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located between right exhaust manifold and "Y" exhaust pipe on right side of engine. Valve must operate freely. To install coil spring, position shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer end (tongue) of spring in upper left-hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end (tongue) of spring down around and up and over stop stud.

►*DUAL EXHAUST NOTE:* When valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - Auto-Lite AR-42 (V8 Std.), AR-32 (D-500), AGR-32 (D-500-1). Resistor type. Torque to 30-32 ft. lbs.

COIL: Auto-Lite CAH-4001B.
Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.
Resistor - Auto-Lite PU-4003. .665-.735 Ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead between ignition switch and coil. When testing coil include resistor with coil. Test without resistor will show coil to be defective.

DISTRIBUTOR: Auto-Lite.	Auto-Lite Distr. No.
V8 Std. (Exc. D-67-2)	IBP-4002
V8 Power Pkg. (Std. D-67-2)	IBP-4002B
D-500 Early	IBK-4301A
D-500 Later	IBP-4002D
D-500 Power Pkg.	IBS-4005
D-500-1	IBS-4005

NOTE - IBS-4005 & IBK-4301A are "Double Breaker" type.
Condenser - Auto-Lite IAT-2015RA (IBP Distr.), IBB-2015R (IBK Distr.). **Capacity** - .25-.285 mfd.
Contact Point Set - Auto-Lite IBP-3028AS (IBP Distr.), IGW-3028KS (IBK Distr.) - two used.
Breaker Gap - .015-.018".
Cam Angle - 27-32° (IBP Single Breaker), 36-39° (IBK & IBS Double breaker with both sets operating together). Do not set gap outside limits to obtain specified cam dwell.

►*CAM ANGLE SETTING CAUTION (IBP DISTR.)* Cam angle should be checked with vacuum line **disconnected**. Cam angle may decrease as much as 10° with maximum vacuum advance but must not decrease more than 12°

Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - IBP-4002

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0		900
1		535	2		1070
4		800	8		1600
6		1200	12		2400
8.5		1700	17		3400

Automatic Advance - IBP-4002B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		370	2		740
5		450	10		900
7		720	14		1440
8		850	16		1700

Automatic Advance - IBP-4002D

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		350	0		700
1		455	2		910
5		900	10		1800
8		2025	16		4050
9		2400	18		4800

Automatic Advance - IBK-4301A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		430	2		860
5		750	10		1500
8		1850	16		3900
9.5		2400	19		4800

Automatic Advance - IBS-4005

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1		415	2		830
3 5		450	7		900
7		1025	14		2050
8		1200	16		2400

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4002, 2B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7 1/8
1	2	7 5/8
7	14	11 7/8
12	24	16 3/4
13	26	18

Vacuum Advance - IBP-4002D

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	10 1/2
1	2	11
6	12	13 3/8
12	24	16 3/8
13	26	17 1/8

Vacuum Advance - IBK-4301A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7 1/2
1	2	8 1/8
5	10	10 7/8
10	20	15 1/8
11.5	23	17

Vacuum Advance - IBS-4005

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	9 1/8
1	2	9 7 8
5	10	12 7/8
9	18	16 1 2
10 25	20 50	18

Distributor Basic Timing & Drive Shaft Bushing: See *"Ignition Notes" in Dodge Special Data.*

IGNITION TIMING

Model	Std. Ignition Setting
Std. V8 (Exc. D-67-2)	4° BTDC
V8 Power Pkg. (Std. D-67-2)	6° BTDC
D-500 & D-500-1	6° BTDC

Timing Mark - Crankshaft pulley or vibration dampener marked "DC" at TDC point with 2° graduations before and after this mark. Align correct graduation with pointer on chain case cover.

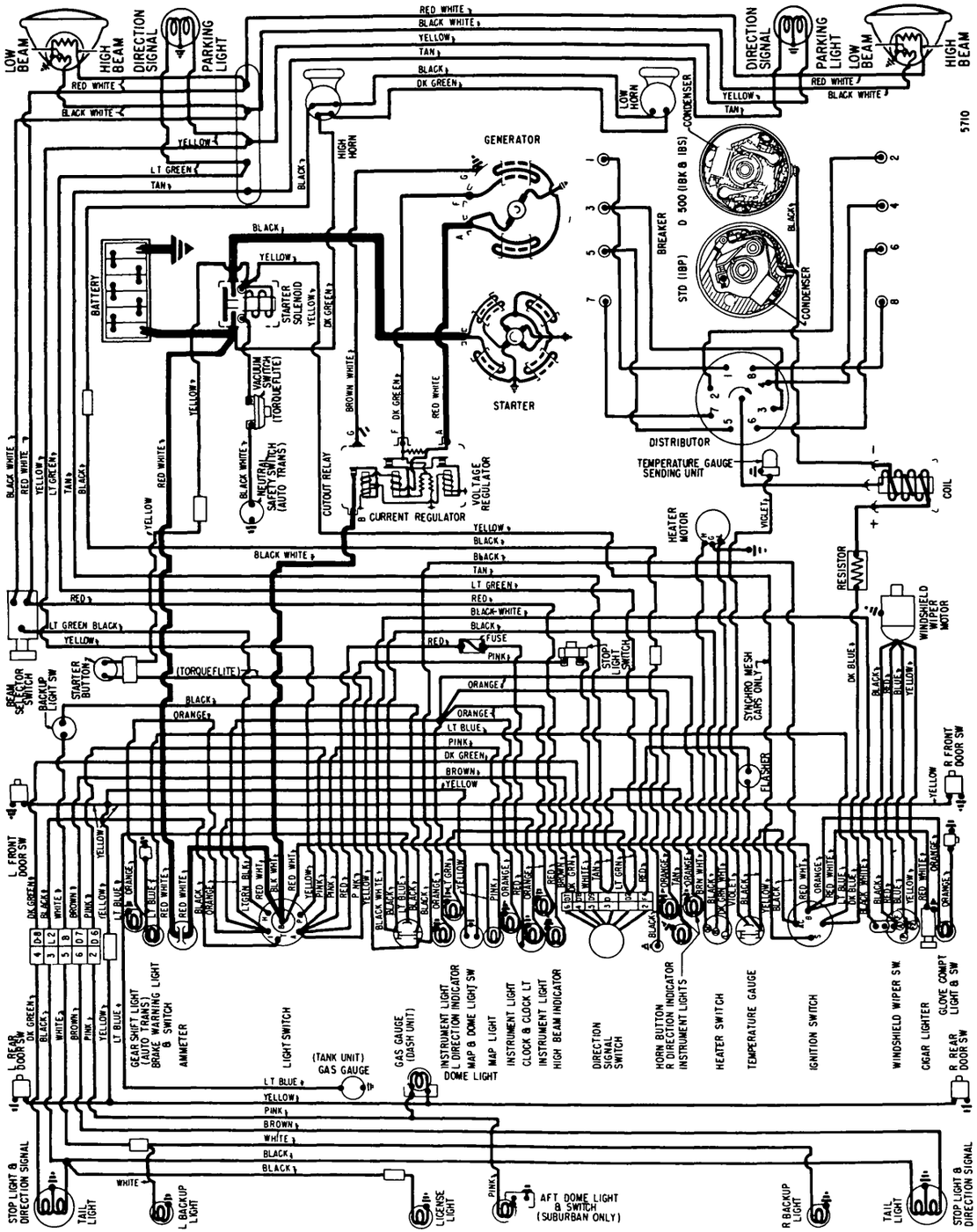
CARBURETOR

►*CARBURETOR APPLICATION: Stromberg WW 2-Barrel Carburetor used as standard equipment on Standard V8 engine, except D-67-2. Carter 4-Barrel Carburetor standard on D-67-2, D-500 and as Power Package on standard V8 engine. Two Carter 4-Barrel Carburetors used on D-500-1 and as Power Package on D-500.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

THROTTLE LINKAGE ADJUSTMENT (PowerFlite & Torqueflite Cars) Bring engine to operating temperature and adjust idle speed (in Neutral) to 475-500 RPM. Loosen throttle linkage adjusting screw located on ac-

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celerator shaft-to-carburetor rod (PowerFlite), adjusting nut located on bellcrank to intermediate throttle control (TorqueFlite). Hold rod lightly to rear against transmission stop and tighten screw (7-9 ft. lbs.) or nut. On PowerFlite 4-Barrel Carburetors, remove pedal to accelerator shaft rod at pedal arm, loosen locknut, turn ball and socket end of rod to obtain wide open throttle with pedal just against floor mat. On 2-Barrel Carburetors, adjust bellcrank to carburetor rod in same manner.

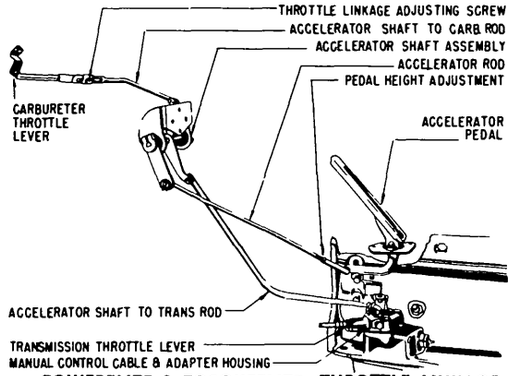
STROMBERG WW 2-BARREL

Model	Stromberg C de N .
Std. V8 (Synchro-mesh)	WW 3-149
Std. V8 (Auto. Trans.)	WW 3-150

► *MANIFOLD FUEL DISTRIBUTION- Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - 1 turn open. Adjust both screws alike Turn screws out for richer mixture.

Idle Speed - 450-500 RPM (Std. Trans.), 475-500 RPM (Auto. Trans.). In Neutral position.



POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

Float Level - 7/32" from top of main body (gasket removed) and center of float, with inlet needle seated. Use Gauge T-26019 to check float and T-24733 to bend float lip for correction.

Accelerating Pump - Normal setting, center hole, inner hole for less fuel, outer hole for more fuel.

Fast Idle - Turn throttle stopscrew out so that throttle valves completely closed. Hold throttle valves closed, back out fast idle screw until fast idle cam can be positioned with **first** step in line with fast idle screw, turn screw in until it just contacts cam, then turn screw in additional 5½ turns. Close choke valve as far as possible (fast idle screw against shoulder on cam), measure valve opening by inserting No. 12 drill (3-149), No. 24 drill (3-150) between upper edge of valve and air horn. Adjust by bending fast idle rod.

Automatic Choke Setting- *NOTE* - Choke is "Cross-over" type mounted in manifold and linked to choke valve. Should not require adjustment (must be removed from manifold well for checking). Index mark on disc should be centered on scale on thermostat cover plate.

Thr ttle Linkage Adjustment- *See CARBURETOR above.*

► *OTHER DATA: See "Stromberg WW (Dodge & Plymouth)" Carburetors in Carburetion Section*

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CARTER WCFB 4-BARREL

Model	Single Carburetor	Carter Carb. No.
Std. V8 Power Pkg. & D-67-2 (Std.)		2532S
D-500 Early (Std.)		2622S, SA
D-500 Later (Std.)		2532S
D-500 (Police)		2698S

► *STUMBLE & LEANNESS CORRECTION (2532S & 2622S) See "Carter WCFB Carburetor" in Carburetion Section.*

► *MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - 1 turn open. Turn screws out for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans.). In Neutral position.

Throttle Linkage Adjustment (TorqueFlite & PowerFlite Cars)· See *CARBURETOR above.*

► *OTHER DATA See "Carter WCFB Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL

Model	Dual (Tw Carburetor)	Carter Carb. No.
D-500 (Power Pkg.)	(Front) 2633S, (Rear) 2634S	
D-500-1	(Front) 2534S, (Rear) 2535S	

► *CARBURETOR IDLE ADJUSTMENT CHANGE NOTE· The following idle speed & mixture adjustment procedure supersedes previous instructions.*

► *MANIFOLD FUEL DISTRIBUTION RIGHT barrels feed right bank cylinders, LEFT barrels feed left bank*

► *CARBURETOR SYNCHRONIZATION NOTE* Before adjusting idle mixture and idle speed, the carburetor inter-connecting rod must be adjusted as follows Hold rear carburetor throttle in wide open position (choke off) and adjust rod at slotted end so front carburetor throttle valve will be in wide open position. Make sure rod can rotate slightly on pivots and not bind.

Idle Speed & Mixture Adjustment· Screw the "idle by-pass" screw (7/16" slotted hex head screw located on left rear side of each carburetor body flange) against its seat *(NOTE - This "by-pass screw" is no longer used for idle speed adjustment and must remain in the closed position).* Adjust engine idle speed to 650 RPM (transmission in neutral)·by screwing in the **idle speed screw** (throttle stop screw at throttle shaft lever) on the front carburetor only. Adjust all four (two on each carburetor) idle mixture screws 1 turn open from a lightly seated position. Obtain the smoothest possible idle speed by further adjusting idle mixture screws on **front** carburetor *(NOTE - It may also be necessary to re-adjust idle mixture screws on rear carburetor if adjustment of front carburetor does not provide proper idle speed).*

Throttle Linkage Adjustment (Automatic Transmission Cars)· See *CARBURETOR above.*

► *OTHER DATA See "Carter WCFB 4-Barrel Carburetor" in Carburetion Section.*

FUEL PUMP PRESSURE· 6-7 lbs.

CARB. EQUIPMENT

Fuel Pump· Carter M2502S (Std.) M2503S (D-500 & Air Conditioned Cars) **Pressure** - 6-7 lbs
See "Fuel Pumps" in Carburetion Section

Gasoline Gauge Auto-Lite Electric Type
Dash Unit - Auto-Lite 14375A
Tank Unit - Auto-Lite 14380A (Suburban), 14382A (Others)
See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY FILTER ELEMENT type Clean every 5,000 miles, replace element every 15,000 miles

► *CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Gould 11-OE-53. 12 volt, 9 plate, 53 ampere hour capacity (at 20 hr rate)
Grounded Terminal - Negative
Engine Ground - Left front of engine

STARTER

Auto-Lite MDL-6001 (D-500-1), MDL-6003 (Others).
Armature - Auto-Lite MDL-2088 (D-500-1), MDL-2006 (Others).
Drive - Solenoid Pinion Shift (D-500-1), Bendix "Folo-Thru" type, No. A3596 (Others).
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 42-53 ozs.

Performance Data - MDL-6001 & 6003

Torque	RPM	Volts	Amperes
0	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Starting Switch· Auto-Lite SAE 4001 (Std.) SAE 4002 (Auto Trans.) **Synchro-mesh & PowerFlite** - Magnetic switch controlled by Ignition & Starter Switch plus Neutral Safety Switch on transmission (PowerFlite) **TorqueFlite** - Magnetic Switch controlled by pushing In Neutral Button plus Vacuum Switch on Intake Manifold and Neutral Safety switch on outside of transmission
See "Starter Controls" in Electrical Section

Neutral Safety Switch Adjustment: *See "PowerFlite & TorqueFlite" in Transmission Section*

GENERATOR

Auto-Lite Used as follows

Application	Generator No.	Armature No.
Standard Early	GJC-7001D	GJC-2030F
Standard Later	GJC-7012A	GJC-2030F
Spec. Equip.	GGA-6001AC	GFY-2101F
Taxi	GHM-6004A	GHM-2059F
Air Cond.	GHM-6004C	GHM-2059F

► *SPECIAL GENERATOR NOTE* GJC, GGA, & GHM types generators used. Performance specifications apply equally to all generators within the three groups specified.

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data GHM (Cold - 70°F) -

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counter-clockwise at commutator end
Brush Spring Tension - 18-36 ozs. (GJC-7000), 34-41 ozs. (GGA), 35-53 ozs. (GHM).
Field Current - 1.2-1.3 Amps. (GJC), 1.1-1.3 Amps. (GGA & GHM), at 10.0 volts (70°F).
Motoring Current - 3.4-3.9 Amps. (GJC), 2.3-2.6 Amps. (GGA) 3.0-3.5 Amps. (GHM) at 10 volts (70°F).
Belt Adjustment· (Std.) - 1/4" deflection with 10 lb pull applied midway of longest span
(Air Cond.) Loosen generator mounting bolts and use Tool C-3379 & Tool C-3005 to apply .15 lbs tension to belt Tighten generator mounting bolts while holding this tension

REGULATOR

Auto-Lite VRX-6201A (GJC & GHM Gen.), VAT-6201A (GGA Gen.).

Cutout Relay

Cuts In - 12.6-13.6 volts
Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amps.
Contact Gap - .015" minimum.
Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 10.0 amperes (80°F) or with .25 Ohm resistor in series between regulator and battery.
Air Gap - .048-.052" (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

► *SETTING CAUTION· "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A - After 15 minutes operation charging at 10 amps.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).
Air Gap - .048-.052" (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps· Sealed Beam *See Electrical Section*
Directional Signals· *See Electrical Section*
Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft Headlamp knob is held on its shaft by means of a recessed hex screw
Stop Light Switch Location: On forward end of master cylinder

LIGHTING CIRCUIT BREAKERS: Used as follows
20 Ampere Protects Headlights Parking lights, and

CONTINUED ON NEXT PAGE

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Ignition light
15 Ampere. Protects Tail, Stop, License plate, Instrument, Map, Dome, Clock, Glove Compartment and Courtesy lights
5 Ampere. Protects Windshield Wiper (Std.)
6 Ampere. Protects Windshield Wiper (Variable Speed)

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc. Sect.*

ENGINE SPECIFICATIONS: 90° V8, Overhead Valves. Different engines used as follows:
"Red Ram" & "Super Red Ram" Engines - Std. on all models. These engines have polyspherical combustion chamber and single rocker arm shaft.
"D-500" & "D-500-1" Engines - "D-500" Optl. on all models. "D-500-1" Optl. on Coronet only. These engines have hemispherical combustion chamber and double rocker arm shafts, heavier pistons and connecting rods, different valve timing, and larger brakes.

Model	Bore	Stroke	Displacement
V8 Std.	3.69"	3.80"	325 cu. ins.
D-500	3.69"	3.80"	325 cu. ins.
D-500-1	3.94"	3.63"	354 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
Std. V8 ①	8.5-1	43.6	245 at 4400 RPM
Std. V8 ②	8.5-1	43.6	260 at 4400 RPM
D-500 Std.	9.25-1	43.6	285 at 4800 RPM
D-500 Pwr.Pkg.	9.25-1	43.6	310 at 4800 RPM
D-500-1	10.0-1	49.7	340 at 5200 RPM

① - Except D-67-2.
② - With Power Pkg. (Std. on D-67-2).
Compression & Vacuum Reading - *See TUNE-UP*

OIL PAN REMOVAL: 1) Disconnect steering linkage at idler arm support bracket. Remove starter, rotate crankshaft to bring timing marks to 5 o'clock position (to place counterweights out of way).
Single Exhaust - Disconnect "Y" pipe at right and left exhaust manifolds and remove heat valve. Loosen tail pipe and rear muffler support clamps and remove clamp from exhaust to "Y" pipe. Break "Y" pipe connection, move "Y" out of way. *NOTE* - To replace "Y" pipe, remove right hand torsion bar. Remove engine front supports at frame, raise front end of engine ½'.
2) Remove pan bolts, drop rear of pan and work out over top of crossmember.

ENGINE REMOVAL: *See "Engine" in Dodge Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data*

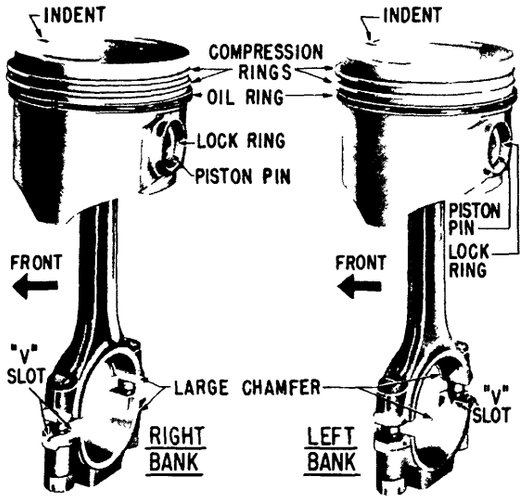
TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data*

PISTONS

Aluminum alloy, slipper type, elliptically turned, steel strut, tin plated

►*CYLINDER BORE OVERSIZE CAUTION Engines with letter "A" following engine number indicates that cylinder bores are 020" oversize*

Weight - 19.5 ozs (D-500) 22.8 ozs (D-500-1), 18.6 ozs (All others)
Removal - Pistons and rods removed from above
Clearance - Top of skirt - .00075-.00125"



DODGE V8 PISTON & ROD ASSY.

Fitting New Pistons: Invert piston in cylinder bore with .0015" X ½" feeler stock between thrust face of piston and cylinder wall. Pull required to withdraw feeler should be 5-10 lbs. at 70°F.
Replacement Pistons: Furnished in Std. and .005", .020", .030", .040" and .060" oversize
Installing Pistons: Notch on piston must be toward front of engine, *See Rod Installation below*

PISTON PINS

Floating type with lock ring at each end
Diameter - .984" (D-500-1), .922" (All others)
Length - 3.145" (D-500-1), 3.07" (All others)
Pin Fit in Piston - .0000-.0005" Tight thumb press fit at 70°F.
Pin Fit in Rod Bushing - .0001-.0004" Tight thumb press fit at 70°F. Selective fit
Replacement Pins: Std. .003", .008" oversize
NOTE - Fitted pins furnished with new pistons

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	.0015-.0030"
Compr. (2)	.0775-.0780"	.010-.020"	.0010-.0025"
Oil (3)	.1860-.1865"	① .010-.020"	.001-.003"

① - .007-.017" Muskegon rings
Replacement Rings: Furnished Std. .005", .020", .030", .040", .060" oversize
Installing Rings: "Top" mark on compression ring is to top of piston when ring is installed

CONNECTING RODS

Length (Center to Center) - 6.95" (D-500-1), 6.62" (All others)
Weight - 25.2 ozs (D-500-1) 22.5 ozs (All others)
Crankpin Journal Diameter - 2.2495-2.2505"
Maximum out-of-round and taper limits .001"
Lower Bearings - Tri-Metal Copper lead on Steel Back (D-500-1), Lead base babbitt on Steel (Others) Removable precision type. No shims

►*JOURNAL DIAMETER CAUTION ONE OR MORE Journals Machined UNDERSIZE - See "CRANKSHAFT" below*

Clearance - .0005-.0015"
End Play - .006-.014" (D-500-1), .009-.017" (All others)
Bearing Adjustment - None, replace bearings
Replacement Bearings: Std. and .001", .002", .003", .010" .012" undersize
Installing Rods: Install piston and rod assemblies with indentation in piston head toward front of engine and larger chamfer on lower end of rod toward nearest crankshaft fillet. Oil groove in rod and bearing cap must be be together (for cylinder wall lubrication)

►*CAUTION* Rods are **interchangabl** . However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangabl** with the other bank

CRANKSHAFT

Journal Diameter: 2.2495-2.2505"

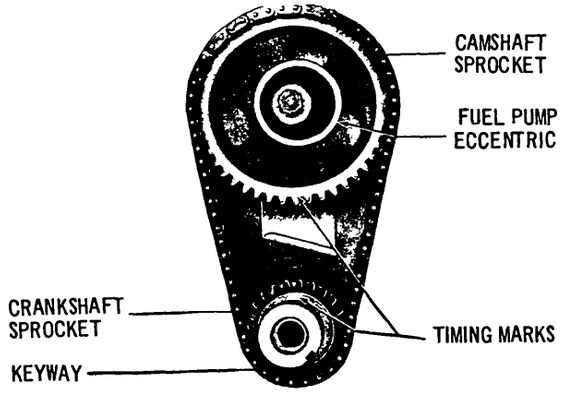
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION* Engines with undersize journals identified as follows **.010" UNDERSIZE (All Main & Connecting Rod Journals)** - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize. **.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)** - Position of undersize journals are stamped on the machined surface of the center (NO 3) counterweight in the following manner "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following the letter indicates main or connecting rod journal number (counting from front of engine)
Bearing Type - Replaceable, precision type, as follows
(Exc. D-500-1) - No. 3 is tin base babbitt on steel, all others are lead base babbitt on steel
(D-500-1) - Has Tri-metal (Copper Lead on Steel Back)
Clearance - (Exc. D-500-1 Rear Main) - .0005-.0015" (D-500-1 Rear Main) - .0015-.0025"
Replacement Bearings: Std. .001", .002", .003", .010" .012" undersize. Halves of Nos. 1, 2 and 4 bearings are interchangeable with one another (caps are not interchangeable), upper and lower halves of No. 3 bearing interchangeable, No. 5 halves are NOT INTERCHANGEABLE
End Thrust; Taken by No. 3 main bearing
End Play - .002-.007"
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data*

CAMSHAFT

►*CAUTION* Three camshafts used. One for D-500, one for D-500-1 and one for all other V8 models
Journal Diameter - (1) 2" (2) 1.984", (3) 1.96875", (4) 1.053125", (5) 1.4375"
Bearings - Removable, lead base babbitt on steel
Clearance - .001-.003" Maximum .005"
End Thrust: Taken by thrust plate behind camshaft sprocket hub
End Play - .002-.006" Maximum .010"
Timing Chain - 1 1/8" **Pitch** - .375" **Length** - 68 links
Camshaft Setting: Mark on gears should be adjacent and in line across shaft centers

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DODGE V8 VALVE TIMING MARKS

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Dodge Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data*

VALVES

Tappet Clearance: (D-500-1) - Intake .015" exhaust .024" Hot

(All Others) - Zero lash hydraulic lifters

VALVES:

Std. V8 Engines			
Valve	Head Diam.	Stem Diam.	Length
Intake	1.84"	.372-.373"	4.31"
Exhaust	1.47"	.371-.372"	4.31"
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.389"	.001-.003"
Exhaust	45°	.389"	.002-.004"

D-500 Engine			
Valve	Head Diam.	Stem Diam.	Length
Intake	1.87"	372-.373"	4.83"
Exhaust	1.53"	.371-.372"	4.85"
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.388"	.001-.003"
Exhaust	45°	.388"	.002-.004"

D-500-1 Engine			
Valve	Head Diam.	Stem Diam.	Length
Intake	1.94"	.371-.372"	5.03"
Exhaust	1.75"	.372-.373"	4.99"
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	① .444"	.001-.003"
Exhaust	45°	② .435"	.002-.004"

① - .394" (Optl. Camshaft). ② - .400" (Optl. Camshaft).

► *VALVE SEAT INSERT REPLACEMENT* *See "Valve System" in Dodge Special Data*

► *VALVE STEM OVERSIZE NOTE* Oversize valve stems are indicated by letter "I" Intake or "E" Exhaust stamped on rocker arm cover gasket boss Ream integral guides when installing valves with oversize stems furnished .005" .015" .030" oversize

Intake Valve Stem Oil Seal - Cup type seals used on all intake valve stems

► *VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3436 If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area in gauge)

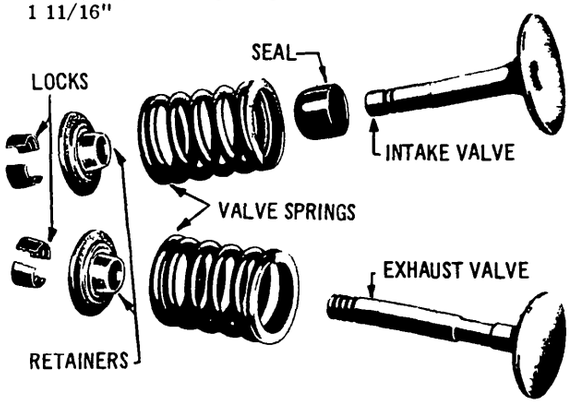
Valve Springs: Double springs used on D-500-1, Single springs used on all other models

Valve Spring Specifications

(V8 Standard)		
Valve	Lbs. Pressure	Length
Closed	72 ..	1.69"
Open	166	1.31"
(D-500)		
Valve	Lbs. Pressure	Length
Closed	78-88	1.69"
Open	170-184	1.31"

(D-500-1)				
	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	28	1.53"	60	1.66"
Open	66	1.09"	158	1.22"

► *VALVE SPRING HEIGHT CAUTION* If valves or seats are ground check installed height of spring (from counterbore in head to lower surface of spring retainer) If height exceeds 1 11/16" install 1/16" spacer under spring to bring height within limits of 1 5/8" 1 11/16"



DODGE V8 VALVE ASSEMBLIES

► *VALVE SPRING LOAD CAUTION:* Hydraulic lifter "pump up" will restrict engine speed and cause valves to burn if spring loads are not maintained

Valve Guides, (Std V8) Valve guides cast integral with cylinder head When valve stem clearance excessive use reamer tool set to ream guides for next oversize valve as follows C 3433 (379 380" 005" O S) C 3430 (389 390" 015" O S) C 3427 (404 405" 030" O S)

(D-500, D-500-1) Drive out old guides with Tool C 3159 through top of cylinder head Place steel gauge across combustion chamber and drive Intake guide down until punch mark on side of driving tool is flush with face of cylinder head Drive exhaust guide down until flat end of valve guide is flush with top of valve guide boss Use Tool C 741 to ream guide to 374-375" Intake valve guide will measure 15/16" from top of guide to top of valve seat, while Exhaust valve guide will measure 1 3/32"

► *OVERSIZE VALVE STEM IDENTIFICATION NOTE* Engines with oversize valve stems marked as follows Letter "E" (Exhaust), "I" (Intake) on rocker arm cover gasket boss indicates that all stems of valves are oversize (depending on the letter)

Hydraulic Valve Lifters: Used on all models except D-500-1

► *OVERSIZE LIFTER NOTE:* A "DIAMOND" mark on engine serial number pad indicates .008" oversize lifter bores

Diameter - .9040-.9045" **Clearance** - .0005-.0015"

Replacement Lifters - Furnished Standard and .001", .008" .030" oversize

Lifter Overhauling & Testing - *See "Valve System" in Dodge Special Data*

Rocker Arm Assembly: *See "Valve System" in Dodge Special Data*

VALVE TIMING

See "Camshaft Setting" under Camshaft above

Ⓒ V8 Std. & D-500 (Early) Valve Timing

Intake - Open 10° BTDC. Close 58° ALDC.
Exhaust - Open 56° BLDC. Close 16° ATDC.

Ⓒ D-500 (Later) Valve Timing

Intake - Open 18° BTDC. Close 58° ALDC.
Exhaust - Open 56° BLDC. Close 20° ATDC.

Ⓒ D-500-1 (Std.) Valve Timing

Intake - Open 35° BTDC. Close 65° ALDC.
Exhaust - Open 65° BLDC. Close 25° ATDC.

Ⓘ D-500-1 (Optl.) Valve Timing

Intake - Open 33° BTDC. Close 71° ALDC.
Exhaust - Open 68° BLDC. Close 36° ATDC.

Ⓘ - With valve train solid.

Valve Timing Check (V8 Std & D-500 Early) - Rotate engine to close No 1 intake valve Insert .210" spacer between rocker arm and valve stem and wait for hydraulic lifter to bleed down so valve train will be solid Mount dial indicator to register valve spring retainer movement as valve is opened Zero indicator then turn crankshaft until dial indicator reads .024" (valve lift) Pointer on timing case cover should indicate between 5° BTDC and 7° ATFC when timing is correct Reverse crankshaft rotation until indicator returns to zero and remove spacer *See "Camshaft Setting" under CAMSHAFT above*

► *CAUTION* Do not turn crankshaft further than indicated above Further movement might bottom spring and damage mechanism

OILING SYSTEM

► *ENGINE OILING SYSTEM* *See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data*

Crankcase Capacity: 5 quarts (refill) add 1 quart when filter changed

Normal Oil Pressure: 50-65 lbs at 1500 RPM

Oil Pressure Relief Valve - Mounted in oil pump

► *RELIEF VALVE SPRING NOTE* Three types of springs available Replace with correct color spring *See "Relief Valve Spring Specifications" below*

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R li f Valv Spring Specifications

Spring Col r	Lbs. Pressure	Length
Gray (Light)	16 1-17 1 .	3 1/32"
Red (Standard)	19 5-20 5	.2 27/32"
Brown (Heavy)	22 9-23 9	2 31/32"

Free Length - 2 1/16"

Oil Pressure Gauge: Mechanical

Oil Pump: Mounted on rear main bearing cap Rotor type with strainer mounted on oil pump body Strainer must be mounted parallel with bottom of cylinder block

Overhaul - *See "Oiling System" in Dodge Special Data*

► *OIL PUMP INSTALLATION NOTE:* Prime oil pump before installing on rear main bearing cap.

Oil Filter: Full flow (D-500-1), Shunt type all other models Shunt type filters only a portion of pump output, balance of output goes directly into engine lubrication system

Filter Element - Install new filter element and cover gasket at 5,000 miles intervals (or earlier if required) Change oil at same time filter element is changed

Crankcase Ventilation: Filter element in crankcase filler Cap and breather tube at rear of crankcase NOTE - Remove air cleaner in ventilator pipe (when so equipped) wash in kerosene and reoil

COOLING

Water Capacity: 21 quarts (D-500-1), 20 quarts (all other models) Add 1 quart for heater

► *AIR CONDITIONER OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation

Pressure Valve: 14 lb radiator filler cap (All models)

Thermostat: Pellet type In water pump to radiator connector Starts to open at 157-162°F

Water Pump: Packless type Sealed ball bearing type No lubrication required

See "Water Pumps" in Dodge Special Data.

Pump Removal - Drain cooling system, remove fan shroud (air conditioned cars), loosen fan belt, loosen idler pulley (air conditioned cars) Remove fan spacer and pulley, remove mounting bolts and water pump

Fan Belt Adjustment (Air Conditioned Cars); 1/8" deflection with 10 lbs pressure midway between idler and water pump pulleys

NOTE - For Generator belt adjustment see Generator above

T mperature Gauge: Auto-Lite Electric type

Dash Unit - Auto-Lite 14377A

Engine Unit - Auto-Lite 14405A

See "Temperature Gauges" in Misc Section

CLUTCH

Borg & Beck. Used as follows

Model	Borg & Beck No.	Disc No.
D66 70,10A8(Std)	361417	382531
D67,71,500-1,11A8	361447	382626
D66,70,11A8(H D)	361428	381850

See "Borg & Beck" Clutches in Clutch Section

P dal Adjustment· Adjust the fork rod to secure 3/16" free movement of clutch fork outer end This adjustment will provide necessary 1" free play at pedal

Ov r-Center Spring Adjustment: (NOTE - Over center spring located above clutch pedal and attached to pedal mounting bracket) Release clutch rod at clutch pedal Back off adjusting nut to release over-center spring Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch Reinstall clutch rod to clutch pedal

Removal: Remove transmission and clutch housing pan, pull out clutch release bearing and sleeve Mark clutch cover and flywheel Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession to release spring tension until cover is free) Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section*

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: Drain lubricant, disconnect propellor shaft, speedometer cable, gear shift control rods. Remove back-up light switch (if so equipped), and speedometer drive pinion For transmission overhaul, or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281). Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748) Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed transmission

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite" Transmission in Transmission Section*

► *TESTING & TROUBLE SHOOTING. See "PowerFlite" Transmission in Transmission Section*

Lubrication: Check fluid every 1,000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid type "A"

Checking Fluid Level - *See "TorqueFlite" below*

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER POWERFLITE SERVICE DATA: See "PowerFlite" Transmission in Transmission Section*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed transmission

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "TorqueFlite" Transmission in Transmission Section*

► *TESTING & TROUBLE SHOOTING: See "TorqueFlite" transmission in Transmission Section*

Lubrication: Check fluid every 1,000 miles, drain and refill every 20 000 miles with Automatic Transmission Fluid type "A"

Checking Fluid Level - *CAUTION - Following procedure and fluid l vel supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

C ld Transmission (After standing and bef r being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driv n s v ral miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER TORQUEFLITE SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear

Rear Universal Joint Op rating Angl - *See "Propellor Shaft Notes" in Dodge Special Data*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive *NOTE* 'Two pinion gear type differential used in all models

See "Dodge Hypoid" in Rear Axle Section

► *REAR AXLE LUBRICANT LEVEL CAUTION* Recommended lubricant capacity of 3½ pints will bring lubricant level to ½" below bottom of filler plug opening. DO NOT ADD lubricant to bring level up to bottom of filler plug opening.

Ratios:	Std. Trans.	PowerFlite	T rqu Flite
D-66	3 73 (41-11)	3 36(37-11)	3 18(35-11)
D-67	3 73 (41-11)		3 18(35-11)
D-70 D-71	3 91 (43-11)		3 36(37-11)
D-500	①3 73 (41-11)		②3 18(35-11)
D-500-1	③3 73 (41-11)		②3 18(35-11)

① - 3 54(39-11), 3 91(43-11) Optl

② - 3 36(37-11), 3 54(39-11) Optl

③ - 2 92(38-13), 3 18(35-11), 3 36(37-11), 3 54(39-11), 3 73(41-11), 3 91(43-11), 4 1(41-10), 4 3(43-10), 4 56 (41-9), 4 89(44-9), 5 12(41-8), 5 38(43-8), 5 83(35-6), 6 17(37-6)

Backlash - 006- 010"

Carrier Removal: Remove axle shafts (see below), disconnect rear universal joint, remove differential carrier capscrews lift out carrier assembly

► *RANJC HOUSING INSTALLATION NOTE* Check rear universal joint angle *See "Propellor Shaft Notes" in Dodge Special Data*

Axle Shaft Removal: Jack up car, remove wheels, hub and drum assembly (Tool C-845) Block brake pedal, disconnect brake line at wheel cylinder, remove axle key, brake and dust shield Note number of shims removed from axle housing, use puller Tool C-499 to remove axle shaft and bearing, remove inner seal (Tool C-637)

Wheel Bearing Adjustment: Shims between backing plate

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and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay** - .003-.008"

SHOCK ABSORBERS

"**Oriflow**". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Ind pendent. New "Torsion-Aire" type with ball joints and torsion bar springing.

See "Torsion-Aire" in Front Suspension & Wheel Alignment Section.

St ring Axis Inclination - 6 1/2° at 0° Camber.

Cast r - (Manual Steering) Neg. ¾° ± ¾°, (Power Steering) Pos. ¾° ± ¾°. *NOTE* - Both sides should be set at same dimension.

Camber (Right Wh l) - 0° ± ¼°, 0° preferred.

Camber (L ft Wh l) - Pos. ¼° ± ¼°, Pos. 3/8° preferred.

► *CASTER & CAMBER ADJUSTMENT NOTE: Adjusting shims located between upper control arm support bracket and frame side rail.*

Toe-In - 3/32-5/32". 1/8" preferred.

T -Out on Turns - With outer wheel at 20°, Inner wheel should be 21°37'.

STEERING

Manual: G mm r. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

P w r St ring: Co-Axial. Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering wheel.

See "Co-Axial" Power Steering in Steering Section.

Ste ring Linkag : *See "Steering Linkage" in Steering Section.*

St ring Wh l & Horn Butt n R m val: *See "Gemmer Worm & Roller" in Steering Section.*

St ring G ar R m val: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: "Total-Contact" (Floating Shoe) type.

See "Chrysler, De Soto, Dodge, Flymouth Center-Plane" Brakes in Brake Section.

Drum Diameter - 12" (D-500-1), 11" (All Others).

Wheel Cylinder Diameters - 1 1/8". Single acting (front), double acting (rear).

Replacement Lining & Shoes - Linings or shoes with linings furnished Standard and .030" oversize.

Lining - Molded asbestos (bonded to shoe).

Lining Width - (D-500-1) 2.5" All. **(All Others)** 2.5" (Front), 2.0" (Rear with 2.5" used on 4-Door Hardtops and Convertibles).

Length - 16.6" (D-500-1), 11.5" (All others).

Thickness - .20" All models.

Clearance - Front Wheels - .006". Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked. Turn cams in opposite direction until no drag is felt.

Rear Wheels - .006". Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation.

Braking Power - D-66, D-67 65% Front, 35% Rear (except 4-Door Hardtops & Convertibles which are 60% Front, and 40% Rear).

All Others - 60% Front, 40% Rear.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Rem val - Disconnect pedal return spring, pushrod, brake tube and stop light switch leads. Remove master cylinder to dash bolts, slide master cylinder straight out from dash.

Power Brakes: New "Oval Piston Assist" type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "De Soto, Dodge Oval Type Piston Power Unit" in Brake Section.

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm). Mark across power unit adjacent to vacuum test port and mounting bracket; and between mounting bracket and firewall. Disconnect vacuum hose, remove bolts securing bracket to firewall, slide unit and bracket straight forward.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans., internal expanding type used with Automatic Trans.

Adjustment - *See "Brake Notes" in Dodge Special Data.*

Lining	Width	Thickness	Length
6" Ext. type	2"	5/32"	15.38"
7" Int. type	2"	5/32"	13.44"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite electric. EPW-4001A (Single Speed), EPV-4001B (Variable Speed).

Air Conditioning: Heater-Air Conditioning.

See "Air Conditioning" in Miscellaneous Section.

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.

See "Electric Window Regulators" in Misc. Section.

Power Seat Adjusters: Electric, 6-Way type.

See "Power Seat Adjusters" in Misc. Section.

Convertible Top Control: Electrical-hydraulic type.

See "Power Top Controls" in Misc. Section.

MODEL IDENTIFICATION

Model	Model Identification
Coronet Standard	LD1-1
Coronet Custom	LD1-2

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.

Starting Serial Number - As follows:

Model	Detroit	Los Angeles	Newark
LD1-1	LD1-1001	LD1L-1001	LD1N-1001
LD1-2	LD1-1001	LD1L-1001	LD1N-1001

ENGINE NUMBER: Stamped on boss on left front section of cylinder block.

► *ENGINE NUMBER LETTERS (Following Engine Number): Identified as follows:*
"A" - ALL cylinder bores .020" oversize.
"B" - ALL Main & Connecting Rod Bearings .010" undersize. "AB" - BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed (150 RPM min.). Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 18-20" at idling speed.

VALVE TAPPET CLEARANCE: .010" Intake and Exhaust (Hot and idling). *NOTE* - Tappet screws are self-locking.

► *CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for **exhaust** tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type with counterweight. Valve should operate freely. When installing coil, place coil spring in position over shaft slot, with outer end (tongue) of spring in the upper left hand position (10 o'clock). Press inner end of coil into slot and seat firmly. Move outer end of spring down (counter-clockwise), around and up over stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Plugs - Auto-Lite Resistor Type AR51. 14 mm. Torque to 30-32 ft. lbs.

COIL: Auto-Lite CAG-4001B.

Ignition Current - 1.8 amps. idling, 2.4 amps. stopped.
Resistor - None used.

DISTRIBUTOR: Auto-Lite IBR-4001.

Condenser - Auto-Lite IAT-2015RA. **Capacity** .250-.285 mfd.
Contact Point Set - Auto-Lite IGW-3028BS.
Breaker Gap - .020". Limits .018-.022".
Cam Angle - 36-42°. DO NOT exceed breaker gap limits to obtain dwell.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degreesm Eng.	RPM
Start	350	0	700
1	460	2	920
6.5	1050	13	2100
7.5	1425	15	2850
8.5	1800	17	3600

Vacuum Spark Control: Integral type.

Vacuum Advanc

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10½
8	16	13¾
9.5	19	16

IGNITION TIMING

Setting - 2° BTDC.
Timing Mark - 2° BTDC mark on vibration damper under pointer on front cover.

CARBURETOR

Stromberg WW, Code 3-159 (Synchro-mesh), 3-160 (Auto. Trans.). Dual downdraft type.

► *CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

► *MANIFOLD FUEL DISTRIBUTION: Each barrel feeds all cylinders.*

► *HARD STARTING OR STALLING WITH COLD ENGINE CORRECTION:* May be due to improper choke or fast idle screw adjustments. *See "Stromberg WW Carburetors" in Carburetion Section.*

Idle Setting - ¾-1¼ turns open. Adjust both screws alike. Turn screw out for richer mixture.
Idle Speed - 450-500 RPM with transmission in neutral.
Float Level - 3/16" from top of main body (gasket removed) to top of float, with gauge (Tool T-25569) at center of float and float lip held firmly against fuel inlet needle. To adjust, bend float lip (Tool T-24733).
Accelerating Pump - Normal setting, center hole; for less fuel install rod in inner hole; for more fuel install rod in outer hole.

Fast Idle Speed: With choke cover removed, place one cover screw through Spring Tool T-25906 and attach Tool to housing above choke lever. Hook other end of spring to long tang of Thermostat lever. Remove spring from throttle stopscrew and replace screw only. Close throttle valves, turn stopscrew in until it contacts lever, then continue to turn screw in 5 1/8 turns. Hold choke valve closed and bend cam contact ear so that No. 48 drill rod will just go between ear end of contact lever and first step of fast idle cam. *NOTE* - Ear must be parallel to throttle shaft after bending. Replace throttle stopscrew spring.

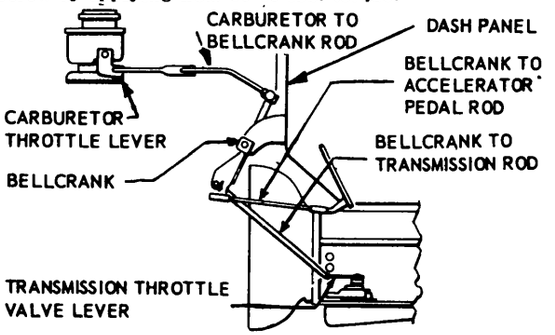
Fast Idle Cam Setting: Open throttle valve to clear fast idle cam, close choke valve lightly. Force throttle closed against tension of cam positioning spring. Ear on cam contact lever should just clear high step of fast idle cam (Max. .020"). Bend fast idle rod as necessary.

Automatic Choke Setting: Centered (At Index).

Dashpot Adjustment: Push plunger in to end of its stroke. With throttle stopscrew set at normal idle speed, there should be 1/16-3/32" clearance between end of dashpot plunger and ear of throttle lever. Adjust by loosening locknut and turning dashpot in bracket.

► *OTHER DATA: See "Stromberg WW Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment (PowerFlite Cars): Adjust engine idle to 475-500 RPM with transmission in neutral. Loosen throttle linkage adjusting screw (located on throttle control rod from bellcrank to carburetor). While holding throttle control rod against closed throttle stop, move bellcrank arm just enough to start extending accelerator return spring. **(Do not extend spring more than 1/8" in opposite direction).** With control rods in line and preloaded lightly, lock throttle control rod adjusting screw by applying from 10-15 lbs. torque.



POWERFLITE TRANSMISSION LINKAGE

CARB. EQUIPMENT

Fuel Pump: Carter M2609S. Mechanical type.
Pressure - 4-6 lbs.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite. Electric type.
Dash Unit - Auto-Lite 14515A.
Tank Unit - Auto-Lite 14673A (22" lead Female), 14676A (4½" lead Male).
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 5,000 miles, replace element every 15,000 miles.

► *CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Auto-Lite 11-HS-50, Willard HO-11-50, or Gould 11-OE-53. 12 volt, 9 plate, 50 ampere hours capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front of engine.

STARTER

Auto-Lite MDM-6001 (Std.), MDL-6004 (Auto. Trans.).
Armature - Auto-Lite MDL. 2088 (All).
Drive - Bendix "Folo-Thru" No. A3596.
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 31-47 ozs.

Performance Data - MDL

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Performance Data - MDM

Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (Auto. Trans.). Magnetic switch controlled by ignition switch. Neutral safety switch mounted on transmission

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on Automatic Transmission cars. See *"Starter Controls" in Electrical Section.*

Neutral Safety Switch Adjustment: See *"PowerFlite" in Transmission Section.*

GENERATOR

Auto-Lite GJC-7012A (Std.), GGA-6001AC (Spec. Equip.), GHM-6004A (Taxi).

Armature - Auto-Lite GJC-2030F (GJC-7012A), GFY-2101F (GGA-6001AC), GHM-2059F (GHM-6004A).

Performance Data-GJC-7012A

Amperes	Volts	RPM
0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA-6001AC

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600

Performance Data - GHM-6004A

Amperes	Volts	RPM
5.0	14:0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC); 34-41 ozs. (GGA); 35-53 ozs. (GHM).

Field Current - 1.2-1.3 Amps. (GJC); 1.1-1.3 Amps. (GGA & GHM) at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 Amps. (GJC); 2.3-2.6 Amps. (GGA); 3.0-3.5 Amps. (GHM) at 10.0 volts (70°F).

Belt Adjustment: Torque Method - Loosen all mounting bolts and apply specified torque (see below) using Adjusting Bracket, Tool C-3379, and a torque wrench.

Belt Torque Specifications (Ft. Lbs.)

Belt	New	Used
Std. Fan & Generator	30	20
Generator with Power Strng	17	10

Deflection Method - Measured in inches (see below) midway between pulleys under a five-pound push or pull.

Belt Deflection Specifications (Inches)

Belt	New	Used
Std. Fan & Generator	3/32"	5/32"
Generator with Power Strng	1/8"	7/32"

REGULATOR

Auto-Lite VRX-6201A (GJC & GHM Gen.), VAT-6201A (GGA Gen.).

Cut out Relay

Cuts In - 12.6-13.6 volts

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amps.

Contact Gap - .015" minimum.

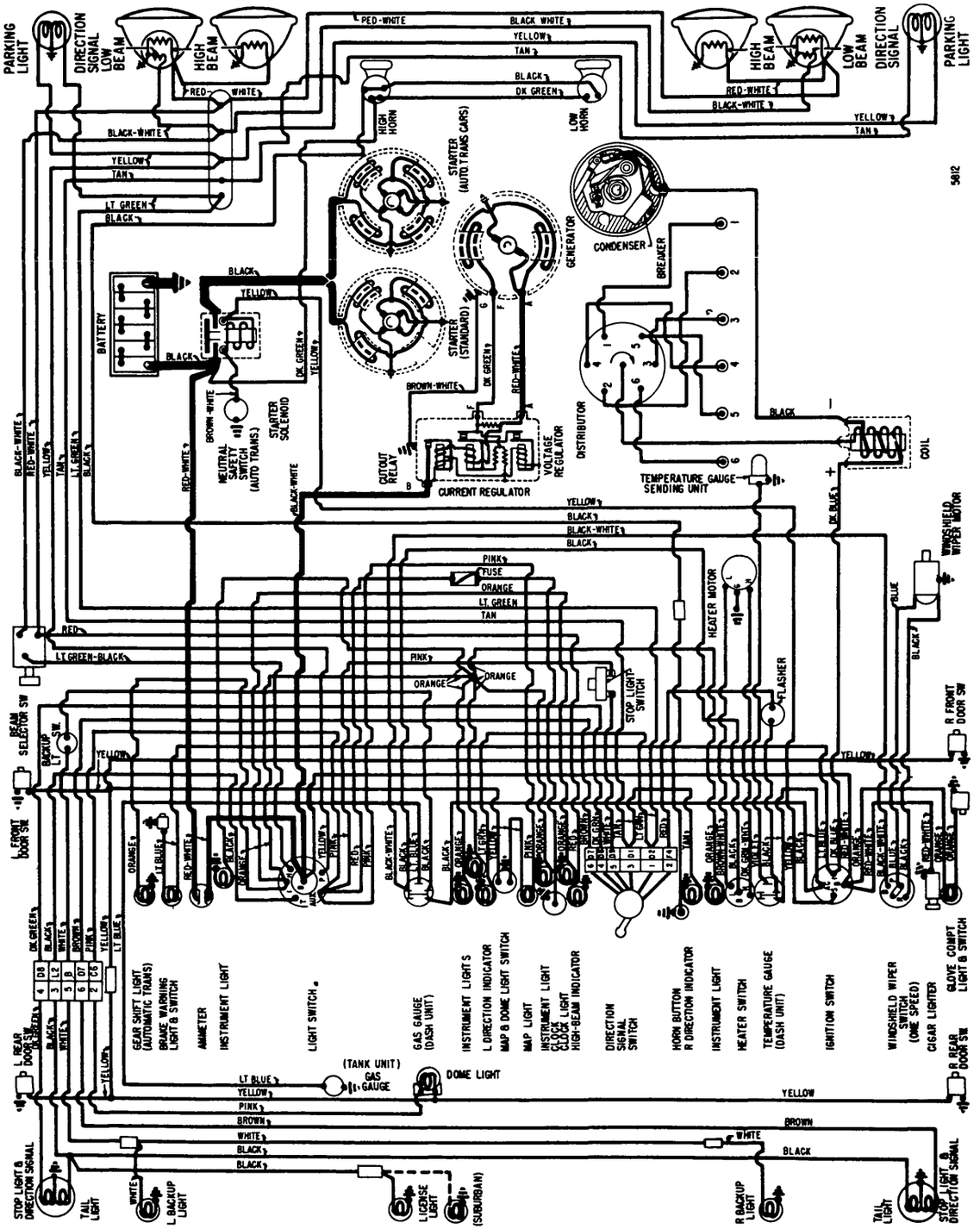
Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 10.0 amperes (80°F) or with .25 Ohm resistor in series between regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

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Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A - After 15 minutes operation charging at 10 amps.

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.7-13.9 volts (VAT), 13.6-13.8 (VRX).

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by means of a recessed hex screw.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Used as follows:

23 Ampere - Protects headlights, high beam indicator, ignition switch light. Located in headlight switch.

15 Ampere - Protects all other lighting circuits (except direction signals). Located in headlight switch.

6 Ampere - Protects windshield wiper (variable speed). In wiper switch.

5 Ampere - Protects windshield wiper (single speed). In wiper switch.

FUSES: 3 Ampere - Protects clock. In clock lead.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc. Section.*

ENGINE SPECIFICATIONS: Six Cylinder "L" head.

Bore	Stroke	Displacement
3.25"	4.63"	230.2 Cu. ins.

Compr. Ratio	Rated HP	Developed HP
8.0-1	25.35	138 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Dodge Special Data.*

►*MANIFOLD INSTALLATION CAUTION:* Two long capscrews extend into cylinder block water passage. Before installing, apply sealer to these capscrews. It is important that conical washers at flange ends of exhaust manifold be installed to permit expansion and contraction without loosening.

OIL PAN REMOVAL: Drain engine oil. As soon as oil is drained, install drain plug and tighten securely. Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal. Remove oil level indicator and drop pan on tie rod. Lift up oil strainer so it clears baffle inside pan. With strainer lifted, slide pan to rear and remove. NOTE—New end gaskets should protrude 1/4" to 1/8" above oil pan. *Ends must not be cut off.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" oversize.*

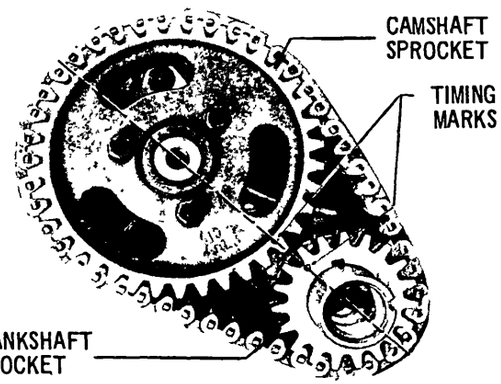
Weight—16 ozs. (stripped).

Removal—Pistons and rods removed from above.

Fitting New Pistons: .0008" clearance, ¼-¾" from bottom of skirt. Pull to withdraw ribbon feeler ½" wide, .002" thick, placed at right angles to piston pin (piston inverted) should be from 6-10 lbs.

Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.

Installing Pistons: "U" slot away from valves.



DODGE 6 CYL. VALVE TIMING MARKS

PISTON PINS

Full floating type.

Diameter—55/64". **Length**—2-3/4".

Pin Fit in Piston—.0000-.0005". DOUBLE THUMB push fit at room temperature (70° F.)

Pin Fit in Rod Bushing—.0001-.0002". Tight thumb push fit at room temperature (70° F.)

Replacement Pins: Std., .003", .008" oversize.

NOTE—Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (No. 3 & 4)	5/32"	.010-.020"	.001-.0025"

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" oversize.

Installing Rings: #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center to Center)—7-13/16". **Weight**—27.9 ozs.

Crankpin Journal Diameter—2.0625".

Maximum out-of-round and taper limits—.001"

Lower Bearings - Removable, precision type, tin-base babbitt on steel. No shims.

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below.*

Clearance—.0005-.0015".

Endplay—.006-.011".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std. and .001", .002", .003", .010", .012", .020", .030", .040" undersize.

Installing Rods: Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter—2.4995-2.5005". Four bearing.

Bearing Type - Removable, precision type. Lead-base babbitt on steel, except thrust bearing, which is tin-base babbitt on steel. No shims.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows: **.010" UNDERSIZE (All Main & Connecting Rod Journals)**—Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

Clearance—.0005-.0015" desired.

Replacement Bearings: Std. and .001", .002", .003", .010", .012", .020", .030", .040" undersize.

End Thrust: Taken by flanged faces on rear (#4) main bearing. **Endplay**—.003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

Journal Diameters—(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".

Bearings—Removable, steel-backed babbitt lined bushings (exc. #4—machined in crankcase).

Clearance—.001-.003". NOTE—If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain: **Width**—1". **Pitch**—.500". **Length**—24" or 48 links.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Camshaft Setting: Sprockets marked. Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Dodge Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data.*

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VALVES

Tappet Clearance: .010" Intake. .010" Exhaust (engine hot and idling). NOTE—.002" additional clearance on exhaust tappets if car driven at continuous high speed.

Valve	Head Diameter	Stem Diameter	Length
Intake	1 17/32"	.340-.341"	4.84"
Exhaust	1 13/32"	.340-.341"	4.89"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	001-.003"
Exhaust	45°	.365"	003-.005"

Valve Seat Width—1/16-3/32". Runout .0015" maximum.

►*VALVE SEAT INSERT CAUTION: See "Valve System" in Dodge Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance (See Valve Stem Clearance above). *CAUTION—Guides must be installed with counterbored end UP on exhaust valves and counterbored end DOWN on intake valves.*

Valve Springs: Install with closely coiled end up.

Free Length - 2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1 3/4"
Valve Open	110-120 lbs.	1 3/8"

Valve Lifters: Mushroom type (remove from below).

Stem Diameter - 5/8". Ream holes from above (pilot in guide). Furnished .001", .008", .030" Oversize.

Lifter Clearance - .0002-.001".

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*

►*VALVE TIMING NOTE: The following valve opening and closing points are with .014" lifter clearance*

Intake Valves - Open 12° BTDC. Close 44° ALDC.

Exhaust Valves - Open 50° BLDC. Close 6° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 quarts. Add 1 quart when changing filter element.

Normal Oil Pressure: 40-45 lbs. at 1500 RPM.

Oil Pressure Relief Valve - Located on left side of block below starting motor.

►*RELIEF VALVE SPRING NOTE:* Three types of spring available. Replace with correct color spring as follows:

Relief Valve Spring Specifications

Spring Color	Lbs. Pressure	Length
Red	12 4-13.8	1 1/4"
Std. (No color)	14.4-15.8	1 1/4"
Green	16.2-17.8	1 1/4"

Free Length - 1 13/16".

Oil Pressure Gauge: Auto-Lite 14517A Mechanical type.

Oil Pump: Rotor type on right side of crankcase

Overhaul—See *"Oiling System" in Dodge Special Data*

Oil Filter: By-pass type. On left side of engine above starter.

Servicing—Install new filter element and cover gasket at 8000 mile intervals (more often in dusty areas). Change oil at same time filter is changed.

Crankcase Ventilation: Filter in oil filler tube and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 13 qts Add 1 qt for heater.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 16°F (above zero) for summer operation.*

Pressure Valve: 14 lb radiator filler cap (All models)

Thermostat: Pellet type. In water outlet connection on cylinder head Starts to open at 157-162°F.

Water Pump: Packless type. Ball bearing type. No lubrication required

See "Water Pumps" in Dodge Special Data.

Pump Removal - Drain cooling system, remove fan belt, disconnect hoses at pump, remove pump mounting studs, remove pump.

Water Distributing Tube: *See "Cooling System" in Dodge Special Data*

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14518A.

Engine Unit - Auto-Lite 14405A

See "Temperature Gauges" in Misc Section

CLUTCH

Borg & Beck. 9A7 No. 361384 (Std.), 10A8 No. 361463 (H.D.). **Auburn.** No. 100131-2 (Optional).

Clutch Disc - Borg & Beck 362649 (Std.), 381758 (H D)

See "Borg & Beck" & "Auburn" Clutches in Clutch Sect

Pedal Adjustment: Adjust the fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: *NOTE* - Over-center spring located above clutch pedal and attached to pedal mounting bracket Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch, 5 full turns for 9 1/4" clutch Reinstall clutch rod to clutch pedal.

Removal: Remove transmission, clutch housing pan, pull out clutch release bearing and sleeve Mark clutch cover and flywheel Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession) to release spring tension until cover is free Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section*

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: Drain lubricant, disconnect propellor shaft, speedometer cable, gear shift control rods Remove back-up light switch (if so equipped) and speedometer drive pinion For transmission overhaul or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281) Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748) Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A". *NOTE* - Under severe operating conditions drain and refill at 10,000 mile intervals.

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" below "L" mark. Add or drain fluid as necessary to maintain this level.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral fluid level should be between ½" above "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Dodge Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive.

See "Dodge Hypoid" in Rear Axle Section.

►*"SURE GRIP" AXLE NOTE:* Optional in all ratios and similar in design to Power-Lock (Plate Clutch Type) Differential Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

Axle Ratios: Synchro-mesh - 3 9-1 (43-11) Standard, 3.73-1 (41-11) or 4 1-1 (41-10) Optional

PowerFlite - 3 73-1 (41-11) Standard, 3.54-1 (39-11) or 3 9-1 (43-11) Optional

►*BANJO HOUSING INSTALLATION NOTE* Check rear universal joint operating angle. *See Propeller Shaft Notes" in Dodge Special Data.*

Carrier Removal: Remove axle shafts (see below) disconnect rear universal joint, remove differential carrier cap screws, lift out carrier assembly

Axle Shaft Removal: Jack up car remove wheels, hub and drum assembly (Tool C 815) Block brake pedal, disconnect brake line at wheel cylinders, remove axle

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key, brake and dust shield. Note number and remove shims from each axle housing, use puller Tool C-499 to remove axle shaft and bearing, remove inner oil seal (Tool C-637).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .005", .010", .0125", .015", .030" thick) equally at both wheels. **Endplay** - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

"Torsion-Aire" suspension, with ball joint mounted steering knuckle and torsion bar front springs.

See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 5¾-7¼° at 0° Camber.

Caster - (Manual Steering) Neg. ¾° ±¾°. (Power Steering) Pos. ¾° ±¾°. *NOTE* - Both sides should be set at same dimension.

Camber (Right Wheel) - 0° ±¼° 0° preferred.

Camber (Left Wheel) - Pos. ¼° ±¼°. Pos. 3/8° preferred.

Toe-In - 3/32-5/32". 1/8" preferred.

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46'.

STEERING

Manual: Gemmer. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: New "Constant Control Full Time" power steering.

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

►*MASTER CYLINDER PRODUCTION CHANGE & FREE-PLAY ADJUSTMENT NOTE:* Later cars without power brakes have new master cylinder, Part No. 1829400, with built-in pedal stop to eliminate pedal freeplay adjustment.

Service: "Center Plane" (Floating Shoe) hydraulic type. *See "Chrysler, DeSoto, Dodge & Plymouth Center Plane & Total Contact Brakes" in Brake Section.*

Drum Diameter - 11" front & rear.

NOTE - 12" brakes optional.

Wheel Cylinder Diameter - 1 1/8" front & rear. Two single acting cylinders on front, one double acting cylinder on rear.

Lining - Molded asbestos bonded to shoe.

Width - 2½" front, 2" rear (2½" rear on 4-door hardtops).

Length - 11½" all shoes. **Thickness** - .20" all shoes.

Braking Power - 60% front, 40% rear.

Clearance - Front Wheels - .006". Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked. Turn cams in opposite direction until no drag is felt.

Rear Wheels - .006". Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pedal return spring, push rod, brake tube, and stop light switch leads. Remove master cylinder to dash bolts, slide master cylinder straight out from dash.

Power Brakes: "Oval Piston Assist" type, Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "De Soto, Dodge Oval Piston Type Power Unit" in Brake Section.

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm). Mark across power unit adjacent to vacuum test port and mounting bracket; and beween mounting bracket and firewall. Disconnect vacuum hose, remove bolts securing bracket to firewall, slide unit and bracket straight forward.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Automatic Trans. **Adjustment** - *See "Brake Notes" in Dodge Special Data.*

Lining	Width	Thickness	Length
6" Ext. type	2"	5/32"	16.68"
7" Int. type	2"	5/32"	© 13.06"

© - Total both shoes.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite electric. EPW-4001A (Single speed), EPV-4001B (Variable speed).

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Electric 6-Way Type.

See "Power Seat Adjusters in Misc. Section.

►*DODGE ENGINE & EQUIPMENT NOTE: "R d Ram" (325 cu. in. displac m nt), is standard quipm nt n "LD2" mod ls. "Super R d Ram" (350 cu. in. displac - .m nt), is standard on "LD3" models. "D-500" (361 cu. in. displac m nt), is optional on all models.*

MODEL IDENTIFICATION

M d l	Model Identification
Coronet Standard	LD2-L1
Coronet Custom	LD2-L2
Royal	LD2- M
Suburban & Sierra	LD3-L
Custom Royal	LD3-H
Custom Sierra	LD3-H
D-500 (Coronet & Royal)	LD2-S
D-500 (Custom Royal, Suburban & Custom Sierra)	LD3-S

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Starting S rial Number - As follows:

M d l	D tr it	Los Angeles	Newark
LD2-L1, L2, M	LD2-1001	LD2L-1001	LD2N-1001
LD3-H, L	LD3-1001	LD3L-1001	LD3N-1001
LD2-S	LD2-1001		
LD3-S	LD3-1001		

ENGINE NUMBER: Stamped on boss at center of cylinder block directly behind water pump and next to oil filler pipe.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Numb r): Id ntifi d as follows:*

"A" - All Cylinders .020" oversize.

"B" - All Crankshaft Journals .010" undersize.

"AB" - Both above conditions exist.

"MALTESE CROSS" (3/8" high) - ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*

"♦" (3/8" high) - ALL Valve Lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: With engine turning over at 150 RPM (minimum), plugs removed, and throttle valves wide open, pressure should be as follows:

R d Ram Engin - 90-155 lbs. Maximum variation between cylinders should not exceed 15 lbs.

Sup r R d Ram & D-500 Engines - 150-180 lbs. Maximum variation between cylinders should not exceed 25 lbs.

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely. To install coil spring, position shaft in extreme counterclockwise position. Place coil spring in position over shaft slot, with outer end (tongue) of spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end of spring (tongue) one complete revolution counterclockwise and hook over stop stud.

►*DUAL EXHAUST NOTE: When valve is closed, most xhaust gas s ar discharged through left exhaust pipe.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylind rs - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - Auto-Lite AGR-42 (Red Ram), AR-42 (Super Red Ram & D-500 with Fuel Inj.), AR-32 (D-500 exc. Fuel Inj.). *NOTE* - For high speed or heavy duty operation use AR-32

COIL: Auto-Lite CAH-4001E (LD2 Models), CAH-4001A (All Other Models).

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-4008.

►*COIL RESISTOR NOTE: Resistor is connected in lead between ignition switch and coil.*

DISTRIBUTOR: Auto-Lite. As follows:

Model	Auto-Lite Model
Red Ram Engine ①	IBP-4002E
Super Ram Engine ② D-500 Engine ②	IBP-4005
D-500 Engine ③	IBS-4006B
D-500 Engine ④	IBS-4009

① - 2-Barrel or one 4-Barrel Carburetor

② - One 4-Barrel Carburetor.

③ - Two 4-Barrel Carburetors. ④ - Fuel Injection.

►*DISTRIBUTOR NOTE: IBS-4006B & IBS-4009 distributors are "double breaker" type.*

Condenser - Auto-Lite IBB-2042SS-1 (All Models).

Contact Point Set - Auto-Lite IBP-3028AS (IBP Distr.), IGW-3028JS (IBS Distr.).

Breaker Gap - .015-.018".

Cam Angle - 26-32° (Single Breaker) 31-37° (Double Breakers). Double breaker distributors must be checked with both s ets of breakers operating. Do not set gap outside limits to obtain specified cam dwell.

►*CAM ANGLE CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may d crease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.

Breaker Arm Spring Tension - 17 - 20 ozs.

Rotation - Clockwise (Red Ram Eng.), counterclockwise (Super Ram Eng.), viewed from above.

Automatic Advance - IBP-4002E

Degrees Distr.	RPM	Degrees Eng.	RPM
0	350	0	700
1	410	2	820
5	650	10	1300
8	1400	16	2800
9	1650	18	3300

Automatic Advance - IBP-4005, IBS-4006B, 4009

Degrees Distr.	RPM	Degrees Eng.	RPM
0	350	0	700
1	425	2	850
5.5	750	11	1500
9	1725	18	3450
10	2000	20	4000

Vacuum Spark Control; Auto-Lite. Integral type.

Vacuum Advance - IBP-4002E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6¾
1	2	7¼
6	12	10¼
10	20	13¼
11	22	14

Vacuum Advance - IBP-4005, IBS-4006B, 4009

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7 1/8
1	2	7 5/8
7	14	11¼
12	24	15½
13	26	16½

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Not s" in D dg Special Data.*

IGNITION TIMING

Setting - 6° ± 4° BTDC at 450-500 RPM. (Exc D-500 with two 4-Barrel Carbs. or Fuel Injection). 8° ± 4° BTDC at 500-550 RPM (D-500 with two 4-Barrel Carbs. or Fuel Injection). *CAUTION* - DO NOT exceed maximum specifications.

Timing Mark - Crankshaft pulley (Red Ram Eng.), vibration dampener (Super Red Ram & D-500 Eng.), marked "DC" at TDC point with 2° graduations before and after this mark. Align correct graduation with pointer on timing chain cover.

CARBURETOR

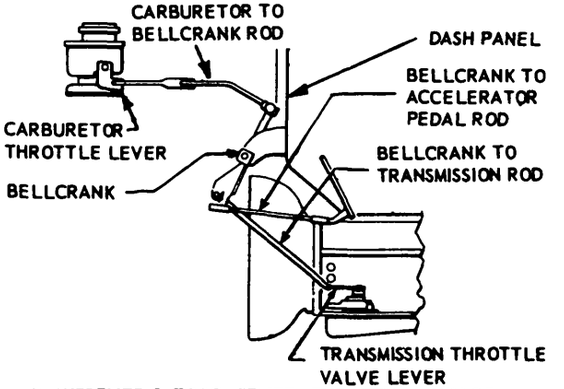
Engine	CARBURETOR APPLICATION	Carburetor
Red Ram (Coronet LD2-L)		One Stromberg WW 2-Bbl.
Red Ram (Royal LD2-M)		One Carter AFB 4-Bbl.
Super Red Ram & D-500		One Carter AFB 4-Bbl.
D-500 (Optl.)		Two Carter AFB 4-Bbl. or Fuel Inj.

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

►*HARD STARTING OR STALLING WITH COLD ENGINE CORRECTION:* May be due to improper choke or fast idle adjustments. *See "Stromberg WW Carburetors" or "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

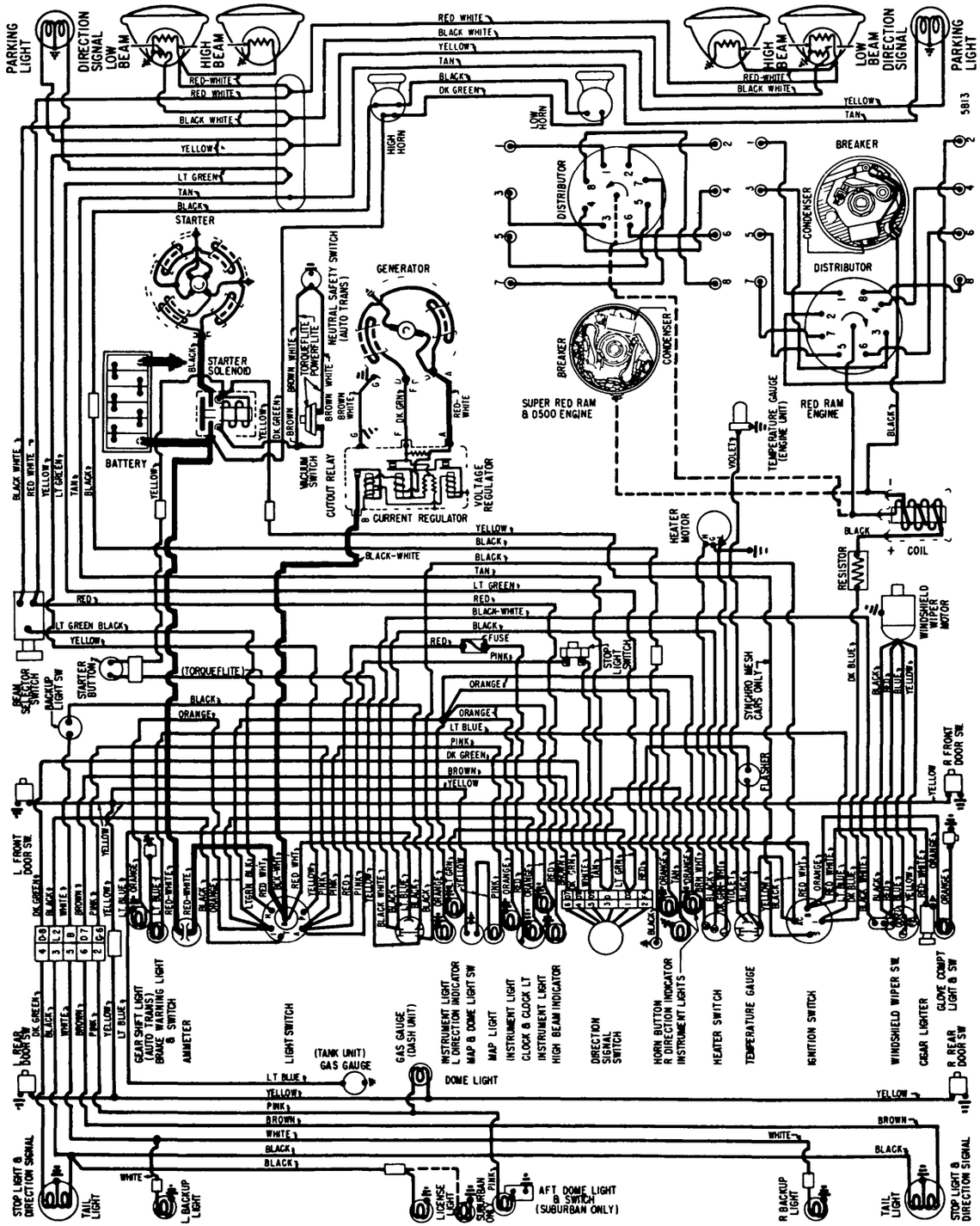
►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

THROTTLE LINKAGE ADJUSTMENT (PowerFlite): Bring engine to normal operating temperature and adjust idle speed to 475-500 RPM. Loosen throttle linkage adjusting screw located on accelerator shaft to carburetor rod. Move rear position of accelerator shaft to carburetor rod rearward until it is stopped by idle stop on transmission throttle cam, then with rods in line and rear portion of rod preloaded, lock throttle adjusting screw by tightening to 7-9 ft.lbs. Recheck idle speed.



P WERFLITE & TORQUEFLITE THR TTLE LINKAGE

CONTINUED ON NEXT PAGE



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TorqueFlit : With engine at normal operating temperature and carburetor off fast idle cam, adjust idle speed to 475-500 RPM. Loosen throttle linkage adjusting nuts on carburetor to bellcrank rod, and on bellcrank to transmission rod. Adjust carburetor to bellcrank rod to position the lever 1/2" from cowl dash panel and tighten adjusting nut. *(NOTE* - Check to make sure correct bellcrank to transmission rod has been installed. This rod should be 8½" long). Hold slight preload rearward on bellcrank to transmission rod while holding transmission throttle valve lever forward against its stop, then tighten adjusting nut. Accelerator pedal should be at an angle of 115° to horizontal. If necessary, adjust pedal angle by removing accelerator pedal end of bellcrank to pedal rod, and shortening or lengthening rod by rotating swivel.

STROMBERG WW 2-BARREL

Model	Stromberg Cd No.
Coronet (Synchro-mesh)	WW3-163
Coronet (Auto. Trans.)	WW3-164

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8. LEFT barrel 1-4-6-7.*

Idle Setting - ¾ - 1¼ turns open. Adjust both screws alike. Turn screw out for richer mixture.

Idle Speed - 450-500 RPM (Std. Trans.), 475-500 RPM (Auto. Trans.). In Neutral position.

Float Level - 7/32" from top of main body (gasket removed) and center of float, with inlet needle seated. Use Gauge T-26019 to check float and T-24733 to bend float lip for correction.

Accelerating Pump - Normal setting, center hole; inner hole for less fuel, outer hole for more fuel.

Fast Idle: Turn throttle stopscrew out so that throttle valves completely closed. Hold throttle valves closed and back out fast idle screw until fast idle cam can be positioned with first step in line with fast idle screw. Turn screw in until it just contacts cam, then turn screw in an additional **8 turns.** Close choke valve as far as possible (fast idle screw against shoulder on cam), measure choke valve opening by inserting a "J" or 9/32" drill between upper edge of valve and air horn. Adjust by bending fast idle rod.

Automatic Choke Setting: Centered on index. *(NOTE* - Choke is "Cross-over" type mounted in manifold and linked to choke valve). Choke assembly must be removed from manifold well for checking and adjusting.

Throttle Linkage Adjustment (Auto. Trans. Cars): *See CARBURETOR above.*

►*OTHER DATA See "Stromberg WW (DeSoto, Dodge & Plymouth) Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL
(Single Carburetor)

Model	Carter Carb. No.
Royal LD2-M	WCFB-2660S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting: - ½ - 1½ turns open. Turn screws out for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans.) with transmission in neutral.

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Throttle Linkage Adjustment (Aut . Trans. Cars): See *CARBURETOR above.*

►*OTHER DATA* See *"Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Singl Carburetor)

Cart r AFB, No. 2773S (Synchro-mesh), 2642S (Auto. Trans.), 2801S (P lic Special). Used on Super Red Ram & D-500 Engin s.

Idle S tting - ¾-1¾ turns open (2642S, 2801S), ¾-2¼ turns open (2773S) Turn screws out for richer mixture

Throttle Linkage Adjustment (Auto. Trans.): See *CARBURETOR above*

►*OTHER DATA* See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Tw Carburetors)

Cart r AFB, No. 2652S (Front), 2653S (Rear). Used on D-500 Engin .

Interconnecting Linkage Adjustment - Remove air cleaners and throttle pull-back springs from both carburetors With rear carburetor at wide open throttle, adjust nut on front carburetor control shaft until front carburetor throttle is wide open

Idle Spe d & Mixture Adjustment - Special procedure required to insure correct mixture and speed (idle air) screw settings See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkag Adjustm nt (Auto Trans.): See *CARBURETOR abov*

►*OTHER DATA* See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter Used as follows

Engine	Pumps Without Filter	Carter No.
Red Ram (Std)		M2607S
Red Ram (Air Cond)		M2610S
Super Red Ram & D-500		M2769S
Engin	**Pumps With Filter**	**Carter No.**
Red Ram		M2663S
Super Red Ram & D-500		M2662S

Pressure - 5-7 lbs

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Auto-Lit . Electric type

Dash Unit -

Tank Unit - Auto-Lite as follows

Model	Auto-Lite No.
Station Wagon (exc Fuel Inj)	Ⓒ 14684A
Station Wagon (Fuel Inj)	Ⓒ 14683A
Others (exc Fuel Inj)	Ⓔ 14673A, Ⓒ 14676A
Others (Fuel Inj)	Ⓔ14686A, Ⓒ 14687A

Ⓒ 4½" lead Male Ⓔ - 22" lead Female

See "Fuel Gauges" in Carburetion Section

Air Clean r: DRY FILTER ELEMENT type Clean every 5 000 miles replace element every 15 000 miles

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash elem nt in solvent or other liquids and DO NOT oil or lubricat*

BATTERY

Red Ram Engine - Auto-Lite 11-HS-50, Willard HO-11-50 or Gould 11-OE-53 12 volt 9 plate, 50 ampere hour capacity (20 hr rate)

Super Red Ram & D-500 Engines - Auto-Lite 11-HS-60 or Willard HO-11-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Left front of engine

STARTER

Auto-Lite MDL-6003 (Red Ram), MDT-6001 (Super Red Ram & D-500).

Armature - Auto-Lite MDL-2088 (All Models).

Drive - Bendix "Folo-Thru", A3596.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension-31-47 ozs. (MDL), 42-53 ozs.(MDT).

Performance Data - MDL-6003

Torque	RPM	Volts	Amperes
0 ft lbs	3200	10.0	60
6 0 ft lbs	Lock	4.0	225

Performance Data - MDT-6001

Torque	RPM	Volts	Amperes
0 ft lbs	3800	11.0	58
8 5 ft lbs	Lock	4.0	350

Starting Switch: Auto-Lite SAE-4001 (Std) SAE-4002 (Auto Trans) **Synchro-mesh & PowerFlite** - Magnetic switch controlled by Ignition & Starter Switch, plus Neutral Safety Switch on transmission (PowerFlite)

TorqueFlite - Magnetic Switch controlled by pushing In Neutral Button plus Vacuum Switch on Intake Manifold and Neutral Safety switch on outside of transmission

See "Starter Controls" in Electrical Section

Neutral Safety Switch Adjustment: See *"PowerFlite & TorqueFlite" in Transmission Section*

GENERATOR

Auto-Lite. Used as follows.

Engine	Armature No.	Generator No.
All (Std)	GJC-2030F	GJC-7012A
All (Air Cond)	GHM-2059F	GHM-6004C
All (Air Cond)	GFY-2101F	GGA-6001N
Red Ram (Taxi)	GHM-2059F	GHM-6004A
Red Ram (Spec Equip)	GFY-2101F	GGA-6001AC
Super Red Ram (Spec Equip)	GFY-2101F	GGA-6003E
Super Red Ram (Spec Equip)	GHM-2006F	GHM-6014A
D-500 (2 Carbs & Air Cond)	GHM-2059F	GHM-6007C
D-500 (2 Carbs & Air Cond)	GFY-2101F	GGA-6003F

►*SPECIAL GENERATOR NOTE:* GJC, GGA, & GHM types generators used. Performance specifications apply equally to all generators within the three groups specified.

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Perf rmance Data GHM (Cold - 70°F) -

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC-7000), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

Field Current - 1.2-1.3 Amps. (GJC), 1.1-1.3 Amps. (GGA & GHM), at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 Amps. (GJC), 2.3-2.6 Amps. (GGA), 3.0-3.5 Amps. (GHM) at 10 volts (70°F).

Belt Adjustment: Torque Method Loosen all mounting bolts and apply specified torque (see below) using Adjusting Bracket Tool C-3379, and a torque wrench

Belt Torque Specifications (Ft. Lbs.)

Belt	New	Us d
Idler	50	35
Generator (Std)	30	20
Generator (Air Cond) Ⓒ	90	65
Generator (Air Cond) Ⓔ	95	70

Ⓒ - Red Ram Engine

Ⓔ - Super Red Ram & D-500 Engines

Deflection Method - Measured in inches (see below) midway between pulleys under a five-pound push or pull

Belt Deflection Specifications (Inches)

Belt	New	Used
Idler	1/16"	1/8"
Generator (Std)	1/8"	1/4"
Generator (Air Cond) Ⓒ	3/8"	1/2"
Generator (Air Cond) Ⓔ	1/4"	3/8"

Ⓒ - Red Ram Engine

Ⓔ - Super Red Ram & D-500 Engines

REGULATOR

Auto-Lite VRX-6201A (GJC & GHM Gen.), VAT-6201A (GGA Gen.).

Cutout Relay

Cuts In - 12.6-13.6 volts

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amps

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 10.0 amperes (80°F) or with .25 Ohm resistor in series between regulator and battery,

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX-6201A	36	30 (28-32)
VAT-6201A	46	40 (38-42)

Test A - After 15 minutes operation charging at 10 amps.

T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts (VRX), 13.7-13.9 volts (VAT).

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Air Gap - .048-.052" (check at brass armature stop pin). **Checking & Adjusting** - *See "Auto-Lite 12 V Ht Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by a recessed hex screw.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Used as follows:

23 Ampere - Protects headlights, high beam indicator, ignition switch light. Located in headlight switch.

15 Ampere - Protects all other lighting circuits (except direction signals). Located in headlight switch.

6 Ampere - Protects windshield wiper (variable speed).

5 Ampere - Protects windshield wiper (single speed).

FUSES: 3 Ampere - Protects clock. In clock lead.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc. Sect.*

ENGINE SPECIFICATIONS: 90° V8 with overhead valves. Different engines used as follows:

"Red Ram" Engine (Std. on LD2 Models): These engines have polyspherical combustion chambers and a single rocker arm shaft on each head.

"Super Red Ram" Engine (Std. on LD3 Models): This is a new engine having a single rocker arm shaft on each head. The engine block has been recessed at front to form an integral timing chain case and the engine-to-transmission adapter plate at rear of engine has been eliminated.

"D-500" Engine (Optional on LD2 & LD3): Same basic design as "Super Red Ram" engine, but with an increased cylinder bore.

Engine	Bore	Stroke	Displacement
Red Ram	3.69"	3.80"	325 cu. ins.
Super Red Ram	4.06"	3.38"	350 cu. ins.
D-500	4.12"	3.38"	361 cu. ins.

Engine	Compr. Ratio	Rated HP	Dev. HP & RPM
Red Ram ①	9.0-1	43.3	252 at 4200
Red Ram ②	10.0-1	43.3	265 at 4400
Super Red Ram ②	10.0-1	52.7	295 at 4600
D-500 ②	10.0-1	54.3	305 at 4600
D-500 ③	10.0-1	54.3	320 at 4800
D-500 ④	10.0-1	54.3	333 at 4800

① - 2-Barrel carburetor
② - One 4-barrel carburetor
③ - Two 4-Barrel carburetors
④ - Fuel Injection.

Compression & Vacuum Reading - *See TUNE-UP.*

►*HIGH OIL CONSUMPTION CORRECTION (Super Red Ram & D-500 Engines):* May be caused by leak at intake manifold allowing oil to be drawn in from valve chamber. To correct, coat new gasket, Part No. 1737709, with Sealing Compound, Part No. 1057794, and install gasket and manifold. Then install two Gasket End Reinforcements, Part No. 1737710, at each end and hold down with 1/4-20 hex head bolts (in place of Phillips head screws) torqued to 8 ft. lbs.

OIL PAN REMOVAL (Red Ram Engine): Disconnect steering linkage at idler arm support bracket. Remove starter, then rotate crankshaft to bring timing marks to 5 o'clock position (to place counterweights out of way). *(NOTE* - On single exhaust systems, disconnect "Y" pipe at right and left manifolds and remove heat valve. Loosen tail pipe and rear muffler support clamps and remove clamp from exhaust pipe to "Y" pipe. Break "Y" pipe connection and move out of way). Disconnect front engine supports at frame and raise engine ½". Remove pan bolts, drop rear of pan and work out over top of crossmember.

Super Red Ram & D-500 Engines: Disconnect steering linkage from steering arm, and on single exhaust systems remove exhaust crossover pipe. Remove pan bolts, then lower rear of pan, turning it sideways to clear cross. member. *NOTE* - When installing pan, bottom of oil strainer must be parallel with lower machined surface of engine block.

ENGINE REMOVAL: *See "Engine" in Dodge Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Dodge Special Data.*

►*1957-58 CYLINDER HEAD GASKET LEAK CORRECTION (Red Ram Engine): See "Cylinder Head Installation" in Dodge Special Data.*

►*EXHAUST MANIFOLD ATTACHING BOLT PRODUCTION CHANGE & INSTALLATION CAUTION (Red Ram Engine): See "Cylinder Head & Manifolds" in Dodge Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, elliptically turned, tin plated with horizontal slot, thermally controlled by steel band.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number have cylinder bores .020" oversize.*

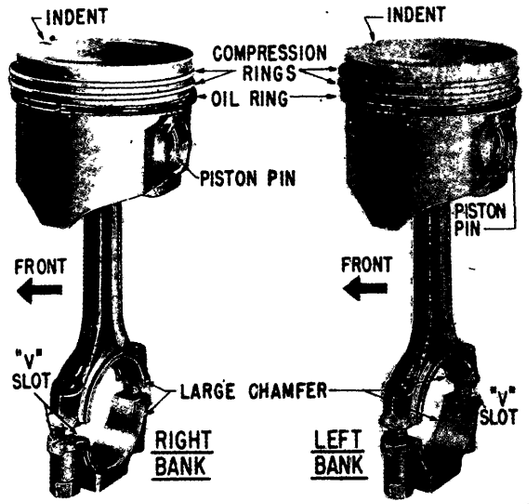
Weight - 18.5 ozs. (Red Ram), 24.5 ozs. (Super Red Ram early), 21.4 ozs. (Super Red Ram late), 24.4 ozs. (D-500 early), 21.3 ozs. (D-500 late).

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance - .0005-.0015" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine. On Red Ram engines, pull to withdraw a .0015" x ½" feeler should be 5-10 lbs. (piston inverted).

Replacement Pistons: Furnished in Std., .005", .020", .030", .040" Oversize (All Engines); and .060" Oversize (Red Ram Engine).

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer on lower end of connecting rod (right bank cylinders, 2-4-6-8). *See "Rod Installation" below.*



DODGE V8 PISTON & ROD ASSY.

PISTON PINS

Red Ram Engine - Floating type with lock ring at each end.

Super Red Ram & D-500 Engines - Piston pins are a tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diameter - .922" (Red Ram), 1.0936" (Super Red Ram & D-500).

Length - 3.07 (Red Ram), 3.44" (Super Red Ram & D-500).

Pin Fit in Piston - .0000-.0005" (Red Ram), .00045-.00075" (Super Red Ram & D-500). Light thumb press fit at 70°F.

Pin Fit in Rod (Red Ram) - .0001-.0004". Tight thumb press fit at 70°F. Selective fit.

Pin Fit in Rod (Super Red Ram & D-500) - .0007-.0012" interference fit.

Piston Pin Removal & Installation (Super Red Ram & D-500) - *See "Piston Pins" in Dodge Special Data.*

Replacement Pins: Red Ram - Std., .003" & .008" Oversize.

Super Red Ram & D-500 - Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, tin plated. Oil rings are cast iron, single piece units.

Ring	Red Ram Engine Width	End Gap	Side Clearance
Compr. (Upper)	.078"	.010-.020"	.0015-.0030"
Compr. (Lower)	.078"	.010-.020"	.0010-.0025"
Oil	.186"	.010-.020"	.001-.003"

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Super Red Ram & D-500 Engines

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.078"	.013-.025"	.002-.0035"
Compr. (Lower)	.078"	.013-.025"	.002-.0035"
Oil	.188"	.013-.025"	.001-.0025"

Replacement Rings: Furnished Std. .005", .020", .030" .040", .060" oversize.

Installing Rings: "Top" mark on compression ring is to top of piston when ring is installed.

CONNECTING RODS

Length (Center-to-Center) - 6.62" (Red Ram), 6.36" (Super Red Ram & D-500).

Weight - 22.5 ozs. (Red Ram), 28.6 ozs. (Super Red Ram & D-500).

Crankpin Journal Diameter - 2.2495-2.2505" (Red Ram), 2.374-2.375" (Super Red Ram & D-500).

Lower Bearings (Red Ram & D-500 Police Special) - Removable precision type, bimetallic Copper Lead Grid, Steel backed.

Lower Bearings (Other Engines) - Removable precision type, Lead-based babbitt on steel.

►*JOURNAL DIAMETER CAUTION: ONE OR MORE Journals Machined UNDERSIZE* - *See "CRANKSHAFT" below.*

Clearance - .0005-.0015" (Red Ram Eng.), .002-.0022" (Super Red Ram & D-500 Engines). Wear limit .0025".

End Play - .006-.014" (Red Ram Eng.), .009-.017" (Super Red Ram & D-500 Engines). Total for both rods.

Installing Rods: With piston correctly installed on connecting rod (see "Pistons" above), larger chamfer on lower end of rod should be installed toward nearest crankshaft fillet. Oil groove in rod and bearing cap must be together.

►*CAUTION:* Rods are **interchangeable.** However, when rods are assembled to piston, the assemblies of one engine bank are **not interchangeable** with the other bank.

CRANKSHAFT

Journal Diam ter: 2.5" (Red Ram). 2.625" (Super Red Ram & D-500).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows: **.010" UNDERSIZE (All Main & Connecting Rod Journals)** - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize. **.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)** - Position of undersize journals are stamped on the machined surface of the center (NO.3) counterweight in the following manner: "R" indicates connecting rod journal, "M" indicates main bearing journal. The number following the letter indicates main or connecting rod journal number (counting from front of engine).

Bearings - Removable precision type. Tin-based babbitt on steel (Thrust Bearing), Lead-based babbitt on steel (Other Bearings).

Clearance - .0005-.0015". Maximum allowable before reconditioning .0025".

Replacement Bearings: Furnished Std., .001", .002", .003", .010", .012" Undersize.

Bearing Interchangeability (Red Ram) - Halves of Nos. 1, 2 and 4 bearings are interchangeable with one another (caps are not interchangeable); upper and lower halves of No. 3 bearing are interchangeable; No. 5 halves are NOT INTERCHANGEABLE.

Bearing Interchangeability (Super Red Ram & D-500) - Lower bearing halves of 1, 2, 4 & 5 are interchangeable; upper bearing halves of 1, 2, 4 & 5 are interchangeable. Upper and lower halves are **not** interchangeable, nor are No. 3 bearing halves interchangeable with other bearings.

End Thrust; Taken by No. 3 main bearing.

End Play - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

Journal Diameter: (1) 1.998-1.999", (2) 1.982-1.983" (3) 1.967-1.968", (4) 1.951-1.952", (5) 1.4355-1.4365".

Bearings - Removable, lead-base babbitt on steel.

Clearance - .001-.003". Maximum .005".

End Thrust (Red Ram): Taken by thrust plate behind camshaft sprocket hub.

Endplay (Red Ram) - .002-.006". Maximum .010".

Timing Chain (Red Ram): Width 1 1/8", **Pitch** .375", **Length** 68 links.

Timing Chain (Super Red Ram & D-500): Width .88", **Pitch** .5", **Length** 50 links.

Camshaft Setting: Mark on gears should be adjacent and in line across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Dodge Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Red Ram Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	1.84"	.370"	4.31"
Exhaust	1.47"	.370"	4.31"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.389"	.002"
Exhaust	45°	.389"	.003"

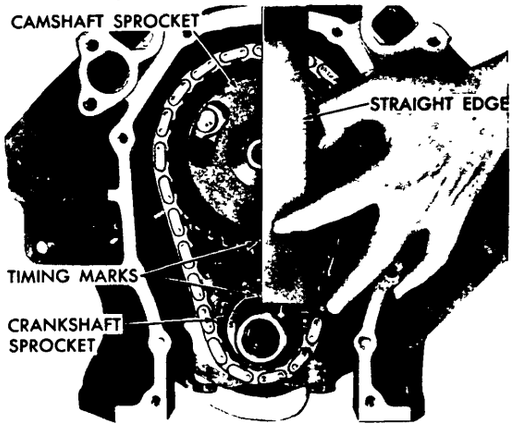
Super Red Ram & D-500 Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	1.95"	.370"	4.81"
Exhaust	1.60"	.370"	4.82"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.390"	.002"
Exhaust	45°	.390"	.003"

►*VALVE STEM OVERSIZE NOTE:* Oversize valve stems are indicated by letter "I" (Intake), or "E" (Exhaust) stamped on rocker arm cover gasket boss. Ream integral guides when installing valves with oversize stems, furnished .005", .015", .030" oversize.

Intake Valve Stem Oil Seal - Cup type oil seals used on all intake valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3436 (Red Ram Eng.) C-3648 (Super Red Ram & D-500 Engines). If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area in gauge).



DODGE V8 VALVE TIMING MARKS

Valve Springs: Single springs used on all valves.

Valve Spring Specifications
(Red Ram Engine)

Valve ①	Lbs. Pressure	Length
Closed	72	1.69"
Open	166	1.31"

(Super Red Ram Engine)

Valve ①	Lbs. Pressure	Length
Closed	80	1.86"
Open	180	1.47"

(D-500 Engine)

Valve ①	Lbs. Pressure	Length
Closed	100	1.86"
Open	195	1.47"

① - Intake & Exhaust valves.

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 5/8-1 11/16" (Red Ram Eng.), 1 55/64" (Super Red Ram & D-500 Engines), install spacer under spring to bring height within limits.

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation (Super Red Ram & D-500) - Install all springs with closed-coil end toward head.

►*CAUTION:* Spring ends must be square within 1/16".

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive ream guides and install oversize valves.

►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (Red Ram):* Engines with oversize valve stems marked as follows: Letter "E" (Exhaust), "I" (Intake) on rocker arm cover gasket boss indicates that all stems of valves are oversize (depending on letter).

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►*PUSHROD INSTALLATION CAUTION (Sup r R d Ram & D-500 Engines):* Small (1/4" diam.) end of pushrod must seat in lifter, large (5/16" diam.) end must contact rocker arm. Improper installation will cause valves to be partially held open.

Hydraulic Valve Lifters: Used on all engines.

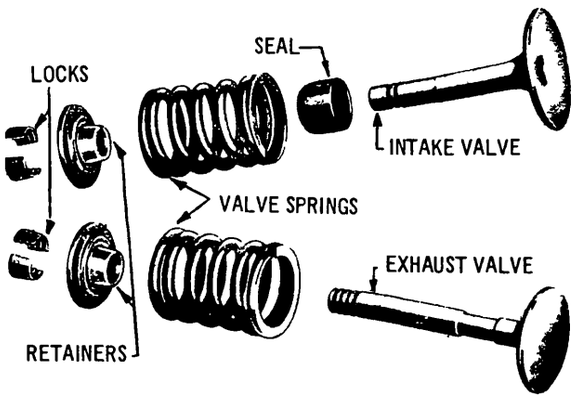
►*OVERSIZE LIFTER NOTE:* A "DIAMOND" mark on engine serial number pad indicates 008" oversize lifter bores

Diameter - 9040- 9045" **Clearance** - 0005- 0015"

Replacement Lifters - Furnished Standard and 001", 008", 030" oversize

Lifter Overhauling & Testing - *See 'Valve System" in Dodge Special Data*

Rocker Arm Assembly: *See "Valve System" in Dodge Spe- Data*



DODGE V8 VALVE ASSEMBLIES

VALVE TIMING

See "Camshaft Setting" under Camshaft above

① **Red Ram Engine**

Intake - Open 10° BTDC. Close 58° ALDC.
Exhaust - Open 56° BLDC. Close 16° ATDC.

① **Super Red Ram & D-500 Engines (With One 4-Barrel Carb.)**

Intake - Open 15° BTDC. Close 57° ALDC.
Exhaust - Open 57° BLDC. Close 15° ATDC.

① **D-500 Engine (With Two 4-Barrel Carbs. or Fuel Inj.)**

Intake - Open 20° BTDC Close 60° ALDC.
Exhaust - Open 58° BLDC. Close 22° ATDC.

① - With valve train solid.

Valve Timing Check: Rotate engine until No. 1 intake valve is closed (Red Ram Engine), engine at TDC (Super Red Ram & D-500 Engines). Insert a .210" spacer (Red Ram Engine), ¼" spacer (Super Red Ram & D-500 Engines) between rocker arm pad and stem tip of No. 1 intake valve. Install a dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed tappet down (providing a solid tappet). Turn crankshaft in normal running direction until valve has lifted .024". Timing on vibration dampener or crankshaft pulley should now read from 5° BTDC to 7° ATDC. *CAUTION - R move spacer before turning engin any furth r in normal dir ction.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 5 qts. (Red Ram), 4 qts. (Super Red Ram & D-500) for refill. Add 1 quart when filter changed.

►*DIPSTICK CAUTION:* "Add Oil" mark should be 2 5/8" from bottom of stick on Super Red Ram & D-500 engines, and 1 5/8" from bottom of stick on Red Ram engine.

Normal Oil Pressure: 50-65 lbs. at 1500 RPM (Red Ram), 45-70 lbs. at 1500 RPM (Super Red Ram & D-500)

Oil Pressure Relief Valve - Mounted in oil pump. *See "Oiling System" in Dodge Special Data.*

Oil Pressure Gauge - Auto-Lite No 14517A, not electric

Oil Pump (Red Ram): Mounted on rear main bearing cap. Rotor type with strainer mounted on oil pump body. Strainer must be mounted parallel with bottom of cylinder block.

►*INSTALLATION NOTE:* Prime oil pump before installing on rear main bearing cap.

Oil Pump (Super Red Ram & D-500): Rotor type. Mounted on cylinder block on lower left side near crankshaft sprocket.

Oil Filter (Red Ram): Shunt type Filters only a portion of pump output, rest goes directly into engine lubrication system. Replace element every 5,000 miles or sooner if needed.

Oil Filter (Super Red Ram & D-500): Full flow, disposable type. Replace every 5,000 miles or sooner if needed.

►*OIL FILTER INSTALLATION CAUTION (Super Red Ram & D-500):* Screw new filter on base until gasket on filter contacts base. **Tighten ½-turn by hand.** *Do not overtighten.*

Oil Pump Overhaul - *See "Oiling System" in Dodge Special Data.*

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in valve chamber cover (Red Ram), in right rocker arm cover (Super Red Ram & D-500). *NOTE* - Remove air cleaner in ventilator pipe (when so equipped), wash in kerosene and reoil.

COOLING

Water Capacity: 20 qts. (Red Ram), 16 qts. (Super Red Ram & D-500). Add 1 quart for heater.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 16°F (above zero) for summer operation.*

►*RADIATOR OR FAN REPLACEMENT CAUTION (Super Red Ram & D-500 Engines).* Clearance between fan and radiator core should be ½-1". To obtain this clearance, install Fan Spacer No. 1825931 (13/16") or Fan Spacer No. 1855808 (39/64") as necessary.

Pressure Valve: 14 lb radiator filler cap (All models)

Thermostat: Pellet type In water pump to radiator connector Starts to open at 157-162°F

Water Pump: Packless type Sealed ball bearing type No lubrication required

See "Wat r Pumps" in Dodg Special Data.

Pump R m val - Drain cooling system, remove fan shroud (air conditioned cars), loosen fan belt, loosen idler pulley (air conditioned cars) Remove fan spacer and pulley, remove mounting bolts and water pump.

Temp ratur Gaug : Aut -Lit . Electric type.

Dash Unit - Auto-Lite 14518A.

Engine Unit - Auto-Lite 14405A.

See "Temperature Gauges" in Misc Section

CLUTCH

Borg & Beck. Used as follows

Engine	Mod l	Cover	Disc No.
Red Ram (Std.)	10A8	361463	38253¹
Super Red Ram (Std.)	10.5A8	361461	382621
D-500 & All H.D.	11A8	361464	382626

See "Borg & Beck Clutches" in Clutch Section.

Pedal Adjustment: Adjust the fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustm nt: *NOTE* - Over-center spring located above clutch pedal and attached to pedal mounting bracket. Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch Reinstall clutch rod to clutch pedal

Removal: Remove transmission, clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession) to release spring tension until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section*

Transmission Controls: *Se "Transmission Controls" in Transmission Section*

Removal: Drain lubricant, disconnect propellor shaft, speedometer cable, gear shift control rods. Remove back-up light switch (if so equipped) and speedometer drive pinion For transmission overhaul or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281). Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748) Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed transmission

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlit " Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A". *NOTE* - Under severe operating conditions drain and refill at 10,000 mile intervals

Checking Fluid L vel - *See "TorqueFlite" below*

Throttle Linkage Adjustment - *See CARBURETOR above*

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► *OTHER POWERFLITE SERVICE DATA: See "PowerFlite" Transmission in Transmission Section*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed transmission

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section*

► *TESTING & TROUBLE SHOOTING: See "TorqueFlite" transmission in Transmission Section*

Lubrication. Check fluid every 1,000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid type "A". *NOTE* - Under heavy duty operating conditions, drain and refill at 10,000 mile intervals.

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" below "L" mark. Add or drain fluid as necessary to maintain this level.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral fluid level should be between ½" above "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER TORQUEFLITE SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section*

UNIVERSALS

Front Universals. Ball & Trunnion front, Cross rear

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Dodge Special Data.*

REAR AXLE

Type. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE* - Two pinion gear type differential used in all models

See "Dodge Hypoid" in Rear Axle Section.

► *"SURE GRIP" AXLE NOTE* Optional on all models and in all ratios and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

Car Model	Synchro-mesh Trans.	Auto. Trans.
LD2-L	④ 3.54 (39-11)	③⑥ 3.15 (41-13)
LD2-M	④ 3.54 (39-11)	⑥ 3.15 (41-13)
LD3 ①	⑤ 3.31 (43-13)	⑥ 3.15 (41-13)
LD3 ⑦	④ 3.54 (39-11)	⑥ 3 15 (41-13)

① - Except Station Wagon. ⑦ - Station Wagon

③ - PowerFlite 3.31 (43-13) Std., 3 15 (41-13), 3.54(39-11) Optl

④ - 3 31 (43-13), 3.73 (41-11) Optional

⑤ - 3 15 (41-13), 3.54 (39-11) Optional

⑥ - 2.93 (41-14), 3.31 (43-13) Optional.

Backlash - 006- 010"

Carrier Removal: Remove axle shafts (see below), disconnect rear universal joint, remove differential carrier capscrews, lift out carrier assembly

► *RANJO HOUSING INSTALLATION NOTE.* Check rear universal joint angle *See "Propeller Shaft Notes" in Dodge Special Data*

Axle Shaft Removal: Jack up car, remove wheels, hub and drum assembly (Tool C-845) Block brake pedal, disconnect brake line at wheel cylinder, remove axle key, brake and dust shield Note number of shims removed from axle housing, use puller Tool C-499 to remove axle shaft and bearing, remove inner seal (Tool C-637)

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel hub removed, check end play with dial indicator To adjust, remove backing plate (see above), add or remove shims (furnished 005", 010", 0125", 015", 030" thick) equally at both wheels. **Endplay** - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type. Serviced by replacement

FRONT SUSPENSION

Independent. "Torsion-Aire" type with ball joints and torsion bar springs.

See "Torsion-Aire" in Front Suspension & Wheel Alignment Section

Steering Axis Inclination - 6 1/2° at 0° Camber

Caster - (Manual Steering) Neg ¾° ± ¾°, (Power Steering) Pos ¾° ± ¾° *NOTE* - Both sides should be set at same dimension

Camber (Right Wheel) - 0° ± ¼°, 0° preferred

Camber (Left Wheel) - Pos ½°±½°, Pos 3/8° preferred

► *CASTER & CAMBER ADJUSTMENT NOTE Adjusting shims located between upper control arm support bracket and frame side rail*

Toe-In - 3/32-5/32" 1/8" preferred

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46'

STEERING

Manual - Gemmer. Worm and three tooth roller

See "Gemmer Worm & Roller" in Steering Section

Power Steering New "Constant Control Full Time" power steering

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section

Steering Linkage - *See 'Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal - *See 'Gemmer Worm & Roller" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller in Steering Section*

BRAKES

► *MASTER CYLINDER PRODUCTION CHANGE & FREE-PLAY ADJUSTMENT NOTE* Later cars without power brakes have new master cylinder, Part No 1829400, with built-in pedal stop to eliminate pedal freeplay adjustment

Service: "Center Plane" (Floating Shoe) hydraulic type. *See "Chrysler, DeSoto, Dodge & Plymouth Center Plane & Total Contact Brakes" in Brake Section.*

Wheel Cylinder Diameter - 1 1/8" front & rear Two single acting cylinders on front, one double acting cylinder on rear

Drum Diameter - 11" front and rear *NOTE* - 12" brakes optional on all models.

Lining - Molded asbestos bonded to shoe

Width - 2½" front, 2" rear (2½" rear on 4-door hardtops and convertibles)

Length - 11½" all shoes **Thickness** - 20" all shoes

Braking Power - 60% front, 40% rear

Master Cylinder: On engine side of dash panel opposite base of brake pedal

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartm

Removal - Disconnect pedal return spring pushrod, brake tube and stop light switch leads Remove master cylinder to dash bolts, slide master cylinder straight out from dash

Power Brakes. "Oval Piston Assist" type Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder)

See "De Soto, Dodge Oval Type Piston Power Unit" in Brake Section

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm) Mark across power unit adjacent to vacuum test port and mounting bracket, and between mounting bracket and firewall Disconnect vacuum hose remove bolts securing bracket to firewall slide unit and bracket straight forward

Parking Brake - On shaft at rear of transmission 6" external contracting type used with Synchro mesh Trans internal expanding type used with Automatic Trans

Adjustment - *See "Brake Notes' in Dodge Special Data*

Lining	Width	Thickness	Length
6" Ext type	2"	5/32"	16 68"
7" Int type	2"	5 32"	① 13 06"

① - Total both shoes

MISC. MECHANICAL

Windshield Wipers Auto Lite electric EPW-4001A (Single Speed) EPV 4001B (Variable Speed)

Air Conditioning - Heater-Air Conditioning

See "Air Conditioning" in Miscellaneous Section

Power Window Regulators - Electric type Reversible type motor in each window Controlled by door switch and master control switch

See 'Electric Window Regulators" in Misc Section

Power Seat Adjusters - Electric 6 Way type

See "Power Seat Adjusters' in Misc Section

Convertibl Top Control - Electrical hydraulic type

See 'Power Top Controls" in Misc Section

MODEL IDENTIFICATION

Model	Model Identification
Coronet Six	MD1-L

SERIAL NUMBER: Stamped on plate attached to front (engine side) top of right or left cowl **(Except Los Angeles Cars)**, on plate attached to left front hinge pillar post, on **Los Angeles Cars.** *NOTE* - Number (example below) includes identification data as follows:

① ② ③ ④ ⑤

M 3 0 2 100001

① - Year Model - 1959.
② - Car Make 3 Dodge.
③ - Model Series. 0 - 6 Cyl. Coronet. 6 - 6 Cyl. Taxi.
④ - Assembly Plant. 2 - Detroit 3 - Evansville.
4 - Los Angeles. 5 - Newark. 8 - Valley Park.
⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped in boss at left side of block at front and below cylinder head

Starting Engine Number - M230-1001. *NOTE* - 230 indicates displacement.

►*ENGINE NUMBER MARKS (Following Engine Number):*
"A" - All cylinder bores .020" oversize.
"B" - All Main & Connecting Rod Bearings .010" Undersize.
"AB" - Both above conditions exist.

TUNE-UP

►*COLD WEATHER HARD STARTING CORRECTION* Caused by "Blued" ignition points resulting from operation in temperatures at 20°F or less. *See "Regulator Replacement Note" under Regulator.*

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed (150 RPM min). Maximum variation between cylinders 10 lbs.

VACUUM READING: Steady 18-20" at idling speed

VALVE TAPPET CLEARANCE: 011" Intake. .014" Exhaust (Cold), .010" Intake, .012" Exhaust (Hot and Idling). *NOTE* - Tappet screws are self-locking.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional 002" clearance for exhaust tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type with counterweight. Valve should operate freely When installing coil, place coil spring in position over shaft slot with outer end (tongue) of spring in the upper left hand position (10 O'clock). Press inner end of coil into slot and seat firmly. Move outer end of spring down (counterclockwise), around and up over stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Plugs - Auto-Lite Resistor Type AR51. 14 mm Torque to 30-32 ft. lbs.

COIL: Auto-Lite CAG-4001 (Std.), CAH-4001 (Hvy. Dty.).
Ignition Current - **(CAG)** 1.8 amps. idling, 2.4 amps. stopped. **(CAH)** 2.5 amps. idling, 3.1 amps stopped.
Resistor - None used with standard coil, Auto-Lite PU-5001 used with H.D. coil. Test coil and resistor together.

DISTRIBUTOR: Auto-Lite IBR-4001.
Condenser - Auto-Lite IAT-3076LA. **Capacity** .250-.285 mfd.
Contact Point Set - Auto-Lite IGW-3028BS.
Breaker Gap - 020". Limits .018-.022".
Cam Angle - 39°±3°. DO NOT exceed breaker gap limits to obtain dwell.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		460	2		920
6.5		1050	13		2100
7.5		1425	15		2850
8.5		1800	17		3600

Vacuum Spark Control: Integral type

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10 1/2
8	16	13 3/4
9.5	19	16

IGNITION TIMING

Setting - 2½° BTDC.
Timing Mark - Timing mark on vibration damper in line with correct degree mark on timing indicator on chain case cover. Indicator marked 0° to 10° BTDC.

CARBURETOR

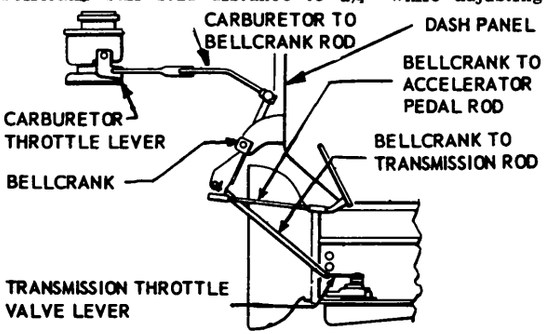
►*CARBURETOR APPLICATION* Carter single barrel carburetors used on all models.

►*HARD COLD STARTING (Cars with cross-over choke carburetors)* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn Operate valve to flush out gum formation

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

►*THROTTLE LINKAGE ADJUSTMENT CORRECTION (To Correct Harsh or Erratic Shift Pattern):* When tightening clamp bolt nut on accelerator lever does not remove condition, install a 020-.030" thick x 5/16" wide shim between flat on shaft and flat on lever with slot spread to 5/32". Tighten clamp bolt nut to 10-12 ft. lbs.

THROTTLE LINKAGE ADJUSTMENT (Auto. Trans.): On early cars, distance from heater housing-to-center of bellcrank ball stud should be 2¼" and length of spring should be 8¼" with choke fully open and throttle off fast idle cam On later models (with new accelerator lever, shaft, and bracket assembly), insert a 3/16" rod approximately 6" long through the bracket and lever to establish correct throttle lever position On all models, adjust idle speed to 475-500 RPM with engine warm and carburetor off fast idle cam. Loosen adjusting locknuts on both carburetor rod and transmission throttle rod. On early cars, hold heater-to-bellcrank ball stud distance to 2¼" while adjusting



POWERFLITE TRANSMISSION LINKAGE

throttle rod to secure 8¼" spring length. Adjust accelerator pedal-to-bellcrank rod so that pedal is 115° from horizontal. On later cars, insert rod (above) through bracket and lever and with rod in place, carburetor off fast idle and throttle lever against idle stopscrew, tighten locknut on carburetor throttle rod. On all cars, with throttle lever adjusted correctly, adjust length of rod at transmission by holding transmission lever forward against its stop while tightening locknut on rod

CARTER BBS (SINGLE)

Model	Carter Carb. No.
Synchro-mesh	BBS-2567S
Auto. Trans.	BBS-2569S
City Traffic	BBS-2403S
Taxi	BBS-2410S
Repl (for BBS-2567S, 69S)	BBS-2604S

Idle Setting - ½-1¾ turns open (2567S, 2569S, 2403S), 1-2 turns open (2410S). Turn screw out for richer mixture

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (Auto. Trans)

Float Level - 9/32" (2403S, 10S), 7/32" (2567S, 69S) Distance from top of each float to top surface of body casting with float pin retainer removed and float pin at bottom of guide slots

Accelerating Pump - Install connector rod in center hole of throttle link (medium stroke)

Fast Idle: 016-020" (Gauge T109-44) clearance between lower edge of throttle valve and carburetor bore with fast idle cam in fast idle position Adjust by bending connector rod at lower angle (Tool T109-213)

Automatic Choke: Centered at index (All Models)

Slow Closing Throttle Dashpot (Auto. Trans.): Loosen locknut and adjust dashpot unit so that dashpot plunger shaft can be moved inward approximately 3/32" with throttle valve fully closed

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA See "Carter BBS Carburetors" in Carburetion Section*

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CARB. EQUIPMENT

Fuel Pump: Carter M2609S. Mechanical type.
Pr ssur - 5-6 lbs.
See "Fuel Pumps" in Carburetion Section.
Gasolin Gaug : King-Seeley Electric "CV" (Constant Voltage) type with Voltage Regulator King-Seeley No. 56562.
Dash Unit - King-Seeley No. 56551.
Tank Unit - King-Seeley No. 44351 (Pass. Car), No. 44352 (Suburban), No. 44350 (with 23 gal. tank).
See "Fuel Gauges" in Carburetion Section.
Air Cleaner: Dry Filter Element type. Clean every 5,000 miles, replace element every 15,000 miles.
►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solv nt or other liquids and DO NOT oil or lubricate.*

BATTERY

Auto-Lit 11-HS-50, Willard HP-11-50 or Gould 11-0E-53. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Batt ry Gr und - Negative.
Engin Gr und - Left front of engine.

STARTER

Aut -Lite MDU-6003. Armature MDL-2088.
►*NOISY OR ERRATIC STARTER OPERATION CORRECTION:* Caused by lack of lubrication or deposits of foreign material. To correct, remove inspection plate at bottom of torque converter or clutch housing and lubricate shaft (use 7" tubing on spout of pressure oil can) with fuel detergent and rust inhibiter Part No. 1643272. *NOTE* - In extreme cases it may be necessary to remove and thoroughly clean starter assembly.
Drive - Bendix "Folo-Thru" No. A-3596.
Rotation - Counterclockwise at commutator end.
Brush Spring T nsi n - 31-47 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (Auto. Trans.). Magnetic switch controlled by ignition switch. Neutral safety switch mounted on transmission on Auto-Trans. Cars.
See "Starter Controls" in Electrical Section.
N utral Safety Switch Adjustment: *See "PowerFlite" in Transmission Section.*

GENERATOR

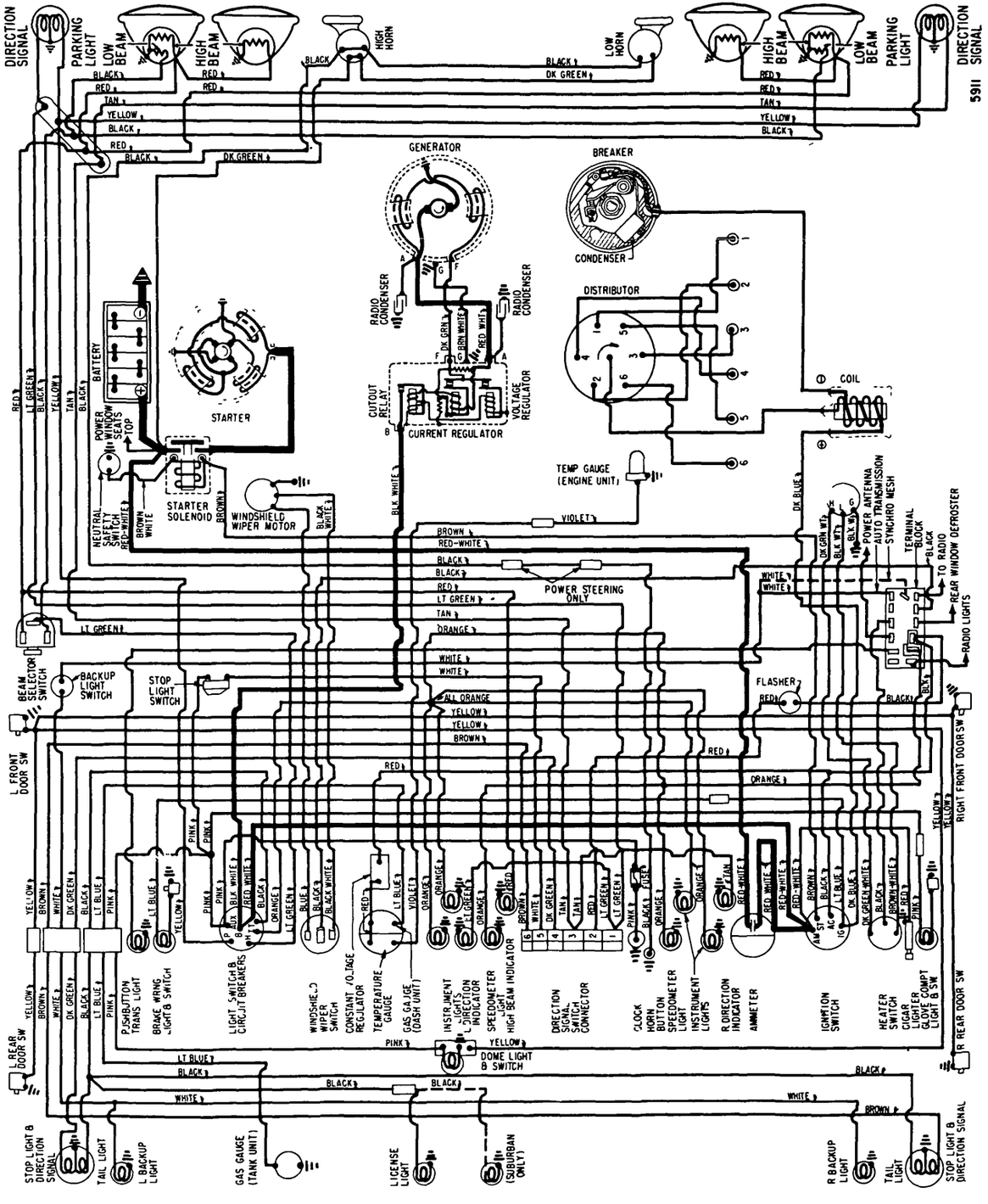
Auto-Lit . Used as follows.

M del	Generator	Armature
All Models (Std.).	GJM-8001A	GJC-2058F
All Models (Canada)	GJC-7012A	GJC-2030F
Spec. Equip.	GGA-6001AC	GFY-2101F
Taxi	GHM-8001B	GHM-2034F

Performanc Data - GJM-8001A

Amperes	Volts	RPM
0	12.8	1150
35	15.0	2100

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P rf rmanc Data - GJC-7012A

Amperes	Volts	RPM
0	12 8	1225-1325
30 0	15 0	2050-2250

Performance Data - GGA-6001AC

Amperes	Volts	RPM
4.0 -	14.6	950
40 0	14.6	1600
40 0	15 0	1600

Performance Data - GHM-8001B

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 18-36 ozs (GJM, GJC), 34-41 ozs (GGA), 35-53 ozs (GHM)

Field Current - 1 1-1 3 amperes (GGA, GHM), 1 2-1 3 amperes (GJC), 1 6-1 7 amperes (GJM) all at 10 Volts (70°)

Motoring Current - 3 9-4 3 amperes (GJM), 3 4-3 9 amperes (GJC), 3 0-3.5 amperes (GHM) with field terminal grounded to frame 3 1-3 5 amperes (GGA with felt oil seal in drive end head), 2 3-2 6 amperes (GGA Others)

Belt Adjustment: With 5 lb load applied midway between generator and water pump (generator), water pump and power steering pump (power steering), belt deflection should be as follows

Belt	New Belt	Used Belt
Generator (Less Pwr Strg)	3/32"	5/32"
Generator (With Pwr Strg)	3/32"	7/32"
Power Steering	3/32"	5/32"

REGULATOR

Auto-Lite VAT-6201A (GGA); VRX-6201A (GHM,GJC); VRX-6301A (GJM).

►*VRX-6301A REGULATOR REPLACEMENT NOTE* When hard starting at temperatures of 20°F or less is experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has Code No 11-N,2-P or higher stamped on base

Cutout Relay

Cuts In - 12 6-13 6 volts

Cuts Out - 3-5 amps discharge current after a charge of 10 amps (VAT), 7 amps (VRX)

Contact Gap - 015" minimum

Air Gap - 031-034"

Voltage Regulator

Setti ng - 14 5 volts charging at 7 amps (VRX), 10 amps (VAT) (80°F) or with 25 ohm resistor in series between regulator and battery

Air Gap - 048-052" (check at brass armature stop pin)

Checking & Adjusting - *See 'Auto-Lite 12 Volt Regulators" in Electrical S ction*

Current R gulator

►*SETTING CAUTION "Temperature Compensated" type Set to following specifications at 70°F.*

R gulat r	Test A - Op rating Amp r s	Test B
VAT-6201A	46	40 (38-42)
VRX-6201A	37	30 (28-32)
VRX-6301A	44	35 (33-37)

Test A - After 15 minutes operation charging at 10 amps (VAT), 7 amps (VRX)

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13 7-13 9 volts (VAT), 13 6-13 8 volts (VRX)

Air Gap - 048"-052"

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) *See '4-Headlight Systems" in Electrical Section*

Automatic Beam Changer: *See Electrical Section*

Electronic Rear View Mirror: *See Electrical Section*

Directional Signals: *See Electrical Section*

Lighting Switch Removal: Push control knob and shaft to "OFF" position (full in) Depress button on top of switch and at same time pull out control knob and shaft Remove switch locking nut and remove switch assembly

Stop Light Switch Location: On forward end of master cylinder

LIGHTING CIRCUIT BREAKERS: Used as follows

22.5 Ampere - Protects Headlamps, Headlamp Beam Indicator, and Parking Lamp In headlight switch

15 Ampere - Protects Tail, Stop, License Plate, Instrument and Dome Lights In headlight switch

5 Ampere - Protects Windshield Wiper (Single Speed)

6 Ampere - Protects Windshield Wiper (Variable Speed)

30 Ampere - Protects Window Lift and Seat Adjuster

FUSES: SFE-10 in clock lead

SFE-20 in rear unit of Air Conditioning

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions' in Miscellaneous Section*

ENGINE SPECIFICATIONS Six cylinder "L" head

Bore	Stroke	Displacement
3 25"	4 63"	230 2 cu ins
Compr Ratio	**Rated HP**	**Developed HP**
8 0-1	25 35	135 at 3600 RPM

Compression & Vacuum Reading - *See TUNE-UP*

►*MANIFOLD INSTALLATION CAUTION* Two long capscrews extend into cylinder block water passage Apply sealer to these screws before installation It is important that conical washers at flange ends of exhaust manifold be installed to permit expansion and contraction of the manifold without loosening

OIL PAN REMOVAL: Drain engine oil, reinstall plug securely. Remove clutch housing pan Remove oil level indicator, drop pan on tie rod Lift oil strainer so it clears baffle inside pan With strainer lifted, slide pan to rear to remove *NOTE* - New end gaskets should protrude 1/8-1/4" above oil pan *DO NOT cut off ends*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Dodge Special Data*

TIGHTENING TORQUES: *See 'Tightening Specifications" in Dodge Special Data*

PISTONS

Aluminum Alloy, U-Slot, Tin-Plated

►*CYLINDER BORE OVERSIZE CAUTION Engines with letter "A" following engine number indicates that cylinder bores are 020" oversiz*

Weight - 15 8 ozs

Removal - Pistons and rods removed from above

Fitting New Pistons: Clearanc - 0002-0012" at top of skirt Pull to withdraw a 0015" x ½" wide feeler, placed at right angles to piston pin (piston inverted) should be 5-10 lbs

Replacement Pistons: Furnished Std , 005", 020", 030", 040", 060" Oversize

Installing Pistons: "U" slot away from valves

PISTON PIN

Full floating type

Diameter - 8592" **Length** - 2 741"

Pin Fit In Piston - 000-0005"

Pin Fit In Rod Bushing - 000-0004" Tight thumb push fit at room temperature of 70°F

Replacement Pins: Std , 0006", 003", 008"

NOTE - Fitted pins furnished with new pistons

PISTON RINGS

►*REPLACEMENT RING SET NOTE* Use **only** "Multi-Purpose" Ring Set Part No 1653371 consisting of chrome plated top compression rings, chrome plated steel rails on oil rings

Ring	Width	End Gap	Side Cl arance
Compr (1)	093"	010-020"	0025-004"
Compr (2)	093"	010-020"	002-0035"
Oil (3)	155"	010-020"	001-0025"
Oil (4)	155"	010-020"	0015-003"

Replacement Rings Std , 020", 030", 040", 060" Oversize

Installing Rings: No 1 compression ring with step on inner edge up No 2 compression ring with step on inner edge up (step down, if step on outer edge)

CONNECTING ROD

Length (Center-to-Center) - 7 085-7 8125"

Weight - 27 9 ozs

Crankpin Journal Diameter - 2 0615-2 0625"

Maximum out of Round Limit - 0003" **Tap r Limit** 0005"

Lower Bearings - Removable, precision type, steel backed, grid type

►*JOURNAL DIAMETER CAUTION (ONE OR MORE JOURNALS MACHINED UNDERSIZE) See 'CRANKSHAFT' below*

Clearance - 0005-0015"

Sideplay - 0055-0115"

Bearing Adjustment: None Replace bearings

Replacement Bearings: Std , 001", 002", 003", 010", 012", 020", 030", 040" Undersize

Installing Rods Oil metering hole toward valve side of engine

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CRANKSHAFT

Journal Diameter - 2.4995-2.5005" Four bearing
Bearing Type - Removable, precision type, lead-base babbitt on steel, except thrust bearing which is tin-base babbitt on steel No shims

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION* Engines with undersize journals identified as follows

.010" UNDERSIZE (All Main & Connecting Rod Journals) - Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" Undersize

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - When replacing bearings, look for stamped number on center counterweight of crankshaft An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker-wall bearing For example "M2" and "R1" means that .001" thicker-wall bearing inserts are used on the No 2 main bearing and the No 1 connecting rod bearing

Clearance - .0005-.0015" desired
Replacement Bearings: Std .001", .002", .010", .020", .030" Undersize
End Thrust: Taken by flanged No 4 main bearing **Endplay** - .003-.007"
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data*

CAMSHAFT

Journal Diameters - (1) 1.998-1.999", (2) 1.9665-1.9675", (3) 1.935-1.936", (4) 1.2475-1.2485"
Bearing Diameters - (1) 2.000-2.001", (2) 1.9685-1.9705" (3) 1.937-1.939", (4) 1.250-1.251"
Bearings - Removable, steel-backed babbitt lined bushings (except No 4 which is machined in crankcase)
Clearance - .001-.003" *NOTE* - If clearance exceeds .005" when checked by placing dial indicator on block with plunger on cam nearest a bearing and prying shaft back and forth, install new camshaft for additional test If clearance with new shaft exceeds .0035", install a new bearing
End Thrust: Taken by thrust plate behind camshaft sprocket hub **Endplay** - .002-.006"
Timing Chain, Width - .88" **Pitch** - .500" **Length** - 48 links
Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data*
Camshaft Setting: Sprockets marked Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers
Engine Front Cover Installation *See Engine Front Cover in Dodge Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal) *See Engine Front Cover in Dodge Special Data*

VALVES

Tappet Clearance .011" Intake, .014" Exhaust (Cold) .010" Intake, .012" Exhaust (Hot and Idling)

Valve	Head Diameter	Stem Diam't'r	Length
Intake	1.526-1.536"	.340-.341"	①4 7/8"
Exhaust	1.402-1.412"	.340-.341"	②4 7/8"

① - To top of valve face ② - Overall

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	.001-.003"
Exhaust	45°	.365"	.003-.005"

Valve Seat Width - 1/16-3/32" Run-out .0015" max
►*VALVE SEAT INSERT CAUTION: See "Valve System" in Dodge Special Data.*
Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, finish ream to give correct valve stem clearance (See Valve Stem Clearance above). *CAUTION–Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*
Valve Springs: Install with closely coiled end up.
Free Length - 2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1 3/4"
Valve Open	110-120 lbs.	1 3/8"

Valve Lifters: Mushroom type (remove from below).
Stem Diameter - 5/8". Ream holes from above (pilot in guide). Furnished .001", .008", .030" Oversize.
Lifter Clearance - .0002-.001".
Rocker Arm Assembly: *See "Valve System" in Dodge Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
►*VALVE TIMING NOTE: The following valve opening and closing points are with .014" lifter clearance*
Intake Valves - Open 12° BTDC. Close 44° ALDC.
Exhaust Valves - Open 50° BLDC. Close 6° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*
Crankcase Capacity: 5 qts Add 1 qt when changing filter element
Normal Oil Pressure: 40-45 lbs at 1500 RPM
Oil Pressure Relief Valve - Located on left side of block below starting motor
►*RELIEF VALVE SPRING NOTE* Three types of spring available Replace with correct color spring, see *"Oiling System" in Dodge Special Data*
Oil Pressure Gauge Auto-Lite No 14828A Mechanical type
Oil Pump: Rotor type on right side of crankcase
Overhaul - *See Oiling System in Dodge Special Data*
Oil Filter: Bypass type On left side of engine above starter
Servicing - Install new element and cover gasket at 8,000 mile intervals or more often in dusty areas Change oil at same time filter is changed
Crankcase Ventilation Filter in oil filler tube and air cleaner in crankcase ventilation outlet pipe

COOLING

Water Capacity: 13 qts Add 1 qt with heater installation
►*AIR CONDITIONER OPERATION CAUTION* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation
Pressure Valve. 14 lb radiator filler cap (All Models)
Thermostat: Pellet type In water outlet connection on cylinder head Starts to open at 157-162°F
►*COOLING THERMOSTAT IDENTIFICATION CAUTION:* Some 180° thermostats stamped "160" on gasket flange with CORRECT "180" stamped on pellet bottom When checking thermostat for installation of methanol type antifreeze, check mark on pellet bottom. Replace thermostat with 160° type (models without Air Conditioning) when this type antifreeze used
Water Pump: Sealed ball bearing Do not lubricate *See "Water Pumps" in Dodge Special Data.*
Water Pump: Sealed ball bearing, packless type No lubrication required *See Water Pump Section*
Pump Removal - Drain cooling system, remove fan belt, disconnect hoses at pump, remove pump mounting studs and remove pump
Water Distributing Tube: *See "Cooling System" in Dodge Special Data*
Temperature Gauge. King-Seeley electric Constant Voltage ("CV") type with Voltage Regulator, King-Seeley No 56562
Dash Unit - King-Seeley No 56556
Engine Unit - King-Seeley No 44255
See Temperature Gauges in Miscellaneous Section

CLUTCH

Borg & Beck Model 9A7 or Auburn (Std.), Borg & Beck 10A8 (Optl.). Single plate, dry disc type *See "Borg & Beck" & "Auburn" Clutches in Clutch Section*
Pedal Adjustment: Adjust the fork rod to secure 3/16" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.
Over-Center Spring Adjustment: *NOTE* - Over-center spring located above clutch pedal and attached to pedal mounting bracket. Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch, 5 full turns for 9 1/4" clutch. Reinstall clutch rod to clutch pedal.
Removal: Remove transmission, clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession) to release spring tension until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section*
Transmission Controls: *See "Transmission Controls" in Transmission Section*
Removal: Drain lubricant, disconnect propellor shaft, speedometer cable, gear shift control rods Remove back-up light switch (if so equipped) and speedometer drive pinion. For transmission overhaul or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281). Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748) Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission
See "PowerFlite" Transmission in Transmission Section.

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►*POWERFLITE BUZZING NOISE IN REVERSE CORRECTION* Install New Torque Converter Control Valve Part No 2124247 *See 'PowerFlite Transmission" in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "PowerFlite' Transmission in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "PowerFlite" Transmission in Transmission Section*

Lubrication: Check fluid level every 1,000 miles Drain and refill every 10,000 miles Use Automatic Transmission Fluid Type "A" Suffix "A" *NOTE* - This supersedes previous drain interval of 20,000 miles

Checking Fluid Level: Check fluid level with transmission at operating temperature (driven approximately 10 miles), engine idling and with transmission in neutral, after pressing each push button, returning to neutral between each position Under above conditions, level should be between **'Add 1 Pint'** and **Full'** mark When **below 'Add 1 Pint"** mark, bring level between the marks but never **above 'Full'** mark Remove fluid, when **above Full'** mark, to proper level *NOTE* - When transmission and torque converter are drained and refilled, level should be ¾ **below 'Add 1 Pint'** mark (fluid is not at operating temperature)

Throttle Linkage Adjustment *See CARBURETOR above*

►*OTHER DATA See "PowerFlite Transmission" in Transmission Section*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear
Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes' in Dodge Special Data*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive
See Dodge Hypoid' in Rear Axle Section.

►*SURE-GRIP AXLE NOTE* Optional in 3 73-1 (41-11) ratio only and is similar in design to Power-Lock (Plate Clutch Type) Differential Identified by letter "S" is stamped on carrier housing at axle ratio identification pad and by a round aluminum tag (Use Sure-Grip Lube) attached to a carrier housing nut
See 'Power-Lock (Plate Clutch Type) Differential" in Rear Axle Section

►*'SURE-GRIP' AXLE SHAFT INSTALLATION CAUTION* Axle shaft used with "Sure-Grip" differential is 3/32" shorter than the standard axle shaft DO NOT use the standard axle shaft with "Sure-Grip" differential

►*REAR AXLE KNOCKING OR CHUCKLING NOISE See "Dodge Hypoid" in Rear Axle Section*

Axle Ratios: 3 73-1 (41-11) Std , 3 9-1 (43-11) Optional all transmissions "Sure-Grip" axle available in 3 73-1 ratio
Backlash - 006- 010"

►*BANJO HOUSING INSTALLATION NOTE* Check rear universal joint operating angle. *See 'Propeller Shaft Notes" in Dodge Special Data.*

Carrier Removal: Remove axle shafts (see below), disconnect rear universal joint, remove differential carrier cap screws, lift out carrier assembly

Axle Shaft Removal: Jack up car, remove wheels, hub and drum assembly (Tool C-845) Block brake pedal, disconnect brake line at wheel cylinders, remove axle key, brake and dust shield. Note number and remove shims from each axle housing, use puller Tool C-499 to remove axle shaft and bearing, remove inner oil seal (Tool C-637).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel hub removed, check end play with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished 005", 012", 030" thick) equally at both wheels
Endplay - 013- 018"

SHOCK ABSORBERS

'Oriflow". Direct acting, hydraulic type Serviced by replacement

Shock Absorbers (Dodge No.)

	Front	Rear
Standard 1"	1881774	1879307
Heavy Duty 1"	1881775	1879306
Heavy Duty 1 3/8"		1881877

FRONT SUSPENSION

"Torsion-Aire" suspension with ball joints and torsion bar front springs *NOTE* - Caster and Camber adjustment is controlled by position of eccentric cams operating in cam retainers welded to front and rear faces of upper control arm brackets No shims are used *See 'Torsion-Aire' Suspension in Suspension & Wheel Alignment Section*

Steering Axis Inclination - 6½° at 0° camber

Caster - (Manual Steering) - Neg ¾°±¾°, Neg ¾° preferred **(Power Steering)** - Pos ¾°±¾° Pos ¾° preferred *NOTE* - Caster should be as equal as possible on both sides of car

Camber (Left Wheel) - Pos ½° to 0° 3/8° preferred
Camber (Right Wheel) - 0°±¼° 0° preferred

Toe-In - 3/32-5/32" 1/8" preferred

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46'

AIR SUSPENSION

At rear only Air springs used in conjunction with conventional leaf springs Optional on all models *See "Dodge Air Suspension" in Suspension & Wheel Alignment Section*

►*COMPRESSOR KNOCKING NOISE CORRECTION* Caused by end float in crankshaft Correct by installing Air Suspension Compressor Kit No 2084466 *See "Dodge Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual: Gear. Worm and three tooth roller
See "Gemmer Worm & Roller" in Steering Section
Power Steering: "Constant Control Full Time" Power Steering

►*POWER STEERING PRODUCTION CHANGE* Gear housing and valve lever spring changed to increase valve travel and reduce valve leakage Use new spring and housing together and use with spring loaded valve lever steering gears identified by letter "J" or succeeding letters New housing No 2122041 new spring No 1822871 Gears with new housing and spring identified by letter "R" stamped on housing

►*POWER STEERING OIL LEVEL CHECK* No dipstick used on later cars Oil level should be at bottom of filler neck (engine cold), halfway up filler neck (engine hot)

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller or Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

BRAKES

Service: Two types "Center Plane" (Floating Shoe) hydraulic, and "Three Platform Total Contact" *See "Dodge Center Plane & Total Contact Brakes" or 'Dodge Three Platform Total Contact Brakes" in Brake Section*

►*BRAKE PRODUCTION CHANGE NOTE* New "Three Platform Total Contact Brakes" used in production on later cars These brakes have important design changes and parts from early and later brakes are not interchangeable

Drum Diameter - 11" Std , 12" Optl front and rear

Wheel Cylinder Diameter - 1 1/8" front and rear Two single acting cylinders on front, one double acting cylinder on rear
Lining - Molded asbestos bonded to shoe
Width - 2" **Length** 11 5", **Thickness** 20" All

Braking Power - 60% front, 40% rear

Clearance - Front Wheels - 006" Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked Turn cams in opposite direction until no drag is felt

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Rear Wheels - .006". Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of firewall opposite base of brake pedal.

►*MASTER CYLINDER NOTE (Cars Without Power Brakes).* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder eliminating need for adjustment. No pedal return spring is used. A service package consisting of piston-collar-rod-retainer and boot assembly is available for replacement of individual parts that are worn or damaged.

Checking Fluid Level - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pushrod, brake tube and stop light switch leads. Remove master cylinder to dash bolts. Slide master cylinder straight out from dash.

Power Brakes: "Oval Piston Assist" type Mounted on firewall and linked to upper end of brake pedal. Used with adjustable pushrod type master cylinder.
See "Chrysler, Dodge & Plymouth Oval Piston Type Power Brakes" in Brake Section.

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm). Mark across power unit adjacent to vacuum test port and mounting bracket, and beween mounting bracket and firewall. Disconnect vacuum hose, remove bolts securing bracket to firewall, slide unit and bracket straight forward.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type used with Automatic Trans.
Adjustment - *See "Brake Notes" in Dodge Special Data*

Lining	Width	Thickness	Length
6" Ext. type	2"	.5/32"	16.68"
7" Int. type	2"	5/32"	© 13.06"

© - Total both shoes.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite electric. EPW-4001C (Single Speed), EPV-4001G (Variable Speed).
See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioning. *See "Dodge Air Conditioning" in Miscellaneous Section.*

►*AIR CONDITIONING COMPRESSOR CLUTCH NOISE CORRECTION.* Caused by compressor bearing To correct, replace old bearing with Bearing Assembly Part No 1769318P *See "Dodge Heater-Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Electric 6-Way type.
See "Power Seat Adjusters" in Miscellaneous Section

►*ENGINE & EQUIPMENT IDENTIFICATION NOTE: In the following V8 data pages, engine and equipment will b referred to by "Engine Designation" (which is Engine No. prefix) in table below.*

Engine	Car Model	Eng. Designation
Red Ram ①	MD2-L	DMP8 (326")
Ram Fire ①	MD3L, M	ML361
Super Ram Fire ②	MD3H	ML361
D-500 ②	All (Optl)	ML383
Super D-500 ③	All (Optl)	ML383

① - One 2-Bbl. Carb. ② - One 4-Bbl. Carb.
③ - Two 4-Bbl. Carbs.

MODEL IDENTIFICATION

Model	Model Identification
Coronet	MD2-L
Royal	MD3-M
Custom Royal	MD3-H
Standard Sta. Wgn.	MD3-L
Custom Sta. Wgn.	MD3-H

SERIAL NUMBER: Stamped on plate attached to front (engine) side at top of right or left cowl **(Except Los Angeles Cars),** on plate attached to left front hinge pillar post **Los Angeles Cars.** *NOTE* - Number (example below) includes identification data as follows:

① ② ③ ④ ⑤
M 3 1 2 100001

① - Year Model - 1959.
② - Car Make **3** Dodge.
③ - Model Serial - **1** - Coronet. **3** - Royal. **5** - Custom Royal. **7** - All Wagons. **8** - V8 Taxi. **9** - Special Models.
④ - Assembly Plant. **2** - Detroit. **3** - Evansville. **4** - Los Angeles. **5** - Newark. **8** - Valley Park.
⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped on boss located on top of cylinder block behind water pump.

Starting Engine Number - *NOTE* - Each engine number has a prefix (DMP8, ML361 or ML383), which indicates following: "M" for 1959, "L" for low block. Where three numbers follow they indicate the cubic inch displacement. The displacement of the DMP8 engine is 326 cubic inches.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*
"**A**" - All Cylinders .020" oversize.
"**B**" - All Crankshaft Journals .010" undersize.
"**AB**" - Both above conditions exist.
"**MALTESE CROSS**" **(3/8" High)** - ONE OR MORE Crankshaft Journals .001" undersize. See *"Connecting Rods" & "Crankshaft" below.*
"♦" - **(3/8" High)** - ALL Valve Lifters .008" oversize.

TUNE-UP

►*COLD WEATHER HARD STARTING CORRECTION:* Caused by "Blued" ignition points resulting from operation in temperatures at 20°F or less. See *"Regulator Replacement Note" und r Regulator.*

COMPRESSION PRESSURE: With engine turning over at 150 RPM minimum, plugs removed, and throttle valve wide open, pressure should be as follows:
DMP8 Engine - 125-165 lbs. Maximum variation allowable between cylinders 15 lbs.
ALL ML361 Engines - 150-180 lbs. Maximum variation allowable between cylinders 30 lbs..
ALL D-500 Engines - 150-180 lbs. Maximum variation allowable between cylinders 25 lbs.

VALVE TAPPET CLEARANCE: None in service (Hydraulic Lifters).

►*VALVE TAPPET CLEARANCE CAUTION: Some DMP8 engines may have rocker arms with adjusting screws. These screws are preset at the factory and are NOT TO BE DISTURBED.*

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located at right exhaust manifold (between manifold and gasket).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUGS: Auto-Lite **AR-42** (DMP8), **A-42** (All ML361 Engines and ML383 Engines with one 4-Bbl. Carb.). **A-32** (ML383 with two 4-Bbl. Carbs.) and ML361 Engines when operated at continuous high speed. *NOTE* - ML361 & ML383 Engines with A-32 or A-42 type spark plugs have resistance type spark plug cables with word "RADIO" on cable.

COIL: Auto-Lite CAH-4001.
Ignition Current - 2.5 amps. idling, 3.1 amps. stopped. Test coil and resistor together.
Resistor – Auto-Lite PU-5001.

►*COIL RESISTOR NOTE:* Resistor is connected in lead between ignition switch and coil.

DISTRIBUTOR: Auto-Lite. Used as follows:

Engine	Auto-Lite No.
DMP8 (2-Bbl. Carb.)	IBP-4003J
ML361 (2-Bbl. Carb.)	IBP-4005B
ML361 (4-Bbl. Carb.)	IBP-4005B
ML383 (4-Bbl. Carb.)	IBP-4005B
ML383 (Two 4-Bbl. Carbs.)	IBS-4006C
Police Pkg. (One 4-Bbl. Carb.)	IBS-4006C

►*DISTRIBUTOR NOTE: IBS-4006C distributor is "double breaker" type.*
Condenser - Auto-Lite IAT-3076LA. **Capacity** .25-.285 mfd.
Contact Point Set - Auto-Lite IBP-3028AS (IBP-4003J), IBP-3028BS (IBP-4005B), IGW-3028JS (IBS-4006C).
Breaker Gap - .015-.018".
Cam Angle - 27-32° (Single Breaker), 31-37° (Double Breaker). Double breaker distributors must be checked with both sets of breakers operating. DO NOT set gap outside limits to obtain specified cam dwell.

►*CAM ANGLE CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.
Br aker Arm Spring T nsion - 17-20 ozs.

Rotati n - Clockwise (IBP-4003J), counterclockwise (IBP-4005B & IBS-4006C), viewed from above.

Aut matic Advanc - IBP-4003J

Degrees Distr.	RPM	Degrees Eng.	RPM
0	450	0	900
1	590	2	1180
2.5	800	5	1600
5	1750	10	3500
6.5	2300	13	4600

Automatic Advanc - IBP-4005B

Degrees Distr.	RPM	Degrees Eng.	RPM
0	350	0	700
1	435	2	870
5	800	10	1600
8	1700	16	3400
9.5	2150	19	4300

Automatic Advanc - IBS-4006C

Degrees Distr.	RPM	Degrees Eng.	RPM
0	450	0	900
1	500	2	1000
6.5	800	13	1600
8	1400	16	2800
9.5	2000	19	4000

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advanc - IBP-4003J

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/4
1	2	9 1/4
5	10	11 3/8
9	18	13 3/4
10	20	14 3/8

Vacuum Advanc - IBP-4005B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8 5/8
6	12	12
10	20	15 1/4
11	22	16 1/8

Vacuum Advanc - IBS-4006C

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	12
12	24	17
13	26	8 1/8

►*DISTRIBUTOR DRIVE SHAFT BUSHING & BASIC TIMING NOTE: See "Ignition Notes" in Dodge Special Data.*

IGNITION TIMING

Setting - 10° BTDC at 500 RPM.
Timing Mark - Timing mark on vibration damper in line with correct degree mark on timing indicator on chain case cover. Indicator marked 0 to 10° BTDC.

►*TIMING MARK NOTE:* To check position of timing mark on crankshaft damper on ML361 engines (between 11915-12291) ML383 engines (between 6273-6580), remove spark plug, insert suitable dial indicator (Special Tool C-3075) to determine TDC of No. 1 cylinder.

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Mark on vibration damper should be directly under "O" mark on timing indicator on chain case cover. Correct by making chisel mark at correct position on damper (painting new mark white). Use black paint to blot out old mark.

CARBURETOR

►*CARBURETOR APPLICATION: See table following.*

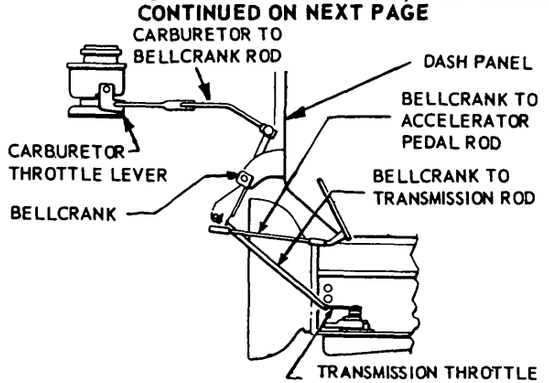
Engin	Carburetor Make & Model
DMP8	Stromberg WW (2-Bbl.)
ML361	Carter BBD (2-Bbl.)
ML361	Carter AFB (4-Bbl.)
ML383	Carter AFB (4-Bbl.)

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE:* Special cleaning procedure required. *See AIR CLEANER below.*

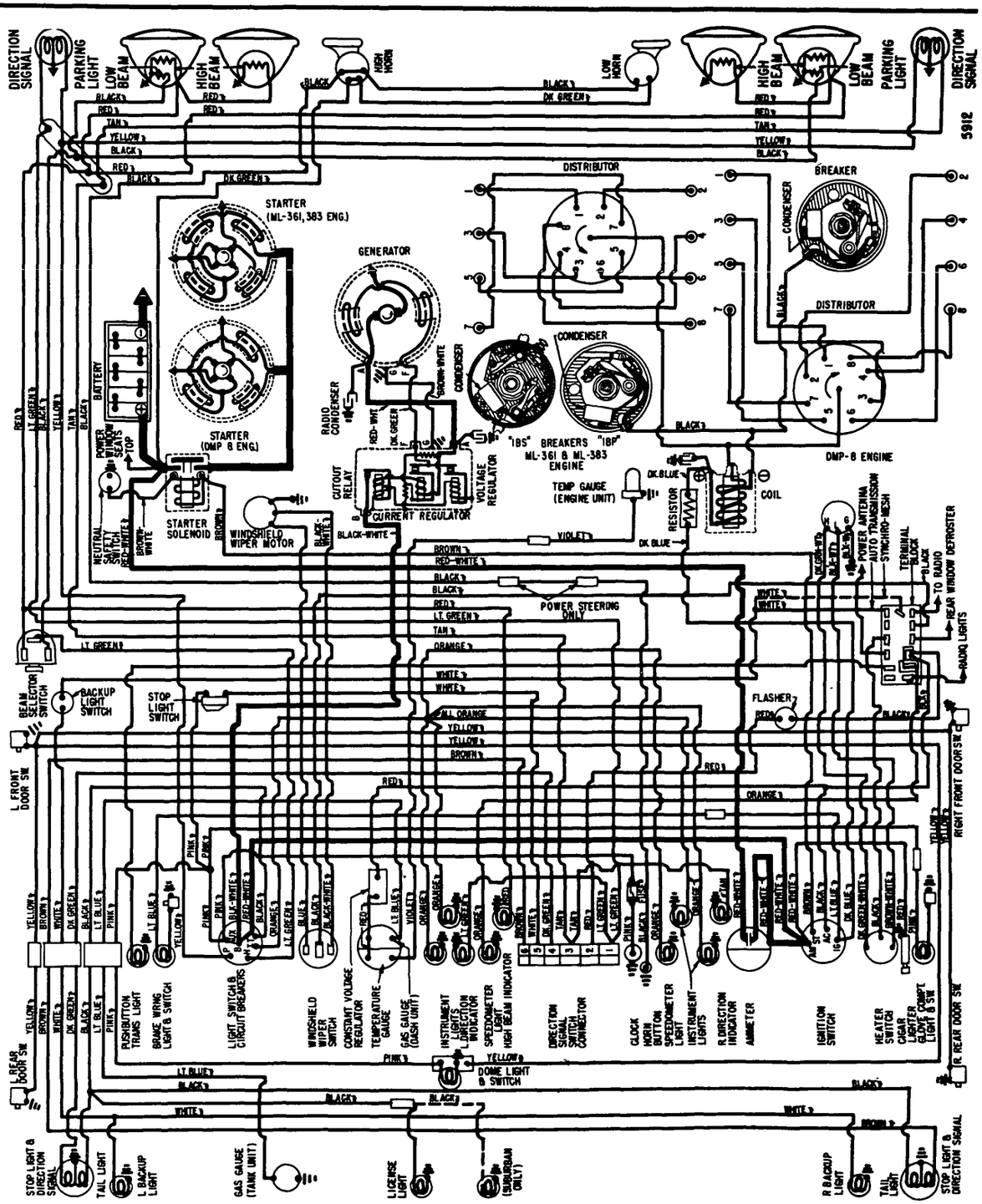
►*HARD COLD STARTING (Cars with cross-over choke carbur tors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

THROTTLE LINKAGE ADJUSTMENT (Auto. Trans.): On early cars and D-500 Models, distance from dash-to-bellcrank should be ½" with rod held rearward to limit of travel, engine hot and idling, and carburetor off fast idle cam. On later cars (with new accelerator lever, shaft, and bracket assembly), insert 3/16" rod approximately 6" long through bracket and lever to establish correct throttle lever position. On all models (except ML383 with two 4-barrel carburetors), adjust idle speed to 475-500 RPM (500-550 RPM -ML383 with two 4-barrel carburetors) with engine warm and carburetor off fast idle cam. Loosen adjusting locknuts on both carburetor rod and transmission throttle rod. On later cars, insert above rod through bracket and lever. On early cars, hold throttle rod at correct distance (see above) while tightening locknut on rod. Accelerator pedal should be 115° from horizontal, measured from rear of pedal. If necessary, adjust accelerator rod under slanting toe-board. On all cars, with throttle

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POWERFLITE & TORQUEFLITE THROTTLE LINKAGE



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lever position adjusted correctly, adjust length of rod at transmission by holding lever forward against its stop while tightening locknut on rod.

STROMBERG WW 2-BARREL

Model	Stromberg Carb. No.
DMP8 Synchro-mesh ①	WW3-164
DMP8 Auto. Trans ①	WW3-181
DMP8 Synchro-mesh ②	WW3-182
DMP8 Auto Trans. ②	WW3-183

① - Before throttle lever change.
② - After throttle lever change.

►*COLD ENGINE STALLING CORRECTION.* Modify choke as follows·

1) Remove air cleaner, vacuum cylinder plug and piston with link assembly

2) Enlarge bleed hole in vacuum piston groove to No 50 drill (.070") Replace assembly, install new vacuum cylinder plug (Stromberg No 387166) Piston must operate freely in cylinder

3) Place a .040" wire in front end of cylinder slot and move choke valve toward closed position With piston against wire, choke valve opening should be 13/32" (use a 13/32" drill) Correct by bending arm on choke shaft.

4) Remove wire, check choke shaft for binding and valve for proper seating without binding

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7*

Idle Setting - 1¼ turns open. Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 450-500 RPM (Std Trans), 475-500 RPM (Auto. Trans) In Neutral position

Float Level - 7/32" from top of main body (gasket removed) and center of float, with inlet needle seated Use Gauge T-26019 to check float and T-24733 to bend lip for correction

Accelerating Pump - Normal setting, center hole, inner hole for less fuel, outer hole for more fuel

Fast Idle: Turn throttle stopscrew out so that throttle valves completely closed Hold throttle valves closed and back out fast idle screw until fast idle cam can be positioned with first step in line with fast idle screw Turn screw in until it just contacts cam, then turn screw in an additional **8 turns.** Close choke valve as far as possible (fast idle screw against shoulder on cam), measure choke valve opening by inserting a "J" or 9/32" drill between upper edge of valve and air horn Adjust by bending fast idle rod

Automatic Choke Setting: Centered on index *NOTE* - Choke is "Cross-Over" type mounted in manifold and linked to choke valve Choke assembly must be removed from manifold well for checking and adjusting

Thr ttl Linkag Adjustm nt (Aut . Trans. Cars): *See CARBURETOR above*

►*OTHER DATA See "Stromb rg WW (Dodge) Carburetors" in 1958 Annual Data or lat r Manual dition*

CARTER BBD 2- BARREL

Mod l	Cart r Carb. N .
ML361 (Ram Fire) Up to throttle change	BBD-2822S
ML361 (Ram Fire) After throttle change	BBD-2870S

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl 2-3-5-8 LEFT barrel 1-4-6-7*

Idle Setting - ¼-1¼ turns open Turn both screws alike Turn screw out for richer mixture

Idle Speed - 450-500 RPM (Std Trans), 475-500 (Auto Trans) In Neutral position

Float Level - 9/32"±1/64" Distance from top of floats to top of body with gasket removed (Gauge T109-280) To adjust, bend float lip

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever

Fast Idle: 015" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on high step of cam

Fast Idle Cam Clearance - With choke valve closed and lip of inner choke shaft lever contacting lug on outer lever, index mark on cam should align with fast idle adjusting screw Adjust by bending lip on inner choke shaft lever

Automatic Choke Setting (Cross-Over Type): Centered on index *NOTE* - Choke is "Cross-Over" type mounted in manifold and linked to choke valve Choke assembly must be removed from manifold well for checking and adjusting

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter BBD Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Model (Single Carburetor)	Carter Carb. No.
ML361 (Super Ram Fire) Std Trans	AFB-2773S
ML361 (Super Ram Fire) Auto Trans	AFB-2787S
ML383 (D-500) One Carb	AFB-2794S
Police Special	AFB-2854S

►*CRUISING SPEED ENGINE SURGE CORRECTION Carter AFB-2794S) See "Carter AFB Carburetors" in Carburetion Section*

Idle Setting - ½-2 turns open (2794S, 2854S), ¾-2¼ turns open (2773S, 2787S)

Idle Speed - 450-500 RPM (Synchro-mesh), 475-500 (Auto-Trans) In neutral position

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Model (Two Carburetors)	Carter Carb. No.
ML383 (Super D-500) Front	AFB-2790S, Rear AFB-2791S

Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane Correct either bent or damaged levers *NOTE* - Install interconnecting rod with slotted end connected to **low r h l** in **front** carburetor throttle lever, and end connected at **t p h l** of **r ar** carburetor throttle lever Hold **rear** carburetor throttle wide open (choke in full open position) and adjust slotted end of rod so **front** carburetor throttle valves will also be in wide open position Tighten locknut and check operation Interconnecting rod must rotate slightly on pivots without bind in any position

Idle Speed & Mixture Adjustm nt - Special procedure required to insure correct mixture and speed (Idle Air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment (Aut . Trans.): *S CARBURETOR above.*

►*OTHER DATA: See "Cart r AFB 4-Barr l Carbur tors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. Used as follows

Engine	Pumps With ut Filt r	Cart r N .
DMP8 Std		M2608S or M2611S
DMP8 A C		M2886S or M2737S

Engine	Pumps With Filt r	Cart r N .
ML361, 383		M2821S or M2662S

Engine	Pumps With Filt r & Magnatrap	Cart r N .
ML361, 383		M2662S

Pressure - 6-7 lbs.
See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with voltage regulator King-Seeley No 56562

Dash Unit - King Seeley No 56551

Engine Unit - King-Seeley No 44351 (Pass Car), No 44352 (Suburban), No 44350 (With 23 Gal Tank) *See "Fuel Gauges" in Carbur tion Section*

Air Cleaner: Dry filter element type Clean every 5,000 miles, replace element every 15,000 miles

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Gould 11-OE-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Left front of engine

STARTER

Auto-Lite MDU-6003 (DMP8 Engine), MDT-6001 (ML361 & ML383 Engines).

►*NOISY OR ERRATIC STARTER OPERATION CORRECTION* Caused by lack of lubrication or deposits of foreign material To correct, remove inspection plate at bottom of torque converter or clutch housing and lubricate shaft (use 7" tubing on spout of pressure oil can) with fuel detergent and rust inhibiter Part No 1643272 *NOTE* - In extreme cases it may be necessary to remove and thoroughly clean starter assembly

Drive - Bendix "Folo-Thru" No A3596

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 31-47 ozs (All)

Performance Data - MDT-6001

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

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Performance Data - MDU-6003

Torque	RPM	Volts	Amperes
0 ft lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (Auto. Trans.). Magnetic switch controlled by Ignition and Starter Switch (with Neutral Safety Switch on Automatic Trans. Cars).

See "Starter Controls" in Electrical Section.

Neutral Safety Switch Adjustment: *See "PowerFlite & TorqueFlite" in Transmission Section.*

GENERATOR

Auto-Lite. Used as follows:

Model	Generator	Armature
All Models (Std.)	GJM-8001A	GJC-2058F
Coronet-A.C. Dual Unit	GHM-8004A	GHM-2045F
A.C. & H.D.	GGA-6001AC	GFY-2101F
Taxi	GHM-8001B	GHM-2034F
Others - (Std.)	GHM-8005A	GHM-2045F
A.C. Dual Unit	GHM-8004A	GHM-2045F
A.C. & H.D.	GGA-6007A	GFY-2101F
Taxi	GHM-8002B	GHM-2034F
ML383 H.D.	GGA-6003E	GFY-2101F
Canada	GJC-7012A	GJC-2030F

►*GENERATOR DRIVE PULLEY REPLACEMENT CAUTION: See DeSOTO Car Pages for Puller alteration and pulley installation procedure.*

►*SPECIAL GENERATOR NOTE: Performance specifications apply for all generators within the following groups.*

Performance Data - GJC (Cold-70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GJM (Cold-70°F)

Amperes	Volts	RPM
0	12.8	1150
35	15.0	2100

Performance Data - GGA (Cold-70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data - GHM (Cold-70°F)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC, GJM); 34-41 ozs. (GGA); 35-53 ozs. (GHM).

Field Current - 1.2-1.3 amps. (GJC); 1.6-1.7 amps. (GJM); 1.1-1.3 amps. (GGA, GHM) at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 amps. (GJC); 3.9-4.3 amps. (GJM); 2.3-2.6 amps. (GGA); 3.0-3.5 amps. (GHM) at 10.0 volts (70°F).

Belt Adjustment: Deflection with 5 lb. force applied as shown in table below. Place straightedge across pulleys to measure deflection.

Model	New Belt	Used Belt
DMP8 ℂ	9/16"	5/16"
ML361, 383 ℂ	9/16"	5/16"
DMP8 ②	1/4"	5/32"
ML361, 383 ②	1/4"	1/8"

ℂ - Between Crankshaft, Generator & Air Susp. Compressor.

② - Between Crankshaft, Generator & Water Pump.

REGULATOR

Auto-Lite VAT-6201A (GGA Gen.), VRX-6201A (GHM & GJC Gen.), VRX-6301A (GJM Gen.).

►*VRX-6301A REGULATOR REPLACEMENT NOTE:* When hard starting at temperatures of 20°F or less is experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has Code 11-N, 2-P or higher stamped on base.

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amperes (VAT), 7 amperes (VRX).

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 7 amps. (VRX), 10 amps. (VAT) at 80°F or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes - Test B
VAT-6201A	46 - 40 (38-42)
VRX-6201A	37 - 30 (28-32)
VRX-6301A	44 - 35 (33-37)

Test A - After 15 minutes operation charging at 10 amps. (VAT), 7 amperes (VRX).

Test B - After additional 15 minutes operation with current regulator operating-load applied to hold voltage down to 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).

Air Gap - .048"-.052".

Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System). *See "4-Headlight Systems" in Electrical Section.*

Automatic Beam Changer: *See Electrical Section.*

Electronic Rear View Mirror: *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Push control knob and shaft to "OFF" position (full in). Depress button on top of switch and at the same time pull out control knob and shaft. Remove switch locking nut and remove switch assembly.

Stop Light Switch Location: On forward end of master cylinder.

LIGHTING CIRCUIT BREAKERS: Used as follows:

22.5 Ampere - Protects Headlights, Headlamp Beam Indicator and Parking Lamp. In headlight switch.

15 Ampere - Protects Tail, Stop, License Plate, Instrument, Dome, Clock and Glove Compartment Lights. In headlight switch.

5 Ampere - Protects Windshield Wiper (Single Speed).

6 Ampere - Protects Windshield Wiper (Variable Speed).

30 Ampere - Protects Window Lifts.

40 Ampere - Protects Seat Adjuster.

FUSES: SFE-1. In clock lead.

SFE-7.5. In Radio lead.

SFE-7.5. Protects Rear Defroster.

SFE-20. In Heater lead.

3AG-18. Protects Heater & A.C.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Different engines used as follows:

326" (DMP8). Standard on Coronet V8. 90° V8. Similar in design to previous models.

361" (ML361). Standard on Royal, Custom Royal, Std. Sta. Wgn. and Custom Sta. Wgn. 90°V8 with overhead valves located on outboard side of single rocker arm shaft. Engine block is recessed at front to form integral timing gear case and ignition distributor is located at front of engine.

383" (ML383, D-500 and Super D-500). Optional on all models. 90°V8 similar in design to 361" (ML361). Super D-500 has high performance camshaft, heavier valve springs with surge dampers on all valves, two 4-barrel carburetors and two-breaker distributor.

Engine	Bore	Stroke	Displacement
DMP8	3.95"	3.31"	326 cu. in.
ML361	4.12"	3.38"	361 cu. in.
ML383	4.25"	3.38"	383 cu. in.

Engine	Compr. Ratio	Rated HP	Dev. HP & RPM
DMP8	9.2	49.9	255 at 4400
ML361	10.0	54.3	ℂ 295 at 4600
ML383	10.0	57.8	② 320 at 4600

ℂ - 305 at 4600 with 4-barrel carb.

② - 345 at 5000 with two 4-barrel carbs.

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL (DMP8): Remove dipstick, drain oil, leave plug out. Disconnect steering linkage at steering arm and remove starter. On single exhaust system, remove crossover pipe. Remove converter dust shield, raise engine approximately 1¼" after disconnecting front engine mounts. Block up engine and remove oil pan bolts. Lower rear end of pan, turning it sideways to clear crossmember.

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(ML361 & 383) - Disconnect steering linkage from steering arm, and on single exhaust systems, remove exhaust crossover pipe. Remove pan bolts, then lower rear of pan, turning it sideways to clear crossmember. *NOTE* - When installing pan, bottom of oil strainer must be parallel with lower machined surface of engine block.

ENGINE REMOVAL: *See "Engine" in Dodge Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Dodge Special Data.*

►*CYLINDER HEAD GASKET NOTE (DMP8 Eng.):* New Gasket, Part No. 1947354-P, available for replacement. DO NOT use gasket sealer. Tighten all cylinder head bolts to specifications, then bring engine to operating temperature and recheck all bolts.

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data.*

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel band (DMP8), by steel struts (Others).

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number have cylinder bores .020" Oversize.

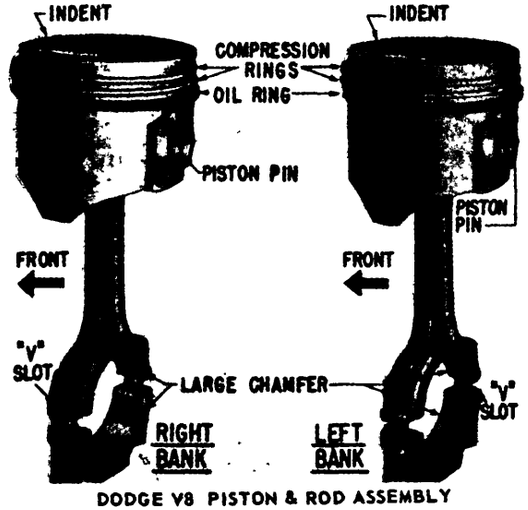
Weight - 20.8 ozs. (DMP8); 25.6 ozs. (ML361); 27.2 ozs. (ML383).

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance - .0005-.0015" (DMP8), .0005-.001" (ML361, 383), between thrust face of piston and cylinder wall, measured at top of skirt on piston and halfway down cylinder wall crosswise to engine. Pull to withdraw .0015" x ½" feeler should be 5-10 lbs. (piston inserted upside down).

Replacement Pistons: Furnished Std., .005", .020" (All Eng.) plus .040" (ML383) Oversize.

Installing Pistons: Assemble pistons and rods for left hand cylinder bank (1-3-5-7) with piston boss marked "Front" and indent on piston head on **same side** as larger chamfer on large end of connecting rod. Assemble pistons and rods for right hand cylinder bank (2-4-6-8) with "Front" and indent **opp sit** large chamfer on connecting rod. *See "Rod Installation" below.*



DODGE V8 PISTON & ROD ASSEMBLY

PISTON PIN

DMP8 Eng. - Floating type with lock ring at each end.

ML361, 383 Eng. - Piston pins are tight press fit in connecting rod and special removal and installation procedures required. Piston pins are available only with new pistons.

Diameter - .984" (DMP8), 1.093" (ML361, 383).

Length - 3.0" (DMP8), 3.56" (ML361, 383).

Pin Fit in Piston - .0000-.0005" clearance (DMP8), .00045-.00075" clearance (ML361, 383). Light thumb press fit at 70°F.

Pin Fit in Rod (DMP8) - .0000-.0005" clearance.

Pin Fit in Rod (ML361, 383) - .0007-.0012" interference.

Piston Pin Removal & Installation - (ML361, 383) *See "Piston Pins" in Dodge Special Data.*

Replacement Pins: (DMP8) Furnished Std., .003", .008" Oversize. **(ML361, 383)** Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, tin plated. Oil rings are cast iron, single piece units.

DMP8 Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.078"	.010-.020"	.0015-.0030"
Compr. (2)	.078"	.010-.020"	.0015-.0030"
Oil	.186"	.010-.020"	.001-.003"

ML361, 383 Engines

Ring	Width	End Gap	Side Clearance
Compr.(1)	.078"	.013-.025"	.0015-.0030"
Compr.(2)	.078"	.013-.025"	.0010-.0025"
Oil	.186"	.013-.025"	.0010-.0030"

Replacement Rings: Furnished Std., .020", .040" Oversize.

Installing Rings: Install compression ring with "Top" mark toward top of piston.

CONNECTING ROD

Length (Center-to-Center) - 6.12" (DMP8), 6.36" (ML361, 383).

Weight - 25.6 ozs. (DMP8), 28.6 ozs. (ML361, 383).

Crankpin Journal Diameter - 2.124-2.125" (DMP8), 2.373-2.375" (ML361, 383).

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE):* See CRANKSHAFT.

Lower Bearings (DMP8) - Removable precision type, Bi-metal Grid.

Lower Bearings (ML361, 383) - Removable precision type, Lead Based Babbitt on Steel.

Clearance - .0005-.0015". Wear Limit - .0025" (All Eng.).

Sideplay - .006-.014" (DMP8), .009-.017" (ML361, 383).

Replacement Bearings: Std. and .001", .002", .003", .010", .012" Undersize.

Installing Rods: With piston correctly installed on connecting rod (see "Pistons" above), larger chamfer on lower end of connecting rod should be installed toward crankshaft journal fillet.

CRANKSHAFT

Journal Diameter: 2.50" (DMP8), 2.63" (ML361, 383).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows:

.010" UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) stamped on engine numbering pad indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize journals is stamped on a machined surface of a counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Removable precision type. Tin-based babbitt on steel (No. 3 Thrust Bearing), Lead-based babbitt on steel (All others).

Clearance - .0005-.0015" (All Engines).

Replacement Bearings: Furnished Std., .001", .002", .010" Undersize.

Bearing Interchangeability - (DMP8) - Numbers 1, 2 & 4 bearing sets are identical. Number 3 or 5 not interchangeable.

(ML361, 383) - Numbers 1, 2, 4 & 5 bearing sets are identical. Number 3 is not interchangeable.

End Thrust: Taken by No. 3 (center) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968", (4) 1.951-1.952", (5) 1.5605-1.5615" (DMP8), 1.748-1.749" (ML361, 383).

Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.5625-1.5635" (DMP8), 1.750-1.751" (ML361, 383).

Bearings - Removable, lead based babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust: (DMP8) - Taken by thrust plate behind camshaft sprocket hub. **(ML361, 383)** - Taken by camshaft sprocket hub. Camshaft held to rear by design when running.

Timing Chain: (DMP8) - Width .875". Pitch .38". Length 68 links.

Timing Chain: (ML361, 383) - Width .875". Pitch .50". Length 50 links.

Camshaft Setting: Marks on sprockets should be adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Engine Front Cover (Removal & Installation): *See Dodge Special Data.*

►*318" ENGINE CHAIN CASE COVER & GASKET CAUTION:* New cast aluminum covers used on some engines require new gasket Nos. 1618685 (Chain Case Cover), 1676031 (Water Pump).

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data.*

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VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

DMP8 Engine

Valve	Head Diameter	③Stem Diameter	Length
Intake	1.844"	.3725"	①4.54"
Exhaust	1.563"	.3715"	②4.48"

Valve	Seat Angle	Lift	Side Clearance
Intake	45°	.390"	.001-.003"
Exhaust	45°	.368"	.002-.004"

ML361, 383" Engines

Valve	Head Diameter	③Stem Diameter	Length
Intake	1.95"	.3725"	①4.79"
Exhaust	1.60"	.3715"	②4.79"

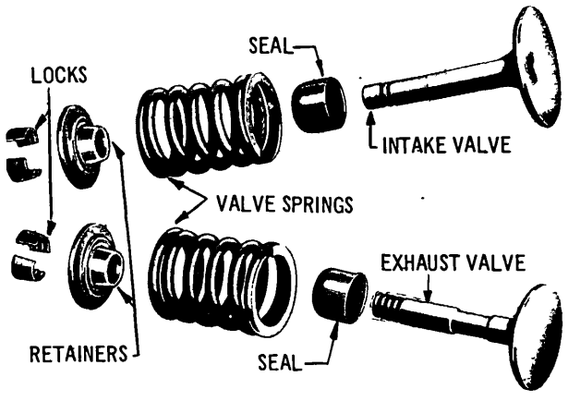
Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.390"	.001-.003"
Exhaust	45°	.390"	.002-.004"

① - To top of valve face. ② - Overall

③ - Standard valves. Also .005", .015", .030" Oversize.

Intake Valve Stem Oil Seal - Cup type seals used on all intake valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3436 (DMP8), C-3648 (ML361, 383). If valve tip exceeds maximum (end of cylindrical gauge) grind tip down to approach but do not go below minimum height (slotted area in gauge).



DODGE V8 VALVE ASSY. (ML 361 & 383)

Valve Springs: Single springs used on all engines.

Valve Spring Specifications

DMP8 Engine

Valve ①	Lbs. Pressure	Length
Closed	83 lbs.	1 11/16"
Open	177 lbs.	1 5/16"

ML361, 383 Engines

Valve ①	Lbs. Pressure	Length
Closed	95-105 lbs.	1.86"
Open	188-202 lbs.	1.47"

① - Intake & Exhaust Valves.

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 5/8-1 11/16" (DMP8), 1 55/64" (ML361, 383), install a 1/16" spacer under spring to reduce spring height.

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "pump-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation (ML361, 383) - Install all springs with closed-coil end toward head.

►*CAUTION:* Spring ends must be square within 1/16".

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install next oversize valves.

►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (DMP8 Eng.):* "I" (Intake) or "E" (Exhaust) on boss above nearest appropriate valve indicates that valve stem is .005" Oversize.

►*PUSHROD INSTALLATION CAUTION (ML361,383 Eng.):* Small (½" diam.) end of pushrod must seat in lifter, large (5/16" diam.) end must contact rocker arm. Improper installation will cause valves to be held partially open.

Hydraulic Valve Lifters: Used on all engines.

►*HYDRAULIC LIFTER INTERCHANGEABILITY CAUTION:* All passenger car hydraulic lifters are interchangeable except the type used in DMP8 (326") engine which has groove higher in body. *Use only this type lifter in DMP8 (326") engines and DO NOT use this type in any other engine.*

►*OVERSIZE LIFTER NOTE:* A "DIAMOND" mark on engine serial number pad indicates .008" oversize lifter bores.

Diameter - .9040-.9045". **Clearance** - .0005-.0015".

Replacement Lifters - Furnished Std. and .001", .008", .030" Oversize.

Lifter Overhauling & Testing - *See "Valve System" in Dodge Special Data.*

Rocker Arm Assembly: *See "Valve System" in Dodge Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT.

DMP8 Engine

Intake - Open 14° BTDC. Close 54° ALDC.
Exhaust - Open 56° BLDC. Close 12° ATDC.

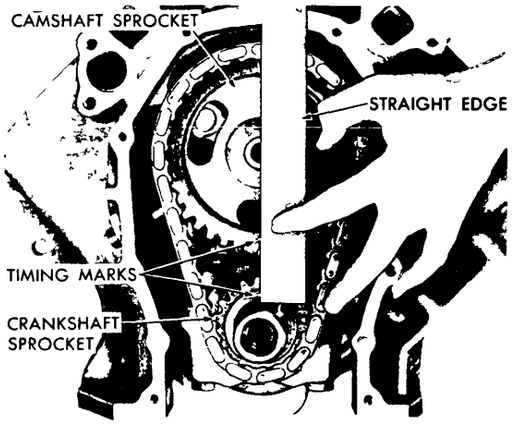
ML361 & ML383 D-500 Engines

Intake - Open 15° BTDC. Close 57° ALDC.
Exhaust - Open 57° BLDC. Close 15° ATDC.

ML383 Super D-500

Intake - Open 20° BTDC. Close 60° ALDC.
Exhaust - Open 58° BLDC. Close 22° ATDC.

Valve Timing Check: Rotate engine to TDC on No. 1 cylinder. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve. Install a dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed tappet down (providing a solid tappet). Turn crankshaft in normal running direction until valve has lifted .006" (DMP8), .024" (ML361 & ML383 with one carburetor). Timing on timing indicator (chain case cover) should now read 10° BTDC to 2° ATDC (DMP8) or 5° BTDC to 7° ATDC (ML361 & ML383 with one carburetor). *CAUTION* - Remove spacer before turning engine any further in normal direction.



DODGE V8 VALVE TIMING MARKS

OILING SYSTEM

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

►*DIPSTICK CAUTION:* "Add Oil" mark should be 2 5/8" from bottom of stick on ML361, 383 engines, and 1 5/8" from bottom of stick on DMP8 engines.

Normal Oil Pressure: 45-65 lbs. at 1500 RPM, with 15 lbs. minimum pressure at 500 RPM.

Oil Pressure Relief Valve - Mounted in oil pump. *See "Oiling System" in Dodge Special Data.*

Oil Pressure Gauge - Auto-Lite No. 14828A. Mechanical.

Oil Pump (DMP8): Mounted on rear main bearing cap. Rotor type with strainer mounted on oil pump body. Strainer must be mounted parallel with bottom of cylinder block.

Oil Pump Overhaul - *See "Oiling System" in Dodge Special Data.*

Oil Pump (ML361, 383): Rotor type. Mounted on cylinder block on lower left side of motor at front end.

Oil Pump Overhaul - *See "Oiling System" in Dodge Special Data.*

Oil Filter (DMP8): Shunt type. Filters only a portion of pump output. Replace element every 5,000 miles or sooner if needed.

Oil Filter (ML361, 383): Full flow, disposable type. Replace every 5,000 miles or sooner if needed.

►*OIL FILTER INSTALLATION CAUTION (ML361,383):* Screw new filter on base until gasket on filter contacts base. **Tighten ½-turn by hand.** DO NOT overtighten.

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in valve chamber cover (DMP8), in right rocker arm cover (ML361,383). *NOTE* - Remove air cleaner in ventilator pipe (when so equipped), wash

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Form 10B

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in kerosene and reoil.

COOLING

Water Capacity: 20 qts. (DMP8), 16 qts. (ML361,383). Add 1 qt. for heater.

►*AIR CONDITIONER OPERATING CAUTION: Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.*

►*RADIATOR OR FAN REPLACEMENT CAUTION (ML361, 383 Engines):* Clearance between fan and radiator core should be ½-1". To obtain this clearance, install Fan Spacer No. 1825931 (13/16") or Fan Spacer No. 1855808 (39/64") as necessary.

Pressure Valve: 14 lb. radiator filler cap (All Models).

Thermostat: Pellet type. Located under water outlet connector. *NOTE* - 180°F thermostat standard after October 1958. Use 160°F thermostat for alcohol-type antifreeze.

►*THERMOSTAT IDENTIFICATION NOTE:* Disregard the 160° mark shown on top surface of gasket flange on some thermostats. Correct (180°) mark is located on bottom of pellet. This applies to double coil spring type thermostats.

Water Pump: Sealed ball bearing, packless type. No lubrication required.

Pump Removal - Drain cooling system, remove fan shroud (air conditioned cars), loosen fan belt, loosen idler pulley (air conditioned cars). Remove fan spacer and pulley, then remove mounting bolts and water pump.

Overhaul - *See Water Pump Section.*

Temperature Gauge: King-Seeley electric Constant Voltage ("CV") type with Voltage Regulator King-Seeley No. 56562.

Dash Unit - King-Seeley No. 56556.

Engine Unit - King-Seeley No. 44255.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10A8 (MD2), 11A8 (MD3-L Early), 10.5A8 (MD3-L Later). Single plate, dry disc type. *See "Borg & Beck" in Clutch Section.*

Pedal Adjustment: Adjust the fork rod to secure 5/32" free movement of clutch fork outer end. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: (*NOTE* - Over-center spring located above clutch pedal and attached to pedal mounting bracket). Release clutch rod at clutch pedal. Back off adjusting nut to release over-center spring. Hold clutch pedal fully depressed, adjust nut until it just touches "C" link of spring, then turn nut 7 full turns for 10" clutch. Reinstall clutch rod to clutch pedal.

Removal: Remove transmission and clutch housing pan, pull out clutch release bearing and sleeve. Mark clutch cover and flywheel. Remove clutch cover to flywheel bolts (release each bolt a few turns at a time in succession to release spring tension until cover is free). Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. *See "Dodge Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable, gear shift control rods. Remove back-up light switch (if so equipped), and speedometer drive pinion. For transmission overhaul, or rear seal replacement, apply hand brake, remove flange nut (flange holding Tool C-3281). Disconnect hand brake cable, remove brake drum and flange assembly (puller Tool C-452) and oil seal (puller Tool C-748). Pull transmission straight back until pinion shaft clears clutch disc, then lower transmission.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed transmission.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

►*POWERFLITE BUZZING NOISE IN REVERSE CORRECTION:* Install new Torque Converter Control Valve Part No. 2124247, *see "PowerFlite Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles. Drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A" Suffix "A". *NOTE* - This supersedes previous drain interval of 20,000 miles.

Checking Fluid Level: Check fluid level with transmission at operating temperature (driven approximately 10 miles), engine idling and with transmission in neutral, after pressing each push button, returning to neutral between each position. Under above conditions, level should be between the **"Add 1 Pint"** and **"Full"** marks. When below **"Add 1 Pint"** mark, bring level between the marks but never **above "Full"** mark. Remove fluid, when **above "Full"** mark, to proper level. *NOTE* - When transmission and torque converter are drained and refilled, level should be ¾" **below "Add 1 Pint"** mark (fluid is not at operating temperature).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER POWERFLITE SERVICE DATA: See "PowerFlite Transmission" in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three-speed transmission.

►*TORQUEFLITE BUZZING NOISE IN REVERSE CORRECTION:* Install new Torque Converter Control Valve Part No. 2124247, *see "TorqueFlite Transmission" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1,000 miles. Drain and refill every 10,000 miles with Automatic Transmission Fluid type "A" Suffix "A". *NOTE* - This supersedes previous drain interval of 20,000 miles.

Checking Fluid Level: Check fluid level with transmission at operating temperature (driven approximately 10 miles), engine idling and with transmission in neutral, after pressing each push button, returning to neutral between each position. Under above conditions, level should be between the **"Add 1 Pint"** and **"Full"** marks. When below **"Add 1 Pint"** mark, bring level between the marks but never **above "Full"** mark. Remove fluid, when **above "Full"** mark, to proper level. *NOTE* - When transmission and torque converter are drained and refilled, level should be ¾" **below "Add 1 Pint"** mark (fluid is not at operating temperature).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER TORQUEFLITE SERVICE DATA: See "TorqueFlite Transmission" in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear.

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Dodge Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE* - Two pinion gear type differential used in all models.

See "Dodge Hypoid" in Rear Axle Section.

►*"SURE-GRIP" AXLE NOTE:* Optional on all models and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and a round aluminum tag (Use Sure-Grip Lube) attached to a carrier housing nut.

►*"SURE-GRIP" AXLE SHAFT INSTALLATION CAUTION:* Axle shaft used with "Sure-Grip" differential is 3/32" shorter than the standard axle shaft. DO NOT use the standard axle shaft with "Sure-Grip" differential.

See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Ratios: Available as follows:

Model	Synchro-mesh	PowerFlit	TorqueFlit
DMP8 Std.	Ⓒ 3.54	Ⓒ 3.31	Ⓒ 2.93
Optl.	3.31	3.54	Ⓒ 3.31
ML361,383, Ⓡ Std.	Ⓒ 3.31		Ⓒ 2.93
Optl.	3.54		Ⓒ 3.31
ML361,383, Ⓤ Std.			Ⓒ 2.93
Optl.			Ⓒ 3.31
D-500 Std.			Ⓒ 3.31
Optl.			Ⓒ 2.93

Ring & Pinion Teeth For Each Ratio - 2.93 (41-14); 3.31 (43-13); 3.54 (39-11).

Ⓒ - 3.31 used with "Sure-Grip".

Ⓒ - 2.93 used with "Sure-Grip".

Ⓡ - Royal. Ⓤ - Custom Royal.

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Backlash - 006- 010"

Carrier Removal: Remove axle shafts (see below), disconnect rear universal joint, remove differential carrier capscrews, lift out carrier assembly

► *BANJO HOUSING INSTALLATION NOTE.* Check rear universal joint angle *See "Propeller Shaft Notes" in Dodge Special Data*

Axle Shaft Removal: Jack up car remove wheels, hub and drum assembly (Tool C-845) Block brake pedal, disconnect brake line at wheel cylinder, remove axle key, brake and dust shield Note number of shims removed from axle housing, use Puller Tool C-499 by remove axle shaft and bearing remove inner seal (Tool C-637)

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel hub removed, check end play with dial indicator To adjust, remove backing plate (see above) add or remove shims (furnished 005" 012", 030" thick) equally at both wheels

Endplay - 013- 018"

SHOCK ABSORBERS

"Oriflow". Direct acting, hydraulic type Serviced by replacement

Shock Absorber (Dodge No.)	Front	Rear
Standard 1"	1881774	1879307
Heavy Duty 1"	1881775	1879306
Heavy Duty 1 3/8"		1881877

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joints and torsion bar front springs *NOTE* - Caster and camber adjustment is controlled by position of eccentric cams operating in cam retainers welded to front and rear faces of upper control arm bracket No shims used *See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section*

Steering Axis Inclination - 6½° at 0° camber

Caster - (Manual Steering) - Neg ¾°±¾°, Neg ¾° preferred **(Power Steering)** - Pos ⅜°±¾° Pos ⅜° preferred *NOTE* - Caster should be as equal as possible on both sides of car

Camber (Left Wheel) - Pos ½° to 0° 3/8° preferred

Camber (Right Wheel) - 0°±¼° 0° preferred

Toe-In - 3/32-5/32" 1/8" preferred

Toe-Out in Turns - With inner wheel at 20°, outer wheel should be 18°46'

AIR SUSPENSION

At rear only Air springs used in conjunction with conventional leaf springs Optional on all models *See "Dodge Air Suspension" in Suspension & Wheel Alignment Section*

►*COMPRESSOR KNOCKING NOISE CORRECTION* Caused by endfloat in crankshaft Correct by installing Air Suspension Compressor Kit No 2084466 *See "Dodge Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual: Gemmer. Worm and three tooth roller *See "Gemmer Worm & Roller" in Steering Section*

Power Steering: "Constant Control Full Time" Power Steering *See 'Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

Steering Linkage: *See Steering Linkage in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

BRAKES

Service: Two types "Center Plane" (Floating Shoe) hydraulic, and "Three Platform Total Contact" *See "Dodge Center Plane & Total Contact Brakes" or "Dodge Three Platform Total Contact Brakes" in Brake Section.*

►*BRAKE PRODUCTION CHANGE NOTE* New "Three Platform Total Contact Brakes" used in production on later cars These brakes have important design changes and parts from early and later brakes are not interchangeable

Drum Diameter - 11" *NOTE* - 12" diameter drums are optional on all V8 models

Wheel Cylinder Diameter - 1 1/8" front and rear Two single acting cylinders on front, one double acting cylinder on rear

Lining - Molded asbestos bonded to shoe

Width - 2½" front, 2" rear (2½" rear on Station Wagons, Royal and Custom Royal Convertibles & Hard Tops)

Length - 11 5" all shoes **Thickness** - 20"

Braking Power - 60% front, 40% rear

Clearance - Front Wheels - 006" Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked Turn cams in opposite direction until no drag is felt

Rear Wheels - 006" Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation

Master Cylinder: On engine side of firewall opposite base of brake pedal

►*MASTER CYLINDER NOTE (Cars Without Power Brakes)* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder, eliminating need for adjustment No pedal return spring is used A service package consisting of piston-collar-rod-retainer and boot assembly is available for replacement of individual parts that are worn or damaged

Checking Fluid Level - Filler plug at top of master cylinder (on dash panel in engine compartment)

Removal - Disconnect pushrod, brake tube and stop light switch leads Remove master cylinder to dash bolts Slide master cylinder straight out from dash

Power Brakes: "Oval Piston Assist" type Mounted on firewall and linked to upper end of brake pedal Used with adjustable pushrod type master cylinder *See "Chrysler, DeSoto, Dodge & Plymouth Oval Piston Type Power Brakes" in Brake Section*

Removal - Place block or wedge between power lever and bracket (to prevent damage to ramp of trigger arm) Mark across power unit adjacent to vacuum test port and mounting bracket, and between mounting bracket and firewall Disconnect vacuum hose, remove bolts securing bracket to firewall, slide unit and bracket straight forward

Parking Brake: On shaft at rear of transmission 6" external contracting type used with Synchro-mesh Trans , internal expanding type used with Automatic Trans

Adjustment - *See "Brake Notes" in Dodge Special Data*

Lining	Width	Thickness	Length
6" Ext type	2"	.5/32"	16.68"
7" Int type	2"	5/32"	① 13 06"

① - Total both shoes

MISC. MECHANICAL

Windshield Wipers: Auto-Lite electric EPW-4001C (Single Speed), EPV-4001G (Variable Speed) *See "Auto-Lite Electric Windshield Wipers" in Misc Ilaneous Section*

Air Conditioning: Heater-Air Conditioning. *See "Dodge Air Conditioning" in Miscellaneous Section*

►*AIR CONDITIONING COMPRESSOR CLUTCH NOISE CORRECTION* Caused by compressor bearing To correct, replace old bearing with Bearing Assembly Part No 1769318P *See "Dodge Heater-Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters - Electric 6-Way type *See "Power Seat Adjusters" in Miscellaneous Section*

Convertible Top Control: Electric-Hydraulic type *See "Power Top Controls" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Identification
Seneca	PD3-L
Pioneer	PD3-M

SERIAL NUMBER: Stamped on plate attached to left front door hinge post. Number (example below) includes identification data.

① ② ③ ④ ⑤
4 1 0 2 100001

① - Car make. 4 Dodge Dart 6 Cyl.
② - Model Series. 1 Seneca. 2 Pioneer. 5 Seneca Station Wagon. 6 Pioneer Station Wagon.
③ - Year. 0 (1960).
④ - Assembly Plant. 1 Plymouth (Detroit). 2 Dodge (Detroit). 3 Jefferson (Detroit). 5 Los Angeles. 6 Delaware. 7 St. Louis. 8 Clairpointe. 9 Canadian Plant.
⑤ - Beginning vehicle number at each assembly plant.

ENGINE NUMBER: Stamped on right side of block below cylinder head at front or rear of engine. Number (example below) includes identification data.

① ② ③ ④ ⑤
P 22 .... 8 1

① - Year P (1960).
② - Displacement - 225 cu. ins.
③ - If this space blank, engine is standard. A - Indicates all cylinders .020" oversize. B - Indicates all crankshaft journals .010" undersize. AB - Indicates both conditions.
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 1 1st day of month, etc.

TUNE-UP

COMPRESSION PRESSURE: 130-160 lbs. at 150 RPM (plugs removed). Maximum variation between cylinders 15 lbs.

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust, Hot.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Spark Plugs - Autolite AG52 Std. (Use to replace AG42 used in early production), Autolite AG82 (Taxicab). "Long Reach" 14 mm. type. *NOTE* - Plugs are installed in aluminum sleeves which serve as plug gaskets.

COIL: Autolite CAH-4001. (Service Coil Autolite 200575).
Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.
Resistor - Autolite 201000. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

►*ROUGH IDLE OR ENGINE STALLING CORRECTION:* Caused by loose terminal on lead at resistor. Correct by increasing crimp on female terminal for more positive connection.

DISTRIBUTOR: Own. Chrysler N. 2095270. Conventional type with centrifugal and vacuum advance.
Condenser - Chrysler 1818757. **Capacity** .25-.285 mfd.
Contact Point Set - Chrysler No. 1838643.
Breaker Gap - .017-.023".
Cam Angle - 36-42°.
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250-450	0	500-900
0-2	450	0-4	900
5.5-7.5	1000	11-15	2000
10.5-12.5	2200	21-25	4400

Vacuum Spark Control: Integral type

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.9-6.9
4.5-7	9-14	9.5
7.8-10.3	15.6-20.6	12

IGNITION TIMING

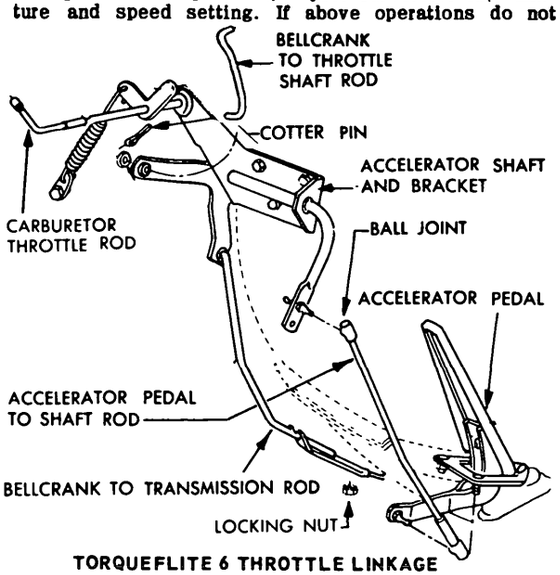
Setting - 2.5° BTDC (Synchromesh), 5° (Auto. Trans.).
Timing Mark - Align correct mark on chain case cover with mark on crankshaft pulley.

CARBURETOR

►*CARBURETOR APPLICATION: Carter BBS single barrel carburetor used.*

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

►*POOR ENGINE IDLE PERFORMANCE (In congested traffic in hot weather, or after continuous highway driving at 60-70 MPH):* Check all of the following points: Intake Manifold and Carburetor mounting for air leaks. All vacuum operated accessories (power brakes, vacuum actuated switches, etc.) for air leaks, adjust Tappet Clearance, set Ignition Timing, check carburetor linkage for free operation, adjust carburetor idle mixture and speed setting. If above operations do not correct trouble, and a slight hesitation is experienced at 40-70 MPH. on light acceleration, reposition air cleaner at 90° to right across valve cover.



TORQUEFLITE 6 THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Bring engine to normal operating temperature with carburetor off fast idle cam and adjust idle speed to 500 RPM. Loosen locknut at lower end of transmission throttle rod and move transmission throttle control lever forward until it stops. Tighten locknut. Adjust a spirit level protractor to 11½° and place lengthwise on flat face of accelerator pedal. With car level, disconnect accelerator pedal rod and adjust length of rod so bubble is centered in spirit level. Connect rod.

CARTER BBS

Carter BBS No. 2985S, SA, SB (Synchro-mesh), No. 2986S, SA, SB (Auto. Trans.), No. 3053S, SA (Taxicab). Single barrel, downdraft type with automatic choke.

►*CARTER BBS No. 2986S PRODUCTION CHANGE AND SERVICE RECOMMENDATION:* Replace original set-up wire. *See "Carter BBS Carburetors" in Carburetion Section.*

Idle Setting - 1/8-1 1/2 turns open (Except 3053S,SA), 1-2 turns open (3053S,SA). With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.
Idle Speed - 550 RPM (Synchro-mesh), 500 RPM (Auto. Trans. in "N").
Float Level - 7/32" (2985S,SA,SB; 2986S, SA,SB), 9/32" (3053S,SA) between top of each float ridge at center of float and top surface of body casting. To adjust, bend lip of float arm.
Accelerating Pump - Install throttle connector rod in center hole (medium stroke) of throttle lever.
Fast Idle Speed: 1200-1400 RPM with engine at normal operating temperature and fast idle speed screw (2985SB & 2986SB); idle speed screw (Others) on index mark of cam. *NOTE - No adjustment is necessary for fast idle on 2985S,SA; 2986S,SA; 3053S,SA carburetors. On 2985SB & 2986SB carburetors, rotate fast idle screw as necessary to obtain proper engine speed.*
Automatic Choke: Cross-Over type. Set at Index.
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter BBS Single Carburetor" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2996S. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

Fuel Filter: New disposable paper type located in fuel line between pump and carburetor. Replace every 9000 miles.

Gasoline Gauge: Constant Voltage type with voltage regulator inside gauge.
Dash Unit - Chrysler No. 2096881.
Tank Unit - Chrysler No. 2034062 (Exc. Sub.), 2084272 (Sub.).
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Paper element type, clean every 5,000 miles, replace element every 15,000 miles. More frequent servicing may be necessary under severe operation.

►*CLEANING CAUTION:* Remove filter element from from housing. Blow compressed air gently from inside

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out (2" away) to remove dust particles. DO NOT tap these filters to loosen grit or DO NOT immerse them in any fluid.

ELECTRICAL

►*SEE DODGE V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC. ELECTRICAL DATA.*

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extrem care wh n disconnecting any part of air conditioning r lin s f r access to engine. See "Air Conditi ning S rvic Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: New "Inclined" Six Cylinder, Overhead valve type. *NOTE* - Engine is inclined 30° to right when installed in chassis and oil pan correspondingly sloped with bottom of oil pan parallel to the floor.

Bore	Str ke	Displacement
3.40"	4.125"	225 cu. ins.
Compr. Rati	**Rated HP**	**Developed HP**
8.5-1	27.74	145 at 4000 RPM

Compr ssi n & Vacuum Reading - *See TUNE-UP.*

►*VALVE PUSHROD BENDING OR BREAKING:* May be caused by insufficient lubrication of valve train due to rear camshaft bearing turning in the block and cutting off the oil lead to the rocker arm shaft. When replacing rear camshaft bearing, check for a sufficiently tight fit to prevent bearing turning in service. If necessary, coat outside diameter of bearing with a high tin-content solder before installation.

►*LOW OR INTERMITTENT OIL PRESSURE OR LOSS OF OIL PRESSURE ON TURNS:* May be caused by incorrect positioning of oil pick-up tube and screen assembly in crankcase. Can be checked through oil pan drain hole without removing pan. Bottom of screen should be parallel with bottom of pan with approximately 1/8" clearance. *See "Oil Pick-up Tube & Screen Position" under OIL PAN below.*

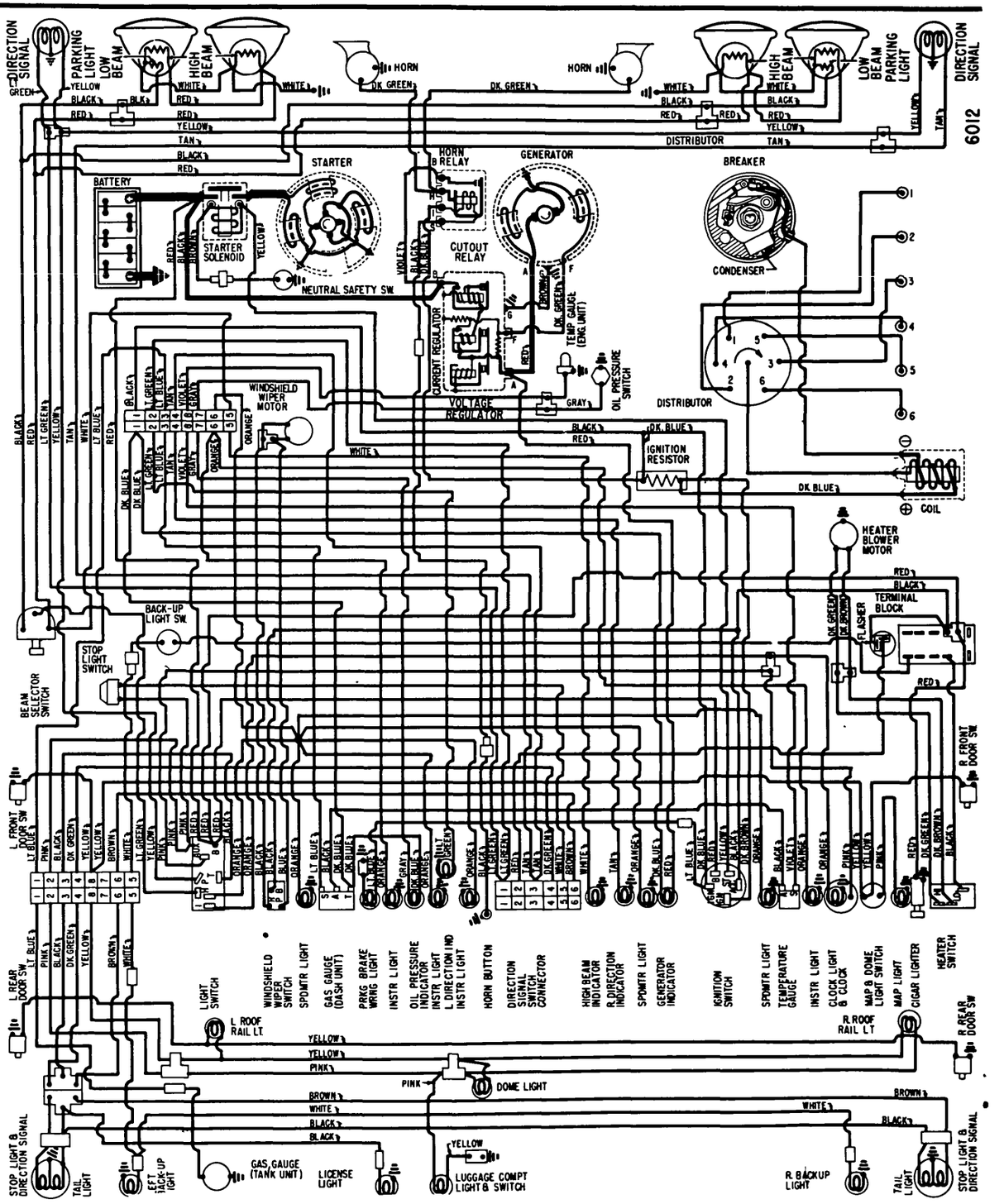
►*OIL LEAKAGE AT REAR CAMSHAFT BEARING CORE PLUG:* May be caused by oil accumulation in recess behind camshaft rear bearing journal. *See "Camshaft & B arings" in D dge Special Data.*

OIL PAN: R m val - Remove tie rod at steering and idler arms. Support engine and remove front engine mounting-to-frame bolts, disconnect and remove left side support (connecting converter housing and cylinder block). Raise engine approximately 2 inches. Drain crankcase. Remove oil pan bolts, lower pan and remove it toward the rear. *CAUTION - Do not turn oil pick-up tub and strainer out of position.*

Installati n: Check position of oil pick-up tube and screen (see below). Install cork rail gaskets on block using sealer to hold them in position, install front rubber molded gasket on chain case cover. Place oil pan in position and install attaching bolts, tighten bolts evenly to 200 **inch lbs.** (supersedes original recommendation of 15 ft. lbs.). Install left side support and tighten bolts to 30 ft. lbs. Lower engine, install front engine mounting bolts and tighten to 85 ft. lbs.

►*OIL PICK-UP TUBE & SCREEN POSITION:* With oil pan off, make certain that tube is tight in block. Check position of screen by placing straightedge vertically in line with inner edge of cylinder block oil pan rail. Distance from straightedge to nearest edge of screen

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should be 1 1/8". S also "Low or Int rmittent Oil Pressur " abov

ENGINE REMOVAL: S "Engin " in D dg Sp cial Data.

CYLINDER HEAD: See "Cylinder Head & Manifold" in Dodge Special Data.

TIGHTENING TORQUES: See "Tightening Specifications" in Dodge Special Data.

PISTONS

Aluminum alloy, cam ground, tin plated, slipper type skirt. Thermally controlled by steel struts.

►*OVERSIZE CYLINDER BORE CAUTION:* Letter "A" (A or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates all cylinder bores and pistons are .020" Oversize.

Weight - 16.3 ozs.

Removal - Pistons and rods removed from above.

Clearance - .0005-.0015" at top of skirt.

Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure piston at top of skirt at right angles to pin hole, measure cylinder bore halfway down and at right angles to crankshaft.

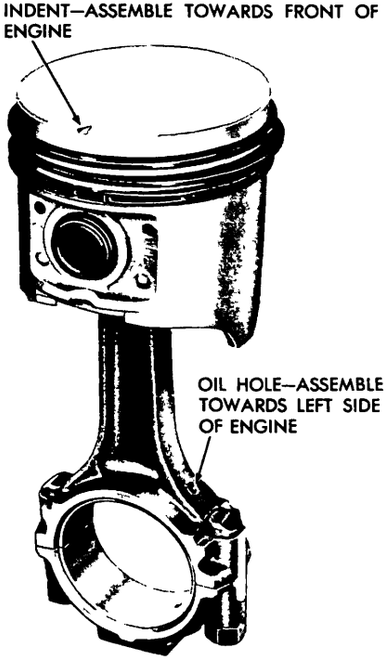
Installing Pistons - Notch in piston head must be toward front of engine. See *Rod Installation.*

Replacement Pistons: Furnished with pins in Std. size and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

PISTON PIN

Press fit in connecting rod.

Diameter - .9007-.9009". **Length** - 2.955-2.975".



DART 6 CYL. PISTON ASSEMBLY

Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

Pin Fit in R d - .0007-.0012" Interference fit. Special procedure and tools used for removal & installation. See *"Piston Pins" in Dodge Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

Compression rings cast iron (No. 1 is chrome-plated, No. 2 is tin-plated). Oil ring is three-piece type with chrome-plated rails.

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	.010-.020"	.0015-.003"
Oil	.1860-.1865"	.015-.055"	.0010-.003"

Installing Rings - Mark "Top" on compression rings must be toward top of engine.

Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020" to .029",.040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.699".

Weight - 27.34 ozs.

Crankpin Journal Diameter - 2.1865-2.1875". Taper and out-of-round limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Pin Bore in Rod - .8995-.9000".

Clearance - .0005-.0015". Wear limit .0025".

Side Clearance - .006-.012".

Bearing Adjustment - None, replace bearings.

Installing Rods - Notch in head of piston must be to front of engine, oil squirt hole in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010", Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505". Taper and out-of-round limit .001".

Bearing Type - Removable, precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-based babbitt on steel.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (All Main & Connecting Rod Journals) - Letter "B" (B or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates that ALL Main and Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - Letter (M - Main Journal, R - Connecting Rod Journal) and Number (designates particular journal) stamped on center counterweight of crankshaft indicate that particular journal is .001" Undersize and fitted with .001" thicker wall bearing insert.

►*MAIN BEARING NON-INTERCHANGEABILITY CAUTION:* Nos. 1 & 2 upper bearings are chamfered along right inside edge at tab end and are interchangeable. No. 4 upper bearing is not chamfered and is NOT interchangeable with other bearings (*NOTE* - This bearing identified by blue marking on edge). No. 3 upper and l w r bearings are flanged and NOT interchangeable with other bearings. Upp r and l wer bearing halves are NOT interchangeable (upper bearings grooved, lower bearings plain). Nos. 1, 2, 4 l wer bearings are interchangeable. *CAUTION - Us of No. 1 or 2 upp r bearing in No. 4 p sition may caus oil l ak, use of No. 4 upper bearing in No. 1 position would prevent proper lubrication f timing chain and sprock ts.*

Clearance - .0005-.0015".

End Thrust - Taken by No. 3 (rear intermediate) flanged bearing. **Endplay** - .002-.007".

Replacement Bearings: Std. and .001", .002", .010", Undersize.

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Crankshaft Rear Main Bearing Oil S al: See *"Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: S "Engin Fr nt Cover" in *Dodge Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952".

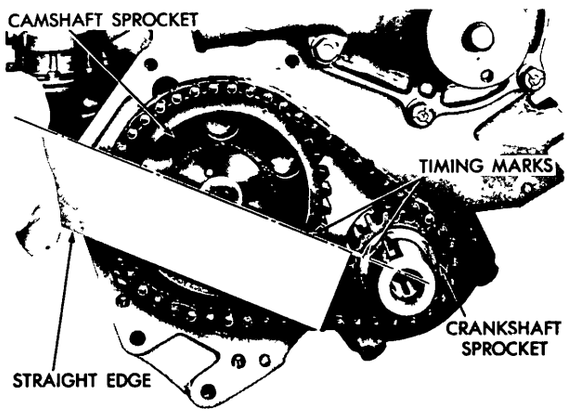
Bearings - Lead-based babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.

Timing Chain: Side guide type. Width .88", Pitch .50", Length 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold crankshaft sprocket stationary, use torque wrench to turn camshaft sprocket in both directions applying 30 ft. lbs. turning torque if cylinder head installed, 15 ft. lbs. turning torque if head off).

Camshaft Removal: See *"Camshaft & B arings" in D dg Special Data.*



DART 6 CYL. VALVE TIMING MARKS

Camshaft Setting: Marks on sprockets must be adjacent and in line with straightedge across shaft centers.

Engine Front Cover Installation: S e *"Engine Front Cover" in Dodge Special Data.*

Engin Fr nt Cov r Oil Seal (Crankshaft Front Seal): *See "Engine Front C v r" in Dodg Special Data.*

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VALVES

►*INSUFFICIENT VALVE TRAIN LUBRICATION (Rocker Arms, Valv St ms, and Pushrods): See "Camshaft & B arings" in Dodg Special Data for inspection of rear camshaft b aring and il passages in camshaft.*

Tapp t Clearanc : Initial setting with cold engine .012" Intake, .023" Exhaust. With engine at normal operating temperature and idling, set clearance to .010" Intake, .020" Exhaust.

Valv	H ad Diam.	① Stem Diam.	Length
Intake	1.615-1 625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

Valv	S at Angle ④	Lift	Stem Clearance
Intake	45°	.375"	② .001-.003"
Exhaust	45°	.360"	③ .002-.004"

① - Std. Also furnished .005", .015", .030" Oversize.
② - Wear Limit .004". ③ - Wear Limit .006".
④ - Valve face angle 45° (Int.), 47° (Exh.).

Valve Seat Width: 5/64-3/32" Int., 3/64-1/16" Exh.

Valve St m Oil Seals: Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valv Springs: Free Length 2".

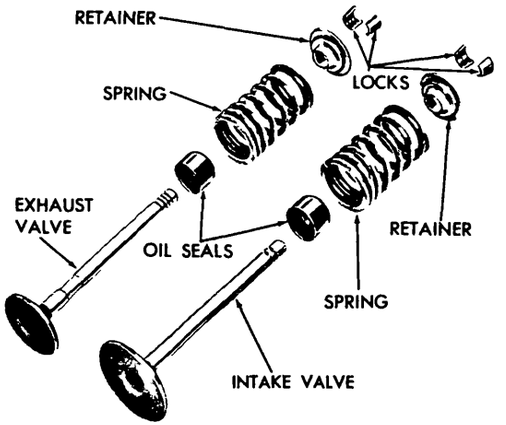
Valv Spring Specifications

Valv	Pr ssure	Length
Closed	68-76 lbs.	1 11/16"
Open	160-172 lbs.	1 5/16"

Valve Spring Installati n - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer) If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16"

Valve Lifters: Barrel type, removed from above.

R ck r Arm Assembly: *S e "Valve System" in Dodge Sp cial Data.*



DART 6 CYL. VALVE ASSEMBLY

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open at TDC Close 52° ALDC
Exhaust Valves - Open 40°BLDC Close 8° ATDC

Valve Timing Check - Remove rocker arm cover, mount dial indicator on cylinder head so that pointer contacts adjusting screw of No 3 Intake Valve (6th rocker arm from front of engine) Turn crankshaft until maximum valve lift is indicated on dial indicator At this point, timing mark on damper should be in line with 4° BTDC mark on chain case cover. *NOTE* - If timing is off one tooth, maximum valve lift will occur approximately 23° BTDC or 15° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Located in Pump body.

►*RELIEF VALVE SPRING NOTE:* Three types of spring available. Replace with same color spring, *see "Oiling Syst m" in Dodg Special Data.*

Oil Pr ssur Indicat r: Indicator light on Instrument panel operated by Oil Pressure Switch, Autolite No. 14272A. On oil pump on right side of block.

Oil Pump: Rotor type, on right side of crankcase.
Overhaul - *See "Oiling System" in Dodge Special Data.*

Oil Filter: Full flow type. Replace filter element every 4,000 miles, to correspond with oil changes

Crankcase Ventilation: Filter in oil filler cap (air intake) and outlet vent tube extending from rocker arm cover to lower right rear of engine. Wash filler cap filter in kerosene and re-oil every 5000 miles or more often in dusty areas.

COOLING

Water Capacity: 13 qt. Add 1 qt. for heater installation.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.

►*FAN-RADIATOR CORE CLEARANCE CAUTION:* Clearance should be ¾"± ¼"Thinner fan spacer, Part No. 2120510 can be used to correct.

►*FAN BELT SLIPPING CORRECTION:* Install improved belt, Part No. 2129078.

Pressure Valve: 14 lb. radiator cap (All Models).

Thermostat: Pellet type. In water outlet connection on cylinder head. Starts to open at 177-182°F.

Water Pump: Sealed ball bearing, packless type. No lubrication required.
See "Water Pumps" in Dodge Special Data.
Pump Removal - Drain cooling system, remove shroud (on air conditioned cars), loosen fan belt and Idler (on air conditioned cars). Remove fan spacer and pulley. Remove retaining bolts and washer and remove pump.

Temperature Gauge: Constant voltage type with voltage regulator inside gasoline gauge for both instruments.
Dash Unit - Chrysler No. 2096879.
Engine Unit - Chrysler No. 2084459.
See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*SEE DODGE V8 PAGES (FOLLOWING) FOR ALL CLUTCH, SYNCHRO-MESH, TORQUEFLITE SIX, UNIVERSALS, REAR AXLE, SHOCK ABSORBERS, FRONT SUSPENSION, STEERING, BRAKES & MISC. MECHANICAL DATA.*

►*JACKING & HOISTING CAUTION B for jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Model	Model Designation
Dodge Matador	PD1-L
Dodge Polara	PD2-H
Dodge Dart Seneca	PD4-L
Dodge Dart Pioneer	PD4-M
Dodge Dart Phoenix	PD4-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post Number (example below) includes identification data

① ② ③ ④ ⑤
5 3 0 5 100001

① - Car make **5** Dodge Dart, **6** Dodge
② - Model Series **1** Matador & Seneca. **2** Pioneer, **3** Polara & Phoenix
③ - Year **0** 1960
④- Assembly Plant **2** Detroit **3** Jefferson (Detroit) **5** Los Angeles **6** Newark **7** St Louis
⑤ - Beginning vehicle number

ENGINE NUMBER: (Exc. 318" Engine) - Stamped on boss on top right side of cylinder block just behind water pump Number (example below) includes identification data

① ② ③ ④ ⑤
P 36 ... 8 4

① - Year **P** 1960
② - Displacement **36** - 361 cu ins **38** - 383 cu ins
③ - If this space blank, engine is standard For identifying marks see "Engine Number Marks (All Engines)" below
④ - Month assembled **8** August, etc
⑤ - Day assembled **4** 4th day, etc

►*361" & 383" ENGINE NUMBER NOTE· Some early engines were marked with engine displacement followed by a serial number, similar to the type of marking used on 318" engines (below)*

318" Engine: Stamped on front face of left hand cylinder block Number (example below) includes identification data

① ② ③
P 318 1001

① - Year, **P** 1960
② - Engine displacement
③ - Beginning serial number

►*318" ENGINE NUMBER NOTE· To identify marks following the engine number, see "Engine Number Marks (All Engines)" below*

►*ENGINE NUMBER MARKS. Identified as follows*
"A" - All cylinders 020" oversize
"B" - All crankshaft journals 010" undersize
"AB" - Both above conditions exist
"Maltese Cross" (3/8" high) - ONE OR MORE crankshaft journals 001" undersize *See "Connecting Rods" and "Crankshaft" below*
♦(3/8" high) - One or more valve lifters 008" oversize

TUNE-UP

COMPRESSION PRESSURE: 125-165 lbs (318" Eng), 150-180 lbs (361" & 383" Engs) Maximum variation between cylinders 20 lbs (318" Eng), 30 lbs (361" & 383" Engines)

VACUUM READING: 19 5" at idle speed

VALVE TAPPET CLEARANCE: 318" Engin - 010" Intake, 018" Exhaust, hot with engine idling
361" & 383" Engines: Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine Valve must operate freely (lubricate with Special Lubricant, Part No 1879318) To install coil spring, position shaft in extreme counterclockwise position Place coil spring over shaft slot with outer end tongue in lower right hand position Press inner end of coil into slot of shaft and seat firmly Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud

►*RAM MANIFOLD HEAT CONTROL VALVE NOTE* Two heat control valves used, one in each cylinder bank exhaust manifold outlet When valve is closed, exhaust gases are diverted through bypass pipe around hot spot in intake manifold

►*THERMOSTATIC COIL SPRING CHANGE TO CORRECT SPARK PLUG FOULING· See "Spark Plugs" below*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035"
Spark Plugs - Autolite A42 (Std Engines), A32 (High Perf Engines) 14mm Torque to 30 ft lbs

►*SPARK PLUG FOULING CORRECTION (Early Ram Induction Engines)* Condition may occur under extended idle and low speed operations To correct, install new later production manifold heat valve thermostatic spring, Part No 2128933 New spring has approximately 5 coils *CAUTION - DO NOT use higher heat range spark plugs to correct this condition as severe engine damage will result*

COIL: Autolite No. 200575.
Ignition Current - 2 5 amps idling, 3 1 amps stopped
Resistor - Autolite 201000 Connected in lead between ignition switch and coil Bypassed during cranking by second lead from ignition switch

DISTRIBUTOR: Autolite models as follows

Engine	Autolite No.
318" Eng (Early), Synchro-mesh ①	IBP-4003P
318" Eng (Late) Synchro-mesh ①	IBP-4003T
318" Eng Auto Trans ①	IBP-4003L
318" Eng All ②	IBP-4003N
361" Eng ①	IBP-4005C
383" Eng (Early) ②	IBP-4005C
383" Eng (Late) ②	IBP-4005D
361" & 383" Eng (Ram Induction) ②	IBS-4006E
383" D-500 Eng (1 or 2 Carbs) ②	IBS-4006D

① - 2-Barrel Carb ② - 4-Barrel Carb
Condenser - Autolite IAT-3076LA **Capacity** - 25- 285 mfd
Contact Point Set - Autolite IBP-3028AS (IBP-4003L,N, P,T), IBP-3028BS (IBP-4005C,D), IGW-3028JS (IBS-4006D,E)
Breaker Gap - 015- 018"
Cam Angle (IBP Distr.) - 26-32°

►*CAM ANGLE SETTING CAUTION (IBP Distributor): Cam angle should be set with vacuum line disconnected*
Cam Angle (IBS Distr.) - 26-32° (single set of points), 31-37° (both sets of points operating together)
Breaker Arm Spring Tension - 17-20 ozs

Rotation - Clockwise (IBP-4003L,N,T,P), counterclockwise (IBP-4005C,D, IBS-4006D,E)

Automatic Advance - IBP-4003L

Degrees	Distr. RPM	Degrees	Eng RPM
Start	450	0	900
1	565	2	1130
3	800	6	1600
8	2050	16	4100
9	2300	18	4600

Automatic Advance - IBP-4003N

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	450	0	900
1	550	2	1100
3	750	6	1500
6	1850	12	3700
7 5	2400	15	4800

Automatic Advance - IBP-4003T

Degrees	Distr RPM	Degrees	Eng RPM
Start	350	0	700
1	430	2	860
5 5	800	11	1600
10	1925	20	3850
11 5	2300	23	4600

Automatic Advance - IBP-4003P

Degrees	Distr. RPM	Degrees	Eng RPM
Start	350	0	700
1	405	2	810
4 5	600	9	1200
7	1600	14	3200
8 5	2200	17	4400

Automatic Advance - IBP-4005C

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
4 5	800	9	1600
7	1800	14	3600
8	2200	16	4400

Automatic Advance - IBP-4005D

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	385	2	770
4	500	8	1000
10	1915	20	3830
11	2150	22	4300

Automatic Advance - IBS-4006D

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	450	0	900
1	515	2	1030
5 5	800	11	1600
8	1800	16	3600
9 5	2400	19	4800

Automatic Advance - IBS-4006E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	440	2	880
5 5	600	11	1200
9	2000	18	4000
10	2400	20	4800

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Vacuum Spark Control: Autolite integral type.

Vacuum Advance - IBP-4003L, T, N

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/4
1	2	8 3/4
7	14	12 1/8
12	24	15 3/4
13	26	17

Vacuum Advance - IBP-4003P

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5 1/2
1	2	6 1/4
5	10	9 1/4
9	18	12 1/4
10	20	13 1/4

Vacuum Advance - IBP-4005C, D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/8
1	2	8 5/8
4	8	10 1/2
8	16	13 1/2
9.5	19	15

Vacuum Advance - IBS-4006D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	11 7/8
10	20	15
11	22	16

Vacuum Advance - IBS-4006E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 5/8
5	10	11 3/8
8	16	13 3/4
9	18	14 1/2

IGNITION TIMING

Setting - With distributor vacuum line disconnected, set timing to mark indicated in table below. *NOTE - On cars with Ram Induction, adjust engine idle speed below 600 RPM (transmission in neutral and air conditioning compressor off). After adjusting timing, adjust engine idle speed to 725-750 RPM.*

Model	Setting
318" Eng. (Synchro-mesh) 2-Bbl. Carb.	5° BTDC
318" Eng. (Auto. Trans.) 2-Bbl. Carb.	10° BTDC
318" Eng. (Power Pack) 4-Bbl. Carb.	10° BTDC
361" Eng. 2-Bbl. Carb.	10° BTDC
383" Eng. 4-Bbl. Carb.	① 10° BTDC
361 & 383" Eng. (Ram Induction)	7.5° BTDC
383" D-500 (1 or 2 Carbs.)	12.5° BTDC

① - See "Early 383" Engine Note" below.

►*EARLY 383" ENG. (WITH DISTR. NO. IBP-4005C) TIMING NOTE: For improved performance on cars with this distributor, set the timing to 12½° BTDC.*

Timing Mark (318" Engine) - Graduation marks on crankshaft pulley and pointer on chain case cover. Align proper mark on pulley with pointer.

Timing Mark (Exc. 318" Eng.) - Mark on vibration dampener and graduations on indicator on timing chain cover. Align vibration dampener mark with proper mark on indicator.

CARBURETOR

►*CARBURETOR APPLICATION: As follows:*

Engine	Carburetor
318" (Exc. Power Pack)	① Stromberg WW (2-Bbl.)
318" (Exc. Power Pack)	① Carter BBD (2-Bbl.)
318" (Power Pack)	Carter AFB (4-Bbl.)
361" (Exc. Ram Induction)	Stromberg WWC (2-Bbl.)
361" (Ram Induction)	Two Carter AFB (4-Bbl.)
383" (Exc. D-500)	Holley (4-Bbl.)
383" (D-500)	One Carter AFB (4-Bbl.)
383" (D-500)	② Two Carter AFB (4-Bbl.)
383" (Ram Induction)	Two Carter AFB (4-Bbl.)

① - Either Carter or Stromberg used in production.
② - Carburetors mounted front & rear on a single manifold.

►***HARD COLD STARTING (Cars with cross-over choke carburetors):*** **May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.**

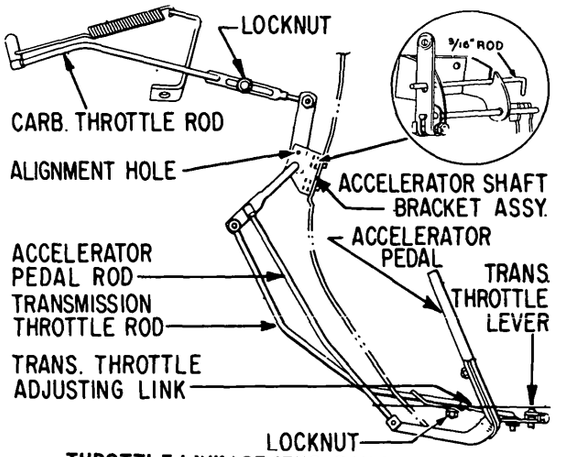
THROTTLE LINKAGE ADJUSTMENT (EXC. RAM INDUCTION): With engine at operating temperature and idling at 475-500 RPM (carburetor off fast idle and transmission in "N"), stop engine, loosen locknuts on transmission throttle lever and on carburetor throttle rod. Insert a 3/16" diameter rod through holes in bellcrank and lever, hold transmission throttle lever forward against its stop and tighten locknut. Remove 3/16" diameter rod. Make sure carburetor throttle lever is off fast idle cam and against idle stopscrew and move carburetor throttle rod rearward until stopped by internal stop in transmission. Tighten locknut. Accelerator pedal should be at an angle of 114° to horizontal. To adjust, remove pedal end of bellcrank-to-pedal rod and adjust length of rod by loosening locknut at swivel end and rotating swivel.

THROTTLE LINKAGE ADJUSTMENT (WITH RAM INDUCTION): With engine at normal operating temperature (carburetor off fast idle and transmission in "N"), **proceed exactly as follows:**

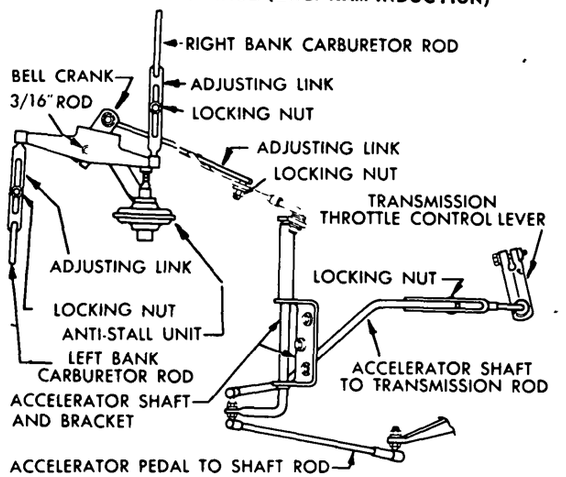
1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod. Insert a 3/16" diameter rod into holes in accelerator shaft bracket and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut.

2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator pedal. Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket.

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficently so bellcrank will pivot (hold dashpot push-rod when turning setscrew to prevent damage to diaphragm). Pivot bellcrank so 3/16" diameter rod can be inserted through hole in bellcrank and into locating hole in intake manifold. Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors. Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod. Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten adjusting link locknut.



THROTTLE LINKAGE (EXC. RAM INDUCTION)



THROTTLE LINKAGE WITH RAM INDUCTION

4) Start engine and make sure idle speed of 725-750 RPM correctly set with transmission in "N" and air conditioning compressor "ON". Put transmission in "D" with parking brake applied and adjust anti-stall dashpot plunger so there is .010" clearance between dashpot plunger and bellcrank.

CARTER BBD 2-BARREL

Carter BBD, No. 2921S (Synchro-mesh), 2922S (Aut. Trans.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - ¼-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (550 RPM on Air Cond. Cars with Air Cond. "ON"), with automatic transmission in "N" (neutral).

Fl at Level - 9/32" (Gauge T109-239) from top of each float (at free end) to top surface of body casting. To adjust, bend lip of float arm.

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Acc lerating Pump - Install connector rod in center hole (medium stroke) of throttle lever. With throttle valves closed, distance between top of pump shaft and top of air horn should be 1 1/8"±1/64". To adjust, bend connector rod at lower angle (Tool T109-213).

Fast Idle: .015" (Gauge T109-44) throttle valve opening or clearance between lower edge of valve and bore with adjusting screw on high step of fast idle cam.

Fast Idle Cam Clearance - With choke valve closed and lug on fast idle cam contacting lip on choke shaft lever, center of fast idle screw should align with index mark on cam. To adjust, bend lip on choke shaft lever.

Fast Idle Speed - 1375-1425 RPM with fast idle screw at index mark on high step of fast idle cam.

Automatic Choke: "Cross-Over" type. Set on index.

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

STROMBERG WW 2-BARREL

Stromberg WW. Code 15-41, A (Synchro-mesh), No. 15-42 (Auto. Trans.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*HESITATION OR STUMBLE ON LIGHT ACCELERATION CORRECTION (WW15-42):* Install new main metering jets and main discharge nozzle. *See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section.*

Idle Setting - 1¼ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (550 RPM on Air Cond. Cars with Air Cond. "ON"), with automatic transmission in "N" (Neutral).

Float Level - 7/32" from top of float (at center) to top of main body with gasket removed and lip of float held firmly against needle valve. Check with Tool 73519. To adjust, bend float lip.

Accelerating Pump - Normal setting, pump rod connected in center hole of throttle lever. With choke valve open, pump travel should be 9/32-5/16" as throttle valves are moved from fully closed to wide open position. To adjust, bend pump rod at lower angle (Tool T109-213).

Fast Idle: Turn throttle stopscrew out so that throttle valves are completely closed. Hold throttle valves closed, and back out fast idle screw until fast idle cam can be positioned with fast idle screw on high step of cam against shoulder on cam. Turn screw in until it just contacts cam, **then turn screw in an additional 8 turns.** With fast idle cam held in this position, close choke as far as possible with light pressure, check clearance between upper edge of choke valve and air horn wall using 13/64" drill rod. If opening not correct, adjust by bending fast idle rod at upper bend.

Fast Idle Speed - 1375-1425 RPM with fast idle screw on high step of fast idle cam.

Automatic Choke: "Cross-Over" type. Set at index.

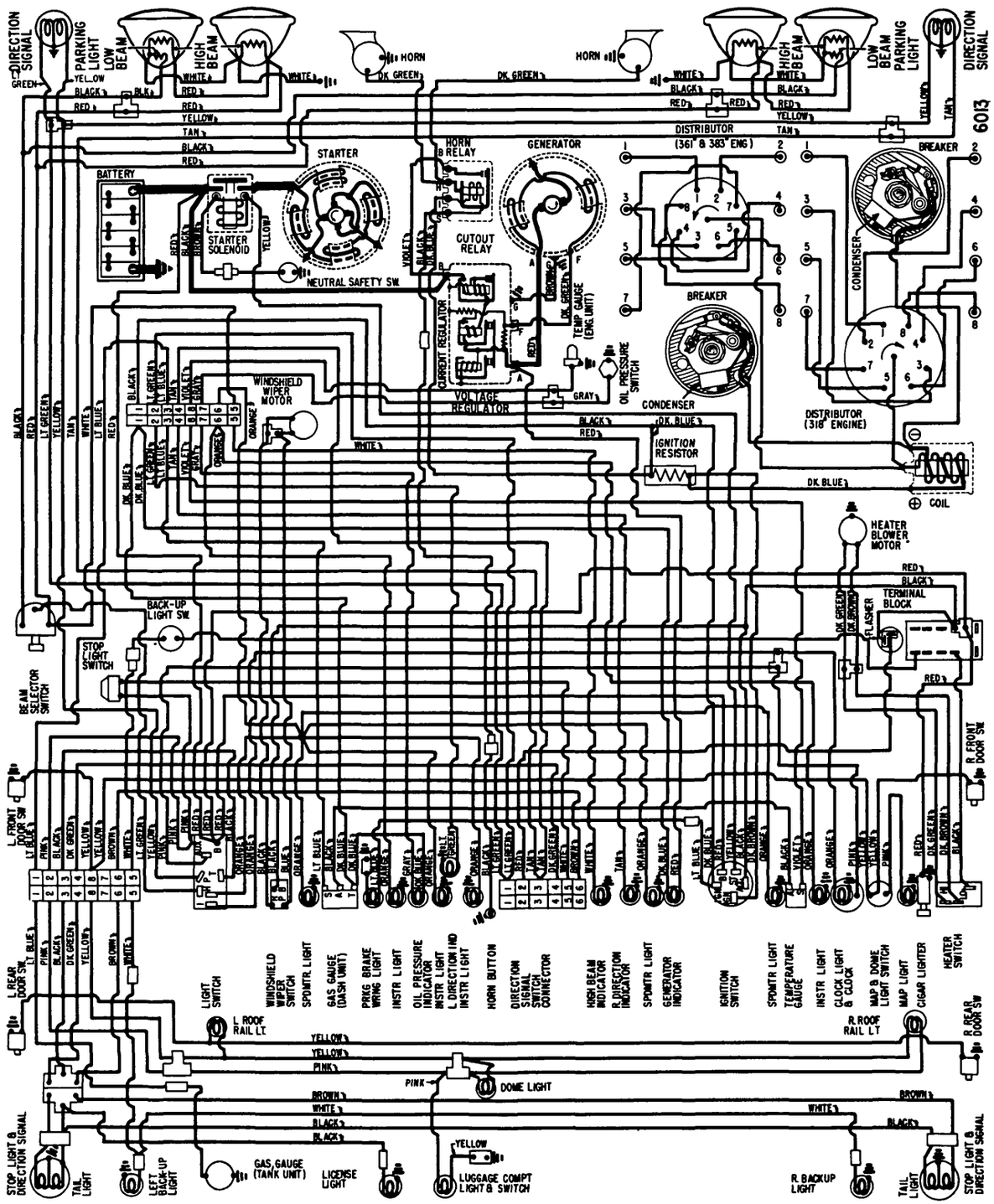
Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section.*

STROMBERG WWC 2-BARREL

Str mberg WWC, C d 3-188 (All Trans.). Downdraft type with automatic choke.

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►*MANIFOLD FUEL DISTRIBUTION: Carbur t r RIGHT barr l f ds Cyls. 2-3-5-8, LEFT barr l f ds 1-4-6-7.*

Idl S tting - 1/2-5/8 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idl Sp d - 500 RPM (550 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N".

Fl at L v l - 1/8" from top of center rib of float to top of main body with gasket removed measured with "T" scale or Tool 73725. To adjust, bend float lip with Tool 73605.

Acc l rating Pump - 7/16" total pump travel. To adjust, bend pump rod at upper angle using Tool T109-213.

Fast Idl Sp d: 1375-1425 RPM with fast idle adjusting screw resting on high step (against shoulder) of fast idle cam.

Aut matic Ch k : "Cross-Over" type. Set 1 notch rich.

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: S e "Str mberg WWC Carburetors" in Carbur tion S ction.*

HOLLEY 4-BARREL
(Singl Carburetor)

Holl y R2052A (Synchro-m sh), R1971A (Auto. Trans.).

Idl Setting - 1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idl Sp d - 500 RPM with automatic transmission in "N" (Neutral). Air conditioner "ON" if so equipped.

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels f d 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*OTHER DATA: Se "H ll y 2 & 4-Barrel Carburetors" in Carbur ti n S cti n.*

CARTER AFB 4-BARREL
(Singl Carburetor)

Engin	Carter No.
318" Synchro-mesh	2948S
318" Auto. Trans.	2991S
383" D-500 Police, Auto. Trans.	2968S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr ls f d Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*FUEL INLET NEEDLE & SEAT ASSEMBLY PRODUCTION CHANGE & CARBURETOR FLOODING CORRECTION (Early Carbs. Except 2968S):* Install new inlet needle and seat assembly. *See "Carter AFB 4-Barr l Carbur tors" in Carburetion Section.*

►*CARBURETOR 2948S IDLE MIXTURE & SPEED SETTING:* Idle Air Bypass Screw on throttle body used to adjust idle speed. Special procedure required to insure correct mixture and speed (idle air) screw setting. *See "Carter AFB 4-Barrel Carburetors" in Carburetion S ction.*

Idl Setting (2991S & 2968S) - 1¼-2¼ turns open (2991S), ¼-1¼ turns open (2986S). Turn both screws alike. Turn screws out for richer mixture.

Idl Sp d - 500 RPM (550 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N".

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: Se "Carter AFB 4-Barrel Carburetors" in Carbur tion Section.*

CARTER AFB 4-BARREL
(Ram Inducti n With Tw Carbur t rs)

Cart r AFB 2903S. Two carburetors used, one at each side of engine.

►*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor fe ds l ft bank cylind rs. LEFT carbur tor fe ds right bank cylinders.*

►*IDLE SPEED ADJUSTMENT NOTE: Idl Air Bypass scr w on thr ttl body is used t adjust idl sp d. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage & Carburetor Interconnecting Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Front & Rear Carburetors)

Carter AFB No- 2790S (Front), No. 2791S (Rear).

Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane. Correct either bent or damaged levers. *NOTE* - Install interconnecting rod with slotted end connected to **lower hole** in **front** carburetor throttle lever, and end connected at **top hole** of **rear** carburetor throttle lever. Hold **rear** carburetor throttle wide open (choke in full open position) and adjust slotted end of rod so **front** carburetor throttle valves will also be in wide open position. Tighten locknut and check operation. Interconnecting rod must rotate slightly on pivots without bind in any position.

Idle Speed & Mixture Adjustment - Special procedure required to insure correct mixture and speed (Idle Air) screw settings. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter. No. M2608S (318" Eng. Std.), No. M2611S (318" Eng. Air Cond.), No. M2769S (361" & 383" Eng.).

Fuel Pump Pressure - 5-7 lbs. (318" Eng.), 3½-5 lbs. (361" & 383" Eng.).
See "Fuel Pumps" in Carburetion Section.

Fuel Filter: Located in carburetor inlet line. Replace every 9000 miles or if clogged.

Gasoline Gauge: Constant Voltage type with voltage regulator inside dash unit.

Dash Unit - Chrysler No. 2096881.

Tank Unit - Chrysler No. 2084272 (Suburban), No. 2084062 (Others).
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Paper element type. Clean every 5000 miles, replace element every 15,000 miles. Service more often under severe operating conditions.

►*CLEANING CAUTION:* Clean filter element by blowing out with compressed air from the inside surface of element. Hold air nozzle 2" from element to avoid damage. DO NOT oil, lubricate or wash element.

BATTERY

6 Cyl. & 318" Eng: Aut lit 11-HS-50 r Willard HO-11.50 or Gould 11-OE-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

361" & 383" Eng: Aut lit 11-HS-60 r Willard HO-11-60 or Gould 11-OE-60. 12 volt, 11 plate, 60 ampere hour capacity (20 hr. rate).

►*NOTE:* 70 Amp. battery optional on all models.

Battery Ground - Negative.

STARTER

Autolite No. MDT-7002 (6 Cyl.), No. MDU-7001 (318" Eng.), No. MDT-7001 (361" & 383" Eng.).

Armature - Autolite No. 16-84 (MDT-7002), No. 16-75 (MDU-7001 & MDT-7001).

Drive - Bendix "Folo-Thru" type.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performance Data - MDT-7001, 7002

Torque	RPM	Volts	Amperes
0 ft. lbs.	3600	10.0	56
8.5 ft. lbs.	Lock	4.0	350

Performance Data - MDU-7001

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Chrysler No. 1692658 (Synchro-mesh), No. 1692659 (Auto. Trans.). Magnetic switch controlled by Ignition & Starter Switch No. 2097628. Neutral Safety Switch No. 1704283 mounted on transmission on automatic transmission cars.

Neutral Safety Switch Adjustment - *See "TorqueFlite Six", "PowerFlite" and "TorqueFlite" in Transmission Section.*

GENERATOR

Autolite. Used as follows:

Model	Generator
Standard	GJM-8201A
Low Cut-In	GHM-8001B
Single Unit Air Cond.	GJM-8202A
Dual Unit Air Cond.	GHM-8002A
Heavy Duty Air Cond.	GGA-6003F
Heavy Duty Without Air Cond.	GGA-6003E

►*GENERATOR WIRING BURNING CORRECTION (318" Eng.):* Make sure clips holding generator wiring near choke housing keep wires at least ½" from intake manifold.

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12.8	1150
35	15.0	2100

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Brush Spring Tension - 18-36 ozs. (GJM), 35-53 ozs. (GHM), 34-41 ozs. (GGA).

Field Current - 1.6-1.7 amps. (GJM), 1.1-1.3 amps. (GHM & GGA) All at 10.0 volts and 70°F.

Motoring Current - 3.3-3.7 amps. (GJM), 3.0-3.5 amps. (GHM), 2.3-2.6 amps. (GGA). All at 10.0 volts and 70°F.

Rotation - Counterclockwise at commutator end.

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Belt Adjustment: Deflection with 5 lb force applied as shown in table below Place straightedge across pulleys to measure deflection.

Belt	318" Eng. New	318" Eng. Used	361" & 383" Engs. New	361" & 383" Engs. Used
Gen (No A C)	5/32"	1/4"	5/32"	1/4"
Gen (A.C)	1/8"	3/16"	1/4"	3/8"
Idler (Water Pump)	3/32"	3/16"	1/16"	1/8"

6 Cyl. Eng. - 1/8" new, 1/4" used.

REGULATOR

Autolite. Used as follows

Regulator	Generator Type
VBO-4202C	GHM (30 Amp)
VBO-4202B	GJM (35 Amp)
VBO-4202A	GGA (40 Amp)

Cutout Relay

Cuts In - 12 5-13 5 volts
Cuts Out - 3-5 amps discharge current after charging at 7 amps
Contact Gap - 015" minimum
Air Gap - 025- 027"

Voltage Regulator

Setting - 14 3-14 8 volts charging at 7 amperes and 80°F or with a 25 ohm resistor in series between regulator and battery
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 70°F*

Regulator	Test A - Operating Amperes	Test B
VBO-4202C	37	30 (28-32)
VBO-4202B	44	35 (33-37)
VBO-4202A	49	40 (38-42)

Test A - After 15 minutes operation charging at 7 amps
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13 6-13 8 volts
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlights: 4-Headlight System. *See "4-Headlight Systems" in Electrical Section.*
Direction Signals: *See Electrical Section.*
Automatic Beam Changer: *See Electrical Section.*
Electronic Rear View Mirror: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery Pull switch knob out and rotate until flat on shaft is down. Push knob all the way in. Disconnect wires, press spring-loaded release button on top center of switch, and pull shaft and knob out of switch. Remove switch mounting bezel on instrument panel and remove switch.

Stop Light Switch Location: On forward end of brake master cylinder.

Speedometer Removal: Disconnect battery and mask speedometer lens to protect finish. Remove automatic transmission push button bezel and remove push buttons and covers. Remove steering column bracket on synchromesh cars. Loosen gear shift control housing and cable assembly. Remove gear selector bracket Disconnect speedometer cable at speedometer Remove speedometer attaching screws and remove speedometer.

CIRCUIT BREAKERS: 22.5 Ampere - Headlights, Parking lights, High Beam Indicator, Ignition light In headlight switch.
15 Ampere - Tail, Stop, License, Instrument, Dome, Clock & Glove Box lights. In headlight switch.
6 Ampere - Variable speed windshield wiper & back-up lights On wiper motor.
5 Ampere - Single speed windshield wiper & back-up lights. On wiper motor.

FUSES: 20 Ampere - Heater.
20 Ampere - Air Conditioner (front).
20 Ampere - Air Conditioner (rear).
7.5 Ampere - Radio.
7.5 Ampere - Rear window defroster.
2 Ampere - Clock.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 318" engine is same design as previous 326" engine. 361" and 383" engines are same as used previously.

►*RAM INDUCTION ENGINE NOTE: These engines are same as standard 361" & 383" engine except for Ram Induction Manifold (two carburetors) and special camshaft.*

►*TWO CARBURETOR ENGINE NOTE: This 383" engine has two carburetors mounted front and rear on a single manifold Reference in following data will be to "2 Carbs."*

Engine	Bore	Stroke	Displacement
318"	3 910"	3.310"	318 cu. ins.
361"	4 125"	3.375"	361 cu. ins.
383"	4 250"	3.375"	383 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
318" (2-Bbl.)	9 0-1	48.9	230 at 4400 RPM
318" (4-Bbl.)	9.0-1	48.9	255 at 4400 RPM
361" (2-Bbl.)	10.0-1	54.3	295 at 4600 RPM
361" (Ram Ind.)	10.0-1	54.3	310 at 4800 RPM
383" (4-Bbl.)	10.0-1	57.8	325 at 4600 RPM
383" (2 Carbs.)	10.0-1	57.8	330 at 5200 RPM
383" (Ram Ind.)	10.0-1	57.8	330 at 4800 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Dodge Special Data*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifolds" in Dodge Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Dodge Special Data*

OIL PAN REMOVAL (318" Engine): Remove dipstick, drain crankcase and disconnect steering linkage from steering arm Remove starter, exhaust crossover pipe, and converter dust shield Disconnect front engine mounts and raise engine about 1¼" Remove oil pan bolts and remove pan, turning sideways to clear crossmember *NOTE* - When installing, bottom surface of oil strainer must be parallel to lower machined surface of cylinder block

OIL PAN REMOVAL (361" & 383" Engines): Disconnect battery Raise car and disconnect steering linkage from idler and steering arms Remove outlet breather pipe and disconnect exhaust pipe branches from both manifolds. Remove exhaust pipe Drain crankcase and remove converter dust shield Remove oil pan bolts and remove pan, turning counterclockwise to clear oil screen and suction pipe *NOTE* - When installing, bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel band (318"), steel struts (361" & 383").

►*CYLINDER BORE OVERSIZE NOTE: Letter "A" within engine number indicates that cylinder bores are .020" Oversize.*

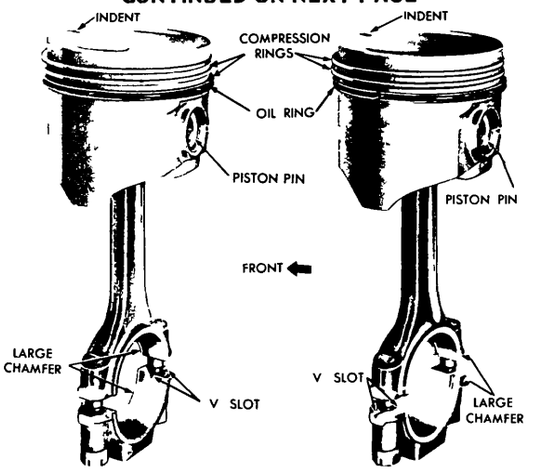
Weight - 20.9 ozs. (318"), 25.6 ozs. (361"), 27.2 ozs. (383").
Removal - Pistons and rods removed from above

Fitting New Pistons: Clearance (318") - .0005-.0015" on thrust side at top of skirt. With .0015" x ½" feeler inserted between cylinder wall and piston at thrust face, pull to withdraw feeler should be 5-10 lbs
Clearance (361" & 383") - .0005-.0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8). *See Rod Installation.*

Replacement Pistons: Furnished Std , 005", 020" & 040" Oversize with fitted pins.

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DODGE V8 PISTON & ROD ASSEMBLY

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PISTON PIN

318" Engine - Floating type with lock ring at each end. **361" & 383" Engines** - Piston pin is tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diameter - .9842" (318"), 1.0935-1.0937" (361" & 383").

Length - 2.995" (318"), 3.555-3.575" (361" & 383").

Clearance in Piston (318") - .0000-.0005". Thumb press fit at 70°F.

Clearance in Piston (361" & 383") - .00045-.00075". Light thumb press fit at 70°F.

Clearance in Rod (318") - .0001-.0004" (selective). Thumb press fit at 70°F.

Clearance in Rod (361" & 383") - .0007-.0012" interference fit.

Piston Pin Removal & Installation (361" & 383") - See *"Piston Pins" in Dodge Special Data.*

Replacement Pins: Std., .003", .008" Oversize (318"). Furnished only with new pistons (361" & 383").

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	①	.0015-.0030"
Oil (3)	.1860-.1865"	①	.0010-.0030"

① - .010-.020" (318"). .013-.025" (361" & 383").

Installing Rings: Install compression rings with "Top" mark toward top of piston.

Replacements Rings: Furnished for oversize ranges of: Std. to .009", .020" to .029", .040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.123" (318"), 6 356-6.360" (361" & 383").

Weight - 25.6 ozs. (318"), 29.8 ozs. (361" & 383").

Crankpin Journal Diameter - 2.124-2.125" (318"), 2.374-2.375" (361" & 383").

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Lower Bearing - Removable precision type. Bi-Metal Grid (318"), Lead base babbitt on steel (361" & 383").

Clearance - .0005-.0015". Wear limit .0025". All Engines.

Side play - .006-.014" (318"), .009-.017" (361" & 383"). Total for both rods.

Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.

Replacement Bearings: Std., & .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

Journal Diameter - 2.4995-2.5005" (318"), 2.6245-2.6255" (361" & 383").

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" within engine number and on a crankshaft counterweight indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) within engine number indicates that one or more connecting rod and main bearing journals are machined .001" undersize. On 318" engine, position of undersize journals is stamped on No. 6 counterweight. On 361" and 383" engines, position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Removable precision type Tin based babbitt on steel (No. 3 thrust bearing), lead based babbitt on steel (Others).

Clearance - .0005-.0015". Wear limit .0025" All Engines.

Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves of **any** bearing are **not** interchangeable. No. 3 bearing is not interchangeable with other bearings. On 318" engine, No. 5 bearing is not interchangeable with other bearings.

End Thrust: Taken by flanged No 3 (center) main bearing **Endplay** - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Dodge Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Dodge Special Data.*

CAMSHAFT

►*CAMSHAFT USAGE NOTE: Various camshafts used depending on carburetion, lifters or other equipment. See "Valves" and "Valve Timing" below for lift, spring and valve timing specifications.*

Journal Diameter: (1) 1.998-1.999". (2) 1.982.1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.5605-1.5615" (318"), 1.748-1.749" (361" & 383").

Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954" (5) 1.5625-1.5635" (318"), 1.750-1.751" (361" & 383").

Bearings - Removable, lead base babbitt on steel.

Clearance - .001-.003". Wear limit 005".

End Thrust (318"): Taken by thrust plate behind camshaft sprocket hub. **Endplay** - .002-.006". Wear limit .010".

End Thrust (361" & 383"): Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain (318"): Width 1.02". **Pitch** .375". **Length** 68 links.

Timing Chain (361" & 383"): Width .88". **Pitch** .50". **Length** 50 links.

Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Dodge Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Dodge Special Data.*

►*318" ENGINE CHAIN CASE COVER & GASKET CAUTION:* New cast aluminum covers used on some engines require new gasket Nos. 1618685 (Chain Case Cover), 1676031 (Water Pump).

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Dodge Special Data.*

VALVES

Tappet Clearance: 318" .010" Intake, .018" Exhaust, hot and idling. **383" With Ram Ind. & Mech. Lifters** .016" Intake, .028" Exhaust, Cold. **All Others** Zero lash, hydraulic lifters.

318" Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	1.844"	.372-.373"	4.60"
Exhaust	1.563"	.371-.372"	4.54"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.001-.003"
Exhaust	45°	②	.002-.004"

361" & 383" Engines

Valve	Head Diam.	Stem Diam.	Length
Intake	③	.372-.373"	4.87"
Exhaust	1.60"	.371-.372"	4.89"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	⑨	⑤ .001-.003"
Exhaust	45°	④	⑥ .002-.004"

① - .370" (2-Bbl. Carb.), .390" (4-Bbl. Carb.).
② - .368" (2-Bbl. Carb.), .390" (4-Bbl. Carb.).
③ - 1.95" (361" Eng.). 2.08" (383" Eng.).
④ - .389" Std. Engine (2 or 4-Bbl. Carb.); .430" High Perf. Engines (One 4-Bbl., 2 Carbs., Ram Ind. Exc. Mech. Lifters); .449" Intake, .454" Exhaust on Ram Ind. With Mech. Lifters.
⑤ - Wear limit .004". ⑥ - Wear limit .006".
⑦ - Standard valves. Also .005", .015", .030" Oversize.

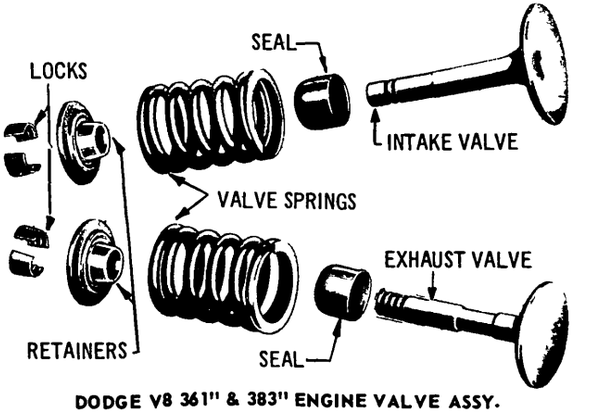
Valve Seat Width - .060-.085" Intake, .040-.060" Exhaust.

Valve Stem Oil Seal - Cup type seals used on all intake valves (all engines), on exhaust valves (361" & 383" engines only).

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip of valve down to approach, but do not go below minimum height (slotted area of gauge).

Valve Springs: Damper spring used inside valve spring on all high performance engines.

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DODGE V8 361" & 383" ENGINE VALVE ASSY.

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Spring Specifications - 318" Engine

Valve	Pressure	Length
Closed	78-88 lbs.	1 11/16"
Open	170-184 lbs.	1 5/16"

Spring Specifications - 361" & 383" Engines

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	©187-203 lbs.	1.47"

© - Std. Engines. For High Perf. Engines (with damper spring) 205 lbs. at 1.43".

Spring Free Length - 2.34" (361" & 383" Engines).

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 11/16" (318"), 1 57/64" (361" & 383"), install 1/16" spacer under spring to bring height within limits (1 5/8-1 11/16" for 318", 1 53/64-1 57/64" for 361" & 383").

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation (361" & 383"): Install all springs with closed coil end toward cylinder head.

►*CAUTION:* Spring ends must be square within 1/16" (all engines).

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.379-.380"), C-3427 (.404-.405") to ream guides in progressive steps of .005", .015" & .030".

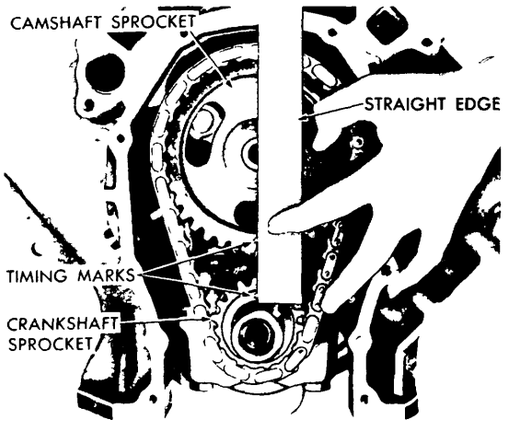
►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (318" Eng.):* "I" or "E" on boss above nearest appropriate valve guide indicates that valve stem is .005" Oversize.

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

Hydraulic Valve Lifters: Used on 361" & 383" engines except some 383" Police Engines with Ram Induction which have mechanical lifters.

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" Oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Diameter - .9040-.9045". **Clearance** - .0005-.0018".
Replacement Lifters - Furnished Std. & .001", .008", .030" Oversizes.
Lifter Overhaul & Testing - *See "Valve System" in Dodge Special Data.*
Rocker Arm Assembly: *See "Valve System" in Dodge Special Data.*



DODGE V8 VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

318" Engine - 2-Bbl. Carb.
Intake Valves - Open 17° BTDC. Close 47° ALDC.
Exhaust Valves - Open 55° BLDC. Close 9° ATDC.

318" Engine - 4-Bbl. Carb.
Intake Valves - Open 13° BTDC. Close 55° ALDC.
Exhaust Valves - Open 51° BLDC. Close 17° ATDC.

361" Eng. (2-Bbl.) & 383" Eng. (4-Bbl.) (Camshaft With .389" Valve Lift)
Intake Valves - Open 15° BTDC. Close 57° ALDC.
Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

383" Engine - One 4-Bbl. or 2 Carbs. (Camshaft With .430" Valve Lift)
Intake Valves - Open 24° BTDC Close 64° ALDC.
Exhaust Valves - Open 64° BLDC. Close 24° ATDC.

361" & 383" Engines With Ram Induction (Except 383" With Mechanical Lifters)
Intake Valves - Open 20° BTDC. Close 68° ALDC.
Exhaust Valves - Open 60° BLDC. Close 28° ATDC.

383" Engine - Ram Ind. & Mech. Lifters
Intake Valves - Open 25° BTDC. Close 79° ALDC.
Exhaust Valves - Open 74° BLDC. Close 30° ATDC.

►*NOTE:* Check valve timing with valve train solid.
Valve Timing Check (318"): Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Install a dial indicator on No. 1 intake valve so indicator pointer contacts spring retainer as nearly perpendicular as possible. Turn No. 1 intake valve adjusting screw in one full turn. Adjust indicator to zero. Turn crankshaft clockwise until valve has lifted .033" (2-Bbl.), .024" (4-Bbl.). Timing on timing indicator should read from 10° BTDC to 2° ATDC.
Valve Timing Check (361" & 383"): Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted as shown in table below. Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning crankshaft any further in normal direction.*

Valve Timing Check Specifications

Engine	Valve Lift
361" & 383" Engines (2-Bbl.)	.017"
361" Engine (Ram Induction)	.025"
383" Engine (4-Bbl. - .389" Valve Lift)	.017"
383" Engine (4-Bbl. - .430" Valve Lift)	.025"
383" Engine (2 Carbs. or Ram Induction)	.025"

OILING SYSTEM

►*ENGINE OILING SYSTEM:* See *"Engine Lubrication" under OILING SYSTEM in Dodge Special Data.*
►*OIL PRESSURE RELIEF VALVE OR OIL PAN NOISE CORRECTION (361" & 383"):* Noise may be a chattering or tapping noise heard or felt in oil pan. If loosening oil pressure relief valve retaining nut or removing valve spring affects noise, install new oil filter element, Part No. 1851658, and make sure drain-back valve is free *(see "Oil Filter" below).*
Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.
Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.
Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, see *"Oiling System" in Dodge Special Data.*
Oil Pressure Indicator: Warning light on instrument panel operated by Oil Pressure Switch, Part No. 1818830 (Autolite No. 14272A).
Oil Pump (318"): Mounted on rear main bearing cap. Rotor type with strainer mounted on pump body. Strainer must be installed parallel with bottom of cylinder block.
Pump Overhaul - *See "Oiling System" in Dodge Special Data.*
Oil Pump (361" & 383"): Rotor type mounted on cylinder block at lower left front side of engine.
Pump Overhaul - *See "Oiling System" in Dodge Special Data.*
Oil Filter (318"): Partial flow type. Replace filter element every 4000 miles to coincide with engine oil change.
Oil Filter (361" & 383"): Full flow disposable type. Replace filter every 4000 miles to coincide with engine oil change.
►*OIL FILTER REPLACEMENT CAUTION (361" & 383"):* Use only Filter, Part No. 1851658, for service replacement. Before installing, make sure drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base.
►*OIL FILTER INSTALLATION CAUTION (361" & 383"):* Screw new filter on base until gasket contacts base. **Tighten ½-turn additional by hand.** DO NOT overtighten.
Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap every 5000 miles or sooner under heavy dust conditions.

COOLING

Water Capacity: 20 qts. (318"). 16 qts. (361" & 383"). Add 1 qt. for heater.
►*AIR CONDITIONING OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.
Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

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Thermostat: Pellet type. Located in water outlet housing. Standard 180° thermostat, Part No. 1674602, starts to open at 177-182°F. Designed for use with permanent type anti-freeze. Optional 160° thermostat, Part No. 1734957, also available.

Water Pump: Sealed ball bearing type. No lubrication required.

See "Water Pumps" in Dodge Special Data.

Fluid Fan Drive: Used on air conditioned cars. *See "Cooling System" in Dodge Special Data.*

Temperature Gauge: Constant Voltage type with voltage regulator inside gasoline gauge dash unit for both instruments.

Dash Unit - Chrysler No. 2096879.

Engine Unit - Chrysler No. 2084459.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck or Auburn. Used as follows: *NOTE - Semi-centrifugal type used on V8 cars.*

Engine	Clutch Make	Clutch Model
6 Cyl. Std.	Auburn	100131-4
6 Cyl. Std.	Borg & Beck	9A7
6 Cyl. H.D. & Taxi	Borg & Beck	10A5
318" Std.	Borg & Beck	10¼A8WW
318" Optl. & 361"	Borg & Beck	10.5A8WW
383"	Borg & Beck	11A8WW

See "Auburn" or "Borg & Beck" in Clutch Section.

►*CLUTCH VIBRATION OR GEAR RATTLE CORRECTION (Early 6 Cyl.):* May be noticeable at 20-30 MPH. To correct, install new clutch disc, Part No. 2200061, having 6 light blue springs. Later cars have this disc.

Pedal Free play Adjustment: Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This will provide correct 1-1¼" pedal freeplay.

Over-Center Spring Adjustment: Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off over-center spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 3 turns tighter (9¼" clutch), 5 turns tighter (10", 10½", 11" clutch) with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort too high, tighten adjusting nut; if too low, loosen nut. Initial effort required to start pedal moving should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Clutch Removal: Remove transmission (see below) and clutch housing pan. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to relieve tension. Remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Used as follows:

6 Cylinder - Own. New "Synchroshift" type with helical cut gears.

V8 Std. - Own. Same design as used previously.

V8 Heavy Duty - Warner Mod. T-85. 3-speed constant mesh, all helical gear type.

See Dodge and Warner Synchro-mesh Transmissions in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Lubricant Capacity - 6 Cyl. 5 pints (supersedes previous specification of 2¾ pints). **Std. V8** 2¾ pints. **Heavy Duty V8** 3½ pints.

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable and housing and gearshift rods. Disconnect parking brake cable. *CAUTION - On 6 Cyl., remove speedometer cable by hand as pinion comes out with cable (do not crush housing).* Disconnect back-up light switch wires. Install Engine Support Fixture C-3806 (6 Cyl.), C-3487 (V8), so hooks are firmly in holes in frame side member with support against underside of oil pan flange. With fixture supporting engine, raise engine slightly and disconnect rear support. On 6 Cyl., remove crossmember. On all cars, support transmission and remove transmission attaching bolts. Remove transmission by sliding to rear so pinion shaft clears clutch. *NOTE* - On V8 cars, crossmember is removed with transmission.

AUTOMATIC TRANSMISSION

TorqueFlite Six of new design used on 6 Cyl. Cars only. **PowerFlite & TorqueFlite** of same designs used previously used on V8 Cars.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 10,000 miles or sooner if used in heavy duty service.

Checking Fluid Level (TorqueFlite Six): *NOTE - Following specifications supersede all previous instructions.* Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Fluid level should be between "F" mark and **5/8" above** "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, oil level should be at "F" mark. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*

Checking Fluid Level (PowerFlite & TorqueFlite): Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Maintain fluid level at (or slightly below) "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, maintain fluid level at (or slightly below) "L" mark. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

UNIVERSALS

Driveline Universals. Ball & Trunnion front, Cross rear.

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Dodge Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear with Hotchkiss Drive. *NOTE - "Sure-Grip" differential optional.*

See "Dodge Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION (Early Cars): See "Dodge Hypoid" in Rear Axle Section.*

►*DIFFERENTIAL TYPE & RATIO IDENTIFICATION NOTE:* Ratio stamped on identification pad on carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad or by a metal tag marked "Use Sure-Grip Lube" attached to a carrier housing bolt.

►*"SURE-GRIP" AXLE SHAFT CAUTION:* Axle shaft used with "Sure-Grip" differential is 1/8" shorter than standard axle shaft. DO NOT interchange shafts.

Axle Ratios: As follows: *NOTE* - All ratios except 3.90-1 are available with "Sure-Grip".

Engine & Trans. ①	Standard Ratio	Optional Ratio
6 Cyl. S-M	⑨ 3.54-1 (39-11)	3.90-1 (39-10)
6 Cyl. T-F	3.31-1 (43-13)	3.54-1 (39-11)
318" S-M	3.54-1 (39-11)	3.31-1 (43-13)
318" P-F	3.31-1 (43-13)	3.54-1 (39-11)
318" T-F	2.93-1 (41-14)	3.31-1 (43-13)
361" & 383" S-M	3.54-1 (39-11)	3.31-1 (43-13)
361" P-F	3.31-1 (43-13)	3.54-1 (39-11)
361" ②, 383" ④ T-F	2.93-1 (41-14)	3.31-1 (43-13)
361" & 383" T-F ③	3.31-1 (43-13)	2.93-1 (41-14)
383" S-M ⑤	3.54-1 (39-11)	⑥⑦
383" T-F ⑤	3.31-1 (43-13)	⑧⑦

① - S-M Synchro-mesh. P-F PowerFlite. T-F Torqueflite.
② - 2-Bbl. Carb. ③ - Ram Induction D-500 Engine.
④ - Std. Engine, One 4-Bbl. Carb.
⑤ - Max. Performance Police Engines (One 4-Bbl., 2 Carbs., Ram Induction with Hydr. or Mech. Lifters).
⑥ - With Conventional and "Sure-Grip": 2.93-1, 3.31-1.
⑦ - With "Sure-Grip" only: 4.1-1 (41-10), 4.3-1 (43-10), 4.56-1 (41-9), 4.89-1 (44-9).
⑧ - With Conventional and "Sure-Grip": 2.93-1, 3.54-1.
⑨ - Or 3.73-1 (41-11).

Backlash - .006-.008".

Axle Shaft Removal: Remove wheel and hub and drum assembly (use Puller C-845). *CAUTION - Do not strike end of axle shaft or use "knock-off" type puller.* Block brake pedal and disconnect brake line at wheel cylinder. Remove axle shaft key. Remove brake support and dust shield (use Oil Seal Installing Sleeve C-745 to protect outer seal). Remove shim pack. Remove axle shaft with Puller C-499. *NOTE* - Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637 and brake dust shield outer seal with Driver C-3565.

Carrier Assembly Removal: Remove axle shafts (see above). Disconnect propeller shaft at rear universal joint. Drain lubricant. Remove attaching bolts and remove carrier.

Wheel Bearing Adjustment: Controlled by axle shaft end-play adjustment. *See "Dodge Hypoid" in Rear Axle Section.*

Axle Shaft Endplay - .013-.023".

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SHOCK ABSORBERS

Oriflow. Direct acting, hydraulic. Serviced by replacement.

►*SHOCK ABSORBER MOUNTING NOISE CORRECTION:* On front shock absorber, lower mounting bolt may have short threads preventing "U" mounting bracket from gripping lower bushing. To correct, install a washer between bracket and nut and tighten nut to 55 ft. lbs. On rear shock absorber, upper mounting stud may be loose at body attachment. To correct, inspect stud and nut threads for damage and tighten nut to 70 ft. lbs. *NOTE - If above procedure does not correct noise, install new type shock absorbers (see below).*

►*SHOCK ABSORBER REPLACEMENT NOTE: Use only shock absorbers listed below for service replacement and to correct noise.*

Replacement Shock Absorbers

Shock Absorber	Package No.	©Identification No.
Front Std. ②	2240353	2206506
Rear Std. ②	2240358	2206508
Front Heavy Duty	2240356	2206504
Rear Heavy Duty	2240360	2206510

© - Stamped on shock absorber base.
② - Includes Suburbans.

FRONT SUSPENSION

"Torsion-Aire" type of same design used previously with eccentric cam adjustment for caster and camber. *See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section.*

Steering Axis Inclination - 5½-7½°.
Caster (Manual Steering) - Neg. ½°±½°.
Caster (Power Steering) - Pos. ¾°±½°.
Camber (Right Wheel) - Pos. 1/8°±1/4°. Pos. 1/8° preferred. **(Left Wheel)** - Pos. 3/8°±1/4°. Pos. 3/8° preferred.
Toe-In - 3/32-5/32". 1/8" preferred.
Toe-Out on Turns - With outer wheel at 20°, inner wheel should be at 20½-22½°.

Wheel Bearing Adjustment: Tighten adjusting nut to 180 **inch-lbs.** torque while rotating wheel. Position nut lock on nut with slots in line with cotter pin hole in spindle and then back off nut and nut lock 1½ slots (cotter pin holes will be covered). Remove nut lock and reposition on nut so slot lines up with cotter pin hole and install cotter pin. *CAUTION - Do not turn adjusting nut.*

STEERING

Manual: Gemmer. Worm & three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

►*STEERING GEAR PRODUCTION CHANGE:* Later cars have flexible coupling in steering gear tube. *See "Gemmer Worm & Roller" in Steering Section.*

►*STICKY OR HARD STEERING, OR POOR RETURNABILITY CORRECTION:* May be caused by steering column jacket bearing being out of place. *See "Gemmer Worm & Roller" or "Dodge Constant Control Power Steering" in Steering Section.*

►*HARD STEERING OR GEAR BINDING CORRECTION (Manual Steering):* May be caused by cross shaft adjusting screw retaining snap ring being unseated. *See "Gemmer Worm & Roller" in Steering Section.*

►*STEERING CENTER LINK-OIL PAN INTERFERENCE CORRECTION (361" & 383"):* Make sure power steering and manual steering pitman arms are not interchanged. Center-to-center length of pitman arms (between attaching holes) is as follows: Manual Steering 5 3/8", Power Steering 6 1/2",

Power Steering: Constant Control Full Time type of same design used previously.
See "Dodge Constant Control Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Dodge Constant Control Power Steering" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Dodge Constant Control Power Steering" in Steering Section.*

BRAKES

Service: Three Platform Total Contact type of same design used previously.
See "Dodge Three Platform Total Contact Brakes" in Brake Section.

►*BRAKE HOWL AT LOW SPEED CORRECTION:* Install Rear Spring Insulators, Part No. 1731797 (upper), and No. 1731798 (lower).

►*BRAKE DRAGGING, IMPROPER RELEASE OR PULL CORRECTION:* May be caused by lining contacting drum (burrs or paint on dust shield platforms) or improper return spring tension. *See "Dodge Three Platform Total Contact Brakes" in Brake Section.*

►*OVAL PISTON TYPE POWER UNIT "THUMP" CORRECTION (Early Cars):* Noise occurs when brakes released. *See "Dodge Oval Piston Type Power Unit" in Brake Section.*

Drum Diameter - 11" front & rear. (12" front & rear optional on high performance engine packages).
Wheel Cylinder Diameter - 1 1/8" front & rear. Two single acting cylinders used on front, one double acting cylinder used at rear.
Lining - Molded asbestos bonded to shoe.

Lining Width	Front	Rear
6 Cyl. & 318" (Suburban)	2½"	2"
6 Cyl. & 318" (Others)	2"	2"
361" & 383" Engines	2½"	2½"

Lining Length - 11½" (11" brakes), 12.6" (12" brakes).
Lining Thickness - 11/64".
Braking Power - 60% front, 40% rear.
Clearance - With wheel locked against drum, back off adjusting cam until no drag is felt.

Master Cylinder: On engine side of firewall opposite base of brake pedal.

►*MASTER CYLINDER NOTE (Cars Without Power Brakes):* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder eliminating need for adjustment. No pedal return spring is used. A service package consisting of piston-collar-rod-retainer and boot assembly is available.

►*BRAKE PEDAL & PUSHROD CAUTION:* Never pull brake pedal back beyond piston stop in master cylinder. A pull of 50 lbs. could pull pushrod off piston.

Checking Fluid Level - Master cylinder cover is used as a filler cap.

Removal: Disconnect pushrod, brake tube and stop light switch wires. Remove attaching bolts and remove cylinder.

Power Brakes: "Oval Piston" or "Bellows" type power units used. Mounted on firewall and linked to upper end of brake pedal. Used with adjustable pushrod type master cylinder.
See "Dodge Bellows Power Unit" or "Dodge Oval Piston Power Unit" in Brake Section.
Pedal Freeplay Adjustment - *See "Dodge Bellows Power Unit" or "Dodge Oval Piston Power Unit" in Brake Section.*

Removal: Place a wedge between power lever and bracket to prevent damage to trigger arm. Scribe mark power unit and mounting bracket, and mounting bracket and firewall. Disconnect vacuum hose from power unit. Remove master cylinder (see above). Remove mounting bracket attaching bolts and remove power unit and bracket assembly.

Parking Brake: Transmission mounted type. 6" external contracting and 7" internal expanding types used. Foot-operated lever applies brake.
Adjustment - *See "Brake Notes" in Dodge Special Data.*

Lining	Width	Thickness	Length
External Type	2"	5/32"	16.68"
Internal Type	2"	5/32"	© 6.53"

© - Per shoe (2 shoes).

MISC. MECHANICAL

Windshield Wiper: Autolite electric, single or variable speed. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Heater-Air Conditioning. *See "Dodge Air Conditioning" in Miscellaneous Section.*

Power Top Control: Electric-Hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: 6-Way electric type. *See "Power Seat Controls" in Miscellaneous Section.*

Door Locks: Vacuum type. *See "Vacuum Door Locks" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	1954	1955
Plaza	P-25-1	P-26-1
Savoy	P-25-2	P-26-2
Belvedere	P-25-3	P-26-3

SERIAL NUMBER: On left front door hinge pillar post.

Starting Serial Numbers

Assembly Plant	1954	1955
Detroit	13,506,001	13,835,001
Los Angeles	25,163,001	20,745,001
Evansville	20,658,001	25,180,001
San Leandro	25,590,001	

ENGINE NUMBER: Stamped on left front side of cylinder block.

Starting Engine Number—1001 up (each year).

►*ENGINE NOTE: Two engines used in 1954. 217 Cu. In. (4 3/8" Stroke) used in Early 1954. 230 Cu. In. (4 5/8" Stroke) used in Late 1954 and 1955.*

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*

"A"—ALL cylinders .020" oversize.
"B"—ALL crankshaft journals .010" undersize.
"AB"—BOTH above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: 105 lbs. (217" Engine); 120-150 lbs. (230" Engine). At cranking speed of 150 RPM. 10 lbs., maximum variation between cylinders.

VACUUM READING: Steady 18-21" at idling speed.

VALVE TAPPET CLEARANCE: .010", Intake and Exhaust. Engine must be hot and idling.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for exhaust tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil type. See that valve operates freely. When installing coil, spring should be installed so that approximately ¾ turn is required to hook outer end of spring around stud.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Plugs—Auto-Lite Resistor 4S-140, 14mm. Torque to 32 ft. lbs.

COIL: Auto-Lite CR-4001 (Early 1954); CR-6012C (Late 1954 & 1955). CR-6007B (Canada).

Ignition Current—2.25 amperes idling. 5.0 stopped.

DISTRIBUTOR: Auto-Lite IAT-4101 (Early 1954); IAT-4101C (Late 1954); IAT-4101B (Later 1954 & 1955); IAT-4012 (Canada).

Condenser—IAT-3076RA. Capacity—.250-.285 mfd.
Contact Point Set—Auto-Lite IGW-3028BS.
Breaker Gap—.018-.022". Set maximum gap to .020".
Cam Angle—36-42°. DO NOT exceed breaker gap limits
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance—IAT-4101B

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	525	2	1050
4	875	8	1750
7	1225	14	2450
8	1350	16	2700

Automatic Advance—IAT-4101, 4012

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
5	800	10	1600
9	1300	18	2600
10	1425	20	2850

Automatic Advance—IAT-4101C

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	440	2	880
5	800	10	1600
8	1175	16	2350
9	1300	18	2600

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance—IAT-4101, B, C

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-3/4
1	2	5-7/8
4	8	9-3/8
7	14	12-7/8
8	16	14

Vacuum Advance—IAT-4012

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-1/4
2	4	6-3/4
4	8	8-5/8
6	12	10-3/4
9	18	15

►*DISTRIBUTOR INSTALLATION CAUTION: Make sure that No. 1 piston is at TDC on compression stroke and that distributor rotor is in No. 1 firing position.*

IGNITION TIMING

Setting—2° BTDC.

Timing Mark—On crankshaft drive pulley or vibration dampener. Five marks on each side of "DC" mark. Each mark is 2°.

Manual Adjustment—Timing may be advanced to 6° BTDC with some premium fuels. Range of timing should not exceed plus or minus 4° from recommended factory setting.

CARBURETOR

►*CARBURETOR APPLICATION: Carter Carburetors used as follows:*

Model	Carter Model & No.
1954 (Early)—Standard ①	BB D6H2
1954 (Early)—Overdrive ①	BB D6U1
1954 (Early)—HyDrive ①	BB D6P2
1954 (Early)—City Traffic ①	BB D6N2
1954 (Early)—Standard ②	BBS 920S
1954 (Early)—Overdrive ②	BBS 993S
1954 (Early)—Hy-Drive ②	BBS 994S
1954 (Early)—City Traffic ②	BBS 2203S
1954 (Late) & 1955—Standard ②	BBS 2063S,SA
1954 (Late) & 1955—Overdrive ②	BBS 2062S,SA
1954 (Late) & 1955—Hy-Drive ②	BBS 2116S,SA
1954 (Late) & 1955—PowerFlite ②	BBS 2116S,SA
1954 (Late) & 1955—City Traffic ②	BBS 2215S

①—217" Engine (4 3/8" Stroke).
②—230" Engine (4 5/8" Stroke).

CARTER B & B

Idle Setting—1/2—1-1/2 turns open. Turn screw out for richer mixture.

Idle Speed—450-500 RPM.

Float Level—Top of float (not soldered seam) 5/64" plus or minus 1/64" below top edge of bowl.

Accelerating Pump—Long stroke for cold weather, short stroke for hot weather.

Fast Idle: No adjustment required.

Automatic Choke Setting: Insert gauge pin through hole in automatic choke shaft, and hole in base flange to position shaft, loosen choke valve screw and position choke so that valve is tightly closed.

Slow Closing Throttle (Dashpot): (D6P2) Tighten adjusting screw (top of bowl cover), then turn counter-clockwise 4-1/2 turns. Further adjustment outward will increase action of dashpot.

Overdrive Kickdown Switch Adjustment: (D6U1) With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide.

►*OTHER DATA: See "Carter BB" in Carburetor Section.*

Fuel Pump Pressure: 4-5-1/2 lbs.

CARTER BBS

►*1954 METERING JET PRODUCTION CHANGE (Carburetor Nos. 920S, 993S, 994S): See "Carter BBS & BBD Jet Specifications" in Carburetion Section for later type jets.*

►*1955 CARBURETOR PRODUCTION CHANGE:* Clearance between throttle shaft and holes in throttle body have been reduced to improve fit of parts. These carburetors identified by letters "D-S" punched in brass tag attached to carburetor.

►*REPLACEMENT CARBURETOR NOTE:* Carter BBS 2249S is replacement for above carburetors. With Overdrive use Unitized Pkg. 192-33U (Kickdown Switch), and with PowerFlite Unitized Pkg. 202-80U (Dashpot).

Idle Setting—1/2—1-1/2 turns open. Turn screw out for richer mixture.

Idle Speed—450-500 RPM.

Float Level—7/32" from top surface of body casting to top of each float. If one float lower than other, adjust by bending float arm. If both floats require same correction, adjust by bending lip on float arm.

Accelerating Pump—Center hole. Distance from top of bowl cover to top of plunger shaft should be 54/64". Adjust by bending throttle connector rod at lower angle.

Fast Idle: .019-.023" (920S, 993S, 994S); .022-.026" (Others), clearance between throttle valve and bore of carburetor (side opposite idle port), with choke valve held tightly closed and throttle stop screw backed off.

Automatic Choke: Set on index.

Slow Closing Throttle (Dashpot): (994S, 2116S, SA) Maximum dashpot action is obtained by loosening locknut and adjusting dashpot unit so that dashpot plunger can be moved inward approximately 3/32" with throttle valve tightly closed.

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Overdriv Kickdown Switch: (993S, 2062S, SA). With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kick-down lever and switch stem guide.

Throttle Linkage Adjustment (PowerFlite Cars): *See "PowerFlite" in Transmission Section.*

►*OTHER DATA: See Carter "BBS" in Carburetor Section.*

Fuel Pump Pressure: 4-5½ lbs.

CARB. EQUIPMENT

Fuel Pump: (1954)—AC diaphragm type. **Replacement Pump**—AC No. 588 or 9926. Fuel only.

Fuel Pump: (1955)—Carter diaphragm type. **Replacement Pump**— Carter No. M2242S.

Pressure—4-5½ lbs.

S "Fu l Pumps" in Carbur ti n S ction.

Gas line Gaug : Auto-Lite electric type as follows. *NOTE—"Two Wire Thermostatic Type" used on Late 1954 Suburban. "One Wire Magnetic Type" used on all other models.*

Dash Unit (1954)—Auto-Lite 12780A (Exc. Suburban); 13210A (Early Suburban); 13513A (Late Suburban).

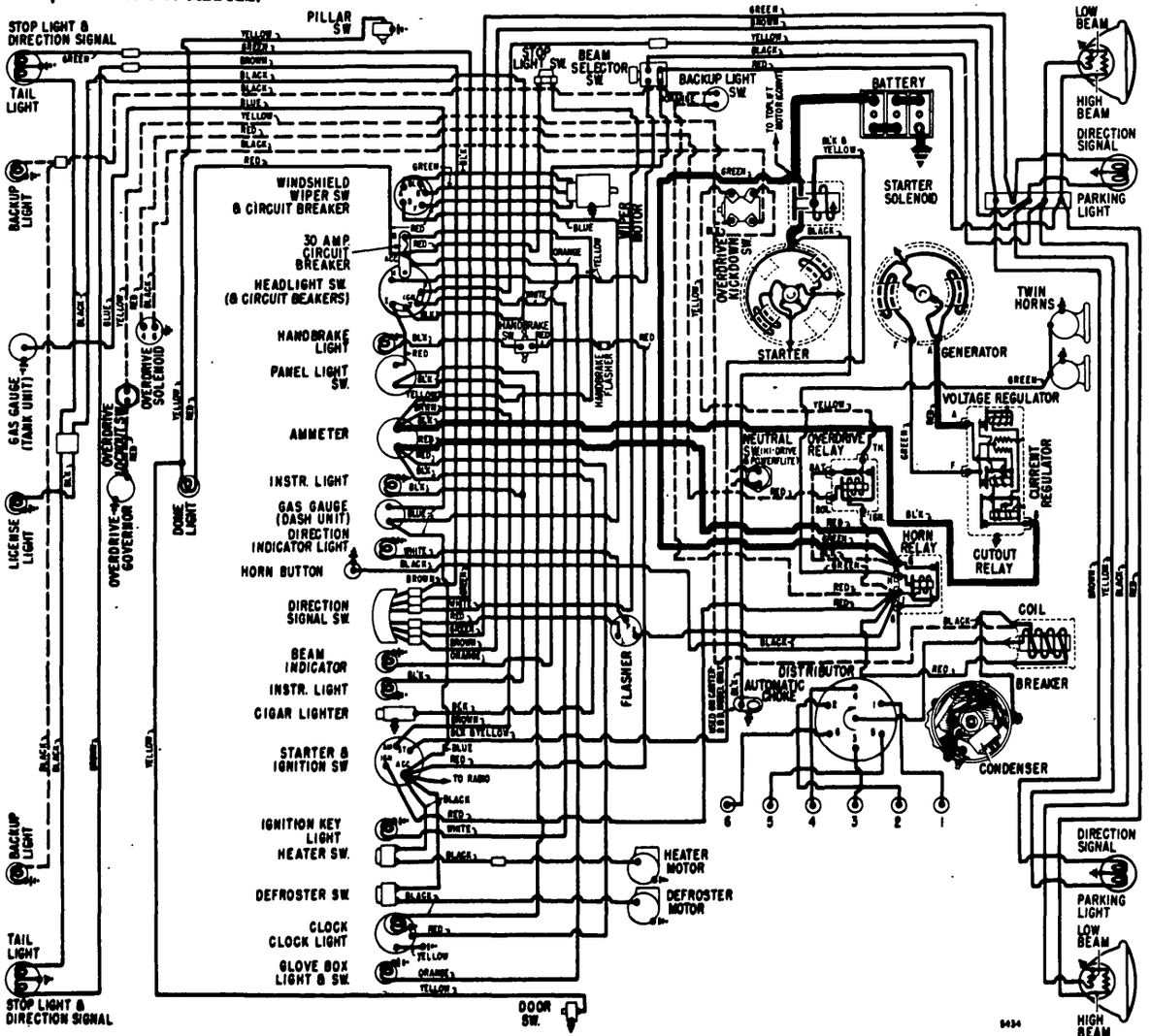
Dash Unit (1955)—Auto-Lite 13753A.

Tank Unit (1954)—Auto-Lite 12617A (Exc. Suburban); 12904A (Early Suburban; 13514A (Late Suburban).

Tank Unit (1955)—Auto-Lite 13794A.

See "Fuel Gauges" in Carburetion Equipment Section.

►*1955 FUEL TANK CAP CAUTION:* A vented fuel tank filler cap now incorporated in production. Previous production filler pipe had "V" slot at top to provide fuel tank venting. Current production does not have slotted vent. Care must be taken to match right cap with each pipe to insure proper. venting and unrestricted flow of fuel to engine. Failure to vent tank will result in its collapse. If this occurs, tank can be restored to original shape by light application of air pressure.



1954 MODELS

BATTERY

Auto-Lite 1M-100-D or Willard HW-1-100-C. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate). **With PowerFlite**—Auto-Lite 2H-120-D. 6 volt, 120 ampere hour capacity (20 hr. rate).

Grounded Terminal—Positive.

Engine Ground—Left front of engine.

STARTER

Model	Auto-Lite N.	Armatur
1954 (U.S.)	MCH-6205	MCH-2088
1955 (U.S.)	MCH-6305	MCH-2088
1954 (Canada)	MCH-6206	MCH-2088
1955 (Canada)	MCH-6204	MCH-2088

Drive—Bendix "Folo-thru" type.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—42-53 ozs. (with new brushes).

Performanc Data—MCH

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4300 (Min.)	5.0	65
6.0 ft. lbs. (Min.)	Lock	2.0	335

Performanc Data—MCL

Torque	RPM	Volts	Amperes
0 ft. lbs.	4900	5.0	65
8.0 ft. lbs.	Lock	2.0	410

Starting Switch: Auto-Lite SST-4006 (Std.), SST-4013 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral Safety Switch mounted on transmission on Automatic Transmission cars. *S e "Starter Controls" in Electrical Equip. S cti n.*

Neutral. Safety Switch Adjustment (Hy-Driv & P w r-Flite Cars): *See "Hy-Driv " or "P werFlite" Transmissions in Transmissi n S ction.*

GENERATOR

Model	Auto-Lite G n. N.	Armatur N.
1954-55 Std.	GGW-6001J	GGW-2006F
1954-55 Spec.	GGU-6001G	GGU-2006F
1954-55 Spec.	GGJ-6001F	GGJ-2101F
1954 Spec.	GGJ-6001G	GGJ-2101F
1954 Spec.	GGU-6001R	GGU-2006F
1954 Spec.	GGW-6001K,Q	GGW-2006F
1954 Pow. St. ①	GGW-6008F,G,J	GGW-2045F
1954 Pow. St. ②	GGW-6008FA	GGW-2045F
1954-55 Taxi	GGU-6005A	GGU-2059F
1955 Pow. St. ①	GGW-6016A	GGW-2090F
1955 Pow. St. ①	GGU-6013D	GGU-2071F
1955 Pow. St. ②	GGW-6016E	GGW-2090F

①—U.S. Cars. ②—Canada Cars.

►*SPECIAL GENERATOR NOTE:* GGJ, GGU, and GGW type generators used. Performance specifications below apply equally to all generators, within any one of the three groups specified.

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P rformance Data–GGJ

Amperes	Volts	Cold –R.P.M.–	Hot
0	6.4	600-700	650-750
50	8.0	1400-1600	1550-1750
55	8.0	1500-1700	1650-1850

P rformanc Data–GGU

Amperes	Volts	Cold –R.P.M.–	Hot
0	6.4	750-850	800-900
45	8.0	1450-1650	1650-1850
50	8.0	1550-1750	1750-1950

P rformanc Data–GGW

Amperes	Volts	Cold –R.P.M.–	Hot
0	6.4	870-970	950-1050
40	8.0	1800-2000	2150-2350
45	8.0	1925-2125	2350-2550

Brush Spring T nsi n–(GGJ) 34-41 ozs., (GGU, GGW) 35-53 ozs., with new brushes.

Field Curr nt–(GGJ) 1.4-1.7 amperes, (GGU) 1.4-1.6 amperes, (GGW) 1.6-1.7 amperes, all at 5.0 volts.

Motoring Curr nt–(GGJ) 4.1-4.6 amperes, (GGU) 5.0-6.0 amperes, (GGW) 5.0-5.5 amperes, all at 5.0 volts.

Rotati n–Counter-clockwise at commutator end.

B lt Adjustment: Approximately 1/4" slack (when pushed lightly with fingers from straight line between pulleys).

REGULATOR

Auto-Lite R gulat r N .	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A	GGW

Cut ut Relay

Cuts In–6.3-6.8 volts.
Cuts Out–4.1-4.8 volts.
C ntact Gap–.015" minimum.
Air Gap–.031-.034" with contacts open (check at hinge enf of core).

V ltag Regulator

S tting–7.1-7.4 volts at 70° F. *after 15 minutes operating charging at 1/2 maximum rate.*
Air Gap–.048-.052" with contacts just opening.
Ch cking & Adjusting–*See Electrical Equip. Section.*

Curr nt R gulator

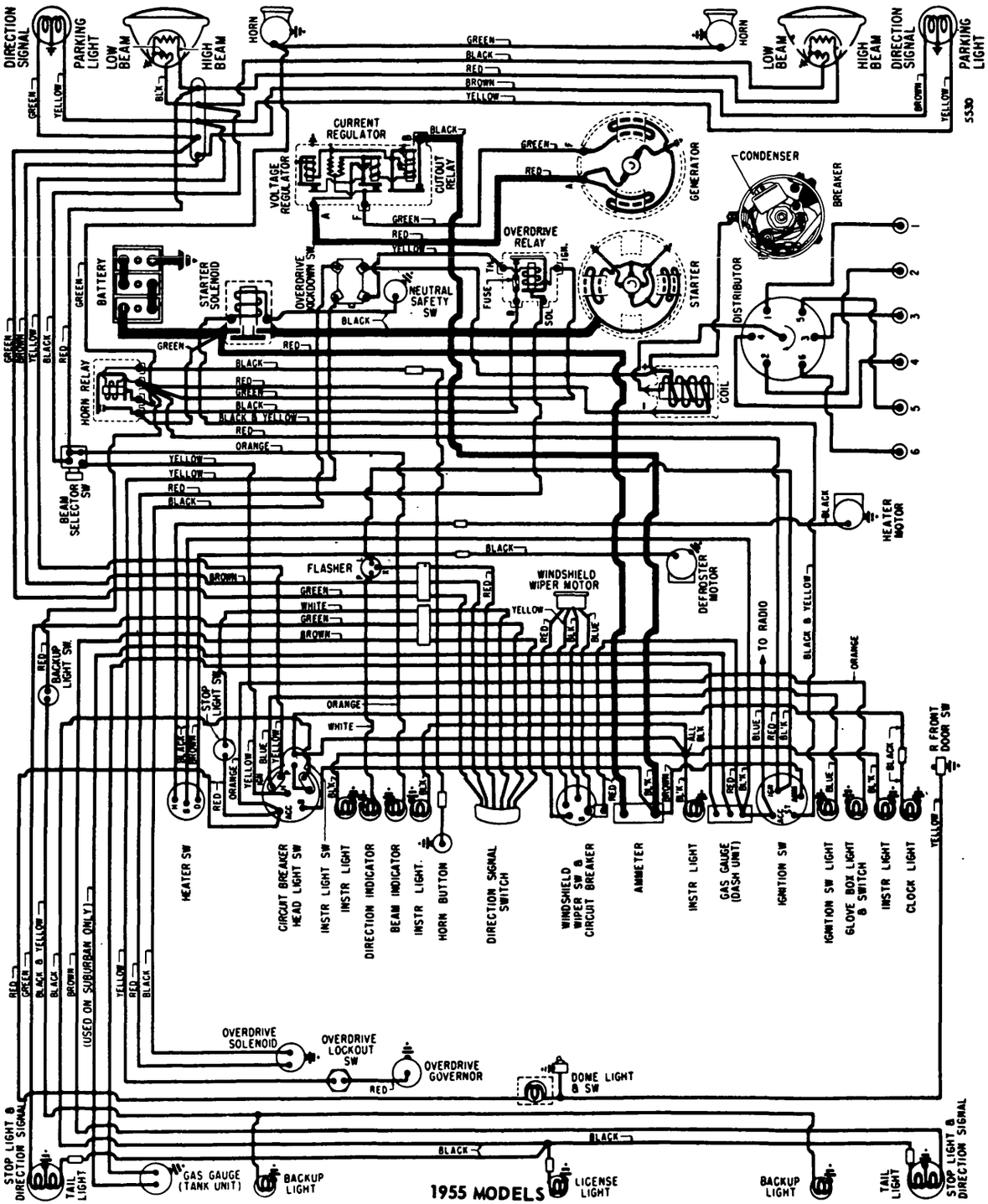
►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

	Test A –Operating Amperes–	Test B
VBE-6001A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VAV-6001B, 2B	55	50 (48-52)

Test A–After 15 minutes operating charging at 1/2 maximum rate.

T st B–After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF).
Air Gap–.048-.052" with contacts just opening.
Ch cking & Adjusting–*See Electrical Equip. Section.*

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1955 MODELS

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MISC. ELECTRICAL

Headlamps Sealed Beam. *See Electrical Equip. Section.*
Direction Signal *See Electrical Equip. Section.*
►*IGNITION STARTER SWITCH CAUTION When installing accessories, use accessory terminal only on ignition-starter switch and not ammeter terminal post.*
Lighting & Panel Switch Removal Remove knob (use small screwdriver to raise up special clip in knob, or remove small cross-head screw, depending on method used to hold knob). Remove hex nut and collar that holds assembly in place. Pry out switch (each switch has threaded sleeve with two flat sides. Sleeve fits snugly in respective switch hole in panel).
Stop Light Switch Location (1954)–On frame left side rail. **(1955)**–On forward end of master cylinder.
CIRCUIT BREAKERS (1954): 30 amp. circuit breaker, part of light switch assembly, protects lighting circuits.
CIRCUIT BREAKERS (1955): Three circuit breakers located in lighting switch, as follows
30 Amperes–Protects headlights, high beam indicator light and parking lights.
10 Amperes–Protects tail lights, license plate lights, clock and instrument panel lights.
10 Amperes–Protects stop lights, map light, dome light, glove box light, courtesy light, and trunk compartment light.
Windshield Wiper 10 ampere circuit breaker located in wiper switch.
FUSES Clock–3 amperes. In clock lead wire.
Radio–14 amperes. In feed behind radio.
Overdrive–20 ampere. On overdrive relay.
HORNS Auto-Lite. Twin horns with relay

Model	High Pitch	Low Pitch
1954 P-25-1 (Early) ①	HAB-4671	
1954 P-25-1 (Late) ①	HAB-4683	
1954 P-25-2 & 3	HAB-4656	HAB-4655
1954 Canada	HAB-4660	HAB-4659
1955 All Models	HAB-4702	HAB-4701
1955 Canada	HAB-4720	HAB-4719

①–Single horn used. Other models are dual horns.

Horn Relay: Auto-Lite HRL-4104 (Early 1954), RAF-4001 (Late 1954 & 1955)

ENGINE

ENGINE SPECIFICATIONS: Six Cylinder "L" head
►*1954 ENGINE PRODUCTION CHANGE 217" Engine (4 3/8" Stroke) replaced in production with 230" Engine (4 5/8" Stroke).*

Model	Bore	Stroke	Displacement
1954 (Early)	3¼"	4 3/8"	217.8 cu Ins
1954 (Late)	3¼'	4 5/8"	230.2 cu ins.
1955	3¼'	4 5/8'	230 2 cu. ins.

Model	Compr.Ratio	Rated HP	Developed HP
1954 (Early)	7.1-1	25.35	100 at 3600 RPM
1954 (Late)	7.25-1	25.35	110 at 3600 RPM
1955	7 4-1	25.35	117 at 3600 RPM

Compression & Vacuum Reading–*See TUNE-UP*
ENGINE REMOVAL *See "Engine" in Plymouth Special Data*
►*HARSH ENGINE VIBRATION CORRECTION (Due to Short Insulator Spacer) See "Engine Mountings" in Plymouth Special Data*
OIL PAN REMOVAL Remove clutch housing pan to prevent damaging oil pan gaskets on clutch housing pan dust seal Turn crankshaft so No 1 connecting rod journal is at bottom dead center Remove tie rod Remove oil level indicator Drop pan and while holding up oil strainer so it clears baffle inside pan, slide pan to rear and remove NOTE– New end gaskets should protrude 1/8 above oil pan *Ends must not be cut off*
ENGINE MOUNTINGS *See "Engine Mountings" in Plymouth Special Data*
CYLINDER HEAD *See "Cylinder Head & Manifold" in Plymouth Special Data*
►*MANIFOLD INSTALLATION CAUTION* Two long capscrews extend into cylinder block water passage Before installing, apply sealer to these capscrews It is important that conical washers at flange ends of exhaust manifold be installed to permit expansion and contraction without loosening
TIGHTENING TORQUES *See "Tightening Specifications" in Plymouth Special Data*

PISTONS

Aluminum alloy, U-slot, cam ground type.
►*CYLINDER BORE OVERSIZE CAUTION Engines with letter "A" following engine number indicates that cylinder bore .020" Oversize.*
Weight–16 ozs. (stripped).
Removal–Pistons and rods removed from above.
Fitting New Pistons 0007 measured ¾ from the bottom on thrust face. With piston pin and rings removed, cylinder wall and piston dry and clean, insert piston, upside down, into cylinder bore, with feeler stock, .002" x 1/2", inserted between cylinder wall and piston, on high spot of piston contour. Pull to withdraw feeler should be 5-10 lbs.
Replacement Pistons Std., .005", .020", .030", .040", .060" Oversize.
Installing Pistons "U" slot away from valves.

PISTON PINS

Full floating type.
Diameter–55/64". **Length**– 2-3/4".
Pin Fit in Piston–.0000-.0005". TIGHT DOUBLE THUMB push fit at room temperature (70°F).
Pin Fit in Rod Bushing–.0001-.0002' TIGHT THUMB push fit at room temperature (70°F)
Replacement Pins Std., .003", .008" Oversize.
NOTE–Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (#3)	5/32"	.010 .020"	.001-.0025"
Oil (#4)	5/32"	.010-.020"	001- 0025'

Replacement Rings: Std., .010", .020", .030", .040", .050", 060" Oversize.
Installing Rings: #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center to Center)–7 15/16" (217" Engine), 7 13/16" (230" Engine).
Weight–31.1 ozs. (217" Engine), 27.9 ozs. (230" Engine).
►*THICKER WALL-BEARING & JOURNAL DIAMETER CAUTION (One or more Journals Machined Undersize). "See "CRANKSHAFT" below.*
Crankpin Journal Diameter–2.0625".
Maximum out-of-round and taper limits–.001".
Lower Bearings–Removable, precision type, thin babbitt on steel. No shims.
►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below.*
Clearance–.0005-.0015".
Endplay–.006-.011".
Bearing Adjustment. None. Replace bearings.
Replacement Bearings Std., .001", .002", .003", .010", .012", .020" Undersize.
Installing Rods Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter–2.4995-2.5005". Four bearing.
Bearing Type–Removable, precision type, thin babbitt on steel. No shims.
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION.* Engines with undersize journals identified as follows
.010" UNDERSIZE (All Main & Connecting Rod Journals)–Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)–When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker-wall bearing. For example "M2" and "R1" means that .001" thicker-wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.
Clearance–.0005-.0015".
Replacement Bearings: Std., .001", .002", .003", .010", .012", .020", .030", .040" Undersize.
Crankshaft Rear Oil Seals *See "Crankshaft & Main Bearings" in Plymouth Special Data*
Crankshaft Front Oil Seal *See "Engine Front Cover" in Plymouth Special Data*
End Thrust. Taken by flanged faces on rear (#4) main bearing. **Endplay**–.003-.007".

CAMSHAFT

Journal Diameters–(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".
Bearings–Removable, steel-backed babbitt lined bushings (exc. #4– machined in crankcase).

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Clearance—.001-.003" NOTE—If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

Removal & Installation—See *"Camshaft & Bearings" in Plymouth Special Data.*

End Thrust—Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain—Width—1". Pitch—.500". Length—24" or 48 links.

Camshaft Setting—Sprockets marked. Mesh chain in sprockets with "0" marks on sprockets adjacent and in line with straightedge across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Plymouth Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal)—*See "Engine Front Cover" in Plymouth Special Data*

VALVES

Tappet Clearance: .010" Intake. .010" Exhaust. Engine hot and idling. NOTE—.002" additional clearance on exhaust tappets if car driven at continuous high speed.

Valves	Head Diam.	Stem Diam.	Length
Intake	1-17/32"	.340-.341"	4-27/32"
Exhaust	1-13/32"	.340-.341"	4 25/32'
Valves	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	3/8"	.001-.003"
Exhaust	45°	3/8"	.003-.005"

Valve Seat Width—1/16-3/32". Runout .0015" maximum.

►*VALVE SEAT INSERT CAUTION*—*See "Valve System" in Plymouth Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, ream guides to inside diameter of .342-.343" (Intake), .344-.345" (Exhaust). *CAUTION—Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*

Valve Springs: Can be installed with closely coiled end at either top or bottom. *NOTE—Springs are available in several colors. Colors do not refer to spring tension but merely identify the manufacturer.*

Free Length—2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1-3/4"
Valve Open	107-115 lbs.	1-3/8"

Valve Lifters: Mushroom type (remove from below).

Stem Diameter—5/8". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".

Lifter Clearance in Block: .0002-.001"

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 12° BTDC. Close 44° ALDC.

Exhaust Valves—Open 50° BLDC. Close 6° ATDC.

Valve Timing Check—With .014' (Cold) tappet clearance No 6 intake valve should open with No 6 piston 12-13° or 0766-0770' BTDC Reset tappet clearance to 010' HOT running clearance

OILING SYSTEM

►*ENGINE OILING SYSTEM*—*See "Engine Lubrication" and "OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity: 5 qts. (Except 1954 Hy-Drive Models). 10 qts. (1954 Hy-Drive Models). Add one quart to above capacities when filter is changed.

Normal Oil Pressure: 40-50 lbs. at 25-30 MPH.

Oil Pressure Relief Valve—Two types used as follows.

Standard, Overdrive, & PowerFlite Models—Located under plug on left side of crankcase below starting motor. Three different springs may be found in relief valve (see below for identification and specifications). When replacing spring in relief valve, same color spring as the one removed should be used.

Hy-Drive Models—Located under cover of oil pump. The spring used in this valve is painted blue for identification, and should not be replaced by any other color spring. Spring tension is 22-24 lbs., with spring compressed to 1 25/32'.

Relief Valve Spring Identification

Color Code	Free Height	①Spring Pressure
Red (Light)	1 13/16'	12.4-13.8 lbs.
Black (Standard)	1 13/16'	14.4-15.8 lbs.
Green (Heavy)	1 13/16"	16.2-17.8 lbs.

①—Pressure with spring compressed to 1¼".

Oil Pressure Gauge—Auto-Lite 13093A (1954), 13751A (1955). Not electric.

Oil Pump—Rotor type. On right side of crankcase.

Overhaul—*See "Oiling System" in Plymouth Special Data*

Oil Filter—Shunt type On left side of engine above starter

Servicing—Replace filter every 5000 miles or more often in dusty areas

Crankcase Ventilation—Filter in oil filler pipe cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity. 13 qts. (14 qts. with heater).

Pressure Valve. Plymouth No. 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat—By-pass type in cylinder head water outlet. Starts to open at 157-162° F.

Water Pump. Packless type. Grease fitting for lubrication. *See "Water Pumps" in Plymouth Special Data*

Temperature Gauge: Auto-Lite 12782A. Not electric.

Water Distribution Tube: *See "Cooling System" in Plymouth Special Data*

Temperature Gauge: Auto-Lite 12782A (1954), 13752A (1955). Not electric.

CLUTCH

1954 Models

Borg & Beck	Standard	Overdrive	Hy-Drive
Model	9A7	9A7	8.5A6
Assy. No. (Early)	926	926	1369
Assy. No. (Later)	951	951	1369
Disc No. (Early)	381843	382098	382094
Disc No. (Later)	382237	382237	382094

Heavy Duty—B&B 10A7, Assy. No. 957, Disc No. 381758.

1955 Models

Borg & Beck	Standard	Overdrive
Model	9A7	9A7
Assembly No (U S)	361373	361373
Assembly No (Can Std)	926	926
Disc No (U S)	382237	382237
Disc No. (Can O D)	381843	382098

Heavy Duty—B&B No 10A7, Assy No 361368, Disc No 381758 (U S), B&B No 11A6, Assy No 931, Disc No 381850 (Can)

See "Borg & Beck" in Clutch Section

Pedal Free Play Adjustment: Adjust fork rod to secure 1/8" to 5/32" (1954); 3/16" (1955) free movement of clutch fork outer end. This adjustment will provide 1" free pedal movement at pedal pad.

Over-Center Spring Adjustment (Hy-Drive Cars Only): Make certain clutch pedal free play is 1". Correctly position over-center spring bracket by loosening attaching nut and bolt. Then move bracket to position which will give desired over-center spring action. Retighten nut to hold bracket in place. Over-center spring tension is controlled by the spring eyebolt and bracket adjusting nut. If clutch pedal action is soft and sluggish on return, back off adjusting nut. If pedal action requires excessive effort, tighten nut until desired action is obtained.

Over-Center Spring Adjustment (1955 Models): Tighten eyebolt sleeve on clutch pedal over-center spring bolt finger tight with pedal in depressed position, then tighten four complete turns.

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods. Remove transmission (see Synchro-mesh Transmission). Mark clutch cover and flywheel (on cars with Hy-Drive mark clutch drive plate and clutch cover). Remove bolts holding clutch cover to flywheel, loosening each bolt a few turns at a time until cover is free. Remove clutch disc and pressure plate assembly.

SYNCHRO-MESH TRANSMISSION

Own. *See "Plymouth Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►***1955 SYNCHRO-MESH TRANSMISSION NOTE & REPLACEMENT PARTS CAUTION***: **A new transmission identified by letters "CK" stamped on left side of case was used on some cars. This transmission has different gear ratios than other transmissions and the parts are not interchangeable. *See "Plymouth Synchro-mesh" in Transmission Section.***

Removal: Disconnect propeller shaft at front universal (if transmission is to be disassembled, loosen companion flange nut, by first applying parking brake to hold mainshaft). Disconnect speedometer cable, gear shift rods and overdrive control wires. On Hy-Drive equipped cars remove neutral safety switch. Disconnect hand brake cable. Remove nuts holding transmission to clutch housing. Pull transmission straight back until transmission shaft clears clutch disc before lowering transmission.

OVERDRIVE

Warner Type AS1-R10G. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.

See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

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Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

HY-DRIVE TRANSMISSION

Own. Torque Converter and Standard 3-speed Transmission.

See "Hy-Drive" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hy-Drive" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hy-Drive" in Transmission Section.*

Dashpot Setting—*See TUNE-UP.*

Transmission Control: *See "Hy-Drive" Transmission in Transmission Section.*

Lubrication: Two oil changes required per year (regardless of mileage.) Drain engine and "Hy-Drive" Torque Converter separately. To refill, pour 10 qts. (11 qts. if filter changed) of correct viscosity oil into crankcase and run engine at fast idle for 5 minutes. Check engine oil level.

Capacity—10 qts. (11 qts. if filter changed).

►*OIL FILTER CHANGE CAUTION: On "Hy-Drive" cars, oil filter element must be changed every 5000 miles.*

►*OTHER "HY-DRIVE" SERVICE DATA: See "Hy-Drive" Transmission in Transmission Section.*

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A).

Checking Fluid Level—Apply hand brake, place selector lever in neutral position. Allow engine to idle until normal operating temperature is reached. Shift selector lever through all ranges. Shift selector lever back to neutral and add Automatic Transmission Fluid to bring level to full mark on oil level indicator.

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball and Trunnion Type.

REAR AXLE

►***REAR AXLE PINION CARRIER BUMPER PRODUCTION CHANGE (To Provide Fuller Contact & Additional Protection Under Severe Bottoming Conditions):***

New bumper now incorporated in production. Available under Part No 1311417 and can be installed on earlier cars

Own. Semi-floating, hypoid gear type with Hotchkiss drive.

See "Plymouth Hypoid" in Rear Axle Section.

Transmission	Rear Axle Ratio
Standard	3.73-1 (41-11), 4.1-1 (41-10)
Overdrive	4.1-1 (41-10)
PowerFlite	3.73-1 (41-11)
Hy-Drive	3.73-1 (41-11)

Backlash—.006-.008"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support). pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick (equally at both wheels). **Endplay**—.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement.

Type	Plymouth Part No. Front	Rear
1954 Standard	1450629	1450632
1954 Hvy. Duty	1450041	1450635
1954 Special Hvy.Duty		1450075
1955 Standard	1614404	1450917
1955 Hvy. Duty	1617004	1450920
1955 Special Hvy Duty		1450037

FRONT SUSPENSION

Independent. Coil springs and direct-acting shock absorbers. *See "Plymouth" in Front Suspension Section.*

1954 Models

Kingpin Inclination—5 1/2° at 0° camber.

Camber—Pos. 3/8° to Neg. 3/8° (Left side 1/4-1/2° greater than right side within these limits).

Caster—Neg. 1° to Pos. 1° (0° preferred).

Toe-In—0" to 1/16" (0" preferred).

Toe-Out on Turns—Inside wheel at 20° with outside wheel at 18-3/4°.

1955 Models

Kingpin Inclination—5—6½° at 0° camber

Caster—Neg 2° to 0° (Left side 0° to Neg. 3/4°, Right side 0° preferred)

Camber—Pos. 1/4°±3/8° (Left side Pos 1/2°, Right side 0° preferred)

Toe-In—0" to 1/16" (0" preferred)

Toe-Out on Turns—Inside wheel at 20° with outside wheel at 17-1/2—19°

STEERING

Manual Steering Gear: Gemmer Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section

Power Steering (1954): Monroe Linkage Type—Used with Standard steering gear.

See "Monroe Linkage Type" in Steering Section.

Power Steering (1955): Coaxial—Steering gear with built-in power unit.

See "Coaxial Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Plymouth "Safe-Guard" Lockheed hydraulic.

See "Plymouth Safe-Guard" in Brake Section.

Drums—Cast iron. Diameter 10".

Wheel Cylinder Diameter—1-1/8". Single acting (front), double acting (rear wheels)

Lining—Molded asbestos (bonded to shoe).

Length—Primary (Front & Rear)10.5", Secondary (Front) 10.5", Secondary (Rear) 8.0".

Width—2" **Thickness**—3/16'

Braking Power—60% Front. 40% Rear.

Clearance—.006" at end of all shoes

Master Cylinder (1954): On frame at base of brake pedal.

Checking Fluid Level—Access hole at left of front floor pan.

Removal—Remove floor mat and toe board Disconnect pushrod. Remove horseshoe clip and slide brake pedal off shaft. Disconnect brake line tubes at master cylinder fittings. Remove bolt retaining master cylinder to frame.

Master Cylinder (1955): On engine side of dash panel.

Checking Fluid—Access hole at top of master cylinder

Removal—Disconnect pushrod Disconnect brake line tubes at master cylinder fittings Remove four stud nuts from studs, remove master cylinder

Power Brakes: Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder *See "Plymouth Power Unit" in Brake Section*

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans. 7" internal expanding type is used with PowerFlite.

Adjustment—*See "Hand Brake Notes" in Plymouth Special Data.*

Lining—	Width	Thickness	Length
6" Ext. Type	2"	5/32"	① 16-11/16"
7" Int Type	2"	5/32"	13-1/16"

①—Two-piece molded lining, 15-3/8" long, optional.

Clearance (External Type)—.015-.020" around band.

Internal Type—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMD-4003B, Std. (1954), EMU-4101, Std. (1955), EMG-4102B, Two-Speed (1954), EMZ-4001, Two Speed (1955).

See "Auto-Lite" Electric Windshield Wipers in Miscellaneous Section.

Convertible Top Control: Electrical-Mechanical type.

See "Dodge & Plymouth" Top Controls in Miscellaneous Section.

Power Window Regulators: Electric type. Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Misc. Section.*

Power Seat Adjusters: Electric type. *See "Power Seat Adjusters" in Miscellaneous Section*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

Series	Model Identification
Plaza	P-27-1
Savoy	P-27-3
Belvedere	P-27-2

SERIAL NUMBER: On plate attached to left front door hinge pillar post.

Starting Serial Nos.	Detroit	Evansville	Los Angeles
All Series	15663001	22182001	26524001

ENGINE NUMBER: On center of engine behind water pump

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number)–Identified as follows:*

"A"–ALL cylinders .020" oversize.

"B"–ALL Main & Connecting Rod Bearings .010" undersize.

"AB"–BOTH above conditions exist.

"DIAMOND" (3/8" high)–.008" oversize tappets used.

TUNE-UP

COMPRESSION PRESSURE: 125-155 lbs at cranking speed of 150 RPM.

VACUUM READING: Steady 18-21" at idling speed.

VALVE TAPPET CLEARANCE: No adjustment required, except when valves are reconditioned (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic coil type, located in exhaust manifold of right cylinder block. Valve should operate freely. When installing coil, position shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer (tongue) end of spring below shaft, horizontal and facing front of engine. Press inner end of coil into slot and seat firmly Now move outer (tongue) end up, around (counter-clockwise) and hook under left stud (toward rear of engine) *See "Manifold Heat Control" in Plymouth Special Data.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders–RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .040' (2259SB, 2260SB, 2261SB, 2274SA Carbs,). 035" (Others)

Plugs–Auto-Lite Resistor 4S-165, 14mm Torque to 32 ft lbs

COIL: Auto-Lite CR-6012-C.

Ignition Current–2.25 amperes idling, 5.0 amperes stopped.

DISTRIBUTOR: Auto-Lite IAZ-4003C.

Condenser–Auto-Lite **IBB-2015R. Capacity**–.25-.28 microfarad.

Contact Point Set–Auto-Lite IGP-3028ZS.

Breaker Gap–.015-.018". Set maximum gap to .017".

Cam Angle–34° ± 3° (both sets of contacts). Do not adjust gap outside limits to obtain specified cam dwell.

Breaker Arm Spring Tension–17-20 ozs.

Rotation–Clockwise viewed from above.

Automatic Advance–IAZ-4003C

Degrees Distr.	R.P.M	Degrees Eng.	R.P.M.
Start	350	0	700
1	370	2	740
5	450	10	900
17	1800	34	3600
18	1900	36	3800

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance–IAZ-4003C

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-1/4
1	2	6
5	10	9-1/4
10	20	14-7/8
11.5	23	17

►*167 HP ENGINE VACUUM DIAPHRAGM CAUTION.* When installing Carter BBD-2259SB, 2260SB, 2261SB, 2274SA carburetors or other Carter carburetors which have Carter Unitized Package 195-62U installed, it will be necessary to change vacuum diaphragm assembly with new diaphragm assembly (Plymouth No. 14339671, Auto-Lite No IAZ-2023RA) The spring, calibration washers, sealing washer and nut must be transferred from diaphragm assembly on distributor to new vacuum assembly *NOTE*–Maximum vacuum advance will be changed to 25° at 17' of vacuum *See "Carburetor" below for application*

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Plymouth Special Data.*

IGNITION TIMING

Setting–4° BTDC. See Manual Adjustment below.

Timing Mark–On crankshaft drive pulley.

Manual Adjustment–Timing may be advanced with some premium fuels. Range of timing should not exceed plus or minus 4° from recommended factory setting.

CARBURETOR

►*CARBURETOR APPLICATION: Carter BBD 2-Barrel Carburetors are Std., Carter WCFB 4-Barrel Carburetor is Special Equipment (Power Package).*

►*167 HP ENGINE CARBURETOR PRODUCTION CHANGE (Carter BBD 2259S, 2260S, 2261S, 2274S to Improve Cold Starting, Part Throttle Loading, & Road Load Economy): NOTE–Later 2259SA, 2260SA, 2261SA carburetors have necessary parts installed. See Carter "BBD" in Carburetor Section for data*

►*167 HP ENGINE CARBURETOR KIT (To Correct Poor Mileage):* Unitized Package 195-62U available to correct poor mileage. This kit should **not** be installed on carburetors already set on lean limit (leanness or surge may be experienced if installed). *NOTE–Later 2259SB, 2260SB, 2261SB, 2274SA carburetors have parts in Unitized Package 195-62U installed. See Carter "BBD" in Carburetor Section for data.*

CARTER 2-BARREL BBD

Transmission	Carter No.
Synchro-mesh (157 HP Eng.)	BBD-2141S
Overdrive (157 HP Eng.)	BBD-2154S
PowerFlite (157 HP Eng.)	BBD-2155S
Synchro-mesh (167 HP Eng.).	BBD-2259S, SA, SB
Overdrive (167 HP Eng.)	BBD-2260S, SA, SB
PowerFlite (167 HP Eng.) .	BBD-2261S, SA, SB

►*REPLACEMENT CARBURETOR NOTE:* Carter BBD-2262S is replacement for 157 HP engine, BBD-2274S SA for 167 HP engine. Use with unitized Pkg. 192-34U (Overdrive Cars) or 202-83U (PowerFlite Cars). *See BBD-2274S change above.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT Barrel 1-4-6-7.*

Idle Setting–1/2–1-1/2 turns open (157 HP Eng.), 1/4–1-1/4 turns open (167 HP Eng.). Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed–450-500 RPM.

Float Level–7/32" (Gauge T109-239) from top surface of body casting to top of each float. If one float lower than other, equalize by bending float arm. If both floats require same correction, adjust by bending lip on float arm.

Accelerating Pump–Normal setting, outer hole (medium stroke).

Fast Idle: .009-.013" (157 HP Eng.–Gauge T109-200), .015-.019" (167 HP Eng.–Gauge T109-44), clearance between throttle valve and bore of carburetor (side opposite idle port), with throttle valve tightly closed. Adjust by bending choke connector rod at lower angle (Tool T109-213).

Unloader Adjustment: After Fast Idle adjusted, hold throttle valve wide open with choke valve fully closed. Clearance between upper edge of choke valve and air horn wall should be 1/4". Adjust by bending arm on choke trip lever (Tool T109-214).

Automatic Choke Setting: 2 Points Lean (157 HP Eng. Carbs.) & Carb. Models 2259S, 60S, 61S (167 HP Eng.). Centered (all other 167 HP Eng. Carbs.). *See "Carburetor Production Change" under CARBURETOR above.*

Kickdown Switch Adjustment (2154S, 2260S, SA): With throttle valves in wide open position adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide. To adjust, bend kickdown lever to contact switch stem.

Slow Closing Throttle (Dashpot) Adjustment (2155S, 2261S, SA): Loosen lock nut and adjust dashpot unit so that plunger shaft can be bottomed with a 1/16" gauge placed between shaft and operating lever with throttle valves tightly closed. Tighten lock nut.

Throttle Linkage Adjustment: *See "PowerFlite" Transmission in Transmission Section*

►*OTHER DATA: See Carter "BBD" in Carburetor Section*

CARTER 4-BARREL WCFB NO. 2253S

►*MANIFOLD FUEL DISTRIBUTION. Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting–1/2–1-1/2 turns open. For richer mixture, turn screws out

Idle Speed–450-500 RPM with selector lever in neutral.

Throttle Linkage Adjustment *See "PowerFlite" Transmission in Transmission Section*

►*OTHER DATA: See Carter "WCFB 4-Barrel" Carburetor in Carburetor Section*

Fuel Pump Pressure: 5-6½ lbs

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CARB. EQUIPMENT

►*FUEL TANK FILLER CAP CAUTION:* Vented fuel tank filler cap now incorporated in production. Previous production filler pipe had "V" slot at top to provide fuel tank venting. Current production does not have slotted vent. Care must be taken to match right cap with each type pipe to insure proper venting and unrestricted flow of fuel to engine. Failure to vent tank will result in its collapse. If this occurs, tank can be restored to original shape by light application of air pressure.

Fuel Pump: AC or Auto-Lite. Diaphragm type. **Replacement Pump**–AC No. 4280 or Auto-Lite FB-4006.

Pressure–5-6½ lbs.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: Auto-Lite.

Dash Unit–Auto-Lite 13753A.

Tank Unit–Auto-Lite 13794A.

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Auto-Lite 1M-100-D or Willard HW-1-100-C. 6 volt, 15 plate, 100 ampere hour capacity.

Grounded Terminal–Positive.

Engine Ground–Left front of engine.

STARTER

Auto-Lite MCH-6205. Armature–MCH-2088.

Drive–Bendix No. A3274. "Folo-thru" type.

Rotation–Counter-clockwise at commutator end.

Brush Spring Tension–42-53 ozs (with new brushes).

Performance Data

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4300 (Min.)	5.0	65
6.0 ft. lbs. (Min.)	Lock	2.0	335

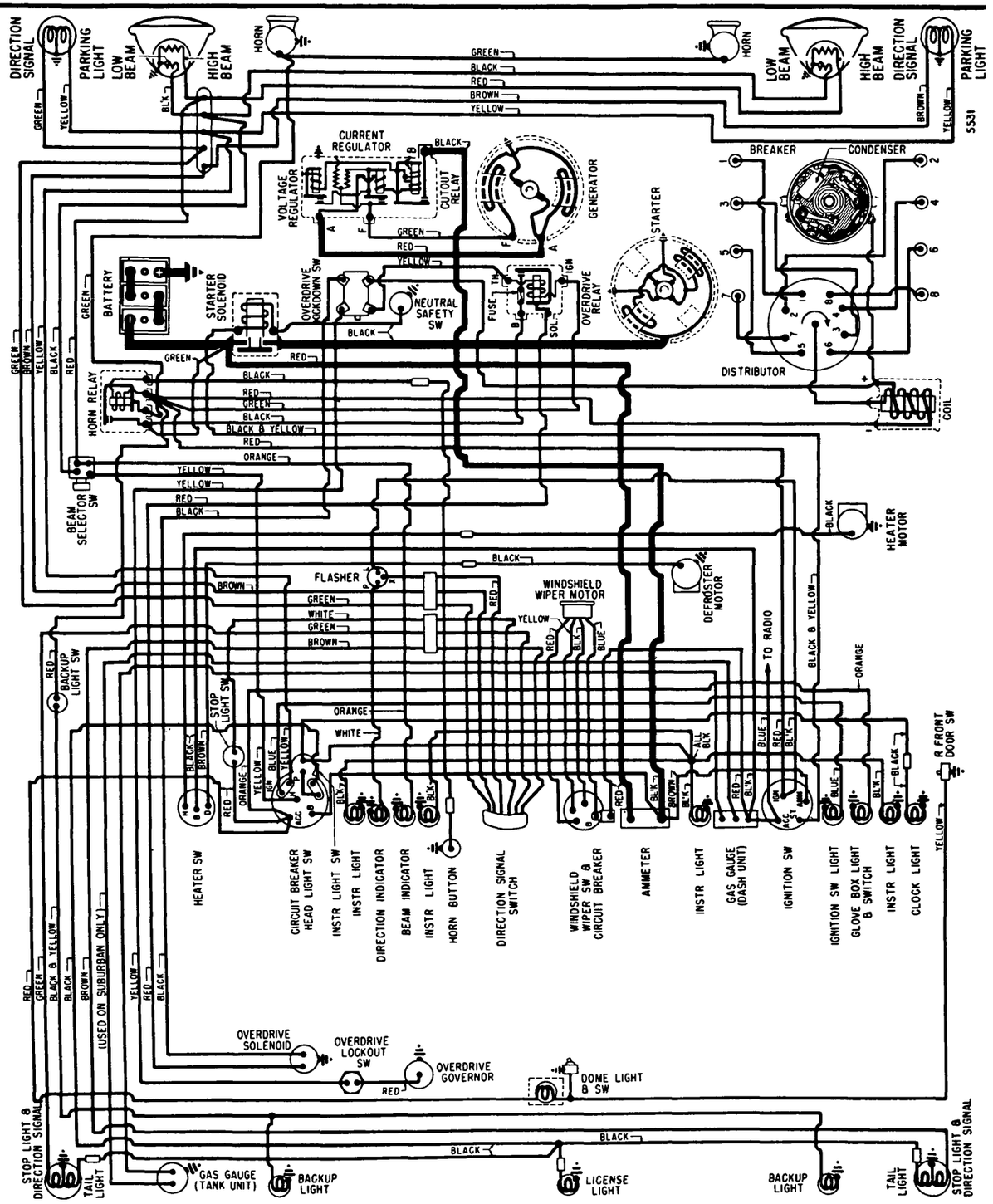
Starting Switch: Auto-Lite SST-4006 (Std.), SST-4013 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral safety switch mounted on transmission of automatic transmission cars. *See "Starter Controls" in Electrical Equipment Section.*

GENERATOR

Auto-Lite Generator No.	Armature No.
GGW-6012-B (Std.)	GGW-2006F
GGJ-6005-A (Spec. Equip.)	GGJ-2101AF
GGJ-6005-D (Spec. Equip.)	GGJ-2101AF
GGW-6016-A (Pow. St.)	GGW-2090F
GGU-6013-D (Pow. St.)	GGU-2071F
GGW-6016-E (Pow. St. Can.)	GGW-2090F
GGW-6017-A (Air Cond.)	GGW-2098F
GGU-6008-C (Air Cond.)	GGU-2063F
GGJ-6001-K (Air Cond.)	GGJ-2101AF
GGW-6016-C (A.C. & Pow. St.)	GGW-2090F
GGU-6013-C (A.C. & Pow. St.)	GGU-2071F
GGW-6016-F (A.C. & P.S. Can)	GGW-2090F

►*SPECIAL GENERATOR NOTE:* GGJ, GGU, and GGW type generators used. Performance specifications below apply equally to all generators, within any one of these groups.

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Performance Data-GGJ

Amperes	Volts	Cold	R.P.M.	Hot
0	6.4	600-700		650-750
50	8.0	1400-1600		1550-1750
55	8.0	1500-1700		1650-1850

Performance Data-GGU

Amperes	Volts	Cold	R.P.M.	Hot
0	6.4	750-850		800-900
45	8.0	1450-1650		1650-1850
50	8.0	1550-1750		1750-1950

Performance Data-GGW

Amperes	Volts	Cold	R.P.M.	Hot
0	6.4	870-970		950-1050
40	8.0	1800-2000		2150-2350
45	8.0	1925-2125		2350-2550

Brush Spring Tension—(GGJ) 34-41 ozs., (GGU, GGW) 35-53 ozs., with new brushes.
Field Current—(GGJ) 1.4-1.7 amperes, (GGU) 1.4-1.6 amperes, (GGW) 1.6-1.7 amperes, all at 5.0 volts.
Motoring Current—(GGJ) 4.1-4.6 amperes, (GGU) 5.0-6.0 amperes, (GGW) 5.0-5.5 amperes, all at 5.0 volts.
Rotation—Counter-clockwise at commutator end.
Belt Adjustment: Approximately ½" slack (when pushed from a straight line midway between pulleys).

REGULATOR

Autolite Regulator No.	Generator
VBF-6001A	GGJ
VBF-6002A (Neg. Gd.)	GGJ
VAV-6001B	GGU
VAV-6002B (Neg. Gd.)	GGU
VBE-6001A	GGW

Cutout Relay

Cuts In—6.3-6.8 volts.
Cuts Out—4.1-4.8 volts.
Contact Gap—.015" minimum.
Air Gap—.031-.034" with contacts open (check at hinge end of core).

Voltage Regulator

Setting—7.1-7.4 volts at 70°F. *after 15 minutes operation charging at ½ maximum rate.*
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

	Test A — Operating Amperes	Test B
VBE-6001A	52	45 (43-47)
VBF-6001A, 2A	66	55 (53-57)
VAV-6001B, 2B	55	50 (48-52)

Test A—After 15 minutes operation charging at ½ maximum rate.
Test B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage to 6.7-6.9 volts (VAV, VBE), 6.7-7.0 volts (VBF).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equip. Section.*
►*IGNITION STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not ammeter terminal post.*
Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by a recessed hex screw.
Stop Light Switch (Location): On forward end of master cylinder.
FUSES: Clock—3 amperes. In clock lead wire.
Radio—14 amperes. In feed behind radio.
Overdrive—20 ampere. On overdrive relay.
LIGHTING CIRCUIT BREAKERS: Located in headlight switch assembly. Three in number, as follows:
30 Ampere Circuit Breaker—Protects headlights, high beam indicator light, and parking lights.
10 Ampere Circuit Breaker—Protects tail lights, license plate lights, clock light, and instrument panel light.
10 Ampere Circuit Breaker—Protects stop lights, map light, dome light, glove box light, courtesy light, and trunk compartment light.
HORNS: Auto-Lite. Twin horns with relay.
High Pitch—HAB-4702.
Low Pitch—HAB-4701.
Horn Relay: Auto-Lite RAF-4001.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*
►*TWO ENGINES USED AS FOLLOWS:* Both engines have polyspherical combustion chamber with lateral valves and single rocker arm shaft. Bore in two engines differs as indicated in ENGINE SPECIFICATIONS below.

ENGINE SPECIFICATIONS: 90° V8 (All Models).

Engine	Bore	Stroke	Displacement
157 HP	3-7/16"	3-¼"	241 cu. ins.
167 HP	3-9/16"	3-¼"	267 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
157 HP	7.6-1	37.9	157 at 4400 RPM
167 HP	7.6-1	40.6	①167 at 4400 RPM

①—177 at 4400 RPM with special Power Package.

Compression & Vacuum Reading—*See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Plymouth Special Data.*
►*HARSH ENGINE VIBRATION CORRECTION (Due to Short Insulator Spacer): See "Engine Mountings" in Plymouth Special Data.*
ENGINE MOUNTS: *See "Engine Mountings" in Plymouth Special Data.*
OIL PAN REMOVAL: Remove oil level indicator, drain oil, disconnect steering linkage at idler arm support bracket, and allow linkage to drop. Remove bolts that hold oil pan to cylinder block and slide pan out, down, and away from engine.
CYLINDER HEAD: *See "Cylinder Head & Manifold" in Plymouth Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

PISTONS

Aluminum alloy, slipper type, elliptically turned, steel-banded, horizontal slot, tin-plated, with pin offset to right .006". **Weight**—16 ozs. (stripped).
Clearance—.001-.0015" (157 HP Eng.), .00075-.00125" (167 HP Eng.) at top of skirt, Pull to withdraw .0015" x ½" feeler between thrust face of piston and cylinder wall should be 5-10 lbs. at 70°F.
►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bores are .020" oversize.*
Removal: Pistons and rods removed from above.
Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.
Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod. On left bank (1-3-5-7) assemble with indent on same side as large chamfer at insert end of connecting rod. *See Rod Installation.*

PISTON PINS

Full floating type.
Diameter—.8591-.8593". **Length**—2.880-2.890".
Clearance in Piston—.0000-.0005". Tight DOUBLE THUMB press fit at 70°F.
Clearance in Rod—.0001-.0004". Tight thumb press fit at 70°F.
Replacement Pins: Std., .003", .008" oversize.
NOTE: Fitted pins furnished with new pistons.
►*PISTON PIN INSTALLATION NOTE:* If pin cannot be installed as explained, use expansion reamer to enlarge hole. Use extreme care and take very light cuts, alternately reaming and fitting.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0015-.003"
Compr. (#2)	3/32"	.010-.020"	.001-.0025"
Oil (#3)	5/32"	.010-.020"	.001-.003"

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" oversize.
Installing Rings: Compression rings with step on inner edge up.

CONNECTING RODS

Length (Center-to-Center)—5.94". **Weight**—21.1 ozs.
Crankpin Journal Diameter—1.9365-1.9375".
►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)—See "CRANKSHAFT" below.*
Lower Bearing—Replaceable precision type.
Clearance—.0005-.0015" desired.
Endplay—.006-.014" (two rods).
Bearing Adjustment: None. Replace bearings.
Replacement Bearings: Std., .001", .002", .003", .010", .012" undersize.
Installing Rods—*See "Pistons (Installation)" above.* Install rod and piston assembly with indent on top of piston pointing toward front of engine. NOTE—Connecting rod bores are chamfered more on one side than the other. Larger chamfer must be installed toward crankshaft journal fillet.

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►*BEARING INSERT CAUTION:* When installing lower bearing insert, make certain that "V" groove in insert is in line with "V" groove in cap. Tighten bearing cap nuts to 45 ft. lbs. torque.

CRANKSHAFT

Journal Diameter—2.3745-2.3755". Five bearing.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows:

.010" UNDERSIZE (Main & Connecting Rod Journals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)—When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker wall bearing. For example, "M2" and "R1" means that .001" thicker wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.

Clearance—.0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .012" undersize.

Crankshaft Rear Oil Seals: *See "Crankshaft & Main Bearings" in Plymouth Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data.*

End Thrust: Taken by center (No. 3) main bearing. **Endplay**—.002-.007".

CAMSHAFT

Journal Diameters—(1) 2", (2) 1 63/64", (3) 1 31/32", (4) 1 61/64", (5) 1 7/16".

Bearings—Removable, steel-backed babbitt lined bushings.

Clearance—.001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**—.002-.006".

Timing Chain: Width—1.12". **Pitch**—.38". **Length**—68 links.

Camshaft Setting: Place crankshaft "Zero" mark exactly in line with center of camshaft. Temporarily install camshaft sprocket less chain, line up dowel pin holes in hub and gear, while at the same time positioning camshaft gear "Zero" mark exactly in line with center of crankshaft. (A straightedge should be used to check accuracy of this alignment). Remove camshaft gear and engage with timing chain. Place timing chain over crankshaft gear and at the same time, slide the camshaft gear over end of camshaft, keeping timing mark in position. With timing marks aligned, push gear on camshaft. Install fuel pump eccentric. Install nut.

Removal & Installation: *See "Camshaft & Bearings" in Plymouth Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Plymouth Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Plymouth Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1-23/32"	372-.373" ①	4 1/4"
Exhaust	1 15/32"	371-.372" ①	4 13/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.360"	.001-.003"
Exhaust	45°	.360"	.002-.004"

①–Standard. *See Valve Guides below.*

Valve Seat Width—1/16-3/32" (Intake), 3/64-1/16" (Exhaust).

►*VALVE OVERSIZE NOTE:* "I" or "E" stamped on cylinder head at rock cover gasket boss, indicates that all intake or exhaust valves are oversize in that bank depending upon what letter is stamped.

►*VALVE GRINDING CAUTION:* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length of 1/32" or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3436, If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge). Improper valve clearance at high speed will result if this condition is not corrected.

Valve Guides: Cast integral with cylinder head. Service as follows: When valve stem clearance excessive, use Reamer Tool Set to ream guides for NEXT OVERSIZE Valve as follows: Tool C-3433 (.005" O.S.), Tool C-3430 (.015" O.S.), Tool C-3427 (.030" O.S.). Valves furnished Std. and .005", .015", .030" Oversize.

Valve Springs: Both intake and exhaust valve springs should have 134-136 lbs. pressure when compressed to 1-5/16". **Free Length**—1-15/16".

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are reground, check **installed** height of spring. If height of spring is 1-11/16" or greater, install a 1/16" spacer (Part No. 1400482) in the head counterbore to bring spring height back to nominal 1 5/8–1 11/16".

►*VALVE SPRING NOISE CORRECTION (Caused by Spring Striking Head at Edge of Valve Recess):* To correct, bevel or chamfer edge of recess to provide necessary clearance for spring.

Valve Lifters: Hydraulic, one-piece integral type. *See "Hydraulic Valve Lifters" in Plymouth Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 17° BTDC. Close 47° ALDC.

Exhaust Valves—Open 55° BLDC. Close 9° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity: 5 qts. (refill). Add one additional quart when filter changed.

Normal Oil Pressure—40-50 lbs. at 25-30 MPH.

Oil Pressure Relief Valve—Located in oil pump body. Adjustable by replacing springs (3 types). (1) Standard spring painted BLACK. (2) Lighter than standard spring painted RED. (3) Heavier than standard spring painted GREEN.

►*OIL PRESSURE RELIEF VALVE NOTE:* Springs identified as follows:

Color Cod	Checking Height	Spring Pressur
Gray (Light)	3 1/32"	16.1-17.1 lbs.
Red (Standard)	2 27/32"	19.5-20.5 lbs.
Brown (Heavy)	2 31/32"	22.9-23.8 lbs.

Free Height—2 1/16".

Oil Pressure Gauge: Auto-Lite 13751A. Not electric.

Oil Pump: Rotor type. In crankcase at rear end. Mounted on rear bearing cap.

Overhaul—*See "Oiling System" in Plymouth Special Data.*

Priming Oil Pump (After Overhaul)—Prime oil pump before installing oil pump and strainer to rear main bearing cap.

Oil Filter: Shunt type. A portion of oil from oil pump is directed through this filter and the remainder flows directly into engine lubrication system.

Filter Element—Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 19 quarts (20 with heater).

Pressure Valve: Plymouth 1373136. Radiator filler cap. Opens at 7 lbs.

Thermostat: By-pass type in cylinder head water outlet. Starts to open at 159-165°F.

Water Pump: Packless type. Grease fitting for lubrication on early type only. *See Water Pump Note below.*

See "Water Pumps" in Plymouth Special Data.

Pump Removal—Drain cooling system, remove fan, belt, and pulley. Remove four water pump attaching bolts and remove water pump.

►*WATER PUMP NOTE:* Three types used. Early pump was bushing type with lubrication fitting. Two later types are ball-bearing, which are pre-lubricated and require no additional lubrication (have no lubrication fitting).

Temperature Gauge: Auto-Lite 13752A. Electric type.

CLUTCH

Borg & Beck	Model	Assy. No.	Disc No.
Standard	10A7	361368	382358
Heavy Duty	11A6	929	381850

See "Borg & Beck" Clutches in Clutch Section.

Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: Tighten eyebolt sleeve on clutch pedal overcenter spring bolt finger tight with pedal in depressed position, then tighten four complete turns.

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods. Remove transmission (See Synchro-mesh Transmission). Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel; loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

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SYNCHRO-MESH TRANSMISSION

Oper. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)
See "Plymouth Synchro-mesh" in Transmission Section.
Transmission Controls: *See "Transmission Controls" in Transmission Section*
►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle carrier.

Removal: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down
See "Warner R10" Overdrive in Transmission Section.
Overdrive Controls: *See "Overdrive Controls" in Transmission Section*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission
See "PowerFlite" Transmission in Transmission Section
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* *See "PowerFlite" Transmission in Transmission Section*
►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section*

Lubrication Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid (Type A)
Checking Fluid Level—Apply hand brake, place selector lever in neutral position Allow engine to idle until normal operating temperature is reached Shift selector lever through all ranges Shift selector lever back to neutral and add Automatic Transmission Fluid (Type A) to bring level to full mark on oil level indicator
Oil Fill Tube (Location): At right rear of engine compartment

►*CAUTION.* To prevent dirt from entering transmission make sure oil level indicator is properly seated in filler tube

►*OTHER "POWERFLITE" SERVICE DATA See "PowerFlite" Transmission in Transmission Section*

UNIVERSALS

Detroit Universal. Ball and Trunnion Type

REAR AXLE

Oper. Separate carrier, semi floating hypoid, with Hotchkiss Drive

Transmission (Ratios)	Standard	Optional
Synchro-mesh	3 73-1	4 1-1
Overdrive	4 1-1	
PowerFlite	3 54-1	

►*REAR AXLE PINION CARRIER BUMPER PRODUCTION CHANGE (To Provide Fuller Contact & Additional Protection under Severe Bottoming Conditions)* New bumper now incorporated in production Available under Part No 1311417 and can be installed on earlier cars
Backlash—.006-.010'

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller) *NOTE*—Use Puller C-293-E to remove bearing from shaft, Puller C-748 or C-358 to remove inner oil seal, Drift C-359 to install seal Use Tool C-452 to remove flange

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed check endplay with dial indicator To adjust, remove backing plate (see above), add or remove shims (furnished .010", 0125", .015", .030" thick (equally at both wheels). **Endplay**—.003-.008"

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type Serviced by replacement

Type	Plymouth Part No. Front	Rear
Standard	1614404	1450917
Heavy Duty	1617004	1450920
Heavy Duty (Spec)		1450037

FRONT SUSPENSION

Independent. Coil springs and direct-acting shock absorbers Shock absorbers located within coil springs
Kingpin Inclination: 5—6½° at 0° camber
Caster—Neg 2° to 0° (Left side 0° to Neg. ¾° more than right side, Right side 0° preferred)
Camber—Neg. 1/8° to Pos. 5/8° (Left side Pos ½°, Right side 0° preferred)
Toe-In—0" to Pos 1/16" (0" preferred)
Turn-Out on Turns—With inside wheel at 20°, outside wheel should be 17½-19°

STEERING

Manual: Gemmer. Worm and three-tooth roller
See "Gemmer Worm & Roller" in Steering Section
Power Steering: "Coaxial". Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column
See "Coaxial" Power Steering in Steering Section.
Steering Linkage: *See "Steering Linkage" in Steering Section*
Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section*
Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section*

BRAKES

Service: Plymouth "Safe-Guard" Lockheed hydraulic
See "Plymouth Safe-Guard" in Brake Section
Drum Diameter—11" (Front), 10" (Rear-Suburban only 11')
Wheel Cylinder Diameter—1 1/8" Single acting (front), double acting (rear wheels)
Lining—Molded asbestos (bonded to shoe)
Width—2" **Thickness**—3/16"
Braking Power—60% Front, 40% Rear
Clearance—.006" at ends of all shoes
Master Cylinder: On engine side of dash panel opposite base of brake pedal
Checking Fluid—Filler plug at top of master cylinder (on dash panel in engine compartment)
Removal: Disconnect pushrod. Disconnect brake line tubes at master cylinder fittings Remove four stud nuts from studs, remove master cylinder
Power Brakes: Combination vacuum power unit and master cylinder Unit mounted on engine side of firewall and replaces regular master cylinder. *See "Plymouth Power Unit" in Brake Section*
Parking Brake: On shaft at rear of transmission 6" external contracting type used with Synchro-mesh Transmissions. 7" Internal expanding type used with Powerflite Transmission
Adjustment—*See "Hand Brake Notes" in Plymouth Special Data.*

Lining—	Width	Thickness	Length
6" Ext Type	2'	5/32"	15 3/8"
7" Int Type	2'	5/32'	13 1/16"

Clearance (External Type)—.015-.020" around band.
Internal Type—Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010"

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EMU-4101 (Std.), EMZ-4001 (Two-speed—Optl.) *See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section*
Air Conditioning: *See "Plymouth Airtemp" Air Conditioning in Miscellaneous Section*
Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Misc. Section*
Power Seat Adjusters: Electric type *See "Power Seat Adjusters" in Miscellaneous Section*
Convertible Top Control: Electrical-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	1956 - Model Designation - 1957	
Plaza	P-28-1	P-30-1
Savoy	P-28-2	P-30-2
Belvedere	P-28-3	P-30-3

SERIAL NUMBER: On plate attached to left front door hinge pillar post

Starting Serial Numbers - As follows

	Detroit	Evansville	Los Angeles
1956	14720001	20820001	25202001
1957	14280001	20860001	25215001

ENGINE NUMBER: Stamped on boss located on left front section of cylinder block

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number) indicates the following*

"**A**" - All cylinders .020" oversize

"**B**" - All Main & Connecting Rod Journals 010" undersize.

"**AB**" - Both above conditions exist

TUNE-UP

►*HARD COLD ENGINE STARTING (1956-57 Cars):* On cars with oil-filled coil (Auto-Lite CAG-4001), change the coil position as follows Remove coil from bracket, cut off angular flange at top of bracket leaving vertical section intact, position coil against vertical face of bracket with terminals upward and mark coil strap mounting hole location, drill holes with ¼ drill (elongate holes horizontally to facilitate coil mounting) Mount coil on bracket vertically with terminals up Make up new longer high tension lead to connect coil to distributor

COMPRESSION PRESSURE: 125-155 lbs. at cranking speed (150 RPM) Maximum allowable variation between cylinders 10 lbs

VACUUM READING: Steady 18-21" at idling speed

VALVE TAPPET CLEARANCE: .010" (Intake & Exhaust) with engine hot and idling.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional 002" clearance for exhaust tappets is desirable

MANIFOLD HEAT CONTROL: Thermostatic coil type. See that valve operates freely When installing coil, spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud

IGNITION

FIRING ORDER: 1–5–3–6–2–4

SPARK PLUG GAP: 035'

Plugs - Auto-Lite Resistor type AR-80 (1956), AT-51 (1957) 14 mm Torque to 30-32 ft lbs

COIL: Auto-Lite CAF-4002 (Early 1956), CAG-4001A (Late 1956 & 1957). *NOTE* - CAG-4001A is oil-filled type

►*COIL MOUNTING CHANGE (To Correct Hard Cold Starting) See Hard Cold Starting under TUNE-UP (above)*

Ignition Current - 1.8 amps. idling, 2 4 stopped.

Resistor - None used.

DISTRIBUTOR: Auto-Lite IAT-4101B (Early 1956), IAT-4103 (Late 1956), IBR-4001 (1957), IAT-4012 & 12D (Can. 1956), IBR-4002 (Can. 1957).

Condenser - Auto-Lite IAT-3076RA (IAT-4101B Distr.), IAT-2015RA (IAT-4103, IBR-4001, 2 Distr.)

Capacity - 25-28 mfd (All)

Contact Point Set - Auto-Lite IGW-3028BS (All)

Breaker Gap - .020". Limits .018-.022".

Cam Angle - 39° plus or minus 3°

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Clockwise viewed from above

Automatic Advance - IAT-4012

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
5	800	10	1600
9	1300	18	2600
10	1425	20	2850

Automatic Advance - IAT-4012D

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
5	800	10	1600
9	1400	18	2800
10	1550	20	3100

Automatic Advance - IAT-4101B

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	525	2	1050
4	875	8	1750
7	1225	14	2450
8	1350	16	2700

Automatic Advance - IBR-4001

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	460	2	920
3 5	1050	13	2100
7 5	1425	15	2850
8 5	1800	17	3600

Automatic Advance - IBR-4002

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	440	2	880
5	800	10	1600
7	1300	14	2600
8	1550	16	3100

Vacuum Spark Control: Integral type.

Vacuum Advance - IAT-4012

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	5 1/4
2	4	6 3/4
4	8	8 5/8
6	12	10 3/4
9	18	15

Vacuum Advance - IAT-4012D

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	5
1	2	6
5	10	10
9	18	14
10	20	15

Vacuum Advance - IAT-4101B

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	4 3/4
1	2	5 7/8
4	8	9 3/8
7	14	12 7/8
8	16	14

Vacuum Advance - IBR-4001

Distr Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6
1	2	6 7/8
5	10	10 1/2
8	16	13 3/4
9 5	19	16

Vacuum Advance - IBR-4002

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4 1/2
1	2	5 3/8
5	10	8 7/8
10	20	14 1/2
11	22	16

►*DISTRIBUTOR INSTALLATION NOTE Make certain that No. 1 piston is at TDC on compression stroke and that distributor rotor is at No. 1 firing position*

IGNITION TIMING

Setting - 2° BTDC *NOTE* - This supersedes previous setting of TDC to provide better performance and economy

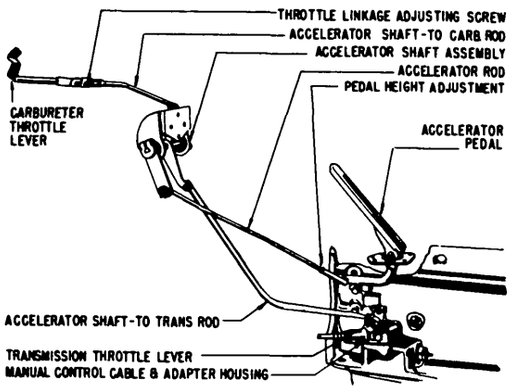
Timing Mark - Correct mark on crankshaft pulley or vibration dampener in line with pointer on chain case cover

CARBURETOR

►*CARBURETOR APPLICATION: Carter single barrel or Stromberg dual carburetors used on 1956 cars, Carter single barrel carburetors only used on 1957 cars*

THROTTLE LINKAGE ADJUSTMENT (Powerflite) Loosen vertical clamp rod and adjust the carburetor throttle lever rod to provide a 5 7/16" distance between the anchor points of the throttle return spring. Then with engine idling (off fast idle), take up slack at the vertical rod and tighten the clamp nut.

CONTINUED ON NEXT PAGE



POWERFLITE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

Thr ttl Pr ssur Adjustm nt (P w rFlit): *Se "P w r-Flit Transmission" in Transmission S ction.*

CARTER BBS (SINGLE BARREL)

M d l	1956 Carburetors	Carter No.
Synchro-mesh		2063SA③,2293S
Overdrive		2062SA③,2294S
PowerFlite		2116SA③,2295S
City Traffic		②2403S
Taxicab		2410S

1957 Carburetors	
Synchro-mesh	BBS 2567S
Overdrive	BBS 2568S
PowerFlite	BBS 2569S
Replacement	① BBS 2604S
City Traffic	② BBS 2403S
Taxi	BBS 2410S

① - Replacement for 2567S. Use with kickdown switch (192-33U) to replace 2568S. Use with dashpot (202-80U) to replace 2569S. ② - With throttle restrictor.

③ - Temporary production only.

Idle Setting - ½-1½ turns open (2062SA, 63SA; 2116SA), 1-2 turns open (2410S), ½-1¾ turns open (All others). Turn screw out for richer mixture.

Idl Spe d - 450-500 RPM (Synchro-mesh & Overdrive). 475-500 RPM (PowerFlite - in Neutral).

Fl at L v l - 7/32" (Exc. 2403S, 2410S), 9/32" (2403S, 2410S) from top of each float to top surface of body casting with float pin retainer removed and float pin at bottom of guide slots.

Acc l rating Pump - Install connector rod in center hole of throttle lever (medium stroke).

Fast Idl : .022-.026" (2062SA, 63SA; 2116SA), .016-.020" (All others) between lower edge of throttle bore and carburetor bore with fast idle cam in fast idle position. Adjust by bending connector rod at lower angle using using Tool T109-213.

Aut matic Ch k : Centered at index (all models).

Sl w Cl sing Thr ttl Dashpot (PowerFlite): Loosen locknut and adjust dashpot unit so that dashpot plunger shaft can be moved inward approximately 3/32" with throttle valve fully closed.

Ov rdriv Kickd wn Switch: With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide.

Throttl Linkag Adjustment (PowerFlite): *See CAR-BURETOR ab v ; ►OTHER DATA: S "Carter BBS Carburetors" in Car-bur tion S ction.*

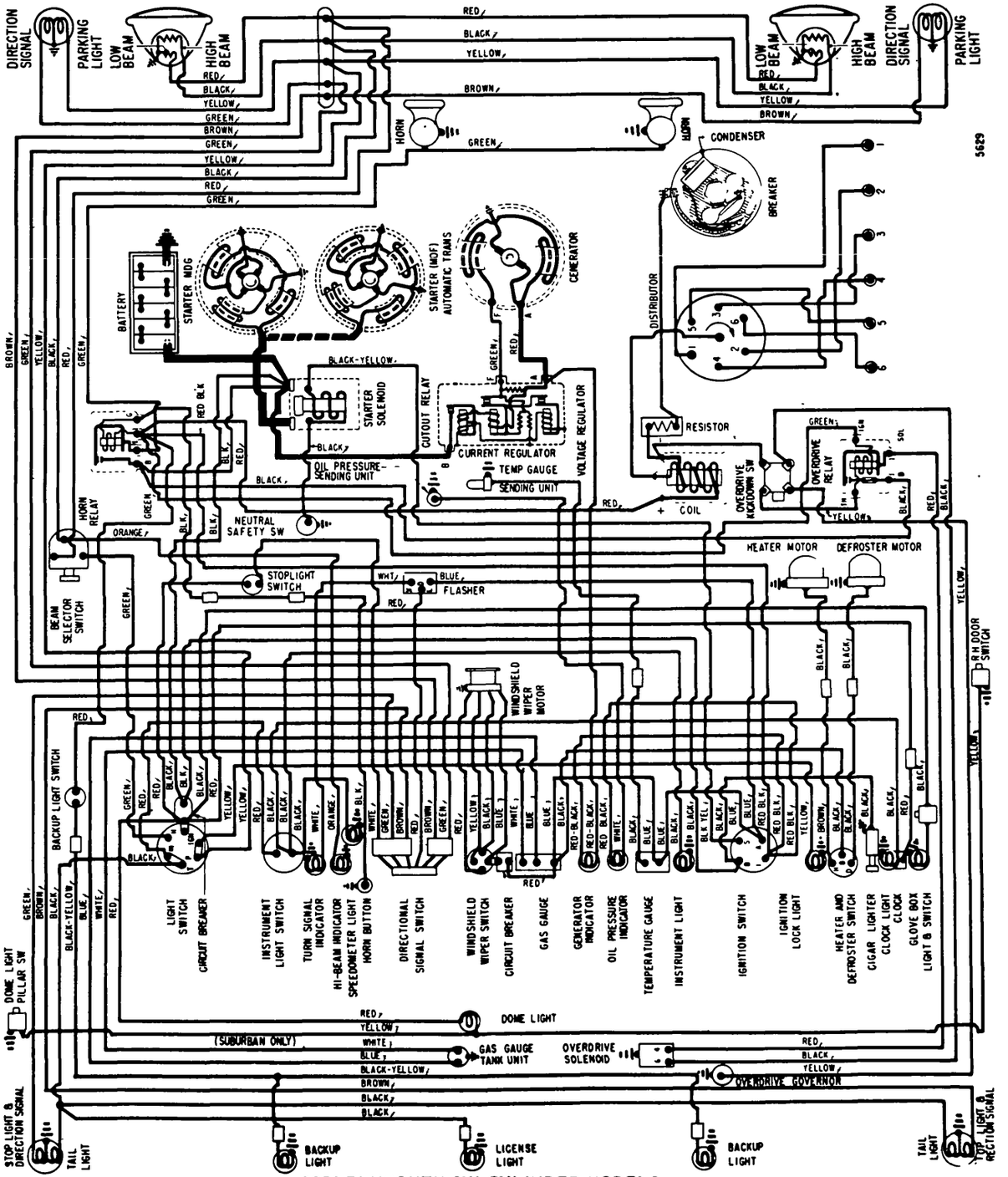
STROMBERG WW (DUAL)

M del	Stromberg Code No.
Synchro-mesh	3-124
Overdrive	3-125
PowerFlite	3-126

►*MANIFOLD FUEL DISTRIBUTION: Each barrel feeds all cylind rs.*

Idl Setting - 1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

CONTINUED ON NEXT PAGE



1956 PLYMOUTH SIX CYLINDER MODELS

CONTINUED FROM PRECEDING PAGE

Idle Speed - 450-500 RPM with transmission in neutral.
Float Level - 3/16" from top of main body (gasket removed) to top of float, with gauge (Tool T-25569) at center of float and float lip held firmly against fuel inlet needle. To adjust, bend float lip (Tool T-24733).
Accelerating Pump - Normal setting, center hole; for less fuel install rod in inner hole; for more fuel install rod in outer hole.

Fast Idle Speed: With choke cover removed place one cover screw through Spring Tool T-25906 and attach Tool to housing above choke lever. Hook other end of spring to long tang of Thermostat lever. Remove spring from throttle stopscrew and replace screw only. Close throttle valves, turn stopscrew in until it contacts lever, then continue to turn screw in 5 1/8 turns. Hold choke valve closed and bend cam contact ear so that No. 48 drill rod will just go between ear end of contact lever and first step of fast idle cam. *NOTE* - Ear must be parallel to throttle shaft after bending. Replace throttle stopscrew spring.

Fast Idle Cam Setting: Open throttle valve to clear fast idle cam, close choke valve lightly. Force throttle closed against tension of cam positioning spring. Ear on cam contact lever should just clear high step of fast idle cam (Max. .020"). Bend fast idle rod as necessary.

Choke Positioning Spring Setting: With spring tool T-25906 in position, attach weight tool T-25864 on choke lever between rod and end of shaft, hold carburetor vertical, close throttle, making sure cam contact lever ear rests on high step of fast idle cam (If necessary rotate fast idle cam to get this position). Apply light closing pressure on throttle valve which should open choke valve against choke positioning spring tension just enough to insert correct size drill rod between choke valve and wall of air horn. Adjust by bending ear of choke lever as required.

Automatic Choke Setting: Centered (At Index).

Dashpot Adjustment: Push plunger in to end of its stroke. With throttle stopscrew set at normal idle speed, there should be 1/16-3/32" clearance between end of dashpot plunger and ear of throttle lever. Adjust by loosening locknut and turning dashpot in bracket.

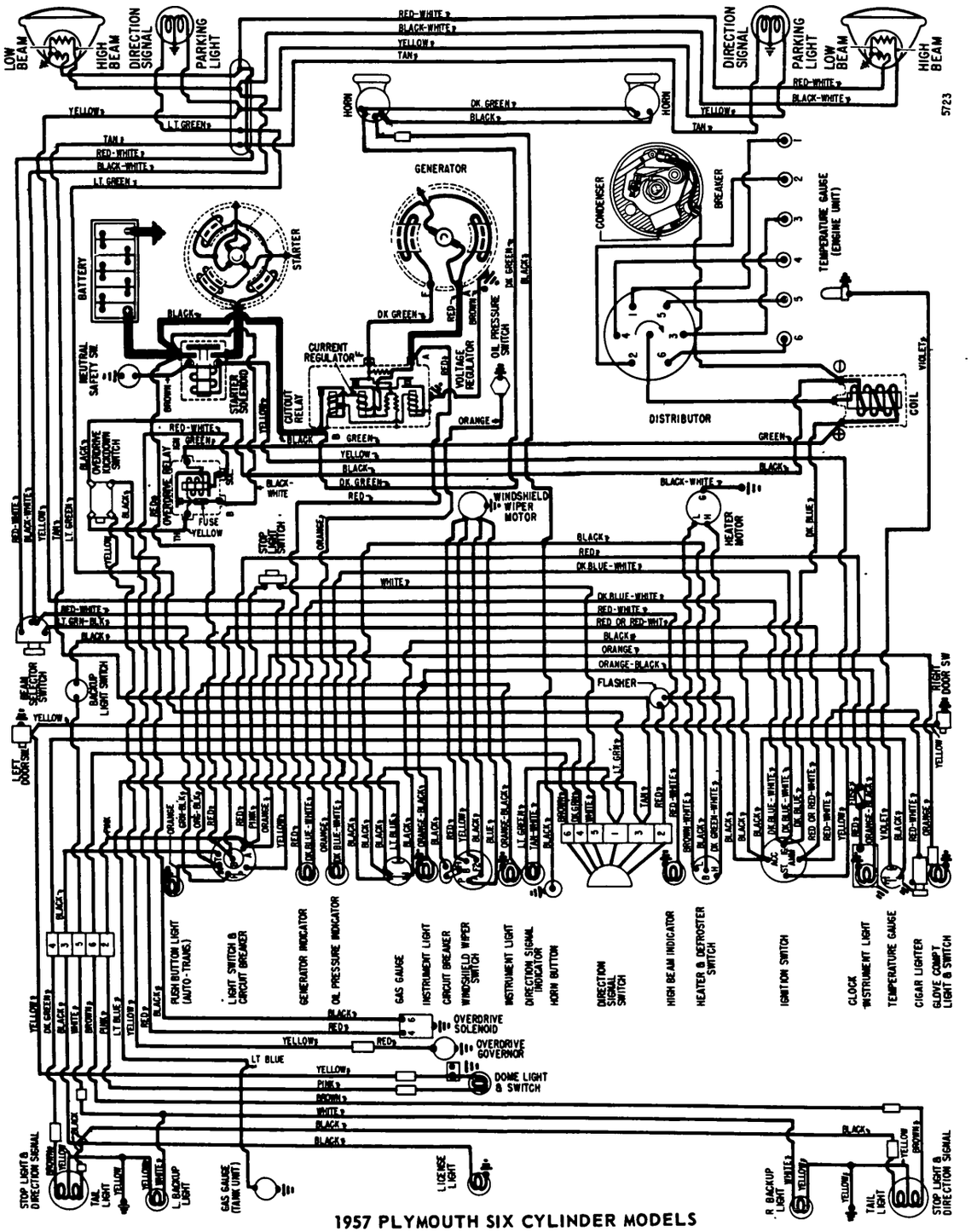
► *OTHER DATA: See "Stromberg WW Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Auto-Lite FA-4005 (1956), Carter M2242S (1956), Carter M2494S (Early 1957), Carter M2609S (Late 1957). Carter M750S Fuel & Vacuum Pump Optl.
Pressure - 4-5½ lbs. (1956), 3½-6 lbs. (1957).
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite Electric type.
Dash Unit - Auto-Lite 13997A (P28), 14038A (P28 Sub.), 14332A (P30 All).
Tank Unit - Auto-Lite 13969A (P28), 13905A (P28 Sub.), 14382A (P30), 14380A (P30 Sub.).
See "Fuel Gauges" in Carburetion Section.

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1957 PLYMOUTH SIX CYLINDER MODELS

CONTINUED FROM PRECEDING PAGE

Air Cleaner (1957): DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.

► *CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Auto-Lite 11-HS-50 or Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Grounded Terminal - Negative.

STARTER

Auto-Lite. Used as follows:

Application	Starter No.	Armature No.
1956 (Synchro-mesh)	MDG-6001	MDF-2088
1956 (PowerFlite)	MDF-6002	MDF-2088
1957 (Synchro-mesh)	MDM-6001	MDL-2088
1957 (PowerFlite)	MDL-6004	MDL-2088
1957 (Canada)	MDL-6003	MDL-2088

Drive - Bendix "Folo-Thru" A3274 (1956), A3596 (1957).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs. (MDF & MDG), 31-47 ozs. (MDL & MDM) with new brushes.

Performance Data - MDF

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.5 ft. lbs.	Lock	4.0	240

Performance Data - MDL

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Performance Data - MDG & MDM

Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission cars. *See "Starter Controls" in Electrical Section.*

Neutral Safety Switch Adjustment: *See "PowerFlite & Torqueflite" in Transmission Section.*

GENERATOR

Auto-Lite. Used as follows:

Application	Generator	Armature
1956 Std.	GJC-7002A	GJC-2030F
1957 Std. (Early)	GJC-7002H	GJC-2030F
1957 Std. (Later)	GJC-7012A	GJC-2030F
1956 Taxicab	GJC-7006C	
1957 Taxicab	GHM-6004A	GHM-2059F
1956-57 Pwr. Strg.	GJC-7003B	GJC-2090F
1956-57 Pwr. Strg.	GHM-6003C	GHM-2071F
1956 Spec. Equip.	GGA-6001L	
1957 Spec. Equip.	GGA-6001AC	GFY-2101F

Performance Data - GJC

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data GHM (Cold - 70°F) -

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 18-36 ozs. (GJC-7000); 34-41 ozs. (GGA); 35-53 ozs. (GHM).
Field Current - 1.2-1.3 Amps. (GJC); 1.1-1.3 Amps. (GGA & GHM); at 10.0 volts (70°F).
Motoring Current - 3.4-3.9 Amps. (GJC); 2.3-2.6 Amps. (GGA); 3.0-3.5 Amps. (GHM) at 10 volts (70°F).
Belt Adjustment: ¼" deflection with 5 lbs. pull applied midway of longest belt span.

REGULATOR

Auto-Lite. Used with generators as follows:

Auto-Lite Regulator No.	Generator
VAT-6201A	GGA
VRX-6201A	GJC & GHM

► *VRX-6201A REGULATOR PRODUCTION CHANGE:* Two resistors used on early 1956 regulators, three resistors (see wiring diagram) on later regulators. *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

Cutout Relay

Cuts In - 12.6-13.6 volts (All Models).
Cuts Out - 3.0-5.0 amperes discharge current after charging at 10 amps. (VAT), 7 amps. (VRX).
Contact Gap - .015".
Air Gap - .031-.034" with contacts open.

Voltage Regulator

Setting - 14.5 volts at 80°F while charging at 10 amps. or with .25 ohm resistor in series between regulator and battery.
Air Gap - .048-.052" with contacts just opening
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

► *SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.
Test B - After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).
Air Gap - .048-.052" with contacts just opening.
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signal: *See Electrical Section.*
Lighting & Panel Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hex nut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.
Stop Light Switch (Location): On forward end of master cylinder.
CIRCUIT BREAKERS: Used as follows:
20 Ampere - Located on headlight switch, protects headlight, beam indicator, parking and ignition lights.
15 Ampere - Protects all other lighting circuits.
5 Ampere (Single Speed), 6 Ampere (Variable Speed) - Located on windshield wiper switch. Protects windshield wiper circuit.
FUSES: Clock - 2 ampere. In clock lead.
Overdrive - 14 amps. On Overdrive Relay.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl., "L" head.

Bore	Stroke	Displacement
3 1/4"	4 5/8"	230 cu. ins.

	Compr. Ratio	Rated HP	Developed HP
1956	7.6-1 Ⓒ	25.4	Ⓟ 125 at 3600 RPM
1957	8.0-1 Ⓣ	25.4	132 at 3600 RPM

Ⓒ - 7.9-1 Compression Ratio available for Taxicabs and other cars with 10" H.D. Clutch. Special Cylinder Head is Part No. 1676377.
Ⓟ - 131 at 3600 RPM with special Power Package.
Ⓣ - Std. with 1731545 Head (Casting No. 1676337). 8.2-1 Compression ratio available for Taxicabs with Special Cylinder Head No. 1821845 (Casting No. 1821682).
Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Drain engine oil, disconnect pitman arm from cross shaft and idler arm from idler arm bracket. Remove dust shield and remove starter. Disconnect front motor mounts and raise front of engine approximately 2". Install small wooden block under motor mounts and remove oil pan.

► *OIL PAN INTERFERENCE NOTE:* If the oil pan contacts right hand frame cross member, install a 1/8" shim under right motor mount.

ENGINE REMOVAL: *See "Engine" in Plymouth Special Data.*
ENGINE MOUNTINGS: *See "Engine Mountings" in Plymouth Special Data.*
CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Plymouth Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

PISTONS

Aluminum alloy, U-slot, cam ground type.

► *CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicate that cylinder bore is .020" Oversize.*

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Weight–16 ozs. (stripped).
Removal–Pistons and rods removed from above.
Fitting New Pistons: .0007" measured ¾' from the bottom on thrust face. With piston pin and rings removed, cylinder wall and piston dry and clean, insert piston, upside down, into cylinder bore, with feeler stock, .002" x 1/2", inserted between cylinder wall and piston, on high spot of piston contour. Pull to withdraw **feeler should be 5-10 lbs.**
Replacement Pistons: Std., .005", .020", .030", .040", .060" Oversize.
Installing Pistons. "U" slot away from valves.

PISTON PINS

Full floating type.
Diameter–55/64". **Length**– 2-3/4".
Pin Fit in Piston–.0000-.0005". DOUBLE THUMB push fit at room temperature (70° F.).
Pin Fit in Rod Bushing–.0001-.0002". Tight thumb push fit at room temperature (70° F.).
Replacement Pins: Std., .003", .008" Oversize.
NOTE–Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (#3)	5/32"	.010-.020"	.001-.0025"
Oil (#4)	5/32"	.010-.020"	001- 0025'

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" Oversize.
Installing Rings. #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center.to.Center)–7 13/16'
Weight–27 9 ozs
►*THICKER WALL-BEARING & JOURNAL DIAMETER CAUTION (One or more Journals Machined Undersize). "See "CRANKSHAFT" below.*
Crankpin Journal Diameter–2.0625".
Maximum out-of-round and taper limits–.001".
Lower Bearings–Removable, precision type, thin babbitt on steel. No shims.
►***LOWER BEARING NOTE (Taxi Cab):* Starting with Engine No P-30 7563 NEW BI-METAL GRID bearings were installed in production. Use new type bearing when servicing Taxi Cabs**
►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below.*
Clearance–.0005-.0015".
Sideplay - 006-.011".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", .012", .020" Undersize.

Installing Rods Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter–2.4995-2.5005". Four bearing.
Bearing Type–Removable, precision type, thin babbitt on steel. No shims.
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows
.010" UNDERSIZE (All Main & Connecting Rod Journals)–Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)–When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker-wall bearing. For example "M2" and "R1" means that .001" thicker-wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.
Clearance–.0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .010", .012", .020", .030", .040" Undersize.
Crankshaft Rear Oil Seals: *See "Crankshaft & Main Bearings" in Plymouth Special Data*
Crankshaft Front Oil Seal *See "Engine Front Cover" in Plymouth Special Data*
End Thrust. Taken by flanged faces on rear (#4) main bearing. **Endplay**–.003-.007".

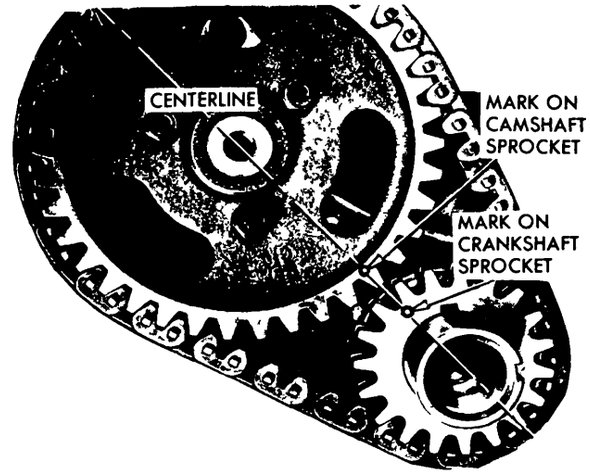
CAMSHAFT

Journal Diameters–(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".
Bearings–Removable, steel-backed babbitt lined bushings (exc. #4– machined in crankcase).
Clearance–.001-.003" NOTE–If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.
Removal & Installation *See "Camshaft & Bearings" in Plymouth Special Data.*
End Thrust. Taken by thrust plate behind camshaft sprocket hub. **Endplay**–.002-.006".
Timing Chain Width–1". **Pitch**–.500". **Length**–24" or 48 links.
Camshaft Setting: Sprockets marked. Mesh chain in sprockets with "0" marks on sprockets adjacent and in line with straightedge across shaft centers.
Engine Front Cover Installation: *See "Engine Front Cover" in Plymouth Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in Plymouth Special Data*

VALVES

Tappet Clearance: .010" Intake. .010" Exhaust. Engine hot and idling. NOTE–.002" additional clearance on exhaust tappets if car driven at continuous high speed

Valves	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.340-.341"	4 84"
Exhaust	1 13/32"	.340- 341"	4 89"



PLYMOUTH 6 CYL. VALVE TIMING MARKS

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	.001-.003"
Exhaust	45°	.365"	.003-.005"

Valve Seat Width–1/16-3/32". Runout .0015" maximum.
►*VALVE SEAT INSERT CAUTION: See "Valve System" in Plymouth Special Data.*
Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, ream guides to inside diameter of .342-.343" (Intake), .344-.345" (Exhaust). *CAUTION–Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*
Valve Springs: Can be installed with closely coiled end at either top or bottom. *NOTE–Springs are available in several colors. Colors do not refer to spring tension but merely identify the manufacturer.*
Free Length–2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1-3/4"
Valve Open	110-120 lbs.	1-3/8"

Valve Lifters: Mushroom type (remove from below).
Stem Diameter–5/8". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".
Lifter Clearance in Block– 002' maximum.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE:* **The following valve opening and closing points are with tappet clearance of 014" Reset to operating specifications after checking valve timing**
Intake Valve - Open 12° BTDC Close 44° ALDC
Exhaust Valve - Open 50° BLDC Close 6° ATDC

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OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubricati n" und r OILING SYSTEM in Plymouth Special Data.*

►*OIL PUMP OUTLET PIPE INTERFERENCE CORRECTION:* To correct noise caused by outlet pipe interfering with oil pan, bend outlet pipe to provide clearance.

Crankcase Capacity: 5 quarts (refill). Add one quart with filter change

Normal Oil Pressure - 40-50 lbs. at 25-30 MPH

Oil Pr ssur R lief Valve-Located on left side of cylinder block below starter.

Oil Pr ssur Reli f Valve Spring: Color black. Free Length 1 7/8", Pressure 14:25-15 75 lbs. when compressed to length of 1¼".

Oil Pr ssur Indicator Switch: Located on left side of cylinder block at rear. When oil pressure exceeds 8-12 lbs. switch opens, indicator lamp goes out.

Oil Pump: Rotor type. On right side of crankcase.

Ov rhaul - *S "Oiling System" in Plymouth Special Data.*

Oil Filter: By-pass type with shunt type oil circuits. When pressure relief valve close, it blocks oil return from filter. As valve opens oil is permitted to flow through filter and excess oil returns to crankcase.

Filter El ment - Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element changed.

Crankcase Ventilati n: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Wat r Capacity: 13 quarts. Add one quart for heater.

Pr ssur Valv - Radiator filler cap. Opens at 14 lbs.

Th rm stat: Pellet type located in cylinder head water outlet. Opens at 157-162°F

Wat r Pump: Ball bearing type. No lubrication required. *S "Water Pumps" in Plymouth Special Data.*

Water Distributi n Tube: *See "Cooling System" in Plymouth Sp cial Data.*

Temperatur Gaug : Auto-Lite. Electric type.

Dash Unit - Auto-Lite 13998A (1956), 14333A (1957).

Engin Unit - Auto-Lite 13550A (1956), 14405A (1957).

S e "T mp ratur Gaug s" in Miscellaneous Section.

CLUTCH

B rg & B ck r Auburn.. Single plate types. Used as follows:

B rg & B ck Clutches

Application	C ver Assy.	Clutch Disc
1956 Std. - 9A7	361373	382237
1956 Sta.Wgn. - 10A7	361368	©382358
1956 Canada - 9A7	361383	382237
1956 H.D. Can. - 11A6	929	381850
1957 Std. -9A7	361384	382649
1957 H.D. - 10A7	361376	381758
1957 Special - 10.5A8	361418	382621

© - Heavy Duty - Borg & Beck No. 381758

Auburn Clutch s

Applicati n	C ver Assy.
1956 Std.	100052-2
1957 Std.	100131-1

S e "Borg & Beck" or "Auburn" Clutches in Clutch S ction

P dal Adjustm nt: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: Tighten eyebolt sleeve on clutch pedal overcenter spring bolt finger tight with pedal in depressed position, then tighten four complete turns

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods Remove transmission (See Synchro-mesh Transmission). Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)

See "Plymouth Synchro-mesh" in Transmission Section.

►*LOW & REVERSE GEAR BINDING CORRECTION: See "Synchro-mesh Transmission" in Transmissio n Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle carrier.

Removal: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down

See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission

See "PowerFlite" Transmission in Transmission Section

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section*

►*THROTTLE VALVE BUZZING DURING DOWNSHIFT (1956): See Production Changes in "P w rFlite Transmissi n" in Transmissi n Secti n.*

►*TRANSMISSION DRAINING PROCEDURE CHANGE (1956):* Oil pan drain plug discontinued in production and later transmissions should be drained by disconnecting filler tube at oil pan connector.

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles Use only Automatic Transmission Fluid Type "A"

Checking Fluid Level - *See TORQUEFLITE below.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed planetary transmission.

See "TorqueFlite" Transmission in Transmission Section

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite" Transmission in Transmission Section.*

LUBRICATION: Check fluid level every 1000 miles, drain and refill every 20,000-miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "TORQUEFLITE" SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball & Trunnion (1956 All, 1957 Front only). Cross type (1957 Rear).

Rear Universal Joint Operating Angle (1957) - *See "Propeller Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating with separate carrier and Hotchkiss drive *See "Plymouth Hypoid" in Rear Axle Section*

►*REAR AXLE HOUSING INSTALLATION NOTE (1957): Check rear universal joint angle. See "Propeller Shaft Notes" in Plymouth Special Data.*

►*REAR AXLE LUBRICANT LEVEL CAUTION (1957):* Recommended lubricant capacity of 3¼ pints will bring level to 1" below bottom of filler plug opening. DO NOT add lubricant to bring level up to filler plug opening.

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Form 11B

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Rear Axl Rati s	Standard	①Opti nal
Conventional	3.73-1(41-11)	4.1-1(41-10)
Overdrive	4.1-1(41-10)	
Auto. Trans	3.73-1(41-11)	3.9-1(43-11)

①Mountains and Hilly country.

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller-Tool C-845), block brake pedal disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed Check endplay with dial indicator To adjust, remove backing plate (above), add or remove shims furnished .010", .0125", .015", 030" thick equally at both wheels. **Endplay** - 003-.008" (1956), .013-.018" (1957).

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement

FRONT SUSPENSION

1956 MODELS

Independent. Coil springs and direct acting shock absorbers located within the springs.

See "Plymouth" in Suspension & Wheel Alignment Section.

Kingpin Inclination 5–6½° at 0° camber

Caster–Neg. 2° to 0° (Left side 0° to Neg. ¾° more than right side, Right side 0° preferred)

Camber–Neg. 1/8° to Pos. 5/8° (Left side Pos ½°, Right side 0° preferred)

Toe-In - 1/8" preferred.

Toe-Out on Turns - With inside wheel at 20°, outside wheel should be 17½-19°.

1957 MODELS

Independent. New "Torsion-Aire" Suspension with ball joint mounted steering knuckles and torsion bar front springs

See "Torsion-Aire" in Front Suspension and Wheel Alignment Section

►*UPPER BALL JOINT LUBRICANT LOSS CORRECTION: See "Torsion-Aire" in Front Suspension and Wheel Alignment Section*

Steering Axis Inclination - 6½° with correct camber.

Camber - Left Wheel 3/8° preferred, limits Pos. ½°-0°. Right Wheel 0° preferred, limits 0°±¼°.

Caster - 0 to Neg. 1½° (Manual Strg.), Pos. 1½° to 0° (Pwr. Strg.). *NOTE* - Set both sides the same.

Toe-In - 1/8" preferred, limits 3/32-5/32".

Toe-Out on Turns - Inner wheel 20°, outer wheel 17½-19°.

STEERING

Manual: Gemmer. Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section

Pwr Steering: "Coaxial". Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column

See "Coaxial" Power Steering in Steering Section.

Steering Linkag : *See "Steering Linkag " in Steering Section*

Steering Wh l & H rn Butt n R m val: *See "Gemmer Worm & Roller" in Steering Section*

Steering Gear Removal *See "Gemmer Worm & Roller" in Steering Section*

BRAKES

1956 MODELS

Service: Plymouth "Safeguard" Lockheed hydraulic.

See "Plymouth Lockheed Safeguard" in Brake Section.

Drum Diameter - 10" front and rear.

Wheel Cylinder Diameter - 1 1/8" single acting (Front), double acting (Rear)

Lining - Molded asbestos (bonded to shoes).

Width - 2" **Thickness** - 3/16" **Length** - 10.5" (Primary - all wheels), 10.5" (Secondary - front), 8" (Secondary - rear).

Clearance - .006" at each end of all shoes.

Braking Power - 60% front, 40% rear.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pushrod. Disconnect stop light wires and brake line tube at master cylinder. Remove four stud nuts from studs, remove master cylinder.

►*MASTER CYLINDER REPLACEMENT COVER CAUTION:* Some new replacement covers have reduced lower crown or a reduced overall height. Original hold-down bolt will bottom when used with these covers. Use bolt, Part No. 1671571, which is ¼" shorter.

Power Brakes: Synchro-mesh Cars - Integral type. Replaces regular master cylinder. Unit mounted on engine side of firewall.

PowerFlite Cars - Bellows type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

Removal of Integral Type Power Unit - Same as for standard master cylinder, after stop light wires and hydraulic lines are removed.

Removal of Bellows Type Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket (*NOTE* - If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers.

Parking Brake: *Same as 1957 (below).*

1957 MODELS

►*BRAKE LINING PRODUCTION CHANGE & PARTS REPLACEMENT CAUTION:* Improved brake lining (identified by one white and one blue spot on side) used in production beginning approx April 15, 1957. This lining recommended for severe braking conditions and can be installed on **all four wheels.** Furnished in Service Pkg. No. 1843349 (8 Linings), and No 1674067 (Shoe & Bonded Lining).

►*FRONT WHEEL DUST SHIELD SEALING CAUTION:* Dust shields are sealed with heavy body sealer to prevent entrance of dust and water. Whenever wheel cylinder seal disturbed, reseal wheel cylinder openings when servicing brakes.

Service. Plymouth "Total-Contact" (Floating Shoe) type.

See "Chrysler, De Soto, Dodg , Plym uth C nt r-Plane & Total-Contact" Brakes in Brake Section

Drum Diameter - 11" front and rear.

Wheel Cylinder Diameter - 1 1/8".

Lining - Molded asbestos (bonded to shoe).

Length - 11½". **Width** - 2". **Thickn ss** -.20".

Braking Power - 60% front, 40% rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel locked. Turn cams in opposite direction until wheel turns free.

Rear Wheels - Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel

Checking Fluid - Filler plug on top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pedal return spring, push rod and brake tube at master cylinder. Disconnect stop light wires from switch and remove nuts and bolts that secure master cylinder to dash panel. Pull master cylinder straight out from dash panel.

Power Brakes: "Bellows Assist" type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Chrysler, Plymouth Bellows Type Power Unit" in Brake Section

Removal - *See 1956 Bellows Power Unit Removal (above).*

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans., 7" internal expanding type used with Automatic Trans.

Adjustment - *See "Brake Notes" in Plymouth Special Data*

Lining	Width	Thickness	Length
6" Ext.	2"	5/32"	15.38"
7" Int.	2"	5/32"	13.44"

►*PARKING BRAKE CAM LEVER INTERFERENCE CORRECTION:* Install 1/8" steel shim between rear engine mount and crossmember when interference prevents brake from releasing.

MISC. MECHANICAL

Windshield Wiper: Auto-Lite. Electric type Single speed Std., Two-speed Optl.

See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section.

Air Conditioning *See "Plymouth Airtemp" Air Conditioning in Miscellaneous Section*

Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Misc. Section*

Power Seat Adjusters Electric type *See "Power Seat Adjusters" in Miscellaneous Section*

Convertible Top Control: Electrical-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

►*"FURY" NOTE:* This model has a special High Compression Engine with different valve timing (adjustable tappet clearance), ignition setting, spark plugs and carburetor (Carter 4-Barrel). See data below.

►*V8 AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disc nnecting any part of air conditioning quipment r lines for access to engine. See "Air Conditioning S rvice Cautions" in Miscellaneous Secti n.*

MODEL IDENTIFICATION

Seri s	Model Identification
Plaza	P-29-1
Savoy	P-29-2
Belvedere	P-29-3
Fury	P-29-3

SERIAL NUMBER: On plate attached to left front hinge pillar post.

First S rial N .	D tr it	Evansville	Los Angeles
All Models	15873001	22247001	26552001

ENGINE NUMBER: On left front face of cylinder block. Blocks of numbers used for each model as follows·

270 Cu. In. Engine - 41,001 through 80,000 & 250,001 through 274,009.

277 Cu. In. Engine - 1,001 through 40,000, 80,001 through 250,000, 274,001 & Up.

303 Cu. In. Fury Engin - Engine number preceded by prefix letter "F".

►*ENGINE NUMBER LETTERS & MARKS (Following engin numb r): Indicate as follows:*

"A" - All cylinders .020" oversize.

"B" - All Main & Connecting Rod Journals .010" undersize.

"AB" - Both above conditions exist.

"DIAMOND" (3/8" high) - .008" oversize tappets used.

TUNE-UP

COMPRESSION PRESSURE: 125-165 lbs. at cranking speed of 150 RPM Maximum variation between cylinders 15 lbs.

VACUUM READING: 18-21" steady at idling speed

VALVE TAPPET CLEARANCE: V8 270" Engine - None in service (hydraulic lifters).

V8 277" & 303" Fury Engine - 008" Intake, 018" Exhaust, with engine hot and idling. *NOTE* - This supersedes earlier specifications on 277" Engine.

MANIFOLD HEAT CONTROL: Used as follows·

V8 (270 & 277 Cu.In.Std.) - Single Exhaust with Crossover pipe. Located in right exhaust manifold (277 Cu. In. Eng.), between right exhaust manifold and exhaust pipe (270 Cu. In. Eng.).

V8 (303 Cu. In. (Fury) Std. 277 Cu. In. Optl. with Power Packag). Dual Exhaust. Heat control valve in right exhaust pipe.

Coil Spring Installati n - Position valve shaft in extreme counter-clockwise position. Place coil spring in position over shaft slot, with outer end tongue of spring in upper left hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end tongue of spring around and hook under pin (left pin when facing coil end of valve on 270 Cu. In. Single Exhaust and all Dual Exhaust systems).

C unterweight Installati n - Place counterweight over shaft (shield upward) and insert lock in shaft slot. Center counterweight on shaft and turn weight on shaft until seated. Install stop, and tighten nut securely.

►*DUAL EXHAUST NOTE:* When valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: 035" (All).

Spark Plug—Auto-Lite 4S-250 (Fury), AR-52 (Others). 14mm. Tighten to 32 ft lbs.

COIL: Auto-Lite CAD-4003 (Early), CAH-4001B (Later).
Ignition Current—3.1 amps. stopped, 2.5 amps. idling.
Resistor—Auto-Lite PU-4002. Check coil and resistor separately

DISTRIBUTOR: Auto-Lite. Used as follows·

Engine	Auto-Lite Distributor
V8 270" & 277" (Std)	IBJ-4301A
V8 277" (Power Pkg)	IBJ-4301B
V8 303" Fury (Farly)	IBK-4302
V8 303" Fury (Later)	IBS-4001

- Double breaker type distributor
Condenser - Auto-Lite IRB-2015R (IBJ & IBK Distr), IG-3927G (IBS Distr) **Capacity** 25- 28 mfd (All)
Contact Point Set - Auto-Lite IGW-3028MS (IBJ Distr), IGW-3028KS (IBK Distr), IGP-3028FS (IBS Distr)
Contact Gap - 017" Limits 015- 018".
Cam Angle - 31°±3° (IBJ Distr.), 38°±3° (IBK Distr), 34°±3° (IBS Distr) *NOTE* - Cam angle for IBK and IBS distributors is for both sets of contacts operating together
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance—IBJ-4301A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		400	2		800
6 5		700	13		1400
14		1975	28		3950
15		2150	30		4300

Automatic Advance - IBJ-4301B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		385	2		770
9.5		700	19		1400
15		1800	30		3600
16		2000	32		4000

Automatic Advance - IBK-4302

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		415	2		830
6		750	12		1500
11		2050	22		4100
12		2300	24		4600

Aut matic Advanc - IBS-4001

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		415	2		830
5		675	10		1350
9		935	18		1870
10		1000	20		2000

Vacuum Spark Control: Integral type.

Vacuum Advance - IBJ-4301A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 1/2
6	12	9 3/8
11	22	13 1/2
12.5	25	15 1/2

Vacuum Advance—IBJ-4301B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	.5 1/2
1	2	6
5	10	8 1/2
10	20	.13
11.5	23	.15

Vacuum Advance - IBK-4302

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7 1/2
1	2	8 1/8
5	10	10 7/8
10	20	15 1/8
11.5	23	17

Vacuum Advance - IBS-4001

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7 1/2
1	2	8 1/4
4	8	10 1/2
7	14	12 3/4
8	16	13 1/2

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Plymouth Special Data.*

IGNITION TIMING

Engine	Std. Ignition Setting
V8 (All Std.)	4° BTDC
V8 277" (Power Pkg.)	At TDC

►*NOTE·* Only Premium grade fuel recommended for "Fury" engine and other engines with Power Package.

Timing Mark - Crankshaft pulley or vibration dampener marked DC (TDC) with 2° graduations before and after this point to final mark 10 (10° before and after TDC) Align correct mark with pointer on timing chain cover

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CARBURETOR

►*CARBURETOR APPLICATION NOTE: Carter Dual Carburetors standard on all engines. Carter Four Barrel Carburetors used on 277 cu. in. engine with Power Package and 303 cu.in. "Fury" Model.*

►*EXCESSIVE FAST IDLE OR CONTINUOUS FAST IDLE AFTER WARM-UP CORRECTION:* When above condition exists on early production (277 Cu. In. Eng.) cars, check for installation of late type fast idle cam, identified by yellow coating over plating or 1/8" circle on inside face near trademark. Check fast idle adjustment. *See "Fast Idle Adjustment" below.*

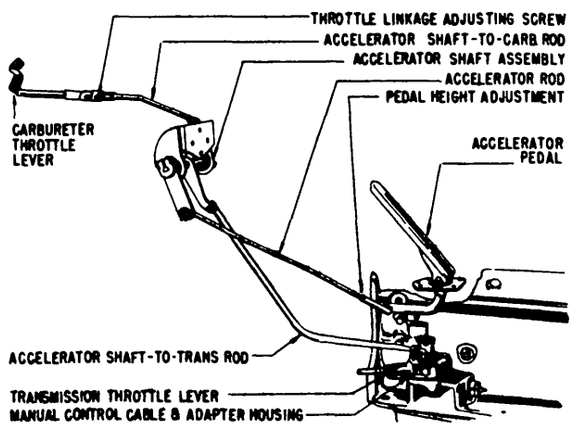
►***"FURY" IMPROPER CHOKE ACTION CORRECTION (Due to Interference Between Carburetor Throttle Lever & Dashpot):*** **Install three regular gaskets, Part No. 1731516. Place spacer on intake manifold first, then regular gaskets. Three regular gaskets can be used if spacer not available. Correction has been made on later cars.**

►***CARBURETOR PRODUCTION CHANGE:*** **Dashpots were eliminated on all V8 cars with PowerFlite about the middle of 1956.**

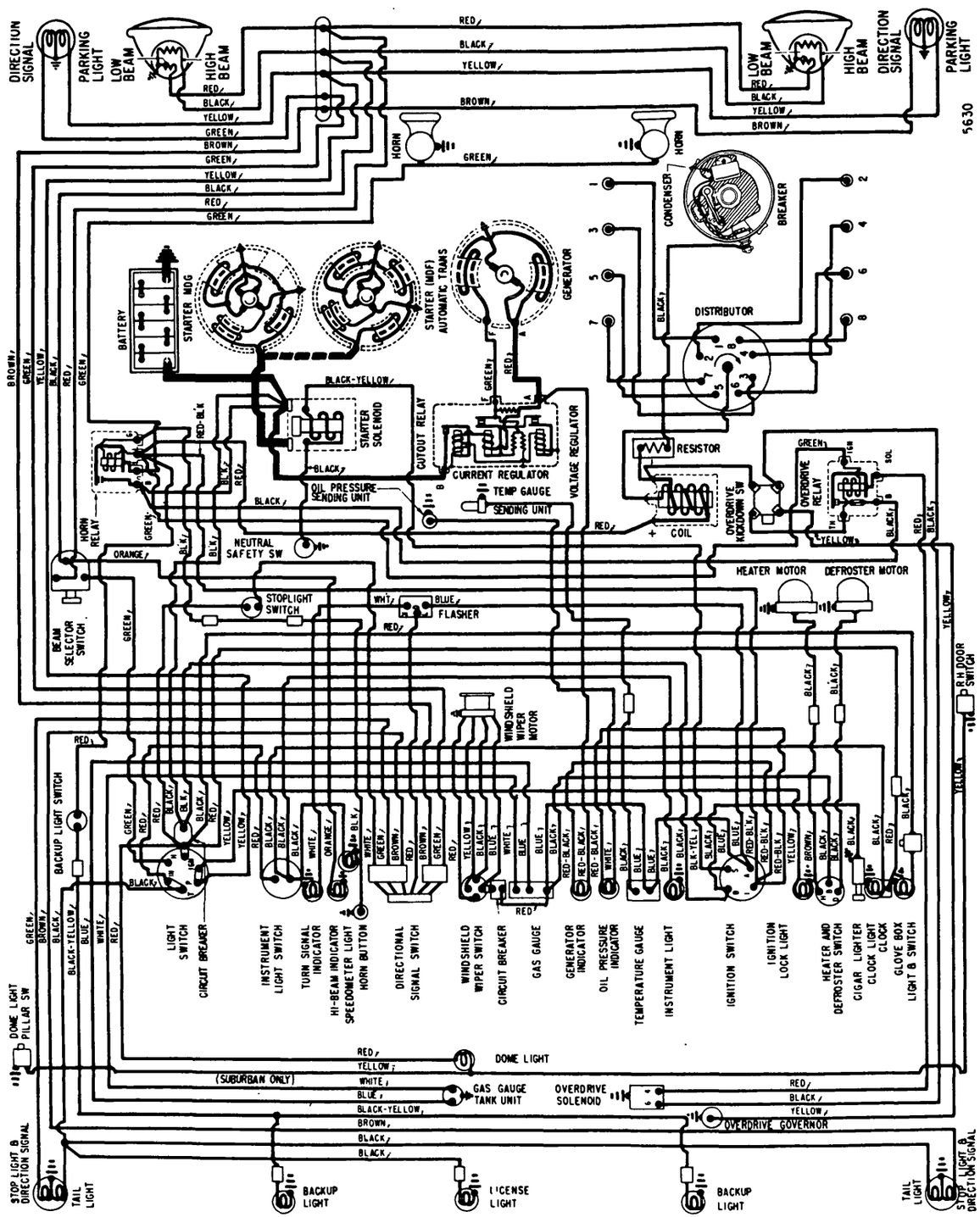
THROTTLE LINKAGE ADJUSTMENT (PowerFlite): Loosen locknut on throttle control rod and slide the rear part of rod toward the rear of car to take up all slack. Tighten locknut. Be sure carburetor is "OFF" fast idle cam.

Throttle Pressure Adjustment (PowerFlite): *See "PowerFlite" Transmission in Transmission Section.*

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POWERFLITE THR TTLE LINKA E



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CARTER BBD (Dual)
(277 Cu. In. Eng.)

Transmission	Carter Carb. Nos.
Synchro-mesh	①BBD 2299S or 2407S
Overdrive	①BBD 2300S or 2408S
PowerFlite	①BBD 2301S or 2409S, SA

(270 Cu. In. Eng.)

Synchro-mesh	②BBD 2259SB or 2422S
Overdrive	②BBD 2260SB or 2423S
PowerFlite	②BBD 2261SB or 2424S

① - "Cross-over" type choke. ② - "Integral" choke.

Idle Setting - ¼-1¼ turns open (2259SB, 60SB, 61SB), ½-1½ turns open (All Others). Turn both screws out equally for richer mixture.

Idle Speed-450-500 RPM (Synchro-mesh or Overdrive), 475-500 RPM (PowerFlite in neutral).

Float Level - ¼" distance from top surface of body casting to top of each float (float pin retainer and gasket removed and float pin down at bottom of guide slots. *NOTE* - This supersedes previous setting of 7/32" on some models.

Accel erating Pump (277")-Install connector rod in center hole (Medium stroke) of throttle lever and inner hole of pump arm.

Accel erating Pump (270")-Install throttle connector rod in outer hole (medium stroke) of throttle lever and inner hole of pump arm.

Fast Idle Cam Clearance (277"): .020" (Gauge T109-29) between lip on fast idle cam and boss on casting with choke valve closed and lip on inner choke shaft lever contacting lug on outer lever. Adjust by bending lip on inner choke shaft lever. On late carburetors, align index mark on cam with adjusting screw.

Fast Idle Throttle Clearance (270" & 277"): .015-.019" (270"), .015" (277") clearance between lower edge of throttle valve and carburetor bore with adjusting screw on high step on cam.

Automatic Choke (Integral Type): Set at Index.

(Cross-Over Type) - See *"Carter & Stromberg Cross-Over Type Choke" in Carburetion Section*

Slow Closing Throttle (Dashpot): Maximum dashpot action is obtained by placing 1/16" gauge between shaft and operating lever, then adjust dashpot in or out to obtain fully closed throttle.

Overdrive Kickdown Switch: With throttle valves wide open there should be 1/64-3-64" between kickdown lever and switch stem guide.

Throttle Linkage Adjustment (PowerFlite): See *CARBURETOR above.*

►*OTHER DATA: See "Carter BBD (Dual)" Carburetor in Carburetion Section.*

Fuel Pump Pressure: 5-6½ lbs.

CARTER WCFB (4-Barrel)

Engine	Carter Carburetor No.
V8 277" Eng (All Trans.)	①WCFB 2302S, SA, SB
V8 303" Fury Eng	①WCFB 2442S

① - With "Cross-Over" type Automatic Choke

►*ENGINE CUTTING OUT ON LEFT TURN CORRECTION: See "Carter WCFB 4-Barrel" Carburetor in Carburetion Section.*

►***MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.***

Idle Setting - 1 - 2 turns open. Turn screws out for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite), with transmission in neutral.

Automatic Choke (Cross-Over Type): *See "Carter & Stromberg Cross-Over Type Choke" in Carburetion Section*

Throttle Linkage Adjustment: See *CARBURETOR above.*

►***OTHER DATA: See Carter "WCFB" Carburetors in Carburetion Section.***

Fuel Pump Pressure: 5 - 6½ lbs.

CARB. EQUIPMENT

Fuel Pump: Carter or Auto-Lite. Mechanical type.

Model	Auto-Lite	Carter
V8 (270" Eng.)	FB-4006	M9615, M2348S
V8 (Others)	FB-4006	M2241S

Pressure - 5 - 6½ lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite. Electric type.

Dash Unit - 14038A (Suburban), 13997A (Others).

Tank Unit - 13905A (Suburban), 13969A (Others).

See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite 11-HS-50 or Willard HO-11-50 (Std.). *12 Volt,* 9 plate, 50 ampere hour capacity.

Optl. (Warm Climate) - Auto-Lite 11-MS-45 or Willard MO-11-45. *12 Volt,* 7 plate, 45 ampere hour capacity.

Grounded Terminal - Negative.

►***CAUTION - This is reversed from previous models.***

Engine Ground - Left front of engine.

STARTER

Auto-Lite MDG-6001 (Std.), MDF-6002 (PowerFlite).

Armature - Auto-Lite MDF-2088 (All).

Drive - Bendix "Folo-Thru" No. A3274

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 42-53 ozs. (with new brushes).

Performance Data - MDF

Torque	RPM	Volts	Amperes
0 ft.lbs.	3200 min.	10.0	60 max.
6.5 ft.lbs. min.	Lock	4.0	240 max.

Performance Data - MDG

Torque	RPM	Volts	Amperes
0 ft.lbs.	4400 min.	10.0	50 max.
5 ft.lbs. min.	Lock	4.0	210 max.

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission cars. *See "Starter Controls" in Electrical Section.*

Neutral Safety Switch Adjustment: *See "PowerFlite" Transmission in Transmission Section.*

GENERATOR

Auto-Lite. Used as follows:

Application	Generator No.	Armature No.
Std.	GJC-7001A,C	GJC-2030F
Taxicab	GJC-7011A	
Power Strg.	GJC-7003B	GJC-2090F
	GHM-6003B	GHM-2071F
	GGA-6003A,D	
Air Cond.	GJC-7006B	
	GHM-6004C	GHM-2059F
Air Cond. & Pwr. Strg	GJC-7003C	GJC-2090F
Spec. Equip.	GGA-6003A, D	

►*SPECIAL GENERATOR NOTE:* GGA, GHM & GJC type generators used. Specifications below apply equally to all generators within each group.

Performance Data - GHM - 12 Volt

Amperes	Volts	RPM 70°F
5	14.0	875
25 ℄	15.0	1350
30 ℄	15.0	1500

Performance Data - GGA - 12 Volt

Amperes	Volts	RPM 70° F.
4.0	14.6	950 max.
40.0①	14.6	1600 max.
40.0①	15.0	1600 max.

Performance Data - GJC - 12 Volt

Amperes	Volts	RPM Cold
0	12.8	1225-1325
30 ℄	15.0	2050-2250

℄ - Do not operate at high output without ventilating fan for any length of time. To do so may result in burned armature or fields.

Brush Spring Tension - 18-36 ozs. (GJC), 35-53 ozs. (GHM), 34-41 ozs. (GGA) with new brushes.

Field Current - 1.2-1.3 amps (GJC), 1.1-1.3 amps. (GHM & GGA), all at 10.0 volts.

Motoring Current - 3 4-3.9 amps. (GJC), 3.0-3.5 amps. (GHM), 2.3-2.6 amps. (GGA), all at 10.0 volts.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: 1/2" deflection between generator and compressor (air conditioning) or water pump (Others) with normal thumb pressure.

REGULATOR

Auto-Lite. Used as follows:

Regulator No.	Used with Generator
VRX-6201A	GJC & GHM
VAT-6201A	GGA

►*VRX-6201A REGULATOR PRODUCTION CHANGE:* Two resistors used on early 1956 regulators, three resistors (see diagram) on later regulators. *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

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Cut ut R lay

Cuts In - 12.6-13.6 volts (All Models).
Cuts Out - 3.0-5.0 amps. discharge current after charging at 7 amps. (VRX),. 10 amps. (VAT).
Contact Gap - .015".
Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts at 80° F. while charging at 10.0 amperes or with .25 ohm resistor in series between regulator and battery.
Air Gap - .048-.052" with contacts just opening.
Checking & Adjusting - *See Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

Operating Amperes

	Test A	Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.
Test B - After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).
Air Gap - .048-.052" with contacts just opening.
Checking & Adjusting - *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signal: *See Electrical Section.*

►*IGNITION - STARTER SWITCH CAUTION: When installing accessories, use accessory terminal only on ignition-starter switch and not ammeter terminal post.*

Lighting & Panel Switch Removal: Switches held in instrument panel by a common threaded sleeve and hex nut. Panel lamp knob indexes on its switch shaft by means of lugs in knob and slots in shaft. Headlamp knob is held on its shaft by a recessed hex screw.
Stop Light Switch (Location): On forward end of master cylinder.

CIRCUIT BREAKERS: Lighting - 20 ampere. Mounted on headlight switch. Protects all lighting circuits.
Windshield Wiper & Back-Up Lights - 5 ampere (single speed wiper), 8 ampere (2-speed wiper). Mounted on wiper switch. Protects wiper and back-up lights.

HORNS: Auto-Lite. Dual horns with relay.
High Pitch - HAD-4702.
Low Pitch - HAD-4701.
Horn Relay: Auto-Lite RAH-4002.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Bef r disc nnecting any part f air conditioning quipm nt or lin s f r access t ngine, see "Air Conditioning Servic Cautions" in Misc llane us Section.*

►*ENGINE NOTE:* Three engines used. All have polyspherical combustion chamber with lateral valves and single rocker arm shaft. Bores and strokes differ in engines as indicated in Specifications below.

ENGINE SPECIFICATIONS: 90° V8 (All Models).

Engine	Bore	Stroke	Displacement
P-29-1,2,3 Std.	3.75"	3.13"	277 cu. ins.
P-29-1,2 Optl.	3.63"	3.256"	270 cu. ins.
P-29-3 (Fury)	3.8125"	3.3125"	303 cu. ins.

Engine	Compr. Ratio	Rated HP	Dev. HP at RPM
P-29-1,2,3 Std.	8.0	45.0	① 187 at 4400
P-29-1,2 Optl.	8.0	42.2	180 at 4400
P-29-3 (Fury)	9.25	46.5	240 at 4800

① - 200 at 4400 RPM with Power Pack.
Compression & Vacuum Reading - *SEE TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Plymouth Special Data.*

ENGINE MOUNTS: *See "Engine Mountings" in Plymouth Special Data.*

OIL PAN REMOVAL: Remove starter, clutch housing dust cover, front and rear engine mounting bolts, oil pan capscrews, and idler bracket at right frame sub side rail. Lower tie rods. Place base of hydraulic jack against lower control arm and opposite end of jack against torque converter housing at starter location. Move engine approximately ¾ - 1" toward rear of car and remove oil pan.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Plymouth Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

PISTONS

Aluminum alloy, elliptically turned, horizontal slot, tin-plated, thermally controlled by steel band.
Clearance - .0005-.0015" (270" Engine), .0007-.0022" (277" & Fury 303" Engine). Check clearance with .0015" feeler ½" wide inserted between piston and cylinder wall at right angles to pin. Pull to withdraw feeler should be 5-10 lbs. at 70 °F.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bores are .020" oversize.*

Removal: Pistons and rods removed from above.
Replacement Pistons: Std., .005", .020", .030", .040", .060" oversize.
Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod. On left bank (1-3-5-7) assemble with indent on same side as large chamfer at insert end of connecting rod. *See Rod Installation.*

PISTON PINS

Full floating type.
Diameter - .859" (270 Cu. In. Eng.), .984" (Others).
Clearance in Piston - .0000-.0005". Tight double thumb press fit at 70° F.
Cl aranc in Rod - .0001-.0004". Tight thumb press fit at 70° F.
Replac m nt Pins: Std., .003", .008" oversize.

PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compr. (#1)	.0775-.0780"	.010-.020"	.0015-.003"
Compr. (#2)	.0775-.0780"	.010-.020"	.001-.0025"
Oil (#3)	.1860-.1865"	.010-.020"	.001-.003"

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" oversize.
Installing Rings: Compression rings with step on inner edge up.

CONNECTING RODS

Length (Center to Center) - 5.94" (270 Cu. In. Eng.), 6.12" (Others).
Crankpin Journal Diameter - 1.94" (270 Cu.In. Eng.), 2.13" (Others).

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE): S e "CRANKSHAFT" below.*

Lower Bearing - Replaceable, precision type.
Clearance - .0005-.0015" (270 Cu. In. Eng.), .0007-.0022" (Others).
Endplay—.006-.014" (two rods).
Bearing Adjustment: None. Replace bearings.
Replacement Bearings: Std., .001", .002", .003", .010", .012" undersize.
Installing Rods—*See "Pistons (Installation)" abov .* Install rod and piston assembly with indent on top of piston pointing toward front of engine. NOTE—Connecting rod bores are chamfered more on one side than the other. Larger chamfer must be installed toward crankshaft journal fillet.

►*BEARING INSERT CAUTION:* When installing lower bearing insert, make certain that "V" groove in insert is in line with "V" groove in cap. Tighten bearing cap nuts to 45 ft. lbs.

CRANKSHAFT

Journal Diameter - 2.38" (270 Cu. In. Eng.), 2.50" (Others).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows:
.010" UNDERSIZE (Main & C nnecting Rod J urnals)—Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.
.001" UNDERSIZE (ONE OR MORE Main & C nnecting Rod Journals)—When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker wall bearing. For example, "M2" and "R1" means that .001" thicker wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.
Clearance - .0005-.0015" (270 Cu. In. Eng.), .0007-.0023" (Others).
Replacement Bearings: Std., .001", .002", .003", .012" undersize.
Crankshaft Rear Oil Seals: *Se "Crankshaft & Main B arings" in Plym uth Sp cial Data.*

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Crankshaft Front Oil Seal- *See "Engine Front Cover" in Plymouth Special Data.*

End Thrust- Taken by center (No 3) main bearing. **Endplay**- 002-007"

CAMSHAFT

Journal Diameters-(1) 2', (2) 1 63/64', (3) 1 31/32", (4) 1 61/64", (5) 1 9/16".

Bearings - Removable, Steel-backed babbitt.

Clearance -.001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay** - .002-.006".

Timing Chain: **Width** - 1.125" (270 Cu. In. & 303 Cu. In. Engs.), 1.02" (277 Cu. In. Eng.). **Pitch** - .38". **Length** - 68 Links.

Camshaft Setting- Marks on sprockets should be adjacent and in line with a straightedge across the shaft centers

Removal & Installation: *See "Camshaft & Bearings" in Plymouth Special Data.*

Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Plymouth Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal)- *See "Engine Front Cover" in Plymouth Special Data.*

VALVES

Tappet Clearance : **270 Cu. In. Eng.** - None in service. Hydraulic lifters.

277" & 303" Fury Engine - 008" Intake, 018" Exhaust with engine hot and idling *NOTE* - This supersedes earlier specification on 277" Engine

270 Cu. In. Eng.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.72"	.372-.373" ②	4.25"
Exhaust	1.47"	.371-.372" ②	4.20"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.360"	.001-.003"
Exhaust	45°	.360"	.002-.004"

277 Cu. In. & 330 Cu. In. (Fury)

Valve	Head Diam.	Stem Diam.	Length
Intake	1.84"	.372-.373" ②	4.54"
Exhaust	1.56"	.371-.372" ②	4.48"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.374" ①	.001-.003"
Exhaust	45°	.380" ①	.002-.004"

①-On 303 Cu. In. Eng. (Fury) Intake .379", Exhaust .376".

②-Standard. *See Valve Guides Below.*

Valve Seat Width-1/16-3/32' (Intake), 3/64-1/16' (Exhaust)

►*VALVE OVERSIZE NOTE* "I" or "E" stamped on cylinder head at rock cover gasket boss, indicates that all intake or exhaust valves are oversize in that bank depending upon what letter is stamped

►*VALVE GRINDING CAUTION* If the position of the valve in the head has been changed (due to valve or valve seat grinding) so as to shorten the operating length of 1/32' or more from its factory installed position, the dimension from valve spring seat in the head to valve tip should be checked with gauge C-3436 If the valve tip exceeds the maximum allowable on the gauge, grind the tip as necessary (do not go below the minimum allowable on the gauge) Improper valve clearance at high speed will result if this condition is not corrected

Valve Guides: Cast integral with cylinder head Service as follows When valve stem clearance excessive, use Reamer Tool Set to ream guides for NEXT OVERSIZE Valve as follows Tool C-3433 (.005" O S), Tool C-3430 (.015' O S), Tool C-3427 (.030' O S) Valves furnished Std and 005', 015', 030' Oversize

►*VALVE SPRING NOISE CORRECTION*: Adjust tappets. If noise continues, increase engine revolutions until noise is at highest level, then rotate valve spring left to right ¼ to ½ turn.

Valve Springs: Same spring used on intake and exhaust valves. **Free Length**.- 1 15/16" (270"), 2" (Others).

270 Cu. In. Eng.

	Pressure	Length
Valve Open	134-146 lbs.	1 5/16"
Valve Closed	49-57 lbs.	1 11/16"

277 Cu. In. & 303 Cu. In. (Fury)

	Pressure	Length
Valve Open	160-172 lbs.	1 5/16"
Valve Closed	68-76 lbs.	1 11/16"

►*VALVE SPRING HEIGHT CAUTION* If valves or seats are reground, check installed height of spring If height of spring is 1-11/16" or greater, install a 1/16" spacer (Part No 1400482) in the head counterbore to bring spring height back to nominal 1 5/8-1 11/16

►*VALVE SPRING NOISE CORRECTION (Caused by Spring Striking Head at Edge of Valve Recess)* To correct, bevel or chamfer edge of recess to provide necessary clearance for spring

Valve Lifters (All Engines): Barrel type Hydraulic lifter (270" Engine), Mechanical lifter (277" & 303" Fury Engine) Service by reaming bore and installing oversize lifter Remove lifters from above with pushrods removed *NOTE* - Diamond mark stamped on engine serial number pad indicates that lifters are 008" oversize

Diameter - 9040-9045" (Std size)

Clearance - 0005-0015"

Replacement Lifters --Furnished Std and 001", 008", 030" Oversize

Hydraulic Lifter Overhaul (270" Engine): *See "Valve System" in Plymouth Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

V8 (270 & 277 Cu. In. Engines)

Intake Valves - Open 14° BTDC, Close 50° ALDC.

Exhaust Valves -Open 52° BLDC, Close 12° ATDC.

V8 (303 Cu. In. Eng. - Fury)

Intake Valves -Open 9° BTDC, Close 55° ALDC.

Exhaust Valves - Open 47° BLDC, Close 17° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM* *See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity- 5 qts. (refill). Add one additional quart when filter changed.

Normal Oil Pressure : 40-50 lbs. at 25-30 MPH.

Oil Pressure Relief Valve - Located in oil pump body Not adjustable *NOTE* - Different color springs used as listed below Replace with same colored spring

Oil Pressure Relief Valve Springs

Color	Free Height	Load Height & Pressure
Gray (Light)	3 1/32"	16 1-17 1 lbs at 2 1/16"
Red (Standard)	2 27/32"	19 5-20 5 lbs at 2 1/16"
Brown (Heavy)	2 31/32"	22 9-23 9 lbs at 2 1/16"

Oil Pressure Indicator: Indicator light on instrument panel Lights when ignition switch turned on, goes out when oil pressure reaches 8-10 lbs Operated by oil pressure switch on top rear of cylinder block

Oil Pump (V8): Rotor type. In crankcase at rear end. Mounted on rear bearing cap.

Priming Oil Pump (V8 - After Overhaul) - Prime oil pump before installing oil pump and strainer to rear main bearing cap.

Overhaul (All) - *See "Oiling System" in Plymouth Special Data.*

Oil Filter: Different types used as follows:

270 Cu. In. V8 Eng. - Shunt type. A portion of oil from oil pump is directed through filter and remainder flows into engine lubrication system.

277 & 303 Cu. In. Engs. - Full flow type. All oil enters engine lubrication system through filter at full pump pressure. Safety valve in filter opens if filter is clogged, allowing oil to pass into lubrication system under a reduced pressure.

Filter Element - Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 19 qts (270" Engine), 20 qts (277" & 303" Fury Engine) Add 1 qt with heater

Pressure Valve (Exc. Fury & Air Cond.) - Plymouth 1373136. Radiator filler cap. Opens at 7 lbs.

Pressure Valve (Fury & Air Cond.) - Radiator filler cap. Opens at 14 lbs.

Thermostat: Bellows type (Exc. Fury & Air Cond.). Pellet type (Fury & Air Cond.). Located in cylinder head water outlet. Bellows type starts to open at 155-160° F. Pellet type starts to open at 157-162°.

Water Pump: Ball bearing type No lubrication required *NOTE* - Pump on 270" Engine not interchangeable with other models

See "Water Pumps" in Plymouth Special Data

Temperature Gauge: Auto-Lite Electric type

Dash Unit - Auto-Lite 13998A

Engine Unit - Auto-Lite 13550A

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Borg & Beck. Single plate Used as follows

Application	Cover Assy.	Clutch Disc
Std - 10A7	361368	382358
Heavy Duty - 11A6	929	381850

See "Borg & Beck" in Clutch Section

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Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained. This adjustment will provide necessary 1" free play at pedal.

Over-Center Spring Adjustment: Tighten eyebolt sleeve on clutch pedal overcenter spring bolt finger tight with pedal in depressed position, then tighten four complete turns.

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods. Remove transmission (See Synchro-mesh Transmission). Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel; loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Plymouth Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle carrier.

Removal: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods. If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut. This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench. Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission. This precaution will avoid bending clutch disc.

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.
See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

►***THROTTLE VALVE "BUZZING" DURING DOWNSHIFT CORRECTION: See Production Changes under "PowerFlite" Transmission in Transmission Section.***

►***DRAINING OF TRANSMISSION PROCEDURE CHANGE:*** **Approximately April 15, 1956 oil pan drain plug was discontinued. Draining of transmission is accomplished by removing filler tube connector at oil pan.**

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A"

Checking Fluid Level - ***CAUTION - Following procedure and fluid level supersede previous recommendations.*** Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Oil Filler Tube (Location): At right rear of engine compartment.

►*OTHER "POWERFLITE" SERVICE DATA: See "PowerFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball & Trunnion, front and rear (Exc. Fury). Ball & Trunnion - front, Cross type - rear (Fury).

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss Drive.
See "Plymouth Cage Type Hypoid" in Rear Axle Section.

Rear Axle Ratios

Transmission	Standard	Optional
Standard	3.73-1	3.54, 3.9, 4.1, 4.3-1
Overdrive	4.1-1	3.9, 4.3-1
PowerFlite (P-29)	3.54-1	3.73, 3.9, 4.1-1
PowerFlite (Fury)	3.73-1	3.54, 3.9-1

►***REAR WHEEL BEARING PRODUCTION CHANGE:*** **Rear wheel bearing grease holes and plugs were eliminated during production. Relubrication during normal life of car is not required (clean and repack bearings if removed).**

Backlash—.006-.010"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed check endplay with dial indicator To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick (equally at both wheels). **Endplay**—.003-.008".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement

FRONT SUSPENSION

Independent. Coil springs and direct acting shock absorbers with shock absorbers mounted within springs.
See "Plymouth" in Suspension & Wheel Alignment Section.

Kingpin Inclination: 5—6½° at 0° camber

Caster—Neg. 2° to 0° (Left side 0° to Neg. ¾° more than right side, Right side 0° preferred)

Camber—Neg. 1/8° to Pos. 5/8° (Left side Pos. ½°, Right side 0° preferred)

Toe-In - 1/8" preferred.

Toe-Out on Turns - With inside wheel at 20°, outside wheel should be 17½-19°.

STEERING

Manual: Gemmer. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: "Coaxial". Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column.

See "Coaxial" Power Steering in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Plymouth "Safe-Guard" Lockheed hydraulic
See "Plymouth Safe-Guard" in Brake Section.

Drum Diameter - 11" front & 10" rear (exc Suburban & Fury), 11" front & rear (Suburban & Fury)

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Wheel Cylinders - 1 1/8". Single acting (front), double acting (rear).

Lining - Molded asbestos (bonded to shoe).

Width - 2" **Thickness** 3/16". **Length** – 11 5" (Primary - front and rear wheels), 11.5" (Secondary - front wheels), 8.0" (Secondary - rear wheels 10" brakes), 8 8" (Secondary - rear wheels 11" brakes).

Braking Power - 62% front, 38% rear (exc Suburban & Fury), 60% front, 40% rear (Suburban & Fury).

Clearance - .006" at each end of all shoes.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

Checking Fluid - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pushrod. Disconnect stop light wires and brake line tube at master cylinder. Remove four stud nuts from studs, remove master cylinder.

►*MASTER CYLINDER REPLACEMENT COVER CAUTION:* Some new replacement covers have reduced lower crown or a reduced overall height. Original hold-down bolt will bottom when used with these covers. Use bolt, Part No. 1671571, which is ¼" shorter.

Power Brakes: Synchro-mesh Cars - Integral type. Replaces regular master cylinder. Unit mounted on engine side of firewall.

PowerFlite Cars - Bellows type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

Removal of Integral Type Power Unit - Same as for standard master cylinder, after stop light wires and hydraulic lines are removed.

Removal of Bellows Type Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond extremities of bracket *(NOTE* - If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged). Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers.

Parking Brake: On shaft at rear of transmission 6" external contracting type used with Synchro-mesh Transmissions. 7" Internal expanding type used with Powerflite Transmission

Adjustment–*See "Hand Brake Notes" in Plymouth Special Data.*

Lining–	Width	Thickness	Length
6" Ext Type	2'	5/32'	15 3/8'
7" Int Type	2'	5/32'	13 1/16"

Clearance (Internal Expanding) - Adjusting nut on shoe link backed off one notch from point where shoes just drag against drum, approximately .010".

Clearance (External Contracting) - Adjust anchor screw so clearance between band and drum at anchor is .015-.020".

MISC. MECHANICAL

Windshield Wipers: Auto-Lite EPH-4101 (Std.), EPF-4001 (2-Speed - Optl.). *See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Plymouth Airtemp" Air Conditioning in Miscellaneous Section*

Power Window Regulators: Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Electric Window Regulators" in Misc. Section.*

Power Seat Adjusters: Electric type *See "Power Seat Adjusters" in Miscellaneous Section*

Convertible Top Control: Electrical-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Identification
Plaza	P-31-1
Savoy	P-31-2
Belvedere	P-31-3
Fury	P-31

SERIAL NUMBER: On plate attached to left front hinge pillar post.

First Serial No. - 16,083,001 (Detroit), 22,330,001 (Evansville), 26,595,001 (Los Angeles).

ENGINE NUMBER: Stamped on boss at center of cylinder block directly beneath and behind water pump and below battery ground wire attaching point at block.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Indicates as follows*

"A" - All cylinders .020" oversize.

"B" - All Main & Connecting Rod Journals .010" undersize.

"AB" - Both above conditions exist.

♦ (3/8" High) - .008" oversize tappets used.

TUNE-UP

COMPRESSION PRESSURE: 125-165 lbs. (exc. "Fury"), 145-180 lbs ("Fury") Maximum variation between cylinders 15 lbs

VALVE TAPPET CLEARANCE: All Engines - 010" Intake, .018" Exhaust, HOT. *NOTE - Intake valve setting of .010" supersedes previous setting of .008" and is recommended for improved torque and idle characteristics.*

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located at right exhaust manifold (between manifold and exhaust pipe).

IGNITION

FIRING ORDER: 1–8–4–3–6–5–7–2.

Cylinders - RIGHT BANK 2–4–6–8. LEFT BANK 1–3–5–7.

SPARK PLUG GAP: 035" (All)

Spark Plugs - Auto-Lite Resistor AR-52 (277" & 301" Engines), AR-32 (Fury). 14 mm. Tighten to 30-32 ft. lbs. torque.

COIL: Auto-Lite CAH-4001B. All Engines.

Ignition Current - 2.5 amperes idling, 3.1 stopped.

Resistor - Auto-Lite PU-4003. .665-.735 ohms. Resistor is permanently connected in primary circuit between coil and breaker terminal on distributor (no by-pass for starting). Test coil and resistor separately.

DISTRIBUTOR: Auto-Lite.

Engine	Auto-Lite Distr. No.
277" (Early)	IBJ-4301B
277" (Late)	IBP-4003C
301" (Exc. Power Pak)	IBP-4003
301" (Power Pak)	IBP-4003A
318" (Fury)	IBS-4003

►*NOTE:* IBS-4003 is "Double Breaker" type.

Condenser & Contact Point Sets

Distributor	Condenser No.	Contact Point Set
IBJ-4301B	IBB-2015R	IGW-3028MS
IBP-4003, 3A, 3C	IAT-2015RA	IBP-3028AS

Condenser Capacity - .25-.28 mfd.

Breaker Gap - .017" (.015-.018").

Cam Angle - (IBJ & IBP Single Breaker) 27-32° (IBS Double Breaker) 36-39° for both sets of contacts operating together

►*CAM ANGLE SETTING CAUTION (IBP DISTR.):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - IBJ-4301B

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	385	2	770
9.5	700	19	1400
15	1800	30	3600
16	2000	32	4000

Automatic Advance - IBP-4003

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	500	0	1000
1	575	2	1150
5	850	10	1700
8	1750	16	3500
9.5	2200	19	4400

Automatic Advance - IBP-4003A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	370	2	740
6	450	12	900
10	850	20	1700
11	950	22	1900

Automatic Advance - IBP-4003C

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	400	2	800
6.5	700	13	1400
14	1975	28	3950
15	2150	30	4300

Automatic Advance - IBS-4003

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
4	450	8	900
7	875	14	1750
8	1000	16	2000

Vacuum Spark Control: Integral type.

Vacuum Advance - IBJ-4301B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/2
1	2	6
5	10	8 1/2
10	20	13
11.5	23	15

Vacuum Advance - IBP-4003

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7 1/8
1	2	7 5/8
7	14	11 7/8
12	24	16 3/4
13	26	18

Vacuum Advance - IBP-4003A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7 1/8
1	2	7 3/4
5	10	10 1/2
8	16	12 3/4
9.5	19	13 1/2

Vacuum Advance - IBP-4003C

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5 1/2
1	2	6 1/8
6	12	9 3/8
11	22	13 5/8
12.5	25	15 1/2

Vacuum Advance - IBS-4003

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	9 1/8
1	2	9 7/8
5	10	12 7/8
9	18	16 1/2
10 25	20 50	18

IGNITION TIMING

Engine	Distr. No.	Std. Setting
277" (Early)	IBJ-4301B	At TDC
277" (Later)	IBP-4003C	4° BTDC
301" (Exc.Pwr.Pak)	IBP-4003	10° BTDC
301" (Pwr.Pak)	IBP-4003A	4° BTDC
318" (Fury)	IBS-4003	8° BTDC

Timing Mark - Vibration dampener marked "DC" with 2° graduations before and after this point for a total of 10° (10° point marked "10"). Align correct mark with pointer on chain case cover.

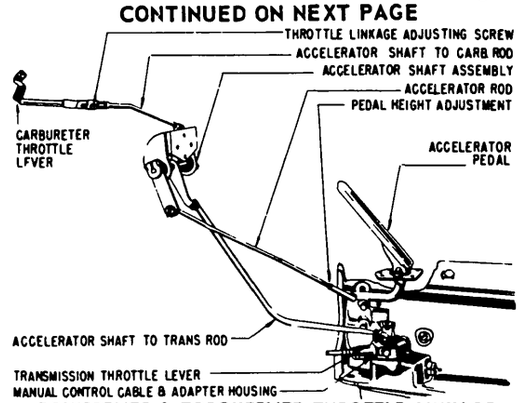
CARBURETOR

►*CARBURETOR APPLICATION NOTE: Carter and Stromberg Carburetors standard on 277" & 301" engines. A single Carter 4-Barrel Carburetor is optional on the 301" engine. Two Carter 4-Barrel Carburetors are standard on the 318" (Fury) engine.*

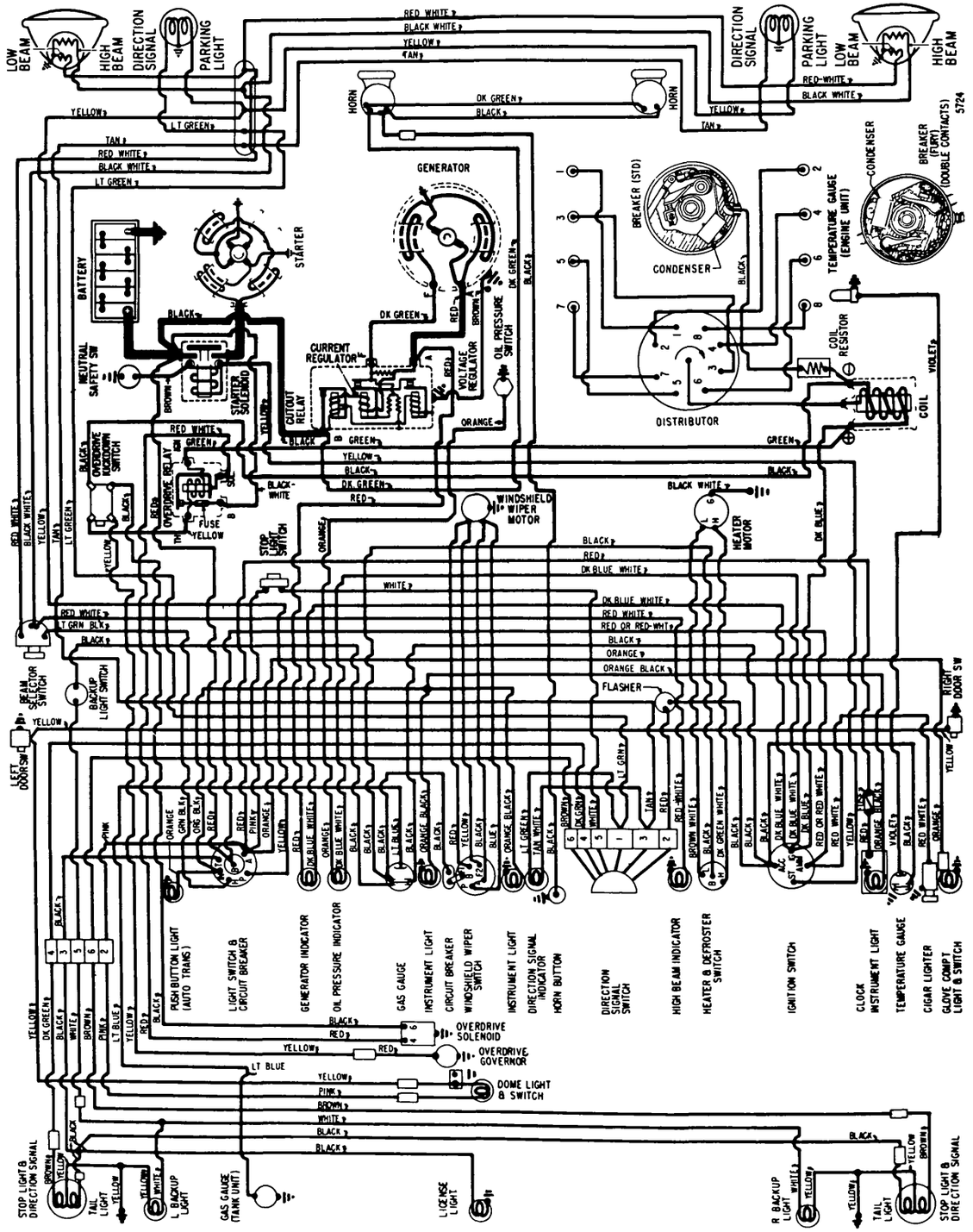
►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedures required. See AIR CLEANER below*

THROTTLE LINKAGE ADJUSTMENT (PowerFlite & TorqueFlite): With engine at normal operating temperature, idle speed adjusted to 475-500 RPM and transmission in "N" (Neutral), loosen the throttle linkage ad-

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POWERFLITE & TORQUEFLITE THROTTLE LINKAGE



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justing nut on bellcrank-to-carburetor rod (Exc. Power Pak Cars), on bellcrank-to-intermediate throttle rod (Power Pak Cars). Hold light preload rearward on rod so throttle valve lever on transmission is against its stop, then tighten throttle adjusting nut. Adjust accelerator pedal rod so that wide open throttle is obtained when pedal depressed just down to the floor mat without compressing it. Make this adjustment by disconnecting pedal rod at pedal arm and turning ball and socket end on rod.

Throttle Pressure Adjustment (PowerFlite): *See "PowerFlite Transmission" in Transmission Section*

CARTER BBD (Dual)
277" & 301 ' Engines

Transmission	Carter Carb. No.
Synchro-mesh	℄ BBD 2512S,SA SB SC
Overdrive	℄ BBD 2513S SA SB,SC
PowerFlite & TorqueFlite	℄ BBD 2514S SA SB SC

℄ - Cross-Over type choke

► *CARBURETOR LIMITED PRODUCTION NOTE (Plaza Models with 277" Engine)· Carter BBD No 2407S & 2409S used on some cars For data on these models, see 1956 Plymouth V8 data*

► *PRODUCTION CHANGES AND RECOMMENDED PARTS CHANGES FOR IMPROVED PERFORMANCE: Se "Carter BBD Carburetors" in Carburetion Section*

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - ¼-1¼ turns open. Turn both screws out equally for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive). 475-500 RPM (PowerFlite & TorqueFlite).

Float Level - 9/32" (Gauge T109-239) between top of each float ridge (at center of float) and top surface of body casting. Adjust by bending lip on float arm.

Accelerating Pump - Install throttle connector in center hole (medium stroke) of throttle lever and inner hole of pump arm.

Fast Idle Cam Clearance: With choke valve closed and lip on inner choke shaft lever contacting lug on outer lever, align index mark with adjusting screw. Adjust by bending lip on inner choke shaft lever.

Fast Idle Throttle Clearance: 020" (Gauge T109-29) between lower edge of throttle valve and bore with adjusting screw on high step of cam This supersedes previous setting of 015"

Automatic Choke (Cross-over Type): *(NOTE - One-piec and Two-piece assemblies used. Adjustment is th same for both types).* Set at index as follows Remove choke assembly from manifold and loosen mounting post locknut and turn mounting post with a screwdriver until index mark on disc is aligned with center mark on scale. Hold in this position and tighten locknut. *(NOTE - If connector rod does not clear sides of hol in housing cover without binding, replace the unit. Do not bend connector rod.*

Overdrive Kickdown Switch: With throttle valves wide open there should be 1/64-3/64" between kickdown lever and switch stem guide.

Throttl Linkage Adjustm nt (P w rFlit & T rqu Flit): *See CARBURETOR abov .*

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►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section*

STROMBERG WW (Dual)
277" & 301" Engine

Transmission	Stromberg Code No.
Synchro-mesh	WW 15-23
Overdrive	WW 15-24
PowerFlite & TorqueFlite	WW 15-25

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - 1-2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite & TorqueFlite).

Float Level - Top of float at center should be 7/32" below top edge of float bowl with needle valve seated. Check with Tool T-25569 placed on top of bowl and float lip held firmly against fuel inlet needle. Adjust by bending float lip.

Accelerating Pump - Normal setting, pump rod connected in center hole of throttle lever. Inner hole for less fuel, outer hole for more fuel.

Fast Idle: Turn throttle stopscrew out so that throttle valves completely closed. Hold throttle valves closed, back out fast idle screw until fast idle cam can be positioned with first step in line with fast idle screw, turn screw in until it just contacts cam, then turn screw in additional 5½ turns. With the fast idle cam held in this position, close choke valve until fast idle screw is against shoulder on cam, measure choke valve opening by inserting No. 12 drill between upper edge of valve and air horn wall. If opening not correct, bend fast idle rod as required.

Automatic Choke Setting: *NOTE* - Choke is "Cross-over" type mounted in manifold and linked to choke valve. Should not require adjustment (must be removed from manifold well for checking). Index mark on disc should be centered on scale on thermostat cover plate.

Throttle Linkage Adjustment (PowerFlite & TorqueFlite): *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (DeSoto, Dodge, Plymouth) Carburetors" in Carburetion Section*

CARTER WCFB (4-Barrel)
301" Engine (Power Pak)

Carter WCFB 2530S, SA (All Transmissions). 4-Barrel downdraft type of same design as used on previous models.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - 1-2 turns open. Turn screws out equally for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite & TorqueFlite).

Throttle Linkage Adjustment (PowerFlite & TorqueFlite): *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

CARTER WCFB (4-Bbl.) DUAL
318" Engine Fury Models

Carter WCFB, 2631S (Front). 2632S (Rear).

►*PRODUCTION CHANGES AND RECOMMENDED PARTS CHANGES FOR IMPROVED PERFORMANCE: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION: RIGHT barrels feed right bank cylinders, LEFT barrels feed left bank*

►*CARBURETOR IDLE ADJUSTMENT CHANGE NOTE: The following idle speed & mixture adjustment procedure supersedes previous instructions.*

►*CARBURETOR SYNCHRONIZATION NOTE:* Before adjusting idle mixture and idle speed, the carburetor inter-connecting rod must be adjusted as follows: Hold rear carburetor throttle in wide open position (choke off) and adjust rod at slotted end so front carburetor throttle valve will be in wide open position. Make sure rod can rotate slightly on pivots and not bind.

Idle Speed & Mixture Adjustment: Screw the "idle by-pass" screw (7/16" slotted hex head screw located on left rear side of each carburetor body flange) against its seat *(NOTE - This "by-pass screw" is no longer used for idle speed adjustment and must remain in the closed position).* Adjust engine idle speed to 650 RPM (transmission in neutral) by screwing in the **idle speed screw** (throttle stop screw at throttle shaft lever) on the front carburetor only. Adjust all four (two on each carburetor) idle mixture screws 1 turn open from a lightly seated position. Obtain the smoothest possible idle speed by further adjusting idle mixture screws on **front** carburetor *(NOTE - It may also be necessary to re-adjust idle mixture screws on rear carburetor if adjustment of front carburetor does not provide proper engine idle speed).*

Throttle Linkage Adjustment (Automatic Transmission Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetor" in Carburetion Section.*

FUEL PUMP PRESSURE: 6-7 lbs. at 2000 RPM.

CARB. EQUIPMENT

Fuel Pump: Carter M2501S (Exc. Air Cond.), M2504S (Air Cond.)

Pressure - 5-7 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Auto-Lite Electric type.

Dash Unit - Auto-Lite 14332A (All).

Tank Unit - Auto-Lite 14382A (P31), 14380A (Sub.).

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Auto-Lite 11-HS-50 or Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

Grounded Terminal - Negative.

STARTER

Auto-Lite MDM-6001 (Synchro-mesh), MDM-6002 (Auto. Trans.), MDL-6003 (Canada).

Armature - Auto-Lite MDL-2088 (All).

Drive - Bendix "Folo-Thru", No. A3596.

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performance Data - MDL

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Performance Data - MDM

Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (Auto. Trans.). Magnetic switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission cars.

See "Starter Controls" in Electrical Section.

Neutral Safety Switch Adjustment: *See "PowerFlite & TorqueFlite" in Transmission Section.*

GENERATOR

Auto-Lite. Used as follows

Generator No.	Armature No.	Application
GJC-7001D	GJC-2030F	Std. (Early)
GJC-7012A	GJC-2030F	Std. (Later)
GJC-7001C		Std. ①
GGA-6001AC	GFY-2101F	Special ②
GHM-6004C	GHM-2059F	Air Cond.
GHM-6004A	GHM-2059F	Taxicab

① - Limited Prod. ② - Except Power Steering.

Performance Data - GJC

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA

Amperes	Volts	RPM
4.0	14.6	950 Max.
40.0	14.6	1600 Max.
40.0	15.0	1600 Max.

Performance Data - GHM

Amperes	Volts	RPM
5.0	14.0	875 Max.
25.0	15.0	1350 Max.
30.0	15.0	1500 Max.

Field Current - 1.2-1.3 amps. (GJC), 1.1-1.3 amps. (GGA & GHM) all at 10.0 volts at 70°F

Motoring Current - 3.4-3.9 amps. (GJC), 2.3-2.6 amps. (GGA), 3.0-3.5 amps. (GHM) all at 10.0 volts.

Brush Spring Tension - 18-36 ozs. (GJC), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

Rotation - Counter-clockwise at commutator end.

Belt Adjustment: **(Std.)** - ¼' deflection with 10 lb. pull midway of longest span.

(Air Cond.) - Loosen generator mounting bolts and use Tool C-3379 & Tool C-3005 to apply 15 lbs. tension on belt. Tighten generator mounting bolts while holding this tension.

REGULATOR

Auto-Lite VAT-6201A (GGA Gen.), VRX-6201A (GJC & GHM Gen.).

Cut Out Relay

Cuts In - 12.6-13.6 volts

Cuts Out - 3-5 amps. discharge current.

Contact Gap - .015".

Air Gap - .031-.034" with contacts open.

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Voltage Regulator

Setting - 14.5 volts at 80°F while charging at 10 amps. or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" with contacts just opening.

Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A	Operating Amperes - Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.

Test B - After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT). 13.6-13.8 volts (VRX).

Air Gap - .048-.052" with contacts just opening.

Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. See *Electrical Section.*

Directional Signals: See *Electrical Section.*

Lighting & Panel Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hexnut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.

Stop Light Switch Location: On forward end of master cylinder.

CIRCUIT BREAKERS: Used as follows:

20 Amp. - Located on headlight switch, protects headlight, beam indicator, parking and ignition lights.

15 Amp. - Protects all other lighting circuits.

5 Amp. (Single Speed), 6 Ampere (Variable Speed). Located on windshield wiper switch. Protects windshield wiper circuits.

FUSES: Clock - SFE 2 in clock lead.

Overdrive - 14 amps. Located on overdrive relay.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*ENGINE NOTE: Three engines used. All have polysphrical combustion chambers with lateral valves and single rocker arm shaft. Bores and stroke differ in engines as indicated in Specifications below.*

ENGINE SPECIFICATIONS: 90° V8 (All Models).

Engine	Bore	Stroke	Displacement
P-31-1 (Std.) ①	3.75"	3.13"	277 cu. ins.
P-31-2,3 (Std.)	3.91"	3.13"	301 cu. ins.
Fury	3.91"	3.31"	318 cu. ins.

① - 301" Engine is standard on Suburban models and optional on other models.

Engine	Compr. Ratio	Rated HP	Developed HP
277"	8.0-1	45.0	197 at 4400 RPM
301"	8.5-1	48.9	② 215 at 4400 RPM
318"	9.25-1	48.9	290 at 5400 RPM

② - 235 at 4400 RPM with Power Pak.

Compression & Vacuum Reading - See *TUNE-UP.*

ENGINE REMOVAL: See *"Engine" in Plymouth Special Data.*

ENGINE MOUNTS: See *"Engine Mountings" in Plymouth Special Data.*

►*ENGINE IMPULSE NOISE CORRECTION:* See "Engine Mountings" in Plymouth Special Data for installation of latest type engine front mount insulator.

OIL PAN REMOVAL: Remove distributor cap and rotor. Drain engine oil. Disconnect pitman arm from cross-shaft and idler arm from idler arm bracket. Remove starter motor. Remove exhaust cross-over pipe, and dust shield. Disconnect front engine mounts and raise front of engine approximately 2". Install small blocks under mounts to support engine and remove oil pan bolts and pan.

►*OIL PAN INTERFERENCE NOTE: If the oil pan touches right hand frame member, install a 1/8" shim under right motor mount.*

CYLINDER HEAD: See *"Cylinder Head & Manifolds" in Plymouth Special Data.*

TIGHTENING TORQUES: See *"Tightening Specifications" in Plymouth Special Data.*

PISTONS

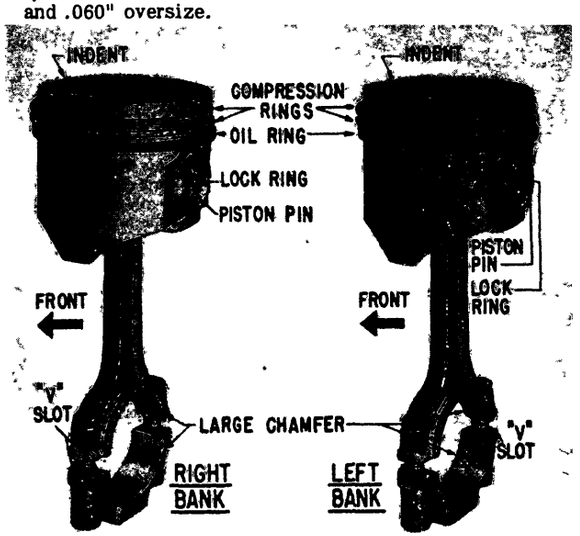
Aluminum alloy, elliptically turned, horizontal slot, tin-plated, thermally controlled by steel band.

Clearance - .005-.0015" at top of skirt. Pull to withdraw .0015 X ½" feeler should be 5-10 lbs. at 70°F.

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number will have .020" oversize cylinder bore.

Removal: Pistons and rods removed from above.

Replacement Pistons: Std., .005", .020", .030", .040", and .060" oversize.



V8 ENGINE PISTON & ROD ASSYS.

Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod. On left bank (1-3-5-7) assemble with detent on same side as large chamfer at insert end of connecting rod. See *Rod Installation.*

PISTON PINS

Floating type with lock ring at each end.

Diameter - .9841-.9843".

Clearance in Piston - .0000-.0005". Tight double thumb press fit at 70°F.

Clearance in Rod - .0001-.0004". Tight thumb press fit at 70°F.

Replacement Pins: Std. .003" and .008" oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	.0015-.003"
Compr. (2)	.0775-.0780"	.010-.020"	.001-.0025"
Oil (3)	.1860-.1865"	.010-.020"	.001-.003"

Replacement Rings: Std. .010", .020", .030", .040", .050", .060" oversize.

Installing Rings: Install compression rings with step on inner edge up.

CONNECTING RODS

Length - 6.12" (Center to Center).

Crankpin Journal Diameter - 2.12".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Lower Bearing - Replaceable, precision type.

Clearance - .0007-.0022" (P-31-1), .0005-.0015" (Others).

Side Play -.006-.014" (two rods).

Installing Rods: Install in cylinder with indent on piston to front of engine. The large chamfer on connecting rod must be toward crankshaft journal fillet.

Bearing Adjustment: None, replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", and .012" undersize.

►*BEARING INSERT CAUTION:* When installing lower bearing insert, make sure that "V" groove in insert is in line with "V" groove in cap for proper lubrication.

CRANKSHAFT

Journal Diameter - 2.50".

►*CRANKSHAFT JOURNAL DIAMETER CAUTION:* Engines with undersize journals identified as follows:

.010" UNDERSIZE (Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker wall bearing. For example, "M2" and "R1" means that .001" thicker wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.

Clearance - .0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .012", undersize.

Crankshaft Rear Oil Seals: See *"Crankshaft & Main Bearings" in Plymouth Special Data.*

Crankshaft Front Oil Seal: See *"Engine Front Cover" in Plymouth Special Data.*

End Thrust: Taken by center (No. 3) main bearing.

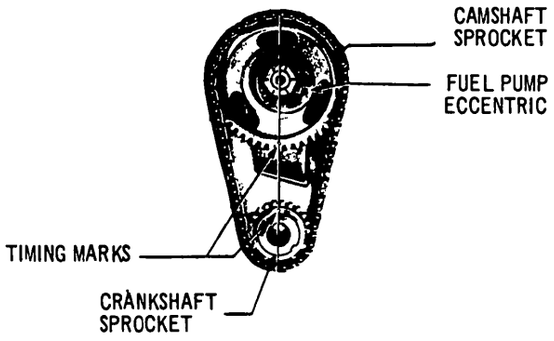
End Play - .002-.007".

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CAMSHAFT

Journal Diameters - (1) 2", (2) 1 63/64", (3) 1 31/64", (4) 1 61/64", (5) 1 9/16".
Bearings - Removable, steel backed babbitt.
Clearance - .001-.003".
End Thrust: Taken by thrust plate behind camshaft sprocket hub.
Timing Chain: Width - 1.02". Pitch - .38". Length - 68 links.
Camshaft Setting: Valve timing is correct when timing marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.



V8 ENGINE VALVE TIMING MARKS

Removal & Installation: *See "Camshaft & Bearings" in Plymouth Special Data.*
Engine Front Cover (Removal & Installation): *See "Engine Front Cover" in Plymouth Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Plymouth Special Data.*

VALVES

Tappet Clearance: .008" Intake, .018" Exhaust, Hot and idling.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.84"	.372-.373"	4.60"
Exhaust	1.56"	.371-.372"	4.58"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.001-.003"
Exhaust	45°	②	.002-.004"

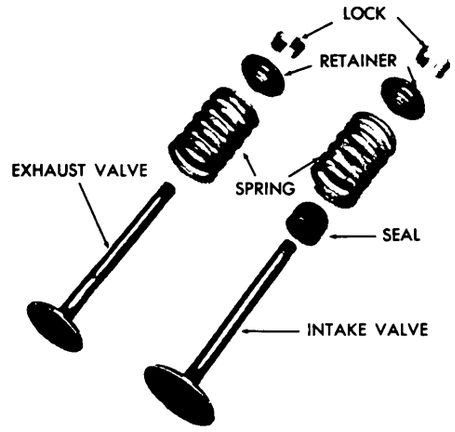
① - .387" (277" & 301" Engines), .405" (Fury).
② - .387" (277" & 301" Engines), .405" (Fury).
Valve Seat Width - .060-.085" (Intake), .040-.060" (Exhaust).

►*VALVE OVERSIZE NOTE:* "I" or "E" stamped on head at rocker arm cover gasket boss, indicates that all intake or all exhaust valves are oversize in that head, depending upon letter stamped on boss.

Valve Springs: Same spring used on intake and exhaust.
Free Length - 1 15/16" (277"), 2" (Others).

Valve Spring Specifications (277" & 301" Engines)

Valve	Spring Pressure	Length
Closed	72 lbs.	1.69"
Open	166 lbs.	1.31"



V8 ENGINE VALVE ASSY.

Fury Engine

Valve	Spring Pressure	Length
Closed	90 lbs.	1.66"
Open	185 lbs.	1.28"

►*VALVE SPRING HEIGHT CAUTION:* If installed height of spring is greater than 1 11/16", install a 1/16" spacer (Part No. 1400482) in head counterbore to bring spring height back to normal 1 5/8-1 11/16".

Valve Guides: Cast integral with cylinder head. Service as follows: When valve stem clearance excessive, use Reamer Tool Set to ream guides to NEXT OVERSIZE Valve as follows: Tool C-3433 (.005" O.S.), Tool C-3430 (.015" O.S.), Tool C-3427 (.030" O.S.). Valves furnished Std., and .005", .0015", .030" oversize.
Valve Lifters: (All) - Barrel type mechanical lifters. Remove from above.
►*LIFTER PRODUCTION CHANGE:* Lifters used in later engines have a shorter overall length (2" early, 1 25/32" later), but are of same weight and are interchangeable.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* Valve timing specifications are with valve train solid.

277" Engine

Intake Valves - Open 14° BTDC. Close 50° ALDC.
Exhaust Valves - Open 52° BLDC. Close 12° ATDC.

301" Engine

Intake Valves - Open 8° BTDC. Close 52° ALDC.
Exhaust Valves - Open 52° BLDC. Close 8° ATDC.

Fury Engine

Intake Valves - Open 17° BTDC. Close 59° ALDC.
Exhaust Valves - Open 55° BLDC. Close 21° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.
Normal Oil Pressure - 50-65 lbs. at 1500 RPM.
Oil Pressure Relief Valve - In oil pump body, Adjustable by replacing spring.

►*OIL PRESSURE RELIEF VALVE SPRING NOTE:* Springs identified as follows:

Color	Free Height	Spring Pressure & Checking Height
Gray (Lt.)	3 1/32"	16.1-17.1 lbs. at 2 1/16"
Red (Std.)	2 27/32"	19.5-20.5 lbs. at 2 1/16"
Brown (Hvy.)	2 31/32"	22.9-23.9 lbs. at 2 1/16"

Oil Pressure Indicator: Lamp on Instrument panel. Light comes on when ignition switch turned on, goes out when oil pressure reaches 8-12 lbs. Operated by oil pressure switch located at the rear of cylinder block at the top.
Oil Pump: Rotor type. Located at rear of engine on rear main bearing cap.
Priming Oil Pump (After Overhaul) - Prime oil pump before installation of pump and strainer to rear main bearing cap.
Overhaul - *See "Oiling System" in Plymouth Special Data.*
Oil Filter: Shunt type. A portion of oil from oil pump is directed through filter and remainder flows into engine lubrication system.
►*ENGINE OILING SYSTEM PRODUCTION CHANGE:* Early production cars had oil by-pass valve in lead from oil pump to main oil galley, later cars have sleeve with 9/64" orifice replacing bypass valve.
Filter Element - Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element is changed.
Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe (if so equipped).

COOLING

Water Capacity: 20 qts. Add 1 qt. for heater.
►*AIR CONDITIONER OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.
Pressure Valve: Radiator filler cap. Opens at 14 lbs.
Thermostat: Pellet type. Located under water outlet elbow. Opens at 157-162°F.
Water Pump: Sealed ball bearing type. No lubrication required.
See "Water Pumps" in Plymouth Special Data.
Fan Belt Adjustment (Air Conditioned Cars): 1/8" deflection with 10 lbs. pressure midway between idler and water pump pulleys. *NOTE - For generator belt adjustment, see Generator above.*
Temperature Gauge: Auto-Lite. Electric type.
Dash Unit - Auto-Lite 14333A.
Engine Unit - Auto-Lite 14405A.
See "Temperature Gauges" in Misc. Section.

CLUTCH

Borg & Beck. 10A7 No. 361376 (Std. V8), 10.5A8 No. 361418 (Fury).
Disc No. - Borg & Beck 382358 (10A7), 382621 (10.5A8).
See "Borg & Beck" Clutches in Clutch Section.
Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained. This adjustment will provide necessary 1" freeplay at pedal.

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Overcenter Spring Adjustment: Tighten eyebolt sleeve on clutch pedal overcenter spring bolt finger tight with pedal in depressed position, then tighten four complete turns

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods Remove transmission (See Synchro-mesh Transmission) Mark clutch cover and flywheel Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)
See "Plymouth Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section*

►*CAR TOWING CAUTION.* If car is to be towed long distances, disconnect propeller shaft at rear axle carrier.

Removal: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down
See "Warner R10" Overdrive in Transmission Section

Overdrive Controls: *See "Overdrive Controls" in Transmission Section*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles drain and refill every 20,000 miles Use only Automatic Transmission Fluid Type "A"

Checking Fluid Level - *See TORQUEFLITE below*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER POWERFLITE SERVICE DATA: See "PowerFlite" in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed planetary transmission.
See "TorqueFlite" Transmission in Transmission Section

►*NO REVERSE CORRECTION: See "TorqueFlite" Transmission in Transmission Section.*

►*HARSH SHIFTING OR SLIPPAGE IN 1-2 UPSHIFT CORRECTION· See "TorqueFlite" Transmission in Transmission Section.*

►*DOWNSHIFT "RUNAWAY" CORRECTION: See "TorqueFlite" Transmission in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING. See "TorqueFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A"

Checking Fluid Level - *CAUTION - Following procedure and fluid level supersede previous recommendations.* Check transmission COLD if possible. Idle engine with brakes applied, press all pushbuttons in turn, then check fluid level on dipstick with engine idling in "N". Maintain level as follows:

Cold Transmission (After standing and before being driven for several miles) - Level should be between "L" mark and ½" below "L" mark. Add oil if below ½" below "L" mark, remove oil if above "L" mark. Do not add oil if level within above range.

Hot Transmission (After being driven several miles) - Level should be between "F" mark and ½" below "F" mark (on cars with first type dipstick with distance of 1 5/8" between "F" and "L" marks, level should be ½" below "F" mark). Add oil if level below "L" mark to bring level up to ½" above "L" mark, remove oil if level above "F" mark. Do not add oil if level within above range.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "TORQUEFLITE" SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball & Trunnion type front, Cross type rear.

Rear Universal Joint Operating Angle - *See "Propellor Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating with separate carrier and Hotchkiss drive.
See "Plymouth Hypoid" in Rear Axle Section.

►*REAR AXLE LUBRICATION LEVEL NOTE·* Recommended lubrication capacity (3½ pints) will bring fluid level to 1" below filler opening. DO NOT add to bring level to opening.

►*BANJO HOUSING INSTALLATION NOTE· Check rear universal joint angle. See "Propellor Shaft Notes" in Plymouth Special Data.*

Rear Axle Ratios

Transmission	Exc. Fury	Fury
Synchro-mesh	3.54-1(39-11)	① 3.73-1(41-11)
Overdrive	3.91-1(43-11)	
PowerFlite	3.36-1(37-11)	
TorqueFlite	3.18-1(35-11)	② 3.36-1(37-11)

① - Optional Ratios - 3.36-1(37-11), 3.54-1(39-11), 3.91-1(43-11), 4.1-1(41-10), 4.3-1(43-10).
② - Optional Ratios - 2.92-1(38-13), 2.93-1(41-14), 3.18-1(35-11), 3.54-1(39-11), 3.73-1(41-11), 3.91-1(43-11), 4.1-1(41-10), 4.3-1(43-10), 4.56-1(41-9), 4.89-1(44-9).

Backlash - .006-.010".

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick equally at both wheels). **End Play** - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. New "Torsion-Aire" suspension, with ball joint mounted steering knuckles and torsion bar front spring.
See "Torsion-Aire" in Front Suspension & Wheel Alignment Section.

►*UPPER BALL JOINT LUBRICATION LOSS CORRECTION: See "Plymouth" in Suspension & Wheel Alignment Section.*

Steering Axis Inclination - 6½° with correct camber.
Camber - Left wheel 3/8° preferred, limits Pos. ½°-0°. Right wheel 0° preferred, limits 0° ± ¼°
Caster - 0° to Neg. 1½° (Manual Strg.), Pos. 1½° to 0° (Pwr. Strg.). *NOTE* - Set both sides the same.
Toe-In - 1/8" preferred, limits Pos. 3/32-5/32".
Turning Radius - Inner wheel 20°, outer wheel 17½-19°.

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STEERING

Manual: Gemmer. Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

Power Steering: "Coaxial", Components encased in tubular housing which is located at bottom of, and concentrically around axis of steering column.
See "Coaxial" Power Steering in Steering Section.

►*LATE 1957 PLYMOUTH POWER STEERING GEAR PRODUCTION CHANGE:* "Constant-Control" type power steering units replaced the "Coaxial" units formerly used. *See "Constant Control Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service. Plymouth "Total-Contact" (Floating shoe) type.
See "Chrysler, DeSoto, Dodge, Plymouth Center-Plane & Total-Contact" Brakes in Brake Section.
Drum Diameter - 11" front and rear.
Wheel Cylinder Diameter - 1 1/8".
Lining - Molded asbestos (bonded to shoe).
Length - 11½". **Width** - 2". **Thickness** - .20".

►*BRAKE LINING PRODUCTION CHANGE AND PARTS REPLACEMENT NOTE:* Improved brake lining (identified by one white spot and one blue spot on side of lining) used in production on front wheel brakes approximately April 15th, 1957. They are recommended for use for severe braking conditions and can be installed on both front and rear wheels. Part No. 1738920 consists of 8 linings. Part No. 1674067 consists of one shoe with bonded lining.
Braking Power - 60% front, 40% rear.
Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel locked. Turn cams in opposite direction until wheel turns free.
Rear Wheels - Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

►*DUST SHIELDS (Front Wheels) SEALING CAUTION:* Wheel shields are sealed with heavy body sealer to prevent dust and water entering braking area. Reseal wheel cylinder openings as necessary, when servicing brakes.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.
Checking Fluid - Filler plug on top of master cylinder (on dash panel in engine compartment). Maintain level to within ½" of top of reservoir.
Removal - Disconnect pedal return spring, pushrod and brake tube at master cylinder. Disconnect stop light wires from switch and remove nuts and bolts that secure master cylinder to dash panel. Pull master cylinder straight out from dash panel.

Power Brakes: Bellows Assist type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Chrysler, Plymouth Bellows Type Power Unit" in Brake Section.

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond bracket. Remove attaching nuts, slide reinforcement plate off studs and remove unit from dash.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans., 7" internal expanding type used with Automatic Trans.
Adjustment - *See "Brake Notes" in Plymouth Special Data.*

Lining	Width	Thickness	Length
6" Ext.	2"	5/32"	15.38"
7" Int.	2"	5/32"	13.44"

►*PARKING BRAKE CAM LEVER INTERFERENCE CORRECTION:* Install 1/8" steel shim between rear engine mount and crossmember when interference prevents brake from releasing.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite Electric. EPW-4001 (Single Speed), EPV-4001A (Variable Speed).
See "Auto-Lite Electric Windshield Wipers" in Misc. Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.
See "Electric Window Regulators" in Misc. Section.

Power Seat Adjusters: Electric, 2-Way type.
See "Power Seat Adjusters" in Misc. Section.

Convertible Top Control: Electric-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Identification
Plaza	LP1-L
Savoy	LP1-M
Belvedere	LP1-H

SERIAL NUMBER: On plate attached to left front hinge pillar post

Starting Serial Number - As follows

Model	Destrict	Evansville	Los Angeles	Newark
All	LP1-1001	LP1E-1001	LP1L-1001	LP1N-1001

ENGINE NUMBER: Stamped on boss located on left front section of cylinder block

Starting Engin Numb r - LP-6-1001 (early), L-230-100001 (later - after approximately March 1, 1958)

►*ENGINE NUMBER LETTERS & MARKS (Following Engin Number) indicat s the following:*

"A" - All cylinders .020" oversize

"B" - All Main & Connecting Rod Journals 010" undersize.

"AB" - Both above conditions exist

NOTE - "10" stamped on left rear side of cylinder head pad indicates 10" clutch

TUNE-UP

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed (150 RPM). Maximum allowable variation between cylinders 10 lbs.

VACUUM READING: Steady 18-21' at idling speed

VALVE TAPPET CLEARANCE: 010" Intake, 012" Exhaust, with engine hot and idling *NOTE* - Exhaust valve clearance changed from 010" to increase valve life

►*TAPPET ADJUSTMENT NOTE* Opening in right fender shield omitted in production Remove entire shield when setting tappet clearance

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002' clearance for exhaust tappets is desirable

MANIFOLD HEAT CONTROL: Thermostatic coil type See that valve operates freely When installing coil, spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud

IGNITION

FIRING ORDER: 1–5–3–6–2–4

SPARK PLUG GAP: 035'

Plugs - Auto-Lite Resistor AR-51 14 mm Torque to 30-32 ft lbs *NOTE* - Auto-Lite AR-5 plugs used on some cars

COIL: Aut -Lit CAG-4001B.

Ignition Current - 1 8 amps. idling, 2 4 stopped.

R sistor - None used.

DISTRIBUTOR: Aut -Lit IBR-4001.

C nd ns r - Auto-Lite IAT-2015RA. **Capacity** - .25-.28 mfd.

C ntact P int S t - Auto-Lite IGW-3028BS.

Br ak r Gap - .020". Limits .018-.022".

Cam Angl - 39° plus or minus 3°

Break r Arm Spring T nsion - 17-20 ozs

R tati n - Clockwise viewed from above

Aut matic Advanc - IBR-4001

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	460	2	920
3.5	1050	13	2100
7 5	1425	15	2850
8 5	1800	17	3600

Vacuum Spark Control: Integral type.

Vacuum Advance - IBR-4001

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6
1	2	6 7/8
5	10	10 1/2
8	16	13 3/4
9 5	19	16

►*DISTRIBUTOR INSTALLATION NOTE Make certain that No. 1 piston is at TDC on compression stroke and that distributor rotor is at No. 1 firing position.*

IGNITION TIMING

Setting - 2° BTDC

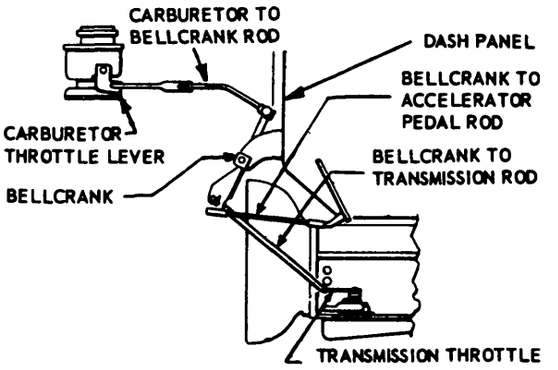
Timing Mark - "DC" mark on fan pulley or vibration dampener aligned with pointer on chain case cover.

CARBURETOR

►*CARBURETOR APPLICATION Carter single barrel carburetors used on all models.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE Special cleaning procedure required. See AIR CLEANER below.*

THROTTLE LINKAGE ADJUSTMENT (PowerFlite): Loosen vertical clamp rod and adjust the carburetor throttle lever rod to provide a 5 7/16" distance between the anchor points of the throttle return spring. Then with engine idling (off fast idle), take up slack at the vertical rod and tighten the clamp nut.



POWERFLITE THROTTLE LINKAGE

CARTER BBS (SINGLE)

Transmission	Carter Carb. No.
Synchro-mesh	BBS 2567S
Overdrive	BBS 2568S
PowerFlite	BBS 2569S
Replacement	① BBS 2604S
City Traffic	② BBS 2403S
Taxi (Synchro-mesh)	BBS 2410S
Taxi (PowerFlite)	BBS 2771S

① - Replacement for 2567S. Use with kickdown switch (192-33U) to replace 2568S. Use with dashpot (202-80U) to replace 2569S. ② - With throttle restrictor.

Idle Setting - ½-1¾ turns open (2567S, 2568S, 2569S & 2403S), 1-2 turns open (2410S, 2771S) Turn screw out for richer mixture

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite - in Neutral)

Float Level - 7/32" (exc 2403S, 2410S, 2771S), 9/32" (2403S, 2410S, 2771S) from top of each float to top surface of body casting with float pin retainer removed and float pin at bottom of guide slots

Accelerating Pump - Install connector rod in center hole of throttle lever (medium stroke).

Fast Idle: .016-.020" clearance between lower edge of throttle valve and carburetor bore with fast idle cam in fast idle position. Adjust by bending connector rod at lower angle (Tool T109-213).

Automatic Choke: Centered at index (all models).

Slow Closing Throttle Dashpot (PowerFlite): Loosen locknut and adjust dashpot unit so that dashpot plunger shaft can be moved inward approximately 3/32" with throttle valve fully closed.

Overdrive Kickdown Switch: With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide.

Throttle Linkage Adjustment (PowerFlite): *See CARBURETOR above.*

►*OTHER DATA See "Carter BBS Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter No M2609S (Fuel only)

Pressure - 3½-6 lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Auto-Lite Electric type

Dash Unit - Auto-Lite 14332A (All)

Tank Unit - Auto-Lite 14673A (22" lead Female, exc Suburban), 14676A (4½" lead Male, exc Suburban), 14684A (4½" lead Male, Suburban)

See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY FILTER ELEMENT type Clean every 5000 miles, replace element every 15,000 miles

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Auto-Lite 11-HS-50 or Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)

Grounded Terminal - Negative

STARTER

Auto-Lite MDM-6001 (Synchro-mesh), MDL-6004 (PowerFlite), MDL-6003 (Canada).

Armature - Auto-Lite MDL-2088 (All).

Drive - Bendix "Folo-Thru", No. A3596.

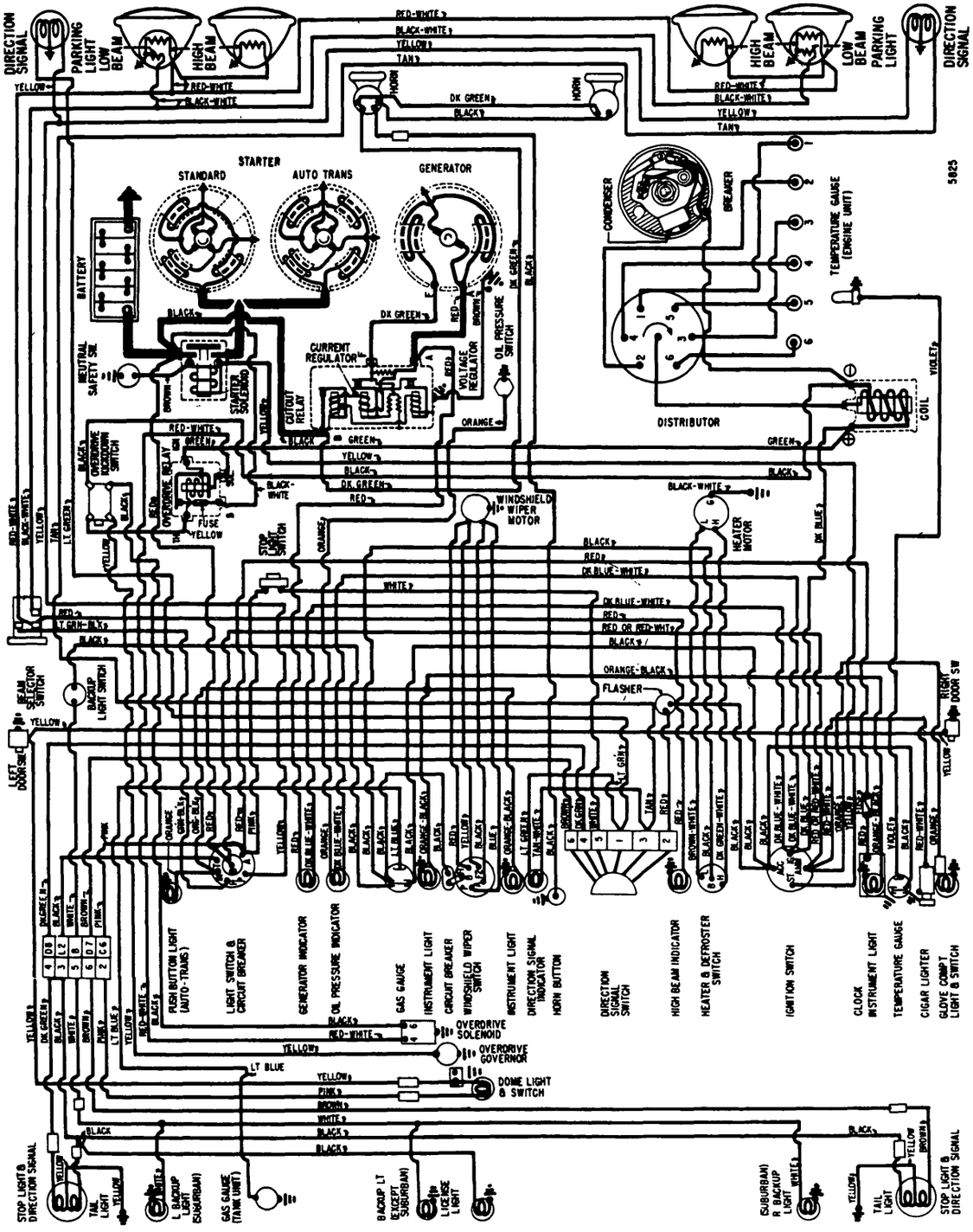
Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performanc Data - MDL

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

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Performance Data - MDM

Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (PowerFlite). Magnetic type switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission cars. *See "Starter Controls" in Electrical Section.*

Neutral Safety Switch Adjustment: *See "PowerFlite" & "TorqueFlite" in Transmission Section.*

GENERATOR

Auto-Lite GJC-7012A (Std.), GGA-6001AC (Spec.Equip.). GHM-6004A (Taxi).

Armature - Auto-Lite GJC-2030F (GJC-7012A), GFY-2101F (GGA-6001AC), GHM-2059F (GHM-6004A).

Performance Data - GJC

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data GHM (Cold - 70°F) -

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC-7000); 34-41 ozs. (GGA); 35-53 ozs. (GHM).

Field Current - 1.2-1.3 Amps. (GJC); 1.1-1.3 Amps. (GGA & GHM); at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 Amps. (GJC); 2.3-2.6 Amps. (GGA); 3.0-3.5 Amps. (GHM) at 10 volts (70°F).

Belt Adjustment: Deflection measured in inches under 5 lbs. push or pull applied midway of longest belt span, as follows:

Belt	New	Used
Std. Generator	3/32"	5/32"
Generator with Power Strng.	3/32"	7/32"

REGULATOR

Auto-Lite. Used with generators as follows:

Auto-Lite Regulator No.	Generator
VAT-6201A	GGA
VRX-6201A	GJC & GHM

Cut out Relay

Cuts In - 12.6-13.6 volts

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amps.

Contact Gap - .015" minimum

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts at 80°F while charging at 10 amps. or with .25 ohm resistor in series between regulator and battery.

Air Gap - 048-.052" with contacts just opening

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Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.

Test B - After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).

Air Gap - .048-.052" with contacts just opening.

Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std See *"4-Headlight System" in Electrical Section*

Directional Signal: See *Electrical Section*

Lighting & Panel Switch Removal: Remove headlight switch knob recessed hex screw, remove knob Remove hex nut and threaded sleeve holding switch or switches in instrument panel Slide panel light switch control off lugs of tab plate

Stop Light Switch (Location): On forward end of master cylinder

LIGHTING CIRCUIT BREAKERS: Used as follows:

23 Amp res - Protects Headlights, Headlight Indicator, Parking Lights and Ignition Switch Light. Located in Headlight Switch.

15 Amp res - Protects Tail, Stop, License Plate, Instrument, Map, Clock, Glove Compartment and Courtesy lights. Located in Headlight Switch.

5 Amperes.- Protects Windshield Wiper (Single Speed).

6 Amperes - Protects Windshield Wiper (Variable Speed).

FUSES: Clock - 2 ampere. In clock lead

Overdrive - 14 amps. On Overdrive Relay.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. "L" head.

Bore	Stroke	Displacement
3¼"	4 5/8"	230 Cu. In.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0	25.4	132 at 3600 RPM

Compression & Vacuum Reading - See *TUNE-UP.*

OIL PAN REMOVAL: Drain engine oil. Disconnect pitman arm bracket Remove dust shield and remove starter motor. Disconnect front motor mounts and raise engine approximately 2". Install wooden blocks under mounts and remove oil pan.

►*OIL PAN INTERFERENCE NOTE: If the oil pan touches right hand frame cross-member, install a 1/8" shim under right motor mount.*

CYLINDER HEAD: See *"Cylinder Head & Manifolds" in Plymouth Special Data*

TIGHTENING TORQUES: See *"Tightening Specifications" in Plymouth Special Data*

PISTONS

Aluminum alloy, U-slot, cam ground type.

►*CYLINDER BORE OVERSIZE CAUTION: Engines with letter "A" following engine number indicates that cylinder bore .020" Oversize.*

Weight–16 ozs. (stripped).

Removal–Pistons and rods removed from above.

Fitting New Pistons: 0002-0012" measured ¾" from bottom on thrust face. With piston pin and rings removed, cylinder wall and piston dry and clean, insert piston, upside down, into cylinder bore, with feeler stock, .002" x 1/2", inserted between cylinder wall and piston, on high spot of piston contour. Pull to withdraw feeler should be 5-10 lbs

Replacement Pistons: Std., .005", .020", .030", .040," .060" Oversize.

Installing Pistons. "U" slot away from valves.

PISTON PINS

Full floating type.

Diameter–55/64". **Length**– 2-3/4".

Pin Fit in Piston–.0000-.0005". DOUBLE THUMB push fit at room temperature (70° F.).

Pin Fit in Rod Bushing–.0001-.0002". Tight thumb push fit at room temperature (70° F.).

Replacement Pins: Std., .003", .008" Oversize.

NOTE–Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.010-.020"	.0025-.004"
Compr. (#2)	3/32"	.010-.020"	.002-.0035"
Oil (#3)	5/32"	.010-.020"	.001-.0025"
Oil (#4)	5/32"	.010-.020"	001-0025

Replacement Rings: Std., .010", .020", .030", .040", .050", .060" Oversize.

Installing Rings. #1 Compression, with step on inner edge up. #2 Compression with step on inner edge up (step down, if step on outer edge).

CONNECTING RODS

Length (Center.to.Center)–7 13/16'

Weight–27 9 ozs

►*THICKER WALL-BEARING & JOURNAL DIAMETER CAUTION (One or more Journals Machined Undersize). "See "CRANKSHAFT" below.*

Crankpin Journal Diameter–2.0625".

Maximum out-of-round and taper limits–.001".

Lower Bearings - Removable precision type, Bi-Metal Grid No shims

►*JOURNAL DIAMETER CAUTION: (ONE OR MORE Journals Machined UNDERSIZE)–See "CRANKSHAFT" below.*

Clearance–.0005-.0015".

Endplay–.006-.011".

Bearing Adjustment: None. Replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", 012", 020", 030", 040" Undersize

Installing Rods Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter–2.4995-2.5005". Four bearing.

Bearing Type - Removable, precision type, lead-base babbitt on steel No shims

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows.

.010" UNDERSIZE (All Main & Connecting Rod Journals)–Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals)–When replacing bearings, look for stamped number on middle throw arm of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker-wall bearing. For example "M2" and "R1" means that .001" thicker-wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.

Clearance–.0005-.0015".

Replacement Bearings: Std., .001", .002", .003", .010", .012", .020", .030", .040" Undersize.

Crankshaft Rear Oil Seals: See *"Crankshaft & Main Bearings" in Plymouth Special Data*

Crankshaft Front Oil Seal: See *"Engine Front Cover" in Plymouth Special Data*

End Thrust. Taken by flanged faces on rear (#4) main bearing. **Endplay**–.003-.007".

CAMSHAFT

Journal Diameters–(1) 2", (2) 1-31/32", (3) 1-15/16", (4) 1-1/4".

Bearings - Removable, lead-base babbitt on steel (exc No 4 - machined in block)

Clearance–.001-.003" NOTE–If clearance exceeds .005" (measure with dial indicator placed against cam lobe and pry toward indicator), install new camshaft for test and if clearance is greater than .0035", replace bearings.

Removal & Installation: See *"Camshaft & Bearings" in Plymouth Special Data.*

End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay**–.002-.006".

Timing Chain Width–1". **Pitch**–.500". **Length**–24" or 48 links.

Camshaft Setting: Sprockets marked. Mesh chain in sprockets with "0" marks on sprockets adjacent and in line with straightedge across shaft centers.

Engine Front Cover Installation: See *"Engine Front Cover" in Plymouth Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Plymouth Special Data.*

VALVES

Tappet Clearance: 010" Intake, 012" Exhaust, with engine hot and idling *NOTE* - Exhaust valve clearance changed from 010" to increase valve life

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An Additional 002" clearance for exhaust tappets is desirable

►*TAPPET ADJUSTMENT NOTE.* Opening in right fender shield omitted in production Remove entire shield when setting tappet clearance

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Valves	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.340-.341"	4.84"
Exhaust	1 13/32"	.340-.341"	4.89"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	.001-.003"
Exhaust	45°	.365"	.003-.005"

Valve Seat Width–1/16-3/32". Runout .0015" maximum.

►*VALVE SEAT INSERT CAUTION: See "Valve System" in Plymouth Special Data.*

Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, ream guides to inside diameter of .342-.343" (Intake), .344-.345" (Exhaust). *CAUTION–Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*

Valve Springs: Can be installed with closely coiled end at either top or bottom. *NOTE–Springs are available in several colors. Colors do not refer to spring tension but merely identify the manufacturer.*

Free Length–2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1-3/4"
Valve Open	110-120 lbs.	1-3/8"

Valve Lifters: Mushroom type (remove from below).

Stem Diameter–5/8". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".

Lifter Clearance in Block–.002" maximum.

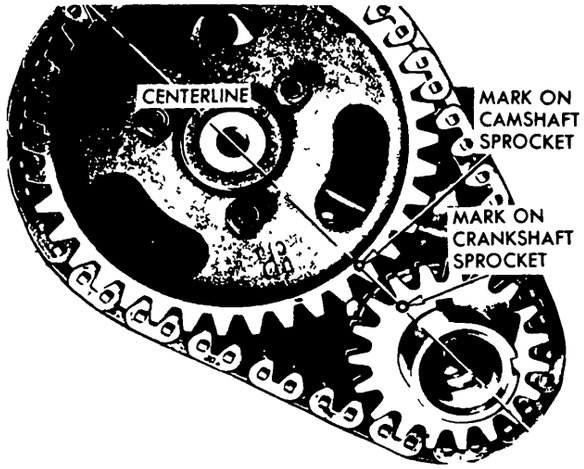
VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* The following valve opening and closing points are with tappet clearance of .014". Reset to operating specifications after checking valve timing

Intake Valve - Open 12° BTDC Close 44° ALDC

Exhaust Valve - Open 50° BLDC Close 6° ATDC



PLYMOUTH 6 CYL. VALVE TIMING MARKS

ILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

►*OIL PUMP OUTLET PIPE INTERFERENCE CORRECTION:* To correct noise caused by outlet pipe interfering with oil pan, bend outlet pipe to provide clearance.

Crankcase Capacity: 5 quarts (refill). Add one quart with filter change.

Normal Oil Pressure - 40-50 lbs. at 25-30 MPH.

Oil Pressure Relief Valve - Located on left side of cylinder block below starter.

Oil Pressure Relief Valve Spring: Color black. Free Length 1 7/8", Pressure 14:25-15.75 lbs. when compressed to length of 1¼".

Oil Pressure Indicator Switch: Auto-Lite 14406A, located on left side of cylinder block at rear

Oil Pressure Indicator Switch: Located on left side of cylinder block at rear. When oil pressure exceeds 8-12 lbs. switch opens, indicator lamp goes out.

Oil Pump: Rotor type. On right side of crankcase.

Overhaul - *See "Oiling System" in Plymouth Special Data.*

Oil Filter: By-pass type with shunt type oil circuits. When pressure relief valve close, it blocks oil return from filter. As valve opens oil is permitted to flow through filter and excess oil returns to crankcase.

Filter Element - Install new filter element and cover gasket at 5000 mile intervals (or earlier if required). Change oil at same time filter element changed.

Crankcase Ventilation: Filter element in oil filler cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 13 quarts. Add one quart for heater.

Pressure Valve - Radiator filler cap. Opens at 14 lbs.

Thermostat: Pellet type located in cylinder head water outlet. Opens at 157-162°F

Water Pump: Ball bearing type. No lubrication required. *See "Water Pumps" in Plymouth Special Data.*

Water Distribution Tube: *See "Cooling System" in Plymouth Special Data*

Temperature Gauge: Auto-Lite Electric.

Dash Unit - Auto-Lite 14333A. **Engine Unit** - 14405A

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. 9A7 No. 361384 (Synchro-mesh & O D - Std.), **10A8 No. 361463** (Synchro-mesh & O D - Heavy Duty), **Auburn No. 100131-1** (optional without overdrive)

Disc No. - Borg & Beck No. 382649 (361384), 381758 (361463)

See "Borg & Beck" or "Auburn" Clutches in Clutch Section

Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained. This adjustment will provide necessary 1" free play at pedal.

Overcenter Spring Adjustment: Disconnect upper end of clutch pedal rod. Move clutch pedal to floor and loosen overcenter spring adjusting nut. Then tighten nut finger tight. Now, with a wrench, tighten adjusting nut against spring bracket **5 full turns.** Reinstall pedal rod.

Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods. Remove transmission (See Synchro-mesh Transmission). Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel; loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Plymouth Synchro-mesh" in Transmission Section.

►*TRANSMISSION PRODUCTION CHANGE:* New transmission with different ratios used in production approximately Feb. 21, 1958 Identified by following code letters on top of transmission case in front of cover: Standard - LA, Heavy Duty - LC, Overdrive - LD *See "Plymouth Synchro-mesh" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle.

Removal: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods. If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut. This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench. Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission. This precaution will avoid bending clutch disc.

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down.

See "Plymouth Overdrive" in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission.

See "PowerFlite" Transmission in Transmission Section.

►*PART THROTTLE DOWNSHIFT RUNAWAY CORRECTION:* Install new throttle valve and spring *See "PowerFlite Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles Use only Automatic Transmission Fluid Type "A" *NOTE* - Under severe operating conditions drain and refill at 10,000 mile intervals

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" below

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"L" mark. Add or drain fluid as necessary to maintain this level.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral fluid level should be between ½" above "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "PowerFlite Transmission" in Transmission Section.*

UNIVERSALS

Detroit. Ball & Trunnion type front, Cross type rear.

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating, Hypoid gear, with separate carrier and Hotchkiss drive. *See "Plymouth Hypoid" in Rear Axle Section.*

►*"SURE GRIP" AXLE NOTE:* Optional in all ratios and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*BANJO HOUSING INSTALLATION NOTE:* Check rear universal joint operating angle. *See "Propeller Shaft Notes" in Plymouth Special Data.*

Axle Ratios	Standard	Optional
Synchro-mesh	3.73-1 (41-11)	4.10-1, 3.90-1
Overdrive	4.10-1 (41-10)	3.90-1
PowerFlite	3.73-1 (41-11)	3.90-1, 4.10-1

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller-Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed. Check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015" .030" thick (equally at both wheels). **End Play** - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joint mounted steering knuckles and torsion bar front springs.

See "Torsion-Aire" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 6½° at 0° camber.

Caster - **(Manual Steering)** Neg. ¾°±¾°. **(Power Steering)** Pos. ¾°±¾°. *NOTE* - Set both sides at same dimension.

Camber (Left Wheel) - Pos. ¼°±¼° (3/8° preferred).

Camber (Right Wheel) - 0°±¼° (0° preferred).

Toe-In - 3/32"-5/32", 1/8" preferred.

Toe-Out on Turns - Inner wheel 20°, outer wheel 18° 46'.

STEERING

Manual: Gemmer - Worm and three-tooth roller

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: New "Constant Control Full Time" power steering.

See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section.

►*"LUMPINESS", TYING-UP, NOISE TRANSMISSION, LOSS OF POWER CORRECTIONS & PARTS CHANGES FOR IMPROVED PERFORMANCE: See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

►*MASTER CYLINDER PRODUCTION CHANGE & FREE-PLAY ADJUSTMENT NOTE;* Later cars without power brakes have new master cylinder, Part No. 1829401, with built-in pedal stop to eliminate pedal freeplay adjustment.

Service. Plymouth "Total-Contact" (Floating Shoe) type.

See "Chrysler, De Soto, Dodge, Plymouth Center-Plane & Total-Contact" Brakes in Brake Section.

Drum Diameter - 11" front and rear.

Wheel Cylinder Diameter - 1 1/8".

Lining - Molded asbestos (bonded to shoe).

Length - 11½". **Width** - 2". **Thickness** -.20".

Braking Power - 60% front, 40% rear.

Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel locked. Turn cams in opposite direction until wheel turns free.

Rear Wheels - Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel

Checking Fluid - Filler plug on top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pedal return spring, push rod and brake tube at master cylinder. Disconnect stop light wires from switch and remove nuts and bolts that secure master cylinder to dash panel. Pull master cylinder straight out from dash panel.

Power Brakes: "Bellows Assist" type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Chrysler, Plymouth Bellows Type Power Unit" in Brake Section.

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond bracket. Remove attaching nuts, slide reinforcement plate off studs and remove unit from dash.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans., 7" internal expanding type used with Automatic Trans.

Adjustment - *See "Brake Notes" in Plymouth Special Data.*

Lining	Width	Thickness	Length
6" Ext.	2"	5/32"	①
7" Int.	2"	5/32"	② 13.06"

① - One-piece 16.68", Two-piece 15.38" (total).

② - Total both shoes.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite Electric. EPW-4001 (Single Speed), EPV-4001A (Variable-speed).

See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.

See "Electric Window Regulators" in Miscellaneous Section.

Power Seat Adjusters: Electric, 2-Way type.

See "Power Seat Adjusters" in Miscellaneous Section.

MODEL IDENTIFICATION

Series	Model Identification
Plaza	LP2-L
Savoy	LP2-M
Belvedere	LP2-H
Fury	LP2-S

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Starting Serial Numbers

Model	Detroit	Evansville	Los Angeles	Newark
All	LP2-1001	L...LP2E-1001	L...LP2L-1001	L... LP2N-1001

ENGINE NUMBER: (318" Engine) - Stamped on left front face of cylinder block.

350" Engine - Stamped on right side of cylinder block between coil and distributor.

Starting Engine Nos. - 318" LP-8-1001, **318" Fury** FLP-1001, **350"** L-350-1001.

►*ENGINE NUMBER LETTERS & MARKS (Following Engine Number): Identified as follows:*

"A" - All Cylinders .020" oversize.

"B" - All Crankshaft Journals .010" undersize.

"AB" - Both above conditions exist.

"MALTESE CROSS" (3/8" high) ONE OR MORE Crankshaft Journals .001" undersize. *See "Connecting Rods" and "Crankshaft" below.*

"♦" (3/8" high) - All valve lifters .008" oversize.

"HD" stamped under engine number indicates 10½" clutch.

TUNE-UP

COMPRESSION PRESSURE: 125-165 lbs. (318" Engine), 150-180 lbs. (350" Engine). Maximum variation between cylinders should not exceed 15 lbs. (318" Engine), 25 lbs. (350" Engine).

VACUUM READING: 19.5" at idling speed.

VALVE TAPPET CLEARANCE: (318" Engine) .010" Intake, .018" Exhaust, HOT. *NOTE* - Intake valve clearance supersedes previous specification of .008" and is recommended for improved torque and idle characteristics.

350" Engine - None. Hydraulic valve lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located at right exhaust manifold (between manifold and gasket).

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035" (All Engines).

Spark Plugs - Auto-Lite Resistor type AR-42 (318" Engine, exc. Fury), AR-32 (Fury & 350" Engine). 14 mm. Tighten to 30-32 ft. lbs.

COIL: Auto-Lite CAH-4001A.

Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.

Resistor - Auto-Lite PU-4008.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch to coil. When testing coil, include resistor with coil.*

DISTRIBUTOR: Auto-Lite. As follows:

Model	Auto-Lite No.
Standard 318" Eng. (2-Barrel Carb.)	IBP-4003F
Standard 318" Eng. (4-Barrel Carb.)	IBP-4003D
Fury 318" Eng. (Two 4-Bbl. Carbs)	IBS-4003
Gold. Commando 350" Eng. (Two 4-Bbl. Carb)	IBS-4006B
Gold. Commando 350" Eng. (Fuel Injection)	IBS-4009

Breaker Gap - .015-.018".

Cam Angle - 26-32° (Single Breaker). 31-37° (Double Breaker). Double breaker distributors must be checked with both sets of breakers operating. Do not set gap outside limits to obtain specified cam dwell.

Condenser - Auto-Lite IBB-2042-SS1 (IBS-4006B, 4009).

Capacity - .25-.28 mfd.

Contact Point Set - Auto-Lite IGW-3028JS (IBS-4006B, 4009).

►*CAM ANGLE SETTING CAUTION (IBP Distributors):* Cam angle should be checked with vacuum line disconnected. Cam angle may decrease as much as 10° with maximum vacuum advance, but must not decrease more than 12°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Clockwise (318" Eng.), Counterclockwise (350" Eng.).

Automatic Advance - IBP-4003F

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	450	0	900
1	565	2	1130
3	800	6	1600
8	2050	16	4100
9	2300	18	4600

Automatic Advance - IBP-4003D

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	425	2	850
4.5	700	9	1400
10	2130	20	4260
11	2400	22	4800

Automatic Advance - IBS-4003

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	375	2	750
4	450	8	900
7	875	14	1750
8	1000	16	2000

Automatic Advance - IBS-4006B, 4009

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
1	425	2	850
5.5	750	11	1500
9	1725	18	3450
10	2000	20	4000

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance - IBP-4003D, F℄

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6 3/4
1	2	7 1/4
7	14	10 7/8
12	24	15
13	26	16

℄ – Distr. IBP-4003F before Date Code 9N. For Vacuum Advance after Date Code 9N, see 1959 Plymouth V8 data.

Vacuum Advance - IBS-4003

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	9 1/8
1	2	9 7/8
5	10	12 7/8
9	18	16 1/2
10.25	20.50	18

Vacuum Advance - IBS-4006B, 4009

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7 1/8
1	2	7 5/8
7	14	11 1/4
12	24	15 1/2
13	26	16 1/2

Distributor-Oil Pump Drive Shaft Bushing: *See "Ignition Notes" in Plymouth Special Data.*

IGNITION TIMING

Setting - 10° (Exc. Fury & 350" Golden Commando Eng.), 8° (Fury & 350" Golden Commando Eng.).

Timing Mark - Vibration dampener marked "DC" at TDC point with 2° graduations before and after this mark. Align correct graduation with pointer on timing chain cover.

CARBURETOR

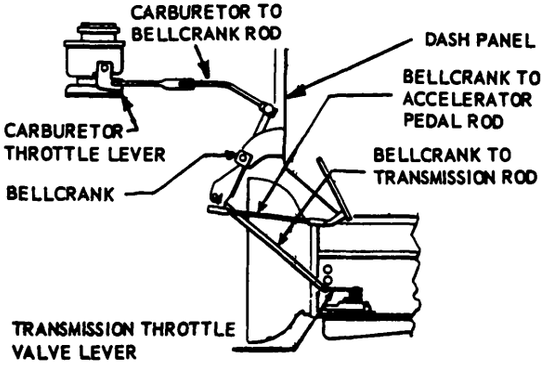
►*CARBURETOR APPLICATION:* As follows:

Engine	Carburetor
318" Std.	One Carter BBD or Stromberg WW 2-Bbl.
318" Optl.	One Carter 4-Bbl.
Fury	Two Carter WCFB 4-Bbl.
Golden Commando	Two Carter 4-Bbl. or Fuel Injection

►*AUTOMATIC CHOKE NOTE: "Cross-over" type choke used on all models except cars with two carburetors.*

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

THROTTLE LINKAGE ADJUSTMENT (PowerFlite): Bring engine to normal operating temperature and adjust engine idle speed to 475-500 RPM. Loosen throttle linkage adjustment screw located on accelerator



POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

shaft to carburetor rod. Move rear position of accelerator shaft to carburetor rod rearward until it is stopped by idle stop on transmission throttle cam, then with rods in line and rear portion of rod preloaded, lock throttle adjusting screw by tightening to 7-9 ft. lbs. Recheck idle speed.

TorqueFlite: With engine at normal operating temperature and idle speed adjusted to 475-500 RPM, loosen throt-

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tle linkage adjusting nut on rod from bellcrank to intermediate throttle control (4-Barrel Carbs.), on rod from bellcrank to carburetor rod (2-Barrel Carbs.). Hold light preload rearward on rod so that throttle valve lever is against stop in transmission, then tighten throttle adjusting nut. Adjust accelerator pedal rod by removing pedal to accelerator shaft rod at pedal arm. Loosen locknut and turn ball and socket end of rod as required to adjust pedal so that wide open throttle is obtained when pedal is depressed just down to floor mat but not compressing it.

CARTER BBD (Dual)

Model	Carter No.
318" Eng. (S.M. Trans.)	BBD-2644S
318" Eng. (O.D. Trans.)	BBD-2645S
318" Eng. (Auto. Trans.)	BBD-2646S

►*HESITATION ON LOW-SPEED ACCELERATION CORRECTION:* Install new step-up piston spring. *See "Carter BBD Carburetors" in Carburetion Section.*

►*PART THROTTLE PERFORMANCE CORRECTION (2644S, 2645S):* Install new step-up rods. *See "Carter BBD Carburetors" in Carburetion Section.*

Idle Setting - ¼-1¼ turns open. Turn both screws out equally for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite & TorqueFlite).

Float Level - 9/32" (Gauge T109-239) between top of each float ridge (at center of float) and top surface of body casting. Adjust by bending lip on float arm.

Accelerating Pump - 1 1/32" from the top of the bowl cover to top of plunger shaft with connector rod installed in center hole of throttle lever and inner hole of pump arm. To adjust, bend throttle connector rod.

Fast Idle Cam Clearance : With choke valve closed and lip on inner choke shaft lever contacting lug on outer lever, align index mark with adjusting screw. Adjust by bending lip on inner choke shaft lever.

Fast Idle Throttle Clearance : .015" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on index mark of cam.

Automatic Choke (Cross-over Type): Centered on index. *(NOTE* - Choke is "Cross-over" type mounted in manifold and linked to choke valve). Choke assembly must be removed from manifold well for checking and adjusting.

Overdrive Kickdown Switch: With throttle valves wide open, there should be 1/64-3/64" clearance between kickdwon lever and switch stem guide.

Throttle Linkage Adjustment (PowerFlite & TorqueFlite): *See CARBURETOR above.*

►*OTHER DATA: See "Carter BBD Dual Carburetors" in Carburetion Section.*

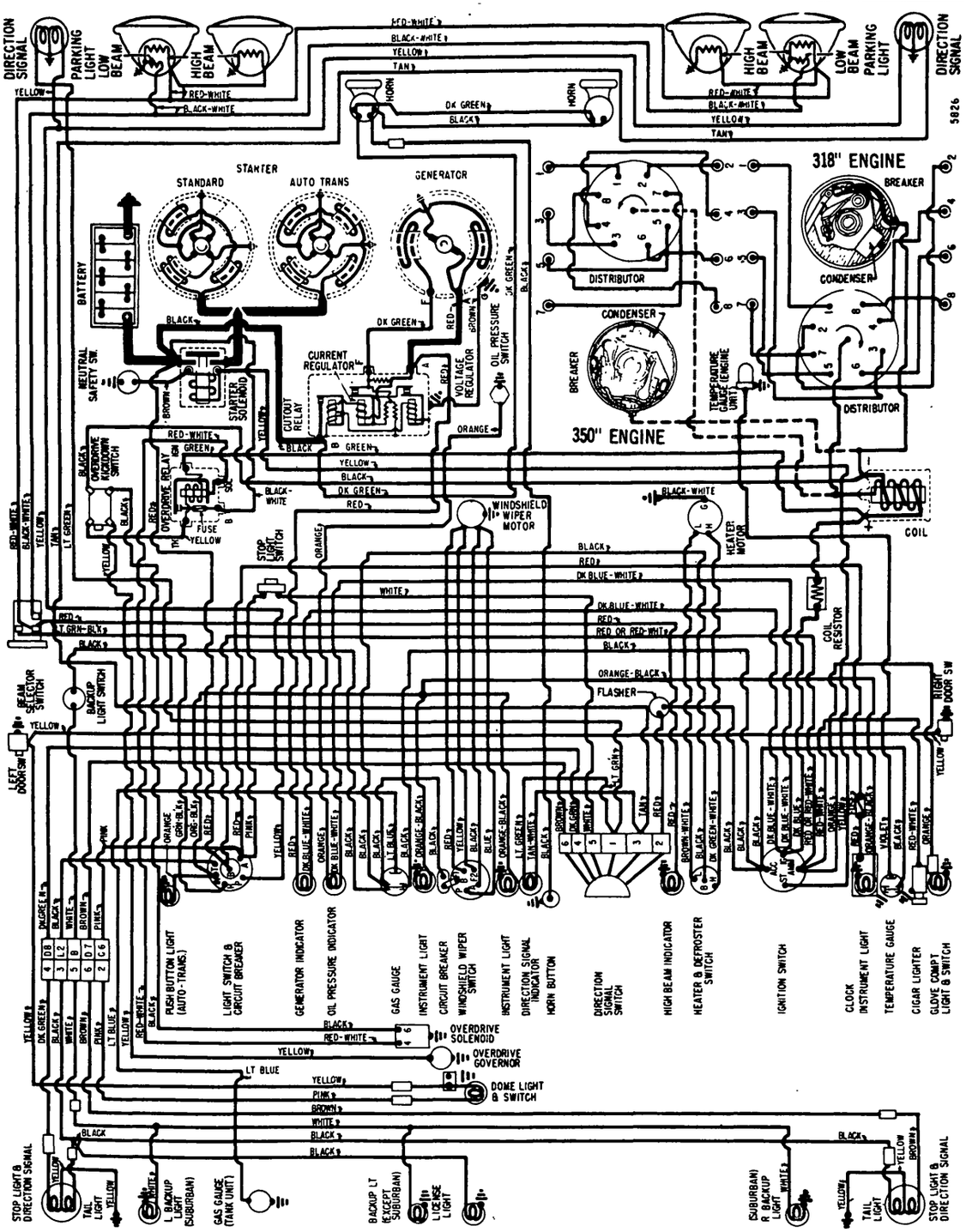
STROMBERG WW (Dual)

Model	Stromberg No.
318" Eng. (S.M. Trans.)	WW 15-26
318" Eng. (O.D. Trans.)	WW 15-27
318" Eng. (Auto. Trans.)	WW 15-28

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - 1 1/8 turns open. Adjust both screws alike. Turn screws out for richer mixture.

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Idl Sp d - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite & TorqueFlite).

Float Level - 7/32" from top of float (at center) to top of main body with gasket removed and lip of float held firmly against needle valve. Check with tool T-25569. To adjust, bend float lip.

Accelerating Pump - Normal setting, pump rod connected in center hole of throttle lever. Inner hole for less fuel. Outer hole for more fuel.

Fast Idle: Turn throttle stopscrew out so that throttle valves completely closed. Hold throttle valves closed, and back out fast idle screw until fast idle cam can be positioned with first step in line with fast idle screw, then turn screw in until it just contacts cam. Turn in an additional 7½ turns With fast idle cam held in this position, close choke valve until fast idle screw is against shoulder of last step (high step) on cam Measure choke valve opening by inserting a ¼" drill between upper edge of choke valve and air horn wall- If opening not correct, bend fast idle rod

Automatic Choke Setting (Cross-over Type): Centered on index. *(NOTE* - Choke is "Cross-over" type mounted in manifold and linked to choke valve). Choke assembly must be removed from manifold well for checking and adjusting.

Throttle Linkage Adjustment (PowerFlite & TorqueFlite): *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW Dual Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Single Carburetor)

Engine	Carter No.
318" Eng (S M Trans)	AFB 2744S, 2813S
318" Eng (Auto Trans)	AFB 2641S, 2812S

►*STALLING IN NEUTRAL OR AFTER COLD START CORRECTION (Transmission in Gear) (2641S, 2744S)* Modify choke valve and choke piston linkage *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

►*INCOMPLETE THROTTLE OPENING CORRECTION (2641S, 2744S)* Install new throttle shaft flex spring *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl 2-3-5-8 LEFT barrels 1-4-6-7*

Idle Setting - ¼-1¾ turns open Turn screws out equally for richer mixture

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (Auto Trans)

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL (Two Carburetors)

Model	Carter No.
Fury (Early)	Front 2631S, Rear 2632S
Fury (Late)	Front 2761S, Rear 2762S

►*MANIFOLD FUEL DISTRIBUTION: RIGHT barrels feed right bank cylinders, LEFT barr ls feed l ft bank.*

►*IDLE SPEED ADJUSTMENT NOTE:* These carburetors have a single Idle Air By-pass screw which is used for all idle speed adjustments (there is no throttle stop screw). Turning the idle air by-pass screw outward increases engine speed and also leans the mixture supplied to engine which must be compensated for by adjustment of idle mixture screws.

Idle Speed & Mixture Adjustment - With engine at normal operating temperature, choke fully off, and carburetor on "slow" (hot) idle, proceed as follows: Adjust engine idle speed to 600-650 RPM, with transmission in neutral, using the idle air by-pass screw. Turn one mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with the other screw on same carburetor. Adjust idle mixture screws on other carburetor in the same manner. Repeat above procedure until turning mixture screws will not increase engine RPM, and the smoothest idle is obtained with the highest vacuum. Readjust idle air by-pass screw for correct engine RPM.

Throttle Linkage Adjustment (PowerFlite & TorqueFlite): *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL (Two Carburetors)

Model	Carter No
350" Eng (Gold Comm)	Front 2652S, Rear 2653S

►*CHOKE FAILURE CORRECTION & PRODUCTION CHANGE* New heat tube splash shield Part No 1854853, installed at Engine No L-350-43132 to prevent road splash entering heat tube Install on earlier cars if needed

►*INCOMPLETE THROTTLE OPENING CORRECTION (2653S)* Install new throttle shaft flex spring *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

►*INCORRECT TIMING, POOR PERFORMANCE, HARD STARTING, BACK FIRING CORRECTION (2653S)* May be due to improperly located distributor vacuum port *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Interconnecting Linkage Adjustment - Remove air cleaners and throttle pull-back springs from both carburetors With rear carburetor at wide open throttle, adjust nut on front carburetor control shaft until front carburetor throttle is wide open

Idle Speed & Mixture Adjustment - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. As follows

Engine	Carter No. Single Pump	Pump With Filter
318" Std	M2608S	
318" Air Cond	M2611S	M2737S
350"	M2769S	M2662S

Pr ssur - 5-7 lbs. at 500 RPM.
S "Fuel Pumps" in Carbur tion S ction.

Gas lin Gauge: Auto-Lite Electric type.

Dash Unit - Auto-Lite 14332A (All).

Tank Unit - Auto-Lite as follows

M d l	Aut -Lit N .
Suburban	Ⓒ 14684A
Fuel Injection	Ⓒ 14686A
Others	Ⓒ 14676A, Ⓒ 14673A

Ⓒ - 4½" lead Male Ⓒ - 22" lead Female
See "Fuel Gauges" in Carburetion S ction.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 5000 miles, replace element every 15,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

318" Engine - Auto-Lite 11-HS-50 r Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)
350" Engine - Auto-Lite 11-HS-60 r Willard HO-11-60. 12 volt 11 plate, 60 ampere hour capacity (20 hr rate)
Grounded Terminal - Negative.

STARTER

Auto-Lite MDM-6001 (318" Eng.), MDT-6001 (350" Eng.), MDL-6003 (Canada).

Armature - Auto-Lite MDL-2088 (All).
Drive - Bendix "Folo-Thru", No. A3596.
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 31-47 ozs.

Performanc Data - MDL			
Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225
Performanc Data - MDM			
Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210
Performanc Data - MDT			
Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

Starting Switch: Auto-Lite SAE-4001 (Std.), SAE-4002 (Auto. Trans.). Magnetic switch controlled by ignition switch. Neutral safety switch mounted on transmission on Automatic Transmission cars.
See "Starter Controls" in El ctrical S ction.

Neutral Safety Switch Adjustment: *S "Pow rFlit & TorqueFlite" in Transmission S ction.*

GENERATOR

Auto-Lite. Used as follows

Application	G n rat r N .
Standard	GJC-7012A
Spec Equip	GGA-6001AC
Taxi	GHM-6004A
Fury (Two 4-Bbl Carbs)	GGA-6007C
Gold Commando (Two 4-Bbl Carbs)	GGA-6003E
Air Cond	GHM-6004C
Air Cond	GGA-6001N
Air Cond (Two 4-Bbl Carbs)	GHM-6007C
Air Cond (Two 4-Bbl Carbs)	GGA-6003F
Fuel Injection	GGA-6001E

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Armatur - GJC-2030F (GJC Gen.), GFY-2101F (GGA Gen.), GHM-2059F (GHM Gen.).

P rf rmanc Data - GJC

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

P rf rmanc Data - GGA

Amperes	Volts	RPM
4.0	14.6	950 Max.
40.0	14.6	1600 Max.
40.0	15.0	1600 Max.

P rformanc Data - GHM

Amperes	Volts	RPM
5.0	14.0	875 Max.
25.0	15.0	1350 Max.
30.0	15.0	1500 Max.

Field Current - 1.2-1.3 amps. (GJC), 1.1-1.3 amps. (GGA & GHM) all at 10.0 volts at 70°F.

M t ring Current - 3.4-3.9 amps. (GJC), 2.3-2.6 amps. (GGA), 3.0-3.5 amps. (GHM) all at 10.0 volts.

Brush Spring T nsi n - 18-36 ozs. (GJC), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

R tati n - Counter-clockwise at commutator end.

B lt Adjustment: Deflection measured in inches (see table below) midway of longest belt span under a five-pound push or pull.

318" Engine

B lt	New	Used
Generator (Std.)	5/32"	1/4"
Generator (Air Cond.)	3/16"	5/16"
Idler (Air Cond.)	5/64"	5/32"

350" Engine

B lt	New	Used
Generator (Std.)	1/8"	1/4"
Generator (Air Cond.)	1/4"	3/8"
Idler (Air Cond.)	1/16"	1/8"

REGULATOR

Aut -Lit VAT-6201A (GGA Gen.), VRX-6201A (GJC & GHM G n.).

Cut ut Relay

Cuts In - 12.6-13.6 volts.
Cuts Out - 3-5 amperes discharge after a charge of 10 amps. (VAT), 7 amps. (VRX).
C ntact Gap - .015" minimum.
Air Gap - .031-.034".

Voltage Regulator

S tting - 14.5 volts at 80°F while charging at 10 amps. (VAT), 7 amps. (VRX) or with .25 ohm resistor in series between regulator and battery
Air Gap - .048-.052" with contacts just opening.

Ch cking & Adjusting - *S e "Aut -Lit 12 Volt R gulators" in El ctrical Section.*

Curr nt R gulat r

►*SETTING CAUTION: "T mperature Comp nsated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes -	Test B
VRX	36 Max.	30 (28-32)
VAT	46 Max.	40 (38-42)

Test A - After 15 minutes operation charging at 10 amperes.
Test B - After additional 15 minutes operation on current regulator (load applied to hold voltage at 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).
Air Gap - .048-.052" with contacts just opening.
Checking & Adjusting - *See "Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*
Directional Signals: *See Electrical Section.*
Lighting & Panel Switch Removal: Remove headlight switch knob recessed hex screw, remove knob. Remove hexnut and threaded sleeve holding switch or switches in instrument panel. Slide panel light switch control off lugs of tab plate.
Stop Light Switch Location: On forward end of master cylinder.
CIRCUIT BREAKERS: Used as follows:
22.5 Ampere - Protects headlight, headlight indicator, parking lights and ignition switch light. Located in headlight switch.
15 Ampere - Protects all other lighting circuits (except direction signals). Located in headlight switch.
6 Ampere - Protects variable speed windshield wiper.
5 Ampere - Protects single speed windshield wiper.
FUSES: Clock - SFE 2 in clock lead.
Overdrive - 14 amps. Located on overdrive relay.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 318" (Standard & Fury) Engine - 90° V8 with overhead valves similar in design to previous engines.
350" (Golden Commando) Engine - 90° V8 with overhead valves. This is a new engine having all valves located on the outboard side of a single rocker arm shaft. The engine block has been recessed at front to form an integral timing chain case and the ignition distributor has been placed near front of engine.

Engine	Bore	Stroke	Displacement
318"	3.91"	3.31"	318 cu. in.
350"	4.06"	3.38"	350 cu. in.

Engine	Compr. Ratio	Rated HP	Dev. HP & RPM
318" (Exc. Fury) ①	9.0-1	48.9	225 at 4400
318" (Exc. Fury) ②	9.0-1	48.9	250 at 4400
318" Fury	9.25-1	48.9	290 at 5200
350" ③	10.0-1	52.7	305 at 5000
350" ④	10.0-1	52.7	315 at 5000

① - 2-Barrel Carb. ② - 4-Barrel Carb.
③ - Golden Commando with two 4-Barrel Carbs.
④ - Golden Commando with Fuel Injection.

C mpr ssi n & Vacuum R ading - *S TUNE-UP.*

OIL PAN REMOVAL: Drain oil, then remove steering and idler arms, dust shield, and starter motor. Remove crankcase breather, and on cars with single exhaust system, remove crossover pipe. Disconnect motor mounts and raise engine approximately 2". Support engine with wooden blocks placed under motor mounts.

►*SMOOTH ENGINE PERFORMANCE NOTE (318" Engine):* On engines from No. LP-8-1001 through LP-8-2224, use "Fury" parts to obtain smooth performance as follows:

Part	Chrysler No.
Crankshaft	1732611
Connecting Rod	1732853
Piston (Std.)	1818597
Piston (.005" Oversize)	1818598
Piston (.020" Oversize)	1818599

►*VIBRATION DAMPER PRODUCTION CHANGE (318" Fury Engine):* Vibration Damper, Part No. 1855153, and Crankshaft Screw, Part No. 1821414, replaced Fan Drive Pulley, Part No. 1852575, and Crankshaft Screw, Part No. 1731525, effective Engine No. FLP-52457.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Plymouth Special Data.*

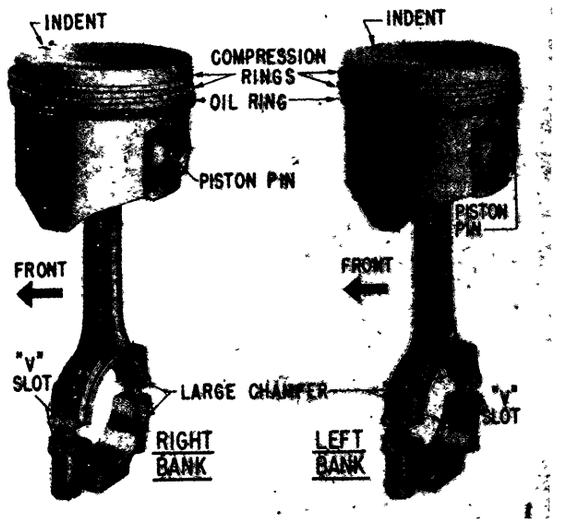
►*CYLINDER HEAD INSTALLATION NOTE (350" Engine): See "Cylinder Head & Manifolds" in Plymouth Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

PISTONS

Aluminum alloy, elliptically turned, horizontal slot, tin-plated, thermally controlled by steel band.
Weight - 21 ozs. (318" Eng.), 24.5 ozs. (350" Eng.).

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine number will have .020" oversize cylinder bore.



V8 ENGINE PISTON & RODASSYS.

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Clearanc (318" Eng.) - .00075-.00125" on thrust side at top of skirt. With .0015" x ½" feeler gauge inserted between cylinder wall and piston, at thrust face, pull to withdraw feeler should be 5-10 lbs.

Clearance (350" Eng.) - .0005-.0015" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine.

R moval: Pistons and rods removed from above.

R placement Pistons: Std., .005", .020", .030", .040", and .060" oversize.

Installing Pistons: Assemble pistons to connecting rod on right hand cylinder bank (2-4-6-8) with indent on top of piston on side opposite to large chamfer at insert end of connecting rod. On left bank (1-3-5-7) assemble with detent on same side as large chamfer at insert end of connecting rod. *See Rod Installation.*

PISTON PINS

318" Engine - Floating type with lock ring at each end.

350" Engine - Piston pins are a tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diameter - .9841-.9843" (318" Eng.), 1.0936" (350" Eng.).

Length - 2.99-3.00" (318" Eng.), 3.44" (350" Eng.).

Pin Fit in Piston - .0000-.0005" (318" Eng.) -.00045-.00075" (350" Eng.). Light thumb press fit at 70°F.

Pin Fit in Rod (318" Eng.) - .0001-.0004". Tight thumb press fit at 70°F. Selective fit.

Pin Fit in Rod (350" Eng.) - .0007-.0012" interference fit.

Piston Pin Removal & Installation (350" Eng.) - *See "Piston Pins" in Plymouth Special Data.*

R placement Pins: 318" Eng. - Std., .003" & .008" Oversize.

350" - Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, tin plated. Oil rings are cast iron, single piece units.

318" Standard Engine

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0775-.0780"	.010-.020"	.0015-.003 "
Compr. (Lower)	.0775-.0780"	.010-.020"	.001 -.0025"
Oil	.1860-.1865"	.010-.020"	.001 -.003 "

350" Golden Commando Engine

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0775-.0780"	.013-.025"	.002-.0035"
Compr. (Lower)	.0775-.0780"	.013-.025"	.002-.0035"
Oil	.1860-.1865"	.013-.025"	.001-.0025"

R placement Rings: Std. .010", .020", .030", .040", .050", .060" oversize.

Installing Rings: Install compression rings with step on inner edge up.

CONNECTING RODS

Length (Center-to-Center) - 6.12" (318" Eng.), 6.36" (350" Eng.).

W ight - 25.6 ozs. (318" Eng.), 28.6 ozs. (350" Eng.).

Crankpin J urnal Diamet r - 2.12" (318" Eng.), 2.38" (350" Eng.).

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE):* See CRANKSHAFT *b l w.*

Lower Bearings - Removable precision type. Bi-metal grid (later 318" engines & all 350" engines), lead-base babbitt on steel (early 318" engines).

Clearance - .0002-.0022" (318" Eng.), .0005-.0015" (350" Eng.).

Side Play - .006-.014" (318" Eng.), .009-.017" (350" Eng.).

Installing Rods: With piston correctly installed on connecting rod (see Pistons above), larger chamfer on lower end of rod should be installed toward nearest crankshaft fillet. Oil groove in rod and bearing cap must be together.

Bearing Adjustment: None, replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010" and .012" Undersize.

CRANKSHAFT

Journal Diameter - 2.4995-2.5005" (318" Eng.), 2.6245-2.6255" (350" Eng.).

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals). A "Maltese Cross" (3/8" high) stamped on engine numbering pad indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize journals is stamped on a machined surface of a counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Clearance - .0005-.0015". **Endplay** - .002-.007".

End Thrust - Taken by No. 3 (center) main bearing.

Replacement Bearings: Std., .001", .002", .003", .012", undersize.

Bearing Interchangeability (318" Engine) - Halves of Nos. 1, 2 and 4 bearings are interchangeable with one another (caps are not inter changeable); upper and lower halves of No. 3 bearing are interchangeable; No. 5 halves are NOT INTERCHANGEABLE.

Bearing Interchangeability (350" Engine) - Lower bearing halves of Nos. 1, 2, 4 & 5 are interchangeable; upper bearing halves of Nos. 1, 2, 4 & 5 are interchangeable. Upper and lower halves are **not** interchangeable, nor are No. 3 bearing halves interchangeable with other bearings.

Crankshaft Rear Oil Seals: *See "Crankshaft & Main Bearings" in Plymouth Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data.*

CAMSHAFT

►*318" ENGINE CAMSHAFT IDENTIFICATION NOTE:* Identified by color stripe between distributor drive gear and camshaft journal, (see table below).

H.P. Rating	Camshaft Part N .	C l r
225	1736107	None
250	1851862	White
290	1825890	Yellow

NOTE - Special "High Performance" camshaft used on 318" Fury engine.

B arings - Removable, lead-base babbitt on steel.

Journal Diameters - (1) 2", (2) 1 63/64", (3) 1 31/64", (4) 1 61/64", (5) 1 9/16" (318" Eng.), 1 3/4" (350" Eng.).

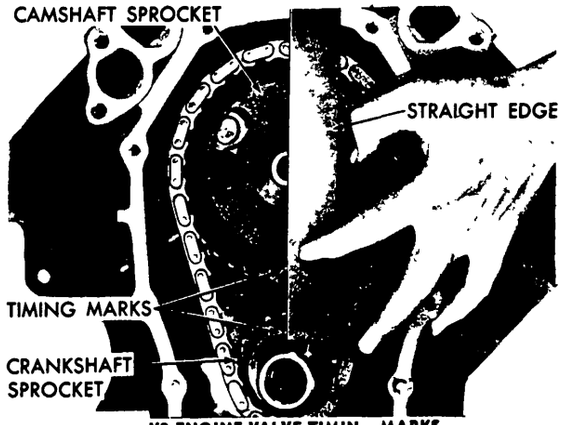
End Thrust (318" Eng): Taken by thrust plate behind camshaft sprocket.

Endplay (318" Eng.) - .002-.006".

Timing Chain (318" Eng.): Width .875", Pitch .38", Length 68 links.

Timing Chain (350" Eng.): Width .875", Pitch .5", L ngth 50 links.

Camshaft Setting: Valve timing is correct when timing marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.



V8 ENGINE VALVE TIMIN MARKS

Removal & Installation: *See "Camshaft & Bearings" in Plymouth Special Data.*

Engine Front Cover (Removal & Installation): *S "Engine Front Cover" in Plymouth Sp cial Data.*

Engine Front Cover Oil Seal (Crankshaft Fr nt Seal): *See "Engine Front Cover" in Plymouth Sp cial Data.*

VALVES

Tappet Clearance (318" Eng.): .010" Intake, .018" Exhaust, HOT. *NOTE* - Intake valve clearance supersedes previous specification of .008" and is recommended for improved torque and idle characteristics.

Tappet Clearance (350" Eng.): Zero lash, hydraulic lifters.

318" Standard Engin

Valve	Head Diameter	St m Diam t r	L ngth
Intake	1.84"	.372-.373"	4.60"
Exhaust	1.56"	.371-.372"	4.58"
Valve	**Seat Angle**	**Lift**	**Sid Cl aranc**
Intake	45°	.405"	.001-.003"
Exhaust	45°	.405"	.002-.004"

350" Golden C mmand Engin

Valve	Head Diameter	St m Diam t r	L ngth
Intake	1.95"	.372-.373"	4.81"
Exhaust	1.60"	.371-.372"	4.82"
Valv	**S at Sngl**	**Lift**	**Sid Cl aranc**
Intake	45°	.390"	.001-.003"
Exhaust	45°	.390"	.002-.004"

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Valve Seat Width - 1/16-3/32" (Intake), 3/64-1/16" (Exhaust).

Intake Valve Stem Seal - Cup type oil seals used on all intake valve stems.

►*VALVE GRINDING CAUTION (350" Engine):* Check valve height when grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area in gauge).

►*VALVE OVERSIZE NOTE:* "I" or "E" stamped on head at rocker arm cover gasket boss, indicates that all intake or all exhaust valves are oversize in that head, depending upon letter stamped on boss.

Valve Springs: Single springs used on both engines

Free Length - 1 15/16" (318" Eng.), 2 5/16" (350" Eng.)

Spring Installation (350" Eng.) - Install all springs with closed-coil end toward head

►*CAUTION* Spring ends must be square within 1/16"

Spring Specifications (318" Engine)

	Pressure	Length
Valve Closed	68-76 lbs.	1 11/16"
Valve Open	160-172 lbs.	1 5/16"

Spring Specifications (350" Engine)

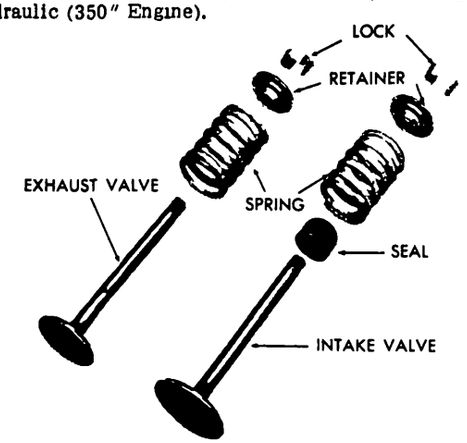
	Pressure	Length
Valve Closed	100	1 86"
Valve Open	195	1 41"

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 11/16" (318" Engine), 1 55/64" (350" Engine), install spacer under spring to bring height within limits of 1 5/8-1 11/16" (318" Engine), 1 51/64-1 55/64" (350" Engine).

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

VALVE GUIDES: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install oversize valves.

VALVE LIFTERS: Barrel type mechanical (318" Engine), hydraulic (350" Engine).



V8 ENGINE VALVE ASSY.

►*OVERSIZE LIFTER NOTE:* "♦" mark on engine number pad indicates .008" oversize lifters

►*PUSHROD INSTALLATION CAUTION (350' Engin)* Small (1/4" diam) end of pushrod must seat in lifter, large (5/16" diam) end must contact rocker arm Improper installation will cause valves to be partially held open

Lifter Overhaul & Testing: *See "Valve System" in Plymouth Special Data*

Rocker Arm Assembly: *See "Valve System" in Plymouth Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE·* Valve timing specifications are with valve train solid.

318" Standard Engine

Intake - Open 8° BTDC. Close 52° ALDC.
Exhaust - Open 52° BLDC. Close 8° ATDC.

318" Fury Engine

Intake - Open 17° BTDC. Close 47° ALDC.
Exhaust - Open 55° BLDC. Close 9° ATDC.

350" Golden Commando Engine

Intake - Open 20° BTDC. Close 60° ALDC
Exhaust - Open 58° BLDC Close 22° ATDC

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data*

Crankcase Capacity: 5 qts (318" Eng.), 4 qts (350") for refill, add additional quart when filter changed

Normal Oil Pressure - 40-50 lbs (318" Eng.), 50-65 lbs (350" Eng.), both at 1500 RPM

Oil Pressure Relief Valve - In oil pump body, adjustable by replacing spring *See "Oiling System" in Plymouth Special Data*

Oil Pressure Indicator: Auto-Lite 14272A switch located at rear of cylinder block Light on instrument panel comes on when ignition switch turned on, goes out when oil pressure reaches 8-12 lbs

Oil Pump (318" Eng.): Mounted on rear main bearing cap Rotor type with strainer mounted on oil pump body Strainer must be mounted parallel with bottom of cylinder block

►*INSTALLATION NOTE* Prime oil pump before installing on rear main bearing cap

Oil Pump (350" Eng.): Rotor type Mounted on cylinder block on lower left side near crankshaft sprocket

Oil Pump Overhaul - *See "Oiling System" in Plymouth Special Data*

Oil Filter (318" Eng.): Shunt type Filters only a portion of pump output, rest goes directly into engine lubrication system Replace element every 5,000 miles or sooner if needed

Oil Filter (350" Eng.): Full flow disposable type Replace every 5,000 miles or sooner if needed

►*OIL FILTER INSTALLATION CAUTION (350" Engine)* Screw new filter on base until gasket on filter contacts base **Tighten ½-turn by hand.** *Do not overtighten*

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in valve chamber cover (318" Engine), in right rocker cover (318" Fury & 350" Engines) *NOTE* - Clean filler cap element and breather tube element (when so equipped) in kerosene and reoil at each engine oil change

COOLING

Water Capacity: 20 qts (318" Eng.), 16 qts (350" Eng.), Add 1 qt for Heater

►*AIR CONDITIONER OPERATING CAUTION·* Engine cooling system must be protected to a temperature of 20°F (above zero) for summer operation.

Pressure Valve: Radiator filler cap. Opens at 14 lbs.

Thermostat: Pellet type. Located under water outlet elbow. Opens at 157-162°F.

Water Pump: Sealed ball bearing type. No lubrication required.

See "Water Pumps" in Plymouth Special Data

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite 14333A.

Engine Unit - Auto-Lite 14405A.

See "Temperature Gauges" in Misc. Section.

CLUTCH

Borg & Beck. As follows

Engine	Model	Cover Assy.	Disc No.
318" Std	10A8	361463	382358
Fury Std	10 5A8	361461	382621
350" & All HD	11A8	361464	382626

See "Borg & Beck Clutches" in Clutch Section

Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained This adjustment will provide necessary 1" freeplay at pedal

Overcenter Spring Adjustment: Disconnect upper end of clutch pedal rod Move clutch pedal to floor and loosen overcenter spring adjusting nut Then tighten nut finger tight Now, with a wrench, tighten adjusting nut against spring bracket **7 full turns.** Reinstall pedal rod If heavier action desired, loosen nut 1 turn, if lighter action desired, tighten nut 1 turn

Removal· Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods Remove transmission (See Synchro-mesh Transmission) Mark clutch cover and flywheel Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)

See "Plymouth Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section*

►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle carrier.

►*TRANSMISSION PRODUCTION CHANGE* New transmission with differdnt ratios used in production approximately Feb 21 1958 Identified by following code letters on top of transmission case in front of cover Standard & Heavy Duty - LB Overdrive - LD *See "Plymouth Synchromesh" in Transmission Section*

Removal· Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage

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caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down
See "Plymouth Overdrive" in Transmission Section.
Overdrive Controls: *See "Overdrive Controls" in Transmission Section*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission.
See "PowerFlite" Transmission in Transmission Section.

►*PART THROTTLE DOWNSHIFT RUNAWAY CORRECTION:* Install new throttle valve and spring *See "PowerFlite Transmission" in Transmission Section*

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "PowerFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "PowerFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles Use only Automatic Transmission Fluid Type "A" *NOTE* - Under severe operating conditions, drain and refill at 10,000 mile intervals

Checking Fluid Level - *See TORQUEFLITE below*
Throttle Linkage Adjustment: *See CARBURETOR above*
►*OTHER POWERFLITE SERVICE DATA: See "PowerFlite" in Transmission Section.*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed planetary transmission.
See "TorqueFlite" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 20,000 miles with Automatic Transmission Fluid Type "A" *NOTE* - Under severe operating conditions, drain and refill at 10,000 mile intervals

Checking Fluid Level (Transmission Cold): It is preferred that transmission be checked when cold (room temperature). Idle engine and operate transmission in all ranges (press all buttons in turn), then check fluid level with engine idling and transmission in neutral. Fluid level should be between "L" mark and ½" below "L" mark. Add or drain fluid as necessary to maintain this level.

Checking Fluid Level (Transmission Hot): With engine idling and transmission in neutral fluid level should be between ½" above "L" mark and "F" mark, but never above the "F" mark. Add or drain fluid as necessary to maintain this level.

Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER "TORQUEFLITE" SERVICE DATA: See "TorqueFlite" Transmission in Transmission Section.*

UNIVERSALS

Detroit Universal. Ball & Trunnion type front, Cross type rear.
Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating with separate carrier and Hotchkiss drive.
See "Plymouth Hypoid" in Rear Axle Section.

►*"SURE GRIP" AXLE NOTE* Optional on all models (except cars with Overdrive, see table below) and similar in design to Power-Lock (Plate Clutch Type) Differential Identified by letter "S" stamped on carrier housing at axle ratio identification pad, and by a round aluminum tag attached to a carrier housing nut *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

►*BANJO HOUSING INSTALLATION NOTE* Check rear universal joint operating angle *See "Propeller Shaft Notes" in Plymouth Special Data*

Conventional Axle Ratios

Engine	Standard	Optional
318" Synchro-mesh	3.54-1 (39-11)	3.73-1, 3.91-1
318" Overdrive	3.91-1 (43-11)	
318" PowerFlite	3.31-1 (43-13)	3.73-1, 3.91-1
318" TorqueFlite	3.31-1 (43-13)	2.93-1, 3.15-1
350" S.M (Early)	3.73-1 (41-11)	
350" S.M (Later)	3.31-1 (43-13)	
350" TorqueFlite	3.31-1 (43-13)	2.93-1, 3.73-1

"Sure Grip" Axle Ratios

Engine	Standard	Optional
All Synchro-mesh	3.73-1 (41-11)	
318" PowerFlite	3.73-1 (41-11)	3.73-1 (41-11)
All TorqueFlite	3.31-1 (43-13)	3.73-1 (41-11)

Backlash - .006-.010".

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly.

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller—Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller).

Wheel Bearing Adjustment: Shims between backing plate and axle housing. With wheel and hub removed, check endplay with dial indicator. To adjust, remove backing plate (see above), add or remove shims (furnished .010", .0125", .015", .030" thick equally at both wheels). **End Play** - .013-.018".

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joint mounted steering knuckles and torsion bar front springs
See "Torsion-Aire" in Suspension & Wheel Alignment Section
Steering Axis Inclination - 6½° at 0° camber
Caster - **(Manual Steering)** Neg ¾°±½° **(Power Steering)** Pos ¾°±¾° *NOTE* - Set both sides at same dimension
Camber (Left Wheel) - Pos ¼°±¼°.(3/8° preferred).
Camber (Right Wheel) - 0°±¼° (0° preferred).
Toe-In - 3/32-5/32", 1/8" preferred
Toe-Out on Turns - Inner wheel 20°, outer wheel 18°46'

STEERING

Manual: Gemmer. Worm and three-tooth roller
See "Gemmer Worm & Roller" in Steering Section
Power Steering: New "Constant Control Full Time" power steering
See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section
►*"LUMPINESS", TYING-UP, NOISE TRANSMISSION, LOSS OF POWER CORRECTIONS & PARTS CHANGES FOR IMPROVED PERFORMANCE See "Chrysler, DeSoto, Dodge & Plymouth Constant Control Power Steering" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*
Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service. Plymouth "Total-Contact" (Floating shoe) type.
See "Chrysler, DeSoto, Dodge, Plymouth Center-Plane & Total-Contact" Brakes in Brake Section.

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Drum Diameter - 11" front & rear. *NOTE* - 12" brakes optional on police cars only.
Wheel Cylinder Diameter - 1 1/8".
Lining - Molded asbestos (bonded to shoe).
Length - 11½". **Width** - 2". **Thickness** - .20".
Braking Power - 60% front, 40% rear.
Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel locked. Turn cams in opposite direction until wheel turns free.
Rear Wheels - Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe adjusting cams are rotated in direction of reverse wheel rotation.

Master Cylinder: On engine side of dash panel opposite base of brake pedal.

►*MASTER CYLINDER PRODUCTION CHANGE & FREE-PLAY ADJUSTMENT NOTE:* Later cars without power brakes have new master cylinder, Part No. 1829401, with built-in pedal stop to eliminate pedal freeplay adjustment.

Checking Fluid - Filler plug on top of master cylinder (on dash panel in engine compartment). Maintain level to within ½" of top of reservoir.
Removal - Disconnect pedal return spring, pushrod and brake tube at master cylinder. Disconnect stop light wires from switch and remove nuts and bolts that secure master cylinder to dash panel. Pull master cylinder straight out from dash panel.

Power Brakes: Bellows Assist type. Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder).

See "Chrysler, Plymouth Bellows Type Power Unit" in Brake Section.

Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond bracket. Remove attaching nuts, slide reinforcement plate off studs and remove unit from dash.

Parking Brake: On shaft at rear of transmission. 6" external contracting type used with Synchro-mesh Trans., 7" internal expanding type used with Automatic Trans.
Adjustment - *See "Brake Notes" in Plymouth Special Data.*

Parking Brake Lining

Lining	Width	Thickness	Length
6" Ext.	2"	5/32"	①
7" Int.	2"	5/32"	② 13.06"

① - One-piece 16.68", two-piece 15.38" (total).
② - Total both shoes.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite Electric. EPW-4001 (Single Speed), EPV-4001A (Variable Speed).
See "Auto-Lite Electric Windshield Wipers" in Misc. Section.

Air Conditioning: Heater-Air Conditioning. *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch.
See "Electric Window Regulators" in Misc. Section.

Power Seat Adjusters: Electric, 2-Way type.
See "Power Seat Adjusters" in Misc. Section.

Convertible Top Control: Electric-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Identification
Savoy	MP1-L
Belvedere	MP1-M

SERIAL NUMBER: On plate attached to left side of upper cowl panel (engine side). *NOTE* - Number (example below) includes identification data as follows:

① ② ③ ④ ⑤

M 1 5 6 - 100001

① - Year model - 1959.

② - Car Make. 1 6 Cyl. Plymouth.

③ - Model Series. **3** - Savoy. **5** - Belvedere. **7** - Station Wagons. **8** - Taxi.

④ - Assembly Plant. **3** - Evansville. **4** - Los Angeles. **5** - Newark. **6** - Detroit. **8** - Valley Park.

⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped on boss on left side at front of cylinder block.

Starting Engine Number - M230-1001.

►*ENGINE NUMBER MARKS (Following Engine Number):*

"**A**" - All cylinders .020" oversize.

"**B**" - All crankshaft journals .010" undersize.

"**AB**" - Both above conditions exist.

TUNE-UP

►*COLD WEATHER HARD STARTING CORRECTION:* When caused by "Blued" ignition points in operation at temperatures of 20°F or less, *see "Regulator Replacement Note" under REGULATOR below.*

COMPRESSION PRESSURE: 120-150 lbs. at cranking speed (150 RPM). Maximum allowable variation between cylinders 10 lbs.

VACUUM READING: Steady 18-21" at idling speed.

VALVE TAPPET CLEARANCE: .010" (Intake & Exhaust) with engine hot and idling.

►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for exhaust tappets is desirable.

MANIFOLD HEAT CONTROL: Thermostatic coil type. See that valve operates freely. When installing coil, spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud.

IGNITION

FIRING ORDER: 1-5-3-6-3-4.

SPARK PLUG GAP: .035".

Plugs - AR 51. 14 mm. Tighten to 30-32 ft. lbs.

COIL: Auto-Lite CAG-4001 (Std.), CAH-4001 (Hvy. Dty.).

Ignition Current - (CAG) 1.8 amps, idling, 2.4 amps. stopped. (CAG) 2.5 amps. idling, 3.1 amps. stopped.

Resistor - None used with standard coil. Auto-Lite PU-5001 used with H.D. coil. Test coil and resistor together.

DISTRIBUTOR: Auto-Lite IBR-4001 (Domestic). IBR-4002 (Canadian).

Condenser - Auto-Lite IAT-3076LA.

Capacity - .25-.285 mfd.

Contact Point Set - Auto-Lite No. IGW-3028BS.

Breaker Gap - .018-.022".

Cam Angl - 36°-42°.

Breaker Arm Spring Tension - 17-20 oz.

Rotation - Clockwise viewed from above.

Automatic Advance - IBR-4001

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	460	2	920
6.5	1050	13	2100
7.5	1425	15	2850
8.5	1800	17	3600

Automatic Advance - IBR-4002

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	440	2	880
5	800	10	1600
7	1300	14	2600
8	1550	16	3100

Vacuum Spark Control: Integral type.

Vacuum Advance - IBR-4001

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10 1/2
8	16	13 3/4
9.5	19	16

Vacuum Advance - IBR-4002

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4 1/2
1	2	5 3/8
5	10	8 7/8
10	20	14 1/2
11	22	16

IGNITION TIMING

►*TIMING NOTE:* 6 Cyl. engines are designed to operate on a good grade of regular fuel.

Setting - 2.5° BTDC.

Timing Mark - Timing mark on vibration damper in line with correct degree mark on timing indicator on chain case cover. Indicator mark 0 to 10° BTDC.

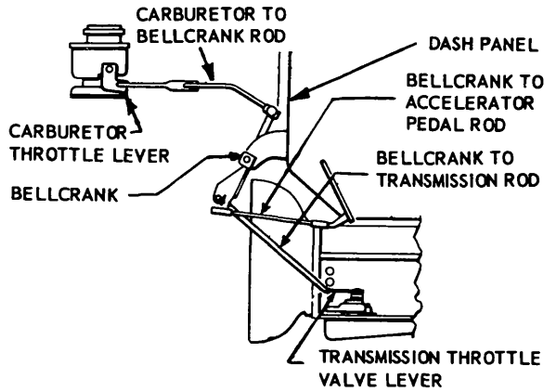
CARBURETOR

►*CARBURETOR APPLICATION:* Carter single barrel carburetors used on all models.

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

►*THROTTLE LINKAGE ADJUSTMENT CAUTION:* Install or replace largest shim possible on flat area of accelerator bellcrank shaft (with clamp open), then tighten clamp securely to insure satisfactory shift pattern. Shim must be in place.

THROTTLE LINKAGE ADJUSTMENT (PowerFlite): Distance from heater housing-to-center of bellcrank ball stud should be 2¼" and length of linkage spring should be 8¼" with choke fully open and throttle off fast idle cam. To correct heater housing-to-bellcrank ball stud distance proceed as follows:



POWERFLITE THROTTLE LINKAGE

1) Adjust engine idle to 475-500 RPM with engine at operating temperature and carburetor off fast idle. Loosen locknuts on throttle rod above cylinder head and the rod at transmission.

2) Hold heater housing-to-bellcrank ball stud distance to 2¼" while adjusting throttle rod to produce 8¼" spring length.

3) Adjust accelerator pedal-to-bellcrank rod to hold pedal 115° from horizontal.

4) Adjust length of rod at transmission by holding transmission lever forward against its stop while tightening locknut on rod.

CARTER BBS (SINGLE)

Transmission	Carter Carb. No.
Synchro-mesh	BBS-2567S
Overdrive	BBS-2568S
PowerFlite	BBS-2569S
Taxi (Synchro-mesh)	BBS-2410S
Taxi (PowerFlite)	BBS-2771S
City Traffic	BBS-2403S
Replacement	① BBS-2604S

① - For BBS-2567S, 2568S, 2569S.

Idle Setting - ½- 1¾ turns open (2403S; 2567S, 68S, 69S; 2604S), 1-2 turns open (2410S, 2771S).

Idle Speed - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite - in Neutral).

Float Level - 7/32" (2567S, 68S, 69S; 2604S), 9/32" (2403S, 2410S, 2771S) from top of each float to top surface of body casting with float pin retainer removed and float pin at bottom of guide studs.

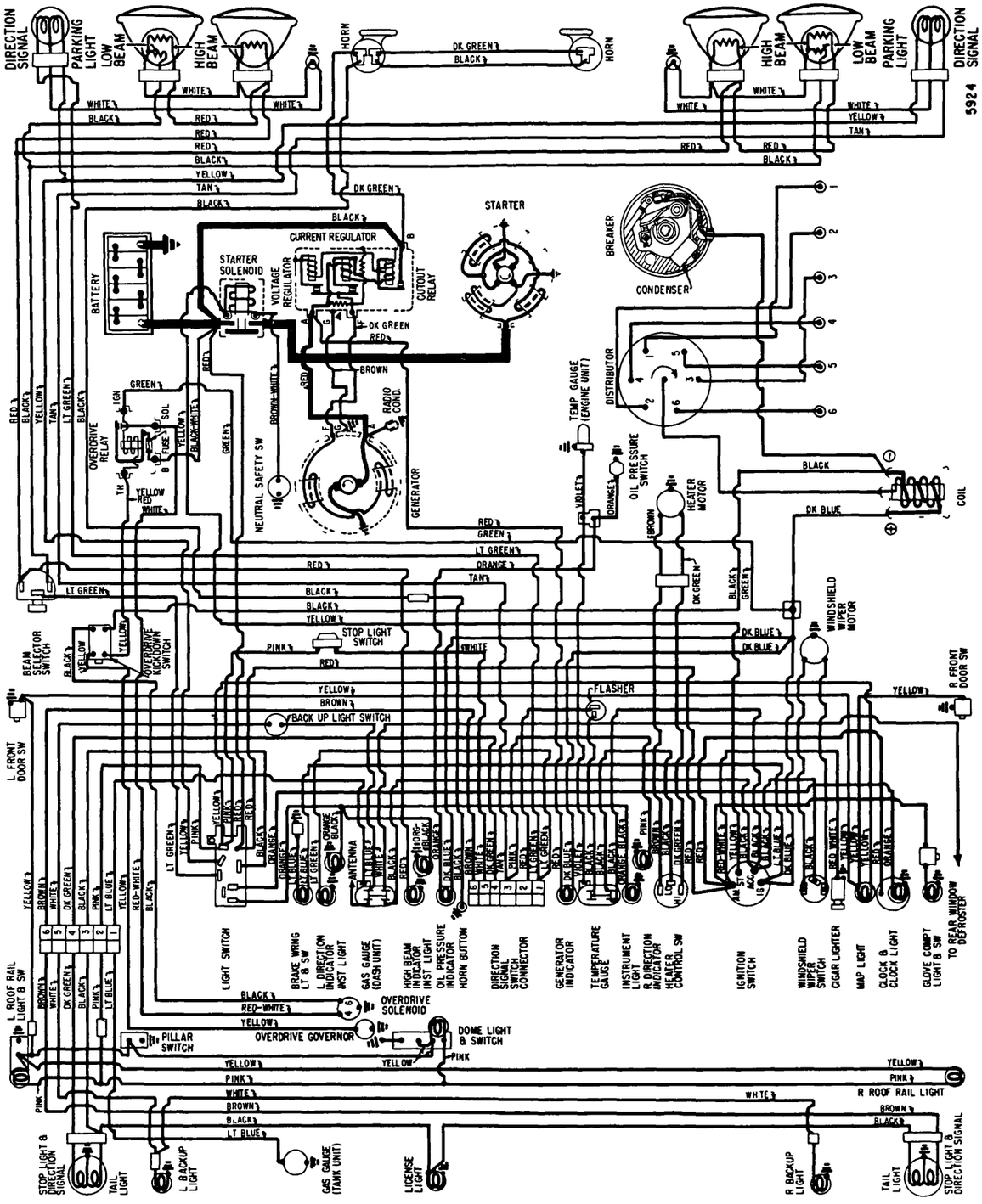
Accelerating Pump - Install connector rod in center hole of throttle lever (medium stroke).

Fast Idle: .016-.020" clearance between lower edge of throttle valve and carburetor bore with fast idle cam in fast idle position. Adjust by bending connector rod at lower angle (Tool T109-213).

Automatic Choke: Centered at index (all models).

Slow Closing Throttle Dashpot (PowerFlite): Loosen locknut and adjust dashpot unit so that dashpot plunger

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shaft can be moved inward approximately 3/32" with throttle valve fully closed.

Overdrive Kickdown Switch: With throttle valve in wide open position, adjust hex nuts on switch to have 1/64-3/64" clearance between kickdown lever and switch stem guide

Throttle Linkage Adjustment (PowerFlite): *See CARBURETOR above*

►*OTHER DATA See "Carter BBS Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter No 2609S (Fuel only)
Pressure - 6-7 lbs
See "Fuel Pumps" in Carburetion Section
Gasoline Gauge· Auto-Lite. Electric type
Dash Unit - Auto-Lite No 14755A
Tank Unit - Auto-Lite No 14675A (Exc Sub), No 14684A (Suburban)
See "Fuel Gauges" in Carburetion Section
Air Cleaner: Dry Filter Element type Clean every 5,000 miles, replace element every 15,000 miles
►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dust particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Auto-Lite 11-HS-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)
Battery Ground - Negative
Engine Ground - Left front of engine

STARTER

Auto-Lite MDU-6003. Armature MDL-2088.

►*NOISY STARTER OPERATION CORRECTION* Caused by deposits of foreign material on Bendix drive To correct, remove inspection plate at bottom of torque converter housing (Auto Trans) or clutch housing pan at bottom of clutch housing (Std Trans), and apply a few drops of No 10 oil Use pressure type oil can and 7" copper tubing extension If deposits are excessive, remove starter assembly, clean off rust and corrosion and lubricate shaft lightly with Part No 1643234 or No 1692689 Engine Oil Additive
Drive - Bendix "Folo-Thru" No A3596
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	5300	10 0	50
6 2 ft lbs	Lock	4 0	280

Starting Switch: Auto-Lite SAE-4001 (Std), SAE-4002 (Auto Trans) Magnetic switch controlled by Ignition and Starter Switch, plus Neutral Safety Switch on Automatic Transmissions
See 'Starter Controls" in Electrical Section

N utral Safety Switch Adjustment· *See 'PowerFlite Transmission" in Transmission Section*

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GENERATOR

Aut -Lit . Used as follows:

Model	Generator	Armature
All Models (Std.).	GJM-8001A	GJC-2058F
All Models (Canada).	GJC-7012A	GJC-2030F
Spec. Equip.	GGA-6001AC	GFY-2101F
Taxi	GHM-8001B	GHM-2034F

Performance Data - GJM-8001A

Amperes	Volts	RPM
0	12.8	1150
35	15.0	2100

Performance Data - GJC-7012A

Amperes	Volts	RPM
0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GGA-6001AC

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data - GHM-8001B

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJM, GJC), 34-41 ozs. (GGA), 35-53 ozs. (GHM).

Field Current - 1.1-1.3 amperes (GGA, GHM); 1.2-1.3 amperes (GJC), 1.6-1.7 amperes (GJM) all at 10 Volts (70°).

Motoring Current - 3.9-4.3 amperes (GJM); 3.4-3.9 amperes (GJC), 3.0-3.5 amperes (GHM) with field terminal grounded to frame. 3.1-3.5 amperes (GGA with felt oil seal in drive end head), 2.3-2.6 amperes (GGA Others).

Belt Adjustment: With 5 lb. load applied midway between generator and water pump (generator), water pump and power steering pump (power steering), belt deflection should be as follows:

Belt	New Belt	Used Belt
Generator (Less Pwr. Strg.)	3/32"	5/32"
Generator (With Pwr. Strg.)	3/32"	7/32"
Power Steering	3/32"	5/32"

REGULATOR

Auto-Lite VAT-6201A (GGA), VRX-6201A (GHM,GJC); VRX-6301A (GJM).

►*VRX-6301A REGULATOR REPLACEMENT NOTE:* When hard starting at temperatures of 20°F or less is experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has a Code 11-N or higher stamped on base.

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3-5 amps. discharge current after a charge of 10 amps. (VAT), 7 amps. (VRX).

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltag R gulat r

S tti ng - 14.5 volts charging at 7 amps. (VRX), 10 amps. (VAT) (80°F) or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes	Test B
VAT-6201A	46	40 (38-42)
VRX-6201A	37	30 (28-32)
VRX-6301A	44	35 (33-37)

Test A - After 15 minutes operation charging at 10 amps. (VAT), 7 amps. (VRX).

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.7-13.9 volts (VAT), 13.6-13.8 volts (VRX).

Air Gap - .048-.052".

Checking & Adjusting - See *"Auto-Lite 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System). See *"4-Headlight Systems" in Electrical Section.*

Automatic Beam Changer: See *Electrical Section.*

Electronic Rear View Mirror: See *Electrical Section.*

Directional Signals: See *Electrical Section.*

Lighting Switch Removal: Push control knob and shaft to "OFF" position (full in). Depress button on top of switch and at the same time pull out control knob and shaft. Remove switch locking nut and remove switch assembly.

Stop Light Switch Location: On forward end of master cylinder.

LIGHTING CIRCUIT BREAKERS: Used as follows:

22.5 Ampere - Protects Headlamps, Headlamp Beam Indicator, and Parking Lamp. In headlight switch.

15 Ampere - Protects Tail, Stop, License Plate, Instrument and Dome Lights. In headlight switch.

5 Ampere - Protects Windshield Wiper (Single Speed)

6 Ampere - Protects Windshield Wiper (Variable Speed).

30 Ampere - Protects Window Lift and Seat Adjuster

FUSES: SFE-10 in clock lead

SFE-7.5 in Radio lead.

SFE-20 in rear unit of Air Conditioning.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. "L" head.

Bore	Stroke	Displacement
3¼"	4 5/8"	230 Cu. In.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0	25.4	132 at 3600 RPM

Compression & Vacuum Reading - See *TUNE-UP.*

OIL PAN REMOVAL: Drain engine oil. Disconnect pitman arm bracket. Remove dust shield and remove motor. Disconnect front motor mounts and raise engine approximately 2". Install wooden blocks under mounts and remove oil pan.

►*OIL PAN INTERFERENCE NOTE: If the oil pan touches right hand frame crossmember, install a 1/8" shim under right motor mount.*

CYLINDER HEAD: See *"Cylind r H ad & Manifolds" in Plymouth Special Data.*

TIGHTENING TORQUES: See *"Tight ning Specifications" in Plymouth Special Data.*

PISTONS

Aluminum Alloy, U-Slot, Tin-Plated.

►*CYLINDER BORE OVERSIZE CAUTION: Engin with letter "A" following engin number indicat s that cylinder bore is .020" Oversiz .*

Weight - 15.8 ozs. (piston only).

Removal - Piston and rods removed from above.

Fitting New Pistons: Clearanc - .0002-.0012" between piston skirt and cylinder wall ¼-¾" from bottom of piston. Pull to withdraw a ribbon feeler ½" wide and .002" thick placed at right angles to piston pin (piston inverted) should be 5-10 lbs.

Replacement Pistons: Std. .005", .020", .030", .040", .060" Oversize.

Installing Pistons: "U" slot away from valves.

PISTON PIN

Full floating type.

Diameter - .859". **Length** - 2.75".

Pin Fit in Piston - .0000-.0005". Double thumb push fit at room temperature (70°F).

Pin Fit in Rod - .0001-.0002". Thumb push fit at room temperature (70°F).

Replacement Pins: Furnished Std., .0006", .003", .008" Oversize. *NOTE* - Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Sid Cl arance
Compr.(1)	.093"	.010-.020"	.0025-.004"
Compr.(2)	.093"	.010-.020"	.002-.0035"
Oil (3)	.155"	.010-.020"	.001-.0025"
Oil (4)	.155"	.010-.020"	.001-.003"

Replacement Rings: Std., .020", .030", .040", .060" Oversize.

Installing Rings: No. 1 compression ring with step on inner edge up. No. 2 compression ring with step on inner edge up (step down, if step on outer edge).

CONNECTING ROD

Length (Center-to-Center) - 7.8125".

Weight - 27.9 ozs.

Crankpin Journal Diameter - 2.0625". Maximum out of round and taper limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE) See CRANKSHAFT below.*

Lower Bearings - Copper Bronze with dull finish when new and dull reddish color or copper speckled when used.

Cl arance - .0005-.0015".

Sid play - .006-.011".

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Form 12A

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Bearing Adjustment: None. Replace bearings.
Replacement Bearings: Std., .001", .002", .003", .010", .012", .020", .030", .040" Undersize.
Installing Rods: Oil metering hole toward valve side of engine.

CRANKSHAFT

Journal Diameter: 2.4995-2.5005". Four bearings.
Bearing Type - Removable, precision type. Lead-base babbitt on steel, except thrust bearing, which is Tin-base babbitt on steel. No shims. *CAUTION:* Lower bearing halves are grooveless without oil hole. DO NOT install grooveless lower half in upper half position.
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize journals identified as follows:
.010" UNDERSIZE (All Main & Connecting Rod Journals) - Letter "B" stamped with engine serial number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - When replacing bearings, look for stamped number on center counterweight of crankshaft. An "M" or "R" followed by a number indicates that a main or connecting rod bearing has a thicker-wall bearing. For example "M2" and "R1" means that .001" thicker-wall bearing inserts are used on the No. 2 main bearing and the No. 1 connecting rod bearing.
Clearance - .0005-.0015".
End Thrust: Taken by flanged rear (No. 4) main bearing.
Endplay - .003-.007".
Replacement Bearings: Std., .001", .002", .010", .020", .030" Undersize.
Crankshaft Rear Oil Seal: *See "Crankshaft & Main Bearings" in Plymouth Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data.*

CAMSHAFT

Journal Diameters - (1) 1.998-1.999", (2) 1.9665-1.9675", (3) 1.935-1.936", (4) 1.2475-1.2485".
Bearing Diameters - (1) 2.000-2.001", (2) 1.9685-1.9705", (3) 1.937-1.939, (4) 1.2475-1.2485"
Bearings - Removable, steel-backed, babbitt lined bushings, except No. 4 which is machined in crankcase.
Clearance - .001-.003". *NOTE* - If clearance exceeds .005" when checked by placing dial indicator on block with plunger on cam nearest a bearing and prying shaft back and forth, install a new camshaft for additional test. If clearance with new shaft exceeds .0035", install a new bearing
End Thrust: Taken by thrust plate behind camshaft sprocket hub. **Endplay** - .002-.006".
Timing Chain: **Width** - 1.02", **Pitch** - .500". **Length** - 48 links
Camshaft Removal: *See "Camshaft & Bearings" in Plymouth Special Data.*
Camshaft Setting: Sprockets marked. Mesh chain with sprockets so that "O" marks on sprockets are adjacent and in line with a straightedge across shaft centers
Engine Front Cover Installation: *See "Engine Front Cover" in Plymouth Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Plymouth Special Data.*

VALVES

Tappet Clearance: .010" Intake and Exhaust, with engine hot and idling.
►*CONTINUOUS HIGH SPEED TAPPET CLEARANCE:* An additional .002" clearance for exhaust tappets is desirable.

Valves	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.340-.341"	4.84"
Exhaust	1 13/32"	.340-.341"	4.89"

Valves	Seat Angle	Lift	Stem Clearance
Intake	45°	.365"	.001-.003"
Exhaust	45°	.365"	.003-.005"

Valve Seat Width—1/16-3/32". Runout .0015" maximum.
►*VALVE SEAT INSERT CAUTION: See "Valve System" in Plymouth Special Data.*
Valve Guides: Remove from above. Press new guides in with upper end 7/8" below top of block, ream guides to inside diameter of .342-.343" (Intake), .344-.345" (Exhaust). *CAUTION—Guides must be installed with counterbore end UP on exhaust valves and counterbore end DOWN on intake valves.*
Valve Springs: Can be installed with closely coiled end at either top or bottom. *NOTE—Springs are available in several colors. Colors do not refer to spring tension but merely identify the manufacturer.*
Free Length—2".

Valve Spring Specifications

	Spring Pressure	Length
Valve Closed	40-45 lbs.	1-3/4"
Valve Open	110-120 lbs.	1-3/8"

Valve Lifters: Mushroom type (remove from below).
Stem Diameter—5/8". Ream holes from above (pilot in guide). Oversizes .001", .008", .030".
Lifter Clearance in Block: 0002" to 001"

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE.* The following valve opening and closing points are with tappet clearance of 014". Reset to operating specifications after checking valve timing.
Intake Valve - Open 12° BTDC. Close 44° ALDC.
Exhaust Valve - Open 50° BLDC Close 6° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*
Crankcase Capacity: 5 quarts (refill). Add 1 qt. with filter change
Normal Oil Pressure - 40-50 lbs. at 1500 RPM.
Oil Pressure Relief Valve - Located on left side of cylinder block below starter.
►*RELIEF VALVE SPRING NOTE:* Three types of springs available. Replace with correct color spring *See "Oiling System" in Plymouth Special Data.*
Oil Pressure Indicator Switch: Auto-Lite No 14272A, located on left side of cylinder block at rear
Oil Pump: Rotor type. On right side of crankcase.
Overhaul - *See "Oiling System" in Plymouth Special Data.*
Oil Filter: By-pass type with shunt type oil circuits. When pressure relief valve is closed, it blocks oil return from filter. As pressure relief valve opens, oil is permitted to flow through filter and filtered oil returns to crankcase.
Filter Element - Install new filter element and cover gasket at 5,000 mile intervals (or earlier if required). Change oil at same time filter element is changed.
Crankcase Ventilation: Filter element in oil filter cap and air cleaner in crankcase ventilation outlet pipe.

COOLING

Water Capacity: 13 qts Add 1 qt for heater
Pressure Valve - Radiator filler cap Opens at 14 lbs
Thermostat: Pellet type located in cylinder head water outlet Opens at 157-162°F
Water Pump: Sealed bearing type No lubrication required
See "Water Pumps" in Plymouth Special Data.
Water Distribution Tube: *See "Cooling System" in Plymouth Special Data*
Temperature Gauge: **Auto-Lite.** Electric type
Dash Unit - Auto-Lite No 14754A
Engine Unit - Auto-Lite No 14405A
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. 9A7 No 361384 Std., 10A8 No. 361463 Heavy Duty **Auburn** No 100131-2 Optional without overdrive
Disc. No. Borg & Beck No 382649 (361384), 381758 (361463)
See "Borg & Beck" or "Auburn" Clutches in Clutch Section
Pedal Adjustment: Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained This adjustment will provide necessary 1" free play at pedal
Overcenter Spring Adjustment: Disconnect upper end of clutch pedal rod Move clutch pedal to floor and loosen overcenter spring adjusting nut Tighten adjusting nut finger tight Reconnect pedal rod, then tighten adjusting nut 5 **complete turns.** If heavier action desired, loosen nut 1 turn, if lighter action desired, tighten nut 1 turn
Overcenter Spring Adjuster Adjustment: To obtain least pedal effort, turn cushion up to point where pedal will NOT return the last 1" of travel from overcenter position to full return, then back off cushion from ½-1 full turn, so pedal will return completely to full return position. Check clutch for ease of operation and readjust as necessary.
Removal: Disconnect propeller shaft, speedometer cable, parking brake cable, and gearshift control rods. Remove transmission (See Synchro-mesh Transmission). Mark clutch cover and flywheel. Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free. Remove clutch disc and pressure plate assembly from clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low and reverse).

CONTINUED ON NEXT PAGE

Form 12B

CONTINUED FROM PRECEDING PAGE

S "Plymouth Synchro-mesh" in Transmission S ction

►*TRANSMISSION SHIFT COVER ASSEMBLY PRODUCTION CHANGE* Cars built after March 1959 will have new design cover which eliminates need for selective fitting of interlock sleeves *See 'Plymouth Synchro-mesh" in Transmission Section*

►*TAXICAB SYNCHRO MESH TRANSMISSION PRODUCTION CHANGE* Linkage interlock entered production May 1959 to hold low & reverse in Neutral when shifting into second and high *See 'Plymouth Synchro-mesh Transmission' in Transmission Section*

Transmission Controls: *See "Transmission Controls" in Transmission Section*

►*GEARSHIFT LEVER LUBRICATION NOTE* In heavy duty service where hard shifting is experienced, remove gearshift lever and apply MoPar Lubriplate to ball end and pivot-pin hole and area surrounding it. Repeat operation at 10,000 mile intervals

►*CAR TOWING CAUTION:* If car is to be towed long distances, disconnect propeller shaft at rear axle.

R moval: Disconnect propeller shaft, speedometer cable, hand brake cable and control rods If transmission is to be disassembled, apply hand brake to hold mainsnaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warner Type R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down *See "Plymouth Overdrive" in Transmission Section.*

Overdrive Controls: *See "Overdrive Controls" in Transmission Section*

R moval: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission

See "PowerFlite" Transmission in Transmission Section

►*POWERFLITE BUZZING NOISE CORRECTION:* To correct noise that occurs while driving in reverse, install new Control Valve Part No 2124247 in converter

►*TESTING & TROUBLE SHOOTING See "PowerFlite" in Transmission Section*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 10,000 miles for both standard and heavy duty operation This specification supersedes previous 20,000 mile drain interval. Use Automatic Transmission Fluid Type "A", Suffix "A"

Checking Fluid Level (Trans. Cold, Car not Driven): Oil level should be between Low (L) mark and bottom of dipstick.

Checking Fluid Level (Trans. Hot, Car Driven at Least 10 Miles): Oil level should be between a point ½" below the full mark and the full mark.

Throttl Linkage Adjustm nt: *See CARBURETOR above*

►*OTHER DATA: S "PowerFlit " in Transmission S cti n.*

UNIVERSALS

D tr it. Ball & Trunnion type front Cross type rear. **R ar Univ rsal J int Op rating Angl** - *S "Prop ller Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating, Hypoid gear, with separate carrier and Hotchkiss drive *See "Plymouth Hypoid" in Rear Axle Section.*

►*SURE-GRIP AXLE NOTE* Optional in ratios listed in table and similar in design to Power-Lock (Plate Clutch Type) Differential. Identified by letter "S" stamped on carrier housing at axle ratio identification pad and by round aluminum tag (marked "Use Sure-Grip Lube") attached to carrier attaching bolt below filler plug. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*"SURE-GRIP" AXLE LUBRICANT NOTE:* Use only Mopar Sure-Grip Lubricant Part No 1879414.

►*BANJO HOUSING INSTALLATION NOTE* Check rear universal joint operating angle *See "Propeller Shaft Notes" in Plymouth Special Data*

Axle Ratios	Standard	Optional
Synchro-mesh	Ⓒ 3.73 (41-11)	3.9 (43-11), 4.1 (41-10)
Overdrive	4.1 (41-10)	3.9 (43-11)
PowerFlite	Ⓒ 3 73 (41-11)	. 3 9 (43-11)

Ⓒ - "Sure-Grip" ratio also.

Backlash - 006- 008"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller-Tool C-845), block brake pedal disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support) pull shaft and bearing (use C-499 Puller)

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed Check endplay with dial indicator To adjust, remove backing plate (see above) add or remove shims (furnished 010", 0125", 015" 030" thick (equally at both wheels) **End Play** - 013- 018"

SHOCK ABSORBERS

"Oriflow". Direct-acting, hydraulic type Serviced by replacement

Shock Absorbers (Plymouth No.)	Fr nt	Rear
Standard 1"	1881774	1879307
Heavy Duty 1"	1881775	1879306
Heavy Duty 1 3/8"		1881877

FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joints and torsion bar front springs *NOTE* - Caster and camber adjustment is controlled by eccentric cams operating in cam retainers welded to front and rear faces of upper control arm brackets. No shims are used. *See "Torsion-Aire" Suspensi n in Suspensi n & Whe l Alignment Section.*

Steering Axis Inclination - 6½° at 0° camber.

Caster - (Manual Steering) Neg ¾°±¾°, Neg ¾° preferred **(Power Steering)** Pos. ¾°±¾° Pos ¾° preferred *NOTE* - Caster should be as equal as possible on both sides of car

Camber (Left Wheel) - Pos ¼°±¼°, 3/8° preferred

Camber (Right Wheel) . 0°±¼° 0° preferred.

Toe-In - 3/32-5/32" 1/8" preferred

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46'

STEERING

Manual: Gemmer - Worm and three-tooth roller.
See "Gemmer Worm & Roller" in Steering Secti n.

Power Steering: "Constant Control Full Time" power steering
See "Plymouth Constant C ntrol P w r Steering" in Steering Section.

►*POWER STEERING PRODUCTION CHANGE:* Gear housing and valve lever spring changed to increase valve travel and reduce valve leakage Use new spring and housing together and use with spring loaded valve lever steering gears identified by letter "J" or succeeding letters New housing No 2122041, new spring No 1822871 Gears with new housing and spring identified by letter "R" stamped on housing.

►*POWER STEERING OIL LEVEL CHECK* No dipstick used on later cars Oil level should be at bottom of filler neck (engine cold), halfway up filler neck (engine hot)

►*POWER STEERING FLUID CHANGE* New Power Steering Fluid Part No 2084329 recommended for additions and refills after overhaul on all Constant Control Power Steering Units

Steering Linkage: *See "Steering Linkag " in Steering Section*

Steering Wheel & Horn Butt n R m val: *S "G mmer Worm & Roller" or "Plymouth Constant Control Power Steering' in Steering Section*

Steering Gear Removal: *See "G mmer Worm & Roll r" or "Plymouth Constant Control" Power Steeringin Steering Section*

BRAKES & MISC. MECHANICAL

►*SEE PLYMOUTH V8 PAGES (FOLLOWING) FOR ALL BRAKES & MISC. MECHANICAL DATA.*

MODEL IDENTIFICATION

Series	Series Designation
Savoy	MP2-L
Belvedere	MP2-M
Fury	MP2-H
Sport Fury	MP2-P
Suburbans	MP2-L,M,H

SERIAL NUMBER: On plate attached to left side of upper cowl panel (engine side) *NOTE* - Number (example below) includes identification data as follows

① ② ③④ ⑤
M 2 3 6 100001

① - Year Model - 1959
② - Car Make - 2 V8 Plymouth
③ - Model Series 3 Savoy 5 Belvedere 6 Fury 7 Suburban 8 Taxi 9 Sport Fury
④ - Assembly Plant 3 Evansville 4 Los Angeles 5 Newark. 6 Detroit 8 Valley Park
⑤ - Beginning vehicle number

ENGINE NUMBER: On 318" Eng., number is stamped on left front face of cylinder block On 361" Eng., number is stamped on right side of cylinder block between coil and distributor

Starting Engine Number - (318") - MP8-1001 (361") ML361-1001.

►*ENGINE NUMBER MARKS (Following Engine Number)*
"A" - All cylinders 020" oversize
"B" - All crankshaft journals 010" undersize
'AB' - Both above conditions exist
"Malt se Cr ss" (3/8" High) - ONE OR MORE crankshaft journals 001" Undersize *See "Connecting Rods" and "Crankshaft" below*
"♦" (3/8" High) - One or more valve lifters 008" Oversize

TUNE-UP

►*COLD WEATHER HARD STARTING CORRECTION*· When caused by "Blued" ignition points in operation at temperatures of 20°F or less, *see "Regulator Replacement Note"* under REGULATOR *below*

COMPRESSION PRESSURE: (318") 125-165 lbs., (361") 150-180 lbs at cranking speed (150 RPM), with 15 lbs variation between cylinders (318"), 25 lbs (361")

VACUUM READING: 19 5 inches Steady at idling speed

VALVE TAPPET CLEARANCE: (318") 010" Intake, 018" Exhaust Hot and with engine idling (361") Zero lash Hydraulic lifters

MANIFOLD HEAT CONTROL: Automatic thermostatic type Located at right exhaust manifold (between manifold and gasket)

IGNITION

►*DISTRIBUTOR NOTE* Auto-Lite and Chrysler (Own make) distributors used *See DISTRIBUTOR below*

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035" (All engines)

Spark Plugs - (318") Auto-Lite AR 42 (361") A-32 All 14 mm Tighten to 30-32 ft lbs *NOTE* - 361" Engine has standard A-32 spark plugs and resistance type spark plug cables that are identified by word "RADIO" AR-32 replaces A-32 used on early cars, until stock of A-32 can be made available

COIL· Auto-Lit CAH-4002.

Ignition Current - 2 5 amps idling, 3 1 amps stopped

Resistor - Auto-Lite PU-5001

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil When testing coil, include resistor with coil

DISTRIBUTOR: Auto-Lite. Used as follows

Model	Auto-Lite No
Savoy, Belvedere (318" Std.)	IBP-4003F
(318" Pwr. Pkg.)	IBP-4003H
Canada	IBP-4003D
361" Golden Commando	IBS-4006C

Condenser - Auto-Lite IAT-3076LA **Capacity** 25- 285 mfd

Contact Point Set - Auto-Lite IBP-3028AS (IBP-4003F, H), IGW-3028JS (IBS-4006C)

Breaker Gap - 015–018" (IBP, IBS Distr.) Set maximum gap to 017"

Cam Angle - 29°±3° (IBP Distr.) with vacuum line disconnected 31-37° (IBS Distr.) with both sets of contacts operating together

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Clockwise (IBP Distr.), Counterclockwise (IBS Distr.) viewed from above.

Automatic Advance - IBP-4003D

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		425	2		850
4 5		700	9		1400
10		2130	20		4260
11		2400	22		4800

Automatic Advance - IBP-4003F

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0		900
1		565	2		1130
3		800	6		1600
8		2050	16		4100
9		2300	18		4600

Automatic Advance - IBP-4003H

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1		405	2		810
4 5		600	9		1200
7		1600	14		3200
8 5		2200	17		4400

Automatic Advance - IBS-4006C

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0		900
1		500	2		1000
6 5		800	13		1600
8		1400	16		2800
9 5		2000	19		4000

Vacuum Spark Control: Auto-Lite Integral type

Vacuum Advance - IBP-4003D

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	6 3/4
1			2	7 1/4
7			14	10 7/8
12			24	15
13 5			27	16

Vacuum Advance - IBP-4003F

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	8 1/4
1			2	8 3/4
7			14	12 1/8
12			24	15 3/4
13			26	17

Vacuum Advance - IBP-4003H

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	5 1/2
1			2	6 1/4
5			10	9 1/4
9			18	12 1/4
10			20	13 1/4

Vacuum Advance - IBS-4006C

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	8 3/8
1			2	8 7/8
6			12	12
12			24	17
13			26	18 1/8

DISTRIBUTOR: Chrysler. Chrysler Part No 1838505-P (Stamped on side of body) replaced Auto-Lite IBP-4003F on 318" engine in March 1959 Automatic & Vacuum Advance Specifications are the same as for Auto-Lite IBP-4003F Only the condenser and bushings are interchangeable *CAUTION* - Use only High-resistance type secondary cable (Cable & Terminals Package Part No 2084427-P) with word "RADIO HR" imprinted on it DO NOT use this cable with Auto-Lite Distributor

►*CONTACT ASSEMBLY NOTE* Complete assembly furnished with spring tension precalibrated and points aligned To adjust spring tension, loosen inner terminal insulator nut to reposition spring

►*OVERHAUL CAUTION* Vertical surface below mounting flange is tapered so it is necessary to clamp distributor on ribbed surface of body to prevent damage to lower bushing

►*HOLD-DOWN CLAMP CAUTION* Use only Hold-Down Clamp Part No 1947612 P with clamp ends curved upward and DO NOT use this type clamp with Auto-Lite Distributor Use of wrong type clamp will prevent fine timing adjustment of Chrysler Distributor and will not provide sufficent clamping with Auto-Lite Distributor

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Plymouth Special Data*

IGNITION TIMING

►*TIMING NOTE* V8 engines with 2-barrel carburetors are designed to operate on good grade of regular fuel. V8 engines with 4-barrel carburetors are designed to operate at peak efficiency with premium gasoline.

Setting - (318") 10° BTDC, Std & Pwr. Pkg (361") 7 5° BTDC

Timing Mark - Timing mark on vibration damper in line with correct degree mark on timing indicator on chain case cover Indicator marked 0 to 10° BTDC

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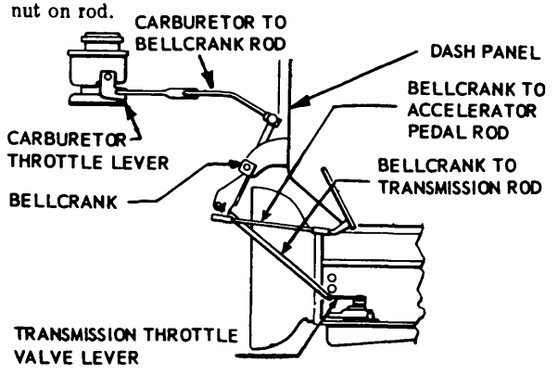
CARBURETOR

►*CARBURETOR APPLICATION: Carter BBD and Stromberg WW 2-Barrel carburetors used on 318" standard engine. Carter AFB 4-Barrel carburetors used on 318" Power Pack and 361" Golden Commando engines, optional on all other models.*

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

►*THROTTLE LINKAGE ADJUSTMENT NOTE:* Install or replace largest shim possible on flat area of accelerator bellcrank shaft (with clamp open), then tighten clamp securely to insure satisfactory shift pattern. Shim must be in place.

THROTTLE LINKAGE ADJUSTMENT (Auto. Trans.): Stop engine with carburetor off fast idle, disconnect transmission throttle rod at carburetor. Distance from dash to bellcrank should be 1/2-9/16" with rod held to full rear position. Correct distance by connecting throttle rod to carburetor and adjusting idle speed to 475-500 RPM with engine at operating temperature and off fast idle. Loosen transmission adjusting locknuts on transmission throttle rod and rod at transmission, then hold lever at correct distance from dash and adjust rodlength and tighten locknuts. *NOTE* - Accelerator pedal should be 115° from horizontal, measured from rear of pedal. If necessary, adjust accelerator rod under slanting toeboard. With distance correct, hold transmission lever forward against stop and adjust rod length then lock nut on rod.



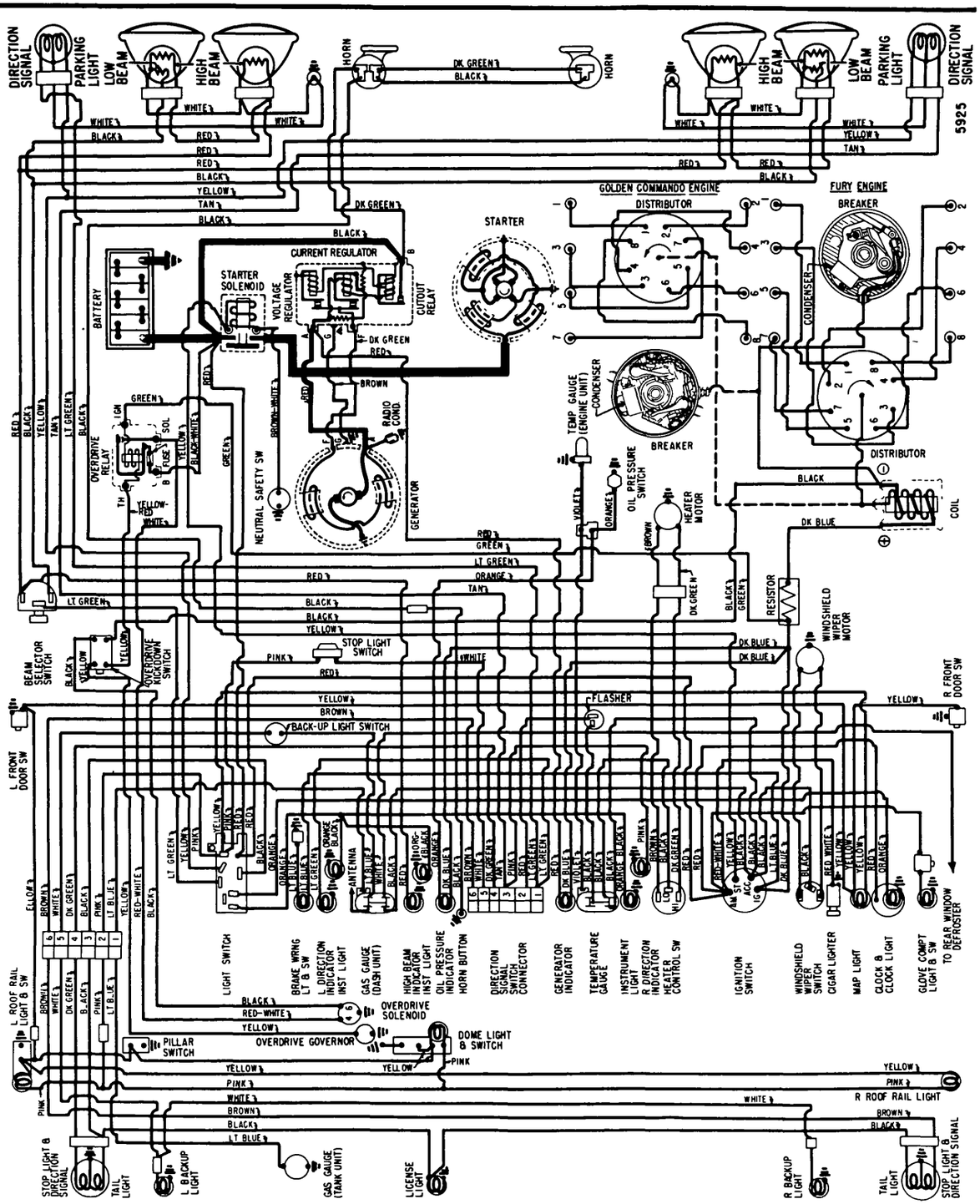
POWERFLITE & TORQUEFLITE THROTTLE LINKAGE

CARTER BBD (Dual)

Model	Carter No.
318" Std. Eng. (S.M.Trans.)	BBD-2775S or 2864S
(O.D. Trans.)	BBD-2776S or 2865S
(Auto. Trans.)	BBD-2777S or 2866S
318" Replacement	BBD-2896S

►*AUTOMATIC CHOKE NOTE:* "Cross-Over" type choke used on all models.

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►*MANIFOLD FUEL DISTRIBUTION Carbur tor RIGHT barrel feeds Cyl 2-3-5-8, LEFT barr l feeds 1-4-6-7*

Idl S tting - ¼-1½ turns open Turn both screws out for richer mixture

Idl Sp d - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (Auto Trans)

Fl at L v l - 9/32" (Gauge T109-239), between top of each float ridge (center of float) and top surface of body casting Adjust by bending lip of float arm

Acc l rating Pump - 1 1/32" from top of bowl cover to top of plunger shaft with connector rod installed in center hole (medium stroke) of throttle lever and inner hole of pump arm To adjust, bend throttle connector rod

Fast Idl Cam Cl aranc : With choke valve closed and lip on inner choke shaft lever *contacting lug on outer* lever, align index mark with adjusting screw Adjust by bending lip on inner choke shaft lever

Fast Idl Thr ttl Cl arance: 015" (Gauge T109-44) between lower edge of valve and bore with adjusting screw on index mark of cam Fast Idle Speed will be 1400 RPM with fast idle screw at index mark of cam

Aut matic Ch ke (Cr ss-Over Type): Centered on index *NOTE* - Choke is "Cross-Over" type mounted in manifold and linked to choke valve Choke assembly must be removed from manifold well for checking and adjusting

Ov rdriv Kickd wn Switch: With throttle valves wide open there should be 1/64-3/64" clearance between kickdown lever and switch stem guide To adjust, loosen locknuts and adjust switch

Thr ttl Linkag Adjustm nt (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA S e "Carter BBD Dual Carburetors" in Carburetion S ction*

STROMBERG WW (Dual)

M d l		Stromberg No.
318" Std Eng	(S M Trans)	WW 15-38
	(Overdrive)	WW 15-39
	(Auto Trans)	WW 15-40

►*COLD ENGINE STALLING CORRECTION* Carburetors with Code 15-40A have improved Choke Piston to overcome this difficulty To correct carburetors with Code 15-40 (no letter "A"), it is necessary to alter the choke *Se "Stromberg Carburetors" in Carburetion Section*

►*AUTOMATIC CHOKE NOTE "Cross-Over" type choke us d on all mod ls*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barr l feeds Cyl 2-3-5-8, LEFT barrel 1-4-6-7*

Idl S tting - 1 1/8 turns open Adjust both screws alike Turn screws out for richer mixture

Idl Sp d - 450-500 RPM (Synchro-mesh & Overdrive), 475-500 RPM (PowerFlite & TorqueFlite)

Fl at L v l - 7/32" from top of float (at center) to top of main body with gasket removed and lip of float held firmly against needle valve Check with tool T-25569 To adjust, bend float lip

Acc l rating Pump - Normal setting, pump rod connected in center hole of throttle lever Inner hole for less fuel Outer hole for more fuel

Fast Idle: Turn throttle stopscrew out so that throttle valves completely closed Hold throttle valves closed, and back out fast idle screw until fast idle cam can be positioned with **first** step in line with fast idle screw, then turn screw in until it just contacts cam Turn in an additional 5½-7½ turns With fast idle cam held in this position, close choke valve until fast idle screw is against shoulder of last step (high step) on cam Measure choke valve opening by inserting a No 12 drill between upper edge of choke valve and air horn wall. If opening not correct, bend fast idle rod Fast idle Speed will be 1300 RPM with screw at last (high) step of cam and engine hot

Automatic Choke Setting (Cross-Over Type): Centered on index *NOTE - Choke is "Cross-Over" type mounted in manifold and linked to choke valve Choke assembly must be removed from manifold well for checking and adjusting*

Overdrive Kickdown Switch: With throttle valves wide open there should be 1/64-1/32" clearance between kickdown lever and switch stem guide.

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA: See "Stromberg WW (Dodge & Plymouth) Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL
(Power Pack 318" Eng.)
(361" Golden Commando)

Model		Carter No.
318" Pwr Pkg	(S M Trans)	AFB 2813S
	(Overdrive Trans)	AFB 2813S
	(Auto Trans)	AFB 2812S
Fury		Ⓒ AFB-2780S
361" Golden Commando	(S M Trans)	AFB 2855S
	(Auto Trans)	AFB 2856S

Ⓒ - Stamped 2813

►*AUTOMATIC CHOKE NOTE "Cross-Over" type choke used on all models*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl 2-3-5-8, Left barrels 1-4-6-7*

Idle Setting - 450-500 RPM (Synchro-mesh), 475-500 RPM (Auto Trans)

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. As follows

Engine	Carter No. Single Pump	Pump With Filter
318" Std	M2608S	
Air Cond		M2886S
361"		M2662S

Pr ssure - 6-7 lbs
See "Fuel Pumps" in Carbur tion S ction

Gasolin Gaug : Auto-Lit . Electric type

Dash Unit - Auto-Lite No 14755A

Tank Unit - Auto-Lite No 14675A (Exc Suburban), No 14684A (Suburban)

S "Fu l Gauges in Carbur tion S ction

Air Cleaner: Dry Filter Element type Clean every 5,000 miles, replace element every 15,000 miles

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dust particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Auto-Lite. (318" Eng.) - 11-HS-60, 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)

(361" Golden Commando Eng.) - 11-HS-60, 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Left front of engine

STARTER

Auto-Lite MDU-6003 (Savoy & Belvedere), MDT-6001 (361' Golden Commando).

Armature - Auto-Lite No MDL-2088 (All)

►*NOISY STARTER OPERATION CORRECTION* Caused by deposits of foreign material on Bendix drive To correct, remove inspection plate at bottom of torque converter housing (Auto Trans), or clutch housing (Std Trans) and apply a few drops of No 10 oil Use pressure type oil can and 7" copper tubing extension If deposits are excessive, remove starter assembly, clean off rust and corrosion and lubricate shaft lightly with Part No 1643234 or 1692689 Engine Oil Additive

Drive - Bendix "Folo-Thru" No A3596

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 31-47 ozs (All)

Performance Data - MDT-6001

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

Performance Data - MDU-6003

Torque	RPM	Volts	Amperes
0 ft lbs.	5300	10 0	50
6 2 ft lbs	Lock	4 0	280

Starting Switch: Auto-Lite SAE-4001 (Std), SAE-4002 (Auto Trans) Magnetic switch controlled by Ignition and Starter Switch, plus Neutral Switch on Automatic Transmissions
See "Starter Controls" in Electrical Section

Neutral Safety Switch Adjustment *See "PowerFlite" or "TorqueFlite" in Transmission Section*

GENERATOR

Auto-Lite. Used as follows

Savoy & Belvedere	Generator	Armatur
All, Std & O D	GJM-8001A	GJC-2058F
All, A C Dual Unit	GHM-8004A	GHM-2045F
318" H D	GGA-6001AC	GFY-2101F
Fury & Sport Fury		
318" Standard	GHM-8005A	GHM-2045F
318" Special	GGA-6007C	GFY-2101F
361" H D	GGA-6003,3E	GFY-2101F
361" A C , H D	GGA-6007A	GFY-2101F
Taxi	GHM-8001B	GHM-2034F
Canada	GJC-7012A	GJC-2030F

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►*SPECIAL GENERATOR NOTE: Performance specifications apply for all generators within the following groups.*

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12.8	1150
35	15.0	2100

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs. (GJC, GJM); 34-41 ozs. (GGA); 35-53 ozs. (GHM).

Field Current - 1.2-1.3 amps. (GJC); 1.6-1.7 amps. (GJM); 1.1-1.3 amps. (GGA, GHM) at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 amps. (GJC), 3.9-4.3 amps. (GJM); 2.3-2.6 amps. (GGA); 3.0-3.5 amps. (GHM) at 10.0 volts (70°F).

Belt Adjustment: Deflection with 5 lb. force applied as shown in table below. Place straightedge across pulleys to measure deflection.

Model	New	Used
318" Standard ℂ	5/32"	1/4"
Air Cond. ℂ	1/8"	1/4"
Air Susp. ℂ	5/16"	9/16"
361" Standard ℂ	1/8"	1/4"
Air Susp. ℂ	5/16"	9/16"

ℂ - Between generator and water pump.
ℂ - Between compressor and generator.

REGULATOR

Auto-Lite VAT-6201A (GGA); VRX-6201A (GHM, GJC); VRX-6301A (GJM).

►*VRX-6301A REGULATOR REPLACEMENT NOTE:* When hard starting at temperatures of 20°F or less is experienced and distributor breaker contact points are "Blued", replace early type Regulator with one that has Code 11-N or higher stamped on base.

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3.0-5.0 amperes discharge after a charge of 10 amperes (VAT), 7 amperes (VRX).

Contact Gap - .015" minimum.

Air Gap - .031-.034".

Voltage Regulator

Setting - 14.5 volts charging at 7 amps. (VRX), 10 amps. (VAT) at 80°F or with .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A - Operating Amperes - Test B
VAT-6201A	46 — 40 (38-42)
VRX-6201A	37 — 30 (28-32)
VRX-6301A	44 — 35 (33-37)

Test A - After 15 minutes operation charging at 10 amps. (VAT), 7 Amps. (VRX).

Test B - After additional 15 minutes operation with current regulator operating-load applied to hold voltage down to 13.7-13.9 volts (VAT). 13.6-13.8 volts (VRX).

Air Gap - .048-.052".

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System). *See "4-Headlight Systems" in Electrical Section.*

Automatic Beam Changer: *See Electrical Section.*

Electronic Rear View Mirror: *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Push control knob and shaft to "OFF" position (full in). Depress button on top of switch and at the same time pull out control knob and shaft. Remove switch locking nut and remove switch assembly.

Stop Light Switch Location: On forward end of master cylinder.

LIGHTING CIRCUIT BREAKERS: Used as follows:

22.5 Ampere - Protects Headlamps, Headlamp Beam Indicator, and Parking Lamp. In headlight switch.

15 Ampere - Protects Tail, Stop, License Plate, Instrument and Dome Lights. In headlight switch.

5 Ampere - Protects Windshield Wiper (Single Speed).

6 Ampere - Protects Windshield Wiper (Variable Speed).

30 Ampere - Protects Window Lift and Seat Adjuster.

FUSES: SFE-10 - In Clock lead.

SFE-7.5 - In Radio lead.

SFE-20 - In rear unit of Air Conditioning.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 318" (Standard, Fury, Sport Fury) Engine - 90° V8 with overhead valves similar in design to previous models.

361" (Golden Commando) Engine - 90° V8 with overhead valves located on outboard side of single rocker arm shaft. Engine block is recessed at front to form integral timing chain case and ignition distributor is located at front of engine.

Engine	Bore	Stroke	Displacement
318"	3.91"	3.31"	318 cu. in.
361"	4.12"	3.38"	361 cu. in.

Engine	Compr. Ratio	Rated HP	Develop. HP & RPM
318"	9.0	48.9	ℂ 230 at 4400
318"	9.0	48.9	ℂ 260 at 4400
361"	10.0	54.3	305 at 4600

ℂ - 2-barrel Carb. ℂ - Power Package.

Compression & Vacuum Reading - *See TUNE-UP.*

►***318" ENGINE CHAIN CASE COVER & GASKET CAUTION:*** New cast aluminum covers used on some engines require new gasket Nos. 1618685 (Chain case cover), 1676031 (Water Pump).

►*318" ENGINE CYLINDER HEAD GASKET REPLACEMENT CAUTION:* One-piece steel and laminated types used in production. Use only laminated type Part No. 1947354-P for replacement.

►*318" ENGINE OIL PAN NOISE CORRECTION:* Oil-pump suction screen may strike oil pan when engine temperature high. To correct, drain oil, then use long screwdriver or similar tool to increase clearance.

►*318" ENGINE TAPPING NOISE CORRECTION:* Caused by valve rocker arms or springs striking rocker arm cover. To correct, relocate cover or make small dimple (from inside cover) to increase clearance.

►*EARLY 318" HIGH SPEED TORSIONAL NOISE CORRECTION:* Engines with synchro-mesh transmissions prior to engine No. MP-126384 (Without Damper) can be corrected by the installation of the following parts:

Part	Part Number	Quantity
Fan Drive Pulley	ℂ 1821411	1
Vibration Damper	1947235	1
Damper Capscrew 2 ¼" long	1821414	1
Fan Drive Pulley Screw	180075	6
Fan Drive Pulley Lock Washer	120214	6
Timing Indicator	1947236	1

ℂ - On Power Steering Cars use Fan Drive Pulley No. 1855152.

►*361" ENGINE TAPPET NOISE, BEARING NOISE OR DELAYED OIL PRESSURE LIGHT OPERATION CORRECTION:* To correct, install Oil Filter Part No. 1851658-P, then use accurate oil gauge to check oil pressure. If pressure still low, remove oil pan, check for oil leaks (with oil leak detector). If condition still exists, remove oil pump and check it for scoring, dirt or improper operation of relief valve. When replacing pump, accurately torque capscrews to 35 inch lbs. only. Check installation of pump for binding by installing an old oil pump-and-distributor drive shaft (with gear removed and 4-5" hex bolt welded to extend shaft) in place of distributor. Relocate pump on block when torque required to turn shaft exceeds 12 in. ozs. Use new Oil Filter Base Assembly Part No. 2120866 (with new oil relief valve plunger) if oil pressure is still low. Replace complete pump with New Oil Pump Part No. 2120870 when complete pump is required.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Plymouth Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

OIL PAN REMOVAL: Drain oil, then remove steering and idler arms, dust shield, and starter motor. Remove crankcase breather, and on cars with single exhaust system, remove crossover pipe. Disconnect motor mounts

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and raise engine approximately 2". Support engine with wooden blocks placed under motor mounts.

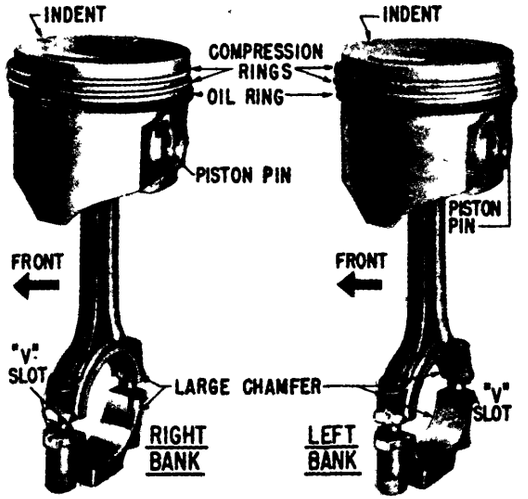
►*OIL PAN NOISE CORRECTION (318" Eng.):* Oil-pump suction screen may strike oil pan when engine temperature high. To correct, drain oil, then use long screwdriver or similar tool to increase clearance.

PISTONS

Aluminum alloy, elliptically turned, tin-plated. Thermally controlled by steel band and horizontal slot (318"), by steel struts (361").

Weight - 21.0 ozs. (318"), 25.6 ozs. (361").

►*CYLINDER BORE OVERSIZE CAUTION:* Engines with letter "A" following engine have .020" oversize cylinder bore.



PLYMOUTH V8 PISTON & ROD ASSEMBLY

Clearance (318" Eng.) - .00075-.00125" on thrust side at top of skirt. With .0015" x ½" feeler gauge inserted between cylinder wall and piston, at thrust face, pull to withdraw feeler should be 5-10 lbs.

Clearance (361" Eng.) - .0005-.001" between thrust face of piston and cylinder wall, measured at top of piston skirt and half way down cylinder wall, crosswise to engine.

Removal: Pistons and rods removed from above.

Replacement Pistons: Std., .005", .020", .040" Oversize.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders 1-3-5-7) with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders 2-4-6-8). *See Rod Installation.*

PISTON PIN

318" Engine - Floating type with lock ring at each end.

361" Engin - Tight press fit in connecting rod. Special removal and installation procedures are required.

Diameter - .984" (318"), 1.093" (361").

Length - 3.00 (318"), 3.56" (361").

Pin Fit in Piston (318") - .0000-.0005". Tight double thumb press fit at 70°F.

Pin Fit in Piston (361") - .00015-.00065". Light thumb press fit at 70°F.

Pin Fit in Rod (318") - .0001-.0004" (Selective). Tight thumb press fit at 70°F.

Pin Fit in Rod (361") - .0007-.0012" interference fit.

Piston Pin Removal & Installation (361") - *See "Piston Pins" in Plymouth Special Data.*

Replacement Pins: 318" Eng. - Std., .003", .008" Oversize. **361" Eng.** - Available only with new pistons.

PISTON RINGS

Compression rings are cast iron, low taper and twist, tin plated (318"), cast iron, standard taper and twist, tin plated (361"). Oil rings are cast iron, single piece units.

318" Standard Engine

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0780"	.010-.020"	.0015-.003"
Compr. (Lower)	.0780"	.010-.020"	.001-.0025"
Oil	.186"	.010-.020"	.001-.003"

361" Golden Commando Engine

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0780"	.013-.025"	.002-.0035"
Compr. (Lower)	.0780"	.013-.025"	.002-.0035"
Oil	.188"	.013-.025"	.0012-.0025"

Replacement Rings: Std., .020", .040" Oversize

Installing Rings: Install compression ring with mark "TOP" to top of piston.

CONNECTING ROD

Length (Center-to-Center) - 6.12" (318"), 6.36" (361").

Weight - 25.6 ozs. (318"), 28.6 ozs. (361").

Crankpin Journal Diameter - 2.125" (318"), 2.375" (361").

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Lower Bearings - 318" Eng. has copper bronze bearings with dull finish when new and dull reddish brown color or copper speckled when used. 361" Eng. has lead based babbitt on steel.

Clearance - .0005-.0015" (All).

Sideplay - .006-.014" (318"), .009-.017" (361").

Installing Rods: With piston correctly installed on connecting rod (see "Piston" above), larger chamfer on lower end of rod should be installed toward nearest crankshaft fillet. Oil groove in rod and bearing cap must be together.

Bearing Adjustment: None, replace bearings.

Replacement Bearings: Std., .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

Journal Diameter - 2.50" (318"), 2.63" (361").

►*CRANKSHAFT UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*

.010" UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" following engine number indicates that ALL Main & Connecting Rod Journals are .010" Undersize.

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) stamped on engine numbering pad indicates that one or more connecting rod and main bearing journals are machined .001" undersize. Position of undersize journals is stamped on machined surface of a counterweight. Connecting rod journals will be identified by the letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Removable precision type. Tin-based babbitt on steel (No. 3 Thrust Bearing), Lead-based babbitt on steel (All Others).

Clearance - .0005-.0015".

Replacement Bearings: Furnished Std., .001", .002", .010" Undersize.

Bearing Interchangeability (318") - Numbers 1, 2 & 4 bearings are identical. Numbers 3 or 5 are not interchangeable. **(361" Eng.)** - Numbers 1,2,4 & 5 bearing sets are identical. Number 3 is not interchangeable.

►*BEARING REPLACEMENT CAUTION:* All bearing sets have grooveless lower half, without an oil feed hole. DO NOT install a grooveless lower half bearing in upper half position.

End Thrust: Taken by No. 3 (Center) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Plymouth Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data.*

CAMSHAFT

Journal Diameter - **(1)** 1.998-1.999". **(2)** 1.982-1.983". **(3)** 1.967-1.968". **(4)** 1.951-1.952". **(5)** 1.5605-1.5615 (318"), 1.748-1.749" (361").

Bearing Diameter - **(1)** 2.000-2.001". **(2)** 1.984-1.985". **(3)** 1.969-1.970". **(4)** 1.953-1.954". **(5)** 1.5625-1.5635" (318"), 1.750-1.751" (361").

►*CAMSHAFT IDENTIFICATION NOTE:* Stripe of colored paint is located at distributor drive-gear end between gear and No. 8 cylinder exhaust lobe. No paint indicates 318" engine with 2-barrel carburetor, white paint 318" engine with Power Package, blue paint 361" Golden Commando. Paint can be seen by removing distributor and rotating camshaft. White may appear yellow or green-colored.

►*CAMSHAFT SPROCKET AND TIMING CHAIN LUBRICATION NOTE:* Lower half of No. 1 Bearing is chamfered on left parting line edge which forms path for oil to crankshaft & camshaft sprockets in addition to oil seepage through bearing.

Bearings - Removable lead based babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust: (318") - Taken by thrust plate behind camshaft sprocket hub. **(361")** - Taken by camshaft sprocket hub. Camshaft held to rear by design when running.

Timing Chain: (318") - Width .875". Pitch .38". Length 68 links.

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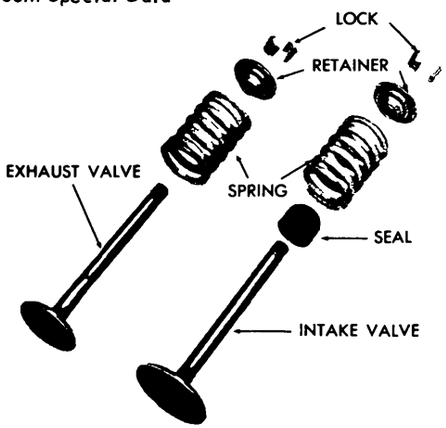
Timing Chain: (361") - Width .875". Pitch .50". Length 50 links.

Camshaft Setting: Marks on sprockets should be adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Plymouth Special Data.*

Engine Front Cover (Removal & Installation): *See Plymouth Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See Plymouth Special Data*



PLYMOUTH 318" V8 VALVE ASSEMBLY

VALVES

Tappet Clearance: (318") - .010" Intake, .018" Exhaust, Hot. **(361")** - Zero lash, hydraulic lifters.

318" Std. & Power Pack Eng.

Valve	Head Diameter	℄ Stem Diameter	Length
Intake	1 84"	372"	4 60"
Exhaust	1.56"	.371- 372"	4.58"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.390"	.002"
Exhaust	45°	.386"	.002"

361" Golden Commando Eng.

Valve	Head Diameter	℄ Stem Diameter	Length
Intake	2.08"	.372"	4.87"
Exhaust	1.74"	.371-.372"	4.88"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.390"	.002"
Exhaust	45°	.390"	.003"

℄ - Standard valves. Also 005", 015", 030" Oversize

Valve Seat Width - 1/16-3/32" (Intake), 3/64-1/16" (Exhaust).

Valve Stem Seal - Cup type seals used on all intake valves (All engines), on exhaust valves (361" Golden Commando engine).

Valve Springs: Single springs used on all engines

Spring Specifications (318" Engine)

	Pressure	Length
Valve Closed	68-76 lbs.	1 11/16"
Valve Open	160-172 lbs.	1 5/16"

Spring Specifications (361" Engine)

	Pressure	Length
Valve Closed	75-85 lbs.	1 55/64"
Valve Open	179-187 lbs.	1 15/32"

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 11/16" (318" Eng.), 1 57/64" (361" Eng.), install 1/16" spacer under spring to bring height to limits 1 5/8"-1 11/16" (318" Eng.), 1 53/64"-1 57/64" (361" Eng.)

►*VALVE SPRING LOAD CAUTION:* Hydraulic lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install oversize valves. Use Reamer C-3433 for .005", C-3430 for .015", C-3427 for .030". Use reamers in sequence.

►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (318" Engine):* "I" (Intake), "E" (Exhaust) on boss above nearest appropriate valve guide indicates that valve is .005" Oversize

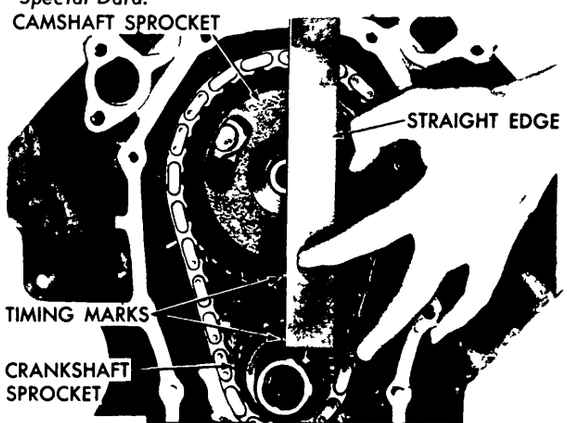
Valve Lifters: (318") - Barrel type mechanical with self-locking adjusting screw **(361")** Hydraulic.

Diameter - (All) .9040-.9045" **Clearance** .0005-.0015".

►*OVERSIZE LIFTER NOTE* "♦" mark on engine number pad indicates .008" oversize lifters.

Hydraulic Lifter Overhaul & Testing: *See "Valve System" in Plymouth Special Data.*

Rocker Arm Assembly: *See "Valve System" in Plymouth Special Data.*



PLYMOUTH V8 ENGINE VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing

318" Standard Engine

Intake - Open 17° BTDC. Close 47° ALDC.

Exhaust - Open 55° BLDC. Close 9° ATDC.

318" Power Pack Engine

Intake - Open 13° BTDC. Close 55° ALDC.

Exhaust - Open 51° BLDC. Close 17° ATDC.

361" Golden Commando Engine

Intake - Open 20° BTDC. Close 60° ALDC.

Exhaust - Open 58° BLDC. Close 22° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity: 5 qts. All engines. Add 1 qt. with filter change

Normal Oil Pressure - 45-65 lbs at 2000 RPM.

Oil Pressure Relief Valve - In oil pump body, see *"Oiling System" in Plymouth Special Data.*

Oil Pressure Indicator Switch: Auto-Lite No. 14272A, located at rear of cylinder block near the top.

Oil Pump (318"): Mounted on rear main bearing cap. Rotor type with strainer mounted on oil pump body. Strainer must be mounted parallel with bottom of cylinder block.

Oil Pump Overhaul - *See "Oiling System" in Plymouth Special Data.*

►*INSTALLATION NOTE:* Prime oil pump before installation on rear main bearing cap.

Oil Pump (361"): Rotor type. Mounted on cylinder block on lower left side near front of engine.

Oil Pump Overhaul - *See "Oiling System" in Plymouth Special Data.*

Oil Filter (318"): Shunt type. Filters only a portion of pump output. Replace element every 5,000 miles or sooner if needed

Oil Filter (361"): Full flow disposable type. Replace every 5,000 miles or sooner if needed

►*OIL FILTER INSTALLATION NOTE (361"):* Screw new filter on base until gasket on filter contacts base, then tighten **½-turn by hand.** DO NOT overtighten.

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in valve chamber cover **(318")**, in right rocker arm cover **(361")**. *NOTE* - Remove air cleaner in ventilator pipe (when so equipped), wash in kerosene and re-oil

COOLING

Water Capacity: 20 qts. **(318")**, 16 qts. **(361")**. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 16°F (above zero) for summer operation.

Pressure Valve: 14 lb. radiator filler cap (All Models).

Thermostat: Pellet type. Located under water outlet connector. *NOTE* - 180°F thermostat standard on all V8 engines. Use 160°F thermostat for alcohol-type anti-freeze.

►*THERMOSTAT IDENTIFICATION NOTE:* Disregard the 160° mark shown on top surface of gasket flange on some thermostats. Correct 180° mark is located on bottom of pellet. This applies to double coil spring type thermostats

Water Pump: Sealed ball bearing, packless type. No lubrication required

See "Water Pumps" in Plymouth Special Data.

Temperature Gauge: Auto-Lite. Electric type.

Dash Unit - Auto-Lite No. 1475A.

Engine Unit - Auto-Lite No. 14405A.

See "Temperature Gauges" in Miscellaneous Section.

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CLUTCH

Borg & Beck Single plate type
Se "Borg & Beck' Clutches in Clutch Section

Pedal Adjustm nt· Turn clutch release fork rod adjusting nut until 3/16" free movement of clutch fork outer end is obtained This adjustment will provide necessary 1" free play at pedal

Overcent r Spring Adjustment· Disconnect upper end of clutch pedal rod Move clutch pedal to floor and loosen overcenter spring adjusting nut Tighten adjusting nut finger tight Reconnect pedal rod, then tighten adjusting nut **7 compl t turns.** If heavier action desired, loosen nut 1 turn If lighter action desired, tighten nut 1 turn

Ov rc nt r Spring Adjust r Adjustment: To obtain least pedal effort, turn cushion up to point where pedal will NOT return the last 1" of travel from overcenter position to full return, then back off cushion from ½-1 full turn so pedal will return completely to full return position Check clutch for ease of operation and re-adjust as necessary

R moval· Disconnect propeller shaft, speedometer cable, parking brake, cable and gearshift control rods Remove transmission (See Synchro-mesh Transmission) Mark clutch cover and flywheel Remove bolts that hold clutch cover to flywheel, loosening each bolt a few turns (in succession) until cover is free Remove clutch disc and pressure plate assembly from clutch housing

SYNCHRO-MESH TRANSMISSION

Own Helical gear, constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse)
See "Plymouth Synchro-mesh" in Tr ansmission Section

Transmissi n Controls· *S e "Transmission Controls" in Transmission Section*

►*GEARSHIFT LEVER LUBRICATION NOTE* In heavy duty service where hard shifting is experienced, remove gearshift lever and apply Mopar Lubriplate to ball end and pivot-pin hole and area surrounding it Repeat operation at 10,000 mile intervals

►*TAXICAB SYNCHRO-MESH TRANSMISSION PRODUCTION CHANGE* Linkage interlock entered production May 1959 to hold low & reverse in neutral when shifting into second and high *See "Plymouth Synchro-mesh Transmission" in Transmission Section*

R moval: Disconnect propeller shaft, speedometer cable, hand brake cable, and control rods If transmission is to be disassembled, apply hand brake to hold mainshaft while loosening flange nut This method will also prevent possible brinelling of bearings, or other damage caused by pounding on wrench Remove transmission by pulling it straight back until pinion shaft clears clutch disc before lowering transmission This precaution will avoid bending clutch disc

OVERDRIVE

Warn r Typ R10. Planetary gear type with solenoid operation and accelerator pedal controlled kick-down
See "Plymouth Overdriv " in Transmission Section

Overdrive Controls· *See "Overdrive Controls" in Transmission Section*

R m val: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected

POWERFLITE TRANSMISSION

Torque Converter and hydraulically operated two speed planetary transmission
See "PowerFlite" Transmission in Transmission Section

►*POWERFLITE BUZZING NOISE CORRECTION* To noise that occurs while driving in reverse, install new Control Valve Part No 2124247 in converter *See Power-Flite' Transmission in Transmission Section*

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION See 'PowerFlite Transmission" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "PowerFlite Transmission" in Transmission Section*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 10,000 miles, both standard and heavy duty operation This specification supersedes previous 20,000 mile drain interval Use Automatic Transmission Fluid Type "A", Suffix "A"

Checking Fluid Level (Trans. Cold, Car not Driven): Oil level to be between the low (L) mark and the bottom of dipstick

Checking Fluid Level (Trans. Hot, Car Driven at least 10 miles)· Oil level should be between ½" below full and full mark

Throttle Linkage Adjustment· *See CARBURETOR above*

►*OTHER DATA See "PowerFlite Transmissions" in Transmission Section*

TORQUEFLITE TRANSMISSION

Torque Converter and hydraulically operated three speed planetary transmission
See "TorqueFlite Transmission" in Transmission Section

►*TORQUEFLITE DRIVE SLEEVE RATTLE CORRECTION* To correct, install Service Package No 2084321 -P, containing modified front pump rotor drive sleeve, rubber "O" ring and cast iron ring *See "TorqueFlite Transmission' in Transmission Section*

►*TORQUEFLITE 2-3 UPSHIFT RATCHETING NOISE CORRECTION* Caused by incorrect assembly of clutch pack Reassemble with pressure plate at front of pack next to snap ring *See 'TorqueFlite Transmission" in Transmission Section*

►*TORQUEFLITE BUZZING NOISE CORRECTION* To correct noise that occurs while driving in reverse, install new Control Valve Part No 2124247 in converter

►*TORQUEFLITE VALVE BODY PRODUCTION CHANGE (To reduce possibility of leakage and to improve shift quality and endurance)* One-piece valve body entered production in June 1959 and identified by new Part Numbers stamped on transmission oil pan rail *See 'TorqueFlite Transmissions" in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "TorqueFlite Transmissions" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "TorqueFlite Transmission" in Transmission Section*

Lubrication: Check fluid level every 1,000 miles, drain and refill every 10,000 miles, both standard and heavy duty operation This specification supersedes previous 20,000 mile drain interval Use Automatic Transmission Fluid Type "A", Suffix "A"

Thr ttl Linkag Adjustm nt: *See CARBURETOR above*

►*OTHER DATA See "TorqueFlite Transmissions" in Transmission Section*

UNIVERSALS

Detroit. Ball & Trunnion type front Cross type rear
Rear Universal Joint Operating Angle – *See 'Propeller Shaft Notes" in Plymouth Special Data*

REAR AXLE

Own. Semi-floating, Hypoid gear, with separate carrier and Hotchkiss drive *See "Plymouth Hypoid" in Rear Axle Section*

►*SURE-GRIP AXLE NOTE* Optional in ratios listed in table below and similar in design to Power-Lock (Plate Clutch Type) Differential Identified by letter "S" stamped on carrier housing at axle ratio identification pad and a round aluminum tag (marked "Use Sure-Grip Lube") attached to carrier attaching bolt below filler plug *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

"SURE-GRIP" AXLE LUBRICANT NOTE - Use only Mopar Sure-Grip Lubricant Part No 1879414

►*BANJO HOUSING INSTALLATION NOTE* Check rear universal joint operating angle *See "Propeller Shaft Notes" in Plymouth Special Data*

Axle Ratios	Standard	Optional
MP2, MP2-P, S M	3 54(39-11)	①② 3 73(41-11)
O D	3 91(43-11)	
MP2(Golden Commando)	④ 3 31(43-13)	
MP2,MP2-P(PowerFlite)	3 31(43-13)	①② 3 73(41-11)
MP2,MP2-P(TorqueFlite)	2 93(41-14)	③ 3 31(43-13)
MP2(Golden Commando)	④ 3 31(43-13)	2 93(41-14)

① - Use with "Sure-Grip" only
② - Use 3 91 (43-11) in mountainous country
③ - Use 3 73(41-11) with "Sure-Grip"
④ - Also used with "Sure-Grip"

Backlash - 006- 008"

Carrier Removal: Disconnect rear universal, remove axle shafts (see below), take out carrier capscrews, lift off carrier assembly

Axle Shaft Removal: Remove wheel, drum, and hub assembly (use screw type hub puller – Tool C-845), block brake pedal, disconnect brake line at wheel cylinder, remove axle shaft key, install sleeve (Tool C-745) in oil seal, remove brake support (oil seal mounted in support), pull shaft and bearing (use C-499 Puller)

Wheel Bearing Adjustment: Shims between backing plate and axle housing With wheel and hub removed, check endplay with dial indicator To adjust, remove backing plate (see above), add or remove shims (furnished 005", 012", 030" thick) equally at both wheels
Endplay - 013- 018"

SHOCK ABSORBERS

"**Oriflow**". Direct-acting, hydraulic type Serviced by replacement

Shock Absorber (Plymouth No.)	Front	Rear
Standard 1"	1881774	1879307
Air Susp 1"		1879305
Hvy Duty 1"	1881775	1879306
Hvy Duty 1 3/8"		1881877

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FRONT SUSPENSION

Independent. "Torsion-Aire" suspension with ball joints and torsion bar front springs *NOTE* - Caster and Camber adjustment is controlled by eccentric cams operating in cam retainers welded to front and rear faces of upper control arm brackets No shims used *See "Torsion-Aire" Suspension in Suspension & Wheel Alignment Section*

Steering Axis Inclination - 6½° at 0° camber
Caster - (Manual Steering) Neg ¾°±¾° Neg ¾° preferred
(Power Steering) Neg ¾°±¾° Pos ¾° preferred
NOTE - Caster should be equal as possible on both sides of car
Camber (Left Wheel) - Pos ¼°±¼° 3/8° preferred
Camber (Right Wheel) - 0°±¼°. 0° preferred
Toe-In - 3/32-5/32" 1/8" preferred
Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°46'

AIR SUSPENSION

At rear only Air springs used in conjunction with conventional leaf springs Optional on all models *See "Plymouth Air Suspension" in Suspension & Wheel Alignment Section*

►*COMPRESSOR KNOCKING NOISE CORRECTION* Caused by end float in crankshaft Correct by installing Air Suspension Compressor Kit No 2084466 *See "Plymouth Air Suspension" in Suspension & Wheel Alignment Section*

STEERING

Manual: Gemmer - Worm and three-tooth roller
See "Gemmer Worm & Roller" in Steering Section

Power Steering· "Constant Control Full Time" Power Steering
See "Plymouth Constant Control Power Steering" in Steering Section

►*POWER STEERING FLUID CHANGE* New Power Steering Fluid Part No 2084329 recommended for additions or refills after overhaul, on all Constant Control Power Steering Units

►*POWER STEERING PRODUCTION CHANGE* Gear housing and valve lever spring changed to increase valve travel and reduce valve leakage Use new spring and housing together and use with spring loaded valve lever steering gears identified by letter "J" or succeeding letters New Housing No 2122041, New Spring No 1822871 Gears with new housing and spring identified by letter "R" stamped on housing

►*POWER STEERING OIL LEVEL CHECK* No dipstick used on later cars Oil level should be at bottom of filler neck (engine cold), half-way up filler neck (engine hot)

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Plymouth Constant Control Power Steering" in Steering Section*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Plymouth Constant Control Power Steering" in Steering Section*

BRAKES

Service Plymouth "Total Contact" (Floating Shoe) type *See "Plymouth Center-Plane & Total Contact Brakes" in Brake Section*

►*BRAKE PRODUCTION CHANGE NOTE* New "Three Platform Total Contact Brakes" used in production on later cars These brakes have important design changes and parts for early and later brakes are **not** interchangeable
See "Plymouth Three Platform Total Contact Brakes" in Brake Section

Drum Diameter - 11" front and rear (Std), 12" (Special Equipment)
Wheel Cylinder Diameter - 1 1/8"
Lining - Molded asbestos, bonded to shoe
Length - 11 5" **Width** - 2" **Thickness** - 20"

►*LINING NOTE* When Special Equipment 12" Drums used, lining length is 12 6", width is 2 5", thickness is 20"

Braking Power - 60% front, 40% rear
Clearance - Front Wheels - Turn each adjusting cam in direction of forward wheel rotation until shoe is solid against drum and wheel is locked Turn cams in opposite direction until no drag is felt
Rear Wheels - Same as for front wheels except that forward shoe adjusting cams are rotated in direction of forward wheel rotation and rear shoe cams are rotated in direction of reverse wheel rotation

Master Cylinder: On engine side of dash panel

►*MASTER CYLINDER NOTE (Cars Without Power Brakes)* Master cylinder has a non-adjustable pushrod and the pedal stop is within the master cylinder eliminating need for adjustment No pedal return spring is used A service package consisting of piston-collar-rod-retainer and boot assembly is available for replacement of individual parts that are worn or damaged
Removal - Disconnect pushrod, brake tube and stop light switch leads Remove master cylinder to dash bolts Slide master cylinder straight out from dash

Power Brakes: Bellows Assist type Mounted on firewall and linked to upper end of brake pedal (used with standard master cylinder)

►*POWER BRAKE SQUEALING OR WHISTLING NOISE:* Install new vacuum check valve No 1944089 (Identified by a daub of white paint on flange of tube section) New valve is a "T" design which permits a single hose connection to reserve tank in place of the two hoses previously used To determine if old valve is faulty, check for looseness of suction tube flange in the valve assembly
See "Chrysler, Plymouth Bellows Type Power Unit" in Brake Section
Removal of Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket, to prevent trigger arm from extending beyond bracket Remove attaching nuts, slide reinforcement plate off studs and remove unit from dash

Parking Brake: On shaft at rear of transmission 6" external contracting type used with Synchro-mesh Trans , 7" internal expanding type used with Automatic Trans

Adjustment - *See "Brake Notes" in Plymouth Special Data*

Lining	Width	Thickness	Length
6" Ext	2"	5/32"	①
7" Int	2"	5/32"	② 13 06"

① - One-piece 16 68", two-piece 15 38" (total)
② - Total both shoes

MISC. MECHANICAL

Windshield Wipers: Auto-Lite Electric EPW-4001B (Single Speed), EPV-4001D (Variable Speed)
See "Auto-Lite Electric Windshield Wipers" in Miscellaneous Section

Air Conditioning: Heater-Air Conditioning *See "Plymouth Air Conditioning" in Miscellaneous Section*

►*AIR CONDITIONING FAILURE TO COOL CORRECTION (Early Cars)* Caused by underhood temperatures affecting expansion valve sensing bulb To correct, install Air Conditioning Refrigerant Tubing Insulation & Mounting Clamp Package Part No 2084287, *see "Plymouth Heater-Air Conditioning" in Miscellaneous Section*

Power Window Regulators· Electric type Reversible type motor in each window, controlled by door switch and master control switch *See "Electric Window Regulators" in Miscellaneous Section*

Power Seat Adjusters· Electric 2-Way type *See "Power Seat Adjusters' in Miscellaneous Section*

Convertible Top Control: Electric-hydraulic type *See "Power Top Controls" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Identification
Savoy	PP1-L
Belvedere	PP1-M
Fury	PP1-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post Number (example below) includes identification data

① ② ③ ④ ⑤
2 1 0 1 100001

① - Car Make **2** Plymouth 6 Cyl
② - Model Series **1** Savoy **2** Belvedere **3** Fury **5** Savoy Sta Wgn **6** Belvedere Sta Wgn **7** Fury Sta. Wgn **8** Taxi **9** Special
③ - Year **0** (1960)
④ - Assembly Plant **1** Plymouth (Detroit) **5** Los Angeles **6** Delaware **7** St Louis **8** Clairpointe **9** Canadian Plant
⑤ - Beginning vehicle number at each assembly plant

ENGINE NUMBER: Stamped on right side of block below cylinder head at front or rear of engine Number (example below) includes identification data

① ② ③ ④ ⑤
P 22 . . 8 1

① - Year - **P** (1960)
② - Displacement - 225 cu ins
③ - If this space blank, engine is standard **A** indicates all cylinders 020" Oversize **B** indicates all crankshaft journals 010" Undersize **AB** indicates both conditions
④ - Month Assembled **8** August, etc
⑤ - Day Assembled **1** 1st day of month, etc

TUNE-UP

COMPRESSION PRESSURE: 130-160 lbs at 150 RPM (plugs removed) Maximum variation between cylinders 15 lbs

VACUUM READING: 19 5" at idle speed

VALVE TAPPET CLEARANCE: 010" Intake, 020" Exhaust, Hot

MANIFOLD HEAT CONTROL: Thermostatic coil spring type Valve must operate freely When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 035"

Spark Plugs - Autolite AG52 Std (Use to replace AG42 used in early production), Autolite AG82 (Taxicab) "Long Reach" 14 mm type *NOTE* **- Plugs are installed in aluminum sleeves which serve as plug gaskets**

COIL: Autolite CAH-4001. (Service Coil Autolite 200575).
Ignition Current - 2 5 amps idling 3 1 amps stopped
Resistor - Autolite 201000 Connected in lead between ignition switch and coil Bypassed during cranking by second lead from ignition switch

►*ROUGH IDLE OR ENGINE STALLING CORRECTION* **Caused by loose terminal on lead at resistor Correct by increasing crimp on female terminal for more positive connection**

DISTRIBUTOR: Own. Chrysler No 2095270. Conventional type with centrifugal and vacuum advance
Condenser - Chrysler 1818757 **Capacity** 25- 285 mfd
Contact Point Set - Chrysler No 1838643
Breaker Gap - 017- 023"
Cam Angle - 36-42°
Breaker Arm Spring Tension - 17-21 5 ozs
Rotation - Clockwise viewed from above

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250-450	0	500-900
0-2	450	0-4	900
5 5-7 5	1000	11-15	2000
10 5-12 5	2200	21-25	4400

Vacuum Spark Control: Integral type

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4 9-6 9
4 5-7	9-14	9 5
7 8-10 3	15 6-20 6	12

IGNITION TIMING

Setting - 2 5° BTDC (Synchromesh), 5° BTDC (Auto Trans)
Timing Mark - Align correct mark on chain case cover with mark on crankshaft pulley

CARBURETOR

►*CARBURETOR APPLICATION Carter BBS single barrel carburetor used*

►*HARD COLD STARTING (Cars with cross-over choke carburetors)* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn Operate valve to flush out gum formation

►*HARD COLD START & WARM-UP CORRECTION.* May be caused by choke rod or choke shaft arm striking carburetor air cleaner To correct, remove air cleaner and install air cleaner mounting gaskets as required for sufficient clearance

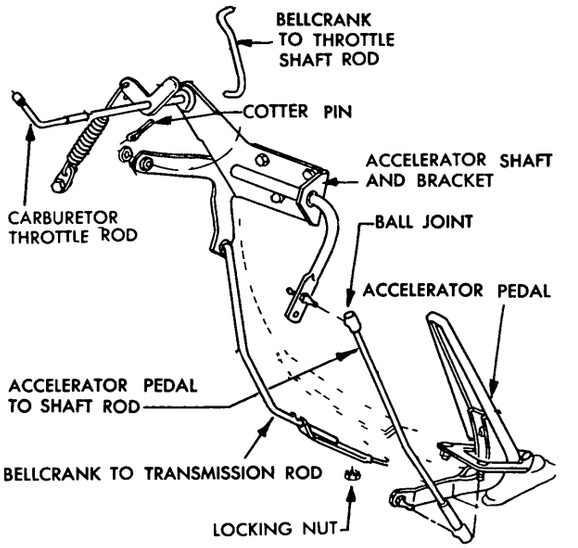
►***POOR ENGINE IDLE PERFORMANCE (In congested traffic in hot weather, or after continuous highway driving at 60-70 MPH)*** **Check all of the following points Intake Manifold and Carburetor mounting for air leaks All vacuum operated accessories (power brakes, vacuum actuated switches, etc) for air leaks, adjust Tappet Clearance, set Ignition Timing, check carburetor linkage for free operation, adjust carburetor idle mixture and speed setting If above operations do not correct trouble, and a slight hesitation is experienced at 40-70 MPH on light acceleration, reposition air cleaner at 90° to right across valve cover**

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Bring engine to normal operating temperature with carburetor off fast idle cam and adjust idle speed to 500 RPM Loosen locknut at lower end of transmission throttle rod and move transmission throttle control lever forward until it stops Tighten locknut Adjust a spirit level protractor to 114° and place lengthwise on flat face of accelerator pedal With car level, disconnect accelerator pedal rod and adjust length of rod so bubble is centered in spirit level Connect rod

CARTER BBS

Carter BBS No. 2958S, SA, SB (Synchro-mesh), No. 2986S, SA, SB (Auto. Trans.), No. 3053S, SA (Taxicab). Single barrel, downdraft type with automatic choke

►*CARTER BBS No 2986S PRODUCTION CHANGE AND SERVICE RECOMMENDATION* Replace original step-up



TORQUEFLITE 6 THROTTLE LINKAGE

wire *See "Carter BBS Carburetors" in Carburetion Section*
Idle Setting - 1/8-1 1/2 turns open (Except 3053S, SA), 1-2 turns open (3053S, SA) With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop Turn screw out just enough to recover engine speed that was lost Readjust idle speed screw for correct engine idle speed
Idle Speed - 550 RPM (Synchro-mesh), 500 RPM (Auto Trans in "N")
Float Level - 7/32" (2985S, SA, SB, 2586S, SA, SB), 9/32" (3053S, SA) between top of each float ridge at center of float and top surface of body casting To adjust, bend lip of float arm
Accelerating Pump - Install throttle connector rod in center hole (medium stroke) of throttle lever

Fast Idle Speed: 1200-1400 RPM with engine at normal operating temperature and fast idle speed screw (2985SB & 2986SB), idle speed screw (Others) on index mark of cam *NOTE - No adjustment necessary for fast idle on 2985S, SA, 2986S, SA, 3053S, SA carburetors On 2985SB & 2986SB carburetors, rotate fast idle screw as necessary to obtain proper engine speed*

CARB. EQUIPMENT

Fuel Pump: Carter M2996S Mechanical type
Pressure - 3½-5 lbs at 500 RPM
Fuel Filter: New disposable paper type located in fuel line between pump and carburetor Replace every 9000 miles
Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with separate Voltage Regulator Chrysler No 2096883
Dash Unit - Chrysler No 1972344
Tank Unit - Chrysler No 2084272 (Suburban), No 2084062 (Others), No 2084063 (With Optional 23 Gal Tank) *See 'Fuel Gauges' in Carburetion Section*

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Air Cleaner: Paper element type, clean every 5,000 miles, replace element every 15,000 miles More frequent servicing may be necessary under severe operation.

►*CLEANING CAUTION:* Remove filter element from housing Blow compressed air gently from inside out (2" away) to remove dust particles DO NOT tap these filters to loosen dirt or DO NOT immerse in any fluid.

ELECTRICAL

►*SEE PLYMOUTH V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC. ELECTRICAL DATA.*

ENGINE

ENGINE SPECIFICATIONS: New "Inclined" Six Cylinder, Overhead valve type *NOTE* - Engine is inclined 30° to right when installed in chassis and bottom of oil pan correspondingly sloped so that it is parallel to the floor

Bore	Stroke	Displacement
3 40"	4 125"	225 cu ins
Compr. Ratio	**Rated HP**	**Developed HP**
8 5-1	27 74	145 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

►*VALVE PUSHROD BENDING OR BREAKING:* May be caused by insufficient lubrication of valve train due to rear camshaft bearing turning in the block and cutting off the oil lead to the rocker arm shaft When replacing rear camshaft bearing, check for a sufficiently tight fit to prevent bearing turning in service If necessary coat outside diameter of bearing with a high tin-content solder before installation

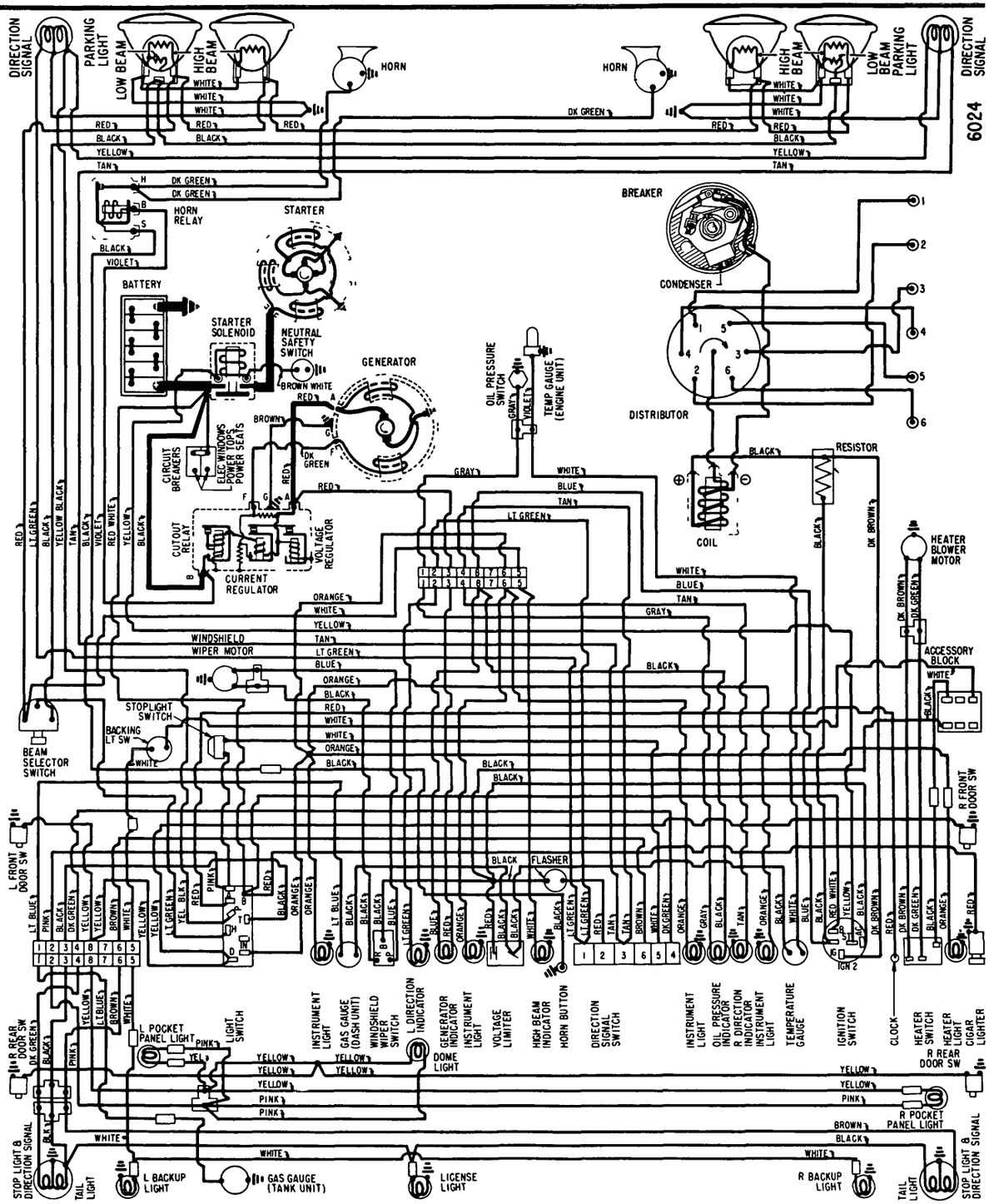
►*LOW OR INTERMITTENT OIL PRESSURE OR LOSS OF OIL PRESSURE ON TURNS·* May be caused by incorrect positioning of oil pick-up tube and screen assembly in crankcase Can be checked through oil pan drain hole without removing pan Bottom of screen should be parallel with bottom of pan with approximately 1/8" clearance *See "Oil Pick-up Tube & Screen Position" under OIL PAN below*

OIL PAN: Removal - Remove tie rod at steering and idler arms Support engine and remove front engine mounting-to-frame bolts, disconnect and remove left side support (connecting converter housing and cylinder block) Raise engine approximately 2 inches Drain crankcase Remove oil pan bolts, lower pan and remove it toward the rear *CAUTION - Do not turn oil pick-up tube and strainer out of position*

Installation: Check position of oil pick-up tube and screen (see below) Install cork rail gaskets on block using sealer to hold them in position, install front rubber molded gasket on chain case cover Place oil pan in position and install attaching bolts, tighten bolts evenly to 200 **inch lbs** (supersedes original recommendation of 15 ft lbs) Install left side support and tighten bolts to 30 ft lbs Lower engine, install front engine mounting bolts and tighten to 85 ft lbs

►*OIL PICK-UP TUBE & SCREEN POSITION* With oil pan off, make certain that tube is tight in block Check position of screen by placing straightedge vertically in line with inner edge of cylinder block oil pan rail Dis-

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tance from straightedge to nearest edge of screen should be 1 1/8". *See also "Low or Intermittent Oil Pressure" above.*

ENGINE REMOVAL: *See "Engine" in Plymouth Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Plymouth Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, slipper type skirt. Thermally controlled by steel struts.

►*OVERSIZE CYLINDER BORE CAUTION:* Letter "A" (A or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates all cylinder bores and pistons are .020" Oversize.

Weight - 16.3 ozs.

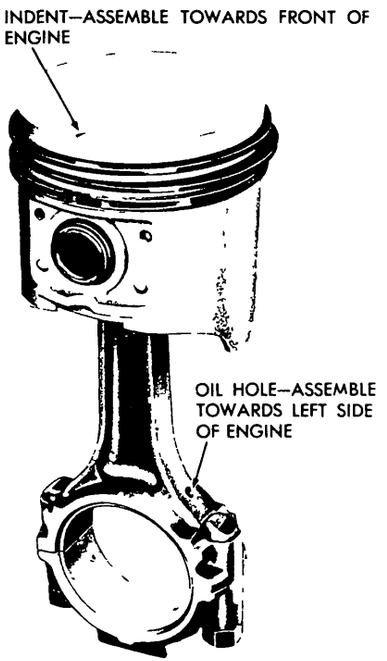
Removal - Pistons and rods removed from above.

Clearance - .0005-.0015" at top of skirt.

Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure piston at top of skirt at right angles to pin hole, measure cylinder bore halfway down and at right angles to crankshaft.

Installing Pistons - Notch in piston head must be toward front of engine. *See Rod Installation.*

Replacement Pistons: Furnished with pins in Std. size and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.



6 CYL. PISTON & ROD ASSEMBLY

PISTON PIN

Press fit in connecting rod.

Diameter - .9007-.9009". **Length** - 2.955-2.975".

Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

Pin Fit in Rod - .0007-.0012" Interference fit. Special procedure and tools used for removal & installation. *See "Piston Pins" in Plymouth Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

Compression rings cast iron (No. 1 is chrome-plated, No. 2 is tin-plated). Oil ring is three-piece type with chrome-plated rails.

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	.010-.020"	.0015-.003"
Oil	.1860-.1865"	.015-.055"	.0010-.003"

Installing Rings - Mark "Top" on compression rings must be toward top of engine.

Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020" to .029",.040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.699".

Weight - 27.34 ozs.

Crankpin Journal Diameter - 2.1865-2.1875". Taper and out-of-round limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Pin Bore in Rod - .8995-.9000".

Clearance - .0005-.0015". Wear limit .0025".

Side Clearance - .006-.012".

Bearing Adjustment - None, replace bearings.

Installing Rods - Notch in head of piston must be to front of engine, oil squirt hole in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010", Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505". Taper and out-of-round limit .001".

Bearing Type - Removable, precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-based babbitt on steel.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows.*

.010" UNDERSIZE (All Main & Connecting Rod Journals) - Letter "B" (B or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates that ALL Main and Connecting Rod Journals are .010" undersize

.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - Letter (M - Main Journal, R - Connecting Rod Journal) and Number (designates particular journal) stamped on center counterweight of crankshaft indicate that particular journal is .001" Undersize and fitted with .001" thicker wall bearing insert

►*MAIN BEARING NON-INTERCHANGEABILITY CAUTION:* Nos 1 & 2 upper bearings are chamfered along right inside edge at tab end and are interchangeable No 4 upper bearing is not chamfered and is NOT interchangeable with other bearings *(NOTE* - This bearing identified by blue marking on edge) No 3 upper and lower bearings are flanged and NOT interchangeable with other bearings **Upper** and **Lower** bearing halves are NOT interchangeable (upper bearings grooved, lower bearings plain). Nos 1, 2, 4 **lower** bearings are interchangeable *CAUTION - Use of No 1 or 2 upper bearing in No 4 position may cause oil leak, use of No. 4 upper bearing in No 1 position would prevent proper lubrication of timing chain and sprockets*

Clearance - .0005-.0015"

End Thrust - Taken by No. 3 (rear intermediate) flanged bearing. **Endplay** - .002-.007".

Replacement Bearings: Std. and .001", .002", .010", Undersize.

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Crankshaft Rear Main Bearing Oil Seal. *See "Crankshaft & Main Bearings" in Plymouth Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952".

Bearings - Lead-based babbitt on steel.

Clearance - .001-.003". Wear limit .005".

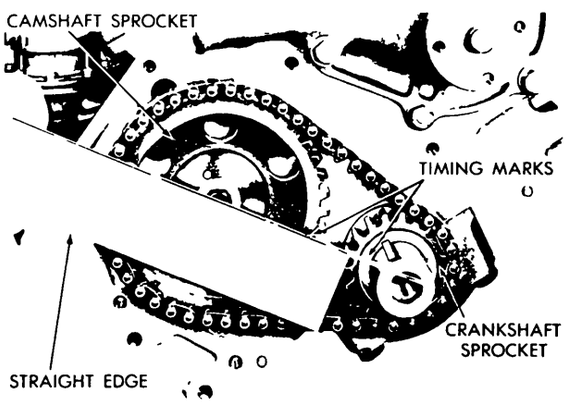
End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.

Timing Chain: Side guide type. Width .88", Pitch .50", Length 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold crankshaft sprocket stationary, use torque wrench to turn camshaft sprocket in both directions applying 30 ft. lbs. turning torque if cylinder head installed, 15 ft. lbs. turning torque if head off).

Camshaft Removal: *See "Camshaft & Bearings" in Plymouth Special Data.*

Camshaft Setting: Marks on sprockets must be adjacent and in line with straightedge across shaft centers.

CONTINUED ON NEXT PAGE



6 CYL. ENGINE VALVE TIMING MARKS

CONTINUED FROM PRECEDING PAGE

Engine Front Cover Installation: *See "Engine Front Cover" in Plymouth Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Plymouth Special Data.*

VALVES

►*INSUFFICIENT VALVE TRAIN LUBRICATION (Rocker Arms, Valve Stems, and Pushrods): See "Camshaft & Bearings" in Plymouth Special Data for inspection of rear camshaft bearing and oil passages in camshaft.*

Tappet Clearance: Initial setting with cold engine .012" Intake, .023" Exhaust. With engine at normal operating temperature and idling, set clearance to .010" Intake, .020" Exhaust.

Valve	Head Diam.	① Stem Diam.	Length
Intake	1.615-1.625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

Valve	Seat Angle ④	Lift	Stem Clearance
Intake	45°	.375"	② .001-.003"
Exhaust	45°	.360"	③ .002-.004"

① - Std. Also furnished .005", .015", .030" Oversize.
② - Wear Limit .004". ③ - Wear Limit .006".
④ - Valve face angle 45° (Int.), 47° (Exh.).

Valve Seat Width: 5/64-3/32" Int., 3/64-1/16" Exh.

Valve Stem Oil Seals: Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

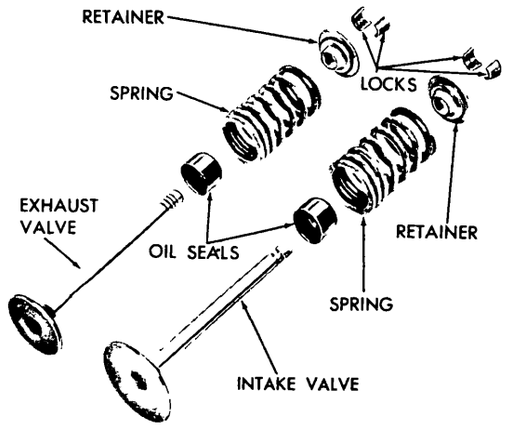
Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valve Springs: Free Length 2".

Valve Spring Specifications

Valve	Pressure	Length
Closed	68-76 lbs.	1 11/16"
Open	160-172 lbs.	1 5/16"

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer). If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16".



6 CYL. ENGINE VALVE ASSEMBLY

Valve Lifters: Barrel type, removed from above.

Rocker Arm Assembly: *See "Valve System" in Plymouth Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open at TDC. Close 52° ALDC.

Exhaust Valves - Open 40°BLDC. Close 8° ATDC.

Valve Timing Check - Remove rocker arm cover, mount dial indicator on cylinder head so that pointer contacts adjusting screw of No. 3 Intake Valve (6th. rocker arm from front of engine). Turn crankshaft until maximum valve lift is indicated on dial indicator. At this point, timing mark on damper should be in line with TDC mark on chain case cover. *NOTE* - If timing is off one tooth, maximum valve lift will occur approximately 27° before or after TDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Located in Pump body.

►*RELIEF VALVE SPRING NOTE:* Three types of spring available. Replace with same color spring, see *"Oiling System" in Plymouth Special Data.*

Oil Pressure Indicator: Indicator light on Instrument panel operated by Oil Pressure Switch, Autolite No. 14272A. On oil pump on right side of block.

Oil Pump: Rotor type, on right side of crankcase.

Overhaul - *See "Oiling System" in Plymouth Special Data.*

Oil Filter: Full flow type. Replace filter element every 4,000 miles, to correspond with oil changes.

Crankcase Ventilation: Filter in oil filler cap (air intake) and outlet vent tube extending from rocker arm cover to lower right rear of engine. Wash filler cap filter in kerosene and re-oil every 5000 miles or more often in dusty areas.

COOLING

Water Capacity: 13 qt. Add 1 qt. for heater installation.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.

►*FAN-RADIATOR CORE CLEARANCE CAUTION:* Clearance should be ⅜"± ⅛" Thinner fan spacer, Part No. 2120510 can be used to correct.

►*FAN BELT SLIPPING CORRECTION:* Install improved belt, Part No. 2129078.

Pressure Valve: 14 lb. radiator cap (All Models).

Thermostat: Pellet type. In water outlet connection on cylinder head. Starts to open at 177-182°F.

Water Pump: Sealed ball bearing, packless type. No lubrication required.

See "Water Pumps" in Plymouth Special Data.

Pump Removal - Drain cooling system. On Air Cond. cars, remove shroud and loosen fan belt and idler. Remove fan spacer and pulley. Remove retaining bolts and washers and remove pump.

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Separate Gauge Voltage Regulator Chrysler No. 2096883.

Dash Unit - Chrysler No. 1972345.

Engine Unit - Chrysler No. 2084459.

See "Temperature Gauges" in Misc Illan ous Section.

MISC. MECHANICAL

►*SEE PLYMOUTH V8 PAGES (FOLLOWING) FOR ALL CLUTCH, SYNCHRO-MESH TRANSMISSION, TORQUE-FLITE SIX, UNIVERSALS, REAR AXLE, SHOCK ABSORBERS, FRONT SUSPENSION, STEERING, BRAKES & MISC. MECHANICAL DATA.*

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Model	Model Designation
Savoy	PP2-L
Belvedere	PP2-M
Fury	PP2-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

①②③④ ⑤
3 1 0 1 100001

① - Car Make. **3** Plymouth V8.
② - Model Series. **1** Savoy. **2** Belvedere. **3** Fury. **5** Savoy Station Wagon. **6** Belvedere Station Wagon. **7** Fury Station Wagon. **8** Taxi. **9** Special.
③ - Year. **0** 1960.
④ - Assembly Plant. **1** Plymouth (Detroit). **2** Dodge (Detroit). **5** Los Angeles. **6** Delaware. **7** St. Louis. **9** Canadian Plant.
⑤ - Beginning vehicle number.

ENGINE NUMBER (Exc. 318" Engine): Stamped on boss on top right side of cylinder block just behind water pump. Number (example below) includes identification data.

① ② ③ ④ ⑤
P 36 ... 8 4

① - Year. **P** 1960.
② - Displacement. **36** 361 cu. ins. **38** 383 cu. ins.
③ - If this space blank, engine is standard. For identifying marks, see *"Engine Number Marks (All Engines)"* below.
④ - Month Assembled. **8** August, etc.
⑤ - Day Assembled. **4** 4th day, etc.

►*361" & 383" ENGINE NUMBER NOTE: Some early engines were marked with engine displacement followed by a serial number, similar to the type of marking used on 318" engines (below).*

318" Engine: Stamped on front face of left hand cylinder block. Number (example below) includes identification data.

① ② ③
P 318 1001

① - Year. **P** 1960.
② - Engine displacement.
③ - Beginning serial number.

►*318" ENGINE NUMBER NOTE: To identify marks following the engine number, see "Engine Number Marks (All Engines)" below.*

►*ENGINE NUMBER MARKS: Identified as follows:*
"A" - All cylinders .020" oversize.
"B" - All crankshaft journals .010" undersize.
"AB" - Both above conditions exist.
"Main Cross" (3/8" high) - ONE OR MORE crankshaft journals .001" undersize. See *"Connecting Rods"* and *"Crankshaft"* below.
♦ (3/8" high) - One or more valve lifters .008" oversize.

TUNE-UP

COMPRESSION PRESSURE: 125-165 lbs. (318" Eng.); 150-180 lbs. (361" & 383" Engs.). Maximum variation between cylinders 20 lbs. (318" Eng.), 30 lbs. (361" & 383" Engs.).

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters, except as follows:
318" Engine - .010" Intake, .018" Exhaust, hot with engine idling.
383" Engine (Ram Manifold with Mechanical Lifters) - .016" Intake, .028" Exhaust, Cold.

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with Special Lubricant, Part No. 1879318). To install coil spring, position shaft in extreme counterclockwise position. Place coil spring over shaft slot with outer end tongue in lower right hand position. Press inner end of coil into slot of shaft and seat firmly. Move outer end of coil spring one complete revolution counterclockwise and hook over stop stud.

►*RAM MANIFOLD HEAT CONTROL VALVE NOTE:* Two heat control valves used, one in each cylinder bank exhaust manifold outlet. When valve is closed, exhaust gases are diverted through bypass pipe around hot spot in intake manifold.

►*THERMOSTATIC COIL SPRING CHANGE TO CORRECT SPARK PLUG FOULING: See "Spark Plugs" below.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - Autolite A42 (Std. Engines), A32 (High Perf. Engines). 14 mm. Torque to 30 ft. lbs.

►*SPARK PLUG FOULING CORRECTION (Early Ram Induction Engines):* Condition may occur under extended idle and low speed operations. To correct, install new later production manifold heat valve thermostatic spring, Part No. 2128933 (5 coils). Enlarge to 7/8" the hole in elbow which connects intake and exhaust manifolds (provides more heat to heat riser). Make sure both automatic chokes are operating correctly, that heat control valve stop arm is not bent, and that asbestos silencing pad at heat valve is not missing or worn through. *CAUTION - DO NOT use higher heat range spark plugs to correct this condition as severe engine damage will result.*

COIL: Autolite No. 200575.
Ignition Current - 2.5 amps. idling, 3.1 amps. stopped.
Resistor - Autolite 201000. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Autolite. Used as follows:

Engine	Autolite Distributor No.
318" Synchro-mesh (2-Bbl.)	IBP-4003T
318" Auto. Trans. (2-Bbl.)	IBP-4003L
318" Power Pack (4-Bbl.)	IBP-4003P
361" & 383" (One or Two 4-Bbl.)	IBS-4006D
361" & 383" (Ram Induction)	IBS-4006E

NOTE - "IBS" distributors are double breaker type.
Condenser - Autolite IAT-3076LA. **Capacity** .25-.285 mfd.
Contact Point Set - Autolite IBP-3028AS (IBP Distr.), IGW-3028JS (IBS Distr.).
Breaker Gap - .015-.018". Set at .017".
Cam Angle (IBP Distr.) - 26-32°.

►*CAM ANGLE SETTING CAUTION (IBP Distributor):* Cam angle should be set with vacuum line disconnected.
Cam Angle (IBS Distr.) - 26-32° (single set of points), 31-37° (both sets operating together).
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise (IBP Distr.), Counterclockwise (IBS Distr.) viewed from above.

Automatic Advance - IBP-4003T

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	430	2	860
5.5	800	11	1600
10	1925	20	3850
11.5	2300	23	4600

Automatic Advance - IBP-4003L

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	450	0	900
1	565	2	1130
3	800	6	1600
8	2050	16	4100
9	2300	18	4600

Automatic Advance - IBP-4003P

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	405	2	810
4.5	600	9	1200
7	1600	14	3200
8.5	2200	17	4400

Automatic Advance - IBS-4006D

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	450	0	900
1	515	2	1030
5.5	800	11	1600
8	1800	16	3600
9.5	2400	19	4800

Automatic Advance - IBS-4006E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	440	2	880
5.5	600	11	1200
9	2000	18	4000
10	2400	20	4800

Vacuum Spark Control: Autolite integral type.

Vacuum Advance - IBP-4003T, L

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 1/4
1	2	8 3/4
7	14	12 1/8
12	24	15 3/4
13	26	17

Vacuum Advance - IBP-4003P

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5 1/2
1	2	6 1/4
5	10	9 1/4
9	18	12 1/4
10	20	13 1/4

Vacuum Advance - IBS-4006D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/8
1	2	8 7/8
6	12	11 7/8
10	20	15
11	22	16

Vacuum Advance - IBS-4006E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 5/8
5	10	11 3/8
8	16	13 3/4
9	18	14 1/2

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IGNITION TIMING

Engin	Setting
318" Synchro-mesh 2-Bbl.	①5° BTDC
318" Auto. Trans. 2-Bbl. or 4-Bbl.	①10° BTDC
361" 4-Bbl.	①10° BTDC
361" Ram Induction	②7.5° BTDC
383" One or Two 4-Bbl.	①12.5° BTDC
383" Ram Induction	②7.5° BTDC

① - At 500 RPM with vacuum line disconnected.

② - Set timing with vacuum line disconnected and engine idling below 600 RPM (transmission in neutral and air conditioning compressor off). After timing correctly set, readjust engine idle speed to 725-750 RPM.

Timing Mark (318" Eng.) - Graduation marks on crankshaft pulley and pointer on chain case cover. Align proper mark on pulley with pointer.

Timing Mark (361" & 383" Engs.) - Mark on vibration damper and graduations on indicator on timing chain cover. Align vibration damper mark with proper mark on indicator.

CARBURETOR

►*CARBURETOR APPLICATION: Carter & Stromberg carburetors used as follows:*

Engine	Carburetor
318" Std.	One Carter or Stromberg WW 2-Bbl.
318" Power Pack	One Carter AFB 4-Bbl.
361" & 383" Std.	One Carter AFB 4-Bbl.
383" High Performance	One Carter AFB 4-Bbl.
383" Two Carbs.	Two Carter AFB 4-Bbl.
361" & 383" Ram Induction	Two Carter AFB 4-Bbl.

►*HARD COLD STARTING (Cars with cross-over choke carburetors):* May be caused by choke vacuum unloader piston sticking and may be corrected by squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate valve to flush out gum formation.

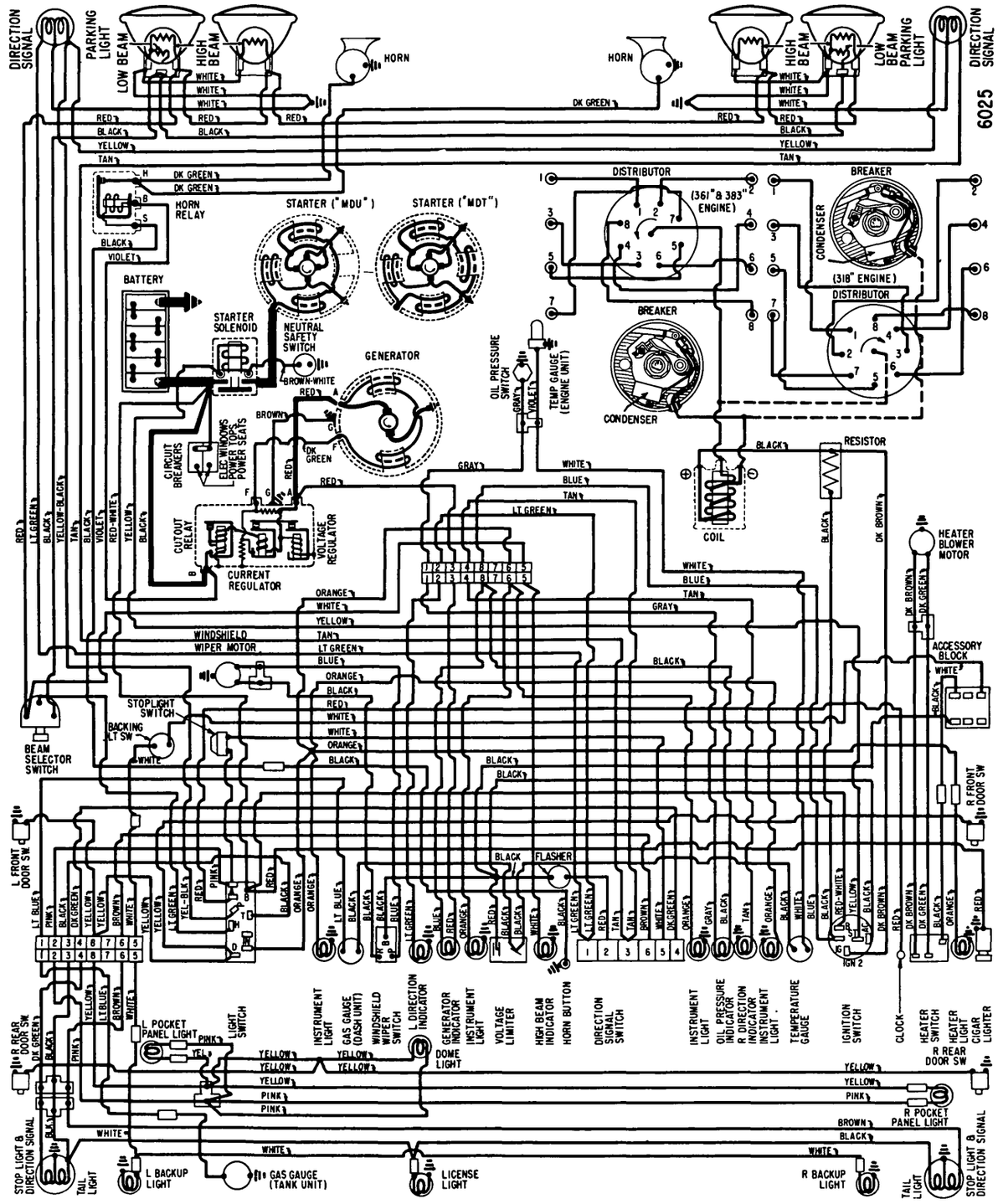
►*EXCESSIVE ACCELERATOR PEDAL EFFORT CORRECTION (RAM INDUCTION ENGINES):* Install new accelerator return spring bracket, Part No. 2129668, and new return spring, Part No. 1320133, on both right and left carburetors.

THROTTLE LINKAGE ADJUSTMENT (EXC. RAM INDUCTION): With engine at operating temperature and idling at 475-500 RPM (carburetor off fast idle and transmission in "N"), stop engine, loosen locknuts on transmission throttle lever and on carburetor throttle rod. Insert a 3/16" diameter rod through holes in bellcrank and lever, hold transmission throttle lever forward against its stop and tighten locknut. Remove 3/16" diameter rod. Make sure carburetor throttle lever is off fast idle cam and against idle stopscrew and move carburetor throttle rod rearward until stopped by internal stop in transmission. Tighten locknut. Accelerator pedal should be at an angle of 114° to horizontal. To adjust, remove pedal end of bellcrank-to-pedal rod and adjust length of rod by loosening locknut at swivel end and rotating swivel.

THROTTLE LINKAGE ADJUSTMENT (WITH RAM INDUCTION): With engine at normal operating temperature (carburetor off fast idle and transmission in "N"), **proc d xactly as f ll ws:**

1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod. Insert a 3/16" diameter rod into holes in accelerator shaft bracket and

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lever Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut

2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator pedal Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficently so bellcrank will pivot (hold dashpot push-rod when turning setscrew to prevent damage to diaphragm) Pivot bellcrank so 3/16" diameter rod can be inserted through hole in bellcrank and into locating hole in intake manifold Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten locknut

4) Start engine and make sure idle speed of 725-750 RPM correctly set with transmission in "N" and air conditioning compressor "ON" Put transmission in "D" with parking brake applied and adjust anti-stall dashpot plunger so there is 010" clearance between dashpot plunger and bellcrank

CARTER BBD 2-BARREL

Cart r BBD, N . 2921S (Synchro-mesh), 2922S (Auto. Trans.).

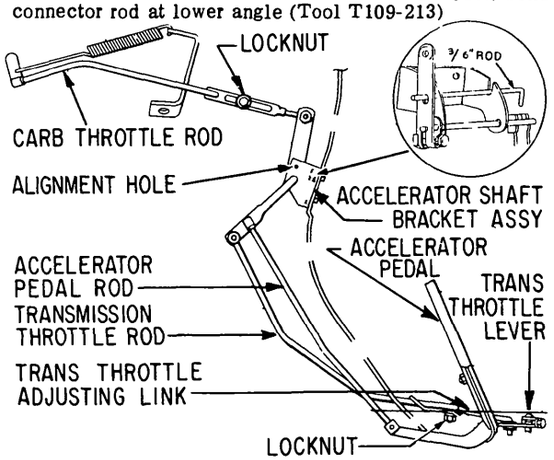
►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7*

Idl S tting - ¼-1½ turns open Adjust both screws alike Turn screws out for richer mixture

Idle Spe d - 500 RPM (550 RPM on Air Cond Cars with Air Cond "ON"), with automatic transmission in "N" (neutral)

Fl at L v l - 9/32" (Gauge T109-239)from top of each float (at free end) to top surface of body casting To adjust, bend lip of float arm

Acc lerating Pump - Install connector rod in center hole (medium stroke) of throttle lever With throttle valves closed, distance between top of pump shaft and top of air horn should be 1 1/8"±1/64" To adjust, bend connector rod at lower angle (Tool T109-213)



THROTTLE LINKAGE (EXC RAM INDUCTION)

Fast Idl : 015" (Gauge T109-44) throttle valve opening or clearance between lower edge of valve and bore with adjusting screw on high step of fast idle cam

Fast Idle Cam Clearance - With choke valve closed and lug on fast idle cam contacting lip on choke shaft lever, center of fast idle screw should align with index mark on cam To adjust, bend lip on choke shaft lever

Fast Idle Speed - 1375-1425 RPM with fast idle screw at index mark on high step of fast idle cam

Automatic Choke: "Cross-Over" type Set on index

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter BBD Carburetors" in Carburetion Section.*

STROMBERG WW 2-BARREL

Stromberg WW. Code 15-41, A (Synchro-mesh), No. 15-42 (Auto. Trans.).

►*HESITATION OR STUMBLE ON LIGHT ACCELERATION CORRECTION (WW 15-42):* Install new main metering jets and main discharge nozzle *See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7*

Idle Setting - 1¼ turns open Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 500 RPM (550 RPM on Air Cond Cars with Air Cond "ON"), with automatic transmission in "N" (Neutral)

Float Level - 7/32" from top of float (at center) to top of main body with gasket removed and lip of float held firmly against needle valve Check with Tool 73519 To adjust, bend float lip

Accelerating Pump - Normal setting, pump rod connected in center hole of throttle lever With choke valve open, pump travel should be 9/32-5/16" as throttle valves are moved from fully closed to wide open position To adjust, bend pump rod at lower angle (Tool T109-213)

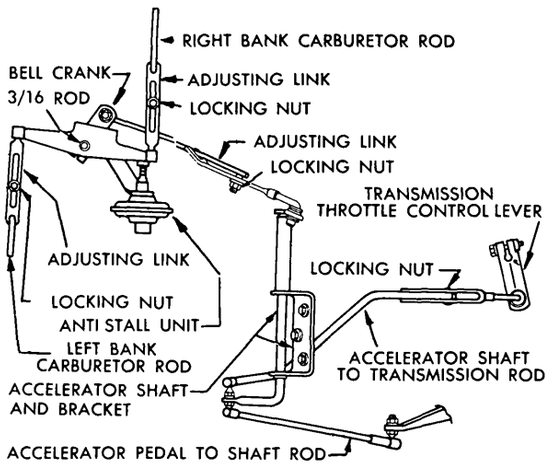
Fast Idle: Turn throttle stopscrew out so that throttle valves are completely closed Hold throttle valves closed, and back out fast idle screw until fast idle cam can be positioned with fast idle screw on high step of cam against shoulder on cam Turn screw in until it just contacts cam, **th n turn scr w in an additi nal 8 turns.** With fast idle cam held in this position, close choke as far as possible with light pressure, check clearance between upper edge of choke valve and air horn wall using 13/64" drill rod If opening not correct, adjust by bending fast idle rod at upper bend

Fast Idle Speed - 1375-1425 RPM with fast idle screw on high step of fast idle cam

Automatic Choke: "Cross-Over" type Set at index

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section.*



THROTTLE LINKAGE WITH RAM INDUCTION

CARTER AFB 4-BARREL
(Single Carburetor)

Engine	Carter No.
318" (Power Pack)	2925S
361" (Synchro-mesh)	2969S
361" (Auto Trans)	2970S
383" (Standard)	2968S
383" (Optional)	3113S

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

►*FUEL INLET NEEDLE & SEAT ASSY PRODUCTION CHANGE & CARBURETOR FLOODING CORRECTION (Early Carbs): See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Idle Setting - ¼-1¾ turns open (Exc 2925S), 1¼-2¾ turns open (2925S) Turn screws out for richer mixture

Idle Speed - 500 RPM with Auto Trans in "N" 550 RPM on Air Cond cars with Auto Trans in "D" or "R" and air conditioning compressor "ON"

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Ram Manifold Installation with Two Carbs.)

Carter AFB, No. 2903S. Two carburetors used, one at each side of engine

►*MANIFOLD FUEL DISTRIBUTION RIGHT carburetor feeds left bank cylinders, LEFT carburetor feeds right bank cylinders*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed on slow idle*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage & Carburetor Interconnecting Linkage Adjustments: *See CARBURETOR above.*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Front & Rear Carburetors)

Carter AFB No. 2790S (Front), No. 2791S (Rear).

Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane Correct either bent or damaged levers. *NOTE - Install interconnecting rod with slotted end connected to low r hol in front carburetor throttle lever and end connected at t p h l of r ar carburetor throttle lever* Hold r ar carburetor throttle wide open (choke in full

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open position) and adjust slotted end of rod so front carburetor throttle valves will also be in wide open position Tighten locknut and check operation Interconnecting rod must rotate slightly on pivots without bind in any position

Idle Speed & Mixture Adjustment - Special procedure required to insure correct mixture and speed (Idle Air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter. No. M2608S (318" Eng. Std.), No. M2611S (318" Eng. Air Cond.), No. M2769S (361" & 383" Eng.).

Fuel Pump Pressure - 5-7 lbs (318" Eng), 3½-5 lbs (361" & 383" Eng)

See "Fuel Pumps" in Carburetion Section

Fuel Filter: Located in carburetor inlet line Replace every 9000 miles or if clogged

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with separate Gauge Voltage Regulator, Chrysler No 2096883

Dash Unit - Chrysler No 1972344

Tank Unit - Chrysler No 2084272 (Suburban), No 2084062 (Others), No 2084063 (With Optional 23 Gal Tank)

See "Fuel Gauges" in Carburetion Section

Air Cleaner: Paper element type Clean every 5000 miles, replace element every 15,000 miles Service more often under severe operating conditions

►*CLEANING CAUTION·* Clean filter element by blowing out with compressed air from the inside surface of element Hold air nozzle 2" from element to avoid damage DO NOT oil, lubricate or wash element

BATTERY

6 Cyl. & 318" Eng. Autolite 11-HS-50 or Willard HO-11-50 or Gould 11-OE-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)

361 & 383' Eng.: Autolite 11-HS-60 or Willard HO-11-60 or Gould 11-OE-60 12 volt, 11 plate, 60 ampere hour capacity (20 hr rate)

►*NOTE* 70 Amp battery optional on all models

Battery Ground - Negative

STARTER

Autolite No. MDT-7002 (6 Cyl.), No. MDU-7001 (318" Eng.), No. MDT-7001 (361" & 383" Eng.)

Armature - Autolite No 16-84 (MDT-7002), No 16-75 (MDU-7001 & MDT-7001)

Drive - Bendix "Folo-Thru" type

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 31-47 ozs

Performance Data - MDT-7001, 7002

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 ft lbs	Lock	4 0	350

Performance Data - MDU-7001

Torque	RPM	Volts	Amperes
0 ft lbs	5300	10 0	50
6 2 ft lbs	Lock	4 0	280

Starting Switch: Chrysler No 1692658 (Synchro-mesh), No 1692659 (Auto Trans) Magnetic switch controlled by Ignition & Starter Switch No 2097628 Neutral Safety Switch No 1704283 mounted on transmission on automatic transmission cars

Neutral Safety Switch Adjustment - *See "TorqueFlite Six", "PowerFlite" and "TorqueFlite" in Transmission Section*

GENERATOR

Autolite. Used as follows

Model	Generator
Standard	GJM-8201A
Low Cut-In	GHM-8001B
Single Unit Air Cond	GJM.8202A
Dual Unit Air Cond	GHM-8002A
Heavy Duty Air Cond	GGA-6003F
Heavy Duty Without Air Cond	GGA-6003E

►*GENERATOR WIRING BURNING CORRECTION (318" Eng)* Make sure clips holding generator wiring near choke housing keep wires at least ½" from intake manifold

Performance Data - GJM (Cold - 70°F)

Amperes	Volts	RPM
0	12 8	1150
35	15 0	2100

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5 0	14 0	875
25 0	15 0	1350
30 0	15 0	1500

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4 0	14 6	950
40 0	14 6	1600
40 0	15 0	1600

Brush Spring Tension - 18-36 ozs (GJM) 35-53 ozs (GHM), 34-41 ozs (GGA)

Field Current - 1 6-1 7 amps (GJM) 1 1-1 3 amps (GHM & GGA) All at 10 0 volts and 70°F

Motoring Current - 3 3-3 7 amps (GJM), 3 0-3 5 amps (GHM), 2 3-2 6 amps (GGA) All at 10 0 volts and 70°F

Rotation - Counterclockwise at commutator end

Belt Adjustment: Deflection with 5 lb force applied as shown in table below Place straightedge across pulleys to measure deflection

	318" Eng.		361" & 383" Engs	
Belt	New	Used	New	Used
Gen (No A C)	5/32"	1/4"	5/32"	1/4"
Gen (A C)	1/8"	3/16"	1/4"	3/8"
Idler (Water Pump)	3/32"	3/16"	1/16"	1/8"

6 Cyl. Eng. - 1/8" new, 1/4" used

REGULATOR

Autolite. Used as follows

Regulator	Generator Type
VBO-4202C	GHM (30 Amp)
VBO-4202B	GJM (35 Amp)
VBO-4202A	GGA (40 Amp)

Cut Out Relay

Cuts In - 12 5-13 5 volts

Cuts Out - 3-5 amps discharge current after charging at 7 amps

Contact Gap - 015" minimum

Air Gap - 025- 027"

Voltage Regulator

Setting - 14 3-14 8 volts charging at 7 amperes and 80°F or with a 25 ohm resistor in series between regulator and battery

Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)

Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION "Temperature Compensated" type Set to following specifications at 70°F*

Regulator	Test A - Operating Amps - Test B
VBO-4202C	37 30 (28 32)
VBO-4202B	44 35 (33-37)
VBO-4202A	49 40 (38-42)

Test A - After 15 minutes operation charging at 7 amps

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13 6-13 8 volts

Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)

Checking & Adjusting - *See 'Autolite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlights: 4-Headlight System *See "4-Headlight Systems" in Electrical Section*

Direction Signals: *See Electrical Section*

Automatic Beam Changer· *See Electrical Section*

Electronic Rear View Mirror: *See Electrical Section*

Stop Light Switch Location: On forward end of brake master cylinder

CIRCUIT BREAKERS: 22.5 Ampere - Headlights, Parking lights, High Beam Indicator In headlight switch

15 Ampere - Tail, Stop, License, Instrument, Dome lights In headlight switch

6 Ampere - Variable speed windshield wiper & back-up lights On wiper motor

5 Ampere - Single speed windshield wiper & back-up lights On wiper motor

FUSES: 20 Ampere - Heater

20 Ampere - Air Conditioner (front)

20 Ampere - Air Conditioner (rear)

7.5 Ampere - Radio

2 Ampere - Clock

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine S "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head 318", 361" & 383" engines of same designs used previously *NOTE* - 383" engine is same design as 361" engine

►*RAM INDUCTION ENGINE NOTE These engines are same as standard 361" & 383" engines except for Ram Induction Manifold (two carburetors) and special camshaft*

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►*TWO CARBURETOR ENGINE NOTE· This 383" engine has two carburetors mounted front and rear on a single manifold Reference in following data will be to "2 Carbs"*

Engine	Bore	Stroke	Displacement
318"	3 910"	3 310"	318 cu ins
361"	4 125"	3 375"	361 cu ins
383"	4 250"	3 375"	383 cu ins

Engine	Compr.Ratio	Rated HP	Developed HP
318" (2-Bbl)	9 0-1	48 9	230 at 4400 RPM
318" (4-Bbl)	9 0-1	48 9	255 at 4400 RPM
361" (4-Bbl)	10 0-1	54 3	305 at 4800 RPM
361" (Ram Ind)	10 0-1	54 3	310 at 4800 RPM
383" (4-Bbl)	10 0-1	57 8	325 at 4600 RPM
383" (2 Carbs)	10 0-1	57 8	330 at 5200 RPM
383" (Ram Ind)	10 0-1	57 8	330 at 4800 RPM

Compression & Vacuum Reading - See *TUNE-UP*

►*318" ENGINE CHAIN CASE COVER & GASKET CAUTION* New cast aluminum covers used on some engines require new gasket Nos 1618685 (Chain case cover), 1676031 (Water Pump)

ENGINE REMOVAL: *See "Engine" in Plymouth Special Data*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifolds" in Plymouth Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Plymouth Special Data*

OIL PAN REMOVAL (318" Engine): Remove dipstick drain crankcase and disconnect steering linkage from steering arm Remove starter, exhaust crossover pipe and converter dust shield Disconnect front engine mounts and raise engine about 1¼" Remove oil pan bolts and remove pan, turning sideways to clear crossmember *NOTE* - When installing, bottom surface of oil strainer must be parallel to lower machined surface of cylinder block

OIL PAN REMOVAL (361" & 383" Engines): Disconnect battery Raise car and disconnect steering linkage from idler and steering arms Remove outlet breather pipe and disconnect exhaust pipe branches from both manifolds Remove exhaust pipe Drain crankcase and remove converter dust shield Remove oil pan bolts and remove pan, turning counterclockwise to clear oil screen and suction pipe *NOTE* - When installing, bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel band (318"), steel struts (361" & 383")

►*CYLINDER BORE OVERSIZE NOTE Letter "A" within engine number indicates that cylinder bores are .020" Oversize*

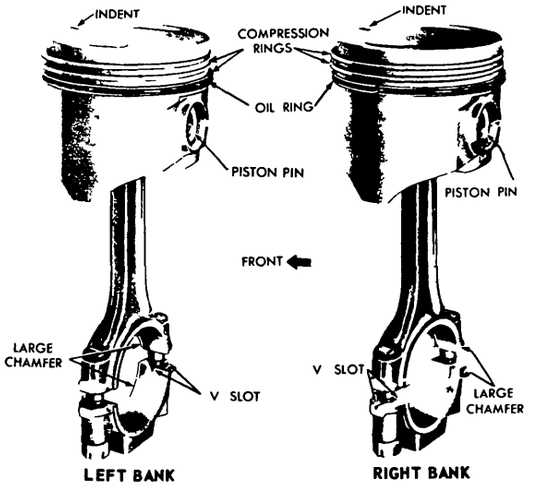
Weight - 20 9 ozs (318"), 25 6 ozs (361"), 27 2 ozs (383")

Removal - Pistons and rods removed from above

Fitting New Pistons· Clearance (318") - 0005- 0015" on thrust side at top of skirt With .0015" x ½" feeler inserted between cylinder wall and piston at thrust face, pull to withdraw feeler should be 5-10 lbs

Clearance (361" & 383") - 0005- 0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine

Installing Pistons. Notch in piston head must be toward front of engine Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8) *See Rod Installation*



V8 ENGINE PISTON & ROD ASSEMBLY

Replacement Pistons: Furnished Std , .005", .020" & .040" Oversize with fitted pins

PISTON PIN

318" Engine - Floating type with lock ring at each end

361' & 383" Engines - Piston pin is tight press fit in connecting rod and special removal and installation procedures are required Piston pins are available only with new pistons

361" & 383" Engines - Piston pin is tight press fit in connecting rod and special removal and installation procedures are required Piston pins are availableonly with new pistons

Diameter - .9842" (318"), 1.0935-1.0937" (361" & 383")

Length - 2.995" (318"), 3.555-3.575" (361" & 383")

Clearance in Piston (318") - .0000- .0005" Thumb press fit at 70°F

Clearance in Piston (361" & 383") - .00045- .00075" Light thumb press fit at 70°F

Clearance in Rod (318") - .0001- .0004" (selective) Thumb press fit at 70°F

Clearance in Rod (361" & 383") - .0007- .0012" interference fit.

Piston Pin Removal & Installation (361" & 383") - *See "Piston Pins" in Plymouth Special Data*

Replacement Pins: Std , .003", .008" Oversize (318") Furnished only with new pistons (361" & 383")

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr (1 & 2)	.0775- .0780"	©	.0015- .0030"
Oil (3)	.1860- .1865"	©	.0010- .0030"

© - .010- .020" (318") .013- .025" (361" & 383")

Installing Rings: Install compression rings with "Top" mark toward top of piston

Replacement Rings: Furnished for oversize ranges of Std to .009", .020" to .029", .040" to .049"

CONNECTING ROD

Length (Center-to-Center) - 6.123" (318"), 6.356-6.360" (361" & 383")

Weight - 25 6 ozs (318"), 29 8 ozs (361" & 383")

Crankpin Journal Diameter - 2.124-2.125" (318"), 2.374-2.375" (361" & 383")

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE) See CRANKSHAFT below*

Lower Bearing - Removable precision type Bi-Metal Grid (318"), Lead base babbitt on steel (361" & 383")

Clearance - .0005- .0015" Wear limit .0025" All Engines

Sideplay - .006- .014" (318"), .009- .017" (361" & 383") Total for both rods

Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet Oil grooves in rod and bearing cap must be together

Replacement Bearings: Std , & .001", .002", .003", .010", .012" Undersize

CRANKSHAFT

Journal Diameter - 2.4995-2.5005" (318"), 2.6245-2.6255" (361" & 383")

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION. Engines with undersize journals identified as follows*

.010' UNDERSIZE (ALL Main & Connecting Rod Journals) - Letter "B" within engine number and on a crankshaft counterweight indicates that ALL Main & Connecting Rod Journals are .010" Undersize

.001 UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - A "Maltese Cross" (3/8" high) within engine number indicates that one or more connecting rod and main bearing journals are machined .001" undersize On 318" engine, position of undersize journals is stamped on No 6 counterweight On 361" and 383" engines position of undersize Main Journals is stamped on No 2 counterweight and position of undersize Connecting Rod Journals is stamped on No 3 counterweight Connecting rod journals will be identified by letter "R" and main journals by letter "M" The number following letter "R" or "M" indicates journal number

Bearings - Removable precision type Tin based babbitt on steel (No 3 thrust bearing) lead based babbitt on steel (Others)

Clearance - .0005- .0015" Wear limit .0025" All Engines

Replacement Bearings - Std & .001", .002", .003", .010", .012" Undersize

►*BEARING INTERCHANGEABILITY NOTE* Upper and lower halves of **any** bearing are **not** interchangeable No 3 bearing is not interchangeable with other bearings On 318" engine, No 5 bearing is not interchangeable with other bearings

End Thrust: Taken by flanged No 3 (center) main bearing

Endplay - .002- .007"

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Plymouth Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Plymouth Special Data*

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CAMSHAFT

►*CAMSHAFT USAGE NOTE· Various camshafts used depending on carburetion, lifters or other equipment See "Valves" and "Valve Timing" below for lift, spring and valve timing specifications*

Journal Diameter: (1) 1 998-1 999" (2) 1 982 1 983" (3) 1 967-1 968" (4) 1 951-1 952" (5) 1 5605-1 5615" (318"), 1 748-1 749" (361" & 383")

Bearing Diameter: (1) 2 000-2 001" (2) 1 984-1 985" (3) 1 969-1 970" (4) 1 953-1 954" (5) 1 5625-1 5635" (318"), 1 750-1 751" (361" & 383")

Bearings - Removable, lead base babbitt on steel
Clearance - 001- 003" Wear limit 005"
End Thrust (318"): Taken by thrust plate behind camshaft sprocket hub **Endplay** - 002- 006" Wear limit 010"
End Thrust (361" & 383"): Controlled by camshaft sprocket hub riding against front face of cylinder block
Timing Chain (318"): Width 1 02" **Pitch** 375" **Length** 68 links
Timing Chain (361" & 383"): Width 88" **Pitch** .50" **Length** 50 links
Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge across shaft centers
Camshaft Removal: *See "Camshaft & Bearings" in Plymouth Special Data*
Engine Front Cover Removal: *See "Engine Front Cover" in Plymouth Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Plymouth Special Data*

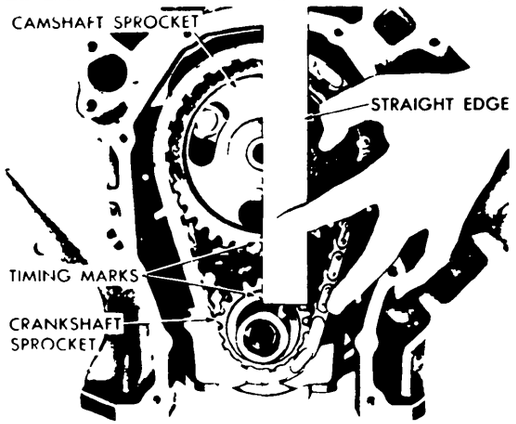
VALVES

Tappet Clearance: 318" 010" Intake, 018" Exhaust, hot and idling **383" With Ram Ind. & Mech. Lifters** 016" Intake, 028" Exhaust, Cold **All Others** Zero lash, hydraulic lifters

318" Engine

Valve	Head Diam.	⑥ Stem Diam.	Length
Intake	1 844"	372- 373"	4 60"
Exhaust	1 563"	371- 372"	4 54"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	001- 003"
Exhaust	45°	②	002- 004"



V8 ENGINE VALVE TIMING MARKS

361" & 383" Engines

Valve	Head Diam.	⑥ Stem Diam.	Length
Intake	③	372- 373"	4 87"
Exhaust	1 60"	371- 372"	4 89"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	430"④	001- 003"
Exhaust	45°	430"⑤	002- 004"

① - 370" (2-Bbl Carb), 390" (4-Bbl Carb)
② - 368" (2-Bbl Carb), 390" (4-Bbl Carb)
③ - 1 95" (361" Eng), 2 08" (383" Eng)
④ - 449" on 383" Eng with Ram Induction & Mechanical lifters
⑤ - 454" on 383" Eng with Ram Induction& Mechanical lifters
⑥ - Standard valves Also 005", 015", 030" Oversize
Valve Seat Width - 060- 085" Intake, 040- 060" Exhaust
Valve Stem Oil Seal - Cup type seals used on all intake valves (All engines), on exhaust valves (361" & 383" engines only)
►*VALVE GRINDING CAUTION* Check valve height in head after grinding valve using Tool C-3648 If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge)
Valve Springs: Damper spring used inside valve springs on all 361" and 383" engines

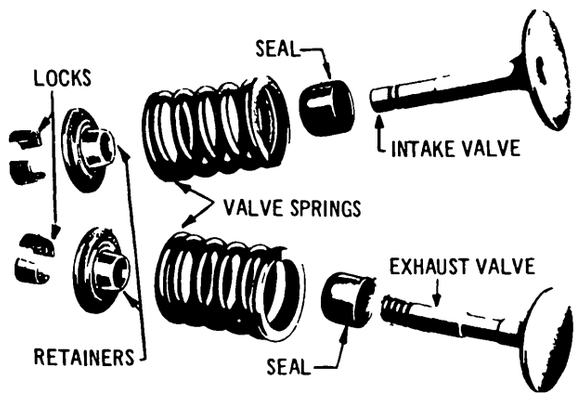
Spring Specifications (318" Engine)

Valve	Pressure	Length
Closed	78-88 lbs	1 69"
Open	170-184 lbs	1 31"

Spring Specifications (361" & 383" Engines)

Valve	Pressure	Length
Closed	95-105 lbs	1 86"
Open	205 lbs	1 43"

Spring Free Length - 2 34" (361" & 383" Engines)
►*VALVE SPRING HEIGHT CAUTION* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer) If height exceeds 1 11/16" (318"), 1 57/64" (361" & 383"), install 1/16" spacer under spring to bring height within limits (1 11/16" for 318", 1 53/64-1 57/64" for 361" & 383")
►*VALVE SPRING LOAD CAUTION* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained



V8 361" & 383" ENGINE VALVE ASSEMBLY

Spring Installation (361" & 383"): Install all springs with closed coil end toward cylinder head

►*CAUTION·* Spring ends must be square within 1/16" (all engines)

Valve Guides: Guides are cast integral with cylinder head When clearance is excessive, ream guides and install valves with oversize stems Valves furnished with 005", .015" & 030" oversize stems Use Tool C-3433 (379- 380"), C-3427 (404- 405") to ream guides in progressive steps of 005", 015" & 030"

►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (318" Eng):* "I" or "E" on boss above nearest appropriate valve guide indicates that valve stem is 005" Oversize

►*PUSHROD INSTALLATION CAUTION·* Small diameter end of pushrod must seat in lifter Large diameter end must contact rocker arm Improper installation will cause valves to be held open partially

Hydraulic Valve Lifters: Used on 361" & 383" engines except some 383" Police Engines with Ram Induction which have mechanical lifters

►*OVERSIZE LIFTER NOTE·* A "♦" on engine serial number pad indicates that lifters are 008" Oversize If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body

Diameter - 9040- 9045" **Clearance** - 0005- 0018"
Replacement Lifters - Furnished Std & 001", 008", 030" Oversizes
Lifter Overhaul & Testing - *See "Valve System" in Plymouth Special Data.*
Rocker Arm Assembly: *See "Valve System" in Plymouth Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

① Valve Timing Specifications

(318" Engine With 2-Bbl. Carb.)
Intake Valves - Open 17° BTDC Close 47° ALDC
Exhaust Valves - Open 55° BLDC Close 9° ATDC

(318" Engine With 4-Bbl. Carb.)
Intake Valves - Open 13° BTDC Close 55° ALDC
Exhaust Valves - Open 51° BLDC Close 17° ATDC

(361" & 383" Engines With 4-Bbl. Carb.)
(383" Engine With 2 Carbs.)
Intake Valves - Open 24° BTDC Close 64° ALDC
Exhaust Valves - Open 64° BLDC Close 24° ATDC

(361" & 383" Ram Induction, Hydraulic Lifters)
Intake Valves - Open 20° BTDC Close 68° ALDC
Exhaust Valves - Open 60° BLDC Close 28° ATDC

(383" Eng , Ram Induction & Mechanical Lifters)
Intake Valves - Open 25° BTDC Close 79° ALDC
Exhaust Valves - Open 74° BLDC Close 30° ATDC
① - With valve train solid

Valve Timing Check (318"): Rotate crankshaft until No 6 exhaust valve is closing and No 6 intake valve is opening Install a dial indicator on No 1 intake valve so indicator pointer contacts spring retainer as nearly

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perpendicular as possible. Turn No. 1 intake valve adjusting screw in one full turn. Adjust indicator to zero. Turn crankshaft clockwise until valve has lifted .033" (2-Bbl.), .024" (4-Bbl.). Timing on timing indicator should read from 10° BTDC to 2° ATDC.

Valve Timing Check (361" & 383"): Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted as shown in table below. Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning crankshaft any further in normal direction.*

Valve Timing Check Specifications

Engine	Valve Lift
361" (4-Bbl.)	.025"
361" (Ram Induction)	.025"
383" (One 4-Bbl. or 2 Carbs.)	.025"
383" (Ram Induction)	.025"

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Plymouth Special Data.*

►*OIL PRESSURE RELIEF VALVE OR OIL PAN NOISE CORRECTION (361" & 383"):* Noise may be a chattering or tapping noise heard or felt in oil pan. If loosening oil pressure relief valve retaining nut or removing valve spring affects noise, install new oil filter element, Part No. 1851658, and make sure drain-back valve is free *(see "Oil Filter" below).*

Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.

Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, see *"Oiling System" in Plymouth Special Data.*

Oil Pressure Indicator: Warning light on instrument panel operated by Oil Pressure Switch, Part No. 1818830 (Autolite No. 14272A).

Oil Pump (318"): Mounted on rear main bearing cap. Rotor type with strainer mounted on pump body. Strainer must be installed parallel with bottom of cylinder block.

Pump Overhaul - See *"Oiling System" in Plymouth Special Data.*

Oil Pump (361" & 383"): Rotor type mounted on cylinder block at lower left front side of engine.

Pump Overhaul - See *"Oiling System" in Plymouth Special Data.*

Oil Filter (318"): Partial flow type. Replace filter element every 4000 miles to coincide with engine oil change.

Oil Filter (361" & 383"): Full flow disposable type. Replace filter every 4000 miles to coincide with engine oil change.

►*OIL FILTER REPLACEMENT CAUTION (361" & 383"):* Use only Filter, Part No. 1851658, for service replacement. Before installing, make sure drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base.

►*OIL FILTER INSTALLATION CAUTION (361" & 383"):* Screw new filter on base until gasket contacts base. **Tighten ½-turn additional by hand.** DO NOT overtighten.

Crankcase Ventilation: Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap every 5000 miles or sooner under heavy dust conditions.

COOLING

Water Capacity: 20 qts. (318"). 16 qts. (361" & 383"). Add 1 qt. for heater.

►*AIR CONDITIONING OPERATING CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

Thermostat: Pellet type. Located in water outlet housing. Standard 180° thermostat, Part No. 1674602, starts to open at 177-182°F. Designed for use with permanent type anti-freeze. Optional 160° thermostat, Part No. 1734957, also available.

Water Pump: Sealed ball bearing type. No lubrication required.

See *"Water Pumps" in Plymouth Special Data.*

Fluid Fan Drive: Used on air conditioned cars. See *"Cooling System" in Plymouth Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with separate Gauge Voltage Regulator, Chrysler No. 2096883.

Dash Unit - Chrysler No. 1972345.

Engine Unit - Chrysler No. 2084459.

See *"Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Borg & Beck or Auburn. Used as follows: *NOTE - Semi-centrifugal type used on V8 cars.*

Engine	Clutch Make	Clutch Model
6 Cyl. Std.	Auburn	100131-4
6 Cyl. Std.	Borg & Beck	9A7
6 Cyl. H.D. & Taxi	Borg & Beck	10A5
318" Std.	Borg & Beck	10¼A8WW
318" Optl. & 361"	Borg & Beck	10.5A8WW
383"	Borg & Beck	11A8WW

See *"Auburn" or "Borg & Beck" in Clutch Section.*

►*CLUTCH VIBRATION OR GEAR RATTLE CORRECTION (Early 6 Cyl.):* May be noticeable at 20-30 MPH. To correct, install new clutch disc, Part No. 2200061, having 6 light blue springs. Later cars have this disc.

Pedal Freeplay Adjustment: Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This will provide correct 1-1¼" pedal freeplay.

Over-Center Spring Adjustment: Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off over-center spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 3 turns tighter (9¼" clutch), 5 turns tighter (10", 10½", 11" clutch) with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort too high, tighten adjusting nut; if too low, loosen nut. Initial effort required to start pedal moving should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Clutch Removal: Remove transmission (see below) and clutch housing pan. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to relieve tension. Remove clutch assembly.

SYNCHRO-MESH TRANSMISSION

Used as follows:

6 Cylinder - Own. New "Synchroshift" type with helical cut gears.

V8 Std. - Own. Same design as used previously.

V8 Heavy Duty - Warner Model T-85. 3-speed constant mesh, all helical gear type.

See Dodge and Warner Synchro-mesh Transmissions in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Lubricant Capacity - 6 Cyl. 5 pints (supersedes previous specification of 2¾ pints). **Std. V8** 2¾ pints. **Heavy Duty V8** 3½ pints.

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable and housing and gearshift rods. Disconnect parking brake cable. *CAUTION - On 6 Cyl., remove speedometer cable by hand as pinion comes out with cable (do not crush housing).* Disconnect back-up light switch wires. Install Engine Support Fixture C-3806 (6 Cyl.), C-3487 (V8), so hooks are firmly in holes in frame side member with support against underside of oil pan flange. With fixture supporting engine, raise engine slightly and disconnect rear support. On 6 Cyl., remove crossmember. On all cars, support transmission and remove transmission attaching bolts. Remove transmission by sliding to rear so pinion shaft clears clutch. *NOTE* - On V8 cars, crossmember is removed with transmission.

AUTOMATIC TRANSMISSION

TorqueFlite Six of new design used on 6 Cyl. Cars only. **PowerFlite & TorqueFlite** of same designs used previously used on V8 Cars.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 10,000 miles or sooner if used in heavy duty service.

Checking Fluid Level (TorqueFlite Six): *NOTE - Following specifications supersede all previous instructions.* Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Fluid level should be between "F" mark and 5/8" **above** "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, oil level should be at "F" mark. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*

Checking Fluid Level (PowerFlite & TorqueFlite): Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Maintain fluid level at (or slightly be-

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low) "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, maintain fluid level at (or slightly below) "L" mark. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "TorqueFlite Six", "PowerFlite", and "TorqueFlite" in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear.
Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Plymouth Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear with Hotchkiss Drive. *NOTE* - "Sure-Grip" differential optional.
See "Plymouth Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION (Early Cars): See "Plymouth Hypoid" in Rear Axle Section.*

►*DIFFERENTIAL TYPE & RATIO IDENTIFICATION NOTE:* Ratio stamped on identification pad on carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad or by a metal tag marked "Use Sure-Grip Lube" attached to a carrier housing bolt.

►*"SURE-GRIP" AXLE SHAFT CAUTION:* Axle shaft used with "Sure-Grip" differential is 1/8" shorter than standard axle shaft. DO NOT interchange shafts.

Axle Ratios: As follows: *NOTE* - All ratios except 3.90-1 and 3.91-1 are available with "Sure-Grip".

Engine & Trans. ①	Standard Ratio	Optional Ratio
6 Cyl. S-M	3.54-1 (39-11)	3.90-1 (39-10)
6 Cyl. T-F	3.31-1 (43-13)	3.54-1 (39-11)
318" S-M	3.54-1 (39-11)	3.91-1 (43-11)
318" P-F	3.31-1 (43-13)	3.54-1 (39-11)
318" T-F	2.93-1 (41-14)	② 3.31-1 (43-13)
361" S-M	3.31-1 (43-13)	3.54-1 (39-11)
361" T-F ③	2.93-1 (41-14)	② 3.31-1 (43-13)
383" S-M ④	3.54-1 (39-11)	⑤⑥
383" T-F ④	3.31-1 (43-13)	⑦⑥

① - **S-M** Synchro-mesh. **P-F** PowerFlite. **T-F** TorqueFlite.
② - Or 3.54-1. ③ - One 4-Bbl. or Ram Induction.
④ - Max. Performance Engines (One 4-Bbl., 2 Carbs., Ram Induction with Hydr. or Mech. Lifters).
⑤ - With Conventional and "Sure-Grip": 2.93-1, 3.31-1.
⑥ - With "Sure-Grip" only: 4.1-1 (41-10), 4.3-1 (43-10), 4.56-1 (41-9), 4.89-1 (44-9), 3.15-1 (41-13).
⑦ - With Conventional and "Sure-Grip": 2.93-1, 3.54-1.
Backlash - .006-.008".

Axle Shaft Removal: Remove wheel and hub and drum assembly (use Puller C-845). *CAUTION - Do not strike end of axle shaft or use "knock-off" type puller.* Block brake pedal and disconnect brake line at wheel cylinder. Remove axle shaft key. Remove brake support and dust shield (use Oil Seal Installing Sleeve C-745 to protect outer seal). Remove shim pack. Remove axle shaft with Puller C-499. *NOTE* - Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637 and brake dust shield outer seal with Driver C-3565.

Carrier Assembly Removal: Remove axle shafts (see above). Disconnect propeller shaft at rear universal joint. Drain lubricant. Remove attaching bolts and remove carrier.

Wheel Bearing Adjustment: Controlled by axle shaft end-play adjustment. *See "Plymouth Hypoid" in Rear Axle Section.*
Axle Shaft Endplay - .013-.023".

SHOCK ABSORBERS

Oriflow. Direct acting, hydraulic. Serviced by replacement.

►*SHOCK ABSORBER MOUNTING NOISE CORRECTION:* On front shock absorber, lower mounting bolt may have short threads preventing "U" mounting bracket from gripping lower bushing. To correct, install a washer between bracket and nut and tighten nut to 55 ft. lbs. On rear shock absorber, upper mounting stud may be loose at body attachment. To correct, inspect stud and nut threads for damage and tighten nut to 70 ft. lbs. *NOTE - If above procedure does not correct noise, install new type shock absorbers (see below).*

►*SHOCK ABSORBER REPLACEMENT NOTE: Use only shock absorbers listed below for service replacement and to correct noise.*

Replacement Shock Absorbers

Shock Absorber	Package No.	①Identification No.
Front Std. ②	2240353	2206506
Rear Std. ②	2240358	2206508
Front Heavy Duty	2240356	2206504
Rear Heavy Duty	2240360	2206510

① - Stamped on shock absorber base.
② - Includes Suburbans.

FRONT SUSPENSION

"Torsion-Aire" type of same design used previously with eccentric cam adjustment for caster and camber. *See "Torsion-Aire Suspension" in Suspension & Wheel Alignment Section.*
Steering Axis Inclination - 5½-7½°.
Caster (Manual Steering) - Neg. ½°± ½°.
Caster (Power Steering) - Pos. ¾°±½°.
Camber (Right Wheel) - Pos. 1/8°±1/4°. Pos. 1/8° preferred. **(Left Wheel)** - Pos. 3/8°±1/4°. Pos. 3/8° preferred.
Toe-In - 3/32-5/32". 1/8" preferred.
Toe-Out on Turns - With outer wheel at 20°, inner wheel should be at 20½-22½°.

Wheel Bearing Adjustment: Tighten adjusting nut to 180 **inch-lbs.** torque while rotating wheel. Position nut lock on nut with slots in line with cotter pin hole in spindle and then back off nut and nut lock 1½ slots (cotter pin holes will be covered). Remove nut lock and reposition on nut so slot lines up with cotter pin hole and install cotter pin. *CAUTION - Do not turn adjusting nut.*

STEERING

Manual: Gemmer. Worm & three-tooth roller.
See "Gemmer Worm & Roller" in Steering Section.

►*STEERING GEAR PRODUCTION CHANGE:* Later cars have flexible coupling in steering gear tube. *See "Gemmer Worm & Roller" in Steering Section.*

►*STICKY OR HARD STEERING, OR POOR RETURNABILITY CORRECTION:* May be caused by steering column jacket bearing being out of place. *See "Gemmer Worm & Roller" or "Plymouth Constant Control Power Steering" in Steering Section.*

►*HARD STEERING OR GEAR BINDING CORRECTION (Manual Steering):* May be caused by cross shaft adjusting screw retaining snap ring being unseated. *See "Gemmer Worm & Roller" in Steering Section.*

►*STEERING CENTER LINK-OIL PAN INTERFERENCE CORRECTION (361" & 383"):* Make sure power steering and manual steering pitman arms are not interchanged. Center-to-center length of pitman arms (between attaching holes) is as follows: Manual Steering 5 3/8", Power Steering 6 1/2".

Power Steering: Constant Control Full Time type of same design used previously.
See "Plymouth Constant Control Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or "Plymouth Constant Control Power Steering" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" or "Plymouth Constant Control Power Steering" in Steering Section.*

BRAKES

Service: Three Platform Total Contact type of same design used previously.
See "Plymouth Three Platform Total Contact Brakes" in Brake Section.

►*BRAKE DRAGGING, IMPROPER RELEASE OR PULL CORRECTION:* May be caused by lining contacting drum (burrs or paint on dust shield platforms) or improper return spring tension. *See "Plymouth Three Platform Total Contact Brakes" in Brake Section.*

►*OVAL PISTON TYPE POWER UNIT "THUMP" CORRECTION (Early Cars):* Noise occurs when brakes released. *See "Plymouth Oval Piston Power Unit" in Brake Section.*

Drum Diameter - 11" front & rear. (12" front & rear optional on high performance engine packages).
Wheel Cylinder Diameter - 1 1/8" front & rear. Two single acting cylinders used on front, one double acting cylinder used at rear.
Lining - Molded asbestos bonded to shoe.

Lining Width	Front	Rear
6 Cyl. & 318" (Suburban)	2½"	2"
6 Cyl. & 318" (Others)	2"	2"
361" & 383" Engines	2½"	2½"

Lining Length - 11½" (11" brakes), 12.6" (12" brakes).
Lining Thickness - 11/64".
Braking Power - 60% front, 40% rear.
Clearance - With wheel locked against drum, back off adjusting cam until no drag is felt.

Master Cylinder: On engine side of firewall opposite base of brake pedal.

►*MASTER CYLINDER NOTE (Cars Without Power Brakes):* Master cylinder has a non-adjustable push-rod and the pedal stop is within the master cylinder eliminating need for adjustment. No pedal return spring is used. A service package consisting of piston-collar-rod-retainer and boot assembly is available.

►*BRAKE PEDAL & PUSHROD CAUTION:* Never pull brake pedal back beyond piston stop in master cylinder. A pull of 50 lbs. could pull pushrod off piston.

Checking Fluid Level - Master cylinder cover is used as a filler cap.

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Removal: Disconnect pushrod, brake tube and stop light switch wires. Remove attaching bolts and remove cylinder.

Power Brakes: "Oval Piston" or "Bellows" type power units used. Mounted on firewall and linked to upper end of brake pedal. Used with adjustable pushrod type master cylinder.

See "Plymouth Bellows Power Unit" or "Plymouth Oval Piston Power Unit" in Brake Section.

Pedal Free play Adjustment - *See "Plymouth Bellows Power Unit" or "Plymouth Oval Piston Power Unit" in Brake Section.*

Removal: Place a wedge between power lever and bracket to prevent damage to trigger arm. Scribe mark power unit and mounting bracket, and mounting bracket and firewall. Disconnect vacuum hose from power unit. Remove master cylinder (see above). Remove mounting bracket attaching bolts and remove power unit and bracket assembly.

Parking Brake: Transmission mounted type. 6" external contracting and 7" internal expanding types used. Foot-operated lever applies brake.

Adjustment - *See "Brake Notes" in Plymouth Special Data.*

Lining	Width	Thickness	Length
External type	2"	5/32"	16.68"
Internal type	2"	5/32"	©6.53"

© - Per shoe (2 shoes).

MISC. MECHANICAL

Windshield Wiper: Autolite electric, single or variable speed. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Heater-Air Conditioning. *See "Plymouth Air Conditioning" in Miscellaneous Section.*

Power Top Control: Electric-Hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: 6-Way electric type. *See "Power Seat Controls" in Miscellaneous Section.*

Door Locks: Vacuum type. *See "Vacuum Door Locks" in Miscellaneous Section.*

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*"HYPER PACK ENGINE" NOTE:* This Powerpack equipment available on Sedans consists of High Compression Engine, Special Camshaft, 4–Barrel Carburetor, and other equipment items. Specifications for this model are designated as "Hyper Pack" in following data.

MODEL IDENTIFICATION

Series	Series Designation
V–100	QX1–L
V–200	QX1–H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 1 0 2 100001

① - Car Make. 1 Valiant.
② - Model Series. 1 Deluxe QX1–L. 3 Custom QX1–H. 4 Deluxe Suburban QX1–L. 5 Custom Suburban QX1–H.
③ - Year – 1960.
④ - Assembly Plant. 1 Plymouth (Detroit). 2 Dodge (Detroit). 5 Los Angeles. 6 Delaware. 7 St. Louis. 8 Clairpointe. 9 Canadian Plant.
⑤ - Beginning vehicle number at each assembly plant.

ENGINE NUMBER: Stamped on boss on left side of cylinder block just below head at front or rear of engine (two bosses provided on each block). Number (example below) includes identification data.

① ② ③ ④ ⑤
P 17 . . . 8 1

① - Year – 1960.
② - Displacement – 170 cu. ins.
③ - If this space blank, engine is standard. **A** indicates all cylinders .020". Oversize **B** indicates all crankshaft journals .010" Undersize. **AB** indicates both conditions.
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 1 1st day of month, etc.

TUNE-UP

COMPRESSION PRESSURE: 130–161 lbs. at 150 RPM (Std. Engine) with plugs removed. Maximum variation between cylinders 15 lbs.

VACUUM READING: Steady 19.5" at idling speed.

VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust, HOT.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing assembly, coil spring should be installed so that approximately one full turn (355° wrap) required to hook outer end on stop stud.

IGNITION

FIRING ORDER: 1–5–3–6–2–4.

SPARK PLUG GAP: .035" (Std. Eng.), .015–.020" (Hyper Pack).

Spark Plugs - Autolite AG52 Std. (Use to replace AG42 used in early production), Autolite AG203 (Hyper Pack), Autolite AG82 (Taxicab - when used in Metropolitan areas only). "Long Reach" 14 mm. type. *NOTE* - Plugs are installed in aluminum sleeves which serve as plug gaskets.

►*PLUG REMOVAL & INSTALLATION NOTE:* Plugs are installed in aluminum tubes which serve as plug gaskets.

COIL: Autolite CAH–4001.

Ignition Current – 2.5 amps. idling, 3.1 amps. stopped.

Resistor – Autolite 201004. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

►*ROUGH IDLE OR ENGINE STALLING CORRECTION:* Caused by loose terminal on lead at resistor. Correct by increasing crimp on female terminal for more positive connection.

DISTRIBUTOR: Own. Chrysler No. 1889750 (Std. Eng.), 2095550 (Hyper Pack) Conventional type with centrifugal advance (All), and vacuum advance (No. 1889750 only). *NOTE* – Distributor 2095550 is "double breaker" type.
Condenser – Chrysler 1818757. **Capacity** .25–.285 mfd.
Contact Point Set – Chrysler 1838643 (1889750 Distr.).
Breaker Gap – .017–.023".
Cam Angle – 36–42° (1889750 Distr. & one set of points on 2095550), 48–54° (2095550 Distr. with both sets of points operating together).
Breaker Arm Spring Tension – 17–21.5 ozs.
Rotation – Clockwise viewed from above.

Automatic Advance – 1889750

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	325–475	0	650–950
0–2.5	475	0–5	950
6–8	820	12–16	1640
11.5–13.5	1925	23–27	3850

Automatic Advance – 2095550

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	425–575	0	850–1150
0–6.5	575	0–13	1150
5–7	800	10–14	1600
11.5–13.5	3400	23–27	6800

Vacuum Advance: Integral type. *NOTE* – Not used on 2095550 distributor.

Vacuum Advance – 1889750

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.7–7.1
5.5–8	11–16	11
9.5–12.5	19–25	14.5

IGNITION TIMING

Engine	Std. Ingition Setting
Std. Engine	5° BTDC at 500 RPM
Hyper Pack	11° BTDC at 700 RPM

►*TIMING NOTE:* Set timing with engine idling at correct RPM with vacuum line disconnected.
Timing Mark – Align mark on crankshaft pulley with correct mark of scale on timing chain cover.

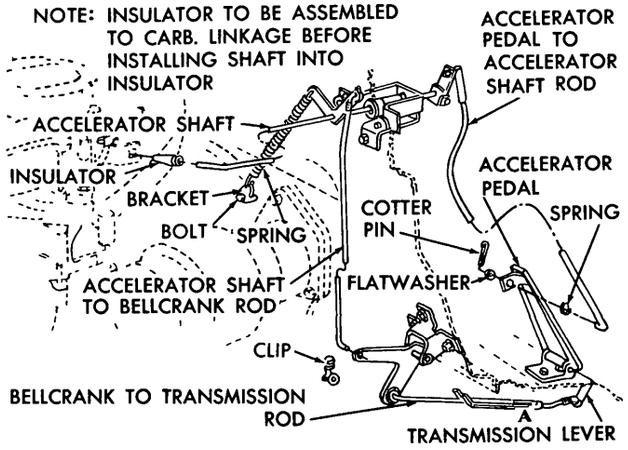
CARBURETOR

►*CARBURETOR APPLICATION: (Std. Engine) – One Carter BBS single barrel carburetor with automatic choke. (Hyper Pack Engine) – Carter AFB 4–Barrel carburetor with manual choke control.*

►*HARD COLD STARTING (Cars with Cross-Over Choke Carburetors):* May be caused by choke vacuum unloader piston sticking. Squirt carburetor cleaner, lacquer thinner, or alcohol through piston link opening in air horn. Operate choke valve to flush out gum formations.

►*HARD COLD START & WARM-UP CORRECTION:* May be caused by choke rod or choke shaft arm striking carburetor air cleaner. To correct, remove air cleaner and install air cleaner mounting gaskets as required for sufficient clearance.

►*POOR ENGINE IDLE PERFORMANCE (In congested traffic in hot weather, or after continuous highway driving at 60–70 MPH):* Check all of the following points: Intake Manifold and Carburetor mounting for air leaks, All vacuum operated accessories (power brakes, vacuum actuated switches, etc.) for air leaks, adjust Tappet Clearance, set Ignition Timing, check carburetor



TORQUEFLITE 6 THROTTLE LINKAGE

linkage for free operation, adjust carburetor idle mixture and speed setting. If above operations do not correct trouble, and a slight hesitation is experienced at 40–70 MPH. on light acceleration, reposition air cleaner at 90° to right across valve cover.

Throttle Linkage Adjustment (Aut. Trans. Cars): Adjust engine idle speed (see below). With engine at operating temperature, and throttle stopscrew on low step of fast idle cam, loosen locknut and move transmission throttle control lever forward until it stops, tighten locknut. Set protractor at 115° and place protractor lengthwise on flat surface of accelerator pedal. Disconnect accelerator pedal rod and adjust length of rod so that pedal will be in correct 115° position when rod connected, reconnect rod.

CARTER BBS

Carter BBS No. 2900S (Synchro-mesh), No. 2901S (Aut. Trans.), No. 3053S, SA (Taxicab). Single barrel downdraft type with automatic choke.

►*IDLE SETTING CAUTION:* Alternator is capable of charging battery at idle speeds and **headlights should be turned on when setting idle speed.** This will compensate for alternator load.

Idle Setting - Initial setting ¼–1½ turns open (2900S & 2901S), 1-2 turns open (3053S, SA). With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.
Idle Speed - 550 RPM (Synchro-mesh), 500 RPM (Auto. Trans. in "N"). *Set idle speed with headlights turned on.*
Float Level - 7/32" (2900S & 2901S), 9/32" (3053S,SA) between top of each float ridge at center of float and top surface of body casting. To adjust, bend lip of float arm.
Accelerating Pump - Install throttle connector rod in center hole (medium stroke) of throttle lever.
Fast Idle Speed: 1200-1400 RPM with engine at normal operating temperature and idle speed screw on index

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mark of cam. *No adjustment necessary, fast idle speed will be correct when slow idle correctly set.*

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter BBS Carburetors" in Carburetion Section.*

CARTER AFB

Carter AFB No. 3083S. Four barrel downdraft type with manual choke.

Idle Speed - 700 RPM with headlights turned on.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2996S.

Pressure - 3½-5 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Fuel Filter: Replaceable unit on suction end of fuel line in fuel tank.

Gasoline Gauge: Constant Voltage type with voltage regulator inside Temperature Gauge.

Dash Unit - Chrysler No. 2076317.

Tank Unit - Chrysler No. 2076362.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type. Clean every 5000 miles, replace element every 15,000 miles. More frequent servicing may be necessary under severe operation.

►*CLEANING CAUTION:* Clean filter element by using compressed air (hold nozzle 2" from element), applying air from inside outward. DO NOT tap these filters to loosen grit or DO NOT immerse in any fluid.

BATTERY

Gould 11-OE-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

Battery Ground - Negative, to engine support bracket.

►*BATTERY FILLER CAP CAUTION:* To prevent hood corrosion, special spray restricting vent caps must be used.

STARTER

Autolite. (Std. Eng.) MDT-7009. (Hyper Pack Eng.) MDT-7002.

Drive - Bendix "Folo-Thru" type.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3600	10.0	56
8.5 ft. lbs.	Lock	4.0	350

Starting Switch: Magnetic switch, Chrysler No. 2095329 (Synchro-mesh), No. 2095330 (Auto. Trans.), controlled by Ignition Switch. Neutral Safety Switch No. 1704283 on transmission case used on Auto. Trans. cars.

Neutral Safety Switch Adjustment: *See "TorqueFlite Six" in Transmission Section.*

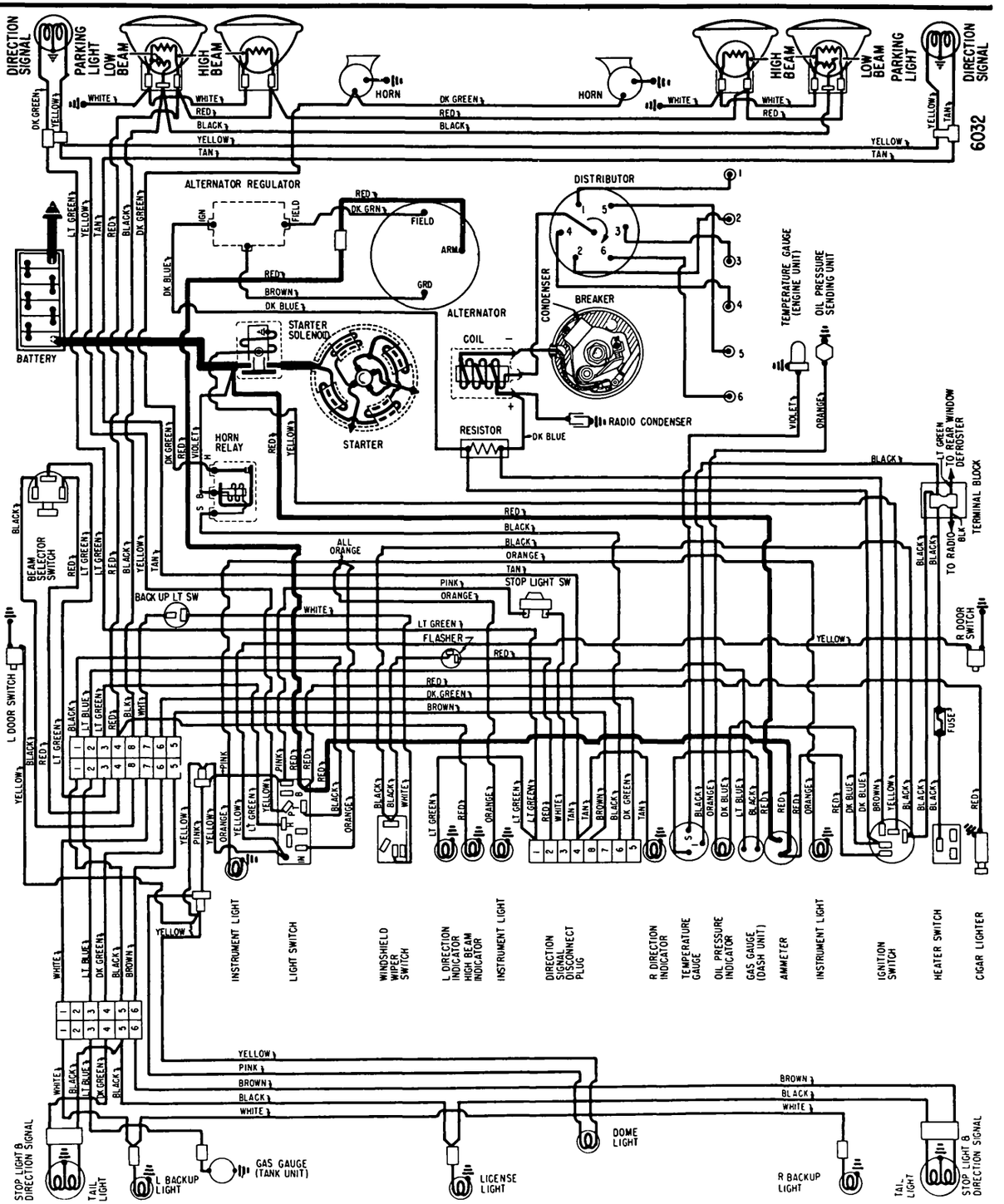
ALTERNATOR

►*EXCESSIVE OR CONTINUOUS AMMETER FLUCTUATION (Cars with Alternators): See "Chrysler Alternator" in Electrical Section for tests and corrections.*

►*BATTERY CHARGING OR STARTING CAR WITH AUXILIARY BATTERY & JUMPER LEADS CAUTION:* Damaged circuits may result from reversed polarity or excessive voltage. *See "Chrysler Alternator" in Electrical Section for correct procedures.*

►*ALTERNATOR ERRATIC OPERATION & ABNORMAL BRUSH WEAR CORRECTION (Manual Steering Cars):*

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Caused by engine oil entering unit from unused upper rear hole in engine block at rear of alternator. To correct, apply sealer to a 3/8" x 3/4" SAE bolt and insert into hole with a copper washer under bolt head.

Own. (Std. Eng.) Chrysler No. 2095060, (Hyper Pack Eng.) Chrysler No. 2095557. Three phase A.C. unit with full-wave rectifier. *NOTE* - Rectifier units built in the alternator.

Rotation - Clockwise at drive end.
Rated Output - 35 amperes.

Performance Data

Amperes	Volts	Engine RPM
28 minimum	14.6	1250
33 minimum	15.0	2200

Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section.*

Belt Adjustment: With 10 lb. load, deflection should be: **(Without Power Steering)** - ½" midway between water pump and alternator.
(With Power Steering) - Two belts. 1) 3/16" midway between water pump and power steering pump. **2)** 1/4" midway between power steering pump and alternator.

REGULATOR

Own. Chrysler No. 1889960 (All Models). Field control type (no Cutout Relay or Current Regulator).

►*REGULATOR REPLACEMENT NOTE (Early Cars):* Regulator on early Detroit built cars (Before No. 112948) has been replaced by improved regulator identified by three resistors (located on underside of base). This new regulator has improved regulating resistance to provide increased contact life.
Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlights: Dual headlights (4-Headlight System). *See "4-Headlight Systems" in Electrical Section.*
Direction Signals: *See Electrical Section.*
Instrument Cluster Servicing: Disconnect battery ground cable. Remove lighting switch knob, see Lighting Switch below. Remove four instrument cluster attaching screws, pull top of cluster forward. Disconnect speedometer cable and all connectors at instruments and switches. Lift cluster out.
Speedometer Removal: After cluster removed (above), speedometer head can be removed from cluster.
Lighting Switch Removal: With switch knob in full "IN" position, depress spring-loaded retainer on switch body to release knob stem, pull knob and stem out. Remove switch retaining bezel, remove switch from instrument panel and disconnect wires.
Stop Light Switch Location: On forward end of master cylinder.
CIRCUIT BREAKERS: 22.5 Ampere - Headlights, Tail lights, High Beam Indicator. On headlight switch.
15 Ampere - Parking, Stop, License, Instrument, Dome, & Glove Box lights. On headlight switch.
6 Ampere - Variable speed windshield wiper.
5 Amp r - Single speed windshield wiper.
NOTE - Back-up lights protected by windshield wiper circuit breaker.
FUSES: 20 Amp r - Heater, in feed line.

ENGINE

ENGINE SPECIFICATIONS: New "Inclined" Six Cylinder, Overhead valve type. *NOTE* - Engine is inclined 30° to right when installed in chassis and oil pan correspondingly sloped with bottom of oil pan parallel to floor.

►*"HYPER PACK" ENGINE NOTE:* This engine has higher compression ratio, special camshaft and different valve timing, and other special features as listed below. *NOTE* – Premium fuel must be used in this engine.

Engine	Bore	Stroke	Displacement
All	3.40"	3.125"	170 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
Std.	8.5—1	27.7	101 at 4400 RPM
Hyper Pack	10.5—1	27.7	148 at 5200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*VALVE PUSHROD BENDING OR BREAKING:* May be caused by insufficient lubrication of valve train due to rear camshaft bearing turning in the block and cutting off the oil lead to the rocker arm shaft. When replacing rear camshaft bearing, check for a sufficiently tight fit to prevent bearing turning in service. If necessary, coat outside diameter of bearing with a high tin-content solder before installation.

►*LOW OR INTERMITTENT OIL PRESSURE OR LOSS OF OIL PRESSURE ON TURNS:* May be caused by incorrect positioning of oil pick-up tube and screen assembly in crankcase. Can be checked through oil pan drain hole without removing pan. Bottom of screen should be parallel with bottom of pan with approximately 1/8" clearance. *See "Oil Pick-up Tube & Screen Position" under OIL PAN below.*

►*OIL LEAKAGE AT REAR CAMSHAFT BEARING CORE PLUG:* May be caused by oil accumulation in recess behind camshaft rear bearing journal. *See "Camshaft & Bearings" in Valiant Special Data.*

OIL PAN: Removal - Remove tie rod at steering and idler arms. Support engine and remove front engine mounting-to-frame bolts, disconnect and remove left side support (connecting converter housing and cylinder block). Raise engine approximately 2 inches. Drain crankcase. Remove oil pan bolts, lower pan and remove it toward the rear. *CAUTION - Do not turn oil pick-up tube and strainer out of position.*
Installation: Check position of oil pick-up tube and screen (see below). Install cork rail gaskets on block using sealer to hold them in position, install front rubber molded gasket on chain case cover. Place oil pan in position and install attaching bolts, tighten bolts evenly to 200 **inch lbs.** (supersedes original recommendation of 15 ft. lbs.). Install left side support and tighten bolts to 30 ft. lbs. Lower engine, install front engine mounting bolts and tighten to 85 ft. lbs.

►*OIL PICK-UP TUBE & SCREEN POSITION:* With oil pan off, make certain that tube is tight in block. Check position of screen by placing straightedge vertically in line with inner edge of cylinder block oil pan rail. Distance from straightedge to nearest edge of screen should be 1 1/8". *See also "Low or Intermittent Oil Pressure" above.*

ENGINE REMOVAL: *See Valiant Special Data.*
CYLINDER HEAD: *See "Cylinder Head & Manifold" in Valiant Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Valiant Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, slipper type skirt. Thermally controlled by steel struts.

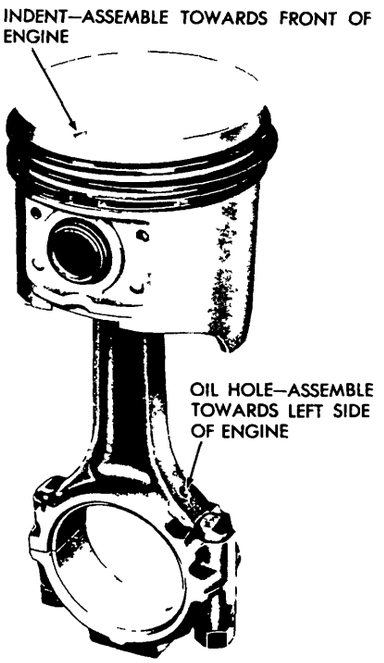
►*OVERSIZE CYLINDER BORE CAUTION:* Letter "A" (A or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates all cylinder bores and pistons are .020" Oversize.

Weight - (Std. Eng.) 16.4 ozs. **(Hyper Pack Eng.)** 17.2-17.6 ozs.
Removal - Pistons and rods removed from above.
Clearance - .0005-.0015" at top of skirt.
Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure piston at top of skirt at right angles to pin hole, measure cylinder bore halfway down and at right angles to crankshaft.
Installing Pistons - Notch in piston head must be toward front of engine. *See Rod Installation.*
Replacement Pistons: Furnished with pins in Std. size and .005", 020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

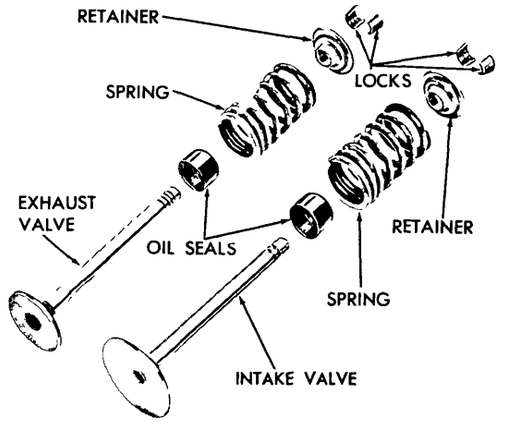
PISTON PIN

Press fit in connecting rod.
Diameter - .9007-.9009". **Length** - 2.955-2.975".
Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

CONTINUED ON NEXT PAGE



VALIANT PISTON & ROD ASSEMBLY



VALIANT VALVE ASSEMBLY

CONTINUED FROM PRECEDING PAGE

Pin Fit in Rod - .0007-.0012" interference fit. Special procedure and tools used for removal & installation. *See "Piston Pins" in Valiant Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

►*PISTON RING CAUTION: Special rings used for Hyper Pack.*

(Std. Engine) – Compression rings cast iron, tin-plated. Oil ring cast iron with low tension hump type expander. **(Hyper Pack Engine)** – Compression rings cast iron (No. 1 Chrome-plated, No. 2 tin-plated). Oil ring is same as Std. Engine.

Ring	Width	End Gap	Side Clearance
Compr. (1&2)	.0775–.0780	.010–.020	.0015–.003"
Oil	.1860–.1865	.010–.020	.0010–.003"

Installing Rings - Mark "TOP" on compression rings must be upward.

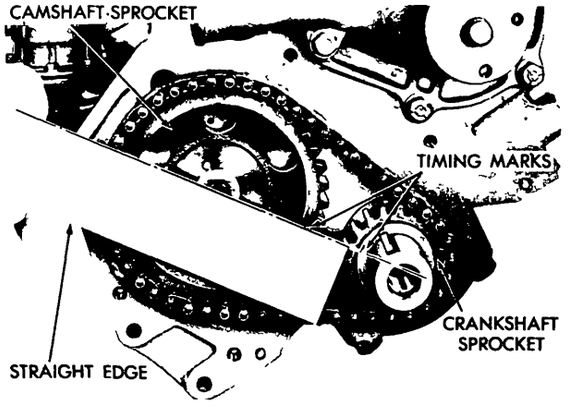
Replacement Rings: Furnished in sets for following oversize ranges: Std. to .009", .020" to .029", .040" to .049".

CONNECTING ROD

Length (Cent-to-Cent) - 5.705-5.709".
Weight - 26.8 ozs.
Journal Diameter - 2.1865-2.1875". Out-of-round limits .001".
►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*
Pin Bore in Rod - .8995-.9000".
Clearance - .0005-.0015". Wear limit .0025".
Side Clearance - .006-.012".
Bearing Adjustment - None, replace bearings.

Installing Rods: Notch in head of piston must be toward front of engine and oil squirt hole in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010" Undersize.



VALIANT VALVE TIMING MARKS

CRANKSHAFT

Journal Diameter - 2.7495-2.7505". Out-of-round limits .001".

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.010" UNDERSIZE (All Main & Connecting Rod Journals)** - Letter "B" (B or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates that ALL Main and Connecting Rod Journals are .010" undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - Letter (M - Main Journal, R - Connecting Rod Journal) and Number (designates particular journal) stamped on center counterweight of crankshaft indicate that particular journal is .001" Undersize and fitted with .001" thicker wall bearing insert.

►*MAIN BEARING NON-INTERCHANGEABILITY CAUTION:* Nos. 1 & 2 **upper** bearings are chamfered along right inside edge at tab end and are interchangeable. No. 4 **upper** bearing is not chamfered and is NOT interchangeable with other bearings. *(NOTE* - This bearing identified by blue marking on edge). No. 3 **upper** and **lower** bearings are flanged and NOT interchangeable with other bearings. **Upper** and **lower** bearing halves are NOT interchangeable (upper bearings grooved, lower bearings plain). Nos. 1, 2, 4 **lower** bearings are interchangeable. *CAUTION - Use of No. 1 or 2 upper bearing in No. 4 position may cause oil leak, use of No. 4 upper bearing in No. 1 position would prevent proper lubrication of timing chain and sprockets.*

Clearance - .0005-.0015".
End Thrust - Taken by No. 3 (rear intermediate) flanged bearing. **Endplay** - .002-.007".

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Replacement Bearings: Std. and .001", .002", .010" Undersize.

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Valiant Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Valiant Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952".
Bearings - Lead based babbitt on steel.
Clearance - .001-.003". Wear limit .005".
End Thrust - Taken by rear face of sprocket hub on front face of block. No thrustplate used.
Camshaft Setting - Marks on sprockets must be adjacent and in line with straightedge across shaft centers.

Timing Chain: Side guide type. Width .88", Pitch .50", Length 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold crankshaft sprocket stationary, use torque wrench to turn camshaft sprocket in both directions applying 30 ft. lbs. turning torque if cylinder head installed, 15 ft. lbs. turning torque if head off).

Camshaft Removal: *See "Camshaft & Bearings" in Valiant Special Data.*

Engine Front Cover Installation: *See "Engine Front Cover" in Valiant Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Valiant Special Data.*

VALVES

►*INSUFFICIENT VALVE TRAIN LUBRICATION (Rocker Arms, Valve Stems and Pushrods): See "Camshaft & Bearings" in Valiant Special Data for inspection of rear camshaft bearing and oil passages in camshaft.*

Tappet Clearance: Initial setting with cold engine .012" (Intake), .023" (Exhaust). With engine at normal operating temperature and idling, set clearance to .010" (Intake), .020" (Exhaust).

Valve	Head Diam.	① Stem Diam.	Length
Intake	1.615–1.625"	.372–.373" Std	4.774"
Exhaust	1.355–1.365"	.371–.372" Std	4.797"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	②	④ .001–.003"
Exhaust	45° ⑥	③	⑤ .002–.004"

① - Also furnished .005", .015", .030" Oversize.
② - .375" (Std. Engine), .430" (Hyper Pack).
③ - .360" (Std. Engine), .430" (Hyper Pack).
④ - Wear limit .004". ⑤ - Wear limit .006".
⑥ - Valve face angle 47°

Valve Seat Width - 5/64-3/32" Intake, 3/64-1/16" Exhaust.
Valve Stem Oil Seals - Cup type seals used on all valve stems (long seal on intake valves, short seal on exhaust).

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" oversize. Ream guides for next oversize using reamer, Tool C-3433 (.005"), C-3430 (.015"), C-3427 (.030").

Valve Springs: *NOTE* - Double springs (Inner & Outer) used on Hyper Pack Engines.
Free Length - 2".

Valve Spring Specifications (Std. Engine)

Valve	Pressure	Length
Closed	68–76 lbs.	1 11/16"
Open	160–172 lbs.	1 5/16"

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(Hyper Pack Engine)

	Inner Spring		① Outer Spring	
	Pressure	Length	Pressure	Length
Closed	30 lbs.	1.56"	90 lbs.	1.66"
Open	77 lbs.	1.13"	227 lbs.	1.22"

① - Check with spring dampers removed.

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer). If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16".

Valve Lifters: Barrel type. Remove from above.

Rocker Arm Assembly: *See "Valve System" in Valiant Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

(Std. Engine)

Intake Valves – Open 8° BTDC. Close 44° ALDC.
Exhaust Valves – Open 48° BLDC. Close at TDC.

(Hyper Pack Engines)

Intake Valves – Open 22° BTDC. Close 74° ALDC.
Exhaust Valves – Open 66° BLDC. Close 22° ATDC.

Valve Timing Check (Std. Engine) – Remove rocker arm cover, mount dial indicator on cylinder head so that pointer contacts adjusting screw of No. 3 Intake Valve (6th. rocker arm from front of engine). Turn crankshaft until maximum lift is indicated on dial indicator. At this point, timing mark on damper should be in line with 15° BTDC point on timing mark on chain case cover. *NOTE* – If timing is off one tooth, maximum valve lift will occur approximately 27° before or after this point.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Valiant Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Located in pump body.

►*RELIEF VALVE SPRING NOTE:* Three types of spring available. Replace with same color spring. *See "Oiling System" in Valiant Special Data.*

Oil Pressure Indicator: Indicator light on instrument panel operated by Oil Pressure Switch, Auto-Lite No. 14272A, on right side of block on oil pump body.

Oil Pump: Rotor type, on right side of crankcase.

Overhaul - *See "Oiling System" in Valiant Special Data.*

Oil Filter: Full flow type. Replace filter element every 4,000 miles, to correspond with oil changes. *NOTE* - Be sure to unseat drain back valve in base of filter using blunt tool.

Crankcase Ventilation: Filter in oil filler cap and outlet vent tube from rocker arm cover down to right rear of engine. Wash filler cap filter in kerosene every oil change or more often in dusty areas and reoil.

COOLING

Water Capacity: 13 qt. Add 1 qt. for heater installation.

Pressure Valve: 14 lb. radiator cap (All Models).

Thermostat: Pellet type. *CAUTION* - Use only No. 2129205 identified by "jiggle" pin in bleed hole.

Water Pump: Sealed ball bearing, packless type. No lubrication required.
See "Water Pump" in Valiant Special Data.

Pump Removal - Drain cooling system. Loosen alternator adjusting strap and push alternator toward engine. Remove fan, spacer, pulley and belt. Remove inlet and heater hoses and clamp from by-pass hose. Remove water pump body down and off by-pass hose.

Temperature Gauge: Constant voltage type with voltage regulator inside gauge. *NOTE* - "A" terminal on gauge is constant-voltage feed terminal for gasoline gauge.

Dash Unit - Chrysler No. 2076319.

Engine Unit - Chrysler No. 2084459.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. 9A7 (9 1/8") Std., 10" Optional.

Cover No. - Borg & Beck No. 361521 (9A7).

Disc No. - Borg & Beck No. 383045 (9A7).

See "Borg & Beck" in Clutch Section.

Pedal Adjustment: Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This adjustment will provide necessary 1" free travel at pedal.

Removal: Raise car and remove transmission, *see Transmission Removal below.* Remove clutch housing pan. Disconnect clutch linkage and retracting spring at clutch fork. Remove clutch fork from release sleeve and bearing assembly. Mark cover and flywheel for reassembly and remove six cover attaching bolts. Remove cover and clutch plate.

SYNCHRO-MESH TRANSMISSION

Own. New "Synchroshift" transmission with helical cut gears.
See "Dodge, Plymouth, Valiant (Synchroshift) Transmission" in Transmission Section.

Gearshift Linkage Adjustment: *See "Dodge, Plymouth, Valiant (Synchroshift) Transmission" in Transmission Section.*

Removal: Drain lubricant, disconnect propeller shaft, speedometer cable and housing and gearshift rods. Disconnect parking brake control cable. Remove speedometer cable by hand (pinion comes out with cable). *CAUTION - Do not crush housing.* Remove back-up light switch (if so equipped). Install engine Fixture C-3806 hooks firmly into holes in frame side member with support ends up against oil pan flange. Adjust fixture to support engine. Raise engine slightly and remove rear support attaching bolts and remove crossmember. Support transmission, remove transmission to clutch housing bolts, slide transmission rearward to clear pinion shaft. Lower transmission and remove from beneath car.

Capacity - 5 pts. This supersedes previous specification of 2¾ pints.

TORQUEFLITE TRANSMISSION

New 3-speed automatic transmission with torque converter.
See "TorqueFlite Six Transmission" in Transmission Section.

►*LOCKING IN PARKED POSITION NOTE:* Caused by incorrect cable installation or adjustment. *See "TorqueFlite Six Transmission" in Transmission Section.*

►*OIL LEAK AT PARKING SPRAG CABLE CORRECTION:* Caused by damaged or undersize "O" ring. *See "TorqueFlite Six Transmission" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "TorqueFlite Six Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "TorqueFlite Six Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 2 years or 21,000 miles, whichever occurs first. *NOTE* - For heavy duty operation, drain and refill every 10,000 miles.

Checking Fluid Level - Bring engine and transmission to normal operating temperature with parking brake applied. Push all selector buttons in turn to assure fluid distribution and check fluid level in "N". Maintain fluid level between "F" mark and 5/8" above "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, oil level should be at "F" mark. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "TorqueFlite Six Transmission" in Transmission Section.*

UNIVERSALS

Detroit Universals. Ball & Trunnion front, Cross rear.

Rear Universal Joint Operating Angle - *See "Propeller Shaft Notes" in Valiant Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type with differential carrier integral with rear axle housing.
See "Valiant Rear Axle" in Rear Axle Section.

Axle Ratios - Used as follows:

Model	Synchro-mesh	Auto. Trans.
Std. Engine	3.55-1 (39-11) ①	②3.23-1 (42-13)
Hyper Pack Engine	③	③

① - 3.23 (42-13) Optl. ② - 3.55 (39-11) Optl.
③ - 3.23 (42-13), 3.55 (39-11), 3.90 (39-10) Optl.

Backlash - .004-.006".

Axle Shaft Removal: Remove wheel and drum. Disconnect brake line at wheel cylinder. Work through axle shaft flange to remove retainer nuts and use Puller C-3725 to pull axle shaft and rear brake assembly. Carefully remove brake assembly from axle shaft without damaging seal contact area. Remove seal from housing. Use same tool to remove bearing from axle shaft (when necessary to replace bearing). Removal damages bearing.

Rear Axle Assembly Removal: Raise car and support body at front of rear wheels. Block brake pedal up. Remove rear wheels and disconnect hydraulic flex line. Disconnect parking brake cable at transmission and propeller shaft at yoke. Remove spring clips (U bolts) and shock absorbers. Remove assembly from beneath car.

SHOCK ABSORBERS

Oriflow. Direct acting, hydraulic type. Serviced by replacement.

►*SHOCK ABSORBER NOISE CORRECTION & PRODUCTION CHANGE:* Use only later type production

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shock absorbers listed below to eliminate noise and for service replacement.

Replacement Shock Absorbers

Model	Package No.	①Shock Absorber No.
Front Std.	2240316	2201572
Front H.D.	2240364	2206514
Rear Std.	2240317	2201575
Rear H.D.	2240365	2206516

① - Stamped on base of shock absorber.

FRONT SUSPENSION

"Torsion-Aire" type similar to design used on other models except that Height Adjustment is made at torsion bar front anchors which are part of lower control arms (rear anchors integral with engine support member). *See "Valiant Torsion Bar Front Suspension" in Suspension & Wheel Alignment Section.*

Steering Axis Inclination – 7½° at 0° camber.

Caster – **(Manual Steering)** Neg. ½°±½°. **(Power Steering)** Pos. ¾°±½°. *NOTE* – Caster should be set as nearly equal as possible on both sides of car with a maximum differential of ¾° and driver's side less positive.

Camber – **(Right Wheel)** Pos. 1/8°±¼° with Pos. 1/8° preferred. **(Left Wheel)** Pos. 3/8°±¼° with Pos. 3/8° preferred.

►*CASTER & CAMBER ADJUSTING NOTE:* Adjusting bolts and cams provided at inner end of upper control arms and adjustment is same as for other Chrysler models.

Toe-In – 1/8"±1/32" with 1/8" preferred.

Toe-Out on Turns – With inner wheel at 20°, outer wheel should be 17°40'.

Wheel Bearing Adjustment: Tighten adjusting nut to 180 **In. Lbs.** torque while rotating wheel, position nut lock on adjusting nut with slots in line with cotter pin hole in spindle, then back off nut and nut lock 1½ slots (cotter pin hole will be covered). Remove nut lock and reposition on nut so slots line up with cotter pin hole, install cotter pin. *CAUTION - Do not disturb adjusting nut.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut type. *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

►*STEERING COLUMN JACKET-TO-STEERING COLUMN SEAL CLAMP NOTE:* Clamp omitted on cars built before Serial No. 103796. Install 1¾" screw type hose clamp around seal at bottom of steering column jacket after filling two seal lips with wheel bearing grease.

Power Steering: Constant Control Full Time power steering, similar to unit used on other Chrysler models except for smaller size. *See "Valiant Constant Control Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" and "Valiant Constant Constant Control Power Steering" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" and "Valiant Constant Control Power Steering" in Steering Section.*

BRAKES

Bendix Hydraulic, single anchor, Duo-Servo type. Parking brake pedal applies rear wheel service brakes. *See "Bendix Hydraulic Single Anchor" Brakes in Brake Section.*

►*HYPER PACK BRAKE NOTE:* Brake lining is Full Metallic or Ceramic Metallic type. Finned aluminum drums with cast iron liner are optional.

Drum Diameter – 9" front & rear.

Master Cylinder – 1.00" (Std. Eng.), 1.125" (Hyper Pack).

Wheel Cylinders – 1.00" Front, .8125" Rear (All Models).

Braking Power - 60% front, 40% rear.

Clearance - Turn adjusting wheel to expand shoes until slight drag is felt, then back off wheel 10-12 notches. Wheel should be free with no drag.

Lining – Molded Asbestos (Std. Engine), Full Metallic or Ceramic Metallic (Hyper Pack). Riveted to shoes.

Lining Width & Length
(Std. Engine)

Shoe	Frt. Wheel	Rear Wheel
Primary	2.25"x7.658"	2.0"x7.658"
Secondary	2.50"x9.818"	2.0"x9.818"

(Hyper Pack – Full Metallic)

Shoe	Frt. Wheel	Rear Wheel
All Shoes ①	1.25"x1.625"	1.0"x1.625"

(Hyper Pack – Ceramic-Metallic)

Shoe	Frt. Wheel	Rear Wheel
All Shoes ②	2.5"x1.75"	2.0"x1.75"

① - 6 Segments (Primary), 10 segments (Secondary).
② - 3 segments (Primary), 4 segments (Secondary).

Lining Thickness – .20" (Std. Eng.), .19" (Hyper Pack - all lining).

Master Cylinder: On engine side of firewall directly above steering column.

►*MASTER CYLINDER NOTE (Cars Without Power Brakes):* Master cylinder has a non-adjustable pushrod and a pedal stop within the master cylinder eliminating need for adjustment. No pedal return spring is used. A service package consisting of Piston-collar-rod-retainer and boot assembly is available for replacement.

Checking Fluid Level - Filler plug at top of master cylinder (on dash panel in engine compartment).

Removal - Disconnect pushrod, brake tube and stop light switch leads. Remove master cylinder to dash bolts. Slide master cylinder straight out from dash.

►*REMOVAL CAUTION:* Never pull brake pedal back beyond piston stop in master cylinder. A pull of 50 lbs. could disengage pushrod from piston.

Power Brakes: Bendix Hydraulic (Disc) Reaction type Power Unit. Mounted on firewall with pushrod connected to brake pedal linkage. Adjustable type pushrod used in master cylinder. *See "Bendix Hydraulic (Disc) Reaction Type Power Unit" in Brake Section.*

Removal - Disconnect vacuum line from vacuum cylinder, and hydraulic line from master cylinder and remove stop light switch wires. Disconnect pushrod from pedal linkage and remove four power unit-to-bracket attaching nuts. Remove unit from car.

MISC. MECHANICAL

Windshield Wiper: Autolite Electric. No. EPW-4002 (Single Speed), ERQ-4001 (Variable Speed). *See "Autolite Electric Windshield Wipers" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

	Ft. Lbs.
Cylinder Head Bolts ©	65-75
Exhaust Manifold Bolts	13-18
Oil Pan Bolts	7-9
Main Bearing Cap Bolts	65-75
Flywheel	75-85
Vibration Damper or Pulley	45-55
Connecting Rod Cap Bolts	19-24
Camshaft Sprocket	35-45
Camshaft Thrust Plate	12-15
Rocker Shaft Support Bracket	30-35
Rocker Arm Cover	3-5
Engine Front Cover	7-9
Water Pump	23-28
Oil Pump	23-28
Flywheel Housing	40-50
Transmission Mounting	32-36

© - See Cylinder Head Installation (below) for head tightening procedure Three different torque applications must be made

ENGINE

ENGINE REMOVAL: *NOTE* - Engine only is removed Do not remove transmission Proceed as follows

1) Remove hood, drain cooling system and crankcase, remove air cleaner and disconnect battery ground cable Remove radiator, drive belt, fan and pulley Disconnect heater hoses at water pump and at carburetor heater spacer outlet, generator and starter wires at units, accelerator rod and choke control cable at carburetor

2) Disconnect windshield wiper hose at vacuum pump Remove fuel pump bowl and disconnect flexible fuel line from tank line (plug tank line) Disconnect primary wire at coil and oil and temperature sending unit wires at units Remove starter and dust seal

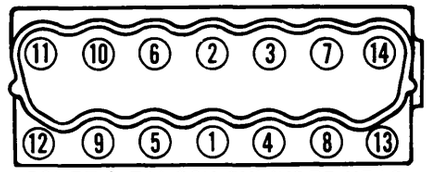
3) Disconnect clutch retracting spring and remove equalizer shaft and arm bracket from underbody rail Remove flywheel or converter upper retaining bolts (accessible through floor pan) and disconnect exhaust pipe from manifold Disconnect engine mounts and remove flywheel or converter housing cover Remove flywheel housing lower bolts (synchro-mesh), disconnect converter from flywheel and remove converter housing lower bolts (auto trans)

4) Support transmission and flywheel or converter, attach lifting hooks under exhaust manifold, remove engine

CYLINDER HEAD & MANIFOLD

CYLINDER HEAD: Removal - Drain cooling system, disconnect battery ground cable, remove air cleaner Disconnect all lines, hoses, and controls from cylinder head Remove valve rocker cover Back off all valve tappet adjusting screws to remove load from rocker arms, loosen rocker arm shaft retaining bolts and remove rocker arm shaft as an assembly Remove pushrods in sequence so that they can be reinstalled in same positions Remove front and rear bolts on manifold side of head and install guide studs in these holes (see Note below) Remove remaining head bolts and lift head off

GUIDE STUD NOTE - Guide studs can be made from 7/16" x 6" bolts by cutting off head, tapering end, and slotting for screwdriver engagement Threads on studs should not exceed 3/8-1/2" in length



COMET & FALCON CYLINDER HEAD

Installation: Clean head and block gasket surfaces, apply head gasket sealer to both sides of new head gasket and position gasket over guide studs in block Install cylinder head over guides and see that exhaust manifold studs engage muffler inlet pipe Coat end bolts on right side of cylinder head with water resistant sealer, install all bolts in head Tighten cylinder head bolts in **three** successive steps in order shown in diagram as follows **1st Step** - 55 ft lbs **2nd Step** - 65 ft lbs **3rd Step** - 75 ft lbs *After final tightening do not disturb bolts* Complete reassembly and note the following points Apply Lubriplate to valve stem tips and rocker arm pads Make certain that oil holes in rocker arm shaft face downward Coat one side of cover gasket with oil resistant sealer and assemble gasket with this side next to cover

PISTON PINS

►*TOOL T60K-6135-A MODIFICATION NOTE:* To prevent damage to piston when Detail 2 of tool seats against piston pin boss, grind a 1/16" - 45° chamfer around outer edge of Detail 2

REMOVAL: Press pin out of piston and connecting rod using vise and wrench with tool shown in illustration, or with arbor press using Tool 6135-J (see illustration)

INSTALLATION: Press pin into piston and connecting rod until Detail 2 is seated firmly in Detail 1 using vise and wrench with tool shown in illustration, or arbor press and Tool 6135-J (see illustration)

CRANKSHAFT & MAIN BEARINGS

►*MAIN BEARING CAP INSTALLATION NOTE:* Caps numbered 1 (front) through 4 (rear) and should be installed in correct position with arrow on cap pointing toward front of engine

CRANKSHAFT THRUST BEARING ALIGNMENT: Align thrust surfaces by tightening cap bolts finger tight, then pry crankshaft forward and pry bearing cap rearward Tighten cap bolts before relieving pressure on shaft

REAR MAIN BEARING OIL SEAL: *NOTE* - To replace upper oil seal, crankshaft must be removed from block,

Cap & Side Seal Installation: Install new cap seal in cap with Tool T60K-6701-A and cut ends of seal flush with cap Install bearing cap Dip side seals in light engine oil (DO NOT use sealer, seals are designed to expand with oil) and install immediately into grooves It may be necessary to drive seals in place the last ½" of travel DO NOT cut off ends of seals

Testing Seal Installation - To check vertical seal installation for leaks, squirt a few drops of oil into parting lines between cap and cylinder block from the outside Blow compressed air against seals from the inside of block If air bubbles appear in oil, it is an indication of oil leakage

ENGINE FRONT COVER

ENGINE FRONT COVER: Removal - Drain cooling system and crankcase Remove radiator Remove drive belt, fan and pulley, and crankshaft pulley Remove front cover and gasket (crankcase ventilation tube attached by one front cover bolt) Remove oil pan(s *Car Model pages) NOTE - Oil pan must be removed as proper gasket seal can be made at installation*

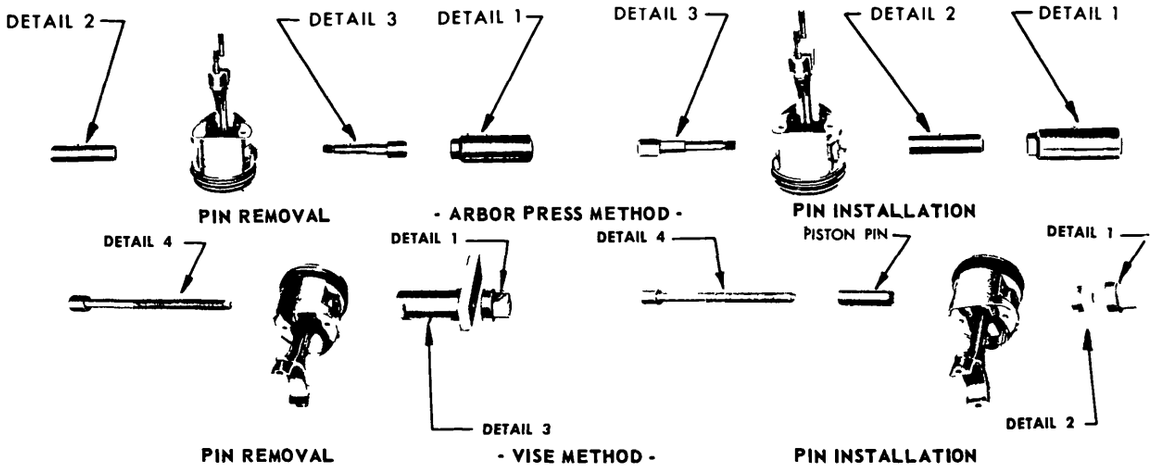
Installation: Apply sealer to cover gasket and place gasket on cover Install cover with Tool T60K-6019-A (crankcase ventilation tube attached by one cover bolt) Install crankshaft pulley Install oil pan, fan and pulley, drive belt, and radiator

FRONT COVER OIL SEAL: Drive out old seal with a punch and clean recess Coat new seal with grease and drive in until fully seated in recess in cover Make sure spring is positioned properly in seal

CAMSHAFT & BEARINGS

CAMSHAFT BEARING REPLACEMENT: *NOTE - No 4 bearing not interchangeable with other bearings* When installing, No 1 bearing must be pressed 100- 140" below front face of bearing bore Press other bearings in and align oil supply holes Install new camshaft rear bearing bore plug

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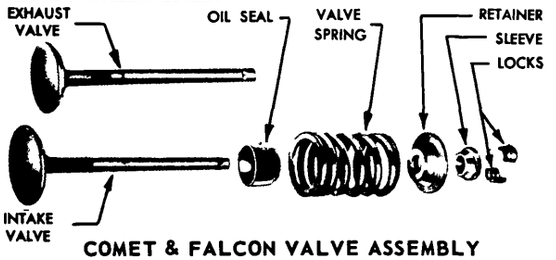
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VALVE SYSTEM

ROTATABLE VALVES: "Rotatable" type valves operate directly in valve guide in cylinder head and are removed and installed as follows:

Valv Rem val: Compress valve spring (Tool 6513-EE) and remove retainer locks. Remove sleeve, spring retainer, spring, stem seal, and valve.

Valve A s mbly Installati n: Lubricate valve guide and stem with engine oil and apply Lubriplate to stem tip. Install each valve into guide from which removed. Install new seal with cup side down toward valve guide boss. Install valve spring with damper (closed) coil down, spring retainer and sleeve. Compress spring and install retainer locks.



COMET & FALCON VALVE ASSEMBLY

ROCKER ARMS

ROCKER ARM SHAFT: Removal - Remove rocker arm cover and back off valve lash adjusting screws to relieve spring load. Loosen rocker shaft retaining bolts and remove shaft as an assembly.

Disass mbly: Remove pin and spring washer from each end of shaft. Slide rocker arm, springs, and supports off shaft. If shaft end plugs to be removed, pierce plug on one end and remove and drive out opposite plug with rod.

R ass mbly: Install plugs in shaft with cup side out. Install all parts in same order as removed, making sure oil holes in shaft face downward.

Installation: Reverse removal procedure and be sure oil holes in shaft face downward.

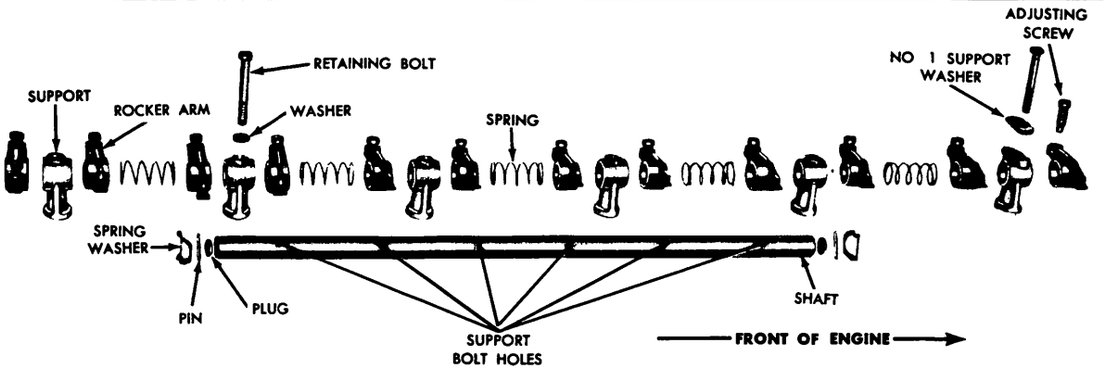
OILING SYSTEM

ENGINE LUBRICATION

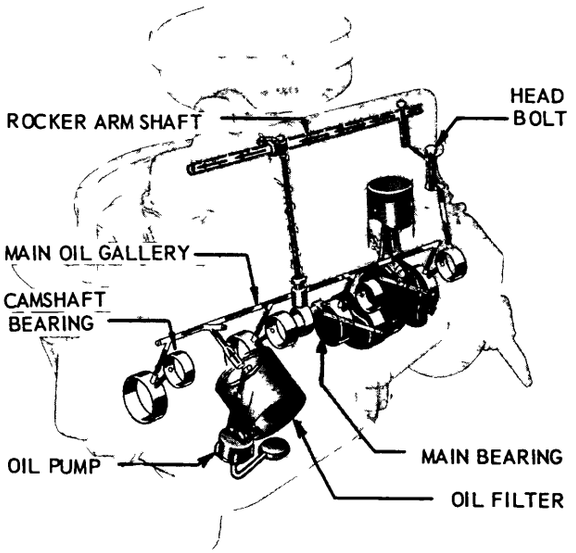
ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil under reduced pressure (metered by camshaft bearing) lubricates distributor drive gear and valve mechanism on cylinder head. All other parts are lubricated by oil spray or splash.

OPERATION: Rotor type oil pump mounted in crankcase at left front corner of engine. Pump draws oil through fixed strainer and intake pipe mounted on pump cover and delivers oil to full flow type filter mounted externally on front left side of crankcase. From the filter, oil passes through transverse passage to main oil gallery extending along full length of engine block directly above the camshaft. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main gallery to each crankshaft bearing and then up to corresponding camshaft bearing. Distributor drive gear is lubricated from front camshaft bearing.



COMET & FALCON ROCKER ARM ASSEMBLY



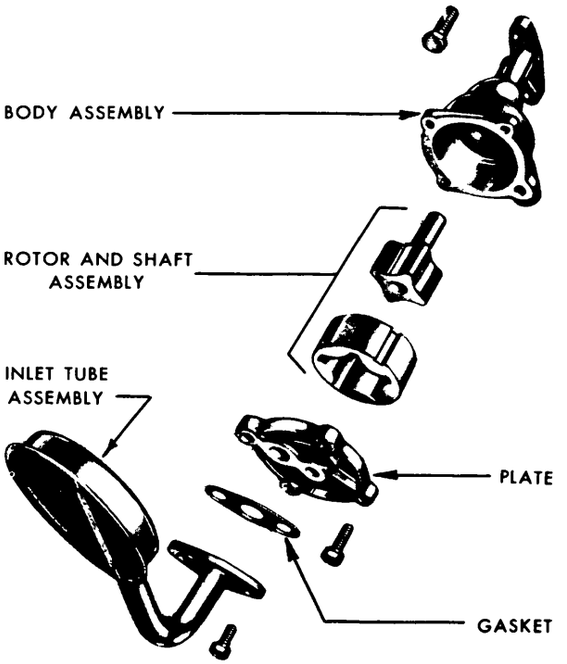
COMET & FALCON ENGINE OILING SYSTEM

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provide continuous flow of oil to connecting rod bearings.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on right side of rod when this hole registers with oil hole in connecting rod journal.

Timing Chain & Sprockets - Lubricated by splash from oil pan.

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows through vertical passage in block and around left rear corner cylinder head bolt to oil port at rear rocker arm shaft bracket pad. Oil then flows around this bracket bolt to hollow rocker arm shaft, and is distributed to each rocker arm for rocker arm, pushrod, and valve tip lubrication. Excess oil is discharged from rocker arm shaft at front shaft bracket. Oil from rocker chamber runs down pushrods to lubricate pushrod seat and lifter and drains back into the oil pan through cored openings in the block.



COMET & FALCON OIL PUMP

OIL FILTER: Full flow type. Mounted externally on left front corner of engine. Filter has integral bypass valve and anti-drain back diaphragm.

OIL PUMP

OIL PUMP: Removal - Remove oil pan, pick-up tube and screen assembly and oil pump retaining bolts. Remove pump.

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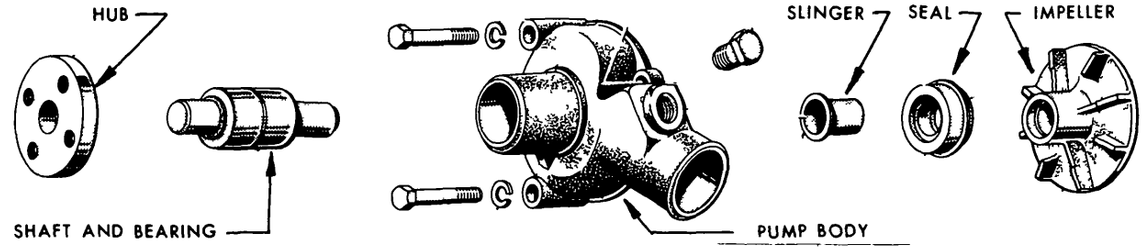
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Disass mbly: Remove inlet tube and gasket, cover, inner rotor and shaft assembly, and outer race. Pull pressure relief valve cap out by means of a self-tapping screw threaded into cap. Remove spring and plunger.

Inspection: Clean all parts in solvent and dry. Check all parts for chips, damage or wear. If cover worn, scored or scratched, replace. Outer race-to-housing clearance should be .006-.011". Install inner rotor and shaft into housing and place straightedge across housing and rotor and outer race. Clearance should be .0010-.0035". Drive shaft-to-housing bearing clearance should be .0015-.0029" (measure O.D. of shaft and I.D. of housing bearing). Relief valve spring tension should be 8.6-9.5 lbs. at 1.078" and relief valve piston-to-bore clearance should be .0015-.0029". *NOTE - Outer race, inner rotor and shaft assembly are replaced as an assembly only.*

Reassembly: Oil all parts. Install relief valve piston, spring, and new cap. Install outer race, inner rotor and shaft and cover. Tighten cover screws to 6-9 ft. lbs. Install inlet tube.

Installation: Reverse removal procedure.



COMET & FALCON WATER PUMP

COOLING SYSTEM
WATER PUMP

WATER PUMP: Removal - Drain cooling system, disconnect radiator lower hose at pump, remove drive belt, fan, and pump pulley. Disconnect heater hose at pump and remove pump.

Disassembly: Remove hub from shaft (Tool 7675-N) and press shaft and bearing assembly out of housing with an arbor press and Tool T52L-8501-DAD-19. Remove impeller from shaft (Tool OTC-952 placed under impeller to give proper support).

Reassembly: Make sure slinger installed on new shaft in same relative position as slinger on old shaft (install with Tool T52L-8501-DAD-18). There should be .220" between slinger and bearing. Coat outer diameter of bearing with grease and press into housing with arbor press and Tool T52L-8501-DAD-19 (support housing with Tool T60K-8512-A). Apply waterproof sealer to seal and press into housing (support housing with T52L-8501-DAD-16 and use T52L-8501-DAD-17 or 18 between press ram and seal). Coat rubbing face of impeller with grease and press shaft into impeller (place impeller in T60K-8512-A and insert this assembly into T52L-8501-DAD so it will support housing). *NOTE - Pump housing should just touch adapter ring. DO NOT put excessive pressure on shaft as bearing will be damaged. Impeller-to-housing clearance should be .005-.0025".* Turn setscrew in fixture plate so it touches shaft and press hub on shaft until distance from face of housing to top surface of hub is 3.94".

Installation: Reverse removal procedure.

►*JACKING & HOISTING CAUTION Before jacking or hoisting car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on rear face of left front door inner panel Number (example below) includes identification data

① ② ③ ④ ⑤
0 H 01 S 800001

① - Year **0** 1960
② - Assembly Plant **H** Lorain **K** Kansas City **R** San Jose **T** Metuchen
③ - Body Series *See table below*
④- Engine **S** Std Engine **D** Low Compression Engine
⑤ - Beginning vehicle number at each assembly plant

Body Series Identification

Series	Code Number
2-Door Sedan	01
4-Door Sedan	02
2-Door Station Wagon	06
4 Door Station Wagon	07

ENGINE IDENTIFICATION NUMBER: Stamped on top surface of block on front left side near crankcase breather pipe Designates Engine Plant, Year, Month & Day of manufacture, and Inspector's identification Not used for licensing

TUNE-UP

►*PART THROTTLE (ROAD LOAD) SURGE CORRECTION* This condition may be caused by factors other than carburetor As an initial step, perform a complete tune-up operation, checking valve lash, spark plug gap, timing, distributor condition and performance (broken advance springs, defective vacuum unit diaphragm, vacuum line leak), carburetor fuel level and idle mixture adjustments, loose carburetor spark valve, and vacuum leaks in windshield wiper or vacuum pump circuit If condition not corrected by performing all the the steps listed above, carbutetor should be modified *See 'Holley Visi-Flo Carburetors" in Carburetion Section*

COMPRESSION PRESSURE: 170 lbs ± 20 lbs Maximum variation between cylinders 10 lbs

VACUUM READING: Steady 18" at specified idling speed

VALVE TAPPET CLEARANCE: .016" All Valves. Use step-type feeler gauge (.015" GO, 017" NO GO) If clearance set with engine cold, reset after operating engine for 30 minutes at 1200 RPM to stabilize temperature Set clearance with engine idling *NOTE - Above specifications supersede any previous specifications.*

►*SELF LOCKING TAPPET CLEARANCE ADJUSTING SCREW NOTE* Torque required to turn screw must be 3 ft lbs minimum Replace screw or screw and rocker arm if less "interference" noted

MANIFOLD HEAT CONTROL: Intake manifold cast integrally with head end has "hot spot" at lower center section where exhaust manifold clamped in place In addition, an engine coolant heated spacer is located between carburetor and intake manifold to prevent carburetor throttle valve icing (forward fitting on spacer connected to heater connection on cylinder head, rear fitting connected to heater) Hot water to heater core flows through this spacer *NOTE* - On cars without heater, hose connections to spacer are omitted

IGNITION

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 032- 036"
Spark Plugs - Champion F-14-Y or 870. 18 mm. Torque to 15-20 ft lbs *NOTE* - Plugs have tapered seat and do not require a gasket Correct torque is important
COIL: Ford No. B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - Ford No COLF-12250-B Resistance wire (pink color) in harness 1 30-1 40 ohms at 75°F
►*COIL RESISTOR NOTE* Resistance wire is connected between ignition switch and dash panel connector and is bypassed during cranking by lead from starter switch to connector
DISTRIBUTOR: Ford No. CODF-12127-A (Synchro-mesh), CODF-12127-B (Auto. Trans.). Loadomatic type of same design used on previous Ford Six cars

See "Ford Loadomatic Distributors" in Electrical Section.

Condenser - Ford 7RA-12300-C **Capacity** 21- 25 mfd
Contact Point Set - Ford No FAA-12171-A
Breaker Gap - 024- 026" **Cam Angle** - 35-38°
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Clockwise viewed from above

Advance Performance
►With Distributor On Test Stand

①CODF-12127-A			②CODF-12127-B		
Distr Degrees	Vacuum (" Hg)	Distr RPM	Distr Degrees	Vacuum (" Hg)	Distr RPM
0	0 33	400	0	0 65	700
½-1½	0 78	600	1¼-2¼	1 27	1000
3½-4½	1 30	800	4¾-5¾	2 93	1600
10-11¼	3 45	1400	5¾-7	3 94	2000
12½-13¾	5 00	1800			
12¾-14	5 35	2000			

① – Set test stand to 0° at 300 RPM & 0" of Hg
② – Set test stand to 0° at 600 RPM & 48" of Hg

►*DISTRIBUTOR INSTALLATION CAUTION:* Intermediate drive shaft must engage seat in oil pump shaft fully If necessary, turn engine over with starter after distributor drive gear partially engaged to insure full engagement of the intermediate shaft

IGNITION TIMING

Transmission	Std. Setting
Synchro-mesh	2° BTDC
Automatic	10° BTDC

NOTE - Allowable range 2-10° BTDC Set timing with engine idling and vacuum line disconnected
Timing Mark - Notch in crankshaft pulley and timing pointer on left side of chain case cover Pointer marked "TDC", "2", "6", "10" to indicate advance Align pulley notch with correct mark on pointer

CARBURETOR

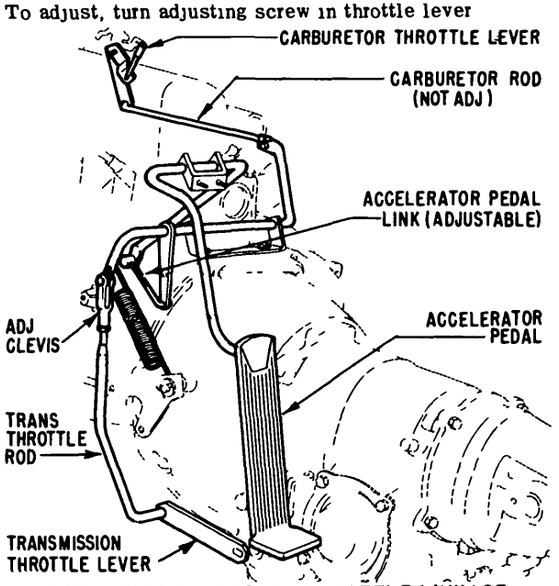
►*CARBURETOR APPLICATION: Holley "Visi-Flo" single barrel carburetor used on all models*

►*ACCELERATOR PEDAL FAILURE TO RETURN TO IDLE CORRECTION* May be caused by interference between accelerator shaft lever and converter housing. To correct, bend lever outward to obtain ½" clearance between end of lever and housing

Thr ttl Linkag Adjustm nt (Synchr -m sh Cars): After carburetor idle speed correctly set, adjust carburetor connecting link for accelerator pedal height of 4 5/16" from top of pedal pad to floor mat with carburetor throttle valve closed

Thr ttl Linkag Adjustm nt (Aut . Trans. Cars): Make sure idle speed of 475-500 RPM in "D" correctly set, anti-stall dashpot correctly adjusted, engine warm, and carburetor at hot idle position. Disconnect throttle control rod at its clevis and push rod downward so transmission throttle lever is against stop in transmission Hold pressure on rod and adjust length of throttle control rod so clevis pin fits freely, then turn clevis 3½ turns clockwise to lengthen rod Connect rod Accelerator pedal height should be 4" from top front corner of pedal to floor mat To adjust, turn threaded trunnion on accelerator connecting link *Make final adjustment using pressure method as follows.* Connect a tachometer to engine, remove valve cap from schrader valve at bracket near throttle control rod and attach pressure gauge, Tool 77820-B, with adapter, Tool 77820-C, to pressure tube With parking brake set and transmission in "D", accelerate to 1200 RPM (engine at normal operating temperature) If pressure below 55 lbs , shorten throttle control rod If pressure above 60 lbs , lengthen rod *CAUTION - If correct pressure cannot be secured within 2½ turn range either way from preliminary setting, other transmission trouble is indicated*

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed Fully depress dashpot plunger and check clearance between end of plunger and adjusting screw in throttle lever This clearance should be 130- 150" To adjust, turn adjusting screw in throttle lever



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

Model	HOLLEY "VISI-FLO" ①Carburetor No.
Synchro-mesh Early (Man Choke)	CODE-9510-A
Synchro-mesh Late (Man Choke)	CODE-9510-C
Synchro-mesh Later (Auto Choke)	CIKE- 9510-A
Auto Trans Early (Man Choke)	CODE-9510-B
Auto Trans Late (Man Choke)	CODE-9510-D
Auto Trans Later (Auto Choke)	CIKE-9510-B

① - Stamped on main body fuel inlet boss

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Form 13B

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►*FAST IDLE SPEED REDUCTION PROCEDURE FOR HOT WEATHER OPERATION:* Use second step of fast idle cam for adjustment *See "Holley Visi-Flo Carburetors" in Carburetion Section.*

►*HESITATION ON ACCELERATION CORRECTION:* May be caused by accelerator pump plunger sticking in its bore. *See "Holley Visi-Flo Carburetors" in Carburetion Section.*

Idle Setting - Initial setting 1-1½ turns open With engine at normal operating temperature, adjust idle speed, then turn mixture adjusting screw in until engine runs roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in until engine runs smoothly Favor a slightly rich mixture Recheck idle speed

Idle Speed - 500-525 RPM in Neutral (Synchro-mesh), 475-500 RPM in Drive (Auto Trans).

Fuel Level - 23/32"±1/32" below power valve mounting surface (remove power valve and use Tool T52L-9550-AEE) Fuel should touch end of longer pin but should not touch shorter pin

Accelerating Pump Setting - Connect link in **inner** hole of throttle lever for average or hot weather operation, **uter** hole for cold weather operation

Fast Idle: No adjustment required (will be correct when throttle stopscrew adjusted for correct hot or slow idle speed)

Automatic Choke Setting: At Index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Ford No CODE-9350-C (fuel & vacuum), No. CODE - 9350-D (fuel only).

Fuel Pump Pressure - 3.5-5.5 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B9MF-10804-A

Dash Unit - Ford No CIKF-9280-A

Tank Unit - Ford No CODZ-9275-C (4-Door Station Wagon), No CODZ-9275-A (Others).

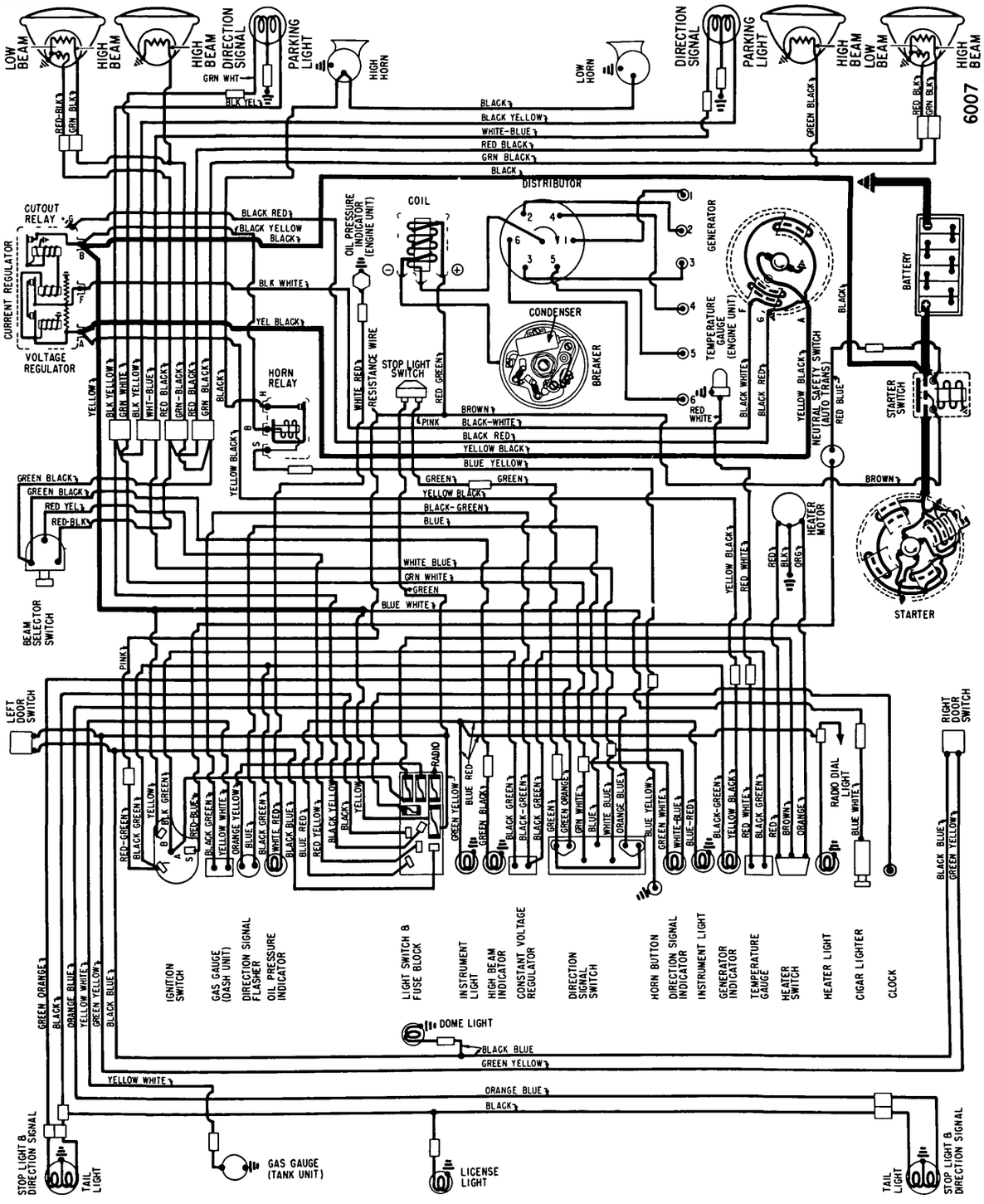
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type Clean every 4000 miles, replace every 20,000 miles. Service more often under severe dust conditions.

►*AIR CLEANER INSTALLATION & INTERCHANGEABILITY CAUTIONS (AUTOMATIC CHOKE CARBS.).* Air Cleaner, Part No CIKE-9600-A, used on carburetors with automatic choke is **not** interchangeable with air cleaner used on other carburetors Install this air cleaner with locating notch in carburetor and mating tab in air cleaner engaged and top cover mark "Front" to front of car with air horn pointed to left side of engine

►*CLEANING CAUTION:* Clean filter element by shaking or tapping squarely on a flat surface If compressed air used, direct stream against inside of element (reversed from normal air flow). *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

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BATTERY

Ford No. CODZ-10654-A (Std.). 12 volt, 9 plate, 40 ampere hour capacity (20 hr. rate).
Ford No. CODZ-10654-B (Optl.). 12 volt, 9 plate, 55 ampere hour capacity (20 hr. rate).
NOTE - Batteries listed are dry type for service replacement.
Battery Ground - Negative, to right front corner of cylinder head.

STARTER

Ford No. CODF-11001-A (Starter & Drive Assy.).
Armature - Ford No. CODF-11005-A.
Drive - Ford No. CODF-11350-A. Solenoid pinion shift.
NOTE - New design drive with solenoid wound on one pole piece. *See "Comet & Falcon Starter Drive" in Electrical Section.*
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 250-290 RPM, 190 amperes max.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12.0	70
15.5 ft. lbs.		5.0	670

℄ - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford No. B6A-11450-A, controlled by ignition switch.
Neutral Safety Switch (Auto. Trans.): Ford No. CODF-7A217-A (without back-up lights), No. CIKF-7A217-A (with back-up lights).
Adjustment - *See "Comet 2-Speed Automatic Transmission" in Transmission Section.*

GENERATOR

Ford No. CODF-10002-C. Armature - Ford B6A-10005-C.
NOTE - When used with 30 amp. regulator, generator identified by Ford No. CODF-10002-D.

Performance Data

Generator	Amperes	Gen. RPM
CODF-10002-C	25	2450
CODF-10002-C	30	2550

Brush Spring Tension - 32-40 ozs.
Field Current - 1.2-1.8 amps. at 12.0 volts (hot).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: ½" deflection midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Ford No. CODF-10505-A (25 Amp.), B7A-10505-B (30 Amp.).
See "Comet Regulators" in Electrical Section.
►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 75°F.*

Cutout Relay

Cuts In - 12.4-13.2 volts.
Cuts Out - 3-7 amperes discharge current.

Vibrator Regulator

Setting - 14.6-15.4 volts at ambient temperature of 75°F.

Current Regulator

Setting - 23-27 amps. (CODF-10505-A), 28-32 amps. (B7A-10505-B).

MISC. ELECTRICAL

►*INOPERATIVE TURN SIGNAL, AUXILIARY LAMP, OR FUEL GAUGE CORRECTION:* May be caused by wiring harness under left front door sill being grounded by scuff plate retaining screw. To correct, remove scuff plate and filler plate. Repair wiring harness. Bend tab on filler plate downward to 45° angle and reinstall with wiring on top of tab. Install scuff plate.
Headlights: 4-headlight system. *See "4-Headlight Systems" in Electrical Section.*
Direction Signals: *See Electrical Section.*
►*DIRECTION SIGNAL CANCELS TOO SOON CORRECTION:* May be caused by distorted signal switch plate. To correct, clamp switch plate shaft in a vise and bend plate downward toward vise 1/16".
Stop Light Switch Location: On forward end of brake master cylinder.
Lighting Switch: New type with blade type terminals. Wire connector for switch is a fuse-junction block, making switch and fuse block one unit.
Removal - Disconnect battery. Remove switch control knob and shaft by pressing release button on switch housing with knob in OFF position, then turn shaft slightly and withdraw. Remove switch bezel nut using Tool 17470-N-51, remove switch from behind instrument panel, disconnect fuse panel by pulling it off switch.
CIRCUIT BREAKERS: 18 Ampere - Headlight circuit. Part of lighting switch.
12 Ampere - Electric windshield wiper. Behind instrument panel on right side of ignition switch.
FUSES: *Located on fuse junction block on lighting switch.*
15 Ampere - Parking, Tail, Dome & Instrument lights.
14 Ampere - Direction Signals & Back-up Lights.
14 Ampere - Heater blower.
7.5 Ampere - Radio.
Cigar Lighter - Sulphur disc on back of lighter.

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head.
NOTE - All specifications below are for the "S" engine.

Bore	Stroke	Displacement
3.50"	2.50"	144 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.7-1	29.4	90 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*
►*ENGINE VIBRATION AT 30-38 MPH CORRECTION:* Vibration is similar to loose vibration damper or flywheel but may be caused by improper torque of generator mounting or adjusting arm bolts. To correct, loosen these bolts and retorque to 23-28 ft. lbs.
►*ENGINE COMPARTMENT NOISE CORRECTION:* Noise is similar to connecting rod knock and may be caused by fuel pump pulsations producing a "hydraulic hammer" condition. To isolate knock, pinch flexible line between fuel pump and fuel tank (engine idling). If noise stops, install Fuel Pump Air Dome, Part No. EAD-9414-A, at fuel inlet fitting at pump using necessary fittings.
►*OTHER ENGINE DATA: See Falcon Car Pages for other engine data and note the following:*
Replacement Pistons: Also furnished .003" Oversize.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Comet Special Data.*
Crankcase Capacity: 3½ qts. refill, add 1 qt. with filter change.
Normal Oil Pressure: 35-55 lbs. (hot) at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator - Indicator light on instrument panel operated by engine unit, Ford No. B6A-9278-B.
Oil Pump: Rotor type pump located in crankcase.
Pump Overhaul - *See "Oil Pump" in Comet Special Data.*
Oil Filter: Full flow type. Replace filter element every 4000 miles when engine oil changed.
Crankcase Ventilation: Filter in oil filler cap (inlet), and outlet pipe at front of block on left side.

COOLING

►*THERMOSTAT REPLACEMENT NOTE:* Replace early type thermostat "R-59" or "S-59" stamped on upper pellet with later type stamped "T-59". If rocker cover front bolt boss extends into water passage at thermostat opening causing improper thermostat operation, remove just enough of bottom end of boss to provide proper clearance.
►*HIGH TEMPERATURE INDICATOR READING CORRECTION:* Make sure later type engine unit, Part No. CODF-10884-A (identified by daub of green paint), installed.
Water Capacity: 8½ qts. Add 1 qt. for heater.
Pressure Valve: Ford No. B8A-8100-A. 12-15 lbs. radiator filler cap.
Thermostat: Ford No. CODE-8575-A (157-162°) standard, No. CODE-8575-B (175-180°) for use with permanent antifreeze.
►*THERMOSTAT INSTALLATION NOTE:* Coolant elbow gasket must be placed on cylinder head before thermostat installed. Install thermostat with copper pellet (element) toward engine side of passage.
Water Pump: Packless, sealed ball bearing type.
See "Water Pump" in Comet Special Data.
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B9MF-10804-A.
Temperature Gauge Dash Unit: Ford No. CIKF-10883-A.
Temperature Gauge Engine Unit: Ford No. B7A-10884-A.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 8½, No. 260013. Single plate, dry disc type. Ford No. CODD-7563-B (Cover Assy.), No. CODD-7550-A (Disc).
►*NOTE: Clutch serviced as an assembly only.*
►*CLUTCH PEDAL INCOMPLETE RETURN CORRECTION:* May be caused by interference between equalizer rod and seal retainer in passenger compartment. To correct, reposition seal retainer so rubber seal is centralized around rod. Apply silicone lubricant to equalizer rod and lubricate equalizer bar.
►*SHUDDER OR CHATTER IN REVERSE CORRECTION:* Make sure clutch is adjusted correctly and that latest type Equalizer Bar, No. CODD-7528-B, and Release Rod, No. CODD-7521-B, are installed. New release rod has .62" offset (was straight). New equalizer bar has 1.20" distance from rod lever to end of bar (was .58").
►*HIGH GEAR VIBRATION CORRECTION:* Vibration occurs in high gear at 28-32 MPH and may be caused by loose clutch disc vibration damper hub. To correct, replace clutch disc.
►*RELEASE BEARING REPLACEMENT NOTE:* Replace release bearing whenever clutch cover assembly is re-

CONTINUED ON NEXT PAGE

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placed or whenever clutch disc is replaced because of heat.

Pedal Adjustm nt: *Mak all adjustments in order as follows:*

1) Clutch Pedal Assist (Overcenter) Spring - Measure distance from rear face of pedal support to end of assist spring retainer (eye bolt to which spring is attached). This distance should be 1 3/16". Adjust by turning retainer nut.

►*SPRING SQUEAK CORRECTION:* Can be corrected by insulating spring ends. Remove spring, slide 1½" long insulating sleeve (No. 8A-14455-B wire terminal insulating sleeve) over each hook end of spring, reinstall spring and adjust as above.

2) Pedal Total Travel - Should be 6-6½". Adjust by loosening mounting bolt and shifting pedal bumper and bracket assembly (mounting bolt hole is slotted).

3) Pedal Freeplay - Should be 7/8-1 1/8" (from released position to point where release bearing just contacts clutch levers). To adjust, loosen adjusting nut on lower end of clutch pedal rod and change position of rod in equalizer bar lever. Tighten both nuts after adjustment completed.

R moval: Remove transmission (see below), starter motor and dust seal. Unhook release lever retracting spring and disconnect the pedal-to-equalizer rod at equalizer bar. Remove release bearing and hub assembly. Remove flywheel housing dust cover and flywheel housing. Remove clutch.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Comet Synchro-mesh" in Transmission Section.

►*HIGH GEAR VIBRATION CORRECTION: See CLUTCH above.*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

R moval: Raise car and remove propeller shaft. Insert Seal Replacer 7657-G into extension housing opening to prevent lubricant leakage. Disconnect speedometer cable and gear shift rods at transmission Disconnect engine rear support and raise engine slightly at flywheel housing. Remove Tool 7657-G and remove transmission.

AUTOMATIC TRANSMISSION

Two-Speed Automatic Transmission with torque converter.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Comet 2-Speed Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Comet 2-Speed Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles. Drain and refill every 24,000 miles. **Use only Comet Automatic Transmission Fluid B9L-19A509 or Automatic Transmission Fluid Type A, Suffix A.**

Checking Fluid Level - With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. With engine idling, maintain fluid at "F" (full) mark on dipstick.

Throttl Linkag Adjustm nt: *S e CARBURETOR ab v .*

►*OTHER DATA: S "C m t 2-Sp d Aut matic Transmission" in Transmissi n S cti n.*

UNIVERSALS

Mechanics. Needle bearing type.

►*CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened). *See "Comet Rear Axle" in Rear Axle Section.*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION:* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange.

REAR AXLE

Own. Integral carrier type, semi-floating, hypoid gear, with Hotchkiss Drive. *See "Comet Rear Axle" in Rear Axle Section.*

►*REAR AXLE PRODUCTION CHANGES, PARTS REPLACEMENT, ADJUSTMENT & OVERHAUL CAUTIONS: Four different rear axle housings have been used in production. For identification, parts replacement, overhaul and adjustment, see "Comet Rear Axle" in Rear Axle Section.*

Axle Ratios - 3.10-1 (31-10), 3.50-1 (35-10), 3.56-1 (32-9), 3.89-1 (35-9).

►*AXLE RATIO IDENTIFICATION:* Code number or letter stamped on patent plate under AXLE as follows:

Ratio	Code	Ratio	Code
3.56-1	1	3.10-1	3
3.89-1	2	3.50-1	J

Backlash - .008-.012". *Supersedes previous specification of .004-.009".*

Axle Shaft Removal: Remove wheel, back off rear brake shoe adjustment. Take off nuts securing brake drum to axle shaft flange and remove drum. Working through hole in axle shaft flange, remove nuts on wheel bearing retainer studs, pull axle shaft assembly out of housing. *CAUTION* - Do not disturb brake backing plate (install one nut to hold plate in place).

►*WHEEL BEARING NOTE:* Bearing is pressed on axle shaft and retained by retainer pressed on shaft against bearing. Remove retainer by nicking with a chisel at several points. DO NOT remove bearing unless new bearing being installed.

►*AXLE SHAFT SEAL INSTALLATION CAUTION: Use only Seal installer T60K-1177-B to install seal.*

Axle Assembly Removal: Support car on underbody and drain lubricant by loosening cover. Disconnect propeller shaft at pinion flange. Disconnect shock absorbers at lower end. Remove axle shafts (see above). Remove brake "T" fitting from axle housing and brake line from clip on housing. Remove brake backing plates from axle housing and tie out of way. Support housing, remove spring clip nuts and plates. Remove axle assembly.

SHOCK ABSORBERS

Direct acting, non-adjustable. Serviced by replacement.

►*REAR SHOCK ABSORBER REMOVAL NOTE:* Upper retaining nut removed through access hole in trunk.

Replacement Shock Absorbers

Model	Front	Rear
Sedans	CIKY-18124-A	COAZ-18125-G
Station Wagons	CODZ-18124-A	CODZ-18125-C

FRONT SUSPENSION

Ind p ndent. "Ball Joint" type with direct acting shock absorbers mounted within coil springs.

Se "Com t Front Susp nsion" in Suspension & Wheel Alignm nt Section.

►*FRONT SPRING NOISE CORRECTION:* This is a metallic noise audible in dash panel area and is caused by interference between upper two coils of front springs. To correct, install a 2" length of 5/8" heater hose on second coil of spring 90° clockwise from tapered end of spring when viewed from above.

►*NOTE: Following specifications for Cast r, Camb r, and Toe-In supersede previous specifications.*

Caster - 0° to Pos. 1°. Pos. ½° preferred. Maximum variation between wheels ½° (¼° preferred).

Camber - 0° to Pos. 1°. Pos. ½° preferred. Maximum variation between wheels ½° (¼° preferred).

Toe-In - 1/4-5/16". 9/32" preferred.

Toe-Out on Turns - Outer wheel 20°, inner wheel 20¾°.

Wheel Bearing Adjustment: Tighten adjusting nut to 11-14 ft. lbs. torque while rotating front wheel hub and drum assembly, then back off adjusting nut at least 1/8 turn but not more than 1/4 turn until nearest slot in nut is aligned with cotter pin hole in spindle, install cotter pin.

STEERING

►*1960 COMET STEERING POOR RECOVERING-TO-STRAIGHT AHEAD POSITION:* Loosen idler arm retaining nut and retighten to 45-60 ft. lbs. *CAUTION - Do not exceed 60 ft. lbs.*

Own. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Steering Linkage: *See "Steering Linkag " in Steering Section.*

Steering Wheel & Horn Button R moval: *See "Saginaw Ball Bearing Worm & Nut" in Steering S ction.*

Steering Gear Removal: *See "Saginaw Ball B aring Worm & Nut" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic. Parking lever applies rear wheel service brakes.
See "Ford-Bendix Hydraulic Brak s" in Brak Section.

►*BRAKE "CLUNK" NOISE CORRECTION:* Noise is heard during brake application and may be caused by insufficient lubrication on backing plate edges, anchor pin-to-brake shoe contact area, and shoe contact buttons on wheel cylinder pistons. To correct, apply lubriplate to these areas.

Drum Diameter - 9" front & rear.

Wheel Cylinder Diameter - 1.062" Front (Sedans), .875" Front (Sta. Wgn.); .8125" Rear (Sedans), .937⅝" Rear (Sta. Wgn.).

Brake Lining Width & Length

Shoe	Front Wheel	R ar Wheel
Primary ...	2¼" x 7.34"	℄ 1½" x 7.34"
Secondary .. ..2¼" x 9.375"		℄ 1½" x 9.375"

℄ - 2¼" on Station Wagons.

Master Cylinder: Located on engine side of firewall.

Checking Fluid - Maintain level within ¼" of top.

Removal - Free boot from pushrod end of cylinder, disconnect brake lines and stop light wires, take out retaining bolts and remove master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum or Electric type with Link & Crank Arm linkage.

See "Windshield Wipers" in Miscellan ous Section.

Tail Gat Wind w (Stati n Wag n): Electric type. *See "Comet & Falcon Tail Gate Power Window" in Miscellaneous Section.*

►*JACKING & HOISTING CAUTION· Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Model	Series
2-Door & 4-Door Sedans	10
Station Wagon & Ranchero	20

SERIAL NUMBER· Stamped on patent plate on rear face of left front door inner panel *NOTE* - Number (example below) includes identification data as indicated

① ② ③ ④ ⑤
0 H 12 S 100001

① - Year **0** 1960
② - Assembly Plant See Assembly Plant table below
③ - Model First digit designates Series **1** Series 10 **2** Series 20 Second digit designates Body Type See Body Type table below
④ - Engine **S** - Std Engine **D** - Low Compression Engine (for 84 Octane fuel)
⑤ - Consecutive unit number

Ass mbly Plant
H - Lorain, **K** - Kansas City, **R** - San Jose, **T** - Metuchen

B dy Type Designation

Model	2-Door	4-Door
Sedan (Series 10)	11	12
Station Wagon (Series 20)	21	22
Ranchero (Series 20)	29	

ENGINE IDENTIFICATION NUMBER· Stamped on top of block on front left side near crankcase breather pipe Designates Engine Plant, Year Month & Day of manufacture and Inspector's Identification Not used for licensing

TUNE-UP

►*ENGINE SURGE OR LOSS OF POWER CORRECTION* This condition is caused by other factors than carburetor, and the following points should be checked and corrected when this trouble is experienced

Fu l Supply - Check flexible line at fuel pump for swelling and deterioration restricting fuel flow and replace with current improved type No B9AA-9288-A Check fuel pump filter and replace early type paper filter with screen type filter No B6T-9365-B Check fuel tank vent If clogged by road splash, relocate vent by drilling ½" hole in rear cross sill 6" from right hand end and 5/8" from forward edge of sill Cut 2" off end of vent tube and insert tube and grommet in this new hole

Distributor - Check for correct spring installation and advance performance Check vacuum unit for leaking diaphragm or leak in vacuum line Check distributor rotor for correct position of rotor contact *See Distributor*

Coil & Spark Plug Wiring - Check for voltage leak at spark plug wires and coil high tension lead If leak exists replace wiring harness with No CODF-18811-B

Igniti n Timing - Check and adjust timing for octane rating of fuel used *See Ignition Timing*

C oling Syst m Th rm stat - Check operation and replace if operating range incorrect or if early type used Check cylinder head thermostat passage for obstruction caused by rocker cover front bolt boss *See Cooling*

COMPRESSION PRESSURE 170 lbs ± 20 lbs Maximum variation between cylinders 10 lbs

VACUUM READING: Steady 18" at specified idling speed

VALVE TAPPET CLEARANCE: 016" All Valves Use step-type feeler gauge (015" GO, 017" NO GO) If tappet clearance set with engine cold, reset clearance after operating engine for 30 minutes at 1200 RPM to stabilize temperature Set clearance with engine idling

►*SELF-LOCKING TAPPET CLEARANCE ADJUSTING SCREW NOTE* Torque required to turn screw must be 3 ft lbs minimum Replace screw or screw and rocker arm if less "interference" noted

MANIFOLD HEAT CONTROL: Intake manifold cast integrally with head and has "hot spot" at lower center section where exhaust manifold clamped in place In addition an engine coolant heated spacer is located between carburetor and intake manifold to prevent carburetor throttle valve icing (forward fitting on spacer connected to heater connection on cylinder head rear fitting connected to heater) Hot water to heater core flows through this spacer *NOTE* - On cars without heater, hose connections to spacer are omitted

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP 032 036"

Spark Plugs - Champion F 14 Y or 870 18 mm Torque to 15 20 ft lbs *NOTE* Plugs have tapered seat and do not require a gasket Correct torque is important

COIL· Ford No B6A-12029-B

Ignition Current - 2 5 amps idling 4 5 amps stopped

Resistor - Ford No COLF 12250 B Resistance wire (pink color) in harness 1 30 1 40 ohms at 75°F

►*COIL RESISTOR NOTE* Resistance wire is connected between ignition switch and dash panel connector and is bypassed during cranking by lead from starter switch to connector

DISTRIBUTOR: Ford No CODF-12127-A (Synchro-mesh), CODF-12127-B (Auto Trans) Loadomatic type of same design used on previous Ford Six cars

See "Ford Loadomatic Distributors" in Electrical Section

►*DISTRIBUTOR ROTOR CHECKING NOTE* On distributors not marked by daub of yellow paint on cap inspect rotor for improperly formed spring contact which may cause engine miss due to air gap between contact and cap Rework spring as necessary so that contact surface is Flush to 040" above top of rotor

Condenser - Ford 7RA 12300 C **Capacity** 21 25 mfd
Contact Point Set - Ford No FAA 12171 A
Breaker Gap - 024 026"
Cam Angle - 35 38°
Breaker Arm Spring Tension - 17 20 ozs
Rotation Clockwise viewed from above

Advance Performance
►With Distributor On Test Stand

①CODF-12127-A			②CODF-12127-B		
Distr Degrees	Vacuum (" Hg)	Distr RPM	Distr Degrees	Vacuum (" Hg)	Distr RPM
0	0 33	400	0	0 65	700
½-1½	0 78	600	1¼-2¼	1 27	1000
3½-4½	1 30	800	4¾-5¾	2 93	1600
10-11¼	3 45	1400	5¾-7	3 94	2000
12½-13¾	5 00	1800			
12¾-14	5 35	2000			

① – Set test stand to 0° at 300 RPM & 0" of Hg
② – Set test stand to 0° at 600 RPM & 48" of Hg

►*DISTRIBUTOR INSTALLATION CAUTION* Intermediate drive shaft must engage seat in oil pump shaft fully If necessary, turn engine over with starter after distributor drive gear partially engaged to insure full engagement of the intermediate shaft

IGNITION TIMING

Engine	Std Setting
Synchro-mesh & Overdrive	2° BTDC
Fordomatic	6° BTDC

NOTE - Allowable range 2-10° BTDC Set timing with engine idling and vacuum line disconnected

►*TIMING SETTING FOR FUEL OCTANE RATING* Set timing within allowable 2-10° range for octane rating of fuel as follows

Fuel Octane	Setting	Fuel Octane	Setting
92	2°BTDC	96	6°BTDC
93	3°BTDC	97	8°BTDC
94	4°BTDC	98	9°BTDC
95	5°BTDC	99	10°BTDC

Timing Mark - Timing pointer on left side of chain case cover marked "O" at TDC point with marks at 2° increments to 10° BTDC point or with lines at other intermediate points indicated by stamped degree figures Align correct mark on pointer with notch in rim of crankshaft pulley

CARBURETOR

►*CARBURETOR APPLICATION Holley 'Visi Flo' (1 Barrel) carburetor with manual choke control used on all engines*

►*EXCESSIVE ACCELERATOR PEDAL EFFORT CORRECTION & DASHPOT SPECIFICATION CHANGE* To correct high accelerator pedal effort, use later production accelerator return spring, Part No CODD-9737-E (20½ coils - Synchro-mesh) No CODD-9737-D (22¼ coils - Fordomatic) *Dashpot clearance with new spring should be 130- 150 '*

Throttle Linkage Adjustment (Synchro-mesh Cars)· After carburetor idle speed correctly set adjust carburetor connecting link for accelerator pedal height of 4 3/16" (from top of pedal pad to floor mat) with carburetor throttle valve closed

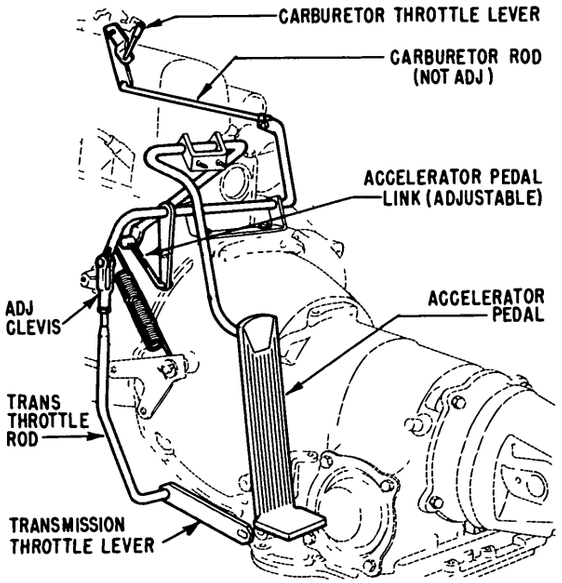
Throttle Linkage Adjustment (Fordomatic Cars) With engine hot or slow idle speed correctly adjusted (see Carburetor data below) and Anti Stall Dashpot adjustment correct disconnect upper end of transmission throttle control rod from accelerator cross shaft Push control rod downward to hold transmission throttle lever against stop in transmission case and make certain carburetor throttle valve in closed position with throttle stopscrew against its stop Adjust clevis on upper end of throttle control rod so that clevis pin is a free fit in cross shaft then **shorten rod by turning cl vis 3½ turns clockwise** connect rod Adjust accelerator pedal height by turning connecting link between accelerator pedal rod and cross shaft lever for pedal height of 4¼" above floor pan *Make final adjustment using pressure method as follows* Connect pressure gauge at 1/8" pipe plug hole on left side of transmission case connect engine tachometer apply brakes Operate engine with selector lever in "D" range increase engine speed to 1200 RPM and note gauge reading Pressure should be 78 82 lbs If pressure below 78 lbs **sh rt n** transmission throttle control rod not more than 2½ turns if pressure above 82 lbs **l ngthen**

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control rod not more than 2½ turns. *CAUTION - If correct pressure cannot be secured within above range (2½ turns either way from preliminary setting), other transmission trouble is indicated.*

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Fully depress dashpot plunger and check clearance between end of plunger and throttle lever. This clearance should be .060-.090" (early cars), .130-.150" (later cars with new accelerator pedal retracting spring - see above). Adjust by loosening locknut and turning dashpot in bracket.



FORDOMATIC THROTTLE LINKAGE

HOLLEY "VISI-FLO"

Model	①Carburetor No.
Synchro-mesh (Early)	②CODE-9510-A
Synchro-mesh (Later)	CODE-9510-C
Fordomatic (Early)	CODE-9510-B
Fordomatic (Later)	CODE-9510-D

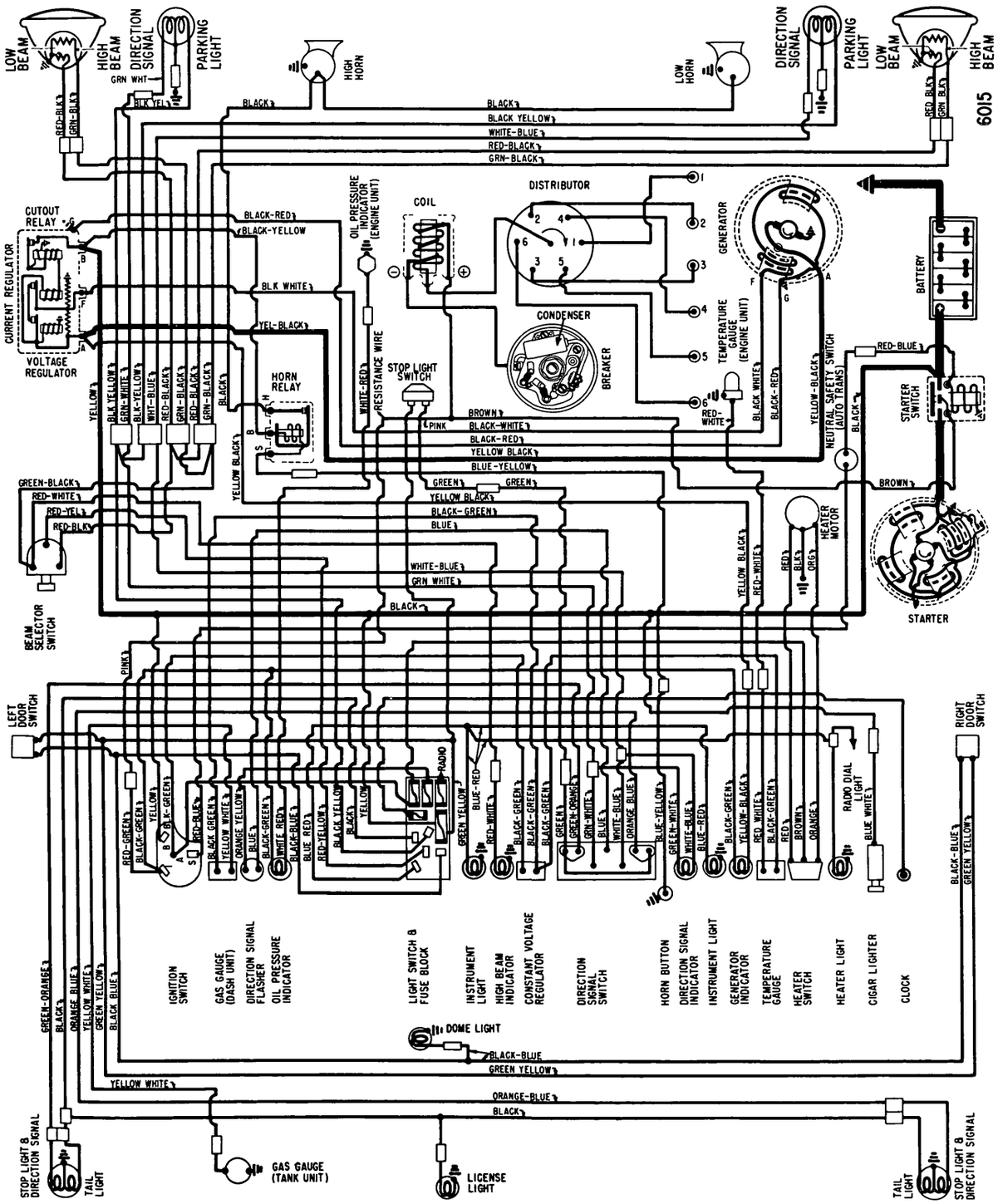
① - Stamped on main body fuel inlet boss.
② - Replace with CODE-9510-C.

Idle Setting - Initial setting 1-1½ turns open. With engine at normal operating temperature, adjust idle speed, then turn mixture adjusting screw in until engine runs roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in until engine runs smoothly. Favor a slightly rich mixture. Recheck idle speed.

Idle Speed - 500-525 RPM in Neutral (Synchro-mesh Cars), 475-500 RPM in Drive (Fordomatic Cars).

Fuel Level - 23/32"±1/32" below power valve mounting surface (remove power valve and use Tool T52L-9550-AEE). Fuel should touch end of longer pin but should not touch shorter pin.

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Acc l rating Pump Setting - Connect link in inn r hole of throttle lever for average or hot weather operation, ut r hole for cold weather operation

Fast Idl : No adjustment required (will be correct when throttle stopscrew adjusted for correct hot or slow idle speed)

Thr ttl Linkag Adjustm nt: *See CARBURETOR above*

►*OTHER DATA: S "Holl y Visi-Flo Carburetors" in Carbur tion S ction.*

CARB. EQUIPMENT

Fu l Pump: Ford No. CODE-9350-A (fuel & vacuum).

Fu l Pump Pr ssur - 3.5-5 5 lbs at 500 RPM.

Se "Fu l Pumps" in Carburetion Section

FUEL FILTER: Located at fuel outlet fitting of fuel pump Cannot be cleaned Replace at 12,000 mile intervals

Gas lin Gaug : King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B9MF-10804-A.

Dash Unit - Ford No. CODF-9280-B.

Tank Unit - Ford No. CODF-9A294-A

S "Fu l Gauges" in Carburetion Section

Air Clean r: Dry filter element type Clean every 6000 miles, replace every 24,000 miles

►*CLEANING CAUTION*· Clean filter element by shaking or tapping squarely on a flat surface If compressed air used, direct stream against inside of element (reversed from normal air flow) *DO NOT wash element in solvent or oth r liquids and DO NOT oil or lubricate*

BATTERY

F rd N . CODZ-10654-A (Std.). 12 volt, 9 plate, 40 ampere hour capacity (20 hr rate)

F rd N . CODZ-10654-B (Optl.). 12 volt, 9 plate, 55 ampere hour capacity (20 hr rate)

NOTE - Batt ri s list d are dry type for service replac m nt

Batt ry Gr und - Negative, to right front corner of cylinder head

STARTER

F rd N . CODF-11001-A (Starter & Drive Assy.).

Armatur - Ford No CODF-11005-A

Driv - Ford No CODF-11350-A. Solenoid pinion shift

NOTE - New design drive with solenoid wound on one pole piece *See "Comet & Falcon Starter Drive" in El ctrical Section*

R tati n - Counterclockwise at commutator end

Brush Spring T nsi n - 48-56 ozs

Cranking Sp d - 250-290 RPM, 190 amperes max

P rformance Data

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	70
15 5 ft lbs		5 0	670

① - With starter on engine and engine idling

Starting Switch: Magnetic type, Ford No B6A-11450-A, controlled by ignition switch

N utral Saf ty Switch (Aut . Trans): Ford No COAF-7A247-A

Adjustm nt - *S e "Falcon 2-Speed Automatic Transmission" in Transmission Section*

GENERATOR

F rd N . CODF-10002-C Armatur - Ford B6A-10005-C

NOTE - When used with 30 amp regulator, generator identified by Ford No CODF-10002-D

P rf rmanc Data

Generator	Amperes	Gen RPM
CODF-10002-C	25	2450
CODF-10002-C	30	2550

Brush Spring Tension - 32-40 ozs

Field Current - 1.2-1.8 amps. at 12 0 volts (hot).

Rotation - Counterclockwise at commutator end

Belt Adjustment: ½" deflection midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Ford No. CODF-10505-A (25 Amp.), B7A-10505-B (30 Amp.).

See "Falcon Regulators" in Electrical Section

►*SETTING CAUTION· "Temperature Compensated" type Set to following specifications at 75°F*

Cutout Relay

Cuts In - 12 4-13. 2 volts

Cuts Out - 3-7 amperes discharge current

Voltage Regulator

Setting - 14.6-15.4 volts at ambient temperature of 75°F

Current Regulator

Setting - 23-27 amps (CODF-10505-A), 28-32 amps (B7A-10505-B).

MISC. ELECTRICAL

►*IGNITION SWITCH BINDING CORRECTION* If switch fails to return to ON position after engine starts, remove lock cylinder and clean all burrs from inside flat surface of switch bezel and apply lubriplate to this surface

Headlights: Two headlights, one in each fender

Direction Signals: *See Electrical Section*

Stop Light Switch Location: On forward end of brake master cylinder

Lighting Switch: New type with blade type terminals Wire connector for switch is a fuse-junction block, making switch and fuse block one unit

Removal - Disconnect battery Remove switch control knob and shaft by pressing release button on switch housing with knob in OFF position, then turn shaft slightly and withdraw Remove switch bezel nut using Tool 17470-N-51, remove switch from behind instrument panel disconnect fuse panel by pulling it off switch

CIRCUIT BREAKER: 12 Ampere - Integral with lighting switch Protects headlights

FUSES: Located on fuse junction block on lighting switch

15 Ampere - Parking, Rear & Dome lights

14 Ampere - Direction Signals

14 Ampere - Heater Blower

7 5 Ampere - Radio

1 Ampere - Clock

ENGINE

ENGINE SPECIFICATIONS: Own 6 Cyl , valve-in-head

NOTE - All specifications below are for the "S" Engine

Bore	Stroke	Displacement
3 50"	2 50"	144 cu. ins
Compr Ratio	**Rated HP**	**Developed HP**
8 7-1	29 4	90 at 4200 RPM

Compr ssi n & Vacuum Reading - *Se TUNE-UP*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Falcon Special Data*

TIGHTENING TORQUES: *S e "Tightening Specifications" in Falc n Special Data*

ENGINE REMOVAL: *S "Engin " in Falcon Sp cial Data*

OIL PAN REMOVAL: Drain crankcase and remove oil level dipstick Remove retaining nuts and washers from both front engine mount-to-support bracket studs. Raise front of engine with a jack (use wooden block on oil pan) and support engine on 2" wood blocks placed between each engine front support and support bracket. Remove stabilizer bar-to-underbody retaining nuts and pull stabilizer bar downward. Remove oil pan retaining bolts, turn crankshaft as necessary for clearance and remove oil pan

PISTONS

Solid skirt type with three rings.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance 0021-.0027" at bottom of skirt Wear limit .005". Check clearance with ½" wide feeler gauge inserted between piston and cylinder wall at right angle to pin (piston inverted and top of piston 1½" below top of cylinder). Pull on 003" feeler should be 6½ lbs. (minimum clearance), 3¾ lbs. (maximum clearance)

Replacement Pistons: Furnished Std (2 sizes, coded Red & Blue) & 020", 030", .040", .060" Oversize. Furnished with fitted pins

Installing Pistons: Notch on piston head should be toward front of engine *See Rod Installation*



PISTON & ROD ASSEMBLY

PISTON PIN

Press fit in connecting rod, no locking device used.

Diameter - 9120- 9123" (rod hole diameter 9107-9112")

Length - 3 010-3 030"

Pin Fit in Piston - 0001- 0003" Wear limit 0008"

Pin Removal & Installation - *See "Piston Pins" in Falcon Special Data*

Replacement Pins: Furnished in assembly with new pistons *See "Replacement Pistons" above*

PISTON RINGS

Top compression ring is chrome plated, lower compression ring is phosphate coated Oil ring is three-piece type with chrome plated rails

Ring	Width	End Gap	Side Clearanc
Compr (1& 2)	0775- 0780"	010- 025" ①	002- 0035"
Oil (3)	1880- 1890"	② 015- 062"	③

① - Wear limit 006" ② - Side sealing type ③ - Snug

Replacement Rings: Std & 020", 030", 040", 060" Oversize

CONNECTING ROD

Journal Diameter - 2 1236-2 1240" (Code Red), 2 1232-2 1236" (Code Blue) Taper wear limit 001", Out-of-round wear limit 0006"

Cl aranc - 0006- 0025"

CONTINUED ON NEXT PAGE

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Side Clearance - .007-.0105". Wear limit .014".
Installing Rods - Numbers on rods and caps must be on same side and installed in same numbered cylinder. Oil squirt hole should be toward right side of engine on all rods and notch in piston head toward front of engine.
Replacement Bearings: Furnished Std. (2 sizes Red-.0564-.0574"; Blue - .0573-.0578"), & .002", .010", .020", .030" Undersize.

CRANKSHAFT

Journal Diameter - 2.2486-2.2490" (Code Red), 2.2482-2.2486" (Code Blue). Taper wear limit .001", Out-of-round wear limit .0006".
Bearings - Steel backed copper lead alloy.
Clearance - .0005-.0025".
Replacement Bearings: Furnished Std. (2 sizes: Red - .0754-.0759"; Blue - .0758-.0763"), & .002", .010", .020", .030" Undersize.
End Thrust: Taken by No. 3 main bearing.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Falcon Special Data.*
Endplay - .004-.008". Wear limit .012".
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Falcon Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Falcon Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated in front of crankshaft sprocket to reduce oil leakage at front oil seal.

CAMSHAFT

Journal Diameter - 1.8095-1.8105".
Clearance - .001-.003". Wear limit .006".
End Thrust: .003-.007". Wear limit .012". Thrust taken by thrust plate and spacer behind camshaft sprocket.
Replacement Bearings: Finished bearings furnished Std. & .015" Undersize. *CAUTION* - No. 4 bearing is **not** interchangeable with other bearings.
Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Falcon Special Data.*
Camshaft Setting: Marks on both sprockets must be adjacent and in line with straightedge across shaft centers.
Timing Chain: Side guide type. Replace chain when side deflection exceeds ½" on slack side (establish reference mark on block with sprocket turned so that all slack removed, then turn sprocket in opposite direction so that slack is present, measure deflection by pressing out on chain midway between sprockets).
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Falcon Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Falcon Special Data.*

VALVES

Tappet Clearance: .016" All Valves, Hot. *See TUNE-UP.*

Valve	Head Diameter	①Stem Diameter
Intake	1.462-1.472"	.3100-.3107" Std.
Exhaust	1.261-1.271"	.3090-.3097" Std.

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°③	.2405"	④.0008-.0025"
Exhaust	45°③	.2395"	⑤.0018-.0035"

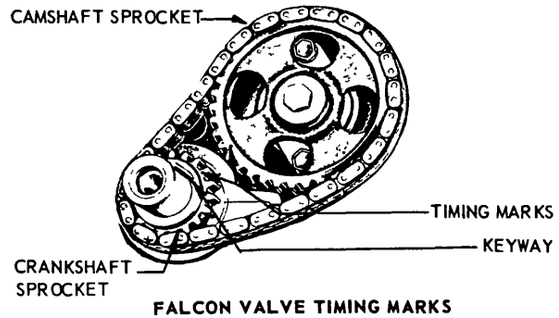
① - Also furnished .003", .015", .030" Oversize.
② - Cam Lobe Lift. Max. allowable lift loss .005".
③ - Seat Angle in head. Valve Face Angle 44°.
④ - Wear limit .0045". ⑤ - Wear limit .0055".

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Falcon Special Data.*
Valve Seat Width - .070-.090" All Valves.
Valve Stem Oil Seals - Cup type seals installed on all valve stems below upper spring retainer.
Valve Springs: Free Length - 2.00" approximately.

Valve Spring Specifications

Valve	Pressure	Length
Closed	①48-56 lbs.	1.585"
Open	②112-122 lbs.	1.22"

① - Wear limit 40 lbs. at 1.585".
② - Wear limit 101 lbs. at 1.22".
►*VALVE SPRING INSTALLATION NOTE:* Valve spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward head. Check installed height of spring which must not exceed 1 39/64" (from surface of cylinder head spring pad to underside of spring retainer). If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 9/16-1 39/64". *CAUTION - Do not install spacers in excess of this recommendation (will overstress springs and overload camshaft lobes).*
Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves. *See "Valve System" in Falcon Special Data.*
Valve Lifters: Barrel type. Remove from above after removing cylinder head.
Clearance - .0005-.0020". Wear limit .004".
Rocker Arm Assembly: *See "Valve System" in Falcon Special Data.*



FALCON VALVE TIMING MARKS

VALVE TIMING

►*VALVE TIMING CHECKING NOTE:* Checking timing by use of quadrant on pulley not recommended by manufacturer. *See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.*

Valve Timing Specifications

Intake Valves - Open 15°①BTDC. Close 37°②ALDC.
Exhaust Valves - Open 45°③BLDC. Close 7°④ATDC.
① - Camlift .0122". ② - Camlift .0152".
③ - Camlift .0119". ④ - Camlift .0142.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Falcon Special Data.*
Crankcase Capacity: 3½ qts. refill, add 1 qt. with filter change.
Normal Oil Pressure: 35-55 lbs. (hot) at 2000 RPM.
Pressure Regulator Valve - In pump body,not adjustable.
Oil Pressure Indicator - Indicator light on instrument panel operated by engine unit, Ford No. B6A-9278-B.
Oil Pump: Rotor type pump located in crankcase.
Pump Overhaul - *See "Oil Pump" in Falcon Special Data.*
Oil Filter: Full flow type. Replace filter element every 4000 miles when engine oil changed.
Crankcase Ventilation: Filter in oil filler cap (inlet), and outlet pipe at front of block on left side.

COOLING

►*THERMOSTAT REPLACEMENT NOTE:* Replace early type thermostat "R-59" or "S-59" stamped on upper pellet with later type stamped "T-59". If rocker cover front bolt boss extends into water passage at thermostat opening causing improper thermostat operation, remove just enough of bottom end of boss to provide proper clearance.
►*HIGH TEMPERATURE INDICATOR READING CORRECTION:* Make sure later type engine unit, Part No. CODF-10884-A (identified by daub of green paint), installed.
Water Capacity: 8½ qts. Add 1 qt. for heater.
Pressure Valve: Ford No. B8A-8100-A. 12-15 lbs. radiator filler cap.
Thermostat: Ford No. CODE-8575-A (157-162°) standard, No. CODE-8575-B (175-180°) for use with permanent antifreeze.
►*THERMOSTAT INSTALLATION NOTE:* Coolant elbow gasket must be placed on cylinder head before thermostat installed. Install thermostat with copper pellet (element) toward engine side of passage.
Water Pump: Packless, sealed ball bearing type. *See "Water Pump" in Falcon Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B9MF-10804-A.
Dash Unit - Ford No. CODF-10883-B.
Engine Unit - Ford No. FEG-10884-B1 (Early), No. CODF-10884-A (Later). *Use only CODF-10884-A for service replacement.*
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 8½, No. 260013. Single plate, dry disc type. Ford No. CODD-7563-B (Cover Assy.), No. CODD-7550-A (Disc).
►*NOTE: Clutch serviced as an assembly only.*
►*SHUDDER OR CHATTER IN REVERSE CORRECTION:* Make sure clutch is adjusted correctly and that latest type Equalizer Bar, No. CODD-7528-B and Release Rod, No. CODD-7521-B, are installed. New release rod has .62" offset (was straight). New equalizer bar has 1.20" distance from rod lever to end of bar (was .58").
Pedal Adjustment: *Make all adjustments in order as follows:*
1) Clutch Pedal Assist (Overcenter) Spring - Measure distance from rear face of pedal support to end of assist spring retainer (eye bolt to which spring is attached). This distance should be 1 3/16". Adjust by turning retainer nut.
2) Pedal Total Travel - Should be 6-6½". Adjust by loosening mounting bolt and shifting pedal bumper and bracket assembly (mounting bolt hole is slotted).

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3) P dal Fr play - Should be 7/8-1 1/8" (from released position to point where release bearing just contacts clutch levers) To adjust, loosen adjusting nut on lower end of clutch pedal rod and change position of rod in equalizer bar lever. Tighten both nuts after adjustment completed.

R m val: Remove starter and rubber dust ring. Remove propeller shaft and place Tool T60K-7657-A in transmission output shaft to prevent leakage. Disconnect speedometer cable, remove extension housing-to-support bolts, muffler support bracket bolts and disconnect shift rods at transmission shift levers. Raise engine slightly (from under oil pan, using a wooden block to protect pan) and remove transmission-to-flywheel housing bolts. Let front of transmission drop slightly, remove tool from output shaft, and slide transmission back and let rest on frame crossmember. Disconnect pedal retracting spring and equalizer rod from equalizer bar. Remove clutch hub and release bearing assembly. Remove flywheel housing dust cover and housing and remove clutch pressure plate and disc.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
S "Falcon Synchro-m sh" in Transmission Section.

►*HARD SHIFT OR GEAR JUMP-OUT CORRECTION:* May be caused by flat type transmission shift levers being installed. To correct, make sure both shift levers are offset type.

Transmissi n C ntr l: *S e "Transmission Controls" in Transmission S ction.*

R m val: Raise car and remove propeller shaft. Insert Tool T60K-7657-A into transmission output shaft to prevent leakage. Disconnect speedometer cable from extension housing and gear shift rods from transmission levers. Remove extension housing-to-rear support bolts and muffler bracket bolts. Raise engine slightly at flywheel. Remove transmission mounting bolts and insert guide pins into lower bolt holes. Remove tool from output shaft and move transmission rearward to clear input shaft and guide pins. Remove transmission.

AUTOMATIC TRANSMISSION

Two-Speed Automatic Transmission with torque converter.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: S "Falcon 2-Speed Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Falcon 2-Sp d Automatic Transmission" in Transmission S ction.*

Lubricati n: Check fluid level every 1000 miles. Drain and refill every 24,000 miles. **Use only Ford Automatic Transmissi n Fluid B8A-19582-A or Automatic Transmissi n Fluid Typ A, Suffix A.**

Ch cking Fluid L v l - With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. With engine idling, maintain fluid at "F" (full) mark on dipstick.

Thr ttl Linkag Adjustm nt: *S CARBURETOR abov .*

►*OTHER DATA: S "Falcon 2-Sp ed Automatic Transmission" in Transmission S ction.*

UNIVERSALS

M chanics. Needle bearing type.

►*CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened). *See "Falcon Rear Axle" in Rear Axle Section.*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION:* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts.

REAR AXLE

Own. Integral carrier type, semi-floating, hypoid, with Hotchkiss Drive. *See "Falcon Rear Axle" in Rear Axle Section.*

►*REAR AXLE PRODUCTION CHANGES, PARTS REPLACEMENT, ADJUSTMENT & OVERHAUL CAUTIONS: Four different rear axle housings have been used in production. For identification, parts replacement, overhaul, and adjustment, see "Falcon Rear Axle" in Rear Axle Section.*

Axle Ratios - 3.10-1 (31-10), 3.50-1 (35-10), 3.56-1 (32-9), 3.89-1 (35-9).

►*AXLE RATIO IDENTIFICATION:* Code number or letter stamped on patent plate under AXLE as follows:

Ratio	Code	Ratio	Code
3.56-1	1	3.10-1	3
3.89-1	2	3.50-1	J

Backlash - .008-.012". *Supersedes previous specification of .004-.009".*

Axle Shaft Removal: Remove wheel, back off rear brake shoe adjustment. Take off nuts securing brake drum to axle shaft flange and remove drum. Working through hole in axle shaft flange, remove nuts on wheel bearing retainer studs, pull axle shaft assembly out of housing. *CAUTION* - Do not disturb brake backing plate (install one nut to hold plate in place).

►*WHEEL BEARING NOTE:* Bearing is pressed on axle shaft and retained by retainer pressed on shaft against bearing. Remove retainer by nicking with a chisel at several points. DO NOT remove bearing unless new bearing being installed.

►*AXLE SHAFT SEAL INSTALLATION CAUTION: Use only Seal installer T60K-1177-B to install seal as seal will be distorted and leak if any other method used.*

Axle Assembly Removal: Support car on underbody and drain lubricant by loosening cover. Disconnect propeller shaft at pinion flange. Disconnect shock absorbers at lower end. Remove axle shafts (see above). Remove brake "T" fitting from axle housing and brake line from clip on housing. Remove brake backing plates from axle housing and tie out of way. Support housing, remove spring clip nuts and plates. Remove axle assembly.

SHOCK ABSORBERS

Direct acting, non-adjustable. Serviced by replacement.

►*REAR SHOCK ABSORBER REMOVAL NOTE:* Upper retaining nut removed through access hole in trunk.

Replacement Shock Absorbers

M d l	Fr nt	Rear
Sedans (Std.)	CODZ-18124-A	COAZ-18125-G
Sedans (H.D.)	CODZ-18124-D	CODZ-18125-E
Station Wagon	CODZ-18124-A	CODZ-18125-C
Ranchero	CODZ-18124-A	CODZ-18125-D

FRONT SUSPENSION

Ind p nd nt. "Ball Joint" type with direct acting shock absorbers mounted within coil springs.
Se "Falcon Front Susp nsion" in Susp nsion & Whe l Alignment Section.

Caster - 0° to Pos. 1°. 0° preferred.

Camber - 0° to Pos. 1° Pos. ½° preferred. Maximum variation between wheels ½° (¼°maximum variation preferred)

Toe-In - 5/32-7/32". 5/32" preferred.

Toe-Out on Turns - Outer wheel 20°, inner wheel 20¾°.

Wheel Bearing Adjustment: Tighten adjusting nut to 11-14 ft. lbs. torque while rotating front wheel hub and drum assembly, then back off adjusting nut at least 1/8 turn but not more than 1/4 turn until nearest slot in nut is aligned with cotter pin hole in spindle, install cotter pin.

STEERING

Own. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Ste ring Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing W rm & Nut" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic. Parking lever applies rear wheel service brakes.
See "Ford-Bendix Hydraulic Brakes" in Brake Secti n.

►*BRAKE DRAG CORRECTION:* If brakes properly adjusted, condition may be caused by insufficient master cylinder pushrod clearance. Inspect through master cylinder cover to see if primary cup uncovers compensating port. If not, adjust pushrod yoke eccentric bolt so pushrod is in extreme rear position. If port still restricted, cut 1/8-1/4" from pointed end of brake pedal rubber bumper.

Drum Diameter - 9" front and rear.

Wheel Cylinder Diameter - 1.062" front, .8125" rear.

Brake Lining Width & Length

Shoe	Front Wheel	Rear Whe l
Primary	2¼" x 7.34"	Ⓒ 1½" x 7.34"
Secondary	2¼" x 9.375"	Ⓒ 1½" x 9.375"

Ⓒ - 2¼" on Station Wagons.

Brake Pedal Freeplay: 5/16-7/16".

Master Cylinder: Located on engine side of firewall.

Checking Fluid - Maintain fluid level to within ½" of top.

Removal - Disconnect rubber boot from pushrod end of master cylinder, brake lines from brake fitting, and stop light wires. Remove retaining bolts and remove master cylinder.

MISC. MECHANICAL

Windshield Wipers: Vacuum type with Link & Arm linkage.
S e "Windshield Wip rs" in Misc llan ous S cti n.

Tail Gat Wind w (Stati n Wag n): Electric type. *S "Com t & Falcon Tail Gat Pow r Window" in Misc l-laneous S ction.*

TIGHTENING SPECIFICATIONS

1954-60 6 CYL. MODELS

	Ft. Lbs.
Cylinder Head Bolts	①
Main Bearing Caps	95-105
Con Rod Nuts	45-50
Int & Exh Manifolds	23-28
Vibration Damper	85-95
Rocker Shaft	45-55
Rocker Arm Cover	②
Rocker Arm Cover Adj Screw Lock Nut	30-35
Pushrod Chamber Cover	③
Engine Front Cover	6-7
Camshaft Sprocket	45-50
Camshaft Thrust Plate	12-15
Fuel Pump	12-15
Oil Pan	12-15
Oil Pump	30-35
Oil Filter	20-25
Water Pump	23-28
Flywheel to Crankshaft	75-85

① - Tighten cylinder head bolts in sequence shown in illustration, in three steps 1) 55 ft lbs (Cold), 2) 65 ft lbs (Cold), 3) 75 ft lbs (Hot, with engine at operating temperature)
② - 2-2 5 ft lbs (1954-59), 4-7 ft lbs (1960)
③ - 1 25-1 75 ft lbs (1954-56), 1 0-1 25 ft lbs (1957-60)

1954-60 V8 MODELS
(239",256",272',292",312",317.5",341",368")

	Ft Lbs.
Cyl Head Bolts	①
Int & Exh Manifolds	23-28
Oil Pan	12-15
Main Bearing Caps	95-105
R Main Bearing Seal Retainer	23-28
Flywheel	75-85
Vibration Damper or Pulley	③
Con Rod Caps	45-50
Camshaft Sprocket	④
Rocker Arm Support Bracket	⑤
Rocker Arm Cover	2-2 5
Engine Front Cover 3/8" Bolt	23-28
Engine Front Cover 5/16" Bolt	12-15
Water Pump	⑥
Oil Pump	⑥
Oil Pump Pick-up Tube Nut	10-12
Oil Pan Pick-up Tube Nut	23-32
Oil Filter	20-25

① - Tighten cyl head bolts in sequence shown in illustration in three steps - First two steps with engine **cold,** third step (final) with engine **hot,** to specifications shown in table below

Cylinder Head Torque

Engine	Ft. Lbs.	1 Step	2 Step	3 Step
239",256",272",292",312"		55	65	②75
317 5", 341"		70	80	90
368" (Plain Bolt)		70	80	90
368" ("FT" on Bolt Head)		80	95	105

② - 85 ft lbs (292" Heavy Duty)
③ - 85-95 ft lbs (Exc 312", 368"), 130-145 ft lbs (312", 368")
④ - 35-45 ft lbs (239", 256", 272", 292"), 15-18 ft lbs (312", 317 5", 341", 368")
⑤ - 12-15 ft lbs (Exc 368"), 22-25 ft lbs (368")
⑥ - 12-15 ft lbs (239", 256", 272", 292"), 23-28 ft lbs (312", 317 5", 341", 368")

1958-60 V8 MODELS
(332", 352", 361', 383', 410", 430")

Engin	Ft Lbs
Cyl Head Bolts	①
Int & Exh Manifolds	23-28
Oil Pan	12-15
Main Bearing Caps	95-105
Vibration Damper	②
Con Rod Caps	45-50
Camshaft Sprocket	③
Rocker Arm Support Bracket	45-50
Rocker Arm Cover	2-2 5
Engine Front Cover 3/8" Bolt	23-28
Engine Front Cover 5/16" Bolt	12-15
Water Pump	23-28
Oil Pump	23-28

① - Tighten cyl head bolts in sequence shown in illustration in three steps - First two steps with engine **cold,** third step (final) with engine **hot,** to specifications shown in table below

Cylinder Head Torque

Engine	Ft. Lbs	1 Step	2 Step	3 Step
332", 352", 361", 383"		70	80	90
410", 430"		85	95	105

② - 130-145 ft lbs (332", 352", 361", 410"), 75-90 ft lbs (383", 430")
③ - 35-45 ft lbs (332", 352"), 23-28 ft lbs (361", 383", 410", 430")

ENGINE

►*1955 LINCOLN ENGINE OVERHAUL CAUTION (Engines identified by yellow paint at water outlet connection housing):* Approximately 600 engines at close of 1955 production have special parts listed below which are not identical with regular engine parts *Observe the following cautions when working on these engines·*

Special Engine Parts

Part	Part No
Crankshaft	EAM-6303-B
Main Bearing (Rear)	① EAM-6331-J ② EAM-6331-K
(Frt & Int)	① EAM-6333-J ② EAM-6333-K
(Center)	① EAM-6337-J, ② EAM-6337-K
Rear Oil Seal	EAM-6701-A
Piston Pin	EAM-6135-A or D

①—Marked RED ②—Marked BLUE

Crankshaft & Main Bearings—Crankshaft main bearing journal diameters are 0005" smaller (increasing clearance from 0007- 0029" to 0015- 0033") and the main bearings listed above must be used with this crankshaft

Piston Pin—Pins are heavier but they can be intermixed and used in any engine

Crankshaft Rear Oil Seal—This seal is approximately 012" less in thickness than regular engine seal but can be used with either crankshaft

1954 6 CYL. PASS. CARS

ENGINE REMOVAL: 1) Remove propeller shaft and loosen transmission rear support bolts On Fordomatic cars, disconnect manual control linkage and remove accelerator cross shaft Disconnect gearshift and clutch release rods and retracting spring Release equalizer bar support and let equalizer hang on frame Remove speedometer cable, overdrive control cable and lever, and solenoid wires
2) Remove hood, radiator and heater motor Disconnect all hoses, fuel lines and wires, then remove air cleaner and tape carb opening closed
3) Disconnect exhaust pipe and remove front engine support bolts Lift engine up and forward to remove it from chassis

1955-60 CYL. PASS. CARS

ENGINE REMOVAL: *NOTE - Unnecessary to remove transmission Procedure below is for removal of engine only* Drain cooling system and crankcase Disconnect all wires, cables, and hoses from engine units (also disconnect and plug automatic transmission oil cooler lines at radiator) Remove radiator and air cleaner Disconnect accelerator and throttle linkage (tie accelerator bracket to dash) Disconnect exhaust manifold, remove starter and automatic transmission filler tube bracket Remove engine rear plate upper right bolt and disconnect clutch linkage (remove bracket from rear of engine) Remove flywheel or converter housing cover Remove flywheel-to-converter nuts and hold converter in housing Disconnect flywheel or converter housing from engine, support transmission and remove rest of engine rear plate bolts Disconnect engine front mounts and remove engine

1954-57 EDSEL, FORD, MERCURY V8 PASS. MODELS

ENGINE REMOVAL: On synchro-mesh cars remove equalizer bar support and bushing and transmission-to-flywheel housing screws Support transmission on jack On Fordomatic cars, disconnect transmission linkage remove converter housing lower cover converter-to-flywheel bolts and converter-to-engine block bolts *NOTE - Access to some bolts is through floor pan plugs* Remove hood and radiator assembly Drain crankcase On Power Steering Cars, disconnect power steering pump bracket and secure pump to fender Disconnect all fuel and vacuum lines, throttle linkage, choke cable and remove fan Disconnect all wires Place front of car on stands, release manifolds, throttle linkage splash shields and remove filter and splash aprons On Thunderbird, it is necessary to remove both steady rest brackets from engine On Air Conditioned cars see "Air Conditioning Service Cautions" before removing any lines Remove engine front steady rest and left engine support Disconnect right engine support Raise and pull engine away from transmission and remove from chassis

1958-60 EDSEL, FORD V8 PASS MODELS (292, 333,352 ENGINES)

ENGINE REMOVAL On 332 352 engines it is necessary to remove hood and coil On all engines remove radiator and drain crankcase Remove air cleaner fuel and vacuum lines heater hoses and all wires Disconnect accelerator rod assembly On Thunderbirds disconnect tachometer drive gear from distributor and remove windshield washer and power brake lines On Air Conditioned Cars disconnect magnetic clutch wire and isolate compressor On Power Booster Fan Cars remove fan and clutch assembly drive pulley and belt On all engines disconnect Power Steering Bracket (wire pump to fender apron) Remove distributor cap and turn coil

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to one side. Remove flywheel or converter housing-to-engine upper bolts. Raise car, remove starter and dust shield (and filler tube on Auto. Trans. Cars). Disconnect exhaust pipes and engine left insulator. Support transmission on jack. On synchro-mesh cars, remove flywheel housing inspection cover, clutch retracting spring, release bracket and flywheel housing-to-engine lower bolts. Remove oil filter. On Auto Trans. Cars, remove converter lower access cover and cover assembly and disconnect converter-to-flywheel nuts. Secure converter in housing. Remove converter housing lower bolts, cooler lines retainer clip (at right insulator bracket). Raise engine slightly and remove right insulator. Pull engine from transmission and remove from car.

1960 THUNDERBIRD (430" ENGINE)

ENGINE REMOVAL: *NOTE - Engine and transmission removed as an ass mbly.* Drain cooling system and crankcase. Remove hood, air intake duct and air cleaner assembly, and radiator. Disconnect all wires, cables, lines, and hoses from engine. Disconnect accelerator and throttle linkage (remove accelerator cross shaft bracket). Remove crankcase ventilation tube (press fit in block). Disconnect muffler inlet pipes from exhaust manifolds. Remove idler arm bracket bolts and lower drag link assembly. Remove engine front support insulators (support engine). Disconnect transmission manual shift rod and speedometer cable (plug transmission). Remove propeller shaft and engine rear support retainer. Install ½ x 14 thread eyebolts in boss at rear of each exhaust manifold, attach lifting bracket and sling (Tool T53L-300-A) to eyebolts and raise engine. Remove engine rear support crossmember and remove engine.

1959-60 MERCURY MODELS (312" ENGINE)

ENGINE REMOVAL: Remove hood. Drain and remove radiator. Remove air cleaner, fan assembly and battery. Disconnect fuel and vacuum lines and all wires. Disconnect carburetor control shaft rod and remove accelerator shaft assembly from transmission control shaft and wire control shaft to dash. On Power Steering Cars, remove pump and secure it out of way. *NOTE - DO NOT disturb lines.* On Power Booster Fan Cars, remove clutch and fan assembly and pulley from water pump. On all cars, remove engine upper splash shields. Remove starter and dust shield. Disconnect exhaust lines. Disconnect clutch release lever rod and clutch release bracket. On Auto. Trans. Cars, disconnect oil transfer line mounting bracket and remove linkage splash shield. Remove converter housing front access cover, and converter lower housing-to-block screws. Remove front insulator assemblies, oil filter, and place jack under transmission. On synchro-mesh cars, remove flywheel lower housing-to-block screws. On Auto. Trans. Cars, remove upper converter housing-to-block screws. Raise engine slightly and push it forward to clear dash, then remove from chassis.

1958-60 MERCURY MODELS (EXC. 312")

ENGINE REMOVAL: Drain cooling system, remove radiator, air cleaner and air inlet duct assembly. Disconnect all fuel and vacuum lines, hoses, and wires. Remove dipstick and tube. On Auto. Trans. Cars, disconnect accelerator shaft to control shaft rod and transmission control shaft rod and remove accelerator shaft bushing. On Synchro-mesh Cars, disconnect accelerator shaft spring, carburetor to transmission control shaft rod, and remove accelerator shaft plastic bushing. Remove wiring loom from clips on rocker cover and remove washer mounting bracket, fan, spacer, pump pulley, and drive belts. On Power Booster Fan Cars, remove fan, and clutch assembly, drive pulley and belts. Raise car, remove front splash shields, transmission linkage splash shields, road draft tube and loosen generator adjusting bracket and push generator against block. Remove exhaust pipe (muffler to manifold). Remove starter and seal, flywheel housing cover and disconnect clutch linkage and slide bracket and two-piece socket from release equalizer bar assembly. On Auto. Trans. Cars, remove converter housing access cover, converter to flywheel nuts, lower housing to block screws and oil transfer line bracket. Remove lower flywheel housing-to-block screws, engine insulator to frame nuts. On Power Steering Cars, remove pump reservoir (drain lines) and secure to fender. Lower car and place a jack under transmission. On Auto. Trans. Cars, remove converter or flywheel housing to block screws. Raise engine and remove from chassis. *CAUTION - DO NOT let torque converter move forward with engine.*

1954-55 LINCOLN MODELS

ENGINE REMOVAL: Disconnect battery, remove hood, radiator, air cleaner, and blower motor assembly. Disconnect all hoses, fuel and vacuum lines, throttle and accelerator linkage and remove "Z" bar from dash. Raise car, drain engine and transmission oil, disconnect exhaust pipe at manifold and remove propeller shaft and throttle and manual control rods. Remove oil filter and engine mounts. Let engine rest on crossmember. Raise engine and remove detachable crossmember. Guide engine to right to clear oil pump and remove from chassis.

1956-57 LINCOLN & CONTINENTAL

ENGINE REMOVAL: Disconnect battery, drain cooling system and remove hood. Remove defroster blower motor and duct assembly. Remove air cleaner and duct as an assembly. Disconnect fuel and vacuum lines and remove hoses, fan, pump pulley and belts. Disconnect all wires, tachometer drive cable and remove power steering pump (wire pipe to hood hinge). Remove carburetor control rod and shaft assembly (wire shaft and bracket to dash). Raise car, remove starter and disconnect exhaust pipes. Remove radiator splash shields, drain engine and remove oil filter, and throttle linkage splash pan. Remove converter cover housing-to-block screws. Remove converter cover and converter to flywheel bolts. Lower car and place jack under transmission. Remove radio speaker and converter housing-to-block screws (through access holes in dash panel). Remove front engine support capscrews. Raise and push engine forward to clear dash and guide engine out of chassis.

1958-60 LINCOLN CONTINENTAL

ENGINE REMOVAL: Remove battery, carrier and bracket. Drain cooling system and remove hood. Disconnect fuel and vacuum lines, hoses, and all electrical wires. Disconnect accelerator control shaft assembly and bracket and remove air cleaner and radiator (on Air Cond. Cars, it will be necessary to first disconnect condenser-receiver assembly, high and low pressure lines at fittings, and remove condenser-receiver, compressor and lines). Release wiring harness from clips. Raise car, drain transmission and replace tube. Remove propeller shaft. Disconnect brake equalizer from lever and remove lever and speedometer cable assembly. Remove rear engine support (necessary to remove rebound insulator to support plate nut, raise transmission with jack and turn support 90° to remove it). Remove linkage splash shield and road draft tube. Disconnect manual shift rod, exhaust crossover pipe and exhaust pipes. Remove front engine supports and lower car. Remove radiator grille, braces, hook hinges and radiator-fender apron supports. Disconnect wiring harness at radiator-fender apron support and remove grille assembly. Disconnect power steering lines and support them to prevent fluid loss. Raise engine with transmission and guide it out of chassis.

1954-56 FORD TRUCKS

ENGINE REMOVAL: Remove hood, fan shroud and bracket assembly, radiator, fan and belts. Disconnect wires, hoses, fuel lines, choke control cable, hand throttle, accelerator rod and spring. Remove air cleaner and tape carburetor opening closed. Disconnect exhaust pipe. Remove clutch return spring and transmission-to-flywheel housing bolts. Support transmission on jack and remove engine. *See additional items required for "Parcel Delivery", "Cab Over Engine" and "Fordomatic" equipped models.*

Parcel Delivery - On 1954 models, remove engine compartment rear cover and latch open front cover. Use lifting bracket with arm of crane through door, and support weight of engine. Remove engine support nuts and remove transmission to flywheel housing bolts. Support transmission on jack and move engine forward to clear transmission main shaft and maneuver it through door. On 1955-56 models, remove drivers seat and support. Remove clutch pedal plate, brake pedal pad, and remove pedal opening plate and slide it over pedal rod. Remove dimmer switch and drop it through floor. Disconnect accelerator pedal. Remove left floor plate. Remove master cylinder inspection cover, center plate nuts and bolts and loosen crossmember reinforcing plate from wheel housing. Remove center plate, then remove one reinforcing plate-to-crossmember bolt at end of body crossmember. Remove engine cover and base plate assembly. On Fordomatic equipped trucks, disconnect selector rods and remove emergency brake cable hold-down bracket. Pull emergency brake cable out of way and remove speedometer cable. Remove propeller shaft. Use portable crane with arm through door and maneuver engine out through door.

Cab Over Engine - Remove floor pan over engine, and remove dash panel. Remove filter lines. Remove one front wheel. Remove radiator grille assembly and radiator support with radiator. Remove engine front support bolts. On V8 engines, remove generator, carburetor, and filler pipe and fuel pump. Use portable crane to support weight of engine and remove transmission to flywheel housing bolts. On 6 Cyl. engine,

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proceed same as for V8 except it is unnecessary to remove generator, carburetor, filler pipe and fuel pump.

1957-60 FORD TRUCKS

ENGINE REMOVAL: Conventional Trucks & School Bus. *NOTE - For Courier & Ranchero, see Passenger Cars.* Remove hood, drain cooling system and crankcase. Remove air cleaner, fan, spacer, belt, radiator and shroud. Release air from reservoir and disconnect lines. Disconnect fuel and vacuum lines, all hoses, wires and choke control, then remove starter and dust seal, exhaust pipes and engine front insulator bolts. On Power Steering Trucks, disconnect lines at left frame sidemember, pump reservoir and pump housing. On Synchro-mesh and Overdrive Trucks, disconnect accelerator rod assembly, throttle control cable and clamp at governor (4-Bbl. Carb.). Remove clutch return spring (HD Eng.), flywheel housing inspection cover and housing bolts. On Auto. Trans. Trucks, disconnect accelerator rod at mounting bracket, transmission cover plate with accelerator assembly. Disconnect cooler lines. Support transmission on jack. Raise engine slightly and pull it from transmission.

Cab Forward Trucks: Same as Conventional Trucks except for releasing cab lock and tilting cab forward.

Parcel Delivery Trucks: *NOTE - Engine and transmission are removed as an assembly.* Drain cooling system and crankcase. Remove drivers seat, master cylinder inspection cover, steering column cover plate, left wheelhouse panel, and center floor plate. Disconnect accelerator linkage at pedal and all wires from headlight dimmer switch. Disconnect right side of engine rear cover from right wheelhouse panel, rear flange of engine rear cover from crossmember and center floor plate from bracket. Remove engine rear cover plate (wedge frame gussets open so plate will clear slots). Remove crossmember and air cleaner. Disconnect all wires, cable lines, and hoses from engine and transmission (remove radiator hoses, hand brake cable and bracket). Disconnect engine from front mounts and exhaust pipes at manifolds. Remove air cleaner stud. Disconnect engine rear support, front universal joint, transmission shift rods and clutch slave cylinder hose. Use a floor crane and remove engine and transmission assembly.

ENGINE MOUNTINGS

1954-56 MODELS (EXCEPT THUNDERBIRD)

ENGINE FRONT STEADY REST REMOVAL & INSTALLATION: Removal – On 8 cylinder engine, drain cooling system, remove radiator, fan, drive belts, and crankshaft damper. All engines, remove two clamp bolts at front of steady rest bracket. Remove spacer bolt that retains insulators in bracket. Remove three bolts (6 Cyl.), four bolts (8 Cyl.) that secure bracket to engine and remove bracket.

Installation – Install bracket on front engine cover, tighten bolts to 23-28 ft. lbs. torque. Install, but do not tighten insulators, spacer bolts, and clamp bolts. If necessary, center spacer bolt in frame bracket by shifting engine mounts in frame brackets. Tighten spacer bolts to 20-25 ft. lbs. torque. Make sure engine weight is not transferred to insulators, then tighten clamp bolts 25-30 ft. lbs. torque. On 8 Cylinder engines, install crankshaft damper, drive belts, and radiator.

1956 THUNDERBIRD

ENGINE STEADY REST REMOVAL, ASSEMBLY & ADJUSTMENT: Removal – Remove upper and lower bracket retaining bolts and remove steady rests as assemblies.

Assembly – Assemble bottom nut, washer, insulator and bracket on the upper end of rod. Install the top insulator washer, and nut on the upper end of rod. Assemble top washer, bushing, and bracket on lower end of rod. Install bottom washer, bushing, washer, and nut on lower end of rod.

Installation & Adjustment – Install assembly in car and tighten bracket bolts to 30-35 ft. lbs. torque. **Adjust insulators as follows:** Loosen lower rod and upper nuts on both steady rests. Let engine seek its own level position. Turn lower rod assembly nut, washer and insulator of each steady rest up against lower (chassis) support bracket. Tighten lower nut until overall dimension of insulator with retainer is 1.29-1.33". Turn lower nut, washer, and insulator at top of each rod assembly up against the engine support bracket, so dimension of lower retainer and insulator is 1.08", then turn upper nut, washer and insulator at top of rod assembly down against engine support bracket until dimension of this insulator is .77". Overall dimension of top portion of rod assembly should be 1.97-2.02".

1957 THUNDERBIRD

ENGINE FRONT SUPPORT: Removal - Remove insulator nut and bolt, and insulator. Remove insulator to bracket bolts and nuts. Jack up engine, remove insulator assembly and spacer.

Installation - Position spacer and insulator assembly and lower engine Install insulator bolt, lower insulator and nut Tighten nut to 85-95 ft. lbs. Install insulator assembly to bracket bolts, flat washer lockwasher and tighten nuts to 45-50 ft. lbs.

1957 THUNDERBIRD

ENGINE STEADY REST: Removal - Remove nut washer, and bushing from lower end of steady rest rod Remove upper bracket bolts, remove assembly from engine.

Disassembly - Remove lower bushing and washer; nut, washer and insulator and bracket from top of rod. Remove remaining insulator washer and nut from top of rod.

Assembly - Install bottom nut, washer insulator and bracket on upper end of rod. Install top insulator, washer, and nut on upper end of rod. Install top bushing and washer on lower end of rod.

Installation - Install assembly in car, tighten engine bracket bolts to 30-35 ft. lbs. Install bottom washers, bushing and nut on lower end of rod.

Adjustment - With both engine and frame brackets in place and tightened, loosen lower and upper nuts on both steady rests. Let engine seek its own level position, then turn lower nut, washer, and insulator (each side of engine) up against lower (chassis) support bracket, tighten lower nut until distance from washer to washer (at lower end) is 1.29-1.33". Turn lower nut, washer, and insulator (at upper end) up against engine support until distance from lower washer to bracket is 1.08" then turn upper nut, washer and insulator down against bracket until distance from upper washer to bracket is .77". Total distance, washer to washer, (at upper bracket) should be 1.97-2.02".

CYLINDER HEAD & MANIFOLD

TIGHTENING TORQUES: *S "Tightening Sp cifications" above.*

1954-55 FORD 6 CYL. MODELS

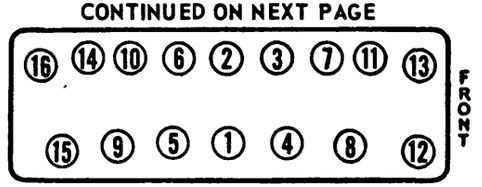
CYLINDER HEAD: *NOTE* - Guide studs can be made up by cutting head off a 7/16"-14 x 6" bolt, tapering end, and cutting a screwdriver slot so that it can be turned into cylinder block hole.

Installation: Coat NEW cylinder head gasket on both sides with special head gasket sealer No. 8A-19554, install gasket on block. Install the two end pushrods and install guide studs in two diagonally opposite end bolt holes. Lower the cylinder head over the guide studs and pushrods. *(CAUTION*–Slide head down carefully and guide pushrod through head). Coat threads of all cylinder head bolts lightly with water resistant sealer, install two bolts at opposite ends of head to hold head gasket in position, remove guide studs, install remaining head bolts. Tighten all head bolts evenly to 75 ft. lbs. torque in correct sequence (see Cylinder Head Diagram). Install all pushrods and assemble rocker arms (see Rocker Arm Data). Recheck cylinder head bolts after engine has reached normal operating temperature and again after 1000 miles of operation.

1956-57 FORD 6 CYL. MODELS

Installation - Apply coating of cylinder head gasket sealer to both sides of gasket, position gasket over guide studs, place cylinder head over guides and lower carefully. Coat threads of each bolt with small amount of water resistant sealer, install two bolts at opposite ends of head to hold gasket in place and remove guide studs. Install balance of bolts, tighten bolts in sequence as shown in diagram, as follows: Tighten to 50 ft. lbs. (Cold) in proper sequence, then 65 ft. lbs. (Cold) in proper sequence. Install pushrods in proper locations, position rocker arm assembly on head and install oil drain line, clip and retaining screw on No. 1 bracket. Make sure line enters shaft locating hole. Position oil feed line on No. 6 bracket, with lower end of line, "O" ring seal in oil supply counterbore, then install bolt. Tighten all retaining bolts to 45-55 ft. lbs. torque. Make preliminary (Cold) valve lash adjustment. Install manifolds, lines, and wires. Connect wiper hose, battery cable and fill cooling system Remove tape from air horn, connect choke wire start and run engine at 1200 RPM for approximately 30 minutes. Tighten cylinder head bolts in proper sequence to 75 ft. lbs. (Hot), recheck valve lash and engine idle as necessary.

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VERHEAD VALVE 6 CYLINDER HEAD

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1958-60 FORD 6 CYL. MODELS

Installati n - Apply a thin coating of cylinder head gasket sealer to both sides of new gasket, position gasket over guide studs, place cylinder head over guides and lower carefully. Coat threads of each bolt with small amount of water resistant sealer, install two bolts at opposite ends of head to hold gasket in place and remove guide studs. Install balance of bolts and tighten all bolts in sequence shown in diagram in three steps as follows: 1) Tighten all bolts in sequence to 55 ft. lbs. 2) Tighten all bolts in sequence to 65 ft. lbs. 3) Finally tighten all bolts in sequence to 75 ft. lbs. *CAUTION - After completing the three steps, DO NOT DISTURB cylind r head bolts.* Install rocker arm shaft assembly on head and oil outlet line, bracket and retaining screw on No. 1 support. *NOTE* - Oil line must enter shaft locating hole. Install new "O" ring seal on lower end of oil inlet line, position line of No. 6 support with "O" ring seal in oil supply counterbore then install bracket and support bolt. Tighten rocker arm bolts to specifications.

1954-60 V8 MODELS

►*CYLINDER HEAD TIGHTENING NOTE:* Use cylinder head wrench S-8663-A on all bolts except No. 10 on right hand head Use a 11/16" socket, 1 5/16" long, plus an SX-5 extension on right hand No. 10 bolt. On Fordomatic cars, force extension from top of manifold past oil level tube to get socket on bolt head

►*1954 LINCOLN & MERCURY SERVICE REPLACEMENT CYLINDER HEAD NOTE:* Cylinder Head Part Nos. EAD-6049-G (LINCOLN), B4A-6049-E (MERCURY) are adaptable to either 14 mm. or 18 mm spark plugs. Spark plug holes are drilled and tapped for 18 mm spark plugs and a special adapter Part No. B5A-6060-A (LINCOLN), B4A-6060-A (MERCURY), is provided so that 14 mm plugs may be used. Adapter can be installed by threading plug into adapter, then installing assembly in cylinder head and torquing to specifications which is sufficient to seal adapter in place.

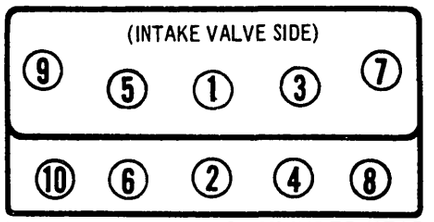
Installation - Apply a coating of cylinder head gasket sealer to both sides of gasket and place gasket over dowels with the words "Front" to front of engine, and "Top" up. Be sure that holes in gasket match holes in cylinder head. Tighten bolts in sequence shown in diagram, to specifications shown in table below. First two steps, with engine c ld, third and final step after engine has been operated to bring it to operating temperature. *F r R ck r Arm Installation, see Rocker Arms (b low).*

Cylinder Head Torque

Engin	Ft. Lbs.	1 Step	2 Step	3 Step
239,256,272,292,312"		55	65	ℂ75
332,341,352,361,371.5,383"		70	80	90
368" Plain Bolt		70	80	90
368" "FT" on Bolt Head		80	95	105
410,430"		85	95	105

ℂ - 85 ft. lbs. 292" Heavy Duty.

INTAKE MANIFOLD: (292,312") R m val - Drain cooling system and remove air cleaner Disconnect fuel line at carburetor and vacuum line at distributor and intake



OVERHEAD VALVE V8 CYLINDER HEAD

manifold Remove vacuum lines at vacuum pump and windshield wiper and remove assembly Disconnect throttle rod at shaft and bracket assembly and remove them from intake manifold Disconnect coil wires at coil heater inlet hose and vacuum control line at water control valve Disconnect upper radiator hose and bypass hose Remove manifold retaining bolts, nuts and four clamps and remove manifold, carburetor, and coil as an assembly

Installation - Use new gasket, place manifold on engine block aligning holes in gaskets with cylinder head tapped holes. Position manifold clamps, install retaining bolts and nuts and tighten to specifications (work from center to ends) Install throttle rod and shaft and bracket assembly to intake manifold

INTAKE MANIFOLD: (332,352,361") Removal - Drain cooling system and remove radiator supply tank Disconnect all linkage, cables, lines, wires, and hoses from intake manifold and units attached to manifold Disconnect crankcase ventilation tube from manifold Remove rocker arm covers Remove rocker arms and pushrods *(see 'Rocker Arms" below for special procedure)* Remove distributor Remove intake manifold (eye bolts with 5/16 - 18 threads may be installed in rocker arm cover screw holes at diagonal corners of manifold for lifting hook and sling attachment)

Installation: Coat seal surfaces of cylinder head and manifold with oil resistant sealer and position seals and gaskets on cylinder heads and block (gasket must rest on head gasket tabs) Position intake manifold (insert distributor temporarily) **and make sure seals are in place.** Tighten manifold attaching bolts to specifications, working from center of manifold Reverse removal procedure to complete installation *NOTE* - To prevent crossfire between No 7 and No 8 cylinders, position No 7 spark plug wire in first position (front of engine) in bracket on rocker arm cover Wire order should be 7, 5, 6, 8 from front of engine

INTAKE MANIFOLD (383,410,430") Removal - Drain radiator, remove battery ground, carburetor air cleaner, choke heat tube, heater hoses, temperature bulb wire, fuel line at pump bowl, vacuum line at distributor and high tension wires. Remove distributor cap and wires as an assembly. Loosen hose at intake manifold and disconnect upper hose at outlet connection. Remove wires from loom clip and coil, and hoses from manifold. Disconnect accelerator shaft spring and kickdown rod and transmission rod. Remove coil and bracket assembly, intake manifold screws, manifold and gasket.

Installation - Reverse removal procedure and note the following: Manifold gaskets are interchangeable and word "FRONT" must be toward front of engine. Spark plug wires for left bank must be properly located to prevent crossfire between No. 7 and No. 8 wires.

ORIGINAL BORE & PISTONS

ORIGINAL PRODUCTION ENGINE BORE & PISTON SIZES: Standard bore in eight grades (covers range shown in table below) with .0003" range in each grade. Standard pistons in three grades (Red, Blue and .003" O.S.) with .0006" range in each grade.

Engine	Bore Range	Piston Rang
223"	3.6250-3.6274"	3.6236-3.6266"
292"	3.7500-3.7524"	3.7486-3.7516"
332,352"	4.0000-4.0024"	3.9983-4.0013"
430"	4.3000-4.3024"	4.2983-4.3013"
361"	4.0500-4.0524"	4.0483-4.0513"

PISTONS

ALL ENGINES

FITTING PISTONS: To check piston fit in cylinder and to determine clearance between piston and cylinder walls, position a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *NOTE - Feeler must extend entire length of piston.* Pull feeler from cylinder and note reading on Piston Pull Scale, Tool FLM-6110-A. Refer to table below for clearance indicated.

Lbs. Pull	Clearance (Using following ½" wide feelers) .002" Feeler	.0025" Feeler	.003" Feeler	.004" Feeler	.0045" Feeler
0	.0025"	003"	.0035"	.0045"	005"
1	.0023"	.0028"	.0033"	.0043"	0048"
2	002"	.0026"	.0031"	0041"	.0046"
3	.0018"	.0023"	.0028"	0039"	.0044"
4	.0015"	.0021"	.0026"	.0037"	.0043"
5	.0013"	.0018"	.0024"	.0035"	0041"
6	.001"	.0016"	.0022"	.0033"	0038"
7	.0007"	.0014"	.0019"	.0031"	.0037"
8		.0012"	.0017"	.0029"	.0035"
9		0008"	0014"	.0027"	.0033"
10			.0013"	.0025"	.0031"
11			001"	.0023"	.0028"
12			.0008"	.0021"	
13				.0019"	
14				0017"	

PISTON PINS

(383,410,430" ENGINE)

REMOVAL: Press or pull pin out of piston and connecting rod assembly with Piston Pin Remover and Replacer Set, Tool 6135-F, using arbor press or vise and wrench as shown in illustration.

INSTALLATION: Press or pull pin into piston and connecting rod with Tool 6135-F and an arbor press or vise and wrench as shown in illustration. Pin must be ¼" beyond face of piston boss. Then check pin fit by installing all parts of Tool 6135-F for vise installation and place in vise. Turn nut with a torque wrench until pilot (Part No. 2 of tool) bottoms in anvil (Part No. 1 of tool). Minimum torque required to seat pilot is 20 ft. lbs. If less torque required, replace connecting rod.

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CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

►*1956 CRANKSHAFT & CRANKSHAFT FRONT OIL SLINGER PRODUCTION CHANGE (To improve seals):* New crankshafts with integral rear oil slingers are used in production on 6 and V8 engines. A Front Oil Slinger, Ford No. B6A-6310-A (6 Cyl. Engine), No. B6A-6310-B (All V8 Engines) can be installed to improve crankshaft front oil seal operation. *6 CYL. ENGINE CAUTION* - New Cylinder Front Cover, Ford No. B6A-6019-A must be used when this front oil slinger is installed.

►*INSTALLATION OF CRANKSHAFT WITH INTEGRAL REAR OIL SLINGER & USE OF FRONT OIL SLINGER ON 1954-56 ENGINES:* New type crankshaft with integral rear oil slinger and separate front oil slinger can be installed on previous engine models as follows:

1954-56 6 Cyl. "223" Engine – Crankshaft No. B6A-6303-E, Front Oil Slinger No. B6A-6310-A. *NOTE* - New Cylinder Front Cover No. B6A-6019-A must be used with this front slinger.

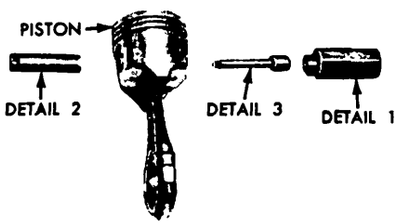
1954-55 V8 "239" & "256" Truck Engines – Crankshaft Front Oil Slinger No. B6A-6310-B.

1955-56 V8 "272", "292", & "312" Engines – Crankshaft No. B6A-6303-D (272 & 292 Engines), No. B6A-6303-C (312 Engine), Front Oil Slinger No. B6A-6310-B.

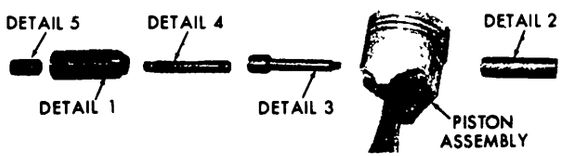
1956 368" Engine - Crankshaft No. ECU-6303-B, Front Oil Slinger No. B6Q-6310-B, Cylinder Front Cover No. B6Q-6059-C. *NOTE* - New Front Cylinder Cover must be used with front oil slinger.

1954-55 317.5", 341" Engines - Front Oil Slinger B6Q-6310-B and Cylinder Front Cover No. B6Q-6059-C. *NOTE* - Both these parts must be used together.

►*1958-60 383" and 430" ENGINE MAIN BEARING BOLT SERVICE REPLACEMENT NOTE:* To prevent loss of torque on main bearing bolts, install bolts, Part No. 374237-S. These new bolts have a 13/16" head (across flats), replacing bolts having 3/4" head. It is recommended that at any time main bearing bolts are removed later type bolts should be installed



PIN REMOVAL (IN ARBOR PRESS)



PIN REMOVAL (IN VISE)

ALL ENGINES

CRANKSHAFT THRUST BEARING ALIGNMENT: Install No 1, 2 & 4 main bearing caps and torque to specifications. Install No. 3 main bearing cap with bolts finger tight. Pry crankshaft forward against upper half of No. 3 main bearing, pry No. 3 main bearing cap to rear to align thrust surfaces of both halves, and tighten bolts, while holding shaft forward and cap to rear, to torque specifications. Check crankshaft end play.

1954-60 6 CYL. MODELS

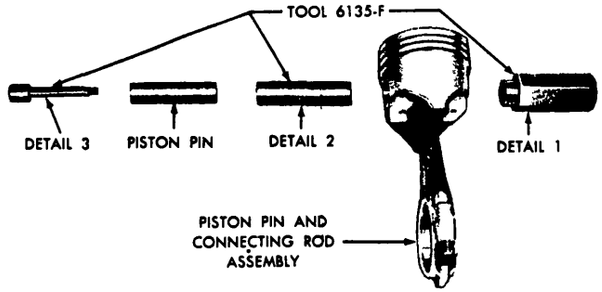
REAR MAIN BEARING OIL SEALS: *NOTE*–Crankshaft seal is installed in groove in block and in seal retainer (directly behind rear main bearing).

Seal Installation: With crankshaft out, install new journal oil seal in cylinder block (Tool T52L-6701-AGD). Cylinder block journal seal and retaining cap journal seal must be cut flush without any frayed edges overlapping. Install a new journal oil seal in oil seal retainer cap (Tool T52L-6701-AGD). Install new retainer cap-to-cylinder block seals. Install main bearing caps and inserts. Lubricate seals with grease to reduce friction, then install retainer in cylinder block.

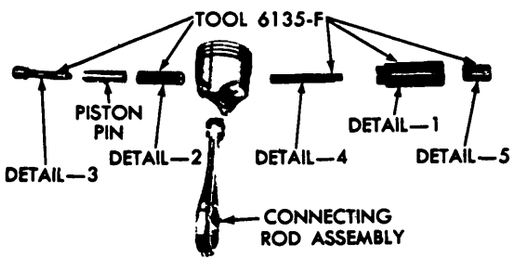
Testing Seal Installation: Check retainer-to-cylinder block seal for leaks. Squirt a few drops of oil into seal corners on outside of cylinder block. Blow compressed air into seal corners from inside block. If air bubbles appear in oil, remove seal retainer. Be sure all mating surfaces are clean. Install new seals and repeat air test.

1954-60 V8 MODELS

►*OVERSIZE REAR MAIN BEARING SEAL NOTE:* When rear main bearing seal does not compress firmly when forced into block and cap (cause of oil leak) install an oversize seal, Part No. B6Q-6336-A. released for service. DO NOT USE oversize seal unless inspection shows that standard seal does not seal opening properly.



PIN INSTALLATION (IN ARBOR PRESS)



PIN INSTALLATION (IN VISE)

REAR MAIN BEARING OIL SEALS: *NOTE* - Crankshaft seal is installed in groove in block and in seal retainer (directly behind rear main bearing) or in rear main bearing cap. Retainer or cap is sealed in block by special sealing strips inserted in grooves in sides of retainer or cap.

Seal Installation: With crankshaft out, install new oil seal in block with special tool to drive it in place (see table below). Cut surplus seal flush with parting surface. Repeat operation on bearing cap or retainer. Use Tool 6335 or 6336-A1 to hold side seals in place while installing retainer. On later cars without seal retainer, dip seals in engine oil and quickly install them. *NOTE - It may be necessary to drive them in place the last ½" of travel.* DO NOT use sealer on side seals. They will expand when in contact with engine oil.

Testing Seal Installation: Same as for 6 Cyl. above.

Rear Main Bearing Seal Tool Tabl

Crankshaft Diam.	Tool N.
2.4980-2.4986"	T52L-6701-AGD
2.6235-2.6243"	6701-A
2.7484-2.7492"	6701C or T58P-6701-A
2.8994-2.9002"	6701-B

ENGINE FRONT COVER

►*1958-59 332" & 361" ENGINE NOISE CORRECTION:* If a high frequency squealing noise or whine at low or idle speeds is encountered, determine if the noise is emanating from engine front cover by operating engine and prying against front cover with a large screwdriver. If this eliminates the noise, correct as follows: Use a rocker arm cover stud seal, Part No. B9A-6570-A, and a flat washer (.45" I.D. x 1" O.D.), Part No. UP-354149-S8 sandwiched together (washer installed over boss on seal). Install this assembly between cylinder block front cover and water pump backing plate, positioning it in the resonating area or in line with camshaft thrust button contact area. If necessary use a thicker washer so the assembly is wedged in position.

6 CYL. PASS. & TRUCK MODELS

ENGINE FRONT COVER: Removal - Remove radiator, crankshaft damper, two front oil pan screws, and loosen remaining pan screws. On 1958 and later models disconnect heater hose and generator arm from front cover and remove water pump. All models, remove cover to block screws and remove cover.

Installation - Reverse removal procedure, using new gasket properly coated with sealer.

Front Cover Oil Seal: Drive out old seal with pin punch. Coat new seal with grease and use Tool T52L-6700-BEE to locate it properly. *NOTE* - Seal must be seated in recess and spring must be located on outside of seal.

V8 PASS. & TRUCK MODELS

ENGINE FRONT COVER: Removal - Remove radiator, drive belts, fan and pulley assembly, crankshaft damper (use Tool 6306-AG). Release and move generator mounting bracket out of way. Disconnect Power Steering pump and secure it out of way. Remove fuel and

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vacuum lines from fuel pump and remove fuel pump and pushrod. On Air Conditioned Cars, move condenser brackets out of way but DO NOT disconnect lines. On Thunderbird, remove engine front support. On Trucks, it is necessary to support front of engine, remove insulator bolts, raise engine remove support bracket. On P-Series Trucks, remove grille, head and parking lights, wind deflector and weather strip as an assembly. On all Models, remove front cover-to-block and oil pan screws and remove water pump and front cover as an assembly.

Installati n - Reverse removal procedure and note the following: Place slinger on crankshaft with cup side to rear when facing engine. Use sealer on new gasket and install cover with gasket on engine but do not tighten screws. Place proper alignment tool over crankshaft (see table below). Hold tool inward while tightening cover screws to specifications.

Fr nt C ver Aligning Tool Nos.

Engine	Tool No.
239,256"	T52L-6059-AAE
272,292,312"	T52L-6059-AEE
332,352,361,410"	T58P-6019-A or 6059-C
317.5, 341"	6059
383, 430"	6059-A, 6059-B
368"	6059-A

CAMSHAFT & BEARINGS

►*1958 CAMSHAFT KNOCK OR WHINE CORRECTION (Early 332 & 352 Engine):* Install Service Kit B8A-6275-A consisting of a Thrust Button, Thrust Button spring, Thrust Button spring retainer clip, 7/16-14 bolt, and flat washer. Rework early cover by removing button retainer with chisel and polishing burrs off of button contact surface. New type cover Part No. B8A-6019-B requires use of new type button and spring.

1956-57 6 CYL. MODELS

CAMSHAFT REMOVAL: Remove air cleaner, tape air horn closed, remove distributor cap. Disconnect high tension wire from coil and spark plug wires, remove fuel pump. Disconnect primary coil wire from engine clip and remove pushrod cover. Remove rocker arm assemblies, pushrods (in sequence), radiator support bar, radiator, and grille assembly. Remove fan belt, vibration dampener, oil pan to cylinder block two front bolts, engine front cover. Turn crankshaft until timing marks on sprockets are 12 link pins apart on drive side, and remove camshaft sprocket bolt. Mark distributor housing and cylinder block for position of rotor and housing reinstallation, and remove distributor. Remove sprockets and timing chain woodruff key camshaft thrust washer. Turn camshaft and raise lifters off lobes and secure with clips. Draw camshaft out carefully so as not to damage bearings.

1958-60 6 CYL. MODELS

CAMSHAFT REMOVAL: Remove cylinder front cover (see above). Remove dipstick, ventilation tube, stabilizer bar, flywheel housing inspection cover and oil pan. Remove air cleaner (tape carburetor air horn closed). Remove valve rocker arm cover, rocker arm shaft assembly then remove pushrods in sequence. Disconnect primary and high tension wire at coil, vacuum line and primary wire at distributor, spark plug wires at plugs and remove distributor cap with high tension wires as an assembly. Remove ignition wires from clip on valve pushrod cover and remove cover then remove fuel pump. Remove crankshaft front oil slinger, turn engine until timing marks on sprockets are 12 pins apart on drive side of chain. Remove camshaft sprocket retaining bolt and washer, scribe line on distributor housing and cylinder block to mark position of rotor and distributor housing for reinstallation, then remove distributor. Remove sprockets and timing chain, woodruff key and camshaft thrust washer. Turn camshaft until tappets can be lifted up with a magnet or fingers and hold them clear of camshaft lobes with clothes pins or clips. Carefully remove camshaft from front of engine.

1956-60 V8 MODELS (272,292,312,368")

CAMSHAFT REMOVAL: Drain cooling system and crankcase, remove air cleaner, intake manifold, carburetor, and coil as an assembly. Remove radiator, fuel pump, drive belts, fan, spacer, pulley, crankshaft dampener, cylinder front cover, stabilizer bar, and oil pan. Turn engine so timing marks on sprockets are 12 pins apart on timing chain. Remove distributor cap, scribe line on distributor housing and cylinder block to mark position of rotor and distributor housing for reinstallation, then remove distributor. Remove timing chain and sprockets, camshaft thrust washer, and woodruff key. Remove rocker arm covers and gaskets then back off valve tappet adjusting screws ¼ turn and remove rocker arm shaft assemblies. Remove valve pushrods in sequence and remove valve pushrod chamber cover. Turn camshaft until lifters can be lifted with magnet or fingers to clear camshaft lobes and secure them with clothes pins or clips. Carefully remove camshaft.

1958-60 V8 MODELS (332,352,361,383,410,430")

CAMSHAFT REMOVAL: 1) Remove engine front cover, see "Engine Front Cover Removal", then remove oil slinger from crankshaft.

2) Turn crankshaft to bring timing marks on sprockets adjacent and in line across shaft centers and remove fuel pump eccentric to camshaft screws, sprockets and timing chain.

3) Remove intake manifold, see "Intake Manifold Removal" then remove rocker arm covers, rocker arm assemblies, (loosen screws alternately to relieve spring tension), then remove pushrods (keep pushrods separate for reinstallation).

4) Remove distributor carefully from block and valve pushrod chamber cover. Remove pushrod cover (lift up at front then pull forward and up).

5) Remove hydraulic lifters (keep lifters in order for reinstallation) and withdraw camshaft, being careful not to damage bearing surfaces.

TIMING CHAIN

►*1958 CHAIN NOISE CORRECTION (332, 352 Eng.):* Caused by inadequate lubrication, misaligned camshaft gear locating pin or loose timing gear and fuel pump eccentric. Correct inadequate lubrication by installing Oil Gallery Plug (Jiggle Pin type) Part No. B8A-6026-A. Correct misalignment by relocating pin so gear has no runout and retention bolt head is square against fuel pump eccentric. Correct loose gear by tapping out retaining bolt hole in camshaft with bottoming tap (7/16"-14) to add three additional threads, then install longer bolt (370301-S8) and tighten to specifications.

VALVE SYSTEM

1954-60 6 CYL. & V8 MODELS

►*1959 332", 352", 361" ENGINE INTAKE & EXHAUST VALVE REPLACEMENT CAUTION:* On engines using cylinder heads identified with the number B8AE-6090-B stamped in ¼" letters on end faces of head, intake and exhaust valves are .032" shorter than valves previously used. On engines identified as above, use only exhaust valves, Part No. COAE-6505-A,B,C,D, and intake valves, Part No. COAE-6507-E,F,G,H.

ALL ENGINES

ROTATABLE VALVES: Valves operate directly in valve guide holes in cylinder head. Remove and install as follows:

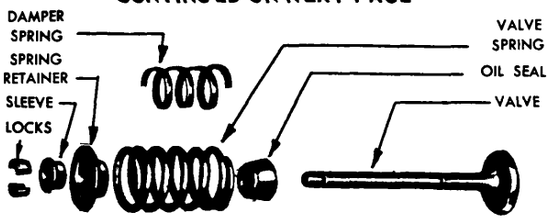
Valve Removal: Use Tool 6513-EE to compress valve springs. Remove all parts of assembly.

Valve Installation: Lubricate valve guides and stems with engine oil. Apply Lubriplate to valve stem tip. Install all parts in same order as removed, making sure closed coil end of valve spring is toward cylinder head and damper spring, if used, is not caught in valve spring.

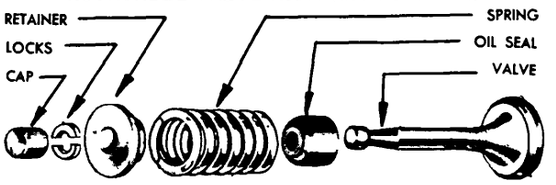
V8 TRUCK EXHAUST VALVES (H.D. ENGINE)

FREE TURNING VALVE CAP CLEARANCE CHECK: Clearance between end of valve stem and inside surface of cap with valve locks and spring retainer installed should be .0002-.004" measured with Tool 6513-CE-2. Lap open end of cap if clearance more than .004".

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ROTATABLE VALVE ASSY. (WITH DAMPER)



FREE-TURNING VALVE ASSY.

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EXHAUST VALVE SEAT INSERT INSTALLATION: Counterbore the recess in head about .001-.002" below old counterbore depth to clean recess. Clean all chips and oil from recess. Chill new oversize insert and tool in dry ice for ½ hour. Place insert on tool with small radius on outer edge facing outward, pilot tool in guide and drive insert into recess until fully seated. DO NOT peen around insert. Reface insert. *CAUTION - Installation must be made quickly after tool and insert removed from dry ice.*

1954-56 6 CYL. & V8 ENGINES (EXC. 272" ECR HVY. DTY.)

►*EXHAUST VALVE STEM DIAMETER CHANGE FOR INCREASED STEM CLEARANCE (Overhead Valve Eng.):* Exhaust valve stem diameter decreased .0005" for increased stem to guide clearance. New Valve sizes are as follows:

Exhaust Valves

Size	Stem Diameter
Std. (Red)	.3400 - .3405"
Std. (Green)	.3405 - .3410"
.003" (Oversize)	.3430 - .3440"
.015" (Oversize)	.3555 - .3560"
.030" (Oversize)	.3700 - .3710"

1954-60 6 CYL. & V8 MODELS

VALVE STEM CLEARANCE CHECK: Install clearance checking tool (see Note below) on valve stem until seated. Tighten knurled setscrew firmly and let valve fall away until tool contacts upper surface of valve guide. Place dial indicator with flat tip against center part of tool spherical section at 90° to valve stem. Move tool on an axis at right angle to rocker shaft. Divide dial indicator reading by 2 (extension factor of tool) to give valve stem clearance. If clearance excessive, ream guides and install valves with oversize stems.

►*VALVE STEM CLEARANCE TOOL NOTE:* Use clearance Tool S-8680-B (6 Cyl. & Y V8 Engines), S-8680-A or 6505-F (All Other Engines).

OVERSIZE VALVE STEM INSTALLATION: Use special reamer (see Tool Table below) to ream cylinder head valve guides for oversize valve stems. Reamers are furnished in .003", .015", .030" Oversize, with standard .003", and .015" pilots respectively. Use reamers in sequence when reaming from standard to oversize. Regrind valve seats and reface valves after reaming guides.

Reamer Tool No.	Nominal Stem Diam.
6085 or T52L-6085-AEE	.3400"
6085-H or T58P-6085-B	.3700"
T56T-6085-B	.4600"

1954-56 MODELS (EXC. CARS WITH HYDRAULIC LIFTERS)

►*INSTALLATION OF SELF-LOCKING TAPPET ADJUSTING SCREWS IN EARLIER ENGINES (1954-56):* When installing self-locking screws to replace earlier type (with locknut), all parts listed below must be installed as a unit:

1956 Engines – Self-locking Tappet Adjusting Screws Part No. B6A-6549-C AND Valve Rocker Arms Part No. B6A-6564-C.

1954-55 Engines – Self-locking Tappet Adjusting Screws Part No. B6A-6549-C must be used with NEW Valve Rocker Arms Part No. B6A-6564-D and NEW Valve Push Rods Part No. B6A-6565-B.

VALVE TAPPET ADJUSTMENT

6 CYL. & V8 239, 256, 272, 292, 312" ENGINES

INITIAL VALVE LASH ADJUSTMENT (After Overhaul): Check rocker arm adjusting screw for proper setting. Torque required to turn screw after interference noted must be 3 ft. lbs. minimum. Replace adjusting screw or rocker arm if necessary.

6 Cylinder - Adjust intake and exhaust valves of each cylinder in firing order (1-5-3-6-2-4) with piston at TDC of compression stroke.

239,256,272,292,312" V8 - 1) Place No. 1 piston at TDC of compression stroke. Adjust the following valve clearances: No. 1,4,5 Exhaust; No. 1,2,7 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at TDC) and adjust following valves: No. 6 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valves: No. 2, 3, 7 Exhaust; No. 3, 6, 8 Intake.

All Engines - *Make final clearance check, see TUNE-UP on Car or Truck Model Pages.*

332 & 352" ENGINES

INITIAL VALVE LASH ADJUSTMENT (After Overhaul): Check rocker arm adjusting screw for proper setting. Torque required to turn screw after interference felt must be 3 ft. lbs. minimum. Replace adjusting screw or rocker arm if necessary. Chalk mark vibration damper at approximately 90° intervals starting with TDC (4 quarters). Proceed as follows:

1) With No. 1 piston at TDC of compression stroke, adjust following valve clearances: No. 1,4,5 Exhaust, No. 1,7,8 Intake.

2)Rotate crankshaft 180° (No. 4 piston at TDC) and adjust following valve clearances: No. 2, 6 Exhaust, No. 4, 5 Intake.

3) Rotate crankshaft 270° or 3/4 turn from 180° (No. 3 piston on TDC) and adjust following valve clearances: No. 3,7,8 Exhaust, No. 2,3,6 Intake.

HYDRAULIC LIFTERS

1954-60 MODELS

HYDRAULIC VALVE LIFTERS: Lifters are "barrel" type integral units with a flat, disc type check valve.

►*CAUTION:* Observe the following cautions when servicing hydraulic lifters: 1) Lifters must be installed in bores from which they were removed. 2) DO NOT intermix parts of one lifter with parts of any other lifter. 3) Absolute cleanliness must be observed to keep lifters free of lint, dust, or other foreign material.

Removal: Remove rocker arm covers, rocker arm assemblies, pushrods, intake manifold, and pushrod cover (on some models it is necessary to remove distributor to remove pushrod cover). Remove lifters from bores in block.

Disassembly: Immerse all lifters in solvent to remove all varnish and carbon deposits. DO NOT CUT OR SCRAPE CARBON FROM LIFTER. Remove lock ring from top of assembly and remove pushrod seat, plunger, valve disc assembly and spring from body. *CAUTION - Disassemble one lifter at a time to avoid intermixing parts.*

Reassembly: Place plunger upside down, insert disc valve in position over hole in bottom of plunger, add spring on top of disc, then position valve spring retainer over disc and spring and push retainer into place on plunger. Place plunger spring and plunger (open end up) into lifter body and install lock ring.

Testing: Use Lifter Tester Tool 6500-E. Place lifter with plunger facing upward in tester, add fluid to bring level above lifter. *CAUTION–DO NOT USE KEROSENE.* Place a 5/16" steel ball in plunger cup and adjust length of ram so pointer is in line with starting line when ram just contacts lifter plunger. Work lifter up and down to fill lifter, then repeat until all air bubbles are removed. Measure time required for weight and ram to move pointer from starting line to stop mark. A lifter is satisfactory when time required is a minimum of 8 seconds or maximum of 45 seconds. *NOTE* - Drain lifter before installation as a dry lifter will fill quicker when engine started. Do not run engine faster than fast idle speed until lifters are completely filled.

1954-57 V8 MODELS

INITIAL VALVE CLEARANCE ADJUSTMENT: To insure valve being on the low side of cam, make all adjustments in the following sequence, and with No. 1 & No. 6 pistons in the indicated position.

No. 1 Piston at TDC (Compression Stroke) - Adjust No. 1 In. & Ex., No. 2 In. & Ex., No. 5 In. & Ex., No. 7 In., No. 4 Ex.

No. 6 Piston at TDC (Compression Stroke) - Adjust No. 6 In. & Ex., No. 3 In. & Ex., No. 7 Ex., No. 8 In. & Ex., No. 4 In.

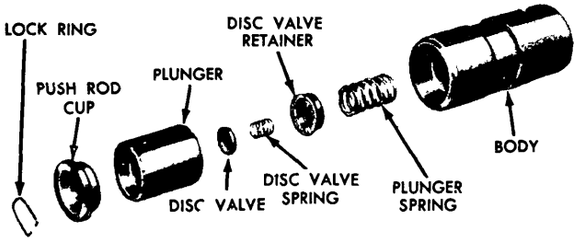
Adjustment - Turn valve adjusting screw clockwise while moving pushrod up and down until all slack is removed. *CAUTION - Plunger unit of hydraulic lifter should not be forced down into body during this operation.* With all slack removed, turn adjusting screw an additional 2½ turns. Hold adjusting screw, tighten locknut to 30-35 ft. lbs. *NOTE* - If lifter is noisy in

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operation, adjustment can be varied by turning adjusting screw ±¼ turn from original 2½ turn setting. Repeat operation on all valves.

Later Models - Self-locking adjusting screws used with a tension of 7-15 ft. lbs. Replace rocker arm when tension reduced to 3 ft. lbs. Turn adjusting screw clockwise and proceed the same as for early models.



V8 ENGINE HYDRAULIC VALVE LIFTER

1958-60 V8 MODELS

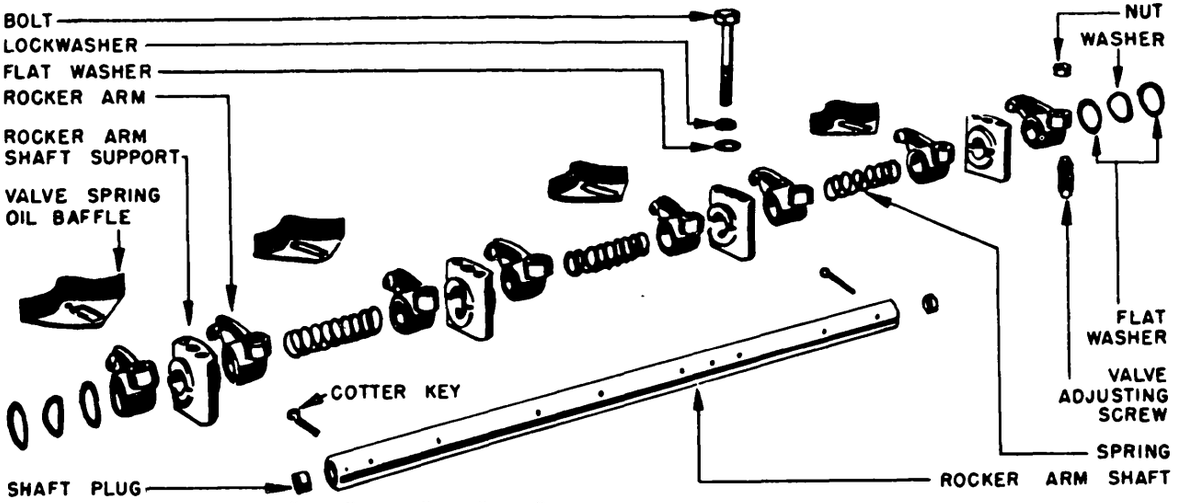
Hydraulic Lifter Operating Range: Clearances shown in table below are for yearly models as specified. Check clearance, by inserting correct thickness feeler gauge between valve stem and rocker, as follows:

1) Rotate engine to TDC on No. 1 cylinder on compression stroke. Insert the **minimum clearance** thickness feeler gauge, after bleeding down hydraulic lifter on No. 1, 4, 5, 8 exhausts and No. 1, 3, 7 and 8 intakes. When this gauge enters, old pushrod can be used. If this gauge will not enter, install shorter pushrod. If the **maximum clearance** thickness gauge will enter it indicates **A)** A pushrod that is too short, **B)** Excessive wear or poor machining of valve stem, **C)** Camshaft lobe worn below specifications.

2) Rotate engine to TDC on No. 6 cylinder, compression stroke. Check clearance after bleeding down hydraulic lifter in No. 2,3,6,7 exhausts, and No. 2,4,5 and 6 intakes. Follow procedure given in step No. 1.

►*MAXIMUM CLEARANCE NOTE:* Replace all parts found worn or defective in items "B" & "C". If all parts checked are OK, install a longer pushrod.

Model	Operating Range Limits
Edsel (1958)	.062-.1875"
Edsel (1959-60)	.078-.218"
Ford (1958-59)	.062-.1875"
Ford (1960)	.078-.218"
Lincoln (1958)	.062-.1875"
Lincoln (1959-60)	.078-.218"
Mercury (1958-60)	.078-.218"



V8 239", 256", 317.5", 341", 368" ENGINE ROCKER ARM ASSEMBLY

ROCKER ARMS

1954-60 6 CYL. MODELS

ROCKER ARMS: Removal - Remove rocker arm cover, capscrew and bracket from No. 6 rocker arm support, pull inlet line out of support, then pull it out of block with pliers, being careful not to damage line. Remove capscrew from No. 1 rocker arm support, remove oil outlet line and bracket. Loosen all rocker arm adjusting screws to remove valve spring load then remove rocker arm shaft assembly.

Disassembly - Remove cotter pins from each end of rocker arm shaft, remove flat washers and spring washers, slide rocker arms, springs, and supports off shaft. Mark parts for reinstallation. *NOTE* - If necessary to remove plugs from shaft, drill or pierce one end, drive out opposite end with steel rod then drive out pierced plug.

Reassembly - Oil all parts with engine oil. Replace end plugs with blunt tool (cup side out). Install flat washer, spring washer, another flat washer and a cotter pin on one end of shaft then install rocker arms, supports, and springs (see diagram). *NOTE* - Be sure oil holes in shaft are facing downward. Install remaining flat washers with spring washer between them and install cotter pin.

1954-60 V8 MODELS

ROCKER ARMS: Removal - Mechanical Lifters - Remove rocker arm cover, then back off adjusting screws to release spring tension then remove rocker arm assembly.

Hydraulic Lifters - Crank engine to bring No. 1 piston at TDC on compression stroke. Rotate crankshaft dampener an additional 45° (Symbol XX on dampener). Start at No. 4 cylinder and loosen right valve rocker arm shaft support bolts in sequence two turns at a time (start with No. 5 cylinder on left rocker arm shaft support bolts) then remove rocker arm shaft assembly and oil baffle plate

Disassembly – Remove cotter pin from each end of rocker shaft, remove flat washers and spring washers, slide rocker arms, springs and brackets off shaft. *NOTE* - Oil tubes must go in same bracket from which they were removed. Identify parts for correct reassembly. Remove plugs from each end of shaft. *NOTE* - Plugs are interference fit. To remove, drill or pierce plug at one end, then force out other plug with steel rod, then force out first plug.

Reassembly – Oil all parts with engine oil. Drive new plugs in each end of shaft with cup side out, using a blunt tool. Install a flat washer, spring washer, another flat washer, and a cotter pin on end of shaft. Install rocker arms, support brackets, and springs in order shown in diagram. *NOTE* - Oil holes in shaft must face downward. Complete assembly by installing remaining washers with spring washer between them and install cotter key.

►*SPARK PLUG FOULING & EXH. SMOKING CORRECTION (383", 430" ENGINES): Caused by rocker arm shaft* hold-down bolt holes drilled through cylinder head allowing oil to seep into intake chamber. Check by removing rocker arm assemblies, holding carburetor primary throttle and choke plates open and applying air pressure to holes. If air escapes from carburetor throat, holes are drilled through head. Correct by installing new studs to replace bolts. Use long studs, Part No. 371972-S, for oil feed and return holes; short studs, Part No. 371971-S, for other holes.

►*1958 ROCKER SHAFT INSTALLATION (332, 352):* Install shaft with oil feed hole down (toward cylinder head), to insure proper lubrication of rocker arms and adjusting screws.

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►*1958 ROCKER LUBRICATION CORRECTION (332, 352, with Rocker Arm Adjusting Screws)*: Position of oil groove must match hole in Rocker Arm Shaft and groove must be 1/32" wide and .003-.004" deep. Correct position of groove in old lifter or replace with lifter that has proper groove, in correct position. Groove should run from 10 O'clock position around 180° counterclockwise when rocker arm in held with adjusting screw to left side. Groove must be over lubrication hole in bottom or rocker arm shaft.

►*1954-55 ROCKER ARM COVER & GASKET PRODUCTION CHANGE & INSTALLATION CAUTION:* New rocker arm cover (B5A-6582-A) and cover gasket (B5A-6584-A) are now available for service. New gasket has greater resistance to shrinkage than those previously used. New cover does not have inner retaining flange for gasket. New type rocker arm cover to be used on 1954 "239" and "256" Engines. Gasket can be used on 1954-55 "239" and "256" Engines. To install new gaskets (.040" thicker than old type) on 1954 "239" and "256" Engines with old type gasket, replace studs with new longer studs (ED-354052-S) to compensate for increased gasket thickness. If new studs not available, old studs (354052-S) should be backed out approximately two turns to allow for thread engagement of nuts. New type nuts (354526-S8) which are threaded completely through should be used to prevent bottoming of stud in nut and provide adequate pressure on gasket. Cement gasket to cover. Apply Sealing Compound (8A-19554-B) to gasket, and allow compound to become tacky before positioning gasket to cover.

OILING SYSTEM

ENGINE LUBRICATION

1954-60 6 CYL. MODELS

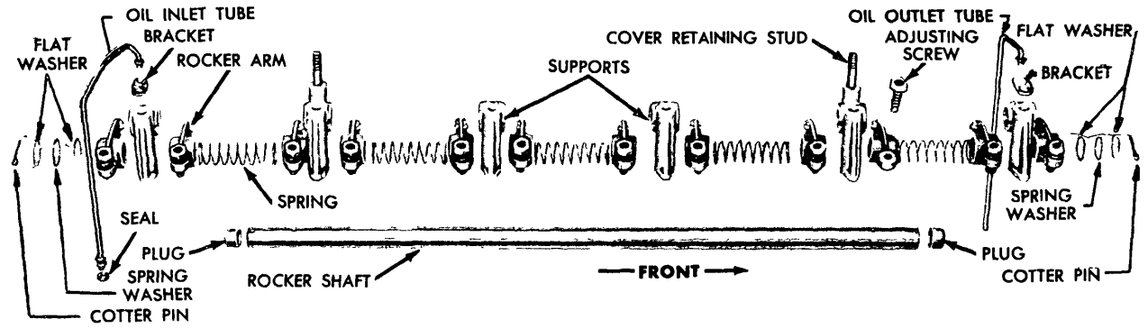
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil metered by No. 3 camshaft bearing lubricates rocker arms, pushrods, and valve stems. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Gear type oil pump mounted in crankcase on right hand side draws oil through fixed oil inlet and strainer mounted on pump cover and delivers all oil through a passage in the pump body and crankcase wall to the oil filter intake port (filter mounted on pad on right side of crankcase). Filter outlet port on filter pad is connected to main oil gallery by a vertical passage and cross-passage in the block. Main oil gallery extends along right side of crankcase and oil is distributed from this gallery as follows:

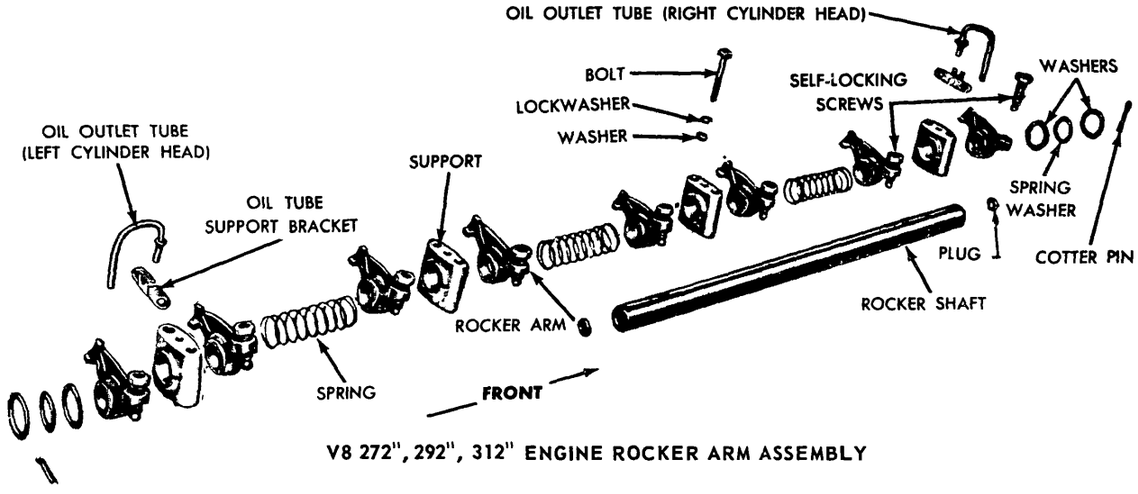
Crankshaft & Camshaft Bearings - Lubricated by drilled passages in each crankcase web through which oil is supplied from main oil gallery to each crankshaft bearing. A transverse passage connects this passage with each camshaft bearing.

C nnecting R ds - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

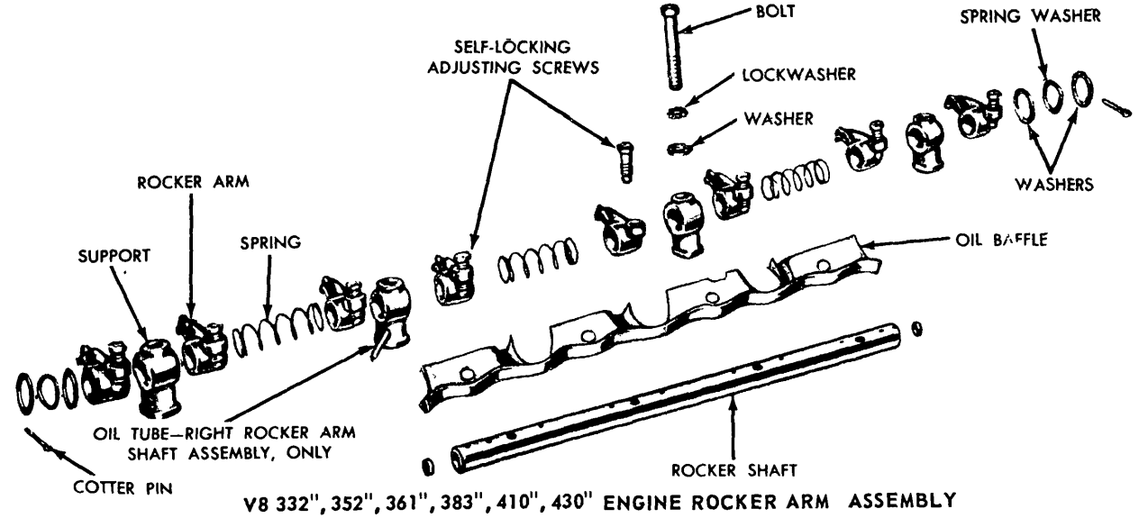
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6 CYLINDER OVERHEAD VALVE ROCKER ARM ASSEMBLY



V8 272", 292", 312" ENGINE ROCKER ARM ASSEMBLY



V8 332", 352", 361", 383", 410", 430" ENGINE ROCKER ARM ASSEMBLY

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Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with connecting rod bearing lubricating hole.

Timing Chain & Sprockets - Lubricated through drilled passage in front end of block which directs oil from front camshaft bearing to crankshaft sprocket (camshaft journal has flat which registers with bearing supply oil hole and timing chain lubrication hole once in each revolution). Oil slinger on front end of crankshaft also throws oil onto chain.

Rocker Arms, Pushrods, & Valves - Drilled passage in No. 3 (rear intermediate) camshaft journal feeds oil at reduced pressure to drilled passage in block. A tube extending up through block and cylinder head directs this oil to the No. 6 (rear) rocker shaft bracket and into the hollow rocker arm shaft. Oil then flows through drilled passages in rocker arm to lubricate rocker arm bushing, pushrod socket and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker arm shaft flows through outlet pipe at No. 1 (front) rocker shaft bracket. This pipe terminates at drilled hole in lifter chamber directly above distributor driveshaft for distributor and drive gear lubrication (see below).

Valve Lifter & Fuel Pump Eccentric - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. A drilled hole in the lifter chamber floor directly above fuel pump eccentric on camshaft provides lubrication for the eccentric. A return hole at rear of lifter chamber allows oil to drain back into the crankcase.

Distributor & Drive Gear - Oil return pipe from rocker arm shaft terminates at drilled hole in lifter chamber. This hole is directly above distributor drive gear on camshaft and gears are lubricated by this return oil. A transverse passage in the block at the oil return pipe location in the lifter chamber directs drain oil to relieved section of distributor housing. Oil holes in housing direct oil to distributor lower bushing and drive gear.

OIL FILTER: Full-flow type mounted on pad on right side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when engine is started up.

1954-60 239, 256, 272, 292, 312" ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil metered by camshaft bearings lubricates rocker arms, pushrods, and valves. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted externally on left side of crankcase draws oil through fixed oil strainer in oil pan and external oil pipe (passes through or attached to side of oil pan) and delivers all oil through a port in the pump mounting base and passages in crankcase to oil filter intake port (filter mounted on pad on left side of crankcase). Filter outlet port on crankcase connects directly with main oil gallery extending along left side of crankcase. Oil is distributed from this main oil gallery as follows:

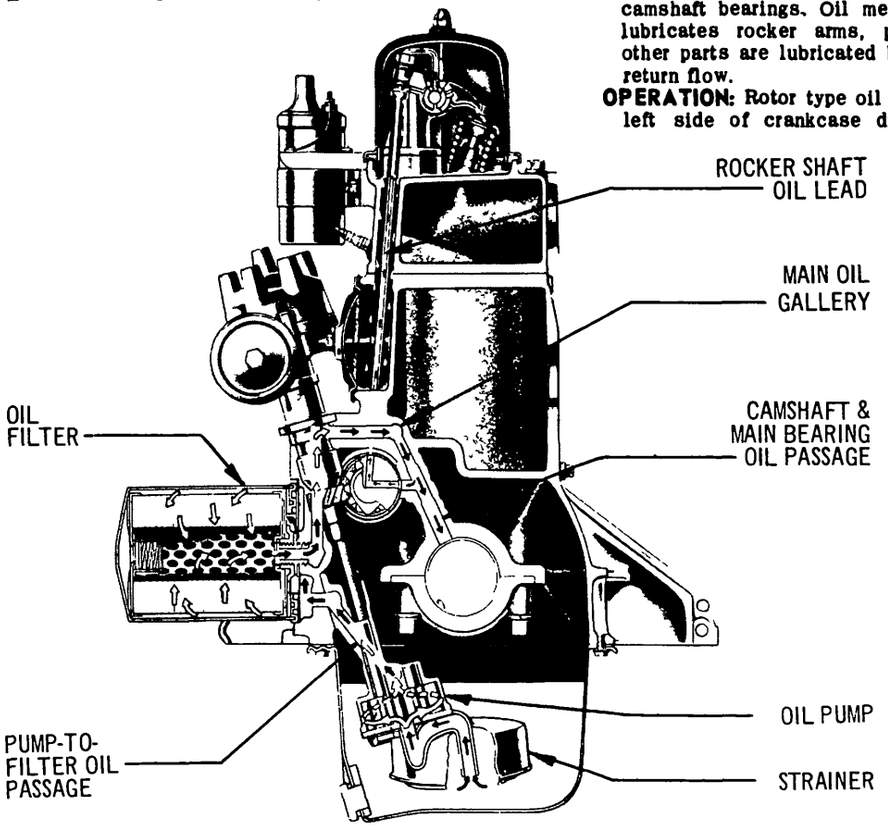
Crankshaft & Camshaft Bearings - Lubricated by drilled passage in each crankcase web through which oil is supplied from main oil gallery to intersecting passage leading to corresponding main and camshaft bearings.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

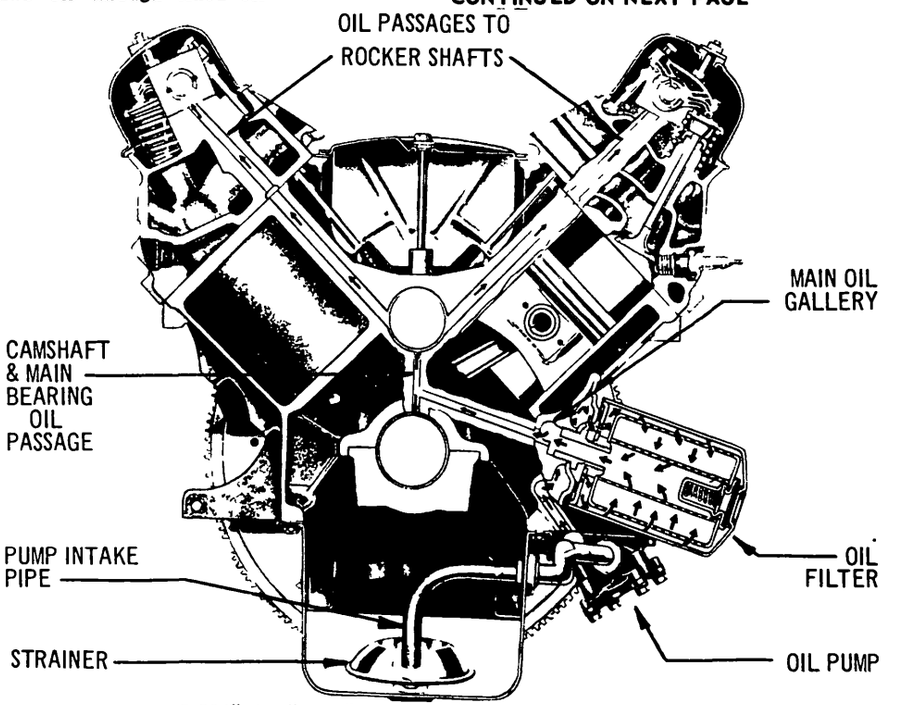
Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in side of connecting rod lower end when this hole lines up with oil hole in crankpin.

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 3 camshaft bearing extend up through block and matching passages in cylinder heads (with offset formed by channel on lower face of head) and oil then flows up through drilled passage in No. 2 rocker shaft support bracket (Right Bank), No. 3 rocker shaft support bracket (Left Bank) to hollow rocker arm shaft. Oil holes in shaft and rocker arm provide lubrication for rocker arm bushing, pushrod ball end and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker shaft flows through outlet pipe at No. 1 rocker shaft

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6 CYL. ENGINE OILING SYSTEM



V8 239", 256", 272", 292", 312" ENGINE OILING SYSTEM

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bracket (Right Bank), No. 4 rocker shaft bracket (Left Bank) for timing chain and distributor lubrication (see below).

Valve Lifters & Pushrod Seats - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. Oil for this purpose is also supplied by rocker shaft outlet pipes which terminate in lifter chamber. Oil in lifter chamber is returned to oil pan through large opening at rear of chamber. This oil lubricates distributor drive gear.

Distributor, Intermediate Shaft & Bushing - Lubricated by oil supplied through drilled passage from No. 5 camshaft bearing (camshaft journal is drilled and oil flows through this passage from camshaft bearing oil hole to distributor oil passage). *NOTE* - Distributor drive gear is lubricated by oil return from lifter chamber to oil pan through large opening at rear of lifter chamber.

Timing Chain & Sprockets - Oil return from right bank rocker chamber (outlet pipe at No. 1 rocker shaft bracket) is channeled by trough in lifter chamber to hole in front cylinder block wall through which the oil is directed on timing chain and sprockets. Oil slinger on crankshaft (not used on all models) also throws oil on timing chain.

OIL FILTER: Full-flow type mounted on pad on left side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when the engine is started up.

317.5, 341, 368" LINCOLN ENGINES

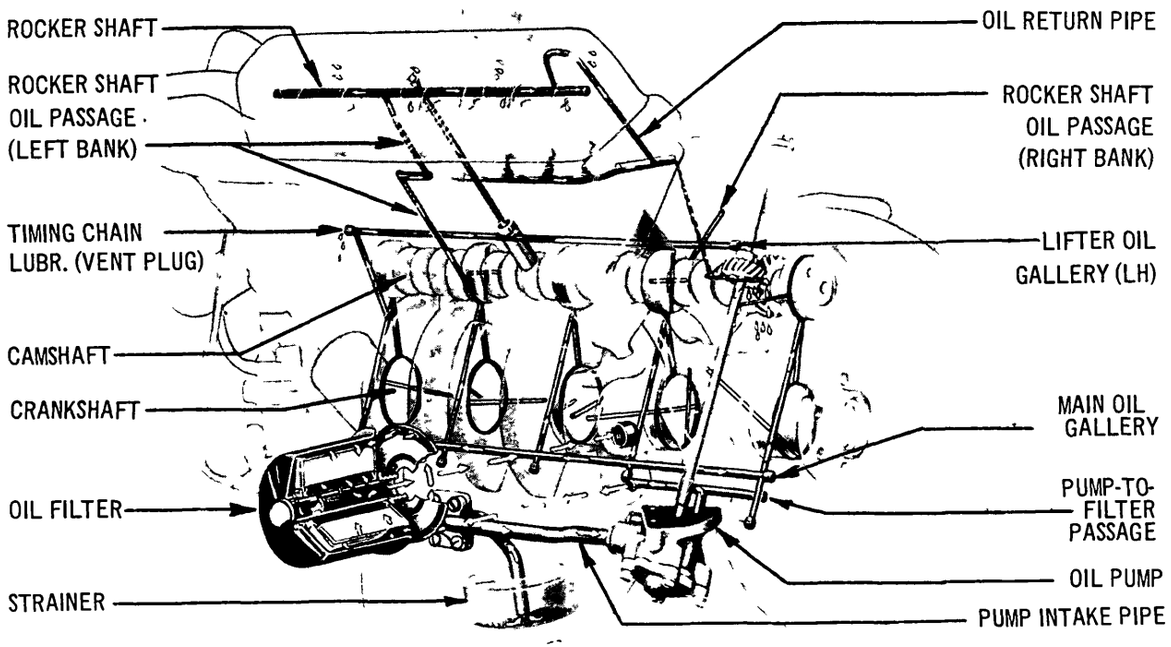
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings and to hydraulic valve lifters. Oil metered by camshaft bearings lubricates rocker arms, pushrods, and valves. Other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Gear type oil pump mounted externally on left rear of crankcase draws oil through fixed oil strainer in oil pan and external oil pipe (attached to side of oil pan) and delivers oil through a port in the pump mounting base and passages in crankcase to oil filter intake port (filter mounted on pad on left side of crankcase above oil pump). Filter outlet port on crankcase connects directly with main oil gallery extending along left side of crankcase. At No. 1 main bearing cross-passage, an intersecting passage connects with the left bank hydraulic lifter oil gallery. Right bank hydraulic lifter gallery is fed by a vertical passage from No. 2 main bearing. Oil is distributed from these oil galleries as follows:

Crankshaft & Camshaft Bearings - Lubricated by drilled passage in each crankcase web connecting main oil gallery with a vertical passage to corresponding camshaft and main bearings (these passages join at a point just below camshaft bearing).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with connecting rod bearing oil hole.



LINCOLN V8 317.5", 341", 368" ENGINE OILING SYSTEM

Camshaft Thrust Plunger & Fuel Pump Eccentric - Spring-loaded, hydraulically actuated thrust plug in forward end of camshaft is supplied with oil through drilled passages in camshaft front journal and hub when this passage lines up with camshaft front bearing oil hole. A side passage in the hub provides lubrication for fuel pump eccentric sleeve. *NOTE - Oil bleeding past the plunger and eccentric sleeve lubricates timing chain and sprockets.*

Hydraulic Valve Lifters - Lifter oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries. A vent plug at forward end of each lifter oil gallery (in timing chain case) allows air to escape so that no air can reach lifters. *NOTE - Oil passing through vent plugs lubricates timing chain and sprockets.*

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 2 camshaft bearing (for right bank), No. 4 camshaft bearing (for left bank) extend up through block and matching passages in cylinder head (with offset formed by channel in lower face of head). Oil is supplied to these passages by metering passage in camshaft journal (oil flows through passages when camshaft oil holes line up). Oil then flows up through drilled passage in No. 3 rocker shaft bracket (right bank), No. 2 rocker shaft bracket (left bank) and into hollow rocker shaft. Oil holes in shaft and rocker arm provide lubrication for rocker arm bushing, pushrod socket, and valve tip. Excess oil from rocker shafts flows through outlet pipe at No. 1 rocker shaft bracket (right bank), No. 4 rocker shaft bracket (left bank) which direct the oil back to the lifter chamber. Oil in lifter chamber drains back into oil pan through large hole at rear of lifter chamber. This oil lubricates distributor drive gear.

Distributor Intermediate Shaft - Lubricated by oil supplied through drilled passage from No. 5 camshaft bearing (camshaft journal is drilled and oil flows from camshaft bearing oil hole). *NOTE - Distributor drive gear is lubricated by oil return from lifter chamber*

Timing Chain & Sprockets - Oil from camshaft thrust plunger and hydraulic lifter oil gallery vent plugs *(see above)* is collected in trough on engine front plate and directed on timing chain and sprockets

OIL FILTER: Full-flow type mounted on pad on left side of crankcase above oil pump Relief valve in filter assures engine lubrication if filter element clogged.

332, 352, 361" V8 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arms. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted in crankcase draws oil through fixed intake pipe and oil strainer mounted on pump body and delivers oil through passage in crankcase to oil filter inlet port on filter mounting pad. From the filter, oil flows through transverse passages in the front wall of the cylinder block to forward end of main oil gallery which extends the entire length of the crankcase in the floor of the lifter chamber. At a point near the rear of the engine, cross-passages

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connect the main gallery with the right and left valve lifter galleries which extend along the length of the crankcase in line with the valve lifters. Oil is distributed through these galleries as follows:

Crankshaft & Camshaft B arings - Front camshaft and crankshaft bearings are lubricated directly from the oil filter outlet passage (vertical passage in front cylinder wall between bearings intersects the filter cross-passage). **Oth r** camshaft and crankshaft bearings are lubricated through vertical passage in crankcase web at each bearing which extends down from main oil gallery to corresponding camshaft and crankshaft bearings (camshaft bearing bore in block is grooved to permit oil flow around bearing and on to the crankshaft bearing).

Connecting Rod B arings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall by connecting rod of the same cylinder in opposite bank. Spray hole consists of a slot in parting face of rod bearing cap through which oil is sprayed when this slot lines up with oil hole in crankpin. *NOTE - Rods must be installed with this slot upward toward camshaft to ff ct this cross-lubrication.*

Valv Lift rs - Right and left lifter oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank) extends up through block and matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect this bolt hole with passage in block). An angle passage in the head connects cylinder head bolt hole with rocker shaft support bolt hole (No. 2 support bracket for left bank , No. 3 bracket for right bank). Oil then flows up around bracket bolt and through an angle passage into the hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips (baffle under rocker shaft assembly shields valve stems from oil splash). Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber is returned to oil pan through drain holes at each end of cylinder head and in lifter chamber.

Timing Chain & Sprockets - Plug at forward end of main oil gallery has vent hole and jiggle pin to vent air trapped in gallery. Oil passing through this vent lubricates timing chain and sprockets.

Distributor & Driv G ar - Lubricated through cross-passage from No. 1 camshaft bearing (see illustration).

OIL FILTER: Full flow type mounted on adapter at right front of crankcase. Relief valve in filter assures engine lubrication if filter element clogged.

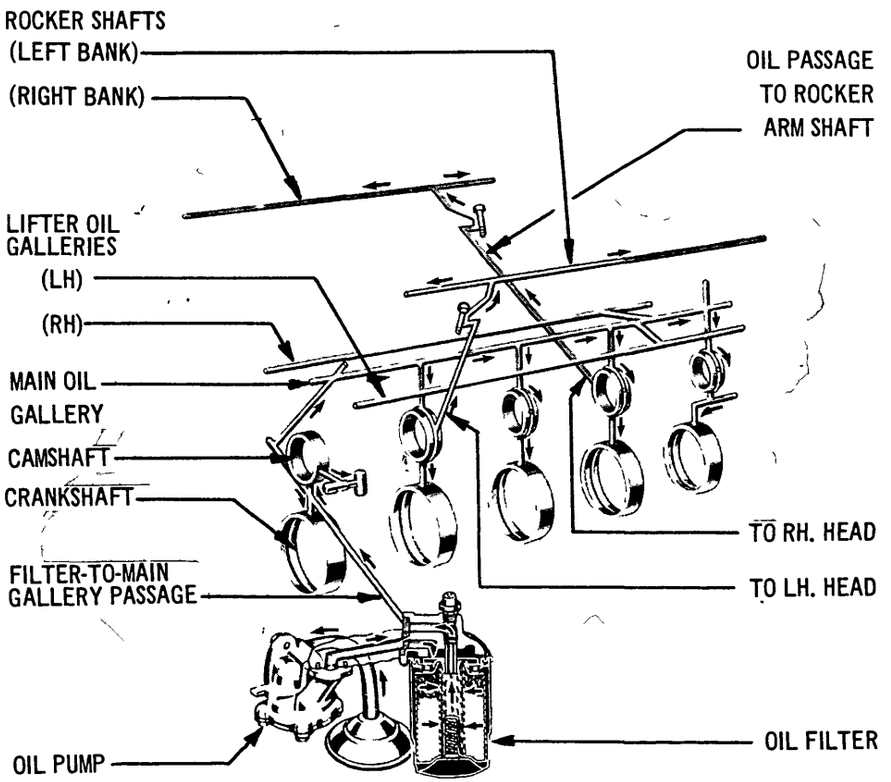
383, 410, 430" V8 ENGINES

DESCRIPTION: *Oiling system for these engines is same as for the V8 332", 352" & 361" Engines (see above) except for the following details:*

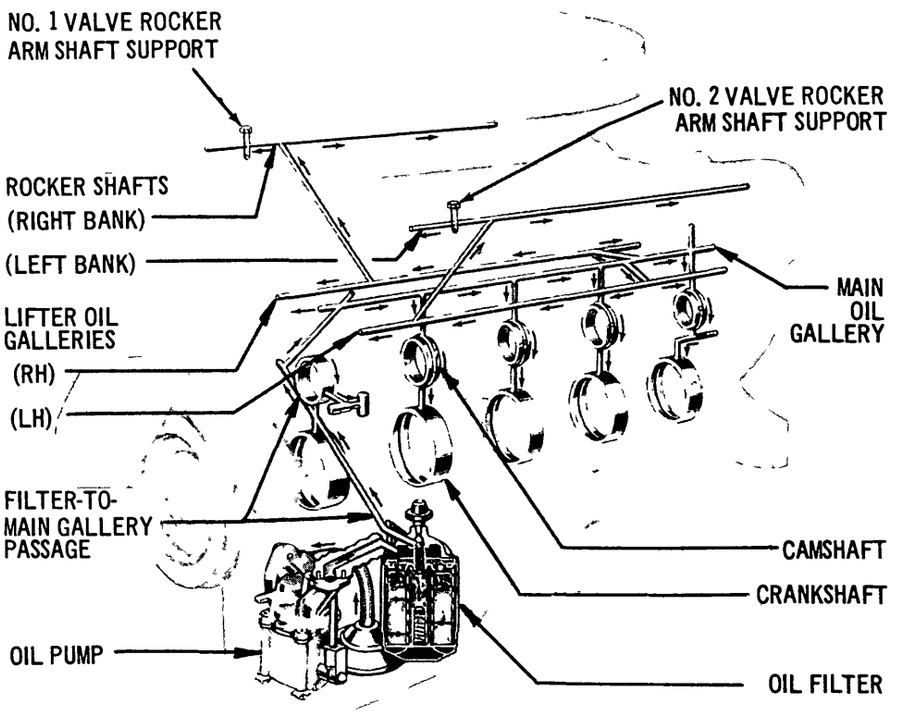
Crankshaft & Camshaft Bearings - All bearings are lubricated through vertical passages from main oil gallery (oil flow from filter is direct to main oil gallery).

Rocker Arms, Pushrods, & Valves - Drilled passages in block lead from right and left lifter oil galleries and connect with matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect passage in block with this bolt hole). An angle passage in the head connects the cylinder head bolt with the rocker shaft support bracket hole (No. 1 support bracket for right bank, No. 2 bracket for left bank). Oil then flows up around bracket bolt and through angle passage in bracket into hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bush-

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V8 332", 352", 361" ENGINE OILING SYSTEM



V8 383", 410", 430" ENGINE OILING SYSTEM

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ings, pushrod ends and valve tips. Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber drains back into lifter chamber through holes at front and rear lower corners of head.

Timing Chain & Sprockets - Oil draining from front camshaft bearing flows onto thrust face of camshaft sprocket and is sprayed on timing chain and crankshaft sprocket.

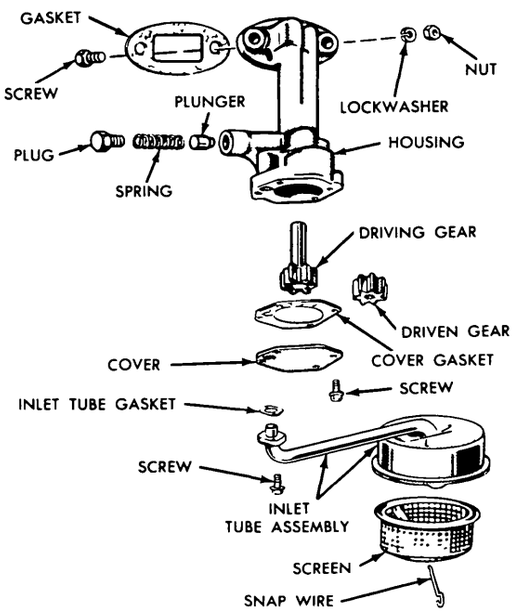
OIL FILTER
1957 MODELS

Disposable Filter Original Installation - Remove and discard original filter. Install Gasket EAA-6838-A (coat gasket with light grease) and Adapter ECG-66391-A; in adapter recess in cylinder block (mark Top on adapter must be upward) install Oil Filter Mounting Bolt Insert No. ECG-6890-A and tighten insert to 50-75 ft. lbs. torque. *(CAUTION* - DO NOT allow adapter to rotate). Install Disposable Filter Assembly MHK-6714-A as follows:

Disposable Filter Replacement - Coat gasket face of filter with oil thread filter on insert by hand until gasket contacts adapter face, then tighten filter an additional one-half turn *(CAUTION* - DO NOT overtighten). Run engine and check for leaks.

OIL PUMP
1954-60 6 CYL. MODELS

►*1954-59 6 CYL. ENGINE SERVICE REPLACEMENT OIL PUMP AND OIL PUMP RELIEF VALVE NOTE:* To correct relief valve sticking, install new relief valve, Part No. B9AE-6674-D, or new pump assemblies, Part No. B4AE-6621-B (1954), B9AE-6621-C (1955-59).



6 CYL. ENGINE OIL PUMP

NOTE - Do not use the old type relief valve, Part No. EAA-6663-D, in the later type pumps.

OIL PUMP: Gear type oil pump mounted in crankcase in line with distributor. Pump driven by means of a hex driven shaft. Shaft pinned in end of distributor drive shaft by a roll pin, and other end seats in end of oil pump drive shaft. Pressure relief valve is incorporated in oil pump housing.

Removal: Remove distributor, oil level indicator, and oil pan. Remove two nuts and lockwashers retaining pump to cylinder block. Remove pump and gasket.

Disassembly: Remove oil pump cover, inlet tube assemblies and gasket then remove snap ring wire retaining screen in inlet tube assembly and remove screen. Push oil pump drive shaft and drive gear assembly from housing and remove driven gear. Remove oil pressure relief valve chamber plug, spring and plunger.

Inspection: Wash all parts in solvent and dry them thoroughly. Use a brush to clean inside of pump housing and pressure relief bore. Be sure all dirt and chips are removed. Remove all old gasket material from pump body and cover. Check pump gear teeth for wear or damage. Relief valve spring tension should be 9.76-9.84 lbs. when compressed to a length of 1.56". Gear end clearance should be .003-.006" (pump assembled). Driven gear to shaft clearance should be .001-.002". Gear to housing radial clearance should be .0015-.006". Replace worn parts when clearance excessive.

Reassembly: Apply engine oil to all moving parts. Install relief valve plunger, spring, and plug and tighten to 33-38 ft. lbs. Slide drive gear and shaft assembly into housing. Install driven gear. Apply sealer to both sides of gasket. Install gasket and cover with screws loose. Secure screen in place with retainer and install inlet tube gasket and inlet tube assembly on pump cover. Now tighten cover retaining screws to 12-15 ft. lbs., and check pump for free rotation.

Installation: Place new gasket on retaining bolts, slide pump mounting flange over retaining bolts, install lockwashers and nuts. Install oil pan, fill crankcase. Run engine and check oil pump pressure.

1954-56 V8 MODELS

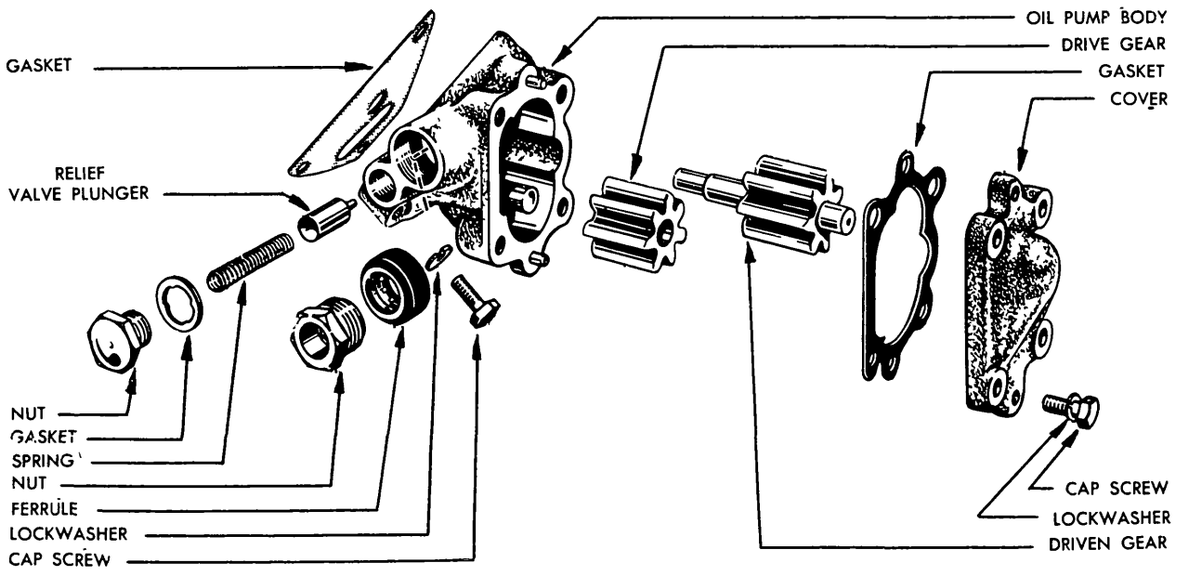
OIL PUMP: Gear type pump mounted on left hand side of crankcase and driven by intermediate shaft from distributor shaft. Pressure relief valve in oil pump housing

Removal: Remove oil pump inlet pipe (NOTE—Early type inlet pipes were connected to oil pan with a flange connector. Later type pipes are one-piece, and are part of oil pump screen cover assembly and should be disconnected at oil pump). Remove capscrews and lockwashers securing pump to engine block. Remove pump and gasket, and the intermediate shaft (if shaft comes out with pump).

Disassembly: Remove capscrews retaining pump cover to body and remove cover plate and gasket. Do not tap pump drive shaft to drive cover off pump. Remove oil pump gear and shaft assembly and oil pump idler gear. Remove oil pressure relief valve plug, gasket, spring and plunger.

Inspection: Check oil pump housing for cracks or excessive wear. Pump shaft should have free running fit without excessive play in pump housing (clearance is .0001-.0024"). Check pump gear teeth for scratches and wear. Check compression of relief

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V8 239", 256", 317.5", 341", 368" ENGINE OIL PUMP

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valve spring which should be 10 82-10.90 lbs. at 1.40". Replace any worn or defective parts.

Reassembly: Oil all parts thoroughly. Install oil pressure relief valve plunger, spring, cover plug, and gasket. Install idler gear and oil pump gear and shaft assembly. Install cover plate with new gasket, and tighten cover plate screws to 12-15 ft. lbs. torque. Check pump shaft endplay with a dial indicator which should be 0015- 0055".

Installation: Reverse removal procedure using a new gasket between pump mounting flange and engine.

1956-60 V8 MODELS
V8 272, 292, 312, 332, 352, 361" ENGINES

►*272, 292, 312" ENGINE OIL PUMP INTERMEDIATE SHAFT INSTALLATION CAUTION:* To prevent intermediate shaft from becoming disengaged when distributor is removed, position retaining washer on intermediate shaft so it is 1.40" from blunt end of shaft. Retaining washer can be tightened on shaft by laying washer on a flat surface and bending the internal prongs slightly with a hammer.

►*OIL PUMP GASKET INSTALLATION CAUTION:* DO NOT USE gear type oil pump gasket on rotor type oil pump. Use only Gasket No. B6Q-6659-A on V8 rotor type oil pumps.

►*OIL PUMP PRODUCTION CHANGE (272,292,312" ENGINES):* New oil pump B9TE-6600-A with cast iron cover (to reduce galling) and with revised relief valve spring (to standardize pressures to 45-65 lbs.), released for service for 1955-59 models.

►*OIL PUMP PRODUCTION CHANGE (332,352,361"ENG.):* New cast iron cover plate, Part No. B8A-6616-C, used to prevent galling or scoring by inner rotor. Use new plate for service replacement. New oil pump, Part No. B8A-6600-B, with new cover plate used on later cars.

OIL PUMP: Rotor type. Mounted externally on left rear outside of crankcase (Exc. 332, 352, 361"), at front inside crankcase (332,352, 361"), driven by distributor intermediate drive shaft. Oil pressure relief valve installed in pump body, not adjustable.

Removal: (Exc. 332, 352, 361") - Disconnect oil inlet tube at pump and remove "O" ring seal. Loosen tube at pan. Remove pump-to-block retaining screws, remove pump, intermediate drive shaft and gasket.

(332, 352, 361") - Remove oil pan (see car pages), then remove oil pump retaining bolts and remove oil pump and inlet tube as an assembly. Remove oil pump drive shaft.

Disassembly: (Exc. 332, 352, 361") - Remove cover screws, cover and "O" ring assembly. Remove inner rotor and shaft, then remove outer race Remove oil pressure relief valve chamber plug, gasket, spring and plunger.

(332, 352, 361") - Remove oil inlet tube from pump, remove gasket Remove cover screws and cover. Remove inner rotor and shaft assembly then remove outer race. Use threaded sheet metal screw to remove oil pressure relief valve chamber cap, then remove spring and plunger

Inspection: Wash all parts in solvent and dry thoroughly. Use brush to clean inside of pump housing and pressure relief chamber. Be sure all dirt and chips are removed. Check inside of pump housing and outer race and rotor for excessive wear or damage. Check mating surface of cover for wear. If worn, scored or grooved, replace cover. Check clearance between cover and rotor and outer race with straightedge across housing (.0015-.003" for 332,352,361", .001-.0035" for others). Relief valve spring tension should be as shown in table below. Outer race, shaft and rotor are replaceable only as an assembly.

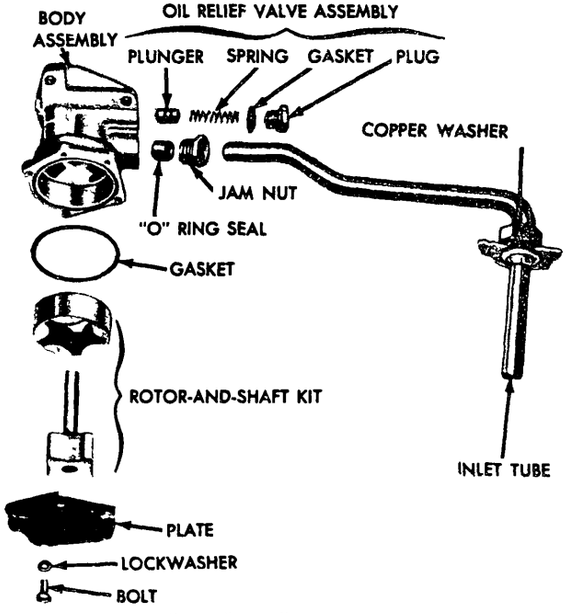
Relief Valve Spring Tension

Model	Lbs. Pressure
1957-58 272, 292, 312 Pass Cars	9.2-10.4 at 0.80"
1958 332, 352 Pass. Cars	8.6-9.5 at 1.078"
1957-58 272 Truck	10.86 at 1.40"
1958 292 Truck	9-2-10.4 at 0.80"
1958-59 383 & 430"	8.6-9.5 at 1.078"
1959-60 292"	8.7-9.9 at 1.71"
1959 332 & 352"	8.6-9.5 at 1.078"
1960 352"	9.0-9.6 at 1.53"

Assembly: Lubricate all parts with engine oil. Install relief valve plunger, spring, and plug with new gasket. Install outer race and inner rotor and shaft assembly. On 332 & 352 pumps, install cover and tighten screws to 6-9 ft. lbs. then position new gasket and oil inlet tube on oil pump and install upper bolt loosely. Do not install bottom bolt at this time. On all other pumps, install "O" ring seal in groove in pump body and install cover and tighten screws to 12-15 ft. lbs.

Installation: (Exc. 332, 352) - Install "O" ring seal on oil pump end of oil inlet pipe and then install tube and seal in pump. Insert intermediate shaft into oil pump drive shaft. Position new gasket on pump housing and install pump and shaft as an assembly. *CAUTION - Do not force pump into position but rotate intermediate shaft to new position.* Tighten retaining screws

Installation: (332, 352) - Insert oil pump drive shaft into oil pump. Position new gasket on pump housing and install pump and shaft assembly. *CAUTION - Do not force pump into position but rotate drive shaft to new position.* Tighten oil pump mounting screws to specifications and swing inlet oil pipe so it will clear oil pan. Position new gasket on oil pan, place oil pan assembly on frame crossmember then position oil pump inlet tube in place and install lower bolt and tighten upper bolt.



V8 272", 292", 312" ENGINE OIL PUMP

1958-60 V8 MODELS
(383,410,430" ENGINES)
ROTOR TYPE OIL & VANE TYPE VACUUM PUMP

►*1958-60 383" & 430" ENGINES OIL PUMP PRESSURE RELIEF VALVE AND SPRING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* In the event of low oil pressure and worn bearings (cars operated at high speed), inspect relief valve plug (in area that contacts relief valve spring) for excessive wear. If worn, replace with plug Part No. COAE-6A616-A and spring, Part No. COME-6670-A.

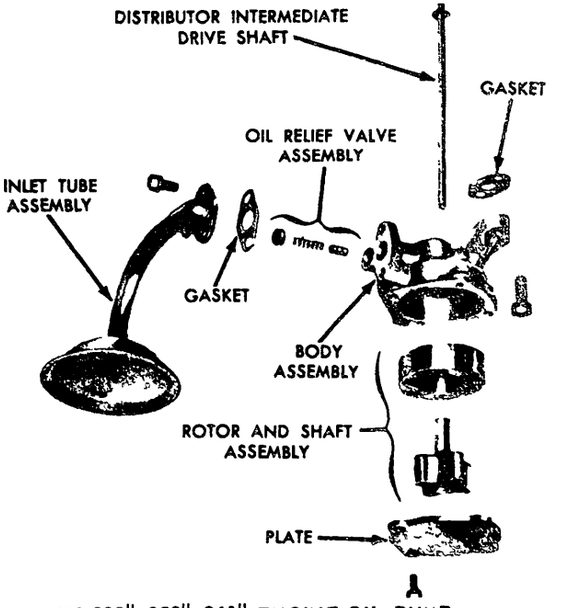
Removal: Remove oil pan, then remove oil inlet pipe and screen assembly and gasket. On oil-vacuum equipped cars, disconnect vacuum inlet line at fitting on cylinder block. Remove oil pump or oil-vacuum pump assembly, gasket, and distributor intermediate shaft from cylinder block.

Disassembly: Oil Pump Assembly - 1) Remove cover to oil pump screws and washers and remove cover.

2) Remove outer rotor and rotor-shaft assembly from oil pump housing.

3) Remove relief valve plug (use self tapping screw in plug oil relief hole and pry plug from opening). Remove spring and relief valve from housing.

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V8 332", 352", 361" ENGINE OIL PUMP

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Disassembly: Oil-Vacuum Pump Assembly - 1) Disconnect vacuum inlet pipe from vacuum pump body, then remove vacuum pump assembly-to-oil pump screws and two locking plates.

2) Scribe mark on cover plate and vacuum pump. Remove vacuum-oil pump cover plate, eccentric rotor, and vanes as an assembly. DO NOT drop vanes or lose springs or pins.

3) Proceed as in items 1 and 2 in "Oil Pump Assembly"

Cleaning & Inspection: Oil Pump or Oil & Vacuum Pump - Wash all parts in cleaning solvent. Use brush to clean all dirt and foreign material from pump housing, pressure relief valve chamber and vacuum pump housing. Check all parts for excessive wear or damage. *NOTE - Outer rotor and rotor-shaft are replaced as a unit.* If cover mating surface worn, scored, or grooved, it should be replaced. Replace vacuum pump unit if cover is damaged. Relief valve spring tension should be 8.6-9.5 lbs. when compressed to 1.078" (1958-59), 9.0-9.6 lbs. when compressed to 1.53" (1960). Relief valve clearance should be .0015-.0029" and valve should be a snug fit in bore without bind. Oil pump outer rotor to housing clearance should be .004-.011". Clearance between pump body and rotors (when assembled in housing) should be .0015-.003". Rotor shaft to housing clearance should be .0015-.0029" (difference between shaft diameter and bore in housing). *NOTE* - When clearances between housing and rotors are not within specifications, replace outer rotor and rotor-shaft, oil pump housing, or replace oil pump assembly. Check vacuum pump parts for scores, wear, or damage. Replace vacuum pump unit if parts damaged. Replace intermediate shaft if broken, bent, or worn excessively.

Assembly: Oil Pump - 1) Install relief valve, spring and plug. Press plug inward until seated, then stake in place.

2) Install outer rotor and rotor-shaft assembly in housing, then install plate with four lockwashers and screws.

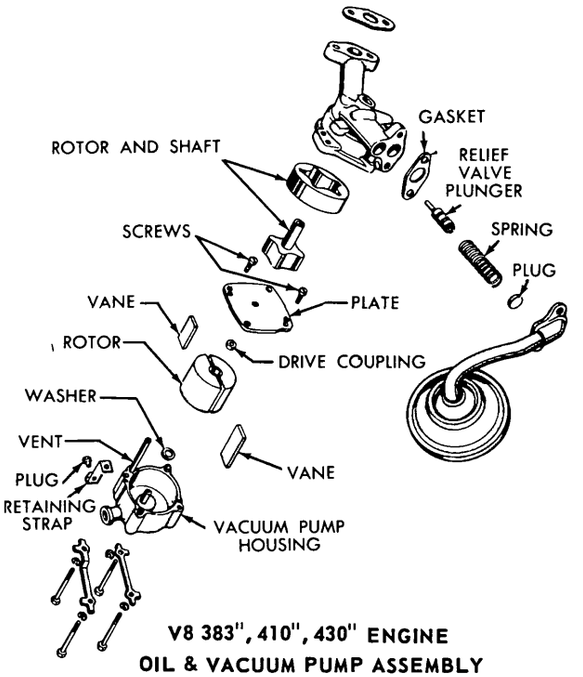
Assembly: Oil-Vacuum Pump Assembly - 1) Install relief valve, spring and plug. Press plug inward until seated, then stake it in place.

2) Install rotor and rotor-shaft in housing, insert spring and guide pin in rotor of vacuum pump, then slide two vanes in rotor slots. *NOTE* - Guide pins must engage hole in each vane.

3) Compress vanes in rotor and insert assembly in housing with drive lug seat toward open end of vacuum housing.

4) Position drive lug in vacuum pump rotor, add cover plate on vacuum pump housing (oil groove facing upward) over dowels and install screws. Install vacuum pump to oil pump with four screws and two lock plates. Connect, but do not tighten, inlet tube to vacuum pump housing.

►*OIL PUMP & OIL-VACUUM PUMP PARTS REPLACEMENT CAUTION:* Due to differences in parts (except housing, relief valve, spring and plug), the two oil pump applications are not interchangeable.



V8 383", 410", 430" ENGINE
OIL & VACUUM PUMP ASSEMBLY

Installation: All Pumps - Install distributor intermediate shaft in oil pump rotor-shaft. *NOTE* - Use proper length shaft (oil pump or oil-vacuum pump) and insert in position in distributor shaft hex bore with internal toothed lockwasher in place on upper end (to hold shaft in position when distributor removed), then secure pump to cylinder block. *CAUTION - Be sure gasket is properly installed.* With OIL-VACUUM pump, connect vacuum pump inlet fittings. Place oil inlet pipe gasket on oil pump housing (use sealer on gasket). Loosely install oil inlet pipe and screen assembly on oil pump with upper mounting screw.

COOLING SYSTEM

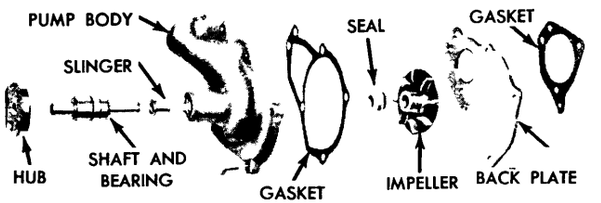
WATER PUMP

(6 CYL. PASS. CARS & TRUCKS)

TYPE: Packless type with double row ball bearing shaft.

OVERHAUL: Disassembly - Press shaft out of hub (1954-57), pull hub off shaft with Tool 7675-N (1958-60), remove snap ring retaining bearing in housing. Press shaft out of impeller and pump body with Tool T52L-8501-DAD and drift smaller than shaft in diammeter. Press out pump seal with Tool T52L-8501-DAD (1954-56), and Detail 19 (1957-60).

Reassembly - Clean off any gasket material on mounting surface of pump. Install new seal in pump housing with Tool T52L-8501-DD-17 (1954-55), T52L-8501-DAD (1956) and Detail 16 & 18 (1957-60). Install water slinger on bearing and shaft assembly with Tool T52-8501-DAD and Detail 18 so flanged end of slinger is 1.94" from end of shaft. Replace impeller if worn or damaged. Coat seal rubbing surface of impeller lightly with grease. Press shaft into impeller. *CAUTION - Press shaft into impeller just far enough so pump housing lightly touches face of insert ring. If excessive pressure exerted on shaft after rear face of housing contacts ring, pump bearing will be damaged.* Impeller to pump body clearance should be .020-.030" after pressing on impeller. Tighten setscrew in bottom of fixture plate until screw touches end of shaft. Do not lift pump body off fixture plate. Install snap ring in housing. Press water pump hub on shaft until dimension from inner face of hub to machined surface of pump housing is 4.24" (1954-57), 4.520" (1958-60).



6 CYL. ENGINE WATER PUMP

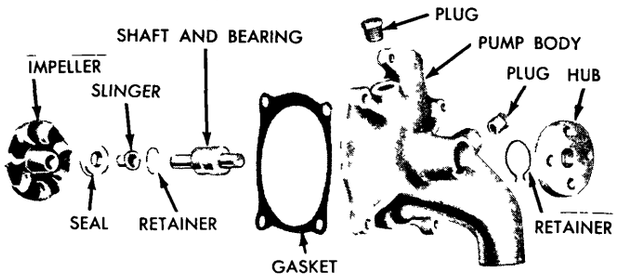
V8 MODELS
(239, 256, 272, 292, 312" ENGINES)

DESCRIPTION: Pre-packed, double row ball bearing type requiring no additional lubrication. Shaft and bearing assembly held in position with snap rings at front and inside housing. Seal is a unit containing graphite seal washer and neoprene shaft seal and spring. Seal assembly must be replaced each time pump is disassembled. A slinger is also provided to protect bearing assembly.

OVERHAUL: Disassembly - Remove hub from impeller shaft. Remove snap ring from front of housing and press shaft out of the impeller and pump body with Tool T52L-8501-DAD and drift smaller in diameter than shaft. Press out pump seal with Tool T52L-8501-DAD and Detail 19. If slinger is damaged, mark its position on shaft then remove slinger. Remove snap ring from housing bore.

Assembly - Remove gasket material from mounting surface and install a new snap ring in bore of housing. Install new slinger on shaft (use locating marks on old shaft for location on new shaft). Apply a light film of water proof sealer on new seal and press seal into

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V8 239", 256", 272", 292", 312" ENGINE WATER PUMP

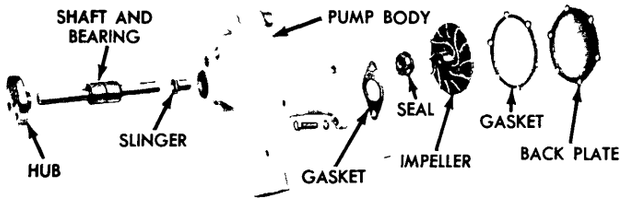
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housing. Coat outer diameter of bearing with grease and press shaft and bearing into housing from front end (*CAUTION* - Press on bearing outer race only) until bearing just touches inner snap ring, then install front snap ring. Replace impeller if worn or damaged. Coat rubbing surface of impeller with grease and press on shaft until distance from outer surface of impeller to machined surface of housing is .030-.040". Use straightedge and feeler gauge to check clearance. Press hub on shaft until distance from front surface of hub to rear machined surface of housing is 4.480".

V8 MODELS (332, 352, 361" ENGINES)

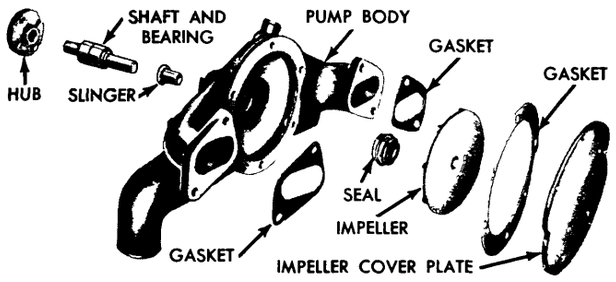
DESCRIPTION: Pre-packed double row ball bearing type requiring no additional lubrication. Seal assembly is a unit containing graphite seal washer and neoprene shaft seal and spring (seal assembly must be replaced each time pump is disassembled). A slinger is also provided to protect the bearing assembly.

OVERHAUL: Disassembly - Remove back plate and gasket, then use suitable puller to remove hub from shaft. Position pump on an arbor press to press shaft off the impeller and out of housing. Press seal out of housing.



V8 332", 352", 361" ENGINE WATER PUMP

Assembly - Remove all gasket material from mounting surfaces of pump and cylinder block. Install new slinger on new bearing and shaft assembly in same relative position as on old shaft. Apply a light film of water proof sealer on new seal and press seal into housing. Coat outer diameter of bearing with grease and press shaft and bearing into housing, pressing on outer race of bearing only, until outer face of bearing is flush with outer face of housing. Coat seal rubbing surface of impeller lightly with grease and press it on shaft until clearance between flat surface of impeller to machined surface of housing is .080-.090" (Use straightedge and feeler gauge). Place hub over shaft and support impeller end of assembly so pressure is against the shaft and press hub on shaft until distance from front face of hub to machined mounting surface of housing is 8.650".



V8 383", 410", 430" ENGINE WATER PUMP

V8 MODELS (383, 410, 430" ENGINES)

DESCRIPTION: Pre-packed, double row ball bearing type requiring no additional lubrication. Seal is a unit containing a graphite seal washer and a neoprene shaft seal and spring. Seal is serviced as an assembly and must be replaced each time pump is disassembled.

Disassembly - Remove back cover and gasket and pulley hub. Place pump (impeller side down) on arbor press. Use Tool 8530 (1½" diameter bearing), 8501-F6M (1 3/16" diameter bearing) over shaft and against bearing to press shaft and bearing assembly, seal, and impeller from pump as a unit.

Assembly - *NOTE - Use new gaskets, seal, shaft and bearing assembly.* Use recessed end of Tool 8501-18 over seal to press seal onto seat. Support pump on arbor press, position shaft and bearing assembly in water pump with slinger facing downward. Press shaft-bearing and slinger assembly into pump housing until bearing is flush with hub edge of housing. Place hub on shaft and bearing assembly. Place pump assembly on press with steel block supporting shaft and bearing assembly and use Tool 8501-F6M or Tool 8530 to press hub on shaft until distance from pulley mounting face of hub to mounting face of water pump legs is 6.404-6.424". Place pump assembly on press with hub end of shaft resting on steel plate and use Tool 8501-F6M or Tool 8530 to carefully press impeller on shaft assembly until rear flat face of the impeller is .095-.105" below back mounting face of water pump housing. Check with .095" feeler gauge between flat face of impeller and straightedge placed across cover mounting face. Install back cover.

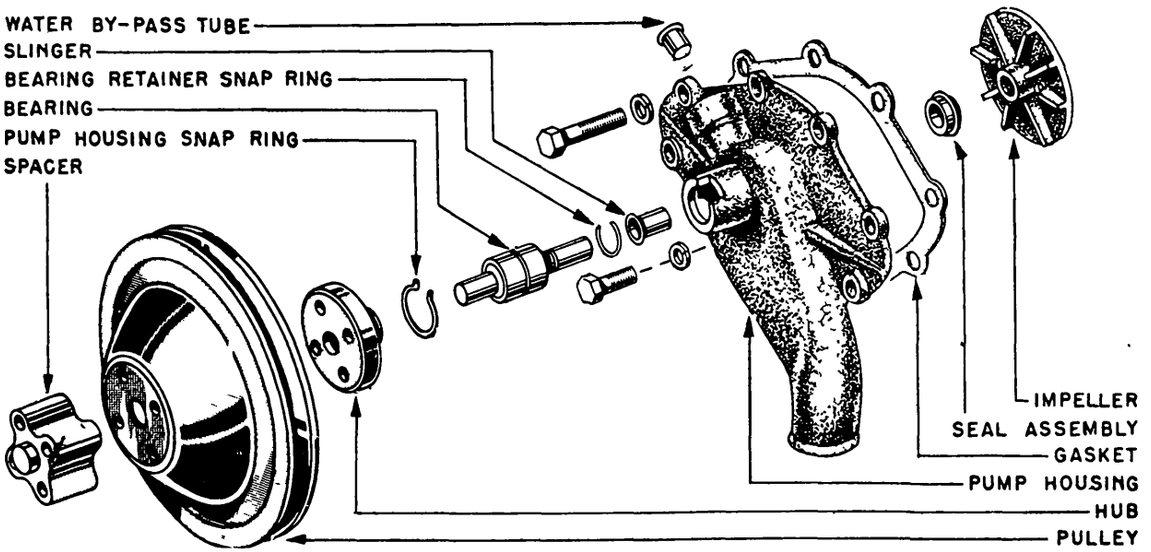
V8 MODELS (317.5, 341, 368" ENGINES)

DESCRIPTION: Packless type with sealed double row ball bearing shaft (shaft serves as inner race for bearing). Bearings are permanently lubricated and require no additional attention in service. Shaft retained by locking ring in pump body.

OVERHAUL: Disassembly - Remove snap ring from groove in front of pump housing directly behind hub. *(NOTE - If pump has pressed steel pulley, remove pulley first, then remove snap ring).* Using arbor press, piece of bar stock having smaller diameter than pump shaft, and Tool 8501-DD-21 with three pins installed in tool, press shaft and bearing assembly and pulley from impeller. Remove impeller. Press shaft and bearing assembly and hub from housing. Using Tool 8501-DD-16 and piece of bar stock, press shaft and bearing assembly from hub. With Tool 8501-DD-19, press seal and sleeve assembly from pump housing. *NOTE - It is not necessary to remove snap ring in center of pump housing.*

Reassembly - Coat all surfaces of pump lightly with cup grease. Install shaft and bearing assembly in pump housing using Tool 8501-DD-19. *CAUTION - When pressing shaft into housing, stop applying pressure when resistance is felt or snap ring inside housing will be broken.* Install snap ring at front of housing to retain shaft and bearing assembly. Using Tool 8501-DD-17 or DD-18, depending on type of seal and sleeve assembly used, and Tool 8501-DD-16, install seal and sleeve assembly into housing. Remove pins from Tool 8501-21 and turn tool upside down. Place Tool 8501-DD-22 in center of Tool 8501-21 and place both tools on arbor press. Lower adjusting screw in center of tool by turning counterclockwise. Install impeller on shaft assembly and set pump on tool so impeller is in tool recess. Press downward on shaft until pump body

CONTINUED ON NEXT PAGE



V8 317.5", 341", 368" ENGINE WATER PUMP

CONTINUED FROM PRECEDING PAGE

makes light contact with tool. This automatically sets impeller-to-housing clearance (.025-.035"). Turn screw in Tool 8501-DD-21 clockwise until it contacts the shaft assembly. Using Tool 8501-DD-19, install water pump pulley hub. *NOTE* - It is necessary that distance from lower surface of pump pulley to machined surface of housing be maintained as near 3 15/16" (1954-55), 5.340" (1956-57) as possible. This will assure correct pulley alignment.

POWER BOOSTER FAN

1957 MERCURY MODELS

DESCRIPTION & OPERATION: This "Power Surge" Fan is a completely automatic unit built-in the fan hub and water pump shaft. The fan blade and hub assembly is mounted on two ball bearings on the pulley hub which allow the fan to "free-wheel" when the clutch is disengaged. The clutch assembly consists of a drive disc (on the end of the pulley hub) and a driven disc (in the fan hub). Clutch is engaged by an operating rod extending through the pump shaft which is actuated by a capsule in the center of the pump impeller. As the water temperature increases, the capsule extends to engage the fan drive clutch causing the fan to be positively driven by the engine. Whenever the engine is at normal temperature or below (with the operating capsule not extended), the rod return spring moves the rod toward the impeller and disengages the clutch.

1958-60 LINCOLN & MERCURY MODELS

POWER BOOSTER FAN: Consists of a rotor (enclosed in housing to which fan is bolted) and driven by shaft secured to water pump flange. Housing is filled with special silicone oil which provides drive for fan through a plastic rotor. This unit designed to provide driving force for maximum fan operation at low speeds and to limit top speeds of fan at higher engine speeds.

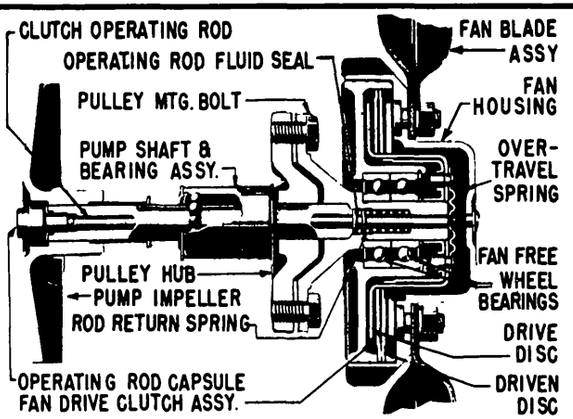
Checking Drive Unit: 1:1 ratio should occur at approximately 1200 RPM (1958 Mercury), 2400 RPM (1959 Lincoln, 1959-60 Mercury) 2700 RPM (1960 Lincoln). Check by marking units with chalk and using a timing light. Speed of fan and damper is the same when both components are "stopped" by timing light. If this stoppage occurs at engine speed less than specified above, the power booster clutch is operating below minimum and must be replaced with a new clutch unit.

FUEL SYSTEM NOTES

383, 410, 430" ENGINES

CARBURETOR AIR INTAKE DUCT ASSEMBLY (WITH THERMOSTAT CONTROL): Thermostatically controlled valve in air intake duct assembly should be fully closed when engine is cold (for air intake from rear "heated" opening), and should start to open as engine warms up and be fully open when engine reaches operating temperature (for air intake from outside through left radiator side air deflector). If valve does not operate satisfactorily, remove duct assembly and test operation of valve as follows:

Duct Assembly Removal: Loosen clampscrew and slide flexible hose off end of duct. Remove wing nut retaining air cleaner on carburetor, remove nut and washer retaining duct assembly on bracket. Loosen two clampscrews and slide duct assembly from air cleaner.



1957 POWER BOOSTER FAN

Testing: Place duct assembly in a pan of water at temperature below specification shown in table for "Closed". *NOTE - Thermostat must be covered by water.* Valve should be in "heat on" position. Heat water slowly. Valve should start to open at "Start Open" temperature. *NOTE - If valve does not start to open at this temperature, hold temperature for eight minutes before discarding thermostat as defective.* Increase water temperature to "Wide Open" specification. Valve should be wide open at "Heat Off" position. *NOTE - If valve not open, hold this temperature for eight minutes before discarding thermostat as defective.* If valve operation not satisfactory remove thermostat and spring assembly and check valve shaft for binding. If valve moves freely, replace thermostat and duct assembly. If valve does not operate correctly adjust thermostat rod as follows:

Adjustment: Increase rod length to move valve toward "heat off" position, decrease rod length to move valve toward "heat on" position.

Test Specifications

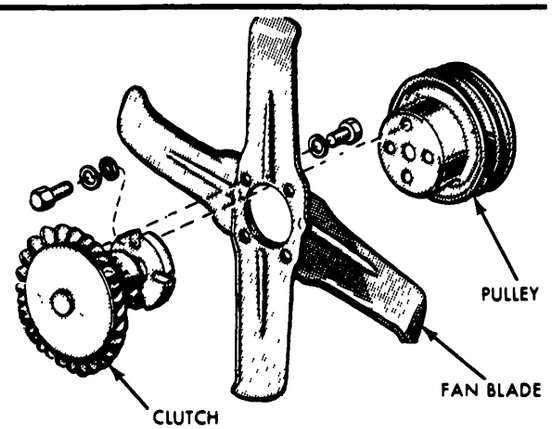
Model	"Closed"	"Start Open"	"Wide Open"
Edsel (1958)	80°F	95°F	105°F
Ford T'Brd (1960)	75°F	95°F	100°F
Lincoln (1956-57)	65°F	75°F	100°F
(1958-59)	65°F	85°F	100°F
(1960)	75°F	85°F	100°F
Mercury (1957)	75°F	85°F	105°F
(1958-60)	75°F	85°F	100°F

PROPELLER SHAFT NOTES

1960 LINCOLN & MERCURY MODELS

PROPELLER SHAFT ANGLE: *NOTE* - Vibration or "shudder" upon fast acceleration, or when coasting using engine as a brake, may be caused by either rear axle being loose in springs or by excessive propeller shaft angle. Propeller shaft angle is the result of Pinion Nose Angle in relation to Riding Height with "U" bolt nuts tight.

Pinion Nose Angle - Place vehicle on known level surface that will allow access to rear axle pinion nose. Drill a small hole in common protractor at exact center of base (0°) line, and insert a line through hole with a light weight attached for bob. Place base of protractor vertically against front face of pinion housing and read where lines crosses scale.



1958-60 POWER BOOSTER FAN

Riding Heights - Place vehicle on smooth level floor. Inflate tires to specifications, fill gas tank and remove all passengers and baggage load. Jounce vehicle to obtain normal position. Measure perpendicular distance from axle housing to frame (Lincoln), to kick-up on underbody side member (Mercury). Distance should be as shown in table below.

Model	Normal Riding Height
Lincoln	6 19/32"±½"
Mercury (Exc. Sta. Wgn. & Park Lane)	① 7.10"
Mercury (Sta. Wgn. & Park Lane)	② 6.80"

① - 6.60" Min., 7.50" Max. ② - 6.40" Min., 7.15" Max.

Riding Height	Pinion Nose Angle Lincoln	Mercury
7 inches	0°	1¼° upward
6½ inches	½° down	1° upward
6 inches	1° down	½° upward
5½ inches	1½° down	¼° upward

① - Allowable Tolerance ½° up or down.

Check Pinion Nose Angle with Riding Height as shown in table above. When Nose Angle does not correspond with Riding Height, remove rear axle "U" bolt nuts and install a 1° or a 2° taper shim between each rear axle spring seat and spring and tighten "U" bolt nuts to 40-50 ft. lbs. *CAUTION* - DO NOT STACK tapered shims. When more than 2° correction is required, replace rear axle housing.

TRANSMISSION NOTES

► *1955-56 PREMATURE GEAR TOOTH WEAR CORRECTION:* When interference between gear shift and clutch rods result in improper gear engagement and excessive gear tooth wear, install parts as follows:

Conventional Trans.

B6A-7326-C Rod (2nd and High).
B6A-7521-A Rod (Clutch Release).
B6A-7515-A Lever (Clutch Release) ①
B6A-7542-A Bracket (Clutch Retracting Spring) ②

Overdrive

B6A-7328-B Rod (Low and Reverse).
B6A-7326-B Rod (2nd and High).
B6A-7515-A Lever (Clutch Release) ①
B6A-7542-A Bracket (Clutch Retracting Spring) ②

① – 1954-56. ② – 1954-55.

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate attached to left front body pillar below upper hinge opening

First Number—100001 up for each year

►*VEHICLE NUMBER NOTE* Vehicle number (example "A5FS100001") includes following identification data in sequence

Engine Type ①	Year ②	Assembly Plant ③	Body Style ④	Serial No
A	5	F	S	100001 up

①—See Engine Type Code below
②—4(1954) 5(1955)
③—See Assembly Plant Code below
④—See Body Style Code below

Engine Type Code

Code	1954 Engine	1955 Engine
A (6 Cyl)	223 cu in	223 cu in
U (V8)	239 cu in	272 cu in
P (V8)	256 cu in	292 cu in

Body Style Code

Code	1954 Models	1955 Models
C	Sunliner	Sunliner
F	Skyliner	Skyliner
H		Thunderbird
R	Ranch Wagon ⑤	Ranch Wagon
S	Sedan Delivery	Sedan Delivery
T	Fordor ⑥	Fordor & Tudor
V	Victoria	Victoria
W	Ranch Wagon ⑦	Special Body
X	Country Sedan	Country Sedan
Y	Country Squire	Country Squire
G	All Others ⑧	All Others ⑦

⑤—Customline ⑥—Crestline ⑦—Mainliner
⑧—Mainliner & Customliner

Assembly Plant Designation

A—Atlanta	F-Dearborn	N—Norfolk
B—Buffalo	G-Chicago	P—St. Paul
C—Chester	K—Kansas City	R—Richmond
D—Dallas	L—Long Beach	S—Somerville
E—Edgewater	M—Memphis	U—Louisville

TUNE-UP

COMPRESSION PRESSURE: 120 lbs (1954) 125 lbs (1955) at cranking speed Maximum variation between cylinders is 10 lbs

VACUUM READING: Steady 18-20" idling at 500 RPM

VALVE TAPPET CLEARANCE: 015" (Intake), 019" (Exhaust) with engine at operating temperature

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight Valve is open at top when engine cold Thermostat spring installed with ¾ turn wind-up and hooked over stop pin

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 034-037" (Champion H-10) 032-036" (Champion 870)

Spark Plugs (1954)—Champion H-10 14mm Use Champion H-11 for slow or stop-and-go driving Tighten to 25-30 ft lbs

Spark Plugs (1955)—Champion 870 18mm Special

►*1955 SPARK PLUG CAUTION Spark plug is new type with tapered seat and does not require a sealing gasket It is important that plugs be torqued to 15-20 ft lbs*

COIL: Ford 8BA-12029.

Ignition Current—3 0 amperes idling, 5 0 amperes stopped

DISTRIBUTOR: FAA-12127-C (1954), B5A-12127-C (1955)

Condenser—Ford 7RA-12300-C **Capacity** 21-25 mfd
Contact Point Set—Ford 7RA-12171
Breaker Gap—024-026'
Cam Angle—35-38°
Breaker Arm Spring Tension—17-20 ozs
Rotation—Clockwise viewed from above

Advance Performance
►**With Distributor on Test Stand**

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
3½-4½	5	500
7-8	1 8	1000
9¾-11	3 8	1500
11½-13	6 0	2000

►*DISTRIBUTOR INSTALLATION CAUTION Be sure oil pump intermediate shaft engages seat in oil pump.*

IGNITION TIMING

Setting—3° BTDC.

Timing Mark—5 marks—0°, 3°, 5°, 7°, 9°, on vibration damper Align correct mark with pointer on engine front cover

CARBURETOR

Ford No. EBP-9510-A (Except Fordomatic), EBP-9510-B (With Fordomatic). "Visi-flo", single barrel

►*1955 ACCELERATOR LINKAGE CORRECTION (To Permit Full Accelerator Travel):* Bend upper arm of accelerator assembly so that it moves on a 6" radius (distance between center of accelerator shaft-carburetor rod pivot point hole and center line of straight portion of accelerator should be 2 9/64")

►*1955 STANDARD & OVERDRIVE TRANSMISSION ACCELERATOR BELL CRANK-TO-CARBURETOR ROD ASSEMBLY PRODUCTION CHANGE (To Correct Difficult Idle Adjustment)* If difficulty encountered in adjusting idle, check to see if car equipped with new rod assembly, Part No TRAA-9772-A (has phosphate-dark-finish) Old rod assembly, Part No AB-9772-A, had cadmium plated finish

Idle Setting—Initial setting 1½ turns open Set for highest steady vacuum reading with engine at normal operating temperature, or midway between missing and rolling points Turn screw out for richer mixture

Idle Speed (1954)—475-500 RPM (Std & O D) 440-460 RPM (Fordomatic) with selector lever in "N"

Idle Speed (1955)—475-500 RPM (Std & O D) 450-475 RPM (Fordomatic) with selector lever in "N"

Fuel Level—11/16 ±1/32" below power valve mounting surface (Tool T52L-9550-AEE) *See "Ford Visi-flo" in Carburetor Section of Manual.*

Accelerating Pump: Inner hole for normal or hot weather, outer hole for cold weather operation (holes located in throttle lever Shift pump link as required)

Fast Idle: Integral type operated by choke valve No adjustment required

Throttle Linkage Adjustment (Fordomatic Cars): With selector lever in "N" position and engine at normal operating temperature set engine idle speed at 440-460 RPM (1954 Models), 450-475 RPM (1955 Models) Adjust Anti-stall Dashpot then turn engine off Remove clevis pin from upper end of transmission control rod (at cross shaft) Pull gently upward on throttle control rod to hold transmission lever against its internal stop Rotate rod clevis for free entry of clevis pin into holes in clevis and cross shaft lever Lengthen control rod by rotating clevis 2½ turns counterclockwise Connect control rod to cross shaft lever Road Test car and if band or clutch slippage evident **increase rod length to 3 turns of clevis but do not exceed 3½ turns** Check transmission for kick-down action and if found to be incorrect disconnect accelerator connecting link from cross shaft lever and adjust pedal height by turning the threaded trunnion on connecting link until top surface of accelerator pedal is 4 5/16" (1954) 4 9/16" (1955) from floor

Anti-Stall Dashpot (Fordomatic Cars): First adjust engine idle speed then turn engine off. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counterclockwise) until head of adjusting screw pushes the dashpot rod up to the end of its travel. Turn dashpot screw in (clockwise) 1½-2 turns to obtain .045-.064" clearance, Tighten locknut

►*OTHER DATA See Ford "Visi-flo" in Carburetor Section*

Fuel Pump Pressure 4 5 lbs at 900 RPM

CARB. EQUIPMENT

►*FUEL TANK FILTER CAUTION:* If particles of foreign material found in fuel pump or carburetor on units built prior to February 1, 1955, particles should be examined very closely (with magnifying glass and strong light). If particles clear or cream colored, short, and thread-like pieces, they are probably from a damaged fuel tank filter To correct, replace fuel tank.

Fuel Pump (1954): Ford No. EAA-9250-E, Fuel only Except Fordomatic & Overdrive Cars), **EBP-9250-A,** Fuel & Vacuum (Fordomatic & Overdrive Cars)

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Fu l Pump (1955): Ford N . B5A-9350-A, Fuel only (Except Fordomatic & Overdrive Cars); **B5A-9350-B,** Fuel & Vacuum (Fordomatic & Overdrive Cars)

Fuel Pump Pressure—4-5 lbs at 900 RPM

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: King-Seeley Electric.

Dash Unit (1954)—Ford No FAG-9280-A.
Dash Unit (1955)—Ford No B5A-9280-A
Tank Unit (1954)—Ford No FAA-9275-A (Except Sta Wgn. & Sedan Delivery) No FAA-9275-B (Sta. Wgn & Sedan Delivery)
Tank Unit (1955)—Ford No B5A-9275-A (Exc Sta. Wgn & Sedan Delivery) B5A-9275-B (Sta Wgn & Sedan Delivery)

S e "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Ford No. FDA-10655-A. 6 volt, 17 plate, 90 ampere hour capacity (20 hr. rate).
Battery Ground—Positive (+) to engine.
Engine Ground—Cylinder head to dash.

STARTER

Ford No. FAC-11002-B (1954); FAC-11002-G (1955). Armature—Ford No. 52-11005 (FAC-11002-B), **FAC-11005-B** (FAC-11002-G)

Drive—Ford No. 1CM-11350-C. Bendix "Folo-Thru" type.
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—48-5€ ozs.
Cranking Speed—115-125 RPM.

Performance Data—FAC-11002-B

Torque	RPM	Volts	Amperes
0 ft lbs	①	6 0	70
16 ft lbs.	Lock		700

Performance Data—FAC-11002-G

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	6.0	70
14 ft. lbs .	Lock		700

①—With starter on engine and engine running.

Starting Switch: Ford No. FAB-11450-B. Mounted on left front fender apron and controlled by Ignition Switch. *NOTE*—A Neutral Safety Switch is used on all models with Fordomatic.

Fordomatic Neutral Safety Switch: Ford No FAC-15812-C (1954), B5A-15812-A (1955)
Adjustment—*See "Fordomatic & Mercomatic" in Transmission Section*

GENERATOR

F rd No. FAA-10002-B. Armature—0A-10005-A.

►*GENERATOR BELT WEAR & IMPROPER CHARGING RATE CAUTION·* If either of these two conditions are encountered, check to make sure an 8-Cyl. generator is not being used.

►*GENERATOR BELT NOISE CORRECTION.* To make sure noise is coming from belt, squrt a few drops of hydraulic fluid on belt driving surface. If noise or whine disappears, belt is at fault and should be replaced with plain type belt, Part No B5A-8620-B In some cases, removal of paint in generator pulley groove has stopped noise without belt replacement.

Performance Data

Generator	Amperes	Eng. RPM
FAA-10002-B	35 ①	850

①—See Regulator for maximum charging rate.

Brush Spring Tension—30 ozs.
Field Current—1½-2½ amperes at 6.0 volts.
Rotation—Counter-clockwise at commutator end.

B lt Adjustm nt: ¼" belt deflection midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

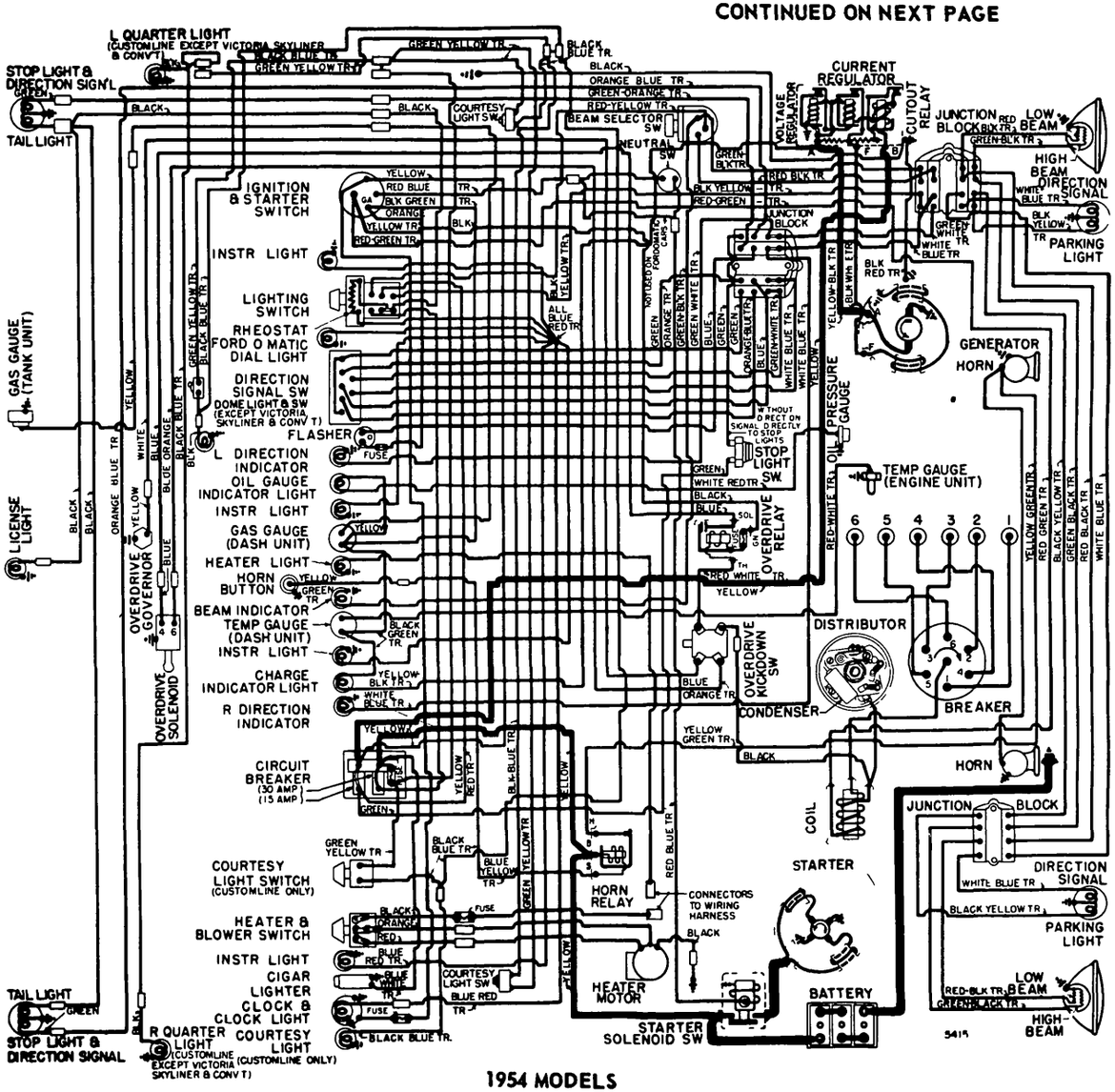
Ford No. FAC-10505-A

►*SETTING NOTE* Settings below are for regulator at NORMAL OPERATING TEMPERATURE (after ½ hour operation) with room temperature at 70°-80 ° F.

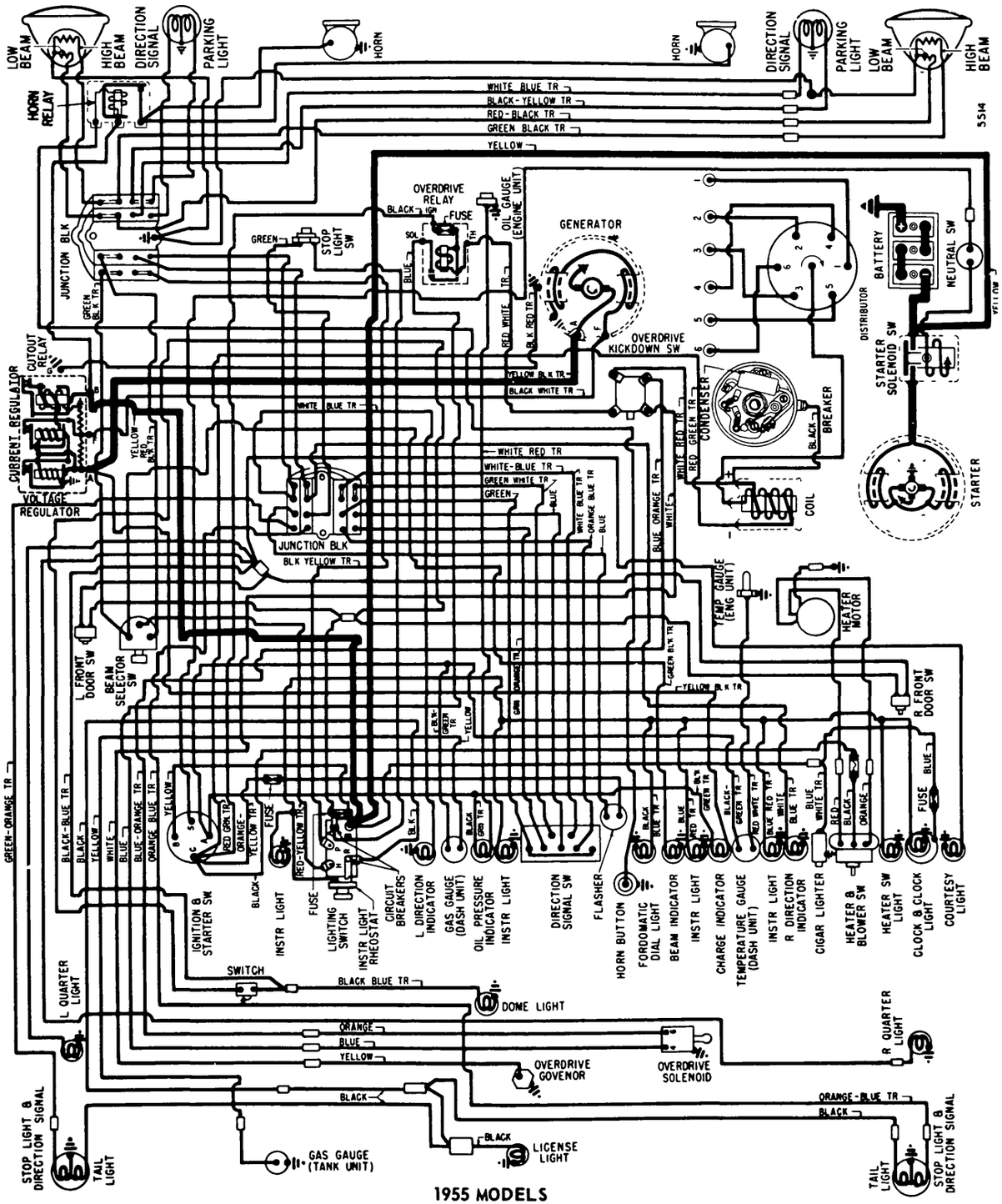
Cutout R lay

Cuts In—6.0-6.6 volts.

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1954 MODELS



1955 MODELS

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►*CUTOUT RELAY AIR GAP CHECK:* With cover off regulator, manually close cutout contacts. Measure air gap between armature and core. This dimension should be .009-.013". Air gap with contacts open should be .012-.020". If either or both of these dimensions are not up to specifications, regulator is defective and should be replaced.

Voltage Regulator

Setting—7.4-7.8 volts.
Checking & Adjusting—See *Electrical Equip. Section.*

Current Regulator

Setting—34-38 amperes.
Checking & Adjusting—See *Electrical Equip. Section.*

MISC. ELECTRICAL

►*1955 BACK-UP LIGHT SWITCH BRACKET INSTALLATION CAUTION:* Change in steering gear shift rod on late production cars affects installation of back-up light switch bracket, Part B5A-15517-A. To install this bracket, bend upward to prevent switch from bottoming when gear shift lever in reverse position. New bracket, Part No B5A-15517-B, is included in new kit, Part No B5A-15517-B, however, some kits will be released with old bracket.

►*1954 DIRECTIONAL SIGNAL BURNING OUT CORRECTION:* Replace 14 amp. fuse with a 9 amp fuse by making a 3/16" long spacer from ¼" copper tubing. Cut spacer lengthwise and place on wire so that it will be between bottom of fuse holder and spring. Press sides of spacer together with pliers

Headlamps: Sealed Beam. See *Electrical Equip. Section.*

Direction Signal: See *Electrical Equipment Section.*

Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N. Remove switch and disconnect all wires.

Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Located as indicated below.

Direction Signal—14 amp. (1954), 15 amp. (1955). In fuse holder between ignition switch and flasher. *1954 NOTE—See "Directional Signal Flasher Burning Out CORRECTION" above.*

Interior Lights—14 ampere On lighting switch
Overdrive—30 amps., on overdrive relay.
Cigar Lighter—Special fuse in lighter base.
Clock—3 amps., in clock lead.
Heater—14 amps., in blower switch wire.

LIGHTING CIRCUIT BREAKERS: On headlight switch. Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits The 14 ampere fuse protects interior lighting circuit

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HORNS: (1954)—Ford No. FAC-13832-E or F (High pitch), FAB-13833-F or G (Low pitch). Dual horns operated by relay.

HORNS: (1955)—Ford No. B5A-13832-C (High pitch), B5A-13833-C (Low pitch). Dual horns operated by relay.

Horn Current—12-14 amps at 6.2-7.2 volts.

Horn Relay: Ford No. FAA-13853-A.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. Valve-in-head.

Bore—3.62". **Stroke**—3.60".

Displacement—223 cu. in. **Rated H.P.**—31.5.

Developed Horsepower—115 at 3900 RPM (1954). 120 at 4000 RPM (1955).

Compression Ratio—7.2-1 (1954). 7.5-1 (1955).

Compression & Vacuum Reading—*See TUNE-UP.*

►*1955 CAMSHAFT OR VALVE SPRING REPLACEMENT CAUTION:* Approximately 2000 1955 models were released with 1956 type camshafts installed. If valve springs or camshaft to be replaced, correct parts must be installed *See "Camshaft" (below) for identification and parts replacement.*

►*1955 OIL BATH AIR CLEANER INTERFERENCE WITH HOOD CORRECTION: On early production cars* Oil Bath Air Cleaner interfered with hood To correct, cut out 2½" long x 7/16" deep section out of top of air cleaner at point of interference with hood. Cars after November 13, 1954 have hoods corrected. If replacement cleaner B5A-9600-F installed on unrevised hood cars, correction will have to be made since service cleaners have not been reworked.

►*1955 DRIVE SHAFT-TO-FRAME INTERFERENCE NOTE & CORRECTION (Conv.):* On early production units, drive shaft may strike bottom of clearance hole in frame "X" member after vehicle passes over a severe bump. Current production is installing three shims and longer bolts (7/16"—20 x 1⅛") between engine rear support and "X" member to prevent interference, and can be installed on early units. *NOTE—If shims removed during repair operation, make sure they are reinstalled.*

►*1955 FUEL LINE (TOO LONG) CORRECTION:* All early production units should be checked for too long a fuel line causing sharp bend in flexible line installed at forward end of fuel line. To correct, bend forward end of fuel line outward, and increase radius of bend in flexible line. Drill a 7/32" hole in No. 2 crossmember. Install a clip, Part No. 8A-14588 and screw, Part No. 31498-58, to secure fuel line to No. 2 crossmember.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

OIL PAN REMOVAL: Drain crankcase, remove oil dipstick Drain coolant from engine and radiator. Disconnect upper radiator hose at engine Remove engine front support bolts Remove engine steady rest Raise front end of engine about 2" Remove left and right engine splash aprons Block engine and lower engine on block Remove flywheel housing inspection cover Remove oil pan retaining screws, remove pan and gasket.

PISTONS

Autothermic type. Solid skirt with three rings above pin.

Removal—Pistons and rods removed from above.

Fitting New Pistons: Use ½" feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows:

New Piston in New Bore—.0015" feeler. 5-10 lbs. pull.

New Piston in Used Bore—.002" feeler. 5-10 lbs. pull.

Used Piston in Used Bore—.0025" feeler. 5-10 lbs. pull.

Replacement Pistons: Standard size, .020", .030", .040", .060" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Install with small indentation in head toward FRONT of engine.

PISTON PINS

Floating type with lock rings at each end.

Diameter— 9120- 9123" **Length**—3 016-3.030".

Pin Fit in Piston— 0001- 0003" Hand push fit at 70°F.

Pin Fit in Rod Bushing—.0001-.0003" clearance. New pin should not fall through bushing of own weight.

Replacement Pins: Standard size, .001", .002" Oversize.

PISTON RINGS

►*SPECIAL SERVICE PISTON RING SET (To reduce Possibility of Excessive Oil Consumption): Special Piston Ring Set, Ford Part No. B4A-6148-AAA furnished as service replacement in addition to standard "Expander and "Snap Ring" type sets.*

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.010-.027"	.002-.0035"
Compr. #2	3/32"	.010-.027"	.002-.0035"
Oil	3/16"	.010-.027"	.0015-.003"

Replacement Rings: Standard size, .020", .030", .040", .060" Oversize.

►*REPLACEMENT PISTON RING NOTE:* "Snap-Type" rings furnished in Std. size only. "Expander" type furnished in all above oversizes. *See "Special Service Piston Ring Set" above.*

CONNECTING RODS

Crankpin Journal Diameter—2.2980-2.2988".

Lower Bearings—Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.

Clearance—.0005-.0023" (1954), .0004-.0023" (1955)

Side Clearance—.005-.007".

Replacement Bearings: Standard size, (4 sizes marked **red** & **blue** for selective fitting) and .010", .020", .030", Undersize.

Installing Rods: Install rod in piston so that squirt hole is to **right** when indentation on top of piston is toward front of engine

CRANKSHAFT

►*1954 CRANKSHAFT & FLYWHEEL PRODUCTION CHANGE:* Later type parts are interchangeable with previous parts except that later crankshaft cannot be used with early flywheel unless inner edge of flywheel bore is chamfered 1/16" x 45° to eliminate flywheel-to-crankshaft interference. Use a bearing scraper to chamfer

Journal Diameter—2.4980-2.4988". Max. wear limits .0015", taper .001".

Bearings—Steel backed, copper lead alloy lined.

Clearance— 0005- 0025' (No 1, 2, 3), 001-.0029' (No 4)

Replacement Bearings: Standard size, (4 sizes marked **red** & **blue** for selective fitting) and .010", .020", .030" Undersize.

End Thrust: Taken on rear intermediate bearing (# 3).

Thrust Bearing Alignment—*See "Crankshaft & Main Bearings" in Ford Special Data.*

Endplay—.004-.008".

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Ford Special Data.*

CAMSHAFT

►*1955 CAMSHAFT & VALVE SPRING REPLACEMENT CAUTION:* When replacing either camshaft or valve springs on Late 1955 models, replacement parts must match the original parts exactly Approximately 2000 Late 1955 models were equipped with 1956 type camshafts and valve springs. THESE PARTS ARE NOT INTERCHANGEABLE WITH STANDARD PRODUCTION 1955 PARTS. If replacement parts are not available, install 1955 camshaft, Part No B5A-6250-B and valve springs, Part No EAA-6513A. 1955 camshafts can be identified by a cam lobe lift of .242" (.273" on 1956 type) 1955 valve springs have 7½ coils with lower coil closely spaced. 1956 valve springs have 7 equally spaced coils Use of mismatched camshafts and springs may result in early failure of camshaft and/or valve flutter at high speeds

Journal Diameter—1.9255-1.9265".

Clearance— 001-.003" (new). .005" (worn limit).

End Thrust—Taken by plate on forward end of block (between camshaft sprocket and shoulder on shaft).

Endplay— 003- 007".

Replacement Camshaft Bearings: Finished bearings furnished Standard, and .015" Undersize. *CAUTION—Rear intermediate (#3) bearing not interchangeable with other bearings.*

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

Timing Chain: Side-guide type. Length 56 links.

►*REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side).

Camshaft Setting: Sprockets marked by "O" at one tooth Mesh chain so that there are 12 pins between "O" marks

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►*CAMSHAFT SPROCKET SPACER INSTALLATION CAUTION:* If spacer, Part No EBE-6265-A, installed backwards, it will allow an excessive amount of end-play. Chamfer on inside diameter of spacer must be t ward No 1 camshaft bearing journal.

Engin Fr nt C ver Oil Seal (Crankshaft Front Seal): *S "Engin Fr nt C v r" in Ford Special Data.*

VALVES

►*EXHAUST VALVE STEM DIAMETER CHANGE (Production & S rvic R plac ment Valves): Stem diameter d cr as d. 0005" for greater stem clearance in guide. S "Valve Syst m" in Ford Special Data.*

Tappet Cl arance: .015" (Intake). .019" (Exhaust) with engine at operating temperature.

Valve	H ad Diam.	① Stem Diam.	Length
Intake	1 785"	.3415"	5.02"
Exhaust	1 515"	3405"	5.02"

Valv	Seat Angl	② Lift	Stem Clearance
Intake	45°	.340"	002 ' max
Exhaust	45°	.340"	003" max

①—Valves furnished with .003", .015", .030" Oversize stems for service replacement. *See "Valve Guides" in Ford Special Data.*

②—Minimum lift for checking camshaft lobe wear.

Valv Seat Width—.066-.084" (Intake). .087-.109" (Exhaust).

►*ROTATABLE VALVE NOTE All valves are rotatable type. See "Valve System" in Ford Special Data.*

Valv St m Oil S als—"Umbrella" type oil seals used on intake and exhaust valve stems. Seals are installed with cupped side down on valve stem at at guide boss on cylinder head. *Install new seals whenever valves removed or when seals become loose on stem.*

►*VALVE STEM OIL SEAL INSTALLATION CAUTION:* New valve stem oil seal, Part No B5A-6571-A, has been released and **should be used to service V8 engines nly.** Old seal, Part No EAA-6571-C, should be used to service only 6-cylinder engines

Valv Springs: Install with closed coil end toward cylinder head.

►*1955 VALVE SPRING REPLACEMENT CAUTION: S "1955 Camshaft & Valve Spring Replacement Caution" und r "Camshaft" above.*

	Valv Spring Specifications Pr ssur	Length
Valve Closed	54-62 lbs.	1.821"
Valve Open	124-140 lbs.	1.505"

Valv Guid s: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.002" Intake, .003" Exhaust), ream guides and install oversize valves *S e "Valve System" in Ford Special Data.*

Valv Lift rs: Mushroom type. Removed from below with camshaft removed.

Rock r Arm Ass mbly: *S "Valve System" in Ford Special Data.*

VALVE TIMING

S e "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE* The following valve opening and closing points are with camlift as indicated

Intak Valv s— Open 13° ①BTDC. Close 68° ①ALDC.
Exhaust Valv s—Open 55° ②BLDC. Close 22° ②ATDC.

①—Camlift .013 '. ②—Camlift 016"

Valve Timing Check: *See "Camshaft Setting" under CAMSHAFT above.* Remove rocker chamber cover Turn engine over until No 1 intake tappet is on heel of No 1 intake cam lobe. Back off No 1 intake valve adjusting screw, push rocker arm to one side, then install dial indicator Zero dial indicator, then rotate engine slowly until desired lift (013") obtained Compare degrees on pulley with specifications (13°). If not within specifications, check for bent timing pointer by bringing No. 1 piston to TDC and see if timing pointer aligned with TDC mark on vibration damper. If pointer not at fault, check timing chain, camshaft sprocket, camshaft, vibration damper, and crankshaft in order of accessibility

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity: 4 qts. (refill), 5 qts. (when new filter installed).

Normal Oil Pressure: 45 lbs. at 2000 RPM.

Pressure Regulator Valve—In pump body, not adjustable.

Oil Pressure Indicator—Indicator light on instrument panel, operated by Engine Unit—Ford No. FDA-9278-A (Stamped #7 on Hex.). Lights when ignition switch turned on, goes out when engine starts and pump operates.

Oil Pump: Gear type pump located in crankcase.

►*1955 OIL PUMP PRODUCTION CHANGE & PARTS INSTALLATION CAUTION:* New oil pump assembly intermediate shaft and body plate released for service Parts not interchangeable with those of previous type pump *See "Oiling System" in Ford Special Data.*

Pump Overhaul—*See "Oil Pump" in Ford Special Data.*

Oil Filter: Full-flow type (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

Replacement Filter Element—Ford No. B2A-6731-A (Kit includes new gaskets).

►*CAUTION—This special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication.*

►*FILTER INSTALLATION CAUTION & OIL LEAKAGE CORRECTION: See "Oiling System" in Ford Special Data.*

Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase on right side of engine.

COOLING

Water Capacity: 15 qts. (without heater). 16 qts. (with heater).

Pressure Valve: Ford LA-8100-A (marked "13" or "14") Radiator filler cap Opens at 12-15 lbs *CAUTION—* If replacement required use 12-15 lb type

Therm stat: Ford No. EAA-8575-A. Mounted inside water outlet elbow in cylinder head. (Stamped 160 on operating cylinder) 160° type. Part No. EAA-8575-B (180°) can be used for permanent anti-freeze.

Wat r Pump: Packless, sealed ball bearing type. *Se "Wat r Pumps" in Ford Sp cial Data.*

Temperatur Gaug : King-Seeley Electric.

Dash Unit—Ford No FDA-10883-A (1954). B5A-10883-A (1955)

Engine Unit—Ford No. 1A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 9½ CF-TS. Ford No. 1A-7563-A.
See "Long Clutches" in Clutch Section.

►*1954 CLUTCH RELEASE BEARING NOISE CORRECTION:* Check release bearing hub shoulder for a second "step" that prevents bearing from seating properly. Correct by replacing hub

►*1954 CLUTCH GRATING NOISE CORRECTION:* Retracting spring reversed and rubbing on steering housing. Long end of spring should be toward front of car.

Clutch Disc No.—Ford No. 8HA-7550-B.

Pedal Adjustment: If total pedal travel is less than 3/8" or more than 6 5/8", reposition pedal bumper until until travel is within limits.

Pedal Free Travel—1 1/8-1 3/8". Loosen clutch pedal release rod locknut (lower end) and turn adjusting nut for correct free travel, tighten locknut.

►*PEDAL FREE TRAVEL ADJUSTMENT CAUTION:* Normal action of pressure plate centrifugal weights at high engine speed will take up approximately ¾" of specified free travel Check free travel when engine is operated at high speed and see if approximately ½" of free travel is left. Insufficient free travel will cause release bearing to rotate at all times and will result in early bearing failure.

Removal: Remove transmission (see Transmission Removal below), and slide clutch release bearing off clutch release lever. Disconnect clutch pedal release rod from clutch release lever assembly. Remove clutch release equalizer bar bracket from flywheel housing and remove equalizer bar. Remove split bronze bushing from bracket and then remove flywheel housing. Install Tool 7563 and remove clutch pressure plate assembly (if tool not available, clutch may be released by backing off the attaching bolts evenly). Remove clutch release bearing from hub with an arbor press.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Ford Synchro-mesh" in Transmission Section

►*INTERMEDIATE & HIGH GEAR JUMP-OUT CORRECTION: See "Ford Synchro-mesh" in Transmission Section.*

►*LOW GEAR JUMP-OUT CORRECTION (Due to Insufficient Clearance):* To correct, remove side cover, grind corner of detent boss to provide sufficient clearance between shift cam and detent boss.

►*GEAR CLASHING CORRECTION (Shifting from Neutral-to-Low or R v rs):* Check operation by depressing clutch pedal and allowing sufficient time for input shaft to stop rotating If clashing still occurs,

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check fit of clutch disc hub on input shaft If it binds on shaft, apply lapping compound to input sh ft and lap hub to shaft If condition continues to exist, it will be necessary to select-fit clutch disc and input shaft *CAUTION–Reducing clutch free-play below specified limit will not correct condition*

Transmission Control: *See "Transmission Control" in Transmission Section.*

Removal: Disconnect gearshift linkage at transmission. Remove speedometer cable and gear. Disconnect drive shaft at transmission and remove the capscrews attaching transmission extension to rear engine support. Place a support under engine and remove the frame cross member and rear engine support. Remove transmission-to-flywheel housing capscrews and install two guide pins. Pull transmission back until main drive gear splines clear housing, and lower transmission from car.

OVERDRIVE

Warner Model AS4-R10F. Solenoid operated type, with governor control and throttle operated kick-down. No Lock-Out Switch used.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.

See "Fordomatic & Mercomatic" in Transmission Section.

►*FORDOMATIC "WHISTLING NOISE" CORRECTION. This condition may occur during normal engine operation. See "Fordomatic & Mercomatic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Fordomatic & Mercomatic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication–Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain & refill every 15,000 miles. **Use only Automatic Transmission Fluid, Type A.**

Checking Fluid Level–Apply parking brakes, place transmission selector lever in "N" position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (Parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator. Wipe indicator clean and insert in tube (make sure indicator is pushed down all the way). Remove indicator and read level. Add sufficient fluid to raise level to full mark on indicator. Replace indicator.

►*OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type

►*CAUTION (All Cars Except Station Wagon & Sedan Delivery) Rear universal joint companion flange nut controls pinion bearing pre-load (must be adjusted whenever nut is loosened). See "Ford & Mercury (Separate Carrier Type) Hypoid" in Rear Axle Section.*

REAR AXLE

PASSENGER CARS

Own. Separate Carrier, semi-floating hypoid, with Hotchkiss drive.

►*NOTE: Axle not same as Station Wagon & Sedan Delivery.*

See "Ford & Mercury (Separate Carrier Type) Hypoid" in Rear Axle Section.

1954 Ratios

Standard Transmission–3 90-1 (39 10)
Overdrive Transmission–4 10-1 (41-10)
Fordomatic Transmission–3 31-1 (43-13). ①

①–3.54-1 (39-11) Optional

1955 Ratios

Standard Transmission–3 89-1 (35-9)
Overdrive Transmission–4 11-1 (37-9)
Fordomatic Transmission–3 30-1 (33-10) ①

①–3 55-1 (32-9) Optional

Backlash–.003-.008".

Axle Shaft Removal: Remove wheel, take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate

Carrier Assembly Removal: Disconnect rear universal. Remove axle shafts (see above). Remove carrier from housing.

Wheel Bearing Adjustment: None required.

SEDAN DEL. & STATION WGN.

Own. Integral Carrier, semi-floating hypoid, with Hotchkiss drive.

►*NOTE: Axle not same as passenger cars.*

See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.

Ratios

Standard Transmission–4.09-1 (45-11).
Overdrive Transmission–4.27-1 (47-11).
Fordomatic Transmission–3.54-1 (39-11).

Axle Shaft Removal: Same as Pass. Cars (above).

Rear Axle Assembly Removal: Raise rear of car and disconnect rear universal. Remove axle shafts. Disconnect brake lines at "T" on left side of axle housing. Disconnect hand brake cable, shock absorbers, spring U-bolts and shackles. Remove axle housing assembly from car.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

1954 Models

Model	Front	Rear
Pass Cars (Std)	B4A-18124-D	B4A-18125-A
Pass Cars (Hvy Duty)	B4A-18124-F	B4A-18125-C
Sta Wgn & Sed Del.	B4A-18124-E	B4A-18125-B

1955 Models

Model	Front①	①Rear
Pass Cars (Std)	B5A-18124-A	B5A-18125-A
Pass. Cars (Hvy Duty)	B5A-18124-C	B5A-18125-C
Sta. Wgn & Sed Del	B5A-18124-C	B5A-18125-D

①–Furnished in kits which include shock absorber mounting bushings.

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs.

See "Lincoln, Mercury, Ford (Ball-Joint)" in Front Suspension Section.

►*LOWER ARM BUMPER INSTALLATION* Right and left hand bumpers are different and must be installed in the correct position. Damage to suspension system will result if installed incorrectly. **Bumpers when installed should point slightly inboard.**

Kingpin Inclination–0° minimum, 7° maximum, crosswise.

Caster–0° to Pos 1° (1954) Pos ¼° to Pos 1¼° (1955) Maximum variation between wheels ½°

Camber–Pos. ¼° to Pos. 1¼°. Maximum variation between wheels ¼°.

Toe-In–1/16" to 1/8".

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type. *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Power Steering: Ford-Mercury Linkage type. Used in conjunction with standard type steering gear.

See "Ford & Mercury Bendix" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

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Form 14A

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BRAKES

Ford-Bendix Hydraulic (Single Anchor-with eccentric on front wheels, with eccentric on rear wheels). Hand lever applies rear wheel service brakes. *See "Ford, Lincoln, Mercury Bendix" in Brake Section.*

►*1955 FORD & THUNDERBIRD BRAKE LINING & REPLACEMENT CAUTION:* Later cars have "shorter" Primary Shoe Brake Lining and modified brake shoes to reduce any tendency toward pulling or diving when brakes applied. *See "Ford Bendix" in Brake Section for installation cautions.*

►*1955 FRONT WHEEL ADJUSTMENT NOTE: Eccentric has been moved from secondary shoe to primary shoe. Adjustment procedures are different for 1954 and 1955 models. See "Ford, Lincoln, Mercury Bendix" in Brake Section.*

►*1955 PARKING BRAKE "FIX" CORRECTION:* A new parking brake cable equalizer, Part No. B5A-2111-A, is available to correct permanent set of early brake cable equalizer. Before installing on a convertible, cut 1 5/8" from each end of equalizer.

►*1954 BRAKE DRUM INTERFERENCE CORRECTION (Sta. Wgn. & Sed. Del.):* Interference occurs between drum lugs and hand hole flange on wheel and does not allow wheel to seat flat against face of drum. Correct by grinding off outer edge of lugs (3) on an angle of 60° to braking surface of drum. *CAUTION–Do not grind corner of drum.*

Drum Diameter–10" (1954 Pass. Cars, Exc. Sta. Wgn. & Sed Del.) .11" (1954 Sta. Wgn. & Sed. Del. 1955 Pass. Cars, Sta. Wgn. & Sed. Del.).

Wheel Cylinder Diameter–1 1/8" (Front–All); 7/8" (Rear–Pass. Cars). 15/16" (Rear–Sta. Wgn.).

Lining Specifications

Car Model	Width	Thickness	Length
Pass. Car (Fr. Pri.)	2¼"	3/16"	10.84"
Pass. Car (Fr.Sec.)	2¼"	15/64"	10.84"
Pass. Car (Rear-All)	1¾"	3/16"	10.84"
Sta.Wgn.,Sed.Del. (Fr.Pri.)	①	7/32"	9.28"
Sta.Wgn.,Sed.Del. (Fr.Sec.)	①	7/32"	11.94"
Sta.Wgn.,Sed.Del. (Rr.Pri.)	②	7/32"	9.28"
Sta.Wgn.,Sed.Del. (Rr. Sec.)	②	7/32"	11.94"

①–2" (1954). 2¼" (1955). ②–1¾" (1954). 2" (1955).

Clearance–.010" at each end of both primary and secondary shoes. Maximum variation .003". *See Adjustment Change above.*

Brake Pedal Free Play Adjustment: ¼-7/16". If play not correct after brake adjustment, loosen locknut on the eccentric bolt that attaches brake pedal assembly to master cylinder pushrod, rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of fire wall.

Checking Fluid–Maintain fluid level to within ½" of top of reservoir.

Removal–Disconnect brake line from master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove cap screws and lock washers attaching master cylinder to firewall.

Power Brakes: Midland Hy-Power Unit mounted on left side of car in engine compartment and connected in hydraulic brake line between master cylinder and wheel cylinders. There are no mechanical connections and adjustments are required.
See "Midland Power Unit" in Brake Section.

Checking Fluid–Same as for manual brakes (above).

Removal of Power Unit–Depress brake pedal a few times to remove all vacuum from system. Disconnect hydraulic lines at the power unit and remove wires from brake stop light switch. Remove power unit to mounting bracket bolts and lockwashers and remove the power unit.

MISC. MECHANICAL

Windshield Wipers: Vacuum link and crank arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Reversible motor in each window. *See "Electric Window Regulators" in Miscellaneous Section.*

►*POWER WINDOW REGULATOR RELAY FLUTTER CORRECTION See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Electric-Hydraulic with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric screw and jack type with individual motors and transmissions for vertical and horizontal adjustment. *See "Power Seat Adjusters" in Miscellaneous Section.*

Form 14B

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate attached to left front door pillar and stamped on top of frame right-hand front cross member-to-side member reinforcement.
First Number—100001 up.

►*VEHICLE NUMBER NOTE:* Vehicle number (example *U4FG100001*) includes following identification data

Eng. Type ①	Year ②	Assy. Plant	Body Style ③	Serial No.
U	4	See Below	See Below	100001 up

①—**A**—6 Cyl. 223 cu. in. engine; **U**—8 Cyl. 239 cu. in. engine; **P**—8 Cyl. 256 cu. in. engine (Special Law Enforcement).

②—Last digit of model year.

③—**C**—Sunliner; **F**—Skyliner, **R**—Ranch Wagon (Customline); **S**—Sedan Delivery; **T**—Fordor (Crestline); **V**—Victoria; **W**—Ranch Wagon (Mainliner); **X**—Country Sedan; **Y**—Country Squire; **G**—All Others (Tudor, Fordor, Coupe—Mainline & Customline).

Assembly Plant Designation

A—Atlanta	**F**—Dearborn	**M**—Memphis
B—Buffalo	**G**—Chicago	**N**—Norfolk
C—Chester	**H**—Highland Park	**P**—St. Paul
D—Dallas	**K**—Kansas City	**R**—Richmond
E—Edgewater	**L**—Long Beach	**S**—Somerville
	U—Louisville	

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. at cranking speed.

VACUUM READING: 18-21" idling at 500 RPM.

VALVE TAPPET CLEARANCE: .019" (intake & exhaust), with engine at normal operating temperature.
Tappet Adjustment—*See "Valve System" in Ford Special Data.*

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve on cars with single exhaust system is located on front end of right hand exhaust manifold. Cars with dual exhaust system, the valve is located in rear end of left hand exhaust manifold. Thermostat spring installed with ¾ turn-windup and hooked over stop pin. NOTE—When valve installed, stop pin should be at top.

►*MANIFOLD HEAT CONTROL VALVE CHANGE (To improve fuel distribution and minimize stalling due to icing):* New 1955 Manifold Heat Control Valve, No. B5A-9685-D, can be installed. Valve has increased spring tension and will provide more exhaust gas heat.

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders—RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .033-.037".
Spark Plugs—Champion H-10 14mm. Use Champion H-11 for slow or stop-and-go driving.

COIL: Ford No. 8BA-12029.
Ignition Current—2.75-3.0 amperes (idling), 5.0-5.5 amperes (stopped).

DISTRIBUTOR: Ford No. FAE-12127-A.
Condenser—FAB-12300-A. **Capacity**—.21-.25 mfd.
Contact Point Set—Ford No. FAB-12171-A (Std.). FAB-12171-B (Heavy Duty).
Breaker Gap—.014-.016".
Cam Angle—26-28° (58-63% dwell idling).
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Counter-clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Dist. RPM
0	0	200
3¾-4¾	0.72	500
10-11	2.20	1000
12½-13½	3.46	1500
14-15½	4.40	2000

►*DISTRIBUTOR INSTALLATION CAUTION: Be sure oil pump tang engages slot in distributor shaft.*

IGNITION TIMING

►*TIMING CAUTION: Timing is different on Synchro-mesh and Fordomatic Drive Cars.*
Setting (Fordomatic Cars)—6° BTDC.
Setting (Synchro-mesh Trans. Cars)—3° BTDC. NOTE—Timing on synchro-mesh cars can be set up to 6° providing higher octane rating gasoline is used.
Timing Mark—On crankshaft pulley and pointer on front engine cover. Align pointer and timing mark. NOTE—Six timing marks (0°-2°-4°-6°-8°-10° BTDC) on dampener. Wide mark represents TDC.

CARBURETOR

Ford No. EBU-9510-E. Dual down-draft type. NOTE—Anti-stall dashpot used on Fordomatic Cars.

►*CARBURETOR INSTALLATION CAUTION:* Tighten carburetor hold-down bolts evenly to 12-15 ft. lbs. torque. Tightening one bolt completely would result in compressing spacer and cracking carburetor throttle body.

►*ACCELERATOR PEDAL ALIGNMENT NOTE: Clearance between brake pedal and accelerator pedal should be 1¾". If not correct, install one or two flat washers on left hand accelerator pedal bracket-to-floor pan bolt.*

►*ENGINE STALLING AT IDLE SPEED CORRECTION:* If engine stalls at idle speed when idle mixture setting is known to be correct, deviate from the specifications as follows:
Turn each idle mixture screw **out** 1/8th turn at a time until engine speed is reduced 25 RPM., then turn screw **in** until specified idle speed is obtained.
Idle Setting—Approximately one turn open. Set both screws for highest steady vacuum reading and highest engine RPM.
Idle Speed—475-500 RPM., (Std. Trans.). 445-455 RPM., (Fordomatic Trans.) with selector lever in "N" position.

Float Level: 1.275-1.305". Measured from bottom of float to underside of bowl cover with needle valve seated. Use Gauge No. T52L—9510AHD.

Accelerating Pump: Center hole average setting. Inner hole for hot weather, Outer for cold weather.

Fast Idle: Integral type. Operated by choke valve lever. No adjustment required.

Anti-Stall Dashpot (Fordomatic Cars): First adjust engine idle speed then turn engine off. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counter-clockwise) until head of adjusting screw pushes the dashpot rod up to the end of its travel. Turn dashpot screw in (clockwise) 1½-2 turns to obtain .045-.064" clearance. Tighten locknut.

Throttle Linkage Adjustment (Fordomatic Cars): *See "Fordomatic & Mercomatic" in Transmission Section.*

►*OTHER DATA: See "Holley-Ford Carburetors" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs.

CARB. EQUIPMENT

Fuel Pump: Ford No. EAN-9350-A, Fuel only (Except Fordomatic & Overdrive Cars). EBY-9350-A, Fuel & Vacuum (Fordomatic & Overdrive Cars.)
Pressure—4-5 lbs.
See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: King-Seeley Electric.
Dash Unit—Ford No. FAG-9280-A.
Tank Unit—Ford No. FAA-9275-A (Exc. Sta. Wgn. & Sedan Delivery). No. FAA-9275-B (Sta. Wgn. & Sedan Delivery).
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Ford No. FDA-10655-A. 6 volt, 17 plate, 90 ampere hour capacity (20 hr. rate).
Battery Ground—Positive (+) to cylinder head.
Engine Ground—Cylinder head to dash.

STARTER

Ford No. FAC-11002-B. Armature—No. 52-11005.

►*STARTER DRIVE INTERFERENCE WITH FLYWHEEL RING GEAR (FORDOMATIC CARS):* Identified by coarse grinding noise when starting, and a wear pattern at bottom lands of drive gear. To correct, install starter, leaving mounting bolts loose. Insert edge of pry bar between starter flange and engine block, and pry starter away from block. Hold in this position and tighten bolts securely. If not corrected in this manner, it may be necessary to replace converter housing.

►*STARTER SEAL INTERFERENCE WITH FLYWHEEL CORRECTION (FORDOMATIC CARS):* Identified by coarse grinding sound or a "ticking" noise (similar to a loose tappet) when engine is running. Correct by installing a new starter seal.
Drive—Ford No. 1CM-11350-C. Bendix "Folo-Thru".
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—48-56 ozs.
Cranking Speed—100 RPM.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	6.0	70
16 ft. lbs.	Lock		700

①—With starter on engine and engine running.

►*STARTER INSTALLATION CAUTION:* Tighten top and bottom flange bolts first, then tighten the center or outer flange bolt. This will avoid misalignment and prevent noisy starter operation.

Starting Switch: Ford No. FAB-11450-B. Mounted on left front fender apron and controlled by Ignition Switch. NOTE—A Neutral Safety Switch is used on all models with Fordomatic.

Fordomatic Neutral Safety Switch: Ford No. FAC-15812-C
Adjustment—*See "Fordomatic & Mercomatic" in Transmission Section.*

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GENERATOR

Ford No. FBC-10002-A. Armature—FBC-10005-A.

►*GENERATOR BELT WEAR & IMPROPER CHARGING RATE CAUTION:* If either of these two conditions are encountered, check to make sure a 6 Cyl. generator is not being used.

Performance Data

Generator	Amperes	Eng. RPM.
FBC-10002-A	35①	900

①—See Regulator for maximum charging rate.

Brush Spring Tension—30 ozs.
Field Current—1½-2½ amperes at 6.0 volts.
Rotation—Counter-clockwise at commutator end.

Belt Adjustment: ¼" belt deflection midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Ford No. FAC-10505-A.

►*SETTING NOTE:* Settings below are for regulator at NORMAL OPERATING TEMPERATURE (after ½ hour operation) with room temperature at 70-80°.

Cutout Relay

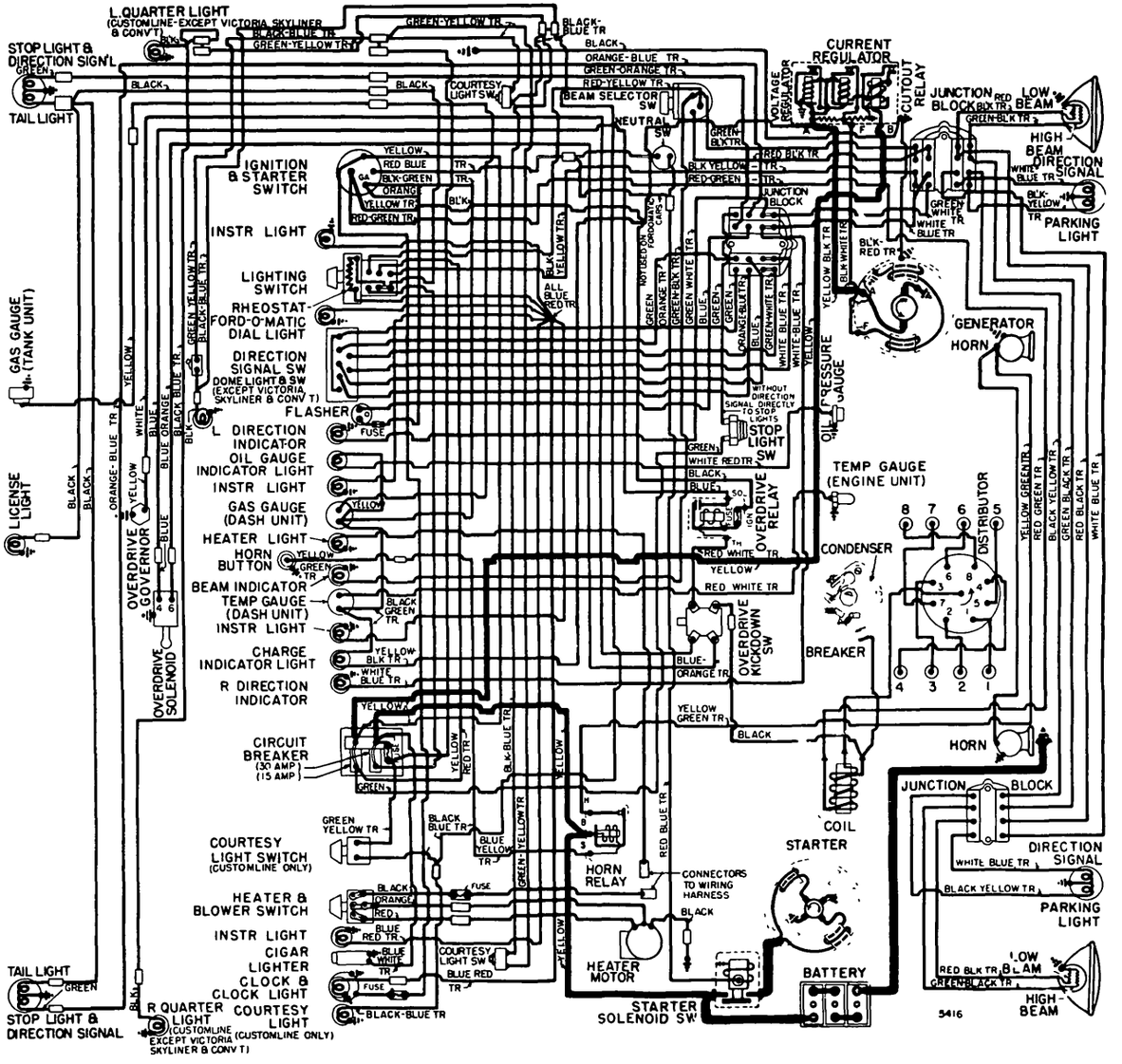
Cuts In—6.0-6.6 volts.

Voltage Regulator

Setting—7.5-7.8 volts.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—34-38 amperes.
Checking & Adjusting—*See Electrical Equip. Section.*



MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equipment Section.*

►*DIRECTION SIGNAL FLASHER BURNING OUT CORRECTION:* Replace 14 amp. fuse with a 9 amp. fuse by making a 3/16" long spacer from ¼" copper tubing. Cut spacer lengthwise and place on wire so it will be between bottom of fuse holder and spring. Press sides of spacer together with pliers.

Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N. Remove switch and disconnect all wires.

Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of brake booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Located as indicated below:
Interior Lights—14 amps., on main circuit breaker.
Direction Signal—14 amps., in fuse holder between ignition switch and flasher. *NOTE—See "Direction Signal Flasher Burning Out Correction" above.*
Overdrive—30 amps., on overdrive relay.
Cigar Lighter—Special fuse in lighter base.
Clock—3 amps., in clock lead.
Heater—14 amps., in blower switch wire.

CIRCUIT BREAKERS: Two circuit breakers on a single panel located behind instrument panel. Upper circuit breaker protects tail & stop light circuits, and lower circuit breaker protects headlamp circuit.

HORNS: Ford No. FAC-13832-E or F (High Pitch), FAB-13833-F or G (Low Pitch). Dual horns operated by relay.
Horn Current—13 amps. (high pitch), 14 amps. (low pitch).
Horn Relay: Ford No. FAA-13853-A.

ENGINE

►*ENGINE FRONT COVER OIL LEAK CORRECTION:* Install gasket Part No. B4A-6020-A (.020" thicker than previous gasket), to correct oil leaks or whenever front cover is removed. Coat both sides of gasket with sealing compound.

►*CYLINDER HEAD PRODUCTION CHANGE:* A new cylinder head, Part No. B4A-6049-A or EBU-6090-B, identified by EBU-6090-B cast in side and top of head, used in later production cars. *CAUTION—LATER TYPE GASKET MUST BE USED WITH THIS HEAD. See "Cylinder Head Gasket Caution" below.*

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ENGINE SPECIFICATIONS: Own 90° V8.
Bore—3.50". **Stroke**—3.10"
Displacement—239 cu. in. **Rated H.P.**—39.2.
Developed Horsepower—130 at 4200 RPM.
Compression Ratio—7.2-1.
Compression & Vacuum Reading—*See Tune-Up.*

CYLINDER HEAD: *See Ford Special Data.*

►*CYLINDER HEAD GASKET CAUTION:* Later type gasket Part No. B4A-6051-A (identified by **elongated core hole** sealing area on outer edge of gasket on piston side between center piston holes), can be used with either early or late type heads. Early gasket Part No. EBU-6051-E (identified by **round hole** sealing area in same location as above), must NOT be used with later type head.

►*CYLINDER HEAD GASKET INSTALLATION CAUTION:* Gaskets are stamped on one side with the words "RIGHT FRONT". When installing gasket on **right hand** side of cylinder block, wording should be **upward** and toward front of engine. When installing on **left hand** side, wording should be **downward** and toward front of engine.

TIGHTENING TORQUES: *See Ford Special Data.*

ENGINE REMOVAL: *See Ford Special Data.*

OIL PAN REMOVAL: *NOTE—Later type oil pan has single piece oil pump screen cover and inlet tube assembly.* To remove oil pan rotate engine to place #1 piston on TDC. Drain oil and remove engine front splash pans and oil pan-to-oil pump pipe (early type pans), disconnect oil pipe at oil pump (later type pans). On Fordomatic Transmission cars, remove converter housing dust cover. Remove oil pan.

PISTONS

Autothermic type. Solid skirt with three rings above pin.
Removal—Pistons and rods removed from above.

Fitting New Pistons: Use ½" feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows
New Piston in New Bore—.0015" feeler. 5-10 lbs. pull.
New Piston in Used Bore—.002" feeler. 5-10 lbs. pull.
Used Piston in Used Bore—.0025" feeler. 5-10 lbs. pull.

Replacement Pistons: Standard size, .020", .030", .040", .060" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Install with small indentation in head toward FRONT of engine.

PISTON PINS

Floating type with lock rings at each end.
Diameter—.9120-.9123". **Length**—2.9820".
Pin Fit in Piston—Hand push fit at 70° F.
Pin Fit in Rod Bushing—.0001-.0003" clearance. New pin should not fall through of own weight.

Replacement Pins: Standard size, .001", .002" Oversize.

PISTON RINGS

►*SPECIAL SERVICE PISTON RING SETS (To Reduce Possibility of Excessive Oil Consumption):* The following "Special Service" piston ring sets are available in addition to the "Expander" & "Snap Ring" type service replacement rings B4A-6149-ABA (Pass. Cars only), has "Unitized" oil ring. B4A-6149-ACA (Pass. Cars & Trucks) has "Steel Section" oil ring. B4A-6149-ADA (Pass. Car & Truck) has "Steel Rail" oil ring.

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.010-.027"	.002-.0035"
Compr. #2	3/32"	.010-.027"	.002-.0035"
Oil	3/16"	.010-.027"	.0015-.003"

Replacement Rings: Standard size, .020", .030", .040", .060" Oversize.

►*REPLACEMENT PISTON RING NOTE:* "Snap-Type" rings furnished in Std. size only. "Expander" type furnished in all above oversizes *See "Special Service Piston Ring Sets" above.*

CONNECTING RODS

►*1954 V8 CONNECTING ROD & BEARING PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION* Late-production connecting rods have an oil hole (for cylinder lubrication) located on the same side as the bearing notch. Early type bearings, with one oil hole MUST NOT BE USED with the later type rod. Later type bearings may be used with either the old or new rod as they have two oil holes and will fit either rod.
Length—6 21/64". **Weight**—24.06 ozs.
Crankpin Journal Diameter—2.1880-2.1888".
Lower Bearing—Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Clearance—.0005-.0021".
Side Clearance—.006-.016" (two rods).

Replacement Bearings: Standard size (4 sizes marked **red** & **blue** for selective fitting) and .010", .020", .030" Undersize.

Installing Rods: Oil squirt hole in rod toward camshaft side of bore on all rods. Numbers on rods and bearing cap should be together and installed in same numbered cylinder.

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL PRODUCTION CHANGE:* Later type parts are interchangeable with previous parts except that later crankshaft cannot be used with early flywheel unless inner edge of bore in flywheel is chamfered 1/16" x 45° to eliminate crankshaft-to-flywheel interference. This operation can be accomplished with a bearing scraper.
Journal Diameter—2.4980-2.4988". Max. wear limits .0015", taper .001".
Bearings—Steel backed, copper lead alloy lined.

Replacement Bearings: Standard size, (4 sizes marked **red** & **blue** for selective fitting) and .010", .020", .030" Undersize.

End Thrust: Taken by No. 3 main bearing. Replace bearing if endplay excessive.
Thrust Bearing Alignment—*See "Crankshaft & Main Bearings" in Ford Special Data.*
Endplay—.002-.006".

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*

►*CRANKSHAFT REAR BEARING OIL SEAL PRODUCTION CHANGE: New type oil seal and oil seal retainer used in later production and is not interchangable with early engines. See Ford Special Data.*

CAMSHAFT

►*1954 239" & 256" ENGINE CAMSHAFT BEARING CHANGE (To prevent oil starvation due to improperly installed front bearing)* On engines equipped with the "ECE" camshaft, new front camshaft bearings have been released for service replacement (Part No. B4C-6261-A, Standard B4C-6261-B, .015" undersize). The later bearings have a slot instead of a 1/8" diameter oil hole. When installing the new bearing make sure that the slot is aligned with hole in cylinder block bore and that the bearing is pressed .005-.020" into cylinder block camshaft bearing bore to eliminate interference with camshaft thrust plate.
Journal Diameter—1.9255-1.9265" (new), 1.924" (worn limit)
Clearance—.001-.003" (new), .005" (worn limit)

End Thrust: Taken by plate on forward end of block (between camshaft sprocket and shoulder on block).
Endplay—.003-.006".

Replacement Camshaft Bearings: Finished bearings furnished Standard, .015" Undersize. *CAUTION—Oil holes in bearings must be lined up correctly. See Ford Special Data.*

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

Timing Chain Side-guide type. Length 56 links.

►*REPLACEMENT NOTE* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side).

Camshaft Setting: *(NOTE—Two types of timing chains used which have different index marks).* **"Brass disc"** type has a brass link pin washer which should be placed next to marked camshaft sprocket tooth (away from opposite sprocket). **"Punched link"** type has a hole punched in center of link which should index with marked tooth on camshaft sprocket. Place #1 piston on TDC (firing position). Place timing chain over camshaft and crankshaft sprockets, making sure that timing marks on sprockets are lined up adjacent to marks on timing chain. Align camshaft and crankshaft keys so that both timing chain sprockets and timing chain can be installed simultaneously.

VALVES

►*1954 VALVE PUSHROD BENDING & ROCKER ARM BREAKAGE CORRECTION* If this condition is encountered at sustained speed over 40-50 MPH, check the guide clearance on the valve in question. The clearance should be .001"-.002" (intake), and .002"-.003" (exhaust). The above condition is usually encountered when less than minimum clearance is provided. Ream valve guides as necessary to provide proper clearance.

►*EXHAUST VALVE STEM DIAMETER CHANGE (Production & Service Replacement Valves): Stem diameter decreased .0005" for greater clearance in guide. See "Valve System" in Ford Special Data.*

Tappet Clearance: .019" (Intake & Exhaust), with engine at normal operating temperature. *NOTE—Valve tappet clearance on truck engines is different.*

Tappet Adjustment—*See "Valve System" in Ford Special Data.*

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Valv	Head Diam.	①St m Diam.	L ngth
Intake	1 652"	3415"	5 02"
Exhaust	1.515"	.3405"	5.02"

Valv	S at Angl	②Lift	Stem Clearance
Intake	45°	.345"	.004" max.
Exhaust	45°	.345"	.005" max.

①—Valves furnished with .003", .015", .030" Oversize stems for service replacement. See "Valve System" in Ford Special Data.

②--Minimum lift for checking camshaft lobe wear.

Valv Seat Width—.060-.070" (Intake). .070-.080" (Exhaust).

►*ROTATABLE VALVE NOTE All valves are rotatable type. Se "Valve System" in Ford Special Data.*

Valv St m Oil Seals—"Umbrella" type oil seals used on intake & exhaust valve stems. Seals are installed with cupped side down on valve stem at guide boss on cylinder head. *Install new seals whenever valves remov d or when s als become loose on valve stems.*

Valv Springs: Install with closed coil end toward cylinder head.

Valv Spring Specifications

	Pressure	Length
Valve Closed	54-62 lbs.	1 821"
Valve Open	124-140 lbs.	1.505"

Valv Guid s: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" Intake, .005" Exhaust), ream guides and install oversize valves. *S "Valv System" in Ford Special Data.*

Valv Lift rs: Mushroom type. Removed from below with camshaft removed.

►*1954 V8 ENGINE TAPPET REPLACEMENT CAUTION·* The cast iron tappet, Part No. EAA-6500-C should no longer be used as service replacement on V8 engines as these tappets may contribute to camshaft lobe wear Install tappet, Part No EAA-6500-D (steel forging) which can be identified by forging marks on outer edge of tappet foot The tappet foot is 140" thick as compared to 220" thickness of the cast iron tappet foot

R ck r Arm Ass mbly: *See "Valve System" in Ford Sp cial Data.*

►*ROCKER ARM COVER OIL LEAKAGE CORRECTION·* Cover may be slightly shallow requiring the use of an additional washer under the acorn nut to firmly seat cover on cylinder head.

VALVE TIMING

S e "Camshaft S tting" under CAMSHAFT above.

Intak Valv s—Open 8° BTDC. Close 44° ALDC.

Exhaust Valv s—Open 47° BLDC. Close 5° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Ford Special Data*

►*1954 239" & 256" ENGINE SERVICE REPLACEMENT OIL PUMP CHANGE & INSTALLATION CAUTION·* A new pump, Part No. EAM-6600-A, with steel gears is available for service replacement The pump is furnished in Kit No B5A-6600-C which includes a pump and spring When installing pump on these engines, remove the Relief Valve Spring from the pump and replace it with the spring, Part No. EBU-6670-A, found in the box

►*1954 V8 ENGINE OIL PUMP FAILURE CORRECTION (Due to oil pan-to-oil pump tube seal breaking off)·* In some cases the tube is too short and when the retaining nut is tightened excessively, the seal is squeezed over the edge of the tube which cuts to seal Always lubricate the seal with engine oil prior to installation, and tighten the retaining nut just enough to ensure against leakage

Crankcase Capacity: 5 qts. (refill)

Normal Oil Pressure: 45-55 lbs. at 30-40 MPH

Pressure Regulator Valve—In pump body, not adjustable.

Oil Pressure Indicator—Indicator light on instrument panel, operated by Engine Unit—Ford No. FDA-9278-A (Stamped #7 on Hex.) Lights when ignition switch turned on, goes out when engine starts and pump operates.

Oil Pump: Gear type pump located on left side of engine crankcase, driven by distributor drive gear.

Pump Overhaul—*See "Oil Pump" in Ford Special Data.*

Oil Filter: Full-flow type (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

Replacement Filter Element—Ford No. B2A-6731-A (Kit includes new gaskets).

►*CAUTION: This special Full-flow filter element must be used for replacement(use of by-pass type element would restrict oil flow and result in insufficient engine lubrication.*

►*FILTER INSTALLATION CAUTION & OIL LEAKAGE CORRECTION· See "Oiling System" in Ford Special Data*

Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase on right side of engine.

►*CRANKCASE VENTILATOR OIL LEAKAGE CORRECTION* Install gasket, Part No. B4A-6872-A, which is a firmer type neoprene gasket and will not distort when tightened.

COOLING

►*TEMPERATURE GAUGE FALSE READING CORRECTION* In cases where heat indicator shows a reading higher than actual water temperature, check water temperature gauge bulb on engine to see that it is not contacting a casting flash inside cylinder head. Remove flashing with a rat tail file.

►*RESTRICTED WATER PUMP BY-PASS CAUTION* A restricted or blocked passage caused by casting flash will retard or decrease the flow of water in engine when thermostat is closed. Check for this condition by listening for a gurgling sound when engine is stopped after a short period of operation. If noise is heard, remove water by-pass tube and inspect for a restricted opening in water pump housing. If necessary, remove pump and drill opening with a 19/32" drill.

Water Capacity: 20 qts. (without heater), 21 qts. (with heater).

Pressure Valve: Ford No. 1M-8100-A. Radiator filler cap cap (7# type), opens at 6¼-7¾ lbs.

Th rm stat: Ford No. B4A-8575-A (160°), No. B4A-8575-B (180° used with permanent anti-freeze). Mounted inside water outlet elbow on forward end of intake manifold. *NOTE—Th abov thermostat replaces type formerly us d.*

Wat r Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Ford Special Data

Temperature Gauge: King-Seeley Electric.

Dash Unit—Ford No. FDA-10883-A.

Engine Unit—Ford No. 1A-10884-A.

Temperature Bulb Sleeve Removal—Thread adapter handle of tool T50T-100-A into sleeve. Tighten locknut against sleeve, then pull sleeve with sliding hammer.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 9½ CF-TS. Ford No. 1A-7563-A.

See "Long Clutches" in Clutch Section.

►*CLUTCH RELEASE BEARING NOISE CORRECTION: Check release bearing hub shoulder for a second "st p" that prevents bearing from seating properly. Corr ct by replacing hub.*

►*CLUTCH GRATING NOISE CORRECTION:* Retracting spring reversed and rubbing on steering housing. Long end of spring should be toward front of car.

Clutch Disc No.—Ford No. 8HA-7550-B.

Pedal Adjustment: If total pedal travel is less than 6 3/8" or more than 6 5/8", reposition pedal bumper until travel is within limits.

Pedal Free Travel—7/8-1 1/8". Loosen clutch pedal release rod locknut (lower end) and turn adjusting nut for correct free travel, tighten locknut.

Removal: Remove transmission (see Transmission Removal below), and slide clutch release bearing off clutch release lever. Disconnect clutch pedal release rod from clutch release lever assembly. Remove clutch release equalizer bar bracket from flywheel housing and remove equalizer bar. Remove split bronze bushing from bracket and then remove flywheel housing. Install Tool 7563 and remove clutch pressure plate assembly (if tool not available, clutch may be released by backing off the attaching bolts evenly). Remove clutch release bearing from hub with an arbor press.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Ford Synchro-mesh" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

►*GEAR CLASHING CORRECTION (Shifting from Neutral-to-Low or Reverse):* Check operation by depressing clutch pedal and allowing sufficient time for input shaft to stop rotating. If clash still occurs, check fit of clutch disc hub on input shaft. If it binds on shaft, apply lapping compound to input shaft and lap hub to shaft. If condition continues to exist, it will be necessary to select-fit clutch disc and input shaft. *CAUTION—Reducing clutch free-play below specified limits will not correct condition.*

Transmission Control: *See "Transmission Control" in Transmission Section.*

R m val: Disconnect rear universal, slide propeller shaft out of transmission. Disconnect clutch, transmission

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and speedometer linkage. Support rear of engine and disconnect rear engine mounting from frame. Take out 4 transmission-to-flywheel housing capscrews and remove transmission.

OVERDRIVE

Warner Model A54-R10F. Solenoid operated type, with governor control and throttle operated kick-down. Lock-out Switch not used on this model.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.

►*FORDOMATIC "WHISTLING" NOISE CORRECTION: This condition may occur during normal engine operation. See "Fordomatic & Mercomatic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication—Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain & refill every 15,000 miles. **Use only Automatic Transmission Fluid Type A.**

Checking Fluid Level—Apply parking brakes, place transmission selector lever in "N" (Neutral) position, run engine at idle speed for approximately four minutes. With engine and transmission at normal operating temperature and idling, move selector lever through all positions to distribute fluid through transmission. Return selector lever to "P", check fluid level on dipstick in filler cap in engine compartment. Maintain level at "Full" mark on dipstick.

►*OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Mechanics. Roller bearing type.

►*CAUTION (All Cars Except Station Wagon & Sedan Delivery): Rear universal joint companion flange nut controls pinion bearing pre-load (must be adjusted whenever nut is loosened). See "Ford & Mercury (Separate Carrier)" in Rear Axle Section.*

REAR AXLE

PASSENGER CARS

Own. Separate Carrier, semi-floating hypoid, with Hotchkiss drive.

See "Ford & Mercury (Separate Carrier)" in Rear Axle Section.

Ratios

Standard Transmission—3.90-1 (39-10).
Overdrive Transmission—4.10-1 (41-10).
Fordomatic Transmission—3.31-1 (43-13). ①

①—3.54-1 (39-11) Optional.

►*AXLE CARRIER & GEAR RATIO IDENTIFICATION: Carrier housing stamped with ring gear & pinion gear ratio (10/39 for 3.90-1 ratio, etc.).*

Backlash—.003-.008".

Axle Shaft Removal: Remove wheel, take off drum, Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: Disconnect rear universal. Remove axle shaft (see above). Remove carrier from housing.

Wheel Bearing Adjustment: None required.

SEDAN DEL. & STATION WGN.

Own. Integral Carrier. Semi-floating hypoid, with Hotchkiss drive.

See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.

Ratios

Standard Transmission—4.09-1(45-11).
Overdrive Transmission—4.27-1 (47-11).
Fordomatic Transmission—3.54-1 (39-11).

Axle Shaft Removal: Same as Pass. Cars (above).

Rear Axle Assembly Removal: Raise rear end of car and disconnect rear universal. Remove axle shafts. Disconnect brake lines at "T" on left side of axle housing. Disconnect hand brake cable, shock absorbers, spring U-bolts and shackles. Remove axle housing assembly from car.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Model	Front	Rear
Pass. Cars (Std.)	B4A-18124-D	B4A-18125-A
Pass. Cars (Hvy. Duty)	B4A-18124-F	B4A-18125-C
Sta. Wgn. & Sed. Del.	B4A-18124-E	B4A-18125-B

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs. *See "Lincoln, Mercury, Ford (Ball-Joint)" in Front Suspension Section.*

►*LOWER ARM BUMPER INSTALLATION CAUTION:* Right and left hand bumpers are different and must be installed in the correct position.

Kingpin Inclination—6° minimum, 7° maximum, crosswise.

Caster—0° to Pos. 1°. Maximum variation between wheels ½°

Camber—Pos. ¼° to Pos. 1¼°. Maximum variation between wheels ¼°.

Toe-In—1/16" to 1/8".

STEERING

MANUAL: Own (Gemmer 305 Design). Worm & Roller type. *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Power Steering: Ford-Mercury Linkage type. Used in conjunction with standard type steering gear.

See "Ford & Mercury Power Unit" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic (Single anchor—with eccentric on front wheels, without eccentric on rear wheels). Hand lever applies rear wheel service brakes. *See "Ford, Lincoln, Mercury Bendix" in Brake Section.*

►*BRAKE DRUM INTERFERENCE (Sta. Wgn. & Sed. Del.):* Interference occurs between drum lugs and hand hold flange on wheel and does not allow wheel to seat flat against face of drum. Correct by grinding off outer edge of lugs (3) at an angle of 60° to braking surface of drum. *CAUTION—Do not grind corner of drum.*

Drums—Diameter 10" (Pass. Cars). 11" (Sta. Wgn. & Sed. Del.).

Wheel Cyl. Diameter—1 1/8" (Front). 7/8" (Rear).

Lining—Molded type riveted to shoe.

Width—2¼" (Front, Pass Cars.). 2" (Front, Sta. Wgn. & Sed. Del.). 1¾" (Rear, All Models).

Thickness—(Pass. Cars) 3/16" (Exc. Front Whl. Secondary). 15/64" (Front Whl. Secondary). **Sta. Wgn. & Sed. Del. 7/32"** (All Shoes).

Length—10.84" (Pass. Cars—All Shoes). 9.28" (All Primary Shoes—Sta. Wgn. & Sed. Del.). 11.94" (All Secondary Shoes—Sta. Wgn. & Sed. Del.).

Clearance—.010" at each end of both primary and secondary shoes. Maximum variation .003".

Brake Pedal Free Play Adjustment: 1/4-7/16". If play not correct after brake adjustment, loosen lock nut on the eccentric bolt attaching brake pedal to master cylinder pushrod, rotate eccentric bolt.

Standard Master Cylinder: On engine side of firewall.

Checking Fluid—Maintain fluid level to within ½" of top of reservoir.

Removal—Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes: Midland Hy-Power Unit mounted on left side of car in engine compartment and connected in hydraulic brake line.

See "Midland Power Unit" in Brake Section.

Removal of Power Unit—Depress brake pedal a few times to remove all vacuum from system. Disconnect hydraulic lines at the power unit and remove wires from brake stop light switch. Remove power unit to mounting bracket bolts and lockwashers.

MISC. MECHANICAL

Windshield Wipers: Vacuum link and crank arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Window Regulators: Reversible motor in each window. Two types used. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Top Control: Electric Hydraulic with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric screw and jack type *See Miscellaneous Section for complete data.*

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous S ction.*

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate attached to left front body pillar below upper hinge opening
First Numb r—100001

►*VEHICLE NUMBER NOTE* Vehicle number (example *P5FV100001*) includes following identification data

Eng. Typ ①	Y ar②	Assy. Plant	Body Style③	Serial No.
P	5	See below	See below	100001 up

①—**A**—6 Cyl 223 cu in engine, **U**—8 Cyl 272 cu in. engine, **P**—8 Cyl 292 cu in engine (Special Law Enforcement & Thunderbird)
②—Last digit of model year
③—**C**—Sunliner, **F**—Skyliner, **H**—Thunderbird, **R**—Ranch Wagon, **S**—Sedan Delivery, **T**—Fordor & Tudor (Fair lane), **V**—Victoria, **W**—Special Body (Solid top), **X**—Country Sedan, **Y**—Country Squire, **G**—All Other (Fordor, Tudor, Mainline & Customline).

Ass mbly Plant Designation

A—Atlanta	**F**—Dearborn	**N**—Norfolk
B—Buffalo	**G**—Chicago	**P**—St. Paul
C—Chester	**K**—Kansas City	**R**—Richmond
D—Dallas	**L**—Long Beach	**S**—Somerville
E—Edgewater	**M**—Memphis	**U**—Louisville

TUNE-UP

►*FORD & THUNDERBIRD V8 ENGINE ROUGH IDLE· Can usually be corr cted by this procedure*
1) Tapp t Cl aranc Adjustment—Adjust using "GO" and "NO GO" gauges (below)
2) High T nsi n Coil & Spark Plug Cable Installati n—If wires loosen at coil and plug connections, check location of pressure relief hole in boot. If hole too low, pierce new .062" hole in side of boot 1/2-3/4" above lower edge of boot
3) Carbur t r Fu l Level—Check for fluctuations caused by burrs or rough spots on float hinge or pin, worn or ridged fuel inlet needle or seat and leakage, or incorrect float setting *See "Holley (Ford) Dual" and "Holl y (Ford, Lincoln, Mercury) 4-Barrel" in Carbur tion S ction for checking procedure and float and fuel lev l specifications.*

COMPRESSION PRESSURE: 130 lbs (Except Special), 140 lbs. (Special)

VACUUM READING: 18-21" idling at 500 RPM

VALVE TAPPET CLEARANCE· .019" (intake & exhaust), with engine at normal operating temperature. *NOTE*—Adjust with engine hot and idling, use .018" feeler as "GO", .020" feeler as "NO GO" gauge. This will insure tappet clearance being .019"±.001".
Tapp t Adjustm nt· *See "Valve System" in Ford Special Data*

MANIFOLD HEAT CONTROL: Automatic thermostatic type Located at front end of right exhaust manifold (Single Exhaust), rear end of left exhaust manifold (Dual Exhaust) Install spring with ¾ turn windup. *NOTE*—Stop pin should be at top with valve installed.

►*MANIFOLD HEAT CONTROL PRODUCTION CHANGE* **(272 Engin with Singl Exhaust):** New Manifold Heat Control Valve, No B5A-9658-D can be installed. Valve has increased spring tension and will improve fuel distribution and minimize stalling (due to icing) by providing more exhaust gas heat

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders—RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.
SPARK PLUG GAP: .032-.036"
Spark Plug—Champion 870. 18mm Special

►*SPARK PLUG CAUTION· Spark plug is new type with tapered seat and does not require a sealing gasket. It is important that plugs tightened to 15-20 ft. lbs.*

COIL: Ford 8BA-12029. On engine at distributor.
Ignition Current—3.0 amps idling, 5.0 stopped.

DISTRIBUTOR: Ford. Used as follows:

	Distributor No.
272 (Std.-2-barrel Carb.)	B5A-12127-B
272 (Special—4-Barrel Carb.)①	③ FEC-12127-A
272 (Special—4-Barrel Carb.)②	⑨ B5A-12127-F
292 (Interceptor)①	③ B5S-12127-D
292 (Interceptor)②	⑨ B5S-12127-E

①—Early Cars ②—Later Cars. ③—See Distributor Modification (below) ⑨—Modified Distributors (with new spring combination for the Distributor Modification.

►*DISTRIBUTOR MODIFICATION & PRODUCTION CHANGE (Distr Nos. FEC-12127-A & B5S-12127-D on Early 272 Special & Interceptor 292 Engines):* To minimize detonation, particularly in areas where fuel octane rating is below average, above distributors can be modified by replacing secondary spring (nearest vacuum chamber) with new spring No 8EQ-12225, and recalibrating distributor advance as indicated in MODIFIED Advance Performance Table below *NOTE*—Later B5A-12127-F & B5S-12127-E Distributors have this new spring and MODIFIED advance performance

►*CAUTION:* Above modification must NOT be made on 272 Std. Engine Distr. B5A-12127-B (will result in excessive spark advance and cause detonation).
Condenser—Ford FAB-12300-A. **Capacity** .21-.25 mfd.
Contact Point Set—Ford FAB-12171-A (B5A-12127-B Distr.), FAB-12171-B (All Others)
Breaker Gap—.014-.016".
Cam Angle—26-28½°.
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Counter-clockwise viewed from above.

Advance Performance
Distributor No. B5A-12127-B
►With Distributor on Test Stand

Distr. Degrees	Vacuum ("of HG)	Distr. RPM
0	15	300
1½-2½	4.40	500
9½-10½	1.58	1000
12¾-14	3.13	1500
15¼-16½	4.60	2000

Distr. FEC-12127-A & B5S-12127-D (Orig.)
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
½-1½	19	300
11-12½	1.36	1000
12¾-13¾	1.59	1400
14¼-15½	1.95	2000

Modified Distr. FEC-12127-A & B5S-12127-D, All B5A-12127-F & B5S-12127-E
►With Distribut r n T st Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
¼-1¼	.16	300
6½-7½	.75	700
9½-10½	1.27	1200
11¼-12¼	1.59	1500
14-15¼	2.19	2000

►*DISTRIBUTOR INSTALLATION CAUTION: Make sur oil pump intermediate shaft properly engages distributor shaft. It may be necessary to turn over the engin with starter, after distributor drive gear is partially engaged, to engage distributor intermediate shaft.*

IGNITION TIMING

►*TIMING CAUTION: Timing is different on Synchromesh and Fordomatic Drive Cars.*
Setting (Fordomatic Cars)—6° BTDC.
Setting (Synchro-mesh Trans. Cars)—3° BTDC. NOTE—Timing on synchro-mesh cars can be set up to 6° providing higher octane rating gasoline is used.
Timing Mark—On crankshaft pulley and pointer on front engine cover Align pointer and timing mark. NOTE—six timing marks (0°-2°-4°-6°-8°-10°-BTDC) on dampener Wide mark represents TDC

CARBURETOR

►*FORDOMATIC THROTTLE LINKAGE PRODUCTION CHANGE & NO DOWNSHIFT CORRECTION (Early Cars)* To correct "No Downshift" condition on cars built prior to January 12, 1955, a new transmission control shaft-to-accelerator rod, Part No B5A-9784-F, and a new control shaft, Part No B5S-77230-F, are available. New parts eliminate bend or twist in bellcrank portion of transmission control shaft and bracket assembly Cars built after January 12, 1955 have new parts installed

►*THUNDERBIRD ACCELERATOR ASSEMBLY PRODUCTION CHANGE (To Correct Permanent Set)* New accelerator assembly, Part No B5S-9725-B, available to replace assembly, Part No B5S-9725-A, which was found to take a permanent set under operating load conditions

►*CARBURETOR APPLICATION Two-barrel and four-barrel carburetors used on 272 Cu. In. Engine. Four-barrel carburetors used on 292 Cu. In. Engine.*

►*ACCELERATOR ROD-TO-BELL CRANK CONNECTING LINK CORRECTION (To Prevent Linkage Disconnection)·* Install a No. 10 lockwasher, Part No. 34803-S7, between lock nut and accelerator rod New rods which incorporate this change and which have improved design ball end sockets are available

Anti-Stall Dashpot (Fordomatic Cars): First adjust engine idle speed then turn engine off. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counter-clockwise) until head of adjusting screw pushes the dashpot rod up to the end of its travel. Turn dashpot screw in (clockwise) 1½-2 turns to obtain .045-.064" clearance.
Throttl Linkag Adjustm nt (F rdomatic Cars): With selector lever in "N" position and engine at normal operating temperature, set idle speed to 450-475 RPM.

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Adjust Anti-Stall Dashpot, then turn engine off. Disconnect transmission throttle control rod from accelerator assembly lever on engine and insert a locking pin (¼" drill rod) through adjusting holes in lever and assembly. Adjust length of link between assembly and carburetor throttle valve lever to close lever against its stop. Adjust accelerator assembly connecting link (assembly-to-cross shaft link) to obtain a pedal height of 3 11/16" (Exc Ford Interceptor, Special & Thunderbird), 3 9/16" (Interceptor & Special), & 4½" (Thunderbird) Remove locking pin Pull gently on transmission throttle control rod to hold transmission lever against its internal stop Rotate clevis on upper end of rod until clevis fits freely on pin on accelerator assembly lever, **then lengthen rod by turning clevis three turns counter-clockwise.** Install throttle control rod on lever Hold lever in alignment to prevent binding, and tighten locknut Road test car, and if band or clutch slippage evident, **increase rod length to 3½ turns of clevis but do not exceed 4 turns.**

NOTE–Connecting link between cross shaft and lever must be parallel to center line of engine. Adjust as necessary by rotating adjusting screw in lever.

FORD TWO-BARREL

Transmission	Ford Carb. No.
Std & Overdrive	B5A-9510-J
Fordomatic	B5A-9510-K

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7*

Idle Setting–Initial setting 1½ turns open Setboth screws alike. Set for highest steady vacuum reading with engine at normal operating temperature, or midway between rolling and missing points Turn screws out for richer mixture

Idle Speed–475-500 RPM. (Std & O.D.), 450-475 RPM. (Fordomatic) with selector lever in Neutral "N"

Float Level–1.275-1.305" measured from flange surface of air horn (near each end), to bottom side of float (not soldered seam) To correct float setting, bend float lever arm up or down.

Accelerating Pump: Center hole average setting. Inner hole for hot weather, Outer for cold weather.

Fast Idle: Integral type. Operated by choke valve lever. No adjustment required.

Throttle Linkage & Anti-Stall Dashpot Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley-Ford Carburetors" in Carburetor Section*

Fuel Pump Pressure: 4-5 lbs. at 900 RPM.

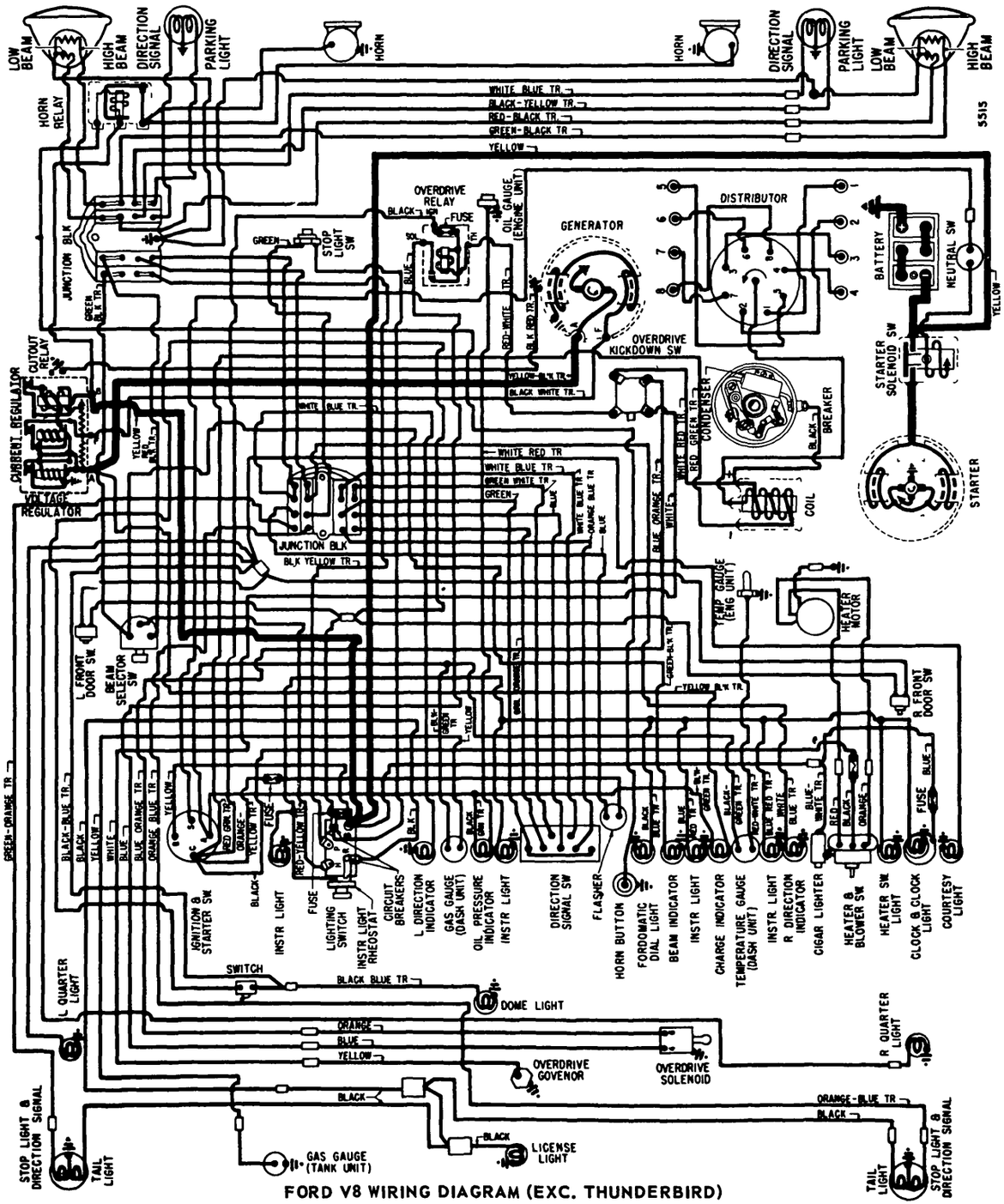
FORD FOUR-BARREL

Transmission	Ford Carb. No.
Std & Overdrive (Early) .	B5A-9510-G
Fordomatic (Early)	B5A-9510-H
Std. & Overdrive (Later) ①	B5A-9510-M
Fordomatic (Later) ①	B5A-9510-N
All Transmissions (Latest) ②	B5A-9510-B

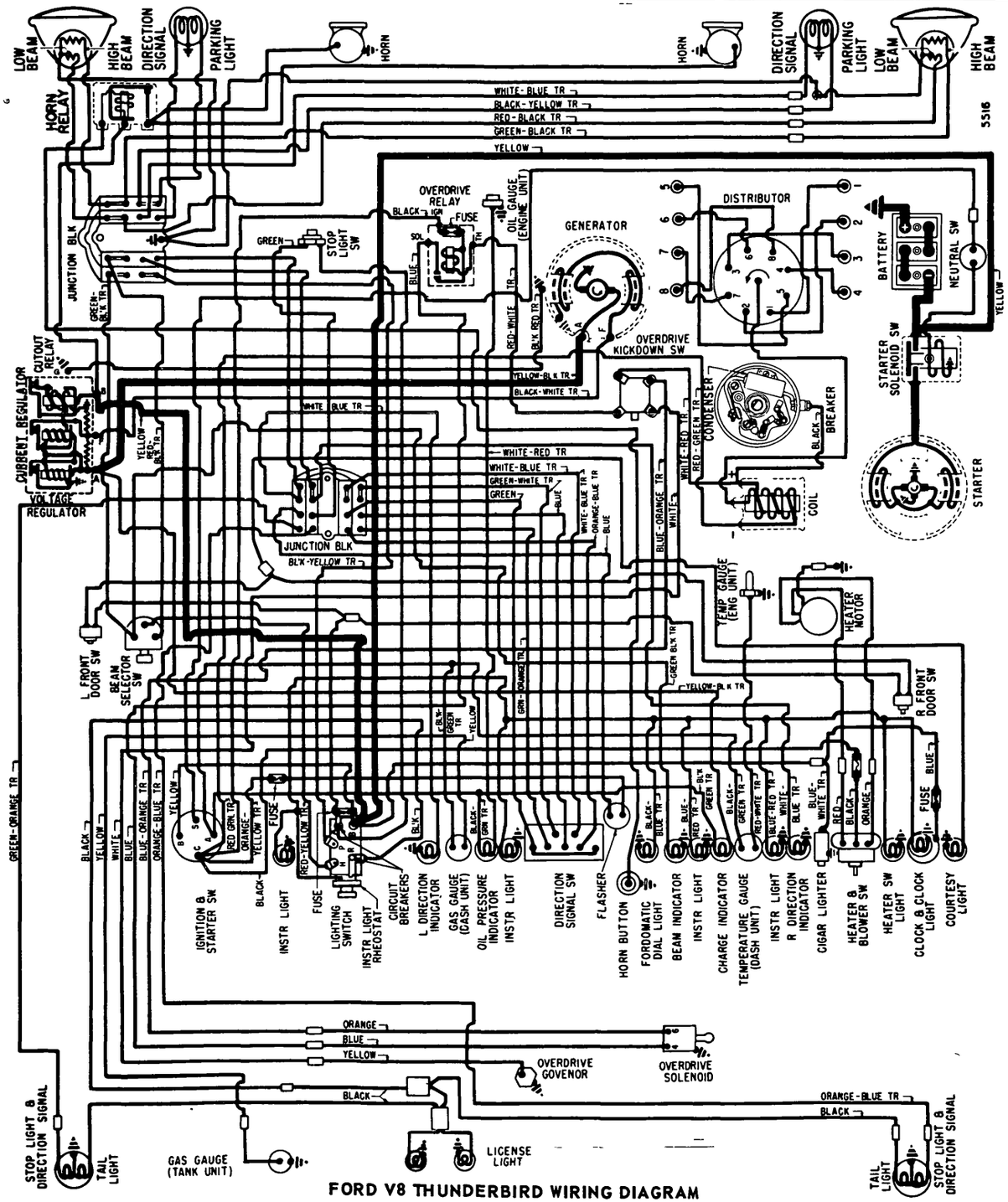
①–When used on 292 Eng. use air cleaner screw, Part No. B5S-9813-A (same as installed on old carburetor).

②–Have leaner etting, accomplished by redesigned idle tube assemblies, nozzle bar air bleeds, main jets,

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FORD V8 WIRING DIAGRAM (EXC. THUNDERBIRD)



FORD V8 THUNDERBIRD WIRING DIAGRAM

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some main body drillings, and changed accelerator nozzles. New carburetor units identified by suffix "-5" either stamped or cast in side of main body following ECG model identification. *See "Ford, Lincoln, Mercury Centri-Quad 4-Barrel" in Carburetor Section.*

►***MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl.2-3-5-8, LEFT barrels 1-4-6-7.***

►*ROUGH ENGINE IDLE CORRECTION: See Tune-Up above.*

►*CARBURETOR ICING CORRECTION:* On early cars, Radiator Upper Air Deflector, No. B5A-8327-A, can be installed to restrict cold air entering engine compartment (this deflector installed in production beginning May, 1955). *CAUTION*—Deflector should be removed during summer months in extremely hot temperatures to avoid possibility of engine overheating.

►*CHOKE VALVE BIND CORRECTION (First Cars): See "Ford Lincoln, Mercury Centri-Quad" Carburetor in Carburetor Section.*

►*CARBURETOR INSTALLATION CAUTION (First Cars):* Care must be taken not to dislodge choke air inlet tube washer in carburetor throttle body which may be carried into engine combustion chamber. *See "Ford, Lincoln, Mercury Centri-Quad 4-Barrel" in Carburetor Section.*

Idle Setting—1¼ turns open (B5A-9510-G, H), 1/2-5/8 turn open (B5A-9510-M, N). Set both screws alike. Set for highest steady vacuum reading with engine at normal operating temperature, or midway between missing and rolling points. Turn screws out for richer mixture.

Idle Speed—475-500 RPM (Std. & O.D.), 450-475 RPM. (Fordomatic Pass. Car), 475-500 RPM (Fordomatic Interceptor) with selector lever in Neutral "N".

Throttle Linkage & Anti-Stall Dashpot Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford, Lincoln, Mercury Centri-Quad 4-Barrel" in Carburetor Section.*

CARB. EQUIPMENT

►*FUEL TANK FILTER CAUTION:* If particles of foreign material found in fuel pump or carburetor on units built prior to February 1, 1955 are clear or cream colored, short, and thread like; they are probably from damaged fuel tank filter. Replace tank.

Fuel Pump: Fuel Only - Ford B5A-9350-C (Exc. Thunderbird), B5S-9350-A (Thunderbird). **Fuel & Vacuum** (Fordomatic & Overdrive Cars) B5A-9350-D (Exc. Thunderbird), B5S-9350-B (Thunderbird).
Pressure—4-5 lbs. at 900 RPM.
See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: King-Seeley Electric.
Dash Unit—Ford B5A-9280-A.
Tank Unit—Ford B5A-9275-A (Exc. Sta. Wgn. & Sedan Del.). B5A-9275-B (Sta. Wgn. & Sedan Del.).
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Ford N. FDA-10655-A (Exc. Thunderbird), 01A-10655-A (Thunderbird). 6 Volt, 17 Plate, 90 Ampere Hour Capacity (20 hour rate).

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Battery Ground—Positive (+) to cylinder head
Engine Ground—Cylinder head to dash

STARTER

Ford FAC-11002-G. Armature—FAC-11005-B.
Drive—Ford 1CM-11350-C Bendix "Folo-thru" type.
Rotation—Counter-clockwise at commutator end
Brush Spring Tension—48-56 ozs
Cranking Speed— 115-125 RPM

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs	①	6 0	70
14 ft lbs.	Lock		700

①—With starter on engine and engine running

►*STARTER INSTALLATION CAUTION.* Make certain that rubber seal properly positioned (can be held in place with rubber cement)

Starting Switch: Ford No FAB-11450-B. Mounted on left front fender apron and controlled by Ignition Switch

Neutral Safety Switch: Ford B5A-15812-A (Exc. Thunderbird), B5S-15812-B (Thunderbird)

Adjustment—*See "Fordomatic & Mercomatic" in Transmission Section.*

GENERATOR

Ford FBC-10002-A (272 Eng.), **B5S-10002-A** (292 Eng.). **Armature**—FBC-10005-A

►*GENERATOR BELT NOISE CORRECTION:* To make sure noise is coming from belt, squirt a few drops of hydraulic fluid on belt driving surface If noise or whine disappears, replace belt with plain type No. B5A-8620-B belt.

Performance Data

Generator	Amperes ①	Eng RPM
FBC-10002-A	35	850
B5S-10002-A	40	850

①—See Regulator for maximum charging rate.

Brush Spring Tension—30 ozs.
Field Current—1 5-2.5 amperes at 6 0 volts
Rotation—Counter-clockwise at commutator end.

►*THUNDERBIRD GENERATOR REMOVAL PROCEDURE (To Prevent Loss of Coolant):* Disconnect generator leads, remove two nuts from generator mounting bolts and capscrew from adjusting bracket. Remove fan belt. Remove capscrew attaching support bracket to front of generator mounting bracket. Remove top capscrew attaching main generator mounting bracket to engine front cover, and loosen lower capscrew about two full turns. Remove capscrew attaching front of generator to main generator mounting. *(NOTE*—Do not remove lower capscrew as it is tapped into water jacket and coolant will be lost). Swing generator up to let bracket pivot outboard on its lower mounting capscrew enough to permit removal of rear generator mounting bolt. Remove generator. *CAUTION*—If generator not immediately installed, tighten lower capscrew to prevent possible loss of coolant

Belt Adjustment: ¼" belt deflection midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Ford FAC-10505-A (FBC-10002-A Gen.), **FAD-10505-A** (B5S-10002-A Gen.).

Cut out Relay

Cuts In—6.0-6.6 volts.

►*CUTOUT RELAY AIR GAP CHECK:* With cover off regulator, manually close cut-out contacts. Measure air gap between armature and core. The dimension should be .009-.013". Air gap with contacts open should be .012-.020". If either or both of these dimensions are not up to specifications, regulator is defective.

Voltage Regulator

Setting—7 4-7.8 volts.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—33-37 amperes (FAC-10505-A Reg.), 38-42 amperes (FAD-10505-A Reg.).
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equipment Section.*
Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch, Unscrew mounting nut with Tool 17470-N
Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of brake booster assembly (Power Brakes).

FUSES: Located as indicated below
Interior Lights—14 amps. on lighting switch.
Direction Signal—14 amps , in fuse holder between ignition switch and flasher
Overdrive—30 amps , on overdrive relay.
Cigar Lighter—Special fuse in lighter base.
Clock—3 amps , in clock lead
Heater—14 amps , in blower switch wire

LIGHTING CIRCUIT BREAKERS: On Lighting Switch. Combination headlight switch circuit breaker and fuse assembly used One circuit breaker protects headlight circuit and second circuit breaker protects instrument lights, parking lights and stop and tail light circuits

HORNS: Ford B5A-13832-C (High Pitch), B5A-13833-C (Low Pitch). Dual horns operated by relay
Horn Relay—Ford FAA-13853-A.

►*BACK-UP LIGHT SWITCH BRACKET INSTALLATION CAUTION.* Change in steering gear shift rod on late production cars affects installation of back-up light switch bracket, Part No B5A-15517-A. To install this bracket, bend upward to prevent switch from bottoming when gear shift lever in reverse position New bracket, Part No B5A-15517-B, is included in new kit, Part No B5A-18276-B However, some new kits will be released with old bracket

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8

Engine	Bore	Stroke	Displmnt.	Rated HP
272 Eng	3 62"	3 30"	272 cu ins	42 0
292 Eng	3 75'	3 30"	292 cu ins	45 0

Engine	Compr. Ratio	Developed HP
272 Exc Special	7 6-1	162 at 4400 RPM
272 Special	8 5-1	182 at 4400 RPM
292 Interceptor	7 6-1	188 at 4400 RPM
T-Bird (Exc. Fordomatic)	8.1-1	193 at 4400 RPM
T-Bird (Fordomatic)	8.5-1	198 at 4400 RPM

Compression & Vacuum Reading—*See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data*

►*CYLINDER HEAD IDENTIFICATION:* Identified by number cast in top of head In addition, 292 Eng. Interceptor has ECK cast in recess in head gasket surface. Identification as follows:

Engine	Compr. Ratio	Casting No.
272 Standard	7.6-1	ECL-6090-A
292 Thunderbird Std.	8 1-1	ECL-6090-A
272 Special (Early)	8 5-1	①ECL-6090-B
272 Special (Later)	8.5-1	ECG-6090-A
292 Thunderbird Fordomatic	8 5-1	①ECL-6090-B
292 Interceptor (Early)	7 6-1	ECL-6090-B
292 Interceptor (Later)	7 6-1	ECK-6090-B

①—These two heads identified from each other by measuring thickness of either of two center machine locating pads (directly beneath No 2 & No 3 spark plug holes on right bank, below No 6 & No 7 holes on left bank) Thicknesses are .964-.966" on 272 Special, 999-1 001" 292 Thunderbird

►*DRIVE SHAFT-TO-FRAME INTERFERENCE CAUTION & CORRECTION (CONVERTIBLE):* On early production units, drive shaft may strike bottom of clearance hole in frame "X" member after vehicle passes over severe bump. Current production is installing three shims and longer bolts (7/16'-20" x 1½") between engine rear support and "X" member to prevent interference, and can be installed on early units. *NOTE*—If shims removed during repair operation, make sure they are reinstalled.

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL: Drain crankcase. Remove engine front splash pans. Disconnect oil pump inlet tube at oil pump Remove oil pan retaining screws and remove oil pan *(NOTE*—No. 1 cylinder must be on TDC before oil pan can be removed) Remove nut securing oil pump inlet tube to oil pan, then remove oil pump screen and inlet tube assembly from oil pan

PISTONS

Autothermic type. Solid skirt with three rings above pin.
Removal—Pistons and rods removed from above.
Fitting New Pistons: Use ½" feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows.
New Piston in New Bore—.0015" feeler. 5-10 lbs. pull.
New Piston in Used Bore—.002" feeler. 5-10 lbs. pull.
Used Piston in Used Bore—.0025" feeler. 5-10 lbs. pull.
Replacement Pistons: Standard size, .020", .030", .040", .060" Oversize. Pistons furnished only with fitted pins.
Installing Pistons: Install with small indentation in head toward FRONT of engine.

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PISTON PINS

Floating type with lock rings at each end.
Diam t r—.9120-.9123". **L ngth**—3.016-3.030".
Pin Fit in Piston—Hand push fit at 70°F.
Pin Fit in R d Bushing—.0001-.0003" clearance. New pin should not fall through of own weight.
R plac m nt Pins: Standard size, .001", .002" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.010-.027"	.002-.0035"
Compr. #2	3/32"	.010-.027"	.002-.0035"
Oil	3/16"	.010-.027"	.0015-.003"

R plac m nt Rings: Standard size, .020", .030", .040", .060" Oversize.

►*REPLACEMENT PISTON RING NOTE:* "Snap type" rings furnished in standard size only, "Steel section type" in all above oversizes.

CONNECTING RODS

Crankpin J urnal Diam t r—2.1880-2.1888".
L wer B aring—Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Cl aranc —.0008-.0027".
Sid Cl aranc —.006-.016" (two rods).
R plac m nt B arings: Standard size (4 sizes marked r d & blu for selective fitting) and .010", .020", .030" Undersize.
Installing R ds: Rod bearing lock slot in rod should be toward outside of engine "V". When installing rod and piston assembly in engine indentation on top of piston head should be to front of engine, and numbers on rod and cap should be to left (left bank) and to right (right bank).

CRANKSHAFT

J urnal Diam t r—2.4980-2.4988". Max. wear limits .0015", taper .001".
B arings—Steel backed, copper lead alloy lined.
R plac ment B arings: Standard size, (4 sizes marked r d & blu for selective fitting) and .010", .020", .030" Undersize.
End Thrust: Taken by No. 3 main bearing. Replace bearing if endplay excessive.
Thrust B aring Alignm nt—*See "Crankshaft & Main B arings" in Ford Special Data.*
Endplay—.002-.006".
Crankshaft R ar Oil Seal Installation: *See "Crankshaft & Main B arings" in Ford Special Data.*
Crankshaft Fr nt Oil S al Installation: *See "Engine Front Cov r" in Ford Sp cial Data.*

CAMSHAFT

J urnal Diam t r—1.9255"-1.9265" (new), 1.924"(worn limit).
Clearanc —.001-.003" (new), .005" (worn limit).
End Thrust: Taken by plate on forward end of block(between camshaft sprocket and shoulder on block).
Endplay—.003-.007".
R plac m nt Camshaft Bearings: Finished bearings furnished Standard, .015" Undersize. *CAUTION—Oil holes in b arings must b lin d up c rr ctly. S Ford Sp cial Data.*
Camshaft R m val - S *"Camshaft & B arings" in Ford Sp cial Data.*
Timing Chain: Side-guide type. Length 56 links.
►*REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side).
►*CAMSHAFT SPROCKET SPACER INSTALLATION CAUTION:* If spacer, Part No. EBE-6265-A, installed backwards, it will allow an excessive amount of endplay. Inside diameter of spacer has a chamfer on one side and this chamfered side should be installed toward No. 1 camshaft bearing journal.
Camshaft Setting: Sprockets marked by "O" at one tooth. Mesh chain so that there are 12 pins between "O" mark s.
Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Ford Special Data.*

VALVES

►*EXHAUST VALVE STEM DIAMETER CHANGE (Production & Service Replacement Valves): Stem diameter decreased .0005" for greater stem clearance in guide. See "Valve System" in Ford Special Data.*
Tappet Clearance: .019" (Intake & Exhaust), with engine at normal operating temperature. *NOTE—Valve tappet clearance on truck engines is different.*
Tappet Adjustment- *See "Valve System" in Ford Special Data.*

Valve	Head Diam.	Stem Diam.①	Length
Intake	1.785"	.3415"	5.02"
Exhaust	1.515"	.3405"	5.02"
Valve	**S eat Angle**	**Lift②**	**Stem Clearance**
Intake	45°	.345"	.002" max.
Exhaust	45°	.345"	.003" max.

①—Valves furnished with .003", .015", .030" oversize stems for service replacement. *See "Valve Guides" in Ford Special Data.*
②—Minimum lift for checking camshaft lobe wear.
Valve Seat Width—.060-.070" (Intake). .070-.080" (Exhaust).
►*ROTATABLE VALVE NOTE: All valves are rotatable type. See "Valve System" in Ford Special Data.*
Valve Stem Oil Seals—"Umbrella" type oil seals used on intake & exhaust valve stems. Seals are installed with cupped side down on valve stem at guide boss on cylinder head. *Install new seals whenever valves removed or when seals become loose on valve stems.*
►*VALVE STEM OIL SEAL PRODUCTION CHANGE & INSTALLATION CAUTION:* New valve stem oil seal (Part No. B5A-6571-A) is being installed in production and is available for service. Skirt length has been increased .100" to seal a greater area of valve stem from oil splash. Also, seal will minimize amount of oil permitted to enter combustion chamber via stem-to-valve guide clearance. *When servicing engines with old type seal, new seal should be used.*
Valve Springs: Install with closed coil end toward cylinder head. **Free Length**—2.11-2.13".

Valv Spring Sp cificati ns	Pr ssure	L ngth
Valve Closed	54-62 lbs.	1.821"
Valve Open	124-140 lbs.	1.505"

Valv Guid s: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (See table above), ream guides and install oversize valve. *S "Valv Guides" in Ford Special Data.*
Valve Lifters: Mushroom type. Removed from below with camshaft removed.
►*VALVE LIFTER INSTALLATION CAUTION:* Cast iron tappet, Part No. EAA-6500-C, should no longer be used as service replacement on 8-cylinder engines as these tappets may contribute to cam lobe wear. Use steel tappet, Part No. EAA-6500-D. Cast iron tappet has smooth molded appearance on unmachined portion of tappet foot. Tappet foot is .220" thick. Steel tappet has forging marks on outer edge of tappet foot and is .140" thick.
Rocker Arm Assembly: *See "Valve System" in Ford Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated.
Intake Valves—Open 12° ①BTDC. Close 54° ② ALDC.
Exhaust Valves—Open 58° ③BLDC. Close 8° ④ ATDC.
①—Camlift .016". ②—Camlift .019". ③—Camlift .014". ④—Camlift .018".
Valve Timing Check: *See "Camshaft Setting" und r CAMSHAFT above.* Remove right-hand rocker chamber cover. Turn engine over until No. 1 intake tappet is on heel of No. 1 intake cam lobe. Back off No. 1 intake valve adjusting screw push rocker arm to one side, then install dial indicator. Zero dial indicator, then rotate engine slowly until desired lift (.016") obtained. Compare degrees on pulley with specifications (12°). If not within specifications check for bent timing pointer by bringing No. 1 piston to TDC and see if timing pointer aligned with TDC mark on crankshaft pulley. If pointer not at fault, check timing chain, camshaft sprocket, camshaft, crankshaft pulley, and crankshaft in order of accessibility.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Datd.*
Crankcase Capacity: 5 qts. (refill). Add 1 qt. when filter changed.
Normal Oil Pressure: 45-55 lbs. at 30-40 MPH.
Pressure Regulator Valve—In pump body, not adjustable.
Oil Pressure Indicator—Indicator light on instrument panel, operated by Engine Unit—Ford No. FDA-9278-A (Stamped No. 7 on Hex.). Lights when ignition switch turned on, goes out when engine starts.
Oil Pump: Gear type pump located on left side of engine crankcase, driven by distributor drive gear.
Pump Overhaul—*See "Oiling System" in Ford Special Data.*
►*OIL PUMP LEAK CORRECTION:* On some oil pumps, oil pump cover bolt holes may be tapped into gear cavity of pump causing oil-leak past threads and out between bolt and pump cover. To correct, remove cover bolts. Coat threads of bolts with Sealing Compound, Part No. 8A-19554-B. Install bolts.
►*OIL PAN-TO-PUMP TUBE SEAL INSTALLATION CAUTION:* Pump failures have been encountered due

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to pieces of oil pan-to-oil pump seal (Part No. B4A-6698-A) breaking off and lodging between oil pump gears. In some cases, oil inlet tube is too short. As a result, when retaining nut is tightened excessively, seal is squeezed over edge of tube which cuts seal. *Always lubricate seal with engine oil prior to installation, and tighten retaining nut just enough to insure against leakage.*

Oil Filter: Full-flow type (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil dirty or polluted.

Filter Element Installation—*See "Oiling System" in Ford Special Data.*

Replacement Filter Element—Ford No. B2A-6731-A (Kit includes new gaskets).

►*CAUTION: This special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication.*

►*BRAKE LINE INTERFERENCE WITH OIL FILTER CORRECTION:* Clip, Part No. B4A-2244-A, and attaching screw, Part No. 39883-S7, now available to secure brake line to rear side of No. 2 crossmember. On vehicles not equipped with additional clip (now used in production), and on which interference is encountered proceed with installation of additional clip as follows: Locate and mark spot on No. 2 crossmember 4½" to left, and 4 15/16" up from center of existing clip at left hand rear side of crossmember. Drill 9/32" hole at this spot. Position brake line on crossmember, and secure line with clip and screw. *NOTE*—Brake line will move far enough to permit installation without bending or crimping line.

Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase on right side of engine.

►*CRANKCASE VENTILATION GASKET INSTALLATION CAUTION:* On some units gasket (B4A-6872-A) may have been installed upside down causing leak at gasket location. Bolt center line is 5/64" below center line of gasket.

COOLING

Water Capacity: 20 qts. (without heater), 21 qts. (with heater).

Pressure Valve: Ford LA-8100-A, 12-15 lbs. (marked "13" or "14"). *CAUTION*—If replacement required use 12-15 lb. type. Radiator filler cap.

Thermostat: Ford No. B4A-8575-A (160°), No. B4A-8575-B (180° used with permanent anti-freeze). Mounted inside water outlet elbow on forward end of intake manifold. *NOTE—The above thermostat replaces type formerly used.*

Water Pump: Packless, sealed ball bearing type.
See "Water Pump" in Ford Special Data.

Temperature Gauge: King-Seeley Electric.
Dash Unit—Ford No. B5A-10883-A.
Engine Unit—Ford No. 1A-10884-A.

Temperature Bulb Sl v R m val: Thread adapter handle of tool T50T-100-A. into sleeve. Tighten locknut against sleeve, then pull sleeve with sliding hammer.
Se "T mp ratur Gaug s" in Misc llan ous Section.

CLUTCH

L ng M d l 10NC F rd N . B5A-7563-A (F rd Std.), 11CF F rd N . B5S-7563-A (Thunderbird Std., F rd HD.).
See "Long Clutches" in Clutch Section.

►*ENGINE VIBRATION CORRECTION (Due to Improper Clutch Disc Friction-Lag):* Vibration noted on some cars equipped with Standard and Overdrive Transmissions. To help this condition, install service clutch disc, Part No. B5A-7550-A, which has proper friction-lag characteristics. *NOTE*—Only disc should be replaced. Repairs to transmission or replacement of clutch pressure plate have proven of little value in correcting condition.

Clutch Disc No.—(B5A-7563-A Clutch) B5A-7550-A, (B5S-7563-A Clutch) B5S-7550-A.

Pedal Adjustment: If total pedal travel is less than 6 3/8" or more than 6 5/8", reposition pedal bumper until travel is within limits.

Pedal Free Travel—1 1/8-1 3/8". Loosen lock nut on clutch pedal release rod, turn adjusting nut until correct travel is reached.

Removal: Remove transmission (see Transmission Removal below), and slide clutch release bearing off clutch release lever. Disconnect clutch pedal release rod from clutch release lever assembly. Remove clutch release equalizer bar bracket from flywheel housing and remove equalizer bar. Remove split bronze bushing from bracket and then remove flywheel housing. Install Tool 7563 and remove clutch pressure plate assembly (if tool not available, clutch may be released by backing off the attaching bolts evenly). Remove clutch release bearing from hub with an arbor press.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Ford Synchro-mesh" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

►*INTERMEDIATE & HIGH GEAR JUMP-OUT CORRECTION: See "Ford Synchro-mesh" in Transmission Section.*

►*STANDARD & OVERDRIVE TRANSMISSION INSTALLATION CAUTION:* 292 Eng. Police Interceptor uses Lincoln-Mercury Transmissions which are not interchangeable with Ford Transmissions.

►*TRANSMISSION GEARSHIFT ROD BIND CORRECTION (Interceptor):* To correct, weld 5/16" flat washer (Part No. 44722-S8) on each rod 5/8" from end.

►*SYNCHRO-MESH LOWGEAR JUMP-OUT CORRECTION (Due to Insufficient Clearance):* To correct, remove side cover, and grind corner of detent boss to provide sufficient clearance between shift cam and detent boss.

Removal: Drain transmission, disconnect gear shift linkage at transmission. Remove speedometer cable and gear, remove drive shaft. Remove bolts which hold transmission extension to engine rear support. Remove frame cross-member and engine rear support. Remove bolts and lock washers which attach transmission to clutch housing, then install two guide pins. Move transmission assembly to rear until input shaft splines clear clutch housing, then lower transmission and pull forward to remove from car.

OVERDRIVE

Warn r Mod l AS4-R10F. Solenoid operated type, with governor control and throttle operated kick-down. Lock-out Switch not used on this model.
See "Warner R10 Overdriv " in Transmissi n S ction.

Overdrive Control: *See "Ov rdriv Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. *See "Fordomatic & Mercomatic" in Transmission Section.*

►*FORDOMATIC "WHISTLING" NOISE CORRECTION: This condition may occur during normal engin operation. See "Fordomatic & M rcomatic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & M rcomatic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: S "Fordomatic & Mercomatic" in Transmission S ction.*

Lubrication—Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain & refill every 15,000 miles. **Us nly Automatic Transmission Fluid Type A.**

Checking Fluid Level: With selector lever in "N" (Neutral) and emergency brake applied, run engine approximately four minutes at idle speed. Check to see that emergency brake is applied and that engine is on slow idle, move selector lever to the "P" (Park) position.

(*NOTE*—When engine and transmission are at normal operating temperature, move selector lever through all ranges to assure fluid distribution throughout transmission). Raise hood and wipe top of oil level indicator. Remove indicator and read fluid level. Add Automatic Transmission Fluid "Type A" if necessary to bring fluid level to "Full" mark on indicator. Replace fluid level indicator.

THROTTLE LINKAGE ADJUSTMENT: *S Carbur tor above.*

►*OTHER "FORDOMATIC" SERVICE DATA: S "Fordomatic & Mercomatic" in Transmission S ction.*

UNIVERSALS

Mechanics. Needle bearing type.

►*CAUTION: (All Cars Exc pt Station Wagon & Sedan Del. & Interceptor): Rear Universal joint companion flange nut controls pinion b aring pre-load (must b adjusted whenever nut is loos n d). S "Ford & Mercury (Separate Carrier)" in R ar Axle Section.*

REAR AXLE

PASSENGER CARS

Own. Separate Carrier, semi-floating hypoid, with Hotchkiss drive.

►*NOTE: Axl not sam as Station Wagon & Sedan D liv ry. S "Ford & M rcury (S parat Carrier)" in R ar Axle S ction.*

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Rati s	Standard	Ov rdriv	F rd matic
V8 Cars	3.78-1	.3.89-1	3 55-1, 3.30-1

►*RATIO, DRIVE GEAR & DIFFERENTIAL CASE IDENTIFICATION:* Refer to following table for identification:

G ar Rati	Differ ntial Cas Color	Drive Gear No. (on Edge of Gear)
3 89-1	Black	AD-4210-B
3 78-1	Black	AG-4210-A
3 55-1	Red	AF-4210-B
3 30-1	Gray	AF-4210-A

Backlash—.003-.008"

Axl Shaft R m val: Remove wheel, take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N (7600-C on Thunderbird) and pull shaft (do not disturb brake backing plate or damage oil seal)

Carri r Ass mbly.R moval: Drain lubricant from rear axle housing. Remove carrier-to-housing nuts, then remove identification tag (ratio) and set it aside for reference during assembly of axle. Remove carrier assembly from axle housing

STA. WGN., SED. DEL. & THUNDERBIRD

Own. Integral Carrier, semi-floating hypoid, with Hotchkiss drive.

►*NOTE: Axl ass mbly not same as passenger cars. S "Lincoln, M rcury, Ford (Integral Carrier)" in R ar Axle S ction.*

Rati s:	Standard	Overdrive	Fordomatic
Sta Wgn	4 09-1	4 27-1	3 54-1
Sedan Del	4 09-1	4 27-1	3 54-1
Interceptor	3 92-1		3 73-1, 3 31-1

Axl Shaft R m val: Same as Pass. Cars (above).

R ar Axl Ass mbly R m val: Raise rear end of car and disconnect rear universal. Remove axle shafts. Disconnect brake lines at "T" on left side of axle housing. Disconnect hand brake cable, shock absorbers, spring U-bolts and shackles. Remove axle housing assembly from car

SHOCK ABSORBERS

Direct acting, non-adjustable Service by replacement

Mod l	①Front	①Rear
Pass. Cars (Std.)	B5A-18124-A	B5A-18125-A
Pass. Cars (H Dty)	B5A-18124-C	B5A-18125-C
Sta Wgn & Sed Del.	B5A-18124-C	B5A-18125-D
Thunderbird	B5S-18124-B	B5S-18125-A

①—Furnished in kits which include shock absorber mounting bushings

FRONT SUSPENSION

Ind pend nt. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs *S "Lincoln, Mercury, Ford (Ball-Joint)" in Front Suspension S ction.*

►*LOWER ARM BUMPER INSTALLATION CAUTION* Right and left hand bumpers are different and must be installed in the correct position Damage to suspension will result if installed incorrectly **Bump rs wh n installed sh uld p int slightly inboard.**

Kingpin Inclinati n—6° minimum, 7° maximum, crosswise

Cast r—Pos. ½° to Pos. 1½°. Maximum variations between wheels ½°

Camb r—Pos. ¼° to Pos. 1¼°. Maximum variation between wheels ¼°.

Toe-In—1/16" to 1/8".

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type.
See "Gemmer Worm & Roller (Type 305)" in Steering Section.

Power Steering: Ford-Mercury Linkage type. Used in junction with standard steering gear.
See "Ford & Mercury Bendix" in Steering Section.

Pump Belt Adjustment: Install torque wrench on pump pulley bolt. Check torque required to slip pulley against belt friction. If torque is not 14-16 ft. lbs. adjustment is required. To adjust, position a heavy duty 1½" "C" clamp with bottom against lower side of pump support bracket and top of clamp resting on pump bracket at its center. Loosen four pump attaching bolts until pump body may be repositioned by tightening "C" clamp. Tighten "C" clamp until torque of 14-16 ft. lbs. is required to slide pump pulley. (*NOTE*—Hold final torque as close as possible to upper limit). Tighten pump attaching bolts, remove "C" clamp, and make a final check of pulley sliding torque.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic (Single Anchor—with eccentric on front wheels, without eccentric on rear wheels). Hand lever applies rear wheel service brakes.
See "Ford Lincoln, Mercury Bendix" in Brake Section.

►*1955 FORD & THUNDERBIRD BRAKE LINING & REPLACEMENT CAUTION·* Later cars have "shorter" Primary Shoe Brake Lining and modified brake shoes to reduce any tendency toward pulling or diving. *See "Ford, Lincoln, Mercury Bendix" in Brake Section.*

►*FRONT WHEEL ADJUSTMENT CHANGE:* Eccentric has been moved from secondary shoe to primary shoe. Initial adjustments made on primary instead of secondary shoe

►*BRAKE LINE INTERFERENCE WITH OIL FILTER CORRECTION See "Oil Filter" under CILING SYSTEM above*

►*PARKING BRAKE "FIX" CORRECTION* New parking brake equalizer, Part No B5A-2119-A, available to correct permanent set of early cable equalizer, Part No 8A-2119-A Before installing on a convertible, cut 1 5/8' from each end of equalizer

Drum Diameter—11' front and rear. Maximum boring limit 11 06'

Wheel Cyl. Diameter—1 1/8' (Front—All), 7/8" (Rear-Pass Car), 15/16' (Rear—Sta Wgn & Sed Del)

Lining—Molded type riveted to shoe

Lining Width - (Exc. Thunderbird) 2¼" (Front All), 7/8" (Pass Car Rear), 15/16" (Sta Wgn & Sed Del Rear)

(Thund rbird) 1¾" (Front-Primary), 2½" (Front-Secondary), 1¾" (Rear All)

Lining Thickn ss—3/16" (Exc. Front Whl. Secondary—Pass. Car), 15/64" (Front Whl. Secondary—Pass. Car), 7/32" (All Shoes—Sta. Wgn. & Sed. Del.).

Lining Length—10.84" (All Shoes—Pass. Car), 9.28" (Primary Shoes—Sta. Wgn. & Sed. Del.), 11.94' (Secondary Shoes—Sta. Wgn. & Sed. Del.).

Clearance—.010" at each end of both primary and secondary shoes. Maximum variation .003" (Adjusting screws backed off 10-12 notches from point where shoes drag on drum. *See Adjustment Change abov .*

Brake Pedal Free Play Adjustment: 1/4-7/16'. If play not correct after brake adjustment, loosen lock nut on the eccentric bolt attaching brake pedal to master cylinder pushrod, rotate eccentric bolt for clearance.

►*BRAKE PEDAL PRODUCTION CHANGE.* New brake pedal (Part No B5S-2455-B) is being installed in production to provide greater clearance between brake and accelerator pedals. Clearance with new pedal is 1¾" as compared with 1¼" with old pedal. If greater clearance desired, new pedal should be installed

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid—Maintain fluid level to within ½" of top of reservoir.

Removal—Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes: Midland Hy-Power Unit mounted on left side of car in engine compartment and connected in hydraulic brake line between master cylinder and wheel cylinder. There are no mechanical connections and no adjustments are required.
See "Midland Power Unit" in Brake Section

Checking Brake Fluid—Same as for manual brakes

Removal of Power Unit—Depress brake pedal a few times to remove all vacuum from system. Disconnect hydraulic lines at the power unit and remove wires from brake stop light switch. Remove power unit to mounting bracket bolts and lockwashers and remove the power unit.

MISC. MECHANICAL

Windshield Wipers: Vacuum link and crank arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Reversible motor in each window *See "Electric Window Regulators" in Miscellaneous Section.*

►*POWER WINDOW REGULATOR RELAY "FLUTTER" CORRECTION: See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Electric Hydraulic with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric screw and jack type with individual motors and transmissions for vertical and horizontal adjustment. *S "Pow r S at Adjust rs" in Misc llan ous S cti n.*

Air C nditi ning: *See F rd "S l ctAir " in Miscellaneous S cti n.*

MODEL IDENTIFICATION

VEHICLE NUMBER: On Rating Plate attached to glove box door, Vehicle Number is also Engine Number.
First Number—10001 up.

►*ENGINE IDENTIFICATION NOTE: Three engines used, and for identification purposes in the following Ford Truck pages, reference is made to each engine by piston displacement, "223", "239", "256". See "Vehicle Number Note" following.*

►*VEHICLE NUMBER NOTE: Vehicle number (example *F10D5A 10001*) includes identification in the following sequence.*

Serial Code①	Engine Symbol②	Model Year③	Assy. Plant	Serial Number
F-10	D	5	See below	10001 Up

①—See Model & Serial Code Table below.
②—**D**—6 Cyl. 223 cu. in. O.H.V. engine. **V**—8 Cyl. 239 cu. in. O.H.V. engine **Z**—8 Cyl. 256 cu. in. O.H.V. engine.
③—Last digit of model year.

Models & Serial Codes

Model	Serial Code	Model	Serial Code
F-100 Conv.	F-10	F-600 Conv.	F-60
F-250 Conv	F-25	F-600 Conv	①F-61
F-350 Conv	F-35	B-600 Sch. Bus	B-60
P-350 Par. Del	P-35	C-600 C.O.E.	C-60
F-500 Conv.	F-50	C-600 C.O.E.	①C-61
B-500 Sch. Bus	B-50	P-600 Par. Del	P-60
C-500 C.O.E.	C-50	P-600 Par. Del	①P-61
P-500 Par. Del	P-50		

①—Light Duty models.

Assembly Plant Designation

A—Atlanta	**F**—Dearborn	**N**—Norfolk
B—Buffalo	**G**—Chicago	**P**—St. Paul
C—Chester	**H**—Detroit Truck	**R**—Richmond
D—Dallas	**K**—Kansas City	**S**—Somerville
E—Edgewater	**L**—Long Beach	**U**—Louisville
	M—Memphis	

TUNE-UP

COMPRESSION PRESSURE: At cranking speed.

Engine	1954	1955
223"	120 lbs	125 lbs.
239"	130 lbs.	130 lbs.
256"	115 lbs. ①	125 lbs.

①—With early type camshaft 120 lbs. with later type camshaft *See "Camshaft" below for identification.*

VACUUM READING: Steady 18-21" at idling speed.

VALVE TAPPET CLEARANCE: 223" Engine—.015" (Intake), .019" (Exhaust). **239" & 256" Engines**—.016" (Intake), .018" (Exhaust). With engine at normal operating temperature.

MANIFOLD HEAT CONTROL (239 Eng.): Automatic thermostatic type with counterweight Valve is open at top when engine cold. Install thermostat spring with ¾ turn wind-up and hook over stop pin.

►*256 ENG. MANIFOLD HEAT CONTROL INSTALLATION (For Cold Weather Operation): See "Manifold Heat Control" in Ford Special Data.*

►*MANIFOLD HEAT CONTROL PRODUCTION CHANGE (239 & 256 Engs. with Single Exhaust):* To minimize engine stalling (due to carburetor icing) and to improve fuel distribution by directing more exhaust gases through crossover passage in intake manifolds, a new manifold heat control valve, Part No. B5A-9685-D, has been released for V8 engines with single exhaust. New valve has bi-metal thermostat spring that holds valve closed for a longer period of time.

IGNITION

FIRING ORDER: 6 Cyl. Engines—1-5-3-6-2-4. **8 Cyl. Engines**—1-5-4-8-6-3-7-2.
Cylinders—RIGHT BANK 1-2-3-4. LEFT BANK 5-6-7-8.

SPARK PLUG GAP: 025-.029" (Champion H-9 or H-10). .028-.032" (Champion 860)
Spark Plugs (1954)—Champion H-9. 14mm. Use Champion H-10 for slow or stop-and-go driving. Tighten to 25-30 ft. lbs.
Spark Plugs (1955)—Champion 860. 18mm. Special. Tighten to 15-20 ft. lbs.

►*1955 SPARK PLUG CAUTION: Spark plug is new type with tapered seat and does not require a sealing gasket. It is important that plug be torqued to 15-20 ft. lbs.*

COIL: Ford No. 8BA-12029.
Ignition Current—2.75-3.0 amperes (idling), 5.0-5.5 amperes (stopped).

DISTRIBUTOR: Ford Part Numbers as listed below.

Engine	1954	1955
223"	FAA-12127-C	B5A-12127-C
239"	FAE-12127-A①	B5C-12127-B
239"	B4A-12127-A②	B5C-12127-B
256"	FAD-12127-B	FAD-12127-B

①—13 tooth distributor gear, used with EBU-6250-B camshaft. ②—14 tooth distributor gear, used with B4T-6250-A camshaft.
Contact Point Set—Ford No. FAB-12171-A (Std.). FAB-12171-B (Heavy Duty).
Breaker Gap—.014-.016".
Cam Angle—36-38° (223" Engine). 26-28½° (239" & 256" Engines). 58-63% idling.
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Clockwise (223" Engine). Counter-clockwise 239" & 256" Engines).

FAA-12127-C Advance Performance
►(With Distributor on Test Stand)

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0-½	0	200
3½-4½	0.5	500
7-8	1.8	1000
9¾-11	3.8	1500
11½-13	6.0	2000

FAE-12127-B & B4A-12127-A Advance Performance
►(With Distributor on Test Stand)

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0-½	0	200
3¾-4¾	0.72	500
10-11	2.20	1000
12½-13½	3.46	1500
14-15½	4.40	2000

B5A-12127-C Advance Performance
►(With Distributor on Test Stand)

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
¾-1¾	0.32	400
3½-4½	0.5	500
7-8	1.8	1000
9¾-11	3.8	1500
11½-13	6.0	2000

B5C-12127-B Advance Performance
►(With Distributor on Test Stand)

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
3¾-5	0.72	500
10-11	2.20	1000
12½-13½	3.46	1500
14-15½	4.40	2000

FAD-12127-B Advance Performance
►(With Distributor on Test Stand)

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0-½	0	200
2½-3¾	0.51	500
9-10	2.18	1000
11¾-13	3.68	1500
13¾-15	5.30	2000

►*DISTRIBUTOR INSTALLATION CAUTION: Be sure oil pump shaft engages distributor intermediate shaft.*

IGNITION TIMING
Setting—5° BTDC (223" Engine). 10° BTDC (239" & 256" Engines).
223" Engine Timing Mark—Rubber type dampener has 5 marks. The long mark represents TDC, and each succeeding mark 3°, 5°, 7°, 9° BTDC. Pointer located on front cover.
239" & 256" Engine Timing Mark—Crankshaft pulley grooved at 10° point. Pointer bolted to water pump cover.

CARBURETOR

ANTI-STALL DASHPOT ADJUSTMENT: First adjust engine idle speed then turn engine off. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counter-clockwise) until head of adjusting screw pushes dashpot up to the end of its travel. Turn dashpot screw in (clockwise) 1½-2 turns to obtain .045-.064" clearance. Tighten locknut.

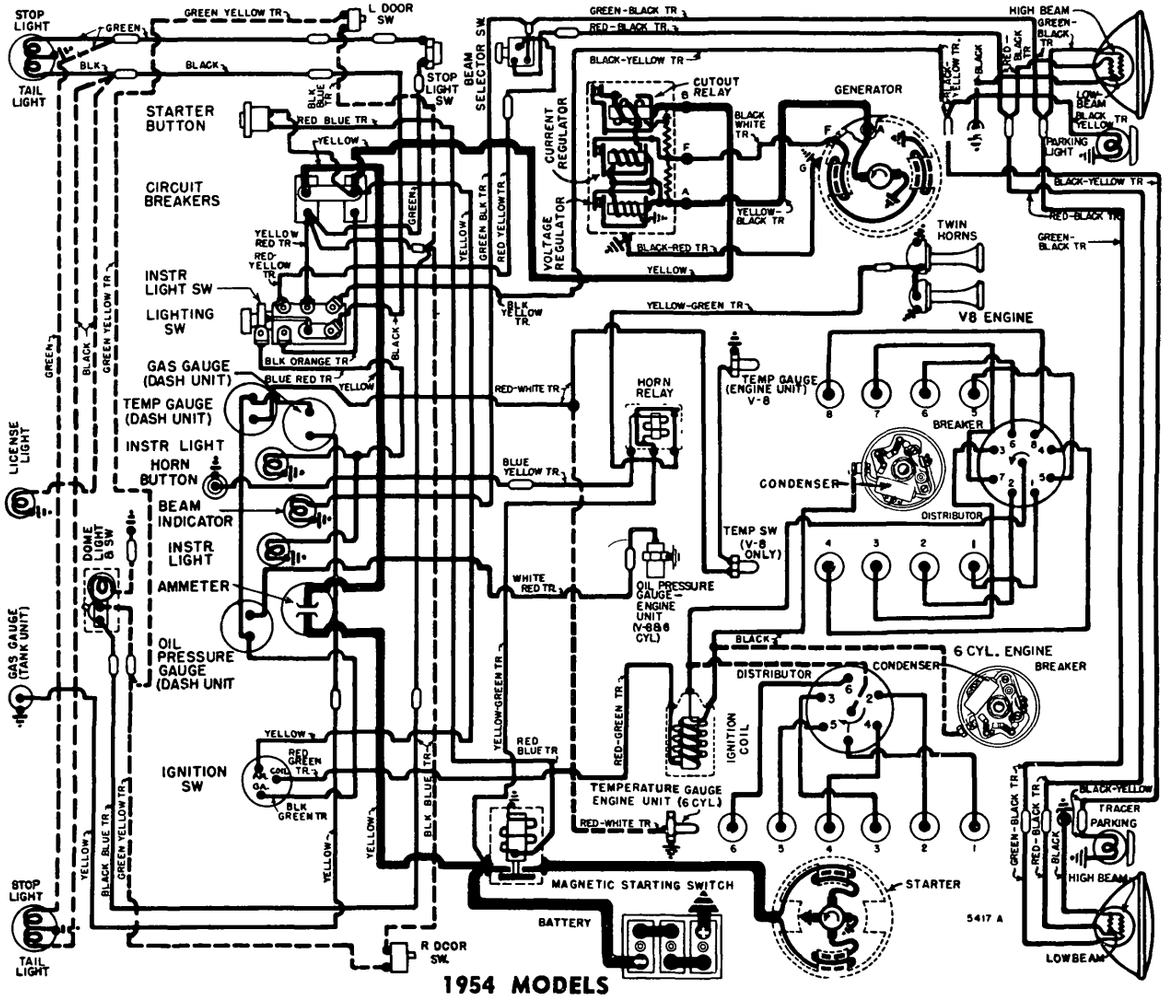
THROTTLE LINKAGE ADJUSTMENT (1954-55 6 CYL. FORDOMATIC TRUCKS): With selector lever in "N" position and engine at normal operating temperature, set engine idle speed at 440-460 RPM (1954 Models), 450-475 RPM. (1955 Models). Adjust Anti-stall Dashpot, (for Adjustment, see above) then turn engine off. Remove clevis pin from upper end of transmission control rod (at cross shaft). Pull gently upward on throttle control rod to hold transmission lever against its internal stop. Rotate rod clevis for free entry of clevis pin into holes in clevis and cross shaft lever. Length-

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en control rod by rotating clevis 2½ turns counter-clockwise. Connect control rod to cross shaft lever. Road test truck and if band or clutch slippage evident, **increas rod l ngth to 3 turns of clevis but do not exce d 3½ turns.** Check transmission for kickdown action. If there is no action, loosen the accelerator stop bolts lock nut located under the accelerator pedal and adjust the stop bolt height until kickdown action is obtained.

THROTTLE LINKAGE ADJUSTMENT (1954-55 FORDOMATIC TRUCKS): Adjust idle speed and Anti-stall dashpot same as for 6 Cylinder models (above). Position Throttle Linkage Adjustment Tool T54L-77230-A on clean surface of accelerator mounting bracket. Lower pin of tool should freely enter hole in accelerator assembly lever. If pin does not enter hole in lever, loosen carburetor connecting link barrel locknut and rotate barrel until pin enters hole freely (with carburetor throttle valve lever against its stop). Tighten link barrel locknuts. Remove clevis pin from upper end of transmission throttle control rod at cross shaft. Pull upward gently on throttle control rod to hold transmission lever against its internal stop. Rotate rod clevis for free entry of clevis pin into holes in clevis and cross shaft lever. **Lengthen control rod by rotating clevis 3 turns counter-clockwise.** Connect control rod to cross shaft. Road test car and if band or clutch slippage is evident, **increase rod length to 3½ turns of clevis but do not exceed 4 turns.** *NOTE*– Connecting link between cross shaft and lever must be parallel to centerline of engine. Adjust as necessary by rotating adjusting screw lever. If height of accelerator pedal stop bolt prevents obtaining kickdown, loosen the accelerator pedal stop bolt jam nut and adjust stop bolt height sufficiently to provide kickdown.



1954 MODELS

CARBURETOR (223" ENGINE)

Ford No. EBR-9510-A (Except Fordomatic), EBP-9510-B (With Fordomatic).

Idle Setting–Approximately one turn open. Set for highest steady vacuum reading with engine at normal operating temperature, or midway between missing and rolling point. Turn screw out for richer mixture.

Idle Speed–475-500 RPM (Exc. Fordomatic), 450-475 (Fordomatic) with selector lever in Neutral "N".

Float Level: *See "Ford Visi-flo" in Carburetor Section*

Fuel Level–Flush to 1/16" below top edge of float hinge bracket in bowl. To adjust, remove bowl cover, bend float tab which contacts float needle spring.

►*NOTE: Fuel level can be checked through glass bowl cover without disturbing carburetor.*

Accelerating Pump: Inner hole for normal or hot weather, outer hole for cold weather operation (holes located in throttle lever. Shift pump link as required).

Fast Idle: Integral type. Operated by choke valve. No adjustment required.

Anti-Stall Dashpot Adjustment: *See "Carburetor" abov .*

Throttle Linkage Adjustment (Fordomatic Trucks): *S e "Carburetor" above.*

►*OTHER DATA: See "Ford Visi-flo" Carburetor in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs.

CARBURETOR (239"-ENGINE)

Ford No. EBV-9510-H. Dual down-draft type with manual choke.

►*FORDOMATIC NOTE: Anti-stall dashpot used on trucks with Fordomatic Transmission.*

Idle Setting–Approximately 1½ turns open from lightly seated position. Set both screws for highest steady vacuum reading and highest engine RPM.

Idle Speed–475-500 RPM (Exc. Fordomatic), 450-475 RPM (Fordomatic) with selector lever in Neutral.

Float Level: With throttle body inverted, distance between bottom of float and flanged surface of air horn should be 1.275-1.305". Use Float Level Gauge T52L-9510-AHD.

Accelerating Pump: Center hole average setting. Inner hole for hot weather, outer hole for cold weather.

Fast Idle: No adjustment required.

Anti-Stall Dashpot Adjustment: *See "Carburetor" above.*

Throttle Linkage Adjustment: *See "Carburetor" above.*

►*OTHER DATA: See "Holley-Ford Carburetors" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs.

CARBURETOR (256" ENGINE)

Ford No. EBZ-9510-C (1954); B4T-9410-A (Early 1955), B4T-9510-A (Late 1955). Dual "Concentric" downdraft type with manual choke control, governor actuating assembly, and "depopper" valve.

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Idle Setting—Approximately 1/2 turns open from lightly seated position Set both screws for highest steady vacuum reading and highest engine RPM
Idle Speed—450-500 RPM *See "Depopper Valve" Adjustment below*

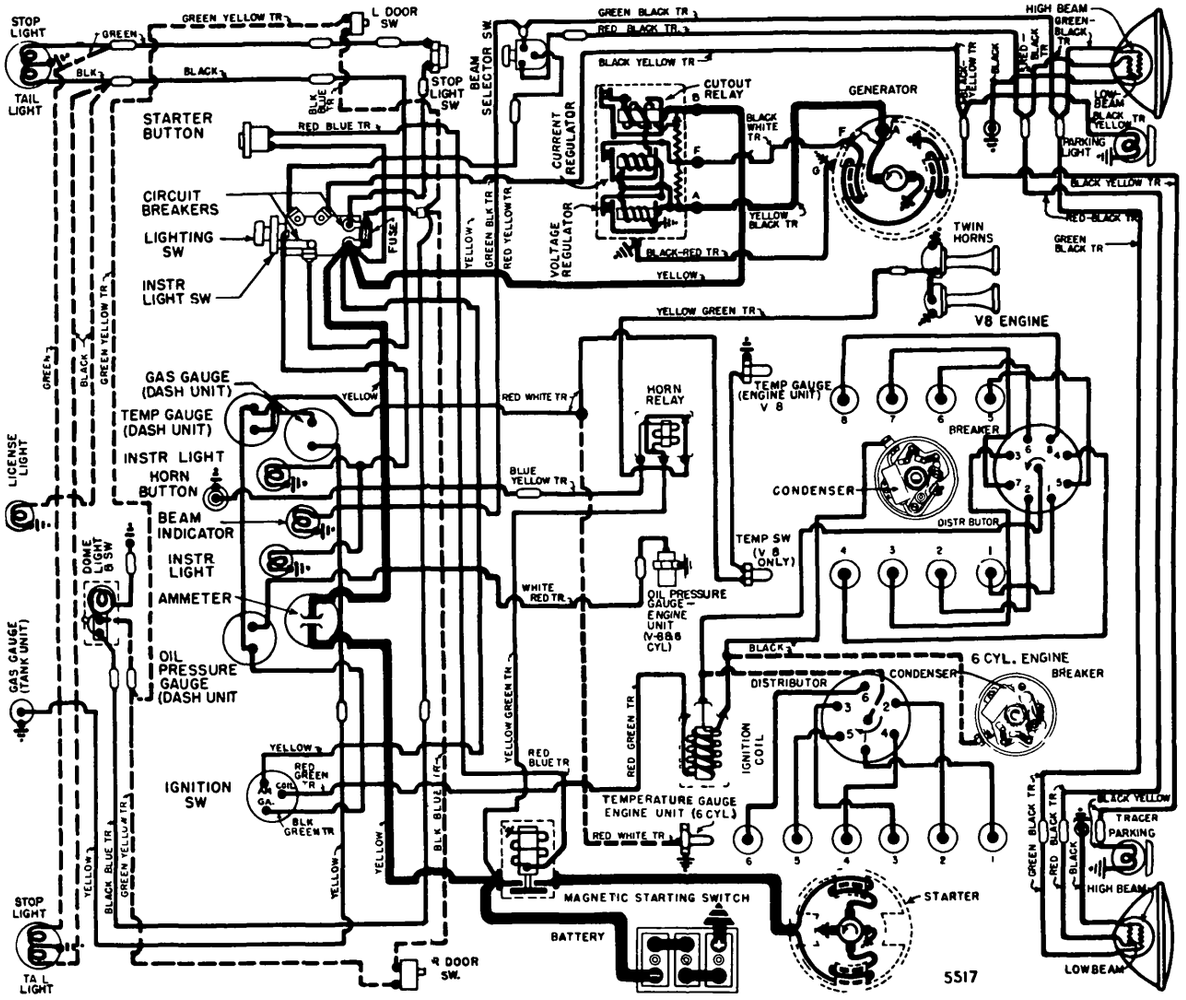
Fuel Level: ½"±1/32" below top edge of bowl with fuel pump pressure at 4-5 lbs. Use Fuel Level Gauge 9550-B to check fuel level, placing gauge squarely on top of main body so that gauge pins extend down into bowl. Fuel should be at least as high as longer GO pin but must not touch shorter NO GO pin Adjust by bending tab on float lever which contacts intake needle

Accelerating Pump: Center hole average setting. Inner hole for hot weather, outer hole for cold weather.

Fast Idle: No adjustment required.

D p pper Valve Adjustment: Turn depopper valve adjusting screw until it is lightly seated *(CAUTION—* Do not force adjusting screw) With depopper valve seated, adjust engine idle speed, with the stop screw, to 450-500 RPM Adjust idle mixture screws (see above) then decrease engine idle speed to 300 RPM (do not disturb idle mixture screws) Turn depopper valve adjusting screw out until engine idle speed comes up to 450-500 RPM If engine will not maintain a steady idle speed and has a tendency to roll, turn spring tension setscrews (directly opposite valve adjusting screw) "in" against piston spring until a steady idle is obtained *(CAUTION—*Do not turn spring tension screw in more than is necessary to attain a smooth idle) Readjust idle mixture with idle adjusting screw If engine RPM increased, reset idle speed to 450-500 RPM with depopper valve adjusting screws *NOTE*—If satisfactory adjustment cannot be made, disassemble and clean

►*OTHER DATA: See "Ford Truck Dual Conc ntric Type" in Carburetor Section*



1955 MODELS

CARB. EQUIPMENT

Fuel Pump Application

Truck Model	Fuel Only	Fuel & Vacuum
223" (1954)	B4A-9350-B	B4A-9350-C
223" (1955)	B5A-9350-A	
239" & 256" (1954)	B4A-9350-D	① EBY-9350-A
239" & 256" (1955)	B5C-9350-A	

①—B4A-9350-E also used

Pressure—4-5 lbs at 900 RPM
See "Fuel Pumps" in Carbur tion Equipm nt S cti n.
Gasoline Gauge: King-Seeley Electric.
Dash Unit—Ford No. FAD-9280-A (All Models Exc. Parcel Delivery). No. 1C-9280-A (Parcel Delivery).
Tank Unit (Ford 21C-9275-B)—F-100, F-250, F,P-350, P-500 Panels Not used with 30 gal tank on P-500 (see below)
Ford FAC-9275-A—C-500, 600 Cab Forward
Ford FAC-9275-B—F-500, 600 Closed Cab
Ford FAC-9275-C—F-100, 250, 350 Closed Cab, B-500, School Bus, P-500 (with 30 gal tank)
See "Fuel Gauges" in Carbur tion Equipment Section.

BATTERY

Ford No. 01A-10655-J. 6 volt, 17 plate, 120 ampere hour capacity (20 hr. rate.).
Battery Ground—Positive(+) to cylinder head.
Engine Ground—Cylinder head to dash.

STARTER

Ford No. FAC-11002-B (1954), FAC-11002-G (1955).
Armature—Ford No 52-11005 (1954), FAC-11005-B (1955)

►*STARTER INSTALLATION CAUTION.* Make certain that rubber seal is properly positioned before mounting starter If trouble encountered in keeping seal in position, apply rubber cement to both seal and engine block to hold seal in position while mounting starter
Drive—ICM-11350-C Bendix "Folo-Thru"
Rotation—Counter-clockwise at commutator end
Brush Spring Tension—48-56 ozs.
Cranking Speed—100 RPM

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs	①	6.0	70
16 ft. lbs .	Lock		700

①-With Starter on engine and engine running
Starting Switch: Magnetic type, Ford No B5A-11450-A Starter switch is controlled by push button switch on instrument panel *NOTE—Neutral safety switch used on Fordomatic Transmission Trucks*

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F rd matic N utral Saf ty Switch: Ford No. FAC-15812-C. **Adjustm nt**—*S "F rdomatic & Mercomatic" in Transmission S ction.*

GENERATOR

Mod l	G n rator No.	Armature No.
223"Engine	FAA-10002-B	OA-10005-A
239" & 256"Engines	FBC-10002-A	FBC-10005-A
All Engines (Optl.)	FBB-10002-A	FAB-10005-A

P rf rmance Data

G n rat r	Amp res ①	Engine RPM.
FAA-10002-B	35	1000
FBC-10002-A	35	1000
FBB-10002-A	50	1200

①—See Regulator for maximum charging rate.

Brush Spring T nsi n—30 ozs.
R tati n—Counter-clockwise at commutator end

B lt Adjustm nt: 223" *ENGINE NOTE—When this engine us d on F-500, F-600 Trucks and Buses, a separate b lt is us d to driv th fan.*
223"Engin (G n rat r B lt)—¼" deflection between water pump and crankshaft pulleys with normal thumb pressure.
223" Engin (S parat Fan Belt)—½"deflection between fan and crankshaft pulleys with normal thumb pressure.
239" & 256" Engin (B th Belts): ½" deflection midway between pulleys with normal thumb pressure

REGULATOR

R gulat r N .	For Generator No.
FAC-10505-A	FAA-10002-A & FBC-10002-A
FAJ-10505-A	FBB-10002-A

►*SETTING NOTE:* Settings below are for regulator at NORMAL OPERATING TEMPERATURE (After ½ hour operation with room temperature at 70-80°F).

Cutout Relay

Cuts In—6.0-6.6 volts.

►*CUTOUT RELAY AIR GAP CHECK*· With cover off regulator, manually close cut-out contacts. Measure air gap between armature and core. The dimension should be 009- 013" Air gap with contacts open should be 012- 020' If either or both of these dimensions are not up to specifications, regulator is defective and should be replaced

V ltag Regulator

S tting—7.4-7.8 volts.
Ch cking & Adjusting—*S Electrical Equip. Section.*

Curr nt Regulator

S tting—33-37 amps (FAC—10505-A). 48-52 amps (FAJ-10505-A).
Ch cking & Adjusting—*S Electrical Equip. Section.*

MISC. ELECTRICAL

H adlamps: Sealed Beam. *See Electrical Equip. Section.*
Lighting Switch R m val: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N. Remove switch and disconnect all wires.

St p Light Switch Locati n: On brake master cylinder, or on brake power unit assembly. Master cylinder located on engine side of firewall (F-100), and on bracket attached to left frame member below brake pedal (Other Trucks)

FUSES: Located as indicated below.
Overdrive—30 amps., on overdrive relay
Cigar Lighter—Special fuse in lighter base.
Clock—3 amps. in clock lead
Heater—14 amps. in blower switch wire.
Interior Lights—14 ampere. On lighting switch.

LIGHTING CIRCUIT BREAKERS: On headlight switch Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument lights, parking lights and stop and tail light circuits. Fuse protects interior lighting circuit (14 amps.).

HORNS: Ford B5A-13832-C (High Pitch), B5A-13833-C (Low Pitch). Dual horns operated by relay
Horn Current—12-14 amperes.
Horn Relay: Ford No. FAA-13853-A

ENGINE

ENGINE SPECIFICATIONS: (223" Engine)—6 Cyl. O.H.V. **(239" Engine & 256" Engine)**—V8 O.H V.

Engine	Bore	Stroke	Displacement
223"	3.62"	3.60"	223 cu. ins.
239"	3.50"	3.10"	239 cu. ins.
256"	3.62"	3.10"	256 cu. ins.

Engine	Comp. Ratio	Rated HP	Developed HP
1954 223"	7 2-1	31 5	115 at 3900 RPM
1955 223" (F-100-250)	7 5-1	31 5	118 At 3900 RPM
1955 223" (Others)	7 5-1	31 5	116 at 3900 RPM
1954 239"	7 2-1	39 0	130 at 4200 RPM
1955 239"	7 5-1	39 0	132 at 4200 RPM
1954 256"	7 2-1	42 0	138 at 3900 RPM
1955 256"	7 5-1	42 0	140 at 3900 RPM

CYLINDER HEAD: *See Ford Special Data.*
TIGHTENING TORQUES: *See Ford Special Data.*
ENGINE REMOVAL: *See Ford Special Data.*
OIL PAN REMOVAL (223" Engine): Drain crankcase. Pull dipstick out of tube Remove oil pan retaining screws, remove pan and gasket
OIL PAN REMOVAL (239" & 256" Engines): *CAUTION—Place #1 piston on top dead center before removing oil pan.* Drain crankcase and remove engine front splash pans, then remove oil pump-to-oil pan tube. On Ford-omatic equipped trucks, remove converter housing dust cover. Remove oil pan.

223" 6 CYL. ENGINE
(See Engine Specifications Above)

See 1954-55 Ford 6 Passenger Car Pages Engine is similar to those used in 1954-55 Pass Cars and all passenger cars engine data applies to truck engines

►*1955 OIL PUMP PRODUCTION CHANGE & PARTS INSTALLATION CAUTION (223" Engin):* New oil pump assembly, intermediate shaft, and body plate released for service Parts not interchangeable with those of previous type pump *S "Oiling System" in Ford Special Data*

239" & 256" ENGINES
(See Engine Specifications Above)

See 1954 Ford V8 Passenger Car Pages. Engine is similar to those used in 1954 Pass. Cars, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW.

►*1954 239" ENG CAMSHAFT PRODUCTION CHANGES*· First type camshaft Part No EBU-6250-A (13 tooth distributor drive gear, and 2 0500-2 0510" diameter bearing journals), replaced by camshaft, Part No B4A-6250-A (with 14 tooth distributor drive gear, and 1 9255-1 9265" diameter bearing journals) The B4A-6250-A camshaft was replaced in later production with camshaft Part No B4T-6250-A (with 14 tooth distributor drive gear and 1 9255-1 9265" diameter bearing journals) The B4T-6250-A camshaft is identified by "14" stamped on front end, or "ECE" cast into shaft

►*1954 256 ' ENG CAMSHAFT PRODUCTION CHANGE*· Early type camshaft, Part No EBY-6250-A replaced in production with Part No B4T-6250-A. Later type camshaft is identified by "14" stamped on front end of shaft, or "ECE" cast into shaft 256" Engines with later type camshaft have a blue or white daub of paint on right or left side of block Engines with early camshafts have a daub of orange paint on right or left side of block. *CAUTION—Valve Timing, Valve Lift, and Compression Pressures are different with early and late type camshafts See data below for differences*

►*1954 V8 ENGINE CONNECTING ROD & BEARING PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION*· Late 1954 production connecting rods have an oil hole (for cylinder lubrication) located on same side as the bearing notch Early type bearings, with one oil hole, MUST NOT BE USED with the later type rod Later type bearings may be used with either the old or new rod as they have two oil holes and will fit either rod.

►*1954 239" & 256" ENGINE CAMSHAFT BEARING CHANGE (To prevent oil starvation due to improperly installed front bearing)* On engines equipped with camshafts (marked "14" on end, or "ECE" cast into shaft), new front bearings have been released for service replacement, Part No. B4C-6261-A Standard, B4C-6261-B (.015" undersize) The later type bearings have a slot instead of a 1/8" diameter oil hole When installing the new bearing, make sure that the slot is aligned with hole in cylinder bore and that bearing is pressed .005- .020" into cylinder block camshaft bearing bore to eliminate interference with camshaft thrust plate

►*1954 239" & 256" ENGINE ROCKER ARM ADJUSTING NOTE:* On engines equipped with B4T-6250-A camshaft, (marked "14" on end of shaft, or "ECE" cast into shaft), it may be found in some cases that the rocker arm adjusting screws are too short to provide proper tappet adjustment and still maintain the neces-

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sary amount of thread contact. If necessary new adjusting screws, Part No. EAA-6549-B should be installed. The new screws are .060" longer when measured from end to center of the socket, than the old screw.

►*1954 239" & 256" ENGINE OIL PUMP SERVICE REPLACEMENT CHANGE & INSTALLATION CAUTION:* A new oil pump, Part No. EAM-6600-A, with steel gears is available for service replacement. The pump is furnished in Kit No. B5A-6600-C which includes a pump and spring. When installing pump on these engines, remove the Relief Valve Spring from the pump and install spring, Part No. EBU-6670-A.

►*1954 V8 ENGINE TAPPET REPLACEMENT CAUTION:* The cast iron tappet, Part No. EAA-6500-C should no longer be used as a service replacement on V8 engines as these tappets may contribute to camshaft lobe wear. Install tappet, Part No. EAA-6500-D (Steel forging) which can be identified by forging marks on outer edge of tappet foot. The tappet foot is .140" (steel forging), .220" (cast iron).

►*239" & 256" TRUCK ENGINE OIL PAN BAFFLE INSTALLATION (To Prevent Loss of Oil Pressure on Sudden Brake Stops):* Fabricate a baffle plate from hot rolled, low carbon, oil hardened steel (.042" thick) to fit the inside of the oil pan at a point 7 11/16" (239" engine), 9 7/8" (256" engine), from rear of pan. The baffle should be 3 9/16" high with the lower corners trimmed off on a 27/32" radius (this will allow oil to flow between both sides of the baffle). Allow 11/16" of material at side and bottom which must be turned at right angles on a 3/16" radius. Tack weld baffle to oil pan securely at sides and bottom.

VALVES:	Head Diam.	Stem Diam①	Length
Intake	②	③	5.02"
Exhaust	1.515"	④	5.02"

Valve	Seat Angle	Lift⑤	Stem Clearance
Intake	45°	.345"	.002" max.
Exhaust	45°	.345"	.003" max.

①—Valves furnished with .003", .015", .030" oversize stems for service replacement.

②—1.652" (239" engine), 1.785" (256" engine).

③—Two standard sizes for selective fitting (Red-.3415-.3420" & Green-.3420-.3425").

④—Two standard sizes for selective fitting (Red-.3405-.3410" & Green-.3410-.3415").

⑤—All models except 1954 256" Engine with EBY-6250-A camshaft. Valve lift for models with the EBY-6250-A camshaft is: .345-.350" (Intake), .339-.343" (Exhaust). *See "1954 256" Engine Camshaft Production Change" above.*

►*256" ENGINE VALVE SEAT INSERT NOTE:* Valve seat inserts used on exhaust valves in production and furnished for service replacement in Std. size, and .020" oversize. *See "Valve System" in Ford Special Data.*

VALVE LIFTERS: *INSTALLATION CAUTION*—Cast iron tappet, Part No. EAA-6500-C, should no longer be used as service replacement on V8 engines as these tappets may contribute to camshaft wear. Use steel tappet, Part No. EAA-6500-D. Cast iron tappet has smooth molded appearance on unmachined portion of tappet foot. Tappet foot is .220" thick. Steel tappet has forging marks on outer edge of tappet foot and is .140" thick.

VALVE TIMING: *NOTE*—The following valve opening and closing points are with camlift as indicated in following table.

Valve Timing
(EBY-6250-A Camshaft)①

Intake Valves—Open 15°②BTDC. Close 67°③ALDC.
Exhaust Valves—Open 57°④BLDC. Close 19°⑤ATDC.

Valve Timing
(Except Trucks with EBY-6250-A Camshaft)①

Intake Valves—Open 8°④BTDC. Close 44°⑥ALDC.
Exhaust Valves—Open 47°④BLDC. Close 5°⑥ATDC.

①—See 1954 256" Engine Camshaft Production Change above.

Camlift—②—.016". ③—.018". ④—.015".⑤—.017".⑥—.019".

Valve Timing Check: Remove right hand rocker chamber cover. Turn engine over until No. 1 intake tappet is on heel of No. 1 intake cam lobe. Back off No. 1 intake valve adjusting screw, push rocker arm to one side, then install dial indicator. Zero dial indicator, then rotate engine slowly until desired lift (.015") obtained. Compare degrees on pulley with specifications (8°). If not within specifications check for bent timing pointer by bringing No. 1 piston to TDC and see if timing pointer is aligned with TDC mark on crankshaft pulley. If pointer not at fault, check timing chain, camshaft sprocket, crankshaft pulley and crankshaft in order of accessibility.

►*CAMSHAFT SPROCKET SPACER INSTALLATION CAUTION (V8 Eng.):* If spacer, Part No. EBE-6265-A, is installed backwards, it will allow an excessive amount of endplay. Inside diameter of spacer has a chamfer on one side and this chamfered side should be installed toward No. 1 camshaft bearing journal.

VALVE TAPPET CLEARANCE: .016" (Intake), .018" (Exhaust). With engine at normal operating temperature.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

►*F-100 TRUCK OIL PRESSURE INDICATOR:* Indicator light on instrument panel operated by engine unit. Lights when ignition switch turned on, goes out when engine starts and oil pump operates. *All other truck models have an oil pressure indicator gauge on instrument panel.*

►*1955 223" ENGINE OIL PUMP PRODUCTION CHANGE & PARTS INSTALLATION CAUTION:* New oil pump assembly, intermediate shaft, and body plate released for service. Parts not interchangeable with those of previous type pumps. *See "Oiling System" in Ford Special Data.*

►*CRANKCASE VENTILATION GASKET INSTALLATION CAUTION (V8 Eng.):* On some units gasket, Part No. B4A-6872-A, may have been installed upside down causing leak at gasket location. Bolt center line is 5/64" below center line of gasket.

Crankcas Capacity: 5 qts. (223 & 239 Eng.), 6 qts. (256 Eng.). 1 qt. addtl. when filter element changed.

N rmal Oil Pr ssur : 45 lbs. at 2000 RPM. (223 Eng.), 45-55 lbs. at 30-40 MPH. (239 & 256 Eng.).

Pressure Regulator Valve: In oil pump body. Not adjustable. *NOTE*—Valve spring pressure should be 9.82 lbs. at 1.56" (223 Eng.), 10.86 lbs. at 1.40" (239 & 256 Eng.).

Oil Pressure Indicator: *See Note above for F100 Trucks.* King-Seeley Electric type.

Dash Unit—Ford No. FAE-9273A (Exc. Par. Del.), 1C-9273A (Parcel Delivery).

Engine Unit—Ford No. 41A-9278 (All).

See "King-Seeley Gauges" in Miscellaneous Section.

Oil Pump: Gear type pump mounted in crankcase (223 Eng.), on left side of crankcase (239 & 256" Eng.).

Pump Overhaul—*See "Oil Pump" in Ford Special Data.*

Oil Filter: Full-flow (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

Replacement Filter Element—Ford No. B2A-6731-A (Kit includes new gaskets).

►*CAUTION:* This special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication.

►*FILTER INSTALLATION CAUTION & OIL LEAKAGE CORRECTION: See "Oiling System" in Ford Special Data.*

Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase on right side of engine.

COOLING

►*TEMPERATURE GAUGE FALSE READING CORRECTION (8 CYL. ENGINES):* In cases where heat indicator shows a reading higher than actual water temperature, check water temperature gauge bulb on engine to see that it is not contacting a casting flash inside cylinder head. Remove flashing with a rat tail file.

►*RESTRICTED WATER BY-PASS CAUTION (8 CYL. ENGINES):* A restricted or blocked passage caused by casting flash will decrease flow of water in engine when thermostat is closed. Check for this condition by listening for a gurgling sound when engine is stopped after a short period of operation. If noise is heard, remove water by-pass tube and inspect for a restricted opening in water pump housing. If necessary, remove pump and drill opening with a 19/32" drill.

Water Capacity (Without Heat r): 18½ qts. (223" Engine), 22 qts. (239" Engine), 22½ qts. (256" Engine).

Pressure Valve: Ford No. 1T-8100-A. Radiator filler cap (opens at 4 lbs.).

Thermostat: Ford No. EAG-8575-A (147-152°). No. EBR-8575-A (167-173°). Mounted inside water outlet elbow.

►*THERMOSTAT INSTALLATION (V8 Engin s): Install th rmostat with word "TOP" in uppermost position.*

Wat r Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Ford Sp cial Data.

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T mp ratur Gaug : King-Seeley Electric type.
Dash Unit—Ford No. FAE-10883-A.
Engin Unit—Ford No. 8A-10884.
T mp rature Bulb Sl ve Removal (V8 Engines)—Thread adapter handle of tool T50T-100-A into sleeve. Tighten locknut against sleeve, then pull sleeve with sliding hammer.
S "T mp rature Gaug s" in Miscellaneous Section.

CLUTCH

L ng M d l 10CF, N . L5222 (F-100, F-250)—Ford No. AE-7563-A. Models with 3-Speed Transmission.
L ng M d l 11CF, N . L1440 (Std. All Other Models and F-100, F-250 with 4-Speed Transmission)—Ford No. 51-7563-A.
L ng Mod l 11CF, N . L1478 (Heavy Duty All Models Exc pt F-100, F-250)—Ford No. 8MTH-7563-A.
S "Long" in Clutch S ction.

Clutch Disc—Use with cover assembly as follows:

L ng N .	F rd N .	Cover Assembly
CD870	59T-7550-A①	Ford No. 51-7563-A
CD606	51A-7550-A	Ford No. AE-7563-A
CD887	TDAA-7550-A	Ford No. 8MTH-7563-A
CD607	TDAA-7550-A	Ford No. 51-7563-A

①—Replaced by Ford No. 81T-7550.

P dal Adjustm nt: 1 1/8-1 3/8" free travel. Adjusting clevis provided. at forward end of connecting rod between pedal shaft and equalizer shaft.

►*PEDAL FREE TRAVEL ADJUSTMENT CAUTION:* Normal action of pressure plate centrifugal weights at high engine speed will take up approximately ¾" of specified free travel. Check fre e travel when engine is operated at high speed and see if approximately ½" of free travel is left. Insufficient free travel will cause release bearing to rotate at all times and will result in early bearing failure.

R moval: Disconnect clutch pedal retracting spring from clutch release lever. Remove lock nut and adjusting nut from release lever rod, then remove rod. Remove transmission assembly from clutch housing (see below). Remove clutch release bearing and hub frcm release lever. Mark pressure plate and cover assembly and flywheel so that parts may be reinstalled in same relative positions. Loosen pressure plate and cover assembly-to-flywheel bolts until pressure plate springs are expanded, then remove bolts. Remove pressure plate and cover assembly and clutch disc assembly through opening in bottom of clutch housing. Remove pilot bearing from flywheel with Tool 7600-E.

TRANSMISSION

►*239" ENGINE HARD SHIFTING CORRECTION (ALL TRANSMISSIONS):* If hard shifting occurs with truck standing and clutch completely disengaged, pilot bearing bore in crankshaft may not be deep enough. This locks transmission input shaft to crankshaft and makes it almost impossible to shift transmission. To correct, grind approximately 1/8" off pilot bearing end of input shaft to provide clearance between end of shaft and counterbore in crankshaft.

3-SPEED (LIGHT DUTY)

Own. 3-Speed, all helical gear. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Steering column shift standard.
See "Ford Truck 3-Speed (Light Duty)" in Transmission Section.

►*INTERMEDIATE & HIGH GEAR JUMP-OUT CORRECTION:* See *"Ford Synchro-mesh" in Transmission Section.*

Removal: Remove floor mat and floor plate. Loosen two nuts that secure top of transmissfon to clutch housing studs. Raise truck, then drain lubricant from transmission. Disconnect the drive shaft from the transmission. If truck equipped with band-type parking brake, disconnect brake cable at brake and at gear shift housing. Disconnect gear shift linkage at transmission, then disconnect clutch pedal retracting spring from clutch release lever. Remove bolts and lockwashers which attach clutch release equalizer bar anchor bracket to transmission. Disconnect speedometer cable from transmission. Remove dust cover from bottom of clutch housing. Position transmission jack under transmission. Remove two top nuts, two bottom bolts, and lockwashers that secure transmission to clutch housing. Move transmission to rear until input shaft splines clear clutch housing. Be careful not to allow clutch release bearing and hub to drop out of release lever fork. Lower transmission to floor.

3-SPEED (HEAVY DUTY)

Own. 3-Speed, helical gear (second & high), spur gear (low & reverse). Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Steering column shift standard.
See "Ford Truck 3-Speed (Heavy Duty)" in Transmission Section.

Removal: Same as for 3-Speed (Light Duty) above.

4-SPEED

Own. 4-Speed, Constant mesh, synchro-mesh (second, third & high). Helical gears used for second, third & high. Spur gears used for low & reverse. Center, floor mounted gear shift lever standard.
See "Ford Truck 4-Speed (Synchro-mesh)" in Transmission Section.

Removal: Same as for 3-Speed (Light Duty) above and note following: *If hoist not used, it may be necessary to remove gear shift lever assembly and lever housing before transmission can be removed from truck.* Disconnect drive shaft, or coupling shaft, at parking brake drum. If truck equipped with coupling shaft support, disconnect support bracket from support plate, then remove coupling shaft.

OVERDRIVE

Warner Model AS4-R10F. Overdrive with solenoid operated (no centrifugal pawls) with governor control and throttle operated kick-down. There is no lockout switch on this unit.
See "Warner R10 Overdrive" in Transmission Section.

Overdriv Contr ls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for 3-Speed Synchro-mesh Transmission (above), after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.
See "Fordomatic & Mercomatic" in Transmission Section.

►*1955 F-100 TRUCK FORDOMATIC OIL COOLER PRODUCTION CHANGE:* The Fordomatic oil cooler discontinued in production after May 1955. A by-pass tube assembly is being used in place of the oil cooler.

►*FORDOMATIC WHISTLING NOISE CORRECTION: This condition may occur during normal engine operation. See "Fordomatic & Mercomatic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication—Check transmission oil every 1000 miles and maintain fluid level at "Full" mark on dipstick. Drain & refill every 15,000 miles. Use only Automatic Transmission Fluid Type A.

Checking Fluid Level—Apply parking brakes, place transmission selector lever in "N" (neutral) position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator. Wipe clean and insert in tube (make sure indicator is pushed all the way down). Remove indicator and read level. Add sufficient fluid to raise level to full mark on indicator. Replace indicator.

►*OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

►*UNIVERSAL JOINT INSTALLATION CAUTION: Make sure that all universal joint yokes in drive line are in the same plane to avoid drive line unbalance.*

Coupling Shaft Center Bearing: Consists of cushion mounted ball bearing bolted to underside of frame intermediate cross member. Bearing is mounted on end of coupling shaft in a sleeve with felt retainer on each end and bearing baffle on front end.

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REAR AXLE

SEMI-FLOATING

Own. Semi-floating, hypoid gear with Hotchkiss drive. *NOTE*—Same axle as used in Station Wagon & Sedan Delivery.

See "Ford & Mercury (Separate Carrier Type) Hypoid" in Rear Axle Section.

Ratios—As follows:
Standard—3.92-1 (47-12).
Optional—4.27-1 (47-11).
Overdrive—4.09-1 (45-11).
Fordomatic—3.92-1 (47-12).

Backlash—.003-.008". Shim adjustment.

Axle Shaft Removal: Remove wheel, take off drum. Remove four axle retainer nuts (work through opening in axle shaft flange). Use Puller No. 4235 and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal).

Axle Assembly Removal: Raise rear of truck, then disconnect hydraulic brake hose from hydraulic brake line at rear axle. Disconnect parking brake cable from equalizer rod, then remove screws which attach brake cable brackets to frame crossmember. Disconnect drive shaft at rear axle universal joint flange. Remove nuts from rear spring clips (U-bolts), then remove spring clips. Loosen shock absorber stud nuts and move shock absorbers out of way. Roll axle assembly away from truck, remove wheels.

Wheel Bearing Adjustment: None required in service.

FULL-FLOATING

Own. Full floating hypoid gear with Hotchkiss drive.

Model	Rear Axle Type
F-250 Conventional (Early)	① Split Housing
P-350 Parcel Del. (Early)	① Split Housing
F-250 Conventional (Later)	Integral Housing
P-350 Parcel Del. (Later)	Integral Housing
F-350 Conventional	② (Heavy Duty) Split Housing
F-500, F-600 (All Models)	Banjo Housing

①—Drive pinion bearings pressed in axle housing.
②—Drive pinion bearings pressed in sleeve and bolted to axle housing.

See Various Types of Ford Rear Axles in Rear Axle Section.

Axle Ratios

Model	Ratio
F-250 Conv.	4.86-1 (34-7), 5.83-1 (35-6) ①
P-350 Par. Del.	4.86-1 (34-7), 5.83-1 (35-6) ①
F-350 Conv.	5.14-1 (36-7), 5.83-1 (35-6) ②
F-500 (All).	5.29-1 (27-7), 6.2-1 (31-5), 6.8-1 (34-5) ③
F-600 (All).	7.2-1 (36-5), 6.2-1 (31-5), 6.8-1 (34-5) ④

①—.008-.013" backlash. ②—.004-.018" backlash.
③—.006-.012" backlash. ④—.006- .016" backlash.

Axle Shaft Removal: Drain lubricant from axle housing, then remove axle shaft stud nuts and washers. Tap center of axle shaft flanges to loosen tapered dowels, then remove dowels. Remove axle shafts from housing, remove hub and drum assemblies.

Axle Assembly Removal: Loosen wheel and stud nuts, then raise rear of vehicle. Disconnect hydraulic brake hose from hydraulic brake pipe. Disconnect drive shaft at rear universal joint flange, remove spring clips (U bolts), roll axle from under car and remove wheels.

Wheel Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher. Adjust bearings by turning bearing adjusting nut (inner nut) up until tight then backing off 1/8 turn. Install bearing lockwasher. (*NOTE*—If adjusting nut equipped with dowel, make sure lockwasher fits over dowel). Install bearing locknut and draw nut up tight. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over locknut. Install axle shaft and lower vehicle.

TWO-SPEED

Own. Electrically operated shift, Two-speed, Full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.

See "Ford Truck Two-Speed" in Rear Axle Section.

Ratio—5.83-1 (Direct Speed), 8.11-1 (Second Speed). 6.33-1 (Direct Speed), 8.81-1 (Second Speed).

Backlash—.006-.016".

Removal: Same as for standard axle (above) after removal of wiring harness.

SHOCK ABSORBERS

Direct acting hydraulic. Shock absorbers are sealed units and are not adjustable or refillable.

►*REPLACEMENT SHOCK ABSORBER NOTE: Shocks are supplied for service replacement in kits consisting of shock absorber and necessary bushings.*

►*SHOCK ABSORBER APPLICATION NOTE:* Front and rear shocks are standard equipment on all F-100, F-250, & P-350 (Parcel Delivery). Front shocks only are standard on F-350. Front and rear shocks are optional on all other models.

1954 Replacement Shock Absorbers

Model	Front - Ford Nos. - Rear
F-100, F-250	B3C-18124-A B3C-18125-A
F-100, F-250	① B3C-18124-B ... ① B3C-18125-B
F-350	B3C-18124-A B3Y-18125-A
F-350	① B3C-18124-B
P-350 (Par. Del.)	A8C-18124-A B3C-18125-A
P-350 (Par. Del.)	① B3C-18125-B
F-500, F-600 (All Models)	B3T-18124-A. .. B3T-18125-A

①—Heavy duty shock absorbers.

1955 Replacement Shock Absorbers

Model	Front - Ford Nos. - Rear
F-100	B5C-18124-A B5C-18125-A
F-100 H.D.	B5C-18124-B B5C-18125-B
F-250, 350	B3C-18124-A
F-250. 350 H.D.	B3C-18124-B
P-350	A8C-18124-A B5C-18125-B
F-250, P-350	B3C-18125-A
F-250, P-350 H.D.	B3C-18125-B
F-350	B3Y-18125-A
B, F-500, 600	B3T-18124-A
B, C, F-500, 600	B3T-18125-A

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliott ends and semi-elliptic springs.

Kingpin Inclination—4° ±½°.

Caster—(F-100, F-250) 3° to 4°, (Others) 3° to 5°. ½° maximum variation between wheels.

Camber—¼° to 1°. ½° maximum variation between wheels.

Toe-In—0-1/16".

STEERING

Own. (Gemmer 305 & 335 D sign). Worm-and-roller types with push-pull adjustment.

►*F-100, 250 DRAG LINK INSTALLATION CAUTION:* Due to design of drag link (THAA-3305-A) it is possible to install link in a reverse position causing steering interference. When properly installed, offset end of drag link is attached to sector shaft arm, and lubrication fittings will be at bottom side of link.

See "Gemmer Worm-and-Roller Types" in Steering Gear Section.

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller (Type 305 & 335)" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller (Type 305 & 335)" in Steering Section.*

BRAKES

Brake types are as listed in application table below. Hand lever applies rear wheel service brakes on F-100 only (independent shaft brake on other models).

►*1954 F-100 TRUCK REAR WHEEL SKIDDING CORRECTION:* If rear wheel skidding on severe brake application (no load) is encountered, replace both rear wheel cylinders with Ford No. 8A-2261 and 8A-2262. These are passenger car type cylinders and are smaller than original truck cylinders. *CAUTION—Right and left wheel cylinders must be replaced.*

►*1955 F-500 BRAKE PRODUCTION CHANGE:* Effective approximately April 13, 1955 all F-500 Series trucks will be equipped with larger rear wheel brakes previously used on these models with 2-Speed Rear Axles. See tables below.

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►*1955 F-500 & F-600 REAR WHEEL BRAKE CYLINDER LEAK CORRECTION (Due to Excessive Depth of Counterbore)* To correct, install two 91A-2152 gaskets between brake pipe and wheel cylinder body

Brake Type Application

Truck Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F,P-250,F-350	Uni-Servo	Duo-Servo
F,B,C,P-500,F,B,C-600	Uni-Servo	2 Cyl.

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe Ratchet adjusting screw.

See "Ford-Bendix Uni-Servo Hydraulic" in Brake Section.

Duo-Servo - Ford-Bendix. Single anchor, self energizing. Wheel cylinders actuates both shoes Ratchet adjusting screw.

See "Ford-Bendix Hydraulic" in Brake Section.

Two-Cylinder Type—Two wheel cylinders in each brake assembly.

See "Ford Truck Two Cylinder" in Brake Section.

Brake Drum Diameter

Model	Front	Rear
F-100 All Models	11"	11"
F-250 All Models	12"	12"
F-350 Conventional	12"	13"
P-350 Parcel Delivery	12"	12"
F-500 (1954 & Early 1955)①	13"	14 1/8"
F-500 (Late 1955)①	13"	15"
F-500 (2-Speed Axle)	13"	15"
F-600 All Models	13"	15"

Lining Width & Thickness

Model	Front	Rear
F-100 All Models	② 2"	④ 1 3/4"
F-250 All Models	② 2"	④ 2"
F-350 Conventional	② 2"	③ 2 1/2"
P-350 Parcel Delivery	② 2"	④ 2"
F-500 (1954 & Early 1955)①	③ 2 1/4"	⑤ 3 1/2"
F-500 (Late 1955)①	③ 2 1/4"	⑤ 4"
F-500 (2-Speed Axle)	③ 2 1/4"	⑤ 4"
F-600 All Models	③ 2 1/4"	⑤ 4"

①—Single Speed Axle ②—3/16" thick ③—¼" thick ④—3/16" thick ⑤—3/8" thick

Lining Length (Primary Shoe)

Model	Front Whl.	Rear Whl.
F-100 All Models	11 29/32"	11 29/32"
F-250 All Models	11 33/64"	11 33/64"
F-350 Conventional	11 33/64"	12 45/64"
P-350 Parcel Delivery	11 33/64"	11 33/64"
F-500 (1954 & Early 1955)①	12 45/64"	14 29/64"
F-500 (Late 1955)①	12 45/64"	15 11/32"
F-500 (2-Speed Axle)	12 45/64"	15 11/32"
F-600 (All Models)	12 45/64"	15 11/32"

Lining Length (Secondary Shoe)

Models	Front Whl.	Rear Whl.
F-100 All Models	11 29/32"	11 29/32"
F-250 All Models	12 31/32"	12 31/32"
F-350 Conventional	12 31/32"	13 61/64"
P-350 Parcel Delivery	12 31/32"	12 31/32"
F-500 (1954 & Late 1955)①	13 61/64"	14 29/64"
F-500 (Late 1955)①	13 61/64"	15 11/32"
F-500 (2-Speed Axle)	13 61/64"	15 11/32"
F-600 All Models	13 61/64"	15 11/32"

①—Single Speed Axle

Clearance—Brake lining to drum clearance different as follows

Uni-Servo & Duo-Servo— 010" clearance measured 1½" from each end of secondary shoe

Two-Cylinder Type—.025" from brake shoe to gauge surface on brake plate

Hand Brake (Except F-100): External contracting type consisting of a brake drum bolted to transmission main shaft companion flange, and an external contracting band mounted on rear of transmission

Adjustment—On cable controlled parking brakes, move lever to full released position On transmission mounted parking brake levers, set lever to first notch. Observe position of cam to make sure flat portion is resting on brake band bracket If cam not flat with bracket, remove clevis pin from upper part of cam, adjust clevis rod to allow flat portion to rest on brake band bracket Install clevis and cotter pins Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise until 010" clearance is established between brake lining and drum at anchor bracket Loosen locknut on adjusting screw from lower half of brake band. Adjust for .010" clearance between lining and drum at lower half of brake band Tighten locknut Turn upper band adjusting rod nut until 010" clearance is established between upper half of band and drum Re-install lockwire in anchor adjusting screw

Hand Brake Drum Diameter—(F-250, 350) 8', (Others) 7 13/16'

Hand Brake Lining

Series	Length	Width	Thickness
F-250, 350	24 5/8"	2'	5/32'
P-350, 500①	23 5/64"	2½'	1/4"
B, C, F-500, 600	24 5/8"	2½'	1/4'

①—Three-piece lining used

Brake Pedal Free Play Adjustment: 3/16-3/8". Adjust free play by loosening brake pedal-to-master cylinder push rod and rotating rod to obtain correct free play. Tighten lock nut while holding push rod securely.

Standard Master Cylinder: Located on bracket attached to left frame side member below brake pedal.

Checking Fluid—Maintain fluid level to within ½" of top of reservoir.

Removal—Disconnect brake lines from master cylinder and depress brake pedal a few times to empty master cylinder. Remove brake pedal return spring from brake pedal clevis pin and remove clevis pin. Disconnect stop light switch wires at switch. Remove assembly from bracket.

Power Brakes: Midland or Hydrovac unit mounted in various positions depending on truck model and connected in hydraulic brake line between master cylinder and wheel cylinders There are no mechanical connections and adjustments are not required

See "Midland" or "Hydrovac" Power Units in Brake Section.

Checking Brake Fluid—Same as for manual brakes (above)

Removal of Power Unit—Depress brake pedal several times to remove all vacuum from system Loosen brake power unit air inlet tube clamp and remove tube Disconnect master cylinder to power unit hydraulic line at power unit Disconnect vacuum tube at power unit. If stop light switch located on brake power unit, disconnect wires Remove mounting bracket bolts and power unit.

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate on left front body pillar.
First Number—100001.

►*VEHICLE NUMBER NOTE:* Vehicle number (example *A6FS 100001*) includes following identification data in sequence:

Eng. Type①	Year②	Assy. Plant	Body Style③	Serial No.
A	6	See below	See below	100001 up

①—**A**—6 Cyl., 223 cu. in. engine; **M**—8 Cyl., 292 cu. in. engine; **P**—8 Cyl., 312 cu. in. engine (Thunderbird & & Interceptor); **U**—8 Cyl., 272 cu. in. engine.

②—Last digit of model year.

③—**C**—Sunliner (Conv.); **F**—Victoria (Fairlane 4-Dr.) **H**—Thunderbird; **R**—Ranch Wagon (Customline); **S**—Sedan Delivery; **T**—Fordor & Tudor (Fairlane); **V**—Victoria (2-Dr.); **W**—Crown Victoria; **X**—Country Sedan; **Y**—Country Squire; **G**—All others (Fordor, Tudor—Mainline & Customline).

Assembly Plant Designation

A—Atlanta	**F**—Dearborn	**N**—Norfolk
B—Buffalo	**G**—Chicago	**P**—St. Paul
C—Chester	**K**—Kansas City	**R**—San Jose
D—Dallas	**L**—Long Beach	**S**—Somerville
E—Mahwah	**M**—Memphis	**U**—Louisville

TUNE-UP

►*SUDDEN ENGINE STOPPAGE CORRECTION:* Inspect distributor primary terminal wire assembly Ford No. B6A-12216-A for defective welds at brass terminals.

COMPRESSION PRESSURE: 150 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: Steady 18-19" idling at 475-500 RPM in neutral.

VALVE TAPPET CLEARANCE: .019" Intake and Exhaust (Hot & Cold).

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal operating temperature and *running at slow idle,* and opens when *operating at high RPM.* Spring is installed with ¾ turn wind-up and hooked over stop pin.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

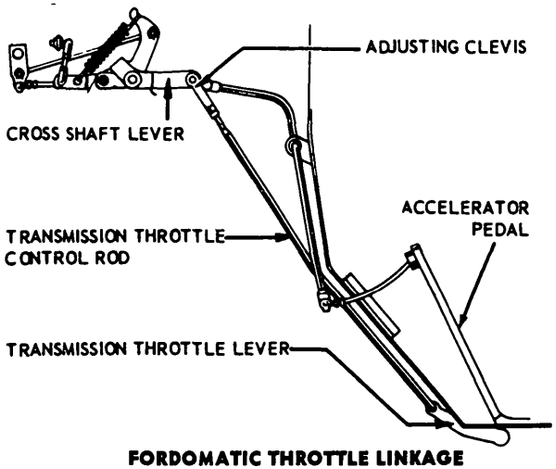
SPARK PLUG GAP: .032-.036".

Spark Plugs—Champion 870. 18mm.

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be torque tightened within the range 15-20 ft. lbs.

COIL: Ford No. B6A-12029-B. *12 Volt.*
Ignition Current—2.5 amps. idling, 4.5 amps. stopped. **Resistor—Ford B6A-12250-B** (Early), **B6A-12250-C** (Later). Mounted next to coil.

►*IGNITION RESISTOR PRODUCTION CHANGES:* Two types of resistors, Ford No. B6A-12250-C used in production to replace original resistor B6A-12250-B. First type replacement identified by copper flashing on heads of rivets which support elements. A piece of fibre glass is cemented to inside channel of support bracket.



FORDOMATIC THROTTLE LINKAGE

Second type has sheet metal cover snapped over channel and rivets are cadmium plated. Replace original type when servicing ignition system.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Ford No. B6A-12127-E. *12 Volt.*

►*DISTRIBUTOR DIAPHRAGM PRODUCTION CHANGE:* A new distributor diaphragm, Ford No. B6A-12370-B, used on all engines after Nov. 15, 1955, and is available for replacement of all B6A-12370-A diaphragms. It can be identified by a die cast end cover in place of stamped cover and incorporates new type material in secondary diaphragm giving it much greater strength.
Condenser—Ford 7RA-12300-C. **Capacity**—.21-.25 mfd.
Contact Point Set—Ford FAA-12171-A.
Breaker Gap—.024-.026".
Cam Angle—35-38°.
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
0±½	18	300
¼-1¼	32	400
1¾-2¾	50	500
8-9¼	2.59	1200
10¾-11¾	4.22	1600
13-14½	6.00	2000

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump. It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump.

Initial Distributor Timing: Set engine crankshaft so that No. 1 cylinder is at TDC after compression stroke (with timing mark in line with pointer). Install distributor so that rotor points to the No. 1 spark plug wire terminal in distributor cap.

IGNITION TIMING

Setting—4° BTDC (Std.), 6° BTDC (Fordomatic) with engine idling at 475 RPM and vacuum line disconnected. *See Initial Distributor Timing above. NOTE*—Maximum initial timing recommended is 6° BTDC (Std.) and 8° BTDC (Fordomatic).
Timing Mark—Vibration damper marked "TDC", and "3", "5", "7", "9" degrees BTDC. Align correct mark with pointer on cylinder front cover.

CARBURETOR

Ford No. B6A-9510-H (Exc. Fordomatic), B6A-9510-G (Fordomatic). "Visi-flo", single barrel.

►*CARBURETOR MAIN METERING JETS PRODUCTION CHANGE:* For main metering jets used in production starting approximately June 1st, 1956 *See "Ford Visi-Flo" in Carburetion Section.*
Initial Setting – Initial setting 1 turn open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture.
Idle Speed – 475-500 RPM (Std. & O.D.), 475-500 RPM (Fordomatic) with selector lever in Neutral with 425-450 RPM final check with selector lever in Dr. range.
Fuel Level – 11/16" ± 1/32" below power valve mounting surface. (Tool T52L-9550-AEE) *See "Ford Visi-fl" in Carburetion Section.*
Accelerating Pump: Inner hole for average or hot weather operation, outer hole for cold weather operation.
Fast Idle: Integral type operated by choke valve. No adjustment required.
Throttle Linkage Adjustment (Ford matic Cars): Adjust engine idle speed to 475-500 RPM with selector lever in "N" position and engine at normal operating temperature. Adjust anti-stall dashpot (see below). Remove cotter pin and clevis pin from upper end of throttle control rod. Pull upward firmly but gently on throttle control rod to hold transmission lever against its internal stop. Rotate throttle rod clevis until pin enters holes in the clevis and the accelerator assembly shaft. Lengthen throttle control rod by rotating clevis 2½ turns counter-clockwise. Assemble throttle control rod to accelerator assembly shaft with clevis pin and cotter pin. Adjust accelerator pedal height by turning threaded trunnion on accelerator connecting link until top surface of accelerator pedal is 4 9/16" from floor pan. Check throttle linkage, and relieve any binding conditions. Road test car. If band or clutch slippage is evident, increase rod length to 3 turns, *but do not exceed 3½ turns of the clevis.*
Anti-Stall Dashpot (Fordomatic Cars): Adjust engine idle speed to 475-500 RPM with selector lever in "N" position and engine at normal operating temperature. Loosen dashpot adjusting screw locknut. Hold throttle in closed position, and turn dashpot adjusting screw out (counter-clockwise) until head of screw pushes dashpot rod up to the end of its travel. Turn dashpot adjusting screw in (clockwise) 1½-2 turns to obtain a clearance of .045-.064" between rod and screw head. After adjustment made, tighten adjusting screw locknut.
Fuel Pump Pressure: 4-5 lbs. at 500 RPM.

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CARB. EQUIPMENT

Fuel Pump: **F rd B5A-9350-A,** Fuel only (Except Fordomatic & Overdrive Cars), **B5A-9350-B,** Fuel & Vacuum (Fordomatic & Overdrive Cars).
Fu l Pump Pr ssur – 4-5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: King-Seeley Electric.
Dash Unit – Ford B6A-9280-D.
Tank Unit – Ford B6A-9275-C (Exc. Sta. Wgn. & Sed. Del.). Ford B6A-9275-B (Sta. Wgn. & Sed. Del.).
See "Fuel Gauges" in Carburetion Section.

BATTERY

Ford N . B6A-10655-C. *12 Volt,* 11 plate, 55 Ampere hour capacity, or **B6A-10655-E.** *12 Volt,* 13 plate, 70 Ampere hour capacity.
Battery Gr und – Negative to engine block.
► *CAUTION: This is reversed from previous models.*
Engin Gr und – Cylinder head to dash.

STARTER

F rd N . B6A-11002-A. *12 Volt.* **Armature**–B6A-11005-A.
► *IMPULSE STARTING (Back-Up Light Equipped Cars) CORRECTION:* Before replacing neutral safety switch to correct short between light and solenoid terminals causing engine to start, interchange leads at switch. Connect longest lead (beyond taped portion of harness) to "A" terminal and short lead to "B" terminal.
Drive – Ford 1CM-11350-C. Bendix "Folo-Thru".
R tation – Counter-clockwise at commutator end.
Brush Spring Tensi n – 48-56 ozs.
Cranking Speed – 150-180 RPM with engine warm.

Perf rmance Data.

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	120′
	150-180 ②		190 max.

① – With starter on engine and engine idling.
② – Cranking speed with engine warm.

Starting Switch: Magnetic type, Ford No. B6A-11450-A. Starter Switch is controlled by ignition switch. *NOTE -* Neutral Safety Switch used on Fordomatic transmission cars.
F rdomatic Neutral Safety Switch: Ford No. FAC-15812-C.
Adjustment – *See "Fordomatic & Mercomatic" in Transmission Section.*

GENERATOR

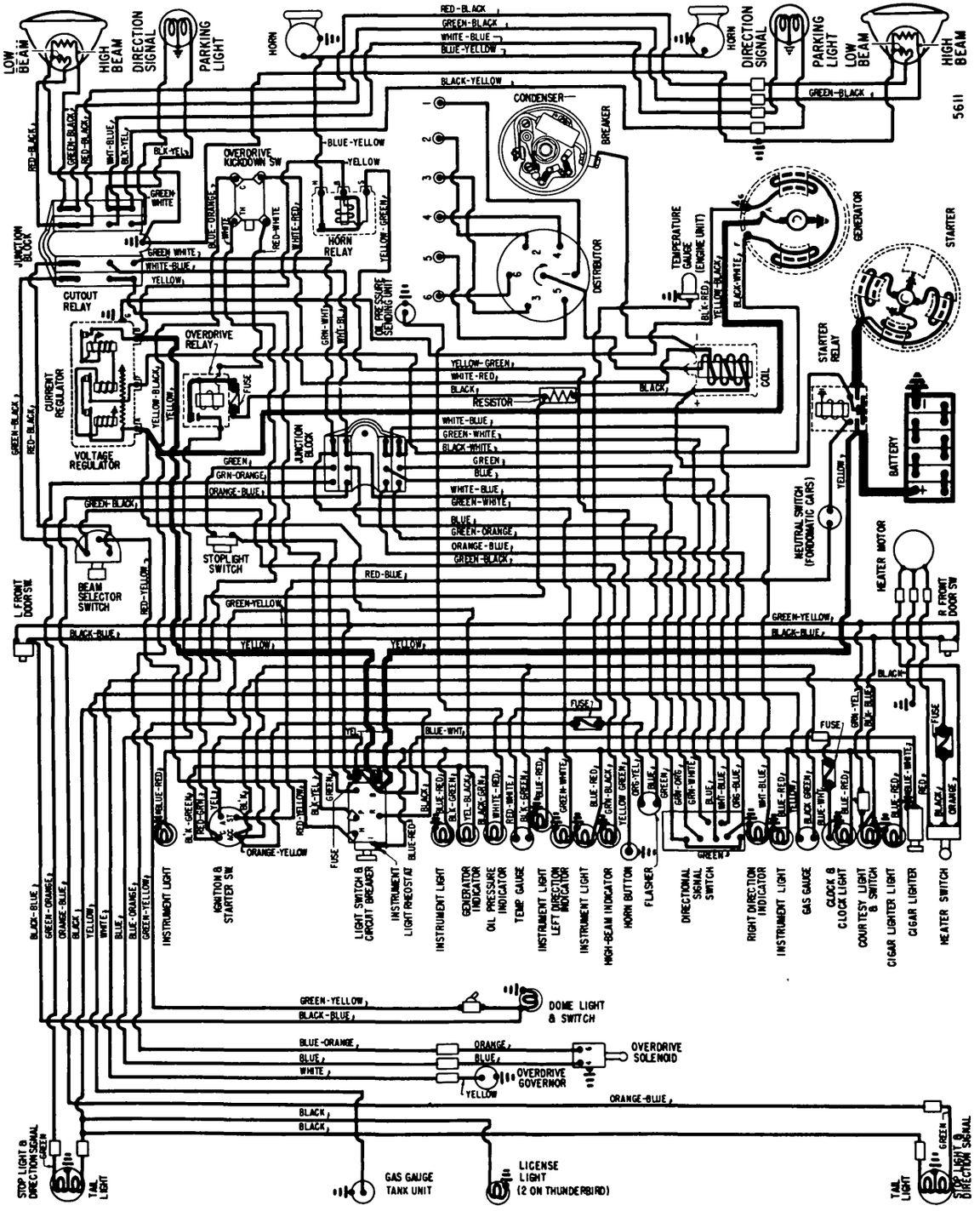
Ford N .B6A-10002-A, *12 Volt.* **Armature** – B6A-10005-A.
► *GENERATOR INDICATOR LIGHT (Idle Speed) CORRECTION:* When generator light comes "ON" when engine idles, install a 75 ohm, 25 Watt resistor (Vitreous enamel type with eyelets moulded into resistor body), at terminal "A" of regulator in series with indicator light wire (Yellow with black tracer). Adjust engine idle speed to high limit. *NOTE -* Light will now have lower illumination than oil indicator light.

Performance Data

Amperes ①	Eng. RPM
30	1250

① – See Regulator for maximum charging rate.
Brush Spring T nsion – 26-34 ozs.

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Field Current – 1.4-1.6 amperes at 12.0 volts.
Rotation – Counter-clockwise at commutator end.
Belt Adjustment: ¼" belt deflection midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Ford No. B6A-10505-A. *12 Volt.*

► *SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 75° F., ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.*

Cutout Relay

Cuts In – 12.0-12.8 volts.

Voltage Regulator

Setting – 14.6-15.4 volts.
Checking & Adjusting – *See Electrical Section.*

Current Regulator

Setting – 28-32 amperes.
Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

► *DOME LIGHT FAILURE (High Voltage) CORRECTION:* When dome lights fail due to high voltage, remove head light switch, remove dome light wire from switch (green wire with yellow tracer) and install 1.5 Ohm, 5-Watt vitreous enamel resistor in dome light circuit.

Head Lamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: With control knob in "OFF" position, press spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N. Remove switch and disconnect all wires.

Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), on top of booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Located as follows:
Interior Lights – 7.5 ampere. On lighting switch.
Overdrive – 15 ampere on overdrive relay.
Cigar Lighter – Special fuse in lighter base.
Clock – 3 amps. in clock lead.
Heater – 7.5 amps. in blower switch lead.

Turn Signal Fuse – 7.5 amps. In flasher to switch lead.

CIRCUIT BREAKERS: On headlight switch. Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits.

► *1956 CIGAR LIGHTER CAUTION:* 12 volt socket and element smaller than 6 volt. 12 volt socket has ink mark stamped on it for identification. DO NOT use 12 volt element in 6 volt socket as heated element will eject onto front seat.

HORNS: (Except West Coast). Ford B5T-13832-B (High Pitch), B5T-13833-B (Low Pitch). *12 Volt.*
(West Coast Only). Ford B6A-13832-A (High Pitch), use bracket Ford No. B6A-13830-A, Ford B6A-13833-A (Low Pitch), use bracket Ford No. B6A-13831-A. *12 Volt.*
Horn Current – 9.2-9.6 amperes at 12-12.6 volts.
Horn Relay: Ford No. 2G-13853-A.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. Valve-in-head.

Bore	Stroke	Displacement
3.62"	3.60"	223 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0-1	31.54	137 at 4200 RPM

Compression & Vacuum Reading – *See TUNE-UP.*

► *CRANKSHAFT OIL SEAL LEAK CORRECTION:* For application of new type front oil slinger and crankshaft with integral oil slinger, *See "Crankshaft & Main Bearings" in Ford Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL: Drain crankcase. Remove oil level indicator. Remove engine left and right front splash aprons. Remove flywheel housing inspection cover. Remove oil pan retaining screws and remove pan.

PISTONS

Autothermic type. Solid skirt with three rings above pin.
Removal – Pistons and rods removed from above.
Fitting New Pistons: Use ½" feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows:
New Piston in New Bore – .0015" feeler. 5-10 lbs. pull.
New Piston in Used Bore – .002" feeler. 5-10 lbs. pull.
Used Piston in Used Bore – .0025" feeler. 5-10 lbs. pull.
Replacement Pistons: Standard size, .020", .030", .040", .060" Oversize. Pistons furnished only with fitted pins.
Installing Pistons: Install with small indentation in head toward FRONT of engine.

PISTON PINS

Floating type with lock rings at each end.

► *1955-56 PISTON PIN INSTALLATION CAUTION:* New B5A-6135-A Pin used in 1956 cars is heavier than the EAA-6135-B Pin used in 1955. *The two pins should not be mixed in any one engine assembly as a vibration or unbalanced condition may result.* New pin can be identified from old pin by machining of the ends. Old pin may be almost flush or chamfered at the internal diameter. New pin will have either a recessed internal diameter as though the ends of the pin were spot faced, or will not be completely drilled through.
Diameter – .9120-.9123". **Length** – 3.016-3.030".
Pin Fit in Piston – .0001-.0008". Hand push fit at 70° F.
Pin Fit in Rod Bushing – .0001-.0008" clearance. Selective fit. Light thumb press fit at 70° F.
Replacement Pins: Standard and .001" and .002" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	3/32"	.010-.027"	.006"
Oil (3)	3/16"	.015-.062"	

Replacement Rings: Standard, .020", .030", .040" and .060" Oversize.

► *REPLACEMENT PISTON RING NOTE:* "Snap Type" rings furnished in Std. size only. "Expander Type" furnished in all oversizes above. "Steel Section Type" furnished in Standard, .020" and .030" Oversize.

CONNECTING RODS

Journal Diameter – 2.2980-2.2988".
Clearance – .0033" maximum.
Side Clearance – .012" maximum.
Replacement Bearings: Standard size (4 sizes marked **Red & Blue** for selective fitting) and .010", .020", .030", Undersize.
Installing Rods: Install rod in piston so that squirt hole is to right when indentation on top of piston is toward front of engine.

CRANKSHAFT

► *CRANKSHAFT PRODUCTION CHANGE: See "Crankshaft Oil Seal Leak Correction" under ENGINE above.*
Journal Diameter – 2.4980-2.4988". Four Bearings.
Bearings – Steel backed, copper lead alloy, or lead babbitt.
Clearance – .0031" maximum (lead babbit bearings), .0035" (copper lead bearings).
Replacement Bearings: Standard size, (4 sizes marked **Red** or **Blue** for selective fitting) and .010", .020", .030" Undersize.
End Thrust: Taken on rear intermediate No. 3 bearing.
Thrust Bearing Alignment – *See "Crankshaft & Main Bearings" in Ford Special Data.*
End Play – .012" maximum.
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Ford Special Data.*

► *OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

Journal Diameter – 1.9255-1.9265".
Clearance – .006".
End Thrust: Taken by thrust plate and spacer (between camshaft sprocket and shoulder on camshaft). *NOTE* - Chamfer on inside of spacer must be to the rear in assembly.
End Play – .012".
Replacement Bearings: Finished bearings furnished Standard and .015" Undersize. *CAUTION* - Rear intermediate (No. 3) bearing not interchangeable with other bearings.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*
Timing Chain: Side-guide type. Length 56 links.

► *REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side). Remove and install chain endless as a unit with both sprockets.
Camshaft Setting: Sprockets marked by "O" at one tooth. Mesh chain so that there are 12 pins between "O" marks on driving side of chain.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*

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VALVES

Tappet Clearance: .019" Intake & Exhaust (Hot or Cold).

Valve	Head Diameter	Stem Diameter ℄
Intake	1.775-1.785"	② .3415-.3420" or ③ .3420-.3425"
Exhaust	1.505-1.515"	② .3400-.3405" or ③ .3405-.3410"

Valve	Seat Angl	Lift ④	Stem Clearance
Intake	45°	.268" min.	.004" max.
Exhaust	45°	.268" min.	.006" max.

① — Furnished with .003",.015",.030" oversize stems. See *"Valve System" in Ford Special Data.*

② — Color coded RED. Use with RED valve guide.

③ — Color coded GREEN. Use with GREEN valve guide.

④ — Cam lobe lift service limit.

►*EXHAUST VALVE STEM DIAMETER PRODUCTION CHANGE: Stem diameter decreased .0005" for increased stem-to-guide clearance to minimize valve sticking. See "Valve System" in Ford Special Data.*

Valve Seat Width – .060.,080" (Intake), .070-.090" (Exhaust).

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Special Data.*

Valve Stem Oil Seals – "Umbrella" type oil seals used on intake and exhaust valve stems. Seals are installed with cupped side down on valve stem at guide boss on cylinder head. *Install new seals whenever valves removed or when seals become loose on stem.*

Valve Springs: Install with closed coil end toward cylinder head.

Free Length – 2.09" approximately.

Valve Spring Specifications

	Pressure	Length
Valve closed	64-79 lbs.	1.780"
Valve open	145-177 lbs.	1.390"

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to spring retainer contact surface. If assembled height is 1 13/16" or greater, install .030" spacer between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 25/32-1 13/16". *CAUTION* - Use of spacers in excess of recommendations will result in overstressing valve springs and lead to excessive load loss and spring breakage.

Valve Guides Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves. *See "Valve System" in Ford Special Data.*

Valve Lifters: Mushroom type. Removed from below with camshaft out.

Rocker Arm Assembly: *See "Valve System" in Ford Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE The following valve opening and closing points are with camlift as indicated.*

Intake Valves–Open 24° ℄ BTDC. Close 46° ② ALDC

Exhaust Valves–Open 68° ℄ BLDC. Close 2° ② ATDC

① – Camlift .016". ② – Camlift .019".

Valve Timing Check – Remove rocker arm cover. Back off No. 1 intake valve adjusting screw, slide rocker arm assembly to one side. With push rod in lifter socket, install dial indicator to indicate push rod movement. Turn engine slowly until cam lobe contacts lifter. Zero indicator and continue to turn crankshaft until .016" (desired lift) is obtained. Timing indicator on pulley should read 24° BTDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity. 4 qts. (refill), 5 qts. (when filter changed).

Normal Oil Pressure: 45-50 lbs. at 2000 RPM.

Pressure Regulator Valve–In pump body, not adjustable.

Oil Pressure Indicator – Indicator light on instrument panel, operated by Engine Unit – Ford No. FDA-9278-A (Stamped No. 7 on Hex.). Lights when ignition switch turned on, goes out when engine starts and pump operates.

Oil Pump: Gear type pump located in crankcase, in line with distributor.

►*OIL PUMP CAUTION: New type oil pump has aluminum body. Use extreme care when servicing to prevent damaging body.*

Pump Overhaul: *See "Oil Pump" in Ford Special Data.*

Oil Filter: Full-flow type (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

Replacement Filter Element – Ford No. B2A-6731-A (Kit includes new gaskets).

►*CAUTION: This special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication). See "Oil Filter" in Ford Special Data.*

Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase at left side of engine.

COOLING

Water Capacity: 14.5 qts., add 1 qt. for heater.

►*LOSS OF COOLANT CORRECTION:* Lower generator mounting bracket bolt holes are tapped into cylinder water jacket. For loss of water at this point, or when replacing bolts, apply a good coating of waterproof sealer.

Pressure Valve: Ford LA-8100-A Radiator filler cap. Opens at 12-15 lbs. *CAUTION* - If replacement required use 12-15 lb. type.

Thermostat: Ford No. EAA-8575-A (157-162°) standard. Ford EAA-8575-B, (177-182 lb.) for use with permanent anti-freeze.

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Ford Special Data

Temperature Gauge King-Seeley Electric.

Dash Unit – Ford No. B6A-10883-A.

Engine Unit – Ford No. B6A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 9½ CF, No. 268594. Semi-centrifugal type.

►*HEAVY DUTY CLUTCH PRODUCTION CHANGE:* Heavy duty clutch Ford No. B6A-7563-A, incorporating oil slinger, and release bearing incorporating lubrication fitting now used in production. New heavy duty clutch disc Ford No. B6A-7550-A released for service. *See "Long Clutches" in Clutch Section.*

Clutch Disc – Long No. 288824.

Pedal Adjustment. If total pedal travel is less than 6 3/8" or more than 6 5/8", reposition pedal bumper and bracket until correct travel is within limits. Adjust assist spring link to give assist spring length of 6 5/8" when clutch is fully released.

Pedal Free Travel – 1 1/8 - 1 3/8". Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is reached. *NOTE* - Check free travel by operating engine at 3000 RPM with transmission in neutral position. There should be a minimum of ½" free travel under these conditions. Readjust as necessary.

Removal: Remove transmission (see Transmission removal below), and slide clutch release bearing off clutch release lever. Disconnect clutch pedal release rod from clutch release lever assembly. Remove clutch release equalizer bar bracket from flywheel & clutch housing and remove equalizer bar. Remove split bronze bushing from bracket and then remove flywheel housing. Install Tool 7563 and remove clutch pressure plate assembly (if tool not available, clutch may be released by backing off the attaching bolts evenly).

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

►*PREMATURE GEAR TOOTH WEAR CORRECTION.* Caused by incorrect gear engagement, *See "Transmission Control Notes" in Ford Special Data.*

►*SYNCHRO-MESH & OVERDRIVE THREE SPEED TRANSMISSION GEAR REPLACEMENT CAUTION:* Shot peened gears used in 1956 models. Shot peened gears can be used in past model transmissions. DO NOT use past model gears in 1956 transmission.

See "Ford Synchro-mesh" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect gearshift linkage at transmission. Remove speedometer cable and gear. Disconnect drive shaft at transmission and remove the capscrews attaching transmission extension to rear engine support. Place a support under engine and remove the frame cross member and rear engine support. Remove transmission-to-flywheel housing capscrews and install two guide pins. Pull transmission back until main drive gear splines clear housing, and lower transmission from car.

OVERDRIVE

Warner Model AS4-R10F. Solenoid operated type, with governor control and throttle operated kick-down. No Lock-Out Switch used.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. *See "Fordomatic & Mercomatic" in Transmission Sect.*

►*FORDOMATIC PRODUCTION CHANGES:* For improved Throttle Control Inner Lever Installation, change in Pressure Regulator Valve Body, and new location of pressure take off plug, *See "Fordomatic & Mercomatic"*

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in Transmission Section.

► *FORDOMATIC "LOCK-UP" CORRECTION (1955-56 Cars & Trucks):* Caused by cross leakage in front servo piston. *See "Fordomatic & Mercomatic" in Transmission Section.*

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication – Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain & refill every 15,000 miles.

Checking Fluid Level – Apply parking brakes, place transmission selector lever in "N" position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (Parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator. Wipe indicator clean and insert in tube (make sure indicator is pushed down all the way). Remove indicator and read level. Add sufficient fluid to raise level to full mark on indicator. Replace indicator.

► *FORDOMATIC TRANSMISSION FLUID CHANGE CAUTION:* New type oil is green colored, similar to engine oil. DO NOT USE IT IMPROPERLY. "Type A" (reddish brown) may be used when adding oil to transmission

Throttle Linkage Adjustment: *See CARBURETOR above.*

► *OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type.

► *CAUTION (All Cars Except Station Wagon & Sedan Delivery): Rear universal joint companion flange nut controls pinion bearing pre-load (must be adjusted whenever nut is loosened).*

REAR AXLE

PASSENGER CARS

Own. Separate Carrier, semi-floating hypoid, with Hotchkiss drive.
See "Ford & Mercury (Separate Carrier Type) Hypoid" in Rear Axle Section.

► *LUBRICATION BAFFLE NOTE:* 1956 rear axle housing has lubrication baffle, held in place by two housing bolts, for directing lubricant to differential side bearings. Recommended for installation on earlier models. Ford No. B5A-4018-A.

Axle Ratios

Synchro-mesh	Overdrive	Fordomatic
3.89-1 (35-9)	4.11-1 (37-9)	Ⓒ 3.22-1 (29-9)

Ⓒ – 3.55-1 (32-9) Optl.

► *RATIO, DRIVE GEAR & DIFFERENTIAL CASE IDENTIFICATION: See Ford V8 Data following.*

Backlash – .003-.008".

Axle Shaft Removal: Remove wheel, take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: Disconnect rear universal. Remove axle shafts (see above). Remove carrier from housing.

STA WGN. & SED. DEL.

Own. Integral Carrier, semi-floating hypoid, with Hotchkiss drive.
See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.

Ratios

Standard Transmission – 4.09-1 (45-11).
Overdrive Transmission – 4.27-1 (47-11).
Fordomatic Transmission – 3.54-1 (46-13).

Axle Shaft Removal: Same as Pass. Cars (above).

Rear Axle Assembly Removal: Remove hub caps, loosen wheel stud nuts, raise car at rear and disconnect hydraulic brake hose from brake line at rear axle. Disconnect parking brake cable from equalizer rod, remove cable assembly from frame brackets. Remove wheels, disconnect drive drive at rear axle universal joint flange. Remove "U" bolts. Remove assembly from under car.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Model	Ⓒ Front	Ⓒ Rear
Pass. Cars (Std.)	B5A-18124-A	B5A-18125-A
Pass. Cars (Hvy. Duty)	B5A-18124-D	B5A-18125-C
Sta. Wgn. & Sed. Del.		B5A-18125-D

Ⓒ – Furnished in kits which include shock absorber mounting bushings.

► *SHOCK ABSORBERS (1955-56 Taxi Cabs) PRODUCTION CHANGE:* Export type shock absorbers used in production as standard equipment, in place of heavy duty type on taxi cab units to eliminate "bottoming".

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs.
See "Lincoln, Mercury, Ford (Ball Joint)" in Suspensions and Wheel Alignment Section.

Kingpin Inclination – 6 - 7° crosswise.
Caster – Pos. ½° to Pos. 1½°
Camber – Pos. ¼° to Pos. 1¼°.
Toe-In – 1/16" to 1/8".

► *TOE-IN ADJUSTMENT NOTE:* When checking toe-in on cars with Power Steering, engine should be running so that power steering control valve will be centered.

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type.
See "Gemmer Worm & Roller (3 tooth)" in Steering Sect.

Power Steering: Ford-Mercury Bendix Linkage type.
See "Ford & Mercury Bendix" in Steering Section.

► *STEERING ARM INTERFERENCE (Power Steering Cars):* To correct interference between steering connecting rod clamps and/or bolts with power steering control valve, *See "Ford & Mercury Bendix Linkage Power Steering" in Steering Section.*

► *POWER STEERING BELT SQUEAL CORRECTION:* When belt slippage or squeal cannot be corrected by belt adjustment, install new pulley, Ford No. B6A-33556-A, and new solid type belt, Ford No. B6A-33558-A.

Steering Linkage: *See "Steering Linkage" in Steering Sect.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller (3 tooth)" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller (3 tooth)" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic. Hand lever applies rear wheel service brakes.
See "Ford, Lincoln, Mercury Bendix" in Brake Section.

► *BRAKE DESIGN CHANGES:* Front wheel brakes do not have eccentric and front and rear anchor pins are fixed (No adjustment).

Drum Diameter – 11" front and rear.

Wheel Cylinder Diameter – 1 1/8" (Front - All), 7/8" (Rear - Pass. Cars), 15/16" (Rear - Sta. Wgn. & Sed. Del.).

Lining Specifications

Passenger Car

Lining	Width	Thickness	Length
Front Primary	2¼"	3/16"	10 27/32"
Front Secondary	2¼"	15/64"	10 27/32"
Rear - All	1¾"	3/16"	10 27/32"

Sedan Delivery & Station Wagon

Lining	Width	Thickness	Length
Front Primary	2¼"	7/32"	9 9/32"
Front Secondary	2¼"	7/32"	11 15/16"
Rear Primary	2"	7/32"	9 9/32"
Rear Secondary	2"	7/32"	11 15/16"

Clearance – Adjusting screw backed off 10 to 12 notches from point where shoes are tight against drum.

Brake Pedal Free Play Adjustment: 5/16" to 7/16". If play not correct after brake adjustment, loosen locknut on the eccentric bolt that attaches brake pedal assembly to master cylinder pushrod, rotate eccentric bolt for desired clearance.

Standard Master Cylinder: on engine side of firewall.

Checking Fluid – Maintain fluid level to within ½" of top of reservoir.

Removal – Disconnect brake line from master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lockwashers attaching master cylinder to firewall.

Power Brakes: Midland Hy-Power Unit mounted on left side of car in engine compartment and connected in hydraulic brake line between master cylinder and wheel cylinders. There are no mechanical connections and no adjustments are required.
See "Midland Power Unit" in Brake Section.

Checking Fluid – Same as for manual brakes (above).

Removal of Power Unit – Depress brake pedal a few times to remove all vacuum from system. Disconnect hydraulic lines at the power unit and remove wires from brake stop light switch. Remove power unit to mounting bracket bolts and lockwashers and remove the power unit.

MISC. MECHANICAL

Windshield Wipers: Vacuum link and crank arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Reversible motor in each window. *See "Electric Window Regulators" in Misc. Sect.*

Power Top Control: Electric-Hydraulic with reversible pump motor. *See "Power Top Controls" in Misc. Sect.*

Power Seat Adjusters: "Fourway" Electric Screw and jack type with individual motors and transmissions for vertical and horizontal adjustment. *See "Power Seat Adjusters" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION· Us extrem care when disconn cting any part of air conditioning equipm nt or lines. See "Air Conditioning Servic Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate, on left front body pillar (V8 Pass. Cars), on dash panel in engine compartment (Thunderbird).
First Numb r—100001

►*VEHICLE NUMBER NOTE:* Vehicle number (Example *M6FS 100001*) includes following identification data in sequence

Eng Typ ①	Y ar ②	Assy Plant	Body Style③	Serial No
M	6	See below	See below	100001 up

①—**A**—6 Cyl , 223 cu in engine, **M**—8 Cyl , 292 cu in engine, **P**—8 Cyl , 312 cu in engine (Thunderbird & Interceptor) **U**—8 Cyl , 272 cu in engine
②—Last digit of model year
③—**C**—Sunliner (Conv), **F**—Victoria (Fairlane 4-Dr), **H**—Thunderbird, **R**—Ranch Wagon (Customline), **S**—Sedan Delivery, **T**—Tudor & Fordor (Fairlane), **V**—Victoria (2-Dr), **W**—Crown Victoria, **X**—Country Sedan, **Y**—Country Squire, **G**—All others (Fordor Tudor—Mainline & Customline)

Ass mbly Plant Designation

A—Atlanta	**F**—Dearborn	**N**—Norfolk
B—Buffalo	**G**—Chicago	**P**—St Paul
C—Chester	**K**—Kansas City	**R**—San Jose
D—Dallas	**L**—Long Beach	**S**—Somerville
E—Mahwah	**M**—Memphis	**U**—Louisville

TUNE-UP

►*SUDDEN ENGINE STOPPAGE CORRECTION.* Inspect distributor primary terminal wire assembly Ford No. B6A-12216-A for defective welds at brass terminals.

COMPRESSION PRESSURE At cranking speed, compression pressures are as follows

Engine	Compr Ratio	Compr. Press
272 cu in	8 0-1	160 lbs
272 cu in	8 4-1	165 lbs
292 cu in	8 0-1	155 lbs
292 cu in	8 4-1	160 lbs
312 cu in	8 0-1	155 lbs
312 cu in	8 4-1	160 lbs
312 cu in	9 0-1	165 lbs

VACUUM READING. 19-20" at 475-500 RPM in neutral

VALVE TAPPET CLEARANCE: 019" Intake and Exhaust (Hot & Cold)
Tapp t Adjustm nt· S *"Valve System" in Ford Special Data*

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight Valve on cars with single exhaust system is located between front end of right hand exhaust manifold and crossover pipe Valve on cars with dual exhaust system is located between rear end of right hand exhaust manifold and muffler inlet pipe Thermostat spring is installed with a ¾ turn wind-up and hooked over stop pin *Valve is closed when engine is at normal operating temperature and running at slow idl , and opens when operating at high RPM*

►*DUAL EXHAUST NOTE* When valve closed most exhaust gases are discharged through left hand exhaust pipe

►*LUBRICATION NOTE* Use lock lubricant Ford No. B6Q-19587-A at shaft and spring bearing positions.

IGNITION

FIRING ORDER· 1-5-4-8-6-3-7-2
Cylinders—RIGHT BANK 1-2-3-4 LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032- 036"
Spark Plugs—Champion 870 18mm

►*SPARK PLUG CAUTION* Spark plug has tapered seat and does not require a sealing gasket It is important that plugs be torque tightened within range 15-20 ft lbs

►*SPARK PLUG MISFIRING CORRECTION* If misfiring occurs between No. 6 and No. 8 cylinders, interchange No. 5 and No. 6 spark plug wire positions in all insulator blocks and separator blocks on left side of engine.

COIL: Ford No. B6A-12029-B. *12 Volt.*
Ignition Current — 2.5 amps. idling, 4.5 amps. stopped.
Resistor — Ford B6A-12250-B, (Early), B6A-12250-C, (Later). Mounted next to coil. *See changes following.*

►*IGNITION RESISTOR PRODUCTION CHANGES·* Two types of resistors Ford No. B6A-12250-C used in production to replace original resistor B6A-12250-B. First type replacement identified by copper flashing on heads of rivets which support elements. A piece of fibre glass is cemented to inside channel of support bracket. Second type replacement has sheet metal cover snapped over channel and rivets are cadmium plated. Replace original type when servicing ignition system.

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil

DISTRIBUTOR· Ford No. B6A-12127-A (272 Eng with 2-Barrel Carb), **B6A-12127-B** (272, 292, & 312 Engs with 4-Barrel Carb) *12 Volt* New double diaphragm, pressure type with separate vacuum lines to manifold and carburetor used with cars equipped with 4-Barrel Carburetors

►*DISTRIBUTOR DIAPHRAGM PRODUCTION CHANGE·* A new distributor diaphragm Ford No. B6A-12370-B used on all engines after Nov. 15th, 1955, and is available for replacement of all B6A-12370-A diaphragms. It can be identified by the die cast end cover in place of stamped cover and it incorporates new type material in secondary diaphragm giving it much greater strength.

►*POOR ACCELERATION OR ROUGH IDLE CORRECTION (Due to Distributor Diaphragm Leaking on Cars Equipped With 4-Barrel Carbs)* Check for leaks as follows Disconnect carburetor and manifold fittings at diaphragm Attach screw-in adapter from distributor stroboscope to primary diaphragm (large fitting) Adjust distributor stroboscope vacuum pump to a steady reading of 20" of vacuum Connect hose to primary diaphragm fitting If reading less than 20" of vacuum one or both diaphragms are leaking and should be replaced If readings hold at 20" of vacuum, further check for small pin holes in the diaphragm by adjusting distributor stroboscope vacuum pump to obtain a steady 3-5" of vacuum Again connect hose to primary diaphragm fitting If a steady reading is not maintained, one or both diaphragms are leaking and should be replaced New diaphragm assemblies, Part No B6A-12370-D should be checked at both vacuum settings before installation
Condenser—Ford FAB-12300-A **Capacity**— 21- 25 mfd
Contact Point Set—Ford FAB-12171-B
Breaker Gap— 014- 016"
Cam Angle — 26-28° ± 5°.
Breaker Arm Spring Tension—17-20 ozs
Rotation—Counter-clockwise viewed from above

Advance Performance—B6A-12127-A
►With Distributor on Test Stand

Distr	Degrees	Vacuum (" of HG)	Distr	RPM
0		0		200
0±½		15		300
¼-1¼		28		400
6½-7½		.96		800
11½-12¾		2 21		1200
14½-15½		3 41		1600
16-17¼		4 60		2000

Advance Performance—B6A-12127-B
►With Distributor on Test Stand

Distr	Degrees	Vacuum (" of HG)	Distr	RPM
0		0		200
0±½		16		300
0-1		29		400
5½-6½		88		800
8½-9½		1 27		1200
11-12		1 73		1600
13-14¼		2 19		2000

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure distributor shaft engages oil pump intermediate hex shaft If may be necessary to turn engine over with starter after the distributor drive gear is partially engaged, in order to engage the intermediate shaft

Initial Distributor Timing Remove No 1 spark plug Hold thumb over spark plug hole until piston starts up on compression Slowly "bump" engine over with starter until timing mark is aligned with pointer Find No 1 spark plug socket in distributor cap and fit distributor cap to distributor housing Mark distributor housing to indicate No 1 spark plug wire position Position rotor approximately 20° counter-clockwise from mark made on distributor housing Engage distributor drive gear and install distributor in engine

IGNITION TIMING

Setting—3° BTDC (Std), 6° BTDC (Fordomatic) with engine idling at 475 RPM and vacuum line disconnected (2-Barrel Carb) PRIMARY (inner diaphragm) vacuum line disconnected (4-Barrel Carb) *See Initial Distributor Timing above NOTE*—Maximum initial timing recommended is 6° BTDC (Std) 8° BTDC (272,292 Eng. Fordomatic), 6° BTDC (312 Eng. Fordomatic).

Timing Mark—Vibration damper marked "TDC" and "2", "4" "6" "8" "10" degrees BTDC Align correct mark with pointer (bolted to water pump)

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CARBURETOR

►*CARBURETOR APPLICATION: Two-barrel Carburetors used on 272 cu. in. engine. Four-barrel Carburetors used on 292 and 312 cu. in. engines.*

►*WIDE OPEN THROTTLE INTERFERENCE CORRECTION (272 Eng.):* Interference with intake manifold may prevent accelerator assembly bar from traveling to wide open position. To correct, bend forward upper end if accelerator assembly bar.

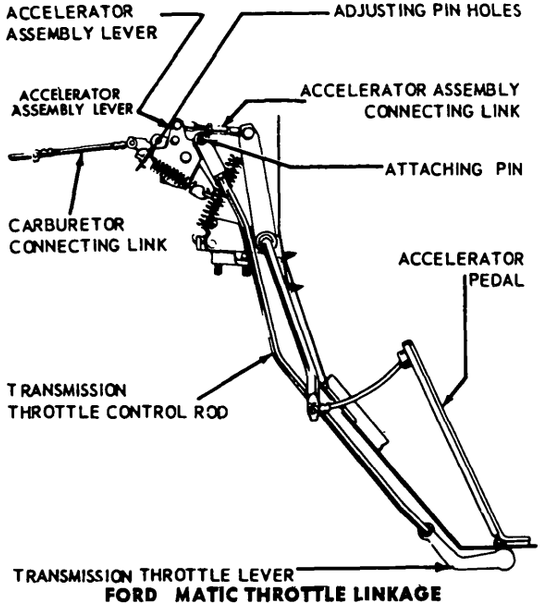
►*HARD STARTING (272 Pass. Car Eng.) CORRECTION:* New choke thermostat with the new bi-metal spring Ford No. B6A-9848-D, identification mark "56F1" can be installed to replace early choke thermostats with identifications either "56F" or "56D".

►*ACCELERATOR PUMP PISTON ROD STICKING CORRECTION (272 Eng.):* When this rod sticks or binds, install new rod Ford B6A-9531-A, identified by deep blue color. Old rod was zinc plated. Free carburetor of burrs or foreign material when installing new rod.

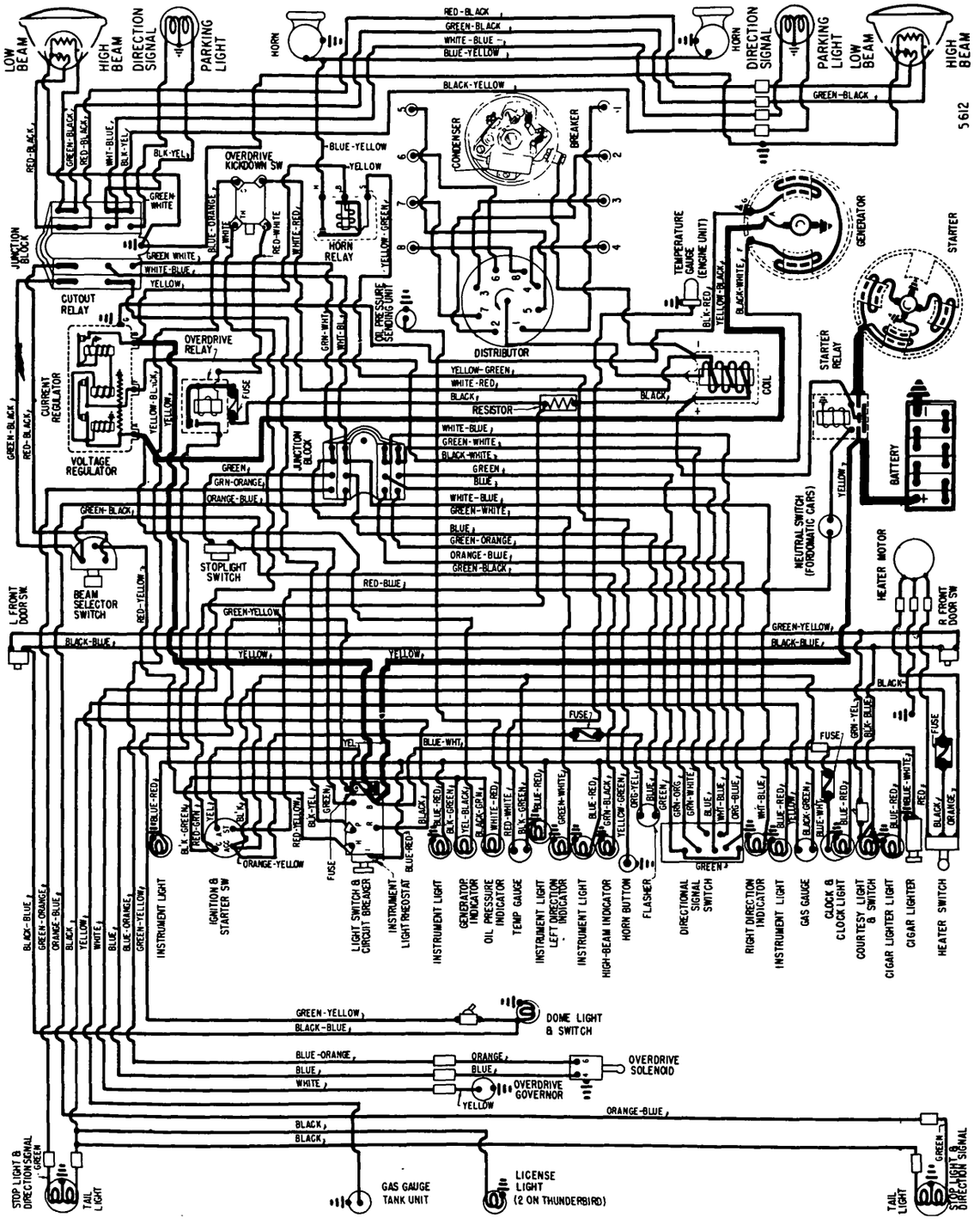
►*ACCELERATOR ASSEMBLY BAR INTERFERENCE CORRECTION:* For elimination of bind or interference (Std. & O.D. Trans.) between bar and distributor diaphragm vacuum line or intake manifold. *See "Ford Dual Downdraft Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment (Fordomatic Cars): Set hand brake and adjust engine idle speed to 475-500 RPM with engine at normal operating temperature and transmission in "N" (Neutral) position. *Make sure that fast idle cam is in slow position.* Adjust anti-stall dashpot (see below). Turn engine off. Disconnect throttle control rod from accelerator assembly. Insert a

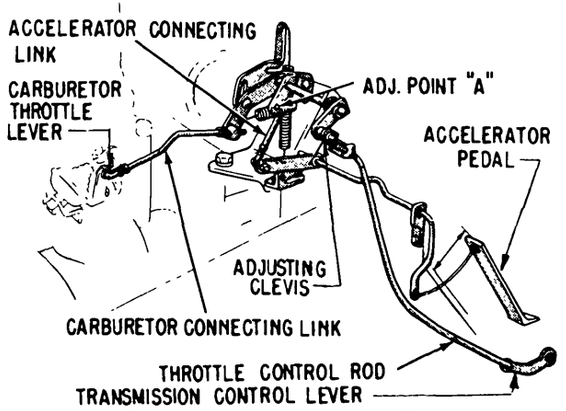
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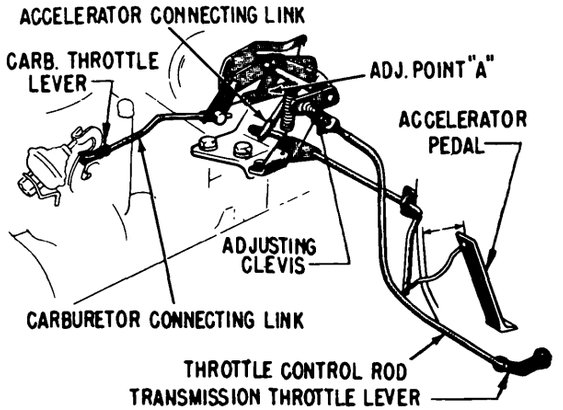
FORD MATIC THROTTLE LINKAGE (2-BARREL CARBURET R)



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FORDOMATIC THROTTLE LINKAGE (4-BARREL CARBURETOR)



FORDOMATIC THROTTLE LINKAGE (THUNDERBIRD)

locking pin (¼" drill rod) through holes in lever and assembly. Adjust length of carburetor connecting link to close carburetor against its stop. Adjust the accelerator assembly connecting link to obtain a pedal height of 3 11/16" (cars with 2-barrel carburetors), 3 9/16" (cars with 4-barrel carburetors except Thunderbird cars), 4 1/4" (Thunderbird Cars). Remove locking pin and check alignment. Pin must re-enter freely. Remove locking pin and adjust throttle control rod. Pull upward gently but firmly on rod to hold transmission lever against its internal stop. Rotate clevis until clevis freely fits pin on accelerator assembly lever. Lengthen throttle control rod by rotating clevis 3 turns counter-clockwise. Assemble throttle control rod to the accelerator assembly lever. Hold clevis in alignment to prevent binding, tighten locknut. Check throttle linkage, and relieve any binding conditions. Road Test car. If band or clutch slippage is evident, increase length of the throttle control rod to 3½ turns, but d n t xc ed f ur turns f th cl vis. On cars with 2-barrel carburetors, check alignment of the accelerator cross shaft-to-accelerator assembly lever connecting link. Connecting link must be parallel to centerline of engine. If connecting link is misaligned, loosen the adjustment screw locknut, then turn adjustment screw until correct alignment is obtained.

Dashpot Adjustment (Fordomatic Cars): Adjust engine idle speed to 475-500 RPM with selector lever in "N" position, engine at normal operating temperature. *Make sure that fast idle cam is in slow position.* Loosen dashpot adjusting screw locknut. Hold throttle in closed position, and turn dashpot adjusting screw out (counter-clockwise) until head of screw pushes dashpot rod up to the end of its travel. Turn dashpot adjusting screw in (clockwise) 1½-2 turns to obtain a clearance of .045-.064" between rod and screw head. After adjustment made, tighten adjusting screw locknut.

FORD TWO-BARREL

Ford No. B6A-9510-J (Exc. Fordomatic), B6A-9510-K (Fordomatic). Dual, downdraft type.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—Initial setting 1 turn open. Set both screws alike. Turn adjusting screws in until engine begins to run rough from the lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly rich mixture. Turn screws out for richer mixture.

Idle Speed—475-500 RPM (Std. & O.D.), 475-500 RPM (Fordomatic) with selector lever in "N" position.

Fuel Level—11/16" below top surface of float bowl (Tool T52L-9550-AGE).

Float Level—1.374-1.438" from flange surface of air horn (inverted) to edge of soldered seam on bottom side of float. It should be equal on both ends of float.

Accelerating Pump: Center hole for normal operation, shortest stroke (closest hole to throttle shaft) for hot weather operation, longest stroke for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Automatic Choke: Index mark on cover aligned with center mark on housing.

Throttle Linkage Adjustment (Fordomatic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Ford Dual Downdraft Carburetors" in Carburetion Section.*

Fuel Pump Pressure: 4-5 lbs. at 500 RPM.

FORD FOUR-BARREL

Ford No. B6A-9510-L (Early Exc. Fordomatic), B6A-9510-M (Early Fordomatic), B6A-9510-N, Q, (Later).

►*CARBURETOR PRODUCTION CHANGES & RECOMMENDED CHANGES FOR IMPROVED STARTING & WARM-UP PERFORMANCE: See "Ford, Lincoln, Mercury 4-Barrel Centri-Quad" in Carburetion Section.*

►*ACCELERATOR RETURN SPRING (Fordomatic)BIND:* To eliminate bind causing throttle to stick open or prevent transmission from kicking down, shorten each end hook of accelerator bellcrank lever spring 1/16".

►*ROUGH IDLE (Caus d by Plugg d S condary High Spe d Air Bl ed):* When adjusting idle mixture screws does not correct condition, look for fuel being discharged from secondary transfer holes or secondary discharge nozzles. Clean bleed holes to eliminate siphoning.

►*AIR CLEANER WING SCREW TIGHTENING CAUTION:* Tighten anchor screw to 135 inch lbs. only, and wing nut just finger tight. Overtightening will permit anchor screw removal with air cleaner and cause lock washer to be drawn into carburetor venturi and engine.

►*4-BARREL CARBURETOR CHOKE LINKAGE INTERFERENCE CORRECTION:* Heat baffle or shield front portion may be bent toward the rear, causing it to bind on carburetor choke linkage.

►*4-BARREL CARBURETOR HARD COLD STARTING CORRECTION:* Choke plates may be operating improperly because wire link in choke housing has become disconnected from choke piston or the choke spring link. Move choke plates manually to see if any spring tension is present. If choke plates are completely free, correct as follows: Remove choke thermostat housing assembly and thermostatic housing plate and connect wire link. It is suggested that ends of wire link be bent slightly in order to make link more secure in proper holes. *NOTE*—Care should be exercised when reworking this link so that shape of link is not changed. Change of shape might cause a bind in the choke mechanism.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—Initial setting 5/8 turn open. Place choke fast idle cam in slow position. Turn both screws in until engine begins to run roughly from lean mixture. Turn screws out until engine begins to roll from rich mixture. Then turn screws in until engine begins to run smoothly. Favor a slightly rich mixture. Final setting may vary ½ turn between screws.

Idle Speed—475-500 RPM (Std. & O.D.), 475-500 RPM (Fordomatic) with selector lever in "N" position.

Throttle Linkage Adjustment (Fordomatic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Ford, Lincoln, Mercury, Centri-Quad Carburetors" in Carburetion Section.*

Fuel Pump Pressure: 4-5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum.

Model	Ford Pump No.
Thunderbird (Std. Trans.)	B5S-9350-A
Thunderbird (O.D. & Fordomatic)	B5S-9350-B
All Others (Std. Trans.)	B5A-9350-C
All Others (O.D. & Fordomatic)	B5A-9350-D

Pressure – 4-5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric.

Model	Dash Unit	Tank Unit
Thunderbird	B6S-9280-A	B6A-9275-C
Sta. Wgn. & Sed. Del.	B6A-9280-D	B6A-9275-B
Others	B6A-9280-D	B6A-9275-C

See "Fuel Gauges" in Carburetion Section.

BATTERY

F rd N . B6A-10655-C. *12 V lt,* 11 Plate, 55 ampere hour capacity **or F rd N . B6A-10655-E,** *12 Volt,* 13 plate, 70 ampere hour capacity.

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Battery Ground – Negative, to engine block.

► *CAUTION: This is reversed from previous models.*

Engine Ground – Cylinder head to dash.

STARTER

Ford No. B6A-11002-A. *12 Volt.* **Armature–B6A-11005-A.**

► *IMPULSE STARTING (Back Up Light Equipped Cars) CORRECTION:* Before replacing neutral safety switch to correct short between light and solenoid terminals causing engine to start, interchange leads at switch. Connect longest lead (beyond taped portion of harness) to "A" terminal and short lead to "B" terminal.

Drive – Ford 1CM-11350-C. Bendix "Folo-Thru".

Rotation – Counter-clockwise at commutator end.

Brush Spring Tension – 48-56 ozs.

Cranking Speed – 150-180 RPM with warm engine.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	120
	150-180 ②		190 max.

① – With starter on engine and engine idling.

② – Cranking speed with warm engine.

Starting Switch: Magnetic type, Ford No. B6A-11450-A. Starter Switch is controlled by ignition switch. *NOTE* - Neutral Safety switch used on Fordomatic transmissions.

Fordomatic Neutral Safety Switch: Ford No. FAC-15812-C. **Adjustment** – *See "Fordomatic & Mercomatic" in Transmission Section.*

GENERATOR

Ford No. B6A-10002-A (Exc. Thunderbird), B6S-10002-A (Thunderbird). *12 Volt.*

Armature – Ford No. B6A-10005-A (All).

► *GENERATOR INDICATOR LIGHT (Idle Speed) CORRECTION:* When generator light comes "ON" when engine idles, install a 75 ohm, 25 Watt resistor (Vitreous enamel type with eyelets moulded into resistor body), at "A" terminal of regulator in series with indicator light wire (Yellow with black tracer). Adjust engine idle to high limit. *NOTE* - Light will now have lower illumination than oil indicator light.

Performance Data

Amperes ①	Eng. RPM
30	1388

① – See Regulator for maximum charging rate.

Brush Spring Tension – 26-34 ozs.

Field Current – 1.4-1.6 amps. at 12.0 volts.

Rotation – Counter-clockwise at commutator end.

Belt Adjustment: Approximately ½" deflection on belts midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Ford No. B6A-10505-A. *12 Volt.*

► *SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 75° F. ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.*

Cutout Relay

Cuts In – 12.0-12.8 volts.

Voltage Regulator

Setting – 14.6-15.4 volts.

Checking & Adjusting – *See Electrical Section.*

Current Regulator

Setting – 28-32 amperes.

Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

► *DOME LIGHT FAILURE (High Voltage) CORRECTION:* When dome lights fail due to high voltage, remove head light switch, remove dome light wire from switch (green wire with yellow tracer), and install 1.5 Ohm, 5 Watt Vitreous enamel resistor in dome light circuit.

Headlamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: With control knob in the "OFF" position, press spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N.

Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of brake booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Located as follows:

Interior Lights – 7.5 ampere. On lighting switch.

Overdrive – 15 ampere. On overdrive relay.

Cigar Lighter – Special fuse in lighter base.

Clock – 3 ampere. In clock lead.

Heater – 14 ampere. In blower switch lead.

Turn Signal Fuse–7.5 ampere. In flasher to switch lead.

CIRCUIT BREAKERS: On headlight switch. Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits.

► *1956 CIGAR LIGHTER CAUTION:* 12 volt socket and element smaller than 6 volt. 12 volt socket has ink mark stamped on it for identification. DO NOT use 12 volt element in a 6 volt socket as element when heated will eject onto front seat.

HORNS: (Except West Coast). Ford B5T-13832-B (High Pitch), B5T-13833-B (Low Pitch). *12 Volt.*

(West Coast Only) Ford B6A-13832-A (High Pitch),use bracket Ford No. B6A-13830-A; Ford B6A-13833-A (Low pitch), use bracket Ford No. B6A-13831-A. *12 Volt.*

Horn Current – 9.2-9.6 amperes at 12 - 12.6 volts.

Horn Relay: Ford No. 2Q-13853-A.

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Section.*

ENGINE SPECIFICATIONS: 90° V8 (All Models).

Engine	Bore	Stroke	Displmnt
272 Eng.	3.62"	3.30"	272 cu. ins.
292 Eng.	3.75"	3.30"	292 cu. ins.
312 Eng.	3.80"	3.44"	312 cu. ins.

Engine	Rated HP	Compr. Ratio	Dev. HP at RPM
272 Eng. ①	42.05	8.0-1	173 at 4400
272 Eng. ②	42.05	8.4-1	176 at 4400
292 Eng. ③	45.00	8.0-1	200 at 4600
292 Eng. ④	45.00	8.4-1	202 at 4600
312 Eng. ⑤	46.21	8.0-1	210 at 4600
312 Eng. ⑥	46.21	8.4-1	215 at 4600
312 Eng. ⑦	46.21	9.0-1	225 at 4600

①–Customline & Mainline (Synchro-mesh Trans. & Overdrive). 2-barrel Carburetor.

②–Customline & Mainline (Fordomatic). 2-barrel Carburetor.

③–Fairlane & Station Wagon Models (Synchro-mesh Trans. & Overdrive). 4-barrel Carburetor & Dual Exhaust.

④–Fairlane & Station Wagon Models (Fordomatic). Thunderbird (Synchro-mesh Trans.), 4-barrel Carburetor & Dual Exhaust.

⑤–Police Interceptor (Synchro-mesh Trans. & Overdrive). 4-barrel Carburetor & Dual Exhaust.

⑥–Police Interceptor (Fordomatic) & Thunderbird (Overdrive). Optl. on Fairlane & Station Wagon. 4-barrel Carburetor & Dual Exhaust.

⑦–Thunderbird Engine (Fordomatic). Optional on Fairlane & Station Wagon. 4-barrel Carburetor & Dual Exhaust.

Compression & Vacuum Reading–*See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data.*

► *CYLINDER HEAD IDENTIFICATION: Heads can be identified by designation cast in top of head as listed below. Use of incorrect head will cause rough engine.*

Engine	Compr. Ratio	Head Ident.
272	8.0-1	ECZ-C
272	8.4-1	ECG-H
292	8.0-1	ECZ-B
292	8.4-1	ECZ-C
292	9.0-1	ECG-H
312	8.0-1	ECZ-A
312	8.4-1	ECZ-B
312	9.0-1	ECZ-C

► *CYLINDER HEAD PART NO. CHANGE (272 & 292 ENGINES):* Cylinder Heads Nos. B6A-6049-K and B6A-6049-E have been used on these engines. See Valve Springs for types used with each head.

► *CYLINDER HEAD BOLT INSTALLATION CAUTION:* Cylinder head bolts used on 1956 cars differ from those used previously. New bolt (B6A-6066-B), used at the four dowel hole locations, is 5/16" longer than other cylinder head bolts (B6A-6066-A). New bolts should be used at dowel hole locations only, as there is a possibility that bolts will bottom at other locations. Use of regular shorter bolts at dowel hole locations may result in cylinder block thread failure.

► *CRANKCASE VENTILATOR COVER OIL LEAK CORRECTION:* Install new .090" thick cover gasket. Old type gasket was .060".

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Spec. Data.*

► *EXCESSIVE VIBRATION (312 Eng.) CORRECTION:* Replace insulator assemblies AE-6038-B (identified by ½" band of white paint), with AE-6038-A insulator assemblies.

OIL PAN REMOVAL: Remove oil level indicator, drain crankcase. Remove engine front splash pans. On Ford-

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omatic equipped cars, remove converter housing cover assembly. Disconnect oil pump inlet pipe at oil pump. Remove "O" ring seal from pump end of tube. Remove oil pan retaining nuts and screws, then remove oil pan. *NOTE* - No. 5 piston must be approximately TDC before oil pan can be removed.

PISTONS

Autothermic type. Solid skirt with three rings above pin.

Removal – Pistons and rods removed from above.

Fitting New Pistons: Use ½" feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Pull to withdraw feeler should be 5-10 lbs. with feeler thickness as follows: .0015" (New Piston in New Bore), .002" (New Piston in Used Bore), .002" (Used Piston in Used Bore).

Replacement Pistons: Standard, .020", .030", .040", .060" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Install with small indentation in head toward FRONT of engine. *See Rod Installation.*

PISTON PINS

Floating type with lock rings at each end.

Diameter – .9120-.9123". **Length** – 3.016-3.030".

Pin Fit in Piston – .0001-.0008" clearance or light thumb push fit at 70° F.

Pin Fit in Rod Bushing – .0008" clearance or light thumb push fit at 70° F.

Replacement Pins: Standard (Green), & .001" (Blue), .002" (Yellow) Oversize. Fitted pins furnished with new pistons.

PISTON RINGS

Two compression, one oil ring per piston. Oil ring is "side-sealing" type (two steel rails with spring spacer between them).

Ring	Width	End Gap	Side Clearance
Compr.(1 & 2)	3/32"	.010-.027" ①	.006" max.
Oil (3)	3/16"	.015-.062" ②	③

① – .012-.029" on 312 Engine.
② – On rails.
③ – "Side-sealing" type.

Replacement Rings: Furnished in sets as follows: "**Snap Type**" Std. & .020", .030", .040", .060" Oversize (except Std. size only for 312 Engine), "**Steel Section**" Std. & .020", .030" Oversize (272 Engine), Std. & .020", .030", .040", .060" Oversize (292 Engine).

CONNECTING RODS

Crankpin Journal Diameter – 2.1880-2.1888".

Lower Bearing – Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.

Clearance – .0037" (272, 292 Engs.), .0036" (312 Eng.) maximum.

Side Clearance – .019" (two rods) maximum.

Replacement Bearings: Standard (2 sizes marked **Red** and **Blue** for selective fitting) and .010", .020", .030" Undersize.

Installing Rods: Install rod in piston so that rod bearing lock slots in connecting rod are toward outside of engine when indentation in head of piston is toward front of engine. Numbers on bearing caps and rods must be on same side when installed. Install in same numbered cylinders.

CRANKSHAFT

►*1956 CRANKSHAFT PRODUCTION CHANGE (To minimize oil leaks at front and rear oil seals):* New Crankshaft with integral Rear Oil Slinger, Part No. B6A-6303-D (272 & 292 Engines), B6A-6303-C (312 Engine), used with separate Front Oil Slinger, Part No. B6A-6310-B. Slingers will divert oil away from seals. *NOTE* - New crankshaft and front slinger can be installed in 1955 272 & 292 engines also.

Journal Diameter – 2.4980-2.4988" (272 & 292 Eng.), 2.6235-2.6243" (312 Eng.).

Bearings – Steel-backed, lead-babbitt (272 Eng.), copper-lead (292 & 312 Eng.).

Clearance – .0031" max. (272 Eng.), .0042" max. (292 Eng.), .0036" max. (312 Eng.).

Replacement Bearings: Standard (2 sizes marked **Red & Blue** for selective fitting) and .010", .020", .030" Undersize.

End Thrust: Taken by No. 3 main bearing. Replace bearing if end play excessive.

Thrust Bearing Alignment – *See "Crankshaft & Main Bearings" in Ford Special Data.*

Endplay – .010" max.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft and Main Bearings" in Ford Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data.*

CAMSHAFT

►*CAMSHAFT REPLACEMENT INSTALLATION CAUTION:* 1956 camshafts have an oil groove around perimeter of journal, replacing oil holes in 1955 camshaft. 1955 and 1956 camshafts and center bearings are **not** interchangeable.

►*312 ENGINE CAMSHAFT PRODUCTION CHANGE (Fordomatic Engines):* New camshaft, Part No. B6A-6250-C (superseding No. B6A-6250-B) used in production beginning Sept. 7, 1956 to reduce engine noise level. Engines with this camshaft marked by daub of blue paint on right side near date stamp. Cam lobe lift and tappet clearance are unchanged with this new camshaft. *See Valve Timing below.*

Journal Diameters – 1.9255-1.9265".

Clearance – .006" max.

End Thrust: Taken by thrust plate and spacer located between camshaft sprocket and shoulder on camshaft.

►*CAMSHAFT THRUST SPACER NOTE:* Chamfer on the inside of spacer must be to the rear or face camshaft journal.

End Play – .012" max.

Replacement Camshaft Bearings: Finished bearings furnished Standard and .015" undersize.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

Timing Chain: Double strand "Diamond" (272 Eng.), Side-guide type (Others). Length 56 links.

►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side). Remove and install chain "endless" as a unit with both sprockets.

Camshaft Setting: Sprockets marked by round depressions on one tooth. Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are both on drive side of chain.

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Ford Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*

VALVES

Tappet Clearance: .019" (Intake or Exhaust) either cold or hot. *NOTE* - Valve tappet clearance on truck engines is different.

Tappet Adjustment - *See "Valve System" in Ford Special Data.*

Valve	Head Diam.	Stem Diam. ①	Length
Intake	1.775-1.785"	②	5.02"
Exhaust	1.505-1.515"	③	5.02"

Valve	Seat Angle	Lift ④	Stem Clearance
Intake	45°	.259"	.004" max.
Exhaust	45°	.267"	.006" max.

① – Furnished with .003", .015", .030" oversize stems.
② – .3415-.3420" (Coded RED), .3420-.3425" (Coded GREEN).
③ – .3400-.3405" (Coded RED), .3405-.3410" (Coded GREEN).
④ – Cam lobe lift. Service limit.

►*EXHAUST VALVE STEM DIAMETER PRODUCTION CHANGE:* Valve stem diameter decreased .0005" for increased stem clearance to minimize valve sticking. *See "Valve System" in Ford Special Data.*

Valve Seat Width – .060-.080" (Intake), .070-.090" (Exhaust).

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Special Data.*

Valve Stem Oil Seals – "Umbrella" type seals on intake and exhaust valve stems. Install seals on valve stems with cupped side down to cover guide boss on head. Install new seals whenever valves removed or when seals become loose on valve stems.

►*VALVE SPRING OIL BAFFLE PRODUCTION CHANGE:* Valve spring oil baffles were discontinued on all 8 cylinder engines approximately May 14th, 1956. Improved rocker arm lubrication eliminates need for these baffles.

Valve Springs: Install with closed coil end toward cylinder head.

►*VALVE SPRING CAUTION:* Valve Spring No. EAA-6513-A (7½ coils, 2.12" free length) used with Cylinder Head No. B6A-6049-K, Spring No. B6A-6513-A (7 coils, 2.09" free length) used with Cylinder Head No. B6A-6049-E. *See Cylinder Head Change above.*

Spring Specifications

	Pressure	Length
Valve Closed	64-79 lbs.	1.780"
Valve Open	145-177 lbs.	1.390"

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to under side of spring retainer. If assembled height is 1 13/16" or greater, install necessary .030" spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended 1 25/32 - 1 13/16". *CAUTION - DO NOT install spacers unless necessary.*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (See table above), ream guides and install oversize valves. *See "Valve System" in Ford Special Data.*

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Valv Lift rs: Mushroom type. Remove from below after camshaft removed from engine.
Clearance – .0026".
Rocker Arm Assembly: *See "Valve System" in Ford Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*312 ENGINE WITH FORDOMATIC CAMSHAFT PRODUCTION & VALVE TIMING CHANGES:* For production change, *See CAMSHAFT above; For Valve Timing change, see below.*

Valve Timing
Exc. 312 Eng. With B6A-6250-C Camshaft
Intake Valves—Open 12° ① BTDC. Close 54° ② ALDC.
Exhaust Valves—Open 58° ③ BLDC. Close 8° ④ ATDC.
312 Eng. With B6A-6250-C Camshaft (Fordomatic)
Intake Valves—Open 20° ⑤ BTDC. Close 54° ② ALDC.
Exhaust Valves—Open 58° ③ BLDC. Close 8° ④ ATDC.
①— Camlift .016". ②—Camlift .019". ③—Camlift .015"
④— Camlift .018". ⑤—Camlift .014".

Valve Timing Check: Remove right rocker arm cover. Back off No. 1 intake valve adjusting screw, slide rocker arm assembly to one side. With push rod in lifter socket, install dial indicator to indicate push rod movement. Turn engine slowly until cam lobe contacts lifter. Zero indicator and continue to turn engine until correct lift is obtained (see table above). Compare degrees on pulley with specifications.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity: 5 qts. (refill), 6 qts. (when filter changed).
Normal Oil Pressure: 45-50 lbs. at 2000 RPM (Hot).
Pressure Regulator Valve—In pump body, not adjustable.
Oil Pressure Indicator – Indicator light on instrument panel, operated by Engine Unit, Ford No. FDA-9278-A (stamped No. 7 on Hex.).
Oil Pump: Gear type, located on left side of engine crankcase, driven by distributor shaft.
►*OIL PUMP CAUTION:* New type oil pump has aluminum body. Use extreme care when servicing.
Pump Overhaul—*See "Oiling System" in Ford Spec. Data.*
Oil Filter: Full-flow type (Std. Equip.) with pressure relief valve in center filter bolt. Replace filter element at 4000 miles or when oil dirty or polluted.
Replacement Filter Element – Ford No. B2A-6731-A
►*CAUTION: This Special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication). See "Oil Filter" in Ford Special Data.*
Crankcase Ventilation: Filter in oil filler cap (inlet) with outlet pipe at left front of engine (exc. Thunderbird), connected to valve chamber cover at right rear of engine (Thunderbird). All engines except Thunderbird have filter screen in outlet pipe. Clean this screen every 2000 miles.

COOLING

Water Capacity: 19 qts. (Pass. Cars and Sta. Wgn.), 20 qts. (Thunderbird). Add 1 qt. for heater.
►*LOSS OF COOLANT CORRECTION:* Lower generator mounting bracket bolt holes are tapped into cylinder water jacket. For loss of coolant at this point or when replacing bolts, apply a good coating of waterproof sealer.
Pressure Valve: Radiator filler cap. Ford No. LA-8100-A, 12-15 lbs. (marked "13" or "14"). *CAUTION* - If replacement required, use 12-15 lb. type.
Thermostat: 157-162° F. (Std.), 177-182° F. (High Temp.) for use with permanent type anti-freeze.
Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Ford Special Data.
Pump Removal – (On Thunderbird) remove engine left hand splash shield). Drain cooling system, disconnect lower radiator hose and heater hose. Remove fan belt, fan, fan spacer, and pulley. (On Thunderbird, remove generator support bracket bolt at the water pump housing and bolt at generator, then move bracket out of way, remove remaining bolts, retaining water pump assembly and timing pointer). On other cars, remove four bolts retaining water pump to cover. Remove pump and timing pointer.
Temperature Gauge: King-Seeley Electric.
Dash Unit – Ford No. B6S-10883-A (Thunderbird), B6A-10883-D (Others).
Engine Unit – Ford No. B6A-10884-A.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 10CF (272 & 292 Eng.), 11CF (Taxi, Interceptor & Thunderbird 292 & 312 Eng.). Single plate, semi-centrifugal type. *NOTE* - 11CF used on 272 & 292 Engines as Heavy Duty equipment.

Cover Assembly	Long No.	Ford No.
10CF	265125	B6A-7563-B
11CF	265126	B6A-7563-A

Clutch Disc	Long No.	Ford No.
272 Pass. Car	284978	B5A-7550-B
292 Pass. Car	285182	B6A-7550-C
272, 292 H.D.	281982	B5A-7550-B
Thunderbird	281982	B5S-7550-A
Interceptor	284961	

See "Long Clutches" in Clutch Section.

►*HEAVY DUTY CLUTCH PRODUCTION CHANGE:* Heavy Duty clutch incorporating an oil slinger to protect disc from excessive lubrication along with release bearing incorporating lubrication fitting, used in production. New heavy duty disc, Ford No. B6A-7550-A, released for service.

Pedal Adjustment: If total pedal travel is less than 6 3/8" or more than 6 5/8", reposition pedal bumper and bracket until correct travel is within limits. Adjust assist spring link to give assist spring length of 6 5/8" when clutch is fully released.

Pedal Free Travel – 1 1/8" - 1 3/4". Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is reached. *NOTE* - Check free travel by operating engine at 3000 RPM with transmission in neutral position. There should be a minimum of ½" free travel under these conditions. Readjust as necessary.

Removal (Exc. Thunderbird): Remove transmission (see transmission below), slide clutch release bearing off clutch release lever. Disconnect clutch pedal release rod from clutch release lever assembly. Remove clutch release equalizer bar. Remove split bronze bushing from bracket, remove flywheel housing. Install Tool 7563 and remove clutch pressure plate assembly (if tool not available, clutch may be released by backing off attaching bolts evenly).
Thunderbird – Drain transmission, remove drive shaft, disconnect shift rods at transmission, disconnect transmission from flywheel housing, move transmission back, so that clutch parts can be removed from flywheel housing. Slide clutch release bearing and hub assembly off end of release lever assembly. Remove pressure plate and cover assembly and clutch disc from engine flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). *See "Ford Synchro-mesh" in Transmission Section.*
►*SYNCHRO-MESH & OVERDRIVE THREE SPEED TRANSMISSION GEAR REPLACEMENT CAUTION:* Shot peened gears used in 1956 models. DO NOT use past model gears in 1956 transmission.
►*GEARSHIFT LINKAGE & CLUTCH RELEASE RODS PRODUCTION CHANGES AND CORRECTIONS:* For application of parts to eliminate interference causing premature gear tooth wear, *See "Transmission Control Notes" in Ford Special Data.*
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: (Exc. Thunderbird) – Drain transmission, disconnect gear shift linkage at transmission. Remove speedometer cable and gear, remove drive shaft. Remove bolts which hold transmission extension to engine rear support. Remove frame crossmember and engine rear support. Remove bolts and lockwashers which attach transmission to clutch housing, then install two guide pins. Move transmission assembly to rear until input shaft splines clear clutch housing, then lower transmission and pull forward to remove from car.
Thunderbird – Drain transmission, disconnect gear shift linkage at transmission. Remove speedometer cable and gear. Remove drive shaft. Remove cover from bottom of clutch housing, then remove starter from clutch housing. Disconnect clutch pedal linkage from clutch release lever. Raise rear of engine slightly, disconnect engine rear mount and remove frame crossmember. Support transmission on jack, and remove transmission to clutch housing bolts. Move transmission to rear so that clutch parts can be removed from clutch housing. Slide clutch release bearing and hub assembly off end of release lever assembly. Remove pressure plate and cover assembly and clutch disc from engine flywheel. Remove clutch housing-to-engine bolts and lower the clutch housing, then remove transmission.

OVERDRIVE

Warner AS4-R10F. Solenoid operated type, with governor control and throttle operated kick-down. Lockout switch not used on this model.

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Form 15A

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S e "Warner R10 Overdrive" in Transmission S ction.

Ov rdriv Control: *See "Warner R10 Overdrive Control" in Transmission Section.*

R m val: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. *See "Fordomatic & Mercomatic" in Transmission Sect.*

► *FORDOMATIC "LOCK-UP" CORRECTION (1955-56 Cars & Trucks):* Caused by cross leakage in front servo piston. *See "Fordomatic & Mercomatic" in Transmission Section.*

► *FORDOMATIC TRANSMISSION FLUID COLOR CHANGE CAUTION:* New Fordomatic transmission oil used in production is green colored, similar to color of engine oil. DO NOT USE IT IMPROPERLY. "Type A" (reddish brown) may be used when adding oil to transmission filled with new type oil.

► *FORDOMATIC PRODUCTION CHANGES:* For improved Throttle Control Inner Lever Installation, change in Pressure Regulator Valve Body and new location of pressure take off plug, *Se "Fordomatic & Mercomatic" in Transmission Section.*

► *PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication – Check transmission fluid level at 1000 mile intervals and maintain level at "F" (Full) mark on indicator. Drain & refill every 15,000 miles.

Ch cking Fluid Level: With selector lever in "N" (Neutral) and emergency brake applied, run engine approximately four minutes at idle speed. Check to see that emergency brake is applied and that engine is on slow idle, then move selector lever to "P" (Park) position. *NOTE* - When engine and transmission are at normal operating temperature move selector lever through all ranges to assure fluid distribution throughout transmission. Remove indicator and read fluid level. Add Automatic Transmission Fluid as necessary to bring fluid level to "Full" mark on indicator.

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above.*

► *OTHER "FORDOMATIC" SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

M chanics. Needle bearing type.

► *CAUTION (All Cars Except Sta. Wgn., Sed. Del. & Interceptor)·* Rear universal joint companion flange nut controls pinion bearing pre-load (must be adjusted whenever nut is loosened). *See "Ford & Mercury" (Separate Carrier)" in Rear Axle Section.*

REAR AXLE

PASSENGER CARS

Own. Separate Carrier, semi-floating hypoid with Hotchkiss drive.

► *LUBRICATION BAFFLE NOTE:* 1956 rear axle housing has lubrication baffle (retained by two housing bolts) to direct lubricant to differential side bearings. *NOTE-* This baffle, Ford No. B5A-4018-A, can be installed on earlier models.

► *THUNDERBIRD REAR SPRING THUMP CORRECTION:* Replace early type rubber bumper with new soft rubber bumper Ford No. B6A-5783-B.

NOTE- Axle not same as Station Wagons & Sedan Delivery. *See "Ford & Mercury (Separate Carrier)" in Rear Axle Section.*

Ratios	Standard	Overdrive	Fordomatic
V8 Cars	3.78-1 or 3.89-1	4.11-1	3.22-1 or 3.55-1

► *RATIO, DRIVE GEAR & DIFFERENTIAL CASE IDENTIFICATION:* When differential case is to be replaced be sure new case is same as old one. Refer to following table for identification.

Drive Gear Ratio	Gear Teeth Drive	Pinion	Differential Case Color
3.22-1	29	9	Gray
3.55-1	32	9	Red
3.78-1	34	9	Black
3.89-1	35	9	Black
4.11-1	37	9	Black

Backlash – .003-.008"

Axle Shaft Removal: Remove wheel; take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: Drain lubricant from rear axle housing. Remove carrier-to-housing nuts, then remove identification tag (ratio) and set it aside for reference during assembly of axle. Remove carrier assembly from axle housing.

STA. WGN., SED. DEL., THUNDERBIRD & INTERCEPTOR

Own. Integral Carrier, semi-floating hypoid with Hotchkiss drive.

► *NOTE* Axle assembly not same as passenger cars. *See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.*

Ratios	Standard	Overdrive	Fordomatic
S.W. & S.D.	4.09-1	4.27-1	3.54-1
Thbd. & Intr.	3.73-1	3.92-1	3.31-1 or 3.54-1

Axle Shaft Removal: Same as passenger cars (above).

Rear Axle Assembly Removal: Remove hub caps, loosen wheel stud nuts, raise car at rear and disconnect hydraulic brake hose from brake line at rear axle. Disconnect parking brake cable from equalizer rod, remove cable assembly from frame brackets. Remove wheels, disconnect drive shaft at rear axle universal joint flange. Remove "U" bolts. Remove assembly from under car.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Mdl	© Frnt	© Rar
All (Exc. S.W. & S.D.)	B5A-18124-A	B5A-18125-A
All (Hvy. Dty.)	B5A-18124-D	B5A-18125-C
S. W. & S.D.		B5A-18125-D
Thunderbird	B5S-18124-C	B5S-18125-B

© — Furnished in kits which include shock absorber mounting bushings.

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs. *See "Lincoln, Mercury, Ford (Ball Joint)" in Suspension and Wheel Alignment Section.*

Kingpin Inclination – 6-7°, crosswise.

Caster – Pos. ½° to Pos. 1½°. Maximum variation between wheels ½°.

Camber – Pos. ¼° to Pos. 1¼°. Maximum variation between wheels ¼°.

Toe-In – 1/16-1/8". *NOTE* - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered.

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type. *See "Gemmer Worm & Roller (Type 305)" in Steering Sect.*

Power Steering: Ford - Mercury Linkage type. Used in conjunction with standard steering. *See "Ford & Mercury Bendix Linkage Type" in Steering Section.*

► *STEERING ARM INTERFERENCE (Power Steering Cars) CORRECTION·* To correct interference between steering connecting rod clamps and bolts with power steering control valve, *See "Ford & Mercury Bendix Linkage Type" Power Steering in Steering Section.*

► *POWER STEERING BELT SQUEAL CORRECTION:* When belt slippage or squeal cannot be corrected by belt adjustment, install new pulley Ford No. B6A-33556-A and new solid type belt Ford No. B6S-33558-A (Thunderbird), B6A-33558-A (Others). *NOTE* - Old type belt with serrations can be used with either the new or old type pulley.

Pump Belt Adjustment: Install torque wrench on pump pulley bolt. Check torque required to slip pulley against belt friction. If torque is not 14-16 ft. lbs. adjustment is required. To adjust, position a heavy duty 1½" "C" clamp with bottom against lower side of pump support bracket and top of clamp resting on pump bracket at its center. Loosen four pump attaching bolts until pump body may be repositioned by tightening "C" clamp. Tighten "C" clamp until torque of 14-16 ft. lbs. is required to slide pump pulley. *(NOTE* - Hold final torque as close as possible to upper limit). Tighten pump attaching bolts, remove "C" clamp, and make a final check of pulley sliding torque.

St ring Linkage· *See "Steering Linkage" in Steering Sect.*

St ring Whe l & H rn Butt n R m val: *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

CONTINUED ON NEXT PAGE

Form 15B

CONTINUED FROM PRECEDING PAGE

Steering Gear Removal: See *"Gemmer Worm & Roller (Type 305)" in Steering Section.*

BRAKES

Bendix Hydraulic, Single Anchor. Hand lever applies rear wheel service brakes.
See *"Ford, Lincoln, Mercury Bendix" in Brake Section.*
► *BRAKE DESIGN CHANGES:* Front wheels do not have eccentric and front and rear anchor pins are fixed (No adjustment).
Drum Diameter – 11" front and rear.

LINING SPECIFICATIONS

Passenger Car

Lining	Width	Thickness	Length
Front Primary	2¼"	3/16"	10 27/32"
Front Secondary	2¼"	15/64"	10 27/32"
All-Rear	1¾"	3/16"	10 27/32"

Sedan Delivery & Station Wagon

Lining	Width	Thickness	Length
Front Primary	2¼"	7/32"	9 9/32"
Front Secondary	2¼"	7/32"	11 15/16"
Rear Primary	2"	7/32"	9 9/32"
Rear Secondary	2"	7/32"	11 15/16"

Thunderbird

Lining	Width	Thickness	Length
Front Primary	1¾"	3/16"	10 27/32"
Front Secondary	2¼"	15/64"	10 27/32"
All-Rear	1¾"	3/16"	10 27/32"

Clearance – Adjusting screw backed off 10 to 12 notches from point where shoes are tight against drum.

Brake Pedal Free Play Adjustment: 5/16" to 7/16". If play not correct after brake adjustment, loosen locknut on the eccentric bolt that attaches brake pedal assembly to master cylinder pushrod, rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid – Maintain fluid level to within ½" of top of reservoir.

Removal – Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes: Midland Hy-Power Unit mounted on left side of car in engine compartment and connected in hydraulic brake line between master cylinder and wheel cylinder. There are no mechanical connections and no adjustments are required.
See "Midland Power Unit" in Brake Section.
Checking Brake Fluid – Same as for manual brakes (above).
Removal of Power Unit – Depress brake pedal a few times to remove all vacuum from system. Disconnect hydraulic lines at power unit and remove wires from brake stop light switch. Remove power unit to mounting bracket bolts and lockwashers and remove power unit.

MISC. MECHANICAL

Windshield Wipers: Vacuum link and crank arm type. *See "Windshield Wipers" in Miscellaneous Section.*
Power Window Regulators: Reversible motor in each window. *See "Electric Window Regulators" in Misc. Sect.*
Power Top Control: Electric-Hydraulic with reversible pump motor. *See "Power Top Controls" in Misc. Sect.*
Power Seat Adjusters: "Four-way" type. Electric screw and jack type with individual motors for vertical and horizontal adjustment. *See "Power Seat Adjusters" in Miscellaneous Section.*
Air Conditioning: *See Ford "SelectAire" in Misc. Sect.*

MODEL IDENTIFICATION

VEHICLE NUMBER· On Rating Plate attached to inside of glove compartment door or on left front cab pillar Vehicle number is also Engine Number
First Number - 10001.

►*ENGINE IDENTIFICATION NOTE* 6 Cyl. and V8 engines used. 6 Cyl. (223 Eng prefix EBR-S-T), V8 (272 Eng prefix ECY-W, light duty, ECR heavy duty). Reference is made to engine by displacement (223 Eng. -223" displacement).

►*VEHICLE NUMBER NOTE* Vehicle number (Example *F10D6 10001*) includes identification in the following sequence.

Serial Code ①	Engine Symb I ②	Year ③	Assy. Plant	Serial Number
F10	D	6	See below	10001 up

① -See Model & Serial Code Table below
② -**D** - 6 Cyl. 223 Eng , **V** - V8 Eng. (2-Barrel Carb. Light Duty), **Z** - V8 Eng. (2-barrel Carb. Heavy Duty), **R** - V8 Eng. (4-barrel Carb. Heavy Duty)
③ -Last digit of model year (1956).

M d ls & Serial Codes

Truck M d l	R g	Serial Codes Light	18,000 lb. max.
F-100 Conv	F-10	F-11	
F-250 Conv	F-25	F-26	
F-350 Conv	F-35	F-36	
P-350 Par Del	P-35	P-36	
F-500 Conv	F-50	F-51	
B-500 Sch Bus	B-50	B-51	
C-500 Cab Fwd	C-50	C-51	
P-500 Par Del	P-50	P-51	
F-600 Conv	F-60	F-61	F-63
B-600 Sch Bus	B-60	B-61	B-63
C-600 Cab Fwd	C-60	C-61	C-63
P-600 Par Del	P-60	P-61	

Assembly Plant Designation

A—Atlanta	**F**—Dearborn	**N**—Norfolk
B—Buffalo	**G**—Chicago	**P**—St Paul
C—Chester	**H**—Detroit Truck	**R**—San Jose
D—Dallas	**K**—Kansas City	**S**—Somerville
E—Mahwah	**L**—Long Beach	**U**—Louisville
	M—Memphis	

TUNE-UP

COMPRESSION PRESSURE. At cranking speed, compression pressures are as follows

Engin	Compr. Ratio	Compr Press
223 Eng	7.8-1	150 lbs
272 Eng (ECY-W)	7 8-1	160 lbs
272 Eng (ECR—2 Bbl Carb)	7 8-1	160 lbs
272 Eng (ECR—4 Bbl Carb)	7 8-1	155 lbs

VACUUM READING: 18-19" (223 Eng), 19-20" (272 Eng) idling at 475-500 RPM in neutral

VALVE TAPPET CLEARANCE: 019" (223 Eng), 018" (272 Eng) Intake and Exhaust (Hot & Cold)

MANIFOLD HEAT CONTROL. (*NOTE*—Manifold heat control valve is **n t** used on 272 ECR Engine) Automatic thermostatic type with counterweight On 6 Cylinder engine valve is located at outlet of exhaust manifold On 8 Cylinder engine valve is located between crossover pipe and inlet of right exhaust manifold Spring stop is at top of valve housing and spring is hooked on stop pin when valve is properly installed Valve is closed when engine is at normal operating temperature and *running at idle speed, and opens at high RPM*

IGNITION

FIRING ORDER: 6 Cyl Engine—1-5-3-6-2-4 **8 Cyl. Engine**—1-5-4-8-6-3-7-2

Cylinders (8 Cyl Eng)—RIGHT BANK 1-2-3-4 LEFT BANK 5-6-7-8

SPARK PLUG GAP: 028'- 032"
Spark Plugs—Champion 860 18mm

►*V8 ENGINE SPARK PLUG MISFIRE CORRECTION* If misfiring occurs at either No. 6 or No. 8 cylinders, interchange position of No. 5 and No. 6 spark plug cables in all insulator blocks and separator blocks on left side of engine

►*SPARK PLUG CAUTION* Spark plug has tapered seat and does not require a sealing gasket It is important that plugs be torque tightened within limits 15-20 ft

COIL Ford No. B6A-12029-B *12 Volt*
Ignition Current—2 5 amps idling 4 5 amps stopped
Resistor—Ford B6A-12250-B (Early), **B6A-12250-C** (Later) Mounted next to coil

►*IGNITION RESISTOR PRODUCTION CHANGES* Two types of resistors Ford No. B6A-12250-C used in production to replace original resistor B6A-12250-B. First type replacement identified by copper flashings on heads of rivets which support elements. A piece of fibre glass is cemented to inside of support bracket. Second type has sheet metal cover snapped over channel and rivets are cadmium plated. Replace earlier type when servicing ignition system.

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil

DISTRIBUTOR: *12 Volt* Ford distributors used as follows

Engine	Carb	Air. Cl.	Distr. No.
223 Eng (EBR-S-T)	1-Bb	Oil Bath	B6A-12127-E
223 Eng (EBR-S-T)	1 Bbl	Dry Type	B6A-12127-E
272 Eng (ECY-W)	2 Bbl		B6A-12127-A
272 Eng (ECR)	2 Bbl		B6T-12127-A
272 Eng (ECR)	4 Bbl		B6T-12127-B

►*SUDDEN ENGINE STOPPAGE CORRECTION* Inspect distributor primary terminal wire assembly Ford No. B6A-12216-A, for defective welds at brass terminals.

►*DISTRIBUTOR DIAPHRAGM PRODUCTION CHANGE* A new distributor diaphragm Ford No B6A-12370-B used on all engines after Nov. 15th 1955, and is available for replacement of all B6A-12370-A diaphragms. It can be identified by die cast end cover in place of stamped cover and incorporates new type material in secondary diaphragm giving it much greater strength

Condens r—Ford 7RA-12300-C (223 Eng,) FAB-12300-A (272 Eng) **Capacity**— 21- 25 microfarad
Contact Point Set—Ford FAA-12171-A (223 Eng), FAB-12171-B (272 Eng)
Breaker Gap— 024- 026" (6 Cyl), 014- 016" (8 Cyl)
Cam Angle—35-38° (6 Cyl) 26-28 5° (8 Cyl)
Breaker Arm Spring Tension—17-20 ozs
Rotation—Clockwise (6 Cyl), counter-clockwise (8 Cyl) viewed from above

Advance Performance
►With Distributor on Test Stand

B6A-12127-E (With Oil Bath Air Cl.)

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
0±½	18	300
¼-1¼	32	400
1¾-2¾	50	500
8-9¼	2 59	1200
10¾-11¾	4 22	1600
13-14½	6 00	2000

B6A-12127-E (With Dry Type Air Cl.)

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
0±½	11	300
0-1	.19	400
1½-2½	.29	500
4½-5½	48	600
7¼-8¼	83	800
9¼-10¼	1 88	1200
10¾-12	3 28	1600
12¼-13½	4 26	2000

B6A-12127-A

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
0±½	.15	300
¼-1¼	28	400
6½-7½	96	800
11½-12¾	2 21	1200
14½-15½	3 41	1600
16-17¼	4 60	2000

B6T-12127-A

Distr Degrees	Vacuum (' of HG)	Distr RPM
0±½	11	300
0-1	13	400
6¼-7¼	80	800
10-11	1 71	1200
12¼-13½	2.66	1600
13¾-15	3 33	2000

B6T-12127-B

Distr Degrees	Vacuum (" of HG)	Distr RPM
0±½	11	300
2½-3½	19	400
7½-8½	50	800
7¾-8¾	54	900
10¼-11¼	80	1200
12½-13¾	1 19	1600
14¼-15½	1 50	2000

►*DISTRIBUTOR INSTALLATION CAUTION* On 6 Cylinder engines be sure oil pump intermediate shaft

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engages seat in oil pump. On 8 Cylinder engines, be sure distributor shaft engages oil pump intermediate hex shaft

Initial Distributor Timing (6 Cyl. Engine): Set engine crankshaft so that No. 1 cylinder is at TDC after compression stroke (with timing mark in line with pointer) Install distributor so that rotor points to the No 1 spark plug wire terminal in distributor cap.

Initial Distributor Timing (8 Cyl Engine): Remove No. 1 spark plug. Hold thumb over spark plug hole until piston starts up on compression. Slowly "bump" engine over with starter until timing mark is aligned with pointer, Find No. 1 spark plug sprocket in distributor cap and fit distributor cap to distributor housing Mark distributor housing to indicate No. 1 spark plug wire position. Position rotor approximately 20° counter-clockwise from mark made on distributor housing. Engage distributor drive gear and install distributor in engine.

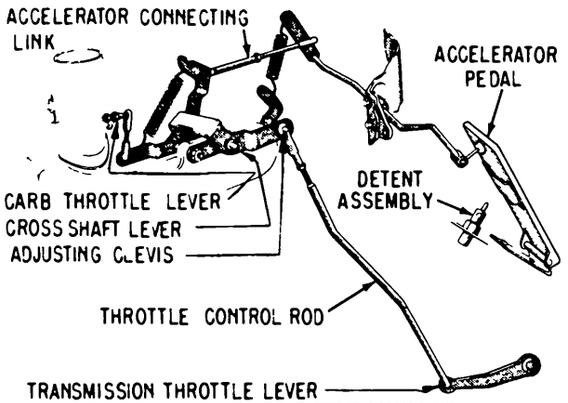
IGNITION TIMING

Setting–223 Engine–5° BTDC (Std & Fordomatic) with engine idling at 475 RPM and vacuum line disconnected. *NOTE*–Maximum initial timing recommended is 5° BTDC (Std.), 6° BTDC (Fordomatic). *See Initial Distributor Timing above.*

272 Engine–10° BTDC (Std. & Fordomatic) with engine idling at 475 RPM and vacuum line disconnected. *NOTE*–Maximum initial timing recommended is 10° BTDC. *See Initial Distributor Timing above.*

Timing Mark–6 Cyl. Engine–Vibration damper marked "TDC", and "3", "5", "7", "9" degrees BTDC. Align correct mark with pointer on cylinder front cover

8 Cyl. Engine–Vibration damper marked "TDC", and "2", "4", "6", "8", "10" degrees BTDC Align correct mark with pointer (bolted to water pump).

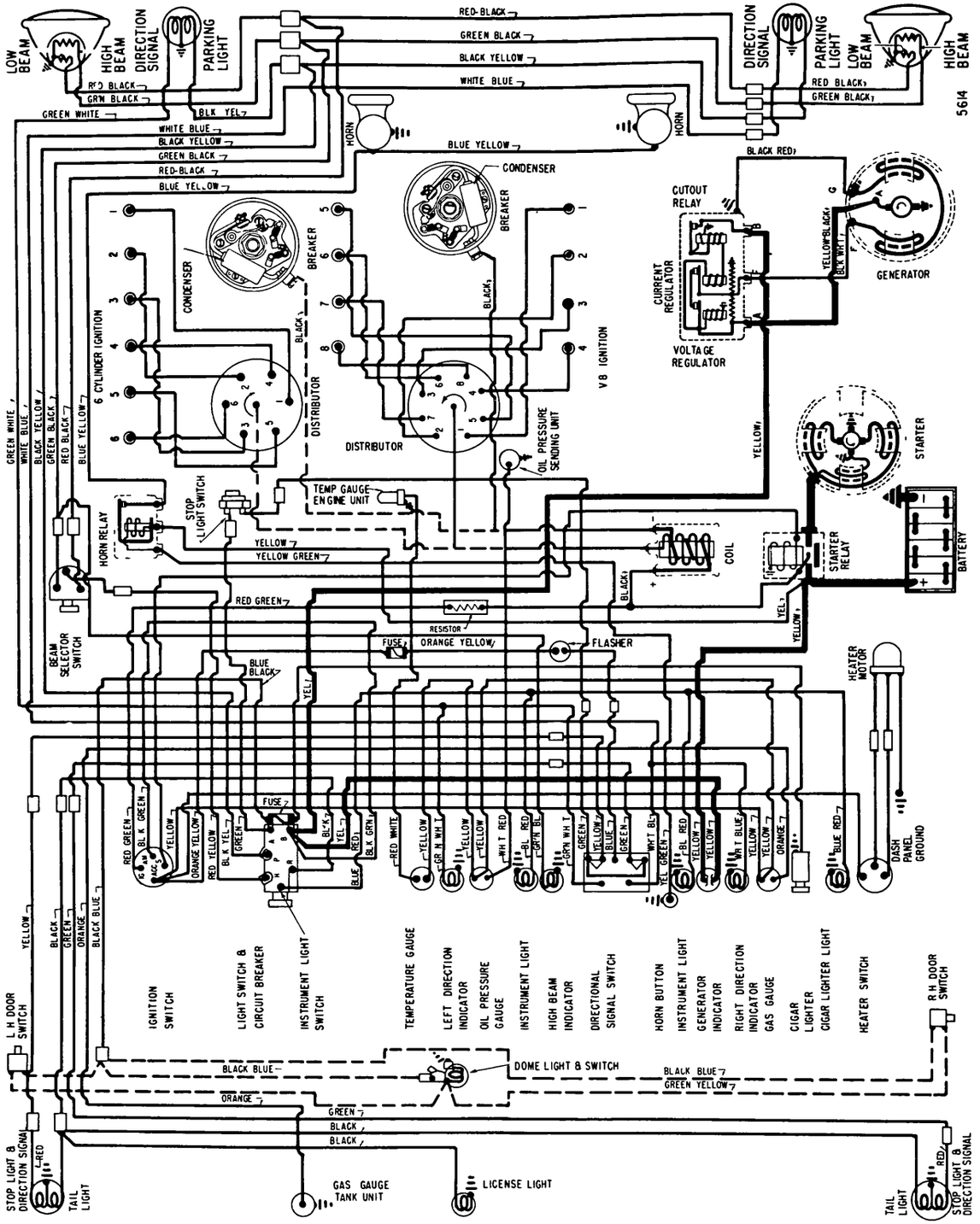


FORDOMATIC THROTTLE LINKAGE (6 CYLINDER TRUCKS)

CARBURETOR

► *CARBURETOR APPLICATION:* Ford Single Barrel Carburetor used on 223 Engine, and Ford 2-Barrel and 4-Barrel Carburetors on the 272 Engine (2-Barrel on ECW-Y Eng., 2-Barrel & 4-Barrel on ECR Eng.).

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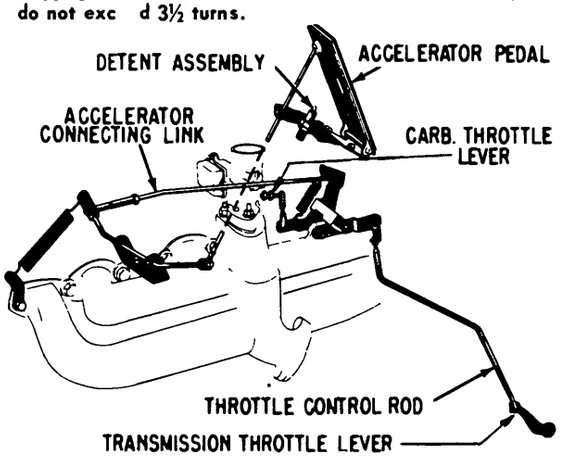
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►*LOW POWER OUTPUT (4-Barr l Carbur t r) CORRECTION:* Incorrect routing of governor vacuum lines at fitting (Governor Housing) causes governor to close throttle plates at speeds above 700 RPM, limiting power output. Attach line from vacuum pump to hole at bend of fitting. Attach line from governor controlling unit in conventional or side opening. *NOTE* - Be sure throttle stops have been removed.

►*AIR CLEANER WING SCREW TIGHTENING (4-Barrel Carbur t r) CAUTION:* Tighten anchor screw to 135 inch lbs. only, and wing nut just finger tight. Overtightening will permit anchor screw removal with air cleaner and cause lock washer to be drawn into carburetor venturi and engine.

►*AIR CLEANER AIR LEAK CORRECTION (C-500 & 600 Series Trucks):* Correct by installing two gaskets between elbow and carburetor and reversing holding clamp to provide better seating.

Thr ttl Linkage & Dashpot Adjustments (Fordomatic): *See "Carburetor" .on Ford 6 and V8 Passenger Car pages and note the following exceptions:* Adjust accelerator pedal height so pedal just touches detent stem when carburetor lever hits its wide-open stop (2 5/8" on V8 trucks). Initial adjustment of control rod is 2½ turns counter-clockwise. If band or clutch slippage evident, increase rod length to 3 turns, **but do not exc d 3½ turns.**



F RD MATIC THROTTLE LINKAGE (PARCEL DELIVERY)

FORD SINGLE BARREL 223 ENGINE

F rd N . B6C-9510-A (Exc. Fordomatic), **B6A-9510-G** (Fordomatic). Single barrel, downdraft type, with manual choke.

►*6 CYL. TRUCK ECONOMY CARBURETOR:* Carburetor B5A-9510-S has been released for owners who desire more fuel economy, but do not require maximum acceleration or top speed.

Idle S tting—Initial setting 1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly richer mixture. Turn screws out for richer mixture.

Idle Speed—475-500 RPM (Std. & Overdrive), 475-500 RPM (Fordomatic) with selector lever in "N" position.

Fuel Level—11/16"±1/32" below power valve mounting surface (Tool T52L-9550-AEE). *See "Ford Visi-flo" in Carburetion Section of Manual.*

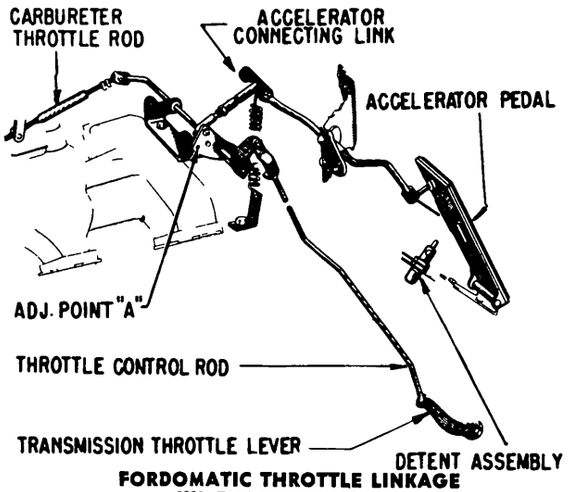
Accelerating Pump: Shortest stroke (closest hole to throttle shaft) for average or hot weather operation, longest stroke for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment (Fordomatic Trucks): *See CARBURETOR above.*

►*OTHER DATA: See "Ford Visi-flo" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 3.5-5.5 lbs. at 500 RPM.



FORDOMATIC THROTTLE LINKAGE (V8 ENGINE TRUCKS)

FORD TWO-BARREL 272 (ECY-W) ENGINE

Ford No. B6Y-9510-A (Exc. Fordomatic), **B6C-9510-C** (Fordomatic). Dual barrel, downdraft type, with manual choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—Initial setting 1 turn open. Set both screw s alike. Turn adjusting screws in until engine begins to run roughly from lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly richer mixture. Turn screws out for richer mixture.

Idle Speed—475-500 (Std. & Overdrive) 475-500 RPM (Fordomatic) with selector lever in "N" position.

Fuel Level—11/16"±1/32" below power valve mounting surface (Tool T56L-9562-A).

Float Level—1.374-1.438" from air horn gasket surface to float bottom (carburetor inverted). It should be equal on both ends of float.

Acc l rating Pump: Center hole for normal operation, shortest stroke (closest hole to throttle shaft) for hot weather operations, longest stroke for cold weather.

Fast Idl : Integral type operated by choke valve. No adjustment required.

Throttl Linkag Adjustm nt (F rd matic Trucks): *See CARBURETOR above.*

►*OTHER DATA: See "Holley Ford" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 3.5-5.5 lbs. at 500 RPM.

FORD TWO-BARREL 272 (ECR) ENGINE

Ford No. B6T-9510-A. Dual "Concentric" downdraft type with manual choke control, governor actuating assembly, and "depopper" valve.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—Initial setting ½ turn open. Set both screws alike. Turn screws in until engine begins to run roughly from lean mixture, then turn screws out until engine begins to roll from rich mixture. Then turn screws in until engine runs smoothly. Favor a slightly rich mixture. Turn screws out for richer mixture.

Idle Speed—475-500 RPM (Std.), 475-500 RPM (Fordomatic) with selector lever in "N" position.

Fuel Level—½"±1/32" below top surface of float bowl, with engine idling.

Accelerating Pump: Center hole for normal operation, shortest strike (nearest hole to throttle shaft) for hot weather operation, longest stroke for cold weather operation.

Fast Idle: No adjustment required.

Throttle Linkage Adjustment (Fordomatic Trucks): *See CARBURETOR above.*

Depopper Valve Adjustment: *See "Ford Truck Dual Centri-flo" Carburetor in Carburetion Section.*

►*OTHER DATA: See "Ford Truck Dual Centri-flo" Carburetor in Carburetion Section.*

Fuel Pump Pressure: 3.5-5.5 lbs. at 500 RPM.

FORD FOUR-BARREL 272 (ECR) ENGINE

Ford No. B6T-9510-B. "Centri-Quad" 4-Barrel, downdraft type, with manual choke control, and NEW ball-type "depopper" device.

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels feed 1-4-6-7.

Idle Setting - Initial setting 1/2 turn open. Turn both screws in until engine begins to run roughly from lean mixture, then turn screws out until engine begins to roll from rich mixture. Then turn screws in until engine begins to run smoothly. Favor a richer mixture. Final setting may vary 1/2 turn difference between the screws.

Idle Speed - 475-500 RPM (Std.), 475-500 RPM (Fordomatic) with selector lever in "N" position.

Depopper Valve Adjustment: *See "Ford, Lincoln, Mercury Centri-Quad 4-Barrel" Carburetor in Carburetion Secti n.*

Throttle Linkage Adjustment (Fordomatic Trucks): *S CARBURETOR above.*

►*OTHER DATA: See "Ford, Lincoln, Mercury Centri-Quad 4-Barr l" Carburet r in Carbur tion Secti n.*

Fuel Pump Pr ssur : 3.5-5.5 lbs. at 500 RPM.

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CARB. EQUIPMENT

►*AIR CLEANER AIR LEAK (C-500, 600 Trucks) CORRECTION:* Install two gaskets between elbow and carburetor, and reverse the holding clamps to provide better seating.

Fuel Pump: AC. Fuel only or Fuel & Vacuum types.

Car Model	Ford Pump No.
223 Eng. (Fuel only)	B5A-9350-A
272 Eng. (2-Bbl. Carb.)	B6C-9350-A
223 & 272 Opt'l. (Fuel & Vacuum)	B6T-9350-A
272 Eng. (4-Bbl. Carb.)	B6T-9350-A

Pressure - 3.5-4.5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric.
Dash Unit - Ford No. B6C-9280-B (P-350, P-500); B6C-9280-C (All Others Exc. Open Face Cowl); B6C-9280-D (All Others with Open Face Cowl Exc. C-500, C-600).
Tank Unit - Ford No. B6C-9275-A (All with Closed Cab exc. P-350, P-500), No. B6C-9275-B (F-100, 250, 350 without Closed Cab & P-350, P-500 with 17 Gal. Tank), No. B6T-9273-A (F-500, 600; B-500, 600; and P-500 with 30 Gal. Tank).
See "Fuel Gauges" in Carburetion Section.

BATTERY

Ford No. B6A-10655-C. *12 Volt,* 11 plate, 55 ampere hour capacity, or **B6A-10655-E.** *12 Volt,* 13 plate, 70 ampere hour capacity.
Grounded Terminal - Negative to engine block.
►*CAUTION: This is reversed from previous models.*
Engine Ground - Cylinder head to dash.

STARTER

Ford No. B6A-11002-A. Armature B6A-11005-A. *12 Volt.*
►*IMPULSE STARTING (Back-Up Light Equipped Cars) CORRECTION:* Before replacing neutral safety switch to correct short between light and solenoid terminals causing engine to start, interchange leads at switch. Connect longest lead (beyond taped portion of harness) to "A" terminal and short lead to "B" terminal.
Drive - Ford 1CM-11350-C. Bendix "Folo-Thru".
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM with warm engine.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	120
	150-180 ②		190 max.

① - With starter on engine and engine idling.
② - Cranking speed with warm engine.

Starting Switch: Magnetic type, Ford No. B6A-11450-A, Starter switch is controlled by ignition switch. *NOTE* - Neutral Safety switch used on Fordomatic transmissions.
Fordomatic Neutral Safety Switch: Ford No. FAC-15812-C.
Adjustment - *See "Fordomatic & Mercomatic" in Transmission Section.*

GENERATOR

Ford No. B6A-10002-A. *12 Volt.*
Armature - Ford No. B6A-10005-A (223 Eng. - with rear bushing), No. B6A-10005-B (223 & 272 Eng. - with rear ball bearing).

Performance Data

Generator	Armature	Amperes①	RPM
B6A-10002-A	B6A-10005-A	30	1250
B6A-10002-A	B6A-10005-B	30	1388

①—See Regulator for maximum charging rate.
Brush Spring Tension—26-34 ozs.
Field Current—1.4-1.6 amps. at 12.0 volts.
Rotation—Counter-clockwise at commutator end.

Belt Adjustment: (*NOTE*—Two belt arrangements used. In one, fan and generator are driven by a single belt. In the other, fan and generator are driven by separate belts). Adjust belt or belts to have ½" deflection midway between generator and fan pulleys or generator and water pump pulleys, with normal thumb pressure.

REGULATOR

Ford No. B6A-10505-A. *12 Volt.*
►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 75°F. ambient (engine compartment) temperature, after ½ hour operation, or after regulator heated and stabilized.*

Cutout Relay
Cuts In - 12.0-12.8 volts.

Voltage Regulator
Setting - 14.6-15.4 volts.
Checking & Adjusting - *See Electrical Section.*

Current Regulator
Setting - 28-32 amps.
Checking & Adjusting - *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signal - *See Electrical Section.*
Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N. Remove switch and disconnect all wires.
Stop Light Switch Location: On brake master cylinder, or on brake power unit assembly. Master cylinder located on engine side of firewall (F-100), and on bracket attached to left frame member below brake pedal (Other Trucks).
LIGHTING CIRCUIT BREAKERS: Combination headlight switch, circuit breaker and fuse assembly is used. One circuit breaker protects headlight circuit, and second circuit breaker protects remaining lighting circuits. Fuse, on back of assembly, protects the interior lighting circuit.

FUSES: Heater—14 amps. On blower switch.
Interior Lights—7.5 amps. On headlight switch.
Overdrive—3AG 15 amps. On overdrive relay.
Directional Signals—7.5 amps. In flasher to switch lead.

HORNS (Exc. West Coast): Ford No. B5T-13832-B (High Pitch), No. B5T-13833-B (Low Pitch). *12 Volt.*
(West Coast Only exc. Parcel Delivery) - Ford No. B6A-13832-A (High Pitch), No. B6A-13833-A (Low Pitch), *12 Volt. NOTE* - Use Bracket Nos. B6A-13830-A and B6A-13831-A with these horns.
Horn Current - 9.2-9.6 amperes at 12-12.6 volts.
Horn Relay: Ford No. 2Q-13853-A. *12 Volt.*

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. 223" Engine (EBR-S-T), and V8 272" Engine (ECY-W and ECR Heavy Duty). All engines are Overhead Valve type.

Engine	Bore	Stroke	Displacement
223	3.62"	3.60"	223 Cu. Ins.
272	3.62"	3.30"	272 Cu. Ins.

Engine	Compr. Ratio	Rated HP	Developed HP
223	7.8-1	31.54	133 at 4000 RPM
272 (ECY-W)	7.8-1	42.05	167 at 4400 RPM
272 (ECR) ①	7.8-1	42.05	158 at 3800 RPM
272 (ECR) ②	7.8-1	42.05	168 at 3800 RPM

① - 2-Bbl. Carb. ② - 4-Bbl. Carb.

CYLINDER HEAD: *See Ford Special Data.*
►*272" V8 CYLINDER HEAD CHANGE:* Cylinder head Part No. B6A-6049-K and B6A-6049-E have been used on these engines. See Valve Springs for type used with each head. *NOTE* - On 1955 256" Engines, Head Part No. has been changed from B6A-6049-K to B5T-6049-C (use with No. B5T-6049-B).
TIGHTENING TORQUES: *See Ford Special Data.*
ENGINE REMOVAL: *See Ford Special Data.*
OIL PAN REMOVAL (223" Engine): Drain crankcase. Pull dipstick out of tube. Remove flywheel housing inspection cover. Remove oil pan retaining screws and remove oil pan and gasket.
OIL PAN REMOVAL (272" Engine): Drain crankcase, remove oil level indicator, engine front splash pans. On Fordomatic equipped trucks, remove converter housing dust cover. Disconnect oil pump inlet tube at oil pump. Remove "O" ring seal from pump end of tube. Remove retaining screws and remove oil pan and gasket.

223" 6 CYL. ENGINES
(See Engine Specifications Above)

See 1956 Ford 6 Passenger Car Pages. Engine is similar to those used in 1956 Pass. Cars, and all passenger car engine data applies to truck engines.

272" V8 ENGINES
(See Engine Specifications Above)

See 1956 Ford V8 Passenger Car Pages. Engine is similar to those used in 1956 Pass. Cars, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW.
►*272" H. D. ENGINE EXHAUST VALVE CAUTION:* Exhaust valves are Sodium cooled and require special disposal handling to prevent possibility of fire or explosion due to chemical reaction. DO NOT DISCARD SODIUM COOLED VALVES with other scrap material. Bury in ground not subjected to excavation or in deep water not subjected to dredging.
►*MAIN BEARING REPLACEMENT CAUTION (272-ECR Eng.):* Some early production 272-ECR engines may have either lead-babbitt or copper-lead type bearings. Replace all lead-babbitt type bearings found in 272 ECR engines with copper-lead type when overhauling engines.

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VALVES:	Head Diameter	Stem Diameter ①	Length
Intake	1.775-1.785"	②	④ 5.02"
Exhaust	1 505-1.515"	③	④ 5 02"
Valve	**Seat Angle**	**Lift ⑤**	**Stem Clearance**
Intake	45°	⑥	.004"
Exhaust	45°	⑦	⑧ .006"

① - Furnished with .003", .015", .030" oversize stems.
② - .3415-.3420" (Coded RED), .3420-.3425" (Coded GREEN).
③ - .3400-.3405" (Coded RED), .3405-.3410" (Coded GREEN) late engines. Early engines and All 272 H D engines .0005" greater (both colors).
④ - 272 H D engine, Intake 5.0275", Exhaust 4 920".
⑤ - Cam lobe lift. Service limit.
⑥ - .268" (L D eng.), .259" (H D eng.)
⑦ - .268" (L D eng.), .257" (H D eng.).
⑧ - 272 H.D. Eng. .005".

VALVE TIMING: *NOTE - The following valve opening and closing points are with cam lift as indicated.*

272" V8 Engine Valve Timing

Intake Valves - Open 8° ① BTDC. Close 44° ② ALDC.
Exhaust Valves - Open 47° ① BLDC Close 5° ② ATDC.
① - Cam lift .015". ② - Cam lift .019".
Valve Seat Width - .060-.080" (Intake), .070-.090" (Exhaust).

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data*

Crankcase Capacit,: 6 qts. (272 H D Eng. with 4-barrel Carb.), 5 qts. (Others). 1 qt. additional with filter change.
Normal Oil Pressure: 45-50 lbs at 2000 RPM (Hot).
Pressur Regulator Valve - In oil pump body. Not adjustable. *NOTE* - Valve spring pressure should be 9 80 lbs. at 1 56" (223 Eng.) 10.86 lbs. at 1 40"(272 Eng.).
Oil Pr ssure Indicator: Warning light (F-100, 250, 350, 500, 600), King-Seeley Gauge (P-350, 500, C-500, 600).
Dash Unit - Ford No. B6D-9273-B (P-350, 500, C-500, 600).
Engine Unit - Ford No. B6A-9278-A (P-350, 500, C-500, 600), FDA-9278-A (F-100, 250, 350, 500, 600).
Se "King-Seeley Gauges" in Miscellaneous Section.
Oil Pump: Gear type pump mounted inside crankcase in line with distributor shaft (223 Eng.), externally mounted on lower left corner of engine (272 Eng.). An external inlet tube from oil pan feeds inlet side of pump.
Pump Removal & Overhaul - *See "Oil Pump" in Ford Sp cial Data.*
Oil Filter Full-flow (Std. Equip.) with pressure relief valve in center bolt. Replace filter element at 5000 mile intervals or when oil becomes dirty or polluted.
Replacement Filt r Element - Ford No. B2A-6731-A (Kit includes new gasket)
►*CAUTION* This special Full-flow filter element must be used for replacement (use of by-pass type element would restrict oil flow and result in insufficient engine lubrication).
►*FILTER INSTALLATION CAUTION & OIL LEAKAGE CORRECTION* *See "Oiling System" in Ford Special Data.*
Crankcase V ntilation: Filter in oil filler cap (inlet) with outlet pipe in rear of crankcase on right side of engine.

COOLING

►*LOSS OF COOLANT CORRECTION:* Lower generator mounting bracket bolt holes are tapped into cylinder water jacket. For loss of coolant at this point or when replacing bolts, apply a good coating of waterproof sealer.
Water Capacity (Without Heater): 18.5 qts. (223 Eng.), 23 qts. (272 Eng. except C,D,Y), 22 qts. (272 Eng. C,D,Y).
Pressure Valve: Ford No. LT-8100-A, Radiator filler cap (opens at 4 lbs.).
Thermostat **223 Eng.** Ford No. B5C-8575-A (152-157°), EBR-8575-A (167-172°). **272 Eng.** Ford No. B4C-8575-A (152-157°), B4C-8575-B (167-172°). Single, spring and cartridge type.
Water Pump: Packless, sealed ball bearing type.
See "Water Pump" in Ford Special Data.

CLUTCH

Temperature Gauge: King-Seeley Electric type.
Dash Unit - Ford No. B6J-10883-A (P-350, P-500). B6C-10883-B (All others with open face cowl Exc. C-500, C-600). B6C-10883-C (All others Exc. open face cowl).
Engine Unit - Ford No. B6C-10884-A.
See "Temperature Gauges" in Miscellaneous Section.
Long L-5222 (10"), 264300 (10½"), L1478 (11") Semi-centrifugal type used as follows

Model	Long No.	Ford No.
F-100,250 (6 Cyl.) ①	L5222	② AE-7563-A
F-100 (8 Cyl.) ①	264300	B6C-7563-A
F-100,250 Optl.	L1478	③ 8MTH-7563-A
All Others	L1478	③ 8MTH-7563-A

① - 3 Spd. L D or H D Trans. and/or O D
② - Supersedes AB-7563-C.
③ - Supersedes 51-7563-A.

Clutch Disc - Use with cover assembly as follows

Model	Long No.	Ford No.
F-100,250 (6 Cyl.) ①	② CD 870	B4C-7550-A
F-100,250 (8 Cyl.) ①	284299	B6C-7550-A
F-100,250 Optl.	③ CD 606	④ ⑤ 81T-7550-A
All Others	③ CD 606	④ ⑤ 81T-7550-A

① - 3 Spd. L D or H D Trans. and/or O D
② - CD 887 Heavy Duty.
③ - CD 607 Heavy Duty.
④ - Supersedes 59T-7550-A.
⑤ - Moulded linings. Woven linings (Thermoid) TDAA-7550-A.

Pedal Adjustment: 1 1/8-1 3/8" free travel. Adjusting clevis provided at forward end of connecting rod between pedal shaft and equalizer shaft. *NOTE* - Check free travel by operating engine at 3000 RPM with transmission in neutral position. There should be a minimum of ½" free travel under these conditions. Readjust as necessary.
Removal: Disconnect clutch pedal retracting spring from clutch release lever. Remove lock nut and adjusting nut from release lever rod, then remove rod. Remove transmission assembly from clutch housing (see below). Remove clutch release bearing and hub from release lever. Mark pressure plate and cover assembly and flywheel so that parts may be reinstalled in same relative positions. Loosen pressure plate and cover assembly-to-flywheel bolts until pressure plate springs are expanded, then remove bolts. Remove pressure plate and cover assembly and clutch disc assembly through opening in bottom of clutch housing. Remove pilot bearing from flywheel with Tool 7600-E.

SYNCHRO-MESH TRANSMISSION

3-SPEED (LIGHT DUTY)

Own. 3-speed, all helical gear. Constant mesh, synchro-mesh (second and high), sliding gear (low and reverse). Steering column shift standard.
See "Ford Truck 3-Speed (L ght Duty)" in Transmission Section.
►*SYNCHRO-MESH & OVERDRIVE THREE SPEED TRANSMISSION GEAR REPLACEMENT CAUTION* Shot peened gears used in 1956 models. Shot peened gears can be used in past model transmissions. DO NOT use past model gears in 1956 transmissions.
Removal: Remove floor mat and floor plate. Loosen two nuts that secure top of transmission to clutch housing studs. Raise truck, then drain lubricant from transmission. Disconnect the drive shaft from the transmissi n. If truck equipped with band-type parking brake, disc nnect brake cable at brake and at gear shift housing. Disconnect gear shift linkage at transmission, then disconnect clutch pedal retracting spring from clutch release lever. Remove bolts and lockwashers which attach clutch release equalizer bar anchor bracket to transmission. Disconnect speedometer cable from transmission. Remove dust cover from bottom of clutch housing. Position transmission jack under transmission. Remove two top nuts, two bottom bolts, and lockwashers that secure transmission to clutch housing. Move transmission to rear until input shaft splines clear clutch housing. Be careful not to allow clutch release bearing and hub to drop out of release lever fork. Lower transmission to floor.

3-SPEED (MEDIUM DUTY)

Own. 3-Speed medium duty with steering column shift standard. *See "Ford Truck 3-Speed (Medium Duty)" in Transmission Section.*
►*3-SPEED (M.D.) TRANSMISSION SHIFT TUBE LEVER & BRAKE PEDAL INTERFERENCE CORRECTION:* To correct, disconnect shift rods at transmission levers, turn sleeve on rod to increase length, leaving ¼" of rod beyond sleeve. Check brake pedal movement and readjust rods to obtain proper cross-over with full travel into transmission detents.
Removal: Same as for 3-Speed (Light Duty) above.

3-SPEED (HEAVY DUTY)

Own. 3-Speed, helical gear (second & high), spur gear (low & reverse). Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Steering column shift standard.
See "Ford Truck 3-Speed (Heavy Duty)" Transmission in Transmission Section.
►*3-SPEED HEAVY DUTY TRANSMISSION SHIFT LEVER BREAKAGE CORRECTION* *For corrective parts and procedures see "Ford Truck 3-Speed Heavy Duty" Transmission in Transmission Section.*
Removal: Same as for 3-Speed (Light Duty) above.

4-SPEED

Own. 4-Speed, Constant mesh, synchro-mesh (second, third & high). Helical gears used for second, third & high. Spur gears used for low & reverse. Center, floor mounted gear shift lever standard.

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See "Ford Truck 4-Spe d (Synchro-mesh)" in Transmission Section.

Removal: Same as for 3-Speed (Light Duty) above and note following: *If hoist not used, it may be necessary to remove gear shift lever assembly and lever housing before transmission can be removed from truck.* Disconnect drive shaft, or coupling shaft, at parking brake drum. If truck equipped with coupling shaft support disconnect support bracket from support plate, then remove coupling shaft.

OVERDRIVE

Warner Model AS4-R10F. Overdrive with solenoid operated (no centrifugal pawls) with governor control and throttle operated kick-down. There is no lockout switch on this unit.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for 3-Speed Synchro-mesh Transmission (above), after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.

See "Fordomatic & Mercomatic" in Transmission Section.

► *FORDOMATIC "LOCK-UP" CORRECTION (1955-56 Trucks):* Caused by cross leakage in front servo piston. *See "Fordomatic & Mercomatic" in Transmission Section.*

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication - Check transmission oil every 1000 miles and maintain fluid level at "Full" mark on dipstick. Drain and refill every 15,000 miles. *See Fluid Change Caution below.*

► *FORDOMATIC TRANSMISSION FLUID CHANGE CAUTION:* New type fluid is green colored, similar to engine oil. DO NOT USE IT IMPROPERLY. "Type A" (reddish brown) may be used when adding oil to transmission filled with new type oil.

Checking Fluid Level - Apply parking brakes, place transmission selector lever in "N" (neutral) position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator. Add sufficient fluid to raise level to full mark on indicator.

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above.*

► *OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Spic r. Needle bearing type.

► *UNIVERSAL JOINT INSTALLATION CAUTION:* Make sure that all universal joint yokes in drive line are in same plane to avoid drive line unbalance.

C upling Shaft Center B aring: Consists of cushion mounted ball bearing bolted to underside of frame intermediate cross member. Bearing is mounted on end of coupling shaft in a sleeve with felt retainer on each end and bearing baffle on front end.

REAR AXLE

SEMI-FLOATING

Own. Semi-floating, hypoid gear with Hotchkiss drive. *NOTE* - Same axle as used in Station Wagon & Sedan Delivery.

See "Ford & Mercury (Integral Carrier Type) Hypoid" in Rear Axle Section.

Ratios - 3.92-1, 4.27-1, 4.09-1.

Backlash - .003-.008".

Axle Shaft Removal: Remove brake drum from axle flange. Work through hole in axle shaft flange to remove bolts that secure brake carrier plate to axle housing. Use Tool 4235-N to pull axle shaft assembly out of housing, but DO NOT DISLODGE BRAKE CARRIER PLATE OR DAMAGE OIL SEAL in housing.

Axle Assembly Removal: Raise rear of truck, then disconnect hydraulic brake hose from hydraulic brake line at rear axle. Disconnect parking brake cable from equalizer rod, then remove screws which attach brake cable brackets to frame crossmember. Disconnect drive shaft at rear axle universal joint flange. Remove nuts from rear spring clips (U-bolts), then remove spring clips. Loosen shock absorber stud nuts and move shock absorbers out of way. Roll axle assembly away from truck, remove wheels.

Wheel Bearing Adjustment: None required in service.

FULL FLOATING

Own. Full floating, Hypoid gear, with Hotchkiss drive.

Model	Rear Axle Type
F-250, P-350	Integral Housing
F-350 and 500, 600 Series	Banjo Housing

See Various types of Ford Rear Axles in Rear Axle Section.

Axle Ratios

Model	Axle Ratios
F-250,P-350	4.56-1(41-9), 4.88-1(39-8), 5.88-1(37-8) ①
F-350	4.86-1(39-7), 5.14-1(36-7), 5.83-1(35-6) ②
F,C,P,B-500	5.83-1(35-6), 6.2-1(31-5), 6.8-1(34-5) ③
F,C,B-600	6.17-1(37-6) ④, 6.67-1(40-6) ③

① - .008-.013" backlash. ② - .004-.018" backlash.
③ - .006-.012" backlash. ④ - .006-.016" backlash.

Axle Shaft Removal: Drain lubricant from axle housing, then remove axle shaft stud nuts and washers. Tap center of axle flanges to loosen tapered dowels, then remove dowels. Remove axle shaft from housing, remove hub and drum assembly.

Axle Assembly Removal: (Integral Carrier) - See "Semi-floating" above. **(Banjo Housing) -** Loosen wheel stud nuts, raise rear of truck, disconnect hydraulic brake hose from hydraulic brake pipe. Disconnect drive shaft at rear universal joint flange, remove spring clips (U bolts), roll axle from under car and remove wheels.

Whe l Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher. Adjust bearings by turning bearing adjusting nut (inner nut) up until tight then backing off 1/8 turn. Install bearing lockwasher. *(NOTE* - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel). Install bearing locknut and draw nut up tight. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over locknut. Install axle shaft and lower vehicle.

TWO-SPEED

Own. Electrically operated shift, Two-speed, Full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.

See "Ford Truck Two-Sp d" in Rear Axle Section.

Ratio - 5.83-1 (Direct Speed), 8.11-1 (Second Speed); 6.33-1 (Direct Speed), 8.81-1 (Second Speed).

Backlash - .006-.016".

Removal: Same as for standard axle (above) after removal of wiring harness.

SHOCK ABSORBERS

Direct acting hydraulic. Shock absorbers are sealed units and are not adjustable or refillable.

► *REPLACEMENT SHOCK ABSORBER NOTE:* Shocks are supplied for service replacement in kits consisting of shock absorber and necessary bushings.

Replacement Shock Absorbers

Model	Front	Ford Nos.	R ar
F-100	B6C-18124-A		B6C-18125-A
F-250	B6D-18124-A		B6C-18125-A
F-350	B6D-18124-A		B3Y-18125-A
P-350	B6J-18124-A		B6C-18125-A
P,F,C-500; F,C-600	B3T-18124-A		B3T-18125-A

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliot ends and semi-eliptical springs.

Kingpin Inclination - 4° ± ½°.

Caster	Min.	Max.
F-100,250	3°	4°
F-350,500;(Exc. F-500 154" W.B.)	3°	5°
B-500,600; F-600 & F-500 154" W.B.)	3½°	5½°
C,P-500,C-600	2½°	4°

½° maximum variation between wheels.

Camber - ¼° to 1° Pos. ¼° maximum variation between wheels.

Toe-In - 0 to 1/16".

STEERING

Own. (Gemmer 305 & 335 Design). Worm-and-roller types with push-pull adjustment.

► *F-100, 250 DRAG LINK INSTALLATION CAUTION:* Due to design of drag link (THAA-3305-A) it is possible to install link in a reverse position causing steering interference. When properly installed, offset end of drag link is attached to sector shaft arm, and lubrication fittings will be at bottom side of link.

See "Gemmer Worm-and-Roller Types" in Steering Section.

Ste ring Wh el & Horn Button R moval: *See "Gemmer Worm & Roller (Type 305 & 335)" in Steering Section.*

Steering Gear Rem val: *See "Gemmer Worm & Roller (Type 305 & 335)" in Steering Section.*

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BRAKES

Brake types are as listed in application table below. Hand lever applies rear wheel service brakes on F-100 only (independent shaft brake on other models).

► *SECONDARY BRAKE LINING PRODUCTION CHANGE (F-100 8 Cyl.)* Thickness of secondary lining, on F-100 8 cyl. trucks, increased to ¼" from 3/16". *CAUTION* - DO NOT MISMATCH LININGS when servicing F-100 truck. ¼" thick lining kits for both 6 and 8 cyl are B6C-2007-A (Front), B6C-2007-B (Rear).

► *REAR WHEEL BRAKE LEAK CORRECTION (1953-56F, C, B-500, 600, P-500)* Install Brake Cylinder Assembly B5T-2261-A (Front), B5T-2262-A (Rear) and Link B5T-2042-A or Conversion Kit B5T-2222-A.

Brake Type Application

Truck Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F,P-250,F-350	Uni-Servo	Duo-Servo
F,B,C,P-500,F,B,C-600	Uni-Servo	2 Cyl.

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe. Ratchet adjusting screw.
See *"Ford-Bendix Uni-Servo Hydraulic" in Brake Section.*

Duo-Servo - Ford-Bendix. Single anchor, self energizing. Wheel cylinder actuates both shoes. Ratchet adjusting screw.
See *"Ford-Bendix Hydraulic" in Brake Section.*

Two-Cylinder Type - Two wheel cylinders in each brake assembly
See *"Ford Truck Two-Cylinder" in Brake Section.*

Brake Drum Diameter

Model	Front	Rear
F-100	11"	11"
F-250	12"	12 1/8"
F-350 Conventional	12"	13"
P-350 Parcel Delivery	12"	12 1/8"
F-500 Single Speed	13"	14 1/8"
F-500 Two Speed	13"	15"
F-600 All Models	13"	15"

Lining Width & Thickness

Model	Front	Rear
F-100	2" X 3/16"	① 1 3/4" X 3/16"
F-250	2" X 3/16"	2" X 1/4"
F-350 Conv.	2" X 3/16"	2 1/2" X 1/4"
P-350 Par. Del.	2" X 1/4"	2" X 1/4"
F-500 Single Spd.	2 1/4" X 1/4"	3 1/2" X 3/8"
F-500 2 Spd.	2 1/4" X 1/4"	4" X 3/8"
F-600 All Models	2 1/4" X 1/4"	4" X 3/8"

① - F-100 V8 Secondary 1/4" thick.

Lining Length (Primary Shoe)

Model	Front Wheel	Rear Wheel
F-100	11 29/32"	11 29/32"
F-250	11 33/64"	11 33/64"
F-350 Conventional	11 33/64"	12 45/64"
P-350 Parcel Delivery	11 33/64"	11 33/64"
F-500 Single Speed	12 45/64"	14 29/64"
F-500 Two Speed	12 45/64"	15 11/32"
F-600 All Models	12 45/64"	15 11/32"

Lining Length (Secondary Shoe)

Model	Front Wheel	Rear Wheel
F-100	11 29/32"	11 29/32"
F-250	12 31/32"	12 31/32"
F-350 Conventional	12 31/32"	13 61/64"
P-350 Parcel Delivery	12 31/32"	12 31/32"
F-500 Single Speed	13 61/64"	14 29/64"
F-500 Two Speed	13 61/64"	15 11/32"
F-600 All Models	13 61/64"	15 11/32"

Clearance - Brake lining to drum clearance differ as follows

Uni-Servo & Duo-Servo - .010" clearance measured 1½" from each end of secondary shoe.

Two-Cylinder Type - Reduce clearance until drum drags, back off until drum is free, plus one turn to give working clearance.

Hand Brake (Exc. F-100): External contracting type, consisting of a brake drum bolted to transmission main shaft companion flange, and an external contracting band mounted on rear of transmission.

Adjustment—On cable controlled parking brakes, move lever to full released position. On transmission mounted parking brake levers, set lever to first notch. Observe position of cam to make sure flat portion is resting on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, adjust clevis rod to allow flat portion to rest on brake band bracket. Install clevis and cotter pins. Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise until .010" clearance is established between brake lining and drum at anchor bracket. Loosen locknut on adjusting screw from lower half of brake band. Adjust for .010" clearance between lining and drum at lower half of brake band. Tighten locknut. Turn upper band adjusting rod nut until .010" clearance is established between upper half of band and drum Re-install lockwire in anchor adjusting screw.

Hand Brake Drum Diameter—(F-250, 350) 8', (Others) 7 13/16"

Hand Brake Lining

Series	Length	Width	Thickness
F-250, 350	24 5/8"	2"	5/32"
P-350, 500①	23 5/64"	2½"	1/4"
B, C, F-500, 600	24 5/8"	2½"	1/4"

①—Three-piece lining used.

Brake Pedal Free Play Adjustment: 3/16-3/8". Adjust free play by loosening brake pedal-to-master cylinder push rod and rotating rod to obtain correct free play. Tighten lock nut while holding push rod securely.

Standard Master Cylinder: Located on bracket attached to left frame side member below brake pedal.

Checking Fluid—Maintain fluid level to within ½" of top of reservoir.

Removal—Disconnect brake lines from master cylinder and depress brake pedal a few times to empty master cylinder. Remove brake pedal return spring from brake pedal clevis pin and remove clevis pin. Disconnect stop light switch wires at switch. Remove assembly from bracket.

Power Brakes: Midland or Hydrovac unit mounted in various positions depending on truck model and connected in hydraulic brake line between master cylinder and wheel cylinders. There are no mechanical connections and adjustments are not required.
See *"Midland" or "Hydrovac" Power Units in Brake Section.*

Checking Brake Fluid—Same as for manual brakes (above).

Removal of Power Unit—Depress brake pedal several times to remove all vacuum from system. Loosen brake power unit air inlet tube clamp and remove tube. Disconnect master cylinder to power unit hydraulic line at power unit. Disconnect vacuum tube at power unit. If stop light switch located on brake power unit, disconnect wires. Remove mounting bracket bolts and power unit.

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate on left front body pillar.
First Number:- 100001.

►*VEHICLE NUMBER NOTE:* Vehicle number (example *A7FV100501*) includes following identification data in sequence.

Eng. Type ①	Year ②	Assy. Plant	Body Style ③	Serial No.
A	7 .	See below	See below	100501

① - **A** - 6 Cyl. 223 cu. in. engine.
② - Last digit of model year.
③ - **C** - Conv. (Fairlane "500"). **F** - Ranchero. **G** - Tudor & Fordor (Custom & Custom "300"). **H** - Thunderbird. **R** - Ranch Wagon (Custom "300"). **S** - Sedan Delivery (Courier). **T** - Tudor & Fordor - Concealed Pillar (Fairlane & Fairlane "500"). **V** - Victoria Tudor & Fordor (Fairlane & Fairlane "500"). **W** - Retractable Hardtop (Fairlane "500"). **X** - Country Sedan. **Y** - Country Squire.

Assembly Plant Designation

A - Atlanta	**F** - Dearborn	**N** - Norfolk
B - Buffalo	**G** - Chicago	**P** - St. Paul
C - Chester	**K** - Kansas City	**R** - San Jose
D - Dallas	**L** - Long Beach	**S** - Somerville
E - Mahwah	**M** - Memphis	**U** - Louisville

TUNE-UP

►*POWER POUND CORRECTION·* This condition may be caused by the cylinder head if normal external corrections, such as tune-up, engine alignment, exhaust system grounding, have not eliminated the trouble Check engine compression and if compression pressure is found to be 170 lbs or greater, it is recommended that the cylinder head be replaced by a 1956 head Part No B6A-6049-D Temperature Indicator Bulb, Part No B7A-10884, must be used with the 1956 head

►*ENGINE PINGING (AT LOW SPEED UNDER LOAD) CORRECTION: Requires modification of Carburetor (B7A-9510-N), and Distributor (B7A-12127-C) See DISTRIBUTOR and CARBURETOR below*

COMPRESSION PRESSURE: 150 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: Steady 18-20" idling at 475-500 RPM in Neutral.

VALVE TAPPET CLEARANCE: .019" Intake & Exhaust (Hot & Cold). Adjust all tappets to .019" clearance while engine is cold, then again check all tappets for .019" clearance after running engine for 30 minutes to normalize temperature.

►*SELF LOCKING VALVE TAPPET ADJUSTING SCREW NOTE·* Special threads on adjusting screw provide interference fit. 3 ft. lbs. (36 in. lbs) interference when center section of screw threads are fully engaged with rocker arm threads. Replace screw and/or rocker arm as necessary when interference is below this specification

MANIFOLD HEAT CONTROL Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM Spring is installed with ¾ turn windup and hooked over stop pin.

IGNITION

FIRING ORDER: 1–5–3–6–2–4.

SPARK PLUG GAP: .032-.036".
Spark Plugs - Champion 870. 18 mm. Torque to 15-20 ft. lbs.

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be torque tightened within range of 15-20 ft.lbs.

COIL: Ford No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4 5 amps. stopped.
Resistor - Ford B6A-12250-D. 1.3-1.4 Ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Ford No. B7A-12127-C. "Loadomatic" type of same design used on previous models.

►*DISTRIBUTOR MODIFICATION TO ELIMINATE ENGINE PING:* Replace distributor primary advance spring with Part No. 7RA-12192 and secondary advance spring with Part No. FDE-12225-A Calibrate distributor to modified advance table below *See also CARBURETOR below*
Condenser - Ford No. 7RA-12300-C **Capacity** .21-.25 mfd.
Contact Point Set - Ford No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance (Unmodified Distributor)
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0±½	0	300
0 ±½	2¼	500
3-4	5	800
7¼-8½	6	1200
9¼-10½	5¾	1500
12-13¼	4¼	2000

Advance Performance (Modified Distributor)
►With Distributor on Test Stand

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	29	600
1-2	55	800
6¼-7¼	1 36	1200
10½-11½	2 66	1700
11-12¼	3 38	2000

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump. It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump.

Initial Distributor Timing: Set engine crankshaft so that No.1 cylinder is at TDC after compression stroke (with timing mark in line with pointer) Install distributor so that rotor points to the No 1 spark plug wire terminal in distributor cap.

IGNITION TIMING

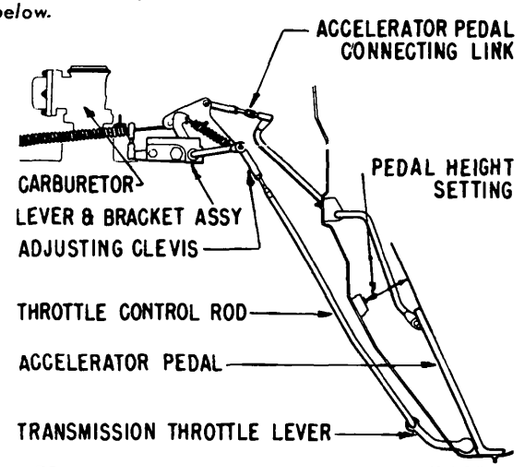
Setting - 4° BTDC (Std.), 6° BTDC (Fordomatic) with engine idling at 475 RPM and vacuum line disconnected. *See Initial Distributor Timing abov . NOTE* - Maximum initial timing recommended is 6° BTDC (Std.) and 8° BTDC (Fordomatic).
Timing Mark - Vibration damper marked "TDC", and "3", "5", "7", "9" degrees BTDC. Align correct mark with pointer on cylinder front cover.

CARBURETOR

Ford No. B7A-9510-C (Std. Trans.), B7A-9510-D (Fordomatic), B7A-9510-N (Std. & F rd matic), B7A-9510-Y (Std. & Fordomatic), B7A-9510-M (Sp cial Ec n my). "Visi-flo" single barrel

►*CARBURETOR MODIFICATION TO ELIMINATE ENGINE PING. See "Ford Visi-flo Carbur tors" in Carburetion Section*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE. Special cleaning procedure required. See AIR CLEANER below.*



FORDOMATIC TRANSMISSI N THR TTLE LINKAGE

Throttle Linkage Adjustment (Fordomatic Cars): Adjust engine idle speed to 475-500 RPM with selector lever in "N" position and engine at normal operating temperature. Adjust anti-stall dashpot (see below). Set hand brake and check idle speed in Dr (Drive) range and adjust if necessary to 425-450 RPM. Pull throttle rod assembly upward firmly so transmission lever is against its internal stop, align hole in throttle rod clevis with hole in accelerator assembly by rotating clevis on throttle rod. Then lengthen throttle control rod 2½ turns counterclockwise. Assemble throttle control rod to accelerator assembly and adjust pedal height to 3.10" by changing length of accelerator assembly connecting link Road test car. If band or clutch slippage is evident, increase rod length to 3 turns but not more than 3½ turns of the clevis

Anti-Stall Dashpot (Fordomatic Cars): After engine idle speed adjusted to 475-500 RPM turn off engine Loosen dashpot adjusting screw locknut Hold throttle in closed position and depress dashpot plunger with a screwdriver blade Turn dashpot or adjusting nut until 045 064" clearance obtained between dashpot plunger and throttle shaft lever Tighten locknut

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FORD "VISI-FLO"

Idl S tting - Initial setting 1 turn open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture, rather than a lean setting.

Idl Sp d - 475-500 RPM (Std. & O D.). 475-500 RPM (Fordomatic) with selector in Neutral and check for 425-450 RPM in Dr (Drive) range. Adjust as necessary to get drive range RPM.

Fuel Lev l - 11/16" ± 1/32" below power valve mounting surface (Tool T52L-9550-AEE).

Accelerating Pump: Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: See *CARBURETOR above*

► *OTHER DATA: See "Ford Visi-flo Carburetors" in Carburetion Section*

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5,000 miles, replace element every 20,000 miles.

► *CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

FUEL PUMP PRESSURE: 3.5-5.5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Ford B5A-9350-A Fuel only (Exc Fordomatic & Overdrive Cars), B5A-9350-B, Fuel & Vacuum (Fordomatic & Overdrive)

Fuel Pump Pr ssure - 4-5 lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

Gas line Gaug : New King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No B7A-10804-B

Dash Unit - Ford No. B7A-9280-A.

Tank Unit - Ford No B6A-9278-B

S e "Fu l Gauges" in Carburetion Section

Air Cleaner: DRY FILTER ELEMENT Type Clean every 5,000 miles, replace element every 20,000 miles

► *CLEANING CAUTION·* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

F rd B6A-10655-C. 12 volt, 11 plate, 55 ampere hour capacity, or **F rd B7A-10665-A,** 12 volt, 11 plate 70 ampere hour capacity (20 hour rate)

Battery Ground - Negative, to engine block

Engine Gr und - Cylinder head to dash

STARTER

F rd B6A-11002-A. Armature - B6A-11005-B.

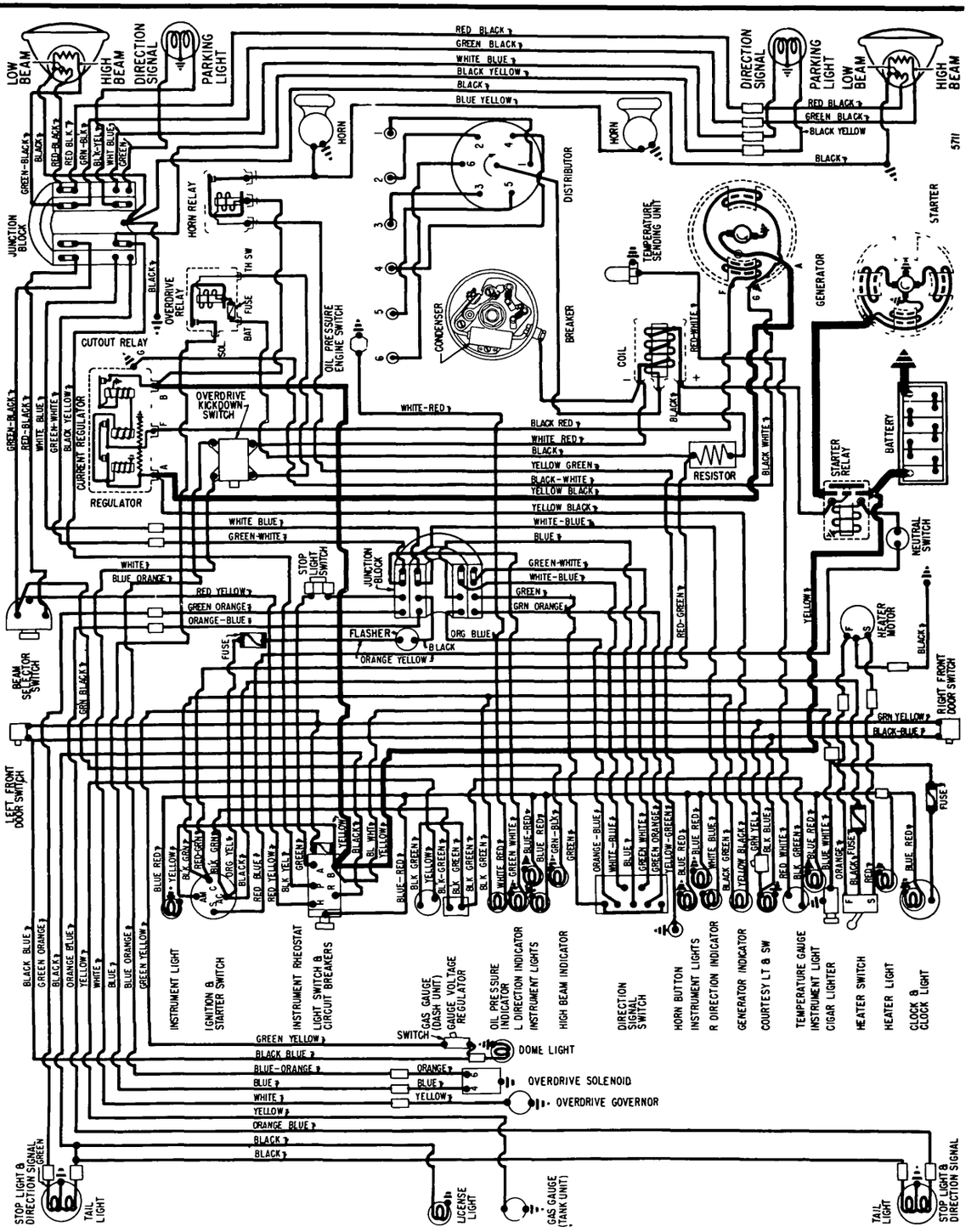
Drive - Ford ICM-11350-C Bendix "Folo-Thru"

R tati n - Counterclockwise at commutator end

Brush Spring T nsi n - 48-56 ozs

Cranking Speed - 150-180 RPM, 190 amperes max

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Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	120
15 5 ft lbs		.5 0	550

①- With starter on engine and engine idling

Starting Switch: Magnetic type, Ford No B6A-11450-A Starter Switch is controlled by ignition switch *NOTE* - Neutral Safety switch used on Fordomatic Transmissions

Fordomatic Neutral Safety Switch: Ford B7A-15812-A **Adjustment** - *See "Fordomatic & Mercomatic" in Transmission Section*

GENERATOR

Ford. Used as follows:

Generator	Armature	Application
B6A-10002-C	B6C-10005-B	①Std
B6A-10002-H	B6A-10005-A	②Std
B6A-10002-F	B6C-10005-C	Special

①- With B6C-10505-B Regulator
②- With B6A-10505-A Regulator

►*40 AMPERE GENERATOR INSTALLATION CAUTION:* Install 2 Spacers, Ford No 10148, to secure proper alignment of generator-to-water pump and fan pulleys *NOTE* - Shorter or thinner spacer at front end of generator longer spacer at rear end

Performance Data

Generator	Amperes	Eng RPM
B6A-10002-C,H	30	1500
B6A-10002-F	40	1500

Brush Spring Tension - 26-34 ozs
Field Current - 1 5-1 6 amperes at 12 volts
Rotation - Counterclockwise at commutator end

Belt Adjustment: ¼" deflection midway between generator and water pump pulleys with light thumb pressure

REGULATOR

Ford B6A-10505-A (B6A-10002-H Gen.), B6C-10505-B (B6A-10002-C Gen.), B6A-10505-B (B6A-10002-F Gen.).

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 75°F, ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized*

Cutout Relay

Cuts In - 12 0-12 8 volts

Voltage Regulator

Setting - 14 6-15 4 volts at 75°F (Ambient)
Checking & Adjusting - *See Electrical Section*

Current Regulator

Setting - 28-32 amperes (B6A 10505-A & B6C-10505 B), 38-42 amperes (B6A-10505-B)
Checking & Adjusting - *See Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*
Directional Signals: *See Electrical Section*
Lighting Switch Removal: With control knob in "OFF" position, press spring release button on switch housing, turn shaft slightly and pull it out of switch Unscrew mounting nut with Tool 17470-N Remove Switch and disconnect all wires
Stop Light Switch: On forward end of master cylinder
CIRCUIT BREAKERS: On headlight switch Combination headlight switch, circuit breaker, and fuse assembly used One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits
FUSES: Size & location as follows:
Back Up Light - SFE 7 5 ampere, in feed wire behind instrument panel
Cigar Lighter - Sulphur disc in base or reset circuit breaker located on back of lighter socket
Clock - 1 AG in feed wire
Heaters - SFE 14 ampere, in feed wire
Interior Lamps - SFE 7 5 ampere, on lighting switch
Overdrive - 15 AGC on overdrive relay
Spot Light - SFE 7 5 ampere in feed wire
Turn Signal - SFE 7 5 ampere in feed wire
Horn Relay: Ford No B7A-13853-H
►*HORN RELAY REPLACEMENT NOTE:* When replacing a horn relay that has been shorted by water, be sure to spray new relay with a plastic ignition spray (around crimped areas in particular but not on terminals) and install three ¼" flat washers between mounting bracket and fender apron

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl Valve-in-head

Bore	Stroke	Displacement
3 62"	3 60"	223 Cu Ins
Compr. Ratio	**Rated HP**	**Developed HP**
8 6-1	31 54	144 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP*
CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Ford Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data*
ENGINE REMOVAL: *See "Engine" in Ford Special Data*
OIL PAN REMOVAL: Drain crankcase, Remove oil level indicator, engine left and right front splash aprons Remove stabilizer bar flywheel housing inspection cover, oil pan retaining screws and pan .

PISTONS

Autothermic type Solid skirt with three rings above pin
Removal - Pistons and rods removed from above
Fitting New Pistons: Clearance - 0009- 0015" at bottom of skirt Use ½" ribbon feeler inserted between piston and cylinder wall at right angle to pin on thrust side with piston inverted and end of piston 1½" below top of block Pull required to remove feeler should be 5 10 lbs when using feeler gauge thicknesses as follows.
New Piston in New Bore - 0015"
New Piston in Used Bore - 0020"
Used Piston in Used Bore - 0025"
Replacement Pistons: Furnished with fitted pins in Std and 020", 030", 040", 060" oversize
Installing Pistons: Install piston with indentation in head of piston toward front of engine

PISTON PINS

Floating type with lock ring at each end
Diameter - 9120- 9123" **Length** - 3 016-3 030"
Pin Fit in Piston - 0001- 0003", wear limit 0008"
Pin Fit in Rod Bushing - 0001- 0003", wear limit 0008"
Replacement Pins: Standard, and 001", 002" oversize

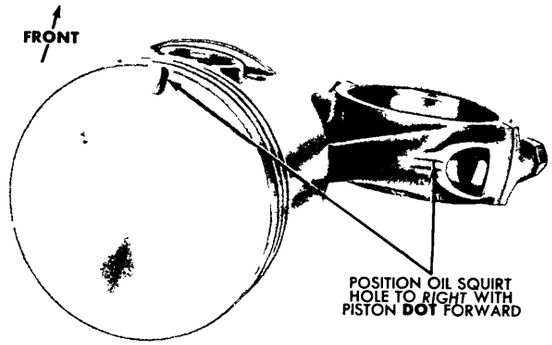
PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr #1,2	3/32"	010- 027"	002- 0035"
Oil #3	3/16"	015- 062"	①

①- Side sealing type ring
Replacement Rings: Standard, 020", 030", 040", 060" oversize (Expander type)

CONNECTING RODS

Journal Diameter - 2 2980-2 2988"
Clearance - 0004- 0023", wear limit 0033"
Side Clearance - 003- 009", wear limit 012"
Replacement Bearings: Standard size (2 sizes marked **Red** & **Blue** for selective fitting) and 010", 020", 030" Undersize
Installing Rods: Install rod with squirt hole to right and piston indentation toward front of engine



FORD 6 CYL. PISTON & ROD ASSY.

CRANKSHAFT

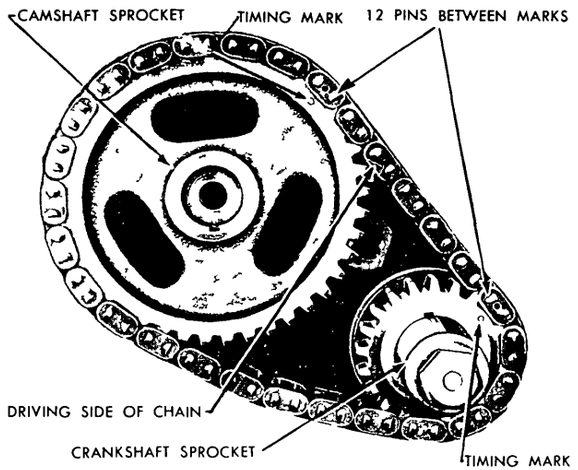
Journal Diameter - 2 4980-2 4988" Four Bearings
Bearings - Steel backed copper lead alloy, or lead babbitt
Clearance - **Copper Lead** - 0005- 0025", wear limit 0035" **Lead Babbitt** - 0005- 0021", wear limit 0031"
Replacement Bearings: Standard size, (2 sizes marked **Red** & **Blue** for selective fitting) and 010", 020", 030" Undersize
End Thrust: Taken on rear intermediate #3 bearing
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data*
End Play - 004- 008" wear limit 012"
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars and truck engines to reduce oil leakage at front oil seal Slinger is held in place by crankshaft pulley and cylinder front cover To remove slinger remove cylinder front cover and slide slinger off crankshaft

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CAMSHAFT

Journal Diam t r - 1 9255-1 9265"
Clearance - 001- 003", wear limit 006"
End Thrust: Taken by thrust plate and spacer behind camshaft sprocket *NOTE* - Chamfer on inside of spacer must be toward camshaft journal
R placem nt B arings: Finished bearings furnished Standard and 015" undersize *CAUTION* - Rear intermediate (#3) bearing not interchangeable with other bearings
Camshaft R m val & Installation: *See "Camshaft & Bearings" in Ford Special Data*
Timing Chain: Side guide type 56 links
►*REPLACEMENT NOTE* Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side and measure on opposite side) Remove and install chain as a unit with both sprockets
Camshaft Setting: Sprockets marked by "O" at one tooth Mesh chain so that there are 12 pins between "O" marks on driving side of chain



FORD 6 CYL. VALVE TIMING MARKS

Engin Fr nt C v r Oil S al (Crankshaft Front Seal)· *See "Engine Front Cover" in Ford Special Data*
Engine Fr nt Cov r R m val· *See "Engine Front Cover" in Ford Special Data*

VALVES

Tappet Cl aranc · 019" Intake & Exhaust (Hot or Cold)

Valv	H ad Diam ter	①Stem Diameter
Intake	1 775-1 785"	3416 3423"
Exhaust	1 505 1 515"	3403- 3410"

Valv s	Seat Angl	②Lift	③Stem Clearance
Intake	45°	273"	001 0024"
Exhaust	45°	273"	0023 0037"

① Furnished with 003" 015" 030" oversize stems
②- Cam lobe lift Wear limit 268"
③ Wear limit 0045"(Intake) 0065" (Exhaust)

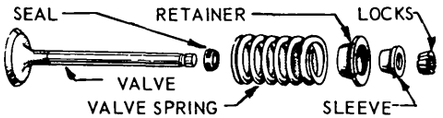
►*ROTATABLE VALVE NOTE All valves are rotat abl type See "Valve System" in Ford Special Data*
Valv St m S als - Umbrella type seals used on both intake and exhaust valve stems, cupped side down
Valve Seat Width - 060- 080" (Intake), 070- 090" (Exhaust)
Valve Springs: Free Length - 2 09" approximately

Valve Spring Specifications

Valve	Spring Pressure	Length
Valve Closed	①71-79 lbs	1 780"
Valve Open	②161-177 lbs	1 390"

①- Wear limit 64 lbs at 1 780"
②- Wear limit 145 lbs at 1 390"

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to spring retainer contact surface If assembled height is 1 13/16" or greater, install necessary 030" spacer or spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 25/32 1 13/16"
Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above) ream guides and install oversize valves *See "Valve System" in Ford Special Data*
Valve Lifters: Mushroom type Removed from below with camshaft out
Rocker Arm Assembly: *See "Valve System" in Ford Special Data*



FORD 6 CYL. VALVE ASSEMBLY

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated
Intake Valves - Open 17°①BTDC Close 53°②ALDC
Exhaust Valves - Open 61°①BLDC Close 9°② ATDC
① Camlift 016" ②- Camlift 019"
Valve Timing Check - Release No 1 Intake valve adjusting screw push rocker arm to one side install dial indicator in pushrod socket Zero indicator with cam on heel of lobe Install quadrant on crank shaft pulley rotate engine to amount of lobe lift shown in table above then check quadrant and compare reading with degrees shown in table above for that valve

OILING SYSTEM

►*ENGINE OILING SYSTEM See 'Engine Lubrication" under OILING SYSTEM in Ford Special Data*
Crankcase Capacity 4 quarts (refill) 5 quarts (when filter element changed)
Normal Oil Pressure· 45 50 lbs at 2000 RPM
Pressure Regulator Valve - In pump body not adjustable
Oil Pressure Indicator - Indicator light on instrument panel operated by engine unit Ford No B6A 9278 B
Oil Pump Gear type pump located in crankcase
Pump Ov rhaul - *See "Oil Pump" in Ford Special Data*
Oil Filt r· New "Disposable" type Replace at 4000 mile intervals
Disp sabl Filt r R placem nt - Coat gasket face of filter with oil thread filter on insert by hand until gasket contacts adapter surface then tighten filter an additional one-half turn
Crankcase Ventilation: Filter in oil filler cap (inlet), an outlet pipe in rear of crankcase at left side

COOLING

Water Capacity: 15 quarts, add 1 quart for heater.
Pressure Valve: Ford LA-8100-A Radiator filler cap Opens 12-15 lbs *CAUTION* - Use only 12-15 lb cap for replacement
Thermostat: Ford No EAA-8575-A (157-162°F) standard Ford No EAA-8575-B (177-182°F) for use with permanent anti-freeze
Water Pump: Packless sealed ball bearing type *See "Water Pump" in Ford Special Data*
Temperature Gauge: New King Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator Ford No B7A-10804-B
Dash Unit - Ford No B7A-10883-A
Engine Unit - Ford No B7A-10884-A
►*TEMPERATURE UNIT (CYL HEAD) CAUTION:* 1957 Unit Ford No B6A 10884-A will not transmit proper temperature when used with a 1956 Cyl Head No B6A-6049-D Use Unit No B7A-10884-B *See "Temperature Gauges' in Miscellaneous Section*

CLUTCH

Long Model 9½ CF. No. 268594, 11 CF 266978. Semi-Centrifugal type
See 'Long Clutches" in Clutch Section
Clutch Disc - Long No 288824 (9½ CF) 285419 (11CF)
Pedal Adjustment· If total pedal travel is less than 6 3/8" or more than 6 5/8" reposition pedal bumper and bracket until travel is within limits Adjust assist spring link to give assist spring length of 6 5 8" when clutch is fully released
Pedal Free Travel - 1 1 8 1 3 8" Loosen locknut on clutch pedal release rod turn adjusting nut until correct travel is obtained *NOTE* Check free travel by operating engine at 3000 RPM with transmission in neutral position There should be a minimum of ½" free travel under these conditions
Removal: Remove transmission flywheel housing cover release lever retracting spring slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation loosen six cover bolts uniformly to release spring tension remove cover and pressure plate through opening in flywheel housing Remove clutch release lever

SYNCHRO-MESH TRANSMISSION

Own Helical gear constant mesh synchro-mesh (second & high) sliding gear (low & reverse)
See "Ford Synchro mesh" in Transmission Section
►*HARD SHIFTING, PARTIAL DISENGAGEMENT, GEAR BREAKAGE & NOISE CORRECTION See 'Ford Synchro-mesh' Transmission in Transmission Section*
Transmission C ntr l *See "Transmission Controls" in Transmission Section*
R m val· With car raised up disconnect drive shaft at rear universal joint slide drive shaft off transmis-

CONTINUED ON NEXT PAGE

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sion output shaft Remove speedometer cable and gear Disconnect shift rods at transmission Remove rear engine support to extension housing bolts Disconnect parking brake adjusting rod from equalizer bracket Support rear of engine and remove rear engine support, then lower engine for clearance and remove transmission to flywheel housing bolts Use guide pins in two lower bolt holes and slide transmission back until input shaft clears flywheel housing, and lower transmission

OVERDRIVE

Warner R10. Solenoid operated type, with governor control and throttle operated kick-down
See "Warner R10 Overdrive" in Transmission Section

Ov rdrive Control: *See "Overdrive Control" in Transmission Section*

R moval: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring

FORDOMATIC TRANSMISSION

Torque Converter and three speed automatic transmission with hydraulic control
See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

► *TESTING & TROUBLE SHOOTING: See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

Lubrication - Check transmission fluid at 1,000 mile intervals and maintain level at "F" mark on indicator Drain and refill every 25,000 miles **Use only Automatic Transmission Fluid Type "A".**

Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in Neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid level Add Automatic Transmission Fluid Type "A" to bring level to "Full" mark on indicator

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER FORDOMATIC SERVICE DATA. See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

UNIVERSALS

Mechanics. Needle bearing type

► *CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See "1957 Ford & Mercury" in Rear Axle Section*

REAR AXLE

Own New Separate Carrier type semi-floating hypoid with Hotchkiss Drive *NOTE - Same type used on all models*
See "1957 Ford & Mercury" in Rear Axle Section

Axle Ratios

Model	Sta. Wgn.	Others
Conventional	3.89-1①	3.70-1 ②3.89-1)
Overdrive	4.11-1	3.89-1 ②3.70-1)
Fordomatic	3.56-1	3.10-1 ②3.56-1)

①- 4.11-1 Optl ②- Optional

Backlash - .004-.009"

Axle Shaft Removal: Remove wheel take off drum Remove four axle retainer locking type nuts (work through opening in axle shaft flange) Use Puller No. 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing With rear universal joint disconnected axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly

Wheel Bearing Adjustment: None required

SHOCK ABSORBERS

Direct acting non-adjustable Service by replacement

Model	①Front	①Rear
Pass. Cars (Std.)	B7A-18124-A	B7A-18125-A
Pass. Cars (H.D.)	B7A-18124-B	B7A-18125-B
Sta. Wgn. & Sed. Del.		B7A-18125-C
Tudor Sedan (Hard Top) Std.		B7A-18125-D
Tudor Sedan (Hard Top) H.D.		B7A-18125-E

① - Furnished in kits which include shock absorber mounting bushing

► *FRONT SHOCK ABSORBER UPPER BUSHING NOTE:* Install bushing with groove seated in frame hole flange, and do not dislodge when installing shock absorber

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within front coil springs
See "Lincoln, Mercury, Ford (Ball Joint)" in Suspensions & Wheel Alignment Section

Caster - Pos. ½° to Pos. 1½° Maximum variation between wheels ½°

Camber - Pos. ½° to Pos. 1½° ¼° preferred Maximum variation between wheels **½°**

Toe-In - 1/16" to 1/8" *NOTE* - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered

Toe-Out on Turns - With Outer wheel at 20°, inner wheel should be 24¼°

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type
See "Gemmer Worm & Roller" in Steering Section

Power Steering: Ford-Mercury Linkage type Used in conjuction with standard type steering gear
See "Ford & Mercury Bendix Linkage Type" in Steering Section

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wh el & Horn Button Removal· *See "Gemmer Worm & Roller (3-tooth)" in St ering Section*

Steering Gear Removal: *See "G mmer Worm & Roller (3-tooth)" in Steering Section*

BRAKES

Ford-B ndix Hydraulic. Hand lever applies rear wheel service brakes

► *BRAKE DESIGN NOTE:* Front brake anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin)
See "Ford, Lincoln, Mercury B ndix" in Brake S ction

► *BRAKE PULLING CORRECTION:* To correct loosen anchor pin attaching bolt (See Brake Design Note above) and retighten to 80-100 ft. lbs.

Drum Diameter - 11" Front and Rear

Wheel Cylinder Diameter - 1 1/8" (Front-All) 7/8" (Rear-Pass. Cars), 15/16" (Rear - Sta. Wgn.)

Model	Primary (Width & Length)	Secondary
Pass. Car(Front)	2 1/4"x10 62"	2 1/4"x 11 93"
(Rear)	1 3/4"x10 62"	1 3/4"x 11 93"
Sta. Wgn. (Front)	2 1/4"x10 62"	2"x 10 62"
(Rear)	2 1/4"x11 93"	2"x 11 93"

Clearance - Adjusting screw backed off 10-12 notches from point where shoes are tight against drum

Brake Pedal Free Play Adjustment: 5/16" to 7/16" If play not correct after brake adjustment, loosen locknut on the eccentric bolt that attaches brake pedal assembly to master cylinder pushrod, rotate eccentric bolt for desired clearance, tighten locknut

Standard Master Cylinder: Located on engine side of firewall

Checking Fluid - Maintain fluid level to within ½" of top of reservoir

Removal - Disconnect rubber boot from rear end of master cylinder brake line at master cylinder fitting stop light switch from front of cylinder and disconnect wires from switch Push down brake pedal several times to force as much fluid as possible (into clean container), remove bolts that secure master cylinder to dash panel Do not disconnect pushrod from brake pedal unless it is to be serviced

Power Brakes: New "Bellows Type" Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel and attached direct to brake power lever
See "Ford Bellows Type" in Brak S ction

Checking Fluid Level - Maintain fluid to within ½" of top of reservoir

Removal - Remove vacuum hose from top of unit, valve adjusting eccentric with flat washer spring and bushing nylon bushing from power unit valve housing Remove two mounting screws (bracket-to-dash panel) and remove power unit from car

MISC. MECHANICAL

Windshield Wipers: New Cable operated type with tension assemblies
See "Windshield Wipers" in Miscellaneous Section

Power Window Regulators: Reversible motor in each window *See "Electric Window Regulators" in Misc Section*

P w r Top Control· Electric-Hydraulic with reversible pump motor *See "Power Top Controls" in Misc Sect*

Pow r S at Adjusters· "4-way" Electric Screw and Jack type with single electric motor driving a screw jack
See "Power Seat Adjusters" in Miscellaneous S ct

►*SPECIAL 270 HP (DUAL 4-BARREL CARBURETOR) & 300 HP (SUPERCHARGED) HIGH PERFORMANCE ENGINES:* Special 312" Engines. Specifications and service data on the equipment used on these engines are given below.

MODEL IDENTIFICATION

VEHICLE NUMBER: Stamped on patent plate on left front body pillar (Exc. Thunderbird). On dash panel in engine compartment (Thunderbird).

First Number - 100001 and up.

►*VEHICLE NUMBER NOTE:* Vehicle number (Example *C7FV100501*) includes following identification data in sequence:

Eng. Type ①	Year ②	Assy. Plant	Body Style ③	Serial No.
C	7	See below	See below	100501

① Engine Type

B - V8 272 cu. in. Engine (Dual Carb.).
C - V8 292 cu. in. Engine (Dual Carb.).
D - V8 312 cu. in. Engine (4-Barrel Carb.).
E - V8 312 cu. in. Engine (Dual 4-Barrel Carb.).
② - Last digit of model year (1957).

③ Body Styles

C - Conv. (Fairlane 500), **F** - Ranchero.
G - Tudor & Fordor (Custom & Custom 300).
H - Thunderbird, Ranch Wagon (Custom 300).
S - Sedan Delivery (Courier).
T - Tudor & Fordor - Hardtop (Fairlane & 500).
V - Victoria Tudor & Fordor (Fairlane & 500).
W - Retractable Hardtop (Fairlane & 500).
X - Country Sedan. **Y** - Country Squire.

Assembly Plant Designation

A - Atlanta	**F** - Dearborn	**N** - Norfolk
B - Buffalo	**G** - Chicago	**P** - St. Paul
C - Chester	**K** - Kansas City	**R** - San Jose
D - Dallas	**L** - Long Beach	**S** - Somerville
E - Mahwah	**M** - Memphis	**U** - Louisville

TUNE-UP

COMPRESSION PRESSURE: 160-165 lbs. (All Engines except Schgd. 300 HP), 120-130 lbs. (Schgd. 300 HP) at cranking speed.

VACUUM READING: Steady 19-20" idling at 475-500 RPM in Neutral.

VALVE TAPPET CLEARANCE: (All Engines except Schgd. 300 HP with B7A-6250-C Camshaft) - .020" (Intake & Exhaust COLD), .019" (Intake & Exhaust HOT). If tappet clearance set with engine Cold, recheck tappet clearance after engine operated for 30 minutes to normalize temperature and set to HOT figure.

(300 HP Engin with B7A-6250-C Camshaft) - .020" Intake. .025" Exhaust. HOT.

Tappet Adjustment - *See "Valve System" in Ford Special Data.*

►*SELF LOCKING TAPPET ADJUSTING SCREW NOTE:* Self locking adjustment screws used which have interference thread fit at center portion of threads. Replace adjusting screw or adjusting screw and rocker arm assembly when torque less than 3 ft. lbs.

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at idle speed, and is open when operating at high RPM. Spring is installed with ¾ turn wind-up and hooked over stop pin.

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032"-.036".

Spark Plugs - (Early) Champion 870 (272" Eng.), 860 (292" & 312" Engs.). **(Later)** F-14Y (All). *NOTE - Use F-14Y for replacement. 18 mm.*

►*SPARK PLUG NOTE:* No gasket. Torque to 15-20 Ft. Lbs.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.

Resistor - Ford No. B6A-12250-D. 1.3-1.4 Ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

►*312" ENGINE COIL RESISTOR INTERFERENCE CORRECTION:* Resistor may ground on intake manifold. To correct, loosen mounting bracket bolt and rotate resistor assembly 45° counterclockwise. Tighten bolt.

DISTRIBUTOR: New type with separate mechanical and vacuum spark advance systems. Tachometer Drive attachment on Thunderbird. Used as follows:

Engine	Distributor No.
272" & 292"	B7A-12127-A
272" Repl. Distr.	B7AF-12127-A
312" (Std.)	B7A-12127-D
312" (2 Carbs.)	B7A-12127-E
312" (Supercharged)	B7A-12127-G
Thunderbird (292" & 312" Std.)	B7S-12127-A
Thunderbird (312" 2-Carb.)	B7S-12127-B
Thunderbird (312" Schgd.)	B7S-12127-C

See "Ford, Lincoln, Mercury Distributors" in Electrical Section.

►*SCHGD. 300 HP ENGINE DISTRIBUTOR NOTE:* This distributor is "Double Breaker" type. Set both sets of points to the same gap.

Condenser - Ford B7A-12300-B (B7A-12127-G & B7S-12127-C Distr.), B7A-12300-A (Others). **Capacity** - .21-.25 mfd.

Contact Point Set - Ford B7A-12171-B (B7A-12127-G & B7S-12127-C Distr.), B7A-12171-A (Others).

Breaker Gap - .014-.016" (All Models). On double breaker distributor, set both sets of points alike.

Cam Angle - 26-28½° (Single Breaker Distr.), 33-36° (Double Breaker Distr.).

Breaker Arm Spring Tension - 17-20 ozs. (All Models).

Rotation - Counterclockwise viewed from above.

Automatic Advance - B7A-12127-A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	375	0	750
¾-1¾	425	1½-3½	850
6-7	600	12-14	1200
11½-12½	1300	23-25	2600
17-18	2000	34-36	4000

Automatic Advance - B7A-12127-D & B7S-12127-A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
½-1½	450	1-3	900
3¼-4¼	550	6½-8½	1100
8-9	1325	16-18	2650
12¼-13¼	2000	24½-26½	4000

Automatic Advanc - B7AF-12127-A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250	0	500
½-1½	350	0-1	700
3¼-4½	500	6½-9	1000
7-8¼	750	14-16½	1500
16½-18	1550	33-36	3100

Automatic Advance - B7S-12127-B

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250	0-½	500
2¾-3¾	400	5½-7½	800
7-8	550	14-16	1100
9½-10½	725	19-21	1450
13½-15	2000	27-30	4000

Automatic Advance - B7S-12127-C

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	300	0-½	600
2-3	400	4-6	800
8-9	600	16-18	1200
9¾-11	1500	19½-22	3000
10¾-12	2000	21½-24	4000

Vacuum Spark Control: Diaphragm type. Mounted on distributor and linked directly to breaker plate.

Vacuum Advance - B7A-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0-2	5
5-7	10-14	10
10-12	20-24	14-20

Vacuum Advance - B7A-12127-D & B7S-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0-2	5
5-7	10-14	10
11-13	22-26	15-20

Vacuum Advance - B7AF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
0-3	0-6	10
6-9	12-18	15
9¼-12¼	18¼-24½	19

Vacuum Advance - B7S-12127-B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0-2	5"
5¼-7¼	10½-14½	10"
7-9	14-18	15-20"

Vacuum Advance - B7S-12127-C

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	1"
0-1	0-2	5"
1-3	2-6	7"
9-11	18-22	14-20"

IGNITION TIMING

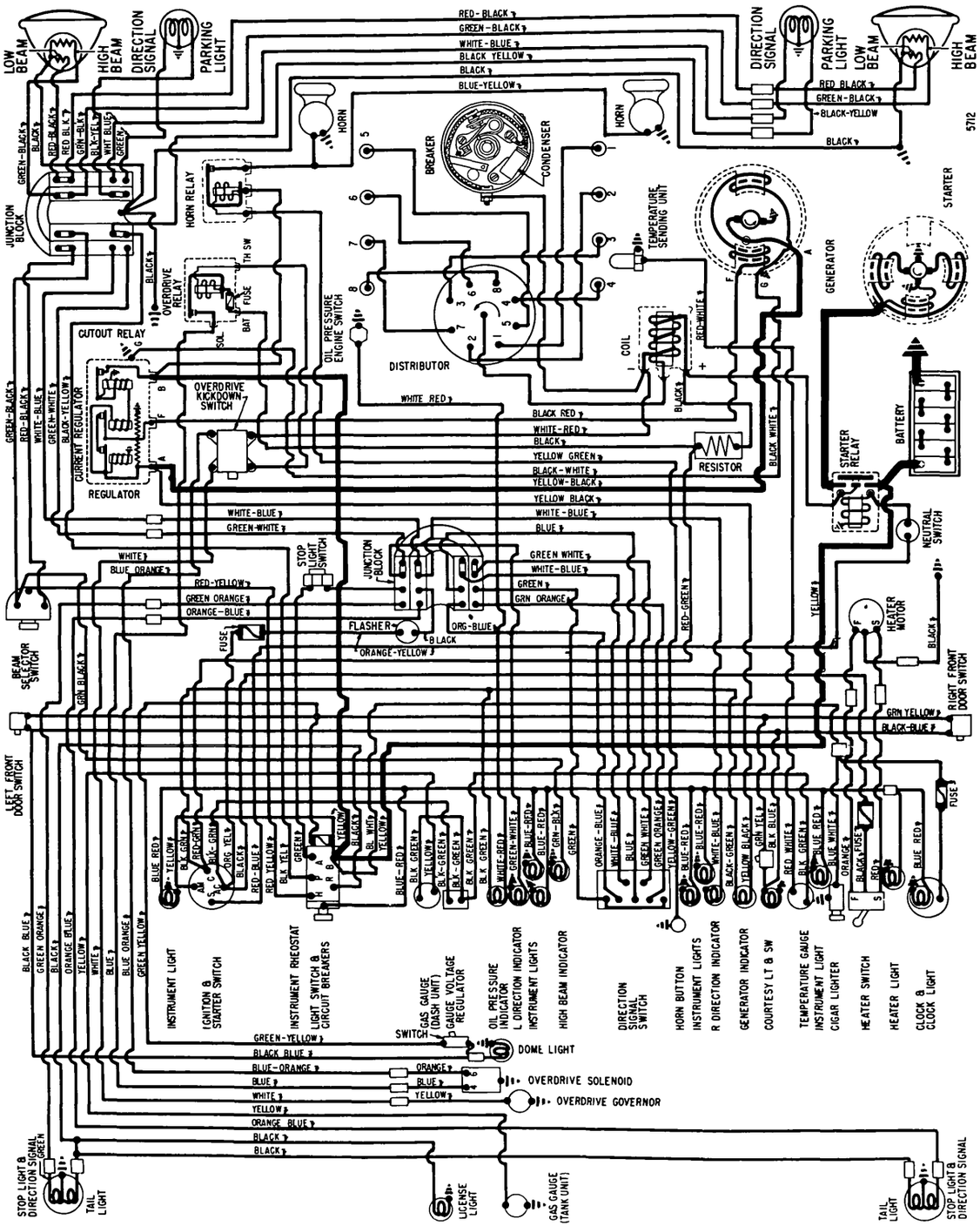
Engine	Std. Ign. Setting
All exc. 300HP (Std. & OD)	3° BTDC (Max. 6° BTDC)
All exc. 300 HP (Fordomatic)	6° BTDC (Max. 8° BTDC)
300 HP Schgd. (All Trans.)	6° BTDC (Max. 10° BTDC)

Timing Mark - Vibration damper marked "TDC" and "2", "4", "6", "8", "10" degrees BTDC. Align correct mark with pointer (bolted to water pump).

CARBURETOR

►*CARBURETOR APPLICATION: Two-barrel carburetors used on 272 & 292 cu. in. engines, 4-barrel carburetors used on 312 cu. in. engine. All new types.*

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Throttle Linkage Adjustment (Fordomatic Cars): With engine at normal operating temperature and idle speed correctly set at 425-450 RPM with selector lever in "Dr" range, disconnect throttle control rod, lock accelerator shaft assembly by inserting pin (¼" drill rod) in lever and bracket, adjust carburetor connecting link so that throttle valves closed. *NOTE* - Holes should remain aligned with pin removed. Adjust clevis on throttle rod while holding throttle control upward against transmission inner stop so pin will enter freely, then turn clevis counter-clockwise 3 turns. Connect assembly. Adjust pedal height to 3.10" (Thunderbird 4.88") by changing length of accelerator assembly connecting link. Road test car. If band or clutch slippage is evident, increase rod length to 3½ turns, but do not exceed 4 turns of clevis.

Dashpot Adjustment (Holley & Ford Carburetors): With engine idle speed set to specifications and throttle closed, there should be .045-.064" clearance between end of dashpot plunger and throttle lever with dashpot plunger fully depressed. To adjust, loosen dashpot locknut, turn adjustment nut to increase or decrease clearance. Tighten locknut.

Dashpot Adjustment (Carter Carburetors) : Hold throttle valves wide open. Distance between top surface of bowl cover and bottom of lever should be 7/16". To adjust, bend dashpot inner arm tang (Tool T109-22).

FORD 2 & 4-BARREL

Ford 2 & 4-barrel carburetors used as follows:

Model	2-BARREL CARBURETORS	Carbur tor No.
Pass. Cars 272" Eng. ① ②	(Early)	B7A-9510-A
Pass. Cars 272" Eng. ① ②	(Later)	B7A-9510-Q
Pass. Cars 272" Eng. ① ②	(Later)	B7A-9510-Z
Pass. Cars 292" Eng. ①		B7A-9510-E
Pass. Cars 292" Eng. ③	(Early)	B7A-9510-L
Pass. Cars 292" Eng. ③	(Later)	B7A-9510-W
Model	**4-BARREL CARBURETORS**	**Carbur tor No.**
Pass. Cars 312" Eng. ③	(Early)	B7A-9510-B
Pass. Cars 312" Eng. ③	(Later)	B7A-9510-X

① - Synchro-mesh transmission.
② - When used with Fordomatic, dashpot and attaching parts must also be used.
③ - Fordomatic transmission.

► *CARBURETOR IDENTIFICATION NOTE: To identify carburetors see "Ford 2 & 4-Barrel Carburetors" in Carburetion Section*

► *DISTRIBUTOR VACUUM LINE INTERFERENCE CORRECTION:* Distributor vacuum line may interfere with fast idle adjusting screw at ¾-open throttle. To correct, reposition vacuum line to give proper clearance.

► *CARBURETOR-TO-INTAKE MANIFOLD GASKET INSTALLATION NOTE:* Two gaskets Part No. B7A-9447-A and 1 spacer, Part No. B7A-9603-C, are required

► *PRODUCTION CHANGES AND RECOMMENDED PARTS AND SETTING CHANGES FOR IMPROVED PERFOR-*

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MANCE: S "Ford 2 & 4-Barrel Carburetors" in Carbur tion S ction.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7*

Idl Setting - Initial setting 1 turn open. Set both screws alike. Turn adjusting screws in until engine begins to run rough from the lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly rich mixture. Turn screws out for richer mixture.

Idl Sp d - 475-500 RPM (Std. & O.D.), 475-500 RPM (Fordomatic) with selector lever in Neutral and check for 425-450 RPM in "DR" (Drive) range. Adjust as necessary to get drive range RPM.

Thr ttl Linkag Adjustm nt (Fordomatic Cars): *See CARBURETOR abov .*

►*OTHER DATA: See "Ford 2 & 4-Barrel Carburetors" in Carburetion S ction.*

HOLLEY 2 & 4-BARREL

Holley 2 & 4-barrel carburetors used as follows:

Mdl 2-BARREL CARBURETORS	Carburetor No.
Pass. Cars 272" Eng. Ⓒ (Early)	B7A-9510-F
Pass. Cars 272" Eng. Ⓒ (Later)	B7A-9510-R
Pass. Cars 272" Eng. Ⓒ ② (Later)	B7A-9510-AA
Pass. Cars 292" Eng. Ⓒ (Early)	B7A-9510-G
Pass. Cars 292" Eng. Ⓒ (Later)	B7A-9510-S
Pass. Cars 292" Eng. Ⓒ (Later)	B7A-9510-AB
Pass. Cars 292" Eng. ③ (Early)	B7A-9510-K
Pass. Cars 292" Eng. ③ ② (Later)	B7A-9510-T
Thunderbird 292" Eng. Ⓒ (Early)	B7A-9510-G
Thunderbird 292" Eng. Ⓒ (Later)	B7A-9510-T

Mod l 4-BARREL CARBURETORS	Carburetor No.
Pass. Cars 312" Eng. ③ ④ (Early)	B7A-9510-H
Pass. Cars 312" Eng. ③ ④ (Later)	B7A-9510-U
Thunderbird 312" Eng. ③ ④ (Early)	B7A-9510-H
Thunderbird 312" Eng. ③ ④ (Later)	B7A-9510-U

Ⓒ - Synchro-mesh transmission.

② - When used with Fordomatic, dashpot and attaching parts must also be used.

③ - Fordomatic transmission.

④ - When used with synchro-mesh transmission, remove dashpot and attaching parts.

►*CARBURETOR IDENTIFICATION NOTE: To identify carbur tors see "Holley 2 & 4-Barrel Carburetors" in Carbur tion Section.*

►*CARBURETOR-TO-INTAKE MANIFOLD GASKET INSTALLATION NOTE:* Two gaskets, Part No. B7A-9447-B (Neoprene or Asbestos), and 1 spacer, Part No. B7A-9603-D ("Resinoid"), are required. *NOTE* - The "Resinoid" spacer should be used to correct a hard hot starting condition where the aluminum spacer (B7A-9603-B) is found

►*PRODUCTION CHANGES AND RECOMMENDED PARTS AND SETTING CHANGES FOR IMPROVED PERFORMANCE: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barr ls 1-4-6-7.*

Idl Setting - Initial setting 1 turn open. Set both screws alike. Turn adjusting screws in until engine begins to run rough from the lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly rich mixture. Turn screws out for richer mixture.

Idle Speed - 475-500 RPM with selector lever in Neutral and check for 425-450 RPM in "DR" (Drive) range. Adjust as necessary to get drive range RPM.

Throttle Linkage Adjustment (Fordomatic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB No. 2441S, SA.

►*SURGE CORRECTION DUE TO LEANNESS:* Install new venturi assemblies, metering rods, and vacuum piston spring. *See "Carter AFB Carburetors" in Carburetion Section.*

►*CHOKE SETTING CHANGE:* Changed from 2 notches rich to 1 notch rich. *See "Carter AFB Carburetors" in Carburetion Section.*

►*HARD HOT STARTING CORRECTION:* Install carburetor-to-intake manifold "Resinoid" spacer, Part No. B7A-9603-D, in place of aluminum spacer B7A-9603-B

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - Initial setting 1 turn open. Set both screws alike. Turn adjusting screws in until engine beginsto run rough from the lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly rich mixture. Turn screws out for richer mixture.

Idle Speed - 475-500 RPM with selector lever in Neutral and check for 425-450 RPM in "DR" (Drive) range. Adjust as necessary to get drive range RPM.

Throttle Linkage Adjustment (Fordomatic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB Carburetors" in Carburetion Section.*

270 HP ENGINE CARBURETORS
(Dual 4-Barrel)

Two Holley 4-barrel carburetors, **Part No. B7A-9510-P,** used. Similar in design to previous models.

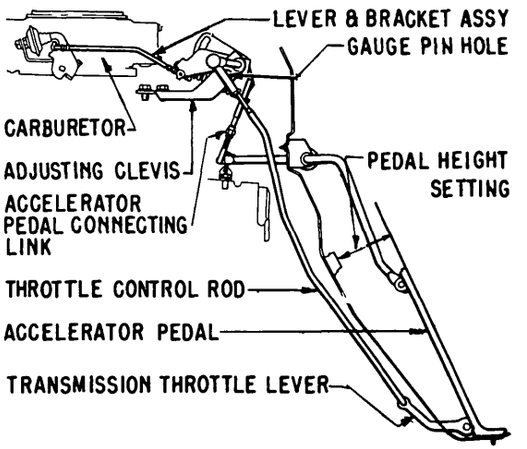
►*CARBURETOR IDENTIFICATION NOTE:* Carburetors stamped ECJ-9510-AA or ECJ-9510-AB on mounting flange.

►*ADJUSTMENT NOTE:* Front and rear carburetors linked together by synchronizer rod which must be adjusted for correct synchronized operation of the carburetors (make this adjustment first).

Throttle Linkage Adjustment - 1) Disconnect rear end of throttle synchronizer rod from rear carburetor. 2) Back off throttle stopscrews so that throttle valves of both front and rear carburetors completely closed. 3) Adjust throttle synchronizer rod length so that rod end enters rear carburetor throttle lever freely, connect rod. 4) Set idle speed by adjusting throttle stopscrews. 5) Adjust idle mixture by adjusting both screws on rear carburetor first, and screws on front carburetor last.

Idle Sp d Setting - 500-600 RPM (All Transmissions) with selector lever in Neutral on Fordomatic Cars.

Idl Mixtur S tting - Both screws (primary side only) 5/8 turn open. Adjust both screws alike. Turn screws out for richer mixture.



FORDOMATIC TRANSMISSION THROTTLE LINKAGE

►*OTHER DATA: See "Holley (Ford, Lincoln, Mercury) 4-Barrel Carburetors" in Carburetion Section.*

300 HP SCHGD. ENGINE
(Supercharger & Carburetor)

Holley 4-barrel carburetor used as follows:

Model	Carburetor N .
Pass. Car	B7A-9510-AC
Thunderbird (Early)	B7A-9510-V
Thunderbird (Later)	B7A-9510-AC

►*CARBURETOR IDENTIFICATION NOTE:* Model B7A-9510-V stamped EDB-9510-AA on edge of carburetor mounting flange.

SUPERCHARGER

►*SUPERCHARGER CAUTION: Two different McCulloch Superchargers may be found on these engines:*

1) Conventional Type - This supercharger has variable speed pulley (High & Low Blower) operated by manifold vacuum.

2) Special Type - This supercharger does not have variable speed pulley and is controlled by carburetor linkage and engine oil pressure (special connection to engine oil pressure system). The following operating precautions must be observed with this type supercharger:

►*OPERATING CAUTION (SPECIAL TYPE SUPERCHARGER):* The engine MUST NOT BE OPERATED with the flexible air hose (between supercharger and carburetor) disconnected, or with Flapper Valve in carburetor elbow not properly seated, or with any restriction in air intake (would result in internal oil leak which would drain engine oil system and damage supercharger). If necessary to operate engine under above conditions, remove drive belts, disconnect supercharger oil line at cylinder block, and plug this fitting in block.

Sup rcharg rC ntr l Linkag (Sp cial Typ Sup rcharg r): 1) Loosen setscrew in swivel clamp on control arm.

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2) Open carburetor throttle valves to approximately 1/8 open position so that 1/8" drill rod can be inserted between throttle stop pin and throttle lever.
3) Place supercharger control lever in full "on" position (control lever foot should be against housing
4) With throttle lever and supercharger control lever positioned as above, and control wire ball end against throttle lever swivel, tighten setscrew in control arm swivel securely against control wire cable.
5) Check adjustment to make certain that carburetor throttle valves move from full-closed to full-open positions and that supercharger control lever moves through full arc of travel when carburetor throttle lever moved from half-open to 7/8 open position.

Supercharger Output Check (Special Type Supercharger): Remove 1 8" pipe plug in side of carburetor elbow and connect gauge at this point Supercharger pressure should be 2 4-2 7 P S I (Std Trans) 3 4-3 7 P S I (Fordomatic) at 2500 RPM

Engine Idle Speed: 500-525 RPM (all transmissions) with selector lever in Neutral on Fordomatic Cars

►*OTHER DATA See "McCulloch Supercharger" and "Holley (Ford, Lincoln, Mercury) 4-Barrel Carburetors" in Carburetion Section*

AIR CLEANER: DRY FILTER ELEMENT type. Clean every 5,000 miles, replace element every 20,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

FUEL PUMP PRESSURE: 3.5-5.5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: AC Fuel only or Fuel & Vacuum

Model	Ford Pump No.
V8 exc Thunderbird (Std)	B5A 9350-C
Overdrive & Fordomatic	B5A-9350-D
Thunderbird (Std)	B5S 9350-A
Overdrive & Fordomatic	B5S-9350-B

Pressure - 3 5-5 5 lbs at 500 RPM
See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: New King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator Ford B7S-10804-A Thunderbird B7A 10804 B Others
Dash Unit-Ford No B7S-9280 A (Thbrd) B7A-9280-A (Others)
Tank Unit - Ford No B7A-9276-A (All)
See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY FILTER ELEMENT type Clean every 5000 miles replace element every 20 000 miles

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Ford B6A-10655-C (All) 12 volt 11 plate 55 ampere hour capacity **Ford B7A-10655-A (Exc. Thbrd).** 12 volt 11 plate, 70 ampere hour capacity (20 hr rate)
Battery Ground - Negative to engine block
Engine Ground - Cylinder head to dash

STARTER

Ford B6A-11002-A. Armature - B6A-11005-B.
Drive - Ford ICM-11350-C Bendix "Folo-Thru"
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 48-56 ozs
Cranking Speed - 150-180 RPM, 190 amperes max

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	120
15 5 ft lbs		5 0	550

①- With starter on engine and engine idling

Starting Switch: Magnetic type Ford No B6A-11450-A Starter Switch is controlled by ignition switch
Fordomatic Neutral Safety Switch: Ford B6S-15812-A (Thbrd) B7A-15812-A (Others)
Adjustment - *See "Fordomatic & Mercomatic" in Transmission Section*

GENERATOR

Ford. Used as follows

Generator	Armature	Application
B6A-10002-C	B6C-10005-B	①Std
B6A-10002-H	B6A-10005-B	②Std
B6A-10002-E	B6C-10005-C	Special

①- Use with B6C-10505-B Regulator
②- Use with B6A-10505-A Regulator

►*40 AMPERE GENERATOR INSTALLATION CAUTION.* Install 2 Spacers Ford No 10148, to secure proper alignment of generator-to-water pump and fan pulleys

Performance Data

Generator	Amperes	Eng RPM
B6A-10002-C H	30	1500
B6A-10002-E	40	1500

Brush Spring Tension - 26-34 ozs
Field Current - 1 5-1 6 amperes at 12 0 volts
Rotation - Counterclockwise at commutator end
Belt Adjustment· Approximately ½" deflection on belts midway between generator and pump pulleys with normal thumb pressure

REGULATOR

Ford No. B6A-10505-A (B6A-10002-H Gen.), B6C-10505-B (B6A-10002-C Gen.), B6A-10505-B (B6A-10002-E Gen.).

►*SETTING CAUTION. "Temperature Compensated" type Set to following specifications at 75°F ambient (engine compartment) temperature*

Cutout Relay
Cuts In - 12 0-12 8 volts

Voltage Regulator
Setting - 14 6-15 4 volts at 75°F (ambient)
Checking & Adjusting - *See Electrical Section*

Current Regulator
Setting - 28 32 amperes (B6A-10505-A & B6C-10505-B), 38-42 amperes (B6A-10505-B)
Checking & Adjusting - *See Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*
Directional Signals: *See Electrical Section*
Lighting Switch Removal: With control knob in the "OFF" position press spring release button on switch housing, turn shaft slightly and pull it out of switch Unscrew mounting nut with Tool 17470-N
Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of brake booster assembly (Power Brakes) Master cylinder located on firewall in engine compartment
CIRCUIT BREAKERS: On headlight switch Combination headlight switch circuit breaker and fuse assembly used One circuit breaker protects headlight circuit and second circuit breaker protects instrument parking, stop and tail light circuits
FUSES: Size and location as follows.
Back Up Light - SFE 7 5 ampere in feed wire
Cigar Lighter - Sulphur disc in base or reset circuit breaker, at back of assembly
Clock - 1 AG, in feed wire
Heaters - SFE 14 ampere in feed wire
Interior Lamps - SFE 7 5 ampere, on lighting switch
Overdrive - 15 AGC on overdrive relay
Turn Signal - SFE 7 5 ampere in feed wire
Horn Relay: Ford No B7A-13853-H

►*HORN RELAY REPLACEMENT NOTE* When replacing a horn relay that has been shorted by water be sure to spray new relay with a plastic ignition spray (around crimped areas in particular but not on terminals) and install three ¼" flat washers between mounting bracket and fender apron

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Misc Sect*

ENGINE SPECIFICATIONS: 90° V8

Engine	Bore	Stroke	Displacement
272	3 62"	3 30"	272 cu ins
292	3 75"	3 30"	292 cu ins
312	3 80"	3 44"	312 cu ins

Engine	Rated HP	Compr. Ratio	Developed HP
272	42 05	8 6-1	190 at 4500 RPM
292	45 0	9 1-1	①206 at 4500 RPM
312	46 21	9 7-1	245 at 4500 RPM
312" 270 HP②		9 7-1	270 at 4800 RPM
312" 300 HP③		8 3-1	. 300

①- 212 HP at 4500 RPM with Fordomatic
②- High Performance Engine (Two 4-Barrel Carbs)
③- High Performance Engine with Supercharger
Compression & Vacuum Reading - *See TUNE-UP*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data*

►*ENGINE OIL LEAK CORRECTION:* Engine oil leakage may occur at point where crankcase vent tube is brazed to adapter

►***1957 FORD THUNDERBIRD & HIGH PERFORMANCE CARS (WITH TWO 4-BARREL CARBS. OR SUPERCHARGER) ENGINE FAILURE CORRECTION:*** Engine failure on these models may be due to a valve stem breaking and allowing valve to drop into the cylinder. To correct, install Spring & Dampener Assembly (Part No. B6A-6513-D; Push Rod, (Part No. B7A-6565-A); Retainer, (Part No. B6A-6514-A). *CAUTION - High performanc ngines must not b operat d in xc ss of 5500 RPM.*

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►*EXHAUST MANIFOLD BREAKAGE CORRECTION:* Breakage at manifold flange caused by exhaust crossover pipe contacting uneven road surface Fabricate and install a guard (1½" diameter pipe flattened at each end to contact frame) and weld to two 2" strap irons bolted (one bolt each) to frame side rail at existing frame holes Brackets will be back against #1 body bolt outrigger

TIGHTENING TORQUES: *S e "Tightening Specifications" in Ford Special Data*

ENGINE REMOVAL: *S e "Engine" in Ford Special Data*

OIL PAN REMOVAL: On conventional car remove stabilizer bar, disconnect oil pump inlet tube at oil pump and remove "O" ring seal retainer screws and oil pan

PISTONS

Autothermic type Solid skirt with three rings.

R m val - Pistons and rods removed from above

Fitting N w Pist ns: Use ½" wide feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side Pull should be 5-10 lbs when using feeler gauge thicknesses as follows New piston in new bore 0015", New piston in used bore 002", Used piston in used bore 0025"

R plac ment Pist ns: Standard, 020", 030", 040" (312 Eng), plus 060" (272 & 292 Eng) Oversize

Installing Pist ns: Install with small indentation in head of piston toward front of engine *See Rod Installation*

PISTON RINGS

Two compression one oil ring per piston Oil ring is "Side Sealing" type (two steel rails with spring spacer between them)

272 & 292 Engines

Ring	Width	End Gap	Side Clearance
Compr #1 2	①	010- 027"	② 002- 0035"
Oil #3		015- 062"	③

312 Engine

Ring	Width	End Gap	Side Clearance
Compr #1	0775- 0780"	012- 029"	② 002- 0035"
Compr #2	0930- 0940"	012- 029"	② 001- 003"
Oil #3		015- 062"	③

①- (272 Eng) 0930- 0935", (292) 0775- 0780"
②- Wear Limit 006" ③- Side sealing type rings

R plac m nt Rings: Furnished in Expander and Steel Section Types in Std 020" 030", 040" (312 Eng), plus 060" (272 & 292 Eng)

PISTON PINS

Floating type with lock ring at each end

Diam ter - 9120- 9123" **L ngth** - 3 016-3 030"

Pin Fit in Pist n - 0001- 0003" Wear limit 0008"

Pin Fit in R d Bushing - 0001- 0003" Wear limit 0008"

Replac m nt Pins: Color marked for identification and furnished in following sizes Standard (Green), 001" (Blue), 002" (Yellow) Oversize Fitted pins furnished with new pistons

CONNECTING RODS

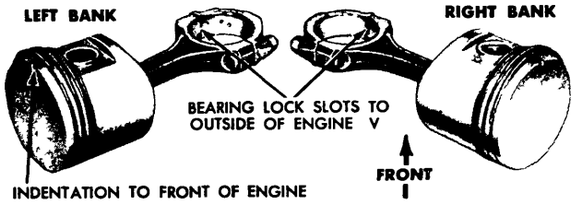
Crankpin J urnal Diam ter - 2 1880-2 1888"

L w r B aring - Steel backed, copper lead alloy lined type Upper and lower halves interchangeable

Clearance - 0008- 0027" Wear limit 0037 (272 & 292 Eng), 0007- 0026" Wear limit 0036 (312 Eng)

Side Clearance - 006- 016" Wear limit 019" (2 rods)

Replacement Bearings· Standard (2 sizes marked **Red** and **Blue** for selective fitting) and 010", 020", 030" undersize



FORD V8 PISTON & ROD ASSY.

Installing Rods: Install rod in piston so that rod bearing lock slots in connecting rod are toward outside of engine when indentation on head of piston is toward front of engine Cylinder numbers on bearing caps and rods must be on same side and installed in same numbered cylinder

CRANKSHAFT

Journal Diameter - 2 4980-2 4988" (272, 292 Eng) 2 6235-2 6243" (312 Eng)

Bearings - Copper lead (All Eng), or Lead babbitt (272 Eng) Steel backed

Clearance	Copper Lead	Lead Babbitt
272	① 0006- 0032"	② 0005- 0021"
292	① 0006- 0032"	
312	③ 0008- 0026"	

①- 0042" wear limit ②- 0031" wear limit
③- 0036" wear limit

Replacement Bearings: Standard (2 sizes marked **Red** and **Blue** for selective fitting) and 010", 020", 030" (272 & 292 Eng) plus 040" (312 Eng) Undersize

End Thrust: Taken by No 3 main bearing Replace bearing if endplay excessive

Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data*

End Play - 002- 006", wear limit 010"

Crankshaft Rear Oil Seal Installation: *See "Crankshaft and Main Bearings" in Ford Special Data*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data*

CAMSHAFT

Journal Diameters - 1 9255-1 9265"

Clearance - 001- 003", wear limit 006"

End Thrust: Taken by thrust plate and spacer located between camshaft sprocket and shoulder on camshaft

►*CAMSHAFT THRUST SPACER NOTE* Chamfer on the inside of spacer must be to the rear or face camshaft journal

End Play - 006" max

R plac m nt Camshaft B arings· Finished bearings furnished Standard and 015" undersize

Camshaft R m val & Installati n· *See "Camshaft & Bearings" in Ford Special Data*

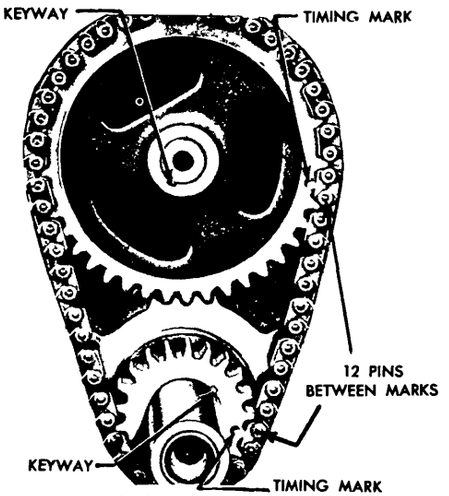
Timing Chain: Side guide type 56 links

►*TIMING CHAIN REPLACEMENT NOTE*· Replace chain and sprockets when deflection on slack side exceeds ½" (take up all slack on driving side, measure slack on opposite side) Remove and install chain "endless" as a unit with both sprockets

Camshaft Setting: Sprockets marked by round depression at one tooth Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are both on drive side of chain

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Ford Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data*



FORD V8 VALVE TIMING MARKS

VALVES

Tappet Clearance: 020" (Intake & Exhaust) Cold 019" (Intake & Exhaust) Hot *NOTE* - Valve tappet clearance on truck engines different

Tappet Adjustment - *See "Valve System" in Ford Special Data*

Valve	Head Diam.	Stem Diam.①	Length
Intake	1 920-1 930"	3416- 3423"	5 02"
Exhaust	1 505-1 515"	3400- 3410"	5 02"

Valve	Seat Angle	②Lift	Stem Clearanc
Intake	45°	272"	0045" wear limit
Exhaust	45°	285"	0065" wear limit

①- Furnished with 003", 015", 030" oversize stems
②- Cam lobe lift 005" wear limit

Valve Seat Width - 060- 080" (Intake), 070- 090" (Exhaust)

►*ROTATABLE VALVE NOTE*· All valves are rotatable type *See "Valve System" in Ford Special Data*

Valve Stem Oil Seals· "Umbrella" type seals on intake and exhaust valve stems Install seals with cupped side down to cover guide boss on head Install new seals whenever valves removed or when seals become loose on valve stems

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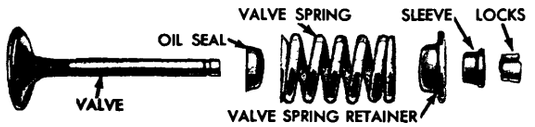
Valv Springs: Install with closed end of coil toward cylinder head

Spring Specifications

	Spring Pressure	Length
Valve Closed	71-79 lbs ①	1 780"
Valve Open	161-177 lbs ②	1 390"

①- 64 lbs wear limit at 1 780"
②- 145 lbs wear limit at 1 390"
Free Length - 2 09"

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to under side of spring retainer If assembled height is 1 13/16" or greater install necessary 030" spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended 1 25/32-1 13/16" *CAUTION* - Do not install spacers unless necessary



FORD V8 VALVE ASSEMBLY

Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (See table above), ream guides and install oversize valves *See "Valve System" in Ford Special Data*

Valve Lifters: Mushroom type Remove from below after camshaft removed from engine
Clearance - 0026"

R cker Arm Assembly: *See "Valve System" in Ford Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated

Valve Timing
(All Engines with B7A-6250-B Camshaft)

Intake Valves - Open 18° ① BTDC Close 58° ① ALDC
Exhaust Valves - Open 66° ② BLDC Close 10° ③ ATDC
①- Camlift 015" ②- Camlift 013" ③ Camlift 016"

Valve Timing
(312" Eng. Schgd. with B7A-6250-C Camshaft)

Intake Valves - Open 32° ℂ BTDC Close 78° ℂ ALDC
Exhaust Valves - Open 72° ℂ BTDC Close 38° ℂ ALDC
ℂ - Camlift 016" ℂ - Camlift 019"

Valve Timing Check: Release No 1 Intake Valve adjusting screw, push rocker arm to one side install dial indicator in pushrod socket Zero indicator with cam on heel of lobe Install quadrant on crankshaft pulley rotate engine to amount of lobe lift shown in table above, then check quadrant and compare reading with degrees shown in table above for that valve If reading not correct check for bent pointer worn timing chain or sprocket before replacing camshaft

OILING SYSTEM

►*ENGINE OILING SYSTEM S e "Engine Lubrication" und r OILING SYSTEM in Ford Special Data*

Crankcas Capacity - 5 qts (refill) 6 qts when filter changed

N rmal Oil Pr ssur : 45-50 lbs at 2000 RPM
Pr ssur R gulat r Valv - In oil pump body, not adjustable
Oil Pressure Indicator - Indicator light on instrument panel operated by Engine Unit Ford No B6A-9278-B (stamped No 7 on Hex) Lights when ignition switch turned on, goes out when engine starts and pump pressure reaches (7 lbs)

Oil Pump: Rotor type located on left side of engine crankcase driven by distributor shaft
Pump Overhaul - *See "Oiling System" in Ford Special Data*

Oil Filter: New "Disposable" type
Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn *CAUTION* - Do not overtighten Run engine and check for leaks

Crankcase Ventilation: Filter in oil filler cap (inlet) all models Road draft outlet pipe for crankcase ventilation all models *NOTE* - 272 and 292 Engines have filter screen in road draft outlet pipe Service filler cap by cleaning with solvent and resaturating with engine oil at 4000 mile intervals.

COOLING

Water Capacity: 19 qts (Pass Cars & Station Wagons), 20 qts (Thunderbird) Add 1 qt for heater

Pressure Valve: Radiator filler cap Ford No LA-8100-A 12-15 lbs (marked "13" or "14") *CAUTION* If replacement required use 12-15 lb type

Thermostat: 157-162°F (Std), 177-182°F (High Temp) for use with permanent type anti-freeze

Water Pump: Packless sealed ball bearing type
See "Water Pump" in Ford Special Data
Pump Removal - (On Thunderbird remove engine left hand splash shield) Drain cooling system disconnect lower radiator hose and heater hose Remove fan belt fan fan spacer and pulley (On Thunderbird remove generator support bracket bolt at the water pump housing and bolt at generator then move bracket out of way remove remaining bolts, retaining water pump assembly and timing pointer) On other cars remove four bolts retaining water pump to cover Remove pump and timing pointer

Temperature Gauge: New King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator Ford B7S-10804 A (Thunderbird), B7A-10804-B (Others)
Dash Unit - Ford B7S-10883-A (Thunderbird), B6A-10883-A (Others)
Engine Unit - Ford No B7A-10884-A
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Long Model 10CF. Std (272 292 Eng) **11CF** Std (Thbrd & 312 Eng) **11CF** Heavy Duty (272, 292 Eng) Single plate semi centrifugal type

Cover Assembly	Long No.	Ford No.
10CF	267346	B7A-7563 A
11CF①	266978	B6A-7563 A
11CF②	267350	B7A-7563 B

①- Black & Yellow paint on cover
②- Green & Lt Blue paint on cover

Clutch Disc	L ng N .	F rd N .
272,292 Std, & O D	236116 or 287222	B7A-7550-A
272,292 H D, 312	287226	B7A-7550-B
Thbrd (292)	281982	B5S-7550-A
272 H D	284961	B6A-7550-B

See "Long Clutches" in Clutch S ction

►*THUNDERBIRD DRIVE LINE VIBRATION OR TRANSMISSION GEAR RATLLE CORRECTION.* When above condition exists on conventional or overdrive cars, install Heavy Duty Dlutch Disc Assembly Ford No B7A-7550-B

Pedal Adjustment: If total pedal travel is less than 6 3/8" or more than 6 5/8", reposition pedal bumper and bracket until travel is within limits Adjust assist spring link to give assist spring length of 9 7 8" (eye centers) with clutch fully released
Pedal Free Travel - 1 1 8-1 3 8" Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is reached *NOTE* - Check free travel by operating engine at 3000 RPM with transmission in Neutral position There should be a minimum of ½" free travel under these conditions

Removal: Remove transmission flywheel housing cover, release lever retracting spring slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation, loosen six cover bolts uniformly to release spring tension remove cover and pressure plate through opening in flywheel housing Remove clutch release lever

SYNCHRO-MESH TRANSMISSION

Own. Helical gear constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse)
See "Ford Synchro-mesh" in Transmission S cti n

►*HARD SHIFTING, PARTIAL DISENGAGEMENT, GEAR BREAKAGE & NOISE CORRECTION See 'Ford Synchro-mesh' Transmission in Transmission Section*

Transmission Controls: *Se "Transmission Controls" in Transmission Section*

Removal (Exc. Thunderbird): With car raised up, disconnect drive shaft at rear universal joint, slide drive shaft off transmission output shaft Remove speedometer cable and gear Disconnect shift rods at transmission Remove rear engine support to extension housing bolts Disconnect parking brake adjusting rod from equalizer bracket Support rear of engine and remove rear engine support then lower engine for clearance and remove transmission to flywheel housing bolts Use guide pins in two lower bolt holes and slide transmission back until input shaft clears flywheel housing and lower transmission

Thunderbird - With car raised up disconnect drive shaft at rear universal joint slide drive shaft off transmission output shaft Remove speedometer cable and gear Disconnect shift rods at transmission Remove rear engine support to extension housing bolts Raise engine and remove engine rear support Lower engine remove transmission to flywheel housing bolts move transmission back for clearance Remove flywheel housing bottom cover and remove starter Disconnect clutch linkage at release lever remove release bearing and hub clutch assembly and

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disc Remove flywheel housing to engine bolts Turn housing upside down and remove from car Then remove transmission

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown

See "Warner R10 Overdrive" in Transmission Section

R m val: Same as for synchro-mesh transmission (above) after disconnecting control cable and wiring

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock

See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission S ction*

► *TESTING & TROUBLE SHOOTING See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

Lubrication - Check transmission fluid at 1,000 mile intervals and maintain level at "F" mark on indicator Drain and refill every 25,000 miles **Use only Automatic Transmission Fluid Type "A".**

Ch cking Fluid L v l - Bring transmission to operating temperature by running engine with selector lever in Neutral position Move selector lever through all ranges to assure fluid distribution then place lever in "P" (Park) position for checking fluid level Add Automatic Transmission Fluid Type "A" to bring level to "Full" mark on indicator

Throttl Linkag Adjustm nt: *See CARBURETOR above*

► *OTHER FORDOMATIC SERVICE DATA See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

UNIVERSALS

M chanics. Needle bearing type

► *CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See "1957 Ford & Mercury" in Rear Axl Section*

REAR AXLE

Own. New Separate Carrier type semi-floating hypoid with Hotchkiss drive *NOTE* - Same type used on all models

Se "1957 Ford & Mercury" in Rear Axle Section

	Axl Ratios	
Mod l	**Sta. Wgns.**	**Others**
Conventional	3 89-1①	3 56-1 ②3 70-1)
Overdrive	4 11-1	3 70-1 ②3 56-1)
Fordomatic	3 56-1	3 10-1 ②3 56-1)

① - 4 11-1 Optl ② - Optional ratio

Backlash - 004- 009"

Axl Shaft R m val: Remove wheel take off drum Remove four axle retainer locking type nuts (work through opening in axle shaft flange) Use Puller No 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carrier Ass mbly R m val: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange and removing five bolts that attach pinion carrier assembly to differential carrier housing With rear universal joint disconnected axle shafts removed (see above) remove differential carrier housing to rear axle housing bolts and lift out carrier assembly

SHOCK ABSORBERS

Direct acting non-adjustable Service by replacement

Model	① Front	① Rear
Pass Cars (Std)	B7A-18124-A	B7A-18125-A
Pass Cars(H D)	B7A 18124-B	B7A-18125-B
Thunderbird(Std)	B7S-18124-A	B7S-18125-A
Thunderbird(H D)	B7S-18124-B	B7S-18125-B
Sta Wgn & Sed Del		B7A-18125-C
Tudor Sedan (Hd Top) Std		B7A-18125-D
Tudor Sedan (Hd Top) H D		B7A-18125-E

① Furnished in kits which include mounting bushing

► *FRONT SHOCK ABSORBER UPPER BUSHING NOTE:* Install bushing with groove seated in frame hole flange and do not dislodge when installing shock absorber

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers.

See "Ford, Lincoln, Mercury, (Ball Joint)" in Suspensions & Wheel Alignment Section

Caster - Pos ½° to Pos 1½° Maximum variation between wheels ½°

Camber - Pos ½° to Pos 1½° ¼° preferred Maximum variation between wheels ½°

Toe-In - 1 16 to 1 8" *NOTE* - When checking toe-in on cars that have power steering, engine should be running so that power steering control valve will be properly centered

Toe-Out on Turns - With outer wheel at 20° inner wheel should be 24¼° (Pass), 25° (Thunderbird)

STEERING

Manual: Own (Gemmer 305 Design). Worm & Roller type

See "Gemmer Worm & Roller" in Steering Section

Power Steering: Ford-Mercury Linkage type Used in conjuction with standard type steering gear

See "Ford & Mercury Bendix Linkage Type" in Steering Section

Pump Belt Adjustment: Install torque wrench on pump pulley bolt Check torque required to slip pulley against belt friction If torque is not 14-16 ft lbs adjustment is required To adjust position a heavy duty 2½" "C" clamp with bottom against lower side of pump support bracket and top of clamp resting on pump bracket at its center Loosen four pump attaching bolts until pump body may be positioned by tightening "C" clamp Tighten "C" clamp until torque of 14-16 ft lbs is required to slide pump pulley *NOTE*- Hold final torque as close as possible to upper limit

Steering Linkage: *See "Steering Linkage" in Steering Section*

Ste ring Whe l & H rn Button Removal: *See "Gemmer Worm and Roller (3-tooth)" in Steering Section*

St ering Gear Rem val: *S e "Gemmer Worm & Roll r (3-tooth)" in Steering Section*

BRAKES

F rd-B ndix Hydraulic. Hand lever applies rear wheel service brakes

► *BRAKE DESIGN NOTE* Front wheel anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin)

See "Ford, Lincoln, Mercury Bendix" in Brake Section

► *BRAKE PULLING CORRECTION:* To correct, loosen anchor pin attaching bolt (see Brake Design Note above) and retighten bolt to 80-100 ft lbs

Drum Diameter - 11" front and rear

Wheel Cylinder Diameter - 1 1 8" (Front-All) 7 8" (Rear-Pass Cars), 15 16" (Rear-Sta Wgn & Courier)

Lining Specifications (Width & Length)

Model	Primary	Secondary
Pass Car(Front)	2 1/4"x10 62"	2 1/4"x 11 93"
(Rear)	1 3 4"x10 62"	1 3/4"x 11 93"
Thunderbird(Front)	2"x10 67"	2 1 2"x 12 13"
(Rear)	1 3/4"x10 67"	2"x 12 00"
Sta Wgn (Front)	2 1/4"x10 62"	2"x 10 62"
(Rear)	2 1/4"x11 93"	2"x 11 93"

Clearance - Adjusting screw backed off 10-12 notches from point where shoes are tight against drum

Brake Pedal Free Play: 5 16 to 7/16" If play not correct after brake adjustment loosen locknut on eccentric bolt that attaches brake pedal assembly to master cylinder pushrod rotate eccentric bolt

Standard Master Cylinder: On engine side of firewall

Checking Fluid Level - Within ½" of top of reservoir.

Removal - Disconnect rubber boot from rear end of master cylinder brake line at master cylinder fitting stop light switch from front of cylinder and disconnect wires from switch Push down brake pedal several times to force as much fluid as possible (into clean container) remove bolts that secure master cylinder to dash panel Do not disconnect pushrod from brake pedal unless it is to be serviced

Power Brakes: New "Bellows Type" Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel

See "Ford Bellows Type" in Brake Section

Checking Fluid Level - Within ½" of top of reservoir.

Removal - Remove vacuum hose from top of unit valve adjusting eccentric with flat washer spring and bushing nylon bushing from power unit valve housing Remove two mounting screws (Bracket to dash panel) and remove power unit from car

MISC. MECHANICAL

Windshield Wipers: Cable operated type (exc. Thunderbird), Link & Crank Arm (Thunderbird).

See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type.

See "Electric Window Regulators" in Misc. Section.

Power Top Control: Electric-Hydraulic (Convertible), Electric (Retractable Hard-Top). *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjust rs: "4-Way" Electric.

See "Power Seat Adjusters" in Miscellaneous Section.

Air Conditi ning: *See "Polar Aire" or "Select Aire" in Miscellan ous Section.*

MODEL IDENTIFICATION

Truck Model	Model & Serial Code Regular	Light	Heavy
F-100 Conv.	F-10	F-11	
F-250 Conv.	F-25	F-26	
F-350 Conv.	F-35	F-36	
P-350 Par. Del.	P-35	P-36	
P-400 Par. Del.	P-40	P-41	
F-500 Conv.	F-50	F-51	
B-500 School Bus	B-50	B-51	
C-550 Tilt Cab	C-55	C-56	
P-500 Par. Del.	P-50	P-51	
F-600 Conv.	F-60	F-61	F-64
B-600 School Bus	B-60	B-61	B-64
C-600 Tilt Cab	C-60	C-61	C-64

VEHICLE NUMBER: Stamped in "Serial No." space on Rating Plate attached to left front cab pillar (no separate Engine No.). This number incorporated the following information in sequence shown (Example *F10J7G10001*)

Serial Code ①	Engine Symbol ②	Year ③	Assy. Plant ④	Serial Number
F 10	J	7	G	10001

① — See Model & Serial Code Table (above).
② — See Engine Identification Note (below).
③ — Last digit of model year (1957).
④ — See Assembly Plant Designation(below).

Assembly Plant Designation

D — Dallas	**K** — Kansas City	**P** — Twin City
E — Mahwah	**L** — Long Beach	(St. Paul)
G — Chicago	**M** — Memphis	**R** — San Jose
H — Detroit	**N** — Norfolk	**U** — Louisville

►*ENGINE IDENTIFICATION NOTE* 6 Cyl. & V8 Engines are used as listed below. For identification in the following Ford Truck data pages, reference is made to these engines by piston displacement, "223 Eng." and "272 Eng.", or as "6 Cyl." and "V8" Engines.

Engine Types

Engine	Model	Displ.	Symbol
6 Cyl.		223 cu. in.	J
V8 ⑤	ECW-272	272 cu. in.	K
V8 ⑥	ECY-272	272 cu. in.	L
V8 ⑦	ECR-272	272 cu. in.	U

⑤ — Light Duty Engine with 2-Barrel Carburetor.
⑥ — Heavy Duty Engine with 2-Barrel Carburetor
⑦ — Heavy Duty Engine with 4-Barrel Carburetor.

TUNE-UP

►***1957 FORD F-100 TRUCK LOW SPEED SURGE CORRECTION (Trucks with 272" Engine & Loadomatic Distributor):*** **This condition may be caused by incorrectly positioned distributor advance springs. Make sure the primary spring (smaller diameter wire) is installed on post furthest from vacuum diaphragm. Adjust primary spring so it is under slight tension and the secondary spring is slack when breaker plate is in full retard position.**

COMPRESSION PRESSURE: At cranking speed

Engine	Compr. Ratio	① Compr. Pressur
6 Cyl.	8.3-1	150 lbs.
V8 (ECW & ECY-272)	8.3-1	160 lbs.
V8(ECR-272)	7.6-1	155 lbs.

①—Plus or minus 10 lbs. & uniform within 10 lbs.

VACUUM READING: (6 Cyl.) 18-19", (V8) 19-20", at idling speed.

VALVE TAPPET CLEARANCE: Can be set with engine cold but must be rechecked with engine at operating temperature (30 minutes minimum operation at 1200 RPM) and engine idling.

Tappet Clearance (Intake & Exhaust)

Engine	Cold	Hot
6 Cyl.	.019"	.019"
V8 (All)	.020"	.019"

►*TAPPET CLEARANCE ADJUSTING SCREW NOTE.* Screws are "self-locking" and torque required to turn screw (after interference noted) must be 3 ft. lbs., minimum, if less than 3 ft. lbs., replace adjusting screw or adjusting screw and rocker arm assembly.

MANIFOLD HEAT CONTROL (Except ECR-272): Automatic thermostatic type. Located at center of exhaust manifold (6 Cyl.), between cross-over pipe and right exhaust manifold (V8 ECW & ECY-272). Install valve assembly with stop pin at top of valve housing

►*MANIFOLD VALVE OPERATION CAUTION:* Valve is closed with engine at normal operating temperature and idling (should open with very light finger pressure on counterweight).

IGNITION
6 CYL. ENGINE

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .028-.032"
Plugs – Champion 860. 18 mm.

►*SPARK PLUG CAUTION.* Plugs have tapered seat and no gasket is used. Tighten plugs to 15-20 ft. lbs.

COIL: Ford No. B6A-12029-B.
Ignition Current – 2.5 amps. idling, 4.5 amps. stopped.
Resistor – Ford No. B6A-12250-D. 1 30-1 40 ohms.

►*COIL RESISTOR NOTE.* Resistor is connected in lead from ignition switch to coil and is by-passed during cranking by lead from starter switch to battery terminal of coil.

DISTRIBUTOR: Ford No. B7A-12127-C. "Loadomatic" type (same design as previous models).
Condenser – Ford No. 7RA-12300-C. Capacity .21-.25 mfd.
Contact Point Set – Ford No. FAA-12171-A.
Breaker Gap – .024-.026".
Cam Angle – 35-38° at idling speed.
Breaker Arm Spring Tension – 17-20 ozs.
Rotation – Clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0-½	0.22	500
5½-6½	0 96	1000
9¼-10½	2.09	1500
12-13¼	3.38	2000

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION* Scribe mark on distributor to indicate rotor position and housing position on block before removing distributor, align marks when installing distributor. Make certain that oil pump intermediate shaft engages distributor shaft properly.

IGNITION
V8 ENGINES

FIRING ORDER: 1-5-4-8 6-3-7-2.
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 028"- 032"
Spark Plug - Champion 860 (ECW & ECY-272), F-10 (ECR-272) No gasket used Torque to 15-20 Ft Lbs

COIL: Ford No. B6A-12029-B.
Ignition Current – 2.5 amps. idling, 4.5 amps. stopped.
Resistor – Ford No. B6A-12250-D (ECW & ECY-272) B7A-12250-A (ECR-272), 1 30-1 40 ohms at 75°F

►*COIL RESISTOR NOTE* See 6 Cyl Note (above)

DISTRIBUTOR: Ford (ECW-272) B6A-12127-A. (ECY-272) B7A-12127-A, (ECR-272) B7T-12127-B, 272 Replacement Distributor B7AF-12127-A Loadomatic type same as used on previous models (ECW & ECR Engs.). New type with separate mechanical and vacuum advance mechanism (ECY Eng.). *For ECY Distributor, see "Ford, Lincoln, Mercury Distributors" in Electrical Section*
Condenser – Ford FAB-12300-A (B6A-12127-A & B7T-12127-B Distr.), B7A-12300-A (B7A-12127-A Distr.).
Capacity .21-.25 mfd.
Contact Point Set – Ford FAB-12171B (B6A-12127-A & B7T-12127B Distr), B7A-12171A (B7A-12127A Distr)
Breaker Gap – .014-.016" (All models).
Cam Angle – 26-28½° at idling speed (All).
Breaker Arm Spring Tension – 17-20 ozs.
Rotation – Counter-clockwise viewed from above.

Advance Performance – B6A-12127-A
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0-½	0.15	300
¼-1¼	0 28	400
6½-7½	0 96	800
11½-12¾	2 21	1200
14½-15½	3 41	1600
16-17¼	4 60	2000

Advance Performance – B7T-12127-B
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	.0	200
1½-2½	0.26	400
6½-7½	1.03	700
9½-10½	1.70	1000
10½-11¾	2.00	1300
12¾-14	2.79	2000

Advance Performance – B7A-12127-A
►Centrifugal (Governor Weight) Advanc

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250	0	500
5½-6½	625	11-13	1250
11-12¼	1050	22-24½	2100
16¾-18	1600	32½-36	3200

Advance Performanc -B7AF-12127-A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250	0	500
½-1½	350	0-1	700
3¼-4½	500	6½-9	1000
7-8¼	750	14-16½	1500
16½-18	1550	33-36	3100

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Vacuum Spark C ntrol - B7A-12127-A & B7AF-12127-A (Thunderbird): Integral type

Vacuum Advanc - B7A-12127-A

Distr. Degrees	Eng. Degrees	①Vacuum (" of HG)
0-1¾	0-3½	10"
3-5¼	6-10½	13"
6½-8½	13-17	16"
9½-11½	19-23	19"
11-13	22-26	21"

Vacuum Advance - B7AF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
0-3	0-6	10
6-9	12-18	15
9¼-12¼	18¼-24½	19

① – At 1000 RPM distributor speed.

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION See 6 Cyl. Caution (above).*

IGNITION TIMING

Engine	Std. Ignition Setting
6 Cyl. (Std. & O D.)	4° BTDC
6 Cyl. (Fordomatic)	6° BTDC
V8 ECW-272 (Std.)	8° BTDC
V8-ECW-272 (Fordomatic)	10° BTDC
V8 ECY-272 & ECR-272	10° BTDC

►*TIMING CAUTION* – Set timing with engine idling and with vacuum line disconnected.

Timing Mark (6 Cyl.) – Vibration dampener marked by lines TDC – 3° – 5° – 7° – 9°.

Timing Mark (V8) – Vibration dampener marked by lines TDC – 2° – 4° – 6° – 8° – 10°. Align correct line with pointer on chain case cover.

CARBURETOR

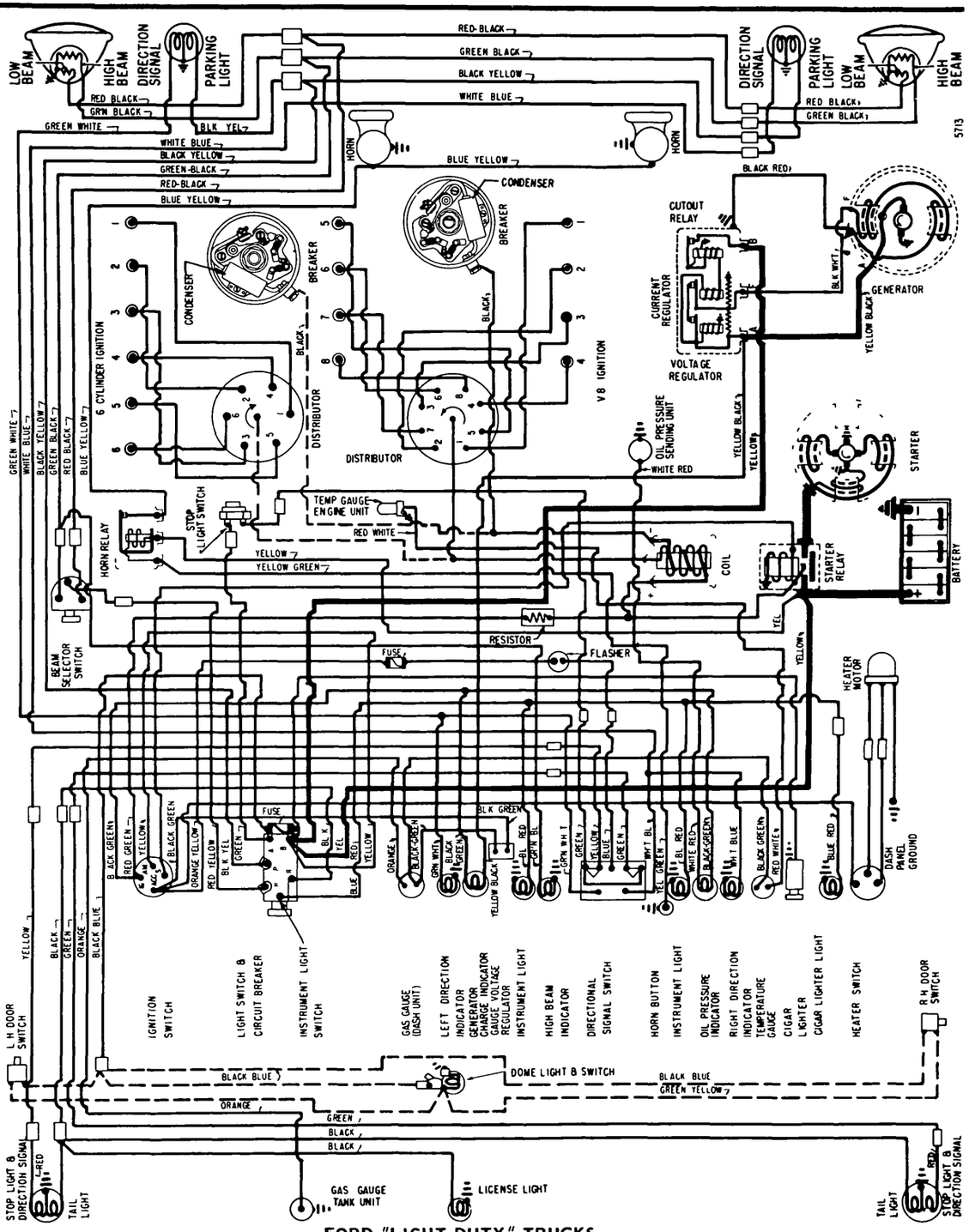
CARBURETOR APPLICATION Ford or Holley carburetors used as follows

Engin	Carburetor Model
6 Cyl. (Std. & OD)	Holley Single B7C-9510-C
6 Cyl. (Fordomatic)	Holley Single B7A-9510-D
V8 ECW-272(Std &OD)	Holley(Ford)Dual B7C 9510-A
V8 ECW-272(Fordomatic)	Holley(Ford)Dual B7C 9510-B
V8 ECY-272 (Par. Del.)	Holley Dual B7J-9510 A
V8 ECY-272 (Others)	Holley Dual B7T-9510-A
V8 ECR-272	Holley 4-Bbl B7T 9510-C

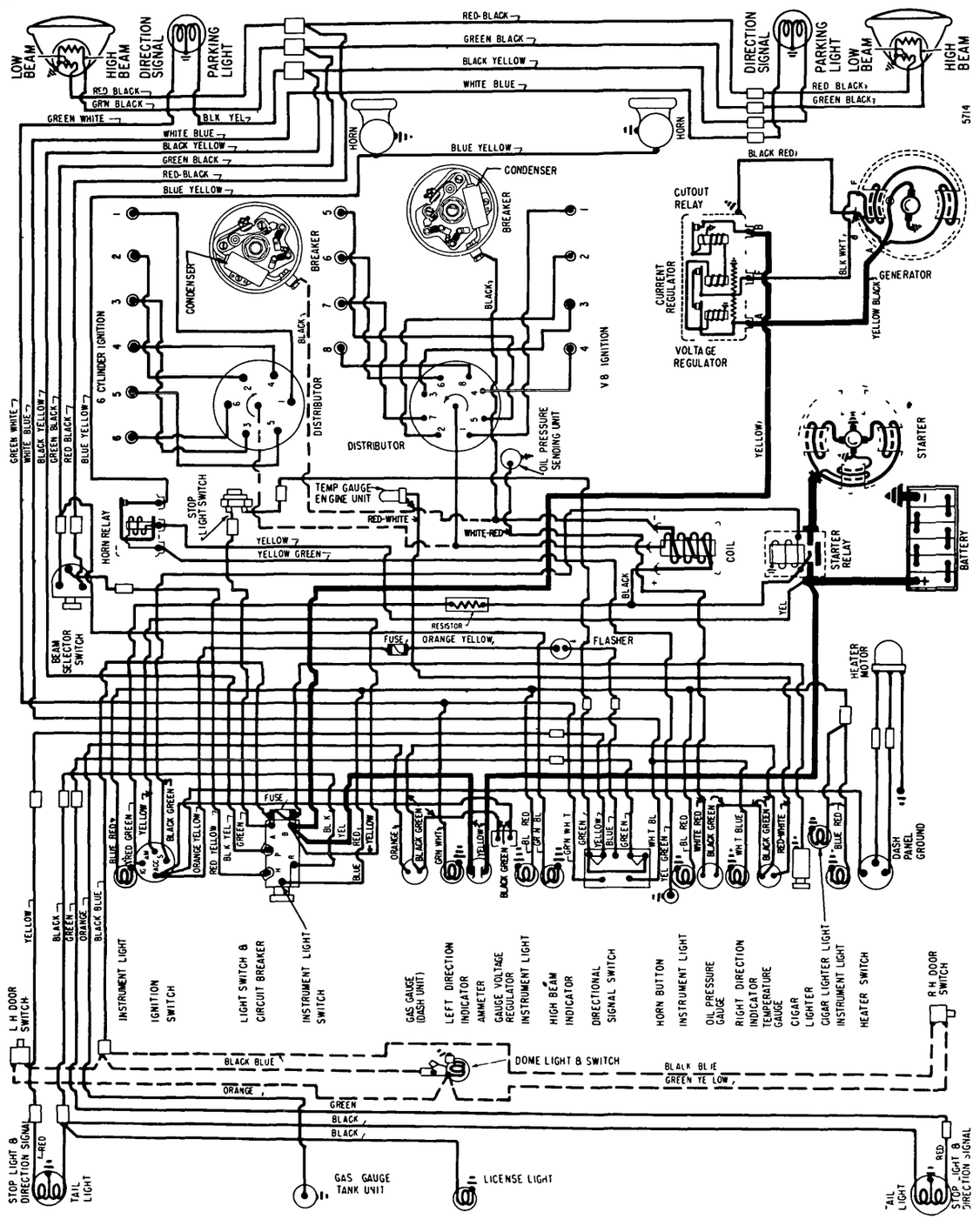
Throttl Linkage Adjustment (Fordomatic Models): *Same as for corresponding 6 Cyl. & V8 Passenger Cars. See Passenger Car data and also note the following:*

Acc l rat r P dal H ight – With gauging pin installed through holes of accelerator assembly, and carburetor connecting link adjusted so that throttle valves closed with throttle lever stopscrew against stop, accelerator pedal height should be 2 3/4" (6 Cyl & V8 Trucks except Parcel Delivery). Adjust pedal height by changing length of accelerator pedal connecting link On all truck models, accelerator pedal should just contact detent (on toeboard under pedal) when carburetor lever strikes wide-open stop (this is the only pedal height specification for Parcel Delivery models)

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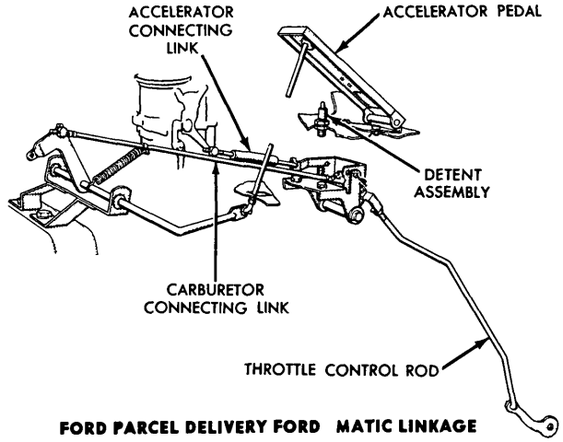
FORD "LIGHT DUTY" TRUCKS



FORD "HEAVY DUTY" TRUCKS

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Dashpot Adjustm nt (All Fordomatic Mod ls): After engine idle speed correctly set, turn off engine, loosen dashpot adjusting screw locknut, depress dashpot plunger fully, turn dashpot in or out of bracket until clearance between end of dashpot plunger and lug on throttle lever is .045-.064" (with throttle closed and throttle stopscrew against stop), tighten locknut.



FORD PARCEL DELIVERY FORD MATIC LINKAGE

HOLLEY SINGLE CARBURETOR (6 Cyl. Trucks)

Ford B7C-9510-C (Std. & OD), B7A-9510-D (Fordomatic).

Idle Setting – Initial setting 1½ turns open. With engine at normal operating temperature, turn screw in until engine runs rough, turn screw out until engine begins to roll, finally turn screw in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. On Fordomatic models, check idle speed with selector lever in Drive "Dr" position. Idle speed in "Dr" must be 425-450 RPM. If not in this range, readjust as necessary.

Float Level: Fuel level in bowl should be 11/16" plus or minus 1/32" below power valve mounting surface on carburetor. Use Gauge T52L-9550-AGE to check fuel level (remove power valve diaphragm cover and power valve assembly, install gauge in this hole). Fuel should touch tip of "Low" pin on gauge but should not touch "High" gauge pin.

Accelerating Pump: Engage pump link in inner hole of throttle lever for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment required.

Throttle Linkage & Dashpot Adjustment (Fordomatic Models): *See CARBURETOR above.*

► *OTHER DATA: See "Ford Visi-flo Carburetors" in Carburetion Section*

HOLLEY (FORD) DUAL CARBURETOR (V8 ECW-272 Engine)

Ford B7C-9510-A (Std. & OD), B7C-9510-B (Fordomatic).

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►*CARBURETOR CHOKE VALVE REMAINING CLOSED CORRECTION.* On some early trucks carburetor choke valve may remain closed because fast idle cam and shaft assembly may move sideways To correct, bend end of choke rod lever contacting fast idle pickup arm approximately 10° away from its original position

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting – Initial setting 1 turn open (both screws). With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, turn needles out until engine begins to roll, finally turn needles in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. On Fordomatic models, recheck idle speed with selector lever in Drive "Dr" position. Idle speed in "Dr" must be 425-450 RPM. If not within this range, readjust as necessary.

Float Level: 1 437-1 500" from flange surface of air horn to bottom of float (adjacent to soldered seam) and equal for both ends of float with needle valve seated. To check float level, remove air horn and float assembly, invert, place Gauge T56L-9510-A on flange surface of air horn. "Go" leg on gauge (1 500') should slide over bottom of float (not soldered seam), "No Go" leg (1 437") should not clear float.

Accel rating Pump: Three holes provided in throttle lever for pump link engagement **Inner Hole –** Hot weather or high altitudes, **Center Hole –** Average conditions, **Outer Hole –** Extreme cold weather.

Fast Idle: No adjustment required.

Throttle Linkage & Dashpot Adjustment (Fordomatic Models): See *CARBURETOR* above.

►*OTHER DATA See "Holley (Ford Truck) Dual Carburetor" in Carburetion Section*

HOLLEY DUAL CARBURETOR
V8 ECY-272 Engines

Ford B7J-9510-A (Par. Del.), B7T-9510-A (Others). New type "Low Silhouette" dual carburetors.

►*MANIFOLD FUEL DISTRIBUTION· Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting – Initial setting 1-1½ turns open (both screws). With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll, finally turn needles in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. On Fordomatic models, recheck idle speed with selector lever in Drive "Dr" position. Idle speed in "Dr" must be 425-450 RPM. If not within this range, readjust as necessary.

Throttle Linkage & Dashpot Adjustment (Fordomatic Models): See *CARBURETOR* above.

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

HOLLEY 4-BARREL CARBURETOR
V8 ECR-272 Engines

Ford B7T-9510-C. New "Low Silhouette" 4-Barrel carburetor with vacuum diaphragm control of the secondary throttle valves.

►*DEPOPPER VALVE OPERATION NOTE·* All trucks equipped with this carburetor have depopper valve made inoperative by plugging air inlet passage between secondary venturis next to air cleaner stud hole boss to improve idle characteristics Remove plug if depopper needed and a higher idle RPM can be maintained

Idle Setting – *NOTE - Idle system provided for all four barrels (primary & secondary). Idle mixture adjusting needles used only on SECONDARY side (one on each side of Fuel Metering Block).* Initial setting 1-1½ turns open (both screws). With engine at operating temperature, turn both screws in until engine runs rough from lean mixture, then turn screws out until engine begins to roll, finally turn screws in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. *NOTE* – Idle speed screw located on Throttle Operating Housing adjacent to throttle lever.

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

FUEL PUMP PRESSURE: 3.5-5.5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: AC. Fuel only or Fuel & Vacuum types (Std.). *NOTE* - Electric type Optl.

Model	Ford Pump No.
223 Eng. Fuel only	B5A-9350-A
272 Eng. (TH,WH) 4-Bbl. Carb. Fuel & Vac.	B6T-9350-A
272 Eng. (THZ,WHZ) Fuel only	B7T-9350-A
272 Eng. Others 2-Bbl. Carb.	B6C-9350-A

Pressure - 3.5-5.5 lbs. (mechanical diaphragm types), 3 5-7 lbs. (electric type).

See "Fuel Pumps' in Carburetion Section.

Gasoline Gauge: New King-Seeley Electric Constant voltage ("CV") type with gauge voltage regulator, Ford No. B7J-10804-A (J,JH,JL), B7A-10804-B (Others).

Dash Unit - Ford No B7C-9280-A.

Tank Unit - Ford No. B6A-9276-A.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 12,000 miles, replace element every 36,000 miles.

►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Ford No. B6A-10655-C. 12 volt, 11 plate, 55 Ampere Hour Capacity **Ford No. B7A-10655-A.** 12 volt, 11 plate, 70 Ampere Hour Capacity. **Ford No. B6A-10655-E.** 12 volt, 13 plate, 70 Ampere Hour Capacity (20 hr. rate).

Grounded Terminal - Negative to engine block.

Engine Ground - At flywheel housing.

STARTER

Ford B6A-11002-A. Armature - B6A-11005-B.

Drive - Ford LCM-11350-C. Bendix "Folo-Thru".

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM, 190 amps. max

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	80 max.
15 5 ft. lbs.		5.0	550 max.

① - If starter on engine, engine must be idling.

Starting Switch: Magnetic type, Ford No. B6A-11450-A Starter switch controlled by ignition switch. *NOTE* - Neutral Safety switch used on Fordomatic transmissions.

Fordomatic Neutral Safety Switch: Ford No. FAC-15812-C.

Adjustment - *See "Fordomatic & Mercomatic" in Transmission Section.*

GENERATOR

Ford. Used as follows

Generator No.	Armature No.	Application
B6A-10002-C	B6C-10005-B	6 & 8 (30 Amp)
B6A-10002-F	B6C-10005-C	6 Cyl. (40 Amp)
B6A-10002-E	B6C-10005-C	V8 (40 Amp)

Performance Data

Generator	Amperes	RPM
B6A-10002-C	30	1500
B6A-10002-E, F	40	1500

Brush Spring Tension – 26-34 ozs.

Field Current – 1 4-1 6 amperes at 12.0 volts.

Rotation – Counter-Clockwise at commutator end.

Belt Adjustment: ¼" deflection (6 Cyl.), ½" deflection (V8) midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Ford B6C-10505-B (B6A-10002-C Gen.). B6A-10505-B (B6A-10002-E & F Gen.). *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section.*

►*SETTING CAUTION "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation or after regulator heated and stabilized.*

Cutout Relay

Cuts In - 12.0-12.8 volts.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F (ambient).

Checking & Adjusting - *See Electrical Section.*

Current Regulator

Setting - 28-32 amperes (B6C-10505-B), 38-42 amperes (B6A-10505-B).

Checking & Adjusting - *See Electrical Section.*

MISC. ELECTRICAL

Headlamps - Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut, remove switch.

Stop Light Switch Location: On brake master cylinder, Power Unit Assembly or fitting on frame side rail. Master Cylinder located on firewall (Conventional Trucks), and on bracket attached to left frame member below brake pedal (Other).

LIGHTING CIRCUIT BREAKERS: Two used in lighting switch. One circuit breaker protects headlight circuit, other circuit breaker protects instrument, parking, stop, and tail light circuits.

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FUSES: **Interior lights** - 7.5 amps. On lighting switch.
Dir ctional Signals - 7.5 amps. in flasher lead.
Overdrive - 15 amps. On Overdrive Relay.
Heater - 7.5 amps. In switch lead.
Clock - 3 amps. In clock lead.
Horn Relay: Ford No. B7A-13853-A.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. 223" Eng. (EBR, EBS,EBT), and V8 272" Eng. (ECW,ECY, and ECR Heavy Duty). All engines are overhead valve type.

Engine	Bore	Stroke	Displacement
223	3.62"	3.60"	223 Cu. ins.
272	3.62"	3.30"	272 Cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
223	8.3-1	31.5	139 at 4200 RPM
ECW-272 ①	8.3-1	41.9	171 at 4400 RPM
ECY-272 ①	8.3-1	41.9	181 at 4400 RPM
ECR-272 ②	7.6-1	41.9	178 at 3800 RPM

① - 2-Bbl. Carb. ② - 4-Bbl. Carb.

CYLINDER HEAD: *See Ford Special Data.*

TIGHTENING TORQUES: *See Ford Special Data.*

ENGINE REMOVAL: *See Ford Special Data.*

OIL PAN REMOVAL (223" Engine): Drain crankcase, remove oil dipstick. Remove left and right front engine splash aprons. Remove flywheel housing inspection cover. Take out oil pan retaining screws and remove oil pan.

OIL PAN REMOVAL (272" Engine): Drain crankcase. On Fordomatic models, remove converter housing dust cover. Disconnect oil pump inlet tube at oil pump and remove "0" ring seal from pump end of tube. On Tilt Cab Trucks, crank engine until No. 1 piston is on TDC. Remove oil pan retaining screws, remove pan.

223" 6 CYL. ENGINES
(See Engine Specifications Above)

See 1957 Ford 6 Cyl. Passenger Car Pages. Engine is similar to those used in 1957 Pass. Cars, and all passenger car engine data applies to truck engines.

272" V8 ENGINES
(See Engine Specifications Above)

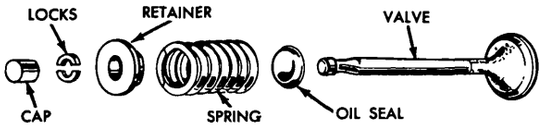
See 1957 Ford V8 Passenger Car Pages. Engine is similar to those used in 1957 Pass. Cars, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW.

CRANKSHAFT: Bearings – Copper lead bearings only used in ECR-272 Engine.

VALVES (ECR-272 ENGINE) Exhaust valves are Sodium Cooled "Free Turning" type with special specifications as follows: Stem Diameter–.4343–.4350". Stem Clearance – .0018"-.0032" (Wear limit .0055"), Valve Seat Width – .070-.090" (Intake), .090-.110" (Exhaust).

Valve Cap Clearance (ECR-272 Exhaust Valves) – .0002-.004" between end of valve stem and inner face of cap (necessary to insure cap carrying valve spring pressure and permit rotating of valve). Measure with Micro Gauge, Tool 6513-CE-2. If clearance greater than .004", reduce clearance by lapping open end of cap on flat surface.

►*EXHAUST VALVE CAUTION (ECR-272 H.D. ENGINE):* Exhaust valves are Sodium cooled and require special disposal handling to prevent possibility of fire or explosion due to chemical reaction. DO NOT DISCARD SODIUM COOLED VALVES with other scrap material. Bury in ground not subjected to excavation or in deep water not subjected to dredging.



FORD V8 ECR-272 VALVE ASSY.

EXHAUST VALVE INSERT (ECR-272 ENGINE): *See "Valve System" in Ford Special Data.*

VALVE TIMING: Cam lift specifications for valve timing points differ from Pass. Car engines. Use Pass. Car Valve Timing Check procedures but note special Cam Lift data following:

Valve Timing (All 272" Engines)

Intake Valves - Open 18° ② BTDC. Close 58° ④ ALDC.
Exhaust Valves - Open 66° ① BLDC. Close 10° ③ ATDC.
Cam Lift - ① .014", ② .015", ③ .017", ④ .018".

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity: 6 qts. (ECR-272 Eng.) 5 qts. (Others). Add 1 qt. with filter change.

Normal Oil Pressure: 45-50 lbs. at 2000 RPM (Hot).

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Indicator: Warning Light (F-100, 250, 350, 500, 600). King-Seeley Gauge (P-350, 400, 500; B-500, 600).

Dash Unit - Ford No. B7J-9273-A (Parcel Delivery), B7T-9273-A (Others).

Engine Unit - Ford No. B7T-9275-A.

See "King-Seeley Gauges" in Miscellaneous Section.

Oil Pump: Gear type pump mounted inside crankcase in line with distributor shaft (223 Eng.), rotor type located on left side of crankcase and driven by distributor shaft (272 Eng.).

Pump Removal & Overhaul - *See "Oil Pump" in Ford Special Data.*

Oil Filter: Full-flow (Std. Equip.), with pressure relief valve in center bolt. Replace filter element at 4000 mile intervals or when oil becomes dirty or polluted.

Replacement Filter Element - Ford No. B2A-6731-A (Kit includes new gasket).

►*CAUTION:* This special Full-flow filter element must be used for replacement (use of bypass type element would restrict oil flow and result in insufficient engine lubrication).

►*FILTER INSTALLATION CAUTION & OIL LEAK CORRECTION: See "Oiling System" in Ford Special Data.*

Crankcase Ventilation: Filter in oil filler cap (inlet) all models. Road draft outlet pipe for crankcase ventilation all models. *NOTE* - V8 engine has filter screen in road draft outlet tube. Service filler cap by cleaning with solvent and resaturating with engin oil at 4000 mile intervals, clean screen in road draft outlet tube at same mileage.

COOLING

►*LOSS OF COOLANT CORRECTION:* Lower generator mounting bracket bolt holes are tapped into cylinder water jacket. For loss of coolant at this point or when replacing bolts, apply a good coating or waterproof sealer.

Water Capacity: (6 Cyl. exc. Par. Del.) - 18 qts. (6 Cyl. Par. Del.) - 18½ qts.
(V8 F-100, 250, 350) - 18 qts. (V8 F-350 Dual Rear Whls, F & B-500, F & B-600) - 22 qts.
(V8 P-350 Single Rear Whls.) - 22 or 23 qts., (V8 P-350 Dual Rear Whls. , P-400, 500) - 27 qts.
(V8 C-550, 600) - 28 qts. Add 1 qt. for heater.

Pressure Valve: Ford No. OL-8100-A, radiator filler cap (opens at 7 lbs.).

Thermostat: 223 Eng. - Ford No. EAA-8575-A (157-162°), EAA-8575-B (177-182°).
272 Eng. - Ford No. B4C-8575-A (152-157°), B4C-8575-B (167-172°). Spring and cartridge type.

Water Pump: Packless, sealed ball bearing type. *See "Water Pump" in Ford Special Data.*

Temperature Gauge: New King-Seeley Electric Constant-voltage ("CV") type with gauge voltage regulator, Ford No. B7J-10804-A (J,JH,JL), B7A-10804-B (Others).

Dash Unit - Ford No. B7J-10883-A (J,JH,JL), B7C-10883-A (Others).

Engine Unit - Ford No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long 10, 10½, & 11CF clutches used. For Truck Model (with type Trans.) application of Cover and Disc. See below.

Model	Long No.-C v r Assy.-Ford No.
6 Cyl. 223" Eng. ①	L5222 ... B4A-7563-B
6 Cyl. 223" Eng. ②	267371 ... B7C-7563-A
V8 272 Eng. ③	L5222 ... B4A-7563-B
V8 272 Eng. ④	267371 ... B7C-7563-A
6 Cyl. & V8 (Others) ⑤	267147 ... B7Y-7563-A

Model	Long N - Disc - F rd N .
6 Cyl. 223" Eng. ①	CD870 ... B7C-7550-A
6 Cyl. 223" Eng. ②	287335 ... B7C-7550-B
V8 272" Eng. ③	CD870 ... B7C-7550-A
V8 272" Eng. ④	287335 ... B7C-7550-B
6 Cyl., V8 (Std.) ⑤	CD607 ... 81T-7550-A
6 Cyl., V8 (H.D.) ⑤⑥	CD606 ... B6D-7550-A

① - F100, 250, 350; P350 (10CF).
② - F100, 250 (EBR); P350 (10½CF).
③ - F100 3-Speed L.D. Trans.; Overdrive (10CF).
④ - F100, 250 (ECW); P350 (10½ CF).
⑤ - 11CF.
⑥ - All 6 Cyl.; 272" Eng. (F100, 250; P350 with Std. Trans.); 272" Eng. (F100, 250 with 4-Speed Trans.); 272" Eng. (F350).

►*HEAVY DUTY CLUTCH DISC:* Heavy Duty Clutch Disc Ford No. B6D-7550-A entered production Jan. 1957 and identified by gray painted damper springs and yellow paint on hub.

Clutch Pedal Clearance: Adjust pushrod eccentric bolt on clutch pedal (Conv. Trucks) or extension rod (Par. Del.) for ¼" free travel at pedal pad before pushrod contacts master cylinder piston.

Clutch R lease L v r Cl aranc - Adjust clearance be-

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tween slave cylinder pushrod adjusting nut and release lever to ¼" (six turns of adjusting nut).

Hydraulic Clutch C ntrol: Master cylinder mounted on firewall (Conv. Cab), on bracket on firewall (Tilt Cab), and connected to Slave Cylinder which is attached to flywheel housing and connected to outer end of clutch release lever.

Filling Mast r Cylind r - Maintain fluid level (H D. Brake Fluid) to within ½" below top of cylinder reservoir. Change fluid at 15,000 mile intervals.

R m val - Release retracting spring. Remove slave cylinder from flywheel housing, slave cylinder pushrod from release lever. Remove trans. (see Trans. Removal below), dust cover from flywheel housing, release bearing and hub from release lever. Mark pressure plate, cover assembly and flywheel for reassembly. Remove pressure plate and cover assembly to flywheel bolts gradually to reduce spring tension, remove assembly through bottom of clutch housing.

SYNCHRO-MESH TRANSMISSION

3-SPEED (LIGHT DUTY)

Own. 3-speed, all helical gear, constant mesh, synchro-mesh (second and high), sliding gear (low and reverse). Steering column shift standard.

Se "Ford Truck 3-Speed (Light Duty)" in Transmission Section.

Rem val: Drain lubricant, disconnect speedometer cable and drive shaft and gear shift linkage at transmission. *(NOTE* - On band type parking brake, disconnect brake cable clevis and remove cable support bracket). Remove flywheel housing-to-transmission bolts and nuts, draw transmission to rear to clear flywheel housing and lower transmission.

3-SPEED (MEDIUM DUTY)

Own. 3-speed medium duty with steering column shift standard. *See "Ford Truck 3-Speed (Medium Duty)" in Transmission Section.*

R m val: Same as for 3-Speed (Light Duty) above.

3-SPEED (HEAVY DUTY)

Own. 3-speed, helical gear (second & high), spur gear (low & reverse), constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Steering column shift standard.

See "Ford Truck 3-Speed (Heavy Duty)" Transmission in Transmission Section.

Rem val· Same as for 3-Speed (Light Duty).

4-SPEED

Own. 4-Speed, constant mesh, synchro-mesh (second, third, & high). Helical gears used for second, third, & high. Spur gears used for low & reverse. Floor mounted gear shift standard.

S e "Ford Truck 4-Sp ed (Synchro-mesh) Transmission" in Transmission Section.

R m val: Same as 3-Speed (Light Duty) and note following If hoist not used, it may be necessary to remove gear shift lever assembly (New Process) and lever housing (Others), before transmission can be removed from truck. *(NOTE* - On Tilt-Cab - release lock and tilt cab forward) Disconnect shift linkage at split pin which attaches universal joint to finger socket shaft in rear cross shaft housing Drain transmission, disconnect drive shaft at parking brake drum If truck equipped with coupling shaft support, disconnect support bracket, and remove coupling shaft. Disconnect parking brake and speedometer cables. Remove dust cover from bottom of clutch housing, support transmission on jack, remove two top nuts, two bottom bolts, move transmission to rear until input shaft splines clear clutch housing and lower transmission.

OVERDRIVE

Warner Model R10. Solenoid operated with governor control and throttle operated kickdown.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as 3-Speed Synchro-mesh Transmission (above), after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. *See "Fordomatic & Merc-O-Matic" in Transmission Section.*

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Fordomatic & Merc-O-Matic" in Transmission Section.*

► *TESTING & TROUBLE SHOOTING. See "Fordomatic & Merc-O-Matic" in Transmission Section.*

Lubrication - Check transmission fluid level every 1000 mile intervals, maintain level at "F" (full) mark on dipstick. Drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level: Bring transmission to operating temperature by idling engine (operate with selector lever in "N" for 4 minutes, in "P" for remainder of time). With transmission warm, move selector lever through all positions, then check fluid level with selector lever in "P" Add Automatic Transmission Fluid Type "A" to bring level to "F" mark on dipstick.

Throttle Linkage Adjustment (Fordomatic Models)· *See CARBURETOR above.*

► *OTHER FORDOMATIC SERVICE DATA See "Fordomatic & Merc-O-Matic" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

► *UNIVERSAL JOINT INSTALLATION CAUTION* Make sure that all universal joint yokes in drive line are in same plane to avoid drive line vibration.

Coupling Shaft Center Bearing· Consists or cushion mounted ball bearing bolted to underside of frame intermediate cross member. Bearing is mounted on end of coupling shaft in a sleeve with felt retainer on each end a id bearing baffle on front end

REAR AXLE

SEMI-FLOATING

Own. New Separate Carrier, hypoid gear, with Hotchkiss drive.

See "1957 Ford & Mercury" in Rear Axle Section.

Ratios - 3 70 (37-10), 3 89 (35-9), 4 11 (37-9)
Backlash - 004- 009".

Axl Shaft Removal Remove wheel, take off drum Remove four axle retainer locking type nuts (work through opening in axle shaft flange) Use Puller No 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carri r Ass mbly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

Wheel Bearing Adjustment: None required.

FULL FLOATING

Full floating, Hypoid gear, with Hotchkiss drive.

Model	Rear Axle Type
F-250,P-350 (Spicer Model 60)	Integral Housing
350;600 Series	Banjo Housing

See Various types of Ford Rear Axles in Rear Axle Section.

Rear Axle Ratios

Model	Axle Ratios
F-250, P-350	4.56(41-9),4.88(39-8),5.88(47-8) ④
F-350, P-350,400	4.86(34-7),5.14(36-7),5.83(35-6) ⑤
F,P,B-500	6.2(31-5),6.8(34-5) ⑥
F,P,B-500, C-550	5.83(35-6),6.2(31-5),6.8(34-5) ⑥
F,B,C-600	6.2(31-5),6.8(34-5),7.2(36-5) ⑥

Backlash - ④ -.008-.013". ⑤ -.004-.018". ⑥ -.006-.012".

Axle Shaft Replacement: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

Axle Assembly Removal (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect rear shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking cable (if so equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring "U" bolts, roll rear axle from under truck and drain lubricant.

Carrier Removal (Banjo Housing): Remove axle shaft stud nuts and lockwashers, strike center of axle shaft flange with hammer and punch to loosen tapered dowels, remove dowels and axle shaft. Disconnect drive shaft at rear universal joint flange, support carrier assembly with roller jack, remove carrier to housing bolts and lockwashers. Tighten puller screws (when provided in carrier) to loosen carrier from housing, roll carrier from truck.

Wheel Bearing Adjustment· Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher Adjust bearings by turning bearing adjusting nut (inner nut) up until tight then backing off 1/8 turn Install bearing lockwasher *(NOTE* - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel) Install bearing locknut and draw nut up tight If flange type lockwasher is used, bend one flange over adjusting nut

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and one flange over locknut. Install axle shaft and lower vehicle.

TWO-SPEED

Own. Electrically operated shift, Two-speed, Full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.
See "Ford Truck Two-Speed" in Rear Axle Section.
Ratio - 5.83-1 (Direct Speed), 8.11-1 (Second Speed); 6.33-1 (Direct Speed), 8.81-1 (Second Speed).
Backlash - .006-.016".
Removal: Same as for standard axle (above) after removal of wiring harness.

SHOCK ABSORBERS

Direct acting hydraulic. Shock absorbers are sealed units and are not adjustable or refillable.
► *REPLACEMENT SHOCK ABSORBER NOTE* Shocks are supplied for service replacement in kits consisting of shock absorber and necessary bushings.

Replacement Shock Absorbers

Model	Front - Ford Nos. - Rear
F-350	B7C-18124-A B3Y-18125-A
F-100,250	B7C-18124-A B7C-18125-A
P-350,400	B7J-18124-B ①B7C-18125-A
P-500	B7J-18124-A ②B7J-18125-A
F,B-500	B7T-18124-A ①B7J-18125-A
P-350	B7J-18124-B ②B3T-18125-A
F,B-500,600	B7T-18124-A ②B3T-18125-A
C-550-600	B7T-18124-B ②B3T-18125-A

① - Single Speed Axle. ② - Two Speed Axle.

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliot ends and semi-elliptical springs.
Kingpin Inclination - 5½° - C-550,600, P-500 (154" W.B.). 4° - Others.

Caster ①	Specification
F-100,250	3° ± ½°
P-350	4° ± 1°
P-400, P-500(137" W.B.), F-500(130" W.B.)	3° ± 1°
C-550,600	3° ± 1°
F-350	3¾° ± 1°
F-500 (154" W.B.), F-600, B-500, B-600	4½° ± 1°
P-500 (154" W.B.)	3½° ± 1°

① - Maximum variation between wheels ½°.
Camber - 0-1°. Maximum variation between wheels ¼°.
Toe-In - 0-1/16". *NOTE* - On Power Steering models, run engine so hydraulic pressure will center power control valve.

STEERING

Own. Gemmer design. Worm-and-roller types with push-pull adjustment. *NOTE* - Tilt Cab steering column has universal joint.
See "Gemmer Worm & Roller Types" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*
Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Brake types are listed in application table below. Hand lever applies rear wheel service brakes on F-100, F-250, and P-350 trucks. Independent transmission mounted drum and contracting band type brake on other models.

Brake Type Application

Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F-250,F,P-350,400	Uni-Servo	Duo-Servo
C-550,600	Uni-Servo	Two Cyl.
F,B,P-500, F,B-600	Uni-Servo	Two Cyl.

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe. Ratchet adjusting screw.
See "Ford-Bendix Uni-Servo Hydraulic" in Brake Section.
Duo-Servo - Ford Bendix. Single anchor, self energizing wheel cylinder actuates both shoes. Ratchet adjusting screw.
See "Ford-Bendix Hydraulic" in Brake Section.
Two-Cylinder Type - Two wheel cylinders in each brake assembly.
See "Ford Truck Two-Cylinder" in Brake Section.

Brake Lining

Model	Drum Diam.	Primary Width-Length	Secondary Width-Length
F-100) Front	11"	2"-11 91"	2"-11.91"
6 Cyl.) Rear	11"	1¾"-11.91"	1¾"-11.91"
F-100) Front	11"	2"-11.91"	2"-11.91"
V8) Rear	11"	1¾"-11.91"	1¾"-11.91"
F-250) Front	12 1/8"	2"-11.65"	2"-13.12"
P-350) Rear	12 1/8"	2"-11 65"	2"-13.12"
F-350) Front	12 1/8"	2"-11.65"	2"-13.12"
P-400) Rear	13"	2½"-12.72"	2½"-14.00"
P-500) Front	13"	2¼"-12.70"	2¼"-12.95"
Rear	14 1/8"	3½"-14.45"	3½"-14.45"
F,B-500) Front	13"	2¼"-12.70"	2¼"-12.95"
F,B-600) Rear	15"	4"-15.31"	4"-15.31"
C-550) Front	14"	2½"-13.65"	2½"-15.02"
C-600) Rear	15"	4"-15.31"	4"-15.31"

Hand Brake: **(F-100,250; P-350)** Eliminate slack in cables after adjusting service brakes. *See "Ford-Bendix Hydraulic" in Brake Section.*

(Except F-100,250; P-350) External contracting type, consisting of a brake drum bolted to transmission main shaft companion flange, and an external contracting band mounted on rear of transmission.

Brake Drum Diameter - 8" (F-350), 9½" (THZ, WHZ 4-Speed Trans.), 7 13/16" (All Others).

Adjustment - On cable controlled parking brakes, move lever to full released position. On transmission mounted parking brake levers, set lever to first notch. Observe position of cam to make sure flat portion is resting on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, adjust clevis rod to allow flat portion to rest on brake band bracket. Install clevis and cotter pins. Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise until .010" clearance is established between brake lining and drum at anchor bracket. Loosen locknut on adjusting screw from lower half of brake band. Adjust for .010" clearance between lining and drum at lower half of brake band. Tighten locknut. Turn upper band adjusting rod nut until .010" clearance is established between upper half of band and drum. Reinstall lockwire in anchor adjusting screw.

Hand Brake Lining

Series	Length	Width	Thickness
F-350	24.63"	2.00"	.156"
P-350,400,500;C-550,600	①	2.50"	.250"
F-500,600,B-500,600	24.63"	2.50"	.250"

① - Two 7.89" and one 7.30".

Standard Master Cylinder: Located on engine side of firewall.
Checking Fluid - Maintain fluid level to within ½" of top of reservoir.

Removal - Disconnect rubber boot from rear end of master cylinder, brake line at master cylinder fitting, stop light switch from front of cylinder and disconnect wires from switch. Push down brake pedal several times to force as much fluid as possible (into clean container) remove bolts that secure master cylinder to dash panel. Do not disconnect pushrod from brake pedal unless it is to be serviced.

Power Brakes: Midland (Diaphragm) or Hydrovac (Piston) types used. *See Model Application following:*

Model	Power Brake	Ford No.
C	Midland Diaphragm	AD-2005-A
D,Y	Hydrovac Piston	B7D-2005-A
J,JL	Hydrovac Piston	B4D-2005-A
JH,T,TH,THZ	Midland Diaphragm	TEAA-2005-B
W,WH,WHZ	Midland Diaphragm	B7T-2005-A

See "Midland" or "Hydrovac" Power Units in Brake Section.
Checking Fluid - Same as for Manual Brakes above.
Removal of Power Unit - (Hydrovac) - Depress brake pedal several times to remove all vacuum from system. Loosen brake power unit inlet tube clamp and remove tube. Disconnect master cylinder to power unit hydraulic line at power unit. Disconnect vacuum tube at power unit. If stop light switch located on brake power unit, disconnect wires. Remove mounting bracket bolts and power unit.

(Midland) - Depress brake pedal several times to equalize air pressure at both sides of diaphragm in booster unit. Loosen slave cylinder clamp and disconnect the air breather hose from the booster. Disconnect Hydraulic lines at booster and intake manifold to booster vacuum hose at booster. Remove booster. *NOTE* - Do not remove breather in cab or controls mounted in engine compartment unless operating conditions indicate repairs are necessary.

MISC. MECHANICAL

Windshield Wipers: Vacuum Link and Arm (Exc. H.D. and Tilt Cab models). Electric (H.D. and Tilt Cab models).
See "Windshield Wipers" in Miscellaneous Section.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left door post. *NOTE* - Number (example below) includes identification data as indicated

① ② ③ ④ ⑤
A 8 F G 100001

① - Engine Type (A - 6 Cylinder).
② - Year (1958)
③ - Assembly Plant, see below.
④ - Body Style, see below.
⑤ - Consecutive unit number

Assembly Plant Designation

A - Atlanta	F - Dearborn	N - Norfolk
B - Buffalo	G - Chicago	P - St. Paul
C - Chester	K - Kansas City	R - San Jose
D - Dallas	L - Long Beach	U - Louisville
E - Mahwah	M - Memphis	

Body Style

C - Convertible (Fairlane "500").
F - Ranchero
G - Tudor, Fordor, (Custom & Custom "300"), Business Tudor (Custom).
R - Ranch Wagon, Custom "300" Ranch Wagon, Tudor.
S - Courier.
T - Tudor, Fordor (Fairlane & Fairlane "500").
V - Victoria, Tudor & Fordor (Fairlane & Fairlane "500").
X - Fordor Station Wagon, Country Sedan.
Y - Fordor Station Wagon, Country Squire.

NOTE - Asterisk used to prevent tampering with number.

COMPRESSION PRESSURE: 150 lbs. at cranking speed Maximum variation between cylinders 10 lbs

VACUUM READING: Steady 18-19" at idling speed (475-500 RPM), in Neutral

VALVE TAPPET CLEARANCE: .019" Intake & Exhaust (Hot & Cold) Adjust all tappets to .019" clearance while engine is cold, then again check all tappets for .019" clearance after running engine for 30 minutes to normalize temperature.

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM Spring is installed with ¾ turn windup and hooked over stop pin.

IGNITION

FIRING ORDER: 1–5–3–6–2–4.

SPARK PLUG GAP: .032-.036".

Spark Plugs - Champion 870 18 mm. Torque to 15-20 ft. lbs.

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be torque tightened within range of 15-20 ft.lbs.

COIL: Ford. B6A-12029-B.

Ignition Current - 2.5 amps idling, 4.5 amps. stopped.
Resistor - Ford B8E-12250-A. 1.3-1.4 ohms.

DISTRIBUTOR: Loadomatic type of same design used on previous models Distributors must be used with correct carburetor as follows:

Application	Distributor No.	Carburetor No.
Early Cars	① B7A-12127-H	B8A-9510-J,M
Later Cars	② B8A-12127-J	B8A-9510-J,M
Latest Cars	③ B8A-12127-M	B8A-9510-M,U

① - Replaced by B8A-12127-J
② - Engr No FET-12127-B ③ - Engr No FET-12127-C

►*DISTRIBUTOR PRODUCTION CHANGES TO MINIMIZE DETONATION:* Different distributors used with carburetors listed above Later distributors have different advance performance (see below) and later carburetors have different jet calibrations to eliminate leanness and surging and to provide correct distributor vacuum *Distributor and Carburetor combinations listed above. must be used together.*

►*EARLY DISTRIBUTOR MODIFICATION (For use with later carburetors)* Distributor B8A-12127-J can be reworked for use with Carburetor B8A-9510-U by installing new Secondary Advance Spring FAA-12225-A and recalibrating advance performance to specifications listed below for B8A-12127-M distributor *NOTE - Distributor B7A-12127-H should be replaced by B8A-12127-J, or M*

Condenser - Ford No 7RA-12300-C **Capacity** .21-.25 mfd.
Contact Point Set - Ford No FAA-12171-A
Breaker Gap - 024-026"
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

B7A-12127-H

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	29	600
1-2	55	800
6¼-7¼	1 36	1200
10½-11½	2 66	1700
12¼-12½	3 38	2000

B8A-12127-J

Distr. Degrees	Vacuum (" of Hg)	Distr RPM
0	29	600
1-2	55	800
6¼-7½	1 36	1200
10½-11½	2 66	1700
11-12¼	3 88	2000

B8A-12127-M

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	.38	450
2½-3½	79	650
6¾-7¾	2 85	1100
8¾-9¾	4 33	1400
10½-11¼	5 99	1800

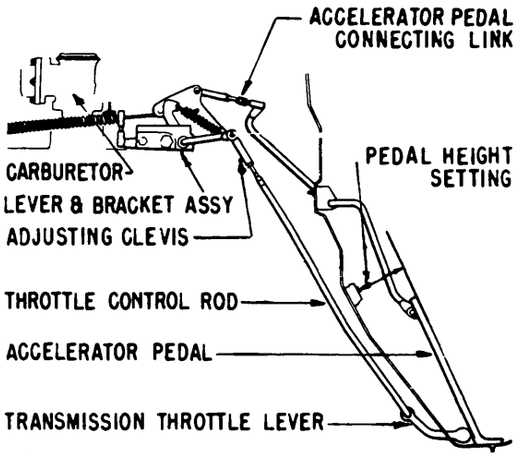
►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump. It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump

IGNITION TIMING

Setting (For Fuel of 88 Octane Research Fuel) - TDC (Std. & O.D. Cars), 2° BTDC (Auto. Trans.) with engine idling at 475 RPM and vacuum line disconnected.

►*NOTE:* Above settings supersede previous recommendations.

Timing Mark - Vibration damper marked "TDC", and "3", "5", "7", "9" degrees BTDC. Align correct mark with pointer on cylinder front cover.



FORDOMATIC TRANSMISSION THROTTLE LINKAGE

CARBURETOR

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE Special cleaning procedure required See AIR CLEANER*

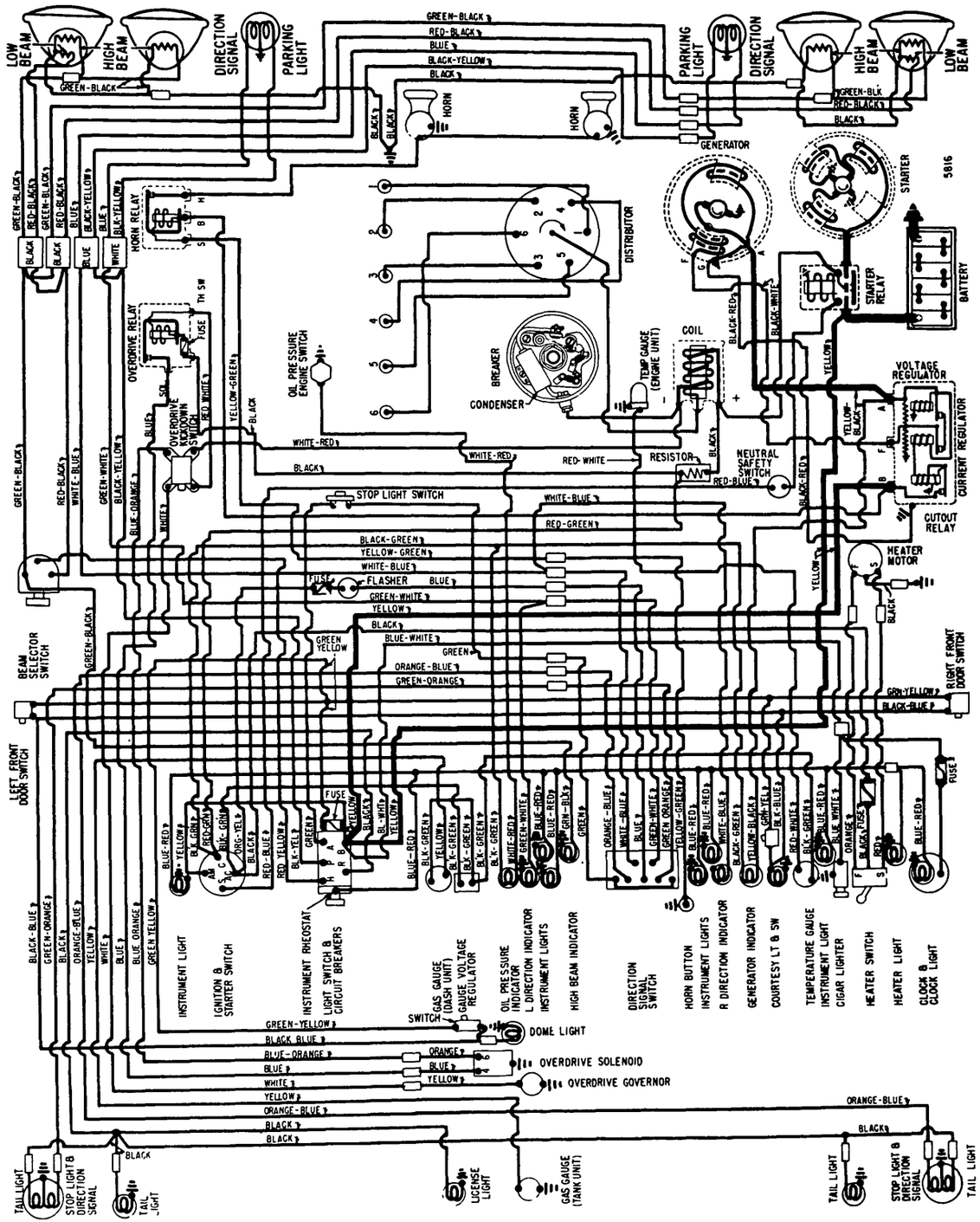
Throttle Linkage Adjustment (Automatic Trans.): Adjust engine idle speed to 475-500 RPM with selector lever in "N" position and engine at normal operating temperature. Adjust anti-stall dashpot (see below) Set hand brake and check idle speed in Dr (Drive) range and adjust if necessary to 425-450 RPM Pull throttle rod assembly upward firmly so transmission lever is against its internal stop, align hole in throttle rod clevis with hole in accelerator assembly by rotating clevis on throttle rod Then lengthen throttle control rod 2½ turns counterclockwise Assemble throttle control rod to accelerator assembly and adjust pedal height to 3.10" by changing length of accelerator assembly connecting link. This is an approximate setting. To adjust Control rod for correct operating pressure, place car on hoist, then remove 1/8" plug located ahead of transmission levers (on some cars at rear face of transmission), and install pressure gauge Lower car, install tachometer and shift into DR (Fordomatic), D1 or D2 Cruise-O-Matic) position. Raise engine speed to 1,000 RPM. Gauge reading should be 80-85 lbs. When pressure below 80 lbs., lengthen throttle rod. When pressure above 85 lbs, shorten rod *For pressure ranges at Idle and Stall speed conditions, see "Fordomatic" & "Cruis - O-Matic" in Transmission Section*

Anti-Stall Dashpot (Automatic Trans.): After engine idle speed adjusted to 475-500 RPM turn off engine. Loosen dashpot adjusting screw locknut Hold throttle in closed position and depress dashpot plunger with a screwdriver blade Turn dashpot or adjusting nut until 045 064" clearance obtained between dashpot plunger and throttle shaft lever Tighten locknut

FORD "VISI-FLO"

Holley (Ford) Visi-Flo. Ford No. B8A-9510-J (Std. Early), B8A-9510-U (Std. Later), B8A-9510-M (Special Economy).

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►*APPLICATION & RFPLACEMENT NOTE: Carbur tors must be us d with corr ct Distributor. Us only B8A-9510-U for service replac ment. S DISTRIBUTOR above.*

►*SURGING & LEANNESS CORRECTION (B8A-9510-J,M):* Install new main metering jet, No. 1GA-9533-B (#62). This jet used on B8A-9510-U Carburetor. *S e "Holl y (Ford) Visi-Flo Carburetors" in Carbur tion S ction.*

Idle Setting - Initial setting 1 turn open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture, rather than a lean setting.

Idle Speed - 475-500 RPM in Neutral. Recheck automatic transmission cars with selector lever in "DR" range. Readjust to obtain 450 RPM.

Fuel Level - 11/16" ± 1/32" below power valve mounting surface (Tool T52L-9550-AEE).

Accelerating Pump: Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: *S CARBURETOR abov .*

►*OTHER DATA: See "Ford Visi-flo Carbur tors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Ford B5A-9350-E (Fuel only), B5A-9350-F (Fuel & Vacuum).

Fuel Pump Pressure - 3.5-5.5 lbs. at 500 RPM. *See "Fuel Pumps" in Carburetion S ction.*

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B7A-10804-B. **Dash Unit** - Ford No. B8A-9280-A.

Tank Unit - Ford No. B8A-9275-F (Pass. Cars), B8A-9275-G (Sta. Wgn.). *See "Fuel Gauges" in Carburetion S ction.*

Air Cleaner: DRY FILTER ELEMENT Type. Clean every 4,000 miles, replace element every 24,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping lightly and shaking to remove dirt particles. *DO NOT wash element in solvent or oth r liquids and DO NOT oil or lubricate.*

BATTERY

Ford B6A-10655-C. 12 volt, 11 plate, 55 ampere hour capacity, or **Ford B7A-10665-A,** 12 volt, 11 plate 70 ampere hour capacity (20 hour rate).

Battery Ground - Negative, to engine block.

Engine Ground - Cylinder head to dash.

STARTER

Ford B6A-11002-A. Armatur - B6A-11005-B.

Drive - Ford ICM-11350-C. Bendix "Folo-Thru".

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM, 190 amperes max.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	80
15.5 ft. lbs.		5.0	550

①- With starter on engine and engine idling.

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Starting Switch: Magnetic type, Ford No. B6A-11450-A. Starter Switch is controlled by ignition switch. *NOTE* - Neutral Safety switch used on Fordomatic Transmissions.

N utral Safety Switch (Auto. Trans.): Ford No. B8A-15812-D (Fordomatic), B8A-15812-E (Cruise-O-Matic). *S "Fordomatic" & "Cruise-O-Matic" in Transmission S ction.*

GENERATOR

F rd. Used as follows:

G nerator	Armature	Application
B6A-10002-C	B6C-10005-B	①Std.
B6A-10002-H	B6A-10005-A	②Std.
B6A-10002-F	B6C-10005-C	Special

① - With B6C-10505-B Regulator.
② - With B7A-10505-B Regulator.

P rformance Data

Generator	Amperes	Eng. RPM
B6A-10002-C,H	30	1500
B6A-10002-F	40	1500

Brush Spring T nsi n - 26-34 ozs.
Field Curr nt - 1.5-1.6 amperes at 12 volts.
R tati n - Counterclockwise at commutator end.
B lt Adjustm nt: ¼" deflection midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

F rd N . B7A-10505-B (B6A-10002-H Gen.), B6C-10505-B (B6A-10002-C G n.), B7A-10505-A (B6A-10002-F Gen.).

►*SETTING CAUTION: "Temperature Compensated" typ . Set to following specifications at 75°F, ambient (ngine compartm nt) temperature, after ½ hour operation in vehicle, or aft r regulator heated and stabiliz d.*

Cut ut Relay

Cuts In - 12.4-13.2 volts (B7A-10505-B & B6C-10505-B), 12.0-12.8 volts (B7A-10505-A).
Cuts Out - 2-9 amps. (B7A-10505-B & B6C-10505-B), 2-6 amps. (B7A-10505-A).

V ltag Regulator

Setting - 14.6-15.4 volts at 75°F (Ambient).
Checking & Adjusting - *S e Electrical Section.*

Curr nt Regulator

S tting - 28-32 amperes (B7A-10505-B & B6C-10505-B), 38-42 amperes (B7A-10505-A).
Ch cking & Adjusting - *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System). *S "4-Headlights" in Electrical Section.*
Dir cti nal Signals: *See El ctrical Section*
Lighting Switch R m val: With control knob in "OFF" position, press spring release button on switchhousing, turn shaft slightly and pull it out of switch. Unscrew mounting nut. Remove Switch and disconnect all wires.
St p Light Switch L cati n: On forward end of brake master cylinder (Conventional Brakes), on top of booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.
CIRCUIT BREAKERS: On headlight switch. Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits.

FUSES: Size & location as follows:
Back Up Light - SFE 7.5 ampere, in feed wire behind instrument panel.
Cigar Lighter - Sulphur disc in base or reset circuit breaker located on back of lighter socket.
Clock - 1 AG, in feed wire.
Heaters - SFE 14 ampere, in feed wire.
Interior Lamps - SFE 7.5 ampere, on lighting switch.
Overdrive - 15 AGC on overdrive relay.
Turn Signal - SFE 7.5 ampere, in feed wire.
Horn Relay: Ford No. B8C-13853-A.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. valve-in-head.

Bore	Stroke	Displacement
3.62"	3.60"	223 cu. ins.

Compr.Ratio	Rated HP	Developed HP
8.6-1	31.54	145 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*FLYWHEEL PRODUCTION CHANGE (Fordomatic):* New Flywheel Part No. B8A-6375-C and Spacer Plate No. B7A-6383-A used on late cars. Spacer plate must go between flywheel and heads of crankshaft mounting bolts. Use this flywheel and spacer plate with all 11¾" diameter converter assemblies.

►*ENGINE STARTS IN DRIVE POSITION CORRECTION:* When Neutral Safety Switch **cannot** be adjusted so engine will start in "P" & "N" positions **ONLY,** replace switch with Part No. B8A-15812-D (Fordomatic) or B8A-15812-E (Cruise-O-Matic).

►*ENGINE STALLING AFTER COLD START CORREC-* (Holley Carb.): Caused by incorrect automatic choke linkage adjustment. *See "Holley Carburetors" in Carburetion Section.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL: Drain crankcase, Remove oil level indicator, engine left and right front splash aprons. Remove stabilizer bar, flywheel housing inspection cover, oil pan retaining screws, and pan.

PISTONS

Autothermic type. Solid skirt with three rings
Removal - Pistons and rods removed from above.
Fitting New Pistons: Clearance - .0009-.0015" at bottom of skirt. Use ½" wide ribbon feeler inserted between piston and cylinder wall at right angle to pin on thrust side, with piston inverted and end of piston 1½" below top of block. Pull required to remove feeler should be 5-10 lbs. when using feeler gauge thicknesses as follows:
New Piston in New Bore - .002".
New Piston in Used Bore - .0025".
Used Piston in Used Bore - .003".
Replacement Pistons: Furnished with fitted pins in Std. and .020", .030", .040", .060" oversize.
Installing Pistons: Install piston with indentation in head of piston toward front of engine.

PISTON PINS

Floating type with lock ring at each end.
Diam t r - .9120-.9123". **L ngth** - 3 016-3.030".
Pin Fit in Pist n - .0001-.0003", wear limit .0008".
Pin Fit in Rod Bushing - .0001-.0003", wear limit .0008".
Replacement Pins: Standard, and .001", .002" oversize.

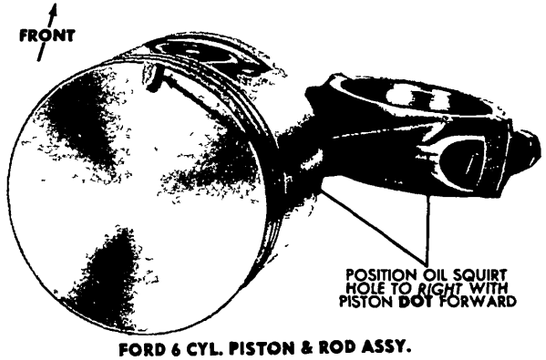
PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr.#1,2	3/32"	.010-.027"	.002-.0035"
Oil #3	3/16"	.015-.062"	①

① - Side sealing type ring.
Replacement Rings: Standard, .020", .030", .040", .060" oversize (Expander type).

CONNECTING RODS

Journal Diameter - 2.2980-2.2988".
Clearance - .0004-.0023", wear limit .0033".
Side Clearance - .003-.009", wear limit .012".
Replacement Bearings: Standard size (2 sizes marked **Red** and **Blue**) and .010", .020", .030" Undersize.



FORD 6 CYL. PISTON & ROD ASSY.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
Installing Rods: Install rod with squirt hole to right and piston indentation toward front of engine.

CRANKSHAFT

►*REAR MAIN BEARING PRODUCTION CHANGE:* Copper-lead narrow type used on later cars. Both wide and narrow types available for service.
Journal Diameter - 2.4980-2.4988". Four Bearings.
Bearings - Steel backed, copper lead alloy, or lead babbitt.
Clearance - **Copper Lead** - .0005-.0025", wear limit .0035". **Lead Babbitt** - .0005-.0021", wear limit .0031".
Replacement Bearings: Standard size (2 sizes marked **Red** and **Blue** for selective fitting) and .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance. Use mixed set (Red & Blue) if necessary to obtain selective fit.
End Thrust: Taken on rear intermediate #3 bearing.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data.*
End Play - .004-.008", wear limit .012".
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main B arings" in Ford Sp cial Data.*
Crankshaft Fr nt Oil S al Installati n: *S "Engin Front Cov r" in Ford Special Data.*

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Form 16A

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CAMSHAFT

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

Journal Diameter - 1.9255-1.9265".

Clearance - .001-.003", wear limit .006".

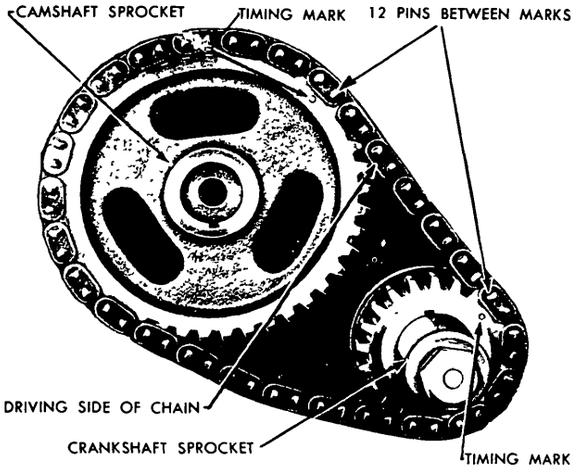
End Thrust: Taken by thrust plate and spacer behind camshaft sprocket. *NOTE* - Chamfer on inside of spacer must be toward camshaft journal.

Replacement Bearings: Finished bearings furnished Standard, and .015" undersize. *CAUTION* - Rear intermediate (#3) bearing not interchangeable with other bearings.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

Timing Chain: Side-guide type. 56 links.

Camshaft Setting: Sprockets marked by "O" at one tooth. Mesh chain so that there are 12 pins between "O" marks on driving side of chain.



FORD 6 CYL. VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*

VALVES

Tappet Clearance: .019" Intake & Exhaust (Hot or Cold).

Valve	Head Diameter	①Stem Diameter
Intake	1.775-1.785"	.3416-.3423"
Exhaust	1.505-1.515"	.3403-.3410"

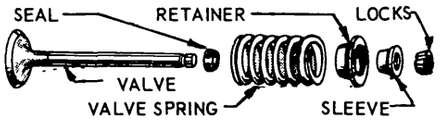
Valves	Seat Angle	②Lift	③Stem Clearance
Intake	45°	.273"	.001-.0024"
Exhaust	45°	.273"	.0023-.0037"

①- Furnished with .003", .015", .030" oversize stems.

②- Cam lobe lift. Wear limit, .268".

③- Wear limit .0045" (Intake), .0065" (Exhaust).

►*ROTATABLE VALVE NOTE: All valves are rotatable type. See "Valve System" in Ford Special Data.*



FORD 6 CYL. VALVE ASSEMBLY

Valve Stem Seals - Umbrella type seals used on both intake and exhaust valve stems, cupped side down.

Valve Seat Width - .060-.080" (Intake), .070-.090" (Exhaust).

Valve Springs: Free Length - 2.09" approximately.

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①71-79 lbs.	1.780"
Open	②161-177 lbs.	1.390"

①- Wear limit 64 lbs. at 1.780".

②- Wear limit 145 lbs. at 1.390".

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to spring retainer contact surface. If assembled height is 1 13/16" or greater, install necessary .030" spacer or spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 25/32-1 13/16".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves. *See "Valve System" in Ford Special Data.*

Valve Lifters: Mushroom type. Removed from below with camshaft out.

Rocker Arm Assembly: *See "Valve System" in Ford Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated.

Intake Valves - Open 17°①BTDC. Close 53°②ALDC.

Exhaust Valves - Open 61°①BLDC. Close 9°②ATDC.

①- Camlift .016". ②- Camlift .019".

Valve Timing Check - Release No. 1 Intake valve adjusting screw, push rocker arm to one side, install dial indicator in pushrod socket. Zero indicator with cam on heel of lobe. Install quadrant on crankshaft pulley, rotate engine to amount of lobe lift shown in table above, then check quadrant and compare reading with degrees shown in table above for that valve. If reading not correct, check for bent pointer, worn timing chain, or worn sprocket before replacing camshaft.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity: 4 quarts (refill), 5 quarts (when filter element changed).

Normal Oil Pressure: 45-50 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator - Indicator light on instrument panel, operated by engine unit, Ford No. B6A-9278-B

Oil Pump: Gear type pump located in crankcase,

Pump Overhaul - *See "Oil Pump" in Ford Special Data.*

Oil Filter: "Disposable" type. Replace at 4,000 mile intervals.

Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn.

Crankcase Ventilation: Filter in oil filler cap (inlet), an outlet pipe in rear of crankcase at left side

COOLING

Water Capacity: 15 quarts, add 1 quart for heater.

Pressure Valve: Ford LA-8100-A Radiator filler cap. Opens 12-15 lbs. *CAUTION* - Use only 12-15 lb. cap. for replacement.

Thermostat: Ford No. B7A-8575-A (157-162°F) standard, Ford No. B7A-8575-B (177-182°F) for use with permanent anti-freeze.

Water Pump: Packless, sealed ball bearing type. *See "Water Pump" in Ford Special Data.*

Temperature Gauge: King-Seeley Electric Constant-voltage ("CV") type, with gauge voltage regulator Ford No. B7A-10804-B. **Dash Unit** - Ford B8A-10883-A. **Engine Unit** - Ford B7A-10884-A. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Long Model 9½ CF. No. 268594, 11 CF 267350 (Pass. Cars), 11NC No. 266978 (Taxi). Semi-centrifugal type. *See "Long Clutches" in Clutch Section.*

Clutch Disc - Long 288849 (9½ CF), 288851 (11 CF).

Pedal Adjustment: If total pedal travel is less than 6 3/8" or more than 6 5/8" reposition pedal bumper and bracket until travel is within limits. Adjust spring link to give assist spring length of 9¾-10" (between eye centers) with pedal fully released.

Free Travel - 1 1/8-1 3/8". Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is obtained. *NOTE* - Check free travel by operating engine at 3,000 RPM with transmission in neutral position. There should be a minimum of ½" free travel under these conditions.

Removal: Remove transmission, *see "Synchro-Mesh Transmission" below,* then remove flywheel housing cover and release lever retracting spring. Slide release bearing and hub off release lever. Mark clutch cover and flywheel for reinstallation, loosen six cover bolts uniformly to release spring tension. Remove cover and pressure plate through opening of flywheel housing.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low and reverse). *See "Ford Synchro-mesh" in Transmission Section.*

►*TRANSMISSION & REAR AXLE RATIO PRODUCTION CHANGE (To Improve Economy):* Late production cars (Exc. Taxi) use Transmission B8A-7003-G, with New Input Shaft, New Intermediate Gear, and New Cluster Gear with 3.56-1 Rear Axle Ratio to improve economy. Use speedometer Driven Gear No. B7A-17322-Q(8.00x14; 7.50x14; 6.70x15 tires) or B7A-17322-P (7.10x15 tires). New transmission identified by lettering (WAP-G) on extension housing.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

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R m val: With car raised up, disconnect drive shaft at rear universal joint, slide drive shaft off transmission output shaft Remove speedometer cable and gear Disconnect shift rods at transmission Remove rear engine support to extension housing bolts Disconnect parking brake adjusting rod from equalizer bracket Support rear of engine and remove rear engine support, then lower engine for clearance, and remove transmission to flywheel housing bolts Use guide pins in two lower bolt holes and slide transmission back until input shaft clears flywheel housing, and lower transmission

OVERDRIVE

Warner R10. Solenoid operated type, with governor control and throttle operated kick-down

S e "Ford Ov rdriv " in Transmission Section.

Ov rdriv C ntr l: *S e "Overdrive Control" in Transmission S ction*

R m val: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring

AUTOMATIC TRANSMISSION

Torque Converter and three speed automatic transmission with hydraulic control

See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

► *TESTING & TROUBLE SHOOTING· See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission Section*

Lubricati n - Check transmission fluid at 1,000 mile intervals and maintain level at "F" (Full) mark on dipstick Drain and refill every 24,000 miles **Use only Aut matic Transmissi n Fluid Type "A".**

Ch cking Fluid L v l - Bring transmission to operating temperature by running engine with selector lever in Neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid level Add Automatic Transmission Fluid Type "A" to bring level to "Full" mark on dipstick

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER FORDOMATIC SERVICE DATA. See "Fordomatic, Merc-O-Matic & Turbo-Drive" in Transmission S ction*

UNIVERSALS

M chanics. Needle bearing type

►*CAUTION* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *S "Ford & Mercury" in Rear Axl S cti n*

REAR AXLE

Own. Separate carrier type, semi-floating, hypoid, with Hotchkiss Drive *NOTE* - Same type used on all models *S "Ford & M rcury" in R ar Axle Section*

►*TRANSMISSION & REAR AXLE RATIO PRODUCTION CHANGE (T Improv Economy)· S "SYNCHRO-MESH TRANSMISSION" ab v*

Axl Rati

M d l		Pass. Cars	② Oth rs
Synchro-mesh (Early)		3 22-1 (29-9)	
Synchro-mesh (Later)	①	3 56-1 (32-9)	
Overdrive		3 70-1 (37-10)	.3 89-1(35-9)
Auto Trans		3 56-1(32 9)	3 56-1(32-9)

① - With New Ratio Trans Ford No B8A-7003-G Supersedes 3.70-1 ratio

② - Ranchero, Sta Wgn , Sedan Del

Backlash - 004- 009"

Axle Shaft Removal: Remove wheel take off drum Remove four axle retainer locking type nuts (work through opening in axle shaft flange) Use Puller No 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing With rear universal joint disconnected axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly

SHOCK ABSORBERS

Direct acting, non-adjustable Service by replacement

Model	Front	Rear
Pass Cars ①③	B8A-18124-A	B8A-18125-A
Pass Cars Hvy Dty	④ B8A-18124-B	. ③ B8A-18125-B
Sta Wgn ①	B8A-18124-B	B8A-18125-C
Hard Top ①	B8A-18124-C	B8A-18125-D
Pass Cars ②③	B8A-18124-B	⑤
Sed Del & Sta Wgn ②	B8A-18124-F	⑥
Hard Top ②	B7A-18124-H	B7A-18125-K
Taxi		B7A-18125-H

① - With Air Susp ② - Less Air Susp

③ - Exc Hard Top, Sta Wgn & Sed Del

④ - Exc Hard Top & Sed Del

⑤ - B7A-18125-H or B8A 18125-E

⑥ - B7A-18125-J or B8A 18125-G

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs

See "Ford, Thunderbird, Mercury" in Suspension & Wheel Alignment Section

Caster - 0° to Pos 1° Maximum variation between wheels ½°

Camber - Pos ½° to Pos 1½° Maximum variation between wheels ½° (¼° preferred)

Toe-In - 1/16-1 8" *NOTE* - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered

Toe-Out on Turns - Outer wheel 20°, inner wheel should be 24½°

STEERING

Manual: Own. Recirculating ball worm and nut

See "Saginaw Ball B aring Worm & Nut" in St ring Section

P w r St ring: Ford-Mercury Linkage type Used in conjunction with standard steering gear

Se "Ford & Mercury Linkag Type" in St ering S ction

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic. Hand lever applies rear wheel service brakes

► *BRAKE DESIGN NOTE:* Front brake anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin)

See "Ford, Lincoln, Mercury Bendix" in Brake Section

► *BRAKE PULLING CORRECTION:* To correct loosen anchor pin attaching bolt (See Brake Design Note above) and retighten to 80-100 ft lbs

Drum Diameter - 11" front and rear

Wheel Cylinder Diameter - 1 1/8" (Front-All), 7/8" (Rear-Pass Cars), 15/16" (Rear - Sta Wgn

Lining Width & Length

Model	Primary	Secondary
Sed & Cpe (Front)	2¼" x 10 62"	2¼" x 11 93"
(Rear)	1¾" x 10 62"	1¾" x 11 93"
Others (Front)	2¼" x 10 62"	2¼" x 11 93"
(Rear)	2" x 10 62"	2" x 11 93"

Clearance - Adjusting screw backed off 10-12 notches from point where shoes are tight against drum

Brake Pedal Free Play Adjustment: 5/16" to 7 16" If play not correct after brake adjustment loosen locknut on the eccentric bolt that attaches brake pedal assembly to master cylinder pushrod rotate eccentric bolt for desired clearance, tighten locknut

Standard Master Cylinder: Located on engine side of firewall

Checking Fluid - Maintain fluid level to within ½" of top of reservoir

Removal - Disconnect rubber boot from rear end of master cylinder brake line at master cylinder fitting stop light switch from front of cylinder and disconnect wires from switch Push down brake pedal several times to force as much fluid as possible (into clean container) remove bolts that secure master cylinder to dash panel Do not disconnect pushrod from brake pedal unless it is to be serviced

Power Brakes: "Bellows Type" used Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel and attached direct to brake power lever

See "Ford Bellows Type" in Brake Section

Checking Fluid Level - Maintain fluid to within ½" of top of reservoir

Removal - Remove vacuum hose from top of unit, valve adjusting eccentric with flat washer spring, and bushing nylon bushing from power unit valve housing Remove two mounting screws (bracket-to-dash panel) and remove power unit from car

MISC. MECHANICAL

►*Se Ford V8 Data following*

Form 168

►*AIR SUSPENSION CAR CAUTION: Befor jacking, hoisting, towing or working under car, se SERVICE CAUTIONS and TOWING instructions in "Ford Air Suspension" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left door post. *NOTE* - Number (example below) includes identification data as indicated.

①②③④ ⑤
B 8 F G 100001

① - Engine Type, see below.
② - Year (1958).
③ - Assembly Plant, see below.
④ - Body Style, see below.
⑤ - Consecutive unit number.

Engine Type

B - Interceptor V8 (Dual Carb.).
C - Y-V8 (Dual Carb.).
G- Interceptor V8 & Interceptor V8 Special (4-Barrel Carb.).
H - Interceptor V8 Thunderbird Special (4-Barrel Carb.).
W - Police Interceptor Option (361 Engine).
NOTE - Asterisk used to prevent tampering with number.

Assembly Plant Designation

A - Atlanta	**F** - Dearborn	**N** - Norfolk
B - Buffalo	**G** - Chicago	**P** - St. Paul
C - Chester	**K** - Kansas City	**R** - San Jose
D - Dallas	**L** - Long Beach	**U** - Louisville
E - Mahwah	**M** - Memphis	**Y** - Wixom

NOTE - Wixom is Lincoln-Thunderbird plant.

Body Style

C - Convertible (Fairlane "500").
F - Ranchero.
G - Tudor, Fordor (Custom & Custom "300"): Business Tudor (Custom)
H - Thunderbird.
R - Ranch Wagon, Custom "300" Ranch Wagon; Tudor.
S - Courier.
T - Tudor, Fordor (Fairlane & Fairlane "500").
V - Victoria, Tudor & Fordor (Fairlane & Fairlane "500").
X - Fordor Station Wagon, Country Sedan.
Y - Fordor Station Wagon, Country Squire.
W - Retractable Hard Top

►*ENGINE IDENTIFICATION NOTE:* Specifications below are designated for each engine using engine displacement figure as follows: **292** - Y-V8 (Dual Carb.) **332** - Interceptor V8 & Interceptor Special V8 (Dual & 4-Barrel Carb.), **352** - Interceptor V8 Thunderbird Special, **361** - Police Interceptor Power Option.

TUNE-UP

►*HIGH IDLE SPEED CORRECTION (Ford Carb.):* High idle speed caused by accelerator rod clip interference at wide open throttle can be corrected by grinding or filing off throttle lever so edge of lever is concentric with hole. Lever should have not more than 1/8" greater radius than hole.

COMPRESSION PRESSURE: 160 lbs. (292), 180 lbs. (Others) at cranking speed.

VACUUM READING: Steady 19-20" at 475-500 RPM in Neutral.

Tappet Clearance - Mechanical Lifters - (292") .020" Cold, .019" Hot, All Valves, **(332" & 352")** .026" Cold & Hot, All Valves. *NOTE* - If tappet clearance set Cold, recheck clearance after engine operated 30 minutes to normalize temperature and reset tappet clearance to Hot figure. *See "Valve System" in Ford Special Data for Tappet Clearance checking procedure.*

Hydraulic Lifters - (332", 352", 361") None in service. *See "Valve System" in Ford Special Data for operating range check of hydraulic lifters.*

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Self-locking adjusting screws used which have interference thread fit at center portion of threads. Replace adjusting screw or rocker arm assembly when turning torque is less than 3 ft. lbs. (36 in. lbs.).

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at idle speed and is open when operating at high RPM. Spring is installed with ¾ turn wind-up and hooked over stop pin.

IGNITION

FIRING ORDER: 292 - 1-5-4-8-6-3-7-2, **332,352 & 361** - 1-5-4-2-6-3-7-8.

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036".

Spark Plugs - 292 - Champion F-14-Y, **332,352** - Champion F-11-Y. 18 mm. Torque to 15-20 ft. lbs.

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be torqued to 15-20 ft. lbs.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 stopped.

Resistor - Ford B8E-12250-A. 1.30-1.40 ohms at 75°F.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Same type as used on previous V8 models (with centrifugal and vacuum spark advance). *See "Ford, Lincoln, Mercury Distributors" in Electrical Section.*

Engine	Ford Distributor No.
292" (No mark on Frt. Cover)	B8A-12127-B
292" (Orange mark on Frt. Cover)	B8A-12127-L
332" (Early) Ⓒ	② B8A-12127-C
332" (Late) Ⓒ	③ B8A-12127-E
332" (Later)	④ B8A-12127-G
352" (Mech. Lifters)	⑤ B8A-12127-F
352" (Hydr. Lifters)	⑥ B8A-12127-K

Ⓒ - Replaced by Distributor No. B8A-12127-G.
② - Eng. No. FEU-12127-B. ③ - Eng. No. FEU-12127-E.
④ - Eng. No. FEU-12127-J. ⑤ - Eng. No. FEU-12127-H.
⑥ - Eng. No. FEU-12127-N.

►*LOW SPEED DETONATION CORRECTION (332" & 352" ENGINES):* May be caused by use of regular fuel (instead of specified premium fuel) or low octane rating of available fuel. Correct as follows:

332" Engines - Reset Ignition Timing to 2° BTDC. If detonation still present, indicating use of fuel of less than 92 Octane Rating, recalibrate distributor for special centrifugal and vacuum advance listed below under "332 Engine Special Calibration", and set Ignition Timing to 3° BTDC (Synchro-mesh Cars) or 6° BTDC (Auto. Trans. Cars). If detonation still present, reset Ignition Timing to 2° BTDC (All Trans.).

352"Engines with Mechanical Lifters - If fuel of less than 96 Octane Rating used, recalibrate distributor (B8A-12127-F) to advance specifications listed below for B8A-12127-K distributor. DO NOT change specified Ignition Timing setting. *CAUTION* - Ignition timing should not be retarded beyond 2° BTDC under any conditions.

Condenser - Ford B7A-12300-A. **Capacity** .21-.25 mfd.
Contact Point Set - Ford B7A-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance - B8A-12127-B, L

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	150	0	300
1½-2½	450	3-5	900
6¾-7¾	700	13½-15½	1400
16½-18	2000	33-36	4000

Automatic Advance - B8A-12127-C, E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300-425	0-1	600-850
0-1¼	475	0-2½	950
8-9	1000	16-18	2000
14½-16	2000	29-32	4000

Automatic Advance - B8A-12127-G

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	150	0	300
1-2	500	2-4	1000
8-9	900	16-18	1800
13¾-15¼	2000	27½-30½	4000

Automatic Advanc
332" Engine - Special Calibration Ⓒ

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	575	0	1150
3-4	800	6-8	1600
5½-6½	1050	11-13	2100
10½-11½	2000	21-23	4000

Ⓒ - *See "Low Speed Detonation Corr ction" above.*

Automatic Advanc - B8A-12127-F

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	150	0	300
1-2	450	2-4	900
7½-8½	800	15-17	1600
10¼-11¾	2000	20½-23½	4000

Automatic Advanc - B8A-12127-K

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	425	0	850
½-1½	500	1-3	1000
4½-5½	700	9-11	1400
7½-8½	1000	15-17	2000
13¼-14¾	2000	26½-29½	4000

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Aut matic Advanc - 361 Engin

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
0-½	375	0-1	750
4-5	515	8-10	1030
7½-9	2000	15-18	4000

Vacuum Spark C ntr l: Diaphragm type. Mounted on distributor and linked directly to breaker plate.

① Vacuum Advance - B8A-12127-B, L

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1-3	2-6	6
9-11	18-22	13
10½-12½	21-25	16-20

① Vacuum Advance - B8A-12127-C, E

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
0-1½	0-3	7
4½-6½	9-13	10
10-12	20-24	15

① Vacuum Advance - B8A-12127-G

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
1-3	2-6	6
8-10	16-20	12
10½-12½	21-25	16-20

① Vacuum Advance
332" Engine - Sp cial Calibration ②

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-3	0-6	6
5-8	10-16	10
9-12	18-24	14

① Vacuum Advance - B8A-12127-F

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1-3	2-6	6
8-10	16-20	12
10½-12½	21-25	16-20

① Vacuum Advance - B8A-12127-K

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
1-3¾	2-7½	8
4½-7½	9-15	11
7-10	14-20	14

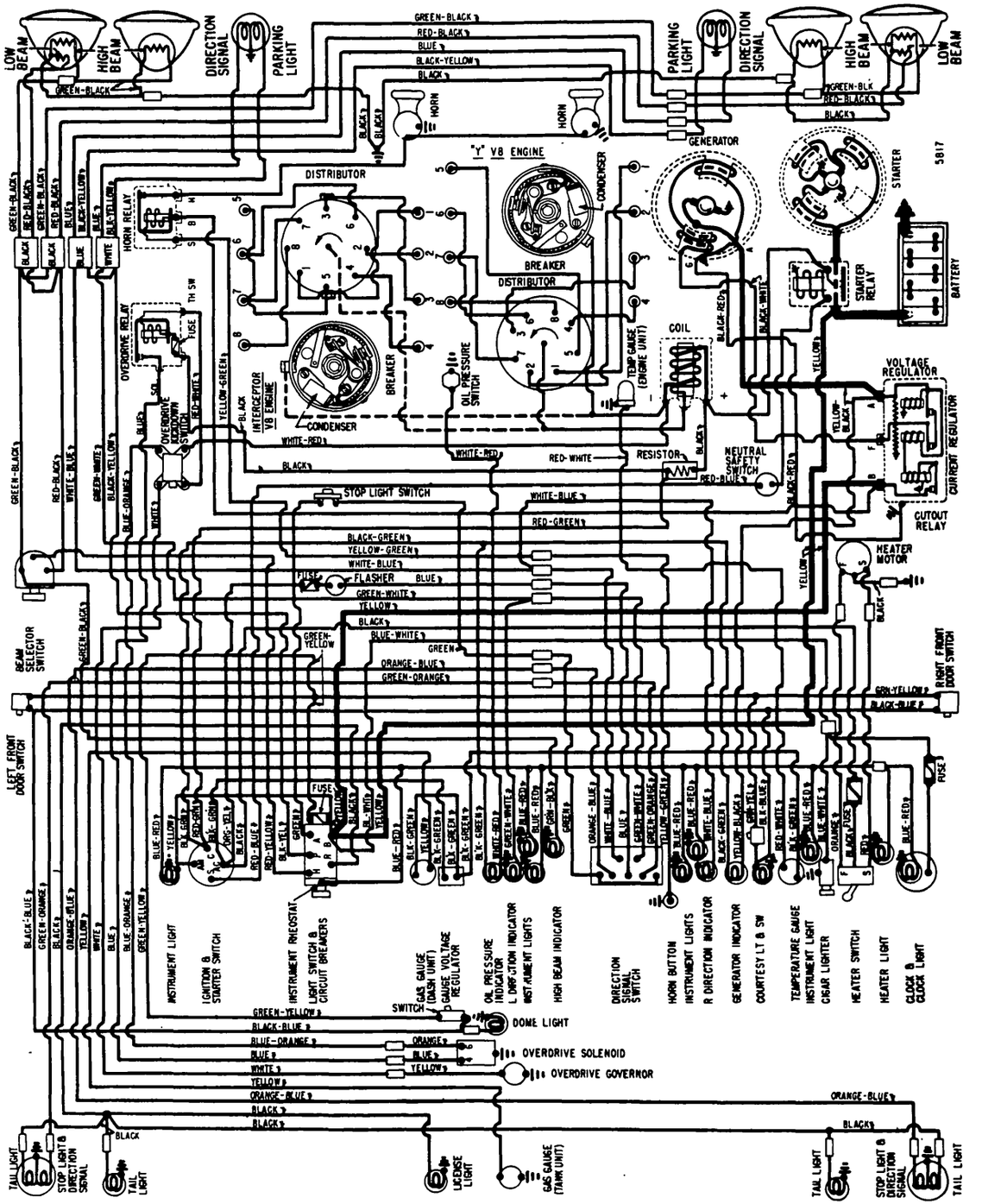
① Vacuum Advance - 361 Engine

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0	0	1-6
0-2	0-4	10
5-7	10-14	14

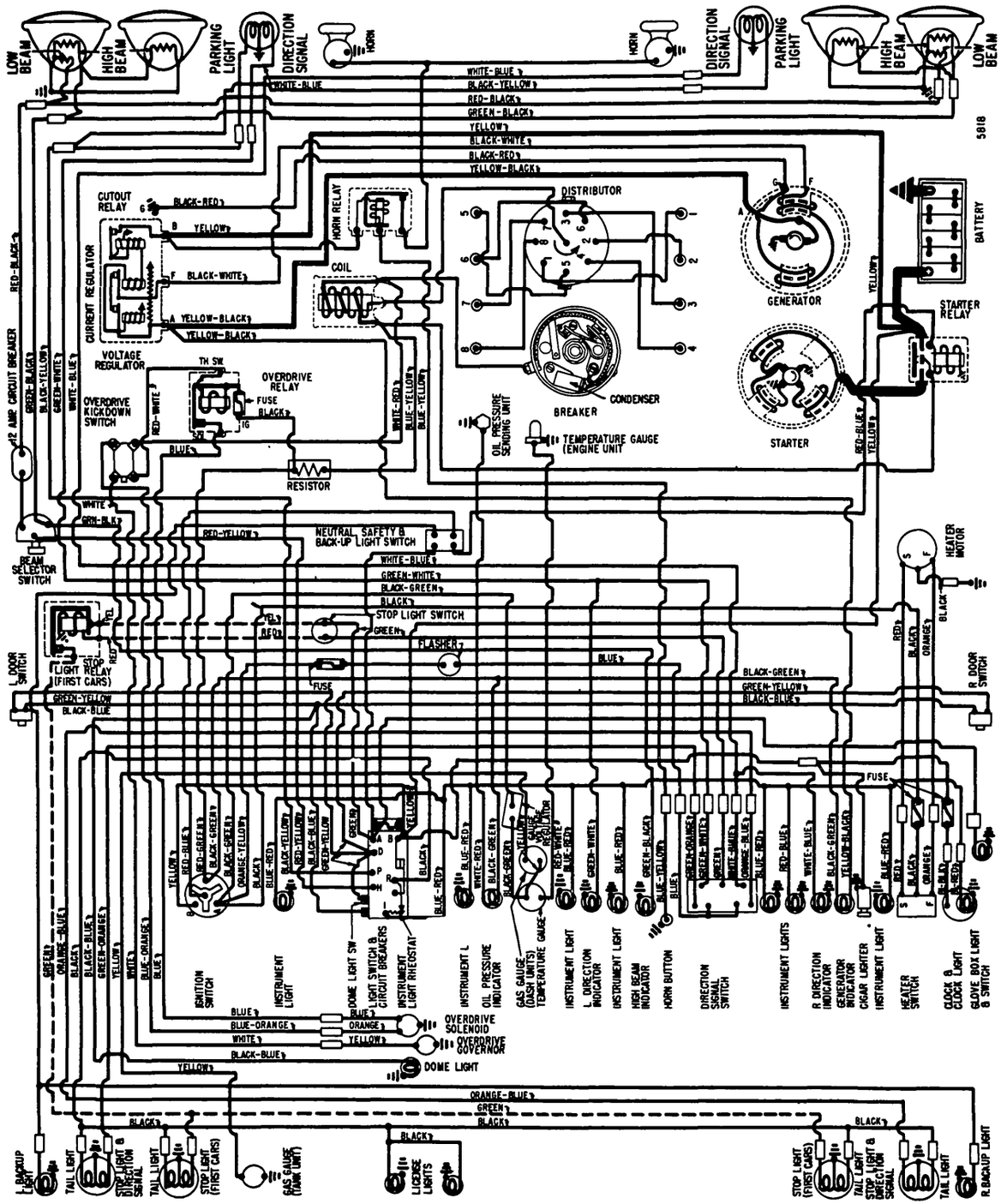
① - With distributor speed of 1000 RPM.
② - *See "Low Spe d D t nation Correction" above.*

►*332" & 352" DISTRIBUTOR REMOVAL CAUTION:* When oil pump intermediate shaft retainer is loose on shaft, shaft may become disengaged from oil pump as distributor is removed. To correct, remove oil pan, oil pump intermediate drive shaft, and remove retainer from shaft. Strike retainer lightly with hammer to flatten it and reinstall. *NOTE* - Retainer must be tight on shaft and bear against top of crankcase with shaft fully seated.

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FORD V8 (EXCEPT THUNDERBIRD) WIRIN DIAGRAM



FORD THUNDERBIRD WIRING DIAGRAM

IGNITI N TIMING

►*INCORRECT IGNITION TIMING & DETONATION NOTE:* If detonation is encountered and timing is set properly (for type of fuel being used), check and reset, if necessary, the ignition timing pointer on engine frontcover, as follows: Remove No. 1 spark plug and install a dial indicator to contact top of No. 1 piston. Rotate crankshaft clockwise to locate TDC, then adjust dial indicator to zero. Rotate crankshaft clockwise until a reading of .005" is obtained and scribe a line on dampener. Rotate crankshaft counterclockwise until .005" is obtained and scribe another line on dampener. Position crankshaft between the two marks on true TDC, then bend ignition timing pointer to align with the correct TDC mark on dampener.

Standard Igniti n Setting

Engine	Synchro-mesh Cars	Aut . Trans.
292"	①3° BTDC	②6° BTDC
332" (Std.)	5° BTDC	8° BTDC
332" (Det. Corr. ③)	2° BTDC	2° BTDC
352"	3° BTDC	6° BTDC
361"	3° BTDC	6° BTDC

① - Maxium 6° BTDC. ② - Maximum 8° BTDC.

③ - *See "Low Speed Detonati n C rr ction" und r Distributor (above).*

Timing Mark - Crankshaft dampener or pulley marked TDC (long line) and 2°, 4°, 6°, 8°, 10° BTDC (five short lines). Align pointer with correct mark.

CARBURETOR

►*CARBURETOR APPLICATION:* Used as follows:

Engine Type	Carburet r Typ
292	Ford & Holley 2-Barrel
332	Ford & Holley 2-Barrel & 4-Barrel
352	Ford & Carter 4-Barrel
361	Ford & Holley 4-Barrel

►*1958 FORD AUTOMATIC CHOKE FAILURE TO COMPLETELY OPEN CORRECTION:* If choke valve does not open completely or "come off" quickly enough, it may be due to improper sealing of choke stove to manifold. Correct by cementing gasket to manifold and the choke stove cover to gasket with asbestos furnace cement.

►*ENGINE STALLING AFTER COLD START CORRECTION (Cars with Holley Carbur t rs):* Caused by incorrect choke linkage adjustment and insufficient choke action. *See "Holley 2 & 4-Barrel Carbur tors" in Carburetion Section.*

►*HOLLEY CARBURETOR IMPROVED OPERATION (332" Engine Cars with 2 or 4-Barr l Carburet rs):* It is recommended that Hot Start Bleed Holes (in venturi wall) be plugged with drive screws, Part No. 92032-S2. *For installation data, s e "H ll y 2 & 4-Barr l Carburetors" in Carburetion S cti n.*

►*INEFFECTIVE IDLE SCREW ADJUSTMENT (Cars with Holley 4-Barrel Carburetor):* Caused by excessive fuel mixture bleed past secondary throttle valves. *For secondary valve stopscrew adjustm nt, se "Holl y 2 & 4-Barrel Carburetors" in Carburetion S ction.*

►*332" & 352" ENGINE THROTTLE LINKAGE INTERFERENCE CORRECTION (Aut . Trans.):* Accelerator

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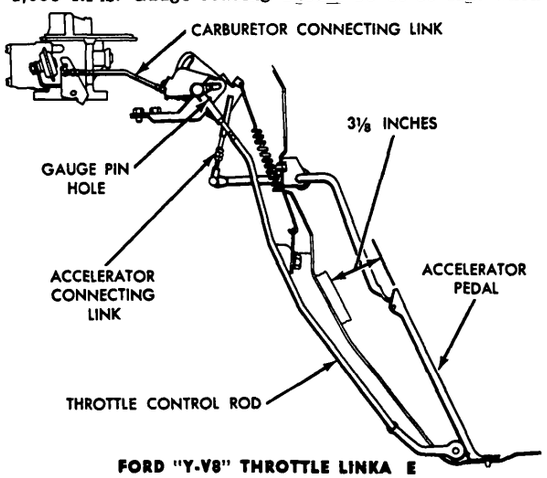
bellcrank-to-carburetor rod should be parallel to centerline of engine and accelerator-to-transmission control rod should be installed with retaining nuts to outside of engine and in an inclined position (not vertical) when viewed from front of engine.

►*LOW GAS MILEAGE OR ROUGH ENGINE IDLE CORRECTION (Cart r 4-Barrel Carb.):* Caused by poor automatic choke operation. *See Choke Housing Change and n w s tting und r "Carter Carburetors" in Carburetion Secti n.*

►*SLOW & HARD HOT START CORRECTION (4-Bbl. Carb.): See "Carter 4-Barrel Carburetors" or "Ford 4-Barrel Carburetors" in Carburetion Section.*

►*A.C. CAR IDLE SPEED NOTE:* During season when A.C. in use, set idle speed after operating A.C. for 20 minutes with unit on at maximum cooling.

Thr ttl Linkag Adjustment (Auto. Trans. Cars): Adjust engine idle speed (see Carburetor data below) with engine at normal operating temperature. Adjust Anti-stall Dashpot (see below). Stop engine. Disconnect upper end of transmission throttle control rod. Insert gauge pin (¼" drill rod) in gauge pin hole (see illustration). Adjust carburetor connector link length so that carburetor throttle lever is against hot or slow idle stop. Adjust accelerator pedal link for pedal height of 3 1/8". Remove gauge pin and check alignment of holes (pin must enter freely). Pull upward firmly on transmission throttle control rod so that transmission lever is held firmly against its stop, adjust clevis on upper end of rod until clevis fits pin on accelerator assembly lever freely, **th n l ngthen rod by turning clevis 3 full turns count rcl ckwis ,** connect rod. Then adjust rod for correct operating pressure as follows: Place car on hoist then remove 1/8" plug located ahead of transmission levers (on some cars at rear face of transmission), and install pressure gauge. Lower car, install tachometer and shift into DR (Fordomatic), D1 or D2 (Cruise-O-Matic) position. Raise engine speed to 1,000 RPM. Gauge reading should be 80-85 lbs. When reading below 80 lbs. lengthen throttle rod. When pressure is above 85 lbs. shorten throttle rod. For pressure ranges at Idle and Stall speed conditions, *see "F rd-omatic" & "Cruise-O-Matic" in Transmission Section.*



FORD "Y-V8" THROTTLE LINKA E

Dashpot Adjustment (Ford & Holley Carbs.): Loosen dashpot locknut, bottom dashpot plunger, hold throttle in hot idle position. Clearance between dashpot plunger and throttle lever should be .060-.090" (V8 Ford Carbs.); .045-.064" (All other carbs.). To adjust, turn dashpot or dashpot adjusting nut. Tighten locknut.

Dashpot Adjustment (Carter Carbs.): Hold throttle valves wide open. Distance between top surface of bowl cover and top of plunger shaft should be 7/16". To adjust, bend stop lug on dashpot operating lever.

FORD & HOLLEY 2-BARREL
(292 & 332 Engines)

FORD 2-BARREL

Car Model	Carb. No.
292" Eng. (Early) Std. & O.D. Ⓒ	B8A-9510-K
292" Eng. (Late) Std. & O.D.	B8A-9510-N
292" Eng. Auto. Trans.	B8A-9510-P
332" Eng. (Early) Std. & O.D. Ⓒ	B8A-9510-L

HOLLEY 2-BARREL

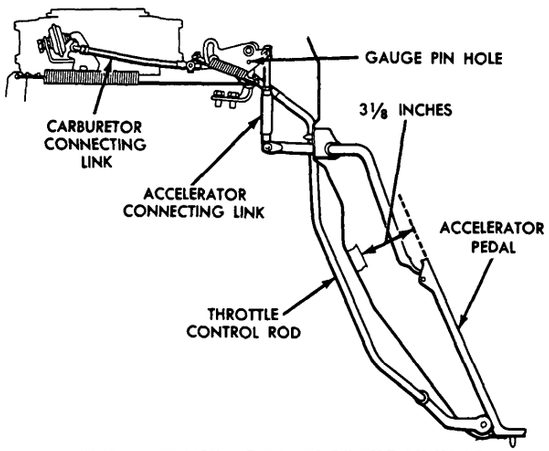
Car Model	Carb. No.
292" Eng. (Early) Std. & O.D. Ⓒ	B8A-9510-H
292" Eng. (Late) Std. & O.D. Ⓒ	B8A-9510-R
292" Eng. Auto. Trans.	B8A-9510-G
332" Eng. (Early) Std. & O.D. Ⓒ	B8A-9510-D
332" Eng. (Late) Std. & O.D. Ⓒ	B8A-9510-S

Ⓒ - Add dashpot when used with Auto. Trans.

►*MANIFOLD FUEL DISTRIBUTION (292): Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

►*MANIFOLD FUEL DISTRIBUTION (332): Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting - Initial setting 1-1½ turns (Ford Carb.), ¾-1¾ turns (Holley Carb.) open. Set both screws alike. Turn adjusting screws in until engine begins to run rough from the lean mixture, then turn screws out until engine begins to roll from rich mixture. Turn screws in until engine runs smoothly. Favor a slightly rich mixture.



FORD "INTERCEPT R V8" THROTTLE LINKAGE

Idl Sp d - Dependent on transmission type as follows: **(Synchro-mesh & O.D.)** - (292" Eng.) 475-500 RPM. (332" Eng. with mechanical valve lifters) 600 RPM. (332" Eng. with hydraulic valve lifters) 475 RPM. **(Auto Trans.)** -(292" Eng.) 450 RPM. (332" Eng. with mechanical valve lifters) 500 RPM. (332" Eng. with hydraulic valve lifters 450 RPM. Transmission in either "Drive" range.

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA: See "Ford" or "Holley 2-,4-Barrel Carburetors" in Carburetion Section.*

Accelerating Pump - (Ford Carb.) Place pump link in No. 3 position for summer and winter operation. Four positions numbered out from shaft. *NOTE* - Disregard previous setting (No. 1 position).

(Holley Carb.) Place adjusting screw in No. 1 hole (top) for Summer, No. 2 hole (bottom) for winter driving.

FORD & HOLLEY 4-BARREL
(332, 352, 361 Engines)

FORD 4-BARREL

Car Model	Carb. No.
332" Eng. Std. & O.D. Ⓒ	B8A-9510-A
352" Eng. Std. Trans. ③	B8A-9510-E
352" Eng. Auto. Trans. ②	B8A-9510-E

HOLLEY 4-BARREL

Car Model	Carb. No.
332" Eng. Std. & O.D. Ⓒ	B8A-9510-C
332" Eng. Std. & O.D. Ⓒ	B8A-9510-T

Ⓒ - When used with Auto. Trans., install dashpot, bracket and attaching parts.

② - Pass. Car & Thunderbird.

③ - Thunderbird with Synchro-mesh Transmission..

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.*

Idle Setting - Initial setting 1-1½ turns open. Set both screws alike. Turn screws in until engine begins to run rough from lean mixture, then turn screws out until engine begins to roll from rich mixture, finally turn screws in just enough so that engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - Dependent on transmission type as follows: **(Synchro-mesh & O.D.)** - (332" & 352" Eng. Exc. Pol. Interceptor with mechanical lifters) 600 RPM, (with hydraulic lifters) 475 RPM. (352" & 361" Eng. Pol. Interceptor) 475-500 RPM.

(Auto. Trans.) - (352" Engine exc. Police Interceptor, with mechanical lifters) 500 RPM, (with hydraulic lifters) 450 RPM. (Police Interceptor) 450 RPM. *NOTE*- With transmission in either "Drive" range.

Accelerating Pump (Ford Carb.) - Place pump link in No. 2 position (summer), No. 3 position (winter). Four positions numbered out from shaft. *NOTE* - Disregard previous settings.

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(Holley Carb.) Place adjusting screw in No. 1 hole (Top) for Summer, in No. 2 hole (Bottom) for winter driving.

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA: See "Ford" or "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

CARTER 4-BARREL (352 Engine)

Carter AFB 2640S, SA

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.*

Idle Setting - Initial setting ½-1½ turns open. Set both screws alike. Turn adjusting screws in until engine begins to run rough from lean mixture, then turn screws out until engine begins to roll from rich mixture, finally turn screws in just enough so engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - Dependent on transmission type as follows: **(Synchro-mesh & O.D.)** - (352" Eng. Exc. Pol. Interceptor, with mechanical lifters) 600 RPM, (with hydraulic lifters) 475 RPM, (Police Interceptor) 475-500 RPM. **(Auto. Trans.)** - (352" Eng. Exc. Pol. Interceptor, with mechanical lifters) 500 RPM, (with hydraulic lifters) 450 RPM. (Police Interceptor) 450 RPM. Transmission in either "Drive" range.

Accelerating Pump: No seasonal adjustment.

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Fuel only or Fuel & Vacuum.

Model	Ford Pump No.
All Std. (Fuel only)	B8A-9350-A,C
All Optl. (Fuel & Vacuum)	B8A-9350-D,B

Pressure - 3.5-5.5 lbs. (Fuel only), 4.5-6.5 lbs. (Fuel & Vacuum).

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric Constant Voltage ("CV") type with gauge voltage regulator, Ford No. B7A-10804-B.

Dash Unit	Ford Part No.
All (exc. Thunderbird)	B8A-9280-A
Thunderbird (exc. Air Cond.) ①	B8S-9280-A
Thunderbird (with Air Cond.) ①	B8S-9280-B
Tank Unit	**Ford Part No.**
All (exc. below)	B7A-9275-F
Sta. Wgn. & Sedan Del.	B7A-9275-G
Hard Top	B7A-9275-B
Thunderbird	B8S-9275-A

① - Combination Fuel & Temperature Gauge.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 4,000 miles, replace element every 24,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping lightly against hard surface. *DO NOT wash element in cleaning solvent or blow out with compressed air.*

►*AIR CLEANER INSTALLATION CAUTION (332" & 352" Eng.):* Word "Front" should be to front on all air cleaner installations, except when recess in bottom of cleaner will not clear carburetor linkage when cleaner mounted on carburetor. In this case, position notch in cleaner on lug in carburetor (disregarding word "Front").

BATTERY

Ford B6A-10655-C. 12 volt, 11 plate, 55 ampere hour.
Ford B7A-10655-A. 12 volt, 11 plate, 70 ampere hour.
Ford B8A-10655-A. 12 volt, 13 plate, 65 ampere hour.
All capacities are 20 Hour Rate.
Battery Ground - Negative to engine block.
Engine Ground - Cylinder head to dash.

STARTER

►*ENGINE STARTING IN OTHER THAN "N" & "P" POSITION:* If Neutral Safety Switch cannot be adjusted so that engine starts ONLY in "N" and "P" positions, replace switch with latest type (see below).

Ford B6A-11002-A. Armature - B6A-11005-B.
Drive - Ford ICM-11350-C. Bendix "Folo-Thru"
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM, 190 amperes max.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs	①	12.0	80
15.5 ft. lbs.		5.0	550

① - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford No. B6A-11450-A. Starter Switch is controlled by ignition switch. *NOTE* - Neutral safety switch used on Fordomatic Transmission

Neutral Safety Switch (Auto. Trans.): Ford B8A-15812-D (Fordomatic), B8A-15812-E (Cruise-O-Matic). *NOTE* - B8A-15812-E supersedes B8A-15812-C and can be identified by black paint on actuating lever. It reduces starter closed-circuit arc from 9-10° to 4½-7° and will assist in correcting engine starting in other than "N" and "P" positions (see above).
Adjustment - *See "Ford Automatic Transmission" in Transmission Section.*

GENERATOR

Ford. Used as follows:

Model	Generator	Armature
Exc. T-Bird (Std.) ①	B6A-10002-C	B6C-10005-B
Exc. T-Bird (Std.) ②	B6A-10002-H	B6C-10005-C
Exc. T-Bird (A.C.)	B8A-10002-A	B8A-10005-A
Exc. T-Bird (Spec.)	B6A-10002-E	B6C-10005-C
Thunderbird	B7S-10002-A	B6A-10005-B

① - Use with Regulator B6C-10505-B.
② - Use with Regulator B7A-10505-B.

Performance Data

Generator	Amperes	Engine RPM
B6A-10002-C, H	30	1500
B7S-10002-A	30	1500
B6A-10002-E	40	1500
B8A-10002-A	35	1500

Brush Spring Tension - 26-34 ozs.
Field Current - 1.5-1.6 amperes at 15.0 volts.
Rotation - Counterclockwise at commutator end.

Belt Adjustment: ½" deflection (292), 3/8" deflection (332, 352, 361) midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Ford. Used as follows:

Ford Regulator No.	Generator
B6C-10505-B	B6A-10002-C
B7A-10505-B	B6A-10002-H, B7S-10002-A
B7A-10505-A	B6A-10002-E
B8E-10505-B	B8A-10002-A

►*SETTING CAUTION: "Temperature compensated" type. Set to following specifications at 75° ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.*

Cutout Relay

Cuts In - 12.4-13.2 volts (Exc. B7A-10505-A), 12.0-12.8 volts (B7A-10505-A).
Cuts Out - 2-9 amperes (Exc. B8E-10505-B & B7A-10505-A), 2-6 amperes (B8E-10505-B & B7A-10505-A) discharge current.

Voltage Regulator

Setting - 14.6-15.4 volts at ambient temperature of 70-80°F.
Checking & Adjusting - *See "Ford 12-V Voltage Regulators" in Electrical Section.*

Current Regulator

Setting - 28-32 amperes (B6C-10505-C & B7A-10505-B), 33-37 amperes (B8E-10505-B), 38-42 amperes (B7A-10505-A).
Checking & Adjusting - *See "Ford 12-V Voltage Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: Dual Headlights (4-Headlights), *see "4-Headlight System" in Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: With control knob in the "OFF" position, press spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut with Tool 17470-N

Stop Light Switch Location: On forward end of brake master cylinder (Conventional Brakes), and on top of brake booster assembly (Power Brakes). Master cylinder located on firewall in engine compartment.

CIRCUIT BREAKERS: On headlight switch. Combination headlight switch, circuit breaker, and fuse assembly used. One circuit breaker protects headlight circuit and second circuit breaker protects instrument, parking, stop and tail light circuits

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FUSES: Size and location as follows:
Back Up Light - SFE 7.5 ampere, in feed wire.
Cigar Lighter - Sulphur disc in base or reset circuit breaker, at back of assembly.
Clock - 1 AG, in feed wire.
Heaters - SFE 14 ampere in feed wire.
Interior Lamps - SFE 7.5 ampere, on lighting switch.
Overdrive - 3 AG-15, in clip on O.D. relay.
Spot Light - SFE 7.5 ampere in feed wire.
Turn Signal - SFE 7.5 ampere in feed wire.
Horn Relay: Ford No. B8A-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8. TWO types of engines used: "**Y-V8**" - 292" Displ. V8 of same design used on previous models. "**Interceptor V8**" - 332" Displ. Interceptor & Interceptor Special V8, 352" Displ. Thunderbird Special V8, 361" Displ. Police Interceptor V8.

►*INTERCEPTOR ENGINE NOTE:* These engines are new design with combination intake manifold and valve tappet chamber cover. Distributor is mounted on forward end of engine and new valve arrangement and firing order is used. *NOTE* - 352" Cylinder Block is painted Blue, 361" block painted Yellow.

Engine	Bore	Stroke	Displacement
292	3.75"	3.30"	292 cu. in.
332	4.00"	3.30"	332 cu. in.
352	4.00"	3.50"	352 cu. in.
361	4.05"	3.50"	361 cu. in

Engine	Rated HP	Comp. Ratio	Developed HP
292	45.00	9.1-1	205 at 4500 RPM
332	51.20	9.5-1	240 at 4600 RPM
352	51.20	10.2-1	300 at 4600 RPM
361	52.49	10.5-1	303 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*AERATED ENGINE OIL CORRECTION (Interceptor Engines):* Due to air leak at oil pump inlet tube. May cause noisy hydraulic lifter operation. Check for air bubbles in oil flowing from No. 2 Cyl. exhaust valve pushrod coolant tube. Correct by replacing inlet tube-to-pump gasket (if defective) or brazing fittings at both ends of oil pump inlet tube (if leak occurs at this point).

►*INTAKE MANIFOLD-TO-BLOCK SEAL FAILURE & OIL LEAK CORRECTION (Interceptor Engines):* Install new type Intake Manifold-to-Block Seals, Part Nos. B8A-9422-B & B8A-9423-B with tabs and double ridge type sealing lip. These seals used at front and rear ends of manifold.

►*INTAKE MANIFOLD-CYLINDER HEAD GASKET PRODUCTION CHANGE & REPLACEMENT NOTE (332, 352 Engines):* Later cars use one-piece "Steelbestos" gasket, Part No. B8A-9439-B, for better sealing, and replaces three-piece type used previously. Use new type gasket for service replacement.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL (292" Eng.): Drain oil, remove stabilizer bar, disconnect oil pump inlet tube at oil pump. Remove oil pan screws, lower oil pan.

OIL PAN REMOVAL (Others): Drain oil, remove dipstick. Turn engine to bring No. 1 piston to TDC. Remove stabilizer bar, oil pan screw, lower oil pan to frame crossmember. Remove lower, and loosen upper oil pump inlet tube bolts. Swing tube clear of oil pan. Push oil pan forward and tilt down to remove.

PISTONS

Autothermic type. Solid skirt with three rings above pin.
Removal - Pistons and rods removed from above.
Clearance - .0012-.0018" (292), .0015-.0021" (Others) at bottom of skirt.
Fitting New Pistons: Use ½" wide feeler gauge full length of cylinder, inserted between piston and cylinder wall at right angles to pin on thrust side, piston inverted and 1½" below top of block. Pull required to remove feeler should be 5-10 lbs. when using feeler gauge thicknesses as follows: New Piston in New Bore - .002" feeler, New Piston in Used Bore - .0025", Used Piston in Used Bore - .003".
Replacement Pistons: Furnished Standard and .020", .030", .040" & .060" Oversize, with fitted pins.
Installing Pistons - Install piston with indentation in head of piston toward front of engine. *See Rod Installation.*

PISTON PINS

Floating type with lock ring at each end.
Diameter - .9120-.9123" (292), .9750-.9753" (Others).
Length - 3.016-3.030" (292), 3.156-3.170" (Others).
Pin Fit in Piston - .0001-.0003". Wear limit .0008".
Pin Fit in Rod Bushing - .0001-.0003". Wear limit .0008".
Replacement Pins: Color marked for identification and furnished in following sizes: Standard (Green), .001" (Blue), .002" (Yellow) Oversize. Fitted pins furnished with new pistons.

PISTON RINGS

Two compression and one oil ring per piston. Oil ring is "Side Sealing" type (two steel rails with spring spacer between them).

292 Engine

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.010-.027"	.002-.0035"
Compr. #2	.0775-.0780"	.010-.027"	.002-.0035"
Oil	.1850	.015-.062"	②

332 & 352 Engines

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.013-.030"	.002-.0035"
Compr. #2	.0930-.0935"	.013-.030"	.002-.004"
Oil	①	.015-.062"	②

361 Engine

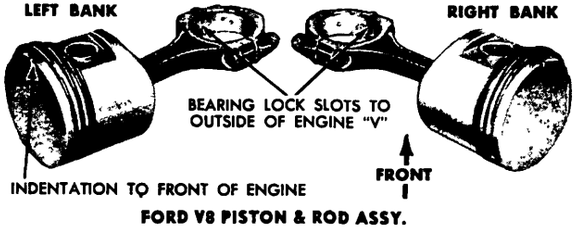
Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.013-.030"	.002-.0035"
Compr. #2	.0929-.0935"	.013-.030"	.0025-.0045"
Oil	.1885"	.015-.062"	②

① - .1880" (332), .1860" (352).
② - Side sealing type ring.

Replacement Rings: Furnished in Partial Ring Sets (for 2 Pistons) in Standard & .020", .030", .040", .060" Oversize.

CONNECTING RODS

Crankpin Journal Diameter - 2.1880-2.1888" (292), 2.4380-2.4388" (Others).
Lower Bearing - Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Clearance - .0008-.0027" (292), .0009-.0028" (Others).
Side Clearance - .006-.016". Wear limit .019" (2 rods).
Replacement Bearings: Standard size (2 sizes marked **Red & Blue**) and .010", .020", .030" (292) plus .040" (Others) Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
Installing Rods: Install rod in piston so that rod bearing lock slots in connecting rod are toward outside of engine when indentation on head of piston is toward front of engine. Cylinder numbers on bearing caps and rods must be on same side and installed in same numbered cylinder.



FORD V8 PISTON & ROD ASSY.

CRANKSHAFT

Journal Diameter - 2.4980-2.4988" (292), 2.7484-2.7492" (Others).
Bearings - Copper-lead, steel-backed.
Clearance - .0006-.0032" (292), .0007-.0029" (Others).
Replacement Bearings: Standard size (2 sizes marked **Red & Blue**) and .010", .020", .030" (292) plus .040" (Others) Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by No. 3 main bearing. Replace bearing when endplay is excessive.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data.*
Endplay - .002-.006". Wear limit .010"

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Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Front Special Data.*

CAMSHAFT

►*CAMSHAFT REPLACEMENT CAUTION (Interceptor Engines):* Check all camshafts for correct type, before installation, as follows:

332" & 352" Engine (Mechanical Lifters) - Camshaft No. B8A-6250-A. Check diameter of cam lobes (2 Intake and 2 Exhaust) at right angles to centerline through high point of cam. Intake lobe diameter should be .006" larger than exhaust lobe.

332", 352", & Late 361" Engine (Hydraulic Lifters) - Camshaft No. B8A-6250-B. Check cam lobe diameter in same manner as for engine with mechanical lifters (above). Intake and exhaust lobes are SAME diameter and in addition shaft has letter "X" stamped on rear of No. 5 bearing journal following date code.

Early 361" Engine (Hydraulic Lifters) - Camshaft No. B8E-6250-A. Shaft has cast letters "EDD" located between No. 16 cam lobe and rear bearing journal.

►*CAMSHAFT THRUST BUTTON PRODUCTION CHANGE (Interceptor Engines):* Revised Thrust Button & Spring assemblies with revised Engine Front Cover used on later engines to eliminate possibility of thrust knocks. *See thrust knock correction following.*

►*CAMSHAFT THRUST KNOCK OR WHINE CORRECTION (Early Interceptor Engines): See Thrust Button Production Change above. Make correction on early engines as follows:*

Thrust Knock Correction - Install all parts furnished in Kit No. B8A-6275-A (Thrust button, spring, retainer clip, bolt and washer). Engine front cover must be reworked by removing button retainer plate with a sharp chisel and polishing burrs on button contact surface, or installing revised Front Cover No. B8A-6019-B. *CAUTION* - Above kit must be installed whenever revised front cover installed to replace original cover No. B8A-6019-A.

Whining Noise Correction - On early cars with first type thrust button assembly, noise is caused by thrust button operating on rough bolt head. Correct by polishing bolt head and applying lubriplate to area.

Journal Diameter - (292) 1.9255-1.9265", (332 & 352) 2.1238-2.1248", (361) 2.1230-2.1240".

Bearings - Steel-backed, babbitt lined bushings.

Clearance - .001-.003"

End Thrust: (292) - Taken by thrust plate and washer located between camshaft sprocket and shoulder on camshaft.

(Other Engines) - Controlled by spring loaded thrust button on fuel pump eccentric bolt.

►*CAMSHAFT THRUST WASHER NOTE (292 Engine):* Chamfer on inner diameter of washer must be toward the rear or facing the camshaft journal when installed.

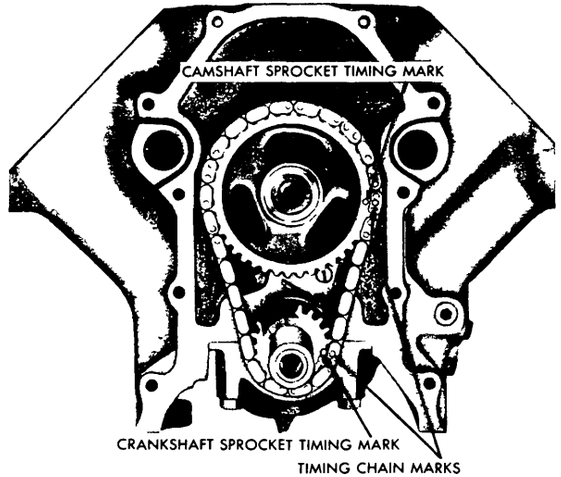
Replacement Camshaft Bearings: Furnished Standard and .015" Undersize.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

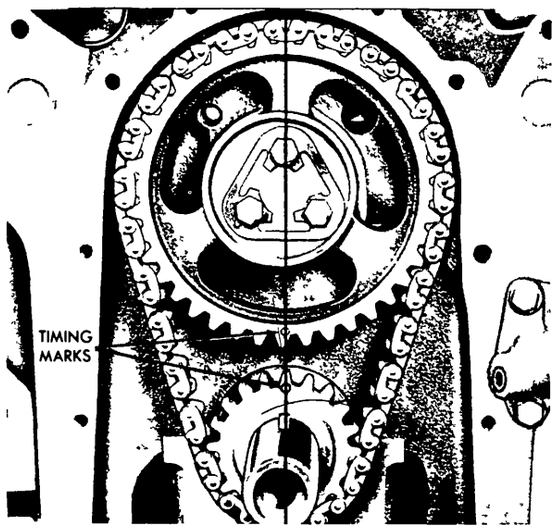
Timing Chain: Side guide type. Length 56 links (292), 48 links (Others).

►*332, 352, 361 TIMING CHAIN NOISE CORRECTION:* Caused by inadequate lubrication, misaligned camshaft gear locating pin, or loose timing gear and fuel pump eccentric. *See "Camshaft" in Ford Special Data.*

►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain (endless) as a unit with both sprockets.



FORD V8 292 VALVE TIMING MARKS



FORD V8 332 & 352 INTERCEPTOR ENGINE VALVE TIMING MARKS

Camshaft Setting: (292) Timing marks on chain and sprockets are together when chain marks are on drive side. There are 12 timing chain link pins between timing marks on sprockets.

(332, 352, 361) - Timing marks on sprockets must be adjacent and in line across shaft centers.

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Ford Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Cover.*

VALVES

Tappet Clearance: Mechanical Lifters - (292") .020" Cold, .019" Hot, All Valves. **(332" & 352")** .026" Cold & Hot, All Valves. *NOTE* - If tappet clearance set Cold, recheck clearance after engine operated 30 minutes to normalize temperature and reset tappet clearance to Hot figure. *See "Valve System" in Ford Special Data for Tappet Clearance checking procedure.*

Hydraulic Lifters - (332", 352", 361") None in service. *See "Valve System" in Ford Special Data for operating range check of hydraulic lifters.*

292 Engine

Valve	Head Diameter	① Stem Diameter
Intake	1.920-1.930"	.3416-.3423"
Exhaust	1.505-1.515"	.3403-.3410"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°	.272"	③ .001- .0024"
Exhaust	45°	.285"	④ .0023-.0037"

332,352,361 Engines

Valve	Head Diameter	① Stem Diameter
Intake	2.022-2.032"	.3711-.3718"
Exhaust	1.551-1.561"	.3693-.3700"

Valve	Seat Angle	⑤ Lift	Stem Clearance
Intake	30°	.241"	.001-.0024"
Exhaust	45°	.244"	.0028-.0042"

① - Furnished with .003", .015", .030" oversize stem.
② - Cam lobe lift. .005" wear loss limit.
③ - .0045" wear limit. ④ - .0065" wear limit.
⑤ - Cam lobe lift with mechanical lifters. .232" (intake & exhaust) cam lobe lift with hydraulic lifters. Camshaft Part No. B8A-6250-B

Valve Seat Width - .060-.080" Intake, .070-.090" Exhaust.

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over valve guide.

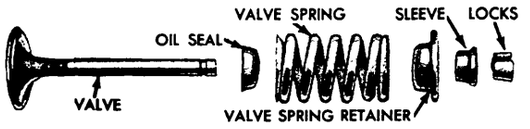
►*ROTATABLE VALVE NOTE:* All valves are rotatable type.
See "Valve System" in Ford Special Data.

Valve Springs: Install with closed coil end toward cylinder head.

►*VALVE SPRING NOTE:* **(332, 352, 361)** - Early production engines used dampener spring inside valve spring, single spring used in later production. Both types have same spring specifications and can be intermixed.

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FORD V8 VALVE ASSEMBLY

Fr L ngth - (292) 2.09". **(332, 352, 361)** 2.26".

Spring Sp cifications - 292

Valv	Spring Pressure		Length
Closed	71-79 lbs.	①	1.780"
Open	161-177 lbs.	②	1.390"

332,352,361 Engines - ③

Valve	Spring Pressure		Length
Closed	94-104 lbs.	④	1.82"
Open	180-198 lbs.	⑤	1.42"

① - Wear limit 64 lbs. at 1.780".
② - Wear limit 145 lbs. at 1.390".
③ - Spring and dampener assembly.
④ - Wear limit 85 lbs. at 1.82".
⑤ - Wear limit 162 lbs. at 1.42".

Out of Squar Limit - .062" (All engines).

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to under side of spring retainer. If assembled height is 1 13/16" (292), 1 55/64" (Others) or greater, install necessary .030" spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended 1 25/32-1 13/16" (292), or 1 53/64-1 55/64" (Others). *CAUTION* - Do not install spacers unless necessary.

Valv Guid s: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (See table above), ream guides and install oversize valves. *See "Valve Syst m" in Ford Special Data.*

Valv Lift rs (M chanical): (292, 332, 352) Mushroom type. Remove from below after camshaft remove d.

Clearance - .0008-.0024"

Valv Lift rs (Hydraulic): (332, 352, 361) Barrel type. Can be removed from above without removing camshaft.

Cl aranc - .0008-.0023".

Lift r Ov rhaul - *S "Valve System" in Ford Special Data.*

Hydraulic Lift r Op rating Range - With lifter collapsed, operating range should be .062-.1875". *See "Valv Syst m" in Ford Special Data.*

R ck r Arm Ass mbly: *S e "Valve System" in Ford Sp cial Data.*

►*VALVE ROCKER ARM LUBRICATION CORRECTION (332 & 352 Engin with Mechanical Lifters):* Improper lubrication caused by incorrect position or machining of oil groove. *S "Rock r Arms" in Ford Special Data.*

VALVE TIMING

See "Camshaft S tting" und r CAMSHAFT abov .

►*VALVE TIMING NOTE - Th following valv op ning and closing points ar with camlift as indicated.*

Valv Timing - 292 Eng.

Intak Valv s - Open 18° ① BTDC. Close 58° ① ALDC.
Exhaust Valv s - Open 66° ② BLDC. Close 10° ③ ATDC.

Valv Timing - 332" & 352" Engs. (Mechanical Valve Lifters)

Intake Valves - Open 21° ④ BTDC. Close 51° ⑤ ALDC.
Exhaust Valves - Open 67° ④ BLDC. Close 9° ⑤ ATDC.

Valve Timing - 332" & 352" Engs. (Hydraulic Valve Lifters)

Intake Valves - Open 22° ⑥ BTDC. Close 68° ⑦ ALDC.
Exhaust Valves - Open 68° ⑥ BLDC. Close 22° ⑦ ATDC.

Valve Timing - 361 Eng.

Intake Valves - Open 17° ⑥ BTDC. Close 59° ⑦ ALDC.
Exhaust Valves - Open 57° ⑤ BLDC. Close 19° ⑦ ATDC.

① - Camlift .015". ② - Camlift .013". ③ - Camlift .016". ④ - Camlift .017". ⑤ - Camlift .019". ⑥ - Camlift .002". ⑦ - Camlift .005".

Valve Timing Check: Release No. 1 Intake Valve adjusting screw, push rocker arm to one side, install dial indicator in pushrod socket. Zero indicator with cam on heel of lobe. Install quadrant on crankshaft pulley, rotate engine to amount of lobe lift shown in table above, then check quadrant and compare reading with degrees shown in table above for that valve. If reading not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity - 5 qts. (refill). 6 qts. when filter changed.

Normal Oil Pressure: 45-50 lbs. at 2000 RPM.

Pressure Regulator Valve - In oil pump body, not adjustable.

Oil Pressure Indicator - Indicator light on instrument panel, operated by Engine Unit, Ford No. B6A-9278-B (stamped No. 7 on Hex.). Lights when ignition switch turned on, goes out when engine starts and pump pressure reaches (7 lbs.).

Oil Pump: Rotor type. Located outside crankcase on left side (292), at front inside crankcase (332, 352). Driven by distributor through intermediate drive shaft.

Pump Overhaul - *See "Oiling System" in Ford Special Data.*

Oil Filter: New "Disposable" type.

Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn. *CAUTION* - Do not overtighten. Run engine and check for leaks.

Crankcase Ventilation: Filter in oil filler and breather cap (Inlet) all models. Road draft outlet pipe for crankcase ventilation, all models. *NOTE* - 292 Engine has filter screen in road draft outlet pipe. Service filler cap by cleaning with solvent and resaturating with engine oil at 4000 mile intervals.

COOLING

Water Capacity: 20 qts. (Thunderbird), 18½ qts. (All Others). Add 1 qt. for heater.

Pressur Valve: Opens 12-15 lbs. Use only 12-15 lb. cap for replacement. Ford B8A-8100-A.

Therm stat: Ford B7A-8575-A (157-162°F) (Std.), & B7A-8575-B (177-182°F) (Permanent anti-freeze).

Water Pump: Packless, sealed ball bearing type.

Pump R m val (292 Engin). Drain cooling system, disconnect radiator lower hose and heater hose from water pump. Remove fan belt, fan, fan spacer, and pulley. Take out four mounting bolts, remove pump, gaskets, and timing pointer.

Pump Removal (332, 352, 361 Engine) - Drain cooling system, loosen generator and remove fan belt. Disconnect lower radiator hose and heater hose (from water pump). Loosen fuel pump bolts for access to lower left water pump bolt. Remove generator bracket bolts and move bracket away from pump. Loosen and move water pump by-pass hose front clamp to rear. Remove water pump to block bolts and remove water pump assembly. *See "Water Pump" in Ford Special Data.*

Temperature Gauge: King-Seeley Electric. Constant-voltage ("CV") type with gauge voltage regulator Ford No. B7A-10804-B.

Dash Unit - (Pass. Cars) Ford No. B8A-10883-A. **(Thunderbird)** Ford No. B8S-9280-A (Without Air Cond.), B8S-9280-B (With Air Cond.). *NOTE* - Thunderbird units are combination Fuel and Temperature gauges.

Engine Unit - Ford No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long Model 10CF (Std. 292), **11CF** (Std. 332, 352 & Heavy Duty on 292 Pass, Cars & Taxi). Single plate, semi-centrifugal type.

See "Long Clutches" in Clutch Section.

Cover Assembly	Long No.	Ford N .
10CF	267346	① B7A-7563-A
11CF	267350	② B8A-7563-A
11CF	267350	③ B8A-7563-B

① - Yellow & Brown cover - White pressure plate.
② - Brown & Yellow cover - Green pressure plate.
③ - Pink & Orange cover - Green pressure plate.

Clutch Disc	Long No.	Ford No.
292 O.D.	288855	④ B8A-7550-D
292 S.M.	288852	⑤ B8A-7550-C
292 Pass. & Taxi H.D.	288853	⑥ B8A-7550-E,G
332 Pass	288853	⑥ B8A-7550-G
352 Pass. & T-Bird	288351	⑦ B8A-7550-F

O.D. Overdrive. **S.M.** Synchro-mesh. **H.D.** Heavy Duty.
④ - Orange springs (blue paint).
⑤ - 4 Aluminum & 4 unmarked springs.
⑥ - **E** - Orange springs (White paint). **G** - Orange springs.
⑦ - Blue springs.

Pedal Adjustment: If pedal travel is less than 6 3/8" or 6 7/8" (Thunderbird) or more than 6 5/8" or 7 1/8" (Thunderbird), reposition pedal bumper and bracket until travel is within limits. Adjust assist spring link to give assist spring length of 9 7/8" or 6 3/4-6 7/8" (Thunderbird) between eye centers with clutch released.

P dal Free Travel - 1 1 8-1 3 8". Loosen locknut on clutch pedal release rod, turn adjusting nut until

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correct travel is reached. *NOTE* - Check free travel by operating engine at 3000 RPM with transmission in Neutral position. There should be a minimum of ½" free travel under these conditions.

Removal: Remove transmission, flywheel housing cover, release lever retracting spring, slide release bearing and hub off release lever. Mark clutch cover and flywheel for reinstallation, loosen six cover bolts uniformely to release spring tension, remove cover and pressure plate through opening in flywheel housing. Remove clutch release lever.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse).
See "Ford Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal (Exc. Thunderbird): With car raised up, disconnect drive shaft at rear universal joint, slide drive shaft off transmission output shaft. Remove speedometer cable and gear. Disconnect shift rods at transmission. Remove rear engine support to extension housing bolts. Disconnect parking brake adjusting rod from equalizer bracket. Support rear of engine and remove rear engine support, then lower engine for clearance, and remove transmission to flywheel housing bolts. Use guide pins in two lower bolt holes and slide transmission back until input shaft clears flywheel housing, and lower transmission.

Thunderbird - Drain transmission, raise car and remove driveshaft at rear universal joint. Disconnect parking brake adjusting rod. Disconnect parking brake cables from equalizer. Disconnect exhaust pipe assembly at manifolds and couplings. Remove exhaust inlet assembly. Remove transmission to rear engine support bolts. Raise transmission on jack and remove crossmember. Disconnect speedometer cable bracket and disconnect cable from transmission. Remove shift rods and bolts that secure transmission to flywheel housing. Remove transmission

OVERDRIVE

Warner R10. Solenoid operated type, with governor control and throttle operated kickdown. No Lock-out Switch used.
See "Ford Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for synchro-mesh transmission (above) after disconnecting control cable and wiring.

AUTOMATIC TRANSMISSION

Fordomatic & Cruise-O-Matic. Two types, with Torque Converter and three speed automatic transmission with hydraulic control "Cruise-O-Matic" has different Clutch and Hydraulic Control System design and operation, with one additional manual selected driving range.
See "Ford Automatic Transmission" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Ford Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Ford Automatic Transmission" in Transmission Section.*

Lubrication - Check transmission fluid at 1,000 mile intervals and maintain level at "F" (Full) mark on dipstick. Drain and refill every 24,000 miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in Neutral position. Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid level. Add Automatic Transmission Fluid Type "A" to bring level to (Full) mark on dipstick

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER AUTOMATIC TRANSMISSION DATA: See "Ford Automatic Transmission Section", in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type.

►*CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened). *See "Ford & Mercury" in Rear Axle Section.*

REAR AXLE

Own. Separate carrier type, semi-floating, hypoid, with Hotchkiss Drive. *NOTE* - Same type used on all models. *See "Ford & Mercury" in Rear Axle Section.*

Model	Axle Ratios S.M.& O.D.	F/M	C/M
Pass. (292)	3.56-1Ⓒ	3.10-1	
Pass. (332)	3.56-1Ⓒ		2.69-1
S/D (292)	3.89-1	3.56-1	
(352)	3.70-1		2.69-1
Ranchero (292)	3.89-1	3.56-1	
(352)	3.70-1		2.69-1
Sta. Wgn.	3.70-1	3.10-1	2.69-1
Hard Top	3.70-1	3.10-1	2.69-1
Thbrd	3.70-1		3.10-1
Pol. Int.	3.56-1Ⓒ		2.69-1

S.M. Synchro-mesh. **O.D.** Overdrive. **F/M** Fordomatic. **C/M** Cruise-O-Matic.
Ⓒ - Or 3.70-1.
Backlash - .004-.009".

Axle Shaft Removal: Remove wheel, take off drum Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No.4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

SHOCK ABSORBERS

Mdl	Frnt	Rear
Pass.Hvy.Dty.②⑦	B7A-18124-F	B8A-18125-B
Pass. Std. Ⓒ③	B8A-18124-A	B8A-18125-A
Pass. Std. Ⓒ④	B8A-18124-B	B8A-18125-A
Pass. ②③	B8A-18124-D	⑤
Sta. Wgn. Ⓒ	B8A-18124-B	B8A-18125-C
Sed. Del. ②	B8A-18124-F	⑥
Sta. Wgn. ②	B8A-18124-F	⑥
Hard Top ②	B7A-18124-H	B7A-18125-K
Hard Top Ⓒ	B8A-18124-C	B8A-18125-D
Thbrd. ②	B8S-18124-A	B8S-18125-A
Thbrd. Ⓒ	B8S-18124-B	B8S-18125-B
Taxi		B7A-18125-H

Ⓒ - With Air Susp. ② - Less Air Susp.
③ - Exc. Hard Top, Sta. Wgn. & Sed. Del.
④ - Exc. Hard Top & Sed. Del.
⑤ - B7A-18125-H or B8A-18125-E.
⑥ - B7A-18125-J or B7A-18125-G.
⑦ - Exc. Hard Top, Sed. Del., Sta. Wgn. & Taxi.

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs. *See "Ford, Thunderbird, Mercury" in Suspension & Wheel Alignment Section.*

Caster - 0° to Pos. 1°. Maximum variation between wheels ½°.

Camber - Pos. ½° to Pos. 1½°. Maximum variation betwbeen wheels ½° (¼° preferred).

Toe-In - 1/16-1/8". *NOTE* - When checking toe-in on cars with power steering, engine shquld be running so that power steering control valve will be properly centered.

Toe-Out on Turns - Outer wheel 20°, inner wheel should be 24½°.

REAR SUSPENSION

Thunderbird uses coil springs, other models have conventional semi-eliptical springs.
See "Ford Thunderbird" in Suspension & Wheel Alignment Section.

AIR SUSPENSION

Optional on Fairlane, Fairlane 500, and Station Wagons with Automatic Transmission.
See "Ford & Mercury Air Suspension" in Suspension & Wheel Alignment Section.

STEERING

Manual: Own. Recirculating ball worm & nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Ford-Mercury Linkage type. Used in conjunction with standard steering gear.
See "Ford & Mercury Linkage Type" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

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Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Ford-Bendix Hydraulic. Hand lever applies rear wheel service brakes.

► *BRAKE DESIGN NOTE:* Front wheel anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin).
See "Ford, Lincoln, Mercury Bendix" in Brake Section.

► *BRAKE PULLING CORRECTION:* To correct, loosen anchor pin attaching bolt (see Brake Design Note above) and retighten bolt to 80-100 ft. lbs.

Drum Diameter - 11" front and rear.

Wheel Cylinder Diameter - 1 1/8" (Front-All), 7/8" (Rear-Pass. Cars), 15/16" (Rear-Sta. Wgn. & Courier).

Lining Specifications (Width & Length)

Model	Primary	Secondary
Pass. Cars (Front)	2¼" x 10.62"	2¼" x 11.93"
(Rear)	1¾" x 10.62"	1¾" x 11.93"
Sta. Wgn. & (Front)	2¼" x 10.62"	2¼" x 11.93"
Sedan Del. (Rear)	2" x 10.62"	2" x 11.93"
Thunderbird (Front)	2½" x 10.64"	2½" x 10.91"
(Rear)	2" x 10.64"	2" x 10.91"

Clearance - Adjusting screw backed off 10-12 notches from point where shoes are tight against drum.

Brake Pedal Free Play: 5 16 to 7 16". If play not correct after brake adjustment, loosen locknut on eccentric bolt that attaches brake pedal assembly to master cylinder pushrod, rotate eccentric bolt

Standard Master Cylinder: On engine side of firewall.

Checking Fluid Level - Within ½" of top of reservoir.

Removal - Disconnect rubber boot from rear end of master cylinder, brake line at master cylinder fitting, stop light switch from front of cylinder and disconnect wires from switch. Push down brake pedal several times to force as much fluid as possible (into clean container), remove bolts that secure master cylinder to dash panel. Do not disconnect pushrod from brake pedal unless it is to be serviced.

Power Brakes: "Bellows Type" used. Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel
See "Ford Bellows Type" in Brake Section.

Checking Fluid Level - Within ½" of top of reservoir.

Removal - Remove vacuum hose from top of unit, valve adjusting eccentric with flat washer spring, and bushing, nylon bushing from power unit valve housing. Remove two mounting screws (Bracket to dash panel) and remove power unit from car.

MISC. MECHANICAL

Windshield Wipers: Vacuum type with Link & Arm type linkage (Exc. Thunderbird), Cable operated (Thunderbird).
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type.
See "Electric Window Regulators" in Misc. Section.

Power Top Control: Electric-Hydraulic (Convertible), Electric (Retractable Hard-Top). *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: "4-Way" Electric.
See "Power Seat Adjusters" in Miscellaneous Section.

Air Conditioning: *See "Polar Aire" or "Select Aire" in Miscellaneous Section.*

MODEL IDENTIFICATION

Truck Model	Model & Serial Code Regular	Light	Heavy
F-100	F-10	F-11	
F-250	F-25	F-26	
F-350	F-35	F-36	
P-350 Par. Del.	P-35, P-37 ①	P-36	
P-400 Par. Del.	P-40	P-41	
F-500 Conv.	F-50	F-51	
B-500 School Bus	B-50	B-51	
C-550 Tilt Cab	C-55	C-56	
P-500 Par. Del.	P-50	P-51	
F-600 Conv.	F-60	F-61	F-64
B-600 School Bus	B-60	B-61	B-64
C-600 Tilt Cab	C-60	C-61	C-64

① - P-37 has 7200 rear axle.

VEHICLE NUMBER: Stamped on Rating Plate on left front cab pillar (Exc. Par. Del.), on right hand dash panel (Par. Del.). *NOTE* - Number (example below) includes identification data as follows

① ②③④ ⑤
F 10 L 8 U 10001

① - Truck Series. *See "Serial Code" above.*
② - Engine Type Symbol. *See "Engine Types" below.*
③ - Year 8 (1958)
④ - Assembly Plant. *See Assembly Plant Designation*
⑤ - Beginning engine number.

►*ENGINE IDENTIFICATION NOTE:* 6 Cyl. & V8 engines are used as listed below. For identification in the following Ford Truck data pages, reference is made to these engines by 6 Cyl , V8 272 MD & HD, 292 MD & HD *NOTE* - MD is Medium Duty, HD is Heavy Duty

Engine Types

Engine	Model	Displ.	Symbol
6 Cyl	EBR, S, T	223 cu in	J
V8	ECW, Y, ①	272 cu in	L
V8	ECR ②	272 cu in	U
V8	①	292 cu in	C
V8	②	292 cu in.	D

① - 2-Barrel Carburetor ② - 4-Barrel Carburetor

Assembly Plant Designation

A - Atlanta	H - Lorain	R - San Jose
D - Dallas	K - Kansas City	U - Louisville
E - Mahwah	N - Norfolk	
G - Chicago	P - Twin City (St Paul)	

TUNE-UP

►*LOSS OF POWER CORRECTION (272 4-Bbl Carb Eng)* Caused by ball check sticking in secondary diaphragm housing To correct, remove ball check *See "Holley 4-Barrel Carburetors" in Carburetion Section*

COMPRESSION PRESSURE: 150±20 lbs with variation limit between cylinders of 10 lbs

VACUUM READING: (6 Cyl.) 18-19", (V8) 19-20", at idling speed.

VALVE TAPPET CLEARANCE: Can be set with engine cold but must be rechecked with engine at operating temperature (30 minutes minimum operation at 1200 RPM) and engine idling.

Tappet Clearance (Intak & Exhaust)

Engin	C ld	H t
6 Cyl.	.019"	.019"
V 8 (All)	.020"	.019"

►*TAPPET CLEARANCE ADJUSTING SCREW NOTE.* Screws are "self-locking" and torque required to turn screw (after interference noted) must be 3 ft. lbs., minimum, if less than 3 ft. lbs., replace adjusting screw or adjusting screw and rocker arm assembly.

MANIFOLD HEAT CONTROL (Except ECR-272): Automatic thermostatic type. Located at center of exhaust manifold (6 Cyl.), between cross-over pipe and right exhaust manifold (V8 MD Engines only) Install valve assembly with stop pin at top of valve housing and hook thermostatic spring on stop pin.

►*MANIFOLD VALVE OPERATION CAUTION:* Valve is closed with engine at normal operating temperature and idling (should open with very light finger pressure on counterweight). Valve will open momentarily when engine accelerated, and will be open when engine operated at high RPM.

IGNITION
6 CYL. ENGINE

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .028-.032"
Plugs – Champion 860. 18 mm.

►*SPARK PLUG CAUTION:* Plugs have tapered seat and no gasket is used. Tighten plugs to 15-20 ft. lbs.

COIL: Ford No. B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 0 amps stopped
Resistor - Ford No. B8E-12250-A 1.3-1.4 ohms at 75°F.

DISTRIBUTOR: Loadomatic type of same design used on previous models Distributors must be used with correct carburetor as follows

Application	Distributor No.	Carburetor No.
Early Trks ①	B7A-12127-H	B8A-9510-J,M
Later Trks ②	B8A-12127-J	B8A-9510-J,M,B8C-9510-B
Latest Trks ③	B8A-12127-M	B8A-9510-M,U,B8C-9510-C

① - Replaced by B8A-12127-J
② - Engr No FET-12127-B
③ - Engr No FET-12127-C

►*DISTRIBUTOR PRODUCTION CHANGES TO MINIMIZE DETONATION* Different distributors used with carburetors listed above Later distributors have different advance performance (see below) and later carburetors have different jet calibrations to eliminate leanness and surging and to provide correct distributor vacuum *Distributor and Carburetor combinations listed above must be used together*

►*EARLY DISTRIBUTOR MODIFICATION (For use with later carburetors)* Distributor B8A-12127-J can be reworked for use with Carburetor B8A-9510-U by installing new Secondary Advance Spring FAA-12225-A and recalibrating advance performance to specifications listed below for B8A-12127-M distributor. *NOTE - Distributor B7A-12127-H should be replaced by B8A-12127-J, or M*

Condenser – Ford No. 7RA-12300-C. Capacity .21-.25 mfd.
Contact Point Set – Ford No. FAA-12171-A.
Breaker Gap – .024-.026".
Cam Angle – 35-38° at idling speed.
Breaker Arm Spring Tension – 17-20 ozs.
Rotation – Clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand
B7A-12127-H

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	29	600
1-2	55	800
6¼-7¼	1 36	1200
10½-11½	2 66	1700
11-12¼	3 38	2000

B8A-12127-J

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	29	600
1-2	55	800
6¼-7½	1 36	1200
10½-11½	2 66	1700
11-12¼	3 88	2000

B8A-12127-M

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	38	450
2½-3½	79	650
6¾-7¾	2 85	1100
8¾-9¾	4 33	1400
10½-11¼	5 99	1800

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION* Scribe one mark on body to denote rotor position, scribe another mark on body and cyl block to denote position of body in block *NOTE* - DO NOT rotate crankshaft with distributor removed as timing of engine will be disturbed Make certain that intermediate drive shaft is properly seated in oil pump when reinstalling distributor

IGNITION
V8 ENGINES

FIRING ORDER: 1-5-4-8-6-3-7-2
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 028- 032" (All Engines)
Plugs - Champion F-10

►*SPARK PLUG CAUTION* Plugs have tapered seat and no gasket is used Tighten plugs to 15-20 ft lbs

COIL: Ford No. B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 0 amps stopped
Resistor - Ford B8E-12250-A 1 3-1 4 ohms at 75°F

DISTRIBUTOR: "Loadomatic" type used on 272 HD, Dual (Centrifugal & Vacuum) type used on 272 and 292 MD, Centrifugal Advance type used on 292 HD, as follows

Model	Parts No .	Eng. No .
272 HD	B8T-12127-A	FEM-12102-C
272 MD	B8C-12127-C	FEH-12127-B
272 Repl Distr	B7AF-12127-A	B7AF-12127-A
292 MD	B8C-12127-B	FFD-12127-B
292 HD	B8T-12127-A, B	FFD-12127-L

Condenser - Ford B7A-12300-A **Capacity** 21- 25 mfd
Contact Point Set - Ford No B7A-12171-A
Breaker Gap - 014- 016" (All models)
Cam Angle - 26-28½° at idling speed (All)
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

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Aut matic Advanc - 272 HD
►With Distribut r n T st Stand

Distr Degrees	Vacuum (" of Hg)	Distr. RPM
0-½	0	200
1½-2½	0 26	400
6½-7½	1 03	700
9½-10½	1 70	1000
10½-11¾	2 00	1300
12¾-14	2 79	2000

Aut matic Advance - 272 MD

Degrees Distr.	RPM	Degrees Eng.	RPM
0	250	0	500
0-½	300	0-1	600
4-5	500	8-10	1000
16¾-18	1500	33½-36	3000

Aut matic Advanc - 272 MD Replacement

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250	0	500
½-1½	350	0-1	700
3¼-4½	500	6½-9	1000
7-8¼	750	14-16½	1500
16½-18	1550	33-36	3100

Aut matic Advance - 292 MD

Degrees Distr.	RPM	Degrees Eng.	RPM
0	325	0	650
½-1½	425	1-3	850
6-7	700	12-14	1400
8½-9½	900	17-19	1800
14¼-15¾	4000	28½-31½	8000

Aut matic Advance - 292 HD

Degrees Distr.	RPM	Degrees Eng.	RPM
0	550	0	1100
½-1½	600	1-3	1200
5-6	825	10-12	1650
7¼-8¼	1000	14½-16½	2000
14¼-15¾	1900	28½-31½	3800

Vacuum Spark Control (272 & 292 MD): Integral type with vacuum diaphragm unit mounted on distributor housing and linked to breaker plate Operates in conjunction with centrifugal (governor weight) advance mechanism

Vacuum Advance - 272 MD

Distr Degrees	Eng Degrees	Ⓒ Vacuum (" of Hg)
0-1¼	0-3½	10
3-5¼	6-10½	13
6½-8½	13-17	16
9½-11½	19-23	19
11-13	22-26	21

Vacuum Advanc - 272 MD Replacement

Distr Degrees	Eng Degrees	Vacuum (" of HG)
0-3	0-6	10
6-9	12-18	15
9¼-12¼	18¼-24½	19

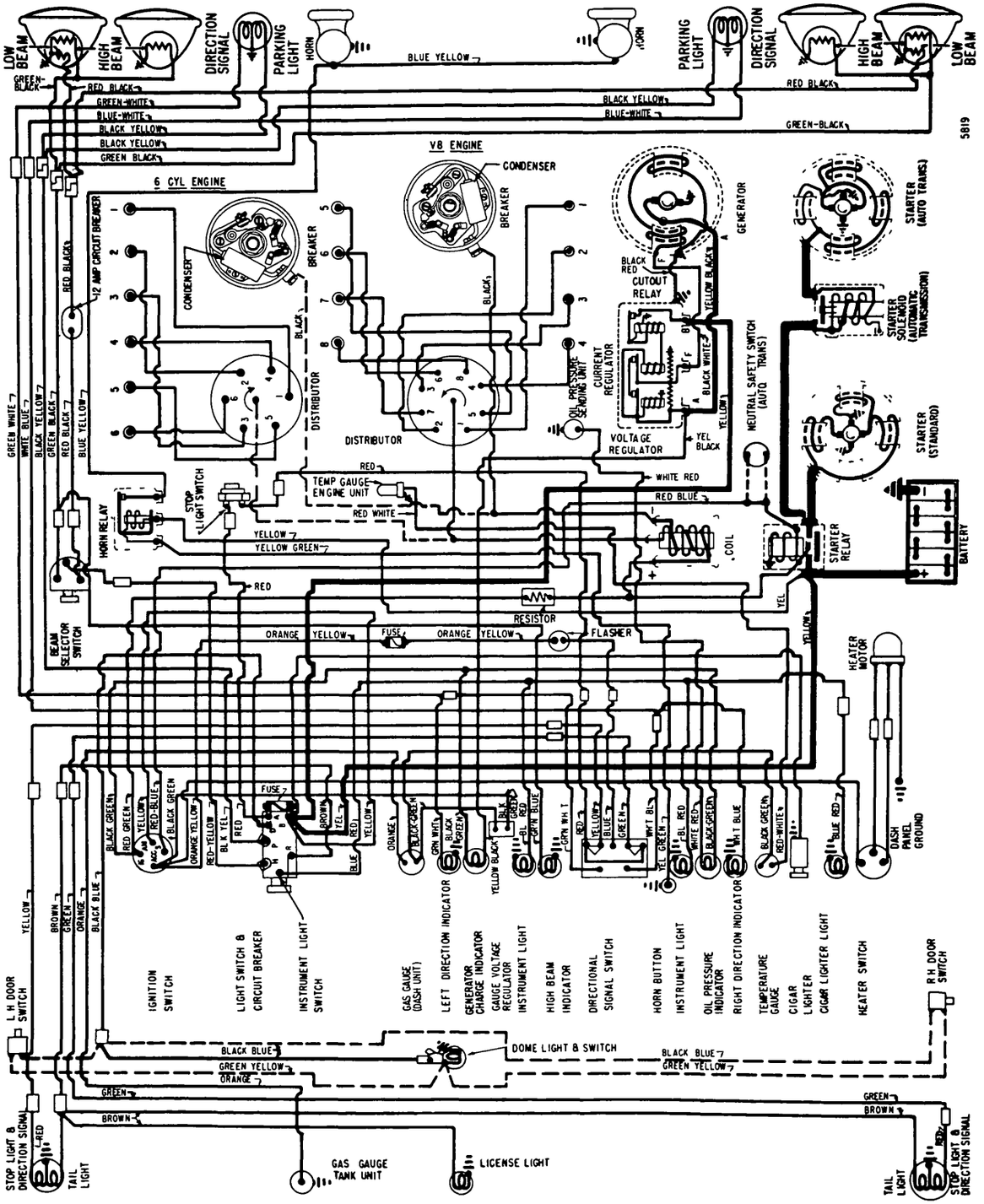
Vacuum Advance - 292 MD

Distr Degrees	Eng Degrees	Ⓒ Vacuum (" of Hg)
0-2	0-4	6
6-8	12-16	9¼

Ⓒ - At 1000 RPM distributor speed

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION See 6 Cyl Caution (above)*

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IGNITION TIMING

Engine	Std. Ignition Setting
6 Cyl. (All Trans.)	4° BTDC
272 MD (ECW) All Trans.	5° BTDC
272 MD (ECY) & HD (Std. & O.D.)	10° BTDC
292 All Trans	4° BTDC

►*TIMING CAUTION:* Disconnect vacuum line on distributors with vacuum advance. Operate engine below 550 RPM when checking centrifugal and vacuum advance distributor. Operate engine at idle speed for other distributors. Rotate distributor counterclockwise(6 Cyl.) or clockwise (V8) to advance timing.

Timing Mark (6 Cyl.) - Vibration dampener marked by lines - TDC -3°-5°-7°-9°. Align pointer half-way between 3° and 5° lines (4° BTDC) on vibration dampener.

Timing Mark (272, 292) - Vibration dampener has six marks - Long mark is TDC, preceding marks are 2°, 4°, 6°, 8°, 10° BTDC. Align pointer with correct specification shown in Ignition Table above.

CARBURETOR

►*CARBURETOR APPLICATION:* Holley (Ford) or Holley Carburetors used as follows:

Engine	Carburetor Model
6 Cyl. (Std. & O.D.) ①	Holley(Ford) Single B8C-9510-B
6 Cyl. (Std. & O.D.) ②	Holley(Ford) Single B8C-9510-C
6 Cyl. (Fordomatic) ①	Holley(Ford) Single B8A-9510-J
6 Cyl. (Fordomatic) ②	Holley(Ford) Single B8A-9510-U
6 Cyl. (Spec. Economy)	Holley (Ford) Single B8A-9510-M
272 MD (Par. Del)	Holley Dual B7J-9510-B
272 MD (Others)	Holley Dual B7T-9510-D
292 MD (Par. Del.)	Holley Dual B8J-9510-A
292 MD (Others)	Holley Dual B8C-9510-A
272 HD	Holley 4-Bbl. B7T-9510-C
292 HD	Holley 4-Bbl. B8T-9510-A

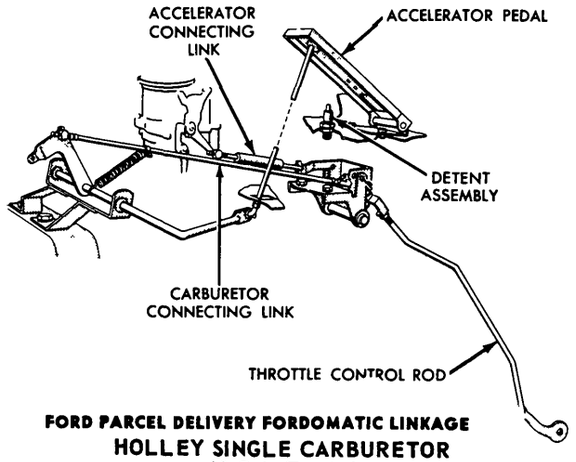
① - With Distributor B8A-12127-J.

② - With Distributor B8A-12127-M.

Throttle Linkage Adjustment (Fordomatic Models): *Same as for corresponding 6 Cyl. & V8 Passenger Cars. See Passenger Car data and also note the following:*

Accelerator Pedal Height – With gauging pin installed through holes of accelerator assembly, and carburetor connecting link adjusted so that throttle valves closed with throttle lever stopscrew against stop, accelerator pedal height should be 2-3/4" (6 Cyl. & V8 Trucks except Parcel Delivery). Adjust pedal height by changing length of accelerator pedal connecting link. On all truck models, accelerator pedal should just contact detent (on toeboard under pedal) when carburetor lever strikes wide-open stop (this is the only pedal height specification for Parcel Delivery models).

Dashpot Adjustment (All Fordomatic Models): After engine idle speed correctly set, turn off engine, loosen dashpot adjusting screw locknut, depress dashpot plunger fully, turn dashpot in or out of bracket until clearance between end of dashpot plunger and lug on throttle lever is .045-.064" (with throttle closed and throttle stopscrew against stop), tighten locknut.



FORD PARCEL DELIVERY FORDOMATIC LINKAGE

HOLLEY SINGLE CARBURETOR
(6 Cyl. Trucks)

Holley (Ford) Visi-Flo. Ford No. B8A-9510-J, B8C-9510-B,C (Std. Early); B8A-9510-U (Std. Later); B8A-9510-M (Special Economy).

►*APPLICATION & REPLACEMENT NOTE: Carburetors must be used with correct Distributor. Use only B8A-9510-U for service replacement. See DISTRIBUTOR above.*

►*SURGING & LEANNESS CORRECTION (EXC. B8A-9510-U):* Install new main metering jet, No. 1GA-9533-B (#62). This jet used on B8A-9510-U Carburetor. *See "Holley (Ford) Visi-Flo Carburetors" in Carburetion Section.*

Idle Setting – Initial setting 1½ turns open. With engine at normal operating temperature, turn screw in until engine runs rough, turn screw out until engine begins to roll, finally turn screw in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. On Fordomatic models, check idle speed with selector lever in Drive "Dr" position. Idle speed in "Dr" must be 425-450 RPM. If not in this range, readjust as necessary.

Float Level: Fuel level in bowl should be 11/16" plus or minus 1/32" below power valve mounting surface on carburetor. Use Gauge T52L-9550-AGE to check fuel level (remove power valve diaphragm cover and power valve assembly, install gauge in this hole). Fuel should touch tip of "Low" pin on gauge but should not touch "High" gauge pin.

Accelerating Pump: Engage pump link in inner hole of throttle lever for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment required.

Throttle Linkage & Dashpot Adjustment (Fordomatic Models): *See CARBURETOR above.*

►*OTHER DATA: See "Ford Visi-flo Carburetors" in Carburetion Section.*

HOLLEY DUAL CARBURETOR
272 & 292 Medium Duty

Ford B6J-9510-B (272 MD Par. Del.), B7T-9510-D (272 MD Others); B8J-9510-A (292 MD Par. Del.), B8C-9510-A (292 MD Others).

New type "Low Silhouette" dual carburetors.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting – Initial setting 1-1½ turns open (both screws). With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll, finally turn needles in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral. On Fordomatic models, recheck idle speed with selector lever in Drive "Dr" position. Idle speed in "Dr" must be 425-450 RPM. If not within this range, readjust as necessary.

Float Level - Drain fuel at lower bolt hole, remove bowl, and use Gauge MC-241 to check float level. Without Gauge, distance between floor of fuel bowl and bottom of float (bowl inverted) should be 13/16" (272 & 292 MD).

Accelerating Pump - Install screw in bottom hole of cam (cold weather), top hole of cam (summer weather).

Fast Idle - After adjusting engine idle speed, hold choke wide open, turn fast idle screw in to obtain .005-.008" clearance between screw and fast idle cam. (Turn screw in to just touch cam then back off 1/8-1/4 turn).

Throttle Linkage & Dashpot Adjustment (Ford Automatic Models): *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

HOLLEY 4-BARREL CARBURETORS
272 & 292 Heavy Duty

Ford B7T-9510-C (272 HD), B8T-9510-A (292 HD). "Low Silhouette" 4-Barrel carburetor with vacuum diaphragm control of the secondary throttle valves.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting *NOTE - Idle system provided for all four barrels (primary & secondary). Idle mixture adjusting needles used only on SECONDARY side (one on each side of Fuel Metering Block).* Initial setting 1-1½ turns open (both screws). With engine at operating temperature, turn both screws in until engine runs rough from lean mixture, then turn screws out until engine begins to roll, finally turn screws in just enough for smooth running (favor slightly rich mixture).

Idle Speed – 475-500 RPM with transmission in neutral.

NOTE – Idle speed screw located on Throttle Operating Housing adjacent to throttle lever.

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Gasoline Gauge: King-Seeley Electric Constant Voltage ("CV") type with gauge voltage regulator, Ford No. B7J-10804-A, (J, JH, JL), B7A-10804-B (Others).

Dash Unit - Ford B7J-9280-A (J, JH, JL), B7C-9280-A (Others).

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Tank Unit - Ford No B6A-9276-A
See "Fuel Gauges" in Carburetion Section

Fuel Pump: AC, Fuel only or Fuel & Vacuum types

Mod l	Ford Pump No.
223 Eng	①B5A-9350-A
223 Eng	B7A-9350-B
223 Eng	②B7A-9350-C
223 Eng	B8A-9350-E
223 Eng	②B8A-9350-F
272 Eng (4-Bbl Carb)	B7T-9350-A
272, 292 Eng (2-Bbl Carb)	B6C-9350-A
292 Eng (2-Bbl Carb)	B8C-9350-A
292 Eng (4-Bbl Carb)	③B8T-9350-A
292 Eng (4-Bbl Carb)	B8T-9350-B

① - Repl by B7A-9350-B ② - Fuel & Vacuum
③ - Repl by B8T-9350-B

Pr ssur - 3 5-5 5 lbs at 500 engine RPM
See "Fuel Pumps" in Carburetion Section

Air Cl an r: DRY FILTER ELEMENT type Clean every 12,000 miles, replace element every 36,000 miles
►*CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash lement in solvent or oth r liquids and DO NOT oil or lubricate*

BATTERY

F rd B6A-10655-C (Exc. Sch. Bus). 12 volt, 66 plate, 55 Amp Hr capacity, **B6A-10655-A (All).** 12 volt, 78 plate, 70 Amp Hr capacity, all at 20 hour rate
Batt ry Gr und - Negative to engine block
Engin Gr und - At flywheel housing

STARTER

F rd B6A-11002-A (Synchr -mesh), B7T-11002-A (Auto. Trans.) *NOTE* - B7T-11002-A is Delco-Remy Solenoid Pinion Shift Starter
Armatur - Ford B6A-11005-B (B6A-11002-A), B8C-11005-A (B7T-11002-A)
Driv (B6A-11002-A) - Bendix "Folo-Thru", Ford ICM-11350-C
Driv (B7T-11002-A) - Delco-Remy Solenoid Pinion Shift and overrunning clutch
R tati n - Counterc lockwise at commutator end
Brush Spring T nsi n - 48-56 ozs (B6A-11002-A), 35 ozs (B7T-11002-A)
Cranking Spe d - 150-180 RPM, 190 amps max

P rf rmanc Data-B6A-11002-A

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	80 Max
15 5 ft lbs		5 0	550 Max

P rf rmanc Data - B7T-11002-A

Torque	RPM	Volts	② Amperes
0 ft lbs	3600-5100	10 6	65-100
Lock		3 5	300-360

① - If starter on engine, engine must be idling
② - Includes solenoid

Starting Switch: Magnetic type, Ford B6A-11450-A (B6A-11002-A), Solenoid Switch Ford B8C-11390-A (B7T-11002-A) Starter switch controlled by ignition switch *NOTE* - Neutral Safety switch used on Auto Trans
N utral Safety Switch (F rd matic): Ford No FAC-15812-C
Adjustment - *See "Fordomatic & Mercomatic" in Transmission Section*

GENERATOR

Generator	Armature	Application
B6A-10002-F	B6C-10005-C	6 Cyl 40 Amp
B6A-10002-E	B6C-10005-C	V8 40 Amp
B6A-10002-H	B6A-10005-A,B,C	All 30 Amp
B8QH-10002-A	B8QH-10005-A	All 40 Amp

Performance Data

Generator	Amperes	RPM
B6A-10002-E, F	40	1800
B6A-10002-H	30	2525
B8QH-10002-A	40	2500

Brush Spring Tension - 32-40 ozs (B6A-10002-H, B8QH-10002-A), 34-41 ozs (B6A-10002-E,F)
Field Current - 1 5-1 6 amperes at 12 volts
Rotation - Counterclockwise at commutator end
Belt Adjustment: ¼" (6 Cyl), ½" (V8), deflection midway between generator and water pump pulleys with light thumb pressure

REGULATOR

Ford B6A-10505-B (B6A-10002-E Gen.) ①; B7A-10505-A (B6A-10002-E, F Gen.); B7A-10505-B (B6A-10002-A, H Gen.); B8E-10505-C (B8QH-10002-A Gen.).

① - B6A-10505-B replaced by B7A-10505-A

See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section
►*SETTING CAUTION· "Temperature Compensated" type Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation or after regulator heated and stabilized*

Cutout Relay

Cuts In - 12 4-13 2 volts (B6A-10505-B, B7A-10505-A), 12 0-13 9 volts (B7A-10505-B, B8E-10505-C), at 75° F (Ambient Temp)
Cuts Out - 2-9 Amps (B6A-10505-B, B7A-10505-A), 2-8 Amps (B7A-10505-B, B8E-10505-C)

Voltage Regulator

Setting - 14 6-15 4 volts (B6A-10505-B, B7A-10505-A), 14 2-14 9 volts (B7A-10505-B, B8E-10505-C) at 75°F (Ambient Temp)
Checkina & Adjusting - *See Electrical Section*

Current Regulator

Setting - 28-32 Amps (B6A-10505-B, B7A-10505-A)' 38-42 Amps (B7A-10505-B, B8E-10505-C)
Checking & Adjusting - *See Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) *See "4-Headlight Systems" in Electrical Section*
Dir cti nal Signals: *See El ctrical S cti n*
Lighting Switch R m val: With control knob in "OFF" position press spring release button on switch housing, turn shaft slightly and pull it out of switch Unscrew mounting nut, remove switch
St p Light Switch L cati n: On brake master cylinder, Power Unit Assembly, or fitting on frame side rail Master Cylinder located on firewall (Conventional Trucks), on bracket attached to left frame member below brake pedal (Others)
LIGHTING CIRCUIT BREAKERS: Two used in lighting switch One circuit breaker protects headlight circuit, other circuit breaker protects instrument, parking,stop, and tail light circuits
FUSES: Interior Lights - 7 5 Amps On lighting switch
Directional Signals - 7 5 Amps in flasher lead
Overdrive - 15 Amps On overdrive relay
Heater - 7 5 Amps In switch lead
Clock - 3 Amps In clock lead
Horn Relay: Ford No B8C-13853-A

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl 223" Eng , V8 272 & 292 Eng Medium Duty (MD), V8 272 & 292 Eng Heavy Duty (HD) All engines are overhead valve type

Engine	Bore	Stroke	Replacement
223	3 62"	3 60"	223 cu ins
272	3 62"	3 30"	272 cu ins
292	3 75"	3 30"	292 cu ins

Engine	Compr. Ratio	Rated HP	Developed HP
223	8 3-1	31 50	139 at 4200 RPM
272 MD ①	8 3-1	41 90	181 at 4400 RPM
272 HD ②	7 6-1	41 90	178 at 3800 RPM
292 MD ①	7 9-1	44 60	186 at 4000 RPM
292 HD ②	7 6-1	44 60	187 at 3800 RPM

① - 2 Bbl Carb ② - 4-Bbl Carb

Compression & Vacuum Reading - *See TUNE-UP*
CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifolds" in Ford Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data*
ENGINE REMOVAL: *See "Engine" in Ford Special Data*
OIL PAN REMOVAL (223 Eng.): Drain oil, remove dipstick and flywheel housing cover Remove oil pan screws and remove oil pan and gasket
OIL PAN REMOVAL (272, 292 Eng.): Drain oil, remove dipstick On Fordomatic trucks, remove converter housing dust cover On F100 trucks, turn engine to TDC Disconnect oil pump inlet tube at oil pump and remove "O" ring seal from pump end of tube Remove oil pan

223" 6 CYL. ENGINES

(See Engine Specifications Above)

See 1958 Ford 6 Cyl Passenger Car Pages Engine is similar to those used in 1958 Pass Cars, and all passenger car engine data applies to truck engines

272" & 292" V8 ENGINES

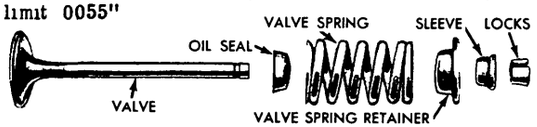
(See Engine Specifications Above)

See 1957 Ford V8 Passenger Car Pages Engines are similar to these used in 1957 Pass Cars, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW

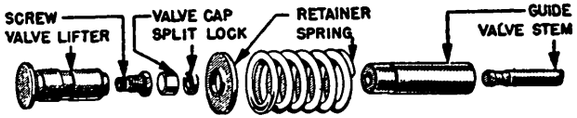
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VALVES: Valve Stem to Guide Clearance - (272, 292 MD) Clearance should be 0010-0024" Intake, wear limit 0045", Exhaust 0023-0037", wear limit 0065" **(272, 292 HD)** Clearance should be 0010-0024" Intake, wear limit 0045", Exhaust 0018-0032", wear limit 0055"



FORD V8 "ROTATABLE" VALVE ASSEMBLY



FREE TYPE VALVE ASSY.

Valve Seat Width - (272 MD, 292) 060-080" Intake, 070-090" Exhaust **(272 HD)** 070-090" Intake, 090-110" Exhaust

Valve Lifter Bore Clearance - (272) 0005-0021", **(292)** 0008-0024"

Valve Cap Clearance (Exh. Valves HD Engines) - *See "Valve System" in Ford Special Data*

►*ROTATABLE & FREE TURNING VALVE NOTE* Free Turning type valve (cap over end of stem) used for Sodium Cooled Exhaust valves on HD engines All other valves (All Engines) have "Rotatable" type valve (sleeve between spring retainer and lock) See Illustrations

►*EXHAUST VALVE CAUTION (HD Engines):* Exhaust valves are Sodium cooled and require special disposal handling to prevent possibility of fire or explosion due to chemical reaction DO NOT DISCARD SODIUM COOLED VALVES with other scrap material

EXHAUST VALVE INSERT (HD Engines): *See 'Valve System" in Ford Special Data*

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Ford Special Data*

Crankcase Capacity: 6 qts (HD Engines), 5 qts (Others) Add 1 qt with filter change

Normal Oil Pressure: 45-50 lbs at 2000 RPM (Hot)

Pressure Regulator Valve - In oil pump body

Oil Pressure Indicator: Warning Light (Exc Par Del), King-Seeley Gauge (Par Del)

Dash Unit - Ford B7J-9273-A (Par Del)

Engine Unit - Ford B7T-9278-A (Par Del), B6A-9278-B (Others)

See "King-Seeley Gauges" in Miscellaneous Section

Oil Pump: Gear type pump mounted inside crankcase in line with distributor shaft (223 Eng), rotor type located on left side of crankcase and driven by distributor shaft (Others)

Pump Removal & Overhaul - *See "Oil Pump" in Ford Special Data*

Oil Filter: Full-flow with pressure relief valve in center bolt or "Disposable" type Replace element or filter unit at 4000 mile intervals

Replacement Element Disposable Unit - Ford No B2A-6371-A (223, 272), B8C-6371-A (292) element Ford B7A-6371-B (All) disposable unit *NOTE* -Adapter B7A-6882-A used with disposable unit

Crankcase Ventilation: Filter in oil filler cap (inlet) all models Road draft outlet pipe for crankcase ventilation all models *NOTE* - V8 engines has filter screen in road draft outlet tube Service filler cap by cleaning with solvent and resaturating with engine oil at 4000 mile intervals Clean screen in road draft outlet tube

COOLING

Pressure Valve: Ford OL-8100-A, radiator filler cap (opens at 7 lbs)

Thermostats: (All) Ford No B7A-8575-A (157-162°F), B7A-8575-B (177-182°F) Use with permanent anti-freeze

Water Pump: Packless, sealed ball bearing type *See "Water Pump in Ford Special Data*

Temperature Gauge: King-Seeley Electric Constant Voltage ("CV") type with gauge voltage regulator, Ford No B7J-10804-A (Par Del), B7A-10804-B (Others)

Dash Unit - Ford No B7J-10883-A (Par Del), B7C-10883-A (Others)

Engine Unit - Ford No B7A-10884-A

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Long 10, 10½ & 11CF Clutches used as follows

Ford No	Cover Assembly	Long No.
B4A-7563-B 10"	①	L5222
B7C-7563-A 10½"	②	267371
B7Y-7563-A 11"	③	267147
B7Y-7563-A 11"	⑪	267147
Ford No.	**Disc**	**Long No.**
B7C-7550-A 10" Molded		CD870
B7C-7550-B 10½" Molded		287335
B7C-7550-C 11" Molded		CD607
B6D-7550-A 11" Woven		CD606

① - With Disc Ford B7C-7550A, Long No CD870
② - With Disc Ford B7C-7550B Long No 287335
③ - With Disc Ford B7C-7550C, Long No CD607
⑪ - With Disc Ford B6D-7550A Long No CD606

See 'Long Clutches' in Clutch Section

►*CLUTCH LINKAGE PRODUCTION CHANGE (To Reduce Operation Effort)* New linkage installed in trucks approximately Jan 2nd 1958 New linkage parts consist of Clutch Pedal and Release Lever Assemblies, Master Cyl Pushrod, Spring and Retainer Assembly, Master Cyl Piston Stop Plate and Repair Kit New parts can be installed in early 1958 and all 1957 trucks

Clutch Pedal Clearance: Free travel 1 3/8" (F & T Trucks), 1 11/16" (C Trucks)

Pedal Height - Adjust pedal travel (Bumper adjustment) so pedal is even with brake pedal when fully released

Free Travel Adjustments - 1) Remove retracting spring, bottom slave cylinder pushrod and piston (force it forward), pull release lever to rear until bearing just contacts release fingers Adjust pushrod adjusting nut to obtain not less than ¼" clearance between adjusting nut and lever (6 turns equal ¼")

2) Adjust master cylinder pushrod eccentric bolt to obtain 3/16-3/8" (F & B Trucks), 7/32" (C Trucks) or ¼" (Par Del Trucks), free travel at pedal pad before pushrod contacts master cylinder piston

Removal: Release retracting spring Remove slave cylinder from flywheel housing and slave cylinder pushrod from release lever Remove transmission (see Transmission Removal below), dust cover from flywheel housing, release bearing and hub from release lever Mark pressure plate, cover assembly and flywheel for reassembly Remove pressure plate and cover assembly-to-flywheel bolts gradually to reduce spring tension, remove assembly through bottom of clutch housing

Hydraulic Clutch Control: Master cylinder mounted on firewall (Conv Cab), on bracket on firewall (Tilt Cab), and connected to Slave Cylinder which is attached to flywheel housing and connected to outer end of clutch release lever

Filling Master Cylinder - Maintain fluid level (HD Brake Fluid) to within ½" below top of cylinder reservoir Change fluid at 15000 mile intervals

SYNCHRO-MESH TRANSMISSION

3-SPEED (LIGHT DUTY)

Own. 3-speed, all helical gear, constant mesh, synchro-mesh (second and high), sliding gear (low and reverse). Steering column shift standard.

See "Ford Truck 3-Speed (Light Duty)" in Transmission Section.

Removal: Drain lubricant, disconnect speedometer cable and drive shaft and gear shift linkage at transmission. *(NOTE* - On band type parking brake, disconnect brake cable clevis and remove cable support bracket). Remove flywheel housing-to-transmission bolts and nuts, draw transmission to rear to clear flywheel housing and lower transmission.

3-SPEED (MEDIUM DUTY)

Own. 3-speed medium duty with steering column shift standard. *See "Ford Truck 3-Speed (Medium Duty)" in Transmission Section.*

Removal: Same as for 3-Speed (Light Duty) above.

3-SPEED (HEAVY DUTY)

Own. 3-speed, **left hand** helical gear (second & high), spur gear (low & reverse), constant mesh, synchro-mesh (second & high), sliding gear (low & reverse) Steering column shift standard *NOTE* - Left hand helical gears can be used in 1957 HD transmissions

See "Ford Truck 3-Speed (Heavy Duty)" Transmission in Transmission Section.

Removal: Same as for 3-Speed (Light Duty).

4-SPEED

Own. 4-Speed, constant mesh, synchro-mesh (second, third, & high). Helical gears used for second, third, & high. Spur gears used for low & reverse. Floor mounted gear shift standard.

See "Ford Truck 4-Speed (Synchro-mesh) Transmission" in Transmission Section.

Removal: Same as 3-Speed (Light Duty) and note following If hoist not used, it may be necessary to remove

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gear shift lever assembly (New Process) and lever housing (Others), before transmission can be removed from truck. *(NOTE* - On Tilt-Cab - release lock and tilt cab forward). Disconnect shift linkage at split pin which attaches universal joint to finger socket shaft in rear cross shaft housing. Drain transmission, disconnect drive shaft at parking brake drum. If truck equipped with coupling shaft support, disconnect support bracket, and remove coupling shaft. Disconnect parking brake and speedometer cables. Remove dust cover from bottom of clutch housing, support transmission on jack, remove two top nuts, two bottom bolts, move transmission to rear until input shaft splines clear clutch housing and lower transmission.

OVERDRIVE

Warner M-d-l R10. Solenoid operated with governor control and throttle operated kickdown.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as 3-Speed Synchro-mesh Transmission (above), after disconnecting control cable and wiring.

FORDOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. *See "Fordomatic & Merc-O-Matic" in Transmission Section.*

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Merc-O-Matic" in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Fordomatic & Merc-O-Matic" in Transmission Section.*

Lubrication - Check transmission fluid level every 1000 mile intervals, maintain level at "F" (full) mark on dipstick. Drain and refill every 16,000 miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level: Bring transmission to operating temperature by idling engine (operate with selector lever in "N" for 4 minutes, in "P" for remainder of time). With transmission warm, move selector lever through all positions, then check fluid level with selector lever in "P" Add Automatic Transmission Fluid Type "A" to bring level to "F" mark on dipstick.

Throttle Linkage Adjustment (Fordomatic Models): See *CARBURETOR above.*

► *OTHER FORDOMATIC SERVICE DATA: See "Fordomatic & Merc-O-Matic" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

► *UNIVERSAL JOINT INSTALLATION CAUTION:* Make sure that all universal joint yokes in drive line are in same plane to avoid drive line vibration.

Coupling Shaft Center Bearing: Consists or cushion mounted ball bearing bolted to underside of frame intermediate cross member. Bearing is mounted on end of coupling shaft in a sleeve with felt retainer on each end and bearing baffle on front end.

REAR AXLE

SEMI-FLOATING

Own. New Separate Carrier, hypoid gear, with Hotchkiss drive.

See "Ford & Mercury" in Rear Axle Section.

Ratios - 3.70 (37-10), 3.89 (35-9), 4.11 (37-9).

Backlash - .004-.009".

Axle Shaft Removal: Remove wheel, take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

Wheel Bearing Adjustment: None required.

FULL FLOATING

Full floating, Hypoid gear, with Hotchkiss drive.

Model	Rear Axle Type
F-250, P-350 (Spicer Model 60)	Integral Housing
350-600 Series	Banjo Housing

See Various types of Ford Rear Axles in Rear Axle Section.

Rear Axle Ratios

Model	Axle Ratios
F-250	5.87-1①, 4.56-1
F-350	4.86-1, 5.14-1, 5.83-1①
P-350	4.56-1②, 4.86-1, 5.87-1⑥
P-400	4.86-1, 5.14-1, 5.83-1①
P-500	5.83-1②,③, 6.2-1①,②,③, 6.8-1①
F-, B-500	5.83-1②,③, 6.2-1①,②,③, 6.8-1①,②
C-550	5.83-1②, 6.2-1②, 6.8-1②
F-,B-600	6.2-1④, 6.8-1⑤, 7.2-1⑤
C-600	6.2-1⑥, 6.8-1⑥ 7.2-1⑤

4.56-1(41:9); 4.86-1 (34:7); 5.14-1 (36:7); 5.83-1(35:6); 5.87-1(47:8); 6.2-1(31:5); 6.8-1(34:5); 7.2-1(36:5).

① - 6 Cyl. ② - V8. ③ - 6 Cyl. with HD Axle.
④ - V8 with HD Axle. ⑤ - With HD Axle.
⑥ - With Std. & HD Axle.

Axle Shaft Replacement: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

Axle Assembly Removal (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect rear shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking cable (if so equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring "U" bolts, roll rear axle from under truck and drain lubricant.

Carrier Removal (Banjo Housing): Remove axle shaft stud nuts and lockwashers, strike center of axle shaft flange with hammer and punch to loosen tapered dowels, remove dowels and axle shaft. Disconnect drive shaft at rear universal joint flange, support carrier assembly with roller jack, remove carrier to housing bolts and lockwashers. Tighten puller screws (when provided in carrier) to loosen carrier from housing, roll carrier from truck.

Wheel Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher. Adjust bearings by turning bearing adjusting nut (inner nut) up until tight then backing off 1/8 turn. Install bearing lockwasher. *(NOTE* - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel). Install bearing locknut and draw nut up tight. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over locknut. Install axle shaft and lower vehicle.

TWO-SPEED

Own. Electrically operated shift, Two-speed, Full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.

See "Ford Truck Two-Speed" in Rear Axle Section.

Ratio - 5.83-1 (Direct Speed), 8.11-1 (Second Speed); 6.33-1 (Direct Speed), 8.81-1 (Second Speed).

Backlash - .006-.016".

Removal: Same as for standard axle (above) after removal of wiring harness.

SHOCK ABSORBERS

Direct acting hydraulic. Shock absorbers are sealed units and are not adjustable or refillable.

► *REPLACEMENT SHOCK ABSORBER NOTE:* Shocks are supplied for service replacement in kits consisting of shock absorber and necessary bushings.

Replacement Shock Absorbers

Model	Front	Ford Nos.	Rear
F-100, 250	B7C-18124-A		B7C-18125-A
P-350, 400	B7J-18124-B		B7C-18125-A
F-350	B7C-18124-A		B3Y-18125-A
P-500	B7J-18124-A	①	B3T-18125-A
F-500	B8T-18124-A	②	B7J-18125-A
B-500	B8T-18124-A		B3T-18125-A
C-550, 600	B7T-18124-B		B3T-18125-A

① - B7J-18125-A with 2-Speed Axle

② - With 2-Speed Axle

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliot ends and semi-elliptical springs.

Kingpin Inclination - 4° (All Trucks).

Caster ①②	Std. Strg.	Pwr. Strg.
F-100, 250	3°	6°
F-350	3¾°	6¾°
P-350	4°	4°
P-400, C-550, C-600	3°	6°
F-500 (154" Wheelbase)	4½°	7½°
B-500; F-, B-600	4½°	7½°
P-500 (137" Wheelbase)	3°	6°
P-500 (154" Wheelbase)	3½°	6½°
C-550, C-600	3°	6°

① - Maximum variation between wheels ¼°.

② - F-100 with 130" wheelbase is 3¾° Std., 6¾° Pwr. Strg.

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Camb r - 1° Maximum variation between wheels ¼°
Toe-In - 1/16" *NOTE* - On Power Steering models, run engine so hydraulic pressure will center power control valve

STEERING

Manual: Own Gemmer design Worm-and-roller types with push-pull adjustment *NOTF* - Tilt Cab steering column has a universal joint
See "Gemmer Worm & Roller Types" in Steering Section
Power Steering, Ford-Mercury Linkage type Used in connection with standard type steering gear
See Ford Truck Power Steering in Steering Section
Steering Linkage: *See "Steering Linkage" in Steering Section*
Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section*
Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section*

BRAKES

Brake types are listed in application table below. Hand lever applies rear wheel service brakes on F-100, F-250, and P-350 trucks. Independent transmission mounted drum and contracting band type brake on other models.

Brake Type Application

Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F-250,F,P-350,400	Uni-Servo	Duo-Servo
C-550,600	Uni-Servo	Two Cyl.
F,B,P-500, F,B-600	Uni-Servo	Two Cyl.

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe. Ratchet adjusting screw.
See "Ford-Bendix Uni-Servo Hydraulic" in Brake Section.
Duo-Servo - Ford Bendix. Single anchor, self energizing wheel cylinder actuates both shoes. Ratchet adjusting screw.
See "Ford-Bendix Hydraulic" in Brake Section.
Two-Cylinder Type - Two wheel cylinders in each brake assembly.
See "Ford Truck Two-Cylinder" in Brake Section.

Brake Lining Thickness

Model	Primary	Secondary
F-100 6 Cyl	187"	187"
F-100 V8	187"	250"
F-250	250"	250"
F-350 Front	250"	300"
P-350 Rear	250"	250"
Others Front	250"	250"
Rear	375"	375"

Drum Diam ter & Lining Width & L ngth

Mod l		Drum Diam.	Primary Width - Length	S condary Width - Length
F-100	Front	11"	2" - 11 96"	2" - 11 96"
	Rear	11"	1¾" - 11 96"	1¾" - 11 96"
F-250	Front	12 1/8"	2" - 11 63"	2" - 13 09"
	Rear	12 1/8"	2" - 11 63"	2" - 13.09"
F-350	Front	12 1/8"	2" - 11 63"	2" - 13 09"
	Rear	13"	2½" - 12 71	2½" - 13 95"
P-350①	Front	12 1/8"	2" - 11 63	2" - 13 09"
	Rear	12 1/8"	2" - 11 63"	2" - 13 09"
P-350②	Front	12 1/8"	2" - 11 63"	2" - 13 09"
P-400	Rear	13"	2½" - 12 71"	2½" - 13 95"
F-500)	Front	13 7/32"	2¼" - 12 68"	2¼" - 13 95"
B-500)	Rear	15"	4" - 15 31"	4" - 15 31"
P-500	Front	13 7/32"	2¼" - 12 68"	2¼" - 13 95"
	Rear	14 1/8"	3½" - 14 42"	3½" - 14 42"
F-600)	Front	14"	2½" - 13 66"	2½" - 15 03"
B-600)	Rear	15"	4" - 15 31"	4" - 15 31"
C-550)	Front	14"	2½" - 13 66"	2½" - 15 03"
C-600)	Rear	15"	4" - 15 31	4" - 15 31"

① - With Spicer Rear Axle
② - With Timken B-100 Rear Axle

Hand Brake: (Except F-100, 250; P-350) External contracting type, consisting of a brake drum bolted to transmission main shaft companion flange, and an external contracting band mounted on rear of transmission
Brake Drum Diameter - 8" (F-350), 7 812" (P-350, 400, 500, C-550, 600), 7 812" (Std Trans), 9 500" (Transmatic) F-500, 600, B-500, 600
Adjustment - *NOTE* - On cable controlled parking brakes place lever in fully released position On rod type linkage, set lever at first notch Flat portion of cam must rest on brake band bracket If not on flat spot, remove clevis pin and adjust clevis rod, then proceed as follows
1) Remove adjusting screw lockwire and turn screw to obtain 010" clearance between lining and drum at anchor bracket Replace lockwire
2) Loosen adjusting screw nut for lower half of band and turn screw to obtain 010" clearance between lining and drum at lower half of brake band, then tighten locknut
3) Turn upper band adjusting rod nut to obtain 010" clearance between upper band lining and drum

Hand Brake Lining

Model	No. & Length	Width	Thickness
F-350	1 - 24 63"	2"	156"
P-350, 400, 500)	2 - 7 89"	2 50"	250"
C-550 600)	1 - 7 30"	2 50"	250"
F-500, 600	① 2 - 10 00"	2 50"	250"
B-500, 600)	② 1 - 24 63"	3 00"	310"

① - With Std Trans ② - With Transmatic

Standard Mast r Cylind r: Located on engine side of firewall on F-, B-, T- Series, mounted under instrument panel beside brake pedal arm on C-Series, above left frame side member under drivers seat on P-Series
Checking Fluid - Maintain fluid level to within ½" of top of reservoir
Removal - *CAUTION* - When truck equipped with booster, stop engine and expel all vacuum from system before disconnecting hydraulic lines, then proceed as follows
1) Disconnect rubber boot from rear end of master cylinder On F- B- T- P- Series, disconnect stoplight switch wires from switch and brake line at fitting. On P-Series, turn front wheels to left out of way, then remove apron for access to master cylinder On C-Series, roll back floor mat, remove floor plate to disconnect hydraulic line
2) Force all brake fluid from master cylinder
3) On F-, B-, T- Series, remove master cylinder to dash panel bolts and left cylinder away from pushrod On C-Series, remove 2 mounting bolts and lower cylinder from pushrod On P-Series, remove brake pedal return spring Remove cotter pin from clevis pin and remove master cylinder pushrod and boot Remove 3 mounting bolts
Power Brakes: Bendix (Hydrovac) Piston type used on F-250, 350, P-350, 400 Midland (Hy-power) Diaphragm type used on all other models
See 'Hydrovac" or "Midland" Pow r Units in Brak Section
Checking Fluid - Same as for Manual Brakes above
Removal of Power Unit (Hydr vac) - Depress brake pedal several times to remove all vacuum from system Loosen brake power unit inlet tube clamp and remove tube Disconnect hydraulic lines and vacuum hose from booster Remove mounting bolts and remove booster from bracket *NOTE* - **DO NOT** remove breather or vacuum check valve unless operating conditions indicate repairs are necessary
Removal of Power Unit (Midland) - Stop engine, depress brake pedal several times to remove all vacuum from system Disconnect 2 hydraulic lines and vacuum hose from booster On frame mounted booster, loosen air breather hose clamp and disconnect hose from booster Remove 3 mounting bolts, then remove booster On F-100, remove 2 bolts from under side of mounting bracket and remove booster from engine compartment *NOTE* - On frame mounted booster, do not remove breather or vacuum check valve unless operating conditions indicate repairs are necessary

MISC. MECHANICAL

Windshield Wipers: Vacuum Link and Arm (Par Del), Electric all others
See "Windshield Wipers" in Misc llaneous S ction

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left door post. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③ ④ ⑤
A 9 F G 100001

① - Engine Type (A - 6 Cylinder).
② - Year (1959).
③ - Assembly Plant, see below.
④ - Body Style, see below.
⑤ - Consecutive unit number.

Assembly Plant Designation

A - Atlanta	**G** - Chicago	**N** - Norfolk
C - Chester	**H** - Lorain	**P** - St. Paul
D - Dallas	**K** - Kansas City	**R** - San Jose
E - Mahwah	**L** - Long Beach	**S** - Pilot Plant
F - Dearborn	**M** - Memphis	**U** - Louisville

Body Style

C - Convertible
F - Ranchero
G - Tudor & Fordor (Custom & Custom "300").
R - Ranch Wagon & Country Sedan (Custom & Custom "300").
S - Tudor & Fordor (Galaxie) (Fairlane "500").
T - Town Sedan & Club Sedan (Fairlane & Fairlane "500").
V - Town & Club Victoria (Fairlane & Fairlane "500").
W - Retractable Hardtop.
X - Commercial Ranch Wagon "Courier".
Y - Country Squire.

TUNE-UP

COMPRESSION PRESSURE: 150±10 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: Steady 18-19" at specified idle speed, with transmission in neutral.

VALVE TAPPET CLEARANCE: .019" Intake & Exhaust (Hot & Cold). Adjust all tappets to .019" clearance while engine is cold, then again check all tappets for .019" clearance after running engine for 30 minutes to normalize temperature.

►*SELF-LOCKING VALVE TAPPET ADJUSTING SCREW NOTE:* Special threads on adjusting screw provide interference fit. 3 ft. lbs. (36 in. lbs.) interference when center section of screw threads is fully engaged with rocker arm threads. Replace screw and/or rocker arm as necessary when interference is below this specification.

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾ turn windup and hooked over stop pin.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .032-.036".

Spark Plugs - Champion 870 (Std.), 860 with economy carburetor. 18 mm. Torque to 15-20 ft. lbs. (25-30 ft. lbs. new plug in new cyl. head).

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be tightened within range of 15-20 ft. lbs.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - B8A-12250-A. 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is bypassed during cranking by a lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Ford No. B8A-12127-M. "Loadomatic" type of same design used on previous models. *NOTE - Distributor identified by No. FET-12127-C stamped on distributor housing.*

Condenser - Ford No. 7RA-12300-C. **Capacity** .21-.25 mfd.
Contact Point Set - Ford No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	.38	450
2½-3½	.79	650
6¾-7¾	2.85	1100
8¾-9¾	4.33	1400
10¼-11¼	5.99	1800

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump. It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump.

Initial Distributor Timing: Set engine crankshaft so that No. 1 Cylinder is at TDC after compression stroke (with timing mark in line with pointer). Install distributor so that rotor points to the No 1 Spark Plug Wire Terminal in distributor cap.

IGNITION TIMING

Setting - 4° BTDC (Std. & O.D. Trans.), 3° BTDC (Auto. Trans.). Allowable range 2-10° BTDC. Set timing with engine at normal idle speed and vacuum line disconnected.

Timing Mark - Vibration damper marked "TDC" and "3", "5", "7", "9" degrees BTDC. Align correct mark with pointer on engine front cover.

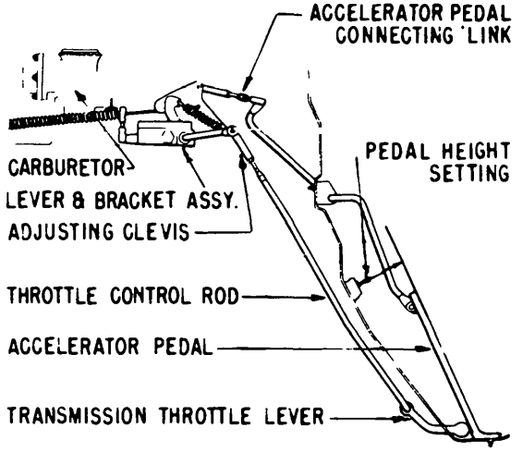
CARBURETOR

►*THREE-SPEED FORDOMATIC THROTTLE ADJUSTMENT NOTE:* Adjustment the same as for "TWO-SPEED" except to lengthen throttle rod 2½ turns and adjust pedal height to 3.10".

Throttle Linkage Adjustment (2-Speed Fordomatic Cars): Adjust engine idle speed to 475-500 RPM and make anti-stall dashpot adjustment (see below). With engine stopped and carburetor on hot idle, remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut. Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission. Turn clevis until pin enters hole in lever **and lengthen rod 3½ turns** (see "Special Setting Note" below). Connect throttle control rod, tighten locknut, install clevis lock. Measure accelerator pedal height from top rear corner of pedal to floor mat. Distance should be 3½". Adjust by turning threaded trunnion on accelerator link.

►*SPECIAL SETTING NOTE:* For more satisfactory shift feel, rod may be lengthened 2±½ turns in place of 3½ turns.

Anti-Stall Dashpot Adjustment: After engine idle speed adjusted to 475-500 RPM, turn off engine. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and depress dashpot plunger with a screwdriver blade. Turn dashpot or adjusting nut until .045-.064" clearance obtained between dashpot plunger and throttle shaft lever. Tighten locknut.



FORDOMATIC TRANSMISSION THROTTLE LINKAGE

HOLLEY VISI-FLO

Carburetor No.	① Identification No.
B9A-9510-F (Std. & O.D.)	② B9EA-9510-A,B,C
B9AE-9510-A (Econ.)	② B9AE-9510-A,B9EA-9510-D,E

① - Stamped on flat of main body at fuel inlet.
② - Add dashpot when used with Fordomatic.

►*STANDARD CARBURETOR ECONOMY IMPROVEMENT NOTE:* Use later type main metering jet. See *"Holley Visi-Flo" in Carburetion Section.*

Idle Setting - Initial setting ¼-1¾ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture, rather than a lean setting.

Idle Speed - 475-500 RPM in Neutral. Recheck automatic transmission cars with selector lever in "DR" range. Readjust to obtain 450 RPM.

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Fu l Level - 11/16" ± 1/32" below power valve mounting surface (Tool T52L-9550-AEE).

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Ford B8A-9350-E (Fuel only), B9A-9350-B (Fuel & Vacuum).

Fuel Pump Pressure - 3.5-5.5 lbs. at 500 RPM. *See "Fuel Pumps" in Carburetion Section.*

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with gauge voltage regulator Ford No. B7A-10804-B.

Dash Unit - Ford No. B9A-9280-A.

Tank Unit - See table below.

Model	Ford Part No.
Retractable Hardtop	B7A-9275-B
Sta. Wgn., Sed. Del., Ranchero	B7A-9275-G
Others	B9A-9275-A

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 4,000 miles, replace element every 24,000 miles.

►*CLEANING CAUTION:* Clean element by tapping it against a hard surface. DO NOT immerse element in cleaning solvent or blow it out with compressed air. Clean cleaner body and cover in solvent and wipe dry.

BATTERY

Ford Part No.	Color	Volts	Plates	℄ Capacity
B9A-10655-A	Red	12	11	55 ampere
B9A-10655-B	Silver	12	13	65 ampere
B9A-10655-C ℰ	Yellow	12	11	70 ampere

℄ - At 20 hr. rate.

ℰ - Requires special tray & holders.

Battery Ground - Negative, to engine block.

Engine Ground - Cylinder head to dash.

STARTER

Ford B6A-11002-A. Armature - B6A-11005-B.

Drive - Ford ICM-11350-C. Bendix "Folo-Thru".

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM, 190 amperes max.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12.0	80
15.5 ft. lbs.		5.0	550

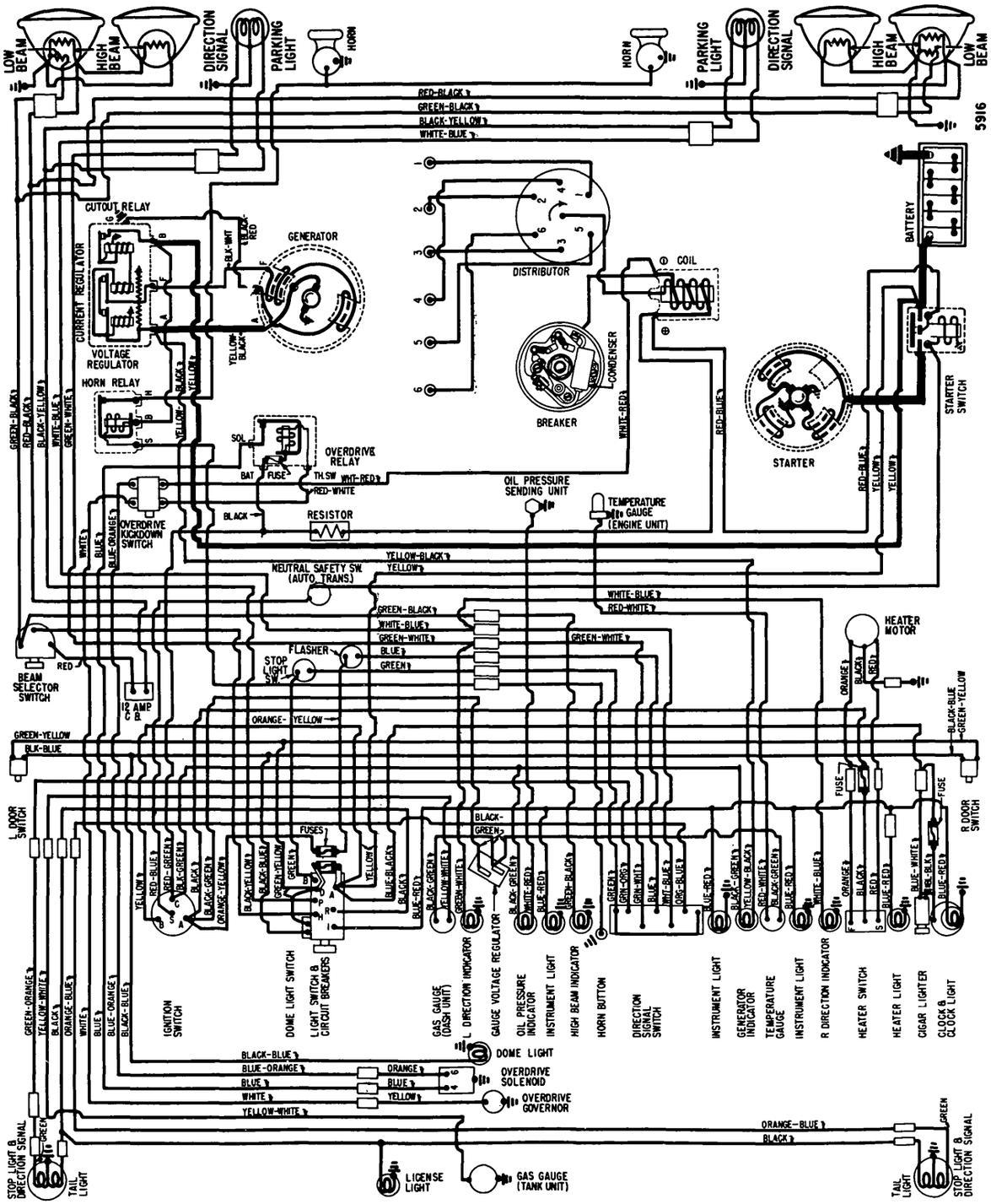
℄ - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford No. B6A-11450-A. Starter Switch is controlled by ignition switch.

NOTE - Neutral safety switch used on Fordomatic Transmissions.

N utral Safety Switch (Aut -Trans.): Ford No. B9A-15812-A1 (Auto. Trans.).

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Adjustment - *See "Ford Two-Speed Automatic" in Transmission Section*

►*NEUTRAL SAFETY SWITCH REPLACEMENT NOTE* Both "RBM" & "MECO" switches used in production Use B9A-15812-A1 for replacement

GENERATOR

Ford, Bosch & Auto-Lite generators used

Generator	Armature
B6A-10002-C (Bosch) ①	B6C-10005-B
B6A-10002-H (Ford) ②	B6A-10005-A,B,C
B9A-10002-A (Ford) ③	B6A-10005-B
B6A-10002-F (Auto-Lite) ④	B6C-10005-C
B6A-10002-D (Bosch) ⑤	B6C-10005-A
B6A-10002-B (Bosch)	FAA-10005-A
B6A-10002-G (Ford) ⑥	B6C-10005-D

① - Bosch Low Cut In Identification - FBZ-10000-B, FCB-10000-A, FCH-10000-A, FCJ-10000-A, B, FCP-10000-A

② - Identification - FAS-10000-G, FBT-10000-D, FBU-10000-C, FCW-10000-C, 2700004

③ - Identification - FHA-10000-A, 290039,40,42,43,44, 45,46

④ - Identification - FAW-10000-A, FCE-10000-A, FGN-10000-A

⑤ - Identification - FBS-10000-C, FCC-10000-A, FGG-10000-A, FCK-10000-A,B, FCN-10000-A, FCR-10000-A

⑥ - Identification - FAY-10000-B, FCA-10000-B, FCL-10000-A,B, FCM-10000-A, FCS-10000-A

Performance Data

Generator	Amps	RPM
B6A-10002-C	30	1220
B6A-10002-H	30	
B9A-10002-A	30	2525
B6A-10002-F	40	1800
B6A-10002-D	50	1380
B6A-10002-B	60	2240
B6A-10002-G	60	1390

Brush Spring Tension - **Auto-Lite** 34-41 ozs, **Bosch** 16-18 ozs, **Ford** 32-40 ozs

Field Current - B6A-10002-(C) 1 27, (F) 1 3, (D,B) 1 31 (G) 1 72, B9A-10002-(A) 1 0-1 1 Amps at 10 volts hot

Rotation - Counterclockwise at commutator end

Belt Adjustment- ¼" deflection midway between generator and water pump pulleys (right side) with light thumb pressure

REGULATOR

Regulator	Generator
B6C-10505-B Bosch	B6A-10002-C
B7A-10505-B Ford	B6A-10002-H
B7A-10505-B Ford	B9A-10002-A
B7A-10505-A Auto-Lite	B6A-10002-F
B6A-10505-C Bosch	B6A-10002-D
B5C-10505-A Bosch	B6A-10002 B
B6C-10505-A Ford	B6A-10002-G

►*SETTING CAUTION* "Temperature Compensated" type Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized

Cut-out Relay

Cuts In - Auto-Lite 12 5-13 9 volts **Bosch** 13 0-13 5 volts, **Ford** 12 0-12 8 volts (B7A-10505-B), 12 0 12 6 volts (B6C-10505-A)

Cuts Out - Auto-Lite 2-6 amps, **Bosch** 2-8 amps, **Ford** 6-9 amps (B7A-10505-B), 2-6 amps (B6C-10505-A)

Voltage Regulator

Setting - Auto-Lite 14 2-14 9 volts, **Bosch** 14 1 volts lower contacts, 14 8 volts upper contacts, **Ford** 14 6-15 4 volts (B7A-10505-B), 15 0 volts (B6C-10505-A)

Checking & Adjusting - *See Auto-Lite, Bosch & Ford Regulators in Electrical Section*

Current Regulators

Setting - Auto-Lite 38-42 amperes, **Bosch** 28-32 amperes (B6C-10505-B), 48-52 (B6C-10505-C), 58-62 amperes (B5C-10505-A), **Ford** 28-32 amperes (B7A-10505-B), 58-62 amperes (B6C-10505-A)

Checking & Adjusting - *See Auto-Lite, Bosch & Ford Regulators in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) *See "4-Headlight Systems" in Electrical Section*

Directional Signals: *See Electrical Section*

Lighting Switch Removal- With control knob in the "OFF" position, press spring and release button on switch housing turn shaft slightly and pull it out of switch Unscrew mounting nut with Tool 17470-N, remove bezel and switch and remove wires

Stop Light Switch Location- On forward end of brake master cylinder

CIRCUIT BREAKERS- Two circuit breakers built in lighting switch 1) Protects Headlights 2) Protects Instrument, Parking, Stop, Tail & Back-up lights

12 Ampere - Protects headlight low beam circuit Located at lower left edge of instrument panel

FUSES- **7 5 Ampere** - Interior lights On headlight switch

5 Ampere - Direction signals On headlight switch

15 Ampere - Overdrive On overdrive relay

14 Ampere - Heater In feed wire

1 Ampere - Clock In feed wire.

Horn Relay: Ford No B8C-13853-A

ENGINE

ENGINE SPECIFICATIONS 6 Cyl valve in head

Bore	Stroke	Displacement
3 62"	3 60"	223 cu in
Compr Ratio	**Rated HP**	**Developed HP**
8 4 1	31 54	145 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

►*ENGINE OIL PRESSURE LOSS CORRECTION* New oil pump screen and cover assembly No B9AE-6622-C with bypass valve reduces possibility of pressure loss due to screen stoppage

►*SLOW ENGINE WARM UP CORRECTION* Remove shield located in front of bi-metal spring on heat control valve Crimp shaft at slot to retain spring Center bushings in manifold cavity

►*ENGINE OIL LEAK AT FUEL PUMP NOTE* Use Fuel Pump Gasket No B5A-9417-A which is 020" thick

►*OIL PUMP DRIVE SHAFT BREAKAGE CORRECTION.* Enlarge holes in **distributor shaft** to 140" to permit roll pin to float in distributor shaft and the flats of the hexagon to drive the oil pump

►*ROCKER ARM COVER OIL LEAK CORRECTION* When cover inner gasket retainer interferes with proper seating of gasket, grind off retainer edge to provide clearance and install new gasket

►*ORIGINAL BORE & PISTON SIZES See "Pistons" in Ford Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Ford Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data*

ENGINE REMOVAL: *See "Engine" in Ford Special Data*

OIL PAN REMOVAL: Drain crankcase, remove oil level dipstick and flywheel housing inspection cover Remove oil pan screws, oil pan and gasket

PISTONS

Autothermic type Solid skirts with three rings

Removal - Pistons and rods removed from above

Fitting New Pistons: Clearance - 0008-0026" at bottom of skirt Use ½" wide ribbon feeler gauge inserted between piston and cylinder wall at right angle to pin on thrust side, piston inverted and bottom of piston skirt 1½" below top of block To test minimum clearance, use 0015" feeler and 4 lbs pull, to test maximum clearance use 003" feeler and 4 lbs pull

Replacement Pistons: Furnished Std (1 size only) and 020", 030", 040", 060" Oversize with fitted pins

Installing Pistons: Install piston with indentation in head of piston toward front of engine *See Rod Installation*

PISTON PINS

Floating type with lock ring at each end

Diameter - 9120 9123" **Length** - 3 016-3 030"

Pin Fit in Piston - 0001 0003" wear limit 0008"

Pin Fit in Rod Bushing - 0001-0003" wear limit 0008"

Replacement Pins: Standard and 001" 002" oversize

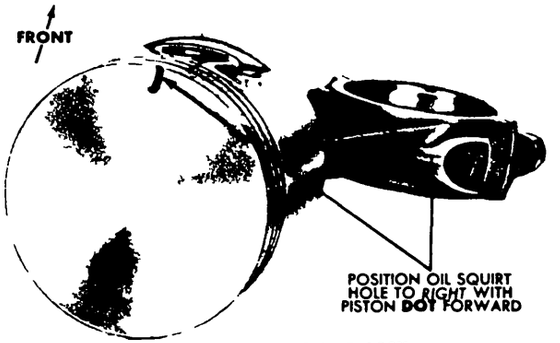
PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr #1 2	3 32"	010 027"	002 0035"
Oil #3	3 16"	015-062"	①

① Side sealing type ring

Replacement Rings- Standard 020" 030" 040" 060" oversize (Expander type)

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FORD 6 CYL. PISTON & ROD ASSY.

CONTINUED FROM PRECEDING PAGE

CONNECTING RODS

Journal Diameter - (Red) 2.2984-2.2988", (Blue) 2 2980-2.2984".
Clearance - 0004- 0023" wear limit 0033"
Side Clearance - 003- 009", wear limit 012"
R placement Bearings: Standard size (2 sizes marked **Red** and **Blue**) and 010", 020", 030" Undersize
►*STANDARD SIZE NOTE* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance
Installing Rods: Install rod with squirt hole to right and piston indentation toward front of engine

CRANKSHAFT

Journal Diameter - (Red) 2.4984-2.4988", (Blue) 2 4980-2.4984"
Bearings - Steel backed copper lead alloy
Clearance - .0005- 0025" Wear limit .0035"
R placement Bearings: Standard size (2 sizes marked **Red** and **Blue** for selective fitting) and 010", 020", 030" Undersize
►*STANDARD SIZE NOTE* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance
End Thrust: Taken on rear intermediate #3 bearing
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data*
End Play - 004- 008", wear limit 012"
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars and truck engines to reduce oil leakage at front oil seal

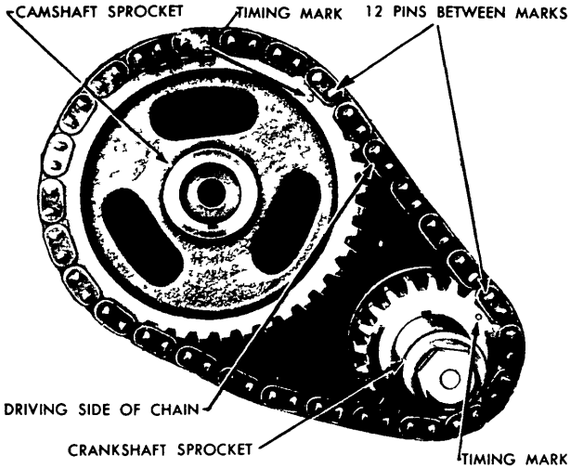
CAMSHAFT

►*CAMSHAFT LOBE WEAR CORRECTION (1952-59):* A hardenable iron valve lifter has been released under Part No B8C-6500-A for use when excessive cam lobe wear is experienced
Journal Diameter - 1 9255-1 9265"
Clearance - 001- 003", wear limit 006"
End Thrust: Taken by thrust plate and spacer behind camshaft sprocket *NOTE* - Chamfer on inside of spacer must be toward camshaft journal
R placement Bearings: Finished bearings furnished Standard, and 015" undersize *CAUTION* - Rear intermediate (#3) bearing not interchangeable with other bearings
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data*
Timing Chain: Side-guide type 56 links
Camshaft Setting: Sprockets marked by "O" at one tooth Mesh chain so that there are 12 pins between "O" marks on driving side of chain
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Special Data*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data*

VALVES

Tappet Clearance: 019" Intake & Exhaust (Hot or Cold)

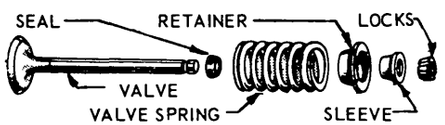
Valve	Head Diameter	①Stem Diameter
Intake	1 775-1 785"	3416- 3423"
Exhaust	1 505-1 515"	3403- 3410"



FORD 6 CYL. VALVE TIMING MARKS

Valves	Seat Angle	②Lift	③Stem Clearance
Intake	45°	273"	001- 0024"
Exhaust	45°	273"	0023- 0037"

①- Furnished with 003", 015" 030" oversize stems
②- Cam lobe lift Wear limit, 268"
③- Wear limit 0045"(Intake), 0065" (Exhaust)
►*ROTATABLE VALVE NOTE: All valves are rotatable type See "Valve System" in Ford Special Data*



FORD 6 CYL. VALVE ASSEMBLY

Valve Stem Seals - Umbrella type seals used on both intake and exhaust valve stems cupped side down
Valve Seat Width - 060- 080" (Intake), 070- 090" (Exhaust)
Valve Springs: Free Length - 2 09" approximately

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①71-79 lbs	1 780"
Open	②161-177 lbs	1 390"

①- Wear limit 64 lbs at 1 780"
②- Wear limit 145 lbs at 1 390"

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to spring retainer contact surface If assembled height is 1 25/32" or greater, install necessary 030" spacer or spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 3/4-1 25/32"
Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves *See "Valve System" in Ford Special Data*
Valve Lifters: Mushroom type Removed from below with camshaft out
Clearance - .0008-.0024" wear limit 0045".
Rocker Arm Assembly: *See "Valve System" in Ford Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT abov
►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated
Intake Valves - Open 17°①BTDC Close 53°②ALDC
Exhaust Valves - Open 61°①BLDC Close 9°②ATDC
①- Camlift 016" ②- Camlift 019"

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*
Crankcase Capacity: 4 quarts (refill), 5 quarts (when filter element changed)
Normal Oil Pressure: 45-50 lbs at 2000 RPM
Pressure Regulator Valve - In pump body, not adjustable
Oil Pressure Indicator - Indicator light on instrument panel operated by engine unit, Ford No B6A-9278-B
Oil Pump: Gear type pump located in crankcase,
Pump Overhaul - *See "Oil Pump" in Ford Special Data.*
Oil Filter: "Disposable" type Replace at 4,000 mile intervals
Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface then tighten filter an additional one-half turn
Crankcase Ventilation: Filter in oil filler cap (inlet), an outlet pipe in rear of crankcase at left side

COOLING

►*OVERHEATING DURING EXTENDED IDLE CORRECTION* To correct above condition, install extra cooling water pump pulley B7A-8509-D with fan belt B7A-8620-E identified by EBP-8620-E
Water Capacity: 15 qts. Add 1 qt for heater
Pressure Valve: Ford B8A-8100-A 14 lb radiator filler cap
Thermostat: Ford No B7A-8575-A (157-162°F) standard, Ford No. B7A-8575-B (177-182°F) for use with permanent antifreeze
►*THERMOSTAT INSTALLATION NOTE:* Install thermostat with valve pivot shaft in a vertical position to insure best operation
Water Pump: Packless, sealed ball bearing type
See "Water Pump" in Ford Special Data
Temperature Gauge: King-Seeley Electric Constant-voltage ("CV") type, with gauge voltage regulator Ford No B7A-10804-B
Dash Unit - Ford B9A-10883-A
Engine Unit - Ford No B7A-10884-A
See 'Temperature Gauges' in Miscellaneous Section

CLUTCH

Long Model 9½CF (Std.), 11CF (Heavy Duty). Semi-centrifugal, single plate type

Cover Assembly

Type	Long No.	Ford No.
9½CF	268594	1A-7563-A
11CF	266978	B7A-7563-C

See "Long Clutches' in Clutch Section

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Typ	Clutch Disc. L ng No.	Ford No.
9½CF	288849	B8A-7550-A
11CF	288851	B8A-7550-B

Pedal Adjustm nt: If total pedal travel is less than 6 5/8" or more than 6 7/8", reposition pedal bumper and bracket until travel is within limits Adjust spring link to give assist spring length of 9¾-10" (between spring eye centers) with pedal fully released against bumper

Fre Trav l - 1 1/8-1 3/8" Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is obtained *NOTE* - Check free travel by operating engine at 3,000 RPM with transmission in neutral position There should be a minimum of ½" free travel under these conditions

R moval· Remove transmission, *see "Synchro-mesh Transmission" below,* then remove flywheel housing cover and release lever retracting spring Slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation Loosen six cover bolts uniformly to release spring tension Remove cover and pressure plate through opening in flywheel housing

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)
See "Ford Synchro-mesh" in Transmission Section

Transmission C ntrol: *See "Transmission Controls" in Transmission S ction*

Removal: Raise car and disconnect drive shaft at rear joint flange Slide drive shaft off transmission output shaft Insert Tool T57L-7657-A over output shaft and into seal Disconnect speedometer cable at extension housing, gear shift rods from transmission levers Remove parking brake equalizer lever from bracket and remove brake cable from bracket on crossmember Remove extension housing to engine rear support bolts and raise rear of engine and remove engine rear support and frame crossmember as a unit Place jack under transmission and remove transmission to flywheel housing bolts Slide transmission and jack to rear to clear input shaft and remove transmission from beneath car

OVERDRIVE

Warn r R10. Solenoid operated type, with governor control and throttle operated kick-down
See "Ford Overdriv ' in Transmission Section

Ov rdriv C ntrol· *See "Overdrive Control' in Transmission Section*

Removal· Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring

FORDOMATIC TRANSMISSION

Tw -Sp d F rd matic New, simplified type, with torque converter and two speed automatic transmission

►*THREE-SPEED FORDOMATIC NOTE* Some cars have Three-Speed Fordomatic installed These cars can be identified by letter "C" stamped on "TRANS" entry on serial number plate

►*TWO-SPEED FORDOMATIC RUMBLE NOISE CORRECTION* Install new pressure regulator valve and spring Kit No B9AZ-7A135-A, *see 'Ford Two-Speed Fordomatic" in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Ford Two-Speed Fordomatic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "Ford Two-Speed Fordomatic" in Transmission Section*

Lubrication - Check fluid level every 1,000 miles Drain and refill every 24,000 miles Use Automatic Transmission Fluid Type "A", Suffix A

►*TRANSMISSION FLUID COLOR NOTE* A dye is added to automatic transmission fluid at assembly plant to aid in detecting leaks

Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid Maintain level at "Full" mark on dipstick

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Ford Two-Speed Fordomatic" in Transmission Section*

UNIVERSALS

Mechanics. Needle bearing type

►*CAUTION* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See "Edsel, Ford & Mercury" in Rear Axle Section*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts

REAR AXLE

Own. Separate carrier type, semi-floating, hypoid, with Hotchkiss Drive "Equa-Lock" (Power Transfer) type differential Optional *See "Edsel, Ford, Thunderbird & Mercury (Deep-Offset) Hypoid' or Ford Equa-Lock Differential ' in Rear Axle Section*

Axle Ratios - 3 56-1(32-9), 3 70-1(37-10), 3 89-1 (35-9)

Backlash - 004- 009"

Axle Shaft Removal Remove wheel and brake drum Remove four axle bearing retainer locking type nuts (work through opening in axle shaft flange) Use puller No 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carri r Ass mbly R moval Remove axle shafts (see above) and drive shaft Remove locknuts which attach carrier to housing and remove carrier from housing

SHOCK ABSORBERS

Direct acting, non adjustable Serviced by replacement.

Ford Shock Absorber Nos.

Model	Front	Rear
Pass Car ℂ	B9A-18124-A	B9A-18125-B
Hardtop	B7A-18124-H	B9A-18125-D
Station Wagon		B9A-18125-C
Pass Car ℂ (Hvy Dty)	B7A-18124-F	B9A-18125-A
Sed Del , Taxi (Hvy Dty)	B7A-18124-F	B9A-18125-A
Sta Wgn (Hvy Dty)	B7A-18124-F	B9A-18125-H

ℂ - Exc Hardtop, Ranchero & Sta Wgn
ℂ - Exc Sta Wgn & Ranchero

FRONT SUSPENSION

Independent "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs
See "Ford, Thunderbird, Mercury" in Suspension & Wheel Alignment Section

Caster - 0° to Pos 1° Maximum variation between wheels ½°

Camber - Pos ½° to Pos 1½° Maximum variation between wheels ½° (¼° preferred)

Toe-In - 1 16 1 8" *NOTE* When checking toe-in on cars with power steering engine should be running so that power steering control valve will be properly centered

Toe-Out on Turns - Outer wheel 20°, inner wheel should be 24½°

STEERING

Manual: Own Recirculating ball worm and nut
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Linkage type Used in conjunction with standard steering gear
See "Bendix Linkage Type" in Steering Section

►*POWER STEERING PUMP NOISE CORRECTION* To eliminate cold start noise, install Kit (B9MY-3A711-A), *see "(Eaton Roller Type) Power Steering Pump" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut' in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Ford-Bendix Hydraulic Parking lever applies rear wheel service brakes

►*BRAKE DESIGN NOTE* Front brake anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (Wheel cylinder mounted on anchor pin)
See 'Ford, Lincoln, Mercury Bendix' in Brake Section

Drum Diam t r - 11" front and rear

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Wheel Cylinder Diameter - 1 1/8" (front all), 7/8" (Rear-Pass. Cars), 15/16" (Sta. Wgn. & Ranchero).

Brake Lining (Width-Length)

Model	Primary	Secondary
Sed. & Cpe. (Front)	2¼" x 11.62"	2¼" x 11.93"
(Rear)	1¾" x 10.62"	1¾" x 11.93"
Others (Front)	2¼" x 10.62"	2¼" x 11.93"
(Rear)	2" x 10.62"	2" x 11.93"

Clearance - Adjusting screw backed off 10-12 notches from point where shoes are tight against drum.

Brake Pedal Freeplay: 5/16-7/16".

►*REVISED BRAKE PEDAL ADJUSTMENT:* No return spring used on later cars. Measure distance from floor to brake pedal (pushrod against master cylinder piston). Lift pedal against bumper stop and again measure distance. Difference between measurements is pedal freeplay.

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid - Maintain fluid level to within ½" of top of filler neck.

Removal - Disconnect rubber boot from rear end of master cylinder, brake line at fitting, stop light switch wires from switch. Push down brake pedal several times to force as much fluid as possible into clean container, then remove bolts that secure master cylinder to dash panel and lift cylinder away from pushrod and out of vehicle.

Power Brakes: "Bellows" type used. Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel and attached direct to brake power lever.
See "Ford Bellows" type in Brake Section.

Checking Fluid Level - Maintain fluid level to within ½" of top of filler neck.

Removal - Remove vacuum hose from top of unit. Remove valve adjusting eccentric nut, flat washer, spring and bushing, then remove eccentric. Remove nylon bushing from power unit valve housing. Remove two nuts and two screws that retain bracket to dash panel and remove unit from car.

MISC. MECHANICAL

Windshield Wipers: Electric & Vacuum types with Link & Arm type linkage.
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type.
See "Electric Window Regulators" in Misc. Section.

Power Top Control: Electric-Hydraulic. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Controls: 4-Way Electric.
See "Power Seat Adjusters" in Miscellaneous Section.

Air Conditioning: *See "Air Conditioning" in Miscellaneous Section.*

►*THUNDERBIRD JACKING & HOISTING PRECAUTIONS* Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left door post *NOTE* - Number (example below), includes identification data as follows

① ② ③ ④ ⑤

C 9 F V 100001

① - Engine type **C** - 292" Y-V8, **B** - 332", **H** - 352", **J** - 430" *See Note below*
② - Year (1959)
③ - Assembly plant *See Table below*
④ - Body style *See Table below*
⑤ - Consecutive unit number

Assembly Plant Designation

A - Atlanta	**G** - Chicago	**N** - Norfolk
C - Chester	**H** - Lorain	**P** - St Paul
D - Dallas	**K** - Kansas City	**R** - San Jose
E - Mahwah	**L** - Long Beach	**S** - Pilot Plant
F - Dearborn	**M** - Memphis	**U** - Louisville

Y - Wixom (Thunderbird only - Lincoln plant)

Body Style

C) - Convertible
F) - Ranchero
G) - Tudor & Fordor (Custom & Custom "300")
H) - Thunderbird Tudor Hardtop
J) - Thunderbird Convertible
R) - Ranch Wagon & Country Sedan (Custom & Custom "300")
S) - Tudor & Fordor (Galaxie) (Fairlane "500")
T) - Town Sedan & Club Sedan (Fairlane & Fairlane "500")
V) - Town & Club Victoria (Fairlane & Fairlane "500")
W) - Retractable Hardtop
X) - Commercial Ranch Wagon "Courier"
Y) - Country Squire

►*ENGINE IDENTIFICATION NOTE* In the following Ford V8 data pages, engines will be referred to as follows

Engine	Designation
Thunderbird 292" V8	**292**
Thunderbird 332" Special V8	**332**
Thunderbird 352" Special V8	**352**
Thunderbird 430" V8 (Thunderbird Car Only)	**430**

COMPRESSION PRESSURE: 292 - 160±10 lbs, **332, 352** - 180±20 lbs, **430** - 200±20 lbs At cranking speed

VACUUM READING: 292, 332, 352 - 19-20", **430** - 17-18" Steady at specified engine idle speed with transmission in neutral

VALVE TAPPET CLEARANCE: 292 - 019" Cold, 018" Hot, all valves *NOTE* - Adjust all tappets to 019" clearance while engine is cold, then check all tappets for 018" clearance after running engine for 30 minutes to normalize temperature

332, 352, 430 - Zero lash, hydraulic lifters *See "Valve System" in Ford Special Data for operating range check of hydraulic lifters*

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (292)* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL: 292, 332, 352 - Automatic thermostatic type with counterweight Valve is closed when engine is at normal temperature and running at idle speed and is open when operating at high RPM Spring is installed with ¾ turn wind-up and hooked over stop pin

430 - Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve *See Cooling System for data.*

►*MANIFOLD HEAT CONTROL VALVE NOTE (332, 352).* Use new type valve B8A-9685-C to minimize pin binding or breaking

►*CARBURETOR AIR INTAKE DUCT ASSEMBLY (430)* Carburetor air intake duct with thermostatically controlled valve Provides warm air for cold engine (below 85°F), or cool air for warm engine (above 105°F) *See "Fuel System Notes" in Ford Special Data*

IGNITION

FIRING ORDER: 292 - 1-5-4-8-6-3-7-2 **332, 352, 430** - 1-5-4-2-6-3-7-8

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032-036"

Spark Plugs - 292 - Champion F-14-Y **332, 352, 430** - Champion F-11-Y 18 mm Torque to 15-20 ft lbs (25-30 ft lbs new plug in new cylinder head)

NOTE - Plugs have tapered seat, no gasket used

COIL: Ford No. B6A-12029-B.

Ignition Current - 2 5 amps. idling, 4 5 amps stopped
Resistor - Ford B8A-12250-A 1 30-1 40 ohms at 75°F

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil and is bypassed during cranking by lead from starter solenoid to battery terminal of coil

DISTRIBUTOR: Ford. (Early) - Same type as used on previous V8 models **(Later)** - New pivot plate type Both have centrifugal & vacuum spark advance *See "Distributors" in Electrical Section*

Engine	Distr. Part No.	① Engineering No.
292 (Early)	B9A-12127-B	B9FA-12127-A
292 (Later)	B9AF-12127-B	B9AF-12127-B
332 (Early)	B8A-12127-G	FEU-12127-J
332 (Later)	B9AF-12127-A	B9AF-12127-A
352 (Early)	B8A-12127-K	FEW-12127-N
352 (Later)	B9AF-12127-D	B9AF-12127-D
430 (Early)	B8S-12127-A	②
430 (Later)	B9S-12127-B	FEW-12127-H
430 (Latest)	B9MF-12127-B	B9MF-12127-B

① - Stamped on distributor housing for identification
② - This distributor not replaced

►*332 ENGINE DETONATION CORRECTION* If timing retarded to 2° BTDC and detonation still occurs, install Spring, Part No. B8QH-12192-C for **both** primary and secondary weights and recalibrate distributor according to special table below

Condenser - Ford B7A-12300-C **Capacity** 21-25 mfd

►*CONDENSER REPLACEMENT NOTE (1957-59)* Condenser B7A-12300-C replaces B7A-12300-A which is retained for use on trucks

Contact Point Set - Ford B7A-12171-A
Breaker Gap - 014-016"
Cam Angle - 26-28½°
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - B9A-12127-B & B9AF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
0-1		450	0-2		900
1-2		500	2-4		1000
3½-4½		700	7-9		1400
14-15½		2000	28-31		4000

Automatic Advance - B8A-12127-G & B9AF-12127-A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
1-2		500	2-4		1000
6½-7½		775	13-15		1550
8-9		900	16-18		1800
13¾-15¼		2000	27½-30½		4000

Automatic Advance - B8A-12127 G (Modified)
►To Correct Detonation

Degrees	Distr	RPM	Degrees	Eng.	RPM
Start		300	0		600
0		575	0		1150
3-4		800	6-8		1600
5½-6½		1050	11-13		2100
10½-11½		2000	21-23		4000

Automatic Advance - B8A-12127-K & B9AF-12127-D

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		425	0		850
½-1½		500	1-3		1000
4½-5½		700	9-11		1400
7½-8½		1000	15-17		2000
13¼-14¾		2000	26½-29½		4000

Automatic Advance - B9S-12127-B & B9MF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		350	0		700
1-2¼		525	2-4½		1050
14-15½		2000	28-31		4000

Vacuum Spark Control: Diaphragm type Mounted on distributor and linked directly to breaker plate

① Vacuum Advance - B9A-12127-B & B9AF-12127-B

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3½	0-7	6½
6½-9½	13-19	12
9½-12½	19-25	15

① Vacuum Advance - B8A-12127-G & B9AF-12127-A

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
1-3	2-6	6
8-10	16-20	12
10½-12½	21-25	16

① Vacuum Advance - B8A-12127-G (Modified)
►To Correct Detonation

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3	0-6	6
5-8	10-16	10
9-12	18-24	14

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ℂ Vacuum Advanc - B8A-12127-K & B9AF-12127-D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1-3¾	2-7½	8
4½-7½	9-15	11
7-10	14-20	14

ℂ Vacuum Advance - B9S-12127-B & B9MF-12127-B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-3½	0-7	6½
6½-9½	13-19	12
9½-12½	19-25	16

ℂ - With distributor speed of 1000 RPM

►*DISTRIBUTOR REMOVAL CAUTION:* When oil pump intermediate shaft retainer is loose on shaft, shaft may become disengaged from oil pump as distributor is removed. To correct, remove oil pan, oil pump, oil pump intermediate shaft and remove retainer from shaft. Strike retainer lightly with hammer to flatten it and reinstall in original position (1.40" from bottom of shaft on 292) *NOTE* - Retainer must be tight on shaft and bear against crankcase when pump and shaft are installed

IGNITION TIMING

ℂ Standard Ignition Setting

Engine	Std. Trans.	Auto. Trans.
292 ②	3° BTDC	6° BTDC
332 ②		3° BTDC
352 ②	3° BTDC	6° BTDC
430 ③		6° BTDC

ℂ - These are operating recommendations. Factory setting is 3° BTDC (Std. & O.D. Trans.), 6° BTDC (Auto. Trans.).

② - Allowable range 2-10° BTDC.

③ - Allowable range 6-10° BTDC.

Timing Marks - Align correct mark on crankshaft pulley or vibration damper with pointer on chain case cover as follows:

292 - 16 marks from TDC to 30° BTDC in 2° increments.

332, 352 - 6 marks from TDC to 10° BTDC in 2° increments.

430 - 11 marks from TDC to 20° BTDC in 2° increments.

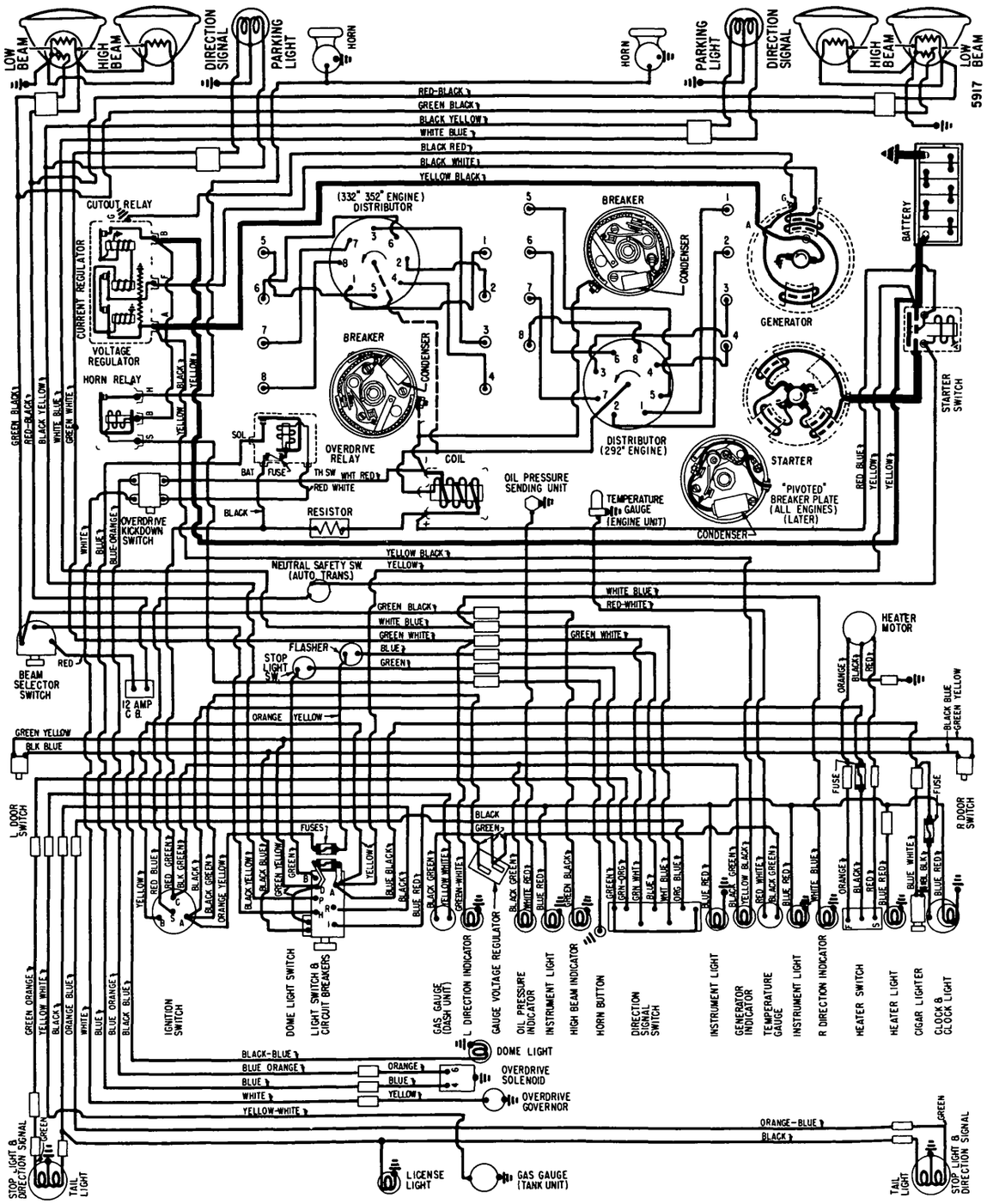
CARBURETOR

►*CARBURETOR APPLICATION: Ford, Holley & Carter carburetors used as follows:*

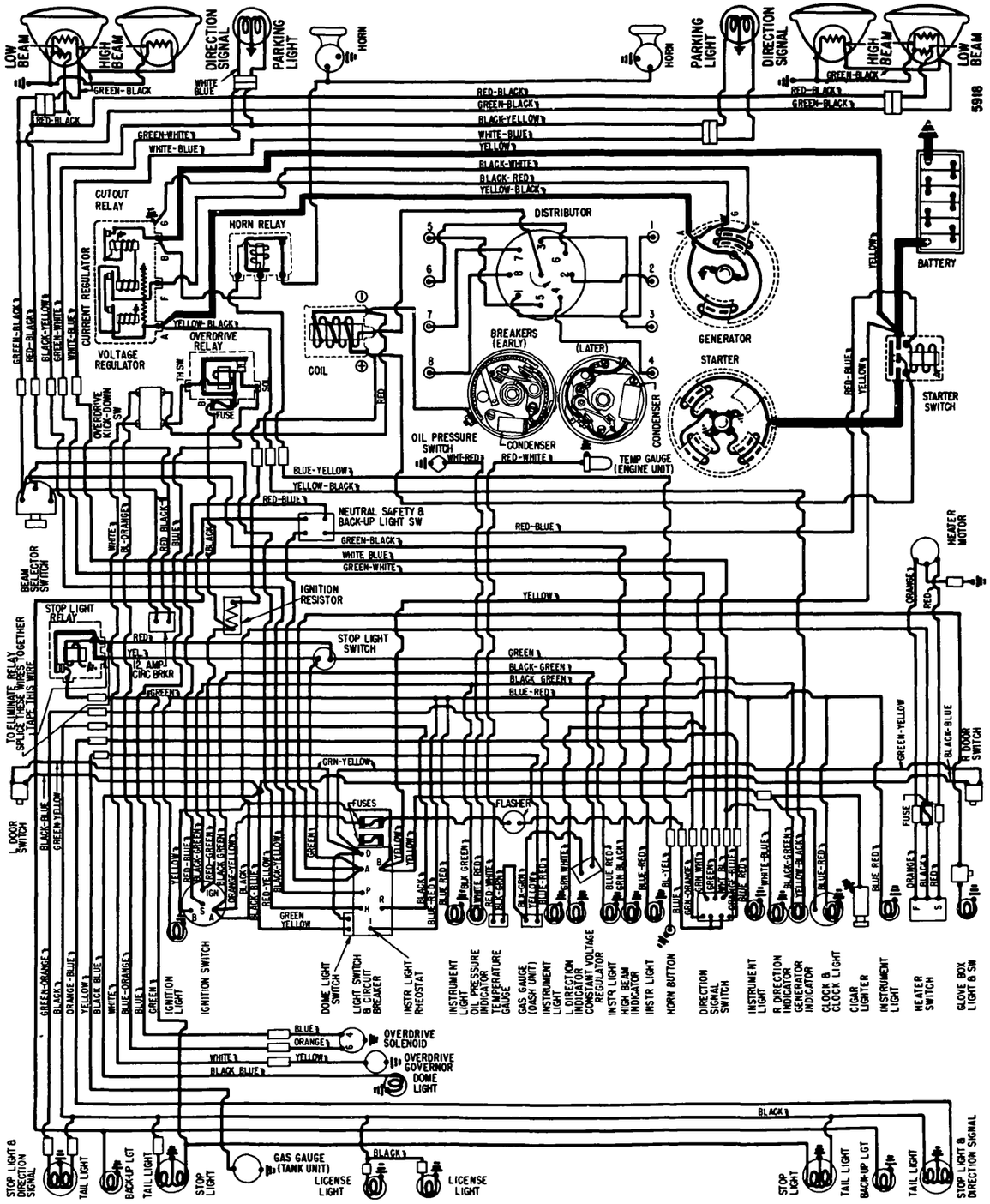
Engine	Carburetor Type
292	Ford 2-Barrel
332	Ford or Holley 2-Barrel
352	Ford 4-Barrel
430	Carter 4-Barrel

►*CARBURETOR INSTALLATION CAUTION (292, 332):* 1959 2-bbl. carburetor-to-intake manifold spacers B9AE-9603-A Phenolic resin bonded asbestos (Ford), B9AE-9603-B Aluminum die cast (Holley) are **not** interchangeable and cannot be used on 1958 models Gasket B9AE-9447-A can be used with either spacer

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FORD V8 PASSENGER CARS (EXCEPT THUNDERBIRD)



FORD V8 THUNDERBIRD

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►*HARD COLD STARTING, STALLING, POOR COLD ACCELERATION & SPARK PLUG FOULING CORRECTION:* These conditions can be eliminated by changing specifications and adjustments as follows:

Ford Carb. (292,332,352) - With fast idle screw on starting step of fast idle cam (marked "O") adjust fast idle speed to 2000 RPM (hot engine). Set choke at **2 notches rich** (292), **3 notches lean** (332 & 352). Place pump rod in **fourth hole** (farthest from throttle shaft). *NOTE* - Place rod in **third hole** to improve performance and economy in hot weather.

Holley Carb. (332) - Place pump rod in No. 2 position by aligning lower hole in pump cam with lower hole in throttle lever and placing attaching screw in lower hole (marked 2) for **winter only.**

Carter Carb. (430) - With engine temperature normal and fast idle screw on lowest step of cam, adjust fast idle speed to 600-650 RPM with transmission in drive.

►*THREE-SPEED FORDOMATIC THROTTLE LINKAGE ADJUSTMENT NOTE:* For adjustment procedures for cars with 3-speed Fordomatic, see *1958 Ford V8 Data.*

Throttle Linkage Adjustment (Fordomatic): Adjust engine to correct idle speed. Stop engine and make anti-stall dashpot adjustment (see below). Disconnect throttle control rod from accelerator bellcrank and insert ¼" gauge pin through gauging holes in bellcrank. Adjust carburetor connecting link so carburetor lever is against hot idle stop **and then lengthen rod 1 full turn at turnnion.** Accelerator pedal height should be 3½" from top rear corner of pedal to floor mat. Adjust by turning accelerator connecting link. Remove gauge pin and check alignment of holes. Pin should enter freely. With gauge pin removed, pull firmly but gently upward on throttle control rod so transmission lever is held against internal stop in transmission and rotate clevis until pin fit freely on accelerator bellcrank. Then lengthen rod by rotating clevis 3½ turns counterclockwise (*see "Special Setting Note" below).* Connect throttle control rod.

►*SPECIAL SETTING NOTE:* For more satisfactory shift feel, rod may be lengthened 2±½ turns in place of 3½ turns.

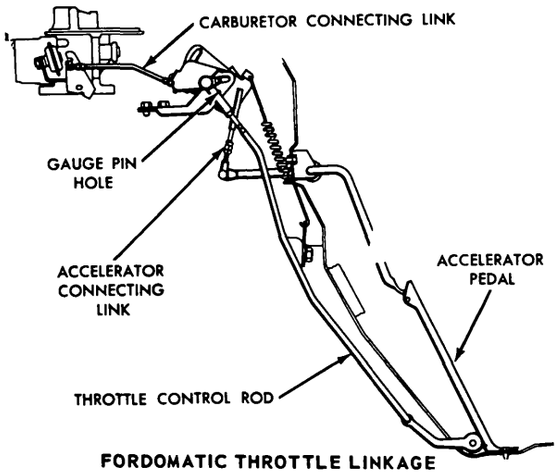
Throttle Linkage Adjustment (Cruise-O-Matic): Adjust engine to correct idle speed. Stop engine and make anti-stall dashpot adjustment (see below). Disconnect throttle control rod from accelerator bellcrank and insert ¼" gauge pin through holes in bellcrank. With fast idle cam in slow position, adjust carburetor connecting link so carburetor lever is against its hot idle stop. Accelerator pedal height should be 3½" (Pass. Cars), 4½" (Thunderbird) from top corner of pedal to floor. Adjust by turning accelerator connecting link. Remove gauge pin and check alignment of holes. Pin should enter freely. With gauge pin removed, pull throttle control rod upward firmly but gently so transmission lever is against internal stop in transmission. Rotate clevis on throttle control rod so clevis pin fits freely on bellcrank lever. Then lengthen throttle control rod by turning clevis **3 full turns c unt rcl ckwis .** Con-

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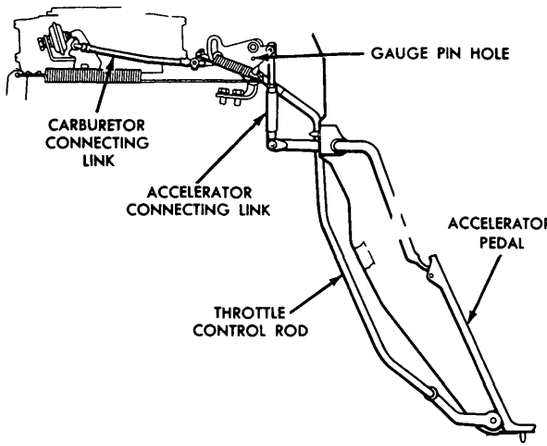
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nect rod *For final adjustment, use pressure method as follows* Make sure transmission is at normal operating temperature Raise car and remove 1/8" pipe plug forward of transmission levers Install pressure gauge Lower car and install a tachometer Put selector lever in either Drive position With engine speed at 1000 RPM , pressure should be 80-85 lbs If below 80 lbs , lengthen throttle control rod, if above 85 lbs , shorten rod Connect rod, tighten locknut For pressure ranges at Idle & Stall speed conditions, *see "Edsel, Ford, Lincoln, Mercury Automatic Transmissions" in Transmission Section*

Anti-Stall Dashpot Adjustment (Ford & Holley): With engine idle speed properly set, engine stopped, and throttle in hot idle position, loosen dashpot locknut and bottom dashpot plunger Clearance between plunger and throttle shaft lever should be 035-050" (292, 352), 035-060" (332). Adjust by turning dashpot or adjusting nut Tighten locknut



FORDOMATIC THROTTLE LINKAGE



CRUISE-O-MATIC THROTTLE LINKAGE

Anti-Stall Dashpot Adjustment (Carter): Set engine at correct idle speed, then stop engine

1) With primary throttle plates **closed,** clearance between dashpot plunger operating lever and top surface of air horn should be 1/16-5/32" Adjust by bending dashpot lever in area between lever arm base and dashpot plunger

2) With primary throttle plates **wide open,** clearance between dashpot plunger operating lever and top surface of air horn should be 3/8-7/16" To adjust, bend stop tang on opposite side of lever arm

FORD & HOLLEY 2-BARREL

FORD 2-BARREL

Engine	Parts No.	①Engr. No.	②Distr. No
292③	B9A-9510-A	5752306	B9A-12127-B
292④	B9A-9510-B	5752307	B9A-12127-B
332④	⑤B9A-9510-C	5752305	B8A-12127-G

HOLLEY 2-BARREL

292⑥	B9AE-9510-B	B9AE-9510-B	B8A-12127-G
332④	⑥B9A-9510-D	5752297	B8A-12127-G

① - Identification number stamped on left side of fuel bowl

② - Carburetors and Distributors MUST be used together

③ - Std & O D Trans ④ - Auto Trans

⑤ - Remove dashpot when used with Synchro-mesh Trans

⑥ - With Governor

►*MANIFOLD FUEL DISTRIBUTION (292) Carburetor RIGHT barrel feeds Cyl 2-3-5-8, LEFT barrel 1-4-6-7*

►*MANIFOLD FUEL DISTRIBUTION (332)· Carburetor RIGHT barrel feeds Cyl 1-4-6-7, LEFT barrel 2-3-5-8*

►*POOR ENGINE PERFORMANCE AND CHOKE MALFUNCTION CORRECTION (Holley 2-Bbl Carb)* Change choke setting or modify choke *See "Holley 2 & 4-Barrel Carburetors' in Carburetion Section*

Idle Setting - 1-1½ turns open (Ford), ¾-1¾ turns open (Holley) for both screws With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll Finally turn needles in just enough for smooth running (favor a slightly rich mixture)

Idle Speed - 475-500 RPM in Neutral Recheck automatic transmission cars with selector lever in any "DR" range Readjust to obtain 450 RPM

►*AIR CONDITIONED CAR IDLE SPEED NOTE* During season when air conditioning in use, set idle speed after operating air conditioner for 20 minutes at maximum cooling and with unit on

Throttl Linkag Adjustm nt: *See CARBURETOR above*

►*OTHER DATA See "Ford" or "Holl y 2-Barrel Carbur tors" in Carburetion Section*

FORD 4-BARREL

Engin	Parts N .	①Engr. No.	②Distr. N .
352③	B9A-9510-E	5752308, 9	B8A-12127-K

① - Identification number stamped on left side of primary fuel bowl

② - Carburetors and Distributors MUST be used together

③ - All transmissions Remove dashpot when used with Std & O D Trans

►*MANIFOLD FUEL DISTRIBUTION (352) Carbur tor RIGHT barrels feed Cyl 1-4-6-7, LEFT barr ls 2-3-5-8*

Idle Setting - 1-1½ turns open (both screws) With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll Finally, turn needles in just enough for smooth running (favor a slightly rich mixture)

Idle Speed - 475-500 RPM in Neutral Recheck automatic transmission cars with selector lever in any "DR" range. Readjust to obtain 450 RPM

►*AIR CONDITIONED CAR IDLE SPEED NOTE* During season when air conditioning in use set idle speed after operating air conditioner for 20 minutes at maximum cooling and with unit on

Throttle Linkage Adjustment· *See CARBURETOR above*

►*OTHER DATA See "Ford 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Engine	Carter No	F rd N	①Engr N .
430②	2853S	B9S-9510-A	5752040

① - Stamped on front of air cleaner flange for identification ② - Cruise-O-Matic

►*NOTE Carburetor 2853S MUST be used with Distributor B9S-12127-B*

►*MANIFOLD FUEL DISTRIBUTION (430) Carburetor RIGHT barrels feed Cyl 1-4-6-7, LEFT barrels 2-3-5-8*

Idle Setting - 1½-2½ turns open Set both screws alike With engine at normal operating temperature, turn both idle adjusting screws in until engine runs rough from lean mixture, then turn screws out until engine begins to roll Finally, turn screws in just enough for smooth running (favor a slightly rich mixture)

Idle Speed - 475-500 RPM in Neutral Recheck automatic transmission cars with selector lever in either "DR" position Readjust to obtain 450 RPM

►*AIR CONDITIONED CAR IDLE SPEED NOTE* During season when air conditioning in use, set idle speed after operating air conditioner for 20 minutes at maximum cooling and with unit on

Throttle Linkage Adjustment: *See CAPBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

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CARB. EQUIPMENT

Fuel Pump: AC. Fuel only or Fuel & Vacuum

Model	Ford Pump No.
All (Fuel & Vacuum)	B9AE-9350-A
All (Fuel Only)	B9AE-9350-C
Thbrd (430)	B8S-9350-A

Pressure - 4 0-6 0 lbs. (Exc. 430), 4 5-6 5 lbs. (430). All at 500 RPM

See "Fuel Pumps" in Carburetion Section

Gasolin Gaug : King-Seeley Electric Constant Voltage ("CV") type with gauge voltage regulator, Ford No B7A-10804-B

Dash Unit	Ford Part No.
All (Exc Thbrd)	B9A-9280-B
Thunderbird ①	B9S-9280-A

Tank Unit	Ford Part No.
Thunderbird	B8S-9275-A
Retractable Hardtop	B7A-9275-B
Sta Wgn ,Sed Del ,Ranchero	B7A-9275-G
Others	B9A-9275-A

① - Combination Fuel and Temperature Gauge

See "Fuel Gauges" in Carburetion Section

Air Cleaner: Dry filter element type Clean every 4,000 miles, replace every 24,000 miles

►*CLEANING CAUTION* Clean element by tapping it against a hard surface DO NOT immerse element in cleaning solvent or blow it out with compressed air Clean cleaner body and cover in solvent and wipe dry

►*THUNDERBIRD 352 OR 430 AIR CLEANER INSTALLATION NOTE* Air cleaner should be replaced when the index notch and tabs are not on same side as air inlet opening when word "Front" is properly positioned

BATTERY

Ford Part No.	Color	Volts	Plates	①Capacity
B9A-10655-A	Red	12	11	55 ampere
B9A-10655-B	Silver	12	13	65 ampere
B9A-10655-C②	Yellow	12	11	70 ampere

① - At 20 hr rate ② - Requires special tray & holders

Battery Ground - Negative, to cylinder head

Engin Ground - Cylinder head to dash

STARTER

Ford B6A-11002-A (Ford), FAY-11002-A (Thunderbird).

Armatur - Ford No B6A-11005-B

Drive - Bendix "Folo-Thru" Ford ICM-11350-C

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 48-56 ozs

Cranking Speed - 150-180 RPM 155-190 amperes

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	80
15 5 ft lbs		5 0	550

① - With starter on engine and engine idling

Starting Switch: Magnetic type, Ford No B6A-11450-A Starter switch is controlled by ignition switch

NOTE - Neutral safety switch used with Auto Trans

Neutral Safety Switch (Auto. Trans.): Ford No B9A-15812-A1 (Fordomatic), B9A-15812-B1 (Cruise-O-Matic)

See "Fordomatic" or "Cruis -O-Matic" in Trans Sect

►*NEUTRAL SAFETY SWITCH REPLACEMENT NOTE* Both "RBM" & "MECO" switches used in production Use Ford Nos given above for replacement

GENERATOR

►*GENERATOR BEARING OR DRIVE BELT FAILURE CORRECTION (430)* Use thin spacer (.06") No 371263-S and thick spacer No EDG-2887-A at either bolt position behind mounting bracket as necessary to align bracket Lockwasher No 34807-S8 and longer bolt No 20408-S7 available if required

Ford, Bosch & Auto-Lite generators used

Generator	Armature
B6A-10002-C (Bosch) ①	B6C-10005-B
B6A-10002-H (Ford)	③ B7A-10005-A,B,C
B8S-10002-A (Ford) ⑤	B6A-10005-C
B9A-10002-A (Ford) ⑦	B6A-10005-B
B8A-10002-A (Ford) ⑪	B8A-10005-A
B6A-10002-E	B6C-10005-C
B6A-10002-D (Bosch)	B6C-10005-A
B6A-10002-B (Bosch)	FAA-10005-A
B6A-10002-G (Ford)	B6C-10005-D

① - Bosch Low Cut In Identification - FBZ-10000-A, FCB-10000-A, FCH-10000-A, FCJ-10000-A,B, FCP-10000-A

③ - 352 Thunderbird does not use B6A-10005-A

⑤ - 430 Thunderbird

⑦ - Pass Car Thunderbird with 430 eng

⑪ - Pass Car & 352 Thbrd with Air Cond

Performance Data

Generator	Amperes	RPM
B6A-10002-C	30	1220
B6A-10002-H	30	
BSA-10002-A	30	
B9A-10002-A	30	2520
B8A-10002-A	35	1460
B6A-10002-E	40	
B6A-10002-D	50	1380
B6A-10002-B	60	1680
B6A-10002-G	60	1030

Brush Spring Tension - Auto-Lite 34-41 ozs , **Bosch** 16-18 ozs ; **Ford** 32-40 ozs

Field Current - (B6A-10002-A) 1 0-1 1 amps , (B6A-10002-C) 1 27 amps , (B6A-10002-D,B) 1 31 amps , (B6A-10002-G) 1 72 amps , (B6A-10002-A) 1 48-1 58 amps All at 10 volts hot

Rotation - Counterclockwise at commutator end

Belt Adjustment: ½" (292), 3/8" (Others) deflection midway between generator and water pump pulleys with light thumb pressure

REGULATOR

Ford, Bosch & Auto-Lite. Used as follows

Ford Regulator No.	Generator
B5C-10505-A Bosch	B6A-10002-B
B6C-10505-A Ford	B6A-10002-G
B6C-10505-B Bosch	B6A-10002-C
B6A-10505-C Bosch	B6A-10002-D
B7A-10505-A Auto-Lite	B6A-10002-E
B7A-10505-B Ford	B6A-10002-H,B8S-10002-A
B7A-10505-B Ford	B9A-10002-A
B8E-10505-B Ford	B8A-10002-A

►*SETTING CAUTION* "Temperature Compensated" type Set to following specifications at 75°F, ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized

Cut ut Relay

Cuts In - Aut -Lit 12 5-13 9 volts, **Bosch** 13 0-13 5 volts, **Ford** 12 0-12 8 volts (B7A-10505-B,B8E-10505-B), 12 0-12 6 volts (B6C-10505-A)

Cuts-Out - Auto-Lite 2-6 amps , **Bosch** 2-8 amps , **Ford** 6-9 amps (B7A-10505-B), 2-6 amps (B8A-10505-A, B6A-10505-G)

Voltage Regulator

Setting - Auto-Lite 14 2-14 9 volts, **Bosch** 14 1 volts lower contacts, 14 8 volts upper contacts, **Ford** 14 6-15 4 volts (B9A-10505-A, B8A-10505-A),15 0 volts (B6A-10505-G)

Checking & Adjusting - *See 'Auto-Lite", "Bosch" & "Ford Regulators' in Electrical Section*

Current Regulator

Setting - Auto-Lite 38-42 amperes **Bosch** 28-32 amperes (B6C-10505-B), 48-52 amperes (B6A-10505-C), 58-62 amperes (B5C-10505-A), **Ford** 28-32 amperes (B7A-10505-B), 33-37 amperes (B8E-10505-B), 58-62 amperes (B6C-10505-A)

Checking & Adjusting - *See "Auto-Lite", "Bosch" & "Ford Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System)

See 4-Headlight Systems" in Electrical Section

Directional Signals: *See Electrical Section*

Lighting Switch Removal: With control knob in "OFF" position, press spring release button on switch housing, turn shaft slightly and pull it out of switch Unscrew mounting nut with Tool 17470-N, remove bezel and switch and remove wires

Stop Light Switch Location: On forward end of brake master cylinder

►*STOP LIGHT SWITCH NOTE* Early Thunderbirds used stop light switch with relay, later type switch B9SF-13480-A does not require relay and can be installed on early Thunderbirds by connecting wires as shown in wiring diagram

CIRCUIT BREAKERS: Two circuit breakers built in lighting switch 1) Protects Headlights 2) Protects Instrument, Parking, Stop, Tail & Back-up Lights

12 Ampere - Protects headlight low beam circuit Located at lower left edge of instrument panel (Pass Cars), on top of left air inlet (Thunderbird)

FUSES: 7 5 Ampere - Interior lights On headlight switch

5 Ampere (Pass. Cars) - Direction signals On headlight switch

7.5 Ampere (Thunderbird) - Direction signals In feed wire

15 Ampere - Overdrive On overdrive relay

14 Ampere - Heater. In feed wire

1 Ampere - Clock In feed wire

Horn Relay: Ford No B8C-13853-A

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own. 90° V8 Different engines used as follows

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Thund rbird 292' V8 - YV8 of same design used previously

Thunderbird 332" & 352" Special V8 - Same design as previous Interceptor engines

Thunderbird 430" Special V8 - Has special water jacketed intake manifold and 3-stage engine warm-up and cooling system Combustion chamber located in cylinder block *See Cooling System Data*

►*POLICE SPECIAL ENGINE NOTE This engine is same as standard 352" Engine but has a high lift camshaft and damper spring and spacer on all valves*

Engine	Bore	Stroke	Displacement
292	3 75"	3 30"	292 cu in
332	4 00"	3 30"	332 cu in
352	4 00"	3 50"	352 cu in
430	4 30"	3 70"	430 cu in

Engine	Compr. Ratio	Rated HP	Developed HP
292	8 8-1	45 00	200 at 4400 RPM
332	8 9-1	51 20	225 at 4400 RPM
352	9 6-1	51 20	300 at 4600 RPM
430	10 0-1	59 17	350 at 4800 RPM

Compression & Vacuum Reading - See *TUNE-UP*

►***1959 FORD 352" ENGINE OVERHEATING CORRECTION:*** **If overheating occurs when engine is operated at idle speed for a prolonged period at ambient temperatures above 90°F, install a new water pump pulley, Part No. B8A–8509–B (1.05–1 ratio), and a new fan belt, Part No. B9S–8620–A.**

►*430" ENGINE ROCKER ARM COVER AND GASKET REPLACEMENT NOTE·* New rocker arm cover, Part No B9LE-6582-A, and gasket, Part No B9ME-6584-B, should be used for service replacement to reduce oil leaks at this area New gasket has round screw holes and notch on inside edge Install gasket with notch toward **front** of engine on **right** bank, to **rear** of engine on **left** bank

►*OIL LEAKAGE AT INTAKE MANIFOLD (FRONT OR REAR) CORRECTION (332, 352) See "Cylinder Head Manifolds" in Ford Special Data*

►*COOLANT LEAKAGE CORRECTION & EXHAUST MANIFOLD INSTALLATION NOTE (430)* Use new exhaust manifold attaching studs (with Lok Thred - 3/8-16 x 1 68) Part No 372404-S7 to reduce coolant leakage at studs, using sealer or Permatex No 2 on stud threads

►*OIL LEAKAGE AT FUEL PUMP GASKET CORRECTION* Caused by installation of incorrect gasket Correct gaskets are B8A-9417-A (060" thick) for 332" & 352" Engines, or B5A-9417-A (020" thick) for 292" engine

►*DIRT & WATER ENTERING FLYWHEEL HOUSING CORRECTION (430)* Install cylinder block cup plug No 371058-S into manufacturing hole in oil pan rail at right rear of cylinder block

►*THUNDER B IRD 430 ENGINE VIBRATION RUMBLE NOISE CORRECTION* When pressure applied at "X" section of valley cover dampens noise, insert a 2½" long piece of 1" heater hose, slit at one end, at "X" section of valley between valley and intake manifold

►*1959 FORD V8 ENGINE EXCESSIVE ENGINE OIL CONSUMPTION, EXHAUST SMOKING & SPARK PLUG FOULING CORRECTION* These conditions may be caused by plugged cylinder head oil return holes If excessive oil is found in rocker arm cover chambers, clean drain passages with a piece of wire, air pressure and solvent

►*EXHAUST MANIFOLD PRODUCTION CHANGE (430).* New exhaust manifolds Part No B9ME-9430-A (Right Hand), B9LE-9431-A (Left Hand) used in production beginning Feb 1959 New type has thicker flanges and has detents cast on lower surface of inlet flange

ORIGINAL BORE & PISTONS: *See "Original Bore & Pistons" in Ford Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data*

ENGINE REMOVAL: *See "Engine" in Ford Special Data*

OIL PAN REMOVAL: Proceed as follows

292 - Drain crankcase and disconnect oil pump inlet tube at oil pump Remove oil pan retaining screws and remove pan

332,352 (Pass. Cars) - Drain crankcase and remove dipstick Crank engine so No 1 piston is at TDC Remove oil pan retaining screws and lower pan to frame crossmember Loosen oil pump inlet tube upper bolt and remove lower bolt Swing tube clear of oil pan Remove pan by moving it forward and tilting down

352 (Thunderbird) - **1)** Drain cooling system and crankcase Disconnect radiator upper hose at radiator tank Remove oil pan retaining screws and lower pan to underbody crossmember Position crankshaft so counterweight will clear pan, then move pan forward

2) Remove bolts holding coil and move coil out of way Raise engine so tension is off mounts and remove bolts holding engine to front mounts Raise engine so bolts holding oil pump can be removed Remove oil pan and pump

430 - Crank engine until 14° BTDC mark on damper is aligned with pointer Drain crankcase Remove both engine front mounts Remove both engine front support-to-underbody nuts Raise engine and place 1" wood blocks between engine front support brackets and underbody Let engine rest on blocks Remove oil pan retaining screws and let pan rest on underbody crossmember Loosen oil pump inlet tube upper bolt and remove lower bolt Swing tube out of way Remove pan in a lowering forward motion

PISTONS

►*PISTON IDENTIFICATION & USAGE NOTE (292,332, 352)* Two types of pistons used intermingled in production **On type** has ring lands machined **round** with no stabilizing step on bottom ring land Skirt of piston is cam ground **Oth r typ** has both ring lands and skirt cam ground and the bottom ring land has stabilizing step

Autothermic type Solid skirt with three rings above pin.

Removal - Pistons and rods removed from above

Clearance - (292) 0008- 0026" (wear limit 005") at bottom of skirt

Clearance (332,352,430) - 0011- 0029" at bottom of skirt Wear limit 005" (332,352), 0045" (430)

Fitting New Pistons: To test minimum and maximum clearances, use ribbon feeler gauges ½" wide inserted between piston and cylinder wall at right angle to pin on thrust side, piston inverted and bottom of piston skirt 1½" below top of block, as follows

Engine	Minimum Clearanc Feeler	Lbs. Pull	Maximum Clearance Feel r	Lbs. Pull
292	0015"	4¼	003"	4
332,352,430	0015"	3¾	.003"	3¼

Replacement Pistons: (Exc. 430) Furnished Std (1 size only) and 020", 030", 040", 060" Oversize with fitted pins .

(430) Furnished in 2 Std sizes (Red-Grade 2, 4 2985", Blue-Grade 6, 4 2997") and 020", 030", 040", Oversize with fitted pins

Installing Pistons: Install piston with indentation in head of piston toward front of engine, and on **430**, step on piston head towards inside of engine "V" *See Rod Installation*

PISTON PIN

Floating type with lock ring at each end (Exc 430) No retaining rings used (430) Pin is press fit in connecting rod *See Pin Fit in Rod below*

Diameter - 9120- 9123" (292), 9750- 9753" (Others)

Length - 3 016-3 030" (292), 3 156-3 170" (332, 352), 3 480-3 500" (430)

Pin Fit in Piston - 0001- 0003" loose Wear limit 0008" Light thumb press fit at 70°F

Pin Fit in Rod - (292.332,352) - 0001- 0003" loose Wear limit 0008" Light thumb press fit at 70°F

Pin Fit in Rod - (430) - Interf rence fit. *See "Piston Pins" in Ford Special Data*

Replacement Pins· (292,332,352) - Furnished Standard (Green), and 001" (Blue), 002" (Yellow) Oversize

(430) - Standard only Fitted pins furnished with new pistons

PISTON RINGS

Two compression and one oil ring per piston Oil ring is "Side Sealing" type (two steel rails with spring spacer between them)

292 Engine

Ring	Width	End Gap	Side Clearance
Compr 1 & 2	0775- 0780"	010- 027"	① 0020- 0035"
Oil	1880- 1890"	② 015- 062"	③

332, 352 Engines

Ring	Width	End Gap	Side Clearance
Compr (1)	0775- 0780"	013- 030"	① 0020- 0035"
Compr (2)	0930- 0935"	013- 030"	① 0020- 0040"
Oil	1880- 1890"	② 015- 062"	③

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430 Engine

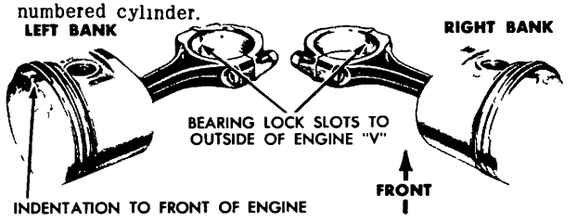
Ring	Width	End Gap	Side Clearanc
Compr. (1)	.0775-.0780"	.015-.025"	①.0015-.0030"
Compr. (2)	.0930-.0940"	.015-.025"	①.0010-.0030"
Oil	.1880-.1890"	②.015-.055"	③

① - Wear limit .006". ② - Steel rail.
③ - Side sealing type ring.

Replac ment Rings: Furnished in Partial Ring Sets (for 2 Pistons) in Standard & .020", .030", .040"Oversize (All engines), plus .060" Oversize (Exc. 430).

CONNECTING ROD

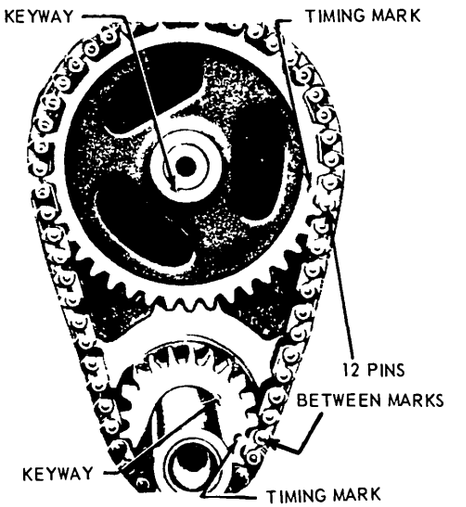
L ngth (C nt r-t -C nt r) - **(292)** - 6.320-6.324". **(332,352)** - 6.538-6.542"). **(430)** - 6.599-6.601".
Journal Diam ter - **(292)** - 2.1880-2.1888". **(332,352)** - 2.4380-2.4388". **(430)** - 2.5992-2.6000",
Low r B aring - Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Cl aranc - **(292)** .0008-.0027" (wear limit .0037").
Clearance - **(332, 352)** - .0009-.0028" (wear limit .0036"). **(430)** - .0006-.0026" (wear limit .0034").
Sid Clearance - **(292,332,352)** - .006-.016" (wear limit .019"). **(430)** - .005-.015" (wear limit .018").
Replacem nt B arings: Standard size (2 sizes marked **R d & Blu)** and .010", .020", .030" (292, 430), plus .040" (332, 352) Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
Installing Rods: Install rod in piston so that rod bearing lock slots in connecting rod are toward outside of engine when indentation on head of piston is toward front of engine. Cylinder numbers on bearing caps and rods must be on same side and installed in same numbered cylinder.



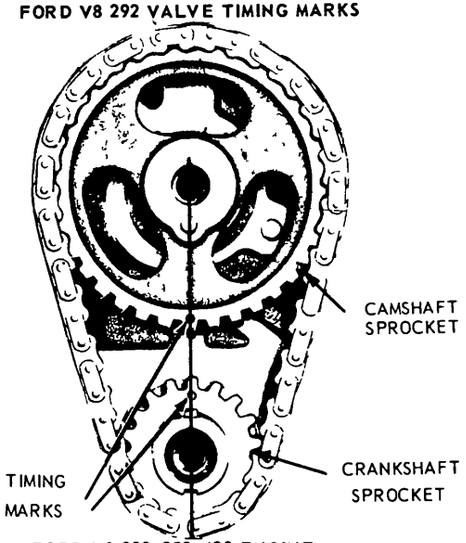
FORD V8 PISTON & ROD ASSY.

CRANKSHAFT

Journal Diamet r - **(292)** - 2.4980-2.4988". **(332,352)** - 2.7484-2.7492". **(430)** 2.8994-2.9002".
Bearings - Copper-lead, steel-backed.
Cl aranc - **(292)** .0006-.0032" (wear limit .0042"). **(332,352)** - .0007-.0029" (wear limit .0036"). **(430)** - .0009-.0029" (wear limit .0038").
R plac ment B arings: Standard size (2 sizes marked **Red & Blue)** and .010", .020", .030" (292, 430), plus .040" (332, 352) Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by No. 3 main bearing. Replace bearing when endplay is excessive.
Thrust B aring Alignm nt - *See "Crankshaft & Main Bearings" in Ford Sp cial Data.*
Endplay - **(292.332,352)** .002-.006" (wear limit .010") **(430)** - .004-.008" (wear limit .012").



FORD V8 292 VALVE TIMING MARKS



FORD V8 332, 352, 430 ENGINE VALVE TIMING MARKS

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data*

CAMSHAFT

►*CAMSHAFT NOTE:* 352 Police Special Engine uses a special "high lift" camshaft.
Journal Diameter - **(292)** - 1.9255-1 9265" **(332, 352)** - 2.1238-2.1248" **(430)** - 2.264-2.265".
Bearings - Steel-backed babbitt lined bushings.
Clearance - .001-.003" Wear limit 006"
End Thrust: **(292)** - Taken by thrust plate and washer located between camshaft sprocket and shoulder on camshaft
(332, 352) - Controlled by spring loaded thrust button on fuel pump eccentric bolt.
(430) - Camshaft end thrust toward rear of engine. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.
►*CAMSHAFT THRUST WASHER NOTE (292):* Chamfer on inner diameter of washer must be toward rear of facing camshaft journal when installed.
Replacement Camshaft Bearings: Furnished Standard & .015" Undersize.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*
Timing Chain: Side guide type. Length 56 links (292), 48 links (332, 352), 52 links (430).
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side).
Camshaft Setting - **(292)** - Sprockets marked by round depression on one tooth. Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are on drive side.
Camshaft Setting - **(332,352,430)** - Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers.
Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in Ford Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*

VALVES

►***1959 (LATE) FORD 332" & 352" PASS. CAR ENGINE CYLINDER HEAD & VALVE NOTE:*** **Engines identified by the ¼" high letters "B9AE–6090" stamped on either end of cylinder head have the valve machined .015" further into the heads and the valve stems are shortened .032". *CAUTION – Use only 1960 valves, Part No. COAE–6505–A (Exhaust), COAE–6507–E (Intake) in these engines. DO NOT use 1959 valves.***
Tappet Clearance: Mechanical Lifters - **(292)** - .019" **Cold,** .018" **Hot** All valves. *See "Valve System" in Ford Special Data for Tappet Clearance checking procedures.*
Hydraulic Lifters - **(332,352,430)** - None in service. *See "Valve System" in Ford Special Data for operating range check of hydraulic lifters*

292 Engine

Valve	Head Diameter	①Stem Diameter
Intake	1.920-1.930"	3416-.3423"
Exhaust	1.505-1 515"	.3403-.3410"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°	.264"	③.0010-.0024"
Exhaust	45°	.244"	④ 0023- 0037"

332, 352 Engines

Valve	Head Diameter	①Stem Diameter
Intake	2.022-2.032"	3711- 3718"
Exhaust	1.551-1.561"	.3693-.3700"

Valve	Seat Angle	②⑤Lift	Stem Clearanc
Intake	30°	.232"	③ 0010- 0024"
Exhaust	45°	232"	④ 0028- 0042"

430 Engine

Valv	H ad Diam t r	①St m Diamet r
Intake	2 080-2.090"	.3711- 3718"
Exhaust	1.770-1 780"	3693- 3700"

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Valv	Seat Angl	②Lift	St m Cl arance
Intake	30°	232"	③ 0010- 0024"
Exhaust	45°	232"	⑤ 0028- 0042"

① - Furnished with 003", 015" & 030" oversize items
② - Cam lobe lift Wear loss limit 005"
③ - Wear limit 0045" ⑤ - Wear limit 0065"
⑤ - Except 352 Police Special High lift camshaft used

Valve Seat Width - 060- 080" Intake, 070- 090" Exhaust
Valve Stem Oil Seals - Umbrella type seals used on all valves Install seals with cup side down over valve guide

►*ROTATABLE VALVE NOTE* All valves (except Police Special V8) are rotatable type *See "Valve System" in Ford Special Data*

Valve Springs: Install with closed coil end toward cylinder head

►*VALVE SPRING NOTE* Valve damper springs used inside valve springs on 352 Police Special and 430 Engines

Free Length - (292) 2 09", **(332,352)** 2 26", **(430)** 2 03"

Spring Specifications - 292

Valve	Spring Pressure	Length
Closed	71-79 lbs ①	1 780"
Open	161-177 lbs ②	1 390"

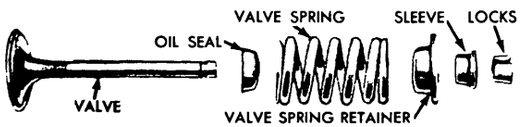
Spring Specifications - 332, 352

Valve	Spring Pressure	Length
Closed	94-104 lbs ③	1 820"
Open	180-198 lbs ④	1 420"

②Spring Specifications - 430

Valve	Spring Pressure	Length
Closed	66-77 lbs ⑤	1 830"
Open	240-260 lbs ⑥	1 430"

① - Wear limit 64 lbs at 1 780"
② - Wear limit 145 lbs at 1 390"
③ - Wear limit 85 lbs at 1 820"
④ - Wear limit 162 lbs at 1 420"
⑤ - Wear limit 60 lbs at 1 830"
⑥ - Wear limit 225 lbs at 1 430"
⑦ - Spring and damper assembly together



FORD V8 VALVE ASSEMBLY

Out of Square Limit - 062" (All engines)

►*VALVE SPRING INSTALLATION NOTE* Measure valve spring assembled height from machined surface of cylinder head spring pad to underside of spring retainer If assembled height is greater than 1 25/32" (292), 1 27/32" (332, 352), 1 55/64" (430), install necessary 030" spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended 1 3/4-1 25/32" (292), 1 13/16-1 27/32" (332,352), 1 13/16-1 55/64" (430) *CAUTION* - DO NOT install spacers unless necessary to bring measurement within specifications

Valv Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves *See "Valve System" in Ford Special Data*

Valve Lifters (Mechanical): (292) Mushroom type Remove from below after camshaft removed
Clearance - 0008- 0024" Wear limit 0045"

Valve Lifters (Hydraulic): (332,352,430) Barrel type Can be removed from above without removing camshaft
Clearance - 0005- 0020"

►*HYDRAULIC LIFTER NOTE* 1959 hydraulic lifter Part No B8S-6500-A is approximately 1/8" shorter (overall length) than previous design Both types of lifters are interchangeable
Lifter Overhaul - *See "Valve System" in Ford Special Data*
Hydraulic Lifter Operating Range - With lifter collapsed, operating range should be 062- 1875" (332,352) 126- 226" (430) *See "Valve System" in Ford Special Data*

Rocker Arm Assembly: *See "Valve System" in Ford Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE The following valve opening and closing points are with camlift as indicated*

Valve Timing - 292
Intake Valves - Open 12° ①BTDC Close 54° ② ALDC
Exhaust Valves- Open 58° ③ BLDC Close 8° ④ ATDC

Valve Timing - 332
Intake Valves - Open 17° ⑤ BTDC Close 59° ⑥ ALDC
Exhaust Valves - Open 57° ⑤BLDC Close 19° ⑥ ATDC

Valve Timing - 352
Intake Valves - Open 22° ⑤ BTDC Close 68° ⑥ ALDC
Exhaust Valves - Open 68° ⑤BLDC Close 22° ⑥ ATDC

Valve Timing - 430
Intake Valves - Open 22° ⑤ BTDC Close 68° ⑥ ALDC
Exhaust Valves - Open 63° ⑤ BLDC Close 27° ⑥ ATDC
① - Camlift 016" ② - Camlift 019" ③ - Camlift 015"
④ - Camlift 018" ⑤ - Camlift 002" ⑥ - Camlift 005"

►*VALVE TIMING CHECK NOTE* Checking timing by use of quadrant on pulley and dial indicator in pushrod socket no longer recommended due to inaccuracy of interpreting degree of crankshaft rotation at pulley position

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrucation" under OILING SYSTEM in Ford Special Data*

Crankcase Capacity: 5 qts refill, add 1 qt with filter change
Normal Oil Pressure - 45-50 lbs (292), 35-50 lbs (332,352,430) all at 2000 RPM
Pressure Regulator Valve - In oil pump body, not adjustable
Oil Pressure Indicator - Indicator light on instrument panel operated by Oil Pressure Switch Ford No B6A-9278-B (stamped No 7 on Hex) Lights when ignition switch turned on, goes out when engine starts and pump pressure reaches 7 lbs

►*OIL PRESSURE BUILD-UP (AFTER COLD ENGINE START) CORPECTION (332, 352, 430)* Caused by oil relief valve plug vent closed by flange of oil pick-up tube *See "Oil Pump" in Ford Special Data*

Oil Pump: Rotor type (292,332,352), Rotor type oil pump and Vane type vacuum pump (430). Located outside crankcase on left side (292), at front inside crankcase (332, 352, 430) Driven by distributor through intermediate drive shaft
Pump Overhaul - *See "Oil Pump" in Ford Special Data*

Vacuum Pump (430): Part of oil pump assembly *See "Vacuum Pump" in Ford Special Data*

Oil Filter: Disposable type
Disposable Filter Replac m nt - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn *CAUTION* - Do not overtighten Run engine and check for leaks

Crankcase Ventilation: Filter in oil filler and breather cap (Inlet) all models Road draft outlet pipe for crankcase ventilation, all models Service filler cap by cleaning with solvent and resaturating with engine oil at 4,000 mile intervals

COOLING

430" ENGINE - New three-stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold Additional thermostat installed in front face of each cylinder head
Below 140°F - Water circulates from pump to cylinder heads, intake manifold and back to water pump
140-180°F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to water pump
Above 180°F - Water circulates the same as between 140-180°F except it returns to radiator for cooling
NOTE - Cylinder block thermostats are accessible by removing water pump

Water Capacity: 20 qts (Thunderbird), 19 qts (All others) Add 1 qt for heater

Pressure Valve: Ford B8A 8100-A 14 lbs radiator filler cap

Thermostat: One thermostat located in water outlet connector (All Engines) plus 2 thermostats in front face of block behind water pump (430 Eng) See table following

Replacement Thermostats

Engine	Opens	Ford Part No.
292,332,352	160°F	B7A-8575-A
292,332,352	①177-182°F	B7A-8575-B
430	160°F	B8E-8575-B
430	① 170°F	B9S-8575-A
430 (In block)	137-142°F	B9S-8575-B

① - For use with permanent type anti-freeze

►*THERMOSTAT INSTALLATION NOTE:* Install thermostat with pivot shaft in vertical position to insure best operation

Water Pump: Packless, sealed ball bearing type
See "Water Pump" in Ford Special Data
Pump Removal - (Exc. Thbrd.) - Drain cooling system, disconnect lower radiator hose and heater hose at water pump Remove fan belt, fan, fan spacer (292) end pulley Remove four bolts retaining pump to cylinder front cover (292) or to block (332,352) then remove pump, gaskets and timing pointer (292)

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Form 17A

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(Thbrd.) - Drain cooling system, remove generator arm bolt at generator and loosen adjusting arm bolt at water pump Loosen two generator mounting bolts at brackets and move generator inward to remove fan belts Disconnect lower radiator hose and heater hose at water pump On 352 engine, loosen fuel pump bolts and slide pump out to obtain access to water pump lower left retaining bolt Remove generator bracket retaining bolt at water pump and loosen generator bracket retaining bolt at cylinder head then block bracket away from water pump Loosen and move water pump bypass hose front clamp to rear Remove water pump retaining bolts and remove water pump and gaskets Remove fan, spacer and pulley Remove generator adjusting arm retaining bolt and remove arm

Temperature Gauge: King-Seeley Electric Constant Voltage ("CV") type, with gauge voltage Regulator, Ford No B7A-10804-B

Dash Unit - (Pass. Cars) - Ford No B9A-10883-A **(Thunderbird)** - Ford No B9S-9280-A *NOTE* - Thunderbird units are combination Fuel & Temperature gauges

Engin Unit - Ford No B7A-10884-A

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

L ng M d l 10CF (Std 292) **11CF** (Std 332,352 and Heavy Duty on 292 Pass Cars & Taxi) Single plate, semi-centrifugal type

C v r Assembly	Long No.	Ford No.
10CF	267346	① B7A-7563-A
11CF	267350	② B8A-7563-B

① - Yellow & Brown cover - White pressure plate
② - Pink & Orange cover - Green pressure plate

Clutch Disc.	Long No.	Ford No
292 S M	288852	③ B8A-7550-C
292 Overdrive	288855	B9AA-7550-A
292 Pass & Taxi H D	288853	④ B8A-7550-G
332 Pass	288853	④ B8A-7550-G
352 Pass Cars & Thbrd	288351	⑤ B8A-7550-F

③ - 4 Aluminum & 4 unmarked springs
④ - Orange springs ⑤ - Blue springs

See "Long Clutches" in Clutch Section

Pedal Adjustment: If total pedal travel is less than 6 5/8" or more than 6 7/8" (Pass Cars), 6 7/8" or more than 7 1/8" (Thbrd), reposition pedal bumper and bracket until travel is within limits Adjust assist spring link to give assist spring length of 9 7/8" (Pass Cars) 6 3/4-6 7/8" (Thbrd) between spring eye centers with clutch fully released

Pedal Fr Trav l - 1 1 8 1 3 8" Loosen locknut on clutch pedal release rod turn adjusting nut until correct travel is reached *NOTE* Check free travel by operating engine at 3000 RPM with transmission in Neutral position There should be a minimum of ½" free travel under these conditions

R m val Remove transmission flywheel housing cover release lever retracting spring slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation loosen six cover bolts uniformly to release spring tension remove cover and pressure plate through opening in flywheel housing Remove clutch release lever

SYNCHRO-MESH TRANSMISSION

Own. Helical gear constant mesh synchro-mesh (Second & High), sliding gear (Low & Reverse)

See "Ford Synchro-mesh" in Transmission Section

Transmission Controls *See "Transmission Controls" in Transmission Section*

Removal (Exc. Thunderbird): With car raised up disconnect drive shaft at rear universal joint slide drive shaft off transmission output shaft Remove speedometer cable and gear Disconnect shift rods at transmission Remove rear engine support to extension housing bolts Disconnect parking brake adjusting rod from equalizer bracket Support rear of engine and remove rear engine support then lower engine for clearance and remove transmission to flywheel housing bolts Use guide pins in two lower bolt holes and slide transmission back until input shaft clears fly wheel housing and lower transmission

Thunderbird - Drain transmission, raise car and remove driveshaft at rear universal joint Disconnect parking brake adjusting rod Disconnect parking brake cables from equalizer Disconnect exhaust pipe assembly at manifolds and couplings Remove exhaust inlet assembly Remove transmission to rear engine support bolts Raise transmission on jack and remove crossmember Disconnect speedometer cable bracket and disconnect cable from transmission Remove shift rods and bolts that secure transmission to flywheel housing Remove transmission

OVERDRIVE

Warner R10 Solenoid operated type with governor control and throttle operated kickdown No Lock out Switch used

See "Ford Overdrive in Transmission Section

Overdrive Control *See "Overdrive Controls" in Transmission Section*

Removal Same as for synchro mesh transmission (above) after disconnecting control cable and wiring

AUTOMATIC TRANSMISSION

Two types used **Fordomatic** New simplified type with torque converter and two-speed automatic transmission **Cruise-O-Matic** Of same design as used previously *See "Ford Automatic Transmission in Transmission Section*

►*THREE-SPEED FORDOMATIC NOTE* Some cars have 3-speed Fordomatic installed These cars can be identified by letter "C" stamped on "TRANS" entry on serial number plate

►*TWO-SPEED FORDOMATIC RUMBLE NOISE CORRECTION* Install new pressure regulator valve and spring Kit No B9AZ-7A135-A *See 'Ford Two Speed Automatic Transmission' in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See 'Ford Automatic Transmission' in Transmission Section*

►*TESTING & TROUBLE SHOOTING See 'Ford Automatic Transmissions' in Transmission Section*

Lubricati n: Check fluid level every 1 000 miles Drain and refill every 24 000 miles Use only Ford Automatic Transmission Fluid P rt No B8A 19582-A

►*TRANSMISSION FLUID COLOR NOTE* A lye is added to automatic transmission fluid at assembly plant to aid in detecting leaks

Ch cking Fluid L v l - Bring transmission to operating temperature by running engine with selector lever in neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid Maintain level at "Full" mark on dipstick

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Ford Automatic Transmission" in Transmission Section*

UNIVERSALS

Mechanics. Needle bearing type

►*CAUTION* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See "Ford & Mercury' in Rear Axle Section*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts

REAR AXLE

Own. Separate carrier type semi-floating, hypoid, with Hotchkiss Drive "Equa-Lock" (Power Transfer) type differential optional *See 'Edsel, Ford, Thunderbird & Mercury (Deep-Offset) Hypoid and 'Ford Equa-Lock Differential" in Rear Axle Section*

Axle Ratios - 3 56-1 (32-9) 3 70-1 (37-10), 3 89-1 (35-9)

Backlash - 004- 009"

Axle Shaft Removal· Remove wheel and brake drum Remove four axle bearing retaining locking type nuts (work through opening in axle shaft flange) Use puller No 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carrier Assembly Removal: Remove axle shafts (see above) and drive shaft Remove 10 nuts which attach carrier to housing and remove carrier from housing

SHOCK ABSORBERS

Direct acting non-adjustable Serviced by replacement **Ford Shock Absorber Nos**

Model	Front	Rear
Pass Car ①	B9A-18124-A	B9A 18125-B
Thunderbird	B9S-18124-A	B9S-18125-A
Hardtop	B7A-18124-H	B9A-18125-D
Station Wagon		B9A-18125-C
Pass Car ② Hvy Dty	B7A-18124-F	B9A-18125-A
Sed Del Taxi Hvy Dty	B7A-18124-F	B9A-18125-A
Sta Wgn Hvy Dty	B7A-18124-F	B9A-18125-H

① Exc Thbrd Hardtop Ranchero & Sta Wgn
② Exc Thbrd Sta Wgn & Ranchero

FRONT SUSPENSION

Independent "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs

See "Ford, Thunderbird, Mercury" in Suspension & Wheel Alignment Section

Caster - 0° to Pos 1° Maximum variation between

Caster (Pass Cars) - 0° to Pos 1° Maximum variation between wheels ½°

CONTINUED ON NEXT PAGE

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Cast r (Thund rbird) - Pos ½° to Pos 1½° Maximum variation between wheels ½°

Camber - Pos ½° to Pos 1½° Maximum variation between wheels ½° (¼° preferred)

T e-In - 1/16"-1/8" *NOTE* - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered

T e-Out on Turns - Outer wheel 20°, inner wheel should be 24½°

STEERING

Manual: Own. Recirculating ball worm and nut
S e "Saginaw Ball Bearing Worm & Nut" in Steering S ction

Power Steering: Linkage type Used in conjunction with standard steering gear
See "Bendix Linkage Type" in Steering Section

►*POWER STEERING PUMP NOISE CORRECTION* To eliminate cold start noise, install Kit B9MY-3A711-A
See "(Eaton Roller Type) Power Steering Pump" in Steering Section

St ring Linkage: *See "Steering Linkage" in Steering S ction*

St ering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

St ering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Ford-Bendix Hydraulic. Parking lever applies rear wheel brakes

►*BRAKE DESIGN NOTE* Front brake anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin)
S e "Ford, Lincoln, Mercury Bendix" in Brake Section

Drum Diam ter - 11" front & rear

Wh el Cylind r Diam t r - 1 1/8" (front all), 7/8" (rear - Pass Cars), 15/16" (Sta Wgn & Ranchero)

Brake Lining (Width-Length)

Model		Primary	Secondary
Sed & Cpe	(Front)	2¼" x 11 62"	2¼" x 11 93"
	(Rear)	1¾" x 10 62"	1¾" x 11 93"
Sta Wgn &	(Front)	2¼" x 10 62"	2¼" x 11 93"
Ranchero	(Rear)	2" x 10 62"	2" x 11 93"
Thunderbird	(Front)	2½" x 11 62"	2½" x 11 93"
	(Rear)	2½" x 10 62"	2½" x 11 93"

Clearance - Adjusting screw backed off 10-12 notches (Pass Cars), 14-16 notches (Thunderbird) from point where shoes are tight against drum

Brake Pedal Freeplay: 5/16-7/16"

►*REVISED BRAKE PEDAL ADJUSTMENT* No return spring used on later cars Measure distance from floor to brake pedal (pushrod against master cylinder piston) Lift pedal against bumper stop and again measure distance Difference between measurements is pedal freeplay

Standard Master Cylinder: On engine side of firewall

Checking Fluid - Maintain fluid level to within ½" of top of filler neck

Removal - Disconnect rubber boot from rear end of master cylinder, brake line at fitting, stop light switch wires from switch Push down brake pedal several times to force as much fluid as possible into clean container, then remove bolts that secure master cylinder to dash panel and lift cylinder away from pushrod and out of vehicle

Power Brakes: Early (Bellows) Type. Pedal assist power unit with vacuum bellows and control valves mounted on drivers side of dash panel and connected through linkage to standard master cylinder

Lat r (Piston) Type - Combination vacuum booster and master cylinder unit located on engine side of firewall and connected to brake pedal by pushrod *NOTE*- Due to interference at evaporator housing, this unit cannot be used on Thunderbird with Air Conditioning
See "Ford Bellows Type" or "Bendix Hydraulic (Disc) Reaction Type" Power Units in Brake Section

Checking Fluid - Same as for standard master cylinder

Removal - Remove bolt securing brake pedal to brake unit (inside vehicle) From engine compartment, disconnect stop-light switch wires at master cylinder and brake line at outlet fitting Loosen clamp that secures vacuum hose to unit and remove hose, then remove vacuum reserve tank hose at unit Remove nuts and lockwashers that secure unit to cowl panel and slide unit forward from cowl panel

MISC. MECHANICAL

Windshield Wipers: Electric & Vacuum types with Link & Arm type linkage (Exc Thbrd), Vacuum type with cable control (Thbrd)
See "Windshield Wipers" in Miscellan ous Section

Power Window Regulators: Electric type
See "Electric Window Regulators" in Misc Section

Power Top Control: Electric-Hydraulic (Convertible), Electric (Retractable Hard-Top), *see "Power Top Controls" in Miscellaneous Section*

Power Seat Controls: 4-Way Electric
See "Power Seat Adjusters" in Misc llaneous Section

Air Conditioning: *See "Air Conditioning" in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front cab pillar or glove box door, depending on truck model On Parcel Delivery models, plate is on right hand dash panel *NOTE* - Number (example below) includes identification data as follows

① ②③④ ⑤
F10 C 9 U 10001

① - Truck Model *See Table Below*
② - Engine Type **J** - 6 Cyl , **C** - 292" V8, 2-Bbl Carb , **D** - 292" V8, 4-Bbl Carb *See Engine Note Below*
③ - Year Model, 1959
④ - Assembly Plant *See Table Below*
⑤ - Beginning vehicle number

Truck Model Identification

Truck Series	Model Code
F-100 (Conventional)	F10
F-250 (Conventional)	F25
F-350 (Conventional)	F35
P-350 (Parcel Delivery)	P35
P-400 (Parcel Delivery)	P40
F-500 (Conventional)	F50
P-500 (Parcel Delivery)	P50
B-500 (School Bus)	B50
C-550 (Tilt Cab)	C55
F-600 (Conventional)	F60
P-600 (Parcel Delivery)	P60
B-600 (School Bus)	B60
C-600 (Tilt Cab)	C60

Assembly Plant Designation

A - Atlanta	**H** - Lorain	**P** - St Paul
D - Dallas	**K** - Kansas City	**R** - San Jose
E - Mahwah	**L** - Long Beach	**U** - Louisville
G - Chicago	**N** - Norfolk	

►*ENGINE IDENTIFICATION NOTE* In the following Ford Truck data pages, engines will be referred to as follows

Engine	Designation
6 Cyl 223"	6 Cyl
V8 292" 2-Bbl Carb Med Duty	V8MD
V8 292" 4-Bbl Carb Heavy Duty	V8HD

TUNE-UP

COMPRESSION PRESSURE 150 lbs ± 10 lbs at cranking speed Cylinders must be uniform within 10 lbs

VACUUM READING· 18 19" (6 Cyl), 19-20" (All V8) at idling speed

VALVE TAPPET CLEARANCE Can be set with engine cold but must be rechecked with engine at operating temperature (30 minutes operation at 1200 RPM) and idling **Cold Clearance** - 019" All valves, All engines **Hot Clearance** - 019" (6 Cyl), 018" (All V8), All valves

►*SELF LOCKING TAPPET ADJUSTING SCREW NOTE* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL (EXC. V8HD): Automatic thermostatic type Located at center of exhaust manifold (6 Cyl), between crossover pipe and right exhaust manifold (V8MD) Install valve assembly with stop pin at top of valve housing and hook thermostatic spring on stop pin

IGNITION

6 CYL. ENGINE

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 028- 032"
Spark Plugs - Champion 870 18 mm Torque to 15-20 ft lbs *NOTE* - Plugs have tapered seat, no gasked used
COIL· Ford No B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - B8A-12250-A 1 3-1 4 ohms at 75°F
►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil Bypassed during cranking by lead from starter solenoid to battery terminal of coil
DISTRIBUTOR: Ford B8A-12127-M. "Loadomatic" type of same design used on previous models. *NOTE - Distributor identified by No FET-12127-C stamped on distributor housing Use Distr B8A-12127-M only with Carburetor P9TE-9510-A*
Condenser - Ford 7RA-12300-C **Capacity** 21- 25 mfd
Contact Point Set --Ford FAA-12171-A
Breaker Gap - 024–026"
Cam Angle - 35-38°
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Clockwise viewed from above

Advance Performance
►With Distributor on Test Stand

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	38	450
2½-3½	79	650
6¾-7¾	2 85	1100
8¾-9¾	4 33	1400
10¼-11¼	5 99	1800

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION* Scribe mark on distributor to indicate rotor position and housing position on block before removing Align marks when installing Make sure oil pump intermediate shaft engages distributor shaft properly

V8 ENGINES

FIRING ORDER: 1-5-4-8-6-3-7-2
Cylinders - RIGHT BANK 1-2-3-4 LFFT BANK 5-6-7-8
SPARK PLUG GAP· 028- 032"
Spark Plugs – Champion 860 18 mm Torque to 15-20 Ft lbs (Std) New plug in new cylinder head 25-30 ft lbs *NOTE* Plugs have tapered seat no gasket required
COIL· Ford B6A-12029-B
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - B8A-12250-A 1 3-1 4 ohms at 75°F
►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Bypassed during cranking by lead from starter solenoid to battery terminal of coil
DISTRIBUTOR Ford (V8MD Early) Same design as used on previous models **(V8MD Later)** New pivot plate type Both types have centrifugal and vacuum advance **(V8HD)** Centrifugal advance type distributor This distributor does not have vacuum advance
See "Distributors" in Electrical Section

Engine	Parts No	① Engr. No.
V8MD	② B8C-12127-B	FFD-12127-B
V8MD	B9TF-12127-B	B9TF-12127-B
V8HD Std Trans	③ B8T-12127-B	FFD-12102-N
V8HD Std Trans	B8T-12127-A	FFD-12102-F L
V8HD Auto Trans	④ B8C-12127-E	FFD-12102-K
V8HD Auto Trans	B8C-12127-D	FFD-12102-H,M

① - Stamped on distributor housing
② - Replaced by B9TF-12127-B
③ - Replaced by B8C-12127-D
④ - Replaced by B8T-12127-A

Condenser No. - B7A-12300-A (Exc B9TF-12127-B), B9TF-12300-A (B9TF-12127-B) Capacity 21- 25 mfd
Contact Point Set - B7A-12171-A (B8C-12127-B, B9TF-12127B), B8Q-12171A (B8C-12127D,E, B8T-12127A,B)
Breaker Gap: 014- 016"
Cam Angle - 26-28½° at idling speed
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - V8MD

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		325	0		650
½-1½		425	1-3		850
6-7		700	12-14		1400
8½-9½		900	17-19		1800
14¼-15¾		2000	18½-31½		4000

Automatic Advance – V8HD

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		550	0		1100
½-1½		600	1-3		1200
5-6		825	10-12		1650
7¼-8¼		1000	14½-16½		2000
12¼-13½		1900	24½-27		3800

Vacuum Spark Control (V8MD): Both early and late type have vacuum diaphragm unit mounted on distributor housing and linked to breaker plate Pivot type breaker plate used on later distributors Both types operate in conjunction with centrifugal (governor weight) advance mechanism

Vacuum Advance - V8MD

Distr Degrees	Eng Degrees	① Vacuum (" of Hg)
0-2	0-4	6
4-6	8-12	8
6-8	12-16	9¼

① - At 1000 RPM distributor speed

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION See 6 Cyl above*

IGNITION TIMING

Engine	Std Ignition Setting
6 Cyl & V8MD	4° BTDC
V8HD (85-88 Octane Fuel)	4° BTDC
V8HD (88-90 Octane Fuel)	6° BTDC
V8HD (90-92 Octane Fuel)	8° BTDC
V8HD (92 Octane or Premium Fuel)	10° BTDC

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►*TIMING CAUTION:* Set timing with engine idling and vacuum line disconnected. Check advance operation by accelerating engine after vacuum line connected.

Timing Mark (6 Cyl.) - Vibration damper marked by lines: TDC (long mark), & 3°, 5°, 7°, 9° BTDC. Align space between 3° and 5° lines (4° BTDC) with pointer on chain case cover.

Timing Mark (V8) - Vibration damper has 16 lines from TDC to 30° BTDC in 2° increments. Align correct line with pointer on chain case cover.

CARBURETOR

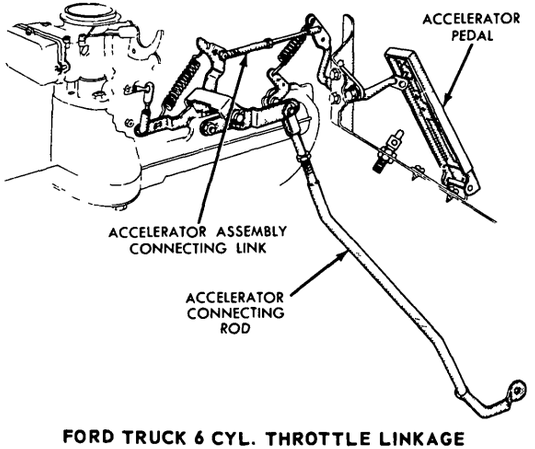
►*CARBURETOR APPLICATION: Holley carburetors used. "Visi-Flo" (1-Bbl.) used on 6 Cyl. 2-Barrel used on V8MD. 4-Barrel used on V8HD.*

►*SCHOOL BUS CARBURETOR ICING CORRECTION (V8HD):* Install exhaust manifold heat control valve No. B7A-9685-C, replacing studs at manifold outlet with new studs No. 353409-S. Use new gasket 1GA-9450 on each side of valve.

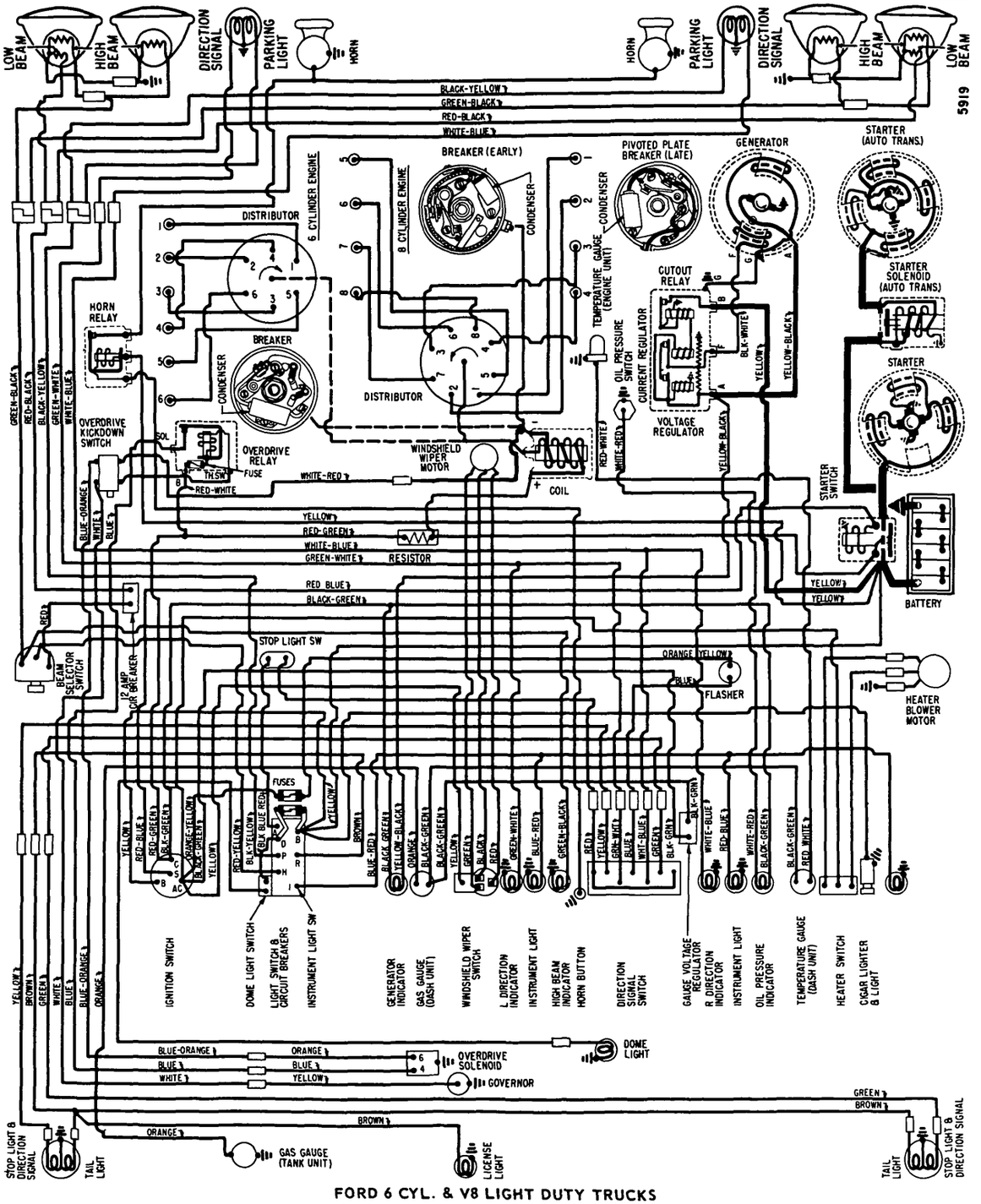
Throttle Linkage Adjustment (6 Cyl. Fordomatic Trucks): Adjust engine idle speed to 475-500 RPM and make anti-stall dashpot adjustment (see below). With engine stopped and carburetor on hot idle, remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut. Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission. Turn throttle rod clevis until pin enters hole in lever and lengthen throttle rod 2½ turns. Connect throttle control rod, tighten locknut, install clevis lock. Measure accelerator pedal height from point where linkage connects to pedal to floor mat. Distance should be 2¾". Adjust by turning threaded trunnion on accelerator connecting link.

Throttle Linkage Adjustment (V8 Fordomatic & Cruise-O-Matic Trucks): Warm up engine and adjust to correct idle speed. Make anti-stall dashpot adjustment (see

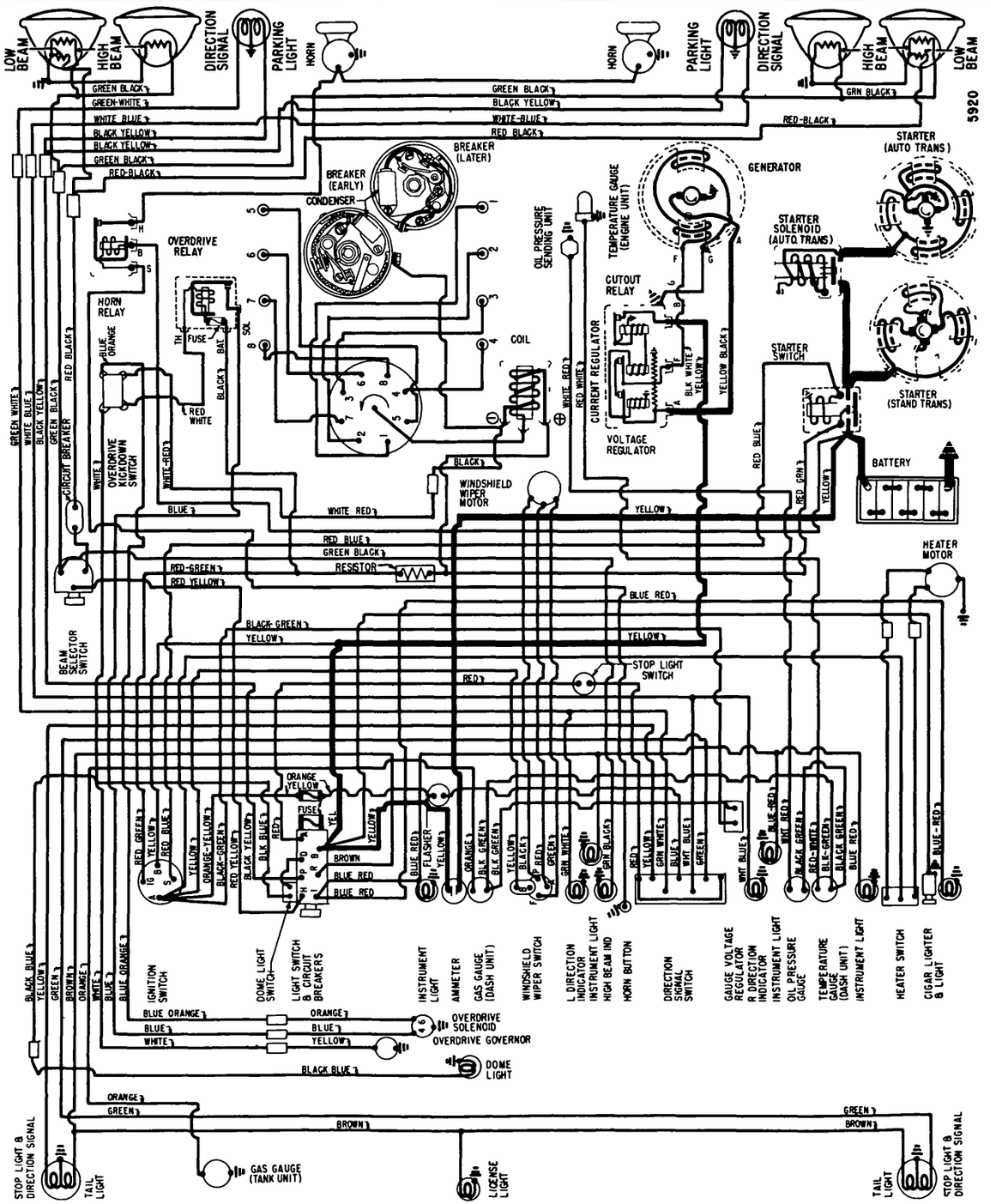
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FORD TRUCK 6 CYL. THROTTLE LINKAGE



FORD 6 CYL. & V8 LIGHT DUTY TRUCKS



FORD V8 HEAVY DUTY TRUCKS

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below) Disconnect throttle control rod from accelerator Insert ¼" gauge pin through holes in carburetor bellcrank Adjust length of carburetor connecting link so carburetor is on hot idle position Adjust accelerator connecting link so accelerator pedal height is 2¾" from floor mat to point where linkage connects to pedal Remove gauge pin and make sure holes are aligned so pin can enter freely With gauge pin removed, pull throttle control rod upward so transmission lever is against internal stop in transmission Rotate clevis on throttle control rod so clevis freely fits pin on bellcrank lever Then turn clevis **3 full turns counterclockwise** to lengthen throttle control rod Connect rod *For final adjustment, use pressure method as follows.* Make sure transmission is at normal operating temperature Raise truck and remove 1/8" pipe plug forward of transmission levers Install pressure gauge Lower truck and install a tachometer Put selector lever in any Drive position. With engine speed at 1000 RPM, pressure should be 80-85 lbs If below 80 lbs , lengthen throttle control rod, if above 85 lbs , shorten rod Connect rod, tighten locknut For pressure ranges at Idle & Stall speed conditions, *see "Fordomatic (3-Speed) Transmission and 'Cruise-O-Matic Transmission" in Transmission Section*

Anti-Stall Dashpot Adjustment: After engine idle speed adjusted to 475-500 RPM, turn off engine. Loosen dashpot adjusting screw locknut Hold throttle in closed position and depress dashpot plunger with a screwdriver blade Turn dashpot or adjusting nut until 045- 064" clearance obtained between dashpot plunger and throttle shaft lever Tighten locknut

HOLLEY "VISI-FLO"

Holley Visi-Flo Ford No B9TE-9510-A Identified by No B9TE-9510-A, 5752317 or 318 stamped on main body at fuel inlet

►*APPLICATION & REPLACEMENT NOTE: Carburetors must be used with correct Distributor See DISTRIBUTOR above*

Idle Setting - Initial setting ¾-1⅜ turns open Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture Turn screw in until engine runs smoothly Favor a slightly rich mixture, rather than a lean setting

Idle Speed - 475-500 RPM in Neutral) Recheck automatic transmission trucks with selector lever in "DR" range Readjust to obtain 450 RPM

Fuel Level - 11/16" ± 1/32" below power valve mounting surface (Tool T52L-9550-AEF)

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation

Fast Idle- Integral type operated by choke valve No adjustment required

Thr ttl Linkage Adjustment- *See CARBURETOR above*

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►*OTHER DATA See "Holley Visi-Flo Carburetors" in Carburetion Section*

HOLLEY 2-BARREL

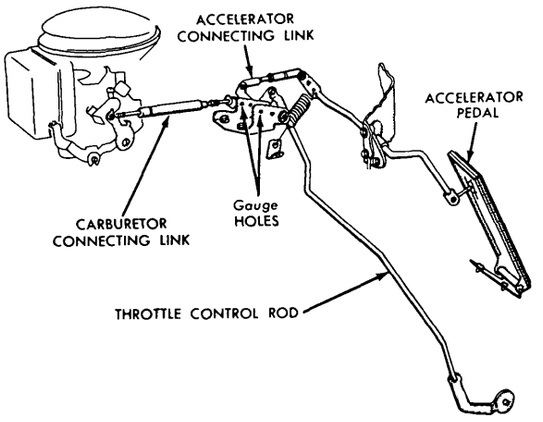
Ford No. B9C-9510-C. "Low Silhouette" type Identified by No 5752310 or 12 or 13 stamped on left front side of choke plate flange

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl 2-3-5-8 LEFT barrel feeds 1-4-6-7*

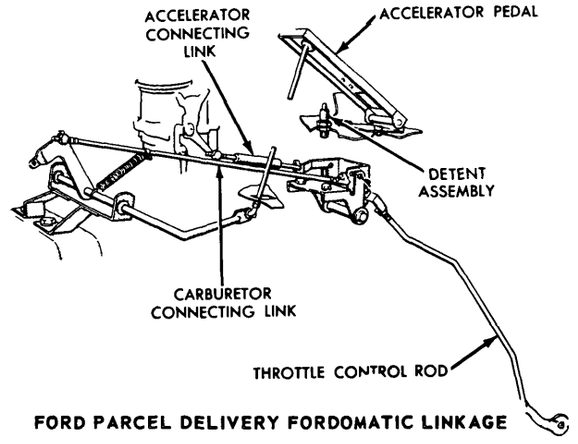
Idle Setting - Initial setting 1-1½ turns open (both screws) With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll, finally turn needles in just enough for smooth running (favor a slightly rich mixture)

Idle Speed - 475-500 RPM in Neutral Recheck automatic transmission trucks with selector lever in "DR" range Readjust to obtain 450 RPM

Fuel Level - Level with lower edge of sight plug open-



FORD TRUCK V8 THROTTLE LINKAGE



FORD PARCEL DELIVERY FORDOMATIC LINKAGE

ing, ± 1/16" To adjust, stop engine, loosen lockscrew on top of float bowl and turn adjusting nut in until fuel level is **bel w** desired setting Always make a final adjustment by raising fuel level *NOTE* - 1/6 turn of the nut will change fuel level 3/64" Recheck fuel level with engine running

Accelerating Pump - Install screw in bottom hole of cam (cold weather), top hole of cam (hot weather)

Fast Idle - After adjusting engine idle speed, hold choke wide open, turn fast idle screw in to obtain 005-008" clearance between screw and fast idle cam Turn screw in to just touch cam, then back off 1/8-1/4 turn

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

HOLLEY 4-BARREL

Ford No. B9T-9510-A (Early), B9TE-9510-L (Later). Early carburetor identified by No 5751759, late carburetor by No B9TE-9510-L, stamped on left front side of choke plate flange

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels feed 1-4-6-7*

Idle Setting - *NOTE - Idle mixture adjusting needles used only on SECONDARY side (one on each side of Fuel Metering Block)* Initial setting 1-1½ turns open (both screws) With engine at operating temperature, turn both screws in until engine runs rough from lean mixture, then turn screws out until engine begins to roll Finally, turn screws in just enough for smooth running (favor a slightly rich mixture)

Idle Speed - 475-500 RPM in Neutral Recheck automatic transmission trucks with selector lever in "DR" range Readjust to obtain 450 RPM *NOTE* - Idle speed screw located on Throttle Operating Housing adjacent to throttle lever

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Gasoline Gauge: King-Seeley Electric Constant Voltage ("CV") type with Voltage Regulator, Ford No B7J-10804-A (P-350, 400, 500), B7A-10804-B (Others)

Dash Unit - Ford B9C-9280-A.

Tank Unit - Ford No. B8C-9275-A (F-100,250,350, P-350,400,500), Par Del and Chassis

Tank Unit - Ford No. B8C-9275-B (F-100,250,350, 600, B-500, exc, electric fuel pump), closed cab

Tank Unit - Ford No.B8T-9275-A (B-500, F-600) Chassis, (P-500) with 30 gal fuel tank

See "Fuel Gauges" in Carburetion Section

Fuel Pump: AC, Fuel only or Fuel & Vacuum types

Model.	Ford Pump No.
6 Cyl (Early)	B8A-9350-E
6 Cyl (Later)	B9A-9350-B
V8MD (Early)	B8C-9350-A
V8MD (Later)	B9TF-9350-A
V8HD	B8T-9350-B

Pressure - 3 5-5 5 lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

Air Cl an r: Dry filter element type standard, oil bath type optional on all models Clean every 4,000 miles, replace dry type element every 32,000 miles

►*DRY TYPE CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate

BATTERY

Ford B9A-10654-A (Exc. Sch l Bus), 12 volt, 11 plate, 55 ampere hour capacity (painted red), **B9A-10654-C (School Bus),** 12 volt, 11 plate, 70 ampere hour capacity (painted yellow) Both at 20 hr rate *NOTE* - These batteries are dry type for service replacement

Battery Ground - Negative to engine block

Engine Ground - At flywheel housing (6 Cyl), at left cylinder head (V8)

STARTER

Ford. As follows

Model	Starter N	Armature N .
6 Cyl & V8 (Std)	**B6A-11002-A**	B6A-11005-B
6 Cyl (Fordomatic)	**B8C-11002-A**	B9TF-11005-A
6 Cyl (H D Clutch)	**B7T-11002-A**	B8C-11005-A
V8 (Auto Trans)	**B7T-11002-A**	B8C-11005-A

Drive (B6A-11002-A) - Bendix "Folo-Thru" Ford No 1CM-11350-C

Drive (B8C-11002-A) - Bendix "Folo-Thru" Ford No B6C-11350-A

Drive (B7T-11002-A) - Delco-Remy Solenoid Pinion Shift Ford No B8C-11350-A

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 48-56 ozs (B6A-11002-A), 42-53 ozs (B8C-11002-A), 35 ozs (B7T-11002-A)

Cranking Speed - 150-180 RPM (B6A-11002-A), 150-160 RPM (B7T-11002-A) - 190 amps max 140-160 RPM (B8C-11002-A)

Performance Data - B6A-11002-A & B8C-11002-A

Torque	RPM	Volts	Amperes
0 ft lbs	①	12 0	②
15 5 ft lbs		5 0	550

Performance Data – B7T-11002-A

Torque	RPM	Volts	③ Amperes
0 ft lbs.		12 0	80
14 2 ft lbs	Lock	5 0	525

① - With starter on engine and engine idling

② - 80 amps (B6A-11002-A), 85 amps (B8C-11002-A)

③ – Includes Solenoid

Starting Switch· Magnetic type, Ford B6A-11450-A (B6A-11002-A), Solenoid Switch Ford B8C-11390-A (B7T-11002-A) Starter switch controlled by ignition switch *NOTE* - Neutral Safety switch used on Auto Trans

Neutral Safety Switch (Aut -Trans): Ford No B9A-15812-A1 (Fordomatic), B9A-15812-B1 (Cruise-O-Matic)

See 'Fordomatic" or "Cruise-O-Matic" in Trans S ct

►*NEUTRAL SAFETY SWITCH REPLACEMENT NOTE* Both "RBM" & "MECO" switches used in production Use Ford Nos given above for replacement

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GENERATOR

Used as follows

Generator	Armature
B6A-10002-C (Bosch) ①	B6C-10005-B
B6A-10002-H (Ford) ②	B6A-10005-A,B,C
B9A-10002-A (Ford) ③	B6A-10005-C
B6A-10002-F (Auto-Lite) ④	B6C-10005-C
B8QH-10002-A (Ford) ⑤	B8QH-10005-A
B6A-10002-E (Auto-Lite) ⑥	B6C-10005-C
B6A-10002-D (Bosch) ⑦	B6C-10005-A
B6A-10002-G (Bosch) ⑧	B6C-10005-D

① - Identified by No FBC-10000-B, FCB-10000-A, FCH-10000-A, FCJ-10000-A,B, FCP-10000-A

② - Identified by No FAS-10000-G,FBT-10000-D, FBU-10000-C, FBW-10000-C, 2700004

③ - Identified by No FHA-10000-A, 2900639,40,42,43, 44,45,46

④ - Identified by No FAW-10000-A, FCE-10000-A, FGN-10000-A, B9TF-10000-C,D

⑤ - Identified by No 10000-A, FGS-10000-B, 2900425, 56, 57, 58, 59, 60, 61, 62

⑥ - Identified by No FAU-10000-A, FAV-10000-A,B, FCD-10000-A, FCT-10000-A, B9TF-10000-A,B, FGM-10000-B

⑦ - Identified by No FBS-10000-C, FCC-10000-A, FCG-10000-A, FCK-10000-A,B, FCN-10000-A, FCR-10000-A-

⑧ - Identified by No FAY-10000-B, FCA-10000-B, FCL-10000-A,B, FCM-10000-A, FCS-10000-A

Performance Data

Generator	Amperes	Eng RPM
B6A-10002-C	30	1220
B6A-10002-H	30	2550
B9A-10002-A	30	
B6A-10002-F	40	1800
B8QH-10002-A	40	2500
B6A-10002-E	40	1800
B6A-10002-D	50	1380
B6A-10002-G	60	2240

Brush Spring Tension - Auto-Lite 34-41 ozs , **Bosch** 16-18 ozs , **Ford** 32-40 ozs

Field Current - 1 2-1 8 amps (B6A-10002-C,D,E,F,G), 1 7-1 8 amps (B6A-10002-H), 1 4-1 5 amps (B8QH-10002-A)

Rotation - Counterclockwise at commutator end

Belt Adjustment: ¼" (6 Cyl), ½" (V8), deflection midway between generator and water pump pulleys with light thumb pressure

REGULATOR

Used as follows

Ford Regulator No.	Generator
B6C-10505-B (Bosch)	B6A-10002-C
B7A-10505-B (Ford)	B6A-10002-H
B7A-10505-B (Ford)	B9A-10505-A
B7A-10505-H (Auto-Lite)	B6A-10002-F
B8E-10505-C (Ford)	B8QH-10002-A
B7A-10505-A (Auto-Lite)	B6A-10002-E
B6A-10505-C (Bosch)	B6A-10002-D
B6C-10505-A (Bosch)	B6A-10002-G

See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section

►*SETTING CAUTION* "Temperature Compensated" type Set to following specifications at 75°F, ambient (engine compartment) temperature, after ½ hour operation in vehicle or after regulator heated and stabilized

Cutout Relay

Cuts In - Auto-Lite 12 5-13 9 volts, **Bosch** 13 0-13 5 volts, **Ford** 12 0-12 8 volts

Cuts-Out - Auto-Lite 2-6 amps , **Bosch** 2-8 amps , **Ford** 6-9 amps

Voltage Regulator

Setting - Auto-Lite 14 6-14 9 volts, **Bosch** 14 2-14 6 volts (B6C-10505-A,B) both upper and lower sets, 14 2-14 6 volts upper, 14 2-14 8 volts lower (B6A-10505-C), **Ford** 14 6-15 4 volts

Checking & Adjusting - *See Electrical Section*

Current Regulator

Setting - Auto-Lite 38-42 amps , **Bosch** 28-32 amps (B6C-10505-B), 48-52 amps (B6A-10505-C), 58-62 amps (B6C-10505-A), **Ford** 28-32 amps (B7A-10505-B), 38-42 amps (B8E-10505-C)

Checking & Adjusting - *See Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) *See "4-Headlight Systems" in Electrical Section*

Directional Signals: *See Electrical Section*

Lighting Switch Removal: With control knob in "OFF" position press spring release button on switch housing, turn shaft slightly and pull it out of switch Unscrew mounting nut, remove switch

Stop Light Switch Location: On brake master cylinder, Power Unit Assembly, or fitting on frame side rail Master Cylinder located on firewall (Conventional Trucks), on bracket attached to left frame member below brake pedal (Others)

LIGHTING CIRCUIT BREAKERS: Two used in lighting switch One circuit breaker protects headlight circuit, other circuit breaker protects instrument, parking,stop, and tail light circuits

FUSES: 7.5 Ampere - Interior lights On headlight switch
5 Ampere - Directional Signals On headlight switch
15 Ampere - Overdrive On overdrive relay
14 Ampere - Heater In feed wire
1 Ampere - Clock In feed wire

Horn Relay: Ford No B8C-13853-A

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl 223" Eng and V8 292" Eng All engines are overhead valve type

Engine	Bore	Stroke	Displacement
6 Cyl	3 625"	3 60"	223 cu in
V8	3 75"	3 30"	292 cu in

Engine	Compr Ratio	Rated HP	Developed HP
6 Cyl	8 1-1	31 50	139 at 4200 RPM
V8MD①	7 9-1	44 60	186 at 4000 RPM
V8HD②	7 6-1	44 60	187 at 3800 RPM

① - With 2-Bbl Carb ② - With 4-Bbl Carb

Compression & Vacuum Reading - *See TUNE-UP*

CYLINDER HEAD & MANIFOLDS: *See Ford Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data*

ENGINE REMOVAL: *See "Engine" in Ford Special Data*

OIL PAN REMOVAL (6 CYL.): Drain crankcase, remove oil level dipstick and remove flywheel housing cover Remove oil pan retaining screws and remove pan

OIL PAN REMOVAL (V8): Drain crankcase and remove dipstick Remove converter housing dust cover on auto trans trucks On C-Series, crank engine until No 1 piston is on TDC Disconnect oil inlet tube from oil pump and remove "O" ring seal from tube Remove oil pan retaining screws and remove pan

►*OIL PAN LEAK NOTE (292)* Use New Studs No, 88351-S8 with interference fit, lockwashers No 34806-S7, and nuts 33798-S8 at rear main bearing seal retainer locations to eliminate leaks at rear of oil pan *NOTE* - Coat threaded portion of stud that fits into block with oil resistant type sealer prior to installation

6 CYL. ENGINE

►*See 1959 Ford 6 Cyl Passenger Car Pages* Engine is similar to that used in 1959 Pass Cars, and all passenger car engine data applies to truck engine

V8 ENGINES

►*See 1959 Ford V8 Passenger Car Pages* Engines are similar to 1959 292" Pass Car engine, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW

VALVES: Exhaust Valve Stem Diameter (V8HD) - 4343-4350"

Cam Lobe Lift (V8HD) - 272" (All valves)

Valve Timing Specifications (V8HD)

Intake - Open 18° ① BTDC Close 58° ① ALDC
Exhaust - Open 66° ② BLDC Close 10° ② ATDC

① - Camlift 015" ② - Camlift .013" ③ - Camlift .016"

Valve Cap Clearance (Exh. Valves HD Engines) - *See "Valve System" in Ford Special Data*

►*ROTATABLE & FREE TURNING VALVE NOTE* Free Turning type valve (cap over end of stem) used for Sodium Cooled Exhaust valves on HD engines All other valves (All Engines) have "Rotatable" type valve (sleeve between spring retainer and lock)

►*EXHAUST VALVE CAUTION (HD Engines)* Exhaust valves are Sodium cooled and require special disposal handling to prevent possibility of fire or explosion due to chemical reaction DO NOT DISCARD SODIUM COOLED VALVES with other scrap material Bury in ground not subjected to excavation or in deep water not subjected to dredging

EXHAUST VALVE INSERT (HD Engines): *See 'Valve System" in Ford Special Data*

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity· 6 qts (HD Eng), 5 qts (Others) Add 1 qt for filter change

Normal Oil Pressure · 35-50 lbs at 2000 RPM (hot)

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Pr ssure R gulat r Valve - In oil pump body Not adjustable

Oil Pressure Indicator: Warning Light (Exc Par Del & Tilt Cab), King Seeley Gauge (Par Del & Tilt Cab)

Dash Unit - Ford No B7J-9273-A (Par Del & Tilt Cab)

Engine Unit - Ford B7T-9278-A (Par Del & Tilt Cab B6A-9278-B (Others)

See King-Seeley Gauges in Miscellaneous Section

Oil Pump: Gear type pump mounted inside crankcase in line with distributor shaft (223 Eng), rotor type located on left side of crankcase and driven by distributor shaft (Others)

Pump Removal & Overhaul - *See "Oil Pump" in Ford Special Data*

Oil Filter: Full-flow with pressure relief valve in center bolt or "Disposable" type Replace element or filter unit at 4000 mile intervals or when oil becomes dirty or polluted

Replacement Element or Disposable Unit - Ford No B2A-6371-A (6 Cyl), B8C-6371-A (V8) element Ford No B7A-6371-B or B9AE-6714-B (All) disposable unit

NOTE - B7A-6882-A adapter used with disposable unit

Crankcase Ventilation: Filter in oil filler and breather cap (Inlet) all models Road draft outlet tube for crankcase ventilation all models Service filler cap by cleaning with solvent and resaturating with engine oil at 4,000 mile intervals

COOLING

Pressure Valve: Ford OL-8100-A, radiator filler cap (opens at 7 lbs)

Thermostats: (All) Ford No B7A-8575-A (157-162°F), B7A-8575-B (177-182°F) Use with permanent anti-freeze

Water Pump: Packless, sealed ball bearing type

See "Water Pump" in Ford Special Data

Temperature Gauge: King-Seeley Electric Constant Voltage ("CV") type with gauge voltage regulator, Ford No B7J-10804-A (Par Del), B7A-10804-B (Others)

Dash Unit - Ford No B7J-10883-A (Par Del),B9C-10883-A (Others)

Engine Unit - Ford No B7A-10884-A

See 'Temperature Gauges' in Miscellaneous Section

CLUTCH

Long 10, 10½ & 11CF clutches used For cover and disc combinations see table below

Ford No	Cover Assembly	Long No.
B4A-7563-B	10"	L5222
B7C-7563-A	10½"	267371
B7Y-7563-A	11"	267147
B7Y-7563-	11"	267147

Ford No	Disc	Long No
B7C-7550-A	10" Molded	CD870
B7C-7550-B	10½"Molded	287335
B7C-7550-C	11" Molded	CD607
B6C-7550-A	11" Woven	CD606

Clutch Pedal Clearanc : Free travel 2" See *Adjustments that follow*

Pedal Height: Adjust pedal travel (Bumper adjustment) so pedal is even with brake pedal when fully released

Free Travel Adjustments - **1)** Remove retracting spring bottom slave cylinder pushrod and piston (force it forward), pull release lever to rear until bearing just contacts release fingers Adjust pushrod adjusting nut to obtain not less than ¼" clearance between adjusting nut and lever (6 turns equal ½")

2) Adjust master cylinder pushrod eccentric bolt to obtain 3/16-3/8" (F & B Trucks), ¼" (P & C Trucks) free travel at pedal pad before pushrod contacts master cylinder piston

Removal: Release retracting spring Remove slave cylinder from flywheel housing and slave cylinder pushrod from release lever Remove transmission (see Transmission Removal below), dust cover from flywheel housing, release bearing and hub from release lever Mark pressure plate, cover assembly and flywheel for reassembly Remove pressure plate and cover assembly-to-flywheel bolts gradually to reduce spring tension, remove assembly through bottom of clutch housing

Hydraulic Clutch Control: Master cylinder mounted on firewall (Conv Cab), on bracket on firewall (Tilt Cab), and connected to Slave Cylinder which is attached to flywheel housing and connected to outer end of clutch release lever

►*CLUTCH SLAVE CYLINDER BOOT PRODUCTION CHANGE (F-100-600)* New boot, Ford No B9TT-7A508-A, entered production Oct 1959 to reduce slave cylinder fluid leakage

►*CLUTCH MASTER CYLINDER PUSHROD BREAKAGE CORRECTION (P Series)* Install new master cylinder stop washer Ford No B8C-2188-A to eliminate binding between pushrod and washer

Filling Master Cylinder - Maintain fluid level (HD Brake Fluid) to within ½" below top of cylinder reservoir Change fluid at 15000 mile intervals

SYNCHRO-MESH TRANSMISSION

3-SPEED (LIGHT DUTY)

Own. 3-speed, all helical gear, constant mesh, synchro-mesh (second and high), sliding gear (low and reverse). Steering column shift standard.

See "Ford Truck 3-Speed (Light Duty)" in Transmission Section.

Removal: Drain lubricant, disconnect speedometer cable and drive shaft and gear shift linkage at transmission. *(NOTE* - On band type parking brake, disconnect brake cable clevis and remove cable support bracket). Remove flywheel housing-to-transmission bolts and nuts, draw transmission to rear to clear flywheel housing and lower transmission.

3-SPEED (MEDIUM DUTY)

Own. 3-speed medium duty with steering column shift standard. *See "Ford Truck 3-Speed (Medium Duty)" in Transmission Section.*

Removal: Same as for 3-Speed (Light Duty) above.

3-SPEED (HEAVY DUTY)

Own. 3-speed, **left hand** helical gear (second & high), spur gear (low & reverse), constant mesh, synchro-mesh (second & high), sliding gear (low & reverse) Steering column shift standard *NOTE* - Left hand helical gears can be used in 1957 HD transmissions

Se "Ford Truck 3-Speed (Heavy Duty)" Transmission in Transmission Section.

►*LOW GEAR JUMP-OUT CORRECTION (F-100 3-Speed with Overdrive)* Install new output shaft No B9TT-7061-D with 004-.006" deep relief 1 17/64" long cut in coast side of first and reverse sliding splines New shaft used in production Feb 1959

►*SHIFT LEVER LOOSENESS ON SHAFT OR BREAKAGE CORRECTION (F-350,P-350,400,500 Series with 3-Speed H D Trans)* Use heavier late production shift levers on all above models Continue to use former levers on F-100,250 Series Conventional Trucks

Removal: Same as for 3-Speed (Light Duty).

4-SPEED

Own. 4-Speed, constant mesh, synchro-mesh (second, third, & high). Helical gears used for second, third, & high. Spur gears used for low & reverse. Floor mounted gear shift standard.

See "Ford Truck 4-Speed (Synchro-mesh) Transmission" in Transmission Section.

Removal: Same as 3-Speed (Light Duty) and note following If hoist not used, it may be necessary to remove gear shift lever assembly (New Process) and lever housing (Others), before transmission can be removed from truck. *(NOTE* - On Tilt-Cab - release lock and tilt cab forward). Disconnect shift linkage at split pin which attaches universal joint to finger socket shaft in rear cross shaft housing . Drain transmission, disconnect drive shaft at parking brake drum. If truck equipped with coupling shaft support, disconnect support bracket, and remove coupling shaft. Disconnect parking brake and speedometer cables. Remove dust cover from bottom of clutch housing, support transmission on jack, remove two top nuts, two bottom bolts, move transmission to rear until input shaft splines clear clutch housing and lower transmission.

TRANSFER CASE

(4-WHEEL DRIVE)

Own. 2-speed, manually controlled type, used with 4-wheel drive

See "Ford Transfer Case" in Transmission Section

Removal: Drain transfer case and disconnect rear drive shaft, transmission output shaft and front drive shaft at case. Disconnect shift rod and speedometer cable at case Support transfer case, remove mounting bolts and remove case

OVERDRIVE

Warner Model R10. Solenoid operated with governor control and throttle operated kickdown.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as 3-Speed Synchro-mesh Transmission (above), after disconnecting control cable and wiring.

AUTOMATIC TRANSMISSION

Fordomatic & Cruise-O-Matic types used Transmissions are of same design as used on previous Truck (Fordomatic) or Passenger Car (Cruise-O-Matic) models

See Ford Automatic Transmissions" in Transmission Section

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►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION* See *"Ford Automatic Transmissions" in Transmission S ction*

►*TESTING & TROUBLE SHOOTING* See *"Ford Automatic Transmissions' in Transmission Section*

Lubrication - Check fluid level every 1,000 miles Drain and refill every 16,000 miles **Use only Ford ut matic Transmissi n Fluid Part No. B8A-19582-A.**

Checking Fluid Lev l: Bring transmission to operating temperature by running engine with selector lever in neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid Maintain level at "Full" mark on dipstick

Throttl Linkage Adjustment: See *CARBURETOR above*

►*OTHER DATA* See *"Ford Automatic Transmissions" in Transmission Section*

UNIVERSALS

Spic r. Needle bearing type.

►*UNIVERSAL JOINT INSTALLATION CAUTION:* Make sure that all universal joint yokes in drive line are in same plane to avoid drive line vibration.

C upling Shaft C nt r B aring: Consists or cushion mounted ball bearing bolted to underside of frame intermediate cross member. Bearing is mounted on end of coupling shaft in a sleeve with felt retainer on each end and bearing baffle on front end.

FRONT AXLE

4-WHEEL DRIVE

Spic r Mod l 44-4F. Full-Floating, hypoid gear type See *"Front Axle" on 1960 Ford Truck Car Page.*

REAR AXLE

SEMI-FLOATING

Own Separate carrier, hypoid gear, with Hotchkiss drive See *"Ford (Deep Offset) Hypoid" in Rear Axle Section*

Spic r 44 used with Optional "Power-Lock" Differential See *"Ford Truck Hypoid' and Power-Lock (Plate Clutch) Differential" in Rear Axle Section*

Rati s - 3.70 (37-10), 3.89 (35-9), 4.11 (37-9).

Backlash - .004-.009".

Axle Shaft R m val: Remove wheel, take off drum. Remove four axle retainer locking type nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Axl Ass mbly R m val (Spicer): See *"Full-floating (Int gral Housing) R moval" following*

Carrier Assembly R m val· *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above), remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

Wh l Bearing Adjustment: None required.

FULL FLOATING

Full floating, Hypoid gear, with Hotchkiss drive *NOTE - "Power-Lock" differential optional on F-250*

M del	R ar Axle Type
F-250,P-350 (Spicer Model 60)	Integral Housing
350-600 Series	Banjo Housing

See "Ford Truck Hypoid","Ford Truck Hypoid (Banjo Housing)" and "Power-Lock(Plate Clutch) Differential" in Rear Axle Section

Model	Rear Axle Ratios — Axle Ratios
F-250	4 56-1②,4 88-1,5 87-1①
F-350	4 85-1,4 86-1②,5 14-1⑥ 5 83-1①⑤
P-350	4 56-1 ②,4 86-1④,4 88-1
	5 14-1③,5 83-1③,⑤,5 97-1①
P-400	4 86-1②,5 14-1,5 83-1
P-500	5 83-1②,6 2-1①②③,6 8-1①②
F,B-500	5 83-1②,6 2-1①②③,6 8-1①②
C-550	5 83-1,6 2-1②,6 8-1②
F-B-60	6 2-1⑥, 6 8-1⑥

① - 6 Cyl ② - V8 ③ - 6 Cyl with HD Axle
④ - V8 with HD Axle ⑤ - With HD Axle
⑥ - With Std & HD Axle

►*NUMBER OF GEAR & PINION TEETH FOR EACH RATIO NOTE* 4 56 (41-9), 4 86 (34-7), 4 88 (39-8), 5 14 (36-7), 5 83 (35-6), 5 87 (47-8)

Axle Shaft Replacement: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

Axle Assembly Removal (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect rear shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking cable (if so equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring "U" bolts, roll rear axle from under truck and drain lubricant.

Carrier Removal (Banjo Housing): Remove axle shaft stud nuts and lockwashers, strike center of axle shaft flange with hammer and punch to loosen tapered dowels, remove dowels and axle shaft. Disconnect drive shaft at rear universal joint flange, support carrier assembly with roller jack, remove carrier to housing bolts and lockwashers. Tighten puller screws (when provided in carrier) to loosen carrier from housing, roll carrier out

Wheel Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher Adjust bearings by turning bearing adjusting nut (inner nut) up until tight then backing off 1/8 turn Install bearing lockwasher *(NOTE* - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel). Install bearing locknut and draw nut up tight. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over locknut. Install axle shaft

TWO-SPEED

Own. Electrically operated shift, Two-speed, Full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.

See "Ford Truck Two-Speed" in Rear Axle Section.

Ratio - Two ratios available 1) 5 83-1 (35-6) with reduction ratio of 8 11-1 2) 6 33-1 (38-6) with reduction ratio of 8 81-1

Backlash - 006- 016"

Removal: Same as for standard axle (above)

SHOCK ABSORBERS

Direct acting hydraulic Shock absorbers are sealed units and are not adjustable or refillable

►*REPLACEMENT SHOCK ABSORBER NOTE* Shocks are supplied for service replacement in kits consisting of shock absorber and necessary bushings

Replacement Shock Absorbers

Model	Front	Rear
F-100	B7C-18124-A	B7C-18125-A
F-250	B7C-18124-A	B9TZ-18125-A
P-350,400	B7J-18124-B	B9TZ-18125-A
F-350	B7C-18124-A	B3Y-18125-A
P-500	B7J-18124-A	① B3T-18125-A
F-500	B8T-18124-A	① B3T-18125-A
B-500	B8T-18124-A	① B3T-18125-A
C-550,600	B7T-18124-B	B3T-18125-A
F,B-600	B8T-18125-A	B3T-18125-A

① - B7J-18125-A with 2-Speed Axle

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliot ends and semi-elliptical springs

Kingpin Inclination - 5½° (C-550 & C-600), 4° (All Others) crosswise

Caster - As follows

Model	Man. Steering	Power Steering
F-100, F-250	3°	6°
F-350	3¾°	6¾°
P-350	4°	4°
P-400	3°	6¾°
F-500 (130" WB)	3¾°	6¾°
F-500 (154" WB)	4½°	7½°
B-500, B & F-600	4½°	7½°
P-500 (137" WB)	3°	6°
P-500 (154" WB)	3½°	6½°
C-550, C-600	3°	6°

NOTE - Maximum variation between wheels ½°

Camber - 1° maximum (All Models) Maximum variation between wheels ¼°

Toe-In - 1/16" maximum (All Models) *NOTE* - On power steering trucks, run engine so that hydraulic pressure will center power steering control valve

STEERING

Manual: Gemmer Worm & Roller type with some Saginaw Recirculating Ball type used of F-100,250,350 and C-500,600 models starting in Dec 1958

See "Gemmer Worm & Roller" or 'Saginaw Recirculating Ball" types in Steering Section

Power Steering: Ford Linkage type Used in conjunction with standard steering gear

See 'Ford Truck Power Steering" in Steering Section

►*POWER STEERING FRONT END SHIMMY CORRECTION (F,B-600)* Caused by collapse of first type piston rod insulator To correct, use New Power Steering Piston Rod End-to-Bushing Kit Part No B9T-3314-A (used in production beginning Dec 1958)

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St ring Linkag : *See 'Steering Linkage in Steering Section*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" and "Saginaw Recirculating Ball" in Steering Section*

Steering Gear Removal: *See 'Gemmer Worm & Roller" & "Saginaw Recirculating Ball" in Steering Section*

BRAKES

Service: Brake types are listed in application table below Hand lever applies rear wheel service brakes on F-100, 250 and P-350 trucks Independent transmission mounted drum-type with either contracting band or internal expanding shoe type brakes used on all other models Type used depending on truck models and transmission used

Brake Type Application

Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F-250,F,P-350,P-400	Uni-Servo	Duo-Servo
C-550,600	Uni-Servo	Two-Cyl
F B,P-500,F,B-600	Uni-Servo	Two-Cyl

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe. Ratchet adjusting screw.
See "Ford-Bendix Uni-Servo Hydraulic" in Brake Section.

Duo-Servo - Ford Bendix. Single anchor, self energizing wheel cylinder actuates both shoes. Ratchet adjusting screw.
See "Ford-Bendix Hydraulic" in Brake Section.

Two-Cylinder Type - Two wheel cylinders in each brake assembly.
See "Ford Truck Two-Cylinder" in Brake Section.

►*REAR BACKING PLATE NUT NOTE (F-100, B,F, P-500, C-550, F,C,B-600)* Use "Huglock" type nut Part No 34424-S7 for proper retention of backing plates subjected to high temperatures

►*F-100 TRUCKS SERVICE LINING NOTE* Use V8 lining for service replacement on both 6 Cyl & V8 trucks

Brake Lining Thickness

Model	Primary	Secondary
F-100 6 Cyl	187"	187"
F-100 V8	187"	250"
F-250	250"	250"
F-350 Front	250"	300"
P-350 ①	250"	300"
P-350 ②, P-400 Front	250"	300"
Rear	250"	.250"
Others, Front	.250"	250"
Rear	.375"	375"

① - With Spicer 60 RA ② - With Timken B-100 RA

Clearance (Duo-Servo & Uni-Servo) - Adjusting screw backed off 10-12 notches from point where shoes are against drum

Cl aranc (Tw -Cylind r) - Adjust each shoe by turning adjusting worm in direction of forward wheel rotation until shoes drag, then back off adjusting worm until shoes are just free

Drum Diameter & Lining Width & L ngth

Model		Drum Diam.	Primary Width - Length	S c ndary Width - Length
F-100	Front	11"	2" - 11 96"	2" - 11 96"
	Rear	11"	1¾" - 11 96"	1¾" - 11 96"
F-250	Front	12 1/8"	2" - 11 63"	2" - 13 09"
	Rear	12 1/8"	2" - 11 63"	2" - 13.09"
F-350	Front	12 1/8"	2" - 11 63"	2" - 13 09"
	Rear	13"	2½" - 12 71	2½" - 13 95"
P-350①	Front	12 1/8"	2" - 11 63	2" - 13 09"
	Rear	12 1/8"	2" - 11 63"	2" - 13 09"
P-350②	Front	12 1/8"	2" - 11 63"	2" - 13 09"
P-400	Rear	13"	2½" - 12 71"	2½" - 13 95"
F-500	Front	13 7/32"	2" - 12 68"	2" - 13 95"
B-500	Rear	15"	4" - 15 31"	4" - 15 31"
P-500	Front	13 7/32"	2" - 12 68"	2" - 13 95"
	Rear	14 1/8"	3½" - 14 42"	3½" - 14 42"
F-600	Front	13 7/32"	2" - 13 66"	2" - 15 03"
B-600	Rear	15"	4" - 15 31"	4" - 15 31"
C-550	Front	14"	2½" - 13 66"	2½" - 15 03"
C-600	Rear	15"	4" - 15 31"	4" - 15 31"

① - With Spicer Rear Axle
② - With Timken B-100 Rear Axle

Hand Brake (Exc. F-100,250;P-350): External contracting or internal expanding types used

External Type - Consists of brake drum bolted to transmission main shaft companion flange and an external contracting band mounted on rear of transmission and operated by brake cable (Exc C-Series), by rod type linkage (C-Series)

Internal Type - Consists of a brake drum attached to drive shaft (or coupling shaft), primary and secondary brake shoes, an actuating cam mechanism with rod type linkage to parking brake lever

Hand Brake Specifications

Model	Drum Diam.	Drum Width	Lining Length	Lining Thickness
F-350	8 0"	2 0"	24 63"	0 156"
P-350,400, 500	7 812"	2 5"	2-7 89",1-7 3"	0 250"
Others ①	9 0"	2 0"	2-10 57"	0 210"
Others ②	9 0"	3 0"	2-10 57	0 210"

① - Warner T-98A Trans or Clark 250-V Trans
② - Transmatic Trans

Adjustment - (External Type) *NOTE* - On cable controlled parking brakes, place lever in fully released position On rod type linkage, set lever in first notch Flat portion of cam must rest on brake band bracket If not on flat spot, remove clevis pin and adjust clevis rod, then proceed as follows

1) Remove adjusting screw lockwire and turn screw to obtain .010" clearance between lining and drum at anchor bracket Replace lockwire

2) Loosen adjusting screw nut for lower half of band and turn screw to obtain .010" clearance between lining and drum at lower half of brake band, then tighten locknut

3) Turn upper band adjusting rod nut to obtain .010" clearance between upper band lining and drum

Adjustm nt - (Int rnal Type) Release brake lever, remove clevis pin Turn clevis counterclockwise (from beneath truck) until shoes contact drum with clevis pin in place Remove clevis pin and back off clevis until there is a minimum of .010" clearance between shoes and drum at all points with clevis pin installed

Standard Master Cylinder: Located on engine side of firewall on F- & B-Series, mounted under instrument panel beside brake pedal arm on C-Series, above left frame side member under drivers seat on P-Series

Checking Fluid - Maintain fluid level to within ½" of top of reservoir

Removal - *CAUTION* - When truck equipped with booster, stop engine and expel all vacuum from system before disconnecting hydraulic lines, then proceed as follows

1) Disconnect rubber boot from rear end of master cylinder On F-, B- & P-Series, disconnect stoplight switch wires from switch and brake line at fitting. On P-Series, turn front wheels to left out of way, then remove apron for access to master cylinder On C-Series, roll back floor mat, remove floor plate to disconnect hydraulic line

2) Force all brake fluid from master cylinder

3) On F- & B-Series, remove master cylinder to dash panel bolts and lift cylinder away from pushrod On C-Series, remove 2 mounting bolts and lower cylinder from pushrod On P-Series, remove brake pedal return spring Remove cotter pin from clevis pin and remove master cylinder pushrod and boot Remove 3 mounting bolts

Power Brakes: Bendix (Hydrovac) Piston type used on F-250, 350, P-350, 400 Midland (Hy-power) Diaphragm type used on all other models
See "Hydrovac" or "Midland" Power Units in Brake Section

Checking Fluid - Same as for Manual Brakes above

Removal of Power Unit (Hydrovac) - Depress brake pedal several times to remove all vacuum from system Loosen brake power unit inlet tube clamp and remove tube Disconnect hydraulic lines and vacuum hose from booster Remove mounting bolts and remove booster from bracket *NOTE* - **DO NOT** remove breather or vacuum check valve unless operating conditions indicate repairs are necessary

Removal of Power Unit (Midland) - Stop engine, depress brake pedal several times to remove all vacuum from system Disconnect 2 hydraulic lines and vacuum hose from booster On frame mounted booster, loosen air breather hose clamp and disconnect hose from booster Remove 3 mounting bolts, then remove booster On F-100, remove 2 bolts from under side of mounting bracket and remove booster from engine compartment *NOTE* - On frame mounted booster, do not remove breather or vacuum check valve unless operating conditions indicate repairs are necessary

MISC. MECHANICAL

Windshield Wip rs: Vacuum Link and Arm or Electric type *NOTE* - Electric Vacuum Assist available for use with vacuum type wiper
See "Windshield Wipers" in Miscellaneous S ction

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left door post. *NOTE* – Number (example below) includes identification data as indicated.

① ② ③ ④ ⑤
O F 32 V 100001

① – Year (1960).
② – Assembly Plant, see below.
③ – Model. See Body Style below.
④ – Engine type (V–6 Cylinder).
⑤ – Consecutive unit number.

Assembly Plant Designation

A – Atlanta	**G** – Chicago	**P** – Twin City
C – Chester	**H** – Lorain	**R** – San Jose
D – Dallas	**J** – Los Angeles	**S** – Pilot Plant
E – Mahwah	**K** – Kansas City	**U** – Louisville
F – Dearborn	**N** – Norfolk	

Body Style

Fairlan – Series 30
31 – 2–Dr. Club Sedan
32 – 4–Dr. Town Sedan
33 – 2–Dr. Business Sedan

Galaxie – Series 50
51 – 2–Dr. Club Sedan
52 – 4–Dr. Town Sedan
54 – 4–Dr. Town Victoria

Fairlane "500" – Series 40
41 – 2–Dr. Club Sedan
42 – 4–Dr. Town Sedan

Station Wagon – Series 60
61 – 2–Dr. Ranch Wagon
62 – 4–Dr. Ranch Wagon
64 – 4–Dr. 6–Pass. Country Sedan
66 – 4–Dr. 9–Pass. Country Sedan
68 – 4–Dr. 9–Pass. Country Squire
69 – 2–Dr. Courier (Commercial Wagon)

TUNE-UP

COMPRESSION PRESSURE: 150 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: Steady 18" at specified idle speed, with transmission in neutral.

VALVE TAPPET CLEARANCE: .019" Intake & Exhaust (Hot & Cold). Adjust all tappets to .019" clearance while engine is cold, then again check all tappets for .019" clearance with engine idling after running engine for 30 minutes to normalize temperature.

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾ turn windup and hooked over stop pin.

IGNITION

FIRING ORDER: 1–5–3–6–2–4.
SPARK PLUG GAP: .032–.036".

Spark Plugs - Champion 870. 18 mm. Torque to 15-20 ft. lbs.

NOTE – When a new spark plug is installed in a new replacement cylinder head, torque plug to 20–30 ft. lbs.

COIL: F rd N . B6A–12029–B.
Igniti n Curr nt – 2.5 amps. idling, 4.5 amps. stopped.
R sist r – Pink resistance wire (1.30–1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from multiple connector to starter solenoid.

DISTRIBUTOR: Ford. Used as follows:

Mdl	Distributor No.	①Identification No.
S.M. & O.D.	②**B8A–12127–M**	FET –12127–C
S.M. & O.D.	**COAF–12127–G**	COAF–12127–G
Fordomatic	③**COAF–12127–F**	COAF–12127–F
All	④**COAF–12127–C**	COAF–12127–C

① - Stamped on distributor housing.

② - Replace with Distributor No. COAF–12127–G.

③ –"Step-Stop" type. *See Note below.*

④ - Replace with Distributor No. B8A–12127–M.

See "Ford Loadomatic Distributors" & "Ford Step-Stop Distributors" in Electrical Section.

►*DISTRIBUTOR COAF–12127–F NOTE:* This distributor is "Step-Stop" type with secondary spring eliminated and modified vacuum diaphragm. *See "Ford Step-Stop Distributors" in Electrical Section.*

►*DISTRIBUTOR ROTOR CHECK:* Distributors not marked with daub of yellow paint should be checked for proper spring contact of flush to .040" above rotor top. Improperly formed contact on rotor will create an air gap between rotor and cap, causing engine to miss.

Condenser – Ford No. 7RA–12300–C. **Capacity** .21–.25 mfd.
Contact Point Set – Ford No. FAA–12171–A.
Breaker Gap – .024–.026".
Cam Angle – 35–38°.
Breaker Arm Spring Tension – 17–20 ozs.
Rotation – Clockwise viewed from above.

Advance Performance –Loadomatic Distr.
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.38	450
2½–3½	0.79	650
6¾–7¾	2.85	1100
8¾–9¾	4.33	1400
10¼–11¼	5.99	1800

Advance Performance – Step–Stop Distr.
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
3½–4½	1.08	800
6¼–7¼	1.70	1000
7½–8½	2.38	1200
7½–8½	5.63	2000
9-10½	6.50	1450

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump. It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump.

IGNITION TIMING

Setting – 4° BTDC (S.M. & O.D. Trans.), 10° BTDC (Auto. Trans.). Allowable range 2–10° BTDC. Set timing with engine at normal idle speed and vacuum line disconnected. *NOTE – 10° BTDC setting for Auto. Trans. cars supersedes previous setting of 6° BTDC.*

Timing Mark – Vibration damper has five timing marks ranging from top dead center (TDC) to 9° before top dead center (BTDC). Align correct mark with pointer on engine front cover.

CARBURETOR

►*CARBURETOR APPLICATION NOTE: One Holley "Visi-Flo" 1-barrel carburetor used.*

►*THROTTLE LINKAGE PRODUCTION CHANGE & ADJUSTMENT NOTE:* A turnbuckle has been installed on clevis end of throttle control rod on later production cars. When making preliminary adjustment, rotate clevis. Turnbuckle may be used when making final adjustment by pressure method.

Thr ttl Linkag Adjustment (F rdomatic Cars): With engine stopped and carburetor at hot idle position, remove lock from clevis pin on throttle control rod, Loosen clevis locknut. Remove clevis and pull throttle control rod upward to hold throttle lever against stop inside transmission. Turn throttle rod clevis until clevis pin enters hole in lever. Lengthen throttle rod 3½ turns. Connect throttle control rod to accelerator shaft and secure it with clevis pin lock. Adjust accelerator pedal height by turning threaded trunnion on the accelerator connecting link until accelerator pedal 3½" from floor mat. Measure from top rear corner of pedal to floor mat. *For final adjustment, use pressure method as follows:* Raise car and remove 1/8" pipe plug on left side of transmission case. Install pressure gauge. Lower car, install a tachometer and place selector in "Drive" position. With brakes applied, accelerate engine to 1000 RPM. If pressure below 77 lbs., lengthen throttle rod. If pressure above 84 lbs., shorten rod. *Do not lengthen or shorten rod more than 2½ turns from initial adjustment.*

Anti-Stall Dashpot Adjustment: With engine idle speed properly adjusted, and engine at operating temperature, loosen anti-stall dashpot screw. Hold throttle in closed position and depress dashpot plunger fully. Turn dashpot in bracket until .060–.090" clearance obtained between dashpot plunger and throttle shaft lever. Secure dashpot in bracket after adjustment.

HOLLEY "VISI-FLO"

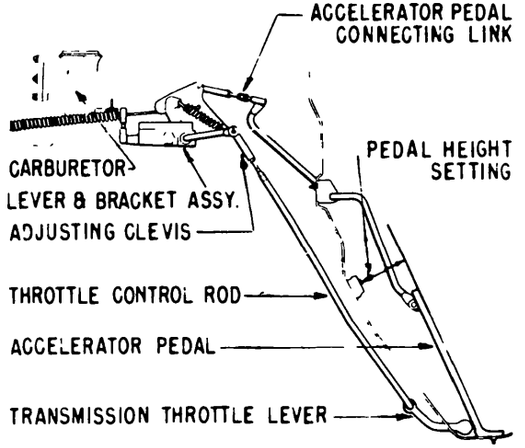
Carburetor No.	① Identification No.
COAE–9510–U (Std. & O.D.)	COAE–9510–E or U
COAE–9510–Z (Auto. Trans.)	COAE–9510–Z
COAE–9510–Y (Taxi)	COAE–9510–F, V, Y

① – Stamped on flat of main body at fuel inlet.

Idle Setting – Initial setting ½–1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture, rather than a lean setting.

Idle Speed – 475–500 RPM (Synchro–mesh), 450–475 RPM (Fordomatic in "D").

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FORDOMATIC TRANSMISSION THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

Fuel Level – 11/16" ±1/32" below power valve mounting surface (Tool T52L–9550–AEE).

Accelerating Pump – Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Ford No. COAE-9350-D (Fuel & Vacuum), No. COAE-9350-C (Fuel Only).

Fuel Pump Pressure - 3.5-5.5 lbs. at 500 RPM. *See "Fuel Pumps" in Carburetion Section.*

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No. B9MF-10804-A.

►*INACCURATE FUEL GAUGE READING CORRECTION:* Make sure correct fuel tank sending unit installed. *See below.*

Dash Unit - Ford No. COAF-9305-B.

Tank Unit - Ford No. COAF-9A294-B (Sta. Wgn.), No. COAF-9A294-C (Others).

See "Fuel Gauges" in Carburetion Section.

Fuel Filter: Disposable type located in carburetor inlet line Replace every 12,000 miles or if clogged.

Air Cleaner: Dry filter element type. Clean every 4,000 miles, replace element every 24,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. If compressed air used, direct air stream from inside surface of filter element. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

ELECTRICAL

►*SEE FORD V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC. ELECTRICAL DATA.*

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., Valve-in-head.

Bore	Stroke	Displacement
3.62"	3.60"	223 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.4-1	31.54	145 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ROCKER ARM COVER INSTALLATION NOTE:* Torque cover attaching bolts to specifications twice, once initially and again after two minutes from initial torquing to prevent oil leaks.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL: Drain crankcase and remove flywheel housing cover and crankcase ventilation tube. Remove oil pan retaining bolts and remove pan.

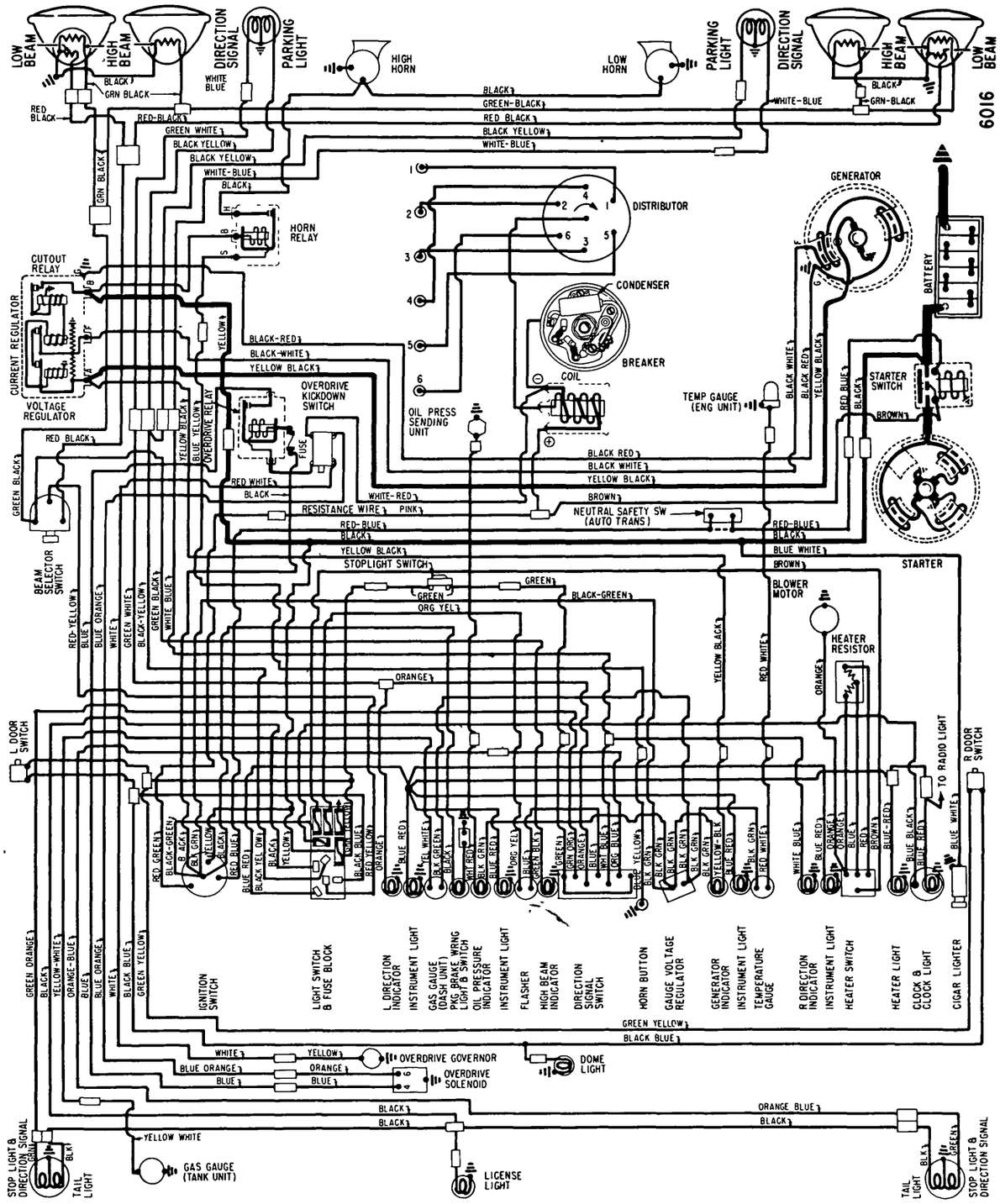
PISTONS

Autothermic type. Solid skirts with three rings.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance - .0008-.0026" at bottom

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of skirt. Use ½" wide ribbon feeler gauge inserted between piston and cylinder wall at right angle to pin on thrust side, piston inverted and bottom of piston skirt 1½" below top of block. To test minimum clearance, use .0015" feeler and 4 lbs. pull; to test maximum clearance use .003" feeler and 4 lbs. pull.

Replacement Pistons: Furnished Std. (1 size only) and .020", .030", .040", .060" Oversize with fitted pins.

Installing Pistons: Install piston with indentation in head of piston toward front of engine. *See Rod Installation.*

PISTON PIN

Floating type with lock ring at each end.

Diameter - .9120-.9123". **Length** - 3.016-3.030".

Pin Fit in Piston - .0001-.0003". Wear limit .0008".

Pin Fit in Rod Bushing - .0001-.0005". Wear limit .001".

Replacement Pins: Std., .001" & .002" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0930-.0935"	.010-.025"	①.0020-.0035"
Oil (3)	.1880-.1890"	.015-.062"	②

① - Wear limit .006". ② - Side sealing type ring.

Replacement Rings: Std., .020", .030", .040" & .060" Oversize

CONNECTING ROD

Journal Diameter - 2.2984-2.2988" (Red), 2.2980-2.2984" (Blue).

Clearance - .0004-.0025". Wear limit .0035".

Side Clearance - .003-.009". Wear limit .012".

Length - 6.258-6.262" center-to-center.

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* Red marked bearings increase clearance, Blue marked bearings decrease clearance.

Installing Rods: Install rod in piston so that oil squirt hole is to right when indentation on piston head is to front of engine. Rods and caps are numbered 1 to 6. Numbers on rods and caps must be on same side and installed in same numbered cylinders.

CRANKSHAFT

Journal Diameter - 2.4984-2.4988" (Red), 2.4980-2.4984" (Blue).

Bearings - Steel backed copper lead alloy.

Clearance - .0006-.0028". Wear limit .0038".

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* Red marked bearings increase clearance, Blue marked bearings decrease clearance.

End Thrust: Taken by rear intermediate (No. 3) bearing.

Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data.*

Endplay - .004-.008". Wear limit .012".

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data.*

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

Journal Diameter - 1.9255-1.9265".

Clearance - .001-.003". Wear limit .006".

End Thrust: Taken by thrust plate and spacer behind camshaft sprocket. *NOTE* - Chamfer on inside of spacer must be toward camshaft journal.

Endplay - .001-.007". Wear limit .012".

Replacement Bearings: Finished bearings furnished Std. & .015" Undersize. *CAUTION* - No. 3 bearing is **not** interchangeable with other bearings.

Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Special Data.*

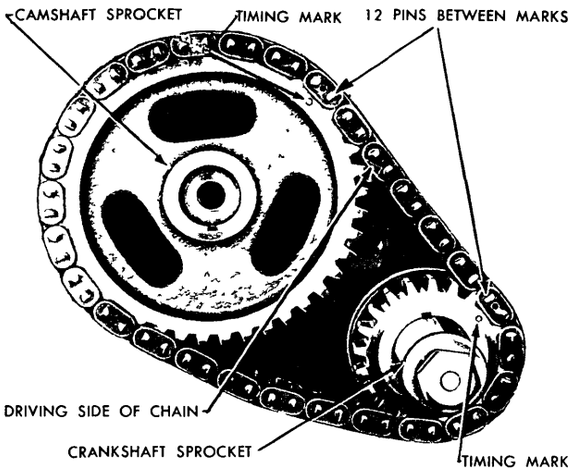
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*

Timing Chain: Side guide type. 56 links.

Camshaft Setting: Sprockets marked by "O" at one tooth. Mesh chain so that there are 12 pins between "O" marks with marks on driving side of chain.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*



FORD 6 CYL. VALVE TIMING MARKS

VALVES

Tappet Clearance: .019" Intake & Exhaust, Hot. *See TUNE-UP*

Valve	Head Diameter	①Stem Diameter
Intake	1.775-1.785"	.3416-.3423"
Exhaust	1.505-1.515"	.3398-.3405"

Valve	Seat Angle	②Lift	③Stem Clearance
Intake	45°④	.273"	.0010-.0024"
Exhaust	45°④	.273"	.0028-.0042"

① - Furnished with .003", .015", .030" Oversize Stems.
② - Cam Lobe Lift. Wear limit .268".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.

Valve Stem Seals - Umbrella type seals used on all valve stems. Install with cupped side down.

Valve Seat Width - .070-.090", all valves.

Valve Springs: Free Length - 2.09" approximately.

►*VALVE SPRING INSTALLATION NOTE:* Measure valve spring assembled height from machined surface of cylinder head spring pad to underside of spring retainer. If assembled height is 1 25/32" or greater, install necessary .030" spacer or spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 3/4-1 25/32". *Spring ends must be square within 1/16".*

Valve Spring Specifications

Valve	Pressure	Length
Closed	①71-79 lbs.	1.780"
Open	②161-177 lbs.	1.390"

① - Wear limit 64 lbs. at 1.780".
② - Wear limit 145 lbs. at 1.390".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Special Data.*

Valve Lifters: Mushroom type. Remove from below with camshaft out.

Clearance - .0011-.0027". Wear limit .0055".

Rocker Arm Assembly: *See "Valve System" in Ford Special Data.*

VALVE TIMING

►*VALVE TIMING CHECKING NOTE:* Checking timing by use of quadrant on pulley not recommended by manufacturer. *See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.*

Valve Timing Specifications

Intake Valves - Open 17°① BTDC. Close 53°②ALDC.

Exhaust Valves - Open 61°① BLDC. Close 9°② ATDC.

① - Camlift .016". ② - Camlift .019".

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump, not adjustable.

Oil Pressure Indicator - Indicator light on instrument panel, operated by engine unit, Ford No. B6A-9278-B.

Oil Pump: Gear type pump located in crankcase.

Overhaul – *See "Oiling System" in Ford Special Data.*

Oil Filter: Disposable type. Replace every 4,000 miles.

Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn.

Crankcase Ventilation: Filter in oil filler cap (inlet), and outlet pipe in rear of crankcase at left side. Clean filter in filler cap every 4000 miles.

COOLING

Water Capacity: 15 qts. Add 1 qt. for heater.

Pressure Valve: Ford No. B8A-8100-A. 12-15 lbs.

Thermostat: Ford No. B7A-8575-A (157-162°) Low Temp., No. B7A-8575-B (175-180°) High Temp., for use with permanent type anti-freeze.

Water Pump: Packless, sealed ball bearing type. *See "Water Pump" in Ford Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No. B9MF-10804-A.

Dash Unit - Ford No. COAF-10970-B.

Engine Unit - Ford No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*SEE FORD V8 PAGES (FOLLOWING) FOR ALL CLUTCH, SYNCHRO-MESH TRANSMISSION, OVERDRIVE, FORDOMATIC TRANSMISSION, UNIVERSALS, REAR AXLE, SHOCK ABSORBERS, FRONT SUSPENSION, STEERING, BRAKES & MISC. MECHANICAL DATA.*

►*THUNDERBIRD JACKING & HOISTING PRECAUTIONS* Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to left front door post Number (example below) includes identification data

① ② ③ ④ ⑤
0 F 32 Y 100001

① - Year - 1960 ② - Assembly Plant See table below
③ - Model Series ④ - Engine Type See table below
⑤ - Consecutive unit number at each assembly plant

Assembly Plant Designation

A - Atlanta	**F** - Dearborn	**N** - Norfolk
C - Chester	**G** - Chicago	**P** - St Paul
D - Dallas	**H** - Lorain	**R** - San Jose
E - Mahwah	**J** - Los Angeles	**S** - Pilot Plant
	K - Kansas City	**U** - Louisville

Y - Wixom (Thunderbird only - Lincoln plant)

Model Series Designation

Fairlane - Series 30	**Fairlane 500 - Series 40**
31 - 2-Dr Club Sedan	**41** - 2-Dr Club Sedan
32 - 4-Dr Town Sedan	**42** - 4-Dr Town Sedan
33 - 2 Dr Business Coupe	
Galaxie - Series 50	**Station Wagons - Series 60**
51 - 2-Dr Club Sedan	**61** - 2-Dr Ranch Wagon
52 - 4-Dr Town Sedan	**62** - 4-Dr Ranch Wagon
53 - Starliner 2-Door	**64** - 6 Pass Country Sedan
54 - 2-Dr Town Victoria	**66** - 9 Pass Country Sedan
55 - Sunliner Convertible	**68** - 9 Pass Country Squire
Thunderbird - Series 70	**69** - Courier
71 - 2-Door Hardtop	**73** - Convertible

Engine Code Designation

Engine	Code Letter
292" Engine	**W**
292" Engine (Export)	**T**
352" Eng 2-Bbl Carb	**X**
352" Eng 4-Bbl Carb	**Y**
352" Eng 4-Bbl Carb (Export)	**G**
430" Engine	**J**

Engine Production Code Number: Indicates place, day and month of engine manufacture Not used for licensing Located as follows **292** - Stamped on front of block at pushrod cover-to-cylinder head mounting surface **352** - Stamped on machined boss on left front of engine below cylinder head **430** - Stamped on block in front of left cylinder head

►*ENGINE IDENTIFICATION NOTE* Engines will be referred to as follows

Engine	Designation
Thunderbird 292" V8	**292**
Thunderbird 352" V8	**352**
Thunderbird 352" Special V8	**352**
Thunderbird 352" Police Interceptor V8	**352**
Thunderbird 430" V8 (Thunderbird Car Only)	**430**

TUNE-UP

►*SURGE, MISFIRE OR HARD START CORRECTION* Check for high tension voltage leak at coil, distributor and spark plug leads If leak exists, replace wiring harness with new harness, Part No B8S-12259-A

COMPRESSION PRESSURE: 292 - 160±10 lbs **352** - 180±20 lbs **430** - 200±20 lbs At cranking speed

VACUUM READING: 18" (All Engines) steady at specified engine idle speed with transmission in neutral

VALVE TAPPET CLEARANCE: 292 - 019" Cold, 018" Hot all valves *NOTE* - Adjust all tappets to 019" clearance while engine is cold, then check all tappets for 018" clearance with engine idling after running engine for 30 minutes to normalize temperature

Tappet Adjustment - See "Valve System" in Ford Special Data

352 & 430 - Zero lash, hydraulic lifters

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (292)* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL: 292 & 352 - Automatic thermostatic type with counterweight Valve is closed when engine is at normal temperature and running at idle speed and is open when operating at high RPM Spring is installed with ¾ turn wind-up.

CARBURETOR AIR INTAKE DUCT ASSEMBLY (430): See "Fuel System Notes" in Ford Special Data

IGNITION

FIRING ORDER: 292 - 1-5-4-8-6-3-7-2 **352 & 430** - 1-5-4-2-6-3-7-8

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032-036"

Spark Plugs - 292 - Champion F-14-Y **352 & 430** - Champion F-11-Y 18mm Torque to 15-20 ft lbs *NOTE* - Plugs have tapered seat, no gasket used

COIL: Ford No. B6A-12029-B.

Ignition Current - 2 5 amps idling, 4 5 amps stopped

Resistor - Pink resistance wire (1 30-1 40 ohms at 75°F) used between ignition switch and multiple connector on dash

DISTRIBUTOR: Ford. Pivoted breaker plate type. See "Distributors" in Electrical Section

Engine	①Distributor
292	**COAF-12127-A**
352 Synchro-mesh, 2-Bbl Carb	**COAF-12127-E**
352 Auto Trans , 4-Bbl Carb	**COAF-12127-D**
352 All Trans , 4-Bbl Carb	**COAF-12127-B**
352 Special & Pol Interceptor V8	**COAF-12127-H**
352 Special & Pol Interceptor V8 ②	**COAF-12127-J**
430 ③	**COLF-12127-A B9MF-12127-B**

① - This number stamped on distributor housing for identification

② - Double Breaker type with Centrifugal Advance only Replaced by distributor COAF-12127-H

③ - Replaced by distributor B9MF-12127-B

Condenser - Ford No B9AF-12300-A (Exc COAF-12127-H&J), 7RA-12300-C (COAF-12127-H&J) **Capacity** - 21- 25 mfd

Contact Point Set - Ford No FAB-12171-B & FDS-12171-A (COAF-12127-J&H Distr), B7A-12171-A (Others)

Breaker Gap - 014- 016" Set both sets of points to same gap on double breaker distributors

Cam Angle - 26-28½° On double breaker distributors 26-28½° for each set of points operating separately Max variation between point sets 1° Total angle 33° (both sets operating together)

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance - COAF-12127-A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		500	0		1000
1¼-2¼		800	2½-4½		1600
5-6¼		1300	10-12½		2600
10¼-11¾		2000	20½-23½		4000

Aut matic Advanc - COAF-12127-E

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		500	0		1000
1-2		775	2-4		1550
5-6¼		1250	10-12½		2500
11½-13		2000	23-26		4000

Automatic Advanc - COAF-12127-D

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
¾-1¾		500	1½-3½		1000
5-6¼		1100	10-12½		2200
11½-13		2000	23-26		4000

Automatic Advanc - COAF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1-2		500	2-4		1000
7-8¼		1200	14-16½		2400
13¾-15¼		2000	27½-30½		4000

Automatic Advanc - B9MF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0		750
½-1½		500	1-3		1000
6-7¼		1100	12-14½		2200
14¼-15¾		2000	28½-31½		4000

Automatic Advanc - COAF-12127-J & K

Degrees	Distr.	RPM	Degrees	Eng.	RPM
2¼-3¼		650	4½-6½		1300
5-6½		800	10-13		1600
7¾-9		1125	15½-18		2250
11½-13		2000	23-26		4000

Vacuum Spark Control: Diaphragm type Mounted on distributor and linked directly to breaker plate

①Vacuum Advanc - COAF-12127-A

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	7
5-8	10-16	12½
8-11	16-22	16
9½-12½	19-25	20

①Vacuum Advanc - COAF-12127-E & D

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	5
5-8	10-16	10
8-11	16-22	13½
9½-12½	19-25	17

①Vacuum Advanc - COAF-12127-B

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	5
5¼-8¼	10½-16½	10
8½-11½	17-23	15

①Vacuum Advanc - B9MF-12127-B

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3	0-6	6½
5-8	10-16	10
9½-12½	19-25	15

① - With distributor speed of 1000 RPM

IGNITION TIMING

Setting (292) - 3° BTDC (Synchro-mesh), 10° BTDC (Auto Trans) Allowable range 2-10° BTDC *NOTE - 10° BTDC setting for auto trans cars supersed s previous setting of 6° BTDC*

Setting (352 & 430) - 3°BTDC (Synchro-mesh), 6° BTDC (Auto Trans) Allowable range 2-10° BTDC

Timing Mark - Timing pin located in crankshaft pulley and pointer on engine front cover Pointer marked 0, 3, 6, 10 Align pin with correct mark on pointer

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CARBURETOR

►*CARBURETOR APPLICATION: Ford, Holley & Carter Carbur tors used as follows:*

Engin	Carburetor Type
292	Ford 2-Barrel
352	Ford 2-Barrel
352 (Special & Pol. Interceptor V8)	Holley 4-Barrel
430	Carter 4-Barrel

►*THROTTLE LINKAGE PRODUCTION CHANGE & ADJUSTMENT NOTE (EXC. THUNDERBIRD):* A turnbuckle has been installed on clevis end of throttle control rod on later production cars (except Thunderbird). When making preliminary adjustment, rotate clevis. Turnbuckle may be used when making final adjustment by pressure method.

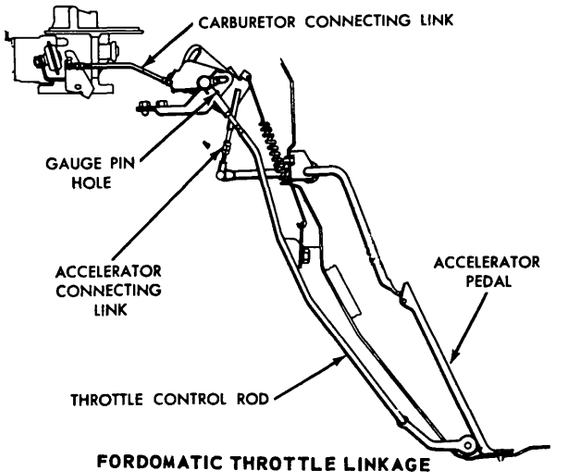
THROTTLE LINKAGE ADJUSTMENT (FORDOMATIC & CRUISE-O-MATIC): Adjust engine to correct idle speed. Stop engine and make anti-stall dashpot adjustment (see below). Disconnect throttle control rod and carburetor connecting link from accelerator bellcrank and insert ¼" gauge pin through gauging holes in bellcrank. Lift carburetor connecting link to normal operating position and maintain forward pressure so carburetor throttle lever is firmly against carburetor idle adjusting screw. Adjust length of connecting link so trunnion fits freely into accelerator bellcrank. Rotate trunnion 1 full turn counterclockwise to lengthen connecting link. Make sure gauge pin fits freely in its holes, then remove pin and attach connecting link to bellcrank. Pull upward firmly but gently on throttle control rod so transmission lever is held against internal stop in transmission and rotate clevis until pin fits freely on accelerator bellcrank **th n lengthen rod by rotating cl vis 3 turns countercl ckwise.** Connect throttle control rod. Adjust accelerator connecting link so distance from top corner of accelerator pedal to floor mat is 3½" (Pass. Cars), 4½" (Thunderbird). *For final adjustment, us pr ssur method as follows:* Raise car and remove 1/8" pipe plug on left side of transmission case and install a pressure gauge. Lower car, install a tachometer and place selector in any "Drive" position. With brakes applied, accelerate engine to 1000 RPM. If pressure below 77 lbs. (Fordomatic), 80 lbs. (Cruise-O-Matic), lengthen throttle rod. If pressure above 84 lbs. (Fordomatic), 85 lbs. (Cruise-O-Matic), shorten rod. *D not lengthen or shorten rod more than 2½ turns from initial 3 turn adjustm nt.*

Anti-Stall Dashpot Adjustm nt (Ford Carb.): With engine idle speed properly set, engine stopped, and throttle in hot idle position, loosen dashpot locknut and bottom dashpot plunger. Clearance between plunger and throttle shaft lever should be .060-.090" (All Engines). Adjust by turning dashpot or adjusting nut. Tighten locknut.

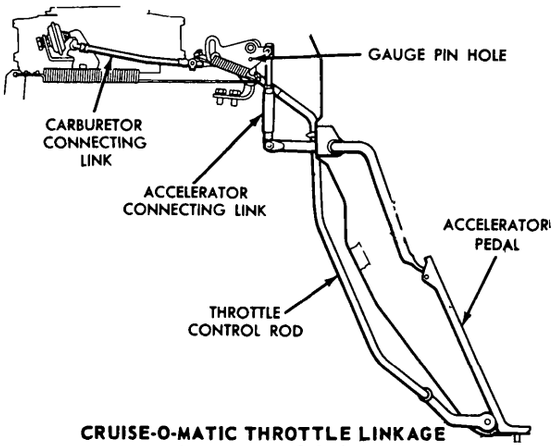
Anti-Stall Dashpot Adjustm nt (Carter Carb.): Set engine at correct idle speed, then stop engine.

1) With primary throttle plates **closed,** clearance between dashpot plunger operating lever and top surface of air horn should be 1/16-5/32". Adjust by bending dashpot lever in area between lever arm base and dashpot plunger.

2) With primary throttle plates **wid p n,** clearance between dashpot plunger operating lever and top surface of air horn should be 3/8-7/16". To adjust, bend stop tang on opposite side of lever arm.



FORDOMATIC THROTTLE LINKAGE



CRUISE-O-MATIC THROTTLE LINKAGE

FORD & HOLLEY 2 & 4-BARREL

FORD 2-BARREL CARBURETOR

Engine	①Carburetor No.
292 Synchro-mesh (Early)	COAE-9510-M
292 Synchro-mesh (Later)	COAE-9510-AF
292 Auto. Trans. (Early)	COAE-9510-H
292 Auto. Trans. (Later)	COAE-9510-AG
352 Synchro-mesh (Early)	②COAE-9510-R
352 Synchro-mesh (Later)	COAE-9510-AB
352 Auto. Trans. (Early)	COAE-9510-S
352 Auto. Trans. (Later)	COAE-9510-AC

FORD 4-BARREL CARBURETOR

352 Synchro-mesh	③COAE-9510-J
352 Auto. Trans.	COAE-9510-K

HOLLEY 4-BARREL CARBURETOR

352 Special & Police	COAE-9510-AA

① - Part No. stamped on left side of fuel bowl (Ford Carb.); on left front side of choke plate flange (Holley Carb.).

② - Replaced by Carburetor No. COAE-9510-AB.

③ - Also furnished in Service Package No. COAZ--9510-C which includes dashpot for auto. trans. cars.

►*MANIFOLD FUEL DISTRIBUTION (292): Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*MANIFOLD FUEL DISTRIBUTION (352): Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.*

►*HESITATION OR STUMBLE CORRECTION (Ford Carb.):* Use revised accelerator pump adjustment procedure. *See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

Idle Setting - 1-1½ turns open for both screws from a lightly seated position. With engine at normal operating temperature, turn both idle adjusting needles in until engine runs rough from lean mixture, then turn needles out until engine begins to roll. Finally, turn needles in just enough for smooth running (favor a slightly rich mixture.),

Idle Speed - 500-525 RPM (Synchro-mesh), 450-475 RPM (Auto. Trans. in "D") with engine at normal operating temperature.

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* Operate air conditioner at least 20 minutes before setting idle speed.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford 2 & 4-Barrel Carburetors" or "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Engine	Carter No.	①Ford No.	②Distr. No.
430	2992S	COLE-9510-A	B9MF-12127-B

① - Stamped on front of air cleaner flange for identification.

② - Carburetor and Distributor MUST be used together.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8,*

►*IDLE COMPENSATOR CAUTION:* Idle Compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - Initial setting ½-2 turns open. Turn screws out for richer mixture. With engine at normal operating temperature, turn both idle adjusting screws in until engine runs rough from lean mixture, then turn screws out until engine begins to roll. Finally, turn screws in just enough for smooth running (favor a slightly rich mixture).

Idle Speed - 450-475 RPM with Cruise-O-Matic in either "D" position.

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* Operate air conditioner at least 20 minutes before setting idle speed.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum as follows:

Model	Ford Pump No.
292 & 352 2-Bbl. (Fuel Only)	COAE-9350-B
292 & 352 2-Bbl. (Fuel & Vacuum)	COAE-9350-A
352 4-Bbl. (Fuel Only)	COAE-9350-E
430 (Fuel Only)	B8B-9350-A or COLE-9350-A

Fu l Pump Pressure - 292 & 352 - 4-6 lbs. at 500 RPM.
430 - 4½-6½ lbs. at 500 RPM.
See "Fu l Pumps" in Carburetion S ction.

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Gasolin Gaug : King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No B9MF-10804-A (Pass Cars), No B7A-10804-B (T-Bird)

►*INACCURATE FUEL GAUGE READING CORRECTION (Pass. Cars):* Make sure correct fuel tank unit installed *See below*

Dash Unit - Ford No COAF-9305-B (Pass Cars), No COSF-9307-B (T-Bird - Fuel & Temp Gauge Unit)

Tank Unit - Ford No B8S-9275-A (T-Bird), No COAF-9A294-B (Sta Wgn), No COAF-9A294-C (Others) *See "Fuel Gauges" in Carburetion Section*

Fuel Filter: Disposable type located in carburetor inlet line Replace every 12,000 miles or if clogged

Air Cleaner: Dry filter element type Clean every 4,000 miles, replace element every 24,000 miles

►*CLEANING CAUTION* Clean element by tapping lightly against a hard surface DO NOT wash in solvent or other liquids If compressed air used, direct stream from inside surface of filter element

►*AIR CLEANER NOISE CORRECTION (Pass. Cars):* Remove air cleaner element from base, and clean bottom surface of base Install a 37½"long strip of adhesive backed sponge rubber weatherstrip 5/16" thick by 1/2" wide over spot welds in the base and butt ends together carefully Make sure wing nut holding air cleaner is tightened securely and outer edge of inlet flange may be crimped to prevent sharp edges deflecting air flow

BATTERY

Ford Part No. ①	Volts	Plates	②Capacity
B9A-10654-D ③	12	11	55 Ampere Hr
B9A-10654-E ④	12	13	65 Ampere Hr
B9A-10654-F ⑤	12	11	70 Ampere Hr

① - Numbers are for dry type batteries for service replacement ② - At 20 hour rate

③ - Replaces original battery with red filler caps

④ - Replaces original battery with gray filler caps

⑤ - Replaces original battery with yellow filler caps

Battery Ground - Negative, to cylinder block

Engine Ground - Converter or flywheel housing to frame (6 Cyl), Cylinder head to dash (V8)

STARTER

Ford No. B6A-11002-A (6 Cyl., 292 & 352), B9S-11002-A or FAY-11002-A (430).

Armature - B6A-11005-B (All)

Drive - Bendix "Folo-Thru" type Ford 1CM-11350-C (identified by 2900550 or FAY-11001-A on tag attached to frame of starter)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 48-56 ozs

Cranking Speed - 150-180 RPM, 155-190 amperes

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs.	①	12 0	80-85
15 5 ft. lbs.		5.0	550

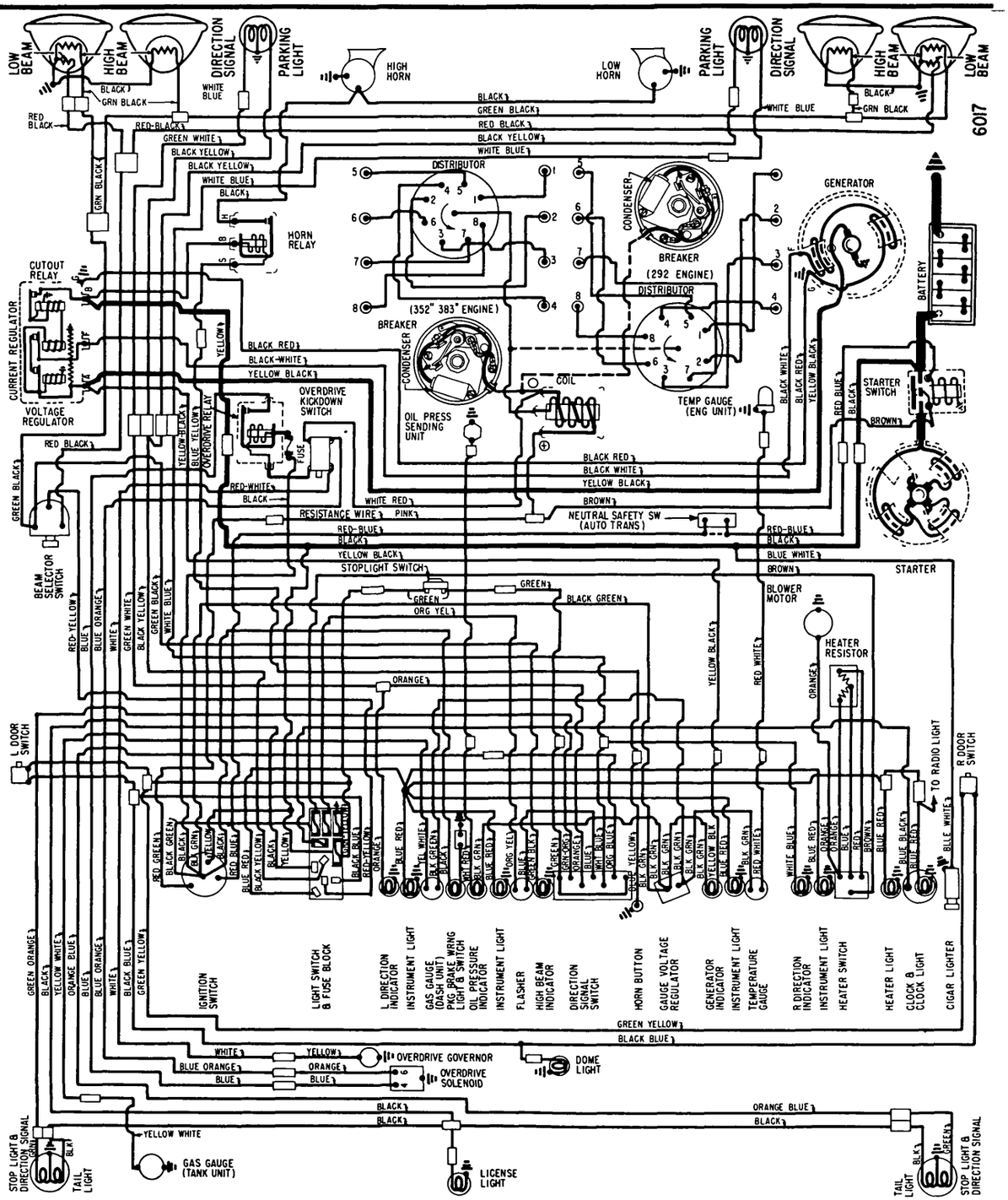
① - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford No B6A-11450-A, controlled by ignition switch

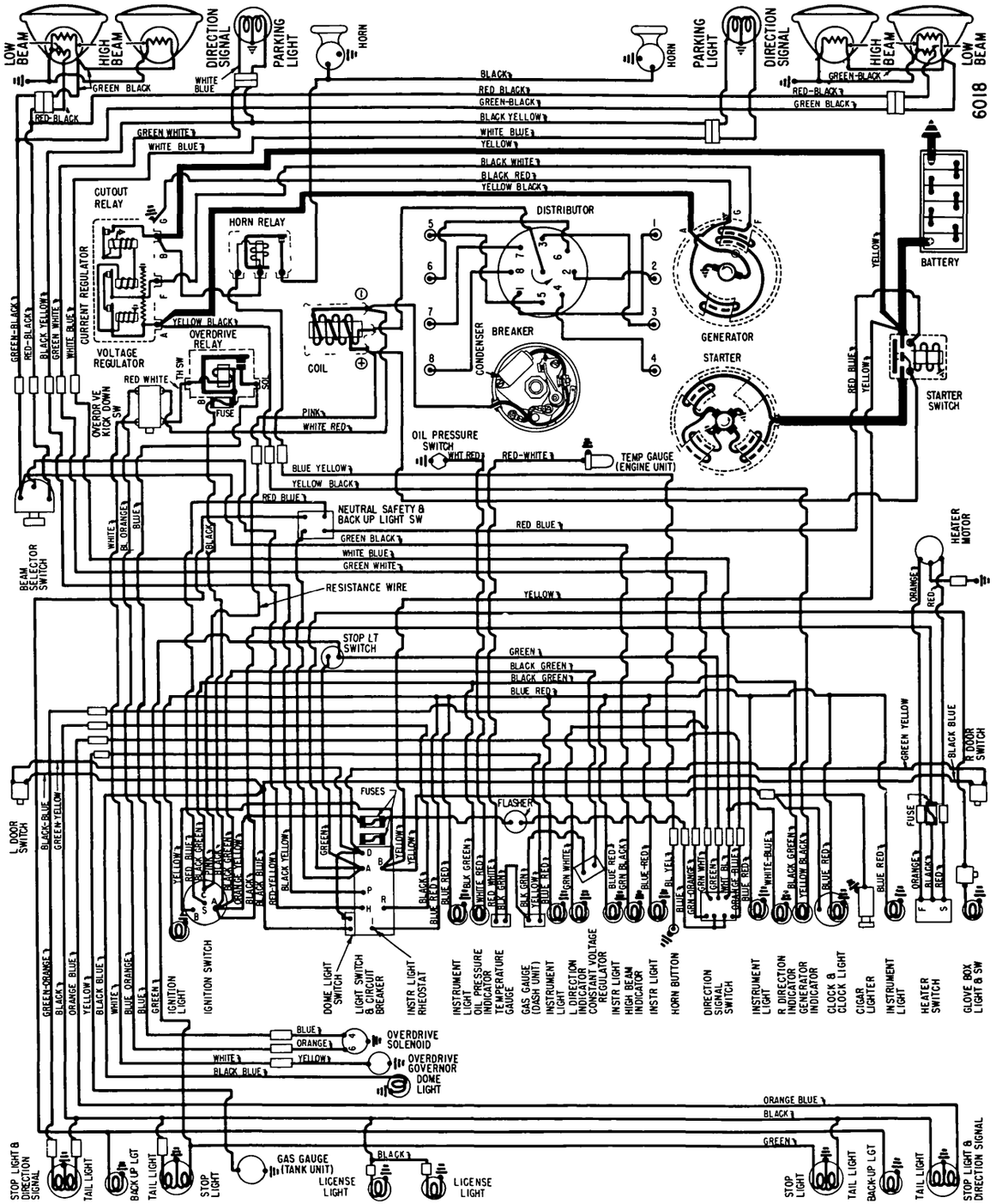
Neutral Safety Switch (Auto. Trans.): Ford No COAF-7A247-A (Fordomatic), No COAF-7A247-B (Cruise-O-Matic)

Adjustm nt - *See Ford Automatic Transmissions in Transmission Section.*

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FORD V8 (EXCEPT THUNDERBIRD) WIRING DIAGRAM



FORD V8 THUNDERBIRD WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION (DELCO-REMY REGULATOR): Battery charging circuit protected by fuse, Ford No. COAF-10602-A, clipped to BAT terminal of generator regulator. Check for blown fuse when diagnosing battery, generator, or regulator failure.*

Generator	Armature	① Regulator
B6A-10002-H ②	B6A-10005-A or C ⑥	B7A-10505-B
B9A-10002-A ②	B6A-10005-C	B7A-10505-B
PB8M-10002-B ②	B6A-10005-C	B7A-10505-B
B8A-10002-A ②	B8A-10005-A	B8E-10505-B
COAF-10002-A ②		COMF-10505-A
B6A-10002-F ③	B6C-10005-C	B7A-10505-A
B9FM-10002-A ②	B8A-10005-A	COMF-10505-A
B8QH-10002-A ②	B8QH-10005-A	B8E-10505-C
COAF-10002-B ④	COAF-10005-A	COAF-10505-B
B6A-10002-D ⑤	B6C-10005-A	B6A-10505-C

① - Generators must be used with Regulators as indicated.
② - Ford type ③ - Autolite type
④ - Delco-Remy type ⑤ - Bosch type.
⑥ - T-Bird with 352" Eng. uses Armature B6A-10005-C only

Performance Data

Generator	Amperes	Volts	Gen. RPM
B6A-10002-H, B9A-10002-A	30	15.0	2525
PB8M-10002-B	30	15 0	2525
B8A-10002-A, COAF-10002-A	35	15.0	2670
B9FM-10002-A	35	15.0	2670
B6A-10002-F	40	15.0	1800
B8QH-10002-A	40	15.0	2650
COAF-10002-B	40	15 0	2300
B6A-10002-D	50	15.0	1380

Brush Spring Tension - Autolite 34-41 ozs., **Bosch** 16-18 ozs **Ford** 32-40 ozs , **Delco-Remy** 28 ozs.
Field Current - 2.4-3 0 amps. (Delco-Remy), 1 2-1 8 amps. (Others) at 12.0 volts. (hot).
Rotation - Counterclockwise at commutator end
Belt Adjustment: ½" deflection measured midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Regulator	① Generator
B7A-10505-B Ford 30 Amp.	②
B8E-10505-B Ford 35 Amp.	B8A-10002-A
COMF-10505-A Ford 35 Amp	COAF-10002-A, B9FM-10002-A
B7A-10505-E Autolite 40 Amp	B6A-10002-F
B8E-10505-C Ford 40 Amp	B8QH-10002-A
COAF-10505-B Delco-Remy 40 Amp.	COAF-10002-B
B6A-10505-C Bosch 50 Amp	B6A-10002-D

① - Regulators must be used with Generators as indicated
②- Used with Generators B6A-10002-H, B9A-10002-A, PB8M-10002-B

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Cutout Relay

Cuts In - 12.4-13.2 volts (30 & 35 Amp.), 12.0-12 8 volts (40 Amp. Ford), 12.5-13 9 volts (40 Amp. Autolite), 11.8-13.0 volts (40 Amp. Delco-Remy), 13 0-13 5 volts (50 Amp).
Cuts Out - 6-9 amps. (30 Amp), 2-6 amps. (35 Amp & 40 Amp Autolite), 5-9 amps. (40 Amp Ford), 8 amps. max. at 12 2 volts (40 Amp Delco-Remy), 2-8 amps. (50 Amp.), discharge current.

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V Itag R gulator

Setting (F rd & Aut lit) - 14.6-15.4 volts (Ford), 14 2-14.9 volts (Autolite) at ambient temperature of 75°F.

Setting (Delco-Remy) - 14.6-15.4 volts at 75°F ambient temperature when operating on upper contacts. .1-.3 volts lower when operating on lower contacts.

Setting (Bosch) - 14.1-14.8 volts (upper contacts), 14.1-14.6 volts (lower contacts) at ambient temperature of 75°F.

Checking & Adjusting - *See Ford, Autolite, Delco-Remy (Double Contact), and Bosch 12-Volt Regulators in Electrical Section.*

Current Regulator

Setting (30 Amp.) - 28-32 amperes.

Setting (35 Amp.) - 33-37 amperes.

Setting (40 Amp. Ford & Autolite) - 38-42 amperes.

Setting (40 Amp. Delco-Remy) - 43.0-51.5 amperes at 85°F ambient temperature (temperature compensated type).

Setting (50 Amp.) - 48-52 amperes.

Checking & Adjusting - *See Ford, Autolite, Delco-Remy (Double Contact), and Bosch 12-Volt Regulators in Electrical Section.*

MISC. ELECTRICAL

►*IGNITION SWITCH BINDING CORRECTION:* If switch fails to return to ON position after engine starts, remove lock cylinder and clean all burrs from inside flat surface of switch bezel and apply lubriplate to this surface.

Headlights: 4-Headlight System. *See "4-Headlight Systems" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Stop Light Switch Location: On forward end of brake master cylinder.

Lighting Switch: New type switch with blade type terminals. Wire connector for switch is a fuse junction block, making switch and fuse block one unit.

Switch Removal - Disconnect battery. Remove switch control knob and shaft by pressing spring-release button on top of switch (switch in "off" position). Unscrew retaining nut and remove switch.

CIRCUIT BREAKER (Pass. Cars): Circuit breaker built into lighting switch protects headlights.

CIRCUIT BREAKER (T-Bird): Circuit breaker built into lighting switch protects Headlights, Parking, Tail, Stop, Instrument Panel, Back-up, & Dome lights.

FUSES (Pass. Cars): 15 Ampere - Parking, Tail, Stop & Instrument Panel lights. On fuse block.

15 Ampere - Overdrive. On overdrive relay.

14 Ampere - Direction Signals. On fuse block.

14 Ampere - Heater Blower. On fuse block.

14 Ampere - Back-up lights. On fuse block.

7.5 Ampere - Radio. On fuse block.

1 Ampere - Clock. On fuse block.

Cigar Lighter - Sulphur disc on back of lighter.

FUSES (T-Bird): 15 Ampere - Overdrive. On overdrive relay.

14 Ampere - Heater Blower. In feed wire from ignition switch.

7.5 Ampere - Interior lights (Dome Light Feed). On fuse block

5 Amper - Direction Signals. On fuse block.

5 Amp r - Radio. In feed wire.

1 Ampere - Clock. In feed wire.

Cigar Light r - Sulphur disc on back of lighter.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Us extr me car when disconn cting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8. 292", 352" & 430" engines of same designs used previously.

►*POLICE SPECIAL ENGINE NOTE: This engine is same as standard 352" Engine but has a high lift camshaft and damper spring and spacer on all valves.*

Engine	Bore	Stroke	Displacement
292	3.75"	3.30"	292 cu. ins.
352	4.00"	3.50"	352 cu. ins.
430	4.30"	3.70"	430 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
292	8.8-1	45.00	185 at 4200 RPM
352 ①	8.9-1	51.20	235 at 4400 RPM
352 ②	9.6-1	51.20	300 at 4600 RPM
430	10.0-1	59.17	350 at 4600 RPM

① - With 2-Bbl. Carb. ② - With 4-Bbl. Carb.

Compression & Vacuum Reading - *See TUNE-UP.*

►*CYLINDER HEAD PRODUCTION CHANGE & VALVE USAGE CAUTION (430 ENG.):* Cylinder Head, Part No. B9ME-6049-C, used up to Dec. 2, 1959. Cylinder Head, Part No. COME-6049-B, used from Dec. 2, 1959. Later type head has **smaller** valve ports and uses smaller diameter valves. *DO NOT INTERCHANGE. See "Head Diameter" under VALVES for correct usage and specifications.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Special Data.*

OIL PAN REMOVAL: Proceed as follows:

292 - Drain crankcase and disconnect oil pump inlet tube at oil pump. Remove oil pan retaining screws and remove pan.

352 (Pass. Cars) - Drain crankcase and remove dipstick. Remove flywheel housing lower cover. Remove oil pan retaining screws and let pan rest on frame crossmember. Crank engine so crankshaft counterweight will clear rear of oil pan. Loosen oil pump inlet tube upper bolt, remove lower bolt and swing tube out of way. Remove pan by moving forward and tilting down.

352 (Thunderbird) - **1)** Drain cooling system and crankcase. Disconnect radiator upper hose at radiator tank. Remove oil pan retaining screws and lower pan to underbody crossmember. Position crankshaft so counterweight will clear pan, then move pan forward.

2) Remove bolts holding coil and move coil out of way. Raise engine so tension is off mounts and remove bolts holding engine to front mounts. Raise engine so bolts holding oil pump can be removed. Remove oil pan and pump.

430 - Crank engine until 14° BTDC mark on damper is aligned with pointer. Drain crankcase. Remove both engine front mounts. Remove both engine front support-to-underbody nuts. Raise engine and place 1" wood blocks between engine front support brackets and underbody. Let engine rest on blocks. Remove oil pan retaining screws and let pan rest on underbody crossmember. Loosen oil pump inlet tube upper bolts and remove lower bolt. Swing tube out of way. Remove pan in a lowering forward motion.

PISTONS

Autothermic type. Solid skirt with three rings above pin.

R m val - Pistons and rods removed from above.

Cl aranc (292 & 430) - .0008-.0026" at bottom of skirt. Wear limit .005".

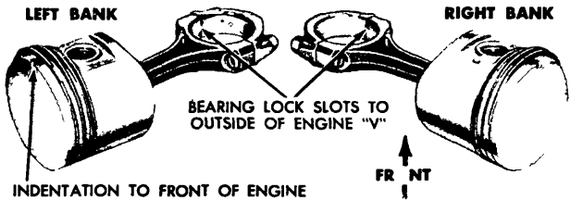
Clearance (352) - .0011-.0029" at bottom of skirt. Wear limit .005".

Checking Clearance - *See "Original Bor & Pistons" in Ford Special Data.*

Installing Pistons - Install piston with indentation in head of piston toward front of engine, and **n 430,** step on piston head toward inside of engine "V", *S e Rod Installation.*

Replacement Pistons: Furnished Std. & .020", .030", .040", .060" Oversize. *NOTE - Std. siz only on 430 engine.*

►*352 ENGINE PISTON IDENTIFICATION:* Pistons for 2-Bbl. Carb. engine have 1 notch on piston dome, pistons for 4-Bbl. Carb. engine have 2 notches.



FORD V8 PISTON & ROD ASSY.

PISTON PIN

Floating type with lock ring at each end **(292 & 352),** press fit in connecting rod **(430).**

Diameter - 292 - .9120-.9123", **352** .9750-.9753", **430** .9749-.9752".

Length - 292 3.016-3.030", **352** 3.156-3.170", **430** 3.480-3.500".

Clearance in Piston (292 & 352) - .0001-.0003" loose. Wear limit .0008". Light thumb press fit at 70°F.

Clearance in Piston (430) - .0002-.0004" loose. Wear limit .0008". Light thumb press fit at 70°F.

Clearance in Rod (292 & 352) - .0001-.0005" loose. Wear limit .001". Light thumb press fit at 70°F.

Clearance in Rod (430) - Interference press fit in rod bushing. *See "Piston Pins" in Ford Special Data.*

Replacement Pins: 292 & 352 - Furnished Std. (Green), .001" (Blue), & .002" (Yellow) Oversize.

430 - Furnished Std. size only (fitted with new pistons).

PISTON RINGS

Two compression rings and one oil ring per piston. Oil ring is "Side Sealing" type (two steel rails with spring spacer between them).

292 Engin

Ring	Width	End Gap	Sid Cl aranc
Compr. 1&2	.0775-.0780"	.010-.025"	① .0020-.0035"
Oil	.1880-.1890"	②015-.062"	③

352 Engin

Ring	Width	End Gap	Sid Cl aranc
Compr. (1)	.0775-.0780"	.013-.030"	① .0020-.0035"
Compr. (2)	.0930-.0935"	.013-.030"	① .0020-.0040"
Oil	.1880-.1890"	② .015-.062"	③

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430 Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0770-.0780"	.015-.030"	①.0015-.0030"
Compr. (2)	.0680-.0690"	.015-.030"	①.0010-.0030"
Oil	.1880-.1890"	② .015-.062"	③

① - Wear limit .006". ② - Steel rail.
③ - Side sealing type ring.

Replacement Rings: Furnished Std. & .020", .030",.040", .060" Oversize. *NOTE - .060" Oversize not furnished for 430 engine.*

CONNECTING ROD

Length (Center-to-Center) - 292 6.320-6.324", **352** 6.538-6.542", **430** 6.599-6.601".

Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.1884-2.1888"	2.1880-2.1884"
352	2.4384-2.4388"	2.4380-2.4384"
430	2.5996-2.6000"	2.5992-2.5996"

Lower Bearing - Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Clearance - 292 - .0005-.0024". Wear limit .0034".
352 & 430 - .0007-.0028". Wear limit .0038".
Side play - 292 & 352 .006-.016". Wear limit .019".
430 .005-.015". Wear limit .018".
Installing Rods - Install rod in correct numbered cylinder with notch in head of piston toward front of engine and bearing lock slots in rod toward outside of engine.
Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize. *NOTE - .040" Undersize also for 352 engine.*
►*STANDARD SIZE NOTE:* Red marked bearings increase clearance, Blue marked bearings decrease clearance.

CRANKSHAFT

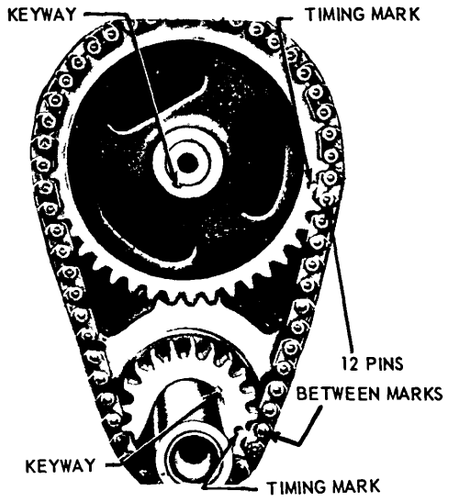
Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.4984-2.4988"	2.4980-2.4984"
352	2.7488-2.7492"	2.7484-2.7488"
430	2.8998-2.9002"	2.8994-2.8998"

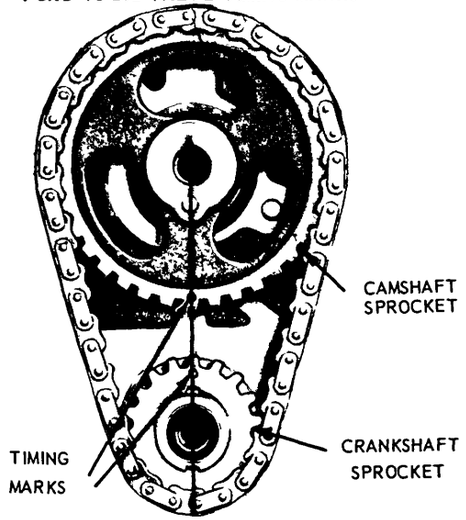
Bearings - Steel backed copper lead alloy.
Clearance - 292 .0006-.0032". Wear limit .0042". **352** .0007-.0029". Wear limit .0039". **430** .0009-.0029". Wear limit .0039".
Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize. *NOTE - .040" Undersize also furnished for*
►*STANDARD SIZE NOTE:* Red marked bearings increase clearance, Blue marked bearings decrease clearance.
End Thrust: Taken by No. 3 (center) main bearing.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Special Data.*
Endplay - .004-.008". Wear limit .012".
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE:* 352 Engine with 4-Bbl. Carb. uses camshafts Part No. COAE-6250-B & COAE-6250-A. No. COAE-6250-A identified by "A" between No. 16 lobe and 5th bearing journal. 352 Police Special Engine uses "high lift" camlift, Part No. B9A-6250-A, identified by "B9EA" on rear of 5th bearing journal.
Journal Diameter - 292 1.9255-1.9265", **352** 2.1238-2.1248", **430** 2.264-2.265".
Bearings - Steel backed babbitt lined bushings.
Clearance - .001-.003". Wear limit .006".
End Thrust: 292 - Taken by thrust plate and spacer located between camshaft sprocket and shoulder on camshaft. **Endplay** - .001-.007". Wear limit .012". **352** - Controlled by spring-loaded thrust button on fuel pump eccentric bolt.
430 - Thrust is toward rear. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.



FORD V8 292 VALVE TIMING MARKS



FORD V8 352" & 430" ENGINE VALVE TIMING MARKS

Replacement Bearings: Std. & .015" Undersize.
Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Special Data.*
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Special Data.*
Timing Chain: Side guide type. Length 56 links (292), 48 links (352), 52 links (430).
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.
Camshaft Setting (292): Sprockets marked by round depression on one tooth. Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are on drive side.
Camshaft Setting (352 & 430): Timing marks on both sprockets adjacent and in line with straightedge across shaft centers.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Special Data.*

VALVES

Tappet Clearance: 292 - .019" Cold, .018" Hot, All valves. *For preliminary adjustment after overhaul, see "Valve System" in Ford Special Data.*
352 & 430 - Zero lash, hydraulic lifters. *For hydraulic lifter operating range check, see "Valve System" in Ford Special Data.*

292 Engine

Valve	Head Diam.	①Stem Diam.	Length
Intake	1.642-1.652"	.3416-.3423"	5.02"
Exhaust	1.505-1.515"	.3398-.3405"	5.02"
Valve	**Seat Angle**	**②Lift**	**Stem Clearance**
Intake	45°③	.264"	④.0010-.0024"
Exhaust	45°③	.262"	⑤.0028-.0042"

352 Engine

Valve	Head Diam.	①Stem Diam.	Length
Intake	2.022-2.037"	.3711-.3718"	5.356"
Exhaust	1.551-1.561"	.3693-.3700"	5.356"
Valve	**Seat Angle**	**②⑥Lift**	**Stem Clearance**
Intake	30°⑦	.232"	④.0010-.0024"
Exhaust	45°③	.232"	⑤.0028-.0042"

430 Engine

Valve	Head Diam.	①Stem Diam.	Length
Intake	⑧	.3711-.3718"	5.293"
Exhaust	⑨	.3693-.3700"	5.293"
Valve	**Seat Angle**	**②Lift**	**Stem Clearance**
Intake	45°③	.2316"	④.0010-.0024"
Exhaust	45°③	.2316"	⑤.0028-.0042"

① - Furnished with .003", .015" & .030" Oversize stems.
② - Cam lobe lift. Wear loss limit .005".
③ - Valve face angle 44°.
④ - Wear limit .0045"-
⑤ - Wear limit 0055".
⑥ - Except 352 Police Special. High lift camshaft used.
⑦ - Valve face angle 29°.
⑧- 2.080-2.090" with B9ME-6049-C Cyl. Head; 1.962" with COME-6049-B Cyl. Head. *See "Cylinder Head Production Change" above.*
⑨ - 1.770-1.780" with B9ME-6049-C Cyl. Head; 1.655" with COME-6049-B Cyl. Head. *See "Cylinder Head Production Change" above.*

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Valv S at Width - 070- 090" (All Engines & Valves)
Valve Stem Oil Seals - Umbrella type seals used on all valves Install seals with cup side down over valve guide

►*ROTATABLE VALVE NOTE:* All valves are rotatable type *See "Valve System" in Ford Special Data*

Valve Springs: Install with closed coil end toward cylinder head

►*VALVE SPRING NOTE* Valve damper springs used inside valve springs on 352 Police Special and may be found on other 352 and 430 engines
Free Length - 292 2 09", **352** 2 26", **430** 2 03"

Spring Specifications - 292

Valve	Spring Pressure	Length
Closed	71-79 lbs ①	1 780"
Open	161-177 lbs ②	1 390"

Spring Specifications - 352

Valve	Spring Pressure	Length
Closed	94-104 lbs ③	1 820"
Open	180-198 lbs ④	1 420"

① Spring Specifications - 430

Valve	Spring Pressure	Length
Closed	66-77 lbs ⑤	1 830"
Open	240-260 lbs ⑥	1 430"

① - Wear limit 64 lbs at 1 780"
② - Wear limit 145 lbs at 1 390"
③ - Wear limit 89 lbs at 1 820"
④ - Wear limit 163 lbs at 1 420"
⑤ - Wear limit 60 lbs at 1 830"
⑥ - Wear limit 225 lbs at 1 430"
⑦ - Spring and damper assembly together

Spring Out-of-Square Limit - 072" (All Engines)

►*VALVE SPRING INSTALLATION NOTE·* Measure valve spring assembled height from machined surface of cylinder head spring pad to underside of spring retainer If assembled height is greater than 1 25/32" (292), 1 27/32" (352), 1 55/64" (430), install necessary 030" spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended 1 3/4-1 25/32" (292), 1 13/16-1 27/32" (352), 1 13/16-1 55/64" (430) *CAUTION* - DO NOT install spacers unless necessary to bring measurement within specifications

Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems *See "Valve System" in Ford Special Data*

Valve Lifters (292): Mechanical, mushroom type Remove from below after camshaft removed
Clearance - 0011"- 0027" Wear limit 0055"

Valve Lifters (352 & 430): Hydraulic, barrel type Can be removed through pushrod holes without disturbing valve chamber cover or manifold
Clearance - 0005- 0020" Wear limit 005"
Lifter Overhaul - *See "Valve System" in Ford Special Data*
Hydraulic Lift r Op rating Rang - *See "Valve Syst m" in Ford Special Data*

Rock r Arm Ass mbly: *See "Valve System" in Ford Special Data*

VALVE TIMING

►*VALVE TIMING CHECKING NOTE* Checking timing by use of quadrant on pulley not recommended by manufacturer *See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear*

Valve Timing Specifications - 292
Intake Valves - Open 12°①BTDC Close 54°②ALDC
Exhaust Valves - Open 58°③BLDC Close 8°④ ATDC

Valve Timing Specifications - 352 (2-Bbl.)
Intake Valves - Open 17°⑤BTDC Close 59°⑥ALDC
Exhaust Valves - Open 57°⑤BLDC Close 19°⑥ ATDC

Valve Timing Specifications - 352 (4-Bbl.)
(Camshaft No. COAE-6250-A)
(Exc. Police Interceptor with High Lift Camshaft)
Intake Valves - Open 22°⑤BTDC Close 68°⑥ALDC
Exhaust Valves - Open 68°⑤BLDC Close 22°⑥ ATDC

Valve Timing Specifications - 430
Intake Valves - Open 22°⑤BTDC Close 68°⑦ ALDC
Exhaust Valves - Open 63°⑤BLDC Close 27°⑥ ATDC

① - Camlift 016" ② - Camlift 019", ③ - Camlift 015"
④ - Camlift 018" ⑤ - Camlift 002" ⑥ - Camlift 005"
⑦ - Camlift 0045"

OILING SYSTEM

►*ENGINE OILING SYSTEM See 'Engine Lubrication' under OILING SYSTEM in Ford Special Data*

Crankcase Capacity: 5 qts refill, 6 qts with filter change

Normal Oil Pressure: 35-55 lbs at 2000 RPM
Pressure Regulator Valve - In pump body, not adjustable
Oil Pressure Indicator - Indicator light on instrument panel, operated by engine unit, Ford No B6A-9278-B

Oil Pump (292 & 352): Rotor type driven by distributor through intermediate drive shaft Located outside crankcase on left side (292), on inside crankcase at front (352)

Oil Pump (430): Combination oil-vacuum pump located on inside crankcase at front and driven by distributor through intermediate drive shaft

Pump Overhaul (All Engines): *See "Oiling System" in Ford Special Data*

Oil Filter: Full flow disposable type
Filter- Replacement - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter face, then tighten filter an additional ½-turn Run engine and check for leaks *CAUTION - Do not overtighten*

Crankcase Ventilation: Filter in oil filler cap (inlet) and ventilation tube at rear of engine Clean and lubricate filler cap filter at 4000 mile intervals

COOLING

►*430 ENGINE NOTE* Three-stage engine warm-up and cooling system with water jacketed intake manifold and a thermostat in front of each cylinder head Same design as used previously.

Water Capacity: 20 qts (T-Bird), 19 qts (Pass Cars) Add 1 qt for heater

Pr ssur Valv : Ford No B8A-8100-A 12-15 lb radiator filler cap

Th rm stat: One thermostat located in water outlet connector (All Engines), plus 2 thermostats in front face of block behind water pump (430) See table below

R plac m nt Th rm stats

Engin	Op ns	F rd Part N .
292 & 352	160°F	B7A-8575-A
292 & 352	① 177-182°F	B7A-8575-B
430	160°F	B8E-8575-B
430	① 178°F	B9S-8575-A
430 (In block)②	137-142°F	B9S-8575-B

① - For use with permanent type anti-freeze
② - Two used

►*THERMOSTAT INSTALLATION NOTE:* Install thermostat with pivot shaft in vertical position to insure best operation

Water Pump: Packless, sealed ball bearing type *See "Water Pump' in Ford Special Data*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No B9MF-10804-A
Dash Unit - Ford No COAF-10970-B (Pass Cars), No COSF-9307-B (T-Bird - Fuel & Temp Gauge Unit)
Engine Unit - Ford No B7A-10884-A
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Long. Used as follows

Cover Ass mbly

Engine	Model	L ng No.	F rd N .
6 Cyl Std	9½CF	268594	1A-7563-A
6 Cyl H D	11NC	266978	B7A-7563-C
292 Std	10½CF	260108	COAA-7563-A
292 H D	11CF	267350	B8A-7563-B
352 Std & H D	11CF	267350	B8A-7563-B
352 Special & Police (10½")			COAA-7563-C
352 Special & Police (11")			COAA-7563-B

Clutch Disc

Engine	L ng N .	F rd No.
6 Cyl Std	288849	B8A-7550-A
6 Cyl H D	288851	B8A-7550-B
292 Std	280166	COAA-7550-A
292 H D ,352 Std & H D	288351	B8A-7550-F
352 Special & Police (10½")		COAA-7550-C
352 Special & Police (11")		COAA-7550-B

See "Long Clutches" in Clutch Section

Pedal Adjustment: If total pedal travel is less than 6 5/8" or more than 6 7/8", reposition pedal bumper and bracket until travel is within limits Adjust spring link to give assist spring length of 9¾-10" (between spring eye centers) with pedal fully released against bumper
Free Travel - With engine idling, depress pedal to take up free travel and note reading from released position Free travel should be 1" To adjust, turn adjusting nut on equalizer rod Tighten locknut securely Operate engine at 3000 RPM Free travel should not be less than ½" Readjust equalizer rod if necessary *Free travel must be set exactly*

Removal: Remove transmission (or slide back far enough to clear input shaft, *see "Synchro-mesh Transmission" below),* then remove flywheel housing cover and release lever retracting spring Slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation Loosen six cover bolts uniformly to release spring tension Remove cover and pressure plate through opening in flywheel housing

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SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Ford Synchro-mesh Transmission" in Transmission Section.

Transmissi n Contr l: *See "Transmission Controls" in Transmission Section.*

R m val (Pass. Cars): Raise car and disconnect drive shaft at rear joint flange. Slide drive shaft off transmission output shaft. Insert Tool T57L-7657-A over output shaft and into seal. Disconnect speedometer cable at extension housing, gear shift rods from transmission levers, and parking brake cable from equalizer lever. Remove extension housing-to-engine rear support bolts, raise rear of engine and remove engine rear support and frame crossmember as a unit. Place jack under transmission and remove transmission-to-flywheel housing bolts. Install guide pins in the two lower bolt holes. Slide transmission and jack to rear to clear input shaft and remove transmission from beneath car.

R m val (T-Bird): Drain transmission, disconnect drive shaft from rear joint, parking brake adjusting rod, and parking brake cables from equalizer. Disconnect right and left exhaust pipes at manifolds and remove exhaust pipe from section as an assembly (rear connection just behind equalizer pipe). Disconnect transmission from rear support and raise transmission to take weight off crossmember. Remove attaching bolts and move crossmember out of way. Disconnect speedometer cable bracket and cable, gear shift rods from shift levers and remove rods. Remove flywheel-to-transmission attaching bolts and remove transmission.

OVERDRIVE

Warn r R10. Solenoid operated type, with governor control and throttle operated kickdown.
See "Warner R10 Overdrive" in Transmission Section.

Ov rdriv Contr l: *See "Overdrive Control" in Transmission Section.*

R m val: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

AUTOMATIC TRANSMISSION

Tw -Sp d F rd matic and **Cruise-O-Matic** of same designs used previously.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: S "Ford 2-Speed Automatic" and "Ford Aut matic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Ford 2-Speed Automatic" and "Ford Automatic" in Transmission S ction.*

Lubricati n: Check fluid level every 1000 miles, drain and refill every 24,000 miles. **Use nly F rd Aut matic Transmission Fluid, Part N . B8A-19582-A r Automatic Transmissi n Fluid Typ A, Suffix A.**
Ch cking Fluid L v l - With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. With engine idling, maintain fluid at "F" mark on dipstick. DO NOT OVERFILL.

Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Ford 2-Speed Automatic" and "Ford Automatic" in Transmission Section.*

UNIVERSALS

Needle bearing type.
►*CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened). *See "Ford Deep-Offset Hypoid" in Rear Axle Section.*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION:* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts.

REAR AXLE

Own. Separate carrier type, semi-floating, hypoid, with Hotchkiss Drive. "Equa-Lock type Differential" optional. *See "Ford Deep-Offset Hypoid" and "Ford Equa-Lock Differential" in Rear Axle Section.*

Axle Ratios & Identification Code: *NOTE - Identification code number or letter stamped under AXLE on car patent plate on left front door hinge pillar post.*

Axle Ratio	Code
3.56-1 (32-9)	1
3.89-1 (35-9)	2
3.10-1 (31-10) ①	3
3.78-1	4
3.22-1	6
2.91-1 (32-11) ②	8
3.70-1 (37-10) ③	9
3.56-1 (Equa-Lock)	A
3.89-1 (Equa-Lock)	B
3.10-1 (Equa-Lock)	C

① - With Cruise-O-Matic on Thunderbird with 352 Engine.
② - With 430 Engine and Cruise-O-Matic.
③ - With Std. & O.D. Trans. on Thunderbird with 352 Engine.

Backlash - .004-.009". Max. variation between teeth .003".

Axle Shaft Removal: Remove wheel and brake drum. Remove axle bearing retainer nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to securebrake backing plate.

Carri r Ass mbly R moval: Remove axle shafts (see above) and drive shaft. Remove carrier attaching nuts and remove carrier.

SHOCK ABSORBERS

Direct acting, non-adjustable. Serviced by replacement.

Ford Shock Absorber Nos.

Model	Front	Rear
T-Bird	CODZ-18124-A	COAZ-18125-F
Sta. Wgn. Std.	COAZ-18124-B	COAZ-18125-D
Sta. Wgn. H.D.	COAZ-18124-C	COAZ-18125-E
Pass. Std.	COAZ-18124-D	COAZ-18125-A
Pass. H.D. & Taxi	COAZ-18124-E	COAZ-18125-B

FRONT SUSPENSION

Independent. Ball-Joint type with shock absorbers mounted within coil springs.
See "Ford Front Suspension" in Suspension & Wheel Alignment Section.

►*NOTE: Stabilizer bar not used on 6 Cyl. Cars.*

►*FRONT WHEEL BEARING ADJUSTMENT PROCEDURE & CAUTION (Pass. Cars): Following procedure supersedes previous instructions.* Rotate wheel slowly and tighten adjusting nut to 11.5-12.5 ft. lbs. while wheel rotates. Then back off nut 1 castellation but not more than 2 castellations.

Caster - (Pass. Cars) Pos. ¾° to 1¼°.
Caster - (T-Bird) Pos. ½° to Pos. 1½°. Maximum variation between wheels ½°.
Camber - (Pass. Cars) Pos. ½° to Pos. 1°. Maximum variation between wheels ½° (¼° preferred).
Camber - (T-Bird) Pos. ½° to Pos. 1½°. Maximum variation between wheels ½° (¼° preferred).
Toe-In - 1/8-1/4" (Pass. Cars), 1/16-1/8" (T-Bird).

NOTE - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered.

Toe-Out on Turns (Pass. Cars) - With outer wheel at 20°, inner wheel should be at 24¼°.
Toe-Out on Turns (T-Bird) - With inner wheel at 20°, outer wheel should be at 17 1/8°.

STEERING

Manual: Own. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Bendix Linkage Type. Used in conjunction with standard steering gear.
See "Bendix Linkage Type Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

St ring G ar R m val: *S e "Saginaw Ball B aring Worm & Nut" in Ste ring S ction.*

CONTINUED ON NEXT PAGE

BRAKES

Ford-Bendix Hydraulic. Parking lever applies rear wheel service brakes.
See "Ford-Bendix Hydraulic" in Brake Section.
Drum Diameter - 11" front & rear.
Wheel Cylinder Diameter - 1 3/32" front; 15/16" rear, Pass. Cars; 29/32" rear, T-Bird.

Brake Lining Width & Length

Car Series		Primary	Secondary
30, 40, 50	(Front)	2½" x 11.62"	2½" x 11.93"
	(Rear)	2½" x 10.62"	2½" x 11.93"
60 Ⓒ	(Front)	3" x 10.62"	3" x 11.93"
	(Rear)	2½" x 10.62"	2½" x 11.93"
Thunderbird	(Front)	2½" x 11.62"	2½" x 11.93"
	(Rear)	2½" x 11.62"	2½" x 11.93"

Ⓒ - Also includes Police Interceptor and Taxi.
Clearance - Adjusting screw backed off 14-16 notches (Thunderbird), or until shoes are free of drag (Pass. Cars), from point where shoes are tight against drum.
►*LEFT REAR WHEEL ADJUSTMENT CAUTION:* Adjusting slot in **left rear wheel** carrier plate is located to rear of vertical centerline of plate. Position **and rotation** of adjusting screw **is reversed** from other wheels.
Standard Master Cylinder: Located on engine side of firewall.
Checking Fluid - Maintain fluid level to within ½" of top.
Master Cylinder Bore Diameter - 1".
Removal - Disconnect rubber boot from rear of master cylinder (passenger compartment side), brake line and stop light switch wires. Remove attaching bolts and remove cylinder.

Power Brakes: V8 Pass. Cars and Thunderbird without Air Cond. use Bendix type. 6 Cyl. Cars and Thunderbird with Air Cond. use Bellows type.
See "Bendix Hydraulic (Disc) Reaction Type Power Unit" and "Ford Bellows Type Power Unit" in Brake Section.

Removal (6 Cyl.) - Remove vacuum hose, valve adjusting eccentric nut, flat washer, spring and bushing and eccentric. Remove nylon bushing from valve housing, bracket-to-dash panel retaining screw and remove unit.

Removal (Bendix Type - V8 Cars & T-Bird) - From under instrument panel remove horseshoe retaining clip or eccentric bolt locknut and push eccentric bolt out through brake pedal and power unit pushrod. Disconnect stoplight switch wires, brake line and both vacuum hoses from power unit (under hood). Remove power unit retaining bolts and remove unit.

Removal (Bellows Type - T-Bird) - Disconnect stoplight switch wires and brake line and force as much fluid as possible from master cylinder. Remove master cylinder and slide boot off pushrod. Remove headlight dimmer switch and left cowl trim panel. Remove hood control cable from bracket by removing cable-to-bracket nut. Remove overdrive control handle and bracket (if equipped). Remove left vent air register panel by loosening 6 screws and 3 attaching bolts, lowering parking brake control handle and tilting panel outward at bottom. Disconnect vacuum hose at power unit. Remove valve adjusting eccentric nut, flat washer, spring and sleeve and slide eccentric to left until it contacts brake pedal. Remove bolts and screws from power unit mounting bracket and remove unit carefully.

MISC. MECHANICAL

Windshield Wipers: Vacuum or Electric types with Link & Crank Arm type linkage (Pass. Cars), Vacuum with Cable Control (T-Bird).
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type.
See "Electric Window Regulators" in Misc. Section.

Power Seat Control: 4-Way Electric.
See "Power Seat Controls" in Miscellaneous Section.

Power Top Control: Electric-Hydraulic.
See "Power Top Controls" in Miscellaneous Section.

Air Conditioning: *See "Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front cab pillar or glove box door On Parcel Delivery models, plate is on right hand dash panel *NOTE* - Number (example below) includes identification data as follows

① ② ③ ④ ⑤ ⑥
C 550 C O U 10001

① - Truck Model Type *See Truck Model Table below*
② - Truck Model Size *See Truck Model Table below*
③ - Engine *See Table Below*
④ - Year Model **1960.**
⑤ - Assembly Plant *See Table below*
⑥ - Beginning Vehicle Number

Engine Designation

Letter		Sales Designation
B	- 2 Bbl Carb (Export)	292 MD V8
C	- 2 Bbl Carb	292 MD V8
D	- 4 Bbl Carb	292 HD V8
E	- 4 Bbl Carb (Export)	292 V8
J	-	223 Six

►*ENGINE IDENTIFICATION NOTE.* In the following Ford Truck data pages, engines will be referred to as follows

Engine	Designation
6 Cyl 223"	6 Cyl
V8 292" 2-Bbl Carb Med Duty	292MD
V8 292" 4-Bbl Carb Heavy Duty	292HD

Truck Model

Letter	Type	Number	Size
F	Conventional	100,250,350,400	Light Duty
C	Tilt Cab	500,550,600	Medium Duty
B	School Bus		
P	Parcel Del		

Assembly Plant Designation

A - Atlanta	H - Lorain	P - St Paul
D - Dallas	K - Kansas City	R - San Jose
E - Mahwah	N - Norfolk	U - Louisville
G - Chicago		

TUNE-UP

COMPRESSION PRESSURE: 150 lbs ± 10 lbs at cranking speed Cylinders must be equal within 10 lbs
VACUUM READING: 18" (All) at idling speed
VALVE TAPPET CLEARANCE: Can be set with engine cold but must be rechecked with engine at operating temperature (30 minutes operation at 1200 RPM) and idling
Cold Clearance - 019" All valves All engines
Hot Clearance - 019" (6 Cyl), 018" (292MD & HD), All valves
►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum
MANIFOLD HEAT CONTROL (EXC. V8HD): Automatic thermostatic type Located at center of exhaust manifold (6 Cyl) between crossover pipe and right exhaust (V8MD) Install valve assembly with stop pin at top of valve housing and hook thermostatic spring on stop pin

IGNITION
6 CYL. ENGINE

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 028-032"
Spark Plugs - Champion 860 18 mm Torque to 15-20 ft lbs *NOTE* - Plugs have tapered seat, no gasket used
COIL: Ford B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - COLF-12250-A 1 3-1 4 ohms at 75°F
►*COIL RESISTOR NOTE:* New Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to upper quick disconnect at dash panel Resistor Wire Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil
DISTRIBUTOR: Ford. "Loadomatic" type Used as follows

Distributor No.	①Identification No.
B8A-12127-M (Early)	FET-12127-C
COAF-12127-G (Later)②	COAF-12127-G

① - This number stamped on distributor housing
② - Use this distributor to replace B8A-12127-M
See "Distributors" in Electrical Section
►*DISTRIBUTOR ROTOR CHECK* Distributors not marked with daub of yellow paint should be checked for proper spring contact of flush to 040" above rotor top Improperly formed contact on rotor will create an air gap between rotor and cap, causing engine to miss
Condenser - Ford 7RA-12300-C **Capacity** - 21- 25 mfd
Contact Point Set - Ford FAA- 12171-A
Breaker Gap - 024- 026"
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Clockwise viewed from above

Advance Performance
►With Distributor on Test Stand

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	38	450
2½-3½	79	650
6¾-7¾	2 85	1100
8¾-9¾	4 33	1400
10¼-11¼	5 99	1800

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION* Scribe marks on distributor body to indicate rotor to body position and body to block position before removing Align marks when installing Make sure oil pump intermediate shaft engages distributor shaft properly

V8 ENGINES

FIRING ORDER: 1-5-4-8-6-3-7-2
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8
SPARK PLUG GAP: 028-032"
Spark Plugs - Champion 860 (292MD), F10 (292HD) 18 mm Torque to 15 20 ft lbs *NOTE* - Plugs have tapered seat no gasket used
COIL: Ford B6A-12029-B
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - COLF-12250-A 1 3-1 4 ohms at 85°F
►*COIL RESISTOR NOTE* New Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to upper quick disconnect at dash panel Resistor Wire Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil
DISTRIBUTOR: Centrifugal & Vacuum Advance type used on 292MD Centrifugal type used on 292HD as follows

Engine	①Distributor No
292MD	**COTF-12127-B**
292HD Synchro-mesh	**COTF-12102-C**
292HD Auto Trans	**COTF-12102-D**

① - Stamped on distributor housing
See "Distributors" in Electrical Section
Condenser No. - B7A-12300-C (Exc COTF-12127-B), B9TF-12300-A (COTF-12127-B) **Capacity** 21- 25 mfd
Contact Point Set - B8C-12171-A (Exc COTF-12127-B), B7A-12171-A (COTF-12127-B)
Breaker Gap - 014- 016"
Cam Angle - 26-28½°
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance
①COTF-12127-B

Degrees Distr.	RPM	Degrees Eng.	RPM
0	550	0	1100
¾-1¾	700	1½-3½	1400
3¼-4¼	900	6½-8½	1800
5½-6½	1150	11-13	2300
8½-10	1600	17-20	3200
9¼-10¾	1800	18½-21½	3600

Automatic Advance
①(B8C-12127-E, COTF-12102-C,D)

Degrees Distr.	RPM	Degrees Eng.	RPM
0	400	0	800
½-1½	500	1-3	1000
5½-6½	900	11-13	1800
8½-9½	1250	17-19	2500
10¾-12¼	2000	11½-24½	4000

① - Set Test Stand to 0° at 250 RPM
Vacuum Spark Control (292 MD): Integral type

Vacuum Advance
②(COTF-12127-B)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	5
3⅜-6¾	7½-13½	10
5½-8½	11-17	13

② - Set Test Stand to 0° at 1000 RPM and 0" of Hg
►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION See 6 Cyl above*

IGNITION TIMING

Engine	Std. Ignition Setting
6 Cyl & 292 MD	4° BTDC
292 HD (85-88 Octane Fuel)	4° BTDC
292 HD (88-90 Octane Fuel)	6° BTDC
292 HD (90-92 Octane Fuel)	8° BTDC
292 HD (92 Octane or Premium Fuel)	10° BTDC

►*TIMING CAUTION* Set timing with engine idling and vacuum line disconnected Check advance operation by accelerating engine after vacuum line connected
Timing Mark (6 Cyl) - Vibration damper marked by lines TDC (Long Mark) & 3°,5°,7°,9° BTDC Align space between 3° and 5° lines (4° BTDC), with pointer on chain case cover
Timing Mark (V8) - Timing pointer has 4 timing marks 0° 3°,6°,10° BTDC Align timing pin on damper with proper timing mark on timing pointer

CARBURETOR

►*CARBURETOR APPLICATION Holley carburetors used 'Visi-Flo' (1-Bbl) used on 6 Cyl 2-Barrel used on 292 HD, 4-Barrel used on 292 HD*
Throttle Linkage Adjustment (6 Cyl. Fordomatic Trucks): Adjust engine idle speed to 450 RPM in Dr,D2 or D1 and make anti-stall dashpot adjustment (see below). With engine stopped and carburetor on hot idle, remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission Turn throttle rod clevis until pin enters hole in lever and lengthen throttle

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rod 2½ turns. Connect throttle control rod, tighten lock nut, install clevis lock. Measure accelerator pedal height from point where linkage connects to pedal to floor mat. Distance should be 2¾". Adjust by turning threaded trunnion on accelerator connecting link.

Throttle Linkage Adjustment (V8 Fordomatic & Cruise-O-Matic Trucks): Warm up engine and adjust to correct idle speed. Make anti-stall dashpot adjustment (see below). Disconnect throttle control rod from accelerator. Insert ¼" gauge pin through holes in carburetor bellcrank. Adjust length of carburetor connecting link so carburetor is on hot idle position. Adjust accelerator connecting link so accelerator pedal height is 2¾" from floor mat to point where linkage connects to pedal. Remove gauge pin and make sure holes are aligned so pin can enter freely. With gauge pin removed, pull throttle control rod upward so transmission lever is against internal stop in transmission. Rotate clevis on throttle control rod so clevis freely fits pin on bellcrank lever. Then turn clevis **3 full turns counterclockwise** to lengthen throttle control rod. Connect rod. *For final adjustment, use pressure method as follows:*

Pressure Method of Throttle Linkage Adjustment: Make sure transmission is at normal operating temperature. Raise truck and remove 1/8" pipe plug forward of transmission levers. Install pressure gauge. Lower truck and install a tachometer. Put selector lever in any Drive position. With engine speed at 1000 RPM, pressure should be 80-85 lbs. If below 80 lbs., lengthen throttle control rod; if above 85 lbs., shorten rod. Connect rod, tighten locknut.

Anti-Stall Dashpot Adjustment: After completing engine idle adjustment (450 RPM in Dr,D2 or D1) turn off engine. Loosen dashpot locknut and hold throttle in hot idle position and bottom dashpot plunger. Clearance between bottomed plunger and throttle shaft lever should be .045-.064". To adjust, turn dashpot or dashpot adjusting nut.

HOLLEY "VISI-FLO"

Ford No. COTE-9510-S. No. COTE-9510-A, B, J or S stamped on main body fuel inlet boss.

Idle Setting - Initial setting 1-1½ turns open. Turn mixture needle in until engine runs rough (lean mixture) then back out needle until engine rolls (rich mixture). Turn needle in until engine runs smoothly. Always favor a rich mixture.

Idle Speed - 475-500 RPM Synchro-mesh Trans., 450 RPM in Dr, D2 or D1 Auto. Trans.

Fuel Level - 11/16"±1/32" below power valve mounting surface (Tool T52L-9550-AEE).

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

HOLLEY 2-BARREL

Carb. No. ①	Application
COTE-9510-C	B & F Series Synchro-mesh
COTE-9510-E	P Series Synchro-mesh
COTE-9510-D ②	B,F & P Series Auto. Trans.

① - Stamped on right front choke plate housing.

② - Serviced by COTE-9510-C (with dashpot).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - Initial setting 1-1½ turns open. Turn mixture needle in until engine runs rough (lean mixture) then back out needle until engine rolls (rich mixture). Turn needle in until engine runs smoothly. Always favor a rich mixture.

Idle Speed - 475-500 RPM (Synchro-mesh Trans.), 450 RPM in Dr, D2 or D1 (Auto. Trans.).

Fuel Level - Lower edge of sight plug opening (on side of bowl) ±1/16". To adjust, loosen lock screw on top of fuel bowl just enough to permit rotation of adjusting nut underneath. 1/6 turn of nut changes level 3/64". To lower level, always lower float 1/2 turn, then raise in 1/6 turns as necessary.

Accelerating Pump - Inner hole (closest to throttle shaft) is for warm weather, Outer hole is for cold weather.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

HOLLEY 4-BARREL

Ford No. COTE-9510-F.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel is feed Cyl. 2-3-5-8, LEFT barrel is fed 1-4-6-7.*

Idle Setting - *NOTE - Idle mixture adjusting needles used only on SECONDARY side (on each side of Fuel Metering Block).* Initial setting 1-1½ turns open. Turn mixture needles in until engine runs rough (lean mixture), then back needles out until engine begins to roll (rich mixture). Turn needles in until engine runs smoothly. Always favor a rich mixture.

Idle Speed - 475-500 RPM Synchro-mesh Trans., 450 RPM in Dr, D2 or D1 Auto. Trans.

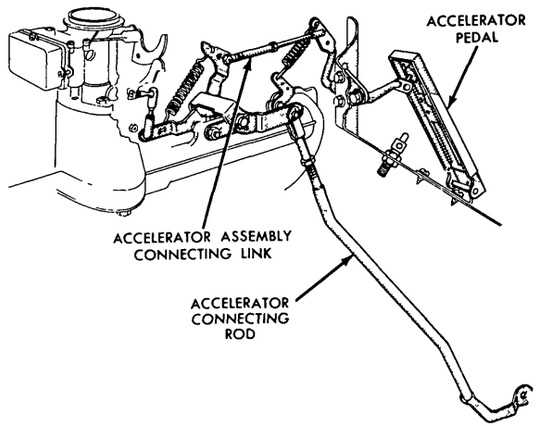
Fuel Level - At lower edge of sight plug opening (on side of bowl) ±1/16". To adjust, loosen lock screw on top of fuel bowl just enough to permit rotation of adjusting nut underneath. 1/6 turn of nut changes level 3/64". To lower level always lower float 1/2 turn, then raise in 1/6 turns as necessary.

Accelerating Pump - Inner hole (closest to throttle shaft) is for warm weather, Outer hole is for cold weather.

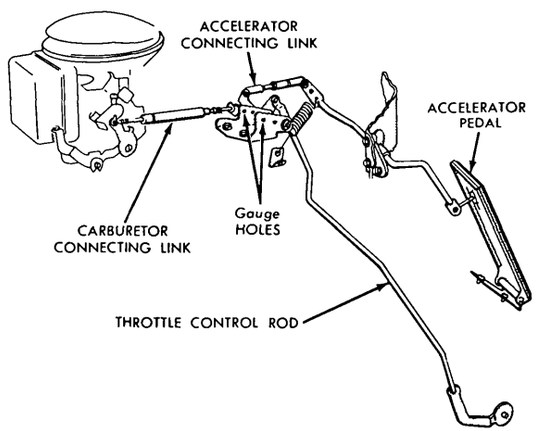
Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

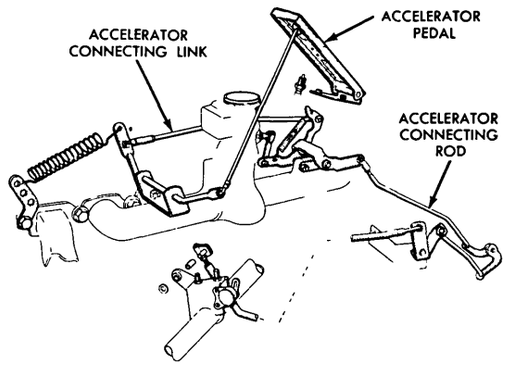
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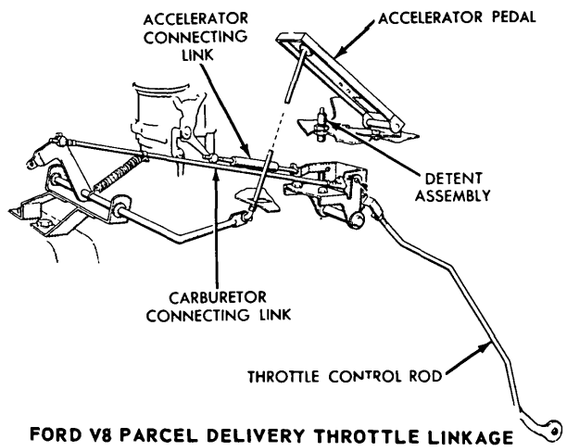
FORD TRUCK 6 CYL. THROTTLE LINKAGE



FORD TRUCK V8 THROTTLE LINKAGE



FORD 6 CYL. PARCEL DEL. THROTTLE LINKAGE



FORD V8 PARCEL DELIVERY THROTTLE LINKAGE

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CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum as follows:

Model	Ford Pump No.
6 Cyl. Fuel Only	B8A-9350-E
6 Cyl. Fuel & Vacuum	B9A-9350-B
292 MD Fuel Only	B9TE-9350-A
292 HD Fuel Only	B8T-9350-B

Fuel Pump Pressure - 6 Cyl. & 292 MD 3.5-5.5 lbs. at 500 RPM. **292 HD** 3.5-6.5 lbs. at 500 RPM. *See "Fuel Pumps" in Carburetion Section.*

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No. B7J-10804-A (P-350, 400, 500), B7A-10804-B (Others).

Dash Unit - Ford No. B7J-9280-A (P-350, 400, 500), COTF-9280-B (Others).

Tank Unit - Ford No. B8C-9275-A (F-100, 250, 350; P-350, 400, 500). No. B8C-9275-B (F-100, 250, 350; F-, B-500; F-, P-, B-600). No. B8T-9275-A (F-, B-500; F-, P-, B-600 and P-400, 500 with 30 gal. fuel tank). *See "Fuel Gauges" in Carburetion Section.*

Fuel Filter (V8): Separate filter in carburetor inlet line. Replace element every 8,000 miles (On Highway), 4,000 miles (Off Highway), or if clogged.

Air Cleaner: Oil Bath and Dry Filter Element types used. Clean as follows:

Type	Air Cleaner Service Interval (Miles) On Highway Clean	On Highway Replace	Off Highway Clean	Off Highway Replace
Oil Bath	8,000		ℂ 1,000	
Dry Type	4,000	24,000	500	4,000

℃ - 500 miles under extremely dusty conditions.

►*DRY TYPE CLEANING CAUTION:* Clean element by tapping lightly against a hard surface. DO NOT wash in solvent or other liquids. If compressed air used, direct stream from inside surface of filter element.

BATTERY

Ford No. B9A-10654-D (Exc. School Bus). 12 volt, 11 plate, 55 ampere hour capacity (20 hr. rate).

Ford No. B6A-10654-C (All). 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).

Ford No. B9A-10654-F (School Bus Only). 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

►*NOTE:* Batteries are dry type for service replacement.

Battery Ground - Negative.

Engine Ground - At flywheel housing (6 Cyl.), at left cylinder head (V8).

STARTER

Model	Starter No.	Armature No.
6 Cyl. & V8 Std. ℂ	B6A-11002-A	B6A-11005-B
6 Cyl. Auto. Trans. ②	B8C-11002-A	B9TF-11005-A
6 Cyl. & V8 Special ③	B7T-11002-A	B8C-11005-A

℃ - Ford type. ② - Autolite MDF-6013.
③ - Delco-Remy type.

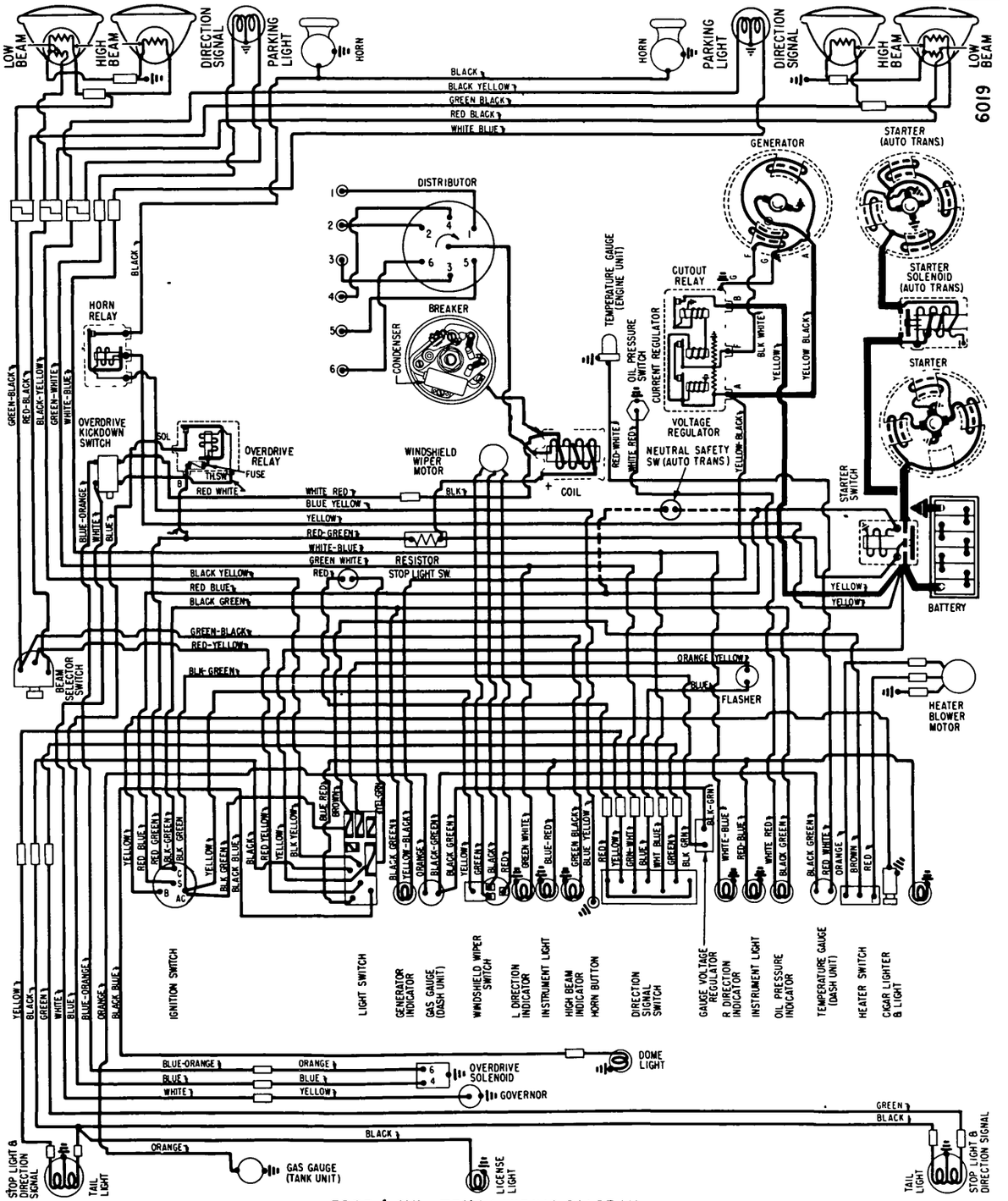
Drive (B6A-11002-A) - Bendix "Folo-Thru" type. Ford No. 1CM-11350-C.

Drive (B8C-11002-A) - Bendix "Folo-Thru" type. Ford No. B6C-11350-A.

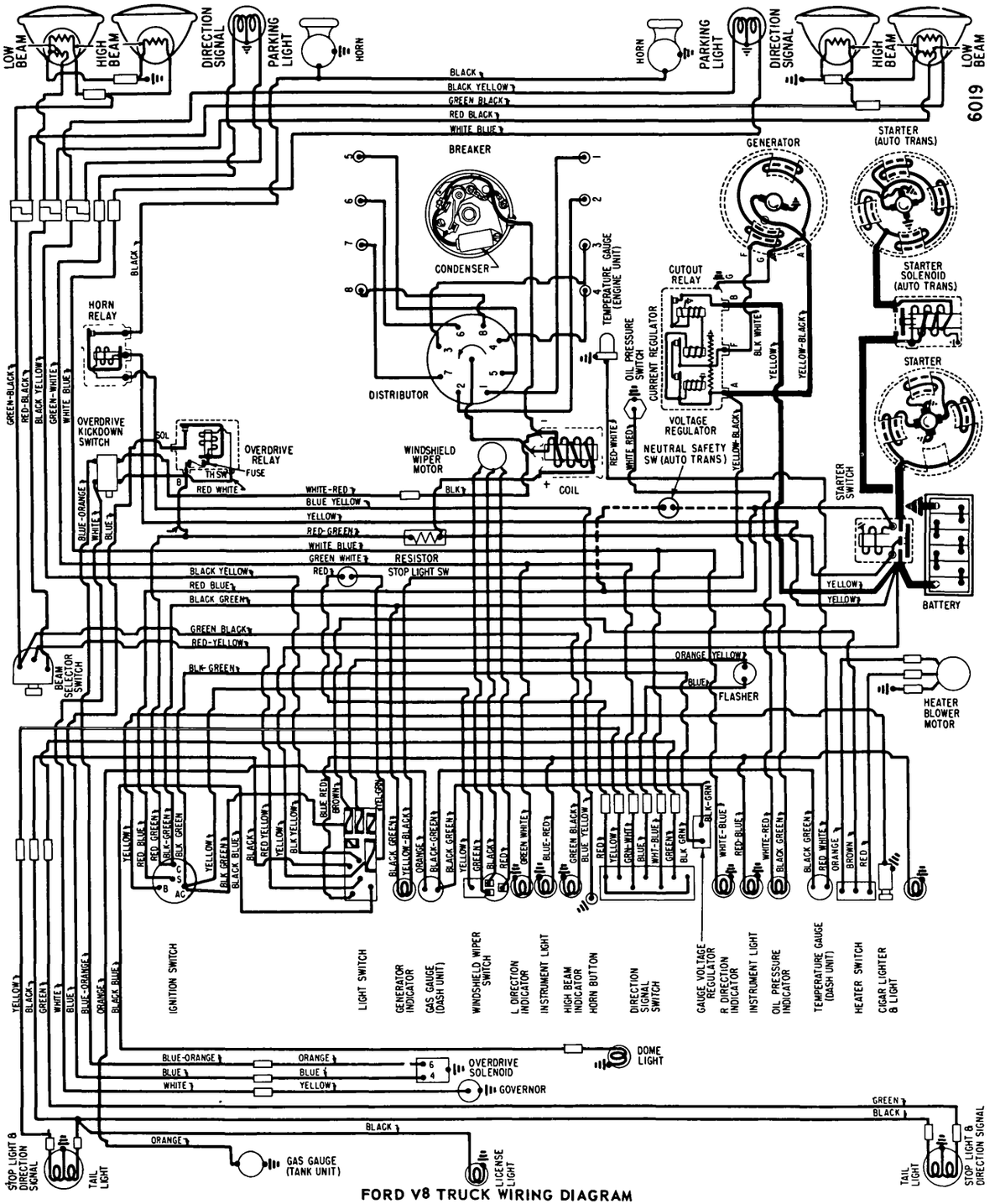
Drive (B7T-11002-A) - Delco-Remy Solenoid Pinion Shift Ford No. B8C-11350-A.

Rotation - Counterclockwise at commutator end.

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FORD 6 CYL. TRUCK WIRING DIAGRAM



FORD V8 TRUCK WIRING DIAGRAM

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Brush Spring Tensi n - 48-56 ozs. (B6A-11002-A), 42-53 ozs. (B8C-11002-A), 35 ozs. (B7T-11002-A).

Cranking Speed - 150-180 RPM (B6A-11002-A), 150-160 RPM (B7T-11002-A), 140-160 RPM (B8C-11002-A).

Performance Data - B6A-11002-A & B8C-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	②
15.5 ft. lbs.	Lock	5.0	550

Performance Data - B7T-11002-A

Torque	RPM	Volts	③ Amperes
0 ft. lbs.		12.0	80
14.2 ft. lbs.	Lock	5.0	525

① - With starter on engine and engine idling.
② - 80 amps. (B6A-11002-A), 85 amps. (B8C-11002-A).
③ - Includes Solenoid.

Starting Switch: Magnetic type, Ford No. B6A-11450-A (All), and also Solenoid Switch, Ford No. B8C-11390-A (B7T-11002-A Starter), controlled by ignition switch.

Neutral Safety Switch (Auto. Trans.): Ford No. FAC-15812-C (Fordomatic), No. B8A-15812-E (Cruise-O-Matic).

Adjustment - *See "Ford Automatic Transmissions" in Transmission Section.*

GENERATOR

Generator	Armature	①R gulat r
B9A-10002-A ②	B6A-10005-C	B7A-10505-B
B6A-10002-C ③	B6C-10005-B	B6C-10505-B
B8QH-10002-A ②	B8QH-10005-A	B8E-10505-C
B6A-10002-E ④	B6C-10005-C	B7A-10505-A
B6A-10002-F ④	B6C-10005-C	B7A-10505-A
B6A-10002-D ③	B6C-10005-A	B6A-10505-C

① - Generators must be used with Regulators as indicated.
② - Ford type. ③ - Bosch type. ④ - Autolite type.

Performance Data

Generator	Amperes	Volts	Gen. RPM
B9A-10002-A	30	15.0	2525
B8QH-10002-A	40	15.0	2500
B6A-10002-E, F	40	15.0	1800
B6A-10002-D	50	15.0	1380

Brush Spring Tension - Ford 32-40 ozs., **Autolite** 34-41 ozs., **Bosch** 16-18 ozs.

Field Current - 1.2-1.8 amps. at 12.0 volts (All).

Rotation - Counterclockwise at commutator end.

Belt Adjustment: ½" deflection measured midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Regulator	①G nerat r
B7A-10505-B Ford 30 Amp.	B9A-10002-A
B6C-10505-B Bosch 30 Amp.	B6A-10002-C
B8E-10505-C Ford 40 Amp.	B8QH-10002-A
B7A-10505-A Autolite 40 Amp.	B6A-10002-E,F
B6A-10505-C Bosch 50 Amp.	B6A-10002-D

① - Regulators must be used with Generators as indicated.

Cutout Relay

Cuts In - 12.4-13.2 volts (30 Amp.), 12.0-12.8 volts (Ford 40 Amp.), 12.5-13.9 volts (Autolite 40 Amp.), 13.0-13.5 volts (50 Amp.).

Cuts Out - 6-9 amps. (30 Amp.), 5-9 amps. (Ford 40 Amp.), 2-6 amps. (Autolite 40 Amp.), 2-8 amps. (50 Amp.), discharge current.

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V ltag R gulat r

Setting (30 & 40 Amp.) - 14.6-15.4 volts (30 Amp. & Ford 40 Amp.), 14.2-14.9 volts (Autolite 40 Amp.) at ambient temperature of 75°F.

Setting (B sch) - 14.1-14.8 volts (upper contacts), 14.1-14.6 volts (lower contacts) at ambient temperature of 75°F.

Ch cking & Adjusting - *See Ford, Autolite and Bosch 12-Volt Regulators in Electrical Section.*

Curr nt Regulator

S tting (30 Amp.) - 28-32 amperes.
S tting (40 Amp.) - 38-42 amperes.
S tting (50 Amp.) - 48-52 amperes.

Ch cking & Adjusting - *See Ford, Autolite and Bosch 12-Volt Regulators in Electrical Section.*

MISC. ELECTRICAL

►*EARLY F-100-600 SERIES IGNITION SWITCH SHORTING CORRECTION:* May be caused by insufficient clearance between "BAT" terminal of switch and inboard parking brake bracket mounting bolt, causing switch to short to ground. To correct, install shorter (½" long) bracket mounting bolts.

H adlights: 4-Headlight System. *See "4-Headlight Systems" in Electrical Section.*

Dir cti n Signals: *See Electrical Section.*

St p Light Switch L cati n: On brake master cylinder or on frame left side rail at brake pipe connector.

Lighting Switch R m val: Remove control knob and shaft by pressing spring-release button on switch housing (knob in "off" position). Turn shaft slightly and pull from switch. Remove retaining nut and remove switch, disconnecting wires, or unplugging fuse block.

CIRCUIT BREAKERS: Circuit breaker in headlight switch protects Headlights and Instrument Panel Lights. Also protects Parking and Tail Lights on H.D. Truck.

FUSES: Fuse panel integral with lighting switch (L.D. Truck), on left cowl panel to rear of air vent (H.D. Truck). All fuses on fuse panel except as noted.

15 Amp re (L.D. Truck) - Parking & Tail Lights.
15 Amp re (L.D. Truck) - Dome Light.
7.5 Amper (H.D. Truck) - Dome Light.
7.5 Amp r - Direction Signals.
7.5 Amp r - Radio.
14 Amp r - Heater Blower.
10 Amp r - Overdrive. On overdrive relay.
14 Amp r (H.D. Truck) - Cigar Lighter.
Cigar Light r (L.D. Truck) - Sulphur disc on back of lighter.

ENGINE

ENGINE SPECIFICATIONS: Own, valve-in-head. 6 Cyl. 223" and V8 292" of same designs used previously.

Engin	B r	Stroke	Displacement
6 Cyl.	3.625"	3.60"	223 cu. ins.
V8	3.75"	3.30"	292 cu. ins

Engin	C mpr. Rati	Rated HP	Developed HP
6 Cyl.	8.1-1	31.50	139 at 4200 RPM
292 MD ①	7.9-1	44.60	172 at 4000 RPM
292 HD ②	7.6-1	44.60	180 at 4000 RPM

① - With 2-Bbl. Carb. ② - With 4-Bbl. Carb.

C mpr ssi n & Vacuum R ading - *See TUNE-UP.*

►*ROCKER ARM COVER INSTALLATION NOTE (6 CYL.):* Torque cover attaching bolts to specifications twice, once initially, and again after two minutes from initial torquing, to prevent oil leaks.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Ford Special Data.*

TIGHTENING TORQUES: *See "Tightning Specifications" in Ford Special Data.*

ENGINE REMOVAL: *See "Engin " in Ford Special Data.*

OIL PAN REMOVAL (6 Cyl.): Drain crankcase, remove dipstick, flywheel housing cover and crankcase vent tube. Remove retaining bolts and remove pan.

OIL PAN REMOVAL (V8): Drain crankcase and remove dipstick. Remove converter housing dust cover (Auto. Trans. Trucks). On C-Series, position No. 1 piston at TDC. Disconnect oil inlet tube from oil pump and remove "O" ring seal from tube. Remove retaining bolts and remove pan.

6 CYL. ENGINE

►*See 1960 Ford 6 Cyl. Passenger Car Pages.* Engine is similar to that used in 1960 Pass. Cars, and all passenger car engine data applies to truck engine.

V8 ENGINES

►*See 1960 Ford V8 Passenger Car Pages.* Engines are similar to 1960 292" Pass. Car engine, and all passenger car engine data applies to truck engines EXCEPT AS NOTED BELOW.

►*292 ENGINE OIL PRESSURE LOSS CORRECTION:* If pressure lost in downgrade or angle operations, install new type oil pump screen and cover, No. COTE-6615-A. If pressure lost after sudden stops, install new design oil pan, No. COTE-6675-A.

►*PISTON & CONNECTING ROD NON-INTERCHANGEABILITY CAUTION:* Higher pistons and shorter connecting rods used in 292 HD engine. DO NOT interchange with those used on 292 MD engine.

Connecting Rod Length - 6.320-6.324" (292 MD), 6.250-6.254" (292 HD) center-to-center.

►*NOTE:* .040" Undersize connecting rod bearings also furnished.

VALVES: Exhaust Valve Stem Diameter (292 HD) - .4343-.4350".

Exhaust Valve Length (292 HD) - 4.92".

Cam Lobe Lift (292 HD) - .272" all valves.

Valve Timing Specifications (292 HD)

Intake Valves - Open 18° ① BTDC. Close 58° ① ALDC.

Exhaust Valves - Open 66° ② BLDC. Close 10° ③ ATDC.

① - Camlift .015". ② - Camlift .013". ③ - Camlift .016".

Exhaust Valve Seat Width (292 HD) - .090-.110".

Lifter-to-Bore Clearance (All) - .0005-.0021". Wear limit .0055".

Exhaust Valve Cap Clearance (292 HD) - *See "Valve System" in Ford Special Data.*

Exhaust Valve Insert Installation (292 HD) - *See "Valve System" in Ford Special Data.*

►*ROTATABLE & FREE TURNING VALVE NOTE:* Free turning type valve (cap over end of stem) used for Sodium Cooled exhaust valves on 292 HD engine. All other valves (both engines) have "Rotatable" type valve (sleeve between spring retainer and lock).

►*EXHAUST VALVE CAUTION (292 HD ENG.):* Exhaust valves are soldum cooled and require special disposal handling to prevent possibility of fire or explosion due to chemical reaction. DO NOT DISCARD SODIUM COOLED VALVES with other scrap material. Bury in ground not subjected to excavation or in deep water not subjected to dredging.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Special Data.*

Crankcas Capacity: 5 qts. refill, 6 qts. with filter change.

N rmal Oil Pr ssure: 35-55 lbs. at 2000 RPM.

Pr ssur R gulat r Valve - In pump body, not adjustable.

Oil Pr ssur Indicat r (F-100, 250, 350; F-, P-, B-600): Indicator light on instrument panel, operated by engine unit, Ford No. B6A-9278-B.

Oil Pressure Indicator (P-350, 400, 500; C-550, 600): King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No. B7J-10804-A (P-350, 400, 500), No. B7A-10804-B (C-550, 600).

Dash Unit - Ford No. B7J-9273-A (P-350, 400, 500), No. COTF-9273-B (C-550, 600).

Engine Unit - Ford No. B9T-9278-A.

See "Oil Pressure Gauges" in Miscellaneous Section.

Oil Pressure Engine Unit Location: On right side of engine above starter (6 Cyl.), at rear of oil filter (V8).

Oil Pump: Gear type mounted inside crankcase in line with distributor shaft (6 Cyl.), rotor type located outside crankcase on left side (V8).

Pump Overhaul - *See "Oiling System" in Ford Special Data.*

Oil Filter: Full-flow with pressure relief valve in center bolt, or "Disposable" type. Replace element or filter unit at 2000 mile intervals (Off Highway), 4000 mile intervals (On Highway). *NOTE* - Replace every 1000 miles under severe operating conditions.

Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter face, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - Do not overtighten.*

Crankcase Ventilation: Filter in oil filler cap (inlet) and outlet pipe at rear of engine. Clean system every 4000 miles (On Highway), 1000 miles (Off Highway), or sooner under severe operating conditions.

COOLING

Cooling System Capacity

Truck Model	① Capacity
6 Cyl. Exc. Parcel Delivery	17½ qts.
6 Cyl. Parcel Delivery	18½ qts.
V8 F-100, 250, 350	② 17½ qts.
V8 F-500, 600; B-500, 600; P-350	③ 21½-22 qts.
V8 P-400, 500	23 qts.
V8 C-550, 600	④ 28 qts.

① - Add 1 qt. for heater.
② - F-350 with Dual Rear Wheels 21½-22 qts.
③ - P-350 with Dual Rear Wheels 23 qts.
④ - Add 1½ qts. with Auto. Trans.

Pressure Valve: Radiator filler cap, Ford No. OL-8100-A, opens at 7 lbs.

Thermostat: Ford No. B7A-8575-A (157-162°F). No. B7A-8575-B (175-182°F) for use with permanent type antifreeze.

Water Pump: Packless, sealed ball bearing type. *See "Water Pump" in Ford Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford No. No. B7J-10804-A (P-350, 400, 500), No. B7A-10804-B (Others).

Dash Unit - Ford No. B7J-10883-A (P-350, 400, 500), No. COTF-10883-B (Others).

Engin Unit - Ford No. B7A-10884-A (All).
S e "T mperatur Gaug s" in Misc llan ous Section.

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CLUTCH

Long 10CF, 10½CF, & 11CF types used.

Ford No.	Cover Assembly	Long No.
B4A-7563-B or B6A-7563-B	10" ①	L5222
B7C-7563-A	10½" ②	267371
B7Y-7563-A	11" ③④	267147
Ford No.	**Disc**	**Long No.**
B7C-7550-A	10" Molded	CD870
B7C-7550-B	10½" Molded	287335
B6D-7550-A	11" Woven	CD606
B7C-7550-C	11" Molded	CD607

① - Use with Disc Ford No. B7C-7550-A, Long No. CD870.
② - Use with Disc Ford No. B7C-7550-B, Long No. 287335.
③ - Use with Disc Ford No. B7C-7550-C, Long No. CD607.
④ - Use with Disc Ford No. B6D-7550-A, Long No. CD606.

See "Long Clutches" in Clutch Section.

Clutch Pedal & Slave Cylinder Adjustments: Make sure system is free of air (bleeder screw on slave cylinder) and master cylinder is filled to within ½" below top of reservoir. Proceed as follows:

1) Adjust clutch pedal total travel by adjusting pedal bumper so clutch pedal pad is even with brake pedal pad in fully released position.

2) Disconnect release lever retracting spring, bottom slave cylinder pushrod (push as far to front of truck as possible) and pull release lever to rear of truck until release bearing touches pressure plate fingers. Clearance between slave cylinder adjusting nut and release lever should be **not less than ¼"**. *Do not let pushrod turn as nut is adjusted.* Tighten locknut securely.

3) Initial pedal free travel should be 1/8-1/4" (C-550, 600), 3/16-3/8" (Others) measured at centerline of pedal pad, before master cylinder pushrod touches master cylinder piston. To adjust, turn master cylinder pushrod eccentric bolt.

4) Final pedal free travel (adjusted clearance at slave cylinder pushrod and free travel at master cylinder pushrod) should be 1 13/16" (C-550,600), 2" (Others). *NOTE - Free travel will decrease at high RPM. Do not readjust as this condition is normal.*

Removal: Disconnect clutch pedal retracting spring and remove muffler left inlet pipe (if necessary). Remove slave cylinder attaching bolts, disconnect slave cylinder pushrod from release lever and release lever retracting spring. Remove transmission *(see "Transmission Removal" below)*. Remove clutch housing dust cover and release bearing and hub from release lever. Mark pressure plate, cover assembly and flywheel for reassembly and remove pressure plate and cover assembly-to-flywheel attaching bolts evenly and gradually to release spring tension. Remove clutch assembly through bottom of housing.

SYNCHRO-MESH TRANSMISSION

3-SPEED

Light, Medium, and Heavy Duty 3-Speed Synchro-mesh Transmissions of same designs used previously.
See "Ford Synchro-mesh Transmissions" in Transmission Section.

Removal: Drain lubricant, disconnect speedometer cable, drive shaft, and gear shift linkage at transmission. On band type (propleelr shaft) parking brake, disconnect cable clevis at cam and remove cable conduit clamp. On 4-wheel drive trucks, remove transfer case shift lever bracket from transmission. Remove transmission-to-flywheel attaching bolts and install guide studs. Pull transmission rearward until input shaft clears clutch housing and then remove transmission.

4-SPEED

Own. 4-speed synchro-mesh transmission of same design used previously.
See "Ford Truck 4-Speed Synchro-mesh" in Transmission Section.

Removal: Remove floor mat and floor plate and loosen nuts holding top of transmission to clutch housing studs. Remove shift lever if necessary (Exc. Tilt Cab). Remove transfer case shift lever bracket from transmission (if equipped). *On Tilt Cab, put transmission in neutral and tilt the cab forward. Remove rear cross shaft housing bolts, loosen rear bolt on adjustment turnbuckle and tie cross shaft housing to prevent falling.* Drain transmission, disconnect drive shaft or transfer case coupling shaft at parking brake drum. *NOTE - If coupling shaft support used, disconnect support bracket to remove shaft.* Disconnect parking brake cable or linkage, remove clutch housing dust cover and support transmission. Remove transmission attaching bolts and remove transmission carefully, pulling rearward until input shaft clears clutch housing.

TRANSFER CASE

(4-WHEEL DRIVE)

Own. 2-speed, manually controlled type, used with 4-wheel drive.
See "Ford Transfer Case" in Transmission Section.

Removal: Drain transfer case and disconnect rear drive shaft, transmission output shaft and front drive shaft at case. Disconnect shift rod and speedometer cable at case. Support transfer case, remove mounting bolts and remove case.

OVERDRIVE

Warner R10. Solenoid operated type, with governor control and throttle operated kickdown.
See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for 3-speed synchro-mesh transmission (above) after disconnecting control cable and wiring.

AUTOMATIC TRANSMISSION

Three-Speed Fordomatic and **Cruise-O-Matic** of same designs used previously.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* See *"Ford Automatic Transmissions" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Ford Automatic Transmissions" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles (Off Highway), 4000 miles (On Highway). Drain and refill every 16,000 miles (On Highway), 12,000 miles (Off Highway). **Use only Ford Automatic Transmission Fluid, Part No. B8A-19582-A.**

Checking Fluid Level - With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. With engine idling, maintain fluid at "F" mark on dipstick. DO NOT OVERFILL.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford Automatic Transmissions" in Transmission Section.*

UNIVERSALS

Needle bearing type.

►*F-100 CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened). *See "Ford Dp-Offset Hypoid" in Rear Axle Section.*

►*UNIVERSAL JOINT INSTALLATION CAUTIONS:* To prevent early failure and vibration, the following cautions must be observed: 1) Bearing retaining strap must be correctly positioned in cast recess in universal joint flange before tightening attaching U-bolts. 2) Front and rear universal joint flanges or yokes on coupling shafts and drive shafts must be positioned in the same plane with each other.

FRONT AXLE

4-WHEEL DRIVE

Spicer Model 44-4F. Full-floating, hypoid gear type. *See "Ford 4-Wheel Drive Front Axle" in Rear Axle Section.*

Axle Ratios - *See table under REAR AXLE below.* *NOTE* - Letter "E" following axle code on patent plate identifies both front and rear axles on 4-wheel drive trucks.

Axle Shaft: Removal - Remove hub grease cap, hub retaining snap ring, slide driving hub from between axle shaft and wheel hub and remove driving hub spacer. Remove locknut, washer and wheel bearing adjusting nut from spindle and remove wheel, hub and drum assembly (outer bearing will also come out). Remove inner bearing. Remove oil baffle from brake carrier plate. Remove brake carrier plate and spindle from spindle arm (unnecessary to disconnect brake line). Support carrier plate. Remove axle shaft assembly.

Installation & Wheel Bearing Adjustment - Install axle shaft assembly. Install spindle and brake carrier plate on spindle arm, tighten retaining screws and install oil baffle. Install wheel inner bearing on spindle, driving hub spacer, and wheel outer bearing and adjusting nut. While rotating wheel forward and rearward, tighten bearing adjusting nut with Tool T59T-1197-A until bearings are firmly seated and then back off adjusting nut 1/8 turn (45°). Install lockwasher on spindle (locking dowel on adjusting nut must enter lockwasher hole most closely aligned with dowel). Torque locknut to 40 ft. lbs. Install driving hub, snap ring and grease cup. Fill spindle arm with proper lubricant.

Spindle Arm: Removal - With axle shaft removed (see above), disconnect steering drag link from spindle arm and spindle connecting rod at both spindle arms. Remove 2-piece seal retainer from spindle arm, felt, rubber and steel rings from spindle arm (place on axle housing). Remove upper and lower spindle arm bearing caps and shims and remove spindle arm. Remove upper and lower spindle bearings with Tool T58L-101-A inserted in bearing and Puller Tool T50T-100-A.

Installation - Make sure felt and rubber seals and steel retainer are placed on axle housing in same order as removed (felt seal toward center of truck, then rub-

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ber seal and steel retainer). Install upper and lower spindle bearing cups in axle housing with Handle T53L-200-A and Driver T57P-4625-A and place bearings in cups (retain lower bearing with wheel bearing grease). Install spindle arm on axle housing and install upper and lower bearing caps (use old shims for a trial pack). Torque bearing cap bolts and stud nuts to 25 ft. lbs. Check bearing preload by rotating spindle arm with an inch-pound torque wrench installed on one of the bearing cap bolt heads. Turning torque should be 50-70 inch-pounds. Adjust shim pack at bearing caps to obtain correct preload. Install steel retainer, rubber and felt seals and 2-piece retainer. Connect spindle connecting rod and drag link. Install axle shaft assembly and adjust wheel bearing (see above).

Axle Housing Removal: Raise truck so front axle hangs freely. Remove axles and spindle arms (see above). Disconnect shock absorbers at lower end and front drive shaft at pinion flange. Support axle and remove spring clip (U-bolt) nuts and spring seats. Remove axle housing assembly.

REAR AXLE

►*AXLE RATIOS & IDENTIFICATION CODE:* Identification code for various axle ratios (see table below) stamped on truck patent plate under AXLE.

Axle Ratio Identification

Code	Ratio	Code	Ratio
OA Ⓒ	3.73-1	07	5.14-1
OB Ⓒ	3.92-1	08, B1	5.83-1
OD Ⓒ	4.56-1	22, B2, K2, S2	6.20-1
OF Ⓒ	4.88-1	23	6.50-1
01	3.70-1	24, B4, K4, S4	6.80-1
02	3.89-1	25	7.17-1
03	4.11-1	S6	7.20-1
04	4.56-1	51, E1, N1	5.83-1/8.11-1
05	4.86-1	E2, N2	6.33-1/8.81-1
06	4.88-1	53	6.50-1/9.04-1

Ⓒ - Power-Lock Differential.

SEMI-FLOATING

Own. Separate carrier, hypoid gear, with Hotchkiss Drive.
See "Ford Deep-Offset Hypoid" in Rear Axle Section.
Spicer Model 44. Used with Power-lock Differential.
See "Ford Truck Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Ratios - *See Table above.*
Backlash - .004-.009". Max. variation between teeth .003".

Axle Shaft Removal: Remove wheel and brake drum. Remove axle bearing retainer nuts (work through opening in axle shaft flange). Use Puller No. 4235-N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Axle Assembly (Spicer): *See "Full-floating (Integral Housing) Removal" following.*

Carrier Assembly Removal: Remove axle shafts (see above) and drive shaft. Remove carrier attaching nuts and remove carrier. *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint and removing pinion retainer attaching bolts.

Wheel Bearing Adjustment: None required.

FULL FLOATING

Full floating, hypoid gear, with Hotchkiss Drive. Both Integral Carrier and Banjo Housing types used. "Power-Lock" Differential optional on some models.
See "Ford Truck Hypoid", "Ford Truck Hypoid (Banjo Housing)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Ratios - *See Table above.*

Axle Shaft Replacement: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

Axle Assembly Removal (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking brake cable (if equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring U-bolts, remove axle assembly.

Carrier Removal (Banjo Housing): Remove axle shafts (see above), disconnect drive shaft at rear joint flange. Support carrier assembly and remove carrier attaching bolts. Tighten puller screws (if provided) to loosen carrier from housing. Remove carrier.

Wheel Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher. Adjust bearings by turning bearing adjusting nut (inner nut) until tight, then back off 3/8 turn. Install bearing lockwasher. *NOTE - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel.* Install bearing locknut and tighten. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over lockmut. Install axle shafts.

TWO-SPEED

Own. Electrically operated shift, two-speed, full-floating spur gear planetary unit (reduction gearing). Spiral bevel gear final drive.
See "Ford Truck Two-Speed" in Rear Axle Section.
Axle Ratios - *See Table above.*
Backlash - .006-.016".
Axle Shaft Removal: *See "Full Floating" above.*
Carrier Removal: Same as for "Full Floating" above after unit shifted into low ratio and electric shift unit removed from carrier.

SHOCK ABSORBERS

Direct acting, non-adjustable. Serviced by replacement.

Ford Shock Absorber Nos.

Model	Front	Rear
F-100	B7C-18124-A	B7C-18125-A
F-100, 250 (4WD)	B9T-18124-A	B9TZ-18125-A
F-250	B7C-18124-A	B9TZ-18125-A
F-350	B7C-18124-A	B3Y-18125-A
P-350, 400	B7J-18124-B	B9TZ-18125-A
P-500	B7J-18124-A	Ⓒ B3T-18125-A
F-, B-500	B8T-18124-A	Ⓒ B3T-18125-A
F-, B-, P-600	B8T-18124-A	B3T-18125-A
C-550, 600	② B7T-18124-B	B3T-18125-A

Ⓒ - No. B7J-18125-A with 2-speed axle.
② - No. B7T-18124-C on C-600 with H.D. springs & 7000 lb. axle.

FRONT SUSPENSION

Conventional "I" beam section front axle with Reverse-Elliot ends and semi-elliptical springs.
Kingpin Inclination - 7½° (4-Wheel Drive), 5½° (C-550, 600), 4° (All Others) crosswise.
Caster - As follows:

Model	Ⓒ Manual Steering	Ⓒ Power Steering
F-100, F-250	②3°	6°
F-350	3¾°	6¾°
P-350	4°	4°
P-400	3°	6°
F-500 (130" WB)	3¾°	6¾°
F-500 (154" WB)	4½°	7½°
B-500, B-, F-600	4½°	7½°
P-500 (137" WB)	3°	6°
P-500 (154" WB)	3½°	6½°
C-550, C-600	3°	3°

Ⓒ - Maximum variation between wheels ½°.
② - 3¼° with 4-Wheel Drive.

Camber - 1½° (4-Wheel Drive), 1° (All Others). Maximum variation between wheels ½°.
Toe-In - 1/16" (All Models). *NOTE* - When checking toe-in on trucks with power steering, engine should be running so that power steering control valve will be properly centered.

Wheel Bearing Adjustment: Tighten adjusting nut while rotating hub until noticeable drag is felt, then back off nut until nearest slot in nut is aligned with cotter pin hole in spindle (1/6-1/4 turn), install cotter pin.

STEERING

Manual: Gemmer Worm & Roller type.
See "Gemmer Worm & Roller" in Steering Section.
Power Steering: Ford Linkage type. Used in conjunction with standard steering gear.
See "Ford Truck Linkage Type Power Steering" in Steering Section.
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*
Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Bendix Hydraulic. *See table below for various types and truck application.* Hand lever applies rear wheel service brakes on F-100, 250 and some P-350 models. Independent transmission mounted drum type parking brake with either contracting band or internal expanding shoe type brake used on all other models.

Brake Type Application

Model	Front	Rear
F-100	Duo-Servo	Duo-Servo
F-250; F-, P-350; P-400	Uni-Servo	Duo-Servo
C-550, 600	Uni-Servo	Two Cyl.
F-, B-, P-500; F-, B-600	Uni-Servo	Two Cyl.

Uni-Servo - Ford-Bendix. Single anchor. Wheel cylinder actuates primary shoe. Ratchet adjusting screw.
See "Ford Truck Bendix Uni-Servo" in Brake Section.
Duo-Servo - Ford-Bendix. Single anchor, self-energizing. Wheel cylinder actuates both shoes. Ratchet adjusting screw.
See "Ford-Bendix Hydraulic" in Brake Section.

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Two-Cylinder Typ . Two wheel cylinders in each brake assembly.
See "Ford Truck Self-Centering" in Brake Section.

►*F-, B-500, 600 ERRATIC OR DRAGGING BRAKE CORRECTION:* May be caused by improper brake shoe-backing plate clearance. This specification should be .045".

Clearance (Duo-Servo & Uni-Servo) - Adjusting screw backed off 10-12 notches from point where shoes are against drum.

Clearance (Two-Cylinder) - Adjust each shoe by turning adjusting cam in direction of forward wheel rotation until shoes drag, then back off adjusting cam until shoes are just free.

Parking Brake (Transmission Mounted): External contracting or internal expanding types used.

Parking Brake Specifications

Model	Drum Diam	Drum Width	Lining Length	Lining Thickness
External	8.0"	2.0"	24.63"	.156"
External	7.812"	2.5"	①	.250"
Internal	9.0"	2.0"	②	.210"

① - Three segments. Two segments 7.89" long each, and one segment 7.3" long.
② - Two shoes. Lining on each is 10.57" long.

Adjustment (External Type) - With hand lever fully released (cable operated), in first notch (rod type linkage), make sure flat part of cam rests on brake band bracket. Remove clevis pin and adjust clevis to correct.

1) Remove adjusting screw lockwire and turn screw to obtain .010" clearance between lining and drum at anchor bracket. Replace lockwire.
2) Loosen adjusting screw nut for lower half of band and turn screw to obtain .010" clearance between lining and drum at lower half of brake band, then tighten locknut.
3) Turn upper band adjusting rod nut to obtain .010" clearance between upper band lining and drum.

Adjustment (Internal Type) - With hand lever released, remove linkage adjusting clevis pin. Lengthen actuating link by turning clevis until shoes seat against drum with clevis pin installed. Remove pin and shorten linkage until there is a minimum of .010" clearance between shoes and drum (measure all around drum with clevis pin installed).

Standard Master Cylinder: Located on engine side of firewall (F & B Series), under instrument panel beside brake pedal arm (C Series), above left frame side member under driver's seat (P Series).

HYDRAULIC BRAKE SPECIFICATION TABLE

Truck Model		Brake Drum Diameter (Inches)		Brake Lining Dimensions (Inches)						Brake Cylinder Bore Diameter (Inches)	Brake Master Cylinder Piston Diameter (Inches)
				Length		Width		Thickness			
		Normal	Maximum Oversize	Primary	Secondary	Primary	Secondary	Primary	Secondary		
F-100	Front	11	11.060	11.96	11.96	2	2	0.187	0.250	1 1/16	1 1/16
	Rear	11	11.060	11.96	11.96	1 3/4	1 3/4	0.187	0.250	7/8	
F-250	Front	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	1 1/4
	Rear	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	
F-350	Front	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	1 1/4
	Rear	13	13.060	12.71	13.95	2 1/2	2 1/2	0.250	0.250	1 1/4	
P-350 (Spicer 60 or Timken B140 rear axle)	Front	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	1 1/4
	Rear	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	
P-350 (Timken B 140 rear axle), P-400	Front	12 1/8	12.185	11.63	13.09	2	2	0.250	0.300	1 1/8	1 1/4
	Rear	13	13.060	12.71	13.95	2 1/2	2 1/2	0.250	0.250	1 1/4	
F-500, B-500	Front	13	13.060	12.68	13.95	2 1/4	2 1/4	0.250	0.250	1 5/16	1 1/4
	Rear	15	15.060	15.31	15.31	4	4	0.375	0.375	1 1/2	
P-500	Front	13	13.060	12.68	13.95	2 1/4	2 1/4	0.250	0.250	1 5/16	1 1/4
	Rear	14 1/8	14.185	14.42	14.42	3 1/2	3 1/2	0.375	0.375	1 1/2	
F-, B, C 600, C-550 (max 6000-lb front axle)	Front	14	14.060	13.66	15.03	2 1/2	2 1/2	0.250	0.250	1	1 1/4
	Rear	15	15.090	15.31	15.31	4	4	0.375	0.375	1 1/2	
C-600 (7000 lb front axle)	Front	16	16.060	16.75	16.75	2 1/2	2 1/2	0.250	0.250	1 1/4	1 1/4
	Rear	15	15.090	15.84	15.84	4	4	0.375	0.375	1 1/2	

Checking Fluid - Maintain fluid level to within ½" of top of filler neck.

Removal - On power brake trucks, relieve vacuum from system (engine stopped). Disconnect stoplight switch wires and brake line at master cylinder. Force as much fluid as possible from master cylinder (depress brake pedal several times). Remove rubber boot from rear of cylinder. On P Series, remove brake pedal return spring and master cylinder pushrod and boot. On all series, remove attaching bolts and remove master cylinder.
ACCESS NOTE - On C Series, roll back floor mat and remove floor plate. On P Series, turn front wheels to extreme left and remove fender apron.

Power Brakes: Hydrovac type booster used on F-250, 350; P-350, 400. Midland type booster used on all others.
See "Hydrovac Power Unit" or "Midland Power Unit" in Brake Section.

Checking Fluid - Std. master cylinder used, see above.

Removal (Midland) - Depress brake pedal several times to relieve vacuum (engine stopped). Disconnect hydraulic lines and vacuum hose from booster. On frame mounted unit, disconnect air breather hose but DO NOT remove breather or vacuum check valve unless necessary for repairs. On all units, remove mounting bolts and remove booster.

Removal (Hydrovac) - Depress brake pedal several times to relieve vacuum (engine stopped). Remove booster air inlet tube. Disconnect hydraulic lines and vacuum hose at booster, remove mounting bolts and remove unit.

MISC. MECHANICAL

Windshield Wiper: Vacuum or Electric types with Link & Crank Arm type linkage.
See "Windshield Wipers" in Miscellaneous Section.

►*AIR CONDITIONED CAR SERVICE CAUTION B fore disconn cting any part of air c nditioning equipment or lines for acc ss to ngine, see "Air Conditi ning S rvic Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to right front body pillar between door hinges.

First Numb r–5001 up (each year) At both plants

►*SERIAL NUMBER NOTE. Serial number (example #55LA5001H#) includes following identification data in sequence.*

Year①	Assy. Plant②	Serial No.	Eng. Type
55	LA	5001	H

①–Last two digits of model year

②–Assembly Plant Code. **LA** (Los Angeles), **WA** (Wayne)

TUNE-UP

COMPRESSION PRESSURE: 135 lbs ± 10 lbs at cranking speed

VACUUM READING: (1954) 18-21" at 450 RPM in neutral. (1955) 19-20" at 500 RPM in neutral

VALVE TAPPET CLEARANCE: None in service (hydraulic)

MANIFOLD HEAT CONTROL: (Early 1954)–"Duckbill" type thermostatic valve located inside right end of cross-over pipe near flange

Lat 1954 & 1955 (Singl Exhaust)–"Butterfly" type valve located at right end of cross-over pipe at flange

1955 Dual Exhaust–"Butterfly" type located at rear flange on right manifold

►*BUTTERFLY TYPE MANIFOLD VALVE INSTALLATION CAUTION* When installing valve assembly, make sure counterweight portion is toward right front of engine

►*BUTTERFLY TYPE MANIFOLD VALVE INSTALLATION ON EARLY CARS:* Crossover pipe, Lincoln Part No EAD-5267-F, Right hand exhaust manifold, Part No EAD-9430-D, and longer studs, Part No 354055-S must be used when installing later type heat control valve Part No EAD-9685-C

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2

Cylind rs–RIGHT BANK 1-2-3-4 LEFT BANK 5-6-7-8

SPARK PLUG GAP: 033- 037" (Champion H-10) 032-036" (Champion 870)

Spark Plugs (1954)–Champion H-10 14mm , or equivalent Tighten plugs to 24-30 ft lbs

Spark Plugs (1955)–Champion 870 18mm special

►*1955 SPARK PLUG CAUTION Spark plug is new type with a tapered s at and do s not require a sealing gasket It is important th t plugs be tightened to 15 ft lbs. exactly*

COIL Lincoln No. 8BA-12029.

Igniti n Current–3 amps idling, 5 amps stopped.

►*COIL HIGH TENSION LEAD CAUTION (Radio Equipped Cars)* Coil-to-Distributor lead is SPECIAL SUPPRESSOR LEAD (non-metallic with carbon impregnated nylon or rayon core) and the special length (approx. 14-1/2") is required for proper radio reception *DO NOT SHORTEN LEAD OR USE ANOTHER TYPE FOR REPLACEMENT.*

DISTRIBUTOR: (Early 1954)–Linc ln N . FAF-12127-B; (Late 1954)–FDD-12127-A; (1955)–FDL-12127-B

►*1954 DISTRIBUTOR (FAF-12127-B) OVER-ADVANCING WHEN ENGINE STARTED AT LOWER TEMPERATURE CORRECTION:* This condition noted when engine detonates excessively after starting under low temperature conditions Install Pin and Post Assembly, Lincoln Part No FDC-12357-A which limits distributor advance to 15° to 15½° FAF-12127-B distributors that have been reworked in production are identified by the part number prefix "ED" *CAUTION–When calibrating a corrected distributor refer to Automatic Advance Table for FDD-12127-A distributor. See "Ford, Lincoln, Mercury Distributor" in Electrical Section.*

Condenser–Lincoln No. FAB-12300-A **Capacity** .21-25 microfarad

Contact Point Set–Lincoln No FAB-12171-B.

Breaker Gap– 014- 016"

Cam Angle–26-28 5°

Breaker Arm Spring Tension–17-20 ozs

Rotation–Counter-clockwise viewed from above.

Advance Performance–FAF-12127-B①

►With Distributor on Test Stand

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
2-3	0 19	300
5½-6¾	0 51	500
10¼-11¼	1 32	1000
11¼-12¾	1 63	1400
15¼-16¼	2 65	2000

①–Distributors **without** correction for "Over-Advance" See Distributor Correction (above)

Advance Performance–FDD-12127-A②

►With Distributor on Test Stand

Distr Degrees	Vacuum (" of HG)	Distr RPM
0	0	200
2 3	0 19	300
5½-6¾	0 51	500
10¼-11¼	1 32	1000
11¼-12¾	1 63	1400
15-15¼	2 65	2000

②–Use this table for FAF-12127-B distributors that have been corrected for "Over-Advance" See Distributor Correction (above)

Advance Performance–FDL-12127-B

►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
4-1/2–5-1/2	62	500
10-11	1 76	1000
11-1/2–12-3/4	2 17	1500
12-1/4–13-1/2	2.35	2000

►*DISTRIBUTOR INSTALLATION NOTE* It may be necessary to crank engine slightly to engage oil pump hex shaft with distributor shaft Procedure will not disturb timing because distributor engages camshaft gear before distributor shaft starts to engage with oil pump drive

Initial Distribut r Timing: Rotate engine until timing mark on crankshaft dampener is lined up with pointer and #1 piston is in firing position. Install distributor with points just breaking and the rotor in position to fire #1 cylinder (vacuum advance connection boss should be at approximately right angles to crankshaft and pointing toward left side of engine).

IGNITION TIMING

Setting–3° BTDC (1954), 5° BTDC (1955)

Timing Mark–Crankshaft pulley marked TDC with ten lines (each line representing 2°) before this point. Align correct timing mark (see Setting above) with pointer on engine front cover

CARBURETOR
1954 MODELS

Lincoln EAD-9510-N "Centri-Quad" four-barrel downdraft type with automatic choke

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels 1-4-6-7*

►*CARBURETOR SERVICE REPLACEMENT NOTE:* Carburetor Assembly, Lincoln Part No. ED-EAD-9510-S (with new type bowl cover to prevent fuel spill-over on sharp right turns) available for service replacement.

►*EXTERNAL VENT PRODUCTION CHANGE:* An adjustable spring clip, Lincoln Part No. EAD-99608-A used in production, and available for service on earlier carburetors to provide a means of closing off lower vent holes in accelerator pump rod for better starting in cold weather. *See "Lincoln-Mercury Centri-Quad" in Carburetor Section.*

►*CARBURETOR "SPILL-OVER" ON SHARP RIGHT TURN CORRECTION:* To prevent spill-over on cars with external vent, replace carburetor bowl cover assembly with Lincoln No. ED-EAD-99983-F. *See "Lincoln-Mercury Centri-Quad" in Carburetor Section.*

►*CHOKE HEAT TUBE ASSEMBLY & INTAKE MANIFOLD PRODUCTION CHANGE:* New assemblies entered production in early June to prevent exhaust gas leakage into choke control heat tube assembly. Previous type heat tube assemblies are retained for service replacement on early cars, and later type heat tubes and manifold assemblies can be installed.

Idle Setting–Exactly 1¼ turns open (set both screws alike)

Idle Speed–400-425 RPM with selector lever in "Drive"

► *1955 IDLE SPEED-UP CONTROL ON AIR CONDITIONED CARS* This automatic throttle control device may be found on 1955 cars (increases engine idle speed to 800 RPM with air conditioning turned on and transmission selector lever in Neutral). *For adjustment, see "Carburetor" on 1956 Lincoln.*

External Vent Seasonal Adjustment: (See "External Vent Production Change" above). On carburetors where spring clip is provided on hollow accelerator pump rod to control vent opening, adjust clip to open or close vent hole for best operation as follows

Winter Operation (Temperatures below 50°F)–Slide clip down on pump rod so that vent hole is CLOSED

Summ r Op rati n (T mp ratur s abov 50°F)–Slide clip upward on pump rod so that full diameter of vent hole is OPEN

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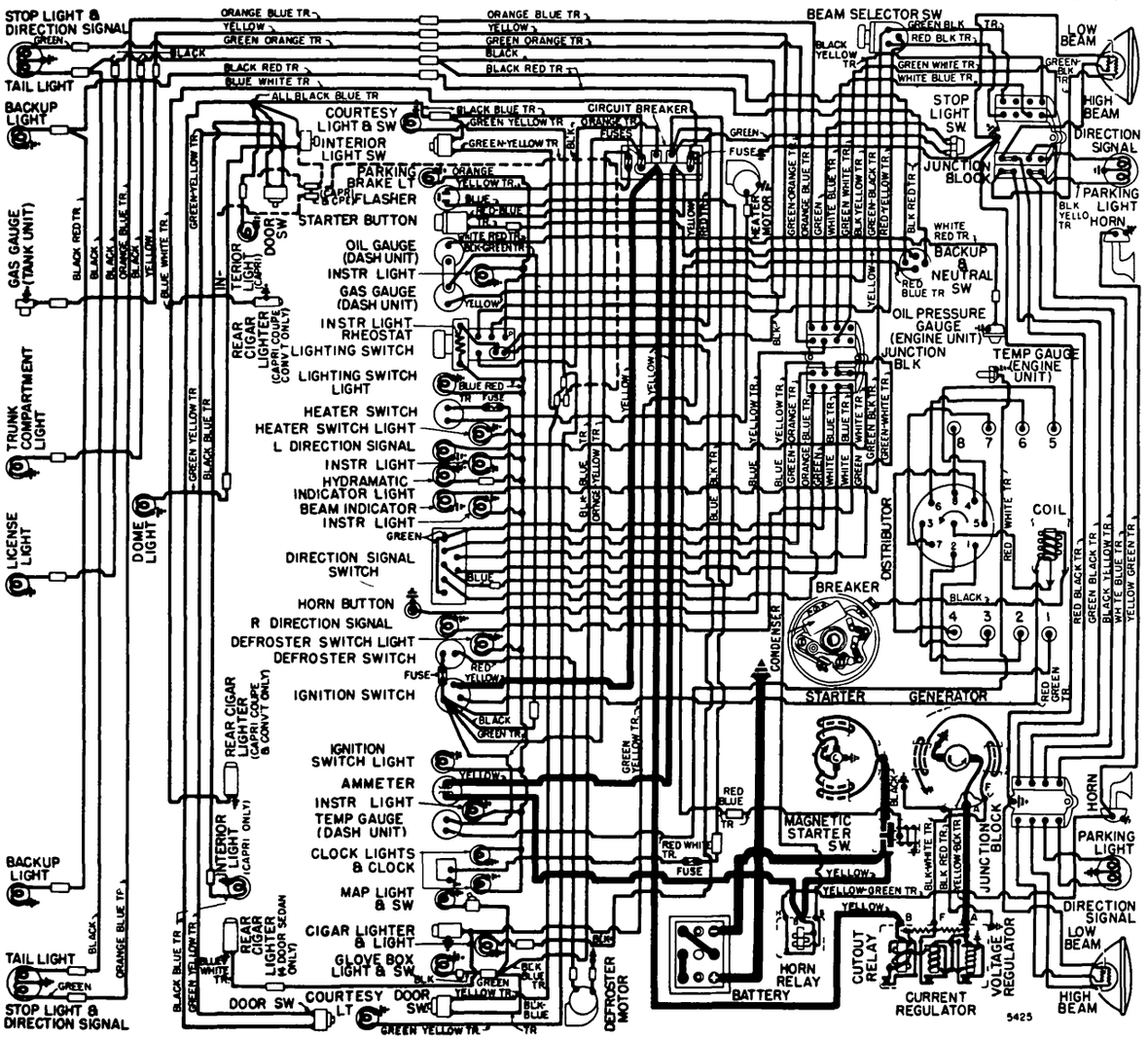
Hydra-Matic Thr ttl Linkag Adjustm nt: With engine at normal operating temperature (choke valve wide open and fast idle inoperative) adjust engine idle speed to 400-425 RPM with transmission selector lever in "N" (Neutral) and turn off engine Disconnect transmission throttle rod at forward end by taking out clevis pin. Adjust carburetor throttle rod by loosening locknut and turning adjusting clevis on rod so that carburetor throttle lever stop screw is against stop, and control shaft assembly is against its stop. Tighten locknut against adjusting clevis *(CAUTION—Throttle rod ends must be in alignment to prevent binding).* Hold throttle lever in slow idle position (stop screw against its stop), and push down firmly on transmission throttle rod so that lever is in its stop position, adjust clevis on forward end of rod so that clevis pin enters freely, then remove pin and **shorten the rod three full turns of clevis.** Connect rod and tighten clevis locknut Check shift points by road testing car

►*OTHER DATA: See "Lincoln & Mercury Centri-Quad" in Carburetion Section*

Fuel Pump Pressure: 3 5-4 5 lbs at 900 RPM

1955 MODELS

Lincoln EBJ-9510-D (Early); EBJ-9510-F, H (Late).



1954 MODELS

"Centri-Quad" four-barrel downdraft type with automatic choke

►*CARBURETOR INSTALLATION CAUTION (First cars with Choke Inlet Air Tub Washer in Thr ttl Body): See "Lincoln & Mercury C ntri-Quad" in Carburetor Section.*

►*AUTOMATIC CHOKE ROD ADJUSTMENT: Must b correct for proper starting and automatic chok op r- ation. See "Lincoln & M rcury C ntri-Quad" in Carburetor Section*

►*MANIFOLD FUEL DISTRIBUTION Carbur tor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7*

Idle Setting—1-1/2 turns open (set both screws alike). **Idle Speed**—425-450 RPM with selector lever in "Drive"

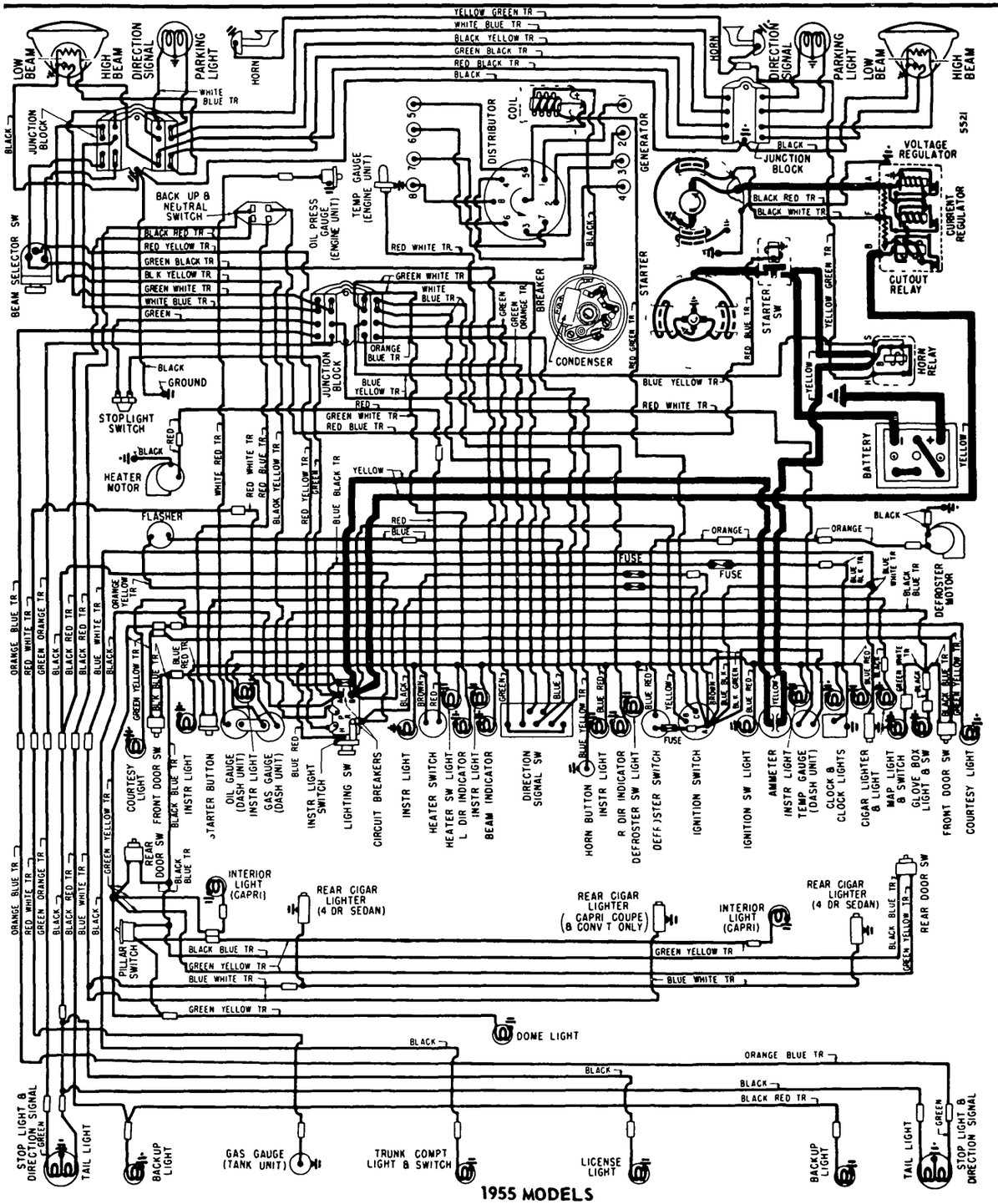
Dashpot Adjustment: Hold dashpot piston in to limit of travel, turn adjusting screw in or out until clearance between screw and dashpot piston rod is .045-.064".

Automatic Throttle Control Adjustment (Air-C nditioned Cars): With engine adjusted to normal idle speed (425-450 RPM , selector lever in "D"), and engine at normal operating temperature, turn air-conditioner "ON" and place transmission selector lever in "N" (Neutral) position Loosen adjusting screw locknut on end of operating rod and adjust knurled adjusting nut to provide an idle speed of 800 RPM. Tighten locknut. Check operation of Automatic Throttle Control to make sure idle speed return to normal idle when transmission is shifted out of "N" (Neutral), or air-conditioner is turned off.

Turbo-Drive Throttle Linkag Adjustm nt: Adjust the engine idle speed to 425-450 RPM with fast idle cam in low idle position and transmission in "Dr" range. Disconnect clevis pin from transmission control-to-accelerator shaft assembly and transmission control shaft-to-transmission rod assembly. Disconnect carburetor-to-transmission control shaft rod assembly. Insert gauge pin through bracket and bellcrank tab. Adjust carburetor-to-transmission control shaft rod assembly so that it fits freely. Reassemble rod assembly and remove gauge pin. Pull upward on transmission control shaft-to-transmission rod assembly to position throttle lever against its internal stop. Adjust transmission control shaft-to-transmission rod clevis so that clevis pin enters clevis and lever on transmission control-to-accelerator shaft assembly freely. Lengthen rod by turning clevis 2-1/2 turns and reassemble. With ignition off and accelerator pedal depressed to full kickdown position, adjust length of toggle rod assembly so that nylon bushing fits in the slot in the transmission control-to-accelerator shaft lever assembly within .25" clearance (approximately). Adjust toggle rod assembly so that it is in a vertical plane when viewed from front of vehicle. This is done by loosening jam nut and turning stud with a screwdriver in desired direction. Retighten jam nut after making adjustment.

Turb -Driv Thr ttl Linkage Adjustm nt (Optional Method): *See "Turbo-Drive" in Transmission Section.*

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1955 MODELS

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►*OTHER DATA: S "Linc ln & M rcury Centri-Quad" in Carburetor Section.*

Fuel Pump Pressure: 3.5-4.5 lbs. at 900 RPM.

CARB. EQUIPMENT

►*CARBURETOR AIR CLEANER INSTALLATION CAUTION: The indentation at bottom of air cleaner and the words "Front" on side of cleaner must face front of engine.*

►*1954 AIR CLEANER GASKET & HOLD-DOWN WING SCREW PRODUCTION CHANGE (To Correct Air Cleaner "Flexing" and Wing Screw Breakage):* The paper gasket has been replaced in production and for service by a neoprene gasket, Part No EAD-99654-B, and the previous wing screw has been replaced by a longer screw. Part No 354535-S8B. When installing the neoprene gasket, apply a coat of cement to both surfaces before inserting in air cleaner.

Fuel Pump: Lincoln No. EAD-9350-E (1954); EAD-9350-F (1955). Fuel & Vacuum type with magnetic type filter

Pressure—3.5-4 5 lbs , at 900 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric type.

Dash Unit—Lincoln No. FAF-9280-A (1954); FDL-9280-A (1955).

Tank Unit—Lincoln No. FAB-9275-A.

See "Fuel Gauges" in Carburetion Section.

BATTERY

►*LINCOLN BATTERY REPLACEMENT CAUTION: Us only a replacement battery with terminal posts on sam side. Damage to battery will result if battery with diagonal terminal posts used.*

Lincoln No. FAA-10655-E. 6 volt, 21 plate, 110 ampere hour capacity (20 hr. rate).

Location—Under front compartment toe-boards on right side of car.

Battery Ground—Positive, to frame side rail.

Engine Ground—Engine cylinder head to dash.

STARTER

Lincoln No. FAC-11002-B (1954); FAC-11002-G (1955).

Armature—Lincoln No 52-11005 (FAC-11002-B), FAC-11005-B (FAC- 11002-G)

Drive—Lincoln No 1CM-11350-C Bendix "Folo-Thru"

Rotation—Counter-clockwise at commutator end

Brush Spring Tension—48-56 ozs

Cranking Speed—115-125 RPM

Performance Data—FAC-11002-B

Torque	RPM	Volts	Amperes
0 ft lbs	①	6 0	70
14 ft lbs	Lock	3 5	700

Performance Data—FAC-11002-G

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	6.0	70
14 ft. lbs	Lock	3.5	700

① —With starter on engine and engine running.

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Removal: Remove battery-to-starter cable. Remove attaching bolts holding steering idler arm support to frame lower support and remove idler arm assembly. Remove capscrews holding endplate to converter housing and remove starter by pulling out and down until starter drive clears housing.

Starting Switch: Lincoln No. B5A-11450-A *(NOTE—This relay is a sealed type and replaces the relay formerly used).* Mounted on frame side rail adjacent to starter, and controlled by Ignition Switch and Automatic Transmission Neutral Safety Switch.

Neutral Safety & Back-up Light Switch (1954): Lincoln No. FAB-15812-A (Without Power Steering); FAD-15812-A (With Power Steering). Located at lower end of steering column.
Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

Neutral Safety & Back-up Light Switch (1955): Lincoln No. FDK-15825-B (Switch Terminal). Located on steering column inside passenger compartment. Supersedes previous switch location.
Adjustment—*See "Turbo-Drive" in Transmission Section.*

GENERATOR

Lincoln No. FBB-10002-A. Armature—FAB-10005-A.

Performance Data

Generator	Amperes	Gen. RPM.
FBB-10002-A	50 ①	1850

① —See Regulator for maximum charging rate.

Brush Spring Tension—26-34 ozs.
Field Current—2.25-2.50 amps. at 6.0 volts.
Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Approximately ½" deflection midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Lincoln No. FAJ-10505-A.

►*SETTING NOTE:* Settings below are for regulator at NORMAL OPERATING TEMPERATURE (after 1/2 hour operation) with room temperature at 70-80° F.

Cutout Relay

Cuts In—6.0-6.6 volts.

Voltage Regulator

Setting—7.4-7.8 volts.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—48-52 amperes.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equipment Section.*

Automatic Headlight Dimmer: *See "Lincoln-Mercury" Headlight Control" in Electrical Equipment Section.*

Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch. Unscrew mounting nut, remove switch and disconnect all wires.

Stop Light Switch Location: On forward end of brake master cylinder (Conventional or Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Turn Signal—14 amps. (1954); 9 amps (1955)
Dome & Courtesy Lights—14 amps. (1954); 9 amps. (1955).
Glove Box—14 amps.
Cigar Lighter (Front & Rear)—Special fuse in lighter base.
Clock—3 amps. (in clock lead) (1954); None (1955).
Heater—20 amps.
Spotlight—14 amps.
Windshield Washer (1955)—14 amps. (or special 3 amps.).

CIRCUIT BREAKERS (1954): Two circuit breakers (30 amps. for headlights, 15 amps. for auxiliary) mounted on signal panel located behind instrument panel.

CIRCUIT BREAKERS (1955): On headlight switch. One circuit breaker protects headlight circuit and second circuit breaker protects instrument panel lights, parking lights, and stop and tail light circuits.

HORNS: Dual Horns operated by relay.

Lincoln Nos.	Without Air Cond.	With Air Cond.
High Pitch	FAE-13832-B	B5A-13832-A
Low Pitch	FAE-13833-B	B5A-13833-A

Horn Relay—Lincoln No. FAA-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION:* Before disconnecting any part of air conditioning equipment or lines for access to engine, *see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*1954 CYLINDER HEAD & VALVE STEM SEAL PRODUCTION CHANGE:* Beginning with April 1954 production, a new cylinder head, Part No. EAD-6049-F (identified by a square shoulder ¼" below top of valve guide), and a new valve stem seal, Part No. EAA-6571-C, replaced earlier cylinder head, Part No. EAD-6049-D (identified by tapered shoulder on valve guide boss), and valve stem oil seal, Part No. EAD-6571-A. Early and late cylinder heads are interchangeable. *CAUTION*—Use later type valve stem seal with late type head, and early type seals with early head.

►*1955 SPECIAL ENGINE OVERHAUL CAUTION (Engines identified by yellow paint at water outlet connection housing):* Approximately 600 engines at close of 1955 production have special parts listed below which are not identical with regular engine parts. Special instructions must be followed when working on these engines. *See "Engine" in Lincoln Special Data.*

ENGINE SPECIFICATIONS: 90° V8 Valve-in-head

Model	Bore	Stroke	Displacement
1954	3.8"	3.5"	317.5 cu. ins.
1955	3.94"	3.5"	341 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
1954	8.0-1	46.2	205 at 4200 RPM
1955	8.5-1	49.6	225 at 4400 RPM

Compression & Vacuum Reading—*See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Special Data.*

OIL PAN REMOVAL: Turn crankshaft so that rear counterweights on crankshaft are upwards, then remove oil pan from front of car.

PISTONS

Aluminum alloy, autothermic slipper type with three rings above pin.
Removal—Rod and piston assembly removed from above.

Fitting New Pistons: Use 1/2" wide feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows:
New Piston in New Bore—.0015" feeler, 6-12 lbs. pull.
New Piston in Used Bore—.002" feeler, 6-12 lbs. pull.
Used Piston in Used Bore—.0025" feeler, 6-12 lbs. pull.

Replacement Pistons: Standard size (see note following), .005", .020", .030", .040" Oversize. Pistons furnished only with fitted pins.

STANDARD SIZE PISTON NOTE: Standard size pistons furnished in eight different sizes ranging from 3.7990" to 3.8014" for selective fitting.

Installing Pistons: Install piston with "F" (embossed on piston) and dimple on head toward front of engine.

PISTON PINS

Floating type with lock rings at each end.
Diameter—.9120-.9123".
Pin Fit in Piston—.0001-.0003".
Pin Fit in Rod—.0002-.0004" loose, (Light thumb press fit).

Replacement Pins: Standard size, .001", .002" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.010-.027"	.0015-.0030"
Compr. #2	.0775-.0780"	.010-.027"	.0010-.0025"
Oil	.1860-.1865"	.010-.027"	.0015-.0030"

Replacement Rings: Standard size, .020", .030", .040" Oversize.

►*PISTON RING REPLACEMENT NOTE: Install Compression Rings with groove on inner edge of ring UPWARD.*

CONNECTING RODS

Length—7.064-7.066". **Weight**—28.36 ozs.
Crankpin Journal Diameter—2.2482-2.2490".
Lower Bearing—Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Clearance—.0005-.0025".
Side Clearance—.006-.014" (two rods).

Replacement Bearings: Standard (2 sizes marked **red** & **blu** for selective fitting) and .010", .020", .030", .040" Undersize.

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Installing R ds: Oil squirt hole in rod toward camshaft side of bore on all rods. Numbers on rods and bearing caps should be together and installed in same numbered cylinder.

CRANKSHAFT

J urnal Diam t rs–2.6235-2.6243".
Out- f-R und Limits–.00025". **Taper Limits–**.0005".
B arings–Steel backed copper lead alloy lined.
Replacement B arings: Standard size (2 sizes marked r d and blu for selective fitting) and .010", .020", .030", .040" Undersize.
End Thrust: Taken by #3 main bearing. Replace bearing if end play excessive.
Thrust B aring Alignment–*See "Crankshaft & Main B arings" in Lincoln Sp cial Data.*
Endplay–.004-.008" (service maximum .012").
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Lincoln Special Data.*
Crankshaft Fr nt Oil Seal Installation: *See "Engine Front C v r" in Lincoln Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE: Camshafts us d in 1954-55 production and for service replacement are as f llows:*

1954 (Std. Camshaft)–EAD-6250-F. "EAD" cast between No. 12 cam lobe and No. 4 cam bearing; also letter "L" stamped on front face of camshaft fuel pump eccentric.
1954 (Heavy Duty Camshaft)–EAD-6250-E. "EAD" cast in same location as for Std. Camshaft (above). Letter "L" not stamped on shaft.
1955 (Early)–EBJ-6250-A. "EBJ" cast between No. 5 cam bearing and distributor drive gear; also letter "J" stamped on front face of camshaft fuel pump eccentric. Specifications are same as for later camshaft.
1955 (Late)–EBJ-6250-B. "EBJ-B" cast between No. 5 cam bearing and distributor drive gear; also letter "J" stamped on front face of camshaft fuel pump eccentric, and the letter "C", with two dimples cast between No. 4 cam lobe and No. 2 cam bearing. Specifications are same as for early camshaft.

►*1954-55 SERVICE REPLACEMENT CAMSHAFT CHANGE (To provid better wear characteristics):* Camshafts, Part Nos. EAD-6250-G (1954 Models), and EBJ-6250-B (1955 Models) are furnished for service replacement. These camshafts are identified by the letter "C", with two dimples, cast between the first two cam lobes, counting from front of engine.

J urnal Diameter–2.1263-2.1268".

Bearings–Steel-backed babbitt-lined bushings.
Clearanc –.0011-.0028". Wear limit .005".
End Thrust: Taken by hydraulic plunger in front end of camshaft. Excessive oil lubricates timing chain, sprockets, and front cover thrust boss. **Endplay–**.000".
Replac m nt Bearings: Standard size, and .015" Undersize.
Camshaft R m val: *See "Camshaft & Bearings" in Lincoln Sp cial Data.*
Timing Chain: Width 1.25". Pitch .5". Length 25".
Camshaft S tting: Timing marks on camshaft and crankshaft sprockets adjacent and in line with straight edge across shaft centers.
Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Lincoln Special Data.*

VALVES

►*EXHAUST VALVE STEM DIAMETER CHANGE (Production & Service Replacement Valves): Stem diameter decreased .0005" for greater stem clearance in guide. See "Valve System" in Lincoln Special Data.*
Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	①②Stem Diam.	Length
Intake	2.000-2.010"	.3415-.3425"	5.18",
Exhaust	1.505-1.515"	.3405-.3410"	5.18"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	③	④.0010-.0020"
Exhaust	45°	③	⑤.0020-.0030"

①–Exhaust valve stems (service replacement) decreased .0005" in diameter. See Exhaust Valve Change above.
②–Valves furnished with .003", .015", .030" oversize stems for service replacement.
③–.354" (1954); .384" (1955).
④–.004" service maximum.
⑤–.005" service maximum.

Valve Seat Width: 1/16" to 5/64".
Oversize Valve Stem Installation: *See "Valve System" in Lincoln Special Data.*
►*ROTATABLE VALVE NOTE: All valves are rotatable type.*

►*1955 VALVE STEM OIL SEAL CHANGE (For Improved Oil Control):* New valve stem oil seal, Part No. B5A-6571-A, has a .100" longer skirt to protect greater area of valve stem from oil splash. This seal used in production on later 1955 engines.

Valve Springs: (1954)–Free Length 2.21". Spring pressure, with spring compressed to 1.80", pressure should be 64-67 lbs. Compressed to 1.47", pressure should be 133-147 lbs.
1955–Free Length 2.11-2.13". Spring pressure with spring compressed to 1.80", pressure should be 67-74 lbs. Compressed to 1.42", pressure should be 165-183 lbs.

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" intake, .005" exhaust), ream guides and install oversize valves. *See "Valve System" in Lincoln Special Data.*

Valve Lifters: Hydraulic, Barrel type. Lifters can be removed from above with camshaft in engine.

►*1954 MODEL NOISY VALVE LIFTER CORRECTION:* On cars built before Serial Nos. 54WA-19137-H & 54LA-7558-H, install an anti-drain back diaphragm B4A-6751-A and oil filter mounting bolt insert, EAA-6890-C in oil filter assembly. *S e "Oil Filt r" in Linc ln Sp cial Data.*

►*1954 HYDRAULIC VALVE LIFTER PRODUCTION CHANGE:* Beginning with Sept. 1954 production a new lifter EBJ-6500-A replaced former lifter EAD-6500-D. Later lifter has three oil holes in outside diameter groove and four holes in plunger, compared to one hole at each point on former lifter. Later type lifters are furnished in unit packs of eight.

►*1954 VALVE PUSH ROD PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* A new pushrod, Part No. EBJ-6565-A has been released for service replacement for use with later type lifters (see Valve Lifter Production Change above). The new type pushrod can be identified by a spherical tappet end (early type had a flat end). *Later type pushrod must not b used with early type hydraulic lifter.*

►*1954 ROCKER ARM COVER SEAL NOTE:* A new seal, Part No. EBU-6570-A and a longer stud, Part No. 354053-S has been released for service to minimize engine noises.

Diameter–.8740-.8745". **Clearance in Block–**.0005-.0020".
Initial Valve Clearance–*See "Valve System" in Lincoln Special Data.*
Lifter Overhaul–*See "Valve System" in Linc ln Special D ata.*
Rocker Arm Assembly: *See "Valve System" in Linc ln Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT abov .
►*VALVE TIMING NOTE: The following valve opening and closing points are with a camlift as indicated.*

1954 Models

Intake Valves–Open 18° ① BTDC. Close 58° ② ALDC.
Exhaust Valves–Open 56° ① BLDC. Close 20° ② ATDC.

1955 Models

Intake Valves–Open 8° ① BTDC. Close 56° ② ALDC.
Exhaust Valves–Open 52° ① BLDC. Close 12° ② ATDC.

①–Camlift .002". ②–Camlift .005".
Valve Timing Check–Slide rocker arm to one side and install dial indicator so reading can be taken from end of valve push rod (use an indicator that will read .300" or more). Install a quadrant (reading in degrees) on crankshaft pulley to check amount of crankshaft rotation. Rotate engine slowly until dial indicator reading for valve being checked is same as indicated in table above. Amount of crankshaft rotation should be the same as shown in valve timing table. As an example, check intake valve opening by rotating engine until dial indicator reads .002" camlift. Quadrant on crankshaft should indicate 18° (1954); 8° (1955). Continue to rotate engine to check valve closing degrees. Dial indicator should read .005" and quadrant should indicate 58° (1954); 56° (1955).

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Lincoln Special Data.*
Crankcase Capacity: 5 qts. (refill), 6 qts. (when filter changed).
Normal Oil Pressure: 35-45 lbs. at 40 MPH.
Pressure Regulat r Valv –In pump body, not adjustable.

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Oil Pressure Indicator—King-Seeley Electric.
Dash Unit (1954)—Lincoln No. FAG-9273-A
Dash Unit (1955)—Lincoln No. FDL-9273-A.
Engine Unit (1954-55)—Lincoln No. 41A-9278 (Use FAA-13785-A Clip)
See "Oil Gauges" in Miscellaneous Section.

Oil Pump: Gear type pump located on left side of engine crankcase and driven by distributor drive gear.

Pump Overhaul—*See "Oiling System" in Lincoln Special Data.*

Oil Filter: Full-flow type with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

►*1954 OIL FILTER PRODUCTION CHANGE (New anti-drain back diaphragm): See "Oiling System" in Lincoln Special Data*

Replacement Filter Element—HCK-6731-A (Kit includes new gaskets).

See "Oiling System" in Lincoln Special Data.

CAUTION—Special "full-flow" filter element must be used for replacement (use of by-pass type filter element will restrict engine oil flow and result in insufficient engine lubrication).

Crankcase Ventilation: Filter element in oil filler cap and in road draft tube. Clean and oil filters every 2000 miles or more often in dusty areas.

►*1954 CRANKCASE VENTILATOR OIL LEAKAGE CORRECTION:* Install gasket, Part No. B4A-6872-A, which is a firmer type gasket and will not distort when tightened.

COOLING

Water Capacity: 22.5 qts. (1954), 23 qts. (1955), without heater (21.5 qts. recommended)

Pressure Valve: Lincoln No. LA-8100-A3 (14 lbs.), LA-8100-A4 (13 lbs.) Radiator filler cap, stamped with figure "13" or "14"

Thermostat: **(1954)**—EAD-8575-B (157-162°) EAD-8575-C (168-173°) **(1955)**—EAD-8575-D (157-162°). B4Q-8575-B (168-173°) *NOTE—When installing 1955 thermostats on 1954 cars, use gasket, Part No. EAD-8590-B.*

Water Pump: Packless type with sealed ball bearing
See "Water Pumps" in Lincoln Special Data.

Temperature Gauge: King-Seeley Electric
Dash Unit (1954)—Lincoln No. FAG-10883-A
Dash Unit (1955)—Lincoln No. FDL-10883-A.
Engine Unit—FAB-10884-A (Early 1954), 1A-10884-A (Late 1954 & 1955)
See "Temperature Gauges" in Miscellaneous Section.

HYDRA-MATIC DRIVE

"Dual-Range" four speed automatic transmission with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 1000 miles. Drain & refill every 25,000 miles. Use only Automatic Transmission Fluid Type A, furnished under Lincoln Part No. 31-19582.

Checking Fluid Level—Check fluid level with engine idling, transmission at normal operating temperature, and selector lever in "Dr" range. Dipstick located under hood on right side of engine. Add fluid to bring level to "Full" mark on dipstick.

►*CAUTION—Do not check fluid level when transmission excessively hot, and do not fill above "Full" mark on dipstick.*

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above*

►*OTHER DATA: See "Hydra-Matic Drive" in Transmission Section.*

TURBO-DRIVE TRANSMISSION

Torque converter and three-speed automatic transmission with hydraulic control and mechanical parking lock
See "Turbo-Drive" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Turbo-Drive" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING See "Turbo-Drive" Transmission in Transmission Section.*

Lubrication—Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 15,000 miles. **Use only Automatic Transmission Fluid Type A.**

Checking Fluid Level—With selector lever in "N" (Neutral) and emergency brake applied, run engine approximately four minutes at idle speed. Check to see that emergency brake is applied and that engine is on slow idle, move selector lever to the "P" (Park) position. *(NOTE*—When engine and transmission are at normal operating temperature, move selector lever through all ranges to assure fluid distribution throughout transmission) Raise hood and wipe top of oil level indicator. Remove indicator and read fluid level. Add Automatic Transmission Fluid "Type A" if necessary to bring fluid level to "Full" mark on indicator. Replace fluid level indicator.

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above.*

►*OTHER "TURBO-DRIVE" SERVICE DATA. See "Turbo-Drive" Transmission in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

REAR AXLE

Own. Semi-floating hypoid gear, with Hotchkiss drive.
See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.

Ratios—3.31-1 (1954); 3.07-1 (Std. 1955); 3.31-1 (Optl. 1955).

Backlash—.003-.008" with .002" maximum variation per gear set.

Axle Shaft Removal: Remove rear wheels and take out screws holding brake drum to axle shaft flange. Remove hydraulic brake lines from brake backing plate. Take out axle retainer nuts (working through opening in axle shaft flange). Use Tool 4235-A to remove axle shaft and bearing assembly from axle housing. Take off backing plate and gasket and remove axle being careful not to damage oil seal.

Axle Assembly Removal: Raise rear of car and remove axle shafts and drive shaft. Take off hydraulic line clips from axle housing and free line from differential housing clip. Disconnect shock absorbers and spring U-bolts. Remove axle housing assembly from car.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement

►*1954 SHOCK ABSORBER REPLACEMENT CAUTION:* Both Gabriel and Monroe shock absorbers used. Valve action is different in each make and it is recommended that single shock be replaced with the same make removed. Either make may be installed in pairs on front or rear.

Model	Front	Rear
Standard (1954)	LA-18045-F	LA-18080-F
Standard (1954)	LA-18045-G	LA-18080-G
Standard (1955)	LE-18045-A	LE-18080-E
Heavy Duty (1954)	LA-18045-H	LA-18080-H
Heavy Duty (1954)	LA-18045-J	LA-18080-J
Maximum Hvy. Duty (1954)	LA-18045-E	LA-18080-E
Special (1954) Ⓒ		LA-18080-B

Ⓒ—Use with Hvy. Duty Springs

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs.
See "Lincoln, Mercury, Ford (Ball Joint)" in Front Suspension Section.

Kingpin Inclination—7°10' with Pos. 3/4° camber.

Caster—0° to Neg. 1-1/2°. Caster must not vary more than 1/2° from one side to the other.

Camber—0° to Pos. 3/4°. Camber must not vary more than 1/4° from one side to the other.

Toe-In—3/32" to 5/32".

Toe-Out on Turns—With outer wheels at 20°, inner wheel should be 23½°.

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STEERING

Manual: Gemmer Mod l 335. "3-Tooth" Worm & Roller type with "push-pull" adjustment.
See "Gemm r Worm & Roller (Type 335)" in Steering Section.

Pow r St ering: Saginaw (GM) Hydraulic . Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic power cylinder.
See "Saginaw (GM) Power Steering" in Steering Section.

Steering Linkag : *See "Steering Linkage" in Steering Section.*

Steering Wh el & H rn Button Removal: *See "Gemmer Worm & Roller (Type 335)" in Steering Section.*

Steering G ar R moval: *See "Gemmer Worm & Roller (Type 335)" in Steering Section.*

BRAKES

►*1955 FRONT BRAKE PRODUCTION CHANGE: Front brake ecc ntric adjustment has been eliminated on Late 1955 cars.*

B ndix Hydraulic (Single Anchor). With Eccentric (Fr nt Wh els—See 1955 Production Change above). **With ut Ecc ntric (R ar Wheels).** Parking lever applies rear wheel service brakes.
See "Ford-Bendix (Ford, Lincoln, M rcury)" in Brake Section.
Drums—Diameter 12".
Wh el Cyl. Diam ter—1-1/8" (front), 15/16" (rear).
Lining—Molded type riveted to shoe
Width—2-1/2" (front whls.), 2" (rear whls.).
Thickness—7/32" (all whls.).
Length—11-33/64" (primary shoes, front & rear whls.), 12-15/16" (secondary shoes, front & rear wheels.).
Braking Power—59% (front whls.), 41% (rear whls.).
Clearance—.010" at each end of both primary and secondary shoes (.003" maximum variation).

Brake Pedal Free Play Adjustment: .240" to .440". If play not correct after brake adjustment, loosen lock nut on the eccentric bolt attaching brake pedal to master cylinder pushrod, rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of fire wall.
Checking Fluid—Maintain fluid level to within 1/2" of top of reservoir.
Removal—Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to fire wall.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and master cylinder). Unit mounted on engine side of fire wall and replaces regular master cylinder.
See "Bendix Power Unit" in Brake Section.
Checking Fluid—Same as for regular master cylinder.
Removal of Pow r Unit—Disconnect valve pushrod from brake pedal assembly in drivers compartment. Remove master cylinder outlet fitting bolt from master cylinder. (NOTE—It is not necessary to remove stop light switch, wires or hose assembly from outlet fitting. Do not disturb outlet fitting in master cylinder). Loosen clamp securing manifold vacuum hose to check valve on power unit. Remove hose from valve. Loosen clamp securing vacuum reserve tank hose to fitting on check valve. Remove four capscrews securing power brake assembly to bracket on dash panel and remove power brake assembly.

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Own. *See "Lincoln Air-Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window Controlled by door switch and master control switch. *See "Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Reversible type motor (mounted under seat) drives two screw type jacks (one on each side) through flexible cables. Controlled by relay and two-way switch. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric type. Individual motor for vertical and horizontal adjustment. *See "P wer Seat Adjusters" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Us xtr m car wh n disconn cting any part of air conditioning quipment or lin s. Se "Air Conditioning S rvic Cautions" in Miscellaneous S ction.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left front body pillar between door hinges.
First Number – (Lincoln) 5001, (Continental) 1001.

►*LINCOLN SERIAL NUMBER NOTE: Serial number (example *56LA5001L*) includes following identification data in sequence.*

Year	Assy. Plant	Serial No.	Engine Type
56	ℂ	5001	② L

ℂ – **LA** – Los Angeles. **WA** – Wayne. ② – Lincoln.

►*CONTINENTAL SERIAL NUMBER NOTE: Serial number (example *C5681001*) includes following identification data in sequence.*

Eng. Type	Year	Month	Serial No.
C ℂ	56	②	1001

ℂ – Continental.
② – Model year began June, 1955. Numbers (6 for June through 9 for September and 0 for October) or letters (beginning with A for November 1955 and alphabetically thereafter) are used

TUNE-UP

►*HARD STARTING CORRECTION: See CARBURETOR below.*

COMPRESSION PRESSURE: 150±10 lbs at cranking speed.

VACUUM READING: 18-19" at 475-500 RPM in neutral.

VALVE TAPPET CLEARANCE: None in service (hydraulic). Adjustment required only when servicing valves or hydraulic lifters.
Initial Valve Tappet Clearance Adjustment - *See "Valve System" in Lincoln Special Data.*

►*TAPPET CLEARANCE ADJUSTING SCREW NOTE "Self-locking" screws used on later cars. See "Valve System" in Lincoln Special Data.*

LINCOLN MANIFOLD HEAT CONTROL: External valve at right exhaust manifold connection to exhaust pipe. Valve is automatic, requires no adjustment but should operate freely. When valve is closed, most exhaust gases are discharged through left hand exhaust pipe.

CONTINENTAL MANIFOLD HEAT CONTROL: Valve is mounted at end of right hand manifold. Valve is automatic, requires no adjustment but should operate freely. Dual exhaust system used.

►*NOTE:* When valve is closed, gases are discharged through left exhaust manifold back through left resonator (one in each exhaust pipe ahead of muffler) to the cross-over pipe where gases are again divided and discharged through the right and left mufflers. Cross-over pipe has been included to equalize exhaust system.

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders–RIGHT BANK 1-2-3-4. LEFT BANK 5-6-7-8.

SPARK PLUG GAP· 032-.036".
Spark Plug - Champion F-14Y 18 mm Torque to 15-20 ft lbs *NOTE* - Supersedes No 860 previously used

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be tightened within limits of 15-18 ft. lbs.

►*LINCOLN SPARK PLUG MISFIRE CORRECTION:* If misfire condition exists at either No. 8 or No. 6 cylinder, interchange No. 6 & No. 5 spark plug wire positions in all insulator blocks.

COIL: Lincoln No. B6A-12029-A. *12 Volt.*
Ignition Current–2 5 amps idling, 4 5 amps. stopped.
Resistor–Lincoln No. B6A-12250-B. On bracket attached to top of coil.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: (Lincoln) **Lincoln No. FDU-12127-B,** (Continental) **No. FEG-12127-A.** *12 Volt.* New double diaphragm, pressure type with separate vacuum lines to manifold and carburetor.

►*LINCOLN GROUNDING OF DISTRIBUTOR TERMINAL PRIMARY WIRE ASSY. CORRECTION:* Screws securing distributor identification plate extend into housing and may penetrate primary wire insulation and ground wire. To correct, grind or file off sharp points, replace damaged wire.

►*INTERMITTENT OR COMPLETE IGNITION FAILURE CORRECTION:* May be caused by having distributor primary wire improperly welded to one or both of its terminal lugs (insulated wire from terminal on distributor to breaker point terminal).

Condenser–Lincoln No. FAB-12300-A. **Capacity** .21-.25 microfarad.
Contact Point Set–Lincoln No. FAB-12171-B.
Breaker Gap–.014-.016".
Cam Angle–26-28.5°.
Breaker Arm Spring Tension–17-20 ozs.
Rotation–Counter-clockwise viewed from above.

Advance Performance
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	.12	350
¼-1¼	.21	400
3-4	46	600
5¼-6¼	70	800
6¾-8	90	1000
8¼-9½	1.09	1200
10¼-11½	1.42	1500
12¾-14	1.88	2000

DISTRIBUTOR INSTALLATION NOTE· It may be necessary to crank engine slightly if distributor is not seated properly in cylinder block. Crank engine, while holding distributor down, until intermediate shaft is engaged and distributor drops into place. *CAUTION– Do not start engine until distributor clamp and nut are in place.*

Initial Distributor Timing· Remove No. 1 spark plug. Crank engine until piston starts up on compression. Slowly "bump" engine over with starter until timing mark is aligned with pointer. Find No. 1 spark plug socket in distributor cap and fit cap to distributor housing. Mark distributor housing to indicate No. 1 spark plug wire position. Position rotor approximately 20° counter-clockwise from mark made on distributor housing. Engage distributor drive gear and install distributor in engine.

IGNITION TIMING

S tting–5° BTDC. with engine idling at 475 RPM and PRIMARY (inner diaphragm) vacuum line disconnected. *See Initial Distributor Timing above.*
Timing Mark–Crankshaft pulley marked TDC with twenty 2° lines before this point. Space between 2nd and 3rd line before TDC mark should be aligned with pointer on engine front cover.

CARBURETOR

Lincoln (Holley), ECU-9510-B, C, D, E. 4-Barrel carburetor with integral automatic choke.

►*CARBURETOR PRODUCTION CHANGES – ECU-9510-D, E (To Provide Improved Chok Operation & Eliminate Possibility of Fuel Leakage at Fu l Inl t Valv): See "Holley (Ford, Lincoln, Mercury) 4-Barr l C ntri-Quad" in Carburetion Section.*

►*CARBURETOR AIR INTAKE DUCT ASSEMBLY (THERMOSTATIC CONTROL):* Carburetor air intake duct to air cleaner has thermostatically controlled valve which provides warm air for cold engine (air taken in through muff or shroud around exhaust manifold), or cool air for warm engine (air taken in at front in front of radiator). Thermostat begins to open valve at 75° F. and valve should be wide open with air temperature of 95° F. or higher. *See "Fuel System N tes" in Lincoln Sp cial Data for testing and adjusting data.*

►*HARD ENGINE STARTING CORRECTION (Du t Disengagement of Choke Link):* If choke link found disengaged, reinstall choke link and bend tab of choke thermostat lever toward link sufficiently to prevent link from becoming disengaged, allowing sufficient clearance between the tab of thermostat lever and choke link to permit operation without binding or sticking. Loop on thermostat spring must fit over tang on thermostat lever.

►*1956-57 HARD STARTING, STALLING OR ENGINE BACKFIRE CORRECTION:* New Choke Heat Tube Part No. ECU-9890-B with larger center section radius and larger runout radius at each end of tube is available for service to correct above conditions. *NOTE* - Service Intake Manifolds ECU-9424-A and C must have original type heat tube replaced by this new type before installation.

►*HARD COLD STARTING (ECU-9510-B Carbur tor):* If, after depressing accelerator, choke plates do not set themselves, choke fast idle cam should be checked. If too much stock has been removed from upper tip of cam at point where cam contacts choke link roller, there is a possibility that the cam will bind and wedge the linkage. This occurs when cam tip falls below roller center line, wedging the linkage.

►*LINCOLN VAPOR LOCK CORRECTION:* Check fuel pump-to-fuel' tube hose assembly. Correct hose, Part No. LE-9288-A, has an inside opening of .31". A hose with too small an inside opening will contribute to the vapor lock condition.

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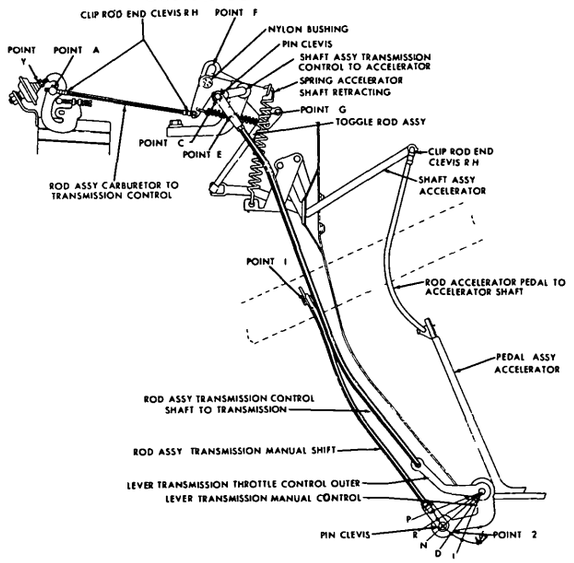
►*IDLE SPEED (AIR CONDITIONED CARS):* Automatic throttle control is incorporated on air conditioned cars and is adjusted as follows: With engine warm, air conditioning system operating, and transmission in neutral, adjust knurled nut at end of operating rod of the control assembly to obtain an idle speed of 800 RPM, tighten locknut. Check idle to make sure that it returns to normal whenever air conditioning is turned off or the transmission is shifted out of neutral.

NOTE – Engine idle should be checked and set to specifications before attempting to adjust fast idle device.

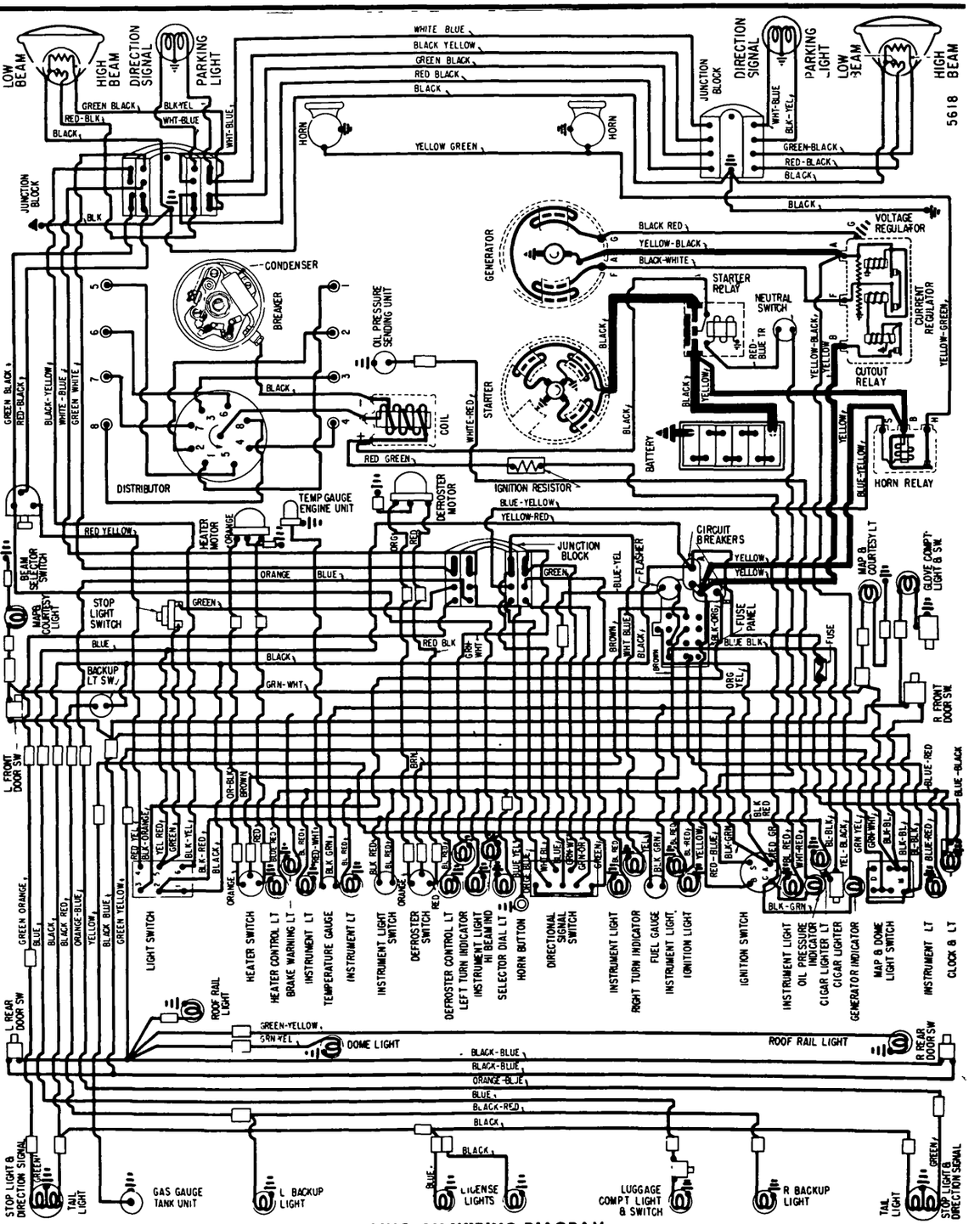
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8. LEFT barrels 1-4-6-7.* **Idle Setting**–1¼ turns open (set both screws alike). **Idle Speed**–425-450 RPM with selector lever in "DR" position.

Throttle Linkage Adjustment: Set hand brake and adjust engine idle to 425 RPM with engine at normal operating temperature, fast idle cam in low idle position, and transmission in "DR" position. Adjust anti-stall dashpot (see below). Disconnect clevis pin from transmission control to accelerator shaft and transmission shaft-to-transmission rod assembly. Disconnect carburetor to transmission control rod. Insert gauge pin through bellcrank and bracket in transmission control-to-accelerator shaft assembly. Set carburetor at low idle manually. Adjust carburetor-to-transmission control rod assembly so that with trunnion pin in place at rear end of rod, trunnion at forward end will go in freely. Assemble in this position. Remove gauge pin. Pull upward gently but firmly on transmission control shaft-to-transmission rod assembly. This will position

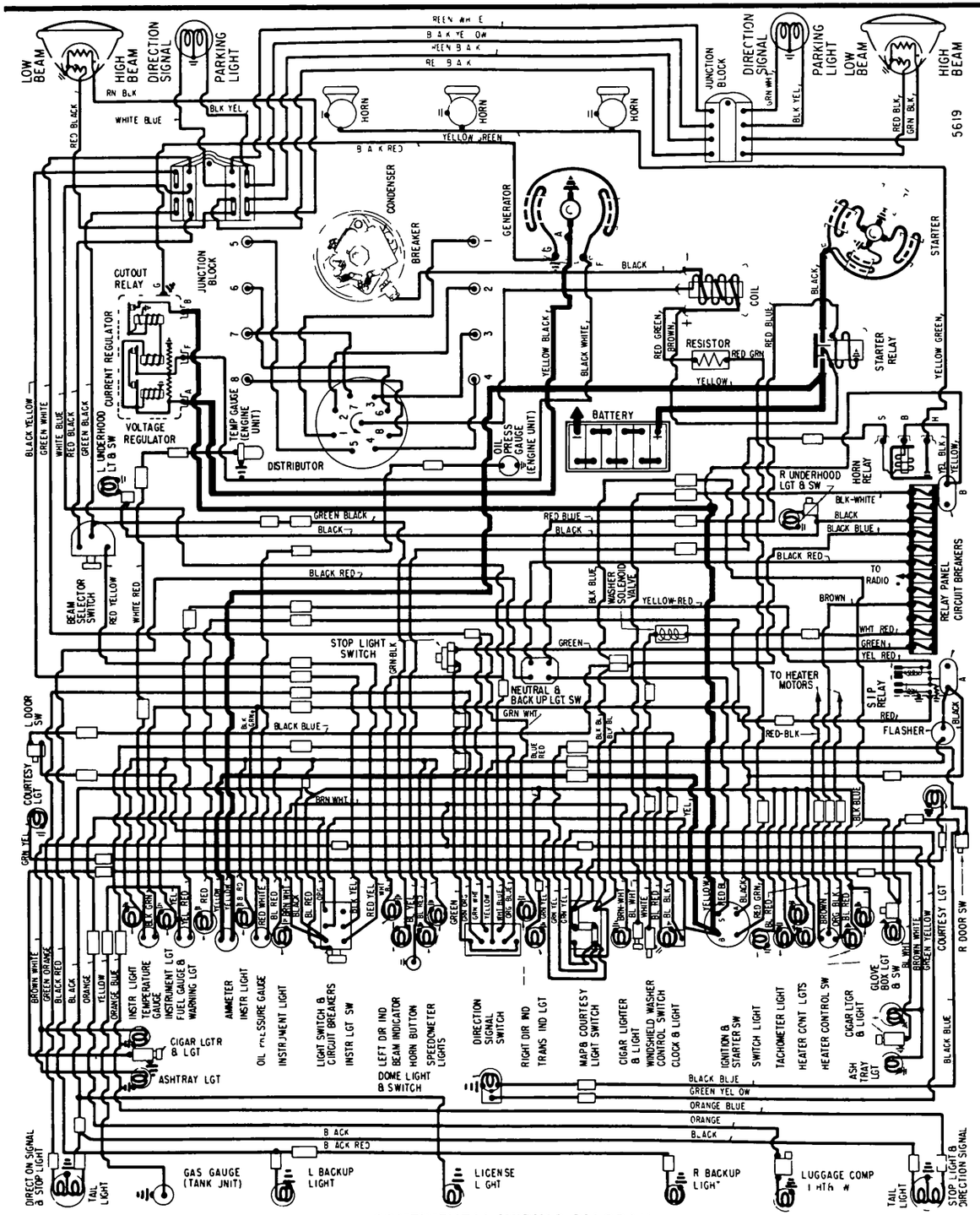
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TURBO-DRIVE THROTTLE LINKAGE



LINC LN WIRING DIAGRAM



CONTINENTAL WIRING DIAGRAM

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throttle lever in the stop position at transmission. Adjust clevis pin at forward end of transmission control-to-accelerator shaft assembly so that clevis pin enters assembly freely Lengthen transmission control shaft-to-transmission rod assembly by turning clevis 2½ turns and assemble in place With ignition off and accelerator depressed to full kickdown position, adjust length of toggle rod assembly so that the nylon bushing has a clearance of .25" (Lincoln), .10" (Continental) from top of slot in accelerator shaft assembly. Adjust lateral angle of toggle rod to a vertical plane, by loosening jam nut at lower end of rod, inserting screwdriver in slot of stud provided and turning ball stud in required direction, tighten jam nuts. *NOTE* - Toggle rod assembly is installed in lower and forward hole (Lincoln) and upper hole (Continental) of transmission control-to-accelerator shaft.

Dashpot Adjustment: Turn throttle lever set screw out until dashpot plunger bottoms, then back it off to give .045-.064" clearance between end of screw and plunger.

► *OTHER DATA: See "Holley (Ford, Lincoln, Mercury) 4-Barrel Centri-Quad" Carburetors in Carburetion Sect.*

Fuel Pump Pressure: 4-6 lbs. at 500 RPM

CARB. EQUIPMENT

Fuel Pump: (Lincoln) Lincoln No. ECU-9350-A, (Continental) No. ECV-9350-A. Fuel and vacuum type.
Pressure – 4-6 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion S ction.
Gasoline Gauge: King-Seeley Electric type.
Dash Unit – (Lincoln) Lincoln No. FDU-9280-A, (Continental) Part of instrument cluster 4049792.
Tank Unit – (Lincoln) Lincoln No. FDU-9275-A, (Continental) No. 4047440.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Lincoln – Lincoln No. FDU-10655-C. *12 Volt,* 13 plate, 65 ampere hour capacity (20 hour rate).

► *LINCOLN BATTERY INSTRUCTION DECAL CAUTION*
A few cars were released with wrong instruction decal on battery box cover, indicating that positive cable grounded. 1956 Lincoln has **negativ** ground.
Continental – Lincoln No. 4047942. *12 Volt,* 13 plate, 65 ampere hour capacity (20 hr. rate).
Location – (Lincoln) In vertical compartment beneath right side of dash panel. (Continental) In engine compartment.
Battery Ground – Negative, to engine block.

► *CAUTION: This is reversed from previous Lincoln models.*

Engine Ground – Cylinder head to dash.

STARTER

Lincoln No. B6A-11002-A. Armatur – B6A-11005-A. *12 Volt.*
Drive – Bendix "Folo-Thru". Lincoln No. 1CM-11350-C.
Rotation – Counter-clockwise at commutator end.
Brush Spring T nsi n – 48-56 ozs.
Cranking Sp ed – 150-180 RPM with warm engine.

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Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4800 max.	12.0	100-120
	150-180 Ⓒ	8 or more	210 max

Ⓒ – Cranking speed with warm engine.

Starting Switch: Relay, Lincoln No. B6A-11450-A, controlled by Ignition & Starter Switch, Lincoln No. B5A-11572-A, and Turbo-Drive Neutral Safety Switch, located on steering column.

Turbo-Drive Neutral Safety Switch Adjustment: *See "Turbo-Drive" in Transmission Section.*

► *SELF-STARTING OF ENGINES & CONTINUOUS OPERATION OF BACK-UP LIGHTS CORRECTION:* Neutral Safety Switch Insulator Assembly has been modified to prevent above condition. Original Part No. FDK-15827-B remains the same, but modified assembly can be recognized by two ridges approximately .020" high on each side and parallel to brass strip.

GENERATOR

Lincoln No. B6A-10002-A. *12 Volt.* **Armature** – B6A 10005-B.

Performance Data

Amperes	Volts	Gen. RPM
30	15	Ⓒ 2500

Ⓒ – At 1500 Engine RPM.

Brush Spring Tension – 26-34 ozs.

Field Current – 1.5-1.6 amps. at 15 volts (Hot).

Rotation – Counter-clockwise at commutator end.

Belt Adjustment: Approximately ½" deflection on belts midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Lincoln No. B6A-10505-A. *12 Volt.*

► *SETTING NOTE:* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75° F.

Cut-out Relay

Cuts In – 12.0-12.8 volts.

Cuts Out – 2.0-6.0 amps. (reverse current).

Voltage Regulator

Setting – 14.6-15.4 volts.

Checking & Adjusting – *See Electrical Section.*

Current Regulator

Setting – 28-32 amperes.

Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Direction Signals: *See Electrical Section.*

Automatic Headlight Dimmer – *See Electrical Section.*

Lighting Switch Rheostat: *(NOTE* – Toggle type used on Lincoln, push-pull type used on Continental). Remove anti-rattle bezel from switch, then remove switch from rear of dash panel.

► *DIMMER SWITCH INSTALLATION CAUTION:* A few defective dimmer switches, Part No. FDU-13740-A were installed in early production. Only switches with yellow spot should be installed in service.

Stop Light Switch Location: On forward end of brake master cylinder (integral with power brake unit). Master cylinder or power brake unit located on firewall in engine compartment.

FUSES: Interior Lights – SFE 7.5 amps.
Direction Signals – SFE 7.5 amps.
Heater Blowers – SFE 14 amps. (2 on Lincoln).
Radio – SFE 7.5 amps.
Clock – AG 1 amp.
Cigar Lighter – SFE 15 amps. (Lincoln), SFE 20 amps. (Continental).
Windshield Washer – SFE 7.5 amps.
Back-Up Lights – SFE 7.5 amps.
Underhood Lights – SFE 7.5 amps. (Continental).
Automatic Headlight Dimmer – AGC 3 amps.
Air Conditioning – SFE 20 amps. (Continental).
Radio Antenna – SFE 14 amps. (Lincoln).

CIRCUIT BREAKERS: Lighting – Two 12 ampere circuit breakers (one for headlights, one for auxiliary lights) mounted on headlight switch (Continental) on fuse panel behind instrument panel (Lincoln).
Windows & Seats – One 15 ampere for each window motor One 15 ampere common to both seat motors.
Convertible Top (Lincoln) – 30 ampere circuit breaker.
Air Conditioning (Lincoln) – 15 ampere circuit breaker.
Underhood Lights (Lincoln) – 12 ampere circuit breaker.
Stop Lights (Continental) – 12 ampere circuit breaker.

HORNS: Dual (Lincoln), Triple (Continental) horns operated by relay. *12 Volt.*

Lincoln Horns

Lincoln Nos.	Trumpet Type	Sea Shell Type
High Pitch	FDT-13832-B	FDU-13832-A
Low Pitch	FDT-13833-B	FDU-13833-A

Continental Horns

Lincoln Nos.	Trumpet Type	Sea Shell Type
High Pitch		B5T-13832-B
Low Pitch		B5T-13833-B
Third Horn	4049179	

Horn Relay – Lincoln No. 2Q-13853-A.

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air conditioning Service Cautions" in Misc. Section.*

► *VALVE STEM SEAL & CYLINDER HEAD PRODUCTION CHANGE:* Short length of valve stem seal has been increased .100" in order to shield a greater area of valve stem from oil splash. As a result of seal change it was necessary to increase length of the outside diameter of the valve guide. *New seal should be used with New Head* (New Seal, Part No. B6Q-6571-A. New Head, Part No. ECU-6049-C). Present seals can be used with either the old or new head.

ENGINE SPECIFICATIONS: 90° V8.

Bore	Stroke	Displacement
4.00"	3.66"	368 cu. ins.
Rated HP	**Compr. Ratio**	**Developed HP**
51.2	9.0-1	285 at 4600 RPM

Compression & Vacuum Reading – *See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Spec. Data.*

OIL PAN REMOVAL: Remove oil inlet pipe hex fittings at oil pump and side of oil pan and remove pipe. Remove oil pan capscrews, then remove oil pan and gasket.

NOTE – When this operation is performed, turn crankshaft until rear counterweights of crankshaft are up. The oil pan can then be removed from front of engine.

PISTONS

Aluminum alloy, autothermic slipper type with three rings above pin. Tin-plated.

► *ORIGINAL BORE & PISTON SIZES:* Std. cylinder bore limits are 4.0000-4 0024" and TWO Standard Pistons are used for selective fitting as follows 3.9993-3.9996" Diameter (marked "2" on dome), 4.0005-4.0008" Diameter (marked "6" on dome). *NOTE* - Std. piston furnished for service in these two sizes.

Removal – Rod and piston assembly removed from above.

Fitting New Pistons: Using 1/2" wide feeler gauge inserted between piston and cylinder wall at right angle to pin on thrust side, pull should be 6-12 lbs. when using feeler gauge thicknesses as follows: New Piston in New Bore - .0015". New piston in Used Bore - .002". Used Piston in Used Bore - .003".

Replacement Pistons: Standard (Two sizes - see Original Bore & Piston Sizes above), and .020", .030", .040" Oversize.

Installing Pistons: Install all pistons with indentation on head toward front of engine. *See Rod Installation.*

PISTON PINS

Floating type with lock rings at each end.

Diameter – .9120-.9123". **Length** - 3.162-3.176".

Clearance in Piston – .0008" maximum.

Clearance in Rod – .0008" maximum. Select for light thumb press fit at 70° F.

Replacement Pins: Standard (marked Green), and .001" (marked Blue), .002" (marked Yellow) oversize.

PISTON RINGS

► *OIL CONTROL RING PRODUCTION CHANGE:* Effective engines built Jan. 6, 1956 (Continental) and Jan. 17 (Wayne) & Feb. 2, 1956 (Los Angeles) for Lincoln, new type oil control rings are being used in production. These rings are of the side sealing type.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.013-.030"	.006" max.
Compr.(2)	.0925-.0935"	.013-.030"	.006" max.
Oil (3)	.1860-.1865"	.010-.027"	Ⓒ.005" max.

Ⓒ – Early type ring. Later type ring is side sealing type. See Production Change above.

Replacement Rings: Standard size and .020", .030", .040" oversize.

► *SPACING NOTE:* Ring gaps should be spaced 120° apart, with oil ring gap to the side opposite spark plug side of cylinder bores.

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CONNECTING RODS

Length – 7.064-7.066". **Weight** - 28.36 ozs.
Journal Diameter – 2.2482-2.2486" (Color coded BLUE), 2.2486-2.2490" (Color coded RED). Use with bearing of same color.
Lower Bearing – Steel-backed, copper lead alloy lined.
Clearance – .0007-.0036".
Side Clearance – .006-.014". .017" Service max.
Replacement Bearings – Standard (2 sizes marked RED & BLUE for selective fitting) and .010", .020", .030", .040" undersize.
Installing Rods – Assemble rods to piston so indentation embossed on piston head will face front of engine. Numbered side of rods on the right bank should face right side of engine and rods for left bank will face left side of engine. Place caps on connecting rods so numbered sides match and install in same numbered cylinders

CRANKSHAFT

►*CRANKSHAFT PRODUCTION CHANGE (To Minimize Oil Leakage at Front & Rear Oil Seals):* New crankshaft has integral rear oil slinger as part of shaft. New front oil slinger may be installed on 1952-56 crankshafts. *See "Crankshaft & Main Bearings" in Lincoln Special Data.*
Journal Diameter – 2.6235-2.6239" (Color coded BLUE), 2.6239-2.6243" (Color coded RED).
Out-of-Round Limits – .0005" max. **Taper Limits** - .001".
Bearings – Steel-backed copper-lead alloy lined.
Clearance - .0008-.0036".

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.
Replacement Bearings: Std. (2 sizes color coded RED & BLUE for selective fitting) and .010", .020", .030", .040" undersize (Center & Rear Bearings), .020", .030" .040" undersize (Front & Intermediate Bearings).
End Thrust: Taken by No. 3 main bearing.
Thrust Bearing Alignment – *See "Crankshaft & Main Bearings" in Lincoln Special Data.*
Endplay – .012" maximum.
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" In Lincoln Special Data.*
Crankshaft Front Seal Installation: *See "Engine Front Cover" in Lincoln Special Data.*

CAMSHAFT

►*CAMSHAFT PRODUCTION CHANGE:* Two different camshafts used in production. New Camshaft, Part No. ECU-6250-C, replaced Camshaft, Part No. ECU-6250-B, in early production. New camshaft can be identified by by annular grooves around centers of Nos. 2 & 4 journals, instead of cross-drilled holes used previously. Similar groove has been cut in No. 3 journal to increase lubrication to journal. If new shaft installed, it will be necessary to replace EAD-6262-B bearings in No. 2 & 4 positions with new type B6Q-6262-A bearings.

Journal Diameter – 2.1240-2.1247". **Out-of-Round Limit** - .001".
Bearings – Steel-backed babbit lined bushings.
Clearance – .006" maximum. **Endplay** - .003" (restrained by thrust spring and plunger).
Replacement Bearings: Std. & .015" undersize.
Camshaft Removal: *See "Camshaft & Bearings" in Lincoln Special Data.*
Timing Chain: Width 1.25". Pitch .5". Length 25".
Deflection – 1/2".
Camshaft Setting: Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers.
Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Lincoln Spec. Data.*

VALVES

Valve Tappet Clearance: None in service (hydraulic). Adjustment required only when servicing valves or hydraulic lifters.
Initial Valve Tappet Clearance Adjustment–*See "Valve System" in Lincoln Special Data.*
►*TAPPET CLEARANCE ADJUSTING SCREW NOTE: "Self-locking" screws used on later cars. See "Valve System" in Lincoln Special Data.*

►*VALVE STEM SEAL PRODUCTION CHANGE: See "Valve Stem Seal & Cylinder Head Production Change" under ENGINE above.*
►*EXHAUST VALVE STEM PRODUCTION CHANGE:* Stem diameter of all standard and oversize production and service exhaust valves has been reduced .0005" in order to increase stem-to-guide clearance. *See "Valve System" in Lincoln Special Data.*

Valve	Head Diam.	Stem Diameter Ⓘ
Intake	2.000-2.010"	Ⓔ.3415-.3420" or Ⓖ.3420-.3425"
Exhaust	1.630-1.640"	Ⓔ.3400-.3405" or Ⓖ.3405-.3410"

Valve	Seat Angle	Lift ⓛ	Stem Clearance
Intake	45°	256" min.	.001-.004" max.
Exhaust	45°	256" min.	.002-.005" max

Ⓘ – Furnished with .003", .015", .030" oversize stems
NOTE – Early production exhaust valve stems, both std. and oversize were .0005" larger.
Ⓔ – Color coded RED. Use with RED valve guide.
Ⓖ – Color coded GREEN. Use with GREEN valve guide.
ⓛ – Cam lobe lift (service limit).

Valve Seat Width – 1/16-5/64" (Intake), 5/64-3/32" (Exhaust).
Oversize Valve Stem Installation: *See "Valve System" in Lincoln Special Data.*
Valve Springs: Free Length – 2-1/8".

Spring Specifications	Pressure	Length
Valve Closed	60 lbs.	1.80"
Valve Open	165 lbs.	1.38"

►*SPRING HEIGHT CORRECTION:* Measure valve spring assembled height from point where spring contacts cylinder head to point where it contacts retainer. Assembled height of spring should be 1 25/32-1 13/16". Spacers are available in steps of .030" & .060" to bring assembled height within these limits or as near to this measurement as possible.
►*SPRING SQUARENESS CAUTION:* If springs more than 1/16" out of square, with spring closed coil end on surface plate and measured with steel square, they should be replaced.
Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" intake, .005" exhaust), ream guides and install oversize valves. *See "Valve System" in Lincoln Special Data.*
Valve Lifters: Hydraulic, barrel type. Lifters can be removed from above with camshaft in engine.
Diameter–.8740-.8745". **Clearance in Block** .0025" max.
Initial Valve Clearance – *See "Valve System" in Lincoln Special Data.*
Lifter Overhaul – *See "Valve System" in Lincoln Special Data.*
Rocker Arm Assembly: *See "Valve System" in Lincoln Special Data.*
►*ROCKER ARM COVER LEAK CORRECTION (Early Cars):* Grind away approximately 1/16" of inner flange for a length of 1½" at rear of cover.
►*VALVE ROCKER ARM PRODUCTION CHANGE (Self-locking Valve Adjusting Screws). See "Valve System" in Lincoln Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
►*VALVE TIMING NOTE: The following valve opening and closing points are with a camlift as indicated.*
Intake Valves – Open 18° Ⓒ BTDC, Close 72° Ⓔ ALDC.
Exhaust Valves– Open 59° Ⓒ BLDC, Close 31° Ⓔ ATDC.
Ⓒ – Camlift .002". Ⓔ – Camlift .004".
Valve Timing Check – With rocker cover removed, loosen adjusting locknut and screw of valve to be tested. Slide rocker arm to one side in order to have pushrod in the clear. With pushrod in tappet socket install a dial indicator in such a manner as to have actuating arm of indicator in the pushrod socket, in the same plane of pushrod movement (dial indicator used should have at least a total movement of .300" or more). Place a quadrant on the crankshaft pulley. If intake valve opening is being checked, engine is rotated slowly until dial indicator shows .002" camlift. At this point the actual opening reading in degrees is taken(18° BTDC). The engine is further rotated to check the valve closing. Dial indicator should read .004" camlift (72° ALDC)

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Lincoln Special Data.*
►*OIL LEVEL INDICATOR CAUTION:* Two types used. Indicator used with air conditioned cars has expanded anti-rattle section adjacent to tube cover and distance from cover to "Full" mark is 25.97" and is about 3" longer than that used with other cars. Distance from cover to "Full" mark on standard type is 23.01".
Crankcase Capacity) 5 qts. (refill). 6 qts. (when filter changed).
Normal Oil Pressure: 45-50 lbs. at 2000 RPM (Hot).
Pressure Regulator Valve– In pump body. Not adjustable.
Oil Pressure Indicator (Line In): Light on instrument panel. Light is on when oil pressure is low.
Oil Pressure Gauge (Contin ntal): King-Seeley Electric.
Engin Unit - (Lincoln) Lincoln No. B6A-9278-A pressure switch. (Continental) No. FDA-9278-A.
S "Oil Pressur Gauges" in Miscellan ous S ction.

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Oil Pump: Gear and rotor types used. Located on left side of engine crankcase and driven by distributor drive gear.

►*OIL PUMP INSTALLATION CAUTION (Aluminum Body):* Attaching screw, Part No. 20446-S8 (5/16"-18 x 1¼") and lockwasher, Part No. 34806-S7, should be used in threaded hole of pump body instead of 1-1/8" used previously. Former screw had tendency to strip softer aluminum thread. Screw should not be longer than 1¼" to prevent possibility of its bottoming.

Pump Overhaul—*See "Oiling System" in Lincoln Special Data.*

Oil Filter: Full-flow type with pressure relief valve in center filter bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted.

Replacement Filter Element—HCK-6731-A (Kit includes new gaskets).

See "Oiling System" in Lincoln Special Data.

CAUTION—Special "full-flow" filter element must be used for replacement (use of by-pass type filter element will restrict engine oil flow and result in insufficient engine lubrication).

Crankcase Ventilation: Combination oil filler and road draft tube and air filter cap, located on front of valve pushrod cover. Clean and oil the oil filler cap filter every 2000 miles.

COOLING

Water Capacity: 23 qts. total - without heater (22 qts. recommended). Additional 2.4 qts. with heater.

Pressure Valve: Lincoln No. LA-8100-A3 (14 lbs.), LA-8100-A4 (13 lbs.). Radiator filler cap, stamped with figure "14" or "13".

Thermostat: Lincoln No. EAD-8575-D (157-162° F.), B4Q-8575-B (168-173° - use with permanent anti-freeze)

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Lincoln Special Data.

Temperature Gauge: King-Seeley Electric.

Dash Unit – (Lincoln) Lincoln No. FDU-10883-A, (Continental) Part of Instrument Cluster, Lincoln No. 4049792.

Engine Unit – Lincoln No. B6A-10884-A (All).

See "Temperature Gauges" in Miscellaneous Section.

TURBO-DRIVE TRANSMISSION

Torque converter and three-speed automatic transmission with hydraulic control and mechanical parking lock.

See "Turbo-Drive" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Turbo-Drive" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Turbo-Drive" Transmission in Transmission Section.*

Lubrication – Check transmission oil level every 2000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 16,000 miles. **Use only Automatic Transmission Fluid Type A.**

Checking Fluid Level—With selector lever in "N" (Neutral) and emergency brake applied, run engine approximately four minutes at idle speed. Check to see that emergency brake is applied and that engine is on slow idle, move selector lever to the "P" (Park) position. *(NOTE*—When engine and transmission are at normal operating temperature, move selector lever through all ranges to assure fluid distribution throughout transmission). Raise hood and wipe top of oil level indicator. Remove indicator and read fluid level. Add Automatic Transmission Fluid "Type A" if necessary to bring fluid level to "Full" mark on indicator.

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above.*

►*OTHER "TURBO-DRIVE" SERVICE DATA: See "Turbo-Drive" Transmission in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

PROPELLER SHAFT

►*1955-58 LINCOLN DRIVELINE THUMP CORRECTION:* This noise occurs in front universal joint and is noticed when car is driven over a slight bump or incline under light or medium throttle. The condition may be caused by oil from transmission seeping back and locating between splines on shaft and universal slip joint. To correct, remove drive shaft and drill and tap a 1/8" pipe thread into center of front universal joint expansion plug, then install an Alemite Relief Valve, Part No. 47200, 47640, or 131100. *CAUTION - Do not thread valve too deeply into plug.*

►*LINCOLN REAR SUSPENSION "THUMP" CORRECTION:* May be caused by differential housing hitting against differential bumper. To correct, replace rear spring torque reaction bumpers, Part No. LD-55786-C, with heavier bumpers, Part No. MA-55712. Rear spring riding height should also be checked.

REAR AXLE

►*REAR AXLE PINION SEAL "SQUEAL" CORRECTION: See "Ford, Lincoln, Mercury (Integral Carrier)" in Rear Axle Section for installation of special type pinion seal.*

Own. Semi-floating hypoid gear, with Hotchkiss drive.

See "Lincoln, Mercury, Ford (Integral Carrier)" in Rear Axle Section.

Ratios – 3.07-1 (Std.), 3.31-1 (Optl. on Lincoln).

Backlash—.003-.008" with .002" maximum variation per gear set.

Axle Shaft Removal: Remove rear wheels and take out screws holding brake drum to axle shaft flange. Remove hydraulic brake lines from brake backing plate. Take out axle retainer nuts (working through opening in axle shaft flange). Use Tool 4235-C2 to remove axle shaft and bearing assembly from axle housing. Take off backing plate and gasket and remove axle being careful not to damage oil seal.

Axle Assembly Removal: Raise rear of car and remove axle shafts and drive shaft. Take off hydraulic line clips from axle housing and free line from differential housing clip. Disconnect shock absorbers and spring U-bolts. Remove axle housing assembly from car.

Wheel Bearing Adjustment: None required.

FRONT SUSPENSION

►*1956-57 LINCOLN CRACKING OR SNAPPING NOISE AT FRONT END CORRECTION:* This condition may be noticed on a hard bump or when shifting from reverse to forward speed, and may be caused by the engine shift in mounting bracket dowel holes. To correct, install a rubber shim (piece of old inner tube), cut to same size as lower surface of the front engine support, by cementing it to bottom of front support using weatherstrip cement. Coat other side of shim and install support on engine mounting bracket. Tighten to 50-65 ft. lbs.

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs.

See "Lincoln, Mercury, Ford (Ball Joint)" in Suspensions and Wheel Alignment Section.

Alignment Specifications	Lincoln	Continental
Kingpin Inclination	① 7°10'	① 7°
Caster	② 0°-Neg. 1½°	③Pos. 1°±¼°
Camber	③ 0°-Pos. ¾°	③Pos. ¾°±¼°
Toe-In	④ 1/8-3/16"	3/32-5/32"

① – With Pos. 3/4° camber.
② – Within 1/2° from one side of car to other.
③ – Within 1/4° from one side of car to other.
④ – Supersedes previous specification of 1/32-3/32".

Toe-Out on Turns – With wheels at maximum turning angle, outer wheel is at 26° and inner wheel is at 36°.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Shock Absorber Nos.	Front	Rear
Lincoln (Std.)	LD-18045-A	LD-18080-A
Lincoln (Hvy. Duty)	LD-18045-H	LD-18080-H
Continental	4048114	4048113

STEERING

►*TIRE RUBBING ON FRAME CORRECTION:* If front tires rub against frame or any other part of vehicle on a full turn, steering arm stops should be replaced with new stops, Part Nos. LD-33590-C and LD-33591-C. New stops can be identified by half-round notch located on edge of part between mounting holes.

►*LINCOLN STEERING COLUMN RATTLE CORRECTION:* Inspect upper steering column bushing and if steering column shaft-to-bushing clearance is excessive, bushing should be removed and be replaced with a spring-loaded nylon type bearing, Part No. FDT-3517-A.

Power Steering: Saginaw In-Line. *See "Saginaw In-Line" Power Steering in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw In-Line" Power Steering in Steering Section.*

Steering Gear Removal: *See "Saginaw In-Line" Power Steering in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Sect.*

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BRAKES

Bendix Hydraulic. Duo-servo with fixed anchor pins. No eccentric adjustment. Parking lever applies rear wheel service brakes.
See "Ford, Lincoln, Mercury Bendix" in Brake Section.

► *BRAKE "SQUEAL" CORRECTION:* An anti-squeal spring, Part No. 51A-1140, is available for installation on outside of brake drum.

Drums – Diameter 12"front and rear.

Wheel Cylinder Diameter— 1 3/32". (front), 15/16" (rear).

Lining – Molded type riveted to shoe.
Width – 2.5" (front), 2" (rear). **Thickness** – 7/32".

Braking Power – 55.5% (front), 44.5% (rear).
Clearance – Tighten adjusting screw about 5 or 6 clicks after wheel stops turning (shoes tight against drum), then back adjusting screw off 12 to 14 clicks.

Brake Pedal Adjustment: Adjust eccentric bolt attaching brake pedal to master cylinder pushrod to give 1/4-7/16" free movement of pedal pad before rod moves master cylinder.

Standard Mast r Cylind r: Located on engine side of firewall.
Ch cking Fluid – Maintain fluid level to within ¼" of top of reservoir.
Removal—Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to fire wall.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and master cylinder). Unit mounted on engine side of fire wall and replaces regular master cylinder.

See "Bendix Power Unit" in Brake Section.

Checking Fluid—Same as for regular master cylinder.

Removal of Power Unit—Disconnect valve pushrod from brake pedal assembly in drivers compartment. Remove master cylinder outlet fitting bolt from master cylinder.

(NOTE—It is not necessary to remove stop light switch, wires or hose assembly from outlet fitting. Do not disturb outlet fitting in master cylinder). Loosen clamp securing manifold vacuum hose to check valve on power unit. Remove hose from valve. Loosen clamp securing vacuum reserve tank hose to fitting on check valve. Remove four capscrews securing power brake assembly to bracket on dash panel and remove power brake assembly.

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type. S *"Windshield Wipers" in Miscellan ous Section.*

Air Conditioning: Own. See *"Lincoln Air-Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type. Reversible type motor in each window. Controlled by door switch and master control switch. S *"Pow r Window Regulators" in Miscellaneous Section.*

Power Top Control: Hydraulic-electric type with power operated latch mechanism. S *"Pow r Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric type. Individual motor for vertical and horizontal adjustment. S *"P w r Seat Adjusters" in Misc llane us Secti n.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left front body pillar between door hinges.

First Number - 3443 (Continental), 5001 (Lincoln).

►*SERIAL NUMBER NOTE (Continental).* Serial number (example *56J3443*) includes following identification data in sequence

Car	Mod l Y ar	Month	Serial No.
C ①	56	J ②	3443

① - Continental.

② - Model year began in August 1956. Letters used to indicate month of production, (letters began with "A" for Nov. 1955 and alphabetically thereafter).

►*SERIAL NUMBER NOTE (Lincoln)* Serial number (example *57WA5001L*) includes following identification data in sequence

Year	Assy. Plant	Serial No.	Eng. Type
57	WA ①	5001	L

① - Assembly Plants - **LA** - Los Angeles. **WA** - Wayne.

TUNE-UP

COMPRESSION PRESSURE: 150±10 lbs. at cranking speed.

VACUUM READING: 18-19" at 475-500 RPM in neutral.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

►*VALVE TAPPET CLEARANCE NOTE:* Rocker arms have self-locking adjusting screws for initial tappet clearance adjustment.

MANIFOLD HEAT CONTROL: External valve at right exhaust manifold connection to exhaust pipe. Valve is automatic, requires no adjustment but should operate freely.

►*DUAL EXHAUST NOTE* When heat control valve closed, all exhaust gases discharge through left hand exhaust pipe and muffler (Lincoln), left hand exhaust pipe and both mufflers (Continental).

►*INTAKE MANIFOLD NOTE.* Production intake manifold has mounting hole (¼" x 18 NPSF) for new constant voltage electric heat indicator bulb sending unit. When replacing a 1957 intake manifold, use a 1956 Lincoln or Continental manifold with 3/8" x 18 NPSF threaded hole and install new constant voltage heat indicator bulb sending unit released for this manifold.

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See "Fu l Syst m Not s" in Lincoln Special Data.*

IGNITION

FIRING ORDER: 1–5–4–8–6–3–7–2.

Cylinders - RIGHT BANK 1-2-3-4. LEFT BANK 5-6-7-8.

SPARK PLUG GAP · .032-.036".

Spark Plug - Champion F-14Y 18 mm Torque to 15-20 ft lbs *NOTE* - Supersedes No 860 previously used.

►*SPARK PLUG WIRE CAUTION* New "Hypalon" insulated high temperature wires must be used on en gines without heat shields *NOTE* - Retain heat shields on Nos 3 & 4 spark plugs

►*SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be tightened within limits of 15-20 ft. lbs.

COIL: Lincoln B6A-12029-B.

Ignition Current -2.5 amps. idling, 4.5 stopped.

Resistor - Lincoln B6A-12250-D. 1.30-1.40 Ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Lincoln FEL-12127-A, Continental FES-12127-A. New type with mechanical (centrifugal) advance and separate Vacuum Spark Control. *See "Ford, Lincoln, Mercury Distributors" in Electrical Section*

►*CONTINENTAL DISTRIBUTOR NOTE: This distributor has a tachometer drive.*

►*DISTRIBUTOR PRIMARY WIRE PRODUCTION CHANGE:* New Primary wire with improved insulation, Part No B7A-12216-B, with shiny black vinyl covering, used in production Use this wire in place of cloth covered wire previously used

Condenser - Lincoln B7A-12300-A. **Capacity** .21-.25 mfd.

Contact Point Set - Lincoln B7A-12171-A.

Breaker Gap - .014-.016".

Cam Angle - 26-28.5°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1½-2½		400	3-5		800
4-5		500	8-10		1000
5½-6½		800	11-13		1600
9-10		1325	18-20		2650
13-14		2000	26-28		4000

Vacuum Spark Control: On distributor housing. Linked to breaker plate.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
4-6	8-16	10
7-9	14-18	13
7-9	14-18	20

IGNITION TIMING

Setting - 5° BTDC. with engine idling at 475 RPM. *NOTE* - Maximum initial ignition timing is 8° BTDC.

►*CAUTION* DO NOT advance timing beyond these specifications

Timing Mark - Crankshaft pulley marked at TDC, 10° BTDC, and 20° BTDC with marks at 2° increments between. Pointer should be half way between the second (4°) and third (6°) marks.

CARBURETOR

Carter WCFB 2404S. 4-barrel with integral Automatic Choke.

►*AIR CLEANER BODY AND ACCELERATOR BELLCRANK INTERFERENCE CORRECTION* Rear side depression of air cleaner body may interfere with bellcrank on some early cars To correct reform air cleaner body to provide 3/16" clearance

►*CUTTING OUT ON LEFT TURN CORRECTION See "Carter WCFB Carburetors" in Carburetion Section*

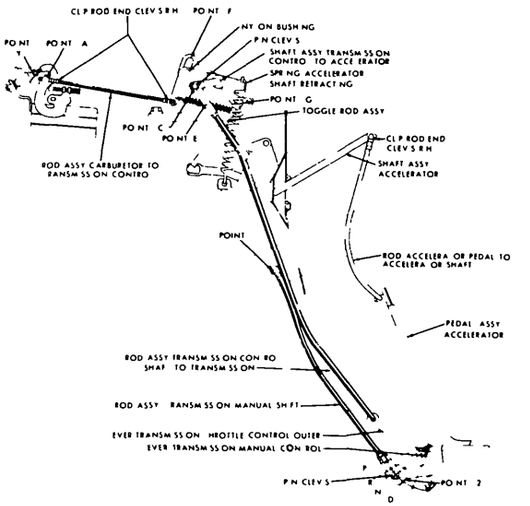
►*1956-57 HARD STARTING, STALLING OR ENGINE BACKFIRE CORRECTION.* New Choke Heat Tube Part No. ECU-9890-B with larger center section radius and larger runout radius at each end of tube is available for service to correct above conditions. *NOTE* - Service Intake Manifolds ECU-9424-A and C must have original type heat tube replaced by this new type before installation.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2–3–5–8. LEFT barrels 1–4–6–7.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required See AIR CLEANER below*

Idle Setting - 1¼ turns open (set both screws alike). **Idle Speed Setting** - 475-500 RPM with selector lever in Neutral, 425-450 RPM with selector lever in Drive.

Idle Speed-Up Control Adjustment (Optl. & Air Conditioned Cars): With engine at normal operating temperature, transmission in "N" (Neutral) position and fast idle control switch in "ON" position, loosen locknut on control assembly shaft and adjust knurled nut to obtain engine idle speed of 800 RPM Tighten locknut securely *NOTE* - Interference between Automatic Throttle Control Lever and Control Assembly may be caused by cut out on end of lever being off center, or burrs on edge of lever Mounting bracket may twist



TURBO-DRIVE THROTTLE LINKAGE

out of alignment To correct replace bolts and nuts with the following Bolt Part No 20326-S7, Nut Part No 33797-S7, Split Lockwasher, Part No 34781-S7

Throttle Linkage Adjustment (Turbo-Drive): With engine at normal operating temperature and idle speed set at 425-450 RPM with selector lever in "DR" position, adjust Anti-stall Dashpot (see below), then proceed as follows Remove clevis pin connecting transmission control rod to control shaft (on engine bracket), insert gauge pin, Tool 77230-MB, through control shaft and bracket. Adjust carburetor-to-control shaft rod so that it freely enters hole in carburetor throttle lever. Remove gauge pin. With carburetor throttle lever in slow idle position, hold transmission control rod up so that transmission lever is against stop, adjust clevis on rod so that clevis pin enters hole in control shaft freely, then **length** n rod by turning clevis 2½ full turns, connect rod.

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Dashpot Adjustment - After making Idle Mixture, Hot Idle, and Fast Idle Adjustments, hold dashpot plunger in to limit of travel. Loosen locknut securing dashpot to dashpot bracket, insert .067" Gauge (Tool T109-234) between dashpot plunger and primary throttle operating lever, rotate dashpot to obtain proper clearance between plunger and lever *CAUTION* - Improper dashpot adjustment may cause excessive rear axle differential backlash

► *OTHER DATA See "Carter WCFB Carburetors" in Carburetion Section*

FUEL PUMP PRESSURE: 4-6 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Lincoln No. ECU-9350-B (Early), -C (Later), Continental No. ECV-9350-A. Fuel & Vacuum.
Pressure - 4-6 lbs. (Early pump), 4½-6½ (later pump) Lincoln & Continental.
See "Fuel Gauges" in Carburetion Section.

Gasoline Gauge (Lincoln): King-Seeley Electric "CV" (Constant Voltage) type with voltage regulator No. FEL-10804-A.
Dash Unit - Lincoln No. FEL-9280-A and FEL-9280-B.
Tank Unit - Lincoln No. FEL-9275-C.
See "Fuel Gauges" in Carburetion Section.

Gasoline Gauge (Continental): Included in Cluster, Lincoln No. 4049792, which includes Ammeter, Fuel, Oil, and Temperature Gauges.
See "Fuel Gauges" in Carburetion Section.

Low Level Fuel Indicator: Light on instrument panel in circuit with Ignition Switch & S.I.P. relay. Replace light bulb when inoperative.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 4,000 miles and replace element every 20,000 miles.

► *CLEANING CAUTION:* Clean element by tapping or shaking to remove particles of dirt. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Lincoln FDU-10655-H, Continental 4050251. 12 Volt. 13 plate, 70 ampere hour capacity (20 hr. rate). Located in right front floor pan (Lincoln), Cowl panel (Engine Side) Continental.
Battery Ground - Negative. Battery to starter.
Engine Ground - Cylinder head to dash.

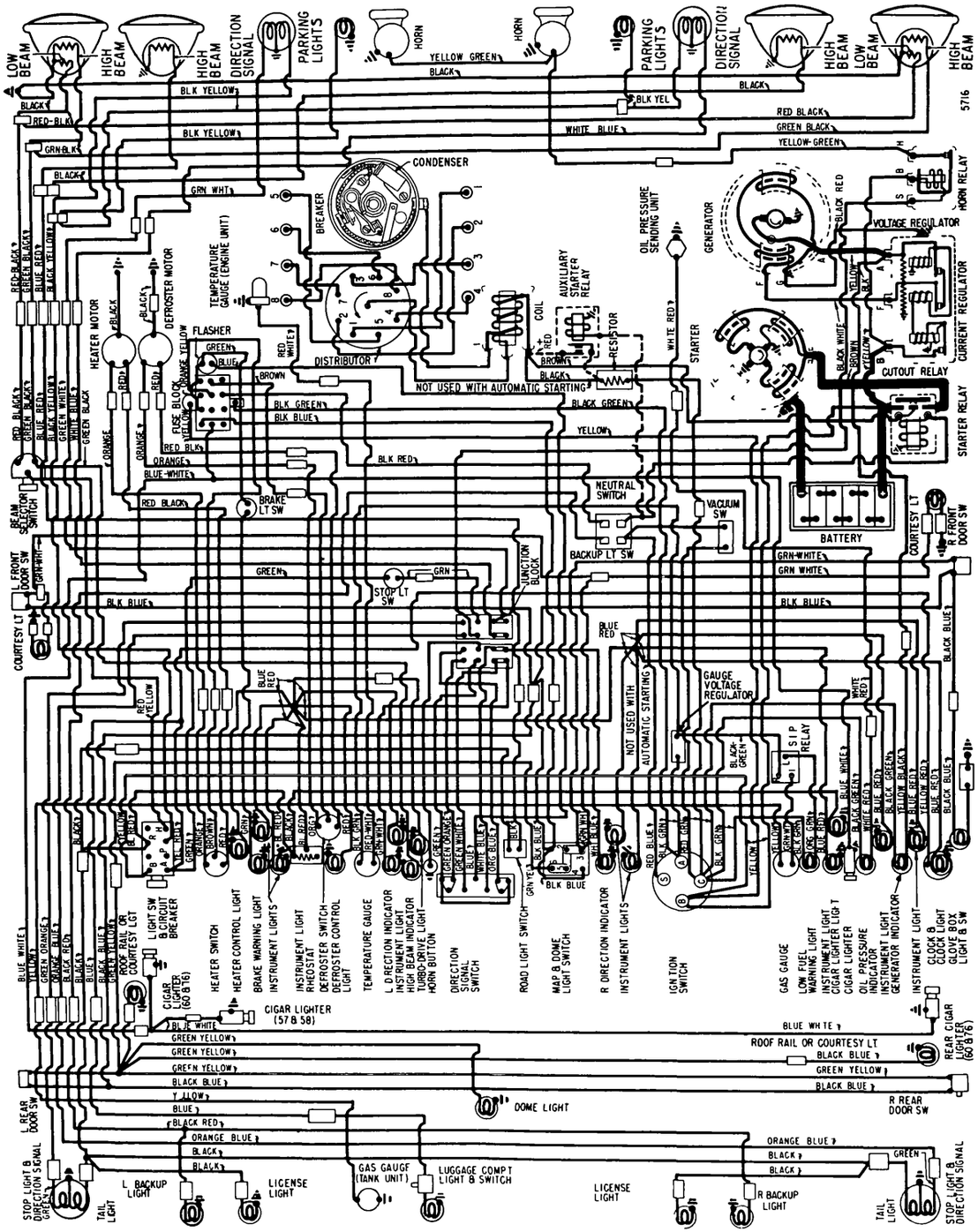
► *BATTERY NOTE* Late type battery can be used to replace 1956 Lincoln battery.

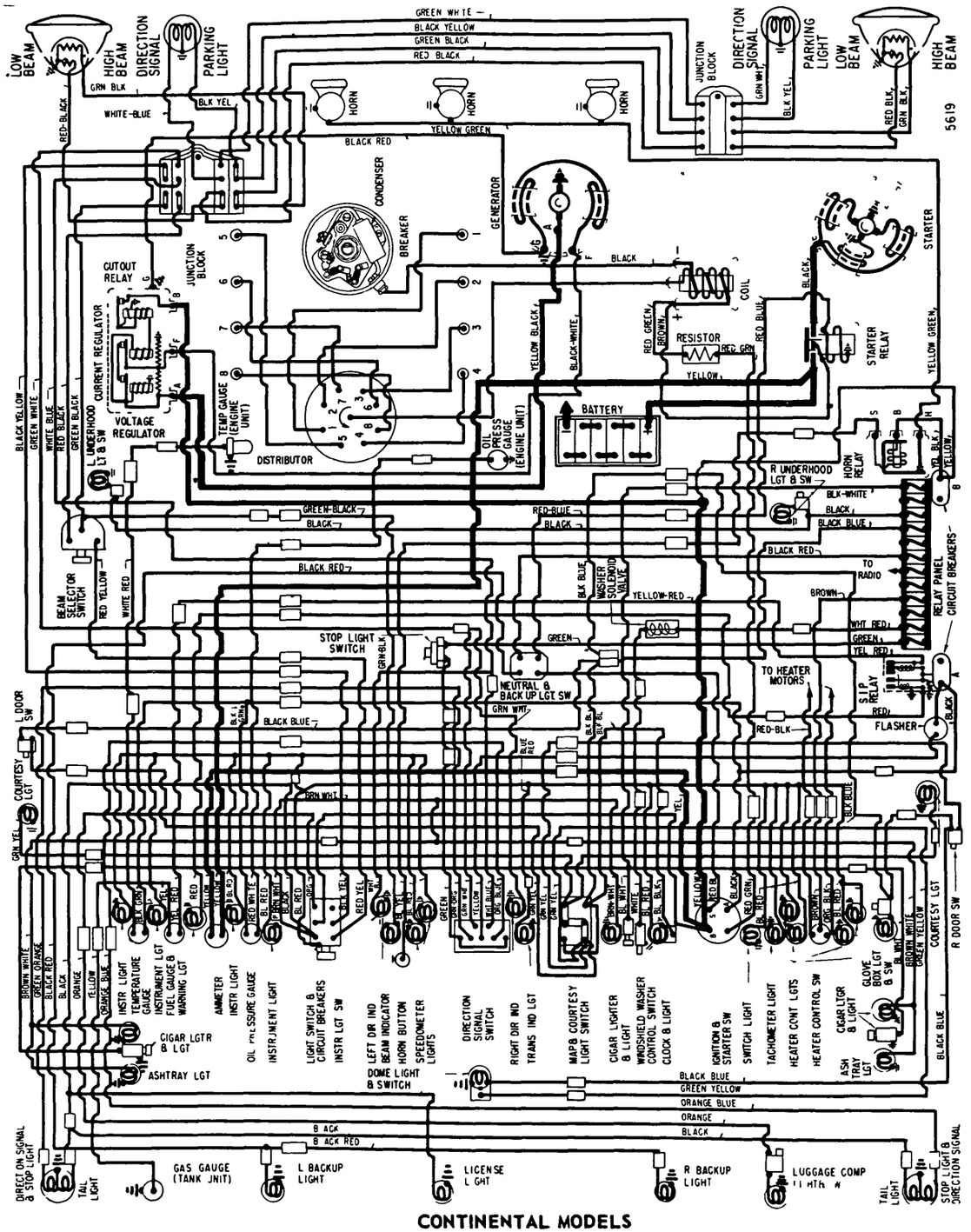
STARTER

Lincoln FAR-11002-B. Armature - FAC-11005-B.

► *STARTER GEAR NOISE CORRECTION* Caused by bottoming of starter pinion in converter cover ring gear. To correct, remove starter as described below, leaving three attaching bolts loose. Tighten center (outer flange) bolt to light snug fit, pry starter lower attaching flange at engine block rear outrigger away from engine block Hold starter in this position while tightening the three attaching bolts.

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Drive - Bendix "Folo-Thru".
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM with engine warm.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	80

Removal: Remove from below by bending gang ignition wires away from top capscrew, removing transmission cooler line clamp below starter so lines can be held away and removing three starter capscrews. Pull out and down or up until starter drive gear clears housing.

Installation: Tape dust seal lip (use masking tape) to inner circumference of housing to hold seal in place, and reverse removal procedure.

Starting Switch: Relay, Lincoln No. B6A-11450-A, controlled by Ignition & Starter Switch, Lincoln No. 11572-A, and Turbo-Drive Neutral Safety Switch, located on steering column.

Automatic Starting (Optl.) - Vacuum Switch No. FEL 11504-B, Auxiliary Starter Relay FDT-11505-A. Provides automatic starting when ignition switch turned on. *See wiring diagram.*

Turbo-Drive Neutral Safety Switch Adjustment: *See "Turbo-Drive" in Transmission Section.*

►***1956-58 LINCOLN NEUTRAL SAFETY SWITCH SERVICE REPLACEMENT (Allowing Starting in Both Neutral and Park Positions):*** **A new neutral switch insulator assembly, Part No. FFC-15827-A, having two terminal strips which allows the car to be started in either "N" (Neutral) or "P" (Park) positions, may be installed as a service replacement.**

GENERATOR

Lincoln No. FGP-10002-A. Armature - FGP-10027-A.

Performance Data

Amperes	Volts	Gen. RPM
40	15	2390

Brush Spring Tension - 26-34 ozs.
Field Current - 1.5-1.6 amps. at 15 volts (Hot).
Rotation - Counterclockwise at commutator end.

Belt Adjustment: Approximately ½" deflection on belts midway between generator and pump pulleys at right side.

REGULATOR

Lincoln FBF-10505-A.

►*SETTING NOTE:* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75°F.

Cutout Relay

Cuts In - 12.0-12.8 Volts.
Cuts Out - 2.0-6.0 amps. (reverse current).

Voltage Regulator

Setting - 14.6-15.4 Volts.
Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 38-42 ozs.
Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section.*

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CONTINENTAL MODELS

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MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Light System with Regular Headlights and auxiliary Roadlights). *See "4-Headlight System" in Electrical Section.*

Directional Signals: *See Electrical Section.*

Automatic Headlight Dimmer: *See Electrical Section.*

Lighting Switch Removal: *(NOTE* - Toggle type used on Lincoln, push-pull type used on Continental). Remove anti-rattle bezel from switch, then remove switch from rear of dash panel.

Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit). Master cylinder or power unit located on firewall in engine compartment.

CIRCUIT BREAKERS: Lighting - Two 12 Ampere circuit breakers (one for headlights, one for auxiliary lights) located on headlight switch.

Air Conditioning (Lincoln) - 15 Ampere.

Power Top (Lincoln) - 30 Ampere in Motor Lift circuit, 20 Ampere in Motor Latch circuit, 10 Ampere in Motor Relay circuit.

4 or 6-Way Seat Regulator - 30 Ampere in Battery lead, 20 Ampere in each seat motor ground lead.

Window Regulators - 30 Ampere in Battery lead, 15 Ampere in each motor ground lead.

Electric Door Locks - 30 Ampere (4-Door), 15 Ampere (2-Door) in starter terminal lead, 10 Ampere in Ignition Switch lead.

FUSES: Fuse panel mounted on brake pedal support behind instrument panel with holders marked for size of fuse and circuit.

Directional Signals - SFE 7.5 amps.

Interior lamps (Glove Box, Dome, & Courtesy) - SFE 7.5 Amp.

Heater Blowers - Two SFE 14 Amp.

Radio - SFE 7.5 Amp.

Radio Antenna - SFE 14 Amp.

Cigarette Lighter - 1 Sulphur Disc (Lincoln), SFE 20 Amp. (Continental).

Back-up Lamps - SFE 7.5 Amp.

Horn Relay: Lincoln - Lincoln No. B7A-13853-A, with bracket, **Continental** - Lincoln No. 4050519 without bracket.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*ENGINE COOLANT LEAKAGE CORRECTION:* Coolant leakage at generator bracket rear mounting bolt can be eliminated by installation of new self-locking type bolt and lockwasher. New bolt has nylon pellet which gives increased thread tension with improved sealing qualities.

ENGINE SPECIFICATIONS: 90° V8.

Bore	Stroke	Displacement
4.00"	3.66"	368 Cu. Ins.
Rated HP	**Compr. Ratio**	**Develped HP**
51.2	10.0-1	300 at 4800 RPM

Compression & Vacuum Reading - *See Tune-Up.*

►*COMPRESSION RATIO NOTE:* Compression ratio increased by revising combustion chamber and increasing length of piston (center of piston pin bore to top of piston) .010".

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Special Data.*

OIL PAN REMOVAL: Remove oil inlet pipe hex fittings at oil pump and side of oil pan and remove pipe. Remove oil pan capscrews, then remove oil pan and gasket. *NOTE*—When this operation is performed, turn crankshaft until rear counterweights of crank are up. The oil pan can then be removed from front of engine.

PISTONS

Aluminum alloy, autothermic, slipper type with three rings above pin. Tin-plated.

►*PISTON INTERCHANGEABILITY CAUTION:* 1957 pistons are .010" higher (piston pin bore to top of piston) and STD. SIZE 1956 & 1957 PISTONS ARE NOT INTERCHANGEABLE. However, 1956 Oversize Pistons (.020", .030", .040") can be used in 1957 engines.

►*ORIGINAL BORE & PISTON SIZES:* Std. cylinder bore limits are 4.0000-4.0024" and TWO Standard Pistons are used for selective fitting as follows: 3.9993-3.9996" Diameter (marked "2" on dome), 4.0005-4.0008" Diameter (marked "6" on dome). *NOTE* - Std. piston furnished for service in these two sizes.

Removal – Rod and piston assembly removed from above.

Fitting New Pistons: Using 1/2" wide feeler gauge inserted between piston and cylinder wall at right angle to pin on thrust side, pull should be 6-12 lbs. when using feeler gauge thicknesses as follows: New Piston in New Bore - .0015". New piston in Used Bore - .002". Used Piston in Used Bore - .003".

Replacement Pistons: Standard (Two sizes - see Original Bore & Piston Sizes above), and .020", .030", .040" Oversize.

Installing Pistons: Install all pistons with indentation on head toward front of engine. *See Rod Installation*

PISTON PINS

Floating type with lock rings at each end.

Diameter – .9120-.9123". **Length** - 3.162-3.176".

Clearance in Piston – .0008" maximum.

Clearance in Rod – .0008" maximum. Select for light thumb press fit at 70° F.

Replacement Pins: Standard (marked Green), and .001" (marked Blue), .002" (marked Yellow) oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.013-.030"	.006" max.
Compr.(2)	.0925-.0935"	.013-.030"	.006" max.
Oil (3)	.1860-.1865"	.010-.027"	Ⓒ

Ⓒ - Side sealing type ring.

Replacement Rings: Standard size and .020", .030", .040" oversize.

►*SPACING NOTE:* Ring gaps should be spaced 120° apart, with oil ring gap to the side opposite spark plug side of cylinder bores.

CONNECTING RODS

Length – 7.064-7.066". **Weight** - 28.36 ozs.

Journal Diameter – 2.2482-2.2486" (Color coded BLUE), 2.2486-2.2490" (Color coded RED). Use with bearing of same color.

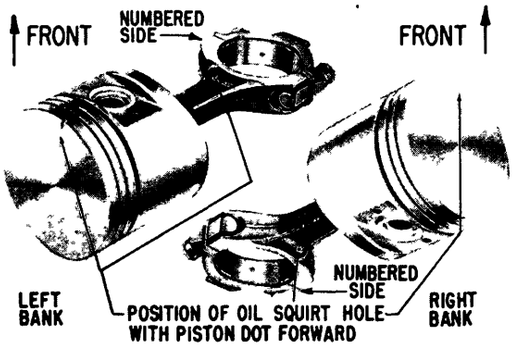
Lower Bearing – Steel-backed, copper lead alloy lined.

Clearance – .0007-.0036".

Side Clearance – .006-.014". .017" Service max.

Replacement Bearings – Standard (2 sizes marked RED & BLUE for selective fitting) and .010", .020", .030", .040" undersize.

Installing Rods – Assemble rods to piston so indentation embossed on piston head will face front of engine. Numbered side of rods on the right bank should face right side of engine and rods for left bank will face left side of engine. Place caps on connecting rods so numbered sides match and install in same numbered cylinders.



PISTON & ROD ASSY.

CRANKSHAFT

Journal Diameter – 2.6235-2.6239" (Color coded BLUE), 2.6239-2.6243" (Color coded RED).

Out-of-Round Limits – .0005" max. **Taper Limits** - .001".

Bearings – Steel-backed copper-lead alloy lined.

Clearance - .0008-.0036".

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Replacement Bearings: Std. (2 sizes color coded RED & BLUE for selective fitting) and .010", .020", .030", undersize.

►*MAIN BEARING INTERCHANGEABILITY NOTE:* 1957 rear main bearings have 9/16" oil hole (previous bearings had 11/32" oil hole). DO NOT use previous type bearings on 1957 engines (1957 bearings can be used on past models).

End Thrust: Taken by No. 3 main bearing.

Thrust Bearing Alignment – *See "Crankshaft & Main Bearings" in Lincoln Special Data.*

Endplay – .012" maximum.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Lincoln Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Lincoln Special Data.*

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CAMSHAFT

J urnal Diamet r – 2.1240-2.1247". **Out- f-R und Limit** - .001".

B arings – Steel-backed babbit lined bushings.

Cl aranc – .006" maximum. **Endplay** - .003" (restrained by thrust spring and plunger).

R plac ment B arings: Std. & .015" undersize.

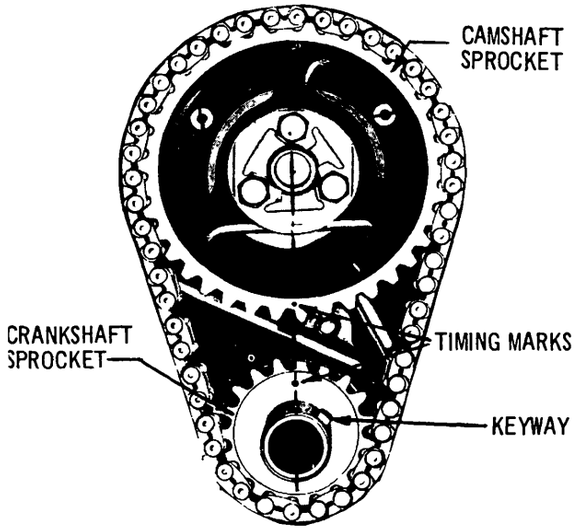
Camshaft Removal: *See "Camshaft & Bearings" in Lincoln Special Data.*

Timing Chain: Width 1.25". Pitch .5". Length 25".

D fl ction – 1/2".

Camshaft S tting: Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers.

Timing Chain C v r S al Installation (Crankshaft Front Seal): *S "Engin Front Cover" in Lincoln Spec. Data.*



VALVE TIMING MARKS

VALVES

Valv Tapp t Clearanc : None in service (hydraulic). Adjustment required only when servicing valves or hydraulic lifters.

Initial Valve Tapp t Cl arance Adjustment–*See "Valve Syst m" in Lincoln Sp cial Data.*

Valv	H ad Diam.	Stem Diameter Ⓘ
Intake	2.000-2.010"	Ⓒ.3415-.3420" or Ⓖ.3420-.3425"
Exhaust	1.630-1.640"	Ⓒ.3400-.3405" or Ⓖ.3405-.3410"

Valve	S at Angle	Lift ⓓ	Stem Clearance
Intake	45°	256" min.	.001-.004" max.
Exhaust	45°	256" min.	.002-.005" max

Ⓘ – Furnished with .003", .015", .030" oversize stems
Ⓒ – Color coded RED. Use with RED valve guide.
Ⓖ – Color coded GREEN. Use with GREEN valve guide.
ⓓ – Cam lobe lift (service limit).

Valv Seat Width – 1/16-5/64" (Intake), 5/64-3/32" (Exhaust).

Valv St m S al. Valve stem seals used on both intake and exhaust valve stems. Install seal over valve stem before installing valve spring.

Ov rsiz Valv St m Installati n: *Se "Valv Syst m" in Lincoln Special Data.*

Valv Springs: Fre L ngth – 2-1/8".

Spring Specifications

	Pressure	Length
Valve Closed	60 lbs.	1.80"
Valve Open	165 lbs.	1.38"

►*SPRING HEIGHT CORRECTION:* Measure valve spring assembled height from point where spring contacts cylinder head to point where it contacts retainer. Assembled height of spring should be 1 25/32-1 13/16". Spacers are available in steps of .030" & .060" to bring assembled height within these limits.

►*SPRING SQUARENESS CAUTION:* If springs more than 1/16" out of square, with spring closed coil end on surface plate and measured with steel square, they should be replaced.

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" intake, .005" exhaust), ream guides and install oversize valves. *See "Valve System" in Lincoln Special Data.*

Valve Lifters: Hydraulic, barrel type.

Diameter–.8740-.8745". **Clearance in Block** .0025" max.

Initial Valve Clearance – *See "Valve System" in Lincoln Special Data.*

Lifter Overhaul – *See "Valve System" in Lincoln Special Data.*

Rocker Arm Assembly: *See "Valve System" in Lincoln Special Data.*

►*ROCKER ARM COVER LEAK CORRECTION (Early Cars):* Grind away approximately 1/16" of inner flange for a length of 1½" at rear of cover.

►*VALVE ROCKER ARM PRODUCTION CHANGE (Self-locking Valve Adjusting Screws). See "Valve System" in Lincoln Special Data.*

VALVE TIMING

See "Camshaft Setting' under CAMSHAFT above.

►*VALVE TIMING NOTE: The following valve opening and closing points are with a camlift as indicated.*

Intake Valves – Open 18° Ⓒ BTDC, Close 72° Ⓒ ALDC.

Exhaust Valves– Open 59° Ⓒ BLDC, Close 31° Ⓒ ATDC.

Ⓒ – Camlift .002". Ⓒ – Camlift .004".

Valve Timing Check – With rocker cover removed, loosen adjusting locknut and screw of valve to be tested. Slide rocker arm to one side in order to have pushrod in the clear. With pushrod in tappet socket install a dial indicator in such a manner as to have actuating arm of indicator in the pushrod socket, in the same plane of pushrod movement (dial indicator used should have at least a total movement of .300" or more). Place a quadrant on the crankshaft pulley. If intake valve opening is being checked, engine is rotated slowly until dial indicator shows .002" camlift. At this point the actual opening reading in degrees is taken(18° BTDC). The engine is further rotated to check the valve closing. Dial indicator should read .004" camlift (72° ALDC)

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Lincoln Special Data.*

►*OIL LEVEL INDICATOR CAUTION:* Two types used as follows. **With ut Air C nditi ning** - Lincoln No. ECU-6750-C, with 23 3/32" from top of tube cover to "Full" mark on dipstick.

With Air C nditi ning - Lincoln No. ECU-6750-D with measurement of 23 13/16" between same two points.

Crankcas Capacity: 5 qts. (refill), 6 qts. (with filter change).

Normal Oil Pressure: 45-50 lbs. at 2000 RPM (hot).

Pressure Regulator Valve -In pump body, not adjustable.

Oil Pressure Indicator (Lincoln): Light on instrument panel. Light is on when oil pressure is low.

Oil Pressure Switch - Lincoln No. B6A-9278-B.

Oil Pressure Gauge (Continental): Included in Cluster, Lincoln No. 4049792,

Engine Unit - Lincoln No. FEM-9278-A.

See "Oil Pressure Gauges" in Miscellaneous Section.

Oil Pump: Rotor type, located on left side of engine crankcase driven by distributor drive gear.

Pump Overhaul - *See "Oiling System" in Lincoln Special Data.*

Oil Filter: Full-flow type (early), Disposable type (later).

►*OIL FILTER PRODUCTION CHANGE:* Disposable oil filter used on later cars and can be installed to replace previous full-flow type filter on earlier cars. *See "Oiling System" in Lincoln Special Data.*

Crankcase Ventilation: Combination oil filler and road draft tube and air filter cap, located on front of valve pushrod cover. Clean and oil the oil filler cap filter every 2,000 miles

COOLING

►*HIGH OPERATING TEMPERATURE CORRECTION:* High operating temperatures resulting from continuous low speeds or extreme load conditions may be improved as follows:

Cars Without Air Cond. - Replace present 4-blade fan with 5-blade fan No. LA-8600-A and install radiator No. LD-8005-D.

Cars With Air Cond. - Replace present 5-blade fan with 6-blade fan No. LA-8600-B.

Water Capacity: 22 qts. Add 3.2 qts. for heater units (Lincoln), 3.4 qts. (Continental).

Pressure Valve: Lincoln No. LA-8100-A (Lincoln), 4048840 (Continental). 12-15 lbs. operating pressure, radiator filler cap.

Thermostat: Lincoln No. EAD-8575-D (157-162°) Std. Lincoln, No. B4Q-8575-B (168-173°) Std. Continental, Optional Lincoln.

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Lincoln Special Data.

Temperature Gauge (Lincoln): King-Seeley Electric "CV" (Constant Voltage) type with voltage regulator No. FEL-10804-A.

Dash Unit - Lincoln No. FEL-10883-B.

Engine Unit - Lincoln No. FEK-10884-A.

Temperature Gauge (Continental): Included in Clusters, Lincoln No. 4049792,

See "Temperature Gauges" in Miscellaneous Section.

TURBO-DRIVE TRANSMISSION

Torque converter and three-speed automatic transmission with hydraulic control.

See "Turbo-Drive" Transmission in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Turbo-Driv " Transmission in Transmission S ction.*

►*TESTING & TROUBLE SHOOTING: S e "Turb -Driv " Transmission in Transmission S ction.*

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Lubricati n – Check transmission oil level every 2000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 16,000 miles. **Us nly Automatic Transmission Fluid Type A.**

Checking Fluid Level: Bring transmission to operating temperature by running engine with selector lever in Neutral position. Move shift lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position for checking fluid level. Add Automatic Transmission Fluid Type "A" to bring level to the "Full" mark on indicator.

►*TURBO-DRIVE TRANSMISSION FLUID CAPACITY NOTE.* With the addition of a fluid cooler located ahead of radiator the capacity has been increased to 11.3 qts. When draining and refilling Turbo-Drive Transmission after overhaul, reverse flush cooler and lines

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER "TURBO-DRIVE" SERVICE DATA: See "Turbo-Drive Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

PROPELLER SHAFT

►*1955-58 LINCOLN DRIVELINE THUMP CORRECTION* This noise occurs in front universal joint and is noticed when car is driven over a slight bump or incline under light or medium throttle. The condition may be caused by oil from transmission seeping back and locating between splines on shaft and universal slip joint. To correct, remove drive shaft and drill and tap a 1/8" pipe thread into center of front universal joint expansion plug, then install an Alemite Relief Valve, Part No. 47200, 47640, or 131100. *CAUTION - Do not thread valve too deeply into plug.*

REAR AXLE

Own. Semi-floating, hypoid gear, with Hotchkiss drive.

►*POWER-LOCK DIFFERENTIAL NOTE·* Optional equipment, and identified by Decal on left front door "Directed Power Differential", plus metal tag with stamped letter "T" under cover bolt, and cover marked a daub of yellow paint.
See "Lincoln (Integral Carrier)" & "Spicer Power-Lock Differential" in Rear Axle Section.

►*REAR AXLE SHAFT & BEARING REPLACEMENT CAUTION:* Rear axle shaft and bearing Lincoln No. LD-4234-B (1/16" shorter than former type) only, should be used with Power-Lock Differential. This axle shaft and bearing available for usage on all other rear axles.

►*REAR WHEEL BALANCE (POWER-LOCK DIFFERENTIAL) CAUTION:* Do not attempt to balance rear wheels on the car when car equipped with "Power-Lock"

Ratios – 3,07-1 (Std.), 3.31-1 (Optl. on Lincoln).

Backlash–.003-.008" with .002" maximum variation per gear set.

Axle Shaft Removal: Remove rear wheels and take out screws holding brake drum to axle shaft flange. Remove hydraulic brake lines from brake backing plate. Take out axle retainer nuts (working through opening in axle shaft flange). Use Tool 4235-C2 to remove axle shaft and bearing assembly from axle housing. Take off backing plate and gasket and remove axle being careful not to damage oil seal.

Axle Ass mbly R moval: Raise rear of car and remove axle shafts and drive shaft. Take off hydraulic line clips from axle housing and free line from differential housing clip. Disconnect shock absorbers and spring U-bolts. Remove axle housing assembly from car.

FRONT SUSPENSION

►*1956-57 LINCOLN CRACKING OR SNAPPING NOISE AT FRONT END CORRECTION:* This condition may be noticed on a hard bump or when shifting from reverse to forward speed, and may be caused by the engine shift in mounting bracket dowel holes. To correct, install a rubber shim (piece of old inner tube), cut to same size as lower surface of the front engine support, by cementing it to bottom of front support using weatherstrip cement. Coat other side of shim and install support on engine mounting bracket. Tighten to 50-65 ft. lbs.

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs.

See "Lincoln (Ball Joint)" in Suspension and Wheel Alignment Section.

Alignment Specifications	Lincoln	Continental
Kingpin Inclination	① 7°	① 7°
Caster	② 0°-Neg.1½°	③ Pos. 1°±¼°
Camber	③ 0°-Pos.¾°	③ Pos. ¾°±¼°
Toe-In	1/8" to 3/16"	3/32" to 5/32"

① - With Pos. ¾° Camber.
② - Within ½° from one side of car to other.
③ - Within ¼° from one side of car to other

Toe-Out on Turns - With wheels at maximum turning angle, outer wheel is at 26° and inner wheel is at 36°.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Shock Absorber Nos.	Front	Rear
Lincoln (Std.)	LD-18045-J	LD-18080-J
Lincoln (Hvy. Duty) Std.	LD-18045-K	LD-18080-K
Lincoln (Hvy. Duty) Adj.	I-500938	I-500941
Continental	4048114	4048113

►*HEAVY DUTY ADJUSTABLE SHOCK ABSORBER NOTE* To adjust shock absorbers proceed as follows

Adjustment (Front) - Remove shock absorber, fully compress it until internal couplings are mated, then turn upper shaft to align arrow on inner washer with arrow on shock absorber body to obtain desired ride control

Adjustment (Rear) - Remove **only** the lower end of rear shock absorber, compress unit until internal couplings are mated, then turn lower shaft until desired ride control is obtained.

STEERING

Power Steering: Saginaw In-Line. See *"Saginaw In-Line" Power Steering in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw In-Line" Power Steering in Steering Section.*

Steering Gear Removal: *See "Saginaw In-Line" Power Steering in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Sect.*

BRAKES

B ndix Hydraulic. Duo-servo with fixed anchor pins. No eccentric adjustment. Parking lever applies rear wheel service brakes.
See "Ford, Linc ln, Mercury B ndix" in Brak Section.

►*BRAKE FLUID REPLACEMENT NOTE.* Use heavy duty brake fluid HACA-19542 with SAE specification 70 R1 for most efficient brake operation. DO NOT MIX HEAVY DUTY BRAKE FLUID WITH ANY OTHER TYPE

►*BRAKE "SQUEAL" CORRECTION:* **An anti-squeal spring, Part No. 51A-1140, is available for installation on outside of brake drum.**

Drums – Diameter 12"front and rear.

Wheel Cylinder Diameter – 1 3/32" (front),,15/16" (rear).

Lining – Molded type riveted to shoe.

Width – 2.5" (front), 2" (rear). **Thickn ss** – 7/32".

Braking Power – 55.5% (front), 44.5% (rear).

Clearance – Tighten adjusting screw about 5 or 6 clicks after wheel stops turning (shoes tight against drum), then back adjusting screw off 12 to 14 clicks,

Brake Pedal Adjustment· Adjust eccentric bolt attaching brake pedal to master cylinder pushrod to give 1/4-7/16" free movement of pedal pad before rod moves master cylinder.

Standard Master Cylinder· on engine side of firewall.

Checking Fluid – Maintain fluid level to within ¼" of top of reservoir.

Removal–Disconnect brake line from brake master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to fire wall.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and master cylinder). Unit mounted on engine side of fire wall.
See "Bendix Power Unit" in Brake Section.

Checking Fluid–Same as for regular master cylinder.

Removal of Power Unit–Disconnect valve pushrod from brake pedal assembly in drivers compartment. Remove master cylinder outlet fitting bolt from master cylinder. (NOTE–It is not necessary to remove stop light switch, wires or hose assembly from outlet fitting. Do not disturb outlet fitting in master cylinder). Loosen clamp securing manifold vacuum hose to check valve on power unit. Remove hose from valve. Loosen clamp securing vacuum reserve tank hose to fitting on check valve. Remove four capscrews securing power brake assembly to bracket on dash panel and remove power brake assembly.

MISC. MECHANICAL

Windshield Wipers· Cable operated vacuum type. *See "Windshield Wipers" in Misc llaneous Section.*

Air Conditioning Own. *Se "Lincoln Air-C nditioning" in Miscellaneous Section.*

Power Window Regulators· Electric type Reversible type motor in each window Controlled by door switch and master control switch *See "Power Wind w Reguiators" in Miscellaneous Section.*

Electric Door Lock: *See "Electric Door Locks" in Miscellaneous Section*

Power Top Control: Hydraulic-electric type with power operated latch mechanism. *Se "Power Top Controls" in Misc llan ous S ction.*

P wer S at Adjusters: "4-Way" & "6-Way" electric type. Single motor with solenoid clutches. *See "Pow r S at Adjust rs" in Misc llan ous Section.*

►*JACKING & HOISTING CAUTION (ALL MODELS): B - fore jacking or h isting, s "Jacking & Hoisting Precautions" in Susp nsion & Whe l Alignment S cti n.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left front body pillar between door hinges. *NOTE* - Number (example below) includes identification data.

① ② ③ ④ ⑤
H 8 Y G 400001

① - Lincoln engine. ② Year 8 (1958).
③ - Assy. Plant: Y (Wixom).
④ - Body style.
⑤ - Beginning engine number.

►*BODY DESIGN NOTE:* Both Lincoln & Continental use new "Unitized Body-Frame" construction.

TUNE-UP

►*SPARK PLUG OIL FOULING & EXCESS EXHAUST SMOKE CORRECTION: S "Rocker Arms" in Lincoln Special Data.*

►*LIGHT LOAD SPARK KNOCK CORRECTION:* Light spark knock occurring on "drive-away" under light load condition can be corrected by modifying first type (FEW-12127-D) distributor. *S e DISTRIBUTOR below.*

COMPRESSION PRESSURE: 200 lbs. with variable limit between cylinders not to exceed 10 lbs.

VACUUM READING: 17-18" at engine idle.

VALVE TAPPET CLEARANCE: None in service hydraulic lifters. *S VALVE LIFTERS below.*

MANIFOLD HEAT CONTROL: Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve. *S COOLING system for data.*

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See "Fu l Syst m N tes" in Lincoln Special Data.*

IGNITION

FIRING ORDER: 1-5-4-2-6-3-7-8. *CAUTION - #2 & #8 cylind r firing ord r r v rsed from previous models.*
Cylind rs - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036".
Spark Plug - Champion F-11-Y. 18 mm. Tapered seat, no gasket required. Torque to 15-20 ft. lbs.

►*SPARK PLUG WIRE ROUTING NOTE:* No. 7 & No. 8 spark plug wires should be separated as far as is practical in their routing through the bracket and separator to prevent a "cross-firing" condition.

COIL: Linc ln B6A-12029-B.
Igniti n Current - 2.5 amps. idling, 4.5 stopped.
R sist r - B8E-12250-A. 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by lead from starter solenoid-to-coil.

DISTRIBUTOR: Linc ln FEW-12127-D (Early), FEW-12127-E (Later). Same design as previous models. *See "F rd, Linc ln, Mercury Distributors" Electrical Section.*

►*DISTRIBUTOR REMOVAL CAUTION:* Intermediate drive shaft (hex sided oil-vacuum pump drive shaft) is retained by internal toothed lockwasher at upper end (lower washer also used on early cars) which should prevent shaft disengaging when distributor removed. If shaft becomes disengaged and drops into oil pan when distributor removed, make certain that lockwasher installed on shaft to prevent reoccurance.

►*DISTRIBUTOR REMOVAL NOTE:* Engine front cover capscrew nearest distributor may interfere with distributor removal on some cars. Loosen screw to remove distributor. Screw may be replaced by Screw, Part No. 20520-S8 (5/16" - 18 x 2").

►*DISTRIBUTOR-INTAKE MANIFOLD INTERFERENCE CORRECTION:* Interference between distributor terminal housing clamp and intake manifold may cause timing difficulty. Correct by grinding off intake manifold.

►*LIGHT LOAD SPARK KNOCK CORRECTION (FEW-12127-D Distr.):* Install new Vacuum Stop FEW-12202-B (supersedes No. FEW-12202-A) and change part number suffix on embossed portion of distributor housing to *"E". NOTE* - With this modification, Vacuum Advance Performance should be same as FEW-12127-E.

►*DETONATION CORRECTION (DUE TO USE OF LOW OCTANE FUEL):* Detonation which is caused by the use of low octane fuel (below 98 Octane), can be corrected by installation of Modification Kit, Part No. MJK-12127-C (FEW-12127-D Distributor), MJK-12127-D (FEW-12127-E Distributor). Each Kit contains necessary Automatic Advance springs, Vacuum Control springs, and Vacuum Control stops. After installation of springs, recalibrate distributor. *See "Automatic Advance (Modified Distributor)".* (Use Vacuum Advance indicated for FEW-12127-E). *NOTE* - If a slight knock is noticeable after modification, retard initial timing to a minimum of 3° BTDC. DO NOT retard under 3° BTDC for any reason. If the above changes do not decrease detonation to a satisfactory point, install a 160° thermostat (Part No. EDG-8575-G) in engine manifold. After modification, stamp an "M" following number on distributor model plate.

Condenser - Lincoln B7A-12300-A. **Capacity** .21-.25 mfds.
Contact Point Set - Lincoln B7A-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance
(FEW-12127-D,E)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
2½-3½		500	5-7		1000
4½-5½		600	9-11		1200
7½-8½		1000	15-17		2000
10-11		1500	20-22		3000
12½-14		2000	25-28		4000

Automatic Advance ②
(Modified FEW-12127-D & E Distrs.)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1-2		500	2-4		1000
3½-4½		800	7-9		1600
5-6½		1000	10-13		2000
9½-11		1500	19-22		3000
14-15½		2000	28-31		4000

② - Applies only to distributors modified for low octane fuel (see "Detonation Correction" above). Use FEW-12127-E vacuum advance specifications for modified distributors.

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate.

Vacuum Advanc ①
(FEW-12127-D)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
½-2½	1-5	6
3-5	6-10	8
5½-7½	11-15	10
9½-11½	19-23	14
10½-12½	21-25	18-20

Vacuum Advance ①
(FEW-12127-E)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	6
1-3	2-6	8
3½-5½	7-11	10
7½-9½	15-19	14
10½-12½	21-25	18-20

① - Test machine speed of 200 RPM.

IGNITION TIMING

Setting - 3-6° BTDC. *DO NOT set less than 3° BTDC.*

►*IGNITION TIMING NOTE:* First cars with unmodified FEW-12127-D distributors set timing at 7-8° BTDC.
Timing Mark - Crankshaft dampener is marked at TDC, 10° BTDC, 20° BTDC with scribed marks at 2° increments between the designated positions. Align correct mark with pointer on timing chain cover.

CARBURETOR

HOLLEY 4-BARREL

Lincoln No. EDJ-9510-A (Early), No. 5750897 (Later). 4-barrel with integral Automatic Choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels 2-3-5-8.*

►*ENGINE STALLING (AFTER A NORMAL COLD START) CORRECTION:* May be due to incorrect choke linkage adjustment. *See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

►*CARBURETOR VENT REWORK (To prevent spillage of fuel under flooding conditions): See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

►*HIGH IDLE RPM CORRECTION:* Caused by interference between fast idle cam and choke operating rod. *See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

►*SLOW OPENING CHOKE CORRECTION:* Caused by binding choke or warped heat stove cover plate. *See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

Idle Setting - Both screws (primary side only) 1-1½ turns open.
Idle Speed - 475 RPM in Neutral. Recheck idle speed in "Cruising Range" and readjust as necessary to obtain 450-475 RPM

►*OTHER DATA: See "Holley 2- & 4-Barrel Carburetors" in Carburetion Section.*

THROTTLE LINKAGE ADJUSTMENT: *CAUTION - After each step recheck tachometer. If engine RPM changes from 450-475 reset LAST adjustment.* Place selector lever in "Dr" ("Dr2" on Twin-Range), set emergency brake, start engine and allow engine and transmission to reach normal operating temperature. Install tacho-

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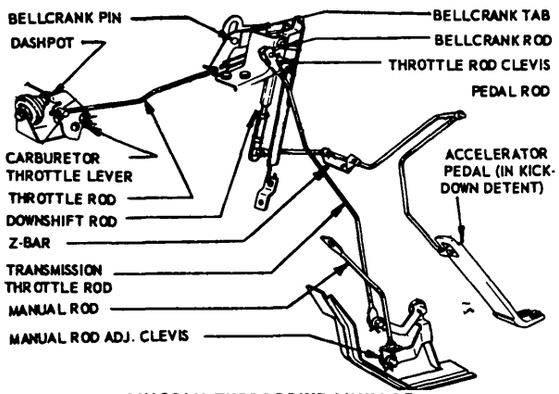
meter, disconnect throttle rod at carburetor throttle lever and transmission throttle rod clevis from bellcrank rod. Make sure carburetor throttle lever is against hot idle screw; set hot idle screw to obtain 450-475 RPM and proceed as follows:

1) Insert ¼" gauge pin through bellcrank bracket and tab. Hold carburetor throttle lever against hot idle screw and adjust throttle rod so pin freely enters hole in throttle lever. Then **lengthen rod pin one full turn** and reassemble. Remove gauge pin. Adjust dashpot so clearance between dashpot and throttle lever is .045-.065" with plunger pushed in.

2) Stop engine. Sight down from bellcrank rod to Z-bar and adjust jam nut at upper end of downshift rod so rod is vertical in relation to sides of car. Tighten jam nut. Depress accelerator pedal to full kickdown position. Downshift rod must now be vertical and top of bellcrank pin must be within .100" or 3/32" from top of bellcrank slot. Make adjustment, if necessary, at adjusting nut at center of downshift rod.

3) Install pressure gauge at rear of transmission. Pull transmission throttle rod upward. Adjust throttle rod clevis so clevis pin enters hole freely, then **lengthen clevis 3 full turns** and reassemble. *NOTE - On Single Range transmissions after Serial No. 10572, do not lengthen clevis more than 5½-6 turns. See "2-3 Upshift Slippage Correction" under TURBO-DRIVE TRANSMISSION below.*

4) Start engine and put selector lever in "Dr" ("Dr2" on Twin-Range). Accelerate to 1000 RPM. Adjust length of transmission throttle rod (lengthen clevis to increase, shorten to decrease pressure) so pressure gauge will read 80-85 lbs. *CAUTION - Do not hold at 1000 RPM too long as transmission will overheat.* Remove pressure gauge and tachometer.

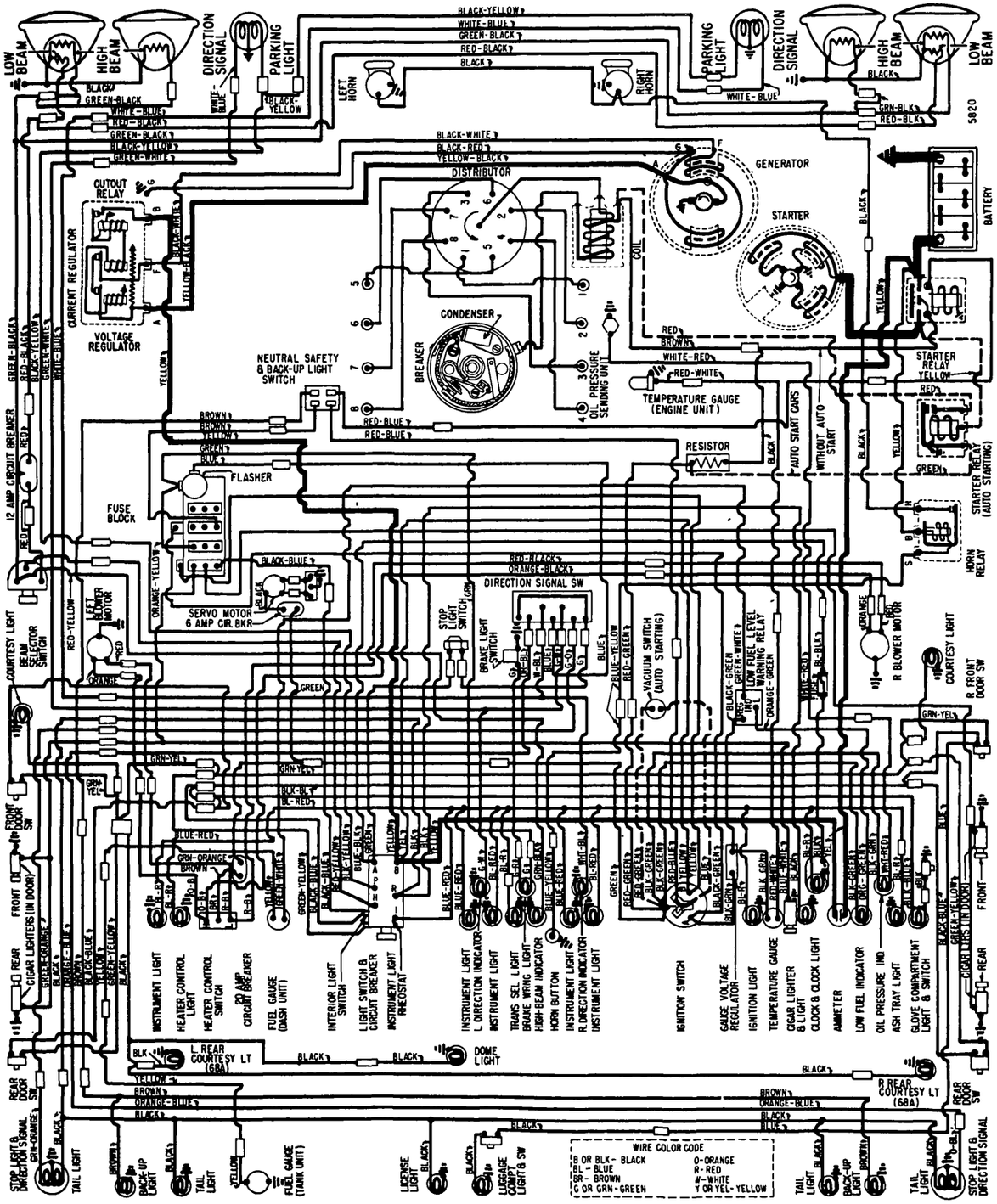


LINCOLN TURBODRIVE LINKAGE

CARB. EQUIPMENT

►*FUEL PUMP PUSHROD & CAMSHAFT ECCENTRIC PRODUCTION CHANGE & NON-INTERCHANGEABILITY CAUTION:* Two pushrods and eccentrics used as follows: Pushrods, EDG-9400-A (cast bronze tip) and 5750261 (oilite bronze tip with groove 1/32" wide x

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020" deep opposite tip) Eccentrics, EDG-6287-A (chrome plated) and 5750260 (plain finish) Use pushrod, EDG-9400-A, and eccentric, EDG-6287-A, on engines dated coded 476U to 479D On engines date coded 479H or later, use pushrod, 5750261, and either eccentric *CAUTION - DO NOT use plain finish eccentric with cast bronze tip pushrod*

►*FUEL FILTER NOTE* Replace element every 4,000 miles

►*VAPOR LOCK CORRECTION (Air Conditioned Cars)* May be caused by heat from high pressure line being transmitted to flexible fuel line from inlet side of fuel pump To correct, reroute fuel line over top of compressor, away from high pressure line

Fuel Pump: Lincoln No EDG-9350-A Fuel only

Pressure - 4 5-6 5 lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge : King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator FFC-10804-B

Dash Unit - Lincoln No FFC-9280-C

Tank Unit - Lincoln No FFC-9275-C

See "Fuel Gauges" in Carburetion Section

Low Fuel Level Indicator: Light on instrument panel controlled by SIP relay, Lincoln No FFC-15854-B, in gasoline gauge circuit Lamp goes on momentarily when ignition switch turned on, lights when fuel in tank reaches 3-5 gallons

Air Cleaner: DRY FILTER ELEMENT type Clean every 2,000 miles and replace element every 20,000 miles

►*CLEANING CAUTION*· Clean element by tapping or shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricat*

BATTERY

Lincoln Kit No HHK-10655-A. 12 volt, 13 plate, 70 ampere hour capacity (20 hr rate)

Battery Ground - Negative, to right cylinder head

Engine Ground - Cylinder head to dash

STARTER

Lincoln No. FAY-11002-A. Armature - B6A-11005-B

►*STARTER NOISE CORRECTION* Caused by insufficient clearance between starter and cylinder block at top mounting lug which "cocks" starter when tightened Grind off top mounting lug to correct

Drive - Bendix "Folo-Thru"

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 48-56 ozs

Cranking Speed - 150-180 RPM 155-190 amps

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	4500	12 0	80
15 5 ft lbs	Lock	5 0	550

Removal: Disconnect negative cable from battery Remove two top drive endplate-to-flywheel housing capscrews and raise car Remove nut from rear engine support bracket stud and raise rear of engine 1" Remove cable from starter and lower drive endplate-to-flywheel housing capscrew Remove starter assembly by working forward and down through lower suspension arms *NOTE* - On power lubricator equipped cars remove two bracket retaining nuts and move lubricator out of way

►*REMOVAL NOTE:* If drain plug on right side of block interferes with starter removal, install ¼" recessed pipe plug, Part No 87709-S

Installation: Place rubber dust shield on flywheel housing, work starter assembly up through lower suspension arms and into position on flywheel housing Install, but do not tighten, lower capscrew Lower engine and replace mounting nut Install two upper capscrews, align assembly Tighten outer capscrew first, then the other two. Install cables and lower car

Starting Switch: Relay, Lincoln No B6A-11450-A, controlled by Ignition & Starter Switch, Lincoln No B5A-11572-A, and Auto Trans Neutral Safety Switch, No FFC-15825-A (includes switch, wire harness & terminal block), located on steering column

Automatic Starting (Optl.) - Vacuum Switch No FEL-11504-B, Auxiliary Starter Relay No FDT-11505-A Provides automatic starting when ignition switch turned on and transmission selector lever in "N" or "P" positions *See Car Wiring Diagram*

Neutral Safety Switch Adjustment: *See "Turbo-Drive" and "Twin-Range Turbo-Drive" in Transmission Section*

►*NEUTRAL SWITCH INSULATOR ASSEMBLY NOTE* Neutral Safety Switch Insulator, Part No FFC-15827-A, may be used to permit starting in both "N" and "P" positions

GENERATOR

Lincoln No. FGV-10002-A Armature - FGP-10027-A

Performance Data

Amperes	Volts	Gen RPM
40	15 0	2390

Brush Spring Tension - 32-40 ozs

Field Current - 1 5-1 6 amps at 15 volts (hot)

Rotation - Counterclockwise at commutator end

Belt Adjustment: 3/8" deflection midway between generator and pump pulleys on right side (both belts)

REGULATOR

Lincoln No. B8E-10505-C

►*SETTING NOTE* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75°F

Cutout Relay

Cuts In - 12 0-12 8 Volts

Cuts Out - 2 0-2 9 amps (reverse current)

Voltage Regulator

Setting - 14 6-15 4 Volts

Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section*

Current Regulator

Setting - 38-42 ozs

Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual headlights (4- Headlight System) Std *See "4-Headlight System" in Electrical Section*

Direction Signals: *See Electrical Section*

Lighting Switch Removal: Disconnect negative cable from battery. Remove instrument cluster top cover plate and lower left cover plate Depress switch shaft pin retainer and pull out switch shaft and knob assembly Remove nut retaining switch to instrument panel Pull switch down with wires attached

Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit) Power unit located on firewall in engine compartment

►*CIGAR LIGHTER SHORTING CORRECTION* Caused by water in receptacle Drill 3/16" drain hole in lower right corner of lighter receptacle to correct

LIGHTING CIRCUIT BREAKERS: Used as follows

18 Ampere - Protects headlight upper & lower beams In headlight switch

12 Ampere - Protects headlight lower beams Between beam selector switch (under toe board) and headlights

12 Ampere - Protects, tail, parking, stop luggage compartment, license plate, and rear deck warning lights

FUSES· Fuses located in fuse panel on left side of brake support with exceptions note

15 Ampere - Protects right front & rear door (or quarter) cigar lighters

15 Ampere - Protects instrument panel, left front & rear door (or quarter) cigar lighters

NOTE - Sulphur disc on back of each lighter

10 Ampere - Protects windshield wiper vacuum pump motor (early cars) In lead to vacuum pump

7 5 Ampere - Protects direction signal & back-up lights

7 5 Ampere - Protects courtesy and dome lights

Horn Relay: Lincoln No B7A-13853-A (with bracket)

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 90° V8, overhead valves New wedge type combustion chamber formed by casting top of cylinder block at 10° angle to piston, by by flat machining bottom surface of cylinder head, and by step design piston head for valve clearance

Bore	Stroke	Displacement
4 30"	3 70"	430 cu ins
Compr. Ratio	**Rated HP**	**Developed HP**
10 5-1 ©	57 19	375 at 4800 RPM

© - 7 25-1 when Low Octane Kit installed *See NOTE below*

Compression & Vacuum Reading - *See TUNE-UP*

►*LOW OCTANE FUEL ADAPTER KIT NOTE* If necessary to lower engine compression ratio for use with

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low octane fuels, install Kit, Part No. I-502591. Kit contains cylinder head and intake manifold gaskets and spacers, longer pushrods, cylinder head dowels and and bolts, and intake manifold bolts. Cylinder head is raised by kit and intake manifold must also be raised as well as longer pushrods and bolts used. Compression ratio changed from 10.5-1 to 7.25-1.

►*CYLINDER BLOCK REPLACEMENT NOTE:* Replacement cylinder blocks code dated 482G and later have code stamped at right rear section of oil pan rail. Blocks dated 482R and later are .020" higher and one cylinder head gasket should be used. On earlier blocks two gaskets may be used.

►*MAXIMUM ENGINE RPM CAUTION (CARS WITH AUTOMATIC TRANSMISSIONS):* DO NOT operate engine in excess of 2500 RPM with selector lever in "N" (Neutral), "P" (Park), or "R" (Reverse) as damage to clutch plates may result.

►*CYLINDER HEAD & INTAKE VALVE PRODUCTION CHANGE & REPLACEMENT CAUTION:* Engine date coded 481J and later use Cylinder Heads, Part No. 5750062. These heads have smaller diameter intake valve seats (2.060"), and Intake Valves, Part No. EDG-6507-F (head diameter 2.080-2.090") MUST BE USED with these heads. *Under no circumstances should heads and valves be intermixed, and same type heads must be used on both banks.*

►*HEAD GASKET SERVICE REPLACEMENT CHANGE AND INSTALLATION NOTE:* Use new gasket No. B9ME-6051-A. Apply Sealer No. 8A-19554-B moderately to each side of gasket before installation.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Special Data.*

OIL PAN REMOVAL: Turn engine so No. 1 piston is 14° BTDC. Remove battery ground cable and oil dipstick. Raise car, Drain oil and remove front splash shield. Remove both front engine insulator nuts. Support front edge of oil pan on safety jack, then lower car to raise engine 2". Place 1" block of wood between insulators and engine. Raise car, remove safety jack, then remove right hand stabilizer mounting bracket bolts, nuts and washers. Pull stabilizer out and down for oil pan clearance. Remove oil pan screws, lower oil pan to crossmember. Remove lower, and loosen upper, oil pump inlet tube and screen screws so they swing freely to clear oil pan baffle. Then lower pan with forward motion.

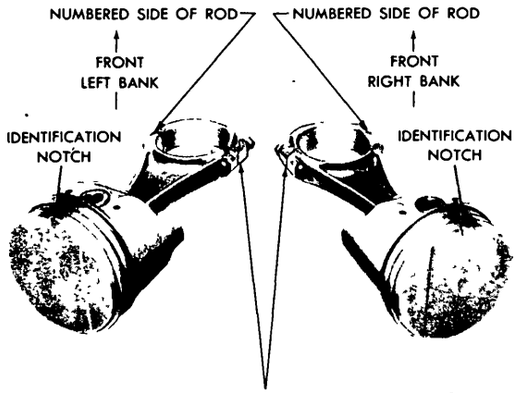
PISTONS

New step head design, longer skirt, slipper type, steel strut, aluminum alloy. No piston pin retaining rings used. Piston pin is interference fit in rod.

►*ORIGINAL BORE & PISTON SIZES:* Standard cylinder bore limits are 4.300-4.3024". Standard size pistons furnished in two sizes for selective fit as follows: Cd 2 pistons 4.2985-4.2988". Cd 6 pistons 4.2997-4.3000". Code marked on top of piston. *Pist ns f r right and l ft hand cylind rs ar NOT int rchang abl .* **R moval** - Pistons and rods removed from above.

Clearance - .0015-.0021" selective fit.

Fitting New Pistons: Using ½" feeler gauge inserted between piston and cylinder wall, with piston inverted and 1½" below top of block and piston pin bore parallel to crankshaft, pull required to remove feeler gauge should be 5-10 lbs. when using feeler thicknesses as follows: .002" for new piston in new bore, .0025" for new piston in used bore, .003" for used piston in used bore.



POSITION OIL SQUIRT HOLE INWARD WITH PISTON IDENTIFICATION NOTCH FORWARD TOWARD FRONT OF ENGINE. CAUTION PISTONS ARE NOT INTERCHANGEABLE FROM ONE CYLINDER BANK TO THE OTHER

LINCOLN PISTON ASSEMBLY

Installing Pistons: *Pistons for right and left hand cylinders are NOT interchangeable.* Install piston so that identification notch on head is toward front of engine. *See Rod Installation.*

Replacement Pistons: Std. (2 sizes, see above), .020", .030", .040" Oversize.

PISTON PINS

Press fit in connecting rod, no retaining device.

Diameter - .9750-.9753". **Length** - 3.48-3.50".

Clearance in Piston - .0001-.0003". Wear limit .0008".

Clearance in Rod - .0008-.0016" interference fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Lincoln Special Data.*

Replacement Pins: Standard size only. Also furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)..	.0775-.0780"..	.015-.025"	.0015-.003"
Compr. (2)....	.0930-.0940".....	.015-.025".....	.001-.003"
Oil (3).....	1825-.1879"..Ⓒ	.015-.055".....	Ⓒ

Ⓒ - Control ring segments. Ⓒ - Side sealing type ring.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap (1" each side of piston head notch).

Replacement Rings: Furnished Std., .020", .030", .040" Oversize.

CONNECTING RODS

Length (Center-to-Center) - 6.599-6.601".

Journal Diameter - 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue).

Lower Bearing - Copper-lead alloy, steel back.

Clearance - .0006-.0026". Wear limit .0037".

Side Clearance - .005-.015". Wear limit .018".

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030" Undersize.

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Installing Rods: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole inward and rod number facing outward toward outer side of cylinder block. *NOTE* - Palnuts on bearing cap discontinued on later cars.

CRANKSHAFT

►*ENGINE MAIN BEARING BOLT SERVICE REPLACEMENT NOTE: See "Crankshaft" in Linc ln Sp cial Data.*

Journal Diameter - 2.8998-2.9002" (Code Red), 2.8994-2.8998" (Code Blue).

Out-of-Round Limits - .00025". **Tap r Limits** - .0005".

Bearings - Copper-lead alloy, steel back.

Clearance - .0009-.0029". Wear limits .0036".

Endplay - .004-.008". Wear limit .012".

End Trust - Taken by No. 3 (center) main bearing.

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030" Undersize.

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Crankshaft Rear Oil Seal Installati n: *S e "Crankshaft & Main Bearings" in Lincoln Special Data.*

Crankshaft Front Seal Installati n: *See "Engine Front Cover" in Lincoln Special Data.*

CAMSHAFT

►*CAMSHAFT PRODUCTION CHANGE:* New camshaft, Part No. 5750914, entered production approximately Nov. 12, 1957. Engines having later camshaft are identified by a dot of orange paint on engine front cover and a daub of yellow paint between No. 1 bearing journal and distributor drive gear. An "X" is also stamped on later camshaft. Heavier valve springs must be used with later camshafts. *See "Valve Springs" & "Valv Timing" b low.*

►*BEARING BORE NOTE:* Bearing bores in block are stepped (largest No. 1, smallest No. 5) to permit easy

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removal and installation of bushings. O.D. of camshaft bearings is greater to fit bores.

J urnal Diam t r - 2.264-2.265" (all journals).

Out-of-R und Limits - .001". **Wear limit** .001".

Bearings - Babbitt lined, steel back.

Cl arance - .001-.003". Wear limit .006".

End Thrust - Toward engine rear. Taken by thrust face of camshaft sprocket riding against front surface of engine block.

Camshaft R m val: *See "Camshaft & Bearings" in Lincoln Special Data.*

Replacement Bearings: Std. and .015" Undersize.

►*BEARING INSTALLATION CAUTION:* Split type bearings must have split toward top of block. No. 1 bearing must have notch in bearing facing front of engine and toward bottom of block. Bearing must seat .005-.020" inward from finished face of block.

Timing Chain Deflection - ½", measured on right side.

Camshaft Setting: Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers.

Timing Chain C v r Seal Installation (Crankshaft Front S al): *See "Engin Fr nt Cover" in Lincoln Spec. Data.*

Engin Fr nt C v r Rem val & Installation: *See "Engin Fr nt C v r" in Lincoln Special Data.*

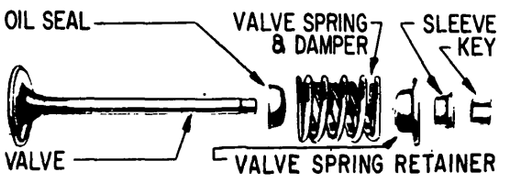
VALVES

Tappet Clearanc : Zero lash, hydraulic lifters.

Valve	Head Diam.	② Stem Diam.
Intake	①	.3711-.3718"
Exhaust	1.770-1.780"	.3693-.3700"

① - 2.140-2.150" early production (Cyl. Head No. 5750064), 2.080-2.090" later production (Cyl. Head No. 5750062).

② - Standard size valve stems. *See "Valve System" in Linc ln Special Data for versize valve stem sizes.*



LINCOLN VALVE ASSEMBLY

Valv	S at Angle	Lift	Stem Clearance
Intake	30°	①	②.0010-.0024"
Exhaust	45°	①	③.0028-.0042"

① - .4411" early production (Camshaft No. EDJ-6250-A), .4076" later production (Camshaft No. 5750914).

② - Wear limit .0045". ③ - Wear limit .0065".

Valv S at Width - .060-.080" Intake, .070-.090" Exhaust.

Valv St m S als - Umbrella type seals used on all valves. Install seals with cup side down over valve guide.

►*EXHAUST VALVE STICKING CORRECTION & VALVE STEM SEAL PRODUCTION CHANGE:* Use new .300" shorter exhaust valve stem seals, Part No. B8S-6571-BUP, to eliminate valve sticking, oil consumption, and stem and guide wear. Later cars use these seals in production.

Oversize Valve Stem Installation: *See "Valve System" in Lincoln Special Data.*

VALVE SPRINGS: Dampener springs used inside valve springs on all valves.

►*VALVE SPRING REPLACEMENT CAUTION:* When installing later camshaft (No. 5750914) valve springs, Part No. 5750053 (painted green) must also be installed.

Free Length - 2.20" (Early, Part No. EDG-6513-A, painted brown), 2.03" (Later, Part No. 5750053, painted green).

Assembled Height - 1.83" measured from surface of cylinder head spring pad to underside of spring retainer. *Do not use more than two .030" spacers to correct assembled height.*

►*SPRING SQUARENESS CAUTION:* If springs more than 1/16" out of square (spring & dampener assembly measured together), replace both springs.

Valve Spring Specifications
(Early Green Springs)

	Pressure	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	245-255 lbs. ②	1.43"

① - Wear limit 60 lbs. ② - Wear limit 220 lbs.

Valve Spring Specifications
(Later Green & Maroon Springs)

	Pressure	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	240-260 lbs. ③	1.43"

① - Wear limit 60 lbs. ③ - Wear limit 225 lbs.

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.0045" intake, .0065" exhaust), ream guides and install valves with oversize stems. *See "Valve System" in Lincoln Special Data.*

VALVE LIFTERS: Hydraulic, barrel type, with no provision for clearance adjustment.

►*HIGH SPEED HYDRAULIC LIFTER NOISE CORRECTION:* Can be caused by aerated oil which will also cause oil pressure to drop (less than 45-50 lbs. at 2000 RPM). To correct, check all oil gallery plugs under air pressure for leaks. Check oil pump. pick-up tube and screen, inlet tube-screen, and all gaskets for cracks or broken conditions. Repair or replace

Diameter - .8740-.8745".

Clearance in Lifter Bore - .0005-.0020", Wear limit .0026".

Hydraulic Lifter Overhaul - *See "Valve System" in Lincoln Special Data.*

Hydraulic Lifter Operating Range Check - *See "Valve System" in Lincoln Special Data.*

ROCKER ARM ASSEMBLY: *S e "Valv Syst m" in Lincoln Sp cial Data.*

►*ROCKER ARM PRODUCTION CHANGE:* New rocker arms, Part No. B8A-6564-C, used in later production. New arms have reinforcing ribs at pushrod socket boss and oil groove on inside diameter.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: Following valve opening and closing points are with camlift as indicated.*

Valve Timing (Early Camshaft) ①

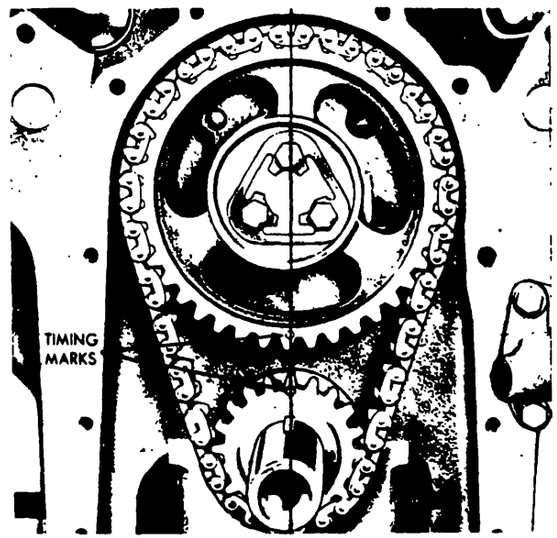
Intake Valves - Open 27° ② BTDC. Close 69° ③ ALDC.
Exhaust Valves - Open 69° ② BLDC. Close 27° ③ ATDC.

Valve Timing (Later Camshaft) ①

Intake Valves - Open 22° ④ BTDC. Close 68° ③ ALDC.
Exhaust Valves - Open 63° ⑤ BLDC. Close 27° ③ ATDC.

① - *See "Camshaft Production Change" above.*
② - .003" camlift. ③ - .005" camlift. ④ - .002" camlift.

Valve Timing Check - Remove rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adaptor Tool 6565-B on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Install quadrant on crankshaft damper. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers valve opening and cam lobe lift. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner.



LINCOLN VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Lincoln Special Data.*

►*HIGH SPEED OIL LEAK CORRECTION:* Caused by oil being drawn out of ventilator tube. On early cars install following parts: Pushrod Cover, Part No.

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5751034 (has baffles and wire mesh filter). Half-moon Cork Seal, Part No. 5751385, between upper ventilation tube and valve cover. Oil Filler Cap, Part No. 5751388. These parts incorporated on later production cars.

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-50 lbs. at 2000 RPM (Early), 35-50 lbs. at 1000 RPM (Later). Hot.

►*LOW OIL PRESSURE CORRECTION: See "Oiling System" in Lincoln Special Data.*

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Light on instrument panel. Goes on when ignition switch turned on, goes out when oil pressure reaches pressure of switch. Light goes on when oil pressure is low.

Oil Pressure Switch - Lincoln No. B6A-9278-B.

Oil Pump: Combination oil-vacuum pump, rotor type. Mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.

►*OIL-VACUUM PUMP DRIVE SHAFT PRODUCTION CHANGE & REPLACEMENT NOTE:* Later type drive shaft, Part No. ED-5750157, has sleeve pressed on shaft to obtain proper depth in pump. Lower internal tooth locating lockwasher eliminated, but upper one must be used to prevent shaft disengagement from pump when distributor removed.

►*VACUUM PUMP NOISE CORRECTION (Similar to Connecting Rod Knock):* Disconnect vacuum hose from windshield wiper to vacuum pump (not inlet hose to intake manifold). Noise will stop if vacuum pump defective. Pump failure caused by exhaust passage plug falling out or exhaust tube falling into oil pan. To correct exhaust passage plug, tap passage with 1/8" pipe tap, 3 or 4 threads deep (DO NOT TAP DEEPER), and install 1/8" pipe plug with suitable sealer. Exhaust tube is press fit in pump housing and if loose, replace pump.

Pump Overhaul - *See "Oiling System" in Lincoln Special Data.*

Oil Filter: Full flow disposable type. Mounted on lower left front corner of cylinder block.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket with light film of oil. Screw on to adaptor until snug. **Then tighten ¼-turn.** ***Do not overtighten.***

Crankcase Ventilation: Filter in oil filler cap and ventilator tube at rear of engine. Clean and oil filter in oil filler cap every 2000 miles.

COOLING

New three-stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

Below 140°F - Water circulates from pump to cylinder heads, intake manifold and back to pump.

140-180°F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to pump.

Above 180°F - Water circulates the same as between 140-180°F except it returns to radiator for cooling. *NOTE* - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 23 qts. without heater, 26 qts. with heater and/or air conditioning.

Pressure Valve: Radiator filler cap, Lincoln No. LD-8100-A. Operating pressure 12-15 lbs.

Thermostat: 157-162° (No. EDG-8575-G), 177-182° (No. EDG-8575-H, for use with permanent type anti-freeze), located in water outlet connector. Two 137-142° Thermostats (EDG-8575-D) in front face of cylinder banks.

►*ENGINE BLOCK THERMOSTAT INSTALLATION NOTE:* Two types used. Install short thermostat entirely within cylinder block. Install long thermostat with spring projecting into water pump casting.

Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Lincoln Special Data.*

►*WATER PUMP PRODUCTION CHANGE & REPLACEMENT NOTE (Air Conditioned Cars):* New pump, Part No. 5751567, identified by yellow paint on housing, used on later cars. Use only new pump for replacement on all air conditioned cars. Pump included in Kit, No. LJK-5751567-A, which contains all parts necessary for change over.

Temperature Gauge: King-Seeley electric, Constant Voltage ("CV") type with Gauge Voltage Regulator No. FFC-10804-B.

Dash Unit - Lincoln No. FFC-10883-B.

Engine Unit - Lincoln No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

TURBO-DRIVE TRANSMISSION

"Turbo-Drive" used on early cars, "Twin-Range Turbo-Drive" used on later cars. Torque converter and three-speed automatic transmission with hydraulic control and mechanical parking lock. Twin-Range Turbo-Drive has two manually selected Drive positions.

See "Turbo-Drive" and "Twin-Range Turbo-Drive" in Transmission Section.

►*2-3 SLIPPAGE CORRECTION (Early Cars):* When 2-3 slippage encountered on Turbo-Drive transmissions with Serial Nos. up to 10572, it is caused by excessive spring pocket depth in throttle and down shift valve and results in low main line pressure. To correct, make Throttle Linkage Adjustments (see CARBURETOR above) and check operating pressure (80-85 lbs. at 1000 RPM). *NOTE* - It may be necessary to increase throttle rod from specified 3 turns to as high as 5½-6 turns to obtain specified pressure. When 5½-6 turns does not correct operating pressure it will be necessary to replace main control valve assembly.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Turbo-Drive" and "Twin-Range Turbo-Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Turbo-Drive" and "Twin-Range Turbo-Drive" in Transmission Section.*

Lubrication: Check fluid every 2000 miles. Drain and refill every 16,000 miles with Automatic Transmission Fluid Type "A".

Checking Fluid Level: Bring transmission to operating temperature by running engine with selector lever in "N" position. Move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. Maintain level at "Full" mark on dipstick.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Turbo-Drive" and "Twin-Range Turbo-Drive" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

►*DRIVELINE IDENTIFICATION & REPLACEMENT NOTE:* Some drive shafts are balanced internally and identified as follows: Shafts, Part No. LF-4602-C, with 5-lb. weight at companion flange end have white band around center and daub of white paint at companion flange end. Shafts, Part No. LED-LF-4602-B, are balanced to 6-inch ounces and have a yellow line longitudinally and a yellow band around center. *NOTE - Use only shaft LF-4602-C (with 5-lb. weight) for replacement.*

►*DRIVELINE THUMP CORRECTION:* Occurs in front universal joint when car driven over slight bump or incline under light or medium throttle. Caused by transmission fluid seeping back and lodging between splines on shaft and front universal joint. To correct, install a relief valve (5-25 lbs. range, see table below) in expansion plug (drill and tap a hole in plug) in front universal joint.

Alemite Part No.	Lbs. Pressur
47200	1-5
47640	7½-15
131100	15-25

REAR AXLE

Own. Semi-floating, hypoid gear, with Hotchkiss drive. *See "Lincoln (Integral Carrier)" in Rear Axle Section.*

►*POWER-LOCK DIFFERENTIAL NOTE:* Optional equipment, and identified by an inscription on trunk lock cover. Serviced by replacement. *See "Power-Lock Differential (Cone Clutch Type)" in Rear Axle Section.*

►*REAR WHEEL BALANCE CAUTION (POWER-LOCK DIFFERENTIAL):* Do not attempt to balance rear wheels on the car when car equipped with "Power-Lock" differential.

►*REAR AXLE LUBRICATION NOTE:* Drain plug on carrier housing has been eliminated. Lubricant change recommended only on overhaul.

Axle Ratios: Standard, early 2.87-1 (43-15); Standard, later 2.89-1 (55-19); Optional 3.07-1 (43-14). *NOTE - Use 2.89-1 ratio for all service replacement.*

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Backlash - .003-.008" with no more than .002" variation between positions checked.

Axl Shaft Rem val: Remove wheel and nuts securing brake drum to axle flange. Remove drum Remove nuts securing wheel bearing retainer by working through hole in axle shaft flange. Pull axle shaft out of housing with Tool 4235-C2, being careful not to dislodge brake backing plate nor damage oil seal.

Axl Ass mbly R m val: Raise rear of car and support at each side of frame, directly opposite fuel tank ends, on underbody box section. Drain lubricant. Remove propeller shaft and install Tool 7657-D on transmission output shaft to prevent fluid leakage. Remove wheels, drums, and axle shafts (see above) Wire brake b ‘ing plates to underbody. Remove hydraulic lines from axle assembly (unnecessary to disconnect), and disconnect parking brake cables. Remove coil springs and insulators. Disconnect track bar and wire to underbody. Remove bolts securing trailing arms to axle housing and remove rear axle assembly.

Wh l B aring Adjustment: None required.

FRONT SUSPENSION

Ind p nd nt. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs

S "Lincoln Front Susp nsion" in Suspension & Wheel Alignment S ction

Kingpin Inclinati n - 7½° at ¾° camber, not adjustable

Cast r - 0° to Neg 1½° and equal within ½° each side

Camb r - 0° to Pos ¾° and equal within ¼° each side

T -In - 1/8-3/16"

T -Out n Turns - With wheels at maximum turning angle, outer wheel is at 28° and inner wheel is at 37°45'

REAR SUSPENSION

Coil springs mounted between underbody and trailing arms which are mounted on underbody at front and rear axle housing at rear. Shock absorbers mounted in "sea leg" fashion

Se "Lincoln R ar Suspension" in Suspension & Wheel Alignm nt Section

SHOCK ABSORBERS

Non-adjustable type standard, adjustable type optional

Shock Absorber Nos.	Front	Rear
Standard	LF-18045-A	LF-18080-B
Heavy Duty ©	I-501821	I-501824

© - Adjustable type See below

Heavy Duty Shock Absorber Adjustment - Remove Shock absorber, **compress fully** until internal couplings are mated Rotate reservoir **clockwise** to align arrow on inner washer (front), dust cover (rear) with arrow on reservoir to obtain desired ride control

STEERING

Power Steering: Saginaw In-Line (early cars), "Torsion Bar" type (beginning Serial No. 408001).

See "Saginaw In-Line" or "Torsion Bar" in Steering Section

Steering Wheel & Horn Button Removal: *See "Saginaw In-Line" or "Torsion Bar" in Steering Section*

Steering Gear Removal: *See "Saginaw In-Line" or "Torsion Bar" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Sect*

BRAKES

Bendix Hydraulic (with Power Unit). Duo-servo with fixed anchor pins No eccentric adjustment. Parking lever applies rear wheel service brakes

See "Ford, Lincoln, Mercury Bendix" in Brake Section

Drum Diameter - 11" front & rear

Wheel Cylinder Diameter - 1 3/32" front, 15/16" rear

Lining - Molded type riveted to shoe

Lining Width - 3 5" front and rear

Clearance - Tighten adjusting screw about 5 or 6 clicks after wheel stops turning (shoes tight against drum), then back adjusting screw off 12-14 clicks

Brake Pedal Adjustment: Adjust eccentric bolt attaching brake pedal to master cylinder pushrod to give 1/4-3/8" free movement of pedal pad before rod moves master cylinder

Power Brake Unit: Bendix Vacuum Power Unit. Combination power unit and master cylinder Mounted on engine side of firewall

S e "B ndix Pow r Unit" in Brak S ction

Ch cking Fluid - Maintain fluid level to within ¼" of top of reservoir

Removal of Power Unit - Disconnect pushrod from brake pedal assembly in driver's compartment Remove master cylinder outlet fitting bolt from master cylinder *NOTE* - *Unnecessary to remove stop light switch* Loosen clamp holding manifold vacuum hose to power unit and remove hose Disconnect booster pushrod from pedal linkage, remove nuts securing assembly to firewall. Remove power brake assembly

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type *See "Windshield Wipers" in Miscellaneous Section*

►*ELECTRIC VACUUM PUMP NOTE*· Used on approximately 700 early cars (replaced by oil-vacuum pump - see "Oil Pump" above) When engine vacuum drops below 9" Hg electric motor starts to supply additional vacuum for windshield wipers Lubricate every 5,000 miles or if pump sluggish or blows 15 amp fuse as follows Disconnect hoses, turn on wipers, add SAE 5-W oil slowly at vacuum intake Run at least 30 seconds to exhaust old oil Reconnect hoses

Heater-Air Conditioning: Own, with electrically controlled servo motors *See "Lincoln Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Electric type with reversible motor in each window (including ventilators) Continental models have electrically controlled rear window *See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Full electric type with electric latch mechanism and electrically controlled rear window *See "Power Top Controls" in Misc Section*

Electric Door Lock: *See "Electric Door Locks" in Miscellaneous Section*

Trunk Lid Lock: *See "Trunk Lid Locks" in Miscellaneous Section*

Power Seat Adjusters: "4-Way" & "6-Way" electric type Single motor with solenoid clutches *See "Power Seat Adjusters" in Miscellaneous Section*

►*JACKING & HOISTING See "Jacking & Hoisting" in Suspension Section*

MODEL IDENTIFICATION

SERIAL NUMBER· Stamped on plate attached to left front body pillar between door hinges *NOTE* - Number (example below) includes identification data

① ② ③ ④ ⑤
H 9 Y A 400001

① - Engine 430 cu in V8
② - Year - 1959
③ - Assembly Plant **Y** - Wixom
④ - Body Series **A** - Capri **B** - Premiere **C** - Continental
⑤ - Beginning Vehicle Number

Engine Production Code Number: Indicates place, day and month of engine manufacture Not used for licensing Stamped on cylinder block directly in front of left cylinder head

TUNE-UP

►*HARD COLD STARTING, STALLING, POOR COLD PERFORMANCE & SPARK PLUG FOULING See 'Carter AFB 4-Barrel Carburetor" in Carburetion Section*

►*LEAN CONDITION OR SURGING ON ACCELERATION See Carter AFB 4-Barrel Carburetor" in Carburetion Section*

►*HARD STARTING, ROUGH IDLE, FLOODING & POOR FUEL ECONOMY See 'Carter AFB 4-Barrel Carburetor' in Carburetion Section*

COMPRESSION PRESSURE· 200±20 lbs All cylinders must be equal within 10 lbs

VACUUM READING· Steady 17-18" at idle speed

VALVE TAPPET CLEARANCE· Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve

CARBURETOR AIR INTAKE DUCT ASSEMBLY· *See 'Fuel System Notes' in Lincoln Special Data*

►*CARBURETOR ICING OR PERCOLATING CORRECTION* May be caused by air intake duct valve plate sticking in fully closed position (causing percolation), or the valve plate may be sticking in a partially open position (causing icing in cold weather) Check operation of valve and replace if necessary *See 'Fuel System Notes" in Lincoln Special Data*

IGNITION

FIRING ORDER· 1-5-4-2-6-3-7-8

Cylinders - RIGHT BANK 1-2-3-4, LFFT BANK 5-6-7-8

SPARK PLUG GAP 032- 036"

Spark Plugs - Champion F-11-Y 18 mm Tapered seat, no gasket used Torque to 15-20 ft lbs

COIL: Lincoln No B6A-12029-B.

Ignition Current - 2 5 amps idling, 4 5 amps stopped

Resistor - B8A-12250-A 1 3-1 4 ohms at 75°F

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil and is bypassed during cranking by lead from starter solenoid to battery terminal of coil

DISTRIBUTOR (Early): Lincoln N . B9S-12127-B. "Ball Bearing Breaker Plate Type" *See "Distributors" in Electrical S ction*

DISTRIBUTOR (Late): Lincoln No. B9MF-12127-B. "Pivoted Breaker Plate Type" *See "Distributors" in Electrical Section*

Condenser - Lincoln No B7A-12300-A (Dist No B9S-12127-B) No B9AF-12300-A (Dist No B9MF-12127-B)

Capacity - 21- 25 mfd

Contact Point Set - Lincoln No B7A-12171-A (Dist No B9A-12127-B & B9MF-12127-B)

Breaker Gap - 014- 016"

Cam Angle - 26-28½°

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance
(B9S-12127-B & B9MF-12127-B)

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		350	0		700
1-2¼		525	2-4½		1050
3-4½		750	6-9		1500
7-8¼		1200	14-16½		2400
10½-12		1600	21-24		3200
14-15½		2000	28-31		4000

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate

Vacuum Advance ①
(B9S-12127-B & B9MF-12127-B)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3½	0-7	6½
3½-6½	7-13	9
6½-9½	13-19	12
9½-12½	19-25	16-20

① - Test machine speed of 200 RPM

IGNITION TIMING

Setting 6° BTDC (8° BTDC maximum limit)

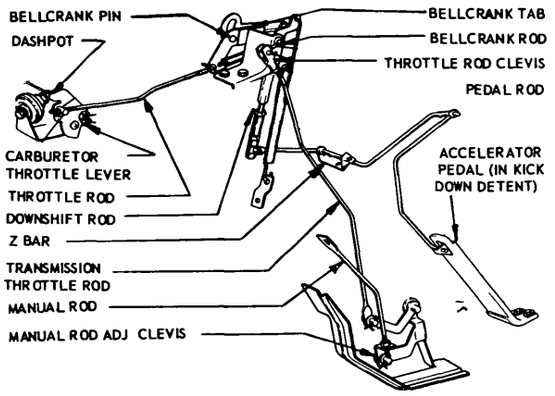
Timing Mark - Crankshaft damper marked TDC, 10° BTDC, & 20° BTDC (long marks) with 2° increment marks (short marks) between Align correct mark with pointer on timing chain cover **Set timing with vacuum line disconnected and carburetor opening taped closed**

CARBURETOR

►*CARBURETOR APPLICATION One Carter AFB 4-Barrel Carburetor used*

Throttle Linkage Adjustment· **1)** Adjust engine to correct idle speed Insert ¼" gauge pin (Tool 77230-MB) through carburetor bellcrank bracket and tab Hold primary throttle shaft lever against hot idle screw and adjust carburetor rod at threaded end so rod freely enters throttle shaft lever Remove gauge pin *CAUTION - Improperly adjusted carburetor rod can result in poor return to idle* **Make anti-stall dashpot adjustment (see below)**

2) Stop engine Sight down from bellcrank rod to Z-bar and adjust jam nut at upper end of downshift rod so rod is vertical in relation to sides of car Tighten jam nut Depress accelerator pedal to full kickdown position Downshift rod must now be vertical and top of bellcrank pin must be within 100" or 3/32" from top of bellcrank



LINCOLN TURBODRIVE LINKAGE

slot Make adjustment, if necessary, at adjusting nut at center of downshift rod

3) Install pressure gauge at rear of transmission Pull transmission throttle rod upward Adjust throttle rod clevis so clevis pin enters hole freely, then **l ngth n clevis 3 full turns** and reassemble

4) Start engine and put selector lever in "DR2" Accelerate to 1000 RPM Adjust length of transmission throttle rod (lengthen clevis to increase, shorten to decrease pressure) so pressure gauge will read 80-85 lbs *CAUTION - Make adjustments quickly so transmission will not overheat* Remove pressure gauge and tachometer

Anti-Stall Dashpot Adjustment· **1)** With primary throttle plates in wide open position, bend dashpot inner tang (Tool T109-22), so there is 7/16" distance between top surface of bowl cover and bottom of dashpot lever

2) With primary throttle plates closed to normal idle position, bend dashpot lever in area between lever arm base and dashpot plunger, so there is 1/16-3/32" clearance between dashpot plunger operating lever and top surface of air horn

CARTER AFB 4-BARREL

Carter AFB No 2853S 4-barrel downdraft type, with internal dashpot

►*HARD COLD STARTING, STALLING, POOR COLD PERFORMANCE & SPARK PLUG FOULING See 'Carter AFB 4 Barrel Carburetor' in Carburetor Section*

►*LEAN CONDITION OR SURGING ON ACCELERATION See Carter AFB 4 Barrel Carburetor' in Carburetion Section*

►*HARD STARTING, ROUGH IDLE, FLOODING & POOR FUEL ECONOMY See Carter AFB 4 Barrel Carburetor in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RICHT barrels feed Cyls 1-4-6-7, LEFT barrels 2-3-5-8*

Idle Setting - Initial setting both screws (primary side only) 1½-2½ turns open Turn screws out for richer mixture

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Idl Spe d – Initial adjustment 525-550 RPM with transmission selector lever in "N". Final adjustment 450 RPM with selector lever in either "DR" position.

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* With engine at normal operating temperature, transmission selector lever in "Dr" position, and with air conditioner turned on so compressor is engaged and operating, adjust idle speed to 450-475 RPM.

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetor" in Carburetion Section.*

CARB. EQUIPMENT

Fu l Pump: Lincoln No. B8S-9350-A. Fuel only.

Pr ssur - 4.5-6.5 lbs.

See "Fuel Pumps" in Carburetion Section.

Gas lin Gaug : King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Lincoln No. FCC-10804-B or B9LF-10804-A.

Dash Unit (Exc. C ntinental) - Lincoln No. B9LF-9280-A.

Dash Unit (C ntin ntal) - Lincoln No. B9FL-9280-B.

Tank Unit - Lincoln No. FFC-9275-A.

See "Fuel Gauges" in Carburetion Section.

L w Fu l L v l Indicat r: Light on instrument panel controlled by S.I.P. relay, Lincoln No. FFC-18854-B.in gasoline gauge circuit. Lamp goes on momentarily when ignition switch turned on, lights when fuel in tank reaches 3-5 gallons.

Air Cl an r: Dry filter element type. Clean every 2000 miles, replace every 20,000 miles, or sooner if required.

►*AIR CLEANER SERVICE NOTE:* Filter element can be cleaned by tapping or shaking or by using compressed air. If air is used, direct air stream against element in direction opposite that of intake air flow, using care not to rupture filtering element fibre. DO NOT wash element in solvent or other liquid and DO NOT oil or lubricate.

BATTERY

Linc ln N . FDU-10657-C. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).

Batt ry Ground - Negative, to right cylinder block.

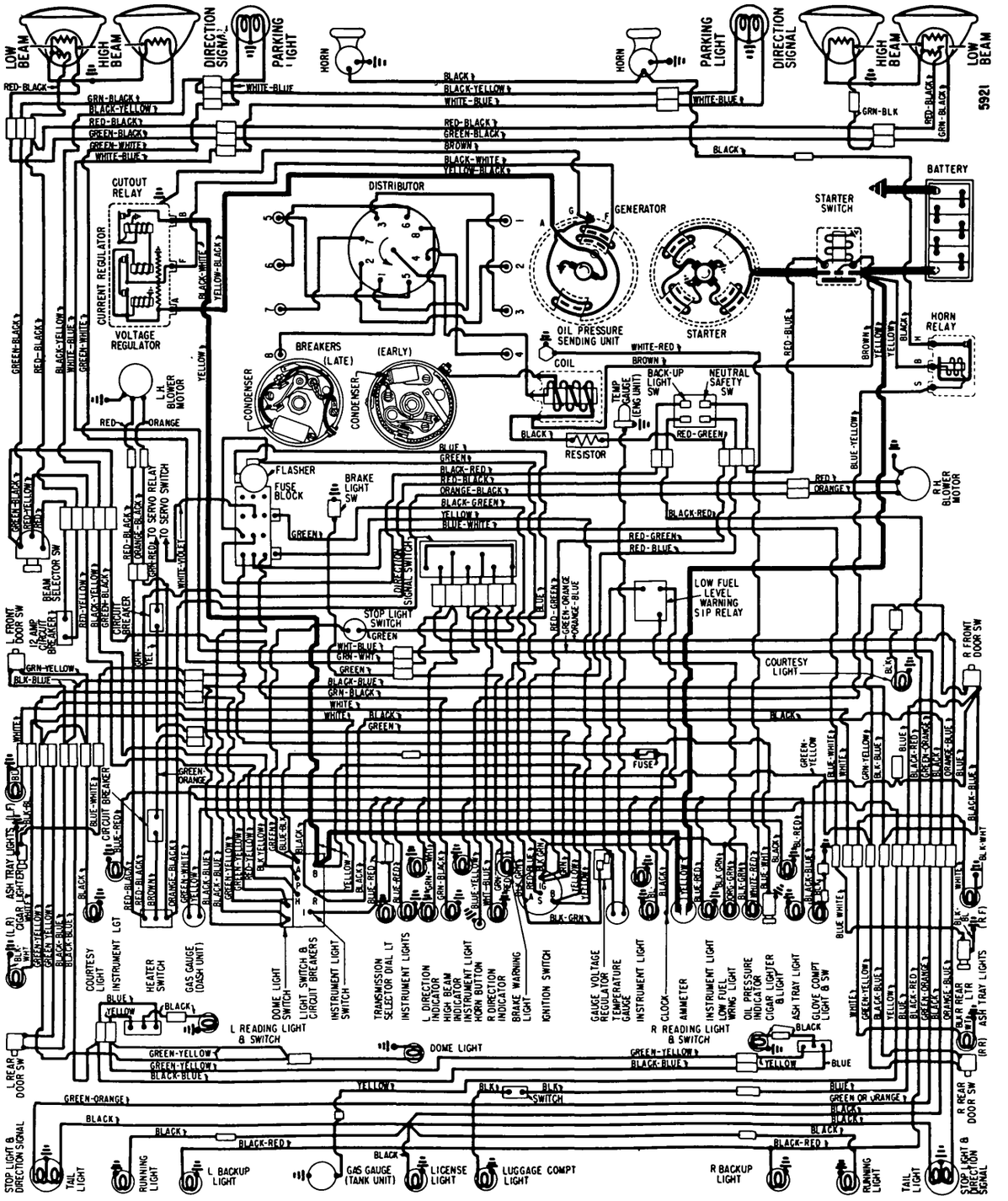
Engine Gr und - At valve pushrod chamber cover.

STARTER

Linc ln No. B9S-11002-A. Armature - B6A-11005-B.

►*STARTER NOT ENGAGING RING GEAR CORRECTION:* If caused by corrosion of starter drive, thoroughly clean or replace drive unit, then apply a bead of rubber cement or Permatex No. 2 to rear surface of wide portion of starter motor-to-flywheel housing seal. Apply seal to cylinder block mating surface, then install seal, making sure that seal lies flat and is properly positioned. Install starter. Check oil pan rail at right rear corner of block to determine if a plug has been installed in the existing hole. If hole is open, install a 3/8" cup plug, Part No. UP-371058-S to seal opening. Position cup plug and tap into place with a blunt punch.

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Drive - Lincoln No. 1CM-11350-C Bendix "Folo-Thru".
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM. At normal engine operating temperature.
Current Draw - 155-190 amps at cranking speed

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs.	4500	12 0	80
15 5 ft lbs.	Lock	5 0	550

Removal: Remove battery and support assembly, then disconnect transmission control rod at accelerator shaft bracket lever Drain cylinder block, then remove nuts attaching right and left front engine support insulators to block. Raise front of engine as high as possible and remove right exhaust manifold Disconnect cable from starter and remove three attaching capscrews and remove starter *NOTE* - If car is equipped with power lubrication, remove bracket retaining nuts and position power lubricator to one side

Installation: Reverse removal procedures and note the following Install attaching screws finger tight and align starter, then tighten outer screw first Finally tighten the two inner screws

Starting Switch: Lincoln No B6A-11450, magnetic type, controlled by Ignition & Starter Switch, Lincoln No B5A-11572-A and Neutral Safety Switch, Lincoln No. FFC-15825-A

Neutral Safety Switch Adjustment: *See "Lincoln 3-Speed Automatic Transmission" in Transmission Section*

GENERATOR

Generator No.	Make	Amperes
FGV-100002-A (Early)	Lincoln	40
B9LF-10002-A (Late)	Lincoln	40
B6A-10002-D (Early)	Bosch	50
B9LF-10000-B (Late)	Delco-Remy	50

Armature (With Bearing) - Lincoln No. FGP-10027-A (Use with FGV-10002-A & B9LF-10002-A Gen)

►*1959 GENERATOR SPLASH SHIELD PRODUCTION CHANGE & SERVICE INSTALLATION NOTE:* A new splash shield, Part No B9MM-10170-A is being installed in production on later generators and may be installed on early generators to prevent water splashing on brushes and commutators. To install shield, loosen adjusting bolts and front mounting bolts, then remove rear mounting bolt. Remove wires from terminals and install shield over rear of generator, positioning it so that terminals are in center shield opening. Install and tighten bolts and wires, then adjust belt tension

►*GENERATOR MOUNTING BRACKET REMOVAL, INSTALLATION & ALIGNMENT CAUTION:* When removing generator mounting bracket, the washer and spacer combinations found between bracket and engine block or front cover must be marked for installation at the same locations to insure correct generator alignment.

►*BOSCH GENERATOR BRUSH "WHINE" CORRECTION:* Excessive brush noise or "whine" can be eliminated by installing four new brushes, Part No. B9TZ-10043-A. These new brushes are of softer material than those previously used After installation, seat brushes with a brush seating compound

Performance Data

Generator	Amps.	Volts	Gen. RPM
FGV-10002-A	40	15	2500
B9LF-10002-A	40	15	2500
B6A-10002-D	50	15	1380
B9LF-10000-B	50	14	2500

Brush Spring Tension - 32-40 ozs. (Lincoln), 16-18 ozs. (Bosch), 28 ozs (Delco-Remy)
Field Current (Lincoln) - 1.5-1.6 amps at 15 volts (hot).
Field Current (Bosch) - 1 0-1 5 amps. at 10 volts
Field Current (Delco-Remy) - 2.0-2 5 amps. at 10 volts
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 3/8" deflection midway between fan and generator pulleys under normal thumb pressure.

REGULATOR

Regulator No.	Make	Use with Gen. No.
PB7M-10505-A	Lincoln	FGV & B9LF-10002-A
B6A-10505-C	Bosch	B6A-10002-D
B9LF-10505-A	Delco-Remy	**B9LF-10000-B**

►*BOSCH GENERATOR-TO-GROUND WIRE ATTACHING NOTE:* The generator-to-regulator ground wire (black with red band) must be attached to regulator base mounting screw If this ground wire is found to be connected to left hand fender apron, relocate as above

►*SETTING CAUTION* "Temperature Compensated" types Set to following specifications at 75°F ambient (engine compartment) temperature after ½ hour operation in vehicle, or after regulator heated and stabilized

LINCOLN (PB7M-10505-A)

Cutout Relay

Cuts In - 12 0-12 8 volts
Cuts Out - 5-9 amps. (discharge current).

Voltage Regulator

Setting - 14 6-15.4 volts at ambient temperature of 75°F.
Checking & Adjusting - *See "Lincoln 12 Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 38-42 amps
Checking & Adjusting - *See "Lincoln 12 Volt Regulators" in Electrical Section*

BOSCH (B6A-10505-C)

Cutout Relay

Cuts In - 13.0-13.5 volts.
Cuts Out - 2-8 amps. (discharge current).

Voltage Regulator

Setting (Low Stage) - 14.1-14.6 volts at ambient temperature of 75°F.
Setting (High Stage) - 14.1-14 8 volts at ambient temperature of 75°F
Checking & Adjusting - *See "Bosch Regulators" in Electrical Section.*

Current Regulator

Setting - 47-52 amps
Checking & Adjusting - *See "Bosch Regulators" in Electrical Section*

DELCO-REMY (B9LF-10505-C)

Cut ut Relay

Cuts In - 11.8-13.0 volts.
Cuts Out - 8 amps. maximum at 12.2 volts (discharge current)

►*AMBIENT TEMPERATURE NOTE: Ambient temperature is the temp ratur of th air surrounding regulator ¼" from its cover. Se "Delco-Remy (Doubl Contact) Regulators" for checking & adjusting procedures.*

Voltage R gulat r

Setting - *NOTE - Adjust to corr ct operating voltag as indicated in following "Ambient Temperatur " table.*

Temp. °F	Volts	Temp. °F	Volts	T mp. °F	V lts
35	14.9-15.7	85	14 5-15.3	135	14.1-14.9
45	14.8-15.6	95	14.4-15.2	145	14.0-14.8
55	14.8-15.6	105	14.3-15 1	155	13 9-14 7
65	14.7-15 5	115	14.2-15 1	165	13.8-14 6
75	14.6-15 4	125	14 1-15 0	175	13.7-14.6

►*NOTE· Lower contact voltage setting should be .3- 5 volts less than the upper contact setting.*
Checking & Adjusting - *See "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current R gulat r

Setting - *NOTE - Adjust to current value as indicated in following "Ambient Temperature" table*

Temp. °F	Amps.	Temp. °F	Amps.	T mp. °F	Amps.
35	54 6-65.0	85	48.0-56 4	135	41.4-48.0
45	53 2-63.0	95	46.6-54 6	145	40.2-46.4
55	52 0-61 6	105	45 4-53.0	155	38.8-44 8
65	50 8-60.0	115	44.2-51 8	165	37 8-43.4
75	49.2-58.0	125	42 8-49.8	175	36.2-42.0

Checking & Adjusting - *See "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System). *See "4-Headlight System" in Electrical Section.*
Direction Signals: *See Electrical Section*
Lighting Switch Removal: Disconnect negative cable from battery Remove instrument cluster top cover plate and lower left cover plate, then disconnect yellow ammeter and battery wire from top of switch. Depress switch shaft pin retainer and pull out switchand knob assembly, then remove nut securing switch assembly to instrument panel Pull switch assembly down as far as possible with wires attached.
Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit on firewall).
LIGHTING CIRCUIT BREAKERS: Used as follows·
18 Ampere - Protects high and low beam headlamps and automatic dimmer. Located in headlamp switch.
12 Ampere - Protects rear lamps, parking and stop lamps, luggage compartment, license plate and rear deck warning light. Located in headlamp switch.
12 Ampere - Protects low beam circuit headlamps. Located in center of instrument panel assembly.
6 Ampere - Protects Air Conditioner and heater servo. Located at center of cowl.
10 Ampere - Protects convertible top control circuit, electric door lock, deck lid lock and deck lid unlock Located at center of cowl
30 Amp r - Protects Air Conditioner and heater blowers. Located in center of instrument panel assembly.

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30 Amp re - Protects power seats, convertible motor feed, power windows. Located at center of cowl.

FUSES: In fuse panel located on left air duct. Remove lower left cover plate on instrument panel for access to fuses

3AG 15 Ampere - Protects cigar lighter.

SFE 7.5 Amp re - Protects back-up lamps.

SFE 7.5 Ampere - Protects turn signals and indicators.

SFE 14 Amp r - Protects courtesy and dome light

H rn R lay: Lincoln No. B8C-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use xtreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8 overhead valve engine of same design used for previous models.

Bore	Stroke	Displacement
4.30"	3 70"	430 cu. ins.
C mpr. Rati	Rat d HP	Developed HP
10.0-1	59.17	350 at 4400 RPM

C mpr ssi n & Vacuum Reading - *See TUNE-UP*

►***ENGINE STALLING OR ROUGH IDLE CORRECTION:* If condition exists with high under hood temperatures and cannot be corrected by carburetor adjustment or engine timing, *see "Carter AFB Carburetors" in Carburetor Section.***

►*MAXIMUM ENGINE RPM CAUTION:* DO NOT operate engine faster than 2500 RPM in "N", "P" or "R". Will cause oil pressure build-up in front clutch resulting in partial application and damage to clutch plates. DO NOT race engine when rocking car out of snow, sand or mud.

►*CYLINDER HEAD GASKET REPLACEMENT NOTE.* **Use Cylinder Head Gasket, Part No. B9ME-6051-A for** replacement Apply Sealer, Part No 8A-19554-B moderately to both sides of gasket before installation.

►***MAXIMUM ENGINE RPM CAUTION (CARS WITH AUTOMATIC TRANSMISSIONS):* DO NOT operate engine in excess of 2500 RPM with selector lever in "N" (Neutral), "P" (Park), or "R" (Reverse) as damage to clutch plates may result.**

►*OIL PUMP TO CYLINDER BLOCK GASKET RESTRICTION CAUTION* When engine is being disassembled, it is recommended that the oil pump be removed and the gasket examined to make sure it is not creating an oil flow restriction. If there are indications of the gasket obstructing the oil passage or if it has not been sealing properly, replace the gasket.

►*VALVE PUSHROD COVER NOISE CORRECTION:* If a resonant engine noise is noticeable at idle speed or between 1800-2000 RPM, determine if it is originating from engine valve pushrod cover as follows With engine at idle speed, insert a hammer handle between intake manifold passage No 2 & 3 and valve pushrod cover If noise is reduced or eliminated by pushing down on handle, it is an indication the pushrod cover is vibrating To correct, cut a ¾" slit lengthwise in a piece of 1" x 2½" heater hose. Work from right side of engine and insert the piece of hose (slit end first) between manifold passage No. 2 & 3 and onto pushrod cover. Position, the hose until it is resting on "X" section of cover reinforcing ribs (slit toward front of engine).

►*VALVE TRAIN NOISE NOTE:* Excessive noise in engine valve train may be caused by the use of incorrect engine oil. The manufacturer recommends the following grades and viscosities: MS or DG grade engine oil. SAE 30 (above +70°F., air conditioned cars). SAE 20-20W (above +32°F.), SAE 10—10W (+32° F. to — 10°F.), SAE 5W (below — 10°F.).

►*ENGINE COOLANT LOSS CORRECTION (EARLY ENGINES):* On engines with early type cylinder heads having manifold-to-cylinder head studs (later heads have hex head bolts), install new type cadmium plated studs, Part No. 372404-S100. Apply Permatex No. 2 to threads (cylinder head end) of studs before installation.

►*CYLINDER HEAD PRODUCTION CHANGE:* Later cylinder heads have blind bosses instead of through holes in water jacket area at exhaust manifold attaching bolt holes. Use 3/8" - 16x1 1/4" hex head bolts, Part No. 20428-S8 and 3/8" lockwashers, Part No. 370383-S to attach exhaust manifold to cylinder head. Tighten manifold attaching bolts to 15-21 ft. lbs. (changed from 23-28 ft. lbs. for early type studs).

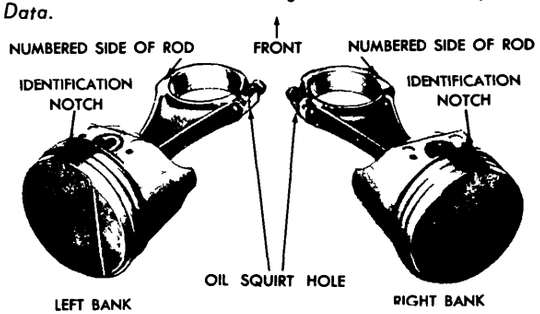
►*EXCESSIVE ENGINE OIL CONSUMPTION, EXHAUST SMOKING & SPARK PLUG FOULING CORRECTION:* These conditions may be caused by improperly operating vacuum check valve or by plugged cylinder head oil return holes. Correct as follows: **Vacuum Check Valve -** Check operation of vacuum check valve located on left lower side of engine (valve is identified by an exterior line running toward rear of engine, then up to wiper motor). Replace check valve if necessary. **Cylinder Head Oil Return Holes -** If excessive oil is found in rocker arm cover chambers, clean drain passages with a piece of wire, air pressure and solvent.

OIL PAN REMOVAL: Crank engine so No. 1 piston is at 14° BTDC. Remove battery ground cable and oil level dipstick Drain crankcase. Remove oil pan retaining screws and let pan rest on frame crossmember. Remove oil pump inlet tube and screen assembly screws and let assembly drop into pan. Remove pan in a lowering forward motion.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Special Data.*



LINCOLN PISTON & ROD ASSEMBLY

PISTONS

Step head, slipper type, aluminum alloy with a steel strut. Piston pin is interference fit in piston. Retaining rings are not used.

►*ORIGINAL BORE & PISTON SIZES:* Standard cylinder bore limits are 4.300-4.3024". Standard size pistons are furnished in two sizes for selective fit as follows: **Code 2 Pistons -** 4.2983"-4.2989" (Color coded Red). **Code 6 Pistons -** 4.2995-4.3001" (Color coded Blue). Color code is marked on top of piston. *CAUTION - Pistons for right and left hand cylinders are not interchangeable.*

Removal - Piston and rod assemblies remove from above. **Clearance -** .0011"-.0029". Maximum Wear Limit - .0045".

Fitting New Pistons: *See "Pistons" in Lincoln Special Data.*

Installing Pistons: *Pistons for right and left hand cylinders are NOT interchangeable.* Install piston so that identification notch on head is toward front of engine. *See Rod Installation.*

Replacement Pistons: Std. (2 sizes, see above), .020", .030", .040" Oversize.

PISTON PIN

Press fit in connecting rod, no retaining device. **Diameter -** .9750-.9753". **Length -** 3.48-3.50". **Clearance in Piston -** .0001-.0003". Wear limit .0008". **Clearance in Rod -** .0008-.0016" **interference fit.**

Piston Pin Removal & Installation: *See "Piston Pins" in Lincoln Special Data.*

Replacement Pins: Standard size. Furnished only with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr. (1)	.0775-.0780"	.015-.025"	.0015-.003"
Compr. (2)	.0930-.0940"	.015-.025"	.001-.003"
Oil (3)	.1825-.1879"	ℂ .015-.055"	ℂ

ℂ - Control ring segments. ℂ - Side sealing type ring.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap (1" each side of piston head notch).

Replacement Rings: Furnished Std., .020", 030", .040" Oversize.

CONNECTING ROD

Length (Center-to-Center) - 6.599-6.601". **Journal Diameter -** 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue). **Lower Bearing -** Copper lead alloy, steel back. **Clearance -** .0006-.0026". **Wear Limit -** .0036". **Side Clearance -** .005-.015"

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard size or .002" Undersize bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Installing R ds: Install rod in correct numbered cylinder with notch on head of piston toward front of engine

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and oil squirt hole in rod facing inward and rod number facing outward toward outer side of cylinder block

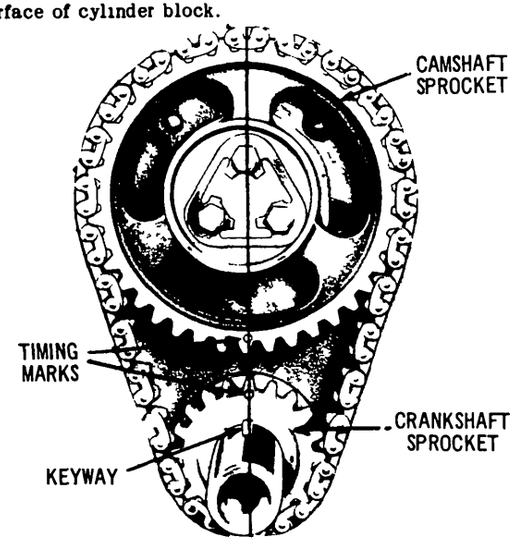
CRANKSHAFT

►*ENGINE MAIN BEARING BOLT SERVICE REPLACEMENT NOTE: See "Crankshaft" in Lincoln Special Data.*

Journal Diameter - 2 8998-2 9002" (Code Red), 2 8994-2 8998" (Code Blue)
Out-of-Round Limits - 00025" **Taper Limits** - 0005"
Bearings - Copper-lead alloy, steel back
Clearance - 0009- 0029" Wear limits .0038"
Endplay - 004- 008" Wear limit 012"
End Thrust - Taken by No 3 (center) main bearing
Replacement Bearings: Std (2 sizes marked RED and BLUE for selective fit), 002", 010", 020", 030" Undersize
►*NOTE* Any combination of RED and BLUE standard size or 002" Undersize bearing inserts may be used to obtain desired clearance If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Lincoln Special Data*
Crankshaft Front Seal Installation: *See "Engine Front Cover" in Lincoln Special Data*

CAMSHAFT

►*BEARING BORE NOTE* Bearing bores in block are graduated in size (largest No 1, smallest No 5) to permit removal and installation of bushings O D of camshaft bearings are also graduated in size
Journal Diameter - 2 264-2 265" (All journals)
Out-of-Round Limits - 001" **Wear Limits** - 001"
Bearings - Babbitt lined, steel back
Clearance - 001- 003" **Wear Limit** - 006"
Camshaft End Thrust - Toward engine rear Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.



LINCOLN VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Lincoln Special Data.*
Replacement Bearings: Std and 015" Undersize
Camshaft Removal: *See "Camshaft & Bearings" in Lincoln Special Data.*
►*BEARING INSTALLATION CAUTION* No 1 bearing must have notch in bearing facing front of engine and toward bottom of block Bearing must seat 005-020" inward from finished face of block The other bearings must be installed with split in bearing facing upward toward top of cylinder block
Timing Chain Deflection - ½" maximum difference between timing chain straight position and position of chain when chain is deflected outward (all slack removed from opposite side)
Camshaft Setting: Timing marks adjacent and in line with straightedge across shaft centers
Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Lincoln Special Data*
Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Lincoln Special Data*

VALVES

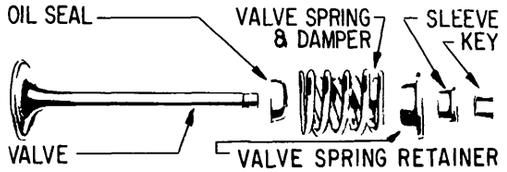
Tappet Clearance: Zero lash, hydraulic lifters

Valve	Head Diameter	①Stem Diameter
Intake	2 080-2 090"	3711- 3718"
Exhaust	1 770-1 780"	3693- 3700"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°	2316"	③ 0010- 0024"
Exhaust	45°	2316"	④ 0028- 0042"

① - Furnished with 003", 015" & 030" oversize stems
② - Cam lobe lift Wear loss limit 005"
③ - Wear limit 0045" ④ - Wear limit 0065"

►*VALVE REPLACEMENT NOTE* Some engines may have valves with 015" oversize stems installed in production For correct replacement, measure stem diameter approximately 1½" from stem end All valve stems are the same diameter for approximately 1" from stem end
Valve Seat Width - 070- 090" (intake & exhaust)



LINCOLN VALVE ASSEMBLY

Valve Stem Oil Seals - Umbrella type seals used on all valves Install seals with cup side down over guide
Oversize Valve Stem Installation: *See 'Valve System" in Lincoln Special Data*
Valve Springs: Damper springs used inside all valve springs **Spring Free Length** - 2 030" (approx)
►*SPRING SQUARENESS NOTE* If springs more than 1/16" out of square, replace spring and damper
►*VALVE DAMPER SPRING INSTALLATION CAUTION* To prevent valve spring clicking noise, damper spring must be installed within valve spring so end of damper spring is within a 135° arc counterclockwise to end of valve spring when viewed from above
Assembled Height - 1 83" measured from surface of cylinder head spring pad to underside of spring retainer (with valve closed) *Do not use more than two 030" spacers to correct assembled height. Measure all components affecting spring height if less than 1.83".*

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	① 66-77	1 83"
Open	② 240-260	1 43"

① - Wear limit 60 lbs at 1 83"
② - Wear limit 225 lbs at 1 43"

Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum 0045" (intake), 0065" (exhaust), ream valve guides and install valves with oversize stems *See "Valve System" in Lincoln Special Data*
Valve Lifters: Hydraulic barrel type No adjustment
►*VALVE LIFTER PRODUCTION CHANGE* New shorter lifters having an overall height of 1 830-1 860" are being used in production replacing the previous 1 968-2 010" lifters Both types interchangeable
►*HIGH SPEED HYDRAULIC LIFTER NOISE CORRECTION* Can be caused by aerated oil which will also cause oil pressure to drop (less than 45-50 lbs at 2000 RPM) To correct, check all oil gallery plugs under air pressure for leaks Check oil pump, pick-up tube and screen, inlet tube-screen, and all gaskets for cracks or broken conditions Repair or replace
Diameter - 8740- 8745"
Clearance in Lifter Bore - 0005- 0020", Wear limit 0026"
Hydraulic Lifter Overhaul - *See "Valve System" in Lincoln Special Data*
Hydraulic Lifter Operating Range Check - *See "Valve System" in Lincoln Special Data*
Rocker Arm Assembly: *See "Valve System" in Lincoln Special Data*
►*ROCKER ARM COVER AND GASKET REPLACEMENT NOTE* New rocker arm cover gasket, Part No B9ME-6584-BUP, should be used for service replacement to reduce oil leaks at this area New gasket has round screw holes and notch on inside edge Install gasket with notch toward **front** of engine on **right** bank, to **rear** of engine on **left** bank

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE Following valve opening and closing points are with camlift as indicated*

Valve Timing

Intake Valves - Open 22° ① BTDC Close 68° ② ALDC
Exhaust Valves - Open 63° ① BLDC Close 27° ② ATDC
① - 002" camlift ② - 005" camlift·
Valve Timing Check - Remove rocker arm assembly Install Dial Indicator Tool 6565 and Indicator Adaptor Tool 6565-B on cylinder head using Holding Fixture Tool 4201-D Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement Install quadrant on crankshaft damper Make sure timing pointer is not bent Turn engine slowly until lifter is on heel of camshaft lobe Set indicator on zero and turn engine slowly until indicator registers

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valve opening and cam lobe lift. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner.

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Lincoln Special Data.***

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

N rmal Oil Pr ssur : 35-50 lbs. at 2000 RPM (Hot).

►***LOW OIL PRESSURE CORRECTION: See "Oiling Syst m" in Lincoln Special Data.***

Pr ssur R gulat r Valv - In pump body, not adjustable.

Oil Pressur Indicator: Light on instrument panel. Light goes on when ignition switch turned on or when oil pressure is low. Light goes out when oil pressure reaches switch pressure.

Oil Pr ssur Switch - Lincoln No. B6A-9278-B.

Oil Pump: Combination oil-vacuum pump, rotor type. Mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.

Pump Ov rhaul - S "Oiling System" in Lincoln Sp cial Data.

Oil Filt r: Full flow disposable type. Mounted on lower left front corner of cylinder block.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket with light film of oil. Screw on to adaptor until snug. **Then tight n ¼-turn.** *Do not overtighten.*

Crankcas V ntilati n: Filter in oil filler cap and ventilator tube at rear of engine. Clean and oil filter in oil filler cap every 2000 miles.

COOLING

Three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

B low 140°F - Water circulates from pump to cylinder heads, intake manifold and back to pump.

140-180° F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to pump.

Ab v 180°F - Water circulates the same as between 140–180°F except it returns to radiator for cooling. *NOTE* - Cylinder block thermostats are accessible by removing water pump.

►*LOWER RADIATOR HOSE LEAKAGE CORRECTION:* Install lower radiator hose on water pump inlet so there will be at least ½" clearance between power steering belt and hose.

►*ENGINE COOLANT LOSS CORRECTION (EARLY ENGINES):* On engines with early type cylinder heads having manifold-to-cylinder head studs (later heads have hex head bolts), install new type cadmium plated studs, Part No. 372404-S100. Apply Permatex No. 2 to threads (cylinder head end) of studs before installation.

►*ENGINE OVERHEATING CORRECTION (AIR CONDITIONED CARS):* If overheating cannot be corrected by proper engine tune-up, correct thermostats or by a correctly operating cooling system, install five bladed fan, Part No. MK-8600-D, and fan shroud, Part No. B911-88145-A. Install fan with notched corner of blades toward engine. Fan shroud must be installed so it is centered around outside diameter of fan blades and with fan blades extending into shroud opening ¾-1".

Water Capacity: 23 qts. without heater, 26 qts., with heater and/or air conditioning.

Pressure Valve: Radiator filler cap, Lincoln No. LA-8100-A. Operating pressure 12-15 lbs.

Thermostat: 157-162° (No. B8E-8575-B); 175-180° (B9A-8575-A); Two 137-142° (B9S-8575-B), located in front face of cylinder banks.

Water Pump: Packless, sealed ball bearing type. ***See "Water Pumps" in Lincoln Special Data.***

Temperature Gauge: King-Seeley electric, Constant Voltage ("CV") type with Gauge Voltage Regulator, No. FFC-10804-B or B9LF-10804-A.

Dash Unit - Lincoln No. B9FL-10883-A (Lincoln), B9FL-10883-B (Continental).

Engine Unit - Lincoln No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

Power Booster Fan: Standard on Air Conditioned cars. *See "Cooling System" in Lincoln Special Data.*

TURBO-DRIVE TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock. Twin-Range Turbo-Drive has two manually selected drive positions. *See "Lincoln 3-Speed Automatic Transmission" in Transmission Section.*

►*ERRATIC SHIFT CORRECTION (WHEN CAUSED BY DIRT OR FOREIGN MATTER IN GOVERNOR HYDRAULIC CIRCUIT): See "Lincoln 3-Speed Automatic Transmission" in Transmission Section.*

►*PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION: See "Lincoln 3-Speed Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Lincoln 3-Speed Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles. Drain & refill every 16,000 miles with Automatic Transmission Fluid Type "A" (Suffix A).

Checking Fluid Level: With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position. Check fluid level and add recommended fluid as required to bring level to "F" (Full) mark on dipstick.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Lincoln 3-Speed Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

►*DRIVE LINE VIBRATION CORRECTION:* Inspect rear universal joint for proper seating in rear axle companion flange. The retaining strap (welded-on) between two universal joint bearing caps may not be properly aligned with groove in companion flange. If the above condition is found, disassemble joint and inspect for lubrication, wear, and damage. Be sure retaining strap is properly centered in groove in companion flange before tightening "U" bolts.

REAR AXLE

Own (Spicer Model). Semi-floating hypoid gear, torque-arm drive.

See "Lincoln Hypoid" in Rear Axle Section.

►*POWER-LOCK DIFFERENTIAL NOTE:* Optional equipment. Cars with this type axle are identified by an inscription on trunk lock cover. *See "Power-Lock Differential (Cone Clutch Type)" in Rear Axle Section.*

►*REAR WHEEL BALANCE CAUTION (POWER-LOCK DIFFERENTIAL):* Do not attempt to balance rear wheels on the car when equipped with Power-Lock Differential.

►*REAR AXLE LUBRICATION NOTE:* Lubricant change recommended only at time of overhaul. Drain plug on carrier has been eliminated.

Axle Ratios: 2.89-1 (55-19), 3.11-1 (59-19).

Backlash - .003-.008" maximum.

Axle Shaft Removal: Remove wheel and nuts securing brake drum to axle flange. Remove drum. Remove nuts securing wheel bearing retainer by working through hole in axle shaft flange. Pull axle shaft out of housing with Tool 4235-C2, being careful not to dislodge brake backing plate nor damage oil seal.

Axle Assembly Removal: Raise rear of car and support at each side of frame, directly opposite fuel tank ends, on underbody box section. Drain lubricant. Remove propeller shaft and install Tool 7657-D on transmission output shaft to prevent fluid leakage. Remove wheels, drums, and axle shafts (see above). Wire brake backing plates to underbody. Remove hydraulic lines from axle assembly (unnecessary to disconnect), and disconnect parking brake cables. Remove coil springs and insulators. Disconnect track bar and wire to underbody. Remove bolts securing trailing arms to axle housing and remove rear axle assembly.

Wheel Bearing Adjustment: None required.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within coil springs.

See "Lincoln Front Suspension" in Suspension & Wheel Alignment Section.

Caster - 0° to Neg. 1½°. Caster should not vary more than ½° from side to side.

Camber - 0° to Pos. ¾°. Camber should not vary more than ¼° from side to side.

Toe-In - 1/8-3/16".

Toe-Out on Turns - With wheels at maximum turning angle, outer wheel should be at 27°26', and inner wheel should be at 37°45'.

REAR SUSPENSION

Coil springs mounted between underbody and trailing arms which are mounted on underbody at front and rear axle housing at rear. Shock absorbers mounted at an angle between axle housing and underbody.

S "Linc ln R ar Suspension" in Susp nsion & Whe l Alignment S ction.

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SHOCK ABSORBERS

Non-adjustable type st andard, adjustable type optional

Shock Absorber Application

Model	Front - Lincoln Part No. - Rear	
Standard	B9LL-18045-C	B9LL-18080-A
Heavy Duty ℂ	PB8L-18077-A	PB8L-18080-A

ℂ - Adjustable type See below

Heavy Duty Shock Absorber Adjustment - Remove shock absorber, **compress fully** until internal couplings are mated, then rotate reservoir **clockwise** to align arrow on inner washer (front), dust cover (rear) with arrow on reservoir to obtain desired ride control.

STEERING

►*POWER STEERING "HISSING" NOISE CORRECTION:* See *"Lincoln Torsion Bar Power Steering" in Steering Section*

Power Steering: See *"Lincoln Torsion Bar Power Steering' in Steering Section*

►*POWER STEERING PUMP PRODUCTION CHANGE·* Power steering pump used on later cars is a vane type pump mounted directly on engine crankshaft The pump reservoir is mounted on front end of left hand cylinder block and is connected to pump by tubing and hose

Steering Wheel & Horn Button Removal: *See "Lincoln Torsion Bar Power Steering" in Steering Section*

Steering Gear Removal: *See Lincoln Torsion Bar Power Steering' in Steering Section.*

Steering Linkage: *See 'Steering Linkage" in Steering Section*

BRAKES

Bendix Hydraulic. Self-adjusting, duo-servo with fixed anchor pin No eccentric adjustment Parking lever applies rear wheel service brakes
See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section

►*BRAKE GRABBING, PULLING OR UNEVEN APPLICATION CORRECTION* Inspect brake shoe for a weld failure between shoe web and lining attaching plate, particularly near end of web Replace shoe if weld failure is found Do not attempt to reweld web

►*PARKING BRAKE RELEASE PRODUCTION CHANGE* A new vacuum controlled parking brake release is being installed in production on later cars to replace the previous "toe" release A switch, located on lower left hand corner of the instrument panel controls the new release In addition to red warning light in instrument cluster, a flasher bulb is installed in bezel of brake release switch to indicate brake application Engine must be running to release brake In an emergency, if engine is not running, parking brake can be released manually with the auxiliary mechanical release lever located on inboard side of parking brake lever by pulling auxiliary release lever rearward and up

►*POWER BRAKE UNIT PRODUCTION CHANGE* Units used on later cars are the "Disc Reaction" type, replacing the "Vacuum Reaction" type used on earlier cars.

Drum Diameter - 11" front and rear
Wheel Cylinder Diameter - 1 3/32" (front), 15/16"(rear)
Lining - Molded type riveted to shoe
Lining Width - 3½" (front & rear)

►*LINING THICKNESS PRODUCTION CHANGE* Thickness of standard lining has been increased .030" (making total lining thickness ¼") *NOTE - The new standard lining and the oversize lining furnished for service replacement are the same thickness, but are not interchangeable due to the radius grind Radius grind is different on oversize lining to match radius of a turned drum*

Clearance - *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section*

Brake Pedal Free play: 1/4-3/8"

Power Brake Unit: Bendix Vacuum Power Unit, vacuum reaction type (early), hydraulic disc reaction type (later) Combination power unit and master cylinder mounted on engine side of firewall *See "Bendix Power Brake Unit (Vacuum Reaction) Type" or 'Bendix Power Brake Unit (Hydraulic Disc Reaction) Type" in Brake Section*

Checking Fluid - Maintain fluid level to within ¼" of top of reservoir

Removal of Power Unit - Disconnect pushrod from brake pedal assembly in drivers compartment, then remove master cylinder outlet fitting bolt from master cylinder *NOTE - Not necessary to remove stop light switch* Loosen clamp holding manifold vacuum hose to power unit and remove hose Remove shoulder bolt retaining booster pushrod from pedal linkage. Remove nuts and lockwasher securing brake unit to firewall and remove unit

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type *See "Windshield Wipers" in Miscellaneous Section*

Heater-Air Conditioner: Own, with electrically controlled servo motors *See "Lincoln Air Conditioning" in Miscellaneous Section*

Power Window Regulators: Electric type with reversible motor in each window (including ventilators) Continental models have electrically controlled rear window *See "Power Window Regulators" in Miscellaneous Section*

Electric Door Lock: *See "Electric Door Locks" in Miscellaneous Section*

Trunk Lid Lock: *See "Trunk Lid Locks" in Miscellaneous Section*

Power Seat Adjusters: "4-Way" & "6-Way" electric type. Single motor with solenoid clutches *See "Power Seat Adjusters" in Miscellaneous Section*

Power Top Control: Electric-Hydraulic type with reversible motor, electric controlled rear window and top compartment cover *See "Power Top Controls" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION (ALL MODELS): B for jacking or hoisting, s e "Jacking & Hoisting Pr cautions" in Susp nsi n & Wh l Alignm nt S ction.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on Patent Plate attached to left front body pillar between door hinges. *NOTE* - Number (example below) includes identification data.

① ② ③ ④ ⑤
0 Y 72 H 400001

① - Year (1960)
② - Assembly Plant. **Y** Wixom.
③ - Body Series. See Body table below.
④ - Engine. **H** - 430" Domestic, **K** - 430" Export.
⑤ - Beginning Vehicle Number.

Body S ries Table

	4-Dr. Sedan	2-Dr. Hardtop	4-Dr. Hardtop
Lincoln	62	63	64
Premiere	72	73	74
Continental	82	83	84

	F rmal Sedan	Limousine	Convertible
Lincoln	92	99	
Continental			85

VEHICLE SPECIFICATIONS: Vehicle specification codes(on Patent Plate) contain Body Style, Color, Trim and Day and Month vehicle was assembled.

Engin Pr ducti n C d Number: Stamped on cylinder block directly in front of left hand cylinder head and indicates place, year, month, day of month and plant inspector. Not used for licensing.

TUNE-UP

►*HARD STARTING CORRECTION:* Caused by loose starter cable terminal at power box bus bar terminal. To correct, install a ¼" external tooth lockwasher and tighten terminal nut to 125-150 **In. lbs.** torque.

►*HARD HOT START CORRECTION(Early Cars): Caused by fu l p rcolation. S e CARBURETOR below.*

►*CARBURETOR ICING OR PERCOLATING CORRECTION:* May be caused by air intake duct valve plate sticking. To correct, make sure assembly is tested and operates properly. *See "Fuel System Notes" in Lincoln Special Data.*

►*DISPOSABLE FUEL FILTER RESTRICTION NOTE: S "Disposable Fu l Filter Flow Checks" under Carb. Equipm nt.*

COMPRESSION PRESSURE: 180±20 lbs. All cylinders must be equal within 10 lbs.

VACUUM READING: Steady 17-18" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve.

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See "Fu l Syst m Notes" in Lincoln Special Data.*

IGNITION

FIRING ORDER: 1-5-4-2-6-3-7-8.
Cylind rs - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036".
Spark Plugs - Champion F-11-Y. 18 mm. Tapered seat, no gasket used. Torque to 15-20 ft. lbs.

►*IGNITION FAILURE CAUTION:* Do not mistake "CORONA" discharge for "FLASH-OVER". Corona is steady blue light around insulator just above spark plug shell crimp and has no effect on ignition performance.

COIL: Linc ln N . B6A-12029-B.
Igniti n Curr nt - 2.5 amps. idling, 4.5 amps. stopped.
R sist r - COLF-12250-A. 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* New Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to a multiple quick disconnect at left side of dash panel. Resistor Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Lincoln No. B9MF-12127-B. Pivoted breaker plate type. *See "Lincoln Distributors" in Electrical Section.*

►*DISTRIBUTOR HOLD-DOWN CLAMP CAUTION:* Clamp nut should be tightened to 10-15 ft. lbs. only to prevent bending studs or causing oil leaks at distributor grommet.

►*ENGINE STUMBLE, HESITATION, ROUGH IDLE, OR INTERMITTENT MISFIRING CORRECTION:* Caused by "Cross-fire" due to failure of boot insulation at distributor cap. To correct, replace faulty distributor wires with wires from Kit, Part No. HJK-12259-D, identified by daub of green paint or words "Radio Resistance" lettered on wires. Distributor wires must be routed as shown in wiring diagram.

Condenser - Lincoln B9AF-12300-A. **Capacity** . 21-.25 mfd.
Contact Point Set - Lincoln No. B7A-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°. *CAUTION* - Set cam angle at idle speed (250 Distributor RPM) and with ZeroVacuum.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance ①

Degrees	Distr. RPM	Degrees	Eng. RPM
0	375	0	750
½-1½	500	1-3	1000
6-7¼	1100	12-14½	2200
14½-15¾	2000	29-31½	4000

① - Adjust Test Stand to 0° at 250 RPM.

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate.

Vacuum Advance ②

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-3	0-6	6½
5-8	10-16	10
9½-12½	19-25	15

② - Adjust Test Stand to 0° at 1000 RPM and 0" of Hg.

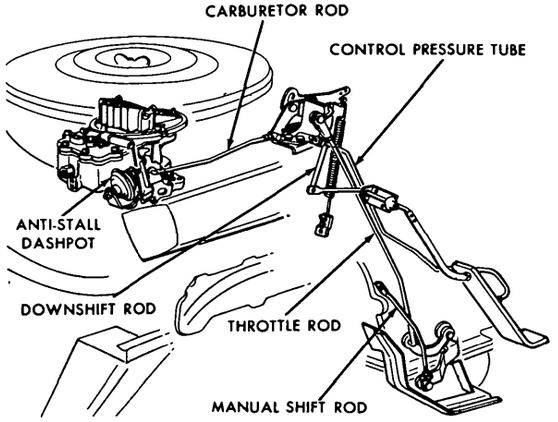
IGNITION TIMING

Setting - 6° BTDC. Range 2°-10° BTDC. *Set with vacuum line disconnected & carburetor opening taped closed.*
Timing Mark - Early - Damper marked TDC, 10° & 20° BTDC (long marks) & 2° short marks between. Align mark with pointer on cover. **Later** - Ball pin on damper to be aligned with 0, 3, 6, 10 sawtoothed marks of pointer on cover.

CARBURETOR

►*CARBURETOR APPLICATION:* New design Carter ABD 2-Barrel Carburetor, with air horn, float bowl and body, and throttle body made of aluminum castings.

►*POOR PERFORMANCE AND ACCELERATION CORRECTION:* Caused by misaligned booster venturi or restricted accelerator pump discharge passages. To correct, s *"Cart r (ABD) 2-Bbl. Carbur tor" in Carbur tion S ction.*



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

►*ENGINE STALL AND ROUGH IDLE CORRECTION:* Caused by fuel vapors entering from carburetor internal vents. To correct, install air bleed valve B8LE-9B532-A. Instructions accompany valve.

Throttle Linkage Adjustment: Make adjustments in the following sequence:

Engine RPM Adjustment - Make Anti-Stall Adjustment, see below, then adjust engine idle to 450-475 RPM with selector lever in D2 position (engine at operating temperature).

Carburetor Rod Adjustment - Disconnect transmission throttle rod at bellcrank bracket and carburetor rod at carburetor lever. Insert ¼" gauge pin, Tool 77230-MB, through alignment holes in bellcrank bracket and tab. Hold carburetor lever against hot idle adjusting screw and adjust length of carburetor rod for free fit in carburetor lever. **Lengthen carburetor rod one turn.** Remove ¼" gauge pin and reconnect rod. Recheck alignment holes and readjust carburetor rod as required. *NOTE* - Guide pin holes must be in alignment.

Throttle Rod Adjustment - Connect pressure gauge at transmission pressure tube fitting at bellcrank. Pull up on throttle rod firmly but gently. Adjust clevis so that pin enters freely,then **lengthen clevis 3½ turns** and reconnect rod. Start engine and with foot brake set firmly, selector lever in D2 position, accelerate engine to 1,000 RPM. Gauge reading should be 80-85 lbs. To correct pressure, adjust length of throttle rod. Lengthen rod to increase pressure, shorten rod to reduce pressure. *CAUTION* - Make checks quickly and return selector lever to neutral position.

Downshift Rod Adjustment - Two adjustments necessary. Specifications are with accelerator depressed to full kickdown position.

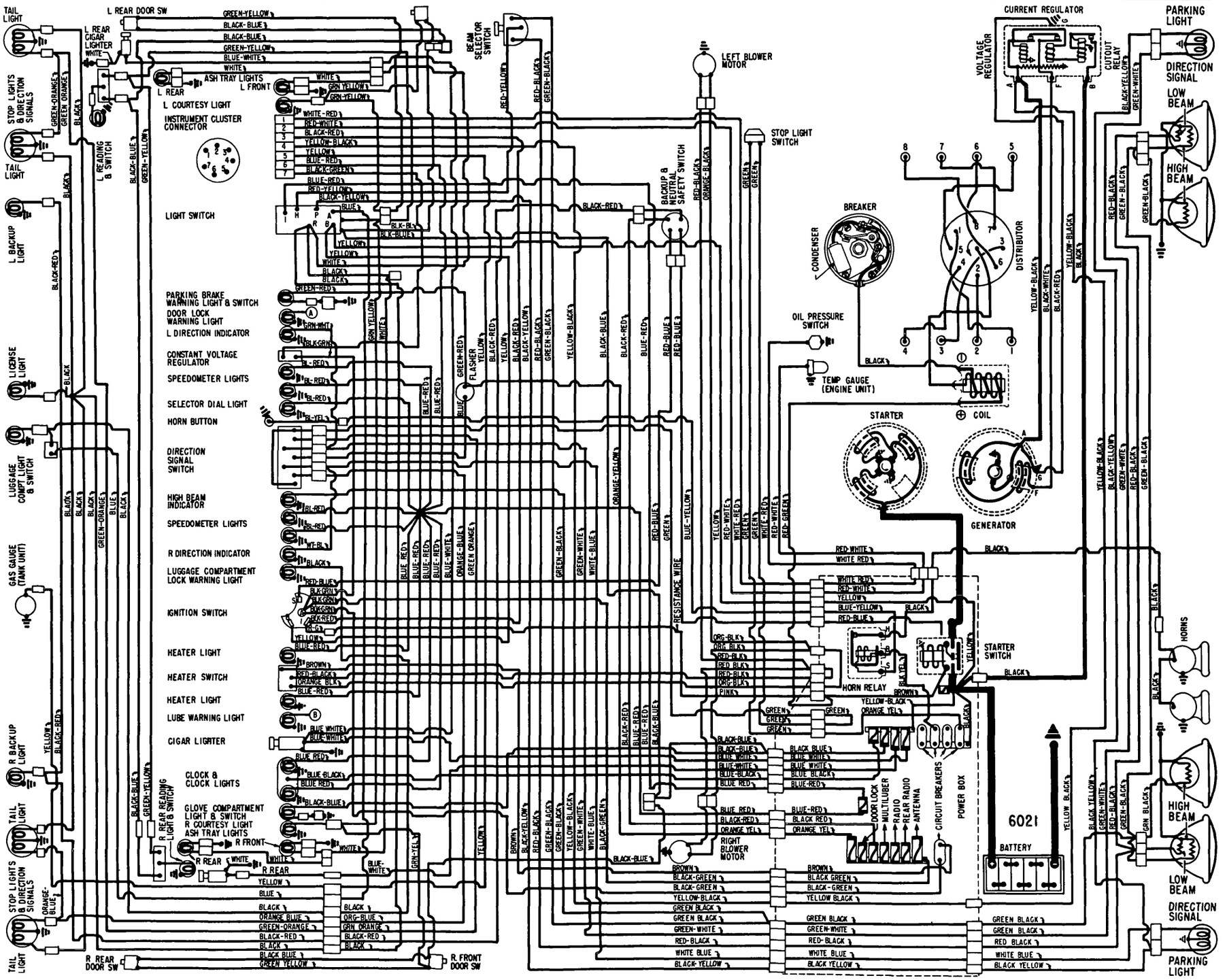
1) Adjust screw and jamnut at upper end of downshift rod so rod is vertical (crosswise) when looking down from bellcrank to "Z" bar.

2) Adjust length of downshift rod at upper end (remove from stud) so that bellcrank pin is within 3/32" from top of slot.

Anti-Stall Dashpot Adjustment: With carburetor lever against hot idle screw and dashpot plunger fully depressed, clearance between dashpot plunger and lever should be .060-.090". To adjust, loosen locknut and turn dashpot in mounting bracket.

CONTINUED ON NEXT PAGE

Form 19B


TAIL LIGHT
L REAR DOOR SW
L REAR CIGAR LIGHTER
ASH TRAY LIGHTS
L FRONT
L REAR
L COURTESY LIGHT
INSTRUMENT CLUSTER CONNECTOR
LIGHT SWITCH
PARKING BRAKE WARNING LIGHT & SWITCH
DOOR LOCK WARNING LIGHT
L DIRECTION INDICATOR
CONSTANT VOLTAGE REGULATOR
SPEEDOMETER LIGHTS
SELECTOR DIAL LIGHT
HORN BUTTON
DIRECTION SIGNAL SWITCH
HIGH BEAM INDICATOR
SPEEDOMETER LIGHTS
R DIRECTION INDICATOR
LUGGAGE COMPARTMENT LOCK WARNING LIGHT
IGNITION SWITCH
HEATER LIGHT
HEATER SWITCH
HEATER LIGHT
LUBE WARNING LIGHT
CIGAR LIGHTER
CLOCK & CLOCK LIGHTS
GLOVE COMPARTMENT LIGHT & SWITCH
R COURTESY LIGHT
ASH TRAY LIGHTS
R FRONT
R REAR
R REAR READING LIGHT & SWITCH
L READING & SWITCH
STOP LIGHTS & DIRECTION SIGNALS
L BACKUP LIGHT
LICENSE LIGHT
LUGGAGE COMPT LIGHT & SWITCH
GAS GAUGE (TANK UNIT)
R BACKUP LIGHT
R REAR DOOR SW
R FRONT DOOR SW
BEAM SELECTOR SWITCH
LEFT BLOWER MOTOR
STOP LIGHT SWITCH
BACKUP & NEUTRAL SAFETY SWITCH
RESISTANCE WIRE
FLASHER
RIGHT BLOWER MOTOR
CURRENT REGULATOR
VOLTAGE REGULATOR
CUTOUT RELAY
BREAKER
CONDENSER
DISTRIBUTOR
OIL PRESSURE SWITCH
TEMP GAUGE (ENGINE UNIT)
COIL
STARTER
GENERATOR
HORN RELAY
STARTER SWITCH
POWER BOX
CIRCUIT BREAKERS
DOOR LOCK
MULTILUBER
RADIO
REAR RADIO ANTENNA
BATTERY
6021
HORNS
PARKING LIGHT
DIRECTION SIGNAL
LOW BEAM
HIGH BEAM

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CARTER ABD 2-BARREL

Carter ABD 2965S, SA. 2-barrel downdraft type.

►*HARD HOT STARTING CORRECTION:* Caused by fuel inlet needle improperly seated. *See "Carter ABD Carburetors" in Carburetion Section.*

►*HARD HOT START CORRECTION (Carbs. installed prior to April 15th production):* Caused by fuel percolation. When carburetor, automatic choke and linkage adjustments, do not correct condition, install Booster Venturi Assembly Kit Part No. COLY-9A523-A and lower float level. Later carburetors have these revisions. *See "Carter ABD Carburetors" in Carburetion Section.*

►*STALLING OR LOADING AFTER SHORT OPERATION OR CHOKE VALVE CLOSING FAILURE CORRECTION:* May be caused by incorrect choke thermostatic coil spring. *See "Carter ABD Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - 1½ turns open. Turn both screws alike. Turn screws out for richer mixture.

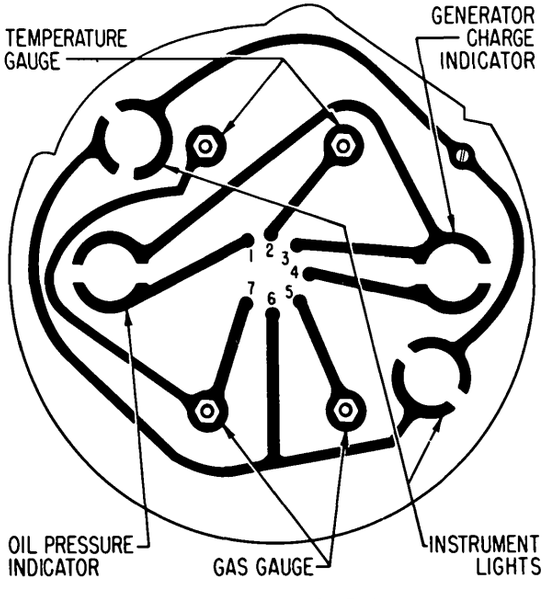
Idle Speed - 450-475 RPM with selector lever in D2 position.

NOTE - On Air Conditioned Cars the compressor should be in operation when idle speed is adjusted.

►*IDLE SPEED AND IDLE FUEL MIXTURE ADJUSTMENT CAUTION:* Hot idle compensating valve must be completely closed when making either adjustment. To close valve, press down on brass valve button (not on bi-metal spring).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter ABD 2-Bbl. Carburetors" in Carburetion Section.*



LINCOLN INSTRUMENT CLUSTER PRINTED CIRCUIT

CARB. EQUIPMENT

Fuel Pump: Lincoln No. COLE-9350-A. Fuel only.
Pressure - 4.5-6.5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

NEW DISPOSABLE TYPE FUEL FILTER: New disposable type fuel filter Part No. COME-9155-B is available for service replacement of filters B8S-9155-A and PB8M-9155-A (1958-59).

Installation - To save damage to filter and possibility of leaks, proceed as follows:

1) Use only the filter hex connection adjacent to mating part for applying torque.

2) Bend filter line so that normal free floating position of the end of line is in proper alignment with filter to avoid induction stress on filter case.

3) Use second wrench on filter hex connection to avoid transferring stress through filter case and tighten fuel filter inlet to fuel pump hand tight plus 2½ turns. Tighten fuel filter outlet to fuel line to 180-200 inch lbs.

Replacement - Remove fuel filter to carburetor fuel tube, and old filter assembly. Remove brass nipple from pump outlet. Install new filter in fuel pump outlet. *CAUTION - DO NOT transfer force through filter case when installing filter or fuel tube.* Assemble filter to carburetor fuel tube at filter end then to carburetor. Check for leaks.

DISPOSABLE FUEL FILTER FLOW CHECKS: Check fuel flow at both inlet and outlet side of fuel filter Minimum flow required for engine operation is 1 pint within 20 seconds at 500 RPM. Static pressure will not vary because of restricted filter. Procedure for checking fuel pump pressure remains the same.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Lincoln No. B9MF-10804-A.
Dash Unit - Lincoln No. COLF-9280-C.
Tank Unit - Lincoln No. COLF-9275-A.
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type. Clean every 2,000 miles, replace every 20,000 miles.

►*AIR CLEANER SERVICE NOTE:* Filter element can be cleaned by tapping or shaking or by using compressed air directed opposite to air intake flow. Use care not to rupture element. *DO NOT wash element in solvent or other liquid and DO NOT oil or lubricate.*

►*AIR CLEANER PRE-FILTER ELEMENT NOTE:* Synthetic fibre, wrap-around element Part No. B8A-9601-A is available for use with dry-type cleaner element, in abnormally dusty areas.

►*PRE-FILTER ELEMENT INSTALLATION & SERVICING:* Remove dry element and slip pre-filter element over outer surface, locating it between upper and lower gasket surfaces. To clean pre-filter element, remove it from dry element and wash or rinse it in plain water. Use a detergent to remove contaminated oil. DO NOT WASH dry element.

BATTERY

Lincoln No. HJK-10655-A. 12 volt, 17 plate, 72 ampere hour capacity (20 hr. rate).
Battery Ground - Negative, to right cylinder head.
Engine Ground - At valve pushrod chamber cover.

STARTER

Lincoln No. FAY-11002-A. Armature B6A-11005-B.
Drive - Lincoln No. ICM-11350-C. Bendix "Folo-Thru".
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	85
15.5 ft. lbs.	Lock	5.0	550

Removal: Remove battery and support assembly, then disconnect transmission control rod at accelerator shaft bracket lever. Drain cylinder block, remove nuts attaching right and left front engine support insulators to block. Raise front of engine as high as possible and remove right exhaust manifold. Disconnect cable from starter and remove three attaching capscrews and remove starter.

Installation: Place dust shield in recess in flywheel housing, insert starter and drive assembly (drive end up) through lower suspension arms and work assembly into position. Install attaching capscrews finger tight, check for proper alignment and tighten capscrews (outer capscrew first).

Starting Switch: Lincoln No. B6A-11450-A, magnetic type, controlled by Ignition & Starter Switch Lincoln No. COLF-11572-A and Neutral Safety Switch Terminal Block Lincoln No. COLF-7A217-A.

Neutral Safety Switch Terminal Block Adjustment: *See "Lincoln Automatic Transmission" in Transmission Section.*

GENERATOR

Generator No.	Make	Amperes
B9LF-10002-A	Lincoln	40
B9LF-10000-B	Delco-Remy	50

Armature (With Bearing) - Lincoln No. FGP-10027-A (use with B9LF-10002-A Gen.).
Armature (Only) - Lincoln No. B9LF-10005-A (use with B9LF-10000-B Gen.).

►*CHARGING CIRCUIT FUSE NOTE:* This fuse located at starter relay in Power Box, was bypassed in production starting February 1960. Fuse may be bypassed on early cars by disconnecting black coded wire (battery terminal of generator regulator to charging system fuse terminal) from upper fuse terminal and reconnecting it to lower terminal.

Performance Data

Generator	Amps.	Volts	Gen. RPM
B9LF-10002-A	40	15	2650
B9LF-10000-B	50	14	2500

Brush Spring Tension - 32-40 ozs. (B9LF-10002-A), 28 ozs. (B9LF-10000-B).
Field Current - 1.0-1.1 Amps. (B9LF-10002-A), 2.0-2.5 Amps. (B9LF-10000-B), at 10 volts Hot.
Rotation - Counterclockwise at commutator end.

Belt Adjustment: ½" deflection midway between generator and water pump pulleys with light thumb pressure.

REGULATOR

Regulator No.	Make	Generator No.
PB7M-10505-A	Lincoln	B9LF-10002-A
COLE-10505-A	Delco-Remy	B9LF-10000-B

►*SEE CHARGING CIRCUIT FUSE CAUTION IN "GENERATOR" ABOVE.*

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LINCOLN (PB7M-10505-A)

►*SETTING CAUTION:* Regulators are temperature compensated type. Set to following specifications at 75° ambient (engine compartment) temperature after one-half hour operation in vehicle or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.0-12.8 volts.
Cuts Out - 5-9 amps. (discharge current).

Voltage Regulator

Setting - 14.6-15.4 volts ambient temperature at 75°F.
Checking & Adjusting - *See "Lincoln 12-Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 38-42 amps.
Checking & Adjusting - *See "Lincoln 12-Volt Regulators" in Electrical Section.*

DELCO-REMY (COLE-10505-A)

►*AMBIENT TEMPERATURE NOTE:* Ambient temperature is the temperature of the air surrounding regulator ½" from its cover.

Cutout Relay

Cuts In - 11.8-13.0 volts.
Cuts Out - 8.0 max. discharge current at 12.2 volts.

Voltage Regulator

Setting - *NOTE - Adjust to correct operating voltages as indicated in following "Ambient Temperature" table.*

Voltage Setting (Upper Contacts)

Temp. °F	Volts	Temp. °F	Volts	Temp. °F	Volts
25	15.0-15.8	85	14.5-15.3	145	14.0-14.8
35	14.9-15.7	95	14.4-15.2	155	13.9-14.7
45	14.8-15.6	105	14.3-15.1	165	13.8-14.6
55	14.8-15.6	115	14.2-15.1	175	13.7-14.6
65	14.7-15.5	125	14.1-15.0		
75	14.6-15.4	135	14.1-14.9		

►*NOTE: Lower contact voltage setting should be .3-.5 volts less than the upper contact setting.*
Checking & Adjusting - *See "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting - *NOTE - Adjust to current value as indicated in following "Ambient Temperature" table.*

Temp. °F	Amps.	Temp. °F	Amps.	Temp. °F	Amps.
25	54.6-65.0	85	48.0-56.4	145	40.2-46.4
35	54.6-65.0	95	46.6-54.6	155	38.8-44.8
45	53.2-63.0	105	45.4-53.0	165	37.8-43.4
55	52.0-61.6	115	44.2-51.8	175	36.2-42.0
65	50.8-60.0	125	42.8-49.8		
75	49.2-58.0	135	41.4-48.0		

Checking & Adjusting - *See "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*CHARGING CIRCUIT FUSE PRODUCTION CHANGE:* *See Note under GENERATOR above.*

►*INSTRUMENT PANEL LIGHT FUSE CHANGE:* Lights are protected by fuse in Power Box on later cars. This change was made by routing line from Instrument Light Rheostat through a fuse in the Power Box as shown in the wiring diagram.

Instrument Cluster Hood Removal: Remove cluster hood screws (at each end and at center). On Air Cond. Cars, remove grille upper molding for access to left hand cluster screw. Remove hood by lifting it up toward steering wheel. *NOTE* - On cars with Electronic Headlight Dimmer Control, disconnect photo-tube harness lead wires at amplifier and remove harness and hood as an assembly.

Instrument Lamp Removal: *NOTE* - Brake Release, Ignition Switch, Lighting Switch, and Door Lock Switch Lamps are accessible from under the panel. Other lamps are accessible after removing hood (above).

Printed Circuit Lamps - Turn bulb socket clockwise to disengage. To install, position bulb and socket in circuit board opening and turn socket approx. 90° clockwise to lock it.

Other Under Hood Lamps - Pull socket out from cluster. To install, press socket in until seated.

Speedometer Removal: With hood removed, disconnect reset cable from lower lip of cluster. Disconnect speedometer cable at speedometer, hi-beam indicator, two speedometer lamp bulbs and socket assemblies. Remove bezel to cluster screws and lift off speedometer assembly. Remove speedometer to bezel screws and remove speedometer.

Printed Circuit Board Removal: With hood removed, remove gauge pod bezel to cluster retaining screws and lift up on gauge pod assembly. Disconnect connector and remove plate assembly-to-bezel retaining screws and separate plate assembly from bezel. Remove temperature and fuel gauge retaining nuts and remove gauges. Remove four bulbs. Remove remaining circuit board-to-plate retaining screws and remove circuit board.

►*POWER BOX NOTE:* A power box mounted on right side of dash panel in engine compartment contains fuse panel, starter and horn relays, power circuit breakers and dash panel wiring connector assemblies. Power box acts as a distribution point for all circuits. A decal inside cover gives circuit breaker and fuse application, ratings, location, and wiring color codes. Fuses may be removed by using ignition key. Heater and air conditioning circuit breakers are installed individually and can be lifted from their spring-loaded holders. Other circuit breakers are mounted on a bus bar and should be removed from holder as an assembly.

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery negative (ground) cable. Press inward on headlamp switch spring release button and carefully remove switch knob and shaft. Remove switch bezel nut and bezel. Lower switch below panel, note wire color codes and disconnect wires.

Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit on firewall).

LIGHTING CIRCUIT BREAKERS: 12 Ampere - On main light switch, protects Parking, Rear, Instrument Panel (Early cars), License, Luggage Compartment and Ash Tray lights.

15 Ampere - Non-recycling type, in Power Box. Protects Stop Light Circuit.

FUSES: All fuses located in Power Box except as noted.

AGW-4 Amp. - Protects Instrument Lights (later cars only, see note above).

SFE 14 Amp. - Protects Courtesy, Dome. & Reading lights.

SFE 9 Amp. - Protects Radio.

3AG 10 Amp. - Protects Single Antenna.

SFE 20 Amp. - Protects Dual Antenna.

SFE 7.4 Amp. - Protects Multi-Luber.

1 AG 1 Amp. - Protects Clock.

SFE 7.5 Amp. - Protects Back-up lights.

Cigar Lighter - Sulphur Disc on back of instrument panel lighter. A 3GA-15 Amp. fuse in Power Box for each lighter in rear doors or quarters.

Horn Relay: Lincoln No. B8C-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own V8, valve-in-head, of same design as previous models.

Bore	Stroke	Displacement
4.30"	3.70"	430 cu. in.

Compr. Ratio	Rated HP	Developed HP
10.0-1	59.17	315 at 4100 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ROCKER ARM COVER GASKET NOTE:* Engine should be Hot when covers are removed to prevent damage to .003-.005" thick neoprene coating on gasket. Exercise extreme care to insure that gasket particles do not fall into engine as gasket is removed. Torque cover bolt to 5-8 ft. lbs.

►*EXCESSIVE OIL CONSUMPTION & TAIL PIPE SMOKING:* Caused by engine oil entering intake manifold due to vacuum valve stuck in open position. Check vacuum valve at left side of engine crankcase and replace as necessary.

►***MAXIMUM ENGINE RPM CAUTION (CARS WITH AUTOMATIC TRANSMISSIONS):*** **DO NOT operate engine in excess of 2500 RPM with selector lever in "N" (Neutral), "P" (Park), or "R" (Reverse) as damage to clutch plates may result.**

►*HEATER & HEATER-AIR CONDITIONING CONTROL ASSEMBLY WHISTLE NOISE CORRECTION (Cars Built Prior to Sept. 20, 1959):* When whistling noise is audible during operation of vacuum servo control, replace the vacuum servo control head, Part No. COLF-18549-C (Heater only) or Part No. COLF-19980-D (Heater-Air Conditioning).

►*CYLINDER HEAD PRODUCTION CHANGE:* New cylinder head used in production Nov. 24, 1959 with new specifications for new color coded standard valves, valve head diameter, stem diameter and with constant rate valve springs which are not available for replacement. Color coded replacement valve spring and damper assembly available for replacement. *New cylinder head with new valves and springs is interchangeable with former head. One of each type head may be used on same engine.* See individual items in data following.

OIL PAN REMOVAL: Crank engine so No. 1 piston is at 14° BTDC. Remove battery ground cable and oil level dipstick. Drain crankcase. Remove oil pan retaining screws and let pan rest on frame crossmember. Remove oil pump inlet tube and screen assembly screws and let assembly drop into pan. Remove pan in a lowering forward motion.

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CYLINDER HEAD: *See "Cylinder Head & Manifold" in Lincoln Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Lincoln Special Data.*

ENGINE REMOVAL: *See "Engine" in Lincoln Special Data.*

PISTONS

Step head, slipper type, aluminum alloy with a steel strut. Piston pin is interference fit in piston. Retaining rings are not used.

►*ORIGINAL BORE & PISTON SIZES:* Standard cylinder bore limits are 4.300-4.3024". Standard size pistons are furnished in two sizes for selective fit, see revised piston sizes and clearance specifications below.

►*REVISED PISTON SIZE & CLEARANCE SPECIFICATIONS:* Std. size piston furnished in two (reduced) sizes and marked with color code on top of piston as follows: Code Red 4.2997-4.2983", Code Blue 4.2989-4.2995". *See revised clearance specification below.*

Removal - Piston & rod removed from above.

Clearanc - .0017-.0035". This supersedes previous specification of .0008-.0026".

Fitting New Pistons: *See "Pistons" in Lincoln Special Data.*

Installing Pistons: Pistons for right and left hand cylinders are NOT interchangeable. Install piston so indentation notch on head of piston is toward front of engine. *See Rod Installation.*

Replac ment Pist ns: Std. (2 sizes, see above) and .003", .020", .030", .040" Oversize.

PISTON PIN

Press fit in connecting rod, no retaining device.

Diameter - .9749-.9752". **Length** - 3.48-3.50".

Clearanc in Piston - .0002-.0004". Wear limit .0008".

Piston Pin Removal & Installation: *See "Piston Pins" in Lincoln Special Data.*

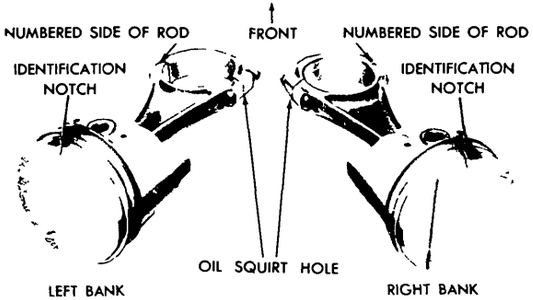
Replac m nt Pins: Standard size. Furnished with new pistons only.

PISTON RINGS

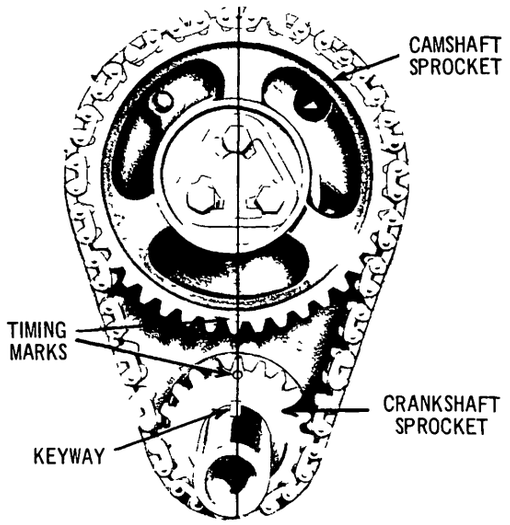
Ring	Width	End Gap	Side Clearance
Compr. (1)	.077-.078"	.015-.030"	①.0015-.003"
Compr. (2)	.068-.069"	.015-.030"	① .001-.003"
Oil (3)	.1825-.1879"	.015-.062"	②

① - Wear limit .006". ② - Side sealing type ring.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap.



LINCOLN PISTON & ROD ASSEMBLY



LINCOLN VALVE TIMING MARKS

Replacement Rings: Furnished Std. .020", .030", .040" Oversize.

CONNECTING ROD

Length (Center-to-Center) - 6.599-6.601".

Journal Diameter - 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue).

Lower Bearing - Copper lead alloy, steel back.

Clearance - .0007-.0028". **Wear Limit** - .0038".

Side Clearance - .005-.015". **Wear Limit** - .018".

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings.

Installing Rods: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole in rod facing inward and rod number facing outward toward outer side of cylinder block.

CRANKSHAFT

►***ENGINE MAIN BEARING BOLT SERVICE REPLACEMENT NOTE:*** ***See "Crankshaft" in Lincoln Special Data.***

Journal Diameter - 2.8998-2.9002" (Code Red), 2.8994-2.8998" (Code Blue).

Out-of-Round Limits - .0004". **Wear Limit** - .0006".

Bearings - Copper-lead alloy, steel back.

Clearance - .0009-.0029". **Wear Limit** - .0039".

Endplay - .004-.008" **Wear Limit** - .012"

End Thrust - Taken by No. 3 (center) main bearing.

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings

Crankshaft R ar Oil Seal Installati n: *See "Crankshaft & Main Bearings" in Lincoln Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Lincoln Special Data.*

CAMSHAFT

Journal Diam t r - 2.264-2.265" (All journals).

Out-of-Round Limits - .0005". **Wear Limit** - .001".

Bearings - Babbitt lined, steel backed.

Clearance - .001-.003". **Wear Limit** - .006".

Endplay - Thrust to rear. Taken by thrust face of cam shaft sprocket riding against front surface of block.

►*CAMSHAFT LOBE LIFT NOTE:* Before installing oversize pushrods, check camshaft lobe lift for wear. *See CAMSHAFT & BEARINGS in Lincoln Special Data.*

Replacement Bearings: Std. and .015" Undersize.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Lincoln Special Data.*

Camshaft Setting: Timing marks should be adjacent and in line with straightedge across shaft centers.

Timing Chain Deflection: Not more than ½" deflection from straight to outward deflected position.

Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Lincoln Special Data.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Lincoln Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

(Early Type Cyl. Head)

Valve	Head Diameter	① Stem Diam ter
Intake	2.080-2.090"	.3711-.3718"
Exhaust	1.770-1.780"	.3692-.3700"

Valve	Seat Angle	②Lift	Stem Clearanc
Intake	⑤45°	.2316"	③ 0010-.0024"
Exhaust	⑤45°	.2316"	④.0028-.0042"

(Late Type Cyl, Head)

Valve	Head Diamet r	①Stem Diamet r
Intake	1.955-1.965"	⑥
Exhaust	1.645-1.655"	⑦

Valve	Seat Angle	②Lift	Stem Clearance
Intake	⑤45°	.2316"	.0010-.0020"
Exhaust	⑤45°	.2316"	.0020-.0030"

① - Furnished with 003", .015", .030" oversize stems.
② - Cam lobe lift Wear limit .005".
③ - Wear limit .0045".
④ - Wear limit .0055".
⑤ - Valve face angle 44°.
⑥ - Red .3711-.3716", Green .3714-.3719".
⑦ - Red .3701-.3706", Green .3704-.3709".

►*VALVE REPLACEMENT NOTE:* Some engines may have valves with .015" oversize stems installed in production. For correct replacement, measure stem diameter approximately 1½" from stem end. All valve stems are the same diameter for approximately 1" from stem end.

Valve Seat Width - .070-.090" (intake & exhaust).

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over guide.

Oversize Valve Stem Installation: *See "Valve System" in Lincoln Special Data*

Valve Springs: Valve springs with damper springs inside are standard. *NOTE - Some engines produced with new constant rate spring (without damper spring, color coded blue, and can be intermixed in an engine with other type).* Blue spring not serviced. Use either a

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"Maroon" or "Gray" color coded spring with damper for replacement. Assembled spring height specifications remain the same for all springs.

►*SPRING SQUARENESS NOTE:* If springs more than 1/16" out of square, replace spring and damper.

►*VALVE DAMPER SPRING INSTALLATION CAUTION:* To prevent valve spring clicking noise, damper spring must be installed within valve spring so end of damper spring is within a 135° arc counterclockwise to end of valve spring when viewed from above.

Assembled Height - 1.83" measured from surface of cylinder head spring pad to underside of spring retainer (with valve closed). Do not use more than two .030" spacers if height more than 1.83". Measure all components affecting spring height if less than 1.83".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	① 66-77	1.83"
Open	② 240-260	1.43"

① - Wear limit 60 lbs. at 1.83".
② - Wear limit 225 lbs. at 1.43".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum .0045" (Intake), .0055" (Exhaust), ream valve guides and install valves with oversize stems. *See "Valve System" in Lincoln Special Data.*

Valve Lifters: Hydraulic barrel type. No adjustment.
Diameter - .8740-.8745".
Clearance in Lifter Bore - .0005-.0020". Wear limit .005".
Hydraulic Lifter Overhaul - *See "Valve System" in Lincoln Special Data.*
Hydraulic Lifter Operating Range Check - *See "Valve System" in Lincoln Special Data.*

Rocker Arm Assembly: *See "Valve System" in Lincoln Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: Following valve opening and closing points are with camlift as indicated.*

Valve Timing

Intake Valves - Open 22°①BTDC. Close 68°②ALDC.
Exhaust Valves - Open 63°①BLDC. Close 27°③ATDC.

②-.002" camlift. ② - .0045" camlift. ③ -.005" camlift.

Valve Timing Check: Install a quadrant on crankshaft damper. Remove right rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers valve opening and cam lobe lift. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner. If readings not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft.

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" and "OILING SYSTEM" in Lincoln Special Data.***

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.

►***LOW OIL PRESSURE CORRECTION: See "Oiling System" in Lincoln Special Data.***

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Light on instrument panel. Light goes on when ignition switch turned on or when oil pressure is low.
Oil Pressure Switch - Lincoln No. B6A-9278-B.

Oil Pump: Combination rotor type oil pump and vane type vacuum pump mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.
Pump Overhaul - *See "Oiling System" in Lincoln Special Data.*

Oil Filter: Full flow disposable type. Mounted on lower left front corner of cylinder block. Replace element every 4000 miles or 4 months.
Installation - Coat gasket with light film of oil. Screw filter onto adapter (by hand) until snug, then tighten ¼ turn. DO NOT OVERTIGHTEN.

Crankcase Ventilation: Filter in oil filler cap and ventilator tube at rear of engine. Clean filler cap every 4000 miles.

COOLING

Three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.
NOTE - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 23 qts. without heater, 26 qts. with heater or air conditioning.

Pressure Valve: Radiator filler cap, Lincoln No. LA-8100-A. Operating pressure 12-15 lbs.

Thermostat: 157-162°F (No. 8BE-8575-B); 175°F (B9S-8575-A): Located in water outlet connection. Two 137-142°F (B9S-8575-B) thermostats located in front face of cylinder banks.

Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Lincoln Special Data.

Temperature Gauge: King-Seeley electric Constant Voltage ("CV") type with Gauge Voltage Regulator No. B9MF-10804-A.
Dash Unit - Lincoln No. COLF-10883-C.
Engine Unit - Lincoln No. B7A-10884-A.
See "Temperature Gauges" in Miscellaneous Section.

Power Booster Fan: Standard on Air Conditioned cars.
See "Cooling System" in Lincoln Special Data.

TURBO-DRIVE TRANSMISSION

Torque converter and three-speed automatic transmission with hydraulic control and mechanical parking lock. Twin-Range Turbo-Drive has two manually selected drive positions. *See "Lincoln Automatic Transmission" in Transmission Section.*

►*PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION: See "Lincoln Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Lincoln Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 2,000 miles, drain and refill every 24,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level: Bring transmission to operating temperature by running engine with selector in neutral position. Move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. Maintain level at "FULL" mark on dipstick.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Lincoln Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type with lubrication fitting.

Propeller Shaft Alignment: *See "Propeller Shafts" in Lincoln Special Data.*

REAR AXLE

Own (Spicer Model). Semi-floating hypoid, with Hotchkiss drive.
See "Lincoln Hypoid" in Rear Axle Section.

►*POWER-LOCK DIFFERENTIAL NOTE:* Optional equipment. Cars with this type differential are identified by inscription on trunk lock cover. *See "Power-Lock Differential (Cone Clutch Type)" in Rear Axle Section.*

►*REAR WHEEL BALANCE CAUTION (Power-Lock Differential Cars):* Do not attempt to balance rear wheels on car.

►*REAR AXLE LUBRICANT NOTE:* Lubricant should be checked at 2,000 mile intervals, add lubricant (B9L-19A08 only) as necessary. Change lubricant only when differential removed for repairs.

Axle Ratio: 2.89-1 (55-19).
Backlash - .003-.008" maximum.

Axle Shaft Removal: Remove wheel and nuts securing brake drum to axle flange. Remove drum. Remove nuts securing wheel bearing retainer by working through hole in axle shaft flange. Pull axle shaft out of housing with Tool 4235-C being careful not to dislodge brake backing plate nor damage oil seal.

Axle Assembly Removal: Raise rear of car and support at each side of frame directly opposite fuel tank ends on underbody box section. Drain lubricant by removing lower bolts from cover. Remove propeller shaft and install Tool 7657-D on transmission output shaft to prevent fluid leakage. Remove wheels, drums, and axle shafts (see above) but do not secure backing plate to housing. Remove hydraulic lines from axle housing (unnecessary to disconnect) and secure backing plates (with brake assemblies and hydraulic lines) to underbody. Raise axle housing to compress shock absorbers so lower end of absorbers can be released, then lower housing. Remove "U" bolts, releasing springs, and remove housing from chassis.

Wheel Bearing Adjustment: None required.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within coil springs.
See "Lincoln Front Suspension" in Suspension & Wheel Alignment Section.

Caster - 0° to Neg. 1½°. Caster should not vary more than ½° from side to side.

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Camber - 0° to Pos. ¾°. Camber should not vary more than ¼° from side to side.

Toe-In - 1/8-3/16".

Turning Angle - With wheels at maximum turning angle, outer wheel should be at 27°26', and inner wheel should be at 37°45'.

Wheel Bearing Adjustment: See *NOTE below for cars with Nut-lock.* Tighten adjusting nut while rotating wheel until noticeable drag is felt, then back off nut until nearest slot is aligned with cotter pin hole in spindle (1/6-1/4 turn) and install cotter pin.
NOTE - Some cars have "nut-lock" (12 sided nut with 8 castellations) installed over regular adjusting nut. To adjust wheel bearings, remove nut-lock, tighten adjusting nut to 15-20 ft. lbs. torque while rotating hub, install nut-lock on adjusting nut so that cotter pin slots are aligned with hole in spindle, then back off adjusting nut and nut-lock together (use 1 1/8" box wrench) until next slot in nut-lock aligns with hole (1/8 turn), install cotter pin.

SHOCK ABSORBERS

Non-adjustable standard, adjustable type optional.

Shock Absorber Application

Model	Front - Lincoln Part No. - Rear
Standard	COLL 18045-B..COLL 18080-B
Hvy. Duty ①	COLY 18077-A..COLY 18080-A

① - Adjustable type. See below.

Heavy Duty Shock Absorber Adjustment - Remove shock absorber, **compress fully** until internal couplings are mated, then rotate reservoir **clockwise** to align arrow on inner washer (front), on dust cover (rear) with arrow on reservoir to obtain desired ride control.

STEERING

Power Steering: *See "Lincoln Torsion Bar Power Steering" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Lincoln Torsion Bar Power Steering" in Steering Section.*
Steering Gear Removal: *See "Lincoln Torsion Bar Steering" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*

BRAKES

Bendix Automatic Adjuster. Duo-servo with fixed anchor pin. Parking lever applies rear wheel service brakes.
See "Bendix Automatic Adjuster Brakes" in Brake Section.

►*HISSING NOISE AT INSTRUMENT PANEL:* Caused by leak at parking brake release hoses. Relocate hoses to relieve downward tension on parking brake release control.

►*PARKING BRAKE DOES NOT STAY APPLIED:* Caused by release button stuck in bezel stamping. Remove vacuum control, dress down burrs or high spots on outside diameter of release button assembly and inside diameter of bezel. Apply a film of lubriplate on inside diameter of bezel before installation.

►*BRAKE DRUM PRODUCTION CHANGE & CAUTION:* Flared type brake drums used on later cars. DO NOT intermix two type drums. Flared type drum Part No. COLL-1102-B (front), COLL-1126-B (rear). First type drum Part No. has "Suffix A".
Drum Diameter - 11.062" Turned drum limit 11.122".
Wheel Cylinder Diameter - 1 3/32" (front), 15/16" (rear).
Lining - Molded type riveted to shoe.
Lining Width - 3½" (front & rear).
Clearance - *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section.*
Brake Pedal Freeplay: *¼-3/8".*

Power Brake Unit: Bendix Vacuum Power Unit, Hydraulic (Disc) Reaction type. Combination power unit and master cylinder mounted on engine side of firewall. *See "Bendix Power Brake Unit (Hydraulic Disc Reaction) Type" in Brake Section.*
Checking Fluid - Maintain fluid level to within ¼" of top of reservoir.
Removal of Power Unit - Disconnect pushrod from brake pedal assembly in drivers compartment, then remove master cylinder outlet fitting bolt from master cylinder. *NOTE - Not necessary to remove stop light switch.* Loosen clamp holding manifold vacuum hose to power unit and remove hose. Remove shoulder bolt retaining booster pushrod from pedal linkage. Remove nuts and lockwasher securing brake unit to firewall and remove unit.

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*
Heater-Air Conditioner: Own, with electrically controlled servo motors. *See "Lincoln Air Conditioning" in Miscellaneous Section.*
Power Window Regulators: Electric type with reversible motor in each window (including ventilators). Continental models have electrically controlled rear window. *See "Power Window Regulators" in Miscellaneous Section.*
Electric Door Lock: *See "Electric Door Locks" in Miscellaneous Section.*
Trunk Lid Lock: *See "Trunk Lid Locks" in Miscellaneous Section.*
Power Seat Adjusters: "4-Way" & "6-Way" electric type. Single motor with solenoid clutches. *See "Power Seat Adjusters" in Miscellaneous Section.*
Power Top Control: Electric-Hydraulic type with reversible motor, electric controlled rear window and top compartment cover. *See "Power Top Controls" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left front body pillar extension.

First Number–10001 up (each year). At both plants.

►*SERIAL NUMBER NOTE: Serial number (example #55LA10001M#) includes following identification data in sequence.*

Year①	Assy. Plant②	Serial No.	Eng. Type
55	LA	10001	M

①–Last two digits of model year.

②–See Assembly Plants following.

Assembly Plants–Indicated in serial number by following codes: **LA**–Los Angeles. **ME**–Metuchen. **SL**–St. Louis. **WA**–Wayne.

ENGINE IDENTIFICATION: One compression ratio used in 1954 engines (no specific identification). In 1955, two compression ratios were used (controlled by cylinder head design). Engine with 7.6-1 head is designated "ECK". Engine with 8.5-1 head is designated "ECL". 1955 Car model engine application is as follows:

1955 Car Model	Engine Designation
Custom	ECK
Monterey	ECK
Montclair	ECL

1955 Engine Identification Mark Location–"ECK" or "ECL" indicated on head between center rocker arm supports and in depression on lower surface. Effective Jan. 3, 1955 (ECK-B or C; or ECL-B), mark included between 1 & 2 and 7 & 8 exhaust ports toward top of head above spark plug shield (visible with mirror). All early engines had tan rocker arm covers. Beginning production Oct. 18, 1954, "ECL" engines have yellow covers, and "ECK" engines continue with tan covers.

TUNE-UP

COMPRESSION PRESSURE: (1954)–120 lbs. **(1955)**–130 lbs. (ECK); 135 lbs. (ECL). At cranking speed on all engines.

VACUUM READING: (1954)–19" at 450 RPM. **(1955)**–19-20" at 500 RPM.

VALVE TAPPET CLEARANCE: .019" (Intake & Exhaust), with engine hot. *This setting supersedes previous 1955 setting of .018" for all valves.* Preliminary cold setting .020" (Intake & Exhaust).

Valve Tappet Adjustment - *See "Valve System" in Mercury Special Data.*

►*1954 VALVE TAPPET ADJUSTING SCREW LOCKNUT CAUTION:* If adjusting screw is found **not** to extend up through rocker arm sufficiently to provide full thread engagement with locknut replace pushrods with Part No. EBU-6565-A and locknuts, Part No. EAA-6549-B.

MANIFOLD HEAT CONTROL: "Butterfly" type valve. Located at right end of crossover pipe at flange (single exhaust system), at flange joining right exhaust manifold to muffler inlet pipe (dual exhaust system). *CAUTION*–When installing, make sure counterweight portion is toward right front of engine.

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders–RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .029-.033" (Champion H-10). .032-.036" (Champion 870).
Spark Plugs (1954)–Champion H-10. 14mm., or equivalent. Tighten plugs to 24-30 ft. lbs.
Spark Plugs (1955)–Champion 870. 18mm., special.

►*1955 SPARK PLUG CAUTION: Plug is new type with tapered seat and does not require a sealing gasket. It is important that plugs be tightened to torque of 15-20 ft. lbs.*

COIL: Mercury No. 8BA-12029.
Ignition Current–3 amps. idling, 5 amps. stopped.

►*COIL HIGH TENSION LEAD CAUTION (Radio Equipped Cars):* Coil-to-Distributor lead is SPECIAL SUPPRESSOR LEAD (non-metalic with carbon impregnated nylon or rayon core) and the special length (approx. 14-1/2") is required for proper radio reception.

DO NOT SHORTEN LEAD OR USE ANOTHER TYPE FOR REPLACEMENT.

DISTRIBUTOR: Mercury No. FAE-12127-C (Early 1954); FDC-12127-A (Late 1954). FDK;12127-C (1955 "ECK" Engine); FEC-12127-A (1955 ECL Engine).

►*1954 FAE-12127-C DISTRIBUTOR OVER-ADVANCE WHEN ENGINE STARTED AT LOWER TEMPERATURE CORRECTION:* This condition noted when engine detonates excessively after starting under low temperature conditions. Install Pin & Post Assembly, Mercury Part No. FDC-12357-A which limits distributor advance to 15°-15½°. FAE-12127-C distributors that have been reworked in production are identified by the part number prefix "ED". *CAUTION*–When calibrating a corrected distributor refer to Automatic Advance Table for FDC-12127-A distributor. *See "Ford, Lincoln, Mercury Distributor" in Electrical Section for installation of Pin & Post Assembly.*

Condenser–Mercury No. FAB-12300-A. **Capacity** .21-.25 microfarad.
Contact Point Set–Mercury No. FAB-12171-B.
Breaker Gap–.014-.016".
Cam Angle–26-28.5°.
Breaker Arm Spring Tension–17-20 ozs.
Rotation–Counter-clockwise viewed from above.

Advance Performance–FAE-12127-C①
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
1½-2½	0.24	500
4¼-5¼	0.43	700
7¼-8¼	0.64	1000
11¾-12¾	1.13	1500
15¼-16½	1.52	2000

①–Distributors **without** correction for "Over-Advance". See Distributor Correction (above).

Advance Performance–FDC-12127-A②
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
1½-2½	0.24	500
4¼-5¼	0.43	700
7¼-8¼	0.64	1000
11¾-12¾	1.13	1500
15-15½	1.52	2000

②–Use this table for FAE-12127-C distributors that have been corrected for "Over-Advance". See Distributor Correction above.

Advance Performance–FDK-12127C, FEC-12127A
►With Distributor on Test Stand

Distr. Degrees	Vacuum (" of HG)	Distr. RPM
0	0	200
1/2–1-1/2	0.19	300
11-1/4–12-1/4	1.36	1000
12-1/2–13-3/4	1.59	1400
14-1/4–15-1/2	1.95	2000

►*DISTRIBUTOR ADVANCE NOTE:* Advance data above is for distributor on TEST STAND. On the engine, advance is dependent on the carburetor used (number and location of vacuum takeoff ports and Spark Control Valve vary).

►*DISTRIBUTOR INSTALLATION NOTE:* It may be necessary to crank engine slightly to engage oil pump hex shaft with distributor shaft. This will not disturb timing because distributor engages camshaft gear before distributor shaft starts to engage the oil pump drive.

Initial Distributor Timing: Rotate engine until timing mark on crankshaft dampener is lined up with pointer and #1 piston is in firing position. Install distributor with point just breaking and the rotor in position to fire #1 cylinder (vacuum advance connection boss should be at approximately right angles to crankshaft and pointing toward left side of engine).

IGNITION TIMING

Setting (1954)–3° BTDC (normal).
Setting (1955)–3° BTDC (Std. & Overdrive Trans.). 6° BTDC (Merc-o-Matic).

Timing Mark–On crankshaft dampener and pointer on engine front cover. *See Initial Distributor Timing under DISTRIBUTOR above.*

CARBURETOR

1954 MODELS

Mercury No. EBY-9510-A (Std. & O.D. Trans.). EBY-9510-H (Merc-o-Matic). "Centri-Quad" four barrel downdraft type with vacuum controlled secondary throttle valve and separate automatic choke.

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barr ls f ed Cyls. 2-3-5-8, LEFT barr ls 1-4-6-7.*

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►*CARBURETOR SERVICE REPLACEMENT NOTE:* Carburetor Assembly, Mercury Part No. ED-EBY-9510-K (with new type bowl cover to prevent fuel spill-over on sharp right turns) available for service replacement.

►*CARBURETOR "SPILL-OVER" ON SHARP RIGHT TURN CORRECTION:* To prevent spill over on cars with external vent, replace carburetor bowl cover assembly with Mercury No. ED-EBY-99983-C. *See "Lincoln-Mercury Centri-Quad" in Carburetor Section.*

►*EXTERNAL VENT PRODUCTION CHANGE:* An adjustable spring clip, Mercury Part No. EAD-99608-A used in production, and available for service on earlier carburetors to provide a means of closing off lower vent holes in accelerator pump rod for better starting in cold weather. *See "Lincoln-Mercury Centri-Quad" in Carburetor Section.*

►*CHOKE HEAT TUBE ASSEMBLY & INTAKE MANIFOLD PRODUCTION CHANGE:* New assemblies entered production in early June to prevent exhaust gas leakage into choke control heat tube assembly. Previous type heat tube assemblies are retained for service replacement on early cars, and later type heat tubes and manifold assemblies can be installed if desired. *See "Lincoln-Mercury Centri-Quad" in Carburetor Section.*

►*FAILURE TO GET FULL THROTTLE (MERC-O-MATIC CARS) CORRECTION: Remove necessary number of shims on accelerator pedal rod to obtain full throttle. NOTE—One shim must be retained to properly shim opening in toe-board.*

►*ENGINE NOT RETURNING TO IDLE SPEED (MERC-O-MATIC CARS) CORRECTION:* Check the following points and correct as necessary. (1) Ignition cable bracket assembly at left rear side of engine near engine ground strap may be interfering with "Z" bar spring support. Correct by bending bracket assembly away from "Z" bar. (2) Adjust carburetor dashpot (see Dashpot following). (3) Change location of accelerator Shaft Retracting Spring by attaching upper end of spring to ball joint and lower end of spring to lowest hole in bracket.

Idle Setting—Exactly 1¼ turns open (set both screws alike).

Idle Speed—With engine at normal operating temperature. 475-500 RPM (Std. & O.D. Trans.). 425-440 RPM (Merc-o-matic) with transmission selector lever in "D" (drive) position.

External Vent Seasonal Adjustment: (See "External Vent Production Change" above). On carburetors where spring clip is provided on hollow accelerator pump rod to control vent opening, adjust clip to open or close vent for best operation as follows:

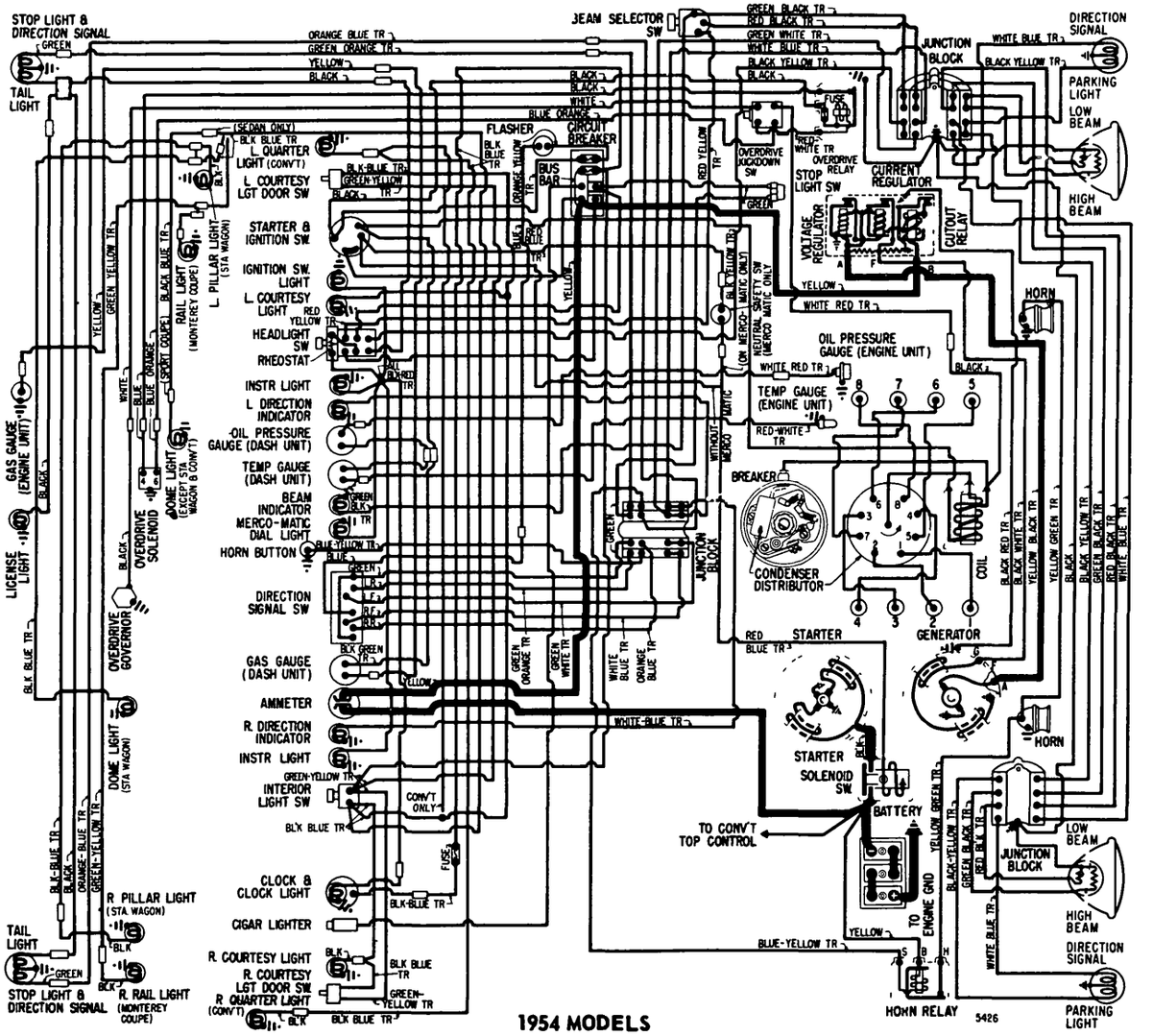
Winter Operation (Temperature below 50°F)—Slide clip down on pump rod so vent is CLOSED.

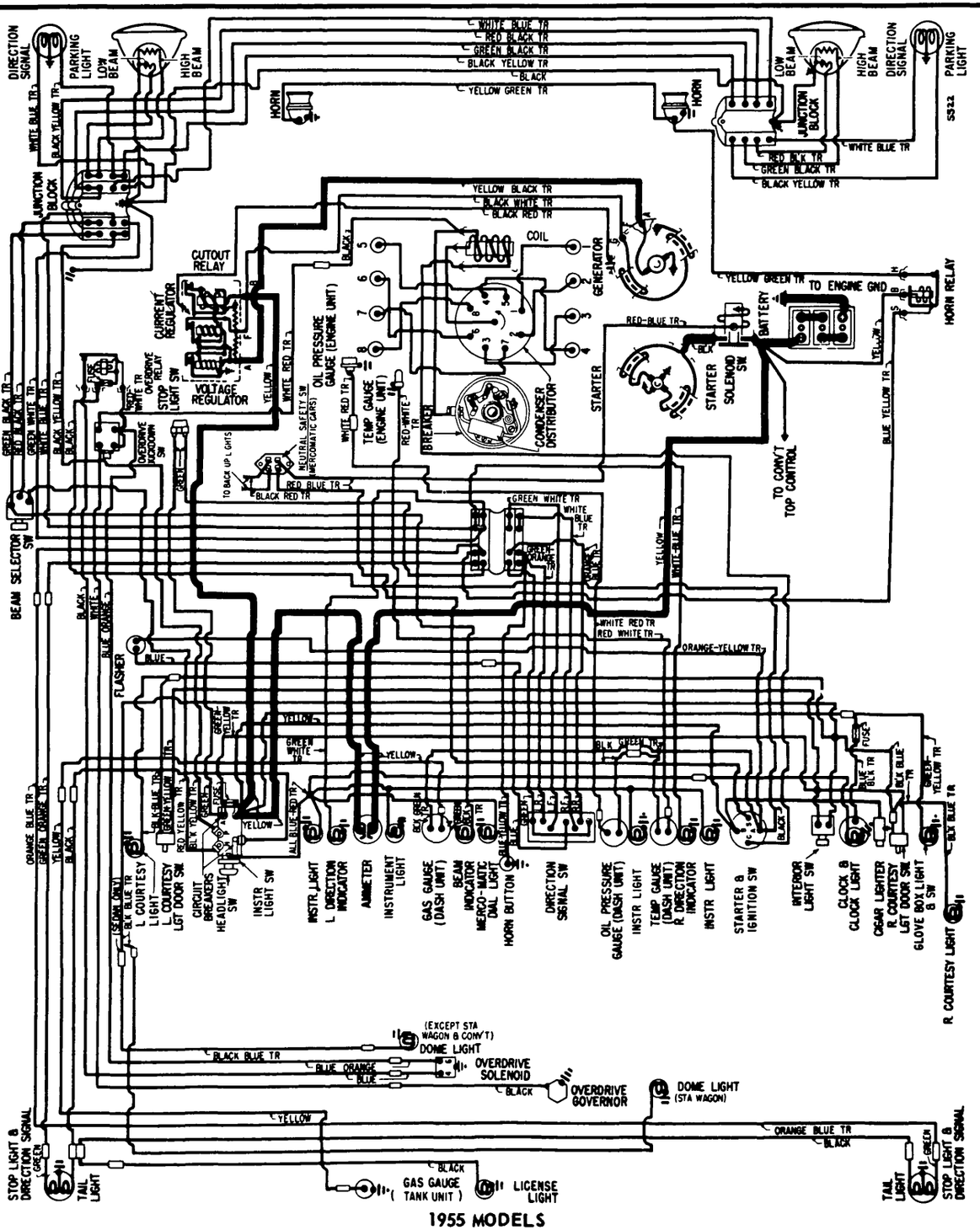
Summer Operation (Temperature above 50°F)—Slide clip upward on pump rod so that full diameter of vent hole is OPEN.

Dashpot Adjustment (Merc-O-Matic Cars): Adjust engine idle speed to correct setting and turn engine off. Loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counter-clockwise) until head of adjusting screw pushes dashpot up to the end of its travel. Turn dashpot screw in 1½-2 turns to obtain .045-.064" clearance. Tighten locknut.

Throttle Linkage Adjustment (Merc-O-Matic Cars): Adjust engine idle speed to 425-440 RPM, with engine at normal operating temperature and selector lever in "Dr" position. Adjust anti-stall dashpot (see above), then turn ignition off. Disconnect carburetor-to-control shaft rod at carburetor. Remove clevis pin securing transmission control rod to transmission control shaft. Insert Gauge Pin 77230-MB through control rod and bracket (on left side of bracket). With carburetor throttle at slow idle position, adjust carburetor-to-control shaft rod so that it enters hole in carburetor throttle lever freely, and remove gauge pin. While holding carburetor throttle in slow idle position, hold transmission throttle control rod up against its stop and adjust length of rod to allow free entry of clevis pin in hole in shaft and hole in clevis at upper end of rod, **then lengthen rod by turning clevis three full turns counter-clockwise.** Install clevis pin and secure with cotter pin. Tighten clevis locknut. *NOTE—If band or clutch slippage is evident, the rod can b*

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1955 MODELS

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length ned an th r c mpl t turn Total l ngth ning of rod must not xceed 4 turns from STOP position

►*OTHER DATA: See "Ford, Lincoln, M rcury C ntri-Quad" in Carburetion Section*

Fuel Pump Pressure: 4-5 lbs

1955 MODELS

►*CARBURETOR PRODUCTION CHANGES: Diff r nt carburetors used as follows:*

Transmission	M rcury Carb. N .
1954 (Std & O D)	EBY-9510-A
1954 (Merc-o-matic)	EBY-9510-H
1955 Early (Std & O D)	① ECK-9510-C
1955 Late (Std & O D)	ECK-9510-G
1955 Early (Merc-o-matic)	② ECL-9510-B
1955 Early (Merc-o-matic)	③ ECK-9510-D
1955 Late (Merc-o-matic)	ECK-9510-H
1955 Late	ECK-9510-S,T

① —Use Serv Part No B5A-9510-G for replacement
② —Identical with ECK 9510-D (Part No Change only)
③ —Use Serv Part No B5A-9510-H for replacement

►*CARBURETOR INSTALLATION CAUTION (First Cars with Choke Inlet Air Tube Washer in Throttl Body). See "Lincoln & Mercury Centri-Quad" in Carburetor Section*

►*MANIFOLD FUEL DISTRIBUTION Carbur tor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7*

►*ACCELERATOR ROD CLIP STICKING IN WIDE OPEN POSITION CORRECTION* On some early 1955 Merc-O-Matic equipped cars accelerator rod clip will not freely clear transmission splash pan when accelerator fully depressed To correct, bend top corner of splash pan forward approximately 3/4" or remove approximately 3/8" of top edge of pan Be sure to provide adequate clearance for spark plug wires running to left bank and for the lead wire to oil pressure gauge

►*AUTOMATIC CHOKE ROD ADJUSTMENT Must be correct for proper starting and automatic chok operation. See "Ford-Lincoln-Mercury Centri-Quad" Carburetor in Carburetor Section*

Idle Setting—Preliminary setting 1-1/2 turns open (set both screws alike) With engine at normal operating temperature, turn one screw at a time out until engine begins to roll from richness, then turn screw in just enough to provide smoothest idle performance

Idle Speed—(Std & O D) 475-500 RPM, (Merc-O-Matic Cars) 425-500 RPM in "Drive" range

Dashpot Adjustment (Merc-O-Matic Cars) Hold dashpot piston in to limit of travel, turn adjusting screw in or out until clearance between screw and dashpot piston rod is 045- 064'

Automatic Throttle Control Adjustm nt (Air-Condition d Cars): With engine adjusted to normal idle speed (see above) and engine at normal operating temperature

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turn air-conditioner "ON" and place transmission selector lever in "N" (Neutral) position. Loosen adjusting screw locknut on end of operating rod and adjust knurled adjusting nut to provide an idle speed of 800 RPM. Tighten locknut. Check operation of Automatic Throttle Control to make sure idle speed returns to normal idle when transmission is shifted out of "N" (Neutral), or air-conditioner is turned off.

Throttle Linkage Adjustment (Merc-O-Matic Cars): Disconnect carburetor-to-control shaft rod at carburetor. Adjust engine idle speed to 425-450 RPM in "Dr" position, turn ignition off. Adjust dashpot (see above). Remove clevis pin that secures transmission control rod to transmission control shaft. Insert gauge pin, Tool 77230-MB, through control rod and shaft bracket. With engine at operating temperature and on slow idle, adjust carburetor-to-control shaft rod so that it enters hole in carburetor freely, **then lengthen two full turns.** Remove positioning gauge pin. While holding carburetor throttle in the slow idle position, hold control shaft-to-transmission rod up against its stop and adjust length of rod to allow free entry of clevis pin in hole in shaft of transmission control shaft. **Lengthen rod by turning clevis three complete turns in a counter-clockwise direction.** If it is not possible to obtain a forced downshift with this adjustment, control shaft-to-transmission rod assembly should be lengthened an additional 1½ turns. Install clevis pin and secure with cotter pin. Tighten clevis locknut.

►*OTHER DATA: See "Lincoln & Mercury Centri-Quad" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs. at 900 RPM.

CARB. EQUIPMENT

►*1954 CARBURETOR AIR CLEANER INSTALLATION CAUTION:* Two types of air cleaners being used in production and should be installed as follows: "Oval" type installed with overhang portion of cleaner facing rear of engine. "Round" type installed with indentation at bottom edge and word "Front" stamped on side of cleaner facing front of engine.

►*1954 AIR CLEANER GASKET & HOLD-DOWN WING SCREW PRODUCTION CHANGE (To correct air cleaner "flexing" and wing screw breakage):* The paper gasket and wing screw have been replaced in production and for service by a neoprene gasket, Part No. 354534-S8B (oval type air cleaner). Gasket, Part No. EAD-99654-B, wing screw, Part No. 354535-S8B (round type air cleaner). When installing the neoprene gasket, apply a coat of cement to both surfaces before inserting in air cleaner.

►*FUEL GAUGE PRODUCTION CHANGE (1955) & REPLACEMENT PARTS CAUTION (1954-55):* New tank units used on late 1955 cars as listed below will minimize inaccuracies in gauge readings and can be used for service replacement on 1954 and early 1955 cars.

NOTE–Later type tank units must not be used on cars prior to 1954.

Fuel Pump: Mercury No. EBY-9350-A (1954); B5A-9350-A (1955). Fuel & vacuum.
Pressure–4-5 lbs. at 1000 RPM (1954), at 900 RPM (1955).
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauges: King-Seeley Electric type.
Dash Unit–Mercury No. FDC-9280-A (1954); FDK-9280-B (1955).
Tank Unit–*See Production Change Note (above) for replacement of 1954 and early 1955 units.*

Model	First Type ①	Second Type
Exc. Sta. Wgn.	FAA-9275-A	B5A-9275-A
Station Wagon	FAA-9275-B	B5A-9275-B

①–1954 & Early 1955 Models.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Mercury No. FAD-10655-C. 6 volt, 19 plate, 120 ampere hour capacity (20 hr. rate).
Location–In engine compartment on right side.
Battery Ground–Positive, to cylinder head bolt.
Engine Ground–Engine left cylinder head to dash panel.

STARTER

Mercury No. FAC-11002-G. Armature FAC-11005-B.
Drive–Mercury No. 1CM-11350-C. Bendix "Folo-Thru".
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–48-56 ozs.
Cranking Speed–115-125 RPM.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	6.0	70
14 ft. lbs.	Lock	3.5	700

①–With starter on engine and engine running.

Removal: Remove battery-to-starter cable. Remove attaching bolts holding steering idler arm support to frame lower support and remove idler arm assembly. Remove capscrews holding endplate to converter housing and remove starter by pulling out and down until starter drive clears housing.

Starting Switch: Mercury No. B5A-11450-A. *(NOTE–This relay is a sealed type and replaces the relay formerly used).* Mounted on frame side rail adjacent to starter and controlled by Ignition Switch and Automatic Transmission Switch.

Neutral Safety & Back-up Light Switch (1954): Mercury No. 1M-15812-B. Mounted on lower end of steering column.

Neutral Safety & Back-up Light Switch (1955): Mercury No. FDK-15825-B (Switch Terminal). Located on steering column inside passenger compartment. Supersedes previous switch location.
Adjustment–*See "Ford-matic & Merc-O-Matic" in Transmission Section.*

GENERATOR

Mercury B5C-10002-A. Armature FBC-10005-A.

Performance Data

Generator	Amperes	RPM
B5C-10002-A	40 ①	1750

①–See Regulator for maximum charging rate.
Brush Spring Tension–30 ozs.
Field Current–2.50-2.80 amps. at 6.0 volts.
Rotation–Counter-clockwise at commutator end.
Removal: Remove front splash pan to rear of front frame cross member and remove generator from below car.
Belt Adjustment: 1/2" belt deflection midway between generator and water pump pulleys with normal thumb pressure.

REGULATOR

Mercury No. FAD-10505-A.
►*SETTING NOTE:* Settings below are for regulator at NORMAL OPERATING TEMPERATURE (after 1/2 hour operation) with room temperature at 70-80°.

Cutout Relay
Cuts In–6.0-6.6 volts.

Voltage Regulator
Setting–7.4-7.8 volts.
Checking & Adjusting–*See Electrical Equip. Section.*

Current Regulator
Setting–38-42 amperes.
Checking & Adjusting–*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Direction Signal: *See Electrical Equipment Section.*
Automatic Headlight Dimmer: *See "Lincoln-Mercury Headlight Control" in Electrical Equipment Section.*
Lighting Switch Removal: With control knob in the "OFF" position, press the spring release button on switch housing, turn shaft slightly and pull it out of switch.
Stop Light Switch Location: Forward end of brake master cylinder (Conventional & Power Brakes). Master cylinder located on firewall in engine compartment.

FUSES: Turn Signal–14 amps. (1954); 9 amps. (1955).
Dome & Courtesy Lights–14 amps. (1954); 9 amps. (1955).
Glove Box–14 amps.
Cigar Lighter–Special fuse in lighter base.
Clock–3 amps. (in clock lead), except 1955 Montclair.
Heater–20 amps.
Spotlight–14 amps.
Windshield Washer–14 amps. (or special 3 amps.).

CIRCUIT BREAKERS (1954): Two circuit breakers (30 amps. for headlights, 15 amps. for auxiliary) mounted on single panel located behind instrument panel.

CIRCUIT BREAKERS (1955): On headlight switch. One circuit breaker protects headlight circuit and second

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circuit breaker protects instrument panel lights, parking lights, and stop and tail light circuits.

HORNS: Mercury No. B5A-13832-C (High Pitch), B5A-13833-C (Low Pitch). Dual horns operated by relay.

Horn Relay–Mercury No. FAA-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 Valve-in head.

Engine	Bore	Stroke	Displacement
1954	3.62"	3.10"	256 cu. ins.
1955 (All)	3.75"	3.30"	292 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
1954	7.5-1	162.5	161 at 4400 RPM
1955 (ECK)	7.6-1	185.00	188 at 4400 RPM
1955 (ECL)	8.5-1	185.00	198 at 4400 RPM

Compression & Vacuum Reading–*See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Mercury Special Data.*

►*1954 REPLACEMENT CYLINDER HEAD NOTE:* One head, Part No EBY-6049-D is used for replacement on on both engine banks. Install plug, EAN-6052-A in rear water passage hole if used for right bank, or adapter, B4A-10911-A for heat indicator bulb in rear passage hole if used for left bank.

►*1954 EXHAUST MANIFOLD PRODUCTION CHANGE:* Later type exhaust manifolds, Part Nos. EBY-9430-B (right hand), and EBY-9431-A (left hand), used in production and for service replacement. Bolt holes are larger and flanges are heavier to prevent breakage in service.

►*INTAKE MANIFOLD-TO-CYLINDER HEAD BOLT CAUTION:* The two bolt holes located at No. 2 and No. 10 valve push rod holes are not tapped deep enough to permit tightening the 3" bolts to correct torque specification without mutilating the two bottom threads. For this reason, only the 3/8"-16 x 2-3/4" bolts, Part No. 45528-S8, should be used at the No. 2 and No. 10 push-rod hole positions.

►*CYLINDER HEAD GASKET INSTALLATION CAUTION:* Gaskets are stamped on one side with the work "FRONT". When installing gasket on **right hand** side of cylinder block wording should be **upward** and toward front of engine. When installing on **left hand** side, wording should be **downward** and toward front of engine.

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data.*

ENGINE REMOVAL: *See "Engine" in Mercury Special Data.*

OIL PAN REMOVAL: Turn crankshaft so that rear counterweights on crankshaft are upward, remove necessary splash pans and remove oil pan.

PISTONS

Aluminum alloy, autothermic solid skirt type with three rings above pin.

Removal–Rod and piston assemblies removed from above.

Fitting New Pistons: Use 1/2" wide feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows.

New Piston in New Bore–.0015" feeler. 5-10 lbs. pull.
New Piston in Used Bore–.002" feeler. 5-10 lbs. pull.
Used Piston in Used Bore–.0025" feeler. 5-10 lbs. pull.

Replacement Pistons: Standard size, .020", .030", .040" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Install piston with "F" (embossed on piston) and dimple on head toward front of engine.

PISTON PINS

Floating type with lock ring at each end.

Diameter–.9120-.9123".
Pin Fit in Piston–.0001-.0003" loose.
Pin Fit in Rod–.0001-.0003" loose.
Replacement Pins: Standard size, .001", .002" Oversize.

PISTON RINGS

1954 Models

Ring	Width	End Gap	Side Clearance
Compr #1	0930-.0935"	010-.027"	0025-.0030"
Compr #2	.0930-.0935"	.010-.027"	.0015-.0030"
Oil ①	.1860-.1865"	.010-.027"	0015-.0030"

①–Expander type ring.

1955 Models

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.010-.027"	.002-.0035"
Compr #2	.0775-.0780"	.010-.027"	.002-.0035"
Oil	.1860-.1865"	.010-.027"	②

②–Side sealing type ring, and side clearance is not evident.

Replacement Rings: Standard size, .020", .030", .040" Oversize.

►*1955 OIL RING INSTALLATION NOTE:* Install spring spacer in oil ring groove directly above pin hole. Butt ends together and hold in this position while installing top steel rail and bottom steel rail. Make sure top ring ends are at least 1" to **left** of spring spacer gap, and bottom rail ends at least 1" to **right.**

CONNECTING RODS

►*1955 CONNECTING ROD & BEARING PRODUCTION CHANGE:* Squirt hole in crankshaft end of rod has been moved to opposite side of rod. New service bearings have two holes drilled in them (may be used with either old or new rod hole location) *CAUTION–Bearings with one hole in them should not be used to service 1955 type rods.*

Length–6.320-6.324". **Weight**–24.05 ozs.
Crankpin Journal Diameter–2.1880-2.1888".
Lower Bearing–Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.
Clearance–.0005-.0025" (1954); .0008-.0027" (1955).
Side Clearance–.006-.016" (two rods)

Replacement Bearings: Standard (two sizes marked **red** and **blue** for selective fitting) and .010", .020", .030" Undersize.

Installing Rods: Oil squirt hole in rod **away from** camshaft side of bore on all rods. Numbers on rods and bearing caps should be together and installed in same numbered cylinder.

CRANKSHAFT

Journal Diameters–2.4980-2.4988".
Maximum Wear Limits–.0005". **Taper**–.0005".
Bearings–Steel backed copper lead alloy lined.

Replacement Bearings: Standard size (2 sizes marked **red** and **blue** for selective fitting) and .010", .020", .030" Undersize.

End Thrust: Taken by #3 main bearing. Replace bearing if endplay excessive.

Thrust Bearing Alignment–*See "Crankshaft & Main Bearings" in Mercury Special Data.*
Endplay–.002-.006".

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

►*1954 CRANKSHAFT REAR MAIN BEARING OIL SEAL PRODUCTION CHANGE:* New type seal and oil seal retainer used in later production and is not interchangeable with early type seal. *See "Crankshaft & Main Bearings" in Mercury Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE: Camshafts used in 1954-55 production and for service replacement are as follows:*

1954 (All)–B4T-6250-A (ECE-6250-A). "ECE" cast between No. 1 cam bearing and No. cam lobe.
1955 (Early)–B5A-6250-A (ECB-6250-A). "ECB" cast between No. 1 cam bearing and No. 1 cam lobe
1955 (Late)–ECK-6250-A. "ECK" cast between No. 1 cam bearing and No. 1 cam lobe. Also, a letter "C" with one dimple on each side is cast between No. 15 & 16 cam lobes.

►*1955 SERVICE REPLACEMENT CAMSHAFT CHANGE (To provide better wear characteristics):* Type of material has been changed in later type camshaft, Part No. ECK-6250-A. Other dimensions and specifications remain the same.

Journal Diameter–1.9255-1.9265".
Clearance–.001-.003".

End Thrust: Taken by thrust plate on forward end block (between camshaft sprocket and shoulder on block).
Endplay–.003-.007".

Replacement Camshaft Bearings: Finished bearings furnished Standard size, .015" Undersize. *CAUTION–Oil holes in bearings must be lined up correctly.*

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Camshaft Rem val & Installati n: *S "Camshaft & B arings" in M rcury Sp cial Data.*

Timing Chain: Side-guide type. Length 56 links.

►*REPLACEMENT NOTE.* Replace timing chain and sprockets when deflection on shaft side exceeds 1/2" (take up all slack on driving side, measure slack on opposite side). Remove and install chain "endless" as a unit with both sprockets.

Camshaft S tting: Timing marks on camshaft and crankshaft sprockets adjacent to timing marks on timing chain, when installed toward left side of engine as viewed from drivers seat.

Timing Chain C v r S al Installation (Crankshaft Front Seal): *S e "Engin Fr nt Cover" in Mercury Special Data.*

VALVES

►*EXHAUST VALVE STEM DIAMETER CHANGE (Production & S rvic Replacement Valves):* Stem diam ter d creased .0005" for greater stem clearance in guide S e "Valve System" in Mercury Special Data

►*1954 VALVE TAPPET ADJUSTING SCREW LOCKNUT CAUTION:* If adjusting screw is found **not** to extend up through rocker arm sufficiently to provide full thread engagement with locknut, replace pushrods with Part No. EBU-9565-A and locknuts, Part No. EAA-6549-B.

Tappet Clearanc : .019" (Intake & Exhaust), with engine at normal operating temperature.

Valv Tapp t Adjustm nt - *See "Valve System" in Mercury Special Data*

Valv	H ad Diam.	①② Stem Diam.	Length
Intake	1.775-1.785"	.3415-.3425"	5.02"
Exhaust	1 505-1.515"	.3405-.3415"	5.02"

Valv	Seat Angl	Lift	Stem Clearance
Intake	45°	③	⑤.001- 002"
Exhaust	45°	④	⑥.002-.003"

①—Exhaust valve stems (service replacement) decreased .0005" in diameter. See Exhaust Valve Change above.

②—Valves furnished with .003", .015", .030" oversize stems for service replacement.

③—.350" (1954). .377" (1955).

④—.350" (1954). .375" (1955).

⑤—.004" service maximum. ⑥—.004" service maximum

Valv Seat Width—(1954) .060-.070" (Intake), .070-.080" (Exhaust). **(1955)** .070-.090" (Intake), .060-.080" (Exhaust).

►*ROTATABLE VALVE NOTE All valves are rotatable typ . Se "Valv Syst m" in Mercury Special Data.*

Valv St m Oil Seals—"Umbrella" type oil seals used on all valves. Seals are installed with cupped side down on valve stem at guide boss on cylinder head. *Install new seals whenever valves removed or when seals become loose on valve stems.*

►*1955 VALVE STEM OIL SEAL PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Valve Stem Oil Seal, Part No. B5A-6571-A, with a .100" longer skirt than used previously, has been released for production and service replacement.

►*1954 VALVE STEM OIL SEAL REPLACEMENT NOTE:* Valve Stem Oil Seal, Part No. B5A-6571-A must be used when servicing 1954 models having service cylinder head, Part No. B4A-6049-F.

Valve Springs: Free Length—2.12".

Valve Spring Specifications

	Pressure	Length
Valve Closed	54-62 lbs.	1.821"
Valve Open	124-140 lbs.	1.505"

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" Intake, .005" Exhaust), ream guides and install oversize valves. *See "Valve System" in Mercury Special Data.*

Valve Lifters: Mushroom type. Removed from below with camshaft removed.

Rocker Arm Assembly *See "Valve System" in Mercury Special Data.*

►*ROCKER ARM COVER INSTALLATION CAUTION* Covers manufactured prior to February 1, 1955 were manufactured without an inner retainer for holding cover gasket in place When replacing gasket it will be necessary to seat gasket firmly against outside flange and secure in place with fast drying cement

►*1954 ROCKER ARM SHAFT OIL OUTLET TUBE NOTE:* A new oil outlet tube, Part No. B4A-6588-B has been released for service. The new tube directs overflow oil from rocker arm shaft to No 1 pushrod hole in right cylinder head, and to No. 16 hole in left cylinder head.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: The following valve opening and closing points are with a camlift as indicated.*

1954 Models

Intake Valves—Open 8° ① BTDC. Close 44° ② ALDC.
Exhaust Valves—Open 47° ① BLDC Close 5°② ATDC.

1955 Models

Intake Valves—Open 12° ① BTDC Close 54° ② ALDC.
Exhaust Valves—Open 58° ③ BLDC Close 8° ④ ATDC.
Camlift—①—.016". ②—.019". ③—.015" ④—.017"

Valve Timing Check—Slide rocker arm to one side and install a dial indicator so reading can be taken from end of v. lve push rod (use an indicator that will read .300" or more). Install a quadrant (reading in degrees) on crankshaft pulley to check amount of crankshaft rotation. Rotate engine slowly until dial indicator reading for valve being checked is same as indicated in table above. Amount of crankshaft rotation should be the same as shown in valve timing table. As an example, check intake valve opening by rotating engine until dial indicator reads .026" cam lift. Quadrant on crankshaft should read 8° (1954), 12° (1955). Continue to rotate engine to check valve closing in degrees. Dial indicator should read .019", and quadrant 44° (1954), 54° (1955)

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubricati n" und r OILING SYSTEM in Mercury Special Data*

►*1954-55 HIGH ENGINE OIL LEVEL CORRECTION:* Install Oil Level indicator (bayonet), Part No B5A-6750-A The new oil level indicator has the markings raised 5/32" to correct complaints of high engine oil level readings.

Crankcase Capacity: 5 qts. (refill). 6 qts. (when filter changed).

Normal Oil Pressure: 45-55 lbs , at 30-40 MPH
Pressure Regulator Valve—In pump body, not adjustable.
Oil Pressure Indicator—King-Seeley Electric.

Dash Unit (1954)—Mercury No. FDC-9273-A.
Dash Unit (1955)—Mercury No. FDK-9273-B
Engine Unit (1954-55)—Mercury No. 41A-9278 (Use with FAA-13875-A Clip).
See "Oil Pressure Gauges" in Miscellaneous Section.

Oil Pump: Gear type pump located on left side of engine crankcase and driven by distributor drive gear.

Pump Overhaul—*See "Oiling System" in Mercury Special Data.*

Oil Filter. Full-flow type with pressure relief valve in center filler bolt. Replace filter element at 4000-5000 miles or when oil becomes dirty or polluted. *See "Oiling System" in Mercury Special Data*

Replacement Filter Element—Mercury No. HCK-6731-A (Kit includes new gaskets).

►*CAUTION Special "full-flow" filter element must be used for service replacement (use of by-pass type filter element will restrict engine oil flow and result in insufficient engine lubrication).*

Crankcase Ventilation Filter in oil filler cap (inlet) and road draft tube. Clean and oil every 2,000 miles or more often in dusty areas

COOLING

Water Capacity: 19 qts. (without heater) 20 qts. (with heater).

Pressure Valve: Mercury No. LA-8100-A3 (14 lbs.), LA-8100-A4 (13 lbs.). Radiator filler cap, stamped with figure "14" or "13".

Thermostat: Mercury No B4A-8575-A (157-162°F), B4A-8575-B (177-182°F —used with permanent anti-freeze). Mounted in water outlet housing at front of intake manifold

►*THERMOSTAT INSTALLATION NOTE· When installing the later type thermostat, be sure that the word "Top" is in the uppermost position to avoid foreign material settling under valve.*

Water Pump. Packless, sealed ball bearing type.
See "Water Pumps" in Mercury Special Data.

Temperature Gauge: King-Seeley Electric.

Dash Unit (1954)—Mercury No. FDC-10883-A.
Dash Unit (1955)—Mercury No. FDK-10883-B.
Engine Unit (1954-55)—Mercury No. 1A-10884-A.
See "T mperatur Gaug s" in Misc llaneous S cti n.

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CLUTCH

Borg & Beck Model 10A6. Mercury No. MB-7563-A (1954). MC-7563-B (1955).
See "Borg & Beck" in Clutch Section.
Clutch Disc No.—Mercury No. MB-7550-B (1954). MC-7550-A (1955).

►*1955 CLUTCH RELEASE RETRACTING SPRING & BRACKET PRODUCTION CHANGE:* **Retracting spring bracket has been eliminated. A longer spring, Part No. MB-7523-B replaces the spring formerly used (later spring is 1" longer). Use bolt, Part No. 354390-S8 when using the later type spring.**

Pedal Adjustment: If pedal free travle is not 1 to 1-1/4", loosen clutch pedal release rod locknut (lower end) and turn adjusting nut for correct free travel, tighten locknut.

R moval: Remove transmission (see Transmission Removal below), and disengage clutch pedal retracting spring and release rod from clutch release lever. Disengage equalizer bar tension spring and remove two capscrews retaining equalizer bracket assembly to flywheel housing. Remove flywheel housing. Mark position of flywheel and pressure plate so parts may be installed in original position. Compress clutch pressure plate assembly with Tool 17563. Remove capscrews and remove pressure plate.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh synchro-mesh (second & high), sliding gear (low & reverse).
See "Mercury Synchro-mesh" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: If equipped with overdrive, remove kickdown switch retainer nut and push switch through floor. Raise car and drain transmission. On overdrive cars remove governor, solenoid, and control cable. Disconnect speedometer cable and remove speedometer drive gear. Remove transmission shift rods at transmission. Remove bolts retaining rear universal joint to companion flange and remove drive shaft. Support rear of engine and remove the detachable cross-member of the frame. Remove two top capscrews retaining transmission to flywheel housing and install a couple of studs to act as guide pins. Remove lower capscrews and slide transmission to rear as far as possible and lower front end. Remove from below car.

OVERDRIVE

Warner Model AS1-R10F. Solenoid operated type, with governor control and throttle operated kickdown. Lockout Switch not used on this model.
See "Warner R10 Overdrive" in Transmission Section.

►*1955 OVERDRIVE SOLENOID FAILURE CORRECTION: If n cessary to r plac original sol noid, additional wires r quired. S "Warner R10 Ov rdriv " in Transmissi n S ction.*

R m val: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

MERC-O-MATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.
See "Fordomatic & Mercomatic" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section.*

Lubrication—Check transmission oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain & refill every 15,000 miles. **Use only Automatic Transmission Fluid Type A.**

Checking Fluid Level—Apply parking brakes, place transmission selector lever in "N" (Neutral) position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (Parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator, wipe clean and insert in tube (make sure indicator is pushed all the way down). Remove indicator and read level. Add sufficient fluid to raise level to "Full" mark on indicator. Replace indicator.

THROTTLE LINKAGE ADJUSTMENT: *See CARBURETOR above.*

►*OTHER MERCOMATIC SERVICE DATA: See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

Mechanics. Roller bearing type.

REAR AXLE

1954 (EXC. STATION WAGON)

►***REAR AXLE "CLINK" CORRECTION: See "Ford & Mercury (Separate Carrier)" in Rear Axle Section.***

►*INTERFERENCE BETWEEN REAR WHEEL & FENDER CORRECTION:* If difficulty is encountered in removing rear wheel, with tire inflated, the cause may be due to incorrect combination of rear springs and shock absorbers. See "Shock Absorbers" below.
Own. Separate Carrier, semi-floating hypoid, with Hotchkiss drive.

NOTE: Different type rear axle used on Station Wagon. See "Ford & Mercury (Separate Carrier)" in Rear Axle Section.

Ratios
Standard Transmissi n—3.90-1 (39-10) Std. ①.
Ov rdrive Transmission—4.10-1 (41-10) Std. ②.
Mercomatic Transmission—3.54-1 (39-11) Std. ③.
①—4.10-1 (41-10) Optional.
②—3.90-1 (39-10) Optional.
③—3.31-1 (43-13) Optional.

►*AXLE CARRIER & GEAR RATIO IDENTIFICATION: Carrier housing stamped with ring gear & pinion gear ratio (10/39 for 3.90-1 ratio, etc.).*
Backlash—.003-.008".

Axle Shaft Removal: Remove wheel and brake drum. Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange). Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: Disconnect rear universal. Remove axle shaft (see above). Remove carrier from housing.

Wheel Bearing Adjustment: None required.

1954 STATION WAGON
1955 ALL MODELS

Own. Integral Carrier. Semi-floating hypoid with Hotchkiss drive.

Model	Rati
1954 Sta. Wgn. (Conventional)	①3.91-1
1954 Sta. Wgn. (Overdrive)	②4.09-1
1954 Sta. Wgn. (Merc-O-Matic)	③3.54-1
1955 Exc. Sta. Wgn. (Conventional)	①3.73-1
1955 Exc. Sta. Wgn. (Overdrive)	④4.09-1
1955 Exc. Sta. Wgn. (Merc-O-Matic)	⑤3.15-1
1955 Sta. Wgn. (Exc. Merc-O-Matic)	④4.09-1
1955 Sta. Wgn. (Merc-O-Matic)	⑥3.54-1

①—4.09-1 Optl. ②—3.91-1 Optl. ③—3.31-1 Optl. ④—3.73-1 Optl. ⑤—3.54-1 Optl. ⑥—3.15-1 Optl.

Axle Shaft Removal: Remove wheel and brake drum. Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange). Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Rear Axle Assembly Removal: Raise rear end of car and disconnect rear universal. Remove axle shafts. Disconnect brake lines at "T" on left side of axle housing. Disconnect hand brake cable, shock absorbers, spring U-bolts and shackles. Remove axle housing assembly from car.

SHOCK ABSORBERS

►*INTERFERENCE BETWEEN REAR WHEEL & FENDER CORRECTION: If difficulty is encountered in removing rear wheel, with tire inflated, th cause may be due to incorrect combination of rear springs and shock absorbers. See table below for correct application.*

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Shock Absorbers: Direct acting, non-adjustable. Service by replacement.

1954 Front Shock Absorbers

Model	Std.	Hvy. Duty
All (Exc. Sta. Wgn.)	MB-18045-B	MB-18045-K
Station Wagon	MB-18045-D	MB-18045-K

1955 Front Shock Absorbers

Model	Std ①	Hvy. Duty
All (Exc. Sta. Wgn.)	MC-18045-F	MC-18045-B
Station Wagon	MC-18045-E	MC-18045-C

①—Use MC-18045-G with Air Conditioning.

►*REAR SHOCK ABSORBER APPLICATION CAUTION: To avoid interference between rear wheels and fenders, springs and shock absorbers must be used in following combinations.*

1954 Rear Shock Absorbers & Springs

Model	①Shock No.	②Spring No.
All (Exc. Following)	MB-18080-A,B,E	MA-5560-F③
Convertible	MB-18080-A,B,E	MA-5560-A④
Station Wagon	MB-18080-C,D,F	MA-5560-B⑤

①—Use MB-18080-G,H (Hvy Duty), when heavy duty springs used.
②—Spring number stamped on lower spring leaf.
③—Heavy Duty Spring No. MA-5560-H
④—Heavy Duty Spring No. MA-5560-J
⑤—No Heavy Duty Spring supplied.

1955 Rear Shock Absorbers & Springs

Model	①②Shock No.	④Spring No.
All (Exc. Following)	MC-18080-F	MC-5560-G⑤
Convertible	MC-18080-F	MC-5560-F⑥
Station Wagon	MC-18080-E③	MC-5560-J

①—Use MC-18080-G (Exc. Sta. Wgn.) when heavy duty springs used
②—Use MC-18080-H on Air Conditioned Cars
③—Use MC-18080-C for heavy duty use. Heavy duty springs not furnished.
④—Spring number stamped on lower leaf.
⑤—Heavy Duty Spring No. MC-5560-H,K.
⑥—Heavy Duty Spring No. MC-5560-L.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs.

See "Lincoln, Mercury, Ford (Ball-Joint)" in Front Suspension Section.

Kingpin Inclination—7° with Pos. 3/4° camber.
Caster—0° to Neg. 1-1/2°. Maximum variation between wheels is 1/2°.
Camber—0° to Pos. 3/4°. Maximum variation between wheels is 1/4°.
Toe-In—3/32" to 5/32".

Toe-Out on Turns—With outer wheel at 20°, inner wheel should be 24° (1954), 24°9' (1955).

STEERING

Manual Gear (Gemmer 305 Design). Worm & Roller type. *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Power Steering Ford-Mercury Linkage type. Used in conjunction with standard type steering gear. *See "Ford & Mercury Power Unit" in Steering Section.*

Steering Linkage. *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal. *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

Steering Gear Removal. *See "Gemmer Worm & Roller (Type 305)" in Steering Section.*

BRAKES

►*1955 FRONT BRAKE PRODUCTION CHANGE: Front brake eccentric adjustment has been eliminated on Late 1955 cars.*

Bendix Hydraulic (Single Anchor). With Eccentric (Front Wheels—See 1955 Production Change above). **Without Eccentric (Rear Wheels).** Parking lever applies rear wheel service brakes
See "Ford-Bendix (Ford, Lincoln, Mercury)" in Brake Section.
Drums—11"
Wheel Cylinder Diameter—1 1/8" (Front), 15/16" (Rear).
Lining—Molded type riveted to shoe.
Width (Front Wheels)—2" (1954); 2½" (1955). **Rear Wheels**—1¾" (1954); 2" (1955).
Length—9.28" (All Primary Shoes), 11.94" (All Secdary Shoes).
Clearance—.010" at each end of both primary and secondary shoes (.003" maximum variation).

►*1955 BRAKE ADJUSTMENT CHANGE:* Adjustment procedure on 1955 Models are affected in that eccentric cam is now spring loaded which eliminates need for locknut to retain it in position. See Production Change above also.

Braking Power—62% (Front Whls.), 38% (Rear Whls.).

Brake Pedal Free Play Adjustment: 1/4—7/16". If play not correct after brake adjustment, loosen lock nut on the eccentric bolt attaching brake pedal to master cylinder pushrod, rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of firewall.
Checking Fluid—Maintain fluid level to within ¼" of top of reservoir.
Removal—Disconnect brake line from master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and master cylinder). Unit mounted on engine side of firewall and replaces regular master cylinder.
See "Bendix Power Unit" in Brake Section.

Checking Fluid Level—Same as for regular master cylinder.

Removal of Power Unit—Disconnect valve pushrod from brake pedal assembly in drivers compartment. Remove master cylinder outlet fitting bolt from master cylinder. (*NOTE*—It is not necessary to remove stop light switch, wires or hose assembly from outlet fitting. Do not disturb outlet fitting in master cylinder). Loosen clamp securing manifold vacuum hose to check valve on power unit. Remove hose from valve. Loosen clamp securing vacuum reserve tank hose to fitting on check valve. Remove four capscrews securing power brake assembly to bracket on dash panel and remove power brake assembly.

MISC. MECHANICAL

Air Conditioning: Own. *See "Mercury Air-Conditioning" in Miscellaneous Section.*

Windshield Wipers: Vacuum, Link & Crank Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric. Reversible motor in each window. Controlled by door switch and master control switch. *See "Window Regulators" in Miscellaneous Section.*

Power Top Control: Reversible type motor (mounted under seat) drives two screw type jacks (one on each side) through flexible cables. Controlled by relay and two-way switch. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric type. Individual motor for vertical and horizontal adjustment. *See "Power Seat Adjusters" in Miscellaneous Section.*

►*SPECIAL "M 260 ENGINE" NOTE* This engine is optional equipment and has the following principal components which are special Cylinder Heads Intake Manifold and Carburetors (two 4 barrel) Camshaft Valve Train (Lifters Pushrods Springs) Fuel Pump Distributor Spark Plugs and other small parts All parts required for conversion of standard engine to this "M-260" are furnished in Optl Engine Kit No MGK-66005 AA

►*1956 AIR CONDITIONED CAR SERVICE CAUTION* *Use extreme care when disconnecting any part of air conditioning equipment or lines See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER Stamped on patent plate attached to left front body pillar extension

First Number—10001 Up

►*SERIAL NUMBER NOTE* *Serial number (example #56ME10001M#) includes following identification data in sequence*

Year	Assembly Plant	Serial No.	Eng. Type
56	See Below	10001	M

Assembly Plants— Indicated in serial number by the following codes **LA**—Los Angeles. **ME**—Metuchen. **SL**—St Louis. **WA**—Wayne.

ENGINE IDENTIFICATION: Five different engines used Engines can be identified by cylinder head identification letters (stamped or cast on outer side of cylinder head between spark plugs and exhaust ports) and color of component parts as follows

Engine HP & Compr. Ratio	Cyl. Head Ident.	Carb. Type	Air Clnr. Color	Valve Cover
210 HP(8 0-1)	ECZ-A	Holley	Red	Red
215 HP(8 4-1)	ECZ-B	Holley	Red	Red
225 HP(9 0-1)	ECZ-C	①	Blue	Blue
235 HP(9.0-1)②	ECZ-C	①	Blue	Silver
260 HP(9 75-1)		Holley (Two)		

①—Holley or Carter Carburetor.

②—235 HP replaced 225 HP engine beginning engine date code 162V as a result of camshaft production change. *See "Camshaft Production Change" under CAMSHAFT below.*

TUNE-UP

COMPRESSION PRESSURE. (8 0-1 Eng.) 155 lbs.,(8 4-1 Eng.) 160 lbs., (9 0-1 Eng.) 165 lbs. plus or minus 10 lbs at cranking speed.

VACUUM READING: 19-20" at 475-500 RPM in neutral.

TAPPET CLEARANCE: (Exc. M-260) .019" (Final HOT), Intake & Exhaust. (M-260). 018" (Final HOT), Intake & Exhaust.

►*TAPPET CLEARANCE ADJUSTING SCREW NOTE* *"Self-locking" screws used on later cars. See "Valve System" in Mercury Special Data.*

Valve Tappet Adjustment - *See 'Valve System in Mercury Special Data*

MANIFOLD HEAT CONTROL· Butterfly type valve mounted between right hand manifold and exhaust pipe (Single & Dual exhaust systems) When installing, make certain counterweight is toward right front

►*DUAL EXHAUST NOTE:* When valve closed, all exhaust gases are discharged through left hand exhaust pipe

IGNITION

►*IGNITION FAILURE CORRECTION* *Intermittent or* complete ignition failure can result if distributor primary wire is improperly welded to terminal lugs (insulated wire leads from terminal on distributor housing to breaker point terminal). In some cases terminal wires are crimped to wire insulation but not at all or partially welded to wire

FIRING ORDER 1-5-4-8-6-3-7-2

Cylinders—RIGHT BANK 1 2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP 032- 036 ' (exc M-260) 023- 028 ' (M-260 Engine)

Spark Plug—Champion 870 18mm

►*SPARK PLUG CAUTION* Spark plug has tapered seat and does not require a sealing gasket It is important that plugs be tightened within limits of 15 18 ft lbs

►*SPARK PLUG MISFIRE CORRECTION* If misfire occurs at either No 8 or No. 6 cylinders, interchange position of No 6 and No. 5 wires in all insulator blocks.

COIL **Mercury No. B6A-12029-B.** *12 Volt.*

Ignition Current—2 5 amps idling, 4 5 amps stopped

Resistor—Mercury No. B6A-12250-B On bracket attached to top of coil

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil

DISTRIBUTOR **Mercury No B6A-12127-D (exc M-260), FDS-12127-E (M-260 Engine)** *12 Volt* New double diaphragm pressure type with separate vacuum lines to manifold and carburetor

►*SHORTING OF DISTRIBUTOR TERMINAL PRIMARY WIRE ASSEMBLY CORRECTION* Screws which secure identification plate to housing extend inside housing and penetrate primary wire insulation, grounding wire Sharp points should be ground or filed off, replace damaged wire

Condenser—Mercury No FAB-12300-A **Capacity** 21-25 microfarad

Contact Point Set—Mercury No FAB-12171-B

Breaker Gap— 014 016

Cam Angle—26-28 5°

Breaker Arm Spring Tension—17 20 ozs

Rotation—Counter-clockwise viewed from above

Advance Performance—B6A-12127-D

►With Distributor on Test Stand

Distr Degrees	Vacuum (of HG)	Distr RPM
Plus or Minus ½	16	300
0-1	29	400
5½-6½	88	800
8½-9½	1 27	1200
11-12	1 73	1600
13-14¼	2 19	2000

►*DISTRIBUTOR INSTALLATION NOTE* It may be necessary to crank engine slightly if distributor is not seated properly in cylinder block Crank engine, while holding distributor down, until intermediate shaft is engaged and distributor drops into place

Initial Distributor Timing· Remove No 1 spark plug Hold thumb over spark plug hole until piston starts up on compression Slowly "bump" engine over with starter until timing mark is aligned with pointer Find No 1 spark plug socket in distributor cap and fit fit distributor cap to distributor housing Mark distributor housing to indicate No 1 spark plug wire position Position rotor approximately 20° counter-clockwise from mark made on distributor housing Engage distributor drive gear and install distributor in engine

IGNITION TIMING

Engine	①Std Setting
With Synchro-mesh or Overdrive	3° BTDC
With Merco-Matic Trans	6° BTDC
"M 260" Engine	12° BTDC

①—With engine idling at 475 RPM and the PRIMARY (inner diaphragm) vacuum line disconnected. *See Initial Distributor Timing abov NOTE*—Maximum recommended initial timing for Standard and Overdrive Transmissions is 6° BTDC

Timing Mark—Crankshaft pulley is marked at TDC, 10° BTDC, and 20° BTDC, with marks at 2° increments between Pointer should line up with third mark (6°) on vehicles equipped with automatic transmissions, and half-way between first and second marks (3°) on vehicles equipped with standard transmissions

CARBURETOR

►*CARBURETOR APPLICATION NOTE* *All carburetors are 4-barrel type. Holley used on 210 & 215 HP Engines, Holley or Carter WCFB used on 225 & 235 HP Engines. TWO Holley carburetors used on special M-260 engine.*

►*HOLLEY CARBURETOR PRODUCTION CHANGES AND RECOMMENDED CHANGES FOR IMPROVED CHOKE OPERATION & HARD STARTING CORRECTION* *See "Holley (Ford, Lincoln, M rcury) 4-Barrel Centri-Quad" in Carburetion Section*

►*AUTOMATIC CHOKE STICKING (Hard Starting, Stalling, Poor Gas Mileage, or Backfiring when cold)* *May be caused by breakage of Fresh Air Heat Tube in manifold. For installation of tube, see 'Ford, Lincoln, Mercury 4-Barrel Centri-quad' in Carburetion Section*

►*IMPROPER UNLOADER ACTION (MERCOMATIC CARS)* May be caused by transmission control-to-accelerator bellcrank-to-lever spring of less than required load resulting in choke valve not opening sufficiently to unload carburetor. Replace spring with spring Part No. MC-7345B (painted Yellow) *NOTE* - This condition may also cause transmission to downshift prior to reaching detent position during heavy throttle operation

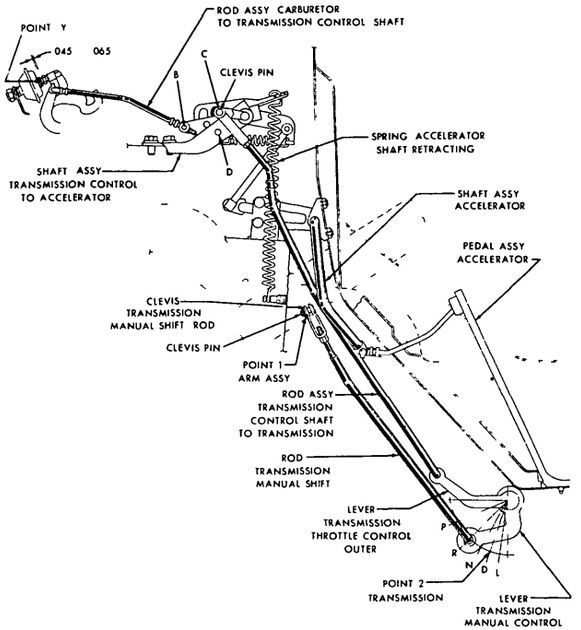
►*IDLE SPEED (AIR CONDITIONED CARS)* Automatic throttle control is incorporated on air conditioned cars and is adjusted as follows With engine warm, air conditioning system operating, and transmission in neutral, adjust knurled nut at end of operating rod of the control assembly to obtain an idle speed of 800 RPM, tighten locknut Check idle to make sure that it returns to normal whenever air conditioning is turned off or the transmission is shifted out of neutral

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►*CARBURETOR THROTTLE LEVER BINDING OR STICKING CORRECTION:* To correct, drive choke fresh air tube into manifold fitting until it bottoms. If this does not correct condition, remove choke fresh air tube and cut approximately ¼" from manifold end of line to provide sufficient clearance for throttle lever. Remove burrs from end of line before installing in manifold fitting.

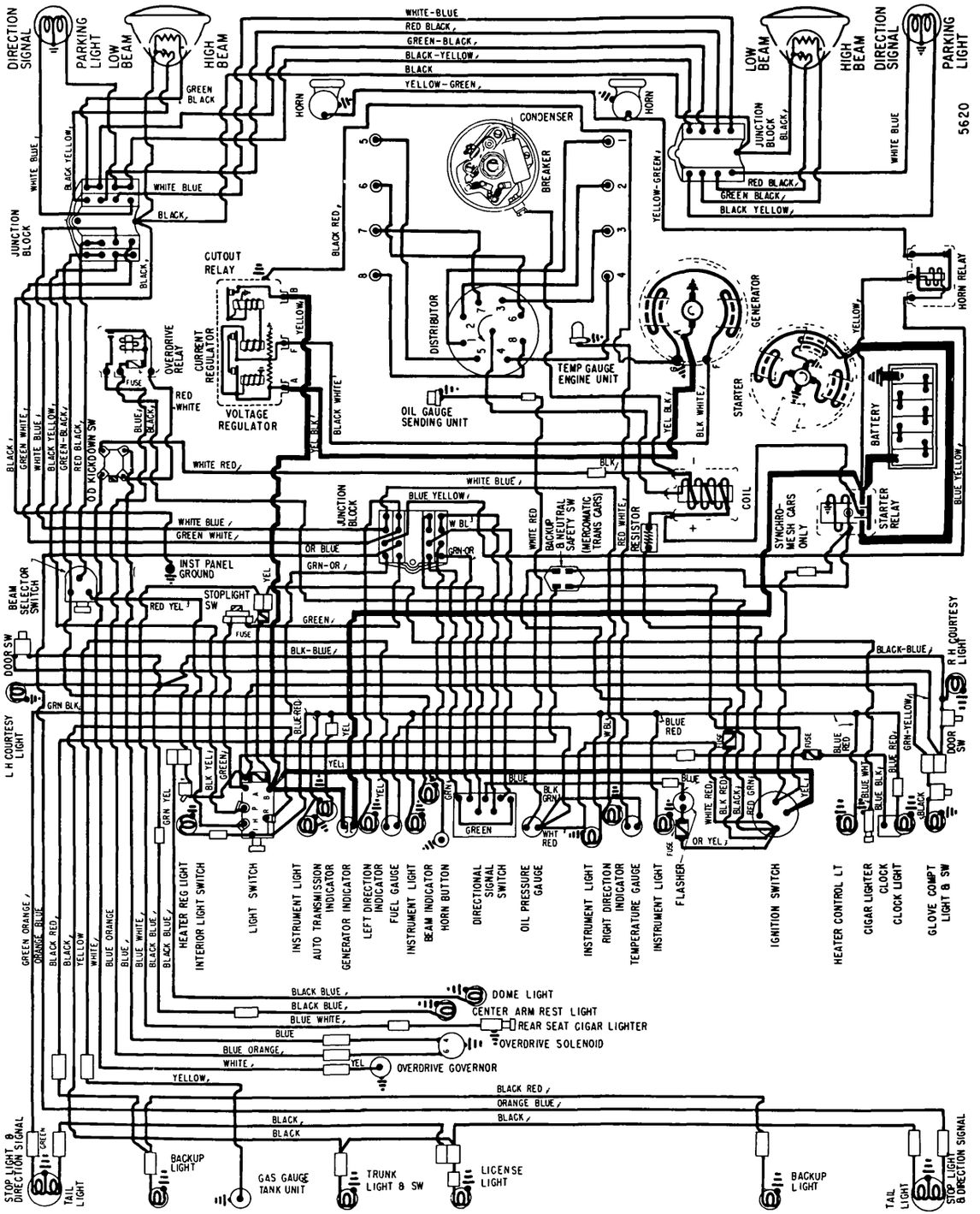
►*COLD HARD STARTING CORRECTION (Early Cars):* A few early Holley Carburetors built before 3rd week in September, 1955 (date code is shown on accelerator pump tower of float bowl cover—Example: 5-9-3 means 1955, September, 3rd week). To correct this condition, turn automatic choke cover clockwise three (3) additional notches.



MERC-O-MATIC THROTTLE LINKAGE

Thr ttl Linkag Adjustm nt (Merc-O-Matic Cars): Set hand brake and adjust engine idle to 425 RPM with engine at normal operating temperature and transmission in "DR" range. Adjust anti-stall dashpot (see below). Disconnect clevis pin from transmission control-to-accelerator shaft and transmission control shaft-to-transmission rod assembly. Disconnect carburetor-to-transmission control shaft rod at carburetor. Insert gauge pin through bellcrank and bracket in transmission control-to-accelerator shaft assembly. Set carburetor at low idle manually. Adjust carburetor-to-transmission control rod assembly so that with trunnion pin in place at rear end of rod, trunnion pin at carburetor end

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will go in freely. Assemble in this position. With gauge pin locking bellcrank, pull upward gently but firmly on transmission control shaft-to-transmission rod assembly. This will position the throttle lever in the stop position at the transmission. Adjust clevis at upper end of transmission control shaft-to-transmission rod assembly so that clevis pin enters clevis and lever on transmission control-to-accelerator shaft assembly freely. Lengthen transmission control shaft-to-transmission rod assembly by turning clevis 3 full turns counter-clockwise and assemble in place. Remove gauge pin.

Dashpot Adjustment: Turn throttle lever set screw out until dashpot plunger bottoms, then back it off to give .045-.064" clearance between end of screw and plunger.

HOLLEY 4-BARREL

Mercury No. B6A-9510-L, M, N, Q. 4-Barrel carburetor with integral automatic choke. *M-260 NOTE* - Two 4-Barrel Carburetors, Part No. EDB-9510-C, used.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8. LEFT barrels 1-4-6-7.*

Idle Setting—Preliminary setting 1¼ turns open (set both screws alike). With engine at normal operating temperature, turn one screw at a time out until engine begins to roll from richness, then turn screw in just enough to provide smoothest idle performance.

Idle Speed—475-500 RPM (Std. & O.D.); 425-450 RPM (Merc-O-Matic), in "DR" position.

Throttle Linkage Adjustment (Merc-O-Matic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Ford, Lincoln, Mercury 4-Barrel Centri-quad" in Carburetion Section.*

Fuel Pump Pressure: 3½-5½ lbs. at 500 RPM.

CARTER WCFB 4-BARREL

Carter No. 2361S, SA (Merc-O-Matic Cars). 4-Barrel, downdraft type with automatic choke. *NOTE* - Carburetor is Mercury No. ECZ-9510-D.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—Preliminary setting 1¼ turns open (set both screws alike). With engine at normal operating temperature, set idle speed (see below). Turn one one screw at a time out until engine begins to roll from richness, then turn screw in just enough to provide smoothest idle performance.

Idle Speed—425-450 RPM, with selector lever in "DR" position.

Throttle Linkage Adjustment (Merc-O-Matic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel" in Carburetion Section.*

Fuel Pump Pressure: 3½-5½ lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Mercury No. B5A-9350-D. Fuel & Vacuum.
Pressure – 3½-5½ lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.
Gas Line Gauge: King-Seeley Electric type.
Dash Unit – Mercury No. FDT-9280-A.
Tank Unit – Mercury No. B6A-9275-B (Sta. Wgn.), B6A-9275-C (Others).
See "Fuel Gauges" in Carburetion Section.

BATTERY

Mercury No. FDT-10655-C. *12 Volt,* 11 plate, 55 ampere hour capacity (20 hr. rate), **or FDU-10655-C.** *12 Volt,* 13 plate, 65 ampere hour capacity (20 hr. rate).
Battery Ground – Negative, to engine block.
►*CAUTION – This is reversed from previous models.*
Engine Ground – Cylinder head to dash.

STARTER

Mercury No. B6A-11002A. *12 Volt.* **Armature** B6A-11005-A.
►*NOISY STARTER MOTOR (Merc-O-Matic with Steel Torque Converter):* May be caused by starter motor seal, No. EBU-6436B, improperly installed or cocked.
Drive – Mercury No. 1CM-11350-C. Bendix "Folo-Thru".
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 48-56 ozs.
Cranking Speed – 150-180 RPM with warm engine.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4800 max.	12.0	100-120
	150-180 Ⓒ	8 or more	210 max.

Ⓒ – Cranking speed with warm engine.

Starting Switch: Relay, Part No. B6A-11450-A, controlled by Ignition and Starter Switch, Part No. B5A-11572-A, and Merc-O-Matic Neutral Safety Switch located on steering column.
►*SELF-STARTING OF ENGINE OR CONTINUOUS OPERATION OF BACK-UP LIGHTS:* May be caused by contact fingers of Neutral Switch Terminal Block touching brass strip on insulator assembly. Correct by installing new Neutral Switch Insulator Assembly No. FDK-15827-B (same number as original type) with two .020" high ridges on each side and parallel to brass strip.
Merc-O-Matic Neutral Safety Switch Adjustment: *See "Fordomatic & Merc-O-Matic" in Transmission Section.*

GENERATOR

Mercury No. B6A-10002-A. *12 Volt.* **Armature** B6A-10005-A.

Performance Data

Amperes	Volts	Gen. RPM
30	15	Ⓒ 2500

Ⓒ – At 1500 Engine RPM.
Brush Spring Tension – 26-34 ozs.
Field Current – 1.5-1.6 amps. at 15 volts (Hot).
Rotation – Counter-clockwise at commutator end.
Belt Adjustment: Approximately ½" deflection on belts midway between generator and pump pulleys with normal thumb pressure.

REGULATOR

Mercury No. B6A-10505-A. *12 Volt.*
►*SETTING NOTE:* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75° F.

Cut out Relay
Cuts In – 12.0-12.8 volts.
Cuts Out – 2.0-6.0 amps. (reverse current).

Voltage Regulator
Setting – 14.6-15.4 volts.
Checking & Adjusting – *See Electrical Section.*

Current Regulator
Setting – 28-32 amperes.
Checking & Adjusting – *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signals: *See Electrical Section.*
Automatic Headlight Dimmer: *See Electrical Section.*
Lighting Switch Removal: With control knob in "OFF" position, press spring release button on switch housing, turn shaft slightly and pull knob and shaft out of switch. Remove screw assembly from inside bezel. Remove bezel, spacer, then remove switch from behind dash panel.
Stop Light Switch Location: On forward end of brake master cylinder (integral with power brake unit). Master cylinder or power brake unit located on firewall in engine compartment.
FUSES: Interior Lights – SFE 7.5 amps. On light switch.
Turn Signals – SFE 7.5 amps.
Heater Blowers – SFE 14 amps.
Radio – SFE 7.5 amps.
Clock – AG 1 amp.
Cigar Lighter – AGC 15 amps.
Overdrive – AGC 15 amps.
Windshield Washer – SFE 7.5 amps.
Back-Up Lights – SFE 7.5 amps.
Spotlight – SFE 7.5 amps.
Glove Box Light – SFE 7.5 amps. (on interior light circuit).
Automatic Headlight Dimmer – AGC 3 amps.
Multi-Luber – SFE 7.5 amps.
CIRCUIT BREAKERS: Lighting – On headlight switch. Combination headlight switch, circuit breaker and fuse assembly. One circuit breaker protects headlight circuit and second circuit breaker protects auxiliary lights. Fuse protects interior lighting circuit.
Windows & Seats – One 15 ampere circuit breaker for each window motor. One 15 ampere circuit breaker common to both seat motors.
Convertible Top – 30 ampere circuit breaker.
Underhood Lights – 12 ampere circuit breaker.
Air Conditioning – 15 ampere circuit breaker. *NOTE* - 20 ampere circuit breaker should be used if temperatures extremely high. Replace blower switch feed wire from 18 to 16 gauge.
HORNS: Dual horns operated by relay.

Type	High Pitch	Low Pitch
Sea Shell	B5T-13832-B	B5T-13833-B
Trumpet	FDT-13832-B	FDT-13833-B

Horn Relay – Mercury No. 2Q-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care before disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Section.*
ENGINE SPECIFICATIONS: 90° V8 (All Models). *See "Engine Identification" Note "under MODEL IDENTIFICATION above.*

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Engin	3 r	Str k	Displac m nt
All	3.80"	3.44"	312 cu. ins.

Engine	C mpr. Ratio	Rated HP	Developed HP
ECZ-6007-F	8.0-1 ①	46.2	210 at 4600 RPM
ECZ-6007-F	8.4-1 ②	46.2	215 at 4600 RPM
ECZ-6007-F,G④	9.0-1 ③	46.2	225 at 4600 RPM
ECZ-6007-F,G④	9.0-1 ③	46.2	235 at 4600 RPM
M-260	9.75-1	46.2	260

① – Head marked "ECZ-A".
② – Head marked "ECZ-B".
③ – Head marked "ECZ-C".
④ – ECA-6007-F (Holley Carb.), ECZ-6007-G (Carter).

C mpressi n & Vacuum R ading – *See TUNE-UP above.*

CYLINDER HEAD: *See "Cylinder Head & Manifold in Mercury Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data.*

ENGINE REMOVAL: S *"Engine" in Mercury Spec.Data.*

OIL PAN REMOVAL: Remove oil inlet pipe hex fittings at oil pump and side of oil pan, remove pipe. Remove oil pan capscrews, then remove oil pan and gasket.

NOTE - When this operation is performed, turn crankshaft until rear counterweights of crankshaft are up. The oil pan can then be removed from front of engine.

PISTONS

Aluminum alloy, Autothermic, solid skirt type with three rings above pin. *NOTE* - Pin is offset in piston.

►*ORIGINAL BORE & PISTON SIZES:* Std. cylinder bore limits are 3.8000-3.8024" and TWO Std. pistons used for selective fitting as follows: 3.7993-3.7996" Diam-(marked "2" on dome), and 3.8005-3.8008" Diameter (marked "6" on dome). *NOTE* - Std. piston furnished for service in these two sizes.

Removal – Pistons and rods removed from above.

Fitting N w Pistons: Use 1/2" wide feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side. Feeler thickness as follows.

N w Pist n in N w Bor –.0015" feeler. 5-10 los. pull.
N w Piston in Us d B r –.002" feeler. 5-10 lbs. pull.
Us d Pist n in Us d B r –.0025" feeler. 5-10 lbs. pull.

Replac ment Pistons: Standard (Two sizes - see Original Bore & Piston Sizes above), .0225", .0325", .0425" Oversize. Pistons are furnished with fitted pins.

Installing Pistons: Indentation or notch on top of piston must face toward front of engine. *See Rod Installation.*

PISTON PINS

Cl aranc in Pist n – .0001-.0003" loose. Select fit. Service maximum - .0008".

Cl aranc in R d – .0001-.0003" loose. Select fit. Service maximum -.0008".

R placem nt Pins: Std. (Green), .001" O.S. (Blue), .002" O.S. (Yellow).

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	5/64"	.012-.029"	.006" max.
Compr. (2)	3/32"	.012-.019"	.006" max.
Oil (3)	3/16"	.015-.029"	①

① – Side sealing type ring

SPACING NOTE – Ring gaps should be placed 120° apart, with oil ring gap positioned so it will be on inside of "V" (high side of cylinder bore).

R placem nt Rings: Standard size, .020", .030", .040" Oversize.

CONNECTING RODS

►*ROD INSTALLATION CAUTION: Previous installation procedures have been superseded. See "Installing Rods" below.*

Journal Diameter – 2.1880-2.1884" (Color coded BLUE), 2.1884-2.1888" (Color coded RED). Use with bearing of same color.

Out-of-Round Limit – .0005". **Taper Limit** - .001".

Lower Bearing – Steel backed, copper lead lined. Upper and lower halves interchangeable.

Clearance – .0008-.0027". Service Limit .0037".

Side Clearance – Service maximum .019" (two rods).

Replacement Bearings: Standard (two sizes color coded RED and BLUE for selective fitting), .010", .020", .030" Undersize.

Installing Rods: Assemble rods to pistons with oil squirt hole in lower end of rod toward right (right bank rods numbered 1-2-3-4), toward left (left bank rods numbered 5-6-7-8) with indentation on piston head toward front of engine (all pistons). Install piston and rod assemblies in engine with numbered side of rod and bearing cap together, facing toward outside of block, and in same numbered cylinder.

CRANKSHAFT

►*1956 CRANKSHAFT PRODUCTION CHANGE (To minimize oil leaks at front and rear oil seals):* New crankshaft, No. B6A-6303C, used with separate Front Oil Slinger, No. B6A-6310B. Slingers will divert oil away from seals. *1955 NOTE* - Same design crankshaft, No. B6A-6303D, furnished for installation in 1955 cars with same Front Oil Slinger, No.B6A-6310B.

Journal Diameters – 2.6235-2.6239" (Color coded BLUE), 2.6239-2.6243" (Color coded RED).

Out-of-Round Limit – .0005". **Taper Limit** – .001".

Bearings – Steel-backed, copper lead lined.

Clearance – .0008-.0026". Service limit .0036".

Replacement Bearings: Std. size (two sizes color coded RED and BLUE for selective fitting), and .010", .020", .030" Undersize.

End Thrust: Taken by No. 3 main bearing.

Thrust Bearing Alignment – *See "Crankshaft & Main Bearings" in Mercury Special Data.*

Endplay – .010" maximum.

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

CAMSHAFT

►*CAMSHAFT PRODUCTION CHANGES:* Four different camshafts used in production and can be identified as follows.

Engine	Camshaft No.	① Identification
Early Engines (All)	B6A-6250B	ECK
Later 210 & 215 HP	B6A-6250C	ECZ
First 235 HP	EDB-6250B	② ECK
Later 235 HP	EDB-6250C	③ ECK

① – Cast in shaft.
② – Letter "E" stamped on hub end also.
③ – Letter "C" stamped on hub end also.

See "Valves" & "Valve Timing" below for camshaft differences.

J urnal Diamet r – 1.9255-1.9265".

Cl aranc – .001-.006".

End Thrust: Taken by thrust plate on forward end (between camshaft sprocket and shoulder on block).

Endplay – .003-.012".

Replacement Camshaft Bearings: Finished bearings furnished Standard size, .015" Undersize. *CAUTION– Oil holes in bearings must be lined up correctly.*

Camshaft Removal & Installation - *See "Camshaft & Bearings" in Mercury Special Data.*

Timing Chain: Side-guide type. Length 56 links.

►*REPLACEMENT NOTE:* Replace timing chain and sprockets when deflection on shaft side exceeds 1/2" (take up all slack on driving side, measure slack on opposite side). Remove and install chain "endless" as a unit with both sprockets.

Camshaft Setting: Marks on both sprockets should be aligned with similarly marked links on timing chain with both marks toward **left** side of engine (at 3 o'clock facing front of engine after installation made).

Timing Chain Cover Seal Installation (Crankshaft Front Oil Seal): *See "Engine Front Cover" in Mercury Special Data.*

VALVES

►*EXHAUST VALVE STEM DIAMETER CHANGE:* Later production exhaust valves have .0005" smaller stem diameter for increased stem clearance. *See "Valve System" in Mercury Special Data.*

►*VALVE PUSHROD REPLACEMENT CAUTION:* 1956 valve pushrods are shorter than 1954-55 pushrods (similar in appearance) and must not be interchanged. 1956 rods can be identified by two parallel radial ridges on outside of adjusting screw socket end and length of 7.98" plus or minus .010" (1954-55 rod length is 8.11" plus or minus .010").

Tappet Clearance: (Exc. M-260) –.019" (Final HOT), Intake & Exhaust. (M-260) .018" (Final HOT), Intake & Exhaust.

►*TAPPET CLEARANCE ADJUSTING SCREW NOTE: "Self-locking" screws used in rocker arms on later cars. See "Valve System" in Mercury Special Data.*

Valve Tappet Adjustment - *See "Valve System" in Mercury Special Data.*

Valve	Head Diam.	Stem Diameter ①
Intake	1.775-1.785"	②.3415-.3420" or ③.3420-.3425"
Exh.	1.505-1.515"	②.3400-.3405" or ③.3405-.3410"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	④	⑤ .001-.002"
Exhaust	45°	④	⑥ .0025-.0035"

① – Furnished with .003", .015", .030" oversize stems.
② – Color coded RED. Use in RED valve guides.
③ – Color coded GREEN. Use in GREEN valve guides.
④ – See special table below.
⑤ – Service limit .0045".
⑥ – Service limit .0065".

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Cam Lobe Lift
(6BA-6250B & C Camshaft)

Valve	Normal Lift	⑥ Service Limit
Intake	.264"	.259" min.
Exhaust	.262"	.257" min.

(ED8-6250B Camshaft)

Intake & Exhaust	.278"	.273" min.

(ED8-6250C Camshaft)

Intake	.272"	.267" min.
Exhaust	.285"	.280" min.

⑥ – Replace camshaft if lift less than minimum.

Valve Seat Width – 1/16-5/64" (Intake), 5/64-3/32" (Exhaust).

Valve Stem Oil Seals – "Umbrella" type oil seals used on all valves. Seals are installed with cupped side down on valve stem at guide boss on cylinder head. *Install new seals whenever valves removed or when seals become loose on valve stems.*

Valve Springs Free Length – 2 09" approximately.

Valve Spring Specifications

	Pressure	Length
Valve Closed	64 lbs	1 780"
Valve Open	145 lbs.	1 390"

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" Intake, .005" Exhaust), ream guides and install oversize valves. *See "Valve System" in Mercury Special Data.*

Valve Lifters Mushroom type. Removed from below with camshaft removed.

Rocker Arm Assembly *See "Valve System" in Mercury Special Data.*

► *ROCKER ARM & ADJUSTING SCREW PRODUCTION CHANGE* New "self-locking" adjusting screws used on later cars with new design rocker arms. Can be installed as an assembly on earlier engines. *See "Valve System" in Mercury Special Data.*

► *TORQUING NOTE (NEW TYPE ROCKER ARMS)* Torque valve adjusting screw to 7-15 ft. lbs. With each valve adjustment this will decrease. When it reaches 3 ft. lbs., rocker arm should be replaced or self-locking screw removed and standard valve adjusting screw and locknut should be installed.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

► *VALVE TIMING NOTE The following valve opening and closing points are with a camlift as indicated in notes following tables.*

210, 215, 225 HP Eng. Valve Timing
(With 6BA-6250B & C Camshaft)

Intake Valves – Open 12° ①BTDC, Close 54° ② ALDC
Exhaust Valves – Open 58° ③BLDC, Close 8° ④ATDC
① – Camlift .016". ③ – Camlift .015".
② – Camlift .019" ④ – Camlift .018".

235 HP Eng. Valv Timing
(With ED8-6250-8 Camshaft)

Intake Valv s – Open 22° ①BTDC, Close 58° ①ALDC
Exhaust Valv s – Open 58° ①BLDC, Close 14°①ATDC.
① – Camlift .015".

235 HP Eng. Valv Timing
(With EDB-6250-C Camshaft)

Intake Valv s–Open 18° ① BTDC. Close 58° ① ALDC.
Exhaust Valves–Open 66° ② BLDC. Close 10° ③ ATDC.
① –Camlift .015". ②–Camlift .014". ③ – Camlift .017".

Valve Timing Check–Slide rocker arm to one side and install a dial indicator so reading can be taken from end of valve push rod (use an indicator that will read .300" or more). Install a quadrant (reading in degrees) on crankshaft pulley to check amount of crankshaft rotation. Rotate engine slowly until dial indicator reading for valve being checked is same as indicated in table above. Amount of crankshaft rotation should be the same as shown in valve timing table.

OILING SYSTEM

► *ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.*

► *OIL LEVEL INDICATOR CAUTION* Two different oil level indicators used. With air conditioning, indicator has expanded anti-rattle section adjacent to tube cover, and distance from cover to "Full" mark is 20.94". On cars **not** equipped with air conditioning, anti-rattle section is half-way down to "Full" mark and distance from cover to "Full" mark is 21.35".

Crankcase Capacity 5 qts. (refill). Add one quart when filter changed.

Normal Oil Pressure 45-50 lbs. at 2000 RPM (Hot)
Pressure Regulator Valve – In pump body. Not adjustable.

Oil Pressure Indicator King-Seeley Electric type.
Dash Unit – Mercury No. FDT-9273-A.
Engine Unit – Mercury No. B6A-9278-A.
See "Oil Pressure Gauges" in Miscellaneous Section.

Oil Pump Gear or rotary type pump. Located on left side of engine crankcase and driven by distributor drive gear. **Pump Overhaul** – *See "Oiling System" in Mercury Special Data*

Oil Filter Full-flow type with pressure relief valve in center filler bolt. Replace filter element at 4000-5000 mile intervals or when oil becomes dirty or polluted. *See "Oiling System" in Mercury Special Data.*

Replacement Filter Element–Mercury No. HCK-6731-A (Kit includes new gaskets).

► *CAUTION Special "full-flow" filter element must be used for service replacement (use of by-pass type filter element will restrict engine oil flow and result in insufficient engine lubrication).*

Crankcase Ventilation Filter in oil filler cap (inlet) and road draft tube Clean and oil every 2,000 miles or more often in dusty areas

COOLING

Water Capacity 19 qts. (total capacity), 18 qts.(recommended capacity). Add 1 quart for heater.

Pressure Valve Mercury No. LA-8100-A (12-15 lbs.). Radiator filler cap.

► *THERMOSTAT INSTALLATION NOTE* Install thermostat with word "TOP" up and toward front of engine to prevent a retarding of flow of coolant.

Wat r Pump· Packless, sealed ball bearing type.
Se "Wat r Pumps" in Mercury Sp cial Data.

Temp ratur Gaug King-Seeley Electric type.
Dash Unit – Mercury No. FDT-10883-A.
Engin Unit – Mercury No. B6A-10884-A.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10A6. Single plate, dry disc type.

Part	Borg & Beck No.	M rcury No.
Assembly No.	361354	MC-7563-B
Disc No.	382175	MC-7550-A

Pedal Adjustment: If pedal free travel is not 1 to 1-1/4", loosen clutch pedal release rod locknut (lower end) and turn adjusting nut for correct free travel, tighten locknut.

Removal: Remove transmission (see Transmission Removal below), and disengage clutch pedal retracting spring and release rod from clutch release lever. Disengage equalizer bar tension spring and remove two capscrews retaining equalizer bracket assembly to flywheel housing. Remove flywheel housing. Mark position of flywheel and pressure plate so parts may be installed in original position. Compress clutch pressure plate assembly with Tool 7563. Remove capscrews, pressure plate and disc.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second and high), sliding gear (low and reverse).
See "Mercury Synchro-mesh" in Transmission Secti n.

► *20-45 MPH DRIVELINE RINGING NOISE CORRECTION* New sound-deadened driveshaft, Part No. MC-4602-F (Exc. Sta. Wgn.), MC-4602-G (Sta. Wgn.) is available to correct above condition on 1955-56 cars.

Transmission Control *See "Transmission Controls" in Transmission Section.*

Removal· If equipped with overdrive, remove kickdown switch retainer nut and push switch through floor. Raise car and drain transmission. On overdrive cars remove governor, solenoid, and control cable. Disconnect speedometer cable and remove speedometer drive gear. Remove transmission shift rods at transmission. Remove bolts retaining rear universal joint to companion flange and remove drive shaft. Support rear of engine and remove the detachable cross-member of the frame. Remove two top capscrews retaining transmission to flywheel housing and install a couple of studs to act as guide pins. Remove lower capscrews and slide transmission to rear as far as possible and lower front end. Remove from below car.

► *SINGLE EXHAUST SYSTEM NOTE* When removing transmission, it will be necessary to remove nuts that secure muffler inlet and exhaust pipes to exhaust manifold, and to remove manifold outlet pipe from mounting bracket at rear of manifold and move exhaust system away from working area.

OVERDRIVE

Warner Model AS1-R10F. Solenoid operated type, with governor control and throttle operated kickdown. Lockout Switch not used on this model.
See "Warner R10 Overdrive" in Transmission Section.

R moval Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

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MERC-O-MATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock.

See "Fordomatic & Mercomatic" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Fordomatic & Mercomatic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING. See "Fordomatic & Mercomatic" in Transmission Section*

Lubricati n – Check transmission oil level every 2000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 16,000 miles. **Use only Automatic Transmissi n Fluid Type A.**

Ch cking Fluid L vel–Apply parking brakes, place transmission selector lever in "N" (Neutral) position, run engine at idle speed for approximately four minutes. With parking brake applied and engine running at slow idle, move selector lever to "P" (Parking) position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission. Return selector lever to "P" position. Raise hood, clean dirt away from fluid level cap, remove indicator, wipe clean and insert in tube (make sure indicator is pushed all the way down). Remove indicator and read level. Add sufficient fluid to raise level to "Full" mark on indicator.

Thr ttl Linkage Adjustment: *See CARBURETOR above*

►*OTHER MERCOMATIC SERVICE DATA See "Fordomatic & Mercomatic" in Transmission Section.*

UNIVERSALS

M chanics. Needle bearing type.

PROPELLER SHAFT

►*DRIVE LINE THUMP CORRECTION* Caused by lubrication build-up in front universal joint Correct by tapping and installing relief valve (5-25 lbs) using 1/8" pipe tap to cut threads in expansion plug of front universal slip joint DO NOT cut threads too deeply in plug as valve will interfere with output shaft

REAR AXLE

Own. Integral carrier, semi-floating hypoid type with Hotchkiss Drive

See "Ford, Lincoln, Mercury (Integral Carrier)' in Rear Axle Section.

►*REAR AXLE "CLUNK' & "SQUEAK' CORRECTION See Ford, Lincoln, Mercury (Integral Carrier)" in Rear Axle Section.*

Transmissi n	Ratios Standard	Optional
Merc-O-Matic (Sta Wgn)	3 54 1	3 15-1
Merc-O-Matic (Others)	3 15-1	3 54-1
Synchro-mesh (Sta Wgn)	4 09-1	3 73-1
Synchro-mesh (Others)	3 73-1	4 09-1
Overdrive (All)	4 09-1	3 73-1

Backlash – .003-.008"

Axl Shaft R m val Remove wheel and brake drum Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange) Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Rear Axle Assembly Removal Raise rear end of car and disconnect rear universal. Remove axle shafts. Disconnect brake lines at "T" on left side of axle housing. Disconnect hand brake cable, shock absorbers, spring U-bolts and shackles. Remove axle housing assembly from car.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Front Shock Absorbers

Model	Standard	Heavy Duty
All (Exc.Sta.Wgn.)	MC-18045-F,H	MC-18045-B,K
Station Wagon	MC-18045-E,J	MC-18045-C,L
All (Exc. Conv.& Sta.Wgn.)		MC-18045-G

Rear Shock Absorbers

Model	Standard	Heavy Duty
All (Exc.Sta.Wgn.)	MC-18080-F,J	MC-18080-G,L
Station Wagon	MC-18080-E,K	MC-18080-C,M
All (Exc.Conv.& Sta.Wgn.)		MC-18080-H

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs.

See "Lincoln, Mercury, Ford (Ball-Joint)" in Front Suspension Section.

Kingpin Inclination–7° with Pos. 3/4° camber.

Caster–0° to Neg. 1-1/2°. Maximum variation between wheels is 1/2°.

Camber–0° to Pos. 3/4°. Maximum variation between wheels is 1/4°.

Toe-In–3/32" to 5/32".

Toe-Out on Turns – With front wheels at maximum turning angle, outer wheel should be 27°40' (Exc. Conv.), 26°50' (Conv.), and inner wheel should be 38° (Exc. Conv.), 36° (Conv.).

STEERING

Manual, Gemmer 2 & 3-Tooth Worm & Roller (Early), **Saginaw** Recirculating Ball Nut type (Later).

See "Gemmer Worm & Roller" or "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering Ford-Mercury Linkage type. Used in conjunction with standard type steering gear.

See "Ford & Mercury Power Unit" in Steering Section.

Steering Linkage *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" or 'Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal *See "Gemmer Worm & Roller' or 'Saginaw Ball Bearing Worm & Nut' in Steering Section.*

BRAKES

Bendix Hydraulic, Singl Anchor (Without eccentric and fixed anchor pins). Parking lever applies rear wheel service brakes.

See "Ford, Lincoln, Mercury B ndix" in Brake Section.

Drum Diameter – 11" front and rear

Wh el Cyl. Diam ter – 1 1/8' (Front), 7/8" (Rear)

Lining – Molded type riveted to shoe.

Width – 2½" (Front wheels), 2" (Rear wheels) **Thickness** - 3/16".

Braking Power – 55 5% (Front), 44.5% (Rear)

Clearance – Adjusting screw backed off 12 to 14 clicks from point where shoes are tight against drum

Brake Pedal Free Play Adjustment 1/4–7/16". If play not correct after brake adjustment, loosen lock nut on the eccentric bolt attaching brake pedal to master cylinder pushrod, rotate eccentric bolt.

Standard Master Cylinder: on engine side of firewall.

Checking Fluid–Maintain fluid level to within ¼' of top of reservoir.

Removal–Disconnect brake line from master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes Bendix Vacuum Power Unit (combination vacuum power unit and master cylinder). Unit mounted on engine side of firewall and replaces regular master cylinder.

See "Bendix Power Unit" in Brake Section.

►*1956-57 MERCURY (312" ENGINE) POWER BRAKE VACUUM ASSIST FAILURE:* This may be caused by the power brake vacuum check valve in intake manifold swelling shut and cutting off manifold vacuum to power brake unit Install a new type check valve, Part No MG-22049-A, identified by groove around middle of hex part of valve When installing the later type valve, also install a 3/8" x 45° elbow, Part No 353779-S between manifold fitting and check valve.

Checking Fluid Level–Same as for regular master cylinder.

Removal of Power Unit–Disconnect valve pushrod from brake pedal assembly in drivers compartment. Remove master cylinder outlet fitting bolt from master cylinder. (*NOTE*–It is not necessary to remove stop light switch, wires or hose assembly from outlet fitting. Do not disturb outlet fitting in master cylinder). Loosen clamp securing manifold vacuum hose to check valve on power unit. Remove hose from valve. Loosen clamp securing vacuum reserve tank hose to fitting on check valve. Remove four capscrews securing power brake assembly to bracket on dash panel and remove power brake assembly.

MISC. MECHANICAL

Windshield Wipers: Vacuum, Link & Crank Arm type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators· Electric Reversible motor in each window. Controlled by door switch and master control switch. *See "Window Regulators" in Miscellaneous Section.*

Power Top Control· Electric Hydraulic with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

P w r S at Adjusters Electric type. Individual motor for vertical and horizontal adjustment. *S "Pow r S at Adjusters" in Misc llan ous S ction.*

Air C nditi ning *See Lincoln & Mercury Air Conditioning in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate attached to left front body pillar extension.
First Number - 10001 up.

► *SERIAL NUMBER NOTE: The serial number (example *57LA10001M*) includes following identification data in sequence.*

Year	Assembly Plant	Serial No.	Vehicle Name
57	See below	10001	① M

① - "M" indicates Mercury.
Assembly Plants - Indicated in serial number by following code: **LA** - Los Angeles. **ME** - Metuchen. **SL** - St. Louis. **WA** - Wayne.

► *ENGINE IDENTIFICATION:* Two different engines used: "ECZ" Safety-Surge 312 cu. ins., and "ECU" Jato-Thrust 368 cu. ins. Specifications below are marked "ECZ" or "ECU" for each particular engine.

TUNE-UP

► *INTERMITTENT ENGINE MISS:* May be caused by distributor primary lead shorting out through nylon insulation. Correct by taping lead with rubberized tape.

COMPRESSION PRESSURE: (ECZ) 170 lbs., **(ECU)** 160 lbs. at cranking speed of 150-180 RPM. *NOTE* - Supersedes previous specification of 165 and 160 lbs.

VACUUM READING: (ECZ) 19-20", **(ECU)** 18-19" with engine idling at 475 RPM in neutral.

VALVE TAPPET CLEARANCE: (ECZ) .020" (Intake & Exhaust COLD), .019" (Intake & Exhaust HOT). If adjusted while engine Cold, recheck with engine Hot (after 30 minutes operation to normalize temperature). **Valve Tappet Adjustment** - *See "Valve System" in Mercury Special Data.*
(ECU) - None in service (Hydraulic Lifters).

MANIFOLD HEAT CONTROL: Butterfly type valve mounted between right hand manifold and exhaust pipe (Single & Dual exhaust systems). When installing, make certain counterweight is toward right front.

► *DUAL EXHAUST NOTE:* When valve closed, all exhaust gases are discharged through left hand exhaust pipe.

IGNITION

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

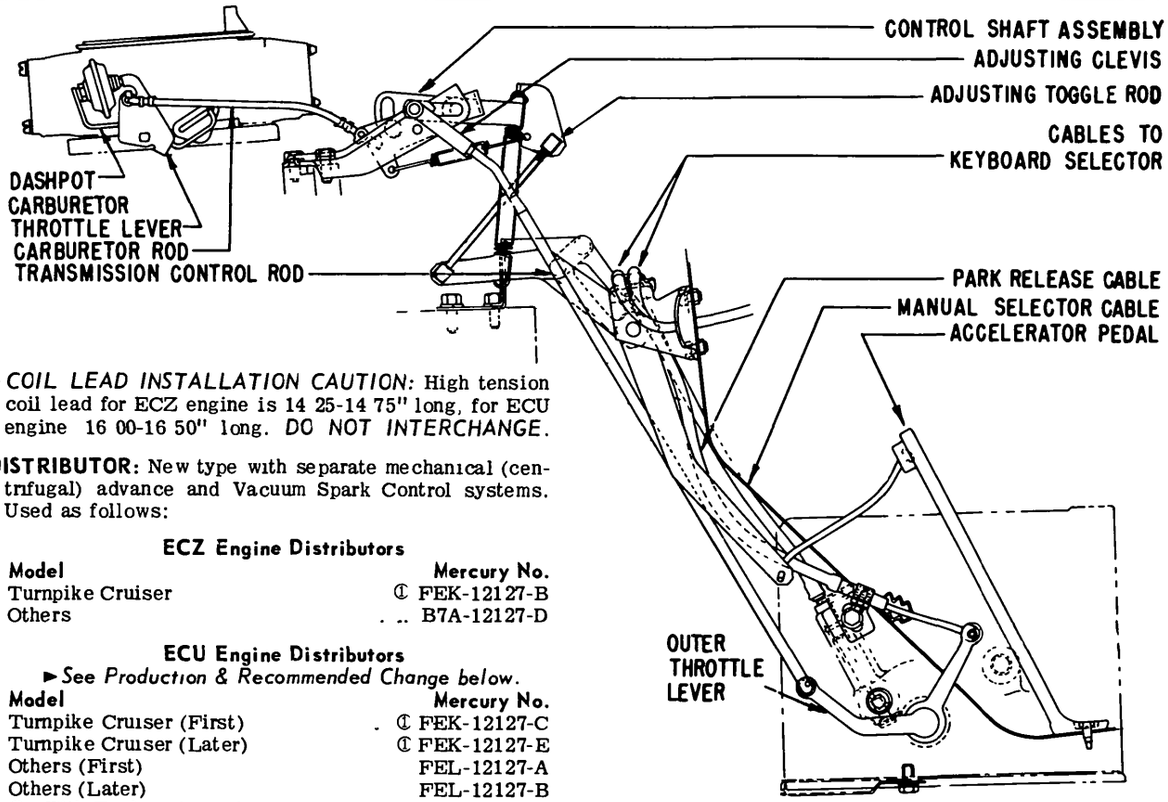
SPARK PLUG GAP: .032-.036"
Spark Plug - Champion 860 (early), F-14Y (later) Use F-14Y for replacement.

► *SPARK PLUG CAUTION:* Spark plug has tapered seat and does not require a sealing gasket. It is important that plugs be tightened to 15-20 ft. lbs.

COIL: Mercury B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Mercury B6A-12250-D. 1.30-1.40 ohms at 75°F.

► *COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by a lead from starter solenoid to battery terminal of coil.

► *COIL RESISTOR GROUNDING CORRECTION:* Resistor may ground on intake manifold. To correct, bend resistor on its mounting bracket in direction of coil to give proper clearance.



MERCOMATIC TRANSMISSION THROTTLE LINKAGE

► *COIL LEAD INSTALLATION CAUTION:* High tension coil lead for ECZ engine is 14 25-14 75" long, for ECU engine 16 00-16 50" long. *DO NOT INTERCHANGE.*

DISTRIBUTOR: New type with separate mechanical (centrifugal) advance and Vacuum Spark Control systems. Used as follows:

ECZ Engine Distributors

Model	Mercury No.
Turnpike Cruiser	Ⓒ FEK-12127-B
Others	B7A-12127-D

ECU Engine Distributors

► *See Production & Recommended Change below.*

Model	Mercury No.
Turnpike Cruiser (First)	Ⓒ FEK-12127-C
Turnpike Cruiser (Later)	Ⓒ FEK-12127-E
Others (First)	FEL-12127-A
Others (Later)	FEL-12127-B

Ⓒ - With Tachometer Drive.
See "Ford, Lincoln, Mercury Distributors" in Electrical Section

Condenser - Mercury No. B7A-12300-A. **Capacity** - 21-25 mfd.
Contact Point Set - Mercury No. B7A-12171-A.
Breaker Gap - 014-016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

► *ECU ENGINE DISTRIBUTOR ADVANCE PRODUCTION & RECOMMENDED CHANGES (FEK-12127-C & FEL-12127-A Distributors):* These distributors can be reworked for improved performance by installing later type Distributor Weight Springs and calibrating Automatic & Vacuum Advance to "Later Production" specifications listed below. *For complete adjustment procedure, see "Ford, Lincoln, Mercury Distributors" in Electrical Section. NOTE* - Later type Distributors FEK-12127-E & FEL-12127-B have new type weight springs and "Later Production" advance specifications apply.

Distributor Advanc Springs

	Original Part No.	New Part No.
Primary Spring	B7A-12192-A	FEL-12192-A-UP
Secondary Spring	FEK-12191-A	B7A-12191-B

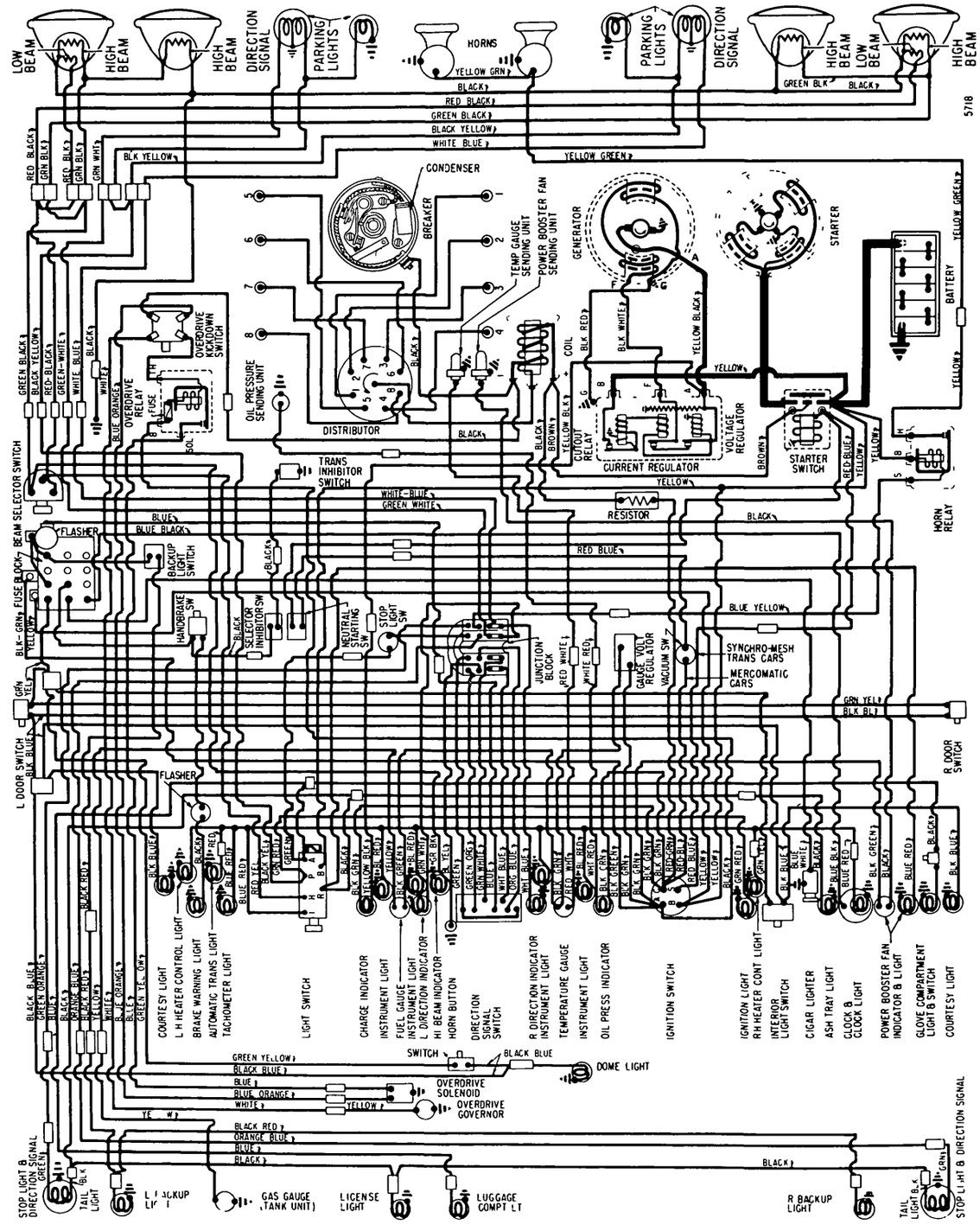
Automatic Advance (ECZ Eng.)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
½-1½		450	1-3		900
3-4		550	6-8		1100
5-6		850	10-12		1700
8-9		1325	16-18		2650
12-13		2000	24-26		4000

Automatic Advance (ECU Eng.)
(Early Pr ducti n)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-½		300	0-1		600
1½-2½		400	3-5		800
4-5		500	8-10		1000
6-7		875	12-14		1750
8-9½		1325	16-19		2650
12-13		2000	24-26		4000

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Automatic Advance (ECU Eng.)
Ⓒ (Lat r Pr duction)

Degrees	Distr. RPM	Degrees	Eng. RPM
0-½	300	0-1	600
3-4	500	6-8	1000
7-8	875	14-16	1750
9-10	1325	18-20	2650
12-13	2000	24-26	4000

Ⓒ - With modified advance. *See Change Note above*

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate

Vacuum Advance (ECZ Eng.)

Distr. Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	5
5-7	10-14	10
11-13	22-26	15-20

Vacuum Advance (ECU Eng.) (Early Production)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-1	0-2	5
4-6	8-12	10
7-9	14-18	13-20

Vacuum Advance (ECU Eng.) Ⓒ (Later Production)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-½	0-1	5
1-3	2-6	10
4-6	8-12	13-20

Ⓒ With modified advance *See Change Note above*

IGNITION TIMING

Engine	Std. Setting
ECZ (Std. & O.D.)	3° BTDC (6° BTDC Max.)
ECZ (Mercomatic)	6° BTDC
ECU	5° BTDC (8° BTDC Max.)

Timing Mark - Crankshaft pulley marked "TDC", "10° BTDC", and "20° BTDC" with 2° graduations between these marks. Align correct mark with pointer on timing chain cover.

CARBURETOR

► *CARBURETOR APPLICATION: ECZ Engines equipped with Carter AFB or Holley 4-Barrel Carburetors, ECU Engine equipped with Carter WCFB 4-Barrel Carburetor.*

► *CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER*

Carburetor Air Intake Duct Assembly (Thermostatic Control): Carburetor air intake duct to air cleaner has thermostatically controlled valve which provides warm air for cold engine (air taken in through muff or shroud around exhaust manifold) or cool air for warm engine (air taken in from the left radiator side air deflector) Valve should be closed at temperatures below 75°F (for air intake from rear "heated" opening) and should start to open at 85°F Valve should be fully open at 105°F (for air intake from outside through left radiator side air deflector) *See "Fuel System Notes" in Mercury Special Data*

Acc lerat r P dal Adjustm nt: Adjust toggle rod linking accelerator pedal bellcrank on firewall to bellcrank on cylinder head for shortest overall length Attach

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one end of rod to accelerator shaft and other end to transmission control shaft Distance between bottom surface of accelerator pedal and bare floor pan should be 4" Lengthen rod to raise pedal shorten to lower. *CAUTION* - Adjust pedal height by **toggle rod only.** Shortest rod length possible must be used

Throttle Linkage Adjustment (Mercomatic Cars): With engine at normal operating temperature and idle speed set at 425-450 RPM with selector button in "D", adjust Anti-stall Dashpot (see below), then proceed as follows. Remove clevis pin connecting transmission control rod to control shaft (on engine bracket), insert gauge pin, Tool 77230-MB, through control shaft and bracket. Adjust carburetor-to-control shaft rod so that it freely enters hole in carburetor throttle lever. Then **lengthen 2 full turns** and install rod Remove gauge pin With carburetor throttle lever in slow idle position, hold transmission control rod up so that transmission lever is against its stop adjust clevis on rod so that clevis pin enters hole in control shaft freely then **lengthen** rod by turning clevis **3 full turns,** connect rod

Dashpot Adjustment (Holley & Carter WCFB Carbs.): Hold dashpot plunger in to limit of travel, loosen dashpot mounting locknut, rotate dashpot in or out on bracket until .067" feeler (Tool T109-234) can just be inserted between dashpot plunger and carburetor throttle lever (throttle closed and throttle stopscrew against stop).

Dashpot Adjustment (Carter AFB Carburetor): This model has dashpot built-in carburetor. Hold primary throttle valves in wide-open position, measure distance from top surface of bowl cover to bottom of dashpot arm lever (at dashpot plunger). This distance should be 7/16". Adjust by bending inner tang on dashpot arm.

HOLLEY 4-BARREL

Mercury No. B7A-9510-U Auto. Trans. (replaces ECZ-9510-V), ECZ-9510-AD Std. & O.D. (replaces ECZ-9510-Y). *NOTE* - Carburetor ECZ 9510-AD is B7A-9510-U with dashpot and attaching parts removed New type 4-barrel carburetor with automatic choke

►*1957 MERCURY 4-BARREL HOLLEY CARBURETOR VENT REWORK (To prevent spillage of fuel under flooding conditions): See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*POOR OR HESITANT ACCELERATION CORRECTION. See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

►*MALFUNCTIONING CAUSED BY IMPROPER GASKET INSTALLATION CORRECTION* Throttle body-to-main body gasket may block vacuum passage from carburetor to distributor vacuum diaphragm To correct install gasket **on throttle body** and make sure **all** holes are aligned correctly

Idle Setting - Both screws (primary side only) ½-1½ turns open. Adjust each screw in sequence, turn screw in until engine begins to run rough, then turn screw out until engine begins to roll, finally turn screw in just enough for smoothest idling (favor rich side of adjustment range). Readjust both screws after rechecking idle speed, turn screws 1/8 turn in either direction for smoothest idle (screws must be within ½ turn of each other).

Idle Speed - 475-500 RPM in Neutral. On Mercomatic cars, recheck idle speed in "D" and readjust as necessary to 425-450 RPM.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB No. 2441S,SA. New type 4-Barrel carburetor with automatic choke

►*RICH OPERATION AT HIGH ALTITUDE CORRECTION:* Install new metering rods or jets *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

►*ACCELERATOR PUMP SPECIFICATION CHANGE·* Changed from 27 64" to 15/32" from top of pump plunger to top of air horn

►*CHOKE SETTING SPECIFICATION CHANGE:* Changed from 2 notches to 1 notch rich from center index

Idle Mixture & Idle Speed Setting - *Same as for Holley 4-Barrel above*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL

Carter WCFB No. 2404S,SA. 4-barrel carburetor with automatic choke

►*STUMBLE OR CUTTING OUT ON TURNS CORRECTION* May be caused by poor seal between carburetor body and air horn *See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

Idle Mixture & Idle Speed Setting - *Same as for Holley 4-Barrel above*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA. See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

FUEL PUMP PRESSURE: 3.5-5.5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Mercury No ECZ 9350-B (ECZ Eng) No ECU 9350-D (ECU Eng) Fuel & Vacuum

Pressure - 3½-5½ lbs (ECZ Eng), 4½-6½ lbs (ECU Eng)

See "Fuel Pumps"in Carburetion Section

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with voltage regulator No FEL-10804 A

Dash Unit - (Std) Mercury No FEK-9280-A (Turnpike Cruiser) FEK-9280 D

Tank Unit - (Std) Mercury No FEG-9275-E (Sta Wgn) FEG-9275-D (Turnpike Cruiser) FEG 9275-E

See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY FILTER ELEMENT type Clean every 4 000 miles replace element every 30,000 miles

►*CLEANING CAUTION:* Clean filter element by tapping or shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

►*AIR CLEANER AIR LEAK CORRECTION (ECZ Eng)* Install Air Cleaner Element Seat Part No ECZ-9610-A beneath air cleaner element and body

►*HEAVY DUTY AIR CLEANER NOTE:* Heavy Duty Air Cleaner Part No EDB 9601-B available for replacement of standard Cleaners No EDB 9601 A1 & EDB 9601 A2 for use in dusty areas

BATTERY

ECZ Eng. - Mercury Kit N . MGK-10655-A. 12 volt, 11 plate, 55 ampere hour capacity

ECU Eng. - Mercury Kit No. MHK-10655-A. 12 volt, 13 plate 70 ampere hour capacity

Battery Ground - Negative to engine block

Engine Ground - Cylinder head to dash

STARTER

Mercury No. B6A-11002-A. Armature - FAC-11005-B.

Drive - Mercury No 1CM-11350-C Bendix "Folo-Thru"

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM., 155-190 amps.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	80 max.

Starting Switch: (Synchro-mesh Trans.) - Relay No B6A-11450-A controlled by Ignition & Starter Switch No B5A-11572-A

(Auto. Trans.) - Relay Part No B6A-11450-A controlled by Neutral & Starter Switch Vacuum Starter Cutout Switch FEK-11516 A and Neutral Starter & Back-up Light Switch FEK 15812-B

Starter Removal: Disconnect battery ground cable, raise front end of car, turn wheels to full right, disconnect starter cable. Remove ignition cable mounting bracket bolt, bracket and wires. Remove starter drive end plate screws, pull starter out and upward until drive assembly clears housing, hold in vertical position, with drive end down, then rotate and lower housing between tie rod and idle arm.

Installation: Tape dust seal lip (use masking tape) to inner circumference of housing to hold it in place, and reverse removal procedure. *NOTE* - Tighten outer cap-screw first, then top and bottom capscrews to maintain alignment of starting motor with flywheel housing.

Mercomatic Neutral Safety Switch Adjustment: *See "Ford-omatic & Mercomatic" in Transmission Section*

GENERATOR

GENERATOR: As follows:

Generator No.	Armatur N
B6A-10002-H (Std)	FGT 10027-A
FGP-10002-B (Special)	FGP-10027-A

Performance Data

Generator	Amperes	Volts	GEN RPM
B6A 10002-H	30	15	2450
FGP-10002-B	40	15	2390

Brush Spring Tension - 26-34 ozs

Field Current - 1 5-1 6 amps at 15 volts (Hot)

Rotation - Counterclockwise at commutator end

Belt Adjustment: Approximately ½" deflection on belts midway between generator and water pump pulleys with normal thumb pressure

REGULATOR

REGULATOR: Used with generator as follows

Regulat r No	G nerat r N
B6A-10505-A	B6A-10002 H
FBF-10505-A	FGP-10002 B

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►*SETTING NOTE:* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75°F

Cutout Relay

Cuts In - 12 0-12 8 volts
Cuts Out - 2 0-6 0 amps (reverse current)

V ltage Regulator

S tting - 14 6-15 4 volts
Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section*

Curr nt Regulator

S tting - 28-32 amps (B6A-10505-A), 38-42 amps (FBF-10505 A)
Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

H adlamps: Sealed Beam 2-Headlights Std (Exc Turnpike Cruiser), 4-Headlights Std (Turnpike Cruiser) *See "4-Headlights" in Electrical Section*

Directional Signals: *See Electrical Section*

Lighting Switch R moval: Disconnect battery ground cable Depress spring and pin retainer located on top of switch pull knob and shaft assembly from switch Use wide blade screwdriver to remove switch retainer nut from face of instrument panel and remove switch

Stop Light Switch Location: On forward end of brake master cylinder (integral with power brake unit) Master cylinder or power brake unit located on firewall in engine compartment

CIRCUIT BREAKERS: 12 ampere used with dual headlights 20 ampere used with Air Conditioner Protects headlights

FUSES: Located in fuse panel behind instrument panel
Interi r Lights - SFE 7 5 ampere
Turn Signals - SFE 7 5 ampere
Heater Blow rs - SFE 14 ampere
Radio - SFE 7 5 ampere
Cl ck - Electric wind 1 AG 1
Overdrive - AGC-15 ampere
Windshi ld Wipers - SFE 7 5 ampere
Back-Up Lights - 7 5 ampere
Sp tlight - SFE 7 5 ampere
Underhood Lamps - SFE 7 5 ampere
Pow r Lubrication - SFE 7 5 ampere
H rn R lay: Mercury No B7A-13853-A

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme car when disconnecting any part of air conditioning system for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8, Overhead Valves. "Safety Surge" (ECZ) & "Jato-Thrust" (ECU) engines.

M del	Bore	Stroke	Displacement
ECZ	3.80"	3.44"	312 cu. ins.
ECU	4.0"	3.66"	368 cu. ins.

Model	Rated HP	Compr. Ratio	Developed HP
ECZ	46.2	9.7-1	255 at 4600 RPM
ECU	51.2	10-1	290 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*POWER BOOSTER FAN NOTE:* Power Booster Fan is standard on some ECZ engines *See "POWER BOOSTER FAN" under "Cooling" in Mercury Special Data*

►*ENGINE OR GEAR NOISE NOTE:* Objectional engine and gear noise can be caused by metallic contact between rear engine mount retainer bracket contacting frame To correct, loosen two mounting bolts align retainer bracket hold drift between retainer and crossmember, while tightening mounting bolts to 22-28 ft lbs

►*MANIFOLD HEAT VALVE STICKING CORRECTION:* Chamfer lower edge of valve plate to eliminate contact with aligning dimple of muffler inlet pipe

►*IGNITION TIMING CAUTION:* Setting Ignition Timing in advance of specifications will burn spark plug electrodes, shorten valve life and cause excessive detonation with burned pistons *See IGNITION TIMING above*

►*CRANKCASE VENTILATION TUBE OIL LEAK CORRECTION (ECZ Eng):* When screen in tube is longer than 1 820" cover will not contact gasket causing oil leak To correct cut either end of screen to reduce length to 1 820"

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* Low octane fuel Kit No I-501769 (ECZ), No ECU-99025-A (ECU) available for service to lower compression ratio

►*AIR CLEANER NOISE CORRECTION·* To eliminate noise due to air cleaner duct contacting exhaust manifold remove duct cut out "U" section at lower end to give 1/8" clearance and reinstall air duct and cleaner,

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Mercury Special Data*

►*"ECU" CYLINDER HEAD BOLT & TORQUE SPECIFICATION CHANGE:* New high tension steel cylinder head bolts Part Nos B4Q-6065-A & B4Q 6066 A permit higher torque specification and reduce possibility of water and combustion chamber leaks *See "Torque Specifications" in Mercury Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data*

ENGINE REMOVAL: *See "Engine" in Mercury Special Data*

OIL PAN REMOVAL: On early cars with front Engine Steady Rest Support, turn crankshaft so No. 1 piston is at 12° ATDC, raise car, drain oil, remove radiator splash shield, stabilizer bar mounting bolt. *NOTE* - With Automatic transmission, remove cooler line clip oil pan screw, loosen cooler outlet pipe at left hand side of radiator and right hand side of transmission. Remove steady rest bracket to frame crossmember bolt, engine front support nuts and retainers, rear engine support crossmember, raise engine 4½" ONLY, drop oil pan down, position stabilizer between oil pan and cylinder block and remove oil pan.

PISTONS

Aluminum alloy Autothermic solid skirt type with three rings above pin *NOTE* - Pin is offset in piston

►*ORIGINAL BORE & PISTON SIZES:* Original bore range is (ECZ) 3 8000-3 8024", (ECU) 4 0000-4 0024" and TWO standard size pistons are used as noted below Piston "Grade" is marked on dome

Std. Piston Sizes

Engine	Grade "2"	Grade "6"
ECZ	3 7993-3 7996"	3 8005-3 8008"
ECU	3 9991-3 9994"	4 0003-4 0006"

Removal - Pistons and rods removed from above

Fitting New Pistons: Use ½" wide feeler gauge inserted between piston and cylinder wall at right angles to pin on thrust side Feeler thickness as follows·
New Piston in New Bore - 002" feeler 5-10 lbs pull
New Piston in Used Bore - 0025" feeler 5-10 lbs pull
Used Piston in New or Used Bore - 003" feeler 5-10 lbs pull

NOTE - Specifications cover both ECZ & ECU engines and supersede previous specifications

Replacement Pistons: (ECZ) standard 0225", 0325", 0425" oversize
(ECU) Standard 020", 030", 040" oversize

►*NOTE* - Standard furnished in two sizes *See "Original Bore & Piston Sizes" above*

Installing Pistons: Indentation or notch on top of piston must face front of engine *See Rod Installation*

PISTON PINS

Floating type with lock ring at each end
Diameter - (All) 9120 9123" **Length** - (ECZ) 3 016-3 030", (ECU) 3 162 3 176"
Clearance in Piston - 0001- 0003" Service max 0008"
Clearance in Rod - 0001 0003" (ECZ), 0002- 0004" (ECU) Service max 0008"
Replacement Pins: (All) Std (Green) 001" (Blue), 002" (Yellow) Oversize

PISTON RINGS

ECZ Engine

Ring	End Gap	Side Clearance
Compr. (1)	.012-.022"	①.0035"
Compr. (2)	.012-.022"	①.003"
Oil Contr.	.015-.062"②	-

ECU Engine

Ring	End Gap	Side Clearanc
Compr. (1 & 2)	.013-.030"	①.003"
Oil Contr.	.015-.062"②	-

① - Service maximum ② - On rails.

Replacement Rings: Standard and 020", 030", 040" oversize

CONNECTING RODS

Journal Diameter - Two (Standard) sizes as follows

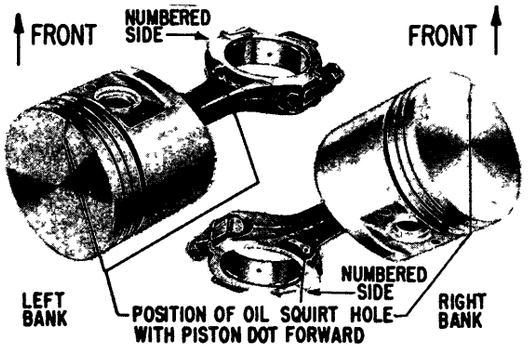
Engine ①	Cod Blu	C de Red
ECZ	2 1880 2 1884"	2 1884-2 1888"
ECU	2 2482 2 2486"	2 2486-2 2490"

① - Use bearing with same Code Color

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Bearings - Copper Lead Alloy with Steel back. Upper and lower halves interchangeable.
Clearance - .0007-.0036".
Side Clearance - .019" (ECZ), .017" (ECU).
Replacement Bearings: Two Standard Sizes (Coded Blue or Red), and .010", .020", .030" (ECZ & ECU) plus .040" (ECU) undersize.
Installing Rods: Assemble rods to piston so indentation embossed on piston head will face front of engine with numbered side of rod to right side of engine (right bank), or to left side of engine (left bank). When installing assemblies in engine, numbers on rods and caps must be together and toward outside of block.



PISTON & ROD ASSEMBLIES

CRANKSHAFT

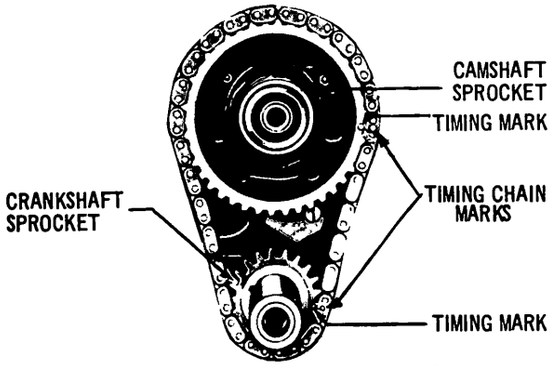
Journal Diameters: 2.6235-2.6239" (Color Coded Blue), 2.6239-2.6243" (Color Coded Red).
Bearings - Copper Lead Alloy, with steel back.
Clearance - .0008-.0026". Service max. .0036".
Replacement Bearings: Two Standard Sizes (Coded Blue or Red), and .010", .020" .030" (ECZ & ECU) plus .040" (ECU) undersize. *NOTE* - Bearings are different on the two engines.
End Thrust: Taken by No. 3 main bearing.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Mercury Special Data.*
End Play - .010" (ECZ), .012" (ECU).
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

CAMSHAFT

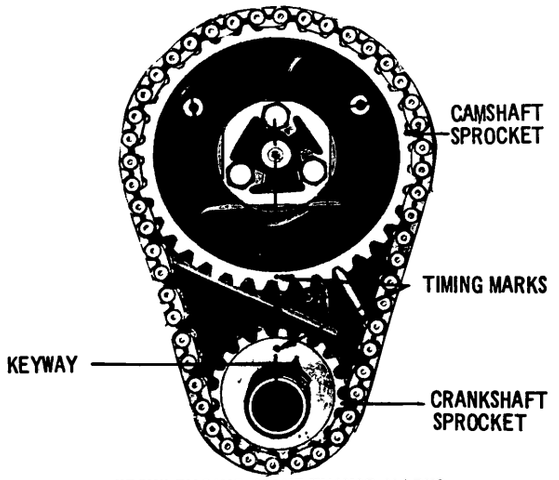
Journal Diameter - (ECZ) 1.9255-1.9265". (ECU) 2.1240-2.1247".
Clearance - .006" maximum (ECZ). .003" (ECU).
End Thrust (ECZ): Taken by thrust plate between camshaft sprocket and shoulder of block.
End Thrust (ECU): Restrained by spring and piston located in front end of camshaft.

Replacement Camshaft Bearings: Reamed bearings furnished in Standard and .015" undersize. *NOTE* - ECZ and ECU bearings are different.

Camshaft Setting (ECZ): Timing is correct when timing marks on sprockets correspond with marks on chain when on drive side of chain.
Camshaft Setting (ECU): Timing is correct when timing marks on sprockets are adjacent and in line across shaft centers.



"ECZ" ENGINE VALVE TIMING MARKS



"ECU" ENGINE VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Mercury Special Data.*
Timing Chain Cover Seal Installation (Crankshaft Front Oil Seal): *See "Engine Front Cover" in Mercury Special Data.*

VALVES

Tappet Clearance: (ECZ) - .020" Intake & Exhaust (Cold), .019" Intake & Exhaust (Hot). Recheck Cold setting after engine warmed up.
(ECU) - None in service, hydraulic lifters.
Valve Tappet Adjustment - *See "Valve System" in Mercury Special Data.*

ECZ Engine

Valve	Head Diameter	① Stem Diameter
Intake	1.920-1.930"	.3416-.3423"
Exhaust	1.505-1.515"	.3403-.3410"

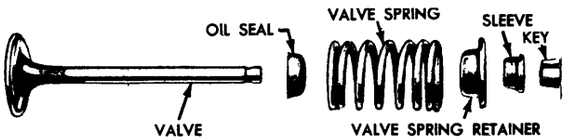
Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°	.272"	③ .001-.002"
Exhaust	45°	.267"	④ .0023-.0037"

ECU Engine

Valve	Head Diameter	① Stem Diameter
Intake	2.000-2.010"	.3416-.3423"
Exhaust	1.630-1.640"	.3403-.3410"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°	.261"	③ .001-.002"
Exhaust	45°	.256"	④ .0023-.0037"

① - Furnished with .003", .015", .030" OS stems.
② - Cam Lift (Service Minimum).
③ - Service maximum: .004" (ECZ), .0045" (ECU).
④ - Service maximum: .006" (ECZ), .0065" (ECU).
Valve Seat Width - 1/16-5/64" (Int.), 5/64-3/32"(Exh.).
Oversize Valve Stem Installation - *See "Valve System" in Mercury Special Data.*
Valve Servicing - *See "Valve System" in Mercury Special Data.*
Valve Stem Seals - "Umbrella" type seals used on all valves. Install seals with cupped side down on valve stem at guide boss on head.



VALVE ASSEMBLY

Valve Springs: Free Length - 2.09" (ECZ), 2.12" (ECU).

Valve Spring Specifications

ECZ Engine

	Pressure	Length
Closed	71-79 lbs.	1.780"
Open	161-177 lbs.	1.390"

ECU Engine

	Pressure	Length
Closed	60 lbs.	1.800"
Open	165 lbs.	1.380"

►*HIGH PERFORMANCE INNER VALVE SPRING (ECU):* Inner valve spring Part No. ECU-66515-A available for high speed operation, and requires use of Valve Spring Retainer No. ECZ-6514-A. Outside of valve guide is machined for usage of inner valve spring. *NOTE* - Free length 1.875". **Specifications** - 28-32 lbs. pressure at 1.62", 78-82 lbs. pressure at 1.17".
Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.004" Intake, .005" Exhaust), ream guides and install oversize valves. *See "Valve System" in Mercury Special Data.*
Valve Lifters: (ECZ) Mushroom type. Removed from below with camshaft removed.
Diameter - .4989-.4995".
Valve Lifters: (ECU) Hydraulic, barrel type. Lifters can be removed from above with camshaft in engine.
Diameter - .8740-.8745". **Clearance in Block** - .0025" maximum.
Lifter Overhaul (ECU) - *See "Valve System" in Mercury Special Data.*

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Rock r Arm Ass mbly: S *"Valv Syst m" in Mercury Special Data*

►*ROCKER ARM COVER INTERFERENCE CORRECTION (ECZ Eng) S "Valve System" in Mercury Sp cial Data*

VALVE TIMING

S *"Camshaft S tting" under CAMSHAFT above*

►*VALVE TIMING NOTE.* Following valve opening and closing points are with cam lift as indicated

Valv Timing (ECZ)

Intake Valv - Open 18° ℂ BTDC Close 58° ℂ ALDC
Exhaust Valv - Open 66° ℂ BLDC Close 10° ℂ ATDC

Valv Timing (ECU)

Intak Valv - Open 18° ⑪ BTDC Close 72° ⑤ ALDC
Exhaust Valv - Open 59° ⑪ BLDC Close 31° ⑤ ATDC
Camlift - ℂ 015", ℂ 013", ⑤ 016", ⑪, 002", ⑤ 004"
Valve Timing Ch ck - With No 1 piston in firing position (No 1 intake valve closed), back off adjusting screw and push rocker arm to one side Mount dial indicator directly above No 1 intake valve pushrod with indicating button in pushrod socket set dial indicator at zero Place a quadrant on crankshaft pulley Rotate engine to point where dial indicator registers camlift as listed in Valve Timing table above Quadrant reading should agree with valve timing figure in table

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.*

Crankcas Capacity: 5 qts (refill) Add 1 quart when filter changed

N rmal Oil Pr ssur : 45-50 lbs at 2000 RPM (Hot)

Oil Pr ssur Indicat r: Light on instrument panel Light is on when oil pressure is low

Oil Pr ssur Switch - Mercury No FDA-9278-A
See "Oil Pressure Gaug s" in Miscellaneous Section

Oil Pump: Rotor type Located at left side of engine crankcase and driven by distributor drive gear

Pump Ov rhaul - *S e "Oiling System" in Mercury Special Data*

Oil Filt r: Full-flow type early cars disposable type late

►*OIL FILTER PRODUCTION CHANGE* Disposable oil filter used on later cars and can be installed to replace previous type full-flow filter on earlier cars For disposable filter installation see *"Oiling System" in Mercury Special Data*

Crankcase V ntilation: Filter in oil filler cap (Inlet) filter screen in road draft tube (Outlet) Clean and oil every 2 000 miles or more often in dusty areas

COOLING

Wat r Capacity: 19 quarts Add 1 quart with heater

Pressure Valve Mercury No LA-8100-A (12-15 lbs) Radiator filler cap

Thermostat (ECZ) Mercury No B4A-8575 A (157-162°F) Std , B4A 8575 B (177 182°F) High Temperature
(ECU) Mercury No B7Q-8575-A (157 162°F) Std , B4Q-8575 B (168 173°F) High Temperature

►*THERMOSTAT INSTALLATION NOTE* Install thermostat with the word "TOP" up and toward front of engine to prevent a retarding of flow of coolant

►*RADIATOR NOTE* Two types of radiator used Standard and Extra Cooling All air conditioned cars use Extra Cooling *NOTE* - Minimum clearance between fan and radiator core is 13/16" or 17/32" between fan and top tank

►*POWER BOOSTER FAN NOTE* Power Booster Fan is standard on some ECZ engines *See "POWER BOOSTER FAN" under "Cooling" in Mercury Special Data*

Water Pump: Packless, sealed ball bearing type
See "Water Pumps" in Mercury Special Data.

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with voltage regulator No FEL-10804-A
Dash Unit - Ford No FEK-10883-E
Engine Unit - Mercury No FEG-10884-B
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Borg & Beck Model 10.5A6 (Std.), Long Model 11CF (Heavy Duty). Single plate, dry disc type

Cover Assembly	Mercury No.
Borg & Beck No 361378	MG-7563-A
Long No 265126	B6A-7563-A

See "Borg & Beck" and "Long" in Clutch Section

Clutch Disc	Mercury No.
Borg & Beck No 382374	MG-7550-B
Long No 287226	81T-7550-A

►*CLUTCH PEDAL AREA NOISE CORRECTION·* Install pedal assist spring with hook (on long stem of spring opening) attached to rivet of clutch pedal lever with opening **upward** This position will eliminate spring to cowl panel interference

Pedal Adjustment: If pedal free travel is not 1 to 1¼", loosen clutch pedal release rod locknut (lower end) and turn adjusting nut for correct free travel, tighten locknut

Removal: Remove transmission (see Transmission Removal below) and disengage clutch pedal retracting spring and release rod from clutch release lever Disengage equalizer bar tension spring and remove two capscrews retaining equalizer bracket assembly to flywheel housing Remove flywheel housing Mark position of flywheel and pressure plate so parts may be installed in original position Compress clutch pressure plate assembly with Tool 7563 Remove capscrews pressure plate and disc

SYNCHRO-MESH TRANSMISSION

Own Helical gear constant mesh synchro-mesh (second and high) sliding gear (low and reverse)
See "Mercury Synchro-mesh" in Transmission Section

Transmission Control: *See "Transmission Controls" in Transmission Section*

Removal· If equipped with overdrive remove kickdown switch retainer nut and push switch through floor Raise car and drain transmission On overdrive cars remove governor solenoid, and control cable Disconnect speedometer cable and remove speedometer drive gear Remove transmission shift rods at transmission Remove bolts retaining rear universal joint to companion flange and remove drive shaft Support rear of engine and remove the detachable cross-member of the frame Remove two top capscrews retaining transmission to flywheel housing and install a couple of studs to act as guide pins Remove lower capscrews and slide transmission to rear as far as possible and lower front end Remove from below car

►*SINGLE EXHAUST SYSTEM NOTE.* When removing transmission, it will be necessary to remove nuts that secure muffler inlet and exhaust pipes to exhaust manifold, and to remove manifold outlet pipe from mounting bracket at rear of manifold and move exhaust system away from working area

OVERDRIVE

Warner Model AS1-R10F. Solenoid operated type, with governor control and throttle operated kickdown Lockout Switch not used on this model
See "Warner R10 Overdrive" in Transmission Section

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring

MERC-O-MATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control and mechanical parking lock
See "Fordomatic & Mercomatic" in Transmission S c tion

►*NO FORCED DOWNSHIFT CORRECTION (Early Cars)* Install new adjustable type accelerator rod No MG-9784-B which entered production Nov. 1956 For adjustment, *See "Fordomatic & Mercomatic" in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Fordomatic & Mercomatic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Fordomatic & Mercomatic" in Transmission Section*

Lubrication - Check fluid level every 2,000 miles drain and refill every 16,000 miles. Use only Automatic Transmission Fluid Type "A"

Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in Neutral position Move selector lever through all ranges to assure fluid distribution, then place in (P) "Park" position for checking fluid level Maintain level at "Full" mark on dipstck

Throttle Linkage Adjustment: *See CARBURETOR abov*

Manual Selector & Park Release Cable Adjustment: *S "Mercury Mercomatic Transmission Keyboard Control" in Transmission Section*

►*OTHER MERCOMATIC DATA: See "Fordomatic & Mercomatic Transmission" in Transmission Section*

UNIVERSALS

Spicer. One used at each end of drive shaft

PROPELLER SHAFT

►*DRIVE LINE THUMP CORRFCTION* Caused by lubrication build-up in front universal joint Correct by tapping and installing relief valve (5-25 lbs) using 1/8" pipe tap to cut threads in expansion plug of front universal slip joint DO NOT cut threads too deeply in plug as valve will interfere with output shaft

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REAR AXLE

Own. New separate carrier type with straddle-mounted pinion, hypoid gear and Hotchkiss drive.
See "Ford & Mercury" in Rear Axle Section.

►*REAR AXLE LUBRICANT LEAK CORRECTION:* **Caused by leak around housing bolt threads. To correct, replace early type carrier bolts (No. 0A-44044-A) with new bolt (AJ-44044-A) with larger head and apply non-hardening sealer to threads before installation.**

Axle Ratios

Model	Standard	Optional
S-M (Exc.Sta.Wgn.)	3 70-1(37-10)	3 89-1(35 - 9)
S-M(Sta.Wgn.)	3 89-1(35 - 9)	3 70-1(37-10)
O D (Exc.Sta.Wgn.)	3 89-1(35 - 9)	
O D (Sta.Wgn.)	3.89-1(35 - 9)	3 70-1(37-10)
Mercomatic	2 91-1(32-11)	
Mercomatic(Sta.Wgn.)	3 22-1(29 - 9)	2 91-1(32-11)

NOTE - 2 91-1(32-11) supersedes 3 22-1(29-9) with ECU Engine.

Backlash - 004- 009"

Axle Shaft Removal: Remove wheel and brake drum Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange) Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above) remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Direct acting, non-adjustable. Service by replacement.

Front Shock Absorber

Model	Standard	Heavy Duty
All(Exc.Sta.Wgn.)	.MG 18077-R	MG 18077-Y
Sta. Wgn.	MG 18077-S	MG 18077-AA

Rear Shock Absorber

Model	Standard	Heavy Duty
All(Exc.Sta.Wgn.)	MG 18097-K	MG 18097-R
Sta. Wgn.	MG 18097-M	MG 18097-N

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within front coil springs. *See "Ford & Mercury (Ball-Joint)" in Suspension & Wheel Alignment Section.*

Steering Axis Inclination: 7° at 0 Camber. Not adjustable.

►*CASTER & CAMBER ADJUSTMENT NOTE:* New mounting of upper control arm inner shaft (bolted to outer surface of frame bracket) changes suspension alignment procedure as follows:

Cast r - Adding 1/16" shim at front bolt changes caster Pos. ½°, adding 1 16" shim at rear bolt changes caster Neg. ½°.

Camber - Adding 1 16" shim at both front and rear bolts will change camber Pos. ¼°, removing 1/16" shim at both bolts will change camber Neg. ¼°.

Caster - 0° to Neg. 1½°. Maximum variation between wheels ½°.

Camber - 0° to Pos. ¾°. Maximum variation between wheels ¼°.

Toe-In - 3/16-5/16". Supersedes earlier data.

Toe-out on Turns - Inner wheel 20°. Outer wheel 17°6' (Manual Steering), 17°20' (Power Steering).

STEERING

►*STEERING GEAR BIND CORRECTION (Early Cars):* Install Steering Gear to Frame Spacers, Part No. MG-3566-A, as necessary to eliminate any bind in worm shaft and steering column.

Manual: Saginaw. Recirculating Ball Nut type.
See "Saginaw Worm & Nut" in Steering Section.

Power Steering: Bendix (Ford & Mercury) Linkage type. Used in conjunction with standard type steering gear. *See "Bendix Linkage Type (Ford & Mercury)" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Nut" in Steering Section.*

BRAKES

►*BRAKE DESIGN NOTE:* Front brake anchor pin (fixed anchor type) is mounted on wheel spindle independently of backing plate (wheel cylinder mounted on anchor pin)

►*REAR WHEEL BRAKE TUBE FITTING CAUTION:* Use new brake tube fitting Part No. MG-2074-B (Exc. Sta. Wgn.), MG-2074-A (Sta. Wgn.) to provide clearance between rear wheel brake hose and shock absorber.

Bendix Hydraulic, Single Anchor (Without eccentric and with fixed anchor pins) **Early type** requires hand adjustment, **Later type** has automatic adjustment.
See "Ford, Lincoln, Mercury Bendix" or "Mercury Bendix (With Automatic Adjuster)" in Brake Section.

Drum Diameter - 11" front and rear.

Wheel Cylinder Diameter - 1 1 8" Front, 15 16" Rear.

Lining - Molded type, riveted to shoe.

Width - 3 0" (ECU) 2 5" (ECZ) front and rear.

Braking Power - 55 5% front, 44 5% rear.

Clearance - (Hand Adjusted) Expand shoes until wheel is locked. Back off adjusting screw 12-14 clicks until wheel turns free.

(Automatic Adjusted) For initial adjustment use Tool No 2081 to expand shoes until wheel is locked Hold adjusting lever away from adjusting screw (use narrow screwdriver through hole in backing plate), and back off adjusting screw until wheel turns free then one more stroke of tool (Approximately 13 strokes total). Wheel should turn free.

Brak Pedal Fr Play Adjustm nt: 1/4-7/16". If play not correct after adjustment, loosen locknut on the eccentric bolt attaching brake pedal to master cylinder pushrod and rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid - Maintain fluid level to within ¼" of top of reservoir.

Removal - Disconnect brake line from master cylinder and depress brake pedal a few times to force out fluid. Disconnect wires leading to stop light switch, and remove eccentric bolt attaching master cylinder pushrod to brake pedal. Remove capscrews and lock washers attaching master cylinder to firewall.

Power Brakes: Bendix Power Unit (new type with hydraulic reaction valve rod). Combination vacuum power unit and master cylinder. Unit mounted on engine side of firewall and replaces regular master cylinder.
See "Bendix Power Unit" in Brake Section.

►*POWER BRAKE AUTOMATIC APPLICATION OR FAILURE TO RELEASE CORRECTION:* **Caused by incorrect installation of brake booster mounting bracket. S** *"Bendix Power Unit" in Brak S ction.*

Checking Fluid Level - Same as for regular master cylinder.

Removal of Power Unit - Release pushrod from lever assembly, master cylinder outlet fitting bolt from master cylinder. *NOTE* - DO NOT remove stop light switch or hose assembly from outlet fitting. Leave outlet fitting in master cylinder. Remove manifold vacuum hose from unit and reserve tank hose from valve fitting. Remove mounting screws and unit from bracket on dash panel.

MISC. MECHANICAL

Windshield Wipers: Vacuum, Cable & Tensioner type.
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric. Reversible motor in each window. Controlled by door switch and master control switch. *NOTE* - Rear Window on Turnpike Cruiser and Tall Gate Window on some Station Wagons also power operated. *See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Electric-Hydraulic with reversible pump motor. *See "Power Top Controls" in Misc. Section.*

Power Seat Adjusters: "4-Way" Electric Screw and Jack type with single electric motor driving screw jack. *See "Power Seat Adjusters" in Miscellaneous Section.*

Seat-O-Matic Control - Automatic position adjustment controlled by switch on instrument panel.
See "Seat-O-Matic Power Seat Adjusters" in Miscellaneous Section.

Air Conditioning: Combination Air Conditioning-Heater System, *See "Mercury Air Conditioning" in Misc. Sect.*

►*AIR SUSPENSION CAR CAUTION: B for jacking, h isting, t wing r working und r car, se SERVICE CAUTIONS nd TOWING instructions in "Mercury Air Susp nsion" in Suspension & Wh el Alignment S ction.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on left front body pillar. *NOTE* - Number (example below) includes identification data.

① ② ③ ④ ⑤
* M 8 W B 500001 *

① - Engine M 383 cu. in. K 430 cu. in.
② - Year 8 (1958).
③ - Assy. Plant W Wayne. J Los Angeles. T Metuchen. Z St. Louis. S Somerville.
④ - Body type.
⑤ - Beginning engine number.
NOTE - Asterisk used to prevent tampering with number.

►*ENGINE IDENTIFICATION NOTE:* Four engines used and are identified by Code No. on fiber tag located at lower right front cover bolt as follows:

383 cu. in.(L w T rqu) – No. 27, 29, 32, 51, 59, 411, 412, 413, 421.
383 cu. in. (High T rque) - No. 31, 49, 53, 57, 69, 416, 419.
430 cu. in. - No. 49, 56, 415, 417.

►*383" ENGINE IDENTIFICATION NOTE:* Engines with Circle "E" on date code pad (See below) have .020" lower head gasket surface and require **two** head gaskets.

►*ENGINE DATE CODE NOTE:* Engine Date Code stamped on block in front of left cylinder head. Used in manufacture and for identification. Not used for licensing.

TUNE-UP

►*LIGHT LOAD SPARK KNOCK CORRECTION:* Light spark knock occuring on "drive-away" under light load condition can be corrected by modifying distributor and resetting ignition timing. *See Distributor & Ignition Timing specificati ns below.*

►*HIGH IDLE SPEED CORRECTION (Ford Carb.):* High idle speed caused by accelerator rod clip interference at wide open throttle can be corrected by grinding or filing off throttle lever so edge of lever is concentric with hole. Lever should have not more than 1/8" radius greater than hole.

►*ENGINE DETONATION NOTE:* Fuel detonation - at cranking speed is normal with high compression ratio - at idle speed is result of incorrect distributor ignition timing. Excess fuel due to too high idle speed will cause engine to heat and run after ignition turned off.

COMPRESSION PRESSURE: 170 lbs. **(312),** 190 lbs. ± 10 lbs. **(Oth rs)** at cranking speed. Variable limit between cylinders 10 lbs.

VACUUM READING: 19-20" **(312),** 17-18" **(Others)** at idling speed.

VALVE TAPPET CLEARANCE: (312): .020" Cold, .019" Hot, intake and exhaust. **Tappet Adjustment** - Se *"Valve System" in Mercury Special Data.*
(383 & 430) None in Service. Hydraulic lifters.

MANIFOLD HEAT CONTROL VALVE: (312) - Butterfly type valve mounted between right hand manifold and exhaust pipe (Single and Dual exhaust systems). When installing, make certain counterweight is toward right front.

►*DUAL EXHAUST NOTE:* When valve closed, all exhaust gases are discharged through left hand exhaust pipe.

MANIFOLD HEAT CONTROL VALVE: (Others) - Water jacketed intake manifold with thermostat controlled circulationl eliminating need for heat valve. *See COOLING for complete data.*

►*DUAL EXHAUST NOTE:* Special cross-over type tail pipes used with air suspension.

CARBURETOR AIR INTAKE DUCT ASSEMBLY: Carburetor air intake duct with thermostatically controlled valve. Provides warm air for cold engine (below 85°F), or cool air for warm engine (above 105°). *See "Fuel System Notes" in Mercury Special Data.*

IGNITION

FIRING ORDER: (312) 1-5-4-8-6-3-7-2. **(Others)** 1-5-4-2-6-3-7-8.
Cylinders - RIGHT BANK 1-2-3-4. LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036". All engines.
Spark Plug - Champion F-14-Y **(312),** F-11-Y **(Others).** Tapered seat. No gasket required. Torque to 15-20 ft.lbs.

►*SPARK PLUG WIRE ROUTING CAUTION:* No. 7 and No. 8 spark plug wires should be separated as far as is practical in their routing through the bracket and separator to prevent a "Cross-firing" condition.

►*SPARK PLUG REMOVAL CAUTION:* Grasp terminal boot above spark plug and use rotating and pulling motion to remove terminal from spark plug to save damaging radio resistance built into cable.

COIL: Mercury B6A-12029-B. All engines.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - B8E-12250-A. 1.3-1.4 ohms at 75°F.

DISTRIBUTORS: Used as follows:

Engine	Mercury No.
312	FEW-12127-F
383, 430 Early	FEW-12127-A
383, 430 Late	FEW-12127-D
383, 430 Later	FEW-12127-E

►*LIGHT LOAD SPARK KNOCK CORRECTION (FEW-12127-A & D Distributors):* These distributors should be modified by installation of parts listed below and type designation changed to "E" *NOTE: Advance performance and Ignition Timing for these modified distributors will be same as FEW-12127-E data below.*
FEW-12127-A Modification: Install Primary Spring No. B8A-12192-A, Secondary Spring No. B8A-12191-A, Vacuum Spring No. B7A-12225-B, and Vacuum Stop FEW-12202-B.
FEW-12127-D Modification: Install Vacuum Stop FEW-12202-B

►*DETONATION CORRECTION (DUE TO USE OF LOW OCTANE FUEL):* Detonation which is caused by the use of low octane fuel (below 98 Octane), can be corrected by installation of Modification Kit, Part No. MJK-12127-B (FEW-12127-A Distributor), MJK-12127-C (FEW-12127-D Distributor), MJK-12127-D (FEW-12127-E Distributor). Each kit contains necessary Automatic Advance springs, Vacuum Control springs, and Vacuum Control stops. After installation of springs, recalibrate distributor. *See "Automatic Advance (Modified Distributor)".* (Use Vacuum Advance indicated for FEW-12127-E). *NOTE* - If a slight knock is noticeable after modification, retard initial timing to a minimum of 3° BTDC, regardless of transmission being used. DO NOT retard under 3° BTDC for any reason. If the above changes do not decrease detonation to a satisfactory point, install a 160° thermostat (Part No. EDG-8575-G) in engine manifold. After modification, stamp an "M" following number on distributor model plate.

Condenser - Mercury B7A-12300-A. **Capacity** .21-.25 mfd.
Contact Point Set - Mercury B7A-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance - FEW-12127-A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
½-1½		500	11-3		1000
3-4		600	6-8		1200
5½-6½		1000	11-13		2000
8-9		1500	16-18		3000
10-11½		2000	20-23		4000

Automatic Advance - FEW-12127-D, E

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
2½-3½		500	5-7		1000
4½-5½		600	9-11		1200
7½-8½		1000	15-17		2000
10-11		1500	20-22		3000
12½-14		2000	25-28		4000

Automatic Advance ②
(Modified FEW-12127-A, D & E Distrs.)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1-2		500	2-4		1000
3½-4½		500	7-9		1600
5-6½		1000	10-13		2000
9½-11		1500	19-22		3000
14-15½		2000	28-31		4000

Automatic Advance - FEW-12127-F

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0		900
¾-2		525	1½-4		1050
6½-7½		800	13-15		1600
12½-14		2000	25-28		4000

② - Applies only to distributors modified for low octane fuel (see "Detonation Correction" above). Use FEW-12127-E vacuum advance specifications for modified distributors.

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate.

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Ⓒ Vacuum Advance - FEW-12127-A

Distr.	Degrees Eng.	Degrees Vacuum	(" of Hg)
0-1	0-2		6
½-2½	1-5		8
3-5	6-10		10
7½-10	15-20		14
10-12	20-24		18-20

Ⓒ Vacuum Advance - FEW-12127-D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
½-2½	1-5	6
3-5	6-10	8
5½-7½	11-15	10
9½-11½	19-23	14
10½-12½	21-25	18-20

Ⓒ Vacuum Advance - FEW-12127-E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	6
1-3	2-6	8
3½-5½	7-11	10
7½-9½	15-19	14
10½-12½	21-25	18-20

③ Vacuum Advance - FEW-12127-F

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
½-3½	1-7	7
6¾-9¾	13½-19½	12
10½	21	Max. Limit

Ⓒ - With Test Machine speed of 200 RPM.

③ - Test Machine set to 0° at 1000 RPM and 0" vacuum.

►*DISTRIBUTOR REMOVAL CAUTION:* Intermediate drive shaft (hex sided oil-vacuum pump drive shaft) is retained by internal toothed lockwasher at upper end (lower washer also used on early cars) which should prevent shaft from disengaging when distributor removed. If shaft becomes disengaged and drops into oil pan when distributor removed, make certain that lockwasher installed on shaft to prevent reoccurance.

►*DISTRIBUTOR REMOVAL NOTE:* Engine front cover capscrew nearest distributor may interfere with distributor removal on some cars. Loosen capscrew to remove distributor or replace this screw with special capscrew, No. 2050-S8 (5/16"-18 x 2").

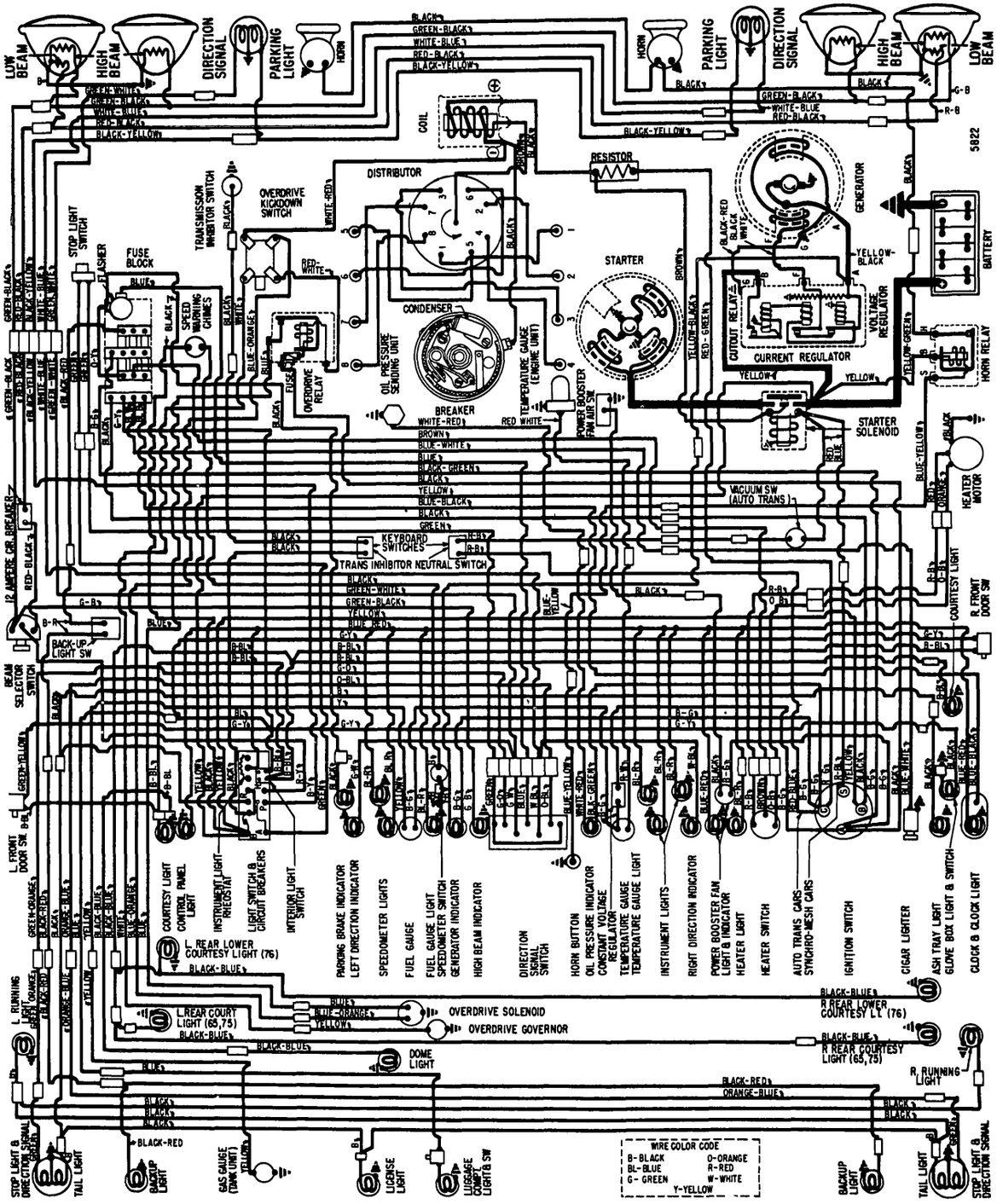
IGNITION TIMING

►*DISTRIBUTOR - INTAKE MANIFOLD INTERFERENCE CORRECTION:* Interference between distributor terminal housing clamp and intake manifold may cause timing setting difficulty. Correct by grinding off intake manifold.

►*IGNITION TIMING CAUTION: See distributor modification above for "LIGHT LOAD SPARK KNOCK CORRECTION". Ignition timing depends on model of distributor used and type of transmission. See table below.*

Engine	Trans.	Distributor	Std. Setting
312	Std. & O.D.	FEW-12127-F	3-7° BTDC
312	Automatic	FEW-12127-F	6-11° BTDC
383	Std. & O.D.	FEW-12127-A	5-7° BTDC
383	Automatic	FEW-12127-A	10-11° BTDC
383, 430	Std. & O.D.	FEW-12127-D,E	4-6° BTDC
383, 430	Automatic	FEW-12127-D,E	7-8° BTDC

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►*IGNITION TIMING NOTE: On cars with modifi d distributors (se "D tonation Corr ction" abov), s t ignition timing to 3-6° BTDC. DO NOT set less than 3° BTDC.*

Timing Mark - Crankshaft dampener is marked at TDC, 10° BTDC, 20° BTDC, with scribed marks at 2° increments between these points. Align correct mark with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Holley 2-Barrel or 4-Barr l, or Ford 4-Barr l Carburetors used. Carburetor for ach engin and typ of transmission listed in table b low.*

HOLLEY 2-BARREL

Eng. & Trans.	Mercury No.
312 Std. Ⓒ	5751095

HOLLEY 4-BARREL

312 Opt. Ⓒ	B7A-9510-U
383 Low Torque, Std. Trans.	② EDG-9510-C, ③ 5750890
383 Low Torque, Auto. Trans.	EDG-9510-E, ⑩ 5750891
383 High Torque, Auto. Trans.	EDG-9510-D, ⑤ 5750898
430 Auto. Trans.	EDJ-9510-A, ⑥ 5750897

FORD 4-BARREL

383 Low Torque, Auto. Trans.	EDG-9510-A
383 High Torque, Auto. Trans.	EDG-9510-B

Ⓒ - Std. & O.D. with 3.56-1 axle ratio, Auto. Trans. with 3.10-1 axle ratio.

② - Not serviced. Use EDG-9510-E or 5750891 less dash pot.

③ - Use 5750891 less dashpot. Replaces EDG-9510-C.

⑩ - Replaces EDG-9510-E.

⑤ - Replaces EDG-9510-D.

⑥ - Replaces EDJ-9510-A.

Throttl Linkag Adjustm nts (Auto. Trans. Cars): Set hand brake firmly, install tachometer and pressure gauge then proceed with adjustments as follows:

Idl Sp ed Adjustm nt - Adjust engine idle speed to 450 RPM (carburetor control shaft disconnected) with engine at operating temperature, transmission in DRIVE (Merc-O-Matic) CRUISING RANGE (Multi-Drive) and throttle lever against hot idle screw.

Carbur t r t C ntr l Shaft Rod Adjustment - Adjust dashpot plunger, see "Dashpot Adjustment" below, then remove transmission control rod to transmission control shaft clevis pin and insert Gauge Pin Tool 77230-MB through control rod shaft and bracket. Adjust carburetor to control shaft rod so it enters freely in hole in carburetor, then lengthen rod one (1) full turn and install rod. Remove tool.

Acc l rat r Shaft t Transmission Shaft Control Rod Adjustm nt - Hold carburetor throttle rod in slow idle position, and transmission control shaft to transmission control shaft rod so clevis pin will enter hole in transmission control shaft to transmission rod freely, then lengthen accelerator shaft-to-transmission control shaft three (3) full turns (turn counterclockwise).

Transmission Control Shaft to Transmission Rod Adjustment - Apply hand brake, increase engine speed to 1000 RPM (transmission in DRIVE for Merc-O-Matic, CRUISING RANGE for Multi-Drive). Pressure gauge should read 80-85 lbs. *NOTE* - Increase pressure reading by increasing length of transmission control shaft to transmission rod (½ turn at a time) or reduce pressure by reducing length (½ turn at a time). *CAUTION - Make adjustments quickly and return to neutral position to avoid overheating transmission.* Install clevis pin with cotter pin and tighten locknut securely.

►*2-3 SLIPPAGE CORRECTION (Early Cars): See MERC-O-MATIC & MULTI-DRIVE TRANSMISSIONS below.*

Dashpot Adjustment: Loosen dashpot to dashpot bracket locknut, rotate dashpot to obtain .045-.064" clearance (312" Engine), .067" clearance using Tool 9545-B or T109-234 (383" & 430" Engines) between plunger and lever with dashpot plunger in to limit of travel and throttle lever closed. Retighten locknut.

HOLLEY 2-BARREL

►*NOTE:* For model application see table above.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - ¾-1¾ turns open. Turn idle mixture screw in until engine begins to run rough, then back off screw until engine begins to "roll" indicating too rich mixture. Turn screw in to obtain smoothest engine idle. Repeat on other screw. Final adjustment should favor "rich" side..

Idle Speed - 475-500 RPM (Std. & O.D.), 450 RPM (Merc-O-Matic in DRIVE) or (Multi-Drive in CRUISING RANGE). Adjust as necessary to secure drive range RPM.

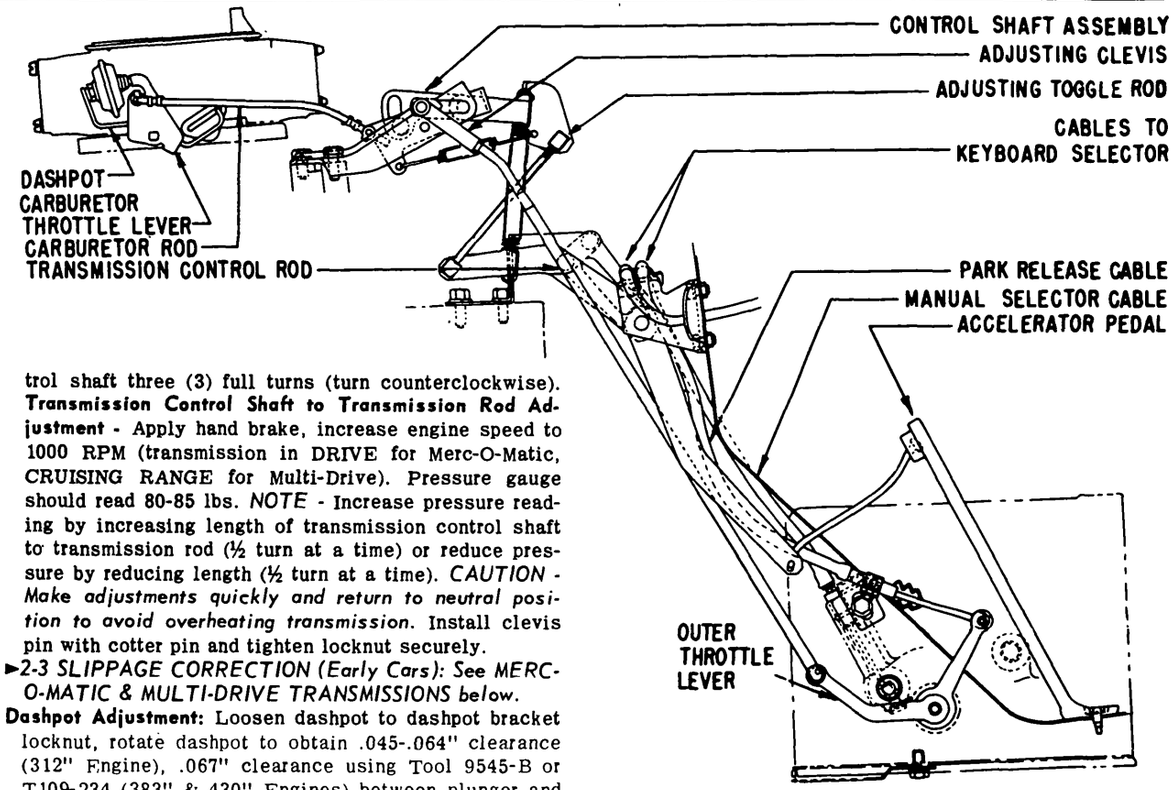
Fuel Level - 3/32" below to 1/32" above lower edge of sight plug opening.

Accelerating Pump: Install screw in lower hole (No. 2) of pump cam for winter driving, or in upper hole (No. 1) for summer driving.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Thr ttle Linkage Adjustment: *S CARBURETOR ab v .*

►*OTHER DATA: S "H ll y 2 & 4-Barr l Car bur tors" in Carbur tion S ction.*



MERCURY MERCOMATIC THROTTLE LINKAGE

FORD & HOLLEY 4-BARREL

►*NOTE:* For model application see table above.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels Cyl. 2-3-5-8.*

►*ENGINE STALLING (AFTER A NORMAL COLD START) CORRECTION:* This may be due to incorrect choke linkage adjustment. *See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*CARBURETOR VENT REWORK (To prevent spillage of fuel under flooding conditions): See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*THROTTLE LEVER & SHAFT ASSEMBLY PRODUCTION CHANGE (383, 430):* Use reinforced throttle lever and shaft assembly to improve engine idle stability. Part No. 5751508 replaces EDB-9581-C (B7A-9581-B). Part No. B8A-9581-D replaces EDJ-9581-A. *NOTE* - Return spring must be under tension with inner tang on top of throttle body boss.

►*HIGH IDLE RPM CORRECTION:* Caused by interference between fast idle cam and choke operating rod retainer clip. *See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*SLOW OPENING CHOKE CORRECTION:* Caused by binding choke or heat warped stove plate cover. *See*

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"Holl y2 & 4-Barr l Carbur tors" in Carbur tion S ction.

►*FORD 4-BARREL FLOODING CORRECTION:* Caused by damaged inlet needle-to-lever connector. Repair or replace connector.

Idle Setting - Both screws (primary side only) 1½ turns open.

Idle Speed - 475-500 RPM (Std. & O.D.), 450 RPM (Merc-O-Matic in DRIVE) or (Multi-Drive in CRUISING RANGE). Adjust as necessary to secure driving range RPM.

Accelerating Pump: Place accelerating pump rod in No. 2 hole (Summer) No. 3 hole (Winter) 383 Low Torque; in No. 1 hole (Summer) No. 4 hole (Winter) 383 High Torque when equipped with Ford 4-Barrel Carb. Place accelerating pump rod in No. 1 hole (Summer) No. 2 hole (Winter) when equipped with Holley 4-Barrel Carb. Holes marked from shaft outward.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford" or "Holley" 4-Barrel Carburetors in Carburetion Section.*

HOLLEY 2-BARREL
(Triple Two-Barrel Compound)

	Mercury No.
Front	5750613
Center	5750614
Rear	5750613

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), *see "Mercury Triple Two-Barrel Compound" Carburetors in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Mercury No. ECZ-9350-B (312), Fuel & Vacuum; No. EDG-9350-B (383, 430) Fuel only.

Pressure - 4.0-6.5 lbs. (312), 4.5-6.5 lbs. (383, 430). *See "Fuel Pumps" in Carburetion Section.*

►*FUEL PUMP PUSHROD & CAMSHAFT ECCENTRIC PRODUCTION CHANGE & NON-INTERCHANGEABILITY CAUTION (383" & 430" Eng.):* Two pushrods and eccentrics used as follows: Pushrods, EDG-9400-A (cast bronze tip) and 5750261 (oilite bronze tip with groove 1/32" wide x .020" deep opposite tip). Eccentrics, EDG-6287-A (chrome plated) and 5750260 (plain finish). Use pushrod, EDG-9400-A and eccentric EDG-6287-A on engines date coded 476U to 479D. On engines date coded 479-E or later (except Mercury 479N) use pushrod 5750261 and either eccentric. *CAUTION - DO NOT use plain finish eccentric with cast bronze tip pushrod.*

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage type with voltage regulator No. FEK-10804-A.

Dash Unit - Mercury No. FEW-9280-A (Std.). Use FEW-9280-C with fuel warning signal.

Tank Unit - Mercury No. B7A-9275-F (Exc. Sta. Wgn.), B7A-9275-G (Sta. Wgn.). Use FEY-9275-A with fuel warning signal.

See "Fu l Gaug s" in Carbur ti n S ction.

Air Cl an r: DRY FILTER ELEMENT TYPE. Clean every 2,000 miles, replace element every 20,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

►*AIR CLEANER INSTALLATION CAUTION (312 Eng.):* Word "FRONT" should be toward front of engine on all air cleaner installations except when recess in bottom of cleaner will not clear carburetor linkage when cleaner placed on carburetor. In this case, position notch in cleaner on lug of carburetor, disregarding word "FRONT". Air inlet opening will be to right side of engine. Block out old word "FRONT" and paint "FRONT" in proper location. New air cleaner body Part No. PB8M-9609-A has "FRONT" in proper location.

BATTERY

Std. - Mercury No. MGK-10655-A. 12 volt, 11 plate, 55 ampere hour capacity.

Auto. Trans. - Mercury No. MHK-10655-A. 12 volt, 13 plate, 65 ampere hour capacity.

Air Cond. - Mercury No. MJK-10655-B. 12 volt, 17 plate, 72 ampere hour capacity. All at 20 hour rate.

STARTER

►*ENGINE STARTS AUTOMATICALLY WHEN IGNITION TURNED ON OR WITH TRANSMISSION IN OTHER THAN NEUTRAL POSITION CORRECTION: See "Mercury Keyboard Transmission Control" in Transmission Section.*

Mercury No. B6A-11002-A or FAY-11002-A. Armature - B6A-11005-B.

►*STARTER NOISE CORRECTION:* Caused by insufficient clearance between starter and cylinder block at top mounting lug which "cocks" starter when tightened. Grind off top mounting lug to correct.

Drive - Mercury No. 1CM-11350-C. Bendix "Folo-Thru".

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM, 155-190 amps.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12	80
15.5 ft. lbs.	0	5.0	550

Starting Switch: (Synchro-mesh Trans.) - Relay No. B6A-11450-A, controlled by Ignition & Starter Switch No. B5A-11572-A.

(Auto. Trans.) - Relay Part No. B6A-11450-A, controlled by Neutral & Starter Switch, Vacuum Starter Cutout Switch No. FEW-11516-A and Neutral Starter Switch FEW-15812-A.

Starter Removal: Turn front wheels to full right, disconnect battery ground (negative) cable and raise car. Remove cable from starter and disconnect exhaust pipes at muffler (single exhaust) or exhaust pipe (dual exhaust). Remove pipe from muffler. Remove starting motor to flywheel housing screws and pull starter out and up until drive clears housing then raise in vertical position with drive end down, between engine and fender apron. Hold motor by drive assembly and rotate starter motor housing to clear drive end plate mounting bosses then lower starter between tie rod and idle arm.

Installati n: Tape dust seal lip (use masking tape) to inner circumference of housing to hold it in place, and reverse removal procedure. *NOTE* - Tighten outer capscrew first, then top and bottom capscrews to maintain alignment of starting motor to flywheel housing.

Neutral Start Switch Adjustm nt: *S "M rcury Keyboard Transmission Control" in Transmission S ction.*

GENERATOR

Mercury. 12 volt. Used as follows:

Application	Generator N.	Armatur N.
Std. & O.D.	FGZ-10002-A	FGT-10027-A
Auto. Trans.	① 2900278	2900199
Air Cond.	FGV-10002-A	FGP-10027-A

① - Or B8A-10002-A.

►*GENERATOR MOUNTING BRACKET PRODUCTION CHANGE (To reduce failur s):* Use new brackets Part No. EDG-10156-B and 5750168 in case of bracket failure. *NOTE* -- On early engines (with smaller bracket mounting surface), place one spacer Part No. 5750163 between mounting bracket and block and one spacer between bracket and engine front cover bracket mounting surface.

Performanc Data

Generator	Amperes	Gen. RPM
FGZ-10002-A	30	2450
2900278, B8A-10002-A	35	2670
FGV-10002-A	40	2390

Brush Spring Tension - 26-34 ozs.

Field Current - 1.5-1.6 amps. at 15 volt (30 & 35 Amp. Gen.), 10 volt (40 Amp. Gen.).

Rotation - Counterclockwise at commutator end.

Belt Adjustment: - Approximately 3/8" deflection midway between generator and water pump pulleys with normal thumb pressure.

REGULATOR

Mercury. 12 volt. Used as follows:

Regulator No.	G n rat r
B7A-10505-B, E	FGZ-10002-A
2900305②	B8A-10002-A, 2900278
B8E-10505-C	FGV-10002-A

② - Or B8E-10505-B.

►*SETTING NOTE:* Settings are for regulator at NORMAL OPERATING TEMPERATURE (after running engine for 20 minutes at 1500 RPM if started cold, or until temperature gauge is steady for 5 minutes if engine previously warmed up) with room temperature at 75°F.

Cutout Relay

Cuts In - 12.4-13.2 Volts (2900305), 12.0-12.8 Volts (Others).

Cuts Out - 2-6 Amps. (2900305), 2-9 Amps. (Others).

Voltage R gulat r

S tting - 14.6-15.4 Volts.

Ch cking & Adjusting - *S "Ford, Lincoln, Mercury 12 V lt R gulat rs" in Electrical S ction.*

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Current Regulator

Setting - 28-32 Amps. (B7A-10505-B), 33-37 Amps. (2900305), 38-42 Amps. (B8E-10505-C).

Checking & Adjusting - *See "Ford, Lincoln, Mercury 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System). *See "4-Headlight Systems" in Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Remove ground (negative) battery cable and steering wheel. Mask steering column tube assembly, area around speedometer and instrument cluster. Remove instrument cluster hood assembly to dash panel screws (four), three screws from recess above speedometer dial, and two lower screws. Remove hood assembly. Remove other three screws, windshield wiper setscrew knob, remove knob and shaft assembly. Unscrew wiper control nut, pull speedometer and instrument cluster out slightly to facilitate removal of socket and bulb assemblies. Push light switch shaft straight in to remove spring pin retainer and remove switch locknut and switch assembly.

Stop Light Switch Location: On forward end of brake master cylinder (integral with power brake unit). Master cylinder or power brake unit located on firewall in engine compartment.

LIGHTING CIRCUIT BREAKERS: 18 Ampere. Integral with lighting switch, protects headlamps.

12 Ampere. Located on left cowl panel, protects headlamp (Low beam).

12 Amp. Integral with lighting switch, protects Parking, Rear, Stop, License Plate and Instrument lamps.

FUSES: Fuses located in fuse panel on left side of brake pedal support with exception noted.

SFE 7.5 Amp. For Interior lamps, Turn Signals, Radio, Spotlight, Multi-Luber, and Instrument lights.

SFE 14 Amp. For Heater Blowers and Elec. Radio Antenna,

1 AG-1 Amp. For clock.

1 AGC 15 Amp. For cigar lighter which has sulphur Disc attached to back of lighter socket.

1 AGC 15 Amp. For Overdrive. On Overdrive Relay bracket located in engine compartment.

ENGINE

►*MAXIMUM ENGINE RPM CAUTION (CARS WITH AUTOMATIC TRANSMISSION):* DO NOT operate engine in excess of 2500 RPM with selector lever in "N" (Neutral), "P" (Park), or "R" (Reverse) as damage to clutch plates may result.

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc Ilan us Section.*

►*LOW OCTANE FUEL ADAPTER KIT NOTE (EDG, EDJ Eng.):* If necessary to lower compression ratio from 10.5-1 to 7.14-1 (EDG) or 10.5-1 to 7.25-1 (EDJ) for use with low octane fuels, install Kit Part No. I-502591 which contains cylinder head-to-block spacer, longer pushrods, new dowels, cylinder head gaskets, and longer cylinder head bolts. *NOTE* - Use cylinder head gasket on each side of spacer.

ENGINE SPECIFICATIONS: 90° V8, Overhead Valves. Three engines used - **312"** similar to 1957 (see NOTE below), **"EDG" (383")** and **"EDJ" (430")** new Marauder engines with two HP ratings for each engine. Wedge type combustion chamber formed by 10° angle of top of block and stopped design piston head. Bottom surface of cylinder head is flat machined.

►*312 ENGINE NOTE:* Engine is similar to 1957 except for Cylinder Block & Camshaft, Valve Rocker Arm & Intake Manifold Assemblies. Aluminum Intake Manifold Spacers used in place of Air Cleaner Air Valve and Duct Assembly. *SEE 1957 MERCURY "ENGINE" FOR ALL DATA EXCEPT THE FOLLOWING: Valve Tappet Clearance, Camshaft, Cam Lobe Lift, Valve Timing, and Valve Timing Check. This data is listed in engine data below.*

►*CYLINDER BLOCK REPLACEMENT NOTE (EDG, EDJ):* Replacement cylinder blocks code dated 4-82G and later have code stamped at right rear section of oil pan rail. Blocks dated 4-82R and later are .020" higher and one cylinder head gasket should be used. On earlier blocks (date coded 4-82R or not coded) two gaskets may be used.

Model	Bore	Stroke	Displacement
312	3.80"	3.44"	312 cu. in.
383	4.30"	3.30"	383 cu. in.
430	4.30"	3.70"	430 cu. in.

Model	Rated HP	Compr. Ratio	Developed HP
312	46.2	9.7-1	255 at 4600 RPM
383	59.17	10.5-1	① 312 at 4600 RPM
430	59.17	10.5-1	② 360 at 4600 RPM

① - Low torque engine, 330 at 4800 RPM high torque engine with larger carburetor.

② - 400 at 5200 RPM with three 2-Barrel carburetors.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Mercury Special Data.*

►*HEAD GASKET SERVICE REPLACEMENT CHANGE AND INSTALLATION NOTE (EDG & EDJ):* Use new gasket No. B9ME-6051-A. Apply sealer No. 8A-19554-B moderately to each side of gasket before installation.

►*CYLINDER HEAD & INTAKE VALVE CAUTION (EDJ Eng.):* All "EDJ" engines after Code Date 4-8-1-J (located on block in front of left cylinder head) have an "EDG" engine cylinder head No. 5750062 with smaller diameter intake valve seats (2.060"). Valve face diameter 2.080-2.090". *CAUTION - EDG-6507-F intake valve cannot be used with 5750064 cylinder head and EDJ-6507-F intake valve cannot be used on 5750062 cylinder head.* Cylinder head 5750062 can be used to service both EDG and EDJ engines when cylinder head equipped with EDG-6507-F intake valves. *NOTE* - Always check assembled spring height.

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data.*

ENGINE REMOVAL: *See "Engine" in Mercury Special Data.*

►*REAR ENGINE MOUNTING CAUTION (EDG):* Different rear mounting used with Edsel frame than with Mercury frame. *See "Engine Mountings" in Mercury Special Data.*

OIL PAN REMOVAL (EDG & EDJ): Turn engine so No. 1 or No. 5 piston is at TDC. Remove battery ground cable and oil dipstick. Raise car. Drain oil and remove front splash shield. Remove both front engine insulator nuts. Support front edge of oil pan on safety jack, then lower car to raise engine 2". Place 1" block of wood between insulators and engine. Raise car and remove safety jack, then remove two right hand stabilizer mounting bracket bolts, nuts and washers. Pull stabilizer out and down for oil pan clearance. Remove oil pan screws, lower oil pan to crossmember. Remove lower and loosen upper oil pump inlet tube-and-screen screws so it swings freely to clear oil pan baffle. Then lower pan with forward motion.

PISTONS

New step head design, longer skirt, slipper type, steel strut, aluminum alloy. No piston pin retaining rings used. Piston pin is interference fit in rod.

►*REVISED PISTON SIZE & CLEARANCE SPECIFICATIONS (430"):* Std. size piston furnished in two (reduced) sizes and marked with color code on top of piston as follows:

Code Red 4.2997-4.2983", Code Blue 4.2989-4.2995". *See revised clearance specification below.*

Removal - Piston and rod removed from above.

Clearance (383") - .0008-.0026" at bottom of skirt. Wear limit .005".

Clearance (430") - .0017-.0035". This supersedes previous specification of .0008-.0026".

Fitting New Pistons: *See "Pistons" in Mercury Special Data.*

Replacement Pistons: Std. *(see NOTE above)* and .020", .030" and .040" Oversize.

►*PISTON REPLACEMENT NOTE: Pistons for RIGHT & LEFT cylinder bank are NOT interchangeable.*

Installing Pistons: Install piston so that indentation on head of piston is toward front of engine. *See Rod Installation.*

►*PISTON INSTALLATION NOTE:* Pistons for RIGHT & LEFT cylinder bank are NOT interchangeable.

PISTON PINS

No retaining rings used. Pin is press fit in connecting rod. Piston and pin furnished as an assembly (oversize pins not furnished). *See Pin Fit in Rod below.*

Diameter - .9750-.9753". **Length** - 3.480-3.500".

Clearance in Piston - .0001-.0003". Light thumb press fit at 70°F. *NOTE* - When excessive replace piston.

Clearance in Rod - .0008-.0016", **interference fit.**

Piston Pin Removal & Installation: *See "Piston Pins" in Mercury Special Data.*

Replacement Pins: Standard size only. Also furnished with new pistons.

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PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.0780"	.015-.025"	.0015-.003"
Compr. #2	.0930-.0940"	.015-.025"	.001-.003"
Oil #3	.1825-.1879"	①.015-.055"	②

① - Control ring segments. ② - Side sealing type ring.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring spacer expander gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of spacer expander gap (1" each side of piston head notch).

Replacement Rings: Furnished Std. .020", .030" & .040" Oversize.

CONNECTING RODS

Length (Center-to-Center) - 6.599-6.601".

Journal Diameter - 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue).

Lower Bearing - Copper-lead alloy, steel back.

Clearance - .0006-.0026". Wear limit .0037".

Side Clearance - .005-.015". Wear limit .018".

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

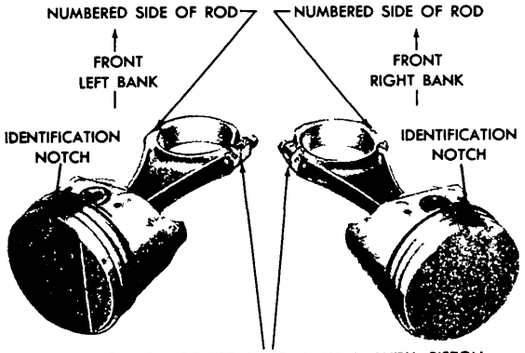
Installing Rods: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole inward and rod number facing outward toward outer side of cylinder block. *NOTE* - Pal nuts on bearing cap discontinued on later cars.

CRANKSHAFT

►*383 & 430" MAIN BEARING BOLT SERVICE REPLACEMENT NOTE: See "Crankshaft" in Mercury Special Data.*

Journal Diameter - 2.8998-2.9002" (Code Red), 2.8994-2.8998" (Code Blue).

Out-of-Round Limits - .00025". Taper Limits .0005".



POSITION OIL SQUIRT HOLE INWARD WITH PISTON IDENTIFICATION NOTCH FORWARD TOWARD FRONT OF ENGINE CAUTION PISTONS ARE NOT INTERCHANGEABLE FROM ONE CYLINDER BANK TO THE OTHER

MERCURY PISTON & ROD ASSEMBLY

Bearings - Copper-lead alloy, steel back.

Clearance - .0009-.0029". Wear limits .0036".

Endplay - .004-.008". Wear limit .012".

End Thrust - Taken by No. 3 (center) main bearing.

Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Mercury Special Data.*

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED or BLUE bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*

CAMSHAFT

►*BEARING BORE NOTE (EDG, EDJ):* Bearing bores in block are stepped (largest at No. 1, smallest at No. 5) to permit easy removal and installation of bushings. O.D. of camshaft bearings is greater to fit bores.

►*CAMSHAFT PRODUCTION CHANGE (EDG, EDJ):* New camshaft No. 5750914 used beginning 12/5/1957 (Date code 4-7BE), EDG engine, and 11/14/1957 (Date code 4-7A0), EDJ engines. Engines having later camshaft are identified by dot of orange paint on engine front cover and daub of yellow paint between No. 1 bearing journal and distributor drive gear. An "X" also stamped on later camshaft.

►*CAMSHAFT INSTALLATION CAUTION (EDG, EDJ):* Split type bearings must have split toward top of block. No. 1 bearing must have notch in bearing facing toward front of block and bearing must seat .005-.020" inward from finished face of block.

Journal Diameter - **(312)** 1.9255-1.9265". **(EDG, EDJ)** 2.264-2.265".

Bearings - Babbitt lined, steel backed bushing.

Clearance - **(All)** .001-.003".

End Thrust - **(312)** Taken by thrust plate between camshaft sprocket and shoulder of block.

End Thrust - **(EDG, EDJ)** Toward rear of engine. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.

Replacement Bearings: Finished bearings furnished Std. and .015" Undersize.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Mercury Special Data.*

Timing Chain Deflection - ½", measured on camshaft side while taking up slack on drive side. Remove and install "Endless" chain as a unit with both sprockets.

Camshaft Setting: **(312)** Install timing chain and sprockets as an assembly when timing marks on sprockets are to drive side and 12 timing chain pins between marks.

(EDG, EDJ) Install timing chain on sprockets with marks adjacent and in line across shaft centers.

Timing Chain Cover & Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Mercury Special Data.*

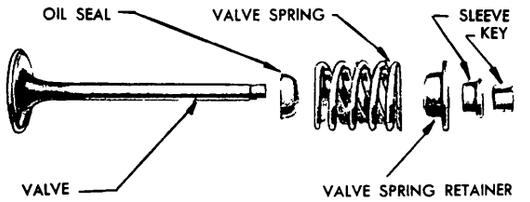
VALVES

Tappet Clearance: **(312)** .020" Intake and Exhaust (Cold), .019" Hot. **(EDG, EDJ)** None in service (Hydraulic Lifters), *See VALVE LIFTERS below.*

Valve Tappet Adjustment - **(312)** *See "Valve System" in Mercury Special Data.*

►*VALVE LIFT NOTE (312"):* Valve lift is .377" (Intake), .375" (Exhaust).

►*EDG, EDJ EXHAUST VALVE STEM SEAL PRODUCTION CHANGE (To Eliminate Valve Sticking, Stem and Guide Wear):* Install New Exhaust Valve Stem Seal (.300" shorter), Part No. B8S-6571-BUP, before replacing piston rings for oil consumption. Use standard seal EDG-6571-AUP on all Intake Valves.



MERCURY VALVE ASSEMBLY

EDG, EDJ Engines

Valve	Head Diameter	Stem Diameter
Intake	① 2.080-2.090"	3711-.3718"
Exhaust	1.770-1.780"	.3693-.3700"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	⑤	③ .001-.0024"
Exhaust	45°	⑤	④ .0028-.0042"

① - All EDG and later EDJ. Early EDJ 2.140-2.150". *See "Cylinder Head & Intake Valve Caution" above.*

③ - Wear limit .0045".

④ - Wear limit .0065".

⑤ - See separate table below.

Cam Lobe & Valve Lift

Model	Valve Lift	Cam Lobe Lift
EDG EARLY	.4021"	.2285"
EDJ EARLY	.4411"	2506"
EDG & J LATE	.4076"	2316"

Valve Seat Width - .060-.080" (Int.), .070-.090" (Exh.).

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over valve guide. *See "Exhaust Valve Stem Seal Production Change" under Valves above.*

Valve Stem Clearance Check - *See "Valve System" in Mercury Special Data.*

Oversize Valve Stem Installation - *See "Valve System" in Mercury Special Data.*

►*ROTATABLE VALVE NOTE:* All valves rotatable type. *See "Valve System" in Mercury Special Data.*

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Valv Springs (EDG, EDJ): Green and Maroon springs used, see specifications below. Use Maroon springs for replacement.

Fr L ngth - 2.030".

►*VALVE SPRING CAUTION:* Valve dampener springs inside valve springs on all valves.

Valv Spring Specifications

Early Green Springs

	Pressure ⑩	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	245-255 lbs ②	1.43"

Lat r Gr n & Maroon Springs

	Pressure ⑩	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	240-260 lbs. ③	1.43"

① - Wear limit 60 lbs. ② - Wear limit 220 lbs.
③ - Wear limit 225 lbs. ⑩ - Spring and dampener.

►*VALVE SPRING INSTALLATION NOTE (EDG, EDJ):* Measure assembled height of spring from cylinder head spring pad to underside of spring retainer (1.830"). If greater, install one or not more than two .030" thick spacers No. EDG-66514-A as necessary to correct height. *NOTE* - DO NOT use spacers unless assembled height is incorrect.

Valv Guid s: (EDG, EDJ) - Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.0045" Intake, .0065" Exhaust), ream guides and install oversize valve. *S e "Valve System" in Mercury Special Data.*

Valv Lift rs: (EDG, EDJ) - Hydraulic lifters used in all engines. Removed from above without removing camshaft.

►*STEADY SPEED HYDRAULIC LIFTER NOISE CORRECTION (EDG, EDJ):* Caused by aerated oil or insufficient oil pressure 35-50 lbs. at 2000 RPM). Check for oil leaks at gallery plugs, oil pump mounting and pickup tube gaskets, cracked or porous oil pump body, or pickup tube assembly. Correct air leak and/or oil pressure.

►*NOISY HYDRAULIC LIFTER CORRECTION:* New .060" longer valve pushrod available. *See "Valve System" in Mercury Sp cial Data.*

Cl aranc in Lift r B re - .0005-.0020". Wear limit .0026".

Hydraulic Lift r Ov rhaul - *See "Valve System" in Mercury Special Data.*

Hydraulic Lift r Op rating Range Check - *See "Valve Syst m" in Mercury Special Data.*

R ck r Arm Ass mbly: *S e "Valve System" in Mercury Special Data.*

►*ROCKER ARM PRODUCTION CHANGE:* New rocker arm used approximately 2/1958 with reinforcing ribs and oil groove for better lubrication. New type Part No. B8A-6564-C is interchangeable with old type No. EDG-6564-B.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT abov .

►*VALVE TIMING NOTE:* Following valve opening and closing points are with camlift as indicated.

Valv Timing (312 Engin)

Intak Valv - Open 12° ① BTDC. Close 54° ② ALDC.
Exhaust Valv - Open 58° ③ BLDC. Close 8° ATDC.

Valve Timing (Early EDG Camshaft) ⑧

Intake Valve - Open 34° ⑤ BTDC. Close 68° ⑦ ALDC.
Exhaust Valve - Open 75° ⑤ BLDC. Close 27° ⑦ ATDC.

Valve Timing (Early EDJ Camshaft) ⑧

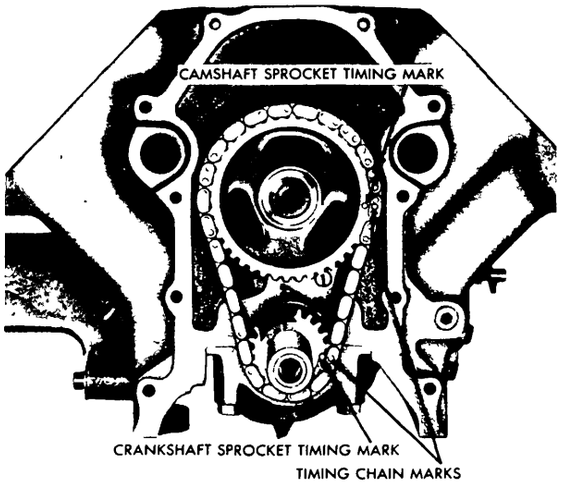
Intake Valve - Open 27° ⑥ BTDC. Close 69° ⑦ ALDC.
Exhaust Valve - Open 69° ⑥ BLDC. Close 27° ⑦ ATDC.

Valve Timing (Later EDG, EDJ Camshaft) ⑧

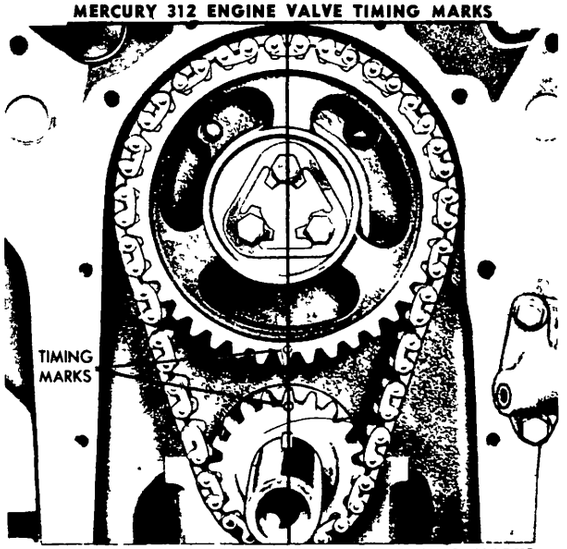
Intake Valve - Open 22° ⑤ BTDC. Close 68° ⑦ ALDC.
Exhaust Valve - Open 63° ⑤ BLDC. Close 27° ⑦ ATDC.

Camlift - ① .016", ② .019", ③ .015", ④ .017", ⑤ .002", ⑥ .003", ⑦ .005".

⑧- *See "Camshaft Production Change" above.*



MERCURY 312 ENGINE VALVE TIMING MARKS



MERCURY EDG & EDJ ENGINE VALVE TIMING MARKS

Valv Timing Ch ck (312) - Slide rocker arm to one side and install dial indicator so reading can be taken from end of valve pushrod (use an indicator that will read .300" or more). Install a quadrant (reading in degrees) on crankshaft pulley to check amount of crankshaft rotation. Rotate engine slowly until dial indicator reading for valve being checked is same as indicated in table above. Amount of crankshaft rotation should be the same as shown in valve timing table. As an example, check intake valve opening by rotating engine until dial indicator reads .016" cam lift. Quadrant on crankshaft should indicate 12°. Continue to rotate engine to check valve closing in degrees. Dial indicator should read .019" and quadrant 54°.

Valve Timing Check (EDG, EDJ) - Remove rocker arm assembly. Install Dial Indicator Tool 6565 and Dial Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Install a quadrant on crankshaft dampener. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers valve opening and cam lobe lift. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner.

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.***
New oil-vacuum pump located in crankcase and driven by distributor intermediate shaft.

►*OIL LEAKAGE CORRECTION (EDG, EDJ):* When oil runs over top of converter or flywheel housing proceed as follows:

1) Coat top right hand flywheel housing to engine capscrew with sealer and tighten to 40-50 ft. lbs.
2) Coat threads of both capscrews that retain accelerator shaft bracket to rear of engine, with sealer and tighten to 10-13 ft. lbs.
3) Check for distorted pushrod cover or replace gasket.

►*HIGH SPEED OIL LEAKAGE CORRECTION (EDG, EDJ):* Caused by oil vapor being drawn through ventilation system. Install new type Valve Pushrod Cover Part No. 5751034, Oil Filler Cap No. 5751388, and replace seal between upper ventilation tube and valve cover with new half moon shaped cork Seal No. 5751385.

Crankcase Capacity: 5 qts. (refill), 6 qts. (after filter change).

Normal Oil Pressure - 35-50 lbs. at 2000 RPM (Hot). *NOTE* - This supersedes previous 45-50 lbs. specification.

Oil Pressure Indicator: Light on instrument panel. Light comes on when oil pressure is low.

Oil Pressure Switch - Mercury No. B6A-9278-A.
S "Oil Pressur Gaug s" in Misc llaneous Section.

Oil Pump: Rotor type, located in crankcase and driven by distributor intermediate drive shaft. Vacuum pump

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(when used) mounted on oil pump cover and driven by oil pump drive shaft.

►*OIL & VACUUM PUMP DRIVE SHAFT PRODUCTION CHANGE (EDG, EDJ). (To Reduce Shaft Breakage):* Install new oil and vacuum Pump Drive Shaft Part No. ED-5750157 or Oil Pump Drive Shaft No. EDG-66627-A (oil pump only). *NOTE* - Continue to use internal lockwasher at upper end of shaft to hold shaft in position when distributor is removed.

►*LOW OIL PRESSURE CORRECTION: See "Oiling System" in Mercury Special Data.*

►*VACUUM PUMP NOISE CORRECTION (EDG, EDJ):* Disconnect vacuum hose from windshield wiper to vacuum pump (not inlet hose to manifold). If noise stops, remove vacuum pump and correct as follows: If exhaust passage plug has dropped out, tap passage 3-4 threads deep using 1/8" pipe tap (DO NOT TAP DEEPER) and install 1/8" pipe plug. If exhaust tube loose in pump housing, replace pump.

Pump Overhaul - *See "Oiling System" in Mercury Special Data.*

Oil Filter: Full flow disposable type. Mounted on lower left front corner of cylinder block. Replace every 4,000 miles or before (in dusty areas) as necessary.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket with light film of oil. Screw on to adapter until snug, then tighten ¼-turn. Do not overtighten.

Crankcase Ventilation: Filter in oil filler cap and road draft tube at rear of engine. Clean and oil filter, in oil filler cap every 4,000 miles. Vacuum pump exhaust supplies fresh air to crankcase.

COOLING

(EDG, EDJ) - New three-stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

Below 140°F - Water circulates from pump to cylinder heads, intake manifold and back to water pump.

140-180°F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to water pump.

Above 180°F - Water circulates the same as between 140-180°F except it returns to radiator for cooling. *NOTE* - Cylinder block thermostats are accessible by removing water pump.

►*LOSS OF COOLANT CORRECTION (EDG, EDJ):* When water pump cover is distorted, loss of coolant may occur at 2000 RPM (Air Cond. Cars), 3000 RPM (Others) or over. Correct by replacing cover and using non-hardening permatex sealer on new gasket. Tighten cover to 6-8 ft. lbs.

►*NEW FOUR BLADE FAN REPLACEMENT NOTE:* Use new reinforced 4-blade fan assembly No. MK-8600-E (.075" less clearance) on standard cooling systems. Recommended for use on cars for high speed driving.

Water Capacity: 20.5 qts. (EDG, EDJ). Add 1 qt. with heater.

Pressure Valve: (EDG, EDJ) Radiator filler cap, Mercury No. LA 8100-A. Operating pressure 12-15 lbs.

Thermostat (312): 160°F. thermostat used on engines prior to 6/11/58 (Date Code 1-86L). After this date and code number, 180°F. thermostats were used.

Thermostat (EDG, EDJ): 157-162° (EDG-8575-G). 177-182°F (EDG-8575-H) type used with permanent type anti-freeze. Located in water outlet connector. **Two** 137-142°F thermostats (No. EDG-8575-D) installed in front face of cylinder banks.

►*ENGINE BLOCK THERMOSTAT INSTALLATION NOTE:* Two types used. Install both types with bulb extending into cylinder block.

Water Pump: Packless, sealed ball bearing type with plastic impeller.

See "Water Pumps" in Mercury Special Data.

►*WATER PUMP PRODUCTION CHANGE & REPLACEMENT NOTE (EDG, EDJ):* Air Cond. Cars produced after 4/1/1958 have a new water pump No. 5751567 which replaces pump No. EDG-88502-B. New pump identified by yellow paint on housing. Use new pump for replacement of all pumps used on air conditioned cars. DO NOT overhaul early pump EDG-88502-B. Pump included in Kit No. MJK-5751567-A.

►*POWER BOOSTER FAN NOTE:* Standard on some 312 engines, and all EDG, EDJ engines equipped with Air Conditioning. Optional on all other EDG, EDJ engines. *See "POWER BOOSTER FAN" under "Cooling" in Mercury Special Data.*

Temperature Gauge: King-Seeley electric, Constant Voltage ("CV") type with Gauge Voltage Regulator No. FEK-10804-A.

Dash Unit - Mercury No. FEW-10883-A.

Engine Unit - Mercury No. B7A-10884-A1.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10.5A6 (312), 11A8 (EDG). Single plate, dry disc type.

Cover Assembly	Mercury No.
Borg & Beck No. 361378	MG-7563-A
Borg & Beck No. 361432	MK-7563-A
Clutch Disc	**Mercury No.**
Borg & Beck No. 382817	MK-7550-B
Borg & Beck No. 382655	MK-7550-A
Borg & Beck No. 382818	MK-7550-C

►*"EDG" OVERDRIVE TRANSMISSION CLUTCH DISC PRODUCTION CHANGE (To Eliminate Vibration):* New Clutch Disc MK-7550-C used on EDG engine with Overdrive transmission, beginning 1/15/1958 to eliminate vibration. Clutch disc used on synchro-mesh and synchro-mesh with overdrive are not interchangeable.

►*CLUTCH NOISE CORRECTION (312 Eng.):* Clutch spring must be installed with long stem hook open end **upward,** to eliminate spring interference with cowl top inner panel.

Pedal Adjustment: Pedal Travel - 6¼-6¾". Adjust clutch pedal bracket up or down to correct.

Free Travel - 1-1¼". Must be made after pedal travel corrected. Loosen clutch pedal release rod locknut and turn adjusting nut, clockwise to increase free travel or counterclockwise to decrease free travel.

Removal: Remove transmission (see Transmission Removal below), and disengage clutch pedal retracting spring and release rod from clutch release lever. Disengage equalizer bar tension spring and remove two capscrews retaining equalizer bracket assembly to flywheel housing. Remove flywheel housing. Mark position of flywheel and pressure plate so parts may be installed in original position. Compress clutch pressure plate assembly with Tool 7563. Remove capscrews, pressure plate and disc.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Mercury Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Remove battery ground cable at battery and drain transmission.

2) On Overdrive cars, use Tool L-6919 to remove governor. Remove solenoid (turn 70° to remove from adapter). Remove overdrive cable and electrical connections.

3) Remove speedometer cable at extension or Overdrive housing, and remove shift rods.

4) On Dual Exhaust Systems - Remove left exhaust manifold to muffler pipe and muffler tail pipe from bracket and move exhaust system out of area.

5) Disconnect rear universal joint flange, remove drive shaft, front universal joint from transmission output shaft.

6) Remove front parking brake cable from equalizer lever and crossmember then remove equalizer rod from lever.

7) Remove two transmission to rear engine support clamp screws and clamp. Place jack under transmission. Raise engine and install engine support tool. Lower engine onto tool and remove engine support crossmember to frame side rails and remove crossmember.

8) Remove transmission to flywheel housing capscrews (two) and install guide pins. Remove lower capscrews, slide transmission to rear to clear main shaft and remove from car.

OVERDRIVE

Warner AS1-R10F. Solenoid operated type, with governor control and throttle operated kickdown.

See "Mercury Overdrive" in Transmission Section

Removal: *See "Synchro-mesh Transmission" above.*

AUTOMATIC TRANSMISSION

TWO types used. **Merc-O-Matic** similar to previous type except for welded Converter Assembly and design changes for new engines (two types used). **Multi-Drive Transmission** similar to Merc-O-Matic but has extra driving range for high performance.

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►*HARD SHIFTING INTO OR OUT OF "PARK" POSITION CORRECTION:* See *"Mercury Keyboard Transmission Control" in Transmission Section.*

►*OIL COOLER FITTING TIGHTENING TORQUE CHANGE & CAUTION:* Oil cooler fitting to transmission case torque has been reduced from 15-20 ft. lbs. to 12-15 ft lbs. Overtightening will cause cooler line bosses to break.

►*2-3 SLIPPAGE CORRECTION (MERC-O-MATIC):* See *"Mercury Automatic Transmission" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* See *"Mercury Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING:* See *"Mercury Automatic Transmission" in Transmission Section.*

Lubrication - Check fluid every 1,000 miles, drain and refill every 16,000 miles with Automatic Transmission Fluid Type A.

Checking Fluid Level - Bring transmission to operating temperature by running engine with transmission in Neutral position. Move shift mechanism through all ranges to assure fluid distribution, then place mechanism in "Park" position for checking fluid level. Maintain level to "Full" mark on dipstick.

Throttle Linkage Adjustment: See *CARBURETOR above.*

Manual Selector & Park Release Cable Adjustment: See *"Mercury Keyboard Transmission Control" in Transmission Section.*

►*OTHER DATA:* See *"Mercury Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. One used at each end of drive shaft.

PROPELLER SHAFT

►*DRIVE LINE THUMP CORRECTION:* Caused by lubrication build-up in front universal joint. Correct by tapping and installing relief valve (5-25 lbs.) using 1/8" pipe tap to cut threads in expansion plug of front universal slip joint. DO NOT cut threads too deeply in plug as valve will interfere with output shaft.

REAR AXLE

Own. Separate carrier type with straddle-mounted pinion, hypoid gear and hotchkiss drive *NOTE* - "Equa-Lock" differential optional with Automatic transmissions
See "Ford & Mercury (Deep-Offset) Hypoid" and "Mercury Equa-Lock" in Rear Axle Section

►*REAR AXLE LUBRICANT LEAK CORRECTION:* Caused by leak around housing bolt threads To correct, replace early type carrier bolts (No. 0A-44044-A) with new bolt (AJ-44044-A) with larger head and apply non-hardening sealer to threads before installation.

►*PINION OIL SEAL PRODUCTION CHANGE (To Reduce Squeal and Oil Leakage):* New 3" Seal Assembly (and other parts) used in production after 2/28/58 and can be installed in earlier cars to replace previous 4½" type seal.
See "Ford & Mercury (Deep-Offset) Hypoid" in Rear Axle Section.

►*REAR AXLE PRODUCTION CHANGE (312):* New Differential & Carrier Assembly (3.56-1 ratio) released for production (Std. or O.D. Trans.). New Assembly has smaller side bearings, 8¾" ring gear and a rear axle drive pinion bumper. The new assembly and 8¾" ring gear will not be released for service.
See "Ford & Mercury (Deep-Offset) Hypoid" in Rear Axle Section for replacement parts.

Axle Ratios

Model & Trans.	Ratio
EDG (Synchro-mesh or Overdrive)	3.56-1
EDG (Auto Trans.)	①2.91-1
EDJ (Auto. Trans.)	2.91-1
312 (Synchro-mesh or Overdrive)	3 56-1
312 (Auto. Trans.)	②3 10-1

① - With transmission PBL-7000-A, M, N; PBE-7000-A, G, H.
② - With transmission PBM-7000-E.

►*GEAR RATIO NOTE:* Gear ratio stamped on tag on rear axle housing bolt.

Backlash - .004-.009".

Axle Shaft Removal: Remove wheel and brake drum. Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange). Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above) remove differential carrier housing to rear axle housing bolts and lift out carrier assembly

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Direct acting, non-adjustable (Std.), Heavy Duty (Optional) Adjustable Heavy Duty optional on Park Lane Series.

Replacement Shock Absorbers

	Front	Rear
(Sedans & Coupes, Exc. Park Lane)		
Std.	①MK-18077-C	①MK-18097-A
H D	③MK-18077-A	③MK-18097-E
(Station Wagons)		
Std	①MK-18077-C	②MK-18097-C
H D	④MK-18077-B	④MK-18097-D
(Park Lane, Exc. Turnpike Cruiser)		
Std.	①MK-18077-C	⑤MK-18097-Y
H D. (Adj.)	I-502422	I-502536

H.D. - Heavy Duty ① - Color Code Yellow.
② - Color Code Blue ③ - Color Code Green.
④ - Color Code White ⑤ - Color Code Orange.

Shock Absorber Adjustment (Adjustable Type): Remove shock absorbers from car, collapse fully, rotate shock absorber body (*CAUTION* - Hold piston rod from turning) in a clockwise direction until desired setting (Firm, Normal, Soft) obtained as indicated by alignment of arrows on dust shield and shock absorber body. A "click" will be audible at each setting point. *CAUTION* - Do not rotate shock absorber in counterclockwise direction which may unscrew piston rod from piston

FRONT SUSPENSION

Independent. Ball-joint type with coil springs Shock absorbers mounted between frame bracket and lower control arm directly behind spring.
See "Mercury" in Suspension & Wheel Alignment Section.

►*FRONT SUSPENSION NOISE CORRECTIONS:* Correct each type noise as follows:

1) Upper Control Arm Squeak - Caused by loss of lubricant at threaded bushing "O" ring seal. Install new type "O" ring seal as used on later cars, or replace bushings.

2) Lower Control Arm Popping or Cracking Noise - Install new type shims No. MK-3054-B (.118") or MK-3054-B (.060") as necessary at outer bushing sleeve position on lower arm. If noise caused by bushing sleeve rubbing on lower arm, install Teflon Washer, No. 371139-S between front bushing and front mounting shim bolt. *NOTE* - This washer installed in production on later cars.

3) Lower Control Arm Rubbing Noise - Caused by lower control arm front mounting bolt rubbing on stabilizer. Correct by cutting off 5/32" from end of bolt or install later type 7 11/32" bolt (first type bolt 7½" long).

King Pin Inclination - 7° with Pos. ¾° Camber.

Caster - 0° to Neg. 1½°. Must be equal within ½° on each side.

Camber - 0° to Pos. ¾°. Must be equal within ¼° on each side.

Toe-In - 3/16-5/16". Supersedes earlier data.

Toe-out on Turns - Inner wheel 20°. Outer wheel 17°6' (Manual Steering), 17°20' (Power Steering).

REAR SUSPENSION

Air Suspension Cars. Control arms used in conjunction with air springs. *See "Ford & Mercury Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs at all four wheels *See "Front Suspension" above for alignment specifications and "Mercury Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Recirculating Ball Nut type
See "Saginaw Worm & Nut" in Steering Section.

Power Steering: Bendix Linkage type. Used in conjunction with standard type steering gear.

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►*PITMAN ARM TO FRAME INTERFERENCE CORRECTION:* Caused by steering gear to frame misalignment or excess forging material on pitman arm.
See "Bendix Linkage Type" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic, Single Anchor (Without eccentric and with fixed anchor pins). Automatic adjustment on all models except those equipped with 312 engine. Parking lever applies service brakes.
See "Ford, Lincoln, Mercury Bendix" or "Bendix (With Automatic Adjuster)" in Brake Section.
Drum Diameter - 11" front and rear.
Wheel Cylinder Diameter - 1 1/8" front, 31/32" rear.
Clearance - (312 Engine Cars) Hand Adjusted type. Expand shoes until wheel is locked. Back off adjusting screw 12-14 clicks until wheel turns free.
Clearance - (Automatic Adjusted type). *See "Bendix (With Automatic Adjuster)" in Brake Section.*

Brak P dal Fr Play Adjustment: ¼-7/16". If play not correct after brake adjustment, loosen locknut on the eccentric bolt attaching brake pedal to master cylinder pushrod and rotate eccentric bolt for desired clearance.

Standard Master Cylinder: Located on engine side of firewall.
Checking Fluid - Maintain fluid level to within ¼" of top of reservoir.
Removal - Remove eccentric bolt, bushing and locknut that secures pushrod to brake pedal, then remove hollow bolt that secures stop light switch and hydraulic line fitting to master cylinder. Remove four capscrews that secure master cylinder to dash panel and remove master cylinder.

Power Brakes: Bendix Power Unit (with hydraulic reaction valve rod). Combination vacuum power unit and master cylinder. Unit mounted on engine side of firewall and replaces standard master cylinder.
See "Bendix Power Unit" in Brake Section.

►*POWER BRAKE AUTOMATIC APPLICATION OR FAILURE TO RELEASE CORRECTION:* Caused by incorrect installation of brake booster mounting bracket. *See "Bendix Power Unit" in Brake Section.*

Checking Fluid Level - Same as for regular master cylinder.
Removal of Power Unit - Release pushrod from lever assembly, master cylinder outlet fitting bolt from master cylinder. *NOTE* - DO NOT remove stop light switch wires or the tube assembly from outlet fitting. Leave outlet fitting in master cylinder. Remove manifold vacuum hose from unit and reserve tank hose from valve fitting. Remove mounting screws and unit from bracket on dash panel.

MISC. MECHANICAL

Windshield Wipers: Vacuum or Electric Motor types, with Cable & Tensioner.
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric. Reversible motor in each window. Controlled by door switch and master control switch. *NOTE* - Rear Window on Turnpike Cruiser and Tail Gate Window on some Station Wagons also power operated. *See "Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Electric-Hydraulic with reversible pump Motor. *See "Power Top Controls" in Misc. Section.*

Power Seat Adjusters: "4-Way" Electric Screw and Jack type with single electric motor driving screw jack. *See "Power Seat Adjusters" in Miscellaneous Section.*
Seat-O-Matic Control - Automatic position adjustment controlled by switch on instrument panel.
See "Seat-O-Matic Power Seat Adjusters" in Miscellaneous Section.

Air Conditioning: Combination Air Conditioning-Heater System, *see "Mercury Air Conditioning" in Misc. Sect.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to left front body pillar between door hinges *NOTE* - Number (example below) includes identification data as follows

① ② ③ ④ ⑤ ⑥
* N 9 W A 500001 *

① - Asterisk used at both ends of number to prevent tampering
② - Engine Type *See Table Below*
③ - Year - 1959
④ - Assembly Plant **J** - Los Angeles (No 2), **T** - Metuchen, **Z** - St Louis, **W** - Wayne
⑤ - Body Series **A** - Monterey, **B** - Montclair, **C** - Park Lane, **D** - Station Wagons
⑥ - Consecutive unit number at each assembly plant

Engine Type

Engin	Code Letter
312" (2-Bbl Carb)	P
383" (2-Bbl Carb)	N
383" (4-Bbl Carb)	M
430" (4-Bbl Carb)	L

Engine Production Code Number: Indicates place, day and month of engine manufacture Not used for licensing
312" Eng. - Stamped on front of cylinder block at push-rod cover-to-cylinder block mounting surface **383" & 430" Eng** - Stamped on cylinder block directly in front of left cylinder head

TUNE-UP

►*383' ENG SPARK PLUG FOULING & LOADING ON COLD START CORRECTION See "Ford 2 & 4-Barrel Carburetor" in Carburetion Section*
►*383' ENG RICH CONDITION, ROUGH IDLE CORRECTION See "Ford 2 & 4-Barrel Carburetor" in Carburetion Section*
►*430" ENG HARD STARTING, ROUGH IDLE, FLOODING & POOR FUEL ECONOMY See "Carter AFB 4-Barrel Carburetor" in Carburetion Section*
►*430" ENG LEAN CONDITION OR SURGING OR ACCELERATION CORRECTION See "Carter AFB 4-Barrel Carburetor" in Carburetion Section*
►*430" ENG IMPROPER RETURN TO IDLE SPEED NOTE See "Carter AFB 4-Barrel Carburetor' in Carburetion Section*

COMPRESSION PRESSURE· 312" - 170±20 lbs **383'** - 190 ±20 lbs **430'** - 200±20 lbs All cylinders must be equal within 10 lbs

VACUUM READING: Steady 19-20" (312"), 17-18"(383"& 430") at idle speed

VALVE TAPPET CLEARANCE: 312" - 020" Intake & Exhaust Cold, 019" Intake & Exhaust Hot, final check with engine temperature stabilized and engine running
Valve Tappet Adjustment - *See "Valve System' in Mercury Special Data*
383" & 430" - Zero lash, hydraulic lifters

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (312")* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL: 312" - Automatic thermostatic type Located in right exhaust manifold Valve must operate freely
383" & 430" - Water jacketed intake manifold with thermostat controlled circulation, eliminates need of heat valve

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See "Fuel System Notes" in Mercury Special Data*

►*CARBURETOR ICING OR PERCOLATING CORRECTION* May be caused by air intake duct valve plate sticking in fully closed position (causing percolation), or the valve plate may be sticking in partially open position (causing icing in cold weather) Check operation of valve and replace if necessary *See "Fuel System Notes" in Mercury Special Data*

IGNITION

FIRING ORDER: 312" - 1-5-4-8-6-3-7-2
383" & 430" - 1-5-4-2-6-3-7-8
Cylinders - RIGHT BANK 1-2-3-4 LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032- 036"
Spark Plugs - Champion F-14-Y (312"), F-11-Y (383" & 430") 18 mm Tapered seat, no gasket used Torque to 15-20 ft lbs

COIL· Mercury No. B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - B84-12250-A 1 3-1 4 ohms at 75°F

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil and is bypassed during cranking by lead from starter solenoid to battery terminal of coil

►*RESISTOR CORRODING & FAILURE CORRECTION* Caused by road splash To correct, install a new resistor on flat part of windshield wiper motor mounting bracket Extend and reroute wires as necessary This change made on later cars

DISTRIBUTOR: "Ball Bearing Breaker Plate Type" (Early), "Pivoted Breaker Plate Type" (Late) as follows

Distributor Application

Model	Mercury No.
312" Eng ①	B9A-12127-B
312" Eng ②	B9AF-12127-B
383" & 430" Eng ①	B9S-12127-B
383" & 430" Eng ②	B9AF-12127-B

① - "Ball Bearing Breaker Plate Type", (Early)
② - "Pivoted Breaker Plate Type", (Late)

See "Mercury Distributors" in Electrical Section
Condenser - Mercury No B7A-12300-A ("Ball Bearing Breaker Plate Type"), No B9AF-12300-A ("Pivoted Breaker Plate Type") **Capacity** - 21- 25 mfd
Contact Point Set - Mercury No B7A-12171-A (All Models)
Breaker Gap - 014- 016"
Cam Angle - 26-28½°
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance - 312" Engine

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
1½-2½		550	3-5		1100
6-7		825	12-14		1650
8½-9½		1100	17-19		2200
12½-14		2000	25-28		4000

Automatic Advance - 383" & 430" Engines

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		350	0		700
1-2¼		525	2-4½		1050
3-4½		750	6-9		1500
7-8¼		1200	14-16½		2400
10½-12		1600	21-24		3200
14-15½		2000	28-31		4000

Vacuum Spark Control: Diaphragm type Mounted on distributor and linked directly to breaker plate

①Vacuum Advance - 312" Engine

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3	0-6	9¼
5½-9	11-18	14
9½-12½	19-25	18

②Vacuum Advance - 383" & 430" Engines

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3½	0-7	6½
3½-6½	7-13	9
6½-9½	13-19	12
9½-12½	19-25	16-20

① - Test machine speed of 1000 RPM
② - Test machine speed of 200 RPM

►***312" DISTRIBUTOR REMOVAL CAUTION:* When oil pump intermediate shaft retainer is loose on shaft shaft may become disengaged from oil pump as distributor is removed. To correct, remove oil pan, oil pump, oil pump intermediate shaft and remove retainer from shaft Strike retainer lightly with hammer to flatten it and reinstall in original position (1 40" from bottom of shaft).** *NOTE* **- Retainer must be tight on shaft and and bear against crankcase when pump and shaft are installed**

IGNITION TIMING

Setting - 3° BTDC (Synchro-mesh), 6° BTDC (Auto Trans) Limits 2-10° BTDC
Timing Mark - Crankshaft damper marked TDC 10° BTDC & 20° BTDC (long marks) with 2° increment marks (short marks) between Align correct mark with pointer on timing chain cover **Set timing with vacuum line disconnected and carburetor opening taped closed.**

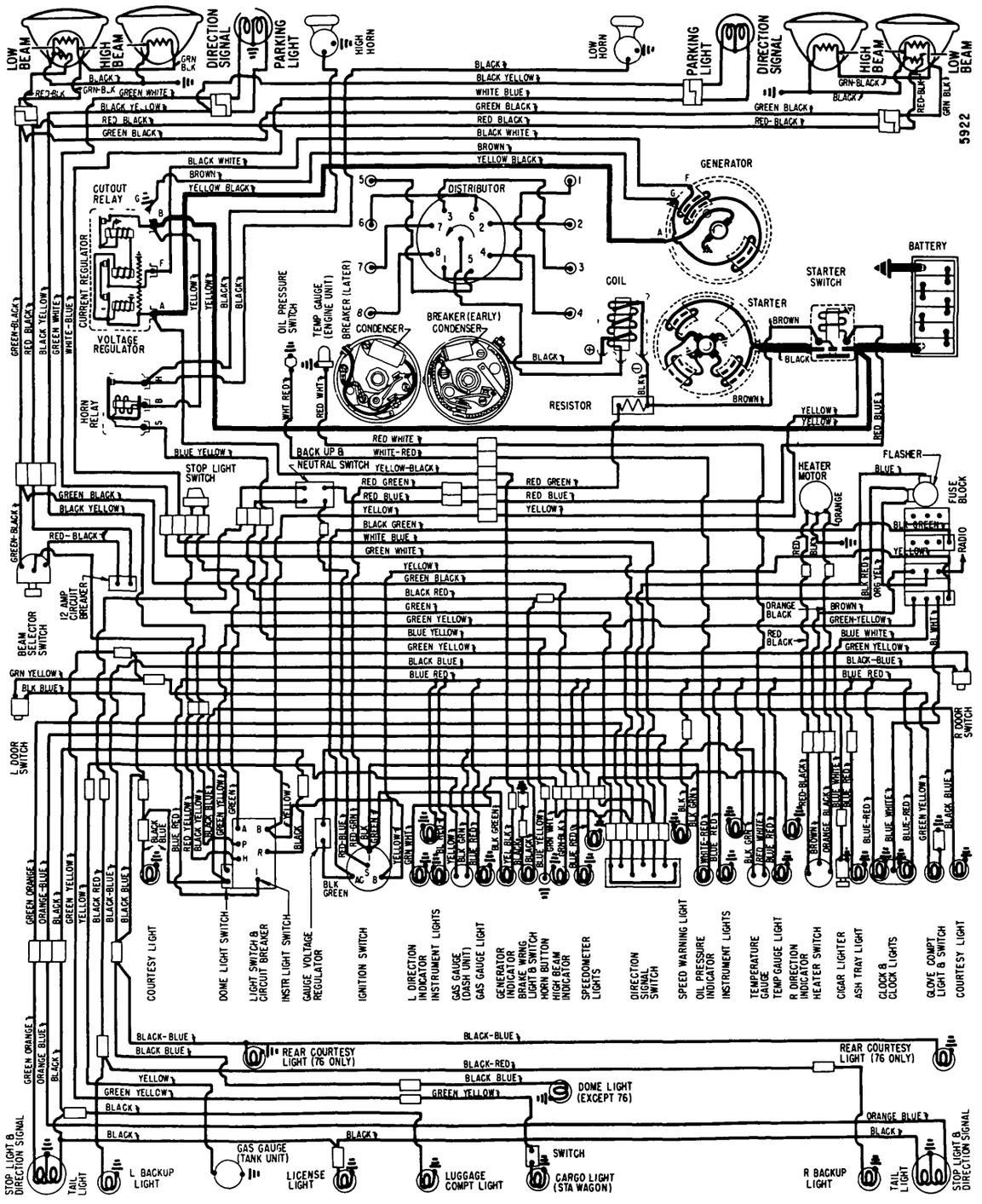
CARBURETOR

►*CARBURETOR APPLICATION Used as follows*

Engine	Carburetor
312"	One Holley 2-Bbl
383" (Monterey)	One Ford 2-Bbl
383" (Montclair)	One Ford 4-Bbl
430"	One Carter AFB 4-Bbl

►*383" ENG SPARK PLUG FOULING & LOADING ON COLD START COPRECTION See "Ford 2 & 4-Barrel Carburetor" in Carburetion Section*
►*383" ENG. RICH CONDITION, ROUGH IDLE CORRECTION See "Ford 2 & 4-Barrel Carburetor" in Carburetion Section*
►*430" ENG HARD STARTING, ROUGH IDLE, FLOODING & POOR FUEL ECONOMY See "Carter AFB 4-Barrel Carburetor" in Carburetion Section*

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►*430" ENG. LEAN CONDITION OR SURGING ON ACCELERATION CORRECTION: See "Carter AFB 4-Barrel Carburetor" in Carburetion Section*

►*430" ENG. IMPROPER RETURN TO IDLE SPEED NOTE: See "Carter AFB 4-Barrel Carburetor" in Carburetion Section.*

►*CARBURETOR-TO-BELLCRANK ROD INSTALLATION NOTE:* Rod must be installed on accelerator shaft arm as follows: **Ford 2-Bbl. & Cart r 4-Bbl. Carbs.** On **l ft** side of arm. Use **right hand** clip, Part No. 59A-9825-A. **Ford 4-Bbl. Carb.** - On **right** side of arm. Use **l ft hand** clip, Part No. 59A-9826-AUP.

Throttle Linkage Adjustment (Aut . Trans. Cars): Adjust engine to correct idle speed with carburetor and transmission rods disconnected at bellcrank. Make anti-stall dashpot adjustment (see below). Insert ¼" gauge pin (Tool 77230-MB) through holes in bellcrank bracket and tab. Hold carburetor lever against hot idle screw and adjust carburetor rod at threaded ends so rod freely enters throttle shaft lever. Remove gauge pin. *CAUTION - Improperly adjusted carburetor rod can result in poor return to idle.* Adjust toggle rod assembly so accelerator pedal height from point where rod connects to pedal to bare floor pan is 4 3/16" Lengthen rod to raise pedal, shorten rod to lower pedal **Toggl r d must b at its shortest possible length.** *NOTE - After pedal height adjusted, check for proper kickdown operation. There will be additional movement of transmission control shaft after throttle fully opened. This will cause pin to override full throttle position in slot in transmission control-to-accelerator shaft assembly. If kickdown not obtained, lengthen toggle rod slightly.* Install tachometer on engine and pressure gauge at rear of transmission. Pull upward on throttle rod firmly but gently and adjust throttle rod clevis so pin freely enters hole in bellcrank **Then lengthen clevis 2 full turns (312'), 3½ full turns (383" & 430").** Reassemble rod Accelerate engine to 1000 RPM. Pressure gauge should read 80-85 lbs. To adjust, lengthen throttle rod clevis to increase pressure, shorten to decrease pressure. *CAUTION - Make pressure adjustment quickly so transmission will not overheat.* Remove pressure gauge and tachometer.

Anti-Stall Dashpot Adjustment (F rd & Holl y): With idle speed correctly set, loosen dashpot locknut and hold throttle in closed position Depress dashpot plunger and turn dashpot in its bracket to give 060-.090" (Ford), .045-.064" (Holley) clearance between dashpot plunger and throttle shaft lever Tighten locknut.

Anti-Stall Dashpot Adjustm nt (Carter): **1)** With primary primary throttle plates in wide open position, bend dashpot inner tang (Tool T109-22), so there is 7/16" between top of bowl cover and bottom of dashpot lever **2)** With primary throttle plates closed to normal idle position, bend dashpot lever in area between lever arm base and dashpot plunger, so there is 1/16-3/32" clearance between dashpot plunger operating lever and top surface of air horn

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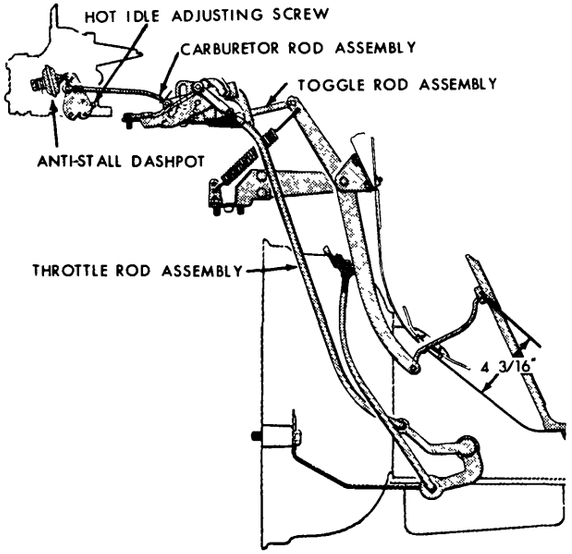
FORD 2 & 4-BARREL

2-BARREL CARBURETOR	Carbur tor No.
383" Eng. (Synchro-mesh)	PB9M-9510-H
383" Eng. (Auto. Trans.)	PB9M-9510-B
4-BARREL CARBURETOR	
383" Eng. (Auto. Trans.)	PB9M-9510-D

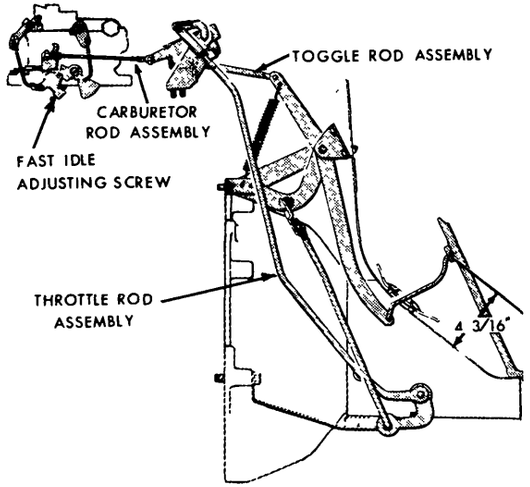
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

Idle S tting - Initial setting 1½ turns open. Turn screws (primary side only on 4-bbl.) out for richer mixture.

Idl Speed - 475-500 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").



312" ENGINE THROTTLE LINKAGE



383" & 430" ENGINE THROTTLE LINKAGE

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* With engine at normal operating temperature, transmission selector lever in "Dr" position, and with air conditioner turned on so compressor is engaged and operating, adjust engine idle speed to 450-475 RPM.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Ford 2 & 4-Barrel Carburetor" in Carburetion Section.*

HOLLEY 2-BARREL

Mercury No. B9ME-9510-A (312" Eng., All Trans.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting ¾-1¾ turns open. Turn screws out for richer mixture.

Idle Speed - 475-500 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* With engine at normal operating temperature, transmission selector lever in "Dr" position, and with air conditioner turned on so compressor is engaged and operating, adjust engine idle speed to 450-475 RPM.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetor" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 2853S (Mercury No. B9S-9510-A). Used on 430" Engine. 4-barrel downdraft type

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

Idle Setting - Initial setting, both screws (primary side only) 1½-2½ turns open. Turn screws out for richer mixture. **Idle Speed** - 450 RPM (Auto. Trans. in "D").

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* With engine at normal operating temperature, transmission selector lever in "Dr" position, and with air conditioner turned on so compressor is engaged and operating, adjust engine idle speed to 450-475 RPM.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetor" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Mercury No. B9AE-9350-C (312" Eng. Fuel only); PB7M-9350-A (312" Eng. Fuel & Vacuum); EDG-9350-B (383" & 430" Engs. Fuel only.

Pressure - 4-6 lbs. (312" Eng.), 4.5-6.5 lbs. (383" & 430" Engs.).

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Mercury No. FEK-10804-A.

Dash Unit - Mercury No. PB9M-9280-A.

Tank Unit - Mercury No. PB9M-9275-A.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type. Clean every 2000 miles, replace every 20,000 miles, or sooner if required.

►*AIR CLEANER SERVICE NOTE:* Filter element can be cleaned by tapping or shaking or by using compressed air. If air is used, direct air stream against element in direction opposite that of intake air flow, using care not to rupture filtering element fibre. DO NOT wash element in solvent or other liquid and DO NOT oil or lubricate.

BATTERY

Std. Trans. - MGK-10655-A, 12 volt, 13 plate, 65 ampere hour capacity.

Auto. Trans. - MJK-10655-A, 12 volt, 13 plate, 65 ampere hour capacity.

Air Cond. Cars (Hvy. Duty) - HJK-10655-A or MJK-10655-B. 12 volt, 17 plate, 72 ampere hour capacity.

Battery Ground - Negative, to right hand cylinder head.

STARTER

Mercury B9S-11002-A. Armature Mercury B6A-11005-B.

►*STARTER NOT ENGAGING RING GEAR CORRECTION:* If caused by corrosion of starter drive, thoroughly clean or replace drive unit, then apply a bead of rubber cement or Permatex No. 2 to rear surface of wide portion of starter motor-to-flywheel housing seal. Apply seal to cylinder block mating surface, then install seal, making sure that seal lies flat and is properly positioned. Install starter. On 383" & 430" Engines, check oil pan rail at right rear corner of block to determine if plug has been installed in existing hole. If hole is open, install a ¾" cup plug, Part No. UP-371058-S to seal opening. Position cup plug and tap into place with a blunt punch.

Drive - Mercury No. 1CM-11350-C. Bendix "Folo-Thru".

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM at normal engine operating temperature.

Current Draw - 155-190 amps. at cranking speed.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	80
15.5 ft. lbs.	Lock	5.0	550

Removal: Disconnect battery ground cable, then disconnect throttle linkage at bellcrank. Raise car and remove battery cable at starter and engine splash shield from frame front crossmember. Remove nuts securing right and left front engine support insulators to frame. Position a safety support jack under front edge of oil pan using a block of wood between pan and jack, then raise engine approximately 1". Remove starter attaching capscrews and remove starter by pulling forward and upward until drive clears housing. Continue upward movement of starter until it is nearly upright with drive end facing down, then rotate starter while holding drive assembly to allow clearance of drive end plate mounting bosses. Lower starter between tie rod and idler arm.

Installation: Reverse removal procedure and note the following: Install attaching screws, then tighten outer screw first, finally tightening top and bottom screws. *NOTE - If outer screw is not tightened first, misalignment of starter motor may result.*

Starting Switch: Mercury No. B6A-11450-A, magnetic type, controlled by Ignition & Starter Switch, Mercury No. B5A-11572-A (Synchro-mesh & Automatic Trans.). Neutral Safety Switch, Mercury No. B9MF-7A217, located on top side of steering column under instrument panel (Automatic Trans. Cars).

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Neutral Safety Switch Adjustment: *See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

GENERATOR

Model	Generator No.	Amperes
312" Eng (Std) ①	PB8M-10002-B	30
312" Eng (Std) ②	B8A-10002-A	35
383" & 430" Engs (Std)	B9FM-10002-A	35
All (Early) ③	FGV-10002-A	40
All (Late) ③	B9LF-10002-A	40
All (Heavy Duty) ④	B6A-10002-D	50

① - Standard Trans ② - Automatic Trans
③ - Air Conditioned cars ④ - Bosch generator

Armature (With Bearing) - Mercury No FGT-10027-A (30 amp Gen), PB8M-10027-A (35 amp Gen), FGP-10027-A (40 amp Gen), B6C-10005-A (50 amp Gen *NOTE* - Furnished without bearing)

►*1959 GENERATOR SPLASH SHIELD PRODUCTION CHANGE & SERVICE INSTALLATION NOTE* A new splash shield, Part No B9MM-10170-A is being installed in production on later generators and may be installed on early generators to prevent water splashing on brushes and commutators To install shield, loosen adjusting bolts and front mounting bolts, then remove rear mounting bolt Remove wires from terminals and install shield over rear of generator, positioning it so that terminals are in center shield opening Install and tighten bolts and wires, then adjust belt tension

►*GENERATOR MOUNTING BRACKET REMOVAL INSTALLATION & ALIGNMENT CAUTION* When removing generator mounting bracket, the washer and spacer combinations found between bracket and engine block or front cover must be marked for installation at the same locations to insure correct generator alignment

►*BOSCH GENERATOR BRUSH "WHINE" CORRECTION* Excessive brush noise or "whine" can be eliminated by installing four new brushes, Part No B9TZ-10043-A These new brushes are of softer material than those previously used After installation, seat brushes with brush seating compound

Performance Data			
Generator No	Amps.	Volts	Gen RPM
PB8M-10002 B	30	15	2525
B8A-10002-A	35	15	2670
B9FM-10002-A	35	15	2670
FGV-10002-A	40	15	2500
B9LF-10002-A	40	15	2500
B6A-10002-D	50	15	1380

Brush Spring Tension - 32-40 ozs (Exc B6A-10002-D) 28 ozs (B6A-10002-D)
Field Current - 1 45-1 50 (PBM-10002-B), 1 25-1 30 (B8A & B9FM-10002-A), 1 20-1 25 (FGV-10002-A), (B9LF-10002-A) 1 20-1 25, Amperes at 15 Volts Hot
B6A-10002-D - 1 0-1 5 amps at 10 Volts Hot

Rotation - Counterclockwise at commutator end
Belt Adjustment· 3/8" deflection midway between fan and generator pulleys under normal thumb pressure

REGULATOR

Regulator No.	Used with Gen. No.
B7A-10505-B (Mercury)	PB8M-10002-B
B8E-10505-B (Mercury)	B8A & B9FM-10002-A
PB7M-10505-A (Mercury)	FGV & B9LF-10002-A
B6A-10505-C (Bosch)	B6A-10002-D

►*BOSCH GENERATOR-TO-GROUND WIRE ATTACHING NOTE The generator-to-regulator ground wire must be attached to regulator base mounting screw*

►*SETTING CAUTION* "Temperature Compensated" type Set to following specifications at 75° ambient (engine compartment) temperature after ½ hour operation in vehicle, or after regulator heated and stablilized

MERCURY
B7A-10505-B, B8E-10505-B & PB7M-10505-A

Cutout Relay

Cuts In - 12 0–12 8 volts (PB8M-10505-B), 12 4-13 2 volts (B8E-10505-B), 12 0-12 8 volts (PB7M–10505-A)
Cuts Out - 6-9 amps (PB8M-10505-B), 2-6 amps (B8E-10505-B), 5-9 amps (PB7M-10505-A) Discharge current

Voltage Regulator

Setting - 14 6-15 4 volts at ambient temperature of 75°F
Checking & Adjusting - *See "Mercury 12 Volt Regulators" in Electrical Section*

Current Regulator

Setting - 28-32 amps (PB8M-10505-B), 33-37 amps (B8E-10505-B), 38-42 amps (PB7M-10505-A)
Checking & Adjusting - *See "Mercury 12 Volt Regulators" in Electrical Section*

BOSCH
(B6A-10505-C)

Cutout Relay

Cuts In - 13 0-13 5 volts
Cuts Out - 2-8 amps

Voltage Regulator

Setting (Low Stage) - 14 1-14 6 volts at ambient temperature of 75°F
Setting (High Stage) - 14 1-14 8 volts at ambient temperature of 75°F
Checking & Adjusting - *See "Bosch Regulators" in Electrical Section*

Current Regulator

Setting - 47-52 amps
Checking & Adjusting - *See "Bosch Regulators in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) *See 4-Headlight System in Electrical Section*
Direction Signals: *See Electrical Section*
Lighting Switch Removal· Disconnect negative cable at battery then remove trim plate located between clusters just above steering column Insert a stiff wire or suitable hook in notch at bottom of plate, then pull upward and out to snap out the plate Remove ignition switch bezel and remove switch from cluster Remove left air vent and power seat control knobs and bezels if so equipped Press inward on headlight switch spring release button and remove switch knob and shaft Remove headlight switch bezel nut and three screws securing left cluster bezel to cluster housing, then remove bezel assembly While holding headlight switch, unscrew retaining nut adapter and lower switch through opening at bottom of cluster

Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit) Master cylinder or power brake unit located on firewall in in engine compartment

►*STOP LIGHTS REMAINING "ON" CORRECTION (EARLY CARS)* This condition may be due to brake pedal not returning completely To correct, remove brake pedal and install a new brake pedal bushing, Part No LE-2461-A

LIGHTING CIRCUIT BREAKERS: Used as follows
12 Ampere - Protects Electric Wiper motor Located on brake pedal support bracket
12 Ampere - Protects, parking, rear stop, license plate, and instrument panel lamp circuits Located on light switch
12 Amoere - Protects headlight low beam Located on brake pedal support bracket
18 Ampere - Protects headlights Located on light switch
20 Ampere - Protects Air Conditioning blower Located on instrument panel lower reinforcement
30 Ampere - Protects convertible top control Located on right fender apron

FUSES: In fuse panel located in back of glove box Remove cover plate from right inner side of glove box for access to fuses
1 AG 5 Ampere - Protects clock
1 AG 5 Ampere - Protects turn signal
SFE 7 5 Ampere - Protects interior light
SFE 7 5 Ampere - Protects spot light
SFE 7 5 Ampere - Protects Multi-Luber
SFE 7.5 Ampere - Protects back-up lamp
SFE 14 Ampere - Protects heater blower
SFE 15 Ampere - Protects cigar lighter

Horn Relay: Mercury No B8C-13853-A

ENGINE

312" V8

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See 'Air Conditioning Service Cautions" in Miscellaneous Section*

►*EXCESSIVE ENGINE OIL CONSUMPTION, EXHAUST SMOKING & SPARK PLUG FOULING CORRECTION* These conditions may be caused by plugged cylinder head oil return holes If excessive oil is found in rocker arm cover chambers, clean drain passages with a piece of wire, air pressure and solvent

►*MAXIMUM ENGINE RPM CAUTION (AUTOMATIC TRANSMISSION CARS)* DO NOT operate engine faster than 2500 RPM with selector lever in "N", "P",or "R" Pressure build-up in front clutch will result in partial application and damage to clutch plates DO NOT race engine when rocking car out of snow, sand or mud

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ENGINE SPECIFICATIONS: 90° V8 overhead valve of same design used on previous models

Bore	Stroke	Displacement
3 80"	3.44"	312 cu. ins.
Comp. Ratio	**Rated HP**	**Developed HP**
9 6-1	46 0	235 at 4100 RPM

Compression & Vacuum Reading: *See TUNE-UP*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Mercury Special Data*

►***HEAD GASKET SERVICE REPLACEMENT CHANGE AND INSTALLATION NOTE:*** **Use new gasket No. B9ME-6051-A. Apply sealer No. 8A-19554-B moderately to each side of gasket before installation.**

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data.*

ENGINE REMOVAL: *See "Engine" in Mercury Special Data*

OIL PAN REMOVAL: Position No 6 piston at TDC, then drain crankcase and remove engine splash shield Remove stabilizer retaining screws and pull stabilizer down. Loosen nut holding oil tube to oil pan and disconnect tube from oil pump. Remove engine front mount crossmember nuts, then place a support stand or jack under front edge of oil pan using a piece of wood between jack and oil pan Lower car enough to raise front of engine approximately 2" and place a block of wood (1" thick) between front engine support insulators and frame. Remove pan from engine, then remove screen cover and inlet tube assembly.

PISTONS

Aluminum alloy, Autothermic, solid skirt type with three rings above pin Piston pin is offset in piston.

►*ORIGINAL BORE & PISTON SIZES:* Standard cylinder bore limits at 3.8000-2 8024". Standard size pistons are furnished in two sizes for selective fit as follows:

Code 2 Pist n - 3 7986-3 7992" (Color coded Red).
C d 6 Pistons - 3.7998-3 8004" (Color coded Blue)
Color code is marked on top of piston
Removal - Pistons and rods removed from above.
Clearanc - .0008- 0026". Maximum Wear Limit - 0045".

Fitting N w Pist ns: *See "Pistons" in Mercury Special Data.*

Installing Pist ns: Indentation or notch on top of piston must face front of engine *See Rod Installation.*

Replac m nt Pist ns: Std. (2 sizes, see above), .020", .030", .040" oversize

PISTON PIN

Floating type with lock ring at each end
Diam t r - 9120-.9123". **Length** - 3 016-3.030".
Clearanc in Pist n - 0001- 0003. Wear Limit - 0008".
Cl aranc in Rod - .0001-.0003" Wear Limit - 0008".

Replacement Pins: Std. .001", .002", oversize

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr (1)	.0775- 0780"	012-.022"	Ⓒ.0002- 0025"
Compr (2)	.0930- 0940"	012- 022"	001- 003"
Oil Contr.	1825-.1879"	.015-.055"Ⓖ	

Ⓒ - 006" maximum wear limit Ⓖ - On rails.

Installing Rings: Space ring gaps 120° apart with oil ring gap positioned so it is on the high side of cylinder bore (when piston installed in engine).

R plac m nt Rings: Std 020", 030", .040" oversize.

CONNECTING ROD

Length (C nter-t -C nt r) - 6.599-6.601".
Journal Diamet r - 2 6239–2.6343" (Code Red), 2.6235-2 6239" (Code Blue).
Lower Bearing - Copper lead alloy, steel back.
Clearance - 0008–.0029" Wear Limit - .0039".
Side Clearance - 006- 016" Wear Limit - .019".

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize

►*NOTE:* Any combination of RED or BLUE standard size or .002" Undersize bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts

Installing Rods: Assemble rods to piston so indentation embosses on piston head will face front of engine with numbered side of rod to right side of engine (right bank), or to left side of engine (left bank) When installing assemblies in engine, numbers on rods and caps must be together and toward outside of block

CRANKSHAFT

Journal Diameters - 2.6239-2.6243" (Color Coded Red) 2 6235-2.6239" (Color Coded Blue).
Out-of-Round Limits - .00025". **Taper Limit** - 001".
Bearings - Copper lead alloy with steel back.
Clearance - 0008-.0029" Wear Limit - .0037"

Replacement Bearings: Std (2 sizes marked RED and BLUE for selective fit), .002", 010", .020", .030" Undersize.

►*NOTE:* Any combination of RED or BLUE standard size or .002" Undersize bearing inserts may be used to obtain desired clearance If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

End Thrust: Taken by No. 3 main bearing
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Mercury Special Data*
Endplay - 002-.006" Wear Limit - 010"

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Mercury Special Data*

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data*

CAMSHAFT

Journal Diameter - 1 925-1.9265"
Out of Round - .0007". Wear Limit - .001".
Clearance - .0010-.0025". Wear Limit - .006"

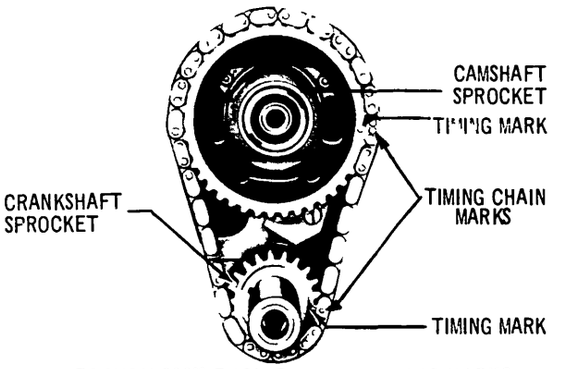
End Thrust (312"): Controlled by thrust plate and spacer between camshaft sprocket and front bearing journal.
Endplay - .001-.007".

Replacement Camshaft Bearings: Prefinished bearings furnished Std. and 015" Undersize.

Camshaft Setting: Install timing chain and sprockets as an assembly when timing marks on sprockets are to drive side and 12 timing chain pins between marks.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in M rcury Special Data*

Timing Chain Cov r S al Installation (Crankshaft Front Oil Seal): *See "Engin Front Cover" in M rcury Special Data*



MERCURY 312" ENGINE VALVE TIMING MARKS

VALVES

Tappet Clearances: .020" Intake & Exhaust (Cold), 019" (Hot).
Valve Tappet Adjustment - *See "Valve System" in Mercury Special Data*

►*CAMSHAFT LOBE LIFT NOTE:* Camshaft lobe lift for checking lobe wear is approximately .272" (Intake), .285" (Exhaust) Wear Limit is .267" (Intake), .280" (Exhaust).

Valve	Head Diam.	Stem Diamet r
Intake	1 920-1 930"	.3416-.3423"
Exhaust	1.505-1.515"	.3400-.3405"

Valve	Seat Angle	Ⓒ Lift	Stem Clearanc
Intake	45°	.400"	Ⓖ .001-.0024"
Exhaust	45°	420"	Ⓔ .0023- 0037"

Ⓒ - Theoretical valve lift.
Ⓖ - Wear limit 004". Ⓔ - Wear limit .006".
Valve Seat Width - .060-.080" (Intake), .070-.090" (Exhaust)
Valve Stem Oil Seals – Umbrella type seals used on all valves. Install seal with cup side down over valve guide.
Valve Stem Clearance Check - *See "Valve System" in Mercury Special Data.*

►*VALVE STEM REPLACEMENT NOTE:* Some engines may have valves with .015" oversize stems installed in production. For correct replacement, measure stem diameter approximately 1½" from stem end. All valve stems are the same diameter for approximately 1" from stem end

Oversize Valve Stem Installation: *See "Valve System" in Mercury Special Data*

Valve Springs: Free Length - 2.09"

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	Ⓒ 71-79	1 780"
Open	Ⓖ 161-177	1 390"

Ⓒ - Wear limit 64 lbs at 1.780"
Ⓖ - Wear limit 145 lbs. at 1.390".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valve. *See "Valve Syst m" in Mercury Special Data*

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Valv Lift rs: Mushroom type removed from below with camshaft removed
Diameter - 4989- 4995"
Rocker Arm Assembly: *See "Valve System" in Mercury Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE Following valve opening and closing points are with camlift as indicated*

Valve Timing

Intake Valve - Open 18° ① BTDC Close 58° ① ALDC
Exhaust Valve - Open 66° ② BLDC Close 10° ③ ATDC
Camlift - ① - 015" ② - 013" ③ - 016"
Valve Timing Check - Install a timing quadrant on crankshaft damper *NOTE - Check for bent timing pointer and replace if bent or damaged* Back off adjusting nut on No 1 cylinder intake valve rocker arm, then slide rocker arm toward rear and secure in this position Install dial indicator on cylinder head and position actuating point of indicator in pushrod socket (in same plane as pushrod movement) Rotate engine until lifter rests on heel of camshaft lobe (pushrod in lowest position) Set indicator to zero, then rotate engine until dial indicator registers the specified cam lobe lift *(see "Valve Timing Specifications" above)* Crankshaft degrees indicated on quadrant should agree with specifications in table above Continue to rotate engine to check valve closing

OILING SYSTEM

►***ENGINE OILING SYSTEM· See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.***

Crankcase Capacity: 5 qts (refill) Add 1 quart when filter changed
Normal Oil Pressure· 35-50 lbs at 2000 RPM
Oil Pressure Indicator: Light on instrument panel Light comes on when oil pressure low
Oil Pressure Switch - Mercury No B6A-9278-A
Oil Pump: Rotor type, located at left side of engine crankcase and driven by distributor drive gear
►*312" ENGINE OIL PUMP INTERMEDIATE SHAFT PRODUCTION CHANGE & INSTALLATION NOTE See "Oiling System" in Mercury Special Data*
Crankcase Ventilation: Filter in oil filler cap (Inlet), filter screen in road draft tube (Outlet) Clean and oil every 2000 miles or more often in dusty areas

COOLING

Water Capacity: 20 qts Add 1 qt with heater
Pressure Valve: Mercury No LA-8100-A (12-15 lbs) Radiator filler cap
Thermostat: Mercury No B7A-8575-A (157-162°F), B7A-8575-B (175-180°F)
Water Pump: Packless, sealed ball bearing type
See "Water Pumps" in Mercury Special Data.
Temperature Gauge: King-Seeley electric, Constant Voltage ("CV") type with Gauge Voltage Regulator, Mercury No FEK-10804-A
Dash Unit - Mercury No PB9M-10883-A
Engine Unit - Mercury No B7A-10884-A
See Temp rature Gauges" in Miscellaneous Section

ENGINE

383" & 430" V8

►*AIR CONDITIONED CAR SERVICE CAUTION Use extrem care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Misc llaneous Section*

ENGINE SPECIFICATIONS: Own 90° V8 overhead valve engine of same design used for previous models

Engine	Bore	Stroke	Displacement
383"	4 30"	3 30"	383 cu ins.
430"	4 30"	3 70"	430 cu ins

Engine	Compr. Ratio	Rated HP	Developed HP
383" ①	9 2-1	59 17	280 at 4400 RPM
383" ②	9 2-1	59 17	322 at 4600 RPM
430"	9 2-1	59 17	345 at 4400 RPM

① - 2-Bbl Carb ② - 4-Bbl Carb

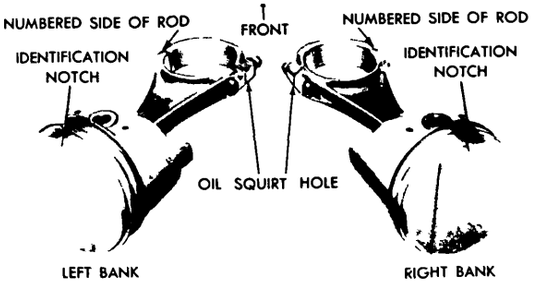
Compression & Vacuum Reading - *See TUNE-UP*
►*MAXIMUM ENGINE RPM CAUTION* DO NOT operate engine faster than 2500 RPM in "N", "P" or "R" Will cause oil pressure build-up in front clutch resulting in partial application and damage to clutch plates DO NOT race engine when rocking car out of snow, sand or mud
►*ROCKER ARM COVER AND GASKET REPLACEMENT NOTE* New rocker arm cover gasket, Part No B9ME-6584-BUP, should be used for service replacement to reduce oil leaks at this area New gasket has round screw holes and notch on inside edge Install gasket with notch toward **front** of engine on **right** bank to **rear** of engine on **left** bank
►*CYLINDER HEAD GASKET REPLACEMENT NOTE* Use Cylinder Head Gasket, Part No B9ME-6051-A for replacement Apply Sealer, Part No 8A-19554-B moderately to both sides of gasket before installation
►*OIL PUMP-TO-CYLINDER BLOCK GASKET RESTRICTION CAUTION* When engine is being disassembled, it is recommended that the oil pump be removed and the gasket examined to make sure it is not creating an oil flow restriction If there are indications of the gasket obstructing the oil passage or if it has not been sealing properly, replace the gasket
►*VALVE PUSHROD COVER NOISE CORRECTION* If a resonant engine noise is noticeable at idle speed or between 1800-2000 RPM, determine if it is originating from engine valve pushrod cover as follows With engine at idle speed, insert a hammer handle between intake manifold passages No 2 & 3 and valve pushrod cover If noise is reduced or eliminated by pushing down on handle, it is an indication the pushrod cover is vibrating To correct, cut a ¾" slit lengthwise in piece of 1" x 2½" heater hose Work from right side of engine and insert the piece of hose (slit end first) between manifold passage No 2 & 3 and onto pushrod cover Position the hose until it is resting on "X" section of cover reinforcing ribs (slit toward front of engine)
►*ENGINE COOLANT LOSS CORRECTION (EARLY ENGINES)* On engines with early type cylinder heads having manifold-to-cylinder head studs (later heads have hex head bolts), install new type cadmium plated studs, Part No 372404-S100 Apply Permatex No 2 to threads (cylinder head end) of studs before installation
►*CYLINDER HEAD PRODUCTION CHANGE* Later cylinder heads have blind bosses instead of through holes in water jacket area at exhaust manifold attaching bolt holes Use 3/8" - 16 x 1¼" hexhead bolts, Part No 20428-S8 and 3/8" lockwashers, Part No 370383-A to attach exhaust manifold to cylinder head Tighten manifold attaching bolts to 15-21 ft lbs (changed from 23-28 ft lbs for early type studs)
►*EXCESSIVE ENGINE OIL CONSUMPTION, EXHAUST SMOKING & SPARK PLUG FOULING CORRECTION* These conditions may be caused by plugged cylinder head oil return holes If excessive oil is found in rocker arm cover chambers, clean drain passages with a piece of wire, air pressure and solvent
CYLINDER HEAD: *See "Cylinder Head & Manifold in Mercury Special Data*
TIGHTENING TORQUES: *See 'Tightening Special Specifications" in Mercury Special Data*
ENGINE REMOVAL: *See "Engine" in Mercury Special Data*
OIL PAN REMOVAL: Position No 1 piston at 14° BTDC Disconnect ground cable at battery Remove dipstick, then disconnect throttle linkage at plastic bushing of bellcrank Drain crankcase, then remove engine splash shield Remove engine front mount-to-crossmember nuts Raise engine and place a 1" block of wood between each front mount and frame Disconnect either right or left stabilizer link at front lower suspension arm and swing out of way Remove oil pan retaining capscrews and let oil pan rest on crossmember Remove oil pump inlet tube and screen assembly screws and let assembly drop into pan Remove pan by dropping it down and moving it forward

PISTONS

Step head, slipper type aluminum alloy with a steel strut Piston pin is interference fit in piston Retaining rings are not used

►*ORIGINAL BORE & PISTON SIZES* Standard cylinder bore limits are 4 300-4 3024" Standard size pistons are furnished in two sizes for selective fitting as follows
►*REVISED PISTON SIZE & CLEARANCE SPECIFICATIONS (430")* Std size piston furnished in two (reduced) sizes and marked with color code on top of piston as follows
Code Red 4 2997-4 2983", Code Blue 4 2989-4 2995"
See revised clearance specification below
Removal - Piston and rod removed from above
Clearance (383") - 0008- 0026" at bottom of skirt Wear limit 005"
Clearance (430") - 0017- 0035" This supersedes previous specification of 0008- 0026"

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MERCURY PISTON & ROD ASSEMBLY

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Fitting N w Pist ns: *Se "Pistons" in M rcury Special Data.*

Installing Pist ns: *Pistons for right and left hand cylinders are NOT interchangeable.* Install piston so that identification notch on head is toward front of engine. *See Rod Installation below.*

R plac m nt Pist ns: Std. (2 sizes, see above), .020", .030", .040" Oversize.

PISTON PIN

Press fit in connecting rod, no retaining device.

Diam ter - .9750-.9753". **Length** - 3.48-3.50".

Cl aranc in Pist n - .0001-.0003". Wear Limit-.0008".

Cl aranc in Rod - .0008-.0016" **interference fit.**

Pist n Pin R moval & Installation: *See "Piston Pins" in Mercury Special Data.*

R plac ment Pins: Standard size. Furnished only with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.015-.025"	.0015-.003"
Compri (2)	.0930-.0940"	.015-.025"	.001-.003"
Oil (3)	.1825-.1879	① .015-.055"	②

① - Control ring segments ② - Side sealing type ring.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring spacer expander gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of spacer expander gap (1" each side of piston head notch).

R plac m nt Rings: Furnished Std. .020", .030" & .040" Oversize.

CONNECTING ROD

L ngth (C nt r-T -C nt r) - 6.599-6.601".

J urnal Diameter - 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue).

L wer Bearing - Copper lead alloy, steel back.

Cl aranc - .0006-.0026". Wear Limit - .0036".

Sid Cl aranc - .005-.015".

R placem nt B arings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard size or .002" Undersize bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Installing R ds: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole in rod facing inward and rod number facing outward toward outer side of cylinder block.

CRANKSHAFT

►*383 & 430" MAIN BEARING BOLT SERVICE REPLACEMENT NOTE: S "Crankshaft" in Mercury Special Data.*

Journal Diam ter - 2 8998-2.9002" (Code Red), 2 8994-2.8998" (Code Blue).

Out- f-R und Limits - 0005" **Taper Limit** - 001"

B arings - Copper lead alloy, steel back.

Cl aranc - .0008-.0029". Wear Limit - .0038".

Endplay - .004-.008". Wear Limit - .012"

End Thrust - Taken by No. 3 (center) main bearing.

Replac m nt B arings: Std. (2 sizes marked RED and BLUE for selective fit), .002", 010", 020", .030" Undersize.

►*NOTE.* Any combination of RED and BLUE standard size or .002" Undersize bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and and install undersize bearing inserts.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*

CAMSHAFT

►*BEARING BORE NOTE:* Bearing bores in block are graduated in size (largest No. 1, smallest No. 5) to permit removal and installation of bushings. O.D. of camshaft bearings are also graduated in size.

Journal Diameter - 2.264-2.265" (all journals).

Out-of-Round Limits - .001".

Bearings - Babbitt lined, steel back.

Clearance - .001-.003". Wear Limit - .006".

End Thrust: Toward engine rear. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block

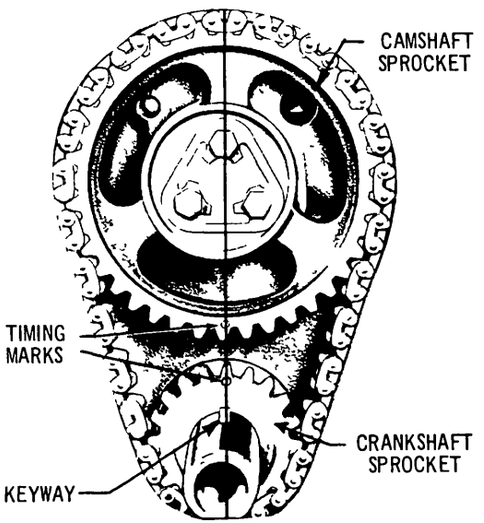
Replacement Bearings: Std. and .015" Undersize.

►*BEARING INSTALLATION CAUTION:* No. 1 bearing must have notch in bearing facing front of engine and toward bottom of block Bearing must be .005- 020". inward from finished face of block. The other bearings must be installed with split in bearing facing upward toward top of cylinder block.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Mercury Special Data.*

Timing Chain Deflection - ½" maximum difference between timing chain straight position and position of chain when chain is deflected outward (all slack removed from opposite side).

Camshaft Setting: (312") Setting is correct when timing marks on sprockets are on drive side with 12 timing chain pins between marks.



MERCURY 383" & 430" ENGINE VALVE TIMING MARKS

Camshaft Setting: (383", 430") Timing marks on sprockets must be adjacent and in line with straightedge across shaft centers.

Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Mercury Special Data.*

Engine Front Cover Removal & Installation: *See "Engin Front Cover" in Mercury Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	①Stem Diameter
Intake	2.080-2.090"	.3711-.3718"
Exhaust	1.770-1.780"	.3693-.3700"

Valve	Seat Angle	②Lift	Stem Clearanc
Intake	45°	.2316"	③ .0010-.0024"
Exhaust	45°	.2316"	④ .0028-.0042"

① - Furnished with 003", .015" & .030" oversize stems

② - Cam lobe lift. Wear loss limit .005".

③ - Wear limit .0045". ④ - Wear limit .0065".

►*VALVE REPLACEMENT NOTE:* Some engines may have valves with .015" oversize stems installed in production. For correct replacement, measure stem diameter approximately 1½" from stem end.

Valve Seat Width - .070-.090" (intake & exhaust).

Valve Stem Oil Seals - Umbrella type seals used on all valves Install seals with cup side down over valve guide.

Oversize Valve Stem Installation: *See "Valve System" in Mercury Special Data.*

Valve Springs: Damper springs used inside all valve springs.

Spring Free Length - 2.030" (approx.).

►*SPRING SQUARENESS NOTE:* If springs more than 1/16" out of square, replace spring and damper.

►*VALVE DAMPER SPRING INSTALLATION CAUTION:* To prevent valve spring clicking noise, damper spring must be installed within valve spring so end of damper spring is within 135° arc counterclockwise to end of valve spring when viewed from above.

Assembled Height - 1.83" measured from surface of cylinder head spring pad to underside of spring retainer (with valve closed). *Do not use more than two 030" spacers to correct assembled height.*

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	① 66-77	1 83"
Open	② 240-260	1.43"

① - Wear limit 60 lbs. at 1.83".

② - Wear limit 225 lbs. at 1.43".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum .0045" (intake), .0065" (exhaust), ream valve guides and install valves with oversize stems. *See "Valve System" in Mercury Special Data*

Valve Lifters: Hydraulic barrel type. No adjustment

►*VALVE LIFTER PRODUCTION CHANGE:* New shorter lifters having an overall height of 1.830-1.860" are being used in production replacing the previous 1.968-2.010" long lifters. Overhaul procedures for the two types are the same and both types of lifters are inter-

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changeable and may be used in any combination in the same engine

►*HIGH SPEED HYDRAULIC LIFTER NOISE CORRECTION* Can be caused by aereated oil which will also cause oil pressure to drop (less than 45-50 lbs at 2000 RPM) To correct, check all oil gallery plugs under air pressure for leaks Check oil pump, pick-up tube and screen, inlet tube-screen, and all gaskets for for cracks or damage

Diameter - 8740- 8745"

Clearance in Lifter Bore - 0005- 0020" Wear Limit - 0026"

Hydraulic Lifter Overhaul - *See "Valve System" in Mercury Special Data*

Hydraulic Lifter Operating Range Check - *See "Valve System" in Mercury Special Data*

ROCKER ARM ASSEMBLY: *See "Valve System" in Mercury Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE Following valve opening and and closing points are with camlift as indicated*

Valve Timing

Intake Valves - Open 22° ℄ BTDC Close 68° ℗ ALDC
Exhaust Valves - Open 63° ℄ BLDC Close 27° ℗ ATDC

℄ - 002" camlift ℗ - 005" camlift

Valve Timing Check - Remove rocker arm assembly Install Dial Indicator Tool 6565 and Indicator Adaptor Tool 6565-B on cylinder head using Holding Fixture Tool 4201-D Pushrod must be in lifter socket and actuator point of indicator in same plane as pushrod movement Install timing quadrant on crankshaft damper Make sure timing pointer is not bent Turn engine slowly until indicator registers valve opening and camlobe lift (as indicated in "Valve Timing" table above) Compare crankshaft degrees indicated on quadrant with Valve Timing Table above Continue to rotate engine to check valve closing specifications in same manner

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.***

►***LOW OIL PRESSURE CORRECTION: See "Oiling System" in Mercury Special Data.***

Crankcase Capacity: 5 qts refill Add 1 qt with filter change

Normal Oil Pressure: 35-50 lbs at 2000 RPM (hot)

Pressure Regulator Valve - In pump body, not adjustable

Oil Pressure Indicator: Light on instrument panel

Oil Pressure Switch - Mercury No B6A-9278-B

Oil Pump: Rotor type, located in crankcase and driven by an intermediate shaft from distributor drive gear

Pump Overhaul - *See 'Oiling System' in Mercury Special Data*

Oil Filter: Full flow disposable type Mounted on lower left corner of cylinder block

►*OIL FILTER INSTALLATION NOTE* Coat gasket with light film of oil Screw onto adaptor until snug **Then tighten ¼ turn ONLY not overtighten.**

Crankcase Ventilation: Filter in oil filler cap (see note below) and ventilator tube at rear of engine Clean and oil filter in filler cap every 2000 miles

►*HEAVY DUTY OIL FILLER CAP & FILLER CAP ELEMENT NOTE* For extreme dusty or sandy conditions, install special oil filler cap, Part No B8WH-6766-A with paper filter element, Part No B8WH-6768-A Replace element every 4000 miles or sooner if needed

COOLING

Three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold Additional thermostat installed in front face of each cylinder bank

Below 140°F - Water circulates from pump to cylinder heads, intake manifold and back to pump

140-180°F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to pump

Above 180°F - Water circulates the same as between 140-180°F except it returns to radiator for cooling

NOTE - Cylinder block thermostats are accessible by removing water pump

►*LOWER RADIATOR HOSE LEAKAGE CORRECTION* Install lower radiator hose on water pump inlet so there will be at least ½" clearance between power steering belt and hose

►*ENGINE COOLING LOSS CORRECTION (EARLY ENGINES)* On engines with early type cylinder heads having manifold-to-cylinder head studs (later heads have hex head bolts), install new type cadmium plated studs, Part No 372404-S100 Apply Permatex No 2 to threads (cylinder head end) of studs before installation

Water Capacity: 20½ qts without heater, 21½ qts with heater and/or air conditioning

Pressure Valve: Radiator filler cap, Mercury No LA-8100-A Operating pressure 12-15 lbs

Thermostat: 157-162° (No B8E-8575-B), 175-180° (B9A-8575-A) Two 137-142° (B9S-8575-B), located in front face of cylinder banks

Water Pump: Packless, sealed ball bearing type

See "Water Pumps" in Mercury Special Data.

Temperature Gauge: King-Seeley electric, Constant Voltage ("CV") type with Gauge Voltage Regulator, No FEK-10804-A

Dash Unit: Mercury No PB9M-10883-A

Engine Unit: Mercury No B7A-10884-A

See "Temperature Gauges" in Miscellaneous Section

Power Booster Fan: *Standard on air conditioned cars See "Cooling System" in Mercury Special Data*

CLUTCH

Borg & Beck Model 10.5A6 (312" Eng.), 11A8 (383" Eng.). Single plate, dry disc type Mercury part numbers

Engine	Cover Assembly	Clutch Disc
312"	B9M-7563-B	MK-7550-B
383"	B9M-7563-A	B9M-7550-A

See "Borg & Beck Clutches" in Clutch Section

Pedal Adjustment: 6¼-6½" (total travel) To adjust move clutch pedal bumper and bracket up or down

NOTE - This adjustment must be made before adjusting clutch pedal free travel

Free Travel - ¾-1" To adjust (after pedal travel is adjusted) loosen clutch pedal release rod locknut and turn adjusting screw clockwise to increase free travel or counterclockwise to decrease free travel

Removal: With transmission removed, disengage clutch pedal retracting spring from clutch release lever, then remove screws retaining equalizer bracket assembly to flywheel housing Remove flywheel housing cover and mark position of flywheel and pressure plate assembly for reference at installation Compress clutch pressure plate assembly with Tool 7563, then remove cap-screws, pressure plate and disc *NOTE - If tool is not available, install three wedges between clutch fingers and pressure plate housing* Remove clutch pilot bearing from flywheel with Tool 7600-E Remove clutch release bearing and hub from lever assembly in flywheel housing

SYNCHRO-MESH TRANSMISSION

Own Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)

See "Mercury Synchro-mesh" in Transmission Section

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: 1) Raise car and drain transmission *NOTE - On cars with dual exhaust, disconnect left hand exhaust pipe from manifold, then remove muffler outlet pipe from mounting bracket at rear of muffler Move exhaust system from under car*

2) Disconnect speedometer cable at transmission extension housing and transmission shift rods at transmission Disconnect drive line at rear universal joint flange and remove drive shaft and universal joint from transmission output shaft Remove front parking brake cable from equalizer lever and retaining clip from rear crossmember, then remove cable from crossmember Remove equalizer rod from lever

3) Remove rear engine support clamp, then position a transmission lift under transmission and lift engine sufficiently for installation of a support tool With transmission lift secured to transmission, remove bolts securing engine support crossmember to frame side rails and remove crossmember Remove two top transmission-to-flywheel housing screws and install two studs as guide pins Remove lower transmission-to-flywheel housing screws and remove transmission

AUTOMATIC TRANSMISSION

Two types used **Merc-O-Matic,** similar to previous type except for welded converter assembly and design changes for different engines **Multi-Drive,** similar to Merc-O-Matic but has extra "DR" (Drive) range position for performance

►*REAR PUMP NOISE CORRECTION & PUMP PRODUCTION CHANGE See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

►*ERRATIC SHIFT CORRECTION (WHEN CAUSED BY DIRT OR FOREIGN MATTER IN GOVERNOR HYDRAULIC CIRCUIT) See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

►*PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

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Lubrication: Check fluid level every 1000 miles Drain & refill every 16,000 miles with Automatic Transmission Fluid Type "A" (Suffix A)

Checking Fluid L v l: With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position Check fluid level and add recommended fluid as required to bring level to "F" (Full) mark on dipstick

Thr ttl Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Mercury 3-Speed Automatic Transmission" in Transmission Section*

UNIVERSALS

Spic r. Needle bearing type

►*DRIVE LINE VIBRATION CORRECTION* Inspect rear universal joint for proper seating in rear axle companion flange The retaining strap (welded on) between two universal joint bearing caps may not be properly aligned with groove in companion flange If the above condition is found, disassemble joint and inspect for lubrication, wear, and damage

►*DRIVE LINE "THUMP" or "GRUNT" NOISE CORRECTION* This condition may be caused by improper lubrication on transmission output shaft and slip yoke splines To correct, remove drive shaft and universal joint assembly and apply a liberal coating of Special Purpose Lubricant, Part No B8A-19589-A on output shaft and slip yoke splines

REAR AXLE

►*REAR AXLE "GROAN" WHEN STARTING IN REVERSE OR LOW UNDER LOAD CORRECTION* Add Rear Axle Lubricant Additive, Part No C1AA-19B546-A

Own. Same design used on previous models *See "Ford & Mercury (Deep Offset) Hypoid" in Rear Axle Section*

Axl Ratios

M d l & Trans.	Ratio
312" (Synchro-mesh) Std	3 56-1
312" (Synchro-mesh) Optl	3 89-1
312" (Auto Trans) Std	3 10-1
383" (Synchro-mesh) Std	3 22-1
383" & 430" (Auto Trans) Std ①	2 69-1
383" & 430" (Auto Trans) Std ②	2 71-1
383" & 430" (Auto Trans) Optl	2 91-1

① - Early ② –Later

►*GEAR RATIO NOTE* Gear ratio stamped on tag on rear axle housing bolt

Backlash - 004- 009"

Axl Shaft R m val: Remove wheel and brake drum Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange) Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal)

Carri r Ass mbly R m val: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing With rear universal joint disconnected, axle shafts removed (see above) remove differential carrier housing to rear axle housing bolts and lift out carrier assembly

Wheel B aring Adjustm nt: None required

SHOCK ABSORBERS

Direct acting, non-adjustable type used on all models

Model Front Sh ck Abs rbers	Part No.
Monterey & Montclair (All) Std	B9M-18077-B
Monterey & Montclair (All) Air Cond	B9MM-18077-D
Other Models, Std	B9MM-18077-D
All Models, Heavy Duty	B9M-18077-A
Model Rear Shock Absorbers	**Part No.**
All Models (Exc Following) Std	B9M-18080-A
Park Lane (All) Std	B9MM-18080-T
Station Wagon (All) Std	B9MM-18080-S
All Models (Exc Sta Wgn) Hvy Duty	B9M-18080-C
All Models with Air Cond	B9MM-18080-T

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within coil springs *See "Mercury Front Suspension" in Suspension & Wheel Alignment Section*

►*"CLUNKING" NOISE CORRECTION See "Mercury Front Suspension' in Suspension & Wheel Alignment Section*

Caster - 0° to Neg 1½° Caster should not vary more than ½° from side to side

Camber - 0° to Pos ¾° Camber should not vary more than ½° from side to side

Toe-In - 1/16-3/16"

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 17°30' (Manual Steering), 17°18' (Power Steering)

STEERING

Manual Steering: Saginaw Recirculating ball type *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Power Steering: Bendix linkage type *See "Bendix Linkage Type" in Steering Section*

►*POOR RECOVERY FROM LEFT HAND TURN CORRECTION (312" ENG) See "Bendix Linkage Type" in Steering Section*

►*STEERING WHEEL SHAKE & SHAFT RATTLE CORRECTION* May be caused by steering column shaft bearing not being properly preloaded To correct, loosen nuts retaining steering column to brace on underside of column, then press down firmly on wheel and tighten nuts on brace *NOTE* When installing steering gear assembly (after service), preload the bearing as follows Push steering gear up toward wheel to compress rubber insert in flex coupling, then tighten steering gear-to-frame bolts to 34-42 ft lbs

►*STEERING COLUMN RATTLE CORRECTION* If caused by play between shift rod and shift tube arm, install a spacer (either flat or wave type) on manual shift rod pin to eliminate looseness

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Bendix hydraulic, single anchor (without eccentric and with fixed anchor pin) Automatic adjustment on all models Parking brake applies rear wheel brakes

See "Bendix Automatic Adjuster Hydraulic Brakes' in Brak Section

►*POWER BRAKE INSUFFICIENT ASSIST CORRECTION If this condition is caused by vacuum leak in booster assembly, see "Bendix Hydraulic (Disc) Reaction Type Power Unit" in Brake Section*

Drum Diameter - 11"

Wheel Cylinder Diameter - 1 1/8" (front), 31/32" (rear)

Lining - Molded type riveted to shoe

Lining Width - 3" (front), 2½" (rear)

►*LINING THICKNESS PRODUCTION CHANGE* Thickness of standard lining has been increased 030" (making total lining thickness ¼") NOTE - The new standard lining and the oversize lining furnished for service replacement are the same thickness but are not interchangeable due to the radius grind Radius grind on oversize lining is different to match turned drum

Clearance - Special procedures required *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section*

Brake Pedal Freeplay Adjustment (Standard Brakes): Adjust eccentric bolt on brake pedal lever (connects master cylinder pushrod to brake pedal lever) to obtain 1/4-7/16" free travel

Brake Pedal Height Adjustment (Power Brakes): Adjust eccentric bolt on brake pedal lever (connects power brake unit pushrod to brake pedal lever) so that letter "E" on head of bolt is in an upright position

Standard Master Cylinder: on engine side of firewall

Checking Fluid - Maintain fluid level to within ¼" of top of cylinder

Removal - Disconnect master cylinder pushrod at brake pedal lever, then remove hollow bolt securing outlet fitting to master cylinder Remove capscrews securing master cylinder to firewall and remove master cylinder

Power Unit: *See 'Bendix Hydraulic (Disc) Reaction Type Power Unit" in Brake Section*

Checking Fluid Level - Same as for standard master cylinder (above)

Removal - Remove outlet fitting bolt from end of master cylinder, then disconnect manifold vacuum hose from power unit Under the instrument panel, remove eccentric capscrew and locknut securing pushrod to brake pedal lever, then remove capscrews and lockwashers holding power brake assembly to bracket and remove assembly

MISC. MECHANICAL

Windshield Wipers: Cable operated electric type *See "Windshield Wipers" in Miscellaneous Section*

Power Window Regulators: Electric type with reversible motor in each window Controlled by door switch and master control switch *NOTE* - Tail gate window on some station wagon models also power operated *See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Electric-hydraulic with reversible pump motor *See "Power Top Controls" in Miscellaneous Section*

Power Seat Adjusters: 4-Way Power Seat - Solenoid controlled ball nut and screw type with single electric motor . *See "Power Seat Adjuster" in Miscellaneous Section*

Seat-O-Matic Control - 4-way seat control with automatic position adjustment controlled by switch on instrument panel *See "Seat-O-Matic Power Seat Adjusters" in Miscellaneous Section*

Air Conditi ning: *See "Mercury Air Conditioning" in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on Patent Plate attached to left front body pillar between door hinges *NOTE* - Number (example below) includes identification data

① ② ③ ④ ⑤
O W 32 N 500001

① - Year (1960)
② - Assembly Plant **J** Los Angeles **T** Metuchen **Z** St Louis **W** Wayne
③ - Body Series See Body table below
④ - Engine **M** 430" Domestic **F** 430" Export **N** 383" Domestic **E** 383" Export **P** 312"
⑤ - Beginning Vehicle Number

Body Series Table

	2-Dr. Sedan	4-Dr. Sedan	Convertible
Monterey	31	32	35
Montclair		42	
Parklane			55
	2-Dr. Hardtop	**4-Dr. Hardtop**	**Sta. Wagon**
Monterey	33	34	
Montclair	43	44	
Parklane	53	54	
Commuter			37
Colony Park			57

VEHICLE SPECIFICATIONS: Vehicle specification codes (on Patent Plate) contain Body Style, Color, Trim, and Date of Assembly

Engine Production Code Number: Indicates - Engine Plant, Year, Month, Day, and Plant Inspector Not used for licensing

312" - Early - On front of cyl block at pushrod valley cover **Later** - On left front corner of cyl block just below cyl head

383" & 430" - On cyl block in front of left cyl head

TUNE-UP

►*ENGINE DETONATION CORRECTION (312" Engine using Regular Gasoline)* Check and adjust the following items in order Recheck engine performance after each step to determine if detonation corrected.
1) Check cooling system for correct pulley, fan, and thermostat Make certain radiator filled with water
2) Check operation of manifold heat control valve
3) Set ignition timing at 2° BTDC (minimum setting) and check distributor advance performance
4) Replace 180 °F thermostat with 160 °F type
5) If above steps DO NOT correct detonation, install TWO head gaskets on each cylinder bank using sealer on head and block sides of gaskets only Reset ignition timing to normal setting.

►*DISPOSABLE FUEL FILTER RESTRICTION NOTE: See "Disposable Fuel Filter Flow Checks" under Carburetor*

COMPRESSION PRESSURE: 312" & 383" - 160±20 lbs , **430"** - 180±20 lbs All cylinders to be even within 10 lbs

VACUUM READING: 17-18" Hg at specified engine idle RPM

VALVE TAPPET CLEARANCE: 312" - 019" Intake & Exhaust Cold, 018" Intake & Exhaust Hot Final check with engine temperature stabilized and engine running
Valve Tappet Adjustment - *See "Valve System" in Mercury Special Data*

383" & 430" - Zero lash, hydraulic lifters

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (312").* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL: 312" - Automatic thermostatic type Located in right exhaust manifold Valve must operate freely

►*NOISY & STICKING CONTROL VALVE NOTE* To correct and prevent recurrence, use mixture of penetrating oil and graphite such as "Lock-Ease" applied to shaft at each chassis lubrication

383" & 430" - Water jacketed intake manifold with thermostat controlled circulation, eliminates need of heat valve

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See FUEL SYSTEM NOTES in Mercury Special Data.*

IGNITION

FIRING ORDER: 312" - 1-5-4-8-6-3-7-2
383" & 430" - 1-5-4-2-6-3-7-8
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032- 036"
Spark Plugs - Champion F-14-Y (312"), F-11-Y (383" & 430") 18 mm Tapered seat, no gasket used Torque to 15-20 ft lbs

►*IGNITION FAILURE CAUTION·* Do not mistake "CORONA" discharge for "FLASH-OVER" Corona is steady blue light around insulator just above spark plug shell crimp and has no effect on ignition performance

COIL: Mercury No. B6A-12029-B.
Ignition Current - 2 5 amps idling, 4 5 amps stopped
Resistor - COLF-12250-A 1 3-1 4 ohms at 75°F

►*COIL RESISTOR NOTE:* New Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to multiple quick disconnect at left side of dash panel Resistor Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil

DISTRIBUTOR: Mercury No. COAF-12127-A (312"), COMF-12127-C (383"), B9MF-12127-B (430").
See "Mercury Distributors" in Electrical Section

►*ENGINE STUMBLE, HESITATION, ROUGH IDLE, OR INTERMITTENT MISFIRING CORRECTION (383", 430" Eng)* Caused by "Cross-fire" due to failure of boot insulation at distributor cap To correct, replace faulty distributor wires with wires from Kit, Part No HJK-12259-D, identified by daub of green paint or words "Radio Resistance" lettered on wires Distributor wires must be routed as shown in wiring diagram *NOTE - Also see "Ford 2-Barrel Carburetor"*

►*DISTRIBUTOR HOLD-DOWN CLAMP CAUTION·* Clamp nut should be tightened to 10-15 ft lbs only to prevent bending studs or causing oil leaks at distributor grommet

Condenser - Mercury No B9AF-12300-A (All) **Capacity** 21- 25 mfd
Contact Point Set - Mercury No B7A-12171-A
Breaker Gap - 014- 016"
Cam Angle - 26-28½° *CAUTION* - Set cam angle at idling speed (250 Distributor RPM) and with Zero vacuum
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance COAF-12127-A

Degrees	Distr.	RPM	Degrees	Eng	RPM
0		500	0		1000
1¼-2¼		800	2½-4½		1600
5-6¼		1300	10 12½		2600
10¼-11¾		2000	20½-23½		4000

① - Adjust test stand to 0° at 300 RPM

② Automatic Advanc - COMF-12127-C

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		425	0		850
¾-1¾		525	1½-3½		1050
4-5		675	8-10		1350
7-8		925	14-16		1850
13¼-14¾		2000	26½-29½		4000

② Automatic Advanc - B9MF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		375	0		750
½-1½		500	1-3		1000
6-7¼		1100	12-14½		2200
14½-15¾		2000	29-31½		4000

② - Adjust test stand to 0° at 250 RPM

Vacuum Spark Control: Integral type

③ Vacuum Advanc COAF-12127-A

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
0-1			0-2	7
5-8			10-16	12½
8-11			16-22	16
9½-12½			19-25	20

③ Vacuum Advanc - COMF-12127-C

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
0-2½			0-5	6
5-8			10-16	10
7½-10½			15-21	13
9½-12½			19-25	16

③ Vacuum Advanc - B9MF-12127-B

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
0-3			0-6	6½
5-8			10-16	10
9½-12½			19-25	15

③ - Adjust test stand to 0° at 1000 RPM and 0" Hg

IGNITION TIMING

Setting - Range 2-10 ° BTDC 3° BTDC (312" Synchromesh), 10 ° BTDC (312" Auto Trans), 6° BTDC (383" & 430") *Set with vacuum line disconnected and carb opening taped closed*

►*ENGINE DETONATION CORRECTION (312" Engine):* See *TUNE-UP above.*

Timing Mark - 312" & Early 383" & 430" - Damper marked TDC, 10° & 20° BTDC (long marks) & 2° short marks between Align mark with pointer on cover **Lat r 383" & 430"** - Ball pin on damper to be aligned with 0, 3, 6, 10 sawtoothed marks of pointer on cover

CARBURETOR

►*CARBURETOR APPLICATION: Us d as follows:*

Engine	Carbur t r
312"	Holley 2-Bbl
383"	Carter 2-Bbl. or Ford 2-Bbl.
430"	Carter 2-Bbl.

►*CARTER CARBURETOR NOTE. N w d sign ABD typ . See below.*

►*HARD HOT START CORRECTION (Cart r ABD Carbs. installed prior to April 15th production)* Caused by fuel percolation. When carburetor, automatic choke and linkage adjustments do not correct condition, install Booster Venturi Assembly Kit Part No COLY-9A523-A and lower float level Later carburetors have these revisions. S *"Cart r ABD Carbur tors" in Carbur ti n S ction.*

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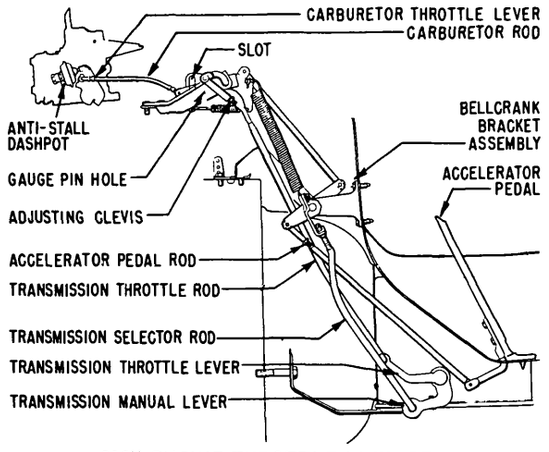
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Thr ttl Linkag Adjustment: Make adjustments in the following sequence:

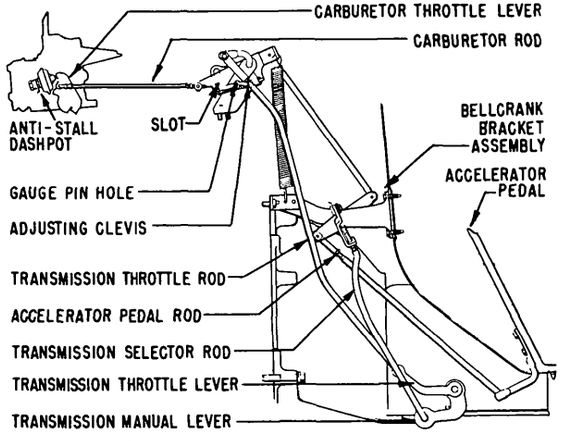
Engin RPM Adjustment - Make Anti-Stall Dashpot Adjustment, see below, then adjust engine idle speed to 450-475 RPM with selector lever in D (Merc-O-Matic), D2 (Multi-Drive) position (engine at operating temperature).

Carburet r R d Adjustm nt - Disconnect transmission throttle rod at bellcrank bracket and carburetor rod at carburetor lever. Insert ¼" gauge pin, Tool 77230-MB, through alignment holes in bellcrank bracket and tube. Hold carburetor lever against hot idle adjusting screw and adjust length of carburetor rod for free fit in carbu-lever. **L ngthen carburetor rod one turn.** Remove ¼" gauge pin and reconnect rods. Recheck alignment holes and readjust carburetor rod as required. *NOTE* - Guide pin holes must be in alignment.

Throttl R d Adjustm nt - Connect pressure gauge at transmission pressure tube fitting at bellcrank. Pull up on throttle rod firmly but gently. Adjust clevis so that pin enters freely, then **l ngthen clevis 3½ turns** and connect rod. Start engine and with foot brake set firmly, selector lever in D (Merc-O-Matic) D2 (Multi-Drive) position, accelerate engine to 1,000 RPM. Gauge reading should be 80-85 lbs. To correct pressure, adjust length of throttle rod. Lengthen rod to increase pressure, shorten rod to decrease pressure. *CAUTION* - Make checks quickly and return selector lever to neutral position.



312" ENGINE THROTTLE LINKAGE



383" & 430" ENGINE THROTTLE LINKAGE

Pedal Height & Kickdown Adjustment: Adjust accelerator rod length to obtain 4 3/16" clearance between bottom surface of pedal and bare floor pan. Shorten rod to raise pedal, lengthen rod to lower pedal. Transmission control shaft must continue to move after throttle is completely opened (pin will override full throttle position in slot in transmission control to accelerator shaft assembly). When kickdown not obtained, shorten accelerator rod slightly (to increase pedal travel).

Downshift Rod Adjustment - Two adjustments necessary. Specifications are with accelerator depressed to full kickdown position.

1) Adjust screw and jamnut at upper end of downshift rod so rod is vertical(crosswise)when looking down from bellcrank to "Z" bar.

2) Adjust length of downshift rod at upper end (remove from stud) so that bellcrank pin is within 3/32" from top of slot.

Anti-Stall Dashpot Adjustment: With carburetor lever against hot idle screw and dashpot plunger fully depressed, clearance between dashpot plunger and lever should be .060-.090". To adjust, loosen locknut and turn dashpot in mounting bracket.

HOLLEY 2-BARREL

Model	Carburetor No.
312" All Trans. (Early)	ℂ B9ME-9510-A
312" All Trans. (Late)	ℂ COME-9510-A
312" Std. Trans.	② COME-9510-F

ℂ - For Std. Trans. remove dashpot and attaching parts.
② - Use B9ME-9510-A or COME-9510-A by removing dashpot and attaching parts.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - 1-1½ turns open. Turn screws out for richer mixture.

Idle Speed - 500-525 RPM (Synchro-mesh), 450-475 RPM (Auto. Trans.). Selector lever in D (Merc-O-Matic), D2 (Multi-Drive) position.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

FORD 2-BARREL

Model	Carburetor No.
383" Less Air Cond. (Early)	COME-9510-G
383" Less Air Cond. (Later)	COME-9510-K
383" Air Cond.	COME-9510-J

►*ROUGH IDLE AND STUMBLE CORRECTION (Ford 2-Barrel Carb.):* Caused by improperly installed vacuum transfer (balance) tubes. To correct, *see "Ford 2 & 4-Barrel Carburetors" in Carburetion Section. NOTE - Also see "Distributor" above.*

►*CARBURETOR FLOODING CORRECTION & FLOAT PRODUCTION CHANGE: See "Ford 2 & 4-Bbl. Carburetors" in Carburetion Section.*

►*HESITATION OR STUMBLE CORRECTION (Ford 2-Barrel Carb.): To correct, see revis d accelerator pump adjustment procedure in "Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1½ turns open. Turn screws out for richer mixture.

Idle Speed - 450-475 RPM with selector lever in D (Merc-O-Matic) D2 (Multi-Drive) position.

►*IDLE SPEED NOTE:* On Air Cond. Cars set idle speed as follows with air conditioner in operation for a minimum of 20 minutes.

1) Loosen locknut securing curved bimetal to idle adjusting screw.

2) Loosen idle adjusting screw locknut and turn screw to secure idle speed of 450-475 RPM, then tighten adjusting screw locknut.

3) Tighten bimetal locknut securely while holding bimetal so opening of curve is toward front of carburetor.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARTER ABD 2-BARREL

Carter ABD No. 2965S, SA (Mercury No. COLE-9510-D).

►*STALLING OR LOADING AFTER SHORT OPERATION OR CHOKE VALVE CLOSING FAILURE CORRECTION:* May be caused by incorrect choke thermostatic coil spring. *See "Carter ABD Carburetors" in Carburetion Section.*

►*POOR PERFORMANCE & ACCELERATION CORRECTION:* Caused by misaligned booster venturi or restricted accelerator pump discharge passages. *See "Carter ABD Carburetors" in Carburetion Section.*

►*HARD HOT STARTING CORRECTION:* Caused by fuel inlet needle improperly seated. *See "Carter ABD Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1-1½ turns open. Turn both screws out for richer mixture.

Idle Speed - 450-475 RPM in "D" or "D2".

►*IDLE SPEED & MIXTURE ADJUSTMENT CAUTION:* Hot idle compensating valve must be closed when making either adjustment. To close valve, press down on brass valve button (not on bi-metal spring).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter ABD 2-Barrel Carburetor" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Mercury No. COME-9350-A (312"), EDG-9350-B (383", 430"). Fuel only.

Pressure - 4.0-6.0 lbs. (312"), 4.5-6.5 lbs. (383", 430") at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

NEW DISPOSABLE TYPE FUEL FILTER: New disposable type fuel filter Part No. COME-9155-B is available for service replacement of filters B8S-9155-A and PB8M-9155-A (1958-59).

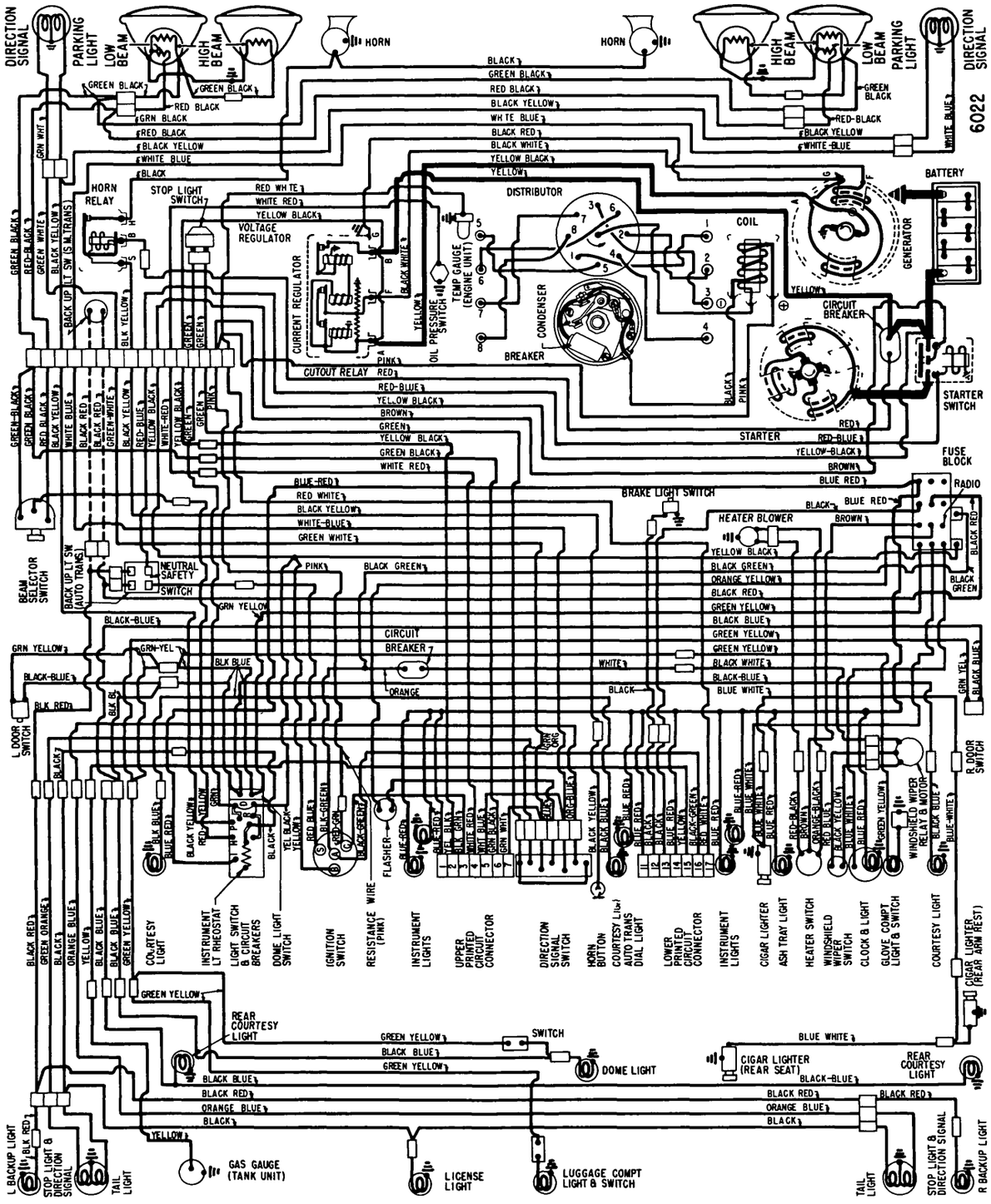
Installation - To save damage to filter and possibility of leaks, proceed as follows:

1) Use only the filter hex connection adjacent to mating part for applying torque.

2) Bend filter line so that normal free floating position of the end of line is in proper alignment with filter to avoid induction stress on filter case.

3) Use second wrench on filter hex connection to avoid

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transferring stress through filter case and tighten fuel filter inlet to fuel pump hand tight plus 2½ turns Tighten fuel filter outlet to fuel line to 180-200 inch lbs

Replacement - Remove fuel filter to carburetor fuel tube, and oil filter assembly Remove brass nipple from fuel pump outlet Install new filter in fuel pump outlet *CAUTION - DO NOT transfer force through filter cas when installing filter or fuel tube* Assemble filter to carburetor fuel tube at filter end, then to carburetor Check for leaks

DISPOSABLE FUEL FILTER FLOW CHECKS: Check fuel flow at both inlet and outlet side of fuel filter Minimum flow required for engine operation is 1 pint within 20 seconds at 500 RPM Static pressure will not vary because of restricted filter Procedure for checking fuel pump pressure remains the same

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Mercury No COMF-10804-A

Dash Unit - Mercury No COMF-9280-A

Tank Unit - Mercury No PB9M-9275-A

See "Fuel Gauges" in Carburetion Section

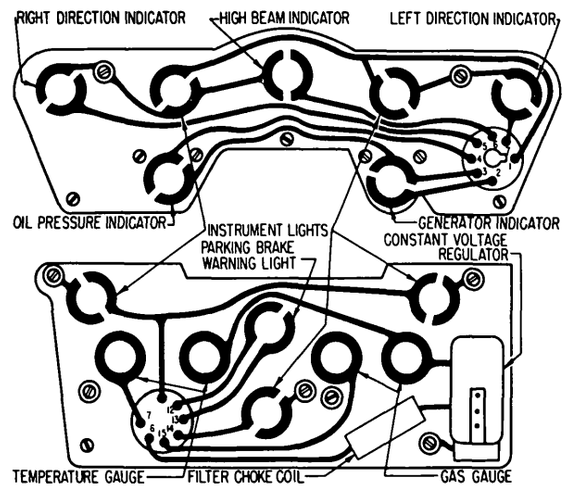
Air Cleaner: Dry filter element type Clean every 4000 miles, replace every 20,000 miles or sooner if required

►*AIR CLEANER SERVICE NOTE·* Filter element can be cleaned by removing it from body and tapping or shaking it or by using compressed air If air is used, direct air stream against element in direction opposite to intake air flow using care not to rupture filtering element fibre *DO NOT use solvents and DO NOT oil paper or screen of element*

►*AIR CLEANER PRE-FILTER ELEMENT NOTE* Synthetic fibre, wraparound element Part No B8A-9601-A is available for use with dry-type cleaner element, in abnormally dusty areas

►*PRE-FILTER ELEMENT INSTALLATION & SERVICING·* Remove dry element and slip pre-filter element over outer surface, locating it between upper and lower

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MERCURY INSTRUMENT CLUSTER PRINTED CIRCUITS

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gasket surfaces. To clean pre-filter element, remove it from dry element and wash or rinse it in plain water. Use a detergent to remove contaminated oil. DO NOT WASH dry element.

BATTERY

(312") Mercury No. B9A-10654-D. 12 volt, 11 plate, 55 ampere hour capacity (20 hr. rate).
(383",430") Mercury No. B9A-10654-F. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).
NOTE - 12 volt, 17 plate, 75 ampere capacity, optional.
Battery Ground - Negative to right cylinder head.
Engine Ground - At valve chamber pushrod cover.

STARTER

Mercury No. FAY-11002-A. Armature B6A-11005-B.
Drive - Mercury No. 1CM-11350-C. Bendix "Folo-Thru".
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.
Cranking Speed - 150-180 RPM at normal engine operating temperature
Current Draw - 155-190 amps. at cranking speed.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	①80
15.5 ft lbs.	Lock	5.0	550

① - 85 amps. with 430" engine.

Removal: Disconnect battery ground cable, then disconnect throttle linkage at bellcrank. Raise car and remove battery cable at starter and engine splash shield from frame front crossmember Remove nuts securing right and left front engine support insulators to frame Position a safety support jack under front edge of oil pan using a block of wood between pan and jack, then raise engine approximately 1" Remove starter attaching capscrews and remove starter by pulling forward and upward until drive clears housing Continue upward movement of starter until it is nearly upright with drive end facing down, then rotate starter while holding drive assembly to allow clearance of drive end plate mounting bosses Lower starter between tie rod and idler arm

Installation: Reverse removal procedure and note the following Install attaching screws, then tighten outer screw first, finally tightening top and bottom screws
NOTE - If outer screw is not tightened first, misalignment of starter motor may result.

Starting Switch: Mercury No B6A-11450-A, magnetic type, controlled by Ignition & Starter Switch, Mercury No. COLF-11572-A, Neutral Safety Switch, Mercury No. COMF-7A217-B located on top side of steering column under instrument panel (Automatic Trans Cars).

Neutral Safety Switch Adjustment: *See "Mercury Automatic Transmissions" in Transmission Section.*

GENERATOR

Generator	Armature	Amperes
B9A-10002-A①	FGT-10027-A	30
COAF-10002-A	PB8M-10027-A	35
B8QH-10002-A②	FGP-10027-A	40
COMF-10002-A	PB8M-10027-A	35
B9LF-10002-A	FGP-10027-A	40
B6A-10002-D③Bosch	B6C-10005-A	50

① - Identification 2900650.
② - Identification FGP-10002-B.
③ - Identification FCG-10002-A.

►*CHARGING CIRCUIT FUSE NOTE:* This fuse located on starter relay was bypassed in production starting February 1960. Fuse may be bypassed on earlier cars by disconnecting YELLOW coded wire (charging line from generator regulator to charging system fuse terminal) and reconnecting this wire to lower terminal of the 30 Amp. Horn Relay Circuit Breaker.

Performance Data

Generator	Amperes	Volts	RPM
All (Exc. Bosch)	①	15.0	2525
Bosch	50	15.0	1380

① - 30, 35 or 40.

Brush Spring Tension - (Bosch) 16-18 ozs., (Others) 32-40 ozs.
Field Current - (Bosch) 1.2-1.8 amps. at 12 volts, (Others) 1.0-1.1 amps at 10 volts. Hot.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: ½" deflection between generator and water pump pulleys with normal thumb pressure.

REGULATOR

Regulator	Generator
B7A-10505-B	30 Ampere
COMF-10505-A	35 Ampere
PB7M-10505-A	40 Ampere
B6A-10505-C (Bosch)	50 Ampere

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Cutout Relay

Cuts In - 12.0-12.8 volts (30 & 40 amp.), 12.4-13.2 volts (35 amp.), 13.0-13.5 volts (50 amp.).
Cuts Out - 6-9 amps. (30 amp.), 2-6 amps. (35 amp.), 5-9 amps. (40 amp.), 2-8 amps. (50 amp.).

Voltage Regulator

Setting - (Bosch) 14.1-14.6 volts (Low stage), 14.1-14.8 volts (High stage); (Others) 14.6-15.4 volts, at ambient temperature of 75°F.
Checking & Adjusting - *See "Bosch 12-Volt Regulators" or "Mercury 12-Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 28-32 amps (30 amp.), 33-37 amps (35 amp.), 38-42 amps. (40 amp.), 47-52 amps (50 amp.).
Checking & Adjusting - *See "Bosch 12-Volt Regulators" or "Mercury 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*CHARGING CIRCUIT FUSE PRODUCTION CHANGE: See Note under GENERATOR above.*

►*INSTRUMENT PANEL LIGHT FUSE CHANGE* - Lights are protected by fuse in Fuse Panel on later cars This change was made by routing line from Instrument Light Rheostat to lights through a fuse in the fuse panel as shown in wiring diagram.

Speedometer & Hood Assembly Removal: Mask hood area to avoid scratching finish. Remove two hood and speedometer assembly-to-instrument panel screws Lift hood and speedometer assembly off dowel pins and disconnect speedometer cable at upper printed circuit board plug connector. Remove speedometer and hood assembly. Remove speedometer assembly to hood retaining screws and remove speedometer assembly, mask and dial. Remove speedometer to case screws and one small screw in front face of speedometer and remove speedometer.

Instrument Lamp Removal: To remove upper circuit board bulbs and lower circuit board center bulbs, partially remove speedometer and hood assembly, see above. Some lamp bulbs located in lower circuit board and right and left clusters are accessible through opening at bottom of clusters.

Circuit Board Lamp Removal - Carefully turn bulb socket (clockwise) to disengage socket and bulb from board. To reinstall, place socket and bulb in board opening and turn socket 90° (clockwise) to lock it.

Other Cluster Lamp Removal - All remaining sockets can be removed by pulling socket out of cluster. To reinstall, place socket in opening and press in until seated.

Upper Circuit Board Removal: Remove speedometer and hood assembly, see above. Remove circuit board to speedometer case retaining screws and remove board.

Lower Circuit Board Removal: Remove speedometer and hood assembly, see above. Disconnect connector, then from underneath or through top of panel, remove 6 retaining screws and remove board from top of panel.

Direction Signals: *See Electrical Section.*

Lighting Switch Removal: Disconnect negative (ground) cable at battery Use paper clip to remove Ignition switch lock cylinder, remove bezel and lower Ignition switch under panel. Press inward on headlamp switch spring release button and carefully remove switch knob and shaft. Remove headlamp switch bezel nut. Remove two screws securing left cluster bezel to cluster housing. Pull left cluster bezel away from panel. Hold headlamp switch and unscrew switch retaining nut adapter. Lower switch through opening at bottom of cluster. Note switch wiring color code and disconnect wires from switch.

Stop Light Switch Location: On forward end of brake master cylinder (integral with power unit) Master cylinder or power unit located on firewall in engine compartment.

LIGHTING CIRCUIT BREAKERS: 18 Ampere. On light switch. Protects Headlights.
12 Ampere. On light switch. Protects Parking, Rear, Instrument Panel (Early cars), License, and Luggage Compartment lights.
12 Ampere. On brake pedal support bracket Protects electric windshield wiper.
30 Ampere. On starter relay. Protects Horn Relay and Horns

FUSES: In fuse panel located in back of glove box.
AGW-4 Amp. On Fuse Panel (later cars). Protects Instrument Panel lights
SFE 7.5 Amp. Interior lights
SFE 7.5 Amp. Turn Signals.
1AC-5 Amp. Radio
SFE-14 Amp. Heater Blower
SFE-7.5 Amp. Spotlight.
1AG-2 Amp. Clock.

►*CHARGING CIRCUIT FUSE - See GENERATOR above.*

Horn Relay: Mercury No B8C-13853-A.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*CYLINDER HEAD PRODUCTION CHANGE:* New cylinder head used in production Nov. 24, 1959 with new specifications for new color coded standard valves, valve head diameter, stem diameter and with constant

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rate valve springs which are not available for replacement. Color coded replacement valve spring and damper assembly available for replacement. *New cylinder head with new valves and springs is interchangeable with former head. One of each type head may be used on same engine.* See individual items in data following.

ENGINE SPECIFICATIONS: Own V8, valve-in-head, of same designs used previously.

Engine	Bore	Stroke	Displacement
312"	3.80"	3.44"	312 cu. in.
383"	4.30"	3.30"	383 cu. in.
430"	4.30"	3.70"	430 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
312"	8.9-1	46.00	205 at 4000 RPM
383"	8.5-1.	59.17	280 at 4200 RPM
430"	10.0-1	59.17	310 at 4100 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ROCKER ARM COVER GASKET NOTE:* Engine should be hot when covers are removed to prevent damage to .003-.005" thick neoprene coating on gasket. Exercise extreme care to insure that gasket particles do not fall into engine as gasket is removed. Torque cover bolt to 5-8 ft. lbs.

►*LOW OIL PRESSURE & WORN BEARINGS CORRECTION (383", 430" Eng.):* Caused by oil pump relief valve spring wearing into plug. If plug worn, replace it with Plug Part No. COAE-6A616-A and use Spring COME-6670-A.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Mercury Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Mercury Special Data.*

ENGINE REMOVAL: *See "Engine" in Mercury Special Data.*

OIL PAN REMOVAL: 312" - Position No. 6 piston at TDC. Drain crankcase and remove engine splash shield. Remove stabilizer retaining screws and pull stabilizer down. Remove nut holding inlet tube to oil pump. Loosen nut holding tube to oil pan. Remove oil pan retaining screws and remove oil pan, screen cover and inlet tube assembly.

383" & 430" - Position No. 1 piston at 14° BTDC. Disconnect battery ground cable at battery, remove dipstick and disconnect throttle linkage and kickdown rod at bellcrank. Drain crankcase. Remove engine splash shield. Remove engine front mount-to-crossmember nuts. Raise engine and place 1" block of wood between each front mount and frame. Disconnect either right or left stabilizer link at front lower suspension arm and swing out of way. Remove oil pan retaining screws and let pan rest on crossmember. Remove oil pump inlet tube and screen assembly screws and let assembly drop into pan. Remove pan in a lowering forward motion.

PISTONS

Aluminum alloy, Autothermic, solid skirt type with three rings above pin. *NOTE* - 383" & 430" pistons have step design head and piston pins are interference fit in rod.

►*ORIGINAL BORE & PISTON SIZES:* Std. cylinder bore as follows:

(312") 3.8000-3.8024", **(383" & 430")** 4.3000-4.3024". *NOTE* - Std. size pistons furnished in two sizes and marked by color code on top of piston as follows: **(312")** Code Red 3.7986-3.7992", Code Blue 3.7998-3.8004".

(383") Code Red 4.2983-4.2989", Code Blue 4.2995-4.3001".

►*REVISED PISTON SIZE & CLEARANCE SPECIFICATIONS (430"):* Std. size piston furnished in two (reduced) sizes and marked with color code on top of piston as follows:

Code Red 4.2997-4.2983", Code Blue 4.2989-4.2995". *See revised clearance specification below.*

Removal - Piston and rod removed from above.

Clearance (312") - .0011"-.0029", at bottom of skirt.

Clearance (383") - .0008-.0026" at bottom of skirt. Wear limit .005".

Clearance (430") - .0017-.0035". This supersedes previous specification of .0008-.0026".

Fitting New Pistons: *See "Pistons" in Mercury Special Data.*

Installing Pistons: Indentation notch in head of piston must be toward front of engine. *See Rod Installation. NOTE* - 383" & 430" pistons are not interchangeable from left to right bank.

Replacement Pistons: (All) Std. (2 sizes see above). **(312")** .003", .0225", .0325", .0425" Oversize. **(383")** .003", .020", .030" Oversize. **(430")** .003", .020", .030", .040" Oversize.

PISTON PIN

(312") Floating type with lock ring at each end.

(383", 430") Press fit in connecting rod, no retaining device.

Diameter - (312") .9120-.9123". **(383", 430")** .9749-.9752".

Length - (312") 3.010-.3.030". **(383",430")** 3.480-3.500".

Clearance in Piston - (312") .0001-.0003". **(383",430")** .0002-.0004". Wear limit (All) .0008".

Clearance in Rod - (312") .0001-.0005". **(383",430")** Interference fit. Minimum torque required to seat pin 20 lbs.

Removal & Installation (383" & 430") - *See "Piston Pins" in Mercury Special Data.*

Replacement Pins: (312") Std., .001", .002" Oversize. **(383", 430")** Standard with new piston only.

PISTON RINGS

312" Engine

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0770-.0780"	.012-.027"	① .0020-.0025"
Compr. (2)	.0930-.0940"	.012-.027"	① .001-.003"
Oil	3-Piece	.015-.062"	③

383" & 430" Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0770-.0780"	②	① .0015-.0030"
Compr. (2)	.068-.069"	②	① .001-.003"
Oil	3-Piece	.015-.062"	③

① - Wear limit .006".
② - .013-.028" (383"), .015-.030" (430").
③ - Snug. Side sealing type.

Replacement Rings: Std., .020", .030", .040" Oversize.

CONNECTING ROD

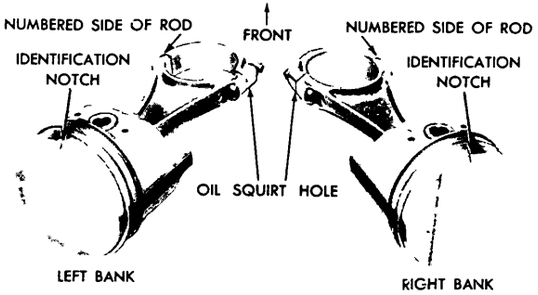
Length (Center-to-Center) - (312") 6.250-6.254", **(383", 430")** 6.599-6.601".

Journal Diameter (312") - 2.1884-2.1888" (Red), 2.1880-2.1884" (Blue).

Journal Diameter (383",430") - 2.5996-2.6000" (Red) 2.5992-2.5996" (Blue).

Lower Bearing - Copper lead alloy, steel back.

Clearance (312") - .0005-.0024". Wear limit .0034".



MERCURY PISTON & ROD ASSEMBLY

Clearance (383",430") - .0007-.0028". Wear limit .0038".

Side Clearance (312") - .006-.016". Wear limit .019".

Side Clearance (383",430") - .005-.015". Wear limit .018".

Replacement Bearings: Std. (2-Sizes Red & Blue), and .002", .010", .020", .030" (All), plus .040" (383" & 430") Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings.

Installing Rods: (All Engines) Numbered side of rod must face to outside of engine with notch in piston head toward front of engine.

CRANKSHAFT

►*383 & 430" MAIN BEARING BOLT SERVICE REPLACEMENT NOTE: See "Crankshaft" in Mercury Special Data.*

Journal Diameter (312") - 2.6235-2.6243" (Red), 2.6239-2.6243" (Blue).

Journal Diameter (383", 430") - 2.8998-2.9002" (Red), 2.8994-2.8998" (Blue).

Out-of-Round Limits - .0006". **Taper Limit** - .001".

Bearings - Copper-lead Alloy, steel back.

Clearance - (312") .0004-.0029". Wear limit .0042". **(383", 430")** 0009-0029" Wear limit .0039".

End Thrust (All): Taken by No. 3 (center) main bearing

Endplay - (312") .002-.006", **(383" & 430")** .004-.008".

Thrust Bearing Alignment - *See "Crankshaft & Bearings" in Mercury Special Data.*

Replacement Bearings: (All) Std. (2-Sizes Red and Blue), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Mercury Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Mercury Special Data.*

CAMSHAFT

►*BEARING BORE NOTE (383" & 430"):* Bearing bores in block are graduated in size (largest No. 1, smallest No. 5) to permit removal and installation of bushings.

Journal Diameter - **(312")** 1.9255-1.9265". **(383", 430")** 2.264-2.265".

Out-of-Round Limits - **(All)** .001"

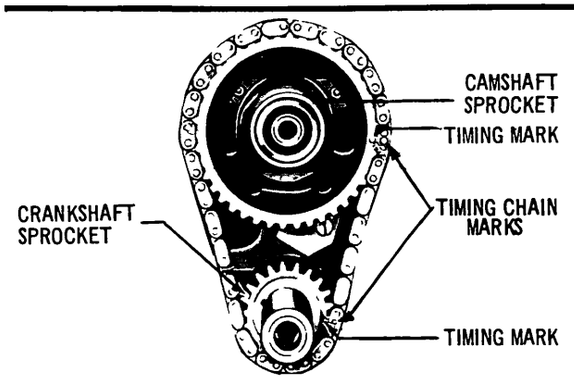
Bearings - Babbitt lined, steel back.

Clearance - **(All)** .001-.003". Wear limit 006".

End Thrust (312"): Controlled by thrust plate and spacer between camshaft sprocket and front bearing journal.

Endplay - .001-.007".

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MERCURY 312" ENGINE VALVE TIMING MARKS

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End Thrust (383", 430"): Toward rear of engine. Taken by thrust face of camshaft sprocket contacting front surface of block.

R placem nt Bearings: (All) Std., .015" Undersize.

Camshaft R moval & Installation: *See "Camshaft & B arings" in M rcury Sp cial Data.*

Timing Chain D flecti n: Not more than ½" deflection from straight to outward deflected position.

Camshaft S tting: (312") Setting is correct when timing marks on sprockets are on drive side with 12 timing chain pins between marks.

Camshaft Setting: (383", 430") Timing marks on sprockets must be adjacent and in line with straightedge across shaft centers.

Timing Chain Cov r S al Installation (Crankshaft Front Seal): *See "Engin Front Cover" in Mercury Special Data.*

Engin Fr nt Cov r Removal & Installation: *See "Engine Front Cover" in M rcury Special Data.*

VALVES

Tapp t Clearance: (312") .020" (Cold), .019" (Hot).

Valv Tapp t Adjustment - (312) *See "Valve System" in M rcury Sp cial Data.*

(383", 430") Zero lash, hydraulic lifters.

312" Engine

Valv	H ad Diam t r	①Stem Diameter
Intake	1.642-1.652"	.3416-.3423"
Exhaust	1.505-1.515"	.3398-.3405"

Valve	②S at Angl	③Lift	Stem Clearance
Intake	45°	③.264"	⑤.0010-.0024"
Exhaust	45°	⑨.262"	⑥.0028-.0042"

383" & 430" Early Type Engine

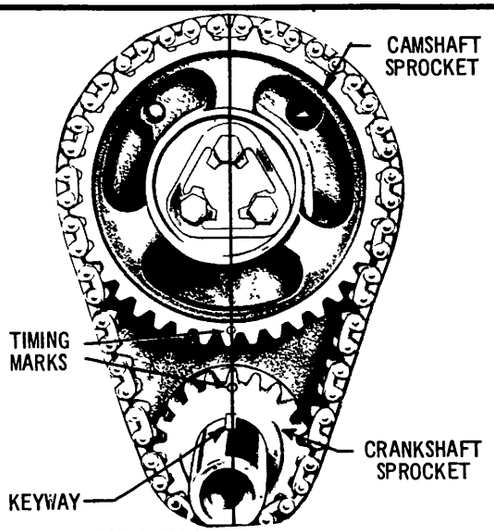
Valv	Head Diamet r	①Stem Diameter
Intake	2.080-2.090"	.3711-.3718"
Exhaust	1.770-1.780"	.3693-.3700"

Valv	②Seat Angl	③Lift	Stem Clearance
Intake	45°	⑦.2316"	⑤.0010-.0024"
Exhaust	45°	⑦.2316"	⑥.0028-.0042"

383" & 430" Late Type Engine

Valve	H ad Diam t r	①Stem Diameter
Intake	1.955-1.965"	⑨
Exhaust	1.645-1.655"	⑩

Valve	②Seat Angl	③Lift	Stem Cl aranc
Intake	45°	.2316"	.0010-.0020"
Exhaust	45°	.2316"	.0020-.0030"



MERCURY 383" & 430" ENGINE VALVE TIMING MARKS

①- Furnished .003", .015", .030" Oversize.
②- Valve face angle 44°.
③- Wear limit .259". ⑨- Wear limit .257".
⑤- Wear limit .0045". ⑥- Wear limit .0055".
⑦- Wear limit .2266". ③- Cam lobe lift.
⑨- Red .3711-.3716", Green .3714-.3719".
⑩- Red .3701-.3706", Green .3704-.3709".

Valve Seat Width - (All) .070-.090" Intake and Exhaust.

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seal with cup side down.

Valve Stem Clearance Check - *See "Valve System" in Mercury Special Data.*

Oversize Valve Stem Installation: *See "Valve System" in Mercury Special Data.*

Valve Springs: Valve springs with inner damper springs are standard. *NOTE - Some engines produced with new constant rate spring (without damper spring, color coded blue, and can be intermixed in an engine with other type).* Blue spring not serviced. Use either a "Maroon" or "Gray" color coded spring with damper for replacement. Assembled spring height specifications remain the same for all springs.

►*SPRING SQUARENESS NOTE:* If springs more than 1/16" out of square, replace spring and damper.

►*VALVE DAMPER SPRING INSTALLATION CAUTION:* To prevent valve spring clicking noise, damper spring must be installed within valve spring so end of damper spring is within 135° arc counterclockwise to end of valve spring when viewed from above.

Spring Free Length - (312") 2.09", **(383",430")** 2.03".

Valve Spring Specifications - 312"

Valve	Spring Pressure	Length
Closed	71-79 lbs. ①	1.780"
Open	161-177 lbs. ②	1.390"

Valve Spring Specifications - 383" & 430"

Valve	Spring Pressure	Length
Closed	66-77 lbs. ③	1.830"
Open	240-260 lbs. ⑨	1.430"

①- Wear limit 64 lbs. at 1.780".
②- Wear limit 145 lbs. at 1.390".
③- Wear limit 60 lbs. at 1.830".
⑨- Wear limit 225 lbs. at 1.430".

Ass mbl d H ight - (312") 1 3/4-1 25/32". **(383",430")** 1 13/16-1 55/64". Measured from surface of cylinder head spring pad to underside of spring retainer (with valve closed). *DO NOT use more than two .030" thick spacers to correct assembled height.*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valve. *See "Valv System" in Mercury Special Data.*

Valve Lifters: (312") Mushroom type, removed from below. **(383",430")** Hydraulic, removed from above.

Diameter - (312") .4983-.4989". **(383",430")** .8740-.8745".

Clearance in Bore - (All) .0005-.0020".

Hydraulic Lifter Overhaul: *See "Valve System" in Mercury Special Data.*

Hydraulic Lifter Operating Range Check: *See "Valv System" in Mercury Special Data.*

Rocker Arm Assembly: *See "Valve System" in Mercury Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: Following valve opening and closing points are with camlift as indicated.*

Valve Timing Specifications (312")

Intake Valves - Open 12°①BTDC. Close 54°②ALDC.
Exhaust Valves - Open 58°③BLDC. Close 8°⑨ATDC.

Valve Timing Specifications (383",430")

Intake Valves - Open 22°⑤BTDC. Close 68°⑥ALDC.
Exhaust Valves - Open 63°⑤BLDC. Close 27°⑦ATDC.

①- Camlift .016". ②- Camlift .019".
③- Camlift .015". ⑨- Camlift .018".
⑤- Camlift .002". ⑥- Camlift .045".
⑦- Camlift .005".

Valve Timing Check: Install a quadrant on crankshaft damper. **On 312"** back off No. 2 intake valve adjusting screw and slide rocker arm to one side. Install dial indicator. **On 383" & 430"** remove right rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. On all engines pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers valve opening and cam lobe lift. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner. If readings not correct, check for bent pointer worn timing chain or sprocket before replacing camshaft.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Mercury Special Data.*

►*LOW OIL PRESSURE CORRECTION: See "Oiling System" in Mercury Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM (hot).

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pr ssure Indicat r: Light on instrument panel. Light comes on when ignition switch turned on, or when oil pressure is low.

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Oil Pressure Switch - Mercury No. B6A-9278-B.

Oil Pump: Rotor type. (312") Located at left side of engine crankcase and driven by distributor drive gear. (383", 430") Located in crankcase and driven by an intermediate shaft from distributor drive gear.

Pump Overhaul - *See "Oiling System" in Mercury Special Data.*

Oil Filter: Full flow, disposable type. Mounted on lower left front corner of cylinder block. Replace element every 4000 miles.

Installation - Coat gasket with light film of oil. Screw filter onto adapter (by hand) until snug, then tighten ¼ turn. DO NOT OVERTIGHTEN.

Crankcase Ventilation: Filter in oil filler cap (and filter screen in road draft tube 312" engine) and road draft tube at rear of engine. Clean filler cap every 4000 miles.

COOLING

►*383" & 430" ENGINES COOLING SYSTEM NOTE:* These engines have three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

NOTE - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 20 qts. (312"), 20.5 qts. (383", 430") without heater. Add 1 qt. for heater.

Pressure Valve: Radiator filler cap, Mercury No. LA-8100-A. Operating pressure 12-15 lbs.

Thermostat: (312") 157-162°F (No. B7A-8575-A), 178°F (No. B7A-8575-B). (383", 430") 157-162°F (No. B8E-8575-E), 178°F (No. B9S-8575-A). All located in water outlet connector. (383", 430") 137-142°F (No. B9S-8575-B) thermostat located in front face of each cylinder block.

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Mercury Special Data.

Temperature Gauge: King-Seeley electric, constant voltage ("CV") type with Gauge Voltage Regulator No. COMF-10804-A.

Dash Unit - Mercury No. COMF-10883-A.

Tank Unit - Mercury No. B7A-10884-A.

See "Temperature Gauges" in Miscellaneous Section.

Power Booster Fan (383", 430"): Standard on air conditioned cars.

See "Cooling System" in Mercury Special Data.

CLUTCH

Borg & Beck Model 10.5A6. Single plate, dry disc type. Mercury Part Numbers.

Engine	Cover Assembly	Clutch Disc
312"	B9M-7563-B	MK-7550-B

See "Borg & Beck Clutches" in Clutch Section.

Pedal Adjustment: 6¼-6½" (total travel). To adjust, move clutch pedal bumper and bracket up or down.

NOTE - This adjustment must be made before adjusting clutch pedal free travel.

Free Travel - ¾-1". To adjust (after pedal travel is adjusted) loosen clutch pedal release rod locknut and turn adjusting screw clockwise to increase free travel or counterclockwise to decrease free travel.

Removal: With transmission removed, disengage clutch pedal retracting spring from clutch release lever, then remove screws retaining equalizer bracket assembly to flywheel housing. Remove flywheel housing cover and mark position of flywheel and pressure plate assembly for reference at installation. Compress clutch pressure plate assembly with Tool 7563, then remove cap-screws, pressure plate and disc. *NOTE - If tool is not available, install three wedges between clutch fingers and pressure plate housing.* Remove clutch pilot bearing from flywheel with Tool 7600-E. Remove clutch release bearing and hub from lever assembly in flywheel housing.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Mercury Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Raise car and drain transmission. *NOTE - On cars with dual exhaust, disconnect left hand exhaust pipe from manifold, then remove muffler outlet pipe from mounting bracket at rear of muffler. Move exhaust system from under car.*

2) Disconnect speedometer cable at transmission extension housing and transmission shift rods at transmission. Disconnect drive line at rear universal joint flange and remove drive shaft and universal joint from transmission output shaft. Remove front parking brake cable from equalizer lever and retaining clip from rear crossmember, then remove cable from crossmember. Remove equalizer rod from lever.

3) Remove rear engine support clamp, then position a transmission lift under transmission and lift engine sufficiently for installation of a support tool. With transmission lift secured to transmission, remove bolts securing engine support crossmember to frame side rails and remove crossmember. Remove two top transmission-to-flywheel housing screws and install two studs as guide pins. Remove lower transmission-to-flywheel housing screws and remove transmission.

AUTOMATIC TRANSMISSION

Two types used. **Merc-O-Matic,** similar to previous type except for welded converter assembly and design changes for different engines. **Multi-Drive,** similar to Merc-O-Matic but has extra "DR" (Drive) range position for performance.

►*PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION: See "Mercury 3-Speed Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Mercury 3-Speed Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 2000 miles. Drain and refill every 24,000 miles with Automatic Transmission Fluid Type "A" Suffix "A".

Checking Fluid Level: With transmission at normal operating temperature, move selector lever through all ranges to assure fluid distribution, then place lever in "P" (Park) position. Check fluid level and add recommended fluid as required to bring level to "F" (Full) mark on dipstick.

Throttle Linkag Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Mercury 3-Speed Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Mercury Special Data.*

REAR AXLE

Own. Same design as used on previous models.

See "Ford & Mercury (Deep Offset) Hypoid" in Rear Axle Section.

►*REAR AXLE "GROAN" WHEN STARTING IN REVERSE OR LOW UNDER LOAD CORRECTION:* Add Rear Axle Lubricant Additive, Part No. C1AA-19B546-A

Axle Ratios

Model & Trans.	Ratio
312" (Synchro-mesh) Std.	3.56-1
312" (Auto. Trans.) Std.	3.10-1
383", 430" (Auto. Trans.)	2.71 or 2.91-1

►*GEAR RATIO NOTE:* Gear ratio stamped on tag on rear axle housing bolt.

Backlash - .004-.009".

Axle Shaft Removal: Remove wheel and brake drum. Remove axle shaft retainer locking type nuts (work through opening in axle shaft flange). Use Puller and pull shaft (do not disturb brake backing plate or damage wheel bearing oil seal). Replace one nut to secure brake backing plate.

Carrier Assembly Removal: *NOTE* - Pinion carrier assembly can be removed separately without disturbing differential carrier by disconnecting rear universal joint at companion flange, and removing five bolts that attach pinion carrier assembly to differential carrier housing. With rear universal joint disconnected, axle shafts removed (see above) remove differential carrier housing to rear axle housing bolts and lift out carrier assembly.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Direct acting, non-adjustable type used on all models.

Model	Front	Rear
312" Std.	COMY-18124-B	COMY-18125-D
312" With AC	COMY-18124-A	COMY-18125-C
383", 430" Less AC	COMY-18124-A	COMY-18125-C
Sta. Wgn. Std.		COMY-18125-B
All, Hvy. Duty	B9MY-18124-A	①B9MY-18125-A

① - Includes Shock Absorber No. B9MM-18080-U for Station Wagons. Use Shock Absorber No. B9M-18080-C for others.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted within coil springs.

See "Mercury Front Suspension" in Suspension & Wheel Alignment Section.

Caster - 0° to Neg. 1½°. Caster should not vary more than ½° from side to side.

Camber - 0° to Pos. ¾°. Camber should not vary more than ½° from side to side.

Toe-In - 1/16-3/16".

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T -Out n Turns - With inner wheel at 20°, outer wheel should be 17°30' (Manual Steering), 17°18' (P ower Steering).

Wheel B aring Adjustm nt: Tighten adjusting nut while rotating hub until noticeable drag is felt, then back off adjusting nut until nearest slot in nut is aligned with cotter pin hole in spindle, install cotter pin.

STEERING

Manual St ring: Saginaw. Recirculating ball type. *S e "Saginaw Ball B aring Worm & Nut" in Steering S ction..*

P w r St ring: Bendix linkage type. *See "Bendix Linkage Type" in Steering Section.*

Steering Linkag : *See "Steering Linkage" in Steering Section.*

St ring G ar R m val: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix hydraulic, single anchor (without eccentric and with fixed anchor pin). Automatic adjustment on all models. Parking brake applies rear wheel brakes. *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section.*

Drum Diam t r - 11".
Wheel Cylinder Diameter - 1 1/8" front, 31/32" rear.
Lining - Molded type riveted to shoe.
Lining Width - 3" front, 2½" rear.
Clearance - Special procedures required. *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section.*

Brake Pedal Freeplay Adjustment: Adjust eccentric bolt on brake pedal lever (connects master cylinder pushrod to brake pedal lever) to obtain 1/4-7/16" free travel.

Standard Master Cylinder: On engine side of firewall.
Checking Fluid - Maintain level to within ½" of top of reservoir.
Removal - Remove eccentric bolt, bushing, and locknut that secures master cylinder pushrod to brake pedal. Remove pushrod and bushing. Remove hydraulic line outlet fitting, stop light wires and switch. Remove two screws and remove master cylinder from dash panel.

Power Brakes: *See "Bendix Hydraulic (Disc) Reaction Type Power Unit" in Brake Section.*
Checking Fluid Level - Same as for standard master cylinder (above).
Removal - Remove master cylinder outlet fitting from master cylinder. *NOTE - When removing booster assembly only, support mast r cylinder with prop and do not disconnect outlet fitting, eliminating need for bleeding.* Remove manifold vacuum hose at power unit and reserve tank hose at fitting, then remove capscrew and locknut securing pushrod to brake lever assembly. Remove two master cylinder screws and remove master cylinder. Remove power brake assembly from dash panel.

MISC. MECHANICAL

Windshield Wipers: Cable operated electric type. *Se "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric type with reversible motor in each window. *NOTE* - Tail gate window on some station wagon models also power operated. *Se "Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Electric-hydraulic with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: 4-Way Power Seat - Solenoid controlled ball nut and screw type with single electric motor. *See "Power Seat Adjuster" in Miscellaneous Section.*

Air Conditioning: *See "Mercury Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Engine	Series
Ranger (& Villager Sta. Wgn)	361"	A
Pacer (& Bermuda Sta. Wgn.)	361"	B
Corsair	410"	C
Citation	410"	D

SERIAL NUMBER: Stamped on Patent Plate on left front body pillar. *NOTE* - Number (example below) includes identification data as follows:

①②③④ ⑤
* W 8 R H 700001 *

① - Engine W 361 cu. in. X 410 cu. in.
② - Year 8 (1958)
③ - Assembly Plant (see below)
④ - Body type.
⑤ - Beginning engine number.

Assembly Plant

E - Mahwah	S - Somerville
J - Los Angeles	U - Louisville
K - Kansas City	W - Wayne
R - San Jose	

►*ENGINE IDENTIFICATION NOTE:* Two engines used. E-400 (361 cu. in. displacement), E-475 (410 cu. in. displacement) Specifications below marked 361 and 410 for each engine.

►*ENGINE PRODUCTION CODE NUMBER:* Date code used in manufacturing and for engine identification. Not used for licensing. Located as follows:

361 Engine - Stamped on machined surface at front of block just below right cylinder head.

410 Engine - Stamped on machined surface at top of left water inlet passage in block just below cylinder head.

TUNE-UP

►*IGNITION CROSSFIRE CORRECTION:* To prevent crossfire between # 7 & # 8 cylinders, route spark plug wires as follows: The sequence should be 7-5-6-8 from left to right in bracket on intake manifold and from front to rear in bracket on rocker cover.

►*ENGINE DETONATION CORRECTION (All Engines):* Can be corrected as follows:

1) Distributor Modification (361 & 410 Engines) - *See DISTRIBUTOR below.*

2) Ignition Timing Change (361 & 410 Engines) - *See IGNITION TIMING below.*

3) Lowering Compression (410 Engine) - Compression ratio can be lowered by installing two head gaskets. *See ENGINE below.*

COMPRESSION PRESSURE: 180 lbs. (361), 200 lbs. (410), at cranking speed.

VACUUM READING: 19-20" (361), 17-18" (410), at specified engine idle.

VALVE TAPPET CLEARANCE: None in service, hydraulic lifters.

MANIFOLD HEAT CONTROL: 361 Eng. Thermostatic exhaust valve in right exhaust manifold.

410 Eng. - Water jacketed intake manifold with thermostat controlled circulation, eliminates need of heat valve. *S COOLING syst m for complet data.*

CARBURETOR AIR INTAKE DUCT ASSEMBLY: Thermostatically controlled air intake supplying warm air for cold engine and cold air for warm engine. *See "Fu l System Notes" in Edsel Special Data.*

IGNITION

FIRING ORDER: 1-5-4-2-6-3-7-8 (All engines.).
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.
SPARK PLUG GAP: .032-.036".
Spark Plug - Champion F-11-Y. 18 mm. Tapered seat. no gasket required. Torque to 15-20 ft. lbs.
COIL: Edsel No. B6A-12029-B.

►*IGNITION COIL REPOSITIONING FOR INCREASED EFFICIENCY (Early Cars):* Turn coil rearward in mounting bracket so ridge on front of coil is against bracket and terminals face toward fan. Reroute battery and distributor wires in front of distributor and reposition heater hoses.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - B8E-12250-A. 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil and is bypassed during cranking by lead from starter relay to coil side of resistor.

DISTRIBUTOR: Has conventional mechanical (centrifugal) advance and separate Vacuum Spark Control. Tachometer drive used on some distributors. *See "Ford, Lincoln, Mercury Distributors" in Electrical Section.*

Engine	Edsel Distributor No.
361③	① B8A-12127-F, ② B8E-12127-C (Tach.)
410 Early ③	④ FEW-12127-D, ⑤ FFA-12127-C (Tach.)
410 Later	FEW-12127-E, ⑥ B8E-12127-E (Tach.)
410 Serv. Repl. (No Tach.)	FEW-12127-H

① - Engr. No. FEU-12127-D replacing FEU-12127-H.
② - Engr. No. FEV-12127-A replacing FEY-12127-A.
③ - See Distributor Modification below.
④ - Replaces FFA-12127-A & replaced by FEW-12127-E.
⑤ - Replaces FFA-12127-B & replaced by B8E-12127-E.
⑥ - Engr. No. FFA-12127-D.

►*DISTRIBUTOR MODIFICATIONS TO CORRECT DETONATION (All Engines):* These modifications should be made in conjunction with changes in Ignition Timing or in Compression Ratio as detailed under IGNITION TIMING and ENGINE below.

1) 361 Engine Distributors FEU-12127-H & FEY-12127-A. To correct detonation occurring during light throttle acceleration, remove distributor and install parts furnished in Vacuum Stop Repair Kit, No. B8E-12202-B, as follows: Unscrew vacuum spring retainer nut, remove and save advance spacer washers, remove spring and fiber advance stop, discard the stop. Install new fiber stop, original spring, and new spring spacer. Adjust Centrifugal Advance and Vacuum Advance to **361 Engine** specifications (below). *NOTE* - If necessary, sand or file end of fiber stop to obtain maximum vacuum advance, and add or remove original spacer washers to obtain correct vacuum advance performance. *After above modification completed, stamp new number on distributor housing: FFU-12127-D (FEU-12127-H Distr.), FEV-12127-A (FEY-12127-A Distr.).*

2) 410 Engin Distribut rs FFA-12127-A & FFA-12127-B. To correct detonation occurring during light throttle acceleration, first check and adjust Centrifugal Advance and Vacuum Advance to **Tabl N . 1** specifications (below). If distributors being overhauled, install following new parts: Secondary Advance Spring B8A-12191-A, Vacuum Spring B7A-12225-B, and Vacuum Stop Repair Kit B8E-12202-C. Adjust Centrifugal Advance and Vacuum Advance to **Tabl N . 2** specifications (below). *After above modification completed, stamp new number on distributor housing: FEW-12127-E (FFA-12127-A Distr.), FFA-12127-D (FFA-12127-B Distr.).*

3) 410 Engine Distributors FEW-12127-D & FFA-12127-C. To correct spark knock or detonation, rework distributors using parts furnished in Vacuum Stop Repair Kit B8E-12202-C plus original spacer washers. Check and adjust Centrifugal Advance and Vacuum Advance to **Table No. 2** specifications (below). *Aft r above modification completed, stamp new number on distributor housing: FEW-12127-E (FEW-12127-D Distr.), FFA-12127-D (FFA-12127-C Distr.).*

Condenser - Edsel B7A-12300-A. **Capacity** .21-.25 mfd.
Contact Point Set - Edsel No. B7A-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic (Centrifugal) Advanc
361 Engin s

Degrees Distr.	RPM	Degrees Eng.	RPM
0	300	0	600
0-½	375	0-1	750
4-5	515	8-10	1030
7½-9	2000	15-18	4000

Automatic (Centrifugal) Advanc
410 Engines - Tabl N . 1
Original Distr. Nos. FFA-12127-A & B Only

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
0-1	400	0-2	800
6-7	700	12-14	1400
9¾-11¼	2000	19½-22½	4000

Automatic (Centrifugal) Advanc
410 Engines - Tabl N . 2
All Other Distribut rs

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	150	0	300
1-1½	400	2-3	800
6-7	750	12-14	1500
12½-14	2000	25-28	4000

Vacuum Spark Control: Integral type mounted on distributor housing and linked directly to breaker plate.

① Vacuum Advanc
361 Engin

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0	0	0
0	0	1
0-2	0-4	10
5-7	10-14	15

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①Vacuum Advanc
410 Engin - Table No. 1

Distr.Degrees	Eng.Degrees	Vacuum (" of Hg)
Start	0	1
0-1	0-2	6
3½-5½	7-11	10
7-9	14-18	14

②Vacuum Advance
410 Engin - Table No. 2

Distr.Degrees	Eng. Degrees	Vacuum (" of Hg)
1-3	2-6	8
8½-10½	17-21	15
10½-12½	21-25	17½-20

① - Distributor RPM of 200.
② - Distributor RPM of 1000.

►*DISTRIBUTOR REMOVAL CAUTION:* Intermediate drive shaft (hex sided oil-vacuum pump drive shaft) is retained by internal toothed lockwasher at upper end (lower washer also used on early cars) which should prevent shaft disengaging when distributor removed. If shaft becomes disengaged and drops into oil pan when distributor removed, make certain that lockwasher installed on shaft to prevent recurrence.

►*DISTRIBUTOR-INTAKE MANIFOLD INTERFERENCE CORRECTION:* Interference between distributor terminal housing clamp and intake manifold may cause timing setting difficulty. Occurs especially after raising heads when installing low octane export kit. Correct by grinding off intake manifold.

IGNITION TIMING

Engin	Std. Setting
361 (Synchro-mesh & O.D.)	0-6° BTDC
361 (Auto. Trans.)	3-8° BTDC
410 (Auto. Trans.)	3-8° BTDC

►*ENGINE DETONATION CORRECTION:* If engines detonate on light throttle acceleration, timing can be modified within above range. *For engines with earlier typ distributors, s Distributor Modification under DISTRIBUTORS abov .*

Timing Mark - On crankshaft pulley as follows:

361 Eng. - TDC and 10° BTDC with 2° increments between.

410 Eng. - TDC, 10° BTDC and 20° BTDC with 2° increments between.

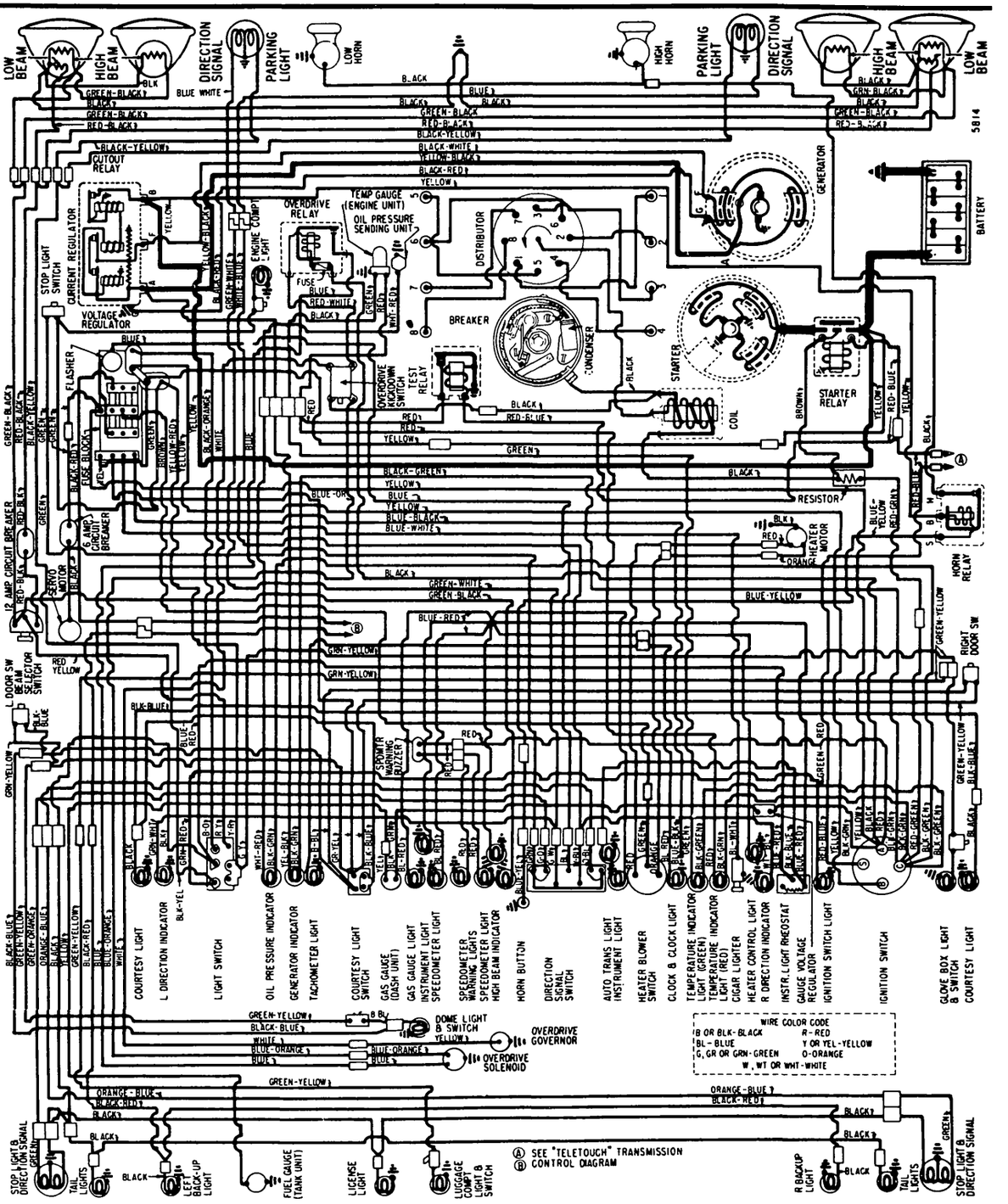
CARBURETOR

►*CARBURETOR APPLICATION NOTE: Holley and Ford 4-Barr l Carbur tors us d. Carburetor for each engine and typ of transmission as follows:*

Eng. & Trans.	Carburetor	Edsel No.
361 Std. Trans. ①	Holley	B8E-9510-A
361 O.D. & Auto. Trans.	Ford	B8A-9510-E
410	Holley	B8E-9510-B

① - Add Dashpot and bracket for Auto. Trans.

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EDSEL RANGER & PACER WIRIN DIAGRAM

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►*THROTTLE LEVER INTERFERENCE CORRECTION:* Caused by interference in area of throttle rod hole which may cause retaining clip to fall off and allow control rod to fall out. To correct, file or grind edge of throttle lever in area of throttle rod hole.

►*NO FORCED DOWNSHIFT CORRECTION (361" ENGINE):* May be caused by accelerator pedal being below 4.09" in height. If pedal height cannot be obtained in normal way proceed as follows: Remove accelerator pedal rod and unscrew clevis and locknut. Add ¾" of threads to rod with ¼"-28 die. Reinstall and adjust pedal height. If threaded end of rod binds on clevis pin cut ½" from threaded end of rod.

Thr ttle Linkage Adjustment (Auto. Trans. Cars): With engine idle speed correctly set at 450-475 RPM in Dr (Drive) range and Anti-stall dashpot correctly adjusted (see below), disconnect carburetor control rod at point "B" of control shaft. Disconnect transmission throttle control rod at point "C" of transmission throttle shaft assembly. Insert gauge pin through throttle shaft and bracket. With engine at slow idle, adjust carburetor control rod so it will enter hole in control shaft freely at point "B" on diagram, then **lengthen carburetor contr l rod two turns,** remove gauge pin, connect control rod to control shaft. Hold control shaft against slow idle stop, lift transmission control rod up against its stop, adjust rod length so clevis pin slips freely into clevis assembly at point "C" then **lengthen rod by turning clevis 3½ turns (361), 4 turns (410),** install clevis pin. Increase engine speed to 1000 RPM and note pressure gauge reading. If pressure below 80-85 lbs. lengthen throttle control rod. *NOTE - Do not exceed 4½ turns (361"), 4 turns (410").* If pressure high shorten rod ½-turn at a time until correct pressure obtained. Install cotter pin, tighten clevis locknut, remove pressure gauge.

Pedal Height Adjustment: Lengthen or shorten accelerator shaft rod to obtain a distance from accelerator pedal to floor of 4.09" (361"), 3.98" (410").

Dashpot Adjustment: Loosen dashpot locknut, fully close throttle (fast idle cam in slow idle position). Turn dashpot in or out to obtain .045-.065" between dashpot plunger and throttle lever with dashpot plunger fully depressed.

FORD & HOLLEY 4-BARREL

►*NOTE* - For model application see table above.

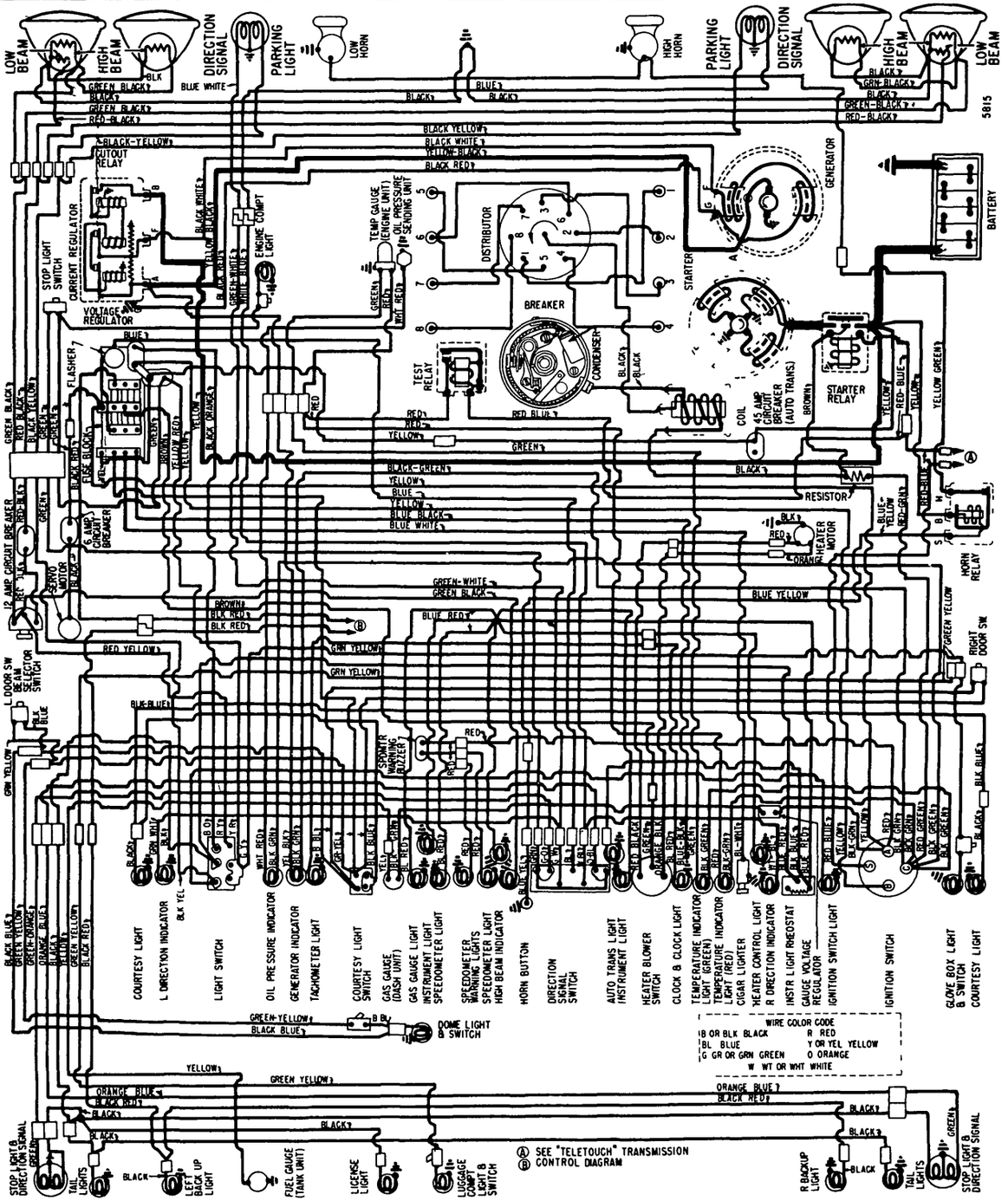
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels feed 5-2-3-8.*

►*HIGH IDLE RPM CORRECTION:* Caused by interference between fast idle cam and choke operating rod. *See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*CARBURETOR VENT REWORK (To prevent spillage of fuel under flooding conditions): See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*ENGINE STALLING (AFTER A NORMAL COLD START) CORRECTION:* May be due to incorrect choke linkage

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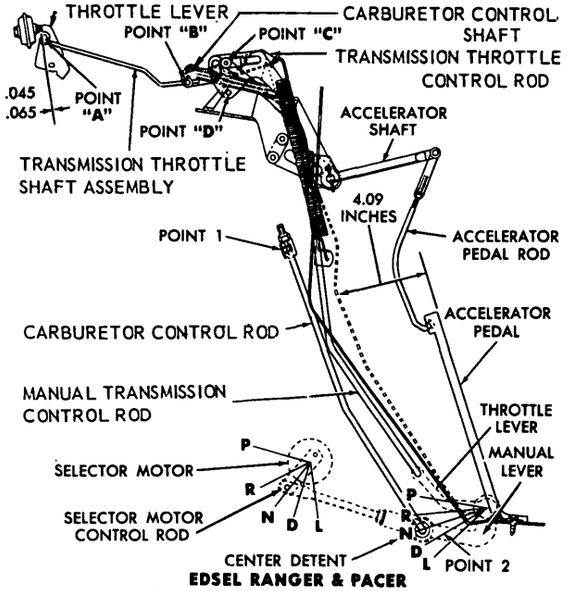
EDSEL C RSAIR & CITATION WIRING DIAGRAM

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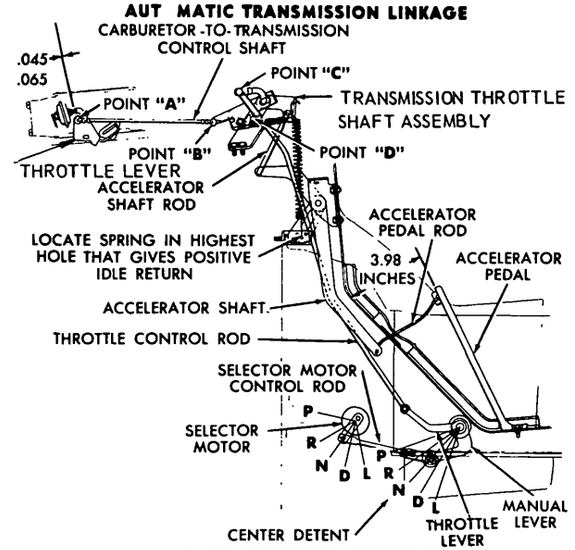
adjustment. *See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*SLOW OPENING CHOKE CORRECTION:* Caused by binding choke or warped heat stove cover plate. *See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*1958 EDSEL CHOKE COIL HOUSING (FORD CARBURETORS) CHANGE & ADJUSTMENT NOTE:* A new choke coil housing assembly, Part No. PB8M-9848-A, identified by the letters "TD" embossed in center of bakelite housing is available for service replacement of the previous cover, Part No. EDC-9848-A. Initial adjustment of the new choke coil housing is at "Index" mark.



EDSEL RANGER & PACER AUTOMATIC TRANSMISSION LINKAGE



EDSEL CORSAIR & CITATION AUTOMATIC TRANSMISSION LINKAGE

Idle Setting - Both screws (primary side only) 1¼ turns (Ford), 1½ turns (Holley) open.

Idle Speed - 475-500 RPM in Neutral. On Auto. Trans. Cars, recheck idle speed in Dr (Drive) and readjust as necessary to obtain 450-475 RPM.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford & Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Edsel No. B8A-9350-A (361" Eng. fuel only), No. B8A-9350-B (361" Eng. fuel & vacuum), No. EDG-9350-B (410" Eng. fuel only).

Pressure - 4.5-6.5 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

►*FUEL PUMP PUSHROD & CAMSHAFT ECCENTRIC PRODUCTION CHANGE & NON-INTERCHANGEABILITY CAUTION (410" ENGINE):* Two pushrods and eccentrics used as follows: Pushrods, EDG-9400-A (cast bronze tip) and 5750261 (oilite bronze tip with groove .020" deep ½" from tip). Eccentrics, EDG-6287-A (chrome plated) and 5750260 (plain finish). Use pushrod, EDG-9400-A, and eccentric, EDG-6287-A, on engine date coded 79E or before. On engines date coded later than 79E, use pushrod, 5750261, and either eccentric. *CAUTION - DO NOT use plain finish eccentric with cast bronze tip pushrod.*

►*FUEL FILTER NOTE:* Replace element every 4,000 miles.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator FEK-10804-A.

Dash Unit - Edsel No. B8E-9280-A (Ranger & Pacer), B8E-9280-B (Corsair & Citation).

Tank Unit - Edsel No. B7A-9275-F Std. (Exc. Station Wagons), B7A-9275-G Std. (Station Wagons). B8E-9275-A Fuel Warning Signal (Exc. Station Wagons), B8E-9275-B Fuel Warning Signal (Station Wagons). *See "Fuel Gauges" in Carburetion Section.*

Low Fuel Level Indicator (Optl. Equip.): Light on instrument panel controlled by S.I.P. relay in gasoline gauge circuit. Lamp goes on momentarily when ignition switch turned on, lights when fuel in tank reaches 3-5 gallons.

Air Cleaner: DRY FILTER ELEMENT type. Clean every 5,000 miles and replace element every 10,000 miles.

►*CLEANING CAUTION:* Clean element by tapping or shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Synchro-mesh & O.D. - Edsel Kit No. B6A-10654-A. 12 volt, 11 plate, 55 ampere hour capacity (20 hr. rate).

Auto. Trans. - Edsel Kit No. B8E-10654-B. 12 volt, 13 plate, 65 ampere hour capacity (20 hr. rate).

Optional - Edsel Kit N. B8E-10654-A. 12 volt, 17 plate, 72 ampere hour capacity (20 hr. rate).

Battery Ground - Negative to engine block.

Engine Ground - Engine to dash.

STARTER

Edsel N. B6A-11002-A. Armature - B6A-11005-B.

►*STARTER NOISE CORRECTION (410" ENGINE):* Caused by insufficient clearance between starter and cylinder block at top mounting lug which "cocks" starter when tightened. Grind off top mounting lug to correct.

►*STARTER RELAY FREEZING CORRECTION (410" ENGINE):* Caused by water accumulation in relay. To correct, move relay into horizontal position on horizontal part of fender apron next to battery.

►*STARTER OPERATION DURING "N" TO "R" SHIFTS CORRECTION (TELETOUCH CONTROL): See "Edsel Teletouch" in Transmission Section.*

Drive - Edsel 1CM-11350-C. Bendix "Folo-Thru" type.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM. 155-190 amps.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4500	12.0	85
15.5 ft. lbs.	Lock	5.0	550

►*STARTER REMOVAL NOTE:* If additional clearance required to remove starter, disconnect steering idler arm bracket from frame and lower steering linkage. Disconnect right exhaust pipe from manifold and pry pipe downward until it clears studs, then move to right as far as possible.

Starting Switch: Relay, Edsel No. B6A-11450-A, controlled by Ignition & Starter Switch, Edsel No. B5A-11572-A, and Auto. Trans. Neutral Safety Switch, No. B8E-15825-A, located on steering column. *NOTE - Neutral Safety Switch used only with lever type transmission control. Integral part of Teletouch control.*

Neutral Safety Switch Adjustment: *See "Edsel Single-Range Automatic Transmission" in Transmission Section.*

GENERATOR

Application	Generator	Armature
361" Eng.	B6A-10002-H	FGT-10027-A
410" Eng.	2900278	2900199
361" Eng. (Optl.)	FGP-10002-B	FGP-10027-A
410" Eng. (Optl.)	FGV-10002-A	FGP-10027-A

Performance Data

Generator	Amperes	Volts	Gen. RPM
B6A-10002-H	30	15	1095
2900278	35	15	1190
FGP-10002-B, FGV-10002A	40	15	1067

Brush Spring Tension - 26-34 ozs.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Approximately 3/8" deflection midway between generator and pump pulleys on right side.

REGULATOR

Regulator	Generator
B7A-10505-B	B6A-10002-H
2900305	2900278
B8E-10505-C	FGP-10002-B, FGV-10002-A

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Cutout Relay

Cuts In - 12.4-13.2 volts (B7A-10505-B & 2900305), 12.0-12.8 volts (B8E-10505-C).

Cuts Out - 2-9 amperes (B7A-10505-B, B8E-10505-C), 2-6 amperes (2900305). Reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts.

Checking & Adjusting - *See "Ford, Edsel, Lincoln, Mercury 12-Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 28-32 amps. (B7A-10505-B), 33-37 amps. (2900305), 38-42 amps. (B8E-10505-C).

Checking & Adjusting - *See "Ford, Edsel, Lincoln, Mercury 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Lighting Switch Removal: Remove two screws from back of switch and work switch carefully out from back of instrument panel.

Stop Light Switch Location: On forward end of brake master cylinder (located on firewall in engine compartment).

CIRCUIT BREAKERS: Used as follows:

18 Ampere - Protects Headlights (High Beam). In fuse panel.

12 Ampere - Protects Headlights (Low Beam). At left side of cowl.

12 Ampere - Protects Parking, Tail, Stop & Instrument lights. In fuse panel.

FUSES: Located in fuse panel mounted on brake pedal support at left of steering column with exceptions noted.

15 Ampere - Protects Overdrive circuit. On Overdrive Relay.

15 Ampere - Protects rear cigar lighter.

7.5 Ampere - Protects interior lights.

7.5 Ampere - Protects direction signals.

1 Ampere - Protects clock.

Sulphur Disc or Circuit Breaker - Protects front cigar lighter. On back of lighter socket.

Horn Relay: Edsel No. B8C-13853-A (with bracket).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*INTAKE MANIFOLD OIL LEAK CORRECTION (361" ENGINE):* To correct oil leak between intake manifold and cylinder block, install new seals, Part No. B8A-9422-B (front), B8A-9423-B (rear), which are thinner and have two (not one) sealing beads on manifold side.

►*361" ENGINE NOISE CORRECTION: See "Engine" in Edsel Special Data.*

►*ENGINE KNOCK AT IDLE SPEED CORRECTION (361" ENGINE):* May be caused by excessive camshaft endplay caused by lack of camshaft thrust button or thrust button spring too weak. To correct install Kit, Part No. B8A-6275-A, which contains new thrust button, spring, retainer clip (to secure spring to retaining bolt), fuel pump eccentric retaining bolt and washer.

►*INTAKE MANIFOLD-CYLINDER HEAD GASKET PRODUCTION CHANGE & REPLACEMENT NOTE (361" ENGINE):* Later cars use one-piece "Steelbestos" gasket, Part No. B8A-9439-B, to replace three-piece laminated type used previously. Use new type gasket for service replacement.

►*410" ENGINE "DRUMMING" OR "GRINDING" NOISE CORRECTION:* This condition may be caused by a vacuum pump-to-oil pump bolt contacting the oil pan assembly. To correct, grind off approximately ¼" from longest bolt boss on vacuum pump. Grind boss square with housing to ensure that lock tab seats properly. *NOTE - Later type pumps have this correction made in production.*

ENGINE SPECIFICATIONS: 90° V8, Overhead Valves. Two engines used. Combustion chamber in cylinder head on 361" Eng. and in cylinder block on 410" Eng. The 361 Intake Manifold also acts as cover for pushrod chamber. 410 Intake Manifold is water jacketed and does not have exhaust heat passages.

Model	Bore	Stroke	Displacement
361	4.05"	3.50"	361 cu. in.
410	4.20"	3.70"	410 cu. in.

Model	Rated HP	Compr. Ratio	Developed HP
361	52.49	10.5-1	303 at 4600 RPM
410	56.45	10.5-1	345 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Edsel Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Edsel Special Data.*

ENGIN REMOVAL: *See "Engine" in Edsel Special Data.*

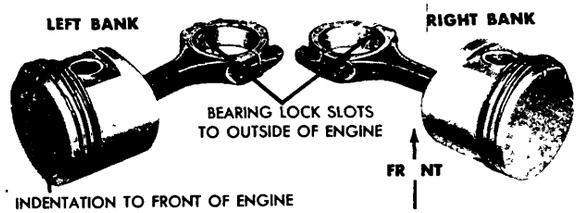
OIL PAN REMOVAL: Turn engine so No. 1 or No. 5 piston is at TDC. Remove dipstick, drain crankcase and remove stabilizer bar. Remove engine mount to frame nuts and raise engine approximately 2" and block in this position. Remove oil pan bolts and lower oil pan on frame crossmember. Remove oil pickup tube bolts and drop oil screen and tube into oil pan. Move oil pan forward and down and remove from under car.

PISTONS

Aluminum alloy with two compression rings and one three-piece oil control ring (serrated springs and two steel rails). 361" Eng. pistons are interchangeable (right & left), 410" Eng. pistons are NOT interchangeable (right & left).

Removal - Pistons and rods removed from above.

Clearance - .0015-.0021" selective fit. Measured at bottom of skirt (361" Eng.), at center of skirt (410" Eng.).



EDSEL PISTON & ROD ASSEMBLY

Fitting New Pistons: With ½" feeler gauge inserted between piston and cylinder wall, with piston inverted and 1½" below top of block, and piston pin bore parallel to crankshaft, pull required to remove .002" feeler should be 5-10 lbs. (new piston in new bore).

Installing Pistons: *NOTE - On 410" Engines, pistons for right and left hand cylinders are NOT interchangeable.* Install piston so that identification notch on head is toward front of engine. *See Rod Installation.*

Replacement Pistons: Std. & .020", .030", .040" Oversize.

PISTON PINS

361" Engine - Bronze piston pin bushing in connecting rod, piston pin retaining rings in piston.

410" Engine - Piston pin press fit in connecting rod, no retaining device used.

Diameter - .9750-.9753".

Length - 3.156-3.170" (361" Eng.), 3.480-3.500" (410" Eng.).

Clearance in Piston - .0001-.0003". Light thumb press fit at 70°F.

Clearance in Rod (361" Eng.) - .0001-.0003". Light thumb press fit at 70°F.

Clearance in Rod (410" Eng.) - .0008-.0016" interference fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Edsel Special Data.*

Replacement Pins: 361" Eng. - Furnished Std., .001" (code Blue), .002" (code Yellow) Oversize.

410" Eng. - Furnished only with new pistons.

PISTON RINGS

361" Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.013-.023"	.002-.0035"
Compr. (2)	.0930-.0935"	.013-.023"	.002-.004"
Oil (3)	.1811-.1879"	① .015-.055"	②

410" Engine

Ring	End Gap	Side Clearance
Compr. (1)	.015-.025"	.0015-.003"
Compr. (2)	.015-.025"	.001-.003"
Oil (3)	① .015-.055"	②

① - Steel rails. ② - Side sealing type ring.

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Installing Rings (410" Engine): Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in position head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap (1" each side of piston head notch).

Replacement Rings: Furnished Std., .020", .030", .040" Oversize.

CONNECTING RODS

Length (Center-to-Center) - 6.538-6.542" (361" Eng.), 6.599-6.601" (410" Eng.).

Journal Diameter (361" Eng) - 2.4384-2.4388" (Code Red), 2.4380-2.4384" (Code Blue).

Journal Diameter (410" Eng.) - 2.5996-2.6000" (Code Red), 2.5992-2.5996" (Code Blue).

Lower Bearing - Copper-lead alloy, steel back.

Clearance - .0006-.0024" (361" Eng.), .0007-.0025" (410" Eng.).

Side Clearance - .006-.016" (361" Eng.), .006-.014" (410" Eng.).

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030" Undersize; and also .040" Undersize for 361" Engine.

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Installing Rods (361" Eng.): Install piston and rod assembly with notch in top of piston toward front of engine and bearing lock slots toward outside of engine.

Installing Rods (410" Eng.): Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole inward and rod number facing outward toward outer side of cylinder block.

CRANKSHAFT

Journal Diameter (361" Eng.) - 2.7488-2.7492"(Code Red), 2.7484-2.7488" (Code Blue).

Journal Diameter (410" Eng.) - 2.8998-2.9002" (Code Red), 2.8994-2.8998" (Code Blue)

Out-of-Round Limits - .00025". **Taper Limits** - .0005".

Bearings - Copper-lead alloy, steel back.

Clearance - .0006-.0024" (361" Eng.), .0008-.0026" (410" Eng.).

Endplay - .002-.006"(361"Eng.), .004-.008"(410"Eng.), **End Thrust** - Taken by No. 3 (center) main bearing.

Thrust Bearing Alignment - *See "Crankshaft" in Edsel Special Data.*

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .010", .020", .030", .040" Undersize. *NOTE - 410" Engine only No. 3 bearing furnished in .040" Undersize.*

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Edsel Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Edsel Special Data.*

CAMSHAFT

►*CAMSHAFT PRODUCTION CHANGE:* New camshafts, Part Nos. B8A-6250-B (361" Eng.), No. 5750914 (410" Eng.), were used in production beginning approximately Nov. 15. 1957. Early production cars having later type camshaft will be identified by an orange dot of paint on engine front cover and by a stripe of yellow paint around camshaft behind front bearing, and/or an "X" stamped on rear face of No. 5 bearing journal. Heavier valve springs must be used when later type camshaft is installed in 410" Engine. *See "Valve Springs" & "Valve Timing" below.*

►*BEARING BORE PRODUCTION CHANGE & NOTE;* On all 410" Engines and on later production 361" Engines, bearing bores in block are stepped (largest No. 1, smallest No. 5) to permit easy removal and installation of bushings. O.D. of camshaft bearings is greater to fit bores.

Journal Diameter - 2.123-2.124" (361" Eng.), 2.264-2.265" (410" Eng.).

Bearings - Babbitt lined, steel back.

Clearance - .001-.003".

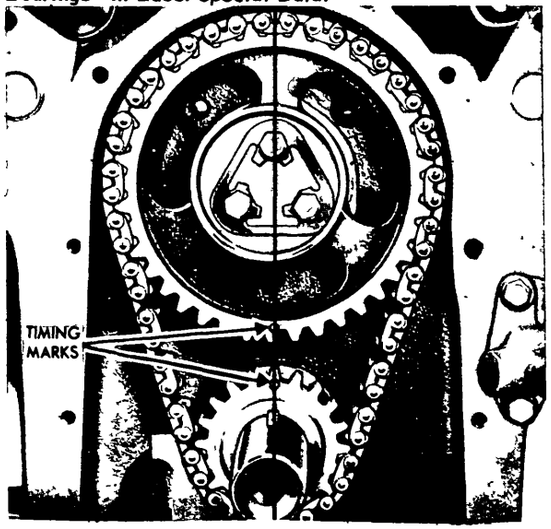
Endplay (361" Eng.) - Taken by thrust button attached to engine front cover.

Endplay (410" Eng.) - Toward engine rear. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.

Replacement Bearings: Furnished Std. & .015" Undersize.

►*BEARING INSTALLATION CAUTION:* Split type bearings must have split toward top of block. No. 1 bearing must have notch in bearing facing front of engine and toward bottom of block. Bearing must seat .005-.020" inward from finished face of block.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Edsel Special Data.*



EDSEL VALVE TIMING MARKS

Timing Chain (361" Eng.) - Width .86", Pitch .5", Length 48 links.

Timing Chain (410" Eng.) - Length 52 links.

Timing Chain Deflection - .5" maximum (all engines), measured on right side.

Camshaft Setting: Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers.

Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Edsel Special Data.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Edsel Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

361" Engine

Valve	Head Diam.	① Stem Diam.
Intake	2.022-2.032"	.3711-.3718"
Exhaust	1.551-1.561"	.3693-.3700"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	30°	③ .2265"	④ .0010-.0024"
Exhaust	45°	③ .2265"	⑤ .0028-.0042"

410" Engine

Valve	Head Diam.	① Stem Diam.
Intake	2.080-2.090"	.3711-.3718"
Exhaust	1.770-1.780"	.3693-.3700"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	30°	⑥ .2506"	④ .0010-.0024"
Exhaust	45°	⑥ .2506	⑤ .0028-.0042"

① - Standard size valve stems. *See "Valve System" in Edsel Special Data for oversize valve stem sizes.*

② - Cam lobe lift. Wear limits .005".

③ - Early camshaft. Later camshaft .232". *See "Camshaft Production Change" above.*

④ - Wear limit .0045".

⑤ - Wear limit .0065".

⑥ - Early camshaft. Later camshaft .2316". *See "Camshaft Production Change" above.*

Rotatable Valves - *See Illustration.*

Valve Seat Width - .060-.080" Intake, .070-.090" Exhaust.

Valve Stem Seals - Umbrella type seals used on all valves. Install seals with cup side down over valve guide.

Oversize Valve Stem Installation: *See "Valve System" in Edsel Special Data.*

VALVE SPRINGS: Dampener springs used inside valve springs on all valves.

►*410" ENGINE VALVE SPRING REPLACEMENT CAUTION:* When installing later camshaft (No. 5750914), valve springs, Part No. 5750053 (painted green) must also be installed.

Free Length (361" Eng.) - 2.26".

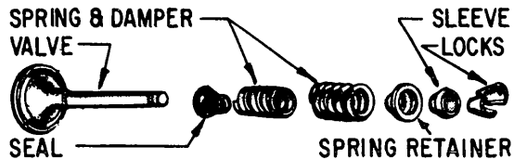
Free Length (410" Eng.) - 2.20"(Early, Part No. 5750011 painted brown), 2.03" (Later, Part No. 5750053, painted green or maroon).

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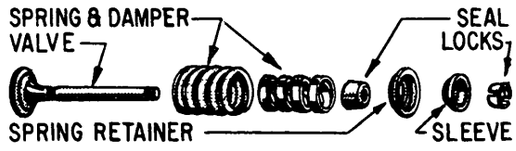
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Assembled Height - 1.78" (361"Eng.), 1.83" (410" Eng.) measured from surface of cylinder head spring pad to underside of spring retainer. *Do not use more than two .030" spacers to correct assembled height.*

►*SPRING SQUARENESS CAUTION:* If springs more than 1/16" out of square (spring & dampener assembly measured together), replace both springs.



EDSEL 361 ENGINE VALVE ASSEMBLY



EDSEL 410 ENGINE VALVE ASSEMBLY

Valve Spring Specifications

361" Engine

	Pressure	Length
Valve Closed	94-99 lbs.	1.78"
Valve Open	180-198 lbs.	1.38"

410" Engine (Brown Springs)

	Pressure	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	245-255 lbs. ②	1.39"

410" Engine (Later Green & Maroon Springs)

	Pressure	Length
Valve Closed	66-77 lbs. ①	1.83"
Valve Open	240-260 lbs. ③	1.43"

① - Wear limit 60 lbs. ② - Wear limit 220 lbs.

③ - Wear limit 225 lbs.

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (.0045" intake, .0065" exhaust), ream guides and install valves with oversize stems. *See "Valve System" in Edsel Special Data.*

VALVE LIFTERS: Hydraulic, barrel type, with no provision for clearance adjustment.

►*HIGH SPEED HYDRAULIC LIFTER NOISE CORRECTION:* Can be caused by aerated oil which will also caused oil pressure to drop (less than 45-50 lbs. at 1000 RPM). To correct, check all oil gallery plugs under air pressure for leaks. Check oil pump, pick-up tube and screen, inlet tube-screen, and all gaskets for cracks or broken conditions. Repair or replace as necessary.

Diameter - .8740-.8745".

Clearance in Lifter Bore - .0005-.0020".

Hydraulic Lifter Overhaul - *See "Valve System" in Edsel Special Data.*

Hydraulic Lifter Operating Range Check - *See "Valve System" in Edsel Special Data.*

ROCKER ARM ASSEMBLY: *See "Valve System" in Edsel Special Data.*

►*PUSHROD REMOVAL NOTE:* All pushrods except the six in the 5/8" holes can be removed by using Valve Spring Compressor, Tool 6513-J, with rocker shaft assemblies installed. Six pushrods in 5/8" holes can be removed only after rocker shaft assemblies removed.

►*ROCKER ARM SHAFT SQUEAK CORRECTION (361" ENGINE):* Replace original shafts (.840-.841" diam.) with new shafts (.839-.840" diam.). Early and later shafts carry same part no. and identified only by measurement.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

361" Eng. Valve Timing (Early Camshaft)

Intake Valves - Open 17° BTDC. Close 59° ALDC.

Exhaust Valves - Open 57° BLDC. Close 19° ATDC.

361" Eng. Valve Timing (Later Camshaft)

Intake Valves - Open 22° BTDC. Close 68° ALDC.

Exhaust Valves - Open 68° BLDC. Close 22° ATDC.

410" Eng. Valve Timing (Early Camshaft)

Intake Valves - Open 27° BTDC. Close 69° ALDC.

Exhaust Valves - Open 69° BLDC. Close 27° ATDC.

410" Eng. Valve Timing (Later Camshaft)

Intake Valves - Open 22° BTDC. Close 68° ALDC.

Exhaust Valves - Open 63° BLDC. Close 27° ATDC.

Valve Timing Check - Remove rocker arm assembly. Install Dial Indicator, Tool 6565, on cylinder head using Holding Fixture, Tool 4201-D (if necessary). Install Indicator Adaptor, Tool 6565-AB, on end of pushrod. Pushrod must be in lifter socket and actuation point of indicator in same plane as pushrod movement. Install quadrant on crankshaft damper. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers valve opening. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Edsel Special Data.*

►*HIGH SPEED OIL CONSUMPTION CORRECTION (410" ENGINE):* Caused by oil being drawn out of crankcase ventilator. To correct, install new oil filler cap, Part No. 5751386.

►*410" ENGINE VACUUM PUMP NOISE CORRECTION (Similar to Connecting Rod Knock):* Disconnect vacuum hose from windshield wiper to vacuum pump (not inlet hose to intake manifold). Noise will stop if vacuum pump defective. Pump failure caused by exhaust passage plug falling out or exhaust tube falling into oil pan. To correct exhaust passage plug, tap passage with 1/8" pipe tap, 3 or 4 threads deep (DO NOT TAP DEEPER), and install 1/8" pipe plug with suitable sealer. Exhaust tube is press fit in pump housing and if loose, replace pump.

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-50 lbs. at 1000 RPM (hot).

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Light on instrument panel. Goes on when ignition switch turned on, goes out when oil pressure reaches pressure of switch. Light goes on when oil pressure is low (approx. 7 lbs.).

Oil Pressure Switch - Edsel No. B6A-9278-B.

Oil Pump: Rotor type. Later 410" engines have combination oil-vacuum pump. Mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.

Pump Overhaul - *See "Oiling System" in Edsel Special Data.*

Oil Filter: Full flow disposable type. Mounted on lower left front corner of cylinder block.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket with light film of oil. Screw on to adaptor until snug. **Then tighten ½-turn by hand.** *Do not overtighten.*

Crankcase Ventilation: Filter in oil filler cap and ventilator tube at rear of engine.

COOLING

410" Engine: New three-stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank. Operates as follows:

Below 140°F - Water circulates from pump to cylinder heads, intake manifold and back to pump.

140-180°F - Water circulates from pump to cylinder heads, intake manifold and cylinder blocks and back to pump.

Above 180°F - Water circulates the same as between 140-180°F except it returns to radiator for cooling.

NOTE - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 18½ qts. (361" Eng.), 22 qts. (410" Eng.). Add 1 qt. for heater.

Pressure Valve: Radiator filler cap, Edsel No. LA-8100-A. Operating pressure 12-15 lbs.

Thermostat (361" Eng.): 157-162° (No. B7A-8575-A), 177-182° (No. B7A-8575-B, for use with permanent type anti-freeze), located in water outlet connector.

Thermostat (410" Eng.): 157-162° (No. EDG-8575-G, early cars), 177-182° (No. EDG-8575-H, later cars and for use with permanent type anti-freeze), located in water outlet connector. One 137-142° thermostat (No. EDG-8575-D) in front face of each cylinder bank.

Water Pump: Packless, sealed ball bearing type.

See "Water Pump" in Edsel Special Data.

Temperature Gauge: Two indicator lights (red & green) on instrument panel controlled by Proving Light Relay, Edsel No. B7T-10800-A, on firewall in engine compartment on left side. Sending unit located at front

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of right cylinder head (361" Eng.), at rear of intake manifold (410" Eng.). When ignition switch turned on, ENG. HOT (Red) light goes on, testing circuit. With engine running after a cold start, ENG. COLD (Green) light goes on until engine temperature reaches approximately 115°F. If temperature goes above approximately 233°F, red light will go on.

Engine Unit - Edsel No. B8E-18208-A (361" Eng.), No. B8E-18208-B (410" Eng.).

CLUTCH

Long 11CF. Single plate, semi-centrifugal type.

C v r Ass mbly - Long No. 267454, Edsel No. B8A 7563-A.

Clutch Disc - Long No. 288347, Edsel No B8E-7550-A. *See "Long Clutches" in Clutch Section.*

P dal Adjustm nt: Adjust pedal bumper and bracket to give 6 3/8-6 5/8" pedal travel. With pedal in fully released position, distance between assist spring eye centers should be 10 3/32"±1/8".

P dal Fr Trav l - With engine stopped free travel should be 1 1/8-1 3/8". Adjust clutch release lever rod adjusting nut clockwise to increase, counterclockwise to decrease, free travel. Start engine and accelerate to 3000 RPM. Pedal free travel must be at least ½" to prevent pressure plate fingers contacting release bearing. Adjust as necessary.

Rem val: Remove transmission (see SYNCHRO-MESH TRANSMISSION below). Remove flywheel housing cover and release lever retracting spring, slide release bearing and hub off release lever. Mark cover and flywheel for reinstallation. Loosen cover-to-flywheel bolts evenly and alternately and remove clutch assembly through bottom of flywheel housing. Remove release lever and anti-rattle spring.

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse).
Se "Edsel Synchro-mesh" in Transmission Section.

Transmission C ntr ls: *S e "Transmission Controls" in Transmission Section.*

R m val: Disconnect propeller shaft at rear axle and slide off transmission output shaft. Insert Tool 7657-D into extension oil seal to prevent lubricant leakage. Disconnect speedometer and shift rods at transmission. Disconnect engine rear support from transmission extension, raise and support engine and remove frame crossmember. Remove two transmission-to-flywheel housing lower bolts and install Guide Pins, Tool 7975, in holes. Remove top bolts. Slide transmission to rear until input shaft clears flywheel housing and then remove from car.

OVERDRIVE

Warn r R10. Solenoid operated type, with governor control and throttle operated kickdown
See "Edsel Overdrive" in Transmission Section

Ov rdriv C ntr l: *See "Overdrive Controls" in Transmission Section.*

Rem val: Same as for synchro-mesh transmission (above) after disconnecting control cable and wiring.

AUTOMATIC TRANSMISSION

Single range automatic transmission with welded torque converter and three-speed automatic transmission similiar to Fordomatic. Hydraulically controlled with mechanical parking lock.
See "Edsel Single-Range Automatic Transmission" in Transmission Section.

►*NO FORCED DOWNSHIFT CORRECTION (RANGER & PACER): May be caused by improper accelerator pedal height. See CARBURETOR above.*

►*TESTING & TROUBLE SHOOTING: See "Edsel Single-Range Automatic Transmission" in Transmission Section.*

Lubrication: Check fluid every 1000 miles, drain and refill every 25,000 miles with Automatic Transmission Fluid Type "A".

Checking Fluid Level: Bring transmission to operating temperature by running engine with transmission in Neutral position. Move shift mechanism through all ranges to assure fluid distribution, then place mechanism in "Park" position for checking fluid level. Maintain level to "Full" mark on dipstick.

Throttle Linkage Adjustment: *See CARBURETOR above.*

Teletouch Selector Motor Linkage Adjustment: *See "Edsel Teletouch" in Transmission Section.*

►*OTHER DATA: See "Edsel Single-Range Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type, with lubrication fittings.
Lubrication - Lubricate through fittings with 2¼ ozs. universal joint lubricant.

REAR AXLE

Own. Separate carrier type with straddle mounted pinion, hypoid gear, and Hotchkiss Drive.
See "Edsel Rear Axle" in Rear Axle Section.

►*"POWER TRANSFER" DIFFERENTIAL NOTE:* Optional on all models. *See "Edsel & Mercury Power Transfer Differential" in Rear Axle Section.*

►*REAR AXLE NOISE & LUBRICANT LEAKAGE CORRECTION:* Install new drive pinion oil seal and rear universal joint companion flange. *See "Edsel Rear Axle" in Rear Axle Section.*

Axle Ratios	361	Sta. Wgn.	410
Std Trans .	① 3 56-1	② 3.70-1	
O D Trans	② 3 70-1	② 3.70-1	
Auto Trans.	2 91-1	③ 3.22-1	2.91-1

① - 3 70-1 Optl ② - 3 56-1 Optl. ③ - 2.91-1 Optl.

Backlash - 004- 009"

Axl Shaft R m val: Remove wheel and brake drum. Work through hole in axle shaft flange and remove locknuts holding wheel bearing outer retainer and brake backing plate to flange on axle housing. Pull axle shaft from housing with Puller, Tool 4235-C, being careful not to dislodge brake backing plate.

Differential Carrier Removal: Remove axle shafts (see above) and propeller shaft. Clean dirt from carrier and axle housing, remove locknuts and washers holding carrier to housing and remove carrier being careful not to let dirt enter carrier or housing.

Wheel Bearing Adjustment: None required.

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs.
See "Edsel Front Suspension" in Suspension & Wheel Alignment Section.

Caster - Pos. ½° to Pos. 1½° (361" Eng.); 0° to Neg. 1½° (410" Eng.) Maximum variation between wheels ½° (¼° preferred).

Camber - Pos. ½° to Pos. 1½° (361" Eng.); 0° to Pos. ¾° (410" Eng.). Maximum variation between wheels ½° (¼° preferred).

Toe-In - 1/32-1/8" (361" Eng.); 1/16-3/16" (410"Eng.).

Toe-Out on Turns - Outer wheel 20°, inner wheel 23½° (361" Eng.), 24¾° (410" Eng.).

SHOCK ABSORBERS

Direct acting, hydraulic. Non-adjustable, serviced by replacement.

Shock Absorber Application ①

Car Model	Front	R ar
Station Wagons	B8E-18124-B	B8E-18125-C
Ranger & Pacer (Std)	B8E-18124-A	B8E-18125-B
Ranger & Pacer (H.D.) ②	B8E-18124-G	B8E-18125-G
Corsair & Citation (Std.)	B8E-18124-C	B8E-18125-A
Corsair & Citation (H.D.)	B8E-18124-H	B8E-18125-H

① - Edsel Kit Nos. ② - B7A-18124-F also used.

STEERING

Manual: Saginaw. Recirculating Ball Nut type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Bendix Linkage Type/ Saginaw In-Lin , or Torsion Bar types used.
See "Bendix Linkage Type", "Saginaw In-Line" and "Torsion Bar" in Steering Section.

►*POWER STEERING PUMP PRODUCTION CHANGE & IDENTIFICATION NOTE:* Later type pumps used to correct noise identified by green or yellow stripe on top of pump or date coded later than K20K (Ranger & Pacer), L13K (Corsair & Citation). *See "Eaton Roll Type Ste r ing Pump" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Ste ring Linkag : *See "Steering Linkag " in Steering S ction*

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BRAKES

Bendix Hydraulic (with Automatic Adjusters). Duo-servo with fixed anchor pins. No eccentric adjustment. Parking lever applies rear wheel service brakes.
See "Bendix Automatic Adjuster Brakes" in Brake Section.
Drum Diameter - 11" front & rear.
Wheel Cylinder Diameter - 1.125" front, .906" rear.
Lining - Molded type riveted to shoe. **Length** - 9.3" primary, 11.93" secondary. **Thickness** - .187".
Lining Width (Ranger & Pacer) - 2.5" front, 2" rear.
Lining Width (Corsair & Citation) - 3" front, 2" rear.
Clearance - (Manual Adjustment After Overhaul) - Hold adjusting lever away from adjusting screw, back off adjusting screw when dragging sound heard. Expand shoes until drum lightly drags at one point. Replace cover, drive car in reverse and apply brake five or six times for final adjustment.

Brake Pedal Adjustment: Adjust eccentric bolt attaching brake pedal to master cylinder pushrod to give ¼-½" free movement of pedal pad before rod moves master cylinder. Tighten locknut to 25-30 ft. lbs.

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid - Maintain fluid level to within ½" of top of filler neck.

Removal: Disconnect rubber boot from end of master cylinder in passenger compartment. *NOTE - Disconnect pushrod only if rod being serviced.* Disconnect brake line and wires from master cylinder. Force as much fluid as possible from cylinder. Remove bolts holding master cylinder to firewall and remove from car.

Power Brake Unit: Bendix Vacuum Power Unit. Combination power unit and master cylinder. Mounted on engine side of firewall.
See "Bendix Power Unit" in Brake Section.

Checking Fluid - Same as for standard master cylinder.

Removal: Disconnect pushrod from brake pedal lever. Remove outlet connector bolt (unnecessary to remove wires or brake line from outlet fitting). Disconnect vacuum hoses from inlet tubes on side of cylinder. Remove screws holding booster to adapter on firewall and remove from car.

MISC. MECHANICAL

Windshield Wipers (Ranger & Pacer): Cable operated vacuum type (early), Linkage vacuum type (later).
Windshield Wipers (Corsair & Citation): Electric type (early), Cable operated vacuum type (later).
See "Windshield Wipers" in Miscellaneous Section.
►*ELECTRIC WINDSHIELD WIPER WIRING NOTE:* If motor found wired directly to power source, reroute through accessory terminal of ignition switch.
Heater-Air Conditioning: Own, with electrically controlled servo motors. *See "Edsel Air Conditioning" in Miscellaneous Section.*
Power Window Regulators: Electric type with reversible motor in each window. *See "Power Window Regulators" in Miscellaneous Section.*
Power Top Control: Electro-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*
Power Seat Adjuster: "4-Way" electric type. *See "Power Seat Adjusters" in Miscellaneous Section.*
Electric Door Lock: *See "Electric Door Locks" in Miscellaneous Section.*
Trunk Lid Lock: *See "Trunk Lid Locks" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER (1959): Stamped on plate on left front body pillar *NOTE - Numb r (xampl bel w) includ s* identification data as follows

① ② ③ ④ ⑤
A 9 U C 700001

① - Engine **A** - 223 cu in 6 Cyl
② - Year - 1959
③ - Assembly Plant **U** - Louisville
④ - Body Series Identification *See table below*
⑤ - Consecutive Unit Number

B dy S ri s Identification

B dy S ri s	Code Letter
Ranger 2-Door Sedan	C
Ranger 4-Door Sedan	F
Ranger 2-Door Hardtop	G
Ranger 4-Door Hardtop	H
Corsair 4-Door Sedan	S
Corsair 2-Door Hardtop	W
Corsair 4-Door Hardtop	X
Corsair Convertible	R
Villager Fordor 6 Pass Station Wagon	T
Villager Fordor 9 Pass Station Wagon	V

Engine Producti n Code Number: Indicates place, day and month of engine manufacture Not used for licensing Stamped on left front corner of cylinder block directly below cylinder head

SERIAL NUMBER (1960): Stamped on plate on left front body pillar *NOTE - Number (example below) includes identification data as follows*

① ② ③ ④ ⑤
0 U 13 V 700001

① - Year - 1960
② - Assembly Plant - **U** Louisville
③ - Body Series (see below)
④ - Engine Type - **V** 6 Cyl
⑤ - Starting unit number (all series)

B dy S ri s Identification

B dy Typ	Code Number
Ranger 2-Door Sedan	11
Ranger 4-Door Sedan	12
Ranger 2-Door Hardtop	13
Ranger 4-Door Hardtop	14
Ranger 2-Door Convertible	15
Villager 4-Door Station Wagon (6 Pass)	17
Villager 4-Door Station Wagon (9 Pass)	18

Engin Pr duction C d Number· Indicates place, day and month of engine manufacture. Not used for licensing Stamped on left front corner of cylinder block directly below cylinder head

TUNE-UP

COMPRESSION PRESSURE: 150±10 lbs at cranking speed All cylinders must be equal within 10 lbs

VACUUM READING: 18-19" steady at idle speed with transmission in neutral

VALVE TAPPET CLEARANCE: 019" Intake & Exhaust (Hot & Cold) Adjust all tappets to 019" clearance while engine is cold, then again check all tappets for 019" clearance after running engine for 30 minutes to normalize temperature

►*SELF LOCKING VALVE TAPPET ADJUSTING SCREW NOTE* Special threads on adjusting screw provide interference fit 3 ft lbs (36 in lbs) interference when center section of screw threads is fully engaged with rocker arm threads Replace screw and/or rocker arm as necessary when interference is below this specification

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM Spring is installed with ¾ turn windup and hooked over stop pin

IGNITION

FIRING ORDER· 1-5-3-6-2-4

SPARK PLUG GAP: 032- 036"

Spark Plugs - Champion 870 18 mm Torque to 15-20 ft lbs

►*SPARK PLUG CAUTION.* Spark plug has tapered seat and does not require a sealing gasket It is important that plugs be tightened within range of 15-20 ft lbs

COIL: Ford No. B6A-12029-B.

Ignition Current - 2 5 amps idling, 4 5 amps stopped

Resistor - Edsel No B8A-12250-A (1959) Resistance wire in harness (1960) 1 3-1 4 ohms at 75°F

►*RESISTOR NOTE* 1959 resistor is mounted on firewall and connected in lead from ignition switch to coil 1960 resistance wire is incorporated in harness Resistor is bypassed during cranking by lead from starter solenoid to battery terminal of coil

DISTRIBUTOR: Edsel No. FET-12127-D (1959 & Early 1960 Synchro-mesh Cars), COAF-12127-G (1960 Synchro-mesh), COAF-12127-F (1960 Auto. Trans.). "Loadomatic" type of same design used on Ford 6 Cyl Cars except for COAF-12127-F (Step-Stop type) *See Edsel "Loadomatic" and "Step-Stop Distributors" in Electrical Section.*

Condenser - Ford No 7RA-12300-C **Capacity** 21- 25 mfd

Contact Point Set - Ford No FAA-12171-A

Breaker Gap - 024- 026"

Cam Angle - 35-38°

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Clockwise viewed from above

Advance Performance (Loadomatic Distr.)
►With Distributor on Test Stand

Distr Degrees	Vacuum (" of Hg)	Distr RPM
0	38	450
2½-3½	79	650
6¾-7¾	2 85	1100
8¾-9¾	4 33	1400
10¼-11¼	5 99	1800

Advance Performance (Step-Stop Distr.)

Distr Degrees	Vacuum (" of Hg)	Distr RPM
3½-4½	1 08	800
6¼-7¼	1 70	1000
7½-8½	2 38	1200
7½-8½	5 63	2000
9-10½ ①	6 50	1450

① - Maximum 13°

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in the oil pump It may be necessary to turn over the engine with starter after distributor drive gear is partially engaged, in order to engage intermediate shaft fully in oil pump

IGNITION TIMING

Initial Distributor Timing: Set engine crankshaft so that No 1 Cylinder is at TDC after compression stroke (with timing mark in line with pointer) Install distributor so that rotor points to the No 1 Spark Plug Wire Terminal in distributor cap Rotate distributor body clockwise until contact points just start to open then tighten screws Check with timing light

Std. Ignition Setting
(88-92 Octane Research Method Fuel)

Synchro-mesh Cars 2° BTDC Min
Auto Trans Cars 2° BTDC Min , 6° BTDC Normal

(93 or greater Octane Research Method Fuel)

Synchro-mesh Cars 4° BTDC Normal, 10° BTDC Max
Auto Trans Cars 6° BTDC Normal, 10° BTDC Max

Timing Mark - Vibration damper marked "TDC" and "3", "5", "7", "9" degrees BTDC Align correct mark with pointer on engine front cover

CARBURETOR

►*CARBURETOR APPLICATION One Holley "Visi-Flo" 1-barrel carburetor used.*

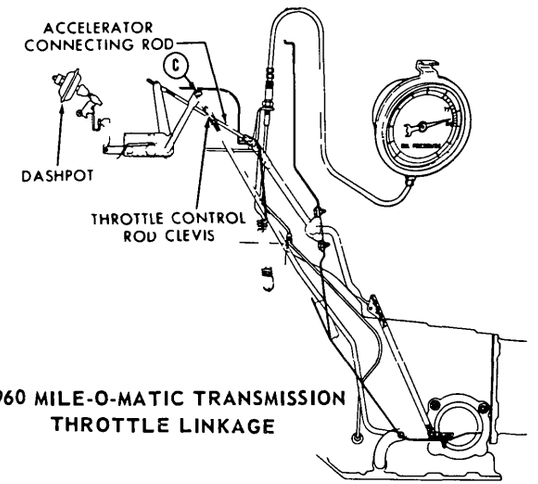
►*1959 GASOLINE ECONOMY CORRECTION: Caus d* by air restriction in air cleaner cover fibre pad and screen To correct, remove air cleaner and discard fibre pad and screen

►*1959 METERING JET CHANGE TO IMPROVE FUEL ECONOMY (Auto Trans Cars)* Main metering jet can be changed to No 60 (superseding No 62) for improved economy on Automatic Transmission Cars only *NOTE* - Carburetors code tagged AAA9BC or later have this new jet installed in production *See "Holley Visi-Flo Carburetor" in Carburetion Section*

Throttle Linkage Adjustment (1959 Auto. Trans.): Adjust engine idle speed to 450-475 RPM (transmission in "D") and make anti-stall dashpot adjustment (see below) With engine stopped and carburetor on hot idle, disconnect accelerator shaft connecting rod at bellcrank. Adjust threaded pin at bellcrank so top corner of accelerator pedal is 3½" from floor mat. Adjust threaded pivot at rear end of connecting rod so rod is parallel with centerline of engine. Remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission Turn throttle rod clevis until pin enters hole in lever and lengthen throttle rod 2±½ turns Connect throttle control rod, tighten locknut, install clevis lock

Throttle Linkage Adjustment (1960 Auto. Trans.): Adjust idle speed to 450-475 RPM (Transmission in "D") and make anti-stall dashpot adjustment (see below) Connect a tachometer to engine, remove valve cap from schrader valve at accelerator bellcrank and attach pressure gauge, Tool 77820-B, and adapter, Tool 77820-C, to pressure tube With parking brake set and

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1960 MILE-O-MATIC TRANSMISSION THROTTLE LINKAGE

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transmission in "D", accelerate to 1000 RPM Pressure gauge should read 77-84 lbs To adjust, lengthen throttle control rod to increase, shorten to decrease pressure With engine stopped and carburetor or hot idle, disconnect accelerator shaft connecting rod at bellcrank Adjust threaded pin at bellcrank so top corner of accelerator pedal is 3½" from floor mat Adjust threaded pivot at rear end of connecting rod so rod is parallel with centerline of engine

Anti-Stall Dashpot Adjustment: *CAUTION - Two types used Adjust each type as follows:*

"One-Second" Type (Before Nov. 16, 1958) - With carburetor throttle lever against hot idle stopscrew, depress dashpot plunger fully with throttle valve closed Clearance between end of plunger and adjusting screw should be 045- 064". Adjust by loosening locknut and turning adjusting screw.

"Two-Second" Type (Identified by figure "42" stamped n hex stud or by square stud instead of hex stud) - Check and adjust in same manner as first type above Setting should be 060- 090"

HOLLEY "VISI-FLO"

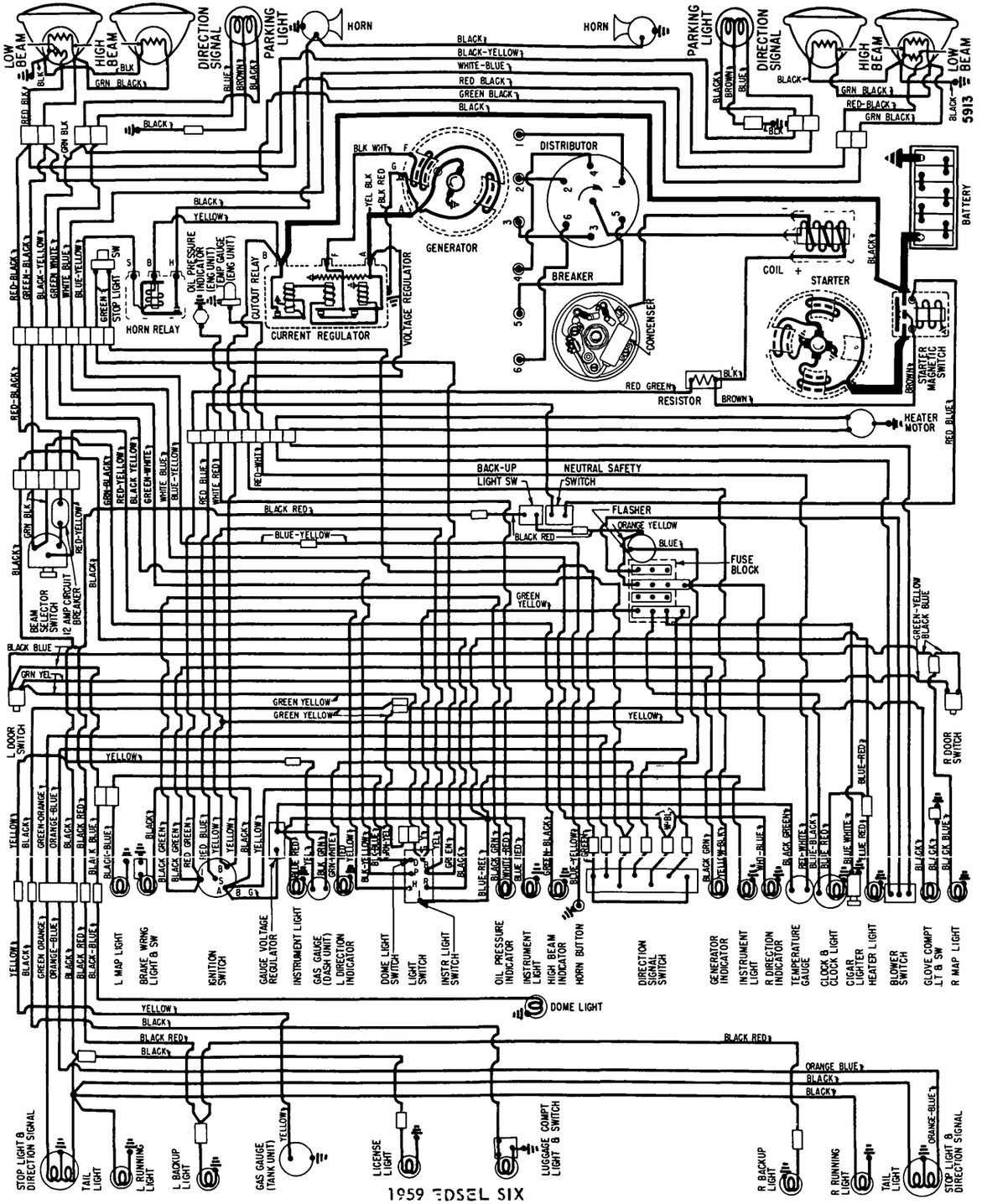
H lley Visi-Flo. Edsel No. B9A-9510-F (Identified by N . B9EA-9510-C).

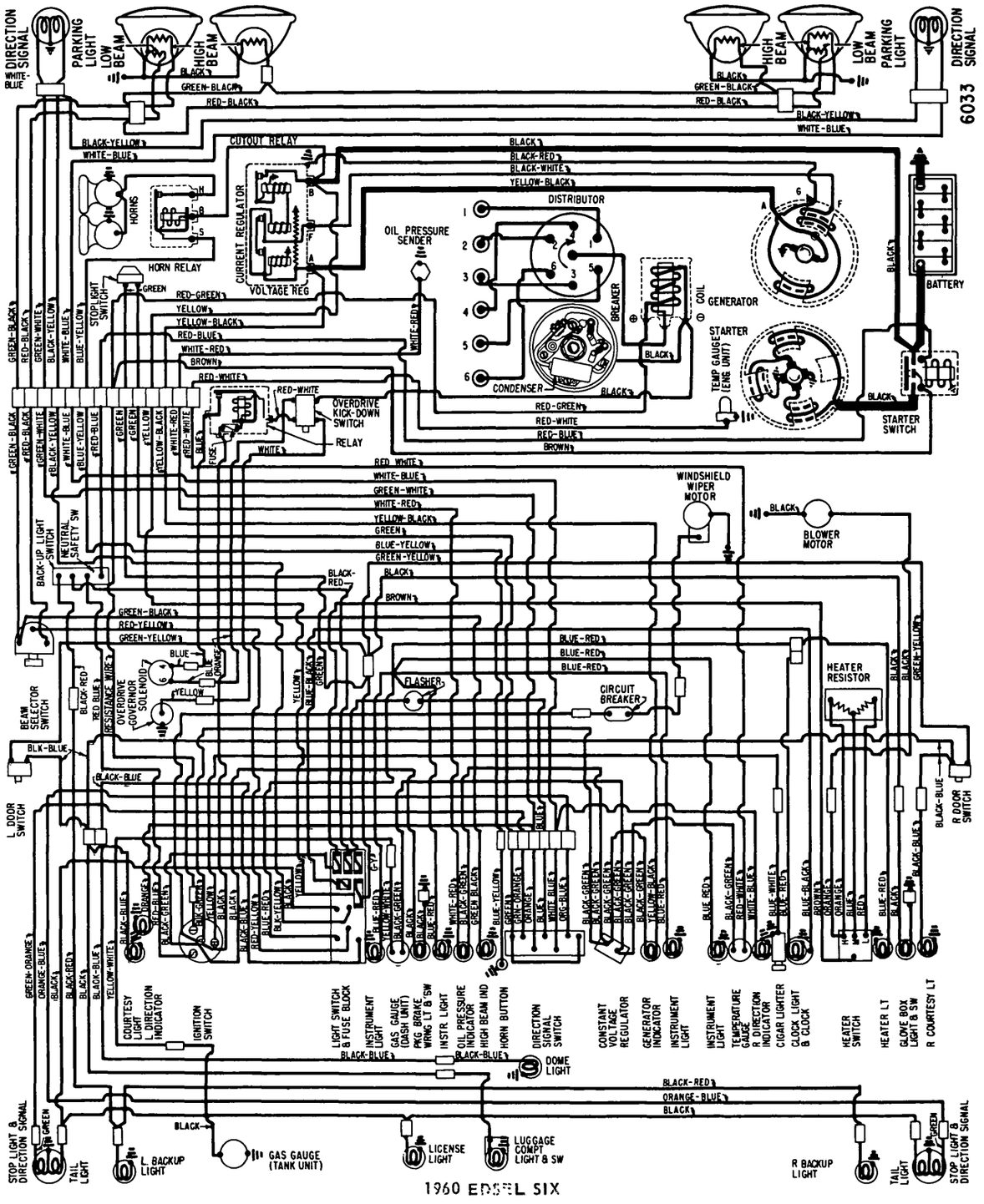
M del	Edsel Carburetor No.
1959 (All Cars)	B9A-9510-F
1960 Synchro-mesh (Early)	COAE-9510-E
1960 Synchro-mesh (Later)	COAE-9510-U
1960 Auto. Trans. (Early)	COAE-9510-G
1960 Auto. Trans. (Later)	COAE-9510-Z

Idle Setting - Initial setting ¾-1¾ turns open Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture Turn screw in until engine runs smoothly Favor a slightly rich mixture, rather than a lean setting

Idl Sp d - 475-500 RPM (Synchro-mesh), 450 RPM (Mile-O-Matic in "D"). *S e Note following.*

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1960 EDSEL SIX

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►*ROUGH IDLE (Auto. Trans. Cars):* If roughness or vibration noted when engine idling in "D", tailor the speed to the individual car as follows: Set parking brake, place selector lever in "D", adjust idle RPM until roughness and vibration eliminated or improved. Idle speed may vary between 475 and 525 RPM.

Fuel Level - 11/16" ± 1/32" below power valve mounting surface (Tool T52L-9550-AEE).

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

FUEL FILTER: Disposable type, mounted in carburetor fuel inlet line. Replace every 12,000 miles or 1 year, whichever is first.

►*FUEL PUMP GASKET LEAKAGE NOTE:* Use Gasket B5A-9417-AUP (.020" thick) only and tighten mounting bolts to 12-15 ft. lbs.

Fuel Pump: (1959) Edsel No. B8A-9350-E (Fuel only), B9A-9350-B (Fuel & Vacuum), **(1960)** Edsel No. COAE-9350-C (Fuel only), COAE-9350-D (Fuel & Vacuum).
Fuel Pump Pressure - 3.5-5.5 lbs. at 500 RPM.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: King-Seeley Electric "CV" (constant voltage) type with Gauge Voltage Regulator, Edsel No. B9AF-10804-A (1959), B9MF-10804-A (1960).

►*INACCURATE FUEL GAUGE READING CORRECTION:* Make sure correct fuel tank sending unit installed. *See below.*

Dash Unit - Edsel No. PB9E-9280-A (1959), COKF-9305-B (1960).

Tank Unit - Edsel No. B7A-9275G (1959), COAF-9A294-B (1960 Sta. Wgn.), COAF-9A294-C (1960 Other Models). *See "Fuel Gauges" in Carburetion Section.*

Air Cleaner: Dry filter element type. Clean every 4000 miles. Replace every 20,000 miles (1959), 24,000 miles (1960).

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate. *NOTE* - Compressed air may be used if applied in opposite direction to intake air flow and if filtering element is not damaged.

BATTERY

Edsel No.	Plates	Ampere Hour Cap.
B8E-10654-B (1959)	13	65
B9A-10654-D (1960)	11	55
B9A-10654-E (1960)	13	65

All 12 Volt. Ampere hour capacity is 20 hour rate.
Battery Ground - Negative, to engine block.
Engine Ground - Cylinder head to dash.

STARTER

Edsel B6A-11002-A (1959) & FAY-11002-A (1960).
Armatur - Edsel No. B6A-11005-B (1959-60).
Driv - Edsel 1CM-11350-C. Bendix "Folo-Thru".

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Rotati n - Counterclockwise at commutator end
Brush Spring T nsi n - 48-56 ozs
Cranking Sp d - 150-180 RPM, 190 amperes max

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	Ⓒ	12 0	80
15 5 ft lbs		5 0	550

Ⓒ - With starter on engine and engine idling

Starting Switch: Edsel B6A-11450-A. Magnetic type Controlled by combination Ignition & Starting Switch
NOTE - Neutral safety switch on automatic transmission cars

Neutral Safety Switch (Auto. Trans. Cars): Edsel No B9A-15812-A1 (1959), COAF-7A247-A & B (1960) Located on steering column
N utral Safety Switch Adjustment - *See "Edsel Automatic Transmission" in Transmission Section.*

GENERATOR

(Standard) B9A-10002-A. (Air Cond. Cars) B8A-10002-A.

Performance Data

G nerator	Amperes	Eng. RPM
B9A-10002-A	30	2550
B8A-10002-A	35	2550

Brush Spring Tension – 32-40 ozs
Field Current - 1 0-1 1 amperes at 10 volts (hot)
R tation - Counterclockwise at commutator end
B lt Adjustment: ½" deflection midway between generator and water pump pulleys with normal thumb pressure
NOTE - Supersedes previous specification of ¼"

REGULATOR

R gulator	Generator
B7A-10505-B	B9A-10002-A
B8E-10505-B	B8A-10002-A

►*SETTING CAUTION* "Temperature Compensated" type Set to following specifications at 75°F, ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized

Cutout Relay

Cuts In - 12 4-13 2 volts (All)
Cuts Out - 6-9 amps (B7A-10505-B), 2-9 amps (B8E-10505-B)

Voltage Regulator

Setting - 14 6-15 4 volts (All)
Checking & Adjusting - *See "Edsel Regulators" in Electrical Section*

Current Regulator

Setting - 28-32 amps (B7A 10505-B), 33 37 amps (B8E-10505-B)
Checking & Adjusting - *See "Edsel Regulators" in Electrical Section*

MISC. ELECTRICAL

H adlamps: Dual headlights (4-Headlight System) *S e "4-Headlight System" in Electrical Section*
Dir ctional Signals: *See Electrical Section*
Lighting Switch Removal: Remove battery ground cable at battery With knob in "OFF" position, press spring-release button on switch body, turn shaft slightly and pull it out of switch Remove retaining nut and switch Note switch wiring color code for reinstallation, then remove wires
Stop Light Switch location· On forward end of brake master cylinder (located on firewall in engine compartment)
CIRCUIT BREAKERS: 18 Amp r - Headlight high beams On lighting switch
12 Amp re (1959) & 15 Amp r (1960) - Headlight low beams and windshield wiper motor on left coil side panel.
12 Amper (1959) & 15 Amp r (1960) - Back-up, Parking, Tail, Stop, License & Instrument lights on lighting switch

FUSES: *NOTE - All fuses located in fuse panel which is on right side of brake pedal support bracket*
14 Ampere - Heater Blower Motor
15 Ampere - Cigar Lighter
7.5 Ampere - Interior lights
7.5 Ampere - Direction Signals
7.5 Ampere - Radio (Signal Seeking)
7.5 Ampere - Spotlight
7.5 Ampere - Power Lubricator.
5.0 Ampere - Radio (Push Button)
1 Ampere - Clock

ENGINE

►*AIR CONDITIONING CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 6 Cyl , valve-in-head

Bore	Stroke	Displacement
3 62"	3 60"	223 cu in
Compr. Ratio	**Rated HP**	**Developed HP**
8 4-1	31 54	145 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

►*ROCKER ARM COVER OIL LEAK CORRECTION* When cover inner gasket retainer interferes with proper seating of gasket, grind off retainer edge to provide clearance and install new gasket

►*ORIGINAL BORE & PISTON SIZES See "Pistons" in Edsel Special Data*

CYLINDER HEAD: *See 'Cylinder Head & Manifold" in Edsel Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications' in Edsel Special Data*
ENGINE REMOVAL: *See 'Engine' in Edsel Special Data*
OIL PAN REMOVAL: Drain crankcase, remove oil level dipstick, stabilizer bar, and flywheel inspection cover Remove oil pan retaining screws and remove pan

PISTONS

Autothermic type Solid skirts with three rings
Removal - Pistons and rods removed from above
Fitting New Pistons: Clearance - 0008-0026" at bottom of skirt Use ½" wide ribbon feeler gauge inserted between piston and cylinder wall at right angle to pin on thrust side, piston inverted and bottom of piston skirt 1½" below top of block To test minimum clearance, use 0015" feeler and 4 lbs pull, to test maximum clearance use 003" feeler and 4 lbs pull
Replacement Pistons· Furnished in 2 Std sizes (Red-Grade 2, Blue-Grade 6) and 020", 030", 040" Oversize with fitted pins

►*PISTON & PIN REPLACEMENT CAUTION* Engines produced after April 13th, 1959 have a lighter weight piston pin, Part No EAA-6135-B When installing present Piston & Pin Assemblies (with heavier pin No B5A-6135-A) in these engines, replace pin with later lighter type, No EAA-6135-B
Installing Pistons: Install piston with indentation in head of piston toward front of engine *S Rod Installation*

PISTON PINS

Floating type with lock ring at each end
See "PISTON & PIN REPLACEMENT CAUTION" under PISTONS
Diameter - 9120- 9123" **Length** - 3 016-3 030"
Pin Fit in Piston - 0001- 0003" wear limit 0008"
Pin Fit in Rod Bushing - 0001- 0003", wear limit 0008"
Replacement Pins: Standard and 001", 002" oversize

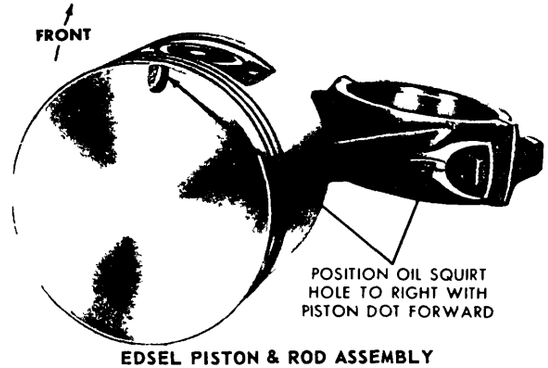
PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compr #1,2	3 32"	010- 027"	002- 0035"
Oil #3	3/16"	015- 062"	Ⓓ

Ⓓ- Side sealing type ring
Replacement Rings: Standard, 020", 030", 040", 060" oversize (Expander type)

CONNECTING R DS

Journal Diameter - (Red) 2 2984-2 2988", **(Blue)** 2 2980-2 2984"
Clearance - 0004- 0023", wear limit 0033"
Side Clearance - 003- 009" wear limit 012"



EDSEL PISTON & ROD ASSEMBLY

Replacement Bearings· Standard in 2 sizes (Red and Blue) and 002" 020" 030" Undersize
►*STANDARD SIZE NOTE* **Red** marked bearings increase clearance **Blue** marked bearings decrease clearance
Installing Rods Install rod with squirt hole to right and piston indentation toward front of engine

CRANKSHAFT

Journal Diameter - (Red) 2 4984-2 4988", **(Blu)** 2 4980-2 4984"
Bearings - Steel backed copper lead alloy
Clearance - 0005- 0025" Wear limit 0035"
Replacement Bearings· Standard in 2 sizes (Red and Blue) and 002", 020", 030" Undersize
►*STANDARD SIZE NOTE* **Red** marked bearings increase clearance **Blue** marked bearings decrease clearance Use mixed set (Red & Blue) if necessary to obtain selective fit
End Thrust· Taken on rear intermediate #3 bearing
Thrust B aring Alignm nt - *S e Crankshaft & Main Bearings" in Edsel Special Data*

CONTINUED ON NEXT PAGE

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End Play - 004- 008", wear limit 012"

Crankshaft Rear Oil Seal Installation: See *"Crankshaft & Main Bearings" in Edsel Special Data*

Crankshaft Front Oil Seal Installation: See *"Engine Front Cover" in Edsel Special Data*

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars and truck engines to reduce oil leakage at front oil seal Slinger is held in place by crankshaft pulley hub and cylinder front cover To remove slinger, remove cylinder front cover and slide slinger off crankshaft

CAMSHAFT

Journal Diameter - 1 9255-1 9265"

Clearance - 001- 003" wear limit 006"

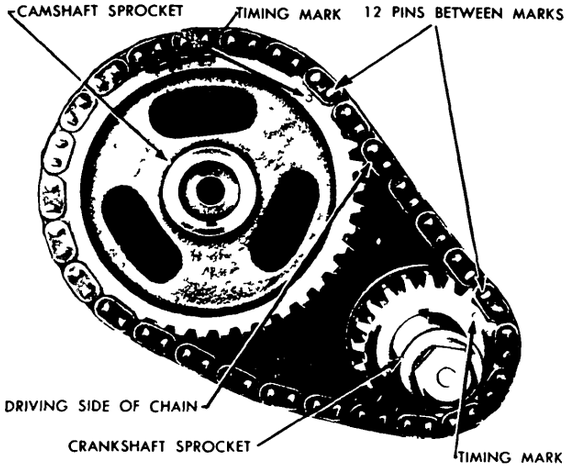
End Thrust: Taken by thrust plate and spacer behind camshaft sprocket *NOTE* - Chamfer on inside of spacer must be toward camshaft journal

Replacement Bearings: Finished bearings furnished Standard, and 015" undersize *CAUTION* - Rear intermediate (#3) bearing not interchangeable with other bearings

Camshaft Removal & Installation: See *"Camshaft & Bearings" in Edsel Special Data*

Timing Chain: Side-guide type 56 links

Camshaft Setting: Sprockets marked by "O" at one tooth Mesh chain so that there are 12 pins between "O" marks on driving side of chain



EDSEL VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Edsel Special Data*

Engine Front Cover Removal: See *"Engine Front Cover" in Edsel Special Data*

VALVES

Tappet Clearance - 019" Intake & Exhaust (Hot or Cold)

Valve	Head Diameter	①Stem Diameter
Intake	1 775-1 785"	3416- 3423"
Exhaust	1 505 1 515"	3403- 3410"

Valves	Seat Angle	②Lift	③Stem Clearance
Intake	45°	273"	001- 0024"
Exhaust	45°	273"	0023- 0037"

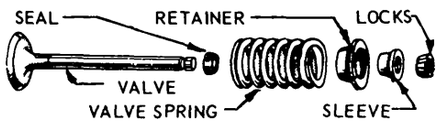
①- Furnished with 003", 015", 030" oversize stems

②- Cam lobe lift Wear limit, 268"

③ - Wear limit (Intake) 0045" (1959), 0055" (1960) (Exhaust) 0065" (1959-60)

►*VALVE REPLACEMENT CAUTION* 015" oversize valves used in some engines Measure all valves (1" or more from stem end) for stem diameter before selecting valve replacement

►*ROTATABLE VALVE NOTE. All valves are rotatable type* See *"Valve System" in Edsel Special Data*



EDSEL VALVE ASSEMBLY

Valve Stem Seals - Umbrella type seals used on both intake and exhaust valve stems cupped side down

Valve Seat Width - Intake 060- 080" (1959), 070- 090" (1960) **Exhaust** 070- 090" (1959-60)

Valve Springs: Free Length - 2 09" approximately

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①71 79 lbs	1 780"
Open	②161-177 lbs	1 390"

①- Wear limit 64 lbs at 1 780"

②- Wear limit 145 lbs at 1 390"

►*VALVE SPRING INSTALLATION NOTE·* Measure valve spring assembled height from machined surface of cylinder head spring pad to spring retainer contact surface If assembled height is 1 25/32" or greater, install necessary 030" spacer or spacers between cylinder head valve spring pad and valve spring to bring assembled height to recommended dimension of 1 3/4-1 25/32"

Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above) ream guides and install oversize valves See *"Valve System" in Edsel Special Data*

Valve Lifters: Mushroom type Removed from below with camshaft out

Clearance - 0008- 0024" wear limit 0045"

Rocker Arm Assembly: See *"Valve System" in Edsel Special Data*

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above*

►*VALVE TIMING NOTE:* The following valve opening and closing points are with camlift as indicated

Intake Valves - Open 17° ①BTDC Close 53° ②ALDC

Exhaust Valves - Open 61° ①BLDC Close 9° ②ATDC

①- Camlift 016" ②- Camlift 019"

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Edsel Special Data.*

Crankcase Capacity: 4 quarts (refill) 5 quarts (when filter element changed)

Normal Oil Pressure : 45 50 lbs at 2000 RPM

Pressure Regulator Valve - In pump body not adjustable

Oil Pressure Indicator - Indicator light on instrument panel, operated by engine unit Edsel B6A-9278-B

Oil Pump: Gear type pump located in crankcase

Pump Overhaul - *See "Oil Pump" in Edsel Special Data*

Oil Filter: "Disposable" type Replace at 4,000 mile intervals

Disposable Filter Replacement - Coat gasket face of filter with oil thread filter on insert by hand until gasket contacts adapter surface then tighten filter an additional one half turn

Crankcase Ventilation: Filter in oil filler cap (inlet), an outlet pipe in rear of crankcase at left side

COOLING

►*OVERHEATING DURING EXTENDED IDLE CORRECTION* To correct above condition, install extra cooling water pump pulley B7A-8509-D with fan belt B7A-8620-E identified by EBP-8620-E

Water Capacity: 15 qts Add 1 qt for heater

Pressure Valve· Edsel No LA-8100-A 14 lb radiator filler cap

►*RADIATOR PPESSURE CAP CAUTION* Vented and non-vented type caps used in production Use vented type only for replacement The vent on a vented type cap will be away from vent seat when cap is held in upright position

Thermostat: Edsel No B7A-8575-A (157-162°F) Std , B7A-8575-B (177-182°F) for use with permanent anti-freeze

►*THERMOSTAT INSTALLATION NOTE:* Install thermostat with valve pivot shaft in a vertical position to insure best operation

Water Pump: Packless sealed ball bearing type

See "Water Pump" in Edsel Special Data

Temperature Gauge: King-Seeley Electric "CV" (constant voltage) type with Gauge Voltage Regulator, Edsel No B9AF-10804-A (1959), B9MF-10804-A (1960)

Dash Unit - Edsel No PB9E-10883-A (1959), COKF-10883-A (1960)

Engine Unit - Edsel No FEG-10884-B1 (1959), FEG-10884-B (1960)

See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Long 9½CF (Std.), 11CF (Heavy Duty). Single plate, semi-centrifugal type

Cover Assembly	Long No.	Edsel No.
9½CF	268954	1A-7563-A
11CF	266978	B7A-7563-C
Clutch Disc	**Long No.**	**Edsel No.**
9½CF	288849	B8A-7550-A
11CF	288851	B8A-7550-B

See "Long Clutches" in Clutch Section

Clutch Disc - Long 288849 (9½ CF), 288851 (11CF)

Pedal Adjustment: If total pedal travel is less than 6 5/8" or more than 6 7/8", reposition pedal bumper and bracket until travel is within limits Adjust spring link to give assist spring length of 9¾-10" (between spring eye centers) with pedal fully released against bumper

Free Travel - 1 1/8-1 3/8" Loosen locknut on clutch pedal release rod, turn adjusting nut until correct travel is obtained *NOTE* - Check free travel by oper-

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ating engine at 3,000 RPM with transmission in neutral position There should be a minimum of ½" free travel under these conditions

Removal: Remove transmission, *see "Synchro-mesh Transmission" below,* then remove flywheel housing cover and release lever retracting spring Slide release bearing and hub off release lever Mark clutch cover and flywheel for reinstallation Loosen six cover bolts uniformly to release spring tension Remove cover and pressure plate through opening in flywheel housing

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)

See Edsel Synchro mesh in Transmission Section

Transmission Control: *See Transmission Controls in Transmission Section*

Removal: Raise car and disconnect drive shaft at rear joint flange Slide drive shaft off transmission output shaft Insert Tool T57L-7657-A over output shaft and into seal Disconnect speedometer cable at extension housing, gear shift rods from transmission levers Remove parking brake equalizer lever from bracket and remove brake cable from bracket on crossmember Remove extension housing to engine rear support bolts and raise rear of engine and remove engine rear support and frame crossmember as a unit Place jack under transmission and remove transmission to flywheel housing bolts Slide transmission and jack to rear to clear input shaft and remove transmission from beneath car

MILE-O-MATIC TRANSMISSION

Two-Speed simplified type, with torque converter and two speed automatic transmission

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Edsel & Ford Two-Speed Automatic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING See 'Edsel & Ford Two-Speed Automatic' in Transmission Section*

Lubrication - Check fluid level every 2 000 miles Drain and refill every 24,000 miles Use Automatic Transmission Fluid, Type A Suffix A

Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in Neutral position Move selector lever through all ranges to assure fluid distribution then place lever in "P" (Park) position for checking fluid Maintain level at Full mark on dipstick

Throttle Linkage Adjustment *See CARBURETOR above*

►*OTHER DATA See 'Edsel & Ford Two-Speed Automatic' in Transmission Section*

UNIVERSALS

Mechanics Needle bearing type

►*CAUTION* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See 'Edsel, Ford & Mercury' in Rear Axle Section*

►*REAR UNIVERSAL JOINT INSTALLATION CAUTION* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts

REAR AXLE

Own Separate carrier type semi-floating, hypoid with Hotchkiss Drive "Equa-Lock" (Power Transfer) type differential Optional *See Edsel, Ford & Mercury (Dep-Offset) Hypoid" or "Ford Equa-Lock Differential" in Rear Axle Section*

Axle Ratios - 3 56-1 (32-9), 3 89-1 (35-9) Std Trans, 3 56-1 (32-9) Auto Trans

Backlash - 004- 009"

Axle Shaft Removal· Remove wheel and brake drum Remove axle bearing retainer locking type nuts (work through opening in axle shaft flange) Use puller No 4235N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate

Carrier Assembly Removal: Remove axle shafts (see above) and drive shaft Remove locknuts which attach carrier to housing and remove carrier from housing

SHOCK ABSORBERS

Direct acting, non-adjustable Serviced by replacement

Edsel Shock Absorber Nos.

Model	Front	Rear
Sta Wgn (1959)	PB9E-18077-C	B9KK-18097-B
Others (1959)	PB9E-18077-B	①PB9E-18097-C
Sta Wgn (1960)	②COKK-18077-D	②COKK-18097-D
Others (1960)	COKK-18077-A	COKK-18097-A

① - PB9E-18080-A (1959 Heavy Duty)

② - 1960 Heavy Duty COKK-18077-F (Front), COKK-18097-E,G (Rear)

FRONT SUSPENSION

Independent. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs

See "Edsel, Ford, Mercury" in Suspension & Wheel Alignment Section

Caster - 0° to Pos 1° Maximum variation between wheels ½°

Camber - Pos ½° to Pos 1½° Maximum variation between wheels ¼°

Toe-In - 1/16-1/8" *NOTE* When checking toe-in on cars with power steering engine should be running so that power steering control valve will be properly centered

Toe-Out on Turns - Outer wheel 20°, inner wheel 24¼°

STEERING

►*SHIFT LEVER SHAKE AND RATTLE CORRECTION* When alignment of shift tube in bushings does not correct noise install Vibration Damper Spring No B6A-77205-A between shift tube and steering column under steering column to dash panel grommet

Manual· Own Recirculating ball worm and nut

See 'Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering· Linkage type Used in conjunction with standard steering gear

See Bendix Linkage Type Power Steering in Steering Section

►*POWER STEERING POOR RECOVERY FROM LEFT TURN CORRECTION See 'Bendix Linkage Type Power Steering Unit' in Steering Section*

►*POWER STEERING PUMP HOSE INTERFERENCE WITH LEFT HORN CORRECTION* On early cars correct by repositioning horn 2 3/8" higher

Steering Linkag *See Steering Linkage in Steering Section*

Steering Wheel & Horn Button Removal *See 'Saginaw Ball Bearing Worm & Nut in Steering Section*

Steering Gear Removal: *See 'Saginaw Ball Bearing Worm & Nut' in Steering Section*

BRAKES

Bendix Hydraulic (With Automatic Adjuster). Duo-servo with fixed anchor pins No eccentric adjustment Parking lever applies rear wheel service brakes

See Bendix Automatic Brake Adjuster' in Brake Section

Drum Diameter - 11" front and rear

Wheel Cylinder Diameter - 1 1/8" front, 15/16" (Exc Sta Wgn) 31/32" (Sta Wgn) rear

Lining - Molded asbestos type, riveted to shoe

Lining Length - 9 5/16" Primary (Front & Rear) 12" Secondary (Front & Rear)

Lining Width - 2 5" Front Wheel, 2" Rear Wheel (1959)

Thickness - 7/32"

Braking Power - 55 5% front, 44 5% rear

Clearance - (Manual Adjustment After Overhaul) - Turn adjusting screw upward (from backing plate side) until wheel is locked Hold adjusting lever away from screw and back off screw until wheel turns free, then back off 1 more stroke (approximately 12 strokes total)

Brake Pedal Adjustment: Loosen locknut on eccentric bolt and rotate bolt to obtain ¼-7/16" free travel Hold bolt securely and tighten locknut to 22-28 ft lbs

Standard Master Cylinder· Located on engine side of firewall

Checking Fluid - Maintain fluid level to within ½" of top of reservoir

Removal - From passenger compartment side remove eccentric bolt, bushings, and locknut that secure pushrod to brake pedal From engine compartment side remove hollow bolt attaching stop light switch and hydraulic fitting to master cylinder Remove four attaching screws and remove master cylinder

Power Brake (1959): "Bellows" Typ - Pedal assist power unit with vacuum bellows and control valve mounted on drivers side of dash panel Connected directly to brake pedal lever *See "Edsel Bellows Type Power Unit" in Brake Section*

Checking Fluid Level - Same as standard master cylinder

Removal - Disconnect vacuum hose from top of unit Remove valve adjusting eccentric with flat washer, spring and bushing Remove nylon bushing from power unit valve housing Remove nuts and screws (attaching bracket to dash panel), and remove power unit *NOTE* - Master cylinder can then be removed in usual manner

Power Brake (1960): Bendix Combination power unit and master cylinder located on engine side of firewall *See "Bendix Hydraulic (Disc) Reaction Type Power Unit" in Brake Section*

Removal - Take out bolt securing brake pedal to power unit (in drivers compartment) In engine compartment, disconnect stop light switch wires, brake line, and vacuum hose Remove nuts and lockwashers attaching unit to firewall and slide unit forward and out

MISC. MECHANICAL

Refer to 1959-60 Edsel V8 Car Model Pages (following)

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front body pillar. *NOTE* - Number (example below) includes identification data as follows

1959 SERIAL NUMBERS

① ② ③ ④ ⑤
C 9 U C 700001

① - Engine. **C** - 292" V8 **B** - 332" V8 **W** - 361" V8
② - Year - 1959
③ - Assembly Plant **U** - Louisville.
④ - Body Series Identification. See table below.
⑤ - Consecutive Unit Number.

Body Series Identification

Body Series	Code Letter
Ranger 2-Door Sedan	C
Ranger 4-Door Sedan	F
Ranger 2-Door Hardtop	G
Ranger 4-Door Hardtop	H
Corsair 4-Door Sedan	S
Corsair 2-Door Hardtop	W
Corsair 4-Door Hardtop	X
Corsair Convertible	R
Villager Fordor 6 Pass. Station Wagon	T
Villager Fordor 9 Pass Station Wagon	V

1960 SERIAL NUMBERS

① ② ③ ④ ⑤
O U 13 W 700001

① - Year - 1960
② - Assembly Plant - **U** Louisville
③ - Body Series see below)
④ - Engine Type (see below)
⑤ - Starting unit number (all series)

Body Series Identification

Body Type	Code Number
Ranger 2-Door Sedan	11
Ranger 4-Door Sedan	12
Ranger 2-Door Hardtop	13
Ranger 4-Door Hardtop	14
Ranger 2-Door Convertible	15
Villager 4-Door Station Wagon (6 Pass)	17
Villager 4-Door Station Wagon (9 Pass)	18

Engine Identification

Engine	Code Letter
292" 2-Bbl Carb	W
292" 2-Bbl Carb (Export)	T
352" 4-Bbl Carb	Y
352" 4-Bbl Carb (Export)	G

Engine Production Code Number: Indicates place, day and month of engine manufacture Not used for licensing Located as follows **292"** - Stamped on front of block at pushrod cover-to-cylinder block mounting surface **332", 352" & 361"** - Stamped on left front of block below cylinder head

TUNE-UP

►*SPARK PLUG FOULING & HESITATION ON DRIVE-AWAY CORRECTION See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section*

►*LOSS OF POWER ON ACCELERATION CORRECTION (All Engines)* May be caused by kinked flexible fuel line at pump To correct, cut kink out of line and reconnect *NOTE* - It may be necessary to bend fuel tank line so it faces pump

►*HARD COLD START CORRECTION (Ford Carb)* Caused by damaged or misaligned choke plate in air horn, preventing complete closing of choke To correct replace or realign choke plate

►*332" ENGINE DETONATION CORRECTION: Distributor must be modified. See DISTRIBUTOR below.*

COMPRESSION PRESSURE: 292 - 160±20 lbs **352, 332 & 361** 180±20 lbs All cylinders must be equal within 20 lbs

VACUUM READING: Steady 19-20" at idle speed

VALVE TAPPET CLEARANCE: 292 - 019" Intake & Exhaust (Cold) After engine temperature stabilized running at 1200 RPM for 30 minutes, clearance should be 018" Intake & Exhaust

Tappet Adjustment - *See "Valve System" in Edsel Special Data*

332, 352 & 361 - Zero lash, hydraulic lifters

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (292")* Torque required to turn screw (after interference noted) must be 3 ft lbs minimum

MANIFOLD HEAT CONTROL: Automatic thermostatic type in right exhaust manifold Valve must operate freely

IGNITION

FIRING ORDER: 292" - 1-5-4-8-6-3-7-2
332, 352 & 361 - 1-5-4-2-6-3-7-8
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8

SPARK PLUG GAP: 032-036"
Spark Plugs - **292** - Champion F-14-Y **332, 352 & 361** - F-11-Y 18mm Torque to 15-20 ft lbs Tapered seat, no gasket used

COIL: Ford No. B6A-12029-B.
Ignition Current - 2 5 Amps idling, 4 5 Amps stopped
Resistor - **(1959)** Edsel No B8A-12250-A **(1960)** Resistance wire connected between ignition switch and coil Bypassed during cranking by lead from starter solenoid to battery terminal of coil Resistance 1 3-1 4 ohms at 75 °F (1959-60)

DISTRIBUTOR: Edsel (Early 1959) - Same type as used on previous V8 models **(Later 1959 & All 1960)** - New pivot plate type Both have centrifugal & vacuum spark advance *See "Distributors" in Electrical Section*

Engine	Distr Part No.	① Engineering No.
292 (Early 1959)	B9A-12127-B	B9FA-12127-A
292 (Later 1959)	B9AF-12127-B	B9AF-12127-B
332 (Early 1959)	B8A-12127-G	FEU-12127-J
332 (Later 1959)	B9AF-12127-A	B9AF-12127-A
361 (Early 1959)	B8A-12127-K	FEU-12127-N
361 (Later 1959)	B9AF-12127-D	B9AF-12127-D
292 (1960)	COAF-12127-A	
352 (1960)	COAF-12127-B	

① - Stamped on distributor housing for identification

►*332" ENGINE DETONATION CORRECTION* If detonation occurs due to low octane fuel, install new weight springs, Part No B8QH-12192-C, for **both** primary and secondary weights and recalibrate distributor according to special table below. *CAUTION - DO NOT retard timing below 2° BTDC nor exceed 10° BTDC*

Condenser - 1959. Edsel No B7A-12300-A (292 & Early 332 and 361), B9AF-12300-A (Later 332 & 361) **1960** Edsel No B9AF-12300-A **Capacity** -21-25 mfd

Contact Point Set - Edsel No B7A-12171-A
Breaker Gap - 014-016"
Cam Angle - 26-28½° *CAUTION* - Set cam angle at 250 Distr RPM and zero vacuum Cam angle may vary 6° through range of vacuum advance
Breaker Arm Spring Tension - 17-20 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance
B8A-12127-B & B9AF-12127-B

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0	800
0-1	450	0-2	900
1-2	500	2-4	1000
3½-4½	700	7-9	1400
14-15½	2000	28-31	4000

Automatic Advance
B8A-12127-G & B9AF-12127-A

Degrees Distr.	RPM	Degrees Eng	RPM
Start	400	0	800
1-2	500	2-4	1000
6½-7½	775	13-15	1550
8-9	900	16-18	1800
13¾-15¼	2000	27½-30½	4000

Automatic Advance - B8A-12127-G (Modified)
►To Correct Detonation

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	550	0	1100
0-1	650	0-2	1300
5¾-7	1200	11½-14	2400
14¼-15¾	2000	28½-31½	4000

Automatic Advance
B8A-12127-K & B9AF-12127-D

Degrees Distr.	RPM	Degrees Eng	RPM
Start	425	0	850
½-1½	500	1-3	1000
4½-5½	700	9-11	1400
7½-8½	1000	15-17	2000
13¼-14¾	2000	26½-29½	4000

Automatic Advance - COAF-12127-A

Degrees Distr	RPM	Degrees Eng	RPM
Start	500	0	1000
1¼-2¼	800	2½-4½	1600
5-6¼	1300	10-12½	2600
10¼-11¾	2000	20½-23½	4000

Automatic Advance - COAF-12127-B

Degrees Distr	RPM	Degrees Eng	RPM
Start	300	0	600
1-2	500	2-4	1000
7-8¼	1200	14-16½	2400
13¼-15¼	2000	26½-30½	4000

Vacuum Spark Control - Diaphragm type Mounted on distributor and linked directly to breaker plate

①Vacuum Advance
B8A-12127-B & B9AF-12127-B

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
0-3½	0-7	6½
6½-9½	13-19	12
9½-12½	19-25	15

① - With distributor speed of 1000 RPM

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℄Vacuum Advanc
B8A-12127-G & B9AF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-3½	0-7	6
8-10	16-20	12
10½-12½	21-25	16

℄Vacuum Advance - B8A-12127-G (Modified)
►To Correct Detonation

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1½-4½	3-9	7
6-9	12-18	11
9½-12½	19-25	14½

℄Vacuum Advance
B8A-12127-K & B9AF-12127-D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1-3¾	2-7½	8
4½-7½	9-15	11
7-10	14-20	14

℄Vacuum Advance - COAF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	7
5-8	10-16	12½
8-11	16-22	16
9½-12½	19-25	20

℄Vacuum Advance - COAF-12127-B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
5¼-8¼	10½-16½	10
8¼-11½	16½-23	15

℄ - With distributor speed of 1000 RPM.

IGNITION TIMING

1959 Std. Ignition Setting
(88-92 Octane Research Method Fuel)

292 Std. Trans.	2°BTDC Min.
292 Auto. Trans.	2°BTDC Min., 6° BTDC Normal
332 All Trans.	2°BTDC Min., 6° BTDC Normal

(93 or greater Octane Research Method Fuel)

292 Std. Trans.	3° BTDC Normal, 10°BTDC Max.
292 Auto. Trans.	6° BTDC Normal, 10°BTDC Max.
332 All Trans.	5° BTDC Normal, 10°BTDC Max.

(96 or greater Octane Research Method Fuel)

361 Std. Trans.	3° BTDC Normal, 10° BTDC Max.
361 Auto. Trans.	6° BTDC Normal, 10°BTDC Max.

1960 Std. Ignition Setting

All Engs. Std. Trans.	℄3° BTDC
All Engs. Auto. Trans.	℄6° BTDC

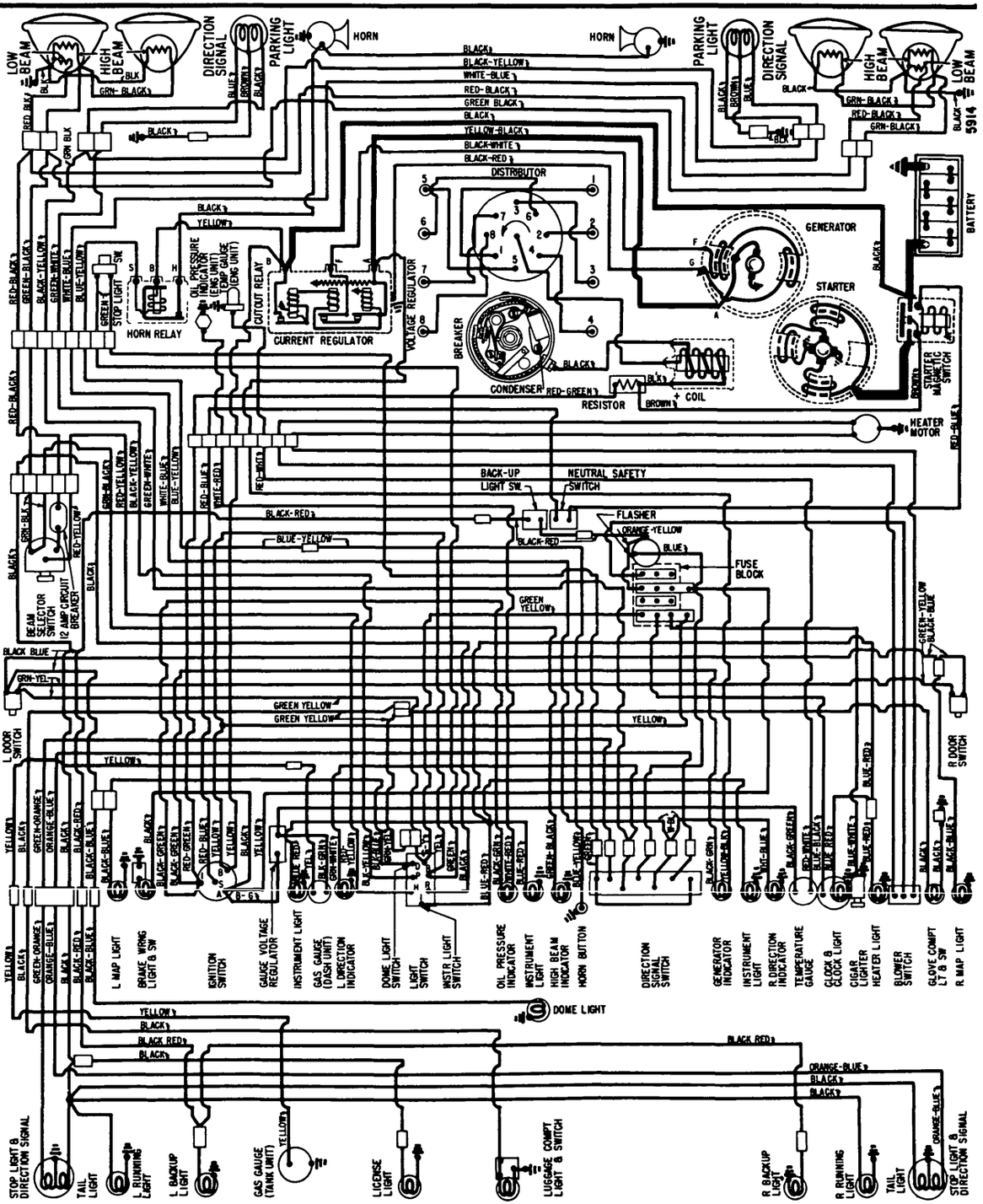
℄ - Allowable range 2-10° BTDC.

Timing Mark - Three long marks, TDC, 10° BTDC, and 20° BTDC with short marks for 2° increments between. **Set timing with vacuum line disconnected.**

CARBURETOR

►*CARBURETOR APPLICATION:* Ford 2-Barrel Carburetor used on 292 Engine. Ford & Holley 2-Barrel Carburetors used on 332 Engines. Ford 4-Barrel Carburetors used on 352 & 361 Engines.

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1959 EDSEL V8 WITH 332" & 361" ENGINES (SEE FORD V8 FOR 292" ENGINE IGNITION WIRING)

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Throttle Linkage Adjustment (1959 Mile-O-Matic Trans.): Adjust engine to correct idle speed. Insert (¼") gauge pin Tool 77230-MB through bellcrank bracket and tab Hold lever firmly against hot idle adjusting screw. Adjust carburetor rod assembly so gauge pin can be reinserted freely with carburetor rod connected and spring tension applied to linkage Remove pin and **lengthen rod 1 full turn.** *NOTE* - When making throttle rod adjustment, holes will not be aligned **Make Anti-Stall Dashpot Adjustment (See below).** Adjust pedal height by loosening locknut on accelerator shaft connecting rod and turning trunnion until top corner of pedal is 3½" from floor mat. Tighten locknut. Disconnect throttle control rod at clevis on bellcrank and loosen locknut on rod. Pull upward firmly on rod to hold transmission lever against internal stop. Adjust clevis so clevis pin enters freely, **then lengthen rod 2 full turns** (± ½ turn if necessary to correct shift points)

Throttle Linkage Adjustment (1959 Dual-Power): Adjust engine to correct idle speed. Insert ¼" gauge pin (Tool 77230-MB) through carburetor bellcrank and tab Hold carburetor lever firmly against hot idle adjusting screw and adjust carburetor connecting link so gauge pin holes align when link attached to throttle lever. Remove pin. *CAUTION - Improperly adjusted carburetor rod can result in a poor return to idle speed.* **Make anti-stall dashpot adjustment (see below).** Raise car and install pressure gauge at rear of transmission. Pull upward on throttle rod firmly but gently and adjust throttle rod clevis so that clevis pin freely enters hole in bellcrank **Lengthen clevis 2 (±½) full turns.** Reassemble Start engine, set brake, and put selector lever in "Dr2". With engine speed of 1000 RPM, gauge should read 80-85 lbs. Lengthen throttle rod clevis to increase, shorten to decrease pressure. *CAUTION - Make pressure test quickly so transmission will not overheat.*

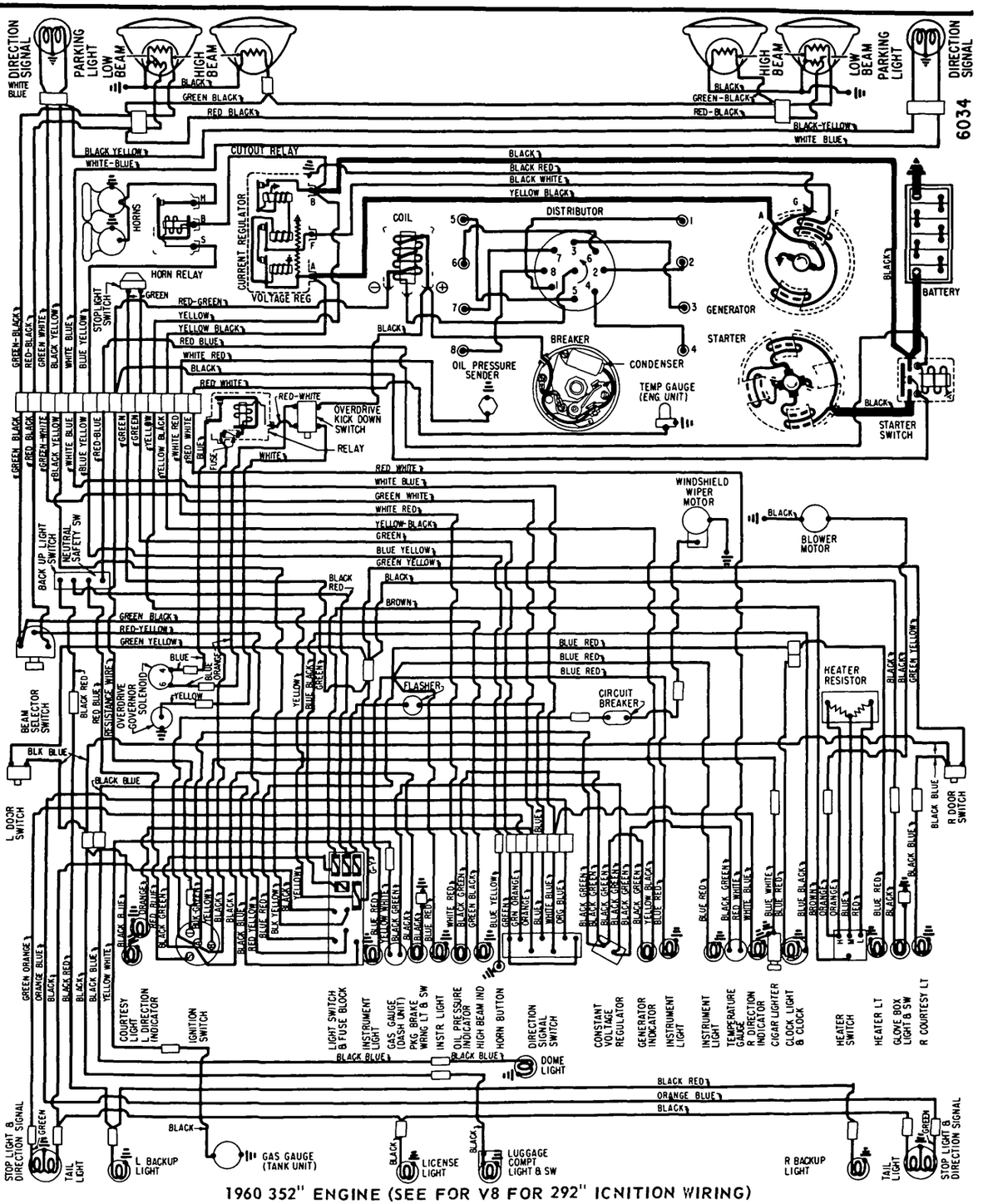
Accelerator Pedal Height Adjustment - Loosen locknut on accelerator shaft connecting rod and adjust rod by turning threaded trunnion until top corner of accelerator pedal is 3½" from floor mat. Tighten locknut

Throttle Linkage Adjustment (1960 Automatic Trans.):

1) Adjust engine to correct idle speed with transmission in "D" (Mile-O-Matic), "D2" (Dual-Power) and make sure carburetor is off fast idle Make anti-stall dashpot adjustment (see below) Stop engine Disconnect transmission throttle rod from bellcrank and carburetor rod from carburetor lever Insert ¼" gauge pin, Tool 77230-MB, through carburetor bellcrank bracket and lever Hold carburetor lever firmly against hot idle adjusting screw and adjust length of carburetor rod so gauge pin fits freely in carburetor lever **Then lengthen rod one full turn.** Remove gauge pin, connect carburetor and transmission throttle rods

2) Connect a tachometer to engine remove valve cap from schrader valve at accelerator bellcrank and attach pressure gauge, Tool 77820-B and adapter Tool 77820-C to pressure tube With parking brake set and transmission in "D" (Mile-O-Matic), "D" (Dual-Power) accelerate to 1000 RPM Pressure gauge should read 77-84 lbs (Mile-O-Matic), 80-85 lbs (Dual-Power) To

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1960 352" ENGINE (SEE FOR V8 FOR 292" ICNITION WIRING)

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adjust, lengthen throttle control rod to increase, shorten to decrease pressure

3) Loosen locknut on accelerator shaft connecting rod and turn threaded trunnion so top corner of accelerator pedal is 3½" from floor mat Tighten locknut

Anti-Stall Dashpot Adjustment: *CAUTION - Two types used Adjust each type as follows*

"One-Second" Type (Before Nov. 16, 1958) - With Carburetor throttle lever against hot idle stopscrew, depress dashpot plunger fully with throttle closed Clearance between end of plunger and adjusting screw should be 035- 050" Adjust by loosening locknut and turning adjusting screw

"Two Second" Type - Identified by figure "42" stamped on hex stud or by square stud instead of hex stud (Holley Carb. 332 Eng.), by yellow paint on dust shield boot retaining spring (Ford Carb. 292, 332, 361 Engines) - Check and adjust in same manner as first type above Setting should be 060- 090"

1959 FORD 2 & 4-BARREL

2-BARREL CARBURETOR	①Ident No.	Carb. No.
292" Eng (S M Trans)	5752306	② B9A-9510-A
292" Eng (Auto Trans)	5752307	PB9E-9510-C
332" Eng (S M Trans)	5752304	② PB9E-9510-G
332" Eng (Auto Trans)	5752305	PB9E-9510-B
4-BARREL CARBURETOR		
361" Eng (Auto Trans)	5752308	② B9A-9510-E

① - Identified by this number stamped on lower left corner of fuel bowl

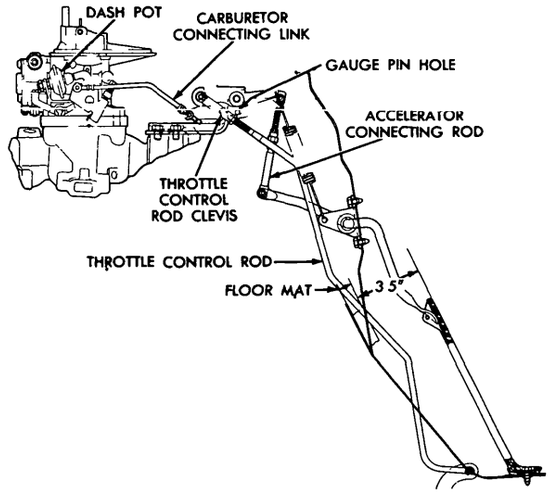
② - For Auto Trans , install dashpot and attaching parts

1960 FORD 2 & 4-BARREL

2-BARREL CARBURETOR	①Carb No
292" Eng (All Trans)	② COAE-9510-H
292" Eng (All Trans)	COAE-9510-M

① - Identification number stamped on float bowl section of main body

② - Use COAE-9510-M to replace this carburetor



1959 MILE-O-MATIC THROTTLE LINKAGE

4-BARREL CARBURETOR	①Carb No.
352" Eng (S M Trans)	COAE-9510-J
352" Eng (Auto Trans)	COAE-9510-K

① - Identification number stamped on float bowl section of main body

►*ROUGH IDLE & STUMBLE ON DRIVE-AWAY CORRECTION (292" Engine with 2-Barrel Carburetors)* See *"Ford 2 & 4-Barrel Carburetors" in Carburetion Section*

Idle Setting - Initial setting 1½ turns open Adjust both screws alike

Idle Speed - 500-525 RPM (Synchro-mesh), 450-475 RPM (Auto Trans in Drive) This supersedes previous Specifications

►*AIR CONDITIONING CAR IDLE SPEED NOTE* During season when air conditioning in use, set idle speed after operating air conditioner for 20 minutes at maximum cooling and unit turned **ON.**

Throttle Linkage Adjustment: See *CARBURETOR above*

►*OTHER DATA See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section*

HOLLEY 2-BARREL

2-BARREL CARBURETOR	①Ident. No.	Carb. No.
332 Eng (All Trans)	5752297	PB9E-9510-F

① - Identified by this number stamped on lower left corner of fuel bowl

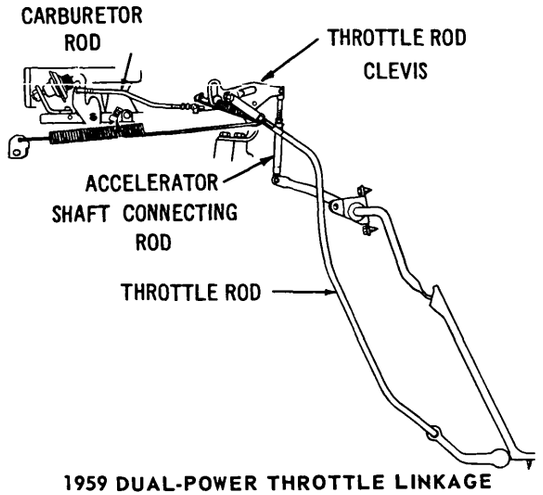
Idle Setting - Initial setting ¾-1¾ turns open Adjust both screws alike

Idle Speed - 500-525 RPM (Synchro-mesh), 450-475 RPM (Auto Trans in Drive) This supersedes previous Specifications

►*AIR CONDITIONED CAR IDLE SPEED NOTE* During season when air conditioning in use, set idle speed after operating air conditioner for 20 minutes at maximum cooling and unit turned **ON.**

Throttle Linkage Adjustment: See *CARBURETOR above*

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*



1959 DUAL-POWER THROTTLE LINKAGE

CARB. EQUIPMENT

Fuel Pump: AC. Fuel only or Fuel & Vacuum

Model	Edsel Pump No.
All 1959 (Fuel & Vacuum)	B9AE-9350-A
All 1959 (Fuel Only)	B9AE-9350-C
292 & 352 (1960) 2-Bbl (Fuel & Vacuum)	COAE-9350-A
292 & 352 (1960) Fuel Only	COAE-9350-B

Pressure - 4 0-6 0 lbs at 500 RPM

See "Fuel Pumps" in Carburetion Section

►*FUEL PUMP GASKET LEAKAGE NOTE* Use Gasket B5A-9417-AUP (020" thick) only and tighten mounting bolts to 12-15 ft lbs

Gasoline Gauge: King-Seeley Electric "CV" (constant voltage) type with Gauge Voltage Regulator Edsel No B7A-10804-A or FEG-10804-B (1959), B9MF-10804-A (1960)

Dash Unit - Edsel No PB9E-9280-A (1959), COKF-9305-B (1960)

Tank Unit - Edsel No B7A-9275-G (1959 Sta Wgn), PB9M-9275-B (Other 1959) COAZ-9275-A (1960 Sta Wgn), COAZ-9275-B (Other 1960)

See "Fuel Gauges" in Carburetion Section

Fuel Filter: Disposable type located in carburetor inlet line Replace every 12,000 miles or if clogged

Air Cleaner: Dry filter element type Clean every 4,000 miles, replace element every 24,000 miles

►*CLEANING CAUTION*· Clean element by tapping lightly against a hard surface DO NOT wash in solvent or other liquids If compressed air used, direct stream from inside surface of filter element

BATTERY

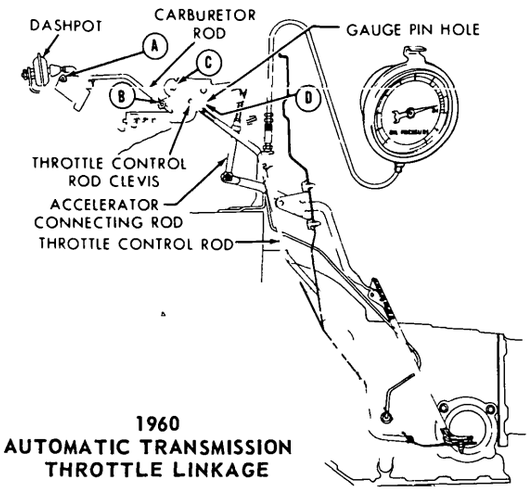
Edsel No.	Plates	Amper Hr. Cap.
B8E-10654-B (1959)	13	65
B9A-10654-D (1960)	11	55
B9A-10654-E (1960)	13	65

All 12 Volt Ampere hour capacity (20 hour rate)

Battery Ground - Negative to engine block

Engine Ground - Engine to dash

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1960 AUTOMATIC TRANSMISSION THROTTLE LINKAGE

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STARTER

Eds l No. B9S-11002-A (1959), FAY-11002-A (1960)
Armatur N . B6A-11005-B (1959-60).
Driv - Edsel No 1CM-11350-C (1959-60) Bendix "Folo-Thru" type
Rotati n - Counterclockwise at commutator end
Brush Spring T nsi n - 48-56 ozs
Cranking Sp d - 150-180 RPM 155-190 amps

P rf rmance Data

Torque	RPM	Volts	Amperes
0 ft lbs	4500	12 0	80
15.5 ft lbs	Lock	5 0	550

►*STARTER REMOVAL NOTE.* It is recommended that idler arm bracket be removed and on some models it may be necessary to remove right exhaust pipe When starter is free, pull it upward, then outward until drive assembly clears flywheel housing, then lower starter down past inner side of frame side rail

Starting Switch: Magnetic type, Edsel No B6A-11450-A Starter Switch is controlled by ignition switch *NOTE* - Neutral safety switch used on Auto Trans

N utral Saf ty Switch (Aut . Trans.): Edsel No B9A-15812-A (1959), COAF-7A247-A (1960) Mile-O-Matic B9A-15812-B(1959) COAF-7A247-B (1960) Dual-Power
Adjustment - S *"Eds l Automatic Transmission" in Transmission Section.*

GENERATOR

Applicati n	Gen rator	Armature
All Engs (1959-60)	B9A-10002-A	FGT-10027-A
332,361(1959)①	B8A-10002-A	PB8M-10027-A
All Engs (1960)①	COAF-10002-A	PB8M-10027-A
All Engs (1960) ②	COAF-10002-B ③ C1AF-10005-A	

① - With Windshield Wiper or Air Conditioning
② - With Windshield Wiper and Air Conditioning
③ - Without bearing

Perf rmance Data

Gen rat r	Amps	Volts	Gen. RPM	Type
B9A-10002-A	30	15	2525	Ford
B8A-10002-A	35	15	2525	Ford
COAF-10002-A	35	15	2525	Ford
COAF-10002-B	40	15	2525	D-R

Brush Spring Tensi n - F rd 32-40 ozs , **Delco-Remy** 28 ozs
Field Current - 2 4-3 0 amps (Delco-Remy), 1 2-1 8 amps (Ford) at 12 0 volts (Hot)
Rotation - Counterclockwise at Commutator end
B lt Adjustm nt: 3/8" **(332,361),** 1/2" **(292,352)** de - flection midway between generator and pump pulleys on right side

REGULATOR

R gulat r (Eds l No.)	① Generator
B7A-10505-B (30 Amp)	B9A-10002-A
B8E-10505-B (35 Amp)	B8A-10002-A
COMF-10505-A (35 Amp)	COAF-10002-A
COAF-10505-B (40 Amp)②	COAF-10002-B

① - Regulators must be used with indicated generators
② - Delco-Remy type, double contact

Cut ut R lay

Cuts In - 12 4-13 2 volts (30 & 35 amps), 11 8-13 0 volts (40 amp Delco-Remy)
Cuts Out - 6-9 amps (30 & 35 Amps), 8 amps Max at 12 2 volts (40 Amp Delco-Remy) discharge current

Voltag R gulator

Setting - 14 6-15 4 volts at ambient 75°F On Delco-Remy (40 Amp), 1- 3 volts lower when operating on lower contacts
Checking & Adjusting - *See "Ford" & "Delco-Remy" Regulators in Electrical Section*

Current Regulator

Setting (30 Amp.) - 28-32 amperes
Setting (35 Amp.) - 33-37 amperes
Setting (40 Amp.) - 43-51 5 amperes at 85°F
Checking & Adjusting - *See "Ford" & "Delco-Remy" Regulators in Electrical Section*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System) *See "4-Headlight System" in Electrical Section*
Directional Signals: *See Electrical Section*
Lighting Switch Removal: Remove battery ground cable at battery With knob in "OFF" position, press spring-release button on switch body, turn shaft slightly and and pull it out of switch Remove retaining nut and switch Note switch wiring color code for reinstallation, then remove wires
Stop Light Switch Location: On forward end of brake master cylinder (located on firewall in engine compartment)

CIRCUIT BREAKERS: 18 Ampere - Headlights on lighting switch (1959 Low Beams, 12 Ampere)
12 Ampere - Back-up, Parking, Tail, Stop, License, and instrument lights in 1959, located on lighting switch
15 Ampere - Interior lights, Parking, Tail, Stop License, and Instrument lights in 1960 located on Main Light Switch
12 Ampere - Electric windshield wiper motor (1959-60) located on left cowl side panel

FUSES: *NOTE* - All fuses located in fuse panel which is on right side of brake pedal support bracket
14 Ampere - Heater blower motor
15 Ampere - Cigar lighter (1959), Sulphur disc fuse (1960)
7.5 Ampere - Interior lights (1959 only)
7.5 Ampere - Directional Signals (1959 only)
14 Ampere - Directional Signals (1960 only)
7.5 Ampere - Radio (Signal Seeking), Spotlight & Power Lubricator
5.0 Ampere - Radio (Push Button)
1 Ampere - Clock

ENGINE

►*AIR CONDITIONING CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See 'Air Conditioning Service Cautions" in Miscellaneous Section*

►*OIL CONSUMPTION, EXHAUST SMOKING, SPARK PLUG FOULING CORRECTION* Caused by plugged cylinder head oil return drain holes To correct, remove rocker arm covers insert wire into hole to loosen obstruction Use solvent and compressed air to clean out passages Remove and clean sludge from oil pan and change oil filter

►*332" & 361" ENGINE NOISE CORRECTION Se "Engin Front Cov rs" in Eds l Sp cial Data*

ENGINE SPECIFICATIONS: Own V8, valve-in-head **292 Y-V8. 332, 352 & 361 V8** of same designs used previously

Engin	Bor	Str k	Displacement
292 (1959)	3 75"	3 30"	292 cu in
292 (1960)	3 75"	3 30"	292 cu in
332	4 00"	3 30"	332 cu in
352	4 00"	3 50"	352 cu in
361	4 00"	3 50"	361 cu in

Engine	Compr.Ratio	Rated HP	Developed HP
292 (1959)	8 8-1	45 00	200 at 4400 RPM
292 (1960)	8 8-1	45 00	185 at 4200 RPM
332	8 87-1	51 20	225 at 4400 RPM
352	10 0-1	51 20	300 at 4600 RPM
361	9 55-1	52 49	303 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP*

CYLINDER HEAD· *See 'Cylinder Head & Manifold" in Edsel Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications' in Edsel Special Data*
ENGINE REMOVAL· *See 'Engine" in Edsel Special Data*

►*ROCKER ARM COVER GASKET REMOVAL NOTE* For easy removal of gasket which has neoprene coating, be sure engine is warm as gasket has a tendency to stick on a cold engine

►*ENGINE OVERHEATING CORRECTION* May be caused by radiator lower hose collapsing because of improperly installed contour spring Properly installed, contour spring must have large diameter end at radiator connection and must be 1½" from each end of hose

OIL PAN REMOVAL 292" - Drain crankcase and remove stabilizer bar Disconnect oil pump inlet tube at oil pump Remove oil pan retaining screw and remove pan
332, 352, 361 - Crank engine so piston No 1 or 5 is at TDC Remove dipstick, drain crankcase and remove stabilizer bar Remove engine front mount-to-frame bolts and raise engine approximately 2" Remove oil pan retaining screws and let pan rest on crossmember Remove bolts holding oil pump screen pick-up tube to pump and let screen and tube fall into pan Move pan forward and remove it

►*OIL PAN REMOVAL NOTE (332,352,361)* When oil pan is removed remove oil pump and inspect mounting gasket to insure that it has not been restricting oil flow and that it may not have been sealing properly If at fault replace with gasket No B8A-6659-A

►*OIL PAN LEAK CORRECTION (1959 292 Eng)* When oil leak occurs at the two rear oil pan retaining screws they should be replaced with 2 Studs No 88351-S8 (5/16"-18-24 x 7/8"), Lockwashers No 34806-S7 (5/16"and 2 Nuts No 33798-S8 (5/16" - 24 Hex) Use oil resistant type sealer on studs

PISTONS

Autothermic design, aluminum alloy with two compression and one oil ring
Removal - Pistons and rods removed from above
Clearance - **(292)** 0008- 0026" at bottom of skirt Wear limit 005"
(332,352,361) 0011- 0029" at bottom of skirt Wear limit 005"
Fitting New Pistons - To test minimum and maximum

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clearances, use ribbon feeler gauge ½" wide inserted between piston and cylinder wall at right angle to pin on thrust side, piston inverted and 1½" below top of block, as follows:

Engine	Minimum Clearance Feeler Lbs. Pull		Maximum Clearance Feeler Lbs. Pull	
292	.0025"	9	0025"	2
332,352,361	.0025"	℄ 8	0025"	℄ 1

℄ - Approximately.

Installing Pistons: Install piston with indentation in head of piston toward front of engine. *See Rod Installation.*

Replacement Pistons: (292) Std. and .020", .030", .040" Oversize with fitted pins.

(332,352) Std (No 2 color coded RED, No. 6 color coded BLUE), and .020", 030", .040", 060" Oversize. Furnished with fitted pins.

(361) Std. in two sizes (No. 2 color coded Red, No. 6 Color coded Blue) and .003", .020", .030", .040" Oversize with fitted pins.

PISTON PIN

Floating type with retaining ring at each end

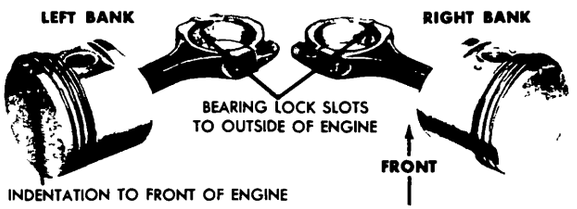
Diameter - (292) .9120-.9123", **(332,352,361)** .9750-.9753".

Length - (292) 3.016-3.030", **(332,352,361)** 3.156-3.170".

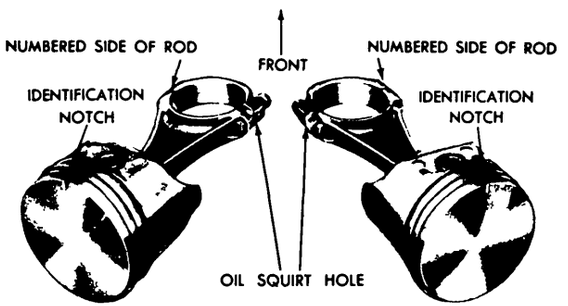
Pin Clearance In Piston - 0001-.0003" (1959), .0001-.0005" (1960). Wear limit .0008".

Pin Clearance In Rod - .0001-.0003" (1959), .0001-.0005" (1960). Wear limit .0008" (1959), .0001" (1960).

Replacement Pins: (292) Std. and .001", .003" Oversize. **(332,352,361)** Std. (Green) and .001" (Blue), .003" (Yellow) Oversize.



EDSEL 292" PISTON & ROD ASSY.



EDSEL 332", 352", 361", PISTON & ROD ASSY.

PISTON RINGS

292" Engin

Ring	Width	End Gap	Side Clearance
Compr. 1 & 2	.0775-.0780"	.010-.027"	℄.0020-.0035"
Oil	.1880-.1890"	℗.015-.062"	℗

332 & 352 Engines

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.013-.030"	℄.0020-.0035"
Compr.(2)	.0930-.0935"	.013-.030"	℄.0020-.0040"
Oil	.1880-.1890"	℗.015-.062"	℗

361" Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.013-.030"	℄.0025-.0040"
Compr. (2)	.0925-.0935"	.013-.030"	℄.0025-.0045"
Oil	.1880-.1890"	℗.015-.062"	℗

℄ - Wear limit .006". ℗ - Steel rail.

℗ - Side sealing type ring.

Installing Rings: Use Piston Ring Expander Tool 6149-10 (292), 6149-13 (332), 6149-16 (361) to expand and install rings. **(292)** Follow instructions on ring package. **(332, 352, 361)** Oil ring expander gap should be opposite notch in piston dome, and segment gaps 1" to each side of expander gap. Compression rings should be placed 150° each side of oil expander gaps.

Replacement Rings: Furnished in sets, Standard and .020", .030", .040", .060" Oversize.

CONNECTING ROD

Length (Center-to-Center) - (292) 6.320-6.324" **(332, 352,361)** 6.538-6.542"

Journal Diameter - (292) (Red) 2.1884-2.1888", (Blue) 2.1880-2.1884". **(332,352,361)** (Red) 2.4384-2.4388", (Blue) 2.4380-2.4384".

332,352,361 Engs. (1959) (Red) 2.4384-2.4388", (Blue) 2.4380-2.4384" **(1960)** (Red) 2.5907-2.5911", (Blue) 2.5911-2.5915".

Lower Bearing - Steel-backed, copper lead alloy lined type. Upper and lower halves interchangeable.

Clearance - (292) (1959) 0008-.0027", (1960) .0005-.0024" **(352)** .0007-.0028". **(332,361)** .0009-.0028".

Side Clearance - 006-.016" (All Engs.). Wear limit .019".

Replacement Bearings. Standard size (two sizes marked Red and Blue) and .002", .010", .020", .030"(All Engs.) plus .040" (332,352,361) Undersize.

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind crankshaft journals and install undersize bearing inserts.

Installing Rods: Install piston and rod assembly with notch in top of piston toward front of engine and bearing lock slots (292) or numbered side of rod (332,361) toward outside of engine.

CRANKSHAFT

Journal Diameter - (292) (Red) 2.4984-2.4988", (Blue) 2.4980-2.4984". **(332,352,361)** (Red) 2.7488-2.7492", (Blue) 2.7484-2.7488".

Out-of-Round Limit - 00025". **Taper Limit -** .0005".

Bearings - Copper lead alloy, steel backed.

Clearance - (292) .0006-.0032", **(332,352,361)** .0007-.0029".

End Thrust - Taken by No. 3 (center) main bearing.

Endplay - (1959) .002-.006". **(1960)** .004-.008".

Replacement Bearings: Standard size (2 sizes marked Red & Blue) and .002", .010", .020", .030",(All Engs.) plus .040" (332,352,361) Undersize.

►*NOTE:* Any combination of Red or Blue bearing inserts may be used to obtain desired clearance. If desired clearance cannot be obtained, it will be necessary to regrind journals and install undersize bearing inserts.

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Edsel Special Data.*

Crankshaft Front Seal Installation: *See "Engine Front Cover" in Edsel Special Data.*

CAMSHAFT

Journal Diameter - (292) 1.9255-1.9265", **(332, 352)** 2.1238-2.1248", **(361)** 2.123-2.124".

Bearings - Steel backed babbitt lined bushings.

Clearance - (All) .001-.003".

Endplay - (292) Controlled by thrust plate behind sprocket.

(332, 352, 361) Controlled by flange on camshaft front and thrust button and spring between eccentric bolt and front cover.

Replacement Bearings: Standard and .015" Undersize.

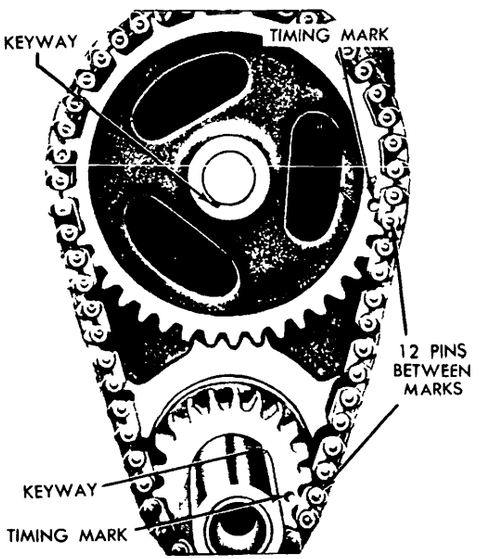
►*BEARING INSTALLATION CAUTION:* Align oil holes in bearing with oil holes in block. No. 1 bearing must be installed .005-.020" below front face of cylinder block.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Edsel Special Data.*

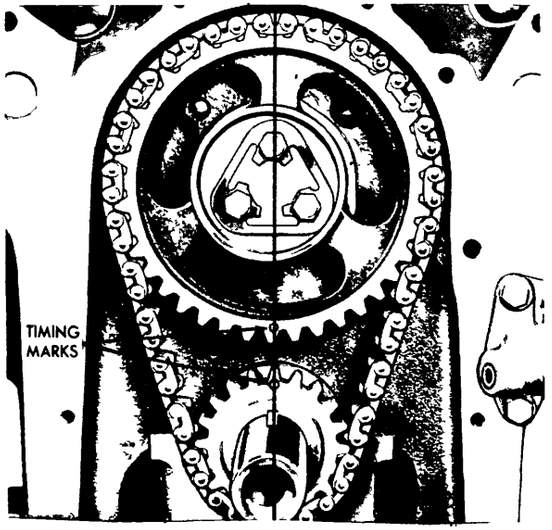
Timing Chain - Links, 56 **(292),** 48**(332,352,361).** Side guide type.

►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds

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EDSEL 292" VALVE TIMING MARKS



EDSEL 332", 352", 361", VALVE TIMING MARKS

CONTINUED FROM PRECEDING PAGE

½" (take up slack on driving side, measure slack on opposite side). Remove and install chain endless (as a unit with both sprockets)

Camshaft S tting: (292) Sprockets marked by round depression on one tooth Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are on drive side.

(332,352,361) Timing marks on camshaft and crankshaft sprockets adjacent and in line with straightedge across shaft centers

Engin Front C ver Oil S al (Crankshaft Front Seal) Installati n: *See "Engine Front Cover" in Edsel Special Data*

Engin Front Cover Removal: *See "Engine Front Cover" in Edsel Special Data*

VALVES

Tappet Clearance: Mechanical Lifters - (292) 019" Cold, 018" Hot All valves *See "Valve System" in Edsel Special Data for Tappet Clearance checking procedures*

Hydraulic Lifters - (332,352,361) None in service *See "Valve Syst m" in Edsel Special Data for operating range check of hydraulic lifters*

292 Engine

Valv	H ad Diameter	① Stem Diameter
Intake (1959)	1 920-1 930"	3416- 3423"
Intake (1960)	1 642-1 652"	3416- 3423"
Exhaust	1 505-1 515"	3403- 3410"

Valv	Seat Angle	② Lift	Stem Clearance
Intake	45°	264"	③ 0010- 0024"
Exhaust	45°	244"	⑨ 0023- 0037"

332, 352 & 361 Engines

Valv	H ad Diameter	① Stem Diameter
Intake	2 022-2 037"	3711- 3718"
Exhaust	1 551-1 561"	3693- 3700"

Valv	Seat Angl	② Lift	Stem Cl aranc
Intake	30°	232"	③ 0010- 0024"
Exhaust	45°	232"	⑨ 0028- 0042"

① - Furnished with 003", 015" & 030" oversize stems
② - Cam lobe lift Wear loss limit 005"
③ - Wear limit 0045" ⑨ - Wear limit 0055- 0065"

►*VALVE REPLACEMENT NOTE* Some engines may have valves with 015" oversize stems To determine correct replacement valve, measure old valve stem approximately 1½" from stem end (all valves same diameter for 1" from stem end).

►***332" & 361" ENGINE INTAKE & EXHAUST VALVE REPLACEMENT CAUTION: See "Valve System" in Edsel Special Data.***

Valve Seat Width - (1959) 060- 080" Intake, 070- 090" Exhaust **(1960)** 070- 090" Intake & Exhaust

Valve Stem Oil Seals - Umbrella type seals used on all valves Install seals with cup side down over valve guide

►*ROTATABLE VALVE NOTE* All intake and exhaust valves are rotatable type
See "Valve System" in Edsel Special Data

Oversize Valve Stem Installation: *See "Valve System" in Edsel Special Data*

Valve Springs: Install with closed coil end toward cylinder head

Free Length - (292) 2 09", **(332,361)** 2 03", **(352)** 2 26"

Valve Spring Specifications - 292"

Valve	Spring Pressure	Length
Closed	71-79 lbs. ①	1 780"
Open	161-177 lbs ②	1 390"

Valve Spring Specifications - 332, 352, 361 Engs

Valve	Spring Pressure	Length
Closed	94-104 lbs. ③	1.820"
Open	180-198 lbs. ⑨	1.420"

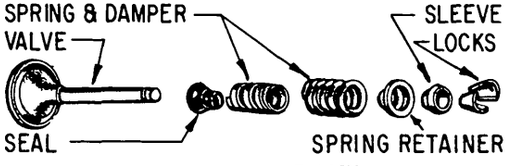
① - Wear limit 64 lbs at 1 780".
② - Wear limit 145 lbs at 1.390".
③ - Wear limit 85 lbs at 1 820".
⑨ - Wear limit 162 lbs at 1 420".

Out of Square Limit - 062" (All engines)

►*VALVE SPRING INSTALLATION NOTE* Measure valve spring height from machined surface of cylinder head spring pad to under side of spring retainer Assembled height should be **(292)** 1 780", **(332, 352, 361)** 1 820", Install 030"spacer between cylinder head valve spring pad and valve spring to bring assembled height to specification *CAUTION* - DO NOT install spacers unless necessary to bring measurement to specification

Valve Guides: Integral with cylinder head When stem-to-guide clearance exceeds maximum (see table above), ream guides and install oversize valves *See "Valve System" in Edsel Special Data*

Valve Lifters (Mechanical): (292) Mushroom type Remove from below after camshaft removed



EDSEL V8 VALVE ASSY.

Clearanc -- 0008- 0024" Wear limit 0045"

Valv Lift rs (Hydraulic): (332,361) Barrel type Can be removed from above without removing camshaft

Clearance - 0005- 0020"

►*HYDRAULIC LIFTER NOTE* Two different lifters used with different body length Later lifter has approximately 1/8" shorter body length Both lifters can be used interchangeably in one engine

Lifter Overhaul - *See "Valve System" in Edsel Special Data*

Hydraulic Lifter Operating Range - With lifter collapsed, operating range should be 078- 218"
See "Valve System" in Edsel Special Data

Rocker Arm Assembly: *See "Valve System" in Edsel Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE* The following valve opening and closing points are with camlift as indicated

Valve Timing - 292" Eng.

Intake Valves - Open 12° ① BTDC. Close 54° ② ALDC.
Exhaust Valves - Open 58° ③ BLDC Close 8° ⑨ ATDC

Valve Timing - 332' Eng.

Intake Valves - Open 17° ⑤ BTDC Close 59° ⑥ ALDC
Exhaust Valves - Open 57° ⑤ BLDC Close 19° ⑥ ATDC.

Valve Timing - 352 & 361 Engs.

Intake Valves - Open 22° ⑤ BTDC. Close 68° ⑥ ALDC
Exhaust Valves - Open 68° ⑤ BLDC. Close 22° ⑥ ATDC.
① - Camlift 016" ② - Camlift 019" ③ - Camlift 015"
⑨ - Camlift 018" ⑤ - Camlift 002" ⑥ - Camlift .005"

Valve Timing Check: Install a quadrant on crankshaft damper. **On 292"** back off No. 1 intake valve adjusting screw and slide rocker arm to one side Install dial indicator **(332, 352, 361)** remove right rocker arm assembly Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D On all engines pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement Make sure timing pointer is not bent Turn engine slowly until lifter is on heel of camshaft lobe Set indicator on zero and turn engine slowly until indicator registers valve opening and cam lobe lift Compare crankshaft degrees indicated on quadrant with Valve Timing Table above Continue to rotate engine to check valve closing specifications in same manner If readings not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Edsel Special Data*

Crankcase Capacity: 5 qts refill, add 1 qt with filter change

Normal Oil Pressure: 45-50 lbs (292), 35-50 lbs (332 352, 361), all at 2000 RPM

Pressure Regulator Valve - In oil pump body, not adjustable

Oil Pressur Indicat r - Indicator light on instrument panel operated by Oil Pressure Switch, Edsel No B6A-9278-B Lights when ignition switch turned on, goes out when engine starts and pump pressure reaches 7 lbs

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Oil Pump: Rotor type Located outside crankcase on left side (292), front inside crankcase (332,352,361) Driven by distributor through intermediate drive shaft
Pump Overhaul - *See "Oil Pump" in Edsel Special Data*
Oil Filter: Disposable type
Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional one-half turn *CAUTION* - DO NOT overtighten Run engine and check for leaks
Crankcase Ventilation: Filter in oil filler and breather cap (Inlet) all models Road draft outlet pipe for crankcase ventilation, all models Service filler cap by cleaning with solvent and resaturating with engine oil at 4 000 mile intervals

►*AUTOMATIC TRANSMISSION DIPSTICK INTERCHANGEABILITY CAUTION* Mile-O-Matic dipstick has steel colored cap and is 19¼" long Dual-Power dipstick has copper colored cap and is 18 43/64" long DO NOT INTERCHANGE

COOLING

Water Capacity: 19 qts Add 1 qt for heater
Pressure Valve: Edsel No LA-8100-A 12-15 lb radiator filler cap
Thermostat: Edsel B7A-8575-A (157-162°F) Std B7A-8575-B (177-182°F) for use with permanent type anti-freeze
►*THERMOSTAT INSTALLATION NOTE* Install thermostat in water outlet manifold with area stamped "TOP" up and toward front of engine
Water Pump: Packless, sealed ball bearing type
See "Water Pumps" in Edsel Special Data.
Pump Removal - Drain cooling system, disconnect radiator lower hose and heater hose at water pump Remove fan belt, fan, fan spacer (292) and pulley On Power steering Cars, remove power steering pump, mounting bracket and hoses (secure against fender) Remove water pump retaining bolts and remove pump
Temperature Gauge: King-Seeley Electric Constant Voltage ("CV") type, with gauge voltage regulator Edsel No B7A-10804-A (1959) B9MF-10804-A (1960), or FEG-10804-B
Dash Unit - (1959) Edsel No PB9E-10883-A, **(1960)** Edsel No COKF-10883-A
Engine Unit - Edsel No B7A-10884-A
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Long Model 10CF (292 Std. 1959), 10½CF (292 Std. 1960). 11CF (332, 352, 361 Std. & 292 H.D.).

Cover Assembly	Long No.	Edsel No.
292 Std (1959)	267346	B7A-7563-A
292 H D (1959)	267350	B8A-7563-B
292 Std (1960)	260108	COAA-7563-A
292 H D (1960)	267350	B8A-7563-B
332 (1959)	267350	B8A-7563-B
332 H D (1959)	267454	B8A-7563-A
352 (1960)	267350	B8A-7563-B
361 (1959)	267350	B8A-7563-B
361 (1959-60 Canada)	267454	B8A-7563-A

Clutch Disc	Long No.	Edsel No.
292 (Std 1959)	288852	B8A-7550-C
292 (Std 1960)	280166	COAA-7550-A
292 (H D 1959)	288853	B8A-7550-G
292 (H D 1960)	280166	B8A-7550-F
332 (Std 1959)	288853	B8A-7550-G
361 (Std 1959)	288351	B8A-7550-F
352 (Std 1960)	288351	B8A-7550-F
361 (1959-60 Canada)	288347	B8E-7550-A

See "Long CF" Clutches in Clutch Section

Pedal Adjustment: If total pedal travel is less than 6 5/8" or more than 6 7/8", reposition pedal bumper and bracket until travel is within limits
Pedal Free Travel - With engine stopped free travel should be 1 1/8-1 3/8" Adjust clutch release lever rod adjusting nut clockwise to increase, counterclockwise to decrease, free travel Start engine and accelerate to 3000 RPM Pedal free travel must be at least ½" to prevent pressure plate fingers contacting release bearing Adjust as necessary
Removal: Remove transmission (see SYNCHRO-MESH TRANSMISSION below) Remove flywheel housing cover and release lever retracting spring, slide release bearing and hub off release lever Mark cover and flywheel for reinstallation Loosen cover-to-flywheel bolts evenly and alternately and remove clutch assembly through bottom of flywheel housing Remove release lever and anti-rattle spring

SYNCHRO-MESH TRANSMISSION

Own. Helical gear, constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse)
See "Edsel Synchro-mesh" in Transmission Section
Transmission Controls: *See "Transmission Controls" in Transmission Section*
Removal: Disconnect propeller shaft at rear axle and slide off transmission output shaft Insert Tool 7657-D into extension oil seal to prevent lubricant leakage Disconnect speedometer and shift rods at transmission Disconnect engine rear support from transmission extension, raise and support engine and remove frame crossmember Remove two transmission-to-flywheel housing lower bolts and install Guide Pins, Tool 7975, in holes Remove top bolts Slide transmission to rear until input shaft clears flywheel housing and then remove from car

AUTOMATIC TRANSMISSION

Two types used **Mile-O-Matic.** New, simplified type with torque converter and two-speed automatic transmission **Dual-Power.** Dual range automatic transmission with welded torque converter and three-speed automatic transmission
See "Edsel Automatic Transmissions" in Transmission Section

►*DUAL POWER REAR PUMP NOISE CORRECTION* *See "Edsel Automatic Transmissions" in Transmission Section*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION* *See "Edsel Automatic Transmissions" in Transmission Section*

►*TESTING & TROUBLE SHOOTING* *See "Edsel Automatic Transmissions" in Transmission Section*
Lubrication: Check fluid level every 2000 miles, drain and refill every 24,000 miles (Mile-O-Matic), 16,000 miles (Dual-Power) Use only Automatic Transmission Fluid Type "A", Suffix "A".
Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in neutral position Move selector lever through all ranges to assure fluid distribution, then place lever in "P" Maintain level at "Full" mark on dipstick
Throttle Linkage Adjustment: *See CARBURETOR above*
►*OTHER DATA* *See "Edsel Automatic Transmissions" in Transmission Section*

UNIVERSALS

Mechanics. Needle Bearing type
►*CAUTION* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened) *See "Edsel, Ford & Mercury" in Rear Axle Section*
►*REAR UNIVERSAL JOINT INSTALLATION CAUTION:* To eliminate possibility of early failure, the bearing retaining strap must be correctly positioned in cast recess in rear axle flange prior to tightening attaching "U" bolts

REAR AXLE

Own. Separate carrier type, semi-floating, hypoid, with Hotchkiss Drive "Equa-Lock" (Power Transfer) type differential Optional
See "Edsel, Ford & Mercury (Dp-Offset) Hypoid" or "Ford Equa-Lock Differential" in Rear Axle Section

	Axle Ratios	
Engine	Synchro-mesh Trans.	Auto. Trans.
292	3.56:1	3.10:1
332	3.56, 3.70:1	2.91, 3.10:1
352 & 361		2.69, 2.91:1

Ring & Pinion Teeth for each ratio - 2.69 (35-13), 2.91 (32-11), 3.10 (31-10), 3.56 (32-9), 3.70 (37-10)
Backlash - .004-.009"
Axle Shaft Removal: Remove wheel and brake drum Remove four axle bearing retaining locking type nuts (work through opening in axle shaft flange) Use puller No 4235N and pull axle shaft (do not disturb brake backing plate or damage wheel bearing oil seal) Replace one nut to secure brake backing plate
Carrier Assembly Removal: Remove axle shafts (see above) and drive shaft Remove self-locking nuts which secure carrier to housing and remove carrier from housing

SHOCK ABSORBERS

Direct acting, non-adjustable Serviced by replacement

Edsel Shock Absorber Nos. ①

Model	Front	Rear
Exc Sta Wgn (1959)	PB9E-18077-B	PB9E-18097-C
Sta Wgn (1959)	PB9E-18077-C	PBKK-18097-B
Exc Sta Wgn (1960)	COKK-18077-A	COKK-18097-A
Sta Wgn (1960)	COKK-18077-D	COKK-18097-D
Sta Wgn (H D 1959)		PB9E-18080-A
Sta Wgn (H D 1960)	COKK-18077-F	COKK-18097-E, G

① - Shock absorber and bushing (Std.), Shock absorber and washer (Heavy Duty)

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FRONT SUSPENSION

Ind p nd nt. "Ball Joint" suspension with direct acting shock absorbers mounted within coil springs. *See "Eds l, Ford, Mercury" in Suspension & Wheel Alignment Section.*

Cast r - 0° to Pos. 1°. Maximum variation between wheels ½°.

Camb r - Pos. ½° to Pos. 1½°. Maximum variation between wheels ¼°.

T -In - 1/16-1/8". *NOTE* - When checking toe-in on cars with power steering, engine should be running so that power steering control valve will be properly centered.

Toe-Out n Turns - Outer wheel 20°, inner wheel 24¼°.

►*FRONT WHEEL BEARING ADJUSTMENT PROCEDURE & CAUTION:* Rotate drum back and forth and tighten nut until there is a noticeable drag, then back off spindle nut to line up ne arest slot with hole in spindle (about 1/6 to 1/4 turn), install cotter pin.

STEERING

►*SHIFT LEVER SHAKE AND RATTLE CORRECTION:* When alignment of shift tube in bushings does not correct noise, install Vibration Damper Spring No. B6A-77205-A between shift tube and steering column under steering column to dash panel grommet.

Manual: Own. Recirculating ball worm and nut. *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

P w r Ste ring: Linkage type. Used in conjunction with standard steering gear. *See "B ndix Linkage Type Power Steering" in Steering Section.*

►*POWER STEERING POOR RECOVERY FROM LEFT TURN CORRECTION: See "Bendix Linkage Type Power Steering Unit" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering S ction.*

Steering Wh l & H rn Button Removal: *See "Saginaw Ball B aring Worm & Nut" in Steering Section.*

Steering G ar R m val: *S "Saginaw Ball B aring Worm & Nut" in Steering Section.*

STEERING: Ste ring Gear Lubrication Procedure - Use following procedure when checking or filling steering gear with lubricant: Turn steering wheel to full left turn position, remove filler plug, remove **lower** sector cover attaching bolt from housing. Agitate fluid with a screwdriver to dissipate air bubbles, check fluid level which should be even with **lower sector cover bolt hole.** Add fluid as required (LA-19578-A) to bring level up to edge of bolt hole. Cycle steering gear by turning wheel to full right turn position and then back to full left turn position, recheck fluid level. Replace lower sector cover bolt and filler plug.

BRAKES

Bendix. Hydraulic, single anchor (with fixed anchor pin). Automatic adjustment on all models. Parking brake applies rear wheel brakes. *See "Bendix Automatic Adjuster Hydraulic Brakes" in Brake Section.*

Drum Diameter - 11" front and rear.

Wheel Cylinder Diameter - 1 1/8" front, 15/16"(Exc. Sta. Wgn.) 31/32" (Sta. Wgn.) rear.

Lining - Molded asbestos type, riveted to shoe.

Lining Width - (1959) 2.5" Front, 2" Rear. **(1960)** 3" Front, 2.5" Rear.

Lining Length - 9 5/16" Primary (Front and Rear). 12" Secondary (Front and Rear). **Thickness** - 7/32".

Braking Power - 55.5% front, 44.5% rear.

Clearance - (Manual Adjustment After Overhaul) - Turn adjusting screw upward (from backing plate side) until wheel is locked. Hold adjusting lever away from screw and back off screw until wheel turns free, then back off 1 more stroke (approximately 12 strokes total).

Brake Pedal Adjustment: Loosen locknut on eccentric bolt and rotate bolt to obtain 1/4-7/16" free travel. Hold bolt securely and tighten locknut to 22-28 ft. lbs.

Standard Master Cylinder: Located on engine side of firewall.

Checking Fluid – Maintain fluid level to within ½" of top of reservoir.

Removal - From passenger compartment side, remove eccentric bolt, bushings, and locknut that secure pushrod to brake pedal. From engine compartment side, remove hollow bolt attaching stop light switch and hydraulic fitting to master cylinder. Remove four attaching screws and remove master cylinder.

P w r Brak s: Piston type, combination vacuum booster and master cylinder unit located on engine side of firewall and connected to brake pedal by pushrod. *See "Bendix Power Unit Hydraulic (Disc) Reaction Type" in Brake Section.*

Checking Fluid Level - Same as for standard master cylinder.

Removal - 1) Remove master cylinder outlet fitting from master cylinder. If only booster assembly is to be removed, suspend master cylinder from hood inner panel. This eliminates necessity of disconnecting outlet fitting and consequently bleeding is not required during assembly.

2) Loosen clamp that secures manifold vacuum hose to power unit. Remove hose from unit.

3) Loosen clamp that secures vacuum reserve tank hose to fitting on unit. Remove hose from fitting.

4) Remove capscrew and locknut that secures pushrod to brake lever assembly.

5) Remove two master cylinder attaching nuts and lockwashers and lift off master cylinder.

6) Remove four capscrews and lockwashers that secure power brake assembly to bracket on dashpanel. Remove power brake assembly.

7) To install, reverse procedure.

MISC. MECHANICAL

Windshield Wipers: Electric & Vacuum types with Link & Arm type linkage. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type with reversible motor in each window. *See "Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Electric-hydraulic type. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: 4-Way electric type. *See "Power Seat Adjusters" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

1954-57 MODELS

	Ft. Lbs.
Cylinder Head	63-73
Intake Manifold	25-30
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps	100-110
Flywheel	50-55
Vibration dampener	100-110
Con Rod Caps	40-45
Piston Pin Clamp Bolt	25-30
Rocker Arm Support Bracket	30-35
Rocker Arm Cover	4-5
Engine Front Cover	20-25
Water Manifold	25-30

1958-60 MODELS

	Ft. Lbs.
Cylinder Head (1958)	60-70
Cylinder Head (1959-60)	60-75
Intake Manifold	25-30
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps (1958)	100-110
Main Bearing Caps (1959)	100-120
Main Bearing Caps (1960)	100-110
Flywheel	50-60
Vibration Damper (1958)	100-110
Vibration Damper (1959-60)	Ⓒ 200-220
Con Rod Caps	40-45
Rocker Arm Support Brackets	30-35
Rocker Arm Cover	4-6 In. Lbs.
Engine Front Cover	20-25
Valve Lifter Cover	4-6 In. Lbs.
Water Manifold (1959-60)	25-30

Ⓒ - No lockwasher used on later cars.

ENGINE MOUNTINGS

1954-56 MODELS

ENGINE MOUNTINGS: The engine and transmission assembly must rest in a normal position which does not impose any side strain on the three rubber mountings. To adjust, tighten engine front mounting pad stud nuts under supports on frame and tighten mounting bracket-to-crankcase bolts. Loosen upper mounting pad-to-bracket bolts. Disconnect torque tube from torque ball, then tighten transmission support-to-frame X member attaching bolts. Tighten transmission mounting pad-to-transmission support and to transmission rear bearing retainer. Tighten thrust pad-to-thrust plate stud nuts (rear) and loosen thrust pad-to-transmission support stud nuts (front). Remove shims located between thrust pad and transmission support. Shake engine sideways to let assembly rest freely and normally on all mounting pads, then install sufficient shims between thrust pad and transmission support to snugly fill the existing space. Tighten thrust pad front stud nuts and connect torque tube to torque ball. Tighten front mounting pad-to-bracket bolts.

1957-60 MODELS

ENGINE MOUNTINGS: Adjustment - (Twin Turbine or Synchr -m sh Transmission Cars). 1) Disconnect exhaust pipes at manifolds. Loosen thre thrust bracket-to-thrust pad nuts and tw mounting pad-to-support nuts. Loosen four engine front mount-to-frame crossmember bolts.

2) Make sure that transmission support-to-frame shims are in original position and that support is in original position fore and aft. Make sure that support-to-frame bolts and thrust bracket-to-rear bearing retainer bolts are tight.

3) Check relationship of thrust bracket and thrust pad. If gap exists between bracket and pad, engine and transmission fore and aft location is not correct and must be adjusted. When no gap exists, fore and aft position of engine and transmission is correct.

4) When gap exists, tighten three thrust pad-to-support nuts to impose a forward thrust on engine. Raise engine slightly and pry forward to allow front mounts to normalize. Then tighten two mounting pad-to-support nuts.

5) Check both front engine mounts for gap between mount and frame. When gap exists with bolts loose, the space must be filled with shims. Tighten engine mount-to-frame bolts. Reassemble exhaust system.

(Triple Turbine). 1) Disconnect exhaust pipes from manifolds. Loosen two outboard mount bolts on each side (Mount-to-support weld nuts). Loosen mount stud nuts inside support on each side. Loosen four engine front mount-to-frame crossmember bolts.

2) Make sure transmission support-to-frame shims are in original position and that support is in original position fore and aft. Make sure support-to-frame bolts are tight and that mount-to-transmission bolts and nuts are tight.

3) Check relationship of thrust surfaces of mounts and transmission support. When a gap exists, fore and aft position of engine and transmission is not correct, and must be adjusted. If gap exists, tighten the two mount-to-support weld nut bolts on each side to impose a forward thrust on engine. Raise engine slightly and pry forward to allow front engine mounts to normalize. Tighten mount stud nuts inside the support on each side.

4) Check front engine mounts for gap between mount and frame. Install shims equal to gap, then tighten mount-to-frame bolts. Reinstall exhaust system.

TORQUE BALL ADJUSTMENT

1954-55 MODELS

TORQUE BALL: Operates between inner and outer retainer bolted to transmission rear bearing retainer. Universal joint seal is provided at front of torque tube. Shims provided between front flanged ends of inner and outer retainers for adjustment.

►*CAUTION: Correct adjustment of the torque ball is extremely important to insure correct operation. Ball is adjusted during reassembly as directed below.*

Disassembly: With rear axle assembly disconnected and moved back out of way, mark edge of torque ball outer retainer to insure reinstallation in original position, then remove torque ball boot, torque ball, retainers, and gaskets from rear bearing retainer. Clean and inspect spherical surface of torque ball and inner and outer retainers, inspect seal and gasket at forward end of torque tube, replace all worn and damaged parts. **Reassembly & Adjustm nt** - Proceed as follows:

►*1954-55 OIL SEAL NOTE:* Propeller shaft oil seal used on these models not interchangeable with previous models. The later seal fits tight in torque tube front flange with lip edge toward front of car, and rides on sleeve pressed shaft stub. This seal eliminates former universal joint oil seal and propeller shaft spline seal.

1)—Install guide pins in upper bolt holes in transmission rear bearing retainer.

►**NOTE—Guide Pins are headless pins ⅜" x 1⅜" having ⅜"-16 threads ½" long and screwdriver slot cut in unthreaded end.**

2)—Install one shim (with 3 notches in outer edge) and inner ball retainer (with oil drain hole and notch in edge down) on guide pins.

3)—Oil bearing surfaces of retainers and torque ball with transmission lubricant.

4)—Install torque ball (with "TOP" mark up), and outer retainer (align marks made before disassembly).

5)—Use Installing Tool J-2597 (Except 1953 and later models with seal in propeller shaft housing—See 1954–55 Oil Seal Note above), and push tool (sleeve and plug) through rear side of torque ball until feather edge of seal is on plug (sleeve will drop off plug). Assemble torque ball and outer retainer (with TOP marks up) on guide pins, fill space between flanges of inner and outer retainers with shims (see Torque Ball Shims below). See that oil seal has seated on universal joint.

Torque Ball Shims—Five thicknesses (marked by notches on outer edge) as follows:

4 Notches .....002-.004"	3 Notches .....004-.006"
2 Notches .....009-.011"	1 Notch .....011-.013"
Unmarked.....013-.015"	

6)—Install thrust plate and bolts in retainers (remove guide pins and install short bolts at these holes). DO NOT TIGHTEN BOLTS.

►*ADJUSTING TOOL NOTE:* A "Hardwood Club" should be used to move universal joint during tightening and to measure the tightness of the torque ball for correct adjustment. Make this club to the following dimensions:

1954-55 **Models**—Diameter 1¼". Length 18½". Turn 2⅝" of one end of club down to 1" diameter then measure 14⅜" from offset and cut a 3/16" groove around large diameter of club.

7)—Tighten retainer bolts evenly while continually moving torque ball by means of hardwood club inserted in end of universal joint. Use a soft mallet and tap outer retainer if ball binds while tightening bolts. *CAUTION—For proper centering of ball and retainers, torque ball must be moved while tightening retainer bolts.*

8)—Attach spring scale to club at groove located 14⅜" from end of universal joint and test pull required to move torque ball when all bolts are tight. A drag of 15 to 25 lbs with scale in groove 14⅜" from universal joint. If torque ball tension not within these limits, repeat centering operation and recheck tension. Adjust by adding or removing shims (see Torque Ball Shims above).

9)—Install torque ball boot by turning large end over small end, engage small end in groove on flange of torque ball then turn large end to front to engage rear end of outer retainer.

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10)—Reinstall shims between thrust plate and thrust pad and tighten thrust plate stud nuts.

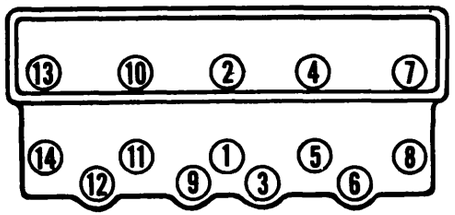
11)—Reinstall rear axle assembly.

CYLINDER HEAD & MANIFOLD

1954-60 MODELS

►*1958-60 ROCKER ARM COVER INSTALLATION CAUTION:* Install cover toward center of engine against flange to eliminate possibility of rocker arm-to-cover interference.

CYLINDER HEAD & GASKET: When handling the thin crimped steel gasket, use care not to damage lacquered surface coat or kink sealing rings stamped in gasket. *(CAUTION* - Do not coat lacquered surface of gasket with any sealing material and DO NOT RE-USE THE OLD GASKET as stamped sealing rings are flattened in a used gasket). Right and left cylinder heads are identical except that the water inlet port is open at front end and is plugged at rear end as installed on engine. After installation of cylinder head, tighten bolts to correct specifications in same sequence. After engine warmed up to correct operating temperature, recheck bolts for correct torque.



BUICK V8 CYLINDER HEAD

►*1956-60 CYLINDER HEAD REMOVAL NOTE:* All cylinder head bolts and pushrods cannot be removed with head in place. When removing head, pull pushrods part way out and tape in place. These same pushrods must be in head before head installation.

1954-55 MODELS

MANIFOLD GASKETS: Gaskets are used on the intake manifold (to head) only. When installing a new exhaust manifold, coat the manifold with a mixture of graphite and oil. In production a special compound is used for this purpose and the original manifold can be re-installed without using additional compound.

►***CAUTION—Do not remove the exhaust manifold while it is hot because warpage is liable to occur.***

1958 V8 MODELS

►*INTAKE MANIFOLD INSTALLATION CAUTION:* Engines with Nos. 551888 to 561999 and starting with 569701 continuously do not use flat washers between intake manifold and cylinder head as intake manifolds on these cars are cast flat at bolt hole position.

PISTONS

1954-55 MODELS

►*REPLACEMENT PISTON CAUTION (1954, 1955):* Use of 1955 type Press-fit Piston Pin does not change piston specifications for these models. Pistons are interchangeable (within year model limitations) and the only precautions necessary are that the piston fit in the cylinder, and the piston pin fit in the piston, are correct as specified on the Buick car model pages.

PISTON PINS

1954-60 MODELS

►*REPLACEMENT PISTON PIN CAUTION (1954,55):* Press-fit Piston Pins (used in production on later 1955 cars) are furnished in Standard Size only as listed below and can be identified by absence of clamp bolt groove. These pins must be used only with Press-fit Connecting Rod Part No. 1162054. Standard Size Clamp-bolt Piston Pins can be used with both type connecting rods but should be checked for size (Diameter .9397-.9394") before any attempt is made to use them with the press-fit connecting rod. Oversize piston pins (.003" & .005" Oversize furnished in Clamp-bolt Type only with groove) can be used only with the clamp-bolt type rod. *BOTH types of pins will be furnished for service.*

Model	Press-fit Piston Pins	Part No.
Series 40 (Std. size only)		1166391
Series 50, 60, 70 (Std. Size only)		1162051

►*1954-56 PISTON PIN NOTE:* Install Piston Support Sleeve J-6047-5 in Fixture Base Plate J-6047-1 with plain flat end upward (late 1955-56 pistons), opposite end with two machined flats upward (1954 and early 1955 pistons).

►*1957-60 PISTON PIN NOTE:* Install Piston Support J-6047-17 in press with radial side up. Guide Pin Tools J-6047-16 & 18 are not used for pin removal.

Pin Removal: Place piston on Support and press pin out using Drive Pin J-6047-4.

Pin Installation: Place support in base plate of press with full radial face upward, using Guide Pin J-6047-16 (364" Eng.), J-6047-18 (401" Eng.). Place rod in piston, with spurt notch on same side as valve depressions in piston dome. Lubriplate pin and enter in boss, forcing rod against opposite boss. Place small end of Drive Pin J-6047-4 in top end of pin and place assembly in press. With all parts aligned correctly, force pin through rod and piston bosses until guide pin stops downward travel. Rotate piston on pin to check pin fit in piston.

CONNECTING ROD & BEARINGS

1954-55 MODELS

►*REPLACEMENT CONNECTING ROD CAUTION (1954 & EARLY 1955 MODELS):* Press-fit connecting rod No. 1162054 (with press-fit type piston pin) used in late 1955 and serviced for 1954 and early 1955 type replacement. When used for replacement of earlier type, a standard size piston pin must be used and special removal and installation procedure as given above must be followed.

CRANKSHAFT & MAIN BEARINGS

1954-57 MODELS

CRANKSHAFT REAR OIL SEAL: Braided fabric seal fitted in groove behind slinger groove in crankcase and bearing cap. Vertical joint between cap and crankcase fitted with cork seals at each side.

Installation—With crankshaft removed, place new braided fabric seal in groove in crankcase with both ends extending out from bearing parting line, force seal in groove with hammer handle or smooth piece of wood so that seal seats within 1/16" of crankcase. Cut ends of seal off flush with crankcase (use razor blade or sharp knife). Repeat operation for bearing cap. Coat vertical grooves in cap with gasket cement (allow to set until tacky), use new cork gasket and fit into groove with putty knife (ends will project beyond cap). Place cap in vise to lightly compress seals in grooves, cut ends of cork seals flush with cap surface. Coat cork gaskets with vaseline, install cap in crankcase.

►***CAUTION—Engine must be operated at slow speed when first started after new braided seal installed.***

1958-60 MODELS

►*REAR MAIN BEARING OIL SEAL PRODUCTION CHANGE AND CAUTION:* Larger crankshaft oil seal journal diameter and larger diameter seal used on later cars. Engines with slotted drain hole in rear main bearing cap have the larger seal and the seal diameter in crankshaft is 2.625". Groove in block increased to accomodate larger seal. Small groove block with large seal journal diameter is satisfactory, but DO NOT USE a larger groove block with a small diameter crankshaft seal journal as an oil leak will develop.

CRANKSHAFT REAR OIL SEAL: Braided fabric seal fitted in groove behind slinger groove in crankcase and bearing cap. Vertical joint between cap and crankcase fitted with cork seals (1959), Neoprene seals (1960) at each side.

Installation - Place new braided fabric seal in groove in crankcase with both ends extending out from bearing parting line. Force seal in groove with hammer handle or smooth piece of wood so that seal seats within 1/16" of crankcase. Cut ends of seal flush with crankcase. Repeat operation for bearing cap. On 1959 Models coat vertical grooves in cap with gasket cement (allow to set until tacky), use new cork gasket and fit into groove with putty knife (ends will project beyond cap). Place cap in vise to lightly compress seals in grooves and cut ends of cork seals flush with cap surface. Coat cork gaskets with vaseline, install in crankcase. On 1960 Models, Neoprene seals are slightly undersize (but swell when oil soaked) and slightly longer than grooves in cap. Lightly lubricate the neoprene seals and install in cap with upper end protruding approximately 1/16". After cap installed force seals up into cap with blunt instrument to be sure of a seal at the parting line between cap and case.

1957 MODELS

VIBRATION DAMPENER: Reinstallation - Check depth of threaded holes in hub (7/8" bolt requires a depth of 56", a 1" bolt a depth of 72") Check that holes do not contain chips or foreign material and that bolts do not bottom in holes Tighten bolts to specifications

Standard Cars - Use flat washer and spring washer under head of bolt with flat washer against dampener pulley

Air Cond. Cars - Use two 060" or one .090" reinforcing plate with 1" bolt and lockwasher.

ENGINE FRONT COVER

1954-60 MODELS

TIMING CHAIN COVER: Removal - Drain cooling system, remove radiator core, shroud, fan belt, fan and pulley, vibration dampener. Remove all bolts attaching tim-

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ing chain cover and water pump manifold to upper and lower crankcase and cylinder heads. *NOTE* - DO NOT REMOVE water pump from chain cover. Remove cover and manifold carefully, making sure not to damage lower crankcase gasket.

1954-60 MODELS

FRONT OIL SEAL: Installation—After removing braided fabric packing with a screw driver and tapping pressed steel shedder out of timing chain cover, work the new packing into the shedder, then drive shedder into recess in timing chain cover using Installer Tool J-5250-1. Push the Packing Expander Tool J-5250-2 through the seal to expand packing into place. Apply a light coat of vaseline to packing.

►*CAUTION: Engine must be operated at slow speed when first started after new braided seal installed.*

FLYWHEEL

ALL MODELS

FLYWHEEL REPLACEMENT: Flywheel or Ring Gear can be replaced separately on Synchro-mesh Cars (gear is shrink fit on flywheel), but must be replaced as an assembly on Dynaflow Drive Cars (gear is welded in place and not furnished separately).

►*FLYWHEEL REPLACEMENT NOTE:* **364" Auto. Trans. and 401" engine flywheels not interchangeable. 401" flywheel identified by four scallops cut in edge of flywheel between 1 O'clock and 9 O'clock leg, while 364" Auto. Trans. flywheel has all sides straight.**

Ring Gear Replacement (Synchro-mesh Cars): Remove old ring gear by drilling 5/16" hole in gear between two teeth, split the gear at this point with a chisel and remove the old gear. Polish several spots on new ring gear with emery cloth, heat gear uniformly on a hot plate or with a torch until polished spots turn blue which will indicate a temperature of approximately 600°F. *(CAUTION*—Heating gear in excess of 800°F. will destroy factory heat treatment). Install ring gear on flywheel with beveled end of teeth out or away from shoulder, allow gear to cool.

Installation of Flywheel (All Models): Make certain that flywheel and crankshaft flange are clean and free from burrs which might cause run-out (remove burrs with a mill file). Install flywheel and tighten all bolts evenly to 50-55 ft.lbs. torque. On Dynaflow Drive Cars, check flywheel run-out (see below). On all cars, check engine for vibration after transmission installed and correct any unbalance caused by replacement of parts. *See ENGINE BALANCING.*

Flywheel Run-out (Dynaflow Drive Cars): Mount dial indicator on flywheel housing so that indicating stem bears on rear ground face of flywheel at inner side of large holes in rim. Turn flywheel making certain that crankshaft end thrust held in one direction and note run-out at flywheel face. Run-out must not exceed .015". If run-out exceeds .015" and cannot be corrected by tapping high side of flywheel with a mallet, remove flywheel and check for dirt or burrs between flywheel and face of crankshaft flange. If run-out still exceeds .015" after re-installation of flywheel, check run-out of crankshaft flange rear face.

ENGINE BALANCING

1954-60 MODELS

►*IF VIBRATION NOTED AFTER INSTALLATION OF CRANKSHAFT, FLYWHEEL, AND OTHER ROTATING PARTS, CORRECT THIS UNBALANCED CONDITION AS FOLLOWS:*

►*CAUTION:* Procedure below will correct minor unbalance caused by replacement of individually balanced parts. Extreme vibration caused by parts abnormally out of balance, or different in weight from corresponding parts, should be corrected by replacement of these parts.

Critical Speed of Vibration—Determine speed at which vibration is most evident (use tachometer) and operate engine at this speed to check results from the following corrective procedures.

SYNCHRO-MESH ENGINE UNBALANCE CORRECTION:

1)—If clutch assembly has been removed and re-installed, make certain all clutch cover bolts are same type and length and that lockwasher used with each bolt. See that alignment marks on clutch cover and flywheel (made before clutch removal) are together. If vibration not caused by clutch, mark clutch cover and flywheel and remove clutch assembly.

2)—Operate engine with clutch removed and check for vibration. If vibration eliminated (indicating unbalance is in clutch), re-install clutch and balance the assembly as directed in step (3) following. If vibration still present, balance the flywheel as follows: Install one clutch cover bolt in successive flywheel bolt holes and operate engine with bolt in each location until a position is found in which vibration is eliminated (this test weight can be varied by using a shorter bolt or by adding washers to the bolt). When engine runs smoothly, remove bolt and drill shallow holes on DIAMETRICALLY OPPOSITE side of flywheel *(CAUTION*—use 3/8" drill and DO NOT drill any hole more than 1/4" deep). When engine runs smoothly, re-install clutch as follows:

3)—Install clutch assembly *(CAUTION*—align marks made before removal), operate engine and check for vibration. If vibration noted, balance clutch by installing plain washer successively under each mounting bolt lockwasher until engine runs smoothly. *NOTE*—If necessary, plain washers can be installed on two adjacent bolts to obtain sufficient weight for clutch balance.

DYNAFLOW DRIVE ENGINE UNBALANCE CORRECTION: *See Buick "Variable Pitch Dynaflow Drive" in Transmission Section.*

VALVE SYSTEM

1956 MODELS

OIL FLOW REDUCTION TO VALVE MECHANISM: Install plug, Part No. 1343643 (with .077" orifice) in both cylinder heads as follows: Remove rocker arm and shaft assembly from each cylinder head. Install plug, Part No. 1343643 in oil feed hole located within counterbore of front rocker arm mounting bracket bolt hole (this oil passage angles downward toward bottom of head, between front center head bolt and front valve). Drive plug into place with a 3/16" diameter punch or rod so that open end of plug is flush with edge of oil hole.

1954-60 MODELS

►*1954 ROCKER ARM SHAFT PRODUCTION CHANGE FOR IMPROVED VALVE STEM LUBRICATION:* Rocker arm shaft diameter reduced .001" (First Type Diameter .810-.811", Later Type Diameter .809-.810"). Later type shaft was used in production on later cars and is furnished for replacement on ALL engines.

ROCKER ARM ASSEMBLY: One assembly mounted on each cylinder head (see illustration).

Disassembly: Remove cotter pin, flat washer, and spring washer from each end of shaft. Pull mounting bolts out of support brackets, slide shaft out of rocker arms and brackets.

Reassembly: See illustration for location of parts. Install longer spring at center of shaft and install rocker arms with offset (slant) toward center of shaft (two types of rocker arms used—see table below for proper location of each type). Turn shaft so that notch in one end of shaft is upward or toward top of bracket and install bolt through bracket and shaft to maintain this position *(CAUTION*—Notch must be upward to place rocker shaft oil holes in proper relationship to rocker arms).

1954-57 R ck r Arms

Part No.	Location
1343454	4 Right Front & 4 Left Rear
1343455	4 Left Front & 4 Right Rear

1958 R ck r Arms

Part No.	L cati n
1169374	4 Right Front & 4 Left Rear
1169375	4 Left Front & 4 Right Rear

1959-60 R cker Arms

Part No.	Locati n
1173808	4 Right Front & 4 Left Rear
1173809	4 Left Front & 4 Right Rear

Installation: Make certain that notch in one end of rocker arm shaft is upward, position assembly on head with dowels engaging blind holes in brackets, tighten all bracket bolts evenly to 30-35 ft.lbs.

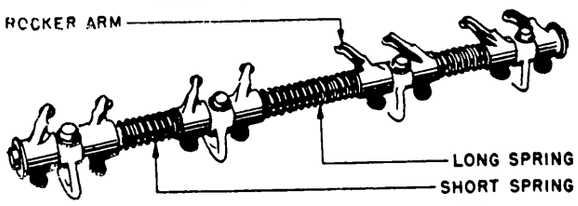
HYDRAULIC LIFTERS

1954-60 MODELS

HYDRAULIC VALVE LIFTERS: Barrel type, consisting of plunger and valve assembly operating within a cylinder formed by valve lifter body. Oil is introduced to this unit through lifter oil gallery in block.

Removal: Remove the air cleaner, then disconnect all pipes and wires from carburetor and intake manifold, remove carburetor and manifold as an assembly. Thoroughly clean cylinder heads, rocker arm covers, and adjacent areas to prevent dirt entering engine. Remove rocker arm covers and

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BUICK V8 ROCKER ARM ASSEMBLY
(ONE ASSEMBLY FOR EACH BANK)

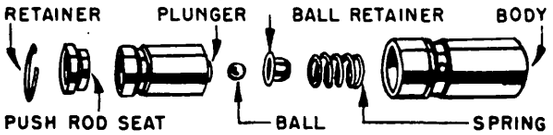
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rocker arm assemblies, remove pushrods. Remove valve lifter cover, lift out individual valve lifters ***and place them in numbered compartments of a holding fixture to insure re-installation in original position in engine.***

Disassembly: Use a push rod to hold down the push rod seat in lifter while removing plunger retainer from body with Retainer Remover J-5238. Remove push rod seat and plunger from lifter body. Body bore above plunger may be caked with carbon and varnish. In this case, place lifter in large end of Plunger Remover Tool J-4160-A, with plunger inward. While holding lifter with thumb, rap open end of remover against a block of wood with just enough force to jar plunger from body.

►***IMPORTANT NOTE***—Disassemble one lifter at a time to avoid interchanging parts. Be careful not to score or nick lifter parts.

Cleaning and Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or identations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.



BUICK HYDRAULIC VALVE LIFTER

Reassembly: Test check ball travel before reassembling lifter (see Testing below). It is recommended that all parts be rinsed in clean kerosene and then assembled without drying (this will eliminate all lint and dust adhering to parts). Hold plunger in vertical position with feed hole up, install check ball, ball retainer, spring, and body over the plunger. Invert assembly and install push rod seat and plunger retainer in end of body, use handle of tool J-5238 to depress these parts until retainer engages groove in body. Test lifter for "leak down rate" (see Testing below). Protect lifter assembly by wrapping in clean paper until it is installed in the engine.

Testing: (Check Ball Travel)—Install Sleeve KMO-30-K on Test Fixture J-5095, to mount dial indicator so that stem of indicator bears squarely on upper end of pin in attachment. Place a new ball check in seat in lifter plunger, then hold plunger and ball firmly against attachment arm with plunger centered over pin and stepped flange. While holding ball and plunger firmly in place, set dial indicator to "0." Remove plunger and ball, place ball in retainer, and install these parts on plunger. Center plunger over pin and stepped flange of check attachment and while pressing plunger and retainer firmly against attachment arm, note dial indicator reading. Ball travel must be .004-.008" to insure satisfactory lifter operation.

►***CHECK BALL TRAVEL NOTE:*** **Current type of ball retainers eliminate need for check ball travel check unless retainer is badly worn or damaged.**

Leakdown Rate - 1) Clean cup of Test Fixture J-5095 and fill it to ½" of top with "Hydraulic Lifter Test Fluid" (Kent-Moore No. J 5268).

2) Remove rubber washer (used for larger lifters) and install Gauge Sleeve J 5180-5 in cup and install Buick V8 Gauge Rod Nose J-5181-15 in ram.

3) Swing arm out of way, raise ram and place lifter (top side up) in Sleeve J-5180-5. *NOTE* - Lifter must be completely covered by fluid during test.

4) Lower ram to rest in lifter pushrod seat, then lower weight arm to rest on roller of ram.

5) Operate lifter plunger, through full travel to force all air out of lifter, until considerable resistance is built up in lifter and a definite grab point is felt at top of stroke when indicator pointer is at bottom of scale.

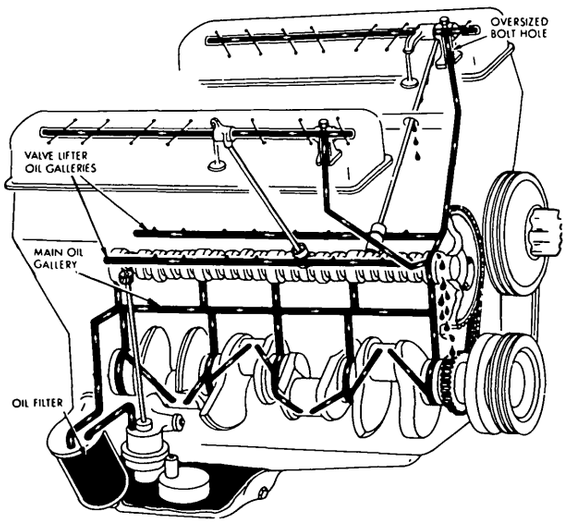
6) Finally operate lifter plunger approximately 10 additional strokes to be sure all air is out of lifter. *NOTE* - When one stroke (of last ten) has noticeable weak resistance, replace check ball and repeat above procedure.

7) Remove weight arm to allow lifter plunger to come up to its retainer, then lower arm to rest on ram roller. As pointer starts moving upward, start rotating fluid cup by turning handle one revolution every two seconds.

8) Use stop watch to check time required for pointer to move from lower to upper mark on scale (Marked Buick V8).

9) Leakdown rate (time between marks) must be between 12 and 40 seconds for satisfactory lifter operation.

►***LIFTER REPLACEMENT CAUTION:*** A doubtful lifter should be checked 3-4 times before deciding to replace it.



BUICK ENGINE OILING SYSTEM

OILING SYSTEM

ENGINE LUBRICATION

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to crankshaft, connecting rods, and camshaft bearings, and under controlled volume to valve lifters, rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. *See "Engine Oil Flow" diagram.*

OPERATION: Gear type oil pump at lower side of crankcase (at rear end) draws oil from crankcase sump through screen (or over top of screen if clogged) and delivers it through oil passages in pump body and crankcase to full flow filter. By-pass ball type valve in filter base opens to by-pass filter element when clogged or when difference in oil pressure between inlet and outlet ports is 4½-5½ lbs. Oil from filter passes into main oil gallery (full length of crankcase below camshaft) and through drilled passages in crankcase at full pressure to all crankshaft and camshaft bearings, where it is distributed to all moving parts of engine.

Crankshaft, Connecting Rods & Pistons - Holes drilled in crankshaft carry oil from main bearings to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through squirt hole in parting surface of connecting rod that registers with hole in crankshaft at each revolution of crankshaft. Pistons are lubricated by splash.

Camshaft, Sprockets, Lifters - Oil from front camshaft bearing, flows down front face of crankcase to drop on sprocket that transfers it to chain. Oil holes in crankcase and camshaft front bearing align with groove in camshaft bearing journal which meters flow of oil from main gallery to valve lifter oil galleries in each bank of cylinders. The full length of cylinder bank oil gallery cuts into lower sides of all valve lifter guide holes to supply low pressure oil to each lifter.

Rocker Arms, Valves & Pushrods - These items receive low pressure oil from valve lifter gallery through connecting passages drilled in front end of cylinder block and head. Oil passage in cylinder head ends in a counterbored recess surrounding front rocker arm shaft bracket bolt. Oversize bolt hole in bracket permits oil to flow into hollow rocker arm shaft (plugged at each end). Holes in rocker arm shaft allow oil to flow to each rocker arm. Oil is metered to pushrod ball seat and to valve stem through drilled holes in rocker arm. Excess oil drains off and returns to oil pan through pushrod opening in cylinder head and block.

OIL PUMP

1954-56 MODELS

OIL PUMP: Gear Type. Driven by distributor shaft which is driven from camshaft through spiral gears.

Disassembly: Carefully pry screen out of housing, remove attaching screws and remove parts in following order: Pump Inlet, Gasket, Screen Housing, Gasket. Body Cover, Shaft & Gear, and Idler Gear. Remove plug on side of body and take out pressure regulator spring and valve.

Cleaning & Inspection: Wash screen and all pump parts in solvent and dry with air. See that oil pressure valve operates freely in body and that hole is not oversize, check spring for wear, distortion or collapsed coils. Inspect pump body, gears, and shaft for wear or scoring. Check gear end clearance by installing gears in body and placing straightedge

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across cover flange. Clearance between straightedge and face of gears must be less than .004" and gears must turn freely. For other clearances, see table:

Oil Pump Clearances

Drive Shaft Bearing Clearance	.001-.0025"
Idler Gear Bearing Clearance	.001-.0025"
Driving Gear Backlash	.003-.006"
Pump Gears Backlash	.006-.012"
Pump Gear End Clearance in Body	.0005-.004"
Regulator Valve Clearance in Body	.003-.006"

Reassembly: Reverse disassembly procedure above.

Installation: Install oil pump with gasket on crankcase, turning pump shaft as required to engage driving tongue on distributor shaft. Install pump attaching bolts with lockwashers, then tighten bolts alternately a little at a time with one hand while turning pump shaft back and forth through gear lash with other hand. Pump shaft must be free of bind when bolts are securely tightened. If shaft binds, rap pump body lightly with a rawhide mallet.

1957-60 MODELS

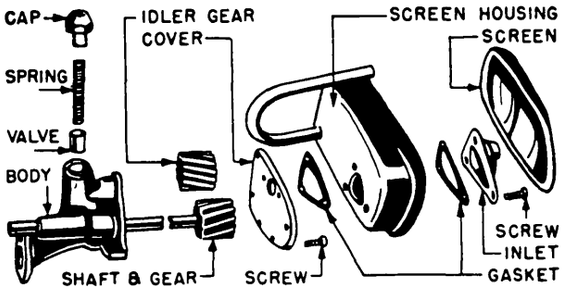
OIL PUMP: 1957-58 models have combination gear type oil pump and a vane type vacuum pump. Vacuum pump is driven by key between oil pump driven gear and vacuum pump rotor. Oil pump shaft is coupled to ignition distributor shaft which is driven by camshaft. 1959-60 models have same type oil pump with a cover in place of the vacuum pump and no drive key in idler gear.

Disassembly: On 1957-58 models, remove vacuum pump assembly with end cover (see vacuum pump following). On 1959-60 models, remove cover from pump body. On all models, remove oil pump shaft and gear and idler gear from pump body. Remove regulator cap spring and ball.

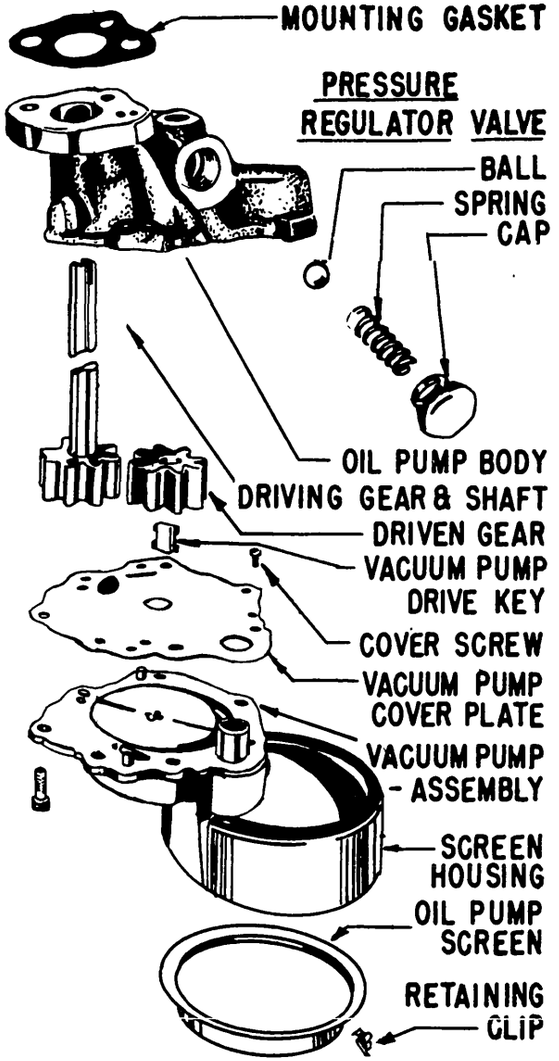
Cleaning & Inspection: Clean all parts in solvent and blow dry with air Check ball must be free in pump body and fit hole its entire length Spring should not be collapsed worn on side or broken. Replace gears, body cover or shaft if worn or scored

Reassembly: Install gear and shaft assembly in pump body. On 1957-58 models, install idler gear with vacuum pump driving grooves toward pump cover. On 1959-60 models, install idler assembly in pump with chamfered end of idler gear teeth inward away from cover.

Gear Clearance - .005". Distance between gears and straightedge placed across pump body.



TYPICAL 1954-56 BUICK OIL PUMP



TYPICAL 1957-60 OIL & VACUUM PUMP

Shaft Endplay - .0005-.005". With vacuum pump attached.

►*OIL PUMP INSTALLATION CAUTION:* After complete assembly and installation on engine, check pump shaft for bind by turning with screwdriver through distributor mounting hole. Remove any bind in shaft rotation by tapping pump body with rubber mallet.

VACUUM PUMP

1957-58 MODELS

VACUUM PUMP: Vane type in combination with oil pump. Driven by driving key from oil pump driven gear. *SERVICED ONLY BY COMPLETE ASSEMBLIES. NOTE* - If vacuum pump severely damaged check oil pump idler gear and driving key.

IGNITION NOTES

1954-56 MODELS

SPARK PLUG CABLE WIRING AFTER WORK ON ENGINE (To prevent mis-firing): Cables should be arranged in following order in grommets on cylinder head to prevent consecutively firing plug cables from being adjacent to each other:

Right Bank Cables—Arrange cables in following order in grommet on head and at entrance to spark plug cover: 3, 5, 7, 1 (front to rear). Arrange #1 plug cable over rear cover stud and #5 spark plug, under #3 spark plug, and over front cover stud. Arrange #3 plug cable under rear cover stud and #5 spark plug. This will prevent #1 and #3 cables from being parallel.

Left Bank Cables—Arrange cables in following order in grommet on head and at entrance to spark plug cover: 4, 6, 2, 8 (front to rear). Arrange #2 plug cable under rear cover stud and #6 spark plug, and over #4 spark plug. Arrange #4 plug cable over rear cover stud and under #6 spark plug.

DETONATION CORRECTION (ALL SERIES): Proceed as follows:

1) Check spark plug cable wiring (see above).
2) Check for excessive oil consumption. Correct as necessary.
3) Check initial distributor setting and if necessary reset to 5° BTDC.
4) Check to see if centrifugal and vacuum advance of distributor falls within specified limits. Check distributor for dwell angle variation. Dwell should not vary more than 3° total between idle speed and 1500 RPM.
5) Make sure fuel is highest octane conveniently available.
6) If the above procedures do not correct the detonation the initial distributor setting may be retarded to TDC without any noticeable loss in performance or economy. If detonation still occurs, remove all traces of carbon from combustion chambers.

1956 MODELS

CHECKING TIMING MARK LOCATION: If the timing mark on the balancer is suspected of being off, it may be checked by removing the balancer and checking the timing mark in relation to keyway. Draw a straight line approximately 7" long on a clean piece of white paper, then using a compass, draw a 1½" diameter circle in center of straight line. Place balancer (with pulley mounting bolt holes upward) over circle drawn on paper so that centerline passes through center of balancer keyway. The timing mark should be located .100" (approx. 3/32") clockwise from centerline at outside diameter of balancer.

►*CHECKING FOR PROPER DISTRIBUTOR CAM (Improper cam will cause rotor tip to burn badly at one corner):* Remove rotor and hold straight edge (6" steel rule) flat against the counter-clockwise edge of rotor positioning slot and angling down towards the breaker cam. If correct cam is installed, the straight edge will be on the counter-clockwise side of the nearest cam lobe. If improper cam is installed, the straight edge will be toward the clockwise side of the nearest lobe.

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ELECTRICAL NOTES

1956 MODELS

DIRECTIONAL SIGNAL SWITCH STICKING CORRECTION: If the trip mechanism in signal switch housing sticks, and does not return to "off" position after a turn is completed, it may be caused by centering pins being bent or trigger spring hanging up on lever. Correct as follows: Remove steering wheel and check centering pins for straightness. Remove trigger spring and sand off any burrs under the tangs. Lubricate trigger spring with Lubriplate, and reassemble, making sure spring operates freely in tangs.

COOLING SYSTEM

WATER PUMP

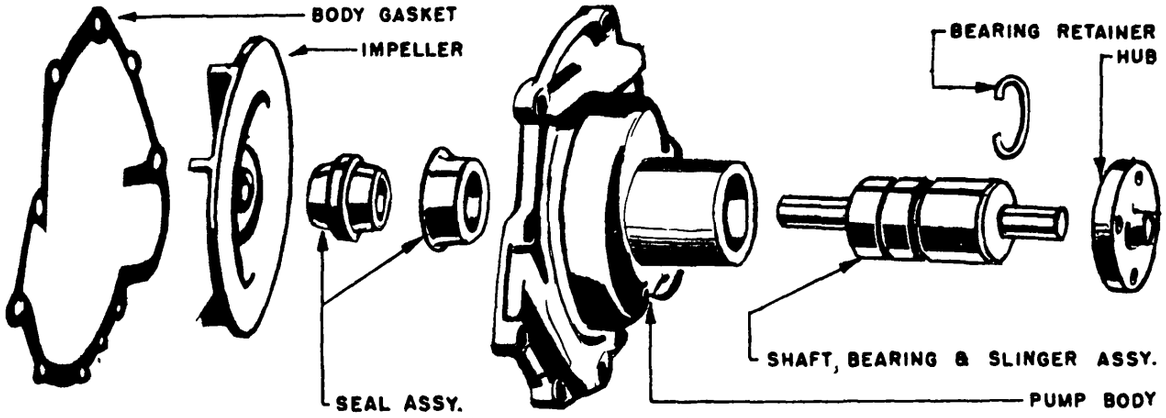
1954-57 MODELS

WATER PUMP: Ball bearing, packless type Non-adjustable seal Bearing is factory lubricated and sealed so that no lubrication required in service

TYPE: Ball bearing, packless type Non-adjustable seal consists of a rubber bellows and spring which bears against a sleeve in pump body Bearing consists of a double row ball bearing held on shaft by a bearing retainer. Bearing is factory lubricated and sealed so that no lubrication required in service

OVERHAUL: Disassembly—Remove pump cover assembly and gasket from timing chain cover Remove impeller from pump shaft, using suitable puller *(NOTE*—Puller with two hooks preferred, one with three hooks may be used) Remove carbon washer, rubber bellows and spring from brass sleeve that is pressed into pump housing It is not necessary to remove brass sleeve if in good condition. If sleeve doubtful, remove by driving it out with punch inserted through vent hole in pump body Thoroughly clean pump cover to remove rust, old gasket, etc *Do not soak in cleaning solvent as this may leak into pump shaft bearing and destroy lubricant.* Check pump shaft bearing for endplay, or roughness in operation. If bearing not serviceable, press fan hub off shaft, remove bearing retainer, then press bearing out toward FRONT of pump cover

Reassembly: If old pump shaft bearing removed, press new bearing in against shoulder in pump cover, long end first, then install bearing retainer. Use care to start fan hub squarely on front end of bearing shaft and press it into position 13/64" (1953-56), 1/4" (1957) from end of the shaft. If the brass seal sleeve removed from pump body, carefully press the new sleeve seal in place with thick-walled tube that bears fully against the flange. *NOTE* - External spring seal used alternately in production If old sleeve not removed, separate new seal sleeve from seal bellows by soaking in hot water to soften cement used to hold seal parts together for ease of handling Install carbon washer, bellows and spring assembly in old sleeve in pump body, being careful to engage the two notches in washer with driving dents in brass sleeve Coat face of carbon washer and impeller hub with rust preventative or Seco oil, then support pump on fan end of shaft, press impeller on shaft until rear face of impeller is flush with end of shaft Install pump cover with new gasket



1954-57 WATER PUMP

Tighten pump cover bolts with lockwashers uniformly

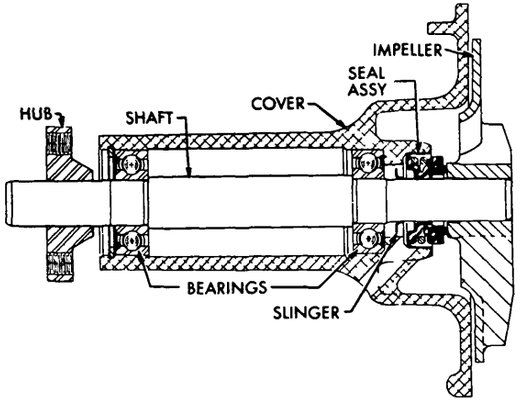
1958-60 MODELS

►*NOTE:* 1958 pump is same as later models except it is serviced as a complete assembly

WATER PUMP: *NOTE* - Water pump cover is die cast aluminum in which pump bearings are shrunk fit The cover, shaft, bearings, and hub are not servicable Seal and impeller are only servicable parts

Disassembly - Pull impeller from pump shaft (avoid end thrust on bearings) Remove carbon washer, rubber bellows and spring from brake sleeve When necessary to replace sleeve, use drift through vent hole in pump body *NOTE* - DO NOT use solvent to clean parts as it will destroy bearing lubricant

Reassembly - Press new brass seal sleeve into body using thick walled tube. When old sleeve not removed, separate new seal sleeve from seal bellows by soaking it in hot water to soften cement. Install bellows and spring in sleeve with notches in washer engaging driving dents of sleeve Coat face of washer and impeller hub with rust preventative and press impeller on shaft until rear face is flush with end of shaft *CAUTION - Avoid any thrust on shaft bearings*



1958-60 WATER PUMP

Installation - Clean gasket surfaces and use new gasket. Bolts with lockwashers must be tightened uniformly.

CLUTCH NOTES

1957-58 MODELS

Equalizer Position - Adjust cable adjusting sleeve so that a ½" x 2½" pin inserted through gauging hole in equalizer (from bottom) and two holes in equalizer bracket will be held in holes

Pedal Adjustment: Check condition of pull back yoke and over-center springs See that over-center spring eyebolt is fully tightened Linkage must not bind and must be well lubricated

Release Rod Adjustment - Remove release rod adjusting end cotter key and washer return spring release rod to yoke clevis pin and spring washer Loosen adjusting jam nut and adjust end until pin fits freely with yoke held to rear then **lengthen** release rod (by rotating adjusting end) 4 turns This will provide release bearing and lever clearance Tighten adjusting jam nut and replace parts removed

Cable Adjustment - Loosen cable pulley mounting bolt and align cable pulley with both upper and lower portions of cable as necessary Tighten bolts To adjust cable hold both upper and lower cables from twisting loosen adjusting sleeve jam nuts turn sleeve clockwise (from top) to tighten cable Tension is correct when gauging pin drops from holes in equalizer and bracket Tighten nuts This will provide pedal lash (free play) of 1 1/8 1 1 4" *Do not mistake tension of pedal return spring as an indication of lack of pedal lash*

1959-60 MODELS

Overcenter Adjustment: *NOTE - Clutch pedal must return fully against its stop Raise car and use ¼" drill rod or suitable ¼" spacer to measure clearance between overcenter spring extension and clutch equalizer (should be ¼" approximately)* To adjust, back-off release rod jam nut and adjusting nut ¾" Place ¼" spacer between spring extension and equalizer, then lower car and back-off pedal rod locknut under instru-

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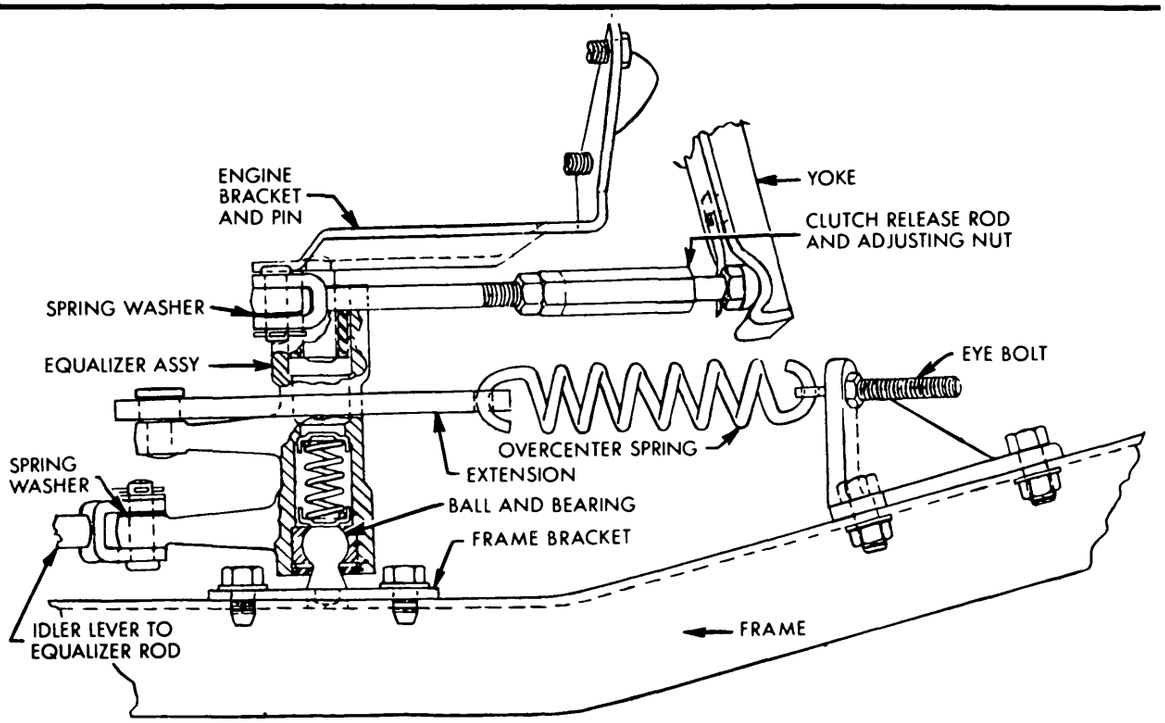
ment panel. Remove clevis pin (clutch pedal to pedal rod clevis) so equalizer will rotate slightly so overcenter spring extension is against the ¼" spacer. Rotate pedal rod clevis as necessary so clevis pin will enter clutch pedal and clevis freely with clevis pulled to rear. *NOTE - Before clevis will rotate freely, pedal rod and clevis pin must be pushed forward, taking up slack in linkage.* Install clevis pin with spring washer, plain washer and cotter pin. Tighten pedal rod locknut. Raise car and remove spacer. Adjust pedal lash, *see below.*

Pedal Lash Adjustment (Freeplay): *NOTE - Return spring must pull pedal firmly against pedal bumper. Pedal linkage must be free and equalizer overcenter spring eye bolt must be fully tightened.* To adjust pedal lash (freeplay), check "Overcenter Adjustment" *see above,* then loosen adjusting nut jam nut on clutch release rod. Turn adjusting nut so that when equalizer is rocked over center by hand, total free movement at outer end of clutch release yoke is ¼". Tighten adjusting jam nut. ¼" movement at end of clutch yoke will give correct lash (freeplay) at pedal (1 1/8" to 1 1/4"). *CAUTION - DO NOT mistake the tension due to pedal return spring as an indication of lack of pedal lash (freeplay).*

BRAKE NOTES

1956 MODELS

PARKING BRAKE RELEASE ROD TRUNNION ADJUSTMENT: Disconnect battery and lower the fuse block to gain access to release rod trunnion. With parking brake in fully released position, disconnect trunnion from release rod lever trigger. Push trigger toward cowl as far as possible, and while holding trigger in this position, lengthen release rod by turning trunnion until it extends approximately ¼" beyond hole in trigger while holding release rod lightly against spring pressure. Connect trunnion to release rod lever trigger. After this adjustment has been performed, approximately 1/8" clearance should exist between knob and escutcheon. Clearance at this point can be obtained by loosening screw in knob and positioning knob as required to obtain specified clearance. Tighten knob screw.



1959-60 BUICK CLUTCH LINKAGE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Model Designation
40	SPECIAL
50	SUPER
60	CENTURY
70	ROADMASTER
M/100 (1954)	SKYLARK

SERIAL NUMBER: Stamped on plate on left front door pillar post and on left front frame side rail.

Starting Serial Number (Each Year)–001001 (at each plant).

►*1954 SERIAL NUMBER NOTE: Beginning 4/1/54, the serial number includes identification data as indicated below.*

►*SERIAL NUMBER NOTE: Serial number (example 4B-2001001) includes the following identification data in sequence:*

Series ①	Year ②	Assy. Plant ③	Serial No.
4	B	2	001001

①–See Series Designation following.

②–Year designation "A" (1954), "B" (1955).

③–See Assembly Plant Designation following.

Series Designation

4–40 Special	6–60 Century
5–50 Super	7–70 Roadmaster & M/100 Skylark

Assembly Plant Designation

1	Flint	5	Wilmington
2	South Gate	6	Atlanta
3	Linden	7	Framingham
4	Kansas City	8	Arlington

ENGINE NUMBER: Stamped on outside of left bank of cylinders on extension of top face of block between middle branches of exhaust manifold.

Starting Engine Number– V-273956 (1954), **V-720080** (1955). Followed by a suffix numeral as indicated in Series Designation above.

►*1955 ENGINE NUMBER NOTE: The "V" Engine Number Prefix not used after Engine Number 1,000,000.*

►*ENGINE NUMBER NOTE:* Dash following engine number indicates that cylinder bores and pistons are .010" Oversize. *NOTE*–Do not confuse dash with vertical groove on pad designating Series 40 engine.

TUNE-UP

►*1954 SKYLARK MODEL 100 NOTE: All specifications for this model are same as Series 70 except as noted.*

►*DETONATION CORRECTION (ALL SERIES): See "Ignition Notes" in Buick Special Data.*

►*SPARK PLUG CABLE ROUTING (To Prevent Misfiring): See "Ignition Notes" in Buick Special Data.*

COMPRESSION PRESSURE: At cranking speed (140 RPM). All cylinders must be equal within 10 lbs.

	Synchro-mesh		Dynaflow	
Series	1954	1955	1954	1955
40	130 lbs.	140 lbs.	145 lbs.	155 lbs.
50,60,70	150 lbs.	155 lbs.	160 lbs.	170 lbs.

VACUUM READING: Steady 18-20" at idling speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatically controlled valve in forward end of left exhaust manifold. Valve must operate freely.

Checking Thermostatic Coil Spring–With engine at 70°F., unhook end of spring from anchor stud on manifold, hold valve closed. End of spring should be 3/8 turn clockwise from anchor stud (3/8 turn "wind-up" to engage spring on stud). Replace thermostatic spring if setting incorrect or if distorted or otherwise damaged.

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.

Cylinders–RIGHT BANK 1-3-5-7, LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .030-.035".

Spark Plugs–AC No. 44-5. 14mm. Torque to 22-28 ft. lbs.

COIL: Delco-Remy 1115082. *12 Volt.*

Ignition Current–2.5 amps. idling, 4.5 stopped.

Resistor–Delco-Remy 1927809. On cowl near ignition coil. Resistance 1.4-1.65 ohms at 75°F.

►*COIL RESISTOR NOTE*–Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by a lead from starter solenoid-to-coil.

DISTRIBUTOR: Delco-Remy 1110849. *12 Volt.*

Condenser–Delco-Remy 1869704 (Closed-end terminal), 1928111 (Open-end terminal). **Capacity** .18-.23 mfd.

Contact Point Set–Delco-Remy 1924499.

Breaker Gap–.0125-.0175".

Cam Angle–26-33° (with .016" gap).

►*BREAKER GAP CAUTION*–Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set point gap.

Breaker Arm Spring Tension–19-23 ozs.

Rotation–Clockwise viewed from above.

►*DISTRIBUTOR REMOVAL NOTE*–Removal of distributor can be facilitated by use of Special Wrench J-5727 (Kent-Moore) or S-9832 (Snap-On).

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-1.5	375	0-3	750
6-8	850	12-16	1700
9.5-11.5	1450	19-23	2900
11-13.5	1750	22-27	3500

Vacuum Spark Control: Delco-Remy 1116090.

Plunger Travel–7/32".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6.5-8.5
9-10.5	18-21	11.5-15

IGNITION TIMING

Setting–5° BTDC exactly.

►*IGNITION TIMING CAUTION–Lower engine idle speed to not exceed 350 RPM when setting ignition timing with timing light. Reset to 450 RPM when completed.*

Timing Mark–Timing indicator marked with four lines indicating 0°, 2.5°, 5°, 7.5° BTDC, located on right side of timing chain cover below fuel pump. Line up mark on Fan Drive Pulley (Series 40), Harmonic Balancer (Other Series) with correct line (5°) on timing indicator for normal operating conditions.

CARBURETOR

►*CARBURETOR APPLICATION: Various carburetors used on 1954-55 cars as follows:*

Series	Carburetor Make & Typ
40 (1954-55)	①Carter WCD or Stromberg AAVB
40 (Late 1955)	①Carter WGD or Stromberg WW
50 (1954)	① Carter WCD or Stromberg AAVB
60, 70 (1954)	②Carter WCFB or Stromberg 4AUV
50, 60, 70 (1955)	②Carter WCFB or Rochester 4GC

①–2-Barrel Carburetor. ②–4-Barrel Carburetor.

►*1954 DYNAFLOW CARS THROTTLE LINKAGE ADJUSTMENT:* The procedure for adjusting throttle linkage on 1954 Dynaflow cars is the same as for "Dynaflow Cars (Without Overtravel)" below, except for adjustment on "stretch-link".

►*1954-55 SYNCHRO-MESH THROTTLE LINKAGE ADJUSTMENT NOTE:* The procedure for adjusting throttle linkage on synchro-mesh cars is the same as for "Dynaflow Cars (Without Overtravel)" below, except for adjustment on "stretch-link", stator control linkage and dashpot.

►*1955 THROTTLE LINKAGE ADJUSTMENT (DYNAFLOW CARS):* The throttle operating rod contains an adjustable spring loaded stretch link which may be optionally adjusted to provide "overtravel" for delayed action of the variable pitch stator In production the stretch link is locked solid to eliminate overtravel and the throttle linkage is adjusted so that the stator shifts to high angle performance position just as wide open throttle is reached. If car is operated consistently at high speed it may be preferred to have the high angle shift occur after wide open throttle is reached. In this case "overtravel" may be obtained as outlined in "Adjustment With Overtravel" below. *CAUTION–Adjust throttle linkage WITHOUT overtravel on all Synchro-mesh cars.*

THROTTLE LINKAGE ADJUSTMENT: With floor mat properly installed and all throttle linkage well lubricated and operating freely, adjust throttle stop screw for proper HOT idling speed of 450 RPM. Turn engine off and check operation of unloader (adjust if necessary). Proceed as follows:

1) Disconnect throttle return spring and throttle operating rod from lever on equalizer shaft. Back off stator pick-up lever adjusting screw until screw end is flush with lever surface.

2) Adjust throttle operating rod in rod end at carburetor so that approximately 5/8" of thread is exposed, then tighten lock nut.

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3) For Adjustment Without Over-travel—Turn rear end of throttle operating rod until stretch link is locked While another person presses accelerator pedal firmly against the floor mat hold throttle lever in wide open position and hold rear end of operating rod at hole in throttle lever Rod must be approximately 1/16" **short** of entering hole in lever Change position of lever on shaft as required to obtain this condition then tighten clamp bolt securely

4) For Adjustment With Over-travel (Do not Use on Synchro-mesh Cars)—Turn rear end of throttle operating rod until rod can be stretched approximately 7/16' against tension of stretch link spring measured at forward end of link While another person holds throttle UPWARD as far as possible, hold throttle lever closed to HOT idle position and hold rear end of throttle operating rod at hole in throttle operating lever Rod must extend 1/16' BEYOND hole in lever Change position of lever on shaft as required to obtain this condition, then tighten clamp bolt securely

5) Connect operating rod to operating lever, snap retaining clip over rod and connect return spring With throttle closed to HOT idle position, check clearance between equalizer shaft lower lever and the stop lug in the shaft-to cowl mounting bracket A minimum clearance of 1/16" (Carter), 3/16' (Rochester) must exist at this point

6) Hold choke valve closed while accelerator pedal is pressed to floor mat to check operation of unloader If clearance between lower lever and stop lug is less than 1/16 , or choke unloader does not operate properly, readjust the operating rod length at rod end on throttle lever or change position of upper lever on equalizer shaft one serration at a time until proper settings are obtained

7) On Dynaflow Cars have accelerator pedal depressed firmly against floor mat, then turn stator pick-up lever adjusting screw against stator operating lever, raising lever until all vertical play is removed from stator operating control rod Turn screw back ½ turn to provide a slight clearance between stator control valve operating lever and the **bottom side** of its stop pin on the high accumulator

8) Finally check for smooth operation of linkage from fully closed to wide open position of throttle valve Make sure that throttle closes firmly against stop screw *NOTE—On Dynaflow Cars (Without Over-Travel), and on Synchro-mesh Cars, throttle valve should be wide open when accelerator pedal strikes floor mat. On Dynaflow Cars (With Over-trav l), the stop on throttl lever must strike boss on throttle body before accelerator pedal can be pressed to floor against tension of stretch spring.*

DASHPOT ADJUSTMENT (Dynaflow Cars) Adjust dash pot only after throttle linkage has been adjusted and engine is at normal operating temperature Rotate fast idle cam to extreme cold idle position (choke closed), hold throttle lever against a 030' feeler gauge placed between stop screw and highest step of fast idle cam Adjust dash pot until it just clears arm of throttle lever, tighten lock nut. With transmission in Direct Drive and brakes firmly applied speed engine up to about 1500 RPM and immediately release throttle, noting engine operation as throttle valves close If engine stalls from too rapid closing of throttle valves, move dash pot forward until its action prevents engine stalling If excessive time is required for throttle valves to reach closed position, move dash pot rearward. Tighten lock nut after each adjustment If proper control cannot be obtained by adjustment, replace dash pot

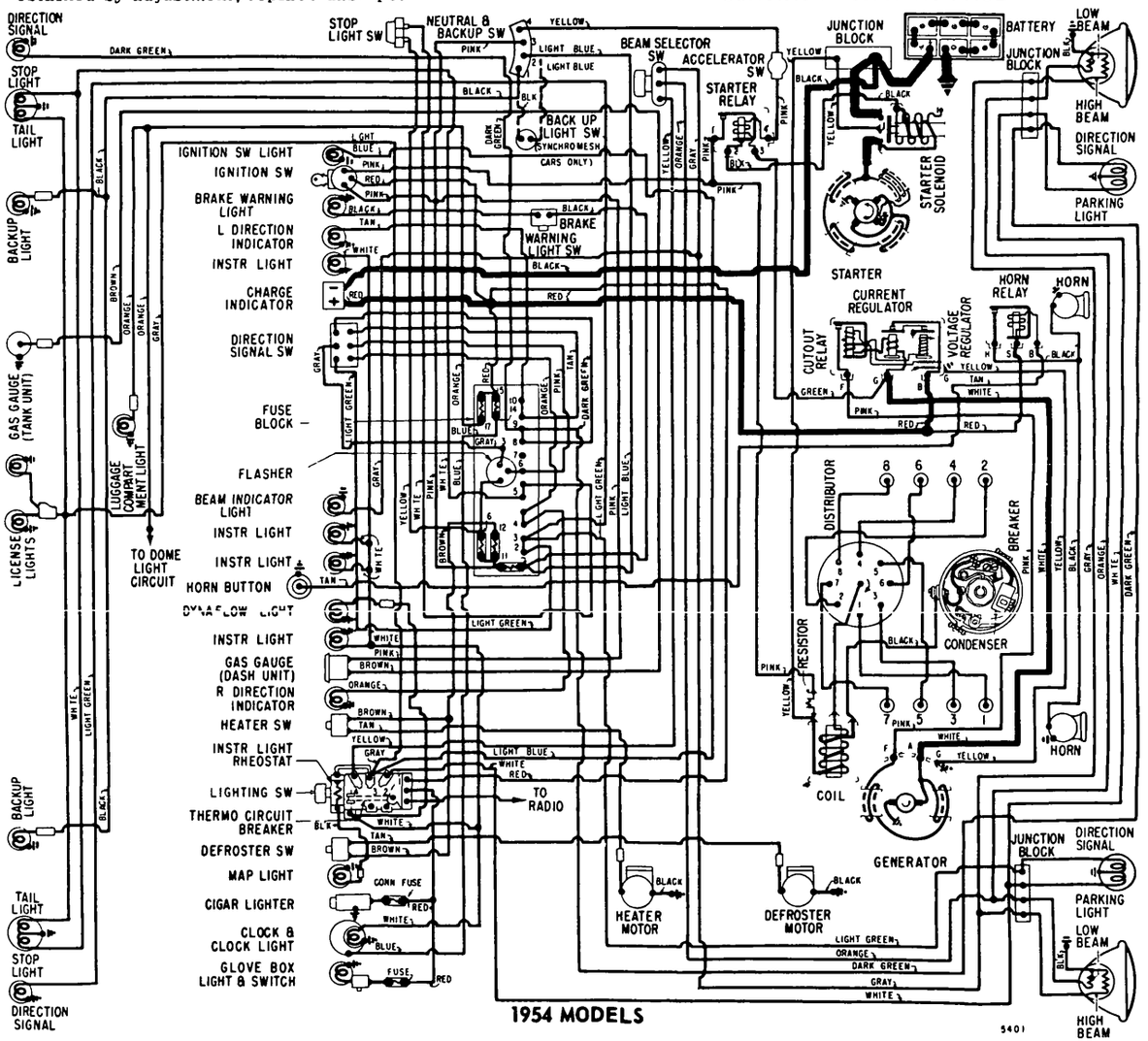
CARTER 2-BARREL WCD

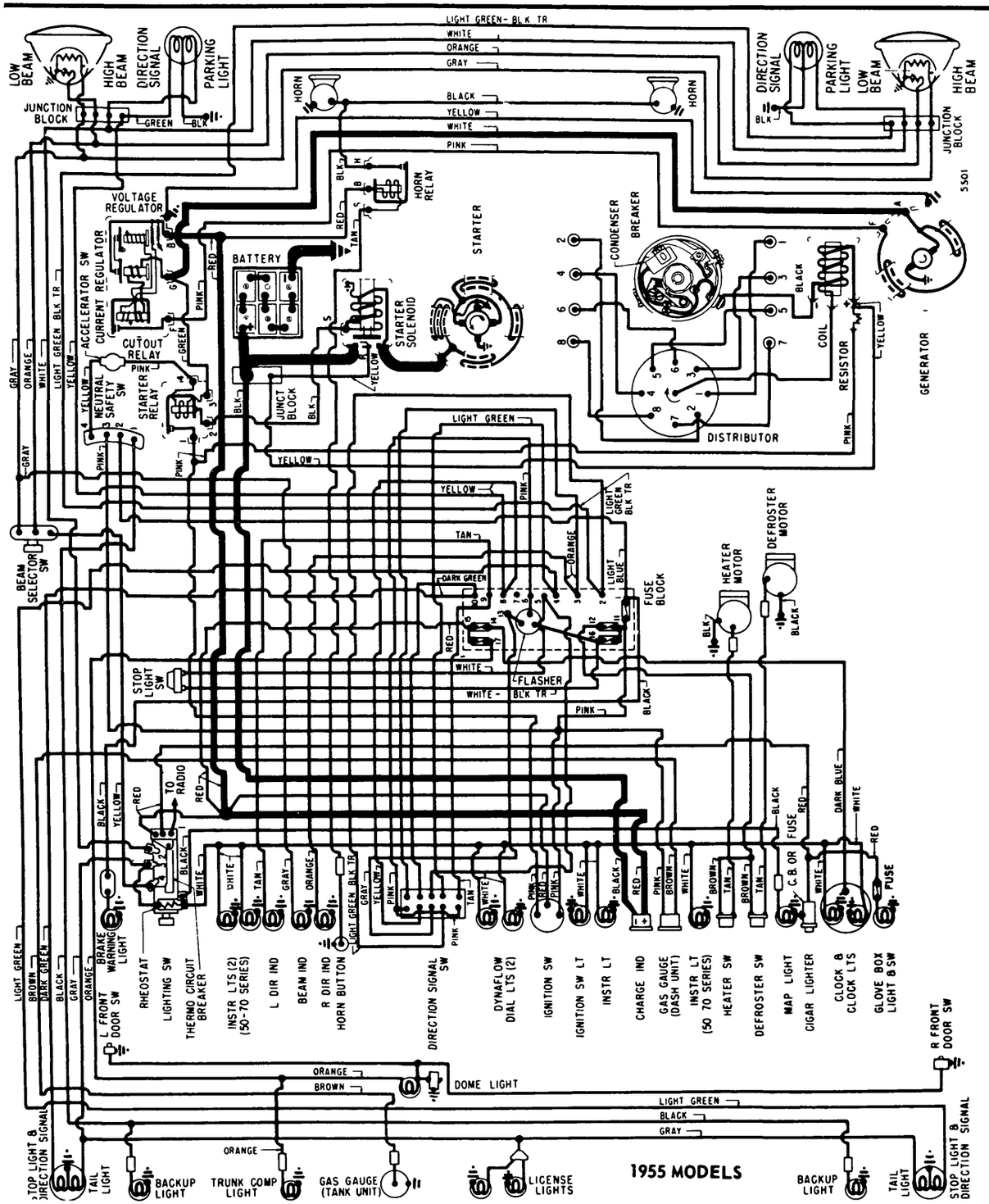
Carter WCD 2081S (Early 1954), 2081SA (Late 1954), 2179S (Early 1955). *NOTE—See "Carter WGD Carburetor" below for Late 1955 Carburetor.*

►*1954 METERING ROD PRODUCTION CHANGE FOR IMPROVED PERFORMANCE (Early 2081S Carburetors): Metering rods changed from No. 75-994 to 75-1107. See "Carter WCD Carburetor" in Carburetion Section.*

►*1954 COLD STUMBLE OR LOW SPEED BUCK ON SYNCHRO-MESH CARS (Cars with 2081S Carburetors):* Correct by changing Choke Cover & Coil Assembly and installing reducer bushing in choke warm air orifice hole in bowl cover *See "Carter WCD Carburetor" in Carburetion Section NOTE—Later 2081SA carburetors have these changes.*

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►*1955 SERIES 40 (SYNCHRO-MESH) CARS WARM-UP PERFORMANCE IMPROVEMENT & ROUGH IDLE CORRECTION: See "Carter WCD Carburetor" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting–One turn (½-1½) open Adjust both screws alike Turn screws out for richer mixture.

Idle Speed–450 RPM (With selector lever in Neutral on Dynaflow Cars)

Float Level–15/64" (2081S, SA), 3/16" (2179S) from top of each float to gasket seat on cover with needle valve seated (invert float assembly to check) Use Gauge T109-240 (15/64"), T109-162 (3/16") installed directly under floats and adjust floats vertically to just clear horizontal portion of gauge and laterally so side of floats barely touch gauge uprights

Accelerating Pump–Install pump connector link in outer hole of pump arm for long stroke

Fast Idle: *CAUTION–Two different setting required:* 1) Loosen choke lever clampscrew on choke shaft Insert Gauge T109-29 (020') between lip of fast idle cam and boss on throttle body, hold choke valve closed and remove slack from linkage by pressing choke lever toward closed position, tighten choke lever clamp screw.

2) With choke valve tightly closed and fast idle screw on high step of cam, adjust fast idle screw as follows If carburetor on bench, adjust for a throttle opening of 025' (Gauge T109-189), between edge of valve and wall on side opposite idle ports If carburetor on engine, adjust idle speed to 1800 RPM

Automatic Choke Setting: Centered (At Index).

Throttle Linkage Adjustment: *See "Carburetor" abov .*

►*OTHER DATA: See "Carter WCD Carburetor" in Carburetion Section*

Fuel Pump Pressure: 4½-5½ lbs at pump outlet, 4-5 lbs at carburetor inlet

CARTER 2-BARREL WGD

Carter WGD 2292S (Late 1955 Cars). *NOTE–S "Carter WCD Carburetor" above for Early 1955 Carburetor.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting–¼-1¼ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed–450 RPM (With selector lever in Neutral on Dynaflow Cars).

Float Level–¼" from top of float (center) to gasket seat on cover with needle valve seated (invert float assembly to check) Use Gauge T109-31 and adjust float so side is parallel to edge of casting.

Accelerating Pump–No seasonal adjustment.

Fast Idle: .015" (Gauge T109-44) clearance between lower edge of throttle valve and carburetor bore with adjusting screw on high step of fast idle cam.

Automatic Choke Setting: Centered (at Index).

Throttle Linkage Adjustment: *See "Carburetor" above.*

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►*OTHER DATA: See "Carter WGD Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.

STROMBERG 2-BARREL AAVB-267

Stromberg AAVB, Code 7-96 (1954), 7-102 & 7-102A (Early 1955). *NOTE–See "Stromberg WW" below for Late 1955 Carburetors.*

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrel feeds Cyl 1-4-6-7, LEFT barrel 2-3-5-8.

Idl Setting–1¼ turns open Adjust both screws alike Turn screws out for richer mixture

Idl Speed–450 RPM (With Selector Lever in Neutral).

Fl at Level–5/64 "above vertical guides on Gauge T-24971, or 1 7/16' from bowl cover gasket to top edge of float with assembly inverted

Accelerating Pump–Pump rod in middle hole of throttle lever

Fast Idle Setting: Close choke valve against a No. 51 drill (Code 7-96), No 54 drill (Code 7-102 & 7-102A) placed between wall of air horn and center of upper edge of choke valve and hold valve firmly against drill. See that fast idle cam spring holds cam upward against end of fast idle rod. Close throttle until stop screw contacts fast idle cam. If screw does not clear edge of highest step on fast idle cam and bear against second step, adjust by bending fast idle rod at large curve.

Lever Clearance–Close choke valve against a No. 53 drill, adjust clearance between ear on locking lever and lug on loose lever on fast idle cam stud so that these levers just clear as throttle valve is opened. Adjustment is made by bending end of loose lever up or down as required.

Automatic Choke Setting: Centered (at index).

►*OTHER DATA: See "Stromberg AAVB Carburetor" in Carburetion Section.*

Throttle Linkage Adjustment: *See "Carburetor" above.*

Fu l Pump Pressure: 4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.

STROMBERG WW

Stromberg WW, Code 7-104 (Late 1955). *NOTE–See Stromberg AAVB Carburetor" above for Early 1955 Carburetors.*

Idle Setting–1¾ turns open Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed–450 RPM (With selector lever in Neutral on Dynaflow Cars).

Automatic Choke Setting: Centered (at index).

Thr ttle Linkage Adjustment: *See "Carburetor" above.*

►*OTHER DATA: See "Stromberg WW Carburetor" in Carburetion Section:*

Fuel Pump Pressure: 4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.

STROMBERG 4-BARREL

Str mb rg 4-AUV, C d 7-98 (1954). Four barrel downdraft type with automatic choke .

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr ls f d Cyl. 1-4-6-7. LEFT barrels 2-3-5-8.*

Idle Setting–1 1/8 turns open (two screws–primary side only). Set both screws alike. Turn screws out for richer mixture.

Idle Speed–450 RPM (With selector lever in Neutral).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg 4A 4-Barrel Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 4½-5½ lbs at pump outlet, 4-5 lbs. at carburetor inlet

CARTER 4-BARREL WCFB

Carter WCFB 2082S (1954), 2197S (Early 1955), 2358S (Late 1955). Four barrel downdraft type with automatic choke.

►*1954 ACCELERATING PUMP LEATHER TURNING BACK (Causing improper acceleration performance and throttle resistance on Early Cars): See "Carter WCFB Carburetors" in Carburetor Section.*

►*1954 METERING ROD CHANGE: See "Carter WCFB 4-Barrel Carburetor" in Carburetor Section.*

►*1955 CARBURETOR CHOKE PISTON CHANGE TO IMPROVE WARM-UP PERFORMANCE (First Cars): See "Carter WCFB 4-Barrel" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting–½-1½ (1954) ¾-1¾ (1955) turns open (two screws–primary side only). Set both screws alike. Turn screws out for richer mixture.

Idle Speed–450 RPM (With selector lever in Neutral).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetor" in Carburetion Section.*

Fuel Pump Pressure: *4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.*

ROCHESTER 4-BARREL 4GC

Rochester 4GC, No. 7006200 (1955). Four barrel downdraft type with automatic choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7. LEFT barrel 2-3-5-8.*

Idle Setting–Adjust idle mixture needle valves for smooth idle and check for correct idle speed

Idle Speed–450 RPM (With selector lever in Neutral).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.

CARB. EQUIPMENT

Fuel Pump: AC **Replacement No. 9763** (Fuel & Vacuum).
Pressure–4½-5½ lbs. at pump outlet, 4-5 lbs. at carburetor inlet.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric type.

Dash Unit (1954)–AC No 1518011 (Series 40, 60, 100); AC No. 1518877 (Series 50, 70).

Dash Unit (1955)–AC No. 1518212 (Series 40 & 60); AC No. 1518203 (Series 50 & 70).

Tank Unit (1954-55)–AC 1518138 (Series 40, 60, 100); AC No. 1518137 (Series 50 & 70).
See "Fuel Gauges" in Carburetion Section.

BATTERY

1954-Delco 3EM60W. *12 Volt,* 11 plate, 60 ampere hour capacity (20 hr rate).
1955-Delco 3KM60. *12 Volt,* 9 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground–Negative (-) terminal.
Engine Ground–Between engine and cowl.

STARTER

Delco-Remy 1107621. *12 Volt.* **Armature**–1926626.
Drive–Overrunning clutch (solenoid pinion shift).
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–30-40 ozs.

	Performanc Data		
Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
11 ft. lbs.	Lock	5.2	460

Starting Switch: Delco-Remy Solenoid 1119760. *12 Volt.* Starter solenoid controlled by separate relay, Delco-Remy 1116876, and Accelerator Vacuum Switch (on carburetor) *See "Starter Controls" in Electrical Equipment Section.*

Accelerator Vacuum Switch: Carter 192-11U (Carter & Stromberg 2-Barrel), 192-21U (Carter 4-Barrel), Stromberg 386030 (Stromberg 4-Barrel) .
Accelerator Vacuum Switch Setting–*See data n ach carburetor type in Carburetion S cti n.*

Dynaflow Neutral Safety & Back-Up Light Switch: (1954) Delco-Remy 1998025 at lower end of steering column. (1955) Delco-Remy 1998101, mounted on steering column jacket under cowl. Switches are connected in starter control circuit so that starter operative only when selector lever in "N" Neutral, or "P" Parking position.

Adjustment–*See "Buick Dynaflow Drive" in Transmission Section.*

►*NEUTRAL SAFETY & BACK-UP LIGHT SWITCH CONNECTION CAUTION: Wires must be connected in correct order as shown on wiring diagram.*

GENERATOR

Delco-Remy 1102008 (Without Air-Conditi ning). 1102006 (With Air-Conditioning). *12 Volt.*

Generator No.	Armatur N .
1102008 ℄	1923535
1102006	1925210

℄–With pulley. Delco-Remy 1102005(without pulley).

Performance Data–C ld

Amperes	Volts	RPM
30 ℄	14 .	2150

℄–Not maximum. See Regulator.

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Brush Spring Tension—24-32 ozs.

Field Current—1.48—1.62 amperes at 12 volts.

Rotation—Counter-clockwise at commutator end.

Belt Adjustment: 3/8" belt deflection with normal thumb pressure midway between generator and fan pulleys.

REGULATOR

Delco-Remy 1118825. *NOTE—Regulator is "1118825 Series". Specifications below are for "Normal" settings.*

Cut-out Relay

Cuts In—12.8 volts (hot).

Contact Gap—.020".

Air Gap—.020" (with contacts just closed).

Voltage Regulator

Setting—14.5 volts (hot).

Air Gap—.075" with armature pressed down to point where contacts just opening.

Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—30 amperes (hot).

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*

Direction Signal: *See Electrical Equip. Section.*

Lighting Switch Removal: Disconnect battery cable from junction block and disconnect wires from lighting switch. Pull switch knob out to last notch, then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch. Remove switch mounting nut with wrench J1589 and remove switch and escutcheon from instrument panel.

Stop Light Switch: (Location)—On brake pipe distributor fitting near master cylinder on left side at transmission support.

FUSES: Located on fuse panel under cowl unless otherwise specified.

Back-Up Light—9 amps.

Dome & Luggage Compartment Light—20 amps.

Electric Clock—2 amps.

Heater & Defroster—9 amps.

Parking Brake Warning Signal—9 amps.

Stop & Directional Signal Lamps—9 amps.

Cigar Lighter—Special Fuse (in back of lighter).

Glove Box Light—2 amps. (in wiring connector).

Air Conditioner Feed—20 amps. (in wiring connector near controls).

Air Conditioner Temp. Control—2 amps. (in wiring connector near controls).

Power Brake Vacuum Pump—14 amps. (in wiring connector near fuse block).

CIRCUIT BREAKER: 22 amps. Located in headlamp switch.

HORNS: Delco-Remy 1999755 (Low Note), 1999756 (High Note). *12 Volt.*

Horn Relay: Delco-Remy 1116781. *12 Volt.*

Contacts Close—2.75-4.0 volts.

Contact Gap—.025". **Air Gap**—.015" (closed).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►***1954 IMPROVED VALVE STEM LUBRICATION: Rocker Arm shaft diameter decreased on later engines. See "Valve System" in Buick Special Data.***

►***1955 ENGINE KNOCK ON STARTING CORRECTION:* This noise may be present after starting an engine that has not been in operation for at least 30 minutes, and may last as long as 10 seconds. This noise is usually accompanied by a lack of oil pressure and disappears when pressure rises. It is recommended that bearing clearances be checked and undersize inserts be installed where clearance is found to exceed .0025". *Before proceeding with the above bearing check, make sure that the exhaust heat manifold control thermostat spring is not broken as this condition may cause the same noise as bearings.***

ENGINE SPECIFICATIONS: Own 90° V8 (All Series).

Series	Bore	Stroke	Displmnt.	Rated HP.
40	3.625"	3.2"	264 cu.ins	42.05
50, 60, 70	4.000"	3.2"	322 cu.ins.	51.2

Series	Compr.Ratio	Developed HP
1954 40 Synchro-mesh	7.2-1	143 at 4200 RPM
1954 40 Dynaflow	8.1-1	150 at 4200 RPM
1954 50 Synchro-mesh	8.0-1	177 at 4100 RPM
1954 50 Dynaflow	8.5-1	182 at 4100 RPM
1954 60 Synchro-mesh	8.0-1	195 at 4100 RPM
1954 60 & 70 Dynaflow	8.5-1	200 at 4100 RPM
1955 40 Synchro-mesh	7.5-1	
1955 40 Dynaflow	8.4-1	188 at 4800 RPM
1955 50 Synchro-mesh	8.4-1	
1955 50 Dynaflow	9.0-1	236 at 4600 RPM
1955 60 Synchro-mesh	8.4-1	
1955 60 & 70 Dynaflow	9.0-1	236 at 4600 RPM

Compression & Vacuum Reading—*See TUNE-UP.*

►*ENGINE IDENTIFICATION NOTE:* See Engine Number for suffix digit designating each series. Series 40 engine also has vertical groove 3/8" wide and 1/8" deep) cast in engine number pad approximately 1¼" to rear of pad centerline.

►*ENGINE COMPRESSION RATIO NOTE:* Same cylinder head used for all engines, different compression ratios secured by use of different pistons (Series 40), different head gaskets (50,60). *See Cylinder Head and Piston data below.*

►*ENGINE PARTS INTERCHANGEABILITY:* Parts are interchangeable on Series 50, 60, 70 engines and are also used in Series 40 engine with following exceptions: Cylinder Block, Pistons, Pins, Rings, Harmonic Balancer (Pulley used on Series 40), Camshaft, & Flywheel.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data*

OIL PAN REMOVAL: Disconnect steering idler arm bracket from right frame side rail and lower steering linkage for clearance, then remove pan. *CAUTION*—Do not allow bracket to turn on idler arm (will change toe-in adjustment).

►*OIL PAN PRODUCTION CHANGE & REPLACEMENT PARTS NOTE:* Later type oil pans for production cars and for service replacement have 18 attaching bolt holes which replaces the early type pan having 24 attaching bolt holes. Both type pans are interchangeable

CYLINDER HEAD & GASKET: Cylinder Head No. 1391745 (1954) used on all 1954 engines. Cylinder Head No 1391947 (1955) used on all 1955 engines. Different compression ratios secured by using special head gasket as listed below (except Series 40 where same gasket used with different pistons).

Series	Compr.Ratio	Cyl. Head Gasket No.
1954 40 (All)	7.2-1 & 8.1-1	1343484 (.015")
1954 50, 60	8.0-1	1343995 (.045")
1954 50, 60, 70	8.5-1	①1343484 (.015")
1955 40 (All)	7.5-1 & 8.4-1	1165307 (.015")
1955 50, 60	8.4-1	1391261 (.045")
1955 50,60,70	9.0-1	①1165307 (.015")

①—Low Compression (Export) No. 1343995 (.045").

Cylinder Head & Gasket Installation—*See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Pistons—Aluminum alloy, dome head, cam ground, full skirt with transverse slots in oil ring groove, Anodized finish.

►*SERIES 40 PISTON CAUTION: Special HIGHER DOME pistons used in high compression (8.1-1 & 8.4-1) engines. Lower compression (7.2-1 & 7.5-1) pistons can be identified by letters "L.C." on top shoulder of piston on valve side.*

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with ⅛" long dash following engine number have .010" Oversize Cylinder Bore and Pistons. Standard cylinder bore size (40) 3.6235-3.6265", (50, 60, 70) 3.9985-4.0015".

►*REPLACEMENT PISTON NOTE:* Pistons not changed by Piston Pin Production Change (See Piston Pins below for later Press-fit type) and same piston and pin fitting data applies to both types.

Removal—Pistons and rods removed from above.

►*CAUTION*—Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.

Fitting New Pistons: Clearance .0007-.0017". If micrometer used on pistons, measure at top and bottom of skirt 90° from pin hole (top diameter very slightly

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less than bottom in service). Use .003" x ½" x 12" feeler gauge to fit pistons with cylinder block in normal position. Insert feeler on lower side of bore 90° from piston pin hole. Pull to withdraw feeler should be 7-13 lbs. at 70°F. (piston and bore clean and dry).

Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and .005", .010", .020", .030" Oversize. *NOTE*–Pistons furnished only with fitted pins.

Installing Pistons: Assemble pistons on rods with valve depressions in head on same side as clamp bolt in rod. Install pistons with valve depressions toward camshaft. *See Rod Installation.*

PISTON PINS

►***1955 PISTON PIN PRODUCTION CHANGE & REPLACEMENT CAUTION:*** Clamp-bolt Piston Pins (clamped in rod) used on 1954 & Early 1955 cars, Press-fit Piston Pins (pressed in rod) used on later 1955 Cars *See "Piston Pins" in Buick Special Data for non-interchangeability cautions and special servicing data.*

Diameter–.940". **Length**–3.100" (40), 3 400" (others)
Clearance in Piston– 0003- 0005" or easy finger push fit at 70°F. *NOTE*–Pin fit in piston is same for both early Clamp-bolt and later Press-fit pins.

Piston Pin Removal & Installation (Later Press-fit type Pins): *See "Piston Pins" in Buick Special Data. CAUTION–Pistons may be damaged if special proc dure and tools not used.*

Replacement Pins: (Clamp-bolt Type) Std. & .003", .005" Oversize. **(Press-fit Type)** Std. size only. Fitted pins furnished with all pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr	.078'	010- 020"	002- 004'
Oil	186"	015- 035"	0035 0095

►*OIL RING NOTE* Ring is three-piece (two rails and spacer) with expander. New rings are cemented assembly for ease in handling (will separate in service).

Replacement Rings: Production type rings furnished singly and in sets Standard & .010", .020", .030' Oversize. Special Service Ring sets furnished Standard (use up to .019" O.S.), & .020", .030" Oversize.

Installing Rings: Compression ring groove or bevel (on inner edge) upward. Oil ring expander gap ends should be at either end of piston pin (in unslotted portion of groove) and side rail gaps must be on valve depression side of piston (upward when installed in cylinder).

CONNECTING RODS

►***1955 CONNECTING ROD PRODUCTION CHANGE & REPLACEMENT CAUTION:*** **Different rods used with 1954 and Early 1955 Clamp-bolt Piston Pin and Later 1955 Press-fit Piston Pin. Later type rods only will be furnished for service. *See "Piston Pins" in Buick Special Data for special pin removal and installation data.***

Length–6" **Weight**–22.16 ozs.
Crankpin Journal Diameter–2.249-2.250"
Out-of-round limit .0015".
Bearings–Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.
Clearance–.0002- 0023' (service limit .003")
Side play–.004- 008' (total for both rods)

Replacement Bearings: Standard & .001", .002", .020", .021" Undersize. Size is stamped on back of bearing at or near tang.

Installing Rods: *See Installing Pistons above.* Install bearing cap with ridge on edge of cap on same side as conical boss on web of rod, install assemblies in engine with this ridge & boss toward other connecting rod on same crankpin and with rod clamp bolt toward camshaft (valve depressions in piston head must also be toward camshaft).

CRANKSHAFT

►***1955 WORN REAR MAIN BEARING THRUST SURFACE CORRECTION (caused by misalignment of rear main bearing cap):*** **Align the thrust faces as follows: Assemble crankshaft and all main bearing caps leaving rear main bearing caps loose. Use a bar or wedge and force crankshaft as far to rear as possible (this will align front thrust faces since bearings and caps are free to move axially). Force crankshaft as far forward as possible and while holding crankshaft in the forward position, tighten rear main cap bolts to specified torque.**

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars): See "Engine Balancing" in Buick Special Data.*

Journal Diameter–2.498-2-499". Five bearings. Out-of-round limit .0015".
Bearings–Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.
BEARING NOTE–Bearing upper halves can be rotated out and in by using tool KMO-734 in oil hole.
Clearance–.0005-.003' (service limit .0036").

Replacement Bearings: Standard & .001", .002" Undersize. *NOTE*–First four bearings identical and interchangeable. Rear bearing longer and flanged.

End Thrust: Taken by rear (#5) flanged bearing.
Endplay–.004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data*

CAMSHAFT

►***CAMSHAFT REPLACEMENT CAUTION:*** Replacement camshafts are alloy iron and are furnished in kits (containing new pushrods, distributor drive gear, and special lifters) as follows: No. 1388706 (Series 40), 1388887 (1954 Series 50, 60, 70, 100 & 1955 Series 50 & 60, Synchro-Mesh), 1388888 (1955 Series 50, 60, & 70 Dynaflow). Parts not interchangeable.

►***CAMSHAFT IDENTIFICATION NOTE & NON-INTERCHANGE CAUTION:*** **Camshafts are identified by grooves in land just forward of No. 3 journal as follows: 1954-55 Series 40–1 groove 1954-55 Series 50, 60 Synchro-mesh–No groove. 1954 Series 50, 60, 70 Dynaflow–No groove. 1955 Series 50, 60, 70 Dynaflow–2 grooves. Do NOT use Series 40 camshaft in other engines.**

Journal Diameters–(1) 1.685-1.686", (2) 1.655-1.656", (3) 1.625-1.626", (4) 1.595-1.596", (5) 1.565-1.566".
Bearings–Steel-backed, babbitt lined bushings.
Clearance– 0005-.0035" (service limit .0015-.004").

End Thrust: Spacer ring installed on shaft between front bearing journal and thrust plate bolted to crankcase behind camshaft sprocket. **Endplay**–.004-.008'.

Timing Chain: Link Belt. **Width** .688", **Pitch** .500" **Length** 26" or 52 links.

Camshaft Setting: Mesh chain on sprockets with two copper-plated washers (12 links apart) in line with "O" marks on sprockets with marks toward left side of engine. Turn camshaft so that keyway is straight downward, turn crankshaft so that #1 and #4 pistons are on top dead center, install sprockets and chain as an assembly.

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diameter	Stem Diameter	Length
Intake	1 750"	3720"	4 704"
Exhaust	1 375'	3715"	4 704"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.0025"
Exhaust	45°	②	0030'

①–Series 40 - 358" Series 50, 60, 70 - 378"

②–Series 40 - 350" Series 50, 60 (Synchro-mesh) 350" Series 50, 60, 70 (Dynaflow) - 378'

Valve Seat Width–1/16" (3/64-5/64").

►*VALVE GRINDING CAUTION:* If height of valve stem end raised .075" by valve grinding, height must be reduced by grinding end of stem or replacing valve to insure correct operation of hydraulic lifter.

Valve Springs: Double springs used on all valves. Install springs with closed-coil end toward cylinder head.

Valve Spring Specifications

Valve	Inner Spring Lbs.Press.	Inner Spring Length	Outer Spring Lbs.Press.	Outer Spring Length
Closed	19.5-24.5	1.53"	37.5-42.5	1.5"
Open	53-59	1.15"	85-91	1.12"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3.

Hydraulic Valve Lifters: Barrel type.
Diameter–.8425". **Clearance in Block**–.0015-.003".
Lifter Overhaul & Testing–*See "Valve System" in Buick Special Data*

►*VALVE GRINDING CAUTION See Valves (above).*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

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VALVE TIMING

S *"Camshaft S tting" und r CAMSHAFT abov .*

1954-55 Series 40 ①

Intak Valv s—Open 25° BTDC. Close 67° ALDC.
Exhaust Valv s—Open 70° BLDC. Close 42° ATDC.

1954-55 S ries 50, 60 (Synchro-mesh) ①
1954 Seri s 50, 60, 70 (Dynaflow) ①

Intake Valves—Open 25° BTDC. Close 77° ALDC.
Exhaust Valv s—Open 70° BLDC. Close 42° ATDC.

1955 Seri s 50, '60, 70 (Dynaflow) ①

Intak Valv —Open 28° BTDC. Close 79° ALDC.
Exhaust Valv s—Open 75° BLDC. Close 42° ATDC.
①—Timing points are with valve .004" off seat.

Valve Timing Check—Timing chain cover must be removed to check chain and sprocket marks. *See Camshaft Setting under CAMSHAFT above.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcas Capacity: 6 qts. (refill), 8 qts. (dry engine). NOTE— 1 qt. additional for dry filter.

Normal Oil Pr ssure: 35 lbs. at 35 MPH.

Pressure Regulator Valve: In oil pump body. Not adjustable.

Oil Pr ssur Indicator—(1954) AC No. 1508046 (Series 50 & 70). No. 1508115 (Series 40, 60, 100). **(1955)** AC No 1508238 (Series 40, 60). No. 1508226 (Series 50, 70). Not electrical.

Oil Pump· Helical gear (early cars), spur gear (later cars), in crankcase at rear of engine
Pump Overhaul—*See "Oiling System" in Buick Special Data.*

Oil Filt r: Full-flow. On pad at right rear of engine. NOTE—Ball check valve in filter base by-passes oil directly to engine when pressure differential between inlet and outlet ports reaches 1½ - 5½ lbs.
Replac m nt Filt r El ment—AC No. PF-122.

Crankcas Ventilati n: Filter element in oil filler cap (air intake) and in rear end of valve lifter cover (air outlet) to which ventilator pipe is connected.

COOLING

Wat r Capacity: (Synchro-mesh Cars) 16 5 qts (without heater), 18 qts. (with heater), **(Dynaflow Cars)** 18 5 qts. (without heater), 20 qts. (with heater)

Pr ssur Valve: AC No 850549 (7 lb —Without Air Conditioning), No 850559 (13 lb —With Air Conditioning) Radiator Filler Cap

Th rm stat: Pellet type in water manifold above pump. (Std.) Buick No. 1391226 opens at 157-162°F. (High Temp.) Buick No. 1391225 opens at 177-182°F.

Wat r Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Buick Special Data

Pump Removal—Remove fan blade assembly, spacer, and pulley from pump shaft hub, then remove pump co er assembly and gasket from timing chain cover.

T mp ratur Gaug (1954): AC No 1512808 (Series 40, 60, 100), No 1512736 (Series 50, 70) Not electric
Se "Temperature Gaug s" in Miscellaneous Section.

Temp ratur Gauge (1955): AC No 1512971 (Series 40, 60), No 1512948 (Series 50, 70) Not electric. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Own. (Series 40) "Crown" spring, (Series 50, 60) conventional springs.
See "Buick Crown Spring" & "Buick Single Plate" in Clutch Section.

Clutch Disc No.—1393704 (Series 40), 1391632 (Series 50, 60).

Pedal Adjustment—Free travel ⅞-1". Adjust by loosening locknut and turning adjusting nut on release rod at clutch fork.

Removal—Remove rear axle and transmission (See below), take off clutch underpan, disconnect linkage at yoke, remove clutch release bearing support by taking out spring washer in housing, pull out yoke (with release bearing) from fulcrum, mark clutch and flywheel, remove cover mounting screws.

►*Series 40 Installation Note — Install release bearing with rounded surface to contact "Crown" spring.*

SYNCHRO-MESH TRANSMISSION

Own. Series 40 transmission differs in design and size with series 50, 60 *See "Buick 40" and "Buick 50" Synchro-mesh in Transmission Section*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal:· Disconnect and remove rear axle assembly. On Series 40 only, place shift lever in neutral, and remove toggle spring and extension, shift lever and selector lever for increased clearance. All cars, remove thrust pad and shims from trans. support. Disconnect discharge and suction lines from compression on "Air-Conditioned" cars, to prevent damage to flexible adapters. *See "Frigidaire Air-Conditioning" in Miscellaneous Section before disconnecting lines.* Remove nuts securing transmission to support. Lift engine to raise transmission off of support. Remove support noting location and number of shims. Remove transmission to flywheel housings bolts, pull transmission back and lower to remove.

DYNAFLOW DRIVE

1954 Series—"Twin-Turbine" Dynaflow Drive. Torque converter and hydraulically operated planetary transmission *See "Buick (Twin Turbine) Dynaflow" in Transmission Section.*

1955 Series—"Variable Pitch" Dynaflow Drive. Torque converter and hydraulically operated planetary transmission. A two position (high & low) stator is used in the torque converter to multiply engine output torque when required (controlled by accelerator pedal at wide open position). *See "Buick (Variabl Pitch) Dynaflow" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick Twin Turbine Dynaflow" (1954), "Buick Variable Pitch Dynaflow" (1955) in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

Throttle Linkage Adjustment and Dash Pot Setting on Dynaflow Drive Cars. *See "Tune-up".*

Lubrication—Check fluid level in transmission every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level—Engine must be idling with selector lever at "P" (parking) and transmission at normal operating temperature. Add oil to "Full" mark on dip stick only.

Capacity—10 quarts.(Add 1¾ pints for dry transmission). *Use only Special Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type A.*

►*OTHER DYNAFLOW SERVICE DATA: See "Buick Twin Turbine Dynaflow" (1954), "Buick Variable Pitch Dynaflow" (1955) in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. One used (in torque ball at rear of transmission).

Torque Ball Adjustment—*See Buick Special Data.*

REAR AXLE

Own Make: Semi-floating type with Hypoid gear and torque tube drive.
See "Buick Hypoid" in Rear Axle Section.

►*REAR AXLE HOUSING FILLER PLUG TIGHTENING CAUTION Plug will break if tightened excessively. Correct torque is 20-30 ft. lbs.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS· See "Buick Hypoid" in Rear Axle Section.*

►*1955 SERIES 50, 60 & 70 REAR AXLE RATIO PRODUCTION CHANGE AND SERVICE REPLACEMENT NOTE·* A 3 36-1 ratio rear axle ring gear and pinion replaces the 3 4-1 ratio unit used in early cars *See "Buick Hypoid" in Rear Axle Section.*

	Rear Axle Ratio		
Model	Series	Synchro-mesh	Dynaflow
1954-55	40	3 9-1	3 6-1
1954, Early 1955	50 & 60	3 9-1	3.4-1
1954, Early 1955	70		3 4-1
Late 1955	50 & 60	3 9-1	3 36-1
Late 1955	70		3.36-1
1954	100		3.6-1

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R ar Axl Rati N t –*Ratio is stamp d on bottom of axl h using. Example 3/9 indicat s a 3.9 to 1 ratio.*
Backlash–.008-.010" desired, .008-.012" maximum.
Axle Shaft Removal: Axle shaft lock washer at inner end of axle. *See "Buick Hypoid" in Rear Axle Section for disassembly procedure.*
R ar Axle Assembly Removal: Raise rear end of car and place car on stands. Disconnect parking brake cable at rear brake sheave and at bracket on front end of torque tube, hydraulic brake line from pipe at X member and remove retainer. Disconnect lower end of shock absorber links, rear radius rod at axle end, lower end of chassis springs, and torque tube from torque ball. Hoist rear end of car and roll axle assembly out.
Wheel Bearing Adjustment–None
R ar Suspension: *See "Buick Rear Suspension" in Rear Axle Section.*

SHOCK ABSORBERS

Delco. Direct-acting hydraulic (front). Double acting "parallel cylinder" (rear). New independent front shocks mounted within coil springs.

Buick Shock Absorber Nos.

Model	Front	① Rear
40, 60 (Exc 49, 69) Std	5515818	5594488, 89
49, 69	5329769	5519694, 95
50, 70 Std	5329769	5519694, 95
40, 60 (Exc 49, 69) ②	5329769	5519694, 95
50, 70 ②	1076248	5511194, 93

①-Right and Left respectively.
②-Used with Export High & Overload Spring.

FRONT SUSPENSION

Independent. New design with Direct Acting Shock Absorbers. Independent upper control arm with Shock Absorbers within coil springs.

See "Buick" in Front Suspension Section.

►*FRONT STABILIZER BAR INTERFERENCE WITH RADIATOR OUTLET HOSE:* Install necessary spacer between bar and frame to provide a clearance of 3/16" between bar and hose Longer bracket mounting bolts mounting bolts will be required for proper assembly

►*ADJUSTMENT CAUTION: Check Spring height and position of Idler Arm before changing adjustments.*

King Pin Inclination–0° crosswise at 7/8° Camber.
Caster–1/4° Neg. desired. (1/2° Pos. to 3/4°Neg.).
Camber–3/8° Pos. desired. (7/8° Pos. to 5/8° Neg.) Both wheels to be within 3/4° of each other.

Toe-In: (1954) 0" to 1/16". **(1955)** 1/16" to 1/8" *1955 NOTE–This supersedes previous setting of 0"-1/16".*
Toe-out on Turns–Outer wheel 20°, inner wheel 22½° ± 3/4°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut type.
See "Saginaw Ball Bearing Worm & Nut" in Steering S ction.

►*1955 STEERING COLUMN RATTLE CORRECTION (SHIFT CONTROL HOUSING): S "Buick Variabl Pitch Dynaflow" in Transmission S ction.*

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic power cylinder. *See "Saginaw (GM) Power Steering" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*
Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor): Conventional two shoe with short molded lining front (Primary) and long molded lining rear (Secondary). Parking "Step-On" lever applies rear wheel service brakes.
See "Bendix Hydraulic (Without Eccentric)" in Brake Section.

►*BRAKE LINING REPLACEMENT CAUTION (POWER BRAKE MODELS)* Special front wheel primary linings are used which can be identified by BROWN edge

NOTE–Rear wheel primary linings are same as used on cars without Power Brakes and have WHITE edge All secondary linings (with & without Power Brakes) have YELLOW edge

Drums–Diameter 12" Rebore limits. .060
Wheel Cyl. Diameter–Front 1-1/8", Rear 1".
Replacement Lining & Shoes–Linings or shoes with linings come in Standard and .030" oversize, and differ between Regular and Power brakes, as well as between car Series.

Lining Width & Thickness

Model	Front	Rear
50,60,M/100	2.25" X 0.187"	2.25" X 0.187"
40	2.25" X 0.187"	1.75" X 0.187"
70	2.50" X 0.25"	2.25" X 0.187"

Braking Power–57% Front, 43% Rear.
Clearance–Heavy drag and back off 15 to 17 notches.

Standard Master Cylinder–On bracket on left side of frame near transmission support.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat. (Move seat back and fold mat to expose hole cover). Fluid level should be ½-1" below top of filler opening.
Removal–Remove from beneath car. Not necessary to disturb other parts.

P w r Brak s (1954): Kelsey-Hayes Vacuum Suspended type power brake cylinder (replaces conventional master cylinder) *S "Buick Power Unit" in Brak S ction.*

P w r Brak s (1955): Moraine Air Suspended type power brake unit (replaces conventional master cylinder). A separate vacuum reservoir is located under hood on left side *See "Moraine Pow r Unit" in Brake Section*

Checking Fluid–Maintain fluid level 1" below top of separate reservoir tank on left side under engine hood.

Removal of Power Unit–Remove cranking motor splash pan. Disconnect return spring, loosen lock nut on cylinder push rod, remove clevis pin at brake pedal, then unscrew push rod from cylinder push rod. Disconnect air inlet hose at air filter on brake cylinder and disconnect hoses from vacuum tee on opposite side of cylinder Disconnect reservoir to hydraulic cylinder pipe and allow reservoir and pipe to drain. Disconnect distributor to cylinder pipe and allow to drain. Discard old fluid and cover pipe ends with tape. Remove nuts and lock washers attaching power cylinder to its support and remove cylinder from car

Electric Vacuum Pump (1954): Moraine or Trico. Pump is connected in engine intake manifold vacuum line and supplements vacuum supply or provides vacuum when engine not running *S "Buick P w r Unit" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers–Cable operated Vacuum type, *S "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning–Frigidaire type with solenoid controlled compressor clutch (compressor operates only with air-conditioning switch turned on. *S "Frigidaire Air-Conditioning" in Miscellaneous Section.*

Power Window Regulators: Two systems used:
Electric (1954-55)–Reversible motor in each window. *See "GM Electric Window R gulators" in Misc l-laneous Section.*
Hydro-Lectric (1954)– Window raised hydraulically, lowered by return spring Motor and pump assembly mounted on left side of firewall. *S "Hydro-L ctric Top Control (With Window & S at C ntr l)" in Miscellaneous Section.*

Power Seat Adjusters: Two systems used:
Electric (1954-55)–Individual motors for vertical and horizontal adjustment *Se "GM El ctric S at R gulators" in Miscellaneous S ction.*
Hydro-Lectric (1954)–Hydraulic type with individual cylinders for vertical and horizontal adjustment *S "Power Top Control (With Window & S at Contr l)" in Misc llan ous S ction.*

P w r T p C ntr l: Hydro-Lectric type *S "Pow r Top Control" in Misc llaneous S ction.*

►*AIR CONDITIONED CAR SERVICE CAUTION: B for disconn cting any part f air conditioning equipment or lines f r acc ss to ngine, see "Air C nditioning S rvice Cauti ns" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front door pillar post and on left frame side rail.
Starting Serial Numb r–001001 (at each plant).

►*SERIAL NUMBER NOTE: Serial number (example 4C2001001) includes the following identification data in s quence:*

Series ①	Year ②	Assy. Plant ③	Serial No.
4	C	2	001001

①–See Series Designation following.
②– Year designation (1956).
③–See Assembly Plant Designation following.

S ries Designation

4–40 Special	6–60 Century
5–50 Super	7–70 Roadmaste

Assembly Plant Designation

1	Flint	5	Wilmington
2	South Gate	6	Atlanta
3	Linden	7	Framingham
4	Kansas City	8	Arlington

ENGINE NUMBER: Stamped on outside of left bank of cylinders on extension of top face of block between middle branches of exhaust manifold.

►*ENGINE NUMBER NOTE: Dash following engine number indicates that cylinder bores and pistons are .010" Oversize. NOTE–Do not confuse dash with vertical groov on pad designating Series 40.*

TUNE-UP

►*DETONATION CORRECTION (ALL SERIES): See "Ignition Not s" in Buick Special Data.*

►***STALLING & LOADING UP DURING FIRST FEW MILES IN COLD WEATHER CORRECTION (CARS WITH ROCHESTER CARBURETOR): Install Choke Modification Kit, Part No. 7009948. See "Rochester 4GC Carbur t r" in Carbur tion Section.***

►***ROUGH ENGINE IDLE CORRECTION: This condition may b caus d by th us of an incorrect vacuum switch pist n which all ws a vacuum leak at the switch. Th piston used n Carter 4-Barrel Carb., has a horizontal sl t while the piston used with all other carbur tors is sl tt d v rtically.***

►***SPARK PLUG CABLE ROUTING (To prevent misfiring): S "Igniti n Not s" in Buick Special Data.***

COMPRESSION PRESSURE: 140 lbs. (Series 40 Synchromesh); 160 lbs. (Series 40 Dynaflow); 170 lbs. (Other Series). At cranking speed (140 RPM). All cylinders must be equal within 10 lbs.

VACUUM READING: 15.5" (minimum) with engine idling at 450 RPM. *NOTE - This is lower than for previous mod ls and is caus d by new engine design.*

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely.

IGNITION

►*BURNED DISTRIBUTOR ROTOR TIP CORRECTION (May b caus d by impr per distribut r cam):* If distributor rotor is badly burned at one corner of the tip, check to determine if the proper cam is being used. *See "Ignition Notes" in Buick Special Data.*

FIRING ORDER: 1-2-7-8-4-5-6-3.
Cylinders–RIGHT BANK 1-3-5-7. LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .030-.035".
Spark Plugs - AC 44. 14 mm. Torque to 25 ft. lbs.

COIL: Delco-Remy 1115087. *12 Volt.*
Ignition Current–2.5 amps. idling, 4.5 amps. stopped.
Resistor–Delco-Remy 1927809. On cowl near ignition coil. Resistance 1.4-1.65 ohms, at 75°F.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by a lead from starter solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110861. *12 Volt.*
Condenser–Delco-Remy 1869704 (Closed-end terminal), 1928111 (Open-end terminal). **Capacity** .18-.23 mfd.
Contact Point Set–Delco-Remy 1924499.
Breaker Gap–.0125-.0175".
Cam Angle–26-33° (with .016" gap).

►*BREAKER GAP CAUTION:* Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set point gap.
Breaker Arm Spring Tension–19-23 ozs.
Rotation–Clockwise viewed from above.

►*DISTRIBUTOR REMOVAL NOTE:* Removal of distributor can be facilitated by use of Special Wrench J-5727 (Kent-Moore) or S-9832 (Snap-On).

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1.5	375	0-3	750
6-8	850	12-16	1700
9.5-11.5	1450	19-23	2900
11-13.5	1750	22-27	3500

Vacuum Spark Control: Delco-Remy 1116090.
Plunger Travel–7/32".

►*1956 DISTRIBUTOR 1110861 VACUUM ADVANCE CHECKING CAUTION:* When checking vacuum advance on these models, distributors marked by a daub of green paint on the vacuum unit will have a different advance curve (vacuum advance operates at a lower Engine RPM). This is due to installation of a different Vacuum Control Diaphragm Spring No. 1921119 (replacing original spring No. 1930435) for slight improvement in low speed economy and performance.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6.5-8.5
9-10.5	18-21	11.5-15

IGNITION TIMING

Setting–5° BTDC exactly.

►*DETONATION CORRECTION:* Ignition timing can be retarded to TDC without noticeable loss in performance.

►*IGNITION TIMING CAUTION: Lower engine idle speed to not xceed 350 RPM when setting ignition timing with timing light. Reset to 450 RPM wh n completed.*
Timing Mark–Timing indicator marked with four lines indicating 0°, 2.5°, 5°, 7.5° BTDC, located on right side of timing chain cover below fuel pump. Line up mark on fan drive pulley (Series 40), harmonic balancer (other series) with correct line (5°) on timing indicator for normal operating conditions.

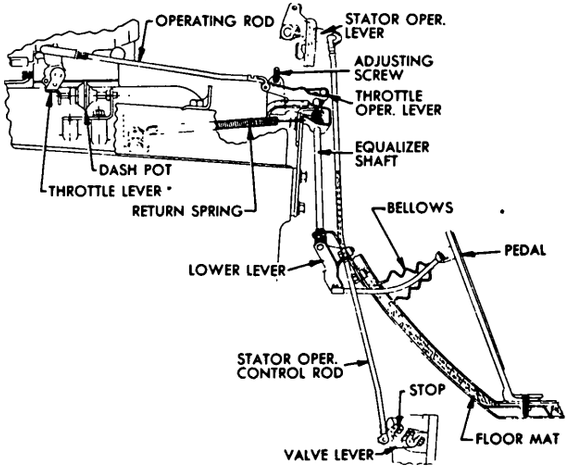
►***CHECKING FOR IMPROPERLY LOCATED TIMING MARKS ON ENGINE BALANCER: See "Ignition Notes" in Buick Special Data.***

CARBURETOR

►*CARBURETOR APPLICATION: "Carter" and "Stromberg" 2-Barrel carburetors used on Series 40. "Carter" and "Rochester" 4-Barrel carburetors used on other Series.*

►*1956 SERIES 40 & 60 FAILURE TO OBTAIN FULL THROTTLE CORRECTION: If a Series 50 & 70 accelerator pedal stop is installed on Series 40 & 60, throttle cannot be opened fully. Series 50 & 70 stops is 1 1/8" long. Series 40 & 60 stop is 5/8" long.*

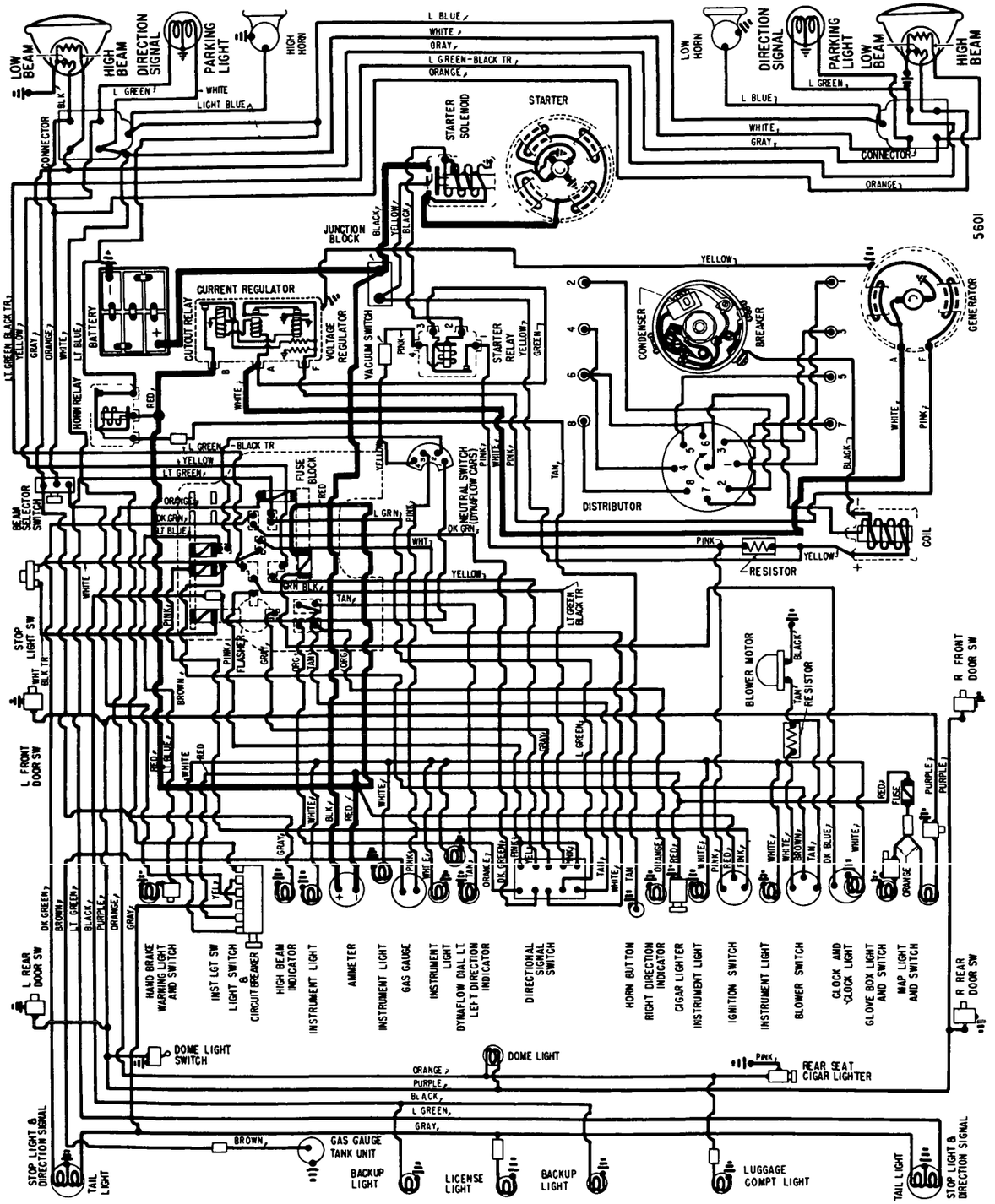
►***WATER IN AUTOMATIC CHOKE HOUSING CORRECTION:* This condition is caused by improper location of heat tube which is pressed into exhaust manifold. Correct by replacing exhaust manifold.**



DYNAFLOW THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT: Adjust idle speed to 450 RPM. Disconnect throttle return spring. Disconnect throttle rod from lever on equalizer shaft. Back off stator pick-up lever adjusting screw on Dynaflow cars until screw end is flush with lever. Adjust throttle rod at carburetor so 5/8" of thread is exposed. Press accelerator against floor mat, hold throttle wide open and hold rod at hole in operating lever. Adjust lever on equalizer shaft to obtain 1/16" distance between rod and hole in lever. Tighten clamp and connect rod. With throttle closed to idle position, a minimum clearance of 1/16" must exist between equalizer lower lever and stop lug in mounting bracket. Adjust operating rod as necessary to obtain this clearance. On Dynaflow cars, depress accelerator pedal against floor mat, then turn stator pick-up lever adjusting screw against lever until all vertical play is removed from stator operating rod. Turn screw back 1/2 turn.

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DASHPOT ADJUSTMENT (Dynaflow Cars): Adjust dash pot only after throttle linkage has been adjusted and engine is at normal operating temperature. Rotate fast idle cam to extreme cold idle position (choke closed), hold throttle lever against .030" feeler gauge placed between stop screw and highest step of fast idle cam Adjust dashpot until it just clears arm of throttle lever, tighten locknut. With transmission in Direct Drive and brakes firmly applied speed engine up to about 1500 RPM and immediately release throttle, noting engine operation as throttle valves close. If engine stalls from too rapid closing of throttle valves, move dashpot forward until its action prevents engine stalling. If excessive time is required for throttle valves to reach closed position, move dashpot rearward Tighten locknut after each adjustment If proper control cannot be obtained by adjustment, replace dashpot.

CARTER 2-BARREL WGD
2378S (Synchro-mesh), 2400S (Dynaflow)

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7. LEFT barrel 2-3-5-8.*
Idle Setting– ¼-1¼ (2378S), ½-1½ (2400S) turns open Adjust both screws alike. Turn screws out for richer mixture
Idle Speed–450 RPM (Selector lever in Neutral on Dynaflow Cars)
Float Level–¼" (Gauge T109-31) between top of float (at center) and bowl cover.
Fast Idle Setting: .015" throttle opening or clearance between valve and wall on side opposite idle ports with choke valve tightly closed. Adjust by bending choke connector rod at lower angle.
Automatic Choke Setting: Centered (on index).
►*OTHER DATA: See "Carter WGD Carbur tors" in Carburetion Section.*
Dynaflow Throttle Linkage Adjustm nt: *S CARBURETOR above.*
Fuel Pump Pressure: 4½ - 6½ lbs. at pump outlet.

STROMBERG WW
Code 7-105 & 7-105A

►*1956 SERIES 40 (EARLY) LEANNESS CORRECTION (Cars with Code 7-105 Carburetors):* Install carburetor kit, Buick Part No 1392722 consisting of new idle tubes, main metering jets, and main discharge jets After modification, change Code No to 7-105A
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8*
Idle Setting–1¾ turns. Adjust both screws alike. Turn screws out for richer mixture.
Idle Speed–450 RPM (Selector lever in neutral on Dynaflow Cars)
Float Level–3/16" below top edge of bowl (without gasket), with needle valve seated
►*OTHER DATA: See "Stromb rg WW (Buick) Carburetor" in Carburetion Section.*
Dynafl w Thr ttl Linkag Adjustm nt: *See CARBURETOR ab v .*
Fu l Pump Pr ssur : 4½ - 6½ lbs. at pump outlet.

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CARTER WCFB 4-BARREL 2347S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels 2-3-5-8.*
Idle Setting—1 1/8 turns open Adjust both screws alike. Turn screws out for richer mixture.
Idle Speed—450 RPM with Dynaflow Selector lever in neutral
►*OTHER DATA: See "Carter WCFB Carburetor" in Carburetion Section.*
Dynaflow Throttle Linkage Adjustment: *See CARBURETOR above.*
Fuel Pump Pressure: 4½ - 6½ lbs. at pump outlet.

ROCHESTER 4GC 4-BARREL 7009200

►*STUMBLE ON LIGHT ACCELERATION (DURING COLD WEATHER) CORRECTION:* Change the accelerating pump spring from .041" to .042" wire diameter. *See "Rochester 4GC Carburetor" in Carburetion Section.*

►*STALLING OR LOADING UP WITH COLD ENGINE:* Install new Automatic Choke parts. See "Rochester 4-Barrel Carburetor on Pg. 82. NOTE: Carburetors stamped "C" on lower left corner of brass tag have these new parts and do not require modification.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels 2-3-5-8.*
Idle Setting—Adjust idle mixture screws for smooth idle and recheck for correct idle speed.
Idle Speed—450 RPM with Dynaflow Selector lever in neutral.
►*OTHER DATA: See "Rochester 4GC Carburetor" in Carburetion Section.*
Dynaflow Throttle Linkage Adjustment: *See CARBURETOR above.*
Fuel Pump Pressure: 4½ - 6½ lbs. at pump outlet.

CARB. EQUIPMENT

Fuel Pump: AC. **Replacement No.** 4304.
Pressure - 4½ - 6½ lbs. at pump outlet.
►*LIGHT ENGINE KNOCK CORRECTION & FUEL PUMP ARM PRODUCTION CHANGE:* A light engine knock caused by early pressed steel type fuel pump arm striking timing chain cover can be corrected by replacing fuel pump with one having a forged arm, or pump with later type pressed steel arm (identified by daub of green paint on cover).
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: AC. Electric type.
Dash Unit - AC No. 1518438 (Red & Green background on dial), No. 1518765 (Plain Black background on dial).
Tank Unit - AC No. 1518138 (Series 40 & 60), No. 1518137 (Series 50 & 70).
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 3KMR62. *12 Volt.* 9 Plate, 62 Ampere Hour capacity (20 hr. rate).
Ground Terminal - Negative (—) terminal.
Engine Ground - Between engine and cowl.

STARTER

Delco-Remy 1107646. *12 Volt.* **Armature** - 1926626.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 35 ozs. min.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
11 ft. lbs.	Lock	5.2	460

Starting Switch: Delco-Remy Solenoid 1119760. *12 Volt.* Starter solenoid controlled by separate relay, Delco-Remy 1116876, and Accelerator Vacuum Switch (on carburetor). *See "Starter Controls" in Electrical Section.*

Accelerator Vacuum Switch: Carter 192-11U (Carter & Stromberg 2-Barrel), 192-21U (Carter 4-Barrel).

►*STARTER RELAY PRODUCTION CHANGE:* A new starter relay, Part No. 1116921 (made waterproof by dipping in vinyl plastic) replaces starter relay, Part No. 1116876.

Accelerator Vacuum Switch Setting—*See data on each carburetor type in Carburetor Section.*

Dynaflow Neutral Safety & Back-Up Light Switch: Delco-Remy 1998101. Mounted on steering column jacket under cowl. Connected in starter control circuit so that starter operative only when selector lever in "N" Neutral, or "P" Parking position.

Adjustment—*See "Buick Dynaflow Drive" in Transmission Section.*
►*NEUTRAL SAFETY & BACK-UP LIGHT SWITCH CONNECTION CAUTION: Wires must be connected in correct order as shown on wiring diagram.*

GENERATOR

Delco-Remy. *12 Volt.* As follows:

Model	Generator	Armature
Early (Without Air Cond.)	1102008 ①	1923535
Late (Without Air Cond.)	1102053 ②	1932900
All (With Air Cond.)	1102051 ②	1932900

①- With pulley. Delco-Remy 1102005 (without pulley).
②- With pulley. Delco-Remy 1102061 (without pulley).

Performance Data - Cold

Generator	Amperes ①	Volts	RPM
1102008	30	14	2150
1102051	35	14	2300
1102053	35	14	2300

①- Not maximum output. See Regulator.

Brush Spring Tension - 24-32 ozs
Field Current - 1.48-1.72 amps. (1102005 Gen.), 1.62-1.82 amps. (1102051 & 1102053 Gen.). All at 12.0 volts.
Rotation - Counter-clockwise at commutator end.

Belt Adjustment: 3/8" belt deflection with normal thumb pressure midway between generator and fan pulleys.
NOTE: On air conditioned cars, deflection should be ½" midway between fan and compressor pulleys.

REGULATOR

Delco-Remy No.	Use with Generator No.
1119003	1102008
1119168 ①	1102051
1119162	1102053

①- Delco-Remy No. 1119162 Regulator is service replacement for No. 1119168.
►*REGULATOR GROUNDING CORRECTION: See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*
►*NOTE: Specifications below are for "Normal" settings. See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

Cutout Relay
Cuts In - 11.8-13.5 volts (hot).
Contact Gap - .020"
Air Gap - .020" (with contacts just closed).

Voltage Regulator
Setting - 13.8-14.8 volts (hot).
Air Gap - .075" with armature pressed down to point where contacts just opening.
Checking & Adjusting - *See Electrical Section.*

Current Regulator
Setting (1119003) - 30 amperes (hot).
Setting (1119162 & 1119168) - 35 amperes (hot).
Air Gap - .075" with armature pressed down to point where contacts just opening.
Checking & Adjusting - *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
►*DIRECTION SIGNAL SWITCH STICKING CORRECTION: See "Electrical Notes" in Buick Special Data.*
Lighting Switch Removal: Disconnect battery cable from junction block and disconnect wires from lighting switch. Pull switch knob out to last notch, then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch. Remove switch mounting nut with wrench J1589 and remove switch and escutcheon from instrument panel.

Stop Light Switch: (Location)—On brake pipe distributor fitting near master cylinder on left side at transmission support.

FUSES: Located on fuse panel under cowl unless otherwise specified.
Back-Up Light - 10 amps.
Dome & Luggage Compartment Light - 20 amps.
Electric Clock - 2 amps.
Heater & Defroster - 20 amps.
Parking Brake Warning Light - 10 amps.
Stop & Direction Signal Lights - 9 amps.
Cigar Light - Special fuse in back of lighter.
Air Conditioner Motor - 15 amps. (in wiring connector near switch).
Air Conditioner Blower - 20 amps. (in fuse block)
Air Conditioner Clutch Control - 5 amps. (in fuse block).
Glove Box Light - 2 amps. (in wiring connector).

CIRCUIT BREAKER: 22 amperes. Vibrating type on Headlight Switch.

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HORNS: D lc -R my. No. 1999769 (Low Note), No. 1999770 (High Note). *12 Volt.*

H rn Relay: Delco-Remy 1116781. *12 Volt.*

Contacts Close—2.75-4.0 volts.
Contact Gap—.025". **Air Gap**—.015" (closed).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8 (All Series).

Series	Bore	Stroke	Displacement
All	4.00"	3.20"	322 cu. ins.

Series	Comp. Ratio	Rated HP	①Dev. HP
40 (Synchro-mesh)	7.6-1	51.2	
40 (Dynaflow)	8.9-1	51.2	220
50, 60, 70	9.5-1	51.2	255

①- At 4400 RPM.

C mpression & Vacuum Reading—*See TUNE-UP.*

►*ENGINE IDENTIFICATION NOTE:* See Engine Number for suffix digit designating each series. Series 40 engine also has vertical groove 3/8" wide and 1/8" deep) cast in engine number pad approximately 1¼" to rear of pad centerline.

►*ENGINE COMPRESSION RATIO NOTE:* Same cylinder head used for all engines. Different compression ratios on Series 40 is secured by the use of different pistons. Head gaskets are the same on all models (.015" thick). *See Piston data below.*

►*ENGINE DETONATION (Low Octane Areas):* If octane rating of available fuel results in detonation complaints, this condition can be corrected by lowering the compression ratio as follows:
Series 40 (Synchro-mesh) - 7.35 - 1 compression ratio can be obtained by using cylinder head gasket, Part No. 1343995 (.045" thick).
Series 40 (Dynaflow) - 8.4-1 compression ratio can be obtained by using cylinder head gasket, Part No. 1343995 (.045" thick).

Series 50, 60, 70 (Dynaflow) - 8.4-1 compression ratio can be obtained by using cylinder head gasket, Part No. 1343995; and engine pistons, Parts No. 1392566.

►*ENGINE KNOCK AT IDLE SPEED OR UNDER LIGHT LOAD CORRECTION (Due to loose harmonic balancer):* Check the balancer hub flat washer to see that it does not bottom against crankshaft, and that balancer bolt does not bottom in tapped hole in crankshaft. If either or both conditions exist, install a second flat washer between present washer and balancer hub, so that clearance exists between washer and crankshaft.

►*FAN SHROUD RATTLE CORRECTION:* Drill a 9/32" hole in bottom of shroud approximately 5/16" from edge of shroud and install a rubber bumper, Part No. 503865.

►*EXHAUST MANIFOLD STUD BREAKAGE CORRECTION:* When installing a new stud, drill out the old hole to .368" (size "U" drill) and thread with a 7/16"-14 tap. Install a 7/16" stud and file out flange holes to accommodate the larger stud.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data*

OIL PAN REMOVAL: Disconnect steering idler arm bracket from right frame side rail and lower steering linkage for clearance, then remove pan. *CAUTION*—Do not allow bracket to turn on idler arm (will change toe-in adjustment).

CYLINDER HEAD & GASKET: Same cylinder head and gasket used on all engines (except as noted in "Engine Detonation Note" above). Different compression ratios secured by use of different pistons as noted under "Pistons" following.

Cylinder Head & Gasket Installation—*See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Pistons—Aluminum alloy, dome head, cam ground, full skirt with transverse slots in oil ring groove, Anodized finish.

►*PISTON REPLACEMENT NOTE:* Different pistons used as follows:

Model	Std. Size Piston No.
Series 40 (Synchro-mesh)	Buick No. 1392564
Series 40 (Dynaflow)	Buick No. 1392566
Series 50, 60, 70 (Dynaflow)	Buick No. 1392565

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with ¼" long dash following engine number have .010" Oversize Cylinder Bore & Pistons. Standard cylinder bore size: (All Models) 3.9985-4.0015".

Removal—Pistons and rods removed from above.

►*CAUTION*—Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.

Fitting New Pistons: Clearance .0014-.0020". If micrometer used on pistons, measure at top and bottom of skirt 90° from pin hole (top diameter very slightly less than bottom in service). Use .003" x ½" x 12" feeler gauge to fit pistons with cylinder block in normal position. Insert feeler on lower side of bore 90° from piston pin hole. Pull to withdraw feeler should be 7-13 lbs. at 70°F. (piston and bore clean and dry).

Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and .005", .010", .020", .030" Oversize. *NOTE*—Pistons furnished only with fitted pins.

Installing Pistons: Assemble rod in piston with oil spurt notch on same side as valve depressions in piston dome. *S e Rod Installation b low.*

PISTON PINS

Diamet r - .940". L ngth - 3.400".
Clearanc in Pist n-.003-.005", or easy push fit at 70° F.
Piston Pin R m val & Installation: *See "Piston Pins" in Buick Sp cial Data. CAUTION - Pist ns may b damaged if sp cial procedure and to ls not used.*
Replacement Pins: Std. size only. Fitted pins furnished with all new pistons.

PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compr	.078"	010-.020"	002-.004"
Oil	.186"	.015-.035"	0035-0095"

►*OIL RING NOTE.* Ring is three-piece (two rails and spacer) with expander. New rings are cemented assembly for ease in handling (will separate in service).

Replacement Rings: Production type rings furnished singly and in sets Standard & .010", .020", .030" Oversize. Special Service Ring sets furnished Standard (use up to .019" O.S.), & .020", .030" Oversize.

Installing Rings: Compression ring groove or bevel (on inner edge) upward. Oil ring expander gap ends should be at either end of piston pin (in unslotted portion of groove) and side rail gaps must be on valve depression side of piston (upward when installed in cylinder).

CONNECTING RODS

Length—6" **W ight**—22.16 ozs.
Crankpin Journal Diameter—2.249-2.250"
Out-of-round limit .0015".
Bearings—Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.
Clearance—.0002-.0023" (service limit .003").
Sideplay - .005-.012".

Replacement Bearings: Standard & .001", .002", .020", .021" Undersize. Size is stamped on back of bearing at or near tang.

Installing Rods: See Installing Pistons above. Install rods so valve clearance depressions in all piston heads and all spurt notches in all connecting rods are toward camshaft. *NOTE* - Rib on edge of rod cap will be on same side as conical boss on web of rod, and these marks will be toward the other connecting rod on same crankpin.

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars):* **See** *"Engin Balancing" in Buick Special Data.*

Journal Diameter—2.498-2-499". Five bearings.
Out-of-round limit .0015".
Bearings—Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.

BEARING NOTE—Bearing upper halves can be rotated out and in by using tool KMO-734 in oil hole.

Clearance - .0005-.0025".

Replacement Bearings: Standard & .001", .002" Undersize. *NOTE*—First four bearings identical and interchangeable. Rear bearing longer and flanged.

End Thrust: Taken by rear (#5) flanged bearing.
Endplay—.004-.008".

Crankshaft R ar Main B aring Oil S al: *Se "Crankshaft & Main Bearings" in Buick Sp cial Data.*

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Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

►*CAMSHAFT THRUST PLATE & TIMING GEAR PRODUCTION CHANGE (APPROXIMATELY 5000 1956 CARS):* The camshaft thrust plate and spacer ring have been eliminated and the timing gear has been changed. If difficulty is encountered on these cars, install a standard type timing gear, spacer plate and thrust ring. The standard timing gear is identified by a round hub while supplementary gear has a cam shaped hub.

►*CAMSHAFT IDENTIFICATION NOTE & NON-INTERCHANGE CAUTION:* Camshafts are identified as follows: **Series 40 (Synchro-mesh Trans.)** - No grooves in land just forward of No. 3 camshaft bearing journal. **All Other Series** - Two grooves in land just forward of No. 3 camshaft bearing journal.

Journal Diameters—(1) 1.685-1.686", (2) 1.655-1.656", (3) 1.625-1.626", (4) 1.595-1.596" (5) 1.565-1.566". **Bearings**—Steel-backed, babbitt lined bushings. **Clearance**—.0005-.0035" (service limit .0015-.004").

End Thrust: Spacer ring installed on shaft between front bearing journal and thrust plate bolted to crankcase behind camshaft sprocket. **Endplay**—.004-.008".

Timing Chain: Link Belt. **Width** .688", **Pitch** .500" **Length** 26" or 52 links.

Camshaft Setting: Mesh chain on sprockets with two copper-plated washers (12 links apart) in line with "O" marks on sprockets with marks toward left side of engine. Turn camshaft so that keyway is straight downward, turn crankshaft so that #1 and #4 pistons are on top dead center, install sprockets and chain as an assembly.

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

►*OIL FLOW REDUCTION TO VALVE MECHANISM NOTE:* Where the valve mechanism is receiving an excessive amount of oil and it is desirable to reduce the flow, a new plug having a .077" orifice can be installed in cylinder head. *See "Valve System" in Buick Special Data".*

►*VALVE ROCKER ARM PRODUCTION CHANGE:* A heavier type rocker arm with a relocated oil hole is now being used in production. The oil hole in the later type rocker arm is located in center of bearing casting and not in boss on rocker arm. The later rocker arm is completely interchangeable with early type.

Tappet Clearance: None in service (hydraulic).

Valve	Head Diameter	Stem Diameter	Length
Intake	1.750"	.3720"	4.704"
Exhaust	1.375"	.3715"	4.704"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.378"	.002-.003"
Exhaust	45°	.378"	.003-.004"

Valve Seat Width—1/16" (3/64-5/64").

►*VALVE GRINDING CAUTION:* If height of valve stem end raised .075" by valve grinding, height must be reduced by grinding end of stem or replacing valve to insure correct operation of hydraulic lifter.

Valve Springs: Double springs used on all valves. Install springs with closed-coil end toward cylinder head.

Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Lbs.Press.	Lgth.	Lbs.Press.	Lgth.
Closed	24-29	1.53"	43-48	1.5"
Open	58-64	1.15"	91-97	1.12"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3.

Hydraulic Valve Lifters: Barrel type.
Diameter—.8425". **Clearance in Block**—.0015-.003".
Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

►*VALVE GRINDING CAUTION: See Valves (above).*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Synchro-mesh Models

Intake Valve - Opens 25° BTDC. Close 77° ALDC.
Exhaust Valve - Opens 75° BLDC. Close 42° ATDC.

Dynaflow Models

Intake Valve - Opens 30° BTDC. Close 82° ALDC.
Exhaust Valve - Opens 78° BLDC. Close 44° ATDC.

Valve Timing Check—Timing chain cover must be removed to check chain and sprocket marks. *See Camshaft Setting under CAMSHAFT above.*

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.***

Crankcase Capacity: 6 qts. (refill), 8 qts. (dry engine). NOTE— 1 qt. additional for dry filter.

Normal Oil Pressure: 35 lbs. at 35 MPH.

Pressure Regulator Valve: In oil pump body. Not adjustable.

Oil Pressure Indicator - AC No. 1508362. Not electric.

Oil Pump: Helical gear (early cars), spur gear (later cars), in crankcase at rear of engine

Pump Overhaul—*See "Oiling System" in Buick Special Data.*

Oil Filter: Full-flow. On pad at right rear of engine. NOTE—Ball check valve in filter base by-passes oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

Replacement Filter Element—AC No. PF-122.

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in rear end of valve lifter cover (air outlet) to which ventilator pipe is connected.

COOLING

►*FAN "OUT-OF-BALANCE" OR DRIVEN PULLEY CRACKING CORRECTION:* This condition may be caused by the counterbore in fan spacer being too shallow. Check to determine if the fan spacer is clamping fan driven pulley against water pump hub. If fan spacer does not clamp, deepen the counterbore to 3/8" using a 5/8" reamer, to provide clearance for water pump shaft.

Water Capacity: (Synchro-mesh Cars) 16.5 qts (without heater), 18 qts. (with heater); **(Dynaflow Cars)** 18.5 qts. (without heater), 20 qts. (with heater).

Pressure Valve: AC No. 850549 (7 lb.—Without Air Conditioning), No. 850559 (13 lb.—With Air Conditioning). Radiator Filler Cap.

►*PRESSURE VALVE NOTE:* ***A 13 lb. pressure valve (same as used on air-conditioned cars) may be used on cars without air conditioning, when operating in temperatures above 110°.***

Thermostat: Pellet type in water manifold above pump. (Std.) Buick No. 1391226 opens at 157-162°F. (High Temp.) Buick No. 1391225 opens at 177-182°F.

Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Buick Special Data.

Pump Removal—Remove fan blade assembly, spacer, and pulley from pump shaft hub, then remove pump cover assembly and gasket from timing chain cover.

Temperature Gauge: AC No. 1513110 (Cars without air conditioning). No. 1513392 (Cars with air conditioning). *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

►*CLUTCH EQUALIZER ASSEMBLY & ENGINE BRACKET INTERFERENCE CORRECTION:* Grind 1/8" from end of equalizer shaft nearest engine and grind off ¼" from both ends of the reinforcing ridge on equalizer engine bracket. Check to see that the long side of the clutch over-center spring extension is upward (this may be installed upside down).

Own. Single plate (conventional spring type).

►*CLUTCH NOTE:* Service replacement parts are not furnished for this clutch.
See "Buick Single Plate" in Clutch Section.
Clutch Disc No. - Buick No. 1391632.

Pedal Adjustment—Free travel ¾-1". Adjust by loosening locknut and turning adjusting nut on release rod at clutch fork.

Removal—Remove rear axle and transmission (See below), take off clutch underpan, disconnect linkage at yoke, remove clutch release bearing support by taking out spring washer in housing, pull out yoke (with release bearing) from fulcrum, mark clutch and flywheel, remove cover mounting screws.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Buick Synchro-mesh in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

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Removal: Disconnect rear axle assembly and move it back out of way. Disconnect speedometer cable, shift rod and selector rod. Disconnect rubber thrust pad from transmission support and remove shims. Remove bolts attaching transmission mounting pad to support. Place a jack under engine and raise engine and transmission just enough to relieve load on transmission support. *(CAUTION - Note the location and number of shims).* Remove support from frame. Remove two top transmission to flywheel housing bolts and install Guide Pins J-851 to support transmission. Remove lower bolts and remove transmission, sliding it straight back. *CAUTION - If guide pins are not used and weight of transmission is allowed to rest on main drive gear in clutch driven hub, the drive plate will be damaged.*

DYNAFLOW DRIVE

"Variable Pitch" Dynaflow Drive. Torque Converter and hydraulically operated planetary transmission. A two position (high & low) stator is used in the torque converter to multiply engine output torque when required (controlled by accelerator pedal at the wide open position). *See "Buick Variable Pitch Dynaflow Drive" in Transmission Section*

►*DYNAFLOW OIL LEAKAGE CORRECTION (Oil flowing from breather pipe):* This condition caused by uncovered oil hole in transmission mainshaft. *See "Buick Dynaflow Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING. See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

Throttle Linkage Adjustment and Dash Pot Setting in Dynaflow Drive Cars. *See "Tune-up".*

Lubrication—Check fluid level in transmission every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level—Engine must be idling with selector lever at "P" (parking) and transmission at normal operating temperature. Add oil to "Full" mark on dip stick only.

Capacity—10 quarts.(Add 1¾ pints for dry transmission). *Use only Special Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type A.*

►*OTHER DYNAFLOW SERVICE DATA See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. One used (in torque ball at rear of transmission).

REAR AXLE

Own. Semi-floating hypoid gear type of new design, and torque tube drive.

►*1956 BUICK REPLACEMENT PROPELLER SHAFT INSTALLATION NOTE:* To prevent excessive pressure on the universal joint, the seal sleeve on front of propeller shaft should be pressed on so it is 1½" from forward end of shaft splines. To make sure that propeller shaft rear coupling is properly seated over the "O" ring seal on pinion shaft, it will be necessary to force shaft by hand until end of shaft protrudes 2" from torque tube front flange.

►*TORQUE TUBE FRONT FLANGE LOOSENING CORRECTION:* This condition is due to uneven flange which does not allow proper seating of bolt head. To correct, file flange rear face, under head of bolt so that a full bearing of the bolt is obtained. Install later type bolts, Part No. **186622** (identified by six radial marks in bolt head) and torque to 50-60 ft. lbs.

►*UNIVERSAL JOINT ROUGHNESS ON DECELERATION CORRECTION:* This condition may be due to the torque tube ball retainer being oversize or off center on the flange which prevents it seating fully in recess in end of rear bearing retainer. Correct by filing down outer diameter of retainer so retainer is free to float when torque ball assembled. Tighten flange bolts alternately.

►*REAR AXLE "CLUNKING" NOISE CORRECTION (At speeds below 25 MPH): May be caused by excessive clearance between differential side gears and bore in differential case. See "Buick Hypoid" in Rear Axle Sect.*

►*SERIES 70 REAR AXLE OIL PUMP NOTE:* Beginning with early May 1956 production, the oil pump formerly used in Series 70 rear axle assemblies has been eliminated. Service replacement parts connected with the oil pump have also been discontinued. When pump is removed for any reason, it should be left out of the assembly. Series 50 & 70 axle shafts and differential carriers are interchangeable.

►*REAR WHEEL BEARING OIL LEAK CORRECTION: See "Buick Hypoid" in Rear Axle Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick Hypoid" in Rear Axle Section.*

Axle Ratios

Series	Synchro-mesh	Dynaflow
40	3.91-1	2.23-1
50, 60, 70		3.36-1

►*REAR AXLE RATIO NOTE:* Ratio is stamped on bottom of axle housing as follows: 3/2 (3.23-1), 3/4 (3.36-1), 3/9 (3.91-1).

Backlash - .007-.009".

Axle Shaft Removal: Remove rear wheel and brake drum. Remove nuts attaching wheel bearing retainer plate to brake backing plate leaving bolts in place to support backing plate. Pull out axle assembly using Puller J-6176 with a slide hammer (be careful not to disturb brake backing plate). *See "Buick "Hypoid" in Rear Axle Section for disassembly procedure.*

Rear Axle Assembly Removal: Place stands under rear axle with wheels clear of floor and place a jack under center of axle housing so it supports weight of axle assembly. Disconnect radius rod at axle end. Disconnect lower ends of rear springs and lower ends of rear shock absorbers. Disconnect parking brake cable at rear cable sheave and at bracket on torque tube. Disconnect brake hose from pipe at frame cross-member and remove yoke (cover hose and brake pipe openings). Loosen torque ball retainer bolts so ball is free. Remove two opposite torque tube flange bolts, replacing them with 3" long guide pins, then remove other flange bolts. Roll rear axle assembly out from under car.

Wheel Bearing Adjustment: None required.

Rear Suspension: *See "Buick Rear Suspension" in Suspension & Wheel Alignment Section.*

Torque Ball Adjustment: New design torque ball assembly does not require adjustment.

SHOCK ABSORBERS

Delco. Direct-acting hydraulic (front & rear). Front shock absorbers mounted within front suspension coil springs.

Front Shock Absorbers

Model	Std.	200# Overload
40, 60 (Exc. 49, 69) Early	5522798	5383669
40, 60 (Exc. 49, 69) Late	5531226	5531225
49, 69 (Early)	5383669	
49, 69 (Late)	5531225	
50, 70 (Early)	5383669	5382679
50, 70 (Late)	5531225	5532070

Rear Shock Absorbers

Model	Std.
41, 43, 48, 63, 63D	5531240
46C, 46R, 66C, 66R	5531428
49, 69, 52, 53, 72, 73	5531242
56C, 56R, 76C, 76R	5531427

►*REAR SHOCK ABSORBER MOUNTING BOLT LOOSENING CORRECTION:* Replace the mounting bolt and nut with Part No. 454961 (bolt); and Part No. 454939 (nut). Torque to 80-90 ft. lbs. The later type bolt is identified by 6 radial marks on head.

FRONT SUSPENSION

Independent. Shock absorbers mounted within the coil springs.

See "Buick" in Suspension & Wheel Alignment Section.

►*FRONT TIRES RUBBING ON FRAME CORRECTION (Early 1956 cars):* Install a 1/32" plain washer under the bolt head of the rear steering arm bolt on both right and left sides.

►*ADJUSTMENT CAUTION:* Check spring height and position of Idler arm before changing adjustments.

Kingpin Inclination - 7° at 7/8° camber.

Caster - 0° to Neg. 2° (Neg. 1° desired at both wheels). *NOTE - This caster setting supersedes the former setting of Neg. ½° to Neg. 1½°.*

Camber - Pos. 7/8° to Neg. 5/8° (Pos. 3/8° desired). Camber on both wheels must be within ¾° of each other.

Toe-In - 1/16" to 1/8".

Toe-out on Turns—Outer wheel 20°, inner wheel 22½° ± 3/4°

STEERING

Manual - Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut type.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: "Saginaw (In-Line) Hydraulic". Recirculating ball nut and worm type with the worm and ball nut, power piston and rack, and the power cylinder all on a single center line.

See "Saginaw (In-Line) Power Steering" in Steering Sect.

Steering Linkage - *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

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Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor): Conventional two shoe with short molded lining front (Primary) and long molded lining rear (Secondary). Parking "Step-On" lever applies rear wheel service brakes.

See "Bendix Hydraulic (Without Eccentric)" in Brake Section.

►*BRAKE SQUEAK CORRECTION:* Install Anti-Squeak Spring, Part No. 1345469 on all four brake drums. Spring is installed on O.D. of drum and held in place with clips, Part No. 1172311, disregard hole in clip as inboard side of wheel will hold them in place.

►*BRAKE PEDAL TWISTING CORRECTION (MANUAL BRAKES):* On early 1956 Dynaflow models a bending or twisting of the brake pedal plate can be corrected by removing the brake pedal pivot lock nut, bolt and pedal as well as the dash insulator retainer. Drill a 9/32" hole through the cowl using the unused hole in brake pedal bracket as a guide. Install a ¼" x 20" x ¾" bolt, washer and locknut and tighten to cowl panel.

►*DISTORTED AND OUT-OF-ALIGNMENT POWER BRAKE PEDAL CORRECTION:* Loosen pivot bolt locknut on right side of brake pedal bracket and with pedal in fully released position, turn eccentric pivot bolt at left side of bracket until there is just enough clearance between push rod and air valve sleeve to prevent contact at any point in pedal travel. Tighten locknut, making sure that adjustment does not change. If the above procedure does not correct the trouble, it will be necessary to shim between pedal plate and power cylinder, as necessary to correct the alignment.

►*POWER BRAKE PEDAL SLOW RETURN CORRECTION:* Install Power Brake Pedal Return Spring, Part No. 1175435 on eccentric bolt and hook it back of brake pedal.

►*BRAKE MASTER CYLINDER PRODUCTION CHANGE:* A new master cylinder, Part No. 5456000 is being used in production and for service replacement. A new master cylinder repair kit, Part No. 5455765 is available and can be used on the earlier type master cylinder to convert it to the later design. *See "Buick Hydraulic Brake Master Cylinder" in Brake Section.*

►*PARKING BRAKE PEDAL SLIPPAGE CORRECTION:* This condition is caused by incorrect adjustment of parking brake release rod trunnion and can be corrected by adjusting the trunnion so when parking brake is in fully released position, the release rod spring will be compressed approximately ¼" to give it a desired preload of approximately 4 - 6 lbs. *See "Brake Notes" in Buick Special Data.*

Drums—Diameter 12" Rebore limits. .060

Wheel Cyl. Diameter—Front 1-1/8", Rear 1".

Replacement Lining & Shoes—Linings or shoes with linings come in Standard and .030" oversize, and differ between Regular and Power brakes, as well as between car Series.

Lining Width & Thickness

Model	Front Wheels	Rear Wheels
Series 40, 50, 60	2.25" x .187"	2.25" x .187"
Series 70	2.50" x .250"	2.25" x .187"

Braking Power - 53% Front, 47% Rear.

Clearance - Heavy drag and back off 15-17 notches.

Standard Master Cylinder: "Displacement" type. Located on engine side of cowl panel directly below brake pedal. *See "Buick Master Cylinder" in Brake Section.*

Checking Fluid - Maintain fluid level ½" to 1" below top of filler opening.

Removal - Disconnect brake pipe and tape end of pipe. Disconnect stop light wire, and disconnect push rod from brake pedal and remove brake pedal. Remove screws holding steering column jacket rubber seal retainer to floor pan and push it up on steering column jacket. Pull floor mat away from pedal plate and remove pedal plate and master cylinder together.

Power Brakes: Moraine Suspended type power brake unit (replaces conventional master cylinder). Reservoir is integral with master cylinder.

See "Moraine Power Unit" in Brake Section.

►*HYDROVAC POWER BRAKE NOTE If this type power brake found on car, see "Hydrovac Power Unit" in Brake Section.*

Checking Fluid Level - Maintain fluid level ½" to 1" below top of filler opening.

Removal of Power Unit - Disconnect brake pipe from master cylinder and tape end of pipe. Disconnect vacuum hoses from power cylinder, and stop light wires from switch. Place drip pan under reservoir and remove reservoir. Disconnect push rod from brake pedal. Remove eccentric bolt and remove pedal. Remove screws holding dash insulator retainer to pedal plate. Remove retainer and push steering column seal up column jacket. Pull floor mat out of way and remove pedal plate and power brake unit from car.

MISC. MECHANICAL

Air Conditioning: Frigidaire-Harrison type with solenoid controlled compressor clutch (compressor operates only with air-conditioning switch turned on). *See "Frigidaire-Harrison Air-Conditioning" in Miscellaneous Sect.*

Windshield Wipers: Cable operated vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric type with reversible motor in each window. *See "GM Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Two-Way): Electric type with single reversible type motor for horizontal adjustment. *See "GM Two-Way Seat Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Six-Way): Electric type with single reversible motor. *See "GM Six-Way Seat Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor. *See "Power Top Controls" in Miscellaneous Sect.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front door pillar post.

Starting Serial Number - 001001 (at each plant).

►*SERIAL NUMBER NOTE:* The serial number (example 4D2001001) includes the following identification data in sequence:

Series①	Year②	Assy. Plant③	Serial No.
4	D	2	001001

① - See Series Designation below.
② - Year designation (1957).
③ - See Assembly Plant Designation below.

Series Designation

4 - 40 Special	6 - 60 Century
5 - 50 Super	7 - 70 Roadmaster

Assembly Plant Designation

1	Flint	5	Wilmington
2	South Gate	6	Atlanta
3	Linden	7	Framingham
4	Kansas City	8	Arlington

ENGINE NUMBER: Same as Serial No. (see above). Stamped on top **left hand corner** of crankcase directly forward of left front corner of valve lifter cover. This number is read from front of car.

►*ENGINE PRODUCTION CODE NUMBER NOTE:* This is a production code number (not used for licensing) stamped on top **right hand corner** of crankcase directly forward of right front corner of valve lifter cover. This number is read from rear of car. Symbols used with this production code number indicate the following: **Oversize Cylinder Bore (All Engines)** - Dash (¼" long) following production code number indicates all cylinder bores .010" Oversize. *See Pistons.*

Low Compression Engine (Series 50,60,70) - "X" preceding production code number indicates special lower compression engine. *See Compression Pressure (below) and Note under Engine Specifications.*

TUNE-UP

►*ENGINE DETONATION (OPERATION IN LOW OCTANE AREAS): See Note under Engine Specifications for recommended changes for foreign travel.*

►*SPECIAL LOWER COMPRESSION ENGINE PRODUCTION NOTE (SERIES 50, 60, 70):* Some engines produced with special 9.5-1 compression ratio for operation in areas with lower fuel octane ratings. *See Compression Ratio (following) and Note under Engine Specifications.*

COMPRESSION PRESSURE: (40 Synchro-mesh) 150 lbs., (40 Dynaflow) 170 lbs., (50,60,70 Std. 10-1 Ratio) 185 lbs., (50,60,70 Spec. 9.5-1 Ratio) 170 lbs., all at cranking speed. Cylinders should be equal within 10 lbs.

VACUUM READING: 14.5" minimum idling at 485 RPM.

►*ENGINE VACUUM NOTE:* 14.5" minimum at idling speed is normal and does not indicate defective valves.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely. Install thermostatic coil with approximately 120° wind-up counterclockwise to engage stop pin. Counterweight should be vertical with valve closed (cold engine).

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.

Cylinders - RIGHT BANK 1-3-5-7, LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .030-.035".

Spark Plugs - AC No. 44. 14mm. *NOTE* - AC No. 42 Comm. may be used for severe service. Torque to 25 ft. lbs.

►*SPARK PLUG WIRE CAUTIONS:* Spark plug wires have linen core impregnated with carbon. Pulling on wire to remove may cause core to separate causing engine missing. To remove, grasp wire by boot. **Do not** pierce No. 1 spark plug wire when timing engine as this also damages core. To eliminate possibility of engine misfiring, spark plug wires must be installed in holding clips on rocker arm covers in same order as they are attached to the plugs.

COIL: Delco-Remy 1115100.

Ignition Current - 2.5 amps. idling, 4.5 stopped.
Resistor - Delco-Remy 1931614. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by lead from starter solenoid-to-coil.

DISTRIBUTOR: Delco-Remy 1110870. New external adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988.
Breaker Gap - .0125-.0175". See Note.
Cam Angle - 28-32°.

►*BREAKER GAP & CAM ANGLE NOTE:* Setting cam angle at 30° will provide .016" breaker gap.

Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	475	1-4	950
6-8	1150	12-16	2300
12-14.5	1875	24-29	3750

Vacuum Spark Control: Delco-Remy 1116106.

Vacuum Advance

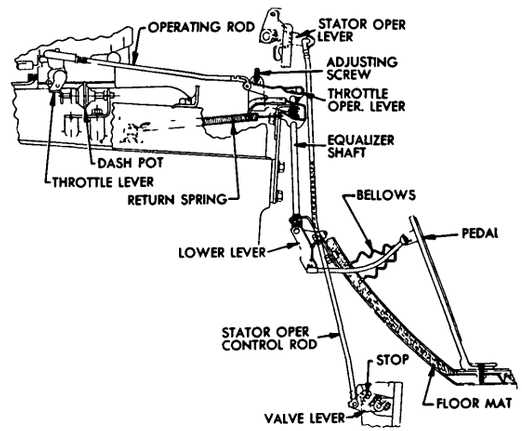
Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
9-10.5	18-21	12-14

IGNITION TIMING

Setting - 5° BTDC at exactly 400 RPM.

►*IGNITION TIMING CAUTION:* Reduce engine idle speed to 400 RPM maximum and disconnect vacuum line to distributor when setting timing (Running engine at regular 485 RPM idling speed or with vacuum line connected will result in some centrifugal or vacuum advance). Reconnect vacuum line and reset engine idle speed to 485 RPM in neutral after timing completed.

Timing Mark - Timing indicator marked with four lines indicating 0°, 2.5°, 5°, 7.5° BTDC, located on right side of timing chain cover below fuel pump. Line up mark on fan drive pulley (Series 40) harmonic balancer (Other Series) with correct line (5°) on timing indicator for normal operating conditions.



DYNAFLOW THROTTLE LINKAGE

CARBURETOR

►*CARBURETOR APPLICATION: 2-Barrel Carburetors (Carter WGD or Stromberg WW) used on Series 40, 4-Barrel Carburetors (Carter AFB or Rochester 4GC) used on Series 50, 60, 70.*

THROTTLE LINKAGE ADJUSTMENT: Adjust idle speed to 450 RPM. Disconnect throttle return spring. Disconnect throttle rod from lever on equalizer shaft. Back off stator pick-up lever adjusting screw on Dynaflow cars until screw end is flush with lever. Adjust throttle rod at carburetor so 5/8" of thread is exposed. Press accelerator against floor mat, hold throttle wide open and hold rod at hole in operating lever. Adjust lever on equalizer shaft to obtain 1/16" distance between rod and hole in lever. Tighten clamp and connect rod. With throttle closed to idle position, a minimum clearance of 1/16" must exist between equalizer lower lever and stop lug in mounting bracket. Adjust operating rod as necessary to obtain this clearance. On Dynaflow cars, depress accelerator pedal against floor mat, then turn stator pick-up lever adjusting screw against lever until all vertical play is removed from stator operating rod. Turn screw back 1/2 turn.

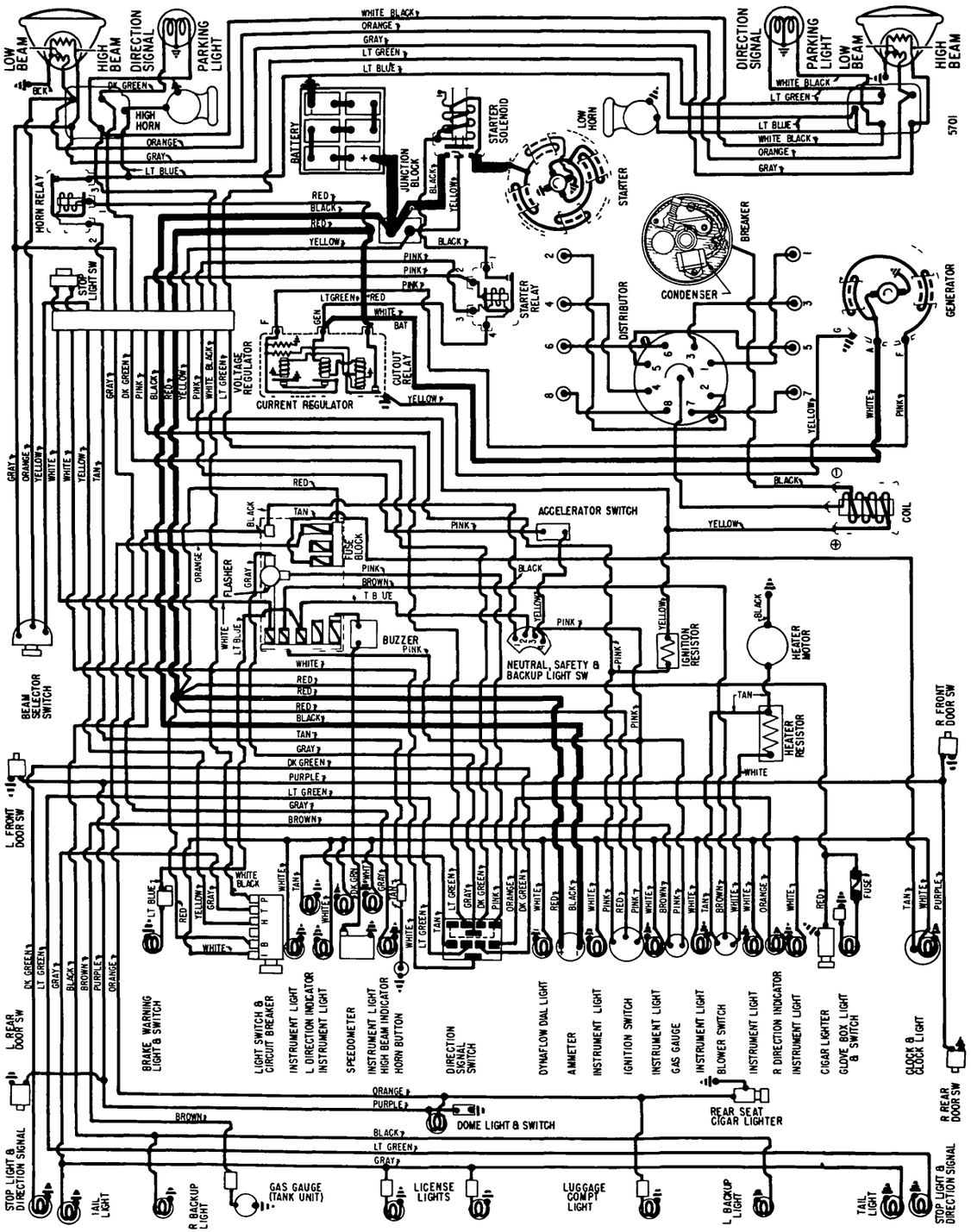
DASHPOT ADJUSTMENT (Dynaflow Cars): Adjust dash pot only after throttle linkage has been adjusted and engine is at normal operating temperature. Rotate fast idle cam to extreme cold idle position (choke closed), hold throttle lever against .030" feeler gauge placed between stop screw and highest step of fast idle cam Adjust dashpot until it just clears arm of throttle lever, tighten locknut. Check operation by quickly releasing throttle at 1500 RPM. If engine stalls, or excessive time required to return to idle speed, change dashpot setting slightly.

CARTER 2-BARREL WGD

Carter WGD, 2529S (Synchro-mesh), 2536S (Dynaflow).

►*LEAN PART THROTTLE AT 30-40 MPH (2529S):* Install parts in Buick Kit No. 1180737 (Metering Rod and Pump Plunger Spring). *See "Carter WGD Carburetors" in Carburetion Section.*

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►*LOADING DURING WARM-UP (2529S):* Install new choke piston and change choke setting (see below) Fast idle speed on car should be change to 1800 RPM (from 1500 RPM) *See "Carter WGD Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7. LEFT barrel 2-3-5-8.*

Idle Setting - ¾ turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM (Selector lever in Neutral or Park on Dynaflow Cars).

Float Level - ¼" (Gauge T109-31) between top of float (at center) and bowl cover.

Choke Lever Setting - .020" (Gauge T109-29), between lug on outer choke shaft lever and stop on inner choke shaft lever.

Fast Idle Setting: .028" clearance between lower edge of throttle valve and carburetor bore with adjusting screw on high step of fast idle cam. *NOTE - This setting supersedes previous specifications.*

Automatic Choke Setting: 1 point rich (first 2529S), 1 point lean (later 2529S with new choke piston - see loading during warmup correction above), centered on Index (2536S).

►*OTHER DATA: See "Carter WGD Carburetors" in Carburetion Section*

Dynaflow Throttle Linkage Adjustment: *See CARBURETOR above.*

STROMBERG 2-BARREL WW

Stromberg WW Code 7-106, A,B, & C (Dynaflow Cars).

►*HARD STARTING & LOADING IN COLD WEATHER:* May be caused by automatic choke thermostatic spring set 3 notches too rich If loading condition definitely established, correct by filing new "V" index mark in cover 3 marks counterclockwise from original index mark, file off original index mark *CAUTION* - Above correction should only be made to correct a loading condition Severe leanness will result if a normal carburetor is reworked

►*LOADING DURING WARMING UP:* Set carburetor to revised specifications listed below. Code 7-106B carburetors have these settings in production

►*CARBURETOR INLET SCREEN NOTE·* Carburetors with Code 7-106-C have filter screen at needle valve and seat fitting added to prevent entry of foreign material This screen to be removed at 1000 mile inspection Carburetors with new glass bowl filter do not have this screen

►*CARBURETOR PRODUCTION CHANGES & RECOMMENDED CHANGES FOR IMPROVED PERFORMANCE: See "Stromberg WW (Buick) Carburetor" in Carburetion Section*

Idle Setting - 1 turn open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM with selector lever in Neutral or Park position.

Float Level - 7/32" (Gauge 73519) from top of float at center to top edge of float bowl (gasket removed) with needle valve seated.

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Fast Idl & Start Aid S ttings: *NOTE* - Choke thermostatic coil and cover must be removed for these adjustments (fast idle mechanism located within choke housing).

1) Open throttle to clear fast idle cam, fully close choke valve. Close throttle until fast idle lever rests on high step of cam. There should be no clearance between fast idle lever and lug on cam. Adjust by bending choke rod.

2) Close choke valve with light pressure on thermostatic spring lever until positioning lever just contacts choke positioning spring. Measure choke valve opening. Clearance between upper edge of choke valve and air horn wall should be .209" (No. 4 drill). Adjust by bending choke positioning lever.

3) With throttle valves fully closed, turn throttle stopscrew in until it contacts throttle lever, then turn screw in additional 6 turns. Hold choke valve closed and hold throttle lever against stopscrew, measure clearance between fast idle lever and high step of fast idle cam. Clearance should be .052" (No. 55 drill). Adjust by bending fast idle lever. *NOTE* - Throttle stopscrew must be readjusted for correct hot idle speed.

Automatic Choke Setting: Centered (at Index).

►*See "Hard Starting & Loading in Cold Weather" Correction above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (Buick) Carburetor" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 2507S. New design, 4-barrel downdraft carburetor with automatic choke.

►*CARBURETOR PRODUCTION CHANGES AND RECOMMENDED PARTS AND SETTING CHANGES FOR IMPROVED PERFORMANCE: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*HARD STARTING (DUE TO CHOKE STICKING):* Caused by choke linkage bind due to air cleaner silencer interference. Correct by using new type Air Cleaner Gasket No. 1458911. *NOTE* - New gasket will prevent above trouble and supersedes previous recommendation of use of two previous type gaskets (No. 1169957).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.*

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM in Neutral or Park.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 7010070 (First Cars), 7011570 (Later Cars). Replacement Carburetor Pkg. 7015777.

►*CARBURETOR PRODUCTION CHANGES & RECOMMENDED PARTS & SETTING CHANGES FOR IMFROVED PERFORMANCE: S e "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels f d Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.*

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM with selector lever in Neutral or Park.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

FUEL PUMP PRESSURE: 6½ lbs. maximum.

CARB. EQUIPMENT

Fuel Pump: AC. Replacement No. 4399.
Pressure - 5¼-6½ lbs. between 485 and 1500 RPM.

►*FUEL PUMP INSTALLATION CAUTION:* When installing pump, turn crankshaft to No. 5 firing position (will insure pump arm contacting eccentric and not riding between eccentric and sprocket).

►*FUEL PUMP DIAPHRAGM PRODUCTION CHANGE & CAUTION:* Pulsator diaphragm on first type pump may block off fuel inlet. Engines Nos. 241715 through 243399 and after No. 252511 have new type diaphragm and pump marked by daub of white paint on casting.
See "Fuel Pumps" in Carburetion Section.

Fuel Line Strainer (In Gas Tank): In fuel fitting in tank. Clean every 5000 miles, replace when necessary. *CAUTION* - Do not tighten fitting to more than 7-10 ft. lbs.

Gasoline Gauge: AC. Electric type.
Dash Unit - AC No. 1518703.
Tank Unit - AC No. 1518726.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco No. 562. 12 Volt, 11 plate, 70 Ampere hour capacity.
Grounded Terminal - Negative.
Engine Ground - Dash to right cylinder head.

STARTER

Delco-Remy 1107667. Armature - 1935851.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
11 ft. lbs.	Lock	5.2	460

Starting Switch: Delco-Remy Solenoid 1119919. Starter Solenoid controlled by s eparate relay, Delco-Remy 1116921, and Accelerator Vacuum Switch (on carburetor). *See "Starter Controls" in Electrical Section.*

Accelerator Vacuum Switch: Carter No. 192-38U.
Accelerator Vacuum Switch Setting - *See data on each carburetor type in Carburetion Section.*

Dynaflow Neutral Safety & Back-up Light Switch: Buick No. 1178138. Mounted on steering column jacket under cowl. Connected in starter control circuit so that starter operative only when selector lever in "N" Neutral or "P" Parking position.
Adjustm nt - *See "Buick Dynaflow Drive" in Transmission Section.*

GENERATOR

Delc -Remy 1102066. Armature - 1932900.

P rformanc Data

Amperes	Volts	RPM
35	14.0	2510

Field Current - 1.69-1.79 amperes at 12.0 volts at 80°F.
Brush Spring Tension - 28 ozs.
Rotation - Counter-clockwise at commutator end.
Belt Adjustment: Check belt tension by using torque wrench on generator pulley. 20-25 ft. lbs. torque should slip generator pulley on belt.

REGULATOR

Delco-Remy 1119168. *NOTE* - Specifications below are for "Normal" settings.

Cut ut R lay

Cuts In - 11.8-13.5 volts (Hot). Adjust to 12.8 volts.
Contact Gap - .020".
Air Gap - .020" (with contacts just closed).

Voltag R gulat r

Setting - 13.8-14.8 volts (Hot).
Air Gap - .075" with armature pressed down to point where contacts just opening.
Checking & Adjusting - *S e "D lco-Remy 12 Volt Regulators" in Electrical Section.*

Current R gulator

Setting - 32-37 amps. (set to 35 amps.).
Air Gap - .075" with armature pressed down to point where contacts just opening.
Checking & Adjusting - *S e "Delco-Remy 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical S ction.*

Direction Signal: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery cable from junction block and disconnect wires from lighting switch. Pull switch knob out to last notch, then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch. Remove switch mounting nut with wrench J-1589-A and remove switch and escutcheon from instrument panel.

Stop Light Switch Location: Located on master cylinder attached to engine side of dash panel.

LIGHTING CIRCUIT BREAKERS: 22 ampere. Located on light switch protects all light circuits that are not fused *(See "Fuses" below).*

FUSES: Located in fuse block under cowl.
20 Ampere. Protects Dome & Luggage Compartment lights.
10 Ampere. Protects Back-up & Brake Warning lights.
1 Ampere. Protects clock.
20 Ampere. Protects Heater Blower.
10 Ampere. Protects Directional Signal & Stop Lights.
2 Ampere. Protects Glove Box light.
2 Ampere. Protects Air Conditioner Clutch Control.

Horn Relay: Delco-Remy 1116920.
Closing Voltage - 5.0-9.5 volts, adjust to 6.5 volts.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8 (All Series).

Series	Bore	Stroke	Displacement
All	4.125"	3.4"	364 cu. ins.

Series	Compr. Ratio	Developed HP
40 (S M)	8 0-1	
40 (Dynaflow)	9 5-1	250 at 4400 RPM
50,60,70 Std.	10 0-1	300 at 4600 RPM
50,60,70 Spec ①	9 5-1	

① - See Special Lower Compression Engine Note below

►*SPECIAL LOWER COMPRESSION ENGINE PRODUCTION NOTE (SERIES 50,60,70):* Some South Gate cars, identified by "X" preceding Engine Production Code No *(see Engine Number)*, have Series 40 Dynaflow Pistons with compression ratio of 9 5-1 *(see Piston Replacement Note below)* *CAUTION* - Replacement pistons must be same type DO NOT mix 9 5-1 & 10 0-1 pistons (will cause very rough operating engine)

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* Minimum fuel octane rating for satisfactory operation is: 91 (Series 40 Synchro-mesh), 98 (All Dynaflow Cars). If satisfactory fuel cannot be secured, compression ratio should be lowered by using export pistons and head gaskets as listed below. *CAUTION* - Some Series 50, 60, 70 Engines built with 9.5-1 Compression Ratio (same pistons as Series 40 Dynaflow Engine). *See Lower Compression Engine Production Note above*

Series	Piston	Head Gasket
40 (Synchro-mesh)	①	②1173567 (.045")
All (Dynaflow)	1392950	1173567 (.045")

① - Domestic & Export pistons are the same.
② - Can be used if desired (Export and Domestic gaskets are both .015").

►*VACUUM PUMP BUZZING NOISE (ENGINE COLD)* Caused by too high oil level allowing oil to enter vacuum pump through discharge opening. Check by disconnecting wiper hose at wiper motor and holding finger over end of hose. If noise present with hose closed and disappears when hose opened, correct as follows: Solder (do not weld) 1¼" long piece of 5/16" thin wall tubing in pump discharge opening to form a standpipe ¾" high above pump housing. *NOTE* - Engines between Nos. 109982 and 127199 and above No. 129976 have this tubing installed in production.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*

OIL PAN REMOVAL: Disconnect steering idler arm bracket from right frame side rail, and lower steering linkage for clearance, then remove oil pan. *CAUTION* Do not allow bracket to turn on idler arm (will change toe-in adjustment).

CYLINDER HEAD & GASKET: Same cylinder head and gasket used on all engines. Different compression ratios secured by use of different pistons as noted under "Pistons" following.

►*CYLINDER HEAD REMOVAL NOTE: See "Cylinder Head & Manifolds" in Buick Special Data.*

►*INTAKE MANIFOLD GASKET INSTALLATION CAUTIONS: See "Cylinder Head & Manifolds" in Buick Special Data.*

►*ROCKER ARM COVER INSTALLATION CAUTION: See "Cylinder Head & Manifolds" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

Compression & Vacuum Reading - *See TUNE-UP.*

PISTONS

Aluminum alloy, dome head (with shallow depressions for valve clearance), cam ground, full skirt with transverse slots in oil ring groove. Anodized finish.

►*PISTON PRODUCTION & REPLACEMENT NOTE:* Different pistons used as listed below Some Series 50, 60, 70 Engines have same pistons as Series 40 Dynaflow Engine (9 5-1 Compression Ratio) *CAUTION* - Same type pistons must be used in all cylinders Use of mixed (different compression ratio) pistons will cause very rough operating engine

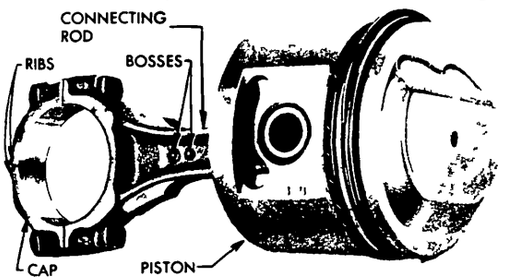
Model	Std. Size Piston No.
Series 40 (Synchro-mesh)	Buick No. 1392769
Series 40 (Dynaflow)	Buick No. 1392771
Series 50, 60, 70 (Dynaflow)	Buick No. 1392770

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with ¼" long dash following Engine Production Code Number (see Engine Number) have .010" Oversize cylinder bore and pistons Std cylinder bore size is 4 1235-4 1265" (All Models)

Removal - Pistons and rods removed from above.

►*CAUTION:* Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.

Fitting New Pistons: Clearance .0008-.0014". If micrometer used on pistons, measure at top and bottom of skirt 90° from pin hole (top diameter slightly less than bottom in service). Use .003" X ½" X 12" feeler gauge



BUICK PISTON & ROD ASSY

to fit pistons with cylinder block in normal position. Insert feeler on lower side of bore 90° from piston pin hole. Pull to withdraw feeler should be 7-13 lbs. at 70°F (piston & bore clean and dry).

Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and .005", .010", .020", .030" Oversize. *NOTE* - Pistons furnished only with fitted pins.

Installing Pistons: Assemble rod in piston with oil spurt notch on same side as valve depressions in piston dome. *See Rod Installation below.*

PISTON PINS

Pins are press fit in connecting rod.
Diameter - .9994-.9997". **Length** - 3.500".
Clearance in Piston - .0004". Finger push fit.
Clearance in Rod - .0007-.0015". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION: Pistons may be damaged if special procedure and tools not used.*

Replacement Pins: Std. size only. Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.077-.078"	.015-.025"	.002-.004"
Oil	.185-.186"	.015-.035"	.0035-.0095"

►*COMPRESSION RING PRODUCTION CHANGE:* Early enginesshave compression rings with chamfer on inner upper edge, later engines have chamfer on inner lower edge. Both types have "TOP" stamped on top face of ring.

Replacement Rings: Std., .010", .020", .030" Oversize in individual rings or in sets.

Installing Rings: Install compression rings *(See Compression Ring Production Change above)* with grooved or beveled side toward bottom of piston. Install oil ring expander with ends in area above ends of piston pin where groove is not slotted. Install oil ring over expander with gap on same side as valve depressions in piston head.

CONNECTING RODS

Length - 6.1" (Center-to-Center). **Weight** - 23.20 ozs.
Crankpin Journal Diameter - 2.249-2.250".
Out-of-round limit .0015".
Bearings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.
Clearance - .0002-.0023" (service limit .003").
Side Play - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020", and .021" Undersize. Size is stamped on back of bearing at or near tang.

Installing Rods: See Installing Pistons above. Install rods so valve clearance depressions in all piston heads and all spurt notches in all connecting rods are toward camshaft. *NOTE* - Rib on edge of rod cap will be on same side as conical boss on web of rod, and these marks will be toward the other connecting rod on same crankpin.

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars): See "Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2.499". Five bearings. Out-of-round limit .0015".

Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE:* Bearing upper halves can be rotated out and in by using tool KMO-734 in oil hole.

Clearance - .0005-.0025".

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Replacement Bearings: Standard and .001", .002" Undersize. *NOTE* - First four bearings identical and interchangeable. Rear bearing longer and flanged.

End Thrust: Taken by rear No. 5 flanged main bearing.

End Play - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

Vibration Dampener Installation: *See "Vibration Dampener" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

►*NOTE* - 1957 camshaft journal O.D. is approximately .100" larger than previous types and cannot be used in previous engines. 1956-57 Distributor Gears and Valve Lifters are interchangeable.

►*CAMSHAFT IDENTIFICATION:* **Series 40 Synchro-mesh** - Has plain land just forward of No. 3 bearing journal.

All Others - Above land has two grooves.

Journal Diameters - **(1)** 1.785-1.786", **(2)** 1.755-1.756", **(3)** 1.725-1.726", **(4)** 1.695-1.696", **(5)** 1.665-1.666".

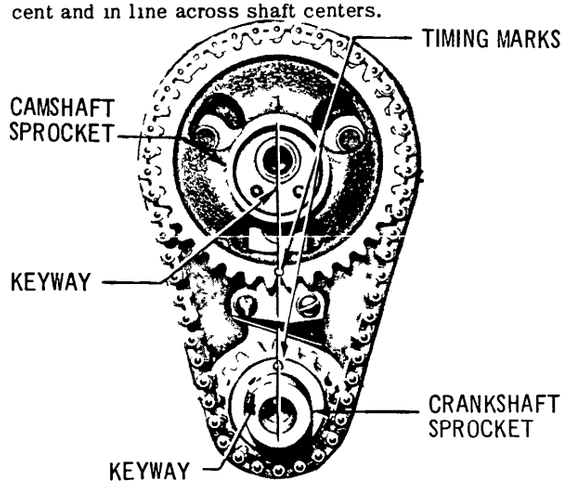
Bearings - Steel-backed babbitt lined bushings.

Clearance - .0005-.0035". Service limit .0015-.004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .688". **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: Valve timing is correct when "0" marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.



BUICK VALVE TIMING MARKS

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	.3720"	4.704"
Exhaust	1.437"	.3705"	4.704"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.423"	.003"
Exhaust	45°	.423"	.004"

Valve Seat Width—1/16' (3/64-5/64").

►*VALVE GRINDING CAUTION:* If height of valve stem end raised .075" by valve grinding, height must be reduced by grinding end of stem or replacing valve to insure correct operation of hydraulic lifter.

Valve Springs: Double springs used on all valves. Install springs with closed-coil end toward cylinder head.

Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Lbs.Press.	Lgth.	Lbs.Press.	Lgth.
Closed	24-29	1.53"	43-48	1.5"
Open	58-64	1.15"	91-97	1.12"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3.

Hydraulic Valve Lifters: Barrel type.

Diameter—.8425". **Clearance in Block**—.0015-.003".

Lifter Overhaul & Testing—*See "Valve System" in Buick Special Data*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Synchro-mesh Models

Intake Valve - Opens 25° BTDC Closes 77° ALDC

Exhaust Valve - Opens 65° BLDC Closes 37° ATDC

Dynaflow Models

Intake Valve - Opens 34° BTDC Closes 83° ALDC

Exhaust Valve - Opens 76° BLDC Closes 41° ATDC

Valve Timing Check—Timing chain cover must be removed to check chain and sprocket marks. *See Camshaft Setting under CAMSHAFT above.*

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.***

Crankcase Capacity: 5 quarts refill. 6 quarts, dry engine. Add 1 quart for dry filter.

Normal Oil Pressure: 40 lbs. at 1600 RPM or 35 MPH.

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Gauge - **AC No. 1508598.** Not electric.

Oil Pump: New combination gear type oil pump and vane type vacuum pump. In crankcase at rear of engine.

Oil Pump Removal & Overhaul - *See "Oiling System" in Buick Special Data.*

Vacuum Pump: Part of oil pump assembly. *See "Vacuum Pump" in Buick Special Data.*

Oil Filter: Full-flow. On pad at right rear of engine. *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

Replacement Filter Element - AC No. PF-122.

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in rear end of valve lifter cover (air outlet) to which ventilator pipe is connected.

COOLING

►*RADIATOR REPLACEMENT NOTE:* Cars with Air Conditioning (installed at factory) have larger radiator cores and shroud assemblies.

Water Capacity: 18 qts., 16.5 qts. without heater.

Pressure Valve: Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Pellet type in water manifold above pump.

(Std.) Buick No. 1391226, opens at 157-162°F.

(High Temp.) Buick No. 1391225, opens at 177-182°F.

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Buick Special Data.

Pump Removal - Drain cooling system, loosen fan belt, remove fan blades, spacer, and pulley from water pump hub, and remove belt. Remove hose from water pump inlet, then remove pump cover assembly and gasket.

Temperature Gauge: AC No. 1513311. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Long 11CF No. 266716. Single plate, semi-centrifugal type.

See "Long" Clutches in Clutch Section.

Clutch Disc - Long No. 286176.

Pedal Adjustment: Free play 1 1/8-1¼". For adjustment procedure *See "Clutch Notes" in Buick Special Data.*

Removal: Remove rear axle and transmission (See below), remove flywheel lower housing. Disconnect release rod from yoke, remove boot. Remove spring washer which retains release bearing support and remove support. Pull yoke outward to release it from ball stud, remove yoke and release bearing through bottom of housing. Remove clutch cover screws uniformly to release spring tension after marking cover and flywheel for reinstallation. *NOTE* - Metal spacers placed between release levers and inner edge of clutch will aid removal and installation. Remove cover assembly and driven plate.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.

See "Buick Synchro-mesh" Transmission in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect rear axle assembly *(CAUTION:* Use 3" torque tube guide pins to save damaging torque tube seal). Drain transmission, remove clutch linkage shield, insert ¼ X 2½" bolt and nut (finger tight) in clutch equalizer and bracket. Remove clevis pin and

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spring from outer end of clutch yoke and two bolts holding equalizer bracket to transmission. Disconnect speedometer cable, shift rod and selector rod from levers, rubber thrust pad from thrust bracket (leave attached to support). Disconnect rubber mounting pad from transmission support. Support engine at rear on jack, remove support from frame, noting number and location of shims. Loosen exhaust pipe so rear of engine can be lowered. Lower engine and transmission to clear X-member. Install guide pins and remove transmission.

DYNAFLOW DRIVE TRANSMISSION

"Variable Pitch" Dynaflow Drive. Torque Converter and hydraulically operated planetary transmission. A two position (high & low) stator is used in the torque converter to multiply engine output torque when required (controlled by accelerator pedal at the wide open position). *See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION* *See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING* *See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

Throttle Linkage Adjustment and Dash Pot Setting on Dynaflow Drive Cars. *See "Tune-up"*

Lubrication - Check fluid level in transmission every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level - Engine must be idling with selector lever at "P" (parking) and transmission at normal operating temperature. Add oil to "Full" mark on dip stick only.

Capacity - 11 quarts. (Add 1¾ pints for dry transmission). *Use only Special Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type A.*

►*OTHER DYNAFLOW SERVICE DATA* *See "Buick Variable Pitch Dynaflow Drive" in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. Saginaw (Front), Saginaw or Spicer (rear). Front joint enclosed in torque ball, rear joint enclosed in torque tube Front joint lubricated by transmission. Rear joint requires no lubrication.

►*"U" JOINT INSTALLATION CAUTION* Hole in spline of propellor shaft must align with mark on "U" joint to insure that "U" joints are 90° apart for proper alignment to avoid unnecessary vibration

►*1957 BUICK UNIVERSAL JOINT REPLACEMENT CAUTION:* 1957 type universal joints are marked with two notches in line with rear yoke of joint while 1958 joints are not marked but have two splines removed 45° off centerline of yoke. Proper alignment of 1957 propeller shaft with the 1958 joint would be difficult and possibly result in drive line roughness and vibration.

PROPELLER SHAFT

►*1957 BUICK PROPELLER SHAFT LUBRICATION CAUTION:* Cars having a rubber plug located in lower side of torque tube approximately 7 15/16" forward of differential carrier face require a special lubrication procedure as follows: Remove rubber plug and fill lubricant fitting in propeller shaft with **two quick shots of chassis lubricant each 1000 miles.** Replace plug making sure that edge of hole is properly seated in groove of plug.

►*1957 BUICK PROPELLER SHAFT PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new propeller shaft having a lubrication fitting and an "O" ring seal to provide adequate lubrication between rear propeller shaft and pinion gear shaft splines is used in late 1957 production. A new package, Part No. 1388309 containing a late type propeller shaft, "O" ring seal, and rubber plug, is available for service replacement. When installing the new propeller shaft, a hole must be drilled in the torque tube for access to the lubrication fitting as follows Locate center of 13/16" hole by carefully measuring 7 15/16" from face of differential carrier (where torque tube is joined to carrier), and at a distance of 1 3/4" up on left side from bottom centerline of torque tube. Drill a 13/16" hole, then remove all burrs from inside and outside of hole. Install propeller shaft in the usual manner after installing the "O" ring seal in groove of pinion gear shaft just ahead of pinion locknut. Lubricate fitting *(see "Lubrication Caution" above),* then install rubber plug making sure that drilled edge of hole is fully seated in groove of plug.

REAR AXLE

Own. Semi-floating, hypoid gear type and torque tube drive

►*REAR AXLE LUBRICANT LEVEL CAUTION* Fill only to ¼-3/8" below filler plug opening DO NOT FILL TO FILLER OPENING
See 'Buick Hypoid" in Rear Axle Section

	Axle Ratios	
Series	Synchro-mesh	Dynaflow
40	3 58-1(43-12)	3 07-1(43-14)
50, 60, 70		3 07-1(43 14)

►*REAR AXLE RATIO NOTE* Ratio is stamped on bottom of axle housing as follows 3 07-1 (3/07), 3 58 1 (3/58)

Backlash - 007- 009"

Rear Axle Removal: Raise rear of car and place stands under frame Raise rear axle assembly on floor jack so it can be rolled free of car Disconnect radius rod at axle end, lower ends of springs, and lower ends of shock absorbers. Disconnect parking brake cable at rear sheave and at bracket on torque tube. Disconnect brake hose from pipe at X-member and remove yoke. Seal hose and pipe openings. Remove two opposite torque tube flange bolts and install 3" guide pins Remove other bolts and roll rear axle assembly from car

Wheel Bearing Adjustment None required.

Rear Suspension: *See "Buick Rear Suspension" in Suspension & Wheel Alignment Section*

Torque Ball Adjustment None required. *CAUTION* Two types used. Later type uses "O" ring seal in place of gasket with inner retainer change to use this type seal.

SHOCK ABSORBERS

Delco. Direct acting hydraulic (front and rear). Front shock absorber mounted within front suspension coil spring.

Model	Front	Rear
40, 60 (Exc. 49, 69) Domestic	5531037	
49, 69, 50, 70 Domestic	5531038	
40, 60 Export	5531038	
50, 70 Export	5534431	5535512
40, 60 (Exc. 49, 69) Export		5535523
56C, 56R, 76C, 76R Domestic		5535523
46, 69, 53, 73, 49D Domestic		5535522
46C, 46R, 66C, 66R Domestic		5535521
41, 43, 48, 63 Domestic		5535520

FRONT SUSPENSION

Independent. New design with steering knuckle mounted on upper and lower ball joints (no kingpin or knuckle support).
See "Buick" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 8° with 0° Camber. Both sides of car should be equal within 1°.

Caster - Neg. 1¾° desired (limits Neg. ¼° to Neg 2¾°). Both sides of car should be equal within ¾°.

Camber - Pos. ½° desired (limits Pos. 1° to Neg ½°). Both sides of car should be equal within ¾°.

Toe-In - 1/16-1/8".

Toe-Out on Turns - Outer wheel 20°, Inner wheel 23° (Manual Steering), 21¾° (Power Steering).

►*CASTER & CAMBER ADJUSTMENT NOTE:* Adjusting shims located between upper control arm inner shaft and frame bracket (shims may also be found installed in same position on lower control arm).

STEERING

Manual Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: "Saginaw (In-Line) Hydraulic". Recirculating ball nut and worm type with the worm and ball nut, power piston and rack, and the power cylinder all on a single center line.
See "Saginaw (In-Line) Power Steering" in Steering Sect.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

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BRAKES

B ndix Hydraulic (Single Anchor): Conventional two shoe with short lining (Primary), longer lining (Secondary). Front and rear linings are of different material and are not interchangeable. Linings are riveted to shoes. Parking "Step-on" lever applies rear wheel service brakes.
See "Bendix Hydraulic (Without Eccentric) Brakes" in Brake Section.

►*ALUMINUM FRONT BRAKE DRUM NOTE:* For model application and usage, *See "Bendix Hydraulic Single Anchor (Without Eccentric) Brakes" in Brake Section.*

►*BRAKE DRUM PRODUCTION CHANGE:* Motor Wheel Drums used on front wheels, *See "Bendix Hydraulic Single Anchor (Without Eccentric) Brakes" in Brake Section.*

►*BRAKE LINING PRODUCTION CHANGE:* Both Primary and Secondary brake linings for all four wheels have grooves and the same lining used on both power and manual brakes starting with production February 4th, 1957. Primary lining has "Blue" paint on edge, Secondary "Yellow".

►*FILLING & BLEEDING BRAKE SYSTEM CAUTION:* Do not spill fluid on backing plates of either front or rear brakes. Fluid will enter brake system around wheel cylinder opening or adjustment hole cover. On finned aluminum drums, fluid will be drawn into seam (between Cast Iron & Aluminum) and appear around aluminum pegs in cast iron ring (when heated) and cause serious damage to lining.

Drums - Diameter 12.017-12.023". Rebore limit 12,083".
Wh l Cyl. Diam t r - Front 1 1/8", Rear 1".
Replacement Lining & Shoes - Linings or shoes with lining come in Standard and .030" Oversize. Late type linings are same for manual and power brakes, but different for 70 Series.

Lining Length & Width

Model	Primary	Secondary
Series 40,50,60	10.094" X 2.25"	12.969" X 2.25"
Series 70	10.094" X ①	12.969" X ①

① - Front 2.50", Rear 2 25".
Lining Thickness - .187" (Series 40,50,60), .265" Front wheels, .187" Rear wheels (Series 70).

Braking Power - 53% Front, 47% Rear.

Clearance - .015" or adjusting screw backed off 15-17 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: "Displacement" type. Located on engine side of cowl panel directly below brake pedal. *See "Buick Master Cylinder" in Brake Section.*

Checking Fluid - Maintain fluid level ¼" below lowest thread of filler opening.

Removal - Disconnect battery ground strap. Remove clevis pin from pushrod clevis, lift brake pedal to pull linkage out of way, then remove large nut holding master cylinder to cowl (Wrench 6618). Disconnect stop light wire connector from switch, brake pipe from master cylinder, tape end of pipe. Remove bolts holding master cylinder to air duct and remove master cylinder.

Power Brakes: Bendix or Moraine Power Brake Unit. Suspended type power unit (replaces conventional master cylinder).

►*NOTE:* Bendix unit is new type with "Hydraulic Reaction" control.
See "B ndix" & "Moraine" Power Units in Brake Section.

Checking Fluid Level - Maintain fluid level ¼" below lowest thread of filler opening.

Removal of Power Unit - Same as for standard master cylinder plus the removal of vacuum hoses from vacuum tee

MISC. MECHANICAL

Air Conditioning: Buick Air Conditioning with all components located ahead of the dash.
See "Buick Air Conditioning" in Miscellaneous Section.

Windshield Wipers: Cable operated vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric type with reversible motor in each window. *See "GM El ctric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Two Way): Electric type with single reversible type motor for horizontal adjustment. *See "GM Two-Way Seat Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Six-Way): Electric type with single reversible motor. *See "GM Six-Way Seat Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor.
See "Power Top Controls" in Miscellan ous Section.

►*AIR SUSPENSION CAR CAUTION: Before jacking, hoisting, towing, r working under car, s e SERVICE CAUTIONS and TOWING instructions in "Buick Air Suspension" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate on left front door p illar post. *NOTE* - Number (example below) includes identification data.

① ② ③ ④
4 E 2 001001

① - See Series Designation below.
② - Year designation (1958).
③ - See Assembly Plant designation below.
④ - Beginning engine number.

Series Designation

4- 40 Special. **6** - 60 Centruy. **8** - 700 Limited.
5- 50 Super. **7** - 70 Roadmaster.

Ass mbly Plant Designation

1	Flint	**5**	Wilmington
2	South Gate	**6**	Atlanta
3	Linden	**7**	Framingham
4	Kansas City	**8**	Arlington

ENGINE NUMBER: Sam as Serial No. (see above). Stamped on top l ft hand corner of crankcase directly forward of left front corner of valve lifter cover. This number is read from front of car. Number on right side of same area is Factory Production Code Number. *NOTE* - ¼" **dash** following Production Code number indicates that cylinder bores are .010" oversize. **X** preceding number (50, 60, 70, 700 Series) indicates 9.5 to 1 compression ratio with low compression pistons.

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel); See Note under Engine Specifications for recomm nded changes.*

►*SPECIAL LOWER COMPRESSION ENGINE PRODUCTION NOTE (S ries 50, 60, 70, & 700): See Note under engine specifications for South Gate production cars.*

COMPRESSION PRESSURE: (40 Synchro-mesh) 150 lbs. (40 Dynaflow) 170 lbs.; (50,60,70,700 Std. 10-1 Ratio) 185 lbs., (50,60,70,700 Low Compr. 9.5-1 Ratio) 170 lbs. all at cranking speed. Cylinders should be equal within 15 lbs.

VACUUM READING: 14" minimum at idling speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely. Check thermostat at 70°F (Room Temperature). Unhook outer end from stud. Hold valve closed. Wind-up required to hook thermostat on stud should be 3/8 turn.

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.

Cylinders - RIGHT BANK 1-3-5-7, LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .030-.035".

Spark Plugs - AC-45 (Average Driving); AC-44 (Sustained High Speed Driving) Early, AC-45-S Later. Tighten to 25 ft. lbs.

►*SPARK PLUG NOTE:* AC-45-S has longer porcelain and electrodes for better anti-fouling under extended idling and low speed operation.

►*SPARK PLUG WIRE CAUTION:* To eliminate possibility of engine misfiring, spark plug wires must be installed in holding clips on rocker arm covers in same order as they are attached to the plugs and the coil to distributor high tension wire must pass UNDER the spark plug wires.

COIL: Delco-Remy 1115100.

Ignition Current - 2.5 amps. idling, 4.5 amps stopped.

Resistor - Delco-Remy 1931614. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco Remy 1110870 (Std. Trans. & Early Dynaflow Cars), 1110934 (Later Dynaflow Cars). *See "Delco-Remy Window Type Distributors" in Electrical Section.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - .0125-.0175". See Note.

Cam Angle - 28-32°.

►*BREAKER GAP AND CAM ANGLE NOTE:* Setting cam angle at 30° will provide .016" breaker gap.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110870

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.0	475	1-4	950
6-8	1150	12-16	2300
12-14.5	1875	24-29	3750

Automatic Advance - 1110934

Degrees Distr.	RPM	Degrees Eng.	RPM
0	625	0	1250
.75-2.5	925	1.5-5	1850
8.5-11	1875	17-22	3750

Vacuum Spark Control: Delco-Remy 1116106 (1110870 Distr.).

Vacuum Advance - 1116106

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
9-10.5	18-21	12-14

IGNITION TIMING

Setting - 5° BTDC at 400 RPM (Cars with 1110870 Distr.), 12° BTDC at idling speed (Cars with 1110934 Distr.).

►*IGNITION TIMING CAUTION (Cars with 1110870 Distributor):* Reduce engine idle speed to 400 RPM maximum when setting timing so that advance mechanism will not operate. Reset idle speed to correct figure after timing completed. *This procedure not required on cars with 1110934 Distributor.*

Timing Mark - (Early Cars) Timing indicator on right side of timing chain cover below fuel pump marked "O" and "5" with two additional lines indicating 2½° increments. **(Later Cars)** Timing indicator marked "O", "5", "12". Align correct mark with yellow line on pulley or balancer.

CARBURETOR

►*CARBURETOR APPLICATION: 2-Barrel Carbur tors (Carter WGD or Stromberg WW) used on S ri s 50, 4-Barrel Carbur tors (Cart r AFB or Rochester 4GC) used on Series 50,60,70,700.*

►*POOR RETURN TO IDLE CORRECTION (All Carburetors except with Engine Production Cod Nos. 586375 to 588199 inclusiv and 602728 (2-bbl.), 602741 (4-bbl.) continuous):* To correct this condition install new Throttle Lever Adapter and Rod Package (see table below) as follows: **Carter & Rochester Carburetors** - Remove and discard old throttle rod, install adapter with bolt in original rod hole in lever, install new throttle rod and connect rod to hole in adapter. **Stromberg Carburetor** - Remove and discard old throttle rod, enlarge **second** hole in throttle lever (not original rod hole) to ¼", connect new throttle lever in this hole. **All Carburetors** - Adjust throttle linkage (see below). *CAUTION* - Before connecting new throttle rod to linkage, check accelerator pedal linkage for freedom from binding and see that lower lever returns to its stop freely. After connecting throttle rod, make certain that throttle returns properly to point where stopscrew makes contact. Check linkage for binding, check all carburetor adjustments.

Carburetor	Buick Part N .
Rochester 4-Bbl	1388588
Carter 4-Bbl	1388589
Carter 2-Bbl	1388590
Stromberg 2-Bbl. (Rod Only)	1173922

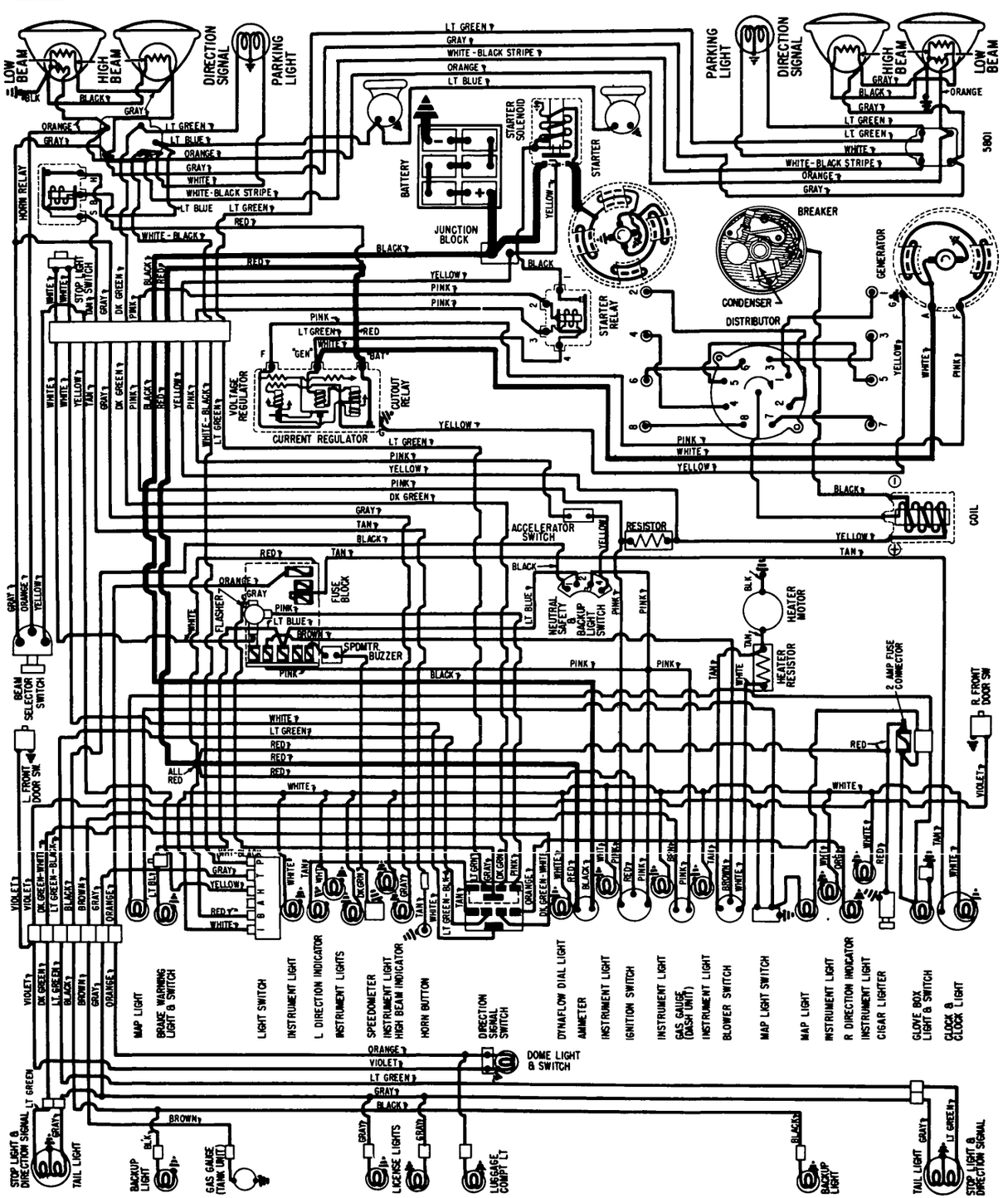
►*CARBURETOR CHOKE STICKING CORRECTION (Exc. Cars with Production Nos. 585966 to 588199 Inclusive and 600788 Continuous):* Sticking condition caused by foreign material entering choke pipe and being drawn into choke housing. To correct sticking condition, install new type heat pipe (See Part No. for each type Carburetor below), in inboard side of right exhaust manifold instead of at the rear. Cut insulation to 8" for new pipe and use 5/16" x 3/4" long steel tubing for bushing in manifold when hole in manifold is 5/16". *NOTE* - Expand end of 1/4" pipe as necessary to get air tight fit in manifold.

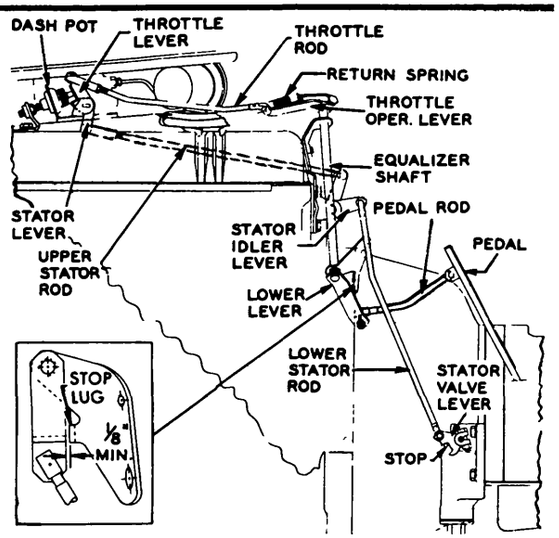
Carburetor	Buick Part N .
Stromberg	1187019
Carter 2-Bbl	1187020
Rochester	1187021
Carter 4-Bbl	1187022

►*MANIFOLD FUEL DISTRIBUTION (All Carbs.): Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barr ls 2-3-5-8.*

Throttle Linkage Adjustment (All Trans.): Adjust idle speed to 485 RPM (550 RPM Air Cond. Cars) in Neutral or Park. Adjust Stator Linkage (Dynaflow Cars) as directed below. Check adjustment of choke unloader (See Carter, Rochester, or Stromberg Carburetors). Disconnect throttle rod from throttle operating lever on equalizer shaft. Adjust throttle operating rod so that ½" of thread is exposed beyond locknut. Hold accelerator to floor mat (wide open throttle) and adjust throttle rod length, or change position of lever on shaft, so throttle rod is 1/16" short of entering hole in lever. Connect throttle rod to lever. Check throttle wide open position. Close throttle to hot idle position. Clearance between equalizer shaft lower lever and stop lug on shaft-to-cowl mounting bracket should be 1/8". Readjust throttle rod length, or position upper lever on equalizer shaft, to obtain this clearance.

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BUICK DYNAFLOW THROTTLE LINKAGE

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Stator Linkage Adjustment (Variable Pitch Dynaflow): Hold throttle in wide open position, pull stator rod forward, adjust upper stator rod so ball joint at forward end will slip into stator lever freely, then **length n stator rod 1 turn.** Connect ball joint to stator lever. At wide open throttle there should be slight endwise stator rod movement.

Stator Linkage Adjustment (Flight Pitch Dynafl w): Disconnect stator rod from stator lever on carburetor. Hold throttle closed in hot idle position. Hold stator rod in full rearward position and adjust upper stator rod length so that ball joint slips freely in stator lever (lever in rearward position), then **sh rt n stat r r d 1 turn** for clearance at transmission stop, connect rod.

Dashpot Adjustment: Make this adjustment after Throttle and Stator Linkage Adjustments completed and with engine at operating temperature. Close throttle lever with fast idle screw on HIGH step of fast idle cam (extreme fast idle position). Adjust dashpot until it just touches throttle lever, then back off dashpot one turn for clearance. Check adjustment by operating engine at 1500 RPM in Drive (*CAUTION* - apply brakes firmly) and closing throttle rapidly. If engine stalls, decrease clearance slightly by moving dashpot toward throttle lever. If closing delayed excessively, increase clearance.

Starter Switch (Car Starter) S tting: (Synchr -m sh Cars) - Remove carburetor, connect test light (12 volt) across switch terminals, block choke valve so fast idle cam is at slow idle position, back off throttle stop screw. Lamp should light with ¼" (drill) clearance between primary throttle valve and wall of air horn, but not light with 7/64" (drill) clearance at same position. To adjust, change number of shims.

Dynafl w Cars - With throttle completely closed, fast idle cam on slow idle position, dashpot plunger clear of throttle, measure distance from diaphragm flange of

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dashpot to near edge of dashpot arm on throttle lever. Then check distance again as switch closes (starter energized by opening of throttle). Switch is properly timed when difference between above two measurements meets specifications for that particular carburetor: (Carter 2 Bbl.)1 1/16-1 5/8", (Carter 4 Bbl.) 13/16-1 5/16", (Rochester 4 Bbl.) 13/16-1 5/8", (Stromberg 2 Bbl.) 1-1 7/16".

CARTER WGD 2-BARREL

Cart r WGD 2674S (Synchr -mesh), 2675S, 2845S (Dynfl w)

Idl Setting - ¾-2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idl Sp d - 485 RPM (550 RPM Air Cond. Cars) in neutral or park position.

Fl at L v l - ¼" (Gauge T109-31) between top of float (at center) and bowl cover.

Ch k L v r Setting - .020" clearance between lower edge of throttle valve and carburetor bore with adjusting screw on high step of fast idle cam

Fast Idl Setting: .026" clearance between lower edge of throttle valve and carburetor bore with adjusting screw on high step of fast idle cam.

Aut matic Ch k Setting: 1 point lean (2674S), Centered on Index (2675S, 2845S).

►*OTHER DATA: S "Cart r WGD Carburetors" in Carburetion S cti n.*

Thr ttl Linkag Adjustm nt (Auto.Trans.): *See CARBURETOR above.*

STROMBERG "WW" 2-BARREL

Str mberg WW, Cod 7-109 (Dynaflow Cars).

Idl S tting - 1½ turns out. Adjust both screws alike. Turn screws out for richer mixture.

Idl Sp d - 485 RPM (550 RPM Air Cond. Cars) in neutral or park position.

Float L v l - 5/32" (Gauge J-7294) from top of float at center to top edge of float bowl (gasket removed) with needle seated.

Fast Idl & Start Aid S ttings: Remove thermostat cover, throttle stop screw and spring and replace stop screw only, then proceed as follows:

1) With throttle fully closed, turn throttle screw in 7¼ turns from point of contact with throttle lever.

2) Bend fast idle lever (Tool J-5197) as necessary to obtain .076" (#48 drill) clearance between fast idle lever and high step of fast idle cam, with choke valve closed and throttle lever against stop screw.

3) Back out throttle stop screw ¼ turn. Bend choke positioning spring pick-up lever (needle nose pliers) so lever just contacts choke positioning spring with throttle at this position.

4) Remove throttle stop screw. With throttle open to clear fast idle cam, close choke valve by pushing up on thermostat spring lever. Close throttle so fast idl e lever is on high step of fast idle cam. Bend choke rod (Tool J-5197) so side of fast idle lever just clears upper index lug on fast idle cam and rests in corner formed by index lug and high step of cam.

5) Reinstall throttle stop screw with spring. Hold choke valve closed against #53 drill (.060"). Bend unloader link (Tool J-5197) so start aid spring just clears tang on choke unloader plate as throttle valve is opened.

6) Lightly close choke and fully open throttle so unloader arm kicks choke valve partially open. Bend unloader arm on throttle lever to obtain .144" (#27 drill) clearance between upper edge of choke valve and wall of air horn.

7) Press thermostat spring lever upward lightly until positioning spring lever just contacts positioning spring to close choke valve. Bend choke positioning lever (needle nose pliers) to obtain .209" (#4 drill) opening between upper edge of choke valve and wall of air horn.

8) Install choke cover and gasket. Adjust choke setting.

Automatic Choke Setting: 1 notch l.ean.

►*AUTOMATIC CHOKE NOTE:* Choke covers that do not have daub of white paint should have index marks removed and new index marks placed three marks counterclockwise from original position and a daub of white paint added.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (Buick) Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB 2676S, 2800S. 4-Barrel downdraft type with automatic choke.

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM (550 RPM Air Cond. Cars) in neutral or park position.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester No. 7011600 (Early), 7013100 (Later). 4-barrel downdraft carburetor.

►*STALLING ON LEFT TURN CORRECTION (Carb. No. 7011600):* This condition may exist when throttle closed or during hard brake application and is caused by hole drilled through into choke passage of main body. To correct, plug hole (even with surface of main body), when a No. 30 drill will drop more than 3/4" into hole. *NOTE* - Remove Air Horn Assembly only to obtain access to hole.

►*ENGINE FADE-OUT ON SHARP TURNS CORRECTION:* To correct this condition increase float drop from 1 5/16" to 1 11/32". DO NOT change float drop unless above condition exists.

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed - 485 RPM (550 RPM Air Cond. Cars) in neutral or park position.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-barrel Carburetors" in Carburetion Section.*

FUEL PUMP PRESSURE: 5¾-7 lbs.

CARB. EQUIPMENT

Fuel Pump: AC, Type FU. Replacement No. 4399.

Pr ssur - 5¾-7 lbs. at 485-1500 RPM with gauge at pump height.

S "Fuel Pumps" in Carburetion Secti n.

Fuel Lin Filt r: Glass bowl fuel filter located between fuel pump and carburetor for visual inspection and cleaning.

Air Cleaner: Four DRY FILTER ELEMENT types used. Different cleaners used on 2- and 4-barrel carburetors and with or without Air Suspension. *NOTE* - DO NOT use Air Suspension cleaners on coil spring cars. Clean every 5,000 miles and replace element every 15,000 miles.

►*CLEANING CAUTION:* Drop element squarely on flat surface from 2" height, repeatedly, until dust is removed. Turn element over and repeat operation. DO NOT wash, air blast or oil element.

Gasoline Gauge: AC. Electric type.

Dash Unit - AC No. 1518999.

Tank Unit - AC No. 5640026.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco-Remy No. 560. 12 Volt, 11 plate, 70 ampere hour capacity.

Battery Ground - Negative.

Engine Ground - Dash to right cylinder block.

STARTER

Delco-Remy 1107667. Armature - 1935851.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	ℂAmperes
0 ft. lbs	5100	10.6	65-100
	Lock	3.5	300-360

ℂ - With solenoid.

Starting Switch: Delco-Remy Solenoid 1119919. Starter solenoid controled by separate relay, Delco-Remy 1116921, and Accelerator Vacuum Switch (on Carburetor). *See "Starter Controls" in Electrical Section.*

Accelerator Vacuum Switch: Carter No. 192-38U (Carter and Stromberg Carb.), Rochester No. 7011372 (Rochester Carb.).

Accelerator Vacuum Switch Setting - *See data on each carburetor type in Carburetion Section.*

Neutral Safety & Back-up Light Switch (Auto. Trans.): Buick No. 1178138 (Dynaflow), 1118293 (Flight Pitch). Mounted on steering column jacket under cowl. Connected in starter control circuit so that starter operative only when selector lever in "N" Neutral or "P" Parking position.

Adjustment - *See "Buick Variable Pitch" or "Buick Flight Pitch" Transmission in Transmission Section.*

GENERATOR

Delco-Remy 1102101. Armature 1939839.

Performance Data

Amperes	Volts	RPM
45	14.0	2900

►*AIR CONDITIONED CAR GENERATOR NOTE:* Same generator used as on Std. car except that with Air Cond. the generator produces 5 ampere higher maximum output (generator has forced cooling by air duct).

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Field Current - 2.66-2.88 amperes at 12.0 volts at 80°F.
Brush Spring Tension - 26-32 ozs.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: Check belt tension by using torque wrench on generator pulley. 15-20 ft. lbs. should slip generator pulley on belt.

REGULATOR

Delco-Remy 1119600 (Std.), 1119601 (Air Cond.). *NOTE - Specifications below are "Normal".*
►*"DOUBLE CONTACT" REGULATOR NOTE: Both regulators have double contacts for voltage regulation.*

Cutout Relay

Cuts In - 11.8-13.6 Volts. (Adjust to 12.8 volts).
Contact Gap - .020"
Air Gap - .020" (with contacts just closed).

Voltage Regulator

Setting - 14-15 volts (Adjust to 14.5 volts) operating on upper contacts. .1-.3 volts lower operating on lower contacts.
Contact Gap - .016"
Air Gap - .067" (with points just touching).
Checking & Adjusting - *See "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting - 38-42 Amps.(1119600), 42-47 Amps. (1119601).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy (Double Contact)Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System). *See "4-Headlights" in Electrical Section.*
Directional Signals - *See Electrical System.*
Autronic Eye: *See Electrical Section.*
Lighting Switch Removal: Disconnect battery cable from junction block and disconnect wires from lighting switch. Pull switch knob out to last notch, then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch. Remove switch mounting nut with wrench J-1589-A and remove switch and escutcheon from instrument panel.
Stop Light Switch Location: Located on master cylinder attached to engine side of dash panel.
LIGHTING THERMOSTATIC CIRCUIT BREAKERS: Delco-Remy 22.5 Amp. located on lighting switch. Protects Head, Tail Parking, License, and Instrument Lights.
FUSES: All fuses except as noted are located under instrument panel on left side.
5AGC. Air Conditioner Clutch Control.
1AGC. Clock
10AGC. Directional Signal & Stop Light.
20SFE. Dome & Trunk Compt. Light.
20SFE. Heater, Defroster, & Air Cond. Blower.
10AGC. Parking Brake & Back-up Light.
1AGC. Speedometer Buzzer.
2AGA. Glove Box & Map Light. In Connector.
Horn Relay: Delco-Remy 1116920.
Closing Voltage - 5.0-9.5 volts, adjust to 6.5 volts.
Amperage Draw - 7-12 amperes at 12 volts (All).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8 (All Series).

Series	Bore	Stroke	Displacement
All	4.125"	3.4"	364 cu. ins.

Series	Comp. Ratio	Rated HP	Developed HP
40 (S.M.)	8.0-1	54.45	
40 (Dynaflow)	9.5-1	54.45	250 at 4400 RPM
50,60,70,700(Std.)	10-1	54.45	300 at 4600 RPM
50,60,70,700(Spec.) ①	9.5-1	54.45	

① See Special Lower Compression Engine Note below.

►*SPECIAL LOWER COMPRESSION ENGINE PRODUCTION NOTE (SERIES 50,60,70):* Some South Gate cars, identified by "X" preceding Engine Production Code No. (see Engine Number), have Series 40 Dynaflow Pistons with compression ratio of 9.5-1 (see Piston Replacement Note below). *CAUTION* - Replacement pistons must be same type. DO NOT mix 9.5-1 & 10.0-1 pistons (will cause very rough operating engine).

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel);* Minimum fuel octane rating for satisfactory operation is: 91 (Series 40 Synchro-mesh) 97 (All Dynaflow Cars). If satisfactory fuel cannot be secured, compression ratio should be lowered by using export pistons and head gaskets as listed below. *CAUTION* - Some Series 50,60,70,700 Engines built with 9.5-1 Compression Ratio (same pistons as Series 40 Dynaflow Engine). *See Lower Compression Engine Production Note above.*

Series	Piston		Head Gasket
40 (Synchro-mesh)	①	②	1173567 (.045")
All (Dynaflow)	1392950		1173567 (.045")

① - Domestic & Export pistons are the same.
② - Can be used if desired (Export and Domestic gaskets are both .015").

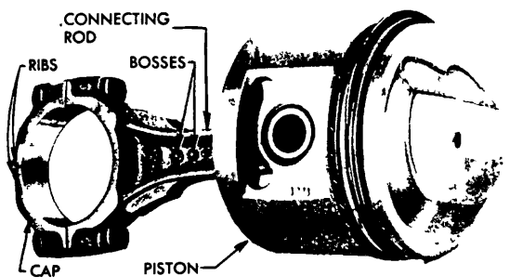
ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*
OIL PAN REMOVAL: Disconnect steering idler arm bracket from right frame side rail, and lower steering linkage for clearance, then remove oil pan. *CAUTION:* Do not allow bracket to turn on idler arm (will change toe-in adjustment).
CYLINDER HEAD & GASKET: Same cylinder head and gasket used on all engines. Different compression ratios secured by use of different pistons as noted under "Pistons" following. *NOTE* - Standard gasket is .015" thick. *See "Engine Operation in Low Octane Areas" (above) for lower compression ratio gasket data.*
►*CYLINDER HEAD REMOVAL NOTE: See "Cylinder Head & Manifolds" in Buick Special Data.*
►*INTAKE MANIFOLD GASKET INSTALLATION CAUTIONS: See "Cylinder Head & Manifolds" in Buick Special Data.*
►*ROCKER ARM COVER INSTALLATION CAUTION: See "Cylinder Head & Manifolds" in Buick Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*
Compression & Vacuum Reading - *See TUNE-UP.*

PISTONS

Aluminum alloy, dome head (with shallow depressions for valve clearance), cam ground, full skirt with transverse slots in oil ring groove. Anodized finish.
►*PISTON REPLACEMENT CAUTION:* Same type pistons must be used in all cylinders. Use of mixed (different compression ratio) pistons will cause very rough operating engine.

Model	Buick Std. Piston No.
Series 40 (Synchro-mesh)	1392769
Series 40 (Auto. Trans.)	1392771
Series 50,60, 70, 700 (9.5-1 Ratio)	1392771
Series 50, 60, 70, 700 (10.0-1 Ratio)	1392770

►*ORIGINAL CYLINDER BORE CAUTION:* **Engines with ¼" long dash following Engine Production Code Number (see Engine Number) have .010" Oversize cylinder bore and pistons. Standard cylinder bore is 4.125" (All Models).**
Removal - Pistons and rods removed from above.
►*CAUTION:* Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.
Fitting New Pistons: Clearance .0008-.0014". If micrometer used on pistons, measure at top and bottom of skirt 90° from pin hole (top diameter slightly less than bottom in service). Use .003" X ½" X 12" feeler gauge



BUICK PISTON & ROD ASSY

to fit pistons with cylinder block in normal position. Insert feeler on lower side of bore 90° from piston pin hole. Pull to withdraw feeler should be 7-13 lbs. at 70°F (piston & bore clean and dry).
Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and .001", .005", .010", .020" and .030" Oversize. *NOTE* - Pistons furnished only with fitted pins.
Installing Pistons: Assemble rod in piston with oil spurt notch on same side as valve depressions in piston dome. *See Rod Installation below.*

PISTON PINS

Pins are press fit in connecting rod.
Diameter - .9995-.9997". **Length** - 3.500".
Clearance in Piston - .0004". Finger push fit.
Clearance in Rod - .0007-.0015". Press fit.

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Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION: Pistons may be damaged if special procedure and tools not used.*

Replacement Pins: Std. size only. Fitted pins furnished with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr	.077-.078"	.015-.025"	.003-.005"
Oil	.185-.186"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE:* Install both compression rings with grooved or beveled side toward bottom of piston and dimple, Letter "T", or word "Top" upward.

Replacement Rings: Std., .010", .020", .030" Oversize, in individual rings or in sets.

CONNECTING RODS

Length - 6.1" (Center to center). **Weight** - 23.20 ozs.
Crankpin Journal Diameter - 2.249-2.250". Out of round limit .0015".
Bearings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.
Clearance - .0002-.0023". Wear limit .003".
Side Play - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020" and .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with spurt notch in lower end of rod and valve depressions in pistons on the high side of cylinder bore. This will bring all spurt notches and valve depressions in pistons toward camshaft. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars):* See *"Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2.499". Five bearings. Out-of-round limit .0015".
Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE:* Bearing upper halves can be rotated out and in by using tool KMO-734 in oil hole.

Clearance - .0005-.0025".

Replacement Bearings: Std. and .001", .002", .003" Undersize. *NOTE* - First four bearings identical and interchangeable. Rear bearing longer and flanged.

End Thrust: Taken by rear No. 5 flanged main bearing.
End Play - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

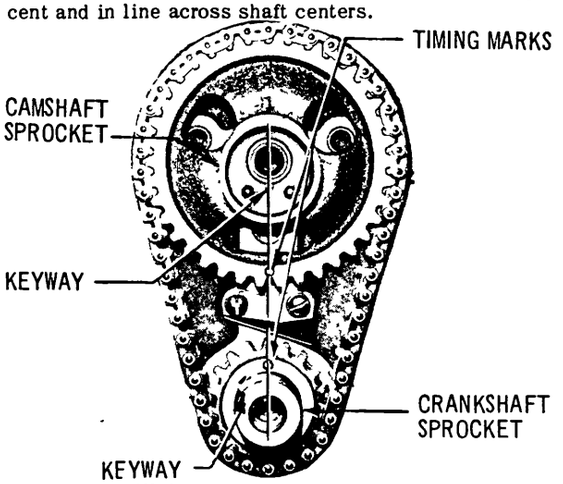
CAMSHAFT

►*CAMSHAFT IDENTIFICATION:* **Series 40 Synchro-mesh** - Has plain land just forward of No. 3 bearing journal.
All Others - Above land has two grooves.
Journal Diameters - (1) 1.785-1.786", (2) 1.755-1.756", (3) 1.725-1.726", (4) 1.695-1.696", (5) 1.665-1.666".
Bearings - Steel-backed babbitt lined bushings.
Clearance - .0005-.0035". Service limit .0015-.004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .688". **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: Valve timing is correct when "0" marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.



BUICK VALVE TIMING MARKS

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	.3720"	4.704"
Exhaust	1.437"	.371"	4.704"

Valve	Seat Angle	℄Lift	Stem Clearance
Intake	45°	.423"	.0015-.0035"
Exhaust	45°	.423"	.003-.005"

℄ - Auto. Trans., .378" Synchro-mesh.

Valve Seat Width—1/16" (3/64-5/64").

►*VALVE GRINDING CAUTION:* If height of valve stem end raised .075" by valve grinding, height must be reduced by grinding end of stem or replacing valve to insure correct operation of hydraulic lifter.

Valve Springs: Double springs used on all valves. Install springs with closed-coil end toward cylinder head.

Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Lgth.	Lbs. Press.	Lgth.
Intake	23-28	1.62"	39.5-44-5	1.53"
Exhaust	63-69	1.2"	93-99	1.11"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3.

Hydraulic Valve Lifters: Barrel type.
Diameter—.8425". **Clearance in Block**—.0015-.003".
Lifter Overhaul & Testing—*See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Synchro-mesh Models

Intake Valve - Opens 25° BTDC. Close 77° ALDC.
Exhaust Valve - Opens 65° BLDC. Close 37° ATDC.

Dynaflow Models

Intake Valve - Opens 34° BTDC. Close 83° ALDC.
Exhaust Valve - Opens 76° BLDC. Close 41° ATDC.
Valve Timing Check - Timing chain cover must be removed to check chain and sprocket marks. *See Camshaft Setting under CAMSHAFT above.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

►*OIL LEVEL DIPSTICK PRODUCTION CHANGE & REPLACEMENT CAUTION:* A new dipstick having a baffle at lower end of bridge section is being used in production and is not interchangeable on earlier engines designed for the previous type dipstick. Leakage will occur and the felt seal and stop will not seat on engine block.

Crankcase Capacity: 5 quarts refill. 6 quarts, dry engine. Add 1 quart for dry filter.

Normal Oil Pressure: 40 lbs. at 1600 RPM or 35 MPH.
Pressure Regulator Valve - In oil pump body. Not adjustable.
Oil Pressure Gauge - **AC No. 1508725.** Not electric.

Oil Pump: New combination gear type oil pump and vane type vacuum pump. In crankcase at rear of engine.
Oil Pump Removal & Overhaul - *See "Oiling System" in Buick Special Data.*

Vacuum Pump: Part of oil pump assembly. *See "Vacuum Pump" in Buick Special Data.*

Oil Filter: Full-flow. On pad at right rear of engine. *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.
Replacement Filter Element - AC No. PF-122.

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in rear end of valve lifter cover (air outlet) to which ventilator pipe is connected.

COOLING

►*CYLINDER BLOCK DRAIN NOTE:* Pipe plugs replaced drain cocks starting with Engine No. 476710. These plugs must be removed to properly drain cylinder blocks.

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►*RADIATOR REPLACEMENT NOTE:* Cars with Air Conditioning (installed at factory) have larger radiator cores and shroud assemblies.

Water Capacity: 19 qts., 16.5 qts. without heater.

Pressure Valve: Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Pellet type in water manifold above pump.
(Std.) Buick No. 1391226, opens at 157-162°F.
(High Temp.) Buick No. 1391225, opens at 177-182°F.

Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Buick Special Data.
Pump Removal - Drain cooling system, loosen fan belt, remove fan blades, spacer, and pulley from water pump hub, and remove belt. Remove hose from water pump inlet, then remove pump cover assembly and gasket.

Temperature Gauge: AC No. 1513545. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Long 11CF No. 266716. Single plate, semi-centrifugal type.
See "Long" Clutches in Clutch Section.
Clutch Disc - Long No. 286176.

Pedal Adjustment: Free play 1 1/8-1¼". For adjustment procedure *See "Clutch Notes" in Buick Special Data.*

Removal: Remove rear axle and transmission (See below), remove flywheel lower housing. Disconnect release rod from yoke, remove boot. Remove spring washer which retains release bearing support and remove support. Pull yoke outward to release it from ball stud, remove yoke and release bearing through bottom of housing. Remove clutch cover screws uniformly to release spring tension after marking cover and flywheel for reinstallation. *NOTE* - Metal spacers placed between release levers and inner edge of clutch will aid removal and installation. Remove cover assembly and driven plate.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Buick Synchro-mesh" Transmission in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect rear axle assembly *(CAUTION:* Use 3" torque tube guide pins to save damaging torque tube seal). Drain transmission, remove clutch linkage shield, insert ¼ X 2½" bolt and nut (finger tight) in clutch equalizer and bracket. Remove clevis pin and spring from outer end of clutch yoke and two bolts holding equalizer bracket to transmission. Disconnect speedometer cable, shift rod and selector rod from levers, rubber thrust pad from thrust bracket (leave attached to support). Disconnect rubber mounting pad from transmission support. Support engine at rear on jack, remove support from frame, noting number and location of shims. Loosen exhaust pipe so rear of engine can be lowered. Lower engine and transmission to clear X-member. Install guide pins and remove transmission.

DYNAFLOW DRIVE TRANSMISSION

"Variable Pitch" and new "Flight Pitch" types used:
Variable Pitch - Torque converter and hydraulically operated planetary transmission. A two-position (high and low) stator is used in the torque converter to multiply engine output torque when required (controlled by the accelerator pedal).
Flight Pitch - New five-unit torque converter (three turbines and variable pitch stator assembly) used with automatic non-shifting hydraulically controlled planetary transmission.

►*FLIGHT PITCH DYNAFLOW OPERATING CAUTION:* DO NOT use "G" range for pulling forward and DO NOT depress accelerator pedal when shifting from "D" to "G". "G" range is intended only for descending steep grades with accelerator pedal released.

►*1957 VARIABLE PITCH DYNAFLOW TRANSMISSION REPLACEMENT CAUTION:* If 1958 transmission assembly used to replace 1957 assembly, the 1957 Universal Joint must be used (remove 1958 joint from transmission assembly).

►*FLIGHT PITCH TRANSMISSION NOISE OR VIBRATION CORRECTION:* Correct filler pipe must be used (If Variable Pitch filler pipe used, pipe will not have sufficient clearance at transmission crossmember).

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick Variable Pitch" or "Flight Pitch Dynaflow Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Buick Variable Pitch" or "Flight Pitch Dynaflow Drive" in Transmission Section.*

Throttle Linkage Adjustment and Dash Pot Setting on Dynaflow Drive Cars. *See "TUNE-UP".*

Lubrication - Check fluid level every 1,000 miles, drain and refill every 25,000 miles. Use only Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type A bearing an AQ-ATF number embossed on can.

Checking Fluid Level - Check with engine idling in "P" (Variable Pitch) or "N" (Flight Pitch) and transmission at normal operating temperature. Maintain level at "Full" mark on dipstick.

Capacity - 12 quarts (Variable Pitch), 12.5 quarts (Flight Pitch). Add 1 1/3 pints for dry transmission. *Use only Special Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type "A" bearing an AQ-ATF number embossed on can.*

►*OTHER DYNAFLOW DRIVE SERVICE DATA: See "Buick Variable Pitch" or "Flight Pitch Dynaflow Drive" in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. Saginaw (Front), Saginaw or Spicer (rear). Front joint enclosed in torque ball, rear joint enclosed in torque tube. Front joint lubricated by transmission. Rear joint requires no lubrication.

►*1957-58 U-JOINT NON-INTERCHANGEABILITY CAUTION:* 1957 and 1958 U-Joints must not be interchanged (use of incorrect type would result in drive line roughness and vibration) and joints can be identified as follows: **1957 Typ** - Marked by two notches in line with rear yoke of joint. **1958 Typ** - Not marked but rear yoke has omitted splines at two points (180° apart) which are 45° off centerline of yoke.

►*U-JOINT INSTALLATION CAUTION:* U-Joint omitted splines (two points 180° apart) must be aligned with blind splines on propeller shaft. This will provide correct relationship of front and rear universals and prevent drive line vibration.

►*REAR PROPELLER SHAFT LUBRICATION NOTE:* Lubricate propeller shaft coupling and splines (when assembling) with type "0" (non-fibrous) chassis lubrication and pack cavity beyond spline about 2/3 full of grease. *CAUTION* - DO NOT plug vent hole in propeller shaft welch plug when servicing as excess grease will accumulate in torque tube ahead of access hole. Limit power grease gun to one shot.

REAR AXLE

Own. Semi-floating hypoid gear type and torque tube drive.

►*REAR AXLE LUBRICANT LEVEL CAUTION:* Fill only to ¼-3/8" below filler plug opening. DO NOT FILL TO FILLER OPENING.
See "Buick Hypoid" in Rear Axle Section.

Axle Ratios

Series 40 (Synchro-mesh)	3.58-1 (43-12)
All Series (Dynaflow)	3.23-1 (42-13)

►*REAR AXLE RATIO NOTE:* Ratio is stamped on bottom of axle housing as follows: 3.58-1 (3/58), 3.23-1 (3/23).

Backlash - .007-.009".

Axle Shaft Removal: Place stands under rear axle so wheels clear floor, then remove wheel and drum. Remove wheel bearing retainer plate-to-backing plate nuts (leave bolts in place to support backing plate). Use puller J-6176 with Slide Hammer to pull axle assembly. Replace two backing plate nuts finger tight to hold plate in place.

Rear Axle Assembly Removal: 1) Raise car and place stands under frame, then place floor jack under center of rear axle housing. Disconnect lower end of rear springs.
2) On Air-Poise Cars, disconnect rear height control valve links at strut rods. Pull levers down carefully to exhaust all air pressure. Remove bolts mounting rear air spring bearing plate on rear axle housing, remove plunger and bearing plate assembly by disengaging plunger from diaphragm center plug.
3) Disconnect radius rod at axle end. *CAUTION* - On Air-Poise Cars DO NOT disconnect radius rod or torque tube until all air pressure is exhausted from air springs.
4) Disconnect shock absorber lower ends, and parking brake cable at rear sheave and at bracket on torque tube.
5) Disconnect brake hose from pipe at frame X member and remove yoke. *NOTE* - Cover hose and brake pipe openings to protect from dirt.
6) Remove two opposite torque tube flange bolts and replace with 3" guide pins, then remove other bolts and pull axle assembly from under car.

Wheel Bearing Adjustment: None required.

Torque Ball Adjustment: None required.

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SHOCK ABSORBERS

Delco. Direct acting, hydraulic (front and rear). Front shock absorber mounted just back of front spring with upper stem attached to frame bracket and lower stem attached to an extension of spring seat.

►*SHOCK ABSORBER INTERCHANGEABILITY NOTE:* Front shock absorbers are interchangeable right and left and are the same on both coil spring and Air-Poise Cars. Rear shock absorbers are interchangeable right and left but the extended length of an Air-Poise shock absorber is 1" shorter than a coil spring shock absorber and they are NOT interchangeable for that reason.

Buick Shock Absorber Nos.

Model	Front	Rear
40,60 (Exc.49,49D,69)	5543704	5535589
49, 49D, 69	5543705	5535512
50, 70, 700	5543705	5535590
All (Exc. 49,49D,69) ℂ		5543706
49, 49D, 69 ℂ		5543712
40,60 (Exc. 49,49D, 69) ℂ	5543705	5535590
50,70,700 ℂ	5535588	5535512
All (Exc. 49,49D,69) ℂ℃		5543713

ℂ - Power Steering & Air-Poise Cars.
℃ - Export High Springs.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers mounted to rear of coil springs.
See "Buick" in Suspension & Wheel Alignment Section.

►*FRONT SPRING SHIM NOTE:* Power Steering equipped cars have one shim on left front spring and NO shims on right spring to compensate for added weight of hydraulic gear.

Steering Axis Inclination - 8° at 0° Camber.
Caster - Pos. ¾° to Neg. 1¾°.
Camber - Pos. 1° to Neg. ½°.
Toe-In - 1/16" to 1/8".
Toe-Out on Turns - Outer wheel 20°, Inner wheel should be 22½°±½°.

►*STEERING AXIS, CASTER, CAMBER NOTE:* ¾° variation limit on opposite sides.

REAR SUSPENSION

Rear Suspension: *See "Buick Rear Suspension" in Suspension and Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs at all four wheels. *See "Front Suspension" above for alignment specifications and "Buick Air-Poise Suspension" in Suspension and Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: "Saginaw (In-Line) Hydraulic". Recirculating ball nut and worm type with the worm and ball nut, power piston and rack, and the power cylinder all on a single center line.
See "Saginaw (In-Line) Power Steering" in Steering Sect.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor) - Conventional two shoe with short lining (primary), longer lining (Secondary). Aluminum FRONT brake drums used on Series 50, 60, 70, 700.
See "Bendix Hydraulic (Without Eccentric)" Brakes in Brake Section.

Drums - Aluminum brake drums with cast iron liner used on Series 50, 60, 70, 700 front wheels. All other drums are cast iron fused to pressed steel disc.

Drum Diameter - 12.017-12.023". Rebore limit 12.083".

►*ALUMINUM BRAKE DRUM NOTE:* Later type does not have aluminum plugs in the bonded iron liner. Drum turning procedures remain the same as for early type drums. The two types are not interchangeable and should NOT be used on same car.

Wheel Cylinder Diameters - Front 1 1/8". Rear 1".

Lining - Primary and secondary linings are of different material and different length and are not interchangeable. Molded linings are riveted to the shoes.

Replacement Linings - Lining and Shoes with Linings furnished Std. and .030" Oversize.

Lining Length & Width

	Front Wheels	Rear Wheels
Primary	10.040" x 2.50"	10.040" x 2.25"
Secondary	12.959" x 2.50"	12.959" x 2.25"

Thickness - .265" (Primary), .187" (Secondary).
Braking Power - 55.9% front, 44.1% rear.
Clearance - Adjusting screw backed off 13-15 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: "Displacement" type. Located on engine side of cowl panel directly below brake pedal. *See "Buick Master Cylinder" in Brake Section.*

Checking Fluid - Maintain fluid level ¼" below lowest thread of filler opening.

Removal - Disconnect battery ground strap. Remove clevis pin from pushrod clevis, lift brake pedal to pull linkage out of way, then remove large nut holding master cylinder to cowl (Wrench 6618). Disconnect stop light wire connector from switch, brake pipe from master cylinder, tape end of pipe. Remove bolts holding master cylinder to air duct and remove master cylinder.

Power Brakes: Bendix or Moraine Power Brake Unit. Suspended type power unit (replaces conventional master cylinder).

►*NOTE:* Bendix unit is new type with "Hydraulic Reaction" control.
See "Bendix" & "Moraine" Power Units in Brake Section.

Checking Fluid Level - Maintain fluid level ¼" below lowest thread of filler opening.

Removal of Power Unit - Same as for standard master cylinder plus the removal of vacuum hoses from vacuum tee

MISC. MECHANICAL

Air Conditioning: Buick Air Conditioning with all components located ahead of the dash.
See "Buick Air Conditioning" in Miscellaneous Section.

Windshield Wipers: Cable operated vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric type with reversible motor in each window. *See "GM Electric Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Two Way): Electric type with single reversible type motor for horizontal adjustment. *See "GM Two-Way Seat Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Six-Way): Electric type with single reversible motor. *See "GM Six-Way Seat Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor.
See "Power Top Controls" in Miscellaneous Section.

►*AIR SUSPENSION CAR CAUTION: B fore jacking or hoisting th car, clos air ride shutoff valv located on radiator tie bar. Before towing the car, see "Buick Air Suspension" in Suspension & Wheel Alignment Section.*

►*TRIPLE TURBINE CAR PUSH STARTING CAUTION: Car CANNOT be started by pushing because rear oil pump has been eliminated on 1959 Triple Turbine Transmission.*

MODEL IDENTIFICATION

Series	Series Designation
Le Sabre	4400
Invicta	4600
Electra	4700
Electra "225"	4800

ENGINE & SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar, and on top surface of crankcase forward of valve lifter cover on left side. Number (example below) includes identification data.

① ② ③ ④
4 F 1 001001

① - Series. **4** - 4400, **6** - 4600, **7** - 4700, **8** - 4800.

② - Year - 1959.

③ - Assembly Plant. **1** Flint, **2** South Gate, **3** Linden, **4** Kansas City, **5** Wilmington, **6** Atlanta, **7** Framingham, **8** Arlington.

④ - Beginning vehicle number.

Engine Production Code No - Stamped on same surface as Engine & Serial No but on **right** side When viewed from front of engine, number is upside down. **364" Engines** have prefix 3F, **401" Engines** have prefix 4F. *NOTE* - ¼" **dash** following code no indicates .010" oversize cylinder bore.

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel): See Note under Engine Specifications for recommended changes.*

►*364" ENGINE DETONATION AT LIGHT (TIP-IN) THROTTLE CORRECTION·* May be caused by slightly higher compression ratio due to production tolerances. To correct on cars when engine vacuum has **not dropped below 8 inches,** install new Vacuum Advance Unit Part No. 1116155 and recheck timing and fuel. Auto Trans. Cars require the use of 99 Octane (Premium) fuels, Synchro-mesh Trans. Cars operate satisfactorily on regular fuels. *See DISTRIBUTOR for Advance Performance.*

►*SPARK PLUG ROUTING (To Eliminate "Cross-Fire" "Engine Miss" or "Spark Plug Early Failure") NOTE:* Wires must pass through brackets in the following sequence from front to rear, Right bank 1-3-5-7, Left bank 2-4-6-8.

►*LACK OF THROTTLE RESPONSE (Cars with Carter AFB 2840S Carburetor)· Se CARBURETOR for recommend correction.*

COMPRESSION PRESSURE: (4400 Synchro-mesh) 150 lbs., (All Others) 185 lbs. at cranking speed (160 RPM) Cylinders must be equal within 15 lbs

VACUUM READING: 16-17" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely. Check thermostat at 70°F (room temperature). There should be 180° wrap on spring

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.

Cylinders - RIGHT BANK 1-3-5-7, LEFT BANK 2-4-6-8.

SPARK PLUG GAP: 035". *Supersedes previous specification of .030-.035".*

Spark Plugs - AC No 44S (STD.), No. C-42 (HighSpeed Driving). 14 mm. Torque to 25-30 ft. lbs. This specification supersedes previous specification of 22-28 ft. lbs.

COIL: Delco-Remy 1115100.

Ignition Current - 2.5 amps idling, 4 5 amps stopped.

Resistor - Delco-Remy 1931614. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch to coil. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy 1110949 (4400 Synchro-mesh), 1110936 (Others - early), 1110956 (Others - later except late 401" Eng.), 1110959 (Late 401" Eng.). *See "Delco-Remy Window Distributors" in Electrical Section.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - Gap (.0125-.0175") will be correct when cam angle correctly set.

Cam Angle - 28-32°, Set to 30°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110949

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.0		475	1-4		950
6-8		1150	12-16		2300
12-14.5		1875	24-29		3750

Automatic Advance – 1110936

Degrees	Distr.	RPM	Degrees	Eng	RPM
0-2		850	0-4		1700
5-7		1450	10-14		2900
9-11		1925	18-22		3850

Automatic Advance - 1110956

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		800	0-4		1600
2-4		1175	4-8		2350
4.5-6.5		1625	9-13		3250
9-11		2400	18-22		4800

Automatic Advance - 1110959

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		275-450	0		550-900
3½-5½		1000	7-11		2000
9-11 Max		1900	18-22 Max		3800

Vacuum Spark Control: Delco-Remy 1116106 (1110949 Distr.), 1116151 (1110936, 56 Distr), 1116155 (1110936 Distr. on 4400 Series with Auto. Trans. to correct detonation).

Vacuum Advance - 1116106, 151

Distr. Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
9-10.5	18-21	12-14

Vacuum Advance - 1116155

Distr. Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8-10
9 25-10.75	18.5-21.5	18-20

Vacuum Advanc - 1110959 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
7.25-8.75	14.5-17.5	16.24-18

IGNITION TIMING

Setting - 5° BTDC (Synchro-mesh), 12° BTDC (Auto. Trans)

Timing Mark – Timing indicator on chain case cover marked "0" (TDC), "5" (5° BTDC), and "12" (12° BTDC). Align correct mark with yellow paint filled groove on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION· Carter WGD or Stromberg WW 2-Barrel carburetor used on 4400 Series. Carter AFB 4-Barrel carburetor used on 46, 47, 4800 Series and as Power Pack on 4400. Rochester 4GC 4-Barrel used also on 46, 47, 4800 Series.*

►*MANIFOLD FUEL DISTRIBUTION (All Cars): Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed Cyls. 2-3-5-8*

►*LACK OF FUEL CORRECTION:* Can be caused by fuel line from tank to pump being kinked at No. 1 body mount. To correct, raise fuel line clip ½" approximately.

►*ENGINE ROAR CORRECTION (Cars With 4-Bbl. Carb.):* May be caused by air cleaner gasket improperly installed or wing nut not tightened to 30-35 in. lbs. Make necessary adjustments to correct.

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Make sure stator linkage is properly adjusted (see below). Then proceed as follows: Disconnect carburetor throttle rod from throttle operating lever. Hold accelerator pedal firmly against floor mat and throttle in wide open position. Now hold throttle rod at hole in lever. **Rod must be 1/16" short of ent ring h l in l v r.** Readjust rod as necessary Connect rod to lever and again check for wide open throttle with accelerator against floor mat. Check and adjust choke unloader if necessary. Check for smooth operation of linkage. Desired wide open throttle position should be when accelerator pedal strikes floor mat rather than stop on throttle lever striking hard against boss on throttle body.

Stator Linkage Adjustment - Hold throttle wide open. Adjust upper stator rod so ball joint at forward end will just slip freely in stator lever on carburetor with stator rod pulled forward and stator lever held rearward against pickup. **N w l ngth n upp r stat r r d 1 full turn** (provides slight clearance at stop in transmission to

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insure carburetor reaching wide open throttle). Reconnect ball joint to stator lever. Tighten locknut. To check adjustment, move throttle lever to wide open position and move stator rod endwise. It should have a slight free movement or "shake".

Anti-Stall Dashp t Adjustm nt - After stator and throttle linkage properly adjusted, engine at normal operating temperature and idle speed correctly set, proceed as follows: Open throttle to clear fast idle cam and rotate cam to extreme fast idle position. Let throttle close against cam. Adjust dashpot until it just touches throttle lever. Tighten locknut. Put transmission in "D" with brakes applied and jab accelerator pedal and release quickly. If engine stalls, adjust dashpot toward throttle lever; if too much time necessary for return to idle, move dashpot away from throttle lever. *Always tighten locknut after ach adjustment*

Start r Switch (Car Start r) S tting: Synchro-mesh Cars - Remove carburetor, connect test light (12 volt) across switch terminals, block choke valve open so fast idle cam is at slow idle position. Lamp should light with ¼" (drill) clearance between wall of throttle body and lower edge of one primary throttle valve at center; but it should not light with 7/64" (drill) clearance at same position. To adjust, change number of shims between contact spring and plunger.

Dynafl w Cars - With carburetor on engine, transmission in "P" and brakes applied, back off throttle stop-screw, rotate fast idle cam to slow idle position **and fully cl se throttl valve.** Measure distance from diaphragm flange of dashpot to **near** edge of dashpot arm Turn ignition on and slowly open throttle while holding scale in position. When starter is energized, measure distance as before. Subtract the two measurements. Difference should be. **Cart r 2-Bbl.** 9/16-7/8", **Strom-b rg 2-Bbl.** 3/4-1 1/8", **Carter 4-Bbl.** 1/2-3/4", **Rochester 4-Bbl.** 1/2-13/16". To adjust, change number of shims between contact spring and plunger.

CARTER WGD 2-BARREL

Carter WGD No. 2837S (Synchro-mesh), 2838S (Dynaflow).

Idl Setting - ¾-2 turns open. Adjust both screws alike Turn screws out for richer mixture.

Idl Sp d - 485 RPM (550 RPM Air Cond. Cars) in "N" or "P"

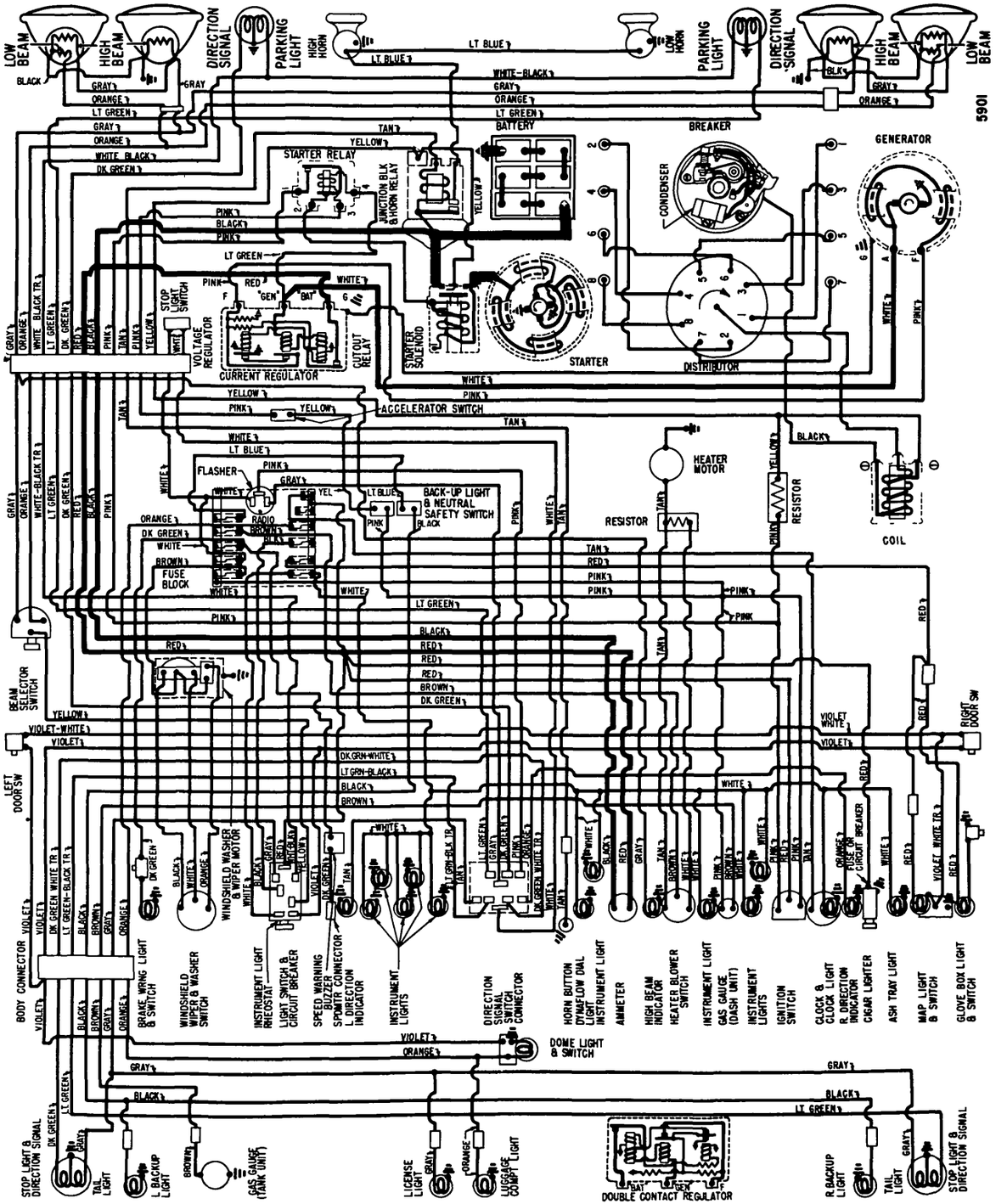
Float L vel - ¼" (Gauge T109-31) between top of float (at center) and bowl cover To adjust, bend float lever

Chok L ver Setting - With slight clearance between tang on fast idle cam and stop on flange casting and inner choke shaft lever contacting lug on outer choke shaft lever, align index mark on cam with adjusting screw To adjust, bend lug on outer choke shaft lever.

Acc l rating Pump - Normal setting, long stroke hole.

Fast Idle Setting: 026" (Gauge T109-189) between lower edge of valve and bore with adjusting screw on high step of cam

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Automatic Choke Setting: 1 point lean (2837S), centered at index (2838S).

Throttle Linkage Adjustment: *See CARBURETOR above*

OTHER DATA: See "Carter WGD Carburetors" in Carburetion Section.

STROMBERG WW 2-BARREL

Stromberg WW, Code 7-112.

Idle Setting - 1 turn out Adjust both screws alike Turn screws out for richer mixture

Idle Speed - 485 RPM (550 RPM Air Cond Cars) in "N" or "P"

Float Level - 5/32" (Gauge J-7294) from top of float at center to top edge of float bowl (gasket removed) with needle seated To adjust, bend float arm tang

Accelerating Pump - Normal setting, medium stroke hole

Fast Idle & Start Aid Settings: Remove thermostat cover, throttle stopscrew and spring and replace stopscrew without spring Proceed as follows.

1) Hold throttle valves fully closed and turn throttle stopscrew in **exactly** 7 turns from point of contact with throttle lever. Choke positioning spring pickup lever should just contact choke positioning spring. Adjust by bending lever. Reinstall stopscrew and spring.

2) Hold choke valve closed and measure distance from upper thermostat cover hole to top of thermostat lever Distance should be 1 3/32". Adjust by bending choke rod with Tool J-5197

3) Partially close choke valve by applying light pressure upward on thermostat spring lever until choke positioning spring lever just contacts spring. Opening between upper edge of choke valve and wall of air horn should be 204" (No. 6 drill). To adjust bend choke positioning spring lever.

4) Install choke cover and gasket, set choke **1 notch lean** and tighten screws and retainers. Choke valve must close partially

5) Open throttle enough to clear fast idle cam so choke is in idle choke kick position. Then close throttle so fast idle screw rests on high step of fast idle cam. Side of screw should line up with drop-off to next lower step of cam. To adjust, bend unloader link with Tool J-5197.

6) Hold choke valve closed on a .061" (No. 53) drill Start aid spring should just clear start aid tang on fast idle cam as throttle valve is opened. To adjust, bend start aid tang

7) With choke closed with light pressure, fully open throttle so unloader arm on throttle lever kicks choke open partially Distance between upper edge of choke valve and wall of air horn should be 146" (No 27 drill). To adjust, bend unloader arm.

8) After carburetor installed on engine (engine at normal operating temperature), position fast idle cam so fast idle screw rests on high step of cam with side of screw lined up with drop-off to next lower step Adjust fast idle screw so engine is running at 1500 RPM

Automatic Choke Setting: 1 notch lean.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Stromberg WW (Buick) Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 2877S (4400 Power Pack), 2840S (46, 47, 4800 Std.).

►*EXCESS IDLE SPEED CORRECTION (2877S):* Use either special adjustment procedure or install new fast idle cam *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*LACK OF THROTTLE RESPONSE CORRECTION (2840S):* Install new metering rods and springs. Carburetors after Nov 1958 have these parts installed in production. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*ROUGH ENGINE ON ¾ THROTTLE ACCELERATION CORRECTION: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*IDLE COMPENSATOR CAUTION·* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making Idle Setting and Idle Speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - ¼-1¾ turns open. Adjust both screws (primary side only) alike Turn screws out for richer mixture.

Idle Speed - 485 RPM (550 RPM Air Cond. Cars) in "N" or "P".

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA· See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC, No. 7013044 (46, 47, 4800 Std.).

►*CARBURETOR PRODUCTION CHANGE NOTE:* Carburetors with "A" on identification tag are improved to correct a cutting out on sharp left turn condition *See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making Idle Setting and Idle Speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - 1½ turns open Adjust both screws (primary side only) alike. Turn screws out for richer mixture

Idle Speed - 485 RPM (550 RPM Air Cond Cars) in "N" or "P"

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC type HE. No. 4706.

Pressure - 5¼-6½ lbs. (at carburetor height).

See "Fuel Pumps" in Carburetion Section.

Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Some Air Cond. Cars have special filter with metering outlet in top and rubber hose for vapor fumes to return to gas tank.

Gasoline Gauge: AC Electric type.

Dash Unit - AC No. 5640303

Tank Unit - AC No 5640299 (Std), No 5640300 (A.C Cars)

See Fuel Gauges' in Carburetion Section.

Air Cleaner: Oil-wetted mesh type. Clean every 5,000 miles or sooner under severe operating conditions. DRY FILTER ELEMENT type optional for heavy duty operation.

►*DRY TYPE CLEANING CAUTION:* Clean every 1,000 miles. Clean by tapping and shaking to remove dirt particles. *DO NOT wash, air blast or oil element.*

BATTERY

Delco No. 562. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative, to cylinder head.

Engine Ground - Engine mounting bracket to frame.

STARTER

Delco-Remy 1107724 (364" Eng.), 1107739 (401" Eng.).

Armature - Delco-Remy 1935851 (1107724 Starter), 1945688 (1107739 Starter).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107724

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107739

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	4700-5400	10.6	80-120
	Lock	2.0	290-370

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid No. 1118816 (364" Eng.), No. 1114252 (401" Eng.), controlled by separate relay, Delco-Remy No. 1116963, and Accelerator Vacuum Switch (on Carburetor). *See "Starter Controls" in Electrical Section.*

Accelerator Vacuum Switch: Carter No. 192-38U (Carter and Stromberg Carb.), Rochester No. 7011372 (Rochester Carb.).

Accelerator Vacuum Switch Setting - *See data on each carburetor type in Carburetion Section.*

Neutral Safety & Back-up Light Switch (Aut.-Trans.): Buick No. 1178138 (2 Turbine), 1118293 (3 Turbine). Mounted on steering column jacket under cowl. Connected in starter control circuit so that starter operative only when selector lever in "N" Neutral or "P" Parking position.

Adjustment - *See "Buick (Twin Turbine) Dynaflow" or "Buick (Triple Turbine) Dynaflow" in Transmission Section.*

GENERATOR

Delco-Remy 1102147 (Std. Early), 1102165 (Std. Later), 1102138 (Air Cond.).

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Armatur - Delco-Remy 1932900 (1102147 Gen.), 1946719 (1102165 Gen.), 1939837 (1102138 Gen.).

►*GENERATOR RATTLE CORRECTION (Early Cars):* Caused by generator bracket bent in direction opposite to which belt tends to deflect it. To correct, insert a steel bar in front bracket hole and bend front mounting ear forward .030".

►*CHARGING CIRCUIT FUSE CAUTION·* Battery charging circuit protected by a fuse clipped to "BAT" terminal of generator regulator. 40 amp. fuse (Std. Regulator) has white ceramic insulator, 50 amp. fuse (Air Cond. Regulator) has white insulator and copper colored retaining screws (early cars), brown insulator (later cars). Check for blown fuse when diagnosing generator, battery or regulator failure.

►*GENERATOR SERVICE CAUTION·* Generator commutator end frame furnished for service is No. 1944265 (later type with ball bearing as used on No. 1102165 Generator). When this end frame used on first type Generator No. 1102147, it will be necessary to install later type Armature No. 1946719 and Bearing (commutator end) No. 904751.

P rf rmance Data

Generator	Amperes	Volts	RPM
1102147, 165	35	14.0	2630
1102138	45	14.0	2600

►*AIR CONDITIONED CAR GENERATOR NOTE:* Special 45 ampere generator used which has a special air duct leading from front of radiator to commutator end of generator supplying cold air for higher output at low speeds.

Fi ld Curr nt - 1.69-1.79 amps. (110147, 165), 2.66-2.86 amps. (1102138) at 12 volts and 80°F.

Brush Spring T nsi n - 26-32 ozs.

R tati n - Counterclockwise at commutator end.

B lt Adjustm nt: Check belt tension by using torque wrench on generator pulley. 15-20 ft. lbs. should slip pulley on belt.

REGULATOR

D lc -R my 1119242 (Std. Gen.), 1119617 (Air Cond. G n.). *NOTE - Regulator 1119617 is "Double Contact" typ .*

►*REPLACEMENT REGULATOR 1119168 CAUTION (Std. G n. Cars):* 1119168 Regulator (1957 Type) replaces 1119242 Regulator. This regulator does not have a Charging Circuit Fuse and when installed on car, fuse from original regulator must be transferred or new fuse installed.

►*SEE CHARGING CIRCUIT FUSE CAUTION IN "GENERATOR" ABOVE.*

NOTE - Specifications below are "Normal" settings.

Cut ut Relay

Cuts In - 11.8-13.5 volts (1119242 & 1119168), 11.8-13.0 volts (1119617).

C ntact Gap - .020".

Air Gap - .020" with contacts just closed.

V ltag Regulator

S tting (1119242 & 1119168) - 13.8-14.8 volts at 125°F ambient temperature.

Setting (1119617) - 13.8-14.6 volts at 125°F ambient temperature operating on upper contacts, 1-3 volts lower operating on lower contacts.

C ntact Gap (1119617) - .016".

Air Gap - .075" (1119242 & 1119168), .067" (1119617) with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119242 & 1119168) - 32-37 amps. at 125°F.

Setting (1119617) - 42.5-47.0 amps. at 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: 4-headlights std. *See "4-Headlights" in Electrical Section.*

Directional Signals - *See Electrical Section.*

Autronic Eye - *See Electrical Section.*

Lighting Switch Removal: Disconnect battery ground cable. Remove lower left instrument panel housing and remove multiple connector from lighting switch. Pull knob out to last notch. Depress spring loaded button on top of switch while pulling knob and rod assembly from switch. Remove mounting nut with Wrench J-7799 remove switch.

►*GLOVE COMPARTMENT LIGHT REMAINING ON CORRECTION* Caused by ground wire contacting instrument panel brace. To correct, reposition lamp assembly

Stop Light Switch Location: Mounted on left frame side rail at front brake pipe distributor.

LIGHT ING THERMOSTATIC CIRCUIT BREAKERS: Delco-Remy 15 amp. located in lighting switch, protects headlight and front parking light circuits only.

FUSES: On fuse block under cowl unless otherwise specified.

10 AGC. Back-up lights.
2 AGA. Clock.
10 AGC. Directional Signal & Stop Lights
20 SFE. Dome, Trunk Compt. & Rear Cigar Lighter
5 AGC. Glove Box & Map Light.
20 SFE. Heater, Defroster,
25 Ampere. Air Conditioner Blower & Compressor Clutch
5 AGC. Instrument Lights & Rheostat
4 AGW. Portable radio, 7.5 SFE Other Radio.
5 AGC. Speedometer Buzzer, Parking Brake Warning Light
10 AGC. Tail, License & Instrument Lights.
25 AGC. Wiper and Washer Motor.
15 AGC. Antenna Motor, located in connector near switch
Special. Cigar Lighter In back of Lighter

Horn Relay: Delco-Remy 1116965.

Closing Voltage - 5.0-9.5 volts Adjust to 6.5 volts.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Us extreme care when disconn cting any part of air conditioning or lines for acc ss to engine. See "Air Conditioning S rvic Cautions" in Misc llaneous S ction.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head.

S ri s	B r	Str k	Displac m nt
4400	4.125"	3.4"	364 cu. in.
46,47,4800	4.1875"	3.64"	401 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
364" Synchro-mesh	8.5-1	54.45	
364" Dynaflow	10.5-1	54.45	250 at 4400 RPM
364" PowerPack	10.5-1	54 45	300 at 4400 RPM
401"	10.5-1	56.11	325 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*401" ENGINE 80-90 MPH PERFORMANCE IMPROVEMENT NOTE:* New distributor used on later cars (identified by the yellow metallic finish oiler cap). *See DISTRIBUTOR above*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel)* Minimum fuel octane rating for satisfactory operation is 92 (Series 4400 Synchro-mesh). 99 (All Dynaflow Cars). If satisfactory fuel cannot be secured, compression ratio should be lowered by using export pistons and head gaskets as listed below. *NOTE - Compression ratio for Synchro-mesh cars, domestic and export, is 8.5-1. Compression ratio for export Dynaflow cars is 8.75-1.*

Series	Piston	Head Gasket
4400 Synchro-mesh	ℂ 1388536	ℭ 1185646 (.015")
4400 Dynaflow	1388541	ℭ 1185646 (.015")
46, 47, 4800	1388539	ℭ 1185646 (.015")

ℂ - Domestic & Export Pistons are the same.

ℭ - All head gaskets are the same.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*

CYLINDER HEAD AND GASKET: Cylinder heads are interchangeable between engines. All engines use a .015" cylinder head gasket and the lower compression ratio used on synchro-mesh engine is obtained by the use of lower dome height pistons. *See "Pistons" following and "Engine Operation in Low Octane Areas (Foreign Travel)" above.*

►*CYLINDER HEAD REMOVAL NOTE See "Cylinder Head & Manifolds" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data*

PISTONS

Aluminum alloy, dome head (with shallow depressions for valve clearance), cam ground, full skirt with transverse slots in oil ring groove.

►*PISTON REPLACEMENT CAUTION* Same type piston must be used in all cylinders. Use of mixed (different compression ratio) pistons will cause very rough operating engine.

Model	Buick Std. Piston No.
Series 4400 Synchro-mesh	1388536
Series 4400 Auto Trans. ℂ	1388542
Series 4400 Auto Trans ℭ	1388541
Series 4600, 4700, 4800 ℂ	1388538
Series 4600, 4700, 4800 ℭ	1388539

ℂ - Not used on low compression export jobs.

ℭ - Export low compression jobs.

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with ¼" long dash following Production Code Number (see

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Engine Number) have 010" oversize cylinder bore and pistons. Standard cylinder bore is 4.125"(4400), 4.1875" (Others).

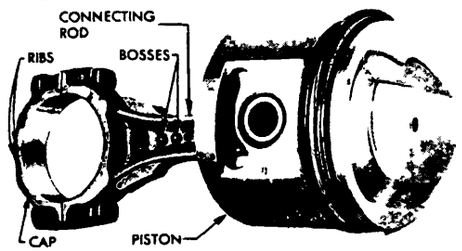
R moval - Pistons and rods removed from above.

►*CAUTION* Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.

Fitting New Pistons: Clearance .0008-.0014". If micrometer used on pistons, measure at top and bottom of skirt 90° from pin hole (top diameter slightly less than bottom in service) Use 003" x ½" x 12" feeler gauge to fit pistons with cylinder block in normal position. Insert feeler on lower side of bore 90° from piston pin hole. Pull to withdraw feeler should be 7-13 lbs. at 70°F (piston & bore clean and dry).

Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and 001", .005", 010", 020" and .030" Oversize. *NOTE* - Pistons furnished only with fitted pins.

Installing Pistons: Assemble rod in piston with oil spurt notch on same side as valve depressions in piston dome. *See Rod Installation below.*



BUICK PISTON & ROD ASSEMBLY

PISTON PIN

Pins are press fit in connecting rod.

Diameter - .9994-.9997". **Length** - 3.520".

Clearance in Piston - .0004". Finger push fit

Cl arance in Rod - 0007- 0015". Press fit

Pist n Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	077- 078"	.015- 025"	.003- 005"
Oil	180- 186"	.015-.035"	0035- 0095"

►*COMPRESSION RING INSTALLATION NOTE* **364" Eng.** - Install both (identical) compression rings with inner bevel toward bottom of piston. **401" Eng.** - Install compression rings with side of ring up which is either marked with a dimple, a letter "T", a letter "O" or word "TOP". Top ring with inner bevel toward top of piston and second ring with inner bevel toward bottom of piston.

Replac m nt Rings: Std., .010", .020", .030" Oversize

CONNECTING ROD

L ngth - Center to center. (4400) 6.100",(Others) 6.220"

Crankpin J urnal Diam ter - 2.249-2.250". Out of round limit .0015".

B arings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.

Clearance - .0002-.0023". Wear limit 003".

Side Play - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020" and .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with spurt notch in lower end of rod and valve depressions in pistons on the high side of cylinder bore This will bring all spurt notches and valvedepressions in pistons toward camshaft. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.

CRANKSHAFT

►*FRONT MAIN BEARING CAP REMOVAL NOTE* To remove these cap bolts, front of engine must be raised sufficiently to provide clearance. Disconnect front engine mounts and exhaust pipe at manifolds.

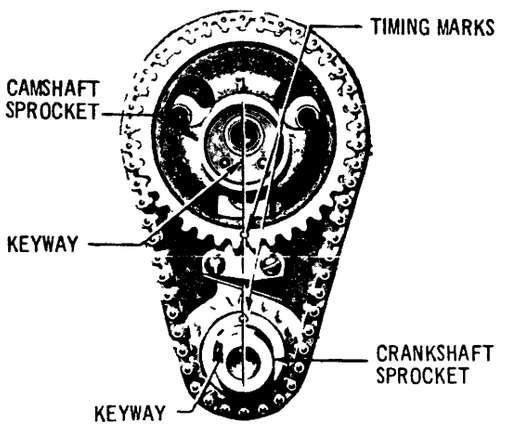
►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars) See "Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2 499". Five bearings. Out-of-round limit .0015".

Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE* Bearing upper halves can be rotated out and in by using Tool KMO-734 in oil hole.

Clearance - .0005-.0021"



BUICK VALVE TIMING MARKS

Replacement Bearings: Std and 001", 002", 003" Undersize.

End Thrust: Taken by Rear No. 5 (364"), No. 3 (401") flanged main bearing.

End Play - .004-.008".

Crankshaft R ar Main B aring Oil S al: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Crankshaft Fr nt Oil S al: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywhe l" in Buick Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE* Various camshafts used in production and are identified by groove markings as follows *NOTE - All service replacement camshafts are later production type.*

Series	Early Producti n Part No.	Groov s	Lat r Pr duction Part N .	Gr v s
4400 S.M	1178587	2	1178587	0
4400 Auto Trans	1185378	0	1185378	4
46, 47, 4800	1185918	1	1185918	1

All Others - Above land has two grooves

Journal Diameters - **(1)** 1.785-1.786", **(2)** 1.755-1.756", **(3)** 1 725-1.726", **(4)** 1.695-1.696", **(5)** 1.665-1 666".

Bearings - Steel-backed babbitt lined bushings.

Clearance - 0005-.0035". Service limit .0015- 004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .688" **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: Valve timing is correct when "0" marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front S al): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	St m Diam.	L ngth
Intake	1.875"	①	4 785"
Exhaust	1.500"	②	4 785"
Valve	**Seat Angle**	**Lift**	**Stem Clearanc**
Intake	45°	③	④
Exhaust	45°	⑤	003- 005"

① - Tapered from .3715"±.0005" to .3730"±.0005".

② - Tapered from 3705"±.0005" to 3720"± 0005"

③ - (4400) 403" Synchro-mesh, 443" Auto Trans , (Others) - 439"

④ - Top 001- 003", bottom 0025- 0045"

⑤ - (4400) 403" Synchro-mesh, 439" Auto Trans , (Others) 441"

Valve Seat Width - 1/16" average (3/64-5/64").

►*VALVE GRINDING CAUTION* Normal height of valve stem above rocker arm cover gasket is 1.540" When valve face or seat grinding raises valve stem height 075" above normal, grind off end of valve stem or replace part

Valve Springs: Inner and outer springs used on all valves Install with closed coils against cylinder head

Valve Spring Sp cificati ns

Valve	Inner Spring Lbs. Press.	Length	Out r Spring Lbs. Pr ss	L ngth
Intake	23-28	1 69"	39 5-44 5	1 60"
Exhaust	63-69	1 25"	93-99	1 16"

Valv Guides: Drive old guides out from combustion chamber side using Driver J-269 Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide

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down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3..

Hydraulic Valv Lift rs: Barrel type.

Diamet r - .8425". Cl arance in Block - .0015-.003".

Lift r Ov rhaul & T sting - *See "Valve System" in Buick Special Data.*

Rocker Arm Ass mbly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valv Timing Specifications

S ri s 4400 Synchr -mesh (Camshaft 1178587)

Intak Valv s - Open 25° BTDC. Close 77° ALDC.
Exhaust Valv s - Open 65° BLDC. Close 37° ATDC.

S ri s 4400 Dynaflow (Camshaft 1185378)

Intak Valv s - Open 35° BTDC. Close 73° ALDC.
Exhaust Valv s - Open 73° BLDC. Close 37° ATDC.

Oth r Seri s (Camshaft 1185918)

Intak Valv s - Open 33° BTDC. Close 77° ALDC.
Exhaust Valv s - Open 75° BLDC. Close 44° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcas Capacity: 5 qts. (refill), 6 qts. (dry engine). Add 1 qt. with filter change.

N rmal Oil Pr ssur : 40 lbs. at 1600 RPM.

Pr ssur R gulator Valv - In oil pump body. Not adjustable.

Oil Pr ssur Gaug - AC No. 1508866. Not electric.

Oil Pump: Spur-geared type oil pump mounted at rear end of crankcase and driven by distributor drive shaft.

Oil Pump R m val & Ov rhaul - *See "Oiling System" in Buick Special Data.*

Oil Filt r: AC full-flow type, mounted at right rear of engine. *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

R plac m nt Filt r El m nt - AC PF-5.

►*OIL FILTER INSTALLATION CAUTION:* DO NOT use a wrench to tighten filter. Tighten by hand until gasket contacts sealing face, then tighten an additional 2/3 turn of the element. This supersedes previous installation instruction.

Crankcas V ntilati n: Air enters through two ventilating type filter caps at top of each rocker arm cover. Air is drawn out through metal gauze filled filter located at rear end of valve lifter cover and ventilator pipe extending down from lifter cover.

COOLING

►*RADIATOR, FAN & SHROUD PRODUCTION CHANGE:* Later cars have radiator tie bar baffle replaced by a radiator mounting bracket (all cars); fan shroud eliminated and 21" fan and fan clutch installed instead (Air Cond. cars).

►*FAN SPACER CHANGE NOTE:* New fan spacer 3¾" long (5/8" shorter than previous type) used on later cars, eliminating need for shims used to locate radiator at 1¼" from fan to radiator core. Replace shims when using longer spacer. Use shorter bolts No. 1190830 with new shorter spacer.

Wat r Capacity: 16.5 qts. less heater, 19 qts. with heater.

Pr ssur Valv : Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Pellet type in water manifold above pump. **(Std.)** Buick No. 1388789, opens at 167-172°F. **(High Temp.)** Buick No. 1391225, opens at 177-182°F.

Water Pump: Packless, sealed ball bearing type with aluminum housing and replaceable seal.

See "Water Pumps" in Buick Special Data.

Pump Removal - Drain radiator, loosen belts and remove fan blade, spacer and pulleys from water pump hub on pump shaft. Remove belts. Disconnect hose from pump inlet and heater hose from nipple. Remove bolts then remove pump assembly and gasket, from timing chain cover.

Temperature Gauge: AC No. 1513694. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Long 11CF. Single plate, semi-centrifugal type.

See "Long" clutches in Clutch Section.

Pedal Adjustment: Free play 1 1/8-1 1/4". For adjustment procedure see *"Clutch Notes" in Buick Special Data.*

Removal: Remove rear axle and transmission (see below), remove flywheel lower housing. Disconnect release rod from yoke, remove boot. Remove spring washer which retains release bearing support and remove support. Pull yoke outward to release it from ball stud, remove yoke and release bearing through bottom of housing. Remove clutch cover screws uniformly to release spring tension after marking cover and flywheel for reinstallation. *NOTE* - Metal spacers placed between release levers and inner edge of clutch will aid removal and installation. Remove cover assembly and driven plate.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.

See "Buick Synchro-mesh" Transmission in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect rear axle assembly. *CAUTION - Use torque tube guide pins to prevent damaging torque tube seal.* Drain transmission, remove torque ball retainers and torque ball. Disconnect speedometer cable and disconnect shift rod and selector rod from levers on transmission. Pull clutch release rod sideways and release yoke clip. Loosen dual exhaust system ball joints at both manifolds. Loosen single exhaust system front to rear exhaust pipe ball joint and rear exhaust to front muffler ball joint. Disconnect rubber thrust pad from thrust bracket leaving thrust pad attached to support. Disconnect rubber mounting pad from transmission support, leaving pad attached to transmission. Place jack under rear of engine pan to support engine. Raise engine and transmission just enough to relieve load on support and remove support from frame noting number and location of shims. Remove upper two transmission to flywheel housing bolts, install Guide Pins J-851-A and remove lower bolts. Lower engine and transmission as an assembly until rear bearing retainer will clear frame crossmember. Move transmission to rear to clear main drive gear from flywheel housing and lower transmission to floor. *S NOTE following.*

►*SYNCHRO-MESH TRANSMISSION REMOVAL NOTE:* Disconnect clutch equalizer at either the frame or the engine to prevent damaging idle lever-to-equalizer rod and causing bind in clutch control linkage.

DYNAFLOW DRIVE TRANSMISSION

"Twin Turbine" & "Triple Turbine" types used. Same as used previously.

►*TRIPLE TURBINE BUZZING NOISE CORRECTION:* Caused by lube pressure regulator ball vibrating on its seat. *To correct see "Buick Triple Turbine" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick Twin Turbine" or "Tripl Turbine" Dynaflow Drive in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Buick Twin Turbine" or "Triple Turbine" Dynaflow Drive in Transmission Section.*

Throttle Linkage Adjustment and Dashpot Setting on Dynaflow Drive Cars. *See TUNE-UP.*

Lubrication - Check fluid level every 1000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type "A" bearing an "AQ-ATF" number embossed on container.

Checking Fluid Level - Check with engine idling, selector lever in "P" and transmission at normal operating temperature. Maintain level to within 1" of FULL mark on dipstick.

Capacity - Twin Turbine 12 qts., Triple Turbine 12½ qts. All dry transmissions 13¾ qts.

►*OTHER DYNAFLOW DRIVE SERVICE DATA: See Buick "Twin Turbine" or "Triple Turbine" Dynaflow Drive in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. Saginaw (Front), Saginaw or Spicer (Rear). Front joint enclosed in torque ball, rear joint enclosed in torque tube. Front joint lubricated by transmission. Rear joint requires no lubrication in service.

►*U-JOINT INSTALLATION CAUTION:* U-Joint omitted splines (two points 180° apart) must be aligned with blind splines on propeller shaft. This will provide correct relationship of front and rear universals and prevent drive line vibration.

►*REAR PROPELLER SHAFT LUBRICATION NOTE:* Lubricate propeller shaft coupling and splines (when assembling) with type "O" (non-fibrous) chassis lubrication and pack cavity beyond spline about 2/3 full of grease. *CAUTION* - DO NOT plug vent hole in propeller shaft welch plug when servicing as excess grease will accumulate in torque tube ahead of access hole. Limit power grease gun to one shot.

REAR AXLE

Own. Semi-floating hypoid gear type and torque tube drive. "Power-Lock Differential (Plate Clutch Type)" optional.

►*REAR AXLE LUBRICANT NOTE:* Flushing & Seasonal changes not recommended for either type axle. Maintain

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fluid level at filler opening. Use Factory Hypoid Gear Lubricant in standard axle. Use Buick Spec. No. 723-TL-1000 Lube in optional axle.
See "Buick Hypoid" or "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Ratios

	S.M.	Twin Turbine	Triple Turbine
4400(2-Bbl.Carb.)	3.58-1	3.07-1	2.78-1
All Others		3.23-1	2.78-1

Export Ratios - Synchro-mesh 3.58-1, Auto. Trans. 3.36-1

►*REAR AXLE RATIO NOTE:* Gear ratios are indicated by numbers stamped on bottom of axle housing.

►*AXLE IDENTIFICATION* Stamped on bottom of housing. "X" next to number indicates "Positive Traction" axle. Lubrication caution tag on filler plug also indicates "Positive Traction" axle.

Backlash - .007-.009".

Axle Shaft Removal: Place stands under rear axle so wheels clear floor, then remove wheel and drum. Remove wheel bearing retainer plate-to-backing plate nuts (leave bolts in place to support backing plate). Use puller J-6176 with Slide Hammer to pull axle assembly. Replace two backing plate nuts finger tight to hold plate in place.

R ar Axle Assembly Removal: 1) Raise car and place stands under frame, then place floor jack under center of rear axle housing. Disconnect lower end of rear springs.

2) On Air-Poise Cars, disconnect rear height control valve links at strut rods. Pull levers down carefully to exhaust all air pressure. Remove bolts mounting rear air spring bearing plate on rear axle housing, remove plunger and bearing plate assembly by disengaging plunger from diaphragm center plug.

3) Disconnect radius rod at axle end. *CAUTION* - On Air-Poise Cars DO NOT disconnect radius rod or torque tube until all air pressure is exhausted from air springs.

4) Disconnect shock absorber lower ends, and parking brake cable at rear sheave and at bracket on torque tube.

5) Disconnect brake hose from pipe at frame X member and remove yoke. *NOTE* - Cover hose and brake pipe openings to protect from dirt.

6) Remove two opposite torque tube flange bolts and replace with 3" guide pins, then remove other bolts and pull axle assembly from under car.

Wheel Bearing Adjustment: None required.

T rque Ball Adjustment: None required.

SHOCK ABSORBERS

Delco. Direct acting, hydraulic (front and rear) Front shock absorbers mounted inside front spring with upper stem attached to frame The lower insulated bracket is bolted to spring seat Rear shock absorber mounted on an angle with upper end "in" and attached to frame bracket Lower end attached to bracket on rear axle housing.

►*SHOCK ABSORBER INTERCHANGEABILITY NOTE·* Front shock absorbers are interchangeable right and left. Rear shock absorbers are interchangeable right and left. *NOTE* - Air-Poise shock absorber is 1" shorter than a coil spring shock absorber.

Buick Shock Absorber Nos.

Model	Front	Rear
4435,4635 (Less Air Ride)	Ⓒ 5543741	Ⓒ 5543747
4435,4635 (Air Ride)	Ⓒ 5543768	Ⓒ 5543748
4400,4600 Exc above(Less A.R.)	Ⓒ 5543743	Ⓒ 5543744
4400,4600 Exc aboye(Air Ride)	Ⓒ 5543767	Ⓒ 5543745
4700,4800 (Less Air Ride)	Ⓒ 5543741	② 5543746
4700,4800 (Heavy Duty)	② 5543742	② 5543747
4400,4600 (Exc. 4435,4635 H.D.)	② 5543741	② 5543746

Ⓒ - Regular & Export. ② - Export only

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers within coil springs. Air Ride Cars have low rate coil springs to match rear air spring rate. A spring seat spacer is located between spring seat and lower control arm to accommodate the longer low rate spring. A spring steel stabilizer shaft used on Air Ride and Station Wagons to control side roll.
See "Buick" in Suspension & Wheel Alignment Section

►*FRONT SUSPENSION TIE ROD SLEEVE NUT NOTE·* Lockwasher used on early cars eliminated and special locknut only recommended for use at this point.

Steering Axis Inclination - 7° at 5/6° camber.

Caster (Manual Steering) - Neg. 2°±¾° Both sides equal within ¾°.

Caster (Power Steering) - Neg. ½°±¾° Both sides equal within ¾°.

Camber - Pos. 1° to Neg. ½°. Pos ½° preferred. Both sides equal within ¾°.

Toe-In - 1/16-5/32".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 23° (manual steering), 22° (power steering)

REAR SUSPENSION

Rear Suspension: *See "Buick Rear Suspension" in Suspension and Wheel Alignment Section*

►*ESTATE WAGON EXCESSIVE SWAY CORRECTION* Install new type Track Bar Bushing, *see "Buick Rear Suspension" in Suspension & Wheel Alignment Section*

AIR SUSPENSION

Air springs replace coil springs at rear wheels.
See "Front Suspension" above for alignment specifications and "Buick Air Suspension" in Suspension & Wheel Alignment Section.

►*CARS NOT RETURNING TO CORRECT TRIM HEIGHT WHEN LOAD REMOVED: See "Buick Air Suspension" in Suspension and Wheel Alignment Section, for recommended rework of Height Control Valve.*

STEERING

Manual: Saginaw Ball B aring W rm & Nut. Recirculating ball worm and nut type
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Pow r St ring: Saginaw (R tary Valv) Hydraulic. New hydraulically actuated unit combining a recirculating ball nut and a rack piston operating in a power cylinder. *NOTE* - Some early cars use "Saginaw (In-Line) Power Steering".
See "Saginaw (In-Line)" or "Saginaw (Rotary Valve)" Power Steering in Steering Section.

►*POWER STEERING BELT SQUEAL CORRECTION* Adjust belt so that pulley will slip at 40-45 ft. lbs.

►*POWER STEERING PUMP SHAFT BREAKAGE NOTE:* Install Kit No. 5688110, *see "Saginaw Power Steering Pumps" in Steering Section*

►*POWER STEERING PUMP NOISE AND LEAK CORRECTION·* Caused by loose expansion plug. *See "Saginaw Power Steering Pumps" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Butt n R moval: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). Conventional two shoe with short lining (primary), longer lining (secondary) Aluminum brake drums with cast iron liner used on all series front brakes. Parking "Step-On" pedal applies rear service brakes.
See "Bendix Hydraulic (Without Eccentric)" Brakes in Brake Section.

►*PARKING BRAKE NOTE* For "Pedal Sticking" and for "Cable Rattle" Corrections, *see "Bendix Hydraulic (Without Eccentric)Brakes" in Brake Section.*

Drums - Aluminum brake drums with cast iron liner used on all front brakes. All rear brake drums are cast iron with steel disc.

Drum Diameter - 12.01-12.02" front and rear

►*BRAKE DRUM REBORING NOTE.* When a drum will not clean up when rebored to a diameter of 12.080" replace drum

Wheel Cylinder Diameters - Front 1 1/8" Rear 1"

Lining - Primary and secondary linings are of different material and different length and are not interchangeable. Molded linings are riveted to the shoes

Replacement Linings - Lining and Shoes with Linings furnished Std. and .030" Oversize.

Lining Length & Width

	Front Wh ls	Rear Wh ls
Primary	10.040"x2.50"	10 040"x2 25"
Secondary	12 959"x2.50"	12 959"x2 25"

Thickness - 265" front wheels, 187" rear wheels.

Braking Power - 55.9% front, 44 1% rear.

Cl aranc - Adjusting screw backed off 13-15 notches from point where wheel can just be turned by hand

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Checking Fluid - Maintain fluid level ½" to 1" below lip of filler opening.

R m val - Remove clevis pin from pushrod clevis. Disconnect brake pipe and tape end of pipe. Remove bolts securing master cylinder and dash reinforcement to dash panel and remove master cylinder from car.

►*MASTER CYLINDER REMOVAL NOTE:* To remove new clevis pin Part No. 1190267 for servicing master cylinder or linkage, insert a tube over small diameter end of pin, compress spring and push pin and tube through hole in clevis and brake pedal linkage. Tool dimensions are 1 7/8" long, .364" max. O.D., .308" min. I.D. *CAUTION* - DO NOT substitute cotter pin for Part No. 1189785 Pin Retainer used on early cars.

Pow r Brak s: Moraine Power Brake Unit. Suspended type power unit replaces conventional master cylinder. *See "Moraine Power Unit" in Brake Section.*

►*STICKING POWER BRAKE CORRECTION:* When pedal sticks in down position, remove fibre washer at brake pedal clevis and reduce its thickness or replace it with washer Part No. 1336539 (.060" thick) which is .020" thinner.

►*POWER BRAKE FADING CORRECTION:* This condition may be corrected by installation of Air Valve Repair Kit Part No. 5459133. For installation procedure, see *"Moraine Power Brake" in Brake Section.*

Checking Fluid Level - Maintain fluid level ½" to 1" below lip of filler opening.

Removal of Power Unit - See Master Cylinder Removal Note above, for clevis pin removal. Disconnect battery ground strap. Remove brake pipe and tape end to prevent entrance of dirt. Remove clevis pin at brake pushrod clevis and remove accelerating pedal and roll back floor mat. Remove bolts securing brake unit to toe plate and remove toe plate. Disconnect vacuum hoses from vacuum tee and remove brake unit from car.

MISC. MECHANICAL

Air C nditi ning: "Frigidaire & Harrison" with all components located in or ahead of dash.
See "Frigidaire & Harrison" in Miscellaneous Section.

Windshield Wipers: Single and two-speed electric link operated type.
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type with a single reversible type motor for each window.
See "GM Electric Window Regulators" in Miscellaneous Section.

Power Seat Control (2-Way): Electric type with single reversible type motor for horizontal adjustment.
See "GM 2-Way Seat Controls" in Miscellaneous Section.

Power Seat Control (6-Way): Electric type with a separate motor on each of the three basic seat movements. *S "GM 6-Way Controls" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor.
See "Power Top Controls" in Miscellaneous Section.

MODEL IDENTIFICATION

Series	Series Designation
LeSabre	4400
Invicta	4600
Electra	4700
Electra "225"	4800

ENGINE & SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar, and on top surface of crankcase forward of valve lifter cover on left side. Number (example below) includes identification data.

① ② ③ ④
4 G 1 001001

① - Series. 4 – 4400. 6 – 4600. 7 – 4700. 8 – 4800.
② - Year – 1960.
③ - Assembly Plant. 1 Flint, 2 South Gate, 3 Linden, 4 Kansas City, 5 Wilmington, 6 Atlanta, 7 Framingham, 8 Arlington.
④ - Begining vehicle number.

Engine Production Code No. – Stamped on same surface as Engine & Serial No., but on right side. When viewed from front of engine, number is upside down. **364" Engines (8.5–1 & 10.25–1 compr. ratio)** have prefix 3G. **364" Engines (9.0–1 compr. ratio)** have prefix L3G. **401" Engines** have prefix 4G. *NOTE* – **¼" dash** following code no. indicates .010" oversize cylinder bore.

►*ENGINE NOTE:* Basic engines used are as follows:

Series	Engine	Compr. Ratio	① Carb. & Trans.
4400	364"	8.5–1	2–Bbl. & S–M
4400	364"	② 9.0–1	2–Bbl. & A–T
4400	364"	③ 10.25–1	2–Bbl. & A–T
4400	364"	④ 10.25–1	4–Bbl. & A–T
46, 47, 4800	401"	10.25–1	4–Bbl. & A–T

① - S–M – Synchro-mesh; A–T – Auto. Trans.
② - Regular Gas Option. ③ - Std. Auto. Trans. Comb.
④ - Power Pack.

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel): See Note under Engine Specifications for recommended changes.*

COMPRESSION PRESSURE: 150 lbs. (8.5–1 ratio), 160 lbs. (9.0–1 ratio), 180 lbs. (10.25–1 ratio) at cranking speed of 160 RPM. Cylinders must be equal within 15 lbs.

VACUUM READING: 14" min. at 485 RPM.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely. Check thermostat at 70°F (room temperature). There should be 180° wrap on spring.

►*LUBRICATION NOTE: Special Lubricant Part No. 980108 should be applied to valve bearings during periodic chassis lubrication.*

IGNITION

FIRING ORDER: 1–2–7–8–4–5–6–3.
Cylinders – RIGHT BANK 1–3–5–7, LEFT BANK 2–4–6–8.

SPARK PLUG GAP: .035".
Spark Plugs – AC No. 44S (Std.), No. C–42 (High Speed Driving). 14 mm. Torque to 25–30 ft. lbs.

COIL: Delco-Remy 1115100.
Ignition Current – 2.5 amps. idling, 4.5 amps. stopped.
Resistor – Resistance wire (1.75–1.85 ohms) connected in circuit from coil to wiring harness connector on dash. Bypassed during cranking by lead from starter solenoid to coil.

►*BURNED PRIMARY RESISTANCE WIRE NOTE (Early Cars):* Check for grounded wire at starter solenoid cap. Replace wiring harness as necessary Later cars have new type cap that eliminates possibility of this wiring grounding.

DISTRIBUTOR: Delco-Remy 1110963 (364" Eng. 8.50-1 Ratio), 1110962 (364" Eng. 9.0-1 Ratio), 1110961 (364" & 401" Eng. 10.25-1 Ratio). Window type with external adjustment. *See "Delco-Remy Window Distributors" in Electrical Section.*

►*DISTRIBUTOR IDENTIFICATION & LUBRICATION NOTE:* Distributors may be identified by color of oiler as follows: No. 1110963 - Black oiler. No. 1110962 - zinc color oiler. No. 1110961-Copper color oiler. *NOTE* - Later distributors have **short** type oilers positioned below base. All distributors should be lubricated regardless of type oiler used.

Condenser – Delco-Remy. **Capacity** .18–.23 mfd.
Breaker Gap – Gap (.0125–.0175") will be correct when cam angle correctly set.
Cam Angle – 28–32°. Set to 30°.
Breaker Arm Spring Tension – 19–23 ozs.
Rotation – Clockwise viewed from above.

Automatic Advance - 1110963

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.0	475	1-4	950
6-8	1150	12-16	2300
12-14.5	1875	24-29	3750

Automatic Advance - 1110961 & 962

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	450	0-4	900
3-5	950	6-10	1900
6-8	1425	12-16	2850
9-11	1900	18-22	3800

Vacuum Spark Control: Delco-Remy 1116163 (1110961 Distr.), 1116164 (1110962 & 963 Distr.).

Vacuum Advance - 1116163

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
7-9	14-18	16.25-18

Vacuum Advance - 1116164

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
9-10.5	18-21	12-14

IGNITION TIMING

Setting – 5° BTDC (Synchro-mesh), 12° BTDC (Auto. Trans.).
Timing Mark – Timing indicator on chain case cover marked "O" (TDC), "5" (5° BTDC), and "12" (12° BTDC). Align correct mark with yellow paint filled groove on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg, Carter & Rochester carburetors used as follows:*

Engine & Compr. Ratio	Carburetor
364" (8.5–1)	Carter WGD 2–Bbl.
364" (9.0–1)	Carter WGD or Stromberg WW 2–Bbl.
364" (10.25–1)	Carter WGD or Stromberg WW 2–Bbl.
364" (10.25–1 Power Pack)	Carter AFB 4–Bbl.
401" (10.25–1)	Carter AFB or Rochester 4GC 4–Bbl.

►*2–BARREL CARB. FLAT SPOT CORRECTION:* May be caused by improperly positioned air cleaner. Make sure air cleaner installed with inlet tube 44° to left of engine centerline (use "front" stamped in cleaner cover to locate tube properly.)

►*SLOW SHIFT TO STATOR HIGH ANGLE CORRECTION:* Make sure throttle and stator linkages are correctly adjusted (see below).

►*HIGH SPEED FUEL SHORTAGE CORRECTION:* May be caused by kink in gas tank vent hose at clip ahead of gas tank filler door. Relocate hose to insure uniform bend.

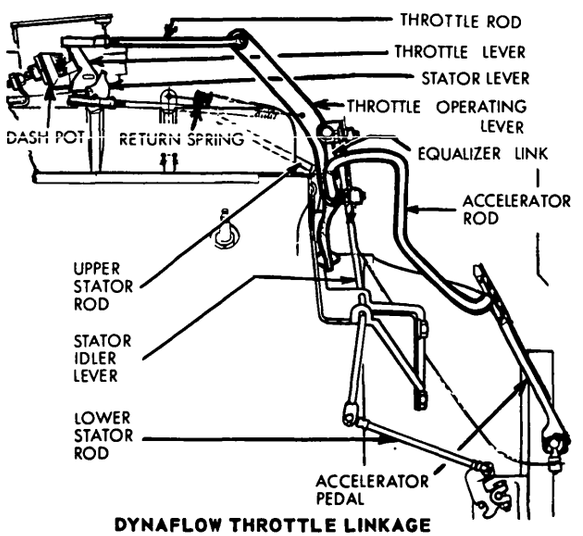
►*STROMBERG & CARTER 2 & 4-BARREL CARBURETOR CHANGES FOR IMPROVED WARM WEATHER OPERATION: See data on each carburetor model below.*

►*MANIFOLD FUEL DISTRIBUTION (All Cars): Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed Cyls. 2-3-5-8.*

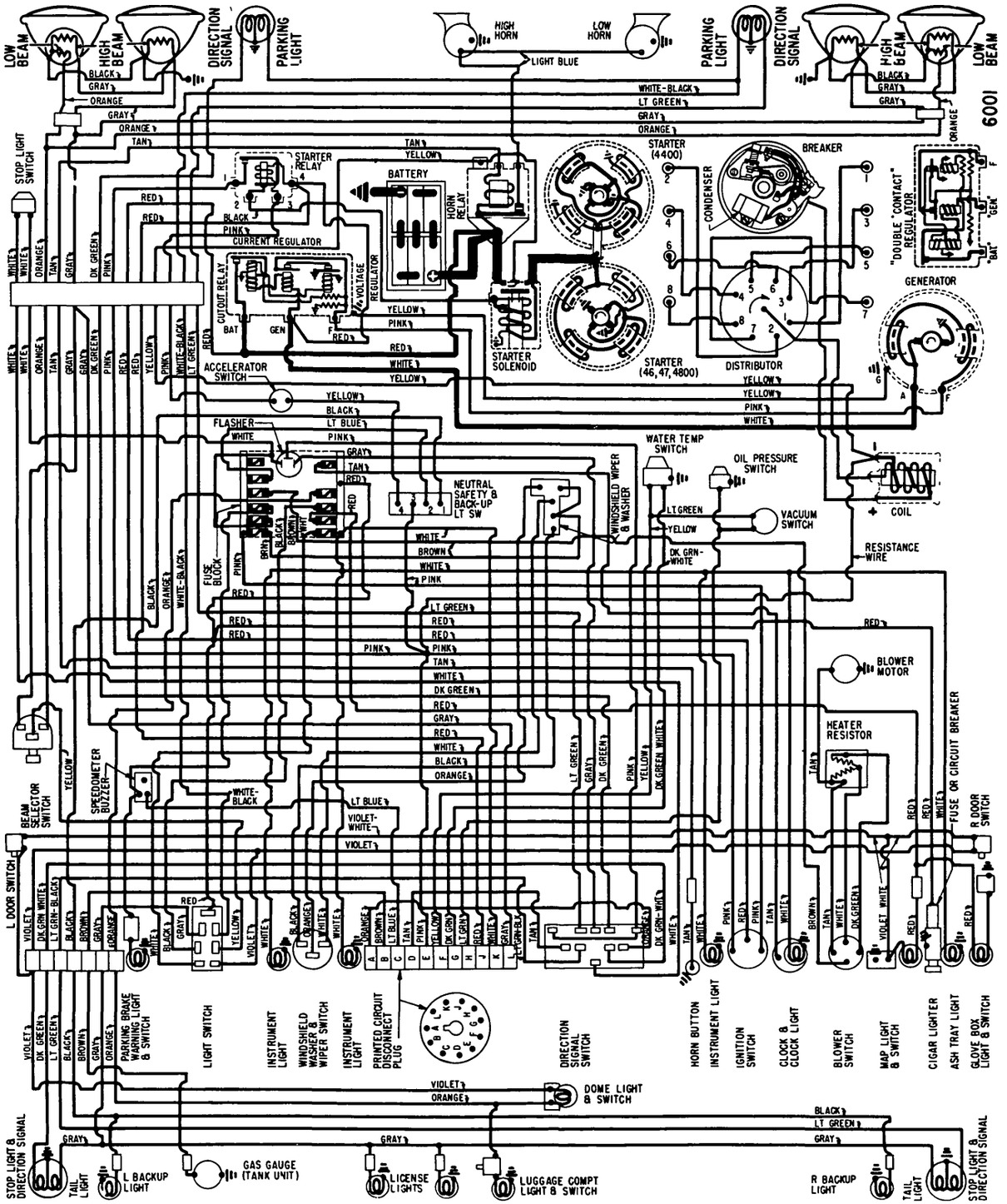
THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Make sure stator linkage is properly adjusted (see below). Then proceed as follows: Disconnect carburetor throttle rod from throttle operating lever. Hold accelerator pedal firmly against floor mat and throttle in wide open position. Now hold throttle rod at hole in lever. **Rod must be 1/16" shorter than entering hole in lever.** Readjust rod as necessary. *NOTE – On 4–barrel carb. cars, if throttle rod cannot be shortened install later type rod which is .20" shorter, Part No. 1188324.* Connect rod to lever and again check for wide open throttle with accelerator against floor mat. Check and adjust choke unloader if necessary. Check for smooth operation of linkage. Desired wide open throttle position should be when accelerator pedal strikes floor mat rather than stop on throttle lever striking hard against boss on throttle body.

Stator Linkage Adjustment – Hold throttle wide open. Adjust upper stator rod so ball joint at forward end will just slip freely in stator lever on carburetor with stator rod pulled forward and stator lever held rearward against pickup. **Now length upper stator rod full turn** (provides slight clearance at stop in transmission to insure carburetor reaching wide open throttle). Reconnect ball joint to stator lever. Tighten locknut. To check adjustment, move throttle lever to wide open position and move stator rod endwise. It should have a slight free movement or "shake".

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DYNAFLOW THROTTLE LINKAGE



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Anti-Stall Dashp t Adjustm nt – After stator and throttle linkage properly adjusted, engine at normal operating temperature and idle speed correctly set, proceed as follows: Open throttle to clear fast idle cam and rotate cam to extreme fast idle position. Let throttle close against cam. Adjust dashpot until it just touches throttle lever. Tighten locknut. Put transmission in "D" with brakes applied and jab accelerator pedal and release quickly. If engine stalls, adjust dashpot toward throttle lever; if too much time necessary for return to idle, move dashpot away from throttle lever. *Always tighten locknut after each adjustment.*

Starter Switch (Car Starter) Setting: Synchro-mesh Cars – Remove carburetor, connect test light (12 volt) across switch terminals, block choke valve open so fast idle cam is at slow idle position. Lamp should light with ¼" (drill) clearance between wall of throttle body and lower edge of one primary throttle valve at center; but it should not light with 7/64" (drill) clearance at same position. To adjust, change number of shims between contact spring and plunger.

Auto. Trans. Cars – With carburetor on engine, transmission in "P" and brakes applied, back off throttle stop screw, rotate fast idle cam to slow idle position **and fully close throttle valve.** Measure distance from diaphragm flange of dashpot to **near** edge of dashpot arm. Turn ignition on and slowly open throttle while holding scale in position. When starter is energized, measure distance as before. Subtract the two measurements. Difference should be: **Carter 2–Bbl.** 9/16–7/8"; **Stromberg 2–Bbl.** ¾–1 1/8"; **Carter 4–Bbl.** ½–¾"; **Rochester 4–Bbl.** ½–13/16". To adjust, change number of shims between contact spring and plunger.

CARTER WGD 2–BARREL

Carter WGD No. 2979S, SA (Synchro-mesh), 2980S, SA (Automatic Trans.).

►*EXCESS IDLE SPEED DURING WARM-UP CORRECTION:* On early cars (dated coded before L-9), this may be caused by incorrect fast idle cam. *See "Carter WGD Carburetors" in Carburetion Section.*

►*CARBURETOR CHANGES FOR IMPROVED HOT WEATHER OPERATION (Carter 2979S & 80S): See "Carter WGD Carburetors" in Carburetion Section for recommended changes.*

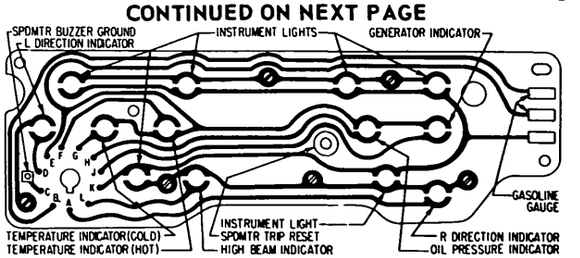
Idle Setting – ¼–2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed – 485 RPM (550 RPM Air Cond. Cars) in "N" or "P".

Float Level – ¼" (Gauge T109–31) between top of float (at center) and bowl cover. To adjust, bend float lever.

Choke Lever Setting – With slight clearance between tang on fast idle cam and stop on flange casting and inner choke shaft lever contacting lug on outer choke shaft lever, align index mark on cam with adjusting

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BUICK INSTRUMENT CLUSTER PRINTED CIRCUIT

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screw. To adjust, bend lug on outer choke shaft lever.

Accelerating Pump – Normal setting, long stroke hole.
Fast Idle: 1500 RPM on hot engine with fast idle screw on index mark of cam.
Automatic Choke Setting: Centered on index.
Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Carter WGD Carburetors" in Carburetors" in Carburetion Section.*

STROMBERG WW 2-BARREL

Stromberg WW, Code 7-113 (Early), 7-113A (Later). Two barrel downdraft type.
►*CARBURETOR CHANGES FOR IMPROVED HOT WEATHER OPERATION (Code 7-113A):* This carburetor has baffle in float chamber and air horn gasket with solid section over float chamber. *See "Stromberg WW Carburetors" in Carburetion Section.*
Idle Setting – 1 turn out. Adjust both screws alike. Turn screws out for richer mixture.
Idle Speed – 485 RPM (550 RPM Air Cond. Cars) in "N" or "P".
Float Level – 5/32" (Gauge J–7294) from top of float at center to top edge of float bowl (gasket removed) with needle seated. To adjust, bend float arm tang.
Accelerating Pump – Normal setting, medium stroke hole.
Fast Idle Setting (On Car): With engine at normal operating temperature and idle speed and mixture adjustments correctly made, rotate fast idle cam to full up position so fast idle screw contacts high step of cam. Adjust fast idle screw so engine is running at 1500 RPM.
Automatic Choke Setting: Centered at index.
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 2981S (4400 Power Pack), No. 2982S (46, 47, 4800 Std.). 4-Barrel, downdraft type.
►*AUTOMATIC CHOKE SETTING CHANGE:* Carburetors date coded "K" or later are set 2 Points Rich (supersedes 1 Point Rich) for improved initial starting.
►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.
Idle Setting – ¼–1¾ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.
Idle Speed – 485 RPM (550 RPM Air Cond. Cars) in "N" or "P".
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC, No. 7015040 (46, 47, 4800 Std.).
►*CHOKE BINDING CORRECTION:* May be caused by wiring from carburetor starter switch to temperature vacuum switch contacting choke operating rod. To correct, make sure wiring connector at carburetor switch installed from rear (installed from front on Carter 4–Bbl. Carb.).
►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.
Idle Setting – 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed – 485 RPM (550 RPM Air Cond. Cars) in "N" or "P".
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetor Section.*

CARB. EQUIPMENT

Fuel Pump. AC Type HE. No. 4706.
Pressure - 5¼-6½ lbs. (at carburetor height).
See "Fuel Pumps" in Carburetion Section.
Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Some Air Cond. cars have special filter with metering outlet in top and rubber hose for vapor fume return to gas tank.
►*FUEL FILTER NOTE:* Inspect every 1,000 miles, clean if necessary. Drain, clean bowl and replace element every 5,000 miles.
Gasoline Gauge: AC Electric type.
Dash Unit - AC No. 5643079.
Tank Unit - AC No. 5640725 (Std.), No. 5640726 (A.C. Cars).
See "Fuel Gauges" in Carburetion Section.
►*FUEL GAUGE NOTE:* Fuel gauge will read accurately only when ignition switch is turned "ON".
►*FUEL TANK RATTLE CORRECTION:* Install three double thickness (Builders 45 lb. felt) pads, 9" x 18" between tank and trunk floor pan.
Air Cleaner: Oil wetted plastic foam type. Clean and reoil every 5,000 miles or sooner if needed.
►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from mesh support and wash in non-flammable solvent. Kerosene or Oleum Spirits may be used if fire hazard precautions are observed. Squeeze element (do not wring) to remove all solvent and reoil with 10W-30 engine oil. Element should not drip oil.

BATTERY

Delco No. 562. 12 volt, 11 plate, 70 ampere capacity (20 hr. rate).
Battery Ground - Negative, to cylinder head.
Engine Ground - Left rear of engine to dash.

STARTER

Delco-Remy 1107724 (364" Eng. Early), 1107783 (364" Eng. Later); 1107773 (401" Eng. Early), 1107784 (401" Eng. Later). *NOTE* - Starters 1107773 & 1107784 are "Two Shunt" type.
Drive – Overrunning clutch (solenoid pinion shift).
Rotation – Counterclockwise at commutator end.
Brush Spring Tension – 35 ozs. minimum.

Performance Data - 1107724 & 783

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600–5100	10.6	65–100
	Lock	3.5	300–360

Performance Data - 1107773 & 784

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3900–5400	10.6	80–120
	Lock	2.0	290–370

Ⓒ - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1118816 (1107724), No. 1114256 (1107773), No. 1114262 (1107783), No. 1114263 (1107784), controlled by separate relay, Delco-Remy No. 1116963 and Accelerator Vacuum Switch (on Carburetor). *See "Starter Controls" in Electrical Section.*
Accelerator Vacuum Switch: Carter No. 192-38U (Carter and Stromberg Carb.), Rochester No. 7011372 (Rochester Carb.).
Accelerator Vacuum Switch Setting - *See data on each carburetor type in Carburetion Section.*
Neutral Safety & Back-up Light Switch (Aut. Trans.): Buick No. 1178138. Mounted on steering column under cowl. Connected in starter control circuit so that starter operates only when selector lever is in "N" or "P" Parking position.
Adjustment - *See "Buick (Twin Turbine) Dynaflow" in Transmission Section.*

GENERATOR

Delco-Remy 1102181 (Std.), 1102197 (Air Cond.).
►*CHARGING CIRCUIT FUSE CAUTION:* Battery charging circuit protected by a 40 amp. (Std. Regulator), 50 amp. (Air Cond. Regulator) fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing battery, generator or regulator failure.

Performance Data

Generator	Amperes	Volts	RPM
1102181	35	14.0	2510
1102197	45	14.0	2600

Field Current – 1.69–1.79 amps. (1102181), 2.66–2.86 amps. (1102197) at 12 volts and 80°F.
Brush Spring Tension – 26–32 ozs.
Rotation – Counterclockwise at commutator end.
Belt Adjustment: Check belt tension by using torque wrench on generator pulley. 15–20 ft. lbs. should slip pulley on belt.

REGULATOR

Delco-Remy 1119242 (Std. Gen.), 1119617 (Air Cond. Gen.). *NOTE* - Regulator 1119617 is "Double Contact" type.
►*REGULATOR 1119242 ADJUSTMENT NOTE:* "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment.
►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*
NOTE – Specifications below are "Normal" settings.

Cutout Relay

Cuts In – 11.8–13.5 volts (1119242), 11.8–13.0 volts (1119617).
Contact Gap – .020".
Air Gap – .020" with contacts just closed.

Voltage Regulator

Setting (1119242) – 13.8–14.8 volts at 125°F ambient temperature.
Setting (1119617) – 13.8–14.6 volts at 125°F ambient temperature operating on upper contacts. .1–.3 volts lower operating on lower contacts.
Contact Gap (1119617) – .016".
Air Gap – .075" (1119242), .067" (1119617) with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Dubl Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119242) – 32–37 amps. at 125°F.
Setting (1119617) – 42.5–47.0 amps. at 125°F.
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

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MISC. ELECTRICAL

►*INSTRUMENT CLUSTER ASSEMBLY NOTE:* It is necessary to remove Instrument Cluster Assembly to replace printed circuit and fuel gauge. Light bulb sockets are accessible by lowering either right or left lower control housings and are removed from printed circuit by turning bulb socket counterclockwise.

Instrument Cluster Assembly Removal: 1) Disconnect battery ground strap. Remove name plate (upper center instrument panel) and remove three screws along front edge of upper panel. Remove right lower control housing panel and nut located at right side of instrument cluster hood. From inside glove box, remove two nuts that attach upper panel to tie bar and disconnect radio speaker wire.

2) Remove left lower control housing panel and disconnect speedometer cable and instrument cluster disconnect plug. *CAUTION* - DO NOT damage connector pins. Unplug clock or ornament and terminal block. Remove three cluster panel-to-instrument panel screws and remove assembly. *NOTE - On cars with Safety Buzzer, buzzer ground wire is attached to connector pin located on underside of printed circuit. Wire must be disconnected from pin before removal of printed circuit.*

Speedometer Removal: Speedometer can be removed from cluster assembly after removal of cluster assembly.

►*LOCKING TYPE ELECTRICAL CONNECTORS CAUTION:* It will be necessary to straighten "Finger Clips", press in on "Thumb Release", remove "Wire Clip" or lift up on "Locking Tab" before attempting to separate connector.

"Guide-Matic" Headlight Control: *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery ground cable. Remove lower left instrument panel housing and remove multiple connector from lighting switch. Pull knob out to last notch. Depress spring loaded button on top of switch while pulling knob and rod assembly from switch. *NOTE - If latch button is depressed before knob is pulled out, knob and rod assembly will not rise as.* Remove mounting nut with wrench J-8563.

CIRCUIT BREAKERS: 15 Ampere - Headlights & Front Parking Lights. In headlight switch.
25 Amper - Twilight Sentinal. In lead near starter relay.
Special - Cigar lighter. On back of lighter.

FUSES: *NOTE - All fuses in fuse block mounted under instrument panel on left side.*

►*INSTRUMENT LIGHT FUSE CHANGE:* 3 Ampere fuse used on later cars for added protection of instrument light rheostat (supersedes 5 amp. type). *Use 3 amp. fuse for replacement on ALL cars. Disregard fuse block notation on earlier cars.*

30 Amper - Heater, Defroster, Air Conditioner Blower & Compressor Clutch. *Supersedes early production 25 amp. fuse.*
25 Amper - Windshield wiper & washer.
20 Amper - Dome light, Trunk light, Rear Cigar Lighter.
10 Amper - Back-up lights.
10 Amper - Direction Signals & Stop lights.
10 Amper - Tail, License & Instrument light rheostat.
7.5 Amper - Radio.
3 Amper - Instrument lights and rheostat (supersedes 5 ampere type - see Change note above).
5 Amper - Glove Box & Map light.
5 Amper - Speedometer Warning Buzzer, Parking Brake Warning Light & Twilight Sentinal Amplifier.
2 Amper - Clock.

Horn Relay: Delco-Remy 1116965.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head.

Series	Bore	Stroke	Displacement
4400	4.125"	3.4"	364 cu. ins.
46, 47, 4800	4.1875"	3.64"	401 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
364" Synchro-mesh	8.5—1	54.45	210 at 4000 RPM
364" Auto. Trans. ①	9.0—1	54.45	235 at 4400 RPM
364" Auto. Trans. ②	10.25—1	54.45	250 at 4400 RPM
364" Auto. Trans. ③	10.25—1	54.45	300 at 4400 RPM
401"	10.25—1	56.11	325 at 4400 RPM

① - Regular Gas Option (2—Bbl. Carb.).
② - Std. Auto. Trans. combination (2—Bbl. Carb.).
③ - Power Pack (4—Bbl. Carb.).

Compression & Vacuum Reading – *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel octane rating for satisfactory operation is: 92 (Series 4400 Synchro-mesh), 99 (All Auto. Trans. cars). If satisfactory fuel cannot be secured for 8.5—1 and 9.0—1 ratio engines, installation of .045" thick cylinder head gasket will improve performance. For 10.25—1 ratio engines, lower compression ratio to 8.75—1 by using export pistons and head gaskets as listed below. *NOTE – Compression ratio for Synchro-mesh cars, domestic and export, is 8.5–1. Compression ratio for export Auto. Trans. cars is 8.75–1.*

Series	Piston	Head Gasket
4400 Synchro-mesh	① 1388536	② 1185646 (.015")
4400 Auto. Trans.	1388541	② 1185646 (.015")
46, 47, 4800	1388539	② 1185646 (.015")

① - Domestic & Export pistons are the same.
② - All head gaskets are the same.

►*ENGINE VIBRATION AT 37-40 MPH:* May be caused by loose generator bracket brace-to-engine mounting pad bolt. Tighten bolt to 25-35 ft. lbs. torque.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*

CYLINDER HEAD AND GASKET: Cylinder heads are interchangeable between engines. All engines use a .015" cylinder head gasket and the lower compression ratio used on synchro-mesh engine is obtained by the use of lower dome height pistons. *See "Pistons" following and "Engine Operation in Low Octane Areas (Foreign Travel)" above.*

►*CYLINDER HEAD REMOVAL NOTE: See "Cylinder Head & Manifolds" in Buick Special Data.*

►*CYLINDER HEAD & GASKET CAUTION:* Later type cylinder heads have two 9/16" clean-out holes on push-rod side near edge of end combustion chamber. Holes line up with holes in block but head gasket not punched and gasket failure will reduce cooling efficiency. Buick furnished gaskets are aluminum coated and have sufficient sealing bead at holes to prevent corrosion.

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Aluminum alloy, dome head (with shallow depressions for valve clearance), cam ground, full skirt with transverse slots in oil ring groove.

►*PISTON REPLACEMENT CAUTION:* Same type piston must be used in all cylinders. Use of mixed (different compression ratio) pistons will cause very rough operating engine.

Model	Buick Std. Piston No.
Series 4400 Synchro-mesh	1388536
Series 4400 Auto. Trans. ①	1388542
Series 4400 Auto. Trans. ②	1388541
Series 4600, 4700, 4800 ①	1388538
Series 4600, 4700, 4800 ②	1388539

① - Not used on low compression export jobs.
② - Export low compression jobs.

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with ¼" long dash following Production Code Number (see Engine Number) have .010" oversize cylinder bore and pistons. Standard cylinder bore is 4.125" (4400), 4.1875" (Others).

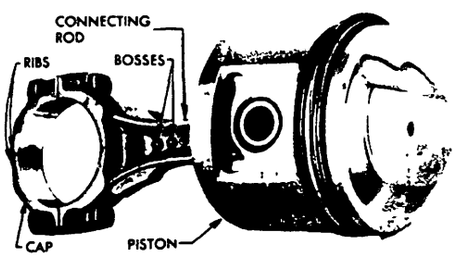
Removal - Pistons and rods removed from above.

►*CAUTION:* Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation. Use Rod Bolt Guides (short guide J-5239-1 on lower bolt, long guide J-5239-2 on upper bolt) to retain bearing shell and assist in pushing assemblies out.

Fitting New Pistons: Clearance .0008-.0014" (4400), .001-.0016" (46,47,4800). Use accurate micrometer and and measure at right angles to piston pin 1/4" from top of skirt. Measure bore approximately 1½" below top of bore at right angles to pin. Block and piston must be at nearly the same temperature.

Replacement Pistons: Standard ("High Limit" or maximum diameter production size) and .001", .005", .010", .020" and .030" Oversize. *NOTE* - Pistons furnished only with fitted pins.

Installing Pistons: Assemble rod in piston with oil spurt notch on same side as valve depressions in piston dome. *See Rod Installation below.*



BUICK PISTON & ROD ASSEMBLY

PISTON PIN

Pins are press fit in connecting rod.
Diameter - .9994-.9997". **Length** - 3.520".
Clearance in Piston - .0002". Finger push fit.
Clearance in Rod - .0007-.0015". Press fit.
Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

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PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.077-.078"	.015-.025"	.003-.005"
Oil	.180-.186"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE:* **364" Eng.** - Install both (identical) compression rings with inner bevel toward bottom of piston. **401" Eng.** - Install compression rings with side of ring up which is either marked with a dimple, a letter "T", a letter "O" or word "TOP". Top ring with inner bevel toward top of piston and second ring with inner bevel toward bottom of piston.

Replacement Rings: Std., .010", .020", .030" Oversize.

CONNECTING ROD

Length - Center to center. (4400) 6.100",(Others) 6.220"

Crankpin Journal Diameter - 2.249-2.250". Out of round limit .0015".

Bearings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.

Clearance - .0002-.0023". Wear limit .003".

Side Play - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020" and .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with spurt notch in lower end of rod and valve depressions in pistons on the high side of cylinder bore. This will bring all spurt notches and valve depressions in pistons toward camshaft. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.

CRANKSHAFT

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* To remove these cap bolts, front of engine must be raised sufficiently to provide clearance. Disconnect front engine mounts and exhaust pipe at manifolds.

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars): See "Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2.499". Five bearings. Out-of-round limit .0015".

Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE:* Bearing upper halves can be rotated out and in by using Tool KMO-734 in oil hole.

Clearance - .0005-.0021".

Replacement Bearings: Furnished Std. and .001", .002". .003" Undersize.

End Thrust: Taken by No. 5 (364"), No. 3 (401") main bearing.

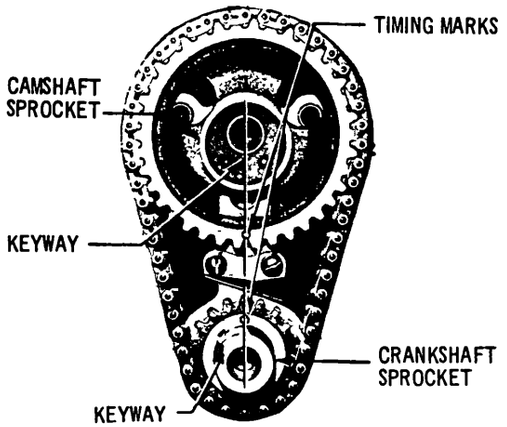
Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*



BUICK VALVE TIMING MARKS

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE:* Grooves cut into land forward of No. 3 bearing journal identify camshafts used as follows: **4400 S.M. (No. 1178587)** - None. **4400 Auto. Trans. (No. 1185378)** - 4 grooves. **46,47,4800 (No. 1185918)** - 1 groove.

Journal Diameters - (1) 1.785-1.786", (2) 1.755-1.756", (3) 1.725-1.726", (4) 1.695-1.696", (5) 1.665-1.666".

Bearings - Steel-backed babbitt lined bushings.

►*BEARING REPLACEMENT NOTE:* Camshaft Bearings must be reamed to size after being pressed into block.

Clearance - .0005-.0035". Service limit .0015-.004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .688". **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: Valve timing is correct when "0" marks on camshaft and crankshaft sprockets are adjacent and in line across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	①	4.785"
Exhaust	1.500	②	4.785"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	③	⑤
Exhaust	45°	④	⑥

① - Top .373", Bottom .3715".
② - Top .372", Bottom .3705".
③ - 4400 Synchro-mesh - .403", All Others - .439".
④ - 4400 Synchro-mesh - .403", 4400 Auto Trans. .439", Others - .441".
⑤ - Top .001-.003", Bottom .0025-.0045".
⑥ - Top .002-.004", Bottom .0035-.0055".

Valve Seat Width - 1/16" average (3/64-5/64").

►*VALVE GRINDING CAUTION:* Normal height of valve stem above rocker arm gasket surface is 1.540". When valve facing or seat grinding raises valve stem height more than .050" above normal, grind off end of valve stem or replace valve.

Valve Springs: Inner and outer springs used on all valves. Install with closed coils against cylinder head.

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	23-28	1.69"	39.5-44.5	1.60"
Open	73-79	1.25"	93-99	1.16"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3..

Hydraulic Valve Lifters: Barrel type.

Diameter - .8425". **Clearance in Block** - .0015-.003".

Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Series 4400 Synchro-mesh (Camshaft 1178587)

Intake Valves - Open 25° BTDC. Close 77° ALDC.
Exhaust Valves - Open 65° BLDC. Close 37° ATDC.

Series 4400 Dynaflow (Camshaft 1185378)

Intake Valves - Open 35° BTDC. Close 73° ALDC.
Exhaust Valves - Open 73° BLDC. Close 37° ATDC.

Other Series (Camshaft 1185918)

Intake Valves - Open 33° BTDC. Close 77° ALDC.
Exhaust Valves - Open 75° BLDC. Close 44° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: "See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcase Capacity: 5 qts. (refill), 6 qts. (dry engine). Add 1 qt. with filter change.

Normal Oil Pressure: 40 lbs. at 1600 RPM.

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Indicator: Oil pressure warning light on instrument panel and oil pressure switch in oil gallery at right rear of engine. Lights when oil pressure drops below safe level. *NOTE* - Light comes on when ignition switch turned on, goes out after pressure builds up, and may come on at idle speed

Engine Unit - AC No. 1508753.

Oil Pump: Spur-geared type oil pump mounted at rear end of crankcase and driven by distributor drive shaft.

Oil Pump Removal & Overhaul - *See "Oiling System" in Buick Special Data.*

Oil Filter: AC full-flow type, mounted at right rear of engine. *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

Replacement Filter Element - AC PF-5.

►*OIL FILTER INSTALLATION CAUTION:* DO NOT use a wrench to tighten filter. Tighten by hand until gasket contacts sealing face, then tighten an additional 2/3 turn of the element. This supersedes previous installation instruction.

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Crankcase Ventilation: Air enters through two ventilating type filter caps at top of each rocker arm cover. Air is drawn out through metal gauze filled filter located at rear end of valve lifter cover and ventilator pipe extending down from lifter cover.

COOLING

►*AIR CONDITIONED CAR FAN NOISE CORRECTION:* If objectionable noise occurs in moderate temperature seasons, rotate thermo-spring tab clockwise to right slot (viewed from front of car).

►*FAN DRIVE CLUTCH (AC CARS) PRODUCTION CHANGE:* New clutch with longer shaft and thicker coupling used on later cars. Eliminates need of fan spacer. New clutch with attaching bolts included in Kit No. 1389419 and Air Conditioner Package.

►*FAN VIBRATION (AC CARS) CORRECTION:* When vibration occurs at approximately 75 MPH (3000 RPM) check the following: 1) Bent fan, fan rib interference with housing, nicks or burrs on fan spacer, excessive paint or burrs on pulley mounting face, or any item that might cause fan runout.

2) Remove spacer. If vibration eliminated or improved, rotate spacer 90° or replace spacer.

3) Substitute fan or clutch to determine item causing vibration.

Temperature Control Fan Clutch (AC Cars): Air Cond. cars are equipped with 21" fan having a torque sensitive fan clutch. Flow of silicone (governing fan speed) controlled by temperature sensitive coil. When air through radiator is 80°F or below, fan speed is 800-1200 RPM. At higher temperatures speed of fan increases to a maximum of 2100 RPM.

Fan Clutch Adjustment - Normal position is in center slot of tab. For hotter fan cut-in, place spring end in right hand slot (facing engine). For colder fan cut-in, place spring end in left hand slot (facing engine). To reposition spring, bend retaining tab just enough to move spring.

Water Capacity: 16.5 qts. (Std.). Add 1½ qts. for heater.

Pressure Valve: Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Poppet type (30,000 cars), pellet type (others). located in water manifold above pump. *NOTE* - If difficulty experienced with poppet type, replace it with either Part No. 1389275 (170°F), or 1391225 (180°F) as required.

Water Pump: Packless, sealed ball bearing type with aluminum housing and replaceable seal.

See "Water Pumps" in Buick Special Data.

Pump Removal - Drain cooling system, loosen belts and remove fan blade, spacer and pulleys from water pump hub on pump shaft. Remove belts. Disconnect hose from pump inlet and heater hose from nipple. Remove bolts, then remove pump assembly and gasket from timing chain cover.

Temperature Indicator: New TWO light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 110°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 248°.

NOTE - Red light circuit is connected to Oil Pressure sender line through a vacuum switch so that the light will come on when the ignition switch is turned on (this checks bulb and circuit each time engine is started). As soon as engine starts and manifold vacuum builds up, vacuum switch opens this circuit and red light will go out. Temperature indicator then functions as above. *See "Temperature Gauges" in Miscellaneous Section.*

►*TEMPERATURE INDICATOR VACUUM SWITCH LOOSENING CORRECTION:* Correct by installing a 10-24 x ¼ round head slotted machine screw in switch mounting button fingers. DO NOT overtighten screw or switch will break.

CLUTCH

Long 11CF. Single plate, semi-centrifugal type.

See "Long" clutches in Clutch Section.

Pedal Adjustment: Free play 1 1/8-1 1/4". For adjustment procedure *see "Clutch Notes" in Buick Special Data.*

Removal: Remove rear axle and transmission (see below), remove flywheel lower housing. Disconnect release rod from yoke, remove boot. Remove spring washer which retains release bearing support and remove support. Pull yoke outward to release it from ball stud, remove yoke and release bearing through bottom of housing. Remove clutch cover screws uniformly to release spring tension after marking cover and flywheel for reinstallation. *NOTE* - Metal spacers placed between release levers and inner edge of clutch will aid removal and installation. Remove cover assembly and driven plate.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.

See "Buick Synchro-mesh" Transmission in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect rear axle assembly. *CAUTION - Use torque tube guide pins to prevent damaging torque tube seal.* Drain transmission, remove torque ball retainers and torque ball. Disconnect speedometer cable and disconnect shift rod and selector rod from levers on transmission. Pull clutch release rod sideways to release it from yoke clip. Loosen dual exhaust system ball joints at both manifolds. Disconnect single exhaust system front to rear exhaust pipe ball joint. Disconnect transmission mount at transmission support. Leave mount bolted to transmission. Place jack under rear of engine pan to support engine. Place another jack under transmission. Raise engine and transmission to relieve load on support and remove support from frame noting number and location of shims. Remove upper two transmission to flywheel housing bolts, install Guide Pins J-851-A and remove lower bolts. Lower engine and transmission as an assembly until rear bearing retainer will clear frame crossmember. Move transmission to rear to clear main drive gear from flywheel housing and lower transmission to floor. *See NOTE following.*

►*SYNCHRO-MESH TRANSMISSION REMOVAL NOTE:* Disconnect clutch equalizer at either the frame or the engine to prevent damaging idle lever-to-equalizer rod and causing bind in clutch control linkage.

DYNAFLOW DRIVE TRANSMISSION

"Twin Turbine" automatic drive of same design used previously.

►*SLOW SHIFT TO STATOR HIGH ANGLE CORRECTION:* Make sure throttle and stator linkages are correctly adjusted. *See "Throttl Linkag Adjustment" under CARBURETOR abov .*

►*FRONT PUMP SEAL DAMAGE NOTE:* Caused by burrs, sharp edges and corners on converter pump hubs. For corrective procedure, *see "Buick (Twin Turbin) Dynaflow Drive Transmission" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Buick (Twin Turbine) Dynaflow Drive Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Buick (Twin Turbine) Dynaflow Drive Transmission" in Transmission Section.*

Lubrication - Check fluid level every 1,000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type A.

Checking Fluid Level - Check with engine idling, selector lever in "P" position and transmission at normal operating temperature. Maintain level at "FULL" mark on dipstick, add oil if level 1" below "FULL" mark on dipstick. Approximately 1 pint fluid required between "ADD" and "FULL" marks.

Capacity - 12 qts. All Dry transmission 13¾ qts.

Throttle Linkage Adjustment & Dashpot Setting: *See CARBURETOR above.*

►*OTHER DYNAFLOW DRIVE SERVICE DATA: See "Buick (Twin Turbine) Dynaflow Drive Transmission" in Transmission Section.*

UNIVERSALS

Saginaw & Spicer. Saginaw (Front), Saginaw or Spicer (Rear). Front joint enclosed in torque ball, rear joint enclosed in torque tube. Front joint lubricated by transmission. Rear joint requires no lubrication in service.

►*U-JOINT INSTALLATION CAUTION:* U-Joint omitted splines (two points 180° apart) must be aligned with blind splines on propeller shaft. This will provide correct relationship of front and rear universals and prevent drive line vibration.

►*REAR PROPELLER SHAFT LUBRICATION NOTE:* Lubricate propeller shaft coupling and splines (when assembling) with type "O" (non-fibrous) chassis lubrication and pack cavity beyond spline about 2/3 full of grease. *CAUTION* - DO NOT plug vent hole in propeller shaft welch plug when servicing as excess grease will accumulate in torque tube ahead of access hole. Limit power grease gun to one shot.

REAR AXLE

Own. Semi-floating hypoid gear type and torque tube drive. "Power-Lock Differential (Plate Clutch Type)" optional.

►*REAR AXLE LUBRICANT NOTE:* Flushing & Seasonal changes not recommended for either type axle. Maintain fluid level at filler opening. Use Factory Hypoid Gear Lubricant in standard axle. Use Buick Spec. No. 723-TL-1000 Lube in optional axle.

See "Buick Hypoid" or "Power-Lock Differential (Plat Clutch Type)" in Rear Axle Section.

Axle Ratios

Model	Synchro-mesh	Auto. Trans.
4400 (2-Bbl.)	3.91-1①	3.07-1
All Others		3.23-1
Export	3.91-1	3.36-1

① - Some early Series 4400 cars have 3.58-1 Ratio.

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Form 23 B

CONTINUED FROM PRECEDING PAGE

►*AXLE IDENTIFICATION NOTE:* Ratio stamped on bottom of axle housing. An "X" inside a circle next to number indicates "Positive Traction" type axle. This type also identified by lubrication caution tag next to filler plug opening.

Backlash - .007-.009".

Axle Shaft Removal: Place stands under rear axle so wheels clear floor, then remove wheel and drum. Remove wheel bearing retainer plate-to-backing plate nuts (leave bolts in place to support backing plate). Use Puller J-6176 with Slide Hammer to pull axle assembly. Replace two backing plate nuts finger tight to hold plate in place.

Rear Axle Assembly Removal: Raise car and place stands under frame, then place floor jack under center of rear axle housing. Disconnect lower end of rear springs. Disconnect track bar at axle end and lower ends of rear shock absorbers. Disconnect parking brake cable at rear cable sheave and at bracket on torque tube. Disconnect brake hose from pipe on torque tube bracket and remove yoke. Cover hose and brake pipe openings. Remove two opposite torque tube flange bolts and insert two 3" guide pins. Remove other flange bolts. Roll rear axle assembly from car

Wheel Bearing Adjustment: None required.

Torque Ball Adjustment: None required

SHOCK ABSORBERS

Delco. Direct acting, hydraulic (front and rear). Front shock absorbers mounted inside front spring with upper stem attached to frame The lower insulated bracket is bolted to spring seat Rear shock absorber mounted on an angle with upper end "in" and attached to frame bracket. Lower end attached to bracket on rear axle housing.

►*SHOCK ABSORBER INTERCHANGEABILITY NOTE:* Front shock absorbers are interchangeable right and left. Rear shock absorbers are interchangeable right and left

Buick Shock Absorber Nos.

Model	Front	Rear
Pass. 44,4600	①5552328	③5552329
Pass. 47,4800	②5552327	④5552330
Sta. Wgns.	5552327	5552332

① - 5552327 Export. ② - 5552331 Export.
③ - 5552330 Export. ④ - 5552332 Export.

FRONT SUSPENSION

Independent. "Ball-Joint" suspension with direct acting shock absorbers within coil springs Side roll is controlled by spring steel stabilizer shaft.

See "Buick Front Suspension" in Suspension & Wheel Alignment Section.

►*SPECIFICATION NOTE·* All measurements except toe-in are taken with alignment pipe pins (3/4" pipe 4 15/16" long) placed between frame and lower control arm at each front wheel.

Steering Axis Inclination - 7° at ¾° camber.

Caster - Neg. 2°±¾°. Both sides equal within ¾°.

Camber - Pos. 1° to Neg. ½° Pos. ½° preferred. Both sides equal within ¾°.

Toe-In - 1/16-5/32".

Toe-Out on Turns - With outer wheel at 20° inner wheel should be 23° (Manual steering), 22° (power steering).

Wheel Bearing Adjustment: Tighten spindle nut to 30 ft lbs torque while rotating drum to seat bearings Back off nut and retorque to 12.5 ft lbs., then back off to nearest cotter pin hole if necessary.

REAR SUSPENSION

Coil type springs mounted between frame crossmember at top of kick-up and seats welded to axle housing. Side sway is prevented by transverse track bar. *See "Buick Rear Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut type

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (Rotary Valve) Hydraulic. *See "Saginaw (Rotary Valve) Power Steering" in Steering Section.*

►*POWER STEERING GEAR PRODUCTION CHANGE:* New rack piston used on later cars *See "Saginaw (Rotary Valve) Power Steering" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). Conventional two shoe with short lining (primary), longer lining (secondary). Aluminum brake drums with cast iron liner used on all series front brakes. Parking "Step-On" pedal applies rear service brakes.

See "Bendix Hydraulic (Without Eccentric)" Brakes in Brake Section

►*PARKING BRAKE NOTE·* For "Pedal Sticking" and for "Cable Rattle" Corrections, *see "Bendix Hydraulic (Without Eccentric) Brakes" in Brake Section.*

Drums - Aluminum brake drums with cast iron liner used on all front brakes. All rear brake drums are cast iron with steel disc.

Drum Diameter - 11 999-12.007".

►*BRAKE DRUM REBORING NOTE.* When a drum will not clean up when rebored to a diameter of 12.080" replace drum.

Wheel Cylinder Diameters - Front 1 1/8". Rear 1".

Lining - Primary and secondary linings are of different material and different length and are not interchangeable. Molded linings are riveted to the shoes.

Replacement Linings - Lining and Shoes with Linings furnished Std. and .030" Oversize.

Lining Length & Width

	Front Wheels	Rear Wheels
Primary	10.040"x2.50"	10.040"x2.25"
Secondary	12 959"x2.50"	12.959"x2.25"

Thickness - .265" front wheels, .220" rear wheels

Braking Power - 56% front 44% rear.

Clearance - Adjusting screw backed off 15 notches from point where wheel can just be turned by hand

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid - Maintain fluid level ½" to 1" below top of filler opening.

Removal - Remove stop light switch connector. Disconnect brake pipe at master cylinder and brake pedal pushrod by removing locknut, then remove shoulder bolt and spring washer. Remove four master cylinder-to-dash panel mounting nuts and remove master cylinder.

►*MASTER CYLINDER VENT HOLE LEAK CORRECTION·* Caused by loose deflector in filler plug. To replace deflector in plug, expand it by tapping it on the bottom and redriving it in plug.

►*PARKING BRAKE PEDAL STICKING CORRECTION:* May be caused by return spring too long. To correct, straighten each end of spring and cut ½" wire from each end (reducing spring length 1"). Reform ends. Also make sure front cable clevis does not bind on kick-pad screw. Remove screw to correct. Later production cars have these corrections.

►*PARKING BRAKE RELEASE HANDLE FAILURE TO RETURN TO "UP" POSITION CORRECTION:* Caused by improper return spring attachment. To correct, make a 180° bend on upper tang of spring so it points downward, and is parallel to spring coils.

Power Brakes: Moraine Power Brake Unit. Power unit replaces conventional master cylinder.

See "Moraine Hydraulic (Diaphragm) Reaction Type Power Unit" in Brake Section.

Removal of Power Unit - Remove stop light switch connector and brake pipe from master cylinder. Tape end of pipe. Remove retainer and washer from brake pedal pin and disengage pushrod eye Remove airsilencer from power cylinder air intake and remove nuts holding power brake unit to dash panel Disconnect vacuum hoses at vacuum tee and remove power unit from car

MISC. MECHANICAL

Windshield Wipers: Single and 2-speed electric, link operated type.

See "Windshield Wipers" in Miscellaneous Section.

►*WINDSHIELD WIPER CHATTER CORRECTION:* Caused by blade being set too low in parked position. For adjustment, *see "Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electric type with a single reversible type motor for each window.

See "GM Electric Window Regulators" in Miscellaneous Section.

Power Seat Control (2-Way): Electric type with single reversible type motor for horizontal adjustment.

See "GM 2-Way Seat Controls" in Miscellaneous Section.

Power Seat Control (4-Way)· Electric type with single motor for vertical and horizontal adjustment.

See "GM 4-Way Seat Control" in Miscellaneous Section.

►*4-WAY SEAT CONTROL REVERSED OPERATION CORRECTION (Early Cars):* When pink and yellow wires in harness connector are reversed. switch will operate in opposite direction of seat movement. For correction, *see "GM 4-Way Seat Control" in Miscellaneous Section.*

Power Seat Control (6-Way): TWO types used· **1)** Three motor type (separate motor for each movement). **2)** One-motor type (with 3 solenoid clutches).

See "GM 6-Way Seat Control" in Miscellaneous Section

Power Top Control: Hydro-Lectric with reversible pump motor

See "Power Top Control" in Miscellaneous Section

Air Conditioning: "Frigidaire & Harrison" with all components located in or ahead of dash.

See "Frigidaire & Harrison" in Miscellaneous Section.

TIGHTENING SPECIFICATIONS

1954-60 MODELS

	Ft. Lbs.
Cylinder Head	65-70
Int & Exh. Manifold	25-30
Oil Pan Screws	10-12
Oil Pan Nuts	15-18
Main Bearing Caps	90-100
Con Rod Caps	40-45
Camshaft Sprocket	15-18
Water Pump Mounting	25-30
Oil Pump Mounting	25-30
Rocker Arm Cover (1954-Early 57)	20-25 inch lbs
Rocker Arm Cover (Late 1957-60)	35-40 inch lbs
Flywheel (1954-55)	80-85
Flywheel Drive (Flex) Plate (1956-60)	75-80
Flywheel Housing (Upper)	45-50
Flywheel Housing (Lower)	25-30
Vibration Dampener (1954-57)	60-65
Vibration Dampener (1958-60)	65-70

ENGINE

1954-56 MODELS

ENGINE REMOVAL (WITH TRANSMISSION IN CAR): *(CAUTION—If car is equipped with Air Conditioning, see Air Conditioning Section for precautions to take when removing equipment or disconnecting refrigerant lines)* Proceed as follows

1—Drain cooling system crankcase and transmission Remove hood top panel (see Hood Removal above) Disconnect battery and wires from generator Remove upper and lower radiator hoses and remove radiator core

2—Disconnect power steering pump to valve body hoses at pump and install caps on fittings to prevent oil leakage Disconnect refrigerant lines (See Air Conditioning Section) Disconnect all heater hoses at water pump and remove right heater hose from thermostatic valve

3—If car is equipped with power brakes, disconnect vacuum line at intake manifold Remove carburetor air cleaner, disconnect throttle linkage and fittings and remove carburetor Disconnect flexible fuel line at fuel pump and remove line from clips Disconnect ground straps, primary wire at distributor, oil pressure and cooling system temperature switch wires Disconnect wires at porcelain resistor

4—Disconnect windshield wiper vacuum hoses at manifold line and vacuum pump line Raise front of car and install stands

5—Disconnect propeller shaft at rear axle and remove assembly from car by sliding yoke out of transmission extension housing Remove transmission linkage slush deflector, and disconnect speedometer cable and shift linkage at transmission Remove starter from car

6—Disconnect front engine supports at frame Disconnect exhaust pipes from exhaust manifold Remove idler arm support screws from frame and lower idler arm and steering connector link Loosen hand brake cable at relay Remove stands from front of car and lower car to floor

7—Install a chain or rope around intake manifold and attach chain hoist above engine Take up all slack and then remove rear engine support bracket from frame and extension housing Lift engine, with transmission out of car

1957-60 MODELS

ENGINE REMOVAL (WITH TRANSMISSION): *CAUTION - Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section* Proceed as follows

1) Drain cooling system crankcase and transmission Remove hood top panel disconnect battery and wires from generator Remove upper and lower radiator hoses and remove radiator core

2) Disconnect power steering pump to valve body hoses at pump and install caps on fittings to prevent oil leakage Disconnect refrigerant lines see Caution above Disconnect all heater hoses at water pump, power brake vacuum line at intake manifold Remove carburetor air cleaner disconnect carburetor linkage and fittings and remove carburetor

3) Remove transmission linkage slush deflector flexible fuel line at steel fuel line engine to cowl ground straps primary wire at coil oil pressure and cooling system temperature switch wires Remove coil and disconnect black wire to porcelain resistor Disconnect windshield wiper vacuum hoses at manifold and vacuum pump line

4) Remove two center-bearing-support to frame bolts (Nuts are tack welded and should remain fastened to support) "U" bolts and locks at rear axle pinion slide propeller shaft and front yoke off transmission main shaft and through frame tunnel section DO NOT nick yoke Remove intermediate support

5) Remove wires from starter and disconnect exhaust pipe at exhaust manifolds Disconnect front motor support screws at frame idler arm support screws from frame and lower idler arm and steering connecting link

6) Install rope or chain around intake manifold attach hoist and take weight off engine Disconnect and remove rear engine support bracket from frame and extension housing, lift engine with transmission out of car

ENGINE BALANCING

ENGINE BALANCE CHECK & UNBALANCE CORRECTION: 1) – Connect a tachometer to engine and run engine at progressively higher speeds (with transmission in neutral). Note degree of vibration at various speeds.

2) – If greatest vibration is noted at approximately 2800 RPM, either the torus cover, flywheel, or flex plate may be out of balance. To correct, add a washer under one of the four flex plate-to-flywheel attaching nuts. Recheck for vibration. If the addition of the washer increases vibration, remove washer and place it under one of the other three attaching nuts until the best over-all balance is obtained. In order to perfect the balance, it may be necessary to add additional washers under other flywheel-to-torus cover attaching nuts in the area of the first washer.

3) – If greatest vibration is noticed at 3500 RPM, the flywheel or flex plate may have excessive lateral runout. Check runout as follows: Remove transmission and inspect flywheel for weld spots which may hold flex plate away from the flywheel.

4) – Mount a dial indicator on rear of engine. Rotate flex plate to check each leg for runout on the surface that contacts the flywheel. The total runout at this point should not exceed .010". If the runout is in excess of .010", use the flex plate leg which is the most rearward as a standard. Then bend back the legs that are too far forward until they are within .005" of standard leg. *NOTE* – Be sure to bend the complete leg, 5) – Install transmission. Tighten flex plate-to-wheel nuts alternately to 5 ft. lbs. Then, tighten to 15-20 ft. lbs. Recheck engine for vibration. If vibration continues to exist at 3800 RPM, the flywheel and torus assembly have excessive runout and should be replaced.

***NOTE:* The flex plate checking procedure should be followed whenever transmission is removed**

1959-60 ENGINE VIBRATION CORRECTION: When engine vibration occurs between 1200-1500 RPM (with cruising loads) at speeds of 30-40 MPH (Dr-4), and 20-25 MPH (Dr-3), first prove that vibration is in engine as follows

1) Check that car speed, for peak vibration, changes when selector lever moved from Dr-4 to Dr-3.

2) Remove belts (one at a time) to isolate possibility that a belt may be affecting the vibration.

3) Produce the vibrations (with car standing still) by either stalling in drive range or fast idling in Neutral.

4) Tighten all mounting bracket screws for all belt driven units (generator, steering pump or air compressor).

If engine vibration definitely present, proceed as follows:

1) Raise car on hoist and install a softer rubber Rear Engine Mount Part No. 3631552 (with cushion production number 1473590). Also use late type Retainer No. 1473638. Above items used in production beginning with Engine No. 032750.

2) Remove front mounting nut and washer and use mirror to check for stud binding or mount deflection. *NOTE* - Upper and lower grooves on underside of mount should be of equal width and stud should not bind against edge of hole in frame crossmember. Use one or more 1/16" body shims, Part No. 1431879, to elevate engine when bind is indicated by shiny spot on stud.

3) When above procedures do not eliminate the vibration, loosen, all exhaust pipe clamps, run engine until all pipes are hot and normalize alignment. Insert a thin shim between underside of each pipe at No. 4 frame outrigger and lower edge of hole in rectangular tire carcass support to eliminate any load from tire carcass after clamps are tightened.

OIL PAN

1954-55 MODELS

OIL PAN REMOVAL: Remove oil level indicator, exhaust cross-under pipe nuts, pipe, gaskets, and manifold heat control valve. Take off starter and lay on frame side rail. Remove two oil pan nuts and eighteen screws, take off oil pan

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Oil Pan Installation: Cement new pan gaskets to pan, install new cork seals in rear main bearing cap and engine front cover with ends of seals seated in grooves. Coat each end of pan gaskets with chassis grease so that ends will slip over front and rear seals. Position pan over two studs on left side of crankcase, then raise right side and insert two pan screws opposite the two studs, put on washers and nuts on two studs. Tighten remaining screws, tightening two screws and nuts originally installed last.

1956-58 MODELS

OIL PAN REMOVAL: Drain engine oil, and remove oil level indicator. Disconnect battery ground strap and wires from starter solenoid. Remove starter motor assembly. Remove idler arm support screws and lower support from frame side bar. Remove water hose and clip from center of crossmember. Remove oil pan screws and nuts and remove oil pan.

Oil Pan Installation: Install new cork seals in rear main bearing cap and in front cover, being sure ends of gaskets are in recess provided for them. Cement pan gaskets to both sides of pan, being sure holes in gasket line up with holes in pan. Place a small amount of chassis grease on each of the four corners of gasket which hang over front and rear cutouts, which will permit pan to slide over corks and insure a good seal. Place pan in position on bottom surface of cylinder block over the four studs, and install nuts and lockwashers loosely. Install remaining screws and tighten screws and nuts in rotation to torque specifications. Complete installation by reversing removal procedure.

CYLINDER HEAD & MANIFOLD

1954-56 MODELS

CYLINDER HEAD INSTALLATION: Use a Torque Wrench and tighten cylinder head capscrews starting from the center row of bolts and working outward and toward each end.

►*CYLINDER HEAD TIGHTENING CAUTION—Loosen intake manifold before checking the cylinder head capscrew torque. This will prevent the upper row of screws from being under-torqued due to the bridging effect of the manifold.*

Cylinder Head Gasket. Install with side stamped "Top" UP

Cylinder Head Capscrews. 8 short screws in outside row, 5 medium length screws in center row, 4 long screws at rocker arm shaft.

Tightening Torque. See Tightening (Torque Wrench) Specifications.

1957-60 MODELS

CYLINDER HEAD REMOVAL: There are six lengths of cylinder head screws used. Carefully note length and position of each cylinder head screw for correct reinstallation.

CYLINDER HEAD INSTALLATION: Use a Torque Wrench and tighten cylinder head capscrews starting from the center row of bolts and working outward and toward each end.

Cylinder Head Gasket - Install with side stamped "Top" UP.

Tightening Torque - See Tightening (Torque Wrench) Specifications.

ORIGINAL BORE & PISTONS

1954-55 MODELS

ORIGINAL PRODUCTION ENGINE BORE & PISTON SIZES: Piston and cylinder size variation indicated by letter ("A" through "M") stamped on top of block at outer edge of cylinder bore. Each letter indicates two sizes ("—" if letter to left of bore, "+" if to right of bore center). These letters used in production for selective fitting of pistons.

►*1954-55 OVERSIZE BORE NOTE:* An asterisk, placed before the engine unit number, indicates that cylinders bored .010" Oversize. Cylinder size variation is stamped to right and left of cylinder bore with a double letter "AA," "BB," etc., as indicated for standard size bore above.

1956-60 MODELS

ORIGINAL PRODUCTION ENGINE BORE & PISTON SIZES: Piston and cylinder bore size indicated by a letter ("A" through "M", 10 sizes), stamped on top face of block either to right or left of each cylinder bore. Sizes range from 4.0000-4.0002" to 4.0018-4.0020" (Cylinder Size), 3.9985-3.9987" to 4.0003-4.0005" (Piston Size). Only "L" and "M" piston sizes available for service. *NOTE* - An "AA" indicates .010" oversize over letter "A" for example: 4.0100-4.0102" (Cylinder Size), 4.0085-4.0087" (Piston Size).

PISTONS

ALL MODELS

REPLACEMENT PISTONS (WITH FITTED PIN): Furnished in Standard size, .010", .020", .030" Oversizes.

ALL MODELS

FITTING NEW PISTONS: Pistons should be fitted by Micrometer Gauge Method or Feeler Gauge Method as described below. Measure piston for clearance ⅛" below horizontal slot of "T" slot.

Piston Skirt Clearance

Engine	Side Clearance
1954	.0015"
1955	.0009"
1956-60	.0015"

Micrometer Gauge Method:—Measure cylinder bore with micrometer gauge at point 1¼" below top edge and at right angles to crankshaft. Set inside micrometer at cylinder bore size, **then measure this gauge length with same outside micrometer used to measure piston.** This method will eliminate any error introduced by using different gauges to measure cylinder and piston. Use outside micrometer to measure piston diameter at upper corner of 'T' slot (adjacent to 'T' slot and ⅛" below horizontal slot).

►*TEMPERATURE VARIATION NOTE:* Skirt clearance shown above is for block and piston at 70°F. Subtract .0001" (or add 2/5 Lb. pull on feeler gauge) for each 6° increase in piston temperature above 70°F. Add .0001" clearance (or subtract 2/5 Lb. pull) for each 6° decrease in piston temperature below 70°F.

Feeler Gauge Method:—Use ½" feeler stock .002", .0025", or .003" thick (see Feeler Gauge Note and table below) on side of piston directly over 'T' slot (center feeler on slot) with lower rounded end of feeler extending ½" down on piston skirt past horizontal slot (feeler must not extend further down on piston skirt because skirt is tapered with greater diameter at bottom). Install piston and feeler in cylinder with piston right side up and feeler toward side, measure pull required to withdraw feeler. Pull will vary in accordance with thickness of feeler gauge used and with piston temperature. See table below for correct pull for each feeler gauge thickness to obtain proper skirt clearance listed above.

Feeler Pull (In lbs.)	.002" Feeler	.0025" Feeler	Piston Clearance (70°F) .003" Feeler
1	.00225"	.00275"	.00326"
2	.002"	.00252"	.00304"
3	.00175"	.00228"	.0028"
4	.0015"	.00205"	.00258"
5	.00125"	.00182"	.00235"
6	.001"	.00157"	.00213"
7	.00075"	.00133"	.0019"
8	.0005"	.00125"	.00175"
9	.00025"	.000875"	.0015"

Feeler Gauge Note—Feeler gauges used for piston clearance measurement should be clean and smooth with lower end rounded. Rusted or wrinkled feelers should be discarded and rough edges should be honed to prevent scratching cylinder wall.

PISTON PINS

1954-59 MODELS

PISTON PIN FITTING: *(NOTE—Special tool J-3848 is required to fit pins to connecting rods).* See following for Removal and Installation:

Removal—Install pilot of tool J-3848 on puller screw and insert this assembly through piston and pin from side of piston stamped "REAR." Install support (part of tool J-3848) over puller screw with small end of support against front side of piston (side opposite to that stamped "REAR"). Install nut loosely on puller screw and place assembly in arbor press with support positioned over slot in press table to allow screw to extend down. Press piston pin out of piston and rod assembly. Remove tool from piston and rod.

Installation—Lubricate pin holes and install pilot (part of tool J-3848) through piston and rod, lubricate pin and insert it in piston pin hole on "REAR" side of piston. Install puller screw through pin and pilot from "REAR" side of piston. Insert spacer (part of tool J-3848) between connecting rod and front side of piston until it is seated on the pilot. Install support over puller screw with smaller end toward front of piston (opposite to side stamped "REAR"). Mount piston and tool assembly in vise with side of piston stamped "REAR" down and flats of puller screw gripped in vise. Install nut on threaded end of puller and tighten with torque wrench to start piston pin into connecting rod.

(CAUTION—If pin can be started into rod with less than 15 ft.lbs. minimum torque, the clearance between piston pin and rod is excessive and either the piston and pin assembly or connecting rod must be replaced). Remove assembly from vise and install in arbor press with large side of support down. Install collar (part of tool J-3848) over piston pin and

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press puller screw down until top of pin is level with top of collar *REMOVE COLLAR and SPACER* Pin will be projecting slightly from rod, and must be guided into pin boss next to support to assure correct alignment When aligned, press pin in until pilot bottoms in support This properly positions pin in rod

1960 MODELS

PISTON PIN FITTING: *NOTE* - Special Tool J-8390 is required to fit pins to connecting rods. See following for removal & installation:

Removal - Place Piston Pin Support J-8390-3 on arbor press and place piston assembly on support with "REAR" mark resting on support. Insert pilot end of Remover J-8390-1 into piston pin and press pin out of piston. *NOTE* - Keep pins in order for reinstallation.

Installation - Lubricate piston pin and holes in piston, place Support J-8390-3 on press with Spring J-8390-4 and Spacer J-8390-2 in position on support. Place connecting rod on its respective piston with "REAR" mark on piston toward rear of engine with number on lower end of rod down. *NOTE* - Nos. 1,3,5,7 are in left bank, 2,4,6,8 in right bank. Place assembly on Support and place pin in piston. Place Pin Remover & Installer J-8390-1 on piston pin and press pin in until it bottoms on spacer in Support.

PISTON RINGS

ALL MODELS

REPLACEMENT PISTON RINGS: Rings are furnished separately and in complete sets as follows: Standard size, .010", .020", .030" Oversize.

CRANKSHAFT & MAIN BEARINGS

1954-56 MODELS

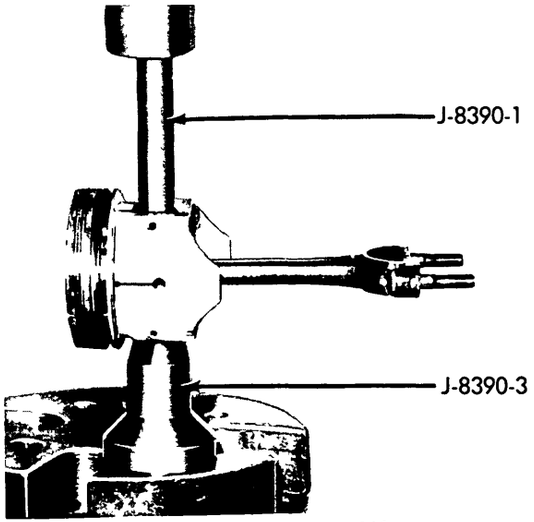
CRANKSHAFT REMOVAL (Engine in Car): Jack up all four wheels and install a stand at each wheel. Drain crankcase and cooling system. Remove oil pan (see Oil Pan Removal), oil pump (see Oil Pump Removal), timing chain (see Timing Chain Removal), and flywheel (see Flywheel Removal). Take off steering idler at right frame side bar and lower linkage to floor. Remove spark plugs. Take off rod caps and push rod and piston assemblies up into bores to clear shaft. Remove front and rear main bearing caps, support shaft at front and rear and remove three remaining caps, lower shaft out of engine.

1957-60 MODELS

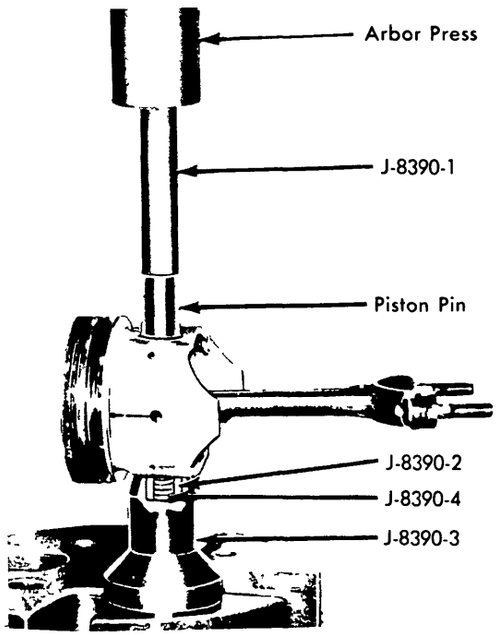
CRANKSHAFT REMOVAL (Engine in Car): Place stands under car at all four wheels Remove timing chain and sprockets Remove transmission and flywheel flex plate Remove steering gear idler arm from right frame side bar and lower steering linkage to floor Remove oil pan, oil pan baffle and oil pump Remove spark plugs disconnect connecting rods and push piston assemblies up into cylinder bores Remove front and rear main bearing caps support crankshaft at front and rear and remove three remaining bearing caps Lower crankshaft

1954-60 MODELS

MAIN BEARING REMOVAL: Upper bearing halves can be rotated out with flattened cotter pin inserted in oil hole in crankshaft and turning shaft



PISTON PIN REMOVAL



PISTON PIN INSTALLATION

clockwise. Crankshaft does not have to be taken out. Installation—Reverse removal instructions given above. *CAUTION*—Do not interchange caps. Install caps with marking numbers (not casting nos.) on left side and in order from front-to-rear of engine.

1954-60 MODELS

REAR MAIN BEARING OIL SEAL: Wiper seal installed in rear groove in bearing cap and block (oil slinger operates in front groove).

Oil Seal Installation (1954-Early 1958) - With crankshaft out of engine (See Crankshaft Removal), and bearing cap off, install length of new packing in groove in block. Use Tool J-3048 (1954-55), J-6349 (1956-Early 1958) and drive seal in place. With tool in place, cut off each end of packing **flush (1956), 1/64" above bearing edge (1957-Early 1958).** Repeat operation for bearing cap. Use arbor press or vise to press packing into place.

Oil Seal Installation (Late(1958-60) - *NOTE - Late type uses rubber seal which can be replaced without removing crankshaft and both halves are identical.*

1) Rotate new seal into position in block, then apply pressure at both ends of seal to insure that it is protruding uniformly on each side.

2) Install lower half of seal in bearing cap with lip of seal facing forward, and with one end of seal over ridge and flush with split line. Hold this end from slipping, and push seal into seated position by applying pressure at other end. Press seal down firmly so that it protrudes uniformly on each side. *CAUTION* - Do not damage sealing edge by applying pressure to seal lip.

3) Apply .010" thick coat of rubber cement to cap and block at ends of seal but do not permit cement to adhere to lip of seal. Lubricate lip of seal with thin film of engine oil.

4) Install bearing cap with bolts finger tight, then adjust cap. *See "REAR MAIN BEARING INSTALLATION CAUTION" below.* Turn crankshaft to assure that there is no bind.

►*REAR MAIN BEARING INSTALLATION CAUTION:* For proper alignment of thrust surfaces of rear main bearing proceed as follows: Install upper and lower inserts in block and bearing cap. With rear oil seal in place and mating surfaces clean, install bearing cap and tighten screws to 1-2 ft. lbs. torque. Using a plastic hammer, drive crankshaft forward, then rearward, then forward again (*CAUTION* - Pound on counterweights, not on connecting rods). Tighten bolts evenly to specifications. Check to make sure crankshaft is not binding.

CAMSHAFT & BEARINGS

1954-60 MODELS

CAMSHAFT REMOVAL: Remove Air Conditioner Condenser, *see "Air Conditioning" in Miscellaneous Section.* Remove radiator, timing chain and sprockets and remove valve lifters. Remove fuel pump and fuel pump pushrod. Slide camshaft forward carefully out of engine. *CAUTION* - DO NOT scratch camshaft bearings with camshaft lobes.

►*CAUTION*—Camshaft is cast iron and must be handled carefully to prevent damage DO NOT pry shaft out of engine and use extreme care not to drop or spring shaft

Camshaft Alignment Check: Check camshaft for proper alignment whenever it is removed from the engine *See "Camshaft Alignment Check" below.*

Camshaft Bushing Removal & Installation: Use Bearing Remover & Installer Tool J-3063 to pull old bushings out Install new bushings with same tool and see that oil holes in bushing line up with oil holes in block (check oil leads with piece of wire after tool removed)

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Camshaft Installation: Re-install camshaft by reversing removal procedure as given above. Install distributor drive gear as follows:

►**Distributor Drive Gear Installation**—Turn crankshaft so that #1 piston on top dead center entering power stroke (mark "C" on dampener in line with pointer on timing case cover)

CAMSHAFT ALIGNMENT CHECK: Put shaft on surface plate and support at front and rear bearing journals on "V" blocks, or on centers. Mount dial indicator on surface plate over centerline of camshaft with pointer touching shaft. Check heel of each cam through 180° rotation with dial set at zero. Replace camshaft if dial reading greater than .0015".

TIMING CHAIN

1954-60 MODELS

TIMING CHAIN REMOVAL: Set engine in firing position for No. 6 cylinder. Remove water pump (see Cooling on car page), oil pan (see Oil Pan Removal), crankshaft pulley and engine front cover. Take out the two camshaft sprocket screws and lockwashers. Remove sprocket with chain from camshaft, remove crankshaft sprocket.

Timing Chain Installation: Reverse removal instructions given above. Timing marks on sprocket must be together and aligned with straightedge across shaft centers.

VALVE SYSTEM

1954-60 MODELS

VALVE REMOVAL: With cylinder head removed, take out spark plugs Install head upside down on Cylinder Head Holding Stand J-3064 Install Holding Strap J-3046-6 over heads of valves Turn head right side up, compress valve springs with compressor bar and stirrup of Head Holding Tool, remove valve keepers Release bar and remove valve spring retainer, also rubber seal from lower groove on valve stem Turn head over, remove Holding Strap, take out valves *CAUTION*—Note location of each valve, must be re-installed in same location

Installation: Reverse removal procedure

VALVE STEM SEALS

1954-60 MODELS

VALVE STEM OIL SEAL CHECK & INSTALLATION: Place 1" diameter suction cup on valve spring retainer Cup will not stick to retainer (when pumped up and down) if seal leaks. To install new seal without removing valve, proceed as follows: Remove spark plug at affected cylinder, insert Valve Holder J-3213-1 in plug port to hold valve up and seated. Reinstall nearest rocker arm bolt and position Valve Spring Compressor J-5892-1 under bolt head and depress valve spring. Remove valve lock and seal. Release spring tension to replace spring.

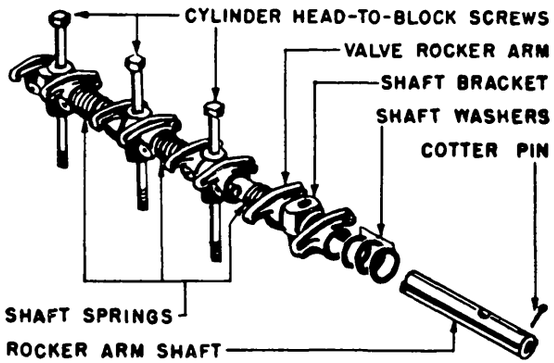
ROCKER ARMS

1954-60 MODELS

ROCKER ARM ASSEMBLY: Remove rocker arm covers Remove secondary wiring and distributor cap as an assembly Remove four cylinder head cap screws which hold rocker arm assembly to cylinder head and remove rocker arm assembly

Disassembly & Reassembly: See illustration for correct order of parts Parts can be removed from shaft by removing cotter pin at end

Installation: Install rocker arm assembly in position on cylinder head with notches on each end of rocker shaft pointing downward and toward center of engine, and rocker arm brackets with larger machined surface next to head Install four cylinder head screws and tighten to specifications Install rocker arm covers and secondary wiring with distributor cap assembly. Tighten cover screws to specifications.



CADILLAC ROCKER ARM ASSY.

HYDRAULIC LIFTERS

►*CADILLAC HYDRAULIC VALVE LIFTER REPLACEMENT CAUTION:* TWO different lifters furnished for service which are not interchangeable and must be used on correct models as listed below with correct type pushrod (different pushrod for each lifter) *CAUTION - Correct lifter and pushrod must be used together due to difference in pushrod lengths*

1954-57 CARS (To Engine No. 042804) - Original replacement lifter (one-piece body) superseded by new lifter with two-piece body Lifters and pushrods may be identified as follows **Hydraulic Lifter** - Part No 5231806 (supersedes 5231375) may be identified by bottom of pushrod seat being 7/16" below top of lifter body This lifter has wide oil groove in body (same as later type lifter) and oil groove width cannot be used to identify lifter. **Pushr d** - Part Nos. 1455420 (1954 and 1956-57), 1463423 (1955) Can be identified by two grooves near one end of rod (1455420) or one groove and daub of white paint (1463423)

1957-60 CARS (B ginning Engin N .042804) - Serviced by original production type units as follows **Hydraulic Lift r** - Part No 5231740 May be identified by bottom of pushrod seat being 1/4" below top of lifter body **Pushrod** - Part No 1468453 May be identified by absence of grooves at end This pushrod is 187" shorter than previous type and may be installed with either end up

1954-55 MODELS

VALVE LIFTERS: Hydraulic, Barrel Type. Consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (See illustration). Oil is introduced to this unit from main oil gallery through hole in side of lifter plunger and body.

Removal: Remove rocker arm covers (hang on cowl), intake manifold, three valve compartment cover screws. Loosen crankcase ventilator pipe screw at flywheel housing, move pipe to permit removal of valve cover. Remove rocker arm assemblies and push rods. Take out lifters (use Tool J-3049), turn lifter while removing to remove any carbon or varnish deposit from lifter base.

***CAUTION*—Keep lifters in order—must be re-assembled in same holes.**

Partial Removal Note—If one or two lifters only to be removed, rocker arm assembly need not be removed, proceed as follows: Compress valve spring, slide rocker arm over, withdraw pushrod.

Disassembly: Press down on center of valve lifter push rod cup, and with a pointed tool, remove lockwire from groove. Invert lifter and slide out push rod cup, plunger, ball retainer and spring. ***NOTE*—** If plunger is stuck in body, place lifter push rod end down, in Valve Lifter Plunger Remover Tool J-4160. Holding tool firmly in hand with thumb over lifter body, strike tool sharply on block of wood until plunger falls out of body.

Cleaning & Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or indentations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: Place ball on its seat in lower end of plunger while holding plunger upside down. Position ball retainer and spring over ball and end of plunger. Lower lifter body over plunger assembly then turn assembly right side up and fill plunger with clean oil. Jiggle ball with small piece of wire until oil drains into body and trapped air is released from body. Refill plunger with oil, place push rod cup on plunger, and position lock wire over cup. Press lock wire into groove with Lock Wire Installer Tool J-2730.

Testing (Leak Down Rate)—Remove distributor cap, coil and rocker arm covers as an assembly. Set timing mark "C" on harmonic balancer to the pointer and observe position of distributor rotor. Check each lifter as outlined in following table, using Valve Lifter Leakdown Tool J-3074:

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With rotor at No. 1 firing position (pointing toward rear of engine), check:

No. 1 Intake	No. 3 Exhaust	No. 6 Exhaust
No. 1 Exhaust	No. 4 Exhaust	No. 7 Intake
No. 2 Intake	No. 5 Intake	No. 8 Intake
No. 2 Exhaust	No. 6 Intake	No. 8 Exhaust

With rotor at No. 6 firing position (pointing toward front of engine) check:

No. 3 Intake	No. 5 Exhaust
No. 4 Intake	No. 7 Exhaust

Insert feeler gauge of tool between valve stem and rocker arm, at the same time compressing the tool "pop-out" spring against valve spring *(NOTE*—Tool should be installed as quickly as possible to avoid any unnecessary leakdown of lifter). Note the interval of time during which the tool is held in place by valve spring pressure. It will be found through this test that bad lifters or lifter will have the shortest leakdown time.

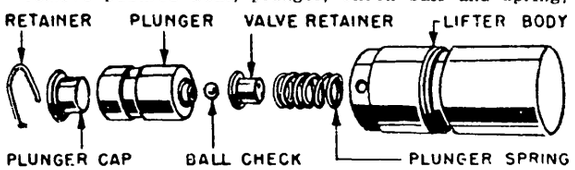
1955-60 MODELS

VALVE LIFTERS: Hydraulic. Barrel type Consist of of plunger and valve assembly operating within a cylinder formed by the lifter body (see illustration). Oil is introduced into this unit from an oil gallery through hole in relieved section of lifter body

R moval (1955-57): Disconnect brake vacuum line at intake manifold. Remove heater hoses from clips on rocker arm covers and remove covers. Remove intake manifold. Remove valve compartment cover screws. Loosen engine ventilator pipe clampscrew at flywheel housing, remove long ventilator pipe screw at valve compartment and remove cover. Remove rocker arm assemblies *(NOTE* -- When only one or two lifters are to be removed, do not remove rocker arm assembly. Compress valve spring, slide rocker arm over and remove the push rod.) Remove push rods, keeping them in order so they may be replaced in the same location. Using Valve Lifter Remover Tool J-3049, remove lifters from engine. Keep lifters in order so they may be replaced in the same location.

R m val (1958): Pushrod holes in cylinder block have been enlarged to permit removal of lifters without removing intake manifold Remove rocker arm cover and gasket, remove rocker arm assembly, remove pushrods *(CAUTION* - Keep pushrods in order and reinstall in same positions). Use mechanical finger or magnet attached to long rod to withdraw lifters

Disassembly: Press down on center of valve lifter pushrod seat, remove lockwire from groove Invert lifter and remove pushrod seat, plunger, check ball and spring,



CADILLAC 1954-55 HYDRAULIC VALVE LIFTER

ball retainer, and plunger spring. *NOTE* - If plunger sticks in lifter body, place lifter in Plunger Remover Tool J-4160 (pushrod end down), hold tool firmly in hand with thumb over lifter body, strike tool firmly on block of wood to dislodge plunger

Cleaning & Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or indentations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: Hold plunger upside down, place check ball and spring on plunger Position ball retainer and plunger spring on assembly, check by moving retainer up and down to make certain spring is in working order Lower lifter body over plunger assembly at an angle to seat spring (if necessary, probe through oil hole with a small wire to allow assembly to be seated) Turn assembly right side up and fill with clean engine oil Jiggle check ball with a small wire until oil fills lifter body and all trapped air is released Refill plunger with oil, install pushrod seat on plunger, position lockwire over seat, press lockwire into groove using Lockwire Installer Tool J-2730

Testing Leak Down Rate (On Engine): 1) On Air Cond. Cars, remove rear bracket and loosen generator. Remove resistor wire from porcelain resistor at coil. Remove distributor cap, coil, and rocker arm covers. Set timing at "C" mark and observe position of distributor rotor. Check each lifter as outlined in the following table:

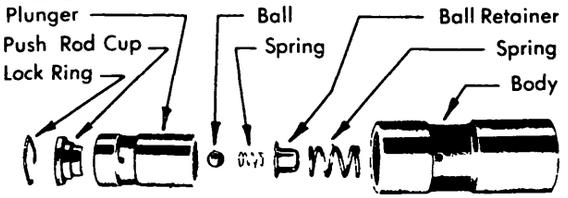
With rotor at No. 1 firing position (pointing toward rear of engine), check each lifter as shown in (2) below.

No. 1 Intake	No. 3 Exhaust	No. 6 Exhaust
No. 1 Exhaust	No. 4 Exhaust	No. 7 Intake
No. 2 Intake	No. 5 Intake	No. 8 Intake
No. 2 Exhaust	No. 6 Intake	No. 8 Exhaust

Rotate crankshaft one complete turn and with rotor at No. 6 firing position (pointing toward front of engine) check:

No. 3 Intake	No 5 Exhaust
No. 4 Intake	No. 7 Exhaust

2) Insert feeler gauge of tool between valve stem and rocker arm, at the same time compress the tool "pop-out" spring against the valve spring retainer. *NOTE* - Tool should be installed as quickly as possible to avoid any unnecessary leak down of lifter. Note the interval of time during which tool is held in place by valve spring pressure. It will be found through this test that noisy lifter or lifters will have the shortest leak down time.



CADILLAC 1955-60 HYDRAULIC VALVE LIFTER

OILING SYSTEM

ENGINE LUBRICATION

ENGINE LUBRICATION: Force feed type of lubrication with oil supplied under pressure to crankshaft, connecting rod, and camshaft bearings, valve lifters, rocker arm bearings and metered to upper rocker arms for pushrod surface and valve lubrication. Oil is supplied from rear main bearing for lubrication of oil pump drive shaft. All other moving parts of engine are lubricated by gravity flow or splash. See "Engine Oil Flow" diagram.

OPERATION: Gear type oil pump mounted on rear main bearing cap (driven by distributor drive shaft) draws oil through a screened intake floating on oil in crankcase and delivers it through rear main bearing cap to a Vertical Header in the block (through a Full Flow Filter on 1960 models). This header delivers oil to an intersecting Right Longitudinal Header and, through a connecting header, to the Left Longitudinal Header. Upper end of vertical header is plugged. Rear end of right longitudinal header supplies oil through cylinder block and head to right rocker arm shaft, left longitudinal header supplies oil at front end through cylinder block to left rocker arm shaft and to partial flow oil filter on 1959 & earlier models. Oil from cylinder heads drains back directly to crankcase through left front and both rear holes in each cylinder head. The hole in front end of right cylinder head drains oil back through head and matching hole in block to engine front cover for lubrication of timing chain and sprockets. A drilled hole at rear of valve lifter compartment returns lifter compartment excess oil to crankcase.

Crankshaft, Connecting Rods & Pistons - Vertical header at rear main bearing supplies oil to rear main bearing. The right longitudinal header supplies oil to the front and center main bearings. The left longitudinal header supplies oil to the two intermediate main bearings. Drilled passages in crankshaft supply oil from main bearing journal to connecting rod journal for connecting rod bearing lubrication. Oil is forced out groove in connecting rod bearing cap against cylinder walls for piston lubrication. Piston pins receive oil through drilled passage in piston.

Camshaft, Sprockets and Lifters - Rear camshaft bearing is supplied oil from the connecting header. All other camshaft bearings receive oil from drilled passages in block from respective main bearing. Oil pressure switch is screwed into upper end of connecting header. Drain back hole in front end of right cylinder head returns surplus oil to engine front cover for timing chain and sprocket lubrication. Each longitudinal header supplies oil through drilled passages in block to its respective bank of valve lifters.

Rocker Arms, Valves & Pushrods - Oil is supplied to rocker arm shaft on right bank from rear end of right longitudinal header through a vertical branch in cylinder block and head. The left rocker arm shaft is supplied through a vertical branch in cylinder block and head at front end of left longitudinal header. Rocker arm shafts are plugged at each end. One hole in bottom of rocker arm shaft intersects a 45° groove and supplies oil evenly under loaded area of each rocker arm. The other

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hole is mismatched with an angular passage in the arm and meters oil to the pushrod end of the arm for lubrication of the pushrod surface in the arm. From this point oil flows down to the opposite end of the arm for valve tip lubrication.

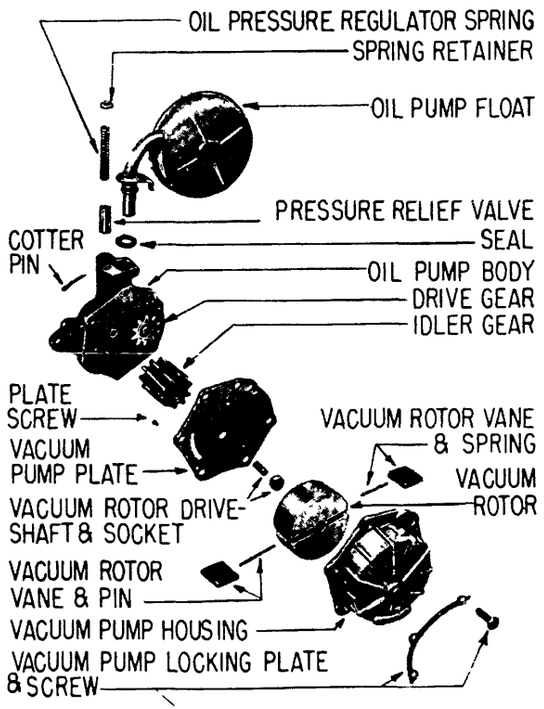
OIL FILTER: Different types used as follows:

1954-59 Partial Flow Type - Mounted on bracket on left front corner of engine. Inlet line is connected to fitting at end of channel feeding from left longitudinal header. Outlet line is connected at left front of engine to return oil to crankcase.

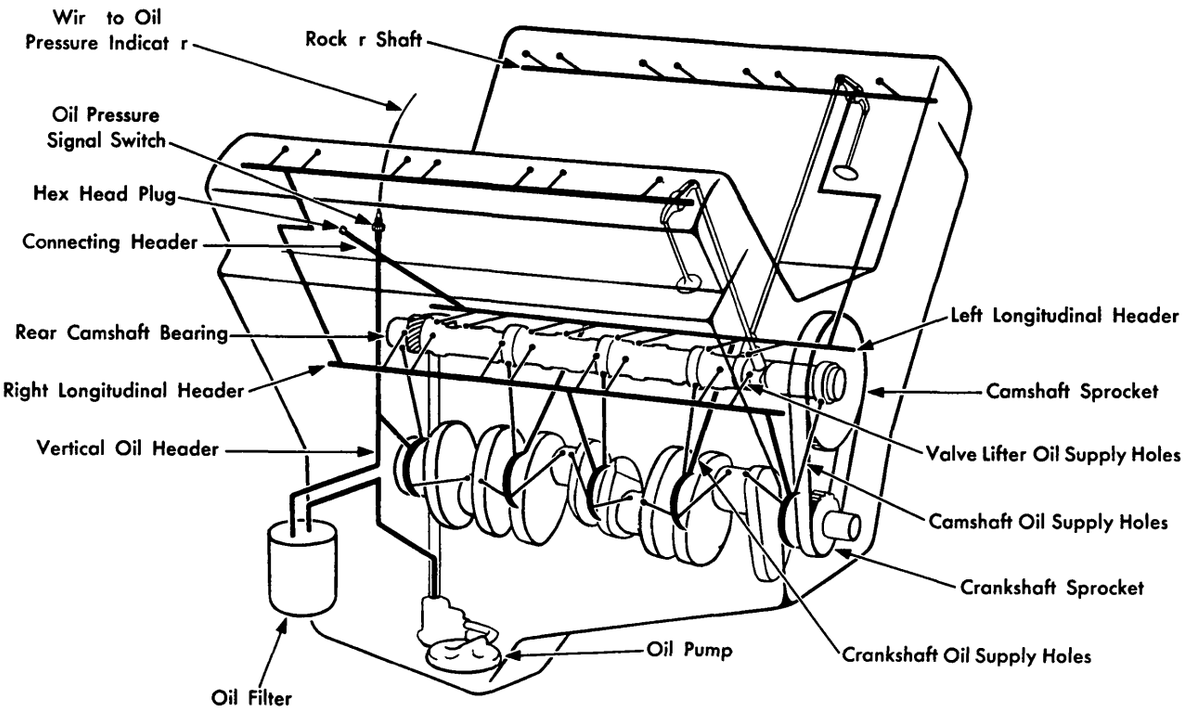
1960 Full Flow Type - Mounted on pad on right rear side of crankcase. Oil inlet (from pump) and outlet (to engine oiling system) channels are located in mounting pad and filter mounting bracket.

OIL PUMP
1954-60 MODELS

►*1954-56 PUMP CORRECTION FOR AIR IN OILING SYSTEM (Before Engine No. 001148):* Check pump float tube and tube bore in pump body for burrs (remove burrs with fine sandpaper). Install "O" ring seal, Part No. 5665829, on float tube against shoulder 1 1/16" from end of tube, insert float tube in body and secure with cotter pin. Check float for free movement. When installing pump, make certain that oil pan baffles clear sides of pan by at least ¼" on each side to insure proper return of oil to sump on hills or during sudden stops. *NOTE* - On 1956 cars after Engine No. 001148, a felt



CADILLAC 1954-58 OIL & VACUUM PUMP



CADILLAC ENGINE OILING SYSTEM

washer is installed in oil pump intake to insure correct sealing of pump intake and prevent air entering system.

OIL PUMP REMOVAL: Drain engine and remove oil pan (see Oil Pan Removal). Remove oil pan baffle. On early models, disconnect vacuum line from engine block. Remove two nuts securing oil pump to rear main bearing cap, and remove oil pump (plus vacuum pump early models), oil float and screen assembly. *NOTE* - Oil pump drive shaft is now loose and should be removed.

Disassembly: Remove float and felt seal Remove pressure regulator valve, spring and spring retainer. *NOTE* - DO NOT lose retainer when removing cotter pin. On early models, remove six screws holding vacuum pump to oil pump and remove vacuum pump and line. On later models, unlock and remove six cover plate to housing screws and remove plate. Slide gear off idler shaft, remove pin from collar on end of drive shaft and press collar off shaft. Slide oil pump drive gear out of pump body.

Inspection: Inspect strainer screen for dirt, float for leaks and check condition of seal. Inspect oil pressure regulator valve for nicks and burrs, drive gear for nicks and burrs, vacuum pump plate for wear by pressing it down on surface plate.

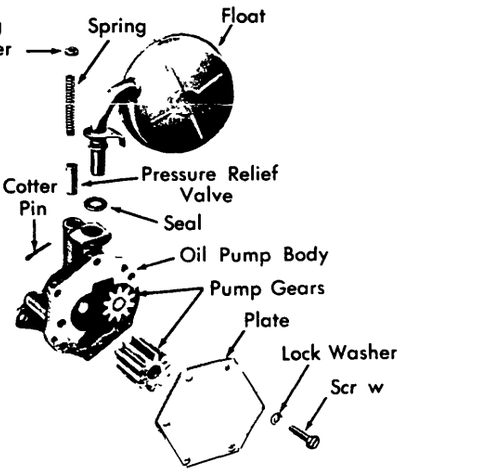
Oil Pump Specifications-Backlash between drive gears - .008-.012". Clearance drive shaft to pump body - 0010-.0025", wear limit .005". Clearance pump body to gears - .003-.005", wear limits .006". End play in pump gears-.001-.004", wear limit .006".

Pressure Regulator Specificati ns - Valve plunger clearance in housing .0025-.0035" (wear limit .005"). Valve spring specifications are as follows:

1951-56 - Free length 2 27/64". Pressure 4.3-4.8 lbs. at 1 7/16".

1957-60 - Free length 2 21/32". Pressure 5¼-5¾ lbs. at 1 7/16".

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CADILLAC 1959-60 OIL PUMP

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R ass mbly: Install drive gear in pump body, press collar on shaft and install lock pin. Slide idler gear into pump body. On earlier models, place vacuum pump assembly with hexagonal drive shaft under oil pump and install six screws and locks. On later models, install oil pump cover plate and secure screws with locks. Slide oil pump strainer into opening in pump body and install lock pin. Check felt seal to be sure it is located correctly. *CAUTION* - Screen must face cover of oil pump.

Installati n: Install oil pump drive shaft, oil pump assembly over studs, guiding vacuum fitting into block.

VACUUM PUMP

VACUUM PUMP (Removal): Drain engine oil and remove oil pan. Remove oil pan baffle and disconnect vacuum line at engine block. Remove six screws holding vacuum pump to oil pump, and remove vacuum pump with the oil pump idler gear. Remove hexagonal drive shaft. *CAUTION*—Oil pump idler gear may fall when pump removed.

Dissass mbly - Remove two cap screws holding plate to vacuum pump and remove plate from dowels. Turn pump upside down and shake out rotor assembly. Remove vanes, pin and spring from rotor.

Vacuum Pump Clearances—Vane to cover plate .002-.005". Rotor to cover plate .004-.007". Socket to cover plate .0144-.0324". Socket to rotor face .0104-.0254". Rotor to shaft .0010-.0023". Rotor to depression in body cavity .0005-.0034"

Installation—Install vacuum lines to pump and replace hexagonal shaft. Install idler gear in oil pump and install vacuum pump below oil pump with six screws. Connect vacuum line to engine block. Install oil pan baffle, then install oil pan.

Reassembly—Inspect inside of body for scores or wear. Inspect plate for wear and dress down on surface plate. (CAUTION—Make sure that all parts are clean and that no foreign material is in housing). Install vanes and spring in rotor. Compress vanes and install rotor in pump body. Position plate on doweled pump body so that hole in plate lines up with hexagonal hole in rotor. Install cover plate.

COOLING SYSTEM

WATER PUMP

WATER PUMP REMOVAL: Drain cooling system. **On Air C nd. Cars,** remove fan shroud. Remove drive belts. Disconnect radiator hoses and heater hose from pump. Remove power steering pump and bracket (swing out of way without disconnecting hoses). Disconnect throttle return spring and remove oil filter unit (lines at filter). **On Std. Cars,** remove 6 water pump screws and remove pump, gaskets and pulley. **On Air Cond. Cars,** remove 4 fan retaining screws and remove fan and pulley, then remove 4 water pump screws, pump and gasket. *NOTE* - **On Air Susp nsi n Cars,** removal is the same except that it is necessary to disconnect air lines from air compressor and to move power steering pump and air compressor out of way.

Disass mbly - Remove thermostat housing, thermostat, fan blade assembly, pulley, cover plate and gasket. Use Puller Tool J-3249 to remove plastic impeller. Remove seal, dampener, and seal washer.

Inspecti n - Check impeller blades for improper clearance or excessive wear and spring-loaded seal for wear and cracks. Check shaft bearing in pump body for roughness or excessive endplay. If defective, remove hub, shaft, slinger, and bearing assembly by pressing out through front of body. Refinish seal surface with Refinisher Tool No. J-2999 to remove scratches or nicks.

Reassembly - Press new bearing, shaft, and slinger assembly in body with Shaft Installer & Hub Spacer Tool No. J-3249, supporting housing on Fixture J-6855-1. Install washer and seal assembly over driving lugs of slinger (washer should slide freely). Press impeller on shaft until outer face is .005-.010" below face of pump (use straightedge and feeler). Place .080" Hub Spacer Shim, Tool J-3249-2 on bottom of Spacer Tool J-3249 and press hub on shaft until tool bottoms on shaft. *NOTE* - On Air Cond. Cars, insert a .094" Hub Spacer Shim, Tool J-6855-2 inside Tool J-3249 and also use .080" Shim, Tool J-3249-2. Assemble cover gasket and cover on pump. Check shaft for impeller clearance. Install pulley and fan assembly and tighten screws to 10-12 ft. lbs. Install thermostat.

Installation - Reverse removal procedure. Run engine and check for leaks.

PROPELLER SHAFT NOTES

1954-55 MODELS

►*1954-55 SERIES 60S, 61, 62 UNIVERSAL JOINT FRONT YOKE REPLACEMENT TO CORRECT DRIVE LINE "THUMP":* New front yoke (as used in later 1955 production has increased spline line (no counterbore) and will prevent axial movement of the output shaft and yoke. This yoke furnished under same part number as previous type.

1) Remove propeller shaft. Inspect output shaft and remove all sharp edges from shaft splines, using a small stone. Inspect new yoke and remove all sharp edges from splines similarly.

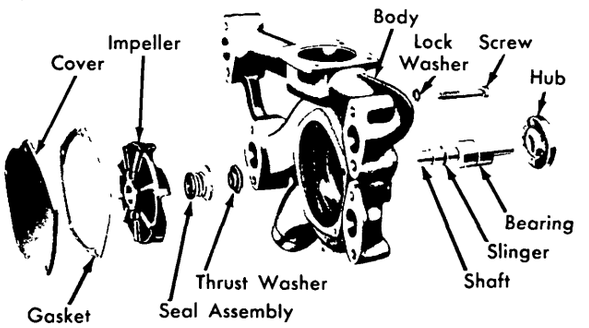
2) Coat yoke splines with E.P. 90 hypoid rear axle lubricant, install yoke on propeller shaft, install shaft.

1957-58 MODELS

PROPELLER SHAFT CENTER BEARING ASSEMBLY: Remove two center-bearing-support-to-support frame bolts (nuts are tack welded, DO NOT REMOVE). Remove "U" bolts and lock at rear axle pinion, slide propeller shaft and front yoke off transmission mainshaft and through frame tunnel section. *NOTE* - Be careful not to nick yoke. Disassemble propeller shafts, remove center bearing support assembly from propeller shaft by tapping on center bearing bracket with soft head hammer. Remove spacer if so equipped. Remove center bearing support bolts and separate bushings, washers, center bearing bracket and center bearing support. To reassemble, reverse disassembly procedure.

1959-60 MODELS

PROPELLER SHAFT CENTER BEARING ASSEMBLY: Pull out "Air Lift" handle and raise car on hoist. Remove two center bearing support to frame bolts. *NOTE* - The nuts for these bolts are tack welded to center bearing support and bracket assembly and remain fastened to bracket. Remove U-bolts and locks at rear axle pinion. Slide propeller shaft and front yoke off transmission mainshaft and through frame tunnel section removing it at rear. DO NOT nick yoke. Pry up center bearing nut locking washer. *NOTE* - Always use new washer for reinstallation. Back off center bearing



CADILLAC 1954-60 WATER PUMP

retaining nut using Tool No. J-7411 and separate front and rear propeller shafts by sliding front propeller shaft off the center slip yoke. Remove center bearing retaining washer, slide center slip yoke seal off slip yoke and remove center bearing retaining nut. Remove center bearing support and bracket assembly from front propeller shaft by tapping on center of assembly with soft hammer. Remove slingers from sides of center bearing, pry out snap ring from front of bearing and remove bearing from support bracket by tapping lightly from rear with soft hammer. To reassemble, reverse disassembly procedure.

BRAKE NOTES

1954-55 MODELS

►*1954-55 SERIES BRAKE PEDAL BIND CAUSING EXCESSIVE PEDAL EFFORT (1955 Cars before Eng. No. 22750):* Check for misalignment at the following points.

1) Brake pedal moving out on shaft over lock ring in groove at end of shaft resulting in binding of pedal and misalignment with master cylinder. Correct by installing later type shaft No. 3510310 with rectangular groove, and later type lock ring No. 1463434 with larger outer diameter. *NOTE*—These parts used in 1955 production beginning Engine No 22750.

2) Binding at brake pedal clevis and bellcrank linkage caused by misalignment in linkage. Correct by installing 1/8" flat washers between master cylinder attaching bosses and frame. Check entire linkage for binding and shim as required. NOTE—These master cylinder washers used in production beginning Engine No. 12725.

1956 MODELS

►*BRAKE PEDAL BINDING CORRECTION:* Check clearance between brake pedal to relay rod and opening in toe board. Correct by moving the pedal attaching bracket at support mount, or enlarge hole in toe board. Check metal retainer over felt seal on inside of toe board and centralize hole in retainer as necessary by rotating seal and retainer. Punch or drill new holes as necessary. Check relay-to-brake rod clevis for interference at relay connecting point. Clevis pin should fit easily into clevis hole. Remove stock from relay as necessary to provide free entry of clevis in hole. Check brake pedal for correct horizontal position as viewed from seat. Level pedal by shimming between attaching bracket and steering column support.

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

ENGINE & SERIAL NUMBER: Stamped on upper right corner on front face of right hand block, on right frame side member just to rear of engine support bracket, and on the plate on front side of left body pillar.

Series	1954	1955
60S	546000001	556000001
62	546200001	556200001
75	547500001	557500001
86 Commercial	548600001	558600001

Identification—First two figures indicate year, third and fourth indicate model (last five figures are numbered consecutively regardless of series).

Engine Unit Number Note: Use for identification Stamped on top of crankcase to rear of left hand block with prefix indicating model:

1954 Models

60S, 62, 75 (Standard)	4-T-1 Up
60S, 62, 75 (Air Conditioning)	4-TK-1 Up
86 (Standard)	7-T-1 Up
86 (Air Conditioning)	7-TK-1 Up
86 (Power Steering)	5-T-1 Up
86 (Power Strg. & Air Cond.)	5-TK-1 Up

1955 Models

60S, 62, 75 (Standard)	4-V-00001 up
60S, 62, 75 (Air-Conditioning)	4-VK-00001 up
86 (Standard)	5-V-00001 up
86 (Air-Conditioning)	5-VK-00001 up
60S, 62 (Eldorado Engine) ①	7-V-00001 up
60S, 62 (Eldorado Engine) ②	7-VK-00001 up

①—Without Air-Conditioning. ②—With Air-Conditioning.

►*ENGINE NUMBER NOTE:* "L C." will be added as a suffix to engine unit number on all engines built to low compression specifications

►*NOTE:* Mark * preceding Engine Unit Number indicates cylinder bore and pistons are .010" oversize.

TUNE-UP

►*1954 CADILLAC STALLING (AFTER COLD START) CORRECTION: Fast idle throttle clearance between plate and bore increased from .023" to .026". See "Rochester 4GC 4-Barrel Carburetor" in Carburetor Section for complete data.*

►*1955 ROUGH IDLE & DETONATION:* May be caused by excessive advance due to vacuum ports in carburetor being too low *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

COMPRESSION PRESSURE: 150 lbs (1954), 165-185 lbs (1955) at cranking speed, 212-230 lbs (1955) at 1000 RPM

VACUUM READING: Not specified (varies with altitude and barometric pressure).

VALVE TAPPET CLEARANCE: None in service (Hydraulic Lifters).

MANIFOLD HEAT CONTROL: Automatic thermostatic type Valve diverts exhaust gases of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035"

Spark Plugs - AC No 46-5 (1954), 44 (1954 Cooler Plugs & All Engines 1955) 14 mm Torque to 20-25 ft lbs

►*SPARKPLUG CAUTION: AC No. 46-5 should not be used under any circumstances on 1955 engines.*

COIL: Delco-Remy 1115082. 12 Volt.

Ignition Current—1.25 amperes idling. 3 amperes stopped.

Resistor—Delco-Remy 1927809. On coil bracket.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by lead from starter solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110844 (1954), 1110852 (1955).

Condenser—Delco-Remy 1869704.

Contact Point Set—Delco-Remy 1918148.

Breaker Gap—.016" (new & used points).

Cam Angle—26°-33°.

►*BREAKER GAP CAUTION: Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance - 1110844

Distributor Degrees	RPM	Engine Degrees	RPM
0-1.5	500	0-3	1000
7-9	950	14-18	1900
9-11	1450	18-22	2900
11-13	1950	22-26	3900

Automatic Advance - 1110852

Degrees	Distr. RPM	Degrees	Eng. RPM
0-1.5	500	0-3	1000
9-11	1550	18-22	3100
11-13	2075	22-26	4150

Vacuum Spark Control: Delco-Remy 1116074 (1954), 1116091 (1955)

Plunger Travel - 19/64-5/16"

Vacuum Advance - 1116074

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6 5-9
13-14 5	26-29	16-17

Vacuum Advance - 1116091

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6-8 5
13-14 5	26-29	15-16

IGNITION TIMING

Setting—2½° BTDC. *CAUTION—Ignition timing mark "A" is 5° BTDC and does not indicate timing point.*

Timing—Disconnect vacuum line to distributor and and with engine idling at 400 RPM, set timing at point HALF-WAY BETWEEN "A" &"C/" marks on vibration dampener in line with pointer on chain case cover

►*1954 CAUTION:* If fuel used in less than 80 Octane Rating and detonation ping noted, timing may be retarded to "C/" mark on dampener (top dead center)

►*1955 TIMING NOTE:* The timing should be checked *for both No. 1 and No. 6 cylinders. First set timing for No. 1 cylinder (at point halfway between "A" and "C/" marks), then check timing on No. 6 cylinder. If light flashes before or after the No. 1 cylind r firing point, set distributor to divide the variance.*

►*1955 ROUGH IDLE OR DETONATION:* May be caused by *excessive advance due to vacuum ports in carburetor being too low. See "Cadillac (Carter & Rochester) Carburetors" in Carburetor Section.*

CARBURETOR

►*IDLE SPEED (AIR-CONDITIONED CARS): Summer and Winter Idle Speed Adjustment is different as follows.*

Summer Setting (Air-Conditioner in Operation)—With transmission selector lever in either "Dr" range, and with Air-Conditioner "ON" set idle speed at 400 RPM (Cars with Std Engine), 480 RPM (Cars with Eldorado Engine)

Winter Setting (Air-Conditioner not in Operation)—With transmission selector lever in either "Dr" range, and with air-conditioner "OFF", set idle speed at 400 RPM (Cars with Std Engine), 480 RPM (Cars with Eldorado Engine)

Idle Speed-Up Control Adjustment (Cars with Air-Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air-conditioner "ON", and place transmission selector lever in "N" neutral position. Adjust engine idle speed to 900 RPM by loosening locknut on diaphragm shaft and turning knurled nut to obtain specified RPM Tighten locknut

1954 Models

Throttle Linkage Adjustment: 1) Disconnect throttle rod at throttle lever on transmission case. Check lever position by installing checking gauge J-3065-A on rear face of transmission case with long leg of tool extending forward along left side of case. Move throttle lever to extreme rear position. Insert clevis pin through hole in lever and hole in checking gauge. If pin does not enter hole in gauge freely, bend lever as required using bending tool J-2029. Remove gauge, connect throttle rod to lever.

2) Disconnect carburetor throttle rod at dash relay lever by removing spring clip and freeing trunnion from lever Install ¼" drill rod through hole in relay lever and hole in bracket to position lever See that throttle lever in correct hot or slow idle position and set for correct idling speed of 400 RPM (maximum) all models Adjust trunnion on rear end of throttle rod until it enters relay lever freely, connect trunnion and install spring clip Back off both nuts on throttle rod at carburetor throttle lever, push on end of rod so that transmission throttle lever and valve is against stop (in transmission), turn rear nut on throttle rod up against the throttle lever trunnion, then back the nut off **3 complete turns,** finally tighten the front nut on the rod securely against trunnion Check to see that linkage moves freely Remove drill rod from relay lever Check and adjust accelerator pedal position

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3) Depress pedal fully and see that it touches floor mat with slight pressure when carburetor throttle valve wide open (*NOTE*—If floor mat removed, allow ½" clearance between pedal and floor in wide open position). Adjust pedal position as required by changing length of pedal to relay lever rod (adjust trunnion located at pedal end of rod).

1955 Models

Throttl Linkag Adjustm nt: *CAUTION—On cars with Air-C nditi ning and Roch ster Carburetors, the engine must b running when throttle linkage is adjusted.*

1) Remove transmission throttle control lever clevis pin at transmission and check lever position with Tool J-3065-C. Fit tool on rear face of transmission case and insert clevis pin through lever and hole in gauge marked '49E '50, while lever is in its rearward position. If throttle lever is misaligned, correct by bending lever with Tool J-2029. Assemble linkage to transmission throttle lever and install new cotter pin.

2) Disconnect spring between carburetor and relay rod at trunnion and remove trunnion from dash relay lever. Place a ¼" drill shank through gauging hole in dash relay lever and into dash relay bracket. Set Carburetor throttle in hot idle position with transmission in "Dr" range (400 RPM-Std. Engine. 480 RPM-Eldorado Engine).

3) Adjust carburetor-to-dash relay rod trunnion to allow free entry into dash relay lever. Connect spring.

4) **On Cars With Singl Carburetor:** Back off both jam nuts on throttle valve rod at carburetor to allow free movement of rod in trunnion. Push end of throttle valve rod to position transmission throttle valve against its stops. Bring rear jam nut up against trunnion and back off **8 flats** (1 1/3 turns). (NOTE—This adjustment may be changed to improve shift characteristics after road test). Tighten front jam nut, check to be sure there is no bind in linkage.

5) **On Cars With Tw Carburetors:** Remove lock nut, adjusting nut and spring from forward end of throttle valve control rod. Back off rear lock nut and adjusting nut and throttle valve rod to permit free movement of rod in trunnion. Push on end of throttle valve rod to position transmission throttle valve against its stop. Bring rear adjusting nut up against trunnion and back off **3 c mpl t turns.** Tighten rear lock nut. Install spring and adjusting nut on front end of throttle valve rod. Adjust nut until the distance between the front face of the trunnion and the rear face of the adjusting nut is 1 13/32". Hold adjusting nut in this position and install lock nut. Recheck above dimension.

6) Remove ¼" drill rod from dash relay and check position of accelerator pedal with wide open throttle. Pedal should touch floor mat with slight pressure (allow ½" clearance if mat has been removed) when throttle is wide open. Adjust accelerator pedal position at pedal end of dash relay-to-accelerator pedal rod. Road test car to insure proper shifting characteristics.

CARTER WCFB
(Standard Engin)

Carter M del WCFB. Four-barrel downdraft type with automatic choke control. *NOTE - Idl Sp d-up control us d with Air Conditioning.*

Carter Carbur ti n Applicati n

Car Model	Carter N .
1954 (Exc. Air Cond.)	2109S
1954 (Air Cond.)	2110S
1954 (Replacement) ℂ	2043S
1955 (Early Less Air Cond.)	2185S
1955 (Later Less Air Cond.) ②	2266S
1955 (Latest Less Air Cond.) ②	2354S
1955 (Early With Air Cond.)	2186S
1955 (Later With Air Cond.) ②	2267S
1955 (Latest With Air Cond.)	2355S

℃ - No. 2043S is service replacement for 1954 carburetors, 2355S for 1955 Carburetors. Unitized Package No. 202-44U (Containing Speed-up Control) must be used on Air Cond. Cars.

② - 1955 Later and Latest carburetors have larger secondary system (Throttle Bore, Main Venturi & Metering Jets).

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.

►*1955 FLAT SPOT OR SHUDDER AT 20-40 MPH ON PART THROTTLE ACCELERATION:* May be caused by over-rich Idle Mixture Setting (below).

►*1955 ROUGH IDLE & DETONATION OR HIGH IDLE SPEED:* May be caused by excessive advance due to vacuum ports in carburetor being too low, or by loose or improperly positioned throttle valves. *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section.*

►*1955 CARBURETOR "ICING" CORRECTION: See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section.*

Idle Mixture & Idle Speed Setting - *See "Carter WCFB (1954) Carburetors" and "Cadillac (Carter & Rochester 1955) Carburetors" in Carburetion Section.*

►*1955 IDLE SPEED ADJUSTMENT NOTE:* Idle Air By-Pass screw on throttle body is used to adjust idle speed. The throttle adjusting screw used on previous carburetors has been eliminated and the throttle valves are normally closed on slow idle.

►*OTHER DATA: See "Carter WCFB (1954) Carburetors" and "Cadillac (Carter & Rochester 1955) Carburetors" in Carburetion Section.*

Idle Speed-Up Control (Air Conditioned Cars): *See "Carburetor" above.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

ROCHESTER 4GC
(Standard Engine)

Rochester 4GC. Four-barrel downdraft type with automatic choke control. *NOTE - Idle Speed-Up Control used with Air Conditioned Cars.*

Rochester Carburetor Application

Car Model	Rochester No.
1954 (Exc Air Cond.) Early	7006220
1954 (Air Cond.) Early	7006221
1954 (Exc. Air Cond.) Later	7006962
1954 (Air Cond.) Later	7006963
1955 (Exc. Air Cond.) Early	7006655
1955 (Air Cond.) Early	7006656
1955 (Exc. Air Cond) Later ℂ	7007970
1955 (Air Cond.) Later ℂ	7007971

℃ - Later carburetors have larger secondary system (Throttle Bore, Main Venturi & Metering Jets).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*1954 CADILLAC STALLING (AFTER COLD START) CORRECTION: Fast idle throttl clearanc , unload r s tting and chok s tting chang d to pr vent stalling. S e "Roch st r 4GC-4-Barrel Carburetor" in Carburetor Section.*

►*1955 OFF-IDLE LEANNESS CORRECTION (Carburetors with brass tag stamped "A5" have had the correction made in production):* This condition noted between 20-30 MPH, and is sometimes accompanied by a slight vibration. *See "Cadillac (Carter & Rochester) 1955 Carburetors" in Carburetion Section.*

►*1955 FLAT SPOT OR SHUDDER AT 20-40 MPH ON PART THROTTLE ACCELERATION:* May be caused by over-rich Mixture Setting (below).

►*1955 ROUGH IDLE & DETONATION OR HIGH IDLE SPEED:* May be caused by excessive advance due to vacuum ports in carburetor being too low, or by loose or improperly positioned throttle valves. *See "Cadillac (Carter & Rochester) 1955 Carburetors" in Carburetion Section.*

►*1955 CARBURETOR "ICING" CORRECTION: See "Cadillac (Carter & Rochester) 1955 Carburetors" in Carburetion Section.*

Idle Mixture & Idle Speed Setting - *See "Rochester 4GC (1954) Carburetors" and "Cadillac (Carter & Rochester) 4GC (1955) Carburetors" in Carburetion Section.*

►*1955 IDLE SPEED ADJUSTMENT NOTE:* Idle Air By-Pass screw on throttle body is used to adjust idle speed. The throttle adjusting screw used on previous carburetors has been eliminated and the throttle valves are normally closed at slow idle.

►*OTHER DATA: See "Rochester 4GC (1954) Carburetors" and "Cadillac (Carter & Rochester) 4GC (1955) Carburetors" in Carburetion Section.*

Idle Speed-Up Control (Air Conditioned Cars): *See "Carburetor" above.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

ROCHESTER 4GC (Two Carb.)
(1955 Eldorado Engine)

Rochester 4GC No. 7007240 (Front), 7007942 (Rear) Without Air-Conditioning. Rochester 4GC No. 7007440 (Front), 7007241 (Rear) With Air-Conditioning.

►*CARBURETOR INSTALLATION NOTE: Front & Rear Carburetors operate together as follows:*

►*MANIFOLD FUEL DISTRIBUTION (FRONT CARB.):* Right PRIMARY & Left SECONDARY barrels feed Cyl. 2-3-5-8, Left PRIMARY & Right SECONDARY barrels feed 1-4-6-7.

►*MANIFOLD FUEL DISTRIBUTION (REAR CARB).:* Left PRIMARY & Right SECONDARY barrels feed Cyl. 2-3-5-8, Right PRIMARY & Left SECONDARY barrels feed 1-4-6-7.

►*OFF-IDLE LEANNESS CORRECTION(Carburetors with brass tag stamped "A5" have had the correction made in production): This condition noted between 20-30 MPH, and is sometimes accompanied by a slight vibration. See "Cadillac (Carter & Rochester) Carburetors" in Carburetor Section*

►*ROUGH IDLE & DETONATION OR HIGH IDLE SPEED:* May be caused by excessive advance due to vacuum ports in carburetor being too low, or by loose or im-

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properly positioned throttle valves. *See "Cadillac (Carter & Roch ster) Carburetors" in Carburetor Section*

►*FLAT SPOT OR SHUDDER AT 20-40 MPH. ON PART THROTTLE ACCELERATION: May be caused by over-rich Idle Mixture Setting (below).*

►*CARBURETOR "ICING" CORRECTION: See "Cadillac (Carter & Rochester) Carburetors" in Carburetor Section for installation of radiator baffle*

Idle Mixture & Idle Speed Setting–*Special procedure required to insure correct mixture and speed (idle air) screw settings. See "Cadillac (Carter & Rochester) Carburetors" in Carburetor Section for detailed procedure.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air-By-Pass screw on throttle body is used to adjust idle speed. The throttle adjusting screw used on previous carburetors has been eliminated and the throttle valves are normally closed at slow idle.*

►*OTHER DATA: See "Cadillac (Carter & Rochester) Carburetors" in Carburetor Section.*

Idle Speed-Up Control (Air Conditioned Cars): *See "Carburetor" above.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

CARB. EQUIPMENT

Fuel Pump: AC (Fuel only). Vacuum pump is part of engine oil pump

Replacement Fuel Pump - AC No. 4075 (1954), 4269 (1955).

Pressure - 4-5½ lbs. (1954, Early 1955), 4½-6½ lbs. (1955 later).

Gasoline Gauge: AC Electric.

Dash Unit–AC No 1517953

Tank Unit–AC No 1517215

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Delco–3EM60 (Exc. Comm'l). *12 Volt*, 9 plate, 60 ampere hour capacity (20 Hr rate)

Delco–3EM70 (Comm'l). *12 Volt*, 11 plate, 70 ampere hour capacity (20 Hr rate)

Battery Ground–Negative

Engine Ground–Connected between engine and cowl.

STARTER

Delco-Remy No. 1107622 (1954), 1107629 (1955).

Armature - Delco-Remy No. 1926626.

Drive–Overrunning clutch (solenoid pinion shift).

Rotation–Counter-clockwise at commutator end

Brush Spring Tension–35 ozs minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs	3500	10 1	95
10 5 ft lbs	Lock	5 4	470

Starting Switch: Delco-Remy Solenoid Switch No 1119760 mounted on starter and controlled by Ignition & Starter Switch No. 1116470 Turn key full RIGHT against spring tension to start.

See El ctrical Equipm nt S ction for compl te data.

N utral Saf ty & Back-up Light Switch (Hydra-Matic Driv Cars nly): Delco-Remy No. 1998054 (1954), 1998108 (1955).

Adjustment–*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy 1102002 (Std.), 1102011 (Air Conditioned Cars). Armature No. 1923535 (All).

►*GENERATOR ARMATURE REPLACEMENT CAUTION:* Std Generator No 1102002 with "N" stamped on frame next to name plate have new type armature with nylon insulated windings. If replacement of this armature required, install regular No 1923535 armature

►*REPLACEMENT GENERATOR:* Delco-Remy 1102005 (Less Fan & Pulley).

Maximum Charging Rat –See Current Regulator.

Performanc Data

	Amperes	Volts	RPM
Cold	30	14	2150

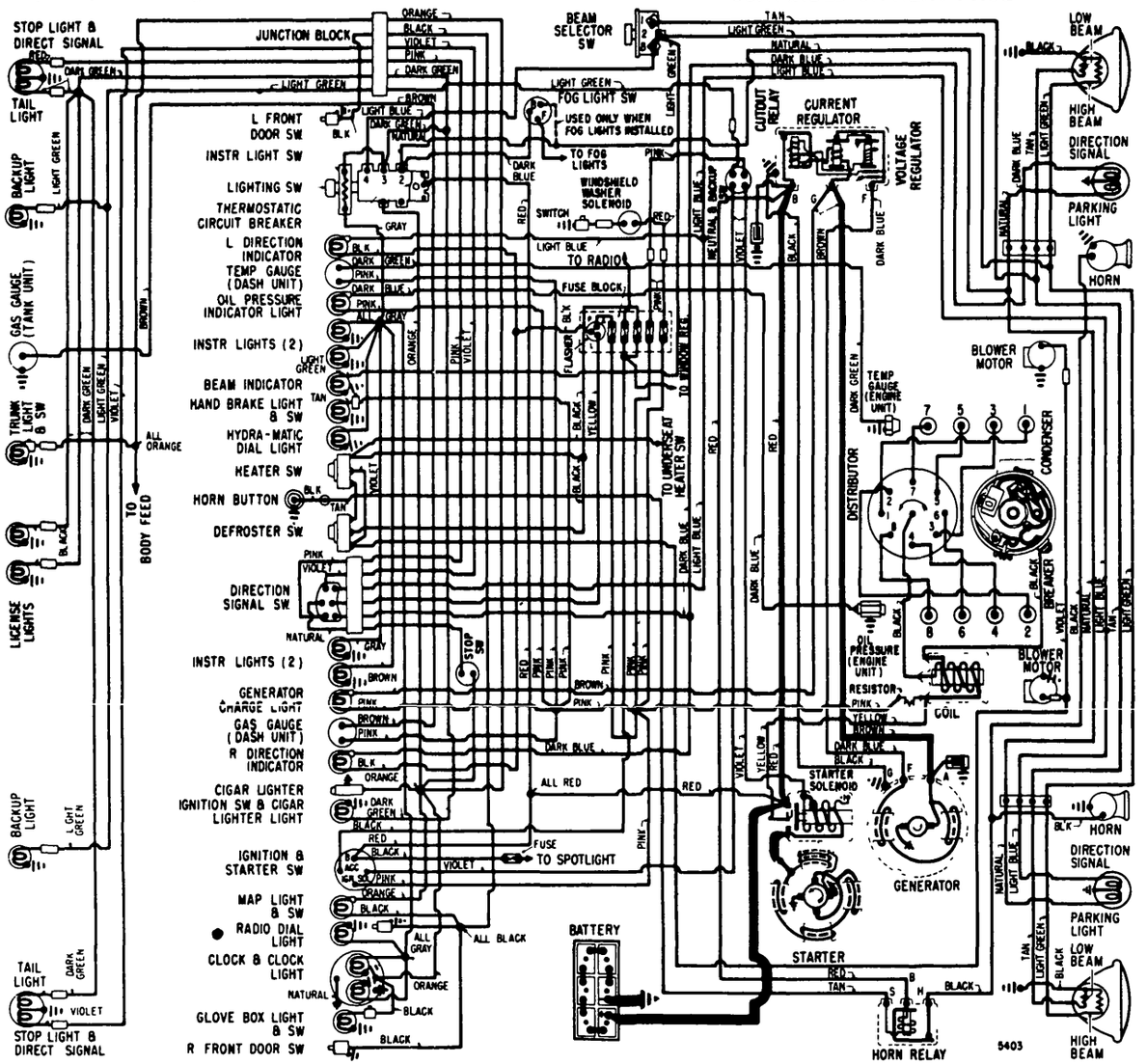
Rotation–Counter-clockwise at commutator end.

Brush Spring Tension–28 ozs. each.

Field Current–1.48-1.62 amperes at 12 volts.

Generator Charge Indicator: Red light on instrument panel. *See Diagram.*

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1954 MODELS

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B lt Adjustment: Loosen both pivot bolts and adjusting strap screw pull generator out until belt just tight enough to drive generator without slip.

REGULATOR

D lc -R my 1118826. S rvice Replacement–Delco-R my 1118825.

►*REGULATOR NOTE: Checking procedure is different than for previous models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment section. Specifications b low are "Normal" settings.*

Cut ut Relay

Cuts In–12.8 volts (hot).
C ntact Gap–.020"
Air Gap–.020" (with contacts just closed).

Voltag Regulator

S tting–14.5 volts (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–*S e Electrical Equip. Section.*

Curr nt Regulator

S tting–30 amperes (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Ch cking & Adjusting–*S Electrical Equip. Section.*

MISC. ELECTRICAL

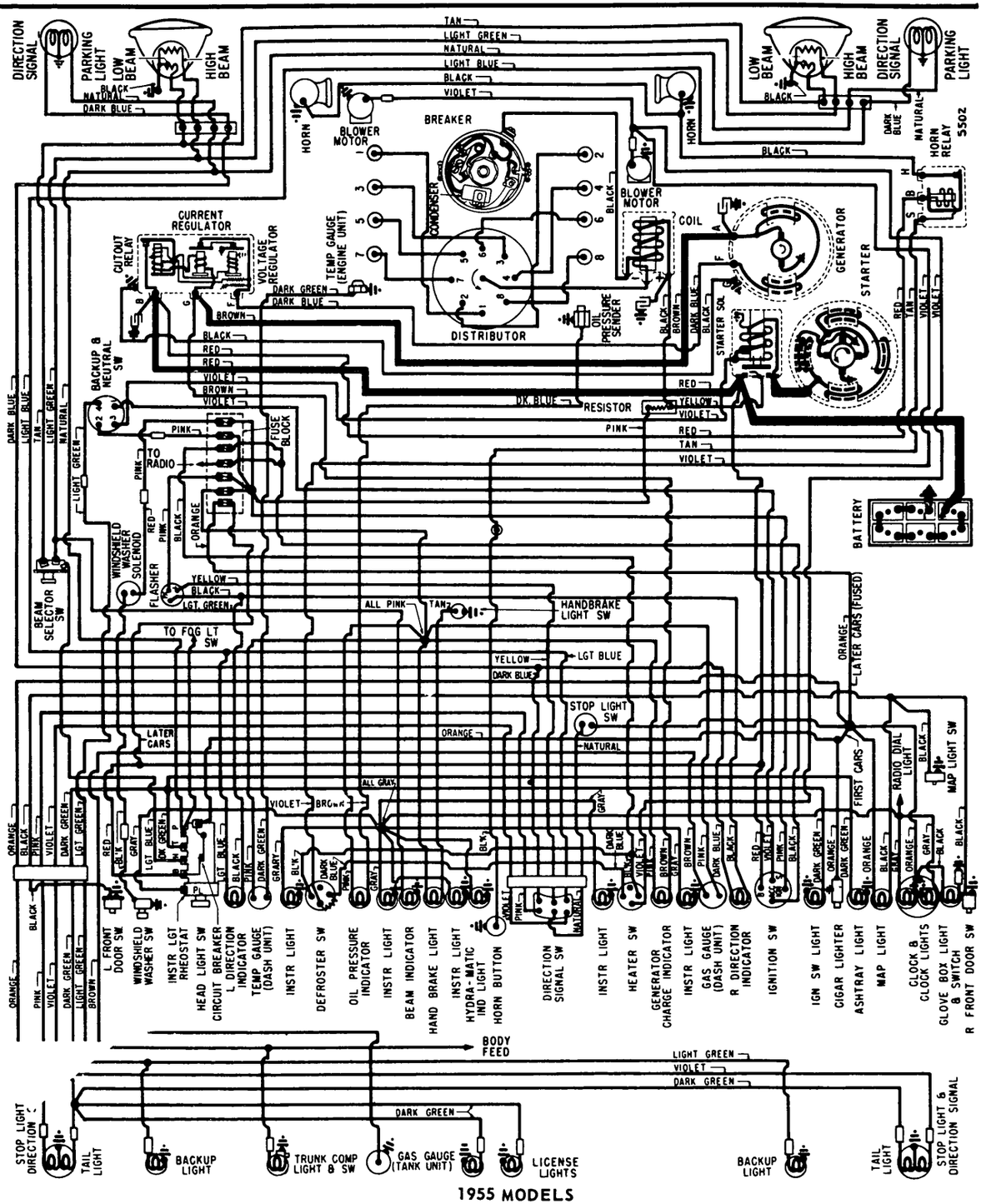
H adlamps: Sealed Beam. *See Electrical Equipment Section.*
Autr nic Ey : *S "Autronic Eye" in Electrical Equipment Section.*
Dir cti n Signal: *S "Direction Signals" in Electrical Equipm nt S ction.*
St p Light Switch: (Locati n) –Mechanical type mounted on underside of toe board and operated by brake pedal.
FUSES: Located on fuse panel under instrument panel on cowl insulating board just to left of car centerline except as noted below

►*1955 WIRING & FUSE PRODUCTION CHANGES:* On later cars, Courtesy & Map Light, Truck Light, Clock Light, Glove Box Light, and Stop Lights are protected by a 14 amp. fuse (see diagram). Ash tray light added.

Windshi ld Washer - 6 Amps.
Back-Up Light - 9 Amps.
Automatic Heating Syst m - 7.5 Amps. (1954), 20 Amp. (1955).
Autr nic Ey - 14 Amps. Located in Autronic Eye Amplifier.
Radi - 7.5 Amps.
Dir cti n Signal - 6 Amps.
Sp t Light - 9 Amps. Under hood at Defroster mounting screw.
Air Conditi n r - Two fuses, 2 Amps. & 20 Amps. (1954), 6 Amps. & 20 Amps. (1955) located under instrument panel near side of glove box (1954), above air conditioner control (1955).
1955 Map, Trunk, Cl ck, Glove Box, & Stop Light (Lat r Cars - Se Pr ducti n Chang ab v): 14 ampere. On block located under instrument panel.

CIRCUIT BREAKERS: (Lighting) 22 Amps., located in main lighting switch. Protects all lighting circuits.

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1955 MODELS

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HORNS: (1954) - D lco-Remy 1999755 (L w N te), 1999756 (High N te). 12 Volt
H rn Relay: Delco-Remy 1116781. 12 Volt
Contacts Close - 2 75-4 0 Volts
Contact Gap - 025" **Air Gap** - 015" (closed)
HORNS: (1955) - (Exc. Eldorado) - Delco-Remy 1999765 (Low Note), 1999766 (High Note). 12 Volt.
(Eldorado) - Delco-Remy 1999585. (Trumpet type) 12 Volt.
H rn Relay: Delco-Remy 1116908. 12 Volt.
Contact Close - 5 0-9 5 Volts.
Contact Gap - 027". **Air Gap** - 014"

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

Bore	Stroke	Displacement	Rated HP
3 13/16".	...3 5/8"	. 331 cu. ins.	.. . . 46.5

Engine	Compr. Ratio	Developed HP
1954	8 25-1	230 at 4400 RPM
1955 Std Eng	9 0-1	250 at 4600 RPM
1955 Eldorado Eng	9.0-1	270 at 4800 RPM

►*OVERSIZE CYLINDER BORE CAUTION: Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have a .010" oversize cylinder bore and pistons.*

►*1954 ENGINE "CLICKING" NOISE CORRECTION (Sounds like loose spark plug wire):* This condition may be caused by oil trapped in vacuum pump. Corrected by installing Divider Plate, Part No 5593537 between vacuum and oil pump.

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Cadillac Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Cadillac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifi cations" in Cadillac Special Data.*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size: 3.8125-3.8145".
Original Bore & Pistons–*See "Original Bore & Pistons" in Cadillac Special Data.*
Pistons–Aluminum alloy, T-T slot, tin plated, "Slipper Skirt" (skirt cutaway at pin bosses).
Weight–19.68 ozs.
Removal–Piston and rod assemblies removed from above. Install connecting rod Guide Studs J-3224, on connecting rod bolts to guide rod out through bore without nicking or scratching. *CAUTION–Do not nick lower edge of bore when pushing rod up.*
Fitting N w Pist ns: Use micrometer or feeler gauge. S *"Pistons" in Cadillac Sp cial Data.*
R plac m nt Pist ns: Standard "High Limit" or maximum production size, and .010", .020", .030" oversize. Pistons furnished only with fitted pins.
Installing Pist ns: Install in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Con n cting Rods" (b low) for installation of pistons on rods.*

PISTON PINS

Pin is pressed in connecting rod.
Diameter–1.000". **Length**–3 3/32".
Pin Fit in Piston–.00005"-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).
Pin Fit in Rod–(NOTE–Special tools required). *See "Piston Pins" in Cadillac Special Data.*

PISTON RINGS

Top compression ring is chrome plated rolled steel and the other two rings are cast iron. An expander is not used behind the oil ring in production.

Ring	Width	End Gap	Side Clearance
Compr (#1 & 2)	5/64"	010- 020'	0017- 0035"
Oil (#3)	3/16"	010- 020"	0008- 0026"

Replacement Rings: Standard, .010", .020", .030" oversize.

►*REPLACEMENT RING NOTE–If re-ring set is to be installed in new or low mileage bores, it is not necessary to install oil ring expander.*

Installing Rings: Chamfered face of both compression rings must be installed toward top of piston

CONNECTING RODS

Length–6 5/8" (center-to-center).
Weight–23.49 ozs.
Crankpin Journal Diameter–2.2488-2.2493".
Out-of-Round Limits–.00025".
Bearings–Moraine-Durex, bearing shell is steel backed aluminum. Bearing halves interchangeable. No shims
Clearance– 0002-.0020" (Service limit .0045").
Sideplay– 008-.014" (total both rods).
Replacement Bearings: Furnished in standard size only
Installing Rods (In Pistons): On pistons Nos. 2-4-6-8, install rod so mark 'REAR' on piston pin boss is to **left** side of rod (with stamped number on rod facing operator). On pistons Nos. 1-3-5-7, install rod so mark 'REAR' on piston pin boss to to **right** side of rod (with stamped number on rod facing operator).

CRANKSHAFT

►*1955 MAIN BEARING CAP PRODUCTION CHANGE & INSTALLATION CAUTION:* Heavier bearing caps used on later cars These caps used WITHOUT lockwashers on retaining screws *CAUTION–Use of lockwashers on these caps will result in insufficient thread engagement of retaining screws.*

Journal Diameters–2.4985-2 4995" Five bearings
Out-of-Round Limits– 00025".
Clearance–.0008-.0015" (service limit .005" max.).
End Thrust–Taken by flanged rear bearing.
End Play–.001- 005" (service limit .010" max.)
Bearings–Moraine Durex. Bearing shell is steel backed aluminum. Bearing halves interchangeable. No shims
Replacement Bearings: Furnished in standard size only
Main Bearing Removal & Installation: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

►*MAIN BEARING CAP INSTALLATION CAUTION:* Bearing caps must not be interchanged Install caps with marking number (not casting number) on left side and in order from front to rear DO NOT use lockwashers on LATER HEAVIER bearing caps (see Production Change above).
Crankshaft R moval & Installation: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*
Rear Main Bearing Oil Seal Installati n: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage or mis-alignment. Check whenever removed
Removal, Alignment & Installati n–*See "Camshaft & Bearings" in Cadillac Sp cial Data.*
Bearings–Steel backed babbitt bushings.
Clearance–.001-.0022' (service limit .004" max.).
Bearing Cut-of-Round Limit–.002" max.
Timing Chain: Link-Belt side guide type. Width 11/16", Pitch 500", Length 23" or 46 links.
Installation & Removal–*See "Timing Chain" in Cadillac Special Data.*
Camshaft Setting: Both sprockets marked '0'. Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.
►*CAUTION:* Install chain as a unit with camshaft sprocket (sprocket press fit on shaft with locating dowel and two retaining capscrews).

VALVES

Tappet Clearance: None in service (hydraulic).

Valves	Head Diam.	St m Diam.	Length
Intake	1 750"	3415- 3425"	①4 628-4 648'
Exhaust	1 562"	3415-.3420"	4 21/32"

Valve	Seat Angle	Lift	St m Clearance
Intake	②44°	③	0005-.0025'
Exhaust	②44°	④	001- 0025"

①–"Rich" Valves "Eaton" Valves 4 628-4 653".
②–New valves (Valves in service can be refaced to 45° if seat width recommendation not exceeded).
③–New valves and guides. Worn limit 005" max.
④ - **.365" (1954), .411" (1955).**

►*VALVE SEATING CAUTION:* Do not lap or grind so that seat width is more than 1/64" (1° difference between valve and seat angle designed to provide "hairline" contact.
►**Valve Seat Recommendations:** 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving). Cut seat so that distance from outer edge to edge of flange on valve head not more than 1/32".
Valve Stem Oil Seal–Rubber oil seal installed in lower groove on valve stem (below valve keeper).
Oil Seal Installation: *See "Valve System" in Cadillac Special Data.*
Valve Removal & Installati n: *See "Valve System" in Cadillac Special Data.*
Valve Guides: Pressed in cylinder head with counterbored end down toward valve head. Use Remover Tool J-3062 to drive old guides out toward top of head, Installer Tool J-3066 to drive new guides in (tool plate serves as stop for driver)
Valve Springs: (Free Length) 1 980"

1954 Valv Spring Sp cificati ns

	Pressure	Length
Valve Closed	61 lbs.	1.696"
Valve Open	140 lbs	1.326"

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1955 Valve Spring Specifications

	Pressure	Length
Valve Closed	62-68 lbs.	1.696"
Valve Open	152-162 lbs.	1.285"

►*SPRING INSTALLATION CAUTION: Lower end of valve spring must be seated in recess in cylinder head.*

Valve Lifters: Hydraulic.
See "Valve System" in Cadillac Special Data.

Valve Lifter Removal—*See "Valve System" in Cadillac Special Data.*

►*LIFTER NOISE CORRECTION:* If noise noted when engine hot, oil level low, after sudden stops, or when descending steep grades, see OILING SYSTEM below for correction to prevent air entering pump.

Rocker Arms: Rocker arm end shaft assemblies are mounted on each cylinder head. *NOTE*—No adjustment screws provided on rocker arms.

Rocker Arm Installation—*See "Valve System" in Cadillac Special Data.*

►*VALVE PUSH ROD CAUTION: 1955 Push Rods are shorter (identified by single groove at upper end), and are not interchangable with previous models.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

1954 Valve Timing

Intake Valves - Open 22° BTDC. Close 67° ALDC.
Exhaust Valves - Open 63° BLDC. Close 27° ATDC.

1955 Valve Timing

Intake Valves—Open 19° BTDC. Close 70° ALDC.

Exhaust Valves—Open 60° BLDC. Close 30° ATDC.

Valve Timing Check—Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing marks.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data.*

►*AIR IN OILING SYSTEM (Causing oil foaming or noisy hydraulic lifter operation): See Oil Pump Installation under "Oiling System" in Cadillac Special Data for installation of "O" ring seal on float tube and inspection of oil pan baffle for clearance.*

Crankcase Capacity: 5 qts. One quart additional for dry filter.

Normal Oil Pressure : 30-35 lbs. min. at 30 MPH. 15 lbs. at idle speed.

Pressure Regulator Valve—On oil pump. Not adjustable.

Oil Pressure Indicator—Light on instrument panel controlled by pressure switch AC No. 1998113 (1954), 1997884 (1955) mounted on engine.

Oil Pump: Helical gear. In crankcase at rear of engine.

Oil Pump Removal & Overhaul: *See "Oiling System" in Cadillac Special Data.*

Vacuum Pump: Part of Oil Pump assy. *See "Vacuum Pump" in Cadillac Special Data.*

Oil Filter: Partial flow. Replace element every 6000 miles or more frequently in dusty areas.

Replacement Filter Element—AC No. 1P-115

Crankcase Ventilation: Air intake in oil filler cap (oil wetted type) with outlet connection at rear of valve compartment cover, and outlet pipe extending down below engine at right corner.

COOLING

►*THERMOSTAT INSTALLATION CAUTION: Install with spring strap parallel to car center line otherwise right engine bank will operate at higher temperature.*

Water Capacity: (Exc. Ser. 75) - 22 qts. (1954), 20¼ qts. (1955), with heater. 19¾ qts. (1954), 18 qts. (1955) without heater.
(Series 75) - 24½ qts. (1954), 22¾ qts. (1955) with heater. 19¾ qts. (1954), 18 qts. (1955) without heater.

Pressure Valve: AC No. 850559. Radiator filler cap. Opens at 12-15 lbs.

Thermostat: Dole type. In water outlet at top of pump body.
Standard Setting—Starts to open at 163° to 168°F.
High Temp.—Starts to open at 177° to 182°F.

Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Cadillac Special Data.
Pump Removal—Remove upper and lower radiator hoses after draining cooling system. Remove generator drive belt and take out capscrew mounting pump and water manifold assembly on front of engine, lift out pump and fan. NOTE—Water manifold and thermostat housing are part of pump casting.

Temperature Gauges: AC Electric.
Dash Unit—AC No. 1512789.
Tank Unit—AC No. 1512678.
See "Temperature Gauges" in Miscellaneous Section.

HYDRA-MATIC DRIVE

Dual-Range four speed automatic transmission and fluid coupling.

►*1954 CADILLAC HARD DOWN-SHIFT CORRECTION—May be caused by excessive thickness of jute under floor mat. Adjust accelerator pedal (see Linkage Adjustment in Hydra-Matic Section) and make sure that thickness of jute under floor mat is less than ½". Check wiring harness bracket, throttle relay, and speedometer cable for possible interference with throttle rod.*

►*1954 HYDRA-MATIC OIL LEAK (At Vent on Front of Transmission Case) CORRECTION: May be caused by out-of-round or undersize pressure regulator valve. See "Hydra-Matic Drive" in Transmission Section.*

►*1955 HYDRA-MATIC CLUTCH PRODUCTION CHANGE (270 HP Eng.):* Thinner clutch discs used in front and rear units and an extra driving disc has been installed in both units. *CAUTION—This type clutch disc is to be used only on the 270 HP Engine equipped cars.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 2000 miles at time of car lubrication. Drain and refill after 6000 miles and every 25,000 miles thereafter. Use only Cadillac Hydra-Matic Fluid.

Capacity—Approximately 10 qts. (refill).

Checking Fluid Level—With selector lever in "N" (neutral) position, run engine at speed of 20 MPH for about 2½ minutes. Reduce engine speed to slow idle (375-400 RPM). Raise engine hood and remove transmission dipstick (located at right rear side of engine) wipe it clean and check fluid level. With engine still idling, add fluid to bring level to "F" (full) mark on dipstick. *CAUTION*—Do not fill above "F" mark on dipstick, foaming will result.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type. Two used (three on commercial cars with center bearing).
See Universals Section for complete data.

►***1955 UNIVERSAL JOINT YOKE PRODUCTION CHANGE & REPLACEMENT CAUTION:* New yokes used in production and furnished for replacement as follows:**

Front Joint (Slip) Yoke—New yoke (same part number as previous type) has longer yoke splines (counterbore eliminated) which provide more contact area between output shaft and yoke splines which eliminates possibility of drive line thump developing in service. *See "Propeller Shaft Notes" in Cadillac Special Data for installation of this yoke on early cars.*

Rear Joint (Pinion Shaft) Yoke—Stronger yoke (thicker flange and without body taper) used on later cars (beginning approx. Eng. No. 27403). *When installing this yoke, longer mounting screws, No. 1463229, MUST be used (shorter screws used with previous type yoke will not have sufficient thread engagement).*

►*REAR UNIVERSAL YOKE CAUTION: Do not disturb nut on end of pinion shaft retaining rear universal joint yoke unless yoke or oil seal should be replaced. Pinion bearing preload must be adjusted whenever this nut disturbed.*

REAR AXLE

Own Make. Hypoid gear, semi-floating with Hotchkiss Drive.
See "Cadillac Hypoid" in Rear Axle Section.

►**1955 DRIVE LINE THUMP CORRECTION: See Front Joint Yoke date under "Universal Joint Yoke Production Changes & Replacement Caution" above.**

►*OVERHAUL CAUTION:* Manufacturer recommends that Carrier Assembly be serviced by replacement. Do not disassemble this unit or attempt service work other than oil seal and universal joint replacement.

Axle Identification—Axles marked by number stamped bottom of differential case below center of pinion shaft (First Cars) or on oil return hole boss at front end of differential case (beginning Engine No. 94850). Ratios and marks are as follows:

Car Model	Ratio	Mark
1954 - 60S,62 Air Cond.	3.36-1	"6"
1954 - 60S,62 Std. ①	3.07-1	"3"
1954 - 60S,62 Opt. ②	3.36-1	"6"
1955 - 60S,62 Std.	3.36-1	"6"
1955 - 60S, 62 Opt.	3.07-1	"3"
1954-55 - 75	3.77-1	"7"
1954-55 - 86	4.27-1	"4"

① - Exc. Air Cond. Cars. ② - Air Cond. Cars.

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►**Pinion Bearing Preload Adjustment:** Must be adjusted each time pinion shaft nut loosened. *See "Cadillac Hypoid" in Rear Axle Section.*

Backlash—.003-.010" Screw adjustment.

Axle Shaft Removal: Remove wheel and take out screws holding brake drum on axle shaft flange and remove drum. Remove nuts and lockwashers from bolts holding bearing retainer and backing plate on axle housing, use Puller J-942-1 and Slide Hammer J-2619 to remove axle shaft.

►*CAUTION:* Use care not to damage axle shaft oil seal when sliding axle shaft out and do not disturb position of backing plate on housing.

Commercial Cars—Remove wheel, remove nut and washer on end of shaft. Use Puller (Snap-On No. S4567 or similar five jaw type) to remove wheel hub and brake drum. Disconnect brake line. Take out retaining screws and remove dust shield (bearing retainer) and backing plate. Use Puller J-838 to pull axle shaft and bearing assembly out, using care not to damage oil seal in housing.

Differential Carrier Removal: Disconnect rear universal joint and remove lubricant from rear axle housing. Remove axle shafts (see above). Remove nuts and washers holding carrier to axle housing and remove entire assembly with gasket. *See "Overhaul Caution" above.*

Wheel Bearings: Sealed ball-bearing type.

CAUTION—Check bearings for loss of lubricant when shaft removed. If bearings spin freely indicating loss of lubricant, replace bearings.

Pinion Bearing Preload Adjustment: Pinion should be adjusted whenever nut on end of pinion shaft disturbed (for universal joint yoke or oil seal replacement).

See "Cadillac Hypoid" in Rear Axle Section.

SHOCK ABSORBERS

Delco. Direct acting permanently sealed, airplane type located within coil springs (front), "Sea-Leg" type installation (rear), as follows:

Car Model	Front - Part No. - Rear
1954 All Series	5531303 5531306
1955 All Series	5531303 5531309

FRONT SUSPENSION

Independent type with direct acting shock absorbers within coil springs.

►*1955 FRONT SPRING PRODUCTION CHANGE & REPLACEMENT CAUTION:* **Longer coil springs WITHOUT** lower insulators used on later cars. When installing this late type spring on early cars, lower insulator should be removed and discarded.

Kingpin Inclination—5°51' with 0° camber.

Caster—0° to Neg. 1°. Adjustment must be equal within ½° or less on both sides of car.

Camber—Neg. 3/8° to Pos. 3/8° with ¼-½° more positive camber on left side.

►***1954 CAMBER NOTE:* Set Left wheel Pos. 3/16°, Right wheel Neg. 3/16° for preferred setting.**

Toe-In—3/16-¼" (at rest). Loosen clamp bolts, turn adjusters at outer end of each rod equally.

Toe-Out on Turns—With outer wheel turned 20°, inner wheel should be 22°40'.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut type.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic power cylinder.

See "Saginaw (GM)" in Steering Section.

►*1954 POWER STEERING GEAR CHATTER (NOT CHUCKLE) CORRECTION (Cars prior to Eng. No. 01688):* This chatter, particularly noticeable after reversing direction of steering wheel rotation when backing into parking space, correct by replacing valve body assembly.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix (Hydraulic) Single Anchor. Conventional two-shoe. Parking lever applies rear wheel service brakes.

Drums—Diameter 12" (all Series). Regrinding limits .060".

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

►*BRAKE PEDAL BIND & EXCESSIVE PEDAL EFFORT (Cars for Engine No. 22750):* *See "Brakes" in Cadillac Special Data.*

1954 Brake Lining

	Length	Width	Thickness
Primary	11.45"	2¼"	¼"
Secondary	12.92"	2¼"	¼"

1955 Brake Lining

	Length	Width	Thickness
Primary	11.52" ①	2½"	¼"
Secondary	12.98"	2½"	¼"

①—(60S & 62). 12.98" (75 & 86 Series).

Braking Power—(Exc. 86 Series) 55.8% (front), 44.2% (rear). (86 Series) 52.8% (front), 47.2% (rear).

Clearance—.010" (top), .015" (bottom). Adjusting screw backed off 14 notches from point where wheel can just be turned by hand.

Master Cylinder: On left frame member directly forward of brake pedal.

Checking Fluid Level Not—Remote fluid reservoir above master cylinder on firewall. Maintain level to within ¾' of top of container.

Master Cylinder Removal—Remove splash shield from flywheel housing and remove master cylinder in usual manner.

Power Brakes: Bendix "Hydrovac" Power Unit connected in hydraulic line between master cylinder and wheel cylinders (no mechanical connection).

See "Hydrovac Power Unit" in Brake Section.

Removal of Power Unit—Disconnect brake lines at power cylinder end plate. Loosen vacuum line hose clamp at check valve and slide hose off check valve. Remove three nuts and lock washers from cylinder mounting bracket and remove assembly from car.

MISC. MECHANICAL

Windshield Wipers: Cable operated—Vacuum type.

See "Windshield Wipers" in Miscellaneous Section.

Windshield Washer: Connected with windshield wiper so that when windshield washer is operated, wiper motor automatically operates to clean windshield.

►***1955 WINDSHIELD WASHER PRODUCTION CHANGE:* Solenoid Switch (for wiper control when washer operated) discontinued on cars beginning Engine No. 97096.** *See "Windshield Washers" in Miscellaneous Section.*

Power Window Regulators (1955): Electric, with reversible motor in each window.

See "Electric Window Regulators" in Miscellaneous Section for data.

Power Top Control: Hydro-Lectric with "sealed" system which does not require periodic draining and refilling. *See "Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: Electric reversible motors for vertical and horizontal adjustment.

►***1955 POWER SEAT CHUCK & NOISE CORRECTION:* May be corrected by adjustment and by installation of** Tension Springs (used in production beginning Engine No. 57610). *See "Power Seat Adjusters" in Miscellaneous Section.*

Air Conditioning: *See "Frigidaire (GM) Air Conditioning in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: B fore disc nn cting any part of air c nditi ning quipment r lin s f r access t ngin , see "Air C nditi ning S rvice Cauti ns" in Miscellaneous Section.*

MODEL IDENTIFICATION

ENGINE & SERIAL NUMBER: Stamped on upper right corner on front face of right hand block, on right frame side member just to rear of engine support bracket, and on lubrication plate on front side of left body pillar (Exc. Coupe), on left door lock pillar (Coupe).

S ri s	First 1956 Nos.
60S	566000001
62	566200001
75	567500001
86	568600001

Id ntification—First two figures indicate year, third and fourth indicate model (last five figures are numbered consecutively regardless of series).

Engin Unit Number Not : Use for identification. Stamped on top of crankcase to rear of left hand block with prefix indicating model:

S ri s	Engine Unit Prefix
60S, 62, 75 (Standard)	4X-1 and up.
60S, 62, 75 (Air Conditioned)	4XK-1 and up.
86 (Standard)	5X-1 and up.
86 (Air Conditioned)	5XK-1 and up.
60S, 62(Dual Carburetors)	7X-1 and up.
60S, 62 (Dual Carbs. & Air Conditioned)	7XK-1 and up.

►*ENGINE NUMBER NOTE:* "L.C." will be added as a suffix to engine unit number on all engines built to low compression specifications.

►*NOTE:* Mark * preceding Engine Unit Number indicates cylinder bore and pistons are .010" oversize.

TUNE-UP

►*1956 DETONATION CORRECTION (Early Cars in Low Octan Ar as): See "Ignition Timing" below.*

►*POWER LOSS OR "STUMBLE" AFTER HARD LEFT TURN CORRECTION (CARS WITH CARTER CARBURETOR):* May be caused by fuel leakage from bowl into choke vacuum passage. *See "Cadillac (Carter & R ch st r) Carbur t rs" in Carburetion Section.*

►*FLAT SPOT & "SHUDDER" CORRECTION (ELDORADO ENGINE): S "Cadillac (Carter & Rochester Carburet rs" in Carbur ti n Section.*

►*SURGE UNDER FULL THROTTLE OR LEANNESS AT HIGH SPEED CORRECTION (CARTER CARBURETORS): See "Cadillac (Carter & Rochester) Carburetors" in Carbureti n S cti n.*

►*PART THROTTLE DETONATION CORRECTION:* Install Vacuum Advance Unit, Delco-Remy Part No. 1116103 on early cars which were equipped with Part No. 1116097.

COMPRESSION PRESSURE: 165 to 185 lbs., (at cranking speed) 212 to 230 lbs., (at 1000 RPM)

VACUUM READING: Not specified. *NOTE*—Beginning with Eng. No. 033849, new Camshaft used which results in decrease in manifold vacuum (normal vacuum at sea level with new camshaft is 13-15" idling)

►*VACUUM CHECKING CAUTION: When checking engine vacuum, shut off engine before removing vacuum hose. The plunger in the vacuum operated throttle check will increase engine speed to approximately 900 RPM if hose is removed with engine running. Set hand brake firmly before checking engine vacuum.*

VALVE TAPPET CLEARANCE: None in service (Hydraulic Lifters).

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Valve diverts exhaust gases of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system during warm-up period.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: 035"

Spark Plugs—AC No 44 (All Engines), 14mm

COIL: Delco-Remy 1115082. *12 Volt.*

Ignition Current—1.25 amps. idling. 3 amps. stopped.

Resistor—Delco-Remy 1927809. On coil bracket.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil.*

DISTRIBUTOR: Delco-Remy 1110858 (Except Eldorado), 1110859 (Eldorado Engine). *12 Volt.* New "Window type" with external adjustment. *See "Delco-Remy (Window type) Distributor" in Electrical Section.*

Condenser—Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set—Delco-Remy 1931988.

Breaker Gap—.016" (new & used points).

Cam Angle—26-33°.

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	575	0-4	1150
6-8	1275	12-16	2550
9-11	1950	18-22	3900

Vacuum Spark Control: Delco-Remy 1116097 (Early); 1116103 (Later). *See "Part Throttle Detonation Correction" above.*

Vacuum Advance - 1116097

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
18	36	15.5-17.25

Plunger Travel - 3/8-13/32"

Vacuum Advance - 1116103

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6.5-8.5
15.5	31	13.5-16

Plunger Travel - 5/16-11/32".

IGNITION TIMING

►*1956 ENGINE DETONATION (Low Octane Areas):* If octane rating of available fuel results in detonation complaints, this condition can be corrected as follows.

1) Ignition Timing—Check timing. Timing can be retarded to 2½° BTDC (midway between "A" and "C" on harmonic balancer), or in extreme cases to TDC ("C" mark on balancer), without noticeable decrease in performance.

2) Distribut r Vacuum Advance—If detonation not corrected by timing change, original Vacuum Advance Unit, Delco-Remy No. 1116097, can be replaced with late type unit No. 1116103.

3) Low ring C mpression Ratio—On engines before Eng. No. 033849, compression ratio can be lowered by installing shim., Part No. 1466224, under each cylinder head. After installing shim, torque head bolts to 65-70 ft. lbs. and retorque after 500 miles to 75-80 ft. lbs. *NOTE*—Beginning Eng. No. 033849, engines have extra head gasket, shim, or modified cylinder head installed in production and it should not be necessary to lower compression ratio.

4) Low Compression Pistons—For travel in foreign countries where octane rating of fuel is not equivalent to average U.S. fuel, a set of low compression pistons, Part No. 3630680, can be installed.

►*SETTING CAUTION: Settings below are latest recommendations and should be followed exactly to avoid detonation and possible damage to engine. THESE SETTINGS ARE CORRECT FOR FUEL OF 97 OCTANE RATING AND TIMING MUST BE RETARDED IF FUEL OF LOWER OCTANE RATING USED.*

Car Model	Ignition Setting
First Cars (To Eng. No. 033849)	2½° BTDC
Later Cars (Beginning No. 033849)	5° BTDC

Timing—Disconnect vacuum line to distributor and tape end of line. Idle engine at 400 RPM, set timing midway between "A" and "C" line on balancer (First Cars—2½° BTDC setting), or at "A" line on balancer (Later Cars - 5° BTDC setting).

Timing Mark—Two lines on vibration balancer at front of engine marked "A" (5° BTDC) and "C" (TDC) and pointer on right side of chain case cover.

CARBURETOR

►*CARBURETOR APPLICATION: One 4-Barrel Carter or Rochester 4-Barrel Carburetor used on all models except Eldorado. Two Carter 4-Barrel Carburetors used on Eldorado.*

►*1956 DETONATION CORRECTION: (Early Cars in Low Octane Areas): See "Ignition Timing" below.*

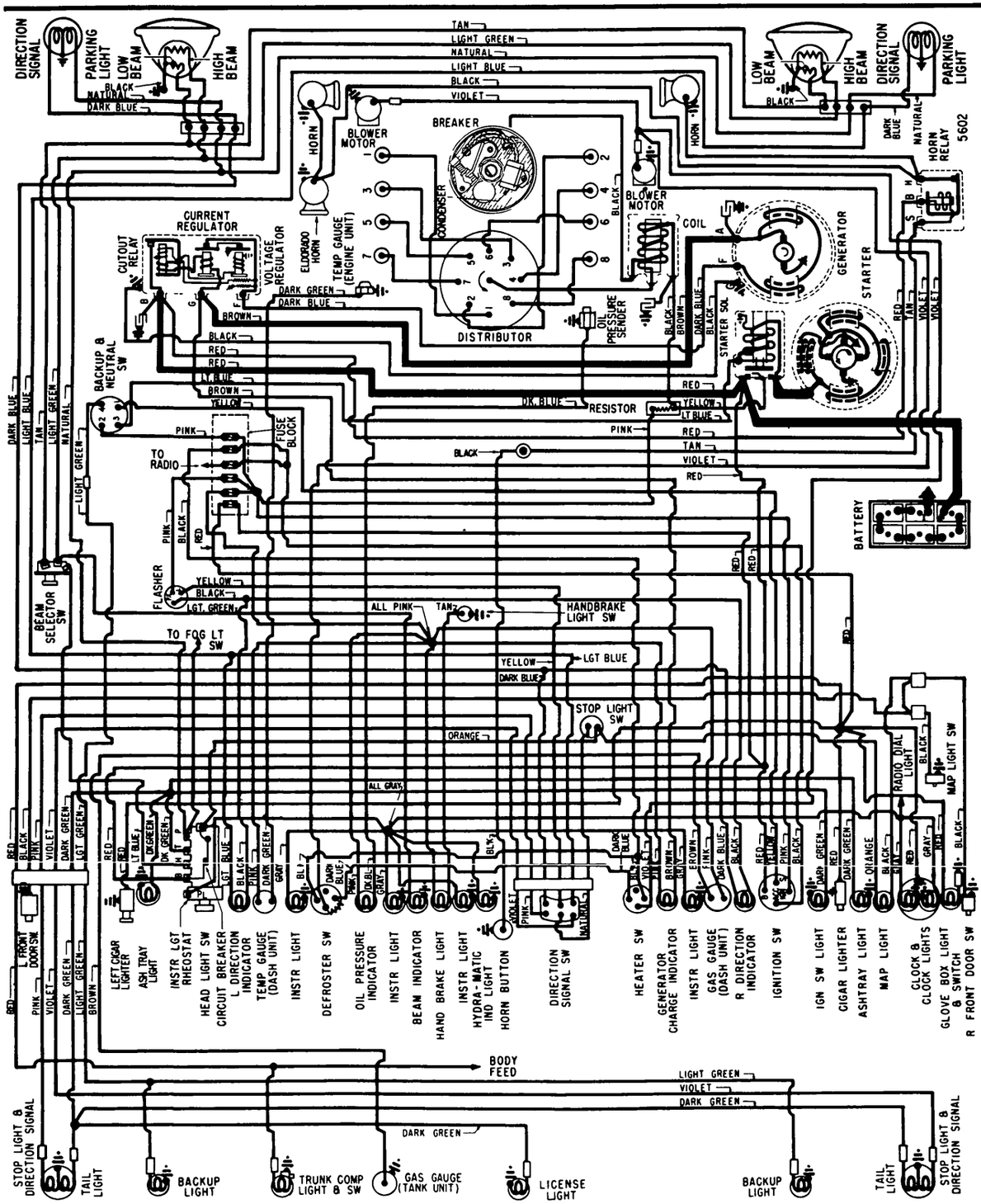
►*CARBURETOR PRODUCTION CHANGES & RECOMMENDED CORRECTIONS: See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section.*

►*FAILURE TO OBTAIN WIDE OPEN THROTTLE POSITION (Due to improper accelerator pedal adjustment):* Adjust accelerator pedal arm-to-trunnion, on the accelerator pedal linkage, up or down to obtain 4¼" clearance from underside of top of pedal to floor pan. With carpet installed, this dimension should be 3¼" to top of carpet.

►*IMPROPER CARBURETOR CHOKE OPERATION CORRECTION:* This condition may be caused by oil leaking from the right rocker arm cover and draining down to the hot air stove on the right exhaust manifold where it is then drawn up into the choke housing. Check for indications of oil in choke assembly and clean if necessary. Replace right rocker arm cover gasket.

►*IDLE SPEED (AIR CONDITIONED CARS): Summer and Winter Idle Speed Adjustment is different as follows:* **Summ r S tting (Air Conditi n r in Op rati n)**—With transmission selector lever in either "Dr" range, and

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with air conditioner "ON" set idle speed at 420 RPM (Cars with Standard Engine). 490-510 RPM (Cars with Eldorado Engine).

Winter Setting (Air Condition r Not in Operati n)– With transmission selector lever in either "Dr" range, and with air conditioner "OFF" set idle speed at 420 RPM (Cars with Standard Engine), 490-510 RPM (Cars with Eldorado Engine).

Idle Speed-Up Control Adjustment (Cars with Air Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air conditioner "ON", and place transmission selector lever in "N" position. Adjust engine idle speed to 900 RPM by loosening locknut on diaphragm shaft and turning knurled nut ot obtain specified RPM. Tighten locknut.

►***THROTTLE CHECK ADJUSTMENT CAUTION (CARS BETWEEN ENGINE NOS. 033849 & 053286):*** **S t plunger gap at .185" to prevent return check opening throttle when vacuum is low (the camshaft change at Engine No. 003849 resulted in lower manifold vacuum).** ***See Production Change b low f r later typ Throttle Check Assembly.***

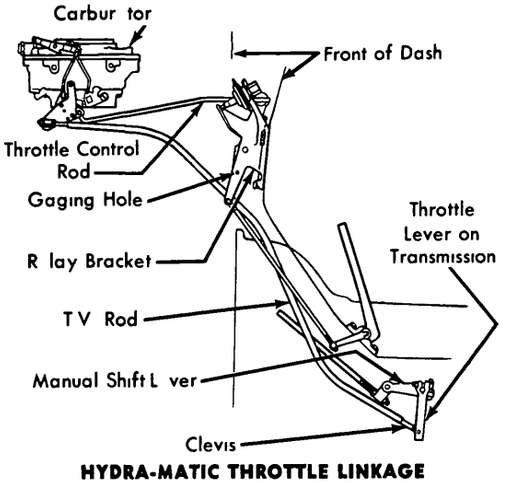
►***THROTTLE CHECK ASSEMBLY PRCDUCTION CHANGE:*** **Starting at Engine No. 053286, a new Throttle Check Assembly entered production to prevent return check opening throttle during low vacuum periods. This later assembly is furnished in kit, Part No. 7009892 (identified by black check valve nipple, and tin plated throttle plunger) and can be used for service replacement on cars after Engine No. 033849.**

Throttle Check Adjustment (Standard Method): With engine at normal operating temperature, allow engine to idle and make sure that check plunger is not in contact with throttle relay lever. Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out. Let throttle snap shut and observe delay caused by throttle check. If engine races, throttle check plunger is too long. If engine stalls, plunger is too short. Adjust plunger screw as necessary for correct operation. *NOTE* – On cars between Engine No. 033849 & 053286, plunger gap must be set at .185". *Se "Thr ttl Ch ck Adjustment Caution" above.*

Throttle Check Adjustment (Alt rnat Method): With engine running at operating temperature and selector lever in "Park" position, remove hose from throttle return check assembly and place a piece of masking tape over end of hose to prevent vacuum leak. Hold plunger with a wrench and turn hex-head stem to obtain an engine speed of approximately 1100 RPM. Connect vacuum hose, making certain that engine speed returns to 420 RPM in "DR" (single carburetor engines); 500 RPM (dual carburetor engines). With foot brake fully applied, check adjustment by momentarily speeding up engine to full throttle with transmission in "DR" range, then quickly release accelerator. When properly adjusted, the engine will barely keep from stalling when foot is released from accelerator. *CAUTION* – Make sure that excessive overrun of throttle check is not present.

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HYDRA-MATIC THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT: Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash) Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket With engine running, set throttle lever in hot idle position (Air Conditioner turned "OFF") Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop Turn front jam nut on throttle valve rod against trunnion until all slack is taken up **Th n tight n nut th number of turns as indicated b l w** (due to engine throttle adapter plate and transmission changes). Tighten rear jam nut being careful not to put binding force on carburetor plate. *NOTE – B caus of differences in carburetion and hydraulic characteristics in th transmission, throttle valve rod adjustments may be varied 1½ turns in either direction to provid corr ct shift points.*

Throttl Valv Rod Adjustment
B for Engin No. 033849
① (Cars with Single Carburetor)

Trans. N .	② Throttle Plate No.	③ Turns
Up to C-32200 or A-2539	#1	3
After C-32199 or A-2538	#3	4

Aft r Engin No. 033848
(Cars with Single Carburetor)

Trans. N .	② Throttle Plate No.	⑩ Turns
Up to C-32200 or A-2539	⑩ #1	⑩ 3
After C-32199 or A-2538	#3	3

①-4 Turns on all engines with dual 4 Bbl. Carburetors.
②-Plate stamped "1" or "3".
③-Tighten nut on T.V. rod the number of turns indicated.
⑩-Remove throttle plate #1 and install kit, Part No. 3630753 which includes a #3 throttle plate. Adjust throttle valve 3 turns.

CARTER WCFB
(Standard Engine)

Carter WCFB 2333S, SA (Early), 2543S (Late) Cars without Air Conditioning. Carter WCFB 2334S, SA (Early), 2544S (Late) Cars with Air Conditioning.

►*CARBURETOR REPLACEMENT NOTE: Carter WCFB 2370SA can be used to replace WCFB 2333S, SA, & 2334S, SA. Carter WCFB 2545S can be used to replace WCFB 2543S, & 2544S. On cars with Air Conditioning, Unitized Package 202-44U must also be used.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*NOTE: Carburetors No. 2334S, SA & 2544S have Idle Speed-up Control for use with Air Conditioning.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air By-Pass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed at slow idle.*

Idle Speed – 420 RPM in "DR" range. (Cars with Air-Conditioning should have the same idle speed, with Air Conditioner turned on). *NOTE – This idle speed setting supersedes the previous setting of 400 RPM.*

Idle Mixture & Idle Speed Setting – Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section.*

►*IDLE SPEED ADJUSTING STOP SCREW NOTE:* An idle speed stop screw has been added to some Carter carburetors to improve idle characteristics during the break-in period. The idle stop screw is not necessary after the break-in period and should be removed at the 1000 mile point.

►*OTHER DATA: See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fuel Pump Pressure: 5¼ - 6½ lbs. at 4800 RPM.

ROCHESTER 4GC
(Standard Engine)

ROCHESTER 4GC No, 7008750 (Early - Without Air Conditioning); No. 7009750 (Late - Without Air Conditioning); 7008751 (Early - With Air Conditioning); 7009751 (Late - With Air Conditioning).

►*CARBURETOR REPLACEMENT NOTE: Rochester 4GC No. 7009901 can be used to replace 7008750 & 7009750. Rochester 4GC can be used to replace 7008751 & 7009751.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feel Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*NOTE: Carburetors No. 7008751 & 7009751 have Idle Speed-up Control for use with Air Conditioning.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air By-pass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed at slow idle.*

►*ROCHESTER CHOKE SETTING CHANGE (To eliminate hard starting after engine stalls while choke is on):* Adjust choke to index mark instead of one point rich mark as previously used.

►*FLAT SPOT CORRECTION (ROCHESTER CARBS.):* Install primary main metering jet No. 7002651. Carburetors with the new jet are identified by a black or red carburetor tag.

Idl Spe d – 420 RPM in "DR" range. (Cars with Air-Conditioning should have the same idle speed, with Air Conditioner turned on). *NOTE – This idl sp ed s tting sup rs d s th previous s tting of 400 RPM.*

Idl Mixture & Idl Sp d Setting – Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Cadillac (Carter & Rochester) Carburetor" in Carburetion Section.*

►*OTHER DATA: See "Cadillac (Carter & Rochester) Carburetor" in Carburetion Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fuel Pump Pressure: 5¼ - 6½ lbs. at 4800 RPM.

CARTER WCFB (2)
(Eldorado Engine)

Carter WCFB 2371S (Front-Without Air Conditioning). 2373S (Front-With Air Conditioning) 2372S (Rear-All Models).

►*FLAT SPOT CORRECTION (Before Engine No. 044963, Cars without Air Conditioning, 044986, Cars with Air Conditioning): See "Cadillac (Carter & Rochester Carburetors)" in Carburetion Section.*

►*IMPROVED IDLE STABILITY NOTE: Wind the torsion closing spring one additional turn around the secondary throttle shaft.*

►*CARBURETOR REPLACEMENT NOTE· Carter WCFB 2371S can be used for service replacement of 2372S & 2373S Unitized Package 202-100U must be used when replacing 2373S (Air Conditioned Cars)*

►*CARBURETOR INSTALLATION NOTE Front & Rear Carburetors operate together as follows*

►*MANIFOLD FUEL DISTRIBUTION (FRONT CARB)* Right PRIMARY & Left SECONDARY barrels feed Cyl 2-3-5-8 Left PRIMARY & Right SECONDARY barrels feed 1-4-6-7

►*MANIFOLD FUEL DISTRIBUTION (REAR CARB):* Left PRIMARY & Right SECONDARY barrels feed Cyl 2-3-5-8 Right PRIMARY & Left SECONDARY barrels feed 1-4-6-7

►*NOTE: 2373S has Idle Speed-Up Control for use with Air Conditioning*

►*IDLE SPEED ADJUSTMENT NOTE Idle Air By-Pass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed at slow idle*

Idle Speed – 490-510 RPM in "DR" range.

Idle Mixture & Idle Speed Setting – Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Cadillac (Carter & Rochester Carburetors)" in Carburetion Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fuel Pump Pressure: 4¼ - 6½ lbs. at 1800 RPM.

CARB. EQUIPMENT

Fuel Pump: AC (Fuel only). Vacuum pump is part of engine oil pump.
R placement Fuel Pump – AC No. 4269.
Pr ssure – 5¼ - 6½ lbs. at 4800 RPM.
See "Fu l Pumps" in Carbur tion Section.

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Gasoline Gauge: AC Electric.
Dash Unit – AC No. 1518488.
Tank Unit – AC No. 1517215.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 3EMR70-W. *12 Volt,* 11 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground – Negative.
Engine Ground – Connected between engine and cowl.

STARTER

►*STARTER MOTOR HARNESS CHAFING CORRECTION (Before Eng. No. 036253): Reroute harness above breather pipe so it will not rub against corner of engine block.*

Delco-Remy 1107642 (Early); 1107657 (Late). *12 Volt.*
Armature – Delco-Remy 1926626 (1107642); 1932185 (1107657).
Drive–Overrunning clutch (solenoid pinion shift)
Rotation–Counter-clockwise at commutator end
Brush Spring Tension–35 ozs minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	3500	10 1	95
10 5 ft lbs	Lock	5 4	470

►*STARTER PINION ADJUSTMENT NOTE:* The later type starter, Delco-Remy No. 1107657 has an extended nose casting that covers all exterior linkage. The starter pinion adjustment is pre-set at the factory and field adjustment is not required.

Starting Switch: Delco-Remy Solenoid Switch No. 1119777 (Starter No. 1107642); No. 1119910 (Starter No. 1107657), mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No. 1116470. Turn key full RIGHT against spring tension to start.
See "Starter Controls" in Electrical Section.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998137.
Adjustment – *See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy 1102002 (Std.), 1102011 (Air Conditioned Cars). Armature No. 1923535 (All). *12 Volt.*

►*REPLACEMENT GENERATOR:* Delco-Remy 1102005 (Less Fan & Pulley).
Maximum Charging Rate–See Current Regulator.

Performance Data

	Amperes	Volts	RPM
Cold	30	14	2150

Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–28 ozs. each.
Field Current–1.48-1.62 amperes at 12 volts.

G nerator Charg Indicator: Red light on instrument panel. *Se Diagram.*

B lt Adjustment· Loosen both pivot bolts and adjusting strap screw pull generator out until belt just tight enough to drive generator without slip.

REGULATOR

Delco-Remy 1119001. *12 Volt.*

►*REGULATOR NOTE: Specifications below are for "Normal" setting. See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

Cutout Relay
Cuts In – 11.8-13.5 volts (hot).
Contact Gap – .020".
Air Gap – .020" (with contacts just closed).

Voltage Regulator
Setting – 13.8-14.8 volts (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See Electric l Section.*

Current Regulator
Setting – 27-33 amperes (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjustment – *See Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Autronic Eye: *See "Autronic Eye" in Electrical Section.*
Direction Signal: *See "Direction Signals" in Electrical Section.*

Stop Light Switch (Location): Mechanical type located to left of steering column adjacent to pedal retaining bar.

FUSES: Located on fuse panel under instrument panel on cowl insulating board just to left of car centerline except as noted below.
Air Conditioner & Heater – 25 amps.
Antenna – 14 amps.
Back-up Lights – 9 amps.
Cigar Lighters, Clock, Dome or Bow Light, Glove Box, & Trunk Light – 25 amps. Body Feed fuse on panel protects these circuits.
Instruments – 9 amps.
Radio – 7½ amps.
Turn Signals – 6 amps.
Spotlight – 9 amps. On steering column support.

CIRCUIT BREAKERS: (Lighting) – 20 amps. Located in headlamp switch. Protects the following circuits: Headlights, Fog Lights, Ash Tray Lights, Instrument Lights, Map Light, Parking Lights, & Stop Lights.
Hydro-Lectric System (When Used) – 15 amps., in feed circuit.
Power Seats & Windows – 40 amps. Located on left inner cowl panel.
Electric Trunk Lock – 5 amps. Located on left inner cowl panel.

HORNS: (Exc. Eldorado)–Delco-Remy 1999765 (Low Note), 1999766 (High Note). *12 Volt.*
Eldorado–Delco-Remy 1999585 (Trumpet type), *12 Volt.*

Horn Relay: Delco-Remy 1116908. *12 Volt.*
Contacts Close–5.0-9.5 volts.
Contact Gap–.027". **Air Gap–**.014".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellan ous Section.*

►*"BOOMING" NOISE ON AIR CONDITIONED CARS CORRECTION (Appar nt at 25 MPH or at off-idl speeds):* Noise can be eliminated or reduced by installing an oil filter-to-hydraulic pump support brace, Part No. 1463022.

►*ENGINE BALANCE CHECK & UNBALANCE CORRECTION: See "Engine Balancing" in Cadillac Special Data.*

Bore	Stroke	Displac m nt	Rated H P
4"	3 5/8"	365 cu. ins.	51.2

Engine	Compr. Rati	D v l p d HP
Standard	9.75-1	285 at 4600 RPM
Eldorado	9.75-1	305 at 4700 RPM

►*OVERSIZE CYLINDER BORE CAUTION: Engines with mark * preceding Engine Unit No. (on l ft r ar of crankcase) have a .010" oversize cylind r bore and pistons.*

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Cadillac Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Cadillac Special Data.*

►***CYLINDER HEAD PRODUCTION CHANGE** (At Engine No. 033849):* **A new cylinder head, Part No. 3630695 (Right hand); No. 3630696 (Left hand) with improved combustion chamber design are used on all models after above engine number.**

TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data.*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size: 4.0000-4 0020"
Original Bore & Pistons–*See "Original Bore & Pistons" in Cadillac Special Data.*
Pistons – Aluminum alloy, T-slot, cam ground, "stannate" coated.
Weight – 22.72 ozs. (less pin).
Removal–Piston and rod assemblies removed from above. Install connecting rod Guide Studs J-3224, on connecting rod bolts to guide rod out through bore without nicking or scratching. *CAUTION–Do not nick lower edge of bore when pushing rod up.*
Fitting New Pistons: Use micrometer or feeler gauge. *See "Pistons" in Cadillac Special Data.*
Replacement Pistons: Standard "High Limit" or maximum production size , and .010", .020", .030" oversize. Pistons furnished only with fitted pins.
Installing Pistons: Ins'all in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Connecting Rods" (below) for installation of pistons on rods.*

PISTON PINS

Pin is pressed in connecting rod.
Diameter–1.000". **Length–**3 3/32".
Pin Fit in Piston–.00005"-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).
Pin Fit in Rod–(NOTE–Special tools required). *See "Piston Pins" in Cadillac Special Data.*

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PISTON RINGS

Top compression ring is chrome plated rolled steel and the other two rings are cast iron. An expander is not used behind the oil ring in production.

Ring	Width	End Gap ①	Side Clearance
Compr. (#1 & 2)	5/64"	.013-.023"	.0017-.0035"
Oil (#3)	3/16"	.013-.023"	.0008-.0026"

①- With Standard 4.0000" cylinder.

Replacement Rings: Standard, 010", .020", 030" oversize.

►*REPLACEMENT RING NOTE–If re-ring set is to be installed in new or low mileage bores, it is not necessary to install oil ring expander.*

Installing Rings: Chamfered face of both compression rings must be installed toward top of piston.

CONNECTING RODS

Length–6 5/8" (center-to-center).
Weight–23.49 ozs.
Crankpin Journal Diameter–2.2488-2.2493".
Out-of-Round Limits–.00025".
Bearings–Moraine-Durex, bearing shell is steel backed aluminum. Bearing halves interchangeable. No shims.
Clearance – .0005-.0020" (Service limit .0045").
Side play– 008-.014" (total both rods)

Replacement Bearings: Furnished in standard size only.

Installing Rods (In Pistons): On pistons Nos. 2-4-6-8, install rod so mark 'REAR' on piston pin boss is to left side of rod (with stamped number on rod facing operator). On pistons Nos. 1-3-5-7, install rod so mark 'REAR' on piston pin boss to to **right** side of rod (with stamped number on rod facing operator). **After piston and rod assembly installed in engine, re-check to see that the numbered side of connecting rod on No. 1, 3, 5, 7 rods are on LEFT side of engine and No. 2, 4, 6, 8 are on RIGHT side of engine and that rods are on the proper crank pins.**

CRANKSHAFT

Journal Diameters – 2 5/8".
Out-of-Round Limits – .0025".
Clearance – .0008-.0025" (service limits .005" max.).
End Thrust– Taken by flanged rear main bearing.
End Play – .001-.005" (service limit .010" max.).
Bearings – Rear main bearing is a steel backed babbit, shell type insert. Other bearings are aluminum inserts.

►*REAR MAIN BEARING INSERT PRODUCTION CHANGE (To reduce leaks):* The later type inserts, Part No. 3630741 do not have a chamfer across full width of bearing ends.

Replacement Bearings: Furnished in standard size only.

Crankshaft Removal: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAMSHAFT PRODUCTION CHANGE:* A new camshaft was used in production beginning Engine No. 033849. Later camshaft has slight increase in valve overlap, which results in a decrease in intake manifold vacuum.

►*CAUTION:* Handle shaft with care to avoid damage or mis-alignment. Check whenever removed.
Removal, Alignment & Installation–*See "Camshaft & Bearings" in Cadillac Special Data.*
Bearings–Steel backed babbitt bushings.
Clearance–.001-.0022' (service limit .004" max.).
Bearing Out-of-Round Limit–.002" max.

Timing Chain: Link-Belt side guide type. Width 11/16", Pitch .500', Length 23" or 46 links.
Installation & Removal–*See "Timing Chain" in Cadillac Special Data.*

Camshaft Setting: Both sprockets marked '0'. Mesh chain with sprockets turned so that marks adjacent and in line with a straightedge across the shaft centers

►*CAUTION:* Install chain as a unit with camshaft sprocket (sprocket press fit on shaft with locating dowel and two retaining capscrews).

VALVES

Tappet Clearance: None in service (hydraulic).

Valves	Head Diam.	Stem Diam.	Length
Intake	1 750"	3415-.3425"	① 4 628-4 648"
Exhaust	1 562"	3415-.3420"	4 21/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	②44°	411"	③ 0005-.0025"
Exhaust	②44°	411"	③ .001-.0025"

①–"Rich" Valves "Eaton" Valves 4 628-4 653"

②–New valves (Valves in service can be refaced to 45° if seat width recommendation not exceeded).

③–New valves and guides. Worn limit .005" max.

►*VALVE SEATING CAUTION:* Do not lap or grind so that seat width is more than 1/64" (1° difference between valve and seat angle designed to provide "hairline" contact.

►**Valve Seat Recommendations:** 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving). Cut seat so that distance from outer edge to edge of flange on valve head not more than 1/32".
Valve Stem Oil Seal–Rubber oil seal installed in lower groove on valve stem (below valve keeper).

Oil Seal Installation: *See "Valve System" in Cadillac Special Data.*

Valve Removal & Installation: *See "Valve System" in Cadillac Special Data.*

Valve Guides: Pressed in cylinder head with counterbored end down toward valve head. Use Remover Tool J-3062 to drive old guides out toward top of head, Installer Tool J-3066 to drive new guides in (tool plate serves as stop for driver).

Valve Springs: (Free Length) 1.980".

Valve Spring Specifications

	Pressure	Length
Valve Closed	62-68 lbs	1 696"
Valve Open	152-162 lbs	1 285"

►*SPRING INSTALLATION CAUTION: Lower end of valve spring must be seated in recess in cylinder head.*

Valve Lifters: Hydraulic.
See "Valve System" in Cadillac Special Data.
Valve Lift Removal–*See "Valve System" in Cadillac Special Data.*

Rocker Arms: Rocker arm assemblies are mounted on each cylinder head. *NOTE* - Adjustment screws are not provided on rocker arms

Rocker Arm Installation–*See "Valve System" in Cadillac Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

(Before Eng. No. 033849).
Intake Valves – Open 22° BTDC. Close 67° ALDC.
Exhaust Valves – Open 63° BLDC. Close 27° ATDC.

(After Eng. No. 033849).
Intake Valves – Open 25° BTDC. Close 78° ALDC.
Exhaust Valves – Open 70° BLDC. Close 28° ATDC.

Valve Timing Check – Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing gears.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data.*

Crankcase Capacity: 5 qts. One quart additional for dry filter.

Normal Oil Pressure: 30-35 lbs. min. at 30 MPH. 15 lbs at idle speed.

Pressure Regulator Valve–On oil pump Not adjustable.

Oil Pressure Indicator – Light on instrument panel controlled by pressure switch, Cadillac No. 1508434 mounted on engine.

Oil Pump: Helical gear. In crankcase at rear of engine.

Oil Pump Removal & Overhaul: *See "Oiling System" in Cadillac Special Data.*

Vacuum Pump: Part of Oil Pump assy. *See "Vacuum Pump" in Cadillac Special Data.*

Oil Filter: Partial flow. Replace element every 6000 miles or more frequently in dusty areas.
Replacement Filter Element–AC No. 1P-115

Crankcase Ventilation: Air intake in oil filler cap (oil wetted type) with outlet connection at rear of valve compartment cover, and outlet pipe extending down below engine at right corner.

COOLING

►*THERMOSTAT INSTALLATION CAUTION: Install with spring strap parallel to car center line otherwise right engine bank will operate at higher temperature*

►*ELDORADO ENGINE COOLING LOSS CORRECTION:* Improper positioning of right hand ignition wire bracket may permit bracket to rub against heater hose. Loosen bracket nut on carburetor and swing bracket as close to firewall as possible. Tighten nut.

►*ALUMINUM RADIATOR CORE CAUTION & IDENTIFICATION NOTE:* Aluminum radiator cores have been used in partial production. The letters "ALC" following the serial number on the plate attached to radiator upper tank identify these radiators. When cleaning these radiators, only clear water should be used. Caustic cleaning solutions will corrode and damage the radiator.

Water Capacity: (Exc. Series 75) 19¼ qts., with heater; 17¼ qts., without heater. (Series 75) 21¾ qts., with heater; 17¼ qts., without heater.

Pressure Valve: AC No. 850800. Radiator filler cap. Opens at 12-15 lbs.

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Therm stat· Dole type In water outlet at top of pump body

Standard Setting—Starts to open at 163° to 168°F

High Temp.—Starts to open at 177° to 182°F

Water Pump: Packless, sealed ball bearing type

See "Water Pumps" in Cadillac Special Data.

Pump Removal—Remove upper and lower radiator hoses after draining cooling system Remove generator drive belt and take out capscrew mounting pump and water manifold assembly on front of engine, lift out pump and fan NOTE—Water manifold and thermostat housing are part of pump casting

T mperature Gauges· AC Electric

Dash Unit - AC No. 1513158.

Engine Unit – AC No. 1513130.

See "Temperature Gauges" in Miscellaneous Section.

HYDRA-MATIC DRIVE

"Jetaway". A new four speed hydraulically controlled automatic transmission having two fluid couplings.

►*HYDRA-MATIC "SQUEAK" CORRECTION:* This squeak may occur in first and reverse gears, and in "Dr3" under full throttle. *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*1-2 OR 2-3 LATE SHIFT CORRECTION:* May be caused by improper throttle valve rod adjustment, dirt in control valve assembly, or interchanged valve springs. *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*ROUGH SHIFT CORRECTION:* May be caused by bent throttle valve rod striking the accelerator pedal arm which would prevent the throttle valve rod from returning to its stop for proper adjustment. Check rod for straightness and adjust for correct shift pattern.

►*ERRATIC SHIFT CORRECTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*FILLER PIPE LEAK CORRECTION:* A new service package, Part No. 8616956 is available to correct oil leakage originating at point where filler pipe fits into sleeve in transmission case.

►*TRANSMISSION OIL FOAMING CORRECTION:* This condition may be caused by leakage in oil cooler. *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*SLIPPING 2-3 SHIFT CORRECTION (EXC. ELDORADO ENGINE):* If this condition cannot be corrected by throttle valve rod adjustment, and is not caused by sticking valves, install an inner accumulator spring, Part No. 8617469. *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

Lubrication – Check fluid level every 2000 miles along with regular car lubrication. Drain and refill every 25,000 miles. Use only Cadillac Hydra-Matic Fluid.

Capacity – 12 qts. (approximately). *NOTE – Th c rrect l v l is d t rmin d by th "Full" mark n gaug , with transmission hot.*

Ch cking Fluid L v l – With selector lever in "N" or "P" position, run engine at speed of 20 MPH for about 1½ minutes (to be sure fluid coupling is full). With engine idling, add fluid to bring level to within ¼" of the "F" mark on dipstick *(NOTE – Fluid level should be ¼" below "F" mark when cold, and at the "F" mark when hot). CAUTION – Do not fill above "F" mark on dipstick as this will cause foaming when oil is hot.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type Two used (three on commercial cars with center bearing)

►*DRIVE LINE "THUMP" CORRECTION (Cars between Engine No. 017541 and 046805. Or cars prior to engine No. 017541 which have the late type replacement transmission):* Install the late type front universal joint yoke, Part No. 5670522, which must be lubricated with one ounce of special lubricant, Part No. 1098652. Th e later type yoke must be lubricated every 25,000 miles by removing the yoke and applying lubricant to the splines.

►*TRANSMISSION REPLACEMENT CAUTION:* If a transmission is replaced on cars with a late type yoke, the extension housing and output shaft of the transmission must be of the late design. Check the output shaft and measure depth of bore in extension housing to make sure it is machined to clear the longer yoke. If the transmission has the early extension housing, use the early type yoke, Part No. 1456508, or special service yoke, Part No. 1465331.

►*REAR UNIVERSAL YOKE CAUTION Do not disturb nut on end of pinion shaft retaining rear universal joint yoke unless yoke or oil seal should be replaced. Pinion bearing preload must be adjusted whenever this nut disturbed*

REAR AXLE

Own Make. Hypoid gear, semi-floating with Hotchkiss Drive

See "Cadillac Hypoid" in Rear Axle Section.

►*OVERHAUL CAUTION* Manufacturer recommends that Carrier Assembly be serviced by replacement Do not disassemble this unit or attempt service work other than oil seal and universal joint replacement

Axle Identification—Axles marked by number stamped bottom of differential case below center of pinion shaft (First Cars) or on oil return hole boss at front end of differential case (beginning Engine No 94850) Ratios and marks are as follows

Series	Ratio	Mark
60S, 62 (Std.)	3.07-1	"3"
60S, 62 (Optl.) Ⓒ	3.36-1	"6"
75	3.36-1	"6"
86	3.77-1	"7"

Ⓒ—Standard on cars with Dual 4-Bbl. Carburetors.

►**Pinion Bearing Pre-Load Caution·** Must be adjusted each time pinion shaft nut loosened *See "Cadillac Hypoid" in Rear Axle Section.*

Backlash– 003- 010' Screw adjustment

Axl Shaft R m val· Remove wheel and take out screws holding brake drum on axle shaft flange and remove drum Remove nuts and lockwashers from bolts holding bearing retainer and backing plate on axle housing, use Puller J-942-1 and Slide Hammer J-2619 to remove axle shaft

►*CAUTION* Use care not to damage axle shaft oil seal when sliding axle shaft out and do not disturb position of backing plate on housing

Commercial Cars—Remove wheel, remove nut and washer on end of shaft Use Puller (Snap-On No S4567 or similar five jaw type) to remove wheel hub and brake drum Disconnect brake line Take out retaining screws and remove dust shield (bearing retainer) and backing plate Use Puller J-838 to pull axle shaft and bearing assembly out, using care not to damage oil seal in housing

Differential Carrier Pemoval Disconnect rear universal joint and remove lubricant from rear axle housing Remove axle shafts (see above) Remove nuts and washers holding carrier to axle housing and remove entire assembly with gasket *See "Overhaul Caution" above*

Wheel Bearings Sealed ball-bearing type

CAUTION—Check bearings for loss of lubricant when shaft removed If bearings spin freely indicating loss of lubricant, replace bearings

Pinion Bearing Preload Adjustm nt Pinion should be adjusted whenever nut on end of pinion shaft disturbed (for universal joint yoke or oil seal replacement)

See "Cadillac Hypoid" in Rear Axle Section

SHOCK ABSORBERS

Delco. Direct acting permanently sealed, airplane type located within coil springs (front), "Sea-Leg" type installation (rear), as follows

Series	Ⓒ Front	Ⓒ R ar
60S, 62	5352611	5352612
75, 86	5352613	5513719

Ⓒ - Cadillac part numbers.

FRONT SUSPENSION

Independent type with direct acting shock absorbers within coil springs

See "Cadillac" in Suspension & Wheel Alignm nt Section

Kingpin Inclination—5°51' with 0° camber

Caster—0° to Neg 1° Adjustment must be equal within ½° or less on both sides of car

Camber—Neg 3/8° to Pos 3/8° with ¼-½° more positive camber on left side

Toe-In – 5/32-7/32" (standing). Loosen clamp bolts, turn adjusters at outer end of each tie rod equally.

Toe-Out n Turns – With outer wheel turned 20°, inner wheel should be 22°40'.

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STEERING

Power Steering: Saginaw (In-Line) Hydraulic. Hydraulically operated in-line power steering gear which combines the recirculating ball type gear with a concentric hydraulic booster.

See "Saginaw (In-Line) Power Steering" in Steering Sect.

►*POWER STEERING GEAR PUMP "SQUEAL" CORRECTION (Pump pressures reduced): See "Saginaw (In-Line) Power Steering" in Steering Section.*

►*POWER STEERING "CLUNKING" NOISE CORRECTION (Can be heard on hard turns and when steering wheel turned with car standing and engine running): See "Saginaw (In-Line) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Sect.*

Steering Wheel & Horn Button Removal: *See "Saginaw (In-Line) Power Steering" in Steering Section.*

Steering Gear Removal: *See "Saginaw (In-Line) Power Steering" in Steering Sect.*

BRAKES

Bendix (Hydraulic) Single Anchor. Conventional two-shoe Parking lever applies rear wheel service brakes. Bendix or Moraine Power Brakes are standard equipment.

►*BRAKE PEDAL BINDING CORRECTION: See "Brake Notes" in Cadillac Special Data.*

Drums—Diameter 12" (all Series). Regrinding limits .060".

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

	Brake Lining Length	Width	Thickness
Primary.	11.52" ①	2½"	¼'
Secondary	12 98"	2½"	¼"

①—(60S & 62) 12.98" (75 & 86 Series)

►*1956 BRAKE LINING PRODUCTION CHANGE:* To reduce possibility of brake squeal, brake lining on all cars beginning Engine No. 000519 has a .004 - .008" crown. *NOTE* - This crowned lining furnished for service replacement on all 1953-56 cars.

Braking Power—(Exc. 86 Series) 55.8% (front), 44.2% (rear). (86 Series) 52.8% (front), 47.2% (rear).

Clearance—.010" (top), 015" (bottom). Adjusting screw backed off 14 notches from point where wheel can just be turned by hand.

Power Brakes: Bendix or Moraine Power Brake units integral with master cylinder and fluid reservoir located on left front frame member.

Master Cylinder – Integral with power brake unit.

Checking Fluid Level – Maintain fluid level to within ¾" of top of filler cap boss.

Removal of Power Unit – Disconnect relay to unit rod at clevis and disconnect relay rod from push rod. Disconnect both vacuum hoses from power brake unit, and disconnect hydraulic line at outlet fitting. Remove four screws and lockwashers and nuts from cylinder mounting bracket and remove power brake assembly.

MISC. MECHANICAL

Windshield Wipers: Cable operated—Vacuum type.

See "Windshield Wipers" in Miscellaneous Section.

Windshield Washer: Connected with windshield wiper so that when windshield washer is operated, wiper motor automatically operates to clean windshield.

Power Window Regulators: Electric, with reversible motor in each window

See "Electric Window Regulators" in Miscellaneous Section for data.

Power Top Control: Hydro-Lectric with "sealed" system which does not require periodic draining and refilling. *See "Top Controls" in Miscellaneous Section.*

Power Seat Adjusters (Two-Way): Electric type with single reversible type motor for horizontal adjustment. *See "GM Two-Way Seat Regulators" in Miscellaneous Section.*

Power Seat Adjusters (Six-Way): Electric type with single adjustable motor. *See "GM Six-Way Seat Regulators" in Miscellaneous Section.*

►*SIX-WAY POWER SEAT "CHUCKING" CORRECTION: See "GM Six-Way Seat Regulators" in Miscellaneous Section.*

Trunk Lid Lock: Reversible electric motor operating a jack screw and limit switches which control opening and closing of the trunk lid. *See "GM Electric Trunk Lid Lock" in Miscellaneous Section.*

Air Conditioning: Frigidaire with magnetic compressor clutch (compressor operates only with switch "on"). *See "Frigidaire (GM) Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

ENGINE & SERIAL NUMBER: Stamped on upper right corner at front face of right hand block, on right frame side member just to rear of front engine support, and on lubrication plate attached to front face of left door lock pillar.

Series	First 1957 Nos.
60S	5760000001
62	5762000001
75	5775000001
86	5786000001
70	5770000001

Identification - First two figures indicate year, third and fourth indicate series (last six figures are numbered consecutively regardless of series).

Engine Unit Number Note: Use for identification. Stamped on top of crankcase to rear of left hand block with a prefix (see below) indicating model.

Series	Engine Unit Prefix
60S, 62 (Standard)	76X-1 and up
60S, 62 (Air Conditioning)	76K-1 and up
75, 86 (Standard)	77X-1 and up
75, 86 (Air Conditioning)	77K-1 and up
62 (Dual Carbs.)	70QX-1 and up
62 (Dual Carbs. & Air Cond.)	70QK-1 and up

► *ENGINE NUMBER NOTE "L.C." will be added as a suffix to engine unit number on all engines built to low compression specifications.*

► *NOTE* Mark * preceding Engine Unit Number indicates cylinder bore and pistons are .010" oversize.

TUNE-UP

COMPRESSION PRESSURE: 165 to 185 lbs. (at cranking speed). 212 to 230 lbs. (at 1000 RPM).

VACUUM READING: Not specified.

► *VACUUM CHECKING CAUTION When checking engine vacuum, shut off engine before removing vacuum hose. Plunger in vacuum operated throttle check will increase engine speed to approximately 900 RPM if hose is removed with engine running. Set hand brake firmly before checking engine vacuum.*

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Automatic thermostatic type. This valve diverts exhaust gases of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system, during warm-up period.

► *MANIFOLD HEAT CONTROL VALVE CAUTION:* Some cars after Engine No 090000 had "B" type valve which adversely affects engine performance. "B" type should be replaced with "A" type, Part No 3510508, which has larger bore diameter and 180° counterweight

► *ENGINE DETONATION (OPERATION IN LOW OCTANE AREAS): See Note under Engine Specifications for recommended changes for foreign travel*

IGNITION

FIRING ORDER: 1–8–4–3–6–5–7–2.

Cylinders - RIGHT BANK 2–4–6–8. LEFT BANK 1–3–5–7.

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 44 (All Engines), 14 mm. Torque to 20-25 ft. lbs.

► *SPARK PLUG NOTE:* If car consistently operated at above normal speeds cooler spark plugs, AC No 43, may be installed

COIL: Delco-Remy 1115082.

Ignition Current - 1.25 amps. idling. 3 amps. stopped.

Resistor - Delco-Remy No 1927809 1 40-1 65 ohms On coil bracket

► *COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil, and is by-passed during cranking.*

DISTRIBUTOR: Delco-Remy 1110876 (Standard), 1110877 (Eldorado Eng. early), 1110898 (Eldorado Eng. later). *See "Delco-Remy Window Distributors" in Electrical Section*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - .016" (new & used points).

Cam Angle - 26-33°.

► *BREAKER GAP AND CAM ANGLE NOTE:* Setting cam angle at 30° will provide 016" breaker gap

Breaker Arm Spring Tension—19-23 ozs

Rotation - Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	450	1-4	900
6-7.75	1300	12-15	2600
11-13	2075	22-26	4150

Vacuum Spark Control: 1116103 or 1116122 (1110876 & 1110877 Distr.) 1116124 (1110898 Distr.)

Vacuum Advance - 1116103

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.8-8.5
15.5	31	13.5-16

Vacuum Advance – 1116122

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
12	24	13.5-15.5

Vacuum Advance - 1116124

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6 25-8 25
12	24	12 75-14 50

IGNITION TIMING

Setting - 5° BTDC.

Timing - Disconnect vacuum line to distributor, and with engine idling at 400 RPM, set timing at point "A" on harmonic balancer in line with pointer on cover.

Timing Mark - Timing indicator marked on harmonic balancer with two lines "A" (5° BTDC), "C" (TDC).

CARBURETOR

► *CARBURETOR APPLICATION One 4-Barrel Carter or Rochester carburetor used on all models except Eldorado. Two Carter 4-Barrel carburetors used on Eldorado.*

► *POOR PERFORMANCE DURING WARM-UP CORRECTION: See MANIFOLD HEAT CONTROL above*

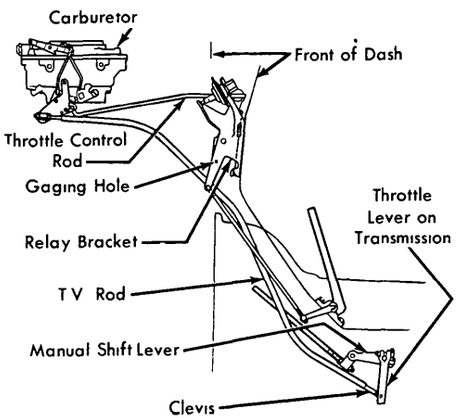
► *IDLE SPEED (AIR CONDITIONED CARS) Summer and Winter Idle Speed Adjustment is different as follows*

Summer Setting (Air Conditioner in Operation) - With transmission selector lever in either "Dr" range, and with air conditioner "ON" set idle speed at 420 RPM (Cars with Standard Engine). 490-510 RPM (Cars with Eldorado Engine).

Winter Setting (Air Conditioner Not in Operation) - With transmission selector lever in either "Dr" range, and with air conditioner "OFF" set idle speed at 420 RPM (Cars with Standard Engine), 490-510 RPM (Cars with Eldorado Engine).

Idle Speed-Up Control Adjustment (Cars with Air Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air conditioner "ON" and place transmission selector lever in "N" position. Adjust engine idle speed to 900 RPM by loosening locknut on diaphragm shaft and turning knurled nut to obtain specified RPM. Tighten locknut.

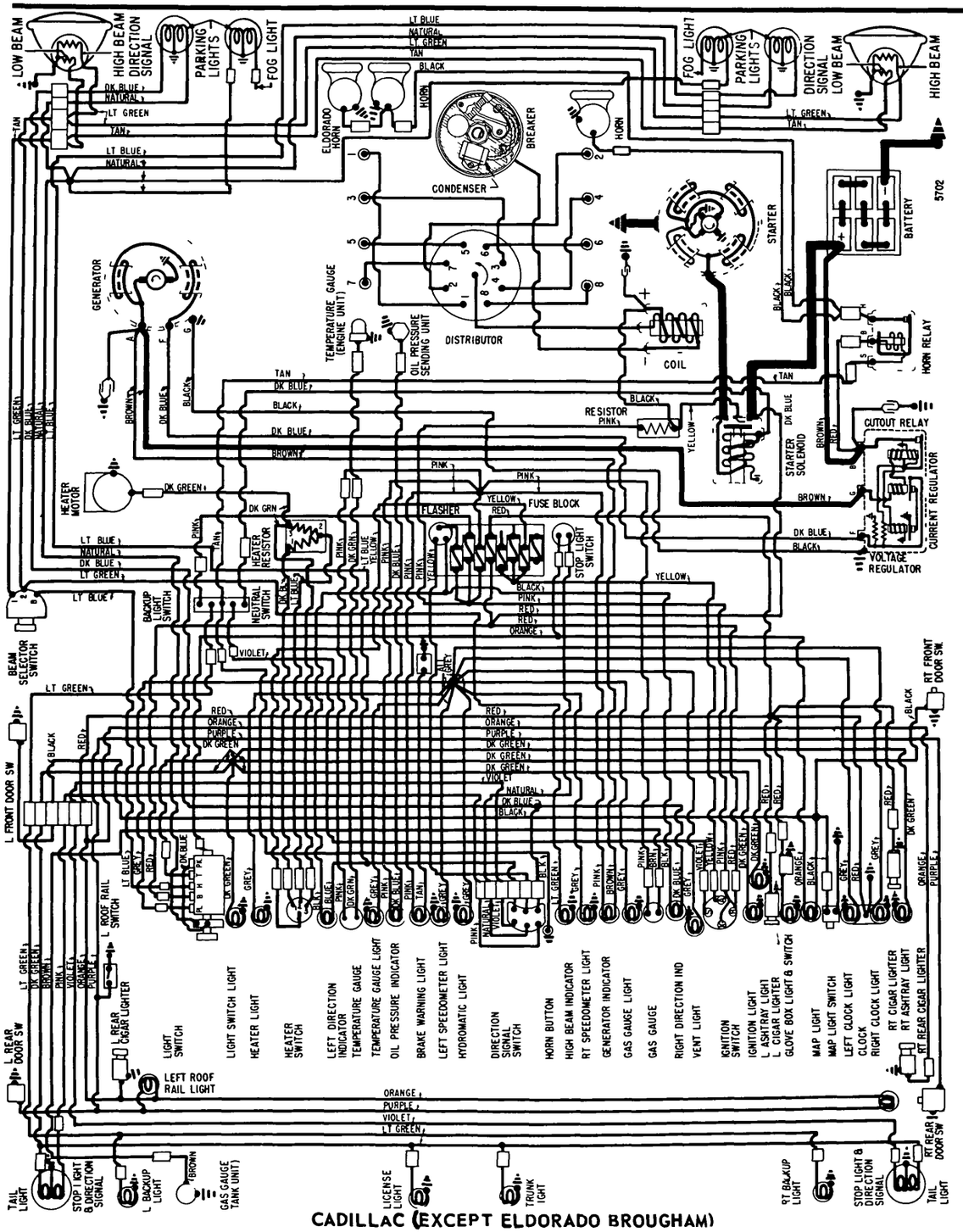
Throttle Check Adjustment: Allow engine to idle and make sure that throttle check plunger is not in contact with throttle relay lever. Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out. Let throttle snap shut and observe delay caused by throttle check. If engine races throttle check plunger is too long. If engine stalls, plunger is too short. Adjust plunger screw as necessary for correct operation.



CADILLAC HYDRA-MATIC THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT: Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash). Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket. With engine running, set throttle lever to hot idle position (Air Conditioner turned "OFF"). Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip. Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop. Bring rear jam nut up against trunnion with throttle in hot idle position. **Back off jam nut three complete turns.** Tighten front jam nut, making certain linkage does not bind in any position. *NOTE* It will be necessary to check and adjust throttle valve jam nut slightly to obtain smooth shifting. This should be done after completion of all other carburetor adjustments.

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CADILLAC (EXCEPT ELDORADO BROUGHAM)

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► *THROTTLE LINKAGE ADJUSTMENT NOTE:* Throttle valve adjustment is set at 1½ turns (instead of 3 turns) at the factory. This setting should be changed to 3 turns after 500 to 2000 miles of operation.

ROCHESTER 4GC
(Standard Engine)

Rochester 4GC. Early - No. 7010100 (without Air Conditioning), No. 7010101 (with Air Conditioning). Later - 7012000 (without Air Conditioning), 7012001 (with Air Conditioning).

► *CARBURETOR PRODUCTION CHANGES AND RECOMMENDED PARTS AND SETTING CHANGES FOR IMPROVED PERFORMANCE: See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

► *MANIFOLD FUEL DISTRIBUTION· Carburetor RIGHT barrels feed Cyls. 2-3-5-8. LEFT barrels 1-4-6-7.*

► *IDLE SPEED ADJUSTMENT NOTE Idle Air By-Pass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed at slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

► *OTHER DATA See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fuel Pump Pressure: 5¼-6½ lbs. at idle speed.

CARTER AFB
(Standard Engine)

Carter AFB 2479S (Without Air Conditioning), No. 2480S (With Air Conditioning).

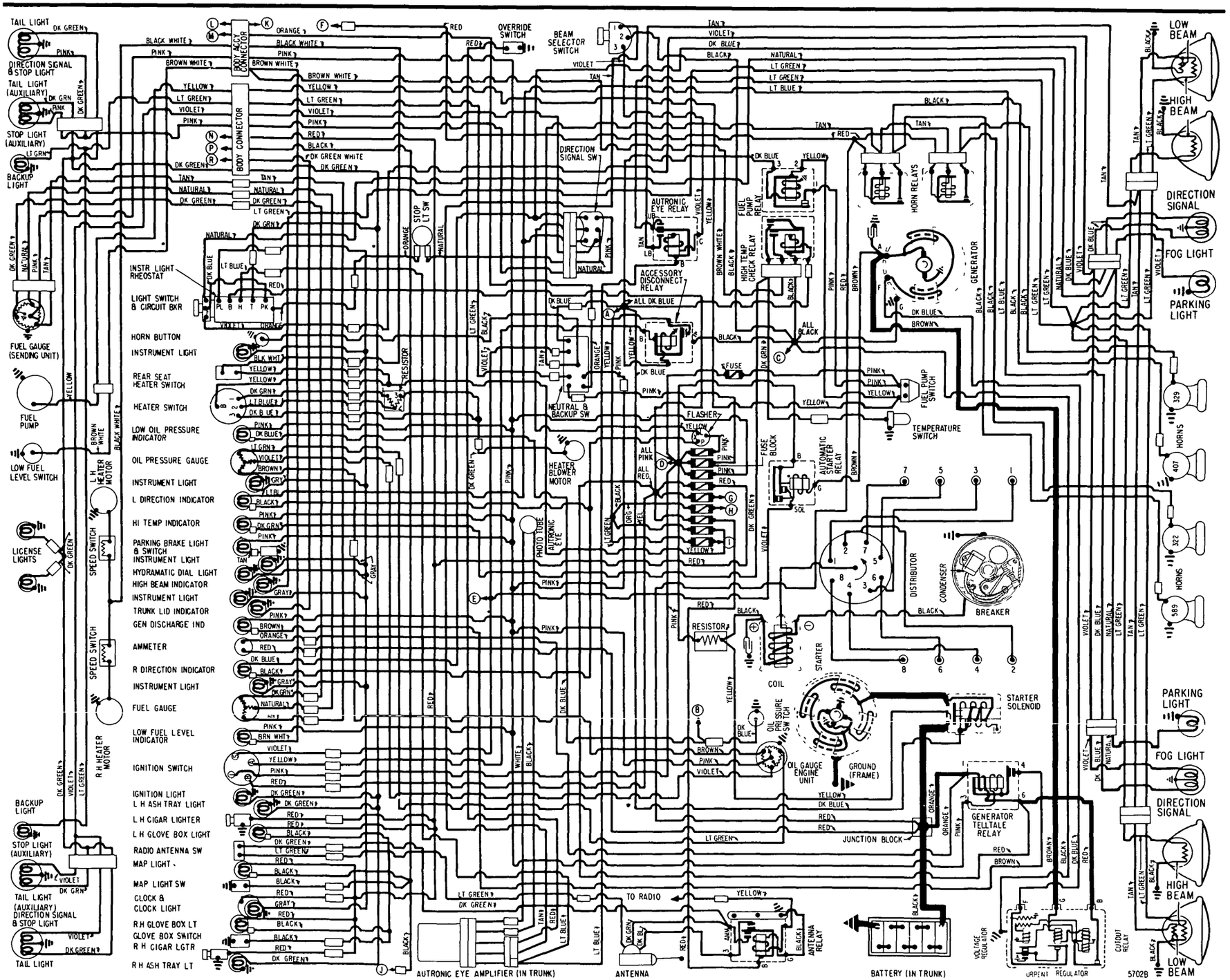
► *CARBURETOR REPLACEMENT NOTE·* Use Carburetor No 2479S with Idle Speed-Up Control, Carter No 202-114U to replace Carburetor No 2480S on air conditioned cars

► *PRODUCTION CHANGE AND APPLICATION NOTE: This carburetor used on some cars after Engine No 101833*

CONTINUED ON NEXT PAGE

ELDORADO BROUGHAM WIRING DIAGRAM LEGEND

(A) - To (A) in Air Suspension Diagram
(B) - To (B) in Air Suspension Diagram
(C) - To (C) in Air Suspension Diagram
(D) - To (D) in Air Suspension Diagram
(E) - To (E) in Air Conditioning Diagram
(F) - To (F) (Power Feed) in Various Accy Diagrams
(G) - To (G) in Air Suspension Diagram
(H) - Radio Feed
(I) - To (I) (Feed) in Air Conditioning Diagram
(J) - To (J) in Door Lock Diagram
(K) - To (K) in Door Lock Diagram
(L) - To (L) in Door Lock Diagram
(M) - To (M) in Door Lock Diagram
(N) - To (N) in (Body Feed) in Various Accy Diagrams
(P) - To (P) in Door Lock Diagram
(R) - To (R) in Trunk Lid Control Diagram



CADILLAC ELDORADO BROUGHAM

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►*MANIFOLD FUEL DISTRIBUTION. Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels 1-4-6-7*

►*IDLE SPEED ADJUSTMENT NOTE Idle Air By-Pass screw on throttle body is used to adjust idle speed Throttl valves are normally closed at slow idle*

Idl Mixtur & Sp d Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

Hydra-Matic Thr ttl Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

CARTER WCFB (2)
(Eld rado Engine)

Cart r WCFB 4-Barr l us d as follows:

Car M d l	Front	Rear
Without Air Conditioning (early)	2582S	2583S
Without Air Conditioning (later)	2690S	2691S
With Air Conditioning (early)	2584S	2583S
With Air Conditioning (later)	2692S	2691S

►*CARBURETOR REPLACEMENT NOTE (EARLY CARS)· Carter WCFB 2582S can be used for service replacement of 2583S & 2584S Unitized Pkg 202-111U must be used when replacing 2584S (Air Conditioned Cars)*

►*CARBURETOR REPLACEMENT NOTE (LATER CARS). Carter WCFB 2690S can be used for service replacement of 2691S & 2692S Unitized Pkg 202-111U must be used when replacing 2692S (Air Conditioned Cars)*

►*CARBURETOR PRODUCTION CHANGES AND RECOMMENDED PARTS AND SETTING CHANGES FOR IMPROVED PERFORMANCE See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION (FRONT CARB.) Right PRIMARY & Left SECONDARY barrels feed Cyl. 2-3-5-8, Left PRIMARY & Right SECONDARY barrels feed 1-4-6-7*

►*MANIFOLD FUEL DISTRIBUTION (REAR CARB.) Left PRIMARY & Right SECONDARY barrels feed Cyl. 2-3-5-8, Right PRIMARY & Left SECONDARY barrels feed 1-4-6-7*

►*NOTE 2584S has an Idle Speed-Up Control for use with Air Conditioning*

►*IDLE SPEED ADJUSTMENT NOTE Idle Air By-Pass screw on throttle body is used to adjust idle speed Throttle valves are normally closed at slow idle*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Cadillac (Carter & Rochester) Carburetors" in Carburetion Section*

►*OTHER DATA S e "Cadillac (Carter & Rochester) Carburetors" in Carburetion S ction*

Hydra-Matic Throttle Linkage Adjustm nt *See "CARBURETOR" above*

Fuel Pump Pressure· 5¼-6½ lbs. at idle speed.

CARB. EQUIPMENT

Fu l Pump: AC mechanical type (Exc Brougham) Electrical type mounted in gas tank (Brougham) Vacuum pump is part of engine oil pump

Replacement Fuel Pump (Exc. Brougham) - AC No 4362

Pressure - 5¼-6½ lbs at 1800 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: AC Electric

	Brougham	Others
Dash Unit (AC No)	1518655	1518739
Tank Unit (AC No)	1518565	1518588

See "Fuel Gauges" in Carburetion Section

Low Fuel Level Indicator (Brougham): Light on instrument panel comes on when fuel level in tank drops to 3 gallons (2 gals usable) *See Wiring Diagram*

BATTERY

Delco 3 FMR70-W (Exc. Brougham). 12 Volt, 11 plate, 70 ampere hour capacity (20 hr rate)

(Brougham) 12 volt 11 plate 72 ampere hour capacity (20 hr rate)

Battery Location - Separate compartment in right rear quarter panel accessible from trunk (Brougham) under hood on tray attached to radiator cradle (Others)

Battery Ground - Negative

Engine Ground - Engine to cowl

STARTER

Delco-Remy No 1107668 (Brougham), No. 1107657 (Others).

Armature - Delco-Remy No 1932185 (1107657 Str)

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs min

Performance Data - 1107668

Torque	RPM	Volts	ℭ Amperes
0 ft lbs	3600-5100	10 6	65-100
ℭ	Lock	3 5	300-360

Performance Data - 1107657

Torque	RPM	Volts	ℭ Amperes
0 ft lbs	3240	10 6	91
ℭ	Lock	3 5	395

ℭ - Armature locked ℭ - Includes solenoid

Starting Switch (Exc. Brougham)· Delco-Remy Solenoid Switch 1119910 mounted on starter and controlled by Ignition & Starter Switch Delco-Remy 1116536 Turn key full RIGHT against spring tension to start

Starting Switch (Brougham): Delco-Remy Solenoid Switch 1119910 mounted under starter and controlled by Ignition & Starter Switch Delco-Remy 1116536 (turn ignition "ON") and Automatic Starter Relay Delco-Remy 1119924 (Vacuum and Electric controlled) *NOTE* - Should Automatic Starter fail turn Ignition & Starter Switch to full RIGHT against spring tension to start

►*ACCESSORY DISCONNECT RELAY (Brougham) NOTE·* Delco-Remy No 1116927 Relay limits battery load by opening circuits to Air Conditioning Heater and Radio while starter is cranking engine

N utral Safety & Back-up Light Switch Delco-Remy 1998170 (Brougham) 1998137 (Others) Located on steering column

Adjustment - *S e "Hydra-Matic Drive" in Trans Sect*

GENERATOR

D lc -R my. Used as follows

M d ls	G n rat r N .	Armatur N .
60S,62 All,75,86 Early	1102086	1932900
75, 86 Later Std	1102099	1932900
75, 86 Air Cond Early	1102060	1935778
75, 86 Air Cond Later	1102100	1935778
Brougham	1106989	1936778

Performance Data

Generator	Amperes	Volts	RPM
1102086, 99	35	14 0	2510
1102060, 100	40	14 0	2320
1106989	55	13 0	1580

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 20 ozs (1106989), 28 ozs (Others)

Field Current - 1 69-1 79 Amperes (1102086,99), 2 66-2 86 Amperes (1102060,100), 2 14-2 28 Amperes (1106989) at 12 Volts

Generator Charge Indicator: Red light on instrument panel *See Diagram*

Belt Adjustment: Use Belt Tensioner Gauge J-6733 Loosen or tighten belt tension adjusting nuts so Red line on Gauge is even with the shoulder

REGULATOR

Delco-Remy. Used as follows

Model	Regulator	Generat r
60S,62 All, 75 86 Early	1119002	1102086
75, 86 Later Std	1119002	1002099
75,86 Air Cond Early	1119163	1102060
75,86 Air Cond Later	1119163	1102100
Brougham	1119175	1106989

►*"DOUBLE CONTACT" REGULATOR NOTE. Regulators 1119163 & 1119175 have new Double Contact Voltage Regulator*

Cutout Relay

Cuts In - 11 8-13 5 Volts

Contact Gap - 020"

Air Gap - 020"

Voltage Regulator

Setting (1119002) - 13 8-14 8 Volts at 125°F (ambient Temperature)

Setting (1119163 & 1119175) - 14-14 6 Volts (Operating on lower contacts) 3- 5 Volts lower (Operating on upper contacts)

Contact Gap (1119163, 175) - 016"

Air Gap - 075" (1119002) 080" (1119163 175) With armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

Current Regulator

Setting - 32-37 Amperes (1119002) 37-42 Amperes (1119163), 53-57 Amperes (1119175)

Air Gap - 075" with armature pressed down to point where contacts just touch

Ch cking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

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MISC. ELECTRICAL

H adlamps: Sealed Beam Two headlamps standard on all models except Brougham Four headlamps standard on Brougham *See "4-Headlight" in Electrical Section*

Autronic Eye: *See "Autronic Eye" in Electrical Section*

Dir ction Signal: *See "Direction Signals" in Electrical Section*

Stop Light Switch (Location): Mechanical type, mounted on brake pedal retaining bar flange

Adjustment - Rotate cam on pedal bar until stoplights are off, when pedal is in fully released position Adjust cam until stoplights come on at slightest movement of pedal

FUSES: Located on fuse panel under instrument panel, except as noted below

Air Conditioner - 25 amps (Brougham), 20 amps (Other)

Air Ride - 6 amps (Brougham)

Back-up Lights - 9 amps

B dy Feed (Brougham) - 25 amps , protects Cigar Lighter, Clock Glove Box-Map-Roof Rail lights

B dy Feed (Others) - 25 amps , protects Cigar Lighters, Clock, Dome or Bow light Glove Box & Trunk Light

Fuel Pump - 6 amps (Brougham) Left side front speaker housing

H ater - 20 amps

Instruments - 9 amps Protects Instruments and all Tell-Tale lights Instrument lights are protected by Lighting Circuit Breaker

Direction Signals - 9 amps *NOTE* - Cut four coils off early 6 amp fuse holder spring for 9 amp fuse

CIRCUIT BREAKERS: (Lighting) - 25 amps (Brougham), 20 amps (Other) Located in lighting switch Protects the following circuits: Ash Tray, Fog Head, Instrument Parking and Stop Lights *NOTE* - Map light protected by circuit breaker on all except Brougham

Hydro-Lectric System (When used) - 40 amps , located on left inner cowl panel

Seats & Windows - 40 amps , located on left inner cowl panel *NOTE* - Protects Brougham Trunk Lid Power Circuit

Trunk Lock (Electric) - 5 amps located on left inner cowl panel Protects Trunk Lid locking circuit

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: V8 Overhead valves Two engines used Standard engine has Single 4-barrel Carburetor, Eldorado engine has Two 4-barrel carburetors with special intake manifold

Bore	Stroke	Displacement	Rated HP
4"	3 5/8"	365 cu ins	51 2

Engine	Compr. Ratio	Developed HP
Standard	10 0-1	300 at 4800 RPM
Eldorado	10 0-1	325 at 4800 RPM

C mpr ssi n Pr ssur - *See TUNE-UP*

►*OVERSIZE CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No (on rear of crankcase) have 010" Oversize cylinder bore and pistons *See "Original Bore & Pistons" in Cadillac Special Data*

►*ENGINE OPERATION IN LOW OCTANE FUEL AREAS (Foreign Travel):* Standard 1957 engine requires 97 (Research Method), 87 (Motor Method) Octane rating gasoline to prevent detonation When only lower Octane rating gasoline is available compression ratio should be lowered Install special low compression pistons Part No (Std) 3630787 or (010") No 3630788 , (020") No 3630789, (030") No 3630790 Oversize *NOTE* - No changes in Distributor, Carburetor or Timing required

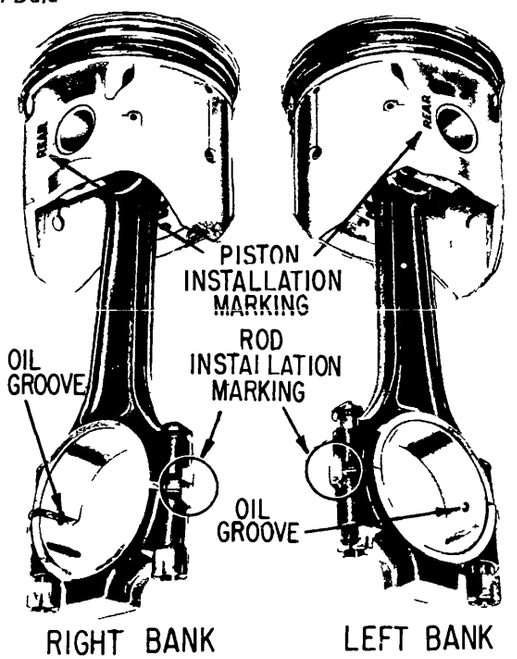
►*LOUD CLICKING NOISE CORRECTION & PISTON PRODUCTION CHANGE:* To correct loud clicking noise (under light load conditions) which stops when spark plug wire is disconnected from noisy cylinder, replace early type cam ground scuff band piston with later round head type New design pistons entered production with Engine No 091632 (Air Cond Cars), No 091594 (less Air Cond Cars), No 094206 (Brougham)

►*CLICKING OR RATTLING NOISE CORRECTION:* To correct, rebend oil filter line where it contacts front engine cover due to vibration This noise is similar to noise produced by pressure regulator valve

►*ENGINE BALANCE CHECK & UNBALANCE CORRECTION. See "Engine Balancing" in Cadillac Special Data*

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data*

OIL PAN REMOVAL: *See "Oil Pan" in Cadillac Special Data*



CADILLAC PISTON & R D ASSY.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Cadillac Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No (on left rear of crankcase) have 010" oversize pistons and cylinder bore Standard cylinder bore size 4 0000-4 0020"

Original Bore & Pistons - *See "Original Bore & Pistons" in Cadillac Special Data*

Pistons - Two types used Early type had cam ground scuff bands on top and second lands, later type had round top pistons without scuff bands *See "Clicking Noise Correction" early type piston cars above*

Weight - 22 72 ozs (less pin)

Removal - Piston and rod assemblies removed from above Install connecting rod Guide studs J-3224, on connecting rod bolts to guide rod out through bore without nicking or scratching *CAUTION - Do not nick lower edge of bore when pushing rod up*

Fitting New Pistons: Use micrometer or feeler gauge *See "Pistons" in Cadillac Special Data*

Replacement Pistons: Standard (Code "L" or "M") and 010", 020", 030" Oversize with rings and pin

Installing Pistons: Install in cylinder with piston pin boss marked "Rear" toward rear of engine *See "Connecting Rods" (below) for installation of pistons on rods*

PISTON PIN

Pin is pressed in connecting rod

Diameter - 1 000" **Length** - 3 3/32"

Pin Fit in Piston - 00005- 0001" clearance at 70°F Not fitted in field (replace piston & pin assembly)

Pin Fit in Rod - (NOTE - Special tools required) *See "Piston Pins" in Cadillac Special Data*

PISTON RINGS

Top compression ring is chrome plated, second compression ring is lubrited An expander is located behind oil ring

Ring	Width	End Gap ①	Side Clearance
Compr (#1&2)	5/64"	013- 023"	0017- 0035"
Oil (#3)	3/16"	013- 023"	0008- 0026"

① - With Standard 4 0000" cylinder

Replacement Rings Standard, 010", 020", 030" oversize

►*REPLACEMENT RING NOTE* Use re-ring sets with chrome top compression ring and expander behind oil ring or multi-piece oil rings

Installing Rings: Chamfered face of both compression rings must be installed toward top of piston

CONNECTING RODS

Length - 6 625" (center to center)

Weight - 23 49 ozs

Crankpin Journal Diameter - 2 2488-2 2493"

Out-of-Round Limits - 00025"

Bearings - Durex 400 bearing shell is steel backed aluminum Bearing halves interchangeable No shims

Clearanc - 0005- 0021" (Service limit 0035")

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Replacement Bearings: Furnished in standard size only.
Installing Rods: Install piston and rod in cylinder bore with "REAR" on piston toward rear of engine and numbers on lower end of rod down. Numbers 1,3,5,7 are in left bank, 2,4,6,8 are in right bank.

CRANKSHAFT

Journal Diameters - 2.625".
Out-of-Round Limits - .0025".
Bearings - Rear, steel backed babbitt, shell type insert. All other bearings are Moraine 400 Aluminum.

►*REAR MAIN BEARING INSTALLATION CAUTION:* For proper alignment of thrust surfaces of rear main bearing proceed as follows: Install upper and lower inserts in block and bearing cap. With rear oil seal in place and mating surfaces clean, install bearing cap and tighten screws to 1-2 ft. lbs. torque. Using a plastic hammer, drive crankshaft forward, then rearward, then forward again (*CAUTION* - Pound on counterweights, not on connecting rods). Tighten bolts evenly to specifications. Check to make sure crankshaft is not binding.

►*MAIN BEARING CAPSCREW NOTE: Lockwashers not used under heads of bearing cap retaining screws.*
Clearance - .0008-.0025" (service limit .002" front, .003" others).
Replacement Bearings: Furnished in standard size only.
End Thrust: Taken by flanged rear main bearing.
End Play - .001-.005" (service limit .010").

►*HARMONIC BALANCER TO CRANKSHAFT SCREW PRODUCTION CHANGE & CAUTION:* Use only new type screw Part No. 1468651 with smaller diameter shank between threaded portion and head of screw and install without lockwasher, but include flatwasher. This replaces old screw Part No. 455012. Tighten screw to specifications.

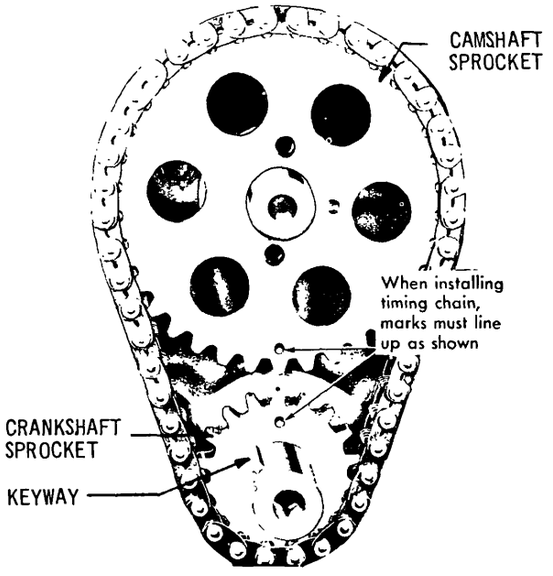
Crankshaft Removal: See *"Crankshaft & Bearings" in Cadillac Special Data.*
Rear Main Bearing Oil Seal Installation: See *"Crankshaft & Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage or mis-alignment. Check whenever removed.
Removal, Alignment & Installation - See *"Camshaft & Bearings" in Cadillac Special Data.*
Bearings - Steel backed babbitt bushings.
Clearance - .001-.0022" (service limit .004" max.).
Bearing Out-of-Round Limit - .002" max.
Timing Chain: Link-Belt side guide type. **Width** 11/16", **Pitch** .500", **Length** 23" or 46 links.
Installation & Removal - See *"Timing Chain" in Cadillac Special Data.*

Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.

►*CAUTION:* Install chain as a unit with camshaft sprocket (sprocket press fit on shaft with locating dowel and two retaining capscrews).



CADILLAC VALVE TIMING MARKS

VALVES

Tappet Clearance: None in service, hydraulic.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	.3415-.3425"	4.688"
Exhaust	1.437"	.3415-.3420"	4.694"

Valve	Seat Angle	Lift	Stem Clearance
Intake	ℂ 44°	.451"	ℂ .0010-.0025"
Exhaust	ℂ 44°	.451"	ℂ .0010-.0025"

ℂ - New Valves (Valves in service can be refaced to 45° if seat width recommendation not exceeded).
ℂ - New valves and guides. Worn limit .005" maximum.

►*NEW VALVE SEAT CAUTION:* Do not lap or grind so that valve contact is more than 1/64" (1° difference between valve and seat angle designed to provide "hairline" contact.

Valve Seat Recommendations - 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving). Cut seat so that distance from outer edge to edge of flange on valve head not more than 1/32".
Valve Stem Oil Seal - Rubber oil seal installed in lower groove on valve stem (below valve keeper).
Oil Seal Installation - See *"Valve System" in Cadillac Special Data.*
Valve Guides: Pressed in cylinder head from combustion chamber side with longest chamfer end pointing toward rocker arm side of head. Use Remover Tool J-3062 to drive out old guides (toward top of head), and Installer Tool J-3066 to drive new guides in (tool plate serves as stop for driver).
Valve Springs: Free Length 2.25" (Approx.).

Valve Spring Specifications	Pressure	Length
Valve Closed	60-65 lbs.	1.946"
Valve Open	155-165 lbs.	1.496"

►*SPRING INSTALLATION CAUTION:* Lower end of valve spring must be seated in recess in cylinder head.
Valve Lifters: Hydraulic.
See *"Valve System" in Cadillac Special Data.*
Valve Lifter Removal - See *"Valve System" in Cadillac Special Data.*

►*HYDRAULIC LIFTER PRODUCTION CHANGE & CAUTION:* Beginning with Engine No. 042804, new type Hydraulic Lifter Assembly & Pushrod entered production. DO NOT mix new type Hydraulic Lifter Assembly or Pushrod with earlier type. New type Hydraulic Lifter Part No. 5231740 requires the usage of New Type Pushrod Part No. 1468453. New lifter has wider relieved section with only one oil feed hole. New Pushrod does not have grooves at ends and is .187" shorter than early type.

Rocker Arm Assembly: See *"Valve System" in Cadillac Special Data.*

►*ROCKER ARM COVER PRODUCTION CHANGE:* Gasket contact flange increased to 1 '8" width approx. Engine No. 007149. Gasket increased in same manner. Cover with gasket is interchangeable with earlier type when used together. When installing New Type Cover & Gasket, tighten cover attaching screws to new specifications.

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*

►*VALVE TIMING NOTE: Specifications are "Without Ramp"*
Intake Valves - Open 25° BTDC Close 78° ALDC.
Exhaust Valves - Open 75° BLDC. Close 28° ATDC.
Valve Timing Check - Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing gears.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data.*

Crankcase Capacity: 5 qts. Add one qt. when changing filter.
Normal Oil Pressure: 30-35 lbs. min. at 30 MPH. 15 lbs. at idle speed.
Pressure Regulator Valve - On oil pump. Not adjustable.
Oil Pressure Indicator (Exc. Brougham) - Light on instrument panel controlled by pressure switch AC No. 1508648, mounted on engine.
Oil Pressure Indicator (Brougham) - Light on instrument panel controlled by pressure switch AC No. 1508624, mounted on engine.
Oil Pressure Gauge (Brougham) - AC electric in addition to Indicator.
Dash Unit - AC No. 1518655.
Engine Unit - AC No. 1508566.
See *"Oil Pressure Gauges" in Miscellaneous Section.*
Oil Pump: Helical gear. Mounted on rear main bearing cap.
Oil Pump Removal & Overhaul - See *"Oiling System" in Cadillac Special Data.*
Vacuum Pump: Part of Oil Pump Assembly. See *"Vacuum Pump" in Cadillac Special Data.*
Oil Filter: Full flow (Brougham), Partial flow (Others). Replace element every 6,000 miles or more frequently in dusty areas.

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Crankcase Ventilation: Air intake in oil filler cap (oil wetted type) with outlet connection at rear of valve compartment cover, and outlet pipe extending down below engine at right corner.

COOLING

►*BELT TENSIONER GAUGE NOTE:* Belt Tensioner Gauge Tool No. J-6733 released for field service for more accurate belt adjustments. Place Gauge on belt, loosen belt tension adjusting nuts, and tighten or loosen belt until red line on barrel is in line with shoulder.

Water Capacity: (With Heater) Models 62, 60S, 86-20 qts.; Model 75-21 qts.; Brougham 22½ qts.

(Without Heater) Except Brougham 19 qts.

Pressure Valve: AC No. 850800. Radiator filler cap. Opens at 12-15 lbs.

Thermostat: Dole type. In water outlet at top of pump body.

Standard Setting - Starts to open at 163° to 168°F.

High Temp. - Starts to open at 177° to 182°F.

Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Cadillac Special Data.*

Pump Removal - Drain cooling system. Remove all belts. Disconnect throttle spring. Detach Power Steering pump and bracket assembly and secure to one side. Remove two remaining thermostat housing screws housing and thermostat. Disconnect lower radiator hose and upper and lower heater hoses. Loosen clamp on transmission Oil Cooler hose. Remove remaining pump flange to cyl. block screws and remove Oil Cooler hose. On Air Cond. cars, remove two compressor mounting bracket screws from water pump flange. Loosen compressor support screw and move support away. Remove water pump and gaskets.

Temperature Gauges (Exc. Brougham): AC electric.

Dash Unit - AC No. 1513326.

Engine Unit - AC No. 1513130.

Temperature Gauge (Brougham): AC No. 1513301. Mechanical.

High Temperature Indicator (Brougham): Light on instrument panel controlled by thermal switch in left cylinder head. Light comes on when engine temperature reaches approx. 239°F.

HYDRA-MATIC DRIVE

"Jetaway". Four speed hydraulically controlled automatic transmission of same design as used on previous models.

►*WHISTLING AND/OR BUZZING NOISE CORRECTION:* *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

Lubrication - Check fluid level avery 2,000 miles, drain and refill every 12,000 miles or once a year. Use only Cadillac Hydra-Matic Fluid.

►*LUBRICATION CHANGE NOTE:* When vehicle is driven under heavy duty conditions (heavy city traffic, continuous mountain driving, prolonged driving during hot weather) it is advisable to drain and refill transmission at 6,000 mile intervals.

Capacity - 12 qts. (approximately). *NOTE* - The correct level is ¼" below the "Full" mark with transmission hot and engine running.

Checking Fluid Level - Run engine with selector lever in "N" (Neutral) or "P" (Park) position at 800 RPM for 1½ minutes to normalize temperature and to be sure coupling is full. Reduce engine speed to slow idle, clean dipstick and check fluid level. With engine running, add fluid through dipstick tube to bring fluid level to ¼" of "FULL" mark on dipstick. *NOTE* - From "LOW" to "FULL" mark on dipstick requires 1 qt. of fluid.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type. Three used with two piece propellor shaft and center bearing.

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Cadillac Special Data*

REAR AXLE

Own Make. Hypoid gear, semi-floating with Hotchkiss Drive. *See "Cadillac Hypoid" in Rear Axle Section.*

►*REAR WHEEL BEARING OIL LEAK CORRECTION:* Check for rubber flashing or nick indicating defective "O" ring located between bearing and housing, and replace if found defective.

►*OVERHAUL CAUTION:* Manufacturer recommends that Carrier Assembly be serviced by replacement. DO NOT disassemble this unit or attempt service work other than oil seal and universal joint replacement

Axle Identification - Gear ratio identified by number stamped on front face of carrier assembly at end of oil return passage. *NOTE* - Brougham rear axle assemblies further identified by letter "B" preceeding axle ratio number

Series	Ratio	Mark
60,62 Exc.Eldorado & AC Cars	3 07-1	3
75,62?S,62?7S,60&62 With AC ©	3 36-1	6
86 ©	3 77-1	7
Brougham	3 36-1	B6

© - Optl. on 60 & 62 without AC. © - Optl. on 75.

►**Pinion Bearing Pre-Load Caution:** Must be adjusted each time pinion shaft nut loosened. *See "Cadillac Hypoid" in Rear Axle Section*

Axle Shaft Removal: Remove wheel and take out screws holding brake drum on axle shaft flange and remove drum. Remove nuts and lockwashers from bolts holding bearing retainer and backing plate on axle housing, use Puller J-942-1 and Slide Hammer J-2619 to remove axle shaft.

►*CAUTION:* Use care not to damage axle shaft oil seal when sliding axle shaft out and do not disturb position of backing plate on housing.

Commercial Cars - Remove wheel, remove nut and washer on end of shaft. Use Puller (Snap-On No. S4567 or similar five jaw type) to remove wheel hub and brake drum. Disconnect brake line. Take out retaining screws and remove dust shield (bearing retainer) and backing plate. Use Puller J-838 to pull axle shaft and bearing assembly out, using care not to damage oil seal in housing

Differential Carrier Removal: Disconnect rear universal joint and remove lubricant from rear axle housing. Remove axle shafts (see above). Remove nuts and washers holding carrier to axle housing and remove entire assembly with gasket. *See "Overhaul Caution" above.*

Wheel Bearings: Sealed ball-bearing type.

►*CAUTION:* Check bearings for loss of lubricant when shaft removed. If bearings spin freely indicating loss of lubricant, replace bearings.

Pinion Bearing Preload Adjustment: Pinion should be adjusted whenever nut on end of pinion shaft disturbed (for universal joint yoke or oil seal replacement). *See "Cadillac Hypoid" in Rear Axle Section.*

SHOCK ABSORBERS

Delco. Direct acting permanently sealed airplane type.

(Brougham) - Mounted in tower on frame crossmember (front), lower end attached to bracket at rear edge of lower suspension arm (rear).

(Others) - Located within coil springs (front), "Sea-Leg" type installation (rear)

	Shock Absorbers	
Series	© Front	© Rear
60S, 62	5535529	5535530
75, 86	5535531	5535532

© - Cadillac part numbers.

FRONT SUSPENSION
(Exc. Brougham)

Independent type with direct acting shock absorbers within coil springs. *See "Cadillac" in Suspension & Wheel Alignment Section*

Steering Axis Inclination - 4°

Caster - 0° to Neg. 1°. Adjustment must be equal within ½° or less on both sides of car.

Camber - Neg. 3/8° to Pos. 3/8° with ¼-½° more positive camber on left side.

Toe-In - 3/16-1/4" (standing) Loosen clamp bolts, turn adjusters at outer end of each tie rod equally.

►*TIE ROD PRODUCTION CHANGE & CAUTION:* New tie rod entered production with Engine No. 023831 requires accurate positioning of sleeve clamps to eliminate interference with frame. All cars after Engine 023830 should have openings in clamps **down** and clamp bolts parallel with ground.

Toe-Out on Turns - With outer wheel turned 20°, inner wheel should be 22°40'.

FRONT SUSPENSION
(Brougham)

Independent type with direct acting shock aborbers with "Air Suspension" in place of coil springs. *See "Cadillac" in Suspension & Wheel Alignment Section*

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Steering Axis Inclination - 4°.
Caster - 0° to Neg. 1°. Adjustment must be equal within ½° or less on both sides of car.
Camber - Neg. 3/8° to Pos. 3/8° with ¼-½° more positive camber on left side.
Toe-In - 1/8" ± 1/32" (standing). Loosen clamp bolts, turn adjusters at outer end of each tie rod equally.

►*TIE ROD PRODUCTION CHANGE & CAUTION:* New tie rod entered production with Engine No. 023831 and requires accurate positioning of sleeve clamps to eliminate interference with frame. All cars after Engine 023830 should have openings in clamps down and clamp bolts parallel with ground.

STEERING

Power Steering: Saginaw (In-Line) Hydraulic. Hydraulically operated in-line power steering gear which combines the recirculating ball type gear with a concentric hydraulic booster.
See "Saginaw (In-Line) Power Steering" in Steering Sect.

►*FRONT TIRE RUB CORRECTION:* Reposition stabilizer bar to center it. If tires still rub stabilizer bar, install new type Steering Knuckle Stop Part No. 1468700 on each side. The stop is "U" shaped metal stamping attached to lower suspension bar by the rear outer spherical joint attaching bolt.

Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Saginaw (In-Line) Power Steering" in Steering Section.*
Steering Gear Removal: *See "Saginaw (In-Line) Power Steering" in Steering Section.*

BRAKES

Bendix (Hydraulic) Single Anchor (Without Eccentric). Conventional two shoe. Parking brake applies rear wheel service brakes.
See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

►*BRAKE SPRING SILENCER NOTE:* Brake Drum Silencer Spring discontinued with Engine No. 012025 as unnecessary with improvements in brake assemblies.

►*BRAKE SQUEAK CORRECTION:* 1) Replace Washer Part No. 5456106 (if perfectly flat). This washer must flex into face of star wheel as brakes are applied. 2) Increase clearance (for adjuster in brake shoe web to eliminate bind) by filing the brake shoe web.

Drums - Diameter 11.995-12.005". **Out-of-Round Limit (I.D.)** - (62,60S) .007" (front & rear), (75,86) .007" front, .006" rear. Regrinding limits 12.060".
Wheel Cylinder Diameter - 1 1/8" front, 1" rear.
Lining: Molded type riveted to shoes. Primary shoe lining has ½" wide circumferential groove 1/8" deep full length.
Replacement Linings - Furnished in Standard size only.

Lining Length & Width

Model	Primary	Secondary
62,60S (front & rear)	10.12" x 2½"	12.98" x 2½"
75,86 (front & rear)	12.98" x 2½"	12.98" x 2½"

Thickness - ¼" All.
Braking Power - (62,60S,75) 55.8% front, 44.2% rear. (86) 52.8% front, 47.2% rear.
Clearance - .010" (top), .015" (bottom). Adjusting screw backed off 14 notches from point where wheel can just be turned by hand.
Standard Master Cylinder: Located on left frame side member.
Checking Fluid - Master cylinder reservoir located on left front fender apron adjacent to Hydrovac Power Unit. Fill to within ¾" of top.
Removal - Remove heat guard. Disconnect outlet fitting and brake filler tube fitting. Disconnect pedal to relay rod from relay by removing snap ring and retainer. Remove screw securing master cylinder to frame and disconnect pedal from actuating arm and remove master cylinder.
Power Brakes: Hydrovac Power Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brake Section.

►*HYDROVAC BRAKE CONTROL VALVE AIR SEAL PRODUCTION CHANGE & CAUTION:* Effective with engine No. 025800 Hydraulic Control Valve Air Seal reversed to assist hydraulic seal in prohibiting brake fluid from being drawn into vacuum side of system and into intake manifold. If above difficulty experienced on early cars, reverse Air Seal as described above.

►*POWER BRAKE BUZZING NOISE CORRECTION:* Air in fluid at control valve assembly causes valve vibration when brakes are released or applied, causing buzzing noise. To correct bleed system, especially at fitting above control valve assembly. Repeat if necessary. If correction NOT permanent, check for air leaks into fluid at master cylinder, wheel cylinders or within power unit itself.

►*HYDROVAC POWER BRAKE HYDRAULIC CYLINDER SEAL NOTE:* Hydraulic cylinder secondary seal Part No. 2248162 (In late repair Kit No. 1467730 or order separately) incorporated in power brake unit on late production cars to eliminate possibility of brake fluid leakage between cylinder and end plate. Seal is located under hydraulic cylinder lock nut. Install this seal on early production cars for correction of leaks in this area.
Removal of Power Unit - Disconnect filler tube, vacuum inlet, hydraulic inlet and outlet fittings and cap lines. Remove four bolts securing unit to cowl and remove unit.

MISC. MECHANICAL

Windshield Wipers: Cable operated - Vacuum type.
See "Windshield Wipers" in Miscellaneous Section.
Trunk Lid Lock: Trunk lid electric lock operated by switch in glove compartment.
See "Cadillac Rear Comprtment Lid Lock" in Misc. Sect
Trunk Lid Control (Brougham): Reversible electric motor operating a jack screw and limit switches which control opening and closing of the trunk lid.
See "Eldorado Brougham Lid Lock" in Miscellaneous Section.
Power Window Regulators: Electric, with reversible motor in each window.
See "Electric Window Regulators" in Miscellaneous Section.
Power Top Control: Hydro-Lectric with "sealed" system which does not require periodic draining and refilling.
See "Top Controls" in Miscellaneous Section.
Door Lock (Eldorado Brougham): Front door lock solenoid controlled by switch in each door. Rear door lock solenoid controlled by neutral switch (that causes inside handle to free wheel), plus a safety interlock switch which controls interlock solenoid which prohibits transmission selector lever from moving into drive position with either rear door open.
See "Eldorado Brougham Door Locks" in Miscellaneous Section.
Power Seat Adjusters (2-Way): Electric type with single reversible type motor for horizontal adjustment.
See "GM 2-Way Seat Regulators" in Miscellaneous Section.
Power Seat Adjusters (6-Way): Electric type with single adjustable motor. *See "GM 6-Way Seat Regulators" or "Eldorado Brougham Seat Regulators" in Misc. Sect.*
Air Conditioning: Frigidaire & Harrison, with magnetic compressor clutch (compressor operates only with switch "ON").
See "Frigidaire & Harrison (GM) Air Conditioning" in Miscellaneous Section.

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting, s "Jacking & Hoisting Precautions" in Susp nsion & Wh l Alignm nt S ction.*

MODEL IDENTIFICATION

ENGINE & SERIAL NUMBER: Stamped on machined boss cast on upper right hand corner of front face of right hand cylinder block, and top flange of right hand frame just forward and adjacent to No. 1 body bracket, and on lubrication plate attached to front face of left door lock pillar. *NOTE* - Number (example below) includes identification data.

① ② ③
58 E 000001

① - Year '58 (1958).
② - Body Style, see below.
③ - Beginning Engine Serial Number.

Body Style

E - 62 Eldorado Biarritz Conv.
F - 62 Convertible.
G - 62 Coupe.
H - 62 Eldorado Seville.
J - 62 Coupe de Ville.
K - 4 Dr. Sedan.
L - 62 Sedan de Ville.
M - 60S (Fleetwood)
N - 62 4 Dr. Sedan
P - 70 Brougham
R - 75 4 Dr. Sedan
S - 75 4 Dr. Imp. Sedan
Z - 86 Comm. Chassis

Engine Unit Number Note: Stamped on top of crankcase behind left hand cylinder block with a prefix (see below) indicating model.

S ries (1958)	Engine Unit Prefix
60,62,75,86	86X
60,62,75,86 With Air Cond.	86K
60,62,75 With three Carburetors	8QX
62 With three Carburetors & Air Cond.	8QK

►*ENGINE UNIT NUMBER NOTE:* "L.C." will be added as a suffix to engine unit number on all engines built to low compression specifications.

NOTE- Mark * preceding Engine Unit Number indicates cylinder bore and pistons are .010" oversize.

TUNE-UP

COMPRESSION PRESSURE: 165-185 lbs. (at cranking speed), 212 to 230 lbs. (at 1000 RPM).

VACUUM READING: Not specified.

►*VACUUM CHECKING CAUTION: When checking engine vacuum, shut off engine before removing vacuum hose. Plunger in vacuum operated throttle check will increase ngine speed to approximately 900 RPM if hose is removed with engine running. Set hand brake firmly before checking engine vacuum.*

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Automatic thermostatic type. This valve diverts exhaust gasses of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system, during warm-up period.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG: .035"

Spark Plugs - AC no. 44 (All engines). .14 mm. Torque to 20-25 ft. lbs.

COIL: Delc -Remy 1115082.

Igniti n Curr nt - 1.25 amps. idling, 2.4 amps. stopped.

R sist r - Delco-Remy 1927809. On coil bracket.

►*COIL RESISTOR NOTE: R sistor is connected in lead from ignition switch-to-coil, and is by-passed during cranking.*

DISTRIBUTOR: Delco-Remy 1110909 (Std. Eng.). 1110926 (Eldorado Eng.). *See "Delco-Remy Window Distributors" in Electrical Section.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - .016-.021". Set at .016".

Cam Angle - 28-32°. Set at 30°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1½	400	0-3	800
2.5-4	600	5-8	1200
5-7	1400	10-14	2800
7-9	2000	14-18	4000

Vacuum Spark Control: Delco-Remy 1116122.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1.75-5.25	3.5-10.5	11
5.25-11.2	10.5-22.5	13
10.5-12.7	21-25.5	15

IGNITION TIMING

Setting - (99 Octane Fuel). 5° BTDC (Single Carb.),10° BTDC (Triple Carb.).

►*SINGLE CARB. DETONATION NOTE:* When detonation occurs with Std. Setting and lower Octane fuels, reduce timing to 2½° BTDC.

►*TRIPLE CARB. NOTE:* If 98 Octane fuel used, set timing at 7½° BTDC.

Timing - Disconnect vacuum line at distributor, idle engine to 450 RPM and rotate distributor to set timing at correct degree mark on balancer as shown in "Setting" and "NOTES" above.

Timing Mark - Timing indicator marked on harmonic balancer with three lines - "C" (TDC), "5" (5° BTDC), "10" (10° BTDC).

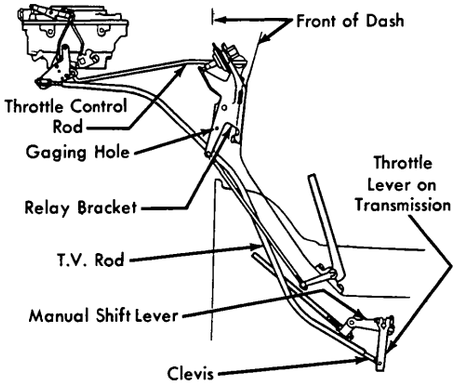
CARBURETOR

►*CARBURETOR APPLICATION: One 4-Barrel Carter or Rochester carburetor used on Standard Engine, three Rochester 2GC 2-Barrel carburetors used on Eldorado Engine.*

Idle Speed-Up Control Adjustment (Cars with Air Conditioner):

1) Remove air cleaner, turn OFF Air Conditioner.
2) Disconnect Freon compressor clutch feed wire from connector at outboard side of compressor.
3) Adjust carburetor so engine will idle at 450 RPM (Normal adjustment).
4) Turn Air Conditioner ON and adjust idle speed-up control to raise engine speed to 525 RPM. *CAUTION* - DO NOT readjust carburetor to obtain this increased speed.

Throttl Ch ck Adjustment: Allow engine to idle and make sure that throttle check plunger is not in contact with throttle relay lever. Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out. Let throttle snap shut and observe delay caused by throttle check. If engine races, throttle check plunger is too long. If engine stalls, plunger is too short. Adjust plunger screw as necessary for correct operation.



CADILLAC HYDRA-MATIC THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT: Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash). Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket. With engine running, set throttle lever to hot idle position (Air Conditioner turned "OFF"). Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip. Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop. Bring rear jam nut up against trunnion with throttle in hot idle position. **Back off jam nut thre c mpl te turns.** Tighten front jam nut, making certain linkage does not bind in any position. *NOTE:* It will be necessary to check and adjust throttle valve jam nut slightly to obtain smooth shifting. This should be done after completion of all other carburetor adjustments.

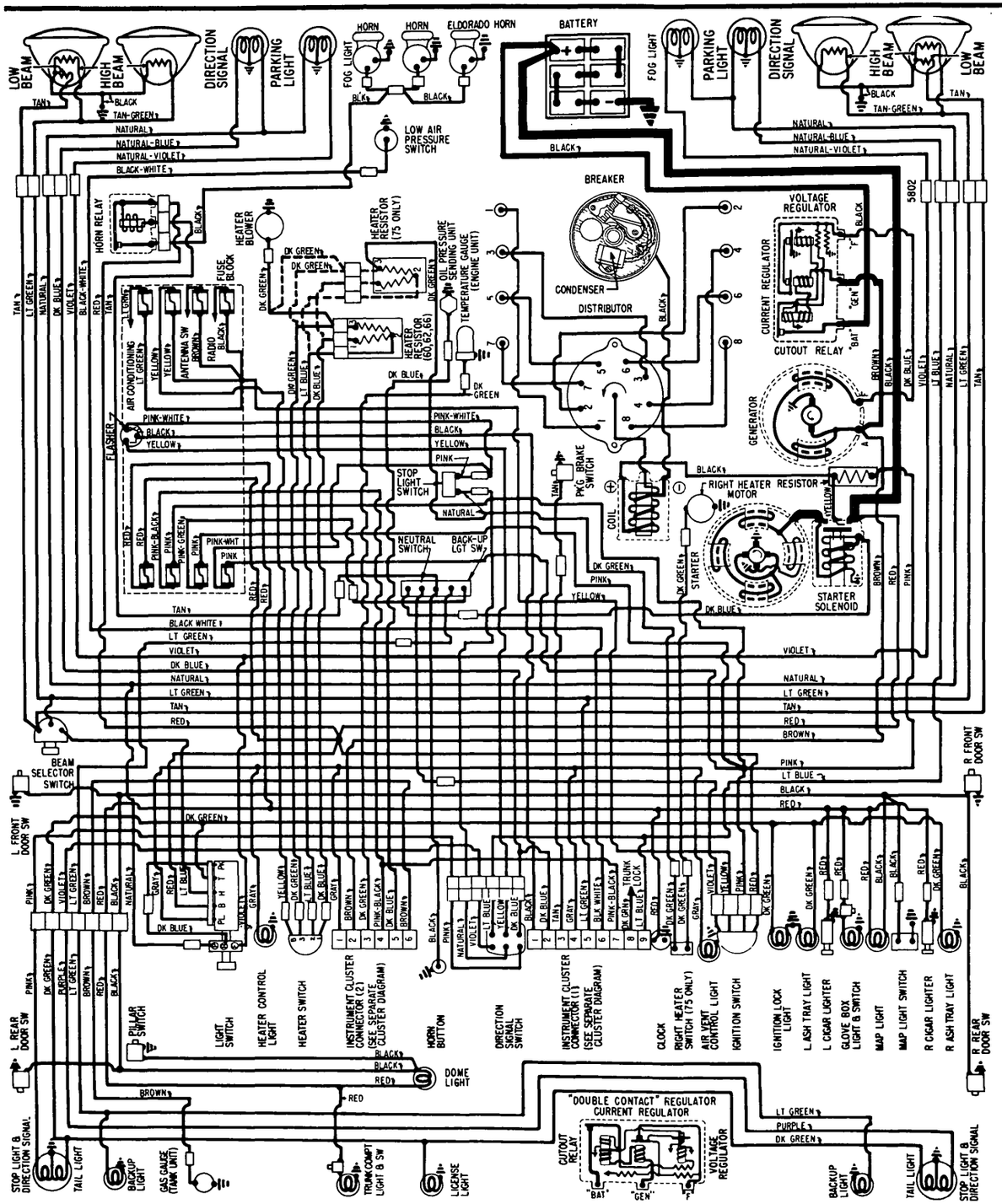
ROCHESTER 4GC 4-BARREL

Rochester 4GC 7012010 (Std. Early); 7012011 (Air C nd. Early). 7012910 (Std. Late), 7012^11 (Air C nd. Lat). 7015801 (Service Replacement, arly carbs.).

►*ROCHESTER 4GC CARBURETOR PRODUCTION CHANGE:* A vacuum assisted primary float system incorporated beginning with Engine No. 045250 approximately, to eliminate a cut-out on heavy acceleration during a turn. Carburetors with the new type float system carry Part No. 7012910 (Std. Cars), 7012811 (Air Cond. Cars). For adjustment procedures on new type carburetors *see "Rochest r 4GC Carbur tors" in Carburetion Section.*

►*4GC CARBURETOR PRODUCTION CHANGES (To Eliminate "OFF IDLE STUMBLE"):* In addition to installation of vacuum assisted float system, a new primary cluster and new metering jets were installed and a change made in power valve restriction to eliminate this condition.

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CADILLAC (EXC. ELDORADO BROUGHAM) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air By-Pass screw on throttle body used to adjust idle speed. Throttle valves are normally closed at slow idle.

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Rochester 4GC 4-Barrel Carburetor" in Carburetion Section.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

Hydra-Matic Throttle Linkage Adjustment: *See CARBURETOR above.*

CARTER AFB 4-BARREL

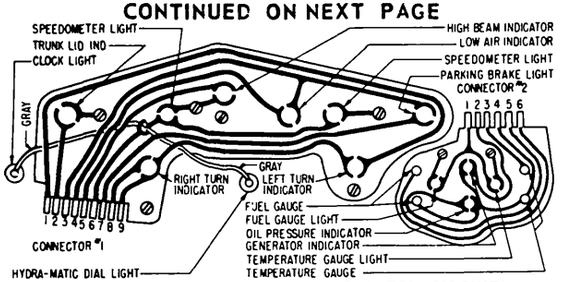
Carter AFB 2696S Early, 2862S Later (Std.), 2697S Early, 2802S Late, 2863S Later (Air Cond.).

►*CARTER AFB CARBURETOR PARTS CHANGE TO IMPROVE OPERATION NOTE:* New fast idle cam and choke coil used starting with Engine No. 057758 (Air Cond. Cars), No. 058491 (Other Cars). For fast idle cam usage on earlier cars and for choke coil setting and choke restriction change, *see "Carter AFB Carburetor" in Carburetion Section.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air By-Pass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB Carburetor" in Carburetion Section.*

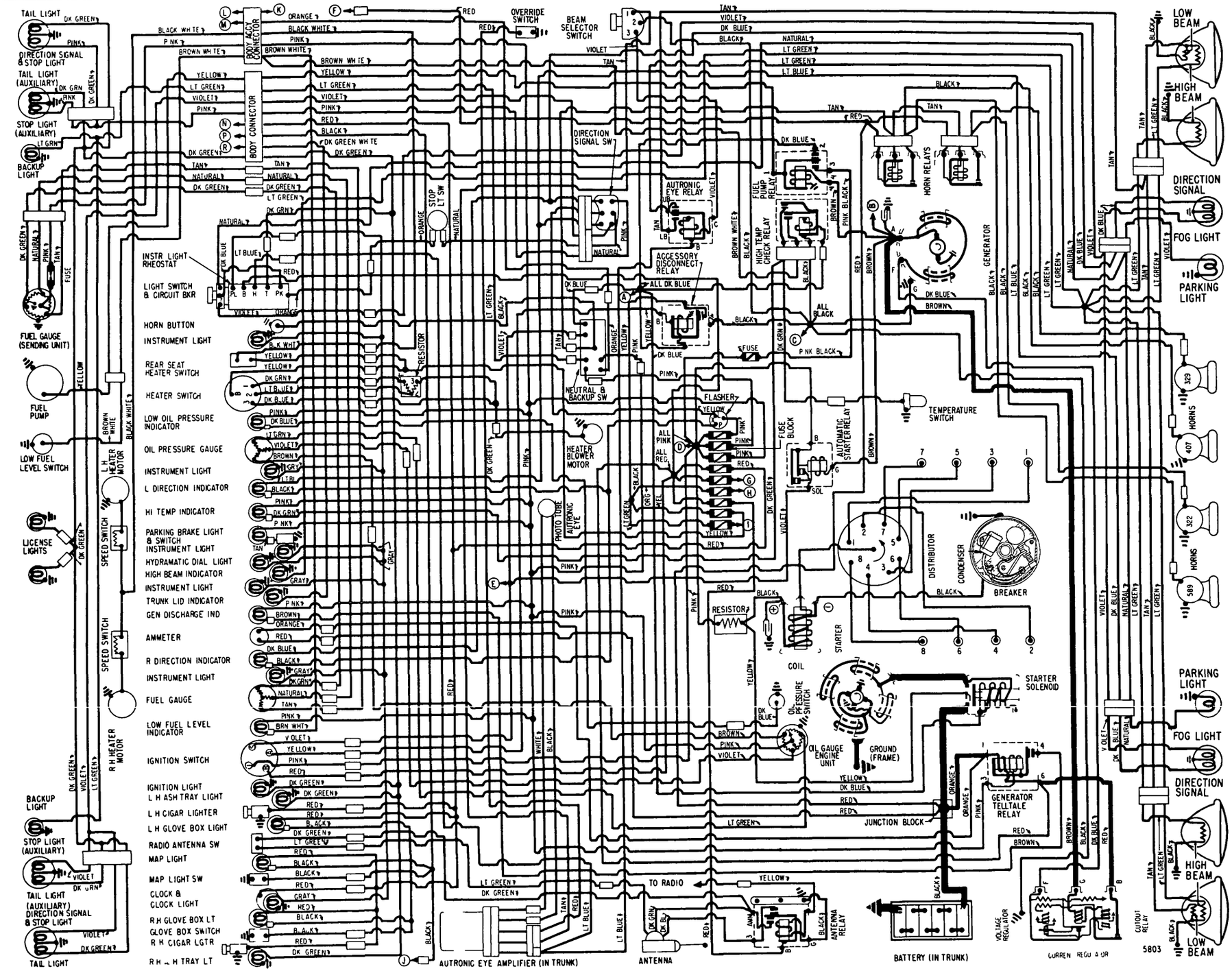
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CADILLAC INSTRUMENT PANEL PRINTED CIRCUIT

ELDORADO BROUGHAM WIRING DIAGRAM LEGEND

(A) - To (A) in Air Suspension Diagram.
(B) - To (B) in Air Suspension Diagram.
(C) - To (C) in Air Suspension Diagram.
(D) - To (D) in Air Suspension Diagram.
(E) - To (E) in Air Conditioning Diagram.
(F) - To (F) (Power Feed) in Various Accy. Diagrams.
(G) - To (G) in Air Suspension Diagram.
(H) - Radio Feed.
(I) - To (I) (Feed) in Air Conditioning Diagram.
(J) - To (J) in Door Lock Diagram.
(K) - To (K) in Door Lock Diagram.
(L) - To (L) in Door Lock Diagram.
(M) - To (M) in Door Lock Diagram.
(N) - To (N) in (Body Feed) in Various Accy. Diagrams.
(P) - To (P) in Door Lock Diagram.
(R) - To (R) in Trunk Lid Control Diagram.



CADILLAC ELDORADO BROUGHAM WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

►*OTHER DATA: S e "Carter AFB 4-Barrel Carbur tor" in Carbur tion Section.*

Hydra-Matic Throttle Linkage Adjustment: *See CARBURETOR above.*

ROCHESTER 2GC 2-BARREL

Rochest r 2G 7012201 (Fr nt - All Models); 2G 7012203 (R ar - All Models); 2GC 7012202 (Early, Center - Exc. Air Cond.); 2GC 7012902 (Later, Center - Exc. Air Cond.); 2GC 7012205 (Early, Center - Air Cond.); 2GC 7012905 (Later, Cent r - Air Cond.).

For complete adjustment procedure on these carburetors (including linkage adjustment to insure correct synchronization) see "Rochester Triple Carburetors" in Carburetion Section.

►*SLOW OPENING THROTTLE VALVE CORRECTION (Secondary Carbs.):* Caused by over-restricted vacuum switch. *See "Rochest r Triple Carburetors" in Carb. Sect.*

►*INABILITY TO OBTAIN FULL THROTTLE CENTER CARBURETOR (Cars prior to Engine No. 012600):* File approximately ¼" from outer edge of throttle lever where lever strikes throttle rod when at wide open position.

►*AIR CLEANER SPACER CAUTION (Front Carburetor of Triple Carburetor Installation):* Check position of spacer between front carburetor and air cleaner on cars prior to Engine No. 014373. After this number, spacer vas discontinued. *NOTE* - Should stud come out with the release of air cleaner wing nut when removing air cleaner, spacer can drop into carburetor.

►*TRIPLE CARBURETOR PRODUCTION CHANGES TO IMPROVE CHOKE OPERATION:* A Kit Part No. 7012817 is available for installation on cars equipped with Triple Carburetors to eliminate an "Over-Rich & Sag or Stumble" condition. These Production Changes were included on cars starting with Engine No. 031647 (Air Cond. Cars), and approximately with Engine No. 032943 (Std. Cars). *For Kit Installation (early cars), see "Cadillac Triple Carburetors" in Carburetion Section.*

►*IDLE SPEED-UP WIRE PRODUCTION CHANGE:* Ground wire for fast idle speed-up control (Air Cond. Cars) rerouted, starting with Engine No. 031028 and concurrent with Engines listed with "Choke Production Change". This rerouting eliminates the wire to neutral switch as this circuit is grounded at the fast idle speed-up control bracket on carburetor with an "I" terminal. Chassis wiring harness changed at the same time.

►*THROTTLE RETURN SPRING PRODUCTION CHANGE (To Correct Poor Idle):* Installation of New Throttle Retracting Spring Part No. 1471929 and New Vacuum Control Bracket Part No. 7012832 starting with Engine No. 067140 provides more positive closing of center carburetor throttle valve. Install New Type Spring and Bracket to correct poor idle condition on early cars.

CARB. EQUIPMENT

Air Cleaner: DRY FILTER ELEMENT type. Clean every 6,000 miles, replace every 12,000 miles.

►*CLEANING CAUTION: Clean filter element by tapping gently to remove dirt particles, DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

►*AIR CLEANER REPLACEMENT NOTE:* Only two types of Air Cleaners now available, one for 4-Bbl. Carb. and one for 2-Bbl. Triple Carb. Both types have Air Suspension Exhaust Tube attached. When replacing air cleaner on a car not having air suspension, remove new air cleaner top and drill out exhaust tube crimping with 5/16" drill, remove tube and plug hole with rubber insert bumper, Part No. 1466995.

Fuel Pump: AC mechanical type (Exc. Brougham), Electric type mounted in gas tank (Brougham). Vacuum pump is part of engine oil pump.

►*FUEL PUMP LEAKAGE CORRECTION (Early Cars):* Larger diameter pulsator diaphragm used starting with Engine No. 020139 (Std.) and No. 020156 (Air Cond.) with lubrited cover screws to eliminate possibility of diaphragm being pulled into pump by fuel pressure.

Replacement Fuel Pump (Exc. Brougham) - AC No. 4362. **Pressure** - 5¼-6½ lbs. at 1800 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric.

►*ELDORADO BROUGHAM FUEL GAUGE FUSE NOTE:* An AGC ¼ ampere fuse located in pink circuit (under cover of Auto. Trunk Lid Motor Assembly) to protect fuel gauge, starting with Eng. No. 012118.

	Brougham	Others
Dash Unit (AC No.)	1518655	1518739
Tank Unit (AC No.)	1518565	1518588

See "Fuel Gauges" in Carburetion Section.

Low Fuel Level Indicator (Brougham): Light on instrument panel comes on when fuel in tank drops to 3 gallons (2 gals. usable). *See Wiring Diagram.*

BATTERY

Delco No. 562 (Exc. Brougham); 3SMR72 (Brougham). 12 Volts, 11 plate, 70 ampere hour (No. 562), 72 ampere hour (3SMR72) capacity (20 hr. rate).

Battery Location - Separate compartment in right rear quarter panel, accessible from trunk (Brougham), under hood on tray attached to radiator cradle (Others).

Battery Ground - Negative

Engine Ground - Engine to dash.

STARTER

Delco-Remy 1107668 (Brougham), No. 1107657 (Others).

Armature - Delco-Remy No. 1932185 (1107657 Starter).

►*STARTER FAILURE CORRECTION:* When end coil of override spring is looped over second coil, the shaft lever collar will be cocked on clutch shaft and starter will not operate correctly. To correct, replace Clutch Assembly with New Part No. 1932188 (Check new assembly for same difficulty before installing).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. min.

Performance Data - All

Torque	RPM	Volts	② Amperes
0 Ft. Lbs.	3600-5100	10.6	65-100
①	Lock	3.5	300-600

① - Armature locked. ② - Includes solenoid.

Starting Switch (Exc. Br ugham): Delco-Remy Solenoid Switch 1119910 mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy 1116536. Turn key full RIGHT against spring tension to start.

Starting Switch (Brougham): Delco-Remy Solenoid Switch 1119910 mounted under starter and controlled by Ignition & Starter Switch Delco-Remy 1116536 (turn ignition "ON") and Automatic Starter Relay Delco-Remy 1119924 (Vacuum and Electric controlled). *NOTE* - Should Automatic Starter fail, turn Ignition & Starter Switch to full RIGHT against spring tension to start.

►*ACCESSORY DISCONNECT RELAY (Brougham) NOTE:* Delco-Remy No. 1116927 Relay limits battery load by opening circuits to Air Conditioning, Heater, and Radio while starter is cranking engine.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998170 (Brougham), 1998137 (Others). Located on steering column.

Adjustment - *See "Hydra-Matic Drive" in Trans. Sect.*

GENERATOR

Delco-Remy. Used as follows:

Model	Generator	Armatur
60,62 (Less Air Cond.)	1102109	1932900
60,62, (With Air Cond.)	1102103	1939837
75,86 (All)	1102103	1939837
Brougham	1106989	1936778

Performance Data

Generator	Amperes	Volts	RPM
1102109	35	14	2400
1102103	45	14	2320
1106989	55	13.0	1580

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 20 ozs. (1106989), 28 ozs. (others).

Field Current - 1.62-1.82 Amps. (1102190), 2.66-2.86 Amps. (1102103), 2.14-2.28 Amps. (1106989) at 12 volts and 80°F.

Generator Charge Indicator: Red light on instrument panel *See Diagram.*

Belt Adjustment: Use Belt Tensioner Gauge J-6733. Loosen or tighten belt tension adjusting nuts so Red line on Gauge is even with the shoulder.

REGULATOR

Delco-Remy. Used as follows:

Model	Regulator	Generat r
60,62 (Less Air Cond.)	1119002	1102109
60,62 (With Air Cond.)	1119601	1102103
75,86 (All)	1119601	1102103
Brougham	1119605	1106989

►*DOUBLE CONTACT REGULATOR NOTE: Regulators 1119601 & 1119605 have double contact type voltage Regulators.*

►*NOTE - Specifications below are "Normal" settings.*

Cutout Relay

Cuts In - (1119002) 11.8-13.5 Volts, (1119601 & 1119605) 11.8-13.0 Volts.

Contact Gap - .020".

Air Gap - .020".

Voltage Regulator

Setting - (1119002) 13.8-14.8 Volts at 125°F ambient temp.

Setting - (1119601 & 1119605) 13.8-14.6 Volts at 125°F ambient temperature when operating on upper contacts. .1-.3 Volts lower when operating on lower contacts.

Contact Gap - (1119601 & 1119605) .016".

Air Gap - (1119002) .075". (1119601 & 1119605) .067" with armature pressed down to points where contacts just touch.

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Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Doubl Contact)Regulators" in Electrical Section.*

Current Regulator

Setting - (1119002) 32-37 Amps.
Setting - (1119601) 42.5-47.0 Amps.
Setting - (1119605) 53-57 Amps.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Two Printed-Circuit Instrument Cluster Components are used as described below. Connections are made to each printed circuit component by means of a multiple connector which engages circuit tabs on the rear of the cluster. Remove and install these cluster components as follows:

1) Gauge & Indicator Printed Circuit (Left Side) - To remove this component, carefully disconnect multiple connector from circuit tabs, remove four gauge terminal retaining nuts and washers, take out two retaining screws and washers, remove printed circuit and bulb sockets as an assembly. Install printed circuit by reversing above procedure

2) Instrument & Indicator Light Printed Circuit (Center) - To remove this component, disconnect Clock and Hydra-Matic Indicator Light Wire Connector (these lights mounted independently but wired in printed circuit), carefully disconnect multiple connector from circuit tabs, remove five printed circuit retaining screws, remove printed circuit assembly. Remove bulb sockets by twisting them counterclockwise. Install printed circuit by reversing above procedure.

Headlamps: Dual Headlights (4-Headlight System) *See "4-Headlight System" in Electrical Section.*
Autronic Eye: *See "Autronic Eye" in Electrical Section.*
Directional Signal: *See "Directional Signals" in Electrical Section.*
Stop Light Switch (Location): Mechanical type, mounted on brake pedal retaining bar flange.
Adjustment - Rotate cam on pedal bar until stoplights are off when pedal in fully released position. Adjust cam until stoplights come on at slightest movement of pedal.
CIRCUIT BREAKER: (Lighting) - 20 Amp. (Exc. Brougham), 25 Amp. (Brougham). In light switch, protects Headlights, Ash Tray. Beam Indicator, Parking, Fog, Tail, License Plate, Instrument, Ignition and Clock lights.
FUSES: Located on fuse panel under instrument panel to left center of car.
6 Ampere - (Brougham Air Ride) in fuse panel.
6 Ampere - Protects Brougham electric Fuel Pump. Located to left side of front speaker housing.
SFE 9 Ampere - Protects Stop Light, Gas Gauge, Temperature Gauge, Oil, Generator, Parking Brake, Turn Signal and LO-Air Tell Tale Lights.
SFE 9 Ampere - Protects Back-up Light.
AGC 25 Ampere - Protects Dome, Map, Air Cond., Clock, Cigar Lighters, and Body Feed.
AGC 9 Ampere - Protects Radio.
25 Ampere - Protects Glove Compartment Light.
SFE 20 Ampere - Protects Heater.
SFE 14 Ampere - Protects Antenna.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: V8 Overhead valves. Two engines used. Standard engine has 4-barrel carburetor, three 2-barrel carburetors used on all Eldorado Series cars, with special intake manifold.

Bore	Stroke	Displacement	Rated HP
4"	3 5/8"	365 cu. in.	51.2

Engine	Compr. Ratio	Developed HP
Standard	10.25-1	310 at 4800 RPM
Eldorado	10.25-1	335 at 4800 RPM

Compression Pressure - *See TUNE-UP.*

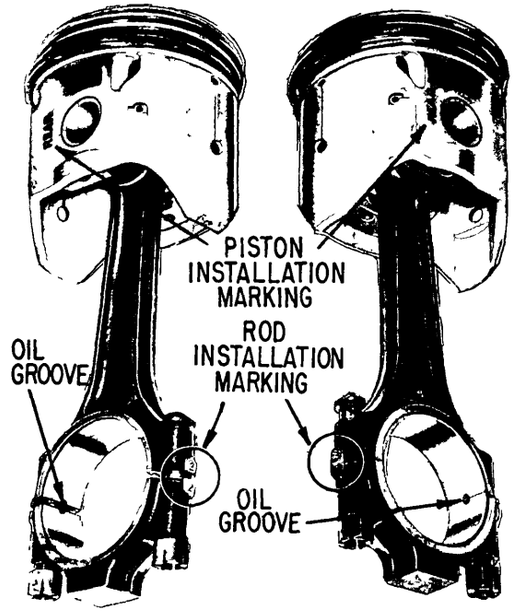
►*OVERSIZE CYLINDER BORE CAUTION:* Engine with mark * preceding Engine Unit No. (on left rear crankcase) have .010" Oversize cylinder bore and pistons.

►*ENGINE BALANCE CHECK & UNBALANCE CORRECTION: See "Engine Balancing" in Cadillac Special Data.*

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*
OIL PAN REMOVAL: *See "Oil Pan" in Cadillac Special Data.*
CYLINDER HEAD: *See "Cylinder Head & Manifold" in Cadillac Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data.*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size: 4.0000-4.0020".
Original Bore & Pistons - *See "Original Bore & Pistons" in Cadillac Special Data.*
Pistons - New type with trough in head to provide improved fuel turbulence and increased clearance for valves at high RPM.
Clearance - .0015" (Top of skirt), .000" (Bottom of skirt).
Weight - 22.72 ozs. (less pin).
Removal - Piston and rod assemblies removed from above. Install connecting rod Guide studs J-3224, on connecting rod bolts to guide rod out through bore without nicking or scratching. *CAUTION - Do not nick lower edge of bore when pushing rod up.*
Fitting New Pistons: Use micrometer or feeler gauge. *See "Pistons" in Cadillac Special Data.*
Replacement Pistons: Standard (Code "L" or "M") and .010", .020", .030" Oversize with rings and pin.
Installing Pistons: Install in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Connecting Rods" (below) for installation of pistons*



CADILLAC PISTON & ROD ASSY.

PISTON PINS

Pin is pressed in connecting rod.
Diameter - 1.000". **Length** - 3 3/32".
Pin Fit in Piston - .00005-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).
Pin Fit in Rod - (NOTE - Special tools required). *See "Piston Pins" in Cadillac Special Data.*

PISTON RINGS

Top compression ring is chrome plated, second compression ring is lubrited. An expander is located behind oil ring.

Ring	Width	End Gap ①	Side Clearance
Compr.(#1&2)	5/64"	.013-.023"	.0017-.0035"
Oil (#3)	3/16"	.013-.023"	.0008-.0026"

① - With Standard 4.0000" cylinder.

Replacement Rings: Standard, .010", .020", .030", oversize.

►*REPLACEMENT RING NOTE:* Use re-ring sets with chrome top compression ring and expander behind oil ring or multi-piece oil rings.

Installing Rings: Chamfered face of both compression rings must be installed toward top of piston

CONNECTING RODS

Length - 6.625" (center to center).
Weight - 23.49 ozs.
Crankpin Journal Diameter - 2.2488-2.2493".
Out-of-Round Limits - .00025".
Bearings - Durex 400, bearing shell is steel backed aluminum. Bearing halves interchangeable. No shims.
Clearance - .0005-.0021" (Service limit .0035").
Replacement Bearings: Furnished in standard size only.

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Installing Rods: Install piston and rod in cylinder bore with "REAR" on piston toward rear of engine and numbers on lower end of rod down. Numbers 1,3,5,7 are in left bank, 2,4,6,8 are in right bank.

CRANKSHAFT

J urnal Diam t rs - 2 625".
Out- f-R und Limits - 0025".
B arings - Rear, steel backed babbitt, shell type insert. All other bearings are Moraine 400 Aluminum.

►*REAR MAIN BEARING INSTALLATION CAUTION:* For proper alignment of thrust surfaces of rear main bearing proceed as follows: Install upper and lower inserts in block and bearing cap. With rear oil seal in place and mating surfaces clean, install bearing cap and tighten screws to 1-2 ft. lbs. torque. Using a plastic hammer, drive crankshaft forward, then rearward, then forward again (*CAUTION* - Pound on counterweights, not on connecting rods). Tighten bolts evenly to specifications. Check to make sure crankshaft is not binding.

►*MAIN BEARING CAPSCREW NOTE: Lockwashers not used under heads of bearing cap retaining screws.*

Cl aranc - .0008-.0025" (service limit 002" front, .003" others).

R plac m nt B arings: Furnished in standard size only.

End Thrust: Taken by flanged rear main bearing.

End Play - 001- 005" (service limit .010")

►*REAR MAIN BEARING O IL SEAL PRODUCTION CHANGE:* A lip type seal used starting with Engine No. 050909 and is not interchangeable with earlier type seal. Replacement of new type seal can be made without removing crankshaft. For removal and installation procedures, see *"Crankshaft & Ma in Bearings" in Cadillac Special Data.*

Crankshaft R moval: See *"Crankshaft & Bearings" in Cadillac Special Data.*

R ar Main B aring Oil S al Installation: See *"Crankshaft & Bearings" in Cadillac Special Data*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage or mis-alignment. Check whenever removed.

Rem val, Alignment & Installation - See *"Camshaft & Bearings" in Cadillac Special Data.*

Bearings - Steel backed babbitt bushings.

Clearance - .001- 0022" (service limit 004" max.)

Bearing Out-of-Round Limit - 002" max.

Timing Chain: Link-Belt side guide type. **Width** 11/16", **Pitch** .500", **Length** 23" or 46 links.

Installation & Rem val - See *"Timing Chain" in Cadillac Special Data.*

Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.

►*CAUTION:* Install chain as a unit with camshaft sprocket (sprocket press fit on shaft with locating dowel and two retaining capscrews)

VALVES

Tapp t Cl arance: None in service, hydraulic.

Valve	H ad Diam.	Stem Diam.	Length
Intake	1 875"	.3415-.3425"	4 688"
Exhaust	1.500"	.3415-.3420"	4 694"

Valv	S at Angle	Lift	St m Cl aranc
Intake	ℂ 44°	.451"	ℂ 0010-.0025"
Exhaust	ℂ 44°	451"	ℂ .0010-.0025"

ℂ - New Valves (Valves in service can be refaced to 45° if seat width recommendation not exceeded).

ℂ - New valves and guides. Worn limit 005" maximum.

►*VALVE GRINDING CAUTION:* DO NOT lap or grind a valve so it has more than 1/64" contact with seat in head. (1° difference between valve and seat angle designed to provide "hairline" contact).

Valve Seat Recommendations - 3 64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving) Cut seat so that distance from outer edge to edge of flange on valve head not more than 1/32".

Valve Stem Oil Seal - Rubber oil seal installed in lower groove on valve stem (below valve keeper).

Oil Seal Installation - See *"Valve System" in Cadillac Special Data.*

Valve Guides: Pressed in cylinder head from combustion chamber side with longest chamfer end pointing toward rocker arm side of head. Use Remover Tool J-3062 to drive out old guides (toward top of head), and Installer Tool J-3066 to drive new guides in (tool plate serves as stop for driver)

Valve Springs: Free Length 2.25" (Approx.)

Valve Spring Specifications

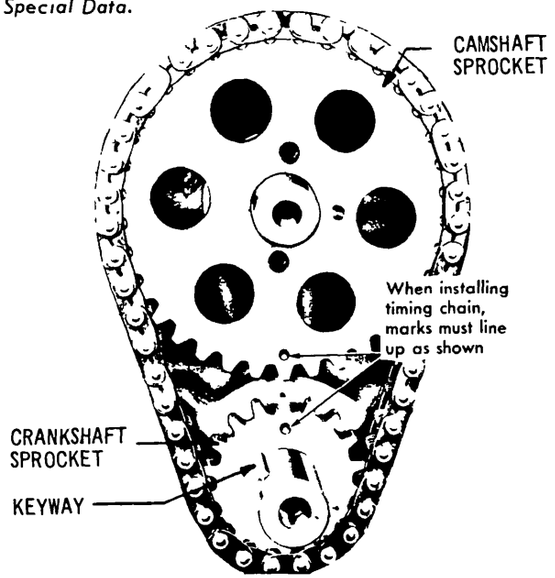
	Pressure	Length
Valve Closed	60-65 lbs.	1 946"
Valve Open	155-165 lbs.	1 496"

►*SPRING INSTALLATION CAUTION:* Lower end of valve spring must be seated in recess in cylinder head.

Valve Lifters: Hydraulic.
See *"Valve System" in Cadillac Special Data*

Valve Lifter Removal - See *"Valve System" in Cadillac Special Data.*

Rocker Arm Assembly: See *"Valve System" in Cadillac Special Data.*



CADILLAC VALVE TIMING MARKS

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*

►*VALVE TIMING NOTE: Specifications are "Without Ramp".*

Intake Valves - Open 27° BTDC. Close 75° ALDC.

Exhaust Valves - Open 73° BLDC. Close 29° ATDC.

Valve Timing Check - Not practical to check in field Manufacturer recommends removing timing chain cover and checking timing gears.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data.*

Crankcase Capacity: 5 qts. refill, 6 qts. filter change.

Normal Oil Pressure: 30-35 lbs. min. at 30 MPH. 15 lbs. at idle speed.

Pressure Regulator Valve - On oil pump. Not adjustable.

Oil Pressure Indicator (Exc. Brougham) - Light on instrument panel controlled by pressure switch AC No. 1508767 mounted on engine.

Oil Pressure Indicator (Brougham) - Light on instrument panel controlled by pressure switch AC No. 1508624, mounted on engine.

Oil Pressure Gauge (Brougham) - AC electric in addition to Indicator.

Dash Unit - AC No. 1518655 **Engine Unit** - AC 1508566. See *"Oil Pressure Gauges" in Miscellaneous Section.*

Oil Pump: Helical gear. Mounted on rear main bearing cap.

Oil Pump Removal & Overhaul - See *"Oiling Syst m" in Cadillac Special Data.*

Vacuum Pump: Part of Oil Pump Assembly. See *"Vacuum Pump" in Cadillac Special Data.*

Oil Filter: Full flow (Brougham), Partial flow (Others). Replace element every 6,000 miles or more frequently

►*OIL FILTER INSTALLATION CAUTION:* Do not tighten cover bolt more than 25 ft. lbs. Cover may be crushed and a leak result.

Crankcase Ventilation: Air intake in oil filler cap (oil wetted type) with outlet connection at rear of valve compartment cover, and outlet pipe extending down below engine at right corner.

COOLING

►*BELT TENSIONER GAUGE NOTE:* Belt Tensioner Gauge Tool No J-6733 released for field service for more accurate belt adjustments. Place Gauge on belt, loosen belt tension adjusting nuts, and tighten or loosen belt until red line on barrel is in line with shoulder.

►*RADIATOR LOWER HOSE PRODUCTION CHANGE (To Provide More Clearance for Power Steering or Compressor Drive Belt):* New hose is more flexible and has wire insert. Use only new type hose on Air Suspension Cars.

Water Capacity: (Without Heater) - Models 62, 60S, 86 - 20½ qts; Model 75 - 22 qts.; Brougham 19½ qts.

Pressure Valve: AC No. 850800. Radiator filler cap. Opens at 12-15 lbs.

Thermostat: Dole type. In water outlet at top of pump body

Standard Setting - Starts to open at 163° to 168°F.

High Temp. - Starts to open at 177° to 182°F.

Water Pump: Packless, sealed ball bearing type.
See *"Water Pumps" in Cadillac Special Data.*

Pump R m val - Drain cooling system. Remove all

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belts Disconnect throttle spring Detach Power Steering pump and bracket assembly and secure to one side Remove two remaining thermostat housing screws, housing and thermostat Disconnect lower radiator hose and upper and lower heater hoses Loosen clamp on transmission Oil Cooler hose Remove remaining pump flange to cyl block screws and remove Oil Cooler hose On Air Cond cars remove two compressor mounting bracket screws from water pump flange Loosen compressor support screw and move support away Remove water pump and gaskets

Temperature Gauges: AC electric.

Dash Unit - AC No. 1513301 (Brougham), 1513514 (Others).

Engine Unit - AC No. 1513402 (Brougham), 1513130 (Others).

HYDRA-MATIC DRIVE

Dual-Coupling, four speed hydraulically controlled automatic transmission of same design as previous models.

►*DUAL-COUPLING HYDRA-MATIC FLUID CAUTION:* Use only improved type transmission fluid Part No. 1471380 (5 qt. cans), No. 1471381 (55 gal. drum). Former type fluid is to be used in Dual-Range Hydra-Matic only.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Dual-Coupling Hydra-Matic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section*

Lubrication - Check fluid level avery 2 000 miles drain and refill every 12 000 miles or once a year Use only Cadillac Hydra-Matic Fluid

►*LUBRICATION CHANGE NOTE·* When vehicle is driven under heavy duty conditions (heavy city traffic continuous mountain driving prolonged driving during hot weather) it is advisable to drain and refill transmission at 6 000 mile intervals

Capacity - 12 qts (approximately) *NOTE* - The correct level is ¼" below the "Full" mark with transmission hot and engine running

Checking Fluid Level - Run engine with selector lever in "N" (Neutral) or "P" (Park) position at 800 RPM for 1½ minutes to normalize temperature and to be sure coupling is full Reduce engine speed to slow idle, clean dipstick and check fluid level With engine running add fluid through dipstick tube to bring fluid level to ¼" of "FULL" mark on dipstick *NOTE* - From "LOW" to "FULL" mark on dipstick requires 1 qt of fluid

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section*

UNIVERSALS

Mechanics. Needle bearing type Three used with two piece propeller shaft and center bearing

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Cadillac Special Data*

Rear Axl Pinion Angle: Must be correct to prevent propeller shaft vibration. For checking and adjusting, *see "Cadillac Rear Suspension" in Susp nsi n & Whe l Alignment Section.*

REAR AXLE

Own Make. Hypoid gear, semi-floating with Hotchkiss Drive.

See "Cadillac Hypoid" in Rear Axle Section.

►*DIFFERENTIAL LUBRICANT & PINION SEAL PRODUCTION CHANGE & CAUTION:* Improved type of differential lubricant and pinion seal used in cars starting with Engine No. 067125. New type seal can be used with old type lubricant but DO NOT use new type lubricant with old type seal as seal will harden and fail *See "Pinion Oil Seal or Universal Yoke Replacement" in Cadillac Hypoid in Rear Axle Section.*

►*OVERHAUL CAUTION:* Manufacturer recommends that Carrier Assembly be serviced by replacement DO NOT disassemble this unit or attempt service work other than oil seal and universal joint replacement

Axle Identification - Gear ratio identified by number stamped on front face of carrier assembly at end of oil return passage *NOTE* - Brougham rear axle assemblies further identified by letter "B" preceeding axle ratio number

Series	Ratio	Mark
60 62 Exc Eldorado & AC Cars	3 07-1	3
75 627S,6237S,60&62 With AC Ⓒ	3 36-1	6
86 Ⓒ	3 77-1	7
Brougham	3 36-1	B6

Ⓒ - Optl on 60 & 62 without AC Ⓒ - Optl on 75

Rear Axle Pinion Angle: Must be correct to prevent propeller shaft vibration. For checking and adjusting, *see "Cadillac Rear Suspension" in Suspension & Wheel Alignment Section.*

Axle Shaft Removal: Remove wheel and take out screws holding brake drum on axle shaft flange and remove drum Remove nuts and lockwashers from bolts holding bearing retainer and backing plate on axle housing use Puller J-942-1 and Slide Hammer J-2619 to remove axle shaft

►*CAUTION* Use care not to damage axle shaft oil seal when sliding axle shaft out and do not disturb position of backing plate on housing

Commercial Cars -Remove wheel, remove nut and washer on end of shaft Use Puller (Snap-On No S4567 or similar five jaw type) to remove wheel hub and brake drum Disconnect brake line Take out retaining screws and remove dust shield (bearing retainer) and backing plate Use Puller J-838 to pull axle shaft and bearing assembly out, using care not to damage oil seal in housing

Differential Carrier Removal: Disconnect rear universal joint and remove lubricant from rear axle housing Remove axle shafts (see above) Remove nuts and washers holding carrier to axle housing and remove entire assembly with gasket *See "Overhaul Caution" above*

Wheel Bearings: Sealed ball-bearing type

►*CAUTION:* Check bearings for loss of lubricant when shaft removed If bearings spin freely indicating loss of lubricant, replace bearings

Pini n B aring Pr l ad Adjustm nt: Pinion should be adjusted whenever nut on end of pinion shaft disturbed (for universal joint yoke or oil seal replacement) *S e "Cadillac Hyp id" in R ar Axl Section*

SHOCK ABSORBERS

D lc . Direct acting permanently sealed airplane type.

Coil Spring Cars - Mounted inside of coil springs (Front), between frame bracket at upper end and lower control link mounting bracket at lower end (Rear).

Air Spring Cars - Mounted between brackets located behind Air Springs (Front) and same as for Coil Springs above (Rear).

Shock Absorbers

Model	Front	Rear
60S,62,75 (Air Sprgs.)	5543716	5543717
60S,62 (Less Air Sprgs.)	5543714	5543715
75 (Less Air Sprgs.)	5543720	5543721

FRONT SUSPENSION

Independent type with direct acting shock absorbers and "Spherical" joints.

►*FRONT SUSPENSION NOTE:* Coil springs standard, Air Springs Optional on all models.

Steering Axis Inclination - 4° at 0° camber.

Caster - 0° to Neg. 1°. Adjustment must be equal within ½° or less on both sides of car.

Camber - Neg. 3/8° to Pos. 3/8°. ¼-½° more positive camber on left wheel to correct crowned road pull.

Toe-In - (Coil Springs) 3/16"-1/4", (Air Springs) 1/16-1/8" Tie rod clamp screw must be down

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22°40'.

REAR SUSPENSION

Rear Suspension: *See "Cadillac Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs on all four wheels. *See "Front Suspension" above for alignment specifications and "Cadillac Air-Suspension" in Susp nsion & Wheel Alignment Section.*

STEERING

Power Steering: Saginaw (In-Lin) Hydraulic. Hydraulically operated in-line power steering gear which combines the recirculating ball type gear with a concentric hydraulic booster

See "Saginaw (In-Line) Power Steering" in Steering Sect

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button R m val: *See "Saginaw (In-Line) Power Steering" in Steering Section*

Steering Gear Removal: *See "Saginaw (In-Line) Power Steering" in Steering Section*

BRAKES

Bendix (Hydraulic) Single Anchor (Without Ecc ntric). Conventional two-shoe with Bendix or Moraine Power Unit. Parking brake applies rear wheel service brakes. *See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.*

►*BRAKE ANCHOR PIN PRODUCTION & TORQUE SPECIFICATION CHANGE·* Heat treated anchor pin nut No. 225857 (identified by three grooves on face of nut) replaced Nut No. 120371 beginning with Engine

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No. 038946. All three backing plate nuts and new anchor pin nut should be tightened to 80-100 ft. lbs.

►*BRAKE SHOE RETRACTING SPRING PRODUCTION CHANGE & CAUTION:* Larger diameter (7/8") brake shoe retracting spring No. 5456495 replaced No.497834 (½") on all Series FRONT wheel brakes starting with Engine No. 017126. All four front wheel retracting springs must be of the same type. All four rear wheel retracting springs (½") must be the same type (two types - Tile Red and Dark Maroon). DO NOT USE large retracting springs on rear wheels.

►*PARKING BRAKE ADJUSTMENT CHANGE TO CORRECT PEDAL RETURN TRAVEL:* For correct adjustment, interference correction and parts changes, *see "Cadillac Brake Adjustment" in Bendix Hydraulic Single Anchor (Without Eccentric) in Brake Section.*

►*MORAINE POWER BRAKE WELCH PLUG SEALING PROCEDURE:* New sealing Kit Part No. 5456601 available and eliminates need for Power Brake Removal, *See "Moraine Power Unit" in Brake Section.*

►*EXCESSIVE BRAKE PEDAL PRESSURE CORRECTION:* Remove lubrication plug from top of Power Brake Vacuum Cylinder and insert one ounce of shock absorber fluid to lubricate vacuum piston leather and if 1957 contour mat is installed cut adequate clearance from mat to provide free movement of brake pedal push-rod.

Drum - Diam ter 11.995-12.005". **Out-of-Round Limit** (I.D.) - (60S,62) .007" (front & rear), (75,86) .007" front, .006" rear.
R grinding Limit - 12.060".

Whe l Cylind r Diameter - 1 1/8" front, 1" rear (Exc.86). (86) 1 1/8" front, 1 1/16" rear.

Lining: Molded type riveted to shoes. Primary shoe lining has ½" wide circumferential groove 1/8" deep full length.
Replacement Linings - Furnished in Standard size only.

Lining Length & Width

Model	Primary	Secondary
60S,62 (front & rear)	10.12"x2½"	12.98"x2½"
75,86 (front & rear)	12.98"x2½"	12.98"x2½"

Thickness - ¼" All.
Braking Power - (60S,62.75) 55.8% front, 44.2% rear. (86) 52.8% front, 47.2% rear.
Clearance - .010" (top), .015" (bottom). Adjusting screw backed off 14 notches from point where wheel can just be turned by hand.

Master Cylinder: Integral with end of Power Unit (engine side of firewall).
Checking Fluid - Remove plug from top of master cylinder and maintain fluid to within ¼" of filler opening.
Removal - *See Power Unit below.*

Power Unit: Bendix or Moraine Power Unit. *See "Bendix" and "Moraine Power Unit" in Brake Section.*
Removal of Power Unit - Disconnect hydraulic line from master cylinder, vacuum hose and reservoir hose from power unit. Remove power unit pushrod to brake pedal relay lever clevis pin. Remove power unit to mounting bracket screws and remove power unit.

MISC. MECHANICAL

Windshield Wipers: Cable operated - vacuum type.
Trunk Lid Lock (Exc. Brougham): Trunk lid electric lock operated by switch in glove compartment.
See "Cadillac Rear Compartment Lid Lock" in Misc. Section.

Trunk Lid Contr l (Brougham): Reversible electric motor operating a jack screw and limit switches which control opening and closing of the trunk lid.
See "Eldorado Brougham Lid Lock" in Miscellaneous Section.

Power Window Regulators: Electric. With reversible motor in each window, operating vent and door windows.
See "Electric Window Regulators" in Miscellaneous Section.

Power Top Control: Hydro-Lectric with "sealed" system which does not require periodic draining and refilling.
See "Top Controls" in Miscellaneous Section.

Door Lock (Eldorado Brougham): Front door lock solenoid controlled by switch in each door. Rear door lock solenoid controlled by neutral switch (that causes inside handle to free wheel), plus a safety interlock switch which controls interlock solenoid which prohibits transmission selector lever from moving into drive position with either rear door open.
See "Eldorado Brougham Door Locks" in Miscellaneous Section.

Power Seat Adjusters (2-Way): Electric type with single reversible type motor for horizontal adjustment.
See "GM 2-Way Seat Regulators" in Miscellaneous Section.

Power Seat Adjusters (6-Way): Electric type with single adjustable motor. *See "GM 6-Way Seat Regulators" or "Eldorado Brougham Seat Regulators" in Misc. Sect.*

Air Conditioning: Frigidaire & Harrison, with magnetic compressor clutch (compressor operates only with switch "ON").
See "Frigidaire & Harrison (GM) Air Conditioning" in Miscellaneous Section.

►*JACKING & HOISTING (ALL MODELS): Before jacking, hoisting, towing or working under car, se "Jacking & Hoisting Pr cautions" and "Cadillac Air Suspension" in Suspension & Wheel Alignment Section. NOTE - DO NOT raise Series 67 & 68 Cars with a frame contact hoist.*

►*STARTING CAR BY PUSHING: Car CANNOT be started by pushing because rear oil pump has been eliminated.*

►*1960 PARKING BRAKE VACUUM RELEASE CAUTION:* Before working on the engine (engine running), car *in gear, disconnect vacuum supply hose from right hand connector of vacuum switch on neutral safety switch and tape switch opening closed.*

MODEL IDENTIFICATION

ENGINE OR SERIAL NUMBER: Stamped on lower left hand side of cylinder block between two welch plugs just above edge of oil pan; on top of frame on left hand side bar just behind radiator; on lubrication plate attached to front face of left door lock pillar. *NOTE* - Number (example below) includes identification data as follows:

① ② ③

60 A 000001

① - Year Model. **59** (1959), **60** (1960).
② - Body Code. *See Series Designation Table below.*
③ - Beginning Engine Serial Number.

Series Designation

Series	Body Style	Body Code
60	6029 Fleetwood Sixty Special	M
62	6229 Sixty-Two 4-Dr. Sedan	K
62	6237 Sixty-Two Coupe	G
62	6239 Sixty-Two 2-Dr. Sedan	A
62	6267 Convertible	F
62	6329 Sedan DeVille 4-Dr	L
62	6337 Coupe DeVille	J
62	6339 Sedan Deville 2-Dr.	B
62	6437 Eldorado Seville	H
62	6467 Eldorado Biarritz Convertible	E
75	6723 Fleetwood Seventy-Five Sedan	R
75	6733 Fleetwood Seventy-Five Limousine	S
68	6890 Commercial Chassis	Z
69	6929 Eldorado Brougham	P

Engine Unit Number: Stamped on bell housing portion of crankcase behind left hand cylinder block directly above cast rib. *NOTE* - "L.C." after unit number indicates low compression engine. Mark * before unit number indicates .010" oversize cylinder bore and pistons.

1959 Models

Series	Engine Unit Prefix
60,62,63,64,67,68 (Std.)	96X
60,62,63,64,67,68 (Air Cond.)	96K
60,62,63,64,67 (3 Carburetors)	9QX
60, 62, 63, 64, 69 (3 Carbs. & Air Cond.)	9QK

1960 Models

Body Style	Engine Unit Prefix
6029; 6229,37,39,67; 6329,37,39 (Less AC)	06X
6029; 6229,37,39,67; 6329,37,39 (With AC)	06K
6437,67 (With 3-Carbs.)	0QX
6437,67; 6929 (With 3-Carbs. & AC)	0QK
6723,33; 6890 (Less AC)	07X
6723,33; 6890 (With AC)	07K

TUNE-UP

COMPRESSION PRESSURE: 165-185 lbs. (cranking speed), 212-230 lbs. (1000 RPM) with throttle wide open. Maximum variation between highest and lowest cylinders should be no more than 20 lbs.

VACUUM READING: Not specified.

VALVE TAPPET CLEARANCE: None, Hydr. lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Valve diverts exhaust gases of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system during warm-up period.

IGNITION

►*1959 EARLY BREAKER POINT OXIDATION CAUSING INTERMITTENT MISS ON LIGHT ACCELERATION:* Burning of breaker points at low mileage may be caused by either of the two conditions listed below. *NOTE* - Cars beginning with Engine No. 062545 have new 6' (1.8 ohms) resistance wire and this trouble should not occur. This longer resistance wire can be identified by red & black cross tracers visible through white insulation.

(1) Engines before No. 024940 - May be caused by non-resistance type wire between coil and ignition switch. Resistance and non-resistance wires similar in appearance. Check wire and correct as follows. *NOTE - If condition persists after this correction, see (2) following.*

Testing For Resistance Wire - Take a voltage reading from Pos. terminal of coil to ground with engine running at 1700 RPM and all accessories OFF. Resistance type wire will have reading of 10.5 volts. Non-resistance type will read 14.5 volts.

Replacing Non-Resistance Wire - Install a 1958 resistor, Part No. 1927809, between coil and feed wire. Mount resistor on cowl at inboard end of heater base, then cut coil wire at suitable location so two ends will *fit resistor. CAUTION - Yellow wire parallel to coil wire must be left in place.*

(2) Engines before 062545 - Correct by installing 12" resistor wire (Part 2974440) in series with original coil primary ignition wires. Jumper has resistance of 0.3 ohms and will reduce coil voltage approximately ½ volt to value of 3½ volts below generator output voltage at 1500 RPM. Install this jumper wire by disconnecting spade terminal of ignition harness at coil + terminal, attach one end of jumper to this harness terminal (bolt or solder terminals together), tape connection securely, connect other end of jumper to coil + terminal.

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - AC No. 44. 14 mm. Torque to 20-25 ft. lbs.

COIL: Delco-Remy 1115087 (1959), 1115134 (1960).
Ignition Current - 1.25 amps. idling, 2.4 amps. stopped.
Resistor - Resistance type cable used between coil and ignition switch. Bypassed during cranking by lead from solenoid to coil.

►*1960 IGNITION COIL NOTE:* Early ignition coil identified by 1" white tape, later coil by Brown Bakelite Insulator. DO NOT use these higher inductance coils on past model cars (this type coil must be used only with 1960 resistance type harness).

DISTRIBUTOR: Delc -R my "Window" type used as follows:

Car Model	Distr. N .
1959 Earlv	1110932
1959 Later 1-Carb	1110955
19593-Carbs(Before Eng. 007064)	1110933
1959 3-Carbs.(Eng.007064 & later)	1110952
1960 1-Carb.	1110932
1960 3-Carbs.	1110952

See "Delco-Remy Window Distributors" in El ctrical Section.

Condenser - Delco-Remy 1932004. **Capacity**. 18-.23 mfd.
Contact Point Set - Delco-Remy 1931988.
Breaker Gap - Breaker gap will be correct (.016") when cam angle correctly set.
Cam Angle - 28-32°. Set at 30°.
Breaker Arm Spring Tensi n - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advanc (1110932 & 33)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1½	400	0-3	800
2½-4	600	5-8	1200
3¾-5½	1000	7½-11	2000
5¾-7¾	1600	11½-15½	3200
7-9	2000	14-18	4000

Automatic Advanc (1110952)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1½	400	0-3	800
2-3¾	600	4-7½	1200
4-5¾	800	8-11½	1600
6¼-8	1000	12½-16	2000
8-10	1175-2000	16-20	2350-4000

Automatic Advanc 1110955

Degrees Distr.	RPM	Degrees Eng.	RPM
0-½	250	0-1	500
1¾-3¾	600	3½-7½	1200
5½-7½	1400	11-15	2800
7.0-9.0	2000	14-18	4000

Vacuum Spark Control: Delco-Remy 1116149 (1110932, 33, 55), 1116150 (1110952).

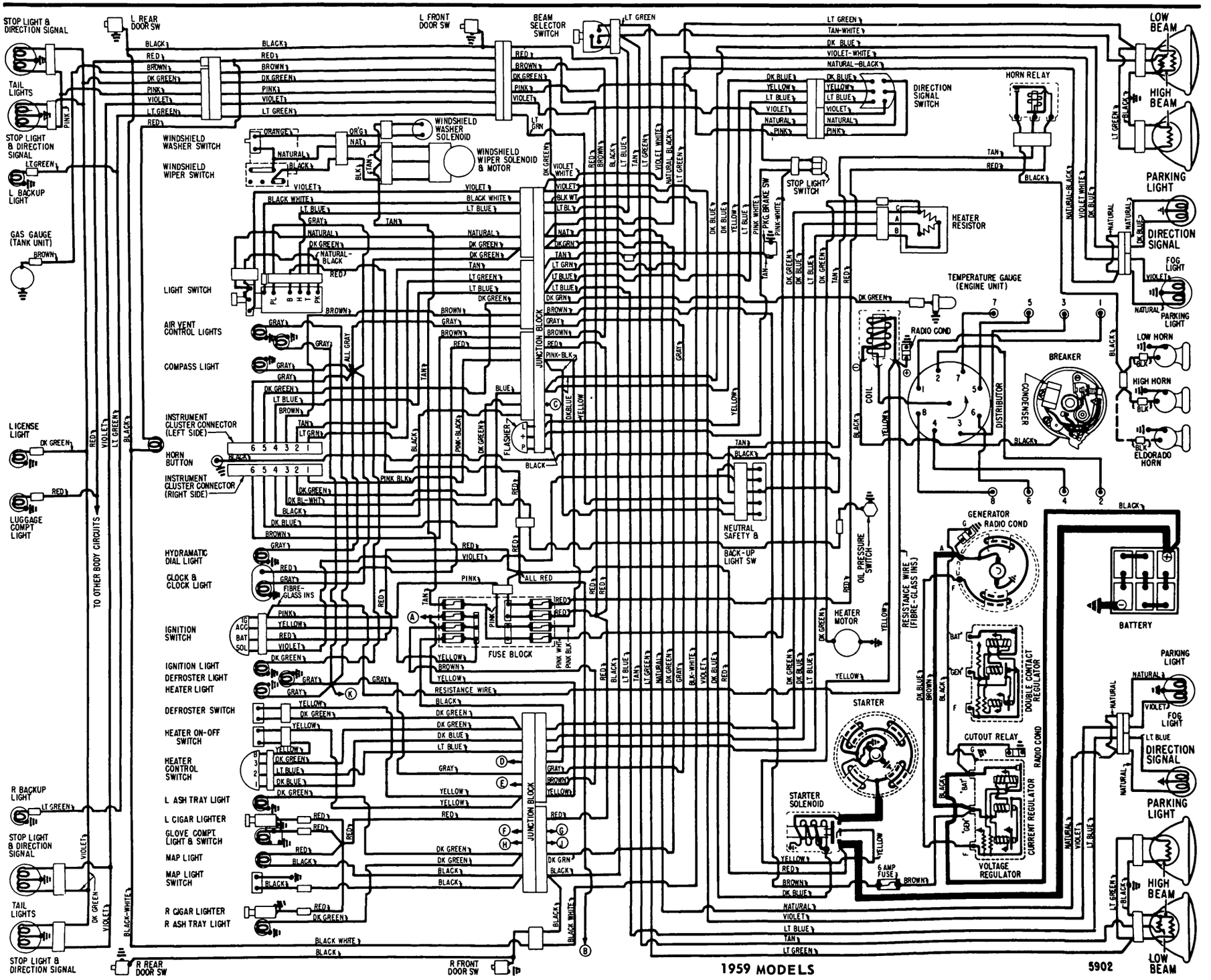
Vacuum Advanc (1110932, 33 & 55)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
4½-7½	9-15	13
7-10½	14-21	15
10½-12	21-24	17-20

Vacuum Advanc (1110952)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
3¼-5¾	6½-11½	11
5¾-8¼	11½-16½	13
7-9¾	14-19½	14
8¼-9¾	16½-19½	15-20

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STOP LIGHT & DIRECTION SIGNAL
L REAR DOOR SW
L FRONT DOOR SW
BEAM SELECTOR SWITCH
LOW BEAM
HIGH BEAM
PARKING LIGHT
DIRECTION SIGNAL
FOG LIGHT
PARKING LIGHT
LOW HORN
HIGH HORN
ELDORADO HORN
TAIL LIGHTS
STOP LIGHT & DIRECTION SIGNAL
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
WINDSHIELD WASHER SWITCH
WINDSHIELD WIPER SWITCH
WINDSHIELD WASHER SOLENOID
WINDSHIELD WIPER SOLENOID & MOTOR
LIGHT SWITCH
AIR VENT CONTROL LIGHTS
COMPASS LIGHT
INSTRUMENT CLUSTER CONNECTOR (LEFT SIDE)
HORN BUTTON
INSTRUMENT CLUSTER CONNECTOR (RIGHT SIDE)
LICENSE LIGHT
LUGGAGE COMPT LIGHT
TO OTHER BODY CIRCUITS
HYDRAMATIC DIAL LIGHT
CLOCK & CLOCK LIGHT
IGNITION SWITCH
IGNITION LIGHT
DEFROSTER LIGHT
HEATER LIGHT
DEFROSTER SWITCH
HEATER ON-OFF SWITCH
HEATER CONTROL SWITCH
L ASH TRAY LIGHT
L CIGAR LIGHTER
GLOVE COMPT LIGHT & SWITCH
MAP LIGHT
MAP LIGHT SWITCH
R CIGAR LIGHTER
R ASH TRAY LIGHT
R BACKUP LIGHT
STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHTS
STOP LIGHT & DIRECTION SIGNAL
R REAR DOOR SW
R FRONT DOOR SW
JUNCTION BLOCK
FLASHER
FUSE BLOCK
DIRECTION SIGNAL SWITCH
HORN RELAY
STOP LIGHT SWITCH
PKG BRAKE SW
HEATER RESISTOR
TEMPERATURE GAUGE (ENGINE UNIT)
RADIO COND
BREAKER
COIL
DISTRIBUTOR
CONDENSER
NEUTRAL SAFETY & BACK-UP LIGHT SW
OIL PRESSURE SWITCH
HEATER MOTOR
RESISTANCE WIRE (FIBRE-GLASS INS.)
GENERATOR
RADIO COND
BATTERY
STARTER
DOUBLE CONTACT REGULATOR
CUTOUT RELAY
CURRENT REGULATOR
RADIO COND
VOLTAGE REGULATOR
STARTER SOLENOID
6 AMP FUSE
1959 MODELS
5902

CONTINUED FROM PRECEDING PAGE

IGNITION TIMING

S tting 5° BTDC

►*SETTING NOTE* When fuel of 100 octane rating or better is not available, retard setting toward "C" mark to eliminate detonation

Timing - Disconnect vacuum line to distributor (tape pipe) and with engine idling at 480 RPM (All engines) rotate distributor so light flashes when pointer is on "A" mark

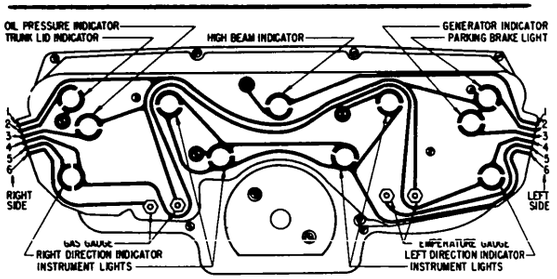
Timing Marks - Timing indicator on chain case cover and harmonic balancer marked "A" & "C" When "C" mark is in line with pointer, No 1 Cyl is at TDC The "A" mark is 5° ahead of "C" mark

CARBURETOR

►*CARBURETOR APPLICATION· One 4-Barrel Carter or Rochester carburetor used on Standard Engine, three Rochester 2GC 2-Barrel carburetors used on Eldorado Engine*

Idle Speed-Up Control Adjustment (Cars With Air Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air conditioner "ON" and place transmission selector lever in "N" position Adjust engine idle speed to 900-950 RPM by loosening locknut on diaphragm shaft and turning nut to obtain specified RPM Tighten locknut

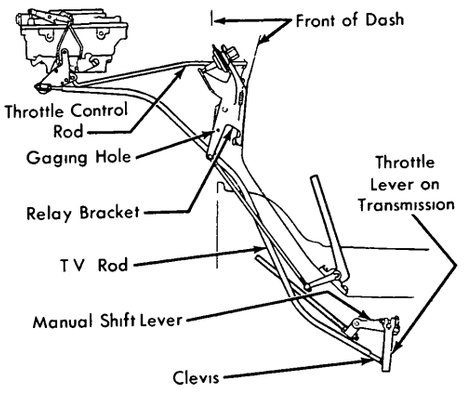
Throttle Return Check Adjustment: Allow engine to idle and make sure that throttle check plunger is not in contact with throttle relay lever Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out Let throttle snap shut and observe delay caused by throttle check If engine races, throttle check plunger is too long If engine stalls, plunger is too short Adjust plunger screw as necessary for correct operation



CADILLAC INSTRUMENT CLUSTER PRINTED CIRCUIT

WIRING DIAGRAM LEGEND

Ⓐ - To Air Conditioning Circuit
Ⓑ - To Electric Window Circuit
Ⓒ - To Trunk Lid Lock Indicator Light
Ⓓ - To Radio (A-Lead)
Ⓔ - To Radio Antenna Switch
Ⓕ - From Antenna Switch (Up)
Ⓖ - To Antenna Motor (Up)
Ⓗ - From Antenna Switch (Down)
Ⓙ - To Antenna Motor (Down)
Ⓚ - To Radio Dial Light



CADILLAC HYDRA-MATIC THROTTLE LINKAGE

►*1959 THROTTLE RETURN CHECK RATTLE CORRECTION (Eng. prior to No 001180)* Rattling of vacuum check due to manifold pulsations during normal engine operation may be prevented by installing new vacuum hose connector, No 1473520, at manifold end This connector has restricted opening at hose fitting end *NOTE* - Cars after above number have restrictor in manifold end of hose (Up to Eng No 019281) or the above restricted fitting (later cars)

THROTTLE LINKAGE ADJUSTMENT. Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash) Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket With engine running, set throttle lever to hot idle position (Air Conditioner turned "OFF") Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop Bring front jam nut on throttle valve rod against trunnion until all slack is taken up **Then tighten nut 3 full turns.** Tighten rear jam nut

Accelerator Pedal Height Adjustment - With ¼" drill shank installed in dash relay bracket and lever, measure clearance between underside of upper end of accelerator pedal and carpet Distance should be 3 5/8" (pedal-to-carpet), 4½" (pedal-to-floor pan) To adjust, remove cotter pin from trunnion on inner side of accelerator pedal arm and remove trunnion Adjust trunnion up or down for proper clearance Assemble linkage

►*1959 THROTTLE LINKAGE INTERFERENCE AT OPEN THROTTLE (Eng prior to No. 012100):* If primary throttle stop lever interferes with upper edge of manifold insulator at open-throttle position, remove insulator and file or grind it at an angle at point of interference to provide clearance *NOTE* - Later cars have new insulator, No 1473021, which has molded taper in raised section on side

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7013030 (Std.), 7013031 (Air Cond.), 7015901 (Service Replac m nt).

►*1959 STALLING OR STUMBLING ON COLD START CORRECTION·* Install choke baffle, Part No 7010598 Carburetors marked "B" on identification tag have baffle installed in production *Se "Roch ster 4GC Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION· Carbur tor RIGHT barrels feed Cyls 2-3-5-8, LEFT barr ls 1-4-6-7*

►*IDLE ADJUSTMENT NOTE· See "Parking Brak Vacuum Release Caution" abov* Disconnecting hose and taping opening prevents air leak which would affect idle adjustment

►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed at slow idle

Idle Mixture & Speed S tting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Rochester 4GC Carbur tors" in Carburetion Section*

Throttle Linkage Adjustment: *S e CARBURETOR abov*

►*OTHER DATA· See "Roch st r 4GC Carbur tors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB. Used as follows·

Model	Standard	Air C nd.
1959	2814S	2815S
1960 (To Eng 22700)	2814S	2915S
1960 (Eng 22700 on)	2951S	2952S

►*1959 LEANNESS AT WIDE OPEN THROTTLE CORRECTION:* Install new metering rod and secondary metering jets Later carburetors identified by letter "A" stamped next to part No have rod and jets installed in production *See "Carter AFB 4-Barr l Carbur tors" in Carburetion Section*

►*1960 CARTER AFB LOW SPEED, LIGHT THROTTLE PERFORMANCE CORRECTION: Se "Cart r AFB 4-Barrel Carburetors" in Carburetion Section*

►*MANIFOLD FUEL DISTRIBUTION. Carbur tor RIGHT barrels feed Cyls 2-3-5-8, LEFT Barr ls 1-4-6-7*

►*IDLE ADJUSTMENT NOTE: S "Parking Brak Vacuum Release Caution" abov* Disconnecting hose at this location eliminates vacuum leakage at neutral switch while making idle mixture calibration

►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body is used to adjust idle speed Throttle valves are normally closed at slow idle

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage Adjustm nt: *S CARBURETOP above.*

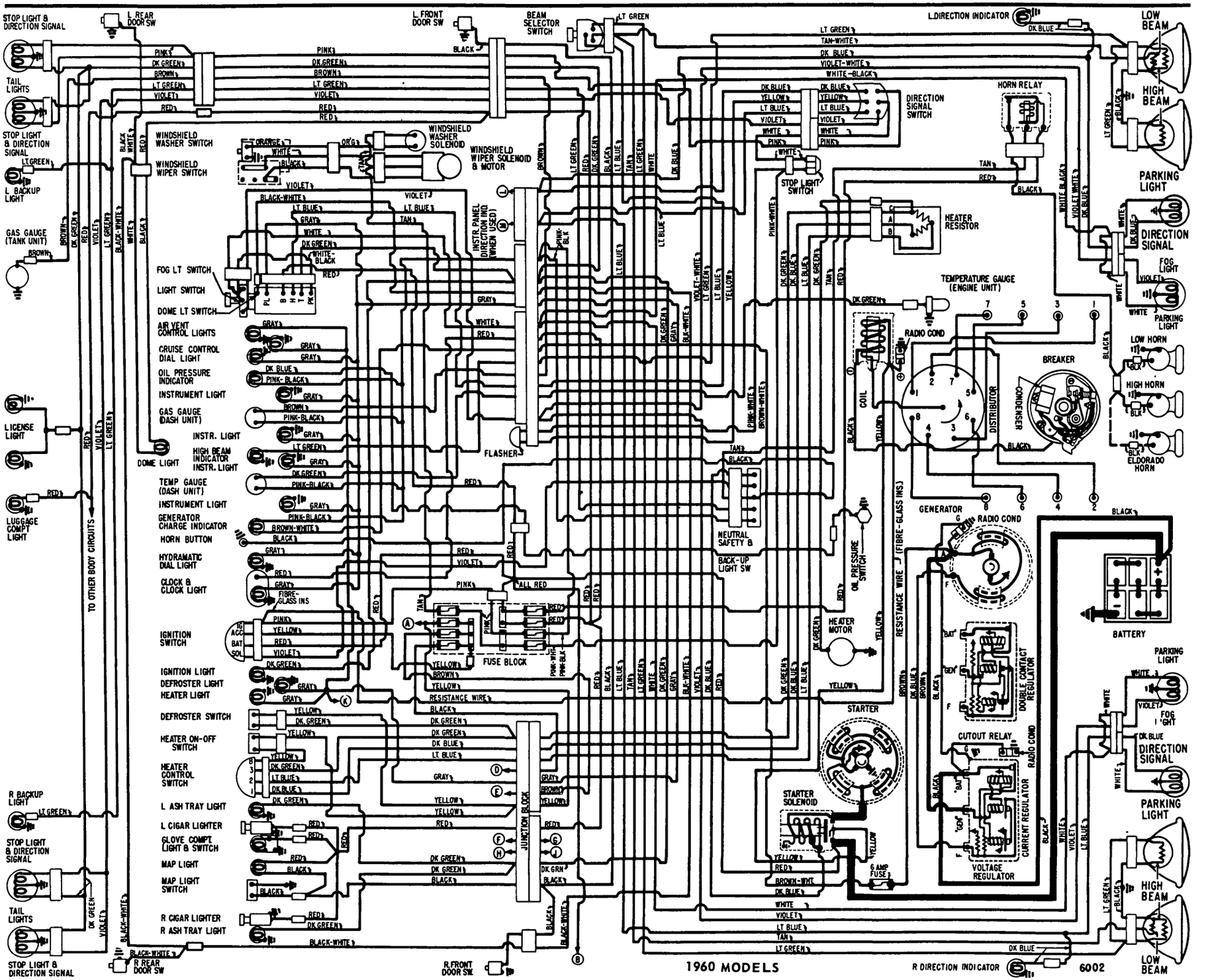
►*OTHER DATA: See "Cart r AFB 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 2GC 2-BARREL (Tripl Carbur t rs)

Rochester 2G 7013033 (Fr nt), 7013035 (R ar), 2GC 7013034 (Center - No. A.C.), 7013037 (C nter - With A.C.).

►*MANIFOLD FUEL DISTRIBUTION· Carbur tor RIGHT barrels fe d Cyls 2-3-5-8, LEFT barr ls 1-4-6-7*

CONTINUED ON NEXT PAGE


STOP LIGHT & DIRECTION SIGNAL
L REAR DOOR SW
L FRONT DOOR SW
BEAM SELECTOR SWITCH
L DIRECTION INDICATOR
LOW BEAM
HIGH BEAM
TAIL LIGHTS
STOP LIGHT & DIRECTION SIGNAL
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
WINDSHIELD WASHER SWITCH
WINDSHIELD WIPER SWITCH
WINDSHIELD WASHER SOLENOID
WINDSHIELD WIPER SOLENOID & MOTOR
INSTR. PANEL DIRECTION IND. (WHEN USED)
FOG LT SWITCH
LIGHT SWITCH
DOME LT SWITCH
AIR VENT CONTROL LIGHTS
CRUISE CONTROL DIAL LIGHT
OIL PRESSURE INDICATOR
INSTRUMENT LIGHT
GAS GAUGE (DASH UNIT)
INSTR. LIGHT
HIGH BEAM INDICATOR INSTR. LIGHT
TEMP GAUGE (DASH UNIT)
INSTRUMENT LIGHT
GENERATOR CHARGE INDICATOR
HORN BUTTON
HYDRAMATIC DIAL LIGHT
CLOCK & CLOCK LIGHT
FIBRE-GLASS INS
IGNITION SWITCH
IGNITION LIGHT
DEFROSTER LIGHT
HEATER LIGHT
DEFROSTER SWITCH
HEATER ON-OFF SWITCH
HEATER CONTROL SWITCH
L ASH TRAY LIGHT
L CIGAR LIGHTER
GLOVE COMPT LIGHT & SWITCH
MAP LIGHT
MAP LIGHT SWITCH
R CIGAR LIGHTER
R ASH TRAY LIGHT
DOME LIGHT
FLASHER
FUSE BLOCK
JUNCTION BLOCK
DIRECTION SIGNAL SWITCH
HORN RELAY
STOP LIGHT SWITCH
HEATER RESISTOR
TEMPERATURE GAUGE (ENGINE UNIT)
RADIO COND
COIL
DISTRIBUTOR
BREAKER
CONDENSER
LOW HORN
HIGH HORN
ELDORADO HORN
PARKING LIGHT
DIRECTION SIGNAL
FOG LIGHT
NEUTRAL SAFETY & BACK-UP LIGHT SW
OIL PRESSURE SWITCH
HEATER MOTOR
GENERATOR
RESISTANCE WIRE (FIBRE-GLASS INS.)
STARTER
STARTER SOLENOID
6 AMP FUSE
CUTOUT RELAY
DOUBLE CONTACT REGULATOR
CURRENT REGULATOR
VOLTAGE REGULATOR
BATTERY
R BACKUP LIGHT
TO OTHER BODY CIRCUITS
LICENSE LIGHT
LUGGAGE COMPT LIGHT
R REAR DOOR SW
R FRONT DOOR SW
R DIRECTION INDICATOR
1960 MODELS
6002

CONTINUED FROM PRECEDING PAGE

For complet adjustm nt data n th s carburetors (including linkage adjustment t insure corr ct synchronization), see "Rochester Triple Carburetors" in Carburetion Section.

Throttle Linkage Adjustment: See *CARBURETOR* above.

CRUISE CONTROL: Automatic speed control and Warning device See *"Cadillac Cruise Control" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 713 or 4622 Fuel only.
Pressure - 5¼-6½ lbs. at idling speed.
See *"Fuel Pumps" in Carburetion Section.*

Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Air Conditioned Cars have special filter and orificed passages for returning fuel vapors to fuel tank

Gasoline Gauge: AC Electric.
Dash Unit - AC No 5640221 (1959), 5643115 (1960)
Tank Unit - AC No. 5640177 (Std), 5640325 (Air Cond.), 1518929 (Comm.)
See *"Fuel Gauges" in Carburetion Section.*

AIR CLEANER: Dry filter element type. Inspect for proper seating and dust leaks every 8,000 miles, replace element every 24,000 miles (12,000 miles on cars with 3-Carbs.)

►*CAUTION Do not attempt to clean element by washing, oiling, tapping or blowing out with air*

BATTERY

Delco No. 562. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate)
Battery Location - Separate compartment in right rear quarter panel, accessible from trunk (Brougham), under hood on tray attached to radiator cradle (Others).
Battery Ground - Negative
Engine Ground - Engine to dash.

STARTER

Delco-Remy 1107657. Armature - 1932185.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	② Amperes
0 ft lbs	3600-5100	10.6	65-100
①	Lock	3.5	300-360

① - Armature locked ② - Includes solenoid.

WIRING DIAGRAM LEGEND

Ⓐ - To Air Conditioning Circuit.
Ⓑ - To Electric Window Circuit.
Ⓓ - To Radio (Switch Lead).
Ⓔ - Radio Antenna Switch (Feed)
Ⓕ - Radio Antenna Switch (Up).
Ⓖ - Radio Antenna Motor (Down).
Ⓗ - Radio Antenna Switch (Down).
Ⓙ - Radio Antenna Motor (Up).
Ⓚ - Radio Dial Light.
Ⓛ - Instr. Panel R Dir. Ind. (when used).
Ⓜ - Instr. Panel L. Dir. Ind. (when used).

Starting Switch: Delco-Remy Solenoid Switch 1119910 mounted on starter and controlled by Ignition & Starter Switch Delco-Remy 1116536.

Neutral Safety & Back-Up Switch: Delco-Remy 1998137 (Exc Cruise Control), 1995697 (Cruise Control) (1959), 1998724 (1960) Located on steering column
Adjustment - *See "Hydra-Matic Drive" in Trans. Section.*

GENERATOR

Delco-Remy. Used as follows

Car Model	Generator	Armature
1959 Ser. 60,62, 63, 64 (Std.)	① 1102140	1932900
1959 Ser 60,62,63,64,(Air Cond)	② 1102141	1939837
1959 Ser 68, 75	② 1102141	1939837
1960 Ser 60,62 (Std)	③ 1102170	1946719
1960 Ser 68,69,75	② 1102141	1939837
1960 Ser 60,62 (Air Cond)	② 1102141	1939837

Replacement Generator (Less Fan & Pulley)
① - 1102087 ② - 1102091 ③ - 1102168

►*1959 GENERATOR PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION (Std. Gen.):* Beginning Engine No 035305 a new 35 amp generator with a ball bearing in the commutator end frame is used This generator has a new End Frame Assembly No 1946720, Ball Bearing No 904751, and Armature No 1946719 *NOTE* - These parts can be used on first type generator but **must all be installed as a unit.**

Performance Data

Generator	Amperes	Volts	RPM
1102140	35	14 0	2630
1102170	35	14 0	2520
1102141	45	14 0	2600

Rotation - Counterclockwise at commutator end
Brush Spring Tension - 28 ozs
Field Current - 1 69-1 79 amps (1102140,171) 2 66 - 2 86 amps (1102141)

Generator Charge Indicator: Red light on instrument panel *See Diagram*

Belt Adjustment: Use Belt Tensioner J-6733 Loosen or tighten adjusting nuts so red line on gauge is even with shoulder

REGULATOR

Delco-Remy 1119168 or 1119002 (1959), 1119002 (1960) Std. Gen.; 1119601 Std. (68,69,75 & 1959-60 Air Conditioning Generator).
NOTE - Regulator 1119601 is "Double Contact" type
►*NOTE: Specifications below are "Normal Settings"*

Cutout Relay

Cuts In - 11 8-13 5 volts (1119002 & 1119168), 11 8-13 0 volts (1119601)
Contact Gap - 020"
Air Gap - 020" with contacts just closed.

Voltage Regulator

Setting - (1119002) & 1119168) 13 8-14 7 volts at 125°F ambient temperature
Setting (1119601) - 13 8-14 6 volts at 125°F ambient temperature when operating on upper contacts 1-3 volts lower when operating on lower contacts
Contact Gap (1119601) - 016"
Air Gap - .075" (1119002 & 1119168), .067" (1119601) with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section*

Current Regulator

Setting (1119002 & 1119168) - 32-37 amps at 125°F.
Setting (1119601) - 42 5-47 amps at 125°F
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section*

MISC. ELECTRICAL

►*1960 LOCKING TYPE ELECTRICAL CONNECTOR NOTE:* It is necessary to straighten "Finger Clips", press in on "Thumb Release", remove "Wire Clip" or lift up on "Locking Tab" before attempting to separate connector

►*1959 INSTRUMENT PANEL COVER & CLUSTER NOTE:* Instrument Panel Cluster contains Cluster Printed Circuit and Fuel and Temperature Gauge

Instrument Panel Cover & Cluster Removal - Disconnect battery cable at battery Remove lower steering column "U" clamp stud nuts and lower steering column Remove speedometer reset stem, knob, and retaining nut, and disconnect speedometer cable at speedometer head Remove six upper instrument cover to lower panel retaining screws Raise upper panel and disconnect multiple connectors linking cover to lower panel and unhook cover hooks from cowl retainers Remove cover and cluster assembly from car Remove four retaining nuts and remove cluster

Cluster Printed Circuit Removal - With upper cover and cluster removed, remove printed circuit retaining nuts and remove printed circuit Remove bulb sockets from printed circuit by twisting counterclockwise

Fuel & Temperature Gauge Removal - With upper cover and cluster removed, remove two nuts retaining each gauge to back plate Remove eight screws-retaining back plate to cluster casting and remove back plate Remove either gauge as required

Headlamps: Dual Headlights (4-Headlight System) *See 4-Headlight System in Electrical Section*

►*1960 INSTRUMENT PANEL COVER & CLUSTER NOTE:* A separate wiring harness (in Cluster) must he removed with cluster by disconnecting three connectors beneath instrument panel top cover.

Instrument Panel Cover & Cluster Removal - Disconnect negative cable at battery. Remove lower steering column cover and Hydra-Matic pointer. Remove panel cover-to-lower instrument panel screws. Raise front edge of cover and insert wood block. *NOTE - Above procedure provides access to components.* Disconnect 2 harness connectors at firewall, headlight feed connector, ignition switch connector, shift indicator light, speedometer cable, and trip mileage cable. Disconnect Guide-Matic & Cruise Control, if so equipped. Unhook panel cover hooks from cowl retainers and remove cover. To install, reverse above procedure after connecting wires and battery cable temporarily so operation of gauges and lights can be checked before lowering panel.

Instrument Cluster Removal - With upper cover and cluster removed, mark bulbs and cluster for reassembly, then remove cluster retaining nuts and cluster.

Speedometer Removal - Speedometer can be removed after removal of upper cover and cluster assembly

Fuel & Temperature Gauge Removal - Disconnect gauge wire connectors and bulb, remove two screws and gauge

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Fuel & Temperatur Gaug R m val On Car - Raise instrument panel cover, see above, then loosen instrument cluster harness from retaining clip and move aside to gain access to gauge. Disconnect gauge wire connectors and bulb. Remove two screws and remove gauge.

►*1959 HEADLIGHT FAILURE CORRECTION:* Caused by corrosion of Autronic Eye Aluminum Terminals. To correct, clean Aluminum terminals and coat them with DC-4 Silicone Compound. After Engine No. 069542, terminals are of brass and are coated in production.

Autr nic Ey : *S "Autronic Eye" in Electrical Section.*

Guide-Matic P w r H adlight Control: *See "Guide-Matic Pow r H adlight Control" in Electrical Section.*

Dir cti nal Signal: *Se "Dir ctional Signals" in Electrical S ction.*

Stop Light Switch L cati n: Early 1959 type mounted on a flange protruding from brake pedal support bracket below instrument panel and operated by pin on brake pedal arm. Later 1959 and 1960 type, mounted above brake pedal arm attached to bracket welded to left side of brake pedal support bracket.

Adjustment - Adjust switch action so stop light is on when pedal is depressed 1" (Early type) or ½" (later type). *NOTE* - Conversion Kit Part No. 361525 available for use on early 1959 cars.

CIRCUIT BREAKER (Lighting): 20 Ampere. Protects Headlamps, Fog, Instrument, Parking, Tail and Rear License lights. Located on headlight switch.

FUSES: *NOTE* - Fuse block located under left end of instrument panel.

25 Amp r - Body Feed fuse. Protects Cigar Lighters, Clock, Interior and Glove Box Lights. On fuse block.

25 Amp r - Windshield Wipers. On Fuse block.

9 Amp r - Instrument Gauges & Indicators (Exc. Generator Telltale) and Back-up Lights. On fuse block.

15 Amp r - Turn Signals and Stop Lights. On fuse block.

6 Amp re - Generator Telltale light. In wire from "A" terminal of generator, behind battery.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extr me car when disconnecting any part of air conditioning quipm nt or lin s for access to engine. See "Air Conditioning Servic Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own V8, overhead valves.

B r	Str k	Displacement	Rated HP
4"	3 7/8"	390 cu. in.	51.2

Engin	C mpr. Ratio	Developed HP
Std. (1 Carb.)	10.5-1	325 at 4800 RPM
Eldorado (3 Carb.)	10.5-1	345 at 4800 RPM

Compression Pressur - *S TUNE-UP.*

►*1959 ENGINE DETONATION CORRECTION:* Install new Cylinder Head Shim Part No. 1473962 as follows: Coat both sides of shim and a cylinder head gasket No. 1473154 with gasket cement (One shim and one gasket on each block with shim against block). Set timing to 5° BTDC.

►*1959 PULSATING ENGINE VIBRATION CORRECTION:* Caused by vibration of Air Compressor & Power Steering Pump Assembly. To correct, on cars prior to Engine No. 067300, install an additional brace (Kit Part No. 3631500) between cylinder head and steering pump.

►*1959 EXCESSIVE OIL CONSUMPTION NOTE:* Caused by leak at valve stem oil seals. To check and replace seals without removing valves, *see "Valve Syst m" in Cadillac Special Data.*

►*1959 ENGINE VIBRATION UNDER LIGHT LOAD CORRECTION (Air Conditioned Cars):* Correct by installing Compressor Rear Support Braces. *See "Frigidaire & Harrison (GM) Air Conditioning" in Miscellaneous Section.*

►*1959 ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel octane rating for satisfactory engine operation is 100 Research Method or 89 Motor Method. *NOTE* - These requirements can be reduced two octane numbers by resetting timing to TDC. When above fuel of correct rating is not available, install low compression Pistons No. 3631344 (Std.), 3631345 (.010"), 3631346 (.020"), 3631347 (.030")Oversize. DO NOT replace distributor or carburetor. Set timing on single and triple carburetor engines at 5° BTDC.

►*1960 CAMSHAFT & FUEL PUMP PUSHROD REPLACEMENT CAUTION:* Use plain end fuel pump pushrod, Part No. 145383, when replacing camshaft. Use No. 3508895, with cast iron tip, when replacing fuel pump pushrod only.

►*OVERSIZE CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. have .010" oversize cylinder bore and pistons.

►*ENGINE VIBRATION CORRECTION: See "Engine" in Cadillac Special Data.*

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*

OIL PAN REMOVAL: Drain crankcase, remove dipstick, disconnect battery ground strap. Disconnect starter solenoid wires, remove starter. Remove right hand exhaust pipe bracket. Remove screws and lower the idler arm support to frame side rail. Remove oil pan screws and oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifolds" in Cadillac Special Data.*

►*1959 CYLINDER HEAD & GASKET PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* Beginning with Engine No. 010700, coolant distribution passage at upper center of each head enlarged and head gaskets were changed to incorporate this larger hole. NEW Cylinder Head and Gaskets can be used on earlier cars, however old type gaskets **cannot** be used on New type head.

TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data.*

PISTONS

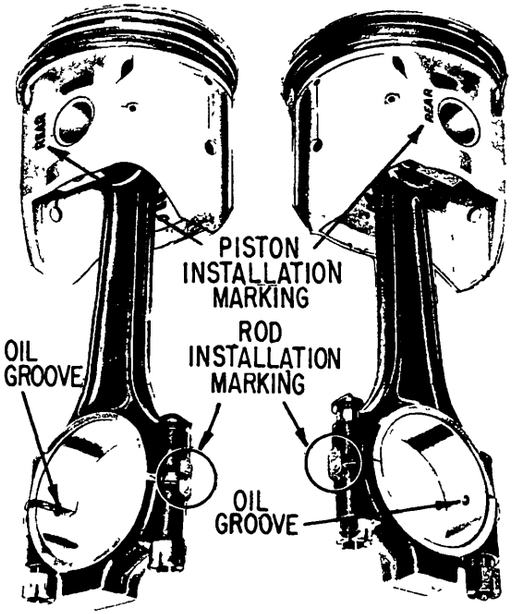
►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size 4.000-4.0020".

Original Bore & Pistons - *See "Original Bore& Pistons" in Cadillac Special Data.*

Pistons - Pistons have trough in head to provide fuel turbulance and clearance for valves at high speed.

Clearance - .0015" (Top of skirt), .000" (Bottom of skirt).

R moval - Piston and rod assemblies removed from above. Install connecting rod Guide Studs J-3224 on connecting rod bolts to guide rod out through bore without nicking or damaging it.



CADILLAC PISTON & ROD ASSY.

Fitting New Pistons: Use micrometer or feeler gauge. *See "Pistons" in Cadillac Special Data.*

Replacement Pistons: Standard (Code "L" or "M") and .010", .020", .030" Oversize with rings and pins.

Installing Pistons: Install in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Connecting Rods" (below) for installation on rods.*

PISTON PIN

Pin is pressed fit in connecting rod.

Diameter - .9994-.9997". **Length** - 3 3/32".

Pin Fit in Piston - .00005-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).

Pin Fit in Rod - *(NOTE* - Special tools required). *S "Piston Pins" in Cadillac Special Data.*

Replacement Pins: Furnished with new pistons only.

►*PISTON PIN TOOL MODIFICATION FOR USE ON 1959 CARS:* To prevent damage to 1959 type pistons, when removing or installing pins, Piston Pin Support, Tool No. J-3848-9 must be modified by grinding new chamfer on end leaving a flat surface 1/8" wide at inner diameter.

PISTON RINGS

Piston rings are 2-in-1 chrome set with side sealing type oil ring.

Ring	Width	End Gap	Side Clearanc
Compr. 1 & 2	5/64"	.013-.023"	.0025-.0035"
Oil	3/16"		①

① - Three-piece type, side sealing.

R plac m nt Rings: Standard, .010", .020", .030" Oversize.

Installing Rings: Chamfered inner edge of both compression rings must be installed toward top of piston.

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CONNECTING ROD

L ngth - 6.5" (center-to-center).
Crankpin Journal Diameter - 2.2488-2.2493". Wear limit .0045".
Out-of-Round Limits - .00025" maximum.
Bearings - Moraine 400. Bearing shell is steel backed aluminum. Bearing halves are interchangeable. No shims.
Clearance - .0005-.0020" (Service limit .0045").
Replacement Bearings: Furnished in standard size only.
Installing Rods: Install piston and rod in cylinder bore with REAR on piston toward rear of engine and numbers on lower end of rod down. Numbers 1, 3, 5, 7 are in left bank; 2, 4, 6, 8 are in right bank.

CRANKSHAFT

Journal Diameter - 2.625".
Out-of-Round Limits - .00025".
Bearings - Rear, Moraine Durex 100A. All other bearings are Moraine 400 Aluminum
Clearance - .0008-.0025". Wear limit .005".
►*REAR MAIN BEARING ALIGNMENT NOTE:* For thrust bearing surface alignment see *"Crankshaft & Main Bearings" in Cadillac Special Data.*
Replacement Bearings: Furnished in standard size only.
End Thrust: Taken by flanged rear main bearing.
Endplay - .001-.007". Wear limit .010".
Crankshaft Removal: See *"Crankshaft & Main Bearings" in Cadillac Special Data.*
Rear Main Bearing Oil Seal Installation: See *"Crankshaft & Main Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage or mis-alignment. Check whenever removed.
Removal, Alignment & Installation - See *"Camshaft & Bearings" in Cadillac Special Data.*
Bearings - Steel backed babbitt bushings.
Clearance - .001-.0022" (service limit .004" max.).
Bearing Out-of-Round Limit - .002" max.
Timing Chain: Link-Belt side guide type. **Width** - 11/16", **Pitch** .500", **Length** 23" or 46 links.
Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.

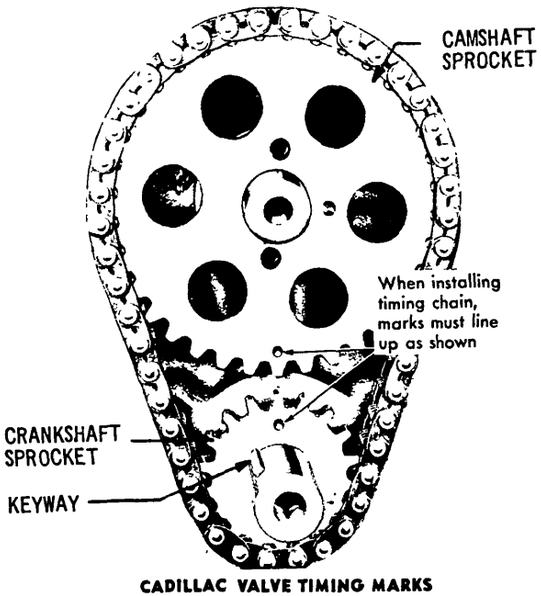
VALVES

Tappet Clearance: None in service, hydraulic.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	.3415-.3425"	4.717-4.688"
Exhaust	1.500"	.3415-.3420"	4.727-4.694"

Valve	Seat Angle	③Lift	Stem Clearance
Intake	①44°	.45"	②.0005-.0025"
Exhaust	①44°	.45"	②.0010-.0025"

① - New valve. Valve may be refaced to 45°.
② - New valves & guides. Wear limit .005" max.
③ - Cam lobe lift .273".
►*NEW VALVE SEAT CAUTION: DO NOT lap or grind so that seat width is mor than 1/64" (du to diff renc of 1° b twe n valve s at and valv which is designed to provide "hairlin " contact.*



CADILLAC VALVE TIMING MARKS

Valve Seat Recommendations - 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving). Cut seat so that distance from outer edge to edge of flange on valve head is no more than 1/32".
Valve Stem Oil Seal - Rubber oil seal installed in lower groove on valve stem (below valve keeper).
Oil Seal Installation - See *"Valve System" in Cadillac Special Data.*
Valve Guides: Pressed in cylinder head from combustion chamber side with longest chamfer end pointing toward rocker arm side of head. Use Remover Tool J-3062 to drive out old guide (toward top of head) and installer Tool J-3066 to drive new guide in (tool serves as stop for driver).
Valve Springs: Free length 2.25" approximately.

Valve Spring Specifications

	Pressure	Length
Valve Closed	60-65 lbs.	1.946"
Valve Open	155-165 lbs.	1.496"

►*SPRING INSTALLATION CAUTION:* Lower end of valve spring must be seated in cylinder head.
Valve Lifters: Hydraulic.
See *"Valve System" in Cadillac Special Data.*
Valve Lifter Removal - See *"Valve System" in Cadillac Special Data.*
Rocker Arm Assembly: See *"Valve System" in Cadillac Special Data.*

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*
►*VALVE TIMING NOTE: Specifications are "Without Ramp".*
Intake Valves - Open 27° BTDC. Close 75° ALDC.
Exhaust Valv s - Open 73° BLDC. Close 29° ATDC.
Valv Timing Ch ck - Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing gears.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubricati n" under OILING SYSTEM in Cadillac Sp cial Data.*
Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.
Normal Oil Pressure: 30-35 lbs. min. at 30 MPH. 15 lbs. at idling speed.
Pressure Regulator Valve - On oil pump. Not adjustable.
Oil Pressure Indicator - Light on instrument panel controlled by pressure switch AC No. 1508767.
Oil Pump: Helical gear, mounted on rear bearing cap.
Oil Pump Removal & Ov rhaul - S *"Oiling Syst m" in Cadillac Special Data.*
Oil Filter: **(1959)** Partial flow. Replace element every 6,000 miles or more frequently in dusty areas. **(1960)** New full flow throw-away type filter located on right side of engine block just ahead of flywheel housing. Replace filter every other recommended oil change (normal operation) or more frequently under severe driving conditions.
►*1959 OIL FILTER INSTALLATION CAUTION:* DO NOT tighten cover bolt to more than 25 ft. lbs. Cover will be crushed and a leak will result.
►*1960 OIL FILTER INSTALLATION CAUTION:* Screw new filter onto stud by hand until gasket touches filter base, then tighten bolt head an additional 2/3 turn. *DO NOT OVERTIGHTEN FILTER.*
Crankcase Ventilation: Air intake in oil filler cap (oil wetted type) with outlet connection at rear of valve compartment cover and outlet pipe extending down below engine at right rear corner.

COOLING

►*OPERATING TEMPERATURE NOTE:* Standard engine thermostat is fully open at 198°F. When Methonol base anti-freeze boils at prolonged idling speeds, refill cooling system with ethylene glycol base anti-freeze or install lower operating thermostat Part No. 1468828. Engine efficiency and heater output will be affected by this change.
►*1959 LOWER RADIATOR HOSE & OIL COOLER LINE INSTALLATION CAUTION:* To prevent damage to Power Steering or Generator belt, the lower hose must be 1¼" away from lower radiator tank with 1" clearance between hose and steering belt. Grommets around oil cooler line should be centered in retaining clips and clips tightened firmly to properly position cooler line.
Water Capacity: 18.5 qts., (without heater); 19.25 qts., Series 62, 68, 20.75 qts. Series 75 (with heater). Add 0.5 qts. with Air Conditioning.
Pressure Valve: (Std.) AC No. RC-6, 12-15 lb., (Air Cond.) AC NO. RC-15, 13½-16½ lb. Radiator filler cap.
Thermostat: Dole type. In water outlet at top of pump body. Starts to open at 173-178°F. Fully open at 198°F.
Temperature Controlled Fan Clutch (Air C nd. Cars) Thermostatically controlled fan clutch used on these cars. When ambient temperature around clutch coil is 130-140°F or more, clutch is engaged (fan speed is 3200-3500 RPM). When coil is 115-125°F or outside temperature is approx. 70°F or below, clutch will disengage (fan speed is limited to 1000-1500 RPM). Thermostatically controlled clutch is serviced only as an assembly.
►*THERMOSTATICALLY CONTROLLED FAN CLUTCH NOTE:* Use ethylene glycol base anti-freeze in cooling

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system (for cold weather protection) to protect engine from overheating with slow-warm-up before thermostat opens.

Water Pump: Packless type, with sealed ball bearing.

Removal & Overhaul - *See "Water Pumps" in Cadillac Special Data.*

Temperature Gauge: AC electric.

Dash Unit - AC No. 1513649 (1959), 1513993 (1960).

Engine Unit - AC No. 1513130.

See "Temperature Gauges" in Miscellaneous Section.

HYDRA-MATIC DRIVE

Dual-Coupling, four-speed hydraulically controlled automatic transmission of same design as used on previous models, except that rear oil pump was discontinued beginning 1959 and the 1960 transmission is smaller in overall size.

►*1959 HYDRA-MATIC BUZZING NOISE OR ERRATIC SHIFT CORRECTION (Early Cars):* To correct, install new Governor No. 8619903. *See "Dual-Coupling Hydra-Matic Transmission" in Transmission Section.*

►*1959 HYDRA-MATIC LOW SPEED THUMP CORRECTION:* Install Service Kit 8619905 (with new Coupling Valve & Coupling Signal Valve). *See "Dual-Coupling Hydra-Matic Transmission" in Transmission Section.*

►*LATE 1960 HYDRA-MATIC TRANSMISSION REMAINING IN 3RD GEAR WHEN CAR IS STOPPED: See "Cadillac Dual-Coupling Hydra-Matic" in Transmission Section.*

►*1959 HYDRA-MATIC TORUS COVER RATTLE CORRECTION (At 9-15 MPH in 3rd Speed; 19-23 MPH in 4th Speed):* Install Torus cover dampener spring (red) Part No. 8619099. *See "Dual-Coupling Hydra-Matic Transmission" in Transmission Section.*

►*1959 CLOSED THROTTLE 3-2 DOWNSHIFT NOISE CORRECTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*1960 GROWL OR BUZZING NOISE CORRECTION (Early Cars):* On cars before Eng. No. 020775, install new soft rubber insulator, Part No. 1475806, in place of old insulator at cooler pipe bracing location below generator at front of frame crossmember. Later cars have new insulator.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

1959 Lubrication - Check fluid every 2,000 miles, drain and refill every 12,000 miles or one year whichever occurs first. *NOTE* - When driven under severe conditions, such as heavy city traffic during hot weather or when engine is idled for long periods of time, change oil at 6,000 miles.

Capacity - 11 qts. refill, 11½ qts. dry. *NOTE* - Correct level is within ¼" of FULL mark on dipstick.

Checking Fluid Level - Run engine for 1½ minutes at 800 RPM with selector lever in "N" or "P". Add or remove fluid (with engine running) to bring level to within ¼" of FULL mark on dipstick. Use only Automatic Transmission Fluid Type "A", Suffix "A".

1960 Lubrication - Check fluid level every chassis lubrication (oil change). Drain original oil at 24,000 miles or 1 year whichever occurs first, then at 12,000 miles or 1 year intervals. For commercial use, heavy driving during hot weather, or prolonged idling, change original oil and make subsequent changes at not to exceed 12,000 mile intervals.

Capacity - 9 qts. refill, 10 qts. dry. *NOTE* - Correct level is at "Full" mark on dipstick.

Checking Fluid Level - Check only with transmission at operating temperature. Run engine for 1½ minutes at 800 RPM with selector lever in "N" or "P" position. Add or remove fluid (with engine running) to bring fluid level to "Full" mark. *NOTE* - Only one pint of fluid is required to raise level from "Add 1 pint" mark to "F" full mark on dipstick. DO NOT OVERFILL transmission and use only Automatic Transmission Fluid Type "A" Suffix "A".

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Mechanics. Needle bearing type. Three used with two piece propeller shaft and center bearing.

PROPELLER SHAFT

Propeller Shaft Center Bearing: *See "Propeller Shaft" in Cadillac Special Data.*

►*PROPELLER SHAFT "THUNK" NOISE CORRECTION:* Condition noticeable when stopping car or when brakes are released. May be caused by binding in sliding fit or propeller shaft center splines. Apply Lubricant Part No- 1476968 to spline area.

►*1960 PROPELLER SHAFT "SHUDDER" OR "VIBRATION" CORRECTION (15-20 MPH):* Caused by incorrectly positioned (sideways) center bearing support. Dampen shuddering effect by elongating mounting holes 1/8", shimming evenly and aligning and tightening support. *NOTE* - DO NOT tilt bracket by using more shims on one side to correct relocation.

Rear Axle Pinion Angle: Must be correct to prevent propeller shaft vibration. For checking and adjusting, see "Cadillac Rear Suspension" in Suspension & Wheel Alignment Section.

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss Drive. *See "Cadillac Hypoid" in Rear Axle Section.*

►*1959 REAR AXLE UPPER CONTROL YOKE ASSEMBLY PRODUCTION CHANGE & CAUTION:* This change in design to improve ride and handling includes a new ball joint, bracket, control yoke, and rear axle housing which are not interchangeable with earlier cars.

►*1960 PINION SEAL NOTE:* Smaller diameter pinion seal used. Requires use of Oil Seal Installer No. J-8436 for installation.

►*1960 WHEEL MOUNTING STUD NOTE:* Right hand threads are used for both right and left side of car.

►***OVERHAUL CAUTION:* Manufacturer recommends that Carrier Assembly be serviced by replacement. DO NOT disassemble this unit or attempt service work other than oil seal and universal joint replacement.**

1959 Axle Identification - Gear ratio identified by number stamped on front face of carrier assembly at end of oil return passage. See table following.

Series	Ratio	Mark
60, 62, 63①	2.94-1	2
64②	3.21-1	1
75	3.36-1	6
68 Comm	3.77-1	7

①- Exc. Air Cond. Cars and/or three 2-barrel Carb.
②- And 60, 62, 63 Series with Air Cond. and/or three 2-barrel Carbs. Optl. on all 60, 62, 63 Series Cars.
③- Optl. on 67 Series.

1960 Axle Identification - Gear ratio identified by letter stamped on bottom side of carrier on flange adjacent to rear axle housing. Year and serial number of differential stamped in same manner. See table following.

Series	Ratio	Mark
62①	③2.94-1	T
62②	3.21-1	W
Eldorado Models	③3.21-1	W
75⑤	3.36-1	X
75②	3.36 or 3.77-1	X or Y
68	3.77-1	Y

①- Exc. AC, 3-Carbs. & Eldorado Models.
②- AC & 3-Carbs.
③- 3.21-1 Optional.
④- 2.94-1 Optional on 6437,67 without AC.
⑤- Exc. AC & 3-Carbs.

►*1959 REAR AXLE LUBRICANT CHANGE AND CAUTION:* Later cars use multiple viscosity lubricant which has a light yellowish color. DO NOT confuse with SAE-30 or 40 engine oil.

Rear Axle Pinion Angle: Must be correct to prevent propeller shaft vibration. For checking and adjusting *see "Cadillac Rear Suspension" in Suspension & Wheel Alignment Section.*

Axle Shaft Removal: Remove wheel and take out screws holding brake drum on axle shaft flange and remove drum. Remove nuts and lockwashers from bolts holding bearing retainer and backing plate on axle housing. Use Puller J-8131 (J-942-1) and Slide Hammer J-2619 (2619-A) to remove axle shaft.

►*CAUTION:* Use care not to damage axle shaft oil seal when sliding axle shaft out and do not disturb position of backing plate on housing.

Commercial Cars - Remove wheel, then remove nut and washer on end of shaft. Pull wheel hub and brake drum assembly off shaft using a five-jaw puller to save warping or distorting brake drum. Disconnect brake line at wheel cylinder. Remove seven screws and lockwashers holding bearing retainer and backing plate to housing flange and remove bearing retainer. Pull axle shaft, bearing assembly and static ring as a complete assembly. DO NOT damage oil seal next to inner side of wheel bearing.

Differential Carrier Removal: Disconnect rear universal joint and remove lubricant from rear axle housing. Remove axle shafts (see above). Remove nuts and washers holding carrier to axle housing and remove entire assembly with gasket. *See "Overhaul Caution" above.*

Wheel Bearings: Sealed ball-bearing type.

►*CAUTION:* Check bearings for loss of lubricant when shaft removed. If bearings spin freely indicating loss of lubricant, replace bearings.

Pinion Bearing Preload Adjustment: Pinion should be adjusted whenever nut on end of pinion shaft disturbed (for universal joint yoke or oil seal replacement).

See "Cadillac Hypoid" in Rear Axle Section.

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SHOCK ABSORBERS

Delco. Direct acting permanently sealed airplane type.
Coil Spring Cars - Mounted inside of coil springs. (Front); between frame bracket at upper end and lower control link mounting bracket at lower end (Rear).

Air Spring Cars - Mounted between brackets located behind Air Springs (Front) and same as for Coil Springs above (Rear).

1959 Shock Absorber Part Nos.

Model	Front	Rear
All Series ①	5543763	5543764
All Series Exc. 6437,67 ②	5543765	5543766
75 ②	5543759	5543760

① - Air Springs. ② - Less Air Springs.

1960 Shock Absorber Part Nos.

Series	Front	Rear
62 Exc. Eldorado	5552333	5552334
All Air Springs	5552339	5552340
75	5552335	5552336
68	5552337	5552338

FRONT SUSPENSION

Independent type with direct acting shock absorbers and Spherical Joints. *1960 NOTE* - Both steering knuckles (right & left) have right hand threads and are interchangeable. *See "Cadillac Front Suspension" in Suspension & Wheel Alignment Section.*

►*FRONT SUSPENSION NOTE:* Air Suspension standard on all Eldorado Models. Optional on all other models.

Steering Axis Inclination - 4° at 0° camber.

Caster - 0°-Neg 1° (Series 60,62); Neg. ¾°-Neg. 1¾° (Series 75,68). Both sides equal within ½°.

Camber - Neg. 3/8°-Pos. 3/8°. With 1/4-1/2° more Pos. camber on left wheel for crowned road pull when necessary.

Toe-In (Coil Spring) - 3/16-1/4".

Toe-In (Air Susp.) -1/16"±1/32".

Toe-Out on Turns - Inside wheel 20°, outside wheel 17°20'.

Wheel Bearing (Ball) Adjustment: Install wheel and adjust nut to 25 ft. lbs. torque then rotate drum to properly seat parts and be sure threads are free. Back off nut and retighten it to 2 ft. lbs. torque. When necessary to align cotter pin hole nut may be tightened but never to exceed 10 ft. lbs.

Wheel Bearing (Roller) Adjustment: Tighten adjusting nut to 30 ft. lbs. torque. All parts must be seated and threads are free. Back off nut ¼ turn (90°) or more to nearest cotter pin hole. Wheel should spin freely. *CAUTION* - Roller type wheel bearings require slight clearance in contrast to preload required with former ball type wheel bearings.

REAR SUSPENSION

R ar Suspension: *See "Cadillac Rear Suspension" in Suspensi n & Whe l Alignment Secti n.*

AIR SUSPENSION

Air Springs replace coil springs on all four wheels. *See "Front Suspension" above f r alignment specifications and "Cadillac Air-Suspension" in Suspension & Wheel Alignment Section.*

►*1959 AIR SUSPENSION ACCUMULATOR VALVE NOISE CORRECTION:* Install new Check Valve and Muffler Assembly Part No. 1474293. *See "Cadillac Air Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Power Steering: Saginaw (Rotary Valve) Hydraulic. Hydraulically operated rotary valve power steering combined with recirculating ball type gear.
See "Saginaw (Rotary Valve) Power Steering" in Steering Section.

►*1960 HIGH PUMP PRESSURE CORRECTION (Cars with Air Susp.):* See *"Saginaw (Vane Type) Power Steering Pump" in Steering Section.*

►*1960 POWER STEERING PUMP "SQUEAL" CORRECTION:* See *"Saginaw (Vane Type) Power Steering Pump" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Ring Removal: *See "Saginaw (Rotary Valve) Power Steering" in Steering Section.*

Steering Gear Removal: *See "Saginaw (Rotary Valve) Power Steering" in Steering Section.*

BRAKES

1959 Bendix (Hydraulic) Single Anchor (Without Eccentric). Conventional two-shoe with Bendix Power Unit. Parking brake supplies rear wheel service brakes. *See "Bendix Hydraulic Single Anchor (Without Eccentric) Brakes" in Brake Section.*

1960 Bendix (Hydraulic) Single Anchor with new Moraine design self-adjusting feature. Parking brake has automatic vacuum release and applies rear service brakes. *See "Cadillac-Bendix (Moraine Automatic Adjuster)" Brake in Brake Section.*

►*1960 BRAKE EQUALIZER NOTE:* Cars with Engine Nos. between 037160 and 042814 should have a 5/16"-18 x 2" bolt installed in each round portion of keyhole slots in equalizer bar to retain cable.

►*1960 SLOW VACUUM PARKING BRAKE RELEASE CORRECTION:* Install late type vacuum hose (50" long) to eliminate pinched hose(42")used on early cars.

►*1960 PARKING BRAKE BUZZING NOISE CORRECTION (Single Carb. Cars):* When placing hand on release lever minimizes noise, place restrictor Part No. 1475267 in vacuum hose connector at intake manifold.

Drum Diameter - 11.995-12.005" All. *NOTE* - 1960 rear drums are finned cast iron for improved cooling.

Regrinding Limit - 12.060".

Wheel Cylinder Diameter - 1 1/8" (Front) All, 1" (Rear 1959 Exc. Ser. 68), 1 1/16" (Rear 1959 Ser. 68 and All Ser. 1960).

Lining: Molded type riveted to shoes. Primary shoe lining has ½" wide circumferential groove 1/8" deep full length.

Replacem nt Linings - Furnished in Std. size only.

Lining L ngth & Width

S ries	Primary	Sec ndary
60,62 Front & Rear	10.05" x 2½"	12.98" x 2½"
68, 75 Front & Rear	12.98" x 2½"	12.98" x 2½"

Thickness - ¼" (All shoes All Series).

Braking Power - **(1959)** 55.8% (Exc. 68), 52.8% (68), Front. **(1960)** 52.8% Front All Series.

Clearance - .010" (top), .015"(bottom) All Series 1959-60. **(1959)** Adjusting screw backed off 14 notches from point where wheel can just be turned by hand. **(1960)** No service adjustment required. For initial adjustment, *see "Cadillac (Bendix-M rain) Aut matic Adjust r" Brakes in Brake Section.*

Master Cylinde r: Integral with Power Unit (Engine side of firewall).

Checking Fluid - Remove plug from top of master cylinder and maintain fluid to within ¾" of filler opening.

Removal - *See Power Unit below.*

POWER UNIT: Bendix or Moraine Power Unit. Se *"Bendix Power Unit Hydraulic (Disc) R acti n Typ " or "Moraine Power Unit Hydraulic (Diaphragm) R acti n Type" in Brake Section.*

►*1959 BENDIX POWER BRAKE LOSS OF POWER ASSIST:* Caused by disengagement of felt retaining ring on vacuum piston. To correct, install ring, then put crimp in ring with needle nose pliers to decrease diameter of ring.

Removal - Disconnect hydraulic line from master cylinder, vacuum hose and reservoir hose from power unit. Remove power unit pushrod-to-brake pedal relay clevis pin and remove power unit mounting nuts. Remove power unit.

MISC. MECHANICAL

Windshield Wipers: New electric windshield wiper with washer pump. Wiper has link arm drive to wiper transmission.
See "Windshield Wipers" in Miscellan us S cti n.

Trunk Lid Lock: Trunk lid electric lock operated by switch in glove compartment.
See "Cadillac Rear Compartment Lid L ck" in Misc l-laneous Section.

Power Window Regulators: Electric, with reversible motor in each window operating vent and door windows. *See "Electric Window R gulat rs" in Miscellan us Section.*

Power Top Control: Hydro-Lectric with "Sealed" system which does not require periodic draining and refilling. *See "Top Controls" in Misc llane us S cti n.*

Door Lock (1959): Switch in each front door controls door locks on each side of car. *See "Electric Door Locks" in Miscellaneous Section.*

Door Lock (1960): Vacuum locking type with master control. *See "Vacuum Door Locks" in Miscellaneous Section.*

Power Seat Control (Two-Way): Electric type with single reversible type motor for horizontal adjustment. *See "GM 2-Way Seat Contr l" in Miscellane us S ction.*

Power Seat Control (Six-Way): (1959) Electric type with a separate motor on each of the three basic seat movements. **(1960)** Two types used. 1) Same as 1959. 2) One-motor type with three solenoid clutches. S e *"GM 6-Way Seat Control" in Miscellaneous Section.*

Air Conditioning: Frigidaire & Harrison, with magnetic compressor clutch (compressor operates only with switch turned "ON").
See "Frigidair & Harrison (GM) Air C nditi ning" in Misc llan ous S cti n.

TIGHTENING SPECIFICATIONS

1954 MODELS

	Ft. Lbs.	In. Lbs.
Cylinder Head Capscrews	75-80	900-960
Main Bearing Bolts	100-110	1200-1320
Con. Rod Nuts	40-50	480-600
Rocker Arm Support Bolts	25-30	300-360
Crankcase Frt. End Plate	15-20	180-240
Timing Gear Cover Screws	6-7½	72-90
Manifold Clamp Bolts	15-20	180-240
Manifold Stud Nuts	25-30	300-360
Clutch Mounting Bolts	25-30	300-360
Clutch Housing Bolts	45-55	540-660
Flywheel Bolts	50-65	600-780
Oil Pan Flange Bolts	6-7½	72-90
Oil Pan Corner Bolts	12½-15	150-180
Oil Distr. Cover Screws	6-7½	72-90
Water Pump Mtg. Bolts	25-30	300-360
Fuel Pump Mtg. Bolts	15-20	180-240
Spark Plugs (14 mm.)	20-25	240-300
Spark Plugs (10 mm.)	10-12	120-144
Pitman Arm Bushing Nuts	30-40	360-480
Prop. Shaft Flange Nut	160-280	1920-3360
Axle Flange Bolts (Trucks)	85-95	1020-1140

1955-60 MODELS

	6 Cyl. Ft. Lbs.	V8 Ft. Lbs.
Cylinder Head	90-95	60-70
Intake Manifold	① 15-20	25-35
Exhaust Manifold	① 15-20	⑤
Oil Pan	② 10½-15	⑥
Main Bearing Caps	100-110	③
Flywheel	50-65	55-65
Con Rod Caps	35-45	④
Rocker Arm Support Bracket	25-30	
Rocker Arm Cover (Inch Lbs.)	20-25	20-25
Engine Front Cover	6-7½	6-8
Clutch Housing	45-55	25-35

① - Tighten two **center** bolts to 25-30 ft. lbs.

② - Corner bolts. Tighten other flange bolts to 6-7½ lbs. (6 Cyl.).

③ - (283") 60-70 Ft. lbs. (348") 95 100 Ft. lbs.

④ - (283") 30-35 Ft. lbs. . (348") 35-45 Ft. lbs.

⑤ - 25-35 ft. lbs. (1955-57), 25-30 ft. lbs. Center and 15-20 ft. lbs. End Bolts (1958-60).

⑥ - 12-15 ft. lbs. (5/16" Front & Rear) and 6-9 ft. lbs. (¼" Intermediate) (1955-57); 12-15 ft. lbs. (283"), 10-15 ft. lbs. (348") (1958-60).

ENGINE

1954 6 CYL. PASS. CARS

ENGINE REMOVAL: Engine, clutch, and transmission can be removed as an assembly as follows: Drain radiator, block, oil pan, and transmission. Take off hood by disconnecting hood springs (use Tool J-3181) and removing two hinge support arm-to-hood bolts at each side (hold hood to prevent dropping down when bolts removed). Remove radiator (see Radiator Removal), battery with ground strap attached, and air cleaner. Disconnect wire harness at right junction block and pull harness through header bar. Remove header bar. Disconnect starter and generator wires, coil lead, windshield wiper vacuum line, gas line at pump, choke and throttle cables at carburetor, line at temperature gauge and oil pressure gauge, exhaust pipe flange at manifold, accelerator pedal from rod, transmission control rods from levers on side of case (work through opening in floor), speedometer cable at transmission, and clutch link to pedal arm. (On Powerglide models, disconnect transmission oil cooler lines and vacuum line). Split the universal joint retainer, sliding the ball back, taking out bearing capscrews and removing trunnion bearings. Remove transmission-to-support bolts, engine side mounting-to-frame bracket bolts, and front engine mounting bolts. Take off rocker arm cover. Remove 4th cylinder head bolt from the rear on left side, 3rd from rear on right side and install engine lifting tool No. J-2967. Use a hoist and lift engine, clutch, and transmission assembly from car.

NOTE—On all models (except Powerglide with Automatic Transmission) after engine has been installed and torque tube connected, fill universal housing through speedometer connection (remove driven gear) with ½ pint of SAE 90 transmission lubricant.

1955-56 6 CYL. PASS. CARS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission and proceed as follows:

1) Scribe alignment marks on hood around hood hinges and remove hood. Remove radiator hoses and heater hoses (on models so equipped). On Powerglide models, remove and plug oil cooler lines.

2) Remove radiator core support to fender bolts and remove radiator core. Remove battery cables and battery,

3) Disconnect starter and generator wires, engine to body group strap, oil pressure indicator wire at switch on block and coil primary lead at coil. Remove temperature indicator element wire. Remove air cleaner and oil filter.

4) Disconnect gasoline feed pipe from fuel pump and disconnect vacuum lines at intake manifold. Remove exhaust pipe to manifold bolts. Disconnect carburetor control rod from dash panel bellcrank. Remove transmission control rods. Remove clutch control bellcrank and control rods on conventional transmission models. On overdrive models, disconnect overdrive wires and cables. On Powerglide models, remove oil filler tube and plug opening.

5) Disconnect speedometer cable at transmission. Remove propeller shaft, overdrive solenoid (if so equipped). Remove rocker arm cover and install lifting hooks (Kit J-4536), in cylinder head bolt holes. Disconnect clutch idler shaft bracket. Raise engine slightly and remove all engine and transmisssion mount bolts and remove engine and transmission.

1957-60 6 CYL. PASS. CARS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission and proceed as follows:

1) Scribe alignment marks on hood around hood hinges and remove hood. Remove radiator hoses and heater hoses (on models so equipped) On Powerglide models, remove and plug oil cooler lines.

2) Remove radiator core support to fender bolts and remove radiator core. Remove battery cables and battery,

3) Disconnect starter and generator wires, engine to body group strap, oil pressure indicator wire at switch on block and coil primary lead at coil. Remove temperature indicator element wire. Remove air cleaner and oil filter.

4) Disconnect gasoline feed pipe from fuel pump and disconnect vacuum lines at intake manifold. Remove exhaust pipe to manifold bolts. Disconnect carburetor control rod from dash panel bellcrank. Remove transmission control rods. Remove clutch control bellcrank and control rods on conventional transmission models. On overdrive models, disconnect overdrive wires and cables. On Powerglide models, remove oil filler tube and plug opening.

5) Disconnect speedometer cable at transmission. Remove propeller shaft, overdrive solenoid (if so equipped). Remove rocker arm cover and install lifting hooks (Kit J-4536), in cylinder head bolt holes. Disconnect clutch idler shaft bracket. Raise engine slightly and remove all engine and transmisssion mount bolts and remove engine and transmission.

1955-56 V8 PASS CARS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission, and proceed as follows:

1) Scribe marks on hood at hood hinges and remove hood. Remove radiator and heater hoses, battery and battery cables. Remove fan shroud and radiator core bolts. On Auto. Trans. models, remove and plug oil cooler lines. Remove radiator core and fan shroud.

2) Disconnect starter and generator wires, engine to body ground strap, oil pressure indicator wire at sending unit on block, and primary wire at coil. Remove air cleaner. Remove Air Conditioning (if so equipped). Disconnect gasoline and vacuum lines at fuel pump and remove distributor cap. Remove Power Steering and Air Suspension lines (if so equipped). Disconnect carburetor control rod from bellcrank and throttle valve lever on transmission (if equipped with Auto. Trans.)

3) Remove exhaust pipe flange nuts and lower exhaust pipes and muffler. Remove road draft tube, exhaust crossover pipe and manifold heat valve from right hand exhaust manifold.

4) Remove transmission control rods. On overdrive models disconnect overdrive wires and cables. Remove clutch control bellcrank and control rods (Synchro-mesh Trans.). On Auto. Trans. Cars, remove oil filler tube and plug opening Disconnect speedometer cable at transmission Remove propeller shaft

5) Install two eye bolts and spacers, Kit J-4536-A, in cylinder head bolt holes, raise engine slightly and remove front mounting bolts. Remove transmission mounting block to frame crossmember bolts. Remove engine and transmission as a unit, tilting engine to clear core support.

1957-60 V8 PASS. CARS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission, and proceed as follows:

1) Scribe marks on hood at hood hinges and remove hood. Remove radiator and heater hoses, battery and battery cables Remove fan shroud and radiator core

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bolts On Auto Trans models remove and plug oil cooler lines Remove radiator core and fan shroud

2) Disconnect starter and generator wires engine to body ground strap, oil pressure indicator wire at send ing unit on block, and primary wire at coil Remove air cleaner Remove Air Conditioning (if so equipped) Disconnect gasoline and vacuum lines at fuel pump and remove distributor cap Remove Power Steering and Air Suspension lines (if so equipped) Disconnect carburetor control rod from bellcrank and throttle valve lever on transmission (if equipped with Auto Trans)

3) Remove exhaust pipe flange nuts and lower exhaust pipes and muffler Remove road draft tube, exhaust crossover pipe and manifold heat valve from right hand exhaust manifold

4) Remove transmission control rods On overdrive models disconnect overdrive wires and cables Remove clutch control bellcrank and control rods (Synchro-mesh Trans) On Auto, Trans Cars remove oil filler tube and plug opening Disconnect speedometer cable at transmission Remove propeller shaft

5) Install two eye bolts and spacers Kit J-4536-A, in cylinder head bolt holes raise engine slightly and remove front mounting bolts Remove transmission mounting block to frame crossmember bolts Remove engine and transmission as a unit, tilting engine to clear core support

1954 TRUCKS

ENGINE REMOVAL (TRUCKS): Drain cylinder block, and oil pan Remove hood assembly, radiator support bracket and radiator Disconnect starter switch cables, coil leads and engine ground strap Disconnect generator leads at generator and disconnect horn wire Disconnect fuel lines at pump, choke and throttle controls at carburetor and remove air cleaner Disconnect oil gauge line at engine, remove temperature gauge engine unit and disconnect vacuum lines at manifold Remove exhaust manifold bolts remove starter pedal and disconnect accelerator pedal from rod Remove floor pan cover in cab and disconnect transmission controls (models with steering column shift), or remove transmission cover and gearshift assembly and install temporary cardboard cover on case Remove hand brake lever, disconnect speedometer cable and clutch link to pedal arm Drain transmission, disconnect propeller shaft Take out bolts in rear engine mounting, remove front engine mounting Remove third cylinder head bolt from rear on left side Install engine lifting eye bolt in this position, attach hoist Remove engine clutch and transmission from chassis as a unit When re-installing engine, see Engine Mounting instructions (following)

1955-56 6 CYL. TRUCKS

ENGINE REMOVAL (6 CYL. TRUCKS): Drain cooling system, crankcase, and transmission, then proceed as follows

1) Disconnect hood springs and hinges, remove hood. Remove radiator support bracket-to-fender bolts, support-to-frame crossmember bolts, then remove radiator and support.

2) Remove battery cable and ammeter wire from starter switch terminal. On vehicles with push-button starter, remove battery cable and ammeter wire from large terminal on solenoid and starter switch wire from small terminal (tape end of battery cable to prevent shorting).

3) Disconnect coil lead from distributor terminal and pull coil high tension wire from center of distributor cap. Remove two coil mounting screws and lay coil with wires attached on dash. Disconnect engine ground strap from frame, gasoline line from fuel pump, generator and field wires from generator.

4) Remove air cleaner and disconnect choke and throttle control cables from carburetor (when used). Remove temperature indicator element from cylinder head and disconnect oil pressure line at cylinder block.

5) Disconnect windshield wiper and Hydrovac vacuum lines (if so equipped). Remove exhaust pipe flange-to-manifold bolts. Remove starter pedal, then remove accelerator pedal from accelerator rod (if so equipped).

6) One ½ and ¾ Ton with conventional transmission, remove control rods from bellcrank on left side of clutch housing. On automatic transmission models, disconnect transmission control and throttle linkage rods from transmission. On 1 Ton models, remove coolant line clips from dash and frame panels. On other models, remove floor mat and transmission floor pan cover

7) On 1 Ton models, remove cotter key and pin attaching parking brake pull rod assembly to parking lever On 1½ and 2 Ton models, disconnect parking brake lever return spring from brake operating lever and remove cotter key and pin attaching inner and outer levers to parking brake operating lever.

8) On 1, 1½, and 2 Ton models, remove transmission cover with parking and gearshift lever. Place piece of cardboard on top of transmission to prevent dirt falling in during removal.

9) Disconnect speedometer cable from transmission and clutch link-to-pedal arm (if so equipped). Remove propeller shaft.

10) Remove rocker arm cover, rocker arm attaching bolts, rocker arm, shaft assembly and pushrods.

11) With Lift Kit J-4536-A, raise engine slightly, remove all four engine mounts and raise engine and transmission from chassis as a unit. Remove crankcase ventilator pipe, then remove starting motor, generator and fan belt.

1957-60 6 CYL. TRUCKS

ENGINE REMOVAL: *NOTE - On 1960 Low Cab Forward Models, see "Front Sheet Metal Assembly Removal" below* On all other models, drain cooling system, crankcase, and transmission, then proceed as follows

1) Disconnect hood springs and hinges, remove hood. Remove radiator support bracket-to-fender bolts, support-to-frame crossmember bolts, then remove radiator and support.

2) Remove battery cable and ammeter wire from starter switch terminal. On vehicles with push-button starter, remove battery cable and ammeter wire from large terminal on solenoid and starter switch wire from small terminal (tape end of battery cable to prevent shorting).

3) Disconnect coil lead from distributor terminal and pull coil high tension wire from center of distributor cap. Remove two coil mounting screws and lay coil with wires attached on dash. Disconnect engine ground strap from frame, gasoline line from fuel pump, generator and field wires from generator.

4) Remove air cleaner and disconnect choke and throttle control cables from carburetor (when used). Remove temperature indicator element from cylinder head and disconnect oil pressure line at cylinder block.

5) Disconnect windshield wiper and Hydrovac vacuum lines (if so equipped). Remove exhaust pipe flange-to-manifold bolts Remove starter pedal, then remove accelerator pedal from accelerator rod (if so equipped).

6) One ½ and ¾ Ton with conventional transmission, remove control rods from bellcrank on left side of clutch housing. On automatic transmission models, disconnect transmission control and throttle linkage rods from transmission. On 1 Ton models, remove coolant line clips from dash and frame panels. On other models, remove floor mat and transmission floor pan cover.

7) On 1 Ton models, remove cotter key and pin attaching parking brake pull rod assembly to parking lever On 1½ and 2 Ton models, disconnect parking brake lever return spring from brake operating lever and remove cotter key and pin attaching inner and outer levers to parking brake operating lever.

8) On 1, 1½, and 2 Ton models, remove transmission cover with parking and gearshift lever. Place piece of cardboard on top of transmission to prevent dirt falling in during removal.

9) Disconnect speedometer cable from transmission and clutch link-to-pedal arm (if so equipped). Remove propeller shaft.

10) Remove rocker arm cover, rocker arm attaching bolts, rocker arm, shaft assembly and pushrods.

11) With Lift Kit J-4536-A, raise engine slightly, remove all four engine mounts and raise engine and transmission from chassis as a unit. Remove crankcase ventilator pipe, then remove starting motor, generator and fan belt.

1955-57 V8 TRUCKS

ENGINE REMOVAL: 1) Drain cooling system, crankcase, and transmission Scribe marks and remove hood Remove radiator hoses, radiator core, and battery with support and cables

2) Disconnect starter and generator wires, engine ground strap, oil pressure switch wire and primary coil lead

3) Remove windshield wiper, temperature gauge element, oil filter, ventilator parts, air cleaner and fan blade and pulley

4) Disconnect fuel line at pump, vacuum lines from manifold, and remove distributor and coil

5) Disconnect carburetor control rod from bellcrank, choke rod from carburetor, crossover pipe and muffler assembly Remove transmission control rods

6) Remove clutch bell crank and control rods, overdrive wires and cables and oil cooler lines Plug openings

7) Disconnect speedometer cable at transmission and remove propeller shaft

8) Remove choke heat tube and rocker arm covers Use two eye bolts from Tool Kit J-4536-A in cylinder bolt holes to raise engine slightly and remove four engine mounts Remove engine and transmission as a unit

1958-59 V8 TRUCKS

ENGINE REMOVAL: 1) Drain cooling system, crankcase, and transmission Remove hood, radiator, and radiator support

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2) Remove battery cable and ammeter wire from solenoid terminal On push button starter trucks, remove battery cable and wires from solenoid and tape battery cable
3) Disconnect coil wire at distributor and spark plug cables from distributor cap Remove screws and lay coil and wiring on dash Disconnect ground strap at frame and disconnect fuel line at pump
4) Remove wires from generator Remove air cleaner and disconnect choke and throttle cables from carburetor Disconnect temperature wire and oil pressure line
5) Disconnect vacuum lines and remove exhaust pipe to manifold bolts Remove starter pedal and remove accelerator pedal from rod
6) On ½ & ¾-ton (S M Trans), remove control rods from bellcrank On Auto Trans , disconnect transmission lines and throttle rod at transmission On 1-ton, remove coolant line clips from dash and frame panels On all models, remove floor mat and transmission floor pan cover
7) On 1-ton, remove parking brake pullrod to lever pin On 1½ & 2-ton, disconnect parking brake spring and remove inner and outer lever-to-parking brake operating lever pin
8) On 1, 1½ & 2-ton, remove transmission cover with parking brake and gearshift lever *NOTE* - Cover transmission to keep out dirt
9) Disconnect speedometer cable at transmission, and clutch link-to-clutch pedal arm Remove propeller shaft, rocker arm cover, rocker arm and shaft assembly, and pushrods
10) Raise engine with Kit, Tool J-4536-A, and remove four engine mounts Remove engine

1958-60 TRUCKS

ENGINE REMOVAL: 1) Drain radiator, crankcase, and transmission Disconnect parking light wire harness connector from dash Remove hood, battery cables and air cleaner
2) Remove hoses, fan blade, spacer, pulley, fan shroud and radiator core Disconnect overdrive lines at manifold, power steering return line, and pump pressure lines
3) Disconnect starter and generator wires, engine ground strap, oil pressure and temperature unit wires at units, and primary coil wire at coil
4) Disconnect choke and throttle cables from carburetor and place on dash Remove accelerator pull-back spring and remove accelerator rod from carburetor and dash bellcrank
5) Remove crankcase ventilation tube and disconnect exhaust pipes and muffler assembly at manifolds
6) Remove transmission control rods, clutch slave cylinder line, and shift control rods (S M Trans) Disconnect oil cooler lines and plug openings Disconnect speedometer cable at transmission and remove propeller shaft
7) Remove floor pan and front sheet metal on Low Cab Forward models, see below
8) Remove engine front mount to crossmember bracket nut and washer Remove rocker arm covers and install two bolts and spacers from Kit J-4536-A Raise engine slightly and remove crossmember Remove engine and transmission as a unit

FRONT SHEET METAL ASSEMBLY REMOVAL (L w Cab Forward): Drain radiator and remove radiator hoses On Air Cond trucks remove compressor lines Disconnect air cleaner intake hose at fender skirt (if so equipped) wire connectors at dash and toe panel battery generator and regulator leads Disconnect Power Steering Reservoir hose at pump Remove hood assembly at hinges and remove front bumper Remove fender extension bolts (note number and location of shims for reinstallation) Remove fender upper edge-to-plenum and hinge pillar bolts Work from under rear of fender to remove two bolts and spacers at fender extension mounting bracket Remove bolt, locking tab, and flat washer from radiator support to crossmember Remove fender skirt mounting bolts and remove bolt, washer, spacer and grommet from fender skirt bracket Remove steering joint cover bolts and cover from fender skirt and remove snap in clip from seal to skirt. Spread seal from steering column and remove cover Remove sheet metal assembly with radiator battery, horn and voltage regulator

ENGINE MOUNTINGS

1954 PASS. CARS

ENGINE MOUNTING REPLACEMENT: Front Mounting. Remove engine front mount bolts from engine mounting plate and frame cross-member. Raise front end of engine until front mounts can be moved out from between plate and frame. With front support mounting surfaces clean (no oil, etc.), bolt new supports to frame, lower engine, install mounting plate, bolt support to engine.

Side Mountings. Unbolt mounting from clutch housing and frame brackets and remove mounting. Install new mounting with serrated face toward frame bracket. Bolt mounting to clutch housing bracket first, then tighten mounting to frame bracket bolts (bolt hole in frame bracket slotted and serrated face of frame bracket and mounting permit proper positioning without use of shims).

Transmission Mounting (except Powerglide Cars). Remove mounting attaching bolts (tangs of lock plate must be bent back from bolt heads). Raise rear of engine until mounting can be moved out from between transmission and frame cross-member. Use new bolt lock plate and bolt new mounting to frame, lower engine, use new bolt lock plate and bolt mounting to transmission (transmission attaching bolt holes slotted permitting alignment between transmission and support).

1955-60 PASS. CARS & TRUCKS

ENGINE MOUNTING REPLACEMENT (Front Mounts)– Remove top and bottom stud nuts and remove washer and cushion between each nut and the cross member or engine bracket Raise front of engine (On V8 models remove the distributor cap before raising engine) *CAUTION–Raise engine only far enough for clearance.* Replace necessary cushions

Rear Mounts Support engine weight to relieve rear mounts Remove mount attaching bolts from frame outrigger and flywheel housing (or Powerglide Transmission) and remove support Install new support and bolts and tighten securely with engine weight resting on mounts

1954 TRUCKS

ENGINE MOUNTINGS (Trucks): Consist of insulated type front and rear mountings as follows.
Front Mounting—Engine mounting bushings are imbedded in rubber insulator assembled between lower retainer and upper plate with a shield on top of the assembly. This mounting should be checked for clearance when installed and periodically in service.

Rear Mounting—Two insulated units. Bolted to bracket on clutch housing and bracket on frame. No adjustment required (keep mounting bolts tight).

Adjustment of Truck Engine Mountings: Check new front engine mounting, and remove and check mounting in service, as follows: With mounting removed from engine, fit insulator into lower retainer and place upper plate on top. Hold parts firmly together and make certain that rubber insulator fits tightly between retainer and plate and that engine mounting bushings project above upper plate (necessary to prevent oil shield contacting upper plate). Replace insulators which do not pass this test. Check clearance between upper edge of lower retainer and lower face of upper plate. If clearance more than 5/64", replace lower retainer. If clearance less than 3/64", grind off top edge of lower retainer. (CAUTION—do not attempt to shim the support). When installing mounting, tighten engine-to-mounting bolts tightly, mounting-to-frame bolts securely but not excessively tight (self-locking type nuts). Rear engine mountings do not require adjustment and mounting bolts should be kept tight.

OIL PAN

1959-60 V8 PASS CARS

OIL PAN REMOVAL· *NOTE - On Turboglide transmission cars, remove transmission control lever cross shaft at transmission shifter lever and shaft assembly in addition to following procedure* Raise car, drain crankcase and radiator Disconnect radiator hoses at radiator Disconnect battery ground strap at engine Disconnect clutch pushrod at pedal control and disconnect intermediate lever and shaft Remove clutch pedal control intermediate lever and shaft assembly from frame mounting bracket, but leave shaft assembly attached to engine. Remove carburetor fuel feed pipe at fuel pump and remove fuel pump On air suspension cars, disconnect hose to alcohol vaporizer jar and hose from air compressor to accumulator tank Remove accelerator control rod from its lever On 348" engine, remove oil level gauge tube Remove power brake vacuum hose at check valve on manifold On 283" engine, remove power steering pump at generator and lay on upper control arm (unnecessary to disconnect hoses) On 348" engines, disconnect generator brace and rotate away from engine so power steering pump will clear brake master cylinder Remove transmission lower control rods at shift levers Disconnect exhaust pipes from manifolds and lower pipe and muffler assembly Remove oil filter Loosen transmission mounting bolts Remove long bolts from each front engine mount *NOTE - Turn crankshaft so harmonic balancer keyway slot is at bottom of engin to enable crankshaft counterweights to clear oil pan baffle* Raise engine at harmon-

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ic balancer approximately 3" (283"), 2¾" (348") until transmission housing contacts underbody toe pan *CAUTION - While raising engine watch clearance at fan blades and shroud* Remove oil pan bolts and remove pan with a tilting motion

TORQUE TUBE & BALL ADJUSTMENT

1954 POWERGLIDE MODELS

UNIVERSAL JOINT BALL ADJUSTMENT (POWERGLIDE MODELS): ***Due to the fact the universal joint is lubricated under pressure (fed by automatic transmission line pressure through channel in output shaft) leakage will develop if the ball joint is not properly adjusted.***
To adjust, remove universal joint ball from torque tube. Clean thoroughly, and inspect for roughness, and clean up with fine emery paper if necessary before making adjustment. Use 4 new universal ball collar shims as a starting point, install joint ball and collar to transmission case and tighten bolts to 8-12 ft. lbs. torque. **NOTE**—Do not install the ball joint collar oil seal (cork) at this time. With bolts tight grasp the ball at the sliding seal (to tube) end with both hands, and test for tightness of ball, up and down If ball assembly can be moved and is a snug fit, the ball is properly adjusted If it cannot be moved by hand or is too loose add or remove shims until proper adjustment is secured. After correct adjustment is made disassemble joint and install cork seal after first lubricating it with a graphite grease, and reassemble to transmission tightening bolts to 8-12 ft. lbs. torque.

CYLINDER HEAD & MANIFOLD

ALL 6 CYL. MODELS

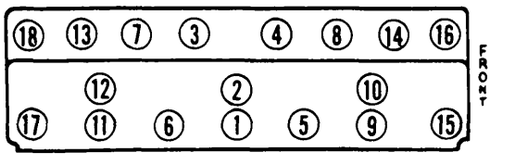
CYLINDER HEAD INSTALLATION (6 CYL. ENGINES) Use torque indicating wrench to tighten cylinder head cap crews in correct sequence as shown in diagram

►*6 CYL EXHAUST MANIFOLD TORQUE CHANGE (To Eliminate Cracking) Two center bolts should be tightened to new specification See "TIGHTENING SPECIFICATIONS" above*

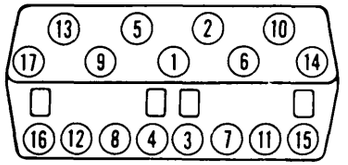
1955-60 V8 MODELS

►*REPLACEMENT CYLINDER HEAD NOTE (348" Eng)* Service cylinder heads have increased water passages cast around spark plug openings but are not drilled for water passages from block When this service cylinder head is to be used on a 1959-60 348" engine drill ¼" (at drill spot near each spark plug) into water passage to match water hole in block DO NOT drill holes when using this service head on a 1958 engine and DO NOT use a cylinder head gasket (without these holes) on 1959-60 engine Long reach spark plugs must be used with this type head

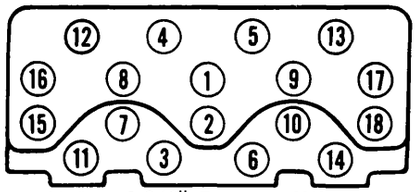
CYLINDER HEAD INSTALLATION (V8 ENGINES): Coat steel head gasket with a good head gasket paste and install gaskets in position on cylinder block Install heads over dowels in block Coat all head bolts with a suitable oil and water thread sealing compound Use a torque indicating wrench and tighten bolts a little at a time to 60-70 ft lbs , in the sequence shown in diagram.



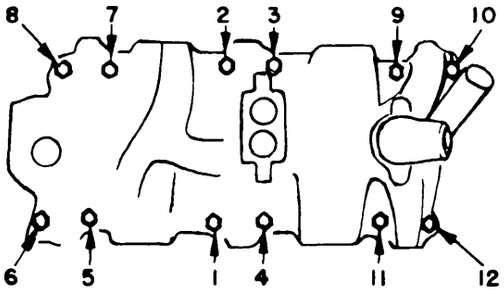
CHEVROLET 6 CYL. CYLINDER HEAD
235" & 261" ENGINE



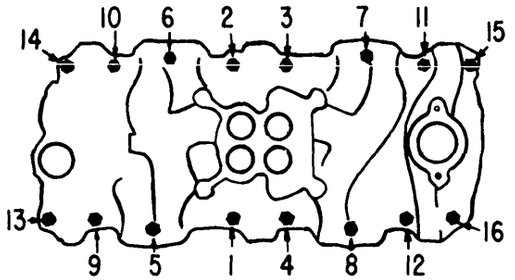
CHEVROLET V8 265" & 283" ENGINE CYLINDER HEAD



CHEVROLET V8 348" ENGINE CYLINDER HEAD



CHEVROLET V8 265" & 283" ENGINE INTAKE MANIFOLD



CHEVROLET V8 348" ENGINE INTAKE MANIFOLD

INTAKE MANIFOLD INSTALLATION (V8 ENGINES) Install manifold end gaskets on cylinder block Coat ends of intake manifold side gaskets around water passages with a good sealing compound and install heads Tighten bolts a little at a time to 25-35 ft lbs torque in sequence shown in diagram

PISTON PINS

ALL V8 MODELS

PISTON PINS (265" & 283" Engin s): Pins are press fit in connecting rod and must be removed and installed with correct tool set to avoid damaging piston
CAUTION - See tool change and modification data below

►*283" ENGINE TOOL J-5538 ALTERATION NOTE* Tapered end of support must be cut back at smaller angle to centerline of support to avoid breakage of bottom piston ring land

►*1957 265" ENGINE TOOL NOTE* Adaptor Set J-5538-9 must be used for pin removal and installation.

Removal: Install pilot of Tool J-5538 (see Tool Notes above) on puller screw and insert assembly through piston and pin, install support over threaded end of puller screw with small end of support against piston, install nut loosely on puller screw Place assembly in arbor press, press pin out toward support

Installation Lubricate pin holes and position connecting rod in its respective piston so that flange or heavy side of rod at bearing end will be toward **fr nt** of piston (cast depression in head of piston and "F" marks on piston struts) on #1-#3-#5-#7 pistons and rod flange to **rear** of piston on #2-#4-#6-#8 pistons Install piston pin on puller screw and pilot on screw Install puller screw through piston and rod, indexing pilot through piston and rod Install support over threaded end of puller screw with small diameter toward piston Install nut on puller screw and tighten with a torque wrench to start piston pin into connecting rod *(CAUTION—If pin can be start d into connecting rod with less than 10 ft. lbs. torque, clearance is excessive).*

PISTON PINS (348" Engin): R m val - Install pilot of piston pin Tool J-6994 on piston pin Place piston and rod assembly on support and place assembly in arbor press Press pin out of connecting rod
Installation - Lubricate piston pin holes in piston and rod position rod in respective piston, so flange or heavy side of rod (at bearing end) will be towards **front** of piston (cast depression in piston head and "F" mark on strut) on No 1-3-5-7pistons,and rod flange or heavy side of rod to **rear** on No 2-4-6-8 pistons Place piston pin on installer and pilot spring and pilot in support Place piston and rod on support indexing pilot through piston and rod Place support on arbor press start pin into piston and press pin into piston until pilot bottoms

CRANKSHAFT & MAIN BEARINGS

1954 MODELS

MAIN BEARING INSTALLATION (Without Removing Engine or Crankshaft from Chassis): Upper bearing halves can be replaced by following procedure (bearings doweled in place and cannot be "rotated" out):

Main Bearing Replacement (Pass. Cars): Remove radiator (see Radiator removal), remove fan belt and vibration dampener (see Vibration Dampener removal). Loosen all rocker arm screws to relieve

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tension on camshaft. Remove spark plugs. Raise car and support securely on stands so car is level and approximately 8" off floor. Remove transmission floor pan cover. Remove clutch housing underpan. Remove transmission rear support-to-crossmember bolts. Disconnect shift rods from transmission levers. Raise rear of engine, place 1" square bar behind flywheel and under clutch housing with ends resting on second cross-member brace (this will support engine weight). Release clutch fork from ball. Remove transmission mounting bolts, slide transmission back approximately ¾". Remove oil pan and timing gear cover. Remove oil pump and screen cover assembly. Rotate crankshaft to position allowing removal of all bearing caps. **Mark timing gears to insur re-meshing gears in same relative position.** Then install new bearings as follows:

Bearing Installation—Loosen but do not remove all main bearing cap bolts sufficiently to allow crankshaft to drop down approximately ⅜". Remove front intermediate and rear main bearing caps (other bearing caps will support crankshaft), remove old bearings from bearing cap and crankcase (if old bearings do not drop down with crankshaft, tap bearings lightly to free dowel). Install new bearings, locating dowel on back of bearing shell in hole in crankcase, and pressing bearing up in place (bearing should snap into place and hold if it has correct spread). Re-install bearing cap, using .006" shim thickness (three .002" shims) on each side of cap, tighten bearing caps just enough to support crankshaft. Repeat above procedure at front and rear intermediate bearings (NOTE—Rear intermediate bearing is close fit in crankcase and may not go up into place until crankshaft lifted up). After all bearings replaced, place a jack under rear intermediate bearing cap and carefully raise crankshaft into position. Keep crankshaft horizontal during this operation (CAUTION—Make certain that timing gears meshed in accordance with marks made before crankshaft dropped). Tighten all bearing caps snugly, then adjust main bearings as directed on car model page.

Main Bearing Replacement (Trucks): Remove radiator (see Radiator removal), remove fan belt and vibration dampener (see Vibration Dampener removal). Loosen all rocker arm screws to relieve tension on camshaft. Remove spark plugs. Take off transmission floor pan cover and clutch housing underpan and extension. Disconnect transmission control rods on side of transmission case (½ & ¾ Ton), remove hand brake lever from transmission mounting stud (Other Trucks). Remove transmission (see Transmission removal instructions for each model on car model page). Remove oil pan and timing gear cover. Romove oil pump and screen cover assembly. Rotate crankshaft to position allowing removal of all bearing caps. Mark timing gears to insure remeshing of gears in sam relative position. Then install new bearings as directed for Pass. Cars.

1955 6 CYL. MODELS

6 CYL. ENGINE MAIN BEARING REPLACEMENT (With Engin in Car)· Upper bearing halves are doweled in position Proceed as follows

1) Remove radiator, harmonic balancer, and timing gear cover Remove rocker arm cover and loosen all rocker arm screws to relieve tension on camshaft Remove spark plugs

2) Remove transmission (see Transmission Removal on Car Page) Drain oil, remove oil pan and oil pump Rotate crankshaft to best possible position for removal of all bearing caps and mark the meshing teeth of timing gears for remeshing in same position

3) Loosen all four main bearing caps evenly until crankshaft is lowered approximately 3/8" Remove front intermediate and rear bearing caps and remove upper and lower bearing shells (If upper shells do not come out with crankshaft, tap lightly to loosen)

4) *NOTE–Always replace bearings in pairs.* Install new upper half bearing shells in rear and front intermediate bearing bores by rolling into position, centering and pressing up into place *(CAUTION–* Be sure to install upper halves so smaller of the two holes will be toward camshaft when rolled into place). Install new lower half bearing shells in caps, and replace caps, using three 002" shims on each side of bearing as a starting point for adjustment Tighten bearing cap bolts until caps are snug to journals

5) Repeat this procedure with other main bearings *NOTE–*Due to close fit the upper half of rear intermediate bearing may not go all the way into place Start it evenly and it will go all the way when crankshaft is raised into place

6) After all bearings have been replaced, raise crankshaft by tightening bearing cap bolts evenly and alternately *(NOTE–*At the same time, check meshing of timing gears with marks made at disassembly) With the crankshaft up in place, force it all the way fore and aft and check end clearance at rear intermediate bearing. Adjust main bearings.

7) Reassemble engine by reversing above procedure

1956-60 6 CYL. MODELS
1955-60 V8 MODELS

6 CYL. & V8 MAIN BEARING REPLACEMENT (With Engine in Car): Upper bearing halves can be "rolled" out for replacement. Proceed as follows

1) Remove spark plugs and remove engine oil pan Remove bearing cap and bearing shell

2) Install main bearing shell removing and installing tool (or use a cotter pin bent as required) Rotate crankshaft in direction of usual rotation and roll upper bearing shell out of engine

3) Oil new bearing shell and insert plain (un-notched) end of shell between crankshaft and block on the indented or notched side Rotate bearing into place Install new bearing shell in bearing cap

1954 MODELS

CRANKSHAFT OIL SEALS: Rear Seal. Special rear main bearing cap (mounted on four bolts with two locating dowels) with wick type oil seal installed in groove in cap and crankcase used. Seal bears on outer rim of crankshaft flange (oil slinger and check valve in oil return hole in bearing cap have been discontinued). To install new seal in bearing cap, insert packing in groove and roll firmly in place with rounded tool (roll from both ends toward center). Use round block of wood (same diameter as crankshaft flange) to hold packing in place, cut both ends off evenly and flush with bearing cap face. Install upper half of seal in crankcase in same manner with engine out of car.

Front (Timing Gear Cover) Oil Seal—Spring-loaded leather type installed in pocket in timing gear cover. To install new seal, place seal on special Oil Seal Replacer J-995 with free end of leather toward end of tool, seat seal in cover with few light hammer blows on tool. NOTE—Timing gear cover must be centered on crankshaft when installed on engine to prevent balancer damaging oil seal. To install cover, coat seal with grease, install centering guide J-966 on crankshaft, install cover and tighten cover screws.

1955-57 6 CYL. MODELS

REAR MAIN BEARING OIL SEAL (6 CYLINDER ENGINE)· Remove rear main bearing cap and remove old seal from groove Insert new packing in bearing cap and roll firmly into place with a rounded tool (roll from both ends toward center) Use a round block of wood, same diameter as crankshaft flange, to hold packing in place Cut off both ends of packing evenly and flush with bearing cap face Install upper half of seal in crankcase in same manner, with engine out of car

1955-57 V8 MODELS

REAR MAIN BEARING OIL SEAL (V8 ENGINE) Remove rear main bearing cap and remove old seal from groove Insert new seal in groove with fingers, and then with Tool J-5788 (Oil Seal Installer), and a hammer, pound seal firmly into groove Cut the small portion of the seal that protrudes from groove flush with surface of bearing cap Replace upper half of seal in crankcase in same manner with engine out of car

1958-60 6 CYL. & 1958 V8 MODELS

REAR MAIN BEARING OIL SEAL (All Engines): To replace rear bearing oil seal without removing engine proceed as follows

1) Remove oil pan oil pump assembly, rear main bearing cap (discard old seal) Loosen all bearing caps (to allow crankshaft to drop a slight amount) *NOTE* - Pry between crankshaft and block to force crankshaft down as necessary

2) Use screwdriver or similar tool to force old seal out of upper bearing so it can be removed with a pair of pliers (rotate shaft to aid in removal of seal)

3) Pre form new upper seal in cap

4) Insert soft wire (tag wire) through new upper seal 1 4" from end and wrap wire around end of seal to keep seal from spreading Lubricate entire surface of upper seal with lubricant and reform seal in lower cap

5) Insert wire through seal opening in crankcase and around crankshaft Use screwdriver or similar tool to start seal accurately, then pull seal into position (working seal into position with tool and rotating crankshaft as necessary) With seal centered, cut off ends 1/64" below bearing edge

6) Install new lower seal in bearing cap (force it into position with Tool J-5788) and cut ends off flush with surface of bearing cap Tighten all bearing caps to specifications

1959-60 V8 MODELS

REAR MAIN BEARING OIL SEAL (V8 Eng) To replace rear main bearing seal without removing engine first remove oil pan (see above for Pass Cars or car model page for Trucks) then proceed as follows

CONTINUED ON NEXT PAGE

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Cap Seal - Remove bearing cap and pry out old seal with screwdriver Lubricate new seal (exc parting surface) and roll seal into place without damaging bead of seal with seal tangs

Block Seal - Use small drift to start seal out until it can be removed with pliers Lubricate new seal (exc parting surface) and gradually push seal in with hammer handle until seal rolls into place DO NOT cut seal with seal retainer tang

VIBRATION DAMPENER

1954 MODELS

HARMONIC BALANCER: Balancer furnished as a complete assembly only. Separate parts not available for service replacement

Removal (Passenger Cars)—Remove radiator (see Radiator Removal), and Radiator Grille and Filler Panel Baffle as an assembly Take off fan belt Remove engine front mounting bolts, raise front end of engine approx ½' (to permit balancer puller head to clear radiator support cross-member) Use puller J-1287, attach puller body to balancer by means of two capscrews screwed in tapped holes in balancer, pull balancer by turning puller screw

Removal (Trucks)—Remove Front End Sheet Metal Assembly (see Front End Sheet Metal Assembly removal preceding) Then remove balancer with puller tool as described for Passenger Cars (above)

Installation—Place drive adapter of puller tool J-1287 in starting crank jaws of balancer, install puller body (as above), line up keyway in balancer and key in crankshaft, turn puller screw down to contact driver, then use puller screw as driver and drive balancer in place until it bottoms against crankshaft gear

1955-60 6 CYL. MODELS

VIBRATION DAMPENER (6 CYL ENGINE): Removal - Drain radiator disconnect hoses On Automatic Transmission models, remove oil cooler lines Remove radiator (note number of shims) Remove fan belt Install Tool J 6978 or J-1287 and remove vibration dampener and pulley assembly

Installation: Remove puller and install two 3/8"-16 x 1" (16 thread) capscrews in dampener to support wheel portion during installation Position dampener on crankshaft with key and keyway on alignment and drive dampener on shaft until it bottoms against crankshaft gear Use a heavy hammer and bar through the grille, taking care that a straight installation is made. Remove the two capscrews previously installed. Install radiator.

1955-57 V8 MODELS

VIBRATION DAMPENER (V8 ENGINE) Removal—Remove radiator On Powerglide models remove oil cooler lines and plug outlets Remove fan belt fan, and pulley and install Puller J-1287-B and pull dampener assembly from crankshaft

Installation Install two 3/16 —16 x 1½ capscrews to hold hub and flywheel portion of dampener together during assembly Coat cover seal contact on dampener with engine oil and position dampener on crankshaft Use Transmission Front Bearing Installer J-5590 and drive dampener on shaft until hub bottoms on timing sprocket Remove the two screws installed previously and install pulley, fan, and fan belt Install radiator

1958-60 MODELS

VIBRATION DAMPENER (8 CYL. ENGINE): Removal - Remove radiator hoses On Automatic Transmission models, disconnect cooler lines from radiator core Remove battery, fan belt, fan and pulley Remove fan shroud bolts and remove radiator and fan shroud Remove vibration dampener pulley bolts and remove pulley Use Tool J-6978 to remove vibration dampener

Installation: Coat vibration dampener front cover seal contact with engine oil align vibration dampener with crankshaft key and use Tool J-5590 to drive vibration dampener on crankshaft until dampener hub bottoms on crankshaft timing gear Install vibration dampener pulley, fan pulley, and fan Place fan shroud over fan blade and lower radiator into place Install bolts Install fan belt

ENGINE FRONT COVER

1955-60 MODELS

FRONT OIL SEAL INSTALLATION Pry old seal out of front cover Install new seal so that open end of seal is toward inside of cover and drive it into position with Oil Seal Driver J-0995 *CAUTION - Support cover at sealing area while installing seal.*

CAMSHAFT & BEARINGS

1960 MODELS

CAMSHAFT LOBE LIFT (All Eng): Remove rocker arm shaft and support assembly (6 Cyl) rocker arms and balls (V8) On 6 Cyl Eng install 3/8" 24 16 Stud Adapter from Tool J-8520 in rocker shaft support hole On all engines attach Tool J-8520 to adapter or stud and adjust dial indicator to seal in pushrod cup *NOTE - Be sure pushrod is seated in lifter socket* Rotate crankshaft slowly (clockwise) until lifter is on heel of cam lobe (pushrod will be in its lowest position) Set dial indicator to Zero and slowly "BUMP" engine over until pushrod is in **FULLY** raised position Compare total lift on dial indicator with Specifications in "CAMSHAFT-WEAR LIMIT" table below *NOTE Continue to rotate engine until indicator reads Zero for accuracy check on dial indicator*

Camshaft Lobe Lift & Wear Limit

	Intake Lift		Exhaust Lift	
Engine	① New	② Worn	① New	② Worn
235" Pass	.222"	.217"	.222"	.217"
235" Trk	210"	.203"	.225"	.218"
261" Trk.	.274"	.269"	.280"	.273"
283" ③⑤	222"	217"	.222"	.217"
283" ④⑤	.266"	261"	266"	.261"
283" ⑥	263"	258"	267"	.262"
348" ⑤	.229"	224"	235"	230"
348" ⑥	232"	227"	.235"	230"

① - Plus or Minus 002" ② - Plus 003", Minus .002"
③ - Pass Cars with 2-Bbl. Carb.
④ - Pass Cars (Exc 2-Bbl Carb.), Corvette & Trucks
⑤ - With Hyd. Lifters. ⑥ - With Mech. Lifters

1955-60 6 CYL. MODELS

CAMSHAFT REMOVAL & INSTALLATION: Remove rocker arm and pushrod covers. Remove rocker shaft assembly, pushrods and valve lifters. Remove timing gear cover attaching screws and two bolts that are installed from back through front main bearing cap, remove cover and gasket. Pull crankshaft gear with Puller T-126-R. Remove two camshaft thrust plate screws by working through holes in camshaft gear. Remove camshaft and gear assembly by pulling it through front of block *(CAUTION* - Support shaft carefully to avoid damage to camshaft bearings). To install camshaft, reverse removal procedures.

6 CYL. CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Install No. 1 and No. 2 bearings first, then rear two bearings. *(CAUTION* —Align oil holes in bearings with oil holes in block before pulling into place), Install plug flush to 1/32" deep from clutch housing face of case.

1955-58 V8 MODELS

CAMSHAFT REMOVAL & INSTALLATION: Remove rocker arm covers and intake manifold. Back off rocker arm nuts until arms may be pivoted away from pushrods. Remove pushrods and valve lifters *(NOTE* - Place or mark lifters and rods so that they may be reinstalled in their original positions). Remove fuel pump. Remove two adapter mounting bolts and lockwashers and remove fuel pump adapter and gasket from block. Remove pushrod. Remove grille assembly. Drain radiator, disconnect hoses. With Powerglide, disconnect oil cooler radiator lines from core. Remove radiator core-to-core support bolts and remove radiator core. Note spacer shims removed, if any. Remove fan belt, fan and pulley. Remove harmonic balancer with Puller J-1287-B. Remove oil pan and heater hose from water pump if so equipped. Remove water pump, then remove front end cover and gaskets. Crank engine until "O" marks on camshaft and crankshaft sprockets are in alignment. Remove three camshaft sprocket-to-camshaft bolts. Remove camshaft sprocket and timing chain together *(NOTE* - Sprocket is a light press fit on camshaft for approximately 1/8". If sprocket does not come off easily, a light blow with a plastic-faced hammer on lower edge should dislodge the sprocket). Install two 5/16"-18 x 4" bolts in two of camshaft bolt holes. Remove camshaft from engine. *(CAUTION* - Camshaft journals are of same diameter and care must be exercised to avoid damage to bearings). To install camshaft, reverse removal procedures.

1959-60 V8 MODELS

CAMSHAFT REMOVAL & INSTALLATION: 1) Drain radiator, remove outlet and inlet hoses On Auto Trans models, remove oil cooler lines from radiator and plug lines and fittings Remove attaching bolts and lift radiator straight up to remove

2) Remove air cleaner, disconnect throttle rod at carburetor (On Auto Trans models, disconnect lower transmission throttle lever rod) Disconnect fuel, vacuum, and choke lines at carburetor coil primary wires, and coil to distributor secondary wires Remove distributor

3) On overdrive models, disconnect kickdown switch wires at switch

4) Remove spark plugs, water and heater hoses, and temperature indicator unit from intake manifold Remove intake manifold

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5) Remove fan belt, exhaust manifold to exhaust crossover pipe stud nuts and lower crossover pipe. Remove exhaust manifold heat control valve from right exhaust manifold.

6) Disconnect generator wires, remove exhaust manifolds, choke heat tube and remove rocker arm covers.

7) Loosen rocker arm nuts, pivot rocker arms and remove pushrods and valve lifters. *NOTE* **- Pushrod seats on solid lifters should remain with lifters.**

8) Remove fuel pump lines at fuel pump, pump mounting bolts, fuel pump, fuel pump pushrod adapter bolts. adapter and pushrod.

9) Remove bumper, grille-to-fender tie bar screws, grille-to-fender screw and screw and bolt at front end of grille. From under fender, remove grille bracket to fender filler panel screw and fender and filler panel to grille screw.

10) Remove grille filler panel-to-grille clips, hood lock plate-to-grille support assembly, and fender tie bar bolts.

11) From under fender, remove tie bar-to-fender skirt bolts and front bolts at tie bar, then loosen rear bolt at each side. Rack tie bar backward to clear top of grille. Lift grille assembly to clear tabs at fillerpanel, unplug electrical connections and remove grille.

12) Remove vibration dampener (see *"Vibration Dampner Removal"***), timing chain cover, timing chain and sprocket. Install two bolts, 5/16"-18 x 4", in camshaft bolt holes and remove camshaft.** *NOTE* **- All camshaft bearings are the same diameter. Use care to avoid damage to bearings.**

V8 CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Remove bearing nearest center of block first, then No. 2 and No. 4 bearings, and finally front and rear bearings (with this sequence minimum number of turns are required to locate Remover & Replacer for removal of next bearing). When installing, install No. 1 or front bearing first. This bearing will act as guide for tool and center the No. 2 and No. 3 bearings being pulled into place. (*CAUTION*–Use care when installing rear bearing due to smaller size of oil pressure holes in rear bearing. When installing end plug, install flush to 1/32" deep to maintain level surface on rear of cylinder block).

TIMING GEARS

1955-60 6 CYL. MODELS

REPLACEMENT TIMING GEARS: Fibre type camshaft gear and steel crankshaft gear used on passenger cars. Aluminum camshaft gear and steel crankshaft gear used on some trucks.

1955-60 6 CYL. MODELS

TIMING GEAR INSTALLATION: Gears are press fit on crankshaft and camshaft and must be removed and installed as follows:

Crankshaft Gear - To remove gear, use Puller T-126-R or J-8105 and pull gear off. When installing gear, make certain that two woodruff keys are installed in crankshaft keyways, drive gear on shaft until it seats against shaft shoulder.

Camshaft Gear–To remove gear, install Gear Remover J-971 on shaft in back of gear (remover consists of support sleeve), place camshaft assembly in arbor press (*CAUTION*–Thrust plate must be positioned so that it will not be damaged by woodruff key in shaft as shaft pressed out), press shaft out of gear. To install gear, place shaft in arbor press (support shaft securely directly back of front bearing journal), install gear spacer ring and thrust plate over end of shaft, and install woodruff key in shaft keyway. Install camshaft gear and press it on shaft until it bottoms against the gear spacer ring. End clearance of thrust plate should be .001" to .005". Install camshaft assembly in engine block, being careful not to damage bearings or cams. With crankshaft installed turn camshaft and crankshaft so that valve timing marks on gear teeth will line up, then push camshaft into position. Install camshaft thrust plate-to-block screws and tighten securely. Camshaft and crankshaft gear runout should not exceed .004" for camshaft and .003" for crankshaft. Backlash between timing gear teeth should not be less than .004" nor more than .006". *CAUTION*–Press on hub only when installing camshaft gear.

TIMING CHAIN

V8 MODELS

TIMING CHAIN: Removal–Remove vibration dampener, timing chain cover, and oil slinger. Rotate engine until timing marks on sprockets are in alignment and adjacent. Remove three camshaft sprocket screws and remove camshaft sprocket and chain together.

Installation: Install chain on camshaft sprocket. Hold sprocket vertical with chain hanging below, and line up 'O' timing marks on both sprockets so they are adjacent and in line with a straight edge across shaft centers. Align dowel in camshaft with dowel hole in sprocket and install sprocket on camshaft. Draw camshaft sprocket onto shaft using the three mounting bolts. Tighten to 15-20 ft. lbs. *CAUTION–Do not attempt to drive sprocket onto shaft as welch plug at rear of engine can be dislodged.*

VALVE SYSTEM

1954 6 CYL. MODELS

►*FIRST 1954 POWERGLIDE ENGINE VALVE "SQUAWK" CORRECTION:* To provide additional lubrication of valve stems at rocker arm and in guide, drill additional holes in rocker arms as follows. *CAUTION*–Other methods of correcting this squawk (grooving arms, revolving seals, reaming guides, etc.) should not be used as they cause other adverse conditions and excessive oil consumption.

Drilling Intake Rocker Arms–Drill additional 7/64" hole in rib on top of rocker arm at point 5/16" toward valve end of arm from present oil hole. Drill this hole **directly into oil groove** in rocker arm bore.

Drilling Exhaust Rocker Arms–Drill additional 7/64" hole in wide side of rocker arm bearing boss 13/16" toward valve end from present oil hole and 5/16" in from edge of wide side of bearing boss. Drill this hole at an angle so that it enters rocker arm bore on valve side of bore center line. *CAUTION*–This hole **must not break into oil groove** in rocker arm bore.

NOTE–Remove all burrs from rocker arm bore. **Do not** plug original oil holes in rocker arms.

1954-55 TRUCKS

VALVE ROTATORS: Standard on all 1955 - 5000 & 6000 Series Trucks. Rotators can be installed on present valves. *CAUTION - Valve Spring Height should be checked when rotators installed.*

VALVE TAPPET ADJUSTMENT

ALL MODELS
WITH MECHANICAL LIFTERS

ENGINE NORMALIZING PROCEDURE (For Valve Tappet Clearance Adjustment): Clearance changes while engine is warming up. Adjust only after engine has been 'normalized' as follows: Run engine at 600 RPM and check oil temperature with thermometer at overflow pipe on valve rocker arm shaft connector until no change noted in oil temperature for a period of five minutes (oil temperature will become stabilized at some point between 150° and 225°F). This normalizing period will be from 5 to 30 minutes depending on engine temperature when started.

ALL MODELS
WITH HYDRAULIC LIFTERS

INITIAL ADJUSTMENT HYDRAULIC VALVE LIFTERS: ***(Required when cylinder head has been removed or rocker arm or valve assemblies have been replaced).***

6 Cylinder Engines: The hydraulic lifters must be at the lowest point of travel when adjusted (piston in firing position). Remove distributor cap and turn engine until rotor is in firing position (points just breaking) for cylinder being set. Starting with #1 cylinder, turn valve adjusting screw down until rocker arm just contacts valve. This can be determined by checking push rod side play at adjusting screw end while turning the adjusting screw. At the point where no side play can be felt, continue turning the adjusting screw down 1-1/2 turns and tighten lock nut securely. Adjust each cylinder following the same sequence as the firing order (1-5-3-6-2-4).

V8 Engines: With No. 1 Cyl. at TDC firing position, adjust Exhaust valves 1-3-4-8, intake valves 1-2-5-7 by backing off the adjusting nut on rocker arm until there is play in valve push rod, then tighten adjusting nut to just remove all push rod-to-rocker arm clearance, **then tighten adjusting nut an additional 3/4 turn** to place hydraulic lifter in center of its travel. Crank engine one revolution so that #6 cylinder is in firing position, and then proceeding as above, adjust Exhaust valves 2-5-6-7, and Intake valves 3-4-6-8.

VALVE STEM SEALS
6 CYL. ENGINES

VALVE STEM OIL SEAL INSTALLATION: Seal consists of synthetic rubber ring installed in second groove of valve stem directly under valve locks on all valves. When assembling valves, install seal as follows: Install valve spring and spring retainer on valve stem, compress spring until lower groove on valve stem is exposed, install seal in this groove (*CAUTION* - Seal must seat flat in groove and not be twisted). Install valve locks in upper groove in valve stem, relieve spring tension, check to see that seal is properly retained in spring retainer and that locks are engaged.

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V8 ENGINES

VALVE STEM OIL SEAL INSTALLATION (Exc. 1959 283" Eng.): Seal consists of "O" ring installed in second groove of valve stem directly under valve locks on all valves, and a cup shaped metal shield placed over outer end of valve spring under valve cap Install valve spring and damper, with closed coiled end against cylinder head and place shield over spring On trucks, place rotator in position (if used) Install cap, compress spring and install seal in lower groove on stem *NOTE*- Be sure seal is flat and not twisted in groove Install valve locks and release spring tension

VALVE STEM OIL SEAL INSTALLATION (1959 283" Eng.): *NOTE - Following procedure supersedes previous recommendations* Make a special tool of steel, brass of plastic bar stock 2 5" long with a 23/64" drill hole through center At one end of bar, enlarge hole to 705"± 003" diameter for a depth of 53"± 010" from end Enlarge this hole to 745"± 003" diameter for a depth of 15" from end Dip seal in engine oil, insert in installer and push onto valve guide until seal bottoms on top surface of guide Lower snap ring retains seal on guide

VALVE STEM GUIDES

ALL 6 CYL ENGINES

VALVE GUIDE REPLACEMENT Guides are press fit in head New guides should be finished reamed to inside diameter of 343" (Hand Reamer Tool J 4822)

Guide Removal - Press old guides out toward bottom of head using Tool J-267 or J 0267

Guide Installation - Use correct driver tool for each model as listed below and drive guides in from top of head until guide height above head is correct as shown Drivers have stop collars which correctly position guide Guide height can be checked with scale placed on cylinder head *CAUTION* On some models it will be necessary to use a shim under the driver or to press guide in further after driver is removed

Valve Guide Tools & Installed Height

	Intake Guide		Exhaust Guide	
Engine	Driver	Height	Driver	Height
235"(1954-55)	J-5599	15/16"	①	7/8"
261"(1954 55)	J 5598	1"	J 5599	15/16"
All(1956)	J-5598	1"	J-5599	15/16"
All (1957-60) ②	J-5599	1"	② J-5734	15/16"

① - Use either J-5598 or J-6599 to start guide, then press to indicated height (check with scale)

② - Use 1/16" shim under driver to secure correct guide height

ROCKER ARMS

1955-60 MODELS

ROCKER ARMS (6 CYL. ENGINES): Diamond bored and "granodized" (no bushings) and fit directly on rocker arm shafts. Different rocker arms used as follows:

Rocker Arm Identification (1959-60 6 Cyl. Rocker Arms)

Oil grooves 015" deep and offset from center with daub of light blue paint on top of web

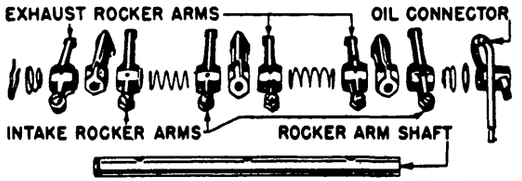
Position	Casting No.	Part No.
L H Intake	3764485	3764489
L H Exhaust	3764487	3764481
R H Intake	3764486	3764490
R H Exhaust	3764488	3764482

(1950-58 6 Cyl. Rocker Arms)

Oil grooves are 030" deep and are located at hub center Spot of light blue paint at vertical surface of rocker web (Casting prior to 1959) at top surface of web (1959 Casting)

Position	Casting No.	Part No.
L H Intake	3837025 or 3764485	3837029
L H Exhaust	3837027 or 3764487	3837031
R H Intake	3837026 or 3764486	3837030
R H Exhaust	3837028 or 3764488	3837032

NOTE - Castings prior to 1959 have last digit of casting number raised on web All 1959 castings have last two digits raised on web



CHEVROLET 6 CYL ROCKER ARM ASSEMBLY
(REAR ASSY. SHOWN—FRONT ASSY. SIMILAR)

Installation. Assemble rocker arms as indicated in illustration with open end of shaft toward center, and baffle in rear shaft open end in vertical position.

V8 MODELS

►*1957 ROCKER STUD REPLACEMENT NOTE* Replacement Rocker Studs now furnished for service are 2 50" long (shorter than 1956 studs which were 2.70" long) and must be installed with NEW Tool 6880 *CAUTION* - DO NOT attempt to install 1956 type stud (2 70" long) with Tool 6880 as stud will break through cylinder head.

ROCKER ARM STUD REPLACEMENT (V8 ENGINES): Oversize rocker arm studs available in 003" & 013" oversizes for service replacement Remove old stud by placing Spacer J-5802 on stud, installing nut and washer, and removing stud by turning nut Ream hole for oversize stud with Reamer J-5715 (003"), J-6036 (013") Coat press-fit area of stud with hypoid lubricant and install stud to correct height as follows On 1955-56 engines, 1¾" (Early Production "Low Boss" head), 1 41/64" (Later Production "High Boss" head) *See "Head Identification" & "Tool Rework" below* On 1957-60 engines, use NEW Tool 6880 to drive stud in head (tool will position stud to correct height of 1 36") *CAUTION - Use Tool 6880 only on 1957 and later type 2 50" long studs*

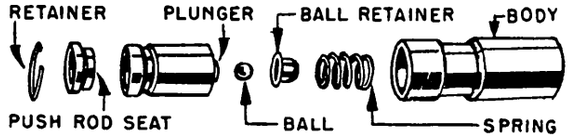
►*V8 CYLINDER HEAD IDENTIFICATION NOTE* "Low Boss" & "High Boss" heads may be identified by placing a straight edge across rocker cover gasket surfaces The low stud boss (early head) will be approximately flush with lower edge of scale while the high stud boss (later head) will be approximately 1/4" above lower edge of scale

►*STUD INSTALLER TOOL J-5801 REWORK (For installing Stud to 1-¾ "Height)* Grind 3/32" off bottom of tool When installing studs in "High Boss" (later type head) use Installer Tool J-5801 to drive stud in to the 1-3/4" height, after which studs will have to be pressed in further to the 1-41/64" height

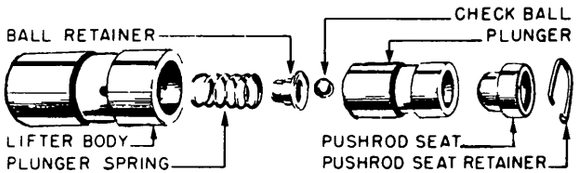
HYDRAULIC LIFTERS

ALL MODELS

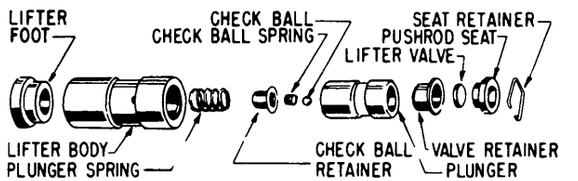
HYDRAULIC VALVE LIFTERS Barrel type, consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (see illustration) Oil is introduced to this unit through oil gallery in block



CHEVROLET 6 CYL HYDRAULIC VALVE LIFTER



1955-56 CHEVROLET V8 HYDRAULIC VALVE LIFTER



1957-60 CHEVROLET V8 HYDRAULIC VALVE LIFTER

Disassembly: Hold plunger down with a pushrod and using a small screwdriver or pointed awl, remove plunger retainer Remove pushrod seat (on 1957-60 V8 Lifters, remove inertia valve and inertia valve retainer) Remove plunger ball check valve ball retainer and retainer spring from lifter body On 1957-60 lifters, invert body inspect each part carefully for nicks, burrs, or wear Replace complete assembly if any parts are damaged

Reassembly: Invert plunger and set check valve ball into hole in plunger and place ball spring in ball retainer Locate spring and retainer on ball and press into position in plunger Place plunger spring over ball retainer and slide lifter body over spring and plunger Turn assembly over and install pushrod seat (and inertia valve assembly 1957-60 V8 lifters), in open end of plunger, then push plunger into body and install retainer Compress plunger to open holes and fill with SAE 10 oil Work plunger up and down and again refill

Installation: Reverse removal procedure

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OILING SYSTEM

235" ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod and camshaft bearings, lifters and rocker arms. Restricted oil pressure supplied to valve stems and pushrod sockets and timing gears. All other parts oiled by spray or mist from engine crankcase.

OPERATION: Gear type oil pump, mounted on crankcase (at right side) and driven by distributor drive shaft, draws oil from oil pan through a floating oil screen and delivers it by pipe to fitting on lower end of passage, leading to a horizontal oil gallery at left side of crankcase. Pressure regulator valve located in oil pump body. Oil is distributed from main oil gallery as follows:

Crankshaft & Camshaft B arings - An oil channel from main oil gallery through each crankcase web delivers oil to each crankshaft main bearing. A similar channel in opposite side of each web delivers oil from each crankshaft bearing to each camshaft bearing.

Conn cting R d Bearings - Crankshaft is drilled so that each connecting rod bearing is lubricated through passages from adjacent main bearing. Main bearings provide continuous flow of oil to connecting rod bearings.

Pistons & Pins - Oil spray is thrown on cylinder walls from an oil hole on left side of connecting rod when this hole registers with hole or passage in connecting rod journal.

Timing Chain & Sprockets - Oil from front camshaft bearing passes through a milled slot in rear surface of front engine plate and is directed by a nozzle at timing gears.

Lifter Oil Gallery - A horizontal lifter oil gallery, located directly above camshaft, receives oil from rear camshaft bearing (early cars) from both front and rear camshaft bearings (later cars). This gallery lubricates both mechanical and hydraulic valve lifters.

Rocker Arms, Pushrods, and Valve Stems - Oil from horizontal lifter gallery is delivered to rocker arms as follows:

1st Type - Prior to 1958, rear camshaft bearing delivered oil through passage in block to a pushrod chamber fitting directly above rear camshaft bearing. A formed pipe connected this fitting and a fitting at upper center of pushrod chamber and delivered oil through passage in upper cylinder block to a matching passage through cylinder head to a fitting on cylinder head.

2nd Type - In 1958, both front and rear camshaft bearings delivered oil through passage in block to lifter oil gallery. A vertical oil gallery from center of lifter gallery, with a 1/16" orifice restriction, delivered oil through a matching passage in cylinder head to fitting on cylinder head.

3rd Type - Same as 2nd type except orifice diameter increased to 11/32" for increased oil pressure.

All Types - Oil is delivered from fitting on cylinder head through a pipe to a connector between hollow rocker arm shafts, then to return passage in cylinder head and block to crankcase. Oil passes through holes in hollow rocker arm shafts to rocker arms where bleeder holes supply oil for valve stem and pushrod socket lubrication.

OIL FILTER: 235" Eng. - Optional partial flow type mounted on engine bracket.

261" Eng. (1959-60) - Full flow type mounted on intake manifold. Receives oil directly from passage in crankcase leading to main oil gallery and delivers it to main oil gallery. *NOTE* - When filter removed, connect inlet and outlet openings in crankcase with pipe and DO NOT plug openings at any time.

265" & 283" ENGINES

DESCRIPTION: Positive pressure lubrication is provided to all main, camshaft and connecting rod bearings and to all valve lifters and rocker arms. Three horizontal oil galleries are located in "V" at center of engine and distribute oil under pressure to all parts of engine.

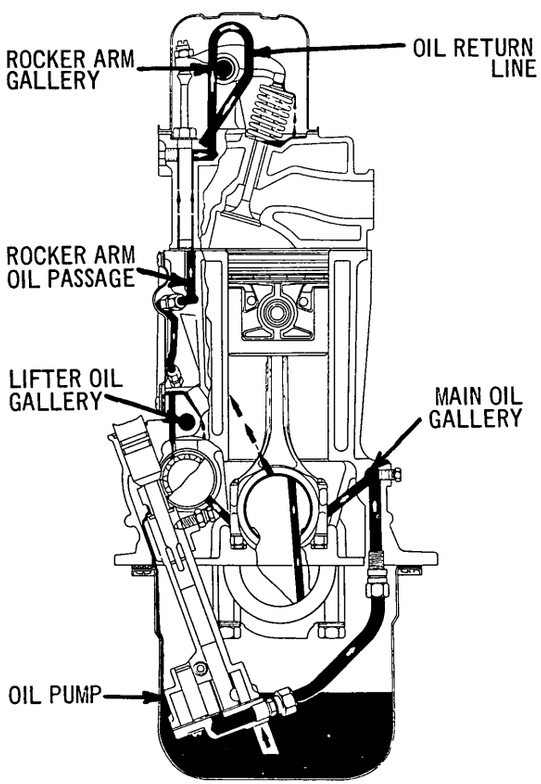
OPERATION: Gear type oil pump mounted on rear main bearing cap draws oil from engine oil pan sump through a meshed screen intake (with bypass valve at center of screen) and delivers it through rear main bearing cap to a vertical passage leading to main oil gallery. On 1956 and later engines, this vertical oil passage is rerouted through a full flow filter mounting pad at left side of crankcase. Bypass valve is located between filter and mounting pad. Oil distribution from main oil gallery is as follows:

Crankshaft & Camshaft Bearings - An oil passage from vertical oil passage supplies oil to rear main bearing. Oil passages from main oil gallery supply oil to each camshaft bearing and to all except the rear main bearing.

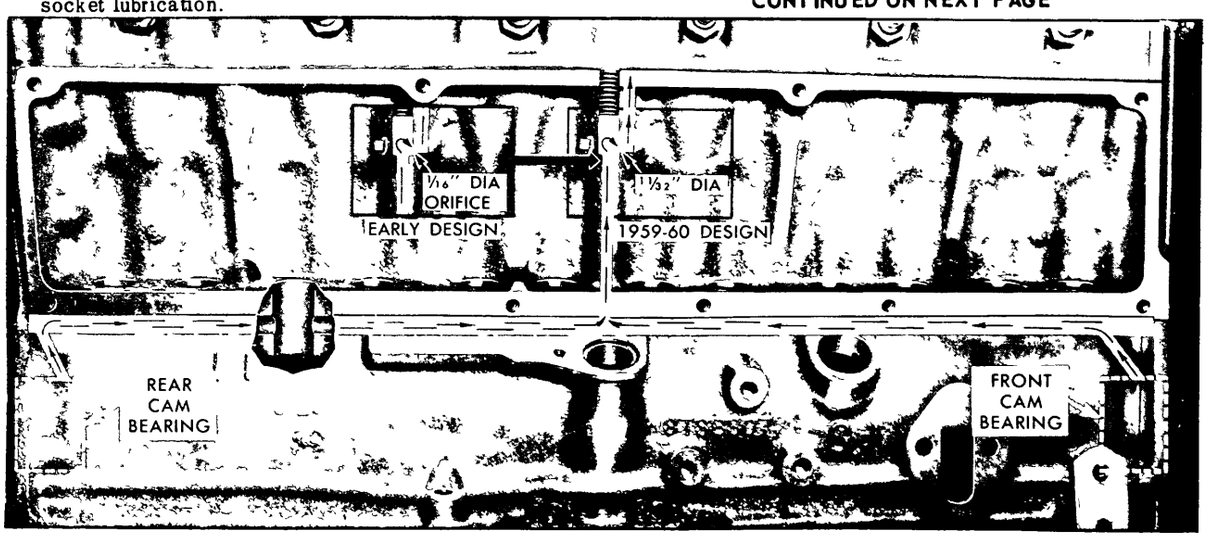
Connecting Rods & Pistons - Oil is delivered from each main bearing to adjacent connecting rod bearing through drilled passages in crankshaft. A hole in connecting rod sprays oil onto cylinder walls, for piston and piston pin lubrication, when hole in rod matches hole in connecting rod journal.

Valve Lifters - Oil passage from rear camshaft bearing supplies oil to lifter oil galleries. Both mechanical and hydraulic valve lifters intersect the gallery. A

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6 CYL. ENGINE OILING SYSTEM



6 CYL. LIFTER OIL GALLERY & ROCKER ARM OIL PASSAGE

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recess in mechanical lifter permits oil to pass into lower end of pushrod A larger passage in rear camshaft bearing permits more oil pressure for lubrication of hydraulic lifters Hydraulic lifters contain an inertia valve which opens permitting oil to pass to hollow pushrods

Rocker Arms & Valve Stems - Oil passes up through hollow pushrods to a hole in upper end that matches hole in rocker arm Oil sprayed out this hole and across rocker arm lubricates valve stem tip

OIL FILTER: Two types used as follows

1955 265" Engine - Optional partial flow type mounted on bracket adjacent to water outlet

1956, 57 265"; 1957-60 283" Eng. - Full flow type mounted on left side of crankcase Receives oil direct from oil passage from oil pump and delivers it back to vertical oil passage Bypass valve located between filter and mounting pad

348" ENGINE

DESCRIPTION: 348" engine lubrication system is the same as for the 265" & 283" engine except for the following The oil pump delivers oil through passage in rear main bearing cap to a filter mounting pad at left side of engine A passage from filter pad leads to a horizontal main oil gallery running full length of engine Oil from this main gallery is delivered through diagonal passages to vertical passages leading up to camshaft and down to crankshaft bearings

OIL FILTER: Full flow type mounted in recess on left lower side of crankcase with bypass valve located in recess Receives oil through direct passage in bearing cap and crankcase and delivers it through passage to main oil gallery

OIL PUMP

6 CYL. MODELS

►*1955 6 CYLINDER ENGINE OIL PUMP SUCTION PIPE PRODUCTION CHANGE & REPLACEMENT ON EARLIER MODELS (To prevent loss of oil pump prime at oil change)·* The new pipe Part No 3836768 is bent in such a manner as to trap oil and prevent draining oil pump Pipe can be installed on earlier engines Tighten pipe in pump cover until lower end of pipe is 7 1/8" below pan gasket surface on block Check pipe for clearance at side of oil pan

6 CYL. OIL PUMP (Removal & Installation): Drain oil, remove oil pan and disconnect oil pump-to-block oil line Remove oil pump retaining sleeve lock screw and remove oil pump and oil pump-to-block oil line Remove pressure oil line from pump and remove pump cover attaching screws, cover, gasket, idler gear and drive gear and shaft Remove regulator valve pin and valve parts On 1954-55 models, remove floating intake screen from pipe by bending tang on float travel control and sliding assembly off pipe *CAUTION - Do not disturb pick-up pipe as this pipe is located at assembly* and controls float level travel On 1956-60 models, remove intake pipe and fixed screen as an assembly. Wash all parts in solvent and inspect pump body for cracks or excessive wear Check shaft for looseness in housing and gear and cover for wear

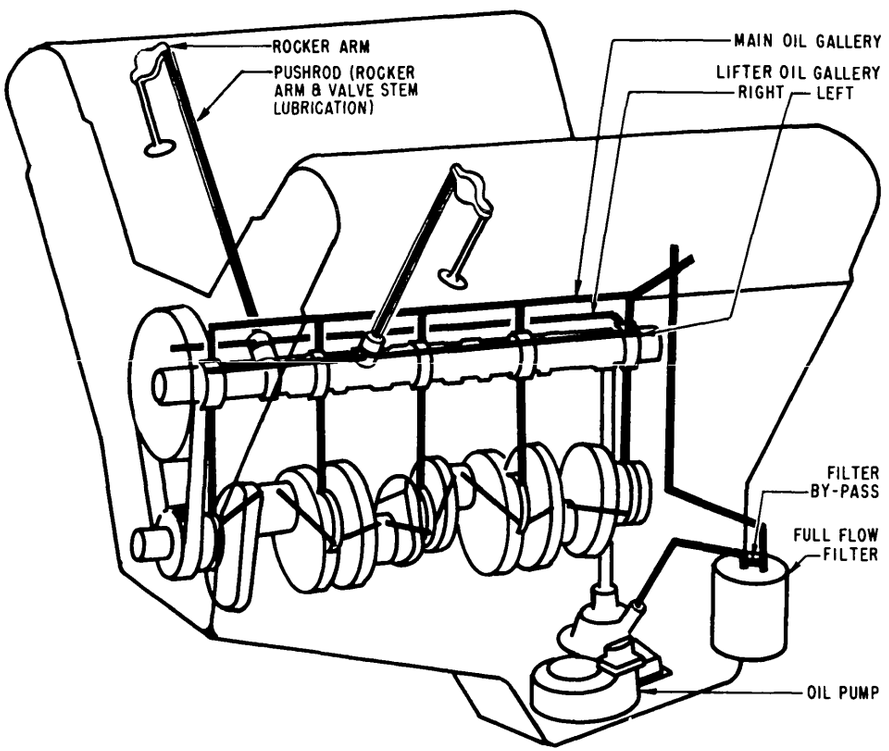
Assembly: Install drive gear and shaft in body Install idler gear with smooth side toward cover Install cover and new gasket Tighten screws securely and check to see that shaft turns freely Install regulator valve plunger, spring, retainer and pin Install oil line to pump body loosely

Installation Install pump in block and align oil lines and install retaining sleeve lock screw and tighten securely *(CAUTION*–Make sure tapered end of lock screw draws down into hole in oil pump body) Tighten oil pump-to-block oil line and pump-to-screen oil line connector nuts securely Replace pump screen

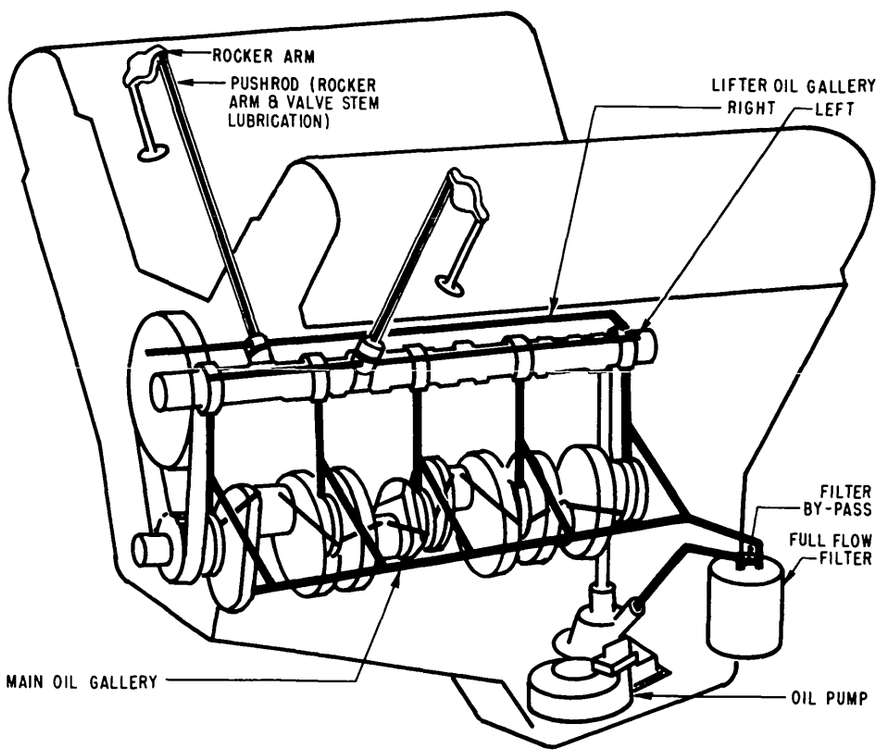
V8 MODELS

V8 OIL PUMP (Removal & Disassembly): Drain oil, remove oil pan, pump-to-rear main bearing cap bolt and remove pump Remove extension shaft clip and extension shaft collar On 1955-56 models, remove floating intake screen from pipe by bending tang on float

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265" & 283" V8 ENGINE OILING SYSTEM



348" V8 ENGINE OILING SYSTEM

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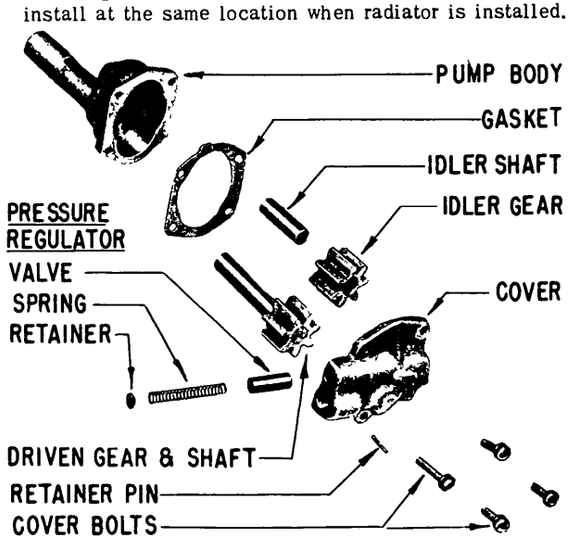
control and sliding float assembly off pipe. On 1957 and later models do not disturb pick-up pipe as this pipe is located at assembly and controls float level travel. If removed, pick-up pipe should be installed with pick-up screen horizontal and toward bottom of oil pan. Remove pump cover attaching screws, cover, idler gear, and drive gear and shaftl Wash all parts in solvent and inspect all parts for cracks, burrs or excessive wear.

Ass mbly: Place drive gear and shaft in pump body and install idler gear so that smooth side of gear will be toward cover. Install cover and attaching screws. Tighten screws to 6-9 ft. lbs. and check to see that shaft turns freely. On 1955-56 models, install pick-up screen on pipe and bend float travel control tang back in place. Assemble collar end of extension shaft assembly over pump drive shaft aligning tang on extension shaft with slot in end of pump drive shaft. Install retaining clip with flat end of clip in groove of pump drive shaft.

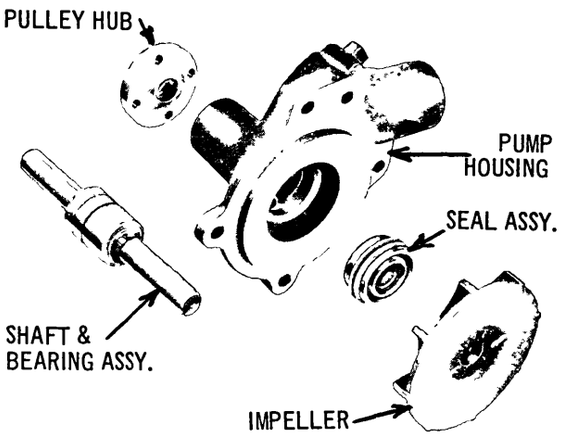
Installation; Assemble pump and extension shaft to rear main bearing cap, aligning slot at top end of extension shaft with drive tang on lower end of distributor drive shaft. Install pump to rear main bearing cap bolt and tighten to 45-50 ft. lbs. Install oil pan.

COOLING SYSTEM
1955-56 PASS. CARS

RADIATOR REMOVAL (Passenger Cars): Drain radiator and remove radiator hoses. On models equipped with Powerglide transmission, remove oil cooler lines from radiator and plug lines and radiator fittings. Remove radiator core to radiator support bolts and lift radiator core straight up to remove. *NOTE*–When removing radiator note the shims at support bolts and install at the same location when radiator is installed.



CHEVROLET 6 CYL. OIL PUMP



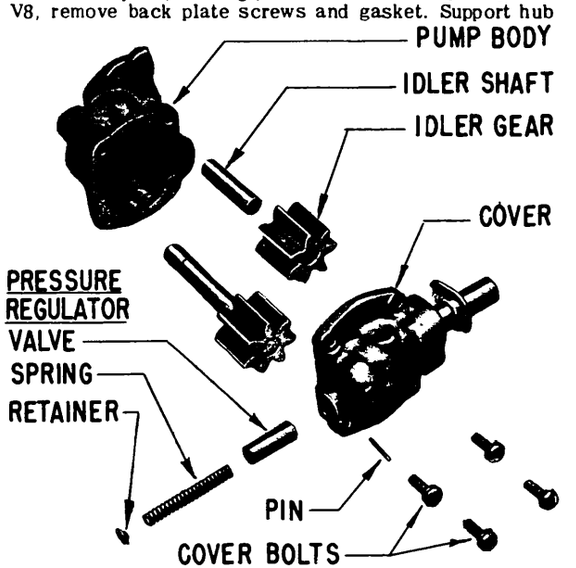
CHEVROLET 6 CYL. WATER PUMP

►*POWERGLIDE OIL COOLER CAUTION:* If foreign matter of any kind is allowed to enter cooler, the core should be cleaned with an air stream and flushed thoroughly with automatic transmission oil. Serious damage will be done to transmission if dirt or foreign matter remains in cooler.

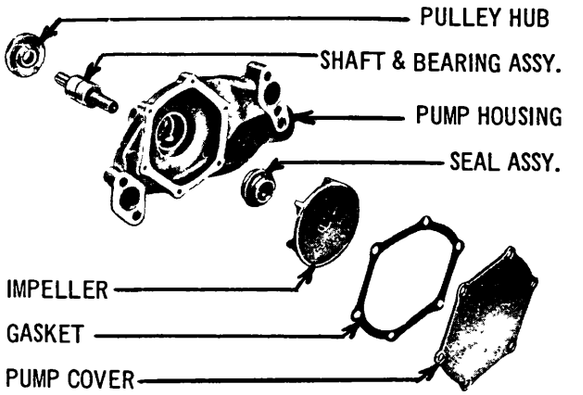
WATER PUMP

WATER PUMP REMOVAL: (All Eng.) Drain radiator, remove water inlet hose and heater hose from pump housing. Remove water pump to cylinder block bolts and remove pump from engine. *NOTE* - On 6 Cyl. engine, pull pump straight out of block to avoid damage to impeller and shaft.

Disassembly - (All Eng.) Remove fan and pulley. On V8, remove back plate screws and gasket. Support hub



CHEVROLET V8 OIL PUMP



CHEVROLET V8 WATER PUMP

in press and force shaft out of hub (use ½" x 2" pin). Support pump in press (use blocks under housing) and press shaft and impeller out of pump. *NOTE - Apply pressure on outer race of bearing only.* Place Tool J-5855 in press, support impeller on seal surface and press shaft out of impeller with ½" x 2" pin. Discard old seal.

Reassembly - 1) On 235", 261", 283" Eng., install shaft and bearing assembly into pump body (from front side) until bearing is flush with front of pump body. **On 348" Eng.,** install shaft and bearing assembly into pump body (from rear side) until bearing is flush with front of pump body. *CAUTION - Apply pressure to out r race of bearing only.*

2) Coat outer diameter of seal with sealing compound and press on outer flange with Tool J-5590 until seal bottoms with outer flange against pump body.

3) Press hub on shaft using Tool J-5775 (235", 261" and 283"), Tool J-7034 (348") to locate hub on shaft to insure proper belt alignment.

4) To check position of hub, place straightedge across front face of hub and insert correct tool (from rear) into one bolt hole. Straightedge should lightly contact short step on Tool J-5775(6 Cyl.), end of Tool J-5775 (283"), short step on Tool J-7034 (348") plus or minus .005".

5) Support pump on hub and install impeller. *NOTE - Clearance between vanes and pump body should be .010-.035". Bend feeler gauge to check 348".* Install cover and gasket, tightening screws diagonally. Install pulley and fan.

Installation - Reverse removal procedure using new gasket between pump and cylinder block. Adjust fan belt and radiator core. Core or shroud minimum clearance with fan should be 5/8-3/4".

CLUTCH NOTES
1959-60 MODELS

CORVETTE FAST CLUTCH RELEASE ACTION (Lo Pedal) CONVERSION: 1) Wedge a wood block between cross shaft levers and toe pan at lower end of pushrod to prevent return spring from rotating levers while linkage disengaged.

2) Disconnect pushrod at both ends and rotate rod 180° on its axis (bend will be reversed when reassembled).

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3) Loosen pushrod bracket bolt at lower slotted position and remove upper bolt.

4) Rotate bracket rearward until unused bracket hole aligns with upper hole in pedal arm and install bracket bolt, lockwasher and nut then tighten both pedal arm bolts.

5) Place special thick washer on short pushrod shaft of bracket, install pushrod (previously rotated). Bushing must be installed at rod lower attachment. Secure upper end of pushrod with clip and lower end with bolt, washer and nut

6) Loosen bumper pad bolt, rotate bumper to align pad with contacting edge of pushrod bracket. Tighten bumper bolt. Check linkage operation, adjust return spring tension to 6-9 lbs. Relieve any bind at dash seal.

PROPELLER SHAFT NOTES

1958-60 PASSENGER CARS

PROPELLER SHAFT: New double tubular propellor shaft with three exposed universal joints (lubricated at assembly). A center bearing support attached to frame X member just forward of center universal joint. Remove propeller shaft assembly by removing two bolts attaching center bearing support to X member, splitting rear universal joint and withdrawing assembly by movingit rearward and to the left under axle housing.

UNIVERSAL JOINT ANGLE CHECK & ADJUSTMENT: Front Shaft Angle "A", Rear Shaft Angle "B", Pinion Shaft Angle "C" and Axle Height "D" must be within limits as shown in tables below. *NOTE* - Angles in tables are for maximum load conditions. If necessary for satisfactory results, Angles "A" and "C" may be increased ¼°. Angle "B" may be increased (Negative direction) ¼°.

Front Shaft Angle - Is relation of Engine Angle to Front Propeller Shaft Angle. Use Protractor on rocker arm cover and up against Front Propeller Shaft.

Rear Shaft Angle - Is relation of Front Propeller Shaft Angle to Rear Propeller Shaft Angle. Use Protractor up against both Propeller Shafts.

Pinion Shaft Angle - Is relation of Rear Propeller Shaft Angle to Pinion Shaft Angle. Use Protractor up against Rear Propeller Shaft and up against bottom machined surface of rear universal joint (Turn surface parallel to floor), for Pinion Shaft Angle.

Axle Height - Is vertical distance from axle housing to frame kick-up.

Checking Procedure - 1) Support car on tires, ramp or twin post hoist, not on frame hoist.

2) Measure Axle Height, place wood block (use length nearest to sizes shown in tables below), between axle housing and frame kick-up and secure frame down on blocks. On Air Suspension Cars (4¼" block), exhaust air from rear air springs by opening manual valve and repeatedly lifting rear of car so frame will settle down on blocks.

CAR LEVEL CAUTION - Do not disturb car level by leaning on fenders when taking engine angle or use different block heights on the two sides at rear axle housing.

3) Record reading of Front Shaft, Rear Shaft, and Pinion Shaft Angles.

4) Determine Angles "A", "B" and "C" by deducting second reading from first when both angles are up at front (may result in minus answer), or add first reading to second reading when first reading angle is up at front and second reading is up at **rear** (In case of Pinion Shaft Angle).

Corrections - 1) If front angle too large, insert shim under transmission support.

2) If rear angle is too small, remove shim from rear suspension upper control arm front attachment. *NOTE* - Alternate shim removal, never remove two shims from one side.

Optional Procedure - For correcting angles "A" and "C", loosen or remove frame center bearing support bolts (under center section) and insert transmission shims between frame section and the support inside driveshaft tunnel. *CAUTION* - Always recheck angles "A" and "B".

Vibration Note - If objectional vibration exists when joint angles are within specifications, readjust angle toward opposite limit (high toward low or low toward high limit).

1958 Coil Spring Suspension

Angle "A"	Angle "B"	Angle "C"	Height "D"
2½° to 3½° ①	½° to -1½° ②	2° to 3°	6 3/8" ±1/4"
2½° to 3½° ①	1° to -2° ③	2½° to 3½° ⑪	6 3/4" ±1/4"
2½° to 3½° ①	1½° to -2½°	2½° to 3½° ⑤	7 1/4" ±1/4"

1958 Air Ride Suspension

2½° to 3½° ①	1½° to 2½°	1° to 2°	4 1/4" ±1/4"

① - 2½ to 3½° desired. ② - Neg. ½° to Neg. 1° desired. ③ - Neg. 1° to Neg. 1½° desired. ⑪ - 2½° to 3° desired. ⑤ - 3° to 3½° desired.

1959 Coil Spring Suspension

Angle "A"	Angle "B"	Angle "C"	Height "D"
2½° to 3° ①	Neg. ½° to Neg. 1° ②	3½° to 4° ③	5¾" ±3/8"

1959 Air Ride Suspension

3¼° to 3¾° ④	¾° to 1¼° ⑤	2½° to 3° ⑥	4" ±3/8"

① - 2¾° desired. ② - Neg. ¾° desired. ③ - 3¾° desired. ④ - 3½° desired. ⑤ - 1° desired. ⑥ - 2¾° desired.

1960 Specifications

Angle "A"	Angle "B"	Angle "C"	Height "D"
Pos. 2½-3° ①	Neg. 1-1½° ②	Pos. 2¾-3¼° ③	6 1/4" ±3/8"

① - Pos. 2¾° desired. ② - Neg. 1¼° desired. ③ - Pos. 3° desired.

REAR AXLE NOTES

1954 MODELS

AXLE SHAFT (PASSENGER CARS): Installation. Assemble new oil deflector, gasket (with shellac or paint on both sides), line up extra hole (center of three closest together) with notch in hub flange in axle shaft (also oil pocket in oil deflector with this notch), insert six new bolts and peen into place in countersink around bolt holes in flange using special Peening Tool and Anvil so that these parts are riveted together. NOTE—Axle shafts are of unequal length, longer shaft used on right side.

Axle Shaft Note—Shafts unequal in length (right shaft longer). Part numbers are as follows:

1954 Passenger Cars

	Part No.	Length	Diam. ①
Left Shaft	3694755	28 1/2"	2 13/16"
Right Shaft	3694756	29 1/2"	2 13/16"

①—Diameter of flange pilot.

Endplay Adjustment—When installing shaft, select correct spacer block (see below) so that when installed on pinion shaft between inner ends of axle shafts, shaft endplay will be from a Free Fit to .014" maximum clearance.

Passenger Car Spacer Blocks

Part No.	Type & Size
597251	Narrow (1.012"
597254	Medium (1.0195" & 1.0295")
473603 ①	Wide (1.0345")

①—Marked by blue paint on rough side.

Above dimensions are measured across the ground surfaces and spacers should be installed with ground surface toward the axle shaft end. Medium spacer ground on all four sides and may be installed either way to secure the two different sizes.

1954 HALF-TON TRUCK

AXLE SHAFT (HALF-TON TRUCK): Shafts are heavier construction than Passenger Car type.

Installation—Assemble new oil deflector, gasket (coat both sides with heavy shellac or paint), line up extra hole (center hole of closely grouped three holes) with notch in hub flange on axle shaft (oil pocket in oil deflector should also be aligned with this notch), install six special bolts, forcing heads down to deflector, and peen shoulder on bolts into countersink around bolt holes in flange using Special Peening Tool and Anvil so that these parts are riveted together. Check endplay (below).

Axle Shaft Note—Shafts unequal in length (right shaft longer). Part numbers are as follows:

1954 Half-Ton Trucks

	Part No.	Length	Marking
Left Shaft	3694769	29 9/16"	"GM-769"
Right Shaft	3694770	30 9/16"	"GM-770"

Endplay Adjustment—When installing shaft, select correct spacer block (see below) so that with spacer installed on pinion shaft between inner ends of axle shafts, shaft endplay will be from a Free fit to .014" maximum clearance.

Axle Spacer (Trucks)—Two spacer blocks furnished which provide three sizes as follows:
Part No. 370217—Narrow (1.1485").
Part No. 372515—Wide (1.1575" & 1.1675").

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These dimensions are taken across ground surfaces. NOTE—Spacers should be installed with ground surface toward axle shaft end. Wide Spacers are ground on all four sides (giving two sizes listed).

1954 TRUCKS

Axle Shaft Removal (¾ & 1 Ton): Remove 8 capscrews and lockwashers in axle shaft flange, install two ½" x 13 screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

CAUTION—Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft. Grease at this point **will cause loosening of axle shaft flange capscrews.**

Axle Shaft Removal (1½ & 2 Ton): Shaft flange is splined in wheel hub (tight fit) and requires special puller for removal. Remove five capscrews and lockwashers in hub cap, remove hub cap and gasket. Assemble special adapter J-1436-8 on Rear Axle Shaft Bearing & Oil Seal Remover J-1436 (remove jaws), thread adapter into hole in axle shaft flange, pull axle shaft. NOTE—When re-installing shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

Axle Shaft Note—Shafts unequal length (right shaft longer) and may be identified by part number stamped on shaft or lengths as follows:

¾ & 1 Ton Truck

	Part No.	Length
Left Shaft	3680977	31 3/16"
Right Shaft	3680978	37 1/16"

1½ Ton Truck (Splined Shaft)

Left Shaft	3685191	34 3/32"
Right Shaft	3685192	40 15/32"

2 Ton & C-O-E (Splined Shaft)

Left Shaft (stamped 01)	3702201	36½"
Right Shaft (stamped 02)	3702202	41"

Wheel Bearing Adjustment: Remove wheels and axle shaft (see above). Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1 Ton), J-870 (1½ & 2 Ton) while turning hub by hand, then back nut off 45°, check for free turning, install adjusting nut lock (with lock tangs aligned with slots in adjusting nut), bend tang down into notch in adjusting nut, install locknut and tighten securely, bend tang of lock down into notch of locknut.

IGNITION NOTES

1955-57 265" V8 ENGINE

►*DISTRIBUTOR INSTALLATION CAUTION (TO INSURE VALVE SYSTEM LUBRICATION)* On this engine, a semi-circular groove in a boss at the lower end of the distributor housing channels engine oil from the main oil gallery to the right and left valve lifter oil galleries (this oil fills hydraulic lifters, lubricates lifters, and also lubricates rocker arm through hollow pushrods). To insure correct register of oil gallery holes and distributor groove, distributor must be installed as directed below. *CAUTION - INCORRECT DISTRIBUTOR INSTALLATION MAY CUT OFF OIL TO EITHER RIGHT OR LEFT LIFTER OIL GALLERY CAUSING NOISY LIFTER OPERATION AND LIFTER AND ROCKER ARM WEAR AND FAILURE*

Distributor Removal: Mark position of rotor arm on distributor housing and note position of distributor on block (see below) before removing distributor from engine

Distributor Installation: If crankshaft has not been turned while distributor out, rotate distributor shaft and rotor about 1/8 turn counterclockwise past mark previously made on housing, push distributor down in place in correct position on block (see below). Rotor should line up with mark on housing when gears are meshed **If crankshaft has been turned** while distributor out, turn crankshaft to firing position for No. 1 cylinder (front cylinder, left bank), then proceed with distributor installation as above.

►*DISTRIBUTOR INSTALLED POSITION:* With distributor correctly installed, distributor cap clips should be approximately at right angles to centerline of engine with vacuum spark control unit on right side and pointing forward. Alignment of oil holes in block and distributor groove can be checked by sighting down distributor mounting bore in block. Rear end of groove should register with hole at rear of mounting bore and with hole at front of mounting bore. **These holes must register with semi-circular groove in boss at lower end of distributor housing when distributor installed.** The hole on rear side of distributor mounting bore is the lead from main oil gallery (through rear camshaft bearing). *NOTE - If there is no oil supply to BOTH cylinder banks, check rear camshaft bearing as it may be burned out or turned in bearing bore.*

BRAKE NOTES

1955-56 PASS. CAR MODELS

SLOW POWER BRAKE PEDAL RETURN CORRECTION: When this condition is encountered, check the following points and correct as necessary.

Push Rod Lever Assembly—Power brake unit pushrod has been installed on the outboard side of lever assembly at pedal linkage. Correct by assembling on inboard side. Lubricate all linkage pivot points.

Power Brake Rubber Boot—Bellows or rubber boot may be gathered at front side of dash panel causing a bind on pushrod. Correct by pulling bellows through smaller hole in dash panel and mounting plate at same time power unit is being assembled to mounting plate.

Power Unit Valve Sleeve—Remove power unit from dash. Remove rubber boot from end plate of unit and squirt rubber lubricant (Ru-Glyde) between valve sleeve into which pushrod is assembled and the sleeve bore in valve assembly to lubricate "O" ring seal on valve sleeve.

MODEL IDENTIFICATION

Seri s	Serial Pr fix	Mdl
1500 ①	A	②ONE-FIFTY
2100	B	②③TWO-TEN
2400	C	②③BEL-AIR
1508	D	②SEDAN DELIVERY

①—Except Sedan Delivery.
②—CONVENTIONAL ENGINE (115 H.P.) Standard.
③—POWERGLIDE ENGINE (125 H.P.). Used when Powerglide option added.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post.

Starting Serial Number—001001 (at each plant), for all models except the Corvette.

►*SERIAL NUMBER NOTE—Serial Number (example B54F 001025) includes following identification data in sequence.*

Series ①	Year	Assy. Plant②	Serial No.
B	54	F	001025

①—See Model Designation above.
②—See Assembly Plant Designation below.

Assembly Plant Designation

A—Atlanta	**J**—Janesville	**O**—Oakland
B—Baltimore	**K**—Kansas City	**S**—St. Louis
F—Flint	**L**—Los Angeles	**T**—Tarrytown
		N—Norwood

ENGINE NUMBER: Stamped on right side of engine block to rear of distributor.

Starting Engine Number—0001001 (at each plant). Suffix letters and numerals indicate plant at which engine built ("F" for Flint, and "T" for Tonawanda), Model Year, and Model Type. See following for model type designation.

Engine	Suffix
Regular "235"	Z
Regular "235" (With H.D. Clutch)	ZC
Regular "235" (with aluminum cam gear)	ZH
Powerglide "235"	Y

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 5-10 lbs. at cranking speed.

VACUUM READING: *CAUTION—Vacuum reading on Standard transmission Cars and Powerglide Cars is different as follows:*

Standard Transmission Cars—17-21" at idling speed.

Powerglide Cars—At 500 RPM.—14.4" (with transmission in Drive Range). 16.7" (with transmission in Neutral). **At 450 RPM.** 14.5" (with transmission in Drive Range). 16.3" (with transmission in Neutral). *NOTE—Manifold vacuum reading at idle speed is lower than previous models because of "high lift" cam used.*

VALVE TAPPET CLEARANCE: (Pass. Cars & 3000 Series Trucks with Conv. Valve Lifters)—.006" Intake. .016" Exhaust.

Other Trucks—.006" Intake. .020" Exhaust.

►*POWERGLIDE ENGINE NOTE—Hydraulic valve lifters used in these models and adjustment required only when cylinder head removed or valve lifters replaced. See "Tappet Clearance Adjustment" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation when tuning engine. Should require ½ turn from unhooked to hooked position. *Distorted springs should be r placed.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4. See Diagram.

SPARK PLUG GAP: .035".

Spark Plug—AC No. 44-5. 14mm.

COIL: Delco-Remy 1115380.

Ignition Current—2.5 amperes idling. 4.5 stopped.

DISTRIBUTOR: Delco-Remy 1112388 (With Std. Trans.); Delco-Remy 1112396 (With Powerglide).

Condenser—Delco-Remy 1869704 (first type), Delco-Remy 1928111 (Second type with spade terminal).

Capacity—.18-.23 microfarad.

Contact Point Set—Delco-Remy 1924571.

Breaker Gap—.016-.021" (New points), .0125-.0175" (Used points).

Cam Angle—38-45° with .016" gap.

►*BREAKER GAP CAUTION—Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension—17-21 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center 'O' position.

Vacuum Spark Control: Delco-Remy 1116076

Plunger Travel—11/64"-15/64".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6"
7.5	15	7.5-10"

IGNITION TIMING

Setting—2° ATDC.

Timing Mark—Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on 'O'. Then adjust Octane Selector as follows:

Octane Selector Setting—Set for slight ping when accelerating with wide open throttle.

CARBURETOR

Model	Rochester No.
Standard Transmission	7005921
Powerglide	7005922

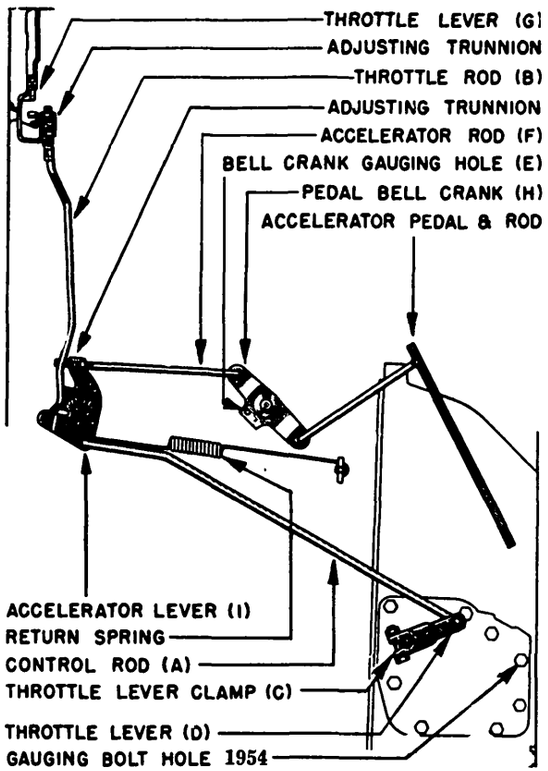
Downdraft types with automatic choke. Throttle Return Check used on Powerglide Models.

Idle Setting—1-2½ turns open.

Idle Speed (Synchro-mesh)—475 RPM.

Idle Speed (Powerglide)—425 RPM with Powerglide selector lever in 'D' position.

Float Level—Use Gauge No. 3696192. Invert bowl cover and float assembly **but do not remove gasket.** Place gauge in position over floats with gauge tang in discharge nozzle. Adjust each float vertically so they just touch top portion of gauge and bend float arms horizontally to center each float in gauge cut-out. Tilt assembly 90° to each side and see that floats do not



touch gauge. Check float drop or travel by turning cover right side up so that floats drop down. Distance from gasket on cover to bottom of each float must be 1¾". Adjust by bending tang at rear of float assembly.

►*CAUTION—Both floats must be set alike and must not be twisted out of alignment.*

Choke Adjustment: Index mark on cover aligned with long cast mark on top of choke housing casting.

Fast Idle: With idle adjusting screw on next to highest step of fast idle cam, Gauge J-5150 (.073") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.

Throttle Linkage Adjustment: *CAUTION - Engine must be at normal operating temperatur and transmission warm (choke valve wide open and fast idle inoperative with throttle stopscrew against low step of fast idl cam) when adjustments are made. Proceed as follows:*

1) Adjust engine speed to 425 RPM. with selector lever in "D" range (set hand brake firmly to hold car while making this adjustment).

2) Disconnect control rod (A) from transmission throttle lever (D). Remove the right side cover bolt from transmission (marked "Gauging Bolt Hole" in illustration). Hold clamp (C) back lightly against stop in transmission, install Throttle Lever Positioning Gauge J-5588 on lever with one gauge pin in hole on lever. If second gauge pin does not enter bolt hole in

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cover *(s "Gauging Bolt Hol " in Throttl Linkag illustration)*, loosen lever-to-clamp attaching bolt and position lever so that gauge pin enters hole freely. *(CAUTION* - Hold adjustment clamp (C) back against its stop while making this adjustment). Tighten lever-to-clamp bolt securely, remove gauge, replace cover bolt. Connect throttle rod (A) to lever.

3) Rotate engine bellcrank clockwise to set transmission lever (D) in full detent (this is wise open throttle position), and adjust trunnion on upper end of rod (B) to length required for free entry of swivel pin into throttle lever when throttle lever is held at wide open (upper position), tighten lower check nut securely and connect rod to throttle lever.

4) Install 3/16" gauge pin through gauging hole (E) in pedal bell crank (H) and through hole in bracket to lock bell crank. With throttle rod (B) held up so that throttle lever is against idle stop in carburetor, adjust trunnion on forward end of rod (F) until trunnion pin freely enters hole in accelerator lever (I) tighten trunnion check nuts securely and connect rod. Remove gauge pin from bell crank (H).

Thr ttl R turn Ch ck Adjustment (235" Powerglide Engin): Have engine at full operating temperature. Align throttle return check adjusting screw with contact arm on throttle lever by bending return check bracket. With parking brake set tight, place selector lever in 'D' range and adjust throttle stop screw and idle adjusting screw in combination with each other to obtain a smooth idle at 425 RPM, this adjustment should be made with choke valve in wide open position with throttle stop screw resting on low step of fast idle cam. Shut off engine. Close choke valve and position throttle stop screw on highest step of fast idle cam. Using a 9/32" wrench on the flat section of throttle return check shaft, hold shaft from turning, and with a 3/8" wrench turn the adjusting screw until it just contacts the throttle lever contact arm.

►*NOTE–If scr w projects more than ½" from shaft when head of screw just touch s lever contact arm, reposition throttle ch ck on manifold stud.*

►*OTHER DATA: See "Rochester B & BC" Carburetors in Carburetor Section.*

Fu l Pump Pr ssur –4 lbs. maximum.

CARB. EQUIPMENT

Fu l Pump: AC Diaphragm type.
R plac m nt Fu l Pump–AC No. 9798 (Fuel only), AC No. 9797 (Fuel & Vacuum).
Pr ssure–4 lbs. maximum.
See "Fuel Pumps" in Carburetion Equipment Section.
Gas lin Gauge: AC Electric.
Dash Unit–AC No. 1517598.
Tank Unit–AC No. 1517761.
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Delc –15AA6-W. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).
Batt ry Ground–Negative terminal.
Engin Ground–Engine to cowl at rear head bolt.

STARTER

►*POWERGLIDE CAR STARTER PRODUCTION CHANGE: In later 1954 production, a four coil starter motor replaced the two coil starter. See following for starter motor application.*

Model	Delco-Remy No.
All Std. Trans. & Early Powerglide	1107109
Later Powerglide Cars	1108035

Armature–Delco-Remy 1917855 (1107109, 1108035).
Drive–Overrunning clutch (solenoid pinion shift).
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–24-28 ozs.

Performance Data–1107109

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
12 ft. lbs.	Lock	3.25	550

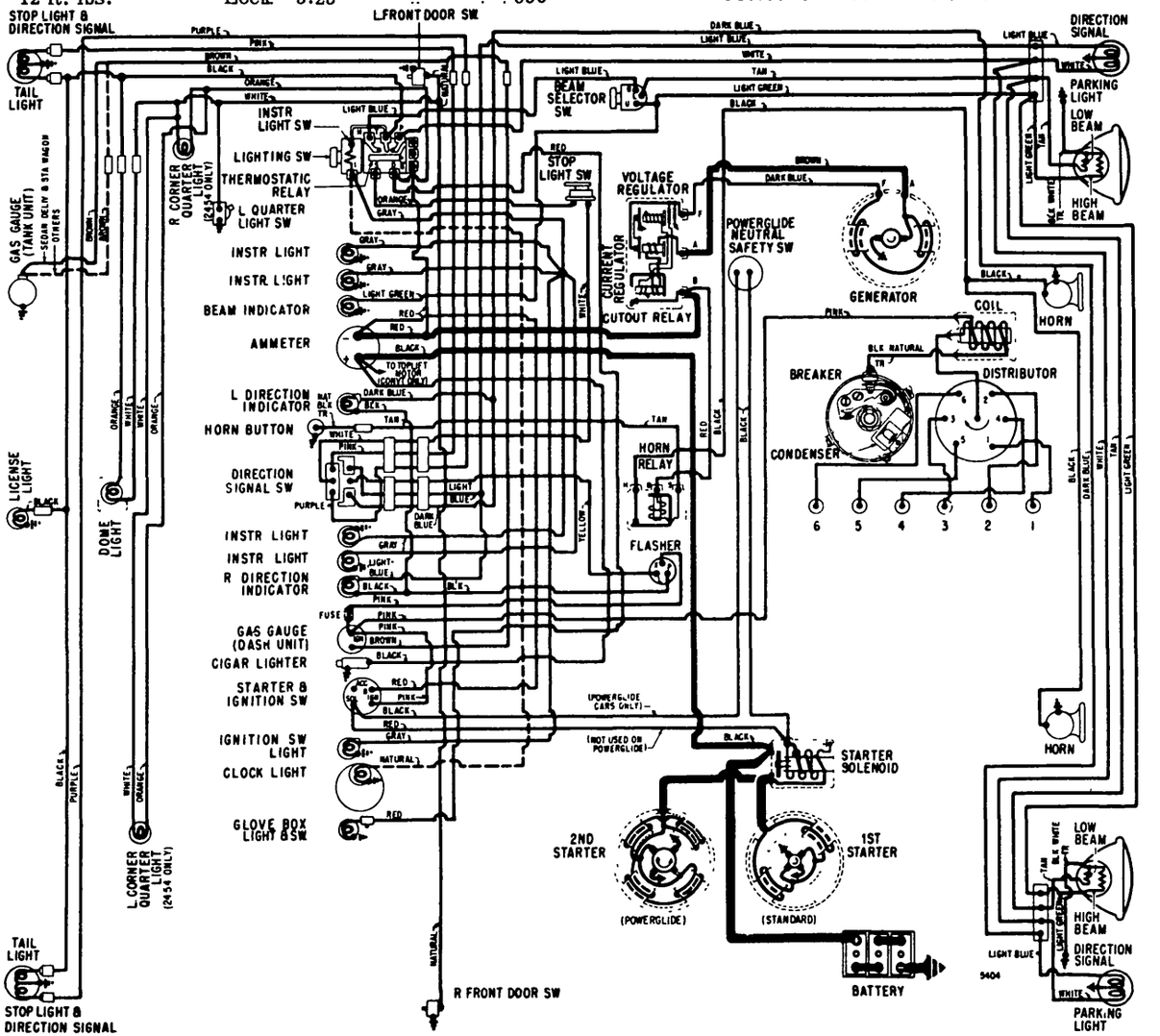
P rf rmanc Data–1108035

Torque	RPM	Volts	Amperes
0 ft. lbs.	6000	5.0	60
15 ft. lbs.	Lock	3.0	600

Starting Switch: Delco-Remy Solenoid Switch No. 1118135 mounted on starter and controlled by Ignition & Starter Switch No. 1116478. Turn key full RIGHT against spring tension to start.
See "Delco-Remy Starter Solenoid (Without Relay)" in Electrical Equipment Section.

Neutral Safety Switch: (Powerglide Cars only), Delco-Remy 1997845 (without Back-Up Light & Power Steering). Delco-Remy 1998040 (with Back-Up Light & Power Steering).

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Adjustm nt—*Se "Ch vrolet P w rglide" in Transmissi n S ction.*

GENERATOR

Delco-Remy. *CAUTION—Alternate wound (3½ turn) armature used on late production passenger cars. Correct regulator must be used with each model generator as indicated below.*

Model	Generator No.	Armature No.
Standard (Early)	1100018	1925348
Standard (Late)	1100028	①1929558
Taxi	1102793	1924893
State Police	1105008	1925556
City Police	1105009	1925630

①—Alternate wound (3½ turn) armature.

Performance Data

Generator	Amperes ①	Volts	RPM
1100018	45	8.0	3000
1100028	40	8.0	2850
1102793	45	8.0	2450
1105008	50	7.0	2100
1105009	40	7.0	1700

①—Not maximum output. See Current Regulator.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—28 ozs.

Field Current—1.87-2.0 amperes (1100018, 1100028, 1102793). 1.77-1.93 amperes (1105008, 1105009). All at 6.0 volts.

Belt Adjustment: 7/16-½" deflection with light pressure midway between generator and pump pulleys.

REGULATOR

Delco-Remy. *"1118825 SERIES" REGULATORS.*

Regulator No.	For Generator No.
1118827	1100018, 1102793
1118843	1100028
1118835	1105008
1118831	1105009

►*REGULATOR NOTE: Checking procedure for "1118825 Series" is different than for previous models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section. All specifications below are "Normal" settings.*

Cutout Relay (All Regulators)

Cuts In—6.4 volts (hot).

Contact Gap—.020".

Air Gap—.020" (with contacts just closed).

Voltage Regulator (All Regulators)

Setting—7.3 volts (hot).

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Regulator No.	Setting (hot)
1118827	27 amps.
1118843	42 amps.
1118835	52 amps.
1118831	42 amps.

Air Gap—.075" (with armature pressed down to point where contacts just touching).

Checking & Adjusting—*See El ctrical Equip. Secti n.*

MISC. ELECTRICAL

H adlamps: Sealed Beam. *See El ctrical Equip. Section.*

Autr nic Eye: *S "Autronic Ey " in El ctrical Equipment Section.*

Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*

Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) and pull shaft and knob out. Remove switch retaining nut and switch assembly.

Stop Light Switch Location (Manual Brakes): Mechanical type mounted on underside of toeboard and operated by brake pedal.

Stop Light Switch Location (Power Brakes): Pressure switch located in fitting at forward end of master cylinder.

FUSES: Located as indicated below.

Direction Signal—Fuse located on front side of instrument panel adjacent to gasoline gauge terminal.

Autronic Eye—14 amps. Located in Autronic Eye amplifier.

CIRCUIT BREAKER: 30 amperes. Located in lighting switch.

HORNS: Delco-Remy 1999681 (Low Note), 1999682 (High Note).

Horn Relay: Delco-Remy 1116775.

Contacts Close—2.75-4.0 volts (set to 3.5 volts).

Contact Gap—.027". **Air Gap**—.014" (closed).

ENGINE

►*TWO ENGINES USED ON PASSENGER CARS. Conventional 235" & Powerglide 235". See Passenger Car & Truck Model Identification for engine application.*

►*1954 235" (POWERGLIDE) & 261" (JOBMASTER) ENGINE ROCKER ARM PRODUCTION CHANGE: See "VALVES" (below) for rocker arm identification.*

►*NOTE—The following repair data applies to all Pass. Car & Truck Engines.*

ENGINE SPECIFICATIONS: Own 6 cylinder valve-in-head.

Bore—3 9/16". **Stroke**—3 15/16".

Displacement—235.5 cu. in. **Rated H.P.** 30.4.

Developed Horsepower—115 at 3700 RPM (Conventional). 125 at 4000 RPM (Powerglide).

Compression Ratio—7.4-1

Compression & Vacuum Reading—*See Tune-Up.*

ENGINE REMOVAL: *See Chevrolet Special Data.*

OIL PAN REMOVAL: Remove bolts attaching steering idler and third arm and bracket assembly to frame cross member and drop down. *CAUTION— Note number of shims between bracket and cross arm and replace this same amount at reassembly.*

ENGINE MOUNTINGS: *See Chevrolet Special Data.*

CYLINDER HEAD: *See Chevrolet Special Data.*

TIGHTENING TORQUES: *See Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with piston pin offset 5/64".

W ight—1.18 lbs. (235" Engine), 1.36 lbs. (261" Engine).

R moval—Pistons and rods removed from above.

Cl arance—.0005-.0011" at bottom of skirt, .0115-.0135" at top land. Selective fit.

R plac m nt Pistons: Furnished Std. Size & .020", .030", .040" oversize. *STANDARD SIZE PISTON NOTE*—Std. pistons furnished in four sizes with size stamp and size range as follows: **S4** (3.5625"-3.5630"), **S5** (3.5630"-3.5635"), **S6** (3.5635"-3.5640"), **S7** (3.5640"-3.5645").

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.

Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

PISTON PINS

Locked in rod. No bushing used in piston.

Di ameter—.8660-.8665" (exc. Jobmaster), .9270-.9275" (Jobmaster). **L ength**—3.198-3.228" (All).

Pin Fit in Piston—Thumb push fit (at room temp.). To check fit, with piston and pin at 70°F, apply light oil film to pin, insert pin vertically in n piston boss (one end of pin in either piston boss). Pin should hold own weight but should install easily with thumb pressure.

Replacement Pins: Furnished Std. .0015", .003", .005 oversize.

PISTON RINGS

Passeng r Cars

Ring	Width	End Gap	Sid Cl aranc
Compr. ①	3/32"	.007-.020"	.002-.0035"
Oil ②	3/16"		④

Trucks

Compr. ①	3/32"	007-.020"	002-.0035"
Oil ③	3/16"	⑤	.0015-.003"

①—Deep section, twist type. Top Ring on Loadmaster & Jobmaster engines is Chrome plated.

②—4-Piece type (Upper & Lower Rails, Steel Spacer, & Expander Spring behind rails and spacer)

③—Wide slot expander type Expander is flat spring (Thriftmaster), coil spring type (Loadmaster & Jobmaster—ring has semi-circular seat for spring).

④—Free fit to .010" maximum

⑤—.005-.015" (Thriftmaster), .010-.018" (Loadmaster & Jobmaster).

►*RING INSTALLATION CAUTION—Install compression rings with side marked "TOP" upward.*

Replacement Rings: Furnished Std. .005", .010", .020", .030", .040" oversize.

CONNECTING RODS

►*CONNECTING ROD REPLACEMENT CAUTION— Rods for 261" Jobmaster engine not int rchangeable with other engines. Casting No. 3701491 (Exc. 261" Engin), No. 3702448 (261" Engine).*

Length—6 13/16". **Weight**—31.76 ozs. (Exc. 261").

Crankpin Journal Diameter—2.311"-2.312", all engines.

Lower Bearing—Replaceable precision type.

Clearance—.0007-.0028". Not adjustable.

Sideplay—.005-.012" at lower end.

Replacement Bearings: Std. .001", .002", .010", .020" undersize.

Installing R ds: Numbers on rods and caps must be together and installed in same numbered cylinders with numbers and pin clamp bolt toward camshaft side.

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CRANKSHAFT

►*CAUTION–No. 1 (front) and No. 2 (front intermediate) bearings similar in appearance but must not be interchanged. No. 2 bearing marked by "T" in oil groove.*

Journal Diameters–(1) 2.6835" 2.6845" (2) 2.7145"-2.7155", (3) 2.7455"–2.7465", (4) 2.7765"-2.7775"

NOTE–Journal taper or out-of-round limits .001". Run-out Limits for Nos. 2 & 3 journals is .002"

Clearance– 0005" minimum .003"maximum (new bearings), Service limits 0005" min. 0045" maximum Adjustment below.

NOTE–Precision type bearings can be replaced singly.

Bearings–Steel backed thin wall babbitt.

Bearing Adjustment: Solid shims. Remove shims until light drag secured when shaft turned by hand, then replace .002" shim on one side for clearance (if unequal number of shims used, place extra shim on same side of all bearings).

Replacement Bearings: Furnished Std. .002", .010", .020", .030" undersize.

Bearing Installation: Not necessary to remove crankshaft or engine from car *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Bearing Cap Installation–No. 2 & No. 3 bearing caps marked for identification. Install No 2 cap with mark "FRONT" toward front of engine, No 3 cap with mark "REAR" toward rear of engine.

Crankshaft Oil Seal Servicing: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

End Thrust: Taken by No. 3 (rear intermediate) bearing To check endplay, force crankshaft to rear, check clearance at rear of No 3 bearing Adjust by replacing bearing. **Endplay**–.0035"- 0095"

Vibration Damper: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*CAMSHAFT CAUTION–Different camshafts used in Conventional and Powerglide engines (261" Truck engine uses same camshaft as used on Corvette). Early type Conventional engine camshaft is forged steel. Later Conventional engines and all Powerglide engines have a cast iron alloy camshaft and a cast iron alloy distributor drive gear*

Camshaft Part Numbers	Camshaft	Dist. Gear
235"Pass (Powerglide)	①3836045	②1929578
235"Pass. (Powerglide)	③3836386	②1929578
235"(Exc P.G.&Corvette)	④3836489	⑤1865180
235"(Exc. P.G.&Corvette)	⑥3713919	②1929578
235"Corvette	⑦3836484	②1929578
261"Truck	⑦3836484	②1929578
235"Truck (Early)	⑧3836490	⑤1865180

①–**Used on First 10,000 cars.** Identified by 7/16"wide cam lobes. NOTE–This camshaft not furnished for service replacement. See *"Camshaft No 3836045 Replacement Caution" below*

②–Cast Iron distributor gear identified by circular groove between teeth and rivet hole.

③–**Used after First 10,000 cars.** Identified by 9/16" wide cam lobes and **two large raised dots** between #5 & #6 inlet cams

④–**Used before 3-1-54 on Pass. Cars & Trucks** *(See "Early 1954 Truck Camshaft Caution" below)* Forged steel Identified by large journal, and No 3836366 forged on shaft. ⑤–Steel distributor gear

⑥–**Used after 3-1-54 on Pass. Cars & Trucks** *(See "Early 1954 Truck Camshaft Caution" below)* Cast iron. Identified by 9/16' wide cam lobes and **one large raised dot** between #5 & #6 inlet cams.

⑦–Cast iron. Identified by 9/16"cam lobes and **three large raised dots** between #5 & #6 inlet cams.

⑧–**Used on 15,000 Early 235" Truck engines.** Forged steel. Identified by 1/8"smaller journal than Camshaft No. 3836489. *See "Early 1954 Truck Camshaft Caution"*

►*CAMSHAFT NO. 3836045 REPLACEMENT CAUTION:* When replacing this camshaft with No. 3836386, connecting rods must be relieved approximately 1/16" by grinding rear side of lower end of connecting rod adjacent to bolt on camshaft side. This will allow connecting rod to clear larger (9/16") cam lobes.

►*EARLY 1954 TRUCK CAMSHAFT CAUTION:* Approximately 15,000 235" Truck engines were equipped in production with Camshaft No. 3836490, which have a smaller journal than later production.

Journal Diameters (Camshaft No. 3836490)–(1) 2.0282"-2.0292", (2) 1.9657-1.9667", (3) 1.9032-1.9042", (4) 1.8407-1.8417".

Journal Diameters (All Others)–(1) 2.1537-2.1547", (2) 2.0912-2.0922", (3) 2.0287-2.0297" (4) 1.9662-1.9672".

NOTE–Journal out-of-round limits .001". Run-out limits .002" (straighten if run-out excessive).

Bearing Type–Steel backed babbitt lined bushing.

Clearance– .002-.004" (Camshaft No. 3836490), .0015-.0035" (All Others)

End Thrust: Taken by thrust plate behind camshaft gear.

Endplay Adjustment–*See "Timing Gears" in Chevrolet Special Data.*

Endplay–Free fit to .003" maximum

Timing Gears: Fibre (Pass Cars. Exc. Corvette), Aluminum (Corvette and Trucks). Steel crankshaft gear.

Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*

Timing Gear Backlash–.003-.004".

Camshaft Setting: Gears punch marked. Punch marks on both gears must line up directly opposite each other.

VALVES

Tappet Clearance: (Pass Cars & 3000 Series Trucks with Conv. Valve Lifters)– .006" Intake. .016" Exhaust

Other Trucks: .006" Intake. .020" Exhaust.

►*EARLY POWERGLIDE ENGINE VALVE "SQUAWK" See "Valve System" in Chevrolet Special Data.*

►*NOTE "XCL" exhaust valves used in 235" Powerglide, H.D. Trk. & 261" Engine (stamped "XCL").*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 7/8"	3410-.3417"	6.364-6.394"
Exhaust	1 1/2"	①	4.902-4.932"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°②	④	.001-.0027"
Exhaust	45°③	⑤	⑥

①– .3400-.3407" (Pass Cars), .339-.3397" (Trucks)

②–Valve seat (Seat Angle in Block 31°)

③–Valve Seat (Seat Angle in Block 46°)

④– .294" (Conv. 235"), .400" (Powerglide 235"), .405" (Corvette & 261" Jobmaster).

⑤– .312" (Conv. 235"), .400" (Powerglide 235"), .414" (Corvette & 261" Jobmaster).

⑥– .002-.0037" (Pass. Cars), .003-.0047" (Trucks).

Valve Seat Width–3/64-1/16" (Intake), 1/16-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Precision type. Pressed in head.

Valve Guide Installation–*See "Valve System" in Chevrolet Special Data.*

Valve Springs: Install springs with closed coil end down.

Free Length–2 5/32" (Conv. 235"), 2 9/32" (Powerglide 235" & Jobmaster 261").

Spring Specifications (235" Conventional Engine)

	Pressure	Length
Valve Closed	62-68 lbs.	1.821"
Valve Open	155-165 lbs.	1.505"

Spring Specifications (235" Powerglide & 261" Jobmaster Engine)

	Pressure	Length
Valve Closed	62-68 lbs.	1.908"
Valve Open	177-187 lbs.	1.518"

Valve Lifters (Conventional 235" Engine): Plain barrel type. Identified by plain barrel and spot of yellow paint below push rod seat. *NOTE*–Valve Lifters used on Corvette has shallow groove around barrel.

Valve Lifters Powerglide 235" Engine): Hydraulic type. 1954 lifter is different than previous lifters and is identified by two raised rings below oil holes in barrel.

Hydraulic Lifter Adjustment–Required only when installing cylinder head or when adjusting screw setting has been disturbed. *See "Tappet Clearance Adjustment" in Chevrolet Special Data.*

Hydraulic Lifter Overhaul & Testing–*See "Hydraulic Valve Lifters" in Chevrolet Special Data.*

►*REMOVING HYDRAULIC VALVE LIFTERS: When removing lifters and push rods use a rack to keep them in proper sequence. Install in their original location when reassembling.*

Rocker Arm Assembly: *See "Rocker Arms" in Chevrolet Special Data.*

►*235" POWERGLIDE ENGINE & 261" JOBMASTER ENGINE ROCKER ARM PRODUCTION CHANGE: See "Rocker Arms" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

235" Conventional Engine

Intake Valves–Open 1° ATDC Close 39° ALDC.

Exhaust Valves–Open 42° BLDC Close 9° ATDC.

235" Powerglide Engine

Intake Valves–Open 10° 30' BTDC Close 53° 30' ALDC

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Exhaust Valv s—Open 49° BLDC. Close 15° ATDC.
Valve Timing Check—(*CAUTION*—On 235" Powerglide engine with hydraulic valve lifters, it will be necessary to replace the hydraulic valve lifter and pushrod operating #1 exhaust valve, with a conventional lifter and pushrod). Remove all tappet clearance from #1 exhaust valve. Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing. Mount dial indicator on rocker arm shaft with stem of indicator contacting #1 exhaust valve adjusting screw and set dial indicator to **.044"** (235" Conventional Engine), **.058"** (235" Powerglide Engine). Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset tappet to correct running clearance.

OILING SYSTEM

►ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.

Crankcase Capacity: 5½ qts. (dry), 5 qts. (refill).
N rmal Oil Pressure: 45 lbs. maximum. Full pressure system of all engines.
Pressure Regulator Valve—In oil pump body. Not adjustable.
Oil Pressure Gauge—AC No. 1507960. Not electric.
Oil Pump: Gear type. Located in crankcase, driven by distributor gear.
Oil Pump Overhaul—*See "Oil Pump" in Chevrolet Special Data.*
Oil Pump Installation—Assemble ground side of idler gear towards cover (use Chevrolet cover gasket only—controls pump clearance). Oil pump assembly mounted in crankcase by tapered screw. See that tapered screw seated firmly in tapered hole in pump housing before tightening locknut.
R cker Arm Oil Lead & Overflow Pipe: *See "Oiling Sys- in Chevrolet Special Data.*
Crankcase Ventilation: Air intake through valve rocker arm cover (air cleaner on some models), outlet through pipe on right side of engine.

COOLING

Water Capacity: 16 qts. (17 qts. with heater).
Pressure Valve: AC No. 850549. Radiator filler cap. 7 lb. type.

Thermostat: Harrison. In cylinder head water outlet.
Standard—No. 3123993 (stamped 151), 151°. Can be used for alcohol anti-freeze.
Optional—No. 3123994 (stamped 160) 160°, or No. 3123995 (stamped 180) 180°. Use for permanent anti-freeze.

T mperature Gauge: AC No. 1512818. Not electric.
See "Temperature Gauges" in Miscellaneous Section.

Wat r Pump: Double outlet, packless type with sealed ball-bearing shaft.
S "Water Pumps" in Ch vrol t Special Data.
B lt Adjustm nt—*S e G nerat r B lt Adjustm nt.*

CLUTCH

Own (Exc. P w rglid Cars). Diaphragm spring type.
S "Ch vrol t (Own)" in Clutch S ction.
Clutch Disc—Chevrolet No. 3835216 (moulded), No. 3835343 (woven), No. 3835454 (heavy duty).
Pedal Adjustment: Pedal free travel ¾-1". To adjust, loosen checknut and turn adjusting nut on connecting link at clutch fork. *NOTE*—Use finger pressure only when checking pedal free travel.
Removal: Remove transmission (see Transmission Removal below). Remove throwout bearing. Remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove cover assembly from below. *CAUTION*—Do not allow pressure plate to hang from retracting springs, (support by hand). When installing clutch, align 'X' mark on cover with 'X' mark on flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Chevrolet 3-Speed" in Transmission Section.
Transmission Control: *See "Transmission Controls" in Transmission Section.*
Removal: Remove floor mat and floor cover over transmission. Disconnect speedometer cable, and shifter rods from levers on transmission. Drain lubricant. Disconnect hand brake pull back spring, and hand brake cable clevis from idler lever, remove idler lever. Remove universal joint dollar-to-support capscrews and slide ball back on propeller shaft housing. Place jack under propeller shaft, remove four capscrews securing front trunnion bearings to front yoke, split joint and lower front end of propeller shaft. Remove rear transmission support-to-frame cross member bolts. Remove two upper transmission-to-clutch housing capscrews. Slide transmission back and lift out through opening in floor.

POWERGLIDE TRANSMISSION

Powerglide Transmission (Used with 235" Powerglide Engine)—Torque converter and hydraulically operated planetary gear unit with manual controls.

►PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS—See "Chevrolet Powerglide" in Transmission Section.

►TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.
Lubrication—Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.
Capacity—5 qts. (refill), 11 qts. (after overhaul).

►POWERGLIDE DRAINING CAUTION—There is no drain plug on converter. Drain transmission case only, add 5 qts. of fluid initially, recheck after idling engine.
Ch cking Fluid L v l—Engine must be idling with the parking brake set, transmission warm, and the control lever in "N" range when taking dipstick readings. Dipstick is located under hood on right side just opposite starter.

►OTHER DATA: See "Chevrolet Powerglide" in Transmission Section.

UNIVERSALS

Own. One used (in torque ball at rear of transmission).

TORQUE TUBE BUSHING INSTALLATION: See "Chevrolet Rear Axle" in Rear Axle Section.

►UNIVERSAL BALL JOINT ADJUSTMENT (POWERGLIDE MODELS): Improp r adjustments will cause leakage. See "Torque Tube & Ball" in Chevrolet Special Data.

REAR AXLE

Own. Semi-floating, hypoid gear type with Torque Tube drive.
See "Chevrolet Hypoid" in Rear Axle Section.

Axle Rati s

Car Model	Axl Rati	S rial Prefix
Without Powerglide	3.70-1	ML or MM
With Powerglide	3.55-1	MS or MT
Optional Without Powerglide	4.11-1	ME or MF

Axle Identification—Prefix of axle serial number (stamped on front face of carrier flange on right side) indicates ratios (see Ratio table above).
Backlash—.005-.007". Screw adjustment.

Removal: Raise rear of car and remove rear wheels and brake drums, install clamps on wheel brake cylinders, disconnect hand brake cables from idler lever and remove cables from cable clamp on frame. Disconnect brake line at axle housing and shock absorbers from rear spring 'U' bolts and plate, disconnect spring shackles and drop springs. Pull axle assembly back to free front end of torque tube, withdraw assembly.

Axle Shaft Removal: Wheel bolted directly on flange on outer end of axle shaft. Shaft retained by 'C' washer on inner end of differential case. To remove axle shaft, remove wheel, take out two 'zipon' nuts retaining brake drum, remove drum, install clamp on wheel brake cylinder. Remove axle housing cover, differential pinion shaft lock screw, pinion shaft and axle shaft spacer. Push axle shaft in, remove 'C' washer on inner end, pull shaft out.

Axl Shaft Installati n & Endplay Adjustm nt: *See "Rear Axle Notes" in Chevrolet Special Data.*

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SHOCK ABSORBERS

Delco. Direct acting non-adjustable. Serviced by replacement.

Model	Front	Rear
All	5519443 ①	5519444 ①

①—Chevrolet Part No.

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs.

See "Chevrolet" in Front Suspension Section.

Kingpin Inclination—4° plus or minus ½° crosswise.

Caster—Pos. ½ ±½°. Adjustable.

Camber—Pos. ½° ± ½°. Adjustable.

Toe-In—0-1/8". Loosen clamp bolts at each end of left hand tie rod and turn rod, tighten clamp bolts.

►*CAUTION—Align tie rods before tightening clamp bolts (ball studs will bind if not aligned).*

Toe-Out On Turns—With inner wheel turned 20°, outer wheel should be 17°40'.

STEERING

Manual; Saginaw Worm & Roller. With push-pull adjustment. *See "Saginaw Worm & Roller" in Steering Section.*

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic power cylinder.

See "Saginaw (GM) Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic. Hand lever applies rear wheel service brakes.

See "Chevrolet Bendix Hydraulic" in Brake Section.

Drums—Diameter 11".

Wheel Cylinder Diameter—Front 1 1/8", Rear 1".

	Brake Lining Width	Thickness
Front Whl	2"	.202"-.222"
Rear Whl	1¾"	.202"-.222"

Length Per Shoe—9.3125" (Primary), 11.6875" (Secondary).

Braking Power—55.9% (front wheels), 44.1% (rear wheels).

Clearance—Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag after adjustment.

Std. Master Cylinder: On bracket at left side of frame below front floor boards. Master cylinder supports clutch and brake pedal levers.

Checking Fluid—Access hole in front floor board directly under steering wheel. Maintain level in master cylinder to lower edge of filler hole.

Removal—Disconnect hydraulic line and remove eccentric bolt from brake pedal extension and main cylinder push rod. Remove clutch link from clutch pedal extension. Remove plug from forward end of master cylinder and insert a stiff wire into shaft lock pin and remove lock pin. Remove clutch and brake pedal extension pivot shafts from master cylinder body. Remove master cylinder to frame mounting bolts and remove cylinder from below.

Brake Pedal Clearance: Toe board clearance is 7/16" obtained by turning eccentric bolt at forward end of master cylinder. *NOTE*—If proper clearance cannot be obtained by turning eccentric bolt, place shims under front or rear master cylinder mounting bolts as necessary.

Power Brakes: Bendix vacuum type power brake cylinder (replaces conventional Master Cylinder).

See "Bendix Power Unit" in Brake Section.

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type.

See "Windshield Wipers" in Miscellaneous Section.

Window Regulators: (Front Door Windows)—Electric with reversible motor in each front door. Not used on rear doors.

See Miscellaneous Section for type and Model application.

Power Top Control: Hydro-Lectric with reversible pump motor.

See "Power Top Controls" in Miscellaneous Section.

Power Seat Adjuster: Reversible electric motor controls horizontal front seat movement.

See "Electric Seat Controls" in Miscellaneous Section.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.
Starting Serial Number—001001 up.
Serial Number Prefix—'E',designating Series 2934.

►*SERIAL NUMBER NOTE—Serial Number example (E54F 001025) includes following identification data in sequence.*

Series ①	Year	Assy Plant ②	Serial No.
E	54	F	001025

①—See Serial Number Prefix above.
②—Assembled only at the Flint Plant.

ENGINE NUMBER: Stamped on boss on right side of cylinder block to rear of distributor.
Starting Engine Number—0001001 (at each plant). Suffix letters and numerals indicate plant at which engine built ('F' for Flint, and 'T' for Tonawanda), Model Year, and Model Type.
Model Type Designation—'YG', Corvette 235" engine.

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 5-10 lbs., at cranking speed.

VACUUM READING: At 500 RPM.—14.4" (with transmission in Drive Range). 16.7" (with transmission in Neutral). At 450 RPM. 14.5" (with transmission in Drive Range), 16.3" (with transmission in Neutral).
NOTE—Manifold vacuum reading at idle speed is lower than for 235" Conventional engine because of "high lift" cam used.

VALVE TAPPET CLEARANCE: .008" Intake. .020" Exhaust.

MANIFOLD HEAT CONTROL: Located in forward half of divided exhaust manifold.

►*MANIFOLD HEAT CONTROL NOTE*—Under normal operating conditions the heat control is not used and manifold is shielded by a plate installed between exhaust and intake manifolds to divert gases away from intake manifold. Manifold heat control valve spring has been reversed to hold valve in "off" position. If operation of manifold heat control valve is desired, it will be necessary to remove manifold shield and install heat control valve spring in correct position.

IGNITION

FIRING ORDER: 1-5-3-6-2-4. See Diagram.

SPARK PLUG GAP: .035".
Spark Plug—AC 44-5 (Use AC COM for continuous high speed driving).

COIL: Delco-Remy 1115394.
Ignition Current—3.0 amperes (idling),. 5.4 amperes (stopped).

DISTRIBUTOR: Delco-Remy 1112314.
Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set—Delco-Remy 1925852.
Breaker Gap—..019" (new points), .016" (used points).
Cam Angle—40.5-47.5° with .016" gap.

►*BREAKER GAP CAUTION—Manufacturers recommends final check with feeler gauge or dial indicator if dwell meters used to set points.*

Breaker Arm Spring Tension—19-23 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	2500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center 'O' position.
Vacuum Spark Control: Delco-Remy 1116076
Plunger Travel—11/64-15/64".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6
7.5	15.0	7.5-10

IGNITION TIMING

Setting—2° ATDC.
Timing Mark—Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing, with Octane Selector set on '0'. Then set Octane Selector as follows:
Octane Selector Setting—Set for slight ping when accelerating with wide open throttle.

CARBURETOR

Carter No. YH 2066S (Early 1954), & YH 2066SA (Late 1954 & 1955). Horizontal type with manual choke control. *Three Carburetors Used per Engine.*

Idle Setting—½-1½ turns open. Turn screws out for richer mixture. *See Throttle Valve Synchronization below.*
Idle Speed—450 RPM with selector lever in "D" (Drive) position. *See Throttle Valve Synchronization below.*
Float Level—3/8" from bowl cover to top of float with bowl cover inverted and gasket removed.
Float Drop—With bowl cover in upright position, distance between float seam (at free end) and bowl cover should be 2". Adjust by bending stop tab on float arm.

Throttle Valve Synchronizing: (Preliminary)—With engine turned off and all three choke valves in wide open position, remove the throttle lever stop screw from each carburetor. Loosen the fillister head screws on carburetor shaft universal which secures couplings to throttle shaft at forward end of both center and rear carburetors. Snap accelerator pedal several times to allow couplings to find their normal position so there is no end pressure on throttle valves. Then tighten fillister head screws. Loosen the two Allen head screws at front end of rear carburetor (*NOTE*—Clearance provided for throttle valve adjustment by holes in flexible couplings being larger than Allen head screws). Manually close throttle valve in rear carburetor, hold it tightly closed and then tighten the two Allen head screws on rear carburetor flexible coupling. Loosen the two Allen head screws at front end of center carburetor and manually close throttle valve in FRONT carburetor. Hold valve tightly closed and tighten the two Allen head screws on flexible coupling on front of center carburetor.

Checking Throttle Valve Synchronization: Throttle valves must be checked separately and in the following sequence and manner.

Rear Carburetor—Check closing of rear throttle valve by twisting (in closing direction) the rear lever of rear carburetor. *There should not be any noticeable signs of rotating on front and of REAR carburetor throttle shaft.* If rotation is noticeable, loosen Allen screws on rear of **center** carburetor and hold throttle valve in rear carburetor closed and tighten Allen screws. If rotation is still noticeable, loosen Allen screws at front of **rear** carburetor and hold rear carburetor throttle valve closed and tighten Allen screws.

Front Carburetor—Check closing off of front carburetor throttle valve by twisting (in closing direction) front lever of **front** carburetor. *There should not be any noticeable signs of rotating near and of FRONT carburetor throttle shaft.* If rotation is noticeable, loosen Allen screws at rear of **front** carburetor and hold throttle valve in **front** carburetor closed and tighten Allen screws. If rotation is still noticeable, loosen Allen screws on front of **center** carburetor and hold throttle valve in **front** carburetor closed and tighten Allen screws.

Center Carburetor—Check center carburetor throttle valve as follows: Disconnect accelerator rod at **center** carburetor. Close throttle valve in rear carburetor manually at rear end of **rear** carburetor. Hold closed and press throttle lever on **center** carburetor and check for rotation of **center** throttle shaft at front end. *There should not be any noticeable signs of rotating on front end of CENTER carburetor throttle shaft.* If rotation noticeable, correct by the Allen screws between **center** and **rear** carburetors. Close throttle valve in **front** carburetor manually at front end of front carburetor and check as outlined above. Correct by the four Allen screws between **center** and **front** carburetors.

Idle Speed & Mixture Adjustment: Assemble throttle lever stop screw and spring on center carburetor only, and adjust so throttle valves are slightly open. Set Idle Adjustment (mixture) screws ¾ turns open. Start engine and run until warm. Pull hand brake lever on and move transmission selector lever to "P" (Park) position. Adjust throttle lever stop screw on center carburetor for 500 engine RPM. Turn idle mixture screw on rear carburetor **1/8 turn - no more**, in either direction to increase engine RPM or manifold vacuum. If there is no change, leave adjustment at ¾ turn. Repeat same with center and front carburetors. If RPM changed, correct speed adjustment on center carburetor. Repeat this adjustment more than once to make sure engine RPM or manifold vacuum remain at their highest point. Assemble throttle lever stop screws and springs in front and rear carburetors. Turn front and rear throttle lever stop screws until engine speeds up slightly, then back off screw at least one turn. **The center throttle lever stop screw is the only one which should control engine idle speed.**

Accelerating Pump—No seasonal adjustment required.

Fast Idle: With choke valve held tightly closed, there should be .020" (Gauge T109-29) clearance between throttle lever and bore of carburetor (side opposite idle port). Adjust by bending offset portion of choke connector link (use bending tool T109-213).

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►*OTHER DATA: See "Carter YH Carburetor" in Carburetor Section*

Powerglide Throttle Linkage Adjustment: *See "Chevrolet Powerglide" in Transmission Section.*

Fuel Pump Pressure: 3½-5 lbs.

CARB. EQUIPMENT

Fuel Pump: AC (Fuel & Vacuum).
Replacement Pump—AC No. 4132.
Pressure—3½-5 lbs.
See "Fuel Pumps" in Carburetion Equipment Section.
Gas Gauge: AC Electric.
Dash Unit—AC No. 1517901.
Tank Unit—AC No. 1517911.
See "Fuel Gauges" in Carburetion Equipment Section.

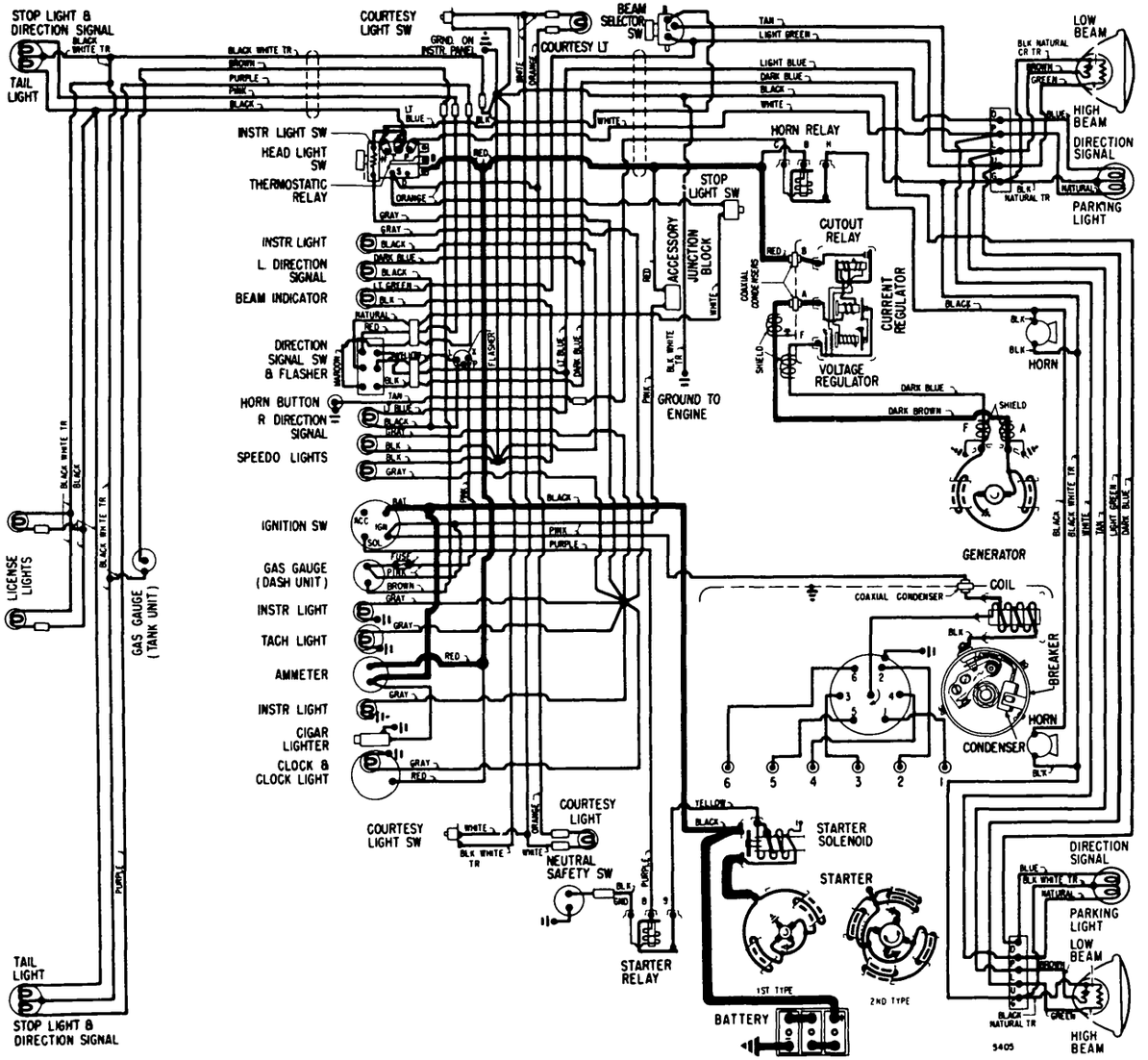
BATTERY

Delco 15AA6. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate)
Battery Ground—Negative terminal

STARTER

Delco-Remy 1107109 (First Cars), 1108035 (Later Cars).

►*STARTER NOTE. First 1107109 (two-coil) starter was superseded by later 1108035 (four-coil) starter*



Armature No.—Delco-Remy 1917855 (All).
Drive—Overrunning clutch (solenoid pinion shift).
Brush Spring Tension—24-28 ozs.
Rotation—Counter-clockwise at commutator end.

Performance Data—1108035

Torque	RPM	Volts	Amperes
0 ft. lbs.	6000	5.0	60
15 ft. lbs.	Lock	3.0	600

Performance Data—1107109

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
12 ft. lbs.	Lock	3.25	550

Starting Switch: Delco-Remy Solenoid Switch 1118135 mounted on starter with separate relay, Delco-Remy 1116886 Controlled by Starter & Ignition Switch, Delco-Remy 1116478. Turn key full RIGHT against spring tension to start
See "Starter Controls" in Electrical Equipment Section.
Neutral Safety Switch: Delco-Remy 1998053.
Adjustment—*See "Chevrolet Powerglide" in Transmission Section.*

GENERATOR

Delco-Remy 1100018 (Early), 1100028 (Later).
Armature—Delco-Remy 1925348 (Gen No 1100018), 1929558 (Gen No 1100028)

Performance Data

Gen No	Ⓘ Amperes	Volts	RPM
1100018	45	8 0	3000
1100028	40	8 0	3000

Ⓘ—Not maximum output See Regulator
Brush Spring Tension—28 ozs.
Field Current—1 87-2 0 at 6 0 volts
Rotation—Counter-clockwise at commutator end
Belt Adjustment: 7/16-1/2" belt deflection at point midway between pulleys with 15 lbs pressure

REGULATOR

Delco-Remy 1118827 (Use with Gen. No. 1100018), No. 1118843 (Use with Gen. No. 1100028).

►*REGULATOR NOTE—Checking procedure is different than for previous regulators. See "Delco-Remy 1118825 Series Regulators" in Electrical Equipment Section. Following Specifications are for "Normal" settings.*

Cutout Relay

Cuts In—5 9-6 7 volts (hot)
Contact Gap—.020".
Air Gap—020" (with contacts just closed)

Voltage Regulator

Setting—6 9-7 4 volts (hot)
Air Gap—075" with armature pressed down to point where contacts just touching
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting (1118827)—42-47 amperes (hot)
Setting (1118843)—37-42 amperes (hot)
Air Gap—075" with armature pressed down to point where contacts just touching
Checking & Adjusting—*See Electrical Equip. Section.*

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MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section*
Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*
Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification) Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) Remove switch retaining nut and switch assembly
Stop Light Switch Location: Mechanical type mounted on underside of toeboard and operated by brake pedal.
FUSES: Located as indicated below
Direction Signal—14 amperes Located at end of lead at gasoline gauge terminal
Radio—14 amperes Located at end of lead at accessory junction block
Heater—14 amperes Located at end of lead at gasoline gauge terminal
Parking Brake Alarm—14 amperes Located at end of lead at accessory junction block
CIRCUIT BREAKER: Located in main lighting switch. Protects all lighting circuits not protected by fuses.
HORNS: Delco-Remy 1999681 (Low Note) 1999682 (High Note)
Horn Relay. Delco-Remy 1116775
Contacts Close—2.75-4 0 volts (set to 3 5 volts)
Contact Gap— 027". **Air Gap**— 014 " (closed)

ENGINE

ENGINE SPECIFICATIONS: Own 6 cylinder valve-in-head.
Bore—3 9/16". **Stroke**—3 15/16".
Displacement—235 5 cu ins **Rated H.P.** 30.4
Developed Horsepower—150 at 4200 RPM
Compression Ratio—8 0-1
Compression & Vacuum Reading—*See Tune-Up.*
TIGHTENING TORQUES: *See Chevrolet Special Data.*
OTHER ENGINE DATA: *See 1954-55 Chevrolet 6 Cyl Pass Car Pages and note the following:*
CAMSHAFT: *NOTE - The Early 1954 Camshafts are different than later 1954 and 1955 camshafts Later type camshafts are identified by 3 large raised dots located between No 5 and No 6 inlet cams*
Camshaft Setting—Timing gears are punch marked, and punch marks on both gears must be lined up and directly opposite each other

VALVES:	Head Diam.	Stem Diam	Length
Intake	1 7/8"	.3410- 3417"	6 364-6 394"
Exhaust	1 1/2"	3400- 3407"	4 902-4.932"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	405"	001- 003"
Exhaust	45°	414"	002- 004"

Valve Springs: Two springs used per valve. Install springs with closed coil end down

Outer Spring Specifications ①		
	Spring Pressure	Length
Valve Closed	55.0 lbs.	1.880"
Valve Open	150.0 lbs.	1.490"
Inner Spring Specifications ①		
	Spring Pressure	Length
Valve Closed	25 0 lbs.	1.810"
Valve Open	57.0 lbs.	1.420"

①—Intake and exhaust valve springs
Valve Lifters: Barrel type identified by shallow groove around lifter Not hydraulic

VALVE TIMING

►*VALVE TIMING CAUTION Timing is different with early and late type camshaft See "Camshaft Setting" under CAMSHAFT above.*

First Type Camshaft

Intake—Opens 19°30' BTDC Close 44°30' ALDC.
Exhaust—Opens 59° BLDC Close 5° ATDC

Later Type Camshaft

Intake—Opens 11°30' BTDC. Close 52°30' ALDC
Exhaust—Opens 51° BLDC Close 13° ATDC.
Valve Timing Check—Remove all tappet clearance from #1 exhaust valve Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing Mount dial indicator on rocker arm shaft with stem of indicator contacting #1 exhaust valve adjusting screw and set dial indicator to 090". Turn crankshaft until indicator reading is ZERO plus or minus 004" Reset tappet clearance to correct running clearance

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*
Crankcase Capacity: 5½ qts (dry), 5 qts (refill)
Normal Oil Pressure: 45 lbs maximum
Pressure Regulator Valve—In oil pump body Not adjustable
Oil Pressure Indicator—AC No 1508063. Not electric
Oil Pump: Gear type Located in crankcase, driven by distributor gear
Oil Pump Overhaul—*See "Oil Pump" in Chevrolet Special Data.*
Rocker Arm Lead & Overflow Pipe: *See "Oiling System" in Chevrolet Special Data.*
Crankcase Ventilation: Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

COOLING

Water Capacity: 17 8 qts (without heater), 18 3 qts (with heater)
Pressure Valve: AC No. 850778 (Chrome) Radiator filler cap 4 lb type
Thermostat: Harrison. Cylinder head water outlet
Standard—No. 3123993 (stamped 151), 151°.
Temperature Gauge: AC No 1512756. Not electric
See "Temperature Gauges" in Miscellaneous Section.
Water Pump: Double outlet, packless type with sealed ball-bearing shaft.
See "Water Pumps" in Chevrolet Special Data.
Belt Adjustment—See Generator Belt Adjustment

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls Selector lever is mounted directly on transmission
For all data see 1954 Chevrolet Six Car Pages

UNIVERSALS

Own. Two used, with open propeller shaft

REAR AXLE

Own. Semi-floating hypoid gear type with Hotchkiss Drive
See "Chevrolet Hypoid" in Rear Axle Section.
Ratio—3.55-1. **Serial Prefix**—NW.
Axle Identification—Prefix of axle serial number (stamped on front face of carrier flange on right side) indicates ratio See Serial Prefix (above)
Backlash—.005- 007" Screw adjustment
Axle Shaft Removal: Wheel bolted directly on flange on outer end of axle shaft Shaft retained by 'C' washers on inner end of differential case. To remove axle shaft, remove wheel, take out two 'zipon' nuts retaining brake drum, remove brake drum, install clamp on wheel brake cylinder. Remove axle housing cover, differential pinion shaft lock screw, pinion shaft and axle shaft spacer. Push axle shaft in, remove 'C' washer on inner end, pull shaft out
Axle Shaft Installation & Endplay Adjustment *See "Rear Axle Notes" in Chevrolet Special Data.*

SHOCK ABSORBERS

Delco, Direct acting non-adjustable Serviced by replacement.
Front—Delco No. 538F. **Rear**—Delco No 561P

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil spring
See "Chevrolet" in Front Suspension Section.
Kingpin Inclination—3½-4½° plus or minus ½° crosswise
Caster—Pos ½°±½°. Adjustable
Camber—Pos ½°±½° Adjustable
Toe-In—0-1/8".
►*CAUTION—Align tie rods before tightening clamp bolts (ball studs will bind if not aligned)*

STEERING

Manual Steering: Saginaw Worm & Roller. With push-pull adjustment.
See "Saginaw Worm & Roller" in Steering Section.

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic. Hand lever applies rear wheel service brakes.
See "Chevrolet-Bendix Hydraulic" in Brake Section.
Drums—Diameter 11".
Wheel Cylinder Diameter—Front 1 1/8". Rear 1".

	Brake Lining Width	Thickness
Front Wheels	2'	.202-222"
Rear Wheels	1¾	202-222"

Length Per Shoe—9.3125" (Primary), 11.6875" (Secondary)
Braking Power—55 9% (front wheels), 44 1% (rear wheels)
Clearance—Single adjusting screw located at bottom of backing plate Back off adjusting screw 7 notches from slight drag position Brakes must be free of any drag after adjustment

MISC. MECHANICAL

Windshield Wipers: Vacuum, cable operated
See "Windshield Wipers" in Miscellaneous Section

MODEL IDENTIFICATION

M d l D signati n

S ri s	Serial Pr fix	Wh lbas	Typ
3100	H	116'	Half Ton
3600	J	125¼"	¾ Ton
3700	K	125¼"	①¾ Ton
3800	L	137"	One Ton
3900	M	137"	① One Ton
4100	N	137"	1½ Ton
4400	P	161"	1½ Ton
4500	R	161"	②1½ Ton
5100	S	110"	③2 Ton
5400	T	134"	③2 Ton
5700	U	158"	③2 Ton
6100	V	137"	2 Ton
6400	W	161"	2 Ton
6400	X	179"	2 Ton
6700	Y	199"	②2 Ton
6800	Z	212"	②2 Ton
5100S	SS	110"	③1½ Ton
5400S	ST	134"	③1½ Ton
5700S	SU	158"	③1½ Ton
6100S	SV	137"	④1½ Ton
6400S	SW	161"	④1½ Ton
6500S	SX	179"	④1½ Ton

①—Forward Control. ②—School Bus Chassis. ③—C.O.E. Special. ④—Special. ⑤—C O E

SERIAL NUMBER: Stamped on plate on cab left hinge pillar post (Flat Face Cowl models have number on left hand cowl inner panel).

Starting Serial Numb r: 001001 (each plant—all models).

►*SERIAL NUMBER NOTE: Serial number (example V54K 001083) includ s following identification data in sequ nc .*

S ri s①	Y ar②	Assy. Plant③	Serial No.
V	54	K	001083

①—Serial Prefix (see Model Designation above).
②—Year (1954) 54, (Early 1955) 55.
③—Assembly Plant Designation (see below).

Ass mbly Plant Designation

A—Atlanta	**K**—Kansas City	**S**—St. Louis
B—Baltimore	**L**—Los Angeles	**T**—Tarrytown
F—Flint	**N**—Norwood	**O**—Oakland
J—Janesville		

ENGINE NUMBER: Stamped on right side of engine block to rear of distributor.

Starting Engin Numb r: 0001001 (at each plant). Suffix letters and numerals indicate plant at which engine built ("F" for Flint, and "T" for Tonawanda), Model Year, and Model Type. See following for Model Type Designation:

S ri s	Engine	Type Designation
3100-3600-3800	Thriftmaster 235"	①X
3100-3600-3800	Thriftmaster 235"②	①U
3100-3600-3800	Thriftmaster 235"③	①M
3700-3900	Loadmaster 235"④	⑤T
3700-3900	Loadmaster 235"③④	⑤L
4000	Thriftmaster 235"⑥	S
5000	Loadmaster 235"	R
5000	Jobmaster 261"	Q
6000	Loadmaster 235"	P
6000	Jobmaster 261"	N

①—"A" stamped following suffix when this engine used in 3600 Series, and "B" when used in 3800 Series.
②—With Heavy Duty Disc Clutch.
③—With Hydra-Matic Transmission.
④—With Updraft Carburetor.
⑤—"A" stamped following suffix when this engine in 3900 Series.
⑥—"A" stamped following suffix when "P" engine in 4000 Series.

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 5-10 lbs., at cranking speed.

VACUUM READING: *CAUTION—Vacuum reading on 235" Thriftmaster & Loadmaster engines is different than on 261" Jobmaster engine.*

235" Thriftmaster & Jobmaster—17-21" at idling speed. **261" Jobmaster—At 500 RPM.** 16.7" (in Neutral), **At 450 RPM.** 16.3" (in Neutral). *NOTE—Manifold vacuum reading at idle speed is lower than other models because of the "high lift" cam used.*

VALVE TAPPET CLEARANCE: (3000 Series Trucks)—Intake .006", Exhaust .016" **(All Others)**—Intake .006", Exhaust 020"

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation when tuning engine. Should require ½ turn from unhooked to hooked position Distorted springs should be replaced

IGNITION

FIRING ORDER: 1-5-3-6-2-4 See Diagram
SPARK PLUG GAP: .035".

Spark Plug—AC No. 44-5 (Exc. 2-Ton) AC No. 43-5 (2-Ton). 14mm types.

►*CAUTION: Tighten plugs to 20-25 ft. lbs. torque or finger tight plus one-half turn.*

COIL: Delco-Remy 1115380.
Ignition Current—2.5 amperes idling 4.5 stopped.

DISTRIBUTOR: Delco-Remy 1112388 (Exc. 261" Engine), Delco-Remy 1112392 (261" Engine).
Condenser—Delco-Remy 1869704 (First type), Delco-Remy 1928111 (Second type with spade terminal).
Capacity—.18-.23 microfarad.
Contact Point Set—Delco-Remy 1924571
Breaker Gap— 016- 021" (New Points), 0125-.0175" (Used points).
Cam Angle—38-45° with .016" gap

►*BREAKER GAP CAUTION—Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension—17-21 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance—1112388

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Aut matic Advanc —1112392

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		350	0-4		700
7-9		750	14-18		1500
11-13		1200	22-26		2400
16-18		1800	32-36		3600

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center 'O' position.

VacuumSpark Control: Delco-Remy 1116043. Used with all truck distributors.
Plunger Travel—17/64".

Vacuum Advance

Distr Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0°	7-8.5"
10°	20°	18 5"

IGNITION TIMING

Setting (235" Engines)—2° ATDC. **261" Engines**—5° BTDC.
Timing Mark—Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on 'O'. Then adjust Octane Selector as follows
Octane Selector Setting—Set for slight ping when accelerating with wide open throttle.

CARBURETOR
ROCHESTER

Downdraft types with automatic or manual choke

Models	Rochester N .
235" Engine ①	②7004468
235" Engine ③	④7005921
261" Engine ⑤	②7005140

①—Except Forward Control, C.O.E. & Automatic Transmission models.

②—With Manual Choke.

③—With Automatic Transmission (Except Forward Control models)

④—With Automatic Choke.

⑤—Except C.O.E models

Idle Setting (Exc. 7005140)—1 to 2½ turns open, (turn screw out for richer mixture).
Idle Setting (7005140)—1 to 1½ turns open, (turn screw out for richer mixture)
Idle Speed—400-450 RPM (Exc Automatic Trans models), 425 RPM. with Selector Lever in "N" position (Automatic Transmission models).
Float Level (All Models)—1 5/16" from bottom of each float to cover gasket (do not remove gasket) with cover inverted so that needle closed. Use No 3696192 gauge to set float level and align floats (twisted floats may hang up or rub on bowl). Check float drop or travel by turning cover right side up so floats drop down. Distance from gasket on cover to bottom of each float should be 1¾". Adjust by bending tang at rear of float assembly.

►*CAUTION: Both floats must be set alike and must n t be twisted out of alignment.*

Accelerating Pump—No seasonal adjustment.

Fast Idl (7005921): To check setting, hold throttle in wide open position, check choke valve opening or clearance between lower edge of valve and air horn

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wall. This clearance should be .073" (Gauge BT-64 or Chevrolet Gauge J-5120). If clearance not correct, adjust by bending connector rod using tool BT-18 (Chevrolet Tool J-4552).

Throttle Kicker (Not used on 7005921)—Operated by cam on choke lever. Opens throttle when choke closed. No adjustment.

►*OTHER DATA—See "Rochester 'B' & 'BC' Carburetors" in Carburetor Section.*

Fuel Pump Pressure: 4 lbs. maximum

Throttle Linkage Adjustment (Hydra-Matic): *See "Hydra-Matic Drive" in Transmission Section.*

CARTER

Carter (BB) 2075S (C.O.E), 871SB (Forward Control). Single barrel updraft type with manual choke control.

Idle Setting—½-1½ turns open (turn screw out for richer mixture).

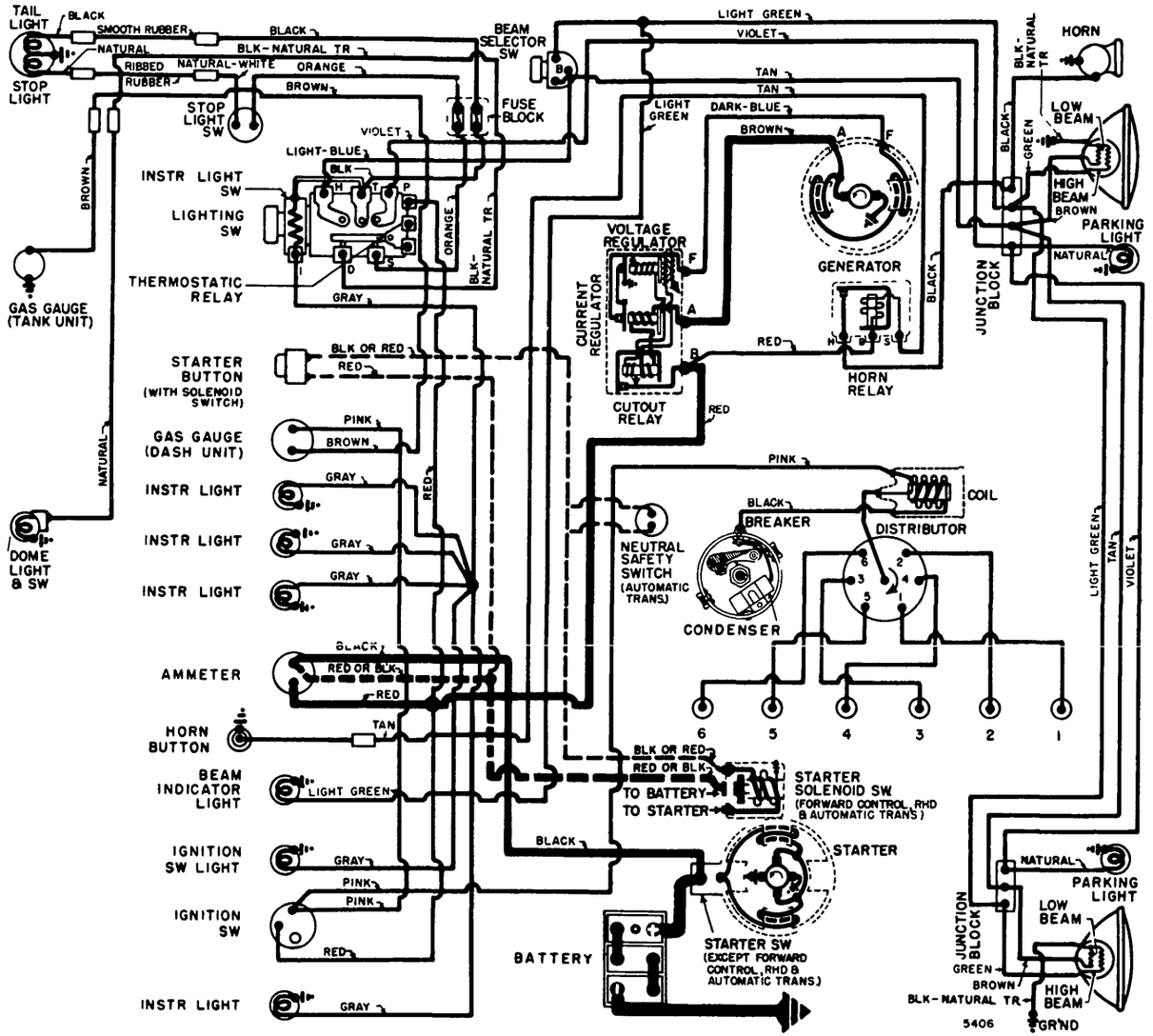
Idle Speed—450-500 RPM.

Float Level—Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed), press float lever lip firmly against needle.

Accelerating Pump—Inner holes (in plunger shaft and throttle lever) Summer, Outer hole Winter.

►*OTHER DATA—See "Carter (BB) Carburetors" in Carburetor Section.*

Fuel Pump Pressure: 4 lbs. maximum.



CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type.

Replacement Pump—AC No. 9798 (Fuel only), AC No. 9797 (Fuel & Vacuum).

Pressure—4 lbs. maximum.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: AC Electric.

Dash Unit—AC No. 1517880 (Exc. Flat Face Cowl). No. 1517168 (Flat Face Cowl).

Tank Unit—AC No. 1517951 (Exc. Forward Control, and Flat Face Cowl). No. 1517952 (Forward Control), No. 1517950 (Flat Face Cowl).

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Delco-15AA6 (Std. Exc. School Bus). 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).

Delco-19Q6 (School Bus). 6 volt, 19 plate.

Battery Ground—Negative terminal.

Engine Ground— Engine to cowl.

STARTER

Model	Delco-Remy No.
All (Exc. F.C., Hydra-Matic & R.H.D),	1107108
Forward Control & R.H.D	1107109
Hydra-Matic Trucks	1107135

Armature—Delco-Remy 1917855 (All Starters).

Drive—(Exc. Forward Control & Hydra-Matic Mdls)—Overrunning clutch and pedal operated manual pinion shift.

Drive—(Forward Control & Hydra-Matic Mdls)—Overrunning clutch with solenoid pinion shift.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—24-28 ozs

Performance Data			
Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
12 ft. lbs	Lock	3.25	550

Starting Switch: 1107108 Starter—Delco-Remy 820052. On starter, operated by starting pedal.

1107109 & 1107135 Starter—Delco-Remy Solenoid 1118135 (no relay) mounted on starter and controlled by Pushbutton Switch 1996055 on instrument panel.

Hydra-Matic Neutral Safety Switch: Delco-Remy 1997845. Connected to starter control circuit prevents starter operating unless selector lever in "N" position.

Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Different generators used as follows:

Model	Generator No.	Armature No.
½, ¾, 1-Ton (Early)	1100018	1925348
½, ¾, 1-Ton (Late)	1100028	①1929558
2-Ton	1102793	1924893
Optl	1105008	1925556
Optl	1105009	1925630
Optl	1106757	1910073

①—Alternate wound (3½ turn) armature.

Maximum Charging Rate—Controlled by regulator and dependent on battery condition.

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Performance Data—Cold

Generator	Amperes ①	Volts	RPM
1100018	45	8.0	3000
1100028	40	8.0	2850
1102793	45	8.0	2450
1105008	50	7.0	2100
1105009	40	7.0	1700
1106757	50	7.5	1410

①—Not maximum output. See Current Regulator.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—(Exc. 1106757)—28 ozs. (1106757) —20 ozs.

Field Current—(1100018, 1100028, 1102793) 1.87-2.0 amps.; (1105008, 1105009) 1.77-1.93 amps.; (1106757) 1.70-1.95 amps. All at 6.0 volts.

Belt Adjustment (½, ¾, 1-Ton Models)—7.16-½" deflection with thumb pressure midway between generator and fan pulleys. Recheck new belt after 1000 miles service, and readjust if deflection (as above) more than ½" with 15 lbs. pressure.

1½ & 2-Ton Models—Adjust to ¾" deflection midway between generator and fan pulleys.

REGULATOR

Delco-Remy Regulator No.	Generator No.
1118827	1100018
1118843	1100028
1118827	1102793
1118835	1105008
1118831	1105009
1118833	1106757

►*REGULATOR NOTE—Checking procedure is different than for previous models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section. All Specifications are "Normal" settings.*

Regulator "Normal" Settings

Regulator Number	Cut out Relay Closing Volts	Voltage Regulator Volts	Current Regulator Amperes
1118827	6.4	7.3	47
1118843	6.4	7.3	42
1118835	6.4	7.3	52
1118831	6.4	7.3	42
1118833	6.4	7.3	55

Cut out Relay Air Gap—.020". (with contacts just closed).

Cut out Relay Contact Gap—.020".

Voltage & Current Regulator Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—See *Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. See *Electrical Equip. Section.*

Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel). Remove switch retaining nut and switch assembly.

Stop Light Switch Location: Mechanical type mounted on underside of toeboard and operated by brake pedal.

FUSES: Fuse block (with snap on cover) located on engine side of dash (exc. Forward Control), under instrument panel (Forward Control). *NOTE*—Spare fuse located in fuse block cover.

Stop Light—20 amps. (in fuse box).

Tail Light—20 amps. (in fuse box).

CIRCUIT BREAKER: 42 amps. Located in Lighting Switch (part of switch assembly). Protects lighting circuits together with fuses listed above.

HORNS: Delco-Remy 1999639 (Low Note), 1999640 (High Note).

Horn Relay: Delco-Remy 1116774.

Contacts Close—2.75-4.0 volts (set to 3.5 volts).

Contact Gap—.027". **Air Gap**—.014" (closed).

ENGINE

►*THREE ENGINES USED ON TRUCKS: 235" Thriftmaster, 235" Loadmaster, & 261" Jobmaster. See Truck Model Identification for engine application.*

►*1954 THRIFT MASTER & LOADMASTER ENGINE CAMSHAFT PRODUCTION CHANGE: See "Camshaft" in Engine Section of 1954 Passenger Car pages.*

►*1954 261" JOBMASTER ENGINE ROCKER ARM PRODUCTION CHANGE: See "Rocker Arms" in Chevrolet Special Data.*

ENGINE SPECIFICATIONS: Own 6 cylinder valve-in-head.

Engine	Bore	Stroke	Displacement
235" Thriftmaster	3 9/16"	3 15/16"	235.5"
235" Powermaster	3 9/16"	3 15/16"	235.5"
261" Jobmaster	3 3/4"	3 15/16"	261.0"

Engine	Compr. Ratio	Developed H.P.
235" Thriftmaster	7.5-1	① 112 at 3700
235" Powermaster	7.5-1	① 112 at 3700
261" Jobmaster	7.17-1	② 135 at 4000

①—107 at 3600 RPM., on Fwd. Control & C.O.E. models.

②—125 at 4000 RPM., on C.O.E. models.

Compression & Vacuum Reading—See *Tune-Up.*

ENGINE REMOVAL: See *Chevrolet Special Data.*

ENGINE MOUNTINGS: See *Chevrolet Special Data.*

CYLINDER HEAD: See *Chevrolet Special Data.*

TIGHTENING TORQUES: See *Chevrolet Special Data.*

OTHER ENGINE DATA: See *1954 Chevrolet Passenger Car pages for all engine data and note the following:*

►*LOADMASTER 235" ENGINE PISTON RING NOTE*—Upper compression ring is chrome plated, and oil control ring is new design with spiral piano wire expander.

VALVES: *NOTE*—Valve Rotators used on 235" Loadmaster, 261" Jobmaster engines, and on all Forward Control models. See *"Valve System" in Chevrolet Special Data.*

VALVE TIMING: Camshaft Setting—Timing gears are punchmarked. Marks on both gears must be lined up and adjacent to each other.

Valve Timing

Thriftmaster & Loadmaster

Intake Valves—Open 1° ATDC. Close 39° ALDC.

Exhaust Valves—Open 42° BLDC. Close 9° ATDC.

Jobmaster

Intake Valves—Open 11°30' BTDC. Close 52°30' ALDC.

Exhaust Valves—Opens 51° BLDC. Close 13° ATDC.

Valve Timing Check—Remove all tappet clearance from #1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening. Mount dial indicator on rocker arm shaft support with stem contacting #1 exhaust valve adjusting screw, set dial indicator to .044" (Thriftmaster & Loadmaster); .063" (Jobmaster). Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset #1 exhaust valve to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul—*See "Oil Pump" in Chevrolet Special Data.*

Oil Pump Installation—Assemble ground side of idler gear towards cover (use Chevrolet cover gasket only - controls pump clearance). Oil pump assembly mounted in crankcase by tapered screw. See that tapered screw seated firmly in tapered hole in pump housing before tightening locknut.

Crankcase Capacity—5 qts. (refill), 5½ qts. (dry).

Normal Oil Pressure—45 lbs. maximum.

Pressure Regulator—In pump body. Not adjustable.

Oil Pressure Indicator—AC No. 1508014 (Exc. Flat Face Cowl Models). AC No. 1507953 (Flat Face Cowl Models). Not electric.

Crankcase Ventilation (Except Forward Control Models): Regular velocity type with air intake pipe through valve rocker cover, (air cleaner on some models), outlet pipe on right side of engine.

Servicing—On all models with air cleaner mounted on valve rocker cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Positive Crankcase Ventilation (Std. on all Fwd. Control Models, Optional on others): Vacuum operated ventilator consisting of vacuum pipe from oil filler pipe to a ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing—Every 5000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly. Test vacuum as follows:

Vacuum Valve—With valve disassembled, check spring tension (must be 7.5 ozs., with spring compressed to .418-.432"). If defective, replace with new valve assembly.

►*CAUTION*—When assembling valve, make certain end of spring engages groove under valve head.

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COOLING

Water Capacity: (½, ¾-Ton, & Fwd. Control) 16 qts. **(1, 1½-Ton)** 17 qts. **(2-Ton & C.O.E.)** 18 qts.

Pressure Valve: AC No. 850501. Opens at 4 lbs.

Thermostat: Harrison. In water outlet of cylinder head.

Standard—No. 3123993 (stamped 151) 151° type. Can be used for alcohol anti-freeze.

Optional—No. 3123994 (stamped 160) 160° type or No. 3123995 (stamped 180) 180° type. Use for permanent anti-freeze.

Temperature Gauge: AC No. 1512692 (Exc. Fwd. Control, C.O.E. & Flat Face Cowl). AC No. 1512750 (Fwd. Control, & C.O.E.L. AC No. 1512701 (Flat Face Cowl). Not electric.

See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Double outlet, packless type with sealed ball-bearing shaft.

See "Water Pumps" in Chevrolet Special Data.

Belt Adjustment: See Generator Belt Adjustment.

CLUTCH

Own. Diaphragm spring, single plate, dry disc type.

See "Chevrolet (Own)" in Clutch Section.

Clutch Disc No. 3836097 (10" molded—Exc. Hvy. Duty, and Forward Control Models). Identified by No. 3836097 stamped on metal part of disc. No. 3836021 (11" woven —Fwd. Control and Hvy. Duty). Identified by pink paint on hub.

Pedal Adjustment: Pedal free travel ¾-1". To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork. NOTE—Use finger pressure only when checking clutch free travel.

Removal: Remove transmission (see Transmission Removal) Remove throw-out bearing, remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove assembly from below. CAUTION—Do not allow pressure plate to hang on retracting springs (support by hand). When installing clutch align 'X' mark on cover with 'X' mark on flywheel.

TRANSMISSION

3-SPEED (LIGHT DUTY)

Own. Three speed, all helical gear type. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever. *See "Transmission Controls" in Transmission Section.*

Removal (Half-Ton): Remove accelerator pedal, floor mat, and transmission cover on floor. Disconnect speedometer cable from rear bearing retainer, remove hand brake lever from transmission case. Drain transmission. Remove battery. Remove four capscrews holding universal joint collar on rear bearing retainer, remove bolts holding transmission support on frame cross-member. Support propeller shaft with jack, slide universal joint ball and collar back on shaft, split front universal by removing capscrews retaining front trunnion bearings on front yoke. Raise propeller shaft as far as possible with jack to provide clearance. Remove two top transmission mounting screws, install special J-1116 guide pins in these holes. Take off clutch housing underpan. Remove two lower transmission mounting screws, slide transmission straight back on guide pin until main drive shaft is free from clutch driven member, lift transmission up and remove through floor opening.

Removal (¾-Ton): Remove accelerator pedal, floor mat and transmission cover from floor. Disconnect speedometer cable from driven gear on transmission housing. Disconnect shift control rods from shifter levers at transmission. Disconnect front universal joint. Remove propeller shaft intermediate bearing support and lower propeller shaft to floor. Remove the two top transmission to clutch housing capscrews and insert two J-1116 guide pins. Remove flywheel underpan and remove two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until clutch gear shaft is free of splines in clutch disc. Remove transmission through opening in floor.

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse).

See "Chevrolet (3-Speed Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.

See "Transmission Controls" in Transmission Section.

Removal: Same as for "3-Speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

See "Chevrolet 4-Speed" in Transmission Section.

Transmission Control: (All Models exc. Forward Control) —Floor mounted gearshift lever.

Removal (½ & ¾-Ton): See "3-Speed (Light Duty)" above.

Removal (Other Trucks): Remove screws fastening steering jacket grommet and slide grommet up out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor and remove cover. On Forward Control models remove both front and rear floor pans. Remove speedometer cable from transmission rear bearing retainer. On 1-Ton, remove cotter key and pin attaching parking brake pull rod to parking lever. On 1½ & 2-Ton, disconnect parking brake lever return spring from parking brake operating lever and remove cotter key and pin attaching inner and outer levers to parking brake operating lever. Remove parking brake lever lock, flat washer and spring and remove parking brake lever. Drain lubricant from transmission. On 1-Ton, break universal joint at transmission joint flange and tape trunnions and bearings together. On 1½ & 2-Ton, disconnect intermediate universal joint by removing two trunnion bearing "U" clamps, split joint and lower front end of rear propeller shaft to floor. Remove the four universal joint flange nuts. Remove nuts attaching propeller shaft bearing support bracket to frame cross member and remove front propeller shaft and bearing assembly. On all models, remove the two capscrews attaching transmission to clutch housing and insert two Guide Pins J-1126 in these holes. Remove flywheel underpan and remove two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until transmission free of splines in clutch disc. Remove transmission.

HYDRA-MATIC DRIVE

"Dual-Range" four speed automatic transmission and fluid coupling.

►*HYDRA-MATIC OIL LEAK AT UNIVERSAL JOINT (¾ & 1-TON TRUCKS): S "Hydra-Matic Drive" in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level in transmission every day. Drain & refill every 25,000 miles. Use only "Automatic Transmission Fluid" Type A.

Checking Fluid Level—With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid l v l with ngin at idling speed.** Add sufficient fluid to bring level in transmission up to "F" mark on dipstick (with engine at idling speed). *CAUTION—Do not ov rfill transmission.*

Capacity—8½ qts. (refill), 9 qts. (after overhaul). *NOTE—Add 1 quart extra on trucks quipped with oil cooler.*

►*OTHER HYDRA-MATIC SERVICE DATA—See "Hydra-Matic Drive" in Transmission S ction.*

UNIVERSALS

Half-Ton: Own. Bushing type.

►*TORQUE TUBE BUSHING INSTALLATION (Half-Ton Truck): See "Chevrolet Pass. Cars & Half-Ton Truck Rear Axle" in Rear Axle Section.*

¾, 1, 1½, 2-Ton Trucks: Spicer needle bearing types.

See "Spicer" in Universals Section.

REAR AXLE

SEMI-FLOATING (HALF-T N).

Own. Semi-floating, hypoid gear with Torque Tube drive.

NOTE—Axle is same design as passenger car.

See "Chevrolet Hypoid Semi-Floating" in R ar Axl Section.

Ratio—3.90-1 (37:9) (Synchro-mesh & Hydra-Matic).

►*IDENTIFICATION NOTE*—Axle is identified by Serial No. Prefix stamped on front face of carrier flange on right side: **MU, MV** (Synchro-mesh), **MA, MB** (Hydra-Matic).

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►*AXLE SHAFT NOTE: Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft, or by length as follows:*

Axle	Part No.	Length
Left	3694769 ①	29 5/8"
Right	3694770 ①	30 5/8"

①—Part No. Stamped on axle for identification.
Backlash—.005-.007". Screw adjustment.

Removal: Raise rear of car, remove rear wheels and brake drums, install clamps on wheel cylinders, disconnect hand brake cable from idler levers and remove cables from cable clamps on frame, disconnect brake line at axle housing and shock absorber from rear spring 'U' bolts and plate, disconnect spring shackles and drop springs. Pull axle assembly back to free front end of torque tube, withdraw assembly from beneath car.

Axle Shaft Removal: Wheel bolted directly on flange on outer end of axle shaft. Shaft retained by 'C' washer on inner end of axle in differential case. To remove axle shaft, remove wheel, take out two 'zipon' nuts retaining brake drum, install clamp on wheel cylinder. Remove axle housing cover, differential pinion shaft lock screw, pinion shaft and axle shaft spacer. Push axle shaft in, remove 'C' washer on inner end, pull shaft out.

Axle Shaft Endplay—Free fit to .014" maximum.

FULL-FLOATING (EXC. HALF-TON)

Own. Full-floating hypoid gear (straddle mounted pinion) with Hotchkiss drive.

►**1½ & 2-Ton Note**—Axle shaft splined to wheel hubs. *See "Chevrolet Truck Hypoid Full-Floating" in Rear Axle Section.*

►*IDENTIFICATION NOTE:* Axles are identified by Axle Serial Number prefix letters stamped on top of carrier housing between reinforcing ribs. The letter indicates model year "M" or "X" (1954); "N" or "Y" (1955). The second letter indicates axle model. See Axle Ratio table following:

Axle Ratios & Identification

Truck Model	Ratio	①Ident. Prefix
¾-Ton (Std.) ②	4.57-1	G or H
¾-Ton (Dual)	4.57-1	D
¾-Ton (Dual)	5.14-1	C
¾-Ton (Optl.)	5.14-1	Q
¾-Ton (Fwd. Cont.)	5.14-1	Q
1-Ton ②	5.14-1	J or Q
1-Ton (Fwd. Cont.)	5.14-1	C or A
1½-Ton (Std.)	6.17-1	L
1½-Ton (Optl.)	5.43-1	E
2-Ton	6.17-1	G or K

①—See Identification above.
②—Except Forward Control Models.

Backlash—.005-.008". Screw adjustment.

Removal: Remove differential cover and axle shafts (see below). Disconnect rear universal by removing two U-bolts from rear yoke (wire trunnions to retain bearings). Slide shaft forward and lower to floor. Remove differential carrier mounting bolts.

Axle Shaft Removal (¾ & 1-Ton): Remove eight capscrews and lockwashers in axle shaft flange, install two ½X13 screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

CAUTION—Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft. *Grease at this point will cause loosening of axle shaft flange capscrews.*

Axle Shaft Removal (1½ & 2-Ton): Shaft flange is splined in wheel hub (tight fit) and requires special puller for removal. Remove five capscrews and lockwashers in hub cap, remove hub cap and gasket. Assemble special adapter J-1436-8 on Rear Axle Shaft Bearing & Oil Seal Remover J-1436 (remove jaws), thread adapter into hole in axle shaft flange, pull axle shaft. *NOTE*—When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

Axle Shaft Note—Shafts unequal length (right shaft longer) and may be identified by part number stamped on shaft, or by length as follows:

¾ & 1-Ton Trucks

Axle Shaft	Part No.	Length
Left	3680977	31¼"
Right	3680978	37"

1½-Ton Truck (Splined Shaft)

Axle Shaft	Part No.	Length
Left	3685191	34¼"
Right	3685192	40 5/8"

2-Ton Truck (29 Splines)

Axle Shaft	Part No.	Length
Left	3702295	36¾"
Right	3702296	41¼"

Wheel Bearing Adjustment: Remove wheels and axle shaft (see above). Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ & 2-Ton) while turning hub by hand, then back nut off 45°, check for free turning, install adjusting nut lock (with lock tangs aligned with slots in adjusting nut), bend tang down into notch in adjusting nut, install locknut and tighten securely, bend tang of lock down into notch of locknut.

TWO-SPEED

Own. Full-floating, two-speed double reduction with hypoid gears (first reduction), helical gears (second reduction). Vacuum shift control.

See "Chevrolet Two-Speed Hypoid Gear" in Rear Axle Section.

►*IDENTIFICATION NOTE*—Axle identified by Serial Number stamped on flat top of carrier on right side.

NOTE—Two ratios available as follows:

Ratio	①Ident. Prefix
6.13-1 (High), 8.10-1 (Low)	N or R
6.7-1 (High), 8.86-1 (Low)	S or D

Two-Speed Shift Control: Vacuum power type with selector valve on instrument panel.

Carrier Assembly Removal: Remove axle shaft flange mounting bolts, pull both axle shafts out of housing approximately 8" (to clear differential). Drain axle lubricant and remove inspection plate. Loosen hose clamps and slip hoses off vacuum cylinder hose connections. Disconnect rear universal joint by removing trunnion bearing "U" bolts from rear flange, slide propeller shaft assembly forward, tape universal bearing trunnions in place to prevent loss of needle bearings, swing propeller shaft out of the way (tie up to frame side rail). Remove capscrews mounting carrier on axle housing (support carrier with a punch inserted through one upper mounting screw hole in housing before removing last mounting screw). Place support jack under carrier assembly, roll assembly straight forward until differential clears housing, remove carrier assembly from beneath truck.

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for regular rear axle (see above).

SHOCK ABSORBERS

Delco. Direct Acting (Airplane Type), or Double Acting (Piston Type) hydraulic shock absorbers as follows:

Direct Acting

Location & Model	Delco No.
Front (½, ¾, 1-Ton)	808M
Front (1½, 2-Ton Exc. C.O.E.)	682P
Front (C.O.E.)	682K
Rear (½-Ton)	843V
Rear (¾-Ton)	843T
Rear (1-Ton Utility)	660V

Double Acting

Location & Model	Delco No.
Left Rear (1-Ton Fwd. Control)	1722 F
Right Rear (1-Ton Fwd. Control)	1722 E

FRONT SUSPENSION

Conventional "I" Beam Section, with Reverse Elliot ends and semi-elliptic springs.

Kingpin Inclination—7°10'±1° crosswise (all).

Camber—1°±½° (all). Bend axle for correction (when kingpin inclination is likewise off).

Caster—See Table below. All specifications ±½°.

Toe-In—See Table below. Adjust by turning tie rod.

CAUTION—Tie rod ends must be aligned with studs.

Model	Caster	Toe-In
½-Ton	1°±½°	1/16-3/16"
¾-Ton (Exc. Fwd. Cont.)	¾°±½°	1/16-3/16"
¾-Ton Fwd. Control	2¼°±½°	1/16-1/4"
1-Ton (Exc. Fwd. Cont.)	1¾°±½°	1/16-1/4"
1-Ton Forward Control	1¼°±½°	1/16-1/4"

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Model	Caster	Toe-In
1½-Ton	1¾°±½°	1/16-1/4"
2-Ton (Exc. C.O.E.)	¾°±½°	1/16-1/4"
2-Ton C.O.E.	2¾°±½°	1/16-1/4"

Toe Out on Turns—Outer wheel turned 20°, inner wheel turned 23°±2°.

STEERING GEARS

Saginaw. Ball Bearing Worm & Nut. (re.circulating ball). *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

NOTE—Two different type brakes used as indicated below:

Chevrolet-Bendix (Except Rear Wheels of 1½ & 2-Ton Models)—Duo-servo, single anchor, hydraulic (without eccentric adjustment).

See "Chevrolet-Bendix Hydraulic" in Brake Section.

Chevrolet Twinplex (Rear Wheels 1½ & 2-Ton Models)—Two-cylinder, four anchor type hydraulic. Shoes are self-centering and self-energizing.

See "Chevrolet Twinplex" in Brake Section.

Wheel Cylinders—Size stamped on housing under adjusting cup lock spring.

Drums—Cast iron with steel web.

Model	Front - Diameter - Rear
½-Ton	11" 11"
¾-Ton	12" 12"
1-Ton	12" 14"
1½ & 2-Ton	14" 15"

Lining—Molded type. Riveted on 1½ & 2-Ton Models and bonded on all others.

Thickness—.202-.222" (11"Drum); .264-.284" (12" Drum); .267-.287" (14" Drum); .392-.412" (15" Drum).

Clearance—Adjust for clearance as follows:

All (Exc. 1½ & 2-Ton Rear Brakes)—Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (½-Ton), just enough to eliminate drag (Other models) but not more than 7 notches.

Rear Wheels 1½ & 2-Ton Models—Remove adjusting covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel).

Hand Brake: Step-on pedal applies rear wheel service brakes on ½, ¾, 1-Ton Models. Hand lever applies independent brake on propeller shaft on all other models.

Adjustment: Adjust each type as follows:

½-Ton—With parking brake pedal released, adjust pedal pull rod clevis for 1/8" clearance between cross shaft and frame cross member at center. Depress foot pedal 1½", adjust clevis on forward end of each wheel cable to remove all slack (pull cable out of conduit by hand until positive stop is felt, adjust clevis and reconnect cable). Release rod handle under instrument panel must have ½" minimum clearance at support bracket.

¾ & 1-Ton—With parking brake pedal released, adjust brake pedal pull rod clevis until hole in end of cross shaft outer lever is correct distance to rear of center of cross shaft: 29/32" (¾-Ton), ¾" (¾-Ton Fwd. Control), 11/32" (1-Ton), 19/32" (1-Ton Fwd. Control). Then adjust each wheel cable clevis at cross shaft lever end in same manner as ½-Ton above.

1½ & 2-Ton—.010-.015" clearance between each shoe and brake drum (adjust the adjusting bolt for outer shoe clearance, nut on link for inner shoe).

Power Brakes: *See "Hydrovac Power Unit" in Brake Section.*

MODEL IDENTIFICATION

Series	Serial Prefix	Model
1500①	A	ONE-FIFTY
2100	B	TWO-TEN
2400	C	BEL-AIR
1508	D	SEDAN DELIVERY

①—Except Sedan Delivery.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post.

Starting Serial Number—001001 (at each plant)

►*SERIAL NUMBER NOTE: Serial Number (example B55F001025) includes following identification data in sequence.*

Series①	Year	Assy. Plant②	Serial No.
B	55	F	.001025

①—See Model Designation above.

②—See Assembly Plant Designation below.

Assembly Plant Designation

A—Atlanta	**J**—Janesville	**O**—Oakland
B—Baltimore	**K**—Kansas City	**S**—St. Louis
F—Flint	**L**—Los Angeles	**T**—Tarrytown
	N—Norwood	

ENGINE NUMBER: Stamped on right side of engine block to rear of distributor

Starting Engine Number—0001001 (at each plant) Suffix letters and numerals indicate plant at which engine built ("F" for Flint, and "T" for Tonawanda), Model Year and Model Type as follows.

Engine	Suffix
Regular "235"	Z
Regular "235" (With H.D. Clutch)	ZC
Regular "235" (With aluminum cam gear)	ZH
Regular "235" (With H.D. Clutch & Alum. gear)	ZJ
Powerglide "235"	Y

TUNE-UP

COMPRESSION PRESSURE: 130 lbs minimum with all cylinders equal within 5-10 lbs at cranking speed

VACUUM READING: *CAUTION—Vacuum reading on Standard transmission Cars and Powerglide Cars is different as follows*

Standard Transmission Cars—At 500 RPM.—14.4" (with transmission in Drive Range). 16.7" (with transmission in Neutral) **At 450 RPM.**—14.5" (with transmission in Drive Range). 16.3" (with transmission in Neutral). *NOTE—Manifold vacuum reading at idle speed is lower than previous models because of "high lift" cam used.*

VALVE TAPPET CLEARANCE: (Pass. Cars With Conv. Valve Lifters) - .006" Intake, .013" Exhaust, with engine "normalized" *See "Valve System" in Chevrolet Special Data*

(Powerglide Cars with Hydraulic Lifters)—Adjustment required only when cylinder head removed or lifters replaced. *See Tappet Clearance Adjustment under "Valve System" in Chevrolet Special Data*

Initial Tappet Clearance (Engs. with Hydraulic Lifters). *See "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation when tuning engine. Should require ½ turn from unhooked to hooked position *Distorted springs should be replaced.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: .035".

Spark Plug—AC No. 44-5. 14mm. **Torque to 20-25 ft. lbs.**

COIL: Delco-Remy 1115087. *12 Volt.*

Ignition Current—2.5 amperes idling. 4.5 stopped.

Resistor—Delco-Remy 1927809. On firewall.

►*COIL RESISTOR NOTE:* Resistor connected to ignition switch by two leads and is by-passed during cranking (second lead provides direct connection to coil when **key turned to "Start Engine" position).**

DISTRIBUTOR: Delco-Remy 1112403. *12 Volt.*

Condenser: Delco-Remy 1928111. **Capacity**—.18-.23 mfd.

Contact Point Set—Delco-Remy 1924571

Breaker Gap— 016-.021" (New points), .0125-.0175" (Used points)

Cam Angle—28-35° with .016" gap.

►*BREAKER GAP CAUTION: Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension—19-23 ozs

Rotation—Clockwise viewed from above

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center 'O' position

Vacuum Spark Control: Delco-Remy 1116089

Vacuum Advance

Distr. Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	4-6
7.5	15	7.5-10

Setting—TDC.

IGNITION TIMING

Timing Mark—Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on 'O'.

CARBURETOR

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): Engine must be at normal operating temperature and transmission warm (choke valve wide open and fast idle inoperative with throttle stopscrew against low step of fast idle cam) when adjustments are made.

►*POWERGLIDE LINKAGE ADJUSTMENT PRODUCTION CHANGE:* On later cars the part throttle upshift has been lowered to 12-18 MPH by changing the angle of the transmission throttle control outer lever, and shortening the throttle valve control rod. **Throttle Linkage Adjustment differs from early cars** as indicated in the procedure following To identify early and late type cars it will be necessary to check the part throttle upshift speed Early cars will be 26-28 MPH. **Later cars will be 12-18 MPH.**

►*DECREASING PART THROTTLE UPSHIFT ON EARLY CARS:* If it is desired to decrease part throttle upshift from 26-28 MPH to 12-18 MPH, replace the early type Throttle Valve Outer Lever, Part No 3710634, with later type Part No 3720323 Replace early type Throttle Valve Control Rod, Part No. 3710632 with later type Part No. 3715711. Adjust throttle linkage as indicated below for "1955 Later Cars" when this change is made.

1) Adjust idle speed to 425 RPM with selector lever in "D" range (set hand brake firmly to hold car).

2) Disconnect control rod from throttle lever on transmission case. On ALL cars, remove extreme **lower rear** bolt on left side cover and install Transmission Outer Lever Positioning Gauge J-5906 (see Gauge rework note below). Rotate throttle valve control outer lever assembly counterclockwise to open throttle position.

3) Hold lever in this position, measure distance between bolt hole in side cover and hole in throttle lever with gauge. Pins on gauge should enter holes. Adjust by loosening lever-to-clamp attaching bolt and adjusting lever position on throttle shaft as follows:

1955 Early Cars (With first type Throttle Valve Control Outer Lever No. 3720634 & longer Throttle Valve Control Rod No. 3710631) - 6 3/8" to lower rear bolt hole (changed from 7 3/32").

1955 Later Cars (With later type Throttle Valve Control Outer Lever No. 3720323 & shorter Throttle Valve Control Rod No. 3715711) - 7 3/32" to lower rear bolt hole (no change).

4) Disconnect bellcrank-to-carburetor throttle rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.

5) Force bellcrank-to-transmission throttle lever rod forward against stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.

6) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.

►*REWORK OF TRANSMISSION OUTER LEVER POSITIONING GAUGE J-5906 (For use on both 6 Cyl. & V8 Cars):* Remove bolt hole locating pin (larger pin) from gauge, pressing pin from back of lever leg to remove. Cut 5/16" from pin and replace pin in lever leg, pressing it into place to allow apex of pin to project ¾" above lever leg surface Stake pin in place securely Separate lever leg and place a 3/16" spacer between legs Reassemble lever gauge. *NOTE—In some cases it may be necessary to grind a beveled radius on the outer end of bolt lever leg as required. It will also be necessary to elongate the pivot hole slightly to provide the recommended 7 3/32" setting on earlier cars with first type lever and rod (this 7 3/32" setting supersedes previous 6 3/8" setting).*

ROCHESTER BC

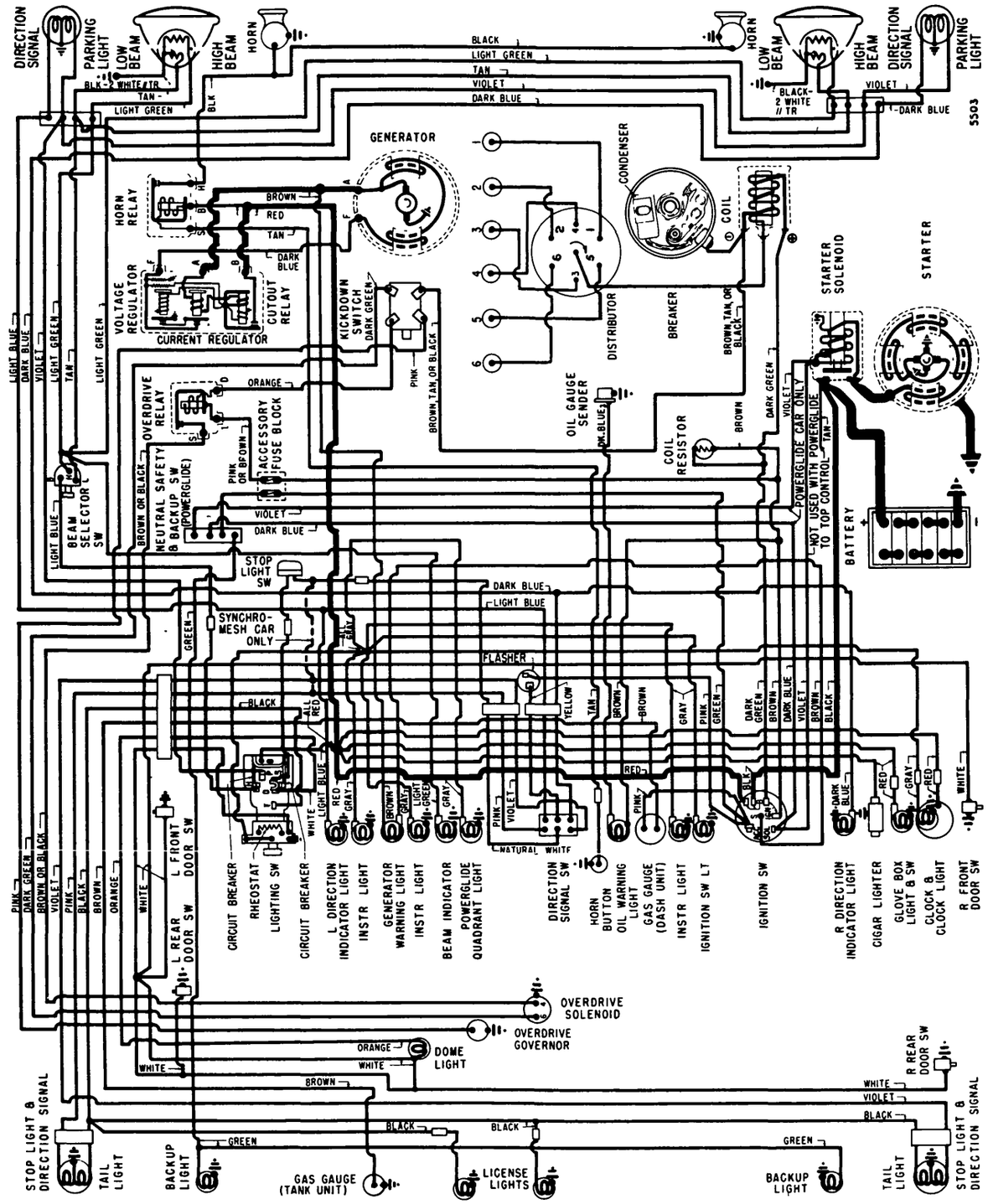
Rochester BC, No. 7007181 (Synchro-mesh), 7007180 (Powerglide). Single barrel, downdraft type.

Idle Setting - 1-2½ turns open. Turn screw out for richer mixture

Idle Speed - 475 RPM (Synchro-mesh), 425 RPM with selector lever in "D" position (Powerglide).

Float Level - Use Gauge No. 3696192. Invert bowl cover and float assembly **but do not remove gasket.** Place gauge in position over floats with gauge tang in discharge nozzle. Adjust each float vertically so they just touch top portion of gauge and bend float arms horizontally to center each float in gauge cutout.

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Tilt assembly 90° to each side to see that floats do not touch gauge. Check float drop or travel by turning cover right side up so that floats drop down. Distance from gasket on cover to bottom of each float must be 1¾". Adjust by bending tang at rear of float assembly.

Choke Adjustment: Index mark on cover aligned with long cast mark on top of choke housing casting.

Fast Idle: With idle adjusting screw on next to highest step of fast idle cam, Gauge J-5120 (.073") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.

Throttle Return Check Adjustment (235" P w rglid Engine): With the engine idle speed set at 425 RPM, shut off engine, close choke valve and position throttle stop screw on highest step of fast idle cam. Using a 9/32" wrench on the flat section of throttle return check shaft, hold shaft from turning, and with a 3/8" wrench turn the adjusting screw until it just contacts the throttle lever contact arm.

►*OTHER DATA: See "Rochester B & BC Carbur t rs" in Carburetor Section.*

Powerglide Throttle Linkag Adjustm nt: *See "CARBURETOR" above.*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type.
Replacement Fuel Pump–AC No. 4149 (Fuel only), No. 4138 (Fuel & Vacuum).
Pressure–3½-4½ lbs.
See "Fuel Pumps" in Carbur tion Equipm nt S ction.

Gasoline Gauge: AC Electric.
Dash Unit–AC No. 1518407.
Tank Unit–AC No. 1518158 (Exc. Sed. Del. & Sta. Wgn.). AC No. 1518180 (Sed. Del. & Sta. Wgn.).
See "Fuel Gauges" in Carbur tion Equipm nt S ction.

BATTERY

Delco 2SM50. *12 Volt.* 9 Plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground–Negative terminal.
Engine Ground–Engine to cowl at rear head bolt.

STARTER

Delco-Remy 1107626. *12 Volt.* **Armatur**–1926626.
Drive–Overrunning clutch (solenoid pinion shift).
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–35 ozs. minimum.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Delco-Remy Solenoid Switch 1119767 mounted on starter and controlled by Ignition & Starter Switch 1116512.
See "Delco-Remy Starter Sol noid (Without R lay)" in Electrical Equipment S ction.

N utral Safety & Back-Up Light Switch: Delco-Remy 1998105 (Powerglide Cars only).
Adjustment–*S "Ch vr l t P werglid " in Transmission S ction.*

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GENERATOR

Delco-Remy 1100310 (Std.), 1102020 (Power Steering).
Armature—Delco-Remy 1928952 (Gen. 1100310), Delco-Remy 1929640 (Gen. 1102020).
Maximum Charging Rate—*See Voltage Regulator.*

Performance Data

Generator	Amps	Volts	RPM
1100310	25	14.0	2780
1102020	30	14.0	2150

Rotation—Counter-clockwise at commutator end
Brush Spring Tension—28 ozs
Field Current—(1100310) 1.5-1.62 amps (1102020) 1.48-1.62 amps. at 12 volts.
Belt Adjustment: 5/16" belt deflection with light thumb pressure midway between generator and pump pulleys

REGULATOR

Delco-Remy 1118945 (Us with Gen. 1100310), Delco-Remy 1118826 (Us with Gen. 1102020). *NOTE*—**Regulator is "1118825 Series".** *Specifications below are for "Normal" settings.*

Cut-Out Relay

Cuts In—11.8-13.5 volts (hot).
Contact Gap—.020".
Air Gap—.020" (with contacts just closed)

Voltage Regulator

Setting—13.8-14.8 volts (hot)
Air Gap—.075" with armature pressed down to point where contacts just touching
Checking & Adjusting—*See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section*

Current Regulator

Setting (1118945)—23-27 amperes (hot)
Setting (1118826)—27-33 amperes (hot)
Air Gap—.075" with armature pressed down to point where contacts just touching
Checking & Adjusting—*See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Autronic Eye: *See "Autronic Eye" in Electrical Equipment Section.*
Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*
Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) and pull shaft and knob out. Remove switch retaining nut and switch assembly
Stop Light Switch Location: Mechanical type mounted under instrument panel adjacent to brake pedal lever
Adjustment—Adjust position of switch so that stop light goes on when brake pedal is depressed 5/8" from fully released position.

FUSES: All accessory fuses except as indicated below are contained on the accessory fuse and junction block located on upper inside of dash panel to left of steering column.

Overdrive—14 amps. Located in Lucite cartridge in overdrive relay feed line on engine side of dash to left of steering column
Radio—In feed line adjacent to radio
Back-up Light—On accessory fuse block

CIRCUIT BREAKER Two 13 amp. circuit breakers located on main light switch, protects all lighting circuits.

HORNS: Delco-Remy 1999759 (Low Note), 1999760 (High Note).
Horn Relay: Delco-Remy 1116781
Contacts Close—5.0-9.5 volts **Contact Gap**—.027"

ENGINE

►*TWO ENGINE USED ON PASSENGER CARS: Conventional 235" & Powerglide 235". See Passenger Car & Truck Model Identification for engine application.*

►*NOTE The following repair data applies to all Pass. Car & Truck Engines.*

Bore	Stroke	Displacement	Rated HP
3 9/16"	3 15/16"	235.5 cu. ins.	30.4

Engine	Compr. Ratio	Developed HP
Standard	7.5-1	123 at 3800 RPM
Powerglide	7.5-1	136 at 4200 RPM

Compression & Vacuum Reading—*See Tune-Up.*

ENGINE REMOVAL: *See Chevrolet Special Data.*

OIL PAN REMOVAL: Remove bolts attaching steering idler arm bracket to frame side rail and drop for clearance. Remove pan retaining bolts and remove pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Chevrolet Special Data*

ENGINE MOUNTINGS: *See Chevrolet Special Data.*

TIGHTENING TORQUES: *See Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64"
Weight—1.18 lbs. (235" Engine), 1.36 lbs (261" Engine),
Removal—Pistons and rods removed from above.
Clearance—.0005-.0011" at bottom of skirt, .0115-.0135" at top land. Selective fit.
Replacement Pistons: Furnished Std. Size & .020", .030", .040" oversize. *STANDARD SIZE PISTON NOTE*—Std. pistons furnished in four sizes with size stamp and size range as follows: **S4**(3.5625"-3.5630"), **S5** (3.5630"-3.5635"), **S6**(3.5635"-3.5640"), **S7**(3.5640"-3.5645").
Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513) With piston and cylinder clean and dry insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.
Installing Pistons: Install piston with notch in piston mark "Front" toward front of engine.

PISTON PINS

Locked in rod. No bushing used in piston.
Diameter—.8660"-.8665". **Length** 3.198"-3.228".
Pin Fit in Piston—Thumb push fit (at room temp.). To check fit, with piston and pin at 70°F, apply light oil film to pin, insert pin vertically in one piston boss (one end of pin in either piston boss). Pin should hold own weight but should install easily with thumb pressure.
Replacement Pins: Furnished Std. .0015", .003", .005" oversize.

PISTON RINGS

Passenger Cars

Ring	Width	End Gap	Side Clearance
Compr. ①	.0930-.0935"	.007-.020"	.001-.003"
Oil ②	.180-.185"	.015"-.035" ③	④

Trucks

Ring	Width	End Gap	Side Clearance
Compr. ①	.0930-.0935"	.007-.020"	.002-.0035"
Oil ⑤	.181-.188"	.015-.055" ③	.000-.008"

①—Deep section "Twist" type. Top ring on Loadmaster & Jobmaster Engines is chrome-plated.
②—4-piece type (two steel rails, spacer, and expander).
③—Gap on rails.
④—Free fit to .010" clearance.
⑤—3-piece type (two chrome-plated steel rails and spacer).

►*RING INSTALLATION CAUTION—Install compression rings with side marked "TOP" upward.*

Replacement Rings: Furnished Std .005", .010", .020", .030", .040" oversize.

CONNECTING RODS

►*CONNECTING ROD REPLACEMENT CAUTION—Rods for 261" Jobmaster engine not interchangeable with other engines. Casting No. 3701491 (Exc. 261" Engine), No. 3702448 (261" Engine).*
Length—6 13/16". **Weight**—31.76 ozs. (Exc. 261" Engine).
Crankpin Journal Diameter—2.311"-2.312", all engines.
Lower Bearing—Replaceable precision type
Clearance—.001-.003" (new), .001-.004" (used). No adjustment. Replace bearings.
Sideplay—.005-.012" at lower end.
Replacement Bearings: Std. .001", .002", .010", .020" undersize.

Installing Rods: Numbers on rods and caps must be together and installed in same numbered cylinders with numbers and pin clamp bolt toward camshaft side.

CRANKSHAFT

►*CAUTION: No. 1 (front) and No. 2 (front intermediat) bearings similar in appearance but must not be interchanged. No. 2 bearing marked by "T" in oil groov .*
Journal Diameters—(1) 2.6835"—2.6845", (2) 2.7145"—2.7155", (3) 2.7455"—2.7465", (4) 2.7765"—2.7775". *NOTE*—Journal taper or out-of-round limits .001". Run-out Limits for Nos. 2 & 3 journals is .002".
Clearance—.0005" minimum,. .003" maximum (new bearings), Service limits .0005" min. .0045" maximum. See Adjustment below.
NOTE—Precision type bearings can be replaced singly.
Bearings—Steel backed thin wall babbitt. *Boring or reaming not required*
Bearing Adjustment: Solid shims. Remove shims until light drag secured when shaft turned by hand, then replace .002" shim on one side for clearance (if unequal number of shims used, place extra shim on same side of all bearings).
Replacement Bearings: Furnished Std. .002", .010", .020", .030" undersize.

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B aring Installati n: Not necessary to remove crankshaft or engine from car. *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Bearing Cap Installation—No. 2 & No. 3 bearing caps marked for identification. Install No 2 cap with mark "FRONT" toward front of engine, No. 3 cap with mark "REAR" toward rear of engine

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data*

End Thrust: Taken by No. 3 (rear intermediate) bearing. To check endplay, force crankshaft to rear, check clearance at rear of No. 3 bearing. Adjust by replacing bearing. **Endplay**—.0035"-.0095".

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*CAMSHAFT REPLACEMENT CAUTION. Different camshafts used in Conventional and Powerglide Engines. The 261" Truck Engine uses same camshaft as used in Corvette (6 Cyl.).*

Camshaft Identification

Model	Camshaft No.	Cast No. ①
235" Pass. (Powerglide) ②	3836483	3836386
235" All (Exc. Powerglide) ②	3836489 ③	3836366
235" Corvette	3636484	3836390
261" Truck	3636484	3836390

①—Number forged or cast on camshaft.

②—Except Corvette.

③—When replacing cast iron camshaft (Identified by **one** large raised dot between No. 5 & No. 6 inlet cams), Steel Distributor Drive Gear, Part No. 1865180 MUST BE USED.

Journal Diameters—**(1)** 2.1537—2.1547". **(2)** 2.0912—2.0922". **(3)** 2.0287—2.0297". **(4)** 1.9662-1.9672".

►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".

Bearing Type—Steel backed babbitt lined bushing.

See "Camshaft & Bearings" in Chevrolet Special Data

Clearance—.0015-.0035".

End Thrust: Taken by thrust plate behind camshaft gear.

Endplay Adjustment—*See "Timing Gears" in Chevrolet Special Data.*

Endplay—Free fit to .003" maximum.

Timing Gears: Fibre (Pass. Cars. Exc. Corvette), Aluminum (Corvette and Trucks). Steel crankshaft gear.

Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*

Timing Gear Backlash—.003-.004".

Camshaft S tting: Gears punch marked. Punch marks on both gears must line up directly opposite each other.

Engin Fr nt C v r Oil Seal (Crankshaft Fr nt S al): *Se "Engin Front Cov r" in Ch vrolet Sp cial Data*

VALVES

Tapp t Clearanc (Pass. Cars with Conv ntional Valv Lifters): 006" Intake, 016" Exhaust, with engine "normalized" *See "Valve System" in Chevrolet Special Data*

(Powerglide Cars with Hydraulic Lifters)—Adjustment required only when cylinder head removed or lifters replaced. *See Tappet Clearance Adjustment under "Valve System" in Chevrolet Special Data*

►*NOTE. "XCR" exhaust valves used in 235" Powerglide, H.D. Trk. & 261" Engine (stamped "XCR").*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 7/8"	.3410-.3417"	6.364-6.394"
Exhaust	1 1/2"	.3410-.3417	4.905-4 930"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30° ③	①	001- 0027'
Exhaust	45° ③	②	.001-.0027'

①—.294" (Conventional 235"), .400" (Powerglide 235"), .405" (Corvette & 261" Jobmaster Engine)

②—.312" (Conventional 235"), .400' (Powerglide 235"), .414" (Corvette & 261" Jobmaster Engine).

③—Seat angle in block 1° additional

Valve Seat Width—.035-.060" (Intake), .062-.093" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Precision type. Pressed in head.

Valve Guide Installation—*See "Valve System" in Chevrolet Special Data.*

Valve Springs: Install springs with closed coil end down. Check with spring tester and replace if not within limits shown below. *NOTE—Conventional Engine and Powerglide Engine valve springs are different.*

Spring Specifications (235" Conventional Engine)

	Pressure	Length
Valve Closed	62-68 lbs.	1.821"
Valve Open	155-165 lbs.	1.505"

Free Length—2 5/32".

Spring Specifications (235" Powerglide Engine)

	Pressure	Length
Valve Open	194-210 lbs.	1.462"

Free Length—2 15/64".

Spring Specifications (261" Truck Engine)

	Pressure	Length
Valve Closed	74-82 lbs.	1.858"
Valve Open	177-187 lbs	1 518"

Free Length—2 281".

Valve Lifters (Conventional 235" Engine): Plain barrel type. Identified by plain barrel and spot of yellow paint below push rod seat. *NOTE*—Valve Lifters used on Corvette has shallow groove around barrel.

Valve Lifters (Powerglide 235" Engine): Hydraulic type. Identified by rib around oil groove.

Hydraulic Lift r Adjustment—Required only when installing cylinder head or when adjusting screw setting has been disturbed. S *"Valve System" in Chevrolet Special Data*

Hydraulic Lift r Overhaul & T sting—*See "Valve System" in Chevrolet Special Data*

►*REMOVING HYDRAULIC VALVE LIFTERS When removing lifters and push rods use a rack to keep them in proper sequence. Install in their original location when reassembling.*

Valve Lifters (261" Truck Engine): Conventional type lifter identified by single groove around body.

Rocker Arm Assembly: *See "Valve System" in Chevrol t Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

235" Conventi nal Engine

Intake Valves—Open 1° ATDC. Close 39° ALDC

Exhaust Valves—Open 42° BLDC Close 9° ATDC

235" Powerglid Engine

Intake Valves—Open 10° 30' BTDC. Close 53° 30' ALDC

Exhaust Valves—Open 49° BLDC Close 15° ATDC.

Valve Timing Check—*(CAUTION*—On 235" Powerglide engine with hydraulic valve lifters, it will be necessary to replace the hydraulic valve lifter and pushrod operating No 1 exhaust valve, with a conventional lifter and pushrod). Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing.

Mount dial indicator on rocker arm shaft with stem of indicator contacting No 1 exhaust valve adjusting screw and set dial indicator to .044" (235' Conventional Engine), 058" (235' Powerglide Engine) Turn crankshaft until indicator hand just stops moving Timing is correct if indicator reading is ZERO plus or minus 004 . Reset tappet to correct running clearance

OILING SYSTEM

►***ENGINE OILING SYSTEM: Se "Engin Lubricati n" under OILING SYSTEM in Ch vrol t Special Data.***

►*ENGINE OIL PUMP SUCTION PIPE PRODUCTION CHANGE (To Prevent Oil Pump Losing Prime at Oil Change): See "Oiling System" in Chevrolet Sp cial Data.*

Crankcase Capacity: 5½ qts (dry), 5 qts (refill)

Normal Oil Pressure: 35 lbs. (approx.)

Pressure Regulator Valv —In oil pump body Not adjustable

Oil Pressure Indicator—Light located at right side of instrument cluster, controlled by a pressure operated switch AC No. 1508245, located in main oil gallery on left side of engine. Switch closes at 4-6 lbs.pressure

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul—*See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: AC P-115

Rocker Arm Oil Lead & Overflow Pip · *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation—Air intake through valve rocker arm cover (air cleaner on some models), outlet through pipe on right side of engine

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COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. (17 qts. with heater).

Pressure Valve: AC No. 850549. Radiator filler cap. 7 lb. type.

Thermostat: Harrison. In cylinder head water outlet.
Standard—No. 3123993 (stamped 151) 151°. Can be used for alcohol anti-freeze.
Optional—No. 3123994 (stamped 160) 160°, No. 3133597 (stamped 170) 170°, No. 3123995 (stamped 180) 180°. *NOTE*—Do not use a 180° thermostat with 7 lb. radiator cap.

Temperature Gauge: AC No. 1512931. Not electric.

Water Pump: Double outlet, packless type with sealed ball-bearing shaft.
See "Water Pumps" in Chevrolet Special Data.

►*WATER PUMP & FAN PULLEY REINFORCEMENT:* Part No. 3720616 has been released for installation on engines where greater pulley durability is required. Later type pumps have this reinforcement. On early type pumps when the reinforcement is installed a slight fan belt misalignment will result, in any case clearance between pulley and pump body should not be less than .065".

Radiator Removal & Installation: *See "Radiator" in Chevrolet Special Data.*

CLUTCH

Own (Exc. Powerglide Cars)—Diaphragm spring type. *See "Chevrolet (Own)" in Clutch Section.*

Clutch Disc—Chevrolet No. 3836103 (Molded). 3836121 (Woven), 3836119 (Hvy. Duty).

Pedal Adjustment: Pedal free travel ¾-1". Loosen check nut at connecting link at clutch fork. Turn adjusting nut to remove all lash at fork, **then back off two turns.** Tighten check nut.

Removal: Remove transmission (see Transmission Removal below). Remove throwout bearing. Remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove cover assembly from below. *CAUTION*—Do not allow plate to hang from retracting springs, (support by hand). When installing clutch, align 'X' mark on cover with 'X' mark on flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh
See "Chevrolet 3-Speed" in Transmission Section.

►*HARD SHIFTING CORRECTION: See "Chevrolet Transmission Control" and "Chevrolet 3-Speed" in Transmission Section for shift linkage rework and installation of new transmission parts.*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain Transmission and disconnect speedometer cable and shift rods. Disconnect propeller shaft at rear universal and slide shaft toward rear to disengage from transmission. Remove two top transmission to clutch housing screws and install Guide Pins J-1126. Remove the two lower screws and slide transmission back until clutch spines are disengaged. Remove transmission from below car.

OVERDRIVE

Warner M d l AS1-R10H. Solenoid operated type with governor control and throttle operated kickdown. Lockout Switch not used.
See "Chevrolet R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh transmission (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Powerglide Transmission (Used with 235" Powerglide Engine)—Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS: See "Chevrolet Powerglide" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication: Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.

Capacity—5 qts. (refill), 11 qts. (after overhaul).

►*POWERGLIDE DRAINING CAUTION—There is no drain plug on converter. Drain transmission case only, add 5 qts. of fluid initially, recheck after idling engine.*

Checking Fluid Level—Engine must be idling with the parking brake set, transmission warm, and the control lever in "N" range when taking dipstick readings. Dipstick is located under hood on right side just opposite starter.

►*OTHER DATA: See "Chevrolet Powerglide" in Transmission Section.*

UNIVERSALS

Own. Needle Bearing type.

►*CAUTION:* Rear bearing companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass. Car (Hotchkiss Drive) in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid gear type, with Hotchkiss Drive. Pinion bearing adjustment is different than on previous models.

See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Car Model	Axle Ratio	Serial Prefix
Std. Transmission	3.70-1	AA or BA
Overdrive	4.11-1	AC or BC
Powerglide	3.55-1	AB or BB

Backlash—.005-.008".

Removal: Raise car and support with jack stands under frame side rails. Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion). Disconnect hand brake cable and equalizer and remove cables from clamps at frame. Disconnect hydraulic brake lines at rear axle housing. Disconnect shocks. Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor.

Axle Shaft Removal: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*—If bearing retainer and parking brake strut interfere, raise strut slightly with screw driver to obtain clearance.

SHOCK ABSORBERS

Delco. Direct acting non-adjustable. Serviced by replacement.

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs and new spherical type joints connecting control arms and steering knuckles.

See "Chevrolet (Spherical Joint)" in Front Suspension Section.

Kingpin Inclination—3½°±½°.
Caster—0°±½°.
Camber—Pos. ½°±½°.

►*CAMBER & CASTER ADJUSTMENT NOTE: Adjusted by shims located between upper control arm inner support shaft and support bracket.*

Toe-In—1/8-3/16".
Toe-Out on Turns—With outer wheel turned 20°, inner wheel should be 22½°±2".

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL BRAKE DATA.*

MISC. MECHANICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL MISC. MECHANICAL DATA.*

►*AIR CONDITIONED CAR SERVICE CAUTION B for disconn cting any part of air conditioning equipm nt or lines for acc ss to ngine, s "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

Series	Serial Prefix	Model
1500	VA	ONE-FIFTY
2100	VB	TWO-TEN
2400	VC	BEL-AIR
2934	VE	CORVETTE

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post

Starting Serial Number–001001 (at each plant) for all models except Corvette

►*SERIAL NUMBER NOTE Serial Number (example VB55F001025) includes following identification information in sequence.*

Series ①	Year	Assy Plant ②	Serial No
VB	55	F	001025

① –See Model Designation above
② –See Assembly Plant Designation below

Assembly Plant Designation

A–Atlanta	**J**–Janesville	**O**–Oakland
B–Baltimore	**K**–Kansas City	**S**–St Louis
F–Flint	**L**–Los Angeles	**T**–Tarrytown
	N–Norwood	

ENGINE NUMBER Stamped on pad at front right hand side of cylinder block behind water pump

Starting Engine Number–001001 (at each plant) Suffix letters and numerals indicate plant at which engine built ("F" for Flint), Model Year and Model Type

Type	Suffix
V8 with 3-Speed Trans	G
V8 with Overdrive	GC
V8 with 4-Barrel Carburetor	GD
V8 with 4-Barrel Carburetor & Overdrive	GE
V8 with 3-Spd Trans & Air Cond	GF
V8 with 3-Spd Trans, Air Cond & 4-Bbl Carb	GG
V8 with Hvy Duty Clutch	GJ
V8 with H D Clutch & Air Cond	GK
V8 with H D Clutch & 4 Bbl Carb	GL
V8 with H D Clutch, Air Cond & 4 Bbl Carb	GM
V8 with Powerglide	F
V8 with Powerglide & 4-Bbl Carb	FB
V8 with Powerglide & Air Cond	FC
V8 with Powerglide, Air Cond & 4-Bbl Carb	FD
V8 Corvette Engine	FG

TUNE-UP

COMPRESSION PRESSURE 130 lbs, minimum with all cylinders within 10 lbs, at cranking speed

VACUUM READING: 17-21" at idling speed

VALVE TAPPET CLEARANCE *(NOTE–Conventional lifters used on first Synchro mesh cars, Hydraulic lifters used on later Synchro-mesh and all Powerglide cars*

Cars With Conventional Lifters - Intake 008" (Std & Corvette) **Exhaust** 016" (Std), 018" (Corvette)

Cars with Hydraulic Lifters–No adjustment required unless cylinder head removed or lifters replaced *See "Valve Tappet Adjustment" under VALVE SYSTEM in Chevrolet Special Data*

MANIFOLD HEAT CONTROL· Thermostatic type Check for free operation when tuning engine

IGNITION

FIRING ORDER 1-8-4-3-6-5-7-2

Cylinders–RIGHT BANK 2-4-6-8 LEFT BANK 1-3-5-7

SPARK PLUG GAP 035"

Spark Plug–AC 44-5 (Std), AC 46-5 (Use for continuous city driving), AC 43-5 (Heavy Duty & Corvette) 14 mm Torque to 20-25 ft lbs

COIL: Delco-Remy 1115087 (Std.), 1115086 (Corvette). 12 Volt At Distributor

Ignition Current–1 8 amps idling 4 0 amps stopped

Resistor–Delco-Remy 1927809 (1 40-1 65 ohms)

►*COIL RESISTOR NOTE* Resistor is connected to ignition switch by two leads and is by-passed during cranking (2nd lead provides direct connection to coil when key turned to "Start Engine" position)

DISTRIBUTOR: Delco-Remy 1110847 (Std.), 1110855 (Corvette).

Condenser–Delco-Remy 1869704, **Capacity** 18 - 23 mfd

Contact Point Set–Delco-Remy 1924499

Breaker Gap– 019" (new points), 016" (used points)

Cam Angle–26-33° with 016" gap

Breaker Arm Spring Tension–19-23 ozs

Rotation–Clockwise viewed from above

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	400	0-4	800
8-10	1150	16-20	2300
15-17	1800	30-34	3600

Vacuum Spark Control Delco-Remy 1116085 (early) 1116100 (later)

Vacuum Advance–No 1116085

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	5-7
14	28	13 5-15 5

Vacuum Advance–No 1116100

Start	0	5-7
11 75	23 5	12-20 5

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265' V8 ENGINE)* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms) *See Ignition Notes in Chevrolet Special Data*

IGNITION TIMING

Setting - 4° BTDC *Set timing at IDLE SPEED with vacuum line connected*

►*IGNITION TIMING PROCEDURE CHANGE Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued*

Timing Mark–Mark on vibration dampener and an indicator on left side of valve chain cover Indicator marked with 5-2° lines each side of "O" TDC mark

CARBURETOR

►*CARBURETOR APPLICATION NOTE: Rochester 2GC Dual Carburetor is Std. on all Pass. Cars & Carter WCFB 4-Barrel Carburetor is Std on Corvette and Optl. n all Pass. Cars as "Pow r Packag ".*

THROTTLE LINKAGE ADJUSTMENT *(POWERGLIDE NOTE–Adjust Transmission Throttle Control Linkage BEFORE adjusting carburetor throttle linkage)*

Carbur t r Throttl Linkage (All Mod ls)–With accelerator pedal depressed full and with throttle valve wide open adjust accelerator-to-throttle lever rod (upper throttle rod) swivel for free entry into throttle lever Then lengthen throttle rod by turning swivel **two full turns.** Connect rod to throttle lever

Transmission Throttle Lev r Adjustm nt (P w rglid Models)–With selector lever in "D" (Drive) range and with hand brake applied, adjust engine idle speed to 425 RPM (engine and transmission at normal operating temperature) Turn engine off and check choke valve to make sure it is fully open and that throttle stop screw is against low step of fast idle cam Disconnect transmission throttle rod at lever on transmission. Remove extreme lower rear bolt in side cover on transmission Rotate transmission throttle valve outer lever counter-clockwise to the open throttle position (against stop) Hold in this position and with throttle valve outer lever positioning gauge J-5906 set to 2-7/8", measure the distance between the bolt hole in side cover and hole in throttle lever If pin of gauge enters hole, adjustment of lever is correct If necessary to adjust, loosen lever to clamp attaching screw and adjust outer lever to obtain correct adjustment Install bolt in side cover and attach throttle rod to transmission lever Disconnect upper and lower rods from carburetor throttle lever Force transmission throttle control rod forward against stop in transmission (open throttle) and adjust lower rod on carburetor throttle lever until swivel pin freely enters hole in lever with throttle valves wide open Adjust upper throttle rod (see Carburetor Throttle Linkage above)

THROTTLE RETURN CHECK ADJUSTMENT (POWERGLIDE CARS) Have engine at full operating temperature Align throttle return check adjusting screw with contact arm on throttle lever by bending return check bracket With parking brake set tight, place selector lever in 'D' range and adjust throttle stop screw and idle adjusting screw in combination with each other for smooth idle at 425 RPM with stopscrew on low step of fast idle cam Shut off engine, close choke valve so that stopscrew on high step of fast idle cam adjust throttle check screw until it contacts throttle lever arm (use wrench to hold shaft)

ROCHESTER 2GC 2-BARREL

Rochester Model 2GC No 7005810 (Early–Pow r-glide), 7008004 (Late–Pow rglid), 7006825 (Early–Synchro-mesh), 7008005 (Late–Synchr -mesh).

►*LEAN SURGE CONDITION AT 55-75 MPH (First Cars with No 7006825 & 7005810 Carburetors) See "Rochester 2GC" Carburetor in Carburetor S ction*

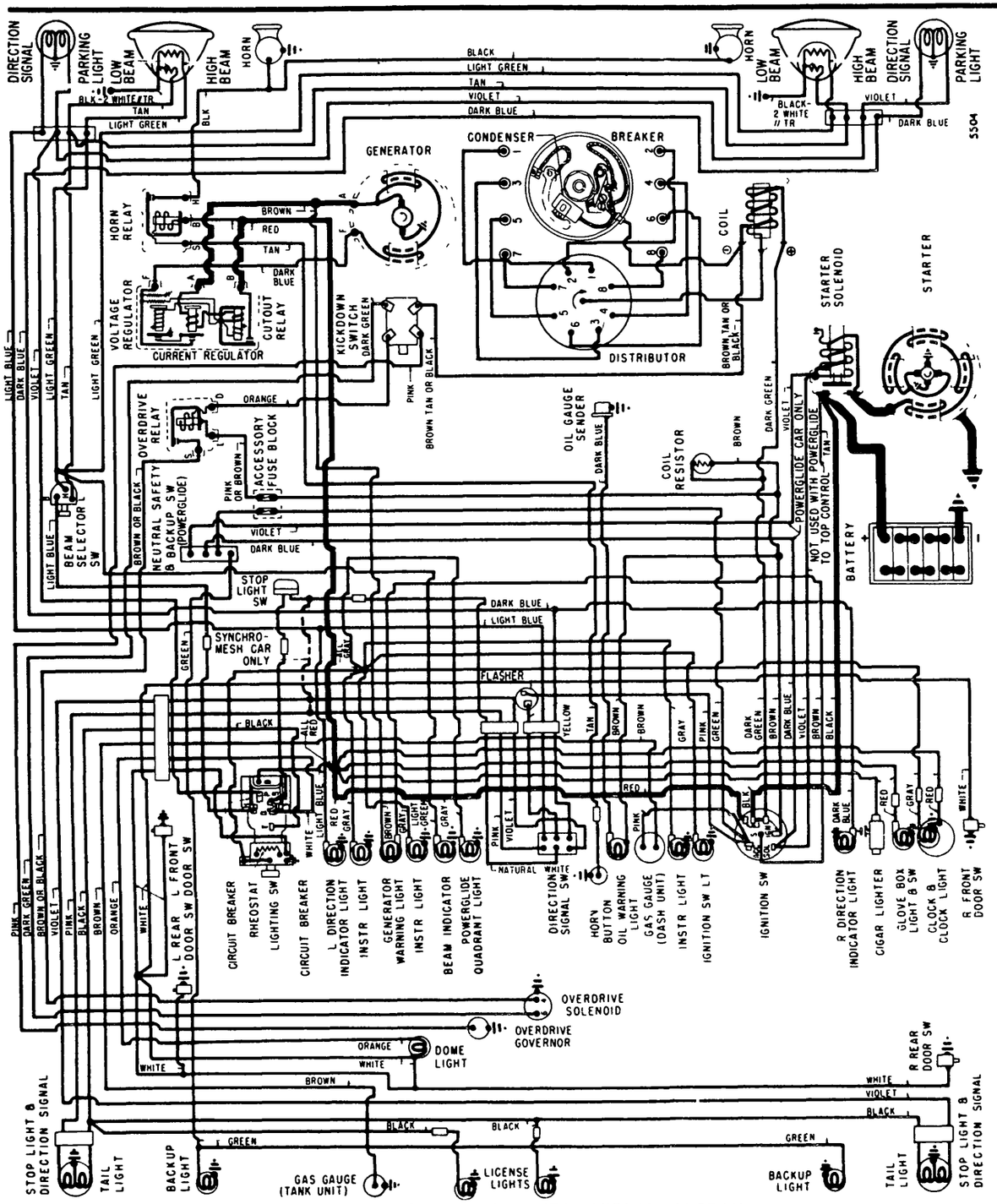
►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting–After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and engine RPM

Idle Speed–450-500 RPM (Synchro-mesh), 400-450 RPM (Powerglide–with Selector lever in "D" range).

Fl at L v l–1 5/32 from air-horn gasket to top of float with assembly inverted Use Gauge BT-107

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PASS. CARS & SEDAN DELIVERY WIRING DIAGRAM

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so it rests against power piston shaft with outer leg in line with center of float.

Float Drop—1 29/32" between air horn gasket and lowest point on bottom of float with air horn held upright (Gauge BT-107). Adjust by bending float tang.

Fast Idle: No adjustment of fast idle speed is provided. It is necessary however, to have correct relationship between fast idle cam position and choke valve position. Check & adjust as follows: Place end of idle adjusting screw on next to highest step of fast idle cam. Using Gauge J-5921, small end of gauge must slide easily between upper edge of choke valve and bore of carburetor, with gauge held vertically. If necessary, bend choke rod until correct clearance is obtained.

Unloader Adjustment—With throttle in wide open position, wide end of Gauge J-5921 must slide freely between upper edge of choke valve and carburetor bore. Bend tang of throttle lever to obtain necessary clearance.

Automatic Choke Setting: Centered (at index).

►*OTHER DATA: See "Rochester 2GC Carburetor" in Carburetor Section.*

Powerglide Throttle Linkage Adjustment: *See "Carburetor" above.*

Throttle Return Check Adjustment (Powerglide Cars): *See "Carburetor" above.*

CARTER 4-BARREL WCFB 2218S & 2351S

►*HARD STARTING (AFTER FLOODING): See "Carter WCFB 4-Barrel Carburetor" in Carburetor Section.*

►*LOADING (WHEN STARTING PARTIALLY WARM ENGINE): See "Carter WCFB 4-Barrel Carburetor" in Carburetor Section.*

►*AIR CLEANER INSTALLATION CAUTION (CARS WITH 4-BARREL CARBURETORS):* Before installing air cleaner, the cutouts in the gasket should be matched up with the vent pipes to prevent blocking off vent

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7*

Idle Setting—1/4—1-1/4 turns open. Adjust both screws alike Turn screws out for richer mixture

Idle Speed—450-500 RPM (Synchro-mesh), 400-450 RPM (Powerglide—with Selector lever in "D" range).

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetor" in Carburetor Section*

Powerglide Throttle Linkage Adjustment: *See "Carburetor" above.*

Throttle Return Check Adjustment (Powerglide Cars): *See "Carburetor" above*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type

Replacement Fuel Pump—AC No. 4150 (Fuel only), No 4141 (Fuel & Vacuum)

Pressure—4-5¼ lbs

See "Fuel Pumps" in Carburetion Equipment Section

Gasoline Gauge: AC Electric

Dash Unit - AC 1519407 (Std.), 1517901 (Corvette).

Tank Unit - AC 1518158 (Exc. Sed. Del., Sta. Wgn,, & Corvette), 1518180 (Sed. Del. & Sta. Wgn.), 1517011 (Corvette). *See "Fuel Gauges" in Carburetion Section.*

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BATTERY

Delco 2SM50. *12 Volt.* 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground–Negative terminal.
Engine Ground–Engine to cowl at rear head bolt.

STARTER

Delco-Remy 1107627, 1107640 & 1107645. 12 Volt.
Armature–Delco-Remy 1926626.
Drive–Overrunning clutch (solenoid pinion shift).
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Delco-Remy Solenoid Switch 1119767 mounted on starter and controlled by Ignition & Starter Switch 1116512. Turn key full RIGHT against spring tension to start.
See "Delco-Remy Starter Solenoid (Without Relay)" in Electrical Equipment Section.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998105 (Std.), 1998112 (Corvette).
Adjustment - *See "Chevrolet Powerglide" in Transmission Section.*

GENERATOR

Pass. Cars - Delco-Remy 1100310 (Std.), 1102020 (Power Steering). 12 Volt.
Corvette - Delco-Remy 1102025. 12 Volt.
Armature - Delco-Remy 1928952 (Gen. 1100310), 1929640 (Gen. 1102020), 1926640 (Gen. 1102025).
Maximum Charging Rate - *See Voltage Regulator.*

Performance Data - Cold

Generator	Amperes	Volts	RPM
1100310	25	14	2780
1102020 & 1102025	30	14	2150

Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - (1100310) 1.5-1.62 amps. (1102020 & 1102025) 1.48-1.62 amps. at 12 volts.
Belt Adjustment: 13/16" belt deflection midway between fan and generator pulleys with a light pressure applied.

REGULATOR

Delco-Remy 1118945 (Use with Gen. 1100310), Delco-Remy 1118826 (Use with Gen. 1102020). *NOTE–Regulator is "1118825 Series". Specifications below are for "Normal" settings.*

Cut-Out Relay

Cuts In–11.8-13.5 volts (hot).
Contact Gap–.020".
Air Gap–.020" (with contacts just closed).

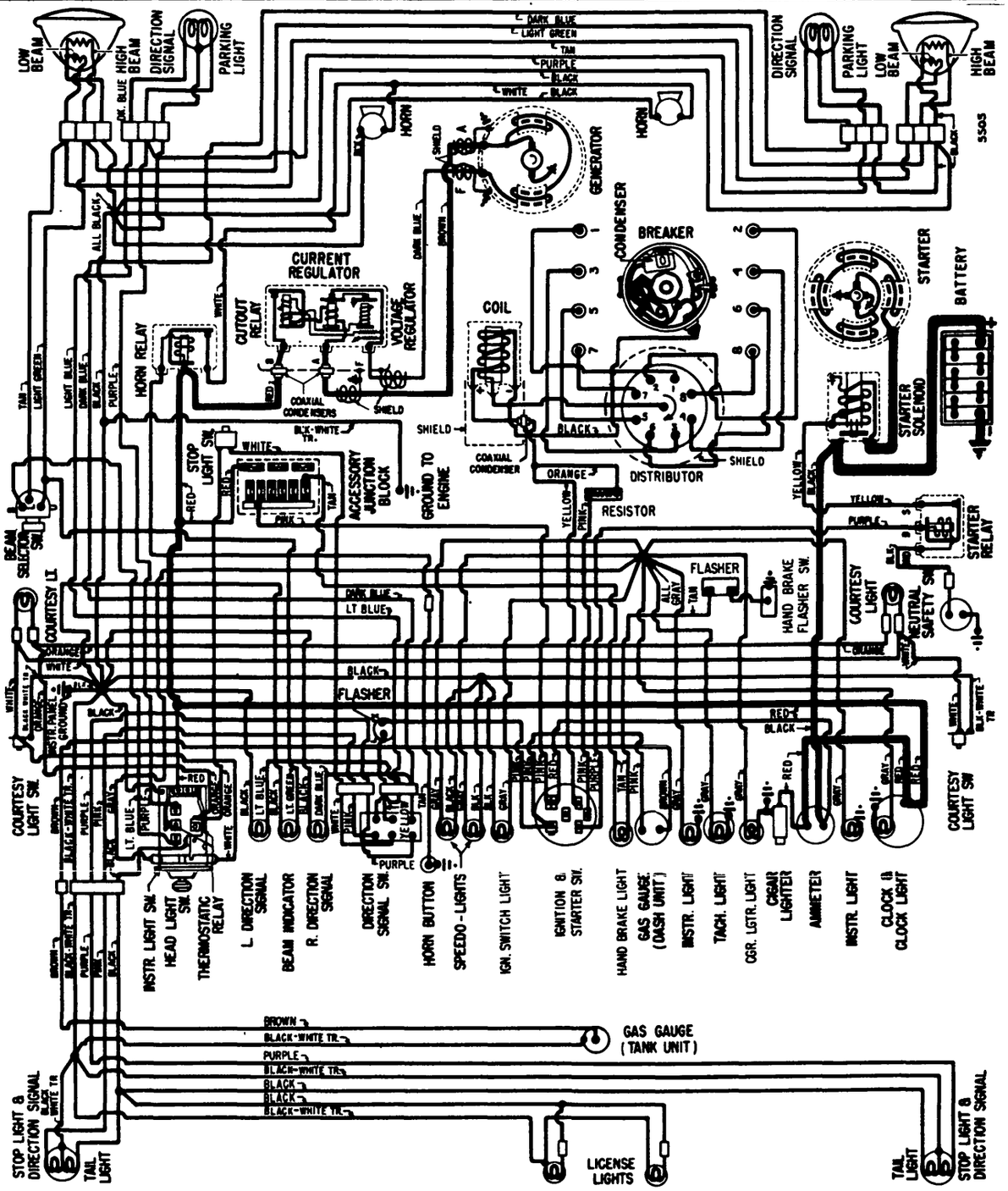
Voltage Regulator

Setting–13.8-14.8 volts (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–*See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section.*

Current Regulator

Setting (1118945)–23-27 amperes (hot).
Setting (1118826)–27-33 amperes (hot).

CONTINUED ON NEXT PAGE



CORVETTE WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—See *"Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equipment Section.*

Autronic Eye: *See "Autronic Eye" in Electrical Equipment Section.*

Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*

Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) and pull shaft and knob out. Remove switch retaining nut and switch assembly.

Stop Light Switch Location: Mechanical type mounted under instrument panel adjacent to brake pedal lever. **Adjustment**—Adjust position of switch so that stop light goes out when brake pedal depressed 5/8" from fully released position.

FUSES: All accessory fuses except as indicated below are contained on the accessory fuse and junction block located on upper inside of dash panel to left of steering column.

Overdrive—14 amps Located in Lucite cartridge in overdrive relay feed wire on engine side of dash panel to left of steering column

CIRCUIT BREAKER: Two 13 amp, circuit breakers located on main lighting switch, protects all lighting circuits

HORNS: Delco-Remy 1999759 (Low Note), 1999760 (High Note).

Horn Relay: Delco-Remy 1116781.

ENGINE

PASSENGER CARS

►*TWO ENGINES ON PASSENGER CARS "Conventional V8" (Early Synchro-mesh Cars—with "solid" valve lifters), and "Powerglide V8" (All Powerglide & Later Synchro-mesh Cars—hydraulic valve lifters)*

ENGINE SPECIFICATIONS· Own "V8" Valve-in-head.

Bore	Stroke	Displacement	Rated H.P.
3¾"	3"	265 cu. ins.	45

Engine	Compr. Ratio	Developed H.P.
Standard	8.0-1	162 at 4400 RPM
With Power-Pack	8.0-1	180 at 4600 RPM

Compression & Vacuum Reading—See *Tune-Up.*

►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE)* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation *See "Ignition Notes" in Chevrolet Special Data*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: Disconnect steering idler arm bracket from frame side rail and drop for clearance.

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data*

CYLINDER HEAD & MANIFOLDS: *See Chevrolet Special Data.*

TIGHTENING TORQUES: *See Chevrolet Special Data.*

PISTONS

Cast aluminum, slipper skirt, with piston pin offset 5/64".

Weight—18.77 ozs.

Removal—Pistons and rods removed from above.

Replacement Pistons: Furnished Std. Size & .020", .030", .040" oversize.

►*STANDARD SIZE PISTON NOTE:* Standard pistons furnished in four sizes with size code stamped on piston. The sizes and codes are· **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520")

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole) Pull required to withdraw feeler must be 7-18 lbs.

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block. *See Rod Installation.*

PISTON PINS

Piston pin is pressed into connecting rod and retainers are not used.

Diameters—.9270-.9273". **Length**—3.1200".

Pin Fit in Piston—.00015-.00025". Pins should be capable of supporting own weight in either pin boss at 60°F.

Pin Fit in Connecting Rod—*NOTE—Special tools required for removal & installation. See "Piston Pins" in Chevrolet Special Data.*

Replacement Pins: Furnished only in assembly with piston. Oversizes not available.

PISTON RINGS

Upper compression ring is chrome plated and oil control ring is the four piece type (two steel rails, separator, and expander).

Ring	Width	End Gap	Side Clearance
Compr	077- 078"	007- 020"	001- 003"
Oil	181- 188"	015- 055" ①	000- 008"

①—Gap on rails

►*RING INSTALLATION CAUTION. Install compression rings with side marked "TOP" upward.*

Replacement Rings: Furnished in Standard size, .020", .030", 040" oversize

CONNECTING RODS

Length—5 700" (center-to-center).

Crankpin Journal Diameter—1 999-2.000".

Lower Bearing—Replaceable precision type.

Clearance— 001- 003" (new), 001-.004" (used).

Sideplay— 008- 014" (both rods).

Replacement Bearings Furnished Standard size, .001", 002", 010", 020" Undersize

Installing Rods: Install rod in piston so that flange or heavy side of rod at bearing end will be toward front of piston (cast depression in head of piston and "F" mark on piston strut) on Nos. 1, 3, 5, and 7 pistons, and rod flange to rear of piston on Nos. 2, 4, 6, and 8 pistons. Install rod and piston assembly in cylinder with cast depression in piston head and "F" mark on strut toward front of cylinder block.

CRANKSHAFT

Journal Diameter—2 2978-2 2988"

►*NOTE Journal runout at intermediate bearing .002" max*

Clearance— 001- 003' (new bearings), 001- 004 (used)

End Thrust—Taken at No 5 (rear) main bearing

Endplay— 002- 006 Check at front of rear bearing

Replacement Bearings Furnished Standard size, 001', 002', 010', 020' Undersize

Bearing Installation Not necessary to remove crankshaft or engine from car *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Rear Main Bearing Oil Seal· *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Front Oil Seal· *See "Engine Front Cover" in Chevrolet Special Data*

Vibration Dampener· *See "Vibration Dampener" in Chevrolet Special Data*

CAMSHAFT

►*CAMSHAFT CAUTION TWO camshafts used as follows* **No 3713453 (Cast No 3713103)**—Cars with solid (conventional mechanical) valve lifters

No 3704212 (Cast No 3703906)—Cars with hydraulic valve lifters

Journal Diameters—1 8682-1 8692' (all journals)

Clearance— 0015- 0035

Bearings—Steel backed babbitt lined bushing

Replacement Bearings· "Precision" type (do not require reaming) Use Tool Set J-6098 to remove and install bearings

Camshaft Setting Both sprockets marked '0' Install chain with sprocket marks adjacent and in line with straight edge across shaft centers

►*CAUTION When installing sprocket on camshaft, line up dowel holes in sprocket and shaft DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket into place*

Timing Chain Silent Link Type

Removal & Installation—*See "TIMING CHAIN" in Chevrolet Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance *NOTE—"Solid" (conventional) lifters used on Early Synchro mesh Cars, Hydraulic lifters used on all Powerglide and Later Synchro mesh Cars*

Cars with Conventional Lifters— 008 Intake 016' Exhaust with engine "normalized" *See "Valve System" in Chevrolet Special Data*

Cars with Hydraulic Lifters—No adjustment required unless cylinder head removed or valve lifters replaced *See "Valve System" in Chevrolet Special Data*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 720"	3415- 3422"	4 902-4 922'
Exhaust	1½'	3410- 3417"	4 913-4 933'

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°③	①	001- 0027'
Exhaust	45°③	②	0015- 0032'

①— 336" (Solid lifters) 324" (Hydraulic lifters)

②— 343" (Solid lifters) 324" (Hydraulic lifters)

③—Seat angle in block is 46°

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Valv Seat Width–3/64"-1/16" (Intake), 1/16"-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves are furnished with .003", .015", .030" oversize stems. Use Reamer Set J-5830 for reaming guide holes.

Valve Springs: Install springs with closed coil end of spring toward cylinder head. On intake valve springs a baffle is used inside spring.

Valve Spring Specifications: 71-79 lbs. pressure when spring compressed to 1 45/64".

Free Length–2.03" **Installed Height**–1 11/16-1 47/64".

►*VALVE SPRING INSTALLED HEIGHT CAUTION.* Check installed height of valve spring after grinding valves by measuring the distance from spring seat in cylinder head to top of valve spring. If this dimension exceeds 1 47/64" install a valve spring seat shim approximately 1/16' thick.

Valve Lifters (Conventional "Solid" Type): Plain barrel type. Remove in same manner as hydraulic lifters. *See "Valve System" in Chevrolet Special Data.*

Valve Lifters (Hydraulic Type): Identified by rib in center of oil feed relief at center of body. *See "Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement–*See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Cars with Conventional Lifters

Intake Valves–Open 12° BTDC Close 54° ALDC.
Exhaust Valves–Open 52° BLDC Close 14° ATDC

Cars with Hydraulic Lifters

Intake Valves–Open 18° BTDC Close 54° ALDC
Exhaust Valves–Open 52° BLDC Close 14° ATDC

ENGINE
CORVETTE

ENGINE SPECIFICATIONS: Own. "V8" Valve-in-head.

Bore	Stroke	Displacement
3¾"	3"	265 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0-1	45	195 at 5000 RPM

►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE):* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation. *See "Ignition Notes" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See Chevrolet Special Data.*

OTHER ENGINE DATA: *See 1955 Chevrolet V8 Pass. Car Engine Data and note the following:*

CAMSHAFT: *CAUTION–The Corvette camshaft is different than the camshaft used in V8 Pass. Cars, and is identified by No. 3711354 cast into shaft.*

Valves:	Head Diam.	Stem Diam.	Length
Intake	1.720"	.3415-.3422"	4.902-4.922"
Exhaust	1½"	.3410-.3417"	4.913-4.933"

Valv	Seat Angl ①	Lift	Stem Clearanc
Intake	45°	.4043"	.001-.0027"
Exhaust	45°	.4136"	.0015-.0032"

①–Angle in head is 46°.

Valve Springs: Install springs with closed coil end down.

	Spring Pressure	Length
Valve Closed	.65-72 lbs.	1.696"
Valve Open	151-161 lbs.	1.306"

Valve Lifters: Barrel type. Not hydraulic

VALVE TIMING: *NOTE–Valve timing is different than on the V8 Passenger Car.*

Intake Valves–Open 21°30' BTDC. Close 63°30' ALDC.

Exhaust Valves–Open 62°30' BLDC. Close 23°30' ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts. (refill), 5 qts (Dry)

Normal Oil Pressure: 35 lbs (approx.)

Pressure Regulator Valve–In oil pump body. Not adjustable.

Oil Pressure Indicator–Light located at right side of instrument cluster, controlled by a pressure operated **switch AC No. 1508245 (Std.), 1508063(Corvette), located in main oil gallery on engine left side. Switch closes at 4-6 lbs.**

Oil Filter Element: AC P-115

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul–*See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation–Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. (17 qts. with heater).

Pressure Valve: AC No. 850549. In radiator cap. 7 lb. type.

Thermostat: Harrison. In water outlet in intake manifold.

Standard–No. 3123993 (stamped 151), 151° Can be used for alcohol anti-freeze.

Optional–No. 3123994 (stamped 160) 160°, No. 3133597 (stamped 170) 170°, No. 3123995 (stamped 180) 180°.

NOTE–Do not use a 180° thermostat with 7 lb. radiator cap.

Temperatur Gaug: AC No. 1512931 (Std.), 1512756 (Corvette). No Electric.

Water Pump: Packless type with sealed ball bearing shaft.

See "Water Pumps" in Chevrolet Special Data.

Radiator Removal & Installation: *See "Cooling System" in Chevrolet Special Data.*

CLUTCH

Own (Exc. Powerglide Cars)–Diaphragm spring type. *See "Chevrolet (Own)" in Clutch Section.*

Model	Clutch Disc No.
Standard (Exc. O.D., Hvy. Duty)	3836708
Standard (Exc. O.D., H.D. & 4-Bbl. Carb.)	3836534
Overdrive (Exc. Hvy. Duty & 4-Bbl. Carb.)	3720227
Heavy Duty	3836119

Pedal Adjustment: Pedal free travel ¾-1'. Loosen check nut at connecting link at clutch fork. Turn adjusting nut to remove all lash at fork, **then back off two turns.**

Removal: Remove transmission (see Transmission Removal below). Remove throw-out bearing. Remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove cover assembly from below. *CAUTION*–Do not allow pressure plate to hang from retracting springs (support by hand). When installing clutch, align 'X' marks on cover and on flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Chevrolet 3-Speed" in Transmission Section.

►*HARD SHIFTING CORRECTION. See "Chevrolet Transmission Control" and "Chevrolet 3-Speed" in Transmission Section for shift linkage rework and installation of new transmission parts.*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission and disconnect speedometer cable and shift rods. Disconnect propeller shaft at rear universal and slide shaft toward rear to disengage from transmission. Remove two top transmission to clutch housing screws and install Guide Pins J-1126. Remove the two lower screws and slide transmission back until clutch splines disengage. Remove transmission from below car.

OVERDRIVE

Warner Model AS1-R10H. Solenoid operated type with with governor control and throttle operated kickdown.

See "Chevrolet R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

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POWERGLIDE TRANSMISSION

Powerglide Transmission—Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Chevrolet Powerglide" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication—Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.

Capacity—5 qts. (refill), 11 qts. (after overhaul).

►*POWERGLIDE DRAINING CAUTION: There is no drain plug on converter. Drain transmission case only, add 5 qts, of fluid initially, recheck after idling engine.*

►*CHECKING FLUID LEVEL & FILLING TRANSMISSION NOTE:* A filler plug has been added to transmission side cover for use in checking fluid level and adding fluid to transmission. This change made necessary because filler tube and dipstick is not accessible from under hood on air conditioned cars.

Checking Fluid Level—Engine must be idling with parking brake set, transmission warm, and the selector lever in "N" position when taking dipstick readings (on cars without air conditioning), or checking level at filler plug on side of transmission (cars with air conditioning). Maintain fluid level to "F" mark on dipstick (cars without air conditioning), or to bottom of filler plug hole on side of transmission (cars with air conditioning).

►*OTHER DATA: See "Chevrolet Powerglide" in Transmission Section.*

UNIVERSALS

Own. Needle bearing type.

►*CAUTION:* Rear bearing companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid gear type, with Hotchkiss Drive. Pinion bearing adjustment is different than on previous models.

See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Car Model	Axle Ratio	Serial Prefix
Std. Transmission	3.70-1	AA or BA
Overdrive	4.11-1	AC or BC
Powerglide	3.55-1	AB or BB

Backlash—.005-.008".

Removal: Raise car and support with jack stands under frame side rails. Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion). Disconnect hand brake cable and equalizer and remove cable from clamps at frame. Disconnect hydraulic brake lines at rear axle housing Disconnect shocks. Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor.

Axle Shaft Removal: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*—If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance.

SHOCK ABSORBERS

Delco. Direct acting non-adjustable. Serviced by replacement.

FRONT SUSPENSION

Independent with direct acting shock absorbers within front coil springs. Different types used as follows:

Corvette—"Threaded Bushing" type pivot points on upper and lower control arms.

Others—"Spherical Joint" type pivot points between control arms and steering knuckle support.

See "Chevrolet" in Suspension & Wheel Alignment Sect.

See "Chevrolet (Spherical Joint)" in Front Suspension Section.

Kingpin Inclination - 3½°±½° (Std.), 3½°-4½° (Corvette).
Caster - 0°±½° (Std.), 0°-Pos. 1° (Corvette).
Camber - 0°-Pos. 1°.
Toe-In - 1/8-3/16" (Std.), 0-1/8" (Corvette).
Toe-Out on Turns - **(Std.)** Outer wheel 20°, inner should be 22½°±2°.
(Corvette) Outer wheel 17°, inner should be 20°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes.

See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION:* To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087" smaller diameter than the drum diameter. Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action. *NOTE—If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter.*

►*SLOW BRAKE PEDAL RETURN CORRECTION: See "Brake Notes" in Chevrolet Special Data.*

Drums—Diameter 11".

Wheel Cylinder Diameter—Front 1 1/8", Rear 1".

Lining	Width	Thickness
Front Whl.	2"	.187-.194"
Rear Whl.	1¾"	.187-.194"

Length Per Shoe—9.3125" (Primary), 11.6875" (Secondary).

Braking Power—55.9% (Front Wheels), 44.1% (Rear Wheels).

Clearance—Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag after adjustment.

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid—Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole.

Removal—Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove four retaining nuts and lock washers holding master cylinder to firewall and remove cylinder.

Installation—Reverse removal procedure making sure that push rod clevis is straddling the brake pedal. Refill master cylinder and bleed all brake lines. Adjust push rod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake push rod (approximately 1/16" pedal clearance).

Power Brakes: Bendix Vacuum Type Power Unit replaces conventional master cylinder.

See "Bendix Power Unit" in Brake Section.

MISC. MECHANICAL

Air Conditioning: *See "Chevrolet Air Conditioning" in Miscellaneous Section.*

Windshield Wipers: Cable operated type (Std.). Electric type (Optional).

See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type with reversible motor operating each door window assembly.

See "Power Window Regulators" in Miscellaneous Section.

Power Top Controls: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjuster: Reversible electric motor controls horizontal front seat movement. *See "Power Seat Adjusters" in Miscellaneous Section.*

MODEL IDENTIFICATION

Series	Serial Prefix	Wheelbase	Type
3100	H	114"	Half Ton
3200	M	123 1/4"	Half Ton
3400	F	104"	① 3/4 Ton
3500	G	125"	① 3/4 Ton
3600	J	123 1/4"	3/4 Ton
3700	K	137"	① 3/4 Ton
3800	L	135"	1 Ton
4100	N	130"	1 1/2 Ton
4400	P	154"	1 1/2 Ton
4500	R	154"	② 1 1/2 Ton
5100	S	112 5/8"	③ 2 Ton
5400	T	136 5/8"	③ 2 Ton
5700	U	160 5/8"	③ 2 Ton
6100	V	130"	2 Ton
6400	W	154"	2 Ton
6500	X	172"	2 Ton
6700	Y	194"	② 2 Ton
6800	Z	220"	② 2 Ton
5100S	SS	112 5/8"	④ 1 1/2 Ton
5400S	ST	136 5/8"	④ 1 1/2 Ton
5700S	SU	160 5/8"	④ 1 1/2 Ton
6100S	SV	130"	⑤ 1 1/2 Ton
6400S	SW	154"	⑤ 1 1/2 Ton
6500S	SX	172"	⑤ 1 1/2 Ton

①—Forward Control. ②—School Bus Chassis.
③—Low Cab Forward. ④—Low Cab Forward Special.
⑤—Special.

SERIAL NUMBER: Stamped on a metal plate and attached to the body as follows: **Forward Control Models**—On instrument panel support. **Flat Face Cowl Models**—On cowl inner panel. **All Other Models**—Left front door hinge pillar.

Starting Serial Number: 001001 at each assembly plant regardless of series.

►*SERIAL NUMBER NOTE: Serial number (example V255K 001083) includes following identification data in sequence.*

Series ①	Year	Assy. Plant ③	Serial No.
V	255②	K	001083

①—Serial Prefix for each model.
②—Second Series 1955
③—See Assembly Plant Designation (below).

Assembly Plant Designation

A—Atlanta	K-Kansas City	S—St. Louis
B—Baltimore	L—Los Angeles	T—Tarrytown
F—Flint	N—Norwood	O—Oakland
J—Janesville		

ENGINE NUMBER (V8): Stamped on pad at front right hand side of cylinder block behind water pump.

ENGINE NUMBER (6 CYL.): Stamped on right side of block to rear of distributor.

Starting Engine Number: 0001001 (at each plant). Engine numbers will run concurrently with 1st Series Trucks. Suffix letters and numerals indicate plant at which engine built ("F" for Flint, "T" for Tonawanda, "C" for Canadian), Model Year, and Model Type. *Series following for Series Type Designation.*

►*ENGINE NUMBER NOTE: Engine number (example 0001025 F 255 T) includes following identification data in sequence.*

Serial No.	Engine Plant ①	Year	Series ②
0001025	F	255③	T

①—See Starting Engine Number (above).
②—See Series Type Designation (below).
③—Second Series 1955.

Series Type Designation

Series	Engine	Designation
3100, 3200, 3600, 3800	Thriftmaster 235"	① X
3100, 3200, 3600, 3800	Thriftmaster 235" ②	① M
3400, 3500, 3700	Thriftmaster 235" ③	T
3400, 3500, 3700	Thriftmaster 235" ④	L
4000	Thriftmaster 235" ⑤	⑥ S
5000	Taskmaster V8	E
6000	Loadmaster 235"	P
6000	Jobmaster 261"	⑦ N

①—"A" stamped following suffix when this engine used in 3600 Series, and "B" when used in 3800 Series.
②—With Hydra-Matic Transmission.
③—With Updraft carburetor.
④—With Updraft carburetor and Hydra-Matic.
⑤—With Heavy Duty Clutch
⑥—"A" stamped following suffix when this engine used in 3600 Series, "B" if used in 3800 Series, and "C" if used in 3100 & 3200 Series.
⑦—"A" stamped following suffix when this engine used in 4000 Series.

TUNE-UP

COMPRESSION PRESSURE: 6 Cyl. Engine—130 lbs. minimum with all cylinders equal within 5-10 lbs. at cranking speed.
V8 Engine—160 lbs. minimum with all cylinders equal within 10 lbs. at cranking speed.

VACUUM READING: 6 Cyl. Engine—17-21" at idling speed.
V8 Engine—Adjust to highest steady vacuum reading

VALVE TAPPET CLEARANCE: *(NOTE—Conventional type lifters used on 6 Cyl. engines. Hydraulic valve lifters used on V8 Engines. See Production Change*

►*V8 ENGINE VALVE LIFTER PRODUCTION CHANGE:* Conventional type lifters used in Early V8 Trucks without Automatic Transmissions All later trucks were equipped with hydraulic valve lifters
Initial Tappet Clearance (Engs. with Hydraulic Lifters) *See "Valve System" in Chevrolet Special Data.*
6 Cyl. Engines—(3000 Series)—Intake 006". Exhaust .016". **(Other Series)**—Intake .006". Exhaust .020". with engine "normalized" *See "Valve System" in Chevrolet Special Data*
V8 Engines (With Conventional Lifters)— 008" Intake, 016" Exhaust, with engine "normalized". *See "Valve System" in Chevrolet Special Data.*
V8 Engines (With Hydraulic Lifters)—No adjustment required unless cylinder head removed or valve lifters replaced *See "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation when tuning engine. On 6 Cyl. engines, ½ turn from unhooked position should be required to place spring in hooked position. Distorted springs should be replaced.

IGNITION

FIRING ORDER: 6 Cyl. Engines—1-5-3-6-2-4.
V8 Engines—1-8-4-3-6-5-7-2. See diagram.

SPARK PLUG GAP: .035".
Spark Plug—AC No 44-5 (Std.). AC 46-5 (Continuous operation). AC 43-5 (Use for heavy duty operation). 14mm. Torque to 20-25 ft. lbs.

COIL: Delco-Remy 1115087. *12 Volt.*
Ignition Current—1 8 amps. idling, 4.0 stopped
Resistor—Delco-Remy 1931614 On firewall.

►*COIL RESISTOR NOTE:* Resistor is connected to ignition switch by two leads and is by-passed during cranking as follows: **(Trucks with Key Starting)**—2nd lead provides direct connection to coil when key turned to "Start Engine" position **(Trucks with Pedal Starting)**—2nd. lead provides direct connection to coil while starter cranking (feed through lead from starter switch to ignition switch—see diagram)

DISTRIBUTOR: Delco-Remy. (235" Eng.) 1112403, (261" Eng.) 1112407, (V8 Eng.) 1110847. *12 Volt.*
Condenser—Delco-Remy 1928111 (6 Cyl Distr.), 1869704 (V8 Distr.) **Capacity**—.18- 23 *mfd.*
Contact Point Set—Delco-Remy 1924571 (6 Cyl. Distr.), 1924499 (V8 Distr.)
Breaker Gap— 019" (new points), 016" (used points).
Cam Angle—28-35° (6 Cyl. Distr.), 26-33° (V8 Distr.), all at 016" gap.
Breaker Arm Spring Tension—19-23 ozs.
Rotation—Clockwise viewed from above.

Automatic Advance—1110847

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	400	0-4	800
8-10	1150	16-20	2300
15-17	1800	30-34	3600

Automatic Advance—1112403

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Automatic Advance—1112407

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	350	0-4	700
7-9	750	14-18	1500
11-13	1200	22-26	2400
16-18	1800	32-36	3600

Vacuum Spark Control: Delco-Remy 1116089 (6 Cyl. Distr.), 1116085 (V8 Distr.)

Vacuum Advance—1110847

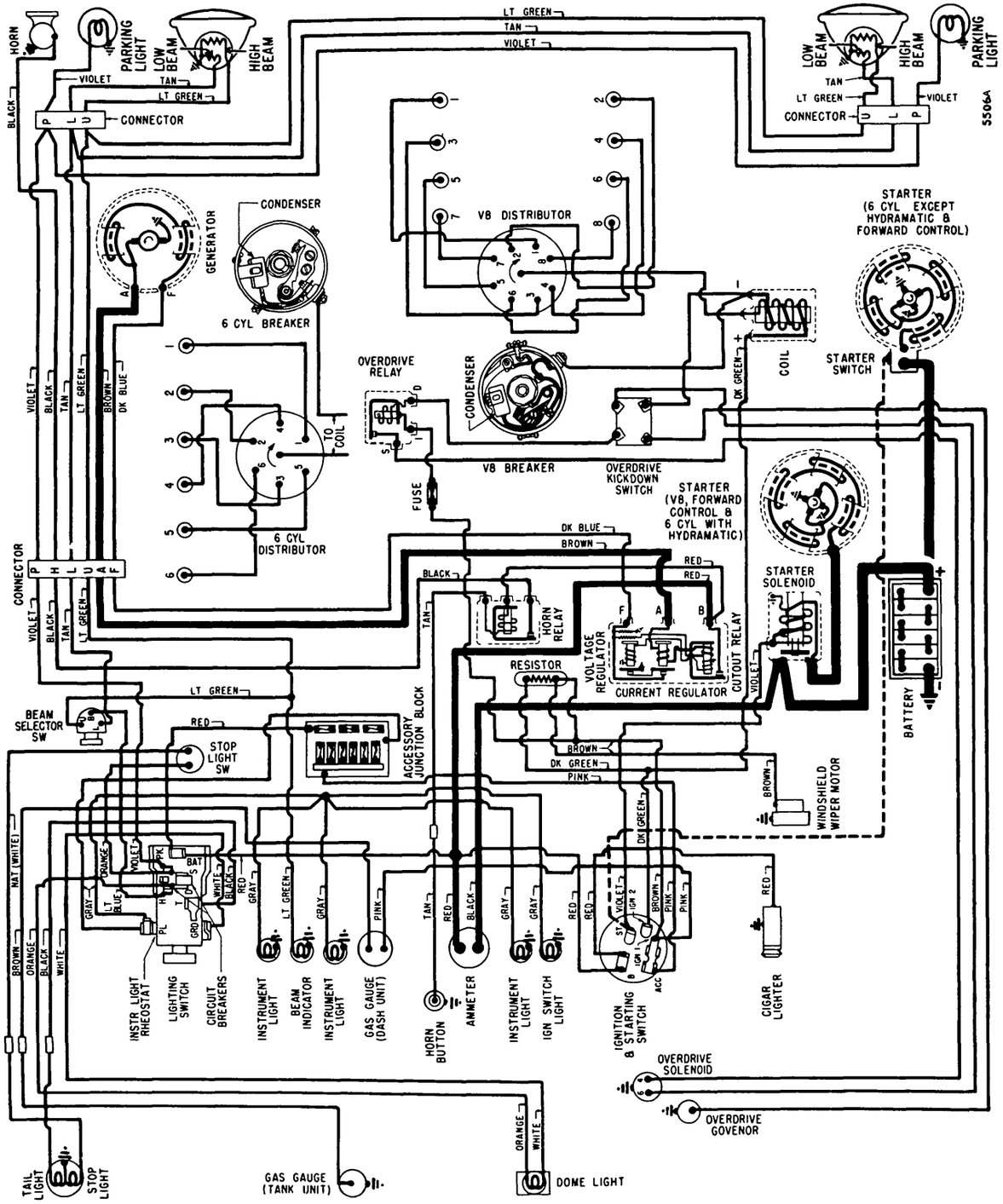
Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
14	28	13 5-15 5

Vacuum Advance—1112403 & 1112407

Start	0	4-6
7.5	15	7.5-10

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265" V8 ENGINE):* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms) *See "Ignition Notes" in Chevrolet Special Data.*

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IGNITION TIMING

6 CYL. ENGINE

Setting (6 Cyl. Engines)–TDC (with engine at normal idle speed).

Timing Mark (6 Cyl. Engines)–Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing, with Octane Selector set on "O". Then adjust Octane Selector as follows:

Octane Selector Setting (6 Cyl. Engines)–Set for slight ping when accelerating with wide open throttle.

V8 ENGINE

Setting (V8 Engines) - 4° BTDC. *Set timing at IDLE SPEED with vacuum line connected.*

►*IGNITION TIMING PROCEDURE CHANGE: Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued.*

Timing Mark (V8 Engines)–Mark on vibration dampener and an indicator on left side of timing chain cover. Indicator is marked with five lines on both sides of "O". Each line represents 2°.

CARBURETOR

►*CARBURETOR APPLICATION NOTE: Rochest r "B" & "BC" Carburetors are standard on all 6 Cyl. Models (except Forward Control). Rochester "2G" & "2GC" Carburetors are standard on all V8 Models. Carter Updraft Carburetor is standard on Forward Control Models.*

THROTTLE LINKAGE ADJUSTMENT (Hydra-Matic Drive Trucks): *See "Hydra-Matic Drive" in Transmission Section.*

ROCHESTER "B" & "BC"

Downdraft types with manual choke (Rochester Model "B"), and automatic choke (Rochester Model "BC").

Models	Rochester N .
235" Engine ①	② 7004468
235" Engine ③	④ 7007181
261" Engine	② 7005140

①–Except Forward Control & Automatic Transmission models.

②–With Manual Choke.

③–With Automatic Transmission (Except Forward Control models).

④–With Automatic Choke.

Idle Setting (Exc. 7005140)–1 to 2½ turns open, (turn screw out for richer mixture).

Idle Setting (7005140)–1 to 1½ turns open, (turn screw out for richer mixture).

Idle Speed–400-450 RPM. (Exc. Automatic Trans. models), 425 RPM. with Selector Lever in "N" position (Automatic Transmission models).

Float Level (All Models)–1 5/16" from bottom of each float to cover gasket (do not remove gasket) with cover inverted so that needle closed. Use No. 3696192 gauge to set float level and align floats (twisted floats may hang up or rub on bowl) Check float drop or travel by turning cover right side up so floats drop down.

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Distance from gasket on cover to bottom of each float should be 1¾". Adjust by bending tang at rear of float assembly.

►*CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump—No seasonal adjustment.

Fast Idle (7007181): To check setting, hold throttle in wide open position, check choke valve opening or clearance between lower edge of valve and air horn wall. This clearance should be .073" (Gauge BT-64 or Chevrolet Gauge J-5120). If clearance not correct, adjust by bending connector rod using tool BT-18 or Chevrolet Tool J-4552.

Unloader Adjustment (7007181): With throttle valve in wide open position, clearance between lower edge of choke valve and carburetor bore should be .166" (large end of Gauge BT-64 or Chevrolet Gauge J-5120). Bend tang of throttle lever with tool J-4552 to obtain necessary clearance.

Automatic Choke Setting (7007181): Centered setting. Scribe mark on cover in line with long mark on housing.

Throttle Kicker (Not used on 7007181): Operated by cam on choke lever. Opens throttle when choke closed. No adjustment.

►*OTHER DATA: See "Rochester B & BC Carburetor" in Carburetor Section.*

Throttle Linkage Adjustment (Hydra-Matic Trucks): *See "Hydra-Matic Drive" in Transmission Section.*

Fuel Pump Pressure: 3½ -4¼ lbs.

ROCHESTER "2G" & "2GC"

Dual downdraft type with manual choke (Rochester Model "2G"), automatic choke (Rochester "2GC").

Models	Rochester No.
265" Engine (V8) ①	② 7006770
265" Engine (V8) ③	④ 7008399

①—Except Forward Control models and models equipped with Overdrive or governor.
②—With Automatic Choke.
③—Models equipped with Overdrive.
④—Manual Choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and engine RPM.

Idle Speed—475 RPM (Synchro-mesh) Trans.). 425 RPM (Hydra-Matic—with selector lever in "N").

Float Level—1 5/32" from air horn gasket to top of float with assembly inverted. Use Gauge BT-107 or Chevrolet Gauge J-5915 so it rests against power piston shaft with outer leg in line with center of float. Adjust by bending float arm between pivot and float with Tool BT-69.

Float Drop—1 29/32" between air horn gasket and lowest point on bottom of float with air horn held upright (Gauge BT-107). Adjust by bending float tang.

Fast Idle: No adjustment of fast idle speed is provided, It is necessary, however, to have correct relationship between fast idle cam position and choke valve position. Check & adjust as follows: Place end of idle adjusting screw on next to highest step of fast idle cam. Using Gauge J-5921, small end of gauge must slide easily between upper edge of choke valve and bore of carburetor, with gauge held vertically. If necessary, bend choke rod for correct clearance.

Unloader Adjustment: With throttle in wide open position, wide end of Gauge J-5921 must slide freely between upper edge of choke valve and carburetor bore. Bend throttle lever tang for correct clearance.

Automatic Choke Setting: Centered (at index).

►*OTHER DATA: See "Rochester 2G & 2GC Carburetor" in Carburetor Section.*

Throttle Linkage Adjustment (Hydra-Matic Trucks): *See "Hydra-Matic Drive" in Transmission Section.*

Fuel Pump Pressure: 4-5¼ lbs.

CARTER

Carter (BB) 871SB (Forward Control Models). Single barrel updraft type with manual choke control.

Idle Setting—½-1½ turns open (turn screw out for richer mixture).

Idle Speed—450-500 RPM (Synchro-mesh), 400-450 RPM (Hydra-Matic).

Float Level—Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed). Press float lever lip firmly against needle.

Accelerating Pump—Inner holes (in plunger shaft and throttle lever) Summer. Outer hole Winter.

►*OTHER DATA: See "Carter (BB) Carburetors" in Carburetor Section.*

Throttle Linkage Adjustment (Hydra-Matic Trucks): *See "Hydra-Matic Drive" in Transmission Section.*

Fuel Pump Pressure: 3½-4¼ lbs.

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type. **Replacement Pump**—As follows:

Model	AC Pump No.
6 Cyl. (exc. School Bus)	① 4149
6 Cyl. (exc. School Bus)	② 4138
6 Cyl. (School Bus)	② 9797
V8	① 4150
V8	② 4141

①—Fuel only. ②—Fuel & Vacuum.

Pressure—3½-4¼ lbs. (6 Cyl.), 4-6¼ lbs. (V8).

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: AC Electric.

Dash Unit—AC No. 1518461.

Tank Unit—AC No. 1518235 (Cab Models, except Forward Control). No. 1518236 (Forward Control Models & Utility Models with Cowl). No. 1518258 (Cowl—Single Unit Models). No. 1518234 (School Bus Chassis).

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Delco-2SM50 (Exc. School Bus). 12 Volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

Delco-3SM70 (School Bus). 12 Volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground—Negative ground.

Engine Ground—Engine to frame (6 Cyl.). Engine to dash (V8).

STARTER

Model	Delco-Remy No.
6 Cyl. (Exc. Fwd. Cont. & Hydra-Matic)	① 1107634
6 Cyl. (With Hydra-Matic)	② 1107633
6 Cyl. (Fwd. Cont. W/O Hydra-Matic)	② 1107626
V8 (Exc. Hydra-Matic)	② 1107627
V8 (With Hydra-Matic)	② 1107643

①—Manual Pinion Shift. ②—Solenoid Pinion Shift.

Armature—Delco-Remy 1926626 (all models).

Drive (6 Cyl. Synchro-mesh Trans., Exc. Fwd. Cont.)—Overrunning clutch (pedal operated pinion shift).

Drive (6 Cyl. Fwd. Control & Hydra-Matic, All V8 Models)—Overrunning clutch (solenoid pinion shift).

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: (Solenoid Pinion Shift Models)—Delco-Remy Solenoid Switch No. 1119767 mounted on starter and controlled by Ignition & Starter Switch 1116522 (exc. Hydra-Matic), 1116514 (Hydra-Matic).

Starter Switch (Manual Pinion Shift Models): Delco-Remy. Mounted on starter and controlled by pedal operated lever. *NOTE*—Switch has small terminal on side for coil resistor by-passing while cranking.

Hydra-Matic Neutral Safety Switch Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Different generators used as follows:

Model	Generator No.	Armature No.
All Models (Std.)	1100310	1928952
Optl. (30 Amp.)	1105947	
Optl. (40 Amp.)	1106981	1929360
Optl. (Power Strg.)	1106982	

Performance Data—Cold

Generator	Amperes ①	Volts	RPM
1100310	25	14.0	2780
1105947	32	14.0	1850
1106981	40	13.0	1500
1106982	40	13.0	1500

①—Not maximum output. See Current Regulator.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—28 ozs.

Field Current—1.5-1.62 amperes (1100310), 1.54-1.67 amperes (1105947), 1.37-1.50 amperes (1106981, 2).

Belt Adjustment: ¾" (6 Cyl. Engine), 13/16" (V8 Engine) deflection midway between water pump and generator pulleys, with a light force applied to belt.

REGULATOR

Delco-Remy. Different regulators used as follows:

Regulator No.	For Generator No.
1118945	1100310
1118826	1105947
1118948	1106981 & 1106982

►*NOTE: Specifications below are for "Normal" settings.*

Cut-Out Relay

Cuts In—11.8-13.5 volts (1118826 & 1118945), 11.5-13.0 volts (1118948)

Contact Gap—.020".

Air Gap—.020" (with contacts just closed).

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V ltage R gulat r

Setting (1118826 & 1118945)–13.8-14.8 volts hot.

Setting (1118948)–13.6-14.3 volts hot.

Air Gap–.075" (1118826 & 1118945), .063" (1118948) with armature pressed down to point where contacts just touching.

Ch cking & Adjusting–*S "Delco-Remy 1118825 Seri s R gulat r" in Electric Equipment Section.*

Curr nt R gulator

Setting (1118945)–23-27 amperes hot.

S tting (1118826)–27-33 amperes hot.

S tting (1118948)–37-42 amperes hot.

Air Gap–.075" with contacts pressed down to point where contacts just touching.

Ch cking & Adjusting–*S "Delco-Remy 1118825 Seri s R gulat r" in El ctrical Equipment Section.*

MISC. ELECTRICAL

H adlamps: Sealed Beam. *S e Electrical Equip. Section.*

Lighting Switch R m val: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel). Remove switch retaining nut and switch assembly.

St p Light Switch L cati n: Mechanical type mounted on underside of toeboard and operated by brake pedal.

CIRCUIT BREAKERS: Two 13 amperes circuit breakers located in main lighting switch.

HORNS: Delco-Remy 1999760 (High), 1999759 (Low).

H rn Relay: Delco-Remy 1116781.

ENGINE

►*FOUR ENGINES USED ON TRUCKS: 235" Thriftmast r, 235" Loadmast r, 261" Jobmaster, 265" Taskmast r. S Truck M d l Identification for application.*

ENGINE SPECIFICATIONS: Own. 6 Cylinder &V8 valve-in-head engines.

Engin	B re	Stroke	Displmnt
235" 6 Cyl. Thriftmaster	3 9/16"	3 15/16"	235.5"
235" 6 Cyl. Loadmaster	3 9/16"	3 15/16"	235.5"
261" 6 Cyl. Jobmaster	3 3/4"	3 15/16"	261.0"
265" V8 Taskmaster	3 3/4"	3"	265.0"

Engin	C mp. Ratio	Rated HP	Dev. HP
235" 6 Cyl. Thriftmaster	7.5-1	30.4	123 at 3800
235" 6 Cyl. Loadmaster	7.5-1	30.4 .....①	123 at 3800
261" 6 Cyl. Jobmaster	7.17-1	33.7	140 at 4000
265" V8 Taskmaster	7.5-1	45.0	154 at 4200

①–119 at 3600 RPM on Forward Control models.

C mpr ssi n & Vacuum Reading–*See Tune-Up.*

►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE):* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation. *See "Ignition Not s" in Ch vrol t Special Data.*

ENGINE REMOVAL: *Se "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: (V8 Engines)–Disconnect steering idler arm bracket from right frame side rail and drop for clearance.

ENGINE MOUNTINGS: *S e "Engin M untings" in Ch vrol t Sp cial Data.*

CYLINDER HEAD & MANIFOLDS: *S "Cylind r H ad & Manif ld" in Ch vrol t Sp cial Data.*

TIGHTENING TORQUES: *Se Ch vrol t Sp cial Data.*

OTHER ENGINE DATA: *S 1955 Ch vrolet Pass ng r Car pag s f r all ngin data and not th f llowing:*

►*LOADMASTER 235" & JOBMASTER 261" ENGINE PISTON RING NOTE: Upper compression ring is chrome plated and oil ring has spiral spring expander.*

►*VALVE ROTATOR NOTE: New type valve rotators are standard equipment on 235" Loadmaster, 261" Jobmaster & 265" Taskmaster Engines on 5000 & 6000 Series (special equipment on other trucks). See "Valve System" in Chevrolet Special Data.*

►*V8 ENGINE HYDRAULIC VALVE LIFTER PRODUCTION CHANGE:* Hydraulic valve lifters are standard equipment on all Late 1955 V8 Engines. Early 1955 V8 Engines when used with Synchro-mesh Transmissions were equipped with conventional type lifters.

TAPPET CLEARANCE: *NOTE–Conventional type lifters used on 6 Cyl. and Early V8 Engines, Hydraulic lifters used on Later V8 Engines.*

6 Cyl. Engine (3000 Series)–.006" Intake, .016" Exhaust, **(Other Series)**–.006" Intake, .020" Exhaust with engine "normalized". *See "Valve System" in Chevrolet Special Data.*

V8 Engines (Conventional Lifters)– .008" Intake, .016" Exhaust with engine "normalized". *See "Valve System" in Chevrolet Special Data.*

V8 Engine (Hydraulic Lifters)–Adjustment required only when cylinder head removed or lifters replaced. *See "Tappet Clearance Adjustment" under VALVE SYSTEM in Chevrolet Special Data.*

VALVE TIMING: As indicated below:

235" Thriftmaster & 235" Loadmaster

Intake Valves–Open 1° ATDC. Close 39° ALDC.

Exhaust Valve–Open 42° BLDC. Close 9° ATDC.

261" Jobmaster

Intake Valves–Open 11°30'BTDC. Close 52°30'ALDC.

Exhaust Valves–Open 51° BLDC. Close 13° ATDC.

265" V8 Taskmaster (Conventional Lifters)

Intake Valves–Open 12° BTDC. Close 54° ALDC.

Exhaust Valves–Open 52° BLDC. Close 14° ATDC.

265" V8 Taskmaster (Hydraulic Lifters)

Intake Valves–Open 18° BTDC. Close 54° ALDC.

Exhaust Valves–Open 52° BLDC. Close 14° ATDC.

Valve Timing Check (235" & 261" Engines): Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening. Mount dial indicator on rocker arm shaft support with stem contacting No. 1 exhaust valve adjusting screw, set dial indicator to .044" (Thriftmaster & Loadmaster); .063" (Jobmaster). Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset No. 1 exhaust valve to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Ch vr l t Sp cial Data.*

Crankcas Capacity: (6 Cyl.)–5 qts. (refill), 5½ qts. (dry). **(V8)**–4 qts. (refill), 5 qts. (dry).

N rmal Oil Pr ssur : (6 Cyl.–45 lbs. **(V8)**–35 lbs.

Pressure R gulat r Valv s–In oil pump body. Not adjustable.

Oil Pr ssure Indicat r–AC No. 1508246. Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul–*See "Oiling System" in Chevrol t Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing–On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing–Every 10,000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

Water Capacity: Standard–17 qts., (½, ¾, 1-Ton & Forward Control). 18 qts. (1½ & 2-Ton). Add one quart for heater on any model.

Optional–18.5 qts. (All except Forward Control). 17 qts. (2-Ton).

Pressure Valve: AC No. 850549. In radiator cap. 7 lb. type.

Thermostat: Harrison. In cylinder head water outlet (6 Cyl.). In water outlet in intake manifold (V8).

Standard–No. 3123993 (stamped 151), 151°. Can be used for alcohol anti-freeze.

Optional–No. 3123994 (stamped 160), 160°. No. 3133597 (stamped 170), 170°. No. 3123995 (stamped 180), 180°. *NOTE*–Do not use 180° thermostat with 7 lb. radiator cap.

Temperature Gauge: AC No. 1512979. Not electric.

Water Pump: Packless type with sealed ball bearing shaft.

See "Water Pumps" in Chevrolet Special Data.

CLUTCH

6 CYL. ENGINES

Own. Diaphragm spring, single plate, dry disc type. *See "Chevrolet (Own)" in Clutch Section.*

Clutch Disc	Diameter	Chevrolet N . Woven	Mold d
Standard	10"	3826119.	3836097
Heavy Duty ①	11"	3836021	.

①–Standard on Forward Control Models.

Pedal Adjustment: Pedal free travel ¾-1". To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork. *NOTE*–Use finger pressure only when checking clutch free travel.

R m val: Remove transmission (see Transmission Removal). Remove throwout bearing, remove fork by prying

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fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove assembly from below. *CAUTION*—Do not allow pressure plate to hang on retracting springs (support by hand). When installing clutch align "X" mark on cover with "X" mark on flywheel.

V8 ENGINES

Borg & Beck 11A7. Chevrolet Part No. 3837155 Single plate.

See "Borg & Beck 11A7" in Clutch Section.

Clutch Disc—Chevrolet No. 3727585.

Pedal Adjustment: Adjust clutch pedal until free travel is 1". Make sure that pedal pad contacts toeboard when pedal pressed down.

Removal: Remove transmission (see Transmission Removal). Before removing clutch assembly, punch mark flywheel, clutch cover and one pressure plate lug so these parts may be assembled in their same relative positions. Loosen hold-down screws evenly and remove cover. *NOTE*—Mark flywheel side of driven plate for correct reassembly

TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three speed, all helical gear type Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever *See "Transmission Controls" in Transmission Section.*

Removal (½ & ¾ Ton): Drain transmission Disconnect speedometer cable at transmission and shift control rods from transmission levers Remove propeller shaft Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes Remove the two lower transmission to clutch housing capscrews Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse).

See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.

See "Transmission Control" in Transmission Section.

Removal: Same as for "3-Speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

See "Chevrolet 4-Speed" in Transmission Section.

Transmission Control: (All Models exc. Forward Control)—Floor mounted gearshift lever

Removal (½ & ¾-Ton): See "3-Speed (Light Duty)" above.

Removal (Other Trucks): Remove screws fastening steering jacket grommet and slide grommet up out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor and remove cover. On Forward Control models remove both front and rear floor pans. Remove speedometer cable from transmission rear bearing retainer. On 1-Ton, remove cotter key and pin attaching parking brake pull rod to parking lever. On 1½ & 2-Ton, disconnect parking brake lever return spring from parking brake operating lever and remove cotter key and pin attaching inner and outer levers to parking brake operating lever Remove parking brake lever lock, flat washer and spring and remove parking brake lever Drain lubricant from transmission. On 1-Ton, break universal joint at transmission joint flange and tape trunnions and bearings together On 1½ & 2-Ton, disconnect intermediate universal joint by removing two trunnion bearing "U" clamps, split joint and lower front end of rear propeller shaft to floor. Remove the four universal joint flange nuts. Remove nuts attaching propeller shaft bearing support bracket to frame cross member and remove front propeller shaft and bearing assembly. On all models, remove the two capscrews attaching transmission to clutch housing and insert two Guide Pins J-1126 in these holes. Remove flywheel underpan and remove two lower transmission to clutch housing capscrews Slide transmission straight back on guide pins until transmission free of splines in clutch disc. Remove transmission.

OVERDRIVE

Warner R10. Used with Chevrolet Truck 3-Speed (Light Duty) Transmission.

See "Chevrolet R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cables have been disconnected.

HYDRA-MATIC DRIVE

Dual Range. Four speed type with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See Transmission Section.*

►*TESTING & TROUBLE SHOOTING. See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level in transmission every day Drain & refill every 25,000 miles Use only "Automatic Transmission Fluid" Type A.

Checking Fluid Level—With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid level with engine at idling speed.** Add sufficient fluid to bring level in transmission to "F" mark on dipstick.

Capacity—8½ qts. (refill), 9 qts. (after overhaul). *NOTE*—1 qt. additional with oil cooler.

►*OTHER HYDRA-MATIC SERVICE DATA—See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type

REAR AXLE

SEMI-FLOATING (HALF-TON)

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE*—Same design as passenger car axle.

See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.

Ratio—(Synchro-mesh & Hydra-Matic) 3.90-1 (39.10) **(Overdrive)** 4.11-1 (37:9).

►*AXLE SHAFT NOTE: Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft, or by length as follows:*

Axle	Part No.	Length
Left	3694769Ⓒ	29 5/8"
Right	3694770Ⓒ	30 5/8"

Ⓒ—Part No. stamped on axle for identification.

Backlash—.005-.008"

Removal of Rear Axle Assembly: Disconnect and remove parking brake pull back spring. Remove cotter pins and clevis pins from each parking brake cable clevis, and remove clevis. Remove springs and retaining clips from cables at frame brackets. Disconnect universal joint trunnion bearing "U" bolts and split rear universal joint. Disconnect shocks from anchor plates. Disconnect hydraulic brake line to connector at rear frame bracket. Remove spring "U" bolts, nuts and anchor plates Raise rear of truck and roll assembly out toward rear *CAUTION—Be careful when pulling parking brake cables through openings in frame.*

Axle Shaft Removal: *See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.*

Axle Shaft Endplay—Free fit to .014" maximum.

STANDARD FULL-FLOATING (1½ & 2-TON) (EXC. LCF MODELS)

Own. Full-floating hypoid gear (straddle mounted pinion) with Hotchkiss drive.

►*AXLE ASSEMBLY NOTE, ¾ & 1-Ton axle assemblies are different design than used on 1½ & 2-Ton with standard rear axle assemblies.*

See "Chevrolet Truck Hypoid Full-Floating" in Rear Axle Section.

►*AXLE RATIO IDENTIFICATION NOTE: Axle ratios are identified by prefix letters in rear axle numbers stamped on top of carrier housing between reinforcing ribs. See Axle Ratios following:*

Axle Ratio Identification

Ratio	Prefix Letters
5.14-1 (36:7)	CA, CB, CE, CF
4.57-1 (32:7)	CC, CD
6.17-1 (37:6)	CG, CH, CJ
7.2-1 (36:5)	CM

Backlash—.005-.008" Screw adjustment

Removal of Axle Assembly: Remove differential cover and axle shafts (see below). Disconnect rear universal by removing two "U" bolts from rear yoke (wire trunnions to retain bearings). Slide shaft forward and lower to floor. Remove differential carrier mounting bolts.

Axle Shaft Removal (¾ & 1-Ton): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

►*CAUTION:* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft *Grease at this point will cause loosening of axle shaft flange capscrews.*

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Axl Shaft Rem val (1½ & 2-T n): Shaft flange is splined in wheel hub (tight fit) and requires special puller for removal. Remove five capscrews and lockwashers in hub cap, remove hub cap and gasket. Assemble special adapter J-1436-8 on Rear Axle Shaft Bearing & Oil Seal Remover. J-1436 (remove jaws), thread adapter into hole in axle shaft flange, pull axle shaft. *NOTE*–When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►**Axl Shaft Note:** Shafts unequal length (rightshaft longer than left). Install in correct position.

¾ & 1-T n Trucks

Axl Shaft	Part No.	Length
Left	3680977	31¼"
Right	3680978	37"

1½-T n Trucks (27 Splines)

Axl Shaft	Part No.	Length
Left & Right	3714735	37½"

2-T n Trucks, Exc. LCF (29 Splines)

Axl Shaft	Part No.	Length
Left & Right	3709890	39 3/8"

Wh l B aring Adjustm nt: Remove wheels and axle shafts (see above). Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ Ton), J-5670 (2-Ton) while turning hub by hand, then back off nut 45°, check for free turning, install adjusting nut lock with lock tangs aligned with slots in adjusting nut. Bend tang down into notch in adjusting nut, install locknut and tighten securely. Bend tang of lock down into notch of locknut.

HEAVY DUTY FULL-FLOATING (2-TON & LCF MODELS)

Own. Full floating, hypoid gear, roller pinion bearings (straddle mounted pinion), with Hotchkiss drive.

Se "Ch vrol t Truck Heavy Duty Hypoid Full Floating" in R ar Axle S ction.

Rati s–Same as for "Standard Full-Floating" above.

Backlash–.005-.008".

R m val Of R ar Axl Ass mbly: Same as for "Standard Full-Floating" above.

Axl Shaft R m val: Same as for 1½ & 2-Ton "Standard Full-Floating" above.

►**Axl Shaft N t :** Shafts unequal length (right shaft longer than left). Install in correct position.

2-T n & LCF Truck (29 Splines)

Axl Shaft	Part No.	Length
Left	3711457	38 9/64"
Right	3711458	40 9/16"

Wh el B aring Adjustm nt: Same as for "Standard Full-Floating" above.

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type. with hypoid primary pinion and ring gear.

See "Chevrol t Truck Plan tary 2-Spe d" in R ar Axl S ction.

►*NOTE: Two gear ratios availabl as follows:*

P w r Rati–6.40-1 (high), 8.72-1 (low). 32:5 Primary gears.

Sp d Ratio–5.83-1 (high), 7.95-1 (low). 35:6 Primary gears.

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above.

SHOCK ABSORBERS

Delco. Direct Acting (Airplane Type) shock absorbers as follows:

Front Shocks

Model	Delco No.
½, ¾, 1-Ton	820R
1½ & 2-Ton (Except LCF)	682Z
Low Cab Forward	660AA

Rear Shocks

Model	Delco No.
½-Ton (114" W.B)	800W
½ & ¾-Ton (123¼" W.B.)	800Z
1½-Ton (Exc. School Bus Chassis)	660V
Utility	660U
Forward Control	684U

FRONT SUSPENSION

Conventional "I" Beam section, with Reverse Elliot ends and semi-elliptic springs.

Kingpin Inclination–6.16° to 8.16°.

Camber–1½° to 1¾°.

Caster (At designed load)–See table below.

Toe-In–See table below.

Model	Caster Ⓒ	Toe-In
3100, 3200	Pos. 3°	.132-.219"
3400, 3500, 3700	Pos. 2°	.26-.33"
3600	Pos. 1½°	.26-.33"
3800	Pos. 2¼°	.26-.33"
4000, 5000	Pos. 2°	.26-.33"
6000	Pos. 2¼°	.26-.33"

Ⓒ–At designed load, NOT curb weight.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut (recirculating ball).

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet Truck (Bendix)" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*NOTE: Two different type brakes used on trucks as indicated below.*

Ch vr l t-B ndix (Exc pt R ar Wh ls f 1½ & 2-T n M d ls–Duo-servo, single anchor, hydraulic (without eccentric adjustment).

Se "Ch vrol t-Bendix Hydraulic" in Brak S ction.

►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION:* If bench type grinder used, grind shoes to .057" to .087" smaller diameter than drum size. If spindle type grinder used, grind shoe to drum diameter.

Chevr olet-Twinplex (Rear Wheels 1½ & 2-Ton Models)–Two-cylinder, four-anchor type hydraulic. Shoes are self-centering and self-energizing.

See "Chevrolet Twinplex" in Brake Section.

Wheel Cylinders–Size stamped on housing under adjusting lock spring.

Drums–Cast iron with steel web.

Drum Diameter

Model	Front	Rear
½-Ton	11"	11"
¾-Ton	12"	12"
1-Ton	12"	14"
1½ & 2-Ton	14"	15"

Lining–Molded type. Riveted on 1½ & 2-Ton Models and bonded on all others.

Thickness & Width

Model	Thickness	Width
½-Ton (Front Whl.)	.202-.222"	2"
½-Ton (Rear Whl.)	.202-.222"	1¾"
¾-Ton (Front & Rear)	.264-.284"	2"
1-Ton (Front Whl.)	.264-.284"	2"
1-Ton (Rear Whl.)	.267-.287"	2½"
1½ & 2-Ton (Front Whl.)	.267-.287"	2½"
1½ & 2-Ton (Rear Whl.)	.392-.412"	4"

Clearance–Adjust for clearance as follows:

All Models (Except 1½ & 2-Ton Rear Brakes)–Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (Half-Ton Models), or just enough to eliminate brake drag (Other Models), but not more than 7 notches.

Rear Wheels (1½ & 2-Ton Models)–Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel).

Parking Brakes: Hand lever applies rear wheel service brakes on Half-Ton & ¾-Ton Models, and an independent brake on propeller shaft on all other models.

Adjustment (½ & ¾-Ton Models)–*See "Chevrolet-Bendix Hydraulic" in Brake Section.*

Adjustment (1, 1½, 2-Ton Models & ¾-Ton with 4-Spe d Transmission)–*See "Chevrolet Twinplex" in Brak Section.*

Master Cylinder: Located under floorboard on left hand side of truck.

Checking Fluid–Maintain fluid level to lower edge of filler hole.

Removal–Remove from below. *CAUTION*–On 1½ & 2 Ton Low Cab Forward, spacer between cylinder and body bracket will fall out when mounting bolts removed.

Installation–Reverse removal procedure. On LCF Models make sure the spacers are reinstalled.

Power Brakes: See "Hydrovac Power Unit" in Brake Section.

MISC. MECHANICAL

Windshield Wip rs: Linkage type. Vacuum motor (Std. Equip.), Electric motor (Optional Equip.).

S "Windshi ld Wip rs" in Misc llan ous S cti n.

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model Designation

Series	Serial Prefix	Model
1500①	A	ONE-FIFTY
2100	B	TWO-TEN
2400	C	BEL-AIR
1508	D	SEDAN DELIVERY

①–Except Sedan Delivery.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post.

Starting Serial Number–001001 (at each plant).

►*SERIAL NUMBER NOTE: Serial Number (example B56F001025) includes following identification date in sequence.*

Series①	Year	Assy. Plant②	Serial No.
B	56	F	001025

①–See Model Designation above.

②–See Assembly Plant Designation below.

Assembly Plant Designation

A–Atlanta	**J**–Janesville	**O**–Oakland
B–Baltimore	**K**–Kansas City	**S**–St. Louis
F–Flint	**L**–Los Angeles	**T**–Tarrytown
	N–Norwood	

ENGINE NUMBER: Stamped on right side of engine block to rear of distributor.

Starting Engine Number–0001001 (at each plant). Suffix letters and numerals indicate plant at which engine built ("F" for Flint, and "T" for Tonawanda), Model Year, and Model Type. See following for Model Type Designation.

Model Type Designation

Engine	Suffix
Regular "235"	Z
Regular "235" (with H.D. Clutch)	ZC
Powerglide "235"	Y

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. at cranking speed. A variation of 20 lbs. between cylinders indicates need for cylinder reconditioning.

VACUUM READING: At 500 RPM – 14.4" (With selector lever in Drive Range – Powerglide Cars), 16.7" (With transmission in Neutral). At 450 RPM – 14.5" (With selector lever in Drive Range - Powerglide Cars), 16.3 (With transmission in neutral).

VALVE TAPPET CLEARANCE: None in service (hydraulic).

Initial Tappet Clearance (Engs. with Hydraulic Lifters). *See "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation when tuning engine. Should require ½ turn from unhooked to hooked position. *Distorted springs should be replaced.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035"

Plugs – AC No. 44-5. 14 mm. Torque to 20-25 ft. lbs.

►*SPARK PLUG INSTALLATION CAUTION:* Spark plug flash-over or misfire on 1956 engines may be caused if 1955 plugs are used. Insulators on 1956 plugs have four annular ribs that help prevent flash-over. Spark plug boot has larger inside diameter.

COIL: Delco-Remy 1115087. *12 Volt.*

Ignition Current – 1.8 amps. idling, 4 amps. stopped.

Resistor – Delco-Remy 1931614. 1.40-1.62 ohms. On firewall.

►*COIL RESISTOR NOTE:* Resistor connected to ignition switch by two leads and is by-passed during cranking (second lead provides direct connection to coil when key turned to "Start Engine" position).

DISTRIBUTOR: Delco-Remy 1112403. *12 Volt.*

Condenser–Delco-Remy 1928111. **Capacity**–.18-.23 mfd.

Contact Point Set–Delco-Remy 1924571.

Breaker Gap–.016-.021 (New points), .0125-.0175". (Used points).

Cam Angle–28-35° with .016" gap.

►*BREAKER GAP CAUTION: Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension–19-23 ozs.

Rotation – Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center 'O' position.

Vacuum Spark Control: Delco-Remy 1116089.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum ("of HG)
Start	0	4-6
7.5	15	7.5-10

Plunger Travel – 3/16-3/32".

IGNITION TIMING

Setting - At TDC. *Set timing at IDLE SPEED with vacuum line connected.*

►*IGNITION TIMING PROCEDURE CHANGE: Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued.*

Timing Mark - Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on "0". Then adjust selector as follows:

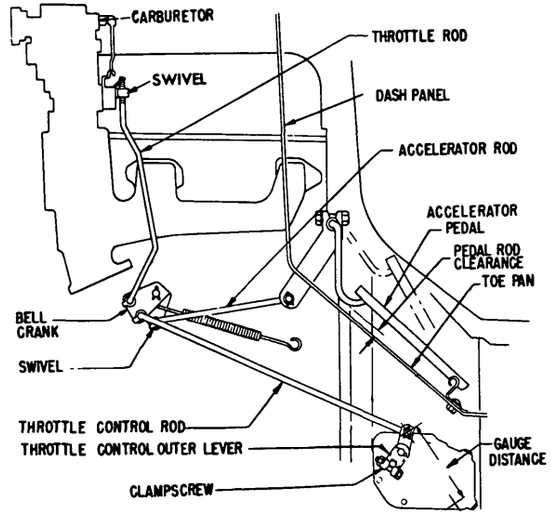
Octane Selector Setting - Set for slight ping when accelerating with a wide open throttle.

CARBURETOR

►*FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS):* Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob on dash is pulled out. **Make sure knob is pushed in when making normal fast idle adjustments** and that fast idle control linkage does not interfere with normal operation of the carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT (All Mod ls): *POWERGLIDE NOTE - Adjust transmission throttle control linkage BEFORE adjusting carburetor throttle linkage (see below).*

Carburetor Throttle Linkage (All Models): With accelerator pedal depressed, clearance between lowest point on accelerator link and toe pan (floor mat removed) should be exactly 1". With throttle actuating lever in wide open position, adjust upper throttle rod swivel for free entry into lever.



POWERGLIDE THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): Engine must be at normal operating temperature and transmission warm (choke valve wide open and fast idle inoperative with throttle stopscrew against low step of fast idle cam) when adjustments made.

1) Adjust engine idle speed to 425 RPM with selector lever in "D" range (set hand brake firmly to hold car while making adjustments).

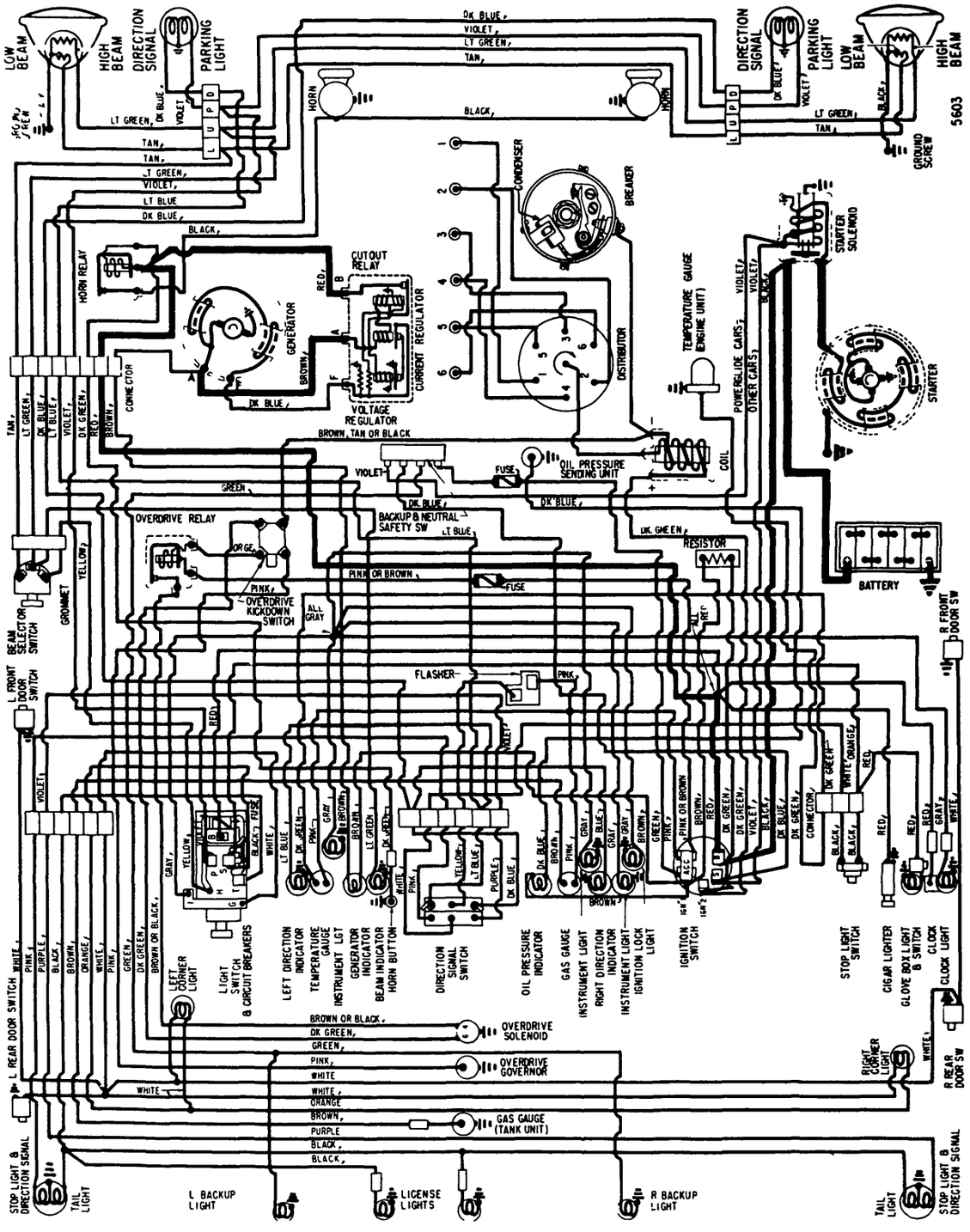
2) Disconnect control rod from throttle lever on transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever assembly counter-clockwise to the open throttle position.

3) Hold lever in this position and with throttle valve outer lever gauge J-5806 set at 7.09" measure distance from left side cover lower rear bolt and hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching bolt and adjust lever on throttle shaft as necessary. Reconnect control rod.

4) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.

5) Force bellcrank-to-transmission throttle lever rod forward against stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.

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6) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.

THROTTLE RETURN CHECK ADJUSTMENT (POWERGLIDE CARS): With engine idle speed set at 425 RPM, shut off engine, close choke valve and position throttle stop screw on highest step of fast idle cam. Using a 9/32" wrench on flat section of return check shaft, hold from turning, and turn the adjusting screw until it just contacts the throttle lever contact arm.

ROCHESTER BC

Model	Rochester No.
Std. Transmission	7009255
Powerglide	7009254

Idle Setting–1-2½ turns open.
Idle Speed (Synchro-mesh)–475 RPM.
Idle Speed (Powerglide)–425 RPM with Powerglide Selector lever in "D" (Drive) range.
Float Level–1 9/32" (Gauge M-250). With air-horn inverted and gasket in place, position Gauge M-250 over the floats with the tang inserted in the discharge nozzle. Bend float arms as necessary so that top of each float just touches the gauge and the float is centered between the gauge legs.
Float Drop–Bend float tang as necessary to obtain a distance of 1¾" from the gasket surface to the bottom of the float, with the air-horn upright and the float hanging free.
Choke Adjustment: Centered on index.
Fast Idle: With idle adjusting screw on next to highest step of fast idle, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.
► *OTHER DATA: See "Rochester BC" Carburetors in Carburetion Section.*
Fuel Pump Pressure: 3½-4½ lbs.

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type.
Replacement Fuel Pump–AC No. 4149 (Fuel only), No. 4138 (Fuel & Vacuum).
Pressure–3½-4½ lbs.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: AC Electric.
Dash Unit – AC No. 1518473.
Tank Unit – AC No. 1518158.
"See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53M. *12 Volt.* 9 plate, 53 ampere hour capacity (20 hr. rate).
Battery Ground – Negative.
Engine Ground – Engine to cowl at rear head bolt.

STARTER

Delco-Remy 1107644. *12 Volt.* **Armature** – 1926626.
Drive – Overrunning clutch (solenoid pinion shift).
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

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Starting Switch: Delco-Remy Solenoid Switch 1119789 mounted on starter and controlled by Ignition & Starter Switch 1116512.
See "Delco-Remy Starter Solenoid (Without Relay)" in Electrical Section.

Neutral Safety & Back-Up Light Switch: Delco-Remy 1998106 (Powerglide cars only).
Adjustment–*See "Chevrolet Powerglide" in Trans.Sect.*

GENERATOR

Delco-Remy. *12 Volt.* Application as follows:

Generator	Armature
1100326 (Std.)	1928952
1102041 (Pow. St.)	1929640
1102042 (Air Cond.)	1923535
1105947 (Taxi)	
1106981 (Taxi & City Pol.)	1929360

Maximum Charging Rate – *See Voltage Regulator.*

Performance Data

Generator	Amperes	Volts	RPM
1100326	25	14.0	2780
1102041, 42	30	14.0	2150
1105947	32	14.0	1850
1106981	40	13.0	1500

Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 28 ozs.
Field Current – (1100326) 1.5-1.62 amps., (1102041, 42) 1.48-1.62 amps., (1105947) 1.54-1.67 amps., (1106981) 1.37-1.50 amps. All at 12.0 Volts.
Belt Adjustment: 5/16" belt deflection with light thumb pressure midway between generator and pump pulleys.

REGULATOR

Delco-Remy. *12 Volt.* Used with generators as follows:

Delco-Remy Regulator No.	Generator No.
1119000	1100326, 1102041
1119001	1102042, 1105947
1119004	1106981

NOTE – Regulator is "1119000 Series". Specifications below are "Normal" settings.

Cutout Relay

Cuts In – 11.5-13.0 volts (1119004) 11.8 - 13.5 volts (Others). Hot.
Contact Gap – .020".
Air Gap – .020" (with contacts just closed).

Voltage Regulator

Setting – 13.6-14.3 volts (1119004), 13.8 - 14.8 volts (Others). Hot.
Air Gap – .063" (1119004), .075" (Others) with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series" Regulator in Electrical Section.*

Current Regulator

Setting (1119000) – 23-27 amperes (hot).
Setting (1119001) – 27-33 amperes (hot).
Setting (1119004) – 37-42 amperes (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series" Regulator in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signal: *See Electrical Section.*
Automatic Ey: *See Electrical Section.*
Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) and pull shaft and knob out. Remove switch retaining nut and switch assembly.
Stop Light Switch Location: Mechanical type mounted under instrument panel adjacent to brake pedal lever.
Adjustment–Adjust position of switch so that stop light goes on when brake pedal is depressed 5/8" from fully released position.
FUSES: All accessory fuses except as indicated below are contained on the accessory fuse and junction block located on upper inside of dash panel to left of steering column.
Overdrive–14 amps. Located in Lucite cartridge in overdrive relay feed line on engine side of dash to left of steering column.
Radio–In feed line adjacent to radio.
Back-up Light–On accessory fuse block.
►*LIGHTING SWITCH FUSE NOTE:* A 3 ampere fuse has been added to light switch to protect instrument panel rheostat from burning out.
LIGHTING CIRCUIT BREAKERS: Two 13-amp. circuit breakers located on main light switch, protect all lighting circuits.
HORNS: Delco-Remy 1999759 (Low Note), **1999760** (High Note). *12 Volt.*
Horn Relay: Delco-Remy 1116781 or 1116913.
Contacts Close – 5.0-9.5 volts.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Section.*
►*NOTE: The following repair data applies to all Pass. Car & Truck Engines.*

Bore	Stroke	Displacement	Rated HP
3 9/16"	3 15/16"	235.5 cu. ins.	30.4

Compression Ratio	Developed HP
8.0-1	140 at 4200 RPM

Compression & Vacuum Reading – *See TUNE-UP.*

ENGINE REMOVAL: *See Chevrolet Special Data.*
OIL PAN REMOVAL: Remove bolts attaching steering idler arm bracket to frame side rail and drop for clearance. Remove pan retaining bolts and remove pan.
CYLINDER HEAD: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*
ENGINE MOUNTINGS: *See Chevrolet Special Data.*
TIGHTENING TORQUES: *See Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".
Weight–1.18 lbs. (235" Engine), 1.36 lbs. (261" Engine).
Removal–Pistons and rods removed from above.
Clearance – .0005-.0011" measured 1.29" below top of piston. Selective fit.
Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize. *STANDARD AND .001". PISTON NOTE* - Two sizes pistons furnished for Standard and .001" Oversize as follows:
235" Engine - Std. - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize -** Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").
261" Engine - Std. - Marked **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **.001" Oversize -** Marked **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520").
Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.
Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

PISTON PINS

Locked in rod. No bushing used in piston.
Diameter - 235" Eng. - .8660-.8665". **261" Eng.** - .9270-.9275".
Pin Fit in Piston - Thumb push fit (at room temp.). To check fit, with piston and pin at 60° F., apply light oil film to pin, insert pin vertically in one piston boss (one end of pin in either piston boss). Pin should hold own weight, but should install easily with thumb pressure.
Replacement Pins: Furnished Std. & .0015", .003", .005", oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0930-.0935"	①	②
Oil(3)	.181-.188"	③ .015-.055"	.000-.008"

①- (235" Eng.) .007-.020". (261" Eng.) .010-.020"
②- (235" Eng.) .001-.003". (261" Eng.) .002-.0035"
③- On Rails.

►*RING INSTALLATION CAUTION: Install compression rings with side marked "TOP" upward.*
Replacement Rings: Furnished Std. & .005", .010", .020", .030", .040" oversize.

CONNECTING RODS

Length–6 13/16". **Weight**–31.76 ozs. (Exc. 261" Engine).
Crankpin Journal Diameter–2.311"-2.312", all engines.
Lower Bearing–Replaceable precision type.
Clearance–.0007-.0028". Not adjustable, replace bearings.
Sideplay–.005-.012" at lower end.
Replacement Bearings: Std. .001", .002", .010", .020" undersize.
Installing Rods: Numbers on rods and caps must be together and installed in same numbered cylinders with numbers and pin clamp bolt toward camshaft side.

CRANKSHAFT

►*CAUTION: No. 1 (front) and No. 2 (front intermediate) bearings similar in appearance but must not be interchanged. No. 2 bearing marked by "1" in il gr ve.*
Journal Diameters–(1) 2.6835"–2.6845", (2) 2.7145"–2.7155", (3) 2.7455"–2.7465", (4) 2.7765"–2.7775". *NOTE*–Journal taper or out-of-round limits .001". Run-out Limits for Nos. 2 & 3 journals is .002".

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Clearance –.0005" minimum,. 003" maximum (new bearings), Service limits .0005" min. .0045" maximum. See Adjustment below.

NOTE–Precision type bearings can be replaced singly.

Bearings–Steel backed thin wall babbitt. *Boring or reaming not required*

Bearing Adjustment: Precision type. Replace bearings.

Replacement Bearings: Furnished Std. .002", .010", .020", .030" undersize.

Bearing Installation: Not necessary to remove crankshaft or engine from car. *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Bearing Cap Installation–No. 2 & No. 3 bearing caps marked for identification. Install No 2 cap with mark "FRONT" toward front of engine, No. 3 cap with mark "REAR" toward rear of engine

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data*

End Thrust: Taken by No. 3 (rear intermediate) bearing. To check endplay, force crankshaft to rear, check clearance at rear of No. 3 bearing. Adjust by replacing bearing. **Endplay**–.0035"-.0095".

Vibration Damper: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

Journal Diameters–(1) 2.1537-2.1547", (2) 2.0912-2.0922", (3) 2.0287-2.0297", (4) 1.9662-1.9672".

►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".

Bearing Type–Steel backed babbitt lined bushing *See "Camshaft & Bearings" in Chevrolet Special Data*

Clearance –.0015-.0035".

End Thrust: Taken by thrust plate behind camshaft gear.

Endplay Adjustment–*See "Timing Gears" in Chevrolet Special Data.*

Endplay–Free fit to .003" maximum.

Timing Gears: Fibre (Pass. Cars. Exc. Corvette), Aluminum (Corvette and Trucks). Steel crankshaft gear.

Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*

Timing Gear Backlash – .003-.005".

Camshaft Setting: Gears punch marked. Punch marks on both gears must line up directly opposite each other.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance: (Passenger Cars) – None in Service (hydraulic).

Initial Tappet Clearance (Engs. with Hydraulic Lifters)- *See "Valve System" in Chevrolet Special Data.*

(Trucks) – (235") .006" Intake, .016" Exhaust. (261") .006" Intake, .020" Exhaust, HOT. *See "Valve System" in Chevrolet Special Data.*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 7/8"	.3410-.3417"	6.376-6.396"
Exhaust	1 1/2"	.3410-.3417"	4.913-4.933"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30° ℄	.4004"	.0010-.0027"
Exhaust	45° ℄	.4004"	.0010-.0027"

℄ – Seat angle in block 1° additional.

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 30° and 45°. When seats are ground to new recommendations of 30° and 45°, valves must be ground to recommended angle of 29° (Intake) and 44° (Exhaust) whether valves are being re-used or new valves are being installed.

Valve Seat Width – 3/64"-1/16" (Intake), 1/16-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Precision type. Pressed in head.

Valve Guide Installation–*See "Valve System" in Chevrolet Special Data.*

Valve Springs: Install springs with closed coil end down.

Spring Specifications

	Pressure	Length
Valve Closed	74-82 lbs.	1.858"
Valve Open	196-208 lbs.	1.462"

Free Length – 2.281"

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve springs. If distance from spring seat in head to top of valve spring exceeds 1 55/64", install shim approximately 1/16" thick. At no time should spring be shimmed to give installed height of less than 1 51/64".

Valve Lifters (Pass. Cars) – Hydraulic type. *See "Valve System" in Chevrolet Special Data.*

Hydraulic Lifter Overhaul & Testing – *See "Valve System" in Chevrolet Special Data.*

Valve Lifters (Trucks): Mechanical type.

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

235" Engine

Intake Valves – Open 10°30' BTDC, Close 53°30'ALDC.

Exhaust Valves – Open 49° BLDC, Close 15° ATDC.

Valve Timing Check – *(CAUTION* - It will be necessary to replace the hydraulic valve lifter and pushrod operating No. 1 exhaust valve, with a conventional lifter and pushrod). Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing. Mount dial indicator on rocker arm shaft with stem of indicator contacting No 1 exhaust valve adjusting screw and set the dial indicator to .058". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset tappet to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 5½ qts (dry), 5 qts (refill).

Normal Oil Pressure: 35 lbs. (approx.).

Pressure Regulator Valve–In oil pump body. Not adjustable

Oil Pressure Indicator–Light located at right side of instrument cluster, controlled by a pressure operated switch, Delco-Remy 1998149, located in main oil gallery on left side of engine. Switch closes at 4-6 lbs.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul–*See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: AC P-115

Rocker Arm Oil Lead & Overflow Pipe: *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing – On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing – Every 10,000 miles (or oftener if required) clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. (17 qts with heater).

Pressure Valve: AC No. 850795. Radiator filler cap. 7 lb. type. **Replacement Valve** - AC No. RC-1.

Thermostat: Harrison. In cylinder head water outlet.

Standard – No. 3133595 (stamped 151) 151°. Can be used for alcohol anti-freeze.

Optional–No. 3123994 (stamped 160), 160°, No. 3133597 (stamped 170) 170°.

Temperature Gauge: AC Electric.

Dash Unit – AC No. 1513134.

Engine Unit – AC No. 1513130.

See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Double outlet, packless type with sealed ball-bearing shaft.

See "Water Pumps" in Chevrolet Special Data.

Radiator Removal & Installation: *See "Radiator" in Chevrolet Special Data.*

CLUTCH

Own (Exc. Powerglide Cars)–Diaphragm spring type *See "Chevrolet (Own)" in Clutch Section.*

Clutch Disc–Chevrolet No 3836103 (Molded) 3836121 (Woven), 3836119(Hvy Duty)

Pedal Adjustment· Pedal free travel ¾-1 Loosen check nut at connecting link at clutch fork Turn adjusting nut to remove all lash at fork, **then back off two turns.** Tighten check nut.

Removal· Remove transmission (see Transmission Removal below). Remove throwout bearing from fork. Remove clutch fork tension spring from fork, disconnect clutch fork pushrod. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch

CONTINUED ON NEXT PAGE

Form 26 B

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Pilot Tool J-5824, to support clutch assembly during removal. Loosen clutch attaching bolts one turn at a time until diaphragm spring is released. Remove Pilot Tool, then remove clutch assembly from car. *CAUTION*- When installing clutch, align "X" mark on clutch cover with "X" mark on flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Chevrolet 3-Speed" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain Transmission and disconnect speedometer cable and shift rods. Disconnect propeller shaft at rear universal and slide shaft toward rear to disengage from transmission. Remove two top transmission to clutch housing screws and install Guide Pins J-1126. Remove the two lower screws and slide transmission back until clutch spines are disengaged. Remove transmission from below car.

OVERDRIVE

Warner Model AS1-R10H. Solenoid operated type with governor control and throttle operated kickdown. Lockout Switch not used.
See "Chevrolet R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh transmission (above) after disconnecting control cable and wiring

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS. See "Chevrolet Powerglide" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication: Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.

Capacity—5 qts. (refill), 11 qts (after overhaul).

►*POWERGLIDE DRAINING CAUTION—There is no drain plug on converter. Drain transmission case only, add 4½ qts.. of fluid initially, recheck after idling engine.*

Checking Fluid Level—Engine must be idling with the parking brake set, transmission warm, and the control lever in "N" range when taking dipstick readings Dipstick is located under hood on right side just opposite starter

►*OTHER DATA. See "Chevrolet Powerglide" in Transmission Section.*

UNIVERSALS

Own. Yoke & Spider (Trunnion) type.

►*CAUTION.* Rear bearing companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass. Car (Hotchkiss Drive) in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid gear type, with Hotchkiss Drive. Pinion bearing adjustment is different than on previous models

See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION.* Rear universal joint companion flange controls rear axle pinion bearing preload Bearing preload must be adjusted whenever companion flange nut is loosened

Car Model	Axle Ratio	Serial Prefix
Std Transmission	3 70-1	.AA or BA
Overdrive	4 11-1	AC or BC
Powerglide	3 55-1	.AB or BB

Backlash — .006-.009" (.008" preferred).

Removal: Raise car and support with jack stands under frame side rails Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion). Disconnect hand brake cable at equalizer and remove cables from clamps at frame Disconnect hydraulic brake lines at rear axle housing Disconnect shocks. Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor

Axle Shaft Removal: Raise car and place jack stands under axle housing Remove tire, wheel and brake drum assembly Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange) Attach axle Puller J-5748,with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*—If bearing retainer and parking brake strut interfere, raise strut slightly with screw driver to obtain clearance.

SHOCK ABSORBERS

Delco. Direct acting non-adjustable. Serviced by replacement.

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs and new spherical type joints connecting control arms and steering knuckles

See "Chevrolet (Spherical Joint)" in Front Suspension Section.

Kingpin Inclination — 3½-4½°.
Caster — Pos. ½-1½°.
Camber — 0° to Pos. 1°.

►*CASTER & CAMBER ADJUSTMENT NOTE: Adjusted by shims located between upper control arm inner support shaft and support bracket.*

Toe-In — 1/16-1/8" (per wheel), 1/8-1/4" (total both wheels).

Toe-Out on Turns — With inside wheel at 20°, outside wheel should be 18° 10".

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment Hand lever applies rear wheel service brakes

See "Chevrolet-Bendix Hydraulic" in Brake Section

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION:* To compensate for lack of brake anchor adjustment, brake shoes are ground to a 057- 087" smaller diameter than the drum diameter Grinding shoes to the true drum diameter on bench grinders will cause heel and toe contact, resulting in erratic brake action *NOTE—If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter*

Drums—Diameter 11".

Wheel Cylinder Diameter—Front 1 1/8", Rear 1".

	Brake Lining Width	Thickness
Front Whl	2"	.187- 194"
Rear Whl	1 3/4"	187- 194"

Length Per Shoe—9 3125" (Primary), 11 6875' (Secondary)

Braking Power—55 9% (front wheels), 44 1% (rear wheels

Clearance—Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag after adjustment.

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid—Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole

Removal—Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove four retaining nuts and lock washers holding master cylinder to firewall and remove cylinder.

Installation—Reverse removal procedure making sure that push rod clevis is straddling the brake pedal Refill master cylinder and bleed all brake lines. Adjust push-rod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1/16-3/16" pedal movement should be felt).

Power Brakes: Bendix Vacuum Type Power Unit replaces conventional master cylinder.
See "Bendix Power Unit" in Brake Section.

►*SLOW POWER BRAKE PEDAL RETURN CORRECTION:* *See "Brake Notes" in Chevrolet Special Data*

MISC. MECHANICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL MISC. MECHANICAL DATA.*

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model Designation

Series	Serial Prefix	Model
1500	VA	ONE-FIFTY
2100	VB	TWO-TEN
2400	VC	BEL-AIR
2934	VE	CORVETTE
1508	VD	SEDAN DELIVERY

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post

Starting Serial Number—001001 (at each plant) for all models except Corvette

►*SERIAL NUMBER NOTE Serial Number (example VB56F001025) includes following identification information in sequence*

Series①	Year	Assy. Plant②	Serial No
VB	56	F	001025

①—See Model Designation above

②—See Assembly Plant Designation below

Assembly Plant Designation

A-Atlanta	J—Janesville	O—Oakland
B—Baltimore	K—Kansas City	S—St Louis
F—Flint	L—Los Angeles	T—Tarrytown
	N—Norwood	

ENGINE NUMBER: Stamped on pad at front right hand side of cylinder block behind water pump

Starting Engine Number—001001 (at each plant) Suffix letters and numerals indicate plant at which engine built ("F" for Flint, "T" for Tonawanda), Model Year (56) and Model Type Designation (see below).

Model Type Designation

Engine	Suffix
V8 with 3-Speed Trans	G
V8 with Overdrive	GC
V8 with Air Cond & Overdrive	GQ
V8 with Powerpack & Overdrive	GE
V8 with Air Cond & 3-Spd Trans	GF
V8 with Hvy Duty Clutch	GJ
V8 with Air Cond & H D Clutch	GK
V8 with Power Pack	GL
V8 with Air Cond & Power Pack	GM
V8 with Power Pack O D & Air Cond	GN
V8 with Powerglide	F
V8 with Powerglide & Power Pack	FB
V8 with Powerglide & Air Cond	FC
V8 with Powerglide Air Cond Pow Pack	FD
V8 (Corvette) with 3-Spd Trans.	GR
V8 (Corvette) with Powerglide	FG

TUNE-UP

COMPRESSION PRESSURE: 150 lbs. (162 & 170 HP Engs.), 160 lbs. (Others), at cranking speed. A variation of 20 lbs. between cylinders indicates need for cylinder reconditioning.

VACUUM READING: Steady 17-21" at idling speed

VALVE TAPPET CLEARANCE: (Corvette)—.008" Intake, .018" Exhaust, with engine HOT and idling. (Others)—None in service - hydraulic.

Initial Tappet Clearance (Engs. with Hydraulic Lifters)- *See "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: V8 (Std.)—Single exhaust with crossover pipe. Heat control valve with counterweight and thermostatic coil spring located between right manifold and exhaust pipe. Hook coil spring under stop stud. Install counterweight with square projection up and upper end of spring stop resting on top of stop stud.

V8 (Corvette Std., Others Optl.)—Dual exhaust system. Coil spring and counterweight same as other V8 (Std.)

►*DUAL EXHAUST NOTE*· With valve closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7

SPARK PLUG GAP: .035".

Spark Plugs—AC No. 44-5 (Std. V8), AC No. C-43 (Corvette). 14 mm. Torque to 20-25 ft. lbs.

►*SPARK PLUG INSTALLATION CAUTION* Spark plug flash-over on 1956 engines may be caused if 1955 plugs are used. Insulators on 1956 plugs have four annular ribs that help prevent flash-over, and larger inside diameter on spark plug boot. If 1955 plugs installed, flash-over or misfire will be prevalent due to loose fit of boot.

COIL. Delco-Remy 1115087 (Std.), 1115091 (Corvette). *12 Volt.*

Ignition Current—1.8 amps. idling, 4 amps. stopped.

Resistor - Delco-Remy 1931614 (exc Corvette), 1115091 (Corvette) 1.40-1.62 ohms On firewall

►*COIL RESISTOR NOTE* Resistor connected to ignition switch by two leads and is by-passed during cranking (second lead provides direct connection to coil when key turned to "Start Engine" position).

DISTRIBUTOR: Delco-Remy. *12 Volt.* Single breaker, or double breaker types with 8 lobe cam. Used as follows

Application	Delco-Remy Distr. No
V8 (Std.), 2-Bbl.Carb.(Early)	1110866, 1110369
V8 (Std.), 2-Bbl.Carb.(Later)	1110847
V8 (Std.), 4-Bbl.Carb.(Early)	1110866, 1110869
V8 (Std.), 4-Bbl.Carb.(Later)	1110878
V8 (Corvette), 4-Bbl.Carb.(Early)	1110872
V8 (Corvette), 4-Bbl.Carb.(Later)	1110879
V8 & Corvette, TWO 4-Bbl.Carb.(Early)	1110872
V8 & Corvette, TWO 4-Bbl.Carbs.(Later)	1110879

Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1924499 (Distributor 1110847, 66, 69, 78), Delco-Remy 1918148 (Distributor 1110872 & 79 Two used)

Breaker Gap - .019" (New Points - Distr 1110847, 66, 69, 78), .015" (New Points - Distr 1110872, 79), .016" (Used Points).

Cam Angle—26-33° with .016' gap (Distributor 1110847, 66, 69, 78), 34° plus or minus 1° for both sets of points operating together (Distributor 1110872, 79)

►*CAM ANGLE NOTE (Double Breaker Distributors)* Adjust each set of points separately for cam angle of 29° plus or minus 1° (block other set of points open with insulator at least .025" thick). Cam angle for both sets operating together should then be 34° plus or minus 1° with breaker gap of .014-.018

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Clockwise viewed from above.

Automatic Advance—1110847

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
8-10		1150	16-20		2300
15-17		1800	30-34		3600

Automatic Advance—1110866, 69, 72

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		350	0-4		700
7.5-9.5		750	15-19		1500
10-12		1200	20-24		2400
13-15		1750	26-30		3500

Automatic Advance - 1110878, 79

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.5		400	1-5		800
6-8		750	12-16		1500
9.5-11.5		1300	19-23		2600
13-15		1850	26-30		3700

Vacuum Spark Control: Delco-Remy 1116100 (Distributor 1110847 & 66), **1116104** (Distributor 1110869 & 78). *NOTE* - No vacuum control used on 1110872 & 79

Vacuum Advance—1116100

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
11.75	23.5	12-20

Vacuum Advance—1116104

Distr. Degress	Eng. Degrees	Vacuum (" of HG)
Start	0	7-9
11.75	23.5	14-15.5

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265' V8 ENGINE)* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms) *See 'Ignition Notes" in Chevrolet Special Data*

IGNITION TIMING

Setting - *As indicated in table below at IDLE SPEED with vacuum line connected*

►*IGNITION TIMING PROCEDURE CHANGE Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued*

Distributor No	Ignition Setting (Idle Speed)
1110847	4° BTDC
1110866	4° BTDC
1110869	4° BTDC
1110872 (1 Carb)	4° BTDC
1110872 (2 Carbs)	ℂ 8° BTDC
1110878	4° BTDC
1110879 (1 Carb)	4° BTDC
1110879 (2 Carbs)	℗ 8° BTDC

ℂ - Do not exceed 10° BTDC

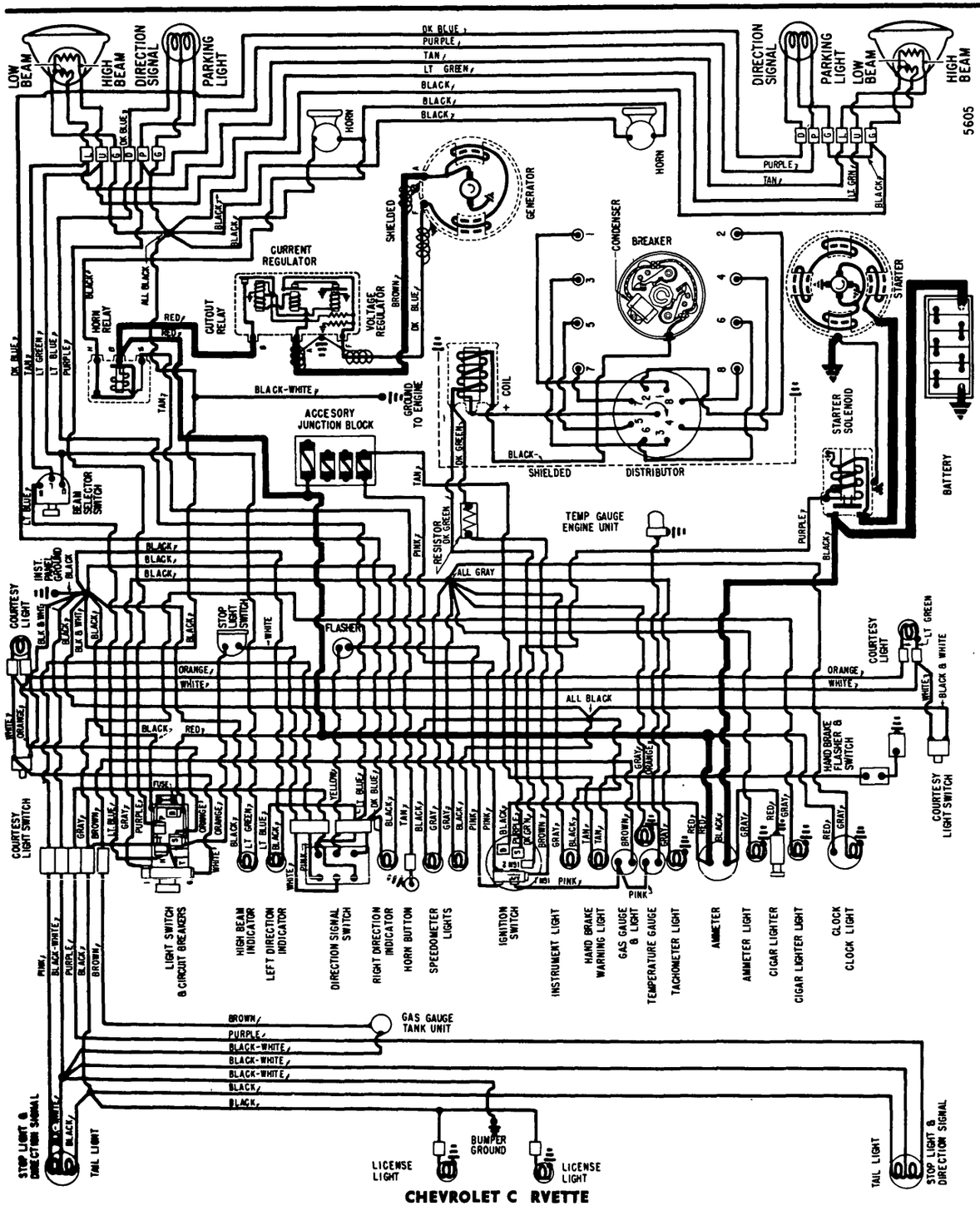
℗ - Do not exceed 12° BTDC

Timing Mark—Mark on vibration damper and an indicator on left side of valve chain cover. Indicator is marked with five lines on each side of "O" mark. Each line represents 2°.

CARBURETOR

►*CARBURETOR APPLICATION NOTE. Rochester 2GC Dual Carburetors is Std. on all models (Exc. Corvette).*

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CHEVROLET C RVETTE

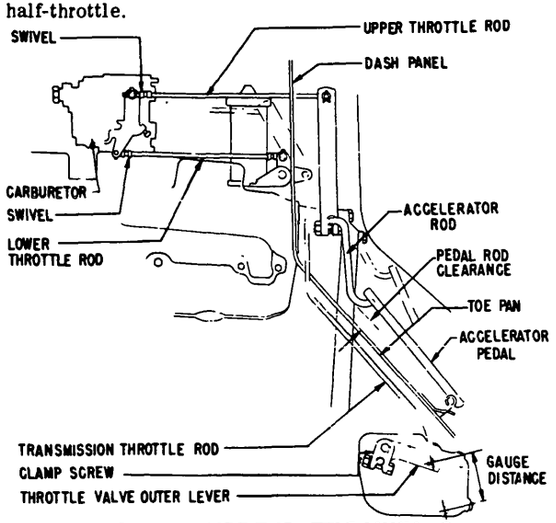
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Roch st r 4GC and Cart r WCFB 4-Barr l Carbur t rs us d n a mix d basis on m d ls (Exc. C rvette) with P w r Packag . A singl r TWO Carter WCFB 4-Barrel Carburetors used on C rv tt .

► *FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS):* Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob on dash is pulled out. **Make sure knob is push d in wh n making normal fast idle adjustments** and that fast idle control linkage does not interfere with normal operations of the carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT (All M d ls): *POWERGLIDE NOTE – Adjust transmission throttl linkage BEFORE adjusting carbur tor throttl linkage (see below).*

Carburetor Throttle Linkage (All Mod ls): With accelerator pedal depressed so that clearance between lowest point on accelerator link and toe pan (floor mat removed) is exactly ¾" (2-Bbl. Carbs.), 1" (4-Bbl. Carb. - except Corvette), 3/8" (Corvette - single and double carbs.); adjust upper throttle rod swivel so that it enters carburetor throttle lever freely (rear carburetor on Corvette double carburetor installation), connect rod. **Corvette Double Carb. M d ls** - Hold rear carburetor throttle valves wide open, check front carburetor for throttle valves being wide open and against stop. Adjust by turning nut on front carburetor control shaft. *NOTE* - With correct adjustment, front carburetor throttle valves begin to open with rear carburetor at half-throttle.



POWERGLIDE THR TTLE LINKA E

Transmission Throttle Contr l Linkage Adjustm nt (Powerglide Cars): With selector lever in "D" (Drive) range and with hand brake applied, adjust engine idle to correct speed (engine and transmission at normal operating temperature). Turn engine off and check choke valve to make sure it is fully open and that throttle stop screw is against low step of fast idle

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cam. Disconnect transmission throttle rod at transmission. Remove extreme lower rear bolt in side cover on transmission. Rotate transmission throttle valve outer lever assembly counter-clockwise to the open throttle position (against stop). Hold in this position and with throttle valve positioning gauge J-5906 set to 2 7/8", measure the distance between the bolt hole inside cover and hole in throttle lever. If pin or gauge enters hole, adjustment of lever is correct If necessary to adjust, loosen lever to clamp attaching screw and adjust outer lever to obtain correct adjustment. Install bolt in side cover and attach throttle rod to transmission lever Force transmission throttle control rod forward against stop in transmission (open throttle) and adjust lower rod on carburetor throttle lever for free entry of swivel pin into carburetor throttle lever, with carburetor throttle valve in wide open position. Adjust upper throttle rod as outlined in Carburetor Throttle Linkage above

ROCHESTER 2GC

Mdl	Rochester No.
Std Transmission	7008387
Powerglide	7008388

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM

Idle Speed—450-500 RPM (Synchro mesh), 400-450 RPM (Powerglide—with Selector Lever in "D" range).

Float Level—1¼" (Gauge BT-129) With air-horn inverted and gasket in place, position the float level gauge over the float so it rests against the pump side of power piston shaft, with the outer gauge leg in line with the center of the float Bend float arm to adjust

Float Drop—Bend float tang as required to obtain a distance of 1 29/32" from the gasket surface to bottom of the float, with air-horn upright and float hanging free.

Automatic Choke Setting: Centered at index.

►*OTHER DATA: See "Rochester 2GC Carburetor" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL
No. 7008737

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—Adjust idle mixture screws for highest steady vacuum.

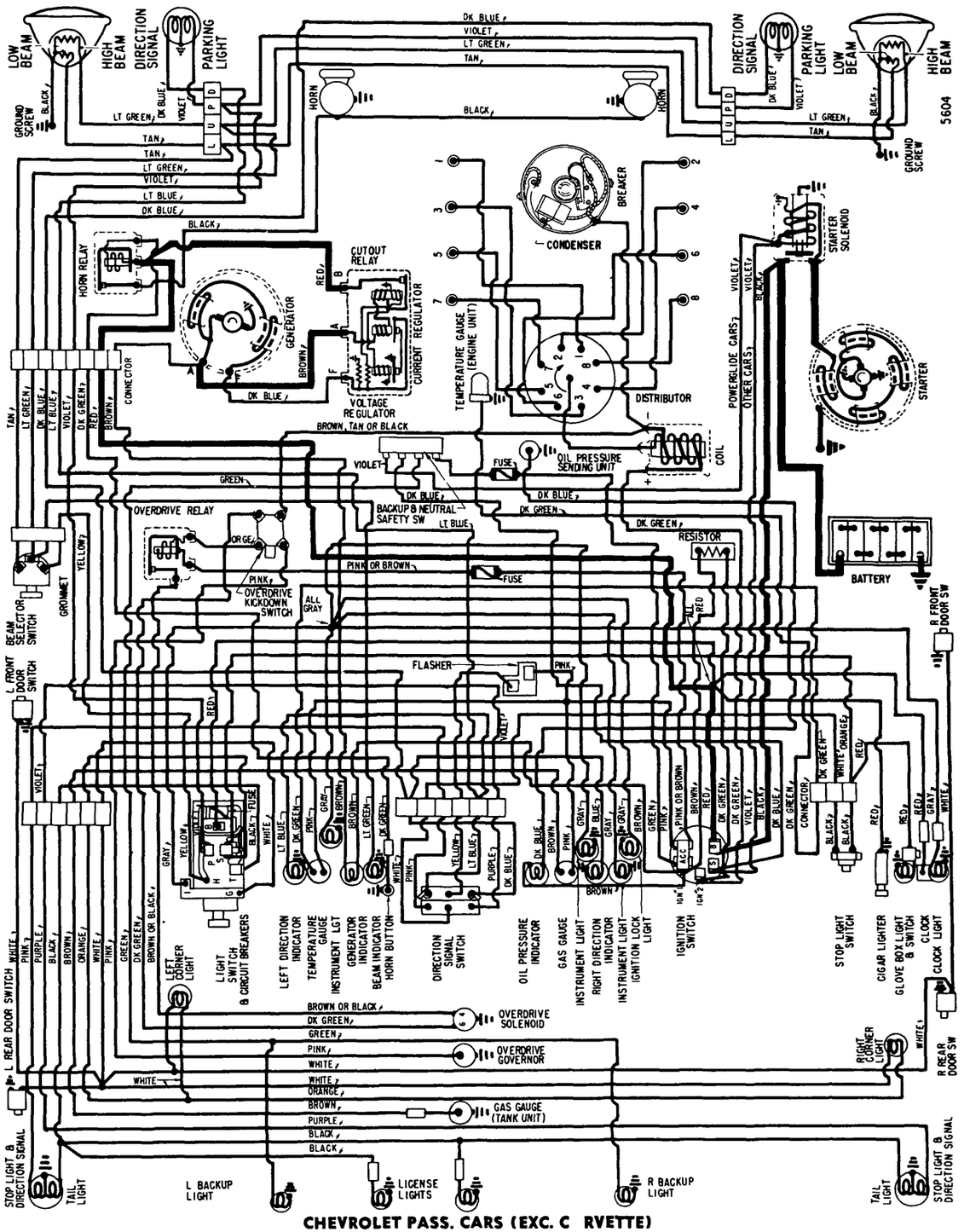
Idle Speed—450-500 RPM (Std. & O.D.), 400-425 RPM (Powerglide - with Selector Lever in "D" range).

►*OTHER DATA: See "Rochester 4GC" Carburetor in Carburetion Section.*

CARTER WCFB 4-BARREL
No. 2366S, SA (Std. V8 Power Pkg. & Corvette with Single Carb.)

►*CHOKE SETTING PRODUCTION CHANGE & STALLING CORRECTION: Adjust automatic choke to 1 point rich, superseding previous setting of "centered" setting.*

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CHEVROLET PASS. CARS (EXC. CORVETTE)

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►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrels fe d Cyl. 2-3-5-8, LEFT barr ls 1-4-6-7.*
Idle Setting–¼-1¼ turns open. Adjust both screws alike. Turn screws out for richer mixture.
Idle Speed – (Exc. Corvette) 450-500 RPM (S.M. & O.D.) 400-450 RPM (Powerglide – With Selector Lever in "D" range).
Idle Speed – (Corvette) 600 RPM. *NOTE* - On Powerglide Cars with Selector Lever in "D" Range and brake set.
►*OTHER DATA: See "Carter WCFB" Carburetors in Carburetion Section.*

CARTER WCFB 4-BARREL
No. 2419S (Front), No. 2362S (Rear)
(Corvette Eng. with TWO Carbs.)

►*RECOMMENDED CHANGES FOR IMPROVED IDLING & LOW SPEED OPERATION: See "Carter WCFB 4-Barrel Carburetor" in Carburetion Section.*
►*CARBURETOR INSTALLATION NOTE:* **Front and rear carburetors operate together at idle speed and for high-speed or full power operation. Front carburetor throttle begins to open when rear carburetor throttle valves are approximately at half-throttle position.**
►*CARBURETOR ADJUSTMENT NOTE:* These carburetors have special "Idle Air Bypass Adjustment Screws" but these screws are NOT used for adjustment. *See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section for complete adjustment instructions.*
Idle Mixture & Idle Speed Setting - *See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section for recommended adjustment procedure.*
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type.
Replacement Pump – AC No. 4150 (Fuel only), No. 4141 or 708 (Fuel & Vacuum). *NOTE* - No. 4150 only used on Corvette.
Pressure – 4-5¼ lbs.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: AC Electric.

Dash Unit – (Corvette) AC 1518244, (Others) 1518473.
Tank Unit – (Corvette) AC 1617911, (Others) 1518158.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53W (Std. V8), 2SM53W (Corvette). *12 Volt,* 9 plate, 53 ampere hour capacity (20 hr. rate).
Battery Ground – Negative.
Engine Ground – Engine to cowl at rear head bolt.

STARTER

Delco-Remy. *12 Volt.* Application as follows:

Car Model	Starter No.
V8, Std. Trans.	1107645
V8, Powerglide	1107649
Corvette	1107627

Armatur (All) – Delco-Remy No. 1926626.
Driv – Overrunning clutch (solenoid pinion shift).
R tati n – Counter-clockwise at commutator end.
Brush Spring Tensi n – 35 ozs. minimum.

P rformanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75 max.
10.5 ft. lbs. min.	Lock	5.8	435 max.

Starting Switch: Delco-Remy Solenoid Switch 1119767 (Corvette), 1119789 (Others) mounted on starter and controlled by Ignition & Starter Switch 1116512. Turn key full RIGHT against spring tension to start. *See "Delco-Remy Starter Solenoid (Without Relay)" in Electrical Section.*
Neutral Safety & Back-up Light Switch: Delco-Remy No.1998112 (Corvette), 1998106 (Others).
Adjustment – *See "Chevrolet Powerglide" in Transmission Section.*

GENERATOR

Delco-Remy. *12 Volt.* Application as follows:

Application	Generator	Armature
V8 Std.	1100321	1928952
V8 Pwr. Strg.	1102041	1929640
V8 Air Cond.	1102042	1923535
V8 Spec. (Cab)	1105947	
V8 Spec. (Cab & Pol.)	1106981	1929360
Corvette	1102043	1929640

Performance Data

Generator	Amperes ①	Volts	RPM
1100321	25	14.0	2780
1102041, 42, 43	30	14.0	2150
1105947	32	14.0	1850
1106981	40	13.0	1500

① – Not maximum output. See Regulator data.

Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 28 ozs.
Field Current – (1100321) 1.5-1.62 amps., (1102041, 42, 43) 1.48-1.62 amps., (1105947) 1.54-1.67 amps., (1106981) 1.37-1.50 amps., all at 12.0 volts.
Belt Adjustment: 13/16" belt deflection midway between fan and generator pulleys with light pressure applied.

REGULATOR

Delco-Remy. *12 Volt.* Application as follows:

Regulator No.	Generator
1119000	1100321
1119001	1102041, 42, 43; 1105947
1119004	1106981

NOTE – Regulators are "1119000 Series Regulators". Specifications below are for "Normal" Settings.

Cutout Relay

Cuts In – 11.8-13.5 volts Hot (1119000, 1), 11.5-13.0 volts Hot (1119004).
Contact Gap – .020".
Air Gap – .020" (with contacts just closed).

Voltage Regulator

Setting – 1119000, 1) 13.8-14.8 volts Hot, (1119004) 13.6-14.3 volts Hot.
Air Gap – .075" (1119000, 1), .063" (1119004) with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

Current Regulator

Setting – (1119000) 23-27 amperes Hot, (1119001) 27-33 amperes Hot, (1119004) 37-42 amperes Hot.
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signals: *See Electrical Section.*
Autronic Eye: *See Electrical Section.*
Direction Signals: *See Electrical Section.*
Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel) and pull shaft and knob out. Remove switch retaining nut and switch assembly.
Stop Light Switch Location: Mechanical type mounted under instrument panel adjacent to brake pedal lever.
Adjustment–Adjust position of switch so that stop light goes out when brake pedal depressed 5/8" from fully released position.
FUSES: All accessory fuses except as indicated below are contained on the accessory fuse and junction block located on upper inside of dash panel to left of steering column.
Overdrive–14 amps. Located in Lucite cartridge in overdrive relay feed wire on engine side of dash panel to left of steering column.
Back-up Light –On accessory fuse block.
►*LIGHTING SWITCH FUSE NOTE:* A 3 ampere fuse has been added to light switch to protect instrument panel rheostat from burning out.
LIGHTING CIRCUIT BREAKERS: Two 13-amp. circuit breakers located on main light switch.
HORNS: Delco-Remy 1999759 (Low Note), **1999760** (High Note). *12 Volt.*
Horn Relay: Delco-Remy No. 1116913, or 1116781.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Sect.*
►*PASSENGER CAR ENGINE NOTE: Hydraulic valve lifters are used on the Standard V8 Engine and solid Type lifters are used on the Corvette engine.*
ENGINE SPECIFICATIONS: V8, Valve-in-Head.

Bore	Stroke	Displacement	Rated HP
3¾"	3"	265 cu. ins.	45

Engine	Compr. Ratio	Developed HP
V8 Std.	8.0-1	162 at 4400 RPM
V8 Powerglide	8.0-1	170 at 4400 RPM
V8 Power Package	9.25-1	205 at 4600 RPM
V8 Corvette	9.25-1	225 at 5200 RPM

Compression & Vacuum Reading – *See TUNE-UP.*
►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE):* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation. *See "Ignition Notes" in Chevrolet Special Data.*
ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

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OIL PAN REMOVAL: Disconnect steering idler arm bracket from frame side rail and drop for clearance.

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*

CYLINDER HEAD & MANIFOLDS: *See Chevrolet Special Data.*

TIGHTENING TORQUES: *See Chevrolet Special Data.*

PISTONS

Cast aluminum, slipper skirt, with piston pin offset 5/64".

Weight—18.77 ozs.

Removal—Pistons and rods removed from above.

Replacement Pistons: Furnished Std. Size & .020", .030", .040" oversize.

►*STANDARD SIZE PISTON NOTE:* Standard pistons furnished in four sizes with size code stamped on piston. The sizes and codes are: **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520").

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block. *See Rod Installation.*

PISTON PINS

Piston pin is pressed into connecting rod and retainers are not used.

Diameters—.9270-.9273". **Length**—3.1200".

Pin Fit in Piston—.00015-.00025". Pins should be capable of supporting own weight in either pin boss at 60°F.

Pin Fit in Connecting Rod—*NOTE—Special tools required for removal & installation. See "Piston Pins" in Chevrolet Special Data.*

Replacement Pins: Furnished only in assembly with piston. Oversizes not available.

PISTON RINGS

Upper compression ring is chrome plated and oil control ring is 3-piece type (2 chrome plated rails and spacer).

Ring	Width	End Gap	Side Clearance
Compr.No.1	.077-.078"	.008-.016"	.001-.003"
Compr.No.2	077-.078"	.009-.018"	.001-.003"
Oil	.181-.188"	.015-.055" ①	.000-.008"

① — On rails.

►*RING INSTALLATION CAUTION:* Install compression rings with side marked "TOP" upward.

Replacement Rings: Furnished Std. & .020", .030", .040" Oversize.

CONNECTING RODS

Length (Center to Center) — 5.7000". **Weight** — 19.02 ozs.

Crankpin Journal Diameter—1.999-2.000".

Lower Bearing—Replaceable precision type.

Clearance—.001-.003" (new), .001-.004" (used).

Side play—.008-.014" (both rods).

Replacement Bearings: Furnished Standard size, .001", .002", .010", .020" Undersize.

Installing Rods: Install rod in piston so that flange or heavy side of rod at bearing end will be toward front of piston (cast depression in head of piston and "F" mark on piston strut) on Nos. 1, 3, 5, and 7 pistons, and rod flange to rear of piston on Nos. 2, 4, 6, and 8 pistons. Install rod and piston assembly in cylinder with cast depression in piston head and "F" mark on strut toward front of cylinder block.

CRANKSHAFT

Journal Diameter—2.2978-2.2988".

►*NOTE: Journal runout at intermediate bearing is .002" maximum.*

Clearance—.001-.003" (new bearings), .001-.004" (used bearings).

End Thrust—Taken at No. 5 (rear) main bearing.

Endplay—.002-.006". Check at front end of rear main bearing.

Replacement Bearings: Furnished Standard size, .001", .002", .010", .020" Undersize.

Bearing Installation: Not necessary to remove crankshaft or engine from car. *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*CAUTION: Camshafts differ on engines as follows:*

Model	Chevrolet No.
Corvette (All)	3711354
Others (Synchro-mesh)	① 3704212
Others (Powerglide)	② 3728779

① — Cast 3703906. ② — Cast 3728284.

Journal Diameters—1.8682-1.8692" (all journals).

Clearance—.0015-.0035".

Bearings—Steel backed babbitt lined bushing.

Replacement Bearings: "Precision" type (do not require reaming). Use Tool Set J-6098 to remove and install bearings.

Camshaft Setting: Both sprockets marked '0'. Install chain with sprocket marks adjacent and in line with straight edge across shaft centers.

►*CAUTION: When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket into place.*

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link Belt. Width — .875". Pitch — .500. Length — 46 links.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*

VALVES

Tappet Clearance: (Corvette) — .008" Intake, .018" Exhaust, with engine hot and idling. (Others) — None in service - hydraulic.

Initial Tappet Clearance (Engs. with Hydraulic Lifters). *See "Valve System" in Chevrolet Special Data.*

Valve	Head Diam.	Stem Diam.	Length
Intake	1.720"	.3415-.3422"	4.902-4.922"
Exhaust	1½"	.3410-.3417"	4.913-4.933"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45° ③	①	.001-.0027"
Exhaust	45° ③	②	.0015-.0032"

① — .3336" (Std. V8 S.M.), .3732" (Std. V8 Powerglide) .40432" (Corvette).

② — .3336" (Std. V8 S.M.), .3732" (Std. V8 Powerglide), .41355" (Corvette).

③ — Seat angle in head is 46°.

►*VALVE GRINDING CAUTION:* Replacement valves furnished with face angle of 45°. When seats are ground to new recommendation of 45°, valves must be ground to recommended angle of 44° (Intake & Exhaust), whether valves being re-used or new valves installed.

Valve Seat Width—3/64"-1/16" (Intake), 1/16"-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

►*VALVE SEAL PRODUCTION CHANGE:* New "shedders" installed over upper end of valve springs used on later cars and should be installed on all engines. These shedders replace previous type shield within valve springs. *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves are furnished with .003", .015", .030" oversize stems. Use Reamer Set J-5830.

Valve Springs: Install springs with closed coil end of spring toward cylinder head. On intake valve springs a baffle is used inside spring.

Spring Specifications (Std. V8)

	Pressure	Length
Valve Closed	76-84 lbs.	1.696"
Valve Open	155-165 lbs.	1.366"

Spring Specifications (Corvette)

	Pressure	Length
Valve Closed	65-72 lbs.	1.696"
Valve Open	151-161 lbs.	1.306"

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring the distance from spring seat in cylinder head to top of valve spring. If this dimension exceeds 1 45/64", install valve spring seat shim furnished 1/32" & 1/16" thick. Installed height of spring must be 1 11/16 - 1 45/64".

Valve Lifters (Std. V8): Hydraulic type. *See "Valve System" in Chevrolet Special Data.*

Valve Lifters (Corvette): Plain barrel type. Remove in same manner as for hydraulic valve lifters. See *"Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement — *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Conventional Std. V8 Valve Timing

Intake Valves — Open 18° BTDC, Close 54° ALDC.

Exhaust Valves — Open 52° BLDC, Close 20° ATDC.

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Powerglide Std. V8 Valve Timing

Intake Valves – Open 26°30' BTDC, Close 63°30' ALDC.
Exhaust Valves – Open 66°30' BLDC, Close 23°30' ATDC.

Corvette Valve Timing

Intake Valves – Open 21°30' BTDC, Close 62°30' ALDC.
Exhaust Valves – Open 62°30' BLDC, Close 23°30' ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts. refill (exc. Corvette), 5 qts. refill (Corvette). Add 1 qt. when filter changed.

Normal Oil Pressure: 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve – In oil pump. Not adjustable.

Oil Pressure Indicator (Std. V8) – Light on right side of instrument cluster, controlled by pressure switch, Delco-Remy No. 1998149, located on left side of engine. Switch operates at 4-6 lbs.

Oil Pressure Indicator (Corvette) – AC No. 1508063. Not electric.

Oil Filter: Full flow type. Replace element at 6000 mile intervals. Use new seal, tighten center bolt to 20-25 ft. lbs.

Replacement Filter Element – AC No. PF-131.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul–*See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation–Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. (17 qts. with heater).

Pressure Valve: AC Type RC-1, Chevrolet No. 850795. 7 lb. type radiator filler cap.

Thermostat: Harrison. In water outlet on intake manifold.
(Std.) No. 3133595 (stamped 151), 151°.
(Optl.) No. 3123994 (stamped 160), 160°; or No. 3133597 (stamped 170), 170°.

Temperature Gauge (Std. V8): AC. Electric type.
Dash Unit – AC No. 1513134.
Engine Unit – AC No. 1513130.
See "Temperature Gauges" in Miscellaneous Section.

Temperature Gauge (Corvette): AC No. 1513198. Not electric.

Water Pump: Packless type with ball bearing shaft.
See "Water Pumps" in Chevrolet Special Data.

CLUTCH

Own (Diaphragm Spring Type) or Borg & Beck. Single plate.
See "Chevrolet (Own)" or "Borg & Beck" Clutches in Clutch Section.

Borg & Beck	Model	Assy. No.	Disc No.
V8 Std. (Pow. Pkg.)	10A9	361404	382527
V8 O.D. (Pow. Pkg.)	10A9	361404	382526
Corvette	10.5A9	361402	382528

Own (Diaphragm Spring Type)	Cover No.	Disc No.
Synchro-mesh (10")	3836723	3836708
H.D. & O.D. (11")	3836719	3836906

►*STD. V8 OVERDRIVE DRIVEN PLATE REPLACEMENT NOTE (BORG & BECK CLUTCH):* New Clutch Driven Plate Assy., Part No. 3741089, has been released to replace Clutch Driven Plate Assembly, Part No. 3729780, to eliminate drive line rattle. New assembly has six inner damper springs instead of the four on old assembly.

Pedal Adjustment: Pedal Free Travel ¾-1". Loosen check nut at connecting link at clutch fork. Turn adjusting nut to remove all lash at fork, **then back off two turns.** Tighten check nut.

Removal (Borg & Beck): Remove transmission (see Transmission Removal below). Remove clutch housing pan. Pull out clutch release bearing and sleeve. Mark flywheel, cover, and one pressure plate lug with punch to insure proper reassembly. Loosen holding screws a turn or two at a time to avoid bending rim of cover, until cover is free. Remove clutch assembly and clutch disc assembly from clutch housing. When removing driven disc be sure to mark flywheel side.

Removal (Diaphragm Spring Type): Remove transmission (see Transmission Removal below). Remove clutch throwout bearing from fork, then clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one turn at a time until diaphragm spring is released. Remove tool, then clutch assembly from vehicle. *NOTE* - When installing clutch, align "X" marks on cover and flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.
See "Chevrolet 3-Speed" in Transmission Section.

Transmission Control: *See "Transmission Controls" in in Transmission Section.*

Removal: Drain transmission and disconnect speedometer cable and shift rods. Disconnect propeller shaft at rear universal and slide shaft toward rear to disengage from transmission. Remove two top transmission to clutch housing screws and install Guide Pins J-1126. Remove the two lower screws and slide transmission back until clutch splines disengage. Remove transmission from below car.

OVERDRIVE

Warner Model AS1-R10H. Solenoid operated type with with governor control and throttle operated kickdown. Lockout Switch not used.
See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Powerglide Transmission–Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Chevrolet Powerglide" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication–Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.

Capacity–5 qts. (refill), 11 qts. (after overhaul).

►*POWERGLIDE DRAINING CAUTION: There is no drain plug on converter. Drain transmission case only, add 4½ qts. of fluid initially, recheck after idling engine.*

►*CHECKING FLUID LEVEL & FILLING TRANSMISSION NOTE:* A filler plug has been added to transmission side cover for use in checking fluid level and adding fluid to transmission. This change made necessary because filler tube and dipstick is not accessible from under hood on air conditioned cars.

Checking Fluid Level–Engine must be idling with parking brake set, transmission warm, and the selector lever in "N" position when taking dipstick readings (on cars without air conditioning), or checking level at filler plug on side of transmission (cars with air conditioning). Maintain fluid level to "F" mark on dipstick (cars without air conditioning), or to bottom of filler plug hole on side of transmission (cars with air conditioning).

►*OTHER DATA: See "Chevrolet Powerglide" in Transmission Section.*

UNIVERSALS

Own. Yoke & Spider (Trunnion) type.

►*CAUTION:* **Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever nut loosened.** *See "Chevrolet (Pass. Car)" in Rear Axle Section..*

REAR AXLE

Own. Semi-floating, hypoid gear type, with Hotchkiss Drive. Pinion bearing adjustment is different than on previous models.
See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Axle Ratios	Standard	Optional
Std. V8 (Synchro-mesh)	3.70-1	
Std. V8 (Overdrive)	4.11-1	
Std. V8 (Powerglide)	3.55-1	
Corvette (Synchro-mesh)	3.55-1	3.27-1
Corvette (Powerglide)	3.55-1	3.27-1

Backlash – .006-.009" (.008" preferred).

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Removal: Raise car and support with jack stands under frame side rails. Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion). Disconnect hand brake cable and equalizer and remove cable from clamps at frame. Disconnect hydraulic brake lines at rear axle housing Disconnect shocks. Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor.

Axle Shaft Removal: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*–If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance.

SHOCK ABSORBERS

Delco. Direct acting non-adjustable. Serviced by replacement.

FRONT SUSPENSION

Independent with direct acting shock absorbers within front coil springs. Different types used as follows:

Corvette – "Threaded Bushing" type pivot points on upper and lower control arms.

Others – "Spherical Joint" type pivot points between control arms and steering knuckle support.

See "Chevrolet" in Suspension & Wheel Alignment Sect.

Kingpin Inclination – 3½ - 4½° crosswise.

Caster – (Corvette) 0° to Pos. 1°, (Others) Pos. ½-1½°.

Camber – 0° to Pos. 1°.

Toe-In – (Corvette) 0-1/8". (Others) 1/16"-1/8" per wheel or 1/8-1/4" total.

Toe-Out on Turns – With outside wheel at 20°, inside wheel should be 23° (Corvette), 22-26° (Others).

STEERING

Manual: Different type steering systems used as follows: **Corvette - Saginaw Worm & Roller.** Push-pull adjustment.

Others – Saginaw Ball Bearing Worm & Nut. Recirculating ball type.

See Saginaw "Worm & Roller" or "Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes.

See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION:* To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087" smaller diameter than the drum diameter. Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action. *NOTE–If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter.*

►*SLOW BRAKE PEDAL RETURN CORRECTION: See "Brake Notes" in Chevrolet Special Data.*

Drums–Diameter 11".

Wheel Cylinder Diameter–Front 1 1/8", Rear 1".

Lining	Width	Thickness
Front Whl.	2"	.187-.194"
Rear Whl.	1¾"	.187-.194"

Length Per Shoe–9.3125" (Primary), 11.6875" (Secondary).

Braking Power–55.9% (Front Wheels), 44.1% (Rear Wheels).

Clearance–Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag after adjustment.

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid–Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole.

Removal–Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove four retaining nuts and lock washers holding master cylinder to firewall and remove cylinder.

Installation–Reverse removal procedure making sure that push rod clevis is straddling the brake pedal. Refill master cylinder and bleed all brake lines. Adjust push rod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1/16-3/16" pedal movement should be felt).

Power Brakes: Bendix Vacuum Type Power Unit replaces conventional master cylinder.

See "Bendix Power Unit" in Brake Section.

MISC. MECHANICAL

Windshield Wipers: Cable operated type (Std.). Electric type (Optional).

See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type with reversible motor operating each door window assembly.

See "Power Window Regulators" in Miscellaneous Section.

Power Top Controls: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjuster: Reversible electric motor controls horizontal front seat movement. *See "Power Seat Adjusters" in Miscellaneous Section.*

Air Conditioning: See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section.

MODEL IDENTIFICATION

Model Designation

Series	Serial Prefix	Wheelbase	Type
3100	3A	114"	Half Ton
3200	3B	123¼"	Half Ton
3400	3C	104	①¾ Ton
3500	3D	125"	①¾ Ton
3600	3E	123½"	¾ Ton
3700	3F	137"	①¾ Ton
3800	3G	135"	1 Ton
4100	4A	130"	1½ Ton
4400	4B	154"	1½ Ton
4500	4C	154"	② 1½ Ton
5100	5A	112 5/8"	③ 2 Ton
5400	5B	136 5/8"	③ 2 Ton
5700	5C	160 5/8"	③ 2 Ton
5100S	5D	112 5/8"	④ 1½ Ton
5400S	5E	136 5/8"	④ 1½ Ton
5700S	5F	160 5/8"	④ 1½ Ton
6100	6A	130"	2 Ton
6400	6B	154"	2 Ton
6500	6C	172"	2 Ton
6700	6D	194"	② 2 Ton
6800	6E	220"	② 2 Ton
6100S	6F	130"	⑤ 1½ Ton
6400S	6G	154"	⑤ 1½ Ton
6500S	6H	172"	⑤ 1½ Ton

①—Forward Control. ②—School Bus Chassis.

③—Low Cab Forward. ④—Low Cab Forward Special

⑤—Special.

►*SERIAL PREFIX NOTE (MODELS WITH V8 ENGINE): A "V" will precede the Serial Prefix, "V3X", etc.*

SERIAL NUMBER: Stamped on metal plate and attached to the body as follows: **Forward Control Models**—On instrument panel support. **Flat Face Cowl Models**—On cowl inner panel. **All Other Models**—Left front door hinge pillar.

Starting Serial Number: 001001 at each assembly plant regardless of series.

►*SERIAL NUMBER NOTE: Serial number (example 3A56K001083) includes following identification data in sequence.*

Series①	Year	Assembly Plant②	Serial No.
3A	56	K	001083

①—Serial Prefix for each model (Models with V8 engine will have a "V" preceding the "3A").

②—See Assembly Plant Designation below.

Assembly Plant Designation

A—Atlanta	**K**—Kansas City	**S**—St. Louis
B—Baltimore	**L**—Los Angeles	**T**—Tarrytown
F—Flint	**N**—Norwood	**O**—Oakland
J—Janesville		

ENGINE NUMBER (6 Cyl): Stamped on right side of block to rear of distributor.

ENGINE NUMBER (V8): Stamped on pad at front right hand side of cylinder block behind water pump.

Starting Engin Numb r: 0001001 (at each plant). Suffix letters and numerals indicate plant at which engine built ("F" for Flint, "T" for Tonawanda, "C" for Canadian), Model Year, and Model Type. *S follow-ing for S ri s Typ D signation.*

►*ENGINE NUMBER NOTE: Engine number (example 0001025 F 56 X) includes following identification data in sequence.*

Serial No.	Engine Plant①	Year	Series②
0001025	F	56	X

①—See Starting Engine Number (above).

②—Engine Series Type Designation.

Series Type Designation

Series	Engine	Designation
31, 32, 36, 3800	Thriftmaster 235" ①	X
31, 32, 36, 38, 4000	Thriftmaster 235" ②①	XG
34, 35, 3700	Thriftmaster 235" ③	W
34, 35, 3700	Thriftmaster 235" ④	WA
31, 32, 26, 28, 4000	Thriftmaster 235" ⑤	V
4000, 6000	Thriftmaster 235" ⑥	U
4000	Thriftmaster 235" ⑦	UD
6000	Jobmaster 261" ⑦	TA
6000	Jobmaster 261" ⑧	TD
31, 32, 36, 38, 4000	V8 Conv. ①	A
31, 32, 36, 38, 4000	V8 Hydramatic ①	B
31, 32, 36, 38, 4000	V8 H.D. Clutch ①	M
34, 35, 3700	V8 Forward Control	D
34, 35, 3700	V8 F.C., Hydramatic	DA
34, 35, 3700	V8 F.C., H.D. Clutch	DB
5000	V8 Conv.	E
5000	V8 Optional ⑧	EA
4000, 6000	V8 Conv. ⑥	H
6000	V8 Optional ⑧	JB

① — "A" stamped following suffix when this engine is used in 3600 Series, "B" when used in 3800 Series, "C" when used in 4000 Series.

② — With Hydra-Matic Transmission.

③ — Updraft Carburetor.

④ — Updraft Carburetor & Hydra-Matic Transmission.

⑤ — Heavy Duty Clutch. "A" stamped following suffix when this engine used in 3600 Series, "B" if used in 3800 Series, "C" if used in 3100 & 3200 Series.

⑥ — "A" stamped following suffix if used in 4000 Series.

⑦ — Optional, Heavy Duty.

⑧ — Optional, Heavy Duty. Allison Transmission.

TUNE-UP

COMPRESSION PRESSURE: (6 Cyl.) 130 lbs., **(V8)** 140 lbs. at cranking speed. Variation of 20 lbs. between cylinders indicates need for cylinder head reconditioning.

VACUUM READING: 6 Cyl. Engine—17-21" at idling speed.

V8 Engine—Adjust to highest steady vacuum reading.

VALVE TAPPET CLEARANCE: *NOTE—Conventional type lifters used on 6 Cyl. engines. Hydraulic valve lifters used on V8 Engines.*

6 Cyl. Engines—(3000 Series)—Intake .006". Exhaust .016". **(Other Series)**—Intake .006". Exhaust .020".

V8 Engin s (With Hydraulic Lift rs)—No adjustment required unless cylinder head removed or valve lifters replaced.

Initial Tapp t Clearanc (Engs. with Hydraulic Lift rs). *S "Valv Syst m" in Chevrol t Sp cial Data.*

MANIFOLD HEAT CONTROL: 6 Cyl. — Thermostatic type. Check for free operation when tuning engine. Should require 1/2 turn from unhooked to hooked position. *Distorted springs sh uld b r placed.*

V 8 — Heat control valve with counterweight and thermostatic coil spring located between right manifold and exhaust pipe. Hook coil spring under stop stud. Install counterweight with square projection up and upper end of spring stop resting on top of stop stud.

IGNITION

FIRING ORDER: 6 Cyl. — 1-5-3-6-2-4

V8 — 1-8-4-3-6-5-7-2.

Cylinders (V8) — RIGHT BANK 2-4-6-8. LEFT 1-3-5-7.

SPARK PLUG GAP: .035"

Spark Plug — AC No. 44 or 45-Com. (½, ¾, 1, 1½ Ton), AC No. C43 (2 Ton V8). 14 mm. Torque to 20-25 ft.lbs.

►*SPARK PLUG INSTALLATION CAUTION:* Spark plugs flash-over on 1956 engines may be caused if 1955 plugs are used. Insulators on 1956 plugs have four annular ribs that help prevent flash-over, and larger inside diameter on spark plug boot. If 1955 plugs installed, flash-over or misfire will be prevalent due to loose fit of boot.

COIL: Delco-Remy 1115087. *12 Volt.*

Ignition Current — 1.8 amps. idling, 4 amps. stopped.

Resistor — Delco-Remy 1931614. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE (6 Cyl. Trucks Exc. Forward Control):* Resistor connected to ignition switch by two leads. Second lead is connected through starter switch and provides a direct connection to coil when starter switch operated.

►*COIL RESISTOR NOTE (6 Cyl. Forward Control & All V8 Models):* Resistor connected to ignition switch by two leads and is by-passed during cranking (second lead provides direct connection to coil when key turned to "Start Engine" position).

DISTRIBUTOR: Delco-Remy. *12 V lt.* Application as follows:

Engine	Distributor No.	Condens r	C ntact S t
235" Engine	1112403	1928111	1924571
261" Engine	1112407	1928111	1924571
V8 Engine	1110847	1924499	1924499

Condenser Capacity — .18-.23 mfd. (all models).

Breaker Gap—.019" (new points), .016" (used points).

Cam Angle - 28-35° (Distr. 1112403 & 1112407), 26-33° (Distr. 1110847). All with .016" gap.

►*BREAKER GAP CAUTION: Manufactur r recommends final check with feeler gaug or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tensi n—19-23 ozs.

Rotation—Clockwise viewed from above.

Automatic Advanc —1110847

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
8-10		1150	16-20		2300
15-17		1800	30-34		3600

Automatic Advanc —1112403

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

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Aut matic Advance–1112407

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		350	0-4		700
7-9		750	14-18		1500
11-13		1200	22-26		2400
16-18		1800	32-36		3600

Vacuum Spark C ntr l: Delco-Remy 1116089 (for Dist. Nos. 1112403 & 1112407). No. 1116100 (for Dist. No. 1110847).

Plug r Trav l – 3/16-7/32" (1116089), 15/64-1/2" (1116100).

Vacuum Advance – 1110847

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
11.75	23.5	12-20.5

Vacuum Advance – 1112403, 7

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6
7.5	15	7.5-10

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265" V8 ENGINE):* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms). *See "Ignition Notes" in Ch vrolet Sp cial Data.*

IGNITION TIMING

Setting - *As indicat d in table below at IDLE SPEED with vacuum line c nn cted.*

►*IGNITION TIMING PROCEDURE CHANGE: Previous rec mmendation of s tting timing at 1000 RPM with vacuum lin disc nn cted has been discontinued.*

Engin	Ignition Setting (Idle Speed)
6 Cyl. (235" & 261")	At TDC
V8 Engine	4° BTDC

Timing Mark – 6 Cyl. - Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on "O". Adjust Octane Selector as follows: Set for slight ping when accelerating with wide open throttle.

V8 – Mark on vibration damper and an indicator on left side of valve chain cover. Indicator is marked with five lines on each side of "O" mark. Each line represents 2°.

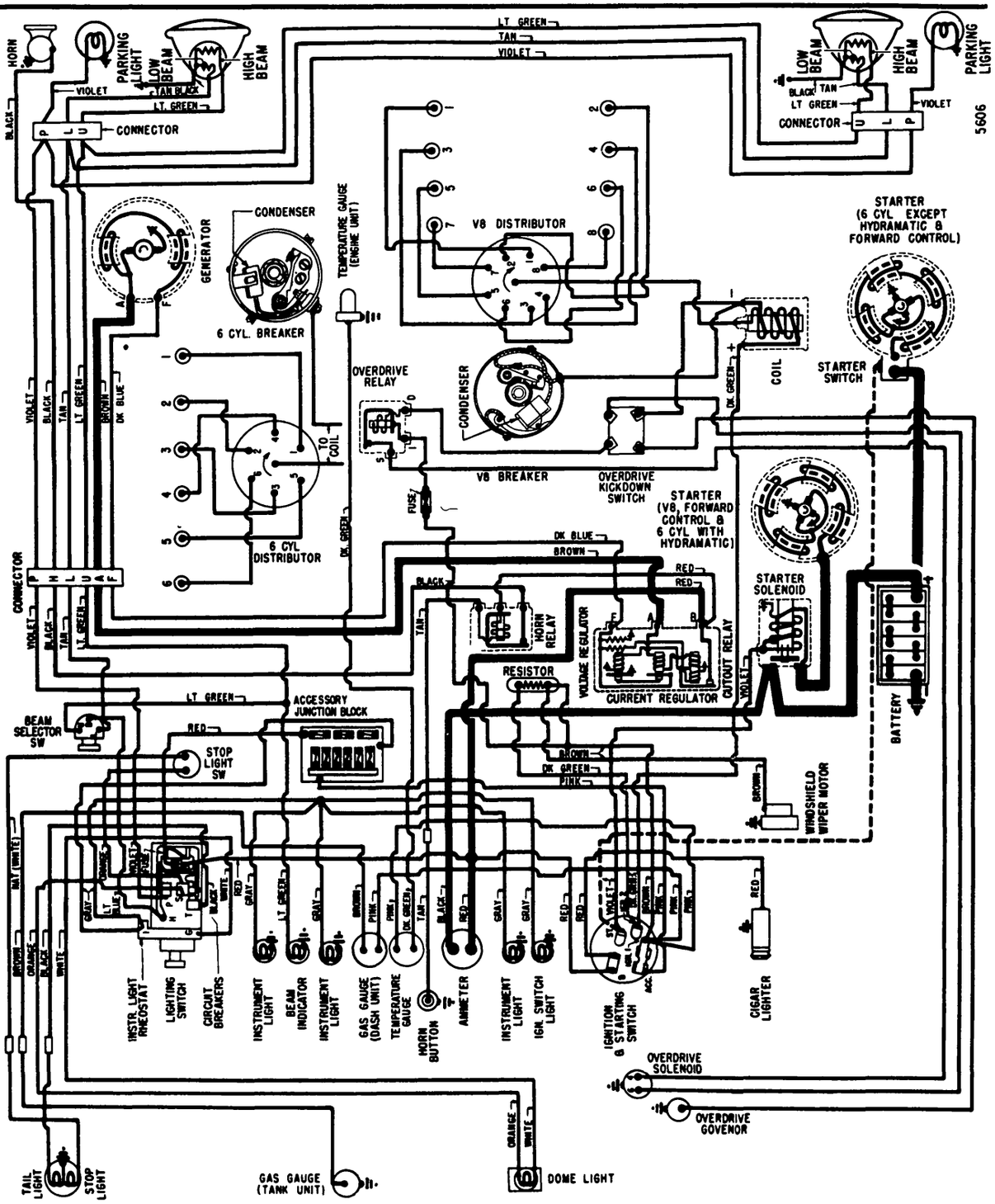
CARBURETOR

►*CARBURETOR APPLICATION: Rochester "B" & "BC" Carbur tors ar standard on all 6 Cyl. Models (Exc pt Forward Contr l). Rochester "2G" Carbur tor is standard n all V8 Models. Carter Updraft Carbur tor is standard on Forward Control Models.*

THROTTLE LINKAGE ADJUSTMENT: *NOTE–On Automatic Transmission Cars, adjust transmission throttle contr l linkag BEFORE adjusting carburetor throttle linkage.*

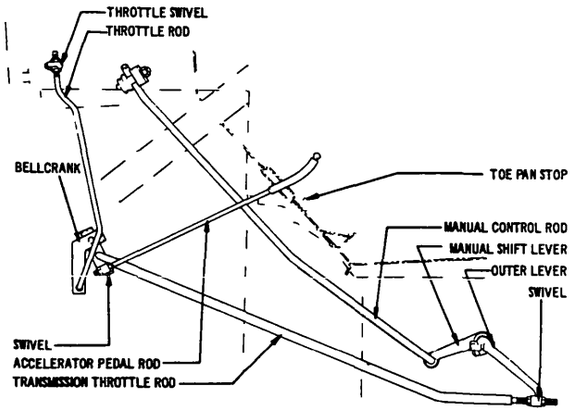
Carburetor Thr ttle Linkag : With accelerator depressed fully and throttle valve wide open, adjust threaded swivel at throttle lever for free entry into throttle lever. Then lengthen control rod by turning swivel **two full turns.** Connect rod to throttle lever.

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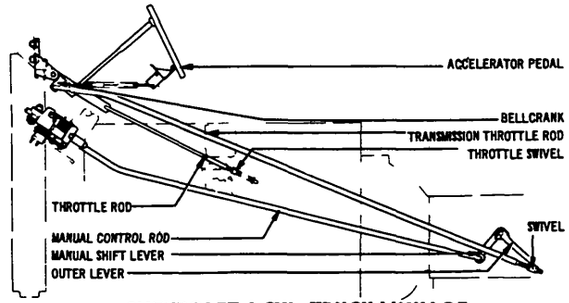
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Throttle Linkage Adjustment: (6 Cyl. Hydra-Matic Driv Trucks, except Forward Control) – With engine at normal operating temperature and idle speed set at 425 RPM, remove lower end of carburetor throttle lever-to-bell crank rod from lever on bell crank. Install Lever Positioning Gauge J-5609 in hole in lever and gauge hole in pan rail of engine block (hole is located toward rear of bell crank position), and leave gauge in this position. Remove swivel from bell crank-to-transmission outer lever at transmission and move transmission outer lever back against stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using Tool J-5260 *(CAUTION–Do not apply force to stops at either end of lever travel).* Hold outer lever back against stop and adjust swivel position on bell crank-to-transmission rod so it just enters hole in transmission lever. Remove Positioning Gauge from bell crank and reinstall throttle rod. Recheck engine idle speed with idle screw against stop on carburetor, and adjust carburetor throttle-to-bell crank rod so swivel at upper end freely enters hole in throttle lever. At this point, **shorten** bell crank-to-transmission outer lever by turning swivel lock nuts **two full turns.** Remove bell crank-to-carburetor throttle rod upper swivel from lever and pull rod upward until linkage is stopped by forward stop in transmission. Hold in this position and adjust accelerator-to-bell crank rod swivel until accelerator pedal is against floor stop, then shorten rod **one full turn.** Replace upper end of throttle-to-bell crank rod in throttle lever.



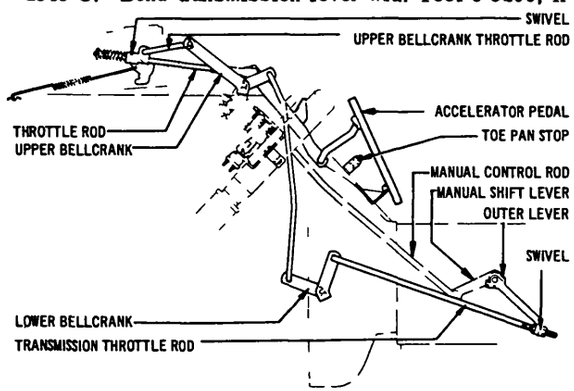
CHEVROLET 6 CYL. TRUCK LINKAGE (EXCEPT FORWARD CONTROL)

Throttle Linkage Adjustment: (6 Cyl. Hydra-Matic Forward Control) – With engine at normal operating temperature and idle speed set at 425 RPM, remove accelerator pedal-to-bellcrank rod and install Carburetor Control Lever Adjusting Gauge J-5629 with slotted end resting on inside shoulder of hex head brass fitting on intake manifold and pin end in rod hole in lever on bell crank. Leave gauge in this position. Remove swivel from bell crank-to-transmission outer lever rod at transmission and move lever back against stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using tool J-5260 *(CAUTION-Do not apply force to stops at either end of lever travel).* Hold outer lever back against stop and adjust swivel position on bell crank-to-transmission rod so it just enters hole in transmission lever, then **shorten** bell crank-to-transmission outer lever rod **two full turns.** Recheck engine idle speed with idle screw against stop on carburetor. Adjust carburetor throttle-to-bell crank rod so swivel at lower end freely enters hole in throttle lever. Remove Positioning Gauge from bell crank lever Remove carburetor throttle-to-bell crank rod from throttle lever and pull bell crank-to-transmission outer lever rod up toward floorboard until linkage is stopped by forward stop in transmission. Hold rod in this position and install accelerator pedal-to-bell crank rod in bell crank lever, and adjust swivel so accelerator pedal is against toe board stop. Install carburetor throttle-to-bell crank rod, then **shorten** accelerator pedal-to-bell crank rod **one full turn.**



CHEVROLET 6 CYL. TRUCK LINKAGE (FORWARD CONTROL)

Throttle Linkage Adjustment: (V8 Hydra-Matic Drive Trucks) – Back out throttle valve adjusting screw so throttle valve is in the tightly closed position and swivel on end of throttle rod is against lug on upper bellcrank throttle rod. Remove swivel from transmission throttle lever and move lever back against its internal stop. Check distance from hole in lever to rear face of transmission case with Throttle Lever Checking Gauge J-2545-C. Bend transmission lever with Tool J-5260, if necessary, to allow entry of gauge into hole *(CAUTION-Do not apply force against stop at either end of lever travel).* Adjust length of transmission throttle rod so swivel just enters hole in transmission throttle lever. Adjust engine idle speed to 425 RPM with selector lever in "N" position. This adjustment will move transmission throttle lever off its internal stop. Depress accelerator pedal to obtain 5/8" distance between toe pan stop and bottom of pedal, then adjust length of throttle rod to give full open throttle. Depress pedal until transmission throttle lever is tight against forward stop on transmission and turn screw on toe pan stop up against accelerator pedal. Release pedal and turn screw upward **two full turns** and secure screw with jam nut (transmission throttle lever will be moved slightly off forward stop on transmission).



CHEVROLET V8 TRUCK LINKAGE

ROCHESTER "B" & "BC"

Downdraft types with manual choke (Rochester Model "B"), and automatic choke (Rochester Model "BC")

Models	Rochester Nos.
235" Engine ①	②7004468
235" Engine ③	④7009255
261" Engine	②7005140

①—Except Forward Control & Automatic Transmission models
②—With Manual Choke
③—With Automatic Transmission (Except Forward Control models)
④—With Automatic Choke

Idle Setting (Exc. 7009255) – 1-2½ turns open (turn screw out for richer mixture).
Idle Setting (7009255) – 2½ turns open (turn screw out for richer mixture).
Idle Speed – 400-450 RPM (Exc. Auto. Trans. models), 425 RPM (Auto. Trans. models with Selector Lever in "N" position).
Float Level – 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.
Float Drop–Turn cover right side up so float drops down Distance from gasket on cover to bottom of each float should be 1¾" on all models Adjust by bending tang at rear of each float assembly
►*CAUTION Both floats must be set alike and must not be twisted out of alignment*
Accelerating Pump–No seasonal adjustment
Choke Adjustment Centered on index
Fast Idle (7009255) With fast idle screw on next to highest step of fast idle cam Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore To adjust, bend connector rod
Throttle Linkage Adjustment (Hydra-Matic Driv Trucks): *See 'Carburetor" above.*
►*OTHER DATA See "Rochester B & BC" Carburetors in Carburetion Section.*
Fuel Pump Pressur 3½-4½ lbs.

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ROCHESTER "2G"

Dual downdraft type with manual choke.

M d l	Rochester No.
Synchro-mesh Trans.	7008389
Overdrive Trans.	7008383

►*V8 TRUCK ENGINE CARBURETOR-TO-MANIFOLD GASKET PRODUCTION CHANGE (To Eliminate Hard H t Starting):* New intake manifold-to-carburetor gasket, Part No. 3733281, with better insulation characteristics, is now being used in production and should be used on all 2-barrel carburetor V8 Truck installations when replacement required. Former gasket, Part No. 3704952, will continue to be used on passenger cars.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idl S tting—After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and engine RPM.

Idl Sp d - 475 RPM (Synchro-mesh), 425 RPM with selector lever in "N" Neutral (Automatic Trans.).

Float L v l—1¼" from air horn gasket to top of float with assembly inverted. Use Gauge BT-129 so it rests against power piston shaft with outer leg in line with center of float. Adjust by bending float arm between pivot and float with Tool BT-69.

Fast Idl : No adjustment of fast idle speed is provided. It is necessary, however, to have correct relationship between fast idle cam position and choke valve position. Check & adjust as follows: Place end of idle adjusting screw on next to highest step of fast idle cam. Using Gauge J-5921, small end of gauge must slide easily between upper edge of choke valve and bore of carburetor, with gauge held vertically. If necessary, bend choke rod until correct clearance is obtained.

Thr ttl Linkag Adjustment (Hydra-Matic Drive Trucks): *Se "Carbur tor" abov .*

►*OTHER DATA: S "Rochester 2G' Carburetors in Carbur ti n S cti n.*

CARTER

Carter (BB) 871SB (F rward Control Models). Single barrel updraft type with manual choke control.

Idl S tting—½-1½ turns open (turn screw out for richer mixture).

Idl Sp d—450-500 RPM (Synchro-mesh), 400-450 RPM (Hydra-Matic).

Fl at L v l—Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed). Press float lever lip firmly against needle.

Acc l rating Pump—Inner holes (in plunger shaft and throttle lever) Summer. Outer hole Winter.

Thr ttl Linkag Adjustm nt (Hydra-Matic Driv Cars): *S e "Carbur tor" abov .*

►*OTHER DATA: See "Cart r (BB)" Carburetors in Carbur tion S ction.*

Fu l Pump Pr ssur : 3½-4½ lbs.

CARB. EQUIPMENT

Fu l Pump: AC Diaphragm type.

Model	AC Pump No.
6 Cyl., Std. (Fuel only)	4149
6 Cyl., Optl. (Fuel & Vacuum)	4138, 707
V8, Std. (Fuel only)	4150
V8, Optl. (Fuel & Vacuum)	4141, 708

Pump Pressure—(6 Cyl.) 3½-4½ lbs. (V8) 4-5¼ lbs.

Gasoline Gauge: AC Electric.

Dash Unit—AC No. 1518461.

Tank Unit	Truck Model
AC No. 1518258	Half Ton
AC No. 1518236	¾ Ton
AC No. 1518498	1½ & 2 Ton
AC No. 1518234	School Bus

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53 (Exc. School Bus). *12 Volt,* 9 plate, 53 ampere hour capacity (20 hr. rate).

Delco 3SM70 (School Bus). *12 Volt,* 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground—Negative.

Engine Ground—(6 Cyl.) Engine to frame, (V8) Engine to dash.

STARTER

Model	Delco-Remy No.
6 Cyl. (Exc. Fwd. Cont. & Hydra-Matic)	①1107634
6 Cyl. (With Hydra-Matic)	②1107633
6 Cyl. (Fwd. Cont. W/O Hydra-Matic)	②1107626
V8 (Exc. Hydra-Matic)	②1107627
V8 (Hydra-Matic)	②1107643

①—Manual Pinion Shift. ②—Solenoid Pinion Shift.

Armature—Delco-Remy 1926626 (all models).

Drive (6 Cyl. Synchro-mesh Trans., Exc. Fwd. Cont.)—Overrunning clutch with pedal operated manual pinion shift.

Drive (6 Cyl. Fwd. Cont. & Hydra-Matic Models. All V8 Models)—Overrunning clutch with solenoid pinion shift.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: (Solenoid Pinion Shift Models)—Delco-Remy Solenoid Switch No. 1119767 mounted on starter and controlled by Ignition & Starter Switch 1116522. Turn key full RIGHT against spring tension to start.

Starter Switch: (Manual Pinion Shift Models)- Starter switch mounted on starter and controlled by pedal operated lever.

Hydra-Matic Neutral Saf ty Switch: Delco-Remy No. 1998111 (Exc. Forward Control). Delco-Remy 1998110 (Forward Control).

Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

D lco-R my. *12 Volt.* Generators used as follows:

M d l	G n rat r N .	Armatur N .
All (Std.)	1100326	1928952
Optl., Pow. St., 30 amps.	1102041	1929640
Optl., Pow. St., 40 amps.	1106982	1932349
Optl., 30 amps.	1105947	
Optl., 40 amps.	1106981	1929360

Maximum Charging Rate—Controlled by regulator and governed by battery condition.

Performance Data - Cold

Generator	Amperes ①	Volts	RPM
1100326	25	14.0	2780
1102041	30	14.0	2150
1105947	32	14.0	1850
1106981, 2	40	13.0	1500

① — Not maximum output. See Current Regulator.

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—28 ozs.

Field Current—1.5-1.62 amps. (1100326), 1.48-1.62 amps. (1102041), 1.54-1.67 amps. (1105947), 1.37-1.50 amps. (1106981, 2). All at 12.0 volts.

Belt Adjustment: 5/16" (6 Cyl.), 13/16"(V8) deflection midway between water pump and generator pulleys with light load applied to belt.

REGULATOR

Delco-Remy. *12 Volt.* Regulators used with generators as follows:

Regulator No.	Generator N .
1119000	1100326, 1102041
1119001	1105947
1119004	1106981, 2

►*NOTE: Regulator is "1119000 Series Regulator". Specifications below are for "Normal" settings.*

Cutout Relay

Cuts In—(1119000, 1119001) 11.8 - 13.5 volts HOT. (1119004) 11.5-13.0 volts HOT.

Contact Gap—.020".

Air Gap—.020" (with contacts just closed).

Voltage Regulator

Setting—(1119000, 1119001) 13.8-14.8 volts HOT. (1119004) 13.6-14.3 volts HOT.

Air Gap—.063" (1119004), .075" (Others), with armature pressed down to point where contacts just touch.

Checking & Adjusting—*See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

Current Regulator

Setting (1119000)—23-27 amperes HOT.

Setting (1119001)—27-33 amperes HOT.

Setting (1119004)—37-42 amperes HOT.

Air Gap—.075" with armature pressed down to point where contacts just touch.

Checking & Adjusting—*See "Delco-Remy 1119000 Series Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Direction Signals: *See Electrical Section.*

Lighting Switch Removal: Disconnect all wires from switch (make sure that all wires are tagged for identification). Depress switch shaft retainer on top side of switch assembly (rear of instrument panel). Remove switch retaining nut and switch assembly.

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►*LIGHTING SWITCH FUSE NOTE:* A 3 ampere fuse has been added to lighting switch assembly to prevent instrument panel rheostat from burning out.

Stop Light Switch Location: Mechanical type mounted on underside of toeboard and operated by brake pedal

CIRCUIT BREAKERS: Two 13 amperes circuit breakers located in main lighting switch One protects headlamps and parking lamps and the other circuit breaker protects all other light circuits

HORNS: Delco-Remy 1999760 (High), 1999759 (Low)
Horn Relay: Delco-Remy 1116913. *12 Volt.*

ENGINE

►*ENGINE APPLICATION NOTE: Three variations of 235" Thriftmaster engine, the 261" Jobmaster engine, and two V8 engines (the 265" Taskmaster & Trademaster) are used in 1956 production. See "Truck Model Identification" for engine application.*

Engine	Series
Thriftmaster 6 Cyl.	Ⓒ 3000, 4000
Thriftmaster Special 6 Cyl.	② 3400, 3500, 3700
Thriftmaster Hvy. Duty 6 Cyl.	③ 6000
Jobmaster 6 Cyl.	⑩ 6000
Trademaster V8	⑤ 3000, 4000
Trademaster Hvy. Duty V8	⑥ 5000

Ⓒ—Std. Equip. Conventional Models.
②—Std. Equip. Forward Control Models.
③—Std. Equip. Optional on 4000 Series.
⑩—Optional Equip.
⑤—Optional Equip. Conventional & Forward Control.
⑥—Std. Equip. Optional on 4000, 6000 Series.

ENGINE SPECIFICATIONS: Own. 6 Cylinder & V8 valve-in-head engines.

Engine	Bore	Stroke	Displmnt
235" Thriftmaster	3 9/16"	3 15/16"	235.5"
261" Jobmaster	3 3/4"	3 15/16"	261.0"
265" V8 Trademaster	3 3/4"	3"	265.0"
265" V8 Taskmaster	3 3/4"	3"	265.0"

Engine	Compr. Ratio	Rated HP	Dev. HP
235" Thriftmaster	8.0-1	30.4	140 at 4200
261" Jobmaster	7.8-1	33.7	148 at 4000
265" V8 Trademaster	7.5-1	45.0	155 at 4200
265" V8 Taskmaster	7.5-1	45.0	155 at 4200

Compression & Vacuum Reading—See *TUNE-UP.*

►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE)* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation *See "Ignition Notes" in Chevrolet Special Data*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: (V8 Engines)—Disconnect steering idler arm bracket from right frame side rail and drop for clearance

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data*

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data*

►*OTHER ENGINE DATA: See 1956 Passenger Car pages and not the following*

ALL 6 CYL. & V8 ENGINES: Valves—High alloy steel exhaust valves replace those formerly used.

Oil Control Ring—Three-piece oil control rings replace four-piece type used previously. New ring consists of two chrome plated rails and spacer.

6 CYL. ENGINES: Upper Main Bearing Insert—"Roll-out" type upper main bearings used. Inserts are retained by a tang which bears against cap and fits into matching groove in cylinder block. Bearings can be rolled out by removing bearing cap and inserting special plug in crankshaft oil hole.

Valve Guide Installation—On both 235" & 261" engines, exhaust valve guides are installed in head so they will extend 15/16" above the head, and intake valve guides are installed to extend 1" above the head. Use Tool J-5599 to install exhaust guides, Tool J-5598 to install intake guides.

►*THRIFTMASTER 235" HEAVY DUTY ENGINE NOTE* Upper compression rings are chrome plated and rotators are standard equipment on exhaust valves.

V8 ENGINES: Rings—Top compression rings are chrome plated.

Valve Rotators—Standard on all exhaust valves.

Valve Spring Dampers & Oil Shields—Used on all intake and exhaust valves.

►*TASKMASTER V8 PISTON NOTE:* Two small notches are ground into crown of each piston to provide additional piston-to-valve clearance (minimizing possibility of valve-piston collision during engine over-speeding conditions).

►*VALVE SPRING HEIGHT CAUTION (V8 ENGINES):* Check installed height of valve springs. Distance from top of shim, or spring seat, to top of valve spring shield should not be in excess of 1 45/64". If so, install a 1/16" or 1/32" shim to obtain an installed spring height of 1 5/8" for exhaust, 1 11/16" for intake.

VALVE TIMING: As indicated below

235" Thriftmaster & 261" Jobmaster

Intake Valves—Open 11°30' BTDC, Close 52°30' ALDC.
Exhaust Valves—Open 51° BLDC, Close 13° ATDC.

265" Trademaster & Taskmaster

Intake Valves—Open 18° BTDC, Close 54° ALDC.
Exhaust Valves—Open 52° BLDC, Close 14° ATDC.

Valve Timing Check (235" & 261" Engines): Remove all tappet clearance from No 1 exhaust valve Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening Mount dial indicator on rocker arm shaft support with stem contacting No 1 exhaust valve adjusting screw set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset No. 1 exhaust valve to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data*

Crankcase Capacity (6 Cyl.)—5 qts (refill) 5½ qts (dry) **(V8 Engines)** - 4 qts refill (Trademaster), 5 qts refill (Taskmaster) Add 1 qt for filter change

Normal Oil Pressure: (6 Cyl.—45 lbs **(V8)**—35 lbs

Pressure Regulator Valves—In oil pump body Not adjustable

Oil Pressure Indicator—AC No 1508246 Not electric

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP INTAKE NOTE:* Oil pump intake is fixed screen type and replaces "floating" type previously used. Intake and screen are removed as an assembly.

Oil Pump Overhaul—*See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine

Servicing—On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions

Crankcase Ventilation (Optional): Positive Type Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold Valve is spring loaded variable opening type giving constant crankcase ventilation at all speeds **Valve must close at idling to give proper air-fuel mixture**

Servicing—Every 10 000 miles (or oftener if required) clean vacuum pipe valve and filler pipe thoroughly Filler cap gasket must seal tightly

►*VACUUM VALVE CAUTION* If improper action of spring is suspected due to spring being distorted or etched from corrosive action the valve assembly should be replaced

COOLING

Water Capacity: As follows

Model	235"	265"	261"
½, ¾, 1 Ton	17 qts.	17½ qts.	
½, ¾, 1 Ton H.D.	17½ qts.	18 qts.	
1½ Ton Special	17½ qts.	18 qts.	
1½ Ton Special H.D.	18 qts.	18½ qts.	
5000 Ser., 4 or 5 speed		18 qts.	
5000 Series, H.D.		18½ qts.	
5000 Series, Powermatic		21 qts.	
6000 Series, 4 or 5 Speed	17½ qts.	18 qts.	17 qts
6000 Series, H.D.	18 qts.	18½ qts.	
6000 Series, Powermatic		21½ qts.	21 qts.

NOTE—Add one quart for models with heater.

Pressure Valve: AC No. 850795. Radiator filler cap. 7 lb. type. **Replacement Valve**—AC No. RC-1.

Thermostat: Harrison. In cylinder head water outlet (6 Cyl.). In water outlet in intake manifold (V8).

Standard—No. 3133595 (stamped 151), 151°. Can be used for alcohol anti-freeze.

Optional—No. 3123994 (stamped 160), 160°. No. 3133597 (stamped 170), 170°.

Temperature Gauge: AC Electric type

Dash Unit - AC No 1513138

Engine Unit - AC No 1513130

See "Temperature Gauges" in Miscellaneous Section

Water Pump: Packless type with sealed ball bearing shaft. *See "Water Pumps" in Chevrolet Special Data*

CLUTCH

6 CYL. ENGINES

Own. Diaphragm spring, single plate, dry disc type. *See "Chevrolet (Own)" in Clutch Section.*

Model	Cover	Wovern Disc	Molded Disc
Standard (10")	3836716	3826119	3836097
Heavy Duty (11')	3836720	3826011	

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Pedal Adjustment: Pedal free travel ¾-1". To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork. *NOTE*–Use finger pressure only when checking clutch free travel.

Removal: Remove transmission (see Transmission Removal). Remove throwout bearing, remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove assembly from below. *CAUTION*–Do not allow pressure plate to hang on retracting springs (support by hand). When installing clutch align "X" mark on cover with "X" mark on flywheel.

CLUTCH

V8 ENGINES

Borg & Beck. Single plate, dry disc type.

Series	Model	Assy. No.	Disc No.
3000 & 4000	10.5A9	361402	352528
5000 & 6000 Ⓒ	11A9	361403	382286

Ⓒ–Heavy Duty on 3000 & 4000 Series.

See "Borg & Beck" Clutches in Clutch Section.

Pedal Adjustment: Adjust clutch pedal until free travel is 1". Make sure that pedal pad contacts toeboard when pedal pressed down.

Removal: Remove transmission (see Transmission Removal). Before removing clutch assembly, punch mark flywheel, clutch cover and one pressure plate lug so these parts may be assembled in their same relative positions. Loosen hold-down screws evenly and remove cover. *NOTE*–Mark flywheel side of driven plate for correct reassembly.

TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three speed, all helical gear type. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).

See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever. *See "Transmission Controls" in Transmission Section.*

Removal (½ & ¾ Ton): Drain transmission. Disconnect speedometer cable at transmission and shift control rods from transmission levers. Remove propeller shaft. Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes. Remove the two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc.

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse).

See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.

See "Transmission Control" in Transmission Section.

Removal: Same as for "3-Speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

See "Chevrolet 4-Speed" in Transmission Section.

Transmission Control: (All Models exc. Forward Control) –Floor mounted gearshift lever.

Removal (½ & ¾-Ton): See "3-Speed (Light Duty)" above.

Removal (Other Trucks): Remove screws fastening steering jacket grommet and slide grommet up out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor and remove cover. On Forward Control models remove both front and rear floor pans. Remove speedometer cable from transmission rear bearing retainer. On 1-Ton, remove cotter key and pin attaching parking brake pull rod to parking lever. On 1½ & 2-Ton, disconnect parking brake lever return spring from parking brake operating lever and remove cotter key and pin attaching inner and outer levers to parking brake operating lever. Remove parking brake lever lock, flat washer and spring and remove parking brake lever. Drain lubricant from transmission. On 1-Ton, break universal joint at transmission joint flange and tape trunnions and bearings together. On 1½ & 2-Ton, disconnect intermediate universal joint by removing two trunnion bearing "U" clamps, split joint and lower front end of rear propeller shaft to floor. Remove the four universal joint flange nuts. Remove nuts attaching propeller shaft bearing support bracket to frame cross member and remove front propeller shaft and bearing assembly. On all models, remove the two capscrews attaching transmission to clutch housing and insert two Guide Pins J-1126 in these holes. Remove flywheel underpan and remove two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until transmission free of splines in clutch disc. Remove transmission.

OVERDRIVE

Warner R10. Used with Chevrolet Truck 3-Speed (Light Duty) Transmission.

See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cables have been disconnected.

HYDRA-MATIC DRIVE

Dual Range. Four speed type with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication–Check fluid level in transmission every day. Drain & refill every 25,000 miles. Use only "Automatic Transmission Fluid" Type A.

Checking Fluid Level–With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid level with engine at idling speed.** Add sufficient fluid to bring level in transmission to "F" mark on dipstick.

Capacity–8½ qts. (refill), 9 qts. (after overhaul). *NOTE*–1 qt. additional with oil cooler.

►*OTHER HYDRA-MATIC SERVICE DATA–See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

REAR AXLE

SEMI-FLOATING (HALF-TON)

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE*–Same design as passenger car axle.

See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.

Ratio–(Synchro-mesh & Hydra-Matic) 3.90-1 (39:10). **(Overdrive)** 4.11-1 (37:9).

►*AXLE SHAFT NOTE: Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft, or by length as follows:*

Axle	Part No.	Length
Left	3694769Ⓒ	29 5/8"
Right	3694770Ⓒ	30 5/8"

Ⓒ–Part No. stamped on axle for identification.

Backlash–.005-.008".

Removal of Rear Axle Assembly: Disconnect and remove parking brake pull back spring. Remove cotter pins and clevis pins from each parking brake cable clevis, and remove clevis. Remove springs and retaining clips from cables at frame brackets. Disconnect universal joint trunnion bearing "U" bolts and split rear universal joint. Disconnect shocks from anchor plates. Disconnect hydraulic brake line to connector at rear frame bracket. Remove spring "U" bolts, nuts and anchor plates. Raise rear of truck and roll assembly out toward rear. *CAUTION–Be careful when pulling parking brake cables through openings in frame.*

Axle Shaft Removal: *See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.*

Axle Shaft Endplay–Free fit to .014" maximum.

FULL-FLOATING (¾, 1, 1½TON)

Own. Full-floating hypoid gear (straddle mounted pinion) with Hotchkiss drive.

►*AXLE ASSEMBLY NOTE, ¾ & 1-Ton axle assemblies are different design than used on 1½ & 2-Ton with standard rear axle assemblies.*

See "Chevrolet Truck Hypoid Full-Floating" in Rear Axle Section.

►*AXLE RATIO IDENTIFICATION NOTE: Axle ratios are identified by prefix letters in rear axle numbers stamped on top of carrier housing between reinforcing ribs. See Axle Ratios following:*

Axle Ratio Identification

Ratio	Prefix Letters
5.14-1 (36:7)	CA, CB, CE, CF
4.57-1 (32:7)	CC, CD
6.17-1 (37:6)	CG, CH, CJ
7.2-1 (36:5)	CM

Backlash–.005-.008". Screw adjustment.

Removal of Differential Carrier: Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal below. Remove two trunnion bearing "U" bolts

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from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier in floor jack and roll from under truck.

Axle Shaft Removal (¾ & 1-Ton): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket *Use new gasket when installing shaft.*

►*CAUTION* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft *Grease at this point will cause loosening of axle shaft flange capscrews.*

Axle Shaft Removal (1½ & 2-Ton): Shaft flange is splined in wheel hub (tight fit) and requires special puller for removal Remove five capscrews and lockwashers in hub cap, remove hub cap and gasket Assemble special adapter J-1436-8 on Rear Axle Shaft Bearing & Oil Seal Remover. J-1436 (remove jaws), thread adapter into hole in axle shaft flange, pull axle shaft. *NOTE*–When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►**Axle Shaft Note:** Shafts unequal length (right shaft longer than left). Install in correct position.

Wheel Bearing Adjustment: Remove wheels and axle shafts (see above) Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ Ton), J-5670 (2-Ton) while turning hub by hand, then back off nut 45°, check for free turning, install adjusting nut lock with lock tangs aligned with slots in adjusting nut. Bend tang down into notch in adjusting nut, install locknut and tighten securely. Bend tang of lock down into notch of locknut:

HEAVY DUTY FULL-FLOATING (2-TON & LCF MODELS)

Own. Full floating, hypoid gear, roller pinion bearings (straddle mounted pinion), with Hotchkiss drive.

See "Chevrolet Truck Heavy Duty Hypoid Full Floating" in Rear Axle Section.

Ratios–Same as for "Standard Full-Floating" above.

Backlash– 005- 008".

Removal Of Rear Axle Assembly: Same as for "Standard Full-Floating" above.

Axle Shaft Removal: Same as for 1½ & 2-Ton "Standard Full-Floating" above.

►**Axle Shaft Note:** Shafts unequal length (right shaft longer than left). Install in correct position.

Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type. with hypoid primary pinion and ring gear.

See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.

►*NOTE: Two gear ratios available as follows:*

Power Ratio–6.40-1 (high), 8.72-1 (low). 32:5 Primary gears.

Speed Ratio–5.83-1 (high), 7.95-1 (low). 35:6 Primary gears.

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above

SHOCK ABSORBERS

Delco. Direct Acting (Airplane Type) shock absorbers as follows:

Front Shocks

Model	Delco No.
½, ¾, 1 Ton	820R
2 Ton School Bus	682Z

Rear Shocks

Model	Delco No.
½ Ton (114")	800W
½ Ton (123¼")	800Z
¾ Ton	800Z
1 Ton	684U
1½ Ton	660U
2 Ton School Bus (Exc. H.D.)	660U
2 Ton School Bus (H.D.)	660W

FRONT SUSPENSION

Conventional "I" Beam section, with Reverse Elliott ends and semi-elliptic springs.

Kingpin Inclination – 6-8°

Caster (At designed load) – See Table below.

Camber – 1°.

Toe-In – See Table below.

Model	Caster	Toe-In
3100, 3200	1½°	1/8-7/32"
34, 35, 37, 40, 5000	2°	1/4-7/32"
3600	1½°	1/4-7/32"
3800, 6000	2¼°	1/4-7/32"

STEERING

Manual: Saginaw Ball Bearing Worm & Nut (recirculating ball).

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Bendix Linkage Type – *See "Chevrolet Truck (Bendix)" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*NOTE: Two different type brakes used on trucks as indicated below.*

Chevrolet-Bendix (Except Rear Wheels of 1½ & 2-Ton Models–Duo-servo, single anchor, hydraulic (without eccentric adjustment)

See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION:* If bench type grinder used, grind shoes to .057" to .087" smaller diameter than drum size. If spindle type grinder used, grind shoe to drum diameter.

Chevrolet-Twinplex (Rear Wheels 1½ & 2-Ton Models)–Two-cylinder, four-anchor type hydraulic. Shoes are self-centering and self-energizing.

See "Chevrolet Twinplex" in Brake Section.

Wheel Cylinders– Size stamped on housing under adjusting lock spring.

Drums–Cast iron with steel web.

Drum Diameter

Model	Front	Rear
½-Ton	11"	11"
¾-Ton	12"	12"
1-Ton	12"	14"
1½ & 2-Ton	14"	15"

Lining–Molded type. Riveted on 1½ & 2-Ton Models and bonded on all others.

Thickness & Width

Model	Thickness	Width
½-Ton (Front Whl.)	202-.222"	2"
½-Ton (Rear Whl.)	.202-.222"	1¾"
¾-Ton (Front & Rear)	.264- 284"	2"
1-Ton (Front Whl.)	.264-.284"	2"
1-Ton (Rear Whl.)	.267- 287"	2½"
1½ & 2-Ton (Front Whl.)	.267- 287"	2½"
1½ & 2-Ton (Rear Whl.)	392- 412"	4"

Clearance–Adjust for clearance as follows.

All Models (Except 1½ & 2-Ton Rear Brakes)–Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (Half-Ton Models), or just enough to eliminate brake drag (Other Models), but not more than 7 notches

Rear Wheels (1½ & 2-Ton Models)–Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel)

Parking Brakes: Hand lever applies rear wheel service brakes on Half-Ton & ¾-Ton Models, and an independent brake on propeller shaft on all other models.

Adjustment (½ - & ¾-Ton Models)–*See "Chevrolet-Bendix Hydraulic" in Brake Section.*

Adjustment (1, 1½, 2-Ton Models & ¾-Ton with 4-Speed Transmission)–*See "Chevrolet Twinplex" in Brake Section.*

Master Cylinder: Located under floorboard on left hand side of truck

Checking Fluid–Maintain fluid level to lower edge of filler hole.

Removal–Remove from below. *CAUTION*–On 1½ & 2 Ton Low Cab Forward, spacer between cylinder and body bracket will fall out when mounting bolts removed.

Installation–Reverse removal procedure. On LCF Models make sure the spacers are reinstalled.

Power Brakes: *See "Hydrovac Power Unit" in Brake Sect.*

Removal–Remove vacuum line, brake fluid line to wheel and master cylinders, and air cleaner hose from vacuum unit. Remove nuts and bolt securing unit to its bracket on right side rail of frame.

MISC. MECHANICAL

Windshield Wipers: Linkage type. Vacuum motor (Std. Equip.). Electric motor (Optl. Equip.).

See "Windshield Wipers" in Miscellaneous Section.

MODEL IDENTIFICATION

Model D signation		
S ri s	S rial Prefix	Model
1500 ①	A	ONE-FIFTY
2100	B	TWO-TEN
2400	C	BEL-AIR
1508	D	SEDAN DELIVERY

① - Except Sedan Delivery.

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Starting Serial Numb r - 100001 (at each plant) for all models.

► *SERIAL NUMBER NOTE: Serial Number (example B57F100025) includ s following identification information in s qu nce.*

S ri s ①	Y ar	Assy. Plant ②	Serial No.
B	57	F	100001

① - See "Serial Prefix" in Model Identification above.
② - See Assembly Plant Designation below.

Car Ass mbly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
J - Janesville	**O** - Oakland	

ENGINE NUMBER: Stamped on right side of engine block to rear of distributor.

► *ENGINE NUMBER NOTE: Engine Number (example T 101 A) includ s following identification information in sequence:*

Plant ①	M nth ②	Day ③	Engine Type ④
T	1	01	A

① - "F" Flint, "T" Tonawanda.
② - "1" (January) "2" (February), etc.
③ - "01" (First Day), "02" (Second Day), etc.
④ - See Model Type Designation below.

Mod l Typ Designation

Equipm nt	Engine Number Suffix
3-Speed Trans.	A
Heavy Duty Clutch	AD
Powerglide	B

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 20 lbs. at cranking speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

Initial Tapp t Clearance (Engs. with Hydraulic Lifters) - *Se "Valve System" in Ch vrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation. Should require ½ turn from unhooked to hooked position. *Distorted spring should be replaced.*

IGNITION

FIRING ORDER: 1–5–3–6–2–4.

SPARK PLUG GAP: .035".

Spark Plug - AC No. 44 (Std.). No. 45 (Hotter, for continuous City operation). C-43 COM (Colder, for continuous heavy duty service). 14mm. Tighten to 20-25 ft. lbs.

COIL: D lco-R my 1115087.

Igniti n Curr nt - 1.8 amps. idling, 4 amps. stopped.

R sistor - Delco-Remy 1931614. 1.40-1.62 Ohms.

► *COIL RESISTOR NOTE:* Resistor connected to ignition switch by two leads and is by-passed during cranking (see diagram) when coil is energized directly from ignition bypass terminal on starter solenoid.

DISTRIBUTOR: D lc -R my 1112403.

Condenser - Delco-Remy 1928111. **Capacity -** .18-.23 mfd.

Contact Point Set - Delco-Remy 1924571.

Breaker Gap - .016-.021" (new points), .0125-.0175" (used points).

Cam Angle - 28-35° with .016" gap.

► *BREAKER GAP CAUTION - Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "0" position.

Vacuum Spark Control: Delco-Remy 1116089.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6
7.5	15	7.5-10

IGNITION TIMING

Setting - At TDC. *Set timing at IDLE SPEED with vacuum line connected.*

► *IGNITION TIMING PROCEDURE CHANGE: Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued.*

Timing Mark - Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on "0". Then adjust selector as follows:

Octane Selector Setting - Set for slight ping when accelerating with a wide open throttle.

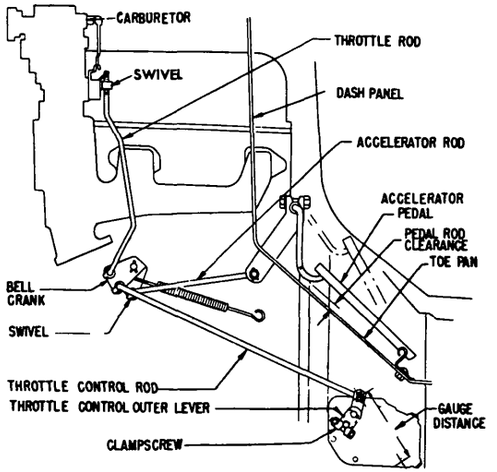
CARBURETOR

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): Engine must be at normal operating temperature and transmission warm (choke valve wide open and fast idle inoperative with throttle stopscrew against low step of fast idle cam) when adjustments made.

1) Adjust engine idle speed to 425 RPM with selector lever in "D" (Drive) range (set hand brake firmly to hold car while making adjustments).

2) Disconnect control rod from throttle lever on transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever assembly counterclockwise to the open throttle position.

3) Hold lever in this position and with throttle valve outer lever gauge J-5806 set at 7.09" measure distance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod.



POWERGLIDE THROTTLE LINKAGE

4) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.

5) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.

6) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.

Model	ROCHESTER BC	Rochester No.
Std. Transmission		7009657
Powerglide		7009656
Governor Controlled Engine		7009784

► *CHOKE SETTING CHANGE FOR IMPROVED PERFORMANCE: See "Choke Adjustment" below.*

► *METERING JET CHANGE FOR IMPROVED PART THROTTLE PERFORMANCE: See Rochester Single & Dual Jet Specification Table for latest jets.*

Idle Setting - 1-2½ turns open.

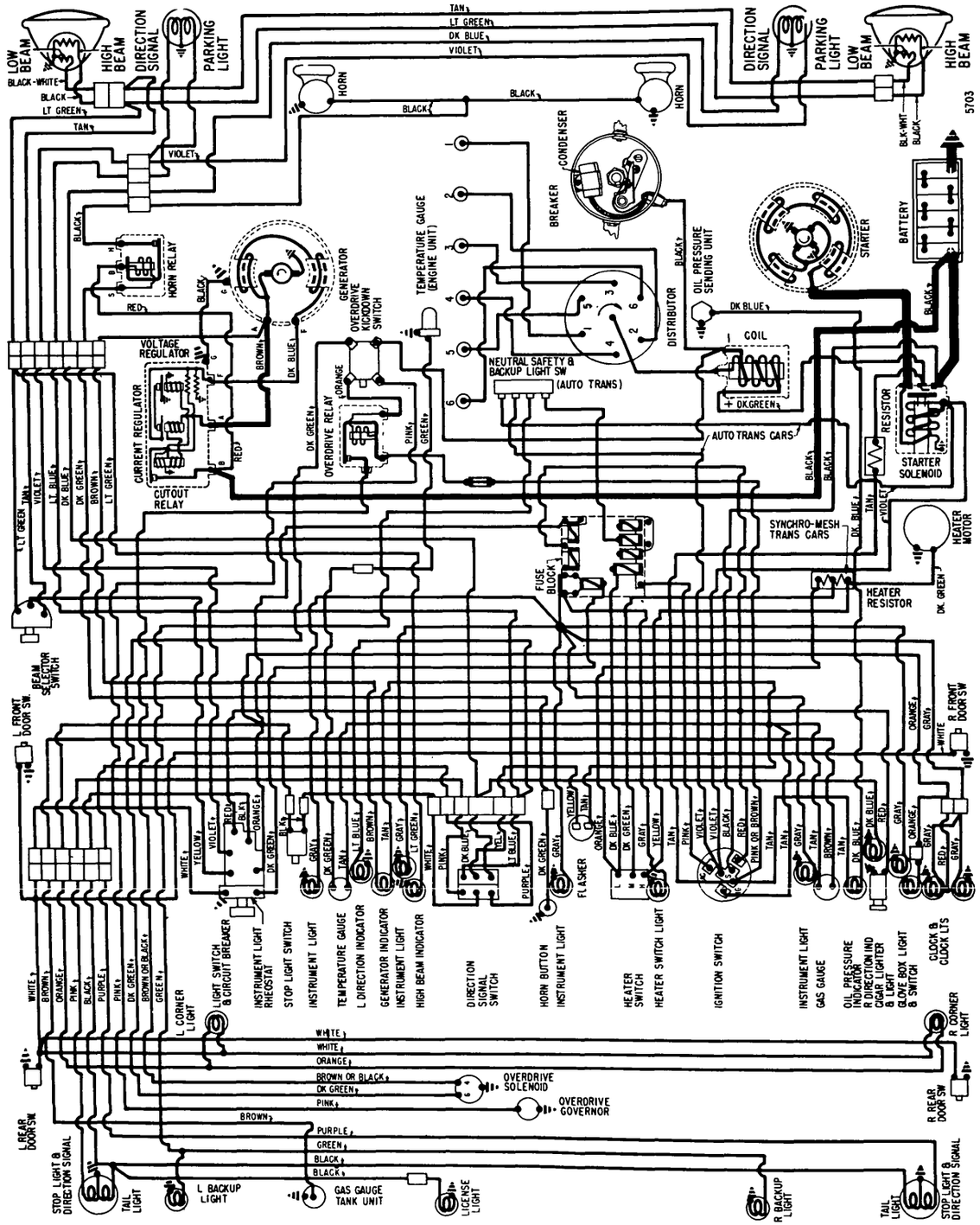
Idle Speed (Synchro-mesh) - 475 RPM.

Idle Speed (Powerglide) - 425 RPM with Powerglide selector lever in "D" (Drive) range.

Float Level - 1 9/32" (Gauge M-250). With air horn inverted and gasket in place, position Gauge M-250 over the floats with the tang inserted in the discharge nozzle. Bend float arms as necessary so that top of each float just touches the gauge and the float is centered between the gauge legs.

Float Drop - Bend float tang as necessary to obtain a distance of 1¾" from the gasket surface to bottom of the float, with the air-horn upright and the float hanging free.

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Choke Adjustm nt: Three notches lean. *NOTE* - This supersedes previous setting of one notch rich (Synchro-mesh cars), and one notch lean (Powerglide cars).

Fast Idle: With fast idle adjusting screw on next to highest step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.

► *OTHER DATA: See "Rochest r BC Carburetors" in Carburetion Section.*

FUEL PUMP PRESSURE: 3½-4½ lbs.

CARB. EQUIPMENT

Fuel Pump: AC. Diaphragm type.
Replacement Fuel Pump - AC No. 4149 (Fuel only), No. 4138 or 707 (Fuel & Vacuum).
Pressure - 3½-4½ lbs. at 450-1000 RPM.
See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: AC. Electric type.
Dash Unit - AC No. 1518711.
Tank Unit - AC No. 1518775 (Sta. Wgn.), 1518776 (Others). *See "Fuel Gauges" in Carburetion Section.*

BATTERY

Delco 2SMR53W. *12 Volt.* 9 plate, 53 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Engine to cowl at rear head bolt.

STARTER

Delco-Remy 1107652. Armature - 1932185.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	①Amperes
0 ft. lbs	6200-9400	10.6	49-76
	Lock	4.25	270-310

① - Includes solenoid.

Starting Switch: Delco-Remy Solenoid Switch 1119781 mounted on starter and controlled by Ignition & Starter Switch 1116535.
See "Delco-Remy Starter Solenoid (Without Relay)" in Electrical Section.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998173 (Powerglide cars only).
Adjustment - *See "Chevrolet Powerglide" in Trans. Sect.*

GENERATOR

Delco-Remy. Used as follows:

Application	Generator No.	Armature No.
6 Cyl. Std.	1100326	1928952
6 Cyl. Pwr. Strg.	1102041	1929640
6 Cyl. Air Cond.	1102083	1932900
6 Cyl. A.C. & P.Strg.	1102084	1938761

Performance Data - Cold

Generator	Amperes	Volts	RPM
1100326	25	14.0	2570
1102041	30	14.0	2210
1102083, 84	35	14.0	2510

Rotati n - Counter-clockwise at commutator end.
Brush Spring Tensi n - 28 ozs.

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Field Current - 1.5-1.62 amps. (1100326), 1.48-1.62 amps. (1102041), 1.69-1.79 amps. (1102083,84), at 12 volts.

Belt Adjustment: 5/16" belt deflection midway between water pump and generator pulleys.

REGULATOR

Delco-Remy. Used as follows:

Delco-Remy Regulator No.	Generator No.
1119000	1100326
1119003	1102041
1119168	1102083,84

Cut out Relay

Cuts In - 11.8-13.5 volts.
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting - 13.8-14.8 volts at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section.*

Current Regulator

Setting (1119000) - 23-27 amperes.
Setting (1119003) - 27-33 amperes.
Setting (1119168) - 33-37 amperes.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps. Sealed Beam. *See Electrical Section.*
Directional Signals: *See Electrical Section.*
Autronic Eye: *See Electrical Section.*
Lighting Switch Removal: Pull handle out to headlamp position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule, escutcheon and bezel, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.
Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.
LIGHTING CIRCUIT BREAKER: One 13 amp. circuit breaker located on main lighting switch, protects headlamp and parking light circuits.
FUSES: All fuses except as noted below are contained on the accessory junction block located on upper inside of dash panel to left of steering column.
Panel & Accessory Lamps - 3 amps. *See Note below.*
Tail, Dome, Glove Box, Clock & Stop Lamps - 9 amps. *See Note below.*
Heater (Without Air Conditioner) - 10 amps.
Air Conditioner (Includes Heater) - 20 amps.
Backing Light - 9 amps.
Overdrive - 9 amps. Located in feed line to relay.
►*NOTE:* If car not equipped with accessory junction block, these fuses will be found in an in-line fuse holder back of instrument panel.

Horn Relay: Delco-Remy 1116920.
Contact Closes - 5.0-9.5 volts.
Contact Gap - .027".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 6 Cyl., Valve in head.

►*ENGINE SERVICE NOTE:* Data below applies to all 6 Cyl. Engines: 235" (Pass. Cars), 235" & 261" (Trucks). See Chevrolet Truck for 235" & 261" Truck engine specifications.

Bore	Stroke	Displacement
3 9/16"	3 15/16"	235 cu. ins.

Compr. Ratio	Rated HP	Developed HP
8.0-1	30.4	140 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: Remove bolts attaching steering idler arm bracket to frame side rail, and drop for clearance. Remove pan retaining bolts and drop pan. *NOTE* - Crankshaft may have to be turned so oil pan will clear front cross member.

CYLINDER HEAD: *See "Cylinder Head & Manifolds". in Chevrolet Special Data.*

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".
Weight - 1.18 lbs. (235" engine), 1.36 lbs. (261" Engine).
Removal - Pistons and rods removed from above.
Clearance - .0005-.0011" measured 1.29" below top of piston. Selective fit.
Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize. *STANDARD AND .001". PISTON NOTE* - Two sizes pistons furnished for Standard and .001" Oversize as follows:
235" Engine - Std. - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize** - Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").
261" Engine - Std. - Marked **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **.001" Oversize** - Marked **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520").

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.
Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

PISTON PINS

Locked in rod. No bushing used in piston.
Diameter - 235" Eng. - .8660-.8665". **261" Eng.** - .9270-.9275".
Pin Fit in Piston - .00015-.00025" clearance. With both piston and pin at 70°F., and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure.
Replacement Pins: Furnished Std. & 0015", .003", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0930-.0935"	①	②
Oil(3)	.181-.188"	③	.015-.055"	.000-.008"

①- (235" Eng.) .007-.020". (261" Eng.) .010-.020"
②- (235" Eng.) .001-.003". (261" Eng.) .002-.0035"
③- On Rails.

►*RING INSTALLATION CAUTION:* Install Compression rings with side marked "TOP" up.

CONNECTING RODS

Length - 6.81" Center-to-center.
Crankpin Journal Diameter - 2.311-2.312".
Lower Bearing - Replaceable precision type.
Clearance - .001-.003" (New), .001-.004" (Used).
Sideplay - .005-.012".
Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.
Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft.

CRANKSHAFT

Journal Diameters - **(1)** 2.6835-2.6845", **(2)** 2.7145-2.7155", **(3)** 2.7455-2.7465", **(4)** 2.7765-2.7775".
Clearance - .001-.003" (New), .001-.004" (235" Eng. Used), .001-.0045" (261" Eng. - Used).
Bearings - Thin wall babbitt with steel back.
Bearing Adjustment: Precision type. Replace bearings.
End Thrust - Taken by No. 3 (rear intermediate) main bearing.
End Play - .003-.009".
Replacement Bearings: Furnished Std. & .002", .010", .020", .030" Undersize.
Bearing Installation: Can be replaced without removing engine.
See "Crankshaft & Main Bearings". in Chevrolet Special Data.
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings". in Chevrolet Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*
Vibration Dampener: *See "Vibration Dampener". in Chevrolet Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1537-2.1547", **(2)** 2.0912-2.0922", **(3)** 2.0287-2.0297", **(4)** 1.9662-1.9672".
►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".
Bearing Type - Steel backed babbitt lined bushings, precision type. Reaming not required.
Clearance - .0015-.0035".
End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket.

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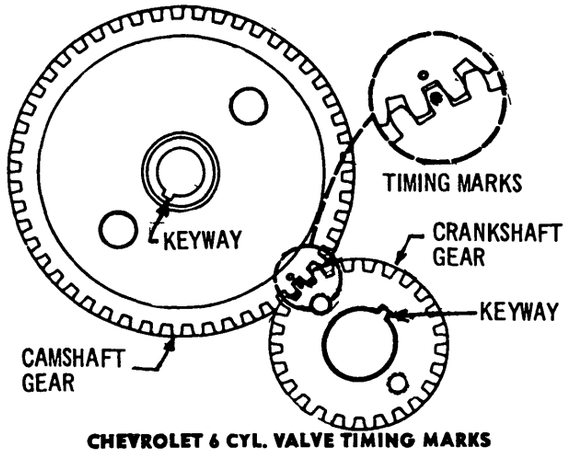
End Play - .001-.005".

Timing Gear: Fibre camshaft gear, steel crankshaft gear.

Back Lash - .003-.005".

Replacement Timing Gears & Installation: See *"Timing Gears" in Chevrolet Special Data.*

Camshaft Setting: Timing is correct when timing marks on gears are together.



CHEVROLET 6 CYL. VALVE TIMING MARKS

Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance: (Pass. Cars) - None in service (hydrulic).

Initial Tappet Clearance (Engs. with Hydraulic Lifters) - *See "Valve System" in Chevrolet Special Data.*

(Trucks) - 235" Eng. - .016" Intake, .018" Exhaust. Hot. 261" Eng. - .020" Intake & Exhaust, Hot. *See "Valve System" in Chevrolet Special Data.*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 7/8"	.3410-.3417"	6.364-6.394"
Exhaust	1 1/2"	.3410-.3417"	①

Valve	②Seat Angle	Lift	Stem Clearance
Intake	30°	.4004"	.001-.0027"
Exhaust	45°	.4004"	.001-.0027"

① - 235" Eng., 4.905-4.930"; 261" Eng., 4.902-4.932".

② - Face Angle 29° Intake, 44° Exhaust.

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 30° and 45°. When seats are ground to recommendations of 30° and 45°, valves must be faced to recommended angle of 29° (Intake) and 44° (Exhaust).

Valve Seat Width - 3/64-1/16" (Intake), 1/16-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: *Precision type, pressed in head.*

Valve Guide Installation - *See "Valve System" in Chevrolet Special Data.*

Valve Springs: *Install springs with closed coil end down.*

Spring Specifications

	Pressure	①Length
Valve Open (All)	194-210 lbs.	1 29/64"

① - Free Length 2 5/32" (Conv.), 2 15/64" (Auto Trans.)

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve springs. If distance from spring seat in head to top of valve spring exceeds 1 55/64", install shim approximately 1/16" thick. At no time should shim spring be installed to obtain installed height of less than 1 51/64".

Valve Lifters (Pass. Cars): Hydraulic type. *See "Valve System" in Chevrolet Special Data.*

Valve Lifters (Trucks): Mechanical type. Removed from above.

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* Specifications are for valve timing with Zero valve lash and apply to both 235 & 261" engines. *See Valve Timing Check below.*

Intake Valves - Open 10°30' BTDC. Close 53°30' ALDC

Exhaust - Open 49° BLDC. Close 15° ATDC.

Valve Timing Check - *CAUTION:* It will be necessary to replace the hydraulic valve lifter and pushrod operating No. 1 exhaust valve, with a conventional lifter and pushrod). Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing. Mount dial indicator on rocker arm shaft with stem of indicator contacting No. 1 exhaust valve adjusting screw and set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .005". A greater or lesser reading indicates either excessive gear wear or improperly installed timing gears. Reset tappet clearance to specifications.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 5 qts. (refill), 5½ qts. (dry).

Normal Oil Pressure: 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Indicator - Light located at right side of instrument cluster, controlled by pressure switch, Delco-Remy 1998149 or AC No. 1508425, located in main oil gallery on left side of engine. Switch closes when pressure drops to 4-7 lbs.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul — *See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: AC P-115.

Rocker Arm Oil Lead & Overflow Pipe: *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing — On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing — Every 10,000 miles (or oftener if required) clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. (17 qts. with heater).

Pressure Valve: AC No. 850795. Radiator filler cap. 7 lb. type. **Replacement Valve** - AC No. RC-1.

Thermostat: Harrison. In cylinder head water outlet.

Standard — No. 3133595 (stamped 151) 151°. Can be used for alcohol anti-freeze.

Optional — No. 3123994 (stamped 160), 160°, No. 3133597 (stamped 170) 170°.

Temperature Gauge: AC electric.

Dash Unit - AC No. 1513317.

Engine Unit - AC No. 1513321.

See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball-bearing shaft. *See "Water Pumps" in Chevrolet Special Data.*

CLUTCH

Own. Diaphragm Spring type. 9½" (Std.), 11" (H. D.). *See "Chevrolet (Own)" in Clutch Section.*

Clutch Disc - (Std. 9½") Chevrolet No. 3737944 (Woven - Hub marked White), No. 3737942 (Molded - Hub not paint marked); (Heavy Duty 11") Chevrolet No. 38-36906 (Woven - Hub marked Pink).

Pedal Adjustment: Pedal free travel ¾-1". Loosen check nut at connecting link at clutch fork. Turn adjusting nut to remove all lash at fork, **then back off two turns.** Tighten check nut.

Removal: Remove transmission (see Transmission Removal below). Remove throwout bearing from fork. Remove clutch fork tension spring from fork, disconnect clutch fork pushrod. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824, to support clutch assembly during removal. Loosen clutch attaching bolts one turn at a time until diaphragm spring is released. Remove Pilot Tool, then remove clutch assembly from car. *CAUTION* - When installing clutch, align "X" mark on clutch cover with "X" mark on flywheel.

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SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh (Std.) three or four speed (close-ratio) optional.
See "Chevrolet 3-Speed" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain Transmission and disconnect speedometer cable and shift rods. Disconnect propeller shaft at rear universal and slide shaft toward rear to disengage from transmission. Remove two top transmission to clutch housing screws and install Guide Pins J-1126. Remove the two lower screws and slide transmission back until clutch spines are disengaged. Remove transmission from below car

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown.
See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh transmission (above) after disconnecting control cable and wiring

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS. See "Chevrolet Powerglide" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication: Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Change oil, remove and clean oil suction screen every 25,000 miles. Use only AUTOMATIC TRANSMISSION FLUID "Type A" bearing an "AQ-ATF" marking on container.
Capacity - 4½ qts. (refill), 10½ qts. (after overhaul).

►*POWERGLIDE DRAINING CAUTION–There is no drain plug on converter. Drain transmission case only, add 4½ qts. of fluid initially, recheck after idling engine.*

Checking Fluid Level–Engine must be idling with the parking brake set, transmission warm, and the control lever in "N" range when taking dipstick readings. Dipstick is located under hood on right side.

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER POWERGLIDE SERVICE DATA: See "Powerglide" in Transmission Section.*

UNIVERSALS

Own. Yoke & Spider (trunnion) type.

►*CAUTION* - Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass Car (Hotchkiss Drive)" in Rear Axle Section.*

REAR AXLE

Own Semi-floating, hypoid gear type with Hotchkiss Drive. *NOTE* - "POSITRACTION" Limited Slip Differential Optl.
See "Chevrolet Pass Car (Hotchkiss Drive)" Rear Axle and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Ratios - 3.55-1 (Std.), 4.11-1 (Overdrive), 3.36-1 (Powerglide).

Backlash - .003-.010" (.005-.008" preferred).

Removal: Raise car and support with jack stands under frame side rails. Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion). Disconnect hand brake cable and equalizer and remove cables from clamps at frame. Disconnect hydraulic brake lines at rear axle housing. Disconnect shocks. Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor

Axle Shaft Removal: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach axle Puller J-5748,with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*–If bearing retainer and parking brake strut interfere, raise strut slightly with screw driver to obtain clearance.

SHOCK ABSORBERS

Delco. Direct acting non-adjustable.

Replacement Shock Absorbers

Model	Front	Rear
Pass. Exc.Conv.(No AC)	5531202	5531211
Pass. Exc.Conv.(With AC)	5524088	5531211
Conv. .	5524088	5524089
Sed De. Sta.Wag.,Taxi	5524088	5524089

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs and new spherical type joints connecting control arms and steering knuckles.
See "Chevrolet (Spherical Joint)" in Suspension and "Wheel Alignment Section

Steering Axis Inclination - 3-4°

Caster - Pos. 1° preferred.. Limits Pos. ½° to Pos. 1½°.

Camber - Pos. ½° preferred. Limits 0° to Pos. 1°.

Toe-In - 1/8-1/4".

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18°10'

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment Hand lever applies rear wheel service brakes
See "Chevrolet-Bendix Hydraulic" in Brake Section

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION:* To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087" smaller diameter than the drum diameter Grinding shoes to the true drum diameter on bench grinders will cause heel and toe contact, resulting in erratic brake action
NOTE–If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter

Drums–Diameter 11".

Wheel Cylinder Diameter–Front 1 1/8", Rear 1".

	Brake Lining Width	Thickness
Front Whl	2"	.187-.194"
Rear Whl	1 3/4"	.187-.194"

Length Per Shoe–9.3125" (Primary), 11.6875" (Second-

Braking Power–55.9% (front wheels), 44.1% (rear

Clearance–Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid–Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole.

Removal–Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove four retaining nuts and lock washers holding master cylinder to firewall and remove cylinder.

Installation–Reverse removal procedure making sure that push rod clevis is straddling the brake pedal. Refill master cylinder and bleed all brake lines. Adjust push-rod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1/8-3/8" pedal movement should be felt).

Power Brakes: Std. Trans. - Hydrovac Power Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brake Section.

Auto. Trans. - Bendix Vacuum Power Unit. Replaces conventional master cylinder.
See "Bendix Power Unit" in Brake Section.

Removal - Disconnect vacuum lines and hydraulic brakes line. Remove lever-to-pushrod bolt and disengage push-rod from lever. Take out four mounting bolts and remove unit.

MISC. MECHANICAL

Windshield Wipers: Vacuum, cable operated (Std.), Electric type (Optional).
See "Windshield Wipers" in Miscellaneous Section

Window Regulators: Electric type with reversible motor operating each door window assembly.
See "Power Window Regulators" in Miscellaneous Section

Power Top Control: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjuster: Reversible electric motor controls horizontal front seat movement. *See "Power Seat Adjusters" in Miscellaneous Section.*

Air Conditioning: *See "Chevrolet Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model Designation

Series	Serial Prefix	Model
1500 ①	VA	ONE-FIFTY
2100	VB	TWO-TEN
2400	VC	BEL-AIR
2934	VE	CORVETTE
1508	VD	SEDAN DELIVERY

① - Except Sedan Delivery.

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Starting Serial Number - 100001 (at each plant) for all models except Corvette.

►*SERIAL NUMBER NOTE: Serial Number (example VB57F100025) includes following identification information in sequence.*

Series ①	Year	Assy. Plant ②	Serial No.
VB	57	F	100001

① - See "Serial Prefix" in Model Identification above.
② - See Car Assembly Plant Designation below.

Car Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
J - Janesville	**O** - Oakland	

ENGINE NUMBER: Stamped on pad at front right hand side of cylinder block behind water pump.

►*ENGINE NUMBER NOTE: Engine Number (example T101 C) includes following identification information in sequence.*

Plant ①	Month ②	Day ③	Engine Type ④
T	1	01	C

① - "F" Flint, "T" Tonawonda.
② - "1" (January), "2" (February), etc.
③ - "01" (First Day). "02" (Second Day) etc.
④ - See Model Type Designation below.

Model Type Designation

Pass. Cars (265 Cu. In. Engine)

Equipment	Engine Number Suffix
3-Speed Transmission	C
Overdrive	CD
Heavy Duty Clutch	CE

Pass. Cars (283 Cu. In. Engine)

Equipment	Engine Number Suffix
4-Barrel Carburetor	E
Fuel Injection	EJ
Fuel Injection & Hi Lift Cam	EK
Overdrive & 4-Barrel Carburetor	EC
Dual 4-Barrel Carburetors	EA
Dual 4-Barrel Carburetors & Hi Lift Cam	EB
Dual 4-Barrel Carburetors & Powerglide	FD
Dual 4-Barrel Carburetors & Turboglide	GD
Powerglide	F
Powerglide & Air Conditioning	FA
Powerglide & 4-Barrel Carburetors	FC
Powerglide & Fuel Injection	FJ
Powerglide, Air. Cond. & 4-Barrel Carbs.	FE
Turboglide	G
Turboglide & 4-Barrel Carburetors	GC
Turboglide & Fuel Injection	GF

Corvette (283 Cu. In. Engine)

Equipment	Engine Number Suffix
3-Speed Trans. & 4-Barrel Carburetors	EF
3-Speed Trans., Fuel Injection & Hi Lift Cam	EL
3-Speed Transmission & Fuel Injection	EM
Dual 4-Barrel Carbs. & Hi Lift Cam	EG
Dual 4-Barrel Carburetors	EH
Dual 4-Barrel Carbs. & Powerglide	FG
Powerglide	FH
Powerglide & Fuel Injection	FK

TUNE-UP

COMPRESSION PRESSURE: 150 lbs. min. (265" & 283" Engines with 2-Bbl. Carb.), 160 lbs. min. (283" Engine with 4-Bbl. Carb.) and cylinders equal within 10 lbs.

VACUUM READING: 18-21" steady at idling speed (except Fuel Injection Engines), 13.5" (Fuel Injection Engines).

VALVE TAPPET CLEARANCE: (Corvette Engine with Special Camshaft & Mechanical Lifters) - .012" Intake, .018" Exhaust, HOT. *NOTE* - Intake can be set at .008" for competition. Adjust tappet clearance by turning rocker arm stud nut (self-locking).

Initial Tappet Clearance (Engs. with Hydraulic Lifters). *See "Valve System" in Chevrolet Special Data.*

►*FUEL INJECTION ENGINE ADJUSTMENT NOTE:* When running engine with rocker covers removed, air cleaner must be installed and a shield should be improvised to prevent oil fumes entering the fuel injection system.

Engines with Hydraulic Lifters - None in service.

MANIFOLD HEAT CONTROL: (Single Exhaust) - Single exhaust pipe with cross over pipe from right exhaust manifold. Heat control valve with thermostatic coil spring located between right exhaust manifold and exhaust pipe. Make sure valve shaft is free to turn. If sticking, free up with kerosene or alcohol containing a small amount of baking soda.

Dual Exhaust - Coil spring and counterweight (same as for single exhaust).

►*DUAL EXHAUST NOTE: With valve closed, most exhaust gases are discharged through left exhaust pipe.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - (Except Corvette Engine) AC No. 44 (Std.), No. 45 (Hotter - for continuous city operation), No. C-43 COM (Colder - for continuous heavy duty operation). **(Corvette Engine)** AC No. 46 (Std.), No. 44 (Town & Country operation), No. C-43COM (Heavy Duty & High Speed operation). *NOTE* - These plugs supersede previous plugs, No. C-43 (Std.), and No. 43-5 COM (continuous high speed). C-42-1 Com. (Road Racing).

COIL: Delco-Remy 1115087 (Std.), 1115091 (Corvette).

Ignition Current - 1.8 amps. idling, 4 amps. stopped.

Resistor - (Std. - 1115087 Coil) Delco-Remy 1931614, 1.40-1.62 ohms. **(Corvette - 1115091 Coil)** Delco-Remy 1931385.

►*COIL RESISTOR NOTE:* Resistor in coil primary circuit is bypassed during cranking as follows: Coil is energized directly from ignition bypass terminal on starter solenoid (Exc. Corvette), Coil is energized directly by second lead from ignition switch to coil (Corvette).

DISTRIBUTOR: Delco-Remy.

Application	Delco-Remy Distr. No.
V8 265" & 283" Eng. (2-Bbl. Carb.)	1110874
V8 283" Engine (4-Bbl. Carb.)	1110890
V8 Corvette Eng. (1 or 2 4-Bbl. Carb.)	1110891
V8 Corvette Eng. Fuel Injection (Early)	1110889
V8 Corvette Eng. Fuel Injection (Later)	1110905
V8 Corvette Eng. Fuel Injection (Later)	1110906

►*DISTRIBUTOR NOTE: Different types used as follows:*

Models 1110874 & 1110890 - New external adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*

1110889, 1110891, 1110905 & 1110906 - Double breaker with conventional distributor cap (not window type). Vacuum Spark Control not used (centrifugal weight advance only).

Condenser - Delco-Remy 1932004 (1110874 & 1110890), 1869704 (1110889 & 1110891). **Capacity -** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988 (1110874 & 110890), 1918148 (1110889 & 1110891) 1938330 (1110905 & 1110906).

Breaker Gap (1110874 & 1110890) - *NOTE* - When cam angle properly adjusted (see below), breaker gap opening (.016") will be correct.

Breaker Gap (1110889, 1110891, 1110905 & 1110906) - .014-.018" (new points).

Cam Angle (1110874 & 1110890) - 28-32°. Set to 30°.

Cam Angle (1110889, 1110891, 1110905 & 1110906) - Adjust each set of points to 29° ± 1° with other set of points blocked open with .025" thick insulator. Cam angle for both sets of points operating together will be 34° ± 1°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110874

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0-4	800
8-10	1150	16-20	2300
15-17	1800	30-34	3600

Automatic Advance - 1110889, 90, 91

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	1-5	800
6-8	750	12-16	1500
9.5-11.5	1300	19-23	2600
13-15	1850	26-30	3700

Vacuum Spark Control: Delco-Remy 1116108 (1110874 Distr.), 1116118 (1110890 Distr.). *NOTE* - No vacuum Control used on 1110889 and 1110891.

Automatic Advanc - 1110905

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	400	1-5	800
6.5-8.5	775	13-17	1550
9.5-11.5	1600	19-23	3200
13-15	2500	26-30	5000

Vacuum Advance (1110874)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	5-7
11	22	11.75-13.75

Vacuum Advance (1110890)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	7-9
7.5	15	15-16

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►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265" V8 ENGINE):* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms). *See "Ignition Notes" in Ch vrol t Sp cial Data.*

IGNITI N TIMING

Std. S tting - Set timing to setting indicated below.

►*IGNITION TIMING PROCEDURE CHANGE: Previous recomm ndation of s tting timing at 1000 RPM has been disc ntinued.*

Engin	Igniti n Timing Setting	Setting
V8 265" & 283" (2-Bbl. Carb.)		4° BTDC
V8 283" (4-Bbl. Carb.)		4° BTDC
Corvette (One 4-Bbl. Carb.)		4° BTDC
Corvette (Dual 4-Bbl. Carb.)		① 12° BTDC
Corvette (Fuel Injection) ②		① ③ 12° BTDC
Corvette (Fuel Injection) ④		⑤ ⑥ 4° BTDC

① - Do not exceed 14° BTDC.
② - Automatic Transmission.
③ - Engine idling at 600 RPM.
④ - Synchro-mesh Transmission.
⑤ - Engine idling at 800-850 RPM.
⑥ - Do not exceed 8° BTDC.

Timing Mark - Mark on vibration dampener and an indicator on left side of engine front cover. Indicator is marked with 8 lines on "advance" side of "0" mark, and two lines on "retard" side. Each line indicates 2°.

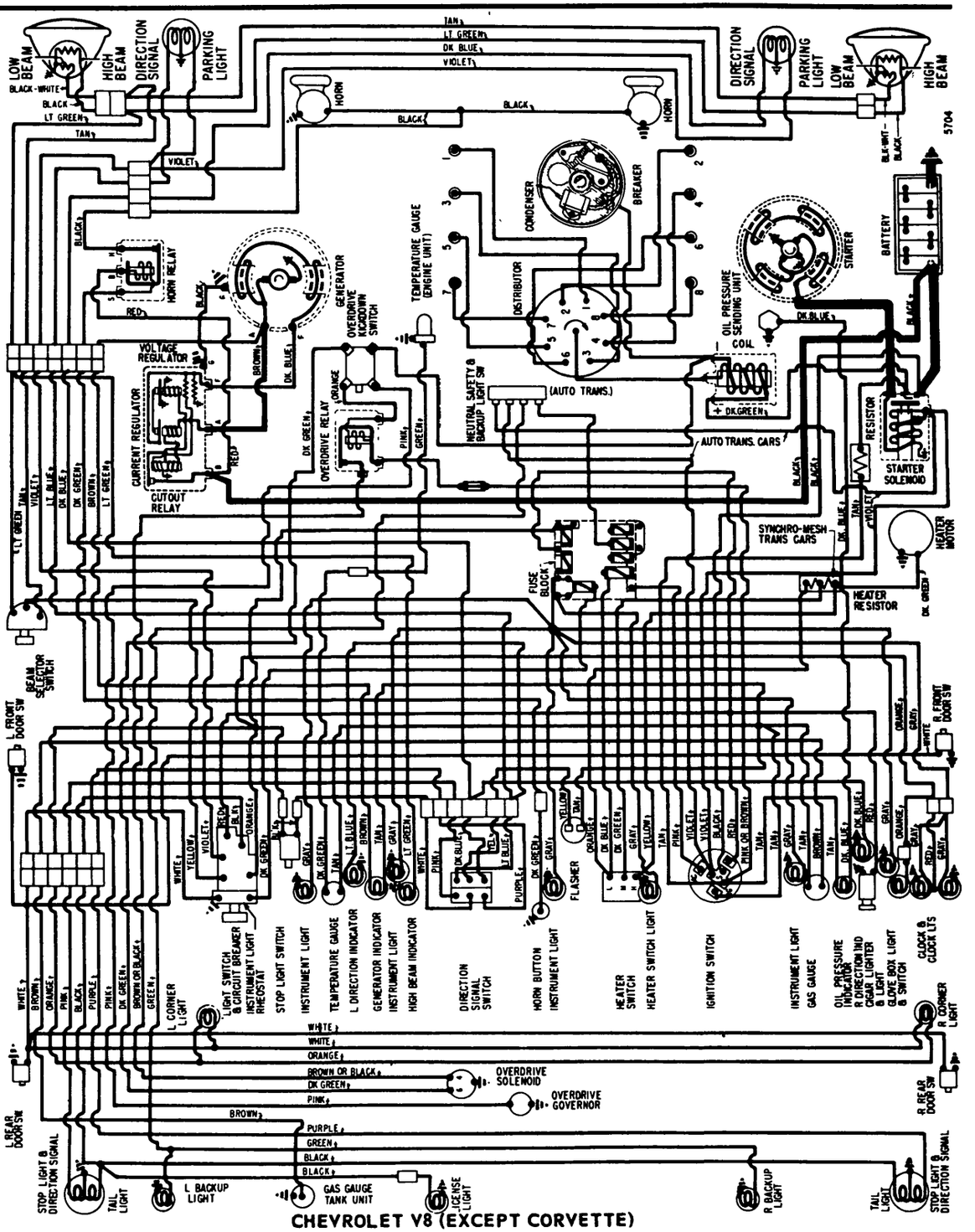
CARBURETOR

►*CARBURETOR APPLICATION NOTE: Rochester 2GC Dual Carbur tor is standard on all models (Exc. Corvett). Roch ster 4GC and Carter WCFB 4-Barrel Carburetors us d on a mixed basis on all models (Exc. Corv tt) with Pow r Package. ONE or TWO Carter WCFB 4-Barr l Carbur tors used on Corvette. Rochester "Ramj t" Fu l Inj ction System is optional on Corvette 283" Engin .*

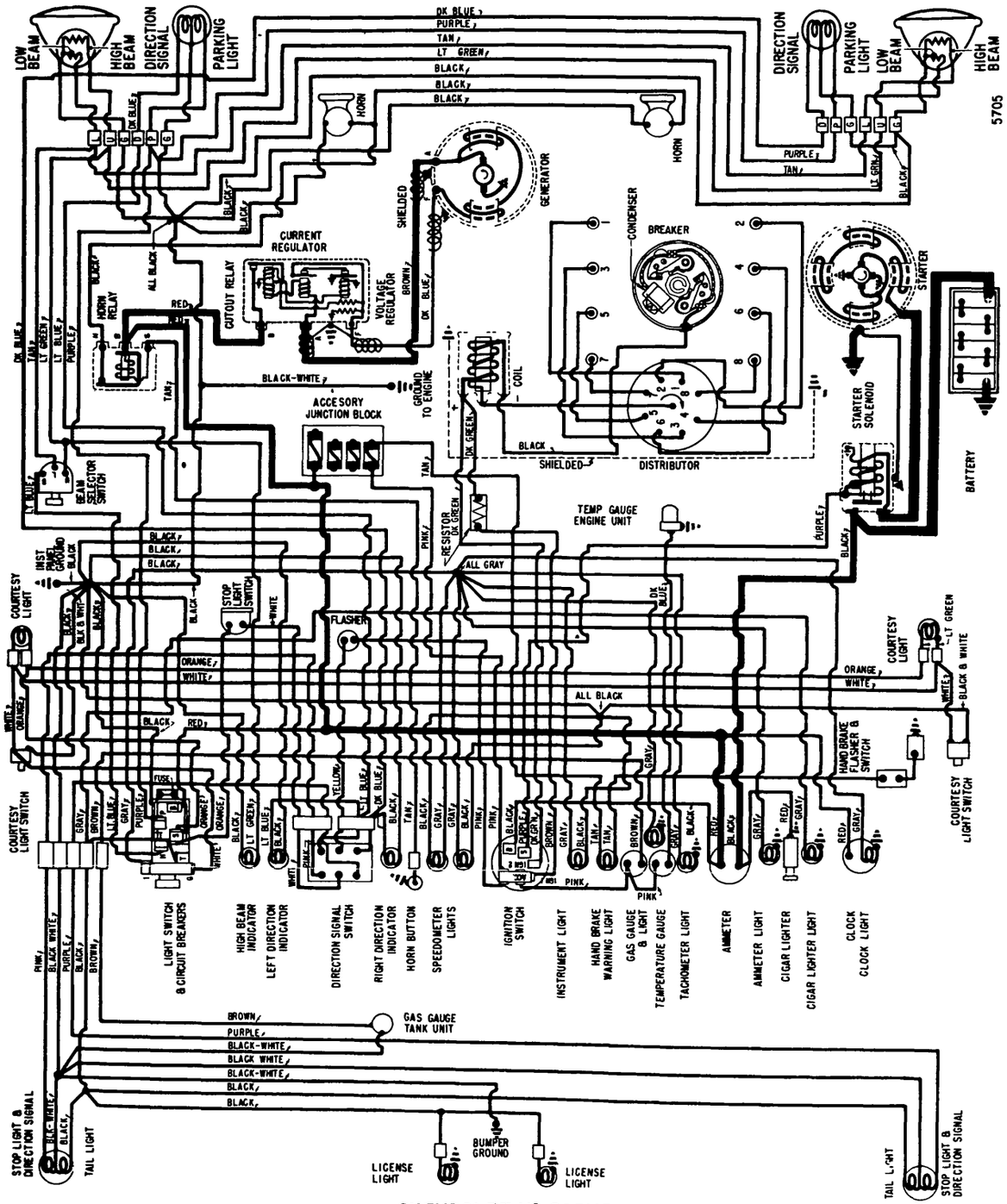
►*FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS):* Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustments and that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT: Powerglide Cars - Remove lower control rod and loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotated counterclockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor. Place throttle valve in wide open position and pull upper control rod forward until it is stopped by transmission internal stop. Adjust swivel on end of upper control rod for free entry into throttle lever, then attach swivel to throttle lever. Check adjustment by placing linkage in idle position, then return to wide open throttle by rotating throttle lever on carburetor. Push up on transmission throttle lever and note if lower control rod deflects, which would indicate that transmission is not on

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CHEVROLET V8 (EXCEPT CORVETTE)

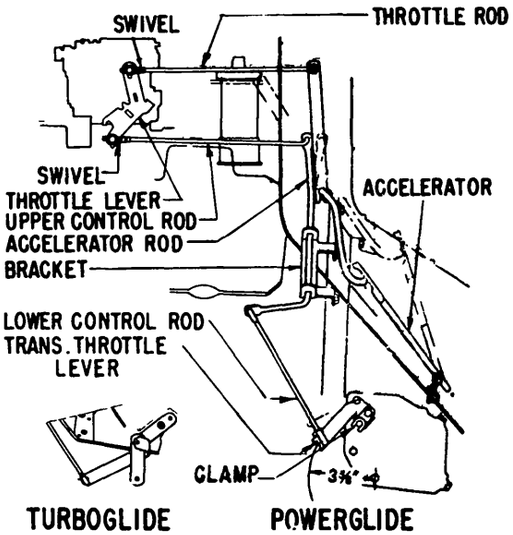


CHEVROLET V8 CORVETTE

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its internal stop. If rod deflects or throttle valve does not reach wide open position, repeat the adjustment. Depress accelerator pedal and place lowest part of accelerator rod ¾" (Pass. Cars), 3/8" (Corvette) above floor panel. Disconnect throttle rod at carburetor throttle lever and adjust swivel on rod for free entry in hole in lever with throttle valves wide open.

Turboglide Cars: Remove upper control rod from throttle lever. Place throttle lever in wide open position and pull rod forward until stator control valve spring is overcome and lever is bottomed. Adjust swivel on upper control rod for free entry into hole in lever, then attach swivel. Check adjustment by placing linkage in idle position, then return to wide open throttle position by rotating throttle lever. Push upward on transmission throttle lever and note if lower control rod deflects, indicating that stator control valve spring is not fully



CHEVROLET TRANSMISSION THROTTLE LINKAGE

compressed. If rod deflects, or throttle lever will not reach full detent, repeat the adjustment. *CAUTION - Stall tests must not be performed on cars with this transmission.*

ROCHESTER 2GC 2-BARREL

Model	Rochester No.
Standard Transmission (Early)	7010647
Standard Transmission (Later)	7011131
Powerglide & Turboglide (Early)	7010648
Powerglide & Turboglide (Later)	7011124
Governor Equipped Eng. (Early)	7010719
Governor Equipped Eng. (Later)	7011149

► *PARTS CHANGES FOR IMPROVED PERFORMANCE*
See "Rochester 2GC Carburetors" in Carburetion Section

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - After idle speed set to correct specifica-

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tions (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 450 RPM (Synchro-mesh), 425 RPM (Powerglide & Turboglide, with selector lever in "D").

Float Level - 1¼" (Gauge BT-129). With air horn inverted and gasket in place, position float level gauge over float so it rests against pump side of power piston shaft, with the outer gauge leg in line with center of float. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Use scale or scribed mark on float and pump gauge.

Automatic Choke Setting: Centered at index.

► *OTHER DATA: See "Rochester 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7009846 (Early), No. 7012126 (Later).

► *PRODUCTION AND PARTS CHANGES FOR IMPROVED PERFORMANCE: See "Rochester 4GC Carburetors" in Carburetion Section.*

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2–3–5–8, LEFT barrels 1–4–6–7.*

Idle Setting - Adjust idle mixture screws for peak vacuum and engine RPM reading.

Idle Speed - 450 RPM (Synchro-mesh), 425 RPM (Powerglide & Turboglide, with selector lever in "D").

► *OTHER DATA: See "Rochester 4GC Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL

(Power Pkg. & Corvette Eng. With Single Carb.)

Carter WCFB 2555S (Std. Trans.), 2505S (Auto. Trans.), 2655S (All Trans.).

► *CARBURETOR REPLACEMENT NOTE: Carb. No. 2505S with choke set one point lean can be used to replace No. 2555S.*

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - (2505S & 2555S) ¾-1¾ turns open. (2655S) ½-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed (All Carbs.) - 475 RPM (Synchro-mesh), 425 RPM (Powerglide & Turboglide with selector lever in "D").

► *OTHER DATA: See "Carter WCFB Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL

No. 2626S (Front), No. 2627S (Rear)

(Corvette Engine with TWO Carbs.)

► *CARBURETOR NOTE: "Idle Air Mixture Screws" have been eliminated on these carburetors and the special procedure formerly required is no longer necessary.*

► *CARBURETOR OPERATION NOTE: Front and rear carburetors operate together at idle speed and at high speed for full power operation. Front carburetor throttle begins to open when rear carburetor throttle valves are approximately at half-throttle position.*

Idle Setting - Set both idle mixture screws on each carburetor 1 turn open. Start and warm up engine. With engine at normal operating temperature, set idle speed to correct RPM (see Idle Speed below). Adjust all idle mixture screws individually (rear carburetor screws first, front carburetor screws last), for best engine idle "feel" and highest engine RPM. Reset idle speed to correct figure, readjust all idle mixture screws, finally reset idle speed.

Idle Speed - 600 RPM (With Std. Camshaft), 800-850 RPM (With "SR" Racing Camshaft).

Synchronizing Carburetors: Adjust accelerator pedal so it is 3/8" above toeboard (carpet removed) with throttle valve of rear carburetor wide open. With rear carburetor on wide open throttle, adjust front carburetor control shaft until throttle on front carburetor is wide open and against throttle stop. Tighten locknut on front control shaft. *NOTE* - When linkage is properly adjusted, front carburetor will begin to open when rear carburetor is at approximately half-throttle.

► *OTHER DATA: See "Carter WCFB Carburetors" in Carburetion Section.*

ROCHESTER "RAMJET"

(Optional on Corvette 283" Engine)

► *See "Rochester (Ramjet) Fuel Injection" in Carburetion Section.*

FUEL PUMP PRESSURE: 4-5¼ lbs.

CARB. EQUIPMENT

Fuel Pump: AC diaphragm type.

Replacement Pump - (Exc. Corvette) AC No. 4150 Std. (Fuel only), No. 4141S or 708 Optl. (Fuel & Vacuum).

(Corvette) - AC No. 4346 (Fuel only).

Pressure - 4-5½ lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric.

Dash Unit - (Corv.) AC 1518244, (Others) 1518711.

Tank Unit - Used as follows:

	AC No.
Pass. Car (Std.)	1518776
Pass. Car (2 Carb.)	1518784
Sta. Wgn. & Sed. Del. (Exc. 2 Carb.)	1518775
Sta. Wgn. (9 Pass.)	1518774
Corvette	1518785

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53W (Std. Pass. Cars), 25M53W (Corvette).

12 Volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Engine to cowl at rear head bolt.

STARTER

Delco-Remy 1107664 (Exc. Turboglide), 1107660 (Turboglide).

Armature - Delco-Remy 1935829.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75 max.
10.5 ft. lbs.	Lock	5.8	435 max.

Starting Switch: Delco-Remy Solenoid Switch 1119919 mounted on starter and controlled by Ignition & Starter Switch 1116535 (Exc. Corvette), 1116512 (Corvette) with key starting. NOTE - Separate Relay, Delco-Remy 1116904, used on Corvette with Powerglide. *See "Delco-Remy Starter Solenoid Switch (No Relay)" in Electrical Section.*

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998173 (Powerglide Cars), 1998174 (Turboglide Cars), 1998112 (Corvette).

Adjustment - *See "Powerglide" or "Turboglide" in Transmission Section.*

GENERATOR

Delco-Remy. Application as follows:

Model	Generator No.	Armature No.
Std. 25 Amp.	1100321	1928952
Std. 30 Amp.	1102041	1929640
Corvette	1102043	1929640
Air Cond. 35 Amp.	1102083	1932900
A.C. & Pwr. Strg.	1102084	1938761

Performance Data - Cold

Generator	Amperes ①	Volts	RPM
1100321	25	14.0	2750
1102041, 3	30	14.0	2210
1102083, 4	35	14.0	2210

① - Not maximum output. See Regulator Data.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.5-1.62 amps. (1100321), 1.48-1.62 amps. (1102041,3), 1.69-1.79 amps. (1102083,4), all at 12.0 volts.

Belt Adjustment: 13/16" belt deflection midway between fan and generator pulleys with light pressure applied.

REGULATOR

Delco-Remy. Application as follows:

Regulator No.	Generator No.
1119000	1100321
1119003	1102041, 3
1119002 or 1119168	1102083, 4

Cutout Relay

Cuts In - 11.8-13.5 volts.

Contact Gap - .020".

Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting - 13.8-14.8 volts at 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 12 volt Regulators" in Electrical Section.*

Current Regulator

Setting (1119000) - 23-27 amperes.

Setting (1119003) - 27-33 amperes.

Setting (1119002 or 1119168) - 32-37 amperes.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 12 volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

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Autronic Eye: See *Electrical Section*

Lighting Switch Removal: Pull handle out to headlamp position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule, escutcheon and bezel, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.

Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.

LIGHTING CIRCUIT BREAKER: One 13 amp circuit breaker located on main light switch, protects headlamp and parking light circuits.

FUSES: All fuses except as noted below are contained on the accessory junction block located on upper inside of dash panel to left of steering column.

NOTE - Corvette has two 13 ampere circuit breakers on light switch.

Panel & Accessory Lamps - 3 amps.
Tail, Dome, Glove Box, Clock & Stop Lamps - 9 amps
Heater (Without Air Conditioning) - 10 amps
Air Conditioner (Includes Heater) - 20 amps
Radio - 7½ amps.
Backing Light - 9 amps
Overdrive - 9 amps. Located in feed line to relay.

Horn Relay: Delco-Remy 1116920

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION* *Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*VALVE LIFTER NOTE* *Hydraulic valve lifter used on all engines with standard camshaft. Mechanical type lifter used on engines with "Hi-Lift" camshaft.*

ENGINE SPECIFICATIONS: V8 Valve-in-head

Engine	Bore	Stroke	Rated HP	Displacement
265	3 3/4"	3"	450	265 cu ins
283 (All)	3 7/8"	3"	480	283 cu ins

Engine	Compr. Ratio	Developed HP
Turbo-Fire 265 ①	8.0-1	162 at 4400 RPM
Turbo-Fire 283 ②	8.5-1	185 at 4600 RPM
Super Turbo-Fire 283 ③	9.5-1	220 at 4800 RPM
Corvette ④	9.5-1	245 at 5000 RPM
Corvette ④	9.5-1	250 at 5000 RPM
Corvette ④⑤⑦	9.5-1	270 at 6000 RPM
Corvette ④⑥⑦	10.5-1	283 at 6200 RPM

① - One Single Barrel Carburetor
② - One 2-Barrel Carburetor
③ - One 4-Barrel Carburetor & Dual Exhaust
④ - Either Standard Pass Car or Corvette
⑤ - Two 4-Barrel Carburetors & Dual Exhaust
⑥ - Fuel Injection & Dual Exhaust
⑦ - With special "SR" Racing Camshaft.

Compression & Vacuum Reading - *See TUNE-UP*

►***NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE)*** Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation. *See "Ignition Notes" in Chevrolet Special Data.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: Disconnect steering idler arm bracket from frame side rail and drop for clearance. Remove retaining bolts and remove pan.

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data*

CYLINDER HEAD & MANIFOLDS: *See Chevrolet Special Data*

TIGHTENING TORQUES: *See Chevrolet Special Data*

PISTONS

Cast aluminum, slipper skirt, with piston pin offset 5/64".

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. & 001", 020", 030", 040" oversize. With fitted pins.

►*STANDARD & 001" OVERSIZE PISTON NOTE* These pistons furnished in TWO sizes as follows:
265" Eng.-Std. - Marked **S4** (3 7500-3 7505"), **S5** (3 7505-3 7510"), **.001" Oversize** - Marked **S6** (3 7510-3 7515"), **S7** (3 7515-3 7520")
283" Eng.-Std. - Marked **S4** (3 8750-3 8755"), **S5** (3 8755-3 8760"), **.001" Oversize** - Marked **S6** (3 8760-3 8765"), **S7** (3 8765-3 8770")

►*283" ENGINE PISTON NOTE* Pistons have four depressions in head to prevent interference with valves at higher engine speeds. 'Domed" type pistons are used in 10.5-1 compression ratio engines.

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513) With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler should be 7-18 lbs.

Installing Pistons: Install pistons with cast depression in head and 'F' mark cast in piston strut toward front of block. *See Rod Installation*

PISTON PINS

Pin is press fit in connecting rod.

Diameter - .9270-.9273'

Pin Fit in Piston - .00015-.00025' clearance. With piston and pin at 60°F., and light film of oil on pin, pin should support own weight in either pin boss.

Pin Fit in Connecting Rod - Pressed in rod. *For pin removal and installation, see "Piston Pins" in Chevrolet Special Data*

Replacement Pins: Furnished only in assembly with piston. Replace with new piston and fitted pin assembly.

PISTON RINGS

Compression rings are 'twist" type (Top ring has **upper** inner edge chamfered, lower ring has **lower** inner edge chamfered) and faces are tapered for correct wiping action. Oil ring is 3 piece type (two rails with spacer)

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.077-.078"	.009-.018"	.0012-.0032'
Oil (3)	.161-.188'	① .005-.015'	.0006-.0084'

① - on rails

Replacement Rings: Cromflex ring sets furnished Std. & .020', .030', .040' oversize.

Installing Rings: Install compression rings with mark "TOP" or "G.M." upward.

CONNECTING RODS

Length (Center to Center) - 5.7000" **Weight** - 19.02ozs.
Crankpin Journal Diameter - 1.999-2.000"
Lower Bearing - Replaceable precision type. *See "Connecting Rod & Main Bearing Note" under Crankshaft below*
Clearance - .001-.003" (new), .001-.004" (used)
Side Play - .008-.014" (both rods)

Replacement Bearings: Furnished Std., .001", .002", .010', .020' Undersize.

Installing Rods: Install rod in piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (cast depression in head of piston and "F" mark on piston strut) on Nos. 1, 3, 5, and 7 pistons, and rod flange to **rear** of piston on Nos. 2, 4, 6, and 8 pistons. Install rod and piston assembly in cylinder with cast depression in piston head and "F" mark on strut toward front of cylinder block.

CRANKSHAFT

Journal Diameter - 2.2978-2.2988"

►*CONNECTING ROD & MAIN BEARING NOTE (Corvette Engines) Connecting rod bearings and front and intermediate main bearings are special steel backed aluminum alloy with a thin tin-copper overlay.*

Clearance - .001-.003" (new), .001-.004" (Used)
End Thrust - Taken by No. 5 (rear) main bearing
End Play - .002-.006" Check at front end of rear main bearing.

Replacement Bearings: Furnished in .001", .002", .010", .020" Undersize.

Bearing Installation: Not necessary to remove engine or crankshaft from car. *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings' in Chevrolet Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data*

CAMSHAFT

►*CAMSHAFT CAUTION* Different camshafts used as follows:

Model	Chevrolet No.
265" Engine	3704212
283' Engine (Std.)	3733431
283' Engine (Hi-Lift Cam)	3736097

Journal Diameters - 1.8682-1.8692" (all journals)
Bearings - Steel backed babbitt lined bushings
Clearance - .0015-.0035"

Replacement Bearings: "Precision" type (do not require reaming) Use Tool Set J-6098 to remove and install bearings.

Camshaft Setting: Both sprockets marked 'O' Install chain with sprocket marks adjacent and in line with straight edge across centers.

►*CAUTION* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. *DO NOT DRIVE SPROCKET ON SHAFT,* use three mounting bolts and DRAW sprocket into place.

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Camshaft Removal & Installation: See *"Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link belt. **Width** - .875". **Pitch** - .500". **Length** - 46 Links.

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Chevrolet Special Data.*

VALVES

Tappet Clearance (Hi-Lift Cam) - Intake .012" (.008" for competition), Exhaust .018", Hot.

(All Others). None in service, hydraulic lifters.

Initial Tappet Clearance (Engs. with Hydraulic Lifters) - See *"Valve System" in Chevrolet Special Data.*

►283". *ENGINE VALVE NOTE:* Special lightweight valves used with Hi-Lift Camshaft and mechanical lifters. Identified by swirl polish under head

Valve	Head Diam.	Stem Diam.	Length
Intake	1.720"	.3415-.3422"	①4.902-4.922"
Exhaust	1.5"	.3410-.3417"	4.913-4.933"

Valve	②Seat Angle	Lift	Stem Clearance
Intake	45°	③	.001-.0027"
Exhaust	45°	③	.0015-.0032"

①- 4.8799" on cars with "Hi-Lift" camshaft.

②- Face angle 44°.

③- 265" Eng., .3336"; 283" Eng. Std., .3987", Hi-Lift Camshaft, Intake .3938", Exhaust .3998".

Valve Seat Width - .035-.060" (Intake), .062-.093" (Exhaust).

Valve Stem Seal Installation: See *"Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .003", .015", .030" Oversize. Use Reamer Set J-5830.

Valve Springs: Install with closed end of coil toward cylinder head, and shield over spring on intake valves.

►*VALVE SPRING NOTE:* Valve spring shield on both intake and exhaust valves on 283" engine.

Spring Specifications
265" Engine

Valve	Spring Pressure	Length
Closed	76-84 lbs.	1.696"
Open	155-165 lbs.	1.366"

283" Engine①

Valve	Spring Pressure	Length
Closed	65-72 lbs.	1.696"
Open	151-165 lbs.	1.306"

①- Except engines with "Hi-Lift" camshaft.

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from spring seat in cylinder head to top of valve spring. If this dimension exceeds 1 45/64", install valve spring seat shim furnished 1/32 & 1/16" thick. Installed height of spring must be 1 11/16-1 45-64".

Valve Lifters (Std. V8): Hydraulic type. See *"Valve System" in Chevrolet Special Data.*

Valve Lifters (Corvett): Plain barrel type. Remove in same manner as for hydraulic valve lifters. See *"Valve System" in Chevrolet Section.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement - See *"Valve System" in Chevrolet Special Data.*

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*

Valve Timing Specifications (265" Engine)

Intake Valves - Open 18° BTDC. Close 72° ALDC.

Exhaust Valves - Open 52° BLDC. Close 20° ATDC.

Valve Timing Specifications (283" Engine)
(With Standard Camshaft)

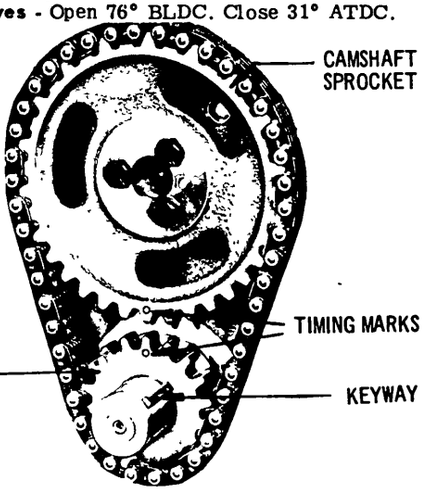
Intake Valves - Open 12°30' BTDC. Close 57°30'ALDC

Exhaust Valves - Open 54°30' BLDC. Close 15°30' ATDC.

Valve Timing Specifications (283" Engine)
(With "Hi-Lift" Camshaft)

Intake Valves - Open 35° BTDC. Close 72° ALDC.

Exhaust Valves - Open 76° BLDC. Close 31° ATDC.



CHEVROLET V8 VALVE TIMING MARKS

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts. refill (exc. Corvette), 5 qts. refill (Corvette). Add 1 qt. when filter changed.

Crankcase Capacity: 4 quarts (refill) 5 qts. (dry)

Normal Oil Pressure: 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve - In oil pump. Not adjustable.

Oil Pressure Indicator (Std V8) Light located at right side of instrument cluster, controlled by a pressure switch Delco-Remy 1998149 or AC No. 1508425, located in main oil gallery adjacent to distributor. Switch closes when pressure drops to 4-7 lbs.

Oil Pressure Gauge (Corvette) - AC No. 1508131. Not electric.

Oil Filter: Full flow type. Replace element at 6,000 mile intervals. Use new seal, tighten center bolt to 20-25 ft. lbs.

Replacement Filter Element - AC No. PF-131.

Oil Pump: Spur gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul - See *"Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation - Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE OR TURBOGLIDE): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16 qts. add 1 qt. for heater.

Pressure Valve: AC RC 1, Chevrolet No. 750795. 7 lb. type radiator filler cap.

Thermostat: Harrison. In water outlet on intake manifold.

Standard - No. 3133595 (stamped 151) 151° Can be used for alcohol anti-freeze.

Optl. - No. 3133596 (stamped 160) 160°. No. 3133597 (stamped 170) 170°.

Temperature Gauge: AC electric.

Dash Unit - AC No. 1513317 (Std. V8), 1513198 (Corvette).

Engine Unit - AC No. 1513321.

See *"Temperature Gauges" in Miscellaneous Section.*

Water Pump: Packless type with ball bearing shaft.

See *"Water Pumps" in Chevrolet Special Data.*

CLUTCH

►*CLUTCH NOTE: Both Chevrolet (Own) Diaphragm type & Borg & Beck Coil Spring type Clutches used:*

Chevrolet (Own) Diaphragm Clutch

Car Model	Size	Chevrolet No.
V8 (Std.)	10"	3836723
V8 (Heavy Duty)	11"	3836719

Borg & Beck Clutch

V8 & Corvette (4Bbl. Carb)	①3744753
V8 & Corvette (Two 4 Bbl. Carb)	②3744752

①- Borg & Beck 10A8W Assy. No. 361468.

②- Borg & Beck 10A8 Assy. No. 361466 (use 361468 for service).

See *"Chevrolet (Own)" and "Borg & Beck" Clutches in Clutch Section.*

Clutch Disc (Chevrolet Clutch)

Car Model	Chevrolet No.
Std. 10" (Woven - Blue Hub)	3737946
Std. 10" (Molded - Lt. Brown Hub)	3737948
Overdrive 10" (Woven - Maroon Hub)	3741091
Heavy Duty 11" (Woven - Pink Hub)	3836906

Clutch Disc (Borg & Beck Clutch)

Std. (4 Bbl. Carb) 10" (Black Hub)	③3738227
Overdrive (4 Bbl. Carb) 10" (Lt. Green)	④3738229
Std. (Two 4 Bbl. Carb) 10" (Dark Brown)	⑤3740462

③- Borg & Beck No. 382657.

④- Borg & Beck No. 382653.

⑤- Borg & Beck No. 382657.

Pedal Adjustment: Pedal free-travel ¾-1". To adjust, disconnect trunnion on rear end of clutch fork rod from cross shaft (remove cotter pin, washer, and spring), turn trunnion on rod for correct free play (one turn equals approximately 3/16" play), reinstall trunnion.

Removal (Borg & Beck): Remove transmission (see Transmission Removal below). Remove clutch housing pan. Pull out clutch release bearing and sleeve. Mark

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flywheel, cover, and one pressure plate lug with punch to insure proper reassembly Loosen holding screws a turn or two at a time to avoid bending rim of cover, until cover is free Remove clutch assembly and clutch disc assembly from clutch housing When removing driven disc be sure to mark flywheel side

R moval (Diaphragm Spring Type)· Remove Transmission (see Transmission Removal below) Remove clutch throwout bearing from fork then clutch fork tension spring from fork Remove clutch fork by forcing it forward and toward center of vehicle Install Clutch Pilot Tool J 5824 to support clutch assembly Loosen clutch attaching bolts one turn at a time until diaphragm spring is released Remove tool then clutch assembly from vehicle *NOTE* When installing clutch align 'X" marks on cover and flywheel

SYNCHRO-MESH TRANSMISSION

Own Three speed synchro-mesh (Std) three or four speed (close ratio) optional

See Chevrolet 3 speed in Transmission Section

Transmission Controls· *See 'Transmission Controls' in Transmission Section*

R moval: Drain transmission and disconnect speedometer cable and shift rods Disconnect propellor shaft at rear universal and slide shaft toward rear, off transmission output shaft Remove two top transmission to clutch housing screws and install Guide Pins J-1126 Remove the two lower screws and slide transmission back until clutch gear splines disengaged Remove transmission from below car

OVERDRIVE

Warner R10 Solenoid operated type with governor control and throttle operated kickdown Lockout switch not used

See 'Chevrolet Overdrive' in Transmission Section

Overdrive Control: *See "Warner R10 &R11 Overdrive Control" in Transmission Section*

Removal: Same as for synchro-mesh (above) after disconnecting control cable and wiring

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS See "Chevrolet Powerglide" in Transmission Section*

► *TESTING & TROUBLE SHOOTING See "Chevrolet Powerglide" in Transmission Section*

Lubrication: Check fluid level in transmission every 1,000 miles, drain and refill at 25,000 mile intervals, with Automatic Transmission Fluid type "A" bearing an "AQ-ATF" marking on container

Capacity - 4½ qts (refill), 10½ qts (after overhaul)

► *POWERGLIDE DRAINING CAUTION* There is no drain plug on converter Drain transmission case only, add 4½ qts of fluid initially, recheck after idling engine

Checking Fluid Level - Engine must be idling with transmission warm, selector lever in "N" range and parking brake applied Check fluid level on dipstick located in filler tube on right side of engine opposite starter Fluid level should be at full mark on dipstick *NOTE - DO NOT OVERFILL*

Thr ttl Linkag Adjustment: *See CARBURETOR above*

► *OTHER POWERGLIDE SERVICE DATA S e "Chevrolet Powerglide' in Transmission Section*

TURBOGLIDE TRANSMISSION

New "non-shifting" hydraulically controlled, planetary type transmission with three unit torque converter

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION See "Chevrolet Turboglide" Transmission in Transmission Section*

► *TESTING & TROUBLE SHOOTING See 'Chevrolet Turboglide" in Transmission Section*

Lubrication: Check fluid level in transmission every 1000 miles, drain and refill every 25,000 miles Use Automatic Transmission Fluid Type A (with "AQ-ATF" mark on container)

Capacity - 3½ qts (refill), 9½ qts (after overhaul)

► *TURBOGLIDE DRAINING CAUTION*· There is no drain plug on converter Drain transmission case only, add 3½ qts of fluid initially, recheck after idling engine

Checking Fluid Level (Exc Air Cond. Cars) - With transmission at normal operating temperature, transmission selector lever in "D" (drive) range, and engine idling, check fluid level on dipstick in filler tube on right side of engine Fluid level should be at full mark on dipstick *CAUTION - DO NOT OVERFILL*

Checking Fluid Level (Air Cond. Cars) - *NOTE* - Regular filler tube and dipstick not used Fluid Level is checked from beneath car (car on hoist) as follows With transmission at normal operating temperature, selector lever in "N" (neutral) range and engine idling, check fluid level by removing cap from oil level tube at rear of transmission oil pan under extension housing Oil level should be at *top* of tube If oil level low, remove speedometer drive gear fitting, add oil through fitting hole until fluid level reaches top of oil level tube

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER TURBOGLIDE SERVICE DATA See 'Chevrolet Turboglide' in Transmission Section*

UNIVERSALS

Own. Yoke & Spider (Trunnion) type

► *CAUTION* Rear universal companion flange nut controls rear axle pinion bearing preload Preload must be adjusted whenever companion flange nut loosened *See 'Chevrolet Pass Car (Hotchkiss Drive)" in Rear Axle Section*

REAR AXLE

Own Semi-floating hypoid gear type, with Hotchkiss Drive *NOTE* - "Positraction" Limited Slip Differential optional

See "Chevrolet Pass Car (Hotchkiss Drive)" Rear Axle & "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section

► *PINION BEARING PRELOAD CAUTION* Rear universal joint companion flange nut controls rear axle pinion bearing preload Bearing preload must be adjusted whenever companion flange nut is loosened

Rati s - 3 55-1 (Std), 4 11-1 (Overdrive) 3 36-1 (Powerglide & Turboglide)

Backlash - 003- 010" (005- 008" preferred)

Removal Raise car and support with jack stands under frame side rails Remove rear wheels and remove two trunnion bearing "U" bolts from rear universal yoke and separate the joint (tape bearings to trunnion) Disconnect hand brake cable and equalizer and remove cable from clamps at frame Disconnect hydraulic brake lines at rear axle housing Disconnect shocks Support axle assembly on hydraulic jack and remove spring "U" bolts, nuts and anchor plate, and lower axle to floor

Axle Shaft Removal Raise car and place jack stands under axle housing Remove tire, wheel and brake drum assembly Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange) Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly Be careful not to disturb backing plate *NOTE*–If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance

SHOCK ABSORBERS

Delco. Direct acting hydraulic, non-adjustable Serviced by replacement

Replacement Sh ck Absorb rs

Model	Fr nt	R ar
Pass exc Conv (No A C)	5531202	5531211
Pass exc Conv (With A C)	5524088	5531211
Convertible	5524088	5524089
Corvette	5531206	5531213
Sedan Del ,Sta Wgn ,Taxicab	5524088	5524089

FRONT SUSPENSION

Independent with direct acting shock absorbers within front coil springs. Different types used as follows

Corvette – "Threaded Bushing" type pivot points on upper and lower control arms.

Others – "Spherical Joint" type pivot points between control arms and steering knuckle support.

See "Chevrolet" in Suspension & Wheel Alignment Sect.

Steering Axis Inclination - 3-4°

Caster - Pos 1° preferred Limits Pos ½° to Pos 1½°

Camber - Pos ½° preferred Limits 0° to Pos 1°

Toe-In - 1/8-1/4"

Toe-Out on Turns - With inner wheel at 20° outer wheel should be 18°10'

STEERING

Manual. Different type steering systems used as follows **Corvette - Saginaw W rm & R ller.** Push-pull adjustment.

Others – Saginaw Ball Bearing W rm & Nut. Recirculating ball type.

See Saginaw "Worm & Roller" or "Ball Bearing Worm & Nut" in Steering Section.

Power Steering: *See "Chevrol t Pow r St ring" in Steering Section.*

St ring Linkag *See "Steering Linkage" in Steering Section*

Ste ring Whe l & Horn Button R m val *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

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Steering Gear Removal *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Chevrolet-Bendix. Duo-servo single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes.
See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION*
To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087 smaller diameter than the drum diameter. Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action. *NOTE—If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter.*

Drums—Diameter 11".
Wheel Cylinder Diameter—Front 1 1/8", Rear 1".

Lining	Width	Thickness
Front Whl	2"	.187-.194"
Rear Whl	1¾	.187-.194"

Length Per Shoe—9.3125" (Primary), 11.6875" (Secondary).
Braking Power—55.9% (Front Wheels), 44.1% (Rear Wheels).

Clearance—Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag after adjustment.

Standard Master Cylinder. Located on engine side of firewall in line with brake pedal.

Checking Fluid—Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole.

Removal—Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove four retaining nuts and lock washers holding master cylinder to firewall and remove cylinder.

Installation—Reverse removal procedure making sure that push rod clevis is straddling the brake pedal. Refill master cylinder and bleed all brake lines. Adjust push rod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1 8-3/8" pedal movement should be felt).

Power Brakes: Std. Trans. - Hydrovac Power Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brake Section.
Aut. Trans. - Bendix Vacuum Power Unit. Replaces conventional master cylinder. *See "Bendix Power Unit" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers: Vacuum, cable operated (Std.). Electric type (Optional).
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type with reversible motor operating each door window assembly.
See "Power Window Regulators" in Miscellaneous Section.

Power Top Controls: Hydro-Electric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjuster: Reversible Electric motor controls horizontal front seat movement. *See "Power Seat Adjusters" in Miscellaneous Section.*
Air Conditioning: *See "Chevrolet Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Seri s	Serial Prefix	Wh lbas	Typ
3100	3A	114"	Half-Ton
3200	3B	123"	Half-Ton
3400	3C	104"	① ¾-Ton
3500	3D	125"	① ¾-Ton
3600	3E	123¼"	¾-Ton
3700	3F	137"	① ¾-Ton
3800	3G	135"	1-Ton
4100	4A	132½"	1½-Ton
4400	4B	156½"	1½-Ton
4500	4C	156½"	② 1½-Ton
5100	5A	112 5/8"	② 2-Ton
5400	5B	136 5/8"	③ 2-Ton
5700	5C	160 5/8"	③ 2-Ton
5100S	5D	112 5/8"	④ 1½-Ton
5400S	5E	136 5/8"	④ 1½-Ton
5700S	5F	160 5/8"	④ 1½-Ton
6100	6A	132½"	2-Ton
6200	6J	129 5/8"	2-Ton
6400	6B	156½"	2-Ton
6500	6C	174½"	2-Ton
6600	6K	153 5/8"	2-Ton
6700	6D	196½"	2-Ton
6800	6E	222½"	2-Ton
6100S	6F	132½"	⑤ 1½-Ton
6400S	6G	156½"	⑤ 1½-Ton
6500S	6H	174½"	⑤ 1½-Ton

① - Forward Control. ② - School Bus Chassis.
③ - Low Cab Forward. ④ - Low Cab Forward Special.
⑤ - Conventional Special.

► *SERIAL PREFIX NOTE (MODELS WITH V8 ENGINE): A letter "V" will precede the Serial Prefix, "V3A", etc.*

SERIAL NUMBER: Stamped on metal plate and attached to the body as follows: **Forward Control Models**--On instrument panel support. **Flat Face Cowl Models** - On cowl inner panel. **All Other Models** - Left front door hinge pillar.

Starting Serial Number: 100001, at each assembly plant regardless of series.

► *SERIAL NUMBER NOTE: Serial number (example 3A57K100183) includes following identification data in sequence*

S ries ①	Year	Assy. Plant ②	Serial No.
3A	57	K	100183

① - Serial Prefix for each model (Models with V8 engine a regular production option, will have a "V" preceding the "3A").
② - See Truck Assembly Plant Designation below.

Truck Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
J - Janesville	**O** - Oakland	

ENGINE NUMBER (6 CYL.): Stamped on right side of engine block to rear of distributor.

ENGINE NUMBER (V8): Stamped on pad at front right hand side of cylinder block behind water pump.

► *ENGINE NUMBER NOTE: Engin number (example F 101 P) includes following identification information in sequence.*

Plant ①	M nth ②	Day ③	④ Engine & Seri s
F	1	01	P

① - "F" (Flint), "T" (Tonawanda)
② - "1" (January), "2" (February), etc.
③ - "01" (First Day), "02" (Second Day), etc.
④ - See Model Type Designation below.

Series Type Designation

Series	Engine	Designation
31,32,36,3800	Thriftmaster 235"	H
31,32,36,38,4000	Thriftmaster 235" ①	HD
31,32,36,38,4000	Thriftmaster 235" ②	HE
34,35,3700	Thriftmaster 235" ③	J
34,35,3700	Thriftmaster 235" ① ③	JA
6000	Jobmaster 261"	K
6000	Jobmaster 261" ④	KC
31,32,36,38,4000	V8 Trademaster 265"	L
31,32,36,38,4000	V8 Trademaster 265" ①	LA
31,32,36,38,4000	V8 Trademaster 265" ②	LB
34,35,3700	V8 Trademaster 265"	M
5000	V8 Taskmaster 283"	N
5000	V8 Taskmaster 283" ④	NA
5000	V8 Super Taskmaster 283" ⑤	NC
5000	V8 Super Taskmaster 283" ④ ⑤	ND
6000	V8 Taskmaster 283"	P
6000	V8 Taskmaster 283" ④	PA
6000	V8 Super Taskmaster 283" ⑤	PC
6000	V8 Super Taskmaster 283" ④ ⑤	PD

① - Hydra-Matic Transmission.
② - Heavy Duty Clutch. ④ - Powermatic Transmission.
③ - Updraft Carburetor. ⑤ - 4-Barrel Carburetor.

TUNE-UP

COMPRESSION PRESSURE: (6 Cyl.) 130 lbs. **(V8)** 150 lbs. All cylinders should read alike within 20 lbs.

VACUUM READING - 17-21" (Single & Dual Carb.), 16-20" (4-Barrel Carb.).

VALVE TAPPET CLEARANCE: (235") - .006" Intake, .018" Exhaust, Hot.
(261) - .006" Intake, .020" Exhaust, Hot.

(V8 Engines) - None in service (Hydraulic). For initial tappet adjustment, *see "VALVE SYSTEM" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: 6 Cyl. - Thermostatic type. Check for free operation. Should require ½ turn from unhooked to hooked position. Distorted spring should be replaced.
V8 - Thermostatic coil spring type located between right manifold and exhaust pipe.

IGNITION

FIRING ORDER: 6 Cyl. - 1-5-3-6-2-4.
V8 - 1-8-4-3-6-5-7-2.
Cylinders (V8) - RIGHT BANK 2-4-6-8. LEFT 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plug - AC used as follows:

Model	Std.	① Hot	② Cold
½-1½ Ton	AC-44	AC-45 or 46	C-43COM
2 Ton (Early)	C-42COM	C-43COM	
2 Ton (Later)	C-42-1COM	AC-44	C-43COM

① - City type operation.
② - Continuous heavy duty operation.

COIL: Delc -R my 1115087.
Ignition Curr nt - 1.8 amps. idling, 4 amps. stopped.
R sist r - Delco-Remy 1931614.

► *COIL RESISTOR NOTE (6 Cyl. Trucks Exc. Forward Control):* Resistor connected to ignition switch by two leads. Second lead is connected through starter switch and provides a direct connection to coil when starter switch operated.

► *COIL RESISTOR NOTE (6 Cyl. Forward Control & All V8 Models):* Resistor connected in coil primary circuit (see diagram) is bypassed during cranking when coil is energized directly from ignition bypass terminal on starter solenoid.

DISTRIBUTOR: Delco-Remy. Conventional type used on 6 Cyl. models. "Window Type" used on V8 models. *See "Delco-Remy (Window Type) Distributors" in El ctrical Section.*

Engine	D lc -R my No.
Thriftmaster 235"	1112403
Jobmaster 261"	1112403
Trademaster 265" & 283" (Exc. Hydra-Matic)	1110874
Trademaster 265" (With Hydra-Matic)	1110890
Taskmaster 283" (2-Barrel Carb.)	① 1112349
Super Taskmaster 283" (4-Barrel Carb.)	①② 1112350

① - Without Vacuum Spark Control.
② - Use 1112349 for service replacement.

Condenser - Delco-Remy 1928111 (1112403 Distr.), 1932004 (Others). **Capacity** - .18-.23 mfd.

Contact Point Set - Delco-Remy 1924571 (6 Cyl.). 1931988 (V8).

Breaker Gap (6 Cyl.) - .019" (new points). .016" (used points).

Breaker Gap (V8) - *NOTE - When cam dwell is properly adjusted, breaker gap opening (.016") will be correct. See CAM ANGLE below.*

Cam Angle - 28-35° (6 Cyl.), 28-32° (V8). *NOTE - Set V8 distributors to 30°.*

Breaker Arm Spring Tension - 19-23 ozs.

Automatic Advanc - 1112403

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Automatic Advance - 1110874, 1112349, 50

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
8-10	1150	16-20	2300
15-17	1800	30-34	3600

Automatic Advance - 1110890

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	400	1-3	800
6-8	750	12-16	1500
9.5-11.5	1300	19-23	2600
13-15	1850	26-30	3700

Vacuum Spark Control: Delco-Remy 1116108 (Distr. 1110874), 1116118 (Distr. 1110890), 1116089 (Distr. 1112403).

Vacuum Advance - 1110874

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11	22	11.75-13.75

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Vacuum Advanc - 1110890

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
7 5	15	15-16

Vacuum Advance - 1112403

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
7.5	15	7.5-10

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION (265" V8 ENGINE):* Incorrect installation may cut off oil to RIGHT or LEFT valve lifter gallery (valve lifters, pushrods, and rocker arms). *See "Ignition Notes" in Chevrolet Special Data.*

IGNITION TIMING

Setting - 6 Cyl. Engines - At TDC. **All V8 Engines** - 4° BTDC. *Set timing at IDLE SPEED with vacuum line connected*

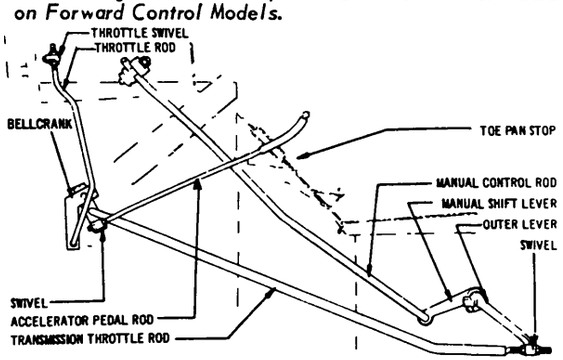
►*IGNITION TIMING PROCEDURE CHANGE: Previous recommendation of setting timing at 1000 RPM with vacuum line disconnected has been discontinued*

Timing Mark (6 Cyl.) - Steel ball insert in flywheel lined up with pointer in inspection hole in right front faceof housing with Octane Selector set on "0". Adjust Octane Selector as follows: Set for slight ping when accelerating with wide open throttle.

Timing Mark (V8) - Mark on vibration dampener and an indicator on left side of engine front cover. Indicator is marked with 8 lines on "advance" side of "0" mark, and two lines on "retard" side. Each line indicates 2°.

CARBURETOR

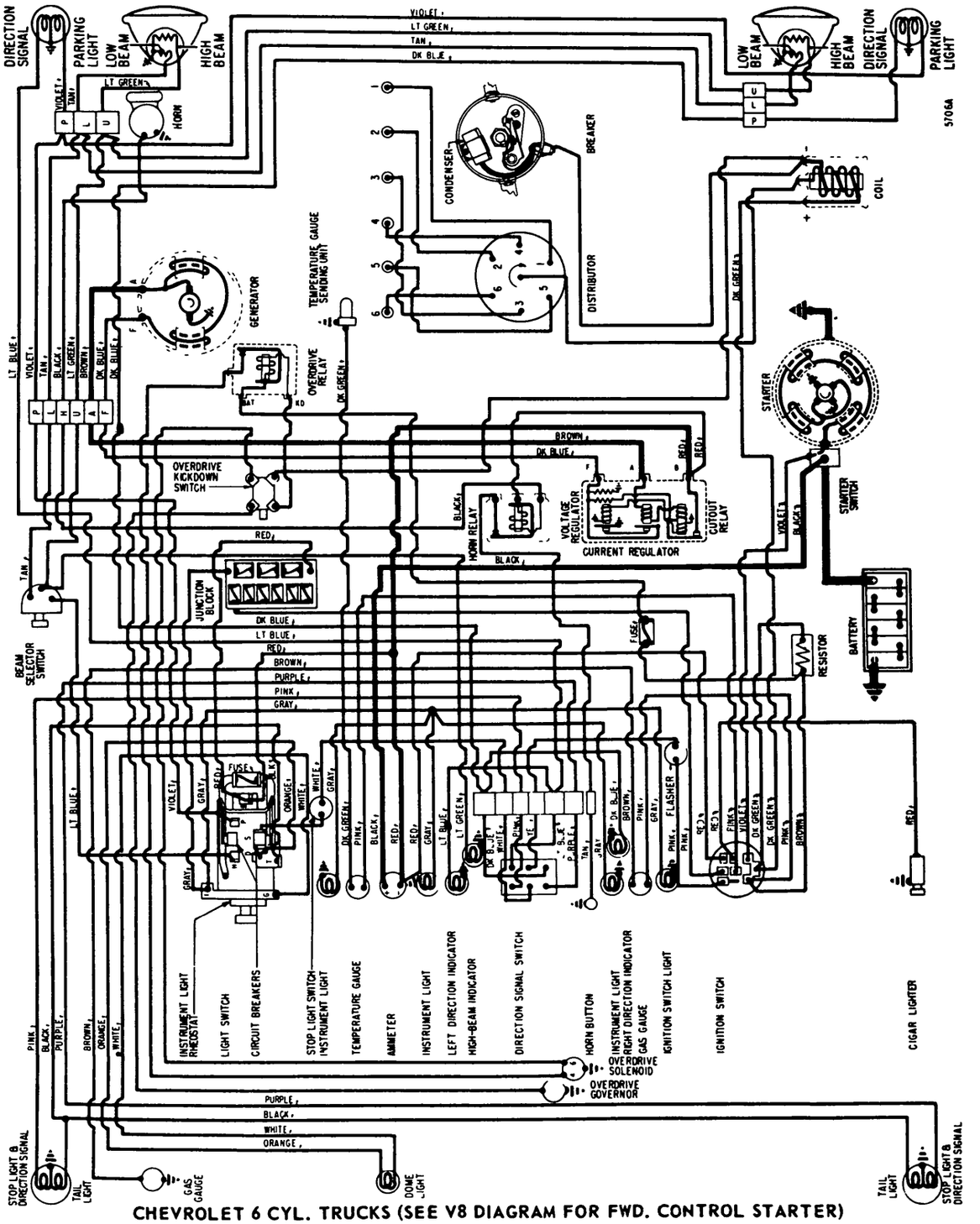
►*CARBURETOR APPLICATION: Rochester "B" & "BC" Carburetors are standard on all 6 Cyl. Models (Exc. Forward Control). Rochester "2G" Carburetor is standard on 265" Trademaster & 283" Taskmaster Engines. Rochester "4G" Carburetor is standard on Super Taskmaster Engines. Carter Updraft Carburetor is standard on Forward Control Models.*



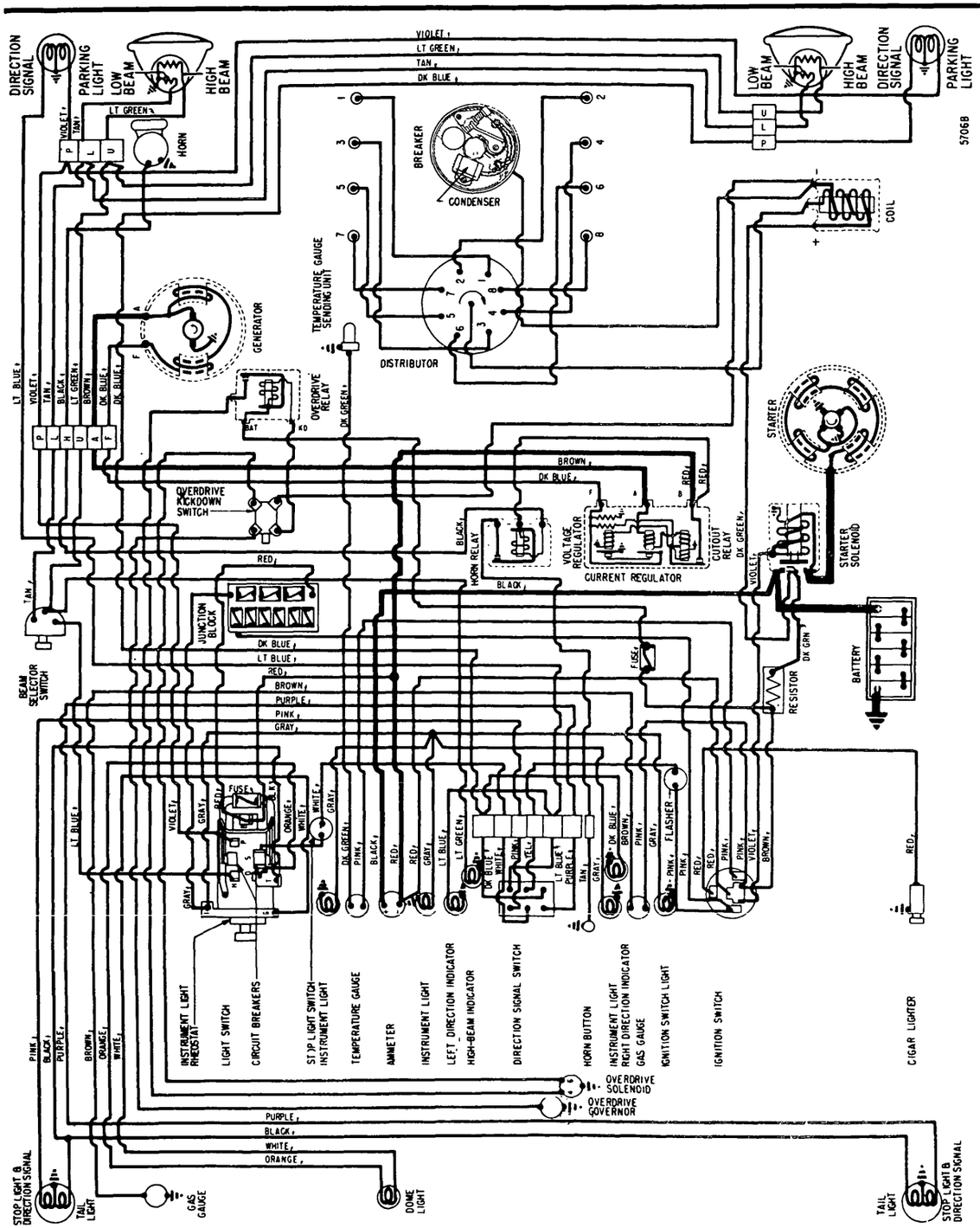
CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (EXCEPT FORWARD CONTROL)

Throttle Linkag Adjustm nt (6 Cyl. Hydra-Matic Drive Trucks xc pt Forward Control): With engine at normal operating temperature and idle speed set at 400-450 RPM remove lower end of carburetor throttle lever-to-bellcrank rod from lever on bellcrank Install Lever Positioning Gauge J-5609 in hole in lever and gauge

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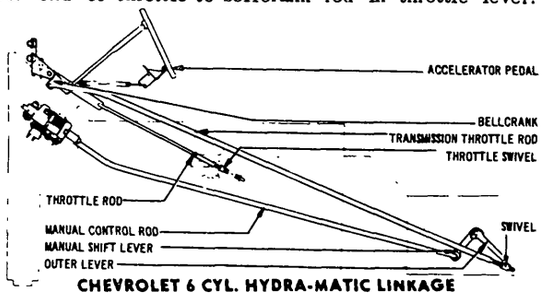
CHEVROLET 6 CYL. TRUCKS (SEE V8 DIAGRAM FOR FWD. CONTROL STARTER)



CHEVROLET V8 TRUCKS (SEE 6 CYL. DIAGRAM FOR PEDAL CONTR. STARTER)

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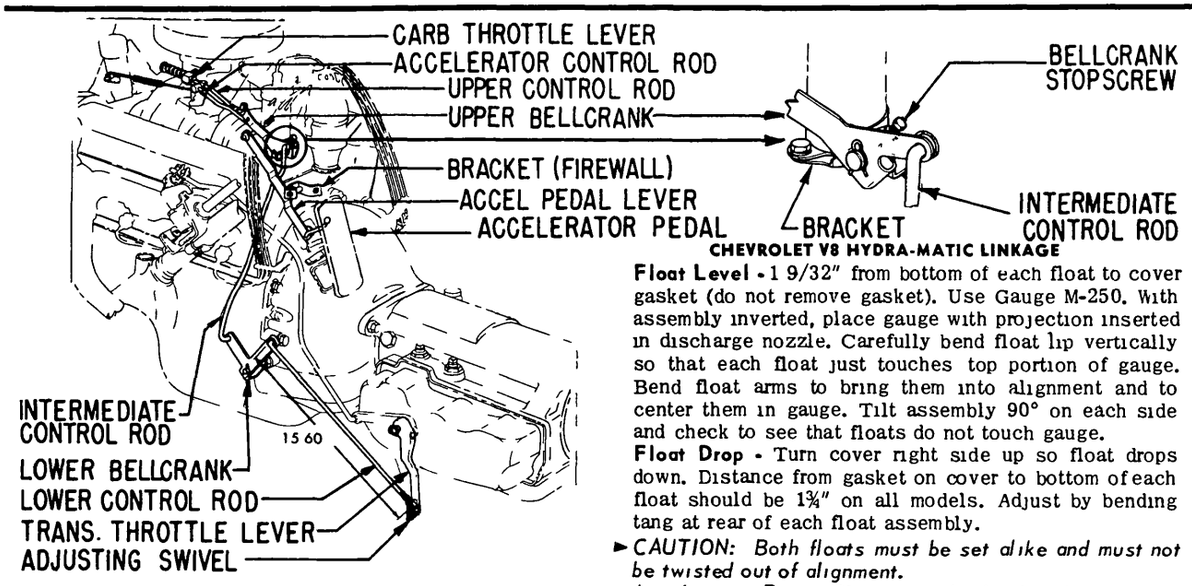
hole in pan rail of engine block (hole is located toward rear of bellcrank position), and leave gauge in this position. Remove swivel from bellcrank-to-transmission outer lever at transmission and move transmission outer lever back against its stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using Tool J-5260 (*CAUTION - D not apply force to stops at either end of lever travel*). Hold outer lever back against its stop and adjust swivel position on bellcrank-to-transmission rod so it just enters hole in transmission lever. Remove Positioning Gauge from bellcrank and reinstall rod. Recheck engine idle speed with idle screw against stop on carburetor, and adjust carburetor throttle-to-bellcrank rod so swivel at upper end freely enters hole in throttle lever. At this point, **short n** bellcrank-to-transmission outer lever rod by turning swivel locknuts **three and one-half** turns. Remove bellcrank-to-carburetor throttle rod upper swivel from lever and pull rod upward until linkage is stopped by forward stop in transmission. Hold in this position and adjust accelerator-to-bellcrank rod swivel until accelerator pedal is against floor stop, then **shorten** rod **one full turn.** Replace upper end of throttle-to-bellcrank rod in throttle lever.



CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (FORWARD CONTROL MODELS)

Throttle Linkage Adjustment (F rward C ntrol M d ls With Hydra-Matic Drive): With engine at normal operating temperature and idle speed set at 400-450 RPM, insert 1/8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever. Adjust length of throttle rod so that swivel just enters throttle lever. Remove swivel from outer lever and move lever back against transmission stop. Check distance from hole in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole. *CAUTION - Do not apply force against stop at either end of lever travel.* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever then **sh rt-en** throttle rod **three and ne-half turns** of jam nut. Tighten nut. Remove pin from hole in accelerator pedal lever, back off adjusting screw and depress accelerator pedal until outer lever is tight against forward stop on transmission and then turn adjusting screw against accelerator pedal lever. Release accelerator pedal turn adjusting screw down **ne full turn,** and secure with jam nut.

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CHEVROLET V8 HYDRA-MATIC LINKAGE

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Throttle Linkage Adjustment (V8 Hydra-Matic Drive Trucks): With carburetor at hot idle remove lower control rod from transmission throttle lever and hold lever back against transmission stop Check distance from hole in lever to back of transmission case with Lever Checking Gauge J-2545-C and bend lever as necessary to allow entry of gauge into hole (Tool J-5260) Adjust lower control rod to 15 60" and install in transmission throttle lever then install intermediate and upper control rods **Shorten** lower control rod by loosening adjusting swivel **three and one-half turns** and tightening locknuts Back off bellcrank stopscrew and rotate upper bellcrank until linkage is stopped by full detent stop in transmission then turn stopscrew until it contacts bracket Release upper bellcrank and turn stopscrew in **one-half to one full turn** and lock **On 3100, 3200, 3600 Series Only** install 1 8" gauge pin through hole in accelerator pedal lever and bracket at firewall then install accelerator control rod to accelerator pedal lever and rotate lever until bellcrank stopscrew contacts bracket Adjust length of accelerator control rod so swivel just enters lug on upper control rod

ROCHESTER "B" & "BC"

Downdraft types with manual choke (Rochester Model "B") and automatic choke (Rochester Model "BC").

Model	Rochester No
235" (exc Hydra-Matic) Ⓒ	B 7004468
235" (with Hydra Matic) Ⓒ	BC 7009255
261" Ⓒ	B 7005140

Ⓒ Except Forward Control

Idle Setting - 1½-2½ turns open (7004468 & 7005140) 2½ turns open (7009255) Turns screw out for richer mixture

Idle Speed - 450-500 RPM (exc Auto Trans models) 425 RPM (Auto Trans models with selector lever in "N" position)

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

► *CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump - No seasonal adjustment.

Choke Adjustment· Centered on index.

Fast Idle (7009255): With fast idle screw on next to highest step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks)· *See CARBURETOR above*

► *OTHER DATA See "Rochester B & BC Carburetors" in Carburetion Section*

ROCHESTER "2G"

Dual downdraft type with manual choke

Model	Rochester No
V8 Trademaster 265" (Std Trans) Ⓒ (Early)	7010649
V8 Trademaster 265" (Std Trans) Ⓒ (Early)	7010716
V8 Trademaster 265" (Overdrive) (Early)	7010718
V8 Trademaster 265" (Std Trans) Ⓒ (Later)	7011135
V8 Trademaster 265" (Std Trans) Ⓒ (Later)	7012147
V8 Trademaster 265" (Overdrive) (Later)	7011132
V8 Taskmaster 283" Ⓒ (Early)	7010717
V8 Taskmaster 283" Ⓒ (Later)	7011143

Ⓒ Without governor Ⓒ With governor

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 425 RPM with transmission in "N" (Automatic Trans.).

Float Level - 1¼" from air horn gasket to top of float with assembly inverted. Use Gauge BT-129 so it rests against power piston shaft with outer leg in line with center of float. Adjust by bending float arm between pivot and float with Tool BT-69.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks) *See CARBURETOR above*

► *OTHER DATA See "Rochester 2G Carburetors" in Carburetion Section*

ROCHESTER "4G"

Rochester 4G No 7009661 (early), 7011161 (later). Four barrel downdraft type with manual choke and vacuum operated governor

Replacement Package - Rochester No. 7015713.

Idle Setting - Adjust idle mixture screws for highest steady vacuum.

Idle Speed - 450 RPM (Synchro-mesh), 425 RPM (Automatic Trans. with selector lever in "D" range).

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks)· *See CARBURETOR above*

► *OTHER DATA. See "Rochester 4G & 4GC Carburetors" Carburetion Section*

CARTER

Carter (BB) 871SC (Forward Control Models). Single barrel updraft type with manual choke.

Idle Setting - ½-1½ turns open (turn screw out for richer mixture.)

Idle Speed - 450-500 RPM (Synchro-mesh), 400-450 RPM (Hydra-Matic).

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed). Press float lever lip firmly against needle.

Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks): *See CARBURETOR above*

► *OTHER DATA See "Carter BB Carburetors" in Carburetion Section*

FUEL PUMP PRESSURE: 3½-4½ lbs.

CARB. EQUIPMENT

Fuel Pump· **(6 Cyl.)** AC No. 4149 (Std. - Fuel only), 4138 or 707 (Optl. - Fuel & Vacuum).

(V8) - AC No. 4150 (Std. - Fuel only), No. 4304 (Optl. - Fuel & Vacuum).

Pressure - 3½-4½ lbs. (6 cyl.), 4-5¼ lbs. (V8).

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric.

Dash Unit - AC No. 1518461.

Tank Unit -	Truck Model
AC No 1518777	(Utility Cab)
AC No. 1518779	(Utility Exc. Fwd. Cont.)
AC No. 1518780	(Utility Fwd. Cont.)
AC No. 1518778	School Bus
AC No. 1518783	¾ Ton Fwd. Cont.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53W. (Exc. School Bus) - 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

Delco 2SMR72D. (School Bus) - 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).

Battery Ground - Negative

Engine Ground - Engine to frame (6 cyl.) Engine to dash (V8).

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STARTER

Delco-Remy. Application as follows

Model	Starter	Armature
6 Cyl. (Exc. Fwd. Cont.)	1107634 ①	1926626
6 Cyl. (Fwd. Cont.)	1107652 ②	1932185
6 Cyl. (Hydra-Matic)	1107677 ② ③	1926626
V8 (Exc. Hydra-Matic)	1107664 ②	1935829
V8 (Hydra-Matic)	1107674 ②	1927343

① - Manual Pinion shift. ② - Solenoid pinion shift.
③ - Delco-Remy 1107633 also used.

Drive (6 Cyl. Synchro-mesh Trans., Exc. Fwd. Cont.) - Overrunning clutch with pedal operated manual pinion shift.

Drive (6 Cyl. Fwd. Cont. & Hydra-Matic Trans., All V8 Models) - Overrunning clutch with solenoid pinion shift.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107634, 74, 77

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10 5 ft. lbs.	Lock	5.8	435

Performance Data - 1107652, 64

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6200-9400	10 6	49-76
	Lock	4.25	270-310

① - Includes solenoid.

Starting Switch (Solenoid Pinion Shift Models): Delco-Remy Solenoid 1119919 (1107652 & 1107664), 1119760 (1107674), 1119793 (1107677) Mounted on starter and controlled by Ignition & Starter Switch 1116537.
See "Delco-Remy Solenoid Starting Switch (Without Relay)" in Electrical Section.

Starting Switch (Manual Pinion Shift Models): Delco-Remy Switch 1930496. Mounted on starter and actuated by pedal operated lever. Ignition Switch 1116522 is connected to small terminal on side of starter switch to bypass resistor for starting.
See "Delco-Remy Manual Pinion Shift Starter Switches" in Electrical Section.

Hydra-Matic Neutral Safety Switch: Delco-Remy 1998110.
Adjustment - *See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows

Model	Generator	Armature
Std. (25 Amp.)	1100326	1928952
Optl. (30 Amp.)	1105947	1928003
Optl (40 Amp.)	1106981	1929360
Power Strg.	1102041	1929640
Power Strg. (Optl.)	1106982	1932349

Performance Data - Cold

Generator	① Amperes	Volts	RPM
1100326	25	14 0	2570
1102041	30	14.0	2210
1105947	32	14 0	1850
1106981, 2	40	13 0	1500

① - Not maximum output. See Current Regulator.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension- 28 ozs (1100326, 41, 47), 20 ozs (1106981, 2)

Field Current - 1.5-1.62 amps. (1100326), 1 48-1.62 amps. (1102041), 1 54-1 67 amps (1105947), 1 37-1.50 amps. (1106981, 82) All at 12 volts.

Belt Adjustment: 5/16" (6 Cyl.), 13/16" (V8) deflection midway between water pump and generator pulleys with light load applied to belt.

REGULATOR

Delco-Remy. Application as follows

Regulator No.	Generator No.
1119000 (25 Amp.)	1100326
1119001 (30 Amp.)	1105947
1119003 (30 Amp.)	1102041
1119004 (40 Amp.)	1106981, 82

►*NOTE - Specifications below are for "NORMAL" settings.*

Cutout Relay

Cuts In - 11.5-13.0 volts (1119004), 11.8-13.5 volts (Others).
Contact Gap - .020".
Air Gap - .020" (with contacts just closed).

Voltage Regulator

Setting - 13.6-14.3 volts (1119004), 13.8-14.8 volts (Others).
Air Gap - .075" with armature pressed down to point where contacts just touching.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section.*

Current Regulator

Setting - (1119000) 23-27 Amperes (1119003) 27-33 Amperes, (1119004) 37-42 Amperes.
Air Gap - .075" with armature pressed down to point where contacts just touching.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators' in Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signals: *See Electrical Section.*
Lighting Switch Removal: Disconnect all wires from switch (tag wires for reinstallation), depress switch shaft retainer (on top of switch) and remove knob and shaft Remove retaining ferrule, remove switch.
Stop Light Switch Location Attached to under side of toe pan to left of brake pedal.
LIGHTING CIRCUIT BREAKERS: Two 13 ampere circuit breakers located in main lighting switch. One protects headlamps and parking lamps and the other circuit breaker protects all other light circuits except instrument panel lights.
FUSES: Instrument Lights - 3 ampere. On lighting switch.
Overdrive - 9 ampere. In overdrive relay lead.
Horn Relay: Delco-Remy 1116920.
Contacts Close - 5 0-9.5 volts.
Contact Gap - .027".

ENGINE

Engine	Series
Thriftmaster 235" (6 Cyl.)	① 3000, 4000
Thriftmaster 235" (6 Cyl.)	② 3400, 3500, 3700
Jobmaster 261" (6 Cyl.)	① 6000
Trademaster 265" (V8)	③ 3000, 4000
Taskmaster 283" (V8)	④ 5000
Super Taskmaster 283" (V8)	⑤ 5000

① - Std. Equip., Conventional Models.
② - Std. Equip., Forward Control Models.
③ - Optional Equip., Conventional & Forward Control.
④ - Std. Equip. Optional on 6000 Series.
⑤ - Optional Equip.

ENGINE SPECIFICATIONS: Own. 6 Cyl. & V8 Valve-in-head.

Engine	Bore	Stroke	Displacement
Thriftmaster	3 9/16"	3 15/16"	235.5 cu. ins.
Jobmaster	3 3/4"	3 15/16"	261 cu. ins.
Trademaster	3 3/4"	3"	265 cu. ins.
Taskmaster	3 7/8"	3"	283 cu. ins.
Super Taskmaster	3 7/8"	3"	283 cu. ins.

Engine	Compr. Ratio	Rated HP	D v. HP
Thriftmaster	8.0-1	30.4	① 140
Jobmaster	7.8-1	33.7	② 148
Trademaster	8.0-1	45.0	① 155
Taskmaster	8.0-1	48.0	② 160
Super Taskmaster	8.0-1	48.0	③ 175

① - At 4200 RPM. ② - At 4000 RPM. ③ - At 4400 RPM.
Compression & Vacuum Reading - *See TUNE-UP.*

►*NOISY VALVE OPERATION & LACK OF OIL IN VALVE SYSTEM (265" V8 ENGINE)* Lack of oil in valve system of RIGHT or LEFT cylinder banks may be caused by incorrect distributor installation *See "Ignition Notes" in Chevrolet Special Data*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: (6 Cyl. Engine) - Drain oil and remove flywheel housing under pan, flywheel underpan extension, and oil pan screws. Remove oil pan.

OIL PAN REMOVAL: (V8 Engin) - Drain oil, disconnect steering idler arm bracket from right hand frame side rail and drop for clearance. On 5000 Series truck, remove oil gauge tube attaching bolt and remove gauge and tube. Remove oil pan bolts and screws and remove oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*OTHER ENGINE DATA See 1957 Passenger Car pages and note the following.*

PISTON RINGS (6 CYL. ENGINES): 235" & 261" Engines have "Chrome Plated" top compression rings. Other compression rings are cast iron, oil rings are three piece steel (2 Chrome-Plated Rails & Spacer).

VALVES (ALL ENGINES): Rotocoil Valve Rotators - Used on exhaust valves of some 6 Cyl. & V8 engines.

VALVE LIFTERS (ALL ENGINES): Mechanical type lifters used on all 6 cyl.truck engines. Hydraulic lifters used on all V8 engines.

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VALVE TIMING (ALL ENGINES): As follows

235" Thriftmaster & 261" Jobmaster

Intake Valves—Open 11°30' BTDC, Close 52°30' ALDC.
Exhaust Valves—Open 51° BLDC, Close 13° ATDC.

265" Trademaster

Intake Valve - Open 18° BTDC. Close 72° ALDC.
Exhaust Valve - Open 52° BLDC. Close 20° ATDC.

283" Taskmaster & Super Taskmaster

Intake Valve - Open 12°30' BTDC. Close 57°30' ALDC.
Exhaust Valve - Open 54°30' BLDC. Close 15°30' ATDC.

Valve Timing Check (235" & 261" Engines): Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening. Mount dial indicator on rocker arm shaft support with stem contacting No. 1 exhaust valve adjusting screw, set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .004". Reset No. 1 exhaust valve to correct running clearance

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: (235") 5 qts Add 1 qt with filter change **(261")** 5 qts Add 2 qts with filter change **(283" Trademaster)** 4 qts, **(283" Taskmaster)** 5 qts Add 1 qt with filter change

Normal Oil Pressure - 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator - AC No. 1508246. Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed with pickup pipe screen horizontal and toward bottom of pan.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing - On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing - Every 10,000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

►*TASKMASTER V8 CRANKCASE VENTILATION NOTE:* Positive type crankcase ventilation is Standard.

COOLING

Water Capacity: In quarts for each type engine:
½, ¾, 1 Ton (Std.) - 17 (235"), 17½ (265").
½, ¾, 1 Ton (H.D.) - 17½ (235"), 18 (265").
1½ Ton Spec. (Std.) - 17½ (235"), 18 (265").
1½ Ton Spec. (H.D.) - 18 (235", 18½ (265").
5000 Series - 18 (283" Std.), 18½ (283" Powermatic).
6000 Series (Std.) - 17½ (235"), 17 (261"), 18 (283").
6000 Series (H.D.) - 18 (235"), 18½ (283").
6000 Series (Powermatic) - 21 (261"), 21½ (283").
NOTE - Add 1 qt. for heater.

Pressure Valve: AC No. 850795. Radiator filler cap. 7 lb. type. Replacement Valve - AC No. RC-1.

Thermostat: Harrison. In cylinder head water outlet (6 Cyl.). In water outlet in intake manifold (V8).
Standard - No. 3133595 (stamped 151) 151°. Can be used for alcohol anti-freeze.
Optional - No. 3133596 (stamped 160) 160°. No. 313-3597 (stamped 170), 170°.

Temperature Gauge: AC Electric.
Dash Unit - AC No. 1513138.
Engine Unit - AC No. 1513321.
See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball bearing shaft
See "Water Pumps" in Chevrolet Special Data.

CLUTCH

Own. (Diaphragm Spring) and Borg & Beck (Coil Spring) types used. Single plate, dry disc type.

Chevrolet (Own) Diaphragm Clutch

Model	Size	Chevrolet No
6 Cyl. (Exc. H.D., Fwd. Contr.)	10"	3836715
6 Cyl. Fwd. Contr. (Exc. 2 ton)	11"	3836719
6 Cyl. ½, ¾, 1, 1½ ton H.D	11"	3836719
Borg & Beck Clutch		
6 Cyl. 2 ton (261" Eng.)	11"	① 3837155
V8 ½, ¾, 1, 1½ ton	11"	① 3837155
V8 2 ton	11"	3743203

① - Borg & Beck 11A9 No. 361455.
See "Chevrolet (Own)" or "Borg & Beck" in Clutch Section.

Clutch & Clutch Disc Application - As follows

Clutch Disc (Chevrolet Clutch)

Model	Chevrolet No.
Std. 10" (Woven-Red Hub)	3836119
Std. 10" (Molded-Orange Hub)	3836097
H.D. 11" (Woven-Pink Hub)	3836906
Clutch Disc (Borg & Beck)	
Std. 10½" (Dark Green Hub)	③ 3727585
H.D. 11" (Yellow Hub)	⑪ 3733153

③ - Borg & Beck No. 382528.
⑪ - Borg & Beck No. 382286.

6 CYL. ENGINES

Pedal Adjustment: Pedal free travel ¾-1" To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork. *NOTE*—Use finger pressure only when checking clutch free travel.

Removal: Remove transmission (see Transmission Removal). Remove throwout bearing, remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool K-411 (to support clutch), loosen all six cover bolts evenly, remove assembly from below. *CAUTION*—Do not allow pressure plate to hang on retracting springs (support by hand). When installing clutch align "X" mark on cover with "X" mark on flywheel.

V8 ENGINES

Pedal Adjustment: Adjust clutch pedal until free travel is 1". Make sure that pedal pad contacts toeboard when pedal pressed down.

Removal: Remove transmission (see Transmission Removal). Before removing clutch assembly, punch mark flywheel, clutch cover and one pressure plate lug so these parts may be assembled in their same relative positions. Loosen hold-down screws evenly and remove cover. *NOTE*—Mark flywheel side of driven plate for correct reassembly.

TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three speed, all helical gear type. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever. *See "Transmission Controls" in Transmission Section.*

Removal (½ & ¾ Ton): Drain transmission. Disconnect speedometer cable at transmission and shift control rods from transmission levers. Remove propeller shaft. Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes. Remove the two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc.

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.
See "Transmission Control" in Transmission Section.

Removal: Same as for "3-Speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

Transmission Control: Floor mounted gearshift lever.

Removal (½ Ton): *See "3-speed (Light Duty)" above.*

Removal (Other Trucks): Drain transmission, disconnect parking brake and remove lever. Remove propellor shaft, transmission gearshift lever (use Tool K-353). Remove screws that fasten steering jacket grommet to floor and slide grommet up jacket out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor, remove cover. On Forward Control Models, remove both front and rear floor pans. Disconnect speedometer cable from driven gear fitting at transmission rear bearing retainer. Remove two top attaching screws, insert Guide Pins J-1126, remove flywheel underpan, two lower transmission screws, slide transmission straight back, remove transmission from vehicle.

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OVERDRIVE

Warner R10. Used with Chevrolet Truck 3-Speed (Light Duty) Transmission.

See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cables have been disconnected.

HYDRA-MATIC DRIVE

Dual Range. Four speed type with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level in transmission every day. Drain & refill every 25,000 miles. Use only "Automatic Transmission Fluid" Type A.

Checking Fluid Level—With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid level with engine at idling speed.** Add sufficient fluid to bring level in transmission to "F" mark on dipstick.

Capacity—8½ qts. (refill), 9 qts. (after overhaul). *NOTE*—1 qt. additional with oil cooler.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA—See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

REAR AXLE

SEMI-FLOATING (HALF-TON)

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE*—Same design as passenger car axle.

See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.

Ratio—(Synchro-mesh & Hydra-Matic) 3.90-1 (39.10). **(Overdrive)** 4.11-1 (37:9).

►*AXLE SHAFT NOTE: Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft, or by length as follows:*

Axle	Part No.	Length
Left	3694769①	29 5/8"
Right	3694770①	30 5/8"

①—Part No. stamped on axle for identification.

Backlash—.005-.008".

Removal of Rear Axle Assembly: Disconnect and remove parking brake pull back spring. Remove cotter pins and clevis pins from each parking brake cable clevis, and remove clevis. Remove springs and retaining clips from cables at frame brackets. Disconnect universal joint trunnion bearing "U" bolts and split rear universal joint. Disconnect shocks from anchor plates. Disconnect hydraulic brake line to connector at rear frame bracket. Remove spring "U" bolts, nuts and anchor plates. Raise rear of truck and roll assembly out toward rear *CAUTION—Be careful when pulling parking brake cables through openings in frame.*

Axle Shaft Removal: *See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.*

Axle Shaft Endplay—Free fit to .014" maximum.

FULL-FLOATING (¾, 1, 1½ TON) (EXC. LCF MODELS)

Own. Full-floating hypoid gear (straddle mounted pinion) with Hotchkiss drive.

►*AXLE ASSEMBLY NOTE, ¾ & 1-Ton axle assemblies are different design than used on 1½ & 2-Ton with standard rear axle assemblies.*

See "Chevrolet Truck Hypoid Full-Floating" in Rear Axle Section.

►*AXLE RATIO IDENTIFICATION NOTE: Axle ratios are identified by prefix letters in rear axle numbers stamped on top of carrier housing between reinforcing ribs. See Axle Ratios following:*

Axle Ratio Identification

Ratio	Prefix Letters
5.14-1 (36:7)	CA, CB, CE, CF
4.57-1 (32:7)	CC, CD
6.17-1 (37:6)	CG, CH, CJ
7.2-1 (36:5)	CM

Backlash—.005-.008". Screw adjustment.

Removal of Differential Carrier: Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal below. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier in floor jack and roll from under truck.

Axle Shaft Removal (¾ & 1-Ton): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft withdraw shaft from housing, remove and discard gasket *Use new gasket when installing shaft*

►*CAUTION* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft *Grease at this point will cause loosening of axle shaft flange capscrews.*

Axle Shaft Removal (1½ & 2-Ton): Shaft flange is splined in wheel hub (tight fit) and requires special puller for removal Remove five capscrews and lockwashers in hub cap, remove hub cap and gasket Assemble special adapter J-1436-8 on Rear Axle Shaft Bearing & Oil Seal Remover. J-1436 (remove jaws), thread adapter into hole in axle shaft flange, pull axle shaft. *NOTE*—When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket

►**Axle Shaft Note:** Shafts unequal length (right shaft longer than left). Install in correct position.

Wheel Bearing Adjustment: Remove wheels and axle shafts (see above) Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ Ton), J-5670 (2-Ton) while turning hub by hand, then back off nut 45°, check for free turning, install adjusting nut lock with lock tangs aligned with slots in adjusting nut Bend tang down into notch in adjusting nut, install locknut and tighten securely. Bend tang of lock down into notch of locknut

HEAVY DUTY FULL-FLOATING (2-TON & LCF MODELS)

Own. Full floating, hypoid gear, roller pinion bearings (straddle mounted pinion), with Hotchkiss drive.

See "Chevrolet Truck Heavy Duty Hypoid Full Floating" in Rear Axle Section.

Ratios—Same as for "Standard Full-Floating" above.

Backlash— 005- 008"

Removal Of Rear Axle Assembly: Same as for "Standard Full-Floating" above

Axle Shaft Removal: Same as for 1½ & 2-Ton "Standard Full-Floating" above

►**Axle Shaft Note:** Shafts unequal length (right shaft longer than left). Install in correct position.

Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above.

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type with hypoid primary pinion and ring gear.

See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.

►*NOTE: Two gear ratios available as follows:*

Power Ratio—6.40-1 (high), 8 72-1 (low). 32:5 Primary gears

Speed Ratio—5 83-1 (high), 7.95-1 (low). 35:6 Primary gears

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above

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SHOCK ABSORBERS

Delco. Direct Acting (Airplane Type) shock absorbers as follows.

Shock Absorber Nos.	Front	Rear
½, ¾, 1 ton (Exc. Fwd. Contr.)	5532049	5534435
½, ¾, 1 ton Fwd. Contr.	5513193	5513349
1½, 2 ton (Exc. Fwd. Contr., Sch. Bus)	5521698	5534401
1½ ton Sch. Bus	5521698	5320846
2 ton Sch. Bus	5521699	5534401

FRONT SUSPENSION

Conventional "I" Beam section, with Reverse Elliott ends and semi-elliptic springs.

Kingpin Inclination - 7.16°.

Caster - Pos. 1½° (3100, 3200), Pos. 3° (3600), Pos. 2° (3400, 3500, 3700, 4000, 5000), Pos. 2¼° (3800, 6000).

Camber - Pos. ½° to Pos. 1½°.

Toe-In - 1/8" to 7/32" (½ Ton), ¼" to 5/16" (Others).

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22.5° to 23.5°.

STEERING

Manual Saginaw Ball Bearing Worm & Nut (recirculating ball)
See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering Bendix Linkage Type – *See "Chevrolet Truck (Bendix)" in Steering Section.*

Steering Linkage *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

►*NOTE Two different type brakes used on trucks as indicated below*

Chevrolet-Bendix (Except Rear Wheels of 1½ & 2-Ton Models–Duo-servo single anchor hydraulic (without eccentric adjustment)
See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION* If bench type grinder used, grind shoes to 057" to 087" smaller diameter than drum size If spindle type grinder used, grind shoe to drum diameter

Chevrolet-Twinplex (Rear Wheels 1½ & 2-Ton Models)– Two-cylinder four-anchor type hydraulic Shoes are self-centering and self-energizing
See "Chevrolet Twinplex" in Brake Section

Wheel Cylinders– Size stamped on housing under adjusting lock spring

Drums–Cast iron with steel web

Drum Diameter

Model	Front	Rear
½-Ton	11"	11"
¾-Ton	12"	12"
1-Ton	12	14"
1½ & 2-Ton	14"	15"

Lining–Molded type Riveted on 1½ & 2-Ton Models and bonded on all others

Thickness & Width

Model	Thickness	Width
½-Ton (Front Whl.)	202- 222"	2"
½-Ton (Rear Whl.)	202- 222"	1¾"
¾-Ton (Front & Rear)	264- 284"	2"
1-Ton (Front Whl.)	264- 284"	2"
1-Ton (Rear Whl.)	267- 287"	2½"
1½ & 2-Ton (Front Whl.)	267- 287"	2½"
1½ & 2-Ton (Rear Whl.)	392- 412"	4"

Clearance–Adjust for clearance as follows

All Models (Except 1½ & 2-Ton Rear Brakes)–Remove adjusting hole cover and turn brake adjusting screw until light drag is felt then back off adjusting screw 7 notches (Half-Ton Models) or just enough to eliminate brake drag (Other Models) but not more than 7 notches

Rear Wheels (1½ & 2-Ton Models)–Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt then back off 3 notches Repeat on front adjusting screw (2 adjustments on each wheel)

Parking Brakes: Hand lever applies rear wheel service brakes on Half-Ton & ¾-Ton Models and an independent brake on propeller shaft on all other models

Adjustment (½ & ¾-Ton Models)–*See "Chevrolet-Bendix Hydraulic" in Brake Section*

Adjustment (1, 1½, 2-Ton Models & ¾-Ton with 4-Speed Transmission)–*See "Chevrolet Twinplex" in Brake Section*

Master Cylinder: Located under floorboard on left hand side of truck

Checking Fluid–Maintain fluid level to lower edge of filler hole

Removal–Remove from below. *CAUTION*–On 1½ & 2 Ton Low Cab Forward, spacer between cylinder and body bracket will fall out when mounting bolts removed

Installation–Reverse removal procedure On LCF Models make sure the spacers are reinstalled

Power Brakes *See "Hydrovac Power Unit" in Brake Sect.*

Removal–Remove vacuum line, brake fluid line to wheel and master cylinders, and air cleaner hose from vacuum unit. Remove nuts and bolt securing unit to its bracket on right side rail of frame

MISC. MECHANICAL

Windshield Wipers Linkage type. Vacuum motor (Std. Equip.). Electric motor (Optl. Equip.).
See 'Windshield Wipers' in Miscellaneous Section.

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Model Designation

Series	Serial Prefix	Model
1100	A	Delray & ① Yeoman
1500	C	Biscayne & ① Brookwood
1700	E	Bel Air & ① Nomad
1171	G	Sedan Delivery

① - Station Wagons

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③ ④

A 58 F 100001

① - Serial Prefix. See Model Designation table above.
② - Year. 58 (1958).
③ - Assembly Plant Designation. See table below.
④ - Unit Number. Continuous for all cars except Corvette at each assembly plant starting with 100001.

Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
J - Janesville	**O** - Oakland	

ENGINE NUMBER: Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor). *NOTE* - Number (example below) includes identification data as indicated.

⑤ ⑥ ⑦

T 101 A

⑤ - Engine Plant - **F** - Flint, **T** - Tonawanda, **C** - Engines built in Canada.
⑥ - Code number indicating Month and Day of engine manufacture. This is not an individual or continuous number.
⑦ - Engine type. See table following.

Engine Type

NOTE - Following engines are all 6 Cyl. 235" displacement.

A - 3-Speed Synchro-Mesh Transmission
AE - Above engine with Heavy Duty Clutch.
AF - Taxicab with 3-Speed Transmission.
B - Powerglide Transmission.
BC - Taxicab with Powerglide Transmission.

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 20 lbs at cranking speed.

VACUUM READING: 17-21" steady at idling speed.

VALVE TAPPET CLEARANCE: None in service (Hydraulic). For initial tappet clearance, *see "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation. Should require 1/2 turn from unhooked to hooked position Replace distorted spring

IGNITION

FIRING ORDER: 1-5-3-6-2-4.
SPARK PLUG GAP: '.035".
Spark Plug - AC No. 44 (Std.) No. 45 or 46 (Hotter, for continuous City operation). No. C-43 COM (Colder, for continuous heavy duty service). 14 mm. Tighten to 20-25 ft lbs.
COIL: Delco-Remy 1115087.
Ignition Current - 1.8 Amps. idling, 4 Amps. stopped.
Resistor - Delco-Remy 1931614. 1.40-1.62 ohms.
►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by a lead from starter solenoid-to-coil.*
DISTRIBUTOR: Delco-Remy 1112403.
Condenser - Delco-Remy 1928111. **Capacity** - .18-.23 mfd.
Contact Point Set - Delco-Remy 1924571.
Breaker Gap - .019" (New points), .016" (Used points).
Cam Angle - 28-35° with .016" gap.
►*BREAKER GAP CAUTION: Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "0" position.
Vacuum Spark Control: Delco-Remy 1116076

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
7.5	15	7.5-10

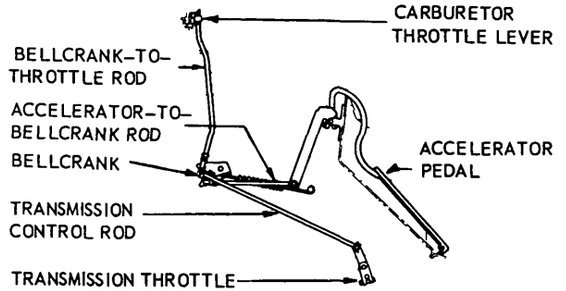
IGNITION TIMING

Setting - At TDC. Set timing at idle speed with vacuum line disconnected.
Timing Mark - Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on "0".

CARBURETOR

►*CARBURETOR APPLICATION: Rochester BC No. 7012127 (Std.), No. 7011102 (Powerglide).*

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): **1)** Disconnect control rod from throttle lever at transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever counter-clockwise to open throttle position.
2) Hold lever in this position and with throttle valve outer lever Gauge **J-5906** set at 7.09", measure disance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod.
3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.
4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.
5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bell crank rod for free entry of swivel pin into hole in bellcrank.



CHEVROLET 6 CYL. POWERGLIDE THROTTLE LINKAGE

ROCHESTER BC

Idle Setting - 1½ turns open. 2½ turns open after engine temperature normal.
Idle Speed (Synchro-Mesh) - 475 RPM.
Idle Speed (Powerglide) - 450 RPM with selector lever in "D" (Drive) range.
Float Level - 1 9/32" (Gauge M-250). With air horn inverted and gasket in place, position Gauge M-250 over the floats with the tang inserted in the discharge nozzle. Bend float arms as necessary so that top of each float just touches the gauge and the float is centered between the gauge legs.
Float Drop - Bend float tang as necessary to obtain a distance of 1¾" from the gasket surface to bottom of the float, with the air horn upright and the float hanging free.
Choke Adjustment: One notch lean (Synchro-Mesh), Centered on Index (Powerglide Cars).
Fast Idle: With fast idle adjusting screw on second step and against high step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore. To adjust bend connector rod.
►*OTHER DATA: See "Rochester BC" Carburetors in Carburetion Section*
FUEL PUMP PRESSURE: 3½-4½ lbs.

CARB. EQUIPMENT

Fuel Pump· AC. Diaphragm type
Replacement Fuel Pump - AC No. 4433 (Fuel & Vacuum).
Pressure - 3½-4½ lbs. at idle speed.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: AC Electric type.
Dash Unit - AC No 1518938 (All).
Tank Unit - See table below.

Model	AC No.
Pass. Car	①1518903 or ②5640058
Sta. Wgn. (6 Pass.)	1518775
Sta. Wgn. (9 Pass.)	①1518935 or ②5640059

① - 5/16" tube. ② - 3/8" tube.
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco 2SMR53W. *12 Volt* 9 plate, 53 ampere hour capacity (20 hr rate)
Battery Ground - Negative
Engine Ground - Engine to cowl at rear head bolt

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STARTER

D lc -R my 1107652. Armatur - 1932185.
Driv - Overrunning clutch (solenoid pinion shift).
R tati n - Counterclockwise at commutator end.
Brush Spring T nsi n - 35 ozs. minimum.

P rf rmance Data

Torque	RPM	Volts	①Amperes
0 ft. lbs.	6200-9400	10.6	49-76
....	..... Lock	4.25	270-310

①- Includes solenoid.

Starting Switch: Delco-Remy Solenoid Switch 1119781 mounted on starter and controlled by Ignition & Starter Switch 1116544.

S "D lco-R my Starter Solenoid (Without Relay)" in Electrical S ction.

N utral Saf ty & Back-up Light Switch: Delco-Remy 1998677 (Powerglide cars only).

Adjustm nt - *See "Ch vrolet Powerglide" in Transmission S ction*

GENERATOR

D lc -R my. Used as follows:

Applicati n	Generator	Armature
Standard	1102096	1923535
Power Strg.	1102115	1940313
Spec. Equip.	1102114	1940737
Spec. Equip.	1106985	1927074

P rf rmance Data

Generator	Amperes	Volts	RPM
1102096	30	14.0	2240
1102114, 5	35	14.0	2510
1106985	45	13.0	1400

R tati n - Counter-clockwise at commutator end.
Brush Spring T nsi n - 28 ozs. (Exc. 1106985), 20 ozs. (1106985).
Fi ld Curr nt - 1.69-1.79 Amps. (Exc. 1106985), 2.14 - 2.28 Amps. (1106985). All at 12.0 volts.
B lt Adjustm nt: 5/16" deflection midway between generator and fan pulleys.

REGULATOR

D lc -R my. Used as follows:

R gulat r N .	Generator No.
1119001	1102096
1119002	1102114,5
1119603	1106985

►*DOUBLE CONTACT REGULATOR NOTE: Regulator 1119603 has double contacts for voltage regulation.*

►*NOTE - Specifications b low are for "Normal" settings.*

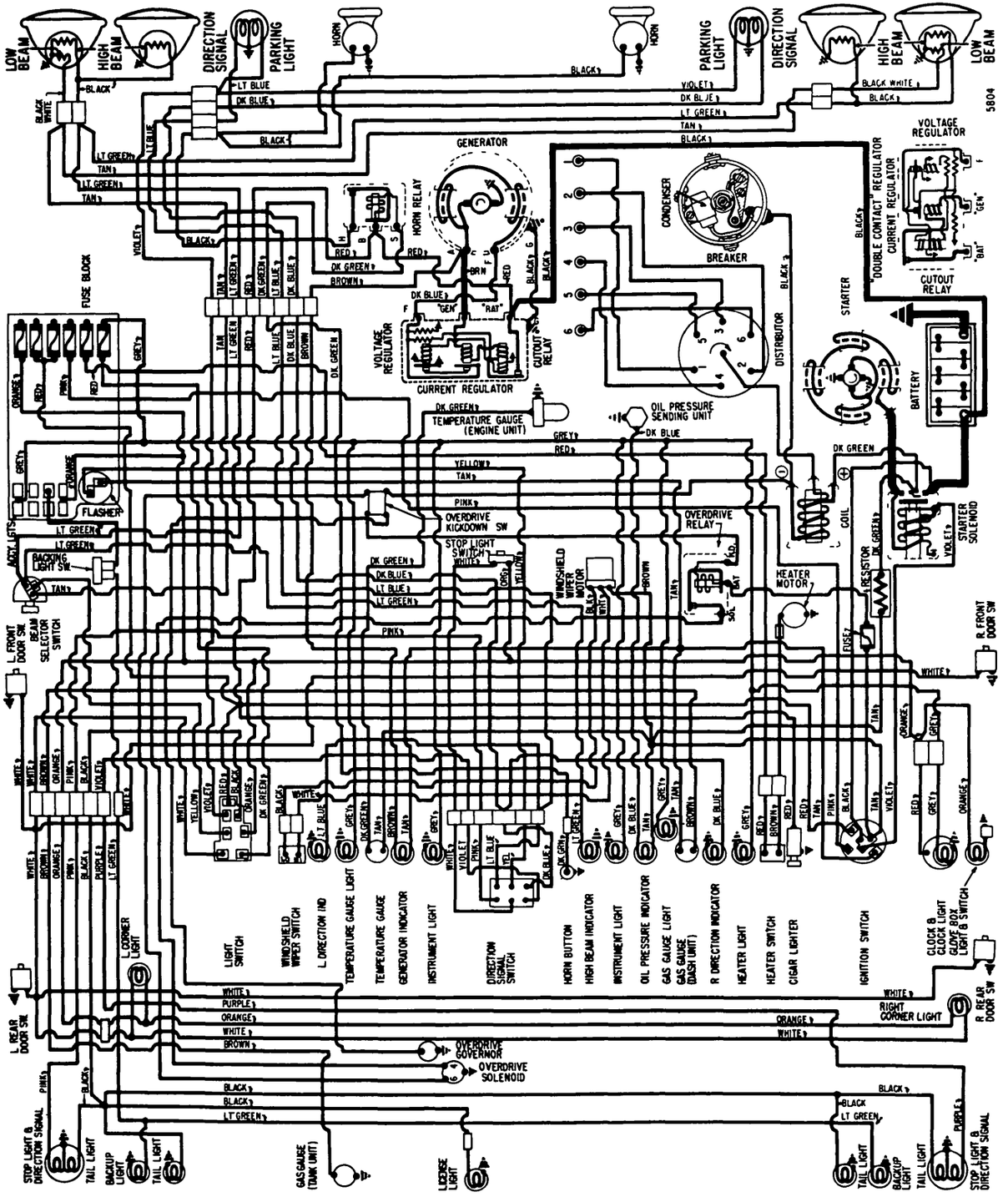
Cut ut Relay

Cuts In - 11 8-13 5 volts (1119001,2) 11 8-13.0 volts (1119603).
C ntact Gap - .020". **Air Gap** - .020".

V ltag Regulator

Setting - (1119001,2) 13.8 - 14.8 volts at 125° F.
S tting - (1119603) 13.8-14.6 volts (Upper contacts), .1-.3 volts lower (Lower contacts) at 125° F.
C ntact Gap -- (1119603) .016" (Upper contacts) with lower contacts just touching.
Air Gap - .075" (Exc. 1119603), .067" (1119603) with armature pressed down to point where contacts just touch.

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Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119001) - 27-33 amperes.
Setting (1119002) - 32-37 amperes.
Setting (1119603) - 43-47 amperes.
Air Gap - .075". With armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System). *See "4-Headlight System" in Electrical Section.*
Directional Signals: *See Electrical Section.*
Autronic Eye: *See Electrical Section.*
Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.
Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.
CIRCUIT BREAKER (Lighting): One 15 ampere circuit breaker located on main light switch protects all head and parking lamps.
FUSES: All fuses contained in accessory fuse panel behind instrument panel on left side of steering column.
10 Ampere - Protects Tail lamps.
15 Ampere - Protects Spot lamp and Antenna.
10 Ampere - Protects Back-up and Brake Alarm lights.
7.5 Ampere - Protects Radio Circuits.
20 Ampere - Protects Heater & Air Conditioning.
3 Ampere - Protects Instrument Lamps.
Horn Relay: Delco-Remy 116920.
Contact Close - 5.0-9.5 volts.
Contact Gap - .027".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care in disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 6-Cyl., valve-in-head.

Bore	Stroke	Displacement
3 9/16"	3 15/16"	235.5 cu. ins.
Compression Ratio	**Rated HP**	**Developed HP**
8.25-1	30.4	145 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP*
ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*
OIL PAN REMOVAL: Remove hood, then remove battery-to-engine ground cable and generator lead wires. Remove radiator and disconnect oil cooler lines. Remove fan and pulley assembly, then remove rocker arm cover and install lifting Tool J-4536. Attach a chain fall and lift engine to remove load from front mounts, then remove center bolts from each mount. Disconnect exhaust pipe from manifold. On synchro-mesh cars, disconnect clutch idler shaft bracket from engine. Remove overdrive solenoid (if so equipped). Remove flywheel underpan extension and disconnect shifter rods at transmission. On automatic transmission cars, disconnect oil cooler lines and transmission control linkage at transmission. On all models, disconnect propeller shaft at rear axle, then remove center mount support bolts and slide to rear until free of transmission. Drain transmission and remove transmission crossmember and mounting block. Disconnect speedometer cable at transmission. Drain crankcase and remove oil pan bolts, then raise engine far enough so oil pan clears crossmember and pan can be removed through front of engine compartment. *NOTE* - Rotate crankshaft so oil pan clears counterweights.
CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*
ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".
Removal - Pistons and rods removed from above.
Clearance - .0005-.0011", measured 1.29" from top of piston. Selective fit.
Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize. *STANDARD AND .001" PISTON NOTE* - Two sizes pistons furnished for Standard and .001" Oversize as follows:
235" Engine - Std. - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize** - Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").
261" Engine - Std. - Marked **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **.001" Oversize** - Marked **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520").
Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.
Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

PISTON PINS

Locked in rod. No bushing used in piston.
Diameter - 235" Eng. - .8660-.8665". **261" Eng.** - .9270-.9275".
Pin Fit in Piston - .00015-.00025" clearance. With both piston and pin at 70°F., and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure.
Replacement Pins: Furnished Std. & .0015", .003", .005" and .010" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0930-.0935"	①	②
Oil(3)	.181-.188"	③ .015-.055"	.000-.008"

①- (235" Eng.) .007-.020". (261" Eng.) .010-.020"
②- (235" Eng.) .002-.004". (261" Eng.) .002-.0035".
③- On Rails.

Replacement Rings: Furnished Std., .020", .030" and .040" Oversize.
►*RING INSTALLATION CAUTION:* Install Compression rings with side marked "GM" up.

CONNECTING RODS

Length - 6.81" Center-to-center.
Crankpin Journal Diameter - 2.311-2.312".
Lower Bearing - Replaceable precision type.
Clearance - .001-.003" (New), .001-.004" (Used).
Sideplay - .005-.012".
Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.
Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft.

CRANKSHAFT

Journal Diameters - **(1)** 2.6835-2.6845", **(2)** 2.7145-2.7155", **(3)** 2.7455-2.7465", **(4)** 2.7765-2.7775".
Clearance - .001-.003" (New), .001-.004" (235" Eng. Used), .001-.0045" (261" Eng. - Used).
Bearings - Thin wall babbitt with steel back.
Bearing Adjustment: Precision type. Replace bearings.
End Thrust - Taken by No. 3 (rear intermediate) main bearing.
End Play - .003-.009".
Replacement Bearings: Furnished Std. & .002", .010", .020", .030" Undersize.
Bearing Installation: Can be replaced without removing engine.
See "Crankshaft & Main Bearings" in Chevrolet Special Data.
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*
Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1537-2.1547", **(2)** 2.0912-2.0922", **(3)** 2.0287-2.0297", **(4)** 1.9662-1.9672".
►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".
Bearing Type - Steel backed babbitt lined bushings, precision type. Reaming not required.
Clearance - .0015-.0035".
End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket.
End Play - .001-.005".
Timing Gear: Fibre camshaft gear, steel crankshaft gear.
Back Lash - .003-.005".
Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*
Camshaft Setting: Timing is correct when timing marks on gears are together.

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Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance: (Pass. Cars) - None in service (hydraulic).

Initial Tappet Clearance (Engs. with Hydraulic Lifters): *See "Valve System" in Chevrolet Special Data.*

(Trucks) - 235" Eng. - .006" Intake, .018" Exhaust, Hot, 261" Eng. - .006" Intake, .020" Exhaust, Hot. *See "Valve System" in Chevrolet Special Data.*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 7/8"	.3410-.3417"	6.364-6.394"
Exhaust	1 1/2"	.3410-.3417"	①

Valve	②Seat Angle	Lift	Stem Clearance
Intake	30°	.4004"	.001-.0027"
Exhaust	45°	.4004"	.001-.0027"

① - 235" Eng., 4.905-4.930"; 261" Eng., 4.902-4.932".

② - Face Angle 29° Intake, 44° Exhaust.

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 30° and 45°. When seats are ground to recommendations of 30° and 45°, valves must be faced to recommended angle of 29° (Intake) and 44° (Exhaust).

Valve Seat Width - 3/64-1/16" (Intake), 1/16-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: *Precision type, pressed in head.*

Valve Guide Installation - *See "Valve System" in Chevrolet Special Data.*

Valve Springs: *Install springs with closed coil end down.*

Spring Specifications

Valve (All)	Pressure	Length
Closed	74-82 lbs.	1.858"
Open	196-208 lbs.	1.462"

Free Length - **(235)** - 2 5/32" (Conv.), 2 15/64" (Auto. Trans.); **(261)** - 2 9/32".

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve springs. If distance from spring seat in head to top of valve spring exceeds 1 55/64", install shim approximately 1/16" thick. At no time should shim spring be installed to obtain installed height of less than 1 51/64".

Valve Lifters (Pass. Cars): Hydraulic type. See *"Valve System" in Chevrolet Special Data.*

Valve Lifters (Trucks): Mechanical type. Removed from above.

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data.*

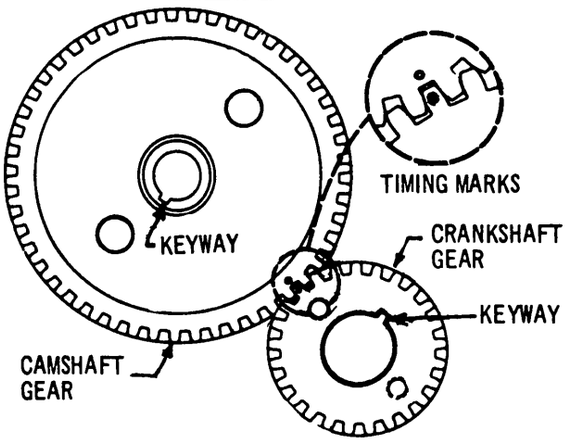
VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* Specifications are for valve timing with Zero valve lash. *See Valve Timing Check below.*

Intake Valves - Open 10°30' BTDC. Close 53°30' ALDC

Exhaust - Open 49° BLDC. Close 15° ATDC.



CHEVROLET 6 CYL. VALVE TIMING MARKS

Valve Timing Check - *CAUTION:* It will be necessary to replace the hydraulic valve lifter and pushrod operating No. 1 exhaust valve, with a conventional lifter and pushrod). Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing. Mount dial indicator on rocker arm shaft with stem of indicator contacting No. 1 exhaust valve adjusting screw and set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .005". A greater or lesser reading indicates either excessive gear wear or improperly installed timing gears. Reset tappet clearance to specifications.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 5 qts. (refill), 5½ qts. (dry).

Normal Oil Pressure: 35 lbs. at 2000 RPM.

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Indicator - Light located at right side of instrument cluster, controlled by pressure switch, Delco-Remy 1998149 or AC No. 1508425, located in main oil gallery on left side of engine. Switch closes when pressure drops to 4-7 lbs.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul—*See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: AC P-115.

►*ROCKER ARM OIL LEAD NOTE:* A drilled passage from lifter gallery eliminates the need for pipe lead used on former models. This change was made in late production 1957 engines.

Crankcase Ventilation (Standard): Air intake through breather filter in valve rocker arm cover and outlet through crankcase breather pipe on right side of engine.

Servicing - Clean breather filter in a good solvent every 2,000 miles, then oil mesh with light engine oil.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing – Every 10,000 miles (or oftener if required) clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank, and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 16½ qts. (17½ qts. with heater).

Pressure Valve: AC No. 850800. Radiator filler cap, 13 lb. type. Replacement Valve - AC No. RC-6.

Thermostat: Pellet type. In cylinder head water outlet. **Standard** - No. 3136185 (180°F), **Optional** - No. 3138868 (170°F) or No. 3136184 (160°F), for use with Methanol (alcohol) anti-freeze.

Temperature Gauge: AC electric.

Dash Unit - AC No. 1513485.

Engine Unit - AC No. 1513321.

See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball-bearing shaft. *See "Water Pumps" in Chevrolet Special Data.*

CLUTCH

Own. Diaphragm Spring type. 9½" (Std.), 11" (H. D.). *See "Chevrolet (Own)" in Clutch Section.*

Clutch Disc - (Std. 9½") Chevrolet No. 3737944 (Woven - Hub marked White), No. 3737942 (Molded - Hub not paint marked); (Heavy Duty 11") Chevrolet No. 38-36906 (Woven - Hub marked Pink).

Pedal Adjustment: Pedal free play ¾-1". Remove cotter pin, washer and spring, then turn swivel to secure correct free play. *NOTE* - Check by holding fork pushrod to rear (to remove lash). Conical point on swivel should line up with dimple in clutch lever and shaft assembly. Reinstall spring, washer and cotter pin.

Over-Center Spring Adjustment: Loosen adjusting hook nut at back of pedal bracket and turn jam nut to obtain an installed length of 10 5/16" for over-center spring. Tighten nut to 8-12 ft. lbs.

Removal: Remove transmission (see Transmission Removal below). Remove throwout bearing from fork. Remove clutch fork tension spring from fork, disconnect clutch fork pushrod. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824, to support clutch assembly during removal. Loosen clutch attaching bolts one turn at a time until diaphragm spring is released. Remove Pilot

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Tool, then remove clutch assembly from car. *CAUTION* - When installing clutch, align "X" mark on clutch cover with "X" mark on flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three speed synchro-mesh.

See "Chevrolet 3-Speed" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Drain transmission and disconnect speedometer cable and shift rods. Remove propeller shaft center bearing support bolts. Separate rear universal joint and pull propeller shaft assembly to rear under axle housing.

2) Support rear of engine, remove transmission rear support noting number of shims

3) Remove two top transmission to clutch housing screws, install guide pins (J-1126), then remove two lower capscrews. Slide transmission back on guide pins to clear clutch disc splines.

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown

See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh transmission (above) after disconnecting control cable and wiring

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS See "Chevrolet Powerglide" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING See "Chevrolet Powerglide" in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick.

►*DRAIN & REFILL NOTE.* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 3½ qts. (refill), 10½ qts. (after overhaul)

Checking Fluid Level - Engine must be idling with transmission warm, selector lever in N range and parking brake applied Check fluid level on dipstick located in filler tube on right side of engine opposite starter Fluid level should be at full mark on dipstick *NOTE - DO NOT OVERFILL*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER POWERGLIDE SERVICE DATA. See "Chevrolet Powerglide" in Transmission Section*

UNIVERSALS

Own. Yoke & Spider (trunnion) type.

►*CAUTION* - Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass Car (Hotchkiss Drive)" in Rear Axle Section*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss Drive. *NOTE* - "POSITRACTION" Limited Slip Differential Optl.

See "Chevrolet Pass Car (Hotchkiss Drive)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload Bearing preload must be adjusted whenever companion flange nut is loosened

Ratios - 3 55-1 (Std), 4 11-1 (Overdrive), 3 36-1 (Powerglide).

Backlash - .003- 010" (.005-.008" preferred)

Carrier Removal: Remove rear wheels, brake drum and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant. Remove differential carrier nuts and lift out carrier assembly.

Axle Shaft Removal: Raise car and place jack stands under axle housing Remove tire, wheel and brake drum assembly Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange) Attach axle Puller J-5748,with slide hammer, to flange and remove axle shaft and bearing assembly Be careful not to disturb backing plate *NOTE*–If bearing retainer and parking brake strut interfere, raise strut slightly with screw driver to obtain clearance

SHOCK ABSORBERS

Delco. Direct acting non-adjustable.

Replacement Shock Absorbers

Model	Front	Rear
Pass. (Std.)	5543712	5543707
Pass. (AC or AT)	5543709	5543707
Pass. (Air Susp.)	5543711	5543708
Taxi	5543709	5543702

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs and spherical type joints connecting control arms and steering knuckles.

See "Chevrolet (Spherical Joint)" in Suspension and Wheel Alignment Section.

Steering Axis Inclination - 7¼° ±½°.

Caster - (Std.) 0° ±½°. (Air Susp.) 1½° ±½°.

Camber - (Std. & Air Susp.) Pos. ½° ±½°.

Toe-In - (Std.) 1/8" to 1/4". (Air Susp.) 0" to 1/8".

Toe-Out on Turns - Inner wheel 20°, outer wheel should be 18½°.

REAR SUSPENSION

Rear Suspension: *See "Chevrolet Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs on all four wheels and shock absorbers mounted to rear of air springs *See "Front Suspension" above for alignment Specifications and "Chevrolet Air-Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut

See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment Hand lever applies rear wheel service brakes

See "Chevrolet-Bendix Hydraulic" in Brake Section

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION* To compensate for lack of brake anchor adjustment, brake shoes are ground to a 057- 087" smaller diameter than the drum diameter Grinding shoes to the true drum diameter on bench grinders will cause heel and toe contact, resulting in erratic brake action *NOTE–If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter*

Drums–Diameter 11

Wheel Cylinder Diameter–Front 1 1/8 , Rear 1

	Brake Lining Width	Thickness
Front Whl	2	.187- 194
Rear Whl	1 3/4	187- 194"

Length Per Shoe–9 3125 (Primary), 11 6875 (Second-

Braking Power–55 9% (front wheels), 44 1% (rear

Clearance–Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal

Checking Fluid–Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole

Removal - Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove cotter and clevis pins from brake pedal arm, then remove four retaining nuts and lockwashers and remove cylinder from firewall.

Power Brakes: Bendix or Moraine Power Unit replaces standard master cylinder.

See "Bendix Power Unit" or "Moraine Power Unit" in Brake Section.

Removal: Remove vacuum hoses from power unit, hydraulic line from master cylinder. Disengage pushrod from pushrod lever and remove four attaching bolts and lift out unit. Note position of odd bolt and washer during removal.

MISC. MECHANICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL MISC MECHANICAL DATA*

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Model Designation Serial Prefix	Model
1200	B	Delray & ① Yeoman
1600	D	Biscayne & ① Brookwood
1800	F	Bel Air & ① Nomad
800	J	Corvette
1271	H	Sedan Delivery

① - Station Wagons

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③ ④

B 58 F 100001

① - Serial Prefix. See Model Designation table above.
② - Year. 58 (1958).
③ - Assembly Plant Designation. See table below.
④ - Unit Number. Continuous for all cars except Corvette at each assembly plant starting with 100001. Corvette continuous starting with 10000‡.

Assembly Plant Designation

A - Atlanta	K - Kansas City	S - St. Louis
B - Baltimore	L - Los Angeles	T - Tarrytown
F - Flint	N - Norwood	W - Willow Run
J - Janesville	O - Oakland	

ENGINE NUMBER: Stamped on pad at front, right hand side of cylinder block. *NOTE* - Number (example below) includes identification data as indicated.

⑤ ⑥ ⑦

T 101 C

⑤ - Engine Plant - F - Flint, T - Tonawanda, C - Engines built in Canada.
⑥ - Code number indicating Month and Day of engine manufacture. This is not an individual or continuous number.
⑦ - Engine type. See table following.

Engine Type

C - 283" Engine & 3-Spd. Trans. (CB,CD,CF,CG,CH indicate Carburetion & Equipment options).
CQ,CR,CS,CT - 283" Corvette Engine & 3-Spd. Trans. (with Carburetion & Equipment options).
D - 283" Engine & Powerglide (DB,DE,DF indicate Carburetion & Equipment options).
DG,DH,DJ - 283" Corvette Engine & Powerglide (with Carburetion & Equipment options).
E - 283" Engine & Turboglide (EB,EC,ED indicate Carburetion & Equipment options).
F - 348" Engine & 3-Spd. Trans. (FA indicates Carburetor option).
G - 348" Engine & Powerglide.
H - 348" Engine & Turboglide (HA indicates Carburetor option).

TUNE-UP

COMPRESSION PRESSURE: 283" (Exc. Corv. with Solid Lifters) 150 lbs. Min. (Dual Carb.), 160 lbs. Min. (4-Bbl. Carb.).
(Corv. with Solid Lifters) 140 lbs. Min. with 20 lbs variation limit between cylinders.
348" (All) 160 lbs. Min. with 20 lbs. variation limit between cylinders.
VACUUM READING: 17-21" (Dual Carb.), 16-20" (4-Bbl. Carb.).
VALVE TAPPET CLEARANCE: (Solid Lifters) .012" (Intake), .018" (Exhaust) Hot.
(Hydraulic Lifters) None in service. For initial tappet *adjustment, see "Valve System" in Chevrolet Special Data.*
MANIFOLD HEAT CONTROL: (Single Exhaust) - Single exhaust pipe with cross over pipe from right exhaust manifold. Heat control valve with thermostatic coil spring located between right exhaust manifold and exhaust pipe. Make sure valve shaft is free to turn. If sticking, free up with kerosene or alcohol containing a small amount of baking soda.
Dual Exhaust - Coil spring and counterweight (same as for single exhaust).
►*DUAL EXHAUST NOTE: With valve closed, most exhaust gases are discharged through left exhaust pipe.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs - AC No. 44 (Std.), No. 45 or 46 (Hotter for continuous City operation), No. C-43 COM (Colder for continuous heavy duty service), 14 mm. Tighten to 20-25 ft. lbs.
COIL: Delco-Remy 1115087 (283" Exc. Corvette & 348"). 1115091 (Corvette & 348" With Triple Carburetors).
Ignition Current - 1.8 Amps. idling, 4 Amps. stopped.
Resistor - Delco-Remy 1931614 (Exc. Corvette), 1931385 (Corvette). 1.4-1.62 ohms.
►*COIL RESISTOR NOTE: Resistor connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by a lead from starter solenoid-to-coil.*
DISTRIBUTOR: Delco-Remy.

Application	Delco-Remy Distr. Nos.
V8 283" (2-Bbl. Carb.)	1110920
V8 283" (4-Bbl. Carb.)	1110890
V8 283" (Two 4-Bbl.)	1110891
V8 283" (Fuel Inj., Std. Cam)	1110915
V8 283" (Fuel Inj. & Sp. Cam)	1110914
V8 348"	1110907, 1110927, 1110930

►*DISTRIBUTOR NOTE: Different types used as follows:*
Models 1110890, 907, 915, 920, 927, 930 - External adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*
Models 1110891, 914 - Double breaker with conventional distributor cap (not window type). Vacuum spark control not used (centrifugal weight advance only)
Condenser - Delco-Remy 1932004 (Except 1110891, 914), 1869704 (1110891,914) **Capacity** - .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988 (Except No. 1110891, 914), 1918148 (1110891, 914 - two used).
Breaker Gap (Except 1110891, 914) - *NOTE* - When cam angle properly adjusted (see below), breaker gap will be correct (.016").
Breaker Gap (1110891, 914) - .014-.018" (new points).
Cam Angle (Except 1110891, 914) - 28-32°. Set to 30°.
Cam Angle (1110891, 914) - Adjust each set of points to 29°±1° with other set blocked open with .025" thick insulator. Cam angle for both sets of points operating together should be 34°±1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110890, 91

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	400	1-5	800
6-8	750	12-16	1500
9.5-13.5	1300	19-27	2600
13-15	1850	26-30	3700

Automatic Advance - 1110907

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	425	1-5	850
5-7	800	10-14	1600
8-10	1400	16-20	2800
11-13	2000	22-26	4000

Automatic Advance - 1110914

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	600	0-4	1200
1.5-3.5	750	3-7	1500
6-8	1950	12-16	3900
10-12	3000	20-24	6000

Automatic Advance - 1110915

Degrees Distr.	RPM	Degrees Eng.	RPM
1.5-2.5	400	1-5	800
6-8	750	12-16	1500
9.5-11.5	1300	19-23	2600
13-15	1850	26-30	3700

Automatic Advance - 1110920

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3700

Automatic Advance - 1110927, 30

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	425	0-4	850
4.5-6.5	800	9-13	1600
8-10	1600	16-20	3200
11-12	2300	22-24	4600

Vacuum Spark Control: Delco-Remy 1116118 (1110890, 920), No. 1116133 (1110907, 927, 930), No. 1116134 (1110915). *NOTE* - Vacuum advance not used on 1110891, 914).

Vacuum Advance - 1116118, 1116133

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
6.5-8.5	13-17	15-16

Vacuum Advance - 1116134

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	3.75-5.75
11-13	22-26	13-15

IGNITION TIMING

►*IGNITION TIMING CAUTION:* On late 1958 V8 cars, vacuum spark control line is connected directly to intake manifold so that vacuum advance is operative during engine closed-throttle idling. On these cars, **vacuum line must be disconnected when ignition timing is being set.** Connect vacuum line after ignition timing completed.

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Engin	① Std. Ignition Setting
283" exc. Corvette (All Carbs.)	② 4° BTDC
283" exc. Corvette (Fuel Inj.)	③ 4° BTDC
283" Corvette (One 4-Bbl. Carb.)	⑥ 4° BTDC
283" Corvette (Two 4-Bbl. Carb.) ④	② 4° BTDC
283" Corvette (Two 4-Bbl. Carb.) ⑤	⑦ 7° BTDC
283" Corvette (Fuel Injection) ④	⑧ 4° BTDC
283" Corvette (Fuel Injection) ⑤	⑨ 14° BTDC
348" (One 4-Bbl. Carb.)	① 4° BTDC
348" (Three 2-Bbl. Carb.)	⑥ 4° BTDC

① - With vacuum line disconnected.
② - At 475 RPM (Synchro-mesh), 450 RPM in "D" (Automatic Transmissions).
③ - At 600 RPM (Synchro-mesh), 500 RPM in "D" (Automatic Transmission).
④ - Standard Camshaft & Hydraulic Lifters.
⑤ - Special Camshaft & Mechanical Lifters.
⑥ - At 475 RPM (Synchro-mesh), 425 RPM in "D" (Automatic Transmission).
⑦ - At 800-850 RPM.
⑧ - At 500-600 RPM.
⑨ - At 600-700 RPM.

Timing Mark - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines at 2° graduations with greatest number of graduations on advance or BTDC side.

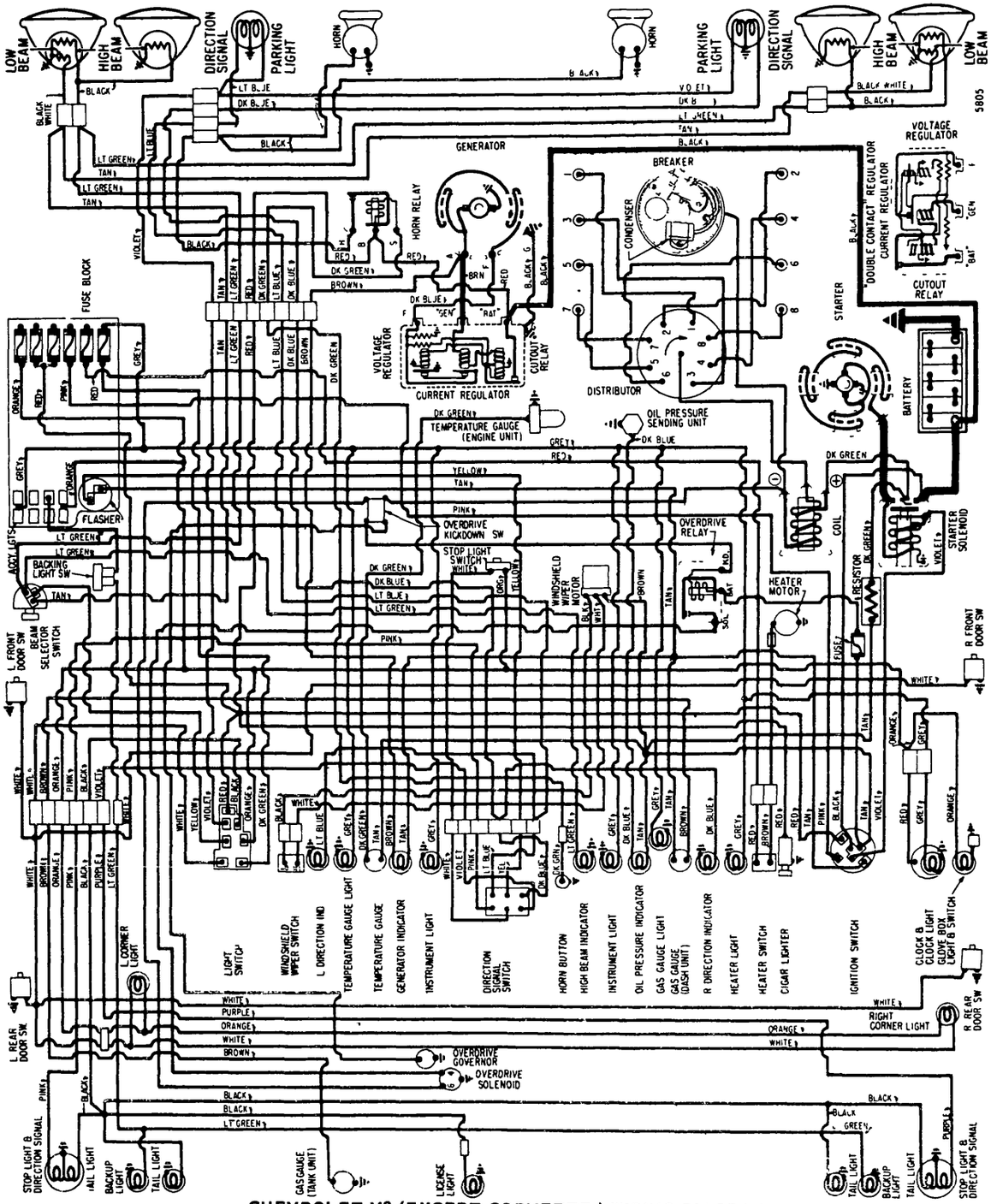
CARBURETOR

Engine Model	Carb. Model
283" Pass. Std.	2-Bbl. Rochester 2GC
283" Pass. Optl.	4-Bbl. Rochester 4GC or Carter WCFB
283" Corvette Std.	4-Bbl. Carter WCFB
283" All Optl.	Two 4-Bbl. Carter WCFB
283" All Optl.	Rochester Ramjet Fuel Injection
348" Pass. Std.	4-Bbl. Rochester 4GC or Carter WCFB
348" Pass. Optl.	Three Rochester 2G & 2GC

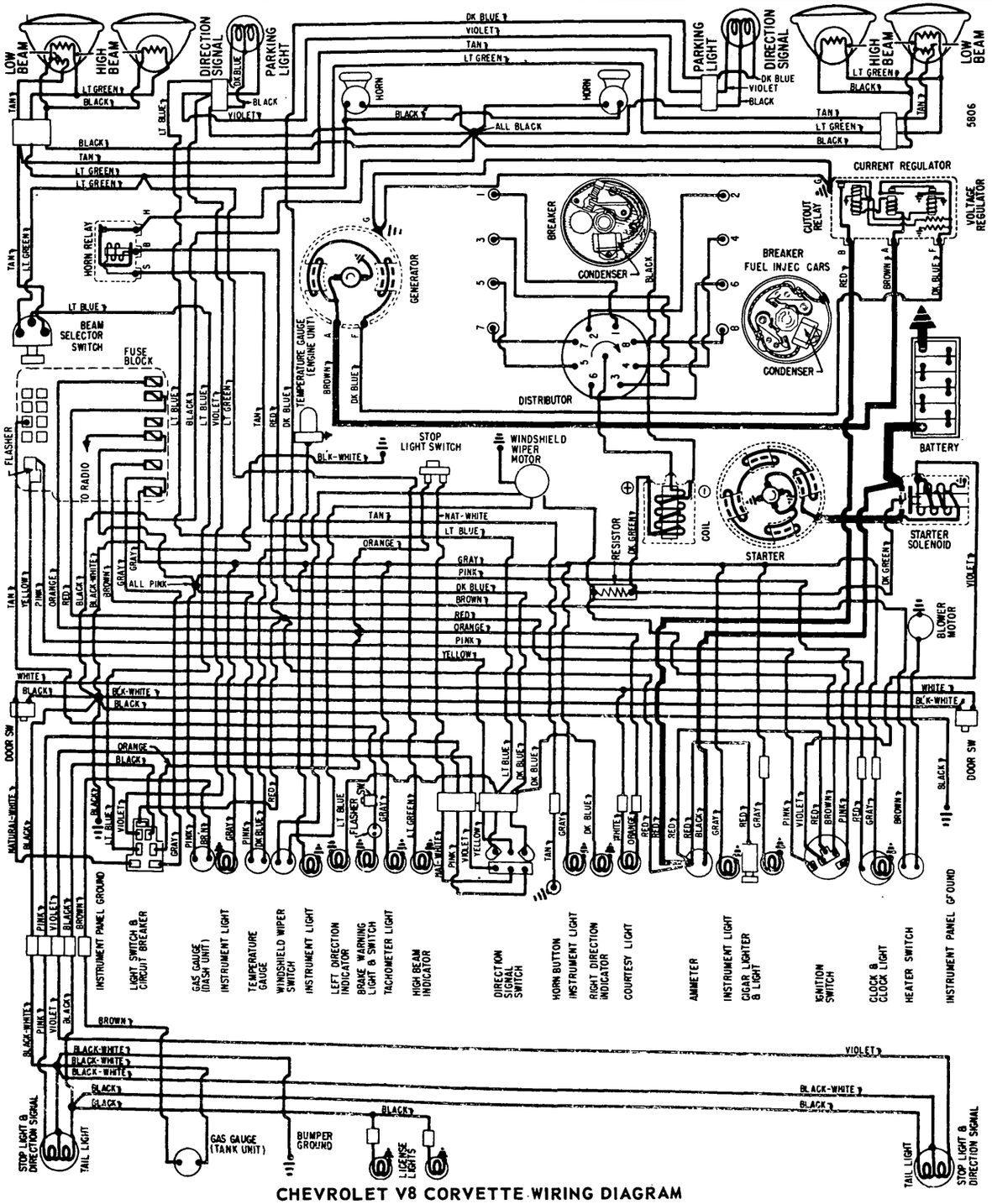
FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS): Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustments and that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT: Powerglide Cars - Remove lower control rod and loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotated counterclockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor and open throttle. Adjust upper control rod length for free entry into throttle lever. Check adjustment by releasing linkage to its idle position then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" (Pass. Car), .85" (Corvette), wood block under accelerator pedal rod depress accelerator

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CHEVROLET V8 (EXCEPT CORVETTE) WIRING DIAGRAM

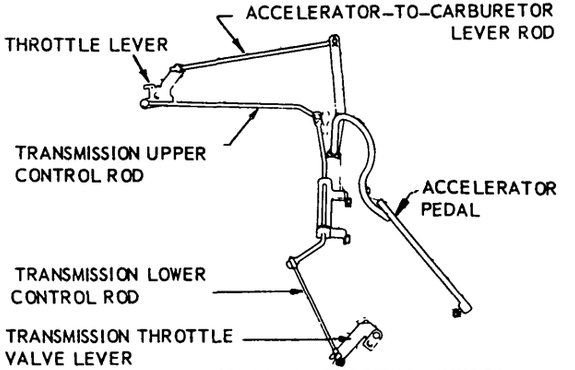


CHEVROLET V8 CORVETTE WIRING DIAGRAM

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against block and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length of accelerator rod when detent is not felt before reaching wide open throttle.

Turboglide Cars: Disconnect transmission throttle valve rod at carburetor throttle lever. Place ½" block of wood under accelerator pedal rod, hold accelerator in this position, pull transmission throttle valve rod toward front of car to full travel through detent and adjust transmission throttle valve rod length for free entry into carburetor throttle lever. Remove wood block and check for feel of detent before accelerator pedal rod strikes floor mat. Road test and readjust if necessary to insure that stator high angle is obtained at full throttle.



POWERGLIDE & TURBOGLIDE THROTTLE LINKAGE

DASHPOT ADJUSTMENT (Turboglide Cars Exc. Fuel Injection): With carburetor adjustments completed, automatic choke in wide open position, throttle valves fully closed (dashpot plunger fully depressed) a .060" feeler should just pass between dashpot plunger and contact arm on transmission throttle valve rod. To adjust, loosen dashpot jam nut and screw assembly in or out on its bracket. Tighten jam nut. If engine stalls reduce clearance. If engine races increase clearance.

ROCHESTER 2GC 2-BARREL

Model	Rochester No.
283" Std. Trans. (Early)	7012133
283" Std. Trans. (Later)	7012451
283" Auto. Trans.	7012452

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans., with selector lever in "D").

Float Level - 1 19/64" (Gauge BT-144). With air horn inverted and gasket in place, position float level gauge over float so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float. Bend float arm to adjust.

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Fl at Dr p - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Jse scale or scribed mark on float and pump gauge.

Automatic Choke Setting - Centered at index.

Throttle Linkage Adjustment (Synchro-mesh): With accelerator pedal fully depressed (hold in this position), adjust threaded swivel on throttle rod at carburetor throttle lever so that swivel freely enters throttle lever with throttle valves wide open, then **lengthen rod by turning swivel two full turns,** connect rod

Throttle Linkage Adjustment (Powerglide) *See CARBURETOR above*

►*OTHER DATA: See "Rochester 2GC Carburetor" in Carburetion Section*

ROCHESTER 4GC 4-BARREL

Model	Rochester No.
283" Auto. Trans.	7012128
348" Auto. Trans.	7011108

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - 1½" turns open. Adjust both screws alike. Turn screws out for richer adjustment.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto-Trans. with selector lever in "D").

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA See "Rochester 4GC Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL

Model	Carter No.
283" (Std Trans.) Ⓒ	2669S
348" (Std. Trans.)	2657S
348" (Auto Trans.)	2656S
Corvette - One Carb. (Synchro-mesh)	2669S

Ⓒ - Replacement for Auto Trans

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - 1 turn open. Adjust both screws alike. Turn screws out for richer adjustment.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Exc. Corv) 425 RPM Corvette (Auto. Trans. with selector lever in "D").

Throttle Linkage Adjustment (Auto. Trans.): *See CARBURETOR above*

►*OTHER DATA See "Carter WCFB Carburetors" in Carburetion Section.*

"TRIPLE CARBURETORS" (Rochester 2G & 2GC)

Trans.	Rochester Carb. Nos. Front	Center	Rear
All Trans. (Early)	7011951 ①	7012503	7011953
All Trans. (Later)	7012851 ①	7012503	7012853

① Synchro-mesh. No 7011952 Auto. Trans.

Idle Setting - *See "Rochester Triple Carburetors' in Carburetion Section for adjustment procedure (center carburetor only)*

Idl Sp d - 450-475 RPM (Synchro-mesh), 425 RPM in "D" Drive (Automatic Transmission)

Thr ttl Linkag Adjustm nt *See CARBURETOR abov*

►*OTHER DATA See "Rochester Triple Carburetors' in Carburetion Section*

DUAL CARBURETORS (Two Carter WCFB 4-Barrel)

Position	Carter Carburetor No.
Front	2626S (Early), 2613S (Later)
Rear	2627S (Early), 2614S (Later)

Idle Setting - ¾ turn open. All four mixture screws equally.

Idle Speed - 600 RPM (Std. Camshaft), 800-850 RPM (Sp. Camshaft). All Trans. with selector lever in "D" range on Powerglide.

Accelerator Linkage Adjustment (Carburetor Synchronization): Remove carpet from area around accelerator pedal, remove air cleaners and throttle return springs on both carburetors Hold rear carburetor throttle valves wide open, measure distance from underside of pedal rod to toe board Distance should be ¾" Adjust by removing spring clip and turning trunnion nut on rear carburetor rod With rear carburetor throttle valves wide open, front carburetor throttle valves should also be wide open. Adjust by loosening locknut and adjusting front carburetor rod With linkage correctly adjusted, front carburetor should start to open with rear carburetor at approximately half-throttle Reinstall throttle return springs and air cleaners

Throttle Linkage Adjustment (Automatic Transmission Cars): *See CARBURETOR above*

►*OTHER DATA See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

ROCHESTER "RAMJET" (Fuel Injection System)

Rochester. Used on Chevrolet Pass Cars & Corvette models with 283" V8 Engine

For complete data on this equipment, see "Rochester Ramjet Fuel Injection' in Carburetion Section

CARB. EQUIPMENT

Fuel Pump· AC diaphragm type Fuel & Vacuum (3 Carburetor Installation) Fuel only (Others)

Replacement Pump - (Corvette All) AC No 4445, (Fuel Injection) AC No 4432, (3 Carb Instl) AC No 4490 (283" Std) AC No 4430, (348" Exc 3 Carb Instl) AC No 4432

Pressure - 5¼-6½ lbs at 450 to 1,000 RPM
See Fuel Pumps' in Carburetion Section

Gasoline Gauge AC electric

Dash Unit - (Corvette) AC 1518244 (Others) AC No 1518938

Tank Unit - See table below

Model	AC No
Pass Car	Ⓒ 1518903 or Ⓒ 5640058
Sta Wgn (6 Pass)	1518775
Sta Wgn (9 Pass)	Ⓒ 1518935 or Ⓒ 5640057
Corvette	1518785
Race Car	1518820

Ⓒ - 5/16" tube Ⓒ - 3/8" tube

See Fu l Gauges' in Electrical Section.

AIR CLEANER (Fu l Inj cti n & Triple Carbur t rs): Replace paper element every 15,000 miles. This supercedes previous instructions of cleaning by dropping on hard surface or applying forced air through element.

BATTERY

(283" Eng.) Delco 2SMR53, 12 volt, 9 plate 53 ampere hour capacity (20 hr rate)

(348" Eng.) Delco 558. 12 volt, 11 plate, 63 ampere hour capacity (20 hr. rate)

Battery Ground - Negative

Engine Ground - Engine to cowl

STARTER

Delco-Remy 12 volt Used as follows

Application	Starter
283" (Exc. Turboglide)	1107664
283" (Turboglide)	1107694
348" (Exc. Turboglide)	1107688
348" (Turboglide)	1107687
348" (Early Hi-Lift Car Models)	1107712
348" (Later Hi-Lift Car Models)	1107688

Armature - Delco-Remy 1935929 (Exc 1107712), 1940624 (1107712)

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107664, 94

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs	6200-9400	10.6	49- 76
	Lock	4.25	270-310

Performance Data - 1107687, 88

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs	3600-5100	10 6	65-100
	Lock	3.5	300-360

Ⓒ - Includes Solenoid

Starting Switch· Delco-Remy Solenoid Switch 1119919 mounted on starter controlled by Ignition & Starter Switch 1116544 (Std Pass) 1116547 (Corvette), 1116549 (Taxi) with key starting *NOTF* - Separate Relay Delco-Remy 1116904 used on Corvette

Neutral Safety & Back-up Light Switch Delco-Remy No 1998174 or 1998677 (Pass Car), No 1998660 (Corvette)

Adjustment - *See 'Powerglide or Turboglide" in Transmission Section*

GENERATOR

Delco-Remy Application as follows

Application	Generat r	Armatur
Standard	1102097	1923535
Pow Steering	1102115	1940313
Air Cond & Police	1102114	1940737
Special	1106985	1927074
Corvette (Std.)	1102043	1929640
Corvette (Spec. & Fuel Inj)	1102059	1925210

Performanc Data - Cold

Generator	Amperes	Volts	RPM
1102097	30	14.0	2240
1102043, 59	30	14.0	2310
1102114, 15	35	14.0	2630
1106985	45	13 0	1475

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs. (Exc 1106985), 20 ozs. (1106985).

Field Current - 1.48-1.62 Amps (1102043, 59), 1 69-1 79 Amps. (1102097,114, 115), 2.14-2 28 Amps. (1106985) All at 12 0 volts, 80°F.

Belt Adjustment: 13/16" belt deflection midway between fan and generator pulleys with light pressure applied.

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REGULATOR

Delco-Remy. Application as follows

Regulator No.	Generator No.
1119001	1102043, 59, 96, 97
1119002	1102114, 15
1119603	1106985

►*DOUBLE CONTACT REGULATOR NOTE: Regulator 1119603 has double contacts for voltage regulation. NOTE - Specifications below are for "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001, 2), 11.8-13.0 volts (1119603).
Contact Gap - .020".
Air Gap - .020".

Voltage Regulator

Setting - (1119001,2) 13.8-14.8 volts at 125°F.
Setting - (1119603) 13.8-14.6 volts (Upper contacts), .1-.3 volts lower (Lower contacts) at 125°F.
Contact Gap - (1119603) .016" (Upper contacts) with lower contacts just touching.
Air Gap - .075" (Exc. 1119603), .067" (1119603) with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section*

Current Regulator

Setting (1119001) - 27-33 amperes.
Setting (1119002) - 32-37 amperes.
Setting (1119603) - 43-47 amperes
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. 4-Headlight System. *See "4-Headlight System" in Electrical Section.*
Direction Signals: *See Electrical Section.*
Autronic Eye: *See Electrical Section.*
Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.
Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.
CIRCUIT BREAKER (Lighting): One 15 ampere circuit breaker located on main light switch protects all head and parking lamps.
FUSES: All fuses contained in accessory fuse panel behind instrument panel on left side of steering column
10 Ampere - Protects Tail Lamps.
15 Ampere - Protects Stop Lamp and Antenna
10 Ampere - Protects Back-up and Brake Alarm Lights
7.5 Ampere - Protects Radio Circuits
20 Ampere - Protects Heater and Air Conditioning.
3 Ampere - Protects Instrument Lamps.
NOTE - Standard wiring harness has two-fuse junction block. **10 Amp** protects Instrument Lights, **3 Amp** protects Tail Lights
Horn Relay: Delco-Remy 1116920.
Contacts Close - 5.0-9.5 volts.
Contact Gap - .027".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section*

►*ENGINE NOTE: Standard 283" Turbo-Fire engine, same as previous model and NEW 348" Turbo-Thrust engine with wedge type combustion chamber formed by 16° angle of top of block and "Peaked-roof" piston head. Bottom surface of cylinder head is flat machined.*

ENGINE SPECIFICATIONS: V8 Valve-in-head.

Engine	Bore	Stroke	Rated HP	Displacement
283"	3.875"	3.0 "	48	283 cu. ins.
348"	4.125"	3.25"	54.5	348 cu. ins.

Engine	Compr. Ratio	Developed HP
283" ①	8.5-1	185 at 4600 RPM
283" ②	9.5-1	230 at 4800 RPM
283" ③	9.5-1	250 At 5000 RPM
283" ④	9.5-1	245 at 5000 RPM
283" ⑤	9.5-1	270 at 6000 RPM
283" ⑥	10.5-1	290 at 6200 RPM
348" ②	9.5-1	250 at 4400 RPM
348" ⑦	9.5-1	280 at 4800 RPM

① - One 2-Bbl. Carb. ② - One 4-Bbl. Carb.
③ - Fuel Injection (Pass. & Corv.)
④ - Dual 4-Bbl. Carb. (Corv.).
⑤ - Dual 4-Bbl. Carb. & Sp. Camshaft (Corv.).
⑥ - Fuel Injection & Sp. Camshaft.
⑦ - Three 2-Bbl. Carbs.

Compression & Vacuum Reading - *See TUNE-UP.*
ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*
OIL PAN REMOVAL: Raise car (Jack or Hoist), drain crankcase, remove distributor cap, exhaust crossover pipe, and heat valve Remove front engine mounting bolts. *NOTE* - Turn crankshaft so harmonic balancer key slot is down (crankshaft counterweights will clear oil pan baffle). Raise engine at harmonic balancer approximately 3". Remove oil pan bolts, tilt oil pan sideways to remove it.
ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*
CYLINDER HEAD & INTAKE MANIFOLD: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*
TIGHTENING TORQUES: *See Chevrolet Special Data*

PISTONS

Cast aluminum, slipper skirt, with piston pin offset .060" to major thrust side.
Removal - Pistons and rods removed from above
Replacement Pistons: Furnished Std & 001", 020", 030", and .040" Oversize With fitted pins
►*STANDARD & .001" OVERSIZE PISTON NOTE* **(283" Eng.).** These pistons furnished in TWO sizes as follows
283" Eng. - Std. - Marked **S4** (3.8750-3.8755"), **S5** (3.8755-3.8760"), **.001" Oversize** - Marked **S6** (3.8760-3.8765"), **S7** (3.8765-3.8770").
►*283" ENGINE PISTON NOTE:* Pistons have four depressions in head to prevent interference with valves at higher engine speeds. "Domed" type pistons are used in 10.5-1 compression ratio engines.
Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler should be 4-6 lbs. (283" Eng.), or 5-9 lbs (348" Eng.).
Installing Pistons: Install pistons with cast depression in head and "F" mark cast on piston strut toward front of block. *See Rod Installation.*

PISTON PINS

Pin is pressed fit in connecting rod.
Diameter - (283") 9270-.9273". (348") .9895-.9898".
Pin Fit in Piston - .00015-.00025" clearance. With piston and pin at 60°F, and light film of oil on pin. Pin should support own weight in either pin boss.
Pin Fit in Connecting Rod - Pressed fit in rod. For pin removal and installation, *see "Piston Pins" in Chevrolet Special Data.*
Replacement Pins: Furnished only in assembly with piston. Replace with new piston and fitted pin assembly.

PISTON RINGS

Compression rings are "twist" type (Top ring has **upper** inner edge chamfered, lower ring has **lower** inner edge chamfered) and faces are tapered for correct wiping action. Oil ring is 3-piece type (two rails with spacer).

283" Engine

Ring	Width	End Gap	Side Clearance
Compr.(1,2)	.077-.078"	.009-.018"	.0012-.0032"
Oil (3)	.181-.188"	① 015-.055"	.0006- 0084"

348" Engine

Ring	Width	End Gap	Side Clearance
Compr. (1,2)	.0780-.0775'	.015- 025"	②
Oil (3)	.250" Max	.015-.055"	

① - On rails. ② - Upper 0012- 0027" lower 0012-.0032".

Replacement Rings: Cromflex ring sets furnished Std. and 020", .030", .040" Oversize
Installing Rings: Install compression rings with mark "GM" upward.

CONNECTING RODS

Length (Center to Center) - (283") 5 700" (348") 6 134-6.136"
Crankpin Journal Diameter - (283") 1.999-2 000". (348") 2.199-2 200"
Lower Bearing - Replaceable precision type, steel-backed babbitt. *See 'Connecting Rod & Main Bearing Note" under Crankshaft below.*
Clearance - 001- 003". Wear limit 004".
Side Play - .008-.014" (All).
Replacement Bearings: Std and 001", 002", 010" and 020" Undersize.
Installing Rods Install rod in piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (marked by cast depressions in head of piston and "F" mark on piston strut) on Nos 1-3-5-7 pistons,

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and flange on rod to rear of piston on Nos. 2-4-6-8 pistons. Install rod and piston assembly in cylinder with cast depressions in head and "F" mark on strut toward front of cylinder block. Oil hole in connecting rod will be toward center of engine.

CRANKSHAFT

Journal Diameter - (283") 2.2978-2.2988", (348") 2.4980-2.4990".

Bearings - Steel-backed babbitt (Std.), see Note below.

►*CONNECTING ROD AND MAIN BEARING NOTE (Corvette Engines with Special Camshaft),* Connecting rod and main bearings are special steel backed aluminum alloy with thin lead alloy overplate.

Clearance - (283") .001-.003". (348") .0008-.0034". Wear limit .004".

End Thrust - Taken by No. 5 (rear) main bearing.

End Play - .002-.006". Check at front end of rear main bearing.

Replacement Bearings: Furnished Std., .001", .002", .010" and .020" Undersize.

Bearing Installation: Not necessary to remove engine from car, see *"Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*CAMSHAFT NOTE* Corvette with Fuel Injection and 10.5-1 compression ratio has special camshaft, solid lifters, and heavy duty main and connecting rod bearings.

Journal Diameter - (All) 1.8682-1.8692".

Bearings - Steel backed babbitt lined bushings.

Clearance - .0015-.0035"

Replacement Bearings: "Precision" type (do not require reaming). Use Tool J-6098 to remove and install bearings.

Camshaft Setting: Both Sprockets marked "0". Install chain with sprocket marks adjacent and in line with straightedge across shaft centers.

►*CAUTION* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket in place.

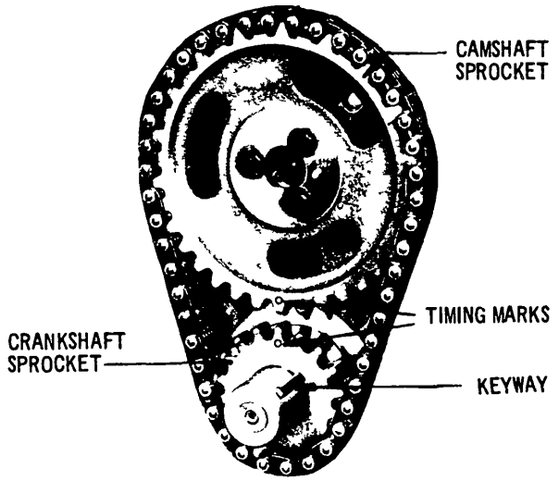
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data*

Timing Chain: Link belt type. See below for specifications.

Engine	Width	Pitch	Length (Links)
283"	.875"	.500"	46
348"	.88"	.500"	48

Installation & Removal - *See "Timing Chain" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*



CHEVROLET V8 VALVE TIMING MARKS

VALVES

Tappet Clearance: (Solid Lifters) Intake .012", Exhaust .018" Hot.

Initial Tappet Clearance (Engs. with Hydraulic Lifters) - *See "Valve System" in Chevrolet Special Data.*

283" Engine

Valve	Head Diam.	Stem Diam.	⑤ Length
Intake	1.720"	.3415-.3422"	4.902-4.922"
Exhaust	1.50"	.3410-.3417"	4.913-4.933"

Valve	① Seat Angle	④ Lift	Stem Clearance
Intake	45°	.3987"	.001-.0027"
Exhaust	45°	.3987"	0015-.0032"

348" Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	1.935-1.945"	.3715-.3722"	5.10-5.11"
Exhaust	1.655-1.665"	.3700-.3717"	5.11-5.12"

Valve	① Seat Angle	Lift	Stem Clearance
Intake	45°	.3987"	② .0010-.0027"
Exhaust	45°	.3987"	③ .0025-.0042"

① - Face Angle 44°. ② - Wear limit 004".
③ - Wear limit .005". ④ - Standard Camshaft
⑤ - Spec. Camshaft 4.8699-4.8899" (Int.), 4.8905-4.9105" (Exh.).

Valve Seat Width - 3/64-1/16" (Int.), 1/16"-3/32" (Exh.).

Valve Stem Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .003", .015", .030" Oversize. Use Reamer Set J-5830(283"), or J-7049 (348").

Valve Springs: Install with closed end of coil toward cylinder head and oil shield over spring.

►*VALVE SPRING NOTE* Specifications are for spring *only (not with dampener).*

283" Engine

Valve	Spring Pressure ①	Length
Closed	69-79 lbs	1.696"
Open	159-169 lbs	1.230"

348" Engine

Valve	Spring Pressure	Length
Closed	78-86 lbs	1.626"
Open	184-196 lbs	1.230"

① - With standard camshaft.

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from spring seat in cylinder head to top of valve spring. If this dimension exceeds 1 45/64" (283") or 1 3/4" (348"), install valve spring seat shim furnished 1/16" thick Installed height of spring must be 1 21/32" (All Engines) *NOTE - 348" Engine specifications supersed previous specifications of 1 3/4" for preferred height, 1 53/64" for top limit.*

Valve Lifters: Hydraulic lifters (Std.) except Corvette engine with 10.5-1 compression ratio. *See "Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement - *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications (283" Std. Cam.)

Intake Valves - Open 12° 30' BTDC. Close 57° 30' ALDC.

Exhaust Valves - Open 54° 30' BLDC. Close 15° 30' ATDC.

Valve Timing Specifications (283" Spec. Cam.)

Intake Valves - Open 35° BTDC. Close 72° ALDC.

Exhaust Valves - Open 76° BLDC. Close 31° ATDC.

Valve Timing Specifications (348")

Intake Valves - Open 18° 30' BTDC. Close 67° 30' ALDC.

Exhaust Valves - Open 68° 30' BLDC. Close 25° 30' ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts. (Exc. Corv.), 5 qts. (Corv.). Add 1 qt. with filter change.

Normal Oil Pressure: 35 lbs. at 2000 RPM.

Pressure Regulator Valve - In oil pump Not adjustable.

Oil Pressure Indicator (Std. V8) - Light located at right side of instrument cluster, controlled by a pressure Switch Delco-Remy 1998149 or AC No 1508425, located in main oil gallery adjacent to distributor. Switch closes when pressure drops to 4-7 lbs.

Oil Pressure Gauge (Corvette) - AC No. 1508063. Not electric.

Oil Filter: Full flow type as optional equipment. Replace element every 4,000 miles. Use new seal, tighten center bolt to 20-25 ft lbs. *NOTE* - Cover with cavity for oil circulation used without filter

Replacement Filter Element - AC No PF-141.

Oil Pump: Spur gear type. Located in crankcase, driven by distributor gear

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data*

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Crankcase Ventilation - Air intake through crankcase breather cap and outlet at crankcase ventilator pipe.

COOLING

►*RADIATOR REMOVAL CAUTION (Auto. Trans.):* Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.

►*WATER BY-PASS NOTE:* 283" engine utilizes hole in cylinder block for water by-pass. 348" engine has by-pass at top of water pump which is connected to inlet manifold which has crossover passages to cylinder head.

Water Capacity: 16 qts. (283"), 22 qts. (348"). Add 1 qt. for heater.

Pressure Valve: AC No. 850800. Radiator filler cap. 13 lb. type. Replacement Valve-AC No. RC-6.

Thermostat: Pellet type. In cylinder head water outlet. **Standard** - No. 3136185 (180°F), **Optional** - No.3138868 (170°F) or No. 3136184 (160°F), for use with Methanol (alcohol) anti-freeze.

Temperature Gauge: AC electric.

Dash Unit - AC No. 1513485 (Pass. Car), 1513198 (Corv.).

Engine Unit - AC No. 1513321 (All).

See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with ball bearing shaft. See Water By-Pass Note above.

See "Water Pumps" in Chevrolet Special Data.

CLUTCH

►*CLUTCH NOTE: Both Chevrolet (Own) Diaphragm type & Borg & Beck Coil Spring type Clutches used.*

Chevrolet (Own) Diaphragm Clutch

Car Model	Size	Chevrolet No.
283" Std.	10"	3742862
283" 4-Bbl. & FI	11"	3742867
283" O.D. & HD	11"	3744300

Borg & Beck Clutch

348"	10½"	①3739756
Corv	10"	②3744753

① - B & B 10.5A9 Assy. No. 361470.
② - B & B 10A8W Assy. No. 361468.

See "Chevrolet (Own)" and "Borg & Beck" Clutches in Clutch Section.

Clutch Disc (Chevrolet Clutch)

Car Model	Chevrolet No.
283" Std. 10" Woven or Molded	①
283" 4-Bbl. & FI 10" Molded	3746431
283" O.D. 10" Woven	3749442
283" HD 11" Woven	3748464

① - 3746431 Woven, 3743505 Molded.

Clutch Disc (Borg & Beck Clutch)

348" 10½" Woven	①3749490
Corv. 10" Woven Drk. Brown	②3740462

① - B & B No. 382856. ② - B & B No. 382855.

Pedal Adjustment: Pedal free play ¾-1". Remove cotter pin, washer and spring, then turn swivel to secure free play. *NOTE* - Check by holding fork pushrod to rear (to remove lash). Conical point on swivel should line up with dimple in clutch and shaft assembly. Reinstall spring, washer and cotter pin.

Over-Center Spring Adjustment: Loosen adjusting hook nut at back of pedal bracket and turn jam nut to obtain an installed length of 10 5/16" for over-center spring.

Removal: Remove transmission (See Transmission Removal below). Remove clutch throwout bearing from fork, then clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one turn at a time until tension of spring is released. Remove tool, then clutch assembly from vehicle. *NOTE* - When installing clutch, align "X" mark on cover and flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three-speed synchro-mesh (Std.), three or four-speed (close ratio) optional.

See "Chevrolet 3-Speed" and "Chevrolet 4-Speed (Close Ratio)" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Drain transmission and disconnect speedometer cable and shift rods. Remove propeller shaft center bearing support bolts. Separate rear universal joint and pull propeller shaft assembly to rear under axle housing.

2) Support rear of engine, remove transmission rear support noting number of shims.

3) Remove two top transmission to clutch housing cap screws, install guide pins (J-1126), then remove two lower capscrews. Slide transmission back on guide pins to clear clutch disc splines.

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown. Lockout switch not used.

See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for synchro-mesh (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS: See "Chevrolet Powerglide" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 3½ qts. (refill), 10½ qts. (after overhaul).

Checking Fluid Level - Engine must be idling with transmission warm, selector lever in "N" range and parking brake applied. Check fluid level on dipstick located in filler tube on right side of engine opposite starter. Fluid level should be at full mark on dipstick. *NOTE - DO NOT OVERFILL.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER POWERGLIDE SERVICE DATA: See "Chevrolet Powerglide" in Transmission Section.*

TURBOGLIDE TRANSMISSION

New "non-shifting" hydraulically controlled, planetary type transmission with three unit torque converter.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Chevrolet Turboglide" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Turboglide" in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 3½ qts. (refill), 9½ qts. (after overhaul).

Checking Fluid Level (Exc. Air Cond. Cars) - With transmission at normal operating temperature, transmission selector lever in "D" (drive) range, and engine idling, check fluid level on dipstick in filler tube on right side of engine. Fluid level should be at full mark on dipstick. *CAUTION - DO NOT OVERFILL.*

Checking Fluid Level (Air Cond. Cars) - *NOTE* - Regular filler tube and dipstick not used. Fluid Level is checked from beneath car (car on hoist) as follows: With transmission at normal operating temperature, selector lever in "N" (neutral) range, and engine idling, check fluid level by removing cap from oil level tube at rear of transmission oil pan under extension housing. Oil level should be at top of tube. If oil level low, remove speedometer drive gear fitting, add oil through fitting hole until fluid level reaches top of oil level tube.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER TURBOGLIDE SERVICE DATA: See "Chevrolet Turboglide" in Transmission Section.*

UNIVERSALS

Own. Yoke & Spider (Trunnion) type.

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section.*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

REAR AXLE

Own. Semi-floating hypoid gear type, with Hotchkiss Drive. *NOTE* - "Positraction" Limited Slip Differential optional.

See "Chevrolet Pass. Car (Hotchkiss Drive)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear uni-

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versal joint companion flange nut controls rear axle pinion bearing preload Bearing preload must be adjusted whenever companion flange nut is loosened

Ratios - 3 55-1 (Std), 4 11-1 (Overdrive), 3 36-1 (Powerglide & Turboglide)

Backlash - 003-.010" (005- 008" preferred)

Carrier Removal: Remove rear wheels, brake drums and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant and remove differential carrier nuts and lift out carrier assembly.

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

Axle Shaft Removal Raise car and place jack stands under axle housing Remove tire, wheel and brake drum assembly Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange) Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly Be careful not to disturb backing plate *NOTE*–If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance

SHOCK ABSORBERS

Delco. Direct acting non-adjustable.

Replacement Shock Absorbers

Model	Front	Rear
Pass.(Std.)	5543712	5543707
Pass.(AC or AT)	5543709	5543707
Pass. (Air Susp.)	5543711	5543708
Taxi	5543709	5543702

FRONT SUSPENSION

Independent with direct acting shock absorbers within front coil springs. Different types used as follows

Corvette – "Threaded Bushing" type pivot points on upper and lower control arms.

Others – "Spherical Joint" type pivot points between control arms and steering knuckle support.
See "Chevrolet" in Suspension & Wheel Alignment Sect.

Steering Axis Inclination - 7¼°±½°.
Caster - (Std.) 0°±½°. (Air Susp.) 1½°±½°.
Camber - (Std. & Air Susp.) Pos. ½°±½°.
Toe-In - (Std.) 1/8" to 1/4". (Air Susp.) 0" to 1/8".
Toe-Out on Turns - Inner wheel 20° outer wheel should be 18½°.

REAR SUSPENSION

Rear Suspension: *See "Chevrolet Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs on all four wheels. Shock absorbers mounted to rear of air springs. *See Front Suspension above for Alignment Specifications and "Chevrolet Air-Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball type.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment Hand lever applies rear wheel service brakes
See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION*
To compensate for lack of brake anchor adjustment, brake shoes are ground to a 057- 087 smaller diameter than the drum diameter Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action *NOTE–If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter*

Drums–Diameter 11 '
Wheel Cylinder Diameter–Front 1 1/8', Rear 1

Lining	Width	Thickness
Front Whl	2	187- 194 '
Rear Whl	1¾ '	187- 194

Length Per Shoe–9 3125 ' (Primary), 11 6875 ' (Secondary)

Braking Power–55 9% (Front Wheels), 44 1% (Rear Wheels)

Clearance–Single adjusting screw located at bottom of backing plate Back off adjusting screw 7 notches from slight drag position Brakes must be free of any drag after adjustment

Standard Master Cylinder Located on engine side of firewall in line with brake pedal

Checking Fluid–Reservoir is integral with master cylinder Maintain level in cylinder to lower edge of filler hole

Removal - Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove cotter and clevis pins from brake pedal arm, then remove four retaining nuts and lockwashers and remove cylinder from firewall.

Installation–Reverse removal procedure making sure that push rod clevis is straddling the brake pedal Refill master cylinder and bleed all brake lines Adjust push rod-to-main cylinder clearance as follows Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1 8-3/8" pedal movement should be felt)

Power Brakes: Bendix or Moraine Power Unit. Replaces standard master cylinder.
See "Bendix Power Unit" or "Moraine Power Unit" in Brake Section.

Removal: Remove vacuum hoses and hydraulic lines from power unit. Disengage pushrod from pushrod lever and remove four attaching bolts and lift out unit. Note position of odd bolt and washer during removal.

MISC. MECHANICAL

Windshield Wipers: Vacuum, link arm operated (Std.), Electric type (Optional).
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electric type with reversible motor operating each door window assembly
See 'Power Window Regulators" in Miscellaneous Section

Power Top Controls Hydro-Electric *See 'Power Top Controls' in Miscellaneous Section*

Power Seat Adjuster: Reversible Electric motor controls horizontal front seat movement *See 'Power Seat Adjusters' in Miscellaneous Section*

Air Conditioning: *See "Chevrolet Air Conditioning in Miscellaneous Section*

MODEL IDENTIFICATION

Model Designation Series	Series Prefix	Wheelbase	Model
3100	① 3A	114"	1/2-Ton
3200	① 3B	123 1/4"	1/2-Ton
3400	②① 3C	104"	④ 3/4-Ton
3500	② ① 3D	125"	④ 3/4-Ton
3600	① 3E	123 1/4"	⑤ 3/4-Ton
3700	②① 3F	137"	④ 3/4-Ton
3800	① 3G	135"	⑤ 1-Ton
4100	① 4A	132 1/2"	⑤ 1 1/2-Ton
4400	① 4B	156 1/2"	⑤ 1 1/2-Ton
4500	① 4C	156 1/2"	⑥ 1 1/2-Ton
5100	③ 5A	112 5/8"	⑦ 2-Ton
5300	③ 5K	124 5/8"	⑦ 2-Ton
5400	③ 5B	136 5/8"	⑦ 2-Ton
5700	③ 5C	160 5/8"	⑦ 2-Ton
6100	③①6A	132 1/2"	⑤ 2-Ton
6200	① 6J	129 5/8"	⑤ 2-Ton
6300	③① 6P	144 1/2"	⑤ 2-Ton
6400	③① 6B	156 1/2"	⑤ 2-Ton
6500	③① 6C	174 1/2"	⑤ 2-Ton
6600	①6K	153 5/8"	④ 2-Ton
6702	① 6D	196 1/2"	⑥ 2-Ton
6703	③① 6V	196 1/2"	⑤ 2-Ton
6802	① 6E	222 1/2"	⑥ 2-Ton
5100 S	5D	112 5/8"	⑧ ⑦ 1 1/2-Ton
5300 S	5L	124 5/8"	⑧ ⑦ 1 1/2-Ton
5400 S	5E	136 5/8"	⑧ ⑦ 1 1/2-Ton
5700 S	5F	160 5/8"	⑧ ⑦ 1 1/2-Ton
5100 H	③ 5G	112 5/8"	⑨ ⑦ 2-Ton
5300 H	③ 5M	124 5/8"	⑨ ⑦ 2-Ton
5400 H	③5H	136 5/8"	⑨ ⑦ 2-Ton
5700 H	③5J	160 5/8"	⑨ ⑦ 2-Ton
6100 S	① 6F	132 1/2"	⑧ ⑤ 1 1/2-Ton
6300 S	① 6R	144 1/2"	⑧ ⑤ 1 1/2-Ton
6400 S	① 6G	156 1/2"	⑧ ⑤ 1 1/2-Ton
6500 S	① 6H	174 1/2"	⑧ ⑤ 1 1/2-Ton
6700 S	① 6T	196 1/2"	⑧ ⑤ 1 1/2-Ton
6100 H	③① 6L	132 1/2"	⑨ ⑤ 2-Ton
6300 H	③① 6S	144 1/2"	⑨ ⑤ 2-Ton
6400 H	③① 6M	156 1/2"	⑨ ⑤ 2-Ton
6500 H	③① 6N	174 1/2"	⑨ ⑤ 2-Ton
6700 H	③① 6U	196 1/2"	⑨ ⑤ 2-Ton

① - Letter "V" ahead of Series Prefix indicates V8 Engine.
② - Letter "P" ahead of Series Prefix (3C,3D,3E) indicates rear axle with 14" brakes.
③ - Letter "P" ahead of series Prefix (Exc. 3C,3D,3E) indicates H.D. Single Speed Axle.
④ - Forward Control. ⑤ - Conventional. ⑥ - School Bus ⑦ - Low Cab Forward. ⑧ - Special 1½-Ton. ⑨ - H.D. 2-Ton.

SERIAL NUMBER: Stamped on metal plate and attached to body as follows: **Forward Control Models** - On instrument panel support. **Flat Face Cowl Models** - On cowl inner panel. **All Other Models** - Left front door hinge pillar. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③ ④
6F 58 K 100001

① - Series Prefix. See Model Designation table above.
② - Year 58 (1958).
③ - Assembly Plant Designation. See table below.
④ - Unit number. Continuous for all trucks starting with 100001.

Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
J - Janesville	**O** - Oakland	

ENGINE NUMBER: 6 Cyl. - Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor).
V8 Eng. - Stamped on pad at front right hand side of cylinder block.
NOTE - Number (example below) indicates identification data as indicated.

⑤ ⑥ ⑦
F 1210 P

⑤ - Engine Plant - **F** - Flint, **T** - Tonawanda, **C** - Engines built in Canada.
⑥ - Code number indicating Month & Day of engine manufacture. This is not an individual or continuous number.
⑦ - Engine type. See table following.

Engine Type

J, K - 235" Eng. (JC, JF, KA indicate Clutch and Trans. Opts.)
L - 261" Eng. (LC, LD, LE indicate Trans. and Brake Opts.)
M, N, P - 283" Eng. (MA, NA, NC, ND, PA, PC, PD indicate Trans. and Brake Opts.)

TUNE-UP

COMPRESSION PRESSURE: (6 Cyl.) 130 lbs., **(V8)** 140 lbs., minimum, All cylinders should read alike within 20 lbs.

VACUUM READING - 17-21" (Single & Dual Carb.), 16-20" (4-Barrel Carb.).

VALVE TAPPET CLEARANCE: (235") - .006" Intake, .018" Exhaust, Hot.
(261) - .006" Intake, .020" Exhaust, Hot.
(V8 Engines) - None in service (Hydraulic). For initial tappet adjustment, see *"VALVE SYSTEM" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic coil spring type, located between manifold and exhaust pipe. *NOTE* - Must operate freely.

IGNITION

FIRING ORDER: 6 Cyl. - 1-5-3-6-2-4. **V8** - 1-8-4-3-6-5-7-2.
Cylinders (V8) - *RIGHT BANK 2-4-6-8, LEFT 1-3-5-7.*
SPARK PLUG GAP: .035".
Spark Plug - All Eng. ½ to 1½-Ton. AC44 (Std.), AC45 or 46 (Hotter for City Driving), AC43 COM (Heavy Duty).
All Eng. 2-Ton. AC42-1 COM (Std.), AC43 (Hotter for City Driving). *NOTE* - 14 mm. Torque to 20-25 lbs.

COIL: Delco-Remy 1115087.
Ignition Current - 1.8 amps. idling, 4 amps. stopped.
Resistor - Delco-Remy 1931614.

►*COIL RESISTOR NOTE (6 Cyl. Trucks Exc. Forward Control):* Resistor connected to ignition switch by two leads. Second lead is connected through starter switch and provides a direct connection to coil when starter switch operated.

►*COIL RESISTOR NOTE (6 Cyl. Forward Control & All V8 Models):* Resistor connected in lead from ignition switch-to-coil. This resistor is bypassed during cranking by a lead from starter solenoid-to-coil.

DISTRIBUTOR: Delco-Remy. Conventional type used on 6 Cyl. models. Two types of "Window" distributors used on V8, centrifugal with Vacuum Advance. and centrifugal only. *See "Delco-Remy (Window Type) Distributors" in Electrical Section.*

Delco-Remy Distributors

Engine	Delco-Remy No.
Thriftmaster 235"	1112403
Jobmaster 261"	1112403
Trademaster 283" (3,4000)	1110920
Taskmaster 283" (5,6000), Dual Carb.	① 1112720,25
Super Taskmaster 283" (5,6000) 4-Bbl. Carb.	① 1112721,26

① - Without Vacuum Control.
Condenser - Delco-Remy 1932004 (1110920), 1928111 (Others).
Capacity - .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988.
Breaker Gap (6 Cyl.) - .019" (new points), .016" (Used points).
Breaker Gap (V8) - *NOTE* - When cam dwell is properly adjusted, breaker gap opening (.016") will be correct. *See CAM ANGLE below.*
Cam Angle - 28-35° (6 Cyl.), 28-32° (V8). Set V8 distributors to 30°.
Breaker Arm Spring Tension - 19-23 ozs.

Automatic Advance - 1112403

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Automatic Advance - 1110920

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3750

Automatic Advance - 1112920,21,25,26

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
5-7	750	10-14	1500
8-10	1175	16-20	2350
12-14	1750	24-28	3500

Vacuum Spark Control: Delco-Remy 1116089 (1112403), 1116118 (1110920).

Vacuum Advance - 1112403 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
7.5	15	7.5-10

Vacuum Advance - 1110920 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
7.5	15.0	15-16

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IGNITION TIMING

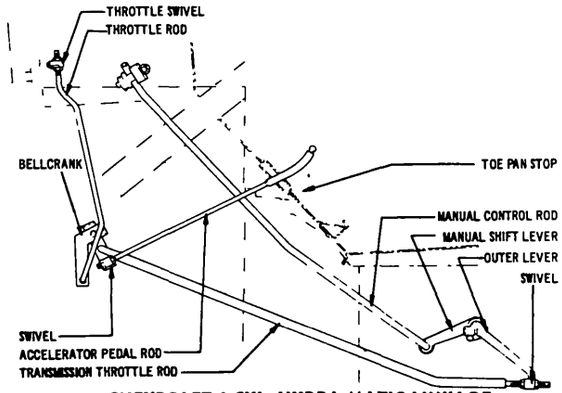
Setting - TDC (6 Cyl.), 4° BTDC (V8) Set timing at idle speed with vacuum line disconnected.

Timing Mark (6 Cyl.) Steel ball insert in flywheel lined up with pointer in inspection hole in right front face of housing with Octane Selector set on "O". Then adjust Selector as follows: Set for slight ping when accelerating with wide open throttle.

Timing Mark (V8) - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines at 2° graduations with the greatest number of graduations on advance or BTDC side.

CARBURETOR

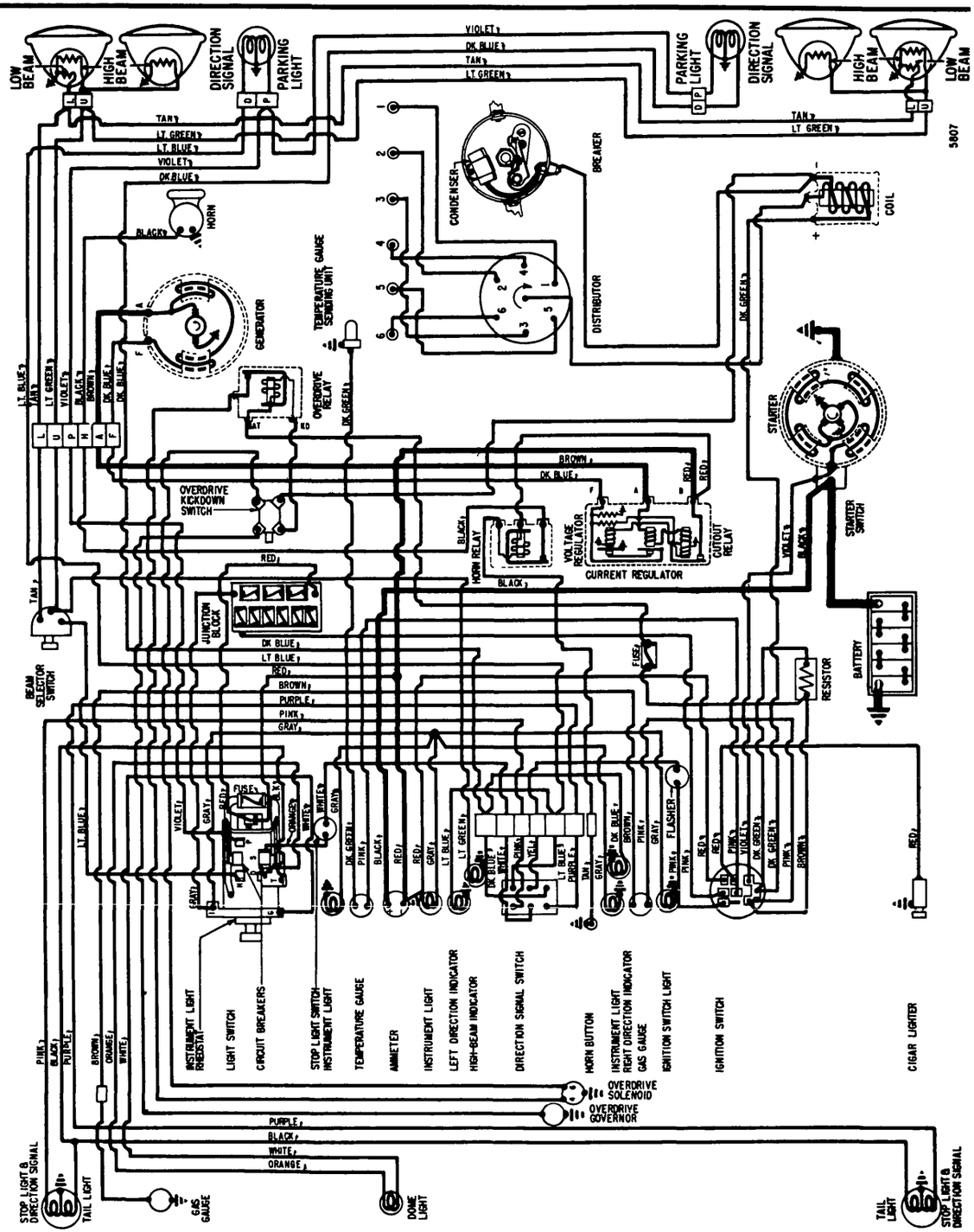
Engine	CARBURETOR APPLICATION	Carburetor
6 Cyl. (Exc. Fwd. Control)		Rochester B
6 Cyl. (Forward Control)		Carter BB
V8 283" Trademaster	2-Bbl.	Rochester 2G
V8 283" Taskmaster	2-Bbl.	Rochester 2G
V8 283" Super Taskmaster	4-Bbl.	Rochester 4G



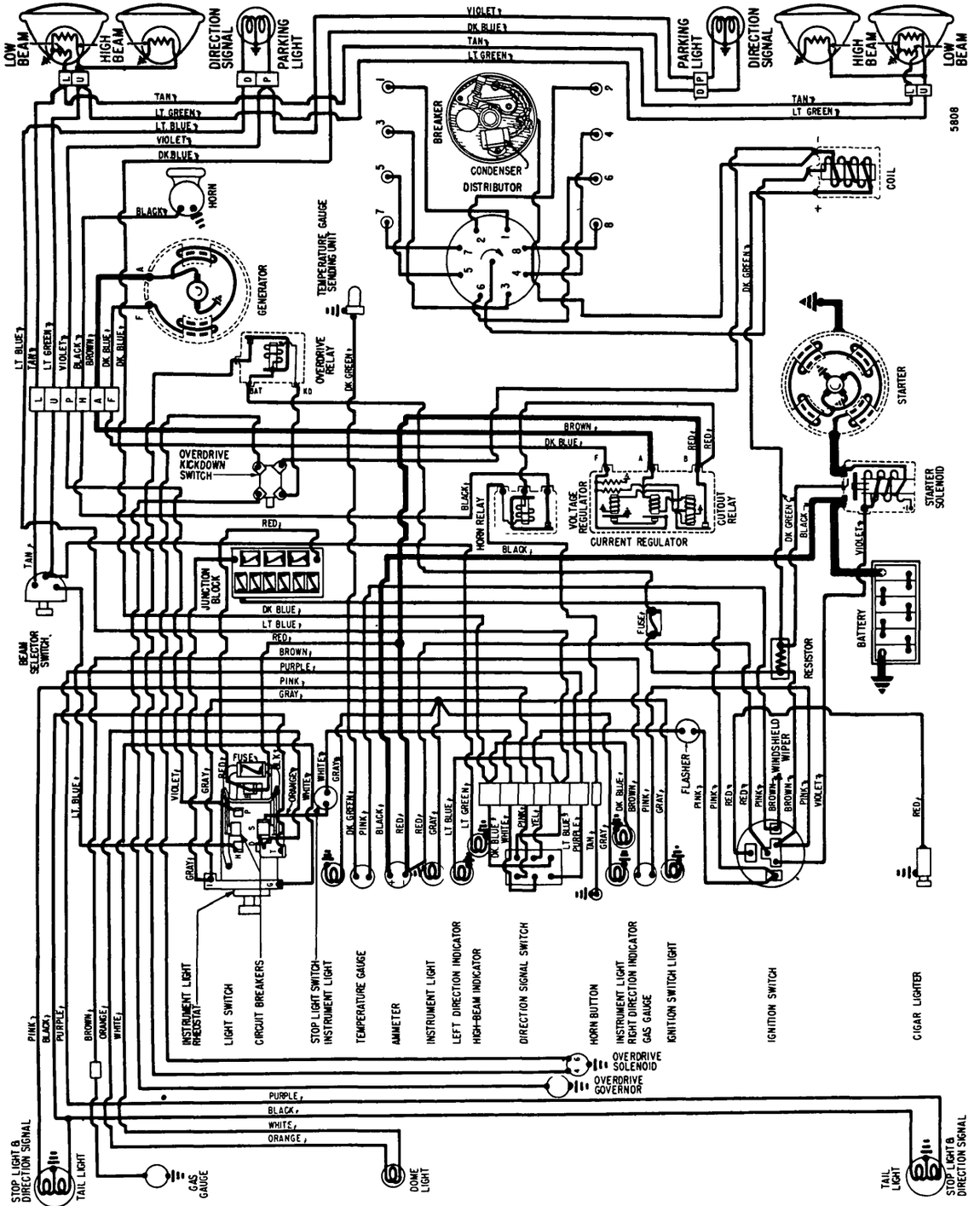
CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (EXCEPT FORWARD CONTROL)

Throttle Linkage Adjustment (6 Cyl. Hydra-Matic Drive Trucks except Forward Control): With engine at normal operating temperature and idle speed set at 400-450 RPM, remove lower end of carburetor throttle lever-to-bellcrank rod from lever on bellcrank. Install Lever Positioning Gauge J-5609 in hole in lever and gauge hole in pan rail of engine block (hole is located toward rear of bellcrank position), and leave gauge in this position. Remove swivel from bellcrank-to-transmission outer lever at transmission and move transmission outer lever back against its stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using Tool J-5260 *(CAUTION - Do not apply force to stops at either end of lever travel).* Hold outer lever back against its stop and adjust swivel position on bellcrank-to-transmission rod so it just enters hole in transmission lever. Remove Positioning Gauge from bellcrank and reinstall rod. Recheck en-

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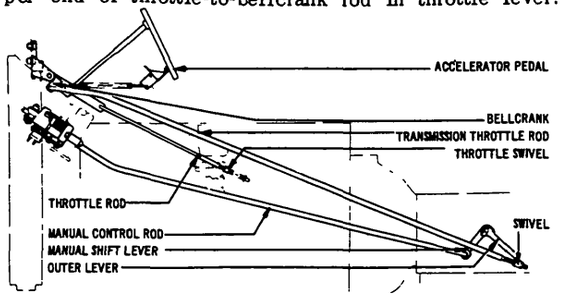
CHEVROLET 6 CYL. TRUCK WIRING DIAGRAM



CHEVROLET V8 TRUCK WIRIN DIAGRAM

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gine idle speed with idle screw against stop on carburetor, and adjust carburetor throttle-to-bellcrank rod so swivel at upper end freely enters hole in throttle lever. At this point, **shorten** bellcrank-to-transmission outer lever rod by turning swivel locknuts **three and one-half** turns. Remove bellcrank-to-carburetor throttle rod upper swivel from lever and pull rod upward until linkage is stopped by forward stop in transmission. Hold in this position and adjust accelerator-to-bellcrank rod swivel until accelerator pedal is against floor stop, then **shorten** rod **one full turn.** Replace upper end of throttle-to-bellcrank rod in throttle lever.



CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (FORWARD CONTROL MODELS)

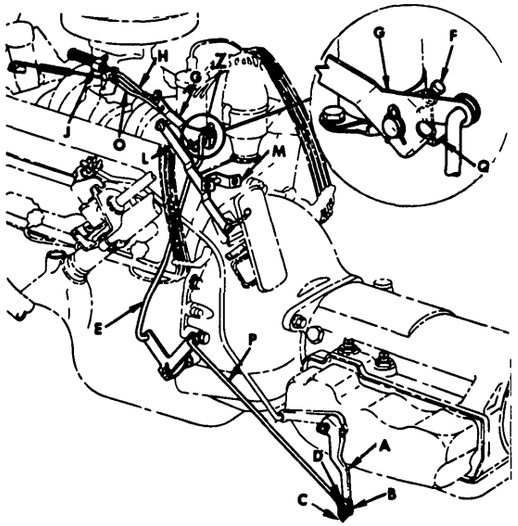
Throttle Linkage Adjustment (Forward Control Models With Hydra-Matic Drive): With engine at normal operating temperature and idle speed set at 400-450 RPM, insert 1/8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever. Adjust length of throttle rod so that swivel just enters throttle lever. Remove swivel from outer lever and move lever back against transmission stop. Check distance from hole in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole. *CAUTION - Do not apply force against stop at either end of lever travel.* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever, then **shorten** throttle rod **three and one-half turns** of jam nut.

THROTTLE LINKAGE ADJUSTMENT: (V8 Hydra-Matic Drive Trucks) - With carburetor at idle speed, disconnect rod "P" at transmission outer lever "A". Hold outer lever "A" back against transmission stop and check distance from hole in outer lever "A" to back of transmission (use Gauge J-2545-C). Bend outer lever "A" as required to allow entry of gauge in hole (Use Tool J-5260). With rods "E" and "H" connected, loosen "D" 3½ turns and tighten "B". Back off stop screw "F" and rotate lever "G" until linkage is stopped by full detent stop in transmission. Adjust screw "F" to contact bracket "Q", release lever "G" and advance screw "F" ½ -1 full turn. *NOTE* - On Series 31,32,3600, install 1/8" gauge pin through hole in lever "L" and bracket "M", Install rod "O" to lever "L" and rotate "L" until screw "F" contacts bracket "Q". Adjust length of rod "O" so swivel just enters lug "H". If unable to get downshift on road test, check for interference between rod

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"E" and cylinder block in area over "G" and bend rod as necessary to give clearance.



CHEVROLET V8 TRUCK HYDRA-MATIC LINKAGE

ROCHESTER "B"

Models	Rochester No.
235" (S.M. & Hydra-Matic)	7004468
261" (Powermatic)	7005140

Idle Setting - 1½-2½ turns open. Turn screw out for richer mixture.

Idle Speed - 450-500 RPM (Synchro-mesh), 450 RPM (Hydra-Matic) with selector lever in "N" position.

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

►*CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump - No seasonal adjustment.

Choke Adjustment: Centered on index.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Rochester B" Carburetors in Carburetion Section*

ROCHESTER 2G

Model	Rochester No.
283" (No Gov.) Early	7012035
283" (No Gov.) Later	7012453
283" (Vel. Gov.) Early	7012047
283" (Vel. Gov.) Later	7012455
283" (Vac. Gov.) Early	7012233
283" (Vac. Gov.) Later	7012457

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barr l f ds Cyl. 2-3-5-8, LEFT barr l 1-4-6-7.*

Idl S tting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto-Trans.) with selector lever in Drive.

Float Level - 1 19/64" (Gauge BT-144) with air horn inverted and gauge placed over float so it rests against pump side of power piston shaft and outer gauge leg in line with center of float. Adjust by bending float arm (Tool BT-69) between pivot and float.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks): See *CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G" Carburetors in Carburetion Section*

ROCHESTER 4G

Model	Rochester No.
283" (3700 RPM Gov.)	7012303
283" (4000 RPM Gov.)	7011487

Idle Setting - Adjust idle mixture screws for highest steady vacuum.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans.) with selector lever in Drive.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks): See *CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G" Carburetors in Carburetion Section.*

CARTER BB

Carter (BB) 871SC (Forward Control Models). Single barrel updraft type with manual choke.

Idle Setting - ½-1½ turns open (turn screw out for richer mixture).

Idle Speed - 450-500 RPM (Synchro-mesh), 400-450 RPM (Hydra-Matic).

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed).

Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.

Throttle Linkage Adjustment (Hydra-Matic Drive Trucks): See *CARBURETOR above.*

►*OTHER DATA: See "Carter BB" Carburetors in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: (6 Cyl.) AC No 4434 (fuel only), No 4433 (fuel & vacuum) (V8) AC No 4430 (fuel only)

Pressure - 3½-4½ lbs (6 Cyl.), 5¼-6½ lbs (V8)

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric

Dash Unit - AC No 1518461

Truck Model	AC Tank Unit No.
3000 Series (Exc. Cab)	1518779
4,5000 Series (Exc Cab)	1518780
3,4,5000 Series (Cab)	1518777
3400 Series (Fwd Contr.)	1518783
35,3700 Series (Fwd Contr.)	1518780
6000 Series	1518782
School Bus	1518778

S *"Fu l Gauges" in Carbur tion S ction.*

BATTERY

D lc -R my 2SMR53W. 12 Volt, 9 plate, 53 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Engine to frame (6 Cyl.), engine to dash (V8)

STARTER

Delco-Remy. Application as follows

Truck Model	Start r	Armatur
6 Cyl. (Exc. Fwd. Cont.)	1107634 ①	1926626
6 Cyl. (Fwd. Cont.)	1107652 ②	1932185
6 Cyl. (Hydra-Matic)	1107677 ②	1926626
V8 (Exc. Hydra-Matic)	1107664 ②	1935829
V8 (Hydra-Matic)	1107674 ②	1927343

① - Manual Pinion shift. ② - Solenoid Pinion shift.

Drive (6 Cyl. Synchro-mesh Trans. Exc. Fwd. C nt.) - Overrunning clutch with pedal operated pinion shift

Drive (6 Cyl. Fwd. Cont. & Hydra-Matic Trans., All V8 Models) - Overrunning clutch with solenoid pinion shift.

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs. min.

Performance Data - 1107634,74,77

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Performance Data - 1107652,64

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

① - Includes solenoid.

Starting Switch (Solenoid Pini n Shift M d ls): Delco-Remy Solenoid 1119919 (1107664), 1119760 (1107674), 1119793 (1107677), 1119781 (1107652) Mounted on starter and controlled by Ignition & Starter Switch 1116537 Turn key full RIGHT against spring tension to start

Starting Switch (Manual Pinion Shift Models): Delco-Remy Switch 1930496. Mounted on starter and actuated by pedal operated lever. Ignition Switch 1116522 is connected to small terminal on side of starter switch to bypass resistor for starting.

See "Delco-Remy Manual Pinion Shift Start r Switch s" in Electrical Section.

Hydra-Matic Neutral Safety Switch - Delco-Remy 1998110. Mounted on steering column.

Adjustment - *See "Hydra-Matic Driv " in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows:

Model	G n rat r	Armatur
30 Ampere	1102096	1923535
35 Amp (Air Cond.)	1102114	1940737
35 Amp (Pwr Strg.)	1102115	1940313
35 Amp (Optional)	1105116	
45 Amp (Pwr Strg.)	1106676	
45 Amp (Optional)	1106985	1927074
50 Amp (Pwr Strg.)	1106680	
50 Amp (Optional)	1106679	

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Performance Data - Cold

Generator	Amps	Volts	RPM
1102096	30	14.0	2240
1102114, 15	35	14.0	2630
1105116	35	14.0	1730
1106676	45	13.0	1400
1106985	50	13.0	1475
1106679, 80	50	13.0	1600

- Not Maximum output. See Current Regulator.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs. (1102096, 114, 115; 1105116), 20 ozs. (1106676, 79, 80; 1106985).

Field Current - 1.69-1.79 Amps. (1102096, 114, 115), 2.73-3.0 Amps. (1105116), 2.14-2.28 Amps. (1106676, 79, 80; 1106985), all at 12 volts.

Belt Adjustment: 5/16" (6 Cyl.), 13/16" (V8) deflection midway between water pump and generator pulleys with light load applied to belt.

REGULATOR

Delco-Remy. Used as follows:

Regulator No.	Generator No.
1119001 (30 Amp.)	1102096
1119002 (35 Amp.)	1102114,5
1119604 (35 Amp.)	1105116
1119603 (45 Amp.)	1106676,985
1119606 (50 Amp.)	1106679,80

►*DOUBLE CONTACT REGULATOR NOTE: Regulators 1119603,4,6 have double contacts for voltage regulation. NOTE - Specifications below are for "NORMAL" settings.*

Cut out Relay

Cuts In - 11.8-13.5 volts (1119001,2), 11.8-13.0 volts (1119603,4,6).

Contact Gap - .020". **Air Gap** - .020".

Vibrating Regulator

Setting (1119001,2) - 13.8-14.8 volts.

Setting (1119603,4,6) - 13.8-14.6 volts (Upper contacts), .1-.3 volts lower (Lower contacts) at 125°F.

Contact Gap - (1119603,4,6) .016".

Air Gap - .075" (1119001,2), .067" (1119603,4,6), with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 12 Volt" and "Delco-Remy (Double Contact)" Regulators in Electrical Section.*

Current Regulator

Setting - 27-33 Amps. (1119001), 32-37 Amps. (1119002), 43-47 Amps. (1119603), 31.0-35.5 Amps.(1119604 at 125°F), 48-52 Amps. (1119606).

►*NOTE:* 1119604 is "Temperature Compensated" type.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 12 Volt" and "Delco-Remy (Double Contact)" Regulators in Electrical Section.*

MISC. ELECTRICAL

Headlights: *Sealed Beam. 4-Headlight System. See "4-Headlight System" in Electrical Section.*

Directional Signals: *See Electrical Section*

Lighting Switch Removal: Disconnect all wires from switch (tag wires for reinstallation), depress switch shaft retainer (on top of switch) and remove knob and shaft. Remove retaining ferrule, remove switch.

Stop Light Switch Location: Attached to underside of toe pan at left of brake pedal.

LIGHTING CIRCUIT BREAKERS: Dual circuit breakers located in lighting switch.

15 Ampere. Protects headlamps and parking lamps.

15 Ampere. Protects all other vehicle lamps except instrument panel lights.

FUSES: 3 Ampere. Protects instrument panel lights.

Horn Relay: Delco-Remy 1116920.

Contacts Close - 5.0-9.5 volts.

Contact Gap - .027".

ENGINE

Engine Model	Type
Thriftmaster	235" 6 Cyl.
Jobmaster	261" 6 Cyl.
Trademaster (Light Duty)	283" V8
Taskmaster	283" V8
Super Taskmaster	283" V8

ENGINE SPECIFICATIONS: 6 Cyl & V8 valve-in-head.

Engine	Bore	Stroke	Displacement
Thriftmaster	3 9/16"	3 15/16"	235 cu. ins.
Jobmaster	3 3/4 "	3 15/16"	261 cu. ins.
Trademaster	3 7/8 "	3"	283 cu. ins.
Taskmaster	3 7/8 "	3"	283 cu. ins.
Super Taskmaster	3 7/8 "	3"	283 cu. ins.

Engine	Comp. Ratio	Rated HP	Developed HP
Thriftmaster	8.25-1	30.4	145 at 4200 RPM
Jobmaster	8.00-1	33.7	150 at 4000 RPM
Trademaster	8.5-1	48.0	160 at 4200 RPM
Taskmaster	8.00-1	48.0	175 at 4400 RPM
Super Taskmaster	8.00-1	48.0	175 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: (6 Cyl. Engines) - Raise front of vehicle and place on stands, drain lubricant and remove bolts and screws. *NOTE* - Turn crankshaft as necessary to allow clearance at front crossmember.

OIL PAN REMOVAL: (V8 Engine) - Raise front of vehicle and place on stands, drain lubricant. On 5, 6000 Series Trucks, remove oil level gauge and tube. Remove bolts and screws, lower oil pan.

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*OTHER ENGINE DATA: See 1958 Passenger Car Pages and note the following:*

PISTON RINGS (6 CYL. ENGINES): 235" & 261" engines have "Chrome Plated" top compression rings. Other compression rings are cast iron. Oil rings are three piece steel (heavy chrome plate oil control rails used in 261" & 283" Engines).

VALVES: "Rotocoil Valve Rotators" used on 261" & 283" Engines with stellite faced and hard tipped exhaust valves.

VALVE LIFTERS (ALL ENGINES): Mechanical type cast alloy iron used on all engines except 283" engine which has Hydraulic Lifters.

VALVE TIMING (ALL ENGINES): As follows:

235" Thriftmaster & 261" Jobmaster

Intake Valve - Open 11°30'BTDC. Close 52°30' ALDC.

Exhaust Valve - Open 51° BLDC. Close 13° ATDC.

283" Trademaster & Taskmaster

Intake Valve - Open 12°30'BTDC. Close 57°30' ALDC.

Exhaust Valve - Open 54°30'BLDC. Close 15°30'ATDC.

Valve Timing Check (235" & 261" Engines): Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening. Mount dial indicator on rocker arm shaft support with stem contacting No. 1 exhaust valve adjusting screw, set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .005". Reset No. 1 exhaust valve to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: (235") 5 qts. Add 1 qt. with filter change. **(261")** 5 qts. Add 2 qts. with filter change. **(283" Trademaster)** 4 qts., **(283" Taskmaster)** 5 qts. Add 1 qt. with filter change.

Normal Oil Pressure - 35 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator - AC No. 1508246. Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed with pickup pipe screen horizontal and toward bottom of pan.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing - On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing - Every 10,000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

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►*TASKMASTER V8 CRANKCASE VENTILATION NOTE*

Positive type crankcase ventilation is Standard.

COOLING

Water Capacity: In quarts for each type engine

Model	Standard	Heavy Duty
3000 Series (235")	17	17½
4000 Series (235")	17½	18
4, 5-speed (261")	① 17	
3000 Series (283")	17½	18
4000 Series (283")	18	18½
5000 Series (283")	②	
6000 Series (283")	③	

① - Powermatic 21 ② - 4, 5-speed 18½, Powermatic 21
③ - 4, 5-speed 18, Powermatic 21½-

NOTE - Add 1 quart for heater

Pressure Valve: Radiator filler cap AC No RC1 (Std), 7 lb , AC No RC12 (5,6000 Series with Auto Trans), 9 lbs

Thermostat: Harrison In cylinder head water outlet (6 Cyl) In water outlet in intake manifold (V8)

Standard - No 3133595 (stamped 151) 151° Can be used for alcohol anti-freeze

Optional - No 3133596 (stamped 160) 160° No 3133597 (stamped 170) 170°

Temperature Gauge: AC Electric

Dash Unit - AC No 1513381

Engine Unit - AC No 1513321

See "Temperature Gauges" in Miscellaneous Section

Water Pump: Packless type with sealed ball bearing shaft

See "Water Pumps" in Chevrolet Special Data

CLUTCH

Own (Diaphragm Spring) and **Borg & Beck** (Coil Spring) types used Single plate, dry disc type

Chevrolet (Own) Diaphragm Clutch

Model	Size	Chevrolet No
6 Cyl (Exc Fwd Contr)	10"	3836715
6 Cyl Fwd Contr (Exc 2 Ton)	11"	3836719
6 Cyl ½, ¾, 1, 1½ Ton H D	11"	3836719
Borg & Beck Clutch		
6 Cyl 2 Ton (261" Eng)	11"	① 3837155
V8 ½, ¾, 1 1½, Ton	② 11"	① 3837155
V8 2 Ton	11"	① 3743203

① - Borg & Beck 11A9 No 361455, ② - With 10½" Disc

See "Chevrolet (Own)" & "Borg & Beck" Clutches in Clutch Section

Clutch & Clutch Disc Application - As follows

Clutch Disc (Chevrolet Clutch)

Model	Chevrolet No.
Std 10" (Woven-Red Hub)	3836119
Std 10" (Molded-Orange Hub)	3836097
H D 11" (Woven-Pink Hub)	3836906
Clutch Disc (Borg & Beck)	
Std 10½" (Dark Green Hub)	③ 3727585
H D 11" (Yellow Hub)	④

③ - Borg & Beck No 382528
④ Borg & Beck No 382860

6 CYL. ENGINES

P dal Adjustm nt: Pedal free travel ¾-1" To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork *NOTE* - Use finger pressure only when checking clutch free travel

R m val: Remove transmission (see Transmission Removal) Remove throwout bearing, remove fork by prying fork off ball, remove fork mounting (use ¾" wrench) Install Clutch Pilot Tool J-5824 (to support clutch), loosen all six cover bolts evenly remove assembly from below *CAUTION* - Do not allow pressure plate to hang on retracting springs (support by hand) When installing clutch align "X" mark on cover with "X" mark on flywheel

V8 ENGINES

Pedal Adjustment: Adjust clutch pedal until free travel is 1" Make sure that pedal pad contacts toeboard when pedal pressed down

Removal: Remove transmission (see Transmission Removal). Before removing clutch assembly, punch mark flywheel, clutch cover and one pressure plate lug so these parts may be assembled in their same relative positions Loosen hold-down screws evenly and remove cover *NOTE*—Mark flywheel side of driven plate for correct reassembly

TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three speed, all helical gear type Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse)

See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever *See "Transmission Controls" in Transmission Section*

Removal (½ & ¾ Ton): Drain transmission Disconnect speedometer cable at transmission and shift control rods from transmission levers Remove propeller shaft Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes Remove the two lower transmission to clutch housing capscrews Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse)

See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever

See "Transmission Control" in Transmission Section.

Removal: Same as for "3-Speed (Light Duty)" above

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse) Floor mounted gearshift.

Transmission Control: Floor mounted gearshift lever.

Removal (½ Ton). *See "3-speed (Light Duty)" above.*

Removal (Other Trucks): Drain transmission, disconnect parking brake and remove lever. Remove propellor shaft, transmission gearshift lever (use Tool J-8109) Remove screws that fasten steering jacket grommet to floor and slide grommet up jacket out of way Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor, remove cover. On Forward Control Models, remove both front and rear floor pans. Disconnect speedometer cable from driven gear fitting at transmission rear bearing retainer. Remove two top attaching screws, insert Guide Pins J-1126, remove flywheel underpan, two lower transmission screws, slide transmission straight back, remove transmission from vehicle.

HYDRA-MATIC DRIVE

Dual Range. Four speed type with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See Transmission S ction.*

►*TESTING & TROUBLE SHOOTING. S "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level in transmission every day Drain & refill every 25,000 miles Use only "Automatic Transmission Fluid" Type A

Checking Fluid Level—With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid lev l with engine at idling speed.** Add sufficient fluid to bring level in transmission to "F" mark on dipstick.

Capacity—8½ qts. (refill), 9 qts. (after overhaul) *NOTE*—1 qt additional with oil cooler

Throttle Linkage Adjustment: *S e CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA—See "Hydra-Matic Drive" in Transmission S ction*

UNIVERSALS

Spicer. Needle bearing type.

FRONT AXLE

4-WHEEL DRIVE

Full floating hypoid gear type Differential assembly (ring gear and pinion assembly) is serviced in same manner as rear axle

See "Chevrolet 4-Wheel Driv " in Rear Axl S ction

Ratio - (½ Ton) 3 90-1 (¾-Ton) 4 57-1 (1-Ton) 5 14-1

Removal: Separate propeller shaft from front axle differential Place jack stands behind front springs Disconnect drag link from steering arm Disconnect brake hoses, shock absorbers from spring clamp plate Remove "U" bolts roll axle from under truck

Axle Shaft Assembly Removal: Remove front wheel (¾ and 1-ton) and drum (½-ton) Remove hub cap and drive flange stud nuts Remove drive flange-to-axle shaft retaining snap ring, drive flange and shim *NOTE* - Use screws in tapped holes in flange (if necessary) to force flange from shaft, then replace plastic plugs Use Tool J-6893 (½-ton), J-6649 (¾ & 1-ton) to remove outer locknut Remove lock and inner locknut Remove hub assembly (½-ton), drum and hub assembly (¾ & 1-ton), but do not drop loose outer bearing from bore of hub Remove brake and spindle assembly mounting nuts (½-ton), brake assembly and spindle Remove brake and spindle mounting nuts (¾ & 1-ton), then remove slinger Remove axle shaft and joint assembly

Installati n: Install axle shaft and joint assembly, being careful not to damage seal with shaft splines Seat

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spindle-to-steering knuckle studs (flat side up to clear brake cylinder on ½-ton), then position brake assembly (½-ton) and slinger (¾ & 1-ton) over studs and tighten stud nuts to 50-60 ft lbs Install hub over spindle (½-ton), drum and hub assembly (¾ & 1-ton) *NOTE* - Lubricate bearings before assembly and DO NOT damage seal Install inner nut and tighten wrench tight, then back off 1/8 turn Hub should be free to turn Install lock and outer locknut (against spacer on ¾ & 1-ton) Install shim and drive flange *NOTE* - Add only enough shims (.010") as necessary for flange to clear end of axle ball housing *CAUTION - Shims in excess of .030" will cause excessive wear of spindle bushing and inner race with the installation of the snap ring.* Install snap ring and flange nuts Tighten flange nuts to 18-20 ft lbs (½-ton), 32-38 ft. lbs (¾ & 1-ton) Install hub caps and lubricate front axle

REAR AXLE

SEMI-FLOATING (HALF-TON)

Own. Semi-floating, hypoid gear type with Hotchkiss drive. *NOTE*—Same design as passenger car axle.

See "Chevrolet Hypoid Semi-Floating" in Rear Axle Section.

Ratio - (Synchro-mesh & Hydra-Matic) 3.90-1 (39-10) Std., 3.70-1 (37-10) Opt'l

►*AXLE SHAFT NOTE:* Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft, or by length as follows:

Axle	Part No.	Length
Left	3694769 Ⓒ	29 5/8"
Right	3694770 Ⓒ	30 5/8"

Ⓒ - Part No. stamped on axle for identification

Backlash - .005-.008"

Axle Shaft Removal: Remove wheel and brake drum Drain rear axle lubricant, remove housing cover Remove differential pinion shaft lockscrew, pinion shaft, axle shaft spacer and pinions Push axle shaft in toward center of car and remove "C" washers from inner ends of shaft, then remove axle shaft

Axle Shaft Endplay - Free fit to .014" maximum

Differential Carrier Removal: Remove axle shafts to clear differential side gears, *see "Axle Shaft Removal"*. Separate rear universal joint (tape bearings to trunnion) Remove differential carrier to housing bolts and separate carrier from housing

FULL-FLOATING (¾, 1, 1½ & 2-TON)

Own. Full-floating hypoid (straddle mounted pinion) with Hotchkiss drive

See "Chevrolet Truck Hypoid Full Floating" in Rear Axle Section

►*AXLE RATIO IDENTIFICATION NOTE:* Axle ratios are identified by prefix letters in rear axle numbers stamped on top of carrier housing between reinforcing ribs

Axle Ratio Identification

Ratio	Prefix Letters
4.57-(32:7)	CC,DC,CP
5.14-1 (36:7)	CA,CB,CE,CF,CG
6.17-1 (37:6)	CG
7.2-1 (36.5)	CM

Backlash - .005-.008"

Removal of Differential Carrier: Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal below. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier in floor jack and roll from under truck.

Axle Shaft Removal (¾ & 1-Ton): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

Axle Shaft Removal (1½ & 2-Ton): Remove hubcap, then thread Tool J-1436-1 into hole in axle shaft and use slide hammer to remove shaft

NOTE—When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines

►**Axle Shaft Note:** Shafts unequal length (right shaft longer than left). Install in correct position.

Wheel Bearing Adjustment: Remove wheels and axle shafts (see above). Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ Ton), J-5670 (2-Ton) while turning hub by hand, then back off nut 45°, check for free turning, install adjusting nut lock with lock tangs aligned with slots in adjusting nut. Bend tang down into notch in adjusting nut, install locknut and tighten securely. Bend tang of lock down into notch of locknut.

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type. with hypoid primary pinion and ring gear.

See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.

Axle Ratio - 6.40-1 (high), 8.72-1 (low) 35:6 Primary gears

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above.

SHOCK ABSORBERS

Delco. Direct Acting (Airplane Type) shock absorbers as follows:

Shock Absorber Nos.	Front	Rear
½, ¾, 1 ton (Exc. Fwd. Contr.)	5532049	5534435
½, ¾, 1 ton Fwd. Contr.	5513193	5513349
1½, 2 ton (Exc. Fwd. Contr., Sch. Bus)	5521698	5534401
1½ ton Sch. Bus	5521698	5320846
2 ton Sch. Bus	5521699	5534401

FRONT SUSPENSION

2-WHEEL DRIVE

Conventional "I" Beam Section, with Reverse Elliott ends and semi-eliptic springs

Kingpin Inclination - 6.16-8.18° (Exc. 6242,6642 with Eaton Axle), 4° (6242,6642 with Eaton Axle)

Caster (At Designed Load) - Pos. 1.5° (31,3200), 3.0° (.3600), 2.25° (3800), 2° (34,35,37,41,44,45,5000), 2.25° (6000), 2.75° (6242,6642)

Camber - 1.25-1.75° (Exc. 6242,6642 with Eaton Axle), 1°30' (6242,6642 with Eaton Axle)

Toe-In - 13-.22" (31,3200), 25-.31" (All Others)

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22.5-23.5°.

4-WHEEL DRIVE

Optional on some ½, ¾ and 1-Ton models

Kingpin Inclination - 8°

Caster - 1¾° Not adjustable

Camber - 1½°. Not adjustable

Toe-In - 1/32-5/32" *NOTE* - Adjust tie rod ends Fine thread end changes toe-in ¼" per turn, coarse end 9/32"

STEERING

Manual: Saginaw Ball Bearing Worm & Nut (recirculating ball).

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Bendix Linkage Type — *See "Chevrolet Truck (Bendix)" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*NOTE: Two differential type brakes used on trucks as indicated below.*

Chevrolet-Bendix (Front - 3,4,5,6000 Series), (Rear -

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3000 Series) - Duo-Servo, single anchor type hydraulic (Without ecce ntric adjustment)

S e "Chevrolet-Bendix Hydraulic" in Brake Section

►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION.* If bench type grinder used, grind shoes to 057"-087" smaller diameter than drum size If spindle type grinder used, grind shoe to drum diameter

Chevrolet-Twinplex (Rear-4,5,6000 Series) - Two cylinder, four anchor type hydraulic Shoes are self-centering and self-energizing

S e "Chevrolet-Twinplex" in Brake Section

Wheel Cylinders - Size stamped on housing under adjusting lock spring

Drums - Cast iron with steel web

Model	Drum Diameter Front	Rear
1/2-Ton	11"	11"
3/4-Ton	12"	©12"
1-Ton	12"	14"
1½ & 2-Ton	14"	15"

© - On Fwd Contr models

Lining - Molded type Bonded on 1'2-ton models, riveted on all other models

Model	Thickness	Width
1/2-Ton (Front Whl)	3/16"	2"
1 '2-Ton (Rear Whl)	3/16"	1¾"
3/4-Ton (Front & Rear)	1/4"	© 2"
1-Ton (Front Whl)	1/4"	2"
1-Ton (Rear Whl)	1/4"	2½"
1½ & 2-Ton (Front Whl)	1/4"	2½"
1½ & 2-Ton (Rear Whl)	3/8"	4"

© - On Fwd Contr models

Clearance - Adjust for clearance as follows·

All Models (Except 1½ & 2-Ton Rear Brakes)—Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (Half-Ton Models), or just enough to eliminate brake drag (Other Models), but not more than 7 notches

Rear Wheels (1½ & 2-Ton Models)—Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel)

Parking Brakes: Hand lever applies rear wheel service brakes on Half-Ton & ¾-Ton Models, and an independent brake on propeller shaft on all other models.

Adjustment (½ & ¾-Ton Models)—*See "Chevrolet-Bendix Hydraulic" in Brake Section.*

Adjustment (1, 1½, 2-Ton Models & ¾-Ton with 4-Speed Transmission)—*See "Chevrolet Twinplex" in Brake Section.*

Master Cylinder: Located under floorboard on left hand side of truck

Checking Fluid—Maintain fluid level to lower edge of filler hole.

Removal—Remove from below. *CAUTION*—On 1½ & 2 Ton Low Cab Forward, spacer between cylinder and body bracket will fall out when mounting bolts removed.

Installation—Reverse removal procedure. On LCF Models make sure the spacers are reinstalled

Power Brakes: *See "Hydrovac Power Unit" in Brake Sect.*

Removal—Remove vacuum line, brake fluid line to wheel and master cylinders, and air cleaner hose from vacuum unit. Remove nuts and bolt securing unit to its bracket on right side rail of frame.

MISC. MECHANICAL

Windshield Wipers: Linkage type Vacuum motor used on 3,4000 Series, New Electric Motor used on all ther models

See "Windshield Wipers" in Misc llaneous S ction.

►*JACKING & HOISTING CAUTION (ALL MODELS):* Before jacking or hoisting, see *"Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Model	Series	Series Prefix
Biscayne, Brookwood Ⓒ	1100	A
Sedan Delivery	1170	G
El Camino Pickup	1180	G
Bel Air	1500	C
Parkwood & Kingswood Ⓒ	1500	C
Impala, Nomad Ⓒ	1700	E

Ⓒ - Station Wagons.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data.

① ② ③ ④

A 59 F 100001

① - Series. See Series Table above.
② - Year - 1959.
③ - Assembly Plant. See Assembly Plant Table below.
④ - Unit Number. Continuous for all cars at each assembly plant starting with 100001.

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St. Louis
G - Pontiac	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor). *NOTE* - Number (example below) includes identification data.

① ② ③

T 101 A

① - Engine Plant. **F** - Flint, **T** - Tonawanda, **C** - Engines built in Canada.
② - Code number indicating month and day of manufacture. This is not an individual or continuous number.
③ - Engine type. **A** - With 3-speed transmission, **B** - With Powerglide, **AE** - With heavy duty clutch.

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum with all cylinders equal within 20 lbs. at cranking speed.

VACUUM READING: 17-21" steady at idling speed.

VALVE TAPPET CLEARANCE: None in service (Hydraulic). For initial tappet clearance, see *"Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic type. Check for free operation. Should require ½ turn from unhooked to hooked position. Replace distorted spring.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 44.

COIL: Delco-Remy 1115120.

Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.

Resistor - Resistance type cable used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation). Bypassed during cranking when coil energized directly from starter solenoid bypass terminal.

DISTRIBUTOR: Delco-Remy 1112403.

Condenser - Delco-Remy 1928111. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1924571.

Breaker Gap - .016".

Cam Angle - 28-35° with .016" gap.

►*BREAKER GAP CAUTION: Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points.*

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "0" position.

Vacuum Spark Control: Delco-Remy 1116140.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
10-12	20-24	15-16

IGNITION TIMING

Setting - 5° BTDC at idle speed with vacuum line disconnected. *NOTE - Supersedes previous specification of TDC and will give better economy.*

Timing Mark - First short vertical line on flywheel, clockwise from steel timing ball (TDC) insert. Line up with pointer in inspection hole in right front face of housing with Octane Selector set on "O".

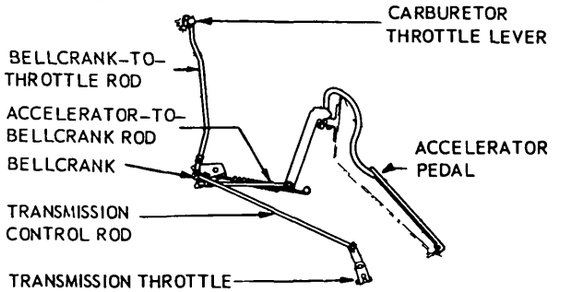
CARBURETOR

►*CARBURETOR APPLICATION: Rochester BC single barrel carburetor used.*

►*WARM ENGINE HARD START CORRECTION (Auto. Trans.):* When engine tune-up does not correct condition, set choke cover one notch lean of index mark.

►*CARBURETOR THROTTLE BODY TO FLOAT BOWL SEALING CORRECTION:* When throttle body to float bowl screws work loose, install new gasket (black in color) released for current models.

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): 1) Disconnect control rod from throttle lever at transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever counterclockwise to open throttle position. 2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7.09", measure distance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod. 3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank. 4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position. 5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.



CHEVROLET 6 CYL. POWERGLIDE THROTTLE LINKAGE

ROCHESTER BC

Rochester BC. Single barrel carburetor used as follows:

Model	Rochester Carburetor No.
Synchro-mesh (Std.)	7013003
Synchro-mesh (Governor)	7013005
Synchro-mesh (Economy)	7013953
Powerglide (Std.)	7013000
Powerglide (Governor)	7012502
Powerglide (Economy)	7013956

Idle Setting - 1½ turns open. 2½ turns open after engine temperature normal..

Idle Speed - 475 RPM Synchro-mesh, 450 RPM Powerglide in "D".

Float Level - 1 9/32" (Gauge M-250). With air horn inverted and gasket in place, position Gauge M-250 over floats with tang inserted in discharge nozzle. Bend float arms as necessary so that top of each float just touches gauge and float is centered between gauge legs.

Float Drop - Bend float tang as necessary to obtain a distance of 1¾" from gasket surface to bottom of float, with air horn upright and float hanging free

Choke Adjustment: 1 notch lean (Synchro-mesh), centered on index (Powerglide).

Fast Idle: With fast idle adjusting screw on second step and against high step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and bore. To adjust, bend connector rod.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA:* See *"Rochester BC Carburetors" in in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type. Fuel only.

Replacement Fuel Pump - AC 4434.

Pressure - 3½-4½ lbs. at 450-1000 RPM.

See *"Fuel Pumps" in Carburetion Section.*

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Gas lin Gaug : AC Electric type.
Dash Unit - AC No. 5640248.
Tank Unit - *See table below.*

M del	AC No.
Pass. 5/16" pipe	5640284
Sta. Wgn. 3/8" pipe	5640297
El Camino Pickup & Pan. Del.	5640297

S e "Fuel Gauges" in Carburetion Section.

BATTERY

D lco. 2SMR53W. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Engine to cowl at rear head bolt.

STARTER

D lco-Remy 1107652. Armature - 1932185.
Drive - Overrunning clutch (solenoid pinion shift).
R tation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid Switch 1119919 mounted on starter and controlled by Ignition & Starter Switch 1116556.
S e "Delco-Remy Starter Solenoid (Without Relay)" in El ctrical Section.

N utral Safety & Back-up Light Switch: Delco-Remy 1998677 used with Powerglide cars.
See "Chevrolet Powerglide" in Transmission Section.

GENERATOR

D lco-Remy. Used as follows:

Application	Generator	Armature
Standard	1102096	1923535
Air Cond.	1102114	1940737
Pwr. Strg.	1102115	1940313
Spec. Equip.	1106985	1927074

Performance Data

Generator	Amperes	Volts	RPM
1102096	30	14.0	2240
1102114, 115	35	14.0	2630
1106985	45-50	13.0	1400

R tation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amps. at 12 volts and 80°F.
B lt Adjustment: 3/8" deflection under 15 lb. load midway between generator and fan pulleys.

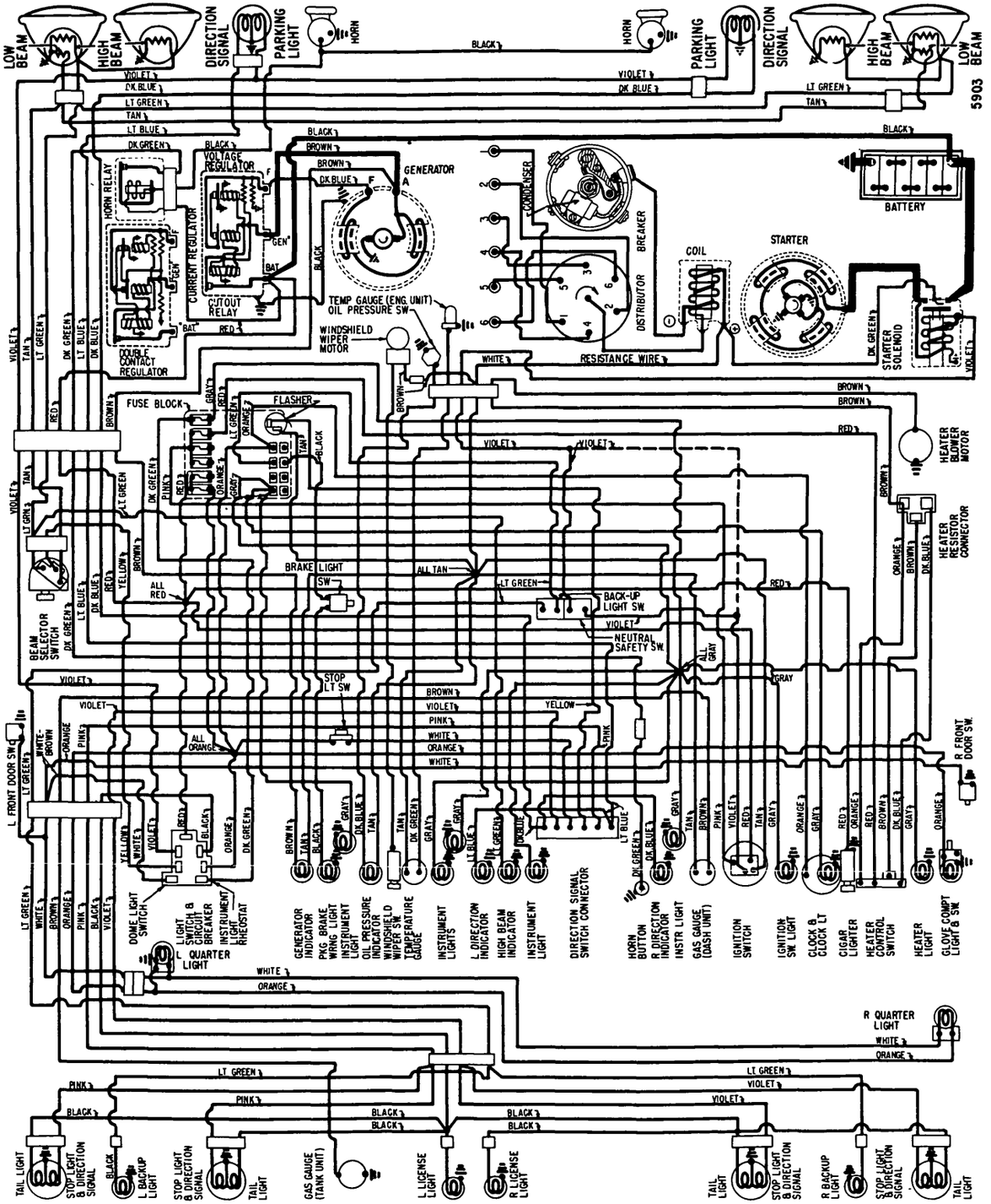
REGULATOR

D lco-Remy. Used as follows:

R gulator No.	Generator No.
1119001	1102096
1119002	1102114,5
1119603	1106985

►*DOUBLE CONTACT REGULATOR NOTE: Regulator 1119603 has d ubl c ntacts for v ltag r gulati n.*
►*NOTE - Specificati ns b l w ar for "Normal" s ttings.*

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Cut ut R lay

Cuts In - 11 8-13 5 volts (1119001 2) 11 8-13 0 volts (1119603)

C ntact Gap - .020". **Air Gap** - .020".

V ltage Regulator

S tting - (1119001,2) 13.8 - 14.8 volts at 125° F.

Setting - (1119603) 13.8-14.6 volts (Upper contacts), .1-.3 volts lower (Lower contacts) at 125° F.

C ntact Gap -- (1119603) .016" (Upper contacts) with lower contacts just touching.

Air Gap - .075" (Exc. 1119603), .067" (1119603)with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Curr nt Regulator

Setting (1119001) - 27-33 amperes.

Setting (1119002) - 32-37 amperes.

Setting (1119603) - 43-47 amperes.

Air Gap - .075". With armature pressed down to point where contacts just touch.

Ch cking & Adjusting - *See "Delco-Remy 12 Volt Regulators" and "D lco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Dual Headlights (4-Headlight System). *See "4-Headlight System" in Electrical Section.*

Dir ctional Signals: *See Electrical Section.*

Autr nic Eye: *See Electrical Section.*

Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.

Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.

Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.

CIRCUIT BREAKERS: A circuit breaker located in main lighting switch protects headlights and parking lights.

FUSES: Fuses contained in fuse block beneath dash on left side except as noted.

►*TAIL LIGHT FUSE CAUTION:* Fuse block may be marked for 10 amp fuse. Destroy marking and make sure 15 amp. fuse is installed.

20 Ampere - Heater & Air Conditioning.

15 Amp r - Tail, Stop, Courtesy, Glove Box, License Plate, Dome Lights and Clock.

10 Amp re - Back-up lights, Brake Warning light

9 Amp r - Overdrive. In wiring harness on engine side of dash.

3 Amp r - Instrument & Clock lights.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment of lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

Engin Sp cifications: **Own.** 6 Cyl valve-in-head.

B r	Str k	Displac m nt
3 9/16"	3 15/16"	235 5 cu. in.
Compr. Ratio	**Rated HP**	**Developed HP**
8.25-1	30.4	135 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

►*1950-58, 59 ROCKER ARM IDENTIFICATION NOTE: See "Rocker Arms" in Chevrolet Special Data*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: Drain crankcase. Raise and support car Drain cooling system and disconnect radiator hoses at radiator Disconnect battery ground strap at engine. Disconnect fuel pump inlet pipe at pump. Disconnect accelerator control rod at its lever. Remove overdrive solenoid. Disconnect power brake hose at check valve. Remove oil filter and support bracket Remove nuts and gasket at exhaust pipe flange-to-exhaust pipe connection. Disconnect lower transmission control rods at transmission. Disconnect clutch fork pushrod at clutch fork Disconnect all clutch control assembly from engine. Loosen transmission, and remove engine front mounting bolts. Remove hood Lift engine with Tool J-4536 about 3" or until valve rocker cover contacts dash upper panel Remove oil pan retaining bolts and screws. On synchro-mesh cars, remove flywheel underpan extension Remove pan

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data*

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64"

Removal - Pistons and rods removed from above

Clearance - .0005-.0011" Measured 1 29" from top of piston Selective fit

►*STANDARD & 001" PISTON NOTE* Standard and 001" pistons are furnished in two sizes as follows

235" Engine - Std. - Marked S4 (3 5625-3 5630"), **S5** (3 5630-3 5635"), **.001" Oversize** - Marked **S6** (3 5635-3 5640"), **S7** (3 5640-3 5645")

261" Engine - Std. - Marked **S4** (3 7500-3 7505"), **S5** (3 7505-3 7510"), **.001" Oversize** - Marked **S6** (3 7510-3 7515"), **S7** (3 7515-3 7520")

Fitting New Pistons: Use 0015" x ½" feeler (part of Tool J-5513) With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole) Pull required to withdraw feeler must be 7-18 lbs

Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine

Replac m nt Pistons: Furnished Std & 001", 020", 030", 040" Oversize

PISTON PIN

Locked in rod No bushing used in piston

Diam t r - **235" Eng.** - 8660- 8665" **261" Eng.** - 9270-9275"

Pin Fit in Piston - .00015- 00025" clearance With both piston and pin at 70°F, and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure

Replacement Pins: Furnished Std. & .0015", .003", .005" Oversize

PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr.(1&2)	.0930- 0935"	...①.....	...②
Oil(3).	181-.188"	..③.015-.055"	.....000-.008"

①- (235" Eng.) .007-.020". (261" Eng.) .010-.020"

②- (235" Eng) .002-.004" (261" Eng.) .002-.0035".

③- On Rails

Replacement Rings: Furnished Std., .020", .030" and .040" Oversize.

►*RING INSTALLATION CAUTION:* Install Compression rings with side marked "GM" up.

CONNECTING RODS

Length - 6 81" Center-to-center

Crankpin Journal Diameter - 2 311-2 312".

Lower Bearing - Replaceable precision type.

Clearance - 001- 003" (New), 001-.004" (Used).

Sideplay - 005- 012"

Replacement Bearings: Std & 001", 002", .010", 020" Undersize

Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft

CRANKSHAFT

Journal Diameters - **(1)** 2 6825-2.6845", **(2)** 2.7145-2 7155", **(3)** 2 7455-2 7465", **(4)** 2.7765-2 7775"

Clearance - 001- 003" (New), 001- 004" (235" Eng. Used), 001- 0045" (261" Eng - Used).

Bearings - Thin wall babbitt with steel back

Bearing Adjustment: Precision type. Replace bearings.

End Thrust - Taken by No. 3 (rear intermediate) main bearing

End Play - 003- 009"

Replacement Bearings: Furnished Std. & 002", 010", 020", 030" Undersize

Bearing Installation: Can be replaced without removing engine

See "Crankshaft & Main Bearings" in Chevrolet Special Data

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data*

CAMSHAFT

Journal Diameters - **(1)** 2 1537-2 1547", **(2)** 2 0912-2 0922", **(3)** 2 0287-2 0297", **(4)** 1 9662-1 9672"

►*NOTE* Journal out-of-round limits 001" Run-out limits 002"

Bearing Type - Steel backed babbitt lined bushings, no reaming required

Clearance - 0015- 0035"

End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket

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End Play - 001- 005"
Timing Gear: Fibre camshaft gear, steel crankshaft gear
Back Lash - 003- 005"
Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data*
Camshaft Setting: Timing is correct when timing marks on gears are together
Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance: (Pass. Cars) - None in service (hydraulic).
Initial Tappet Clearance (Engs. with Hydraulic Lifters) - *See "Valve System" in Chevrolet Special Data*
(Trucks) - 235" Eng - 006" Intake, 018" Exhaust, Hot, 261" Eng - 006" Intake, 020" Exhaust, Hot
See "Valve System" in Chevrolet Special Data

	Head Diam	Stem Diam.	Length
Intake	1 870-1 880"	3410- 3417"	6 376-6 396"
Exhaust	1 495-1 505"	3410- 3417"	4 913-4 933"

Valve	Seat Angle ℂ	Lift	Stem Clearance
Intake	②30°	3275"	0010- 0027"
Exhaust	②45°	3275"	0013- 0030"

ℂ - Valve face angle 29° Intake, 44° Exhaust
② -Valve face and seat angle specifications are service specifications New engine specifications are Seat angle - 31° Intake, 46° Exhaust Face angle - 30° Intake, 45° Exhaust

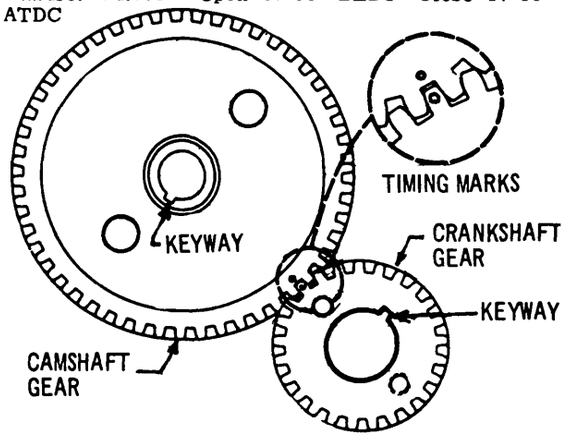
►*VALVE GRINDING CAUTION* Replacement valves are furnished with face angles of 30° and 45° When seats are ground to recommendations of 30° and 45°, valves must be faced to recommended angle of 29° Intake, 44° Exhaust

►*VALVE STEM END GRINDING CAUTION (261" Eng)* DO NOT grind hardened valve stem tip excessively on 261" Engine
Valve Seat Width - 235' Eng. 1/16-3/32" (Int & Exh)
261" Eng. - 1/16-3/32" (Int), 3/32-1/8" (Exh)
Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data*
Valve Guides: Precision type, pressed in head
Valve Guide Installation - *See "Valve System" in Chevrolet Special Data*
Valve Springs: Install springs with closed coil end down
Free Length - (235") 2 5/32", (261") 2 9/32"

Spring Specifications

Valve (All)	Pressure	Length
Closed	62-68 lbs	1 858"
Open	158-168 lbs	1 528"

►*VALVE SPRING HEIGHT CAUTION* Check installed height of valve springs If distance from spring seat in head to top of valve spring exceeds 1 55/64", install shim approximately 1 16" thick. At no time should shim spring be installed to obtain installed height of less than 1 51/64"
Valve Lifters (Pass Cars): Hydraulic type *See "Valve System" in Chevrolet Special Data*
Valve Lifters (Trucks): Mechanical type. Removed from above
Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data* **VALVE TIMING**
See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE:* Specifications are for valve timing with Zero valve lash. *See Valve Timing Check*
Intake Valves - Open 16° BTDC Close 48° ALDC
Exhaust Valves - Open 46°30' BLDC Close 17°30' ATDC



CHEVROLET 6 CYL. VALVE TIMING MARKS

Valve Timing Check - *CAUTION* It will be necessary to replace the hydraulic valve lifter and pushrod operating No 1 exhaust valve, with a conventional lifter and pushrod) Remove all tappet clearance from No 1 exhaust valve Turn engine over until this valve just starts to close and until triangular flywheel mark lines up with pointer on right face of flywheel housing Mount dial indicator on rocker arm shaft with stem of indicator contacting No 1 exhaust valve adjusting screw and set dial indicator to 063" Turn crankshaft until indicator hand just stops moving Timing is correct if indicator reading is ZERO plus or minus .005" A greater or lesser reading indicates either excessive gear wear or improperly installed timing gears Reset tappet clearance to specifications

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data*
Crankcase Capacity: 5 qts (refill), 5½ qts (dry)
Normal Oil Pressure: 35 lbs at 2000 RPM
Pressure Regulator Valve - In oil pump body Not adjustable
Oil Pressure Indicator - Light located at right side of instrument cluster, controlled by pressure switch, AC No 1508753 located in main oil gallery on left side of engine Switch closes when pressure drops to 4-7 lbs
Oil Pump: Gear type Located in crankcase, driven by distributor gear
Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data*
Oil Filter Element: AC P-115.
►*ROCKER ARM OIL LEAD NOTE* Drilled orifice in cylinder block has been increased in size from 1/16" to 11/32" and the overflow end of oil connector has been closed to sustain oil pressure in rocker shaft
Crankcase Ventilation (Standard): Air intake through breather filter in valve rocker arm cover and outlet through crankcase breather pipe on right side of engine
Servicing - Clean breather filter in a good solvent every 2 000 miles then oil mesh with light engine oil
Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds **Valve must close at idling to give proper air-fuel mixture.**
Servicing - Every 10,000 miles (or oftener if required) clean vacuum pipe, valve, and filler pipe thoroughly Filler cap gasket must seal tightly
►*VACUUM VALVE CAUTION·* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS) Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material*
Water Capacity: 16½ qts Std , 17½ qts with heater
Pressure Valve: Radiator filler cap, AC No 850800, AC type RC-6, 13 lb
Thermostat: Pellet type In cylinder head water outlet
►*THERMOSTAT INSTALLATION NOTE* 170° thermostat used as standard in production beginning with Engine No F1119 160° & 180° thermostats optional Use 160° thermostat with Methanol type anti-freeze
Temperature Gauge: AC electric
Dash Unit - AC No 1513665
Engine Unit - AC No 1513321
See "Temperature Gauges" in Miscellaneous Section
Water Pump: Packless type with sealed ball bearing shaft *See "Water Pumps" in Chevrolet Special Data*

CLUTCH

Own. Diaphragm Spring type 10" (Std), 11" (H D)
See "Chevrolet (Own)" in Clutch Section

Clutch Disc -	Wov n-Ch vr l t N	.-Mold d
9½" 1st Design	ℂ 3754604	3743502
9½" 2nd Design	3769724	3769723
11" Hvy Dty	3754603	

ℂ - Hub painted white

Pedal Adjustment: (Preferred Method) - Disconnect forward end of clutch fork pushrod from cross shaft lever Hold fork pushrod rearward (to remove all lash), then adjust swivel on pushrod so conical point lines up with "dimple" in cross shaft lever This will give desired 060" clearance between bearing and clutch spring This procedure provides free travel setting of ¾-1"

Over-Center Spring Adjustment: Loosen adjusting hook nut at back of pedal bracket and turn jam nut to obtain an installed length of 10 5/16" for over-center spring. Tighten nut to 8-12 ft. lbs.
Removal· Remove transmission (see Transmission Removal below). Remove throwout bearing from fork. Remove clutch fork tension spring from fork, disconnect clutch fork pushrod. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824, to support clutch assembly during

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removal. Loosen clutch attaching bolts one turn at a time until diaphragm spring is released. Remove Pilot Tool, then remove clutch assembly from car.

SYNCHRO-MESH TRANSMISSION

Oper. Three speed synchro-mesh.

See "Chevrolet 3-Speed" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Drain transmission and disconnect speedometer cable and shift rods. Remove propeller shaft center bearing support bolts. Separate rear universal joint and pull propeller shaft assembly to rear under axle housing.

2) Support rear of engine, remove transmission rear support noting number of shims.

3) Remove two top transmission to clutch housing screws, install guide pins (J-1126), then remove two lower capscrews. Slide transmission back on guide pins to clear clutch disc splines.

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown.

See "Chevrolet Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 & R11 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh transmission (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS: See "Chevrolet Powerglide" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Use Automatic Transmission Fluid Type A with an AQ-ATF-A number. Type A with AQ-ATF number is permissible when AQ-ATF-A not available.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 4½ qts. (refill), 10½ qts. (after overhaul).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER POWERGLIDE SERVICE DATA: See "Chevrolet Powerglide" in Transmission Section.*

UNIVERSALS

Oper. Yoke & Spider (trunnion) type.

►*CAUTION* - Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened.

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

REAR AXLE

Oper. Semi-floating, hypoid gear type with Hotchkiss Drive. *NOTE* - "POSITRACTION" Limited Slip Differential Optl.

See "Chevrolet Pass. Car (Hotchkiss Drive)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Ratios - 3.55-1 (Std.), 4.11-1 (Early Overdrive), 3.70-1 (Later Overdrive), 3.36-1 (Powerglide).

Backlash - .003-.010" (.005-.008" preferred).

Carrier Removal: Remove rear wheels, brake drum and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant. Remove differential carrier nuts and lift out carrier assembly.

Axle Shaft Removal: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE*—If bearing retainer and parking brake strut interfere, raise strut slightly

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

SHOCK ABSORBERS

Delco. Direct acting non-adjustable.

Replacement Shock Absorbers

Model	Front	Rear
Pass. S.M. (Exc. Air Susp. & AC)	5543736	5543732
Pass. Auto. Trans. (Exc. Air Susp.)	5543735	5543732
Pass. Air Susp.	5543737	5543734
Sta. Wgn., Taxi	5543735	5543733
El Camino Pickup & Sed. Del.	5543735	5543733

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs and spherical type joints. *See "Chevrolet (Spherical Joint) Suspension" in Suspension and Wheel Alignment Section.*

►*FRONT WHEEL ROLLER BEARING & INNER SEAL NOTE:* Roller bearings available for heavy duty Taxis, Police Cars *See "SUSPENSION NOTES" in Chevrolet Special Data.*

Steering Axis Inclination - 7¼° ±½°.

Caster - 0° ±½° (Std.), 1½° ±½° (Air Susp.).

Camber - Pos ½° ±½° (Std & Air Susp.)

Toe-In - 1/8-1/4" (Std.), 0-1/8" (Air Susp.).

Toe-Out on Turns - Inner Wheel 20°, Outer Wheel should be 18°

REAR SUSPENSION

Rear Suspension: *See "Chevrolet Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs on all four wheels. Shock absorbers mounted to rear of air springs. *See "Front Suspension" above for Alignment Specifications and "Chevrolet Air-Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Own (Linkage Type). *See "Chevrolet Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes.

See "Chevrolet-Bendix Hydraulic" in Brake Section

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION.* To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087" smaller diameter than the drum diameter. Grinding shoes to the true drum diameter on bench grinders will cause heel and toe contact, resulting in erratic brake action. *NOTE—If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter*

Drums—Diameter 11".

Wheel Cylinder Diameter—Front 1 1/8", Rear 1".

Brake Lining	Width	Thickness
Front wheel	2.14"	.175"
Rear wheel	2.00"	.175"

Length Per Shoe—9.3125" (Primary), 11.6875" (Secondary).

Braking Power—55.9% (Front Wheels), 44.1% (Rear Wheels).

Clearance—Single adjusting screw located at bottom of backing plate. Back off adjusting screw 7 notches from slight drag position. Brakes must be free of any drag

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal.

Checking Fluid—Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of filler hole.

Removal - Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove cotter and clevis pins from brake pedal arm, then remove four retaining nuts and lockwashers and remove cylinder.

Power Brakes: New Bendix or Moraine Power Units. *See "Bendix Hydraulic (Disc) Reaction" or "Moraine Hydraulic (Diaphragm) Reaction" type Power Unit in Brake Section.*

Removal: Disconnect clevis at brake pedal assembly (remove clevis if necessary to clear hole in firewall). Remove vacuum hoses from brake unit and hydraulic line from master cylinder. Remove four nuts and lockwashers and withdraw power unit.

MISC. MECHANICAL

Windshield Wipers: Electric (Single Speed Std., Two Speed Optl.). Link-and-crank arm type.

See "Windshield Wipers" in Miscellaneous Section.

Window Regulators: Electric type with reversible motor operating each door window assembly.

See "Power Window Regulators" in Miscellaneous Section.

Power Top Control: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjusters: A reversible electric motor for each of the three basic movements of 6-way seat control. *See "Power Seat Adjusters" in Miscellaneous Section*

Air Conditioning: *See "Chevrolet Air Conditioning" in Miscellaneous Section.*

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking, hoisting, towing or working under car, see "Jacking & Hoisting Precautions" and "Chevrolet Air Suspension" in Suspension Section*

MODEL IDENTIFICATION

Model	Series	Series Prefix
Biscayne, Brookwood Ⓒ	1200	B
Sedan Delivery	1270	H
El Camino Pickup	1280	H
Bel Air	1600	D
Parkwood & Kingswood Ⓒ	1600	D
Impala, Nomad Ⓒ	1800	F
Corvette	800	J

Ⓒ - Station Wagons.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data.

① ② ③ ④

B 59 F 100001

① - Series. See Series Table above.
② - Year - 1959.
③ - Assembly Plant. See Assembly Plant Table below.
④ - Unit Number. Continuous for all cars at each assembly plant starting with 100001. *NOTE* - Corvette numbered separately starting with 100001.

Assembly Plant Designation

A - Atlanta	J - Janesville	N - Norwood
B - Baltimore	K - Kansas City	O - Oakland
F - Flint	L - Los Angeles	S - St. Louis
G - Pontiac	W - Willow Run	T - Tarrytown

ENGINE NUMBER: Stamped on pad at front, right hand side of cylinder block. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③

T 101 C

① - Engine Plant. **F** - Flint, **T** - Tonawanda, **C** - Engines built in Canada.
② - Code number indicating month and day of manufacture. This is not an individual or continuous number.
③ - Engine type. See table below.

ENGINE TYPE

283" Pass. Car Engine

	3-Speed		Overdrive	
Carburetor Type	2-Bbl.	4-Bbl.	2-Bbl.	4-Bbl.
Conv. Cars	C	CF	CD	CG
Fuel Inj. Cars	CH, CJ Ⓒ			

	Powerglide		Turboglide	
Carburetor Type	2-Bbl.	4-Bbl.	2-Bbl.	4-Bbl.
Conv. Cars	D	DB	E	EB
Air Susp. Cars	DE	DF	EF	EG
Air Cond. Cars	DK	DM	EG	EJ
Air Susp. & Air Cond.	DL	DN	EH	EK
Fuel Inj. Cars	DP		EC	

283" Corvette Engine

	3-Speed	Powerglide
One 4-Bbl. Carb.	CQ	DG
Two 4-Bbl. Carbs.	CT, CU Ⓒ	DJ
Fuel Inj. Cars	CR, CS Ⓒ	DH

348" Pass. Car Engine

	3-Speed	Powerglide	Turboglide
One 4-Bbl. Carb.	F, FD Ⓒ	G, GD Ⓒ	H
Three 2-Bbl. Carbs.	FA, FB Ⓒ	GB	HA

Ⓒ - Engines with Hi-Lift Camshaft.

TUNE-UP

COMPRESSION PRESSURE: 283" Pass. 2-Bbl. - 140 lbs. min.
283" Pass. Others - 150 lbs. min.
283" Corv. - 140 lbs. (Mech. Lifters), 160 lbs. (Hydr. Lifters).
348" - 150 lbs.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters **except as follows:**
283" Pass. Hi-Lift Cam. - .008" Intake, .018" Exhaust. Hot & Idling (Slow speed driving).
283" Pass. Hi-Lift Cam - .012" Intake, .018" Exhaust, Hot & Idling (High speed driving).
283" Corv. Hi-Lift Cam - .012" Intake, .018" Exhaust, Hot & Idling.
348" Hi-Lift Cam - .008" Intake, .018" Exhaust, Hot & Idling (Maximum economy).
348" Hi-Lift Cam - .012" Intake, .018" Exhaust, Hot & Idling (Maximum power output).
Initial Tappet Clearance (Engines with Hydraulic Lifters) - *See "Valve System" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Single Exhaust - Single exhaust pipe with crossover pipe from right exhaust manifold. Heat control valve with thermostatic coil spring located between right exhaust manifold and exhaust pipe. Make sure valve shaft is free to turn. If sticking, free up with kerosene or alcohol containing a small amount of baking soda.
Dual Exhaust - Coil spring and counterweight (same as for single exhaust).
►*DUAL EXHAUST NOTE:* With valve closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plug - 283" Pass. AC No. 44 (Std.), No. 45 or 46 (hotter for continuous City operation), No. C-43 COM (Colder for continuous heavy duty service), 14 mm. Tighten to 20-25 ft. lbs.
283" Corvette - AC No. 46 (City), No. 44 (Town & Country), No. C43 COM (Hvy. Duty), No. C42-1 COM (Very Heavy Duty).
348" - AC No. 44N (Std.), No. 43N (Hvy. Duty). *NOTE - Long Reach plugs.*

COIL: Delco-Remy (283" Eng.) 1115115 (Std.), 1115083 (Fuel Injection); **Corvette** - Delco-Remy 1115091 (Std.), 1115071 (Fuel Injection); **348" Eng.** - 1115083 (Std.), 1115111 (Three 2-Bbl. Carb.), 1115114 (Hi-Lift Cam).
Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.
Resistor - Delco-Remy 1931385 (Corvette, 348" Eng. with three 2-Bbl. Carbs. & Hi Lift Camshaft).
Resistor (Others) - Resistance type cable used between coil and ignition switch. Bypassed during cranking by lead from solenoid to coil.

DISTRIBUTOR: Delco-Remy. Used as follows:

Application	Delco-Remy No.
283" (2-Bbl. Carb.)	1110947
283" (4-Bbl. Carb.)	1110946
283" (Two 4-Bbl. Carbs.)	1110891
283" (Fuel Inj.)	1110915
283" (Fuel Inj. & Hi-Lift Cam.)	1110914
348" (Std.)	1110946
348" Hi-Lift Cam & Auto. Trans.	1110948
348" Hi-Lift Cam & Synchro-mesh	1110919

►*DISTRIBUTOR NOTE: Different types used as follows:*
Models 1110915, 946, 947, 948 - External adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*
Models 1110891. 914, 919 - Double breaker with conventional distributor cap (not window type), Vacuum spark control not used (centrifugal weight advance only).
Condenser (Window Type) - Delco-Remy 1932004.
Capacity - .18-.23 mfd.
Condenser (Double Breaker) - Delco-Remy 1869704.
Capacity - .18-.23 mfd.
Contact Point Set (Window Type) - Delco-Remy 1931988.
Contact Point Set (Double Breaker) - Delco-Remy 1938330 (two used).
Breaker Gap (Window Type) - Gap (.016") will be correct when cam angle correctly set (see below).
Breaker Gap (Double Breaker) - .014-.018" (new points).
Cam Angle (Window Type) - 28-32°. Set at 30°. Gives .016" point opening.
Cam Angle (Double Breaker) - Adjust each set of points to 29°±1° with other set blocked open with .025" thick insulator. Cam angle for both sets of points operating together should be 34°±1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation --Clockwise viewed from above.

Automatic Advance - 1110891, 915, 946

Degrees	Distr.	RPM	Degrees	Eng.	RPM
1.5-2.5		400	1-5		800
6-8		750	12-16		1500
9.5-11.5		1300	19-23		2600
13-15		1850	26-30		3700

Automatic Advance - 1110914

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		600	0-4		1200
1.5-3.5		750	3-7		1500
6-8		1950	12-16		3900
10-12		3000	20-24		6000

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Aut matic Advanc - 1110919

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	400	1-5	800
6.5-8.5	775	13-17	1550
9.5-11.5	1600	19-23	3200
13-15	2500	26-30	5000

Aut matic Advance - 1110947

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-4	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3750

Aut matic Advance - 1110948

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	425	0-4	850
4.5-6.5	800	9-13	1600
8-10	1600	16-20	3200
11-13	2300	22-26	4600

Vacuum Spark C ntr l: Delco-Remy 1116134 (1110915 Distr.), 1116148 (1110946, 947, 948 Distr.). *NOTE - Vacuum unit not used on double breaker type distributors.*

Vacuum Advance - 1116134

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	3.75-5.75
12	24	13-15

Vacuum Advance - 1116148

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
7.5	15	15-16

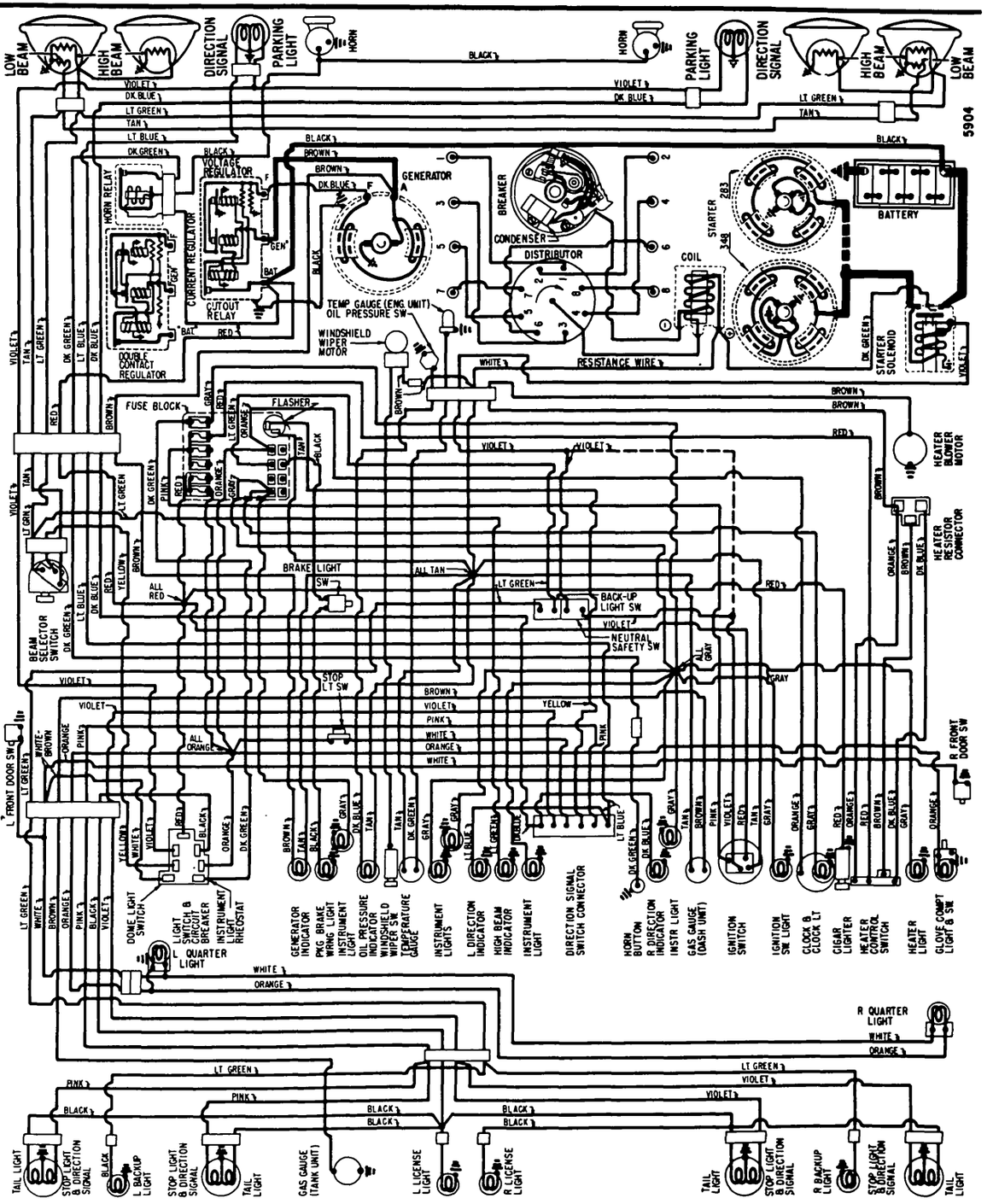
IGNITION TIMING

Engine	Std. Setting
283" Pass. (All Carbs.)	① 4° BTDC
283" Pass.(Fuel Inj. & Hydr. Lifters)	② 4° BTDC
283" Pass. (Fuel Inj. & Mech. Lifters)	③ 18° BTDC
283" Corv. (One 4-Bbl. Carb.)	① 4° BTDC
(Two 4-Bbl. Carbs. & Hydr. Lifters)	⑦ 4° BTDC
(Two 4-Bbl. Carbs. & Mech. Lifters)	④ 7° BTDC
(Fuel Inj. & Hydr. Lifters)	⑤ 4° BTDC
(Fuel Inj. & Mech. Lifters)	⑥ 18° BTDC
348" (One 4-Bbl. Carb.)	① 4° BTDC
(Three 2-Bbl. Carbs. & Hydr. Lifters)	① 4° BTDC
(Three 2-Bbl. Carbs. & Mech. Lifters)	⑦ 4° BTDC

① - Idling at 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").
② - Idling at 600 RPM (Synchro-mesh), 500 RPM (Auto. Trans. in "D").
③ - Idling at 700 RPM (Synchro-mesh), 600 RPM (Auto. Trans. in "D").
④ - Idling at 800-850 RPM (Synchro-mesh).
⑤ - Idling at 550 RPM. ⑥ - Idling at 650 RPM.
⑦ - Idling at 600 RPM.

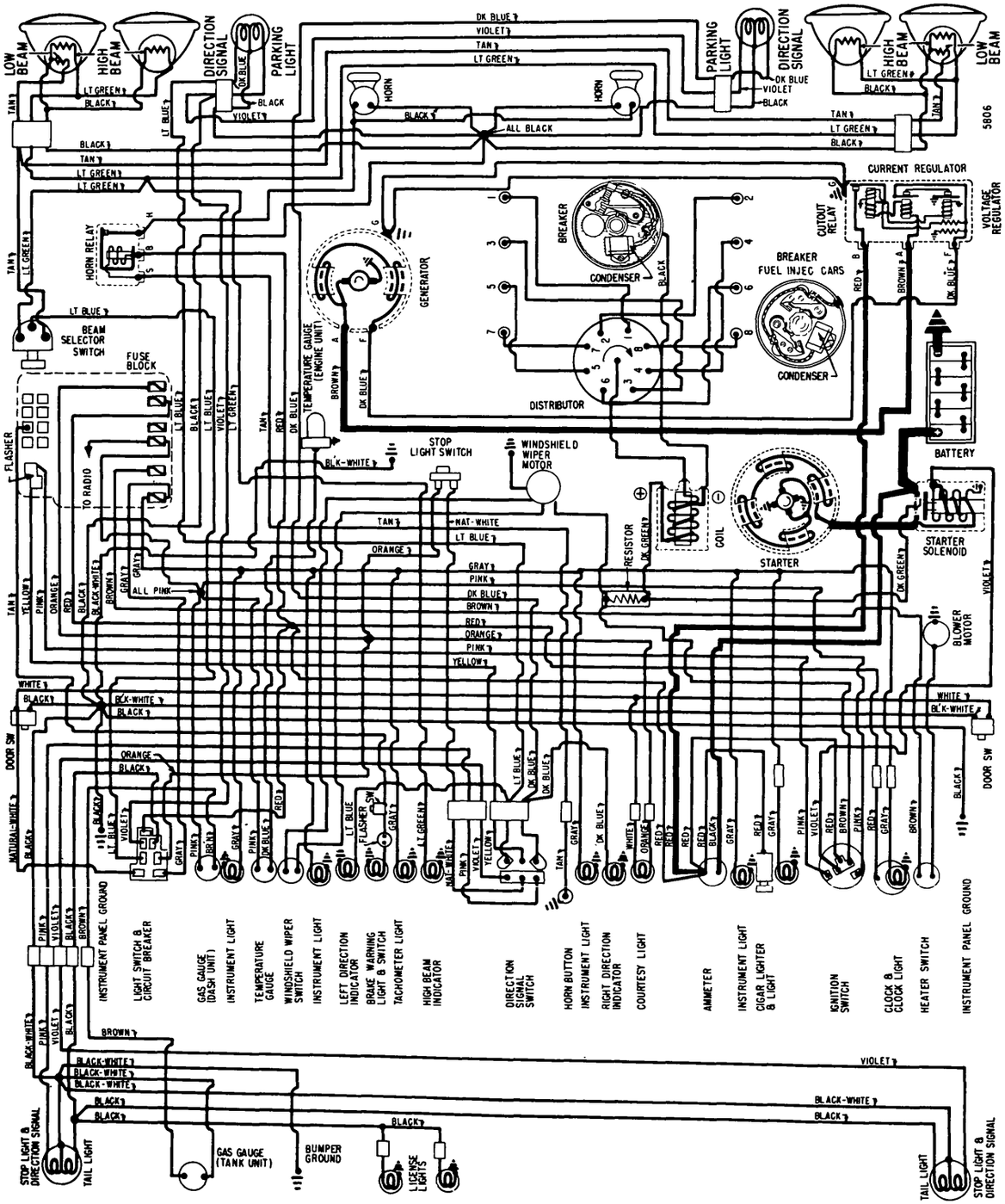
Timing Mark - Mark on vibration damper and timing tab

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CHEVROLET V8 (EXCEPT CORVETTE) WIRING DIAGRAM

Form 28 B



CHEVROLET CORVETTE WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines at 2° increments with greatest number of lines on advance or BTDC side.

►*TIMING SETTING CAUTION: Timing must be set with vacuum line disconnected and manifold or carburetor opening taped closed. On engin s with "t e" connection, disconnect vacuum line at "tee".*

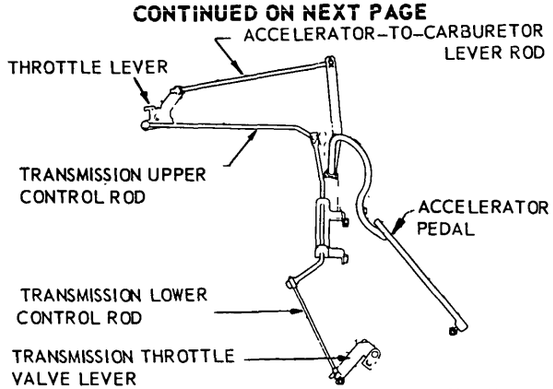
CARBURETOR

Engine	Carbur tor Applicati n
283" Pass. Std.	One Rochester 2GC 2-Bbl.
283" Pass. Optl.	Roch. 4GC or Carter WCFB 4-Bbl.
283" Corvette Std.	One Carter WCFB 4-Bbl.
283" Corvette Optl.	Two Carter WCFB 4-Bbl.
283" All Optl.	Rochester Ramjet Fuel Injection
348" Std.	One Roch. 4GC or Carter WCFB 4-Bbl.
348" Optl.....	1-Carter AFB 4-Bbl. or 3-Roch. 2GC 2-Bbl.

►*FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS):* Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustments and that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT: P werglid Cars - Remove lower control rod and loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotated counterclockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor and open throttle. Adjust upper control rod length for free entry into throttle lever. Check adjustment by releasing linkage to its idle position then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" (Pass. Car), .85" (Corvette), wood block under accelerator pedal rod, depress accelerator against block and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length

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POWERGLIDE & TURBOGLIDE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

of accelerator rod when detent is not felt before reaching wide open throttle.

Turboglid Cars - Disconnect transmission throttle valve rod and accelerator rod from carburetor throttle lever. Pull throttle valve rod forward to full limit of its travel and then adjust swivel for free entry into carburetor throttle lever with lever in wide open position. Attach swivel to lever. To check adjustment, put carburetor throttle lever in wide open position and push downward (counterclockwise) on transmission throttle valve lever. If transmission throttle valve rod attached to carburetor throttle lever deflects (transmission not on internal stop) or carburetor throttle lever will not reach wide open position, repeat adjustment. Now place carburetor throttle lever at wide open throttle and depress accelerator pedal to hold pedal lever in contact with stop. Adjust swivel on accelerator rod for free entry into carburetor throttle lever. Secure swivel to lever. Depress accelerator pedal by hand. Detent should be felt before accelerator pedal rod strikes carpet.

THROTTLE RETURN CHECK ADJUSTMENT (Turboglide Cars Exc. Fu l Inj ction): With fast idle screw on high step of fast idle cam, hold plunger with an open end wrench and turn plunger screw so it just contacts carburetor throttle lever. To check, make a full throttle start, then release accelerator and apply brakes simultaneously. If engine remains at high RPM turn plunger screw clockwise ½-turn. If engine stalls, turn screw ½-turn counterclockwise.

ROCHESTER 2GC 2-BARREL

Rochest r 2GC, N , 7013007 (Synchro-mesh), 7013008 (Auto. Trans.), 7013018 (Auto. Trans. & Air Cond.), 7013082 (Auto. Trans. Canada). Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars.

►*CARBURETOR THROTTLE BODY TO FLOAT BOWL SEALING CORRECTION:* When throttle body to fuel bowl screws work loose, install new gasket (black in color) now released for current models.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr l feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position. Depress button on back side of float bowl.

Idl S tting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and 450 RPM (Auto. Trans. in "D" Range), 475 RPM (Synchro-mesh Models). Turn screws out ¼ turn.

Idl Sp d - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D") with Idle Compensator button pushed in on air cond. cars (Idle Compensator "off").

Fl at L v l - 1 23/64" (Gauge BT-152). With air horn inverted and gasket in place, position float level gauge over float so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Use scale or scribed mark on float and pump gauge.

Automatic Choke Setting: Centered at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Engine	Rochester No.
283" Pass. Auto. Trans. (Std.)	7013004
283" Pass. Auto. Trans. (Air Cond.)	7013010
348" Auto. Trans. (Std.)	7013006
348" Auto. Trans. (Air Cond.)	7013012

►*ROCHESTER 4GC CARBURETOR CUTOUT ON TURNS CORRECTION & PRODUCTION CHANGES: See "Rochester 4GC Carburetor" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.

►*IDLE COMPENSATOR CAUTION:* Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making Idle Setting and Idle Speed adjustments. Remove air cleaner and insert pencil or suitable tool in throttle bore.

Idle Setting - After idle speed correctly set (see below), turn each idle mixture screw for smoothest idle with highest vacuum reading and RPM. *NOTE* - Approximate adjustment obtained by setting screws lean to moderate rough idle and then backing out ¼-turn.

Idle Speed - 450 RPM (Auto. Trans. in "D") with Idle Compensator closed.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL
(Single Carburetor)

Engine	Carter No.
283" Pass. & Corvette	2818S
348" Synchro-mesh	2817S
348" Auto. Trans.	2816S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - Initial setting ½-2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Engin	Carter N .
348" Auto. Trans.	2897S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idl S tting - ½-1¾ turns open. Turn both screws alike. Turn screws out for richer mixture.

Idl Sp d - 600 RPM. Selector in "D" on Auto. Trans.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL
(Two Carburetors)

Engine	Carter N .
283" Corvette (Hydr. Lifters)....	Front 2626S, Rear 2627S
283" Corvette (Mech. Lifters)....	Front 2613S, Rear 2614S

Idle Setting - 1/8-1 1/4 turns open (2613S, 2614S); 1/4-1 1/4 turns open (2626S, 2627S). Adjust all four mixture screws equally.

Idle Speed - 600 RPM (Hydr. Lifters), 800-850 RPM (Mech. Lifters) with Auto. Trans. in "D".

Interconnecting Linkage Adjustment: With rear carburetor at wide open throttle, adjust nut on front carburetor control shaft until front carburetor throttle is wide open and against throttle stop. Front carburetor must begin to open when rear carburetor is at approximately ½ throttle.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

TRIPLE CARBURETORS
(Rochester 2G & 2GC)

Engine	Rochester Carburetor N . Front	Center	R ar
348" Synchro-mesh, Std..	7013015..	7013020.....	7013017
348" Synchro-mesh, Optl..	7013973.....	7013974	7013975
348" Auto. Trans., Std....	7013015....	7013016.....	7013017
348" Auto. Trans., Air Cond....	7013015..	7013026.....	7013017

Idle Speed - Hydr. Lifters - 475 RPM (Synchro-me sh), 450 RPM (Auto. Trans. in "D"). **Mech. Lifters** - 600 RPM. Selector lever in "D" on Auto. Trans. Cars. *For complete adjustment data on these carburetors including linkage adjustment to secure correct synchronization, see "Rochester Triple Carburetors" in Carburetion Section.*

ROCHESTER "RAMJET"
(Fuel Injection)

For Model Application and Adjustments, see "Rochester Ramjet Fuel Injection" in Carburetion Section.

CARB. EQUIPMENT

Fuel Pump: AC diaphragm type. Fuel only.

Replacement Pump - AC No. 4701 (283" Eng.), No. 4657 (348" Eng.). *NOTE* - AC 4657 also used as supply pump with Fuel Injection.

Pr ssur - 5¼-6½ lbs. at 450 to 1000 RPM.

See "Fuel Pumps" in Carburetion Section.

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Gas lin Gaug : AC electric.
Dash Unit - AC No. 5640248 (Pass.), No. 5640356 (Corv.).
Tank Unit - See table below.

M del	AC No.
Pass. ①②	5640284
Pass. & 9 Pass. Sta. Wgn. ③	5640296
Sta. Wgn. (Exc. 9 Pass.) ②	5640297
Sta. Wgn. (Exc. 9 Pass.) ③	5640295
El Camino Pickup, Sed. Del. ②	5640297
El Camino Pickup, Sed. Del. ③	5640295

① - 5/16" pipe (Others 3/8" pipe)..
② - Single Exhaust.
③ - Dual Exhaust.
S e *"Fuel Gauges" in Carburetion Section.*

AIR CLEANER: Dry filter element type. Test or replace element every 15,000 miles.

BATTERY

283" Eng. - Delco 2SMR53. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).
348" Eng. - Delco 668. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative, to engine.
Engine Ground - Engine to cowl.

STARTER

D lco-Remy. Used as follows:

Engine	Delco-Remy No.
283" (Exc. Turboglide)	1107664
283" (Turboglide)	1107694
348" (Std.)	1107688
348" (Turboglide)	1107687
348" (Early Hi-Lift Car Models)	1107712
348" (Later Hi-Lift Car Models)	1107688

Armature - Delco-Remy 1935829 (Exc. 1107712), 1940624 (1107712).
R tation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107664, 694

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

Performance Data - 1107687, 688

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107712

Torque	RPM	Volts	① Amperes
0 ft. lbs.	4700-5400	10.6	80-120
	Lock	2.0	290-370

① - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid Switch 1119919 mounted on starter and controlled by Ignition & Starter Switch 1116547 (Corv.), 1116556 (Pass. Exc. Taxi), 1116560 (Taxi).
N utral Safety & Back-up Light Switch: Delco-Remy 1998677 used with Automatic Transmissions.
C rv tt N utral Saf ty Switch - Delco-Remy 1998660.
Adjustm nt - *See "Pow rglide" or "Turboglide" in Transmission S ction.*

GENERATOR

D lc -R my. Used as follows:

Applicati n	G n rat r	Armatur
V8 Pass. Std.	1102097	1923535
V8 Pass. Air Cond.	1102114	1940737
V8 Pass. Pwr. Strg.	1102115	1940313
V8 Taxi Std.	1105116	1940161
V8 Taxi Pwr. Strg.	1105118	1940313
V8 Pass. Opt.	1106985	1927074
V8 Pass.Optl.(Exc.Pwr.Strg.).	1106679	
V8 Pass.Optl.(Pwr. Strg.)	1106680	
Corvette Std.	1102043	1929640
Corv. Optl. & 348" Hi-Lift Cam.	1102059	1925210

Performance Data - Cold

Generator	Amperes	Volts	RPM
1102097	30	14.0	2240
1102114, 115	35	14.0	2630
1105116, 118	35	14.0	1730
1106985	45	13.0	1475
1106679, 680	50	13.0	1600
1102043, 059	30	14.0	2310

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs. (Exc. 1106679, 680, 985), 20 ozs. (1106679, 680, 985).
Field Current - 1.48-1.62 amps. (1102043, 059); 1.69-1.79 amps. (1102097, 114, 115); 2.14-2.28 amps. (1106679, 680, 985); 2.73-3.0 amps. (1105116, 118). All at 12 volts and 80°F.
Belt Adjustment: 3/4" (283" Eng.), 13/16" (348" Eng.) deflection midway between pulleys with a 15 lb. push.

REGULATOR

Delco-Remy. Used as follows:

Regulator No.	Generator No.
1119001	1102043, 059, 097
1119002	1102114, 115
1119603	1106985
1119604	1105116, 118
1119606	1106679, 680

►*DOUBLE CONTACT REGULATOR NOTE: Regulators 1119603, 604, 606 have double contacts for voltage regulation.*
NOTE - Specifications below are "Normal" settings.

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001, 002), 11.8-13.0 volts (1119603, 604, 606).
Contact Gap - .020". **Air Gap -** .020".

Voltage Regulator

Setting (1119001, 002) - 13.8-14.8 volts at 125°F.
Setting (1119603. 604, 606) - 13.8-14.6 volts (upper contacts), .1-.3 volts lower (lower contacts) at 125°F.
Contact Gap (1119603, 604, 606) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .075" (1119001, 002), .067" (1119603, 604, 606) with armature pressed down to point where contacts just touch.
Ch cking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section.*

Curr nt R gulat r

S tting (1119001) - 27-33 amperes.
S tting (1119002) - 32-37 amperes.
Setting (1119603) - 43-47 amperes.
Setting (1119604) - 31.0-35.5 amperes.
Setting (1119606) - 48-52 amperes.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *Se "Delco-Remy 1119000 Series Regulators" and "D lco-Remy Double Contact Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. 4-Headlight System.
See "4-Headlight System" in Electrical Section.
Direction Signals: *See Electrical Section.*
Autronic Eye: *See Electrical Section.*
Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.
Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.
CIRCUIT BREAKERS: A circuit breaker located in main lighting switch protects headlights and parking lights.
FUSES: Fuses contained in fuse block beneath dash on left side except as noted.
►*TAILLIGHT FUSE CAUTION:* Fuse block may be may be marked for 10 amp. fuse. Destroy marking and make sure 15 amp. fuse is installed.
20 Ampere - Heater & Air Conditioning
15 Ampere - Tail, Stop, Courtesy, Glove Box, License Plate, Dome Lights and Clock.
10 Ampere - Back-up lights, Brake Warning light.
9 Ampere - Overdrive. In wiring harness on engine side of dash.
3 Ampere - Instrument & Clock lights.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTIONS: Us extreme care when disconn cting any part of air conditioning equipment or lines for access to ngine, see "Air Conditioning Service Cautions" in Misc llan ous Section.*
►*NOTE: Engines with special camshaft use mechanical valve lifters. In the following data, engines will be referred to by "lifter type" or "Hi-Lift Cam".*

ENGINE SPECIFICATIONS: Own. V8, valve-in-head, 283" and 348" engines of same design used previously.

Engine	Bore	Stroke	Rat d HP	Displac m nt
283"	3.875"	3.0"	48	283 cu. in.
348"	4.125"	3.25"	54.5	348 cu. in.

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Engin	C mpr. Rati	D v lop d HP
283" Pass. ①	8.5-1	185 at 4600 RPM
283" Pass. & Corv. ②	9.5-1	230 at 4800 RPM
283" Corv. ③	9.5-1	245 at 5000 RPM
283" Corv. ④	9.5-1	270 at 6000 RPM
283" Pass. & Corv. ⑤	9.5-1	250 at 5000 RPM
283" Pass. & Corv. ⑥	10.5-1	290 at 6200 RPM
348" ⑦	9.5-1	250 at 4400 RPM
348" ⑧	⑨ 11.0-1	⑨ 300 at 5600 RPM
348" ⑩	9.5-1	280 at 4800 RPM
348" ⑪	12 11.0-1	⑫ 315 at 5600 RPM

① - One 2-Bbl. Carb. ② - One 4-Bbl. Carb.
③ - Two 4-Bbl. Carbs. & Hydraulic Lifters.
④ - Two 4-Bbl. Carbs. & Mechanical Lifters.
⑤ - Fuel Injection & Hydraulic Lifters.
⑥ - Fuel Injection & Mechanical Lifters.
⑦ - One 4-Bbl. Carb. & Hydraulic Lifters.
⑧- One 4-Bbl. Carb. & Mechanical Lifters.
⑨ - With Powerglide. 11.25-1 ratio, 320 HP at 5600 RPM with Synchro-mesh.
⑩ - Three 2-Bbl. Carbs. & Hydraulic Lifters.
⑪ - Three 2-Bbl. Carbs. & Mechanical Lifters.
⑫ - Or 335 at 5800 RPM with 11.25-1 ratio.

Compr ssion & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Chevrolet Special Data.*

ENGINE MOUNTINGS: *See "Engine Mountings" in Chevrolet Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*

►*CYLINDER HEAD DESIGN NOTE:* 1959 283" Eng. (With Hi-Lift Cam) and 348" Eng. have new spark plug cooling passages in cylinder head to match cooling holes in block for better water circulation. New head gasket used to index both cooling holes. "Long Reach" Spark Plugs must be used with this type head. *See "Replacement Cylinder Head Note" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Cast aluminum alloy, autothermic type with piston pin offset .060" toward major thrust side.

283" Eng. - Flat head, slipper skirt with machined relief for valve clearance (Std.) or domed piston having machined relief (Fuel Injection with Hi-Lift Cam).

348" Eng. - Peak roof, slipper skirt (Std.), half flat with machined relief for valve clearance and half slanted downward 16° (With Hi-Lift Cam).

Rem val - Piston & rods removed from above.

R plac ment Pist ns: Furnished Std., & .001", .020", .030", .040" oversize with fitted pins (Exc. Hi-Lift Cam), Std. & .001", .030" oversize fitted with pins (Hi-Lift Cam),

►*STANDARD & .001" OVERSIZE PISTON NOTE:* These pistons furnished in TWO sizes as follows:

283" Eng. - **Std.** - Marked **S4** (3.8750-3.8755"), **S5** (3.8755-3.8760"); **.001" Oversiz** - Marked **S6** (3.8760-3.8765"), **S7** (3.8765-3.8770").

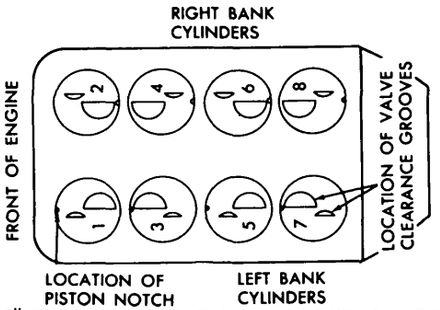
348" Eng. - **Std.** - Marked **S4** (4.1250-4.1255"), **S5** (4.1255-4.1260"); **.001" Oversize** - Marked **S6** (4.1260-4.1265"), **S7** (4.1265-4.1270").

Clearance - .0006-.0010", measured 2.44" (283" Eng.), 2.94" (348" Eng.) from top of piston. *NOTE -* Pistons in 283" Eng. with Hi-Lift Cam have .0016-.0020" clearance.

Fitting New Pistons (Exc. Pistons with .0016-.0020" Clearance): Use .0015" x 1/2" feeler (part of Tool J-5513). With piston and cylinder bore clean and dry, insert feeler and inverted piston into cylinder to point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler should be 4-6 lbs.

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block, except 348" Eng. with 11.0-1 pistons (see Note below). *See Rod Installation.*

►*348" ENGINE SPECIAL PISTON NOTE:* Pistons used on 11.0-1 ratio engines extend into combustion chamber and have cutouts to allow for valve clearance. Pistons must be installed as shown in diagram.



348" ENGINE 11.0-1 RATIO PISTON INSTALLATION

PISTON PIN

Pin is press fit in connecting rod.

Diameter - (283" Eng.) .9270-.9273". (348" Eng.) .9895-.9898".

Length - (283" Eng.) 2.990-3.010". (348" Eng.) 3.250-3.270".

Pin Fit in Piston - .00015-.00025". With piston and pin at 60°F, and light film of oil on pin, pin should support own weight in either pin boss.

Pin Fit in Connecting Rod - Pressed fit in rod. Special procedure used for removal & installation, *see "Piston Pins" in Chevrolet Special Data.*

Replacement Pins: Furnished in assembly with new pistons. Replace with new piston and fitted pin assembly.

PISTON RINGS

Compression rings are plain cast alloy iron, with chrome plated upper and wear resistant coating lower. Oil ring is 3-piece type with chrome plate O.D. rails and stainless steel spacer.

283" Engin

Ring	Width	End Gap	Sid Cl aranc
Comp. (1 & 2)	① .0775-.0780"	.010-.020"	.0012-.0032"
Oil (3)	.224-.231"	② .015-.055"	.0006-.0084"

348" Engin

Ring	Width	End Gap	Sid Cl arance
Compr. (1 & 2)	.0770-.0780"	.015-.025"	③
Oil (3)	④ .224-.232"	⑤ .015-.055"	

① - Upper ring .077-.078" with Hi-Lift Cam.
② - On rails.
③ - Upper .0012-.0027", lower .0012-.0032".
④ - .1855-.1865" with Hi-Lift Cam.
⑤ - .013-.025" with Hi-Lift Cam.

Replacement Rings: Service type rings furnished Std., .020", .030", .040" Oversize.

Installing Rings: Install compression rings with mark "GM" up.

CONNECTING ROD

Length (Center-to-Center) - (283") 5.700". (348") 6.134-6.136".

Weight - (283") 19.02 ozs. (348") 19.20 ozs.

Crankpin Journal Diameter - (283") 1.999-2.000". (348") 2.199-2.200".

Lower Bearing - Replaceable precision type. (Std.) - Steel backed babbitt. (Hi-Lift Cam) - Steel backed aluminum alloy matrix with thin lead alloy overplate.

Clearance - .001-.003". Wear limit .004".

Sideplay - .008-.014" (two rods).

Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.

Installing Rods: *NOTE - See diagram for special 11.0-1 ratio piston installation.* Install rod in piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (marked by cast depression in head of piston and "F" mark on piston strut) on Nos. 1-3-5-7 pistons, and flange on rod to **rear** of piston on Nos. 2-4-6-8 pistons. Install rod and piston assembly in cylinder with cast depression in head and "F" mark on strut toward front of cylinder block. Oil hole in connecting rod will be toward center of engine.

CRANKSHAFT

Journal Diameter - (283") 2.2978-2.2988", (348") 2.4980-2.4990".

Bearings - Replaceable precision type. (Std.)Steel-backed babbitt. (Hi-Lift Cam) No. 1 through 4 are steel-backed aluminum alloy matrix with a thin lead alloy overplate. No. 5 steel-backed babbitt.

Clearance - (283") .001-.003". (348") .0008-.0034". Wear limit .004".

End Thrust - Taken by rear (No. 5) main bearing.

Endplay - .002-.006".

Replacement Bearings: Furnished Std., .001", .002", .010", .020". Undersize.

Bearing Installation: Not necessary to remove engine from car, *see "Crankshaft & Main Bearings" in Chevrol t Special Data.*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cov r" in Chevrolet Special Data.*

Vibrati n Damp n r: *Se "Vibration Dampener" in Chevrolet Special Data.*

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CAMSHAFT

►*SPECIAL CAMSHAFT NOTE:* Special "Hi-Lift" camshafts used in various engines. These camshafts are used with solid valve lifters.

Journal Diameter - (All) 1.8682-1.8692".

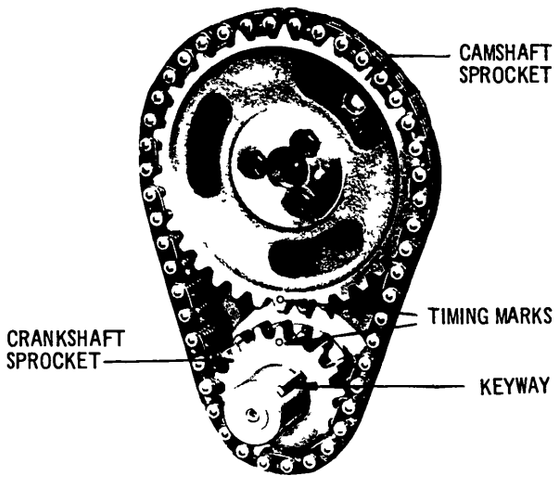
Bearings - Steel backed babbitt lined bushings.

Clearance - .0015-.0035".

Replacement Bearings: "Precision" type (do not require reaming). Use Tool J-6098 to remove and install bearings.

Camshaft Setting: Both Sprockets marked "0". Install chain with sprocket marks adjacent and in line with straightedge across shaft centers.

►*CAUTION.* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket in place.



CHEVROLET V8 VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link belt type. See below for specifications.

Engine	Width	Pitch	Length (Links)
283"	.875"	.500"	46
348"	.88"	.500"	48

Installation & Removal - *See "Timing Chain" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*

VALVES

Tappet Clearance: *See TUNE-UP for complete specifications on all engines.*

283" Engine

	Head Diam.	Stem Diam.	Length
Intake	1.715-1.725"	.3415-.3422"	① 4.9024-4.9224"
Exhaust	1.495-1.505"	.3410-.3417"	4.913-4.933"

348" Engine

	Head Diam.	Stem Diam.	Length
Intake	1.935-1.945"	.3715-.3722"	5.10-5.11"
Exhaust	1.655-1.665"	.3700-.3717"	5.11-5.12"

All Engines

	Seat Angle ②	Lift	Stem Clearance
Intake	45°	③ .3987"	④ .0010-.0027"
Exhaust	45°	③ .3987"	④ .0017-.0034"

① - 4.869-4.889" with mechanical lifters.

② - Valve face angle 44°.

③ - .4058" Intake, .4120" Exhaust with mechanical lifters.

④ - Wear limit .004".

►*NOTE: Valve face and seat angle specifications are service specifications. New engine specifications are: Seat Angle - 46°, Face Angle 45°.*

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 45°. When seats are ground to recommendations of 45°, valves must be faced to recommended angle of 44°.

Valve Seat Width - .035-.060" Intake, 062-.093" Exhaust.

Valve Stem Oil Seals: All Engines - Two seals on all valves as follows: *NOTE - Third seal used on 283" intake valves, see below* 1) Cup shaped cap or shield installed over upper end of valve spring under spring seat (retained by spring retainer) and 2) Synthetic rubber "O" ring installed in second groove of valve stem directly under valve locks. *NOTE - "O" ring seal must seat flat in groove and not be twisted*

Intake Valve Stem Seals (283" Eng.): New synthetic rubber seal on valve stem and guide in addition to "O" ring and spring shield seals (see above). Secured on guide and valve stem by two snap rings. Valve guide machined and chamfered to 45° angle

Valve Stem Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .003", .015", .030" Oversize. Use Reamer Set J-5830 (283"), or J-7049 (348").

Valve Springs. Install springs with closed end of coil toward cylinder head and oil shield over spring.

►*VALVE SPRING DAMPER NOTE:* Damper not used on 348" Eng. with mechanical lifters Damper replaced by inner spring

283" Engine

Valve	Lbs. Pressure	Length
Closed	69-79	1.696"
Open	159-169	1.306"

348" Eng. (Hydraulic Lifters)

Valve	Lbs. Pressure	Length
Closed	78-86	1.626"
Open	184-196	1.230"

348" Eng. (Mechanical Lifters)

	Inner Spring		Outer Spring	
Valve	Lbs. Pressure	Length	Lbs. Pressure	Length
Closed	20-24	1.488"	69-79	1.696"
Open	55-61	1.060"	159-169	1.306"

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from spring seat in cylinder head to top of valve spring. If this dimension exceeds 1 45/64" (283") or 1 3/4" (348"), install valve spring seat shim furnished 1/16" thick. Installed height of spring must be 1 21/32" (All Engines). *NOTE - 348" Engine specifications supersede previous specifications of 1 3/4" for preferred height, 1 53/64" for top limit.*

Valve Lifters: Hydraulic lifters are standard on all engines except with special camshaft. *See "Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head

Rocker Arm Stud Replacement - *See "Valve System" in Chevrolet Special Data*

VALVE TIMING

Valve Timing Specifications

283" Eng. (Hydraulic Lifters)

Intake Valves - Open 12°30' BTDC. Close 57°30' ALDC.
Exhaust Valves - Open 54°30' BLDC. Close 15°30' ATDC.

348" Eng. (Hydraulic Lifters)

Intake Valves - Open 18°30' BTDC. Close 60°30' ALDC.
Exhaust Valves - Open 68°30' BLDC Close 25°30' ATDC.

All Mech. Lifters (Exc. 348" with H.D. Powerglid)

Intake Valves - Open 35° BTDC. Close 72° ALDC.
Exhaust Valves - Open 76° BLDC. Close 31° ATDC.

348" Eng. Mechanical Lifters (H.D. Powerglid)

Intake Valves - Open 33° BTDC. Close 74° ALDC.
Exhaust Valves - Open 88° BLDC. Close 19° ATDC

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: (Exc. Corvette) 4 qts, with filter changes 5 qts. **(Corvette)** 5 qts, with filter change 6 qts

Normal Oil Pressure: 35 lbs at 2,000 RPM.

Pressure Relief Valve - In oil pump. Not adjustable

Oil Pressure Indicator (Std. V8) - Light located at left side of instrument panel, controlled by a pressure Switch AC No. 1508753 (283"), 1508754 (348") located in main oil gallery adjacent to distributor Switch closes when pressure drops to 4-7 lbs.

Oil Pressure Gauge (Corvette) - AC No. 1508895

Oil Filter: Full flow type, std. on 283" Eng with Fuel Injection, mandatory on 348" Eng with Hi-Lift Cam All other engines optional. Replace element every 4,000 miles. Use new seal, tighten center bolt to 20-25 ft lbs *NOTE* - Cover with cavity for oil circulation used without filter

Replacement Filter Element - AC No PF-141

Oil Pump: Spur gear type. Located in crankcase, driven by distributor gear

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Oil Pump Ov rhaul - S *"Oiling System" in Ch vrol t Sp cial Data.*

Crankcas V ntilati n - Air intake through crankcase breather cap and outlet at crankcase ventilator pipe.

COOLING

►*RADIATOR REMOVAL CAUTION (Auto. Trans.):* Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.

►*WATER BY-PASS NOTE:* 283" engine utilizes hole in cylinder block for water by-pass. 348" engine has by-pass at top of water pump which is connected to inlet manifold which has crossover passages to cylinder head.

Water Capacity: (283") 17½ qts. (3-Speed Trans.), 17¼ qts. (Auto. Trans.). (348") 21 qts. Add 1 qt. for heater with all models.

Pressure Valv : Radiator filler cap, used as follows:

M d l	AC No.	Pressure	AC Type
Corv.Less F.I.	850795	7 lb.	RC-1
Corv. With F.I.	850800	13 lb.	RC-6
V8 Pass.	850800	13 lb.	RC-6

Th rm stat: Pellet type. In cylinder head water outlet.

►*THERMOSTAT INSTALLATION NOTE:* 170° thermostats used in production beginning with 283" Eng. at No. F1111 (Flint), T1209 (Tonawanda); with 348" Eng. at No. T1217 (Tonawanda). 160° & 180° thermostats are optional. Use 160° thermostat with Methanol type antifreeze.

T mp ratur Gaug : AC electric. *NOTE* - On Corvette the dash unit is part of combination gas & thermo unit; on V8 Pass. dash unit is part of gauge and case assembly. Both units use the same engine unit.

Dash Unit - (V8 Pass.) AC No. 1513665, (Corv.) 1513715.

Engin Unit - (All) AC No. 1513321.

See "T mp ratur Gaug s" in Miscellaneous Section.

Water Pump: Packless type with sealed ball bearing shaft. *Se "Wat r Pumps" in Chevrolet Special Data.*

CLUTCH

►*CLUTCH NOTE:* Borg & Beck Spring type used in Corvette, Chevrolet (Own) Diaphragm (two types) used in all other models. 283" Eng. (Exc. Corv.) use same type as previous models. 348" Eng. uses new diaphragm type with 6 diaphragm fingers bent upward with weight attached. Other 12 fingers remain straight as previous type. Weighted fingers increase plate load as engine speed increases.

Chevr let (Own) Diaphragm Clutch

M d l	Chevrolet No.
Pass. 2-Bbl. Carb. (Exc. H.D. Clutch, O.D.)	3742861
Pass. 4-Bbl. Carb. Fuel Inj. 283"	3742866
Pass with O.D.	3744199
Pass. 348"	3758517

B rg & Beck Clutch

Corvette (Stamped 1468 on cover) 3745946

Clutch Disc (Chevrolet Clutch)

Pass. With O.D., 348", 11" Cast 8721	3748721
Pass. 283" (Exc. H.D., O.D.) 10" Cast 3748731	3748731

Clutch Disc (B rg & Beck Clutch)

Corvette (Stamped P-7175) 3745947

S e "Ch vr let (Own)" and "B rg & B ck" Clutches in Clutch S cti n.

►*CORVETTE FAST ACTION CLUTCH PEDAL LINKAGE ADJUSTMENT:* For procedure to alter linkage to secure 4½" rather than 6½" pedal movement, *s "Clutch Not s" in Ch vrol t Sp cial Data.*

Pedal Adjustment: (Preferred Method). Disconnect forward end of clutch fork pushrod from cross shaft lever. Hold fork pushrod rearward (to remove all slack) then adjust swivel on pushrod so conical point lines up with the "dimple" in cross shaft lever. This will give desired .060" clearance between bearing and clutch spring. This procedure supersedes free travel setting of 3/4"-1" formerly recommended.

Over-Center Spring Adjustment: Loosen adjusting hook nut at back of pedal bracket and turn jam nut to obtain an installed length of 10 5/16" for over-center spring.

Removal: Remove transmission (See Transmission Removal below). Remove clutch throwout bearing from fork, then clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one turn at a time until tension of spring is released. Remove tool, then clutch assembly from vehicle. *NOTE* - When installing clutch, align "X" mark on cover and flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three-speed synchro-mesh (Std.), four-speed (close ratio) optional.

See "Chevrolet 3-Speed" and "Chevrolet 4-Speed (Close Ratio)" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Drain transmission and disconnect speedometer cable and shift rods. Remove propeller shaft center bearing support bolts. Separate rear universal joint and pull propeller shaft assembly to rear under axle housing.

2) Support rear of engine, remove transmission rear support noting number of shims.

3) Remove two top transmission to clutch housing cap screws, install guide pins (J-1126), then remove two lower capscrews. Slide transmission back on guide pins to clear clutch disc splines.

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown. Lockout switch not used.

See "Chevrolet Overdrive" in Transmiss ion Section.

Overdrive Control: *See "Warner R10 &R11 Overdrive Control" in Transmission Section.*

Removal: Same as for synchro-mesh (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS: See "Chevrolet Powerglide" in Transmission S ction.*

►*TESTING & TROUBLE SHOOTING: S e "Chevrol t Powerglid " in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Use Automatic Transmission Fluid Type A with an AC-ATF-A number. Type A with AC-ATF number is permissible when AC-ATF-A not available.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 4½ qts. (refill), 10½ qts. (after overhaul).

Checking Fluid Level - Engine must be idling with transmission warm, selector lever in "N" range and parking brake applied. Check fluid level on dipstick located in filler tube on right side of engine opposite starter. Fluid level should be at full mark on dipstick. *NOTE - DO NOT OVERFILL.*

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER POWERGLIDE SERVICE DATA: See "Ch vrolet Powerglide" in Transmission Section.*

TURBOGLIDE TRANSMISSION

New "non-shifting" hydraulically controlled, planetary type transmission with three unit torque converter.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Chevrolet Turboglide" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevr l t Turboglide" in Transmission Section.*

Lubrication - Check fluid level in transmission every 1000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Use Automatic Transmission Fluid Type A with an AC-ATF-A number. Type A with AC-ATF number is permissible when AC-ATF-A not available.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 2 qts. (refill), 9½ qts. (after overhaul).

Checking Fluid Level (Exc. Air Cond. Cars) - With transmission at normal operating temperature, transmission selector lever in "D" (drive) range, and engine idling, check fluid level on dipstick in filler tube on right side of engine. Fluid level should be at full mark on dipstick. *CAUTION - DO NOT OVERFILL.*

Checking Fluid Level (Air Cond. Cars) - *NOTE* - Regular filler tube and dipstick not used. Fluid Level is checked from beneath car (car on hoist) as follows: With transmission at normal operating temperature, selector lever in "N" (neutral) range, and engine idling, check fluid level by removing cap from oil level tube at rear of transmission oil pan under extension housing. Oil level should be at top of tube. If oil level low, remove speedometer drive gear fitting, add oil through fitting hole until fluid level reaches top of oil level tube.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER TURBOGLIDE SERVICE DATA: Se "Ch vr let Turb glid " in Transmission S ction.*

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UNIVERSALS

Own Yoke & Spider (Trunnion) type

►*CAUTION.* Rear universal companion flange nut controls rear axle pinion bearing preload Preload must be adjusted whenever companion flange nut loosened *See "Chevrolet Pass Car (Hotchkiss Drive)" in Rear Axle Section*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet-Special Data.*

REAR AXLE

Own. Semi-floating hypoid gear type, with Hotchkiss Drive *NOTE* - "Positraction" Limited Slip Differential optional

See "Chevrolet Pass Car (Hotchkiss Drive)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section

►*PROPELLER SHAFT "SHUDDER" CORRECTION: See "Propeller Shafts" in Chevrolet Special Data.*

►*PINION BEARING PRELOAD CAUTION* Rear universal joint companion flange nut controls rear axle pinion bearing preload Bearing preload must be adjusted whenever companion flange nut is loosened

Axle Ratios - Used as follows

Engine	Synchro-Mesh	Auto. Trans.
283" Pass	① 3 55-1 (9-32)	3 36-1 (11-37)
283" Corv	② 3 70-1	3 55-1 (9-32)
348"	3 36-1 (11-37)	3 08-1 (12-37)

① - 4 11-1 (9-37) with Overdrive

② - 4 11-1 (9-37) & 4 56-1 used with Positraction

►*AXLE IDENTIFICATION NOTE* Conventional axles have serial number on front right side of differential carrier Positraction axles have "P" and number on front left side of carrier

Axle Shaft Removal Raise car and place jack stands under axle housing Remove tire, wheel and brake drum assembly Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange) Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly Be careful not to disturb backing plate *NOTE*—If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance

Carrier Removal: Remove rear wheels, brake drums and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant and remove differential carrier nuts and lift out carrier assembly.

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs Corvette has threaded bushings at pivot point, all other models have spherical joints

See "Chevrolet (Spherical Joint) Suspension" in Suspension and Wheel Alignment Section

►*FRONT WHEEL ROLLER BEARING & INNER SEAL NOTE* Roller bearings available for heavy duty Taxis, Police Cars Etc

ROLLER TYPE FRONT WHEEL BEARING ADJUSTMENT: Tighten spindle nut (while rotating wheel in both directions) until slight drag is felt Back off nut 1/12 turn (½ nut flat) or more to align cotter pin holes DO NOT exceed 1/6 turn or 1 nut flat *CAUTION* - Use only inner bearing seal Part No 3759306 (without 90° flange on inside of stamping)

Steering Axis Inclination - 7¼±½"

Caster (Pass) - 0°±½° (Std Susp), Pos 1½°±½° (Air Susp)

Caster (Corvette) - Pos 2¼°±½°

Camber - Pos ½°±½° (All Susp)

Toe-In - Pass 1/8"-1/4" (Std Susp), 0-1/8" (Air Susp)

Toe-In - Corvette 1/8"

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be at 18°

REAR SUSPENSION

Rear Suspension: *See "Chevrolet Rear Suspension" in Suspension & Wheel Alignment Section*

AIR SUSPENSION

Air springs replace coil springs on all four wheels Shock absorbers mounted to rear of air springs *See Front Suspension above for Alignment Specifications and "Chevrolet Air-Suspension" in Suspension and Wheel Alignment Section*

SHOCK ABSORBERS

Delco. Direct acting non-adjustable

Replacement Shock Absorbers

Model	Front	Rear
Corvette	5531206	5531213
Corvette ①	5543738	5543739
Pass Exc Taxi, AC & Air Susp	5543736	5543732
Pass Air Susp	5543737	② 5543734
Pass Auto Trans (Exc Air Susp)	5543735	5543732
Sta Wgn (Exc Air Susp)	5543735	5543733
El Camino Pickup, Sed Del (Exc A S)	5543735	5543733
Taxi	5543735	5543733

① - With H D Brake/Susp (Exc F I with Hi-Lift Cam)

② - Exc Station Wagon.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball type

See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Own (Linkage Type). *See "Chevrolet (Linkage Type) Power Steering in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment Hand lever applies rear wheel service brakes

See "Chevrolet-Bendix Hydraulic" in Brake Section

►*OPTIONAL METALLIC SHOE LINING NOTE* Used for "Special Purpose Option" and can be used with old drums provided surface of drum is smooth

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION*- To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057-.087" smaller diameter than the drum diameter Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action *NOTE - If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter*

Drum Diameter - 11"

Wheel Cylinder Diameter - Front 1 1/8", rear 1"

Lining Thickness- .175"(Exc Corv), .187-.194"(Corv)

Lining Width & Length

	Front Wheel	Rear Wheel
Primary Shoe	① 2.75x9.30"	② 2x9.30"
Secondary Shoe	③ 2.75x11.70"	④ 2x11.70"

① - Corvette 2" x 9.30" ② - Corvette 1¾" x 9.30"

③ - Corvette 2" x 11.70" ④ - Corvette 1¾" x 11.70"

Clearance - Adjusting screw backed off 12 notches from slight drag position Brakes must be free of any drag after adjusting *NOTE* - This setting supersedes previous specification of 7 notches

Standard Master Cylinder: Located on engine side of firewall in line with brake pedal

Checking Fluid—Reservoir is integral with master cylinder Maintain level in cylinder to lower edge of filler hole

Removal - Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove cotter and clevis pins from brake pedal arm, then remove four retaining nuts and lockwashers and remove cylinder from firewall.

Installation—Reverse removal procedure making sure that push rod clevis is straddling the brake pedal Refill master cylinder and bleed all brake lines Adjust push rod-to-main cylinder clearance as follows Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible end play between main cylinder piston and brake pushrod (1 8-3/8" pedal movement should be felt)

Power Brakes: New Bendix or Moraine Power Units *See "Bendix Hydraulic (Disc) Reaction" or "Morain Hydraulic (Diaphragm) Reaction" typ Power Unit in Brake Section*

Removal: Disconnect clevis at brake pedal assembly (remove clevis if necessary to clear hole in firewall) *Remove vacuum hoses from brake unit and hydraulic* line from master cylinder Remove four nuts and lockwashers and withdraw power unit

MISC. MECHANICAL

Windshield Wipers: Electric (Single Speed Std, Two Speed Optl) Link-and-crank arm type

See "Windshield Wipers" in Miscellaneous Section

Window Regulators: Electric type with reversible motor operating each door window assembly

See "Power Window Regulators" in Miscellaneous Section

Power Top Control: Hydro-Lectric *See "Power Top Controls" in Miscellaneous Section*

Power Seat Adjusters: A reversible electric motor for each of the three basic movements of 6-way seat control *See "Power Seat Adjusters" in Miscellaneous Section*

Air Conditioning: *See "Chevrolet Air Conditioning" in Miscellaneous Section*

MODEL IDENTIFICATION

Series	Series Prefix	Wh lbas	Model
3100	① 3A	114"	1/2-Ton
3200	① 3B	123 1/4"	1/2-Ton
3400	① 3C	104"	② 3/4-Ton
3500	① 3D	125"	② 3/4-Ton
3600	① 3E	123 1/4"	③ 3/4-Ton
3700	① 3F	137"	② 3/4-Ton
3800	① 3G	135"	③ 1-Ton
4100	① 4A	132 1/2"	③ 1 1/2-Ton
4400	① 4B	156 1/2"	③ 1 1/2-Ton
4502	① 4C	156 1/2"	④ 1 1/2-Ton
5100	5A	112 5/8"	⑤ 2-Ton
5300	5K	124 5/8"	⑤ 2-Ton
5400	5B	136 5/8"	⑤ 2-Ton
5700	5C	160 5/8"	⑤ 2-Ton
6100	① 6A	132 1/2"	③ 2-Ton
6200	① 6J	129 5/8"	② 2-Ton
6300	① 6P	144 1/2"	③ 2-Ton
6400	① 6B	156 1/2"	③ 2-Ton
6500	① 6C	174 1/2"	③ 2-Ton
6600	① 6K	153 5/8"	② 2-Ton
6702	① 6D	196 1/2"	④ 2-Ton
6703	① 6V	196 1/2"	③ 2-Ton
6802	① 6E	222 1/2"	④ 2-Ton
5100 S	5D	112 5/8"	⑤⑥ 1 1/2-Ton
5300 S	5L	124 5/8"	⑤⑥ 1 1/2-Ton
5400 S	5E	136 5/8"	⑤⑥ 1 1/2-Ton
5700 S	5F	160 5/8"	⑤⑥ 1 1/2-Ton
5100 H	5G	112 5/8"	⑤⑦ 2-Ton
5300 H	5M	124 5/8"	⑤⑦ 2-Ton
5400 H	5H	136 5/8"	⑤⑦ 2-Ton
5700 H	5J	160 5/8"	⑤⑦ 2-Ton
6100 S	① 6F	132 1/2"	③⑥ 1 1/2-Ton
6300 S	① 6R	144 1/2"	③⑥ 1 1/2-Ton
6400 S	① 6G	156 1/2"	③⑥ 1 1/2-Ton
6500 S	① 6H	174 1/2"	③⑥ 1 1/2-Ton
6700 S	① 6T	196 1/2"	③⑥ 1 1/2-Ton
6100 H	① 6L	132 1/2"	③⑦ 2-Ton
6300 H	① 6S	144 1/2"	③⑦ 2-Ton
6400 H	① 6M	156 1/2"	③⑦ 2-Ton
6500 H	① 6N	174 1/2"	③⑦ 2-Ton
6700 H	① 6U	196 1/2"	③⑦ 2-Ton

① - Letter "V" ahead of Series Prefix indicates V8 engine.

② - Forward Control. ③ - Conventional

④ - School Bus. ⑤ - Low Cab Forward.

⑥ - Special 1½-Ton. ⑦ - H.D. 2-Ton.

SERIAL NUMBER: Stamped on metal plate and attached to body as follows: **Forward Control Models** - On Steering Column. **Flat Faced Cowl** - On Cowl inner panel. **All Other Models** - Left front door hinge pillar. *NOTE* - Number (example below) includes identification data as indicated.

① ② ③ ④
6F 59 K 100001

① - Series Prefix. See table above.
② - Year - 1959.
③ - Assembly Plant. See table below
④ - Unit number. Continuous for all trucks at each assembly plant.

Assembly Plant Designation

A - Atlanta	J - Janesville	O - Oakland
B - Baltimore	K - Kansas City	S - St. Louis
F - Flint	L - Los Angeles	T - Tarrytown
G - Pontiac	N - Norwood	W - Willow Run

ENGINE NUMBER: 6 Cyl. - Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor).

V8 Eng. - Stamped on pad at front right hand side of cylinder block.

NOTE - Number (example below) includes identification data as indicated.

① ② ③
F 1210 P

① - Engine Plant. **F** - Flint, **T** - Tonawanda, **C** - Engines built in Canada.

② - Code number indicating month and day of manufacturer. This is not an individual or continuous number.

③ - Engine Type. See table below.

Engine Type

J, K - 235" Eng. (JC, JF, KA indicate clutch and transmission options).

L - 261" Eng. (LC, LD, LE indicate transmission and brake options).

M,N,P - 283" Eng. (MA, NA, NC, ND, PA, PC, PD indicate transmission and brake options).

TUNE-UP

COMPRESSION PRESSURE: 6 Cyl. - 130 lbs. min. **V8** - 140 lbs. min. All cylinders should be alike within 20 lbs.

VACUUM READING: 17-21" (1 & 2-Bbl. Carb.), 16-20" (4-Bbl. Carb.).

VALVE TAPPET CLEARANCE: 235" - .006" Intake, .018" Exhaust. Hot. **261"** - .006" Intake, .020" Exhaust. Hot. **283"** - Zero lash, hydraulic lifters. *For initial tappet adjustment, see "VALVE SYSTEM" in Chevrolet Special Data.*

MANIFOLD HEAT CONTROL: Thermostatic coil spring type located between manifold and exhaust pipe. Must operate freely.

IGNITION

FIRING ORDER: 6 Cyl. - 1-5-3-6-2-4. **V8** - 1-8-4-3-6-5-7-2.

Cylinders (V8) - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plug - All Eng. ½ Ton - AC 44 (Std.), AC 45 or 46 (Hotter for City Driving), C-43 COM (Hotter for City Driving.

All Eng. 2-Ton - AC C-42-1 COM (Std.), AC C-43 COM 'Hotter for City Driving).

►*SPARK PLUG NOTE:* All plugs are 14 mm, and should be torqued to 20-25 ft. lbs.

COIL: Delco-Remy 1115087.

Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.

Resistor - Delco-Remy 1931614.

►*COIL RESISTOR NOTE (6 Cyl. Exc. Forward Control):* Resistor connected to ignition switch by two leads. Second lead is connected through starter switch and provides a direct connection to coil when starter switch operated.

►*COIL RESISTOR NOTE (6 Cyl. Forward Control & All V8 Models):* Resistor connected in lead from ignition switch to coil. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy. Conventional type used on 6 Cyl. models. Two types of "Window" distributors used on V8, centrifugal with Vacuum Advance, and centrifugal advance only. *See "Delco-Remy Window Distributors" in Electrical Section.*

Delco-Remy Distributors

Engine	Delco-Remy No.
Thriftmaster 235"	1112403
Jobmaster 261"	1112403
Trademaster 283" (3,4000)	1110947
Taskmaster 283" (5,6000) 2-Bbl.Carb.	① 1112720, 25
Super Taskmaster 283" (5,6000) 4-Bbl.Carb.	① 1112721, 26

① - Without Vacuum Control..

Condenser - Delco-Remy 1932004 (1110947), 1928111 (Others). **Capacity** - .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988 (V8, 1924571 (6 Cyl.).

Breaker Gap (6 Cyl.) - .019" (new points), .016" (used points).

Breaker Gap (V8) - Gap (.016") will be correct when cam angle correctly set.

Cam Angle - 28-35° (6 Cyl.), 28-32° (V8). Set V8 distributors to 30° (gives .016" point opening).

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1112403.

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	375	0-2	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Automatic Advance - 1110947

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	375	0-2	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3750

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Aut matic Advanc - 1112720,21,25,26

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-2	750
5-7	750	10-14	1500
8-10	1175	16-20	2350
12-14	1750	24-28	3500

Vacuum Spark Control: Delco-Remy 1116089 or 1116143 for 1112403 Distr., 1116148 for 1110947 Distr.

Vacuum Advance - 1116089

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
7.5	15	7.5-10

Vacuum Advance - 1116143

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
11	22	15-16

Vacuum Advance - 1116148

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
7.5	15	15-16

IGNITION TIMING

Setting - 5° BTDC (235"), TDC (261"), 4° BTDC (V8). Set timing at idle speed with vacuum line disconnected. *NOTE - 5° BTDC setting on 235" supersedes previous setting of TDC.*

Timing Mark (6 Cyl.) - First vertical line on flywheel clockwise from steel ball (235" Eng.), steel ball 261" Eng. Line up line or ball with pointer in flywheel housing, with Octane selector set at "O".

Timing Mark (V8) - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines in 2° graduations with greatest number of lines on advance or BTDC side.

►*TIMING SETTING CAUTION: Set timing with vacuum line disconnected and manifold opening taped closed.*

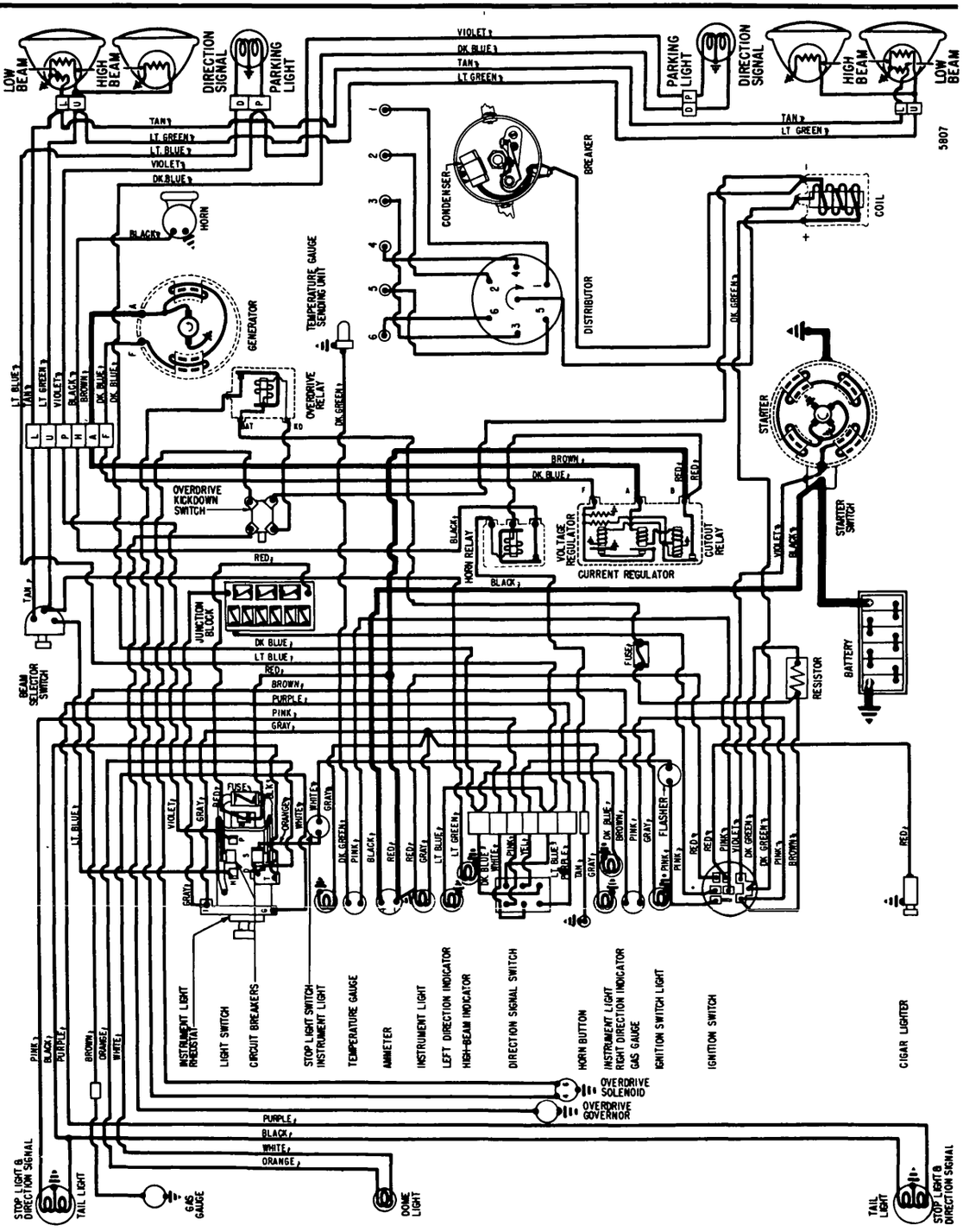
CARBURETOR

Engine	CARBURETOR APPLICATION	Carburetor
6 Cyl.	(Exc. Forward Control)	Rochester B
6 Cyl.	(Forward Control)	Carter BB
V8 283"	Trademaster	Rochester 2G 2-Bbl.
V8 283"	Taskmaster	Rochester 2G 2-Bbl.
V8 283"	Super Taskmaster	Rochester 4G 4-Bbl.

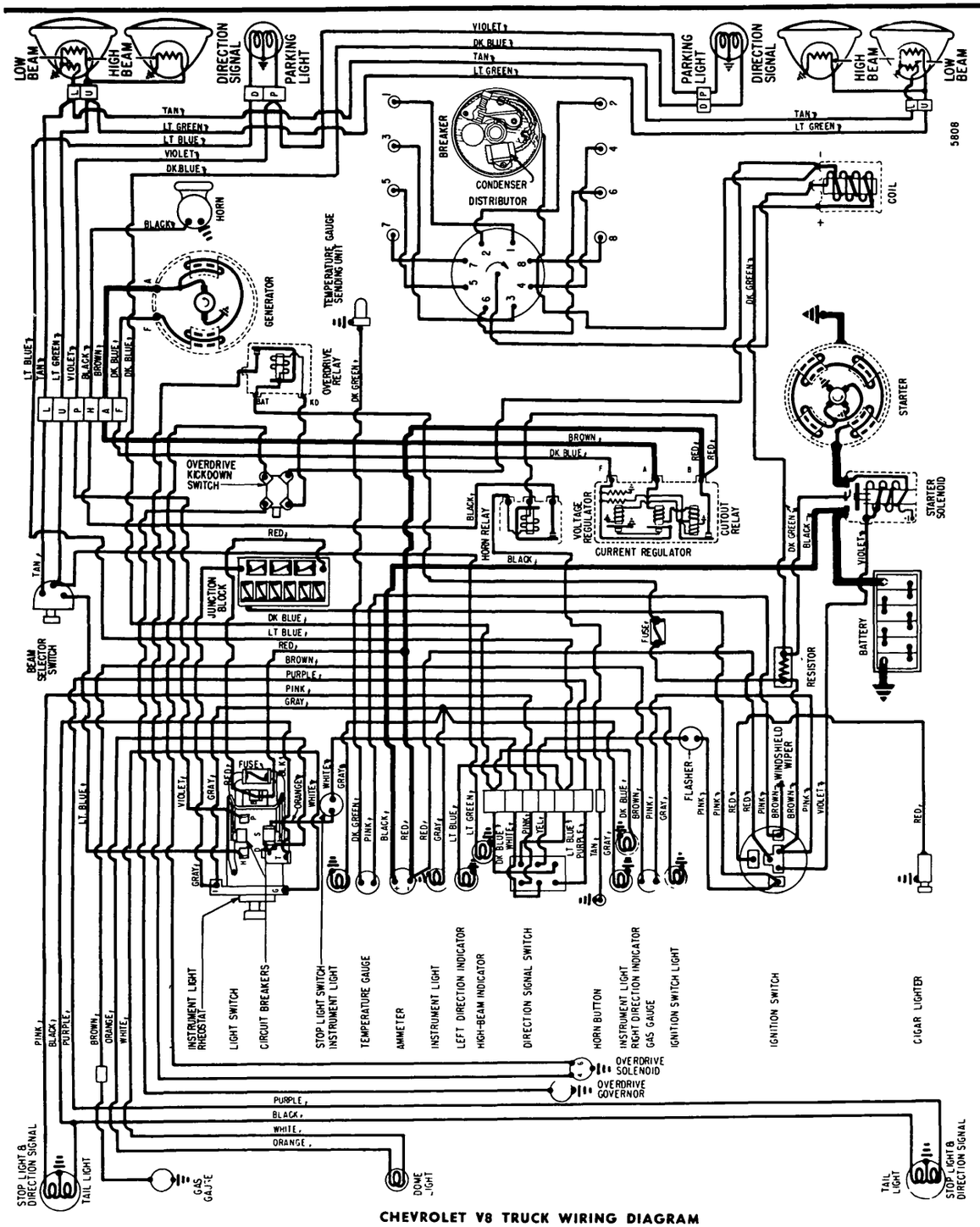
►*OVERSPEED WARNING SYSTEM NOTE:* Engine overspeed warning light mounted in cab and controlled by vacuum switch on Rochester 2G Carburetor 7013013. Oil pressure switch used for testing light bulb circuit (light should go on when ignition switch is turned on).

Throttle Linkage Adjustment (6 Cyl. Hydra-Matic Drive Trucks except Forward Control): With engine at normal operating temperature and idle speed set at 400-450 RPM, remove lower end of carburetor throttle lever-to-bellcrank rod from lever on bellcrank. Install Lever Positioning Gauge J-5609 in hole in lever and gauge hole in pan rail of engine block (hole is located toward

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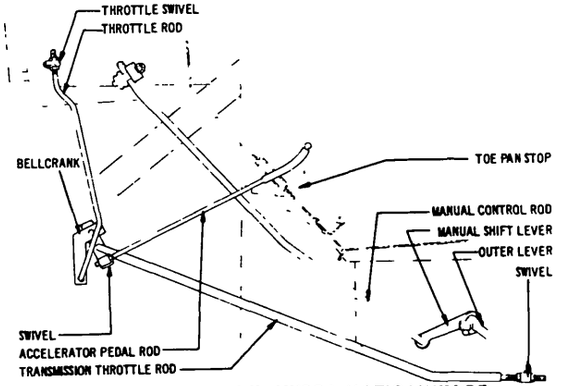
CHEVROLET 6 CYL. TRUCK WIRING DIAGRAM



CHEVROLET V8 TRUCK WIRING DIAGRAM

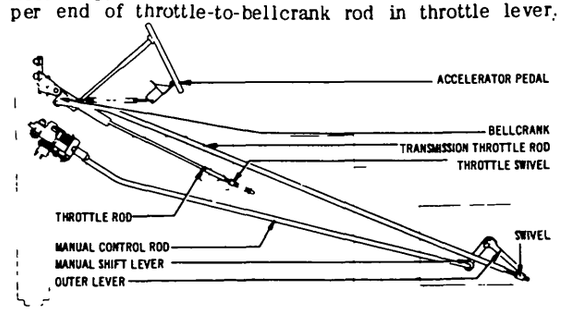
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rear of bellcrank position), and leave gauge in this position. Remove swivel from bellcrank-to-transmission outer lever at transmission and move transmission outer lever back against its stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using Tool J-5260 (*CAUTION - Do not apply force to stops at either end of lever travel).* Hold outer lever back against its stop and adjust swivel position on bellcrank-to-transmission rod so it just enters hole in transmission lever. Remove Positioning Gauge from bellcrank and reinstall rod. Recheck en-



CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (EXCEPT FORWARD CONTROL)

gine idle speed with idle screw against stop on carburetor, and adjust carburetor throttle-to-bellcrank rod so swivel at upper end freely enters hole in throttle lever. At this point, **shorten** bellcrank-to-transmission outer lever rod by turning swivel locknuts **three and one-half** turns. Remove bellcrank-to-carburetor throttle rod upper swivel from lever and pull rod upward until linkage is stopped by forward stop in transmission. Hold in this position and adjust accelerator-to-bellcrank rod swivel until accelerator pedal is against floor stop, then **shorten** rod **one full turn.** Replace upper end of throttle-to-bellcrank rod in throttle lever.



CHEVROLET 6 CYL. HYDRA-MATIC LINKAGE (FORWARD CONTROL MODELS)

Thr ttle Linkage Adjustment (Forward Control M dels With Hydra-Matic Drive): With engine at normal operating temperature and idle speed set at 400-450 RPM,

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insert 1/8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever. Adjust length of throttle rod so that swivel just enters throttle lever. Remove swivel from outer lever and move lever back against transmission stop. Check distance from hole in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole. *CAUTION - Do not apply force against stop at either end of lever travel.* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever, then **shorten** throttle rod **three and one-half turns** of jam nut.

THROTTLE LINKAGE ADJUSTMENT: (V8 Hydra-Matic Drive Trucks) - With carburetor at idle speed, disconnect rod "P" at transmission outer lever "A". Hold outer lever "A" back against transmission stop and check distance from hole in outer lever "A" to back of transmission (use Gauge J-2545-C). Bend outer lever "A" as required to allow entry of gauge in hole (Use Tool J-5260). With rods "E" and "H" connected, loosen "D" 3½ turns and tighten "B". Back off stop screw "F" and rotate lever "G" until linkage is stopped by full detent stop in transmission. Adjust screw "F" to contact bracket "Q", release lever "G" and advance screw "F" ½ -1 full turn. *NOTE* - On Series 31,32,3600, install 1/8" gauge pin through hole in lever "L" and bracket "M", Install rod "O" to lever "L" and rotate "L" until screw "F" contacts bracket "Q". Adjust length of rod "O" so swivel just enters lug "H". If unable to get downshift on road test, check for interference between rod "E" and cylinder block in area over "G" and bend rod as necessary to give clearance.

ROCHESTER "B"

Model	Rochester No.
235" All Trans. (Std.)	7013029
235" 3-Speed (Economy)	7013953
261" Auto. Trans.	7015140

Idle Setting - 1½-2½ turns open. Turn screw out for richer mixture.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

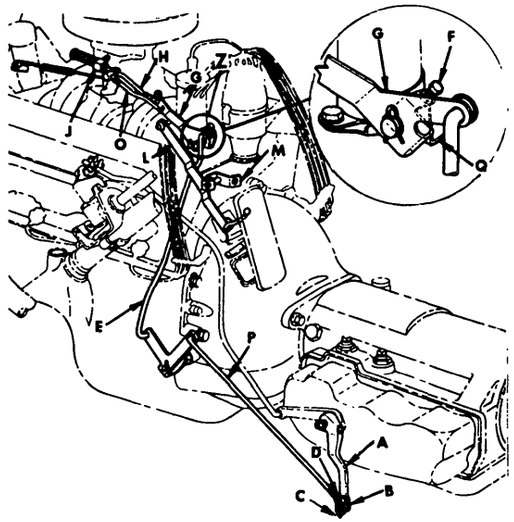
Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

►*CAUTION: Both floats must b s t alike and must not be twisted out of alignment.*

Acc l rating Pump - No seasonal adjustment.

Ch k Adjustm nt: Manual choke used.

Thr ttle Linkag Adjustm nt: *See CARBURETOR above.*



CHEVROLET V8 TRUCK HYDRA-MATIC LINKAGE

►*OTHER DATA: See "Rochester B Carburetors" in Carburetion Section.*

ROCHESTER 2G

Model	Rochester No.
283" (No Gov.)	7013009
283" (Vel. Gov.)	7013011
283" (Vac. Gov.)	7013013

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8. LEFT barrel feeds 1-4-6-7.*

Idle Setting - After idle speed set to correct specifications (see below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans, in "D").

Float Level - 1 23/64" (Gauge BT-152) with air horn inverted and gauge placed over float so it rests against pump side of power piston shaft and outer gauge leg in line with center of float. Adjust by bending float arm (Tool BT-69) between pivot and float.

Float Drop - 1 29/32" (Gauge BT-152) from air horn gasket to bottom of float with air horn held upright. To adjust, bend float tang.

Choke Setting: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4G

Model	Rochester No.
283" (3700 RPM Gov.)	7013023
283" (4000 RPM Gov.)	7013021

Idl S tting - Adjust idle mixture screws for highest steady vacuum.

Idl Sp d - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Thr ttl Linkag Adjustm nt: *S CARBURETOR above.*

►*OTHER DATA: S "Roch ster 4G & 4GC Carbur tors" in Carburetion Section.*

CARTER BB

Carter (BB) 871SC (Forward C ntr l M d ls). Single barrel updraft type with manual choke.

Idle Setting - ½-1½ turns open (turn screw out for richer mixture).

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed).

Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.

Throttle Linkage Adjustm nt: *S e CARBURETOR abov .*

►*OTHER DATA: See "Cart r BB Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: 6 Cyl. AC No. 4466 Fuel & Vacuum (With Vacuum Wiper), No. 4434 Fuel only (Electric Wiper).
283" V8 - AC No. 4701.
Pressure - 3½-4½ lbs. (6 Cyl.), 5¼-6½ lbs. (V8) idling.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric
Dash Unit - AC No. 1518461.
Tank Unit - See table below.

Model	AC N .
3000 (Exc. Cab & Fwd. Contr.)	1518779
3000 & 4000	5640053
3400 Fwd. Contr.	1518783
3500, 3700 Fwd. Contr.	1518780
3,4,5000 (Cab)	1518777
3,4,5000 (Flat Faced Cowl)	1518780
4502 School Bus	1518778
6000 6 Cyl.	5640053
6000 V8 (Cab)	5640232
6000 V8 (Flat Faced Cowl)	5640233
6702, 6802 School Bus	5640234
6200, 6600 Fwd. Contr.	1518780

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco-Remy 2SMR53W. 12 Volt, 9 plate, 53 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Engine to frame (6 Cyl.), engine to dash (V8).

STARTER

Delco-Remy. Application as follows:

Truck Model	Start r	Armature
6 Cyl. (Exc. Fwd. Cont.)	1107634 ①	1926626
6 Cyl. (Fwd. Cont.)	1107652 ②	1932185
6 Cyl. (Hydra-Matic)	1107677 ②	1926626
V8 (Exc. Hydra-Matic)	1107664 ②	1935829
V8 (Hydra-Matic)	1107674 ②	1927343

① - Manual Pinion shift. ② - Solenoid Pinion shift.

Driv (6 Cyl. Synchro-m sh Trans. Exc. Fwd. C nt.) - Overrunning clutch with pedal operated pinion shift

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Drive (6 Cyl. Fwd. Cont. & Hydra-Matic Trans., All V8 Models) - Overrunning clutch with solenoid pinion shift.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. min.

Performance Data - 1107634,74,77

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Performance Data - 1107652,64

Torque	RPM	Volts	①	Amperes
0 ft. lbs.	6200-9400	10.6		49-76
	Lock	4.25		270-310

① - Includes solenoid.

Starting Switch (Solenoid Pinion Shift Models): Delco-Remy Solenoid 1119919 (1107664) 1119760 (1107674), 1119793 (1107677), 1119919 (1107652) Mounted on starter and controlled by Ignition & Starter Switch 1116537 Turn key full RIGHT against spring tension to start

Starting Switch (Manual Pinion Shift Models): Delco-Remy Switch 1930496. Mounted on starter and actuated by pedal operated lever. Ignition Switch 1116522 is connected to small terminal on side of starter switch to bypass resistor for starting.
See "Delco-Remy Manual Pinion Shift Starter Switches" in Electrical Section.

Hydra-Matic Neutral Safety Switch: Delco-Remy 1998110. Mounted on steering column.
Adjustment - *See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy Used as follows

Application	Generator	Armature
Std ①	1102096	1923535
Air Cond	1102114	1940737
Pwr Strg ②	1102115	1940317
Exc Pwr Strg ⑤	1105116	1940161
Pwr Strg ⑤	1105118	
Exc Pwr Strg ①③	1102173	1946719
Exc Pwr Strg ④③	1102174	1946719
Exc Pwr Strg	1105123	1945922
Pwr Strg	1105124	1945899
Pwr Strg	1106676	
Exc Pwr Strg	1106985	1927074
Pwr Strg	1106680	
Opt	1106679	

① - Solid mounts ② - Rubber mounts
③ - Dual ball bearing end frame
④ - Rubber mounts at front ⑤ - Low Cut In

Performance Data - Cold

Generator	① Amperes	Volts	RPM
1102096	30	14 0	2240
1102114, 115	35	14 0	2630
1105116, 118	14	14 0	1680
1105123, 124	40	14 0	1930
1106676	45	13 0	1400
1106985	50	13 0	1475
1106679, 680	50	13 0	1600

① - Not Maximum output See Current Regulator
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 28 ozs (All generators)
Field Current - 1 69-1 79 amps (1102096, 114, 115), 2 73-3 0 amps (1105116,118,1105123,124), 2 14-2 28 amps (1166676,679,680,985), all at 12 volts
Belt Adjustment: 3/8" (6 Cyl), 3/4" (V8) deflection midway between fan and generator pulleys with 15 lbs pressure

REGULATOR

Delco-Remy Used as follows

Regulator No.	Generator No.
1119001 (30 Amp)	1102096
1119002 (35 Amp)	1102114,115,173,174
1119604 (35 Amp)	1105116,117
1119610 (40 Amp)	1105123,124
1119603 (45-50 Amp)	1106676,985
1119606 (50 Amp)	1106679,680

►*DOUBLE CONTACT REGULATOR NOTE* Regulators 1119603,604,606,610 have double contacts for voltage regulation *NOTE* - Specifications below are "NORMAL" settings

Cutout Relay
Cuts In - 11 8-13 5 volts (1119001,2) 11 8-13 0 volts (1119603,4,6,10)
Contact Gap - 020" **Air Gap** - 020"

Voltage Regulator
Setting (1119001,2) - 13 8-14 8 volts
Setting (1119603,4,6,10) - 13 8-14 6 volts (Upper contacts), 1- 3 volts lower (Lower contacts) at 125°F
Contact Gap (1119603,4,6,10) - 016"
Air Gap - 075" (1119001,2), 067" (1119603,4,6,10), with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 12 Volt" and "Delco-Remy (Double Contact)" Regulators in Electrical Section*

Current Regulator
Setting - 27-33 amps (1119001), 32-37 amps (1119002), 43-47 amps (1119603), 31 0-35 5 amps (1119604) at 125°F , 48-52 amps (1119606), 36 0-40 5 amps (1119610) at 125°F
►*NOTE* 1119604 & 1119610 are "Temperature Compensated" type
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 12 Volt" and 'Delco-Remy (Double Contact)" Regulators in Electrical Section*

MISC. ELECTRICAL

Headlights: *Sealed Beam 4 Headlight System*
See "4 Headlight System" in Electrical Section
Directional Signals: *See Electrical Section*
Lighting Switch Removal: Disconnect all wires from switch (tag wires for reinstallation) depress switch shaft retainer (on top of switch) and remove knob and shaft Remove retaining ferrule remove switch
Stop Light Switch Location: Attached to underside of toe pan at left of brake pedal
LIGHTING CIRCUIT BREAKERS. Dual circuit breakers located in lighting switch
15 Amper Protects headlamps and parking lamps
15 Amper Protects all other vehicle lamps except instrument panel lights
FUSES: 3 Amp r Protects instrument panel lights
Horn Relay: Delco-Remy 1116920
Contacts Close - 5 0-9 5 volts
Contact Gap - 027"

ENGINE

►*AIR CONDITIONED TRUCK SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

Engine Model	Type
Thriftmaster	235" 6 Cyl
Jobmaster	261" 6 Cyl
Trademaster	283" V8
Taskmaster	283" V8
Super Taskmaster	283" V8

ENGINE SPECIFICATIONS: 6 Cyl & V8 valve-in-head

Engine	Bore	Stroke	Displacement
Thriftmaster	3 9/16"	3 15/16"	235 cu in
Jobmaster	3 3/4"	3 15/16"	261 cu in
Trademaster	3 7/8"	3"	283 cu in
Taskmaster	3 7/8"	3"	283 cu in
Super Taskmaster	3 7/8"	3"	283 cu in

Engine	Compr. Ratio	Rated HP	Developed HP
Thriftmaster	8 25-1	30 4	135 at 4000 RPM
Jobmaster	8 00-1	33 7	150 at 4000 RPM
Trademaster	8 50-1	48 0	160 at 4200 RPM
Taskmaster	8 00-1	48 0	160 at 4200 RPM
Super Taskmaster	8 00-1	48 0	175 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP*
ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*
OIL PAN REMOVAL: (6 Cyl Engines) Raise front of vehicle and place on stands drain lubricant and remove bolts and screws *NOTE* Turn crankshaft as necessary to allow clearance at front crossmember
OIL PAN REMOVAL: (V8 Engine) - Raise front of vehicle and place on stands drain lubricant On 5 6000 Series Trucks remove oil level gauge and tube Remove bolts and screws lower oil pan
ENGINE MOUNTINGS: *See 'Engine Mountings" in Chevrolet Special Data*
CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data*
TIGHTENING TORQUES: *See "Tightening Specifications in Chevrolet Special Data*
►*OTHER ENGINE DATA See Chevrolet Passenger Car pages and note the following*
PISTON RINGS: All engines have "Chrome Plated" top compression rings Other compression rings are cast iron Oil rings are three piece steel with heavy chrome plate oil control rails
Oil Ring Width - 181- 188" (6 Cyl), 235- 245" (V8)
VALVES- "Rotocoil Valve Rotators" used on 261" and 283" Taskmaster Engines with stellite faced and hard tipped exhaust valves
Valve Lift (283" Eng) - 3336"

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Valv S at Width - 235" Eng. - .062-.093" Int. & Exh. **261" Eng.** - .062-.093" Intake, .093" - .125" Exhaust. **283" Trademaster** - .062-.093" Intake & Exhaust. **283" Taskmaster & Super Taskmaster** - .062-.093" Intake, .093-.125" Exhaust. *NOTE* - Seats on these engines are induction hardened.

►*VALVE SEAT & FACE ANGLE RECONDITIONING CAUTION:* To maintain interference and parallel fit between valve face and seat follow specifications below:

Engine	Int. - Seat Angle - Exh.
235", 261"	31° - 46°
283"	46° - 46°

Engine	Int.- Face Angle - Exh.
235"	30° - 45°
261"	30° - 46°
283"	45° - Ⓒ

Ⓒ - 45° Trademaster, 46° Taskmaster & Super Taskmaster.

Valve Spring Specifications

Engine	Lbs. Pressure	Length
235" Eng.	65	1 27/32"
261" Eng.	78	1 27/32"
283" Eng.	80	1 45/64"

Valve Spring Free Length - 2.156" (235"), 2.281" (261").

Valve Timing Specifications (283" Eng.)

Intake Valves - Open 18° BTDC. Close 54° ALDC.
Exhaust Valves - Open 52° BLDC. Close 20° ATDC.

Valve Timing Check (261" Eng.): Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular mark on flywheel lines up with pointer in flywheel housing opening. Mount dial indicator on rocker arm shaft support with stem contacting No. 1 exhaust valve adjusting screw, set dial indicator to .063". Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .005". Reset No. 1 exhaust valve to correct running clearance.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: (235") 5 qts. refill, 6 qts, with filter change. **(261")** 6 qts. refill (Includes full flow filter). **(283")** 4 qts. refill (Trademaster), 5 qts. refill (Taskmaster). Add 1 qt. for filter change.

Normal Oil Pressure - (6 Cyl.) 35 lbs. at 2000 RPM. **(V8)** 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator - AC No. 1508246. Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed with pickup pipe screen horizontal and toward bottom of pan.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Oil Filt r: AC partial flow (235"), full flow (261" & 283").

R plac ment Filt r El ment - (235") AC-P-115 1 qt. or AC-P-117 2 qt., partial flow. (261" & V8) AC-PF-141 full flow.

Crankcas V ntilati n (Standard): Air intake through valve rocker arm cover, outlet through pipe on right side of engine.

Servicing - On all models with air cleaner mounted on valve rocker arm cover, wash filter element with solvent and re-oil at 2000 mile intervals or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing - Every 10,000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

►*TASKMASTER V8 CRANKCASE VENTILATION NOTE:* Positive type crankcase ventilation is Standard.

COOLING

Water Capacity: In quarts for each type engine.

Model	Standard	Heavy Duty
3000 Series (235")	17	17½
4000 Series (235")	17½	18
4, 5-speed (261")	Ⓒ 17	
3000 Series (283")	17½	18
4000 Series (283")	18	18½
5000 Series (283")	Ⓒ	
6000 Series (283")	Ⓒ	

Ⓒ - Powermatic 21. Ⓒ - 4, 5-speed 18½, Powermatic 21.
Ⓒ - 4, 5-speed 18, Powermatic 21½.

NOTE - Add 1 quart for heater.

Pressure Valve: Radiator filler cap. AC No. RC1 (Std.), 7 lb.; AC No. RC12 (5,6000 Series with Auto. Trans.), 9 lbs.

Thermostat: Harrison. In cylinder head water outlet (6 Cyl.). In water outlet in intake manifold (V8).

Standard - No. 3133596 (stamped 160) 157-163°F.
Optional - No. 3133595 (151°F), No. 3133597 (170°F), No. 3133698 (180°F).

Temperature Gauge: AC Electric.
Dash Unit - AC No. 1513381.
Engine Unit - AC No. 1513321.
See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball bearing shaft.
See "Water Pumps" in Chevrolet Special Data.

CLUTCH

Own (Diaphragm Spring) and **Borg & Beck** (Coil Spring) types used. Single plate, dry disc type.
See "Chevrolet (Own)" or "Borg & Beck" Clutches in Clutch S cti n.

Ch vr l t (Own) Diaphragm Clutch

Model	Siz	Ch vr let No.
6 Cyl. (Exc. H.D., Fwd. Contr.)	10"	3751039
Series 3 & 4 6 Cyl.	11"	3751041

B rg & Beck Clutch

Series 3 & 4 V8, Series 6	11"	3758681

Clutch Disc Applicati n - As follows:

6 Cyl. (Exc. H.D., Fwd. Contr.) 10" Orange hub.	3836097
6 Cyl. H.D., All V8 11" White hub	3758678

6 CYL. ENGINES

Pedal Adjustment: Pedal free travel ¾-1". To adjust, loosen checknut and turn adjusting nut on connecting link at clutch throwout fork. *NOTE* - Use finger pressure only when checking clutch free travel.

Removal: Remove transmission (see Transmission Removal). Remove throwout bearing, remove fork by prying fork off ball, remove fork mounting (use ¾" wrench). Install Clutch Pilot Tool J-5824 (to support clutch), loosen all six cover bolts evenly, remove assembly from below. *CAUTION* - Do not allow pressure plate to hang on retracting springs (support by hand). When installing clutch align "X" mark on cover with "X" mark on flywheel.

V8 ENGINES

Pedal Adjustment: Adjust clutch pedal until free travel is 1". Make sure that pedal pad contacts toeboard when pedal pressed down.

Removal: Remove transmission (see Transmission Removal). Before removing clutch assembly, punch mark flywheel, clutch cover and one pressure plate lug so these parts may be assembled in their same relative positions. Loosen hold-down screws evenly and remove cover. *NOTE*–Mark flywheel side of driven plate for correct reassembly.

TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three speed, all helical gear type. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Light Duty)" in Transmissi n Section.

Transmission Control: Steering column mounted gearshift lever. *See "Transmission Controls" in Transmission Section.*

Removal (½ & ¾ Ton): Drain transmission. Disconnect speedometer cable at transmission and shift control rods from transmission levers. Remove propeller shaft. Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes. Remove the two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc.

3-SPEED (HEAVY DUTY)

Own. Three speed, constant mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.
See "Transmission Control" in Transmission S cti n.

Removal: Same as for "3-Speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd, & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

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Transmission Control: Floor mounted gearshift lever.
Removal (½ Ton): See *"3-speed (Light Duty)" above.*

Removal (Other Trucks): Drain transmission, disconnect parking brake and remove lever. Remove propellor shaft, transmission gearshift lever (use Tool J-8109) Remove screws that fasten steering jacket grommet to floor and slide grommet up jacket out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor, remove cover. On Forward Control Models, remove both front and rear floor pans. Disconnect speedometer cable from driven gear fitting at transmission rear bearing retainer. Remove two top attaching screws, insert Guide Pins J-1126, remove flywheel underpan, two lower transmission screws, slide transmission straight back, remove transmission from vehicle.

HYDRA-MATIC DRIVE

Dual Range. Four speed type with fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* See *Transmission Section.*

►*TESTING & TROUBLE SHOOTING.* See *"Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level in transmission every day Drain & refill every 25,000 miles. Use only "Automatic Transmission Fluid" Type A

Checking Fluid Level—With selector lever in "N" position, parking brake set, and transmission at normal operating temperature, remove access hole cover plate in floor pan, and **check fluid level with engine at idling speed.** Add sufficient fluid to bring level in transmission to "F" mark on dipstick.

Capacity—8½ qts. (refill), 9 qts. (after overhaul). *NOTE*—1 qt. additional with oil cooler.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA*—See *"Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

FRONT AXLE

4-WHEEL DRIVE

Full floating hypoid gear type Differential assembly (ring gear and pinion assembly) is serviced in same manner as rear axle

See "Chevrolet 4-Wheel Drive" in Rear Axle Section

Ratio - (½-Ton) 3 90-1 (¾-Ton) 4 57-1 (1-Ton) 5 14-1

Removal: Separate propeller shaft from front axle differential Place jack stands behind front springs Disconnect drag link from steering arm Disconnect brake hoses, shock absorbers from spring clamp plate Remove "U" bolts, roll axle from under truck

Axle Shaft Assembly Removal: Remove front wheel (¾ and 1-ton) and drum (½-ton) Remove hub cap and drive flange stud nuts Remove drive flange-to-axle shaft retaining snap ring, drive flange and shim *NOTE* - Use screws in tapped holes in flange (if necessary) to force flange from shaft then replace plastic plugs Use Tool J-6893 (½-ton), J-6649 (¾ & 1-ton) to remove outer locknut Remove lock and inner locknut Remove hub assembly (½-ton), drum and hub assembly (¾ & 1-ton), but do not drop loose outer bearing from bore of hub Remove brake and spindle assembly mounting nuts (½-ton), brake assembly and spindle Remove brake and spindle mounting nuts (¾ & 1-ton), then remove slinger Remove axle shaft and joint assembly

Installation: Install axle shaft and joint assembly, being careful not to damage seal with shaft splines Seat spindle-to-steering knuckle studs (flat side up to clear brake cylinder on ½-ton), then position brake assembly (½-ton) and slinger (¾ & 1-ton) over studs and tighten stud nuts to 50-60 ft lbs Install hub over spindle (½-ton), drum and hub assembly (¾ & 1-ton) *NOTE* - Lubricate bearings before assembly and DO NOT damage seal. Install inner nut and tighten wrench tight, then back off 1/8 turn Hub should be free to turn Install lock and outer locknut (against spacer on ¾ & 1-ton) Install shim and drive flange *NOTE* - Add only enough shims (.010") as necessary for flange to clear end of axle ball housing *CAUTION - Shims in excess of .030" will cause excessive wear of spindle bushing and interfere with the installation of the snap ring* Install snap ring and flange nuts Tighten flange nuts to 18-20 ft lbs (½-ton), 32-38 ft lbs (¾ & 1-ton) Install hub caps and lubricate front axle

REAR AXLE

HALF-TON SEMI-FLOATING (OWN)

Own. Semi-floating, hypoid gear type with Hotchkiss drive *NOTE* - Same design as passenger car axle

See "Chevrolet Hypoid Semi-floating" in Rear Axle Section

Ratio - 3 9-1 (39-10) or 3 7-1 (37-10)

►*AXLE SHAFT NOTE* Shafts unequal length (right shaft longer) and may be identified by mark stamped on shaft or by length as follows

Axle	Part No.	Length
Left	3694769℄	29 5/8"
Right	3694770℄	30 5/8"

℄ - Part No stamped on axle for identification

Backlash - .005-.008"

Axle Shaft Removal: Remove wheel and brake drum Drain rear axle lubricant remove housing cover Remove differential pinion shaft lockscrew, pinion shaft, axle shaft spacer and pinions Push axle shaft in toward center of car and remove "C" washers from inner ends of shaft, then remove axle shaft

Axle Shaft Endplay - Free fit to .014" maximum

Differential Carrier Removal: Remove axle shafts to clear differential side gears, see *"Axle Shaft Removal"* Separate rear universal joint (tape bearings to trunnion) Remove differential carrier to housing bolts and separate carrier from housing

HALF-TON SEMI-FLOATING (SPICER)

Spicer "Positraction". Semi-floating, hypoid gear type with Hotchkiss drive, incorporating a limited slip differential *NOTE* - Optional on all models except Four Wheel Drive

See "Spicer Hypoid Semi-floating" in Rear Axle Section

Ratio - 3 92-1 (47-12)

Backlash - .003-.006"

Axle Shaft Removal: Remove wheel and brake drum, drain lubricant, then remove nuts securing axle shaft bearing retainer and brake backing plate to axle housing Pull axle shaft, bearing, retainer and retaining ring assembly from housing *CAUTION - Support shaft to prevent damage to oil seal* Pry out oil seal if advisable to replace it

Rear Axle Assembly Removal: Remove parking brake pull back spring and brake cable clevis pins Remove clevis from cable Remove two springs and retaining clip from each cable at frame brackets Separate rear universal joint (tape bearings to trunnion) Disconnect shock absorbers from anchor plate, and hydraulic brake line at rear frame bracket Remove spring "U" bolts, nuts, and anchor plates Raise vehicle and roll axle assembly to rear

►*LUBRICATION NOTE:* Use only G M No 3758790 or 3758791 lubricant Incorrect lubricant will cause Positraction rear axle to chatter

FULL-FLOATING (¾, 1, 1½ & 2-TON)

Own. Full-floating hypoid (straddle mounted pinion) with Hotchkiss drive

►*AXLE ASSEMBLY NOTE* ¾, 1-ton & 2-ton drive pinion assemblies have roller bearing at rear end, and tapered double roller (one piece outer race) at front end 1½-ton has roller bearing at rear end and double row ball bearing at front end Flange type axle shafts used in ¾ & 1-ton models splined axle shaft flanges and hubs used in 1½ & 2-ton models

See "Chevrolet Truck Hypoid Full Floating" in Rear Axle Section

►*AXLE RATIO IDENTIFICATION NOTE* Axle ratios are identified by prefix letters in rear axle numbers stamped on top of carrier housing between reinforcing ribs

Axle Ratio Identification

Ratio	Prefix Letters
4 57-(32 7)	CC,DC,CP
5 14-1 (36 7)	CA,CB,CE,CF,CG
6 17-1 (37 6)	CG
7 2-1 (36 5)	CM

Backlash - .005-.008"

Removal of Differential Carrier: Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal below. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier in floor jack and roll from under truck.

Axle Shaft Removal (¾ & 1-Ton) Remove eight capscrews and lockwashers in axle shaft flange install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes) turn these screws up evenly to loosen the shaft withdraw shaft from housing remove and discard gasket *Use new gasket when installing shaft*

►*CAUTION* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft *Grease at this point will cause loosening of axle shaft flange capscrews*

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►*AXLE SHAFT NOTE:* Shafts unequal length (right shaft longer than left). Install in correct position.

Axle Shaft Removal (1½ & 2-Ton): Remove hubcap, then thread Tool J-1436-1 into hole in axle shaft and use slide hammer to remove shaft

NOTE–When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►*AXLE SHAFT NOTE:* Some models have different length axle shafts. Install longer shaft on right side.

Wheel Bearing Adjustment: Remove wheels and axle shafts (see above). Bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten adjusting nut tight, using special wrench J-2222 (¾ & 1-Ton), J-870 (1½ Ton), J-5670 (2-Ton) while turning hub by hand, then back off nut 45°, check for free turning, install adjusting nut lock with lock tangs aligned with slots in adjusting nut. Bend tang down into notch in adjusting nut, install locknut and tighten securely. Bend tang of lock down into notch of locknut.

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type. with hypoid primary pinion and ring gear.
See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.

Axle Ratio - 6 40-1 (high), 8 72-1 (low) 35:6 Primary gears

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above.

SHOCK ABSORBERS

Delco. Direct acting (Airplane type) shock absorbers as follows.

Shock Absorber No.	Front	Rear
Series 3 (Exc. Fwd. Contr.)	5532049	5534435
Series 3 Fwd. Contr	5513193	5534435
Series 4, 6 (Exc.Fwd.& Sch. Bus.)	5521698	5534401
Series 6 School Bus	5521699	5534401
Series 6 Fwd. Contr.	5532425	5534401

FRONT SUSPENSION

2-WHEEL DRIVE

Conventional "I" Beam Section, with Reverse Elliott ends and semi-eliptic springs

Kingpin Inclination - 6 16-8 18° (Exc 6242,6642 with Eaton Axle), 4° (6242,6642 with Eaton Axle).
Caster (At Design d L ad) - Pos 1 5° (31,3200), 3.0° (3600), 2 25° (3800), 2° (34,35,37,41,44,45,5000),2 25° (6000), 2.75° (6242,6642)
Camber - 1 25-1 75° (Exc 6242,6642 with Eaton Axle), 1°30' (6242,6642 with Eaton Axle)
Toe-In - 13- 22" (31,3200), 25- 31" (All Others)
Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22.5-23 5°

4-WHEEL DRIVE

Optional on some ½,¾ and 1-Ton models
Kingpin Inclination - 8°
Caster - 1¾° Not adjustable
Camber - 1½° Not adjustable
Toe-In - 1/32-5/32" *NOTE* - Adjust tie rod ends Fine thread end changes toe-in ¼" per turn, coarse end 9/32"

STEERING

Manual: Saginaw Ball Bearing Worm & Nut (recirculating ball).
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.
Power Steering: Bendix Linkage Type – *See "Chevrolet Truck (Bendix)" in Steering Section.*
Steering Linkage: *See "Steering Linkage" in Steering Section.*
Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*
Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*NOTE: Two different type brakes used on trucks as indicated below.*
Chevrolet-Bendix (Front - 3,4,5,6000 Series), (Rear - 3000 Series) - Duo-Servo, single anchor type hydraulic (Without ecce ntric adjustment)
See "Chevrolet-Bendix Hydraulic" in Brake Section.
►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION:* If bench type grinder used, grind shoes to 057"-087" smaller diameter than drum size If spindle type grinder used, grind shoe to drum diameter
Chevrolet-Twinplex (Rear-4,5,6000 Series) - Two cylinder, four anchor type hydraulic Shoes are self-centering and self-energizing
See "Chevrolet-Twinplex" in Brake Section
Wheel Cylinders - Size stamped on housing under adjusting lock spring
Drums - Cast iron with steel web

Drum Diameter

Model	Front	Rear
1/2-Ton	11"	11"
3/4-Ton	12"	ℂ12"
1-Ton	12"	14"
1½ & 2-Ton	14"	15"

ℂ - On Fwd Contr models

Lining - Molded type Bonded on 1'2-ton models, riveted on all other models

Thickness & Width

Model	Thickn ss	Width
1/2-Ton (Front Whl)	3/16"	2"
1'2-Ton (Rear Whl.)	3/16"	1¾"
3/4-Ton (Front & Rear)	1/4"	ℂ 2"
1-Ton (Front Whl)	1/4"	2"
1-Ton (Rear Whl.)	1/4"	2½"
1½ & 2-Ton (Front Whl.)	1/4"	2½"
1½ & 2-Ton (Rear Whl.)	3/8"	4"

ℂ - On Fwd Contr. models.

Clearance - Adjust for clearance as follows:

All Models (Except 1½ & 2-T n R ar Brak s)–Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (Half-Ton Models), or just enough to eliminate brake drag (Other Models), but not more than 7 notches.

Rear Wheels (1½ & 2-Ton M d ls)–Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel).

Parking Brakes: Hand lever applies rear wheel service brakes on Half-Ton & ¾-Ton Models, and an independent brake on propeller shaft on all other models.
Adjustment (½ & ¾-Ton M d ls)–*Se "Ch vr l t-Bendix Hydraulic" in Brak S cti n.*
Adjustment (1, 1½, 2-Ton M d ls & ¾-T n with 4-Sp ed Transmission)–*See "Ch vrolet Twinplex" in Brak Section.*

Master Cylinder: Located under floorboard on left hand side of truck.
Checking Fluid–Maintain fluid level to lower edge of filler hole.
Removal–Remove from below. *CAUTION*–On 1½ & 2 Ton Low Cab Forward, spacer between cylinder and body bracket will fall out when mounting bolts removed.
Installation–Reverse removal procedure. On LCF Models make sure the spacers are reinstalled.

Power Brakes: *See "Hydrov c P w r Unit" in Brak S ct.*
Removal–Remove vacuum line, brake fluid line to wheel and master cylinders, and air cleaner hose from vacuum unit. Remove nuts and bolt securing unit to its bracket on right side rail of frame.

MISC. MECHANICAL

Windshield Wipers: Linkage type. Vacuum motor (3,4000 Std.), electric motor (3,4000 Optl., Other Std).
See "Windshield Wipers" in Misc llaneous S ction.
Air Conditioning: *See "Ch vrol t Air Conditioning" in Miscellaneous Section.*

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Model	Series
Biscayne, Brookwood ①	1100
Sedan Delivery	1170
El Camino Pickup	1180
Biscayne Fleetmaster	1300
Bel Air, Parkwood ①, Kingswood ①	1500
Impala, Nomad ①	1700

① - Station Wagons Brookwood - 2 & 4 Dr 6 Pass, Parkwood - 4 Dr 6 Pass, Kingswood - 4 Dr 9 Pass, Nomad - 4 Dr 6 Pass types

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post *NOTE* - Number (example below) includes identification data

① ② ③ ④
0 1111 F 100001

① - Year 0 1960
② - Series Prefix See Series Prefix table below
③ - Assembly Plant See Assembly Plant Designation below
④ - Unit Number Continuous for all cars at each assembly plant starting with 100001

Series Prefix

Biscayne	Series Prefix	Bel Air	Series Prefix
2-Dr Sedan	1111	2-Dr Sedan	1511
2-Dr Utility (3 Pass)	1121	4-Dr Sedan	1519
4-Dr Sedan	1119	Sport Coupe	1537
Fleetmaster 2-Dr Sedan	1311	Sport Sedan 4-Dr	1539
Fleetmaster 4-Dr Sedan	1319		
Station Wagon & Others		**Impala**	
Brookwood 2-Dr 6 Pass	1115	4-Dr Sedan	1719
Brookwood 4-Dr 6 Pass	1135	Sport Coupe	1737
Sedan Delivery	1170	Sport Sedan 4-Dr	1739
El Camino Pickup	1180	Convertible	1767
Parkwood 4-Dr 6 Pass	1535		
Kingswood 4-Dr 9 Pass	1545		
Nomad 4-Dr 6 Pass	1735		

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor) *NOTE* - Number (example below) includes identification data

① ② ③
T 0101 A

① - Engine Plant **F** - Flint **T** - Tonawanda **C** - Engines built in Canada
② - Code number indicating month and day of manufacture. This is not an individual or continuous number
③ - Engine type *See Engine Type table below*

Std Engine & SM. Trans.

A - Basic Engine	**AJ** - H D Clutch, Pwr Strg, AC
AE - H D Clutch	**AK** - Pwr Strg
AF - Air Cond	**AM** - H D Clutch, Pwr Strg
AG - H D Clutch & Air Cond	**AZ** - Pwr Strg, Air Cond

1300 Engine & SM Trans.

AP - Basic Engine	**All Engines & Powerglide**
AR - H D Clutch	**B** - Basic Engine
AS - Pwr Strg	**BE** - Pwr Strg
AT - H D Clutch & Pwr Strg	**BG** - Air Cond ①
	BH - Pwr Strg, Air Cond ①

① - Except 1300 Engine

►*1300 ENGINE NOTE* This engine used in Biscayne 1300 Series Fleet Cars only Engine is basically the same as that used in standard cars except for use of economy carburetor and mechanical valve lifters (different valve lift and valve timing)

TUNE-UP

COMPRESSION PRESSURE: 130 lbs minimum with all cylinders equal within 20 lbs, at cranking speed
VACUUM READING: 17-21" steady, at idling speed
VALVE TAPPET CLEARANCE: (Exc. 1300 with 3-Speed Trans.) - Zero lash, hydraulic lifters *NOTE - for initial valve adjustment see "VALVES"*
(1300 with 3-Speed Trans.) - 006-011" Intake, 013-018" Exhaust
MANIFOLD HEAT CONTROL: Thermostatic type Check for free operation Should require ½ turn from unhooked to hooked position Replace distorted spring

IGNITION

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 035"
Spark Plugs - AC No 44 Torque to 20-25 ft lbs
COIL: Delco-Remy 1115120.
Ignition Current - 1 8 amps idling, 4 0 amps stopped
Resistor - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal
DISTRIBUTOR: Delco-Remy 1112403.
Condenser - Delco-Remy 1928111 **Capacity** 18-23 mfd
Contact Point Set - Delco-Remy 1924571
Breaker Gap - 016"
Cam Angle - 28-35° with 016" gap
►*BREAKER GAP CAUTION*· Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Clockwise viewed from above

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "O" position
Vacuum Spark Control: Delco Remy 1116140

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
10-12	20-24	15-16

Ignition Switch: Replacement - Disconnect negative battery terminal Place switch in "Lock" position and insert wire in hole in face of cylinder While pushing in on wire (to depress plunger) turn key counterclockwise and withdraw lock cylinder Use Tool J-7607 to remove ignition switch nut (passenger side), pull switch out from under dash and remove wiring connectors and lamp socket and bulb To remove "theft resistant connector" use suitable tool of heavy wire to press on lock clip within slot in connector and gently work connector away from switch until connector is released

IGNITION TIMING

Setting - 5° BTDC at idle speed with vacuum line disconnected

Timing Mark - First short vertical line on flywheel, clockwise from steel ball (TDC) insert This line should align with pointer in inspection hole in right front face of housing with Octane selector set on "O"

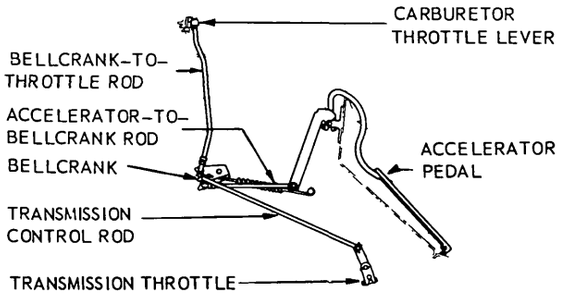
CARBURETOR

►*CARBUPETOR APPLICATION Rochester 3C single barrel carburetor used*

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): **1)** Disconnect control rod from throttle lever at transmission cover Remove lower bolt at rear of transmission side cover Rotate throttle valve control outer lever counterclockwise to open throttle position

2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7 09", measure distance from left side cover lower rear bolt to hole in throttle lever If pins of gauge will enter holes adjustment is correct If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary Reconnect throttle rod

3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever Disconnect accelerator-to-bellcrank rod at bellcrank



CHEVROLET 6 CYL. POWERGLIDE THROTTLE LINKAGE

4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position

5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank

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ROCHESTER BC

R ch ster BC. Single barrel carburetor used as follows

Model	Rochester Carburetor No.
Synchro-mesh (Std)	7013003
Synchro-mesh (Governor)	7013005
Synchro-mesh (Economy)	7013955
Powerglide (Std)	7013000
Powerglide (Economy)	7013956

Idle Setting - 1½ turns open 2½ turns open after engine temperature normal

Idle Speed - 475 RPM Synchro-mesh, 450 RPM Powerglide in "D"

Float Level - 1 9/32" (Gauge M-250) With air horn inverted and gasket in place, position Gauge M-250 over floats with tang inserted in discharge nozzle Bend float arms as necessary so that top of each float just touches gauge and float is centered between gauge legs

Float Drop - Bend float tang as necessary to obtain a distance of 1¾" from gasket surface to bottom of float, with air horn upright and float hanging free

Choke Adjustment: 1 notch rich (Synchro-mesh), 2 notches rich (Powerglide)

Fast Idle: With fast idle adjusting screw on second step and against high step of fast idle cam, Gauge BT-99 (076") should just slide between lower edge of choke valve and carburetor bore To adjust, bend connector rod

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Rochester BC Carburetors" in Carburetion Section*

CARB. EQUIPMENT

FUEL FILTER: Located in fuel line connection at inlet fuel filter nut Remove inlet connection, fuel filter nut and remove filter element and spring **Clean** element by washing in solvent and blowing out **Replace** element every 15,000 miles

Fuel Pump: AC Diaphragm type. Fuel only

Replacement Fuel Pump - AC 4434

Pressure - 3½-4½ lbs. at 450-1000 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: AC Electric type

Dash Unit - AC No. 5642364

Tank Unit - See table below.

Model	AC No.
Pass Car	5640697
Sta. Wgn.①Sed. Del , Par. Del	5640662
Sta. Wgn. (9-Pass.)	5640659

① - Exc 9 Pass. models.

See "Fuel Gauges" in Carburetion Section

Cruise Control: Automatic speed control. *See "Cruise Control" in Carburetion Section.*

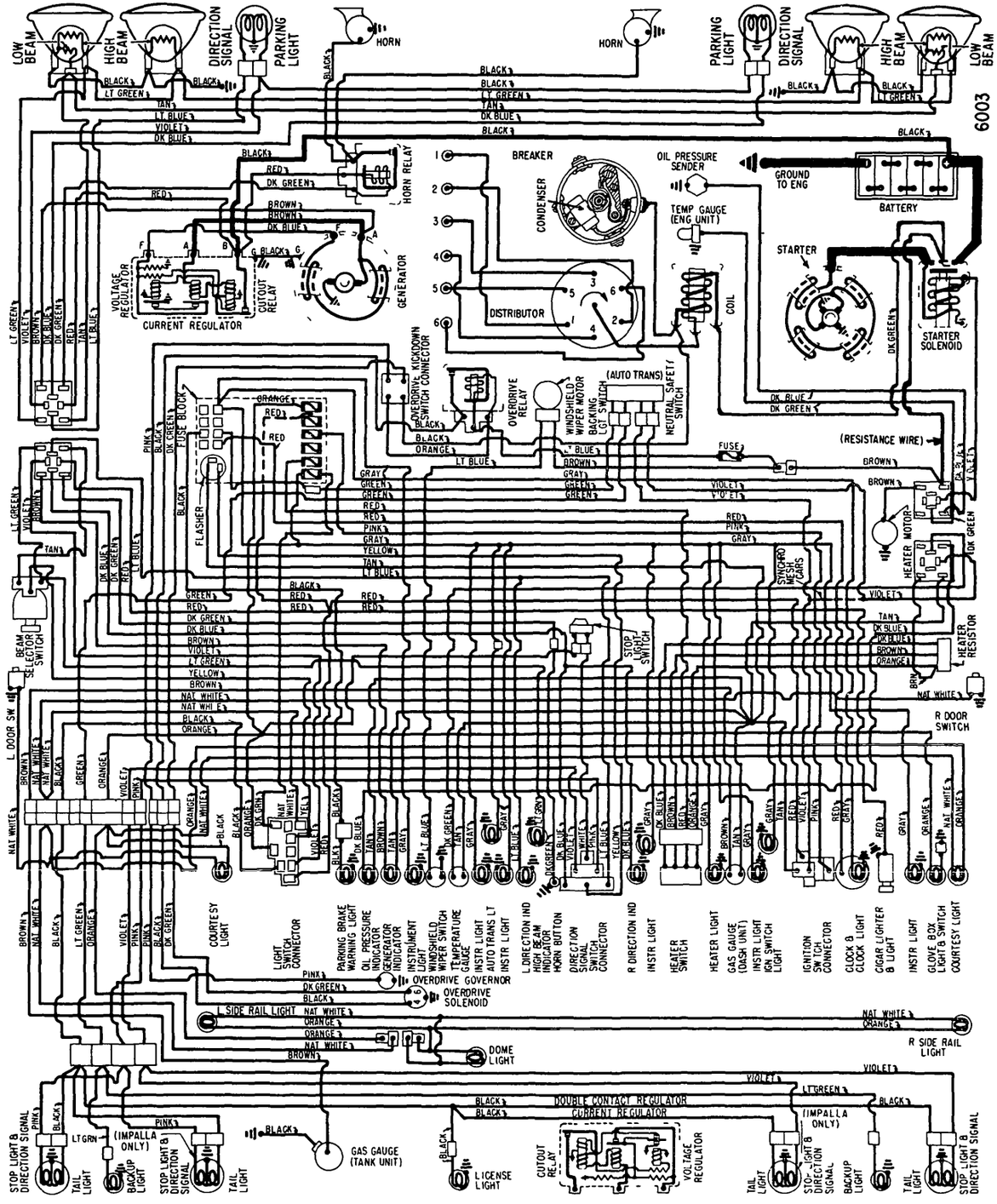
ELECTRICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC ELECTRICAL DATA*

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTIONS: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions" in Miscellaneous Section*

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ENGINE SPECIFICATIONS: Own. 6-cyl. valve-in-head.

Bore	Stroke	Displacement
3 9/16"	2 15/16"	235.5 cu. in.
Compr. Ratio	**Rated HP**	**Developed HP**
8.25-1	30.4	135 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: Drain crankcase. Raise and support car. Drain cooling system and disconnect radiator hoses at radiator. Disconnect battery ground strap at engine. Disconnect fuel pump inlet pipe at pump. Disconnect accelerator control rod at its lever. Remove overdrive solenoid. Disconnect power brake hose at check valve. Remove oil filter and support bracket. Remove nuts and gasket at exhaust pipe flange-to-exhaust pipe connection. Disconnect lower transmission control rods at transmission. Disconnect clutch fork pushrod at clutch fork. Disconnect all clutch control assembly from engine. Loosen transmission, and remove engine front mounting bolts. Remove hood. Lift engine with Tool J-4536 about 3" or until valve rocker cover contacts dash upper panel. Remove oil pan retaining bolts and screws. On synchro-mesh cars, remove flywheel underpan extension. Remove pan. *NOTE* - turn crankshaft as necessary for oil pan to clear counterweights.

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*ENGINE DATA NOTE:* Data following includes both Pass. Car & Trucks as noted.

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".

Removal - Pistons and rods removed from above.

Clearance - (235" Pass.) .0005-.0011"; (235" Trk.) .0006-.0010"; (261") .0012-.0016".

►*STANDARD & .001" PISTON NOTE:* Standard and .001" pistons are furnished in two sizes as follows:

235" Engine - Std. - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize** - Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").

261" Engine - Std. - Marked **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **.001" Oversize** - Marked **S6** (3.7510-3.7515"), **S7** (3.7515-3.7520").

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.

Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize.

PISTON PIN

Locked in rod. No bushing used in piston.

Diameter - 235" Eng. - .8660-.8665". **261" Eng.** - .9270-.9275".

Pin Fit in Piston - .00015-.00025" clearance. With both piston and pin at 70°F, and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure.

Replacement Pins: Furnished Std. & .0015", .003", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0930-.0935"	①	②
Oil (3)	③	④ .015-.055"	.000-.008"

① - (235") .007-.020" (Pass.), .0007-.017" (Trucks); (261") .015-.025" (Top), .010-.020" (No. 2).

② - (235") .002-.004". (261") .002-.0035".

③ - (235" Pass.) .224-.231"; (235", 261" Truck) .177-.182".

④ - On rails.

Replacement Rings: Furnished Std., .020", .030" and .040" Oversize.

►*RING INSTALLATION CAUTION:* Install Compression rings with side marked "GM" up.

CONNECTING ROD

Length - 6.81" Center-to-center.

Crankpin Journal Diameter - 2.311-2.312".

Lower Bearing - Replaceable precision type.

Clearance - .001-.003" (New), .001-.004" (Used).

Sideplay - .005-.012".

Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.

Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft.

CRANKSHAFT

Journal Diameters - **(1)** 2.6835-2.6845", **(2)** 2.7145-2.7155", **(3)** 2.7455-2.7465", **(4)** 2.7765-2.7775".

Clearance - (235" Pass.) .0008-.0024" (No. 1,2), .0010-.0026" (No. 3,4).

(235", 261" Trk.) New - .001-.003". Used - (235") .001-.004", (261") .001-.0045".

Bearing - Thin wall babbitt with steel back.

Bearing Adjustment: Precision type. Replace bearings.

End Thrust - Taken by No. 3 (rear intermediate) main bearing.

Endplay - .0035-.0095" (Pass.), .003-.009" (Trk.).

Replacement Bearings: Furnished Std. & .002", .010", .020", .030" Undersize.

Bearing Installation: Can be replaced without removing engine.

See "Crankshaft & Main Bearings" in Chevrolet Special Data.

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1537-2.1547", **(2)** 2.0912-2.0922", **(3)** 2.0287-2.0297", **(4)** 1.9662-1.9672".

►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".

Bearing Type - Steel backed babbitt lined bushings, no reaming required.

Clearance - .0015-.0035".

End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket.

Endplay - .001-.005".

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Gear: Fibre camshaft gear, steel crankshaft gear.

Back Lash - .003-.005".

Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*

Camshaft Setting: Timing is correct when timing marks on gears are together.

Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*

VALVES

Tappet Clearance: (1300 with 3-Speed Trans.) .006-.011" Intake, .013-.018" Exhaust.

Others - Zero lash, hydraulic lifters. *NOTE - For "Initial Valve Adjustment" see below.*

Trucks - (235") .006" Intake, .018" Exhaust. (261") .006" Intake, .020" Exhaust. All Hot.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	.3410-.3417"	①
Exhaust	1.495-1.505"	③	②

Valve	Seat Angle ④	Lift	Stem Clearance
Intake	⑤ 30°	⑥ .3275"	.0010-.0027"
Exhaust	⑤ 45°	⑥ .3275"	.0013-.003"

① - (235" Pass.) 6.376-6.396"; (235" & 261" Trk.) 6.364-6.394".

② - (235" Pass.) 4.913-4.933"; (235" Trk.) 4.905-4.930", (261" Trk.) 4.902-4.932".

③ - (235" Pass.) .3410-.3417"; (235", 261" Trk.) .001" taper, .3410-.3417" (top), .3400-.3407" (bottom).

④ - Valve face and seat angle specifications are service specifications. New engine specifications are: (235", 261") Seat Angle - 31° Intake, 46° Exhaust; Face Angle - (235") 30° Intake, 45° Exhaust, (261") 30° Intake, 46° Exhaust.

⑤ - Valve face angle 29° Intake, 44° Exhaust.

⑥ - (1300 with 3-Speed Trans.) .3105" Intake, .3325" Exhaust.

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 30° and 45°. When seats are ground to recommendations of 30° and 45°. valves must be faced to recommended angle of 29° Intake, 44° Exhaust.

►*VALVE STEM END GRINDING CAUTION (261" Eng.):* DO NOT grind hardened valve stem tip excessively on 261" Engine.

Valve Seat Width - 235" Eng. 1/16-3/32" (Int. & Exh.). **261" Eng.** - 1/16-3/32" (Int.), 3/32-1/8" (Exh.).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Precision type, pressed in head.

Valve Guide Installation - *See "Valve System" in Chevrolet Special Data.*

Initial Valve Adjustment (Hydraulic Lifters): Bring engine to operating temperature, remove rocker arm cover. Back off rocker arm adjusting screw (engine idling) until arms start to clatter. Turn adjusting screw down until clatter stops and 1½ additional turns.

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Valve Springs: Install springs with closed coil end down. **Free Length** - Pass. 2.16". 235" truck 2.156", 261" truck 2.281".

Spring Specifications (Pass.)

Valve	Pressure	Length
Closed	62-68 lbs.	1.858"
Open	158-168 lbs.	1.528"

Spring Specifications (Trucks)

Engine	Pressure	Length
235"	65 lbs.	1 27/32"
261"	78 lbs.	1 27/32"

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve springs. If distance from spring seat in head to top of valve spring exceeds 1 7/8", install 1/32" shims under spring to bring installed height within 1 51/64-1 7/8".

Valve Lifters: (Pass.) Hydraulic standard except Special Biscayne with 3-Speed Trans. which has mechanical type. *See "Valve System" in Chevrolet Special Data.* **(Trucks)** Mechanical type. Removed from above.

Valve Rotators: (261") Rotocoil type.

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

(Pass. Exc. 1300 with 3-Speed Trans.)

Intake Valves - Open 16° BTDC. Close 48° ALDC.
Exhaust Valves - Open 46° 30' BLDC. Close 17° 30' ATDC.

(1300 with 3-Speed Trans.)

Intake Valves - Open 1° ATDC. Close 39° ALDC.
Exhaust Valves - Open 42° BLDC. Close 9° ATDC.

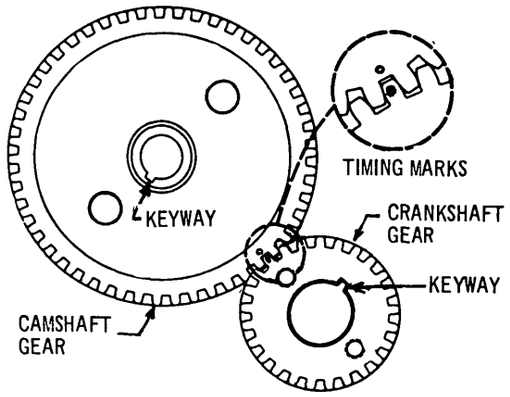
(235" Truck)

Intake Valves - Open 28° BTDC. Close 68° ALDC.
Exhaust Valves - Open 56°30'42" BLDC. Close 23° 30'42" ATDC.

(261" Truck)

Intake Valves - Open 11°30' BTDC. Close 52°30' ALDC.
Exhaust Valves - Open 51° BLDC. Close 13° ATDC.

Valve Timing Check - *NOTE - Mechanical type lifter must be used when making valve timing check.* Remove all tappet clearance from No. 1 exhaust valve. Turn engine over until this valve opens and just starts to close and until triangular flywheel mark (19° BTDC) lines up with pointer on right face of flywheel housing. Mount



CHEVROLET 6 CYL. VALVE TIMING MARKS

dial indicator on rocker arm shaft with stem of indicator contacting No. 1 exhaust valve adjusting screw and set dial indicator to .043" (235"), .063" (261"). Turn crankshaft until indicator hand just stops moving. Timing is correct if indicator reading is ZERO plus or minus .005". A greater or lesser reading indicates either excessive gear wear or improperly installed timing gears. Reset tappet clearance to specifications.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: (235") 5 qts. (261") 6 qts. Add 1 qt. for filter

Normal Oil Pressure: 35 lbs. at 2000 RPM.

Pressure Regulator Valve - In oil pump body. Not adjustable.

Oil Pressure Indicator - Light located on left side of instrument panel, controlled by pressure switch AC No. 1508753 located in main oil gallery on left side of engine. Switch closes when pressure drops to 4-7 lbs.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: Replacement element AC No. 115. Replace every 4000 miles.

Crankcase Ventilation (Standard): Air intake through breather filter in valve rocker arm cover and outlet through crankcase breather pipe on right side of engine.

Servicing - Clean breather filter in a good solvent every 2,000 miles, then oil mesh with light engine oil.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing - Every 10,000 miles (or oftener if required) clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 17 qts. Std., 18 qts. with heater.

Pressure Valve: Radiator filler cap, AC No. 850800 Type RC-6, 13 lb.

Thermostat: Pellet type. In cylinder head water outlet. 170°F Std., 160°F & 180°F Optional. Use 160°F thermostat with Methanol type anti-freeze.

Temperature Gauge: AC Electric.

Dash Unit - AC No. 1514193.
Engine Unit - AC No. 1513321.
See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball bearing. *See "Water Pumps" in Chevrolet Special Data.*

MECHANICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL CLUTCH, SYNCHRO-MESH TRANSMISSION, OVERDRIVE, POWERGLIDE TRANSMISSION, UNIVERSALS, REAR AXLE, FRONT & REAR SUSPENSION, SHOCK ABSORBER, STEERING, BRAKES & MISC. MECHANICAL DATA.*

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

Model	Series
Corvette	867
Biscayne, Brookwood Ⓒ	1200
Sedan Delivery	1270
El Camino Pickup	1280
Biscayne Fleetmaster	1400
Bel Air, Parkwood Ⓒ, Kingswood Ⓒ	1600
Impala, Nomad Ⓒ	1800

Ⓒ - Station Wagons.

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data.

Ⓒ Ⓒ Ⓒ Ⓓ
0 1211 F 100001

Ⓒ - Year. **0** 1960.
Ⓒ - Series Prefix. See Series Table below.
Ⓒ - Assembly Plant. See Assembly Plant Table below.
Ⓓ - Unit Number. Continuous for each assembly plant (Passenger & Corvette separately) beginning with 100001.

Series Prefix

Biscayne Series	Prefix	Bel Air Series	Prefix
2-Door Sedan	1211	2-Dr. Sedan	1611
2-Door Utility (3 Pass.)	1221	4-Dr. Sedan	1619
4-Door Sedan	1219	Sport Sedan 4-Dr.	1639
Fleetmaster 2-Dr. Sedan	1411	Sport Coupe	1637
Fleetmaster 2-Dr. Sedan	1419		

Station Wagons & Others		Impala	
Brookwood 2-Dr., 6 Pass.	1215	4-Dr. Sedan	1819
Brookwood 4-Dr., 6 Pass.	1235	Sport Sedan	1839
Sedan Delivery	1270	Sport Coupe	1837
El Camino Pickup	1280	Convertible	1867
Parkwood 4-Dr., 6 Pass.	1635		
Kingswood 4-Dr. 6 Pass.	1645	**Corvette**	
Nomad 4-Dr., 6 Pass.	1835	2 Pass.	867

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St. Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad at front right hand side of cylinder block. *NOTE* - Number (example below) includes identification data as indicated.

Ⓒ Ⓒ Ⓒ
T 0101 C

Ⓒ - Engine Plant. **F** - Flint. **T** - Tonawanda. **C** - Engines built in Canada.
Ⓒ - Code number indicating month and day of manufacture. This is not an individual or continuous number.
Ⓒ - Engine type. See Engine Type Table Below.

Engine Type
283" Pass. Car Engine

Carburetor Type	3-Speed 2-Bbl.	3-Speed 4-Bbl.	Overdrive 2-Bbl.	Overdrive 4-Bbl.
Conv. Cars	C	CF	CD	CG

Carburetor Type	Powerglide 2-Bbl.	Powerglide 4-Bbl.	Turboglide 2-Bbl.	Turboglide 4-Bbl.
Conv. Cars	D	DB	E	EB
Air Cond. Cars	DK	DM	EG	EJ

283" Corvette Engine

Carburetor Type	3-Speed	Powerglide
One 4-Bbl. Carb.	CQ	DG
Two 4-Bbl. Carbs.	CT, CU Ⓒ	DJ
Fuel Inj. Carb.	CR, CS Ⓒ	

348" Pass. Car Engine

Carburetor Type	3-Speed	Powerglide	Turboglide
4-Bbl. Carb	F	G	H
Three 2-Bbl. Carb.	FA, FE Ⓒ	GB	HA
4-Bbl. Carb. Ⓒ	FG	GD	

Ⓒ - Special Camshaft & Mechanical Lifters.

TUNE-UP

COMPRESSION PRESSURE: 283" Pass. - 2-Bbl. Carb. - 140 lbs. min.
283" Pass. Others & 348" All - 150 lbs. minimum.
Corvette - (Hydraulic Lifters) 160 lbs., **(Mechanical Lifters)** 140 lbs.
All cylinders must be alike within 20 lbs.

VALVE TAPPET CLEARANCE: (Hydraulic Lifters) - Zero lash. *See "Initial Valve Adjustment" under VALVES.*
(Mechanical Lifters) - 348" - .012" Int., .018" Exh.
Corvette - .008" Int., .018" Exh. (Cast Iron Head), .006" Int., .014" Exh. (Aluminum Head); with Special Camshaft.

MANIFOLD HEAT CONTROL: Heat control valve and thermostatic coil assembly located between right exhaust manifold and crossover pipe (Single Exhaust), exhaust pipe (Dual Exhaust). Assembly not used on fuel injection cars. Make sure valve shaft is free to turn. If sticking, free up with kerosene or alcohol containing a small amount of baking soda.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035" (.033-.038").
Torque all spark plugs to 20-25 ft. lbs.
Spark Plugs - (283" Pass.) - AC No. 44 (Std.), AC No. 45 or 46 (City Operation), AC No. C43 COM (Heavy Duty Operation).
(Corvette) Cast Iron Head - AC No. 46 (City), AC No. 44 (Town & Country), AC No. C43 COM (Heavy Duty & High Output), AC No. C42-1 COM (Extended & Extreme High Output).
(Corvette) Aluminum Head & Fuel Injection - AC No. 44FF (City), AC No. 42FF (Extended & Extreme High Output).
(348" Pass.) - AC No. 44N (Std.), AC No. 43N (Heavy Duty Operation).
COIL: Delco-Remy. (283") - 1115115.
(348") - 1115083 (Std.), 1115111 (Three 2-Bbl. Carb. & 4-Bbl. Carb. with Powerglide Trans.), 1115114 (Special Cam).
(Corvette) - 1115091 (Std.), 1115107 (Fuel Injection).
Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.
Resistor (348" Eng. with Three 2-Bbl. Carbs. and Special Camshaft) - Delco-Remy 1931385.
Resistor (Others) - Resistance type cable (1.8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation). Bypassed during cranking when coil energized directly from starter solenoid bypass terminal.

DISTRIBUTOR: Delco-Remy. Used as follows:

Application	Delco-Remy No.
283" (2-Bbl. Carb.)	1110947
283" (4-Bbl. Carb.)	1110946
348" (Std. Cam)	1110948
348" (Sp. Cam)	1110919
Corvette (4-Bbl. Carb.)	1110946
Corvette (Dual 4-Bbl. Carb.)	1110891
Corvette (Fuel Inj. Std. Cam)	1110915
Corvette (Fuel Inj. Spec. Cam)	1110914

►*DISTRIBUTOR NOTE:* Different types used as follows:
Models 1110915, 46, 47, 48 - External adjustment "Window" type. *See "Delco-Remy Window Distributors" in Electrical Section.*
Models 1110891, 914, 919 - Double breaker with conventional distributor cap (not window type). Vacuum spark control not used (centrifugal weight advance only).
Condenser (Window Type) - Delco-Remy 1932004.
Capacity .18-.23 mfd.
Condenser (Double Breaker) - Delco-Remy 1869704.
Capacity .18-.23 mfd.
Contact Point Set (Window Type) - Delco-Remy 1931988.
Contact Point Set (Double Breaker) - Delco-Remy 1938330.
Breaker Gap (Window Type) - Gap (.016") will be correct when cam angle correctly set (see below).
Breaker Gap (Double Breaker) - .014-.018" (new points).
Cam Angle (Window Type) - 28-32°. Set at 30°. Gives .016" point opening.
Cam Angle (Double Breaker) - Adjust each set of points to 29°±1° with other set blocked open with .025" thick insulator. Cam angle for both sets of points operating together should be 34°±1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110891, 915, 946

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.5		400	1-5		800
6-8		750	12-16		1500
9.5-11.5		1300	19-23		2600
13-15		1850	26-30		3700

Automatic Advance - 1110914

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		600	0-4		1200
1.5-3.5		750	3-7		1500
6-8		1950	12-16		3900
10-12		3000	20-24		6000

Automatic Advance - 1110919

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.5		400	1-5		800
6.5-8.5		775	13-17		1550
9.5-11.5		1600	19-23		3200
13-15		2500	26-30		5000

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Aut matic Advanc - 1110947

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
5-7		750	10-14		1500
10-12		1450	20-24		2900
13-15		1875	26-30		3750

Automatic Advance - 1110948

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		425	0-4		850
4.5-6.5		800	9-13		1600
8-10		1600	16-20		3200
11-13		2300	22-26		4600

Vacuum Spark Control: Delco-Remy 1116134 (1110915 Distr.), 1116148 (1110946, 947, 948 Distr.). *NOTE - Vacuum unit not used on double breaker type distributors.*

Vacuum Advance - 1116134

Distr Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	3.75-5.75
12	24	13-15

Vacuum Advance - 1116148

Distr Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
7 5	15	15-16

Ignition Switch: Replacement - Disconnect negative battery terminal. Place switch in "Lock" position and insert wire in hole in face of cylinder. While pushing in on wire (to depress plunger) turn key counterclockwise and withdraw lock cylinder. Use Tool J-7607 to remove ignition switch nut (passenger side), pull switch out from under dash and remove wiring connectors and lamp socket and bulb. To remove "theft resistant connector" use suitable tool of heavy wire to press on lock clip within slot in connector and gently work connector away from switch until connector is released

IGNITION TIMING

Engine	Std. Setting
283"	① 4° BTDC
348"	① 8° BTDC
348" Sp Cam	②
Corvette (One 4-Bbl Carb)	① 4° BTDC
(Two 4-Bbl Carbs. & Hyd Lifters)	① 12° BTDC
(Two 4-Bbl Carbs & Mech Lifters)	③ 12° BTDC
(Fuel Inj & Hyd Lifters)	④ 8° BTDC
(Fuel Inj & Mech Lifters)	⑤ 18°BTDC

① - Idling at 475 RPM (Synchro-mesh), 450 RPM (Auto Trans)

② - 10° BTDC (Premium Fuel), 12° BTDC (Super Premium Fuel) See *"Maximum Advance Caution 348" Special Cam" below*

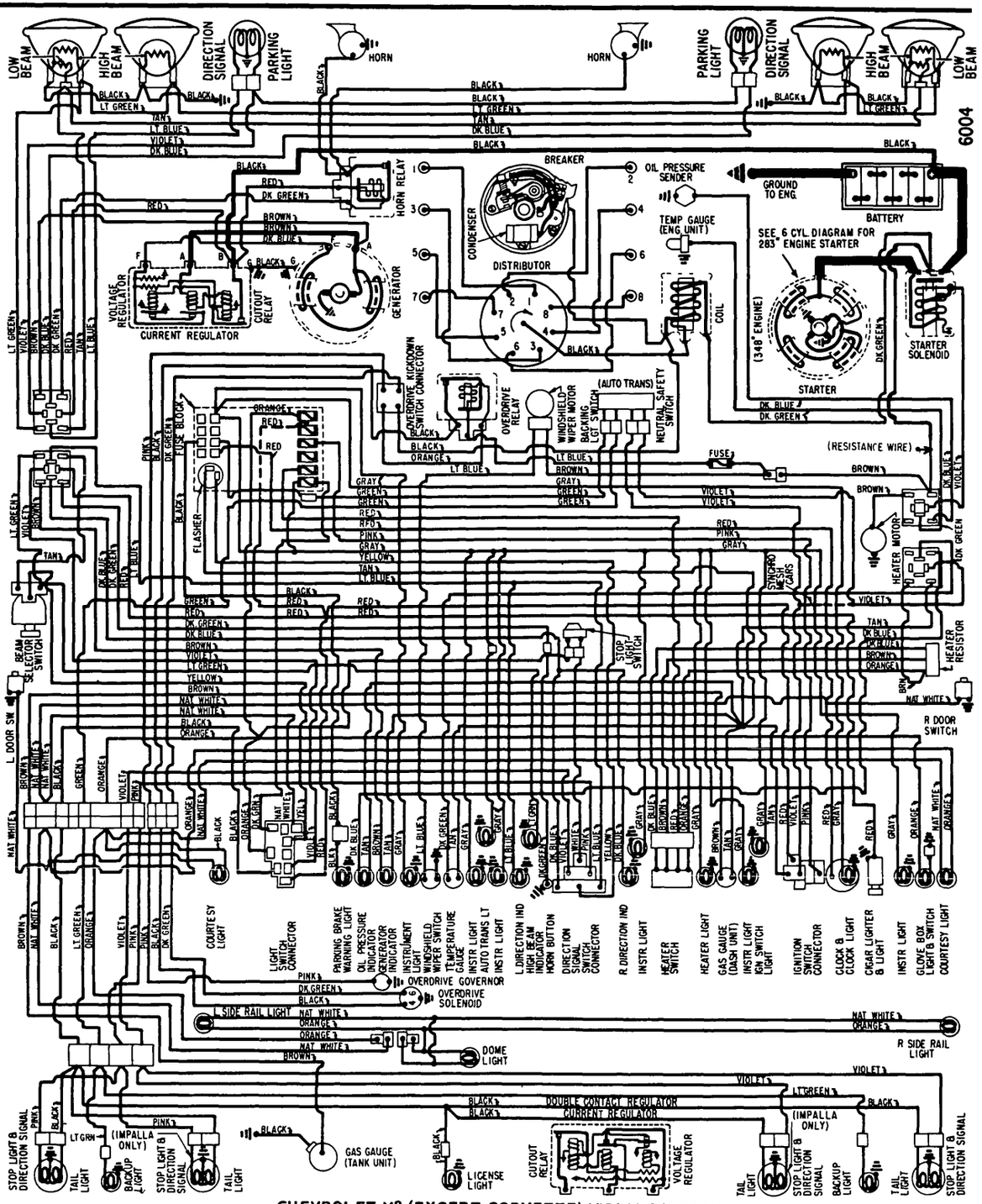
③ - Idling at 800-850 RPM ④ - Idling at 550 RPM

⑤ - Idling at 650 RPM

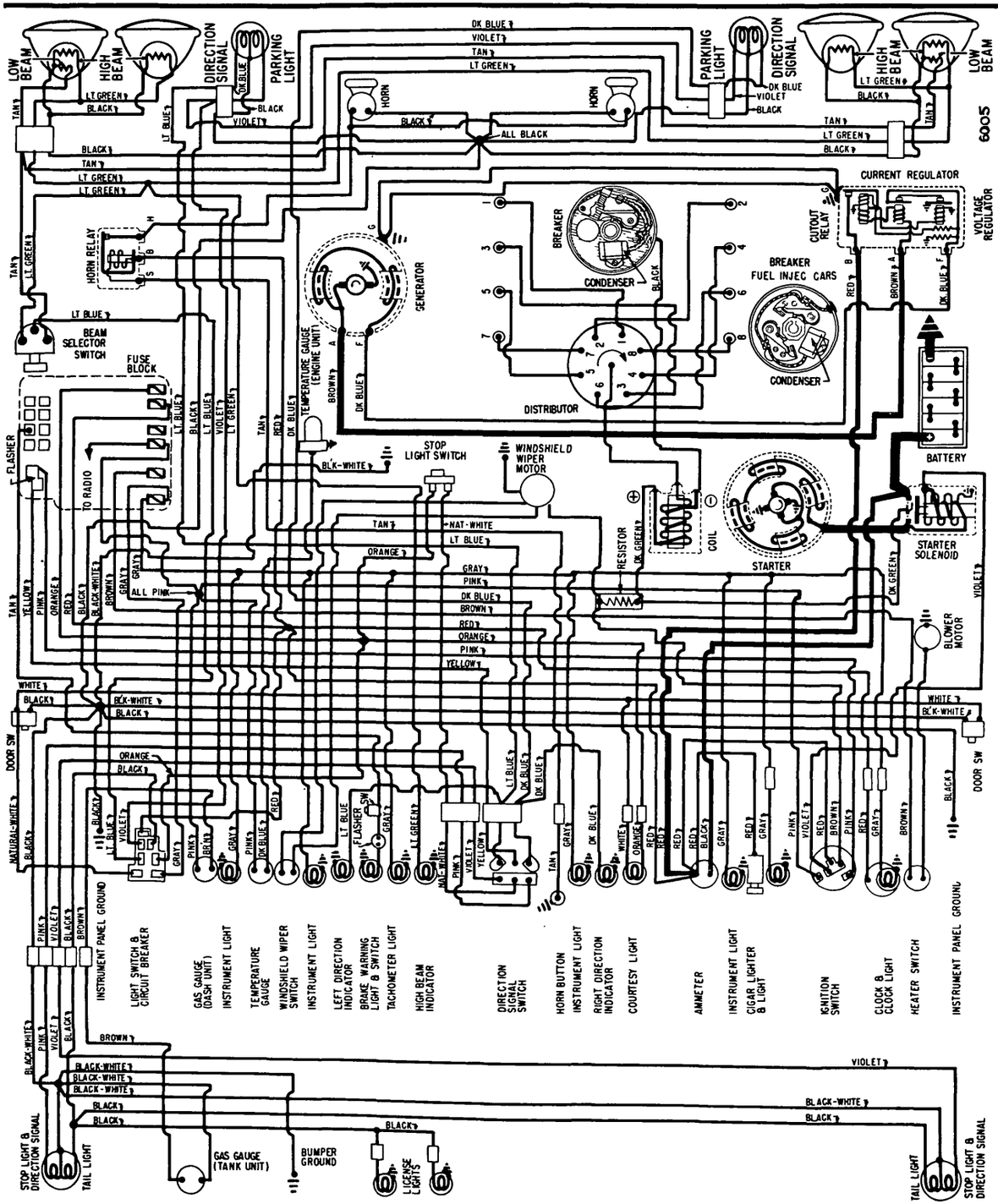
►*1960-61 CHEVROLET (EXC. CORVAIR) ENGINE IGNITION TIMING SERVICE SETTING RANGE LIMIT NOTE* Ignition timing should be within following specifications when "tailoring" for particular operating conditions **235" Eng.** (0° to 8° BTDC), **283" Eng. with 2-Bbl. Carb.** (4° to 8° BTDC), **283" & 348" Engs. with 4-Bbl. Carbs.** (4° to 10° BTDC)

►*MAXIMUM ADVANCE CAUTION (348" Special Cam):* Total maximum advance (Initial Setting plus Distributor Automatic Advance at 2500 Distr RPM) should not exceed 34° (Premium Fuel) or 36° (Super Premium

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CHEVROLET V8 (EXCEPT CORVETTE) WIRING DIAGRAM



CHEVROLET CORVETTE WIRING DIAGRAM

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fuel). When total maximum advance exceeds these figures, Initial Setting must be reduced to bring total maximum advance to specifications.

►*TIMING SETTING CAUTION:* Timing must be set with vacuum line disconnected and manifold opening covered.

Timing Mark - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines at 2° increments with greatest number of lines on advance or BTDC side.

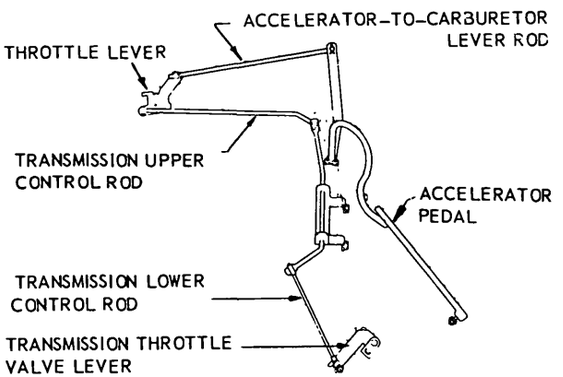
CARBURETOR

Engine	Carburetor Application
283" Pass. Std.	One Rochester 2GC 2-Bbl.
283" Pass. Optl.	One Roch. 4GC or Carter WCFB 4-Bbl.
348" Pass. Std. Trans.	One Carter WCFB 4-Bbl.
348" Pass. Auto. Trans.	One Roch. 4GC or Carter WCFB 4-Bbl.
348" Optl. Sp. Cam	One Carter AFB 4-Bbl.
348" All Trans.	Three Rochester 2GC 2-Bbl.
348" Optl. Sp. Cam, Std. Trans.	Three Rochester 2GC 2-Bbl.
Corvette Std.	One Carter WCFB 4-Bbl.
Corvette Optl.	Two Carter WCFB 4-Bbl.
Corvette Optl. Sp. Cam	Two Carter WCFB 4-Bbl.
Corvette Optl	Rochester Ramjet Fuel Injection
Corvette Optl. Sp. Cam	Rochester Ramjet Fuel Injection

►*FAST IDLE CONTROL CAUTION (AIR CONDITIONED CARS):* Fast idle control is set to provide 900 RPM engine speed when Fast Idle Control Knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustments and that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation.

THROTTLE LINKAGE ADJUSTMENT: Powerglide Cars - Remove lower control rod and loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotated counterclockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor and open throttle. Adjust upper control rod

CONTINUED ON NEXT PAGE



POWERGLIDE & TURBOGLIDE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

length for free entry into throttle lever. Check adjustment by releasing linkage to its idle position then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" (Pass. Car), .85" (Corvette), wood block under accelerator pedal rod, depress accelerator against block and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length of accelerator rod when detent is not felt before reaching wide open throttle.

Turboglide Cars - Disconnect transmission throttle valve rod and accelerator rod from carburetor throttle lever. Pull throttle valve rod forward to full limit of its travel and then adjust swivel for free entry into carburetor throttle lever with lever in wide open position. Attach swivel to lever. To check adjustment, put carburetor throttle lever in wide open position and push downward (counterclockwise) on transmission throttle valve lever. If transmission throttle valve rod attached to carburetor throttle lever deflects (transmission not on internal stop) or carburetor throttle lever will not reach wide open position, repeat adjustment. Now place carburetor throttle lever at wide open throttle and depress accelerator pedal to hold pedal lever in contact with stop. Adjust swivel on accelerator rod for free entry into carburetor throttle lever. Secure swivel to lever. Depress accelerator pedal by hand. Detent should be felt before accelerator pedal rod strikes carpet.

THROTTLE RETURN CHECK ADJUSTMENT (TURBO-GLIDE CARS ONLY): With the fast idle screw on high step of fast idle cam, hold plunger with an open end wrench and turn plunger screw so it just contacts carburetor throttle lever. To check, make a full throttle start, then release accelerator and apply brakes simultaneously. If engine remains at high RPM turn plunger screw clockwise ½-turn. If engine stalls, turn screw ½-turn counterclockwise.

ROCHESTER 2GC 2-BARREL

Rochester 2GC, No. 7013007 (Synchro-mesh), 7013008 (Auto. Trans.), 7013018 (Auto. Trans. & Air Cond.).

►*HESITATION ON LOW SPEED ACCELERATION CORRECTION (7013008 & 7013018).* On carburetors not marked by "D" or later letter on identification tag, install new Accelerating Pump & Spring Assembly. *See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position Depress button on back side of float bowl.

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and 450 RPM (Auto. Trans. in "D" Range), 475 RPM (Synchro-mesh Models). Turn screws out ¼ turn.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D") with Idle Compensator button pushed in on air cond. cars (Idle Compensator "off").

Float Level - 1 23/64" (Gauge BT-152). With air horn inverted and gasket in place, position float level gauge over float so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Use scale or scribed mark on float and pump gauge.

Automatic Choke Setting: Centered at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Engine	Rochester Carb. No. Early	Later
283" Auto.Trans. (No Air Cond.)	7013004	7015004
283" Auto. Trans. (Air Cond.)	7013010	7015010
348" Auto. Trans. (No Air Cond.)	7013006	7015006
348" Auto. Trans. (Air Cond.)	7013012	7015012

►*ROCHESTER 4GC CARBURETOR FLOAT DESIGN & SETTING CHANGE TO CORRECT CUTTING OUT ON TURNS (Cars with Early Carburetors):* Engine cut-out on hard cornering can be eliminated by installation of new type floats and torsion springs furnished in Kit No. 7017804 and setting float level to new specifications. *See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

►*ROCHESTER 4GC CARBURETOR PRODUCTION CHANGE & FLOAT SETTING CAUTION:* Late carburetors listed above have new type floats and torsion springs. These carburetors require special float setting. *See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7

►*IDLE COMPENSATOR CAUTION:* Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making Idle Setting and Idle Speed adjustments. Remove air cleaner and insert pencil or suitable tool in throttle bore.

Idle Setting - After idle speed correctly set (see below), turn each idle mixture screw for smoothest idle with highest vacuum reading and RPM. *NOTE* - Approximate adjustment obtained by setting screws lean to moderate rough idle and then backing out ¼-turn.

Idle Speed - 450 RPM (Auto. Trans. in "D") with Idle Compensator closed

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL

Engine	(Single Carburetor)	Carter No.
283" Pass. & Corvette	2818S (Early),	3059S (Later)
348" Synchro-mesh	2817S (Early),	3060S (Later)
348" Auto Trans.	2816S (Early),	3061S (Later)

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - Initial setting ½-2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Engine	Carter No.
348" Auto. Trans	2897S & 3012S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - ½-2 turns open. Turn both screws alike. Turn screws out for richer mixture

Idle Speed - 600 RPM. Selector in "D" on Auto Trans

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter AFB 4-Barr lCarburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL
(Two Carburetors)

Engine	Carter No.
283" Corvette (Hydr. Lifters).	Front 2626S, Rear 2627S
283" Corvette (Mech. Lifters) .	Front 2613S, Rear 2614S

Idle Setting - 1/8-1 1/4 turns open (2613S, 2614S), 1/4-1 1/4 turns open (2626S, 2627S). Adjust all four mixture screws equally.

Idle Speed - 600 RPM (Hydr. Lifters), 800-850 RPM (Mech. Lifters) with Auto. Trans. in "D".

Interconnecting Linkage Adjustment: With rear carburetor at wide open throttle, adjust nut on front carburetor control shaft until front carburetor throttle is wide open and against throttle stop. Front carburetor must begin to open when rear carburetor is at approximately ½ throttle.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

TRIPLE CARBURETORS
(Rochester 2G & 2GC)

Engine	Rochester Carburetor No. Front	Center	Rear
348" Synchro-mesh,Std.	7013015	7013020	7013017
348" Synchro-mesh,Optl	7013973	7013974	7013975
348" Auto Trans ,Std.	7013015	7013016	7013017
348" Auto Trans.. Air Cond	7013015	7013026	7013017

Idle Speed - Hydr. Lifters - 475 RPM (Synchro-mesh), 450 RPM (Auto Trans. in "D"). **Mech. Lifters** - 600 RPM. Selector lever in "D" on Auto. Trans. Cars. *For complete adjustment data on these carburetors including linkage adjustment to secure correct synchronization, see "Rochester Triple Carburetors" in Carburetors" in Carburetion Section*

ROCHESTER "RAMJET"
(Fuel Injection)

For Model Application and Adjustments, see "Rochester Ramjet Fuel Injection" in Carburetion Section.

CARB. EQUIPMENT

Fuel Pump: AC diaphragm type. Fuel only

Replacement Pump - AC No. 4701 (283"), No 4657 (348" except Sp. Cam & SM), No. 4799 (348" Sp Cam & SM).

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Pressure - 5¼-6½ lbs. (4701, 4657), 9¼-10¾ lbs. (4799). *See "Fuel Pumps" in Carburetion Section*

Gasoline Gauge: AC Electric.

Dash Unit - (Pass.) AC No. 5643264, (Corv.) No. 5643032.

Tank Unit - See table below.

Model	AC No.
Pass. (Dual Exh.) ① 3/8" pipe	5640659
Pass. Others 5/16" pipe	5640657
Sta. Wgn., Sed. Del, Pick-up Del. ②	5640661
Sta. Wgn., Sed. Del, Pick-up Del. ③	5640662
Sta. Wgn. (9 Pass.) 3/8" pipe	5640659

① - Exc. Sta. Wgn., Sed. Del., & Pick-up Del.
② - Dual Exh., except 9 Pass.
③ - Exc. Dual Exh. & 9 Pass.
See "Fuel Gauges" in Carburetion Section

Air Cleaner: (Exc. 283" 2-Bbl. Carb.) Dry filter element type. Test or replace element every 15,000 miles. *NOTE - Cleaning element is not recommended*

Air Cleaner: (283" 2-Bbl. Carb.) Oil wetted type with polyurethane element. Remove from screen, rinse in solvent or kerosene every 5000 miles, squeeze out element lightly, recoil with clean engine oil and carefully reinstall on screen.

Cruise Control: Automatic speed control. *See "Cruise Control" in Carburetion Section.*

BATTERY

(6 Cyl. & 283") Delco 2SMR53. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

(348") Delco 558. 12 volt, 11 plate, 61 ampere hour capacity (20 hr. rate).

Battery Ground - Negative to engine.

Engine Ground - Engine to cowl.

STARTER

Delco Remy. Used as follows:

Engine	Delco-Remy No.
6 Cyl	1107652
283" (Exc. Turboglide)	1107664
283" (Turboglide)	1107694
348" (Std.)	1107688
348" (Turboglide)	1107687

Armature - Delco-Remy 1932185 (6 Cyl.), 1935829 (V8).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107652, 664, 694

Torque	RPM	Volts	①Amperes
0 ft. lbs.	6200-9400	10 6	49-76
	Lock	4.25	270-310

Performance Data - 1107687, 688

Torque	RPM	Volts	①Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

① - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid Switch 1119919 mounted on starter and controlled by Ignition Switch 1116577 (Corv.), 1116576 (Pass. Exc. Taxi), 1116580 (Biscayne Taxi).

Neutral Safety Switch: Delco-Remy 1998677 (Exc. Corv.) and includes Back-Up Switch Delco-Remy 1998660 (Corv.) Neutral Safety Switch used with Auto. Trans.

Neutral Safety Switch Adjustment - *See "Powerglide" or "Turboglide" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows:

Application	Generator	Armature
6 Cyl. Std.	1102096	1923535
283" Std.	1102097	1923535
6 Cyl., 283" Air Cond.	1102174	1948005
348" Std.	1102097	1923535
348" Air Cond.	1102174	1948005
348" Sp. Cam	1102173	1948005
Optl.	1106679	
Taxi	1105116	1940161
Taxi	1105123	1945922
Taxi & Police	1106681	1927074
Corvette Std.	1102043	1940313
Corvette (Fuel Inj.)	1102173	1948005

Performance Data

Generator	Amperes	Volts	RPM
1102096,7	30	14	2240
1102173,4	35	14	2510
1105116	35	14	1730
1105123	40	14	1930
1106681	45	13	1400
1106679	50	13	1600
1102043	30	14	2240

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.48-1.62 amps. (1102043); 1.69-1.79 amps. (1102096,7,173,174); 2.73-3.0 amps. (1106116, 123); 2.14-2.28 amps. (1106679,81). All at 12volts, 80°F.

Belt Adjustment: 3/8" (6 Cyl.) 3/4" (283"), 13/16"(348") with 15 lb. pressure, 7/16-1/2" (Corv.) with light thumb pressure, midway between generator and fan pulleys.

REGULATOR

Delco-Remy. Used as follows.

Regulator	Generator No.
1119001 (6 Cyl., 283" Eng.)	1102043,096,7
1119002 (6 Cyl., 283" Eng.)	1102173,4
1119234 (348" Eng.)	1102097
1119235 (348" Eng.)	1102173,4
1119604	1115116
1119610	1105123
1119619	1106679,81

►*DOUBLE CONTACT REGULATOR NOTE: Regulators 1119604,610,619 have double contacts for voltage regulation*

NOTE - Specifications below are for "Normal" settings

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001,2,234); 11.8-13.0 volts (1119604,10,19).

Contact Gap - .020". **Air Gap** - 020".

Voltage Regulator

Setting - (1119001,2,234,235) 13.8-14.8 volts at 125°F.

Setting - (1119604,10,19) 13.8-14.6 volts (upper contacts), .2-.3 volts lower (lower contacts) at 125°F.

Contact Gap - (1119604,10,19) .016" (upper contacts) with lower contacts just touching.

Air Gap - (1119001,2,234,235) .075", (1119604,10,19) .067" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section*

Current Regulator

NOTE - 1119604,10,19 are "Temperature Compensated" type.

Setting - 27.0-31.0 amps. (1119001,234), 31.0-35.5 amps (1119002,235,604), 36.0-40.5 amps. (1119610); 46.0-50.5 amps. (1119619).

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section*

MISC. ELECTRICAL

Direction Signals: *See Electrical Section*

Autronic Eye: *See Electrical Section*

Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.

Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.

Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.

CIRCUIT BREAKERS: A 15 amp circuit breaker located in main lighting switch protects headlights, beam indicator, and parking lights.

FUSES: Fuses contained in fuse block located beneath dash on left side except as noted.

3 AG/AGC-15 Ampere. Tail, Stop, License Plate, Dome, Glove Compartment.

3 AG/AGC-3 Ampere. Instrument, Ignition, Clock, Radio, Air Cond. lights.

3AG/AGC-10 Ampere. Back-up lights, Clock, Parking Brake Alarm.

3AG/AGC 4 or 7 Ampere. Radio.

3 AG/AGC-10 Ampere. Heater blower.

SAE 9 Ampere. Overdrive. In wiring harness on engine side of dash.

SAE 20 Ampere. Air Cond. blower.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

►*NOTE: Engines with special camshaft use mechanical valve lifters. In the following data, engines will be referred to by "Special Cam"*

ENGINE SPECIFICATIONS: Own V8, valve-in-head, 283" and 348" engines of same design used previously.

Engine	Bore	Stroke	Rated HP	Displacement
283"	3.875"	3.0"	48	283 cu. in.
348"	4.125"	3.25"	54.5	348 cu. in.

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Engin	C mpr. Rati	D v l p d HP
283" Pass ①	8 5-1	170 at 4200 RPM
283" Pass & Corv ②	9 5-1	230 at 4800 RPM
283" Corv ③	9 5-1	245 at 5000 RPM
283" Corv ④	9 5-1	270 at 6000 RPM
283" Corv ⑤	11 0-1	275 at 5200 RPM
283" Corv ⑥	11 0-1	315 at 6200 RPM
348" Pass ⑦	9 5-1	250 at 4400 RPM
348" Pass ⑦	⑩	⑪
348" Pass ⑧	9 5-1	280 at 4800 RPM
348" Pass ⑨	11 25-1 ⑫	335 at 5800 RPM

① - One 2-Bbl Carb ② - One 4-Bbl Carb
③ - Corv with Two 4-Bbl Carbs
④ - Corv with Two 4-Bbl Carbs & Special Cam
⑤ - Corv. with Fuel Injection
⑥ - Corv with Fuel Inj & Special Cam
⑦ - One 4-Bbl Carb , Special Cam, Mechanical Lifters
⑧- Three 2-Bbl Carburetors
⑨ - Three 2-Bbl Carbs , Special Cam, Mech Lifters
⑩ - 11 25-1 (3 or 4-Speed Trans), 11 0-1 (Powerglide)
⑪ - 320 at 5600 RPM (3 or 4-Speed Trans), 305 at 5600 RPM (Powerglide)
⑫- 3 or 4-Speed Trans only

C mpression & Vacuum Reading - *See TUNE-UP*

►*CORVETTE (FUEL INJECTION) CYLINDER HEAD NOTE·* Aluminum cylinder head used with fuel injection high compression engines

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: *See "Oil Pan" in Chevrolet Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data*

ENGINE DATA NOTE: Data following includes Pass Car & Truck as noted in copy

PISTONS

Cast aluminum alloy, autothermic type with piston pin offset 060" toward major thrust side

283" Eng. - Flat head, slipper skirt with machined relief for valve clearance (Std) or domed piston having machined relief (Fuel Injection)

348" Eng. - Peak roof, slipper skirt (Std), half flat with machined relief for valve clearance and half slanted downward 16° (With Special Cam)

Removal - Pistons & rods removed from above

Replacement Pistons: Furnished Std , & 001", 020", 030", 040" Oversize (Exc 283" Fuel Inj , or 348" Special Cam), Std , 001", 030" (283" Fuel Inj or 348" Sp Cam) with fitted pins

►*STANDARD & 001" OVERSIZE PISTON NOTE* These pistons furnished in TWO sizes as follows

283" Eng. - Std. - Marked **S4** (3 8750-3 8755"), **S5** (3 8755-3 8760"), **.001" Oversize** - Marked **S6** (3 8760-3 8765"), **S7** (3 8765-3 8770")

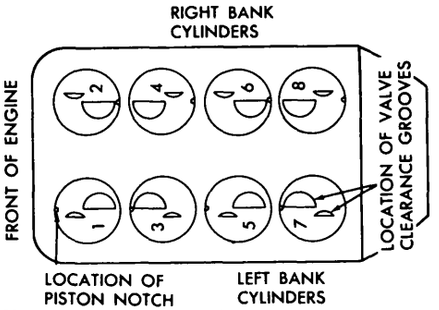
348" Eng. - Std. - Marked **S4** (4 1250-4 1255"), **S5** (4 1255-4 1260"), **.001" Ov rsiz** - Marked **S6** (4 1260-4 1265"), **S7** (4 1265-4 1270")

Cl aranc - 0006- 0010" (Pass), 0016- 0020" (Corv), measured 2 44" (283" Eng), 2 94" (348" Eng) from top of piston

Fitting N w Pist ns (Exc. Pist ns with .0016-.0020" Cl aranc): Use 0015" x 1/2" feeler (part of Tool J-5513) With piston and cylinder bore clean and dry, insert feeler and inverted piston into cylinder to point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole) Pull required to withdraw feeler should be 4-6 lbs

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block, except 348" Eng with Special Cam (see NOTE below) *See Rod Installation*

►*348" ENGINE WITH SPECIAL CAMSHAFT NOTE:* Pistons used with these engines extend into combustion chamber and must be installed as shown in diagram



348" ENGINE (SPEC. CAM) PISTON INSTALLATION

PISTON PIN

Pin is press fit in connecting rod

Diameter - (283" Eng) 9270- 9273" (348" Eng) 9895- 9898"

Length - (283" Eng) 2 990-3 010" (348" Eng) 3 250-3 270"

Pin Fit in Piston - 00015- 00025" With piston and pin at 60°F and light film of oil on pin, pin should support own weight in either pin boss

Pin Fit in Connecting Rod - Press fit in rod Special procedure used for removal & installation, *see "Piston Pins" in Chevrolet Special Data*

Replacement Pins: Furnished in assembly with new pistons Replace with new piston and fitted pin assembly

PISTON RINGS

Compression rings are plain cast alloy iron, with chrome plated upper and wear resistant coating lower Oil ring is 3-piece type with chrome plate O D rails and stainless steel spacer *NOTE* - 348" (Special Cam) has cast alloy oil ring

283" Engine

Ring	Width	End Gap	Side Clearance
Comp (1&2)①	0775- 0780"	010- 020"	0012- 0032"
Oil (3)	224- 231"	② 015- 055"	0006- 0084"

348" Engine

Ring	Width	End Gap	Side Clearance
Compr (1&2)	0770- 0780"	015- 025"	③
Oil (3)	④ 224- 232"	⑤ 015- 055"	

① – Upper ring 077- 078" with Special Cam
② - On rails
③ - Upper 0012- 0027", lower 0012-0032"
④ - 1855- 1865" with Special Cam
⑤ - 013- 025" with Special Cam

R plac ment Rings: Service type rings furnished Std , 020", 030", 040" Oversize

Installing Rings: Install compression rings with mark "GM" up

CONNECTING ROD

Length (Center-to-Center) - (283") 5 699-5 701" (348") 6 134-6 136"

Weight - (283") 19 02 ozs (348") 19 20" ozs

Crankpin Journal Diameter - (283") 1 999-2 000" (348") 2 199-2 200"

Lower Bearing - Replaceable precision type **Std** - Steel backed babbitt **Special Cam Eng. (Exc. 348" with Auto. Trans.)** Premium aluminum bearings

Clearance - 001- 003" Wear limit 004"

Sideplay - 008- 014" (two rods)

Replacement Bearings: Std & 001", 010", 020" Undersize

Installing Rods: *NOTE - S diagram for 348" Eng (Special Cam) piston installation* Install rod in piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (marked by cast depression in head of piston and "F" mark on piston strut) on Nos 1-3-5-7 pistons, and flange on rod to **rear** of piston on Nos 2-4-6-8 pistons Install rod and piston assembly in cylinder with cast depression in head and "F" mark on strut toward front of cylinder block Oil hole in connecting rod will be toward center of engine

CRANKSHAFT

Journal Diameter - (283") 2 2978-2 2988" (348") 2 4980-2 4990"

Bearings - Replaceable precision type **Std.** - Steel backed babbitt **Special Cam Eng. (Exc. 348" with Auto. Trans.)** Premium aluminum bearings used No 1 through No 4 No 5 steel backed babbitt

Clearance - (283") 001- 003" (348") 0008- 0034" Wear limit 004"

End Thrust - Taken by rear (No 5) main bearing **Endplay** - 002- 006"

Replacement Bearings: Furnished Std , 001", 002", 010", 020" Undersize

Bearing Installation: Not necessary to remove engine from car, *see "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings' in Chevrolet Special Data*

Crankshaft Front Oil Seal· *See "Engine Front Cover" in Chevrolet Special Data*

Vibration Dampener: *See "Vibration Dampen r" in Chevrolet Special Data*

CAMSHAFT

►*SPECIAL CAMSHAFT NOTE: Sp cial camshaft us d in various engines Mechanical valv lifters us d with these camshafts*

►*CAMSHAFT LOBE LIFT NOTE·* When improper valve operation is indicated, check lift of each lobe *See "Camshaft & Bearings" in Chevrol t Special Data*

Journal Diameter - (All) 1 8682-1 8692"

Bearings - Steel backed babbitt lined bushings

Clearance - 0015- 0035"

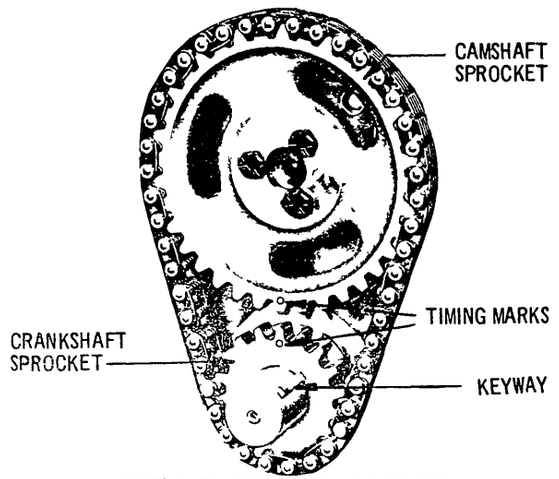
R plac m nt B arings· "Precision" type (do not require reaming) Use Tool J-6098 to remove and install bearings

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Camshaft S tting: Both Sprockets marked "0". Install chain with sprocket marks adjacent and in line with straightedge across shaft centers.

►*CAUTION* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket in place.



CHEVROLET V8 VALVE TIMING MARKS

Camshaft R moval & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link belt type See below for specifications

Engin	Width	Pitch	Length (Links)
283"	875"	.500"	46
348"	88"	.500"	48

Installati n & Removal - *See "Timing Chain" in Chevrolet Special Data.*

Engine Front C ver Oil S al (Crankshaft Front Seal): *See 'Engine Front Cover" in Chevrolet Special Data.*

VALVE

Tapp t Cl aranc : *See TUNE-UP for complete specifi--cations on all engines*

283" Engine

	H ad Diam.	① Stem Diam.	Length
Intake	1 715-1 725"	3415- 3422"	②4 9024-4 9224"
Exhaust	1 495-1 505"	3410- 3417"	4 913-4 933"

	S at Angl	④ Lift	Stem Clearance
Intake	③46°	3336"	⑤ 0010- 0027"
Exhaust	③46°	3336"	⑤ 0017- 0034"

348" Engine

	Head Diam.	① Stem Diam.	Length
Intake	1 935-1 945"	3715- 3722"	5 10-5 11"
Exhaust	1 655-1 665"	3700- 3717"	5 11-5 12"

	Seat Angl	⑥ Lift	Stem Clearance
Intake	③46°	3987"	⑤ 0010- 0027"
Exhaust	③46°	3987"	⑤ 0017- 0034"

① - Standard stem diameter Furnished 003", 015" & 030" Oversize

② - 4 869-4 889" Corvette with mechanical lifters

③ - Valve Face Angle 45°

④ - 2-Bbl. Carb. .3987", (4-Bbl. Carb. or Fuel Inj. with regular cam) 394" Intake, .400" Exhaust (Two 4-Bbl. Carbs. or Fuel Inj. with Special Cam).

⑤ - Wear limit 004"

⑥ - Regular Camshaft. 4058" Intake, 4120" Exhaust for Engines with Special Camshaft

⑦ - Valve Face Angle - (283" Pass & Trk) Intake 45°, Exhaust (283" Pass & Trademaster) 45° (Taskmaster) 46°

Valve Rotators - Used on 283" Truck Engine

Valve Seat Width - 035- 060" Intake, 062- 093" Exhaust

Initial Valve Adjustment (Hydraulic Lifters): Bring engine to operating temperature, remove rocker arm cover Back off rocker arm stud nut (Engine idling) until arm starts to clatter Turn rocker arm stud nut down until clatter stops and then ¾ additional turn

Initial Valve Adjustment (Mechanical Lifters): Adjust rocker arm nut on stud to give desired specification

Valve Stem Seal Installation: *See "Valve System" in Chevrolet Special Data*

Valve Guides: Integral with cylinder head Ream valve guide holes for oversize valves if valve stem clearance is excessive Valves with oversize stems furnished 003", 015", 030" Oversize Use Reamer Set J-5830 (283"), or J-7049 (348")

Valve Springs: Install springs with closed end of coil toward cylinder head and oil shield over spring

►*348" ENGINE VALVE SPRING NOTE* 348" Engines with Special Camshaft and mechanical lifters use inner and outer springs in place of spring and damper assembly

283" Engine (2-Bbl. Carb.)

Valve	Lbs. Pressure	Length
Closed	76-84	1 696"
Open	155-165	1 366"

283" Engine (4-Bbl. Carb.) Corvette (All Equipment)

Valve	Lbs. Pressure	Length
Closed	69-79	1 696"
Open	159-169	1 306"

348" Engine - Regular Cam, Hydraulic Lifters

Valve	Lbs. Pressure	Length
Closed	78-86	1 626"
Open	184-196	1 230"

348" Engine - Special Cam, Mechanical Lifters

	Outer Spring		Inner Spring	
Valve	Lbs. Pressure	Length	Lbs. Pressure	Length
Closed	69-79	1 696"	20-24	1 488"
Open	159-169	1 306"	55-61	1 06"

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve spring by measuring distance from surface of spring seat in head to top of valve spring *NOTE - When measurement taken to top of spring shield, if equipped, add 1/32" to specifications given below* If measurement exceeds maximum, add 1/32" shims to bring height to preferred specification (see below)

Valve Spring Height Specifications

Engine	Max. Height	Preferred Hgt.	Shim No.
283" All	1 45/64"	1 5/8"	3731058
348" Hydr Lifter	1 21/32"	1 19/32"	3731058
348" Mech Lifters	1 11/16"	1 5/8"	3764539

Valv Lift rs: Hydraulic lifters standard except on engines with special camshaft *See "Valve System" In Chevrolet Special Data*

R ck r Arms: Mounted individually on studs pressed into cylinder head

R ck r Arm Stud R plac m nt - *Se "Valv Syst m" in Chevrolet Special Data*

VALVE TIMING

Valve Timing Specifications

(283" Engine 2-Bbl. Carb.)

Intake Valves - Open 18° BTDC Close 54° ALDC
Exhaust Valves - Open 52° BLDC Close 20° ATDC

(283" Pass. & Corvette 4-Bbl. Carb.)
(Corvette, Two 4-Bbl. Carbs. & Fuel Inj., Reg. Cam)

Intake Valves - Open 12°30' BTDC Close 57°30' ALDC
Exhaust Valves - Open 54°30' BLDC Close 15°30' ATDC.

(348" Engine - Regular Cam)

Intake Valves - Open 18°30' BTDC Close 67°30' ALDC.
Exhaust Valves - Open 68°30' BLDC Close 25°30' ATDC.

(Corvette Two 4-Bbl. Carbs. & Fuel Inj. Sp. Cam)
(348" Engine Sp. Cam, Std. Trans.)

Intake Valves - Open 35° BTDC Close 72° ALDC
Exhaust Valves - Open 76° BLDC Close 31° ATDC

(348" Engine Sp. Cam, Powerglide)

Intake Valves - Open 33° BTDC Close 74° ALDC
Exhaust Valves - Open 88° BLDC Close 19° ATDC

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubricati n" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts (Pass.), 5 qts. (Corvette) refill, 5 qts. (Pass) 6 qts. (Corvette) with filter change

Normal Oil Pressure - 35 lbs. at 2000 RPM

Pressure Relief Valve - In oil pump Not adjustable

Oil Pressure Indicator (Std. V8) - Light located at left side of instrument panel, controlled by a pressure Switch AC No 1508753 (283"), 1508754 (348") located in main oil gallery adjacent to distributor. Switch closes when pressure drops to 4-7 lbs

Oil Pressure Gauge (Corvette) - AC No 1508895

Oil Filter: Full flow type standard on all V8 Engines Replace element every 4,000 miles or less under extreme driving conditions

Replacement Filter Element - AC No PF-141

Oil Pump: Spur gear typel Located in crankcase, driven by distributor gear

Oil Pump Overhaul - *See "Oiling System" in Ch v-rolet Special Data*

Crankcase Ventilation - Air intake through crankcase breather cap and outlet at crankcase ventilator pipe

COOLING

►*RADIATOR REMOVAL CAUTION (Auto Trans):* Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material

►*WATER BY-PASS NOTE:* 283" engine utilizes hole in cylinder block for water by-pass 348" engine has by-pass at top of water pump which is connected to inlet manifold which has crossover passages to cylinder head

►*COOLING SYSTEM NOTE:* **Corvette** - Aluminum cross-flow radiator with special Aluminum drop valve filler cap optional Avoid use of salt based inhibited anti-freeze

►*FAN NOTE:* A Viscous Coupling, 5 blade, 3100 RPM limited speed fan optional

Wat r Capacity: (283") 17½ qts (3-Speed Trans), 17¼ qts (Auto Trans) (348") 21 qts Add 1 qt for heater with all models

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Pressure Valve: Radiator filler cap, used as follows:

Model	ACN.	Pressure	AC Type
Corv. Less F.I.	850795	7 lb.	RC-1
Corv. With F.I.	850800	13 lb.	RC-6
V8 Pass.	850800	13 lb.	RC-6

Thermostat: Pellet type. In cylinder head water outlet. 170°F Part No. 3138868 (Std.), 160°F No. 3136184 & 180°F No. 3136185 Optional. Use 160°F with Methanol (alcohol) anti-freeze.

Temperature Gauge: AC electric.
Dash Unit - (V8 Pass.) AC No. 1514195. (Corv.) 1513715.
Engine Unit - (All) AC No. 1513321.
See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type, with sealed ball bearing. *See "Water Pump" in Chevrolet Special Data.*

CLUTCH

Various types used as follows:

6 Cyl. & 283" 2-Bbl. Carb. Engines - Own diaphragm spring type with all flat spring fingers.
283" 4-Bbl. Carb. & 348" Engines - Own diaphragm spring semi-centrifugal type (6 spring fingers bent upward with weights at outer ends to provide this semi-centrifugal action).
Corvette - Borg & Beck Model 10A8W, Assembly No. 361468.

Chevrolet (Own) Diaphragm Clutch

Model	Cover & Spring	Disc No.
6 Cyl. Exc. H.D. 10"	3752850	①3769723
6 Cyl. H.D. 11"	3751041	②3777088
283" 2-Bbl ③	3772926	3777086
283" O.D 11"	3744199	3754610
283" 4-Bbl.	3742866	3754610
348" 10½"	3758517	3758499
(Borg & Beck Clutch)		
Corvette (Stamped 1468 on cover)	3745946	3754612

① - Molded, with hub painted dark green.
② - Woven.
③ - Exc. H.D. & O.D.

See "Chevrolet (Own)" and "Borg & Beck" Clutches in Clutch Section.

►*CORVETTE FAST ACTION CLUTCH PEDAL LINKAGE ADJUSTMENT:* For procedure to alter linkage to secure 4½" rather than 6½" pedal travel, *see "Clutch Notes" in Chevrolet Special Data.*

Pedal Adjustment (Std. Travel): Disconnect forward end of clutch fork pushrod from cross shaft lever. Hold fork pushrod to rear to remove all lash, then adjust swivel to line up dimple in clutch lever shaft assembly (Pass. Cars) or back off swivel 2 turns (Corvette) to give desired .060" clearance between bearing and clutch spring and free travel setting of ¾-1".

Over-Center Spring Adjustment: Loosen adjusting hook nut at back of pedal bracket and turn jam nut to obtain an installed length of 10 5/16" for over-center spring.

Removal: Remove transmission (See Transmission Removal below). Remove clutch throwout bearing from fork, then clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one turn at a time until tension of spring is released. Remove tool, then clutch assembly from vehicle. *NOTE* - When installing clutch, align "X" mark on cover and flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Three-speed synchro-mesh (Std.), three or four-speed (close ratio) optional.

See "Chevrolet 3-Speed" and "Chevrolet 4-Speed (Close Ratio)" in Transmission Section.

►*HIGH GEAR JUMP-OUT CORRECTION:* When caused by loose transmission-to-clutch housing bolts, make sure that ½-13 x 1¾" bolts are installed.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Drain transmission and disconnect speedometer cable and shift rods. Remove propeller shaft center bearing support bolts. Separate rear universal joint and pull propeller shaft assembly to rear under axle housing.
2) Support rear of engine, remove transmission rear support noting number of shims.
3) Remove two top transmission to clutch housing cap screws, install guide pins (J-1126), then remove two lower capscrews. Slide transmission back on guide pins to clear clutch disc splines.

OVERDRIVE

Warner R10. Solenoid operated type with governor control and throttle operated kickdown. Lockout switch not used.
See "Chevrolet Overdrive" in Transmission Section

Overdrive Control: *See "Warner R10 &R11 Overdrive Control" in Transmission Section.*

Removal: Same as for synchro-mesh (above) after disconnecting control cable and wiring.

POWERGLIDE TRANSMISSION

Torque converter and hydraulically operated planetary gear unit with manual controls.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTIONS: See "Chevrolet Powerglide" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Powerglide" in Transmission Section.*

Lubrication: Check fluid level in transmission every 1000 miles. Add oil only when level drops to "Add One Quart" mark on dipstick. Use Automatic Transmission Fluid Type A, Suffix A. Type A fluid can be used if "Type A, Suffix A" fluid not available.

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.
Capacity - 4½ qts. (refill), 10½ qts. (after overhaul).

Checking Fluid Level - Engine must be idling with transmission warm, selector lever in "N" range and parking brake applied. Check fluid level on dipstick located in filler tube on right side of engine opposite starter. Fluid level should be at full mark on dipstick. *NOTE - DO NOT OVERFILL.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER POWERGLIDE SERVICE DATA: See "Chevrolet Powerglide" in Transmission Section.*

TURBOGLIDE TRANSMISSION

New "non-shifting" hydraulically controlled, planetary type transmission with three unit torque converter.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Chevrolet Turboglide" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Chevrolet Turboglide" in Transmission Section.*

Lubrication: Check fluid level in transmission every 1000 miles. Add oil only when level drops to "Add One Quart" mark on dipstick. Use Automatic Transmission Fluid Type A, Suffix A. Type A fluid can be used if "Type A, Suffix A" fluid not available.

Checking Fluid Level - Engine must be idling at 800-1000 RPM with transmission warm, selector lever in "N" range and parking brake applied. Check fluid level on dipstick located in filler tube on right side of engine opposite starter. Fluid level should be at full mark on dipstick. *NOTE - DO NOT OVERFILL.*

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.
Capacity - 2 qt. (refill), 9½ qts. (after overhaul).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER TURBOGLIDE SERVICE DATA: See "Chevrolet Turboglide" in Transmission Section.*

UNIVERSALS

Own. Yoke & Spider (Trunnion) type.

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload. Preload must be adjusted whenever companion flange nut loosened. *See "Chevrolet Pass. Car (Hotchkiss Drive)" in Rear Axle Section*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

REAR AXLE

Own. Semi-floating hypoid gear type, with Hotchkiss Drive. *NOTE* - "Positraction" Limited Slip Differential optional.

See "Chevrolet Pass. Car (Hotchkiss Drive)" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

►*AXLE IDENTIFICATION NOTE:* Conventional axles have serial number on right front side of differential. Positraction axles have serial number on left front side of differential and lubrication tag on filler plug.

►*PROPELLER SHAFT SHUDDER CORRECTION: See "Propeller Shaft Notes" in Chevrolet Special Data.*

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Axl Rati s

M d l		Gear Rati
6 Cyl.	Std.	3.55-1
	Overdrive	3.70-1
	Powerglide	3.36-1
283"	3-Speed Trans.	3.36-1
	Overdrive	3.70-1
	Powerglide	3.08-1
	Turboglide	3.36-1
Corvette	3-Speed Trans.	3.70-1
	4-Speed Trans.	4.11-1 or 4.56-1
	Powerglide	3.55-1
348"	All Carbs. Reg. Cam,3-Spd.Trans.	3.36-1
	All Carbs. Reg. Cam 4-Spd. Trans.	3.70-1
	All Carbs. Reg. Cam, Auto. Trans.	3.08-1
	All Carbs. Sp. Cam, Std, Trans.	3.70-1
	4-Bbl. Carb. Sp. Cam, Powerglide	3.55-1

Backlash - .003-.010" (.005-.008" preferred).

Axl Shaft R moval: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE* - If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance.

Carrier R moval: Remove rear wheels, brake drums and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant and remove differential carrier nuts and lift out carrier assembly.

Propell r Shaft Alignment: *See "Propeller Shaft Notes" in Chevrolet Special Data.*

FRONT SUSPENSION

Independent type with direct acting shock absorbers within front coil springs. Corvette has threaded bushings at pivot point, all other models have spherical joints.

See "Chevrolet (Spherical Joint) Suspension" and "Chevrolet Corvette Front Suspension" in Suspension and Wheel Alignment Section.

Steering Axis Inclination - 7¼°±½° (Pass. Car), 3½°-4½° (Corv.)

Caster - 0°±½° (Pass. Car), 2°±½° (Corv.).

Camb r - Pos. ½°±½° (Pass Car), 0°±½° (Corv.).

Toe-In - 1/8"-1/4" (Pass. Car), 0"-1/8" (Corv. per wheel).

Toe-Out n Turns - With inner wheel at 20°, outer wheel should be 18° (Pass. Car), 17° (Corv).

Wh l B aring Adjustment - (Ball Bearings) - Torque adjusting nut to 28 ft. lbs , back off nut until bearings are loose (0 ft. lbs.) then retorque to 12 ft. lbs. and back off to nearest cotter pin hole if necessary.

►*FRONT WHEEL ROLLER BEARING & INNER SEAL NOTE:* Roller bearings available for heavy duty Taxis, Police Cars, Etc. For correct adjustment, lubrication and seal, adjust these bearings as directed below. *CAUTION* - Use only Inner Bearing Seal Part No. 3759306 (without 90° flange on inside of stamping) with these bearings.

Wh l B aring Adjustm nt - (Roller Bearings) - Tighten adjusting nut while rotating wheel until slight drag is felt, then back off nut 1/12 turn (½ nut flat) or more to align slot in nut with cotter pin hole in spindle *(CAUTION - Do not exceed 1/6 turn or 1 nut flat)*, install cotter pin.

REAR SUSPENSION

Rear Suspension: *See "Chevrolet Rear Suspension" in Suspension & Wheel Alignment Section.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable.

Replacement Shock Absorbers

Model	Front	Rear
Corvette	5552326	5552351
Pass (Exc. H.D.)	5552322	5552321
Pass. Auto. Trans.,Air Cond.	5543718	5552321
Taxi,Sta.Wgn.Sed.Del.,Pickup Del	5543718	5552323

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball type.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Own (Linkage Type). *See "Chevrolet (Linkage Type) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball BearingWorm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-servo, single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes.

See "Chevrolet-Bendix Hydraulic" in Brake Section.

►*OPTIONAL METALLIC SHOE LINING NOTE (Pass. & Corvette):* Used with "Special Purpose Option" and can be used with old drums provided surface of drum is smooth.

►*CORVETTE OPTIONAL BRAKE NOTE:* Two options - **RPO 686** consisting of special riveted "Sintered Iron" segmented linings with standard wheel cylinders. **RPO-687** consisting of riveted "SinteredIron"segmented linings, special wheel cylinders, and with vanes cast on drum rim, air scoops on backing plate, fins between drum and wheel hub.

►*REPLACEMENT BRAKE SHOE GRINDING CAUTION:* To compensate for lack of brake anchor adjustment, brake shoes are ground to a .057- 087" smaller diameter than the drum diameter. Grinding to the true diameter on a bench grinder will cause heel and toe contact, resulting in faulty brake action. *NOTE - If spindle mounted type grinder is used, the shoes should be ground to the true drum diameter.*

Drum Diameter - 11".

Wheel Cylinder Diameter - (Pass., Corv Std. & RPO-686) front 1 3/16", rear 1" (Corv RPO 687) front 1 1/8", rear 7/8".

Braking Power: (Pass.) 58 5% of front, 41.5% rear. (Corv. Std.) 56% front, 44% rear. (Corv. RPO 686) 58.5% front, 41.5% rear. (Corv RPO 687) 62% front, 38% rear.

Lining Width & Length
Pass. Car (M ld d Asb stos)

	Fr nt Wh l	R ar Wheel
Primary	2 75" x 9 30"	2.00" x 9.30"
Secondary	2.75" x 11 70"	2.00" x 11.70"

C rv. Std. (Molded Asbestos)

	Front Whe l	Rear Wheel
Primary	2.0" x 9.29"	1.75" x 9.29"
Secondary	2.0" x 11.69"	1.75" x 11.69"

Corv. RPO 686 (Sintered Iron)

	Front Wheel	Rear Wheel
Primary	(6) 1.0" x 2.0"	(6)1.0" x 2.0"
Secondary	(10) 7/8" x 2.0"	(10).325" x 2.0"

Corv. RPO 687 (Sintered Iron)

	Front Wheel	Rear Wheel
Primary	(6)1.25" x 1.64"	(12)1 25" x 1.64"
Secondary	(6) 7/8" x 2.0"	(10)7/8" x 2.0"

Lining Thickness - (Pass.) .168". (Corv. Std.) .175". (Corv. RPO 686). .205" (Primary front & rear), .325" (Secondary front), .205" (Secondary rear). (Corv. RPO 687) .205" (Primary front & rear), .325" (Secondary front & rear).

Clearance - Adjusting screw backed off 17 notches (Corv. RPO 687), 12 notches (Others) from slight drag position. Brakes must be free of any drag after adjusting.

Standard Master Cylinder: Located on engine side of firewall in line with brake cylinder.

Checking Fluid - Reservoir is integral with master cylinder. Maintain level in cylinder to lower edge of hole.

Removal - Disconnect hydraulic line from end of cylinder and remove bolted brass fitting. Remove cotter and clevis pins from brake pedal arm, then remove four retaining nuts and lockwashers and remove cylinder from firewall.

Installation - Reverse removal procedure making sure that pushrod clevis is straddling the brake pedal. Refill master cylinder and bleed all brake lines. Adjust pushrod-to-main cylinder clearance as follows: Make sure brake pedal returns to fully released position with no binding, and that pedal retracting spring has not lost its tension, then adjust brake pedal clevis to give a barely perceptible endplay between main cylinder piston and brake pushrod (1/8-3/8" pedal movement should be felt).

Power Brakes: Bendix or Moraine Power Unit. *See "Bendix Power Brake Unit Hydraulic (Disc) Reaction" or "Moraine Power Brake Unit Hydraulic (Diaphragm) Reaction" types in Brake Section.*

Removal: Disconnect clevis at brake pedal assembly (remove clevis if necessary to clear hole in firewall). Remove vacuum hoses from brake unit and hydraulic lines from master cylinder. Remove four nuts and lockwashers and withdraw power unit.

MISC. MECHANICAL

Windshield Wipers: Electric (Single Speed Std., Two Speed Optl.) Link-and-crank arm type.

See "Windshield Wipers" in Miscellaneous Section.

Window Regulators: Electric type with reversible motor operating each door & tail gate window assembly.

See "Power Window Regulators" in Miscellaneous Section.

Power Seat Adjusters: Electric 4-Way & 6-Way. TWO types 6-Way used: **1)** Three motor type (separate motor for each movement). **2)** One motor type with three solenoid clutches.

See "G.M. Seat Controls" in Miscellaneous Section.

Air C nditi ning: *See "Chevrolet Air Conditioning" in Miscellaneous S ction.*

►*JACKING & HOISTING CAUTION (ALL MODELS): Before jacking or hoisting these trucks, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*TOWING PROCEDURE (4-WHEEL DRIVE MODELS):* Observe the following precautions

1) Slow Speed & Short Distances - Place transmission lever in "Neutral" and Transfer Case lever in "Two Wheel High" position

2) High Speed or Long Distances - If all four wheels on ground, disconnect front and rear propeller shafts or pull rear axle shafts instead of disconnecting rear propeller shaft If front wheels off ground, disconnect rear propeller shaft or pull rear axle shafts If rear wheels off ground, disconnect front propeller shaft

MODEL IDENTIFICATION

APACHE (Light Duty)

Typing & Rating	Series
½ to 1½ Ton Conventional	C10, C20, C30, C40
½ & ¾ Ton 4-Wheel Drive	K10, K20
¾ & 1 Ton Forward Control	P20, P30

VIKING (Medium Duty)

2 Ton Std & Heavy Duty Conventional	C50, C60
2 Ton Std & Heavy Duty Low-Cab-Forward	L50, L60
2 Ton Std & Heavy Duty School Bus	S50, S60

SERIAL NUMBER: Stamped on plate on upper left hinge pillar (Exc Flat Face Cowl), left side of dash (Flat Face Cowl)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧
S 0 L 6 1 3 T 100001

① - Indicates Std 1½ Ton converted to Special 1½ Ton Used only on Special Models
② - Indicates Year - 1960
③ - Body Type See Body Type Table below
④ - Nominal Rating, see Nominal Rating Table below
⑤ - CA Dimension, see CA Dimension Table below
⑥ - Model (Zero removed), see Model Table below
⑦ - Assembly Plant, see Assembly Plant Table below
⑧ - Serial Number - Continuous starting with 100001 at each assembly plant

Body Type Table

C - Conventional **K** - 4-Wheel Drive **P** - Forward Control
L - Low Cab Forward **S** - School Bus.

Nominal Rating Table

1 - ½-Ton **2** - ¾-Ton **3** - 1-Ton **4** - 1½-Ton **5** - 2-Ton **6** - 2-Ton H D

"CA" Dimension Table (1½-Ton & Up)

1 - 5 ft **2** - 6 ft **3** - 7 ft **5** - 8 ft **6** - 9 ft **8** - 10 ft

Model Table

02 - Flat Face Cowl **03** - Cab-Chassis **04** - Pickup **05** - Panel **06** - Sub Carryall **09** - Platform **12** - Windshield with Cowl **16** - Sub Carryall **34** - Fleetside **42** - Forward Control Chassis **45** - Step-Van

Assembly Plant Table

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: 6 Cyl. Stamped on right side of block next to distributor

V8 Eng. Stamped on forward edge of block under right cylinder head

NOTE - Number (example below) includes identification data as indicated

① ② ③
F 1210 P

① - Engine Plant **F** - Flint **T** - Tonawanda **C** - Engines built in Canada
② - Code number indicating month (Dec) and day (10th) of manufacture This is not an individual or continuous number
③ - Engine Type See table below

Engine Type

J, K - 235" (JB,JC,KA, indicate clutch and transmission options)
L - 261" (LB,LD,LE,LJ,LK,LM indicate transmission, brake and steering options)
M,N,P - 283" (MA,NA,NB,NE,NF,NG,NH PA,PD indicates transmission and brake options)

TUNE-UP

COMPRESSION PRESSURE: 6 Cyl. - 130 lbs min **V8** - 140 lbs min All cylinders alike within 20 lbs
VACUUM READING: 17-21"
VALVE TAPPET CLEARANCE: 235" - 006" Intake, 018" Exhaust Hot **261"** - 006" Intake, 020" Exhaust Hot **283"** - Zero lash hydraulic lifters, *see Initial Valve Adjustment under VALVES*
MANIFOLD HEAT CONTROL: Thermostatic coil spring type located between manifold and exhaust pipe Must operate freely

IGNITION

FIRING ORDER: 6 Cyl. - 1-5-3-6-2-4 **V8** - 1-8-4-3-6-5-7-2
Cylinders (V8) - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7
SPARK PLUG GAP: 035"
Spark Plugs - ½ to 1½ Ton Exc. 261 - AC No 44 (Std), AC No 45 or 46 (City Oper), AC No 43 COM (Hvy Duty) **2-2½ Ton, Incl. 261** - AC No 42-1 COM (Std), No 43 COM (City Oper)
COIL: Delco-Remy 1115087.
Resistor - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal
DISTRIBUTOR: Delco-Remy. Conventional type used on 6 Cyl models Two types of "window" distributors used on V8 - centrifugal with vacuum Advance, and centrifugal advance only *See "Delco-Remy Window Distributors" in Electrical Section.*

Delco-Remy Distributors

Engine	Delco-Remy No.
6 Cyl	1112403
2800 RPM Sch Bus (Gov)	① 1112702
283" Std	1110947
2975 RPM	① 1112732
2 Bbl Carb Std Trans	① 1112725
2 Bbl Carb Auto Trans	① 1112720
2 Bbl Carb 2275 RPM Sch Bus	① 1112738

① - Without Vacuum Control

C nd ns r - Delco-Remy No 1932204 (Ser 10 thru 50 V8), No 1928111 (Others) **Capacity** - 18- 23 Mfd
C ntact Point Set - Delco-Remy (6 Cyl) No 1924571, (V8) No 1931988

Breaker Gap (6 Cyl.) - 019" (new points), 016"(used points)
Breaker Gap (V8) - Gap (016") will be correct when cam angle correctly set
Cam Angle - (6 Cyl.) 28-35°, **(V8)** 28-32° Set V8 distributors to 30° (gives 016" point opening)
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Clockwise viewed from above

Automatic Advance - 1112403

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Automatic Advance - 1112702

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0-4		900
10-12		1200	20-24		2400
17-19		2000	34-38		4000

Automatic Advanc - 1110947

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		375	0-4		750
5-7		750	10-14		1500
10-12		1450	20-24		2900
13-15		1875	26-30		3750

Automatic Advance - 1112720, 25, 32 38

Degrees	Distr.	RPM	Degrees	Eng	RPM
Start		375	0-4		750
5-7		750	10-14		1500
8-10		1175	16-20		2350
12-14		1750	24-28		3500

Vacuum Spark Control: Delco-Remy 1116089, 140, 143 (1112403 Distr), 1116148 (1110947 Distr)

Vacuum Advance - 1116089

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	4 6
7 5			15	7 5-10

Vacuum Advance - 1116140,143

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	4-6
11			22	15-16

Vacuum Advance - 1116148

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	7-9
7 5			15	15-16

IGNITION TIMING

Setting - 5° BTDC (235") TDC (261") 4° BTDC (V8) Set timing at idle speed with vacuum line disconnected
Timing Mark (6 Cyl) - First vertical line on flywheel clockwise from steel ball (235"), steel ball (261") Line up line or ball with pointer in flywheel housing with octane selector set at "0"
Timing Mark (V8) - Mark on vibration damper and timing tab attached to engine front cover Timing tab marked "A" (Advance), "O" (TDC) and lines in 2° graduations with greatest number of lines on advance or BTDC side
►*TIMING SETTING CAUTION Set timing with vacuum line disconnected and manifold opening taped closed*

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CARBURETOR

Engin	CARBURETOR APPLICATION	Carbur tor
6 Cyl	(Exc Fwd Contr)	Rochester B
6 Cyl	(Fwd Contr)	Carter BB
V8		Rochester 2G 2-Bbl

►*OVERSPEED WARNING SYSTEM NOTE* Engine overspeed warning light mounted in cab and controlled by vacuum switch on Rochester 2G Carburetor Oil pressure switch used for testing light bulb circuit (light should go on when ignition switch turned on)

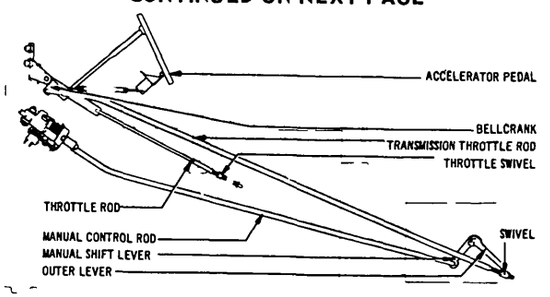
THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC):

F rward C ntrol M d ls - With engine at normal operating temperature and idle speed set at 400-450 RPM insert 1 8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever Adjust length of throttle rod so that swivel just enters throttle lever Remove swivel from outer lever and move lever back against transmission stop Check distance from hole in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole *CAUTION - Do not apply force against stop at either end of lever trav l* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever then **snorten** throttle rod **thr and one-nalf turns** of jam nut

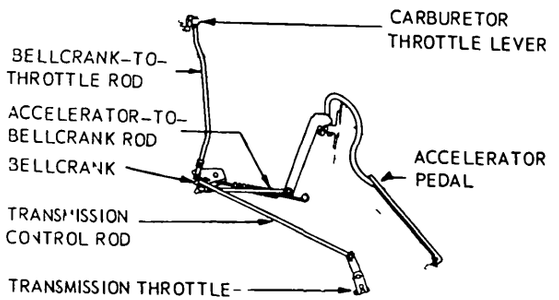
THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

6 Cyl - 1) Disconnect control rod from throttle lever at transmission cover Remove lower bolt at rear of transmission side cover Rotate throttle valve control outer lever counterclockwise to open throttle position

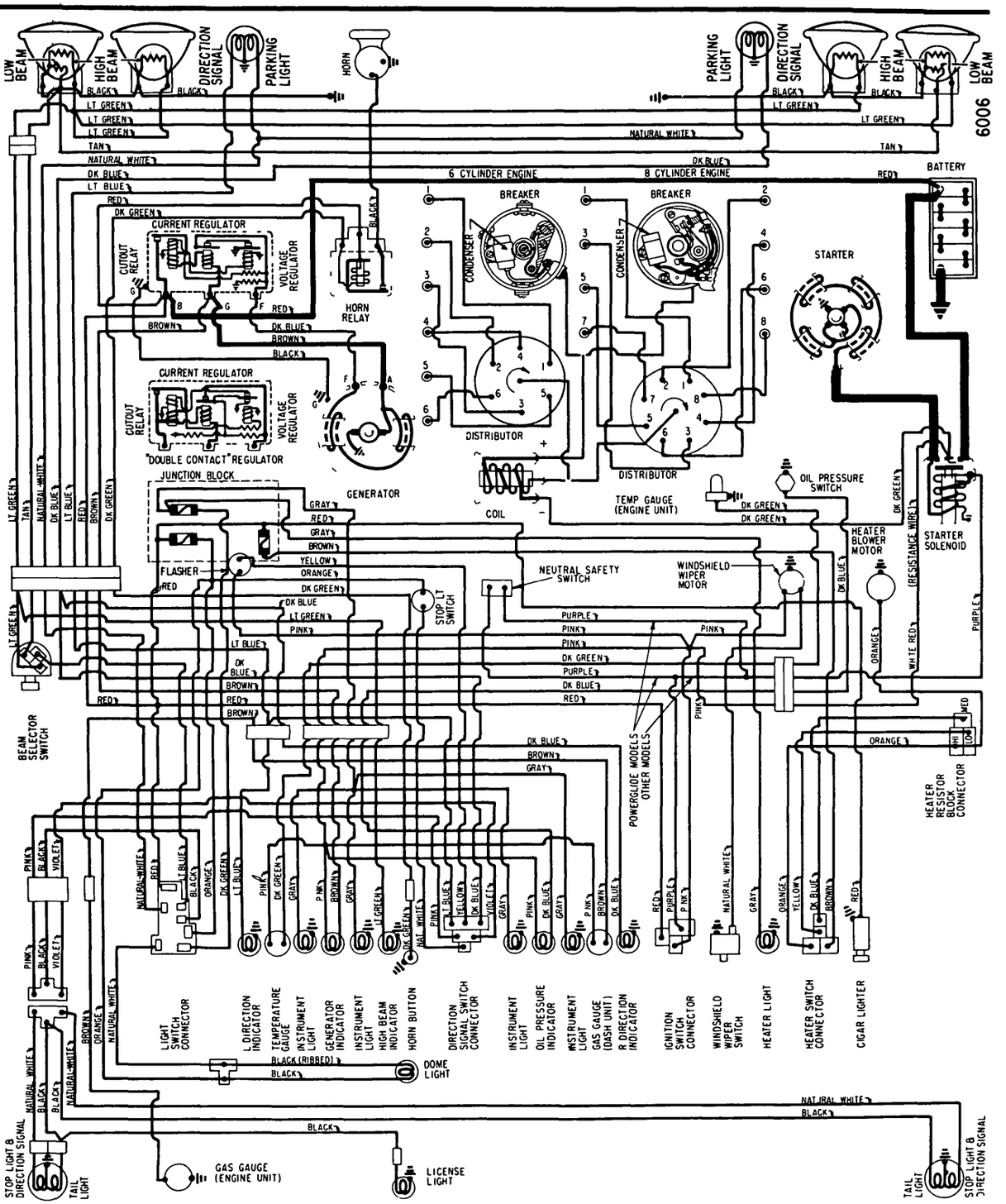
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6 CYL. (FORWARD CONTROL) HYDRA-MATIC THROTTLE LINKAGE



6 CYL POWERGLIDE THROTTLE LINKAGE



CONTINUED FROM PRECEDING PAC

2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7.09", measure distance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod.

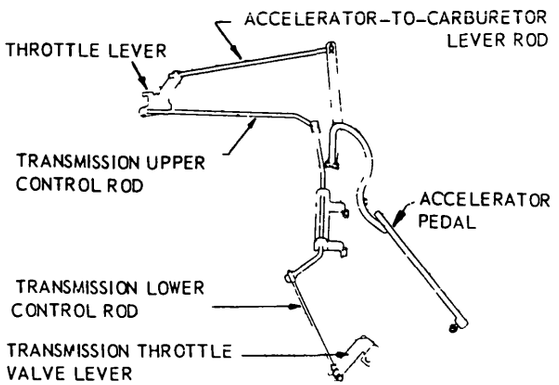
3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.

4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.

5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

V8 - Remove lower control rod, loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotate clockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor. Adjust upper control rod length for free entry into throttle lever with transmission throttle lever pulled forward against transmission internal stop. Attach throttle rod to carburetor lever. Check adjustment by releasing linkage to its idle position, then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" wood block under accelerator pedal rod, depress accelerator against block, and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length of accelerator rod when detent is not felt before reaching wide open throttle



V8 POWERGLIDE THROTTLE LINKAGE

ROCHESTER "B" (SINGLE BARREL)

Engine	Rochester Carb. No.
235" (Std.)	7015011
235" (Economy)	7015021
261"	7015013

►*ENGINE SURGE CORRECTION AT 30-60 MPH (235" Engine with No. 7015011 Carburetor):* Caused by lean fuel-air mixture. Correct by installing richer metering jet, Rochester No. 7001860 (Stamped "55"), in place of standard metering jet No. 7002954 (Stamped "54"). *See "Rochester Single Carburetors" in Carburetion Section.*

Idle Setting - 1½-2½ turns open. Turn screw out for richer mixture.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto Trans. in "D").

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

►*CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump - No seasonal adjustment.

Choke Adjustment: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester Single Carburetors" in Carburetion Section.*

ROCHESTER 2G (2-BARREL)

Engine	Rochester Carb. No.
283" Std.	7015015
283" (Velocity Governor)	7013011
283" (Vacuum Governor)	7015017

►*ENGINE SURGE DURING PART THROTTLE OPERATION CORRECTION (7015015 & 7013011):* On carburetors not marked by "A" or "B" on identification tag, install larger main metering jets. *See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8. LEFT barrel feeds 1-4-6-7.*

Idle Setting - After idle speed set to correct specifications (see below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans, in "D").

Float Level - 1 23/64" (Gauge BT-152) with air horn inverted and gauge placed over float so it rests against pump side of power piston shaft and outer gauge leg in line with center of float. Adjust by bending float arm (Tool BT-69) between pivot and float.

Float Drop - 1 29/32" (Gauge BT-152) from air horn gasket to bottom of float with air horn held upright. To adjust, bend float tang.

Choke Setting: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester Dual 2G & 2GC Carburetors" in Carburetion Section.*

CARTER BB (UPDRAFT)

Carter (BB) 871SC (Forward Control Models). Single barrel updraft type with manual choke.

Idle Setting - ½-1½ turns open (turn screw out for richer mixture).

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated Use Gauge J-818-13A on top edge of bowl (gasket removed).

Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter BB Updraft Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC used as follows:

Model	AC No.
6 Cyl. Std.	4434
6 Cyl. Fwd Contr. & Flat Faced Cowl	4666
V8	4701

Pressure - 3½-4½ lbs. (6 Cyl.), 5½-6½ lbs. (V8) steady at 450-1000 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric.

Dash Unit - (Flat faced cowl) AC No. 5643021. (Others) AC No. 5643018.

Tank Unit - Various types used. Replace with same type as original equipment.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco. 2SMR53, 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

668. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

3SMR72, 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).

Ground - Negative.

Engine Ground - Engine to frame (6 Cyl.), to dash (V8).

STARTER

Delco-Remy. As follows	Starter	Armature
6 Cyl Std.	1107652	1932185
6 Cyl. Fwd. Contr.	1107677	1926626
V8	1107664	1935829

Drive - Overrunning clutch with solenoid pinion shift

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs min

Performance Data - 1107652,64

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	6200-9400	10.6	49-76
	Lock	4 25	270-310

Performance Data - 1107677

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6900	10 3	75
10.5 ft lbs.	Lock	5.8	435

Ⓒ - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid 1119919 (Exc. Auto. Trans.) 1119793 (Auto. Trans). Mounted on starter and controlled by Ignition & Starter Switch

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1116567 (Exc Fwd Control), No. 1116579 (Fwd. Control)

Neutral Safety Switch: Delco-Remy 1998110 Mounted on steering column. Used with Auto. Transmission.

Adjustment - *See "Hydra-Matic Drive" or "Powerglide" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows

Application	Generator	Armature
6 Cyl & V8 Std	1102096	1923535
6 Cyl. & V8 Optl.	1102173,74	1948005
Special Equip	1105116	1940161
Special Equip	1105123	1945922
Special Equip.	1106679,81	

Performance Data - Cold

Generator	Amperes	Volts	RPM
1102096	30	14.0	2240
1102173,74	35	14.0	2500
1105116	35	14.0	1730
1105123	40	14 0	1930
1106679	50	13 0	1600
1106681	45	13.0	1400

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 amps (1102096,173,174), 2 73-3.0 amps (1105116, 123), 2.14-2 28 amps. (1106679, 81)

Belt Adjustment: 3/8" (6 Cyl), 3/4" (V8) with light pressure applied midway between water pump and generator pulleys

REGULATOR

Delco-Remy. Used as follows

Regulator	Generator
1119001 (30 Amp.)	1102096
1119002 (35 Amp)	1102173,74
1119604 (35 Amp)	1105116
1119610 (40 Amp)	1105123
1119619 (50 Amp.)	1106679,81

►*DOUBLE CONTACT REGULATOR NOTE Pegulators 1119604, 610, 619 have double contacts for voltage regulation*

NOTE - Specifications below are for "Normal" settings.

Cutout Relay

Cuts In - 11.8-13 5 volts (1119001,2), 11.8-13.0 volts (1119604,10,19)

Contact Gap - .020" **Air Gap** - 020".

Voltage Regulator

Setting - (1119001,2) 13 8-14 8 volts at 125°F

Setting - (1119604,10,19) 13 8-14.6 volts (upper contacts), .1- 3 volts lower (lower contacts) at 125°F

Contact Gap - (1119604,10,19) 016" (upper contacts) with lower contacts just touching

Air Gap (1119001,2) 075", (1119604 10,29) 067" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section*

Current Regulator

►*NOTE· 1119604,10,19 are "Temperature Compensated" type.*

Setting - 27.0-31.0 Amps. (1119001), 31.0-35.5 Amps. (1119002,604), 36.0-40.5 Amps. (1119610); 46.0-50.5 Amps. (1119619). Cold.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Directional Signals: *See Electrical Section.*

Lighting Switch Removal: Remove connector from switch. Depress switch shaft retainer (on top of switch) and remove knob and shaft. Remove retaining ferrule and switch assembly.

Stop Light Switch Location: Located on underside of dash panel brace Adjust switch position to make electrical contact with 13/16" pedal pad travel.

CIRCUIT BREAKERS: Located on lighting switch.

FUSES: Located on junction block mounted on upper inside of dash panel to left of steering column.

Horn Relay: Delco-Remy 1116920.

ENGINE

►*AIR CONDITIONED TRUCK SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

Engine Model	Type
Thriftmaster	235" 6 Cyl.
Jobmaster	261" 6 Cyl.
Trademaster	283" V8
Taskmaster	283" V8

ENGINE SPECIFICATIONS: 6 Cyl. & V8 Valve-in-Head.

Engine	Bore	Stroke	Displacement
Thriftmaster(Std.)	3 9/16"	3 15/16"	235 cu. in.
Thriftmaster(Econ.)	3 9/16"	3 15/16"	235 cu. in.
Jobmaster	3 3/4"	3 15/16"	261 cu. in.
Trademaster	3 7/8"	3"	283 cu. in.
Taskmaster	3 7/8"	3"	283 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
Thriftmaster(Std)	8.25-1	30.4	135 at 4000 RPM
Thriftmaster(Econ.)	8.25-1	30.4	110 at 3200 RPM
Jobmaster	8.00-1	33.7	150 at 4000 RPM
Trademaster	8.50-1	48.0	160 at 4200 RPM
Taskmaster	8 00-1	48.0	160 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: (6 Cyl. Engines) - Raise front of vehicle and place on stands, drain lubricant and remove bolts and screws *NOTE* - Turn crankshaft as necessary to allow clearance at front crossmember.

OIL PAN REMOVAL: (V8 Engine) - Raise front of vehicle and place on stands, drain lubricant. On Taskmaster engines remove oil level gauge and tube. Remove bolts and screws, lower oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data*

►*OTHER ENGINE DATA See Chevrolet 6 Cyl. & V8 Pass. Car P-*

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" and "OILING SYSTEM in Chevrolet Special Data.***

Crankcase Capacity: 235" & 261" 6 Cyl. 5 qts. 283" Trademaster (Series 10 through 40) 4 qts. 283" Trademaster (Series 50) 5 qts. 283" Taskmaster 5 qts.

NOTE - Add 1 qt. for filter change.

Normal Oil Pressure - (6 Cyl.) 35 lbs. at 2000 RPM. **(V8)** 30 lbs. at 1170-1200 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator - Light on Instrument panel controlled by switch AC No. 1508753 (Exc. Flat Faced Cowl). Oil Pressure Gauge AC No. 1508246 (Flat Faced Cowl). Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed so that bottom of pickup screen is parallel with oil pan rails.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Oil Filter: AC partial flow (235"), full flow (261" & 283").

Replacement Filter Element - (235") AC-P-115 or AC-P-117 partial flow. **(261" & 283")** AC-PF-141 full flow.

Filter Valve Replacement (283") - Drain crankcase, remove filter and cartridge. Remove oil filter valve bolts, valve and seal. *NOTE* -Check valve for cracks, replace if broken. A 10 lb. valve must be used. Position valve away from engine when reinstalling.

Crankcase Ventilation (Standard): Air intake through oil filler cap, outlet through road draft tube at rear of engine.

Servicing - Clean oil filler cap in solvent and reoil with light engine oil every 2000 miles, or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type. Vacuum operated ventilator consisting of a vacuum pipe from oil filler pipe to ventilator valve in fitting on intake manifold. Valve is spring loaded, variable opening type giving constant crankcase ventilation at all speeds. **Valve must close at idling to give proper air-fuel mixture.**

Servicing - Every 10,000 miles (or oftener if required), clean vacuum pipe, valve, and filler pipe thoroughly. Filler cap gasket must seal tightly.

►*VACUUM VALVE CAUTION:* If improper action of spring is suspected due to spring being distorted, or etched from corrosive action, the valve assembly should be replaced.

COOLING

Water Capacity: In quarts for each type engine.

Standard Cooling System

Model	235"	261"	283"
Ser. 10,20,30 Std, Trans.	17.25		17 75
Ser. 10,20 Powerglide	17 75		18.25
Ser. 40 Std. Trans.	17 75		18.25
Ser. P20, 30 Std. Trans.	17.00		
Ser. 50 4-Speed	17.25		18.25
Ser. 60 4-Speed		17.25	18.25

Heavy Duty Cooling System

Model	235"	261"	283"
Ser. 10,20 Std. Trans.	17.75		18.25
Ser, 30,40 All	17.75		18.25
Ser. 50 All	17.75		18.75
Ser. 60 Std. Trans.		17.75	18.75

NOTE - Add 1 qt. for Heater.

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Form 29 B

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Pressure Valve: Radiator Filler Cap. AC Type RC1 7 lb.

Thermostat: Harrison poppet valve (235"), Dole pellet bypass (261" & 283"). In cylinder head water outlet. **Replacement Thermostats - (Series 10 through 50)** 160°F. No. 3133596. (Ser. 60) 160°F. No. 3139133. (Series 60) 180°F No. 3139134.

Temperature Gauge: AC Electric.
Dash Unit - AC No. 1513381.
Engine Unit - AC No. 1513321.
See "Temperature Gauges" in Miscellaneous Section.

Water Pump: Packless type with sealed ball bearing.
See "Water Pumps" in Chevrolet Special Data.

CLUTCH

Two types used as follows:
235" Engine. Chevrolet (Own) conventional flat spring type.
261" & 283" Engine. Borg & Beck 11A9, Assembly No. 361483. Coil spring type.

Chevrolet (Own) Diaphragm Spring

Model	Cover & Spring	Disc No.
235",Ser.10 thru 60 (Exc.H.D.)	3752850	①3836097
235" Ser.10 thru 60 (Exc. H.D.)	3752850	①3836119
235" H.D.	3751041	3758678
235" Fwd. Contr.	3751041	

Borg & Beck Coil Spring

261", Ser. 50,60	3758681
283", Ser. 10 thru 60	3758681

① - Molded lining. ② - Woven lining.

See "Chevrolet (Own)" or "Borg & Beck" Clutches in Clutch Section.

Adjustments - Two adjustments must be made.

Pedal Total Travel (Bumper Adjustment) - *NOTE - Fill master cylinder to ½" below top of reservoir.* Locate clutch pedal bumper to bring clutch pedal even with brake pedal. Disconnect return spring, bottom cylinder pushrod and piston (push pushrod forward as far as possible). Pull clutch fork to rear until bearing touches levers and turn adjusting nut (behind pushrod fulcrum) until clearance between fulcrum pivot and clutch fork is 5/32" (use 5/32" diameter drill).

Pedal Free Travel Adjustment - Adjust pushrod eccentric bolt (on early models) and adjustable pushrod (late models) so as to obtain free travel between master cylinder pushrod and piston. This will amount to 1/8" free travel measured at center line of pedal pad, just before pushrod contacts piston. *NOTE* - This adjustment insures piston uncovering port in reservoir.

Removal: Remove transmission, see Transmission Removal below then proceed as follows:

1) Disconnect slave cylinder at clutch fork and remove bearing from fork.

2) Press fork away from ball mounting (use screwdriver) or remove ball stud from rear of clutch housing. *NOTE* - Pry retainer out of fork with small screwdriver.

3) Install Tool J-5824 to support assembly, loosen clutch attaching bolts gradually to release spring tension then remove tool and remove clutch assembly. *NOTE - On coil spring clutches, mark clutch cover, flywheel and one pressure plate before removing clutch from flywheel.*

Bleeding System: Same as for a brake system. Bleed clutch hydraulic line at clutch slave cylinder bleed hole.

SYNCHRO-MESH TRANSMISSION

3-SPEED LIGHT DUTY

Own. Three-speed, all helical gear type. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Light Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever. *See "Transmission Controls" in Transmission Section.*

Removal (Series 10,20): Drain transmission. Disconnect speedometer cable at transmission and shift control rods from transmission levers. Remove propeller shaft. Remove the two top transmission to clutch housing capscrews and insert two transmission guide pins, Tool J-1126, in these holes. Remove the two lower transmission to clutch housing capscrews. Slide transmission straight back on guide pins until clutch gear is free of splines in the clutch disc.

3-SPEED HEAVY DUTY

Own. Three-speed, constant mesh (second & high), sliding gear (low & reverse).
See "Chevrolet 3-Speed (Heavy Duty)" in Transmission Section.

Transmission Control: Steering column mounted gearshift lever.
See "Transmission Control" in Transmission Section.

Removal: Same as for "3-speed (Light Duty)" above.

4-SPEED

Own. Four-speed, constant mesh, synchro-mesh, helical gear (2nd, 3rd & 4th), sliding spur gear (low & reverse). Floor mounted gearshift.

Transmission Control: Floor mounted gearshift lever.

Removal (Series 10): *See "3-Speed (Light Duty)" above.*

Removal (Other Trucks): Drain transmission, disconnect parking brake and remove lever. Remove propeller shaft, transmission gearshift lever (use Tool J-8109). Remove screws that fasten steering jacket grommet to floor and slide grommet up jacket out of way. Remove accelerator pedal and floor mat. Remove sheet metal screws attaching transmission cover to body floor, remove cover. On Forward Control Models, remove both front and rear floor pans. Disconnect speedometer cable from driven gear fitting at transmission rear bearing retainer. Remove two top attaching screws, insert Guide Pins J-1126, remove flywheel underpan, two lower transmission screws, slide transmission straight back, remove transmission from vehicle.

TRANSFER CASE

4-WHEEL DRIVE

Timken. Two-speed, manually controlled, used with 4-wheel drive.

Removal - Disconnect propeller shafts from transfer case. Disconnect all control linkage and speedometer cable from transfer case. Support transfer case on jack and remove transfer case stud nut, cotter pins, stud nuts, and mounting rubbers. Lower transfer case and remove from car.

HYDRA-MATIC DRIVE

Dual Range Hydra-Matic (Forward Control Models) of same design as used on previous models.

►*PRODUCTION CHANGES AND REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication - Check fluid every 1,000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE* - When this type of fluid is not available, it is permissible to use Type "A".

Checking Fluid Level - Bring transmission to operating temperature, check fluid with control lever in "N" position and with engine idling. Add oil when level reaches "L" mark (1 qt. low) on indicator. *CAUTION* - Fluid level should never be higher than "F" mark on indicator.

Capacity - 8½ qts. (refill), 9 qts. (after overhaul). *NOTE* - 1 qt. additional with oil cooler.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC DRIVE SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

POWERGLIDE TRANSMISSION

Automatic transmission of same design as used on Passenger models, used on all except Forward Control models.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Powerglide Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Powerglide Transmission" in Transmission Section.*

Lubrication - Check fluid every 1,000 miles. Oil should be added only when level gets down to "Add One Quart" mark on dipstick. Use "Automatic Transmission Fluid Type "A" Suffix "A". When Suffix "A" not available, use Type "A".

►*DRAIN & REFILL NOTE:* Periodic drain and refill is no longer recommended. Replace transmission fluid only when transmission removed for repairs.

Capacity - 4½ qts. (refill), 10 qts. (after overhaul).

Checking Fluid Level - Bring transmission to operating temperature, check level with control lever in "N" position with engine idling. Add fluid when level reaches "Add 1 qt. mark" on oil level rod. DO NOT OVERFILL. Use only Automatic Transmission Fluid Type "A", Suffix "A". When Suffix "A" not available, use Type "A".

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Chevrolet Powerglide" Transmission in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

►*PROPELLER SHAFT VIBRATION CORRECTION (P20 Forward Control):* Caused by incorrect installation of rear spring-to-mounting bracket spacers. Install Spacer No. 3753831 (Left side) & No. 3753732 (Right side) with thick edge toward rear of truck. *NOTE* - Word "Front" appears on each bracket

FRONT AXLE

4-WHEEL DRIVE

Full floating hypoid gear type. Differential assembly (ring gear and pinion assembly) is serviced in same manner as rear axle.
See "Chevrolet 4-Wheel Drive" in Rear Axle Section.

Ratio - (Series 10) 3.90-1, (Series 20) 4.57-1.

Front Axle Shaft Assembly: Removal - Remove wheels (and brake drums on Series 10). Remove hub caps, drive flange stud nuts, retaining ring, drive flange, and shims *NOTE - Use tapped holes in flange to force flange off shaft.* Use Tool J-6893 (Series 10), J-6649 (Series 20), to remove outer and inner locknuts and shim.

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Remove hub assembly. *CAUTION - On Series 20, do not drop loose outer bearing from hub bore.* Remove brake and spindle mounting nuts (and slinger on Series 20), remove brake assembly and spindle. Remove axle shaft and universal joint assembly.

Installation - Reverse removal procedure and note the following: *CAUTION - DO NOT damage seal with axle splines. Splines must engage differential side gears.*

1) On Series 10, install spindle seat on knuckle studs with flat side up.

2) Torque stud nuts to 50-60 ft. lbs. torque.

3) Install hub assembly and adjust wheel bearings. See Wheel Bearing Adjustment below.

4) Install sufficient number of .010" shims (not to exceed .030") between drive flange and hub to prevent contact between inner surface of axle housing ball end and ball joint housing. *CAUTION - Shim thickness must not be great enough to cause excessive wear of spindle bushing or interfere with installation of flange retaining ring.*

5) Tighten flange nuts to 18-20 ft. lbs. (Series 10), 32-38 ft. lbs. (Series 20).

Wheel Bearing Adjustment: With drive flange and shim not installed, and outer locknut and lock removed, tighten inner locknut wrench-tight, then back nut off 1/8 turn and make certain that hub turns freely by hand. Align tang on lock with keyway on spindle and seat lock against inner locknut. *NOTE - Turn nut slightly, if necessary, to line up pin on inner locknut with hole in lock.* Tighten outer locknut securely against the lock. Install drive flange and shim. *See Front Axle Shaft Assembly Installation above.*

Front Axle Shaft Disassembly: 1) Hold assembly vertical and rap face of universal joint down sharply against vise or bench to separate inner and outer shafts. *NOTE* - Snap ring on inner shaft will contract permitting joint to separate.

2) Tilt race and cage to remove balls. Align race and cage to remove them from bell housing. Disassemble cage and race.

NOTE - Shaft and universal joint must be replaced as an assembly.

Knuckle Housing: Removal - Remove axle shaft, see above, then proceed as follows:

1) Remove upper and lower bearing caps and shims.

2) Remove seal retainers and seals from front and rear seal retainer bolts.

3) Drive roll pins from upper and lower knuckle housing flanges and remove bolts and washers at front and rear flanges to separate upper and lower housings, then remove bearing cups.

4) Pull upper trunnion bronze bearing and remove key. Remove lower trunnion bearing cone and roller.

Installation - Reverse removal procedure and note the following:

1) Install bearing and cone on lower trunnion, insert key in upper trunnion and install bronze bushing.

2) Position housings over bearings and insert bolts through flanges with nuts finger tight.

3) After inserting roll pin in flange, tighten housing bolts to 50-60 ft. lbs.

4) Place new seals in retainers and install on housings. Tighten larger retainer bolts to 14-18 ft. lbs., smaller bolts to 9-13 ft. lbs.

5) Install .010" shims at each bearing and install cap. Tighten bolts to 50-60 ft. lbs. *NOTE - Knuckle should move easily with no play with 14-20 ft. lbs. (15-16 ft. lbs. preferred) turning torque.* Adjust number of shims at lower bearing cap as necessary.

REAR AXLE

HALF-TON SEMI-FLOATING

Own. Semi-floating, hypoid gear type with Torque Arm Drive. Eaton Positraction differential Optional. *NOTE* - Same design as passenger car axle.

See "Chevrolet Hypoid Semi-floating" and "Eaton Positraction Differential" in Rear Axle Section.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

Axle Ratio Identification ①

Ratio	Identification
3.90 (39-10) Std.	MA(C14),MD(C15),MG(K10)
3.90 (39-10) Optl.-Positraction	MC(C14),MF(C15)
3.38 (44-13) Optl.	MB (C14),ME(C15)

① - Stamped as prefix to Unit No. on Carrier Housing.

Axle Shaft Removal: Remove wheel and brake drum. Drain lubricant, remove housing cover. Remove differential pinion shaft lockscrew, pinion shaft, and axle shaft spacer. Push axle shafts inward and remove "C" washers from inner ends and remove shafts.

Axle Shaft Endplay - Free fit to .014" maximum.

Differential Carrier Removal: Remove axle shafts to clear differential side gears, *see "Axle Shaft Removal".* Reinstall axle shaft spacer, pinion shaft and lockscrew to retain assembly during removal. Separate rear universal joint (tape bearings to pinion). Remove differential carrier to housing bolts and separate carrier from housing.

►*POSITRACTION LUBRICATION CAUTION:* Use GM No. 3758790 or 3758791 lubricant in these axles (this lubricant can be used in regular axles).

FULL-FLOATING (SERIES 20 TO 60)

Own. Full-floating hypoid (straddle mounted pinion) with torque arm drive (Ser.20), Hotchkiss drive (Others). *See "Chevrolet Truck Hypoid Full Floating" in Rear Axle Section.*

Axle Ratio Identification ①

Ratio	Identification
4.57 (32-7) Std.	MH (C20), MK(K20)
4.57 (32-7) Optl. (H.D.,3,4-Speed)	MJ(C20)
5.14 (36-7) Std.	ML(P20),PA(C30),PC(P30)
5.14 (36-7) Optl.(H.M.,H.D. 3,4-Speed)	MN(P20)
5.14 (36-7) Optl.②	PB(C3602,03,09,12),PK(P30)
6.17 (37-7) Std.	PD(C40),PE(C,L,S50;S62,64)
7.20 (36-5) Std.	PF(C,L60;S67)
7.20 (36-5) Optl.	PF(S62,64);PH(C.L.,S60)

① - Stamped as prefix to Unit No. on Carrier Housing.

② - Dual Wheels.

Backlash - .005-.008".

Removal of Differential Carrier: Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal below. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier in floor jack and roll from under truck.

Axle Shaft Removal (Series 20,30): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

►*CAUTION:* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft. *Grease at this point will cause loosening of axle shaft flange capscrews.*

►*AXLE SHAFT NOTE:* Shafts unequal length (right shaft longer than left). Install in correct position.

Axle Shaft Removal (Series 40,50,60): Remove hubcap, then thread Tool J-1436-1 into hole in axle shaft and use slide hammer to remove shaft.

NOTE - When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►*AXLE SHAFT NOTE:* Some models have different length axle shafts. Install longer shaft on right side.

Wheel Bearing Adjustment: Remove wheels and axle shafts see above, bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten inner adjusting nut to 50-65 ft. lbs. (Series 20 & 30), 75-100 ft. lbs. (Series 40,50,60), with special wrench J-2222 (Series 20 & 30), J-870 (Series 40), J-5670(Series 50 & 60) while turning hub, then back off nut 1/8 turn. Check hub for free turning, install adjusting nut lock with tangs aligned with adjusting nut slots, bend tang into adjusting nut slot. Install outer locknut and tighten securely, then bend lock tang down into notch in locknut.

PLANETARY 2-SPEED

Own. Full-floating, two-speed planetary reduction type, with hypoid primary pinion and ring gear.

See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.

Axle Ratio - 6.40-1 (high), 8.72-1 (low). 35:6 Primary gears.

Two-Speed Shift Control: Vacuum power type with control on gearshift lever.

Carrier Assembly Removal: *See "Chevrolet Truck Planetary 2-Speed" in Rear Axle Section.*

Axle Shaft Removal & Wheel Bearing Adjustment: Same as for "Standard Full-Floating" above.

SHOCK ABSORBERS

Delco. Direct acting (Airplane type) shock absorbers as follows:

Series	Shock Absorber No. Front	Rear
10 (115" WB)	5549948	5549872
10 & 20 (127" WB. Std.)	5549948	5552230
10 & 20 (127" WB. H.D.)	5549949	5552232
10 & 20 (4-Whl. Dr.)	5552294	5552295
20 & 30 (Fwd. Contr. & Van)	5513193	5533131
30 & 40 (Std.)	5549948	5549599
30 & 40 (H.D.)	5549949	5549599
50 & 60	5549915	5552114

FRONT SUSPENSION

2-WHEEL DRIVE (EXC. FWD. CONTROL)

Independent type with spherical joints at pivot points and torsion bar springs.

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See "Chevrolet Truck Front Suspension" in Suspension and Wheel Alignment Section.

Curb Height - 4⅛" (Series 10 through 40), 5 1/16" (Series 50 & 60). Distance from top of bumper bracket flange to underside of frame crossmember.

Steering Axis Inclination - 8° (Series 10 through 40), 6° 53' (Series 50, 60).

Caster - Pos. 1°±½° (Series 10 through 40), Pos 2½°±½° (Series 50,60).

Camber - Pos. ½°±½° (Series 10 through 40), Pos ¾°±½° (Series 50,60)

Toe-In - 1/8" to 1/4".

Wheel Bearing Adjustment: (Series 10, 20, 30, 40) Tighten adjusting nut to 33 ft. lbs. torque while rotating hub, then back off nut to align nearest slot in nut with cotter pin hole in spindle, install cotter pin.

(Series 50 & 60) - Tighten adjusting nut to 60 ft. lbs. torque while rotating hub, then back off nut 1/6 turn (slightly more if necessary) to align slot in nut with cotter pin hole in spindle, install cotter pin.

2-WHEEL DRIVE (FWD. CONTROL)

Conventional "I" Beam section front axle with reverse Elliot ends and semi-elliptical springs.

Kingpin Inclination - 7°30' crosswise.

Caster - Pos. 2°. **Camber** - Pos. 1¼-1¾°.

Toe-In - 1/4-5/16".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22½-23½°.

Wheel Bearing Adjustment: See data on same Series above.

4-WHEEL DRIVE

Optl. on Series 10 & 20. See *FRONT AXLE* above.

Kingpin Inclination - 8° crosswise.

Caster - 1¾°. **Camber** - 1½°.

NOTE - Caster and camber not adjustable.

Toe-In - 1/32-5/32". *NOTE* - Adjust by turning tie-rod ends. Fine-thread end changes toe-in 1/4" per turn, coarse end 9/32".

Wheel Bearing Adjustment: See *"FRONT AXLE 4-WHEEL DRIVE" data above.*

REAR SUSPENSION

Rear Suspension (Series 10 & 20 exc. FWD & 4WD): Coil spring type with torque arms.

See *"Chevrolet Series 10,20 Truck Rear Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Manual: Saginaw Ball Bearing Worm & Nut (recirculating ball).

See *"Saginaw Ball Bearing Worm & Nut" in Steering Section.*

►*UP & DOWN MOVEMENT OF STEERING WHEEL AND* down movement of upper and lower steering shaft joints. See *"Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Power Steering (Series 50, 60 Only): Saginaw Linkage Type with control valve in steering gear.

See *"Saginaw (Rotary Valve) Power Steering" in Steering Section.*

Steering Linkage: See *"Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: See *"Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: See *"Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

►*NOTE: Two different type brakes used as indicated below.*

1) Chevrolet-Bendix Hydraulic (Front - Series 10 through 60, Rear - Series 10 through 30).

2) Chevrolet-Twinplex (Rear Series 40,50,60). Two cylinder, four anchor, hydraulic. Shoes are self-centering and self-energizing.

See *"Chevrolet-Bendix Hydraulic" and "Chevrolet-Twinplex" in Brake Section.*

►*HALF-TON TRUCK BRAKE SHOE GRINDING CAUTION:* If bench type grinder used, grind shoes to .057"-.087" smaller diameter than drum size If spindle type grinder used, grind shoes to drum diameter.

Drums - Cast iron with steel hub.

Model	Drum Diameter Front	Rear
C10	10.995"	11.002"
C20	11.105"	11.152"
C30	11.105"	12.958"
P20	11.955"	11.955"
P30	11.955"	12.955"
C40	11.105"	14.955"
C,L,S50,S62,64	13.955"	14.955"
C,L60,S67,Optl.S64,68	13.955"	14.955"
C,L,S60 Optl.	15.0"	14.955"

Braking Power (Front) - (C10) 56%, (C20) 49%, (C30) 41%,(P20) 50%, (P30) 48%, (C40) 29%, (C,L,S50,S62,64) 30%, (C,L60,S67: Optl.S64,68) 30%, (Optl C,L,S60)36%.

Clearance - Adjust for clearance as follows:

All Models (Exc. Series 40,50,60 Rear Brakes) - Remove adjusting hole cover and turn brake adjusting screw until light drag is felt, then back off adjusting screw 7 notches (Ser.10), or just enough to eliminate brake drag (Other Models), but not more than 7 notches.

Rear Wheels (Series 40,50,60 Models) - Remove adjusting hole covers from flange plate and turn rear adjusting screw until slight drag is felt, then back off 3 notches. Repeat on front adjusting screw (2 adjustments on each wheel).

Lining - Molded type Bonded on ½ ton models, riveted on all other models.

Model	Thickness & Width Thickness	Width
C10 (All)	.165"	2.00"
C20 (All)	.249"	2.75"
C30 (Front)	.249"	2.75"
C30 (Rear)	249"	2.50"
P20 (All)	.252"	2.00"
P30 (Front)	.249"	2.00"
P30 (Rear)	.252"	2.50"
C40 (Front)	.249"	2.75"
C40 (Rear)	.375"	4.00"
C,L, S50,S62, 64 (Front)	.250"	2.50"
(Rear)	.375"	4.00"
C,L60, Optl.S64,68 (Front)	.250"	2.50"
(Rear)	.375"	4.00"
Optl. C,L,S60 (Front)	.310"	3.00"
(Rear)	.375"	4.00"

Master Cylinder: Dual barrel (Clutch & Brake) mounted on engine side of firewall, directly connected from pushrod to brake pedal. *NOTE* - Single barrel master cylinder used with Automatic Transmission.

Checking Fluid - Maintain level at ½" below filler.

Removal - Disconnect clutch and brake pedal return springs Slide pushrod boot off cylinder. Remove clutch and brake lines, remove cylinder to dash bolts (three) and remove cylinder assembly.

Installation - Reverse removal procedure and bleed system. *NOTE* - Bleed clutch hydraulic line at clutch slave cylinder bleed hole.

Power Brakes: Two types of Hydrovac Power Unit (Piston & Diaphragm) used. See *"Hydrovac Power Unit" in Brake Section.*

Removal - Remove vacuum and brake fluid lines and air cleaner hose. Remove nuts and bolt securing unit to bracket.

Parking Brake: Hand lever applies rear wheel service brakes (Series 10 & 20 with 3-Speed Trans.), independent brake on propeller shaft (All Others).

Adjustment (Series 10 through 40) - See *"Chevrolet-Bendix Hydraulic" in Brake Section.*

Adjustment (Series 50 & 60) - See *"Chevrolet Twinplex" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers: Single Speed Electric Motor, driving operating link rods.

See *"Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: See *"Chevrolet Air Conditioning" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

►*TIGHTENING CAUTION: Due to use of aluminum crankcase, rear housing, cylinder heads, and other parts, bolt and stud torques must be held as close as possible to specifications in table below to avoid overstressing of base metal parts and stripped threads.*

	Inch-Lbs.	Ft. Lbs.
Cylinder Head		27-33
Exhaust Manifold		10-20
Rocker Arm Stud		27-33
Rocker Arm Stud Nut	55-125	
Rocker Arm Cover	40-60	
Pushrod Guide Ⓒ	60-80	
Oil Pan	40-60	
Oil Cooler		8-12
Oil Cooler Adapter		7-13
Oil Cooler Shroud	60-80	
Oil Pump Cover	60-80	
Oil Filter & Gen. Adapter		7-13
Connecting Rod Caps		20-26
Crankcase Rear Housing		7-13
Crankcase Halves (7/16")		42-48
Crankcase Halves (5/16")		7-13
Crankcase Cover		7-13
Drive Flange or Flywheel		20-26
Flywheel Housing		20-30
Engine Rear Mount Bolt		50-60
Engine Rear Mount Bracket Nut		20-30
Engine Front Insulator-to-Frame		80-100
Engine Front Mount Bracket-to-Trans.		20-30
Engine Front Insulator-to-Bracket		60-80
Engine Rear Shrouds	60-80	
Skid Plate-to-Rear Housing		20-30
Clutch Cover		15-20

Ⓒ - Early cars. Guides retained by rocker arm studs on later cars.

POWER TRAIN

POWER TRAIN REMOVAL. *NOTE - Complete assembly (engine, transmission, and rear axle) must be removed from car as a unit. To separate transaxle from engine, see "Corvair Transaxle" in Transmission Section.*

1) Disconnect ground cable from battery and ground strap to engine, then disconnect wires from coil, generator, oil pressure and temperature sending units. Disconnect accelerator return spring and accelerator rod from carburetor cross shaft.

2) Raise car on a hoist and remove engine side and rear shield seal retainers. Remove both rear wheels and brake drums (cover rear brake shoes), then remove axle shaft universal joints from differential carrier and pull axles out from backing plates *(see "Axle Shaft Removal" below).*

3) Remove wires from starter solenoid and disconnect speedometer cable. Disconnect carburetor cross shaft rod from control idler rear lever, and push rod up into engine compartment, then remove rear idler control lever rod.

4) Disconnect shift rod coupling (manual transmission cars); flexible control cable (automatic transmission cars). On automatic transmission cars, disconnect throttle valve and accelerator rod. Disconnect main gas line and heater fuel line at hose connections, then plug fuel lines.

5) On models with manual transmissions, disconnect clutch fork return spring and unhook clutch control cable clevis. Disconnect clutch fork pull rod, then loosen ball stud at clutch control cable cross shaft and remove cross shaft. Remove emergency brake tension spring. Remove rear engine grille retaining screws and remove grille assembly. Remove engine skid plate bolt and lockwasher.

6) Position a hydraulic transmission jack stand under engine assembly, using Tool J-7894 (adapter), and lock tool in place with attached locking knob and additional bolt and nut. Remove cotter pins and castellated nuts from front engine mount (at transmission) and from rear engine mount. *NOTE - If front mounting bracket and shims are removed from transmission, the same amount of shims removed must be replaced. Rear "toe-in" will be affected if shims are changed.*

7) Lower power train gradually and watch for possible interference at rear mount and left rear lower control arm. Remove exhaust pipe and muffler assembly.

ENGINE SERVICE

►*ENGINE FRONT & REAR IDENTIFICATION: All reference to engine and components is to position installed in car. FRONT of engine is flywheel end toward front of car. REAR of engine is accessory drive end toward rear of car.*

►*ANTI-SEIZE COMPOUND NOTE: Permatex No. 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs and capscrews entering an aluminum part to prevent thread seizure and damage.*

►*ALUMINUM THREAD REPAIR NOTE: A thread repair kit, Part No. 3780960, is available for repairing stripped or damaged threads in aluminum parts.*

►*ALUMINUM PARTS CAUTION: Aluminum components of engine are relatively soft and easily damaged. Use extreme care not to nick, scratch or otherwise distort mating or bearing surfaces.*

CRANKCASE & CYLINDER HEAD STUD REPLACEMENT: Coat stud threads with anti-seize compound (see above) and install into cylinder head or crankcase with special detail of Tool J-8354 to projected length as follows: *NOTE - Measure projected length from shoulder of tool (installed on stud) to surface of crankcase or cylinder head.*

Stud	Projected Length	Tool Detail
Carb. Mounting (Outboard)	4 1/4"	2
Carb. Mounting (Inboard)	1 1/2"	2
Exhaust Manifold	1 3/32"	3
Cylinder (Long - Upper)	8 9/32"	1
Cylinder (Short - Lower)	7 9/16"	1
Rear Housing	4 11/16"	3

►*CYLINDER STUD TORQUE NOTE:* Maximum torque should be 30 ft. lbs., minimum torque 10 ft. lbs. If under 10 ft. lbs., install either .003" or .006" oversize studs as necessary.

EXHAUST MANIFOLD SLEEVE REPLACEMENT: *CAUTION - Remove sleeves from cylinder head only if absolutely necessary.* Remove sleeves by turning gradually with a pipe wrench. **Do not** pry or tap sleeves to remove. To install, coat new sleeves with anti-seize compound (see above). Insert sleeves into dry ice for about 10 minutes and at same time heat cylinder head to 200°F (do not use open flame). Remove sleeves from dry ice and tap into cylinder head bores making sure sleeves are true with bores, *NOTE - Replacement sleeves furnished Std., .002", & .010" Oversize.*

ENGINE MOUNTS: Front Mount Removal - Remove clutch lever control cable cross shaft ball stud at front mount bracket or Powerglide control cable. Support engine and remove insulator-to-bracket nuts. Remove shift rod coupling from transmission shift rod. Lower engine about 2" so front engine bracket clears mount stud. Disconnect parking brake cable from mounting bracket. Remove front mount and insulator. *CAUTION - Shims between transmission and mounting bracket control rear wheel toe-in and must be replaced in original positions.*

Rear Mount Removal: Support engine and remove rear center shield. Remove bracket-to-skid plate nuts, lower engine and remove engine-to-bracket mount assembly.

CRANKCASE COVER, BLOWER & BLOWER BEARING REMOVAL: 1) Disconnect battery ground cable, accelerator and fuel lines, then remove oil level gauge and fresh air choke at air cleaner. Remove choke pipe, air cleaner, air horn and support assembly. Remove carburetor balance tube and retaining strap at engine upper shroud assembly.

2) Remove pulley belt and distributor wire harness, then disconnect cooling air throttle valve lever swivel. Remove upper engine shroud and thermostat rod as an assembly. *NOTE - As an alternate method, remove lower left shroud and remove clip from thermostat rod and remove rod from upper shroud.*

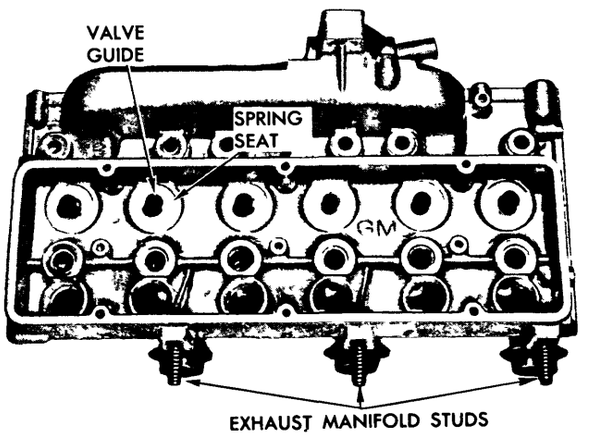
3) Remove four retaining bolts from blower pulley and remove pulley and blower from bearing hub assembly. Remove crankcase cover and blower bearing assembly as a unit. Remove crankcase-to-crankcase vent gasket and crankcase vent.

Blower Bearing Replacement: Use hypoid lubricant on bearing shaft and press bearing on crankcase cover so distance from crankcase cover gasket rail to top surface of large diameter of hub assembly is 4.520-4.530".

OIL COOLER REMOVAL: Remove all screws retaining cooler to engine shrouds, shields and cylinder head, then remove oil cooler access hole cover and remove long oil cooler mounting bolt. Remove oil cooler.

CYLINDER HEAD: Removal - *NOTE - When removing the right hand cylinder head, disconnect choke hat*

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CORVAIR CYLINDER HEAD

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pip and ch ke fresh air pip from xhaust manif ld, then disc nn ct coil, il pressur and il temperatur s nding units in addition to the f llowing r moval procedures.

1) Drain crankcase oil, then disconnect carburetor air intake hose and remove carburetor. Remove outboard carburetor stud (long stud) from mounting. Remove vacuum balance tube from carburetor mounting flange. On left hand cylinder heads, remove generator bracket mounting bolts and swivel br acket, up away from engine upper shroud.

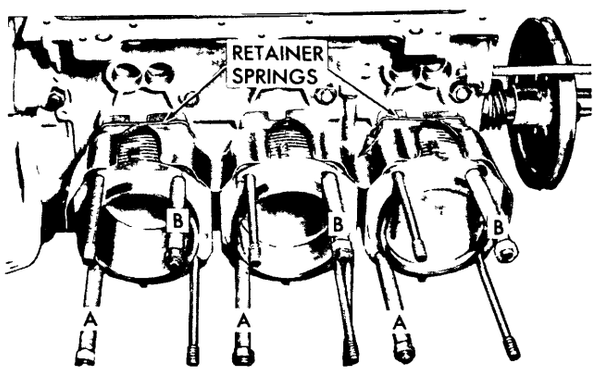
2) Remove spark plugs, then loosen all engine side shield retaining screws and remove screw from engine side shield under carburetor in engine compartment, attached to cylinder head, and remove side shield. Remove oil cooler.

3) Raise car on a hoist and attach Tool J-7894 (adapter) to under side of engine. Remove both engine side seal retainers and rear seal retainers. Remove engine rear center shield and seal assembly. Remove lower engine shroud, then remove exhaust pipe-to-manifold nuts and remove exhaust manifold. Remove engine rear mounting nut and washer from below body rear mounting bracket.

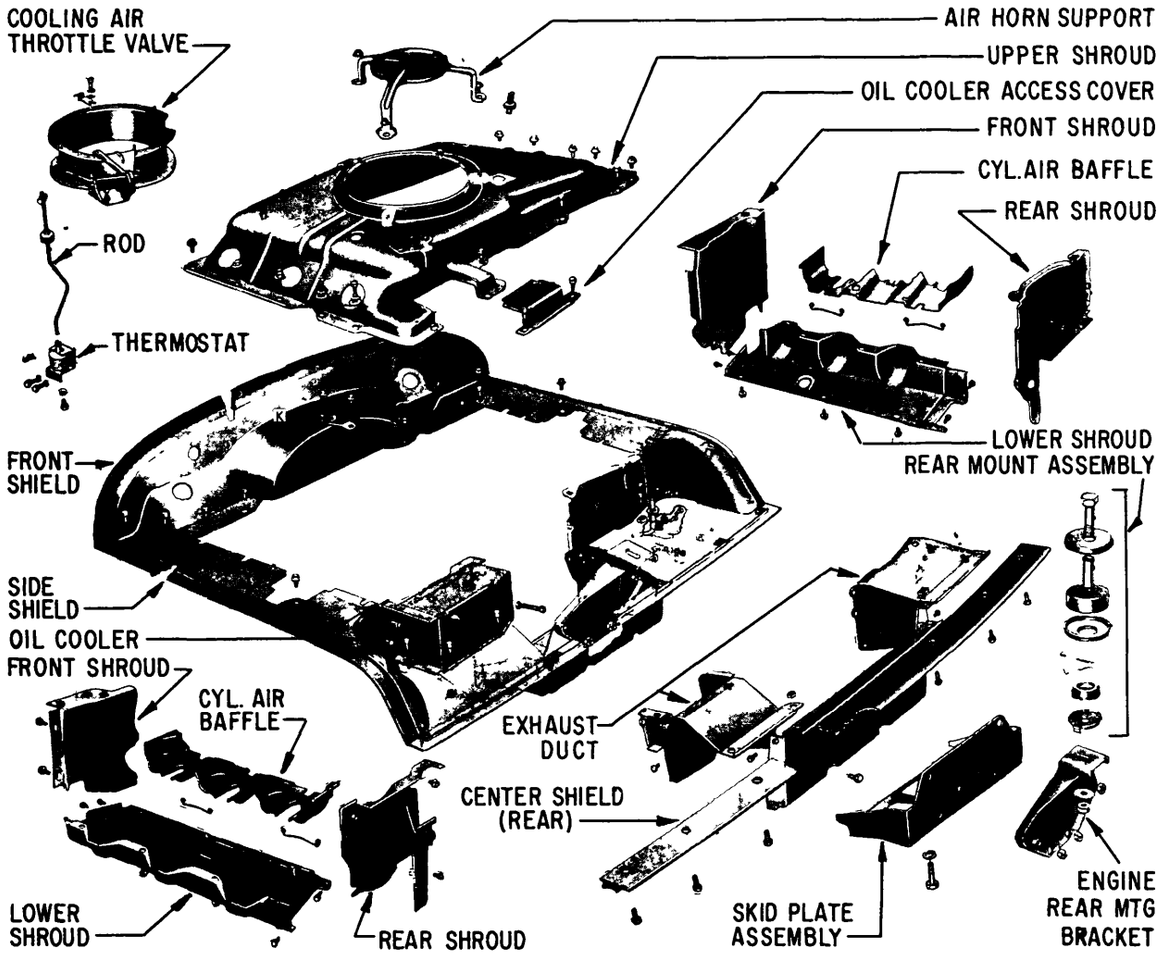
4) Remove valve rocker cover (catch oil draining from cylinder head), then remove rocker arms, pushrods and pushrod guides. *NOTE - On later engines, remove valve rocker studs to remove pushrod guides.* Remove "O" rings from cylinder head and from bottom of pushrod drain tubes, then remove drain tubes. *NOTE - To remove No. 5 pushrod drain tube on left cylinder bank, it is necessary to remove right bank exhaust manifold.*

5) Remove cylinder head nuts and flat washers, then carefully lower engine assembly approximately 3" to clear cylinder head carburetor flange. Remove cylinder head from crankcase studs.

►*CAUTION: Do not rotate crankshaft with cylinder head removed unless holding fixtures are installed on studs to hold cylinder in place. ½" O.D. steel tubes 4¼" long should be installed on one long stud and ½" O.D. steel tubes 3½" long should be installed on one diagonally opposite short stud of each cylinder. See Illustration.*

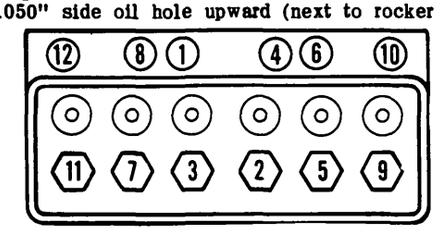


CYLINDER HOLDING FIXTURES



CORVAIR ENGINE SHROUDING

Installation - To install head, reverse removal procedure and note the following: Use anti-seize compound such as Permatex No. 404 or its equivalent on the threads of all bolts, studs and capscrews entering aluminum parts. Tighten cylinder head retaining nuts and rocker arm stud nuts (rocker arm studs have internal threads at lower end that thread over cylinder head studs and act as cylinder head nuts) to 27-33 ft. lbs. in the sequence shown in diagram. Install pushrods with the .050" side oil hole upward (next to rocker arm).

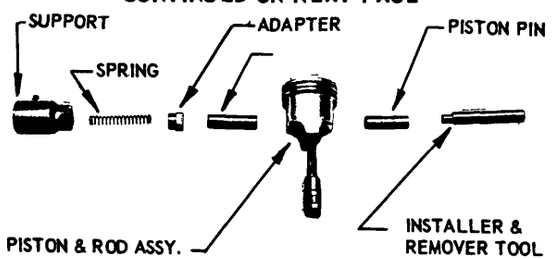


CORVAIR CYLINDER HEAD

Install rocker arms and adjust to proper position (*see "Valve Lash Adjustment" below*). Tighten rocker arm cover screws to 40-60 inch-lbs.

CYLINDER REMOVAL: *NOTE - Cylind r can b remov d with engine in car.* Remove cylinder heads and install holding fixtures (see above). Remove crankcase cover

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CORVAIR PISTON PIN ASSEMBLY

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and blower assembly (see above). Remove cylinder air baffles (secured by retainer spring clips at base of cylinder). Turn crankshaft and remove connecting rod caps. Remove cylinder holding fixture and remove cylinder, piston and rod as an assembly. *NOTE - If desired, cylinder can be removed without removing piston and connecting rod. In this case, use Tool J-8356 to compress piston rings when installing cylinder.* **Installation** - Install new copper gasket over cylinder pilot and install cylinder into crankcase. Reverse removal procedure.

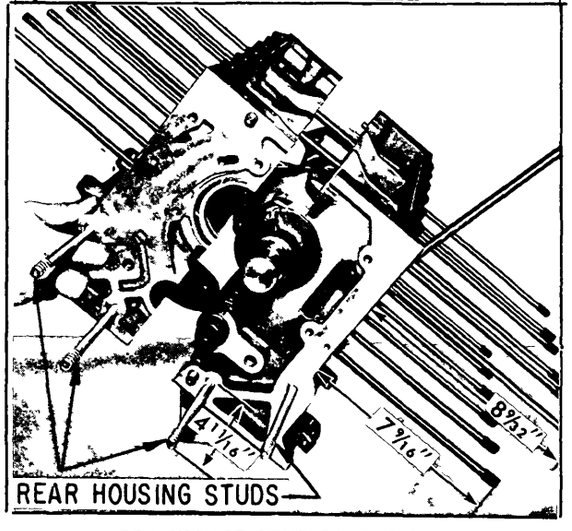
PISTON PIN REMOVAL & INSTALLATION: Use Tool Set J-8355 to remove and install piston pin in piston and connecting rod (see illustration). When installing, press pin in until pilot of tool bottoms on adapter and support.

CONNECTING ROD BEARING REPLACEMENT: *NOTE - Bearings can be replaced without removing engine from car.* Remove crankcase cover and blower assembly (see above). Remove spark plugs. Remove connecting rod bearing caps (turn crankshaft to position rods for access to cap bolts).

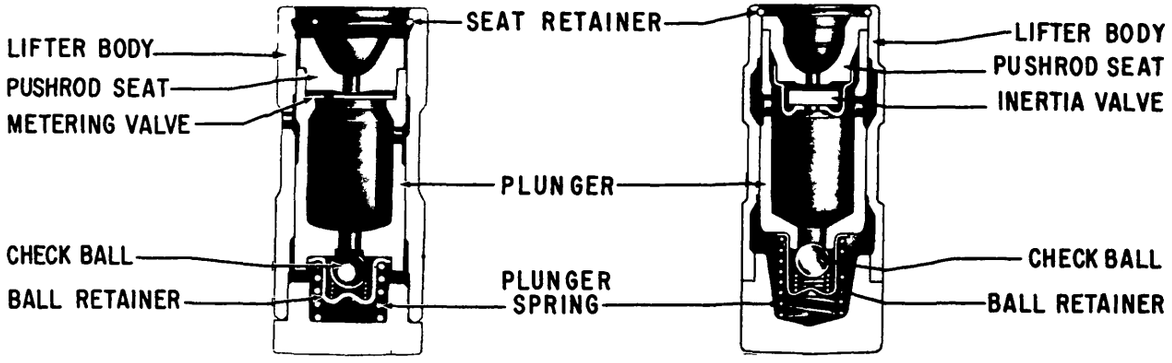
FLYWHEEL HOUSING: Crankshaft Front Oil Seal Replacement - Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-2221-A or suitable installer. *CAUTION : Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350 F.*

ENGINE REAR HOUSING REPLACEMENT: Observe the following: 1) Grooved pin holding oil pump pressure regulator valve must be installed with a suitable drift. 2) Oil pump gallery plug must be flush with counterbore (use sealing compound). 3) Distributor holding stud should project 1 1/8" from distributor mounting pad on housing.

►*PULLEY REMOVAL CAUTION:* Do not install puller screws into pulley more than ¼" when removing pulley as crankshaft rear oil seal will be damaged.



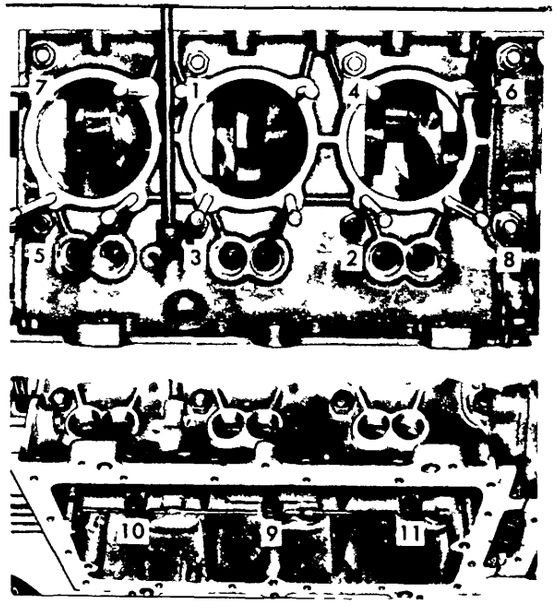
CRANKCASE STUD DIMENSIONS



CORVAIR HYDRAULIC VALVE LIFTER

Crankshaft Rear Oil Seal: *See CAUTIONS below.* Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-270-6 or suitable installer. *CAUTION - Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

►*REAR OIL SEAL PRODUCTION CHANGE & REPLACEMENT CAUTION:* Early production engines have seal flange mounted on inside of housing. Later production seals are mounted on outside of housing. Install seal from same side as removed. *If later type seal, Part No. 6257476, is used on an early engine, later type oil slinger, Part No. 6257477, must also be installed and a 1/32" x 45° chamfer made on outside face of rear housing seal opening. No slinger on later engines.*



CRANKCASE TIGHTENING SEQUENCE

CRANKCASE SEPARATION: After cylinders, rear housing, and flywheel housing removed, remove front oil slinger and snap ring. Loosen crankcase holding bolts. Tilt crankcase on right side at about 15° angle to prevent camshaft and crankshaft falling out. Remove holding bolts and remove crankcase left half.

CRANKCASE ASSEMBLY: Make sure split line surfaces are free of nicks and scratches. Install main bearing inserts in right half and install crankshaft. Install camshaft, guiding thrust washer into groove in crankcase and index timing marks on camshaft and crankshaft gears. Install main bearing inserts in left half and carefully install left half to right half. Torque holding nuts to proper specifications in sequence shown in diagram. *CAUTION - Hold bolt head and tighten nuts. DO NOT tighten at bolt head. Later production engines do not use bolts No. 9 and 11.*

MAIN BEARING REPLACEMENT: When testing bearing clearance, crankcase must be assembled without camshaft exactly as indicated under "Crankcase Assembly" above.

CRANKSHAFT DRIVE FLANGE: Drive flange and crankshaft timing gear are a one-piece unit with a tight press fit on crankshaft. A hydraulic press is necessary to remove and install gear and flange. To remove, use Support Plate J-358-1, Adapter Rings J-7028, and a hydraulic press. To install, support crankshaft between front crankshaft throw and front journal (support must clear thrust face of No. 6 crankpin). Install woodruff key and install crankshaft gear. Press gear on shaft with Tool J-6175 and a hydraulic press.

►*FLYWHEEL SEALING CAUTION:* Flywheel or flex plate-to-crankshaft gear bolts must have sealing compound applied before installation to prevent oil leakage.

CAMSHAFT GEAR REMOVAL & INSTALLATION: Remove gear by supporting gear with Tool J-971 and pressing out shaft with an arbor press. To install, support camshaft at back of front journal, install thrust washer and woodruff key and press gear on shaft with an arbor press (support gear with Tool J-971) until gear bottoms on thrust washer.

PUSHROD, PUSHROD GUIDE & DRAIN TUBE INSTALLATION: *On early production engines, pushrod guides are installed over rocker arm studs. On later production*

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ngin s, guid s must b installed under rock r arm studs. Place "O" rings on each end of drain tubes and install with long end of tube toward cylinder head. Insert pushrods into drain tubes with .050" side oil hole at rocker arm end (pushrod marked with blue paint). Install pushrod guides, and rocker arm studs (later engines). Install rocker arms and make valve lash ad-

VALVE LASH ADJUSTMENT: For initial adjustment after overhaul, proceed as follows: Set distributor at No. 1 firing position and crankshaft pulley notch at 0° on timing tab. Adjust No. 1, 3, 6 Intake and No. 1, 4, 5 Exhaust valves as follows: Turn rocker arm adjusting nut down until no axial movement of pushrod is felt, then turn adjusting nut ¾ turn additional. With distributor at No. 2 firing position (pulley notch at 0°), adjust No. 2, 4, 5 Intake and No. 2, 3, 6 Exhaust valves

HYDRAULIC LIFTERS: Removal - Lifters are removed from lifter bores after pushrods and drain tubes removed by means of a magnet or wire hook and should be reinstalled in same bore from which removed.

Disassembly - Hold plunger down and remove pushrod seat retainer. Remove pushrod seat and inertia or metering valve assembly, plunger, and spring from lifter body. Remove check ball retainer, ball and spring. *NOTE* - Replace entire lifter if any part damaged.

Reassembly - Insert check ball in plunger, place spring in seat in ball retainer and insert retainer on plunger. Place plunger spring over ball retainer and slide lifter body over spring and plunger. Install pushrod seat and inertia or metering valve assembly into plunger and install retainer. *NOTE - Fill lifter with SAE 10 engine oil at reassembly and before installing in engine.*

OILING SYSTEM

ENGINE LUBRICATION: Force feed type with oil under full pressure supplied to all crankshaft, camshaft, and connecting rod bearings, and to hydraulic valve lifters. Oil metered by lifters lubricates pushrods and rocker arms. All other parts are lubricated by oil spray.

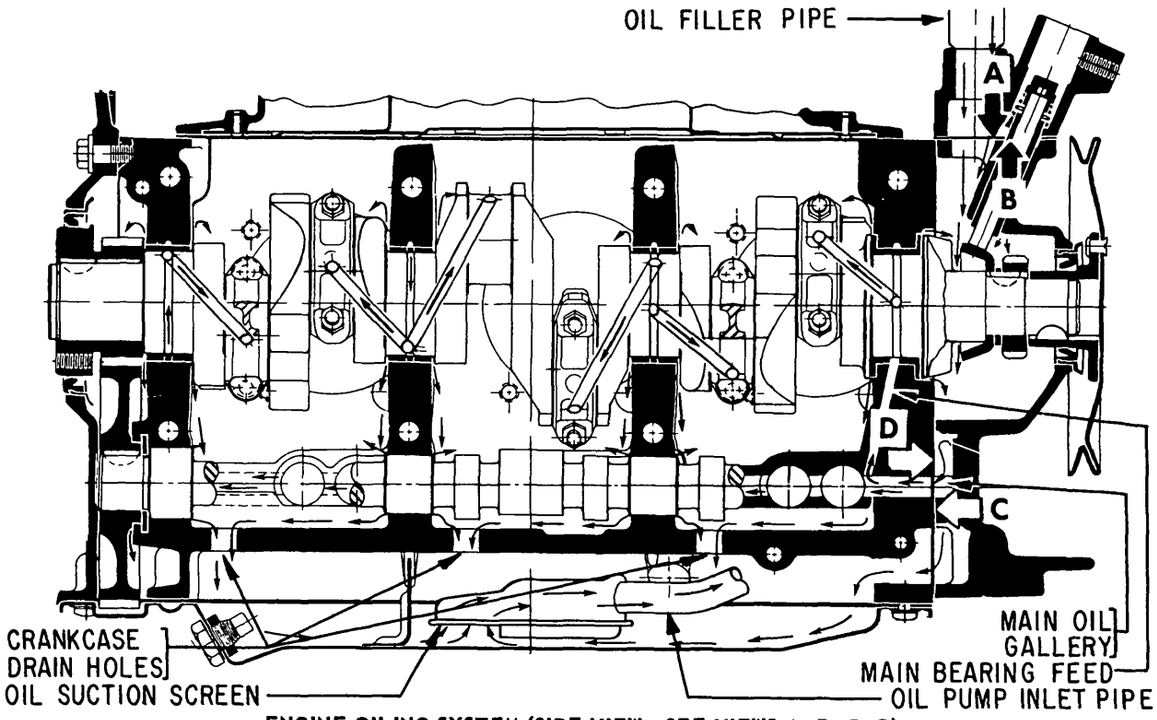
OPERATION: Oil pump located in engine rear housing & driven by distributor shaft which is driven by crankshaft. Pump draws oil through fixed oil screen and intake pipe in crankcase and delivers oil to full-flow type filter mounted on Filter & Generator Adapter which is mounted on engine rear cover. Oil is then directed through oil cooler (mounted on side of engine rear cover) and then to the two main oil galleries (one on either side of camshaft) which extend entire length of crankcase. Oil is distributed through the main galleries as detailed below. *NOTE - See Engine Rear Cover and Filter & Generator Adapter illustrations for location of channels and passages in these parts and for location of bypass valves for oil filter and oil cooler.*

Crankshaft & Camshaft Bearings - Lubricated through passages in crankcase webs from main oil galleries. Individual bearings are lubricated from right or left main oil galleries as follows: **Crankshaft Bearings** - Nos. 1 & 3 (right gallery), Nos. 2 & 4 (left gallery). **Camshaft Bearings** - Nos. 1, 3, 4 (right gallery), No. 2 (left gallery).

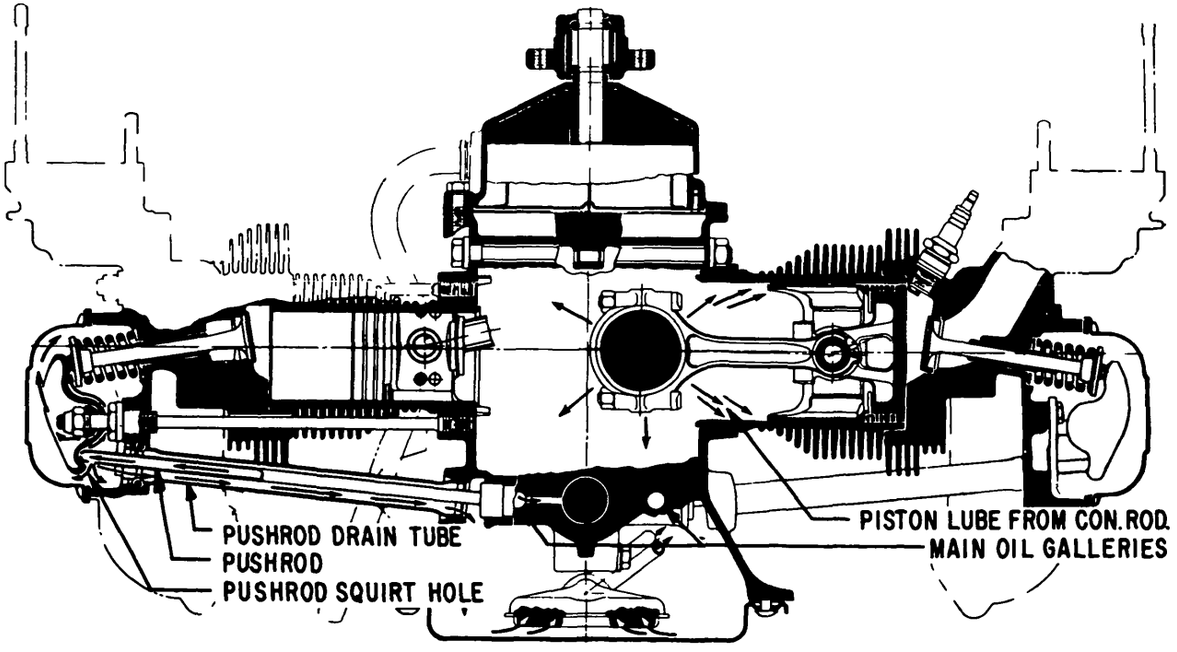
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pist ns & Pins - Lubricated by oil spray thrown on cylinder walls from both ends of connecting rod bearings.

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ENGINE OILING SYSTEM (SIDE VIEW - SEE VIEWS A, B, C, D)



ENGINE OILING SYSTEM (CROSS SECTION)

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Timing Gears - Lubricated by oil spray from forward end of crankshaft and camshaft No. 1 bearings.

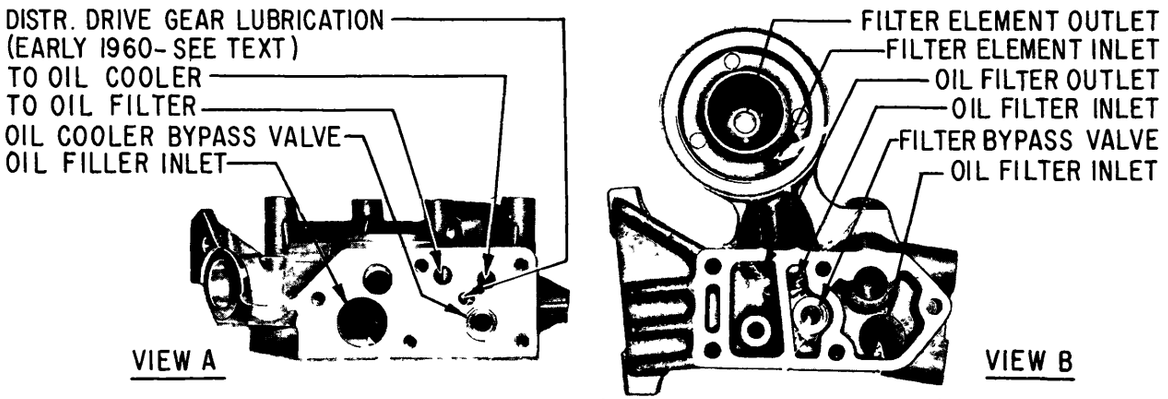
Fuel Pump Eccentric & Distributor Drive Gear - Lubricated through drilled orifice and pressed in nozzle in engine rear housing which directs oil on these parts (early cars), lubricated by overspray from No. 1 (rear) main bearing (later cars - orifice and nozzle omitted from rear housing).

Hydraulic Valve Lifters - Main oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

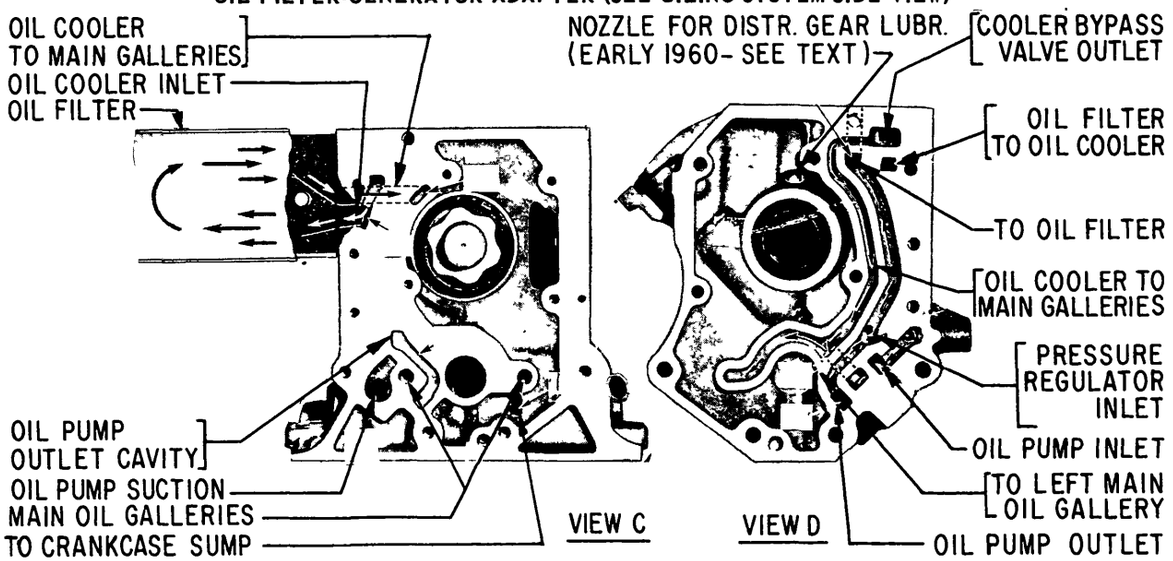
Rocker Arms, Pushrods, & Valves - Pushrods are hollow and are supplied with oil from hydraulic lifter (inertia valve in upper end of lifter permits oil to flow through hole in end of pushrod). Upper end of pushrod has a side hole which sprays the valve chamber (lifter and pushrod rotate in operation and this oil spray is directed around valve chamber) and a through hole in the end which lubricates pushrod socket and rocker arm ball (pushrod hole registers with hole in rocker arm once during each revolution directing oil upward to the rocker arm ball). Oil in rocker arm chamber is returned to crankcase through the tubular pushrod drain tubes.

OIL FILTER: Full-flow type mounted on Filter & Generator Adapter at rear of engine. Bypass valve (10 lb. type) located in adapter (see illustration) permits oil circulation through engine if filter element is clogged.

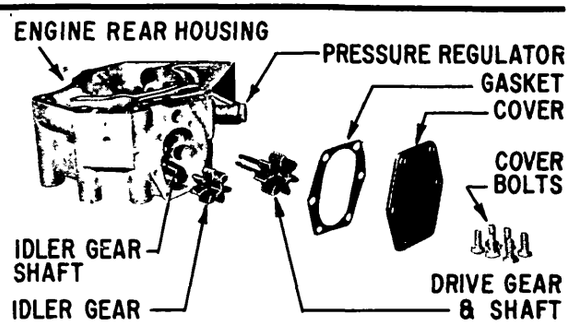
OIL COOLER: Finned cooler mounted on side of Engine Rear Housing in the engine cooling air stream. Bypass valve (10 lb. type) located in Filter & Generator Adapter (see illustration) permits oil circulation through engine if cooler is clogged.



OIL FILTER-GENERATOR ADAPTER (SEE OILING SYSTEM SIDE VIEW)



ENGINE REAR HOUSING (SEE OILING SYSTEM SIDE VIEW)



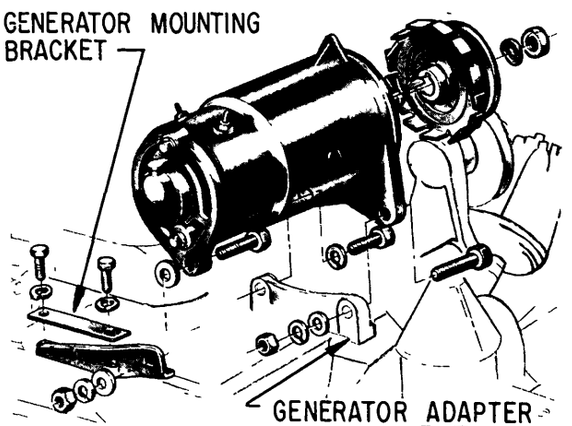
CORVAIR OIL PUMP

OIL PUMP: Disassembly - Drain crankcase, remove rear grille, center shield and engine rear mount (support engine). Remove oil pump cover. Remove oil pump drive gear and shaft and idler gear from rear housing. Remove pressure regulator valve plug, gasket, spring,

Reassembly: Lubricate gears with engine oil. Install idler gear on idler shaft and make sure shaft is .010-.020" below housing gasket surface. Insert drive gear and shaft in housing. Clearance between gears and housing should be .005". *NOTE - Oil pump gears should extend .0025-.0045" above housing gasket surface for oil pump prime. Gears of .001" oversize thickness are available.* Install oil pump gasket and cover and pressure regulator valve assembly. Install engine rear mount, center shield and rear grille.

ELECTRICAL NOTES

GENERATOR INSTALLATION: *CAUTION - If preload on generator exists, end frame will break. To prevent this condition, use following installation procedure exactly.* Tighten generator-to-adapter bolts to 15-22 ft. lbs. and loosely assemble mounting bracket-to-generator bolt and nut (at commutator end of generator). Bracket must be able to move. Tighten generator bracket-to-cylinder head bolts finger tight. Now tighten bracket bolt at commutator end of generator to 8-11 ft. lbs. Tighten front bracket-to-cylinder head bolt to 15-22 ft. lbs. and rear bolt to same torque.



GENERATOR INSTALLATION

►*JACKING & HOISTING CAUTION: B fore jacking or hoisting, see "Jacking & H isting Precauti ns" in Susp nsion & Wh l Alignment S ction.*

►*TIRE INFLATION NOTE:* **Fr nt** - 15 lbs. Cold, 18 lbs. Hot. **Rear** - 26 lbs. Cold, 30 lbs. Hot. Riding, handling, and tire wear will be affected if proper tire pressures not maintained. Over-inflation of front tires may cause the car to "oversteer".

►*HIGH PERFORMANCE ENGINE NOTE:* "Turbo-Air Special" engine optional on Synchro-mesh cars. This engine has different camshaft, carburetors, distributors, and other parts which are included in data below.

MODEL IDENTIFICATION

Model Designation

Model	Body Style	Series
527	Std. 4-Dr. Sedan	J-500
569	Std. Club Coupe	J-500
727	Deluxe 4-Dr. Sedan	K-700
769	Deluxe Club Coupe	K-700
927	Monza Coupe	

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post. *NOTE - Number (example below) includes identification data as indicated below.*

① ② ③ ④
0 0569 W 100025

① - Year (last digit).
② - Model. See Model Designation table above.
③ - Assembly plant. "K" (Kansas City), "O" (Oakland), "W" (Willow Run).
④ - Unit number. Continuous at each assembly plant starting with 100001.

ENGINE NUMBER: Stamped on top of engine block, immediately forward of generator-oil filter adaptor. *NOTE - Number (example below) includes identification data as indicated.*

① ② ③ ④
T 01 01 Y

① - Assembly Plant. **T** Tonawanda.
② - Month Assembled. **01** January.
③ - Day Assembled. **01** First.
④ - Equipment. **Y** Synchro-mesh. **YD** High Perf. Eng. & Synchro-mesh. **Z** Powerglide.

TUNE-UP

►*TUNE-UP NOTE: Procedures and specifications listed below supersede previous recommendations. Use only data below for service adjustments.*

COMPRESSION PRESSURE: 130 lbs. minimum. Variation between highest and lowest cylinders must be less than 20 lbs.

VACUUM READING: 14-18" maximum at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters. If adjustment required, proceed as follows: With valve cover removed and engine at normal operating temperature, run engine at idle speed, then back off rocker arm nut (one at a time) until valve rocker arm starts to clatter against valve. Tighten rocker arm nut until clatter of rocker arm is just stopped. Turn off engine and tighten each valve rocker arm nut exactly ¾ turn. This procedure will set plunger of hydraulic lifter in center of its operating travel. *For initial adjustm nt aft r v rhaul, see "Engine S rvic " in C rvair Sp cial Data.*

►*NOTE:* To catch excess oil when checking clearance with engine operating, cut a discarded valve cover to 1/3 its normal size and install at bottom of cylinder head to use as a trough.

MANIFOLD HEAT CONTROL: None used.

IGNITION

FIRING ORDER: 1-4-5-2-3-6.

Cylinders - RIGHT BANK 1-3-5. LEFT BANK 2-4-6. *NOTE - Right rear cylinder is No. 1 and left rear cylinder is No. 2. Engine rotation, as viewed from rear of car, is counterclockwise.*

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 46FF (No. 44FF for sustained high speed operation). 14mm. Torque to 25 ft. lbs. *NOTE* - No. 44FF were used on early Std. Engines. Use No. 46FF for service replacement. *CAUTION - Do not use other than "FF" type as severe damage to cylinder head will result.*

►*NO. 4 SPARK PLUG REMOVAL NOTE:* Use an offset box end wrench with a long handle on a hex head spark plug socket for easy removal of this plug. Work from front of engine.

►*SPARK PLUG COVER SEALING CAUTION:* Spark plug covers must be tightly in place in plug opening in shroud to prevent loss of all air pressure in cooling system and severe engine overheating.

COIL: Delco-Remy 1115087.

Ignition Current - 1.8 amps. idling, 4 amps. stopped.

Resistor - Resistance type cable (1.8 ohms resistance) used in harness between instrument panel disconnect plug and rear wiring harness connector. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy. Special "Window" type. *NOTE - This distributor does not have external contact point adjustment typical of other window type distributors.* Distributor is driven by gear on rear of crankshaft. Used as follows:

Eng. & Trans. ①	Delco-Remy No.	②Identification
All (Early)	1110252	③Cadmium
S-M (Later)	1110258	④Zinc
P-G (Late)	1110256	③Black
P-G (Later)	1110259	④Black
High Perf. (Early)	1110257	③Copper
High Perf. (Later)	1110260	④Copper

① - S-M - Synchro-mesh. P-G - Powerglide.
② - Color of oiler.
③ - Two pads on mounting flange.
④ - Full diameter mounting flange.

►*DISTRIBUTOR 1110252 MODIFICATION NOTE (POWERGLIDE CARS):* A modification kit is available to change advance characteristics for a 16° BTDC ignition timing setting. After distributor modified, paint oiler black and modify timing mark by installing a 16° timing tab. See tables below for 1110256 & 259 distributors for advance specifications.

Condenser - Delco-Remy 1928111. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1945376.

Breaker Gap - .019" (new points). .016" (used points).

Cam Angle - 31-36°. Set at 33°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110252 & 258

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	200	0-4	400
7-9	1050	14-18	2100
15-17	1800	30-34	3600

Automatic Advanc - 1110256

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	850	0	1700
10	1800	20	3600

Automatic Advanc - 1110259

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	700	0	1400
12	1850	24	3700

Automatic Advanc - 1110257 & 260

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	0	700
3.25	600	6.5	1200
12	2400	24	4800

Vacuum Spark Control: Delco-Remy. Integral type.

Vacuum Advance - 1110252, 258 & 260

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11.5	23	14.5-16

Vacuum Advanc - 1110256 & 259

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7
11.5	23	16

Vacuum Advanc - 1110257

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
7.5	15	15.5

IGNITION TIMING

Distributor	Ignition Timing Sp cificati ns	Setting
1110252 (Unmodified) ①		4° BTDC
1110252 (Modified - see above) ②		③16° BTDC
1110256, 257		③16° BTDC
1110258		4° BTDC
1110259, 260		13° BTDC

① - Cadmium colored oiler. ② - Black oiler.
③ - If pre-ignition or detonation occurs, retard spark to 14° BTDC.

Timing Mark - Early Engin s "O" and "A" marks on timing tab and notch on crankshaft pulley. Mark on pulley should be 1/3 the distance between "O" and "A" marks away from the "O" mark. **Lat r Engin s** "O", "4", "8" and "16" marks on timing tab and a notch on crankshaft pulley. Align mark on pulley with correct mark on tab.

CARBURETOR

►*CARBURETOR APPLICATION: Two R ch st r Model "H", single barrel carburet rs used.*

ACCELERATOR CONTROL LINKAGE ADJUSTMENT: Remove mudguard over idler lever "A" (see illustration) on transmission, then disconnect swivel "D" from lever "A". Disconnect swivel "B" from left carburetor cross shaft lever "E". Pull rod "C" to wide open throttle (through detent for Powerglide and against stop for standard transmission) and turn lever "E" in wide open throttle position (carburetor throttle lever against the stop). Adjust swivel "B" to align with hole in lever "E", then lengthen rod "C" by backing off swivel "B" **five full turns.** Position accelerator pedal by placing a block of wood between pedal end and floor pan or mat. Thickness of wood block should be as follows: **Floor Pan-to-Pedal** - 2" (Powerglide), 1¾" (Std. Trans.). **Floor Mat-to-Pedal** - 1¼" (Powerglide), 1" (Std. Trans.). Hold lever "A" in wide open throttle position (through detent for Powerglide) and turn swivel "D" to align with hole in lever "A". Install mudguard. *NOTE - This compl t proc dure provid s prop r cl aranc b tween acc l rator p dal and floor mat at wid op n throttl .*

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If it is impossible to make proper adjustment at either of the swivels, relationship between pedal and pedal rod is incorrect (see below).

►*PEDAL & PEDAL ROD NOTE:* To determine if pedal and pedal rod relationship are correct, lay the accelerator pedal, with rod attached, on a flat surface (rod assembly up). The distance between bench and underside of pedal rod pin (pin attaching pedal rod to rod running through tunnel) should be 1 11/16". If not correct, reposition accelerator pedal on pedal rod.

►*CARBURETOR HOT AIR INTAKE PIPE SEASONAL SETTING:* Valve in hot air pipe (from exhaust manifold) at air intake elbow should be closed for summer and open for winter operation.

SYNCHRONIZING CARBURETORS: *NOTE - Following procedures supersedes previous instructions.* Remove air cleaner and hose assembly, connect tachometer and timing light. With engine at normal operating temperature (transmission in neutral, choke wide open and carburetor off fast idle), disconnect vacuum spark hose from right carburetor and remove spark advance plastic cover from left carburetor. Rotate fast idle cam so engine is at 1200 RPM and connect vacuum gauge to right carburetor. Note reading. Attach vacuum gauge to left carburetor and note reading. If readings not equal, disconnect cross shaft from left carburetor rod at swivel and adjust swivel so reading on both carburetors is equal within 1" (turn swivel up to increase left carburetor vacuum, turn downward to decrease vacuum). *Further adjustments for idle speed, etc., must be made on both carburetors.*

ROCHESTER MODEL "H"

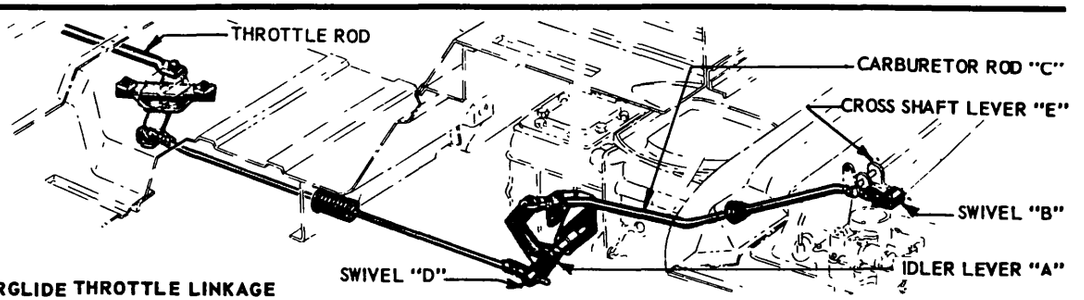
Engine & Trans.	Rochester Carb. No.
All (Early)	7015300
Powerglide (Late)	7015310
Powerglide (Limited Prod.)	7015312
Synchro-mesh (Late)	7015311
Synchro-mesh (Limited Prod.)	7015313
High Performance Engine	7015319

New design, single barrel downdraft type. Two carburetors are used, one on each intake manifold, with the throttle shafts connected by a cross shaft which is actuated by the accelerator linkage. A single air horn/air cleaner assembly located between the two carburetors (connected to carburetors by hose) contains the choke, choke modifier, and fast idle assemblies. Each carburetor contains a ceramic type fuel filter located in the fuel inlet fitting.

►*CARBURETOR PRODUCTION CHANGES & FLOAT SETTING CAUTION:* Different carburetors used in production (see above) have different type floats and float intake needle valve and **require different float settings.** *See "Rochester Model H Carburetors" in Carburetion Section.*

►*FUEL FILTER NOTE: Replace filter every 15,000 miles. Remove filter and wash frequently in solvent and blow dry with air.*

Idle Speed & Mixture Adjustments: For initial setting, turn idle speed screw on both carburetors ½ turn in from point where screw just touches throttle shaft lever. Turn idle mixture screw on both carburetors 1½ turns out from a lightly seated position. Then adjust idle mixture screw to obtain highest engine vacuum and RPM. Adjust idle speed screws to obtain idle speed of 800 RPM (High Perf. Eng.), 500 RPM (Others - Powerglide in D).



POWERGLIDE THROTTLE LINKAGE

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester Model H Carburetors" and "Corvair Automatic Choke & Fast Idle" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4704 (Fuel Only).
Fuel Pump Pressure - 4-5 lbs. at 500-1000 RPM.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: AC Electric type.
Dash Unit - AC No. 5643032.
Tank Unit - AC No. 5640382.
See "Fuel Gauges" in Carburetion Section.
Air Cleaner: Oil wetted type with reusable Polyurethane element. Clean element every 2000 miles.

►*CLEANING CAUTION:* Clean element (after removing metal support) in **kerosene or mineral spirits only.** Squeeze out all solvent, then dip in light engine oil and squeeze out excess oil. DO NOT shake, swing or wring element. **Squeeze only.**

►*INSTALLATION NOTE:* Element must be positioned on support so overhang of upper and lower lips is even. To insure proper seal, lower lip must not be crimped or folded and upper lip must rest on top of air cleaner inner flange. When installing air cleaner assembly on air horn, notch in air cleaner must index with tang on air horn casting.

BATTERY

Delco No. 457 (Std.). 12 volt, 7 plate, 35 ampere hour capacity, **No. 557 (Optl.).** 12 volt, 9 plate, 40 ampere hour capacity. Identified by green paint on negative terminal. Both batteries at 20 hr. rate. *NOTE* - Batteries are dry type for service replacement.
Battery Ground - Negative.
Engine Ground - Right cylinder head to battery ground attaching bolt on body.

STARTER

Delco-Remy No. 1108300 (Synchro-mesh), No. 1108301 (Powerglide).
Armature - Delco-Remy No. 1946226 (All).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. (min.).

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6750-8600	10.6	58-80
	Lock	4.0	280-320

Starting Switch: Delco-Remy 1119919 mounted on starter and controlled by Ignition & Starter Switch 1116567.
Neutral Safety & Back-up Light Switch: Delco-Remy 1998717 used on Powerglide cars.
Adjustment - *See "Corvair Transaxle" in Transmission Section.*

GENERATOR

Delco-Remy No. 1100357 & 1102226 (Std.), No. 1105135 (Low Cut-In).
Armature - Delco-Remy No. 1948086 (1100357 Gen.), No. 1952301 (1102226 Gen.), No. 1950521 (1105135 Gen.).

Performance Data - 1100357

Amperes	Volts	RPM
30	14.0	2900

Rotation - Clockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.50-1.62 amps. at 12 volts and 80°F.
Belt Adjustment: 3/8" deflection midway between blower and idler pulley under a 15 lb. load or 75 lbs. tension with Belt Tension Gauge J-7316. To adjust, move idler pulley bracket.

►*BELT INTERFERENCE (EARLY CARS): If interference between rearmost idler pulley bracket attaching nut and belt, remove stud and replace it with a 3/8" - 16 x 1¼" bolt and plain washer.*

►*NEW BELT INSTALLATION NOTE: If a new belt is installed, tension belt as for a used belt (above), then operate engine at 1500 RPM for a minute or two to seat belt, then readjust tension.*

►*GENERATOR FAN & PULLEY ASSEMBLY NOTE:* Check generator fan to make sure the proper one is installed. As this generator rotates counterclockwise (at drive end), the fan blade should slant so bottom of blade is toward direction of rotation. *NOTE - Standard passenger car generator rotates clockwise (at drive end) and the blades are slanted so bottom of blade is just opposite to the Corvair.*

►*GENERATOR PULLEY INSTALLATION CAUTION:* Pulley nut has **left-hand threads.** DO NOT attempt to turn nut in opposite direction nor install a right-hand thread nut as severe damage to armature will result.

Generator Installation: *See "Electrical Notes" in Corvair Special Data.*

REGULATOR

Delco-Remy No. 1119261 (Std. Gen.). "Post Type" with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment.
Delco-Remy No. 1119635 (Low Cut-In Gen.). "Double Contact" type of same design used on other Chevrolet Cars. *Specifications below are "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119261), 11.8-13.0 volts (1119635).
Contact Gap - .020".
Air Gap - .020" (1119261), .022" (1119635).

Voltage Regulator

Setting (1119261) - 13.8-14.7 volts at ambient temperature of 125°F.

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Setting (1119635) - 13.8-14.6 volts (upper contacts), .1-.3 volts lower operating on lower contacts at ambient temperature of 125°F.

Air Gap - .075" (1119261), .067" (1119635) with armature pressed down to point where contacts just touch.

Contact Gap (1119635) - .016".

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" & "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting - 27.0-31.0 amperes (1119261), 27.8-32.4 amperes (1119635) at ambient temperature of 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" & "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System. *See "4-Headlight Systems" in Electrical Section.*

Direction Signals: *See Electrical Section.*

Stop Light Switch Location: Under instrument panel

Adjustment - Adjust switch in mounting bracket so electrical contact is made when brake pedal depressed ½-¾" from fully released position.

Lighting Switch Removal: Disconnect battery ground cable and pull switch to ON position. Depress switch shaft retaining button (top of switch under instrument panel) and remove shaft and knob. Remove switch retaining ferrule and bezel and remove switch.

Ignition Switch Removal: With negative cable disconnected at battery, position ignition switch in "Lock" and insert a wire in small hole in cylinder face. Depress plunger with wire and continue to turn key counterclockwise until cylinder can be removed. Use a spanner wrench (Tool J-7607 or J-5893, with inside of tangs filed off), and remove attaching nut, then remove switch. To remove "theft resistant" connector, use a piece of heavy wire stock and press on lock clip in slot in connector. Hold wire in place and work connector away from switch.

CIRCUIT BREAKERS: A circuit breaker located in lighting switch protects headlights and parking lights

FUSES: Located in junction block and fuse holder beneath instrument panel.

10 Amperes - Tail, stop, and dome lights.

10 Amperes - Heater blower, glove compartment light.

20 Amperes - Heater (total system), back-up light.

3 Amperes - Instrument panel light. Radio panel light. Heater control panel light.

ENGINE

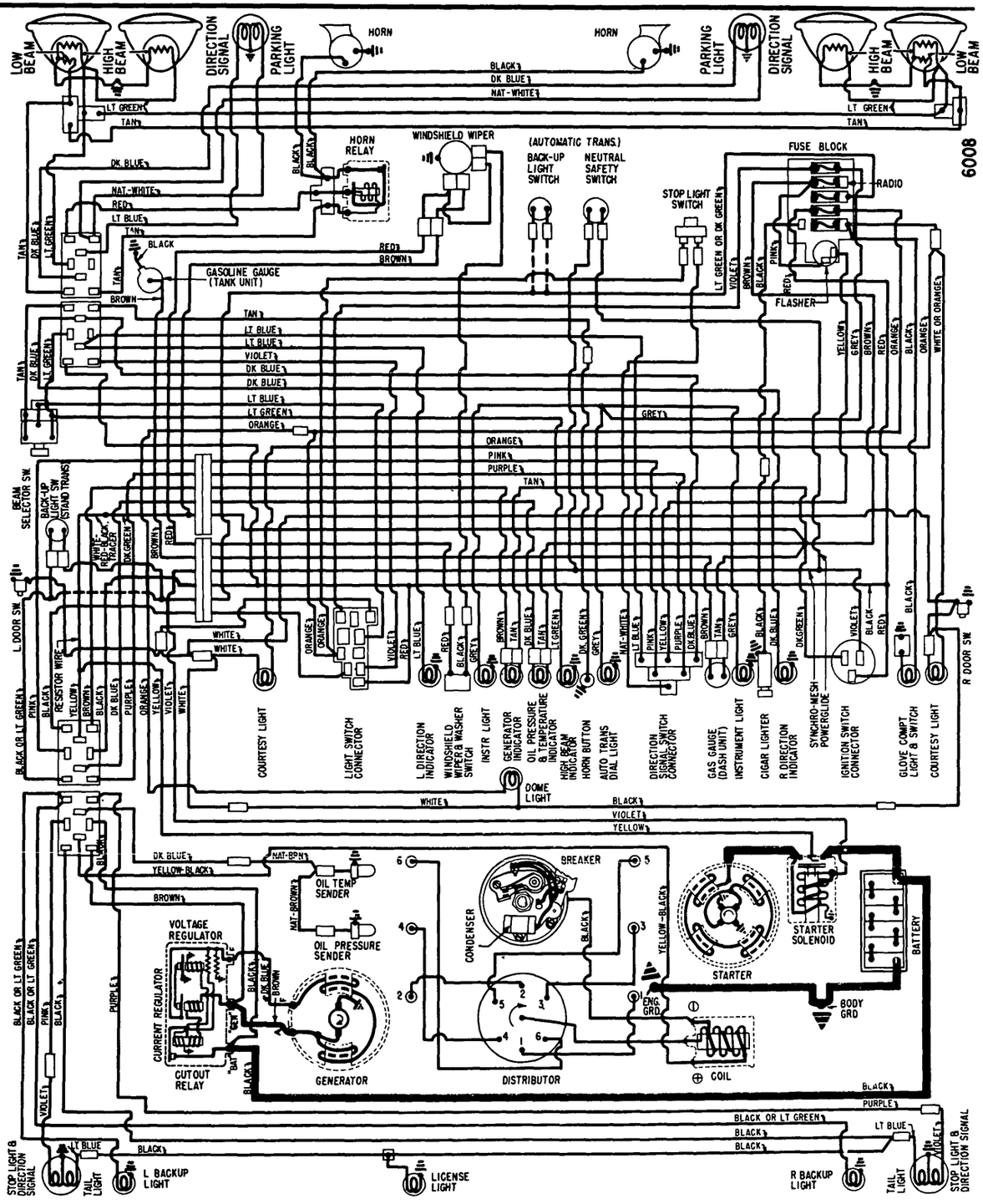
►*ANTI-SEIZE COMPOUND NOTE: Permatex No. 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs and capscrews entering an aluminum part to prevent thread seizure and damage.*

►*ALUMINUM THREAD REPAIR NOTE: A thread repair kit, Part No. 3780960 is available for repairing stripped or damaged threads in aluminum parts.*

DESCRIPTION: 6 cylinder, horizontal opposed, overhead valve, air cooled type of new design. This engine is integral with the power train assembly (transmission and rear axle) and has the following features:

Crankcas : Aluminum type divided into two halves which are held together at the parting line by bolts.

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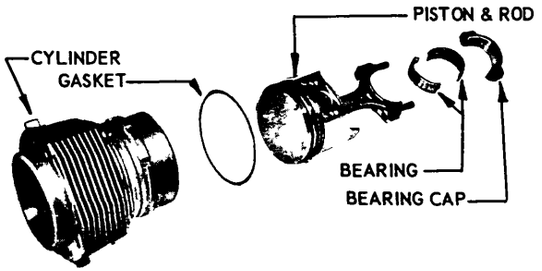


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Crankshaft: Forged steel, housed between split halves of crankcase. Bearing caps are not required since steel backed babbitt lined bearings are supported between crankcase halves.

Camshaft: Cast iron alloy, nested between crankcase halves below the crankshaft. Camshaft journals ride directly on machined base metal of crankcase.

Cylinders: Individual cast iron cylinders that are positioned on crankcase by four long studs at each cylinder. These studs pass freely through holes in cylinder cooling structure and secure cylinders and head to crankcase.



CORVAIR CYLINDER ASSEMBLY

Cylinder Heads: Aluminum cylinder heads are identical, incorporating cooling fins and integral intake manifolds and contain wedge shaped combustion chambers and valves for each cylinder.

Cooling: A centrifugal blower, vertically mounted on top of crankcase cover, and operating on a permanently lubricated ball bearing delivers cooling air downward over cylinder walls and heads. Sheet metal shrouding attached to engine forms a plenum chamber and directs the flow of air. A thermostatically operated cooling valve located in lower part of plenum chamber regulates engine cooling by controlling the air flow.

Lubrication: A spur gear oil pump delivers oil under a maximum pressure of 35 lbs., controlled by an oil pressure regulator, through a full flow type oil filter and an air cooled oil cooler to passages in engine block. Oil is then directed to hydraulic lifters, rocker arm assemblies, main bearings, connecting rod bearings and camshaft bearings. Cylinder walls are spray lubricated from connecting rods and the piston pins and timing gears are lubricated by "splash" from rotating parts.

Engine Specifications

Engine	Bore	Stroke	Displacement
All	3.375"	2.260"	140 cu. ins.
Engine	**Compr. Ratio**	**Rated HP**	**Developed HP**
Std.	8.0-1	27.3	80 at 4400 RPM
High Perf.Ⓒ	8.0-1	27.3	95 at 4800 RPM

Ⓒ - Different camshaft, carburetors, and other parts.

Compression & Vacuum Reading - *See TUNE-UP.*

►*HIGH PERF. ENGINE CYLINDER HEAD NOTE:* Different cylinder head used on this engine to accommodate different valve spring shims.

ENGINE REMOVAL: *See "Power Train" in Corvair Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Corvair Special Data.*

ENGINE MOUNTS: *See "Engine Service" in Corvair Special Data.*

CRANKCASE COVER, BLOWER & BLOWER BEARING: *See "Engine Service" in Corvair Special Data.*

OIL COOLER: *See "Engine Service" in Corvair Special Data.*

CYLINDER HEAD: *See "Engine Service" in Corvair Special Data.*

EXHAUST MANIFOLD: *See "Engine Service" in Corvair Special Data.*

CRANKCASE & CYLINDER HEAD STUDS: *See "Engine Service" in Corvair Special Data.*

OIL PAN REMOVAL: Drain crankcase and remove oil pan retaining bolts. Remove pan.

CYLINDER

Individual cast iron type with integral cooling fins. Replacement cylinders are furnished only as an assembly with piston and pin.

Bore - 3.3745-3.3775". Maximum wear limit .005".

Removal - *See "Engine Service" in Corvair Special Data.*

PISTONS

Aluminum alloy, tin plated, slipper type skirt with steel strut. Piston pin is offset toward major thrust side.

Removal - Piston and rod removed as an assembly with cylinder. *See "Engine Service" in Corvair Special Data.*

Clearance - .0011-.0015" measured 2.20" from top of cylinder bores.

Installing Pistons: Install piston with notch on top of piston toward front (flywheel end) of engine on both banks.

Replacement Pistons: Standard size only. Piston, pin, and cylinder are furnished as a complete assembly.

PISTON PIN

Pin is press fit in connecting rod.

Diameter - .7999-.8002". **Length** - 2.630-2.650".

Pin Fit in Piston - .00015-.00025". With piston and pin at 70°F and light film of oil on pin, pin should support own weight in either piston pin boss.

Pin Fit in Connecting Rod - Press fit. *See "Engine Service" in Corvair Special Data.*

Replacement Pins: Standard size only furnished in assembly with piston and cylinder.

PISTON RINGS

Compression rings are cast alloy iron with wear resistant coating. Oil ring is a single piece, uncoated, with a slotted expander.

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0770-.0780"	.010-.020"	.0012-.0032"
Oil (3)	.1860-.1865"	.010-.020"	.002-.0035"

Installing Rings - Install rings with identification marks and inside bevel toward top of piston.

Replacement Rings: Furnished Standard size only.

CONNECTING ROD

Length - 4.719-4.721" center-to-center.

Journal Diameter - 1.799-1.800".

Lower Bearing - Replaceable precision type.

Clearance - .0007-.0027".

Side play - .005-.010".

Bearing Replacement: Furnished Std., .001", .002", .010", & .020" Undersize, To replace bearings, *see "Engine Service" in Corvair Special Data.*

Installing Rods: No squirt hole. Install in either direction.

CRANKCASE

Cast aluminum alloy, vertically divided into two halves. *See "Engine Description" above.* Studs for mounting cylinders, cylinder heads, rocker arms, and rear housing are mounted in each half and are replaceable. Crankcase must be separated for service on either crankshaft or camshaft.

Crankcase Separation: Crankcase can be separated after removal of cylinder heads, cylinders, rear housing, and clutch housing. *See "Engine Service" in Corvair Special Data.*

Stud Replacement: *See "Engine Service" in Corvair Special Data.*

CRANKSHAFT

Journal Diameter - 2.0978-2.0988".

Bearings - Steel backed babbitt precision type. No adjustment.

Clearance - .0012-.0037".

Bearing Replacement: Furnished Std., .001", .002", .010", & .020" Undersize. To replace bearings, crankcase must be separated. *See "Engine Service" in Corvair Special Data.*

End Thrust - Taken by flanged type No. 1 (rear) main bearing (at accessory drive end of engine).

Endplay - .002-.006".

Crankshaft Front & Rear Oil Seals: *See "Engine Service" in Corvair Special Data.*

Vibration Damper: None used.

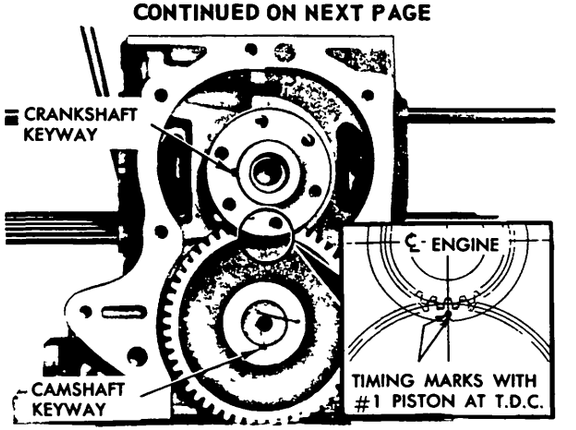
Crankshaft Drive Flange: Integral with steel timing gear. Pressed on crankshaft. *See "Engine Service" in Corvair Special Data.*

CAMSHAFT

Alloy cast iron camshaft located below crankshaft on split line of engine. Camshaft journals ride directly on machined base metal of crankcase and bearing inserts are not used. Exhaust valve lobes are twice the width of intake lobes and actuate a pair of exhaust valve lifters.

►*HIGH PERF. ENGINE NOTE:* Special camshaft, Part No. 3777255, used in this engine. **Do not** interchange with Std. Engine Camshaft, Part No. 6255609.

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CORVAIR VALVE TIMING MARKS

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Journal Diameter - 1.4395-1.4405" (front), 1.1995-1.2005" (all others).
Clearance - .0015-.0035" (new), .002-.004" (used). *NOTE - If beyond the above limits, replace either crankcase or camshaft.*
End Thrust: Controlled by thrust washer located between camshaft gear and front bearing.
Endplay - .002-.007".
Camshaft Removal: Crankcase must be separated. See *"Engine Service" in Corvair Special Data.*

Timing Gear: Aluminum, with steel crankshaft gear, pressed on camshaft. Replace gears in matched sets only. To remove gear, remove camshaft and see *"Engine Service" in Corvair Special Data.*
Backlash - .002-.004".
Camshaft Setting: Align notch in crankshaft gear flange with mark in camshaft gear adjacent to each other across shaft centers. Notches can be aligned only when crankcase reassembled. See *"Engine Service" in Corvair Special Data.*

VALVES

Valve	Head Diam.	①Stem Diam.	Length
Intake	1.335-1.345"	.3415-.3422"	4.489-4.509"
Exhaust	1.235-1.245"	② .3410-.3417"	4.494-4.514"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°③	.314"	.0010-.0027"
Exhaust	45°③	.344"	.0015-.0032"

① - Standard. Also furnished .003" & .010" Oversize.
② - Top of stem. .3400-.3407" at bottom of stem. *NOTE - Valve stems are tapered .001".*
③ - Valve face angle 45°.
Valve Seat Width - 1/32-3/32" Intake, 1/16-1/8" Exhaust.
Valve Seat Inserts: Steel, not replaceable.
Valve Guides: Pressed into cylinder head. Not replaceable. Guides may be reamed for oversize valve stems if valve clearance excessive. Valves with oversize stems furnished .003" and .010" oversize. Use Reamer Set J-5830-01.
Valve Springs: Spring must be installed with a hardened shim (minimum .020") under it to protect aluminum head.
Free Length - 1.74" (Std. Eng.).

Spring Specifications - Std. Engine

Valve	Lbs. Pressure	Length
Closed	58-64	1.508"
Open	141-149	1.148"

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from top of spring shim on cylinder head to top of valve spring. If this dimension exceeds 1 15/32" Intake, 1 1/2" Exhaust, install additional 1/32" shim, Part No. 6255818 (Std. Eng.), No. 3731058 (High Perf. Eng.) to bring installed height to preferred 1 7/16" Intake, 1 15/32" Exhaust.
Pushrods: Externally mounted type between cylinder head and crankcase and enclosed in drain tubes. For servicing, see *"Engine Service" in Corvair Special Data.*
Valve Lifters: Hydraulic. See *"Engine Service" in Corvair Special Data.*
Rocker Arms: Mounted individually on cylinder-cylinder head studs.

VALVE TIMING

See *"Camshaft Setting" under CAMSHAFT above.*

Valve Timing Specifications - Std. Eng.
Intake Valves - Open 43° BTDC. Close 71° ALDC.
Exhaust Valves - Open 87° BLDC. Close 47° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Corvair Special Data.*
Crankcase Capacity: 4 qts. refill, 5½ qts. dry engine. Add 1 pt. with filter change.
Normal Oil Pressure: 35 lbs. at 2000 RPM.
Pressure Relief Valve - In pump body. Not adjustable.
Oil Pressure-Temperature Indicator: Light on instrument panel controlled by Oil Pressure Switch, Part No. 3751700, and Oil Temperature Switch, Part No. 1998713. Light comes on when ignition switch turned on but goes off during normal engine operation. Light comes on if oil pressure low or if engine (oil) temperature goes above 280-300°F.
►*PRESSURE & TEMPERATURE SWITCHES INSTALLATION CAUTION:* Switches are grounded through threads of body. **Do not** coat these threads with sealer or anti-seize compound. Torque pressure switch to 45-65 **inch-lbs.** and temperature switch to 35-45 **inch-lbs.**
Oil Filter: Full flow type. Replace element every 4000 miles. Use a new seal and tighten center bolt to 9-15 ft. lbs.
Replacement Filter Element - AC No. PF-4.
Oil Pump: Gear type pump located in engine rear housing and driven by distributor shaft.
Pump Overhaul - See *"Engine Service" in Corvair Special Data.*
Oil Cooler: Located at rear of engine left side shield. Clean every 5000 miles by removing access cover and removing dirt, twigs, etc.
Crankcase Ventilation: Air intake through crankcase breather cap and an outlet in crankcase top cover.

COOLING

Air cooled. See *"Engine Description" above.*
Thermostat: Bellows type mounted on crankcase between No. 2 and No. 4 cylinders in air exhaust duct passage. Thermostat operates cooling air valve in and out of eye of blower to control cooling air flow. Bellows opens at 177-183°F. If bellows fails, cooling air valve will remain open.
Adjustment - Pull up on thermostat rod until bellows is stopped within its mounting bracket with rod swivel connected to hinge lever. Adjust swivel so distance from top of blower housing to top edge of air valve is 1½" measured at point of highest travel below centerline of air horn. *CAUTION - Pull on thermostat rod only, but do not pull after bellows is stopped as rod will be pulled off retaining clip.*
Temperature Gauge: Engine temperature is indicated by temperature of lubricating oil. See *"Oiling System" above.*

CLUTCH

Borg & Beck. Single plate, dry disc type with starter ring gear mounted on clutch cover.

Cover No. - Chevrolet No. 6257954 (All).

Disc. No. - Chevrolet No. 3779872 (Std. Eng.), No. 3784299 (High Perf. Engine).

►*NOTE: Clutch service as an assembly only.*

Clutch Linkage Adjustment (Pedal Free Play): *NOTE - Clutch pedal should have at least ¾" travel (freeplay).* Disconnect clutch fork pull rod from cross shaft lever, then with return spring connected in lower hole of cross shaft lever, adjust clevis swivel (connected to clutch pedal cable) until there is 1/8-3/8" clearance between cross shaft lever (pull rod lever) and rear edge of cross shaft bracket. Pull clutch fork pull rod forward until slack is taken up and clutch release bearing is touching clutch diaphragm fingers. Hold in this position and adjust swivel on end of pull rod until swivel pin aligns with upper hole in cross shaft pull rod lever. Back off swivel **three complete turns** and assemble to lever.

Removal: Remove power train from car, see *"Power Train" in Corvair Special Data.* Separate the transaxle from engine, see *"Corvair Transaxle" in Transmission Section.* Install Pilot Tool J-5824 to support clutch and loosen clutch attaching bolts slowly and evenly until all pressure released. Remove tool and clutch.

TRANSAXLE

SYNCHRO-MESH TRANSMISSION

Own. Three-speed synchro-mesh type integral with rear axle differential carrier.
See "Corvair Transaxle" in Transmission Section.
Lubrication - *NOTE - Synchro-mesh transmission and rear axle differential carrier assembly are connected by internal passages.* Check fluid level every 1000 miles. Drain and refill every 10,000 miles. Use only SAE 80 "Multi-Purpose" gear lubricant. *CAUTION - Do not use "Mineral Oil" gear lubricants or any "active sulphur soap" lubricants.*
Checking Lubricant Level - With unit at normal operating temperature, check fluid level in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential carrier, also check level in transmission. *NOTE - With unit at operating temperature, fluid should be level with bottom of filler plug. If unit is cold, fluid should be ½" below filler plug hole.*
Draining & Refilling - Remove drain plug in transmission housing and in differential carrier housing. *NOTE - Transmission drain plug is on left side adjacent to idler arm on side of transmission case.* Refill by adding lubricant to both units (5 pints total). Check level at both units after refilling.
Transmission Shift Linkage Adjustment: See *"Corvair Transaxle" in Transmission Section.*
Removal: Remove power train from car and then separate transaxle assembly from engine. See *"Power Train" in Corvair Special Data and "Corvair Transaxle" in Transmission Section.*

POWERGLIDE TRANSMISSION

Three element torque converter and a hydraulically operated two-speed automatic transmission integral with rear axle differential carrier.
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Corvair Transaxle" in Transmission Section.*
►*TESTING & TROUBLE SHOOTING: See "Corvair Transaxle" in Transmission Section.*
Lubrication - Check fluid level in transmission every

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1000 miles. Add fluid when level reaches "Add" mark on dipstick (one pint low). Use Automatic Transmission Fluid Type "A" (Suffix "A"). Draining and refilling of transmission is not recommended except at time of transmission overhaul.

Capacity - 6 pints (converter not drained); 13-14 pints (converter drained).

Ch cking Fluid L vel - With transmission at normal operating temperature and transmission selector lever in "N" position, engine idling, check fluid level on dipstick in filler tube at right side of engine near firewall. Add fluid as necessary to bring level to "Full" mark on dipstick, using Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic Transmission Fluid Typ "A" may be substituted if necessary.*

Draining & Refilling - *NOTE - Not required except at time of transmissi n verhaul.* Drain oil by loosening filler tube attaching nut in oil pan. Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel J-4264. Start engine and allow to idle 3-5 minutes in "N", then add sufficient oil to bring level to "Full" mark.

Thr ttl Linkage Adjustm nt: *See "Accelerator Control Linkag Adjustm nt" und r CARBURETOR above.*

R m val: Remove power train from car and then separate transaxle assembly from engine. *See "Power Train" in Corvair Sp cial Data and "Corvair Transaxle" in Transmission Section.*

►*OTHER DATA: S "C rvair Transaxle" in Transmission S cti n.*

DIFFERENTIAL CARRIER

Own. Straddle mounted hypoid gear type of new design with transmission input and output shaft running axially through differential pinion shaft.

Axl Rati - 3.55-1 (32-9), Standard. 3.89-1 (35-9), Optl.

Lubricati n - Check fluid level every 1000 miles. Drain and refill every 10,000 miles. Use only SAE 80 "Multi-Purpose" gear lubricant. *CAUTION - Do not use "Min-ral Oil" g ar lubricants r any "active sulphur soap" lubricants.* On synchro-mesh cars, the differential carrier and transmission assemblies are connected by internal passages and the same lubricant is used in both units. On Powerglide cars, the differential carrier and transmission are sealed from each other and different lubricants are used. Different procedures are required as follows:

Ch cking, Draining & Refilling (Synchro-mesh Cars) *See "Synchro-mesh Transmission" above.*

Ch cking Lubricant Lev l (Powerglide Cars) - With unit at normal operating temperature, check fluid level in differential carrier (plug is adjacent to rear axle universal joint on left side of transmission case). *NOTE - With unit at p rating temperature, fluid level should b lev l with b tt m of filler plug hole. If unit is cold, l v l sh uld be ½" below filler plug hole.*

Draining & Refilling (P w rglid Cars) - Drain carrier housing and replace drain plug. Refill housing with 3.1 pints of recommended gear lubricant.

Axle Shaft Removal: Remove wheel and brake drum, then remove four nuts securing axle bearing retainer to backing plate. *NOTE - Nuts are accessible through hole in axle shaft flange.* Pull brake backing plate slightly outward, then push it back onto control arm studs to break it away from bearing retainer. Pull axle outward to free universal joint splines from side gears in rear axle. Remove universal joint from yoke on axle shaft, then remove yoke from axle shaft with Tool J-5504. Remove axle shaft from lower control arm.

Carrier Removal: Remove power train from car and then separate transaxle assembly from engine. *See "Power Train" in Corvair Special Data and "Corvair Transaxle" in Transmission Section.*

Rear Axle Universal Joints: Disassemble, clean, and repack joints every 25,000 miles.

REAR SUSPENSION

Independent control arms at each side, connected to crossmember. Shock absorbers are mounted within rear coil springs and are connected to control arm and rear suspension crossmember.

See "Corvair Rear Suspension" in Suspension & Wheel Alignment Section.

►*REAR SUSPENSION ADJUSTMENT NOTE: The only adjustment required for rear suspension is "Toe-In" as indicated below.*

Toe-In - 0-¼" (total toe-in). To check, back car onto "drive-on" type equipment. Toe-in will be read as "toe-out" with car backwards as readings will be taken from rear of tires.

Camber - 1½° ±½°. Not adjustable.

FRONT SUSPENSION

Independent "Ball-Joint" type with direct acting shock absorbers mounted within front coil springs.

See "Corvair Front Suspension" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 7°±½° at 0° camber.

Caster - Pos. 4°+0°,-½°. Caster should be equal within ¼° on both sides of car.

Camber - Pos. ½°±½°. Camber should be equal within ¼° on both sides of car.

Toe-In - 3/16"+0", -1/16" (one wheel), 3/8"+0", -1/8" (two wheels)

Toe-Out on Turns - With inner wheel at 33¾°, outer wheel should be at 30½°.

Wheel Bearing Adjustment: Tighten adjusting nut to **80 inch-lbs.** torque while rotating wheel, then back off nut 1/6 turn (1 flat). If slot in nut does not line up with hole in spindle, back off nut not more than 1/12 turn or 1/2 flat to line up nearest slot with hole. Install cotter pin. *NOTE* - This adjustment will provide zero preload and .000-.004" freeplay.

SHOCK ABSORBERS

D lc . Direct acting, non-adjustable.

R plac ment Shock Absorbers - Chevrolet No. 5552308 Front, No. 5552309 Rear

Rear Shock Absorber Replacement - *See "Corvair Rear Suspension" in Suspension & Wheel Alignment Section.*

STEERING

Saginaw Ball Bearing Worm & Nut. Recirculating ball type similar to that used on other Chevrolet models. *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Chevrolet-Bendix. Duo-Servo single anchor hydraulic, without anchor pin adjustment. Hand lever applies rear wheel service brakes. Lining is bonded to shoes.

See "Chevrolet-Bendix Hydraulic Brakes" in Brak Section.

►*REAR BRAKE ANCHOR PIN TORQUE SPECIFICATION CHANGE: Torque rear anchor pin to 100-126 ft. lbs. Supersedes previous 60-85 ft. lbs.*

Drum Diameter - 9" (front & rear).

Wheel Cylinder Diameter - .875" (front), .9375" (rear).

Brake Lining

	Front & Rear Wheels	
	Primary Shoe	Secondary Sh
Thickness	.160"	.160"
Length	7.85"	9.42"
Width	1.75"	1.75"

Clearance - Adjusting screw backed off 12 notches (front), 15 notches (rear) from a heavy drag position.

Standard Master Cylinder: Located in trunk compartment in line with brake pedal.

Checking Fluid - Maintain level of fluid even with cast boss on inside of cylinder casting. Use only G.M. Hydraulic Brake Fluid Super No. 11.

Pedal Pushrod-to-Master Cylinder Clearance - Loosen locknut on swivel (connecting pedal to pushrod) and turn pushrod to obtain a movement of 1/8" to 3/8" at pedal pad before pushrod end contacts main cylinder piston. Tighten locknut.

Removal - Disconnect hydraulic lines from master cylinder and remove brake pedal return spring. Remove retaining nuts and remove master cylinder-pedal assembly.

MISC. MECHANICAL

Windshield Wiper: Single speed electric type. *See "Windshield Wipers" in Miscellaneous Section.*

Windshield Washer: Electric type. *See "Windshield Washers" in Miscellaneous Section.*

Heater: Gasoline type. *See "Corvair Gasoline Heater" in Miscellaneous Section.*

TIGHTENING SPECIFICATIONS

1954-56 MODELS

	Ft. Lbs.
Cylinder Head	60-70
Intake Manifold (Bolts & Nuts)	22-26
Exhaust Manifold (Bolts & Nuts)	22-26
Oil Pan	9-11
Main Bearing Caps (except Rear)	100
Main Bearing Caps (Rear)	140
Flywheel	85-95
Crankshaft Pulley	45-50
Con Rod Caps	40-50
Camshaft Sprocket & Pump Eccentric	14-17
Rocker Arm Support Brackets	14-17
Engine Front Cover (⅜ & 7/16" Bolts)	30-35
Water Manifold	22-26
Oil Pump Mounting	11-14
Oil Filter to Cylinder Block	30-35
Oil Filter Housing to Base	40-45
Oil Filter Pad Cover	30-35
Flywheel Lower Housing	50-55
Transmission Mounting	60-70

1957-60 MODELS

	Ft. Lbs.
Cylinder Head	60-80
Intake Manifold (Bolts & Nuts)	22-34
Exhaust Manifold (Bolts & Nuts)	19-25
Oil Pan	10-18
Main Bearing Caps (Exc. Rear)	90-120
Main Bearing Cap (Rear)	130-160
Flywheel	85-95
Crankshaft Pulley	100 Min.
Con Rod Caps	38-48
Camshaft Sprocket & Pump Eccentric	14-22
Rocker Arm Support Brackets	14-22
Engine Front Cover	24-40
Oil Pump Mounting	11-14
Oil Filter To Cylinder Block	28-38
Oil Filter Housing Bolt (1957-58)	40-45
Oil Filter Housing (1959-60)	Hand Tight
Flywheel Lower Housing	50-55
Transmission Mounting	60-70

ENGINE MOUNTING

1954-56 MODELS

FRONT ENGINE MOUNT INSTALLATION: Cap screws fastening mounting to frame or bracket should first be screwed finger tight, then tightened alternately, one turn at a time. DO NOT TIGHTEN ONE CAP SCREW IN POSITION INDEPENDENTLY OF THE OTHER, since lower portion of asssembly would not seat evenly in upper portion. Front mounting must be properly positioned and tightened, otherwise mounting will not function properly as an insulator.

OIL PAN

1954-58 MODELS

OIL PAN REMOVAL: Remove starter and exhaust cross-over pipe. Disconnect idler arm from frame and drop steering relay rod. Remove oil pan cap-screws and withdraw pan.

Installation: Cement new cork gaskets to pan, assemble front and rear synthetic seals to pan. Place coat of graphite grease on exposed surface of seals to insure that seal maintain their proper position in pan and do not hang up on front cover and main bearing sealing surfaces during oil pan installation.

CYLINDER HEAD & MANIFOLD

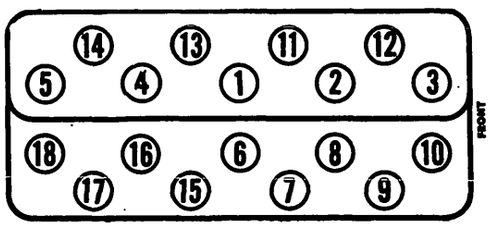
1954-60 MODELS

CYLINDER HEAD: Removal - Drain radiator and cylinder block. Remove intake manifold and generator, disconnect exhaust pipes. Remove valve covers. On air conditioned cars, remove compressor bracket attaching bolts and tip compressor to rear to remove right valve cover. On power steering cars, remove pump mounting bracket bolts and move assembly to one side to remove left valve cover. Remove rocker arm shaft assembly. Disconnect ground strap from rear of head. Rock pushrods to break oil seal between rod and lifter seat (to avoid pulling lifter from bore), then remove pushrods and remaining cylinder head bolts. Remove cylinder head with exhaust manifold attached.

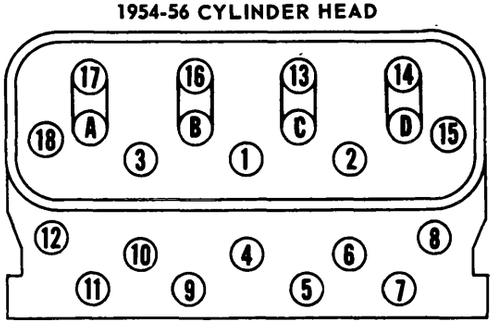
On Air Conditioned Cars - To remove right cylinder head, proceed as follows: Loosen and remove all cylinder head bolts. *NOTE - No. 17 & 18 bolts cannot be removed because of blower duct assembly.* Position rocker arm shaft away from head and remove pushrods. Tip No. 15 & 16 rocker arms to vertical position, tip their pushrods to within ½" of blower duct and tape in position. Remove oil dipstick tube. Lift head, rocker shaft assembly and exhaust manifold off dowel pins, then move down and forward to clear blower duct.

1954-56 MODELS

Installation - Use cylinder head guide studs and coat both sides of gasket with P.O.B. No. 3 Sealer. Place head in position over gasket, install pushrods and rocker arm shaft assembly with pushrods seated in rocker arms and lifters. Tighten rocker arm shaft bracket bolts (No. 1 through No. 5) and cylinder head bolts (No. 6 through No. 18) to specifications and in sequence shown in diagram.



1954-56 CYLINDER HEAD



1957-60 CYLINDER HEAD

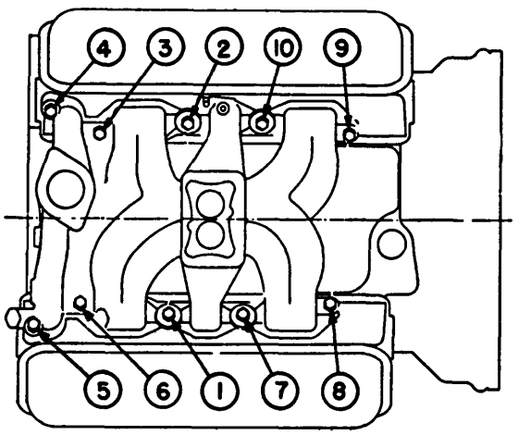
1957-60 MODELS

Installation - *NOTE* - When new cylinder head is installed on left hand bank, engine unit number must be transferred to new head. Use Guide Studs J-3455 and apply P.O. B No. 3 sealer to both sides of gasket. Place gasket and head over studs and tighten all bolts snug. Tighten **Numbered** bolts in sequence indicated in diagram to 50-60 ft. lbs. Tighten **Lettered** bolts in sequence shown in diagram to 14-22 ft. lbs. Retighten **Numbered** bolts in correct sequence to 60-80 ft. lbs. Retighten **Lettered** bolts in correct sequence to 14-22 ft. lbs.

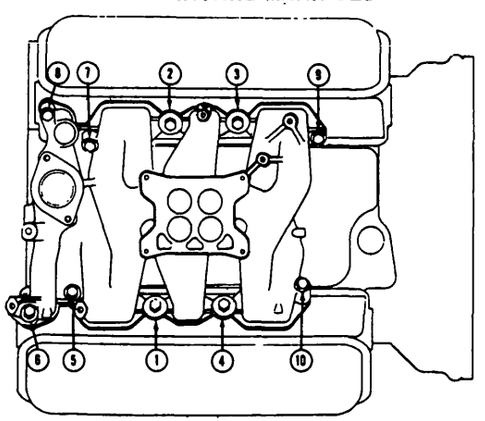
1954-60 MODELS

INTAKE MANIFOLD: Removal - Drain radiator, disconnect upper radiator hose from water outlet. Remove air cleaner and disconnect spark plug wires and throttle linkage. Remove fuel and vacuum lines that interfere with manifold removal and disconnect primary coil wire and remove ignition wires from resistor. On power steering cars, disconnect power steering pump and bracket as an assembly. On air conditioned cars, remove external fuel filter. Disconnect generator, then

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1954-56 INTAKE MANIFOLD



1957-60 INTAKE MANIFOLD

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remove attaching bolts and tip compressor and bracket rearward to obtain clearance for manifold removal. Remove intake manifold with coil and carburetor attached. Clean cylinder head and manifold machined surfaces.

Installation - Reverse removal operations using new graphite coated metal gaskets. Apply Permatex No. 3 sealer or equivalent around gasket water holes. Dip manifold bolts in C.P. No. 9 sealer, install bolts and nuts and torque to specifications. Adjust power steering belt tension, adjust throttle linkage.

CRANKSHAFT & MAIN BEARINGS

1954-60 MODELS

REAR MAIN BEARING OIL SEAL: Asbestos covered wiper seal installed in rear groove in bearing cap and block (oil slinger operates in front groove).

Oil Seal Installation - With crankshaft out of engine and bearing cap off, use a new seal coated with graphite grease, and crowd it by hand into rear groove in cap and block. Drive seal tightly into place by tapping Tool BT-12 (1954-56), Tool 23-14 (1957-58), Tool 23-18 (1959-60), with a hammer. Seal is correctly installed when relieved section of tool will pass over seal when full diameter of tool is moved across cap. Hold tool tightly against seated seal and cut flush with parting line between upper and lower bearing. *NOTE* - Ends of seal must be cut clean (no frayed ends) and seal must entirely fill groove. After bearing cap installed, wipe Dupont Cement No. 5402 in groove in block on both sides of bearing cap and press two cork seals into place in grooves.

ENGINE FRONT COVER

1954-58 MODELS

ENGINE FRONT COVER (Removal): Disconnect lower radiator hose and heater hose from front cover and disconnect generator link at generator. Remove oil pan and remove the two bolts attaching front engine mount to frame. Support engine with Special Tool BT-29 (engine must clear front cross member). Remove radiator assembly, fan blades and pulley and crankshaft pulley. Remove fuel and vacuum pump assembly. Remove front cover attaching bolts and front cover. Reverse removal sequence to install cover, using a new gasket coated on one side with gasket cement. Lubricate sealing surface of front oil seal and fuel pump operating arm. Dip attaching cover bolts in POB No. 3 sealer.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: ***(NOTE—Front cover oil seal can be replaced without removing front cover by using Tool J-4176).*** Remove crankshaft pulley and replace large capscrew in crankshaft end. Place fingers of Tool J-4176 over end of crankshaft and turn tool fingers so that hooks will pass through clearance between crankshaft end and inner diameter of front oil seal, (some light taps on tool center screw will force fingers behind rubber ring of oil seal). Use an end wrench on fixed nuts below puller plate and rotate each finger outward 90° to engage the finger hooks with ring of oil seal, then tighten nuts on upper plate for puller to hold fingers in position. Rotate puller center screw against crankshaft screw and remove seal.

Installation - Use Tool J-4177 to replace seal in cover, first coating outside diameter of seal with P.O.B. No. 3 and sealing lip with special lubricant Part No. 567196. Place seal in cover, then assemble adapter ring and driver so slot in driver will clear crankshaft key. Drive seal into place until adapter bottoms on cover face.

1959-60 MODELS

ENGINE FRONT COVER: Removal - Drain cooling system and disconnect lower radiator hose and heater hose from front cover. Disconnect generator link at generator and remove front engine mount to crossmember nuts. Use Tool J-8568 to raise engine to clear bolts of crossmember, then insert wood block 8" x 2" x 4" between each exhaust manifold and upper control arm and allow engine to rest on 2 x 4's. Remove oil pan, radiator assembly, fan blades and pulley, then remove crankshaft pulley. Remove distributor cap and rotate engine until rotor points toward cowl, then remove fuel pump assembly. Remove front cover attaching bolts and front cover assembly.

Installation - Reverse removal procedures and tighten belts to gauge line on Tool 33-70. *NOTE* - Use a new front oil seal and coat fuel pump rocker arm pad with Special Seal Lubricant Part No. 567196. Front cover bolts should be dipped in P.O.B. No. 3 Sealer and torqued to specifications. Coat on side of fuel and vacuum pump gasket with gasket cement such as P.O.B. No. 4.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: *NOTE - Front cover oil seal can be replaced without removing radiator or crankshaft pulley key as follows:* Remove crankshaft pulley and thread Pilot Bolt J-7583-3 into crankshaft. Thread Tool J-7583-1 into oil seal and then tighten Forcing Screw J-7583-2 until seal is free from front cover. Remove seal from tool and pilot bolt from crankshaft.

Installation - *NOTE - Two types seal (½" & ¾" thick) used in production. Both seals can be installed with Seal Installer J-7584-1 and Adapter Ring J-7584-2 must be used with ¾" seal.* Coat outer diameter of seal with P.O.B. No. 3 sealer and lips of seal with Special Lubricant, Part No. 567196. Position seal in front cover. If ¾" seal used, place Adapter Ring J-7584-2 between Installer J-7584-1 and seal. Place Installer over seal and thread Forcing Screw J-7584-3 into crankshaft until Installer contacts front cover. Remove tools and install pulley and belts.

FLYWHEEL HOUSING

1954-55 MODELS

LOWER FLYWHEEL HOUSING ALIGNMENT: It will always be necessary to carefully check alignment of block and lower bell housing whenever original housing is replaced. Misalignment will be evident in one or both of two conditions; step between rear surfaces of block and lower housing resulting from location of housing too far forward or rearward on block, or a non-parallel condition resulting from either block or lower housing being slightly out-of-square. To insure proper alignment on replacement, proceed as follows:

1) Remove two dowels which serve to align original lower housing with block, install and tighten clutch (flywheel bell) housing to block, place lower flywheel housing in its proper position so that it is flat against clutch housing and contacting cylinder block; then tighten bolts securing lower flywheel housing to clutch housing.
2) Using feeler gauge, check to see if lower housing and block are square with each other, and if not, install proper thickness shims (as near bolts as possible) to properly align parts. If more than .010" of shims required, use different flywheel housing. Tighten lower flywheel housing-to-cylinder block bolts. If all bolts properly tightened it will not be necessary to re-dowel between block and lower housing.
3) If dowels not used to maintain alignment, foregoing procedure will have to be followed when lower housing is removed and replaced.
4) Lower housing to cylinder block alignment can be checked after assembly by removing clutch (flywheel) housing and laying straight-edge along rear surface of block and lower housing. NOTE—Use care not to disturb lower housing when clutch housing removed and replaced.

1954-55 MODELS

CLUTCH (FLYWHEEL BELL) HOUSING ALIGNMENT: Mark flywheel and crankshaft for identification during assembly. Proceed as follows:
1) Support engine by oil pan flanges for alignment of flywheel housing. NOTE—When using engine stand, engine can be supported at front and rear of block. **Do not support on flywheel housing.**
2) With flywheel and crankshaft assembled in place, assemble clutch (flywheel bell) housing onto engine block and tighten housing attaching bolts sufficiently so housing can be shifted by tapping with lead hammer.
3) Install lower flywheel housing and tighten in place. CAUTION—Lower flywheel housing **must be in place when aligning clutch housing.** Install dial indicator, pilot shaft and strap.
4) With dial indicator stem positioned against rear face of clutch housing at approximately 2¼" radius from center line of crankshaft, revolve flywheel 360°. If reading exceeds limits, shim as necessary between housing and engine block to bring within limits. CAUTION—Be sure indicator button is kept clear of oil groove in housing.
5) Assemble dial indicator to pilot shaft using attachment, check radial runout of housing bore, attach flywheel turning tool J-4772 to lower housing to turn flywheel.
6) Shift housing as necessary with lead hammer to bring within limits. Tighten housing to block bolts to 50-55 ft. lbs. torque, recheck limits.
7) Using reamer J-4832-3 and ratchet wrench J-808-6 ream two engine block-to-clutch housing dowel pins, Part No. 557754. After dowel pins installed check to see that dowel pins do not protrude inside housing and interfere with flywheel. Clean all cutting from housing.

1956 MODELS

SYNCHRO-MESH & "DUAL RANGE" HYDRA-MATIC

LOWER FLYWHEEL HOUSING ALIGNMENT: *(NOTE* - Misalignment is evident as a "step" between block and lower housing resulting from location of housing too far forward or rearward on block). To correct misalignment, elongate dowel pin holes so as to allow lower housing to move to rear or front as required. Do not remove dowel pins or enlarge dowel pin holes with an oversize drill, as correct side-wise location of lower housing

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must be maintained for proper engagement of starter pinion and ring gear.

REAR FLYWHEEL HOUSING ALIGNMENT: Loosen capscrews slightly. Remove dowel pins, then shift housing with a lead hammer to bring within limits. *(NOTE* - On Synchro-mesh cars it will be necessary to remove rear housing and saw off dowel pins close to block before driving pins through). After aligning housing, again tighten housing attaching bolts and recheck radial runout. Using Reamer J-4832-3 and ratchet wrench J-808-6, ream two engine block-to-rear housing dowel pin holes. Finish ream with reamer J-4832-4 and install oversize dowel pins, Part No. 557754, with large chamfer end out. *(NOTE* - Above reamers must be shortened to 4" over-all length if operation is to be performed with housing in car).

REAR FLYWHEEL HOUSING ALIGNMENT CHECK: *NOTE* - It is not necessary to have lower housing in place during this check.

1) Install pilot mounting strap J-2548 on flywheel. Install rear housing and tighten bolts. Install pilot shaft and mount dial indicator. Tap crankshaft to rear of engine.

2) Using large button on dial indicator, install indicator assembly so button contacts face of housing with approximately .015" compression With dial indicator positioned against rear face of housing (2 3/4" radius on Hydra-Matic & 2 3/8" radius on Synchro-mesh, from centerline of crankshaft) revolve flywheel 360° and note indicator reading Limits for this reading are not to exceed .003" on indicator within 360°. If reading exceeds limit, shim as necessary between housing and engine block to bring within limits

3) Assemble dial indicator to pilot shaft using attachments 8-50 and 8-51, then check radial runout of housing bore as follows. Mark flywheel housing with pencil or chalk to indicate horizontal and vertical positions. With indicator positioned at zero at either horizontal mark, rotate flywheel 180°. Indicator reading at this opposite point must not exceed 004" plus or minus. With indicator positioned at zero at top mark, rotate flywheel 180°. Indicator reading at bottom must be between .000" and minus 008".

4) If not within above limits, proceed with Rear Flywheel Housing Alignment above

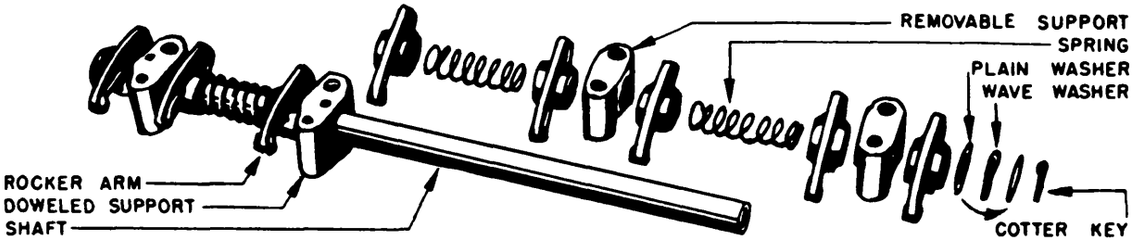
CAMSHAFT & BEARINGS

1954-60 MODELS

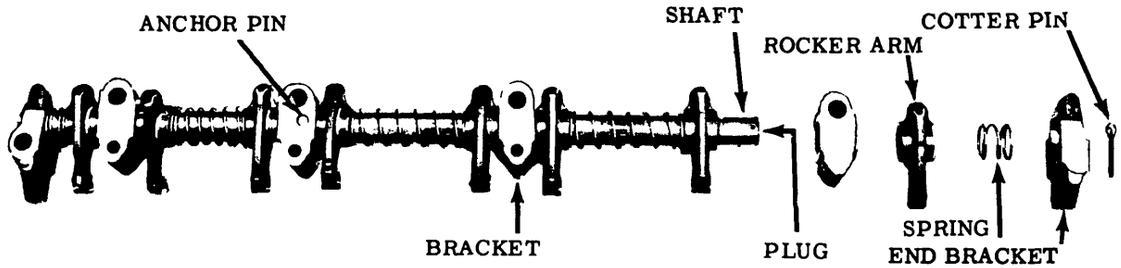
CAMSHAFT: Removal - Remove valve lifters, *see "Hydraulic Lifters"* Remove distributor and engine front cover, *see "Engine Front Cover"* Remove camshaft assembly, fuel pump eccentric, camshaft sprocket and timing chain Slide camshaft out front of engine carefully

Installation - *NOTE* - Always replace camshaft when installing new bearings which DO NOT require line reaming Coat camshaft liberally with engine oil mixed with G M Concentrate Part No 567725

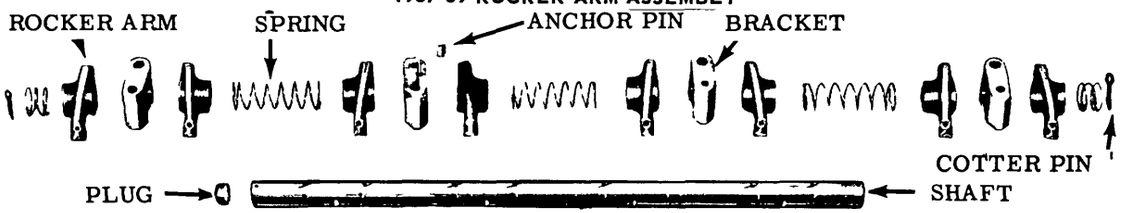
Camshaft Bearings - Removal & Installation - *NOTE* - Replacement bearings do not require line reaming Use Tool Set J-4476 to remove and install bearings without removing camshaft plug at rear of block DO NOT DISTURB PLUG



1954-56 ROCKER ARM ASSEMBLY



1957-59 ROCKER ARM ASSEMBLY



1960 ROCKER ARM ASSEMBLY

VALVE SYSTEM

ROCKER ARMS

1954-56 MODELS

ROCKER ARM SHAFT ASSEMBLIES: Identical hollow steel tube shafts (ends plugged) are used. Four removable supports for each shaft, one support doweled to shaft for oil feed (at oil line from #2 camshaft bearing on left side, from #4 camshaft bearing on right side) Three springs used to position center rocker arms against supports. End rocker arms retained by wave washer, flat washer, and cotter key.

Rocker Arm Shaft Disassembly: With assembly off engine, remove cotter key and washers from end of shaft. Remove rocker arms, supports (except doweled support which should not be removed from shaft), and springs.

►***CAUTION—Rocker arms should be stored so that they can be reassembled in their original position.***

Rocker Arm Shaft Reassembly: Assemble supports in proper position as to doweled support (oil supply). Push rod end of rocker arms must be on same side as large cylinder head bolt hole in each support.

1957-59 MODELS

ROCKER ARM SHAFT ASSEMBLIES: Identical hollow steel shafts used (end plugged). Six brackets used on each shaft as follows One type used for RH Front or LH Rear, one type for LH Front or RH Rear, one type for pin hole, and one type for all other positions. Drive pin is flush with top of bracket. Rocker arms are all one type.

Disassembly: Remove cotter pins from ends of shafts and remove brackets, springs, and arms. *NOTE* - If necessary to remove bracket that is pinned to shaft, drill hole in shaft end plug and pry plug out. Use drift in hollow shaft to drive out pin. Drive replacement plug in end of shaft until it seats against shoulder in shaft or approximately 9/16" in from end of shaft.

Reassembly: Reverse disassembly and follow diagram for position of each type of bracket in respect to cylinder head bolt holes and sequence of assembly Tighten bolts to correct specifications shown in cylhead diagram

1960 MODELS

ROCKER ARM SHAFT ASSEMBLY: *NOTE - Early engines may have end brackets For overhaul of this type assembly, see Oldsmobile 1959 Special Data*

Removal - Remove rocker arm cover *NOTE* - On Air Cond Cars it will be necessary to remove compressor and generator bracket bolts and tip compressor rearward to remove R H cover On Power Steering Cars, it will be necessary to remove pump mounting bracket

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bolts and move assembly to one side to remove L.H. cover. Remove rocker arm bracket bolts. If equipped with Air Cond. (right side only), loosen all bracket bolts. Remove cotter key from rear of rocker shaft and remove rocker arms, springs or shaft as required. Remove rocker arm shaft assembly.

Disass mbly - Remove cotter pins from ends of rocker shaft. Remove brackets, springs and rocker arms from shaft. *NOTE* - One bracket is attached to shaft by anchor pin. When necessary to remove this bracket, insert drift through oil passage in bracket to drive out pin. If necessary to remove plug, punch hole in plug and pry plug from end of shaft.

Reass mbly - Reverse disassembly procedure and note the following: Pinned bracket must have pin driven in flush with bracket. Rocker shaft plug must be driven in until outer shoulder is 9/32" into end of shaft.

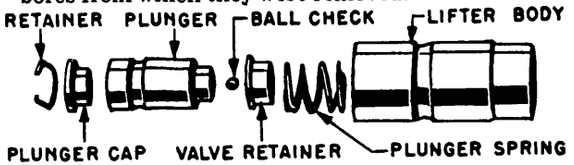
HYDRAULIC LIFTERS

1954-57 MODELS

VALVE LIFTERS: Hydraulic, Barrel Type. Consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet body (See illustration). Oil is introduced to this unit from main oil gallery through hole in side of lifter plunger and body.

Removal: Remove intake manifold, cylinder block cover, valve covers, rocker arm shaft assemblies, push rods and valve lifters.

►*CAUTION*—Valve lifters must be installed in same bores from which they were removed.



1954-57 HYDRAULIC LIFTER

Disass mbly - Remove plunger retainer with Lock Spring Tool BT-31. Remove pushrod seat, plunger, ball check valve, ball retainer and spring. If plunger is stuck in lifter body, soak lifter in "D-Carb" for five minutes and use Tool BT-38 (1954-56), Tool 23-16 (1957) and twist plunger counterclockwise to remove from body.

Cleaning & Inspection: Wash all parts in a suitable cargon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or indentations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore

Reassembly: ***(NOTE—Body and plunger are selectively fit and must not be interchanged, or replaced individually).*** Place plunger over push rod seat and then turn plunger over holding push rod seat in place, and install ball on its seat in plunger. Place ball check valve retainer over ball and then place valve retainer spring over retainer. Carefully assemble valve lifter body over complete assembly. Turn assembly over and while holding push rod seat down, install retaining lock spring, using Tool BT-31.

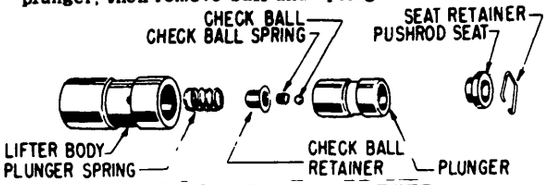
Identification Note—It is important when replacing lifters that the correct oversize lifter be used. An identification number is etched on all lifter bodies except standard. Lifters are furnished in Std., size and the following oversizes: .001", .002", .003", .005". The cylinder block is marked 1, 2, 3, or 5 for lifter size on rail under engine top cover.

1958-60 MODELS

VALVE LIFTERS: Hydraulic, Barrel Type. Consists of plunger and valve assembly operating in a cylinder formed by valve lifter body (see illustration). Oil is forced into lifter from main oil gallery through hole in side of body and plunger.

Removal - *NOTE - Keep lifters in order for reinstallation in original bores in block.* Remove intake manifold, *see "Intake Manifold"*, engine top cover, valve rocker arm covers and rocker arm shaft assemblies. To remove No. 8 intake or exhaust lifter on air conditioned cars proceed as follows: Loosen R.H. rocker shaft bracket bolts. Lift rocker shaft and pry rocker arms against springs and slide pushrod up between between rocker arm and bracket away from lifter then remove lifter. On all units remove pushrods and use "D-Carb." if necessary to assist in removing lifters.

Disassembly: Use Tool BT-31 or small screwdriver to remove retainer spring. Remove pushrod seat, plunger, and plunger spring. Remove ball check retainer from plunger, then remove ball and spring.



1958-60 HYDRAULIC LIFTER

Cleaning & Inspection: Use cleaning brush J-5099 and clean solvent to remove all foreign material from all parts. Check all parts for nicks, burrs, or scoring. *NOTE* - Ball, ball check retainer, springs, pushrod seat and snap ring are interchangeable or can be replaced individually. Body and plunger are selective fit and are not interchangeable. Replace lifter when body or plunger are worn or damaged. *CAUTION - DO NOT replace lifter when a slight gap appears or lifter shows leakage where foot is welded to body unless leak-down is not within specifications.* Place straightedge across lifter foot. If light appears under straightedge placed across foot of lifter, it indicates a flat or concave surface and lifter should be replaced and camshaft lobe checked for wear. Wear at camshaft cam center is normal, but wear across entire width of cam base circle requires replacing of camshaft.

Reassembly & Testing: Lifter must be assembled while submerged in test fluid to obtain accurate leak-down rate.

1) Install Adapter 105-2 in reservoir of Tester BT-60, then fill reservoir with Hydraulic Lifter Test Fluid BT-50 to ½" of top of reservoir.

2) Assemble ball check, spring, and retainer into plunger with flange pressed tight against bottom of recess in plunger.

3) Install spring over ball check retainer. Hold plunger with spring up and insert into lifter body (to prevent cocking spring). Place assembly in tester cup, then position pushrod seat into plunger. Position ¼" steel test ball on pushrod seat and lower tester ram until it contacts steel ball. *NOTE* - Allow ram to move downward by its own weight until air bubbles disappear.

4) Raise ram, then allow it to lower. Repeat several times or until all air is expelled from lifter. *CAUTION - DO NOT ATTEMPT TO EXPEL AIR FROM LIFTER BY PUMPING RAM.*

5) When all air is removed, allow ram to bleed down lifter to expose ring groove and install retaining ring.

6) Adjust ram screw so it contacts steel ball in pushrod seat when pointer is at start line. Raise ram and start test by resting arm on steel ball.

7) Rotate reservoir one revolution every two seconds, and time indicator from start to stop line. Allowable leak-down time is 12-90 seconds (used lifters), 20-90 seconds (new lifters). *NOTE* - If lifter is within specifications, it can be placed in service without removing fluid.

Identification Note - Production engines used Standard, .001", or .010" oversize lifters. Use correct size when replacing lifters. All lifters have identification numeral (Except Standard) on lifter body. Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover. When no mark appears, lifters are standard.

OILING SYSTEM

OIL PUMP

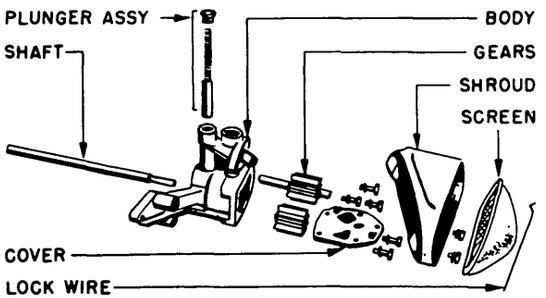
1954-60 MODELS

OIL PUMP: Removal & Disassembly - Remove oil pan, see car page, and remove three capscrews and lockwashers, then remove pump. Pull extension drive shaft from pump. *NOTE - Do not remove special washers from extension shaft (serviced as an assembly).* Remove oil screen lockwire and screen. Remove screen shroud attaching screws and remove shroud. Remove oil pump cover screws and cover, then remove oil pump gears. Remove pressure regulator nut, spring and valve.

Cleaning & Inspection: Wash all parts in solvent and blow out passages with compressed air. Inspect all parts for scoring, clean up small imperfections with crocus cloth. Relief valve clearance should be .0025-.005". Gear end clearance should be .0025-.008".

Reassembly - Reverse disassembly procedure and tighten cover screws to 5-8 ft. lbs., shroud screws to 4-7 ft. lbs. *CAUTION* - The end of extension shaft nearest to special washers must be inserted into drive shaft.

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OLDSMOBILE OIL PUMP

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ENGINE LUBRICATION

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, camshaft bearings, and to hydraulic valve lifters, fuel pump eccentric and lever, and distributor drive gear. Oil metered by camshaft bearings lubricates other valve parts (rocker arms, pushrods, and valve stems). Other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed oil strainer and intake pipe mounted on pump cover and delivers oil through a passage in the pump body, rear main bearing cap, and crankcase to the oil filter intake port (filter mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross passage and vertical passage connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward end of this gallery, a "V" passage connects to front main bearing and to the forward end of the left main oil gallery extending back along the engine just below the left bank valve lifters. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical passage intersecting the horizontal cross passage from the oil filter (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil passage in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (additional passage at front crankshaft bearing supplies oil to left main oil gallery).

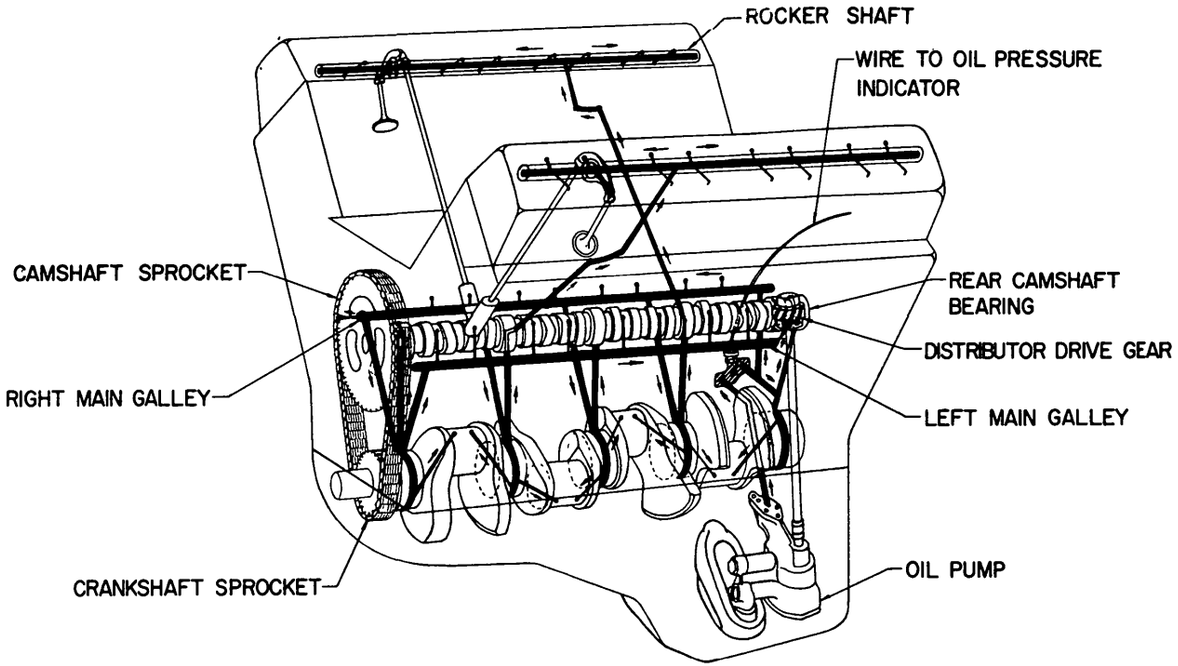
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap of rod for opposite bank of cylinders (slot in rod cap must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Each lifter supplied with oil through short passage leading upward from main gallery at point directly below lifter.

Rocker Arms, Pushrods & Valves - Hollow rocker arm shafts are supplied with oil through passage in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank), and connecting passage in head which registers with drilled oil passage in rocker shaft bracket (see Note below). Rocker arm is drilled to provide lubrication for pushrod socket and valve tip. Oil return holes are provided on lower side of heads.

ROCKER SHAFT BRACKET NOTE - Rocker shaft bracket with drilled oil lead has anchor pin which locates shaft properly so that oil hole in bracket and shaft line up (pin is driven in flush with top of bracket). This bracket is No. 2 or 3 (left bank), No. 4 or 3 (right bank) depending on whether end brackets are used (discontinued during 1960 production).



OLDSMOBILE V8 ENGINE OILING SYSTEM

Distributor Drive Gear - Lubricated from drilled hole in plug at rear end of left main oil gallery.

Timing Chain & Sprockets, Fuel Pump Lever & Eccentric - Lubricated from drilled hole in hexagonal headed plug which closes front end of right main oil gallery.

OIL FILTER: Full flow type mounted on pad on right rear of crankcase. Filter has bypass valve to ensure engine lubrication if filter element clogged.

►*CAUTION:* On cars where filter not used, a cover with a channel oil passage connecting the inlet and outlet ports is installed on filter pad to provide oil circulation. If cover removed, install with new gasket (coat both sides of gasket with POB No. 5 sealer), and torque cover bolts to 35-40 ft. lbs.

COOLING SYSTEM

1954-60 MODELS

►*LOSS OF COOLANT & HEATING CORRECTIONS:* When check of thermostat, water pump and hoses, Ranco valve, does not reveal cause for poor heater operation, loss of coolant or for engine overheating, look for restrictions (core flashing) in engine front cover at the following locations:

1) When heater operation is unsatisfactory, remove heater hose from cover connection and look for restriction at cover connection, and if found remove with long bladed screwdriver.

2) Loss of coolant and overheating can be caused by similar restriction in cover where water from pump passes into right cylinder block. This type restriction will cause water to back up in radiator upper tank when engine is decelerated quickly. Remove restriction as described in item #1.

NOTE - When restriction is too heavy to break out, replace engine front cover.

WATER PUMP

WATER PUMP: Disassembly - Remove bearing retainer wire from front of housing. Support outside surface of pump housing in press and press shaft through impeller and housing pressing impeller end of shaft toward front of housing. Remove seal assembly from rear of housing by driving against face of seal with drift. Support hub and press shaft through hub to remove hub.

Reassembly - Place Gauge 33-68 in impeller side of housing, use driver, Tool 5175, to press shaft and bearing assembly into housing from opposite side until shaft bottoms on gauge. Install retainer wire. Support inner end of shaft on press and use Tool BT-16 to press hub on shaft. Coat outer diameter of new seal with C.P. No. 9 Sealer and use Tool 23-17 to press it into place. Clean mating surface of impeller of any foreign particles and use Tool BT-15 to support impeller while pressing shaft through impeller until bottom edges of vanes are 13/16" from machined face at edge of housing.

Installation - Use gasket cement on pump housing to retain gasket on housing, then install pump assembly in front cover and tighten 5/16" bolt to 14-22 ft. lbs., 7/16" bolts to 24-40 ft. lbs. Install fan pulley, spacer and fan. Tighten fan to hub bolts to 10-15 ft. lbs. Install pulley belts and adjust belt tension.

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PROPELLER SHAFT NOTES

1957-60 MODELS

►*DRIVE LINE VIBRATION CORRECTION (Saginaw Univ rsal J int)* To correct this vibration, check for condition and position of bearing retaining straps, which hold bearing during shipment and which fit into groove in companion flange when universal joint is assembled. Broken or damaged straps should be removed completely. File strap flush with end of companion flange groove should it extend beyond groove.

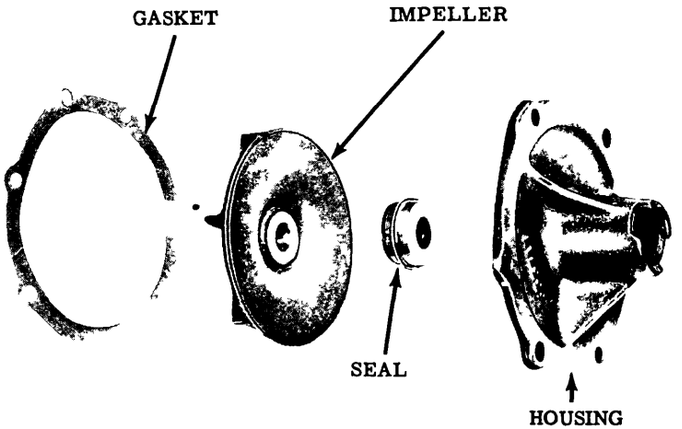
NOTE - New specification for drive shaft "U" bolt torque is 14-18 ft. lbs.

PROPELLER SHAFT: Shaft assembly consists of two sections a center bearing support and three universal joints The rear propeller shaft or center support can be removed independently of the front shaft Whenever it is necessary to remove the front shaft, the complete shaft assembly must be removed

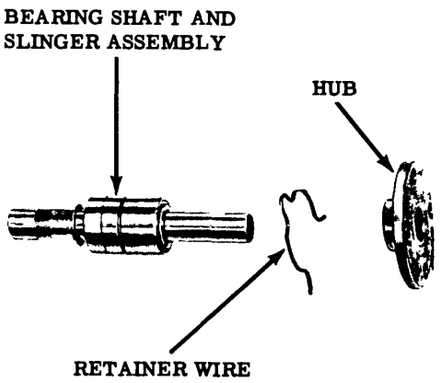
►*CAUTION·* When removing center bearing support scribe a line from center of support to frame member attaching bolts on frame member to facilitate lateral alignment on reassembly Keep shims grouped so they can be reinstalled in same location

PROPELLER SHAFT ALIGNMENT: Shaft aligned vertically and laterally as follows:

V rtical Alignment: Position Aligning Gauge 6514 against right side flange of transmission oil pan (Hydra-Matic), or right side of engine oil pan (Synchro-mesh) so the contact surfaces of gauge seat squarely against pan with level adjusting screw toward front of car Adjust leveling bubble until bubble is centered in gauge level Position gauge against front propeller shaft so contact surfaces of gauge seat squarely against bottom side of propeller shaft with level adjusting screw toward front of car If bubble is not within 1/16" from center of level it will be necessary to align the front propeller shaft as follows Scribe a line from center of support to frame member attaching bolts on frame member to facilitate lateral alignment on reassembly Add or subtract shims between frame member and support as required (see "Shim Part Numbers" below) until bubble in gauge level is centered (or within 1/16" from center of level)



OLDSMOBILE WATER PUMP



Size	Shim Part Numbers Convertibles	Other Models
060"	570380	570378
120"	570053	570052
180"	570381	570379

►*NOTE· A 060" shim will change level bubble approxi- one graduation of level*

►*HYDRA-MATIC CARS NOTE* Distance between transmission rear oil seal and splined yoke must be 9/32" To adjust, slide propeller shaft assembly fore or aft as required

Lateral Alignment: Attach three plumb lines using string 18" to 24" long to underside of car in such a position that the strings touch side of propeller shaft Position one string at front of front propeller shaft, between front weld and balance weights Put second string at rear of front shaft ahead of center bearing, between the end weld and balance weights and the third plumb line at rear of rear shaft in a similar position Sight along the three plumb lines If center line does not line up with front and rear strings, loosen support-to-frame member bolts and slide center bearing assembly laterally in the elongated holes until alignment is obtained Tighten bolts to 45-55 f t lbs

CENTER BEARING OVERHAUL: **Disassembly** - Pry crimped area of slip yoke nut retainer away from nut, unscrew nut pull propeller shafts apart and remove nut retainer and rear slinger Remove center bearing support assembly with Puller TR-278-R and Adapter TR-278-R-2 Remove bearing retainer-to-mounting plate bolts and separate parts

►*NOTE Center bearing and mounting plate is servic d as an assembly*

Reassembly - Place front slinger on front propell r shaft with dished side to front Apply a bead of No 4 cup grease to dished area of center bearing assembly and position assembly on propeller shaft With Tool J-5922 (or 1½" socket) drive inner bearing race until bearing and front slinger are seated on front shaft Apply an ounce of Special Lubricant No 571035 to splines of front shaft and a bead of No 4 cup grease to dished part at rear of center bearing Place rear slinger against center bearing on front shaft with dished side to rear Now place nut retainer on front shaft Tang of retainer must index with slot of shaft and cupped side of retainer must be to rear Install slip yoke seal and align slip yoke index clip with wide serration in front shaft and insert slip yoke into shaft Tighten slip yoke nut to 50-75 ft lbs and crimp nut retainer against nut in two places

►*AIR CONDITIONED CAR SERVICE CAUTION: B for disconnecting any part of air c nditi ning equipment or lines for access to ngin , see "Air C nditi ning Service C autions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBERS: On left body pillar post.
Starting Serial Number–1001.

►*SERIAL NUMBER NOTE: Complete serial number (example 557M 1001) includes following identification data in sequence.*

Year③	Series①	Assy. Plant②	Serial No.
55	7	M	1001

①–Series Designation: 7(88 Series). 8(Super 88 Series), 9 (98 Series).

②–See Assembly Plant Designation following.

③ - Year - 54 (1954), 55 (1955).

Assembly Plant Designation

M–Lansing	L–Linden
A–Atlanta	C–South Gate
B–Framingham	W–Wilmington
K–Kansas City	T–Arlington

ENGINE NUMBER: Stamped on machined pad located on top of left hand cylinder bank of block. The number can be observed between the front and center exhaust manifold ports.
Starting Eng. No. - V-1001 (1954), V400001 (1955).

TUNE-UP

COMPRESSION PRESSURE: 100 lbs., minimum at cranking speed. Reading on low cylinders should not be less than 80% of high cylinder.

VACUUM READING: Steady 17" minimum at idling speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe. Stop spring should strike stop before counter-weight touches pin to prevent valve rattle when cold.

►*MANIFOLD HEAT CONTROL VALVE NOTE*–Check for broken valve welds or frozen bearings by allowing manifold to cool, then start engine and with transmission in neutral, "flash" throttle quickly. The valve should open and return to close position immediately. If welds are broken or bearings frozen, valve weight will not move. Replace the valve assembly.

IGNITION

►*IGNITION SECONDARY WIRING NOTE: Resistance type wires used. Center conductor is graphite impregnated nylon making it necessary to use only pre-cut assemblies for replacement. Distributor rotor does not have a resistance unit.*

FIRING ORDER: 1-8-7-3-6-5-4-2.
Cylinders–RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .030".
Spark Plugs - AC No. 46-5, 14mm (1954), 44-5, 14mm (1955). Torque to 23-28 ft. lbs.

COIL: D lc -R my 1115082. 12 V lt.
Ignition Current–2.0 amperes idling. 4.5 stopped.
Resist r–Delco-Remy 1928016. On bracket adjacent to ignition coil.

►*COIL RESISTOR NOTE: R sistor is conn cted in l ad from ignition switch-t -coil. This r sistor is by-pass d during cranking by a lead from starter solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy No. 1110843 (Early 1954), 1110850 (Late 1954-55).
Condenser–Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set–Delco-Remy 1918148.
Breaker Gap–.016" (.012-.0175").
Cam Angle–26-33° (with .016" gap).

►*BREAKER GAP CAUTION:* Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set gap.
Breaker Arm Spring Tension–19-23 ozs.
Rotation–Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
7.5-9.5		1000	15-19		2000
11-13		1450	22-26		2900
13-15		1725	26-30		3450

Vacuum Spark Control: Delco-Remy 1116059.
Plunger Travel–7/32-15/64".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4.5-6-5
10	20	16-17

►*DISTRIBUTOR INSTALLATION CAUTION:* Before installing distributor, make certain that crankshaft is turned to No. 1 firing position (see Ignition Timing following). Install distributor with flat on distributor gear in line with flat on oil pump shaft, push distributor down just enough to engage gear with shaft but do not push distributor all the way down. Turn rotor so that it is in line with No. 8 terminal in distributor cap (in line with breaker terminal on housing), push distributor all the way down. *NOTE*–Rotor will turn to No. 1 spark plug terminal position as gears are meshed. Install and tighten distributor hold-down clamp.

IGNITION TIMING

Setting–5°. BTDC, with engine idling at 850 RPM and vacuum line to distributor disconnected and carburetor opening taped closed.

►*DETONATION CAUTION: If engine detonates (due to low octane fuel or carbon build-up) set timing to 2½° BTDC. For high altitude operation, timing can be adjusted to 7½° BTDC, if detonation does not occur.*
Timing Mark–Slot in rim of crankshaft pulley and pointer on front cover. Leading edge of slot is 5° BTDC. Trailing edge is TDC. Midway between these points is 2½° BTDC.

CARBURETOR

►*CARBURETOR APPLICATION: Carter WGD 2-Bbl. used on 1954 88 Series, Rochester 2GC 2-Bbl. used on 1955 88 Series & Carter WCFB or Rochester 4GC 4-Bbl. used on 1954 & 1955 Super 88 & 98 Series.*

►*IDLE ADJUSTMENT NOTE:* A new "Split Throttle" lever permits idle speed adjustment after Hydra-Matic Throttle Linkage adjustment made (without affecting that adjustment).

►*AIR-CONDITIONED CAR IDLE ADJUSTMENT CAUTION: For Summer op rati n, s t idl spe d with Air C nditi ner turn d "ON". F r Wint r peration, s t idle speed with Air Condition r turned "OFF".*

►*1954 THROTTLE RETURN SPRING BRACKET CAUTION (Synchro-mesh Cars):* Connect throttle spring to TOP holes for 2-Barrel carburetors, and to BOTTOM holes for 4-Barrel carburetors.

THROTTLE LINKAGE ADJUSTMENT (2 & 4-BARREL CARBURETORS): **1)** Remove throttle rod from transmission throttle lever and move throttle lever to rear against its stop, and with Throttle Lever Gauge J-5605 placed flat against rear face of transmission case, rod on gauge should just enter hole in throttle lever. The distance from rear face of transmission case to hole in throttle lever should be 6¾". Adjust by bending lever with tool J-2029. Attach throttle rod to transmission lever.

►*THROTTLE LEVER PRODUCTION CHANGE (R quiring the reworking of Thr ttl L v r Bending T ol J-2029):* The present forged type throttle and manual levers on transmission are being replaced with pressed steel levers. The new pressed steel manual lever can be used for 1954 & 1955 models. The new pressed steel throttle lever can be used only on 1955 models after transmission Serial No. R55-76159.

►*THROTTLE LEVER BENDING TOOL REWORK (F r use with Later Type Pr ss d Steel L v rs):* With movable lever of tool held upward, grind off 1/8" from lower side of top support pin (flush with side of tool).
2) Apply hand brake and allow engine to warm up. Place throttle lever in "Dr" position and adjust engine idle speed to 400 RPM. Turn engine off. Disconnect upper throttle rod from engine bell crank. Check clearance between end of intermediate throttle rod assembly and dash. This distance should be 5/16" to 3/8" with carburetor on slow idle. Adjust intermediate throttle rod assembly as necessary to obtain specified clearance (NOTE–on 4-Barrel carburetors, open side of rod should face away from center of engine, and toward center of engine on 2-Barrel carburetors).
3) Loosen jam nut and remove pin from lower throttle rod at throttle bellcrank, and with bellcrank against its stop and intermediate throttle rod against its stop, the clevis pin should enter holes in clevis of lower throttle rod and hole in throttle bellcrank freely. Adjust clevis on end of lower throttle rod so pin enters hole freely. *CAUTION–Do not shorten r lengthen rod after this setting obtained.*
4) With upper throttle rod assembly held rearward with light pressure to remove lash, the clevis pin should just touch gauge point on throttle bellcrank (gauge point is curved projection above clevis pin hole in bellcrank). Adjust by rotating clevis so clevis pin just touches, or is within ½ turn short of gauge point. Replace clevis pin and tighten jam nut.
5) Hold choke completely open and move upper throttle rod assembly forward until throttle is wide open. Continue pushing upper throttle rod until transmission throttle lever just stops at its forward position (repeat this operation several times until the exact forward position is distinctly felt). Do not force linkage

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beyond this point. With linkage in this position there should be zero clearance between throttle bellcrank stopscrew and downshift lever. With linkage held forward as outlined, loosen locknut on setscrew and adjust setscrew until it just contacts downshift lever. Release lever and tighten jam nut.

6) Place a wood block 3 7/8" long on top center of floor mat retainer and bring bottom of accelerator pedal down to rest on block. With carburetor in slow idle position (choke completely off) pedal should just touch gauge block. If necessary adjust accelerator position by disconnecting accelerator pedal rod from accelerator bellcrank on dash, and adjust accelerator pedal rod so that clevis just slides over pin with wood block in position and carburetor on slow idle. Reassemble rod, making sure open side of rod end is facing away from center of engine. Remove wood block.

ROCHESTER 2GC

Rochester N . 7006970 (Synchro-mesh & Hydra-Matic).

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel 2-3-5-8.

Idl Setting—Initial setting for both screws 1½ turns open. With engine at operating temperature, turn each adjusting screw in or out for smoothest possible idle (highest vacuum and RPM), then turn each screw out (rich) ¼ turn. *NOTE*—If engine rolls from richness when throttle snapped closed, turn each screw in 1/8 turn.

Idl Sp d—(Synchro-mesh)—425 RPM. (Hydra-Matic)—400 RPM, with selector lever in "Dr" range. *For "Idl Spe d Setting" on Air Conditioned Cars, see "Carbur t r" ab v .*

Fl at L v l—1 9/32" from air-horn gasket to top of float with assembly inverted. Use Gauge J-5917 so it rests against power piston shaft with outer leg in line with center of float. Adjust by bending float arm between pivot and float.

Fl at Dr p—1 29/32" between air-horn gasket and lowest point on bottom of float. Adjust by bending float tang toward float needle seat to lessen drop and away from seat to increase drop.

Fast Idl : 1400-1500 RPM with fast idle screw on high step of fast idle cam. Adjust screw as necessary to obtain the correct engine RPM.

Aut matic Ch k Setting: Centered (at index).

►*OTHER DATA: S "Rochester 2GC Carburetor" in Carburet r S ction.*

Hydra-Matic Thrott l Linkage Adjustment: *See "CARBURETOR" ab v .*

Fuel Pump Pressur : 4-5 lbs. (16" above outlet at 1800 RPM.

CARTER 2-BARREL

Carter WGD N . 2058S. Dual downdraft type with automatic choke.

Idl S tting—¾-1¼ (1953); 1½-2½ (1954), turns open. Turn screws out for richer mixture.

Idl Sp d (Synchr -m sh)—425 RPM.

Idl Sp d (Hydra-Matic)—400 RPM with selector lever in "Dr" position.

Idl Sp d (Dynafl w)—400 RPM with selector lever in "P" position.

Fl at L v l: ¼" between top of float and bowl cover with float assembly inverted.

Acc l rating Pump—No seasonal adjustment.

Fast Idl : .020" throttle opening or clearance between valve and wall on side opposite idle ports with choke valve tightly closed. Adjust by turning sleeve on connector rod.

Automatic Choke Setting: Centered (at index).

►*OTHER DATA: See "Carter WGD Carburetor" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs. at 16" above outlet at 1800 RPM.

CARTER WCFB

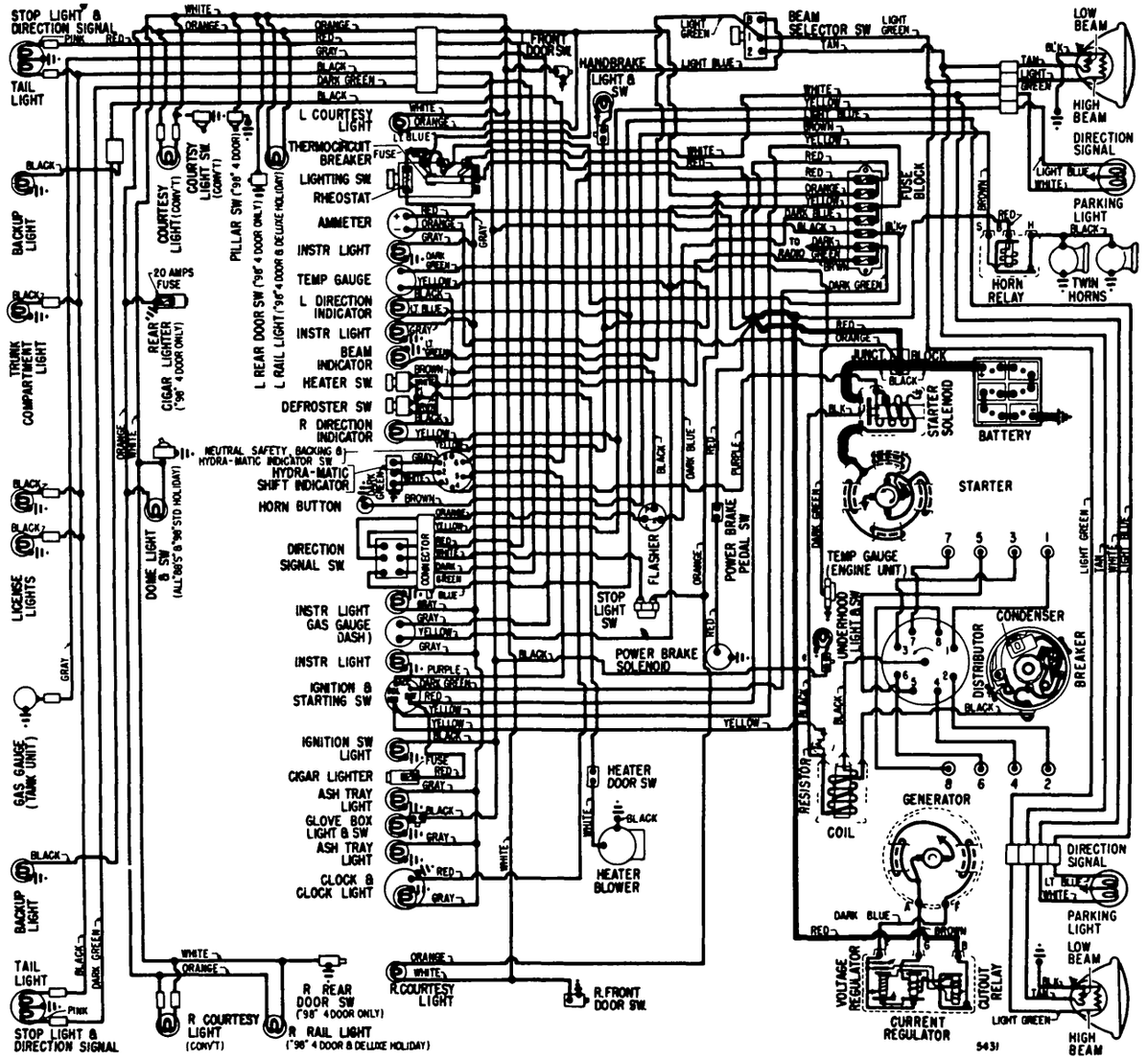
Carter No. 2059S (1954), 2246S (1955). Downdraft type with automatic choke.

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.

Idle S tting—With engine at operating temperature, set idle speed (see below), turn each screw in or out for smoothest possible idle (highest vacuum and RPM), then turn each screw out (rich) ¼ turn. NOTE—If engine rolls from richness when throttle snapped closed, turn each screw in (lean) 1/8 turn.

Idle Speed—(Synchro-mesh) 425 RPM, (Hydra-Matic) 400 RPM with selector lever in either "Dr" position. *For "Idle Speed Setting" on Air Conditioned Cars, see "Carburetor" above.*

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1954 MODELS

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►*OTHER DATA: Se "Cart r WCFB Carburetor" in in Carbur tor S cti n.*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fu l Pump Pressure: 4-5 lbs. (16" above outlet at 1800 RPM).

ROCHESTER 4GC

Rochester Nos. (Synchro-mesh) - 7005600 (1954), 7006000 (1955).

(Auto. Trans.) - 7005900 (1954), 7007000 (1955).

►*MANIFOLD FUEL DISTRIBUTION:* Carburetor RIGHT barrels feed Cyl. 1-4-6-7, LEFT barrels 2-3-5-8.

Idle Setting—With engine at operating temperature, set idle speed (see below), turn each screw in or out for smoothest possible idle (highest vacuum and RPM), then turn each screw out (rich) ¼ turn. *NOTE*—If engine rolls from richness when throttle snapped closed, turn each screw in (lean) 1/8 turn.

Idle Speed—(Synchro-mesh) 425 RPM, (Hydra-Matic) 400 RPM with selector lever in either "Dr" range. *For "Idle Speed Setting" on Air Conditioned Cars, see "Carburetor" above.*

►*OTHER DATA: See "Rochester 4GC Carburetor" in Carburetor Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "CARBURETOR" above.*

Fuel Pump Pressure: 4-5 lbs. (16" above outlet at 1800 RPM).

CARB. EQUIPMENT

Fu l Pump: AC No. 9775 (Early 1954), 4140 (Late 1954). 4148 (1955). Fuel & Vacuum.

Pressure—4-5 lbs. at 16" above outlet at 1800 RPM. *See "Fuel Pumps" in Carburetion Equipment Section.*

Gasoline Gauge: AC Electric Type. *NOTE—Gasoline Gauge tank outlet tube is part of gauge tank unit and is equipped with a saran filter.*

Dash Unit—AC No. 1517999.

Tank Unit—AC No. 1518134.

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Delco 3KM60. *12 volt,* 9 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground—Negative.

Engine Ground—Connected between engine and forward side of firewall.

STARTER

Delco-Remy 1107623. *12 Volt.* **Armature—1927343.**

Drive—Overrunning clutch (solenoid pinion shift).

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—30-40 ozs.

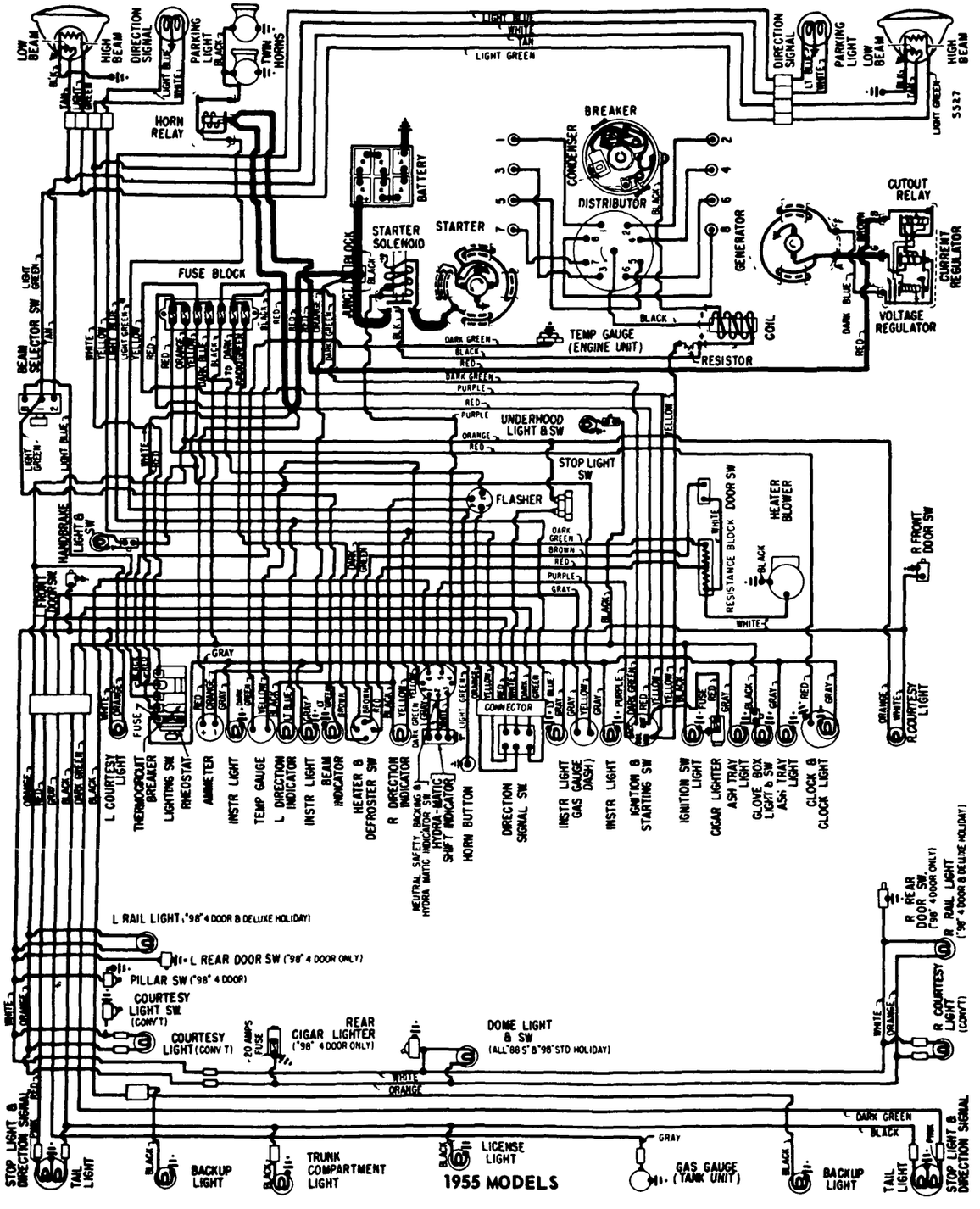
Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
11 ft. lbs.	Lock	5.2	460

Starting Switch: Delco-Remy Solenoid 1119761 (no relay used) mounted on starter and controlled by combination Starter & Ignition Switch and Neutral Safety Switch. *NOTE—A N utral Saf ty Switch is used on all mod ls.*

See "Starter Controls" in El ctrical Equipment S ction.

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►*NEUTRAL SAFETY SWITCH REPLACEMENT CAUTION:* When replacing Neutral Safety Switch, Part No. 1998026 on 1955 model cars make sure that the replacement switch terminals are in the same location as the switch being replaced. The plastic plug used in 1955 carries the switch leads and is designed to fit the second type switch only. *NOTE*–The first type switch can be used providing the leads are removed from the plug and connected individually to the switch

Synchro-Mesh Neutral Safety Switch: Delco-Remy 1998031 (Without Air Conditioning), Delco-Remy 1998094 (With Air Conditioning). Switch is controlled by transmission shift linkage, and allows starter to be operated only when transmission gear shift lever in "Neutral" position

Adjustment–Place transmission in 2nd gear and adjust the Neutral Safety Switch so there is 1/16" clearance between switch arm and stop Check to see that engine will not start with gearshift lever in any position except neutral.

Hydra-Matic Neutral Safety Switch: Delco-Remy 1998026 (Without Air Conditioning), Delco-Remy 1998093 (With Air Conditioning). Combination Neutral Safety Switch, Back-up Light Switch, and Hydra-Matic Indicator Switch

Adjustment–*See "Hydra-Matic Drive" in Transmission Section.*

Hydra-Matic Indicator Switch: *See "Hydra-Matic Transmission" following for description of indicator unit.*

GENERATOR

Delco-Remy 1102003 (Std.), 1102021 (Air-Conditioned Cars). *12 Volt.*

Armature–Delco-Remy 1923535 (All Models)

Maximum Charging Rate–*See Voltage Regulator.*

Performance Data–Cold

Amperes	Volts	RPM
30①	14	2150

①–Not maximum See Regulator

Brush Spring Tension–24-32 ozs

Field Current–1.48-1.62 amps at 12 volts

Rotation–Counter-clockwise at commutator end

Belt Adjustment: Loosen generator attaching bolt and place Tool J-4170 against generator between bracket and generator housing Attach torque wrench to tool to apply torque of 16 ft lbs Tighten generator attaching bolts while holding tension on wrench

REGULATOR

Delco-Remy 1118826. *12 Volt. NOTE–Regulators are "1118825 Series". Specifications below are "Normal" settings*

Cutout Relay

Cuts In–12.8 volts (hot)

Contact Gap–.020"

Air Gap–.020" (with contacts just closed)

Voltage Regulator

Setting–14.5 volts (hot).

Air Gap–.075" with armature pressed down to point where contacts just touching

Checking & Adjusting–*See Electrical Equip. Section*

Current Regulator

Setting–30 amperes (hot)

Air Gap–.075" with armature pressed down to point where contacts just touching

Checking & Adjusting–*See Electrical Equip. Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Equip. Section*

Autronic Eye: See "Autronic Eye" in Electrical Equipment Section

►*AUTRONIC EYE PRODUCTION CHANGE: See "Autronic Eye" in Electrical Equipment Section.*

Direction Signal: *See Electrical Equipment Section.*

Lighting Switch Removal: Disconnect battery cable and disconnect wires from lighting switch. Pull switch knob out to last notch then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch Remove switch mounting nut and remove switch and escutcheon from instrument panel.

Stop Light Switch Location (Std. Brakes): Mechanical type on toe board near brake pedal

Stop Light Switch Location (Power Brakes): Directly above brake pedal on firewall. Adjust so lights come on within free travel of brake pedal

FUSES: All fuses (exc. Instrument Panel fuses) are located on a combination fuse and junction block under the instrument panel. A color code is used on the fuse panel corresponding to the color code of circuits protected by each fuse. The following fuses will be found on this panel:

(1) Clock (Std. on 98 Series only) 1 ampere.
(2) Courtesy Lights, Dome & Stop Lights, and Rear Cigar Lighter. 25 amperes.
(3) Fuel & Temp. Gauges, Hand Brake Signal Light, Hydra-Matic Shift Indicator, and Back-up Lights. 9 amperes.
(4) Turn Signal. 9 amperes.
(5) Glove Box, Underhood, Keyhole, Tail, Trunk, & Spot Lights. 9 amperes
(6) Radio. 7.5 amperes.
(7) Heater & Air Conditioner 20 amperes (without Air Conditioner), 25 amperes (with Air Conditioner)
(8) Electric Windows & Antenna. 20 amperes
Instrument Panel Lights–2 amperes located on headlight switch
Cigar Lighter–20 amperes located behind lighter

CIRCUIT BREAKER: 22 amps. Located in headlamp switch

HORNS: Delco-Remy 1999753 (Low Note) **1999754** (High Note) *12 Volt*

Horn Relay: Delco-Remy 1116781. *12 Volt*

Contacts Close–2.75-4.0 volts

Contact Gap–.025" **Air Gap**–.015" (closed)

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

►*1954 OLDSMOBILE FRONT MAIN BEARING PRODUCTION CHANGE Beginning with Car Serial V52229 a sl ctiv fit fr nt main b aring ent r d pr duction. There ar two bearings available in addition to th regular Std. siz , .002", .010", & .020" Und rsiz bearings. See "Crankshaft" below.*

ENGINE SPECIFICATIONS: 90° V8 with overhead valves.

Bore	Stroke	Displacement	Rated HP
3 7/8"	3 7/16"	324 cu. ins.	48

Engine	Compr. Ratio	Developed HP
1954①	8.25-1	170 at 4000 RPM
1954②	8.25-1	185 at 4000 RPM
1955①	8.5-1	185 at 4000 RPM
1955②	8.5-1	202 at 4000 RPM

① - Deluxe 88. ② - Super 88 & 98.

Compression & Vacuum Reading–*See Tune-Up.*

CYLINDER HEAD: *See Oldsmobile Special Data.*

INTAKE MANIFOLD INSTALLATION: *See "Cylinder Head & Manifolds" in Oldsmobile Special Data.*

TIGHTENING TORQUES: *See Oldsmobile Special Data.*

OIL PAN REMOVAL: *See Oldsmobile Special Data.*

ENGINE FRONT MOUNT INSTALLATION: *See Oldsmobile Special Data.*

PISTONS

Aluminum alloy, three ring, autothermic, steel strut, slipper skirt, cam ground, tin plated.

Length–4 1/32" **Weight**–21.7 ozs (less rings & pin)

Removal–Pistons and rods removed from above.

►*CAUTION* Mark pistons, rods, and bearing caps with cylinder number before removal to insure correct reinstallation.

Fitting New Pistons: 0005-.0010" skirt clearance measured 1/8" from bottom of skirt with piston pin removed Use a .0015" x 1/2" x 12" feeler between piston (pin removed) and cylinder wall at right angles to pin Pull to withdraw feeler should be 5-12 lbs

►*CAUTION: Allow rebored cylinders to cool to normal room temperature before fitting pistons.*

Replacement Pistons: Standard & .020", .030" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Mark "F" cast on each side of piston pin hole on front side of piston. Install pistons 1, 3, 5, 7 in left bank, 2, 4, 6, 8 in right bank with letter "F" toward front on all pistons.

PISTON PINS

Floating type with lock rings at each end.

►*CAUTION: Discard old lock rings and install new service type lock rings when installing pins.*

Diameter–.9803-.9807". **Length**–3 9/64".

Clearance in Piston–.0000-.0002" loose

Pin Fit in Piston–Pin should not fall through piston of own weight when using the low limit (.0000" fit) Piston pin can be tapped in place using a brass drift

Pin Fit in Rod Bushing–.0003-.0005" loose.

Replacement Pins: Standard size, and .001", .003" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (#1 & 2)	.077-.078"	①	.001-.003"
Oil (#3)	1.860-1.865"	①	.0018-.0033"

①–Perfect Circle .010-.020". Sealed Power .008-.016".

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Replacement Rings: Standard size, .020", .030"Oversize.

Installing Rings: Compression rings with step on inner edge UP. Oil rings marked TOP, installed with mark up.

CONNECTING RODS

Length—6 5/8" (Center to center). **Weight**—29.54 ozs.
Crankpin Journal Diameter—2.2488-2.2498".
Out of Round Limit—.0015".

Bearings—Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.
Clearance—.0009-.0029".

Sideplay—.002-.011" (total for both rods).

Replacement Bearings: Standard size, .002", .010", .020" Undersize.

Installing Rods: *CAUTION*—Rods have plain side and boss side (two machined bosses at lower end). **Install rods 1, 3, 5, 7 with plain side to front, and 2, 4, 6, 8 with boss side to front** (*NOTE*—Pistons marked "F" on front side). Caps offset and cannot be installed incorrectly. Groove on rod and cap, and pads for numbering caps and rods are on same side.

►*CAUTION—Use Guide tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

NOTE—Oil spit hole for lubrication of opposite cylinder wall provided in rod above cap joint.

CRANKSHAFT

Journal Diameter—#1, 2, 3, 4 2.498-2.499"; #5 2.623-2.624".

Bearings—Durex 100A, steel backed, full precision type. Rear bearing flanged.
Clearance—.0005-.002" (Front—See Note below), .002-.0035" (Rear - See Note below), .0005-.003" (Others).

►*FRONT MAIN BEARING NOTE: Selective fit bearing used.* **On cars with Power Steering or Air Conditioning it is very important that front bearing fit be held as close as possible because of the increased pump drive and compressor drive belt load.** Bearing Part No. 565770 (Marked "M" on tang) will reduce bearing clearance .0005". Bearing Part No. 564771 (marked "H" on tang) will reduce bearing clearance .001". These bearings are in addition to regular replacement bearings.

►*REAR BEARING NOTE:* Rear bearings are selective fit during manufacture, 3 sizes used: "M" Medium, "T" Thin, "H" heavy. **Use same size bearing (indicated by letter on tang) when replacing bearing.**

Replacement Bearings: Standard size, .002", .010", .020" Undersize. In addition to lettered bearings used at front and rear. *See Front & Rear Bearing Notes above.*

End Thrust: Taken by rear (#5) flanged bearing.
Endplay—.004-.008"

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

Flywheel & Clutch Housing Alignment: *See "Flywheel Housing" in Oldsmobile Special Data.*

CAMSHAFT

Journal Diameters—1.8724-1.8729".
Bearings—Steel backed babbitt.
Clearance—.0014-.0036".

End Thrust: Forward thrust taken by plunger and spring on front of engine, rear thrust at front of cylinder block.

►*CAUTION:* Two main oil gallery holes in block sealed by hex head bolt. A small hole in bolt for right hand gallery provides lubrication to timing chain, fuel pump eccentric and lever.

Camshaft Removal & Installation: *See "Camshaft" in Oldsmobile Special Data.*

Timing Chain:	Link-Belt (Std.)	Morse (Optl.)
Width	27/32"	7/8"
Pitch	.500"	.375"
Length (Links)	48	64

►*NOTE—Morse and Link-Belt chains not interchangeable unless sprockets also changed.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straight edge across shaft centers (or use Tool BT-11).

►*NOTE—Fuel pump eccentric bolted to front of camshaft ahead of sprocket. Assemble with "0" mark to front, machined step against sprocket.*

VALVES

►*INTAKE & EXHAUST VALVE AND SEAL PRODUCTION CHANGE: New valves used in production and for service replacement do not have the oil seal grooves, and valve stem is relieved below the head and at end of stem. A "Top Hat" type oil seal is used with this valve.*

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	① Length
Intake	1¾"	.3417-.3425"	4.965-4.985"
Exhaust	1.432-1.442"	.3930-.3938"	4.989-5.009"

Valve	Angle	② Lift	Clearance
Intake	45°	.403"	.0022-.0040"
Exhaust	45°	.403"	.0027-.0045"

① - 1954 (Intake) 4.907-4.927", (Exhaust) 4.931-4.951".
② - 1954 Lift .366".

Valve Seat Width—.042-.071" (Intake), .070-.098" (Exhaust).

Intake & Exhaust Valve Stem Seals: First type seals are "O" ring type installed in second groove of valve. Later type valves (see Production Change Above) are a "Top Hat" type seal installed above valve spring.

Valve Springs: Intake and exhaust valve springs are alike. Dampeners used on lower end of all valve springs.
Valve Spring Free Length—2.33".

Valve Spring Specifications

Valve	Pressure	Length
Closed	85-95 lbs.	1.829"
Open	149-163 lbs.	1.463"

►*CAUTION—Lower end of damper and spring must seat in recess in head.*

Valve Guides: Intake guides tapered on lower end. Press guides in head until top of guide is 47/64" (.7344") above face of valve spring seat (Tool J-5158 positions guides correctly in head). Ream inside diameter of guide after installation to .3447-.3457 (Intake), .3965-.3975" (Exhaust).

Hydraulic Valve Lifters: Barrel type.

►*HYDRAULIC LIFTER INSTALLATION CAUTION:* FIVE different sizes used in production as follows (marked as indicated): Standard (unmarked), .001" O.S. (marked "1"), .002" O.S. (marked "2"), .003" O.S. (marked "3"), .005" O.S. (marked "5"). **Lifters** marked by etched number on lifter body. **Cylinder Block** marked by number on rail under engine top cover. *Reinstall lifter in same hole or replace with proper size.*
Diameter—.8424-.8427". **Length**—2" (Overall).
Clearance in Block—.0005-.0018" (Selective).

Replacement Lifters: Standard size, .001", .002", .003", .005" Oversize.

Hydraulic Lifter Overhaul & Testing—*See "Valve System" in Oldsmobile Special Data.*

Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves—Open 13½° BTDC. Close 50½° ALDC.
Exhaust Valves—Open 49½° BLDC. Close 14½° ATDC.

Valve Timing Check—Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke). Trailing edge of notch in vibration dampener will be aligned with pointer on timing chain cover. Install tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust push rod. The 7/16" diameter pilot at bottom of tool will fit into cylinder head bolt hole. Screw main body of gauge down so step plunger contacts push rod and small diameter of step plunger is flush with top of main body. Tighten clamp bolt. Rotate engine one complete revolution so that #1 piston is again at TDC (intake stroke). Distributor rotor should now be pointing toward rear of engine. If timing chain is installed properly, top of tool plunger will rise so top of main body of tool is between second and third step. If camshaft is retarded one tooth, the third step will rise above top of main body, and if advanced one tooth, second step will be below main body.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 5 qts. (refill). 6 qts. (dry).
NOTE—1 qt. additional for dry filter.

Normal Oil Pressure: 35-45 lbs. at 50 MPH.
Pressure Regulator Valve—In pump body. Not adjustable.

Oil Pressure Indicator—AC No. 1508118. Not electrical.

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Oil Pump: Gear type. In crankcase at rear end.
Pump Ov rhaul—*S "Oil Pump" in Oldsmobile Special Data.*

Oil Filter: AC No. PM-90-3 full flow type (optional). On lower right side of crankcase at rear.
R placement Filter Element—AC No. PF-122.

►*CAUTION*—If filter (or pad cover if filter not used)is replaced, used a new gasket (coat both sides with POB No. 5 Sealer) and tighten bolts to 35-40 ft. lbs. Oil filter or pad mounted externally on lower right side of crankcase at rear. Oil filter is full flow type (all oil from pump delivered to oil filter) requires pad when filter not used to return oil to main oil gallery.

Crankcase Ventilati n: Air intake in oil filler cap has oil-wetted cleaner, AC No. 1551091 (Std.), No. 1551509 (Heavy Duty). Outlet is connected to ventilating baffle at rear of block above right bank. Outlet pipe is push fit at ventilator and extends down below right rear corner of engine.

►*NOTE:* Air cleaner also used in lower section of ventilator outlet tube on cars with heavy duty inlet breather in filler cap and oil bath air cleaner.

COOLING

Wat r Capacity: 20½ qts. (without heater), 21½ qts. (with heater).

Pr ssure Valv : AC Type RC-1, No. 850549. Radiator Filler Cap (stamped 549/7#).

Th rm stat: Oldsmobile No. 563219 (160°). NOTE—use No. 563311 (180°) with permanent type anti-freeze.

Wat r Pump: Packless, sealed ball bearing type.
See "Wat r Pump" in Oldsmobile Special Data.
Pump R m val—Remove fan and fan pulley. Remove six mounting bolts (4 to engine cover, 2 to engine block). Remove pump. *NOTE*—When installing pump, coat one side of pump housing gasket with gasket cement, dip bolts in CP No. 9 Sealer.

Temp ratur Gaug : *12 Volt.* AC Electric. *CAUTION*—Use only 12 Volt type units which are stamped "12 Volt" on threaded side of block unit below nut hex. Later type 12 volt block units also have a copper colored terminal. 6 volt units have a natural brass terminal.
Dash Unit—AC No. 1512810.
Engin Unit—AC No. 1512678.
See "Temp ratur Gaug s" in Miscellaneous Section.

CLUTCH

L ng 11CF-11 Tl. Single plate dry disc type.
S e "Long Clutches" in Clutch Secti n.
Clutch Disc N .—Oldsmobile No. 565059.
P dal Adjustm nt: Pedal free travel 1 1/8-1 3/8". Adjust by turning adjusting nut on clutch connector link at throw-out yoke.

R m val: Remove transmission (see Transmission), remove right and left splash pans, engine breather pipe, and right and left lower flywheel housing bolts. Install Engine Rear Support Tool BT-28, entering pilot supports into lower housing bolt holes. Remove engine rear mount bolts at clutch housing, and remove frame cross member by removing three bolts at each end. Remove clutch housing by removing eight bolts holding housing to flywheel housing. Remove clutch assembly from flywheel.

Clutch Housing Alignment: *See "Flywheel Housing" in Oldsmobile Special Data.*

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse) all helical gear type. *See "Oldsmobile Synchro-mesh" in Transmission Section.*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission. Remove clutch return spring and disconnect clutch linkage at yoke connecting link. Detach drive shaft at rear universal joint, and slide shaft from transmission. Remove transmission.

HYDRA-MATIC DRIVE

"Dual-Range" four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*NOISE IN LIGHT THROTTLE REVERSE OPERATION CORRECTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 1000 miles. Drain & Refill every 25,000 miles. Use only GM Hydra-Matic Drive Fluid.

Checking Fluid Level—Set hand brake, let engine idle and move selector lever to "Lo" position. Raise engine Raise engine hood and remove dipstick located at right rear side of engine, wipe dry. With engine idling, replace dipstick, and remove quickly to check fluid level. Add GM Hydra-Matic Drive Fluid to bring level to "FULL" mark.

►*CAUTION—DO NOT FILL ABOVE "FULL" MARK.*

Hydra-Matic Indicat r: Lights on instrument panel indicate position of Hydra-Matic selector lever. Unit consists of three coils in sealed unit operating five lights on instrument panel. Coils are energized by movement of Hydra-Matic Neutral Safety and Indicator Switch which is connected to Hydra-Matic linkage.

Checking Indicator Unit—Disconnect all three leads from unit. Connect jumper wire from hot side of ignition switch to #1 terminal on unit; "N" should light. Connected to #2 terminal; "S" should light. Connected to to #3 terminal; "R" should light. If indicator does not indicate correctly, replace unit.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Mechanics. Roller bearing type.

►***PROPELLER SHAFT YOKE LUBRICATION CAUTION:*** **Remove plug, install fitting and lubricate with hand pressure gun using high melting point, low viscosity lubricant, Oldsmobile Part No. 567196 Remove fitting and replace plug. Do not use chassis grease at this point.**

►*CAUTION*—Rear universal companion flange nut controls rear axle pinion bearing pre-load (must be adjusted whenever nut loosened) *See "Oldsmobile Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss drive. *See "Oldsmobile Hypoid" in Rear Axle Section.*

►*PINION SHAFT COMPRESSIBLE SPACER PRODUCTION CHANGE: New type spacer not interchangeabl with those on previous rear axle assemblies. S "Oldsmobile Hypoid" in Rear Axle Section.*

Axle Ratios

Ratio	①C d
3.07-1 (40:13)	0
3.9-1 (39:10)	4
3.64-1 (40:11)	6
3.42-1 (41:12)	8
3.23-1 (42:13)	9

①—Rear axle ratio code number stamped on lower locating boss on forward side of carrier.

Backlash—.004-.006". Screw adjustment.

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used). Remove backing plate mounting nuts and static collector. Loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position.

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Diff r ntial Carri r Ass mbly R m val: Remove axle shafts (see above). Clean differential carrier and axle housing around carrier to prevent dirt entering housing. Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers. Mark universal joint so it can be replaced in the same position. Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing.

CAUTION—Do not wash exterior of carrier until differential has been disassembled.

Wh el Bearing Adjustment: None required. Bearings are built with .012-.015" endplay between balls. Check endplay before removing axle shaft and if endplay greater than .020", replace bearings. *CAUTION*—If bearings removed from shaft, they cannot be reused.

SHOCK ABSORBERS

Delco. Double Acting used on front. **Direct Acting** used on rear.

Front Shock Absorbers

Model	Right	Delco No.	Left
88 & Super 88 ①	5511190		5511191
98	5513733		5513734

①—Except Air-Conditioned Cars.

Rear Shock Absorbers

Model	Right	Delco No.	Left
88 & Super 88	5511192		5511192
98	5519693		5519693

►*SHOCK ABSORBER LUBRICATION NOTE*—(Front) Check fluid level every 10,000 miles and replenish with Delco Shock Absorber Fluid. (Rear) Not serviced.

FRONT SUSPENSION

Independent. Double acting shock absorber directly connected to steering knuckle support and forms upper control arm.
See *"Oldsmobile" in Front Suspension Section.*

►*STEERING TIE-ROD STRIKING OIL PAN CORRECTION:* To prevent tie-rod from striking oil pan on extreme turns, place a 7/16" flat washer under head of wheel stop bolt on steering knuckle support so that stop bolt protrudes a minimum of 1". If this does not provide at least 1/8" clearance between tie-rod and pan, reform the pan slightly as necessary. *CAUTION—Be very careful not to puncture oil pan.*

Kingpin Inclinati n—5° 51' 10" crosswise.
Cast r— 0° to Neg. ¾°. Variation betwe en both sides should not exceed ½°.
Camber—Neg. ¾° to Pos. ¾°. Variation between both sides should not exceed ½°.
Toe-In—1/16" to 1/8".
Toe-Out on Turns—23°±½° on inner wheel with outer wheel turned 20°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic power cylinder.
See "Saginaw (GM) Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). Conventional two shoe with short molded lining front (Primary), and long molded lining rear (Secondary). Parking brake applies rear wheel service brakes.
See "Bendix Hydraulic" in Brake Section.

►***1954 PARKING BRAKE CABLE PRODUCTION CHANGE & ADJUSTMENT CAUTION:*** **Early 1954 type parking brake rear cables are longer, and front cables are shorter. It is necessary when adjusting the first types that threaded part of rear cables do not protrude into clevis more than ¾". Front cable threaded part should be installed all the way through the clevis. Later type cables have been adjusted for length and do not require the above precautions.**

►*BRAKE ASSEMBLY PRODUCTION CHANGE:* Beginning May 15, the brake assembly has been revised to include a larger retracting spring and parking lever assembly *See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section*
Drums—Diameter 11". Rebore limits .060".

Wheel Cylinder Diameter—Front 1 1/32". Rear 31/32".
Lining—Molded. **Width**—2½" (front wheels), 2" (rear wheels). **Thickness**—7/32".

Length—(Primary) 9 3/8", (Secondary) 12 1/32"

Cl aranc —Adjusting screw backed off 16 notches from point where wheels can just be turned by hand

Braking P w r—50% Front. 44% Rear.

Standard Master Cylinder: On left chassis frame front extension under hood.

Checking Fluid—Fluid reservoir is part of master cylinder. Maintain fluid level to top of reservoir.

Removal—Remove from above. Not necessary to disturb other parts.

Power Brakes: Bendix or Moraine Power Unit (combination vacuum power unit and hydraulic master cylinder) Unit is mounted on under side of toe board and replaces regular master cylinder. *See "B ndix Pow r Unit" or "Moraine Power Unit" in Brak S ction.*

Checking Fluid—Same as for standard master cylinder.

Removal of Power Unit—Disconnect hydraulic line at master cylinder and secure hose so that end is above level of junction assembly. Disconnect vacuum hoses hoses at power cylinder, and remove dipstick. Disconnect leads from stop light switch and fold back floor mat. Remove three brake pedal bracket attaching bolts and remove pedal and bracket. Remove mast jacket grommet retainer and slide grommet up mast jacket. Remove mast jacket cover plate attaching screws, cover plate and power cylinder assembly. Remove two cover plate-to-power cylinder bolts and remove cover plate.

MISC. MECHANICAL

Windshield Wipers: Cable operated Vacuum type. *S e "Windshield Wipers" in Miscellan ous S ction.*

Air Conditioning: Frigidaire type with solenoid controlled compressor clutch (compressor) operates only with air-conditioning switch turned on. *S "Frigidaire Air-Conditioning" in Miscellan us Section.*
Window Regulators: Two systems used:
(1) Electric—Reversible motor in each window.
(2) Hydro-Lectric—Window raised hydraulically, lowered by return spring. *See Misc llaneous S ction for typ s and Model application.*
Power Top Control: Hydro-Lectric. *S "Pow r Top Controls" in Miscellaneous S cti n.*
Power Seat Adjusters: Two systems used:
(1) Electric—Individual reversible motor for vertical and horizontal adjustment.
(2) Hydro-Lectric—Individual cylinder for vertical and horizontal adjustment. *S e Misc llaneous Secti n for types and Model applicati n.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL NUMBERS: On left body pillar post.
Starting Serial Number — 1001.

►*SERIAL NUMBER NOTE. Complete serial number (example 567M 1001) includes following identification data in sequence.*

Year	Series①	Assy. Plant②	Serial No.
56	7	M	1001

① — Series Designation 7 — (88 Series). 8 — (Super 88 Series). 9 — (98 Series).

② — See Assembly Plant Designation following.

Assembly Plant Designation

M — Lansing	L — Linden
A — Atlanta	C — South Gate
B — Framingham	W — Wilmington
K — Kansas City	T — Arlington

ENGINE NUMBER: Stamped on machined pad located on top of left hand cylinder bank of block. The number can be observed between the front and center exhaust manifold ports.
Starting Engine Number—V1,000,001

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed. Reading on low cylinders should not be less than 80% of high cylinder.

VACUUM READING: Steady 17" minimum at idling speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe. Stop spring should strike stop before counter-weight touches pin to prevent valve rattle when cold.

►*DUAL EXHAUST NOTE:* When heat control valve closed, most exhaust gases are discharged through right exhaust pipe.

►*DUAL EXHAUST INSTALLATION CAUTION (To prevent Excessive Exhaust Noises From Being Transmitted Into Car):* It is important that intermediate bracket clamp be tightened AFTER other clamps and supports are tightened. If tightened first, vibrations will be transmitted to car.

IGNITION

FIRING ORDER: 1—8—7—3—6—5—4—2.
Cylinders—RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .030".
Spark Plugs—AC No. 44.14mm. Torque to 23-28 ft. lbs.
COIL: Delco-Remy 1115087. 12 Volt.
Ignition Current—2.0 amperes idling. 4.5 stopped.
Resistor—**Delco-Remy 1928016.** On bracket adjacent to ignition coil.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by second lead from ignition switch.*

DISTRIBUTOR: Delco-Remy 1110857. 12 Volt. New external adjustment "Window" type. *See "Delco-Remy (Window Type) Distributor" in Electrical Section.*
Condenser—Delco-Remy 1932004. **Capacity** .18-.23 mfd.
Contact Point Set — Delco-Remy 1931988.
Breaker Gap — .016"
Cam Angle — 26-33°
Breaker Arm Spring Tension — 19-23 ozs.
Rotation — Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
7¾-9¾		1000	15½-19½		2000
9-11		1200	18-22		2400
11-13		2000	22-26		4000

Vacuum Spark Control: Delco-Remy 1116096.
Plunger Travel — 7/32—15/64".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4.5—6.5
10.75	21.50	15.25—16.0

IGNITION TIMING

Setting—5° BTDC, with engine idling at 850 RPM and vacuum line to distributor disconnected and carburetor opening taped closed.

►*DETONATION CAUTION: If engine detonates (due to low octane fuel or carbon build-up) set timing to 2½° BTDC. For high altitude operation, timing can be adjusted to 7½° BTDC, if detonation does not occur.*
Timing Mark— Slot in rim of crankshaft pulley and pointer on front cover. Leading edge of slot is 5° BTDC. Trailing edge is TDC. Midway between these points is 2½° BTDC.

CARBURETOR

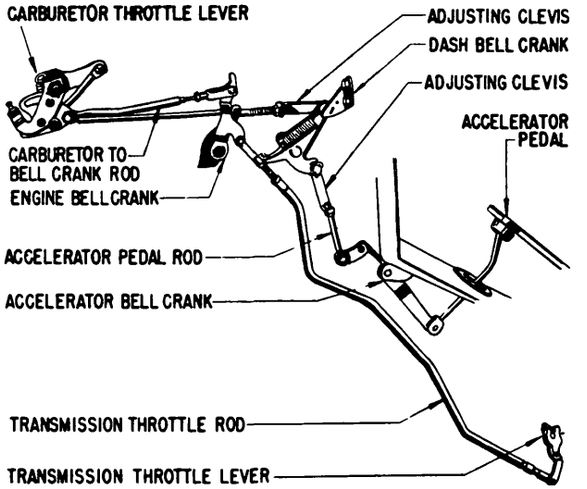
►*CARBURETOR APPLICATION: Rochester 2GC 2-Barrel used on 88 Series, Rochester 4GC 4-Barrel used on Super 88 & 98 Series.*

►*IDLE ADJUSTMENT NOTE: A "Split" throttle lever permits idle speed adjustment after Hydra-Matic Throttle Linkage adjustment made (without affecting that adjustment).*

Throttle Return Check Adjustment (Cars with "Jetaway" Hydra-Matic): With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1500 RPM. Flash throttle and allow to return to slow idle, then turn off the ignition switch. Set carburetor on fast idle and check clearance between throttle return check plunger and throttle lever. Adjust to .020" using two wrenches so that diaphragm is not permitted to turn.

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC DRIVE CARS): Install Throttle Return Check Holding Tool J-6342 to hold plunger away from throttle lever. Proceed as follows:

1) Remove throttle rod from transmission throttle lever and move throttle lever to rear against its stop, and with Throttle Lever Gauge J-5605 (88 Series with Std. Hydra-Matic), Gauge J-6344 (All Series with "Jetaway" Hydra-Matic), placed flat against rear face of transmission case, rod on gauge should just enter hole in throttle lever. Adjust throttle lever by bending with tool J-2029. Attach throttle rod to lever.



HYDRA-MATIC THROTTLE LINKAGE

2) With carburetor on slow idle adjust rod between throttle lever on carburetor and bellcrank on dash so a clearance of 11/32" to 13/32" exists between bellcrank lever and dash *(NOTE — Open side of clevis should face away from engine with 4-Barrel carburetor, and toward engine with 2-Barrel carburetor).*

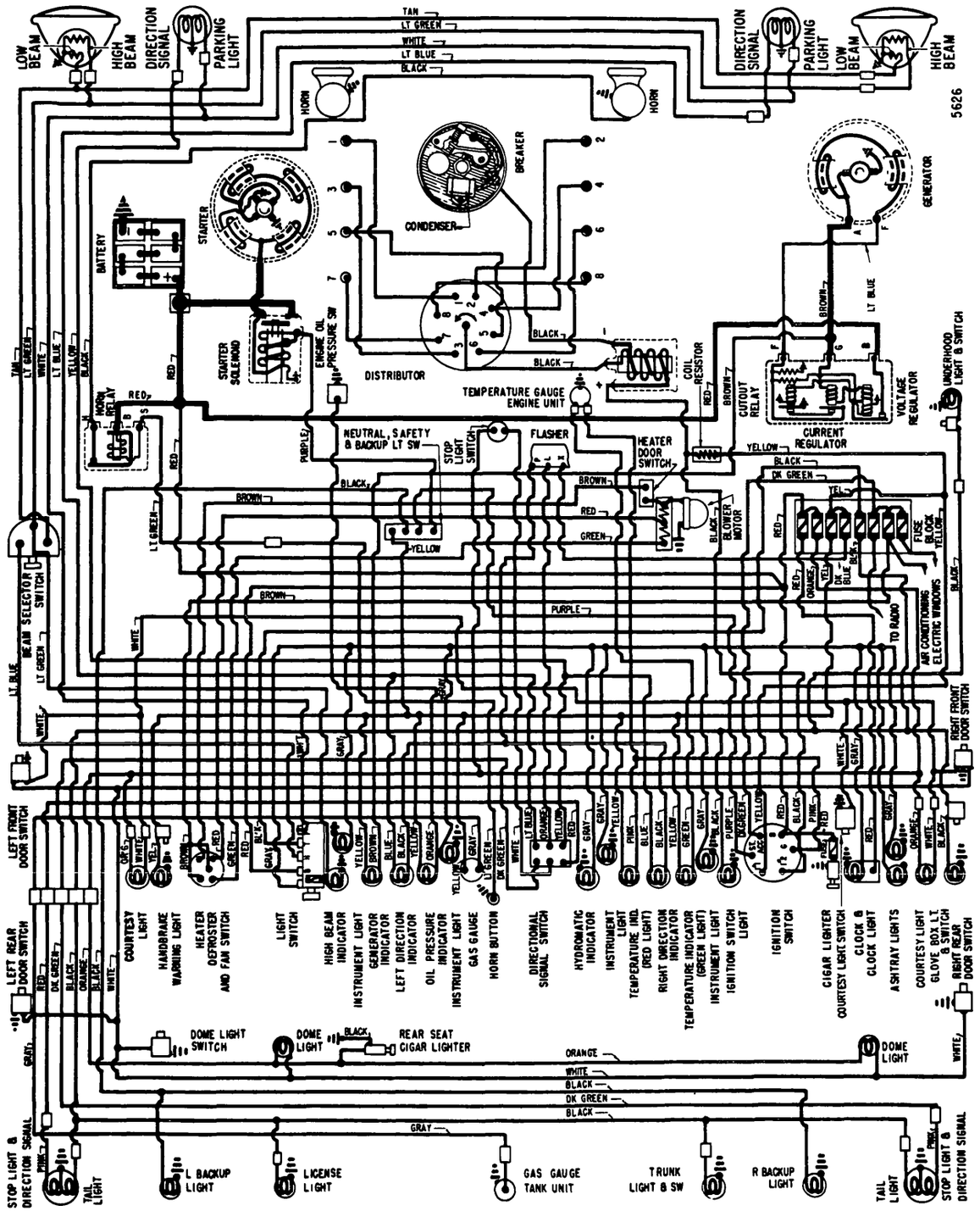
3) Loosen jam nuts and remove both clevis pins and rods from bellcrank on rear of cylinder head. With bellcrank held against the stop and bellcrank-to-transmission throttle lever rod pushed back against the stop, adjust clevis so pin will enter freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut (bellcrank should be against the stop. If it is away from the stop, transmission throttle lever rod is too long). Adjust short rod from carburetor-to-bellcrank so that clevis pin just touches gauge point (gauge point is forward face of elongated section of lever directly above upper hole in lever) on bellcrank, or is one-half turn short.

NOTE — Throttle rod should be pulled lightly toward rear of engine to remove slack and bellcrank should be against the stop when adjustments made.

4) Install clevis pin and cotter pin and tighten jam nut.

5) Hold choke wide open and pull forward on bellcrank on dash until throttle is wide open. Then go beyond to the point of maximum transmission lever travel (this point is a matter of feel and care must be taken not to bend or stretch linkage beyond the actual point of maximum transmission lever travel). With throttle held in this position adjust stopscrew on carburetor throttle lever to just touch the tang on the downshift lever

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(carburetor-to-bellcrank rods are attached to downshift lever). *NOTE* – This adjustment will prevent linkage from bending when a detent downshift is made.

6) Adjust accelerator pedal as follows: Place a wood block 3 7/8" long on the top center of the floor mat retainer and bring bottom of accelerator pedal down to rest on block. With carburetor in the slow idle position (choke completely off), pedal should just touch gauge block. If necessary to adjust, disconnect rod assembly between bellcrank on dash and accelerator pedal bell and adjust rod so that clevis just slides over pin with wood block in position and carburetor in slow idle position. Reassemble rod between dash bellcrank and accelerator bellcrank, making sure that open side of rod is facing away from engine, then remove wood block.

ROCHESTER 2GC (CONCENTRIC BOWL) No. 7007223

The new 2GC (Concentric Bowl) Rochester Carburetor is similar in design to the 2GC (Side Bowl) carburetor used on previous models, the principal difference being the concentric bowl design and the relocation of the metering jets toward the center of the carburetor.

►*ENGINE STALLING WHEN COLD CORRECTION (First Cars)*: Caused by carburetor dropping down to slow idle before engine fully warmed up. Correct by drilling 3/64" hole in end of choke piston to reduce vacuum behind piston. *NOTE–Carburetors tag-dated "B" and later incorporate changes in piston and choke housing DO NOT require this modification.*

►*CARBURETOR PRODUCTION CHANGES (To Correct Cold Drive-away & Low Speed Acceleration Difficulties): See "Rochester 2GC Carburetor" in Carburetion Section.*

Service Replacement Carburetor – Rochester No. 7009300 (Service Package), furnished less Throttle Return Check Assembly.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting – 1 1/2 turns open (initial setting). With engine at normal operating temperature, turn each idle adjusting screw in or out for smoothest possible idle (highest vacuum and RPM), then turn each screw out (rich) 1/4 turn. *NOTE* – If engine rolls from richness when throttle snapped closed, turn each screw in 1/8 turn.

Idle Speed – 425 RPM (Synchro-mesh); 400 RPM (Hydra-Matic – With selector lever in "Dr" range).

Float Level – *NOTE – Double floats used in this carburetor.* With air horn inverted and gasket in place, distance from gasket surface to top of floats should be 1 7/16". Use Float Setting Gauge J-6337 (Oldsmobile), BT-125 (Rochester) and position gauge over both floats so that gauge rests against curvature of air horn. Bend float arm tang until floats just touch the gauge. Align floats vertically in gauge slots.

Float Drop – With air horn held upright, distance from bottom of float to gasket surface should be 2". Bend the float tang toward needle seat to lessen drop and away from seat to increase drop.

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Fast Idl : 1700 RPM with fast idle screw on high step of fast idle cam. Adjust screw as necessary to obtain the correct engine RPM.

Unl ad r: Index the throttle levers by backing out the idle stop screw, then turn it **in one turn** beyond the point where the outside lever begins to move. With the throttle valves wide open, the large end of Gauge J-6338 (Oldsmobile), BT-127 (Rochester), should just fit between the upper edge of the choke valve and the air horn wall (this distance is .155"). To adjust, bend the throttle lever tang with Tool BT-69.

Aut matic Ch k Setting: One notch rich. *NOTE*–Supersedes previous "Centered (at index)" specification.

►*OTHER DATA: S "Rochester 2GC Carburetor" in Carbur ti n S ction.*

Throttl R turn Ch ck Adjustment (Hydra-Matic Drive Cars): *S e CARBURETOR above.*

Hydra-Matic Thr ttl Linkage Adjustment: *See CARBURETOR abov .*

Fuel Pump Pr ssure: 4 — 5 1/4 lbs. at 450-1000 RPM.

ROCHESTER 4GC

Roch ster N . 7007221 (Hydra-Matic), 7007222 (Synchr -m sh).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idl S tting — With engine at operating temperature, set the idle speed (see below), turn each screw in or out for smoothest possible idle (highest vacuum and RPM), then turn each screw out (rich) 1/4 turn. NOTE — If engine rolls from richness when throttle snapped closed, turn each screw in (lean) 1/8 turn.

Idle Sp ed — 425 RPM (Synchro-mesh); 400 RPM (Hydra-Matic — With selector lever in "Dr" range).

►*OTHER DATA: S "Rochester 4GC Carburetor" in Carburetion Secti n.*

Thr ttl Return Check Adjustment (Hydra-Matic Drive Cars): *S CARBURETOR above.*

Hydra-Matic Thr ttl Linkage Adjustment: *See CARBURETOR abov .*

Fuel Pump Pr ssur : 4-5¼ lbs. at 450-1000 RPM.

CARB. EQUIPMENT

Fu l Pump: AC Replac m nt No. 4317. Fuel & Vacuum.
Pr ssur — 4-5¼ lbs. at 450-1000 RPM.
S "Fu l Pumps" in Carburetion Section.

Gasolin Gaug : AC Electric type.
Dash Unit — AC No. 1518430.
Tank Unit — AC No. 1518409.
See "Fu l Gaug s" in Carburetion Section.

BATTERY

D lc 3KMR62. *12 Volt,* 9 plate, 62 ampere hour capacity (20 hour rate).
Batt ry Ground — Negative.
Engin Gr und—Connected between engine and forward side of firewall.

STARTER

D lc -R my 1107638. *12 V lt.* **Armatur** 1927343.
Driv — Overrunning clutch (solenoid pinion shift).
R tati n — Counter-clockwise at commutator end.
Brush Spring T nsi n — 35 ozs. minimum.

P rf rmanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95 max.
10.5 ft. lbs.	Lock	5.4	470 max.

Starting Switch: Solenoid switch, Delco-Remy 1119780, mounted on starter and controlled by combination Starter & Ignition Switch, Delco-Remy 1116521, and Neutral Safety Switch (see below). *NOTE* - Neutral Safety Switch used on all models with automatic transmission.

Hydra-Matic Neutral Safety Switch: Delco-Remy 1998135 (88 Series with Std. Hydra-Matic — 5 - position switch). **Delco-Remy 1998125** - All Series with "Jetaway" Hydra-Matic - 6-position). Combination Neutral Safety and Back-up Light Switch.
Adjustment — *See "Dual Range" or "Dual Coupling" Hydra-Matic in Transmission Section.*

GENERATOR

Delco-Remy 1102003 (Std.), 1102021 (Air Conditioned Cars). *12 Volt. NOTE* — Above listed generators are with pulley. Generator without pulley is Delco-Remy 1102005.

►*GENERATOR WARNING LIGHT NOTE:* Warning light lights when ignition turned on. As generator speed increases, light will go out.

Armature — Delco-Remy 1923535 (All Models).
Maximum Charging Rate — *See Voltage Regulator.*

Performance Data

Amperes	Volts	RPM
30 Ⓒ	14	2150

Ⓒ — Not maximum. See Regulator.
Brush Spring Tension — 28 ozs.
Field Current — 1.48-1.62 amperes at 12 volts.
Rotation — Counter-clockwise at commutator end.

Belt Adjustment: Loosen generator attaching bolt and place Tool J-4170-B against generator between bracket and generator housing. Attach torque wrench to tool to apply torque of 16 ft. lbs. (Std.), 20 ft. lbs. (Air Conditioning). Tighten generator attaching bolts while holding tension on wrench.

REGULATOR

Delco-Remy 1119001. *12 Volt. NOTE - Regulator is "1119000 Series" Specifications below are "Normal" settings.*

Cutout Relay
Cuts In — 11.8-13.5 volts (hot).
Contact Gap — .020".
Air Gap — .020" (with contacts just closed).

Voltage Regulator
Setting — 13.8-14.8 volts (hot).
Air Gap — .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting—*See "1119000 Series Regulator" in Electrical Section.*

Current Regulator
Setting — 27-33 amperes (hot).
Air Gap — .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting — *See "1119000 Series Regulator" in El ctrical S ction.*

MISC. ELECTRICAL

H adlamps: Sealed B am. *See El ctrical S ction.*
Dir cti n Signal: *S El ctrical Secti n.*
Autr nic Ey : *S El ctrical S ction.*

Lighting Switch R m val: Disconnect battery cable and disconnect wires from lighting switch. Pull switch knob out to last notch then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch. Remove switch mounting nut and remove switch and escutcheon from instrument panel.

Stop Light Switch Location (Std. Brakes): Mechanical type on toe board near brake pedal.

Stop Light Switch Location (Power Brakes): Directly above brake pedal on firewall. Adjust so lights come on within free travel of brake pedal.

FUSES: All fuses (exc. Instrument Panel fuses) are located on a combination fuse and junction block under the instrument panel. A color code is used on the fuse panel corresponding to the color code of circuits protected by each fuse. The following fuses will be found on this panel:

(1) Clock (Std. on 98 Series only). 1 ampere.
(2) Courtesy Lights, Dome & Stop Lights, and Rear Cigar Lighter. 25 amperes.
(3) Fuel & Temp. Gauges, Hand Brake Signal Light, Hydra-Matic Shift Indicator, and Back-up Lights. 9 amperes.
(4) Turn Signal. 9 amperes.
(5) Glove Box, Underhood, Keyhole, Tail, Trunk, & Spot Lights. 9 amperes.
(6) Radio. 7.5 amperes.
(7) Heater & Air Conditioner. 20 amperes (without Air Conditioner), 25 amperes (with Air Conditioner).
(8) Electric Windows & Antenna. 20 amperes.
Instrument Panel Lights—2 amperes located on headlight switch.
Cigar Lighter—20 amperes located behind lighter.

CIRCUIT BREAKER: 22 amps. Located in headlamp switch.

HORNS: Delco-Remy 1999753 (Low Note). **1999754** (High Note). *12 Volt.*
Optional (Trumpet Type) — **Delco-Remy 1999586.** *12 Volt.*

Horn Relay: Delco-Remy 1116781. *12 Volt.*
Contacts Close — 5-9 Volts. Set to 6.5 if outside limits.
Contact Gap — .027". **Air Gap** — .014" (closed).

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Befor disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 90° V8 with overhead valve.

Bore	Stroke	Displacement	Rated HP
3 7/8"	3 7/16"	324 cu. ins.	48

Engine	Compr. Ratio	Developed HP
88	9.25-1	230 at 4400 RPM
Super 88 & 98	9.25-1	240 at 4400 RPM

Compression & Vacuum Reading — *See TUNE-UP.*

CYLINDER HEAD: *See Oldsmobile Special Data.*

INTAKE MANIFOLD INSTALLATION: *See "Cylinder H ad & Manif ld" in Oldsm bil Special Data.*

TIGHTENING TORQUES: *S Oldsm bile Sp cial Data.*

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OIL PAN REMOVAL: *S Oldsmobil Special Data.*

ENGINE FRONT MOUNT INSTALLATION: *See Oldsmobile Special Data.*

PISTONS

Aluminum alloy, three ring, autothermic, steel strut, slipper skirt, cam ground, tin plated.

Length – 4.05". **Weight** – 22.07 ozs. (less rings & pin).

►*CAUTION:* Mark piston, rods, and bearing caps with cylinder number before removal to insure correct reinstallation.

Fitting New Pistons: .0005-.0010" clearance at thrust surface (Selective fit). With piston inverted and pin removed, insert piston into bore. Pull required to withdraw a .0015" x 1/2" x 12" feeler placed at 90° to normal position of pin and piston at center of normal travel, should be 5-12 lbs. *See "Pistons" in Oldsmobile Special Data.*

►*CAUTION: Allow rebored cylinders to cool to normal room temperature before fitting pistons.*

R placement Pistons: Std. & .020", .030" Oversize. Pistons furnished only with fitted pins.

Installing Pistons: Install pistons 1, 3, 5, 7 in left bank, and 2, 4, 6, 8 in right bank with letter "F" cast on each side of piston pin hole, and notch in piston head, toward front of engine.

PISTON PINS

Floating type with lock ring at each end

►*CAUTION: Discard old lock rings and install new service type lock rings when installing pins.*

Diameter – .9803-.9807". **Length** – 3.126".

Pin Fit in Piston – Pin should not fall through piston of own weight when using the low limit (.0000" fit). Piston can be tapped into place using brass drift.

Pin Fit in Rod 3ushing – .0003-.0005" loose.

Replacement Pins: Std. size & .001", .003" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compression	.077-.078"	①	.001-.003"
Oil	.180-.186"	②	.0023-.0039"

① – Perfect Circle .010-.020". Sealed Power .008-.016".
② – Perfect Circle & Sealed Power .013-.033".

R placement Rings: Furnished Std. & .010" Oversize (not in sets), Std. & .030" Oversize (in sets).

Installing Rings: Install upper chrome and lower black compression rings with side marked "TOP" up. Install oil ring (either side up) with gap on same side of piston as rod spit hole. Install oil ring expander with gap on side opposite rod spit hole.

CONNECTING RODS

Length—6 5/8" (Center to center). **Weight**—29.54 ozs.
Crankpin Journal Diameter—2.2488-2.2498".
Out of Round Limit—.0015".

Bearings—Durex 100A, steel backed, full precision type. Both halves interchangeable. No shims.

Clearance – .0009-.0029" (vertical), .0019-.0039" (horizontal).

Sid play—.002-.011" (total for both rods).

R plac m nt B arings: Standard size, .002", .010", .020" Undersize.

Installing R ds: *CAUTION*—Rods have plain side and boss side (two machined bosses at lower end). Install rods **1, 3, 5, 7 with plain side to fr nt, and 2, 4, 6, 8 with boss side to front** (*NOTE*—Pistons marked "F" on front side). Caps offset and cannot be installed incorrectly. Groove on rod and cap, and pads for numbering caps and rods are on same side.

►*CAUTION—Use Guide tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

NOTE—Oil spit hole for lubrication of opposite cylinder wall provided in rod above cap joint.

CRANKSHAFT

Journal Diameter—#1, 2, 3, 4 2.498-2.499", #5 2 623-2.624".

Bearings—Durex 100A, steel backed, full precision type. Rear bearing flanged.

Clearance—.0005-.002" (Front—See Note below), .002-.0035" (Rear - See Note below), .0005-.003" (Others).

►*FRONT MAIN BEARING NOTE Selective fit bearing used.* **On cars with Power Steering or Air Conditioning it is very important that front bearing fit be held as close as possible because of the increased pump drive and compressor drive belt load** Bearing Part No 565770 (Marked "M" on tang) will reduce bearing clearance .0005" Bearing Part No. 564771 (marked "H" on tang) will reduce bearing clearance .001". These bearings are in addition to regular replacement bearings

►*REAR BEARING NOTE* Rear bearings are selective fit during manufacture, 3 sizes used· "M" Medium, "T" Thin, "H" heavy **Use same size bearing (indicated by letter on tang) when replacing bearing.**

Replacement Bearings: Standard size, .002", .010", .020" Undersize. In addition to lettered bearings used at front and rear. *See Front & Rear Bearing Notes above.*

End Thrust: Taken by rear (#5) flanged bearing.

Endplay—.004-.008"

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data*

Flywheel & Clutch Housing Alignment· *See "Flywheel Housing" in Oldsmobile Special Data.*

CAMSHAFT

Journal Diameters – 1.9970-1.9975".
Bearings – Steel backed babbitt.
Clearance – .0018-.0038".

End Thrust: Forward thrust taken by plunger and spring on front of engine, rear thrust at front of cylinder block.

►*CAUTION:* Two main oil gallery holes in block sealed by hex head bolt. A small hole in bolt for right hand gallery provides lubrication to timing chain, fuel pump eccentric and lever.

Camshaft R m val & Installati n: *See "Camshaft" in Oldsmobile Sp cial Data.*

Timing Chain:	Link-3 lt	M rs
Width	11/16"	13/16"
Pitch	.500"	.375"
Length (Links)	48	64

►*NOTE—Morse and Link-Belt chains not int rchang able unless sprockets also chang d*

Engine Front Cover Removal & Installati n: *See "Engine Front Cover" in Oldsmobile Special Data*

Engine Front Cover Oil Seal (Crankshaft Fr nt Seal) Installation: *See "Engine Front Cover" in Oldsmobile Special Data*

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straight edge across shaft centers (or use Tool BT-11).

►*NOTE—Fuel pump eccentric bolted to front of camshaft ahead of sprocket. Assemble with "0" mark to front, machined step against sprocket*

VALVES

Valves	Head Diam.	St m Diam.	L ngth
Intake	1.745-1.755"	.3417-.3425"	4.989-5.009"
Exhaust	1.557-1.567"	.3930-.3938"	4.989-5.009"
Valve	**Seat Angle**	**Lift**	**Stem Cl aranc**
Intake	45°	.418"	.0017-.0040"
Exhaust	45°	.418"	.0022-.0045"

Valve Seat - .042-.071" (Intake & Exhaust).

Intake & Exhaust Valve St m Oil S als – A "Top Hat" type oil seal (deflector) is installed on valve stem below valve spring retainer.

Valve Springs: Intake and exhaust valve springs are alike. Dampers are used on lower end of all valve springs.

Valve Spring Sp cificati ns

Valve	Pr ssur	L ngth
Closed	95-105 lbs.	1.880"
Open	183-197 lbs.	1.480"

Spring Free Length – 2.38" approximately.

►*CAUTION:* Lower end of damper and spring must seat in recess in head. Install closely wound spring coils toward cylinder head.

Valve Guides: Press guide in head until top of guide is .787" above top of head. Ream inside diameter of guide, after installation, to .3442-.3457" (Intake), .3960-.3975" (Exhaust).

Hydraulic Valve Lifters: Barrel type.

►*HYDRAULIC LIFTER INSTALLATION CAUTION*

FIVE different sizes used in production as follows (marked as indicated) Standard (unmarked), 001 O S (marked "1"), 002 O S (marked "2"), 003 O S (marked "3"), 005 O S (marked "5") **Lift rs** marked by etched number on lifter body, **Cylind r Bl ck** marked by number on rail under engine top cover *R - install lifter in same hole or r place with proper size.*

Diameter—.8424-.8427". **Length**—2" (Overall).

Clearance in Block—.0005-.0018" (Selective).

Replacement Lifters: Standard size, .001", .002", .003", .005" Oversize.

Hydraulic Lifter Overhaul & Testing—*See "Valve System" in Oldsmobile Special Data*

R ck r Arm Ass mbly: *Se "Valv System" in Oldsmobile Special Data*

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VALVE TIMING

S *"Camshaft S tting" under CAMSHAFT above.*
Intak Valv s – Open 11½° BTDC. Close 52½° ALDC.

Exhaust Valv s – Open 51° BLDC. Close 13° ATDC.

Valv Timing Check–Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke). Trailing edge of notch in vibration dampener will be aligned with pointer on timing chain cover. Install tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust push rod. The 7/1C" diameter pilot at bottom of tool will fit into cylinder head bolt hole. Screw main body of gauge down so step plunger contacts push rod and small diameter of step plunger is flush with top of main body. Tighten clamp bolt. Rotate engine one complete revolution so that #1 piston is again at TDC (intake stroke). Distributor rotor should now be pointing toward rear of engine. If timing chain is installed properly, top of tool plunger will rise so the top of main body of tool is flush with the third step. If camshaft is retarded one tooth, the third step will rise above top of main body, and if advanced one tooth, second step will be below main body.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Oldsmobile Special Data.*

Crankcas Capacity: 5 qts. (refill). C qts. (dry).
NOTE– 1 qt. additional for dry filter.

N rmal Oil Pr ssur : 35-45 lbs. at 50 MPH.
Pr ssur R gulat r Valv –In pump body Not adjustable.
Oil Pr ssur Indicat r – Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter. Lights when pressure below 3 lbs.
Engin Unit – AC No. 1508319.
S *"Oil Pr ssure Indicators" in Miscellaneous Section.*

Oil Pump: Gear type. In crankcase at rear end.
Pump Ov rhaul–*See "Oil Pump" in Oldsmobile Special Data.*

Oil Filt r: AC No. PM-90-3 full flow type (optional). On lower right side of crankcase at rear.
R plac ment Filt r El ment–AC No PF-122

►*CAUTION*–If filter (or pad cover if filter not used) is replaced, used a new gasket (coat both sides with POB No. 5 Sealer) and tighten bolts to 30-35 ft. lbs. Oil filter or pad mounted externally on lower right side of crankcase at rear. Oil filter is full flow type (all oil from pump delivered to oil filter) requires pad when filter not used to return oil to main oil gallery.

Crankcas Ventilation: Air intake in oil filler cap has oil-wetted cleaner, AC No. 1552233 (Std.) No. 1551509 (Heavy Duty). Outlet is connected to ventilating baffle at rear of block above right bank. Outlet pipe is push fit at ventilator and extends down below right rear corner of engine.

►*NOTE* Air cleaner also used in lower section of ventilator outlet tube on cars with heavy duty inlet breather in filler cap and oil bath air cleaner

COOLING

Water Capacity: 20½ qts. (without heater), 21½ qts. (with heater).
Pressure Valve: AC Type RC-1, No. 850795. Radiator filler cap. 7 lb. type.
Thermostat: Dole or Harrison.

Oldsmobile No.	Dole Type	Harrison Type
160° Ⓒ	563219	3126289
180° Ⓒ	563311	3126290

Ⓒ – Use with alcohol anti-freeze.
Ⓒ – Use with permanent type anti-freeze.

Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Oldsmobile Special Data.
Pump Removal–Remove fan and fan pulley. Remove six mounting bolts (4 to engine cover, 2 to engine block). Remove pump. *NOTE*–When installing pump, coat one side of pump housing gasket with gasket cement, dip bolts in CP No. 9 Sealer.

Temperature Indicator: New TWO light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 111-115° F. RED light remains off during normal engine operation but comes on when engine temperature reaches 218-222° F. *NOTE*– Red light will come on when ignition key turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine started).
Engine Unit – Delco-Remy No. 1998140.
See "Temperature Indicators" in Miscellaneous Section.

CLUTCH

Long 11CF Type. Single plate, semi-centrifugal type.
See "Long" Clutches in Clutch Section.

Part	Long No.	Oldsmobile No.
Cover Assy. (Std.)	262832	562619
Disc (Std.)	282687	565059

Pedal Adjustment· Pedal free travel 1 1/8-1 3/8". Adjust by turning adjusting nut on clutch connector link at throw-out yoke

Removal Remove transmission (see Transmission), remove right and left splash pans, engine breather pipe, and right and left lower flywheel housing bolts Install Engine Rear Support Tool BT-28, entering pilot supports into lower housing bolt holes. Remove engine rear mount bolts at clutch housing, and remove frame cross member by removing three bolts at each end. Remove clutch housing by removing eight bolts holding housing to flywheel housing. Remove clutch assembly from flywheel.

Clutch Housing Alignment: *See "Flywheel Housing" in Oldsmobile Special Data.*

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse) all helical gear type.
See "Oldsmobile Synchro-mesh" in Transmission Section

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission. Remove propeller shaft. Remove bolts holding transmission to clutch housing, and remove transmission by moving rearward until main drive gear clears clutch assembly.

HYDRA-MATIC DRIVE

"Dual Range" or "Dual Coupling". Four speed automatic transmission and fluid coupling.

►*APPLICATION NOTE: Early Series 88 used "Dual Range" Hydra-Matic (same as 1955 Models). Later Series 88, Super 88 & 98 use the new "Jetaway (Dual Coupling)" type.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Transmission Section.*

►*TESTING & TROUBLE SHOOTING. See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Trans. Sect.*

Lubrication – Check fluid level every 1000 miles. Drain and refill every 25,000 miles. Use GM Hydra-Matic Drive Fluid Type "A" (can marked AQ-ATF).

Checking Fluid Level – Check with engine at normal operating temperature, idling, and selector lever in "N" (Neutral) on Series 88 "Dual Range" type, and selector lever in "P" (Park) position on later Series 88, Super 88 and 98 "Dual Coupling" type. Add Hydra-Matic Fluid Type "A" (can marked AQ-ATF) to bring level to "FULL" mark on dipstick.

►*CAUTION· Do not fill above "FULL" mark (will caus foaming and improper operation of the transmission).*

►*OTHER HYDRA-MATIC SERVICE DATA· S "Dual Range" or "Dual Coupling" Hydra-Matic in Trans. S ct.*

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UNIVERSALS

Mechanics. Roller bearing type.

►*PROPELLER SHAFT YOKE LUBRICATION CAUTION* Remove plug, install fitting and lubricate with hand pressure gun using high melting point, low viscosity lubricant, Oldsmobile Part No 567196 Remove fitting and replace plug **Do not use chassis grease at this point.**

►*CAUTION*—Rear universal companion flange nut controls rear axle pinion bearing pre-load (must be adjusted whenever nut loosened) *See "Oldsmobile Hypoid" in Rear Axle Section*

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss drive.
See "Oldsmobile Hypoid" in Rear Axle Section.

Ratio	Axle Ratios	① Code
3.08-1 (40:13)		0
3.64-1 (40·11)		6
3.42-1 (41:12)		8
3.23-1 (42:13)		9

①—Rear axle ratio code number stamped on lower locating boss on forward side of carrier.
Backlash—.004-.008". (*NOTE* - As much as .012" may be necessary in some cases to correct tooth contact for noise).

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used). Remove backing plate mounting nuts and static collector. Loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position.

Differential Carrier Assembly Removal: Remove axle shafts (see above). Clean differential carrier and axle housing around carrier to prevent dirt entering housing. Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers. Mark universal joint so it can be replaced in the same position Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing

CAUTION—Do not wash exterior of carrier until differential has been disassembled

Wheel Bearing Adjustment None required Bearings are built with .012-.015" endplay between balls. Check endplay before removing axle shaft and if endplay greater than 020 , replace bearings. *CAUTION*—If bearings removed from shaft, they cannot be reused.

SHOCK ABSORBERS

Delco. Direct acting front and rear. Service by replacement.

Shock Absorbers

Model	Front	Delco No.	Rear
88, Super 88	5352644		5352648
98	5352645		5352649

FRONT SUSPENSION

Independent. Direct acting shock absorbers are mounted within front coil springs.
See "Oldsmobile" in Suspensions & Wheel Alignment Section.

Kingpin Inclination—5° 51' 10' crosswise.
Caster— 0° to Neg. ¾°. Variation between both sides should not exceed ½°.
Camber—Neg. ¾° to Pos. ¾°. Variation between both sides should not exceed ½°
Toe-In—1/16' to 1/8".
Toe-Out on Turns—23°±½° on inner wheel with outer wheel turned 20°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (In Line). *See "Saginaw (In Line)" Power Steering in Steering Section.*

Steering Linkage *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). Conventional two shoe with short molded lining front (Primary), and long molded lining rear (Secondary). Parking brake applies rear wheel service brakes
See "Bendix Hydraulic" in Brake Section

Drums—Diameter 11" Rebore limits .060

Wheel Cylinder Diameter—Front 1 1/32". Rear 31/32'
Lining—Molded. **Width**—2½" (front wheels), 2" (rear wheels). **Thickness**—7/32".

Length—(Primary) 9 3/8', (Secondary) 12 1/32

Clearance—Adjusting screw backed off 16 notches from point where wheels can just be turned by hand

Braking Power—50% Front. 44% Rear.

Standard Master Cylinder: On left chassis frame front extension under hood.

Checking Fluid—Fluid reservoir is part of master cylinder. Maintain fluid level to within ½" of top of master cylinder gasket surface.

Removal—Remove from above. Not necessary to disturb other parts.

Power Brakes· Bendix or Moraine Power Unit (combination vacuum power unit and hydraulic master cylinder) Unit is mounted on under side of toe board and replaces regular master cylinder *See "Bendix Power Unit" or "Moraine Power Unit" in Brake Section.*

Checking Fluid—Same as for standard master cylinder.

Removal of Power Unit—Disconnect positive battery cable at junction block on right fender filler plate, disconnect purple solenoid lead wire from wiring harness, then pull cable through sleeve on power brake. Disconnect hydraulic line at master cylinder and secure hose so end is above level of junction assembly. Disconnect vacuum hoses at power cylinder, and remove dipstick. Disconnect leads from stop light switch and fold back floor mat. Remove three brake pedal bracket attaching bolts and remove pedal and bracket. Remove mast jacket grommet retainer and slide grommet up mast jacket. Remove mast jacket cover plate attaching screws, cover plate and power cylinder assembly. Remove two cover plate-to-power cylinder bolts and remove cover plate. Remove power unit through toe pan opening.

MISC. MECHANICAL

Windshield Wipers: Cable operated, vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section.*

Power Window Regulators· Electric type with individual motors in each window

See "Power Window Regulators" in Miscellaneous Section

Power Top Control· Hydro-Lectric *See "Power Top Controls" in Miscellaneous Section*

Power Seat Adjuster (Two-way): Electric type with single reversible type motor for horizontal adjustment.
See "GM Two-way Seat Regulators" in Misc. Section.

Power Seat Adjuster (Six-way): Electric type with single reversible motor.
See "GM Six-way Seat Regulators" in Misc. Section.

MODEL IDENTIFICATION

SERIAL NUMBERS: On left body pillar post.
Starting Serial Number - 1001.

► *SERIAL NUMBER NOTE: Complete serial number (example 577M 1001) includes following identification data in sequ nce:*

Y ar	Seri s ①	Assy. Plant ②	Serial No.
57	7	M	1001

① - Series Designation: 7 - (88 Series).8 - (Super 88 Series). 9 - (98 Series).
② - See Assembly Plant Designation following.

Assembly Plant Designation

M - Lansing	L - Linden
A - Atlanta	C - South Gate
B - Framingham	W - Wilmington
K - Kansas City	T - Arlington

ENGINE NUMBER: Stamped on machined pad located on top of left hand cylinder bank of block between the center and rear exhaust manifold ports.
Starting Engine Number - A001001. *NOTE* - Export engines are identified by an "E" after the serial number.

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed. Reading on low cylinders should not be less than 80% of high cylinder.

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe. Install with inner end of coil pointing toward spring pin.

IGNITION

FIRING ORDER: 1–8–7–3–6–5–4–2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .030".
Spark Plugs - AC No. 44. 14mm. Torque to 23-28 ft. lbs.

COIL: D lc -R my 1115087.
Igniti n Current - 2.0 amps. idling, 4.5 stopped.
R sistor - Delco-Remy 1928016. 1.40-1.62 ohms.

► *COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by s c nd lead from ignition switch.*

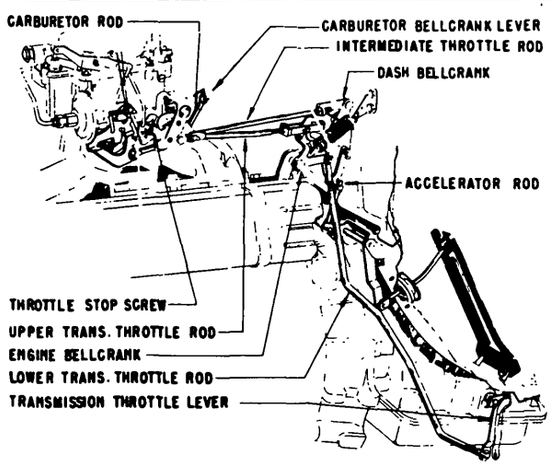
DISTRIBUTOR: Delc -Remy 1110883. "Window" type with external adjustments. *See "Delco-Remy (Window Typ) Distributor" in El ctrical Section.*

► *CONTACT POINT REPLACEMENT CAUTION:* Mounting plate is slotted (old points can be removed by loosening screws and turning plate out). When installing new point set, center hole in mounting plate over dowel in distributor plate when tightening screws.

C nd nser - Delco-Remy 1932004. **Capacity**.18-.23 mfd.
Contact P int S t - Delco-Remy 1931988.
Breaker Gap - .016".
Cam Angle - 28-32° (set at 30°).

► *BREAKER GAP & CAM ANGLE NOTE:* Setting cam angle at 30° will provide .016" breaker gap.

Br aker Arm Spring T nsion - 19-23 ozs.
Rotati n - Counter-clockwise viewed from above.



HYDRA-MATIC TRANSMISSION THROTTLE LINKAGE

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0-4	800
6.5-8.5	975	13-17	1950
8-10	1200	16-20	2400
11-13	2200	22-26	4400

Vacuum Spark Control: Delco-Remy 1116096.
Plunger Travel - 7/32-15/64".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-6.5
10	20	15.25-16.0

IGNITION TIMING

Setting - 5° BTDC, with engine idling at 850 RPM and vacuum line to distributor disconnected and carburetor opening taped closed.

► *DETONATION NOTE: If engine detonates (due to low octane fuel or carbon build-up) set timing to 2½° BTDC. For high altitude operation, timing can be adjusted to 7½° BTDC, if detonation does not occur.*

Timing Mark (Early Cars) - Slot in rim of crankshaft balancer and pointer on front cover. Leading edge of slot is 5° BTDC. Trailing edge is TDC. Midway between these points is 2½° BTDC.

Timing Mark (Later Cars) - Three slots in rim of crankshaft balancer and pointer on front cover. Center slot is 5° BTDC. Facing rear of car, left hand slot is TDC. Right hand slot is 10° BTDC.

CARBURETOR

► *CARBURETOR APPLICATION: Rochester 4GC 4-Barrel Std. on all Series, Rochester 2GC Triple Two-barrel Compound Installation Optl. on J-2 Engines.*

► *IDLE SPEED ADJUSTMENT NOTE: "Slow" idle speed adjustments can be made after Hydra-Matic Throttle Linkage Adjustment completed without affecting relationship between carburetor and transmission.*

Thr ttl R turn Ch ck Adjustm nt: With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1500 RPM. Flash the throttle and allow to return to slow idle, then turn off the ignition switch. Set carburetor on fast idle and check clearance between throttle return check plunger and throttle lever. Adjust to .020" using two wrenches so that diaphragm is not permitted to turn.

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC DRIVE CARS): Install Throttle Return Check Holding Tool J-6342 to hold plunger away from throttle lever. Proceed as follows:

1) Remove throttle rod from transmission throttle lever and move throttle lever to rear against its stop, and with Throttle Lever Gauge J-6344 placed flat against rear face of transmission case, rod on gauge should just enter hole in throttle lever. Adjust throttle lever by bending with Tool J-6373-01 (*NOTE* - This tool may be revised by cutting 5/8" from top of tool). Attach throttle rod to lever.

2) Back out slow idle adjusting screw until carburetor throttle valves are completely closed. Remove clips from carburetor throttle lever and carburetor bellcrank lever (do not remove carburetor rod). Place Gauge No. 33-67 against rod with hole in gauge over pin on carburetor throttle lever. With gauge held up against bellcrank pivot pin, the open end of the tool should fit over pin on bellcrank lever freely without rotation of the bellcrank. If pin does not enter hole freely, remove rod and place in a vise and increase or decrease the bend.

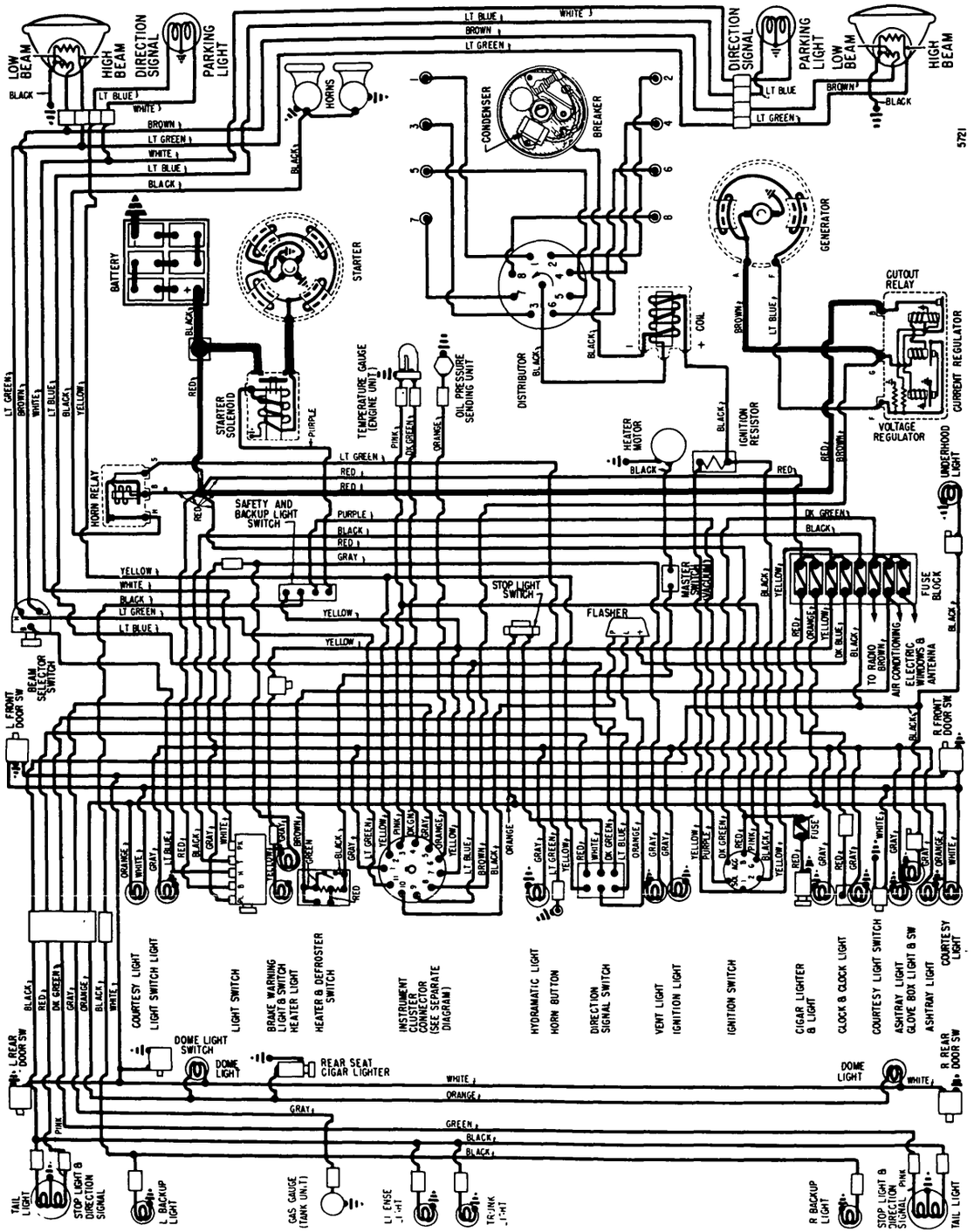
3) Loosen jam nut on transmission throttle rod at bellcrank and remove clevis pin. Remove clevis pin from end of upper transmission throttle rod at bellcrank. With both bellcrank and transmission lower throttle rod held against their rearward stops, adjust lower throttle rod clevis so that pin will enter freely into holes in clevis and the bellcrank. Install cotter pin and tighten jam nut.

► *"J-2 ENGINE" CAUTION:* On first cars (with Throttle Valve Bellcrank Assy 571315 & Lower Control Rod 571318), it may be necessary to **lengthen** rod when making above adjustment as much as 3½ turns to obtain correct throttle valve oil pressure for correct shift pattern. On cars after Engine No. A-198511, new parts used (Throttle Valve Bellcrank Assy. 572496 & Lower Control Rod 569544) and above setting procedure should be used *NOTE* - If either throttle valve bellcrank or lower control rod require replacement on cars before Engine No A-198511, install both new parts and use standard setting procedure

4) With engine bellcrank against its stop and upper transmission throttle rod pulled lightly toward rear of engine to take up slack, adjust clevis on upper transmission throttle rod so that pin enters freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut Set carburetor slow idle at 460 RPM with transmission selector lever in "D" (Drive) position, this will pull engine bellcrank forward from stop and provide proper throttle valve adjustment). *CAUTION - On air conditioned cars, slow idle speed must be set with compressor running.*

5) Loosen jam nut and back out throttle stop screw several turns. Hold choke wide open and pull forward on dash bellcrank until throttle valves are wide open, then go beyond to point of maximum transmission throttle lever travel (*CAUTION - This point is a matter of*

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feel and care should be taken to not b nd or stretch linkage b yond this point). With throttle held in this position, adjust throttle stop screw to just touch tang on downshift lever. Allow throttle valves to return to a closed position, **then turn throttl st p scr w in 1½ t 2 turns and tighten jam nut.**

6) If clearance between dash bellcrank and dash is not 3/8" ± 1/32" adjust as follows: Loosen jam nut on intermediate throttle rod; remove pin and clevis from dash bellcrank, adjust throttle rod so there is 3/8" clearance between dash bellcrank and front of dash. Install rod end and clip with open side of rod toward outside of car, and tighten jam nut.

7) Adjust accelerator pedal height as follows: Position a 3 7/8" wooden block between bottom of accelerator pedal and top of floor mat retainer. Remove clip and accelerator rod assembly from dash bellcrank. Loosen jam nut and adjust accelerator rod so that hole just slides over pin on bellcrank with accelerator pedal touching gauge block. Install rod end on bellcrank with open side toward left side of car. Tighten jam nut and remove gauge block.

ROCHESTER 4GC

Rochester 4GC. 4-Barrel type similar to design used on previous models except for addition of **Ch k Modifier.** Used as follows:

	First Cars	Lat r Cars
Synchro-mesh Cars	7009471	7010926
Hydra-Matic Cars	7009470	7010925

Replacement Carburetor Pkg. - Rochester 7015704.

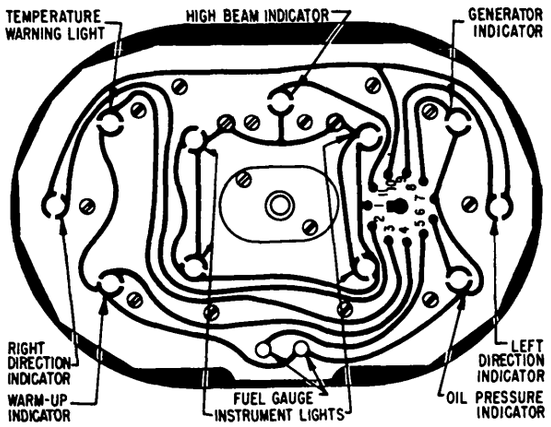
► *CARBURETOR PRODUCTION CHANGES & RECOMMENDED SETTING CHANGES:* See *"Roch ster 4GC 4-Barrel" in Carburetion Section.*

► *MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barr l 1-4-6-7.*

► *IDLE ADJUSTMENT·CAUTION:* It is recommended that idle adjustments be made with **Air Cl an r in plac** (Use of Tool BT-1000-S will make this possible).

Idle Setting: With engine warm and operating at correct idle speed, adjust each idle adjusting screw for smooth

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INSTRUMENT CLUSTER PRINTED CIRCUITS

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idle and highest RPM and vacuum, then turn each screw out (rich) ¼ turn *NOTE* - If engine rolls from richness when throttle snapped closed, turn each screw in (lean) 1/8 turn.

Idle Spe d - 460 RPM (All Cars) with selector lever in "DR" on Hydra-Matic cars On Air-conditioned cars set control in "Maximum Cooling" position *NOTE* - This setting supersedes previous recommendation of 450 RPM (Synchro-mesh) & 425 RPM (Hydra-Matic)

► *AIR CONDITIONED CAR NOTE: On cars with air conditioning, th compressor must be operating when idle speed adjusted*

► *OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carbur tion Section*

Thr ttle Return Ch ck Adjustment (Hydra-Matic Drive Cars): *See CARBURETOR above*

Hydra-Matic Throttl Linkag Adjustment: *See CARBURETOR above.*

ROCHESTER 2GC
(Triple Two-barrel Compound)

Rochest r 2GC. "Triple Two-Barrel Compound" installation as follows

	Rochester No.
Front	7010960
Center	7010959
Rear	7010958

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), see "Oldsmobile Triple Two-Barrel Compound" Carburetors in Carburetion Section

FUEL PUMP PRESSURE: 4-5½ lbs at 450-1000 RPM (1st type with glass filter bowl), 5-6 lbs. at 1800 RPM (later type with pulsator dome)

CARB. EQUIPMENT

Fuel Pump: AC No 4317 (Early cars) No 4397 (Later cars) Fuel and vacuum

Pressure - 4-5¼ lbs at 450-1000 RPM (No 4317), 5-6 lbs at 1800 RPM (No 4397)

See "Fuel Pumps" in Carburetion Section

Gasolin Gauge: AC Electric type

Dash Unit - AC No 1518721

Tank Unit - AC No 1518730

See "Fu l Gauges" in Carburetion Section

Air Cleaner: (Cars with 4-Barrel Carb.) Oil-wetted type (Std), Oil-bath type (Optl),

(Cars with Tripl Compound Carb.) - AC No 1553292 DRY TYPE with paper filter element Clean at 4000 mile intervals (or at engine oil change intervals) Replace element at 10,000 mile intervals or more often under severe conditions Use AC Type A-59C Replacement Element

► *DRY TYPE FILTER CLEANING CAUTION:* Remove filter element from air cleaner and clean by shaking and tapping end plates on a flat surface *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate*

BATTERY

Delc -R ny 3KMR70. *12 Volt,* 11 plate 70 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - From engine to forward side of firewall

STARTER

Delco-Remy No. 1107665. Armature No 1932185

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs minimum

Performance Data

Torque	RPM	Volts	① Amperes
0 ft lbs	3600-5100	10 6	65-100
	Lock	3 5	300-360

① - Includes Solenoid Switch

Starter Switch: Solenoid switch, Delco-Remy No 1119798 mounted on starter and controlled by combination Starter & Ignition switch Delco-Remy No 1116534 and Neutral Safety and Back-up Switch (see below)

Hydra-Matic Neutral Safety Switch: Oldsmobile No 570386 Neutral Safety and Back-up Light Switch

Adjustment - *See "Dual-Coupling Hydra-Matic" in Transmission Section*

GENERATOR

Delco-Remy No. 1102085 (Std.), No. 1102067 (Air Cond.) Armature - No 1923535 (1102085 Gen), No 1932900 (1102067 Gen)

Performance Data (Cold)

	Amperes	Volts	RPM
Standard	30	14 0	2210
Air Cond	35	14 0	2400

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs

Field Current - 1 48-1 62 amperes at 12 volts (1102085), 1 62-1 82 amperes at 12 volts (1102067)

Belt Adjustment: Place Tool 33-70 on belt Loosen generator adjusting link bolt and then tighten belt until line on gauge is even with pointers of gauge Tighten adjusting link bolt

REGULATOR

Delco-Remy No. 1119001 (1102085 Gen.), No. 1119002 (1102067 Gen.). *NOTE - Specifications are "Normal" Settings*

► *REGULATOR IDENTIFICATION:* Std (1119001) regulator marked by daub of red paint Optl (1119002) regulator by daub of yellow paint on mounting lug

Cut-Out Relay

Cuts In - 11 8-13 5 volts

Contact Gap - 020"

Air Gap - 020" (with contacts just closed)

Voltage Regulator

Setting - 13 8-14 8 volts

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

Current Regulator

Setting - 27-33 amperes (1119001), 32-37 amperes (1119002)

Air Gap - 075" with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

► *INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Entire instrument cluster served by a printed circuit All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly Service of printed circuit is by r placem nt nly.

► *FUSE BLOWING CORRECTION:* If caused by loose fuse clips, replace Fuse Panel Check fuse clips to make certain rivets are staked and clips have sufficient tension to grip fuse ends securely

Headlamps: Sealed Beam *See Electrical Section*

Direction Signal: *See Electrical Section*

Autronic Eye: *See Electrical Section*

Light Switch Removal: Disconnect battery cable and disconnect wires from lighting switch Pull switch knob out to last notch then depress spring loaded latch button on switch body while pulling rod and knob assembly out of switch Remove switch mounting nut and remove switch and escutcheon from panel

Stop Light Switch Location (Std. Brakes): Mechanical type on toe board near brake pedal

Stop Light Switch Location (Power Brakes): Directly above brake pedal on firewall Adjust so lights come on within free travel of brake pedal

FUSES: All fuses (exc Instrument Panel and Cigar Lighter fuses) are located on a combination fuse and junction block under instrument panel A color code is used on fuse panel corresponding to color code of circuits protected by each fuse The following fuses will be found on this panel:

(1) Clock (Std. on 98 Series only). 1 ampere

(2) Courtesy, Dome & Stop Lights; Rear Cigar Lighter. 25 amperes

(3) Temp., Generator, Oil Pressure Lights; Fuel Gaug , Back-up Lights, Hand Brake Signal Light. 9 amperes

(4) Turn Signal. 9 amperes

(5) Glove Box, Underhood, Keyhole, Tail, Trunk, St p Lights. 9 amperes

(6) Radio. 7 5 amperes

(7) Heater & Air Conditioner. 20 amperes (25 amperes with Air Conditioning)

(8) Electric Windows & Antenna. 20 amperes

Instrument Panel Lights - 3 amperes located on headlight switch

Cigar Lighter - 20 amperes located behind lighter

CIRCUIT BREAKER: 25 amperes located in switch

Horn Relay: Delco-Remy No 1116781

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION. Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 90°V8 with overhead valves TWO engines used: **T-400** (Std Engine with 4-Barrel Carb), J-2 (Optl Engine with Triple Two-Barrel Compound Carbs)

Eng.	Bore	Stroke	Rated HP	Displacem nt
All	4"	3 11/16"	51	371 cu ins

Engine	Compr. Ratio	Developed HP
T-400	9 5-1	277 at 4400 RPM
J-2	10 0-1	300 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP*

► *ENGINE COMPRESSION RATIO NOTE* Std Engine (9 5-1 Ratio) has 050" thick cylinder head gasket

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Special (10.0-1 Ratio) engine has .025" thick gasket. Same cylinder head used on all engines. *NOTE* - Head gasket for Export (Low Octane Gas) Engine is .085" thick.

►*ENGINE OVERHEATING & LOSS OF COOLANT IN NORMAL DRIVING, OR POOR CAR HEATER PERFORMANCE: See "Cooling" in Oldsmobile Special Data.*

►*1957 OLDSMOBILE ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* **Same as for 1958 models.** *See 1958 Oldsmobile Car pages.*

CYLINDER HEAD INSTALLATION: *See "Cylinder Heads & Manifolds" in Oldsmobile Special Data.*

INTAKE MANIFOLD INSTALLATION: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Oldsmobile Special Data.*

PISTONS

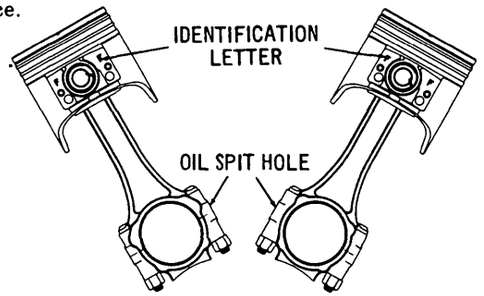
Aluminum alloy, three ring, autothermic, steel strut, slipper skirt, cam ground, tin plated.

Length - 4.05". **Weight** - 25.22 ozs. (less rings & pin).

Removal - Pistons & rods removed from above only.

►*CAUTION:* Mark piston, rods, and bearing caps with cylinder number before removal to insure correct reinstallation.

Clearance - .00075-.00125" Selective fit at thrust surface.



OLDSMOBILE PISTON & ROD ASSY.

Fitting New Pistons: With piston inverted and pin removed, insert piston into bore. Pull required to withdraw a .0015" x ½" feeler placed at 90° to normal position of pin and piston at center of normal travel, should be 1-6 lbs.

►*CAUTION: Allow rebored cylinders to cool to normal room temperature before fitting pistons.*

Replacement Pistons: Std., .010", .020" & .030" Oversize. Furnished with fitted pins.

Installing Pistons: Install pistons 1,3,5,7 in left bank, and 2,4,6,8 in right bank with letter "F" cast on each side of piston pin hole, and notch in piston head, toward front of engine.

PISTON PINS

Floating type with lock rings at each end.

►*CAUTION:* Discard old lock rings and install new service type lock rings when installing pins.

Diameter - .9803-.9807". **Length** - 3.126".

Pin Fit in Piston - .0000-.0002" loose. Pin should not fall through piston of own weight when using the low limit (.0000" fit). Pin can be tapped into place using brass drift.

Pin Fit in Rod Bushing - .0003-.0005" loose.

Replacement Pins: Std., .001" & .003" Oversize (in sets).

PISTON RINGS

Two compression and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr. #1	.0775-.078"	.013-.023"	.001 -.003"
Compr. #2	.0925-.0935"	.013-.023"	.001 - .003"
Oil	.188"(Max.)	①	.0023-.0039"

① Sealed Power .013-.033", Perfect Circle .015-.055".

Replacement Rings: Std. & .010" Oversize, not in sets.

Installing Rings: Install upper chrome and lower black compression rings with side marked "T" or "Top" up.

CONNECTING RODS

Length - 6.625" center-to-center. **Weight** - 29.53 ozs.

Crankpin Journal Diameter - 2.2488-2.2498".

Out of Round Limit - .0045".

Lower Bearing - Aluminum with babbitt overlay, steel backed, both halves interchangeable.

Clearance - .0009-.0030" (vertical), .0019-.0040"(horizontal).

Sideplay - .002-.011" (total for both rods).

Replacement Bearings: Std., .002", .010" & .020" Undersize.

Installing Rods: Bearing index notches on rods and caps, and pads for numbering caps and rods should be to outside of engine. Spit hole for lubrication should be to inside of engine.

►*CAUTION: Use Guide Tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

CRANKSHAFT

Journal Diameter - 2.748-2.749". Five bearings.

Bearings - Steel backed aluminum. Rear bearing flanged, upper and lower inserts **not** interchangeable.

Clearance - *Front & Rear bearing clearances are selective fit - See Notes below. CAUTION - Front bearing clearance has been reduced and specification below supersedes previous recommendations.*

Crankshaft Bearing Clearance

Front Bearing (see Note)	.0003-.0015"
Intermediates (2, 3, 4)	.0005-.0031"
Rear Bearing (see Note)	.0020-.0035"

►*FRONT MAIN BEARING NOTE:* Bearings are selective fit during manufacture. Standard size **Upper** bearing insert furnished with standard wall thickness only, **Lower** bearing insert furnished in FOUR wall thicknesses and marked by letter stamped on back of tang as follows: "B" .0006" thicker wall, "D" .0012" thicker wall, "E" .002" thicker wall, "F" .003" thicker wall. These bearings are in addition to regular Undersize Bearings listed below. *When correcting excessive front main bearing clearance, it will only be necessary to replace lower half of bearing insert with one of the selective fit thicker wall inserts listed above.*

►*REAR BEARING NOTE:* Bearings are selective fit during manufacture. Standard size furnished with Thin, Medium and Heavy wall (marked "T", "M", & "H" on tang). These are in addition to regular replacement Undersize Bearings listed below. *Use same thickness bearing (as indicated by letter on tang) unless undersize bearings being installed to correct wear.*

Replacement Bearings: Std. (Front & Rear furnished in special thicknesses - see Notes above), and .002", .010", .020" Undersize.

End Thrust: Taken by rear (#5) flanged bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

CAMSHAFT

Bearings - Steel backed babbitt or copper, lead, bronze.

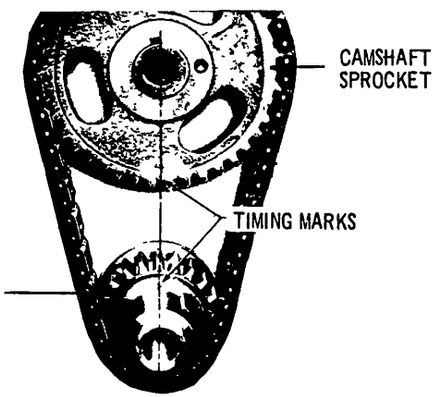
Journal Diameter - 1.9977-1.9985".

Clearance - .001-.0033".

End Thrust: Forward thrust taken by plunger and spring at front end of camshaft.

Timing Chain: Link Belt or Morse. *NOTE - Both chains are completely interchangeable (may be used with either type crankshaft and camshaft sprockets).* **Width** - 27/32". **Pitch** - .50". **Length** - 24" or 48 links.

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straight edge across shaft centers (or use Tool BT-11).



OLDSMOBILE VALVE TIMING MARKS

►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket. Assemble with cupped side out.

►*CAMSHAFT REPLACEMENT CAUTION:* For initial lubrication of NEW camshaft, it should be liberally coated with mixture of G.M. Concentrate No. 567725 and engine oil before installation (2 Pints of concentrate in 4 qts. of oil) and balance of concentrate should be added to crankcase oil for run-in purposes.

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Engine Front Cover Removal & Installation; *See "Engine Front Cover" in Oldsmobile Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Oldsmobile Special Data*

VALVES

Tappet Clearance: None in service hydraulic

Valve	Head Diam.	Stem Diam.	Length
Intake	1.745-1.755"	.3417-.3425"	4.989-5.009"
Exhaust	1.557-1.567"	.3930-.3938"	4.989-5.009"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.419"	.0017-.0035"
Exhaust	45°	.435"	.0022-.0040"

Valve Seat Width - .037-.075" all valves

Valve Stem Seals - A "Top Hat" type oil seal (deflector) is installed on valve stem below valve spring retainer

Valve Springs: Intake and exhaust valve springs are alike Dampers used on lower end of all springs

►*VALVE SPRING PRODUCTION CHANGE*· Beginning Engine No A-176654, larger diameter valve spring (wire diameter size 1/64" larger) with different pressures used Valve spring counterbore in cylinder head was increased .043" in diameter to accommodate this larger spring *NOTE* - First & Later Valve Springs (in Sets) and Cylinder Heads are interchangeable (tolerance limits may cause snug fit if second type spring used with first type head).

Valve Spring Specifications

	First Type		Later Type	
Valve	Pressure	Length	Pressure	Length
Closed	100 lbs	1.880"	90 lbs	1.880"
Open	190 lbs	1.480"	220 lbs	1.480"

Free Length - 2.40"

►*CAUTION.* Lower end of damper and spring must seat in recess in head Install closely wound spring coils toward cylinder head

Valve Guides: Remove guides with Remover Tool J-3062 Drive new guides into top of cylinder head as follows: Lay Gauge Washer J-5158 on valve spring seat, then install guide into cylinder head (with grooved end of guide up) by driving on Tool J-5158-2 until tool seats against gauge washer Guides should extend 25/32" above face of valve spring seat Inside diameter of guide is .3442-.3452" (Intake), .3960-.3970" (Exhaust) *NOTE* - Service guides are Parco-Lubrited and finished to size **DO NOT** ream Guides furnished Std and .010" oversize Oversize guides identified by a groove on O.D. of guide

Hydraulic Valve Lifters: Barrel type, larger in length and diameter than previous models

►*HYDRAULIC LIFTER INSTALLATION CAUTION:* FIVE different sizes used in production as follows (marked as indicated)· Standard (unmarked), .001" O.S. (marked "1"), .002" O.S. (marked "2"), .003" O.S. (marked "3"), .005" O.S. (marked "5") **Lifters** marked by etched number on lifter body **Cylinder Block** marked by number on rail under engine top cover *Reinstall lifter in same hole or replace with proper size*

Diameter - .9210-.9215" (Std.) **Length** - 2.125"

Clearance in Block - .0005-.0020" (Selective)

Replacement Lifters: Std., .001", .002", .003" & .005" Oversize

Hydraulic Lifter Removal, Overhaul & Testing - *See "Valve System" in Oldsmobile Special Data*

Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

Intake Valves - Open 13°30' BTDC Close 54°30' ABDC

Exhaust Valves - Open 51°30' BBDC, Close 20°30' ATDC

Valve Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke) Trailing edge of notch in crankshaft pulley will be aligned with pointer on timing chain cover Install Tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust pushrod The 7/16" diameter pilot at bottom of tool will fit into cylinder head bolt hole Screw main body of gauge down so step plunger contacts pushrod and small diameter of step plunger is flush with top of main body Tighten clamp bolt Rotate engine one complete revolution so that #1 piston is again at TDC (intake stroke) Distributor rotor should now be pointing toward rear of engine If timing chain is installed properly top of tool plunger will rise so the top of main body of tool is flush with the third step If camshaft is retarded one tooth, the third step will rise above top of main body and if advanced on tooth second step will be below main body

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 5 quarts refill Add 1 quart with filter change

Normal Oil Pressure: 35-45 lbs at 50 MPH

Pressure Regulator - In pump body Not adjustable Valve starts to open at 45 lbs Maximum pump pressure is 45-55 lbs

Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter Lights when pressure below 3 lbs

Engine Unit - AC No. 1508319

Oil Pump: Gear type In crankcase at rear end

Oil Pump Removal, Overhaul & Installation - *See "Oil Pump" in Oldsmobile Special Data*

Oil Filter: Full flow type Replace every 5000 miles or sooner if needed Located on lower right side of crankcase at rear

Replacement Filter Element - AC No. PF-122

Crankcase Ventilation: Air intake in oil filler cap has oil-wetted cleaner AC No. 1552233 (Std.), No. 1551509 (Heavy Duty) Outlet is connected to ventilating baffle at rear of block above right bank Outlet pipe is push fit at ventilator and extends down below right rear corner of engine

►*NOTE* Air cleaner also used in lower section of ventilator outlet tube on cars with heavy duty inlet breather in filler cap and oil bath air cleaner

COOLING

Water Capacity: 19½ qts (without heater), 21 qts (with heater)

Pressure Valve: Radiator filler cap AC No. RC-6, 13 lbs (Std.), AC No. RC-15, 15 lbs (Air Cond. Cars)

Thermostat: Choke type Dole or Harrison

Type	Dole	Harrison
160°①	563219	3126289
180°②	563311	3626290

①Use with alcohol base anti-freeze

②Use with permanent type anti-freeze

Water Pump: Packless sealed ball bearing type

See "Water Pumps" in Oldsmobile Special Data.

Pump Removal - Remove fan and fan pulley Remove six mounting bolts (4 to engine cover 2 to engine block) Remove Pump

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block GREEN light is lighted when engine running cold and goes off when engine temperature reaches 111-115°F RED light remains off during normal engine operation but comes on when engine temperature reaches 230-234°F *NOTE*- Red light will come on when ignition key turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine started)

Engine Unit - Delco-Remy No. 1998181 (Std.), No. 1998189 (Air Cond. Cars)

See "Temperature Indicator" in Miscellaneous Section.

CLUTCH

Long 11CF Assy. No. L5167, Oldsmobile No. 570035. Semi-centrifugal single plate type

See "Long Clutches" in Clutch Section

Clutch Disc - Long No. 282687, Oldsmobile No. 565059

Pedal Adjustment: Pedal free travel 1-1¼" Adjust by turning adjusting nut on clutch connector link at throw-out yoke

Removal: Remove transmission (see below) Remove left engine filler plate engine breather pipe and right and left rear lower flywheel housing bolts Remove return spring and disconnect adjusting rod at yoke Install Engine Rear Support Tool BT-28 entering pilot supports into lower housing bolt holes Remove engine rear mount bolts at clutch housing, and remove frame crossmember by removing three bolts at each end Remove clutch housing by removing eight bolts holding housing to flywheel housing Remove clutch assembly from flywheel

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh, synchro mesh (second & high), sliding gear (low & reverse), all helical gear type

See "Oldsmobile Synchro-mesh" in Transmission Section

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission Mark location of center bearing support on frame to facilitate lateral alignment Disconnect front and rear companion flanges and center bearing support to frame

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attaching bolts (*NOTE* - Keep shims grouped so they can be reinstalled in same location) Slide propeller shaft assembly out of frame Remove bolts holding transmission to clutch housing, and remove transmission by moving rearward until main drive gear clears clutch assembly

HYDRA-MATIC DRIVE

"Jetaway" Dual-Coupling Hydra-Matic. Four speed automatic transmission and fluid coupling

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic" in Transmission Section*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section*

Lubrication - Check fluid level every 1000 miles Drain and refill every 25,000 miles Use GM Hydra-Matic Drive Fluid Type "A" (marked AQ-ATF)

Checking Fluid Level - Check with transmission at normal operating temperature engine idling and selector lever in "P" (Park) position Add Hydra-Matic Fluid Type "A" to bring level to "FULL" mark on dipstick *CAUTION* - Do not fill above "FULL" mark

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER HYDRA-MATIC SERVICE DATA. See "Dual-Coupling Hydra-Matic" in Transmission Section*

UNIVERSALS

Saginaw or Spicer. Cross type three used one each at front and rear and one at center

►*UNIVERSAL JOINT INSTALLATION CAUTION TO PREVENT DRIVE LINE VIBRATION See "Propeller Shaft Notes" in Oldsmobile Special Data*

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut loosened) *See "Oldsmobile Hypoid" in Rear Axle Section*

Propeller Shaft Center Bearing Overhaul: *See "Propeller Shaft Notes" in Oldsmobile Special Data*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Oldsmobile Special Data*

REAR AXLE

Own. Hypoid gear semi-floating type with Hotchkiss drive

See "Oldsmobile Hypoid" in Rear Axle Section

Car Model	Axle Ratios Ratio	①Code
88 & S88 S M Std	3 64-1 (40-11)	6
88 H M Std	3 23-1 (42-13)	9
88 H M With Air Cond	3 42-1 (41-12)	8
88 H M Optl	3 08-1 (40-13)	0
S88 H M Std	3 42-1 (41-12)	8
S88 H M Optl	3 08-1 (40-13)	0
98 H M Std (exc Conv)	3 42-1 (41-12)	8
98 H M Std (Conv)	3 64-1 (40-11)	6
98 H M Optl	3 64-1 (40-11)	6
98 H M Optl	3 23-1 (42-13)	9

S M - Synchro-mesh H M - Hydra-Matic

① - Rear axle ratio code number stamped on lower locating boss on forward side of carrier

Backlash - 007- 008' (Limits 003 012")

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used) Remove backing plate mounting nuts and static collector Loosen bearing retainer (do not move backing plate or brake line may be damaged) Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position

Differential Carrier Assembly Removal: Remove axle shafts (see above) Clean differential carrier and axle housing around carrier to prevent dirt entering housing Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers Mark universal joint so it can be replaced in the same position Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing

Wheel Bearing Adjustment: None required

SHOCK ABSORBERS

Delco. Direct acting front and rear Service by replacement

Shock Absorbers (Oldsmobile No.)

Model	Front	Rear
88 & S88 (Exc Sta Wgn)	5329177	5531044
98 All	5536671	5531046
All Station Wagons	5532424	5531045

FRONT SUSPENSION

Independent. New "Spherical" joint type with ball joints connecting upper and lower control arms to steering knuckle

See "Oldsmobile" in Suspensions & Wheel Alignment Section

►*NOTE: Following specifications supersede previous recommendations.*

Steering Axis Inclination - 6° at 0° camber.

Caster - 0° to Neg. 1°.

Camber - Neg. ¼° to Pos. ½°, maximum variation between each side of car not to exceed ½°.

►*CASTER & CAMBER ADJUSTMENT NOTE:* Adjusting shims located between upper suspension arm shaft and frame member.

Toe-In - 0 to 1/16".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 23° ± ½°

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut

See "Saginaw Ball Bearing Worm & Nut" in Steering Section

Power Steering: Saginaw (In Line). *See "Saginaw In Line Power Steering" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Bendix Hydraulic (Single Anchor). Conventional two shoe with short molded lining front (Primary) and long molded lining rear (Secondary) Parking brake applies rear wheel service brakes

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section

Drum Diam t r - 11"

Wh l Cylind r Diam t r - 1 3/32" (Front), 31/32" (Rear)

Replacement Linings & Sh s - Shoes and linings furnished in half sets of Std and 030" Oversize

Lining Width & L ngth	Front Wh l	R ar Wh l
Primary Shoes	2½" x 9 3/8"	. 2" x 9 3/8"
Secondary Shoes	2½" x 12 1/32"	2" x 12 1 32"

Lining Thickness - 7/32"

Clearance - Adjusting screw backed off 16 notches from point where wheels can just be turned by hand

Braking Power - 56% Front 44% Rear

Standard Master Cylinder: On left chassis frame front extension under hood

Checking Fluid - Maintain fluid level to within ½" of top of master cylinder gasket surface

Removal - Remove from above Not necessary to disturb other parts

Power Brakes: Bendix or M raine. Combination vacuum power unit and hydraulic master cylinder Unit is mounted on underside of toe board and replaces regular master cylinder *See "Bendix Power Unit" or "Moraine Power Unit" in Brake Section*

►*1957 BENDIX POWER UNIT PRODUCTION CHANGE:* Two types Bendix Power Unit used Early production cars have vacuum reaction type Later cars have hydraulic reaction type

Checking Fluid -Same as for standard master cylinder

Removal of Power Unit - Disconnect positive battery cable at junction block on right fender filler plate disconnect purple solenoid lead wire from wiring harness, then pull cable through sleeve on power brake Disconnect hydraulic line at master cylinder and secure hose so end is above level of junction assembly Disconnect vacuum hoses at power cylinder and remove dipstick Disconnect leads from stop light switch and fold back floor mat Remove three brake pedal bracket attaching bolts and remove pedal and bracket Remove mast jacket grommet retainer and slide grommet up mast jacket Remove mast jacket cover plate attaching screws, cover plate and power cylinder assembly Remove two cover plate-to-power cylinder bolts and remove cover plate Remove power unit through toe pan opening

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type *See "Windshield Wipers" in Miscellaneous Secti n*

Air Conditioning: *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section*

Power Window Regulators: Electric type with individual motors in each window and master control switch on left front cowl *See "Power Window Regulators" in Miscellaneous Section*

Power Top Control: Hydro-Lectric *See "Power Top Controls" in Miscellaneous Section*

Power Seat Adjuster 4-Way: Electric type with single reversible type motor *See "GM 4-Way Seat Controls" in Miscellaneous Secti n*

Power Seat Adjuster 6-Way: Electric type with single reversible type motor *See "GM 6-Way Seat Controls" in Miscellaneous S ction*

►*AIR SUSPENSION CAR CAUTION: B for jacking, hoisting, towing or working und r car, s SERVICE CAUTIONS and TOWING instructions in "Oldsmobil Air Suspension"*

MODEL IDENTIFICATION

SERIAL NUMBER: On left front door pillar. *NOTE* - Number (example below) includes identification data.

① ② ③ ④
58 7 M 01001

① - Year. (1958).
② - Series. **7** - 88, **8** - Super 88, **9** - 98.
③ - Assembly Plant. **M** Lansing, **A** Atlanta, **B** Framingham, **K** Kansas City, Kan., **L** Linden, **C** South Gate, **W** Wilmington, **T** Arlington.
④ - Beginning vehicle number.

ENGINE NUMBER: Stamped on pad located on top of center exhaust port of left cylinder head.

Starting Engin Numb r - B001001. *NOTE* - Export engines identified by "E" after engine number.

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed. Reading on low cylinder must not be less than 80% of reading on high cylinder.

VALVE TAPPET CLEARANCE: None in service (hydraulic lifters).

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe. Install with inner end of coil pointing toward spring pin.

IGNITION

FIRING ORDER: 1-8-7-3-6-5-4-2.

Cylind rs - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .030".

Spark Plugs - AC No. 44. 14 mm. Torque to 23-28 lbs.

COIL: D lc -R my 1115104.

Igniti n Curr nt - 2.0 amps. idling, 4.5 stopped.

R sist r - Delco-Remy 1928016 (Early), 1942491 (Late). 1.40-1.62 ohms.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by s cond lead from ignition switch.*

DISTRIBUTOR: D lc -R my 1110883 (early), 1110929 (lat). "Window" type with external adjustments. *See D lc -R my (Wind w Type) Distributor" in Electrical S ction.*

C nd ns r - Delco-Remy 1932004 (1110883).

Capacity - .18-.23 mfd.

C ntact P int S t - Delco-Remy 1931988 (1110883).

Br ak r Gap - .016".

Cam Angl - 28-32° (set at 30°).

Br ak r Arm Spring T nsion - 19-23 ozs.

R tati n - Counterclockwise viewed from above.

Aut matic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0-4		800
6.5-8.5		975	13-17		1950
8-10		1200	16-20		2400
11-13		2200	22-26		4400

Vacuum Spark C ntr l: Delco-Remy 1116096 (1110883), 1116141 (1110929), 1116146 (Special - *s "PART THROTTLE DETONATION CORRECTION" under ENGINE)*

Plung r Travel - 7/32-15/64" (1116096)

Vacuum Advanc (1116096)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4 5-6 5
10	20	15 5-16 0

Vacuum Advance (1116141)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8-10
12	24	13-16

Vacuum Advance (1116146)

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8-10
11 25-12 75	22 5-25 5	21

IGNITION TIMING

Setting - 5° BTDC with engine idling at 850 RPM and vacuum line to distributor disconnected and carburetor opening taped closed.

►*DETONATION NOTE: If engine detonates due to low octane fuel or carbon build-up, set timing to 2½° BTDC.*

Timing Mark - Two slots in rim of crankshaft balancer and pointer on upper left side of front cover. First slot is 5° BTDC, second slot is TDC.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester carburetors are used. Series 88 has one 2-barrel carburetor, Series S88 & 98 have one 4-barrel carburetor. J-2 engine option (all series) has three 2-barrel carburetors.*

Throttle Return Check Adjustment: With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1500 RPM. Flash throttle and allow to return to slow idle, then turn off engine. Set carburetor on fast idle and check clearance between throttle return check plunger and throttle lever. Adjust to .050" (2-barrel carburetor), .020" (4-barrel carburetor) using two wrenches so that diaphragm is not permitted to turn.

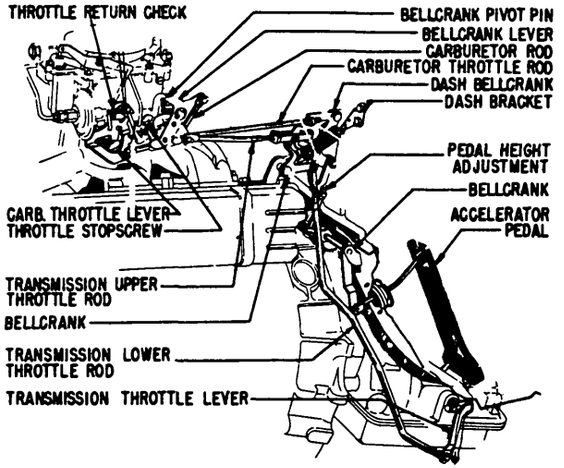
THROTTLE LINKAGE ADJUSTMENT: Install Throttle Return Check Holding Tool J-6342 to hold plunger away from throttle lever. *NOTE* - Revise tool by bending to reduce distance between arms 1/16". Proceed as follows:

1) Remove throttle rod from transmission throttle lever and move throttle lever to rear against its stop, and with Throttle Lever Gauge J-6344 placed flat against rear face of transmission case, rod on gauge should just enter hole in throttle lever. Adjust throttle lever by bending with Tool J-6373-01 *(NOTE* - Tool J-6373 may be revised by cutting 5/8" from top of tool). Attach throttle rod to lever.

2) Back out slow idle adjusting screw until carburetor throttle valves are completely closed. Remove clips from carburetor throttle lever and carburetor bellcrank lever (do not remove carburetor rod).

2-Barrel or J-2 Carburetors - With throttle valves completely closed there should be .030" clearance between bellcrank arm and bellcrank stop.

4-Barrel Carburetor - Place Gauge No. 33-67 against rod with hole in gauge over pin on carburetor throttle lever. With gauge held up against bellcrank pivot pin, open end of tool should fit over pin on bellcrank lever freely without rotation of bellcrank. If pin does not enter hole freely, remove rod and place in a vise and increase or decrease bend as necessary.



OLDSMOBILE V8 THROTTLE LINKAGE

3) Replace retainer clips. Loosen jam nut on transmission throttle rod at bellcrank and remove clevis pin. Remove clevis pin from end of upper transmission throttle rod at bellcrank. With both bellcrank and transmission lower throttle rod held against their rearward stops, adjust lower throttle rod clevis so that pin will enter freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut.

4) With engine bellcrank against its stop and upper transmission throttle rod pulled lightly toward rear of engine to take up slack, adjust clevis on upper transmission throttle rod so that pin enters freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut. Set carburetor slow idle at 460 RPM with transmission selector lever in "D" (Drive) position. This will pull engine bellcrank forward from stop and provide proper throttle valve adjustment. *CAUTION - On all air conditioned cars, slow idle speed must be s t at 520 RPM with compressor running.*

5) Loosen jam nut and back out throttle stopscrew several turns. Hold choke wide open and pull forward on dash bellcrank until throttle valves are wide open, then go beyond to point of maximum transmission throttle lever travel *(CAUTION - This point is a matter of feel and care should be taken not to bend or str tch linkage beyond this point).* With throttle held in this position, adjust throttle stopscrew to just touch tang on downshift lever. Allow throttle valves to return to a closed position, **then turn throttle stopscrew in 1½ t 2 turns and tighten jam nut.**

6) If clearance between dash bellcrank and dash is not 3/8"±1/32" adjust as follows: Loosen jam nut on intermediate throttle rod, remove clevis from dash bellcrank, adjust throttle rod so there is 3/8" clearance between dash bellcrank and front of dash. Install rod end and clip with open side of rod toward outside of car, and tighten jam nut.

7) Adjust accelerator pedal height as follows: Position a 3 7/8" wooden block between bottom of accelerator pedal and top of floor mat retainer. Remove clip and

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accelerator rod assembly from dash bellcrank. Loosen jam nut and adjust accelerator rod so that hole just slides over pin on bellcrank with accelerator pedal toughing gauge block. Install rod end on bellcrank with open side toward outside of car. Tighten jam nut and remove gauge block.

ROCHESTER 2GC (Single Carburetor)

Rochester No. 7012450

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 460 RPM, Hydra-Matic in "D", Synchro-Mesh in Neutral. When Air Conditioning being operated, 520 RPM with control lever at extreme right position, and "Maximum" button pushed in.

Float Level - 1 25/64" (Gauge BT-137). With air horn inverted and gasket in place, position float level gauge over float so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Use scale or scribed mark on float and pump gauge (BT-137).

Automatic Choke Setting: 1 notch lean.

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

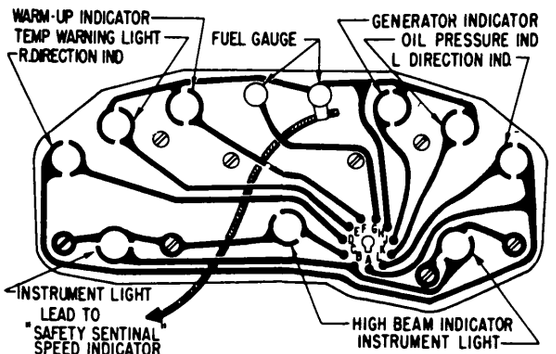
►*OTHER DATA: See "Rochester 2GC Carburetors" in Carburetion Section*

ROCHESTER 2GC
(Triple 2-Barrel Carburetors)

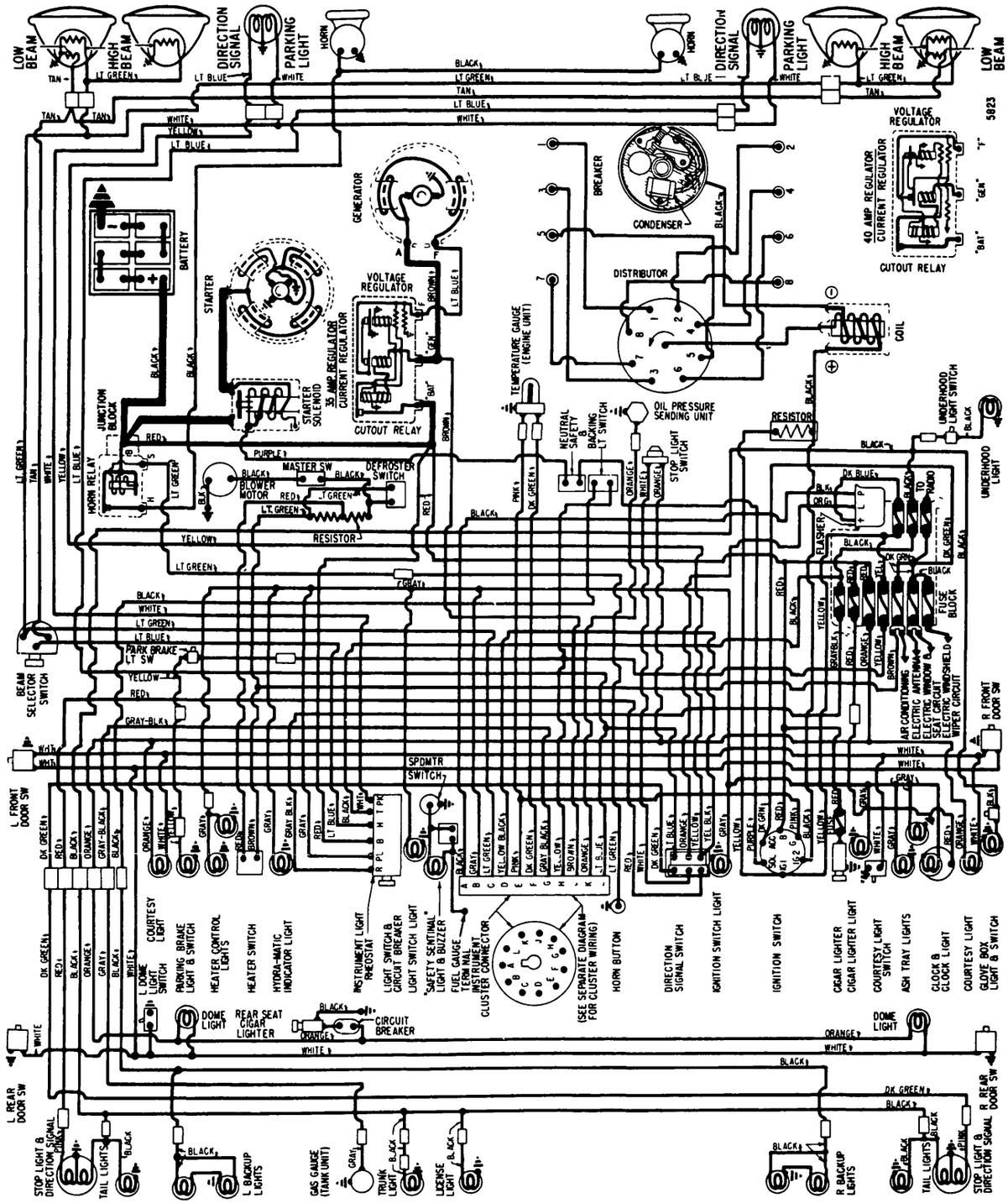
Rochester No. 7011712 (Front), 7011713 (Center, Early), 7012913 (Center, Late), 7011714 (Rear).

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), see "Triple Carburetors" in Carburetion Section

CONTINUED ON NEXT PAGE



LDSMOBILE INSTRUMENT PANEL PRINTED CIRCUIT



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ROCHESTER 4GC

Rochester No. 7012400 (Hydra-Matic), 7012401 (Synchro-Mesh).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - With engine warm and operating at correct idle speed (see below), adjust each idle adjusting screw for smooth idle and highest RPM and vacuum, then turn each screw out (rich) ¼ turn. *NOTE* - If engine rolls from richness when throttle snapped closed, turn each screw in (lean) 1/8 turn.

Idle Speed - 460 RPM, Hydra-Matic in "D", Synchro-Mesh in Neutral. When Air Conditioning being operated, 520 RPM with control lever at extreme right position, and "Maximum" button pushed in.

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4317 (Exc. Air Cond.), No. 4540 (Air Cond.). Fuel & Vacuum.

Pressure - 5-6 lbs. at 1800 RPM with gauge at upper end of pump-to-carburetor line.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric type.

Dash Unit - AC No. 1518960.

Tank Unit - AC No. 1518730 (Exc. Air Cond.), No. 5640098 (Air Cond.).

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Wet type (Std. Series 88). DRY paper element type (Std. Series Super 88 and 98; Optl., Series 88).

►*CLEANING CAUTION (Dry Type):* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

►*TRIPLE CARBURETOR AIR CLEANER REMOVAL & CAUTION:* Remove cleaner wing nut, lift off cover and remove capscrew from inside cleaner assembly. DO NOT drop capscrew in carburetor.

BATTERY

Delco-Remy 3KMR70. 12 Volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - From engine to forward side of firewall.

►*BATTERY NEGATIVE CABLE POSITION NOTE:* On Power Steering and/or Air Suspension Cars, rotate negative battery cable on post rearward as far as possible in order to clear Power Steering and/or Compressor pulley.

STARTER

Delco-Remy 1107665. **Armature** No. 1932185.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	①Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

①- Includes Solenoid Switch.

Starter Switch: Solenoid switch, Delco-Remy No. 1119798 mounted on starter and controlled by combination Starter & Ignition switch, Delco-Remy No. 1116534 and Neutral Safety and Back-up Switch (see below).

Hydra-Matic Neutral Safety Switch: Oldsmobile No. 570386. Neutral Safety and Back-up Light Switch.

Adjustment - *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

GENERATOR

Delco-Remy 1102092 (Std.), 1102093 (Air Cond.).

Armature - Delco-Remy 1932900 (1102092 Gen.), 1939837 (1102093 Gen.).

Performance Data (Cold)

Generator	Amperes	Volts	RPM
1102092	35	14.0	2520
1102093	40	14.0	2600

Brush Spring Tension - 28 ozs. ± 4 ozs.

Field Current - 1.62-1.82 amps. (1102092), 2.66-2.86 amps. (1102093), at 12 volts, 80°F.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Place tension Tool No. 33-70 on generator belt. Loosen generator adjusting link bolt. Tighten belt until line on Tool 33-70 is even with pointer. Tighten adjusting link bolt.

REGULATOR

Delco-Remy 1119002 (1102092 Gen.), 1119600 (1102093).

►*REGULATOR CAUTION: Regulators must be used with generators as indicated above. DO NOT interchange regulators.*

►*"DOUBLE CONTACT" REGULATOR NOTE: Regulator 1119600 has double contacts for voltage regulation. NOTE - Specifications below are "Normal" settings.*

Cutout Relay

Cuts In - 12.8 volts (11.8-13.5 volts, 1119002; 11.8-13.0 volts, 1119600) hot.

Contact Gap - .020".

Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119002) - 14.5 volts (13.8-14.8 volts) at an ambient temperature of 125°F.

Setting (1119600) - 14.5 volts (13.8-14.6 volts) operating on upper contacts. .1-.3 volts lower (operating on lower contacts). At ambient temperature of 125°F.

Contact Gap (1119600) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (1119002), .067" (1119600), with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119002) - 32-37 amps. (adjust to 35 amps.) hot.

Setting (1119600) - 38-45 amps. (adjust to 40 amps.) hot.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Entire instrument cluster served by a printed circuit. All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly. Service of printed circuit is by **replacement only.**

Headlamps: Dual headlights (4 headlights). *See "4-Headlight System" in Electrical Section.*

Directional Signal: *See Electrical Section.*

Autronic Eye: *See Electrical Section.*

Light Switch Removal: Disconnect battery. Disconnect wires from light switch. Pull switch out to last position, then depress button on top of switch assembly and remove rod and knob. Remove Autronic-Eye Switch knob set screw (if so equipped) and remove switch knob. Use Allen wrench to remove sleeve then remove escutcheon. Remove headlight switch from rear of instrument panel.

Stop Light Switch Location (Std. Brakes): Mechanical type attached to underside of toe board and operated by movement of brake pedal.

Stop Light Switch Location (Power Brakes): Mounted on brake pedal bracket and operated by an adjustment screw in arm attached to brake pedal arm. Turn screw in until light just goes off with pedal fully released, then turn screw in four additional turns.

CIRCUIT BREAKER: 25 ampere - Protects head, parking and beam indicator lights. Located on headlight switch.

FUSES: *NOTE - Fuse block located on driver's side of cowl.*

20 Ampere (25 ampere on 98 Holiday & 4-Door Sedans) - Protects stop and body lights and rear seat cigar lighter.

25 Ampere - Protects Air Conditioner (only).

25 Ampere - Protects Heater & Air Conditioner.

25 Ampere - Protects Windshield Wipers.

20 Ampere - Protects Heater (only).

20 Ampere - Protects Windows, Antenna, Seat & Top.

20 Ampere - Protects Instrument panel Cigar Lighter. On back of lighter.

14 Ampere - Protects Back-up Lights, Fuel Gauge, and Indicator Lights.

9 Ampere - Protects Turn Signal, Glove Compartment, Underhood, Trunk, Spot and Tail Lights.

3 Ampere - Protects Instruments Lights.

1 Ampere - Protects Clock.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own 90° V8, Valve-in-head.

Bore	Stroke	Displacement
4"	3.68"	371 cu. ins.

Compr. Ratio	Rated HP	Developed HP
10.0-1	51	Ⓒ

Ⓒ - 265 at 4400 RPM (2-Bbl Carb.), 305 at 4600 RPM (4-Bbl. Carb.), 312 at 4600 RPM (J-2 Eng.).

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C mpr ssi n & Vacuum R ading - *S TUNE-UP*

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL)*· The following modifications should be made to the standard engine before attempting travel in low octane areas (Foreign Travel) to eliminate excessive detonation and resultant engine damage *Lower the compression ratio by making changes listed for fuels of Octane Rating indicated*

Octane Rating	Head Gasket	Compr.Ratio	Ign. Timing
95-93	050"	9 5-1	5°-0° BTDC
91-88 Ⓒ	085"	8 9-1	5°-0° BTDC
86-83	Ⓒ	8 2-1	5°-0° BTDC
82-79	Ⓒ	7 6-1	5°-0° BTDC
80-77	Ⓓ	7 2-1	5°-0° BTDC

Ⓒ - In addition, install Longer Export Pushrods, and Hotter Spark Plugs AC No 46

Ⓒ - Install Kit No 572750 consisting of 125" thick Head Gasket, 060" Intake Manifold Gasket Special Pushrods, and Hotter Spark Plugs AC No 46

Ⓒ - Install Export Pistons, 085" thick Head Gasket, Longer Export Pushrods, and Hotter Spark Plugs AC No 46

Ⓓ - Install Export Pistons and all parts in Kit No 572750 (listed in Ⓒ above)

►*PART THROTTLE DETONATION UPON LIGHT ACCELERATION CORRECTION* When this condition exists on cars prior to Serial No B-210312, and only low octane fuels are available, install Special Vacuum Advance Unit Part No 1116146 (Identified by last three digits "146" stamped on advance unit bracket)

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifold" in Oldsmobile Special Data*

INTAKE MANIFOLD INSTALLATION: *See "Cylinder Head & Manifold" in Oldsmobile Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data*

OIL PAN REMOVAL: Loosen starter motor, remove exhaust crossover pipe, disconnect idler arm support from frame to lower steering linkage Remove pan

PISTONS

Aluminum alloy, three ring, autothermic, steel strut, slipper skirt, cam ground, tin plated

►*PISTON NOTE* Some production cars may have either 005" or 010" oversize pistons

Length - 4 05" **Weight** - 25 22 ozs (less rings & pin)

Removal - Pistons & rods removed from above only

►*CAUTION*· Mark piston rods, and bearing caps with cylinder number before removal to insure correct reinstallation

Clearance - 00075- 00125" Selective fit at thrust surface

Fitting New Pistons: With piston inverted and pin removed, insert piston into bore Pull required to withdraw a 0015" x ½" feeler placed at 90° to normal position of pin and piston at center of normal travel should be 1-6 lbs

►*CAUTION. Allow rebor d cylind rs to cool to normal room temperatur befor fitting pistons*

R plac m nt Pist ns: Furnished with fitted pins in Std (9 Sizes - see table below) and 010", 020", 030" Oversize

Standard Piston Siz s

Pist n C d	Cyl. C d	Pist n C d	Cyl C d
A	AA & A	W	WW & W
B	BB & B	X	XX & X
C	CC & C	Y	YY & Y
D	DD & D	Z	ZZ& Z
E	EE & E		

Installing Pistons: Install pistons 1,3,5,7 in left bank, and 2,4,6,8 in right bank with letter "F" cast on each side of piston pin hole and notch in piston head, toward front of engine

PISTON PINS

Floating type with lock ring at each end Pins are offset in piston 090" toward right side of engine

►*CAUTION:* Discard old lock rings and install new service type lock rings when installing pins

Diameter - 9803- 9807" **Length** - 3 126"

Pin Fit in Piston - 0000- 0002" loose Pin should not fall through piston of own weight when using the low limit (0000" fit) Pin can be tapped into place using brass drift

Pin Fit in Rod Bushing - 0003- 0005" loose

Replacement Pins: Std , 001" & 003" Oversize (in sets)

PISTON RINGS

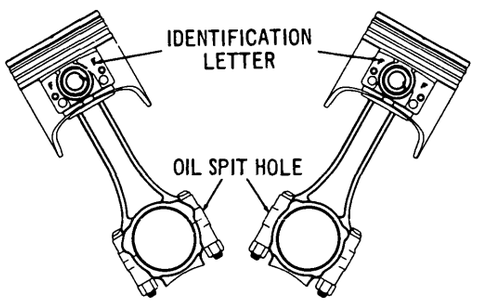
Two compression and one oil ring used

Ring	Width	End Gap	Side Clearance
Compr #1	0775- 078"	013- 023"	001 -.003"
Compr #2	0925- 0935"	013- 023"	001 - 003"
Oil	188"(Max)	①	0023- 0039"

① Sealed Power 013- 033", Perfect Circle 015- 055"

Replacement Rings: Std & 010" Oversize, not in sets

Installing Rings: Install upper chrome and lower black compression rings with side marked "T" or "Top" up



OLDSMOBILE PISTON & ROD ASSY.

CONNECTING RODS

Length - 6 625" center-to-center **Weight** - 29 53 ozs

Crankpin Journal Diameter - 2 2488-2 2498"

Out of Round Limit - 0045"

Lower Bearing - Aluminum with babbitt overlay steel backed both halves interchangeable

Clearance - 0009- 0030" (vertical), 0019- 0040"(horizontal)

Sid play - 002- 011" (total for both rods)

R plac m nt B arings: Std , 002", 010" & 020" Undersize

Installing Rods: Bearing index notches on rods and caps, and pads for numbering caps and rods should be to outside of engine Spit hole for lubrication should be to inside of engine

►*CAUTION· Use Guide Tool BT-22 ov r rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assembli s*

CRANKSHAFT

Journal Diameter - 2 748-2 749" Five bearings

Bear ings - Steel backed aluminum Rear bearing flanged, upper and lower inserts n t interchangeable

Clearance - 0003- 0019" (Front Bearing), 0005- 0021" (No 2 Bearing), 0005- 0031" (Nos 3 & 4 Bearing), 0015- 0031" (Rear Bearing) Obtained by selective fitting of special Standard Bearings *See Main Bearing Note following*

►*MAIN BEARING NOTE* In production, l w r half of Nos 1, 2 5 bearings are selective fit (standard or thicker bearings are listed below) for correct clearance as given above **Upp r** half of these bearings (and both halves of Nos 3 & 4 bearings) are **standard** thickness When installing new standard bearings, select lower bearing half for correct clearance from available thicknesses listed below Bearings are identified by letter stamped on back of bearing tang *NOTE - Standard thickness bearings are unmarked*

No. 1 (Front) Bearing - Lower bearing half ungrooved and furnished in following thicknesses Standard (unmarked) 0005" thicker (marked "A"), 001" thicker (marked "B")

No. 2 Bearing - Lower bearing half ungrooved and and furnished in following thicknesses Standard (unmarked), 0005" thicker (marked "A"), 001" thicker (marked "B"), 002" thicker (marked "E") 003" thicker (marked "F")

Nos. 3 & 4 Bearings - Lower bearing half furnished standard thickness only (unmarked) *NOTE* - Bearing clearance can be reduced by using any of the thicker lower bearing halves listed for No 2 bearing (above) but bearing clearance must n t be reduced to less than 0005"

No. 5 (Rear Bearing) - Lower bearing half has two holes in bearing groove and is furnished in same thicknesses and same markings as No 1 bearing (above)

►*EARLY PRODUCTION REAR BEARING NOTE* First cars used 1957 type bearing shells marked "M" (medium) "T" (Thin) or "H" (Heavy) Replace with same thickness bearing (as indicated by letter on tang) unless undersize bearings being installed to reduce clearance

Replacement Bearings: Furnished Standard (Special sizes - see Main Bearing Note above), and 002", 010", 020" Undersize

End Thrust: Taken by rear (#5) flanged bearing

Endplay - 004- 008"

Crankshaft Rear Main Bearing Oil S al Installati n: *S "Crankshaft & Main B arings" in Oldsmobil Sp cial Data*

Crankshaft Front Oil S al: *S "Engin Front Cov r" in Oldsmobile Special Data*

CAMSHAFT

B arings - Steel backed babbitt or copper, lead bronze

Journal Diam t r - 1 9977-1 9985"

Cl aranc - 001- 0033"

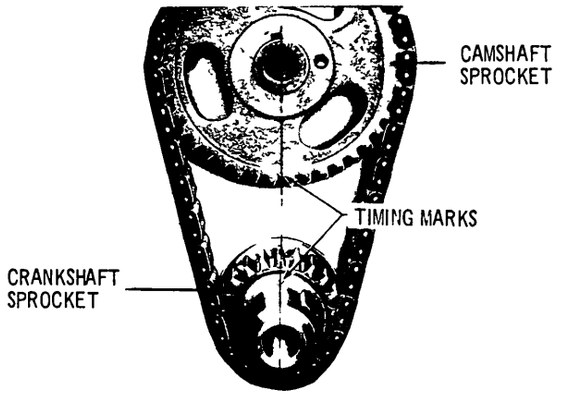
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End Thrust: Forward thrust taken by plunger and spring at front end of camshaft

Timing Chain: Link Belt or Morse *NOTE - Both chains are completely interchangeable (may be used with either type crankshaft and camshaft sprockets)* **Width** - 27/32" **Pitch** - 50" **Length** - 24" or 48 links

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straight edge across shaft centers (or use Tool BT-11)



OLDSMOBILE VALVE TIMING MARKS

►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket Assemble with cupped side out

►*CAMSHAFT REPLACEMENT CAUTION:* For initial lubrication of NEW camshaft it should be liberally coated with mixture of G M Concentrate No 567725 and engine oil before installation (2 Pints of concentrate in 4 qts of oil) and balance of concentrate should be added to crankcase oil for run-in purposes

Engine Front Cover Removal & Installation; *See "Engine Front Cover" in Oldsmobile Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Oldsmobile Special Data*

VALVES

Tappet Clearance: None in service hydraulic

Valve	Head Diam.	Stem Diam.	Length
Intake	1 745-1 755"	3417- 3425"	4 989-5 009"
Exhaust	1 557-1 567"	3930- 3938"	4 989-5 009"

Valve	Seat Angl	Lift	Stem Clearance
Intake	45°	419"	0017- 0035"
Exhaust	45°	435"	0022- 0040"

Valve Seat Width - 037- 075", all valves

Valve Stem Seals - A "Top Hat" type oil seal (deflector) is installed on valve stem below valve spring retainer

Valve Springs: New taper type (larger outside diameter at bottom than at top) No valve dampener spring used with these new valve springs

►*VALVE SPRING REPLACEMENT CAUTION* Use springs are color coded for identification DO NOT use YELLOW coded springs or springs that are not positively identified by another color

Valve Spring Specifications

Valve	Pressure	Length
Open	110 234 lbs	1 437"
Closed	105-115 lbs	1 837"

Free Length - 2 31" (Approx)

Valve Guides: Remove guides with Remover Tool J-3062 Drive new guides into top of cylinder head as follows: Lay Gauge Washer J-5158 on valve spring seat, then install guide into cylinder head (with grooved end of guide up) by driving on Tool J-5158-2 until tool seats against gauge washer Guides should extend 25/32" above face of valve spring seat Inside diameter of guide is 3442- 3452" (Intake), 3960- 3970" (Exhaust) *NOTE* - Service guides are Parco-Lubrited and finished to size **DO NOT** ream Guides furnished Std and 010" oversize Oversize guides identified by a groove on O D of guide

Valve Lifters: Hydraulic lifters standard on all models

►*HYDRAULIC LIFTER INSTALLATION CAUTION* Production engines use Standard, 001", or 010" oversize lifters Use correct size when replacing lifters All lifters have identification numeral (Except Standard) on lifter body Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover When no mark appears lifters are standard

Diameter - 9210- 9215" (Std) **Length** - 2 125"

Clearance in Block - 0005- 0020" (Selective)

Replacement Lifters: Std 001", 002", 003" & 005" Oversize

Hydraulic Lifter Removal, Overhaul & Testing - *See "Valve System" in Oldsmobile Special Data*

Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

Intake Valves Open 16° BTDC Ⓒ Close 45° ALDC Ⓒ

Exhaust Valves - Open 64° BLDC Ⓒ Close 20° ATDC Ⓒ

Ⓒ - 00538" cam lift Ⓒ - 00749" cam lift

Ⓒ - 00535" cam lift

Valve Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke) Trailing edge of notch in crankshaft pulley will be aligned with pointer on timing chain cover Install Tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust pushrod The 7 16" diameter pilot at bottom of tool will fit into cylinder head bolt hole Screw main body of gauge down so step plunger contacts pushrod and small diameter of step plunger is flush with top of main body Tighten clamp bolt Rotate engine one complete revolution so that No 1 piston is again at TDC (intake stroke) If timing chain is installed properly third step of plunger will rise 038" above main body If plunger rises more than 038" camshaft is **advanced** one tooth If plunger does not rise above body (just flush) camshaft is **retarded** one tooth

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts refill Add 1 qt for filter change

Normal Oil Pressure : 35-45 lbs at 50 MPH

Pressure Regulator - In pump body Not adjustable Valve starts to open at 45 lbs Maximum pump pressure is 45-55 lbs

Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter Lights when pressure below 3 lbs

Engine Unit: AC No 1508668

Oil Pump: Gear type In crankcase at rear end

Oil Pump Removal, Overhaul & Installation - *See "Oil Pump" in Oldsmobile Special Data*

Oil Filter: Full flow type Replace every 5000 miles or sooner if needed Located on lower right side of crankcase at rear

Replacement Filter Element - AC No PF-122

Crankcase Ventilation: Air intake in oil filler cap has oil-wetted cleaner AC No 1552233 (Std), No 1551509 (Heavy Duty) Outlet is connected to ventilating baffle at rear of block above right bank Outlet pipe is push fit at ventilator and extends down below right rear corner of engine

►*NOTE:* Air cleaner also used in lower section of ventilator outlet tube on cars with heavy duty inlet breather in filler cap and oil bath air cleaner

COOLING

Water Capacity: 20 qts (without heater), 21 qts (with heater)

Pressure Valve: Radiator filler cap AC No RC-6 13 lbs (Std), AC No RC-15, 15 lbs (Air Cond Cars)

Thermostat: Choke type Dole or Harrison

Type	Dole	Harrison
160°①	563219	3126289
180°②	563311	3626290

①Use with alcohol base anti-freeze

②Use with permanent type anti-freeze

Water Pump: Packless sealed ball bearing type

See "Water Pumps" in Oldsmobile Special Data.

Pump Removal - Remove fan and fan pulley Remove six mounting bolts (4 to engine cover 2 to engine block) Remove Pump

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block GREEN light is lighted when engine running cold and goes off when engine temperature reaches 111-115°F RED light remains off during normal engine operation but comes on when engine temperature reaches 230-234°F *NOTE*- Red light will come on when ignition key turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine started)

Engine Unit - Delco-Remy No 1998181 (Std), No 1998189 (Air Cond Cars)

See "Temperature Indicator" in Miscellaneous Section.

CLUTCH

Long 11CF Assy. No L5167, Oldsmobile No. 570035

Semi centrifugal single plate type

See "Long Clutches" in Clutch Section

Clutch Disc - Long No 282687 Oldsmobile No 565059

Pedal Adjustment: Pedal free travel 1-1¼" Adjust by

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turning adjusting nut on clutch connector link at throw-out yoke.

Removal: Remove transmission (see below). Remove left engine filler plate, engine breather pipe, and right and left rear lower flywheel housing bolts. Remove return spring and disconnect adjusting rod at yoke. Install Engine Rear Support Tool 30-13, entering pilot supports into lower housing bolt holes. Remove engine rear mount bolts at clutch housing, and remove frame crossmember by removing three bolts at each end. Remove clutch housing by removing eight bolts holding housing to flywheel housing. Remove clutch assembly from flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse), all helical gear type. *See "Oldsmobile Synchro-mesh" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission. Mark location of center bearing support on frame to facilitate lateral alignment. Disconnect front and rear companion flanges and center bearing support to frame attaching bolts. (*NOTE* - Keep shims grouped so they can be reinstalled in same location). Slide propeller shaft assembly out of frame. Remove bolts holding transmission to clutch housing, and remove transmission by moving rearward until main drive gear clears clutch assembly.

HYDRA-MATIC DRIVE

"Jetaway" Dual-Coupling Hydra-Matic. Four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

Lubrication - Check fluid level every 1000 miles. Drain and refill every 25,000 miles. Use GM Hydra-Matic Drive Fluid Type "A" (marked AQ-ATF).

Checking Fluid Level - Check with transmission at normal operating temperature, engine idling, and selector lever in "P" (Park) position. Add Hydra-Matic Fluid Type "A" to bring level to "FULL" mark on dipstick. *CAUTION* - Do not fill above "FULL" mark

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

UNIVERSALS

Saginaw or Spicer. Cross type, three used, one each at front and rear, and one at center.

►*UNIVERSAL JOINT INSTALLATION CAUTION TO PREVENT DRIVE LINE VIBRATION: See "Propeller Shaft Notes" in Oldsmobile Special Data.*

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut loosened). *See "Oldsmobile Hypoid" in Rear Axle Section.*

►*UNIVERSAL JOINT LUBRICATION NOTE:* Special Teflon lubricant is difficult to use in pressure gun Use Synthetic Oil Seal Lubricant on slip yoke splines at 6,000 mile lubrication intervals, but use "Special Teflon Lubricant" for repacking slip yoke whenever propeller shaft is disassembled.

Propeller Shaft Center Bearing Overhaul: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss drive.

►*ANTI-SPIN DIFFERENTIAL NOTE:* Anti-spin Differential is available as an option and can be identified by letter "L" stamped on differential carrier case pad near gear ratio code stamp. Anti-spin differential requires the use of special lubricant Part No. 531536. *See "Oldsmobile Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

Axle Ratios

Series	Ratio
88 & S88 S.M. (All)	3.64-1 (40-11)
88 H.M. (Exc. Sta. Wgn.)	3.08-1 (40-13)
88 H.M. Sta. Wgn. & Air Cond.	3.23-1 (42-13)
S88 H.M. (Std.)	3.23-1 (42-13)
S88 H.M. (Air Cond.)	3.42-1 (41-12)
S88 H.M. (Optl.)	3.08-1 (40-13)
98 Std. & Air Cond.	3.42-1 (41-12)
98 Optl	3.08-1 (40-13)
98 Optl. Air Cond.	3.64-1 (40-11)

S.M. - Synchro-mesh. **H.M.** - Hydra-Matic.

►*REAR AXLE IDENTIFICATION NOTE:* Identification code number stamped on boss on lower forward side of carrier as follows:

Ratio	Code	Ratio	Code
3.64-1 (40-11)	6	3.23-1 (42-13)	9
3.42-1 (41-12)	8	3.08-1 (40-13)	0

►*AXLE SHAFT LENGTH CAUTION:* Axle shafts used in cars with Air Suspension are ½" longer than standard axle shaft. When replacing axle shaft (early Standard or Air Cond. Cars) in car equipped with anti-spin differential, it is necessary to grind off 1/16" from splined end of shaft to eliminate interference with internal cross shafts.

Backlash - .007-.008". (Limits .003-.012").

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used). Remove backing plate mounting nuts and static collector. Loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position.

Differential Carrier Assembly Removal: Remove axle shafts (see above). Clean differential carrier and axle housing around carrier to prevent dirt entering housing. Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers. Mark universal joint so it can be replaced in the same position. Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Delco. Direct acting front and rear. Service by replacement.

Shock Absorbers (Oldsmobile No.)

Model	Front	Rear
88, S88 (Exc. Sta. Wgn & Air Susp.)	5329177	5531044
98 (Exc. Air Susp.)	5536671	5531046
All Sta. Wgn. (Exc. Air Susp.)	5532424	5531045
88, S88 Air Susp.	5539214	5539215
98 Air Susp. (Exc. Air Cond.)	5544110	5544111
98 Air Susp. (With Air Cond.)	5544147	5544111

FRONT SUSPENSION

Independent. "Spherical" joint type, with ball joints connecting upper and lower control arms to steering knuckle.

See "Oldsmobile" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 6° at 0° camber.

Caster - 0° to Neg. 1°.

Camber - Neg. ¼° to Pos. ½°, maximum variation between each side of car not to exceed ½°.

►*CASTER & CAMBER ADJUSTMENT NOTE:* Adjusting shims located between upper suspension arm shaft and frame member.

Toe-In - 0 to 1/16".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be at 23 ±½°.

REAR SUSPENSION

Conventional leaf springs standard. On Air Suspension Cars, two lower control arms connected between outer ends of rear axle housing and frame side rail. Two upper control arms are connected between rear axle housing and bracket on frame side rail. Track bar not used. *See "Oldsmobile Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs (front), semi-eliptical springs (rear). Optional all models.

See "Front Suspension" above for alignment specifications and "Oldsmobile Now-Matic Suspension" in Suspension & Wheel Alignment Section.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (In Line). *See "Saginaw In Line Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

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BRAKES

B ndix Hydraulic (Singl Anchor). Conventional two shoe with short molded lining front (Primary) and long molded lining rear (Secondary). Parking brake applies rear wheel service brakes.

S "B ndix Hydraulic Single Anchor (Without Eccentric)" in Brake S ction.

Drum Diam t r - 11".

Wh l Cylind r Diam t r - 1 3/32" (Front), 31/32" (Rear).

R plac m nt Linings & Shoes - Shoes and linings furnished in half sets of Std. and .030" Oversize.

Lining Width & Length		
	Fr nt Wheel	**Rear Wheel**
Primary Shoes	2½" x 9 3/8"	2" x 9 3/8"
Secondary Shoes	2½" x 12 1/32"	2" x 12 1/32"

Lining Thickn ss - 7/32".

Cl aranc - Adjusting screw backed off 16 notches from point where wheels can just be turned by hand.

Braking P wer - 56% Front, 44% Rear.

Standard Mast r Cylinder: On left chassis frame front extension under hood.

Checking Fluid - Maintain fluid level to within ½" of top of master cyliner gasket surface.

Removal - Remove from above. Not necessary to disturb other parts.

Power Brakes: Bendix or Moraine. Combination vacuum power unit and hydraulic master cylinder. Unit is mounted on underside of toe board and replaces regular master cylinder. *See "Bendix Power Unit" or "Moraine Power Unit" in Brake Section.*

Checking Fluid - Same as for standard master cylinder.

Removal of Power Unit - Disconnect positive battery cable at junction block on right fender filler plate, disconnect purple solenoid lead wire from wiring harness, then pull cable through sleeve on power brake. Disconnect brake line at junction block and plug line with rubber stopper. Remove stop light switch leads and fold back floor mat. Remove pedal bracket and pedal assembly, mast jacket grommet and retainer (slide grommet and retainer up on mast jacket). Remove cover plate screws, speedometer cable from clips, and two cover plate-to-power cylinder bolts, then remove cover plate (rest power brake unit on edge of opening in toe pan). Disconnect vacuum hose, then remove brake unit through toe pan opening. *NOTE* - When reinstalling hose, position clamp so screw head may be reached from below car.

MISC. MECHANICAL

Windshield Wipers: Cable operated, vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motors in each window and master control switch on left front cowl. *See "Power Window Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric. *See "Power T p Controls" in Miscellaneous Section.*

Power Seat Adjuster 4-Way: Electric type with single reversible type motor. *See "GM 4-Way Seat Controls" in Miscellaneous Section.*

Power Seat Adjuster 6-Way: Electric type with single reversible type motor. *See "GM 6-Way Seat Controls" in Miscellaneous Section.*

►*STARTING CAR BY PUSHING CAUTION: Car CANNOT be start d by pushing because r ar oil pump has been eliminated in 1959 Hydra-Matic transmission*

MODEL IDENTIFICATION

Series	①Designatio ,	Engine
Dynamic 88	32	371"
Super 88	35	394"
98	38	394"

① - First two digits of series and body style designation following ("59" year number) under STYLE on body identification plate

SERIAL NUMBER: On left front door pillar *NOTE* - Number (example below) includes identification data

① ② ③ ④
59 7 M 01001

① - Year (1959)
② - Series **7** - 88, **8** - Super 88, **9** - 98
③ - Assembly Plant **M** Lansing, **A** Atlanta, **B** Framingham, **K** Kansas City, Kan , **L** Linden, **C** South Gate, **W** Wilmington, **T** Arlington
④ - Beginning vehicle number

ENGINE NUMBER: Stamped on pad located on top of center exhaust port of left cylinder head

►*NOTE* Two engines used **371" Engine** painted gold and has letter "C" prefixed to engine unit number **394" Engine** painted green and has letter "D" prefixed to engine unit number

Starting Engine Number - 001001 (following code letter) *NOTE* - Export engines identified by "E" after engine number

TUNE-UP

►*HARD STARTING IN COLD WEATHER* If failure to start is caused by breaker contact points being burned blue (at relatively low mileage), recurrence of this condition can be prevented as follows **1)** Set voltage regulator to specifications **2)** Install new higher resistance Ignition Coil Resistor Unit, No 1933400 (1 8 ohms - identified by blue color insulator) *NOTE* - Original resistor (1 5 ohms) can be identified by white color insulator

COMPRESSION PRESSURE: 100 lbs minimum at cranking speed Reading on low cylinder must not be less than 80% of reading on high cylinder

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe Install with inner end of coil pointing toward spring pin

IGNITION

FIRING ORDER: 1-8-7-3-6-5-4-2
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7
SPARK PLUG GAP: 030"
Spark Plugs - AC No 44 14 mm Torque to 23-28 lbs
COIL: D lc -R my 1115112.
Igniti n Curr nt - 2 0 amps idling, 4 5 amps stopped
R sist r - Delco-Remy 1942491 1 40-1 62 ohms at 80°F

►*RESISTOR CHANGE TO CORRECT HARD STARTING IN COLD WEATHER S e "Hard Starting in Cold Weather" correction above*

►*COIL RESISTOR NOTE Resistor is connected in lead from ignition switch to coil This resistor is bypassed during cranking by second lead from ignition switch*

DISTRIBUTOR: Delco-Remy No. 1110931. "Window" type with external adjustments *See "Delco-Remy (Window Type) Distributor" in Electrical Section*
Condenser - Delco-Remy 1932004 **Capacity** 18- 23 mfd
Contact Point Set - Delco-Remy 1931988
Breaker Gap - 016"
Cam Angle - 28-32" (set at 30°)
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance

Degrees Distr	RPM	Degrees Eng.	RPM
Start	400	0-4	800
6 5-8 5	975	13-17	1950
8-10	1200	16-20	2400
11-13	2200	22-26	4400

Vacuum Spark Control: Delco-Remy 1116144

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8-10
5 5-9	11-18	16
10-12	20-24	19-21

IGNITION TIMING

Setting - 5° BTDC with engine idling at 850 RPM and vacuum line to distributor disconnected and vacuum fitting line,taped closed

►*DETONATION NOTE If engine detonates due to low octane fuel or carbon build-up, set timing to 2½° BTDC*

Timing Mark - Two slots in rim of crankshaft balancer and pointer on upper left side of front cover First slot is 5° BTDC, second slot is TDC

CARBURETOR

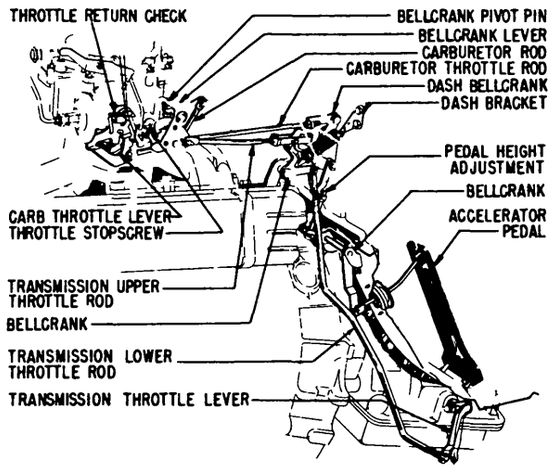
►*CARBURETOR APPLICATION Rochester carburetors are used Series 88 has one 2-barrel carburetor, Series S88 & 98 have one 4-barrel carburetor 4-barrel carburetor optional on Series 88*

►*CARBURETORS RUNNING OUT OF FUEL UNDER NORMAL DRIVING CONDITIONS* May be caused by internal collapse of fuel line hose connecting fuel line to fuel pump inlet When installing new hose, check hose by connecting one end to fuel pump inlet and running engine (on fuel in carburetor bowl) while plugging other end of the hose with a thumb Examine hose for collapsed areas

►*ENGINE NOT RETURNING TO NORMAL IDLE SPEED (EARLY CARS)* May be caused by windshield washer pump relay wire interfering with transmission throttle rod or bellcrank and preventing normal travel of the linkage Correct by rerouting of the wire and taping it up out of the way

Throttle Return Check Adjustment (88): With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1900 RPM Turn off engine Rotate fast idle cam so fast idle screw rests on highest step of fast idle cam Clearance between contact screw and contact on throttle lever should be 050" To adjust, turn contact screw using two wrenches so that diaphragm is not permitted to turn *This setting supersedes previous recommendation of 020"*

Throttle Return Check Adjustm nt (S88 & 98): With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1600 RPM Turn off engine Rotate fast idle cam so fast idle screw rests on highest step of fast idle cam Clearance between contact screw and contact on throttle lever should be 020" To adjust, turn contact screw using two wrenches so that diaphragm is not permitted to turn



OLDSMOBILE V8 THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT: Install Throttle Return Check Holding Tool J-6342 to hold plunger away from throttle lever *NOTE - It may be necessary to revise tool by bending to reduce distance between arms 1/16"* Proceed as follows

1) Raise car Remove throttle rod from transmission throttle lever Place Throttle Lever Gauge J-6344 against machined surface of rear of transmission (do not touch serial number plate). With throttle lever held at end of its rearward travel, gauge rod should align vertically with hole in throttle lever *CAUTION - Do not insert gauge pointer into hole as gauge will be misaligned* If gauge pointer does not align, bend throttle lever with Tool J-6373-01 or J-6373 modified by cutting 5/8" from top of tool Attach throttle rod to lever Lower car

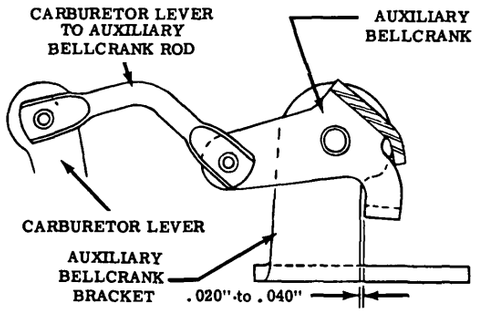
2) Make sure carburetor throttle valves are completely closed by starting engine, removing air cleaner and blocking choke valve open Then turn off engine and back out slow idle adjusting screw until carburetor throttle valves are closed *NOTE - Wh n valves are closed there will be clearance at end of fast idle screw, slow idle screw, and throttle return check plung r*

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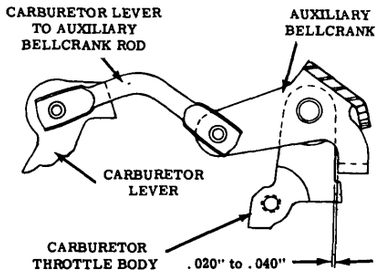
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3) Clearance between auxiliary bellcrank bracket & auxiliary bellcrank (2-barrel carb.), or between carburetor throttle body and auxiliary bellcrank (4-barrel carb.) should be .020-.040". Adjust by bending carburetor-to-auxiliary bellcrank rod.

4) Loosen jam nut on lower throttle rod and remove both upper and lower throttle rods from bellcrank.



CARBURETOR ROD ADJUSTMENT (2-BBL.)



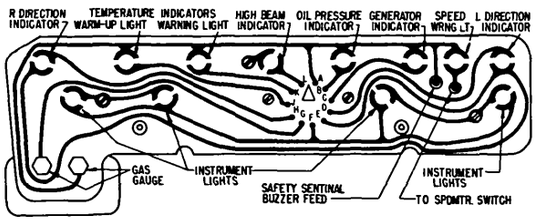
CARBURETOR ROD ADJUSTMENT (4-BBL.)

Upper rod has socket and ball stud connections which snap on and off. With bellcrank and lower throttle rod held against their rearward stops, adjust lower rod clevis so pin will enter freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut.

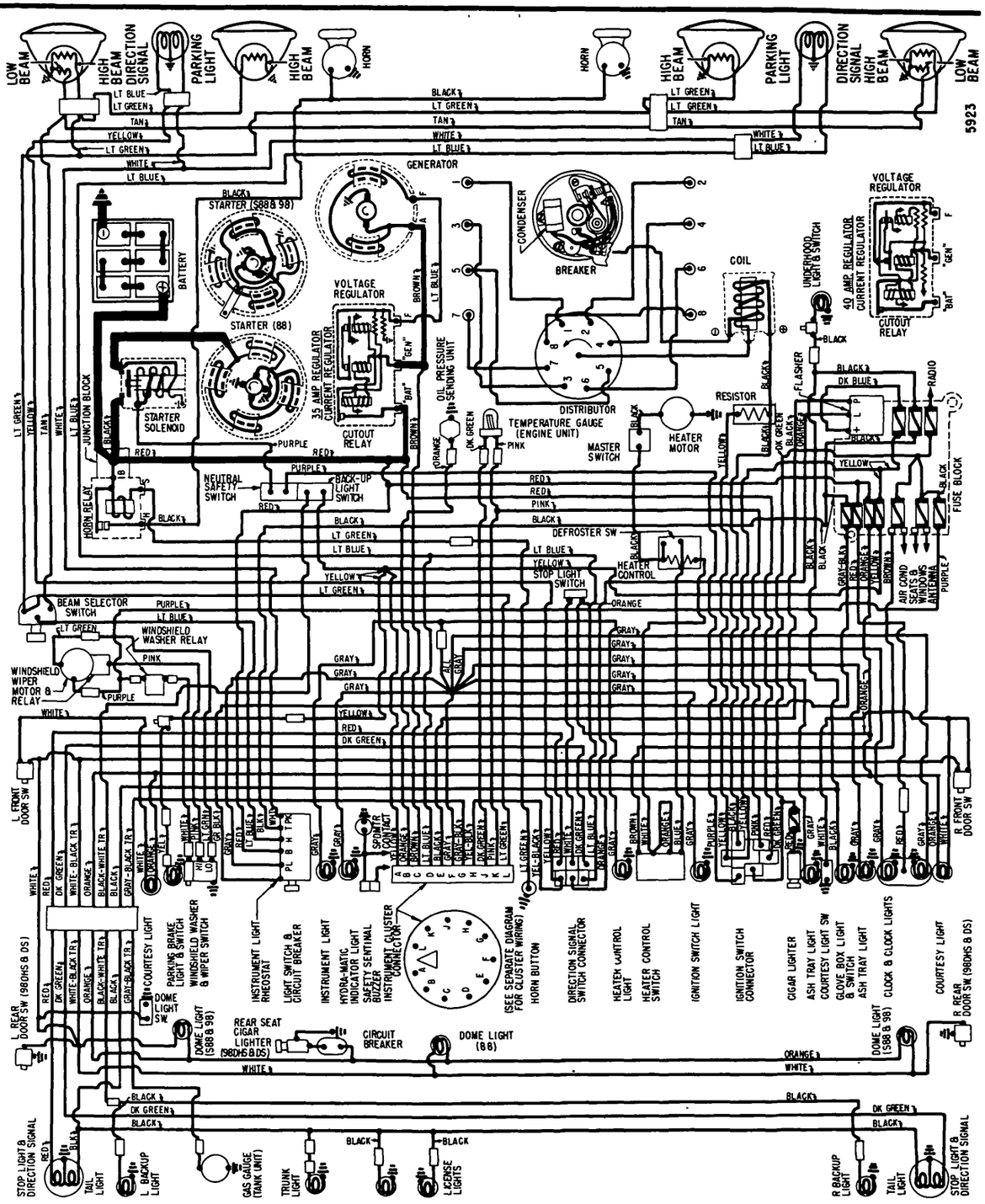
5) Lubricate upper throttle rod ball joint sockets with Special Lubricant, Part No. 571035. Install rod and adjust by turning ball socket assembly until bellcrank is .002-.005" off its stop. *CAUTION - Do not apply pressure to linkage during this adjustment.*

6) Remove block holding choke valve open, start engine

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OLDSMOBILE INSTRUMENT CLUSTER PRINTED CIRCUIT



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and adjust slow idle speed to specifications.

7) With engine stopped and carburetor throttle valves in slow idle position, loosen jam nut on downshift stopscrew and back out stopscrew several turns. Push rearward on accelerator pedal lever until throttle valves are wide open. Hold in this position and rotate throttle bellcrank counterclockwise to limit of transmission lever travel. *CAUTION - This point is a matter of feel and care should be taken not to bend or stretch linkage beyond this point.* Adjust downshift stopscrew so it just touches tang on downshift lever. Return throttle valves to closed position and turn downshift screw in 1½-2 turns. Tighten jam nut.

8) Make sure upper throttle rod is 3 3/16" long. Measure accelerator pedal height from upper top side of pedal to flat washer on dash immediately ahead of pedal. Distance should be 3 13/16". Adjust by turning upper throttle rod adjuster. *NOTE - One turn of adjuster changes pedal height 1/16".*

9) Lubricate all pivot points with light oil, remove Tool J-6342, install air cleaner.

ROCHESTER 2GC

Rochester No. 7013052 (Std.), 7013058 (Air Conditioned). 7015915 Replacement Package for both units. *NOTE* - Carburetors used on factory-installed Air Conditioned cars have Idle Compensator (thermostatically controlled idle air bypass).

►*1959 CARBURETOR PRODUCTION CHANGES FOR IMPROVED PERFORMANCE: See "Rochester 2GC Carburetors" in Carburetion Section.*

►*1959 OLDSMOBILE IMPROVED PERFORMANCE DURING WARM-UP (Rochester 2GC Carburetor):* For improved choke operation during warm-up, new settings are recommended as follows: Fast Idle Speed - 1900 RPM (superseding previous setting of 1600 RPM), Throttle Return Check Setting - .050" (superseding .020").

►*1959 OLDSMOBILE STUMBLE ON LIGHT ACCELERATION (Cars with 2GC Carburetor prior to "M8"):* On carburetors not stamped "M8" or later on brass identification tag, it is recommended that Accelerating Pump Rod setting be increased 1/16". *NOTE* - Carburetors stamped "M8" or later have shorter pump plunger shaft and regular pump rod setting should be used. *See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. If engine speed decreases, readjust to correct RPM.

Idl S tting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idl Sp d - 460 RPM, Hydra-Matic in "DR" or Synchromesh in Neutral. 520 RPM for Air Conditioned cars. *NOTE - On cars with Idle Comp nsator, air conditioning must be "OFF". On cars without Idle Compensator, air conditioning must be "ON".*

Float Level - Use Gauge 100-31. With air horn inverted and gasket in place, place gauge on gasket so that top edge of gauge just touches bottom edge of seam of float at free end. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" from gasket surface to bottom of float, with air horn upright and float hanging free. Use Gauge 100-31.

Fast Idle - Rotate fast idle cam so fast idle screw is on high step of cam. With engine running at normal operating temperature and transmission in "N" (Neutral), adjust fast idle screw to obtain an engine speed of 1900 RPM. *This setting supersedes previous recommendation of 1600 RPM.*

Automatic Choke Setting: Centered at index.

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC

(Std.) Rochester No. 7013050 (Early), 7013950 (Late), (Air Cond.) Rochester No. 7013150 (Early), 7013952 (Late). *NOTE* - Carburetors used on factory-installed Air Conditioned cars have Idle Compensator (thermostatically controlled idle air bypass).

►*CARBURETOR PRODUCTION CHANGE FOR IMPROVED ENGINE IDLE:* Carburetor has new slow idle stop in throttle body. *See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. If engine speed decreases, readjust to correct RPM.

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed - 460 RPM, Hydra-Matic in "DR" or Synchromesh in Neutral. 520 RPM for Air Conditioned cars. *NOTE - On cars with Idle Compensator, air conditioning must be "OFF". On cars without Idle Compensator, air conditioning must be "ON".*

Automatic Choke Setting: Centered at index.

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fu l Pump: AC. Fuel only (Standard), Combination fuel-and-vacuum (With Heater or Air Conditioning).

AC Repl. Pump No.	Us
4726 (Early), 4538 (Later)	Standard
4727 (Early), 4621 (Later)	With Heater
4728 (Early), 4614 (Later)	Heater & Air Cond.

Pressure - 5-6 lbs. at 1800 RPM with gauge at upper end of pump-to-carburetor line.

See "Fuel Pumps" in Carburetion Section.

Gas Gauge: AC Electric type.

Dash Unit - AC No. 5640258.

Tank Unit - AC No. 5640230 (Exc. Air Cond. Cars), 5640231 (Air Cond. Cars).

See "Fuel Gauges" in Carbur tion S ction.

Air Cleaner: Wet type (Std. Series 88), DRY paper element type (Std. Series S88 & 98, Optl. 88).

►*AIR CLEANER PRODUCTION CHANGE & SERVICE CAUTION:* Heavy duty paper element used in later production and furnished for service to replace earlier type element. New element can be identified by whit color paper (previous type had tan color paper). *This filter element should be REPLACED at 10,000 mil intervals (more often in dusty areas).*

►*AIR CLEANER DEFLECTOR BAFFLE INSTALLATION (To prevent element erosion in dusty ar as):* Deflector Baffle, No. 577839, can be installed under air cleaner cover directly in front of snorkel outlet. Baffle will channel air around element and lessen force with which dust particles strike paper element.

BATTERY

Delco-Remy 3KMR70. 12 Volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - From rear of left cylinder head to firewall.

STARTER

Delco-Remy 1107665 (88), 1107716 (Sup r 88 & 98). *NOTE* - No. 1107716 is new "Two-Shunt" type.

Armature - Delco-Remy 1932185 (88), 1941888 (Super 88 & 98).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107665

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107716

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	4700-5400	10.6	80-120
	Lock	2.0	290-370

Ⓒ - Includes Solenoid.

Start r Switch: Solenoid Switch, Delco-Remy No. 1119798 (88), 1118811 (Super 88 & 98) mounted on starter and controlled by combination Starter & Ignition Switch,

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Delco-Remy No 1116554 and Neutral Safety & Back-up Switch (see below)

Hydra-Matic N utral Safety Switch: Oldsmobile No 570386 Neutral Safety and Back-up Light Switch

Adjustm nt - *See "Dual-Coupling Hydra-Matic" in Transmission Section*

GENERATOR

D lc -R my 1102092 (Std. - Early), 1102166 (Std. - Lat r), 1102093 (Air C nd.).

Armatur - Delco-Remy 1932900 (1102092 Gen), 1939837 (1102093 Gen)

►*GENERATOR PRODUCTION CHANGE & REPAIR CAUTION ON FIRST TYPE GENERATOR.* Later 1102166 generator has ball bearing at commutator end with different armature and commutator end frame If commutator end bushing failure experienced on first type 1102092 generator, change generator over to ball bearing type by installing all of the following parts Commutator End Frame No 1946720, Ball Bearing No 904751, and Armature No 1946719 *NOTE* - These are same parts used in 1102166 generator

►*CHARGING CIRCUIT FUSE CAUTION* Battery charging circuit is protected by a fuse, Oldsmobile No 575532, clipped to "BAT" terminal of generator regulator Check for blown fuse when diagnosing Generator, Battery, or Regulator failure

►*GENERATOR GROANING NOISE (EARLY CARS)* On these cars, a groaning noise in "Drive" (off idle) and in 4th gear (at 20-25 MPH or 30-40 MPH), can be corrected by installing later type rubber-mounted generator adjusting link, No 577067 (with longer Attaching Bolt No 456656, Lockwasher No 120382 and special Flat Washer No 446477) *NOTE* - This rubber-mounted adjusting link used in production on later cars

P rf rmance Data (Cold)

Generator	Amperes	Volts	RPM
1102092	35	14 0	2520
1102166	35	14 0	2400
1102093	45	14 0	2600

Brush Spring T nsion - 28 ozs

Fi ld Curr nt - 1 62-1 82 amps (1102092 & 1102166), 2 66-2 86 amps (1102093), at 12 volts, 80°F

R tati n - Counterclockwise at commutator end

B lt Adjustm nt: Place tension Tool No 33-70 on generator belt Loosen generator adjusting link bolt Tighten belt until line on Tool 33-70 is even with pointer Tighten adjusting link bolt

REGULATOR

D lc -R my 1119002 (1102092 Gen.), 1119253 (1102166 G n.), 1119600 (1102093 G n.) *NOTE* - Specifications below are "Normal" settings

►*REGULATOR CAUTION Regulators must be used with generators as indicated above DO NOT interchange regulators*

►*"DOUBLE CONTACT" REGULATOR NOTE· Regulator 1119600 has double contacts for voltage regulation*

►*SEE CHARGING CIRCUIT FUSE CAUTION under Generat r above*

Cut ut R lay

Cuts In - 12 8 volts (11 8-13 5 volts, 1119253 & 1119002, 11 8 - 13 0 volts, 1119600) hot

C ntact Gap - 020"

Air Gap - 020" with contacts closed

Voltage Regulator

Setting (1119253 & 1119002) - 14 5 volts (13 8-14.8 volts) at an ambient temperature of 125°F

Setting (1119600) - 14 5 volts (13 8-14 6 volts) operating on upper contacts 1- 3 volts lower (operating on lower contacts) At ambient temperature of 125°F

Contact Gap (1119600) - 016" (upper contacts) with lower contacts just touching

Air Gap - 075" (1119253 & 1119002), 067" (1119600), with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section*

Current Regulator

Setting (1119253 & 1119002) - 32-37 amps (adjust to 35 amps) hot

Setting (1119600) - 38-45 amps (adjust to 40 amps) hot

Air Gap - 075" with armature pressed down to points where contacts just touch

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE·* Entire instrument cluster served by a printed circuit All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly Service of printed circuit is by **replacement only.**

Headlamps: Dual headlights (4 headlights) *See "4-Headlight System" in Electrical Section*

Directional Signal: *See Electrical Section*

Autronic Eye: *See Electrical Section*

Light Switch Removal: Disconnect battery Disconnect wires from light switch Pull switch out to last position, then depress button on top of switch assembly and remove rod and knob Remove Autronic-Eye Switch knob setscrew (if so equipped) and remove switch knob Use Allen wrench to remove sleeve, then remove escutcheon Remove headlight switch from rear of instrument panel

Stop Light Switch Location - (All Brakes): Mounted on brake pedal bracket and operated by an adjustment screw in arm attached to brake pedal arm Turn screw in until light just goes off with pedal fully released, then turn screw in three additional turns

CIRCUIT BREAKER: 25 Ampere - Protects head, parking and beam indicator lights Located on headlight switch Not adjustable

FUSES: *NOTE - Fuse block located on driver's side of cowl*

20 Amp r (25 amp r on 98 H liday & 4-Do r Sedans) - Protects stop and body lights and rear seat cigar lighter

20 Amp r - Protects Air Conditioner (only).

20 Amp r - Protects Heater & Air Conditioner

20 Amp r - Protects Heater (only)

20 Amp r - Protects Windshield wipers

20 Ampere - Protects Windows, Antenna, Seat & Top

20 Ampere - Protects instrument panel Cigar Lighter On back of lighter

9 Ampere - Protects Back-up Lights, Fuel Gauge, and Indicator Lights

9 Ampere - Protects Turn Signal (only)

9 Ampere - Protects Glove Compartment, Underhood , Trunk, Spot and Tail Lights

3 Ampere - Protects Instrument Lights

1 Ampere - Protects Clock

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 90° V8 Valve-in-head Two engines used 371" Engine used in Series 88 394" Engine used in Super 88 & 98

Engine	Bore	Stroke	Displacement
371"	4"	3 11/16"	371 cu ins
394"	4 1/8"	3 11/16"	394 cu ins

Engine	Compr. Ratio	Rated HP	Developed HP
371" ①	9 75-1	51	270 at 4600 RPM
371" ②	9 75-1	51	300 at 4600 RPM
394"	9 75-1	54	315 at 4600 RPM

① - 2-Barrel Carburetor ② - 4-Barrel Carburetor

Compression & Vacuum Reading - *See TUNE-UP*

►*ENGINE OPERATION IN LOW OCTANE AREAS(FOREIGN TRAVEL):* The following modifications should be made to the standard engine before attempting travel in low octane areas (Foreign Travel) to eliminate excessive detonation and resultant engine damage Lower the compression ratio by making changes listed for fuel of octane rating indicated *TIMING NOTE* - Set ignition timing in range of 5° BTDC to 0° (TDC)

Octane Rating	Head Gasket	Piston Type	Compr. Ratio	Spark Plugs
		371" Engine		
98-95	Std ①	Std	9 75-1	44
87-84	②	Std	8 4-1	46
84-81	060"	Exp	7 9-1	46
80-77	②	Exp	7 4-1	46
		394" Engine		
98-95	Std ③	Std	9 75-1	44
87-84	④	Std	8 4-1	46
84-81	085"	Exp	7 9-1	46
80-77	④	Exp	7 4-1	46

① - 025" thick

② - Use Parts Kit No 577044 consisting of 100" thick Head Gaskets, 060" thick Intake Manifold Gaskets, and set of Longer Pushrods

③ - 050" thick

④ - Use Parts Kit No 577046 consisting of 125" thick Head Gaskets, 060" thick Intake Manifold Gaskets, and set of Longer Pushrods

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifold" in Oldsmobile Special Data*

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INTAKE MANIFOLD INSTALLATION: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data.*

OIL PAN REMOVAL: Disconnect battery. Position No. 1 piston on bottom of stroke. Remove exhaust crossover pipe. Disconnect idler arm support from frame. Remove starter and lower flywheel housing. Remove pan.

PISTONS

Aluminum alloy, three ring, autothermic, steel strut, slipper skirt, cam ground, tin plated.

Length - 4.05" (all) **Weight** 25.82 ozs. (88), 27.76 ozs. (Super 88 & 98).

Removal - Pistons & rods removed from above only.

►*CAUTION:* Mark piston, rods and bearing caps with cylinder number before removal to insure correct re-installation.

Clearance - .001-.0025" at bottom of skirt. Selective fit.

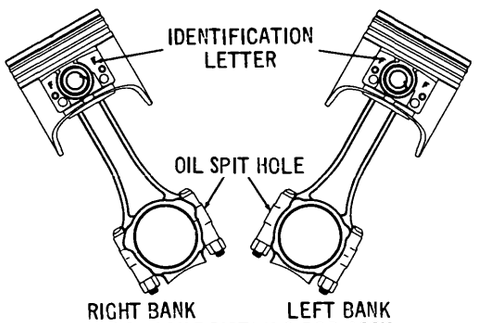
Fitting New Pistons: With piston inverted and pin removed, insert piston into bore. Pull required to withdraw a .0015 x 1/2" feeler placed at 90° to normal position of pin and piston at center of normal travel, should be 2-6 lbs. (371" Eng.), 3-12 lbs. (394" Eng.).

►*CAUTION: Allow rebored cylinders to cool to normal room temperature before fitting pistons.*

Replacement Pistons: Furnished with fitted pins in Std. 9 sizes (see table below) and .010", .020", .030" O.S.

Standard Piston Sizes

Piston Code	Cyl. Code	Piston Code	Cyl. Code
A	AA & A	W	WW & W
B	BB &B	X	XX & X
C	CC & C	Y	YY & Y
D	DD & D	Z	ZZ & Z
E	EE & E		



OLDSMOBILE PISTON & ROD ASSY.

Installing Pistons: Install pistons 1,3,5,7 in left bank, and 2,4,6,8 in right bank with letter "F" cast on each side of piston pin hole, and notch in piston head, toward front of engine. *See Rod Installation.*

PISTON PIN

Floating type with lock ring at each end. Pins are offset in piston .090" toward right side of engine.

►*CAUTION:* Discard old lock rings and install new service type lock rings when installing pins.

Diameter - .9803 - .9807". **Length** - 3.126".

Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.

Pin Fit in Rod Bushing - .0003-.0005" loose.

Replacement Pins: Std., .001" & .003" Oversize.

PISTON RINGS

Two compression and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.078"	.013-.023"	.001-.004"
Compr.(2)	.0925-.0935"	.013-.023"	.001-.004"
Oil	Ⓒ	.015-.055"	Ⓔ

Ⓒ - .1831-.1889" (Perfect Circle), .1840-.1889" (Sealed Power).

Ⓔ - .0006-.0066" (Perfect Circle), .0001-.0051" (Sealed Power).

Replacement Rings: Std. & .010" Oversize.

Installing Rings: Install upper chrome and lower black compression rings with side marked "T" or "Top" up. Sealed Power rings have dimple marked on top of rings.

CONNECTING ROD

Length - 6.998" center-to-center. **Weight** - 35.58 ozs. (88), 34.55 ozs. (S88 & 98).

►*CONNECTING ROD CAUTION:* Rod used in 88 Engine is heavier (heavier bosses at large end) to compensate for lighter piston and is NOT interchangeable with rod used in Super 88 & 98 Engine.

Crankpin Journal Diameter - 2.4992-2.5002".

Lower Bearing - Moraine 400 steel-backed aluminum with babbitt overlay.

Clearance - .0005-.0026" (vertical), .0013-.0034" (horizontal).

Sideplay - .002-.011" (total for both rods).

Replacement Bearings: Std., .002", .010", .020" Undersize.

Installing Rods: Bearing index notches on rods and caps, and pads for numbering caps and rods should be to outside of engine. Spit hole for lubrication should be to inside of engine.

►*CAUTION: Use Guide Tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

CRANKSHAFT

Journal Diameter - 2.9990-3.000". Five bearings.

Bearings - Moraine 400 steel-backed aluminum with babbitt overlay (Nos. 1-4), Durex 100A steel-backed babbitt overlay (No. 5).

Clearance - .0008-.0024" (Nos. 1-4), .0015-.0035" (No. 5). Wear limit .005".

►*MAIN BEARING CAUTION:* Main bearing clearances not within specifications should be corrected by installation of new upper and lower bearing shells INSTALLED AS A PAIR. DO NOT install upper or lower bearing shells singly and do not use shims behind shells to compensate for wear.

Replacement Bearings: Complete bearings (upper and lower halves) furnished Standard & .0005", .001", .0015", .002" Undersize. *Install bearings in PAIRS (upper and lower halves).*

End Thrust: Taken by rear (No. 5) flanged bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

CAMSHAFT

Bearings - Steel-backed babbitt.

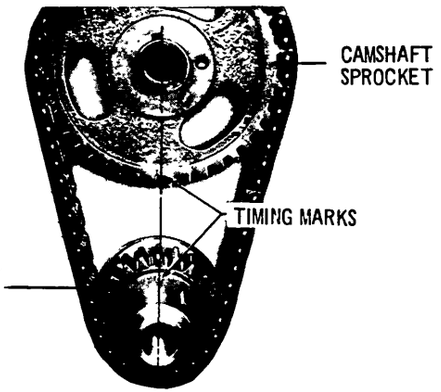
Journal Diameter - 1.9977-1.9985" (All).

Clearance - .001-.0033".

End Thrust: Forward thrust taken by plunger and spring at front end of camshaft.

Timing Chain: (Width) 27/32", **(Pitch)** .50", **(Length)** 24" or 48 Links.

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straight edge across shaft centers (or use Tool BT-11).



OLDSMOBILE VALVE TIMING MARKS

►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket. Assemble with cupped side out.

►*CAMSHAFT REPLACEMENT CAUTION:* For initial lubrication of NEW camshaft, it should be liberally coated with mixture of G.M. Concentrate No. 567725 and engine oil before installation (2 Pints of concentrate in 4 qts. of oil) and balance of concentrate should be added to crankcase oil for run-in purposes.

Engine Front Cover Removal & Installation; *See "Engine Front Cover" in Oldsmobile Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

VALVES

►*EXHAUST VALVE OIL SEAL PRODUCTION CHANGE & "DRY ENGINE" VALVE NOISE CORRECTION (Engines before No. D or C-306540):* Correct by installing new deflector seal with **short** skirt on exhaust valve stems. This new seal used in production beginning with above engine numbers.

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880	.3417-.3425"	4.989-5.009"
Exhaust	1.557-1.567	.3930-.3938"	4.989-5.009"

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Valv	Seat Angl	Lift	St m Cl arance
Intake	45°	419"	.0017-.0035"
Exhaust	45°	435"	0022- 0040"

Valv S at Width - 037-.075", all valves

Valv St m S als - *See Exhaust Valve Oil Seal Production Change above* Cupped type oil deflector installed on valve stem below spring retainer cup on all valves. To install, force oil deflector down on valve stem as far as possible (cupped end down toward toward head) Deflectors will position themselves properly on valve stem when engine is started

Valv Springs: New taper type (larger outside diameter at bottom than at top). No valve dampener spring used with these valve springs.

Fre L ngth - 2.25" (Approximate)

Valv Spring Specifications

Valv	Pr ssure	Length
Open	175-189 lbs	1.437"
Closed	85-95 lbs	1 837"

Valv Guid s: To remove old guides, support head and drive guides out through top of head using Remover Tool J-3062 Install new guides as follows Place Gauge Washer J-5158-3 on valve spring seat. Use Valve Guide Installer Tool J-5158-2 to drive new guide in head (grooved end of guide up) until tool seats against gauge washer This will correctly position guides in head (guide should extend 25/32" above face of valve spring seat)

Valv Lift rs: Hydraulic lifters standard on all models

►*HYDRAULIC LIFTER INSTALLATION CAUTION* Production engines use Standard, 001", or 010" oversize lifters Use correct size when replacing lifters All lifters have identification numeral (Except Standard) on lifter body Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover When no mark appears, lifters are standard

Diameter - 9210- 9215" (Std) **Length** - 2 125"

Cl aranc in Block - 0005- 0020" (Selective)

Replacement Lifters· Std , 001", 002", 003" & 005" & .010" Oversize.

Hydraulic Lifter R moval, Overhaul & Testing - *See "Valve System" in Oldsmobile Special Data*

R cker Arm Assembly: *Se "Valve System" in Oldsmobile Special Data*

VALVE TIMING

See "Camshaft S tting" under CAMSHAFT above

Intak Valv s Open 16° BTDC ① Close 45° ALDC ②

Exhaust Valves - Open 64° BLDC ③ Close 20° ATDC ②

① - 00538" cam lift ② - 00749" cam lift

③ - 00535" cam lift

Valv Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke) Trailing edge of notch in crankshaft pulley will be aligned with pointer on timing chain cover Install Tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust pushrod The 7 16" diameter pilot at bottom of tool will fit into cylinder head bolt hole Screw main body of gauge down so step plunger contacts pushrod and small diameter of step plunger is flush with top of main body Tighten clamp bolt Rotate engine one complete revolution so that No 1 piston is again at TDC (intake stroke) If timing chain is installed properly third step of plunger will rise 038", above main body If plunger rises more than 038", camshaft is **advanced** one tooth If plunger does not rise above body (just flush), camshaft is **retarded** one tooth

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts refill Add 1 qt for filter change

Normal Oil Pressure: 35-45 lbs at 50 MPH

Pressure Regulator - In pump body Not adjustable Valve starts to open at 45 lbs Maximum pump pressure is 45-55 lbs

Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter Lights when pressure below 3 lbs

Engine Unit: AC No 1508668

Oil Pump: Gear type In crankcase at rear end

Oil Pump Removal, Overhaul & Installation - *See "Oil Pump" in Oldsmobile Special Data*

Oil Filter: Full flow type Replace every 5000 miles or sooner if needed Located on lower right side of crankcase at rear

Replacement Filter Element - AC No. PF-122 (Early), PF-5 (Late)

Crankcase Ventilation: Air intake in oil filler cap has oil-wetted cleaner, AC No. 1554198 (Std), No. 1554199 (Heavy Duty) Outlet is connected to ventilating baffle at rear of block above right bank Outlet pipe is push fit at ventilator and extends down below right rear corner of engine

►*NOTE:* Air cleaner also used in lower section of ventilator outlet tube on cars with heavy duty inlet breather in filler cap and oil bath air cleaner

COOLING

Water Capacity: 20 qts (without heater), 21 qts (with heater)

Pressure Valve: Radiator filler cap AC No RC-6 13 lbs (Std), AC No RC-15, 15 lbs (Air Cond Cars)

Thermostat: Choke type Dole or Harrison

Type	Dole	Harrison
160°①	563219	3126289
180°②	563311	3626290

①Use with alcohol base anti-freeze

②Use with permanent type anti freeze

Water Pump: Packless sealed ball bearing type

See "Water Pumps" in Oldsmobile Special Data.

Pump Removal - Remove fan and fan pulley Remove six mounting bolts (4 to engine cover 2 to engine block) Remove Pump

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block GREEN light is lighted when engine running cold and goes off when engine temperature reaches 113-115°F RED light remains off during normal engine operation but comes on when engine temperature reaches 238°-240°F *NOTE* - Red light will come on when ignition key turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine started)

Engine Unit - Delco-Remy No. 1998189 (Std.), No. 1998707 (Air Conditioned Cars).

See "T mp rature Indicators" in Misc llan ous S cti n.

CLUTCH

Long 11CF Assy. No. L5167 (88), 262832 (Super 88 & Heavy Duty). Semi-centrifugal, single plate type. *See "Long Clutches" in Clutch Section*

Clutch Disc - Long No 282687, Oldsmobile No. 565059

Pedal Adjustment: *CAUTION - 1959 clutch linkage is new and must be adjusted as follows·* Install a ¼" gauge pin (piece of steel rod) through holes provided in frame side rail and X-member Remove cotter pin, clevis pin, and spring washer from clevis at upper end of vertical rod (at bellcrank on firewall) Overcenter spring will then hold bottom of rod against gauge pin. Loosen locknut at rear end of horizontal rod (clutch release yoke end of rod) until rod is free of tension Adjust pedal stopscrew at pivot end of pedal until pedal height measured from top of pedal pad to toe pan (roll back floor mat for measurement) is 8". Adjust clevis on upper end of vertical rod until gauge pin is just free in frame holes with rod connected to bellcrank on firewall. Install clevis pin, spring washer, and cotter pin in clevis and tighten locknut Adjust locknut on rear end of horizontal rod for correct pedal free travel of 1-1¼" *NOTE* - After linkage connected, pedal height will be 8¼" with spring load applied

Removal: Remove transmission (see below) Remove left engine filler plate engine breather pipe and right and left rear lower flywheel housing bolts Remove return spring and disconnect adjusting rod at yoke Install Engine Rear Support Tool 30-13 entering pilot supports into lower housing bolt holes Remove engine rear mount bolts at clutch housing, and remove frame crossmember by removing three bolts at each end Remove clutch housing by removing eight bolts holding housing to flywheel housing Remove clutch assembly from flywheel

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh synchro-mesh (second & high), sliding gear (low & reverse), all helical gear type *See "Oldsmobile Synchro-mesh" in Transmission Section*

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission Mark location of center bearing support on frame to facilitate lateral alignment Disconnect front and rear companion flanges and center bearing support to frame attaching bolts (*NOTE* - Keep shims grouped so they can be reinstalled in same location) Slide propeller shaft assembly out of frame Remove bolts holding transmission to clutch housing, and remove transmission by moving rearward until main drive gear clears clutch assembly

HYDRA-MATIC DRIVE

"Jetaway" Dual-Coupling Hydra-Matic. Four speed automatic transmission and fluid coupling

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION. See "Dual-Coupling Hydra-Matic" in Transmission Section*

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►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

Lubrication - Check fluid level every 2000 miles. Drain and refill every 26,000 miles. Use only GM Hydra-Matic Fluid Type A - Suffix A

Capacity - 11 qts. (refill), 11½ qts. (refill after pan removed), 13 qts. (after overhaul).

Checking Fluid Level - Check with transmission at normal operating temperature, engine idling, and selector lever in Park "P" position. Maintain fluid level at "FULL" mark on dipstick. *CAUTION - Do not fill above FULL mark.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

UNIVERSALS

Saginaw or Spicer. Cross type, three used, one each at front and rear and one at center.

►*UNIVERSAL JOINT INSTALLATION CAUTION TO PREVENT DRIVE LINE VIBRATION: See "Propeller Shaft Notes" in Oldsmobile Special Data.*

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut loosened). *See "Oldsmobile Hypoid" in Rear Axle Section.*

Propeller Shaft Center Bearing Overhaul: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss drive.

►*ANTI-SPIN DIFFERENTIAL NOTE:* Anti-spin Differential is available as an option and can be identified by letter "L" stamped on differential carrier case pad near gear ratio code stamp. Anti-spin differential requires the use of special lubricant Part No. 531536. *See "Oldsmobile Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

Series	Rear Axle Ratio	Ratio
88 (Synchro-mesh - All)		3.64-1
88 (Hydra-Matic - Std.) exc. Fiesta		3.08-1
88 (Hydra-Matic - Std.) Fiesta Sedan		3.23-1
88 (Hydra-Matic - Plains Ratio)		2.87-1
88 (Hydra-Matic - Export Opt.)		3.23-1
88 (Hydra-Matic - Air Cond.)		3.23-1
Super 88 (Synchro-mesh - All)		3.64-1
Super 88 (Hydra-Matic - Std.)		3.23-1
Super 88 (Hydra-Matic - Plains Ratio)		2.87-1
Super 88 (Hydra-Matic - Air Cond.)		3.42-1
98 (Std. & Air Cond.)		3.42-1
98 (Plains Ratio)		3.08-1

►*REAR AXLE IDENTIFICATION NOTE:* Identification code number stamped on lower right front face of carrier flange as follows:

Cod N.	Axl Rati	Cod N.	Axl Rati
6	3.64-1 (40-11)	9	3.23-1 (42-13)
7	2.87-1 (43-15)	0	3.08-1 (40-13)
8	3.42-1 (41-12)		

Backlash - .007-.008" (limits .005-.009").

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used). Remove backing plate mounting nuts and static collector. Loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position.

Differential Carrier Assembly Removal: Remove axle shafts (see above). Clean differential carrier and axle housing around carrier to prevent dirt entering housing. Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers. Mark universal joint so it can be replaced in the same position. Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Delco. Direct acting front and rear. Service by replacement.

℄ **Shock Absorbers (Oldsmobile No.)**

Model	Front	Rear
88 & Super 88 (exc. Fiesta)	5544569	5531044
88 & Super 88 (Fiesta)	5549225	5531045
98	5549224	5531046

℄ - Except Air Suspension models.

FRONT SUSPENSION

Independent. "Spherical" joint type, with ball joints connecting upper and lower control arms to steering knuckle.

See "Oldsmobile" in Suspension & Wheel Alignment Section.

Steering Axis Inclination - 10° at 0° camber.

Caster - 0° to Neg. 1°.

Camber - Neg. ¼° to Pos. ½°, maximum variation between each side of car not to exceed ½°.

Toe-In - 0 to 1/16".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be at 23 ±½°.

REAR SUSPENSION

Air Suspension Cars - Upper and lower control arms connected between axle housing and frame side rail at each side of car. *See "Oldsmobile Rear Suspension" in Suspension & Wheel Alignment Section.*

AIR SUSPENSION

Air springs replace coil springs (front), semi-eliptical springs (rear). Optional all models.

See "Front Suspension" above for alignment specifications and "Oldsmobile New-Matic Suspension" in Suspension & Wheel Alignment Section.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw. New "Rotary Valve" type. *See "Saginaw (Rotary Valve) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). *NOTE* - Anchor pin is fixed type and no anchor pin adjustment is required. *See "Bendix Hydraulic Single Anchor (Without Eccentric) Brakes" in Brake Section.*

Drum Diameter - 11".

Wheel Cylinder Diameter - 1 1/8" (Front), 1" (Rear).

Braking Power - 56% Front, 44% Rear.

Replacement Linings & Shoes - Linings and shoes with linings furnished in half sets of Std. and .030" Oversize.

Lining Thickness - .250" (All).

Lining Width & Length	Front Wheel	Rear Wheel
Primary Shoes	2½" x 9 3/8"	2" x 9 3/8"
Secondary Shoes	2½" x 12 1/32"	2" x 12 1/32"

Clearance - Adjusting screw backed off 16 notches from point where wheels can just be turned by hand.

Std. Master Cylinder: On front face of firewall in engine compartment.

Checking Fluid - Maintain fluid level 1/2" below master cylinder filler cap.

Removal - Disconnect hydraulic line at master cylinder and plug line. Remove four attaching bolts and lockwashers, pull master cylinder forward and clear of firewall. *NOTE* - Boot will come out with master cylinder.

Power Brakes: Bendix or Moraine. Combination vacuum power unit and master cylinder. Mounted on forward face of firewall replacing regular master cylinder. *See "Bendix (Hydraulic Reaction Type)" or "Moraine Power Unit" in Brake Section.*

Removal - Disconnect hydraulic line at master cylinder and plug line, disconnect stop light switch leads. Pull pedal pad from pushrod, take out four pedal bracket attaching screws, remove bracket and pedal assembly. Remove steering column grommet retainer clamp, slide grommet and retainer up mast jacket. Take out floor cover plate attaching screws and cover plate-to-power cylinder bolt, remove cover plate while positioning power brake unit on edge of opening in toe pan. Disconnect vacuum hose. Remove power brake unit through toe pan opening.

MISC. MECHANICAL

Windshield Wiper: Electric crank and link arm type. Three types used: One-Speed (with separate motor driven washer), Two-Speed, and Cam-O-Matic.

See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: *See "Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motor for each window and front door ventilator panes on some models.

See "Power Window Regulators" in Miscellaneous Section.

Power Top Control: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjustr: 2-Way or 6-Way electric types. *NOTE* - 6-Way seat control is new with individual motors for each movement (3 used).

See "Power Seat Controls" in Miscellaneous Section.

►*STARTING CAR BY PUSHING CAUTION: Car CANNOT b start d by pushing b caus ther is no rear oil pump in 1960 Hydra-Matic transmissi n.*

MODEL IDENTIFICATION

S ri s	① Designation	Engine
Dynamic 88	32	371"
Super 88	35	394"
98	38	394"

① — First two digits of series and body style designation following "60" year number under STYLE on body identification plate.

SERIAL NUMBER: Stamped on plate on left front door pillar. Number (example below) includes identification data.

① ② ③ ④
60 7 M 01001

① — Year (1960).
② — Series — **7** — 88, **8** — Super 88, **9** — 98.
③ — Assembly Plant. **M** Lansing, **A** Atlanta, **B** Framingham, **K** Kansas City, Kan., **L** Linden, **C** South Gate, **W** Wilmington, **T** Arlington.
④ — Beginning vehicle number.

Engin Unit Numb r: Stamped on pad located on top of center exhaust port of left cylinder head.

Starting Unit Numb r — 500001 with prefix and suffix letters as follows:

371" Engin — Painted gold. **Prefix** — C. **Suffix** — H (engines using premium fuel), E (low compression export engines).

394" Engin — Painted green. **Prefix** — D. **Suffix** — E (low compression export).

TUNE-UP

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed. Reading on low cylinder must not be less than 80% of reading of high cylinder.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe. Install with inner end of coil pointing away from spring pin.

IGNITION

FIRING ORDER: 1–8–7–3–6–5–4–2.
Cylind rs — RIGHT BANK 2–4–6–8, LEFT BANK 1–3–5–7.

SPARK PLUG GAP: .030".
Spark Plugs — AC No. 45 (371" Eng. with 8.75–1 Compr. ratio), AC No. 44 (All others). 14 mm. Torque to 18–34 ft. lbs.

COIL: D lc -R my N . 1115112.
Igniti n Curr nt — 2.0 amps. idling, 4.0 amps. stopped.
R sist r — Delco-Remy. 1.75–1.85 ohms at 80°F.
►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch to coil. Bypassed during cranking by second lead from ignition switch.*

DISTRIBUTOR: D lc -R my No. 1110931 or 1110968. "Window" type with external adjustments. *See "Delco-R my (Window Typ) Distributors" in Electrical Section*

Condens r — Delco-Remy 1932004. **Capacity** .18–.23 mfd.
Contact P int S t — Delco-Remy 1931988.
Break r Gap — .016".
Cam Angl — 28–32° (set at 30°).
Br ak r Arm Spring T nsi n — 19–23 ozs.
R tati n — Counterclockwise viewed from above.

Automatic Advanc

Degrees Distr.	RPM	Degrees Eng.	RPM
0–2	400	0–4	800
6.5–8.5	975	13–17	1950
8–10	1200	16–20	2400
11–13	2200	22–26	4400

Vacuum Spark Control: Delco-Remy 1116144 or 1116168

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8–10
11	22	19–21

►*VACUUM ADVANCE OPERATIONAL CHECK:* Vacuum advance operation should be checked whenever Ignition Timing is set. After setting ignition timing (with vacuum advance cut off by disconnecting vacuum line), reconnect vacuum line and check ignition timing. If vacuum advance operating correctly, engine RPM should increase and timing should advance, if not, vacuum unit is defective.

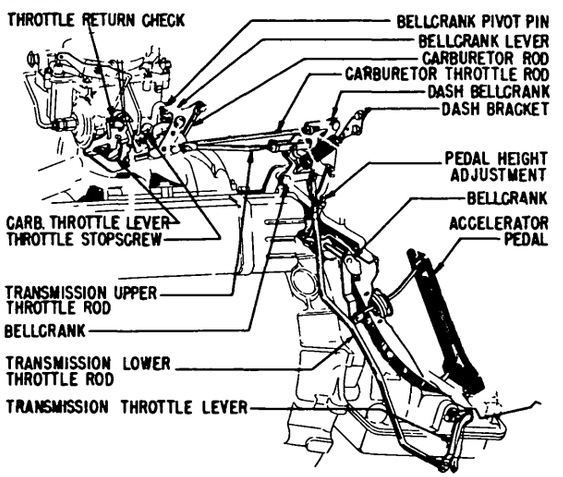
IGNITION TIMING

Setting — 5° BTDC with engine idling at 850 RPM and vacuum line to distributor disconnected and vacuum fitting line taped closed. After setting ignition timing, reconnect vacuum line and check vacuum unit operation. *See above.*
►*DETONATION NOTE: If engine detonates due to low octane fuel or carbon build-up, set timing to 2½° BTDC.*
Timing Mark — Three slots in rim of crankshaft balancer and pointer on upper left side of front cover. Slots indicate 0°, 5° BTDC and 10° BTDC.

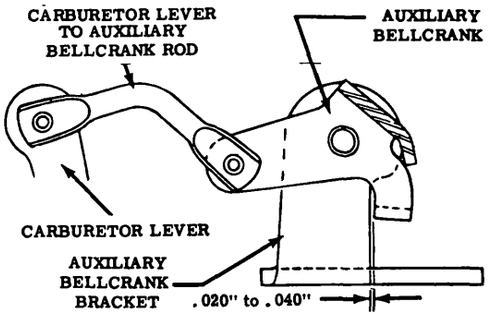
CARBURETOR

►*CARBURETOR APPLICATION: Rochester carburetors are used. Series 88 has one 2–barrel carburetor, Series S88 & 98 have one 4–barrel carburetor. 4–barrel carburetor optional on Series 88.*

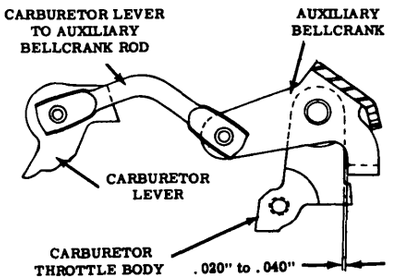
Throttle Return Check Adjustment: With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1600 RPM (4–Bbl.), 1900 RPM (2–Bbl.). Turn off engine. Rotate fast idle cam so fast idle screw rests on highest step of fast idle cam. Clearance between contact screw and contact on throttle lever should be .020" (4–Bbl.), .050" (2–Bbl.). To adjust, turn contact screw using two wrenches so that diaphragm is not permitted to turn.



OLDSMOBILE THROTTLE LINKAGE



CARBURETOR ROD ADJUSTMENT (2-BBL.)



CARBURETOR ROD ADJUSTMENT (4-BBL.)

THROTTLE LINKAGE ADJUSTMENT: Install Throttle Return Check Holding Tool J-6342-01 to hold plunger away from throttle lever *(TOOL MODIFICATION NOTE -* It may be necessary to file or grind .015" off flat area of tool to allow it to be inserted between stopscrew and plunger shoulder of return check assembly). Then proceed as follows:

1) Raise car. Remove throttle rod from transmission throttle lever. Place Throttle Lever Gauge J–8497 against machined surface of rear of transmission (do not touch serial number plate). With throttle lever held at end of its rearward travel, gauge rod should align vertically with hole in throttle lever. *CAUTION — Do not insert gauge pointer into hole as gauge will be misaligned.* If gauge pointer does not align, bend throttle lever with Tool J–6373–01 or J–6373 modified by cutting 5/8" from top of tool. Attach throttle rod to lever. Lower car.

2) Make sure carburetor throttle valves are completely closed by starting engine, removing air cleaner and blocking choke valve open. Then turn off engine and back out slow idle adjusting screw until carburetor throttle valves are closed. *NOTE — When valves ar closed, there will be clearance at end of fast idle screw, slow idle screw, and throttle return ch ck plunger.*

3) Clearance between auxiliary bellcrank bracket & auxiliary bellcrank (2–barrel carb.), or between carburetor throttle body and auxiliary bellcrank (4–barrel carb.) should be .020–.040". Adjust by bending carburetor-to-auxiliary bellcrank rod.

4) Loosen jam nut on lower throttle rod and remove both upper and lower throttle rods from bellcrank. *Upp r rod has sock t and ball stud conn ctions which snap n and off.* With bellcrank and lower throttle rod held against their rearward stops, adjust lower rod

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clevis so pin will enter freely into holes in clevis and bellcrank. Install cotter pin and tighten jam nut.

5) Lubricate upper throttle rod ball joint sockets with Special Lubricant, Part No. 567196. Install rod and adjust by turning ball socket assembly until bellcrank is .002–.005" off its stop. *CAUTION – Do not apply pressure to linkage during this adjustment.*

6) Remove block holding choke valve open, start engine and adjust slow idle speed to specifications.

7) With engine stopped, and choke fully released, block the throttle lever in the WIDE OPEN position. Loosen jam nut on downshift stopscrew and back out stopscrew several turns. Rotate throttle valve bellcrank on engine bracket counterclockwise to point of maximum of transmission throttle valve lever travel *(CAUTION - This point is a matter of feel and care must be used not to bend or stretch linkage beyond this point).* With linkage held in this position, adjust downshift stopscrew so that it just contacts tang on downshift lever, then turn screw in an additional 1½-2 turns and tighten jam nut. *NOTE - Above procedure supersedes previously recommended adjustment data.*

8) Make sure throttle rod is 3 3/16" long. Measure accelerator pedal height from upper top side of pedal to flat washer on dash immediately ahead of pedal. Distance should be 3 13/16". Adjust by turning upper throttle rod adjuster. *NOTE – One turn of adjuster changes pedal height 1/16".*

9) Lubricate all pivot points with light oil, remove Tool J–6342–01, install air cleaner.

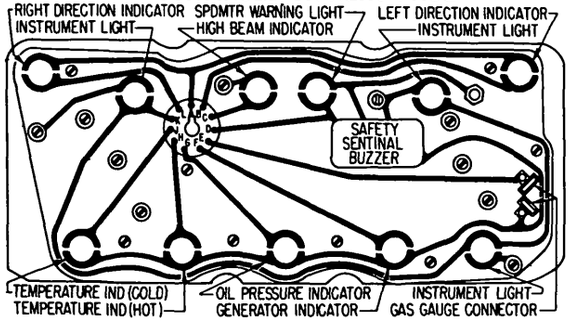
ROCHESTER 2GC 2–BARREL

Rochester 7015052 (Std.), 7015058 (Air Cond. Cars). Dual downdraft type. Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned (factory installed) cars.

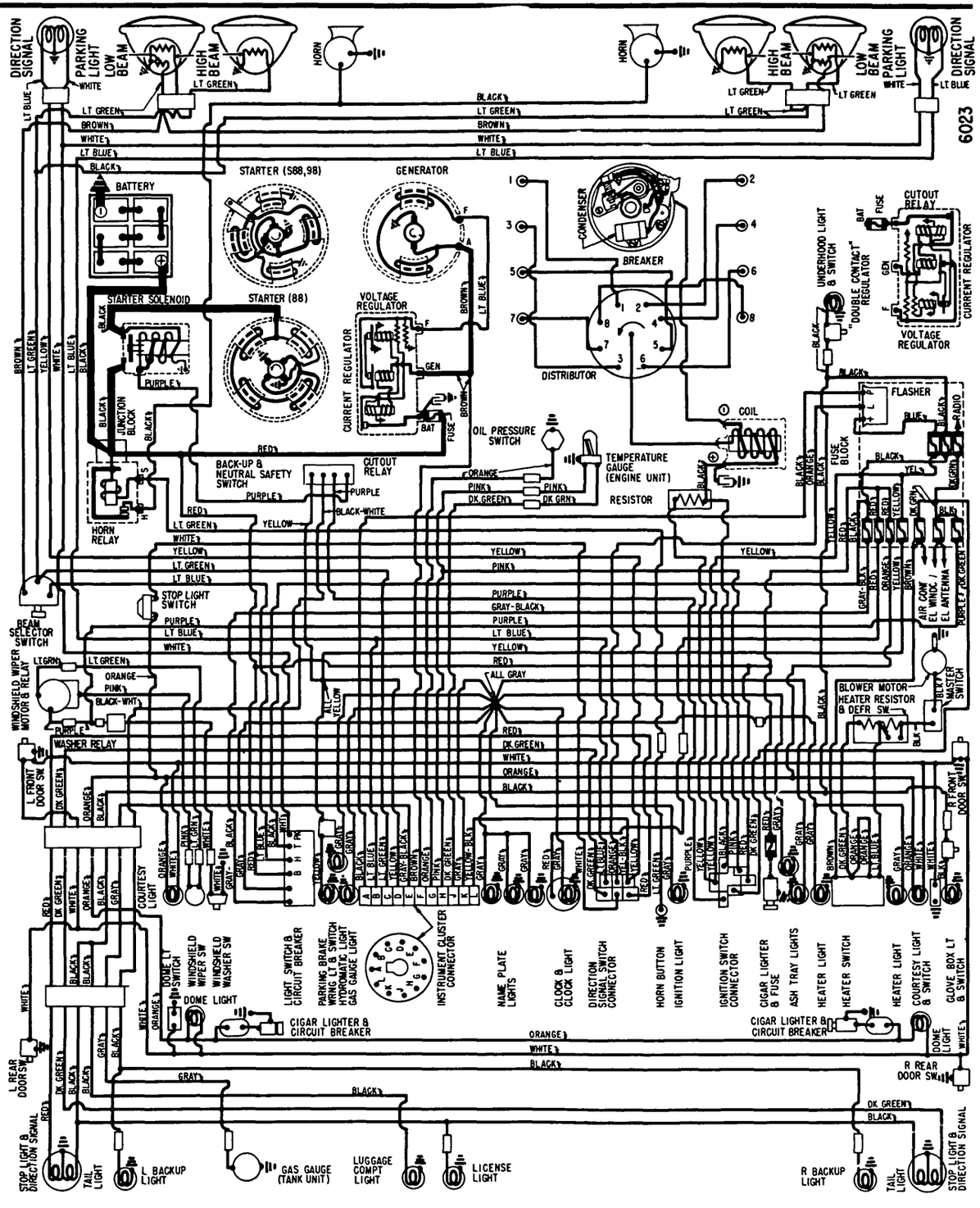
►*HESITATION & STUMBLE CORRECTION (Early Cars):* On cars with no letter stamped on identification tag, this condition can be corrected by installation of all parts in Parts Kit No. 7017980 (Std. Cars), new Accelerator Pump No. 7016475 only (Air Cond. Cars). New identification tag stamped "MOD" should be installed on carburetor when this change made. *See "Rochester Dual 2G & 2GC Carburetors" in Carburetion Section for modification data.*

►*CHOKE STICKING CORRECTION (Carburetors stamped "A" on identification tag):* Caused by choke link going over center. Correct by installing new intermediate choke lever and shaft furnished in Parts Kit 7017981 and installing new identification tag stamped "B" furn-

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OLDSMOBILE INSTRUMENT CLUSTER PRINTED CIRCUIT



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ished with kit. Carburetors marked "B" or "C" on identification tag do not require this modification. *See "Rochester Dual 2G & 2GC Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. If engine speed decreases, readjust to correct RPM.

Idle Setting – After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed – 460 RPM, Hydra-Matic in "DR" or Synchro-mesh in Neutral. 520 RPM for Air Conditioned cars. *NOTE – On cars with Idle Compensator, air conditioning must be "OFF". On cars without Idle Compensator, air conditioning must be "ON".*

Float Level – 11/16" (Gauge BT–179 or BT–151 modified, see below). With air horn inverted and gasket in place, place edge of gauge acroos air horn gasket at outer end of float with lower edge of float seam touching gauge. Bend float arm to adjust.

►*GAUGE BT–151 MODIFICATION NOTE:* To adapt 1959 gauge for new float level on 1960 carburetors, cut a notch 1/16" deep and ½" wide, 1 1/8" in from end of gauge marked "Float Level". Float should fit in notch on gauge.

Float Drop - Bend float tang to obtain distance of 1 29/32" from gasket surface to bottom of float with air horn upright and float hanging free. Use Gauge BT-151 or BT-179.

Fast Idle – Rotate fast idle cam so fast idle screw is on high step of cam. With engine running at normal operating temperature and transmission in "N" (Neutral), adjust fast idle screw to obtain an engine speed of 1900 RPM (2200 RPM for sub-zero temperatures).

Automatic Choke Setting: 1 Point Rich (Early Carbs. with no letter or with "MOD" notation on brass identification tag), Centered (At Index) for later carburetors marked by letters "A", "B", or "C" on identification tag.

►*CHOKE SETTING "TAILORING" FOR CLIMATIC CONDITIONS (Carburetors marked "B" or "C" on identification tag):* These carburetors have choke shaft lever with three holes for intermediate choke rod engagement. Moving rod to next OUTER hole will provide richer mixture during warm-up for acceleration or load, moving rod to next INNER hole will provide leaner mixture under same operating conditions.

Throttle Linkage & Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

►*OTHER DATA: See "Rochester Dual 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4–BARREL

Rochester 7013950 (Std.), 7013952 (Air Cond. Cars). 4–barrel downdraft type. Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned (factory installed) cars.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. If engine speed decreases, readjust to correct RPM.

Idle Setting – After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed – 460 RPM, Hydra-Matic in "DR" or Synchro-mesh in Neutral. 520 RPM for Air Conditioned cars. *NOTE – On cars with Idle Compensator, air conditioning must be "OFF". On cars without Idle Compensator, air conditioning must be "ON".*

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Three types used.

AC Repl. Pump No.	Type
4726 (Less Heater or AC) ①	Fuel Only
4727 (With Heater Only) ①	Fuel & Vacuum
4728 (With Heater & AC) ②	Fuel & Vacuum

① - Integral fuel filter.

② - Pulsator type pump with external fuel filter and return line to tank.

Pressure - 5-6 lbs. at 1800 RPM measured at upper end of pump-to-carburetor line.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: AC Electric type.

►*GAUGE INDICATOR CAUTION:* Gasoline Gauge "E" and "F" marks are located beyond range of gauge scale and pointer will not reach these points when tank is empty or full (line nearest "E" mark is pointer position when tank empty).

►*FIESTA STATION WAGON GASOLINE GAUGE PRODUCTION CHANGE & WIRING CAUTION:* Later cars have "Two Wire" gauge system and **transposing wires at terminals on either dash or tank unit will cause tank unit resistor to burn out.** Connect wires as follows: **Dash Unit -** Both Yellow & Pink wires connected to terminal nearest pink daub of paint on gauge, Brown wire connected to other terminal. **Tank Unit -** Yellow wire connected to terminal marked "Y", Gray wire connected to terminal marked "G".

Dash Unit - AC No. 5643042 (All Models incl. Early Fiesta Sta. Wgn. "One-wire" Type), AC No. 5643388 (Later Fiesta Sta. Wgn. "Two-wire" Type).

Tank Unit - AC. Used as follows:

	No Air.Cond.	Air Cond.
All exc. Fiesta	5640230	5640231
Fiesta Sta. Wgn. "One-wire"	5640857	5640873
Fiesta Sta.Wgn. "Two-wire"	5641522	5641523

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Oil wetted type (Std. Series 88), Heavy Duty replaceable paper element type (Std. Super 88 & 98, Optl. Series 88).

►*HEAVY DUTY AIR CLEANER CAUTION:* Replace element at 10,000 mile intervals or oftener in dusty driving conditions. Remove air cleaner, remove element, clean body and install new element.

BATTERY

Series 88 - Delco-Remy No. 462. 12 volt, 9 plate, 62 ampere hour capacity (20 hr. rate).

Super 88 & 98 - Delco-Remy No. 562. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Rear of left cylinder head to firewall.

STARTER

Delco-Remy. No. 1107665 (Series 88), No. 1107716 Early, No. 1107776 Later (Super 88 & 98). *NOTE - 1107716, 776 are "Two-Shunt" type.*

Armature - Delco-Remy No. 1932185 (1107665), No. 1941888 (1107716, 776).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107665

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107716 & 776

Torque	RPM	Volts	Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

① - Includes Solenoid.

Starter Switch: Solenoid Switch, Delco-Remy No. 1119798 (1107665), No. 1118811 (1107716), No. 1114257 (1107776) mounted on starter and controlled by combination Starter & Ignition Switch, Delco-Remy No. 1116572 and Neutral Safety & Back-up Switch (see below).

Hydra-Matic Neutral Safety & Back-up Light Switch: Oldsmobile No. 570386.

Adjustment - *See "Dual-Coupling Hydra-Matic" in Transmission Section.*

GENERATOR

Delco-Remy 1102166, 1102168, or 1102183 (Std.), 1102187 (Air Cond. Cars).

Armature - Delco-Remy No. 1946719 (1102166, 168, 183), No. 1939837 (1102187).

►*CHARGING CIRCUIT FUSE CAUTION:* Battery charging circuit is protected by a 50 ampere fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing generator, regulator or battery failure.

Performance Data (Cold)

Generator	Amperes	Volts	RPM
1102166	35	14.0	2400
1102168, 183	35	14.0	2510
1102187	45	14.0	2520

Brush Spring Tension - 28 ozs.

Field Current - 1.62-1.82 amps. (1102166), 1.69-1.79 amps. (1102168, 183), 2.66-2.86 amps. (1102187) at 12 volts and 80°F.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Place Tension Tool No. 33-70 on generator belt. Loosen generator adjusting link bolt. Tighten belt until line on Tool 33-70 is even with pointer. Tighten adjusting link bolt.

REGULATOR

Delco-Remy No. 1119253 (1102166, 168, 183 Gen.), 1119600 (1102187 Gen.). *NOTE - Regulator 1119600 is "Double Contact" type.*

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►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*REGULATOR CAUTION: Regulators must b us d with generators as indicated above. DO NOT interchange regulators.*

►*REGULATOR 1119253 ADJUSTMENT NOTE:* May be "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment *NOTE – Specifications below are "Normal" settings.*

Cutout Relay

Cuts In – 11 8–13.5 volts (1119253), 11 8–13 0 volts (1119600), hot.
Contact Gap – 020"
Air Gap – .020" with contacts just closed.

Voltage Regulator

S tting (1119253) - 13.8-14.7 volts at ambient temperature of 125°F.
Setting (1119600) – 13 8–14 6 volts operating on upper contacts. 1– 3 volts lower operating on lower contacts. At an ambient temperature of 125°F
Contact Gap (1119600) – 016" (upper contacts) with lower contacts just touching.
Air Gap – 075" (1119253), 067" (1119600), with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "Delco-Remy 1119000 S ries Regulators" and "Delco-Remy (Double Contact) R gulators" in Electrical Section*

Current Regulator

Setting (1119253) - 31-35.5 am ps. (adjust to 35 amps.) hot
S tting (1119600) - 38-45 amps. (adjust to 40 amps) hot.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) R gulators" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Entire instrument cluster served by a printed circuit. All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly. Service of printed circuit is by **replacement only.**

Instrument Cluster Removal: Remove Air Conditioner, Heater or ventilation controls. Remove two instrument panel to cowl braces. Remove headlight and ignition switches. Disconnect wiring harness, clock, safety sentinel and speedometer cable at cluster. Remove cluster to instrument panel nuts and lockwashers. Remove cluster out to left of steering column.

Sp edometer Head Assembly Removal (Cluster Removed): Remove case attaching screws, then carefully lift case from cluster without disturbing light tubes in cluster. Remove indicator face plate. Disconnect Safety Sentinel wire from terminal inside case. Remove speedometer head-to-case screws, special washers, and grommets. Remove speedometer head assembly.

Printed Circuit Removal: *NOTE - Cluster "ON" or "OFF" car.* Disconnect wiring harness and fuel gauge plug from circuit Pull Safety Sentinel Buzzer from plug at rear of cluster. Remove all light sockets. Remove circuit to cluster attaching screws and remove printed circuit assembly. *NOTE* - Two light sockets with extensions are located in upper left and right corners

Light Switch R m val: Disconnect battery. Disconnect wires from light switch (push-in-type). Pull switch out to last position, then depress button on top of switch assembly and remove rod and knob. Remove Guide-Matic switch knob setscrew (if so equipped) and remove knob. Use screwdriver to remove sleeve, then remove escutcheon with Allen wrench. Remove headlight switch from rear of instrument panel

Stop Light Switch Location: Mechanical type. Mounted on pedal stop bracket above brake pedal arm.
Adjusting - With brake pedal released, and adjusting screw backed out to point where lights are on, turn adjusting screw in until lights just go off, then back screw out exactly three turns.

►*STOP LIGHTS REMAINING ON (Early Synchro-mesh Cars)* May be caused by adjusting screw on brake pedal being out of alignment with stop light switch plunger. Correct by bending bracket in which adjusting screw is located.

CIRCUIT BREAKER: 22 Ampere. Protects Headlights, Parking Lights, and Beam Indicator. Located on lighting switch.

FUSES: All fuses mounted on fuse block located under instrument panel near steering column except as noted.

20 Ampere - Heater and Air Conditioning.
25 Ampere - Electric Window & Seat Controls. *NOTE* - Supersedes 20 ampere type used with first type (3 motor) seat control.
20 Ampere - Windshield Wiper Motor.
20 Ampere (88 & S88), 25 Ampere (98) - Stop, Dome. & Courtesy Lights. *NOTE* - Also protects Rear Seat Cigar Lighter on Series 98.
4 Ampere - Deluxe Radio
7.5 Ampere - Super Deluxe Radio.
9 Ampere - Direction Signal.
9 Ampere - Temperature, Oil Pressure, & Generator Indicators, Fuel Gauge & Parking Brake Light, and Back-up Lights,
9 Ampere - Tail Lights, Glove Box, Trunk, & Underhood Lights
3 Ampere - Clock Light, Instrument Cluster Lights, Heater Vent, Air Cond., and Ash Tray Lights.
1 Ampere - Clock

HORN RELAY: Delco-Remy No. 1116946.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, Valve-in-head Different engines used as follows **Series 88 (Regular Fuel)** - 371" 8.75-1 Compr Ratio, **Series 88 (Premium Fuel)** - 371" 9.75-1 Compr. Ratio, **Series S88 & 98** - 394" Engine (9.75-1 Compr Ratio requiring premium fuel).

Engine	Bore	Stroke	Displacement
371"	4"	3 11/16"	371 cu ins.
394"	4 1/8"	3 11/16"	394 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
371"	8 75-1 ①	51	240 at 4400 RPM
371"	9.75-1 ②	51	260 at 4400 RPM
394"	9.75-1 ②	54	315 at 4600 RPM

① - Requires Regular Fuel. ② - Requires Premium Fuel
Compr ssi n & Vacuum R ading - *See TUNE-UP*

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* The following modifications should be made to the standard engine before attempting travel in low octane areas (Foreign Travel) to prevent excessive detonation and resultant engine damage. Lower the compression ratio by making changes listed for fuel of octane rating indicated. *TIMING NOTE* - Set ignition timing in range of 5° BTDC to 0° (TDC).

371" (8.75-1 Rati) Engin

Octane Rating	Head Gasket	Pist n Typ	C mpr. Rati	Spark Plugs
98-95	Std ①	Std.	8 75-1	Std.
87-84	.050"	Std	8 .4-1	Std.
84-81	.085"	Std	7 9-1	Std.
80-77	③	Std.	7.4-1	AC No 46

371" (9.75-1 Rati) Engin

98-95	Std. ①	Std.	9.75-1	Std
87-84	②	Std	8.4-1	AC No 46
84-81	085"	Export	7.9-1	Std
80-77	③	Export	7.4-1	AC No 46

394" Engin

98-95	Std. ①	Std.	9.75-1	Std.
87-84	②	Std.	8.4-1	AC No 46
84-81	②	Export	7 8-1	AC No 46
80-77	③	Export	7.4-1	AC No 46

① - 025" thick.
② - Use Parts Kit No. 577044 consisting of 100" thick Head Gaskets, .060" thick Intake Manifold Gaskets, and set of longer Pushrods
③ - Use Parts Kit No 577046 consisting of .125" thick Head Gaskets, .060" thick Intake Manifold Gaskets, and set of longer Pushrods
Cylinder Head Gasket Note - Head gaskets for 4" and 4 1/8" bore may be used interchangeably in an engine. *CAUTION* - Whenever head gasket thickness greater than .085" (371" Engine), 060" (394" Engine) is used, a set of longer Pushrods, Part No 577049, must be installed.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
INTAKE MANIFOLD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data*
OIL PAN REMOVAL: Turn crankshaft to bring No 1 piston at bottom of stroke (so oil pan will clear counterweights on No. 1 & 2 cyl) Disconnect battery cable and remove exhaust crossover pipe. Disconnect idler arm support from frame. Remove both front engine mount attaching nuts and use Tool J-8568 to raise engine so bolts will just clear crossmember Drain oil and remove pan. *NOTE - Holes provided in front crossmember for access to front oil pan bolts*

PISTONS

Aluminum alloy, three-ring, autothermic, steel strut, slipper skirt, cam ground, tin plated

►*PISTON NON-INTERCHANGEABILITY CAUTION (371" ENGINE):* 8 75-1 Compr Ratio Pistons have "Dished Head" and are identified by TWO notches on head, 9 75-1 Compr Ratio Pistons have "Flat Head" and are identified by ONE notch on head (same as 9 75-1 Flat Head Pistons used on 394" Engine) Do not interchange pistons
Length - 4 05" (All) **Weight** 25 82 ozs (371" engine), 27 76 ozs (394" engine)
Removal - Pistons & Rods removed from above

►*CAUTION* Mark pistons, rods, and bearing caps with

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number of cylinder before removing to insure correct reinstallation.

Clearance - .001-.0015" at thrust surface (selective fit). *NOTE* - Some engines may have .005" or .010" Oversize pistons.

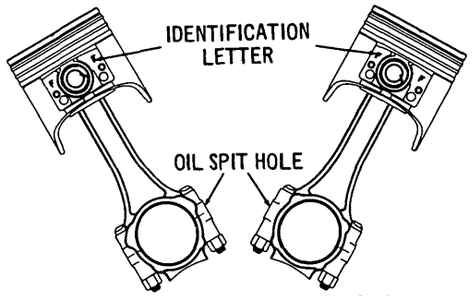
Fitting Pistons - Use a .0015" x ½" x 12" ribbon feeler between inverted piston (pin and rings removed) and cylinder wall at right angles to piston pin position. Pull to withdraw feeler should be 2-6 lbs. (371" Eng.), 3-12 lbs. (394" Eng.).

Replacement Pistons: Furnished with fitted pins in Std. (9 sizes - see table below) and .010", .020", .030" Oversize.

Standard Piston Sizes

Piston Code	Cyl. Code	Piston Code	Cyl. Code
A	AA & A	W	WW & W
B	BB & B	X	XX & X
C	CC & C	Y	YY & Y
D	DD & D	Z	ZZ & Z
E	EE & E		

Installing Pistons: Install piston on same numbered connecting rod with "F" on pin boss and notch or notches toward front of engine. *See Rod Installation.*



OLDSMOBILE PISTON & ROD ASSY.

PISTON PIN

Floating type with lock ring at each end. Pins are offset in piston .090" toward right side of engine.

►*CAUTION.* Discard old lock rings and install new service type lock rings when installing pins.

Diameter - .9803" -.9807". **Length** - 3.126".

Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.

Pin Fit in Rod Bushing - .0003-.0005" loose.

Replacement Pins: Std., .001" & .003" Oversize.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.078"	.013-.023"	.001-.004"
Compr. (2)	.0925-.0935"	.013-.023"	.001-.004"
Oil	①	.015-.055"	.0005-.007"

① - .1831-.1889" (Perfect Circle), .1840-.1890" (Sealed Power).

Replacement Rings: Std and .010" Oversize.

Installing Rings: Install upper "Chrome" and lower "Parco Lubrite" compression rings with side up that is marked with a dimple (Sealed Power) or word "TOP" (Perfect Circle).

CONNECTING ROD

Length - 6.996-7.000" center-to-center. **Weight** 35.58 ozs. (371" engine), 34.55 ozs. (394" engine).

►*CONNECTING ROD CAUTION.* Rod used in 371" engine is heavier (heavier bosses at large end) to compensate for lighter piston and is NOT interchangeable with rod used in 394" engine.

Crankpin Journal Diameter - 2.4992-2.5002".

Lower Bearing - Moraine 400 steel backed aluminum with babbitt overlay.

Clearance - .0005-.0026" (vertical), .0013-.0034" (horizontal).

Sideplay - .002-.011" (total both rods).

Replacement Bearings: Std. and .002", .010", .020" Undersize.

Installing Rods: Install connecting rod in engine with oil spit hole toward center of engine. Install connecting rod caps with bearing index notches in rod and cap on same side.

►*CAUTION: Use Guide Tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

CRANKSHAFT

Journal Diameter - 2.9990-3.000". Five bearings.

Bearings - Moraine 400 steel-backed aluminum with babbitt overlay (Nos. 1 through 4), Durex 100A steel-backed babbitt overlay (No. 5).

Clearance - .0005-.0021" (Nos. 1 & 2), 0008-.0024" (Nos. 3 & 4), .0020-.0034" (No. 5). **Wear Limit** - .0035" (Nos. 1 through 4), .0045" (No. 5).

►*MAIN BEARING CAUTION:* If main bearing clearance not within specifications (above), correct by use of selective bearing shells (see table below for sizes and specifications). **Replace both bearing halves (upper and lower shells) as a pair and do not attempt to shim behind shells.**

Main Bearing Identification

Thickness	Identification (on Tang)
Standard	None
.0005" Undersize	B
.0010" Undersize	C
.0015" Undersize	E

Replacement Bearings: Furnished Std and .0005", .001", .0015", .002", .010" .020" Undersize. See table above for identification. **Install bearings in pairs (upper and lower shells).**

End Thrust: Taken by No 5 (flanged) bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

CAMSHAFT

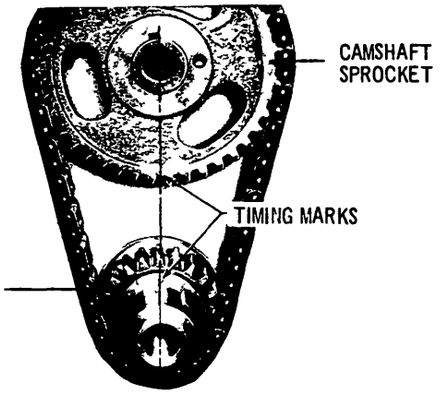
►*IDENTIFICATION NOTE: Camshaft used in Series 88 is identified by step on thrust flange.*

Journal Diameter - 1.9977-1.9985"

Bearings - Steel-backed babbitt

Clearance - 001- 0033"

End Thrust: Taken by flange at front of camshaft against front camshaft bearing. Camshaft held to rear by plunger and spring at front end of camshaft.



OLDSMOBILE VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Oldsmobile Special Data.*

Timing Chain: Single flanged side guide type. **Width** - 27/32". **Pitch** - 50" **Length** - 24" or 48 links

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straightedge across shaft centers (or use Tool BT-11)

►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket with cupped side out

►*CAMSHAFT REPLACEMENT CAUTION:* Coat camshaft liberally with engine oil mixed with G M. Concentrate Part No. 567725 to insure proper installation and provide initial lubrication

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: Two types used and either type can be removed and installed without removing Engine Front Cover. *See "Engine Front Cover" in Oldsmobile Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic)

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	.3427-.3432"	4.999"
Exhaust	1.557-1.567"	.3940-.3945"	4.999"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.0011-.0025"
Exhaust	45°	.435"	.0015-.0030"

① - .427" (371" Eng.), .437" (394" Eng.)

Valve Seat Width - .037-.075", all valves

Valve Stem Seals - Cup type oil seal (deflector) installed cup side down on valve stem below valve spring retainer on all valves.

Valve Springs: Outside diameter at bottom is larger than at top. No damper springs used

Valve Spring Specifications

Valve	Pressure	Length
Open	175-189 lbs.	1.437"
Closed	85-95 lbs.	1.837"

Free Length - 2.25".

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Valve Guides: To remove old guides, support head and drive guides out through top of head using Remover Tool J-3062. Install new guides as follows: Place Gauge Washer J-5158-3 on valve spring seat. Use Valve Guide Installer Tool J-5158-2 to drive new guide in head (grooved end of guide up) until tool seats against gauge washer. This will correctly position guides in head (guide should extend 25/32" above face of valve spring seat).

►*OVERSIZE VALVE GUIDE NOTE:* Valve guides with .010" oversize outside diameter may be identified by a groove on guide.

Valve Lifters: Hydraulic lifters standard on all models.

►*HYDRAULIC LIFTER INSTALLATION CAUTION:* Production engines use Standard, .001" or .010" oversize lifters. Use correct size when replacing lifters. All lifters have identification numeral (Except Standard) on lifter body. Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover. When no mark appears, lifters are standard.

Diameter - .9210-.9215" (Std.). **Length** - 2.125".

Clearance in Block - .0005-.0020" (Selective).

Replacement Lifters: Std., .001", .002", .003", .005" & .010" Oversize.

Hydraulic Lifter Removal, Overhaul & Testing - *See "Valve System" in Oldsmobile Special Data.*

Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data.*

►*ROCKER ARM ASSEMBLY NOTE: Early 1960 engines may have end brackets for rocker arm assembly. For overhaul of this type assembly, see Oldsmobile 1959 Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications - 371" Engine

Intake Valves - Open 14° BTDC. Close 50° ALDC.

Exhaust Valves - Open 54° BLDC, Close 16° ATDC.

Valve Timing Specifications - 394" Engine

Intake Valves - Open 16° BTDC, Close 54° ALDC.

Exhaust Valves - Open 64° BLDC, Close 20° ATDC.

Valve Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that #1 piston is on top dead center (firing stroke). Trailing edge of notch in crankshaft pulley will be aligned with pointer on timing chain cover. Install Tool J-5374 in place of rear rocker shaft bracket with step plunger over #7 cylinder exhaust pushrod. The 7/16" diameter pilot at bottom of tool will fit into cylinder head bolt hole. Screw main body of gauge down so step plunger contacts pushrod and small diameter of step plunger is flush with top of main body. Tighten clamp bolt. Rotate engine one complete revolution so that No. 1 piston is again at TDC (intake stroke). If timing chain is installed properly, third step of plunger will rise .038", above main body. If plunger rises more than .038", camshaft is **advanced** one tooth. If plunger does not rise above body (just flush), camshaft is **retarded** one tooth.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" and "OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 35-45 lbs. at 50 MPH.

Pressure Regulator - In pump body. Not adjustable. Valve starts to open at 45 lbs. Maximum pump pressure is 45-55 lbs.

Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter. Lights when pressure below 3 lbs.

Engine Unit: AC No. 1508668.

Oil Pump: Gear type. In crankcase at rear end.

Oil Pump Removal, Overhaul & Installation - *See "Oiling System" in Oldsmobile Special Data.*

Oil Filter: Full flow type. Replace element every 6,000 miles or sooner if needed. Located on lower right side of crankcase.

Replacement Filter Element - AC No. PF-5.

Crankcase Ventilation: Air intake in oil filter cap with oil-wetted cleaner, AC No. 1554198 (Std.), No. 1554199 (Heavy Duty). Outlet is connected to ventilating baffle at rear of block above right bank. Outlet pipe is push fit at ventilator and extends down below right rear corner of engine.

COOLING

Water Capacity: 20 qts. (Less AC & Heater), 21¾ qts. (AC less Heater). Add 1 qt. for Heater.

Pressure Valve: Radiator filler cap. AC No. RC-6, 13 lbs. (Std.), AC No. RC-15, 15 lbs. (Air Cond.).

Thermostat: Choke type, 170°F.

Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Oldsmobile Special Data.

Removal - Drain cooling system, and loosen belts. Remove fan, spacer and pulley from pump hub. Remove four pump housing to engine front cover bolts and two pump housing to block bolts, and remove pump.

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes out when engine temperature reaches 113°F±2°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 234°F. (Std.), 238°F. (Air Cond. Cars) plus or minus 2°F. *NOTE* - Red light will come on when ignition key turned to "Start" position (to test bulb and circuit) but should go out when key returned to running position.

Engine Unit - Delco-Remy No. 1998740 (Std.), No. 1998741 (Air Cond.).

See "Temperature Indicator" in Miscellaneous Section.

CLUTCH

Long 11CF Assy. No. L5167 (371" Engine). 262832 (394" Engine & Heavy Duty). Semi-centrifugal, single plate type.

See "Long Clutches" in Clutch Section.

Clutch Disc - Long No. 282687, Oldsmobile No. 565059.

Pedal Adjustment: Install a 1/4" gauge pin (piece of steel rod) through holes provided in frame side rail and X member. Remove cotter and clevis pins, and spring washer from clevis at upper end of vertical rod (at bellcrank on firewall). Overcenter spring will then hold bottom of rod against gauge pin. Loosen lock and adjust nut at rear end of horizontal rod (clutch release yoke end of rod) until rod is free of tension. Adjust pedal stopscrew at pivot end of pedal until pedal height measured from top of pedal pad to toe pan (roll back floor mat for measurement) is 8". Adjust clevis on upper end of vertical rod until gauge pin is just free in frame holes with rod connected to bellcrank on firewall. Install clevis pin, spring washer, and cotter pin in clevis and tighten locknut. Adjust locknut on rear end of horizontal rod for correct pedal free travel of 1-1¼". *NOTE* - After linkage connected, pedal height will be 8¼" with spring load applied.

Removal: Remove transmission (see below). Remove left engine filler plate, engine breather pipe, and right and left rear lower flywheel housing bolts. Remove return spring and disconnect adjusting rod at yoke. Install Engine Rear Support Tool 30-13, entering pilot supports into lower housing bolt holes. Remove engine rear mount bolts at clutch housing, and remove frame crossmember by removing three bolts at each end. Remove clutch housing by removing eight bolts holding housing to flywheel housing. Remove clutch assembly from flywheel.

SYNCHRO-MESH TRANSMISSION

Own. Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse), all helical gear type. *See "Oldsmobile Synchro-mesh" in Transmission Section*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission and disconnect manual control rods and speedometer cable at transmission. Mark location of center bearing support on frame to facilitate lateral alignment. Disconnect front and rear companion flanges and center bearing support to frame attaching bolts. (*NOTE* - Keep shims grouped so they can be reinstalled in same location). Slide propeller shaft assembly out of frame. Remove bolts holding transmission to clutch housing, and remove transmission by moving rearward until main drive gear clears clutch assembly.

HYDRA-MATIC DRIVE

"Jetaway" Dual-Coupling Hydra-Matic. Four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

Lubrication - Check fluid level every 2000 miles. Drain and refill every 26,000 miles. Use only GM Hydra-Matic Fluid Type A - Suffix A

Capacity - 9½ qts. (when drained), 10½ qts. (after oil pan removed), 11½ qts. (after complete overhaul).

Checking Fluid Level - Check with transmission at normal operating temperature, engine idling, and selector lever in Park "P" position. Maintain fluid level at "FULL" mark on dipstick. *CAUTION - Do not fill above FULL mark.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic" in Transmission Section.*

UNIVERSALS

Saginaw or Spicer. Cross type, three used, one each at front and rear and one at center.

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►*UNIVERSAL JOINT INSTALLATION CAUTION TO PREVENT DRIVE LINE VIBRATION: See "Propeller Shaft Notes" in Oldsmobile Special Data.*

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut loosened). *See "Oldsmobile Hypoid" in Rear Axle Section.*

Propeller Shaft Centering Bearing Overhaul: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

Propeller Shaft Alignment: *See "Propeller Shaft Notes" in Oldsmobile Special Data.*

REAR AXLE

Own. Hypoid gear, semi-floating type with Hotchkiss drive.

►*ANTI-SPIN DIFFERENTIAL NOTE:* Anti-spin Differential is available as an option and can be identified by anti-spin lubrication tag attached by a carrier to axle housing nut.
See "Oldsmobile Hypoid" and "Power-Lock Differerential (Plate Clutch Type)" in Rear Axle Section.

►*REAR AXLE RATIO IDENTIFICATION NOTE:* Ratio identification code number stamped on boss on lower forward side of carrier as follows:

Ratio	Code	Ratio	Code
2.87-1 (43-15)	7	3.23-1 (42-13)	9
3.42-1 (41-12)	8	3.08-1 (40-13)	0

Series	Rear Axle Ratios	Ratio
88 & S88 S.M. (All)	③	3.42-1 (41-12)
88 H.M. (Exc. Sta. Wgn.)	①	2.87-1 (43-15)
88 H.M. (Station Wagon)	②	3.08-1 (40-13)
88 H.M. (Air Cond.)	②	3.08-1 (40-13)
88 H.M. (Export)		3.23-1 (42-13)
S88 H.M. (Std.)	②	3.08-1 (40-13)
S88 H.M. (Air Cond.)	②	3.08-1 (40-13)
98 Std. & Air. Cond.	②	3.08-1 (40-13)

① - 3.08-1 (40-13) Optional.
② - 2.87-1 (43-15) Optional.
③ - 3.08-1 (40-13) Std. on 371" Eng. with 9.75-1 compr. ratio.

Backlash - .007-.008" (limits .005-.009").

Axle Shaft Removal: Remove wheel and take off brake drum by removing two Tinnerman nuts from wheel studs (if nuts removed by turning off threads they can be reused, if nuts damaged, new nuts must be used). Remove backing plate mounting nuts and static collector. Loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal), replace one nut to hold backing plate in position.

Differential Carrier Assembly Removal: Remove axle shafts (see above). Clean differential carrier and axle housing around carrier to prevent dirt entering housing. Disconnect propeller shaft at rear universal joint after having wired trunnion blocks together to avoid loss of rollers. Mark universal joint so it can be replaced in the same position. Drain oil by removing nuts from carrier mounting studs and moving carrier away from housing.

Wheel Bearing Adjustment: None required.

SHOCK ABSORBERS

Delco. Direct acting front and rear. Service by replacement.

Shock Absorber (Oldsmobile No.)

Model	Front	Rear
88, S88 (Exc. Sta. Wgn.)	5552508	5552509
88, S88 (Sta. Wgn.)	5552512	5552513
88, S88 (Pol. & H.D. Exc. Sta. Wgn.)	5552514	5552515
98	5552510	5552511

FRONT SUSPENSION

Independent. "Spherical" joint type, with ball joints connecting upper and lower control arms to steering knuckle.
See "Oldsmobile" in Suspension & Wheel Alignment Section.
Steering Axis Inclination - 10° at 0° camber.
Caster - 0° to Neg. 1°.
Camber - Neg. ¼° to Pos. ½°, maximum variation between each side of car not to exceed ½°.
Toe-In - 0 to 1/16".

Toe-Out on Turns - With outer wheel at 18°, inner wheel should be 22°±½° (Manual Steering), 23°±½° (Power Steering).

Wheel Bearing Adjustment: Tighten adjusting nut to 17 ft. lbs. torque to seat bearings and insure that all parts are free (rotate wheel), then back off adjusting nut and retighten to 4 ft. lbs. torque. If slot in nut and cotter pin hole in spindle do not line up, back off nut to align nearest slot with hole, install cotter pin.

STEERING

►*POWER STEERING PUMP NOISE CORRECTION:* Crunching, rattling noise (may be mistaken for defective water pump bearing) may be caused by pump belt. If this noise disappears after 3-4 miles of driving or can be eliminated temporarily by applying belt dressing to sides of belt, correct by replacing "Dayton Rubber" type belt with belt of another make.

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw. New "Rotary Valve" type.
See "Saginaw (Rotary Valve) Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic (Single Anchor). *NOTE* - Anchor pin is fixed type and no anchor pin adjustment is required.
See "Bendix Hydraulic Single Anchor (Without Eccentric) Brakes" in Brake Section.
Drum Diameter - 11".
Wheel Cylinder Diameter - 1 1/8" (Front), 1" (Rear).
Braking Power - 56% Front, 44% Rear.
Replacement Linings & Shoes - Linings and shoes with linings furnished in half sets of Std. and .030" Oversize.
Lining Thickness - .250" (All).

Lining Width & Length

	Front Wheel	Rear Wheel
Primary Shoes	2½" x 9 3/8"	2" x 9 3/8"
Secondary Shoes	2½" x 12 1/32"	2" x 12 1/32"

Clearance - Adjusting screw backed off 16 notches from point where wheels can just be turned by hand.
Std. Master Cylinder: On front face of firewall in engine compartment.
Checking Fluid - Maintain fluid level 1/2" below master cylinder filler cap.

Removal - Clean around master cylinder, remove hydraulic line at master cylinder and plug or tape line. On Synchro-mesh cars, install gauge pin in holes in frame side rail and "X" member to support clutch linkage, then disconnect clutch linkage from clutch pedal bellcrank and remove bellcrank. Remove master cylinder attaching bolts and remove master cylinder from studs and pushrod.

Power Brakes: Bendix or Moraine. Bendix unit identified by black cylinder, Moraine by bronze cylinder. Combination vacuum power unit and master cylinder. Mounted on forward face of firewall replacing regular master cylinder. Master cylinder can be removed without removing power unit.
See "Moraine Hydraulic (Diaphragm) Reaction Power Unit" and "Bendix Hydraulic (Disc) Reaction Power Unit" in Brake Section.
Removal - Disconnect hydraulic line at master cylinder and plug or tape line. Disconnect vacuum line at vacuum cylinder. Disconnect operating rod from brake pedal and remove four vacuum cylinder to cowl attaching nuts. Remove unit from cowl. *NOTE* - When removing master cylinder from vacuum unit, note number of shims for reassembly.

MISC. MECHANICAL

Windshield Wipers: Electric crank and link arm type. Three types used: One-Speed, Two-Speed and Two-Speed with Wide-Arc. Integral type washer pump Standard on Twp-Speed with Wide-Arc, Optional on others.
See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Frigidaire & Harrison, with magnetic compressor clutch (compressor operates only with switch turned "ON").
See "Frigidaire & Harrison (GM) Air Conditioning" in Miscellaneous Section.

Power Window Regulators: Electric type with individual motor for each window, front door ventilator and tail gate window.
See "Power Window Regulators" in Miscellaneous Section.

Power Top Control: Hydro-Lectric. *See "Power Top Controls" in Miscellaneous Section.*

Power Seat Adjuster: 2-Way, 4-Way or 6-Way electric.

►*6-WAY POWER SEAT PRODUCTION CHANGE NOTE:* TWO types used: **1)** Three motor type (separate motor for each movement, **2)** One motor type (with 3 solenoid clutches).
See "G.M. Seat Controls" in Miscellaneous Section.

TIGHTENING SPECIFICATIONS

1954 MODELS

	Ft. Lbs.
Cylinder Head Capscrews	60
Main Bearing Capscrews	95
" (6 Cyl. Rear only)	120
Connecting Rod Cap Nuts	45
Flywheel-to-Crankshaft②	105
Piston Pin Lock Bolt	10-12
Frt. Eng. Mount-to-Support	60
Rear Eng. Mount-to-frame (SM)	35
Rear Eng. Mount-to-frame (HD)	60
Harmonic Balancer Bolt	95
Spark Plugs	25-30

②—With self-locking bolts (no lockwashers), torque should be 100 ft. lbs. or 1200 in. lbs.
SM—Synchro-mesh Trans. cars.
HD—Hydra-Matic Drive Trans. cars.

1955-56 MODELS

	Ft. Lbs.
Cylinder Head	95
Intake Manifold	40
Exhaust Manifold	25
Oil Pan	12
Main Bearing Caps (Exc. Rear)	95
Main Bearing Cap (Rear)	120
Flywheel	95
Con Rod Caps	45
Rocker Arm Cover	3
Pushrod Cover	10
Water Pump Mounting	15

1957-60 MODELS

	Ft. Lbs.
Cylinder Head	95
Intake Manifold	40
Exhaust Manifold (1957)	25
Exhaust Manifold (1958-60)	30
Oil Pan (1957-58)	18
Oil Pan (1959-60)	15
Main Bearing Cap (Rear)	120
Flywheel	95
Vibration Damper	160
Con Rod Caps	45
Rocker Arm Cover	5
Pushrod Cover	5
Oil Pan to Engine Front Cover	15
Insulator to Front Cover (1957-58)	60
Water Pump (1957-58)	15
Water Pump (1959-60)	18
Clutch Housing	65

ENGINE

1954 MODELS

POWER PLANT (ENGINE & TRANSMISSION) REMOVAL: Drain water, engine oil, and transmission lubricant, remove battery, remove hood. Then proceed as follows:

►*ENGINE REMOVAL NOTE—On cars with Power Steering, remove pump belt, and pump with mounting bracket, leaving hose connected. Place pump in a position where it will not be damaged during engine removal.*

(1) Remove upper and lower radiator hoses, disconnect heater lines at cylinder head and radiator tank. Disconnect fuel line at fuel pump, oil line to pressure gauge at connection near rear of block, vacuum line at manifold or combination pump.

(2) Remove air cleaner, disconnect throttle linkage remove fuel pump-to-carburetor line, remove crankcase breather outlet pipe, disconnect exhaust pipe at manifold, free exhaust pipe bracket at flywheel housing.

(3) Disconnect following wires: Temperature gauge engine unit, coil primary lead, generator-to-regulator wires at generator (free wires from clips on side of engine), headlamp wire loom at junction block on right fender skirt (free loom from clips on fan shroud), all wires on starter solenoid.

(4) Disconnect control cable at hood latch. Remove radiator upper baffle assembly. Take out screws mounting fan shroud and radiator on radiator support, remove radiator, then remove shroud.

(5) Remove hood catch plate-to-radiator support brace. NOTE—Radiator support cross brace may be removed for extra clearance if desired (requires removal of four rivets—bolts can be used when brace replaced).

(6) Disconnect and remove gearshift linkage at transmission, disconnect clutch throw-out linkage at clutch fork, remove clutch control bracket from flywheel housing. Disconnect and remove propeller shaft.

(7) Attach hoist to engine (see Caution below), take out bolts attaching engine front insulator to frame. Lift weight of engine off rear insulators, remove bolts holding rear insulators to frame. Carefully hoist engine and transmission out of car, maintaining clearance at all points to prevent damaging parts.

►*CAUTION*—If type of hoist used interferes with any engine accessories, remove following to prevent damage: Generator, Starter, Distributor, Carburetor, Fuel Pump.

►**HYDRA-MATIC DRIVE NOTE—On cars with Hydra-Matic Drive, remove frame cross-member on which engine rear insulators mounted and use extreme care to prevent transmission swinging down when rear mountings disconnected (special precautions required due to extra weight of Hydra-Matic Drive).**

1955-60 MODELS

ENGINE REMOVAL: *NOTE* - Engine may be removed with or without transmission. Detail following includes transmission with engine.

1) Drain water, engine and transmission oil. Remove hood. Disconnect all wires, pipes and throttle linkage. Remove carburetor, crankcase ventilator pipe, heater hoses, cooler lines, radiator and fan, battery and cables.

2) On Power Steering Cars, remove pump belt and pump from mounting bracket and secure assembly out of way.

3) Disconnect exhaust pipe from crossover pipe, and disconnect gearshift linkage.

4) On synchro-mesh cars, disconnect clutch fork linkage and remove clutch countershaft bracket from flywheel housing.

5) Remove propeller shaft assembly. Raise engine slightly by hooking chain to intake manifold, threading chain through holes behind carburetor.

6) Remove front and rear insulator mounting screws. Disconnect cooler lines at timing cover.

7) On Auto-Trans. cars, place transmission jack under transmission and remove frame crossmember. *CAUTION - Without jack for supp rt, transmissi n will swing down when crossmember rem v d.*

8) Hoist engine and transmission out of chassis.

ENGINE MOUNTINGS

1954 MODELS

ENGINE FRONT INSULATOR: Front mounting consists of a single assembly on cross-member bracket directly under front end of engine. Insulator has special rebound clamp assembled over top of insulator.

Removal & Disassembly: Drain cooling system, disconnect hoses at water pump and cylinder head. Remove front cross member-to-radiator cross member apron. Remove self-locking nuts from two front insulator-to-engine support bolts. Place jack under oil pan (use wood block to prevent damage to pan), raise engine sufficiently to remove weight from insulator, take out two insulator-to-frame bolts, remove insulator and rebound clamp as an assembly. Remove rebound clamp by using two clamps to compress exposed ends of insulator so that clamp can be slipped off.

Installation: Force new insulator into position in rebound clamp. Install assembly on engine support with open side of rebound clamp forward, tighten self-locking nuts to 60 ft. lbs. Lower engine but do not install two insulator-to-frame bolts until after rear insulators have been installed and tightened (see below).

NOTE—Front insulator should not touch rebound clamp with engine weight on insulator (will be tight in clamp when off engine).

1955-56 MODELS

FRONT INSULATOR: *NOTE—If new r ar insulators are also to be installed, they should be installed first since the engine locates from the rear insulators.*

Removal: 1) Take weight of engine off insulators using suitable lifting equipment *(CAUTION—Do not use a jack under oil pan).* Remove screws fastening engine support to timing chain cover.

2) Remove screws which fasten insulator to frame front crossmember (these screws can be reached through an access hole in bottom of front crossmember). Raise engine just clear of insulator and support assembly.

3) Disconnect exhaust crossover pipe at both manifolds and exhaust pipe so it can be lowered to provide clearance for removing insulator. Remove insulator and assembly.

Installation: 1) Position insulator and support assembly against timing chain cover and install attaching screws with lockwashers. Tighten to 60 ft. lbs.

2) Connect exhaust crossover pipe to both exhaust manifolds and exhaust pipe, using all new gaskets. Use four thin (.075"), or two thick (.135") gaskets at each flange. Tighten attaching bolts securely. Lower engine and install frame to insulator screws with lockwashers and tighten.

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1955-56 MODELS

REAR INSULATOR: *NOTE–Rear insulator locates engine. Front insulator must be allowed to position itself after rear insulator installed.*

Removal: Remove two front insulator to frame bolts. Support engine securely at rear to remove engine weight from rear insulators. *(CAUTION–Do not use jack under oil pan).* Remove two bolts holding each rear insulator to frame crossmember, and then remove insulators by removing two bolts holding each insulator to flywheel housing. Disconnect exhaust pipe from exhaust crossover pipe so exhaust pipe can be moved to gain access to right insulator frame bolts.

Installation: Install new insulators on flywheel housing using lockwashers under each of two bolts holding insulator. Lower engine so rear insulators are resting on frame crossmember and insert insulator to frame bolts from top. Install self locking nuts and tighten to 35 ft. lbs. Raise front of engine slightly to take weight off front insulator, then lower engine completely so it rests on front insulator and install two front insulator to frame bolts (with lockwasher and flat washer on each).

OIL PAN

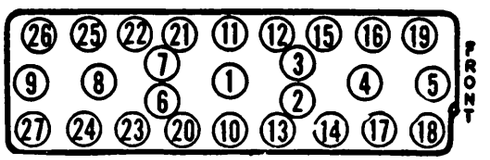
1954 MODELS

OIL PAN REMOVAL: Drain crankcase and cooling system, remove radiator hoses at water pump and cylinder head. Take out two bolts mounting steering idler arm support, drop steering linkage down to provide clearance at pan. Remove front cross member-to-radiator cross member apron. Take off two self-locking nuts mounting engine front insulator to engine support. Use jack under oil pan (place wood block on jack to prevent damage to pan) to raise front end of engine approximately 1" (CAUTION—do not raise engine more than necessary to remove front insulator), take out two bolts mounting front insulator and rebound clamp assembly on frame and remove assembly. Install block approximately 2½" high between frame and engine support, lower engine so that it rests securely on this block, remove jack from under pan. Take off flywheel housing lower cover. Remove oil pan (NOTE —Removal of one engine side apron may be necessary to provide clearance for removing the pan.

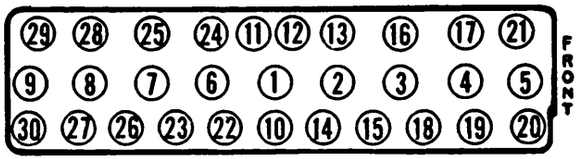
CYLINDER HEAD & MANIFOLD

1954 MODELS

CYLINDER HEAD INSTALLATION: Use torque indicating wrench to tighten cylinder head capscrews, tighten in correct sequence as shown in diagram. Cast iron heads should be tightened cold and rechecked after engine has been run sufficiently to



1954 6 CYLINDER HEAD



1954 8 CYLINDER HEAD

bring all parts to normal operating temperature. **Tightening Torque**—See Tightening (Torque Wrench) Specifications.

1955-57 V8 MODELS

CYLINDER HEAD: Removal–Remove intake manifold and push rod cover. Remove rocker arm covers (On left bank, remove spark plug wires and wire support). Remove battery and engine ground straps, Hydra-Matic level indicator tube bracket and indicator. Loosen all rocker arm adjusting nuts and move rocker arms off pushrods. Remove pushrods and place in order so they can be reinstalled in the same position (*NOTE*–The rearmost pushrod on left bank (cars with defroster) cannot be removed. withdraw rod part way and tie to head. Remove exhaust crossover pipe to manifold attaching screws and remove screws from cylinder head water outlet fitting. Remove cylinder head (dowel pins will hold head in place) and remove head with exhaust manifold attached (*NOTE*–When left head being removed, raise head off dowels, move it forward and "jockey" the the head in order to clear defroster, power steering, and power brake equipment).

1958-60 MODELS

CYLINDER HEAD: Removal - Remove intake manifold, pushrod and rocker arm covers. Remove ground strap from left cylinder head. Loosen rocker arm retaining nuts and move arms off pushrods. Remove pushrods. *CAUTION - Keep in same order and do not invert.* Remove crossover pipe-to-manifold attaching screws. Remove screws from water inlet fitting. Remove power steering pump and air suspension compressor and brackets, leaving hoses connected. Remove head attaching screws and remove head with exhaust manifold attached, using Lifting Hooks J-4266. *NOTE - Left head must be jockeyed out to clear power steering and power brake units.*

1955-60 MODELS

Installation: *(NOTE–Right and left cylinder heads are interchangeable except for water passage plug in end of water passage which must be installed in correct position if new head installed).* To install, reverse removal procedure and note the following: Head screws are three different lengths and when properly installed, all screws will project an equal distance from head. Do not use sealer of any kind on threads.

1958-60 MODELS

CHOKE HEAT TUBE REPLACEMENT: Unnecessary to replace intake manifold. Proceed as follows: Remove intake manifold and 1/8" pipe plug. With square faced punch drive tube from each end into exhaust chamber and remove. To install, press tube into manifold until it clears vertical passage to choke pipe. Install baffle, 1/8" pipe plug and manifold.

PISTONS

1954 MODELS

REPLACEMENT PISTONS (Standard Size): Standard size pistons are furnished in three sizes since there is an allowable tolerance on size of standard bores and pistons. It is important to select pistons to fit bores or hone bores to give proper piston fit (See Car Model Pages for piston fitting specifications).

Oversize Replacement Pistons:—Finished pistons furnished in following oversizes: .005", .010", .020", .030". NOTE—All factory replacement pistons held to uniform weight within 1/16 oz. and all oversize pistons up to .030" oversize are same weight as standard pistons.

CAUTION—Factory replacement pistons electorplated after being finished to size and must not be ground.

PISTON PINS

1954 8 CYL. MODELS

PISTON PIN FITTING (Pins with Snap Ring Retainers—in Cast Iron Pistons): Fit pins to pistons so that 150-250 lbs. pressure required to press pin through **one** boss (NOTE—With this fit pin will not remain permanently tight in engine, and high mileage engines may be found in which piston pins are free). Use special expansion reamer J-874-19 or similar tool to size piston holes to fit oversize pins. To install pins, coat bushing in connecting rod with light engine oil and insert rod in piston with piston skirt plug J-1325-3. Coat pin holes in piston with graphite grease. Position piston on Block J-1325-1 and press in piston pin. Install snap ring pin retainers making sure rings are fully seated in ring grooves.

1954 6 CYL. MODELS

PISTON PIN FITTING (Aluminum Pistons): Full floating pin used with a clearance of .0000-.0002". This clearance will be correct if pin can be pushed into place with the thumb. Clearance is excessive if pin will slide through of its own weight. Use special expansion reamer J-874-19 or similar tool to size piston pin holes to fit pins. Oil bushings in connecting rod and insert connecting rod in piston so oil hole in rod will be toward camshaft side of cylinder when "F" or notch in piston is toward front.

1958-60 MODELS

Removal: *NOTE - Piston Pin Remover & Replacer Set, J-6901 is used. Individual parts are marked with respective numbers.* Place plunger of Tool J-6901 into piston pin bore and position on arbor press. Put J-6901-5 between connecting rod and piston boss. Put J-6901-3 in pin and press until pin bottoms in J-6901. Remove J-6901-5 and plunger and spring from J-6901. Reposition on arbor press and press pin out of rod.

Installation: Place plunger and spring in J-6901 and place plunger in piston pin bore. Position on arbor press. Coat pin and rod lightly with graphite lubricant. Insert pin, put J-6901-3 in pin and press pin in until it bottoms against plunger of J-6901.Piston must turn freely on pin. *Pin must not move under 1500 lb. minimum load after assembly.*

Oversize Pin Installation - .001" and .003" oversize pins can be installed Connecting rod can be honed to fit **but must be .0008-.0016" smaller than the pin used.**

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CONNECTING ROD & BEARINGS

1954 MODELS

CONNECTING ROD LOWER BEARING: Removable type. No adjustment. Shims should not be used or bearing caps filed. When replacing bearings check crankpins. If scored or out-of-round and taper exceeds .001" crankshaft should be replaced.

Checking Bearing Clearance (Brass Shim Method): Use .0015" brass shim stock ½" wide and ⅞" long. Remove cap and lay shim across bearing. Tighten cap (with shim in place). Check bearing fit as follows:—Rod should be locked when testing end movement by hand but should slide on crankpin when tapped lightly with hammer. With shim removed rod should move freely on pin. If rod can be moved by hand with shim in place install .001" undersize bearing.

Installation—Bearing shells fitted with tangs (Six—one to each edge of bearing. Eight—two on each edge). Install cap with tangs on opposite sides of rod (Six), on opposite ends of crankpin (Eight).

1954 MODELS

CONNECTING ROD BUSHING INSTALLATION: Press out old connecting rod bushing using Bushing Remover J-540-1 and Block J-526. Press new bushings into place using Bushing Replacer J-540-2 and Block J-526. This replacer tool must be used as the thin wall split bushings will distort on pressing into rod without support by shank of replacer tool. Swage or expand bushings into connecting rod by using Burnished Tool J-516 and Block J-526, (CAUTION—It is very essential that bushings be burnished into place as bushing may work out of connecting rod bore). Hone bushing to fit piston pin it is to be used with. A Sunnen hone or similar accurate equipment should be used for honing operation. **Do not use a hand reamer.**

1955-57 MODELS

CONNECTING ROD BUSHING REPLACEMENT: Press out old bushing using Bushing Remover & Installer J-5753-3 and Block J-5753, (*NOTE*—For removal of bushing, the smallest diameter or third shoulder on tool is inserted in bushing). Press new bushing into place using same tools as for removal, but using opposite end of Bushing Remover & Installer. This tool must be used since the thin wall bushing will distort when pressed into rod unless supported by shank of tool. Drill a 5/32" hole in bushing through oil hole in top of rod, using care to prevent end of tool damaging opposite side of bushing. Swage or expand bushing into connecting rod using Burnisher Tool J-5753-1 and Block J-5753, pressing Burnisher Tool through bushing with connecting rod assembly supported on Block. Hone bushing to fit piston pin.

CRANKSHAFT & MAIN BEARINGS

1954 MODELS

Checking Bearing Clearance (Brass Shim Method): To check bearing fit, use .002" brass shim stock ½" wide and 1" long. With cap removed place shim across bearing. Tighten cap (with shim in place). Test bearing fit by rocking flywheel by hand. **Do not rock flywheel more than 1" in either direction** or bearing may be damaged by shim. If crankshaft locks with shim in place and rotates freely with shim removed bearing size correct. If shaft moves with shim in place use .001" undersize bearing. IMPORTANT—Do not file main bearing caps. These caps are not furnished separately.

1954 MODELS

MAIN BEARINGS: Removal. Remove the bearings with caps removed and crankshaft in place by inserting suitable tool (see NOTE following) in oil hole in shaft and rotating shaft in usual direction.

NOTE—Bearing Removal Tool can be made from ⅛"x1½" cotter key. Bend each end of key up 5/16" to make ⅝" long base. With this as a base, bend key to form 59° angle. With this tool inserted in place end will just protrude far enough to engage bearing.

Installation—Insert plain edge of bearing in indented side of bearing support, slowly rotate crankshaft until bearing seated.

1954 MODELS

REAR MAIN BEARING OIL SEAL: Seal consists of oil slinger on crankshaft to rear of main bearing, operating in groove formed in block and cap (drain hole in cap returns oil to crankcase) with asbestos seal fitted in separate groove at rear. Edges of seal groove in cylinder block and rear main bearing cap are chamfered to reduce pressure between seal and crankshaft and prevent pinching of seal. One end of groove in bearing cap is recessed and a portion of seal should be worked into this recess to prevent seal turning in service.

Installation—Remove bearing cap and upper half of bearing insert from first main bearing forward of the rear main bearing. Remove all connecting rod bearing caps. Remove rear main cap and loosen remaining main bearing caps sufficiently to allow crankshaft to be lowered approximately ⅜" at rear. Remove upper half of rear main bearing oil seal and with rear main bearing cap on bench, remove oil seal and insert. Install new seal using tool J-1045, and trim flush. *(CAUTION*—Do not pack seal into locking recess). Carefully remove seal from cap and slide it into groove in block over crankshaft. *(Caution*—Take particular care to install seal so that end of seal which was at locking recess in cap during forming operation, will meet locking recess in cap when cap is installed). Install bearing inserts and cap on main bearing forward of the rear main and torque to 95 ft. lbs. to properly seat crankshaft against new oil seal. (NOTE—Make sure that upper half of seal in rear main is flush with edge of block). *(CAUTION*—If inspection shows seal to be an improper length, remove and discard it, and form a new seal as follows: Install a new seal in bearing cap using tool J-1045 and trim one end flush; carefully remove seal from cap and reinstall in cap, rotating it so that trimmed end is below or above edge of cap the proper distance to correct for the improper length of the first seal. Reseat the seal with tool J-1045 and trim the uncut end flush with edge of cap. Reinstall in block groove). Install new seal in rear main bearing cap using tool J-1045 and pack end of seal into locking recess. Trim the other end flush and replace inserts. Install cap and torque to 120 ft. lbs. Remove rear main bearing cap again and inspect break line between cap and block to be certain that none of the seal material has been compressed between the two. Scrape surfaces to insure seating of cap. Re-install and torque to 120 ft. lbs.

Bearing Cap Seal: After rear bearing cap installed, drive wooden wedge seal into groove on each side of bearing cap next to block. ***CAUTION—Use care not to split these wooden wedges.***

1955-60 MODELS

REAR MAIN BEARING OIL SEAL REPLACEMENT:

1) Drain oil and remove oil pan, oil pump, and oil pump drive shaft. Remove oil baffle and cylinder block to oil baffle tube (lower oil level indicator tube). Remove transmission (See Synchro-mesh Transmission Removal on Car Page or Hydra-Matic Drive in Transmission Section).

2) Remove rear center main bearing cap and upper half of rear center main bearing shell to allow crankshaft to be lowered and to prevent damage to thrust surfaces of bearing. Remove rear main bearing cap and loosen remaining bearing caps sufficiently to allow crankshaft to be lowered approximately 3/8" (1955-58), 1/2" (1959-60) at rear.

3) With crankshaft lowered to provide clearance, remove upper half of rear main bearing oil seal and bearing shell.

4) Install seal in cap with end flush with cap, compress seal using hammer and Seal Compressor J-3048-A (1955-56), No. J-6528 (1957-58), J-7588 (1959-60). Do not pack seal into locking recess in cap. *NOTE - On engines with no cast slots in seal groove in block, rotate seal in cap and compress slightly to eliminate bumps caused by seal retaining slots in cap.* Remove seal from cap and install in groove in block by slipping over crankshaft into cavity in block. Insert end which was flush with cap first. Install rear main bearing cap with bearing shell and tighten to 95 ft. lbs. to pull crankshaft into place against seal. Carefully trim both ends of seal flush with block.

5) Install a new seal in cap, as above, except that seal must be packed into locking recess in cap. Trim seal flush with cap. Install cap with shell and tighten to 95 ft. lbs. (1955-58), 120 ft. lbs. (1959-60). Remove rear main bearing cap again and inspect split line to be certain that none of seal material has been compressed between cap and block. Make sure mating surfaces are clean.

6) Apply a bead of sealer (Permatex No. 3) 3/64" to 1/16" in diameter to mating surface of cap extending from packing seal groove outward to the groove for oil pan cork rear gasket. Install rear main bearing cap and tighten to 120 ft. lbs. torque.

7) Remove rear center main bearing cap and reinstall upper half of bearing shell. Install cap and tighten to 95 ft. lbs. Tighten remaining bearing caps to 95 ft. lbs. Replace transmission, oil pump, oil pump drive shaft, oil baffle, oil pan and flywheel lower cover and shield.

►*CAUTION:* Seal must be installed exactly as detailed above to prevent oil leaks at rear bearing. Make certain that seals not cut too short and that mating surfaces of bearing cap and block are free of any packing material, dirt or oiliness (except for Permatex bead on cap) and that they are not scratched or burred.

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VIBRATION DAMPENER

1954 MODELS

HARMONIC BALANCER SERVICING: No service operations required. Do not attempt to disassemble balancer (serviced by replacement).

Removal & Installation—Drain cooling system and disconnect radiator hoses. Remove radiator (see Radiator Removal), loosen and remove fan belt. Remove harmonic balancer retaining bolt, lockwasher, and balancer washer. Use J-2582-A or similar puller to remove balancer from crankshaft. When installing balancer, see that key in place in shaft keyway and balancer washer installed under retaining bolt lockwasher. Tighten bolt to 95 ft. lbs.

1955-60 MODELS

VIBRATION DAMPENER: Removal—Loosen generator at adjusting strap and remove fan belt from vibration dampener. On card equipped with power steering, also remove power steering pump belt. Position fan so wide angles will be at top and bottom allowing access to balancer. Remove dampener attaching screw (15/16" socket) and retaining washer, and slide dampener off shaft.

Installation: Reverse the removal procedure.

ENGINE FRONT COVER

1955-58 MODELS

ENGINE FRONT COVER: Removal—1) Drain radiator. On cars with power steering, remove pump with mounting bracket from pad on top of engine front cover and lay it back on fender skirt where it will be out of the way. *(CAUTION—Disconnect battery ground strap).* 2) Disconnect wires from generator and remove generator and mounting bracket and adjusting strap. Remove fan belt, power steering pump belt, and fan and pulley. Disconnect upper and lower radiator hoses, remove fan shroud, and remove radiator. Remove water inlet elbows from cylinder heads (leave hose attached). Remove fuel pump and remove vibration dampener.

3) Take weight off engine front insulator using suitable engine lifting equipment. *(CAUTION—Do not use jack und r oil pan).* Remove screws and lockwashers attaching front insulator to engine front cover. Remove four front oil pan-to-engine front cover screws. Remove engine front cover-to-block attaching screws and nuts. Pull cover forward to clear studs and remove.

Installation: See Crankshaft Oil Seal (below), install new front oil pan gasket (cement gasket to oil pan), Position new front cover gasket over studs on front of block, position front cover on engine, install all capscrews and nuts with lockwashers and tighten securely. Install four oil pan-to-front cover capscrews and lockwashers, tighten these screws to 10-12 ft. lbs. (1955), 10 ft. lbs. (1956), 18 ft. lbs. (1957), 15 ft. lbs. (1958). Install front engine support-to-front cover screws loosely, then lower engine and tighten screws to correct torque of 60 ft. lbs. Reassemble engine by reversing removal procedure (above).

1959-60 MODELS

ENGINE FRONT COVER: Removal - Drain cooling system. Remove generator adjusting strap, fan and accessory belts and fan and pulley from water pump. Disconnect radiator hoses and remove fuel pump and vibration damper. Remove four oil pan-to-cover screws, two cover-to-oil cooler line screws, and cover-to-block screws and nuts, then pull cover forward to clear studs and remove.

1955-60 MODELS

CRANKSHAFT FRONT OIL SEAL REPLACEMENT: After front cover removed (above), slide old seal off end of crankshaft. Coat face of new seal with graphite lubricant and install on crankshaft before installing front cover.

FLYWHEEL

1955-56 HYDRA-MATIC DRIVE CARS

FLYWHEEL INSTALLATION: Clean mating surfaces of flywheel and crankshaft thoroughly (use Acetone to clean old Pliobond 30 from surfaces). Apply a thin coat approximately ½" wide) of Pliobond 30 sealing compound on surface of crankshaft at bolt circle. Smooth seal compound around toward outer edge and allow to dry about one minute. *(CAUTION*—In no case will a fibre gasket be used between flywheel and crankshaft. Use only Pliobond 30 sealing compound). Install flywheel on crankshaft flange carefully and enter all flywheel bolts through plates. Tighten bolts diametrically opposite uniformly to correct torque. *(NOTE*—Draw flywheel on evenly during this operation to prevent leakage and excessive runout). Mount a dial indicator so stem or button rests on torus cover gasket seal area and check flywheel runout. Runout should not exceed .005".

CAMSHAFT & BEARINGS

1954 MODELS

CAMSHAFT: Removal. Remove Front Fender and Radiator Assembly (see above), remove fan belt, fan, and harmonic balancer (use Puller J-496). Support front end of engine with jack and remove front engine support, timing chain cover, chain, and sprockets. Remove cylinder head and valve covers, take out valves and lifters (lifters are barrel type and can be removed from above with valves out). Remove oil pump, fuel pump, and distributor. Take out screws and remove camshaft thrust plate, withdraw camshaft at front of engine. Re-install camshaft in same manner making certain that timing chain cover is properly centered (see Timing Chain Cover and Oil Seal data below). After camshaft installed, check Valve Timing, Ignition Timing, and Tappet Clearance.

CAMSHAFT BEARINGS: Use tool No. J-550 to remove and install camshaft bearings (rear bearing on Eight must be pulled out toward front as expansion plug at rear prevents driving on bearing from rear). Use driver to install all bearings making certain that oil hole in bearings is lined up with hole in block (holes are at bottom of bearings). Then line ream all bearings to finished sizes as follows:

Bearing Finished Size:	Six	Eight
#1 (Front)	1.9950-1.9955"	1.9950-1.9955"
#2	1.9637-1.9642"	1.9637-1.9642"
#3	1.9325-1.9330"	1.9325-1.9330"
#4	1.9012-1.9017"	1.9012-1.9017"
#5		1.8700-1.8705"

1956-57 MODELS

CAMSHAFT REMOVAL & INSTALLATION: Drain radiator. Remove intake manifold, crankcase ventilator outlet pipe, pushrod cover and rocker arm covers. Disconnect and move spark plug wires out of way. Loosen rocker arm ball nuts so rocker arms can be disengaged from pushrods and turned sideways. Remove pushrods and hydraulic lifters. Mark or store pushrods and lifters so they can be installed in original positions *(NOTE* - Exhaust valve pushrod of No.7 cylinder cann t be removed because of interference with defroster core. It should be blocked up so that it will not interfere with removal of camshaft. Use spring-loaded clothes pin). Remove radiator and timing chain cover. Remove timing chain cover seal and fuel pump eccentric. Slide timing chain and sprockets off ends of crankshaft and camshaft. Remove camshaft thrust plate attaching screws and remove thrust plate. Slide camshaft out of engine carefully, making sure not to damage bearings in block. Front of engine should be raised as necessary to permit shaft to slide between grille and hood catch support plate. To install camshaft, reverse removal procedure.

1958-60 MODELS

CAMSHAFT REMOVAL & INSTALLATION: Drain radiator. Remove intake manifold, crankcase ventilator outlet pipe, pushrod cover and rocker arm covers. Disconnect and move spark plug wires out of way. Loosen rocker arm ball nuts so rocker arms can be disengaged from pushrods and turned sideways. Remove pushrods and hydraulic lifters. Mark or store pushrods and lifters so they can be installed in original positions Remove radiator and timing chain cover. Remove timing chain cover seal and fuel pump eccentric. Slide timing chain and sprockets off ends of crankshaft and camshaft. On 1959-60 Models, remove distributor. Remove camshaft thrust plate and slide camshaft out of engine carefully, making sure not to damage bearings in block. Front of engine should be raised as necessary to permit shaft to slide between grille and hood catch support plate. To install camshaft, reverse removal procedure.

TIMING CHAIN

1954 MODELS

TIMING CHAIN REPLACEMENT: Timing chain must be installed "endless" with both sprockets off the engine as directed below. CAUTION—Any attempt to install the chain by removing only one sprocket will result in breaking of the chain.

Timing Chain Removal—Remove Front End Sheet Metal Assembly as a unit, remove fan belt and fan, remove Harmonic Balancer (see Vibration Dampener). Support front end of engine with support jack, remove front engine support (see Front Engine Insulator Removal), remove timing chain cover, timing chain and sprockets.

Timing Chain Installation—Mesh sprockets in chain with timing marks on both sprockets lined up for correct valve timing (see Camshaft Setting on car model pages), install both sprockets together being careful not to place any side strain on chain.

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1954 MODELS

TIMING CHAIN COVER & OIL SEAL: Consists of cork seal and spring assembled on the crankshaft in front of the chain sprocket so that the cork bears against the inner face of the timing chain cover. **Installing New Cork Seal**—Coat seal with graphite lubricant, rubbing lubricant well into the face of the cork, before installing seal in engine. This lubrication necessary to prevent noise at this point. **Installing Timing Chain Cover**—Use J-546 tool to center timing chain cover before screws tightened. *NOTE:* A timing chain bumper has been incorporated in the timing chain cover on the six cylinder engine. This bumper dampens timing chain vibration. The bumper consists of a synthetic rubber pad which is vulcanized to a steel bracket welded on the left edge of the timing chain cover on the driving side of the chain. The new cover is servicable as an assembly on past 6 cylinder engines.

1955-57 MODELS

►*TIMING CHAIN REMOVAL CAUTION:* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons, or both will result due to piston striking valve. To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage to valves.

TIMING CHAIN: Removal—Remove engine front cover (See Engine Front Cover above). Remove fuel pump eccentric. Align timing marks on sprockets. Slide timing chain and sprockets off camshaft and crankshaft.

Installation: Install new timing chain and sprockets making sure that marks on sprockets are aligned exactly on a straight line passing through shaft centers. Install fuel pump eccentric indexing pin on eccentric with hole in sprocket. Install retainer screw and retainer washer and tighten securely. Install engine front cover.

VALVE SYSTEM

►*1959-EARLY 1960 PONTIAC INTAKE VALVE VENT NOTE:* To prevent excessive wear caused by abrasives entering the small holes drilled in cylinder head (to vent the intake valve guides), the manufacturer recommends that a tapered steel plug. Part No. 534989 be installed. Insert plugs in vent holes (4 per head) and tap in flush with casting. On air conditioned cars it is not necessary to install a plug in vent hole located under the compressor. Later 1960 engines (after Oct. 15, 1959) will not have the vent holes.

1955 V8 MODELS

CHECKING VALVE STEM LENGTH: Position rocker arm on stud and hold in place using Rocker Arm Stud Installer J-5716. Slip valve into place and hold it against valve seat. While holding rocker arm and valve in position securely, insert Valve Train Gauge J-5710 through pushrod hole and seat snugly in pushrod seat of rocker arm. With all parts seated, step end of gauge should be at least flush with gasket face of head, but should not project past step on gauge. If gauge projects too far (indicating valve stem too long), grind off tip of valve stem as necessary. *CAUTION*—When grinding end of valve stem be careful not to overheat it which will soften the hardened stem.

1956-60 MODELS

►*NOTE: The following information does not apply to 1956 285 HP Engine which has 3/32" longer valves than regular production engines.*

CHECKING VALVE STEM LENGTH: Position rocker arm on stud and hold in place using Rocker Arm Stud Installer J-6301. Slip valve into place and hold it against valve seat. While holding rocker arm and valve in position securely, insert Valve Train Gauge J-6324 through pushrod hole and seat snugly in pushrod seat of rocker arm. With all parts seated, step end of gauge should be at least flush with gasket face of head, but should not project past step on gauge. If gauge projects too far (indicating valve stem too long), grind off tip of valve stem as necessary. *CAUTION*—When grinding end of valve stem be careful not to overheat it which will soften the hardened stem.

ROCKER ARMS

1955-60 MODELS

ROCKER ARM STUD REPLACEMENT: *NOTE—Use oversize stud (.003") only when original stud is found to be loose in cylinder head. Use Std. size stud for replacement when original stud threads are damaged).*

Removal: 1) Remove cylinder head from engine. With rocker arm removed, file two slots 3/32" to 1/8" deep on opposite sides of rocker arm stud. Top of slots should be 1/4-3/8" below thread travel. Place washer J-6392-3 at bottom of rocker arm stud. Position Rocker Arm Stud Remover J-6392-1 on rocker arm stud and tighten screws securely with 5/32" allen wrench. Place spacer J-6392-2 over stud remover. Thread 7/8" standard nut on stud remover and turn nut until rocker arm stud is out of cylinder head. If oversize stud being installed, ream out stud hole with Reamer J-5715.

2) Remove plugs from ends of cylinder head oil gallery and thoroughly clean out metal deposits and foreign matter from cylinder head (head must be right side up so metal or foreign material will not lodge around studs).

See "OIL PASSAGE PLUG (IN CYLINDER HEAD) REPLACEMENT" under OILING SYSTEM.

Installation: 1) Position rocker arm on rocker arm stud and place Rocker Arm Stud Installer J-5716 (1955), J-6301 (1956-60) on stud in place of rocker arm ball. Carefully press stud into head using a 2 ton press, until it is installed about halfway (7/16").

2) Position Valve Train Gauge J-5710 (1955), J-6324 (1956-60) in pushrod hole so that it seats properly in the rocker arm. With valve seated, slowly press rocker arm stud into cylinder head until gauge projects about midway between end of gauge and step with respect to gasket surface of cylinder head.

3) Remove Rocker Arm Stud Installer, rocker arm and ball. Blow air through hole in new stud to insure that passage is not restricted, and blow air through oil gallery. Replace plugs in ends of oil gallery. Check oil passages from oil gallery to all studs. Install rocker arm and ball and install nut loosely. Replace cylinder head.

HYDRAULIC LIFTERS

1955-60 MODELS

HYDRAULIC VALVE LIFTER OVERHAUL: Remove intake manifold, pushrod cover and rocker arm cover. Loosen rocker arm ball nut and move rocker arm off pushrod. Remove pushrods (rear lifter on left bank cannot be removed if car is equipped with defroster, but must be raised and moved out of way for removal of lifter). Remove lifter from bore in cylinder block.

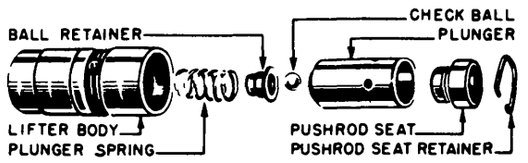
Disassembly: Remove pushrod seat retaining ring by holding down seat with pushrod while dislodging spring from lifter body with pointed tool (*NOTE*—it may be necessary to unseat lifter ball, using plunger unloader J-5097, before plunger can be pushed down). Invert lifter and allow plunger to slide out of body. If plunger sticks, place lifter in large end of Hydraulic Valve Lifter Plunger Remover J-4160-A, with pushrod end of lifter downward. Hold tool firmly in hand with thumb over lifter body and strike sharply against a block of wood until plunger falls out (it may be necessary to soak a lifter with a stuck plunger in cleaning solvent to loosen plunger in body). *CAUTION—If more than one lifter is being disassembled at a time make very sure that parts for each individual lifter be kept together so that parts are not intermixed.*

Inspection: Wash individual lifters separately, keeping parts for each lifter together. If necessary, soak lifter in suitable carbon solvent to dissolve varnish and carbon. Using a lint free cloth, clean each part with a hard wiping action. Use a bristle brush if required. Do not use a wire brush or sandpaper. Inspect lifter body for scoring, and check cam surface at end of lifter for wear. Check plunger, and using a magnifying glass, inspect check ball seat for defects, and outer surface of plunger for scratches or scores. Inspect pushrod seat for roughness and make sure hole in seat is open. Inspect lifter ball for nicks or scoring. If any part of lifter is found defective, replace entire unit.

Assembly: Rinse all parts in clean kerosene before assembly and assemble without drying. Rinse plunger spring and ball retainer and position retainer in spring. Install ball in retainer (check ball spring not used in regular production lifters, used in 1956 285 HP engine) Rinse plunger and place on retainer so seat on plunger mates with ball. Invert plunger with parts assembled thus far and, after rinsing body, install body over spring and plunger. Place lifter body on clean paper; rinse and install pushrod seat and retainer ring.

Checking Leakdown Rate: Fill tester cup in Valve Lifter Leakdown Tester J-5790 to 1" from top with testing

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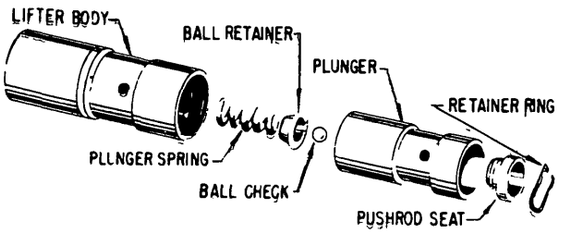


1955 HYDRAULIC LIFTER

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fluid, Swing weight arm up out of way, raise ram, and position lifter in boss in center of tester cup. Place ¼" (1955-56), 7/32" (1957-60) steel ball in pushrod seat of lifter and lower ram onto ball. Adjust ram (with weight arm clear of ram) so that pointer is positioned on set line (marked "S"). Tighten jam nut to maintain setting, Operate lifter through full travel of plunger by pumping weight arm to fill lifter with test fluid and force out air, (Lifter must be completely submerged at all times), Continue pumping for several strokes after definite resistance is felt (*NOTE*–If noticeably weak resistance is felt during any one of last few strokes (of hard pumping), replace ball in lifter and repeat test to this point. Raise weight arm to allow plunger spring to expand fully; lower arm onto ram and commence turning crank slowly (1 revolution every 2 seconds). Time indicator travel from lower line (first line above set line) to line marked .094" (1955) .125" or 1/8" (1956-60), while rotating cup with crank. Lifter is satisfactory if rate is between 9 and 30 seconds (1955), 12-40 seconds (1956-60). Retest 3-4 times before discarding.

Installation: *(CAUTION–If new lifter is to be installed, remove sealer coating from new lifter, making sure that hol in pushrod seat is not plugged with sealer coating. Check l akdown rate).* Place new lifter in lifter boss and replace pushrod exactly as removed (same end against rocker arm). Crank engine until lifter is on base circle of cam (completely off cam lobe), Position rocker arm on pushrod and adjust lifter plunger position as follows: On 1955 engine, turn adjusting nut down until there is no axial movement (clearance between pushrod and rocker arm and lifter seats), making sure that plunger has not been depressed, then turn nut down one complete turn. On later models, position rocker arm on pushrod and tighten nut to 15 ft. lbs. (1956-58), 15-25 ft. lbs. (1959-60). Replace rocker arm cover, pushrod cover and intake manifold.



1956-60 HYDRAULIC LIFTER

OILING SYSTEM

1954 MODELS

CRANKCASE OIL CLEANER: Pontiac type 'controlled flow' design consisting of settling chamber in oil inlet and filter screen housing in crankcase.

Servicing—No service required but Oil Cleaner should be removed and settling chamber cleaned out when oil pan removed for other work, or if car has been upset or turned over. Capacity of cleaner is 1 quart.

Removal & Installation—To remove cleaner with oil pan off engine, disconnect oil suction pipe from crankcase as a unit. Take out attaching screws and remove cleaner from bracket and suction pipe. Remove snap ring on bottom of cleaner and remove oil screen. Take out screws mounting cleaner head to housing shell and remove settling chamber from housing. Wash all parts in gasoline and scrape sediment from settling chamber. When reassembling cleaner see that all gaskets in good condition or use new gaskets. Turn head and housing shell upside down and insert 2 screws and place gasket inside shell, then set settling chamber in place and start screw threads, turn assembly right side up and install remainder of screws, tightening them securely. Assemble all other parts. Fill cleaner with fresh oil and install. CAUTION—Fill cleaner with fresh oil before installing in crankcase (avoids running bearings without oil when engine first started).

1954 MODELS

OIL FILLER CAP & CRANKCASE VENTILATOR CLEANER:—All oil filler caps (Std. & Heavy Duty type) serve as inlet for crankcase ventilating system and must be correctly installed on engine. Install cap with seam on side engaging groove in top of oil filler pipe and opening in cap toward fan. Standard Filler Cap—Wash copper gauze filter element in gasoline and re-oil by dipping in engine oil at 10,000 mile intervals (twice yearly) for ordinary conditions. Service at 2000 mile intervals, or more often if necessary, in dusty areas.
Heavy Duty Filler Cap—Used on cars with heavy duty (oil bath) type carburetor air cleaner. Similar to the standard cap except for greater cleaning capacity. Service in same manner as standard cap and always clean outlet pipe air cleaner at same time.
Crankcase Ventilator Outlet Pipe Air Cleaner—Consists of a copper gauze filtering element in an elbow on the crankcase outlet pipe. Clean in same manner as filler cap (above). NOTE—No outlet pipe cleaner used on cars with Standard Filler Cap.

1955-60 MODELS

OIL PASSAGE PLUG (IN CYLINDER HEAD) REPLACEMENT: *This plug is located on intake side of cylinder head bolt which feeds cylinder head oil gallery (toward rear of head on left bank, and toward front of head on right bank).*

Removal: Remove cylinder head bolt from hole which feeds oil gallery. Attach a piece of rag to a wire for removing rag,, and push rag down into bolt hole past the oil passage in which plug is located. Drive old plug through passage into bolt hole where it will drop onto rag. Pull rag out pulling old plug with it.

Installation: Drive plug into place using a tool which bears into bottom of plug (½" x 3" bolt can be used) until outer edge of plug is flush with surrounding surface of head.

ENGINE LUBRICATION

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic valve lifters. Metered oil is supplied to pushrod seats, rocker arms, timing chain and sprockets, and distributor drive gear, All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on lower face of block in rear of crankcase draws oil up through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in pump body and crankcase to inlet port on oil filter mounting pad on right side of crankcase. From filter outlet, oil flows through transverse passage in rear end of block to rear end of left main oil gallery which extends along entire length of engine block. At forward end of left main oil gallery a "V" passage extends down to crankshaft bearing and up to forward end of right main oil gallery which also extends along entire length of engine block. Oil is distributed through these oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear bearings are lubricated through short vertical passage extending between crankshaft bearing bore and camshaft bearing bore and intersecting the oil filter outlet passage (above) from which oil is supplied to these bearings. **Other** bearings are lubricated by "V" passage in each crankcase web which extends down from left main oil gallery to crankshaft bearing bore and then up to camshaft bearing bore (additional passage at front crankshaft bearing supplies oil to right main oil gallery).

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole from adjacent main bearing.

Pistons & Pins - Lubricated by oil jet thrown on cylinder walls through groove between rod and bearing cap of connecting rod for opposite cylinder when this groove lines up with oil hole in crankpin journal. *NOTE* - Rods must be installed with this groove upward or toward camshaft for this cross-lubrication.

Valve Lifters - Hydraulic valve lifters are supplied with oil through short vertical passage extending from main oil gallery directly to lefter bore.

Pushrods, Rocker Arms, & Valves - Pushrods are filled with oil directly through small hole in top of lifter for lubrication of upper and lower pushrod seats. Vertical passages in block at No. 2 camshaft bearing (for right bank), and No. 4 camshaft bearing (left bank) extend up through engine block and matching passages in head (passage in head is around one cylinder head bolt with grooved channel in lower face of head to connect with hole in block) to connect with cylinder head oil gallery which extends along entire length of each cylinder head. Oil in this system is metered by camshaft bearing and is fed intermittenly when oil holes line up. Rocker arm studs (pressed in head) extend down into this cylinder head oil gallery and have drilled oil passage with side hole at rocker arm ball seat through which oil flows to lubricate ball seat and up through grooves in ball to fill channel section of arm. This oil overflows end of rocker arm to lubricate valve tip. Excess oil in rocker chamber drains down pushrod openings into lifter chamber and oil drain holes in floor of lifter chamber (at each side of center crankcase web) return oil to the oil pan.

Timing Chain, Sprockets, & Fuel Pump Eccentric - Drilled holes in camshaft front journal provide a jet of oil when hole in journal lines up with oil hole in bearing. This jet strikes camshaft thrust plate and part of

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the oil is diverted downward through grooves in front face of engine block and thrust plate for sprocket and chain lubrication. An additional hole in the thrust plate permits an oil jet to pass through opening in camshaft sprocket and lubricate fuel pump eccentric and rocker arm.

Distributor Shaft & Bushings - Lubricated through passage in block from main oil gallery.

OIL FILTER: Full flow type mounted on base adapter bolted on right side of crankcase. Bypass valve located in filter base assures engine lubrication if filter element clogged.

OIL PUMP

1954 MODELS

OIL PUMP SERVICING: Pump is gear type mounted externally on right side of engine.

Removal: Turn crankshaft so that #1 piston on top dead center of compression stroke with distributor rotor at #1 firing position. Remove steering idler arm and right hand engine side pan. Take out pump mounting bolts and remove pump.

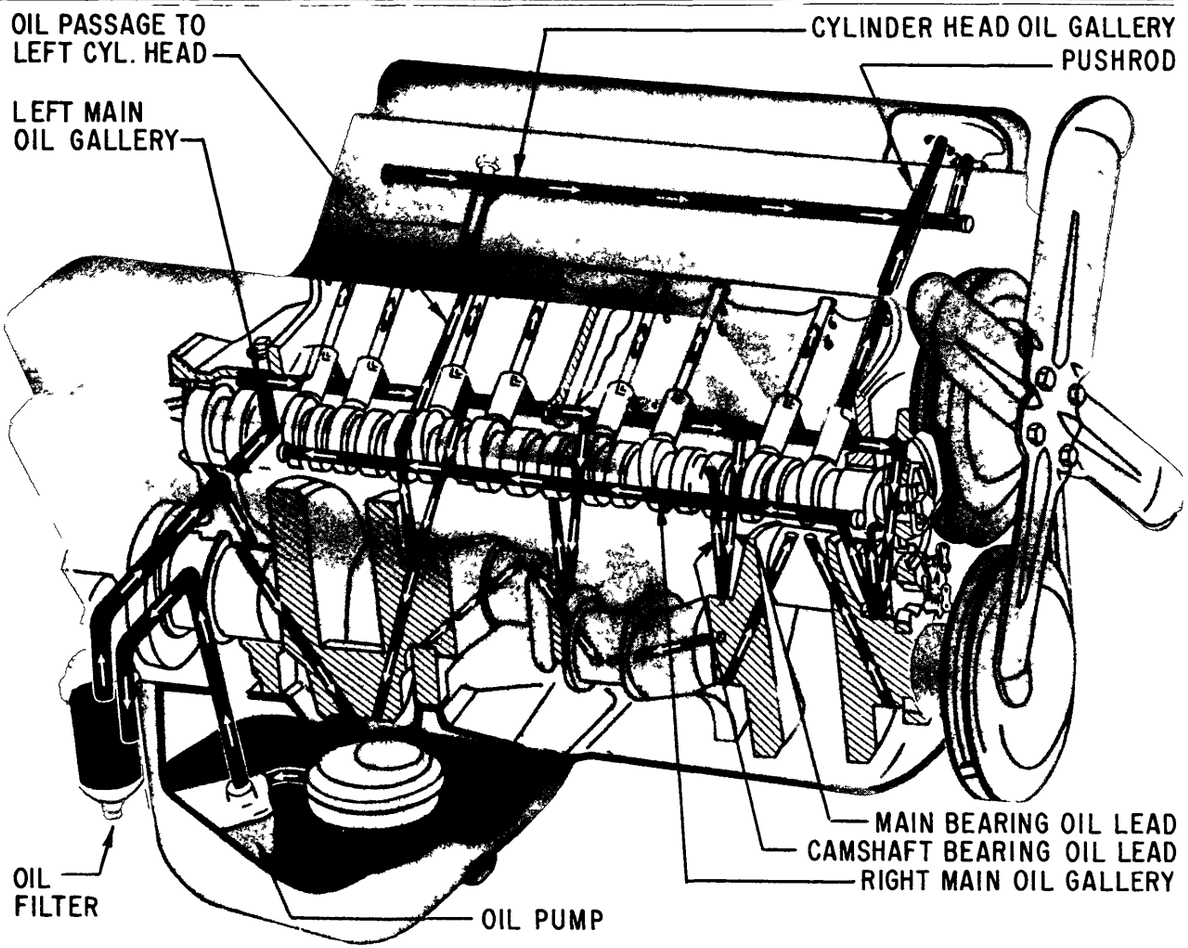
Overhaul: Remove cover assembly, lift out oil pump driven gear. Take out wire retainer and remove three distributor drive springs. Support pump on bottom surface, press pump shaft out of distributor gear (use drift of slightly smaller diameter than shaft inserted in end of drive gear to press on end of shaft). Take out relief valve plug, remove relief valve parts. Clean all parts thoroughly, replace worn or damaged parts. When re-installing parts, note specifications listed below. NOTE—Oil pump drive gear and shaft furnished as an assembly; distributor drive gear, pump driven gear, and driven gear shaft furnished as individual parts.

Pump Specifications—Driveshaft clearance in body .0025-.0005". Driven gear clearance on shaft .0020-.0005". Shaft fit in body .0025-.001" tight (press fit). Pump gear backlash .004-.006". Gear end clearance in body—Flush to .004" protrusion beyond cover surface of body (with gasket removed). Pump shaft end clearance .002-.006" (press distributor gear on shaft until clearance between gear and end of body is .002-.006".

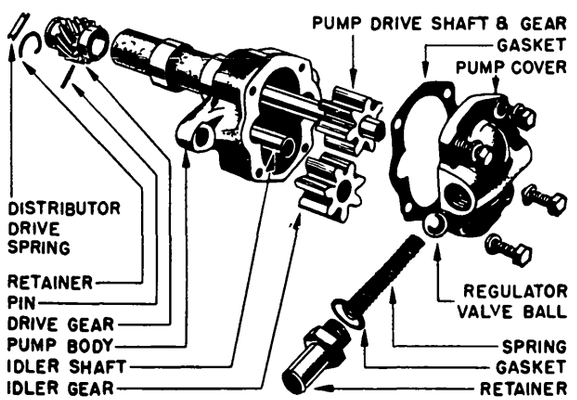
Relief Valve—Consists of a spring-loaded ball located under plug on pump cover. Not adjustable. Clean valve thoroughly and replace spring if length less than 2 5/16".

Distributor Drive Spring Installation—Install bank of three springs (with maximum thickness of .045" in end of distributor drive gear, install retainer ring with curved end hooked in hole in gear and ring seated in notches in both ends of springs. Check to see that drive springs slip readily in slot in distributor shaft when shaft entered in hole in distributor drive gear.

Installation: With crankshaft turned to #1 firing position, turn pump shaft so that drive springs in drive gear are parallel with center-line of crankshaft and punchmark on end of gear points downward (pump body positioned so that relief valve housing on pump cover toward rear of engine). Install pump in this position using new gasket on engine block.



PONTIAC V8 ENGINE OILING SYSTEM



1954 PONTIAC 6 & 8 OIL PUMP

1955-60 MODELS

OIL PUMP OVERHAUL: Rem val—Remove oil pan and remove oil pump attaching screws while holding pump in place. Carefully lower oil pump away from block with one hand while removing oil pump drive shaft with the other hand.

Disassembly: Remove cotter pin which retains floating screen to pump inlet and remove screen. Remove pressure regulator and spring retainer, spring and pressure regulator ball. Remove screws retaining cover to oil pump body and remove cover. Remove driven gear and drive gear with shaft.

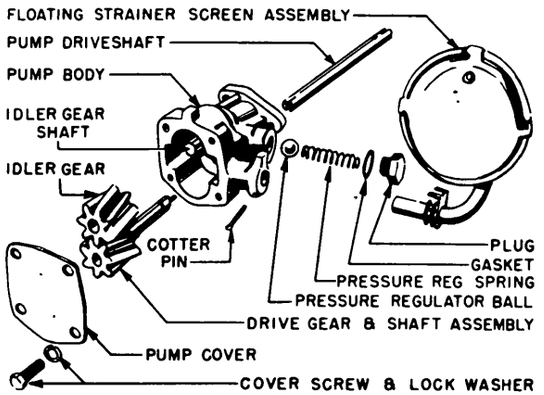
Cleaning & Inspection: Clean all parts thoroughly (clean screen with Bendix Cleaner). Inspect pressure regulator spring for distortion, cracks, and wear on sides. Inspect pressure regulator ball for nicks or other damage. Inspect oil pump drive shaft (distributor to pump shaft) for wear or cracks. Inspect all other pump parts for wear. Replace parts as necessary.

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Ass mbly: Install drive and driven gears. Install cover and turn drive shaft by hand to insure that it turns freely and has a slight amount of endplay. Install pressure regulator ball, spring and retainer using a new gasket on retainer. *(CAUTION—Do not attempt to change oil pr ssur by varying length of pressure regulator spring).* Install screen assembly on oil pump and install new cotter pin retainer.

Installati n: To install pump, position drive shaft into position in distributor and oil pump drive gear. Place new gasket Part No. 522103 in position between pump and block and install pump on block, indexing drive shaft with pump drive gear shaft. Install two attaching screws and lockwashers and tighten securely. *NOTE* - Removal and installation of pump does not disturb distributor timing. Install oil pan.



1955-60 PONTIAC OIL PUMP

FUEL SYSTEM NOTES

1955-56 MODELS

FUEL FILTER (Draining & Cleaning): Remove drain plug and drain out dirt and water. If filter is excessively dirty remove filter from car and agitate it in a carburetor cleaner or solvent. Direct an air stream through the *outlet port* which will force water and dirt out through inlet port. Rinse filter in kerosene and again flush with air. Install drain plug and reinstall filter.

1957 MODELS

FUEL FILTER: On cars with AC glass bowl type filter at carburetor, remove and clean glass bowl. Replace filter element if it is becoming plugged. *See car model page for filter element production change. NOTE* - Additional filters located in fuel tank and in fuel pump (screen located in fuel passage directly below inlet valve)

1955-57 MODELS

EXCESSIVE FUEL PUMP PRESSURE (Causing Carburetor Fl ding): If fuel pump pressure in excess of 5 lbs., check pump for incorrect diaphragm installation (insufficient slack) before replacing pump:

1) Mount pump in vise with fuel side up, loosen fuel pump cover screws two turns to free diaphragm.

2) Flex diaphragm by moving rocker arm up and down several times (use short piece of pipe fitted over rocker arm to provide leverage).

3) Hold rocker arm in extreme upper position while tightening all cover screws securely. This will provide slack in diaphragm.

4) Reinstall pump and check pressure. If pressure still in excess of 5 lbs., replace pump.

►*CARTER WGD CARBURETOR NOTE: See "Carter WGD Carburetor" in Carburetor Section for other recommended changes to correct flooding.*

PROPELLER SHAFT NOTES

1958 MODELS

Center Bearing Assembly: Center bearing and bracket assembly is attached to a bracket located inside frame tunnel. Aligning shims located between frame bracket and bearing bracket. *CAUTION - Bearing lubricated for life and must not be placed in gasoline or solvent.*

Installation Note - Coat splines of front propeller shaft yoke and fill counterbore in shaft with high melting point grease. Assemble parts of center bearing assembly on front propeller shaft in following order: Dust shield, center bearing and bracket, special washer, lockwasher, packing, retaining ring. Hold all parts together with clamp nut on front propeller shaft.

Propeller Shaft Alignment: Place a straightedge under frame tunnel with 1½" flat washers at each end using "C" clamps to hold straightedge in place. Place Tool J-7119 in center of straightedge with removable pin out and center level bubble in tube between two long lines. (On Synchro-Mesh cars, remove exhaust crossover pipe connector). Install removable pin in Tool J-7119 and place tool against right oil pan flange (Synchro-Mesh), right transmission oil pan flange (Hydra-Matic). If bubble still centered or less than 3/16" to front or rear of long lines, engine angle is within limits. If more than 3/16" proceed as follows: If bubble to front of center long lines, remove a shim from between front engine mount insulator and frame crossmember. If bubble to rear, add a shim. Recheck engine alignment. Now place Tool J-7119 against front propeller shaft. If bubble is centered or less than 3/16" to front or rear of long lines, shaft angle is within limits. If bubble to front, add a shim between propeller shaft center bearing support and frame bracket. If bubble to rear, remove a shim. Recheck shaft alignment.

1959-60 MODELS

►*CAUTION:* DO NOT interchange 1958-59 propeller shafts as severe roughness would result. Single engine mount is at rear on 1959 and later models, changing angle alignment procedure.

Center Bearing Assembly: Center bearing and bracket assembly is attached to a bracket located inside frame tunnel. Aligning shims located between frame bracket and bearing bracket. *CAUTION - Bearing lubricated for life and must not be placed in gasoline or solvent.*

Installation Note - Coat splines of front propeller shaft yoke and fill counterbore in shaft with high melting point grease. Assemble parts of center bearing assembly on front propeller shaft in following order: Dust shield, center bearing and bracket, special washer, lockwasher, packing, retaining ring. Hold all parts together with clamp nut on front propeller shaft.

Propeller Shaft Alignment: *NOTE - J-7119 Gauge must be equipped with J-7119-9 (J-7119-7 and 8) pins, id ntified by "Red" markings on knurled section.*

1) Use "C" clamps to secure straightedge up against frame tunnel with a flat washer located at least 6" in from each end of tunnel. *NOTE* - Overtightening "C" clamps will bend straightedge.

2) Place Tool J-7119 in center of straightedge with removable pin out, then zero gauge (use adjusting screw to center bubble). Install long pin (-7) in Tool J-7119 and place tool against Hydra-Matic Transmission or engine oil pan flange (Synchro-mesh) right side.

3) Engine angle is correct if bubble is centered or less than 3/16" to front or rear of long lines. To correct, add or remove shims at engine rear mount. *CAUTION* - Reset level on gauge if engine lifted to change shims.

4) With engine angle within limits, re-zero gauge, with gauge on flange of Hydra-Matic Trans. or Engine oil pan.

5) Install short removable pin (-8) and place tool up against propeller shaft (use mirror to center bubble). The same specifications apply as for engine angle. To correct, add or remove shims between center bearing support and frame bracket.

►*LOW SPEED (15 MPH) ROUGHNESS NOTE:* When this condition still exists after alignment corrected, look for off-center condition of rear engine mount. To correct, move left front engine mount to front (slightly) and right front engine mount to rear (slightly). This will force rear of engine to left and back on centerline of car

MODEL IDENTIFICATION

SERIAL & ENGINE NUMBERS: (Numbers ar th sam). On left front hinge pillar post and on raised pad at front of left side of cylinder block.
Starting Serial & Engine Number. 1001 Up.

►*SERIAL & ENGINE NUMBER NOTE–Serial & Engine number (example C6ZS-1001) includes following identification in sequence).*

Assy. Plant	No. of Cyls.	Model ① Year	Trans.② Type	Serial No.
See below	6	Z	S	1001 Up

①- Year. Z (1954).

②–S and C are Synchro-mesh Transmissions. H and A are Hydra-Matic Transmissions.

Assembly Plant Designations

A–Atlanta
C–South Gate
F–Framingham
K–Kansas City
L–Linden
T–Arlington
W–Wilmington

TUNE-UP

COMPRESSION PRESSURE: 123-141 lbs. (Synchro-mesh), 139-158 lbs. (Hydra-Matic), both at cranking speed of 200 RPM. •

VACUUM READING: 18-20" idling at 520-540 RPM (Synchro-mesh), at 365-385 RPM (Hydra Matic).

VALVE TAPPET CLEARANCE: .011" to .013", HOT. Use .011" "Go" gauge, .013" "No Go" gauge. **High Speed Setting**–.013" (Exhaust Valve, Hot).
Cold Setting With Engine Stopped– 012- 014". Check for .011-.013" after engine warm

MANIFOLD HEAT CONTROL: Thermostatic coil type, non-adjustable(fixed anchor pin) Counterweight should be securely clamped to shaft in vertical position with valve closed (cold position)

IGNITION

►*IGNITION HIGH TENSION CABLE CAUTION:* Non-metallic conductor cables (with built-in suppression resistance) Marked "Radio-4000 GM" Distributor cap is conventional type without built-in resistor *Do not substitute other type cables.*

FIRING ORDER: 1-5-3-6-2-4 See diagram

SPARK PLUG GAP: 025" (023- 028")

Spark Plug–AC No 44-5 14mm Tighten to 25 ft lbs

COIL: Delco-Remy 1115378 (1953), 1115380 (1954).
Ignition Current–2.5 amps. idling. 4 5 stopped.

DISTRIBUTOR: Delco-Remy 1110235 (Synchro-mesh Cars), 1110234 (Hydra-Matic Cars).
Condenser–Delco-Remy 1869704. **Capacity**–.18-.23 mfd.
Contact Point Set–Delco-Remy 1871678.
Breaker Gap–.016".
Cam Angle–38°-45°.
Breaker Arm Spring Tension–19-23 ozs.
Rotation–Counter-clockwise viewed from above

Automatic Advance–First 1110232
►(Black Retaining Clips)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0-4		900
5-7		1200	10-14		2400
9-10		1800	18-20		3600

Automatic Advanc - 1110234

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		450	0-4		900
5-7		1200	10-14		2400
10-12		1950	20-24		3900

Automatic Advance - 1110235

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		500	0-4		1000
6-8		1050	12-16		2100
8-10		1400	16-20		2800
10 5-12 5		1800	21-25		3600

Vacuum Spark C ntr l: Delco-Remy 1116079 Integral type **Plung r Trav l** - 3/16-7/32"

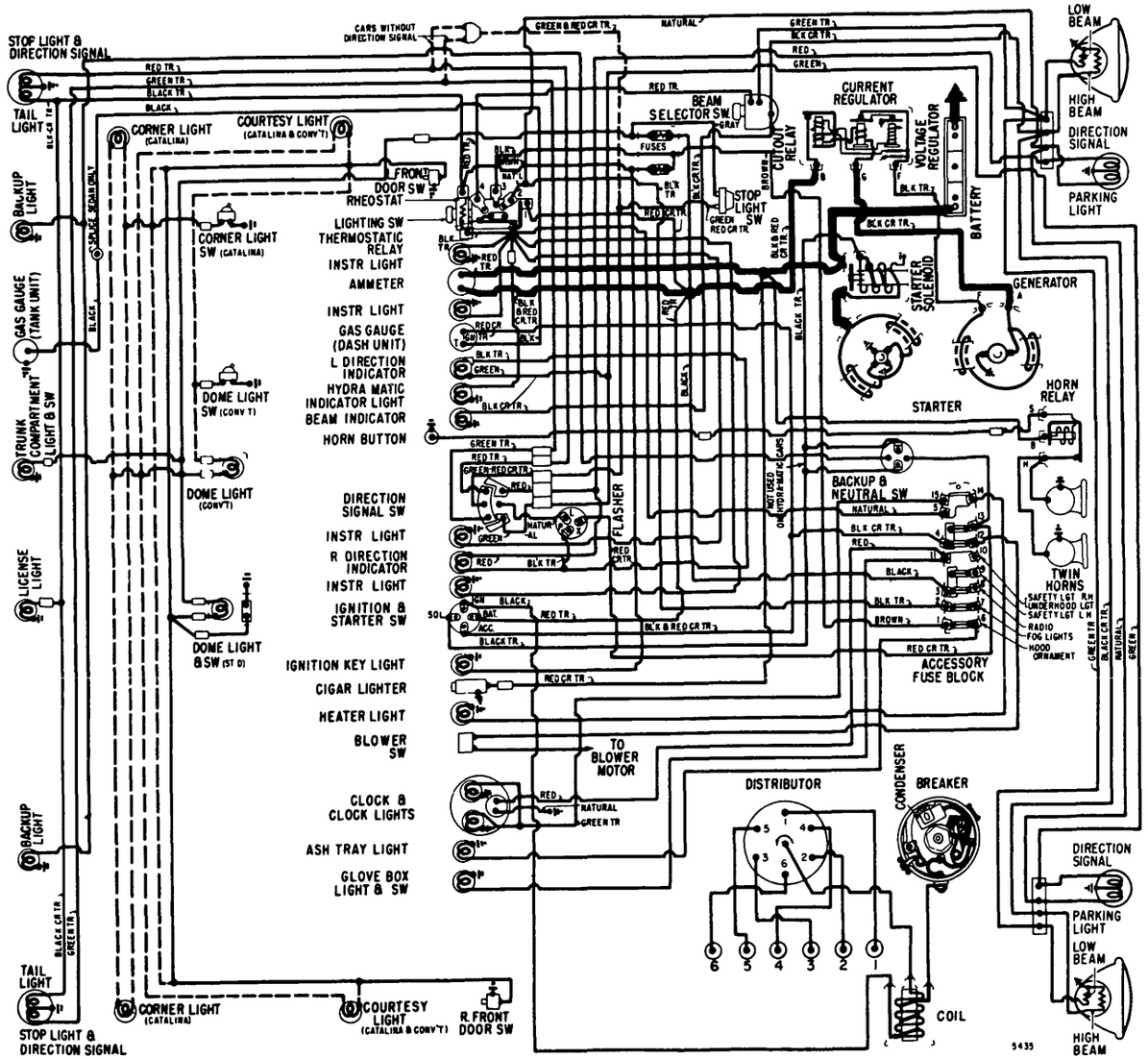
Vacuum Advanc –1116079

Distr. Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	4-6"
11	22	19-20.5"

IGNITION TIMING

Setting–3° BTDC
Timing Marks–Timing marks on dampener indicating **TDC. - 3° BTDC. - 6° BTDC.** Pointer on chain case cover aligned with correct mark on dampener (See Ignition Timing above)

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CARBURETOR

►*1954 CHOKE SETTING CHANGE (To Correct "Loading" During Engine Warm-up):* Change setting from center index to 2 points lean.

THROTTLE LINKAGE ADJUSTMENT (ALL MODELS): *Adjust exactly as follows:*

1) Carburetor Throttle Rod—Disconnect throttle rod at throttle lever on left side of transmission case. Check and adjust engine idle speed to 365-385 RPM, hot or slow idle with engine at normal operating temperature, transmission warm, and selector lever in "N" position. Install adjusting pin J-2544 through holes in carburdtor intermediate lever on left side of cylinder head and lever bracket. Adjust nuts at trunnion on carburetor throttle rod (back off one nut, tighten opposite nut) until adjusting pin is free with carburetor throttle lever stopscrew against its stop. Tighten trunnion nuts but **do not remove adjusting pin.**

2) Transmission Throttle Front Rod—Check adjustment by inserting a second J-2544 adjusting pin through holes in idler lever (left side of crankcase below starter) and lever bracket. If pin does not enter both holes freely, adjust length of transmission throttle front rod at trunnion on upper end of this rod, then tighten both locknuts securely, and remove both adjusting pins.

3) Accelerator Pedal Rod—Loosen front locknut on pedal rod at throttle control idler lever on left side of engine, depress accelerator pedal until carburetor throttle is just wide open. Check clearance between lower face of accelerator pedal and floor mat. If clearance is not ¼" at closest point, adjust pedal by turning rear nut at trunnion on forward end of rod in or out as required, then tighten front nut securely.

CARTER

Carter WCD 2010S. Dual downdraft type with automatic choke.

Idle Setting—First set screw 1¼ turns open from lightly seated position. With engine warm and idling at correct idle speed, turn idle screw in until engine falters from lean mixture, then turn screw out until engine speed is at maximum. One idle screw only.

Idle Speed—520-540 RPM (Synchro-mesh Cars), 365-385 RPM (Hydra-Matic Cars).

Float Level—*NOTE—Floats operate independently of each other, but are adjusted the same as a single type float.* 5/32" from top of float to gasket seat on bowl cover (with gasket removed) using Gauge T109-196. Sides of float should barely touch vertical uprights on gauge to avoid floats binding on sides of bowl.

Accelerating Pump—No seasonal adjustment.

Fast Idle: With choke valve tightly closed and fast idle screw on high step of fast idle cam, tighten adjusting screw until there is .026" clearance between throttle valve and bore of carburetor on side opposite idle ports.

Automatic Choke Setting: 2 points lean. *NOTE—Superseds previous setting (Centered at index) to correct "Loading" during engine warm-up).*

►*OTHER DATA—See "Carburetors WCD Carburetors" in Carburetor Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

Fuel Pump Pressure: 4-4¾ lbs.

CARB. EQUIPMENT

Fuel Pump: AC. **Replacement No. 9630** (Fuel & Vacuum).
Pressure—4-4¾ lbs.
See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: AC Electric type.
Dash Unit—AC No. 1517603.
Tank Unit - AC No. 1518093
See "Fuel Gauges" in Carburetion Section.

BATTERY

Delco. 15E6W. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).
Battery Ground—Negative, to engine.

STARTER

Delco-Remy 1107107. Armature—1917855.
Drive—Overrunning clutch (solenoid pinion shift).
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—24-28 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
11 ft. lbs.	Lock	3.25	550

Starting Switch: Delco-Remy Solenoid No. 1118140 (no relay) mounted on starter and controlled by Ignition Switch (combination starting & ignition). Neutral Safety Switch used on Hydra-Matic Cars.
See "Starter Controls" in Electrical Equipment Section.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998039. At lower end of steering column. Connected in starter control circuit so that starter operates only when selector lever in "N" (Neutral).
Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy 1102794 (Std.), 1105900 (Hvy. Duty & Police).
Armature—Delco-Remy 1912599 (Std.), 1918009 (Hvy. Duty & Police).

Performance Data—Cold

Gen. No.	Amperes ①	Volts	RPM
1102794	45	8.0	2350
1105900	50	7.0	2100

①—Not maximum. See Regulator.

Brush Spring Tension—28 ozs.
Field Current—1.87-2.00 amps. (1102794), 1.77-1.93 amps. (1105900).
Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Belt deflection midway between generator and fan pulleys should be ¼" with 10 lb. force applied.

REGULATOR

Delco-Remy 1118827 (1102794 Gen.), 1118835 (1105900 Gen.). New "1118825 Series" Regulator.

►*1954 REGULATOR NOTE: Checking procedure is different than for previous models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section. Following specifications are "Normal" settings.*

Cut out Relay

Cuts In—6.4 volts (hot).
Contact Gap—.020".
Air Gap—.020" (with contacts just closed).

Voltage Regulator

Setting—7.3 volts (hot).

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—47 amps. (1118827), 52 amps (1118835), hot.

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Autronic Eye: *See "Autronic Eye" in Electrical Equipment Section.*
Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "on" position, push latch button on side of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly allowing switch assembly to be removed from instrument panel.

Stop Light Switch Location: On brake master cylinder located on left frame side rail forward of brake pedal.

FUSES: Main Fuse Block—Left hand side of firewall in engine compartment. Two fuses (plus 1 spare) as follows.

Gold Color Fuse Holder—14 amp. Protects tail, rear license light, instrument lights, ignition key light, and clock light (dome light on Conv.).

Grey Color Fuse Holder—14 amp. Protects trunk and dome lights (exc. dome light on Conv.).

Accessory Fuse Block—Six fuses mounted on fuse behind instrument panel. All fuses are 20 amperes except Radio fuse which is 14 amperes. (Spare Radio fuse on main fuse block on engine side of firewall).

CIRCUIT BREAKER: 42 amps. Located in headlight switch.

HORNS: Delco-Remy 1999645 (Low note), 1999646 (High note).

Horn Relay: Delco-Remy 1116775.

Contacts Close—2.75-4.0 volts (set to 3.5 volts). **Contact Gap**—.027". **Air Gap**—.014" (closed).

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ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cylinder "L" head.
Bore—3 9/16". **Stroke**—4".
Displacement—239.2 cu. in. **Rated H.P.**—30.46.
Developed H.P.—115 at 3800 RPM (7.0-1 Head). 118 at 3800 (7.7-1 Head).
Compression Ratio—7.0-1 (Std. Head, Synchro-mesh). **7.7-1** (Optional Head used with Hydra-Matic).
Compression & Vacuum Reading—See *Tune-Up.*

ENGINE REMOVAL: *See Pontiac Special Data.*

OIL PAN REMOVAL: *See Pontiac Special Data.*

CYLINDER HEAD: *See Pontiac Special Data.*

TIGHTENING TORQUES: *See Pontiac Special Data.*

ENGINE FRONT MOUNTING REMOVAL: *See Pontiac Special Data.*

PISTONS

Aluminum alloy, tin plate, cam ground, Autothermic Steel Strut type.

Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance .0005-.0010". If micrometer used on pistons, measure perpendicular to piston pin hole and just far enough above bottom of skirt to make sure micrometer is in full contact. Use .0015" x ½" feeler gauge inserted between piston and cylinder wall at right angles to piston pin. Pull to withdraw feeler must be 8-15 lbs.

Replacement Pistons: Std. size and .005", .010", .020" .030" oversize.

Installing Pistons: Piston pin offset in piston. Install piston to connecting rod with "F" on front of piston and notch on top of piston toward front of engine. Oil squirt hole in connecting rod must be toward camshaft side of engine.

PISTON PINS

Full floating type retained in piston with lock rings at both ends.
Diameter—.9369-.9375" selective. **Length**—3 1/16".
Clearance in Piston—.0000-.0002". Clearance will be correct if piston pin can be pushed through piston with thumb, excessive clearance if pin slides through of own weight.
Clearance in Connecting Rod—.0004-.0006".

Replacement Pins: .001" (green), .003" (red), .005" (blue) Oversize. Paint code marked on end of pin.

PISTON RINGS

Ring	End Gap	Side Clearance
Compr.	.008-.016"	.0015-.003"
Oil	.005-.015"	.002-.004"

Installing Rings: Install compression rings with marks "TOP" or "T" toward top of piston. Oil ring can be installed either way.

R plac m nt Rings: Std. .005", .010", .020", .030" Oversize.

CONNECTING R DS

L ngth—7.560-7.565" (center-to-center).
Weight—37 ozs. (less bearings).
Crankpin Journal Diameter—2.1237-2.1247".
Piston Pin Bushing (Upper Bearing)—Split bushings.
See "Connecting Rods & Bearings" in Pontiac Special Data.

Lower Bearing—Steel backed, babbitt lined insert.
Clearance—.0001-.0021". **Sideplay**—.007-.012".

Replacement Bearings: Std. .001", .002" Undersize.

Installing Rods: Oil squirt hole in lower end must be toward camshaft side. Marks on rods must be together (marks do not indicate in which cylinder rod is used).

CRANKSHAFT

►*CRANKSHAFT TO FLYWHEEL BOLT REPLACEMENT & INSTALLATION CAUTION (Synchro-mesh Cars):* ¾" hex head bolts (No. 508463) or 1" hex head bolts (No. 510832) are used. *Either type can be used for replacement but head size must be the same on all bolts or engine balance will be destroyed.*

Journal Diameters—(1) 2.4982-2.4992", (2) 2.5294-2.5304", (3) 2.5919-2.5929", (4) 2.6232-2.6242".
Bearings—Thin type, removable, steel backed, babbitt lined. Upper and lower halves are interchangeable.
Clearance—.0003-.0023".

Replacement Bearings: Std. .001", .002" Undersize.

End Thrust: At No. 3 (rear intermediate) bearing.
Endplay—.003-.008".

Rear Main Bearing Oil Seal Renewal: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

Bearing Diameter & Installation: *See "Camshaft" in Pontiac Special Data.*
Clearance—.0015-.0025" (new).

Camshaft Setting: Sprockets marked. Mesh chain with sprockets turned so that 'O' marks are adjacent and in line with straightedge across centers.

End Thrust: Steel plate behind camshaft sprocket. Replace if worn. **End Play**—.003-.007".

Timing Chain: Morse. Width 1", Pitch 3/8". Length 21", or 56 links. Timing chain bumper is installed to eliminate vibration.

Chain Installati n—S *"Timing Chain" in Pontiac Special Data.*

Timing Chain Cover Oil Seal Installati n: *S e "Timing Chain" in P ntiac Sp cial Data.*

VALVES

Tapp t Cl aranc : .011-.013" HOT. Use .011" "Go" gauge, .013" "No Go" gauge. High Speed Setting—.013" (exhaust valve, Hot).

Valve	Head Diam.	St m Diam.	L ngth
Intake	1 19/32"	.310-.311"	5 23/32"
Exhaust	1 15/32"	.310-.311"	5 23/32"

Valve	Seat Angle	Lift	St m Cl aranc
Intake	30°	19/64"	① Free Fit to .0006"
Exhaust	45°	19/64"	① Free Fit to .0006"

①—Tapered (max. clearance at bottom .0006").
Valve Seat Width—1/16".

Valve Springs: Intake and exhaust springs identical. Install with two closed coils at top and dampener on top of each spring. Use new dampeners whenever removed from spring. **Free Length**—2 11/32".

Spring Sp cificati ns	Spring Pr ssur	L ngth
Valve Closed	59-66 lbs.	1 29/32"
Valve Open	97-105 lbs.	1 19/32"

Valve Guides: Guides have tapered hole (.001" taper to inch—greatest clearance at top). Exhaust guides counterbored at top to depth of ¾".

Checking Valve Clearanc in Guid—Clean guide with tool KMO-122, clean counterbore in exhaust guide with Counterbore Cleaner J-2122. Valve should just fall through guide of own weight.

Installing Guides—Use Valve Guide Remover J-2542 to remove and install guides. Drive new guide down in block (counterbored end up on exhaust guides) until upper end 29/32" below top edge of valve seat. Ream guide with PR-131 tapered reamer and finish counterbore with Counterbore Cleaner J-2122.

►*CAUTION—Guides furnished with straight hol which must be taper reamed.*

Valve Lifters: Barrel type, cast iron. Guide holes reamed in block. Lifters furnished .005" Oversize (use pilot reamer J-706-P when reaming holes to maintain alignment—valve guides must be removed).

VALVE TIMING

See "Camshaft Setting" und r CAMSHAFT above.
Intake Valves—Open 12°30' BTDC. Close 52°30' ALDC.
Exhaust Valves—Open 52°30' BLDC. Close 12°30' ATDC.
Valve Timing Check—With .0166" tappet clearance #6 valve should open with #6 piston 12°30' before top dead center. Reset tappet clearance to .011-.013".

OILING SYSTEM

Crankcase Capacity: 5 qts. (refill), 6 qts. (dry).

Normal Oil Pressure: 30-45 lbs. at 40 MPH.
Pressure Regulator—On oil pump. Opens at 40 lbs. Replace spring if free length less than 2 5/16".

Oil Pr ssur Gaug—AC No. 1507707. Not electric.

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Oil Pump: Gear type. On right side of crankcase
Pump Overhaul—See *"Oil Pump" in Pontiac Special Data.*

Oil Cleaner: Precipitation type (in crankcase).
Removal & Installation—See *"Oiling System" in Pontiac Special Data.*

Crankcase Ventilation: Filter element in oil filler cap (inlet). Outlet pipe at valve compartment cover on right rear side of engine (cars with oil bath air cleaner use a 3-piece outlet pipe containing filter element).

►*CAUTION:* Filler cap must be installed with air opening in cap toward front of car and seam in line with groove in tube (may cause excessive oil consumption if installed backwards).

COOLING

Water Capacity: 18¾ qts (without heater), 20½ qts. (with heater).

Pressure Valve: AC No. 850549 Filler cap. Opens at 7 lbs. (6¼-7½ lbs.).

Thermostat: Harrison "Bellows" type. In cylinder head outlet. **(Std.)** Pontiac No. 3126560 opens at 151°. **(High Temp.)** Pontiac No. 3126562 opens at 160° Pontiac No. 3126562 opens at 160°.

Water Pump: Packless, sealed ball bearing shaft.
See "Water Pump" in Pontiac Special Data.

Pump Removal—Drain cooling system, remove hose connections at pump, remove belt, take out water pump mounting bolts and lift pump out.

Temperature Gauge: AC No. 1512458. Not electric.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Inland. Single plate, "Diaphragm", dry disc type with Long driven member.
See "Inland" in Clutch Section.

Clutch Disc No. —Pontiac No. 508403 (Std.), No. 513582 (Heavy Duty).

Pedal Adjustment: Free travel 7/8-1 1/8" (adjusting nut on link at clutch fork).

Removal: Remove transmission (see Transmission Removal below), remove clutch bearing support spring washer (in rear face of clutch housing) remove clutch housing bottom cover and control shaft inner bracket. Remove release bearing support and release bearing. Tap bearing support from inside clutch housing to aid removal. (CAUTION—Avoid striking tubular portion of support). Mark flywheel and clutch cover (to insure reinstallation in same position to maintain balance), remove clutch cover bolts evenly, move clutch assembly away from flywheel at bottom and withdraw driven member, lower cover assembly out.

Clutch Installation Note—Install new felt oil seal against shoulder ahead of oil slinger retainer ring on transmission main drive gear (will bear against flared end of release bearing support when installed). Lubricate seal with engine oil before transmission installed. Coat entire length of outer diameter of release bearing support tube with grease. Lubricate release fork fulcrum points with a very light coat of grease. Apply light coat of Lubriplate on main driving gear splines. Use new paper gasket between support flange and clutch housing, make certain that flange is not bent or distorted (will cause misalignment of transmission).

SYNCHRO-MESH TRANSMISSION

Own. All helical gear.
See "Pontiac Synchro-Mesh" in Transmission Section.

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect speedometer cable, gearshift selector and control rods from transmission. Disconnect rear universal (wire trunnions) and pull out propeller shaft. Remove upper transmission mounting screws, install guide pins (J-851), remove lower screws, pull transmission to rear, down and out.

Installation Note—Use guide pins installed in two upper transmission mounting holes to assist in sliding transmission straight forward into place (to avoid damage to clutch release bearing tubular support). NOTE—These guide pins may be made from 1/2"-13 American National Thread bolts by cutting heads off and reducing overall length to 4¼".

HYDRA-MATIC DRIVE

Dual-Range" four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 2000 miles, drain and refill at 25,000 mile intervals.

Checking Fluid Level—Run engine for approximately 1½ minutes at speed equivalent to 20 MPH with selector lever in "N". Reduce engine speed to **slow idle** and move selector lever to "D" position, measure level with dipstick, add fluid until level is at "FULL" mark with engine idling.

Capacity—Approximately 11 qts. (refill).
Recommended Fluid—Use G.M. Hydra-Matic Fluid or Automatic Transmission Fluid Type A.

►*OTHER HYDRA-MATIC SERVICE DATA*—*See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Mechanics or Saginaw. Needle bearing type.

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing "pre-load" (must be adjusted whenever nut is loosened). *See "Pontiac Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss Drive.
See "Pontiac Hypoid" in Rear Axle Section.
Axle Identification—Code mark stamped on pad at forwardside of differential carrier between bottom web and right hand horizontal web. Axle shaft also marked with daub of paint on end of shaft to indicate ratio. See Code and Paint Markings in table below:

Axle Ratios & Code Marking

Ratio	Gear Teeth	① Code Mark	② Code Color
3.08-1③	40:13	0	Yellow
3.63-1④	40:11	6	Blue
3.9-1⑤	39:10	4	Red
4.1-1④	41:10	3	Green
4.3-1④	43:10	2	White
3.42-1⑤	41:12	8	Aluminum

①—See Axle Identification above.
②—Paint daub on end of axle shaft.
③—Hydra-Matic Drive Cars.
④—Synchro-mesh Transmission Cars.
⑤—Optional (for standard fuel engine).

Backlash—.003-.012" (new), .012" (used).

Axle Shaft Removal: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft with Puller J-942 (do not drag axle shaft on oil seal).

Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Disconnect rear universal and wire trunnion in place (do not disengage spline joint at transmission), remove axle shafts, and carrier flange capscrews. Withdraw carrier assembly from housing.

►*CAUTION: Rear universal joint companion flange controls pinion bearing preload. Readjust whenever nut loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable, sealed (non-refillable). Serviced by replacement.

Model	Front	Rear
Standard	5303492	5303290
Taxi & Police Cars	5519438	5519439

FRONT SUSPENSION

Independent. Shock absorber mounted within front coil springs.
See "Pontiac" in Front Suspension Section.
Kingpin Inclination—4½° at ½° camber.
Caster—0° ± ½°.
Camber—Pos. ½° ± ½°.
Toe-In—0-1/16" measured 9" above floor.
Toe-Out on Turns—With inner wheel at 20°, outer wheel should be 18° 30'.

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STEERING

Manual: Saginaw Worm & Roller. *See "Saginaw Worm & Roller" in Steering Section.*

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic cylinder. *See "Saginaw (GM) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor **(without eccentric adjustment).** Hand lever applies rear wheel service brakes.

See "Bendix Brakes" in Brake Section.

►*1954 BRAKE PEDAL & MASTER CYLINDER CONNECTING ROD INTERFERENCE CORRECTION:* **Difficulty may be experienced in getting correct pedal height adjustment due to interference between master cylinder connecting rod clevis and brake pedal. If pedal height of 4 3/8-4 5/8" cannot be obtained it can be corrected by grinding a relief in master cylinder connecting rod clevis on the lower side at a point approximately 2" from rod end and extending toward clevis end for 1".**

Drums—Diameter 11".

Wheel Cylinder Diameter—Front 1 1/16". Rear 7/8".

Lining Width & Thickness

	Width	Thickness
Front	2¼"	3/16"
Rear	1¾"	3/16"

Clearance—Tighten adjusting "Star Wheel" to point where wheel can just be turned by hand, then back off star wheel 14 notches.

Braking Power—60% front wheels. 40% rear wheels.

Standard Master Cylinder: Forward of brake pedal on bracket attached to engine rear cross member.

Checking Fluid—Fluid reservoir is part of master cylinder. Maintain fluid level to top of reservoir.

Removal—Remove from engine compartment. Not necessary to disturb other parts.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and hydraulic master cylinder). Unit mounted on underside of toe board and replaces regular master cylinder.

See "Bendix Power Unit" in Brake Section.

Checking Fluid—Same as for standard master cylinder.

Removal of Power Unit—Disconnect upper end of vacuum hose attached to inlet tube of master cylinder, and hydraulic line from hydraulic cylinder. Remove stop light switch wires. Disconnect push rod from brake pedal and remove brake pedal from pivot bracket. Remove clutch pedal and steering column seals. Remove vacuum cylinder mounting plate screws while holding power unit by push rod. Remove mounting plate, working it over clutch pedal while holding power brake unit in position. Remove power brake unit.

MISC. MECHANICAL

Windshield Wipers: Cable operated Vacuum type. *See "Windshield Wipers" in Miscellaneous Section.*

Window Regulators: Electric. Reversible motor in each window. Available on front doors only. *See "Window Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

►*1954 AIR-CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air-conditioning equipment or lines. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

SERIAL & ENGINE NUMBERS (Numbers are the same): On left front hinge pillar post and on raised pad at front of left side of cylinder block.

Starting Serial & Engine Number—1001 Up.

►*ENGINE & SERIAL NUMBER NOTE—Engine & Serial number (example C8ZS-1001) includes following identification in sequence:*

Assy. Plant	No. of Cyls.	Model Year①	Trans.② Type	Serial No.
See below	8	Z	S. .	1001 Up

①-Year. Z (1954).

②-S and C are Synchro-mesh Transmissions, H and A are Hydra-Matic Transmissions.

Assembly Plant Designations

A—Atlanta	L—Linden
C—South Gate	T—Arlington
F—Framingham	W—Wilmington
K—Kansas City	

TUNE-UP

COMPRESSION PRESSURE: 123-141 lbs. (Synchro-mesh), 139-158 lbs. (Hydra-Matic), both at cranking speed of 200 RPM.

VACUUM READING: 18-20" idling at 450-475 RPM (Synchromesh), 365-385 RPM (Hydra-Matic).

VALVE TAPPET CLEARANCE: .011" to .013" HOT. Use .011" "Go" gauge, .013" "No Go" gauge. **High Speed Setting**—.013" (Exhaust Valve, Hot).

►*VALVE TAPPET NOTE (AIR-CONDITIONED CARS):* An access door is provided in right front fender splash apron to eliminate necessity of removing air-conditioner compressor or lines.

Cold Setting With Engine Stopped—.012-.014". Check for .011-.013" after engine warm.

MANIFOLD HEAT CONTROL: Thermostatic coil type, non-adjustable (fixed anchor pin). Counterweight should be securely clamped to shaft in vertical position with valve closed (cold position).

IGNITION

►*IGNITION HIGH TENSION CABLE CAUTION:* Non-metallic cables (with built-in suppression resistance). Marked "Radio-4000 GM". Distributor cap is conventional type without built in resistor. *Do not substitute other type cables.*

FIRING ORDER: 1-6-2-5-8-3-7-4. See diagram.

SPARK PLUG GAP: .025" (.023-.028").

Spark Plug—AC No. 44-5, 14mm. Tighten to 25 ft. lbs.

COIL: Delco-Remy 1115380.

Ignition Current—2.5 amperes idling, 4.5 stopped.

DISTRIBUTOR: Delco-Remy 1110831.

Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set—Delco-Remy 1918148.
Breaker Gap—.016".
Cam Angle—21°-30°.
Breaker Arm Spring Tension—19-23 ozs.
Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
5.5-7.5	1200	11-15	2400
6-8	1400	12-16	2800
10-12	1950	20-24	.3900

Vacuum Spark Control: Delco-Remy 1116050.
Plunger Travel—7/32".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7-9"
10	20	17.5-19.5"

IGNITION TIMING

Setting—6° BTDC (Synchro-mesh Cars). **3° BTDC** (Hydra-Matic Cars).

Timing Marks—Timing marks on dampener indicating **TDC.—3° BTDC.—6° BTDC.** Pointer on chain case cover aligned with correct mark on dampener (See Ignition Timing above).

CARBURETOR

Idle Speed-Up Control Adjustment (Cars With Air-Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air-conditioner "ON", and place transmission selector lever in "N" neutral position. Adjust engine idle speed to 750 RPM by loosening locknut on diaphragm shaft and turning knurled nut to obtain specified RPM. Tighten locknut.

Speed-Up Control Switch (Hydra-Matic Cars)—*See (Hydra-Matic Drive Linkage Adjustment) in Transmission Section.*

Speed-Up Control Switch (Synchro-mesh Cars) Two switches used. Adjust as follows:

Gearshift Lever Speed-Up Control Switch—With Air-Conditioner turned "ON" and gear selector lever in neutral position, loosen nut retaining lower gearshift lever-to-switch rod at switch arm. Move switch arm so Speed-Up Control operates engine at fast idle with clutch pedal out (clutch engaged).

Clutch Pedal Speed-Up Control Switch—With Air-Conditioner turned "ON" and gear selector lever in neutral position, loosen bolts retaining clutch switch and move switch so Speed-Up Control operates engine at fast idle with clutch pedal out (clutch engaged), and at normal idle with clutch pedal in (clutch disengaged).

THROTTLE LINKAGE ADJUSTMENT (ALL MODELS): *Adjust exactly as follows:*

1) Carburetor Throttle Rod—Disconnect throttle rod at throttle lever on left side of transmission case. Check and adjust engine idle speed to 365-385 RPM (Cars without Air Conditioning); 460-480 RPM (Cars with Air Conditioning), hot or slow idle with engine at normal operating temperature, transmission warm, and selector lever in "N" position. Install adjusting pin J-2544 through holes in carburetor intermediate lever on left side of cylinder head and lever bracket. Adjust nuts at trunnion on carburetor throttle rod (back off one nut, tighten opposite nut) until adjusting pin is free with carburetor throttle lever stopscrew against its stop. Tighten trunnion nuts but **do not remove adjusting pin.**

2) Transmission Throttle Front Rod—Check adjustment by inserting a second J-2544 adjusting pin through holes in idler lever (left side of crankcase below starter) and lever bracket. If pin does not enter both holes freely, adjust length of transmission throttle front rod at trunnion on upper end of this rod, then tighten both locknuts securely and remove both adjusting pins.

3) Accelerator Pedal Rod—Loosen front locknut on pedal rod at throttle control idler lever on left side of engine, depress accelerator pedal until carburetor throttle is just wide open. Check clearance between lower face of accelerator pedal and floor mat. If clearance is not ¼" at closest point, adjust pedal by turning rear nut at trunnion on forward end of rod in or out as required, then tighten front nut securely.

CARTER

Carter WCD Models. Dual downdraft type with automatic choke control as follows:

Model	Carter No.
1954 Synchro-mesh (Early)	719SA
1954 Synchro-mesh (Late)	①720SA
1954 Hydra-Matic	2122S

①—Approximately 15,000 used on Hydra-Matic Drive cars.

Idle Setting—719SA, 720SA)—¾-1¼ turns open. Turn screw out for richer mixture. NOTE—Two idle screws used.

Idle Setting (2122S)—¾-1¾ turns open. Turn screw out for richer mixture. NOTE—Single idle screw on this carburetor.

Idle Speed—Different settings as follows:

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Model	Idle Speed
Synchro-Mesh Cars	450-475 RPM
Hydra-Matic Cars (without Air-Cond.)	365-385 RPM
Hydra-Matic Cars (with Air-Cond.) ①	460-480 RPM

①—This setting supersedes previous specifications which were same as for cars without air-conditioner.

Float Level—3/16" from top of float to gasket seat on bowl cover (with gasket removed) using gauge T109-162. Sides of float should barely touch vertical uprights on gauge to avoid floats binding on sides of bowl.

Accelerating Pump—Lower hole (min.) Normal.

Fast Idle Setting: With choke valve tightly closed and fast idle screw on high step of fast idle cam, tighten adjusting screw until there is 026" clearance between throttle valve and bore of carburetor on side opposite idle port.

Automatic Choke Setting: Centered (at index).

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

Idle Speed-up Control (Air Conditioned Cars): *See "Carburetor" above.*

►*OTHER DATA: See "Carter WCD" Carburetors in Carburetor Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Replacement No. 9640 (Without Air-Conditioner), No. 539 (With Air-Conditioner). Fuel & Vacuum.

Pressure—4 - 4¾ lbs.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: AC Electric type.

Dash Unit—AC No. 1517603.

Tank Unit - AC No. 1518093.

See "Fuel Gauges" in Carburetion Section.

BATTERY

Standard—Delco 15E6W. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).

Air-Conditioned Car—Delco 19E6W. 6 volt, 19 plate, 130 ampere hour capacity (20 hr. rate).

Battery Ground—Negative to engine.

Engine Ground—Rear of engine to firewall.

STARTER

Delco-Remy 1107957. Armature—1917855.

Drive—Overrunning clutch (solenoid pinion shift)

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—24-28 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	6000	5.0	60
15 ft lbs	Lock	3.0	600

Starting Switch: Delco-Remy Solenoid No. 1118140 (no relay) mounted on starter and controlled by Ignition Switch (combination starting & ignition). Neutral Safety Switch used on Hydra-Matic Cars.

See "Starter Controls" in Electrical Equipment Section.

Neutral Safety & Backup Light Switch: Delco-Remy 1998039. At lower end of steering column. Connected in starter control circuit so that starter operates only when selector lever in "N" (Neutral).

Adjustment—*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Different generators used as follows:

Model	Generator No.	Armature No.
Standard	1102794	1912599
Air Conditioned	1105015	
Hvy Duty & Police	1105900	1918009

Performance Data

Gen. No.	Amperes ①	Volts	RPM
1102794	45	8.0	2350
1105015	50	7.0	2100
1105900	50	7.0	2100

①—Not maximum. See Regulator.

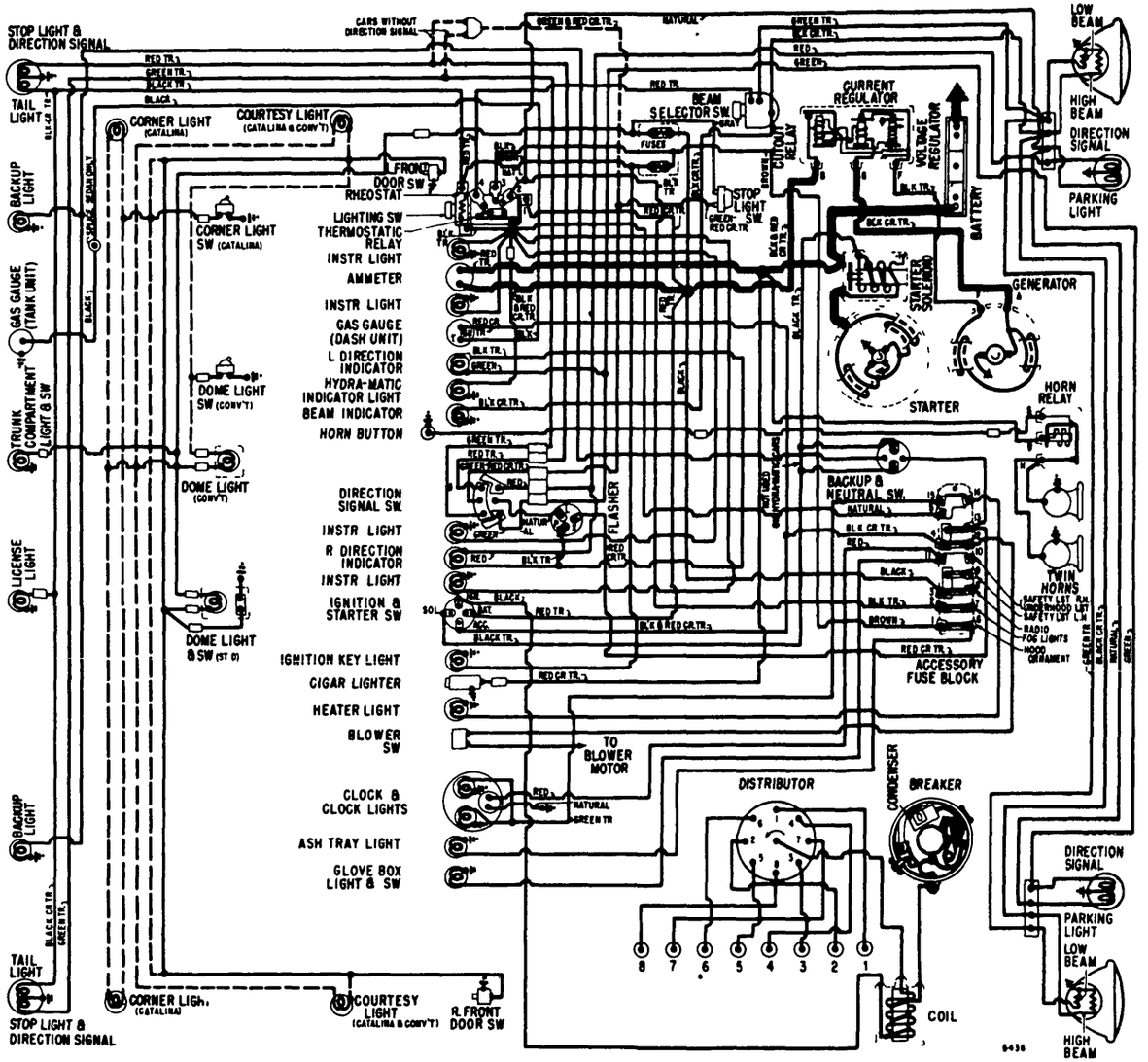
Brush Spring Tension—28 ozs

Field Current—1.87-2.00 amps (1102794), 1.77-1.93 amps (1105015 & 1105900) At 6.0 volts

Rotation—Counter-clockwise at commutator end

Belt Adjustment: Belt deflection midway between generator and fan pulleys should be ¼" with 10 lb. force applied.

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REGULATOR

Delco-Remy 1118027 (1102794 Gen.). 1118035 (1105015 & 1105900 Gen.). New "1118825 Series" Regulator.

►*1954 REGULATOR NOTE: Checking procedure is different than for previous models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section. Following Specifications are "Normal" settings.*

Cut out Relay

Cuts In—6.4 volts (hot).
Contact Gap—.020".
Air Gap—.020" (with contacts just closed).

Vibrating Regulator

Setting—7.3 volts (hot)
Air Gap—.075" with armature pressed down to point where contact just touching
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—47 amps. (1118827), 52 amps. (1118835), hot.
Air Gap—.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting—*See Electrical Equip. Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
Autronic Eye: *See "Autronic Eye" in Electrical Equipment Section.*
Direction Signal: *See "Direction Signals" in Electrical Equipment Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "on" position, push latch button on side of switch assembly and pull out switch knob assembly Screw bushing from switch assembly allowing switch assembly to be removed from instrument panel.

Stop Light Switch Location: On brake master cylinder located on left frame side rail forward of brake pedal.

FUSES: Main Fuse Block—Left hand side of firewall in engine compartment. Two fuses (plus 1 spare) as follows:
Gold Color Fuse Holder—14 amp. Protects tail, rear license light, instrument lights, ignition key light, and clock light (dome light on Conv.).
Gray Color Fuse Holder—Protects trunk and dome lights (exc. dome light on Conv,).
Accessory Fuse Block—Six fuses mounted on fuse block behind instrument panel. All fuses 20 amps., except radio fuse which is 14 amps. (Spare Radio fuse on main fuse block on engine side of firewall).

CIRCUIT BREAKER: 42 amps. Located in headlight switch.

HORNS: Delco-Remy 1999645 (Low note), 1999646 (High note).

Horn Relay: Delco-Remy 1116775.
Contacts Close—2.75-4.0 volts (set to 3.5 volts).
Contact Gap—.027". **Air Gap**—.014" (closed)

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 8 Cylinder "L" head.
Bore—3 3/8". **Stroke**—3 3/4".
Displacement—268.4. cu. ins. **Rated HP**—36.45.
Developed HP (1954)—122 at 3800 RPM (6.8-1 Head). 127 at 3800 RPM (7.7-1 Head).
Displacement—268.4 cu. in. **Rated H.P.**—30.46.
Developed H.P.—122 at 3800 RPM (6.8-1 Head). 127 at 3800 RPM (7.7-1 Head)
Compression Ratio—6.8-1 (Std. Head with Synchro-mesh), 7.7-1 (Optl. Head with Hydra-Matic).
Compression & Vacuum Reading—*See Tune-Up.*
ENGINE REMOVAL: *See Pontiac Special Data.*
OIL PAN REMOVAL: *See Pontiac Special Data.*

CYLINDER HEAD: *See Pontiac Special Data.*
TIGHTENING TORQUES: *See Pontiac Special Data.*
ENGINE FRONT MOUNTING REMOVAL: *See Pontiac Special Data.*

PISTONS

Chrome-nickel alloy iron, tin plated.
Removal—Pistons and rods removed from above.
Taper and Out-of-Round Limits—.001".
Fitting New Pistons: Insert .0015" x ½" feeler gauge between piston and cylinder wall on thrust side. Pull to withdraw feeler must be 10-20 lbs.
Replacement Pistons: Std. size and .010", .020", .030" Oversize.

PISTON PINS

Pressed into pistons and retained in place with retainer rings at each end, floating in connecting rod bushing.
Diameter—.9369-.9375" selective. **Length**—2 7/8".
Pin Fitting in Piston—*See "Piston Pins" in Pontiac Special Data.*
Pin Clearance in Rod Bushing— .0004- .0006".
Piston Pin Removal & Installation—*See "Piston Pins" in Pontiac Special Data.*
Replacement Pins: .001" (green), .003" (red), .005" (blue) Oversize. Paint code marked on end of pin.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Comp. (#1, #2)	3/32"	.008-.015"	.0015-.003"
Oil (#3)	3/16"	.008-.015"	.001-.0025"

Installing Rings: Install compression rings with marks "TOP" or "T" toward top of piston. Oil ring can be installed either way.
Replacement Rings: Std. size, .005", .010", .020", .030" Oversize.

CONNECTING RODS

Length—7.560-7.565" (center-to-center).
Weight—32 ozs. (less bearings).
Crankpin Journal Diameter—1.9987-1.9997".
Piston Pin Bushing (Upper Bearing)—Split aluminum bronze bushing. *See "Connecting Rod & Bearings" in Pontiac Special Data.*

Lower Bearing—Steel backed, babbitt lined insert. No shims.
Clearance—.0001-.0021". **Sideplay**—.007-.012".
Replacement Bearings: Std. .001", .002" Undersize.
Installing Rods: Not offset, install either way. Marks on rods and caps must be together (marks do not indicate in which cylinder rod is used).

CRANKSHAFT

Journal Diameters—(1) 2.3732-2.3742";(2) 2.4044-2.4054"; (3) 2.4357-2.4367"; (4) 2.4469-2.4679"; (5) 2.6232-2.6242".
Bearings—Steel backed babbitt lined inserts. No shims. Upper and lower halves are interchangeable.
Clearance—.003-.0023".
Replacement Bearings: Std. .001", .002" undersize.
End Thrust: Taken at #4 (rear intermediate) bearing.
Endplay—.003-.008".
Rear Main Bearing Oil Seal Renewal: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*
Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

Bearing Diameter & Installation: *See "Camshaft" in Pontiac Special Data.*
Clearance—.0015-.0025" (new).
End Thrust: Steel plate behind camshaft sprocket. Replace if worn. **End Play**—.003-.007".
Timing Chain: Morse. Width 27/32". Pitch 3/8". Length 21" or 56 links.
Chain Installation—*See "Timing Chain" in Pontiac Special Data.*
Camshaft Setting: Sprockets marked. Mesh chain with sprockets turned so that "O" marks are adjacent and in line with straightedge across shaft centers.
Timing Chain Cover Oil Seal Installation: *See "Timing Chain" in Pontiac Special Data.*

VALVES

►*AIR-CONDITIONED CAR NOTE—An access hole is provided in right front fender apron for valve adjustment.*

Tappet Clearance: .011-.013" HOT. Use .011" "Go" gauge .013" "No Go" gauge. High Speed Setting-.013" (exhaust valve).

Valve	Head Diam.	Stem Diam.	Length
Intake	1 15/32"	.310-.311"	5.53"
Exhaust	1 11/32"	.310-.311"	5.53"

Valve Seat Angle		Lift	Stem Clearance
Intake	30°	19/64"	℄ Free Fit to .0006"
Exhaust	45°	19/64"	℄ Free Fit to .0006"

℄—Tapered (max. clearance at bottom .0006").
Valve Seat Width—1/16".

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Valv Springs: Intake and exhaust valve spring identical. Install with two closed coils at top and dampener on top of each spring. Use new dampeners whenever removed from spring.

Spring Specifications

	Spring Pressure	Length
Valve Closed. .	59-66 lbs.	1 29/32"
Valve Open	97-105 lbs.	1 19/32"

Valve Guides: Valve guides have tapered hole (.001" taper to inch - greatest clearance at top) Exhaust guides counterbored at top to depth of 3/4".
Checking Valve Clearance in Guide—Clean guide with tool KMO-122, clean counterbore in exhaust guide with Counterbore Cleaner J-2122. Valve should just fall through guide of own weight.
Installing Guides—Use Valve Guide Remover J-2542 to remove and install guides. Drive new guide down in block (counterbored end up on exhaust guides) until upper end 29/32" below top edge of valve seat. Ream guide with PR-131 tapered reamer and finish counterbore with Counterbore Cleaner J-2122.

►*CAUTION—Guides furnished with straight hole which must be taper reamed.*

Valve Lifters: Barrel type, cast iron. Guide holes reamed in block. Lifters furnished .005" oversize (use pilot reamer J-706-P when reaming holes to maintain alignment - valve guides must be removed).
Clearance—Free fit. Lifter should just move freely with finger touch.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves—Open 5° BTDC. Close 39° ALDC.
Exhaust Valves—Open 45° BLDC. Close 5° ATDC.
Valve Timing Check—With .015" clearance, #1 intake valve should open with #1 piston 5° BTDC with first straight line of dampener mark (6°) slightly past pointer on chain cover. Reset Tappet clearance.

OILING SYSTEM

Crankcase Capacity: 5 qts. (refill), 6 qts. (dry).
Normal Oil Pressure: 30-45 lbs. at 40 MPH.
Pressure Regulator—On oil pump. Opens at 40 lbs. Replace spring if free length less than 2 5/16".
Oil Pressure Gauge—AC No. 1507707. Not electric.

Oil Pump: Gear type. On right side of crankcase.
Pump Overhaul—*See "Oil Pump" in Pontiac Special Data.*

Oil Cl an r: Precipitation type (in crankcase).
R m val & Installati n—*S "Oiling System" in Pontiac Special Data.*

Crankcas V ntilati n: Filter element in oil filler cap (inlet). Outlet pipe at valve compartment cover on right rear side of engine (cars with oil bath air cleaner use a 3-piece outlet pipe containing filter element).
►*CAUTION:* Filler cap must be installed with air opening in cap toward front of car and seam in line with groove in tube (may cause excessive oil consumption if installed backwards).

COOLING

►*AIR-CONDITIONED CAR NOTE: Radiator and radiator hoses used on these cars are of heavier construction than standard models.*
Water Capacity: (Without Air-Conditioner): 18¾ qts. (without heater). 20½ qts. (with heater).
With Air-Conditioner—20 qts. (without heater). 21 3/4 qts. (with heater).
Pressure Valve: AC No. 850549 (Without Air-Cond.) opens at 7 lbs. AC No. 850559 (With Air-Cond.) opens at 13 lbs.
►*PRESSURE VALVE CAUTION: Do not use 7 lb. pressure cap with Air-Conditioning.*
Thermostat: Harrison "Pellet" type. In cylinder head outlet. Pontiac No 3132436 opens at 160°.
►*CAUTION: Install with marks "front" & "to rad." toward radiator.*
Water Pump: Packless, sealed ball bearing shaft. *See See "Water Pump" in Pontiac Special Data.*
Pump Removal—Drain cooling system, remove hose connections at pump, remove belt, take out water pump mounting bolts and lift pump out.
Temperature Gauge: AC No. 1512458. Not electric.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Inland. Single plate, "Diaphragm", dry disc type with Long driven member.
See "Inland" in Clutch Section.
Clutch Disc No.—Pontiac No. 513583.
Pedal Adjustment: 7/8-1 1/8" (adjusting nut on link at clutch fork).
Removal: Remove transmission (see Transmission Removal below), remove clutch bearing support spring washer (in rear face of clutch housing) and remove clutch housing bottom cover and control shaft inner bracket. Remove release bearing support and release bearing. Tap bearing support from inside clutch housing to aid removal (CAUTION—Avoid striking tubular portion of support). Mark flywheel and clutch cover (to insure installation in same position to maintain balance), remove clutch cover bolts evenly, move clutch assembly away from flywheel at bottom and withdraw driven member, lower clutch cover assembly out.
Clutch Installation Note—Install new felt oil seal against shoulder ahead of oil slinger retainer ring on transmission main drive gear (will bear against flared end of release bearing support when installed). Lubricate seal with engine oil before transmission installed. Coat entire length of outer diameter of release bearing support tube with grease. Lubricate release fork fulcrum points with a very light coat of grease. Apply light coat of Lubriplate on main driving gear splines. Use new paper gasket between support flange and clutch housing, make certain that flange is not bent or distorted (will cause misalignment of transmission).
►*CLUTCH PEDAL SPEED-UP CONTROL SWITCH ADJUSTMENT (AIR-CONDITIONED CARS): S "Sp d-Up Control Switch" under CARBURETOR above.*

SYNCHRO-MESH TRANSMISSION

Own. All helical gear.
See "Pontiac Synchro-Mesh" in Transmission Section.
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: Disconnect speedometer cable, gearshift selector and control rods from transmission. Disconnect rear universal (wire trunnions) and pull out propeller shaft. Remove upper transmission mounting screws, install guide pins (J-851), remove lower screws, pull transmission to rear, down and out.

Installation Note—Use guide pins installed in two upper transmission mounting holes to assist in sliding transmission straight forward into place (to avoid damage to clutch release bearing tubular support). NOTE—These guide pins may be made from ½"-13 American National Thread bolts by cutting heads off and reducing overall length to 4¼".

►*GEARSHIFT LEVER SPEED-UP CONTROL SWITCH ADJUSTMENT (AIR-CONDITIONED CARS): See "Speed Up Control Switch" under CARBURETOR above.*

HYDRA-MATIC DRIVE

"Dual-Range" four speed automatic transmission and fluid coupling.
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Driv " in Transmission Section.*
►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission S ction.*
Lubrication—Check fluid level every 2000 miles, drain and refill at 25,000 mile intervals.
Checking Fluid Level—Run engine for approximately 1½ minutes at speed equivalent to 20 MPH. with selector lever in "N". Reduce engine speed to **sl w idl** and move selector lever to "D" position, measure level with dipstick, add fluid until level is at "FULL" mark with engine idling.
Capacity—Approximately 11 qts. (refill).
Recommended Fluid—Use G.M. Hydra-Matic Fluid or Automatic Transmission Fluid Type A.
►*OTHER HYDRA-MATIC SERVICE DATA—S "Hydra-Matic Driv " in Transmission S ction.*

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UNIVERSALS

M chanics or Saginaw. Needle bearing type.

►*CAUTION:* Rear universal companion flange nut controls rear axle pinion bearing "preload" (must be adjusted whenever nut is loosened). See *"Pontiac Hypoid" in R ar Axle S ction*

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss Drive. See *"P ntiac Hyp id" in R cr Axle Section.*

Axl Identificati n—Code mark stamped on pad at forward side of differential carrier between bottom web and right hand horizontal web. Axle shaft also marked with daub of paint on end of shaft to indicate ratio. See Code and Paint Markings in table below

Axle Ratios & Code Marking

Ratio	Gear Te th	①Code Mark	②Code Color
3 08-1③	40 13	0	Yellow
3.23-1③	42 13	9	Brown
3.42-1⑤	41 12	8	Aluminum
3.63-1④	40 11	6	Blue
3.9-1 ④	39 10	4	Red
4.1-1 ④	41 10	3	Green

①—See Axle Identification above.
②—Paint daub on end of axle shaft.
③—Hydra-Matic Drive Cars.
④—Synchro-mesh Transmission Cars.
⑤—Optional (for standard fuel engines).

Backlash—.003-.012" (new), .012" (used).

Axle Shaft R m val: Removal wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft with Puller J-942 (do not drag axle shaft on seal).

Wheel Bearing Adjustment: None.

Differential Carrier Ass mbly Removal: Disconnect rear universal and wire trunnion in place (do not disengage spline joint at transmission), remove axle shafts, and carrier flange capscrews. Withdraw carrier assembly from housing.

►*CAUTION: Rear universal j int companion flange controls pinion bearing prel ad. Readjust whenever nut loos ned.*

SHOCK ABSORBERS

Delc . Direct acting, non-adjustable, sealed (non-refillable). Service by replacement.

Model	Front	Rear
Standard	5303492	5303290
Taxi & Police Cars.	5519438	5519439

FRONT SUSPENSION

►*FRONT SPRING NOTE—Heavi r springs us d on cars with Air-Conditioning.*

Independent. Shock absorber mounted within front coil springs.
See "Pontiac" in Front Suspension Section.
Kingpin Inclination—4½° at ½° camber.
Caster—0° ± ½°.
Camber—½° ± ½°
Toe-In—0-1/16" measured 9" from floor.
Toe-Out on Turns—With inner wheel at 20°, outer wheel should be 18° 30'.

STEERING

Manual: Saginaw Worm & Roller. *See "Saginaw Worm & Roller" in Steering Section.*

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic cylinder. *See "Saginaw (GM) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand lever applies rear wheel service brakes.
See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

►*1954 BRAKE PEDAL & MASTER CYLINDER CONNECTING ROD INTERFERENCE CORRECTION:* Difficulty may be experienced in getting correct pedal height adjustment due to interference between master cylinder connecting rod clevis and brake pedal. If pedal height of 4 3/8-4 5/8" cannot be obtained it can be corrected by grinding a relief in master cylinder connecting rod clevis on the lower side at a point approximately 2" from rod end and extending toward clevis end for 1".

Drums—Diameter 11".
Whe l Cylinder Diam t r—Front 1 1/16". Rear 7/8".

Lining Width & Thickn ss

	Width	Thickness
Front	2¼"	3/16"
Rear	1¾"	3/16"

Clearance—Tighten adjusting "Star Wheel" to point where wheel can just be turned by hand, then back off star wheel 14 notches.

Braking Power—60% front wheels. 40% rear wheels.

Standard Master Cylinder: Forward of brake pedal on bracket attached to engine rear cross member.

Checking Fluid—Fluid reservoir is part of master cylinder. Maintain fluid level to top of reservoir.

Removal—Remove from engine compartment. Not necessary to disturb other parts.

Power Brakes: Bendix Vacuum Power Unit (combination vacuum power unit and hydraulic master cylinder). Unit mounted on underside of toe board and replaces regular master cylinder.
See "Bendix Power Unit" in Brake Section.

Checking Fluid—Same as for standard master cylinder.

Removal of Power Unit—Disconnect upper end of vacuum hose attached to inlet tube of master cylinder, and hydraulic lines from hydraulic cylinder. Remove stop light wires. Disconnect push rod from brake pedal and remove brake pedal from pivot bracket. Remove clutch pedal and steering column seals. Remove vacuum cylinder mounting plate screws while holding power unit push rod. Remove mounting plate, working it over clutch pedal while holding power unit in position. Remove power brake unit.

MISC. MECHANICAL

Windshield Wipers: Cable operated Vacuum type.
See "Windshield Wipers" in Miscellaneous Section.

Air-Conditioning: Harrison type with magnetic compressor clutch (compressor operates only with air-conditioner switch turned on). *See "Harrison" Air-Conditioning in Miscellaneous Section.*

Window Regulators: Electric. Reversible motor in each window. Available on front doors only. *See "Window Regulators" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconn cting any part of air conditioning equip m nt or lines for acc ss to ngin , se "Air Conditioning Service Cautions" in Miscellaneous Section*

MODEL IDENTIFICATION

SERIAL & ENGINE NUMBERS (Numbers are the same): On left front hinge pillar post and on raised pad at front of right hand cylinder block.

Starting Serial & Engine Number—1001 with prefix as indicated below

►*ENGINE & SERIAL NUMBER NOTE: Engine and Serial number (example P755H 1001) includes following identification data in sequence:*

Assy. Plant	Model ①	Model Year	Trans. ② Type	Serial No.
See below	7	55	H	1001

① —**7**—27 Series. **8**—28 Series.
② —**H**—Hydra-Matic Trans. **S**—Synchro-mesh Trans.

Assembly Plant Designations

P—Pontiac	**K**—Kansas City
C—South Gate	**L**—Linden
W—Wilmington	**A**—Atlanta
F—Framingham	**T**—Arlington

►*7.5-1 COMPRESSION RATIO ENGINE IDENTIFICATION. On Synchro-mesh Cars with 7.5-1 compression ratio, an "L" is stamped on engine number pad.*

TUNE-UP

COMPRESSION PRESSURE: 135-145 lbs. at cranking speed.

VALVE TAPPET CLEARANCE. None in service (hydraulic).

►*ADJUSTMENT (When Cylinder Head or Valve System disturbed): See Valve Tappet Adjustment under "Valves" in ENGINE data.*

MANIFOLD HEAT CONTROL: Thermostatic coil type mounted in right hand exhaust manifold.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders—RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".
Spark Plugs - AC No. 44-5 or 45S. 14 mm.

COIL: Delco-Remy 1115087. *12 Volt.*
Resistor—Delco-Remy 1927809.

►*COIL RESISTOR NOTE:* Resistor is connected in lead from ignition switch-to-coil This resistor is by-passed during cranking by lead from starter solenoid-to-coil

DISTRIBUTOR: Delco-Remy 1110828. *12 Volt.*
Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set—Delco-Remy 1918148.
Breaker Gap— 016"
Cam Angle—26-33°.
Breaker Arm Spring Tension—19-23 ozs.
Rotation—Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	325	0-4	650
10.5-12.5	1200	21-25	2400
12-14	1400	24-28	2800
14-16	1700	28-32	3400

Vacuum Spark C ntr l: Delco-Remy 1116080
Plung r Trav l—11/64-3/16".

Vacuum Advanc

Distr Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6"
8	16	12.5-13.5"

IGNITION TIMING

Setting—5° BTDC. With engine running at 400 RPM (Hydra-Matic Cars), 450 RPM (Synchro-mesh Cars).
Timing Marks—Three marks on harmonic balancer indicating **TDC—3° BTDC-5° BTDC.** Pointer on chain case cover aligned with correct mark on balancer.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester and Carter 2-Barrel used on Hydra-Matic Drive Cars. Carter 2-Barrel used on Synchro-mesh Cars. Carter 4-Barrel WCFB or Rochester 4-Barrel 4GC are optional equipment (Power Pack).*

►*ENGINE LOADING CORRECTION (Cars with Rochester 2GC 2-Barrel Carburetor): New choke piston can be installed to provide greater initial choke opening to prevent loading. See "Rochester 2GC Carburetor" in Carburetor Section.*

►*CARBURETOR FLOODING (Due to Excessive Fuel Pump Pressure): See "Fuel System Notes" in Pontiac Special Data.*

►*HARD STARTING DUE TO UNSATISFACTORY UNLOADER OPERATION AFTER FLOODING (Cars with Carter WCFB 4-Barrel Carburetor): See "Carter WCFB 4-Barrel" in Carburetor Section for recommended rework of Carburetor and Throttle Linkage.*

►*CARBURETOR REPLACEMENT CAUTION:* First type intake manifolds with a curved section at rear of mounting flange will accomodate **Carter carburetors only.** Later manifolds with a fairly straight section at this point will accomodate either Rochester or Carter carburetors. A high vacuum leak will occur if Rochester carburetor used with first type intake manifold.

►*LOST MOTION OR LOOSENESS IN THROTTLE LINKAGE (EARLY SYNCHRO-MESH CARS).* Check distance between throttle rod hole center-lines and if found to be greater than 11.420", indicating an early type rod, increase bend in the rod so that distance between hole center-lines is 11.380-11.420".

►*HYDRA-MATIC TRANSMISSION THROTTLE ROD PRODUCTION CHANGE:* Transmission throttle control rod installed in lower hole on later cars and in upper hole on early cars. To decrease throttle valve pressure and increase accelerator linkage free travel, the rod on early cars can be installed in lower hole. *CAUTION*—When making this change, make sure that rod does not touch left rear engine mount at any point in its travel

THROTTLE LINKAGE ADJUSTMENT: (HYDRA-MATIC DRIVE CARS): With engine at normal operating temperature, idle speed set at 390-410 RPM, and with transmission selector lever in neutral, install linkage adjustment pin J-2544 through holes in lever and bracket at rear of left engine block. Pin should fit free in holes without lever movement. If free fit not obtained, adjust trunnion nuts on carburetor throttle rod until pin is free, then lock nuts securely. Leave gauge pin in hole. Loosen trunnion nuts on transmission throttle control rod and push rod downward until control outer lever is felt to touch end of its travel (top nut must not be touching trunnion) **Sh rt n throttl control r d tw turns** by loosening lower nut two turns and tightening upper nut 2 turns Remove gauge pin. With carburetor throttle in full open positive and Downshift Return Spring fully extended, adjust throttle control intermediate rod trunnion (at lever on engine bracket) so that accelerator pedal clears floor mat by approximately ¼" at closest point, tighten trunnion locknuts. *NOTE—See Hard Starting Corr ction in "Carter WCFB 4-Barrel" in Carburetor Section for special s tting on cars with this carburetor.*

ROCHESTER 2GC 2-BARREL

Rochester Model 2GC No. 7006100 (Hydra-Matic Driv Cars).

►*CARBURETOR CHOKE PISTON CHANGE (t corr ct Engine Loading): See "R ch st r 2GC Carburetor" in Carburetor Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting—1-1/2 turns open from lightly seated position (turn screws out for richer mixture). Adjust as necessary from this preliminary setting to give a smooth idle at correct idle speed (see below).

Idle Speed (Synchro-mesh Cars)—450-470 RPM
Idle Speed (Hydra-Matic Cars)—390-410 RPM

►*AIR-CONDITIONED CAR NOTE: Adjust idl sp d with Air Conditioner turned "ON".*

Float Level—1-15/64" from air-horn gasket to top of float with assembly inverted. Use Gauge BT-105 so it rests against power piston shaft with outer leg in line with center of float. Adjust by bending float arm between pivot and float with Tool BT-69.

Float Drop—1-29/32" between air-horn gasket and lowest point on bottom of float with air-horn held upright (Gauge BT-105). Adjust by bending float tang toward float needle seat to lessen drop, and away from seat to increase drop

Fast Idle: No adjustment of fast idle speed is provided. It is necessary however to correct relationship between fast idle cam position and choke valve position. Check & adjust as follows Place end of idle adjusting screw on next to highest step of fast idle cam. Using Gauge J-5920, slide small end between upper edge of choke valve and carburetor bore, with gauge held vertically. If necessary, bend choke rod until correct clearance is obtained.

Unloader Adjustment—With throttle in wide open position and choke thermostat cover set at index, bend tang on throttle lever so that large end of Tool J-5920 just fits between upper edge of choke valve and inner side of air horn.

Automatic Choke Setting: Centered (at index).

►*OTHER DATA: See "Rochest r 2GC Carbur tor" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs *CAUTION—Pressur in excess of 5 lbs. will caus carbur tor t flood. Se "Fuel Syst m Not s" in Pontiac Special Dat .*

►*FUEL PUMP, ARM WEAR CORRECTION· Se "Camshaft" below.*

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CARTER WGD 2-BARREL

M d l	Cart r N .
Synchro-mesh (Early)	2207S
Synchro-mesh (Late)	. 2207SB
Hydra-Matic (Early)	2182S
Hydra-Matic (Later)	2182SA
Hydra-Matic (Late)	2182SB

►*CARBURETOR FLOODING CORRECTION See "Fuel System Not s" in Pontiac Special Data for excessive fu l pump pr ssur . S e also "Carter WGD Carburetor" in Carbur tor S ction for other recommended changes*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr l fe ds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idl Setting (2207-S & SB)—1/2—1-1/2 turns open. Turn screws out for richer mixture.

Idl Setting (2182S, SA & SB)—1-1/4—2-1/4 turns open. Turn screws out for richer mixture.

Idl Sp d (Synchro-m sh Cars)—450-475 RPM.

Idl Sp d (Hydra-Matic Cars)—390-410 RPM.

►*AIR-CONDITIONED CAR NOTE: Adjust idle speed with Air-Condition r turned "ON".*

Float L v l: 7/32" from top of float to gasket seat on bowl cover (with gasket removed). Use Gauge T109-106. Adjust by bending float arm.

Acc l rating Pump—No seasonal adjustment

Fast Idl Setting: .026" throttle opening or clearance between valve and wall on side opposite idle ports with choke valve tightly closed. Adjust by bending choke connector rod at lower angle.

Unload r Adjustm nt—With fast idle adjustment completed, hold throttle valve wide open and close choke valve as far as possible (do not force choke valve closed). Clearance between upper edge of choke valve and inner wall of air horn should be 5/16" (Gauge T109-154). Adjust by bending choke shaft unloader arm.

Aut matic Ch k Setting: *CAUTION—2 Settings used.* **(Synchro-mesh Cars—2207S, SB)**—1 Point Lean **(Hydra-Matic Cars—2182S, SA, SB)**—1 Point Rich

►*OTHER DATA See "Cart r WGD Carburetor" in Carburetor Section*

Hydra-Matic Throttl Linkage Adjustment: *See "Carburetor" above*

Fu l Pump Pr ssur : 4-5 lbs *CAUTION—Pressure in excess of 5 lbs will cause carburetor to flood See "Fuel System Notes" in Pontiac Special Data*

►*FUEL PUMP ARM WEAR CORRECTION See "Camshaft" below.*

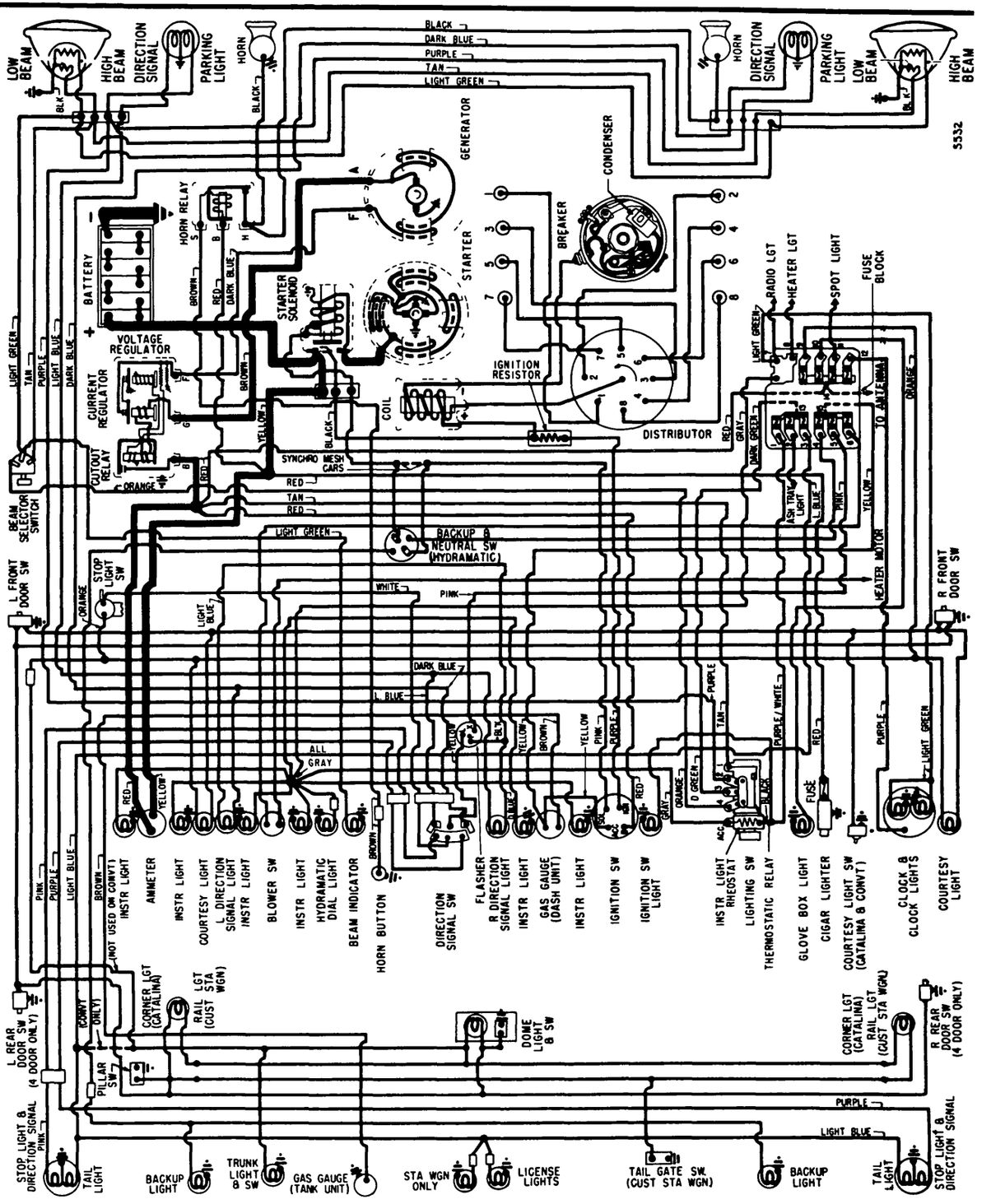
ROCHESTER 4GC 4-BARREL

Rochest r 4GC No. 7007800 (Hydra-Matic Drive Cars).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle S tting—1½ turns open (preliminary setting) For final setting (with engine at normal operating temperature), adjust both idle mixture screws equally to give a smooth idle at specified RPM Turn screws out for richer mixture

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Idl Sp d (Synchr -m sh Cars)–450-470 RPM.
Idl Spe d (Hydra-Matic Driv Cars)–390-410 RPM.

►*AIR CONDITIONED CAR NOTE: Adjust idle speed with Air Conditioner turned "ON".*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetor" in Carburetor Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above,*

Fuel Pump Pressure: 4-5 lbs. *CAUTION–Pressure in excess of 5 lbs. will cause carburetor to flood. See "Fuel System Notes" in Pontiac Special Data.*

►*FUEL PUMP ARM WEAR CORRECTION: See "Camshaft" below.*

CARTER WCFB 4-BARREL

Model	Carter No.
Synchro-mesh	2283S
Hydra-Matic	2268S

►*CARBURETOR UNLOADER IMPROVEMENT (to correct Hard Starting due to unsatisfactory Unloader Operation): See "Carter WCFB 4-Barrel" in Carburetor Section for installation of new throttle lever flex spring.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8, LEFT barrel 1-4-6-7.*

Idle Setting–3/4–1-3/4 turns open. Turn screws out for richer mixture.
Idle Speed (Synchro-mesh Cars)–450-470 RPM.
Idle Speed (Hydra-Matic Cars)–390-410 RPM.

►*AIR CONDITIONED CAR NOTE: Adjust idle speed with Air Conditioner turned "ON".*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetor" in Carburetor Section.*

Hydra-Matic Throttle Linkage Adjustment: *See "Carburetor" above.*

Fuel Pump Pressure: 4-5 lbs. *CAUTION–Pressure in excess of 5 lbs. will cause carburetor to flood. See "Fuel System Notes" in Pontiac Special Data.*

►*FUEL PUMP ARM WEAR CORRECTION: See "Camshaft" below.*

CARB. EQUIPMENT

►*HIGH FUEL PUMP PRESSURE CORRECTION (Causing Carburetor to Flood):* May be caused by the diaphragm being installed with insufficient slack. *See "Fuel System Notes" in Pontiac Special Data.*

►*FUEL PUMP ARM & ECCENTRIC WEAR CORRECTION & INSTALLATION CAUTION: See "Camshaft" below. See "Fuel Pumps" in Carburetion Equipment Section.*

Fuel Pump: AC. Replacement No. 4123 (Fuel & Vacuum).
Pressure–4-5 lbs. *CAUTION–Fuel pump pressure must not exceed 5 lbs. pressure.*

Fu l Filt r: Std. Equipment. This unit is a disc type filter which requires periodic service. *See "Fuel System Notes" in Pontiac Special Data.*

Gas lin Gaug : AC Electric type.
Dash Unit–AC No. 1518131.
Tank Unit–AC No. 1518093 (Exc. Sta. Wgn.). No. 1518250 (Sta. Wgn.).
See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

Air Conditioned Cars–Delco 3SM70. *12 Volt,* 11 plate, 70 ampere hour capacity (20 hr. rate).
Except Air Conditioned Cars–Delco 2SM50. *12 Volt,* 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground–Negative.
Engine Ground–Between engine and fender at battery ground.

STARTER

Delco-Remy 1107631 (Std.), 1107632 (With Power Steering). *12 Volt.*
Armature–Delco-Remy 1926626.
Drive–Overrunning clutch (solenoid pinion shift).
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
10.5 ft. lbs.	Lock	5.4	470

Starting Switch: Delco-Remy Solenoid 1119760 (no relay) mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No. 1116472. Neutral Safety Switch used on Hydra-Matic Drive Cars.

Neutral Safety & Back-up Light Switch: Delco-Remy 1998039. At lower end of steering column. Connected in starter control circuit so that starter operates only when selector lever in "N" (Neutral).

Adjustment–*See "Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy Model:	Gen. No.	Armature No.
Standard	1100304	1928952
Hvy. Duty (1st type)	1102012	1923535
Hvy. Duty (2nd type)	1102018	1923535
Hvy. Duty (3rd type)	1102035	
Air. Cond. Car (1st type)	1105944	① 1932900
Air Cond. Car (2nd type)	1102027	②
Air Cond. Car (3rd type)	1102039	

①–Replaces Armature No. 1930814.
②–Replace Generator assembly with No. 1102039.

Maximum Charging Rate–*See Voltage Regulator.*

Performance Data–Cold

Generator	Amperes	Volts	RPM
1100304	25	14.0	2780
1102012	30	14.0	2150
1102018	30	14.0	2150
1102035	35	14.0	
1105944	35	14.0	2150
1102027	35	14.0	2350
1102039	35	14.0	

Rotati n–Counter-clockwise at commutator end.
Brush Spring T nsi n–28 ozs.

Fi ld Curr nt–1.5-1.62 amps. (1100304); 1.48-1.62 amps. (1102012 & 1102018); 1.64-1.82 amps. (1102027); 1.54-1.67 amps. (1105944), all at 12 volts.

Belt Adjustment: ¼" belt deflection with approximately 8 lbs. pressure midway between pulleys.

REGULATOR

Delco-Remy Regulator N.	Us With G n. N.
1118945	1100304
1118826	1102012 & 1102018
1118967	1102027 & 1102035
1118956	1105944

►*NOTE: Regulator is "1118825 Series". Specifications below are for "Normal" s ttings.*

Cut-Out R lay

Cuts In–11.8-13.5 volts (hot).
Contact Gap–.020".
Air Gap–.020" (with contacts just closed).

Voltag R gulat r

Setting–13.8-14.8 volts (hot).
Air Gap–075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–*See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section.*

Curr nt R gulat r

Setting (1118945)–23-27 amperes (hot).
Setting (1118826)–27-33 amperes (hot).
Setting (1118956 & 1118967)–32-37 amperes (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–*See "Delco-Remy 1118825 Series Regulator" in Electrical Equipment Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*
►*LAMP BULB CAUTION: All lights are 12 Volts.*

Autronic Eye: *See "Autronic Eye" in Electrical Equipment Section.*

Direction Signal: *See "Dir ction Signals" in Electrical Equipment Section.*

►*DIRECTION SIGNAL SHORT CIRCUITING CORRECTION:* Direction signal wiring harness contacts gearshift lever support at upper end of steering column and in some instances may cause a short circuit. To correct, remove direction signal control assembly and replace the wiring harness and switch base assembly. Route the new harness in the guide clamp and push it down through clamp until it lies flush against underside of housing, then bend clamp around harness to hold it securely. Before installing control assembly, bend the clamp and harness toward center of housing to make sure it will not contact gearshift lever support.

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "on" position, push latch button on side of switch assembly and pull out switch knob assembly. Screw bushing from switch

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assembly allowing switch assembly to be removed from instrument panel

Stop Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-Up Light Switch: Located on left rear side of transmission case.

FUSES: Fuses listed below (except as noted) are located on a fuse block behind instrument panel on dash to left of steering column

Instrument Panel–4 amps.
Hood Ornament & Ash Tray–7½ amps.
Stop Lights, Dome & Courtesy Lights–7½ amps.
Tail Lights–7½ amps.
Back-up Light–7½ amps.
Glove Box & Underhood Light–7½ amps
Directional Signal & Brake Light–7½ amps.
Spot Lights–7½ amps.
Heater & Defroster–7½ amps.
Radio & Clock–7½ amps.
Air Conditioner–30 amp. Located in a line holder either on defroster core housing or if car not equipped with defroster, on front of dash where defroster should be.

LIGHTING THERMOSTATIC CIRCUIT BREAKER: 12 Volt. 22 amperes. Located on lighting switch.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION. Before disconnecting any part of air conditioning equipment or lines see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*ENGINE "CLICKING" NOISE WHEN IDLING CAUTION.* May be caused by loose rivets in Vibration Dampener and is sometimes diagnosed as Hydraulic Lifter noise. Check vibration dampener before working on lifters Correct by replacing Vibration Dampener. *See "Vibration Damper" in Pontiac Special Data.*

►*GRINDING SOUND IN ENGINE CORRECTION:* Check oil pump drive shaft for evidence of shaft rubbing against hole in cylinder block. This evidence can be seen on outer diameter of shaft above the upset "nibs". Correct by grinding or turning the shaft for clearance. *CAUTION–Do not grind off the "nibs".*

►*OIL CONSUMPTION AT HIGH SPEED CORRECTION:* This condition may be caused by incorrectly installed crankcase ventilator outlet pipe. If ventilator pipe is pushed too far into push rod cover, high velocity air will carry oil directly out through pipe. Make sure that pipe is not forced past the two locating points on outlet pipe.

ENGINE SPECIFICATIONS: Own. V8 Valve-in-head.

Bore	Stroke	Displacement	Rated HP
3.75"	3.25"	287.3 cu. ins.	45

Engine	① Compr. Ratio	Developed HP
Standard	8.0-1	② 180 at 4600 RPM
With Power Pack	8.0-1	200 at 4600 RPM

①–7.5-1 optional compression ratio obtained by using different pistons "L" stamped on engine number pad indicates low compression engine
②–173 HP at 4400 RPM on "Low Compression" engine.

Compression & Vacuum Reading–*See Tune-Up.*

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove right and left engine side side aprons Remove steering idler lever support attaching screws and lower steering linkage as far as possible. Disconnect exhaust crossover pipe and jockey it around to a position where it can be removed without forcing Remove flywheel housing lower cover and front shield. Loosen crankcase ventilator outlet pipe brace and swing brace out of way.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

Oil Passage Plug (In Cylinder Head) Replacement: *See "Oiling System" in Pontiac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

INTAKE MANIFOLD: With **Special** flat washers under attaching nuts, tighten nuts evenly to 40-45 ft lbs.

ENGINE MOUNTINGS: *See "Engine Mountings" in Pontiac Special Data.*

PISTONS

Cast aluminum alloy, slipper skirt, with piston pin offset 1/16" toward right side of engine

►*DIFFERENT PISTONS USED IN "HIGH" & "LOW" COMPRESSION ENGINES.* Pistons identified as follows High compression pistons are flat on top, and low compression pistons are "dished" out. Low compression pistons also have an "L" stamped on rear side near pin boss.

Removal–Pistons and rods removed from above.

Replacement Pistons: Std. size, and 005", .010", .020", .030" Oversize.

Fitting New Pistons: Clearance .0007-.0012' (measured just far enough above bottom of skirt to make sure micrometer is in full contact, and perpendicular to piston pin boss). Use a 0015" x ½" feeler gauge and spring scale. With piston and cylinder clean and dry, insert inverted piston and feeler gauge into lower half of cylinder (feeler 90° from pin hole). Pull required to withdraw feeler should be 8-15 lbs.

Installing Pistons: Install with notch in piston head and "F" mark on side of piston toward front of engine. *See Rod Installation.*

PISTON PINS

Pin is floating in piston and connecting rod and is retained by snap rings at each end

Diameter–.9803-.9807".

Pin Fit in Piston–.0000"-.0002" loose with piston and pin at room temperature. When pin is toward high limit (.0002") pin can be inserted with light hand pressure, *pin should not fall through of its own weight.* When pin toward low limit (.0000"), considerable hand pressure will be required (a brass drift can be used to tap pin into place with light pressure).

Pin Fit in Connecting Rod–.0003"-.0005" loose.

Replacement Pins: Std. size, .001", .003", .005" Oversize.

PISTON RINGS

Upper compression ring is chrome plated. Both compression rings are taper faced and have either a chamfer or a step on inside diameter of top side.

Ring	Width	End Gap	Side Clearance
Upper Compr.	.078"	.010-.020"	.0012-.0027"
Lower Compr.	.078"	.008-.020"	.0012-.0032"
Oil	.183"	.015-.035"	.0025-.0095"

Installing Rings: Install compression rings with chamfer or step (on inside diameter) toward top of cylinder Oil ring can be installed either way.

Replacement Rings: Std. size, .005", .010", .020", .030" Oversize.

CONNECTING RODS

Length–6.623-6.627" (center-to-center)
Crankpin Journal Diameter–2.2488-2.2498".
Connecting Rod Upper Bushing (Piston Pin) Removal & Installation–*See "Connecting Rods & Bearings" in Pontiac Special Data.*
Lower Bearing–Replaceable precision type
Clearance–.0009-.0029" (new).
Sideplay–.006-.011"

Replacement Bearings: Std. size, .001", .002" Undersize

Installing Rods: Install rods **2-4-6-8 (right bank)** with machined boss at lower end of rod toward the **rear.** Install rods **1-3-5-7 (left bank)** with boss toward the **front** of engine. When installed, machined bosses on rods will face each other *See Pistons above.*

CRANKSHAFT

►*FRONT MAIN BEARING NOISE CORRECTION (POWER STEERING CARS):* Noticeable when engine warm and when power steering pump drive belt tightened to the high limit. Check by loosening belt below specified ft. lb. reading. DO NOT LEAVE BELT LOOSE. If noise not eliminated with belt tightened to low limit 58-65 ft. lbs., (new belt), 51-53 ft lbs, (used belt) using Tool J-5574, decrease clearance between crankshaft and main bearing shells on front main bearing to a clearance of .001-.002".

►*MAIN BEARING CAP PRODUCTION CHANGE* New bearing caps used in later production are heavier and have the bolt boss length increased. *Lockwashers are not used under attaching screws.*

Journal Diameter–2.2498-2.499". Five bearings.
Bearings–Steel backed babbitt lined inserts. No shims.
Clearance– 0005-.003" (Except Rear), .0008-.0033" (Rear)

End Thrust: Taken by No. 4 (rear center) main bearing
Endplay–.0035-.0085".

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Rear Main Bearings: Std. size, .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: See *"Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: See *"Engine Front Cover" in Pontiac Special Data.*

Vibration Dampener Removal & Installation: See *"Vibration Dampener" in Pontiac Special Data.*

FLYWHEEL REPLACEMENT (Hydra-Matic Cars): See *FLYWHEEL in Pontiac Special Data.*

CAMSHAFT

►*FUEL PUMP ARM & ECCENTRIC WEAR CORRECTION & INSTALLATION CAUTION:* If wear is found at the fuel pump arm or eccentric, replace 1½" inside diameter thrust plate with the later type having a 1 9/16" inside diameter. All service replacement thrust plates are 1 9/16" type.

Journal Diameters–1 8992-1 8997". Five bearings.
Clearance–.0015-.0025".

End Thrust: Steel thrust plate located behind camshaft sprocket Replace if worn or grooved.
Endplay– 003-.007".

Timing Chain: Length–60 links.
Timing Chain Installation–*See "Timing Chain" in Pontiac Special Data.*

Camshaft Setting: Both sprockets marked '0'. Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

►*INTAKE VALVE STEM OIL SPLASH SHIELD PRODUCTION CHANGE:* Beginning with Engine No. 54487, Oil Splash Shield, Part No. 520996 is installed over top of inner intake valve spring Splash shields may be installed on early 1955 engines

Tappet Clearance: None in service (hydraulic). *See "Initial Tappet Adjustment" below if cylinder head removed or valve system disturbed.*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 778-1 784"	3407- 3417"	5 250"
Exhaust	1 497- 1 503"	3407- 3417"	5 230"

Valve	Seat Angle	Lift	①Stem Clearance
Intake	②30°	327"	.0003- 0006"
Exhaust	②45°	327"	0003-.0006"

① - In small end of taper reamed hole in guide. Correct fit of valve stem in valve guide is when valve will just drop through of its own weight and with no perceptible side play.

② - Face angle - 29° Intake, 44° Exhaust.

Valve Seat Width–3/64-1/16' (Intake), 1/16" (Exhaust)

Valve Stem Oil Seal: Neoprene type installed in second groove of intake valve stems Later engines have an oil baffle installed over inner valve spring. *See "Intake Valve Stem Oil Splash Shield Production Change" above.*

Initial Tappet Adjustment: If cylinder head removed or valve assembly disturbed, adjust valve tappets as follows. Adjust valves for one cylinder at a time with piston in firing position (both valves completely closed). Loosen rocker arm ball nuts until pushrod is free to rotate, then tighten ball nut just until there is no axial movement (do not depress lifter plunger). **Tighten ball nut one complete turn.** Repeat this procedure for each cylinder.

Checking Valve Stem Length: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Inner and outer valve springs used.

Valve Spring Specifications

	Inner Spring		Outer Spring	
Valve	Pressure	Length	Pressure	Length
Open	54-60 lbs	1 153"	98-106 lbs	1 203"
Closed	23-29 lbs	1 483"	55-61 lbs	1 533"

Valve Guides: Pressed into cylinder head. Guides have tapered hole (.0015" taper to inch), with greater clearance at rocker arm end.

Valve Clearance in Guide–Valve should just fall through guide of own weight and with no perceptible side play

Guide Replacement–Drive old guide out from combustion chamber side using Tool J-2542. Start chamfered end of guide into cylinder head and drive into place using Tool J-2542 until end of guide is 1 1/32" below roof of combustion chamber. Ream guides with taper reamer J-5713-2

►*CAUTION Guides furnished with straight hole which must be taper-reamed.*

Valve Lifters: Hydraulic type.

►*HYDRAULIC VALVE LIFTER REPLACEMENT CAUTION:* Lifters are coated with a plastic "wrap" at the factory and in some instances this coating may flow into hole in pushrod seat Make sure that all traces of "wrap" are removed before installation

►*VALVE LIFTER BALL CHECK VALVE SPRING PRODUCTION CHANGE,* This spring has been eliminated in early production and is not used on any of the succeeding type lifters

►*HYDRAULIC VALVE LIFTER PRODUCTION CHANGE* Three types of lifters have been used in production as follows **1st Type**–Narrow groove in body (219" wide), and undercut section at camshaft end. **2nd Type**–Wide groove (400" wide), and undercut section at camshaft end **3rd Type**–Wide groove (.400" wide), without undercut section. *All types are interchangeable in all respects.*

Diameter–.8420- 8427" **Length**- 2.000".
Clearance (In Lifter Bore)– 0005-.0018"

Hydraulic Valve Lifter Overhaul: *See "Valve System" in Pontiac Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head

Rocker Arm Stud Replacement–*See "Valve System" in Pontiac Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves–Open 22° BTDC. Close 67° ALDC.
Exhaust Valves–Open 63° BLDC. Close 27° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 5 qts. (refill), 6 qts (when filter changed).

Normal Oil Pressure: 35-45 lbs.
Pressure Regulator–In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.

►*OIL PUMP NOISE:* "Grinding" noise may be caused by upper end of oil pump drive shaft rubbing in hole in cylinder block Examine outer diameter of shaft above upset nibs for rubbing and correct by reducing shaft diameter in this area by grinding or turning in a lathe. *CAUTION*–Do not remove nibs on shaft.

Pump Overhaul–*See "Oiling System" in Pontiac Special Data.*

Oil Filter: "Full Flow" type (optional). Replace filter element once every year or every 10,000 miles. *Use only AC Type PF-122 filter element.*

Oil Passage Plug (In Cylinder Head) Replacement: *See "Oiling System" in Pontiac Special Data.*

Crankcase Ventilator Air Filters: Located in oil filler cap and in ventilator outlet pipe. Clean and re-oil every 10,000 miles or oftener if necessary.

►*VENTILATOR OUTLET PIPE CAUTION: If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed into cover beyond the two locating points on pipe. Excessive oil consumption at high speed will result.*

Oil Pressure Gauge: AC No 1508195 Not electric. *See "Oil Gauges" in Miscellaneous Section.*

COOLING

►*LOWER RADIATOR HOSE STRIKING FRAME FRONT CROSSMEMBER CORRECTION Slot radiator mounting holes vertically and raise radiator so there is a minimum clearance of ¼" between hose and crossmember.*

Water Capacity (Without Air Conditioning): 22¾ qts. (without heater), 24½ qts. (with heater).
With Air Conditioning–23 qts (without heater), 25 qts. (with heater).

Pressure Valve: AC No 850549, 7 lbs.

Thermostat: Harrison No. 3133595 (151°), 3133596 (160°), 3133597 (170°)

Water Pump: Packless, sealed ball bearing shaft Serviced as an assembly.

Pump Removal–Drain radiator and engine block. Loosen generator adjusting strap and remove fan belt, fan, and

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pulley. Remove water pump retaining nuts and lockwashers and remove pump.

Temperature Gauge: AC No. 1512874. Not electric. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Inland. Single plate, "Diaphragm", dry disc type with Long driven member.
See "Inland" in Clutch Section.
Clutch Disc No.—Pontiac No. 518130.

Pedal Adjustment: 3/4-1 1/8". Adjust at clutch fork-to-countershaft rod.

Overcenter Spring Adjustment—Remove overcenter spring, spring extension, and pushrod. Loosen lock screw which clamps spring lever to countershaft. Install Gauge J-5819, inserting pins which are closest together into holes in overcenter spring link and lever from which pushrod was removed. Then, while applying rotation to clutch countershaft to hold clutch pedal against stop, rotate overcenter spring lever until third pin in gauge can be inserted into overcenter spring lever. Tighten lockscrew securely, and replace spring, spring extension, and pushrod.

Removal: Remove transmission (see Transmission Removal below), remove clutch bearing support spring washer (in rear face of clutch housing) and remove clutch housing bottom cover and control shaft inner bracket. Remove release bearing support and release bearing. Tap bearing support from inside clutch housing to aid removal (*CAUTION*—Avoid striking tubular portion of support). Mark flywheel and clutch cover (to insure installation in same manner to maintain balance), remove clutch cover bolts evenly, move clutch assembly away from flywheel at bottom and withdraw driven member. Lower clutch assembly out of car.

Clutch Installation Note—Install new felt oil seal against shoulder ahead of oil slinger retainer ring on transmission main drive gear (will bear against flared end of release bearing support when installed). Lubricate seal with engine oil before transmission installed. Coat entire length of outer diameter of release bearing support tube with grease. Lubricate release fork fulcrum points with a very light coat of grease. Apply light coat of Lubriplate on main driving gear splines. Use new paper gasket between support flange and clutch housing, make certain that flange is not bent or distorted (will cause misalignment of transmission).

SYNCHRO-MESH TRANSMISSION

Own. All helical gear type.
See "Pontiac Synchro-Mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*TRANSMISSION SELECTOR LEVER INTERFERENCE CORRECTION (Causing inability to shift gears)*: If trunnion pin at steering column end strikes exhaust manifold, reverse pin in trunnion so that it points toward center of car.

Removal: 1) Disconnect speedometer cable, gearshift selector rod, control rod and backup lamp switch wires from transmission.

2) Disconnect rear universal joint (use a wire or rubber band to prevent trunnions from slipping off spider). Remove propeller shaft by sliding it to rear off transmission mainshaft splines.

3) To give clearance for removing upper capscrew holding transmission to clutch housing, remove transmission shift lever spring yoke and extension. Remove shift lever screw while holding shift lever in neutral (center position) to avoid damage to shift levers on shaft inside transmission. Remove shift lever.

4) To give clearance for removing lower capscrew holding transmission to clutch housing, remove transmission outer lever. Remove transmission upper capscrews and install two transmission guide pins (pins can be made by cutting the heads off two transmission capscrews and sawing a screw driver slot in the ends). *CAUTION*—Guide pins must be used since they support transmission and prevent distortion of clutch driven plate hub when lower transmission capscrews are removed.

5) Remove lower capscrews and move transmission to rear, bringing rear bearing extension into intersection of frame "X" members until main drive gear is free, then lower to floor. *CAUTION*—Use care to avoid getting dirt into front bearing when pulling transmission away from clutch housing.

Installation Note: Use guide pins installed in two upper transmission mounting holes to assist in sliding transmission straight forward into place (to avoid damage to clutch release bearing tubular support).

HYDRA-MATIC DRIVE

"Dual-Range" four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Hydra-Matic Drive" in Transmission Section.*

Lubrication—Check fluid level every 2000 miles, drain and refill at 25,000 mile intervals.

Checking Fluid Level—Run engine 1½ minutes at a speed equivalent to 20 MPH with selector lever in "N". Reduce speed to **slow idle** and move selector lever to "D" position. Measure oil level on dipstick (under hood). Add fluid through dipstick tube until level is at "FULL" mark.

Capacity—Approximately 11 qts. (refill).
Recommended Fluid—Use G.M. Hydra-Matic Fluid or Automatic Transmission Fluid Type A.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Mechanics or Saginaw. Needle bearing type.

►*CAUTION*: Rear universal joint companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut is loosened). *See "Pontiac Hypoid" in Rear Axle Section.*

REAR AXLE

►*REAR SPRING SHACKLE TO FRAME INTERFERENCE CORRECTION*: Make sure spring upper frame bushing is flush with frame bracket toward car centerline. If spring clamp is touching frame, bend as necessary for clearance.

Own. Hypoid gear, semi-floating with Hotchkiss Drive.
See "Pontiac Hypoid" in Rear Axle Section.
Axle Identification—Code mark stamped on pad at forward side of differential carrier between bottom web and right hand horizontal web. Axle shaft also marked with daub of paint on end of shaft to indicate ratio. See Code & Paint Markings in table below.

Axle Ratios & Code Marking

Ratio	Gear Teeth	① Code Mark	② Code Color
3.08-1 ③④⑤	40:13	0	Yellow
3.23-1 ③⑥	42:13	9	Brown
3.64-1 ⑦	40:11	6	Blue
3.90-1 ⑧	39:10	4	Red

①—See Rear Axle Identification.
②—Paint daub on end of axle shaft.
③—Hydra-Matic Drive.
④—Chieftain (27 Series).
⑤—Except Station Wagon.
⑥—Star Chief (28 Series), & Station Wagons.
⑦—Synchro-mesh Transmission (Standard).
⑧—Synchro-mesh Transmission (Optional).

Backlash—.003-.012" (new), .012" (used).
Axle Shaft Removal: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft with Puller J-942 (do not drag axle shaft on seal).
Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Disconnect rear universal and wire trunnion in place (do not disengage spline joint at transmission), remove axle shafts and carrier flange capscrews. Withdraw carrier assembly from housing.

►*CAUTION: Rear universal joint companion flange nut controls rear axle pinion bearing preload. Readjust whenever nut loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable, sealed (not refillable). Service by replacement.

Model	Front	Rear
Standard	5352225	5513345
Taxi & Police Cars	5352226	5513346

FRONT SUSPENSION

Independent. Shock absorber mounted within front coil spring.
See "Pontiac" in Front Suspension Section.

Kingpin Inclination—4½° at ½° camber.

Caster—Neg. 1° ±½°.

Camber—Pos. ½° ±½°.

Toe-In—0" to 1/16".

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Toe-out on Turns—With inner wheel at 20°, outer wheel should be 18° 30'.

STEERING

Manual: Saginaw Worm & Roller. *See "Saginaw Worm & Roller" in Steering Section.*

Power Steering: Saginaw (GM) Hydraulic. Recirculating ball nut and worm type plus extended pitman shaft with gear sector in mesh with power rack. Power rack pinned to piston rod of hydraulic cylinder. *See "Saginaw (GM) Power Steering" in Steering Section.*

►*POWER STEERING NOISE CORRECTION: See "Saginaw (GM) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand brake applies rear wheel service brakes.

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

Drum Diameter—12" (front), 11" (rear).
Wheel Cyl. Diameter—1 1/16" (front), 15/16" (rear).

Lining Width—2½" (front wheels), 1¾" (rear wheels).
Thickness—13/64".

Clearance—Tighten adjusting "star wheel" to point where wheel can just be turned by hand, then back off star wheel 14 notches.

Standard Master Cylinder: Forward of brake pedal on engine side of fire wall.

Checking Fluid Level—Maintain fluid level in master cylinder reservoir to 7/8" from gasket surface of filler neck.

Power Brakes: Bendix or Moraine Power Unit. *See "Moraine Power Unit" or "Bendix Power Unit" in Brake Section.*

Checking Fluid Level—Maintain fluid level in master cylinder reservoir to within ½" of top of filler cap opening.

Removal of Power Unit—Disconnect upper end of vacuum hose attached to inlet at vacuum cylinder, and hydraulic lines at master cylinder. Disconnect pushrod from pedal and wires from stop light switch. Remove nuts from U-bolt retaining pedal pivot bracket to steering column and remove pedal and bracket (with stop light switch assembly attached). Remove clutch pedal and steering column seals at floorboard. On Hydra-Matic cars, remove screws retaining power brake unit to floor pan and remove mounting plate with power unit attached. On Synchro-mesh cars, remove screws retaining power unit to mounting plate (power unit will rest on frame). Remove screws attaching mounting plate to floor pan and remove mounting plate, "jockeying" it as necessary to clear clutch pedal. Remove power unit. *CAUTION*—Do not carry or support brake unit by pushrod as pushrod may be pulled out of cylinder.

MISC. MECHANICAL

Windshield Wipers: Cable operated vacuum type.
See "Windshield Wipers" in Miscellaneous Section.

Air Conditioner: Harrison type with magnetic compressor clutch (compressor operates only with air conditioning switch turned on). *See "Pontiac Air Conditioning" in Miscellaneous Section.*

►*AIR CONDITIONING COMPRESSOR DRIVE BELT MISALIGNMENT CORRECTION: See "Pontiac Air Conditioning" in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor.
See "Power Top Controls" in Miscellaneous Section.

Power Window Regulators: Electric. Reversible motor in each window. Available on front and rear door windows. *See "Power Window Regulators" in Miscellaneous Section.*

► *SPECIAL 285 HP "STRATO-STREAK" V8 ENGINE NOTE. This engine furnished as a factory installed option on all models except those with air conditioning. Service adjustments and specifications are included below.*

► *AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Series Designation
Star Chief	56-28
Star Chief Safari	56-27
Eight Seventy (870)	56-27
Eight Sixty (860)	56-27

SERIAL & ENGINE NUMBERS (Numbers are the same): On left front hinge pillar post and on raised pad at front of right hand cylinder block.

► *ENGINE & SERIAL NUMBER NOTE. Engine and Serial number (example P756H 1001) includes following identification information in sequence.*

Assembly Plant	Model ①	Year	Trans. Type ②	Serial No.
See below	7	56	H	1001

① –7 (27 Series). 8 (28 Series).
② –H (Hydra-Matic). S (Synchro-mesh).

Assembly Plant Designations

P–Pontiac	K–Kansas City
C–South Gate	L–Linden
W–Wilmington	A–Atlanta
F–Framingham	T–Arlington

TUNE-UP

► *SPECIAL 285 HP "STRATO-STREAK" V8 ENGINE SERVICE NOTE.* Service specifications and procedures are different than standard engines as noted below.

COMPRESSION PRESSURE: 145-155 lbs. (8.9-1 Head), 120-130 lbs. (7.9-1 Head), at 160-170 RPM cranking speed.

VALVE TAPPET CLEARANCE: None in service (hydraulic).

► *VALVE ADJUSTMENT NOTE: Because of new design, it is no longer necessary to initially adjust the tappet clearance when cylinder head or valve system disturbed.*

MANIFOLD HEAT CONTROL: Thermostatic coil type mounted in right hand exhaust manifold.

► *DUAL EXHAUST NOTE:* Optional equipment on all but 860 four door station wagon. With control valve closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders–RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7

SPARK PLUG GAP: .035", (.033-.038").

Spark Plugs - AC No. 46 or 45S. 14 mm. Torque to 25 ft. lbs. max. or finger tight plus ¾ turn with wrench.

COIL: Delco-Remy 1115087 (Exc. 285 HP Engine) 1115099 (285 HP Engine). *12 Volt.*
Ignition Current - (1115087) 1.2 amps. idling, 3.5 amps stopped, (1115099) 1.8 amps. idling, 4.0 amps. stopped. **Resistor** - Delco-Remy 1927809 (Exc. 285 HP Engine). 1931395 (285 HP Engine). **Resistance** - 1.40-1.65 ohms (1927809), .27-.39 ohm (1931395).

► *COIL RESISTOR NOTE Resistor is connected in lead from ignition switch-to-coil. This resistor is by-passed during cranking by lead from starter solenoid to coil.*

DISTRIBUTOR: Delco-Remy 1110862 (Exc. 285 HP Engine); 1110875 (285 HP Engine). *12 Volt.*

► *1110875 DISTRIBUTOR (285 HP ENGINE) NOTE:* This distributor is equipped with a dual set of contacts and has centrifugal advance only (vacuum advance is not provided).

Condenser - Delco-Remy 1869704. **Capacity** - .18-.23 mfd.

Contact Point Set - Delco-Remy 1918148.

Breaker Gap - .016" (Exc. 285 HP Engine), .014-.018" (285 HP Engine).

Cam Angle - 26-33° (Exc. 285 HP Engine), 29°±1° (individual breaker operating), 34°±1° (both breakers operating - 285 HP Engine).

Breaker Arm Spring Tension–19-23 ozs.

Rotation–Counter-clockwise viewed from above.

Automatic Advance–1110862

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	525	1-5	1050
7-9	1050	14-18	2100
8-10	1400	16-20	2800
9-11	1800	18-22	3600

Automatic Advance–1110875

Degrees Distr.	RPM	Degrees Eng.	RPM
0-0.5	350	0-1	700
1-3	600	2-6	1200
5-7	1000	10-14	2000
6.5-8.5	1500	13-17	3000
8-10	2000	16-20	4000

Vacuum Spark Control (Exc. 285 HP Engine): 1116080.

Plunger Travel - 11/64-3/16"

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6"
8	16	12.5-13.5"

IGNITION TIMING

Setting (Exc. 285 HP Engine)–5° BTDC, with distributor vacuum line disconnected and engine idling at 450-470 RPM (transmission selector in "N").

Setting (285 HP Engine) - 10° BTDC, with engine idling at 650 RPM (normal idle speed).

Timing Marks - Two marks on vibration damper, TDC and 5° BTDC. 5° mark is slanted Align correct mark with pointer on timing chain cover.

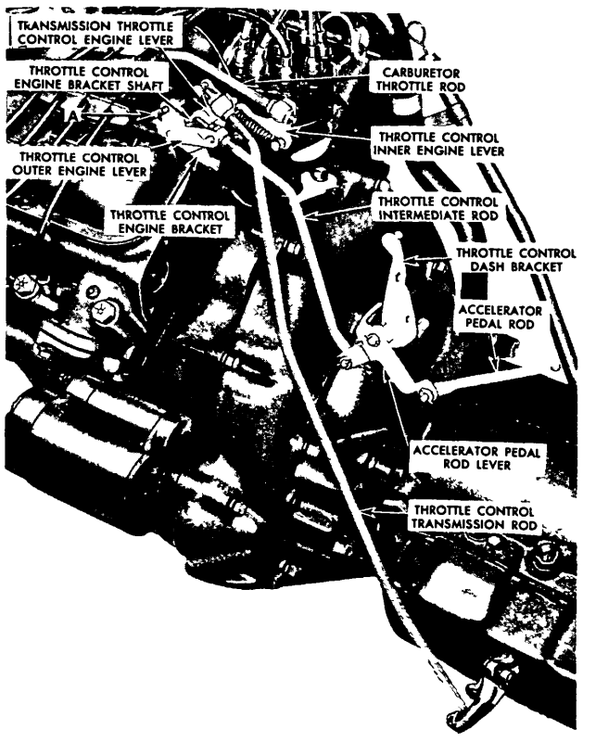
CARBURETOR

► *CARBURETOR APPLICATION: Rochester 2-barrel Carburetors are standard on 56-27 Series Cars. Rochester 4-Barrel Carburetors used on 56-28 Series Cars with Standard Transmission. Rochester or Carter 4-Barrel Carburetors used on 56-28 Series Cars with Hydra-Matic Transmission. Rochester or Carter 4-Barrel carburetors optional on 56-27 Series Cars. Two Rochester 4-Barrel Carburetors are standard on 285 HP Engine.*

► *FUEL FILTER PRODUCTION CHANGE (To Correct Carburetor Flooding Conditions):* New glass bowl, impregnated fiber element, precipitation type fuel filter is now being used in production and is available for installation on earlier cars. Filter Package, Part No. 854345, can be installed using one 90° elbow, Part No. 504500 or 114920.

THROTTLE LINKAGE ADJUSTMENT (DUAL-RANGE HYDRA-MATIC DRIVE CARS): *NOTE–On cars with "Strato-Flight Hydra-Matic" see below.* With engine at normal operating temperature, idle speed set at 450-470 RPM, and with transmission selector lever in "N" (neutral), install linkage adjustment pin J-2544 through holes in lever and bracket at rear of left head. Pin should fit freely in holes without lever movement. If free fit not obtained, adjust trunnion nuts on carburetor throttle valve rod until pin is free then tighten nuts securely. Leave gauge pin in hole. Loosen trunnion nuts on transmission throttle control rod and push rod downward until control outer lever is felt to touch end of its travel (top nut must not be touching trunnion). **Shorten throttle control rod two turns** by loosening lower nut two turns and tightening upper nut two turns. Remove gauge pin. With carburetor throttle in full open position and Downshift Return Spring fully extended, adjust throttle control intermediate rod trunnion (at lever on engine bracket) so that accelerator pedal clears floor mat by approximately 1/4" at closest point, tighten trunnion locknuts.

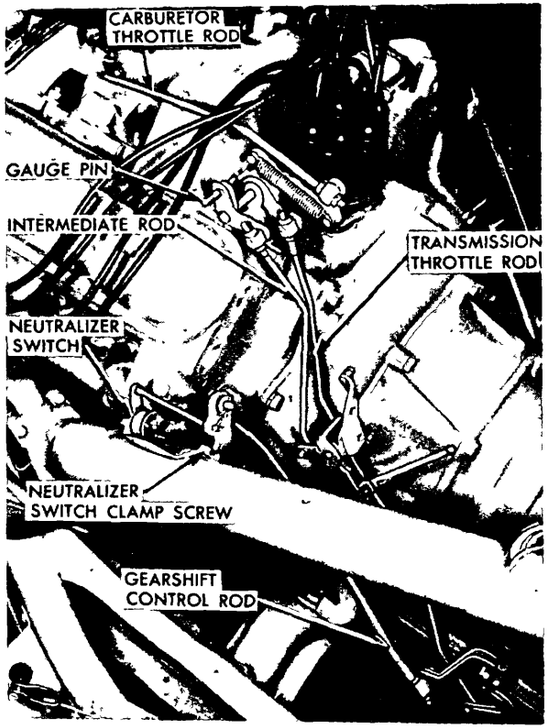
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DUAL RANGE HYDRA-MATIC THROTTLE LINKAGE

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THROTTLE LINKAGE ADJUSTMENT (STRATO-FLIGHT DUAL COUPLING HYDRA-MATIC DRIVE): *NOTE - cars with "Dual-Range Hydra-Matic" see above.* With engine at normal operating temperature and idle speed set to 460 RPM, adjust carburetor throttle rod so that linkage pin fits freely in gauge holes in throttle control bracket assembly. Loosen trunnion on transmission throttle control rod. Push transmission throttle control rod downward until transmission throttle



DUAL COUPLING HYDRA-MATIC THROTTLE LINKAGE

valve control lever is lightly against end of its travel (make sure that top trunnion locknut does not contact trunnion). While holding rod in this position tighten top trunnion locknut until it just touches trunnion, **then two complete turns further.** Tighten lower locknut securely. Adjust throttle control intermediate rod so that with carburetor throttle lever in wide open position there is 1/8" clearance between accelerator rod lever and underside of accelerator rubber bellows.

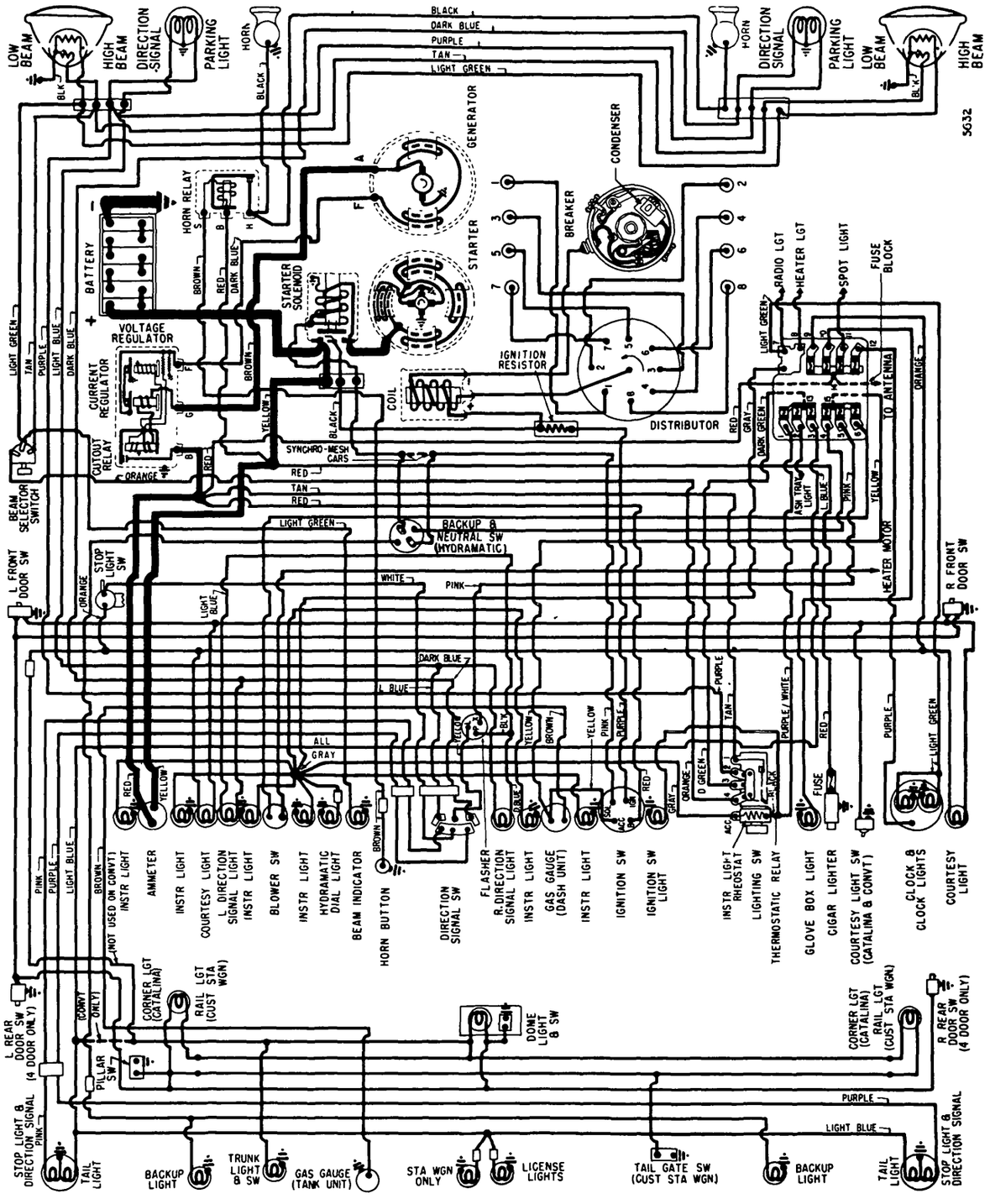
ROCHESTER 2GC

Rochester 2GC, No. 7008695 (Hydra-Matic Cars); No. 7008696 (Synchro-mesh Cars).

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel 1-4-6-7.*

Idl S tting—1 1/2 turns open from lightly seated position (turn screws out for richer mixture).

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Idle Speed (Except Air Condition ed)—450-470 RPM (with transmission in "N" position).

Idle Speed (Air Condition ed Cars)—510-530 RPM (with Air conditioner turned off).

Float Level—1-15/64" from air horn gasket to top of float assembly with assembly inverted. Use Gauge BT-105

Float Drop—1-29/32" between air horn gasket and lowest point on bottom of float with air horn held upright (Gauge BT-105)

Fast Idle: No adjustment of fast idle is provided. It is necessary however to have correct relationship between fast idle cam position and choke valve position. Check & adjust as follows Turn the idle screw in until it just contacts the second step of the fast idle cam, then with the screw on the second step and against the shoulder of the high step, the small end of Gauge BT-128 (.061"), should just fit into place between the upper edge of the choke valve and the wall of the air horn. To adjust, bend counter-weight tang on choke lever

Automatic Choke Setting: Centered (at index).

►*OTHER DATA. See "Rochester 2GC Carburetor" in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above.*

Fuel Pump Pressure - 4-5 lbs. at 450-1000 RPM.

ROCHESTER 4GC
(Standard Engine)

Rochester 4GC, No. 7008697 (Hydra-Matic Cars); No. 7007900 (Synchro-mesh Cars).

Service Replacement Carburetors—Rochester No. 7009906 (7008697), No. 7009905 (7007900).

►*ENGINE STALLING DURING WARM-UP CORRECTION: See "Rochester 4GC" Carburetor in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—1-1/2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed—450-470 RPM (all models—with transmission in "N").

►*AIR CONDITIONED CAR NOTE. Adjust idle speed with Air Conditioner turned "ON".*

►*OTHER DATA: See "Rochester 4GC" Carburetor in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above.*

Fuel Pump Pressure: 4-5 lbs. at 450-1000 RPM.

CARTER WCFB
(Standard Engine)

Carter WCFB 2364S, SA (Hydra-Matic Drive Cars).

►*ENGINE STALLING DURING WARM-UP CORRECTION: See "Carter WCFB" Carburetor in Carburetion Section.*

►*LEFT TURN "CUT-OUT" CORRECTION: See "Carter WCFB" Carburetor in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting—1-1/4—2-1/4 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed—450-470 RPM (all models—with transmission in "N").

►*AIR CONDITIONED CAR NOTE Adjust idle speed with Air Conditioner "ON".*

►*OTHER DATA: See "Carter WCFB" Carburetor in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above.*

Fuel Pump Pressure: 4-5 lbs. at 450-1000 RPM.

ROCHESTER 4GC
(285 HP Engine)

Rochester 4GC, No. 7009820 (Two Used).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor. RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Speed, Mixture Adjustment & Synchronization: Turn idle mixture screws in finger tight and then open each screw on both carburetors 2-1/2 turns. Proceed as follows

1) Hold choke valve fully open (use a pump return spring or other light spring meshed over top edge of choke valve and dividing wall of air horn in such a manner as to provide a slight clamping action). Remove cotter pin and anti-rattle spring and disconnect carburetor throttle rod (rod between bellcrank at rear of engine and front carburetor) from throttle lever of front carburetor.

2) Remove cotter pin and anti-rattle spring and disconnect inter-connecting rod (rod between throttle valve levers of front and rear carburetors), and remove inter-connecting rod. Spacer washer between rod and throttle levers may be left in position. Check pins in throttle levers for tightness. Tighten if necessary.

3) Back off idle speed adjusting screws until throttle valves are fully closed (hold throttles closed with suitable springs hooked between throttle levers and some point on engine). Turn idle speed adjusting screws in on both carburetors until they **just touch** fast idle cams *(CAUTION—It is very important that idle screws are contacting cam equally and from this point to completion of adjustment, screws are turned equally to maintain balance between carburetors).*

4) Adjust trunnion on end of throttle inter-connecting rod so that rod can be installed over pins on carburetor throttle levers freely without changing throttle lever position Install inter-connecting rod over pins of both carburetors (trunnion toward rear and front end of rod pointing toward engine). Make sure that spacers are still in position between rod and throttle levers.

5) Turn each idle speed adjusting screw in 1 1/4 turns (to give approximate idle adjustment). Check throttle inter-connecting rod for freeness and if found to be tight, repeat adjustment as outlined above. Remove springs holding throttle valves closed.

6) Install anti-rattle spring and cotter pin at rear end of inter-connecting rod. Install carburetor throttle, anti-rattle spring and cotter pin on throttle lever at front carburetor. Check rods to see that trunnions on rear of both rods are positioned so flats on front ends of rods are parallel with throttle lever. Remove springs holding choke valves open. Start engine and allow to warm up thoroughly Install tachometer.

7) With engine warm and fast idle cam fully released, turn both idle speed screws equally to obtain an idle speed of 650 RPM. Adjust idle mixture screws for best quality and highest engine idle. Recheck engine idle speed and readjust to 650 RPM if necessary.

►*OTHER DATA: See "Rochester 4GC" Carburetor in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above. NOTE - Normal idle speed 650 RPM.*

Fuel Pump Pressure: 4-5 lbs. at 450-1000 RPM.

CARB. EQUIPMENT

►*HIGH FUEL PUMP PRESSURE CORRECTION (Causing Carburetor to Flood):* May be caused by the diaphragm being installed with insufficient slack. *See "Fuel System Notes" in Pontiac Special Data*

►*FUEL FILTER PRODUCTION CHANGE: See CARBURETOR above.*

Fuel Pump: AC. Replacement - AC No. 4123 (Fuel & Vacuum - used with vacuum wipers), AC No. 4239 (Fuel only - used with electric wipers).

Pressure - 4-5 lbs. at 450-1000 RPM.

►*FUEL PUMP PRESSURE CAUTION - If pressure too high or too low, replace pump.*

Fuel Filter: Disc type. *See "Fuel System Notes" in Pontiac Special Data & "Production Change" above.*

Gasoline Gauge: AC Electric type.

Dash Unit - AC No. 1518504.

Tank Unit - AC No. 1518395. (Exc. Sta. Wgn.), No. 1518524 (860 Sta. Wgn. - 4-Dr.), No. 1518467 (870 4-Dr., 860 2-Dr., Star Chief Safari Sta. Wgns).

►*PASS. CAR IMPROPER GASOLINE GAUGE READING CORRECTION (EXC. STA. WGN.):* Caused by tank unit rheostat float arm being positioned improperly. To correct condition, remove unit, place in vise, and bend float arm so that it is 7/32" lower in tank. Condition has been corrected in production. Units so corrected have a daub of red paint on tank unit outlet tube (over 90 day period).

See "Fuel Gauges" in Carburetion Section.

BATTERY

Standard - Delco 2SMR53. *12 Volt,* 9 plate, 53 ampere hour capacity (20 hr rate).

Air Conditioning & Police - Delco 3SMR72. *12 Volt,* 11 plate, 72 ampere hour capacity (20 hr. rate).

Battery Ground - Negative Left front corner of left head.

Engine Ground - Between engine and fender at battery ground

STARTER

Delco-Remy 1107641. *12 Volt.*

Armature - Delco-Remy 1932185.

Drive—Overrunning clutch (solenoid pinion shift).

Rotation—Counter-clockwise at commutator end.

Brush Spring Tension—35 ozs. minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3500	10.1	95
10.5 ft. lbs	Lock	5 4	. 470

Starting Switch: Delco-Remy Solenoid 1119781 (no relay) mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No 1116472. Neutral Safety Switch used on Hydra-Matic Drive Cars

Neutral Safety & Back-up Light Switch: Delco-Remy 1998039. At lower end of steering column Connected

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in starter control circuit so that starter operates only when selector lever in "N" (Neutral).

Adjustment - *See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Transmission Section.*

GENERATOR

Delco-Remy. *12 Volt.* Application as follows

Delco-Remy Generator No.	Armature
1100304 (Standard)	1928952
1102052 (Air Cond.) Early	1932900
1102073 (Air Cond.) Later	1932900
1102054 (Hvy. Duty)	1932900
1100333 (285 HP Eng.) Ⓒ	1928952

Ⓒ - Replacement Generator No. 1100313.

Maximum Charging Rate - *See Voltage Regulator.*

Performance Data - Cold

Generator	Amperes	Volts	RPM
1100304	25	14.0	2780
1102052	35	14.0	2380
1102073	35	14.0	2100
1102054	35	14.0	2380
1100333	25	14.0	2570

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.5-1.62 amps. (1100304, 1100333), 1.62-1.82 amps. (1102052, 1102073, 1102054). All at 12.0 volts (80°F.).

Belt Adjustment: ¼" belt deflection with approximately 8 lbs. (5 lbs. with Air Conditioning) pressure midway between pulleys.

REGULATOR

Delco-Remy Regulator No.	Use with Gen. No.
1119000	1100304, 1100333
1119002	1102052, 1102073, 1102054

►*NOTE: Regulator is "1119000 Series". Specifications below are for "Normal" settings.*

Checking & Adjusting - *See "1119000 Series" Regulator in Electrical Section.*

Cut-Out Relay

Cuts In–11.8-13.5 volts (hot).

Contact Gap–.020".

Air Gap–.020" (with contacts just closed).

Voltage Regulator

Setting–13.8-14.8 volts (hot)

Air Gap–.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

Current Regulator

Setting (1119000) - 23-27 amps. (hot).

Setting (1119002) - 32-37 amps. (hot).

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "1119000 Series" Regulator in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Direction Signals: *See Electrical Section.*

Automatic Eye: *See Electrical Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "on" position, push latch button on side of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly allowing switch assembly to be removed from instrument panel.

Stop Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-Up Light Switch (Synchro-mesh Cars): Located on lower steering column shift lever.

FUSES: Fuses listed below (except as noted) are located on a fuse block behind instrument panel on dash to left of steering column.

Instrument Panel–4 amps.
Hood Ornament & Ash Tray–7½ amps.
Stop Lights, Dome & Courtesy Lights–7½ amps.
Tail Lights–7½ amps.
Back-up Light–7½ amps.
Glove Box & Underhood Light–7½ amps.
Direction Signal & Brake Light–7½ amps.
Spot Lights–7½ amps.
Heater & Defroster–7½ amps.
Radio & Clock–7½ amps.
Air Conditioner–30 amp. Located in a line holder either on defroster core housing or if car not equipped with defroster, on front of dash where defroster should be.

LIGHTING THERMOSTATIC CIRCUIT BREAKER: *12 Volt.* 22 amperes. Located on lighting switch.

HORNS: Delco-Remy. Dual horns operated by relay (Std.).

Low Pitch - Delco-Remy 1999763.
High Pitch - Delco-Remy 1999768.
Optional - (Trumpet type) Delco-Remy 1999588, (Tritone type) Delco-Remy 1999793.

Horn Relay: Delco-Remy 1116781. *12 Volt.*

Air Gap - .014". **Point Opening** - .027".
Closing Voltage - 5.0-9.5 volts.

►*HORN RELAY CORROSION CAUTION:* An irregular shaped opening occurs where left hand radiator baffle and radiator cross bar join in front of horn relay. This opening should be sealed with auto body putty or similar compound. At time sealing operation is performed, relay mounting screws should be removed and base inspected for corrosion. If evidence of corrosion exists, relay should be replaced.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8 Valve-in-head.

Engine	Bore	Stroke	Displacement
All	3.94"	3.25"	316.6 cu. ins.

Engine	① Compr. Ratio	② Rated HP	Dev. HP
S M ③	8.9-1	49.6	192 at 4400 RPM
S M ④	8.9-1	49.6	216 at 4800 RPM
H M ③	8.9-1	49.6	205 at 4600 RPM
H M ④	8.9-1	49.6	227 at 4800 RPM
Special ⑤	10.0-1	49.6	285 at 5100 RPM

①–S M (Synchro-mesh), H M (Hydra-Matic).
②–7.9-1 Compression Ratio Optional.
③–Standard engine with 2-Barrel Carb.
④–Standard engine with 4-Barrel Carb.
⑤–Special engine optional on all models except Air Conditioner equipped cars.

Compression & Vacuum Reading - *See TUNE-UP above.*

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove right and left engine side side aprons. Remove steering idler lever support attaching screws and lower steering linkage as far as possible. Disconnect exhaust crossover pipe and jockey it around to a position where it can be removed without forcing. Remove flywheel housing lower cover and front shield. Loosen crankcase ventilator outlet pipe brace and swing brace out of way.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

►*CYLINDER HEAD REPLACEMENT CAUTION. 1956 cylinder heads are not interchangeable with previous models.*

►*285 HP ENGINE CYLINDER HEAD CAUTION: This cylinder head not interchangeable with other 1956 models.*

Oil Passage Plug (In Cylinder Head) Replacement: *See "Oiling System" in Pontiac Special Data.*

TIGHTENING TORQUES: *See "Tightning Specifications" in Pontiac Special Data.*

INTAKE MANIFOLD: With **Special** flat washers under attaching nuts, tighten nuts evenly to 40-45 ft. lbs.

ENGINE MOUNTINGS: *See "Engine Mountings" in Pontiac Special Data.*

PISTONS

Cast aluminum alloy, slipper skirt, with piston pin offset 1/16" toward right side of engine.

►*DIFFERENT PISTONS USED IN "HIGH" & "LOW" COMPRESSION ENGINES:* Pistons identified as follows: High compression pistons are flat on top, and low compression pistons are "dished" out. Low compression pistons also have an "L" stamped on rear side near pin boss.

Removal–Pistons and rods removed from above.

Replacement Pistons: Std. size, and .005", .010", .020", .030" Oversize.

Fitting New Pistons: Clearance .0007-.0017" (measured). just far enough above bottom of skirt to make sure micrometer is in full contact, and perpendicular to piston pin boss). Use a .0015" x ½" feeler gauge and spring scale. With piston and cylinder clean and dry, insert inverted piston and feeler gauge into lower half of cylinder (feeler 90° from pin hole). Pull required to withdraw feeler should be 8-15 lbs.

Installing Pistons: Install with notch in piston head and "F" mark on side of piston toward front of engine. *See Rod Installation.*

PISTON PINS

Pin is floating in piston and connecting rod and is retained by snap rings at each end.

Diameter–.9803-.9807".

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Pin Fit in Piston - .0000-.0004" loose with piston and pin at room temperature. When pin is toward high limit (.0004") pin can be inserted with light hand pressure, *pin should not fall through of its own weight.* When pin toward low limit (.0000"), considerable hand pressure will be required (a brass drift can be used to tap pin into place with light pressure).

Pin Fit in Connecting Rod - .0001-.0006" loose.

Replacement Pins: Std. size, .001", .003" Oversize.

PISTON RINGS

Upper compression ring is chrome plated. Both compression rings are taper faced and have either a chamfer or a step on inside diameter of top side.

Ring	Width	End Gap	Side Clearance
Upper Compr.	.078"	.010-.020"	.0012-.0027"
Lower Compr.	.078"	.008-.020"	.0012-.0032"
Oil	.183"	.015-.035"	.0025-.0095"

Installing Rings: Install compression rings with chamfer or step (on inside diameter) toward top of cylinder. Oil ring can be installed either way.

Replacement Rings: Std. size, .005", .010", .020", .030" Oversize.

CONNECTING RODS

Length—6.623-6.627" (center-to-center).
Crankpin Journal Diameter—2.2488-2.2498".
Connecting Rod Upper Bushing (Piston Pin) Removal & Installation—*See "Connecting Rods & Bearings" in Pontiac Special Data.*
Lower Bearing—Replaceable precision type.
Clearance—.0009-.0029" (new).
Side play—.006-.011".

Replacement Bearings: Std. size, .001", .002" Undersize.

Installing Rods: Install rods **2-4-6-8 (right bank)** with machined boss at lower end of rod toward the **rear.** Install rods **1-3-5-7 (left bank)** with boss toward the **front** of engine. When installed, machined bosses on rods will face each other. *See Pistons above.*

CRANKSHAFT

►*REAR MAIN BEARING PRODUCTION CHANGE:* Engines built beginning Jan. 3, 1956 have new type rear bearing shell. However, a number of engines were built after Dec. 16, 1955 with grooves machined in block and cap but with first type bearing shells installed. If leaks are encountered on engines having new groove and first type shells, second type shells may be installed. Part No. of new shell is 522825 (one upper and one lower). New shells have oil drain groove and three oil drain holes.

Journal Diameter—2.2498-2.499". Five bearings.
Bearings—Steel backed babbitt lined inserts. No shims.
Clearance—.0005-.003" (Except Rear), .0008-.0033" (Rear).

End Thrust: Taken by No. 4 (rear center) main bearing.
Endplay—.0035-.0085".

Replacement Bearings: Std. size, .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

FLYWHEEL INSTALLATION (Hydra-Matic Cars): *See "Flywheel" in Pontiac Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION: Camshafts can be identified by numeral stamped on front end of shaft or absence of that numeral. Standard engine with synchro-mesh transmission has numeral "0", standard engine with Hydra-Matic transmission has numeral "4", and 285 HP engine has no marking.*

Journal Diameters—1.8992-1.8997". Five bearings.
Clearance—.0015-.0025".

End Thrust: Steel thrust plate located behind camshaft sprocket. Replace if worn or grooved.
Endplay—.003-.007".

Timing Chain: Length—60 links.
Timing Chain Installation—*See "Timing Chain" in Pontiac Special Data.*

Camshaft Setting: Both sprockets marked '0'. Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): Installation - *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

►*VALVE REPLACEMENT CAUTION: Valves used on 285 HP engine are 3/32" longer than valves used on other engines (not interchangeable).*

►*VALVE ADJUSTMENT NOTE: Because of new design, it is no longer necessary to initially adjust the tappet clearance when cylinder head or valve system is disturbed. See "Rocker Arms" below.*

Tappet Clearance: None in service (hydraulic).

Valve Specifications

Valve	Head Diam.	Stem Diam.	Length
Intake	1.778-1.784"	.3407-.3417"	① 5.250"
Exhaust	1.497-1.503"	.3407-.3417"	② 5.230"

Valve	Seat Angle	Lift	③ Stem Clearance
Intake	30° ⑤	.370" ④	.0002-.0008"
Exhaust	45° ⑤	.370" ④	.0002-.0008"

①—5.340" (Special 285 HP Engine).
②—5.330" (Special 285 HP Engine).
③—In small end of taper reamed valve guide hole in head (valve guide integral with head), or hole in valve guide (pressed into head). Correct fit of valve stem in in guide is when valve will just drop through of its own weight and with no perceptible side play.
④—Standard Synchro-mesh Engine. Standard Hydra-Matic Engine (.400"). Special 285 HP Engine, Intake (.409"), Exhaust (.413").
⑤—Valve face angle 29° (Intake), 44° (Exhaust).

Valve Seat Width - 3/64-1/16" (Intake); 1/16" (Exhaust).

Replacement Valves: Furnished Standard size, .001", .003" oversize.

Valve Stem Oil Seal: Neoprene seal installed in second groove of intake valve stems. An oil splash shield is installed over top of inner intake valve spring (except 285 HP Engine).

Checking Valve Stem Length: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Inner and outer valve springs used.

Standard Engines

Valve	Inner Spring Pressure	Inner Spring Length	Outer Spring Pressure	Outer Spring Length
Open	54-60 lbs.	1.153"	98-106 lbs.	1.203"
Closed	23-29 lbs.	1.483"	55-61 lbs.	1.533"

285 HP Engines

Valve	Inner Spring Pressure	Inner Spring Length	Outer Spring Pressure	Outer Spring Length
Open	95 lbs.	1.08"	128 lbs.	1.13"
Closed	33 lbs.	1.48"	59 lbs.	1.53"

►*285 HP ENGINE VALVE SPRING NOTE:* Interference may be found between inner and outer valve springs during assembly. In such a case, springs must be forced together.

Valve Guides: Cast integral with cylinder head. When valve stem clearance excessive, ream guides using Valve Guide Reamer J-5713 (.001"), J-6341 (.003"). *See Valve Guide Note Below.*

►*VALVE GUIDE NOTE:* Some production engines may be found with removable type guides (same as 1955 models). Guides have tapered hole (.0015" taper to inch), with greater clearance at rocker arm end. To replace guide, drive old guide out from combustion chamber side using Tool J-2542. Start chamfered end of guide into cylinder head and drive into place using Tool J-2542 until end of guide is 1 1/32" below roof of combustion chamber. Ream guides with taper reamer J-5712-2. *CAUTION* - Guides furnished with straight hole which must be taper-reamed.

Valve Clearance in Guide - .0002-.0008". Valve should just fall through guide of own weight and with no perceptible side play.

Valve Lifters: Hydraulic type. *NOTE* - Three different type lifters used in production. Lifters used on standard engines have ribs or a radial groove on lifter body. Lifters used in 285 HP engine are identified by letter "A" stamped on lifter body and area that contacts cam has a lubrited (blackened) finish. The 285 HP engine lifter has spring under ball check valve and redesigned ball check valve retainer. *CAUTION* - It is extremely important that regular production lifters are not used in the 285 HP engine.

Diameter - .8424-.8427". **Length** - 2.000".
Clearance (In Lifter Boss) - .0013-.0028".

Hydraulic Valve Lifter Overhaul: *See "Valve System" in Pontiac Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm to Stud - When valve rocker arm ball retaining nut is tightened to 15 ft. lbs., proper location of rocker arm, with respect to pushrod and valve lifter, is automatically assured.

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Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Synchro-mesh Engines

Intake - Opens 22° BTDC. Close 67° ALDC.
Exhaust - Opens 63° BLDC. Close 27° ATDC.

Hydra-Matic Engines

Intake - Opens 27° BTDC. Close 73° ALDC.
Exhaust Opens 69° BLDC. Close 31° ATDC.

Special 285 HP Engines

Intake - Opens 34° BTDC. Close 75° ALDC.
Exhaust - Opens 81° BLDC. Close 37° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 5 qts. (refill), 6 qts. (when filter changed).

Normal Oil Pressure: 35-45 lbs. at 40 MPH.

Pressure Regulator—In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.

►*OIL PUMP NOISE:* "Grinding" noise may be caused by upper end of oil pump drive shaft rubbing in hole in cylinder block. Examine outer diameter of shaft above upset nibs for rubbing and correct by reducing shaft diameter in this area by grinding or turning in a lathe. *CAUTION*—Do not remove nibs on shaft.

Pump Overhaul—*See "Oiling System" in Pontiac Special Data.*

Oil Filter: "Full Flow" type (optional). Replace filter element once every year or every 15,000 miles. *Use only AC Type PF-122 filter element.*

Oil Passage Plug (In Cylinder Head) Replacement: *See "Oiling System" in Pontiac Special Data.*

Crankcase Ventilator Air Filters: Located in oil filler cap and in ventilator outlet pipe. Clean and re-oil every 10,000 miles or oftener if necessary.

►*VENTILATOR OUTLET PIPE CAUTION: If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed into cover beyond the two locating points on pipe. Excessive oil consumption at high speed will result*

Oil Pressure Gauge: AC No. 1508429. Not electric.

COOLING

Water Capacity: Without Heater - 22¾ qts.
With Underseat Heater - 24½ qts.
With Hydra-Matic Drive - 23½ qts.
With Hydra-Matic Drive & Air Cond. - 23 qts.
With Underseat Heater & Air Cond. - 25 qts.

Pressure Valve: AC No. 850795 (Exc. Air Cond.). 7 lb. type. AC No. 850800 (Air Cond.). 13 lb. type. Radiator filler cap.

Thermostat: Harrison No. 3133596 (Exc. Air Cond.) 160° No. 3126289 (Air Cond.) 160°. No. 3133597 (Exc. Air Cond. - use with permanent anti-freeze) 170°.

Water Pump: Packless, sealed ball bearing shaft. Serviced as an assembly.

Temperature Gauge: AC No. 1513171. Not electric. *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Inland. Single plate, "Diaphragm", dry disc type with Long driven member.
See "Inland" in Clutch Section.

Clutch Disc No. - Pontiac No. 518130.

Pedal Adjustment: 7/8-1 1/8". Adjust at clutch fork-to-countershaft rod.

Overcenter Spring Adjustment—Remove overcenter spring, spring extension, and pushrod. Loosen lock screw which clamps spring lever to countershaft. Install Gauge J-5819, inserting pins which are closest together into holes in overcenter spring link and lever from which pushrod was removed. Then, while applying rotation to clutch countershaft to hold clutch pedal against stop, rotate overcenter spring lever until third pin in gauge can be inserted into overcenter spring lever. Tighten lockscrew securely, and replace spring, spring extension, and pushrod.

Removal: Remove transmission (see Transmission Removal below), remove clutch bearing support spring washer (in rear face of clutch housing) and remove clutch housing bottom cover and control shaft inner bracket. Remove release bearing support and release bearing. Tap bearing support from inside clutch housing to aid removal (*CAUTION*—Avoid striking tubular portion of support). Mark flywheel and clutch cover (to insure installation in same manner to maintain balance), remove clutch cover bolts evenly, move clutch assembly away from flywheel at bottom and withdraw driven member. Lower clutch assembly out of car.

Clutch Installation Note—Install new felt oil seal against shoulder ahead of oil slinger retainer ring on transmission main drive gear (will bear against flared end of release bearing support when installed). Lubricate seal with engine oil before transmission installed. Coat entire length of outer diameter of release bearing support tube with grease. Lubricate release fork fulcrum points with a very light coat of grease. Apply light coat of Lubriplate on main driving gear splines. Use new paper gasket between support flange and clutch housing, make certain that flange is not bent or distorted (will cause misalignment of transmission).

SYNCHRO-MESH TRANSMISSION

Own. All helical gear type.
See "Pontiac Synchro-Mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section*

Removal: 1) Disconnect speedometer cable, gearshift selector rod, control rod and backup lamp switch wires from transmission.

2) Disconnect rear universal joint (use a wire or rubber band to prevent trunnions from slipping off spider). Remove propeller shaft by sliding it to rear off transmission mainshaft splines.

3) To give clearance for removing upper capscrew holding transmission to clutch housing, remove transmission shift lever spring yoke and extension. Remove shift lever screw while holding shift lever in neutral (center position) to avoid damage to shift levers on shaft inside transmission. Remove shift lever.

4) To give clearance for removing lower capscrew holding transmission to clutch housing, remove transmission outer lever. Remove transmission upper capscrews and install two transmission guide pins (pins can be made by cutting the heads off two transmission capscrews and sawing a screw driver slot in the ends). *CAUTION*—Guide pins must be used since they support transmission and prevent distortion of clutch driven plate hub when lower transmission capscrews are removed.

5) Remove lower capscrews and move transmission to rear, bringing rear bearing extension into intersection of frame "X" members until main drive gear is free, then lower to floor. *CAUTION*—Use care to avoid getting dirt into front bearing when pulling transmission away from clutch housing.

Installation Note: Use guide pins installed in two upper transmission mounting holes to assist in sliding transmission straight forward into place (to avoid damage to clutch release bearing tubular support).

HYDRA-MATIC DRIVE

"Dual Range" or "Dual Coupling". Four speed automatic transmission and fluid coupling. *NOTE* - "Dual Range" Hydra-Matic used on early Series 27 cars (same as used in 1955). "Strato-Flight (Dual Coupling)" Hydra-Matic used on later Series 27 and other cars.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Transmission Section.*

Lubrication - Check fluid level every 2000 miles, drain and refill every 25,000 miles. Use "G.M. Hydra-Matic Fluid" or Automatic Transmission Fluid "Type A" (marked AQ-ATF on container).

Checking Fluid Level (Dual Range) - Run engine 1½ minutes at a speed equivalent to 20 MPH with selector lever in "N". Reduce speed to **slow idle** and move selector lever to "D" position. Measure oil level. Add fluid to bring level to "FULL" mark on dipstick.

Checking Fluid Level (Dual Coupling) - With selector lever in "P" position, engine at normal operating temperature and idling at normal idling speed (450-470 RPM) measure oil level. Add fluid to bring level to "FULL" mark on dipstick

Capacity - (Dual Range) 11 qts. refill. (Dual Coupling) 9½ qts. refill.

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual Range" or "Dual Coupling" Hydra-Matic Drive in Transmission Section.*

UNIVERSALS

Mechanics or Saginaw. Needle bearing type.

►*CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload (must be adjusted whenever nut is loosened). *See "Pontiac Hypoid" in Rear Axle Section.*

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REAR AXLE

►*REAR SPRING SHACKLE TO FRAME INTERFERENCE CORRECTION*· Make sure spring upper frame bushing is flush with frame bracket toward car centerline If spring clamp is touching frame, bend as necessary for clearance

Own. Hypoid gear, semi-floating with Hotchkiss Drive *See "Pontiac Hypoid" in Rear Axle Section.*

Axl Id ntificati n—Code mark stamped on pad at forward side of differential carrier between bottom web and right hand horizontal web Axle shaft also marked with daub of paint on end of shaft to indicate ratio. See Code & Paint Markings in table below

Axl Rati s & Code Marking

Rati	G ar T th	①Code Mark	②Code Color
3 08-1③⑨⑤	40 13	0	Yellow
3.23-1③⑥	42 13	9	Brown
3.64-1⑦	40·11	6	Blue
3.90-1⑧	39 10	4	Red

①—See Rear Axle Identification
②—Paint daub on end of axle shaft.
③—Hydra-Matic Drive
④ — 27 Series.
⑤ — Except Station Wagon.
⑥ — 28 Series & Station Wagons.
⑦—Synchro-mesh Transmission (Standard)
⑧—Synchro-mesh Transmission (Optional)

Backlash—.003- 012' (new), 012" (used)

Axl Shaft R m val: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line may be damaged) Pull shaft with Puller J-942 (do not drag axle shaft on seal).

Wh l B aring Adjustment: None

Diff r ntial Carri r Ass mbly Removal· Disconnect rear universal and wire trunnion in place (do not disengage spline joint at transmission), remove axle shafts and carrier flange capscrews. Withdraw carrier assembly from housing

►*CAUTION: R ar universal joint companion flange nut controls r ar axl pinion bearing preload. Readjust whenev r nut loos n d.*

SHOCK ABSORBERS

D lc . Direct acting, non-adjustable, sealed (not refillable) Service by replacement

Model	Front	Rear
Standard	5522515	5524031
Taxi, Police, H D	5352226	5513346

FRONT SUSPENSION

Independent. Shock absorber mounted within front coil spring
See "Pontiac" in Front Suspension Section.

Kingpin Inclination - 1°20' at 0° camber

Caster—Neg 1°±½°

Camber—Pos ½°±½°

Toe-In—0' to 1/16'

Toe-Out on Turns - With inner wheel at 20°, outer wheel should be 18-19°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (In Line). *See 'Saginaw (In Line)" Power Steering in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand brake applies rear wheel service brakes.

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

Drum Diameter - 12" (front), 11" (rear).
Wheel Cyl. Diameter - 1 1/16" (front), 15/16" (rear).
Lining Width - 2¼" (front wheels), 1¾" (rear wheels).
Thickness - 13/64".
Clearance—Tighten adjusting "star wheel" to point where wheel can just be turned by hand, then back off star wheel 14 notches.

Standard Mast r Cylind r: Forward of brake pedal on engine side of fire wall.

Ch cking Fluid L v l—Maintain fluid level in master cylinder reservoir to 7/8" from gasket surface of filler neck.

Power Brakes: Bendix or Moraine Power Unit. *S e "Moraine Power Unit" or "Bendix Power Unit" in Brake Section.*

Checking Fluid Level—Maintain fluid level in master cylinder reservoir to within ½" of top of filler cap opening.

Removal of Power Unit—Disconnect upper end of vacuum hose attached to inlet at vacuum cylinder, and hydraulic lines at master cylinder. Disconnect pushrod from pedal and wires from stop light switch. Remove nuts from U-bolt retaining pedal pivot bracket to steering column and remove pedal and bracket (with stop light switch assembly attached). Remove clutch pedal and steering column seals at floorboard. On Hydra-Matic cars, remove screws retaining power brake unit to floor pan and remove mounting plate with power unit attached. On Synchro-mesh cars, remove screws retaining power unit to mounting plate (power unit will rest on frame) Remove screws attaching mounting plate to floor pan and remove mounting plate, "jockeying" it as necessary to clear clutch pedal. Remove power unit. *CAUTION*—Do not carry or support brake unit by pushrod as pushrod may be pulled out of cylinder.

MISC. MECHANICAL

Windshield Wiper: Vacuum or electric type.
See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Harrison. *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor. *See 'Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motors in each window. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Six-way electric type. Fore & Aft, Up & Down, and Tilting movement provided through three switches and two motors. *See "Power Seat Adjusters" in Miscellaneous Section.*

► *"TRIPLE CARBURETOR" & "EXTRA HORSEPOWER" ENGINE NOTE:* Specifications for special equipment used on these engines (Carburetors, Distributors, Camshaft, etc.) are included in data below.

MODEL IDENTIFICATION

Model	Model Designation
Chieftain	57-27
Super Chief	57-27
Star Chief ①	57-27
Star Chief	57-28

① - 2-Seat Station Wagons only (2 Dr. & 4 Dr.).

SERIAL & ENGINE NUMBER: Numbers are the same. Located on left front hinge pillar post and on machined pad on front of R.H. Cyl. bank. *NOTE* - Production Engine No. located on front of block near R.H. edge of timing chain cover, for factory usage.

► *ENGINE COMPRESSION RATIO NOTE:* Compression ratio indicated by mark stamped on Serial No. pad as follows: "L" in circle - 8.5-1. No mark 10-1.

► *SERIAL NUMBER NOTE:* Engine and serial number (Example P757H 1001) includes following identification data in sequence:

Assembly Plant	Model ①	Model Year	Trans. Type ②	Serial No.
See below	7	57	H	1001

① - **7** - (27 Series). **8** - (28 Series).
② - **H** - (Hydra-Matic). **S** - (Synchro-mesh).

Assembly Plant Designations

P - Pontiac	**K** - Kansas City
C - South Gate	**L** - Linden
W - Wilmington	**A** - Atlanta
F - Framingham	**T** - Arlington

TUNE-UP

COMPRESSION PRESSURE: (8.5-1 Hd.) 140-150 lbs., (10.0-1 Hd.) 155-165 lbs. at cranking speed of 155-165 RPM. Lowest cylinder must not be less than 80% of highest cylinder.

VALVE TAPPET CLEARANCE: All Engines with Hydraulic Lifters - None in service.
Extra HP. Engine with Mechanical Lifters - .018" COLD, All Valves.

MANIFOLD HEAT CONTROL: Thermostatic coil type in right hand exhaust manifold outlet. Valve must operate freely.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAPS: .035" (.033-.038").
Spark Plugs - AC No. 45 Std. (AC No. 44 Extra HP Engines). 14 mm. Torque to 25 ft. lbs.

COIL: Delco-Remy 1115087 (Std.), 1115099 (Extra HP Engines with Synchro-mesh Trans.).
Ignition Current - (1115087) 1.2 amps. idling, 3.5 amps. stopped; (1115099) 1.8 amps. idling, 4 amps. stopped.
Resistor - Delco-Remy (1115087 Coil) 1935134, 1.40-1.62 Ohms. (1115099 Coil) 1931385, .27-.29 Ohms.

► *COIL RESISTOR NOTE:* Resistor is connected in lead between ignition switch and coil. Resistor is by-passed during cranking by second lead from ignition switch to coil side of resistor.

DISTRIBUTOR: Delco-Remy.

Application	Delco-Remy No.
Std. Engine	1110871
Triple Carb. Eng.	1110871
Extra HP Eng. (Hydra-Matic)	1110871
Extra HP Eng. (Synchro-mesh)(Early)	1110888
Extra HP Eng. (Synchro-mesh)(Later)	1110897
Fuel Injection Eng.	1110894

► *DISTRIBUTOR NOTE: Different types used as follows:*
Models 1110871 & 1110894 - External adjustment "window" type.
See "Delco-Remy Window Distributor" in Electrical Section.
Models 1110888 & 1110897 - Double breaker type with conventional distributor cap (not window type). Vacuum spark control not used (centrifugal weight advance only).
Condenser - Delco-Remy 1932004 (All Distributors).
Capacity - .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988 (1110871 & 1110894 Distr.), No. 1918148 (1110888 & 1110897 Distr., Two used.).
Breaker Gap (1110871 & 1110894) - *NOTE* - When cam angle correctly set (see below), breaker gap will be correct (.016").
Breaker Gap (1110888 & 1110897) - .014-.018".
Cam Angle (1110871 & 1110894) - 28-32°. Set to 30°.

► *BREAKER GAP AND CAM ANGLE NOTE:* Setting cam angle at 30° will provide .016" breaker gap.
Cam Angle (1110888 & 1110897) - Adjust each set of points to 29°±1° with other set of points blocked open with .025" thick insulator. Cam angle for both sets of points operating together will be 34°± 1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance (1110871 & 1110894)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
7.5-9.5	1000	15-19	2000
12-14	2125	24-28	4250

Automatic Advance (1110888)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	500	0-4	1000
5-7	1000	10-14	2000
6-8	1325	12-16	2650

Automatic Advance (1110897)

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	525	1-5	1050
7-9	1050	14-18	2100
8-10	1400	16-20	2800
9-11	1800	18-22	3600

Vacuum Spark Control: Delco-Remy 1116126 (1110871 & 1110894). *NOTE* - No vacuum control used on 1110888 or 1110897.

Vacuum Advance (1110871 & 1110894)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
10-12	20-24	14-15¾

IGNITION TIMING

► *TRIPLE CARBURETOR & EXTRA HP ENGINE HARMONIC BALANCER NOTE:* These cars **and early production air conditioned cars with standard engine** have three timing marks on harmonic balancer as follows: 10° BTDC, 6° BTDC and TDC.

Engine	Std. Ign. Setting
Std. Eng. (Std. & A.C.)	6° BTDC at 430-450 RPM
Triple Carb. Eng. ①	6° BTDC at 430-450 RPM
Extra HP Engine ②	10° BTDC at 630-670 RPM

① - Hydra-Matic Drive Cars.
② - Synchro-mesh Cars only. (Hydra-Matic same as Triple Carb. Engine).

► *TIMING CAUTION:* Set timing with engine at operating temperature and idling at indicated RPM **with vacuum line disconnected.**
Timing Marks (All Std. Engines & All Late Production Std. Engines with Air Conditioning) - Two marks on harmonic balancer, TDC and 6° BTDC. Pointer on timing sprocket cover aligned with correct mark on harmonic balancer.
Timing Marks (All Triple Carb. and Extra HP Engines and Early Production Std. Engines with Air Conditioning) - Three marks on harmonic balancer, TDC, 6° BTDC and 10° BTDC. Pointer on timing sprocket cover aligned with correct mark on harmonic balancer.

CARBURETOR

► *CARBURETOR APPLICATION: Used as follows:*

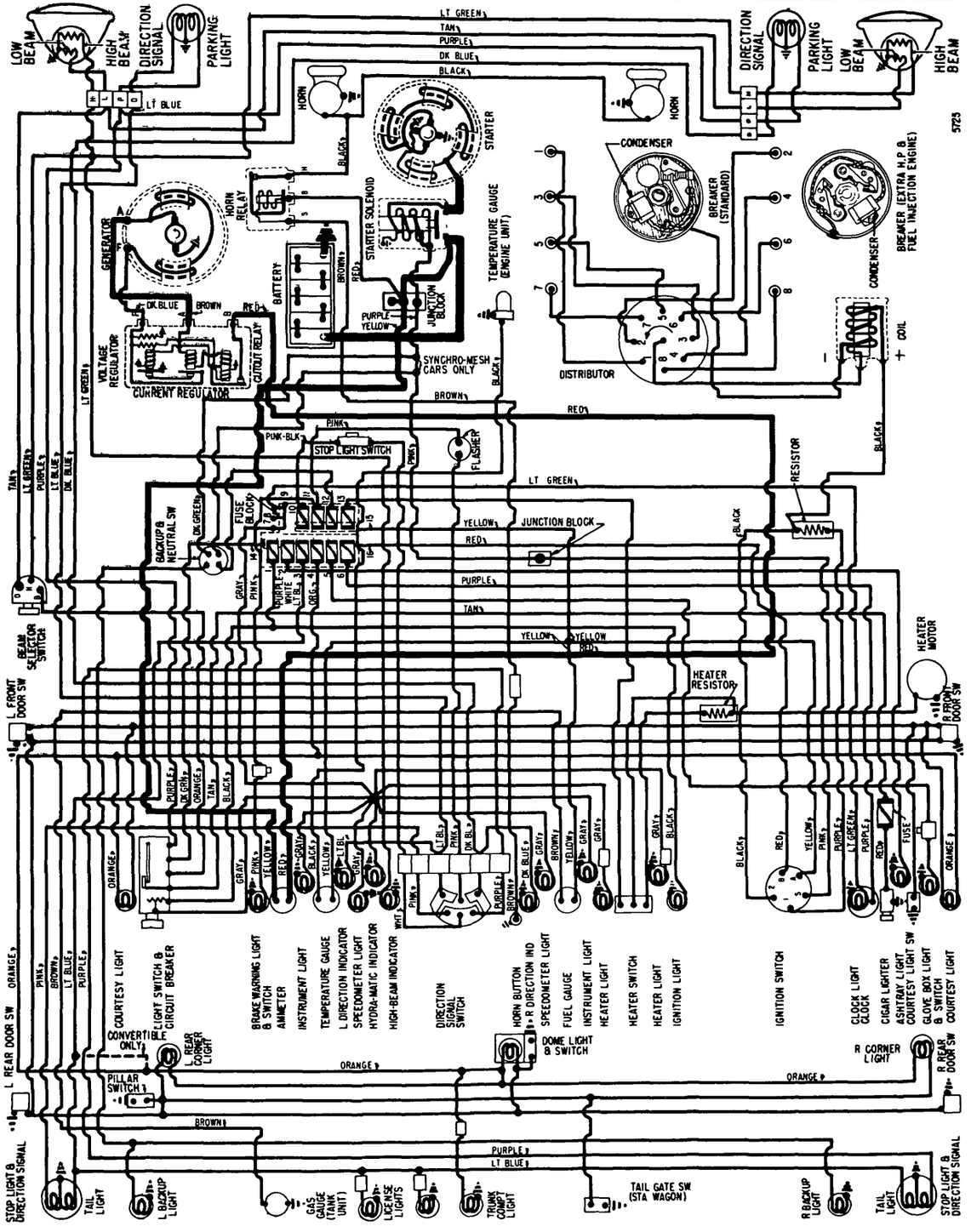
Model	Carb. Type
Chieftain	Rochester 2-Barrel
Super & Star Chief	Carter or Rochester 4-Barrel
Triple Carb. Option	Three Rochester 2-Barrel
Extra HP Engines	Three Rochester 2-Barrel
Special	Rochester Fuel Injection

► *AIR CLEANER NOTE: Replaceable Paper Element type used with Triple Carburetor Option and Extra Horsepower models. See AIR CLEANER below.*

► *FLOODING CORRECTION NOTE (ALL CARBS.): See individual carburetor stories in Carburetion Section.*

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC DRIVE CARS): With engine and transmission at normal operating temperature, idle speed correctly set *(see carburetors below)*, and transmission selector lever in "N" (Neutral) or "P" (Park), proceed as follows: Loosen both nuts on throttle control transmission rod trunnion. Stop engine and install Linkage Adjusting Pin J-2544 through holes in throttle control lever and bracket. With idle adjusting screw seated against its stop, adjust length of carburetor throttle rod at trunnion so gauge pin is free in hole. Tighten locknuts and recheck freeness of gauge pin. Push throttle control transmission rod down until throttle control outer lever touches end of travel. *CAUTION - Top locknut must not touch trunnion.* Hold throttle control transmission rod and tighten upper and lower trunnion locknuts. Shorten throttle control transmission rod by backing off trunnion rear nut two full turns. Tighten front locknut and remove gauge pin. Loosen locknut on throttle control intermediate rod trunnion and adjust intermediate rod to allow ¼" clearance

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between accelerator pedal rod lever and underside of rubber bellows at toeboard. Tighten trunnion locknut.

ROCHESTER 2GC 2-BARREL

Rochester 2GC 7009832 (S.M.), 7009831 (Hydra-Matic).

►*ROUGH IDLE AND SURGE CORRECTION:* Install new venturi cluster No. 7011561 (replaces 7010603) on Synchro-mesh cars, and modified venturi cluster 7010575 on Hydra-Matic cars. *NOTE* - Letter "A" on carburetor tag of Hydra-Matic and "D" on Synchro-mesh cars indicates modification has been made in production.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 1½ turns open from lightly seated position. Turn screws out for richer mixture.

Idle Speed - 450-470 RPM in Neutral (Synchro-mesh), 430-450 RPM in Drive Range (Hydra-Matic), 500-520 RPM (Air Conditioned Cars - with compressor OFF).

Float Level - 1 15/64" ± 1/32" (Gauge J-6629) from bottom of float to gasket on cover with needle valve seated (invert bowl cover assembly and place gauge over float).

Float Drop - 1 29/32" ± 1/8" from gasket on cover to bottom of float at free end with float hanging freely below bowl cover.

Fast Idle: No separate adjustment required (will be correct if hot or slow idle speed correct).

Automatic Choke Setting: Centered (at Index).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2GC Carburetor" in in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC 7009829 (S.M.), 7009830 (Hydra-Matic).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels teed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Mixture & Idle Speed Setting - Same as for Rochester 2GC (above). Idle mixture screws on primary side

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC-4-Barrel" Carburetors in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 2506S. New design 4-barrel downdraft type with automatic choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Mixture & Idle Speed Setting - Same as for Rochester 2GC (above). Idle mixture screws on primary side

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter AFB 4-Barrel" Carburetors in Carburetion Section.*

"TRIPLE CARBURETORS"
(Rochester 2GC)

Engine	Rochester Carburetor No. Front	Center	Rear
Hydra-Matic Optl.	7011351	7011350	7011352
Extra HP Engine Ⓒ....	7011351	7011500	7011352

Ⓒ - Synchro-mesh cars only. Hydra-Matic cars use same carburetors as listed for "Hydra-Matic Optl."

For compl te adjustment data on these carburetors (including linkage adjustment to insure corr ct synchro-

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nization), see "Pontiac Triple Carburetors" in Carburetion Section.

ROCHESTER "RAMJET" (Optional)

See "Rochester Ramjet Fuel Injection" in Carburetion Section.

AIR CLEANER: Oil-wetted type (Std.), Heavy Duty Oil-bath type (Optl.), Replaceable Paper Element type (Triple Carb. & Extra HP. Engines).

►*PAPER ELEMENT TYPE AIR CLEANER CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

FUEL PUMP PRESSURE: 4-5 lbs. at 450-1000 RPM.

►*FUEL PUMP DRIVE NOTE:* Pump drive eccentric on forward end of camshaft has bushing (.010" clearance on eccentric) for pump drive. Bushing must be installed with flanged end toward camshaft sprocket.

CARB. EQUIPMENT

Fuel Pump: AC No. 4123 (Early), No. 4417 (Later). Fuel & Vacuum (With Vacuum Wipers). No. 4328, Fuel only (With Electric Wipers).

►*FUEL PUMP PRODUCTION CHANGE:* Two types of Fuel & Vacuum pumps used. Early type has 5/16" pipe fittings. later type has 3/8" fittings.

►*FUEL PUMP DRIVE NOTE:* Pump drive eccentric on forward end of camshaft has bushing (.010" clearance on eccentric) for pump drive. Bushing must be installed with flanged end toward camshaft sprocket.

Pressure - 4-5 lbs. at 450-1000 RPM.

Fuel Filter: Two used, one as part of Fuel Gauge Tank Unit, the other at inlet side of carburetor.

See "Fuel System Notes" in Pontiac Special Data.

Gasoline Gauge: AC Electric type.

Dash Unit - AC No. 1518594.

Tank Unit - AC No. 1518394 (Exc. Sta. Wgn.), No. 1518812 (2-door Sta. Wgn.), No. 1518813 (4-door Sta. Wgn.).

See "Fuel Gauges" in Carburetion Section.

BATTERY

Synchro-mesh Cars - Delco No. 2SMR53. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

Hydra-Matic Cars - Delco No. 558. 12 volt, 9 plate, 60 ampere hour capacity (20 hr. rate).

Heavy Duty - Delco No. 3SMR72. 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Battery ground extends from fender to engine block.

STARTER

Delco-Remy 1107661. Armature - 1932185.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

① - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119798 (no relay) mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No. 1116533. Neutral Safety & Back-up Switch Delco-Remy No. 1998129 used with Hydra-Matic Trans.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998129 located at lower end of steering column. Connected in starter circuit so that starter operates only when selector lever is in "N" Neutral or "P" park positions.

Adjustment - *See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Application as follows:

Model	Generator No.	Armature No.
Standard 25 Amp.	1100304	1928952
Special 25 Amp.	1100333	1928952
Air Cond. 35 Amp.	1102073	1932900
A.C. Special 35 Amp.	1102071	1932900
Heavy Duty 35 Amp.	1102070	1932900
H.D. Special 35 Amp.	1102079	1932900
Heavy Duty 40 Amp.	1102074	1935778
H.D. Special 40 Amp.	1102077	1935778

Performance Data

Generator	Amperes	Volts	RPM
1100304, 333	25	14.0	2570
1102070,71,73,79	35	14.0	2510
1102074, 77	40	14.0	2320

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.5-1.62 Amps. (1100304,333); 1.69-1.79 Amps. (1102070,71,73,79); 2.66-2.86 Amps. (1102074, 77), at 12 volts (80°F).

Belt Adjustment: ¼" deflection with approximately 8 lbs. (Std.), 14 lbs. (Air Cond.), pressure midway between generator and fan pulleys

REGULATOR

Delco-Remy No.	Used with Generator
1119000	1100304,333
1119002	1102070,71,73,79
1119163	1102074,77

►*1119163 REGULATOR NOTE:* This type regulator has double contacts for voltage regulation.

►*NOTE - Specifications below are "Normal Settings".*

Cutout Relay

Cuts In - 11.8-13.5 volts (hot).

Contact Gap - .020".

Air Gap - .020" (with contacts just closed).

Voltage Regulator

Setting (1119000 & 1119002) - 13.8-14.8 volts at 125° (ambient temperature).

Setting (1119163) - 14.0-14.6 volts (operating on lower contacts). .3-.5 volts Lower (operating on upper contacts).

Contact Gap (1119163) - .016".

Air Gap - .080" (1119163) .075" (Others) with armature pressed down to point where contacts just touching.

Checking & Adjusting - *See "Delco-Remy 12 volt Regulators" in Electrical Section.*

Current Regulator

Setting (1119000) - 23-27 amps. (hot).

Setting (1119002) - 32-37 amps. (hot).

Setting (1119163) - 37-42 amps. (hot).

Air Gap - .075" with armature pressed down to point where contacts just touching.

Checking & Adjusting - *See "Delco-Remy 12 volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*

Directional Signals: *See Electrical Section.*

Autronic Eye: *See Electrical Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "on" position, push latch button on side of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly allowing switch assembly to be removed from instrument panel.

Stop Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-Up Light Switch: Located on steering column and actuated by gearshift lower lever.

FUSES: Fuses listed below (except as noted) are located on a fuse block behind instrument panel on dash to left of steering column. Circuits numbered on wiring diagram and fused as follows:

1) 4 Ampere. Ignition & Instrument Panel lights.
2) 7.5 Ampere. Ash Tray & Fender Ornament lights.
3) 7.5 Ampere. Tail & License Plate lights.
4) 7.5 Ampere. Dome, Courtesy & Trunk lights.
5) 7.5 Ampere. Glove Compt. & Underhood lights.
6) 7.5 Ampere. Clock Motor & Spot light.
7) 7.5 Ampere. Air Cond. & Compass lights.
10) 7.5 Ampere. Stop Light & Air Cond.
11) 7.5 Ampere. Directional Signal & Brake light.
12) 7.5 Ampere. Radio & Back-Up light.
13) 7.5 Ampere. Heater & Rear Defroster.

Electric Antenna - 14 Ampere. Located in fuse holder above fuse block.

Air Conditioner - 30 Ampere. In addition to Stop Light fuse. Located in holder in lead between BAT terminal of Voltage Regulator and Air Conditioner relay.

LIGHTING THERMOSTATIC CIRCUIT BREAKER: 22 Ampere, located in lighting switch.

Horn Relay: Delco-Remy 1116920.

Air Gap - .014", **Point Opening** - .027".

Closing Voltage - 5.0-9.5 volts.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for Access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8, Valve-in-head. All engines are basically the same with modifications as indicated.

Engine	Bore	Stroke	Displacement	Rated HP
All	3.94"	3.56"	347 cu. ins.	49.6

Engine	Compr. Ratio	Developed HP
Chieftain ①	8.5-1	227 at 4600 RPM
Chieftain ②	10.0-1	252 at 4600 RPM
Super & Star Chief ①	8.5-1	244 at 4800 RPM
Super & Star Chief ②	10.0-1	270 at 4800 RPM
Triple Carb. Optl. ②	10.0-1	290 at 5000 RPM
Extra HP Engine	10.0-1	317 at 5200 RPM

① - Synchro-mesh Cars. ② - Hydra-Matic Cars.

Compression & Vacuum Reading - *See TUNE-UP.*

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►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Trav l):* Two compression ratios used. 10.0-1 (Hydra-Matic), 8.5-1 (Synchro-mesh). Use 97 octane ratio (Research Method), with 10.0-1 compression ratio. Use 90 octane ratio with 8.5-1 compression ratio. *NOTE* - 10.0-1 compression ratio can be reduced to 7.8-1 by installing recessed piston & pin assembly. Standard piston furnished in three sizes - 3.936" part No. 524154, 3.937" No. 524155, 3.938" No. 524156. Choose piston to obtain .0007-.0017" clearance between skirt of piston and cylinder bore.

ENGINE REMOVAL: *S "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove right and left engine side aprons. Remove two idler lever support screws and lower the steering linkage. Disconnect exhaust crossover pipe at left exhaust manifold and from exhaust pipe at right exhaust manifold connector, remove crossover pipe by jockeying it out. Remove flywheel housing front shield and housing lower cover.Loosen crankcase ventilator outlet pipe and swing brace out of the way.

CYLINDER HEAD: *Se "Cylinder Head & Manifold" in Pontiac Sp cial Data.*

►*CYLINDER HEAD REMOVAL NOTE:* On cars with defroster No. 7 pushrod cannot be removed. Raise pushrod and tape it in place, then remove pushrod with cylinder head.

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, tin plated, with steel band for added strength and to control expansion. Pin is offset to right side of engine 1/16".

►*PISTON NON-INTERCHANGEABILITY CAUTION:* Different pistons used in Low (8.5-1) & High (10.0-1) compression engines identified as follows: Low Compression-Piston heads dished or recessed and pistons marked "L" on rear side near pin boss (do not confuse this mark with two "F" marks on opposite pin boss indicating front side of piston). High Compression - Pistons have flat head.

Removal - Pistons and rods removed from above.

R placem nt Pistons: Furnished Std. (3.936", 3.937", 3.938"), and .005", .010", .020", .030" Oversize in both Flat Top or Recessed Head.

Fitting New Pistons: Clearance is .0007-.0017" at bottom of skirt. Fit pistons with .0015" X ½" feeler. Pull to withdraw feeler should be 8-15 lbs.

Installing Pistons: Install pistons with notch in piston head and "F" mark at piston boss toward front of engine. *See Rod Installation.*

PISTON PINS

Floating type, with lock ring at each end.

Diam ter - .9803-.9807". **Length** - 3.13".

Pin Fit in Piston - .0000-.0004" loose with pin and bosses clean and dry. When clearance is at mean limit (.0002") pin can be inserted with light hand pressure, when at low limit (.0000") considerable pressure will be required (pin can be tapped into place with brass drift).

Pin Fit in Rod - .0001-.0006" loose, with pin and bushing dry.

Replacement pins: Furnished in Std. and .001", .003" Oversize.

PISTON RINGS

Upper compression ring is chrome plated, lower compression ring is lubrited. Both compression rings are taper faced and have either a chamfer or a step on inside diameter of top side.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.078"	.010-.020"	.0015-.003"
Compr. (2)	.078"	.008-.020"	.0015-.0035"
Oil	.181-.188"	.015-.055"	.0025-.0095"

Installing Rings: Step or chamfer on inside diameter of compression rings must be upward.

Replacement Rings: Std. and .005", .010", .020", .030" Oversize.

CONNECTING RODS

Length - 6.623-6.627" (center-to-center).

Crankpin Journal Diameter - 2.2488-2.2498".

Connecting Rod Upper Bushing (Piston Pin) Removal & Installation - *See "Connecting Rods & Bearings" in Pontiac Special Data.*

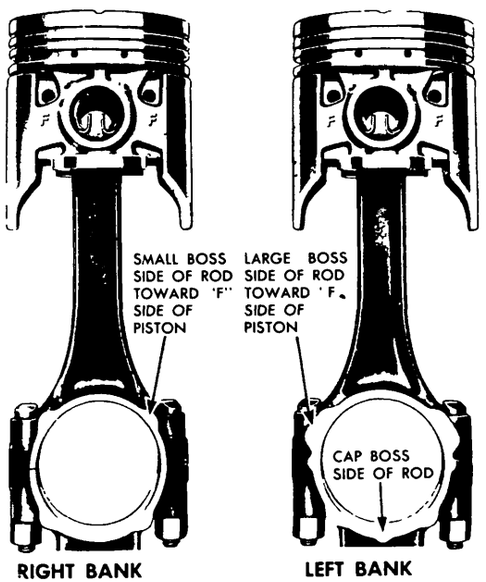
Lower Bearing - Replaceable precision type.

Clearance - .0009-.0029" (new).

Sideplay - .006-.011".

Replacement Bearings: Std. size, .001", .002" Undersize.

Installing Rods: Install rods **2-4-6-8 (right bank)** with machined boss at lower end of rod toward the **rear.** Install rods **1-3-5-7 (left bank)** with boss toward the **front** of engine. When installed, machined bosses on rods will face each other. *See Pistons above.*



PONTIAC PISTON & ROD ASSY.

CRANKSHAFT

Journal Diam ter - 2.623-2.624". Five bearings.

Bearings - Durex, steel backed inserts. No shims.

Clearance - .0005-.003" (Exc. rear), .0008-.0033" (rear).

End Thrust: Taken by No. 4 (rear center) main bearing.

End Play - .0035-.0085".

Replacement Bearings: Furnished Std. and .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *S "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

►*STANDARD ENGINE NOTE:* Different camshafts used on Synchro-mesh (8.5-1) & Hydra-Matic (10.0-1). Engines identified by figure stamped on forward end of camshaft, Synchro-mesh - 0, Hydra-Matic - 2.

Journal Diameter - 1.8987-1.8997". Five bearings.

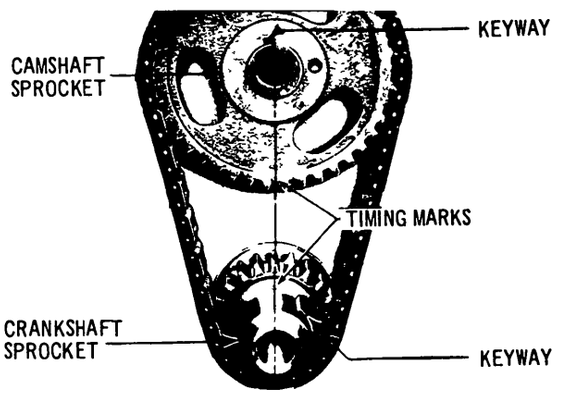
Clearance - .0015-.0030". **Endplay** - .003-.007".

End Thrust - Taken by thrust plate behind camshaft sprocket. Replace if worn or grooved.

Timing Chain: Length - 60 links.

Timing Chain Installation - *See "Timing Chain" in Pontiac Special Data.*

Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers.



PONTIAC VALVE TIMING MARKS

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*

Engine Front Cover Removal: *See "Engine Front Cov r" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

►*VALVE ADJUSTMENT NOTE: Because of design, it is no longer necessary to initially adjust the tapp t cl arance when cylinder head or valve system is disturbed. See "Rocker Arms" below.*

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Tappet Clearance: .018" Int. & Exh. Cold (Extra HP Eng. with mechanical lifters). None in service (Hydraulic Lifters) Others.

Valves	Head Diam.	Stem Diam. ①	Length
Intake	1.88"	.3415-.3422"	5.35"
Exhaust	1.60"	.3410-.3417"	5.34"

Valves	Seat Angle	Lift	Stem Clearance
Intake	30° ②	③	.001-.0027"
Exhaust	45° ②	③	.0015-.0032"

① - Std. See "Replacement Valves" below.
② - Valve Face Angle: Intake 29°, Exhaust 44°.

③ Valve Lift

Engine	Intake Lift	Exhaust Lift
Synchro-mesh (8.5-1)	.373"	.373"
Hydra-Matic (10.0-1)	.373"	.409"
Extra HP (Hydr. Lifters)	.411"	.411"
Extra HP (Mech. Lifters)	.435"	.435"

Valve Seat Width - Intake 3/64-1/16", Exhaust 1/16".

Replacement Valves: Furnished Std. and .001" (Yellow), .003" (Red), .005" (White) Oversize. Color inked on top of valve head.

Valve Stem Oil Seal: Neoprene seal installed in second groove on valve stems (under valve locks).

Valve Spring Shields: Cup shaped shield used over upper end of valve spring on all cars except late Extra HP engines. *NOTE* - This shield not necessary for high speed operation on these engines.

Checking Valve Stem Length: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Inner and outer springs used.

Standard & Triple Carb. Optl. Engine

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
23-29 lbs.	1.483"	55-61 lbs.	1.533"
54-60 lbs.	1.153"	98-106 lbs.	1.203"
Extra HP Engine (Hyd. Lifters)			
32 lbs.	1.48"	60 lbs.	1.52
96 lbs.	1.08"	128 lbs.	1.11"
Extra HP Engine (Mech. Lifters)			
55 lbs.	1.48"	60 lbs.	1 52'
120 lbs.	1.06"	131 lbs.	1 10"

Valve Guides: Cast integral with cylinder head. When valve stem clearance excessive, ream guides using Valve Guide Reamer J-5830-1 (.003"), J-6621 (.005"). *NOTE* - When installing .005" oversize valves, use .003" reamer first then follow with .005" reamer and always reface valve and valve seat after reaming valve guide.

Valve Clearance in Guide - .001-.0027" (Intake), .0015-.0032" (Exhaust). Oversize reamers ream guide to provide these clearances

►*VENTED INTAKE VALVE GUIDE* Intake valve guide vented to atmosphere near upper end by hole drilled through head. Valve stem is relieved at this point.

Valve Lifters: Hydraulic lifters standard all models, Mechanical lifters optional on Extra HP engine.

Hydraulic Lifter: **Diameter** - .8424-.8427". **Length** - 2.000". **Clearance (In Lifter Boss)** - .0013-.0028".

Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data.*

Rockers Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15 ft. lbs. torque. This will insure correct position of rocker arm in respect to pushrod and valve stem.

Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

Rocker Arm Lubrication: Oil from cylinder head oil galleries flows through hollow rocker arm studs to 1/16" hole at upper end of stud to lubricate ball seat and flows through groove in ball to fill rocker arm. Oil flows from hydraulic lifter boss through hollow pushrods for pushrod end lubrication.

Oil Passage Plug Removal & Installation - With rocker arm cover removed, insert easy-out in hole in plug, turn counterclockwise and pull out. Coat plug with gasket paste and drive in place with flat piece of metal or hard wood until plug is flush with outer surrounding surface.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE.* Valve timing below is correct with lifter on end of ramps on cam (Hydraulic Lifters), or with .023" tappet clearance (Mechanical Lifters).

Synchro-mesh (8.5-1) Engine

Intake - Opens 22° BTDC. Close 67° ALDC.
Exhaust - Opens 63° BLDC. Close 27° ATDC.

Hydra-Matic (10.0-1) Engine

Intake - Opens 22° BTDC. Close 67° ALDC.
Exhaust - Opens 69° BLDC. Close 31° ATDC.

Extra HP (Hyd. Lifters)

Intake - Opens 29° BTDC. Close 74° ALDC.
Exhaust - Opens 82° BLDC. Close 31° ATDC.

Extra HP (Mech. Lifters)

Intake - Opens 27° BTDC. Close 63° ALDC.
Exhaust - Opens 59° BLDC. Close 31° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. when changing filter element.

Normal Oil Pressure: 35-45 lbs. above 40 MPH.

Pressure Regulator - In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.

Pump Overhaul - *See "Oiling System" in Pontiac Special Data.*

Oil Filter: Full Flow type. Replace element every 15,000 miles or once a year. Use only AC PF-122 filter element.

Crankcase Ventilation: Filter element in oil filler caps in each rocker arm cover, and ventilator pipe at rear of engine. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. *NOTE* - Filter element for outlet pipe available as an accessory.

►*VENTILATOR OUTLET PIPE CAUTION:* If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed down into cover beyond the two locating points on pipe. Excessive oil consumption at high speeds will result.

Oil Pressure Gauge: AC No. 1508548. Not electric.

COOLING

Water Capacity: Without Heater - 21½ qts.
With Underseat Heater - 23 qts.
With Air Conditioning - 22½ qts.
With Underseat Heater & Air Cond. - 23¾ qts.

Pressure Valve: AC No. RC-6 (13 lbs. less Air Cond.), AC No. RC-15 (15 lbs. with Air Cond.). Radiator filler cap.

Thermostat: Pellet type 170° thermostat in water outlet passage in intake manifold.

Water Pump: Packless, sealed ball bearing shaft Serviced as an assembly

Temperature Gauge: AC Thermo-gauge. Electric type.
Dash Unit - AC No. 1513276.
Engine Unit - AC No. 1513130.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. Model 10.5A9. Assembly No. 361423 (Std.), No. 361452 (Bonneville). Single plate.
See "Borg & Beck" in Clutch Section.
Clutch Disc - Borg & Beck No. 284814 (All Models).

Pedal Adjustment: Adjust stop screw on pedal to provide 4 3/8-4 5/8" between bottom of pedal and floor mat. Set clutch fork to countershaft rod to provide ¾-1 1/8" free movement of clutch pedal.

Overcenter Spring Adjustment - Remove overcenter spring, spring extension, and pushrod. Loosen lock screw which clamps spring lever to countershaft. Install Gauge J-5819, inserting pins which are closest together into holes in overcenter spring link and lever from which pushrod was removed. Then, while applying rotation to clutch countershaft to hold clutch pedal against stop, rotate overcenter spring lever until third pin in gauge can be inserted into overcenter spring lever. Tighten lockscrew securely, and replace spring, spring extension, and pushrod.

Removal: Remove transmission (see Transmission Removal below), remove clutch bearing support spring washer (in rear face of clutch housing) and remove clutch housing bottom cover and control shaft inner bracket. Remove release bearing support and release bearing. Tap bearing support from inside clutch housing to aid removal (*CAUTION* - Avoid striking tubular portion of support). Mark flywheel and clutch cover (to insure installation in same manner to maintain balance), remove clutch cover bolts evenly, move clutch assembly away from flywheel at bottom and withdraw driven member. Lower clutch assembly out of car.

Clutch Installation Note - Position clutch disc so that long end of hub is in flywheel and cover assembly marks line up with marks on flywheel. Use spare transmission main drive gear in spline of driven disc to insure proper alignment and tighten cover bolts one turn at a time until tight. Coat entire outer diameter of release bearing support with high melting point wheel bearing grease. Do not overlubricate. Confine grease to inner diameter only of release bearing. Use new gasket and install support and bearing. Install bearing support spring washer. Coat release fork fingers and release fork ball fulcrum with same type grease and install fork. Lockwasher must be under screw fastening fork ball fulcrum to clutch housing.

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SYNCHRO-MESH TRANSMISSION

Own. All helical gear type.
See "Pontiac Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: 1) Disconnect speedometer cable, gearshift selector rod, and control rod.

2) Disconnect rear universal joint (use wire or rubber band to keep trunnions from slipping off spider). Pull propellor shaft off transmission.

3) Remove shift lever spring yoke and extension to remove upper transmission capscrew. Remove shift lever screw (lever in neutral) and remove lever.

4) Remove transmission outer lever to remove lower transmission capscrew. Remove other upper capscrew and install guide pins in upper capscrew positions. Remove lower capscrew, slide transmission back on guide pins with rear bearing support in frame "X" member until main drive gear is free and lower transmission to floor.

Installation Note: Use guide pins in two upper transmission capscrew positions to avoid damage to clutch release bearing tubular support when sliding transmission into position.

HYDRA-MATIC DRIVE

"Strato-Flight" Dual Coupling. Four speed automatic transmission and fluid coupling.

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication - Check fluid level every 2000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level - Check level with transmission warm and engine idling with selector lever in "P" or "N" position. Maintain level at "Full" mark on dipstick.

Capacity - 9 qts. refill, 11½ qts. after overhaul.

Throttle Linkage Adjustment: *See CARBURETOR above.*

► *OTHER HYDRA-MATIC SERVICE DATA: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Saginaw, Needle bearing type.

► *CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload (must be readjusted after nut is loosened). *See "Pontiac Hypoid" in Rear Axle Section.*

Replacement Universal Joints - Propellor shafts will only be furnished with front and rear universal joints as an assembly.

REAR AXLE

Own. Hypoid gear, semi-floating with Hotchkiss Drive.
See "Pontiac Hypoid" in Rear Axle Section.

Axle Identification - Ratio can be identified by color marking on ends of axle shaft or a code number stamped on pad on differential carrier. *See Code No. & Color Markings in table below.*

Axle Ratios & Code Markings

Model	Ratio	Code No.	Color
S-M (Std.) All	3.42-1(41-12)	8	Gray
(Hills) All	3.64-1(40-11)	6	Blue
(H.D.) S-28	3.90-1(39-10)	4	Red
H-M (Std.)	3.23-1(42-13)	9	Brown
(Plains) ①	3.08-1(40-13)	0	Yellow

① - Sedans & Catalina Coupes.

Backlash - .003-.012" (new), .012" (used).

Axle Shaft Removal: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft with Puller J-942 (do not drag axle shaft on seal).

Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Disconnect rear universal and wire trunnion in place (do not disengage spline joint at transmission), remove axle shafts and carrier flange capscrews. Withdraw carrier assembly from housing.

► *CAUTION: Rear universal joint companion flange nut controls rear axle pinion bearing preload. Readjust whenever nut loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable, sealed (not refillable). Service by replacement.

Model	Front	Rear
Standard	5522515	5524031
Taxi, Police, H.D	5352226	5513346

FRONT SUSPENSION

Independent. Shock absorber mounted within front coil spring.
See "Pontiac" in Suspension & Wheel Alignment Section.

Kingpin Inclination - 1°20' at 0° camber.

Caster - Neg. 1°±½°.

Camber - Pos. ½°±½°.

Toe-In - 0 to 1/16".

Toe-Out on Turns - Outer wheel 20°, Inner wheel should be 22.5°.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.
See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (In Line). *See "Saginaw (In Line)" Power Steering in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand brake applies rear wheel service brakes

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

Drum Diameter - 12" (front), 11" (rear).

Wheel Cyl. Diameter - 1 1/16" (front), 15/16" (rear).

Lining Width & Length

	Front Wheel	Rear Wheel
Primary	2.25" X 10.05"	1.75" X 9.29"
Secondary	2.25" X 12.92"	1.75" X 11.93"

Lining Thickness - 13/64".

Clearance - Adjusting screw backed off 14 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: Forward of brake pedal on engine side of fire wall.

Checking Fluid Level—Maintain fluid level in master cylinder reservoir to 7/8" from gasket surface of filler neck.

Power Brakes: Moraine or Bendix Vacuum Power Unit.
Moraine - *See "Moraine Power Unit" in Brake Section.*
Bendix - *See "Bendix Power Unit (Hydraulic Reaction Control)" in Brake Section.*

Checking Fluid Level—Maintain fluid level in master cylinder reservoir to within ½" of top of filler cap opening

Removal of Power Unit—Disconnect upper end of vacuum hose attached to inlet at vacuum cylinder, and hydraulic lines at master cylinder. Disconnect pushrod from pedal and wires from stop light switch Remove nuts from U-bolt retaining pedal pivot bracket to steering column and remove pedal and bracket (with stop light switch assembly attached). Remove clutch pedal and steering column seals at floorboard On Hydra-Matic cars, remove screws retaining power brake unit to floor pan and remove mounting plate with power unit attached. On Synchro-mesh cars, remove screws retaining power unit to mounting plate (power unit will rest on frame). Remove screws attaching mounting plate to floor pan and remove mounting plate, "jockeying" it as necessary to clear clutch pedal Remove power unit. *CAUTION*—Do not carry or support brake unit by pushrod as pushrod may be pulled out of cylinder

MISC. MECHANICAL

Windshield Wiper: Vacuum or electric type
See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Harrison *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section*

Power Top Control: Hydro-Lectric with reversible pump motor *See "Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motors in each window *See "Power Window Regulators" in Miscellaneous Section*

Power Seat Adjusters: Six-way electric type Fore & Aft, Up & Down, and Tilting movement provided through three switches and two motors *See "Power Seat Adjusters" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION (ALL MODELS): B - for jacking or hoisting, s "Jacking & Hoisting Pr - cautions" in Suspension & Wh el Alignm nt S ction*

MODEL IDENTIFICATION

Model	Model Designation
Bonneville (All)	58-25
Chieftain (Convertible)	58-25
Chieftain (Others)	58-27
Star Chief (Station Wagon)	58-27
Star Chief (Others)	58-28
Super Chief (All)	58-28

SERIAL NUMBER: Located on left front door hinge pillar post. *NOTE* - Number (example below) includes identification data.

① ② ③ ④ ⑤
P 8 58 H 1001

① - Assembly Plant - **P** Pontiac, **C** South Gate, **W** Wilmington, **F** Framingham, **K** Kansas City, Kan., **L** Linden, **A** Atlanta, **T** Arlington.
② - Model - **5** - 25, **7** - 27, **8** - 28.
③ - Model Year - 1958.
④ - Type Transmission - **H** Hydra-Matic, **S** Synchro-Mesh.
⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped on machined pad on front of right bank of cylinder block. *This number is same as Serial Number.*

►*8.6-1 COMPRESSION RATIO IDENTIFICATION NOTE: "L" inside a circle on serial number pad on engine block indicates 8.6-1 compression ratio engine.*

TUNE-UP

COMPRESSION PRESSURE: (8.6-1 ratio) 150-160 lbs (10.0 & 10.5-1 ratios) 180-190 lbs. at cranking speed of 155-165 RPM. Lowest cylinder must not be less than 80% of highest cylinder.

VALVE TAPPET CLEARANCE: None in service, hydraulic.

MANIFOLD HEAT CONTROL: Thermostatic coil type in right hand exhaust manifold outlet. Valve must operate freely.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".
Spark Plugs - AC No 45 Std No 44 used on later production 10 0-1 Synchro-mesh and 10 0-1 Hydra-Matic police cars Use No 43 for high speed operation

COIL: Delco-Remy 1115084 (Std.), 1115099 (Triple 2-Bbl. Carb.).
Ignition Current - 1.2 amps. idling, 3.5 amps. stopped.
Resistor - Delco-Remy 1940096. 1.40-1.62 ohms.

►*COIL RESISTOR NOTE:* Resistor is connected in lead between ignition switch and coil. Resistor is bypassed during cranking by second lead from ignition switch to coil side of resistor.

►*COIL WIRE INTERFERENCE CORRECTION:* Coil primary wire may interfere with carburetor throttle linkage, holding carburetor open and fraying wire insulation. To correct, rotate coil in bracket to obtain proper clearance, or splice 5" extension to coil wire and attach to secondary wire with a grommet (part no. 494104).

DISTRIBUTOR: D lc -R my - External adjustment "Window" Type distributor. *See"D lco-R my (Window Type) Distributors" in Electrical Section*

Distributor Application

Engine Model	Delco-Remy No.
8 6-1 Ratio ①	1110924
10 0-1 Ratio (Early)	1110913
10 0-1 Ratio (Later)	1110943
10 5-1 Ratio (Triple 2-Bbl Carbs)	1110925
10 5-1 Ratio (Fuel Injection)	1110897

① - Identified by letter "L" stamped on serial number pad on engine block. Other engines not stamped.
Condenser - Delco-Remy 1932004 **Capacity** - .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988 (Exc. 1110897 Distr.). 1918148 (1110897 Distr., Two used).
Breaker Gap (Exc. 1110897) - *NOTE* - When cam angle correctly set (see below) breaker gap will be correct (.016").
Breaker Gap (1110897) - .014-.018".
Cam Angle (Exc. 1110897) - 28-32°. Set to 30°.
Cam Angle (1110897) - Adjust each set of points to 29° ± 1° with other set of points blocked open with .025" thick insulator. Cam angle for both sets of points operating together will be 34° ± 1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance (1110924)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-4	750
10-12	1000	20-24	2000
11-13	1450	22-26	2900
13-15	2300	26-30	4600

Automatic Advance (1110913 & 1110925)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	450	1-5	900
7-9	1000	14-18	2000
8-10	1450	16-20	2900
10-12	2300	20-24	4600

Automatic Advance (1110943)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0-4	800
4-6	750	8-12	1500
7-9	1000	14-18	2000
8-10	1450	16-20	2900

Automatic Advance (1110897)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	525	1-5	1050
7-9	1050	14-18	2100
8-10	1400	16-20	2800
9-11	1800	18-22	3600

Vacuum Spark Control: Delco-Remy 1116136(Exc.1110897). *NOTE* - No vacuum control used on 1110897.

Vacuum Advance (1116136)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
9-11	18-22	13-15

IGNITION TIMING

Setting - 6° BTDC *CAUTION* - Set timing with engine at operating temperature and idling at indicated RPM **with vacuum lin disconnected.**

►*IGNITION TIMING NOTE* The above timing setting (6° BTDC) is for operation on regular fuels (8.6-1 ratio engine), and for premium fuels (10 0-1 & 10.5-1 ratio engines). Under no circumstances should ignition timing be retarded to allow for use of regular fuel in a 10.0-1 or 10.5-1 ratio engine, or retarded later than 0° for any situation.
Timing Marks - Two marks on harmonic balancer, TDC and 6° BTDC. Pointer on timing sprocket cover aligned with correct mark on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION· 8.6-1 & 10.0-1 ratio engines use one Rochester 2GC 2-Barrel or on Carter AFB 4-Barrel carburetor. 10.5-1 ratio ngin s us thr Rochester (two 2G & one 2GC) carbur tors or Rochester "Ramjet" Fuel Injection NOTE - On Rochest r 4GC 4-Barrel Carburetor used on s m lat cars*

►*CARBURETOR PRODUCTION CHANGE (CARS WITH ONE 2-BARREL CARBURETOR):* New Rochester 2GC carburetors, having an idle air bypass type idle system are now being used in production. The throttle stop-screw formerly used for hot idle adjustment is not used on the later carburetors Later type carburetors are identified by a spring loaded idle air bypass screw located in main body at rear of carburetor. *S "Rochest r 2GC" (below) for idle speed s tting.*

►*THROTTLE LINKAGE INTERFERENCE (NO TRANSMISSION FORCED DOWNSHIFT) CORRECTION.* **1) Hydra-Matic with one 2-barr l carbur t r** - Carburetor throttle lever may interfere with carburetor-to-fuel pump vacuum line. Bend line downward to secure clearance.
2) All Cars - Accelerator control lever may be too close to intake manifold. **Do n t** adjust linkage to provide more clearance This will lessen proper accelerator pedal travel. To correct, bend lever in a vise to obtain 8" (Hydra-Matic), 7.96" (Synchro-Mesh) distance between hole for throttle control rod and center of slot for for cross shaft

►*THROTTLE LINKAGE BINDING CORRECTION & ASSEMBLY CAUTION NOTE - Carburetor lever end of carburetor throttle rod must have a countersink on both sides* Carburetor throttle rod must be installed as follows
Single 2-Barrel Carburetor - Rod Part No 531176, is used Install with offset and cotter pin toward outside of car
Triple Carburetors - Rod, Part No 531176 is used Install with offset toward center of car and cotter pin toward outside of car
Single 4-Barrel Carburetor - Rod, Part No 531177,is used Install with offset toward outside of car and cotter pin toward center of car

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC DRIVE CARS): With engine and transmission at normal operating temperature, idle speed correctly set *(see carburetors below),* and transmission selector lever in "N" (Neutral) or "P" (Park), proceed as follows Loosen both nuts on throttle control transmission rod trunnion Stop engine and install Linkage Adjusting Pin J-2544 through holes in throttle control lever and bracket. With idle adjusting screw seated against its st op, adjust length of carburetor throttle rod at trunnion so gauge pin is free in hole. Tighten locknuts and recheck freeness of gauge pin. Push throttle control transmission rod down until throttle control outer lever touches end of

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travel. *CAUTION - Top locknut must not touch trunnion.* Hold throttle control transmission rod and tighten upper and lower trunnion locknuts. Shorten throttle control transmission rod by backing off trunnion rear nut two full turns. Tighten front locknut and remove gauge pin Loosen locknut on throttle control intermediate rod trunnion and adjust intermediate rod to allow ¼" clearance between accelerator pedal rod lever and underside of rubber bellows at toeboard. Tighten trunnion locknut.

THROTTLE RETURN CHECK ADJUSTMENT (Cars with Hydra-Matic and 4-Barr l Carburetors): Make carburetor fast idle adjustment, then stop engine. Rotate fast idle cam so that fast idle screw rests on highest step of fast idle cam. Clearance between contact screw and contact on throttle lever should be 1/8" on conventional idle carburetors, 3/32" on idle air bypass carburetors *NOTE - This supersedes previous specification of 1/8" on idle air bypass carburetors* Adjust by turning contact screw *CAUTION - Hold sleeve next to diaphragm brack t from turning while making adjustment*

ROCHESTER 2GC 2-BARREL

R ch st r 2GC 7011703 (E a r l y Synchromesh), 2GC 7012703 (Lat Synchr -mesh), 2GC 7011702 (Early Hydra-Matic), 2GC 7012702 ,(Late Hydra-Matic).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT Barr l f ds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*2GC CARBURETOR PRODUCTION CHANGE:* Late type carburetors, Part Nos. 7012702 & 7012703, have an idle air bypass type idle system. Idle speed adjustments (hot idle) are made with the idle air bypass screw located on main carburetor body at rear of carburetor. The former t h r o t t l e stopscrew has been eliminated. A fast idle screw is provided on these carburetors and fast idle adjustments must be made after correct hot idle speed has been obtained.

►*ROUGH IDLE AND STALLING CORRECTION: Caused by gum build-up in throttle bores. Correction similar to 4-barrel carbur tors. S e "Carter AFB 4-Barrel Carbur tors" in Carburetion Section*

►*FUMP LINK BINDINC CORRECTION* On early cars to correct binding between outer pump lever and pump link, install new pump link and clip, Part No 7013192.

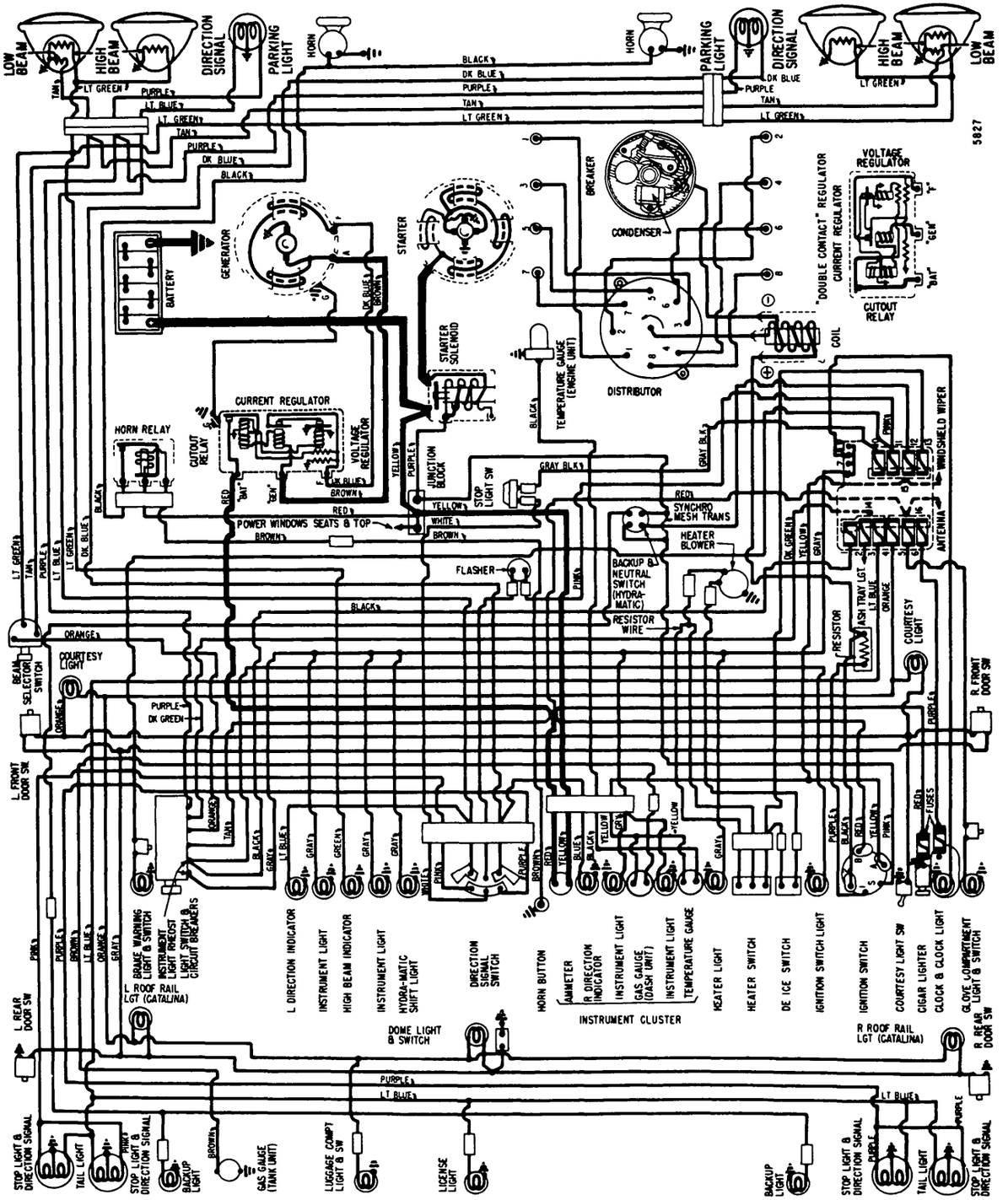
Idl S tting - 1½ turns (7011702 & 7011703), 1 turn (7012702 & 7012703) open from a lightly seated position. Turn screws out for richer mixture.

Idl Sp d - 450-470 RPM (Synchro-mesh), 480-500 RPM (Hydra-Matic, with selector lever in either "Dr" position). 540-560 RPM (Air Conditioned Cars, with air conditioning turned off).

►*IDLE SPEED ADJUSTING NOTE (Cars with "Idle Air Bypass" Type Carbur tors):* As a preliminary setting, open the idle air bypass screw 2 turns from a lightly seated position, then, with engine at normal operating temperature, choke fully open, adjust idle air screw to obtain proper engine RPM (see above). Adjust mixture screws for highest engine RPM, then reset idle air screws for proper idle speed. *NOTE* - Recheck idle mixture setting after adjusting idle air screws.

Float L v l - With air horn inverted, g a s k e t in place and needle seated, there should be 11/16" clearance be-

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tween bottom of float seam at toe end and air horn gasket. Use Gauge J-7292. To adjust bend float arm.

Float Drop - 1 29/32" from gasket on cover to bottom of float at free end with float hanging freely below bowl cover.

Fast Idle (7012702 & 7012703): With hot idle speed and mixture properly adjusted, move fast idle cam so highest step is under end of fast idle screw. Adjust fast idle screw to obtain an engine speed of 2700 RPM.

Automatic Choke Setting: Centered at Index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

Fast Idle (7011702 & 7011703): No separate adjustment required (will be correct when hot or slow idle speed correct).

►*OTHER DATA See 'Rochester 2GC Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB, No. 2751S (Early Synchro-mesh), 2768S, SA (Later Synchro-mesh), 2740S (Early Hydra-Matic), 2767S, SA (Later Hydra-Matic)

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2 3-5-8, LEFT barrels feed 1-4-6-7*

►*ROUGH IDLE AND STALLING CORRECTION* Caused by gum build-up in throttle bores *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

►*PART THROTTLE SURGE CORRECTION* Install richer step-up rods *See "Carter AFB 4-Barrel Carburetors' in Carburetion Section*

►*GASOLINE ODOR, ROUGH IDLE, FLOODING CORRECTION* Due to loose plugs on carburetor *NOTE* - Carburetors with red stain on air adjusting screw or code dated "B" or later do not require modification *See "Carter AFB 4-Barrel Carburetors". in Carburetion Section*

►*AIR CONDITIONED CAR STALLING CORRECTION.* Caused by inability to reach 540-560 RPM idle speed with bypass idle air screw *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Idle Setting - ½-2 turns open Turn screws out for richer mixture

Idle Speed - 450-470 RPM (Synchro-mesh), 480-500 RPM (Hydra-Matic, with selector lever in either "Dr" position), 540-560 RPM (Air Conditioned Cars, with air conditioner turned off)

Throttle Linkage Adjustment (Hydra-Matic): *See CARBURETOR above*

►*OTHER DATA See 'Carter AFB 4-Barrel Carburetors" in Carburetion Section*

ROCHESTER 4GC 4-BARREL

Rochester 4GC 7011701 *NOTE - These carburetors may not have any Model Number designation but may be identified by Idle Air Bypass Adjusting Screw located on throttle body*

Idle Setting - For preliminary setting, turn Idle Air Bypass adjusting screw out 2 turns, turn each idle mixture adjusting screw out 1 turn With engine thoroughly warmed up (choke valve wide open and fast idle inoperative), adjust air screw for idle speed of 480-500 RPM with selector lever in "Drive" Adjust both idle mixture screws for best idle and highest RPM Reset air screw for correct idle speed of 480-500 RPM, recheck idle mixture screws for smoothest possible idle *CAUTION - Idle compensator valve must be closed when making this adjustment*

►*OTHER DATA See "Rochester 4GC 4-Barrel Carburetor" in Carburetion Section*

"TRIPLE CARBURETORS"
(Rochester 2G & 2GC)

Engine & Trans.	Rochester Carburetor No. Front	Center	Rear
Synchro-mesh	7011705	7011709	7011707
Hydra-Matic	7011705	7011706	7011707

NOTE - Front & Rear carburetors are 2G, Center is 2GC

►*THROTTLE VALVES HANGING OPEN CORRECTION* On early cars caused by throttle closing spring on end carburetors wedging between throttle lever and boss on throttle body Correct by bending horizontal tang of spring so distance from top of spring to end of tang is 5 16" *NOTE* - Modification necessary only when clearance between lever and boss with throttle valves wide open is more than 030"

Idle Speed - Same as conventional carburetors (see above)

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), see "Rochester Triple Carburetors" in Carburetion Section

ROCHESTER "RAMJET"
(Fuel Injection)

Rochester No. 7014880 (Optional). *See "Rochester Ramjet Fuel Injection" in Carburetion Section*

Idle Speed - Same as conventional carburetors (see above)

CARB. EQUIPMENT

Fuel Pump: AC No. 4410 (Fuel Injection), No 4488 (Others) Fuel & Vacuum

►*FUEL PUMP DRIVE NOTE* Pump drive eccentric on forward end of camshaft has bushing (010" clearance on eccontric) for pump drive Bushing must be installed with flanged end toward camshaft sprocket

Pressure - 5¼-6½ lbs at 450-1000 RPM

Fuel Filter: Two used, one as part of Fuel Gauge Tank Unit, the other at inlet side of carburetor.

Gasoline Gauge: AC Electric type

Dash Unit - AC No 1518952

Tank Unit - Used as follows

Model	AC No.
All (Exc Sta Wgn & Air Cond)	1518972
All Air Cond (Exc Sta Wgn)	5640146
Sta Wgn (Exc Air Cond)	1518973
Sta Wgn Air Cond	5640147

See "Fuel Gauges" in Carburetion Section

AIR CLEANER: Oil wetted type (Std). Replaceable Paper Element type (Std on Triple Carburetors, Fuel Injection, Air Suspension, Optional on others)

►*AIR CLEANER (DRY TYPE) CAUTION Replace every 10,000 miles or sooner if needed DO NOT clean, shake, oil or re-use*

BATTERY

Delco. Used as follows

Synchr-mesh Cars - No 458 12 volt, 9 plate, 53 ampere hour capacity (20 hr rate)

Hydra-Matic Cars - No 558 12 volt, 11 plate, 63 ampere hour capacity (20 hr rate)

Extra Duty Battery - No 670 12 volt, 11 plate 72 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Battery ground extends from battery to battery support bracket to left cylinder head

STARTER

Delco-Remy No. 1107661 (Synchr-mesh), No. 1107700 (Hydra-Matic).

Armature - Delco-Remy 1932185 (1107697), 1941888 (1107700).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107697

Torque	RPM	Volts	① Amperes
0 Ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107700

Torque	RPM	Volts	① Amperes
0 Ft. lbs.	4700-5400	10.6	80-120
	Lock	2.0	290-370

① - Includes Solenoid

Starting Switch: Delco-Remy Solenoid No 1119798 (Synchro-mesh) No 1119986 (Hydra-Matic) mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No 1116533 Neutral Safety & Back-up Switch Delco-Remy No 1998664 used with Hydra-Matic transmission

Neutral Safety & Back-up Light Switch: Delco-Remy No 1998664 located at lower end of steering column Connected in starter circuit so that starter operates only when selector lever is in "N" or "P" positions.

Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section*

GENERATOR

Delco-Remy No. 1102107 (Std.), 1102104 (Air Cond.), 1102105 (Heavy Duty).

Armature - Delco-Remy No 1939837 (1102104 & 1102105), 1923535 (1102107)

►*GENERATOR VIBRATION CORRECTION* Install rear bracket and support brace Part No 531743, as follows Remove generator through bolts and lockwashers (discard washers) Position rear bracket on commutator end frame, install through bolts and tighten EQUALLY to 80 in lbs Install brace over cylinder head No 2 bolt hole in lower row with new cylinder head bolt and tighten to 95 ft lbs Check fan belt adjustment and route No 2 spark plug wire over brace

Performance Data

Generator	Amperes	Volts	RPM
1102107	30	14.0	2240
1102104, 5	40	14.0	... .2600

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 Ozs.

Field Current - 1.69-1.79 amps. (1102107), 2.66-2.86 amps. (1102104, 5) at 12 volts (80° F).

Belt Adjustment: ¼" deflection with approximately 7-8 lbs. (Std.), 10 lbs. (Air Cond.) pressure midway between generator and fan pulleys.

REGULATOR

Delco-Remy No. 1119001 (Std.), 1119602 (Air Cond. & Heavy Duty).

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►*1119602 REGULATOR NOTE:* This type regulator has double contacts for voltage regulation.

►*NOTE: Specificati ns below are "Normal" s ttings.*

Cut ut Relay

Cuts In - 11.8-13.5 volts (1119001), 11.8-13.0 volts (1119602), hot.

C ntact Gap - .020".

Air Gap - .020" with contacts just closed.

V ltage Regulator

S tting (1119001) - 13.8-14.8 volts at 125°F. (ambient temperature).

S tting (1119602) - I3.8-14.6 volts (operating on upper contacts. .1-.3 volts lower (operating on lower contacts).

C ntact Gap (1119602) - .016".

Air Gap - .075" (1119001), .067" (1119602) with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in El ctrical Section.*

Curr nt Regulator

S tting (1119001) - 27-33 amps. (hot)

Setting (1119602) - 37-42 amps. (hot)

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Seri s Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section*

MISC. ELECTRICAL

►*INSTRUMENT CLUSTER SHORTING CORRECTION:* Be sure that all wire connectors are installed toward center of cluster to prevent grounding on edges of instrument panel.

►*STOP LAMP FAILURE CORRECTION:* May be caused by improperly positioned direction signal switch. Switch must be centered on steering column. To insure proper installation, proceed as follows: Bend a .090" diameter wire into a "U" so height is 2" and loop is 1.58" long. Insert wire into holes on face of switch and tighten attaching screws. If wire enters holes freely, switch is positioned properly.

H adlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Dir cti n Signal: *See El ctrical Section. NOTE* - Direction signal switch mounted on steering column just below instrument panel bracket.

Autr nic Ey : *See Electrical Section.*

Lighting Switch R m val: Remove one battery cable from battery. Pull headlight switch knob to "ON" position. Push latch button on side of switch assembly and pull out switch knob assembly Screw bushing from switch assembly allowing switch to be removed from instrument panel

St p Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-up Light Switch: Located on steering column and actuated by gearshift lower lever.

CIRCUIT BREAKERS: Used as follows:

22 Amp r - Protects head, parking, tail, and beam indicator lights, Located on headlight switch. *NOTE-* Tail lights also protected by 7.5 ampere fuse.

Cigar Light r - Protected by either a fuse or a circuit breaker in back of lighter.

FUSES: *NOTE* - Fuse block located on passenger side of dash, above and to left of steering column. A spare 7.5 amp. fuse is attached to a clip at bottom of fuse block.

14 Ampere - Protects heater motor and air conditioning relay switch. On fuse block.

14 Ampere - Protects stop lights.On fuse block. *NOTE-* Changed from 7.5 ampere.

7.5 Ampere - Protects tail and license lights. On fuse block.

7.5 Ampere - Protects direction signals. On fuse block.

7.5 Ampere - Protects back-up lights and radio. On fuse block.

7.5 Ampere - Protects body and trunk lights. On fuse block.

7.5 Ampere - Protects clock and spot light. On fuse block.

7.5 Ampere - Protects glove compartment and underhood lights. On fuse block.

7.5 Ampere - Protects ash tray light. On fuse block.

4 Ampere - Protects all instrument lights. On fuse block.

3 Ampere - Protects windshield wipers. Located in holder above fuse block.

1 Ampere - Protects clock. Located on back of clock housing. *NOTE - Two fuses protect clock (see above).*

1 Ampere - Protects fuel injection cold enrichment heater. Located in holder on engine side of dash above distributor.

Horn Relay: Delco-Remy 1116920.

Air Gap - .014". **Point Opening** - .027".

Closing Voltage - 5.0-9.5 volts.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for Access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own V8, valve-in-head. All engines are basically the same. 8.6-1 ratio engines have recessed pistons, 10 0-1 & 10 5-1 ratio engines have flat top piston Different cylinder heads used on Triple Carburetor and Fuel Injection (10.5-1 ratio) engines.

►*CYLINDER HEAD IDENTIFICATION MARKS:* "X" stamped to left of center cylinder head bolt hole and casting number indicates Triple Carburetor equipment "XX" indicates Fuel Injection "O" stamped to right of center bolt hole indicates heavy duty valve springs.

Engine	Bore	Stroke	Displacement	Rated HP
All	4 1/16".	3 9/16"	370 cu. ins.	52.8

Engine Type	Compr. Ratio	Dev. HP
2-Bbl. Carb. (S.M. Trans.) ①	8.6-1	240⑥
4-Bbl. Carb. (S.M. Trans.) ②	8.6-1	255⑥
2-Bbl. Carb. (H.M. Trans.) ③	10.0-1	270⑦
4-Bbl. Carb. (S.M. & H.M. Trans.)④	10.0-1	285⑦
3 2-Bbl. Carbs. ⑤	10.5-1	300⑦
Fuel Injection (H.M. Trans.) ④	10.5-1	310⑧

① - Standard on Chieftain & Super Chief.
② - Standard on Star Chief & Bonneville.
③ - Optional on Chieftain & Super Chief.
④ - Optional on all models.
⑤ - Optional on all models with Synchro-mesh or Hydra-Matic transmission.
⑥ - At 4500 RPM. ⑦ - At 4600 RPM. ⑧- At 4800 RPM.

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Use Premium Fuel with 10 0-1 & 10.5-1 compression ratios Use Regular Fuel with 8.6-1 compression ratio. *NOTE* - 10.0-1 & 10 5-1 compression ratios can be reduced by installing recessed piston & pin assembly Standard piston furnished in three sizes - 4.061" Part No. 531147, 4 062" No. 531148, 4.063" No. 531149. Choose piston to obtain .0007-.0017" clearance between skirt of piston and cylinder bore

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove right and left engine side aprons Remove two idler lever support screws and lower the steering linkage. Disconnect exhaust crossover pipe at left exhaust manifold and from exhaust pipe at right exhaust manifold connector, remove crossover pipe by jockeying it out. Remove flywheel housing front shield and housing lower cover.Loosen crankcase ventilator outlet pipe and swing brace out of the way.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

►*CYLINDER HEAD REMOVAL NOTE:* On cars with defroster No. 7 pushrod cannot be removed. Raise pushrod and tape it in place, then remove pushrod with cylinder head.

Choke Heat Tube Replacement - *See "Cylinder Head & Manifold" in Pontiac Special Data.*

►*VIBRATION DAMPER PRODUCTION CHANGE & REPLACEMENT CAUTION (AIR SUSPENSION CARS):* Only Vibration Damper, Part No. 529184 (later type), and Fan Pulley Part No 524763, MUST be used to prevent belt misalignment Compressor may be moved ¾" to rear if necessary to obtain alignment

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, tin plated, with steel band for added strength and to control expansion. Pin is offset to right side of engine 1/16".

►*PISTON NON-INTERCHANGEABILITY CAUTION:* Different pistons used in Low (8.6-1) & High (10.0-1 & 10.5-1) compression engines identified as follows: Low compression piston heads dished or recessed and pistons marked "L" on rear side near pin boss (do not confuse this mark with two "F" marks on opposite pin boss indicating front side of piston). High compression pistons have flat head

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std (4 061", 4 062" & 4.063"), and 005", .010", 020" 030" Oversize in both Flat Top or Recessed Head

Fitting N w Pistons: Clearance is .0007-.0017" (.0022-.0027" on Police Cars after Engine No. 199783) at

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bottom of skirt Fit pistons with .0015" or .0025" x ½" feeler. Pull to withdraw feeler should be 8-15 lbs.

Installing Pistons: Install pistons with notch in piston head and "F" mark at piston boss toward front of engine. *See Rod Installation.*

PISTON PINS

Pin is press fit in rod

Diameter - 9800- 9804" **Length** - 3 25"

Pin Fit in Piston - 0003- 0005" loose with piston bosses and pin clean and dry *NOTE* - Piston and pin must be at room temperature and pin must fall from piston by its own weight

Pin Fit in Rod - 0008- 0016", press fit

Piston Pin Removal & Installation - *See "Piston Pins" in Pontiac Special Data*

Replacement Pins: Furnished in Std , 001" 003" Oversize

PISTON RINGS

Upper compression ring is chrome plated, lower compression ring is lubrited Top compression ring is taper faced and has a step or chamfer on inside diameter of top side Lower compression ring may have step or chamfer on inside diameter of top side Oil ring has chrome plated rail faces

Ring	Width	End Gap	Side Clearance
Compr (1)	078"	016-.026"	0015-.0030"
Compr (2)	078"	013 025"	0015- 0035"
Oil (3)	184"	015- 035"	0015- 0085"

Installing Rings - "T", dot or "TOP" marks toward top of piston

Replacement Rings: Std , 005", 010", 020" and 030" Oversize

CONNECTING RODS

Length - 6 63" (center-to-center)

Crankpin Journal Diameter - 2 2488-2 2498".

Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims.

Clearance - 0009- 0029" (new)

Sideplay - .006-.011"

Replacement Bearings: Std , 001" and 002" Undersize

Installing Rods: Pistons have "F" marks and one notch (10 0-1 & 10 5-1 ratios), two notches (8 6-1 ratio) on front Install rods so that LARGE machined boss at lower end of rod on same side as "F" mark and notch in piston (Left bank cyls 1-3-5-7), on opposite side of piston from "F" mark and notch (Right bank cyls 2-4-6 8) Install assemblies in engine with "F" marks and notches on piston toward front of engine and oil groove in lower end of rod toward center of engine.

CRANKSHAFT

Journal Diameter - 2 623-2 624" Five bearings

Bearings - Durex 100A, steel-backed inserts precision type no shims

Clearance - 0005- 0025" (Front) 0005- 003" (Front Center Center and Rear Center) 0008- 0033" (Rear)

End Thrust: Taken by No. 4 (rear center) main bearing.

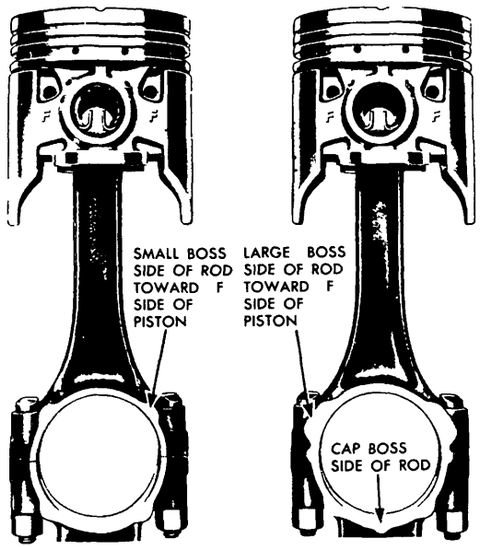
End Play - .0035 .0095'.

Replacement Bearings: Furnished Std. and .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Pontiac Special Data.*

Vibration Damper Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*



PONTIAC PISTON & ROD ASSY.

CAMSHAFT

►*CAMSHAFT IDENTIFICATION NOTE* Different camshafts used on 8 6-1 and 10 0-1 and 10 5-1 ratio engines Identified by number stamped on forward end of camshaft, 8 6-1 - 0

Journal Diameter - 1 8987-1 8997" Five bearings

Clearance - 0015- 0030" **Endplay** - 003- 007"

End Thrust - Taken by thrust plate behind camshaft sprocket Replace if worn or grooved

Timing Chain: Length - 60 links **Width** - 1" **Pitch** - 375"

►*TIMING CHAIN REMOVAL CAUTION* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons, or both will result due to piston striking valve To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC to avoid damage

Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters

Valve	Head Diam.	Stem Diam.	Length
Intake	1 88"	.3412-.3419"	①5.31"
Exhaust	1 60"	.3407-.3414"	②5.30"

① - 3 Carbs. or Fuel Injection 5.35".

② - 3 Carbs. or Fuel Injection 5.34".

Valve	Seat Angle	Lift	Stem Clearance
Intake	③30°	373"①	0016- 0033"
Exhaust	③45°	373"②	0021- 0038"

① - 8 6-1 Compr ratio engines 407" (others)

② - 8 6-1 Compr ratio engines 411" (others)

③ - Face angle - 29° Intake, 44° Exhaust

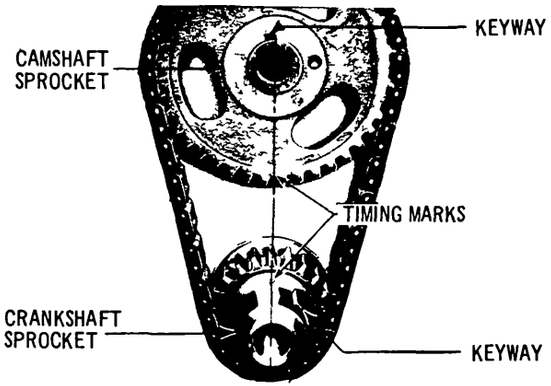
Valve Seat Width - Intake 3/64-1/16", Exhaust 1/16".

Replacement Valves: Furnished Std. and .001" (Yellow), .003" (Red), .005" (White) Oversize. Color inked on top of valve head.

Valve Stem Oil Seal: Neoprene seal installed in second groove on valve stems (under valve locks).

Valve Spring Shields: Inverted cup over upper end of outer valve spring (under spring retainer cup)

Checking Valve Stem Length: *See "Valve System" in Pontiac Special Data*



PONTIAC VALVE TIMING MARKS

Valve Springs: Inner and outer springs used

8.6-1 & 10.0-1 Compr. Ratio Engines ①

Inner Spring		Outer Spring	
Pressure	**Length**	**Pressure**	**Length**
Open 57 lbs.	1.153"	Open 102 lbs.	1.203"
Closed 26 lbs.	1.483"	Closed 58 lbs.	1.533"

① - Exc. 285 HP Engine with Synchro-mesh transmission.

3 Carb. & Fuel Inj. Engines ②

Inner Spring		Outer Spring	
Pressure	**Length**	**Pressure**	**Length**
Open 96 lbs.	1.08"	Open 131 lbs.	1.12"
Closed 32 lbs.	1.48"	Closed 62 lbs.	1.52"

② - Also includes 285 HP Engine with synchro-mesh trans.

Valve Guides: Cast integral with cylinder head. When valve stem clearance excessive, ream guides using Valve Guide Reamer J-5830-1 (.003"), J-6621 (.005"). *NOTE* - When installing .005" oversize valves, use .003" reamer first then follow with .005" reamer and always reface valve and valve seat after reaming valve guide.

Valve Stem Clearance in Guide: 0016- 0033" (Intake), 0021 0038" (Exhaust) Oversize reamers ream guide to provide these clearances

►*VENTED INTAKE VALVE GUIDE* Intake valve guide vented to atmosphere near upper end by hole drilled through head Valve stem is relieved at this point

Hydraulic Lifters: Standard on all models

Diameter - 8424-.8427" **Length** - 2"

Clearance in Lifter Boss - 0013- 0028"

Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm Stud - Tighten rocker arm

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stud nut to 15 ft. lbs. torque. This will insure correct position of rocker arm in respect to pushrod and valve stem.

Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

Rocker Arm Lubrication: Oil from cylinder head oil galleries flows through hollow rocker arm studs to 1/16" hole at upper end of stud to lubricate ball seat and flows through groove in ball to fill rocker arm. Oil flows from hydraulic lifter boss through hollow pushrods for pushrod end lubrication.

Oil Passage Plug Removal & Installation - With rocker arm cover removed, insert easy-out in hole in plug, turn counterclockwise and pull out. Coat plug with gasket paste and drive in place with flat piece of metal or hard wood until plug is flush with outer surrounding surface.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

8.6-1 Compr. Engines

Intake - Open 22° BTDC, Close 67° ALDC.
Exhaust - Open 63° BLDC, Close 27° ATDC.

10.0-1 & 10.5-1 Compr. Engines

Intake - Open 30° BTDC, Close 63° ALDC.
Exhaust - Open 77° BLDC, Close 25° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Pontiac Special Data.*

Crankcas Capacity: 5 qts. refill. Add 1 qt. when changing filter element.

N rmal Oil Pr ssur : 35-45 lbs. above 40 MPH.

Pr ssur R gulat r - In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.

Pump Ov rhaul - *S "Oiling System" in Pontiac Special Data.*

Oil Filt r: Full Flow type. Replace element every 15,000 miles or once a year. Use only AC PF-122 filter element.

Crankcas V ntilati n: Filter element in oil filler caps in each rocker arm cover, and ventilator pipe at rear of engine. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. *NOTE* - Filter element for outlet pipe available as an accessory.

►*VENTILATOR OUTLET PIPE CAUTION:* If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed down into cover beyond the two locating points on pipe. Excessive oil consumption at high speeds will result.

Oil Pr ssur Gaug : AC No. 1508697. Not electric.

COOLING

Wat r Capacity: As follows:

Mod l	Capacity (Qts.)
Synchro-mesh Std.	21 2
Synchro-mesh with Heater	22.3
Hydra-Matic Std.	21.1
Hydra-Matic with Heater	22.2
Hydra-Matic with Heater & Air Cond.	22.5

Pr ssur Valv : Radiator filler cap 12-15 lbs. Std cars (Pontiac No. 850800), 14-17 lbs. Air Cond. cars (No. 861050).

Th rm stat: Pellet type. In water outlet passage in intake manifold. 170° Std. (Pontiac No. 3138868), 180° Optl. (No. 3136185), for use with permanent type anti-freeze.

Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly.

Temperature Gauge: AC Thermo-gauge. Electric type.
Dash Unit - AC No. 1513500.
Engine Unit - AC No. 1513462.
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 11A9. Cover Assembly B.&B. No. 361476, with Long Driven Member No. 289302. All Models, Std. & Heavy Duty.
See "Borg & Beck" in Clutch Section.

Pedal Adjustment: Adjust pedal stop bracket under instrument panel to provide 5½-5¾" pedal height between bottom of pedal and floor mat. Disconnect pedal pushrod from linkage by removing clevis pin. Position Clutch Linkage Gauge, Tool J-7277, between frame and rear end of overcenter lever. With pedal tight against stop bracket, adjust clevis up or down so clevis pin enters freely. Remove tool and adjust fork rod to provide ½-¾" pedal freeplay

Removal: Remove transmission (see "Transmission Removal" below) and clutch housing bottom cover. Disconnect return spring and remove fork and fork ball support. Remove release bearing. *CAUTION - Bearing lubricated for life. Do not degrease.* Mark cover and flywheel to maintain proper balance at reinstallation. Loosen cover bolts evenly one turn at a time, then remove. Move clutch assembly away from bottom of flywheel, remove driven member, then remove cover and pressure plate from car.

Clutch Installation Note - Position clutch disc so that long end of hub is in flywheel and cover assembly marks line up with marks on flywheel. Use spare transmission main drive gear in spline of driven disc to insure proper alignment and tighten cover bolts one turn at a time until tight. Coat entire outer diameter of release bearing support with high melting point wheel bearing grease. Do not overlubricate. Confine grease to inner diameter only of release bearing. Use new gasket and install support and bearing. Install bearing support spring washer. Coat release fork fingers and release fork ball fulcrum with same type grease and install fork. Lockwasher must be under screw fastening fork ball fulcrum to clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. All helical gear type. Std. & Heavy Duty types used.
See "Pontiac Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*SHIFT LEVER HANGING UP & HARD SHIFTING CORRECTION:* Install new lever guides, Part No. 531751 upper, No. 531752 lower, on mast jacket where shift levers extend outward. Shift lever key on gearshift tube must be free of burrs and chips. If not, replace both tube and key. Remove Hydra-Matic interlock plate on upper steering gear shaft bearing housing if so equipped. This plate may make shifting impossible.

R m val: Remove propeller shaft assembly (*s "Propell r Shaft R moval" below). NOTE - On h avy duty transmission front propeller shaft connected to yok flange at transmission. On standard transmission yok slides on main shaft.* Disconnect speedometer cable and control linkage. Remove upper mounting bolts and install Aligning Studs, Tool J-1126. Remove lower bolts and remove transmission by sliding on aligning studs until shaft clears clutch.

HYDRA-MATIC DRIVE

"Strato-Flight" Dual Coupling. Four speed automatic transmission and fluid coupling.

►*SHIFT LEVER INDICATOR DISENGAGEMENT CORRECTION:* On early cars, install Retainer, Part No. 531775, on control rod bracket. Install with needle nosed pliers with indicator in "Dr, left".

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication - Check fluid level every 2000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type "A".

Checking Fluid Level - Check level with transmission warm and engine idling with selector lever in "P" or "N" position. Maintain level at "Full" mark on dipstick.

Capacity - 9 qts. refill, 11½ qts. after overhaul.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Saginaw. Needle bearing type. Three used.

►*CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload which must be readjusted whenever nut is loosened.

Replacement Universal Joints - Universal joints furnished with new propeller shafts. Universal joint repair kits and parts can be obtained separately.

Lubrication - Disassemble and repack every 25,000 miles.
See "Propeller Shaft Removal" below.

PROPELLER SHAFT

Two-piece propeller shaft with three universal joints used. Center bearing and support mounted on a bracket inside frame tunnel.

Removal: Loosen bolts holding center bearing and bracket to frame bracket. *CAUTION - Note number of shims under bracket and reinstall as found to insure proper alignment of propeller shaft.* Remove U-bolts and lock plates from rear axle drive pinion flange. On heavy duty transmission disconnect front universal joint from yoke flange at transmission. Hold bearings on journals with wire or rubber band. Remove stone and splash shield from front of frame tunnel. Remove complete drive line assembly by sliding rearward out of frame tunnel.

Prop ller Shaft Alignm nt & C nt r B aring Ass mbly: *S "Prop ll r Shaft Not s" in Pontiac Special Data.*

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REAR AXLE

Own. Semi-floating, hypoid gear (Std.), Safe-T-Track (Optl.). *See "Pontiac Hypoid" and "Spicer Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

Axle Identification - Ratio can be identified by color marking on ends of axle shaft or a code number stamped on pad on differential carrier. Standard axles identified by **white** paint, Safe-T-Track axles by **green** paint in addition to ratio color. *See Code No. and Color Markings in table below.*

NOTE - Safe-T-Track axle shafts are 1/8" shorter than standard axle shafts.

Axle Ratios & Code Markings

Model	Ratio	Code No.	Color
S-M (Std.) All	3.42-1(41-12)	8	Gray
(Hills) All	3.64-1(40-11)	6	Blue
(H.D.) S-28	3.90-1(39-10)	4	Red
H-M (Std.)	3.23-1(42-13)	9	Brown
(Plains) ①	3.08-1(40-13)	0	Yellow

① - Sedans & Catalina Coupes.

Backlash - .005-.010".

Axle Shaft Removal: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line will be damaged). Pull shaft with Puller J-942-1 (do not drag axle shaft on seal).

Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Remove axle shafts and disconnect rear propeller shaft at companion flange. Drain oil, remove capscrews, and remove assembly.

►*CAUTION: Rear universal joint companion flange nut controls rear axle pinion bearing preload. Readjust whenever nut is loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable, not refillable. Serviced by replacement.

Shock Absorber Application

Model	Front	Rear
Std. Suspension	5535575	5535580
Air Suspension	5535573	5535579

FRONT SUSPENSION

Independent. New "Ball-joint" type with spherical ball joints between upper and lower control arms. *See "Pontiac Front Suspension" in Suspension & Wheel Alignment Section.*

►*CRACKING NOISE CORRECTION: See "Pontiac Front Suspension" in Suspension & Wheel Alignment Section.*

Kingpin Inclination - 4°50' at 0° camber.

Caster - Neg. ½° ±½°.

Camber - Pos. ½° ±½°.

Toe-In - 0-1/16" measured 9" above floor.

Toe-Out on Turns - With right wheel turned 20° to right from straight ahead position, left wheel should be turned 18° to 19°.

REAR SUSPENSION

Coil springs with one upper and two lower control arms.

See "Pontiac Rear Suspension" in Suspension & Wheel Alignment Section.

AIR SUSPENSION

Rubber air springs replace all four coil springs. Optional on all models.

See "Pontiac Air Suspension" in Suspension & Wheel Alignment Section.

STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm and nut.

See "Saginaw Ball Bearing Worm & Nut" in Steering Section.

Power Steering: Saginaw (In Line). *See "Saginaw (In Line)" Power Steering in Steering Section.*

►*OIL LEAK BETWEEN POWER STEERING PUMP & AIR SUSPENSION COMPRESSOR CORRECTION:* **Remove hose clip under bolt head and install copper washer, Part No. 5685606.**

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand brake applies rear wheel service brakes.

See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section.

►*PARKING BRAKE CABLE CAUTION:* Cable must be clipped away from junction block on firewall to prevent shorting and burning. Install Clip, Part No. 530235, if necessary.

►*PARKING BRAKE LEVER INTERFERENCE CORRECTION:* Pedal pad may rub on air inlet grille. Correct by inserting 3/8" plain washers between lever bracket and support at lower bolt nearest lever. *Do not bend lever.*

Drum Diameter - 12" (front), 11" (rear).

Wheel Cyl. Diameter - 1 1/16" (front), 15/16" (rear).

Lining Width & Length

	Front Wheel	Rear Wheel
Primary	2.25" X 10.05"	1.75" X 9.29"
Secondary	2.25" X 12.92"	1.75" X 11.93"

Lining Thickness - 13/64".

Clearance - Adjusting screw backed off 12 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: Forward of brake pedal on engine side of firewall.

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" from gasket surface of filler neck.

Brake Pedal & Stop Light Switch Adjustment: Adjust pedal stop bracket to give 5½-5¾" pedal height from bottom of pedal pad to floor mat. Stop lights must operate after ½" pedal travel. Reset pedal stop and bracket separately to correct. Then adjust length of master cylinder pushrod to give 1/64-1/32" clearance between forward end of pushrod and socket seat in master cylinder piston. Tighten locknut. *CAUTION - Do not lengthen pushrod beyond clearance specifications. Primary cup of master cylinder must be completely clear of compensating port.*

Power Brakes: Moraine or Bendix Vacuum Power Unit.

Moraine - *See "Moraine Power Unit" in Brake Section.*

Bendix - *See "Bendix Power Unit (Hydraulic Reaction Control)" in Brake Section.*

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" of top of filler cap opening.

Removal of Power Unit - Disconnect pushrod at brake pedal, vacuum hoses from vacuum exhaust tube, and pipe from master cylinder hydraulic port (cover all openings). Remove power cylinder from adapter plate on firewall. Remove power brake unit from mounting plate and remove unit. *CAUTION - Don't carry or support brake unit by pushrod as it may be pulled out of plunger.*

MISC. MECHANICAL

Windshield Wiper: Vacuum or electric type.

See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: Harrison. *See "Frigidaire & Harrison" Air Conditioning in Miscellaneous Section.*

Power Top Control: Hydro-Lectric with reversible pump motor. *See "Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motors in each window. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Six-way electric, with memory control unit and "easy entry" feature. *See "Power Seat Seat Adjusters" in Miscellaneous Section.*

►*JACKING & HOISTING CAUTION (ALL MODELS) Before jacking, hoisting, towing or working under car, see "Jacking & Hoisting Cautions" and "Pontiac Air Suspension" in Suspension Section*

►*PUSH STARTING CAR CAUTION Car CANNOT be started by pushing because rear oil pump has been eliminated in 1959 Hydra-Matic transmissions*

MODEL IDENTIFICATION

M del	Model Designation
Catalina	21
Star Chief	24
Bonneville Safari (Station Wagon)	27
Bonneville	28

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar post and on triangle pad on front of right bank of engine (See also Engine Production Code Number below) Number (example below) includes identification data as follows

① ② ③ ④
1 59 P 1001

① - Model 1 - 21, 4 - 24, 7 - 27, 8 - 28 *See Table above*

② - Model Year - 1959

③ - Assembly Plant **P** Pontiac, **C** South Gate, **W** Wilmington, **F** Framingham, **K** Kansas City, **L** Linden, **A** Atlanta, **T** Arlington

④ - Beginning vehicle number for each prefix combination

Engine Producti n Code Number: Near right edge of timing chain cover (early cars), on same location as Serial & Engine Number (later cars – see above) *Do not confuse this number with Serial & Engine Number*

►*ENGINE IDENTIFICATION NUMBERS AND LETTERS·* Twenty-two different engine combinations used Symbols identifying engines and components as follows

D cal (Early Cars) - Indicates various engines components and other equipment combinations Located on carburetor side of left rocker arm cover

Code L tters (Later Cars) - Same as decal above but stamped in front of Engine Production Code Number

E - Indicates 420-E economy engine Stamped on front face of right cylinder bank on upper left (inboard side), and cast also on intake manifold following manifold casting number

4 - Indicates 4-bolt main bearing caps In same location as E above

L - Indicates 8 6-1 compression ratio Stamped on front face of right cylinder bank next to timing cover

X - Indicates 7 8-1 export compression ratio *In same place as L above*

X - Indicates 10 5-1 compression ratio Stamped on one of cast pads on cylinder head near center exhaust port *Do not confuse with 7 8-1 X*

O - Indicates heavy duty valve springs Stamped in same place as 10 5-1 X

TUNE-UP

►*TRIPLE CARBURETOR ENGINE CUTTING OUT AT WIDE OPEN THROTTLE CORRECTION (EARLY)* If interference occurs between front to rear carburetor link and ignition coil resistor terminal with throttle wide open, remove resistor and coil, and straighten coil mounting bracket front tab so that resistor can be positioned to eliminate interference with throttle link

COMPRESSION PRESSURE· (8 6-1 ratio) 160–170 lbs , (10 0-1 & 10 5-1 ratios) 200-210 lbs at cranking speed of 155-165 RPM Lowest cylinder must not be less than 80% of highest cylinder

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL: Thermostatic coil type in right exhaust manifold outlet Valve must operate freely

►*MANIFOLD HEAT CONTROL PRODUCTION CHANGE (4-Bbl Carb Cars)* To correct fast idle cam not releasing fully in cold weather and for general improved operation, new thermostatic coil spring has been installed effective Engine Production Number 20345 Earlier cars with new spring have daub of white paint on right cylinder head New spring, Part No 531972, identified in **free position** by outer tang being 154°±6° counterclockwise from horizontal line through inner tang at 70°F

IGNITION

►*ENGINE MISS IN COLD WEATHER CORRECTION* Caused by oxidized distributor contact points To correct, install a new set of points and a new Coil Resistor, Delco-Remy No. 1933400 Resistor has 1 8 ohm capacity and is of light blue ceramic material

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders - RIGHT BANK 2-4-6-8 LEFT BANK 1-3-5-7

SPARK PLUG GAP· 033- 038" Set at 035"

Spark Plugs - AC No 45S (AC No 44 on Police Cars) 14 mm Torque to 25 ft lbs

COIL: Delco-Remy 1115118

Ignition Current - 1 2 amps idling, 3 5 amps stopped

Resistor - Delco-Remy 1944395 1 40-1 62 ohms

►*COIL RESISTOR NOTE* Connected in lead between ignition switch and coil Bypassed during cranking by second lead from ignition switch to coil side of resistor

►*RESISTOR INTERFERENCE NOTE (3 Carb Cars)* Resistor may interfere with front-to-rear carburetor link To correct, straighten coil mounting bracket front tab so resistor can be repositioned

DISTRIBUTOR· Delco-Remy 1110941 (First 7000 Cars except 420E Engine), 1110943 (All 420E Engines and All Cars after first 7000) *See "Delco-Remy Window Distributors in Electrical Section*

Condenser - Delco-Re my 1932004 **Capacity** 18- 23 mfd

Contact Point Set - Delco-Remy 1931988

Breaker Gap - Gap (016") will be correct when cam angle correctly set

Cam Angl - 28-32° Set at 30° Will give 016" breaker gap

Br aker Arm Spring T nsi n - 19-23 ozs

R tati n - Counterclockwise viewed from above

Automatic Advanc

Degrees Distr	RPM	Degrees Eng.	RPM
Start	400	0-4	800
4-6	750	8-12	1500
7-9	1000	14-18	2000
8-10	1450	16-20	2900

Vacuum Spark Control: Delco-Remy 1116147 (1110941 Distr), 1116136 (1110943 Distr)

Vacuum Advance - 1116136

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6-8
10	20	13-15

Vacuum Advance - 1116147

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	7-9
9	18	12 75-15 0

IGNITION TIMING

Setting - 6° BTDC *CAUTION* - Set timing with engine at operating temperature and idling at indicated RPM **with vacuum line disconnected.**

►*IGNITION TIMING NOTE* The above timing setting (6° BTDC) is for operation on regular fuels (8 6-1 ratio engine), and for premium fuels (10 0-1 & 10 5-1 ratio engines) Under no circumstances should ignition timing be retarded to allow for use of regular fuel in a 10 0-1 or 10 5-1 engine, or retarded later than 0° for any reason

Timing Marks - Two marks on harmonic balancer, TDC and 6° BTDC Pointer on timing sprocket cover aligned with correct mark on harmonic balancer

CARBURETOR

►*CARBURETOR APPLICATION Carter and Rochester carburetors used as follows*

Model	Carburet r
Catalina & Star Chief Std	One Rochester 2-Bbl
Catalina & Star Chief Optl	One Carter 4-Bbl
420E Engine Option	One Rochester 2-Bbl
Bonneville	One Carter 4-Bbl
Special Option (420A Engine)	One Carter 4-Bbl
Special Option	Three Rochester 2-Bbl

CRUISE CONTROL: *See Pontiac Magi-Cruise in Carburetion Section*

►*FAST IDLE CAM NOT RELEASING FULLY CORRECTION See "Manifold Heat Control Valve Production Change" under TUNE-UP above*

►*ERRATIC THROTTLE RETURN CORRECTION* Install accelerator control return spring in second (middle) hole of bracket on dash *NOTE* - Effective Engine Production No 113971, this change made on all cars in production

►*THROTTLE LINKAGE PRODUCTION CHANGES FOR IMPROVED PERFORMANCE* Effective Engine Production No 113971, the following changes were made 1) Accelerator pedal height increased from 4 7/8" to 5 3/16"

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2) Longer carburetor throttle rod on 4-barrel cars. Rod identified by black finish.

3) New extension assembly to relocate pivot stud at carburetor on 4-barrel cars.

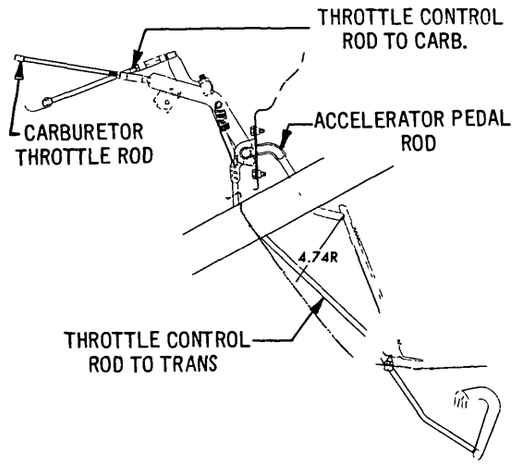
4) New Throttle Return Check with shorter actuating screw (needed because of new extension).

CAUTION - The above parts MUST NOT be interchanged with early parts.

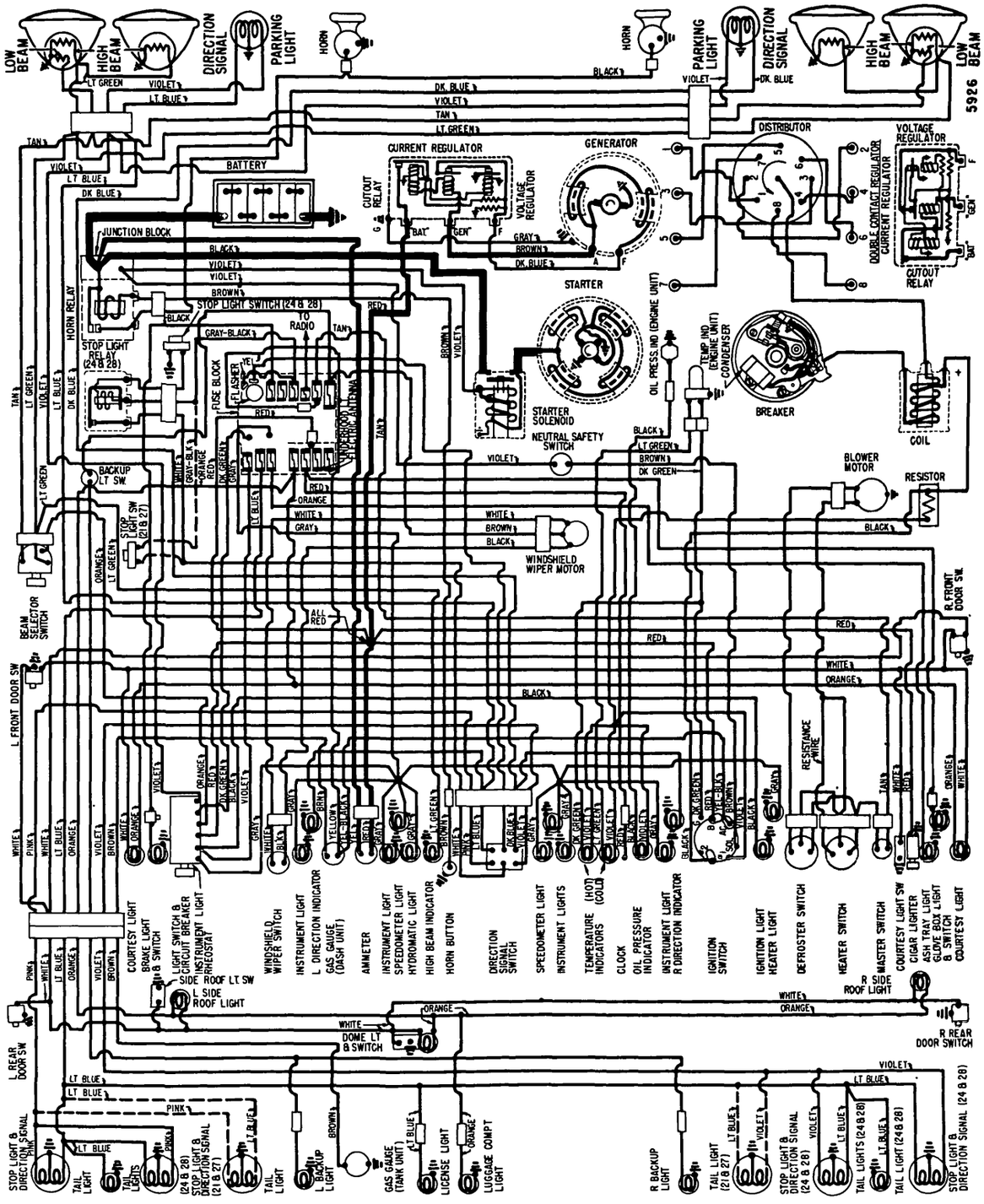
THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC CARS): With engine and transmission at normal operating temperature, idle speed correctly set *(see carburetors below)*, proceed as follows: Loosen both nuts on transmission throttle control rod trunnion. Stop engine and install Linkage Adjusting Pin J-7687 through holes in throttle control lever and bracket. *NOTE - On 4-barrel carburetor cars, remove throttle return check or install Holding Tool J-6342-01 over return check.* Close throttle valves fully and loosen locknut on transmission throttle control rod. Adjust length of rod so pin will enter holes freely. Tighten locknut, but leave pin in place. Push transmission throttle control rod down until throttle control outer lever reaches end of its travel. *CAUTION - Upper locknut must not touch trunnion.* Hold rod and tighten upper and lower trunnion locknuts finger tight. Then shorten rod by backing off lower nut 2½ turns. Tighten upper nut securely. Remove gauge pin. Loosen locknut on carburetor throttle rod and adjust rod so there is 4 7/8" (early cars), 5 3/16" (later cars - see *"Production Changes" above*) clearance between spherical end of pedal rod (at accelerator pedal) and floor pan.

THROTTLE RETURN CHECK ADJUSTMENT (Cars with Hydra-Matic and 4-Barrel Carburetors): Make carburetor fast idle adjustment, then stop engine. Rotate fast idle cam so that fast idle screw rests on highest

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PONTIAC HYDRA-MATIC THROTTLE LINKAGE



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step of fast idle cam Clearance between contact screw and contact on throttle lever should be 093" (use a 3/32" drill rod as a gauge). Adjust by turning contact screw *CAUTION - Hold sleeve next to diaphragm bracket from turning while making adjustment*

ROCHESTER 2GC 2-BARREL

Car Mod l	Rochester No.
Early 420E Engine (Hydra-Matic)	7013069
Later 420E Engine (Hydra-Matic)	7015062
Early Standard Engine (Hydra-Matic)	7013061
Later Standard Engine (Hydra-Matic)	7015070
All 420E Engines (Synchro-mesh)	7013075
All Standard Engines (Synchro-mesh)	7013060

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr l f ds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7*

►*ROCHESTER 2GC FLOAT PRODUCTION CHANGE & FLOAT LEVEL SETTING CAUTION (7013060 & 61 Carb)* Later carburetors (with letter "K" punched in brass tag or code dated "B9" or later) have floats with different buoyancy and require different float setting *See Float Setting below*

►*ROCHESTER 2GC METERING JET SIZE PRODUCTION CHANGES (7013069 & 75 Carb) See "Rochester 2GC" Carburetors and Jet Specifications in Carburetion Section*

Idl S tting - Initial setting 2 turns open from a lightly seated position Turn screws out for richer mixture

Idl Sp d - 480-500 RPM Synchro-mesh & Hydra-Matic in either "DR" position, 540-560 RPM Air Conditioning "OFF" and Hydra-Matic in either "DR" position

►*IDLE SPEED ADJUSTING NOTE (Cars with 'Idle Air Bypass" Type Carburetors)* As a preliminary setting open idle air bypass screw 2 turns from a lightly seated position, then with engine at normal operating temperature, choke fully open, adjust idle air screw to obtain proper engine RPM (see above) Adjust mixture screws for highest engine RPM, then reset idle air screws for proper idle speed *NOTE* - Recheck idle mixture setting after adjusting idle air screws

Fl at L v l (7013060, 61, 70) - With air horn inverted, gasket in place and needle seated, there should be 11/16"±1/16"(Early Carbs - Gauge BT-160), 5/8"±1/16" (Later Carbs - Gauge BT-173) between bottom of float seam at toe end and air horn gasket Later carburetors can be identified by "K" stamped in brass tag or by "K" stamped in brass tag or by date code number "B-9" or later

Fl at L v l (7013069, 62, 75) - With air horn inverted, gasket in place and needle seated, there should be 11/16"±1/16" clearance between bottom of float seam at toe end and air horn gasket Use Gauge BT-169

Fl at Dr p (All Models) - 1¾" minimum from gasket on cover to bottom of float at free end with float hanging freely below bowl cover *(NOTE* - This setting supersedes 'earlier specification of 1 29/32") Use Gauge BT-160 or BT-173 (7013060 & 61 Carb), BT-169 (7013069 & 75 Carb)

Fast Idl (7013060, 61, 70): 037" (Gauge BT-170) With hot idle speed and mixture properly adjusted, move fast idle cam so highest step is under end of fast idle screw Adjust fast idle screw to obtain an engine speed of 2700 RPM

Fast Idl (7013069, 62, 75): No separate adjustment required (will be correct when engine idle speed set)

Automatic Choke Setting: Centered at index

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Rochester 2GC Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB No. 2819S (Early Hydra-Matic), 2976S (Later Hydra-Matic), 2820S (All Synchro-mesh).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed on slow idle*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

TRIPLE CARBURETORS (Rochester 2G & 2GC)

	Rochester Carburetor No.		
Engine & Trans.	Front	Center	Rear
Synchro-mesh	7013063	7013067	7013065
Hydra-Matic	7013063	7013064	7013065

Idle Speed - Same as conventional carburetors (see above)

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization) see "Rochester 2G & 2GC" in Carburetion Section

CARB. EQUIPMENT

Fuel Pump: AC No 4480 Fuel only

Pressure - 5¼-6½ lbs at 450-1000 RPM

See "Fuel Pumps" in Carburetion Section

Fuel Filter: Two used, one as part of Fuel Gauge Tank Unit, the other at inlet side of carburetor

Gasoline Gauge: AC Electric type

Dash Unit - AC No 5640287

Tank Unit - Used as follows

Model	AC No.
All (Exc Sta Wgn & Air Cond)	5640329
All Air Cond (Exc Sta Wgn)	5640330
Sta Wgn (6 Pass Type, Exc Air Cond)	5640209
Sta Wgn (9 Pass , Exc Air Cond)	5640357
Sta Wgn (6 Pass , Air Cond)	5640210
Sta Wgn (9 Pass , Air Cond)	5640358

See "Fuel Gauges' in Carburetion Section

Air Cleaner· Oil wetted type standard (except 3 carb cars) Dry filter element type standard on 3 carb cars, optional on others

►*DRY CLEANER CAUTION Replace element every 15,000 miles or sooner if needed DO NOT clean, shak , oil, or re-use*

BATTERY

Delco. Used as follows

Synchro-m sh Cars - 2SMR53, No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr rate) *NOTE* - Air Conditioned cars use 558 battery

Hydra-Matic Cars - N . 558. 12 volt, 11 plate, 63 ampere hour capacity (20 hour rate) *NOTE* - All cars equipped with air conditioning use 558 model battery regardless of engine or transmission

Extra Duty Battery - 3SMR72, No 670, 12 volt, 11 plate, 72 ampere hour capacity (20 hour rate)

Battery Ground - Negative, to battery support bracket and engine

Engine Ground - Battery ground extends from battery to battery support bracket and engine

STARTER

Delco-Remy No. 1107661 (Synchro-mesh), No. 1107735 (Hydra-Matic). *NOTE* - Starter 1107735 used on Synchro-mesh cars Decal 532972, 77, 79, 81 and Code Letters G, FP, AL, AN, and all Air Conditioned Cars

Armature - Delco-Remy 1932185 (1107661), 1941888 (1107735)

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs minimum

Performance Data - 1107661

Torque	RPM	Volts	Ⓒ Amperes
0 Ft lbs	3600-5100	10 6	65-100
	Lock	3 5	300-360

Performance Data - 1107735

Torque	RPM	Volts	Ⓒ Amperes
0 Ft lbs	4700-5400	10 6	80-120
	Lock	2 0	290-370

Ⓒ - Includes Solenoid

Starting Switch: Delco-Remy Solenoid No 1119798 (Synchro-mesh), No 1118811 (Hydra-Matic) mounted on starter and controlled by Ignition & Starter Switch

Neutral Safety & Back-up Light Switch: Delco-Remy No 1998705 located at lower end of steering column Connected in starter circuit so that starter operates only when selector lever is in "N" or "P" positions

Adjustment - *See "Dual - Coupling Hydra-Matic Drive" in Transmission Section*

GENERATOR

Delco-Remy 1102142 (Std. Early), 1102163 (Std.Late), 1102164 (Std. Later), 1102143 (Air Cond. & H.D.).

Armature - Delco-Remy 1923535 (1102142 Gen), 1939837 (1102143 Gen)

►*STANDARD GENERATOR PRODUCTION CHANGES.* Different generators used in production as follows **1st Type (Part No. 1102142)** has sleeve bearing in an aluminum end frame **2nd Type (Part No. 1102163)** has a ball bearing in a cast iron end frame **3rd Type (Part No. 1102164)** has a ball bearing and an aluminum end frame Armatures for second and third types are hollow with different diameter and length to accommodate ball bearing *Electrical specifications for ALL generators are the same*

►*GENERATOR 1102142 (BUSHING TYPE) CONVERSION TO BALL BEARING TYPE* Install all parts furnished in package, No 1948320 (Commutator End Frame Assembly, Bearing Adapter, Ball Bearing, Washer, and rivets) *When this conversion made, install new name plate designating generator as No 1102163*

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►*GENERATOR SHORT CORRECTION:* Short may occur when brown wire is caught between end of battery terminal screw and fender skirt. Correct by repairing punctured insulation and rerouting wire. Grind terminal screw down.

►*GENERATOR HUM CORRECTION:* Heater hose support No. 534681 replaces No. 533687 in cases where generator hum is objectionable. *NOTE* - It is not necessary to disconnect hose. Spread loop on bracket and fit over hose.

►*CHARGING CIRCUIT FUSE CAUTION: A fuse may be installed in charging circuit at battery terminal of regulator. Check for blown fuse when diagnosing Generator, Battery, or Regulator trouble. For installation of this fuse on cars not so equipped, see "Chassis Wire Harness Shorts Correction" under MISC. ELECTRICAL below.*

Performance Data

Generator	Amperes	Volts	RPM
1102142	30	14.0	2240
1102163,4	30	14.0	2240
1102143	45	14.0	2520

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 amps (1102142, 163, 164), 2.66-2.86 amps. (1102143) at 12 volts and 80°F.

Belt Adjustment: Std. - ¼ deflection with approximately 5-6 lbs. pressure midway between pulleys; or 70-75 lbs. pressure with Burroughs Gauge.

REGULATOR

Delco-Remy 1119001 (Std.), 1119600 (Air Cond. & H.D.). *NOTE - Regulator 1119600 is "Double Contact" type.*

►*NOTE: Specifications below are "Normal" settings.*

►*CHARGING CIRCUIT FUSE CAUTION: A fuse may be installed in charging circuit at battery terminal of regulator. Check for blown fuse when diagnosing Generator, Battery, or Regulator trouble. For installation of this fuse on cars not so equipped, see "Chassis Wire Harness Shorts Correction" under MISC. ELECTRICAL below.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001), 11.8-13.0 volts (1119600), hot.

Contact Gap - .020".

Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119001) - 13.8-14.8 volts at ambient temperature of 125°F.

Setting (1119600) - 13.8-14.6 volts at ambient temperature of 125°F operating on upper contacts. .1-.3 volts lower operating on lower contacts.

Contact Gap (1119600) - .016".

Air Gap - .075" (1119001), .067" (1119600) with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section.*

Current Regulator

Setting (1119001) - 27-33 amperes (hot).

Setting (1119600) - 38-45 amperes (hot).

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy Double Contact Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*CHASSIS WIRE HARNESS SHORTS CORRECTION:* To eliminate damage to any wiring harness resulting from sticking cutout relay points, mount fuse No. 1945171 (copper colored mounting screw and brown ceramic insulator) on battery terminal of regulator. To install, remove screw and wire keeper from "Bat" terminal of regulator. Attach fuse to terminal using long screw extending through fuse assembly. Attach the disconnected lead to terminal of fuse.

Headlamps: Dual headlights (4-Headlight System) Std. *See "4-Headlight System" in Electrical Section.*

Direction Signal: *See Electrical Section. NOTE* - Direction signal switch mounted on steering column just below instrument panel bracket.

Autronic Eye: *See Electrical Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "ON" position. Push latch button on side of switch assembly and pull out switch knob assembly Screw bushing from switch assembly allowing switch to be removed from instrument panel.

Stop Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-up Light Switch: Located on steering column and actuated by gearshift lower lever.

►*BACK-UP LIGHT FAILURE CORRECTION ON SYNCHRO-MESH CARS:* Cause may be improper positioning of switch on steering column. If actuating lever does not contact switch lever or move it to ON position when shift lever is in reverse, correct by loosening switch attaching screw and moving switch clockwise on steering column until proper contact is made by levers to operate lights. Tighten switch screw. If levers still do not make sufficient contact to operate switch after repositioning, bend actuating lever as required to operate lights. After adjustment make sure movement of shift lever into second does not actuate switch.

CIRCUIT BREAKER: 22 Ampere - Headlights, Parking lights, High Beam Indicator. On lighting switch.

FUSES: *NOTE - All fuses located in fuse block inpassenger compartment, on left side of car.*

25 Ampere - Back-up lights, Windshield Wiper & Washer. *NOTE - Windshield wiper motor also has an internal circuit breaker.*

14 Ampere - Tail & License lights..

14 Ampere - Dome, Courtesy & Trunk lights.

14 Ampere - Direction Signals & Indicator and Stop lights.

14 Ampere - Ash Tray & Cigar Lighter lights.

14 Amp r - Parking Brake Warning light.

14 Amp r - Heater Blower Motor & Speedometer Warning Control.

14 Amp r - Glove Box light & Clock.

14 Amp r - Spotlight & Underhood light.

4 Ampere - Lighting Rheostat and ALL instrument panel and dial lights.

Cigar Lighter - Fuse or circuit breaker on forward end of lighter housing.

Horn Relay: Delco-Remy 1116970

Air Gap - .014". **Point Opening** - .027".

Closing Voltage - 5.0-9.5 volts

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for Access to Engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8, valve-on-head. All engines are basically the same with modifications and optional equipment as indicated. *See "Engine Identification Numbers and Letters" under MODEL IDENTIFICATION above. Reference will be made to Decal or Letter Code to indicate on which engines various items will be found.*

►*420A ENGINE NOTE:* These engines are Decal 532979, 72, 77, 81 & Letter Code AL, AN, AK, AM.

►*420E ENGINE NOTE:* These engines are Decal 531936 & Letter Code ES, ET, ER.

Engine	Bore	Stroke	Displacement	Rated HP
All	4 1/16"	3 3/4"	389 cu. in.	52.8

Engine ①	Compr. Ratio	Developed HP
420E (2-bbl., H-M) ②	8.6-1	215 at 3600 RPM
Std. (2-bbl, S-M) ③	8.6-1	245 at 4200 RPM
Std. (2-bbl., H-M) ④	10.0-1	280 at 4400 RPM
Std. (4-bbl., S-M) ⑤	8.6-1	260 at 4200 RPM
Std. (4-bbl., H-M) ⑥	10.0-1	300 at 4600 RPM
Std. (3 Carbs.) ⑦	10.5-1	315 at 4600 RPM
420A (4-bbl., S-M or H-M) ②	10.5-1	330 at 4800 RPM
420A (3 Carbs.) ⑦	10.5-1	345 at 4800 RPM

① - S-M - Synchro-mesh; H-M- Hydra-Matic.
② - Optional on all cars.
③ - Catalina & Star Chief Std.
④ - Catalina & Star Chief Optl.
⑤ - Bonneville Std. ⑥ - Bonneville Optl.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove air cleaner and engine fan. On air suspension cars, drain radiator and remove upper radiator hose. Drain crankcase. Disconnect exhaust pipes at manifolds. On single exhaust system, disconnect crossover pipe. Remove two rear oil pan screws holding flywheel housing front shield to cylinder block. Remove shield from housing. Remove crankcase ventilator pipe and cleaner. Remove flywheel housing lower cover. Disconnect clutch linkage. Remove frame bolts from right idler arm bracket. Remove front and rear engine mount-to-frame nuts. Loosen Hydra-Matic oil filler tube bracket. Raise engine at bell housing so there is 3¾-4" clearance between oil pan and rear upper

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edge of engine support crossmember Remove oil pan screws and remove pan

CYLINDER HEAD: *Se "Cylinder Head & Manifold" in Pontiac Sp cial Data.*

►*CYLINDER HEAD REMOVAL NOTE:* On cars with defroster No. 7 pushrod cannot be removed. Raise pushrod and tape it in place, then remove pushrod with cylinder head.

Ch k Heat Tube Replacement - *See "Cylinder Head & Manifold" in Pontiac Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Sp cial Data.*

PISTONS

Aluminum alloy, tin plated, with steel band for added strength and to control expansion. Pin is offset to right side of engine 1/16".

►*PISTON NON-INTERCHANGEABILITY CAUTION.* Different pistons used in Low (8.6-1) & High (10.0-1 & 10.5-1) compression engines identified as follows Low compression piston heads dished or recessed and pistons marked "L" on rear side near pin boss (do not confuse this mark with two "F" marks on opposite pin boss indicating front side of piston). High compression pistons have flat head *PRODUCTION CHANGE NOTE* - Pistons on later engines have cast relief below oil ring groove but are completely interchangeable with earlier type

Removal - Pistons and rods removed from above

Replac m nt Pist ns: Furnished Std (4 061", 4,062" & 4 063"), and 005", 010", 020", 030" Oversize in both Flat Top or Recessed Head

Fitting New Pistons: Clearance is 0007- 0017" at bottom of skirt (exc 420A & Police Cars - 0022-.0027") Fit pistons using 0015" feeler ½" wide With piston and cylinder wall clean and dry, pull to withdraw feeler should be 8-15 lbs (for 0007- 0017" clearance)

Installing Pistons: Install pistons with notch in piston head and "F" mark at piston boss toward front of engine. *S e Rod Installation.*

PISTON PINS

Pin is press fit in rod

Diamet r - 9800 9804" **Length** - 3 25"

Pin Fit in Piston 0003- 0005" loose with piston bosses and pin clean and dry *NOTE* - Piston and pin must be at room temperature and pin must fall from piston by its own weight

Pin Fit in Rod - 0008- 0016", press fit

Piston Pin Removal & Installation - See *"Piston Pins" in Pontiac Special Data*

R plac m nt Pins: Furnished in Std 001" 003" Oversize

PISTON RINGS

Upper compression ring is chrome plated, lower compression ring is lubrited Top compression ring is taper faced and has a step or chamfer on inside diameter of top side Lower compression ring may have step or chamfer on inside diameter of top side Oil ring has chrome plated rail faces

Ring	Width	End Gap	Side Clearanc
Compr (1)	078"	016 026"	0015- 0030"
Compr (2)	078"	013 025"	0015- 0035"
Oil (3)	184"	015 035"	0015 0085"

Installing Rings - "T" dot or "TOP" marks toward top of piston

Replacem nt Rings. Std 005" 010" 020" and 030" Oversize

CONNECTING ROD

Length - 6 63" (center to-center)

Crankpin Journal Diameter - 2 2492-2 2502"

Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims

Clearance - 0005- 0025"

Sideplay - 006 011"

Replacement Bearings: Std , 001" and 002" Undersize

Installing Rods: Pistons have "F" marks and one notch (10 0-1 & 10 5-1 ratios) two notches (8 6 1 ratio) on front Install rods so that LARGE machined boss at lower end of rod on same side as "F" mark and notch in piston (Left bank cyls 1-3 5-7), on opposite side of piston from "F" mark and notch (Right bank cyls 2-4-6 8) Install assemblies in engine with "F" marks and notches on piston toward front of engine and oil groove in lower end of rod toward center of engine

CRANKSHAFT

Journal Diameter - 3 000" Five bearings

Bearings - Durex 100A, steel-backed inserts, precision type, no shims

Clearance - 0005- 0025" (Front), 0005- 003" (All Others)

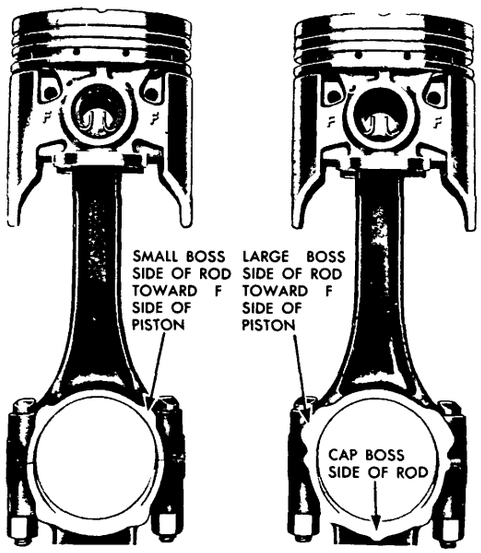
End Thrust: Taken by No. 4 (rear center) main bearing.

End Play - .0035-.0085".

Replacement Bearings: Furnished Std. and .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*



PONTIAC PISTON & R D ASSY.

Vibration Damp ner R moval & Installati n: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION & APPLICATION NOTE* Different camshafts used and identified by number stamped on end of shaft as follows **Synchro-mesh Camshaft** - 0 **Hydra-Matic Camshaft** - 4 (Used on some synchro-mesh cars Decal 532972, 79, Code Letters G & FP) **420A Camshaft** - 6 (Decal 532977,78, 81, 82, Code Letters AL, AN, AK, AM) **420E Camshaft** - 1 (Decal 531936, Code Letters ES, ET, ER)

Journal Diameter - 1 8987-1 8997" Five bearings

Clearance - 0015- 003"

End Thrust - Taken by thrust plate behind camshaft sprocket

Endplay - 003- 007"

Timing Chain: Length - 60 links **Width** - 1" **Pitch** - 375"

►*TIMING CHAIN REMOVAL CAUTION* **Do not rotat crankshaft with timing chain out of engine** Damage to valves pistons or both will result due to piston striking valve To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC to avoid damage

Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data*

VALVES

►***1959-EARLY 1960 PONTIAC INTAKE VALVE VENT NOTE:*** **To prevent excessive wear caused by abrasives entering the small holes drilled in cylinder head (to vent the intake valve guides), the manufacturer recommends that a tapered steel plug, Part No. 534989 be installed. Insert plugs in vent holes (4 per head) and tap in flush with casting. On air conditioned cars it is not necessary to install a plug in vent hole located under the compressor. Later 1960 engines (after Oct. 15, 1959) will not have the vent holes.**

Tappet Clearance· Zero lash, hydraulic lifters

Valve	Head Diam	Stem Diam.	Length
Intake	1 88"	① 3407- 3414"	③ 5 28"
Exhaust	1 60"	② 3402- 3409"	④ 5 27"

Valve	⑥ Seat Angle	Lift	Stem Clearanc
Intake	30°	⑤	0016- 0033"
Exhaust	45°	⑤	0021- 0038"

① - Supersedes 3412- 3419"
② - Supersedes 3407- 3414"
③ - 3 Carbs & 420A Eng 5 33"
④ - 3 Carbs & 420A Eng 5 31"
⑤ - Synchro-mesh Camshaft 37" Hydra-Matic & 420A Eng Camshafts 40" 420E Eng Camshaft 33"
⑥ - **Face Angle - 29° Intake, 44° Exhaust**

Valve Seat Width - Intake 3/64-1/16", Exhaust 1/16"

Replacement Valv s - Furnished Std and 001" (Yellow), 003" (Red), 005" (White) Oversize Color inked on top of valve head

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Valve Stem Oil Seals: Used on all valves as follows:
Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup). *Omitted on 420A Engines.*
Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks).

Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Inner and outer springs used on all engines.

Spring Specifications - 420E Eng. Camshaft

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Open 57 lbs..	1.15"	Open 104 lbs.	1.19"
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"

Spring Specifications - Synchro-mesh Camshaft

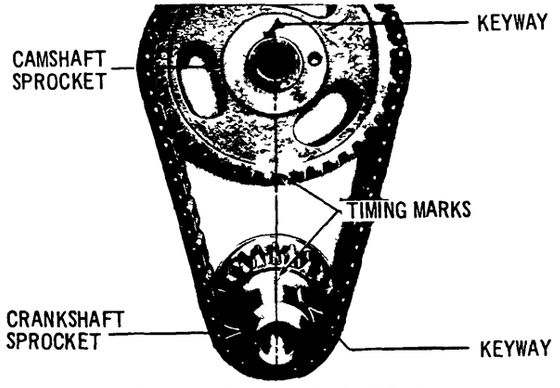
Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Open 60 lbs.	1.11"	Open 109 lbs.	1.15"
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"

Spring Specifications - Hydra-Matic Camshaft

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Open 64 lbs.	1.08"	Open 114 lbs.	1.12"
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"

Spring Specifications - 420A Eng. Camshaft
►Also With H.M. Camshaft Decal 532979 & Code Letter G

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Open 96 lbs..	1.08"	Open 131 lbs.	1.12"
Closed 32 lbs.	1.48"	Closed 62 lbs.	1.52"



PONTIAC VALVE TIMING MARKS

Valve Guides: Cast integral with cylinder head. When valve stem clearance excessive, ream guides using Valve Guide Reamer J-5830-1 (.003"), J-6621 (.005"). *NOTE* - When installing .005" oversize valves, use .003" reamer first then follow with .005" reamer and always reface valve and valve seat after reaming valve guide.

Valve Stem Clearance in Guide: 0016-.0033" (Intake), 0021-.0038" (Exhaust). Oversize reamers ream guide to provide these clearances

►*VENTED INTAKE VALVE GUIDE:* Intake valve guide vented to atmosphere near upper end by hole drilled through head Valve stem is relieved at this point.

Hydraulic Lifters: Standard on all models.
Diameter - .8424-.8427" **Length** - 2".
Clearance in Lifter Boss - .0013-.0028".
Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15–25 ft. lbs. torque. This will insure correct position of rocker arm in respect to pushrod and valve stem.

Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

Rocker Arm Lubrication: Oil from cylinder head oil galleries flows through hollow rocker arm studs to 1/16" hole at upper end of stud to lubricate ball seat and flows through groove in ball to fill rocker arm. Oil flows from hydraulic lifter boss through hollow pushrods for pushrod end lubrication.

Oil Passage Plug Removal & Installation - With rocker arm cover removed, insert easy-out in hole in plug, turn counterclockwise and pull out. Coat plug with gasket paste and drive in place with flat piece of metal or hard wood until plug is flush with outer surrounding surface.

VALVE TIMING

See Camshaft Setting under CAMSHAFT above.

420E Engine Camshaft
Intake Valves - Open 14° BTDC. Close 58° ALDC.
Exhaust Valves - Open 48° BLDC. Close 24° ATDC.

Synchro-mesh Camshaft
Intake Valves - Open 22° BTDC. Close 67° ALDC.
Exhaust Valves - Open 63° BLDC. Close 27° ATDC.

Hydra-Matic Camshaft
Intake Valves - Open 30° BTDC. Close 63° ALDC.
Exhaust Valves - Open 77° BLDC. Close 25° ATDC.

420A Engine Camshaft
Intake Valves - Open 29° BTDC. Close 74° ALDC.
Exhaust Valves - Open 82° BLDC. Close 31° ATDC.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. when changing filter element.

Normal Oil Pressure: 30-40 lbs. at 2600 RPM.
Pressure Regulator - In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.
Pump Overhaul - *See "Oiling System" in Pontiac Special Data.*

Oil Filter: Full Flow type. Replace element every 15,000 miles or once a year. Use only AC PF-122 filter element.

Crankcase Ventilation: Filter element in oil filler caps in each rocker arm cover, and ventilator pipe at rear of engine. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. *NOTE* - Filter element for outlet pipe available as an accessory.

►*VENTILATOR OUTLET PIPE CAUTION:* If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed down into cover beyond the two locating points on pipe. Excessive oil consumption at high speeds will result.

Oil Pressure Indicator: Warning light on instrument panel controlled by pressure switch on engine. Light goes on when ignition turned on, goes out when oil pressure reaches 5 lbs.±1.5 lbs.
Engine Unit - AC Pressure Switch No. 1508753.

COOLING

Water Capacity: As follows:

Model	Capacity in Qts.
Synchro-mesh Std.	21.4
Synchro-mesh with Heater	22.4
Hydra-Matic Std.	21.3
Hydra-Matic with Heater	22.3
Hydra-Matic with Heater & Air Cond.	22.3

Pressure Valve: Radiator filler cap. AC No. RC-6 12-15 lb. type (Std.), No. RC-15 14-17 lb. type (Air Cond. Cars).

Thermostat: Pellet type. In water outlet passage in intake manifold. **170° Std. (Pontiac No. 3148225), 180° Optl. (No. 2149016), for use with permanent type anti-freeze.**

Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly.

Temperature Gauge: New two-light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 113°±2°F, RED light remains off during normal engine operation but will come on when engine temperature reaches 238±2°F. *NOTE* - Red light will light up when ignition switch turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine is started). *See Miscellaneous Section.*
Engine Unit - Delco-Remy 1998189 (Std.- 238°), 1998707 (Air Cond. Cars - 244°).

CLUTCH

Borg & Beck. Pontiac No. 531842 (Std.), 532403 (Heavy Duty). Single plate, semi-centrifugal, dry disc type.
Driven Disc - Pontiac No. 531969 (All).

►*CLUTCH PEDAL STICKING CORRECTION:* Caused by forward end of clutch fork-to-countershaft control rod interfering with clutch housing. Correct by grinding off end of control rod assembly sufficiently to clear housing

►***1959 PONTIAC POWER-LOCK (PLATE CLUTCH TYPE) DIFFERENTIAL CLUTCH PACK REPLACEMENT NOTE:* Replacement clutch packs containing the new type "Belleville" (dished) plates are available in Kit, Part No. 535595 (two required). For installation procedures, see *"Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.***

Pedal Adjustment: Pedal free travel should be 5/8". To adjust, loosen adjusting nut locknut on clutch

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fork rod at clutch fork, turn adjusting nut to remove all freeplay (release bearing contacting clutch pressure plate levers), then back off adjusting nut 3½-3¾ turns which will provide correct free travel of 5/8". Tighten locknut to 60-120 in. lbs. torque. Check pedal height.

Pedal Height Adjustment - Top of pedal pad should be 6¼" above floor mat (*NOTE* - This is lowered setting for operating comfort – original setting of 6¾-7" may be preferred to maintain maximum pedal reserve). To adjust, loosen pedal rod upper trunnion jam nuts and adjust as required. Tighten jam nuts to 60-120 in. lbs. torque when adjustment completed. *NOTE - See Brake Pedal Adjustment also.*

Removal: Remove transmission (see "Transmission Removal" below) and clutch housing bottom cover. Disconnect return spring and remove fork and fork ball support. Remove release bearing. *CAUTION - Bearing lubricated for life. Do not degrease.* Mark cover and flywheel to maintain proper balance at reinstallation. Loosen cover bolts evenly one turn at a time, then remove. Move clutch assembly away from bottom of flywheel, remove driven member, then remove cover and pressure plate from car.

Clutch Installation Note - Position clutch disc so that long end of hub is in flywheel and cover assembly marks line up with marks on flywheel. Use spare transmission main drive gear in spline of driven disc to insure proper alignment and tighten cover bolts one turn at a time until tight. Coat entire outer diameter of release bearing support with high melting point wheel bearing grease. Do not overlubricate. Confine grease to inner diameter only of release bearing. Use new gasket and install support and bearing. Install bearing support spring washer. Coat release fork fingers and release fork ball fulcrum with same type grease and install fork. Lockwasher must be under screw fastening fork ball fulcrum to clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. Standard & Heavy Duty types. *NOTE* - Standard and Heavy Duty Transmissions are of different design. *See "Pontiac Synchro-mesh" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Remove propeller shaft assembly (see *"Propeller Shaft Removal" below). NOTE - On heavy duty transmission front propeller shaft connected to yoke flange at transmission. On standard transmission yoke slides on main shaft.* Disconnect speedometer cable and control linkage. Remove upper mounting bolts and install Aligning Studs, Tool J-1126. Remove lower bolts and remove transmission by sliding on aligning studs until shaft clears clutch.

HYDRA-MATIC DRIVE

"Strato-Flight" Dual Coupling. Four speed automatic transmission and fluid coupling.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication - Check fluid level every 2000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Check with transmission warm and engine idling with selector lever in "P" or "N" position. If fluid level is below lower ball of "dumbbell" marking on lower end of dipstick (marked "Add Oil"), add fluid to bring level up to upper ball of dumbbell (marked "Full - Hot Oil"). Approximately 1 pint required to raise level from lower ball to upper ball. DO NOT overfill. *NOTE* - If level checked with transmission COLD, fluid level should be approximately at lower end of dumbbell and should rise to upper ball as oil temperature rises.

Capacity - 9 qts. refill, 11½ qts. after overhaul.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Saginaw. Needle bearing type. Three used.

►*CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload which must be readjusted whenever nut is loosened.

Replacement Universal Joints - Universal joints furnished with new propeller shafts. Universal joint repair kits and parts can be obtained separately.

Lubrication - Disassemble and repack every 25,000 miles.

See "Propeller Shaft Removal" below.

PROPELLER SHAFT

Two-piece propeller shaft with three universal joints used. Center bearing and support mounted on a bracket inside frame tunnel.

Removal: Loosen bolts holding center bearing and bracket to frame bracket. *CAUTION - Note number of shims under bracket and reinstall as found to insure proper alignment of propeller shaft.* Remove U-bolts and lock plates from rear axle drive pinion flange. On heavy duty transmission disconnect front universal joint from yoke flange at transmission. Hold bearings on journals with wire or rubber band. Remove stone and splash shield from front of frame tunnel. Remove complete drive line assembly by sliding rearward out of frame tunnel.

Propeller Shaft Alignment & Center Bearing Assembly: *See "Propeller Shaft Notes" in Pontiac Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type. "Safe-T-Track" Differential is optional.

See "Pontiac Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Identification - Axle ratio indicated by **color** mark on end of axle shaft and by **code number** stamped on pad on differential carrier flange (lower right side). Safe-T-Track differential axles are identified by tag near oil filler plug.

Axle Ratios & Code Markings

Synchro-mesh Cars

Model	Ratio	Code No.	Color
Std. (Exc. 420A)	3.23-1 (42-13)	9	Brown
Std. (420A Eng.)	3.64-1 (40-11)		
Econ. Option	3.08-1 (40-13)	0	Yellow
Perf. Option	3.42-1 (41-12)	8	White

Hydra-Matic Cars

Std. (Exc. 420E)	3.08-1 (40-13)	0	Yellow
Std. (420E Eng.)	2.87-1 (43-15)	7	Orange
Econ. Option	2.87-1 (43-15)	7	Orange
Perf. Option	3.23-1 (42-13)	9	Brown

Backlash - .005-.009".

Axle Shaft Removal: Remove wheel, brake drum, four brake backing plate bolt nuts, static collector, and loosen bearing retainer (do not move backing plate or brake line will be damaged). Pull shaft with Puller J-942-1 (do not drag axle shaft on seal).

Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Remove axle shafts and disconnect rear propeller shaft at companion flange. Drain oil, remove capscrews, and remove assembly.

►*CAUTION: Rear universal joint companion flange nut controls rear axle pinion bearing preload. Readjust whenever nut is loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable, not refillable Serviced by replacement.

Shock Absorbers (Pontiac Nos.)

Model	Front	Rear
Sedans & Coupes (exc. Air Susp.)	5543750	5543751
Hardtop (exc. Air Susp.)	5543756	5543751
Station Wagon (Exc. Air Susp.)	5543756	5543754
Convt. (exc. Air Susp.)	5543757	5543758
Taxicab & Police (exc. Air Susp.)	5543757	5543758
Air Susp. Cars (exc. Convt.)	5543752	5543753
Heavy Duty (exc. Air Susp.)	5535591	Ⓒ 5535592

Ⓒ - Not used on Station Wagon models.

FRONT SUSPENSION

Independent. "Ball-joint" type with spherical ball joints between upper and lower control arms.

►***1959 PONTIAC "CRACKING" NOISE ON HARD TURN CORRECTION:* This noise can be eliminated by installing a piece of 5/8" heater hose filled with lubricant, over the stop on lower control arm. Cut hose long enough so it extends 1/16–1/8" beyond end of stop.**

See "Pontiac Front Suspension" in Suspension & Wheel Alignment Section.

Kingpin Inclination - 4°50' at 0° camber.

Caster - Neg. 1½°±½°.

Camber - Pos. ¼°±½°. Camber on left side should be ¼° greater than on right side.

Toe-In - 0" to 1/16" measured 9" above floor.

Toe-Out on Turns - With inner wheel turned 20°, outer wheel should be turned 19°.

REAR SUSPENSION

Coil springs with one upper and two lower control arms.

See "Pontiac Rear Suspension" in Suspension & Wheel Alignment Section.

AIR SUSPENSION

Rubber air springs replace all four coil springs. Optional on all models.

See "Pontiac Air Suspension" in Suspension & Wheel Alignment Section.

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STEERING

Manual Saginaw Ball Bearing Worm & Nut Recirculating ball worm and nut

►*1959 PONTIAC HARD STEERING (WITH BRAKES APPLIED) CORRECTION:* **Adjust steering column to instrument panel so the coupling pins extend 030—090" through the flex coupling. To do this, loosen jacket at instrument panel and locate it upward to provide the proper clearance.**

See Saginaw Ball Bearing Worm & Nut Steering Gear in Steering Section

Power Steering Saginaw (Rotary Valve) integral type *See Saginaw (Rotary Valve) Power Steering in Steering Section*

►*POWER STEERING DUST SEAL CHANGE TO CORRECT OIL LEAKS* To correct leaks at adjuster plug install new steering gear adjuster plug seal furnished in Service kit No 5687183 *See Saginaw (Rotary Valve) Power Steering in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: *See 'Saginaw Ball Bearing Worm & Nut" in Steering Section*

Steering Gear Removal· *See "Saginaw Ball Bearing Worm & Nut' in Steering Section*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment) Hand brake applies rear wheel service brakes
See "Bendix Hydraulic Single Anchor (Without Eccentric)" in Brake Section

Drum Diameter - 11" front & rear
Master Cylinder Bore Diameter - 1"
Wheel Cylinder Bore - 1 3/16" (front), 1" (rear)
Braking Power - 58 5% Front, 41 5% Rear

Lining: Molded asbestos, riveted to shoes
Thickness - 220"

Lining Width & Length

Shoe	Front Wheel	Rear Wheel
Primary	2 5" x 9 29"	2 0"x9 29"
Secondary	2 5" x 11 94"	2 0"x11 94"

Clearance - Adjusting screw backed off 12 notches from point where wheel can just be turned by hand

Standard Master Cylinder: Forward of brake pedal on engine side of firewall

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" from gasket surface of filler neck

Power Brakes: New Bendix or Moraine Power Units
See "Bendix Hydraulic (Disc) Reaction Type" or "Moraine Hydraulic (Diaphragm) Reaction Type" Power Units in Brake Section

►*POWER BRAKE VACUUM CHECK VALVE BRACKET NOTE (Cars with 3 Carbs)* Bracket Part No 533680 with offset to provide clearance between check valve and hose and brake operating mechanism must be used

►*POWER BRAKE PEDAL HEIGHT CHANGE* Pedal height was raised from 3¼" to 3¾" to provide greater separation of brake and accelerator pedals

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" of top of filler cap opening

Removal of Power Unit - Disconnect pushrod at brake pedal vacuum hoses from vacuum exhaust tube, and pipe from master cylinder hydraulic port (cover all openings) Remove power cylinder from adapter plate on firewall

MISC. MECHANICAL

Windshield Wiper: Electric type Single-speed (with separate motor driven washer), or Two-speed type (with washer unit mounted on wiper motor)
See "Windshield Wipers" in Miscellaneous Section

Air Conditioning: Harrison *See "Air Conditioning" in Miscellaneous Section*

Power Top Control: Hydro-Lectric type *See "Power Top Controls" in Miscellaneous Section*

Power Window Regulators: Electric type with individual motor in each window Power rear window available on Station Wagons *See "Power Window Regulators" in Miscellaneous Section*

Power Seat Adjuster: Electric Six-way type with individual motor for each seat action (3 used) *See "Power Seat Controls" in Miscellaneous Section*

►*JACKING & HOISTING CAUTION (ALL MODELS) Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wh l Alignment Section*

►*STARTING CAR BY PUSHING CAUTION Car CANNOT be started by pushing because there is no rear oil pump in 1960 Hydra-Matic transmission*

MODEL IDENTIFICATION

S ri s	①Series Designation
Catalina	21
Ventura	23
Star Chief	24
Bonneville Safari (Station Wagon)	27
Bonneville	28

① - First two digits of series and body style designation following "60" year number under STYLE on body identification plate

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar post and on triangle pad on front of right bank of engine near water pump outlet hose (See also Engine Production Code Number below) Number (example below) includes identification data

① ② ③ ④
1 60 P 1001

① - Series 1 - 21, 3 - 23, 4 - 24, 7 - 27, 8 - 28
② - Model Year - 1960
③ - Assembly Plant P Pontiac, S South Gate, W Wilmington, K Kansas City, L Linden, D Doraville, A Arlington
④ - Beginning vehicle number for each prefix combination

Engin Pr ducti n C d Number: On triangle pad on front *of right bank of engine Do not confuse this number with S rial and Engine Numb r*

►*ENGINE IDENTIFICATION LETTER CODE* Twenty different engine combinations used Letter code (A2, P4 etc) stamped on small pad directly below Engine Production Code Number Letter code indicates various items of equipment used in a particular engine and will be listed in following data

TUNE-UP

COMPRESSION PRESSURE: (8 6-1 ratio) 160-170 lbs , (10 25-1 & 10 75-1 ratios) 200-210 lbs at cranking speed of 155–165 RPM Lowest cylinder must not be less than 80% of highest cylinder

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL: Thermostatic coil type in right exhaust manifold outlet Valve must operate freely and anti-rattle spring must be installed in a downward position

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035" (033 038")

Spark Plugs - AC No 45 or 45S (Std), No 44 or 45S (Police Cars) 14 mm Torque to 25 ft lbs

►*SPARK PLUG NOTE* Use new type 45S plug with extended shell

COIL: D lc -R my 1115131. *CAUTION - Use only this coil on 1960 models and do not use this coil on past models*

Ignition Current - 2 1amps idling 3 4 amps stopped

R sist r - Resistor Wire No 1944395 Integral part of wiring harness, composed of a stainless steel wire, plastic coated and covered with a glass braid Connected in circuit between coil and spliced to Ign 1 terminal of ignition switch at temperature and oil indicator feed Bypassed during cranking by second lead from ignition switch

DISTRIBUTOR: Delco-Remy No. 1110965 or 1110971 (8.6-1 ratio), 1110964 or 1110970 (10.25-1 & 10.75-1 ratios). "Window" type with external adjustments *See "Delco-Remy (Window Type) Distributors" in Electrical Section*

Condenser - Delco-Remy 1932004 **Capacity** 18- 23 mfd

Contact Point Set - Delco-Remy 1931988

Breaker Gap - Gap (016") will be correct when cam angle correctly set

Cam Angle - 28-32° Set at 30° Will give 016" breaker gap

Breaker Arm Spring Tension - 19-23 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance - 1110965 & 971

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	450	0-4	900
6-8	1050	12-16	2100
9-11	1800	18-22	3600

Automatic Advance - 1110964 & 970

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
4-6	750	8-12	1500
7-9	1000	14-18	2000
8-10	1450	16-20	2900

Vacuum Spark Control - Delco-Remy 1116167 (1110964 & 970 Distr), 1116167 or 1116136 (1110965 & 1116173)

Vacuum Advance - 1116173 & 1116136

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6-8
10	20	13-15

Vacuum Advance - 1116167

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	10-12
10	20	16 75-18 75

IGNITION TIMING

Setting - 6° BTDC *CAUTION* - Set timing with engine at operating temperature and idling at indicated RPM **with vacuum line disconnected.**

►*IGNITION TIMING NOTE* The above timing setting (6° BTDC) is for operation on regular fuels (8 6–1 ratio engine), and for premium fuels (10 25-1 & 10 75-1 ratio engines) Under no circumstances should ignition timing be retarded to allow for use of regular fuel in a 10 25-1 or 10 75-1 engine, or retarded later than 0° for any reason

Timing Marks - Two marks on harmonic balancer, TDC and 6° BTDC Pointer on timing sprocket cover aligned with correct mark on harmonic balancer

CARBURETOR

►*CARBURETOR APPLICATION Carter and Rochester carburetors used as follows*

Model	Carburetor
All Models (Exc Bonneville)	Rochester 2-Bbl
Bonneville	Carter AFB 4-Bbl
All Models (Optional)	Rochester Triple 2-Bbl

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC CARS): With engine and transmission at normal operating temperature, idle speed correctly set (*see carburetors below*), proceed as follows Loosen both nuts on transmission throttle control rod trunnion Stop engine and install Linkage Adjusting Pin J-7687 through holes in throttle control lever and bracket *NOTE - On 4-barrel carburetor cars, remove throttle return check or install Holding Tool J-6342-01 over return check* Close throttle valves fully and loosen locknut on transmission throttle control rod. Adjust length of rod so pin will enter holes freely Tighten locknut, but leave pin in place Push transmission throttle control rod down until throttle control outer lever reaches end of its travel *CAUTION - Upper locknut must not touch trunnion* Hold rod and tighten upper and lower trunnion locknuts finger tight Then shorten rod by backing off lower nut 2½ turns Tighten upper nut securely Remove gauge pin Loosen locknut on carburetor throttle rod and adjust rod so there is 5 14" clearance between spherical end of pedal rod (at accelerator pedal) and floor pan Tighten locknut

THROTTLE RETURN CHECK ADJUSTMENT (Cars with Hydra-Matic and 4-Barrel Carburetors): Make carburetor fast idle adjustment, then stop engine Rotate fast idle cam so that fast idle screw rests on highest step of fast idle cam Clearance between contact screw and contact on throttle lever should be 093" (use a 3/32" drill rod as a gauge) Adjust by turning contact screw *CAUTION - Hold sleeve next to diaphragm bracket from turning while making adjustment*

ROCHESTER 2GC 2-BARREL

Rochester 2GC 7015073 (Synchro-mesh Trans.). 7015070 early, 7015072 later (Std. Engine, Hydra-Matic Trans), 7015062 (425E Engine Hydra-Matic). Dual downdraft type *NOTE* - 7015070 & 7015072 carburetors have "Idle Air Bypass" idle speed adjustment

►*2GC CARBURETOR IDENTIFICATION NOTE* Color of tag denotes carburetor used with each transmission type Black (Synchro-mesh), Brass (Hydra-Matic)

►*2GC CARBURETOR HIGH SPEED ACCELERATION STUMBLE CORRECTION* Stumble at speed of 50 MPH or above can be corrected by repositioning air cleaner intake tube 30-40° to the right of engine centerline *NOTE* - On Air Cond Cars, cleaner can not be repositioned to this extent

►*2GC CARBURETOR STICKING CHOKE CORRECTION* Caused by burr at upper bend of fast idle link or burr around hole for link where it enters fast idle lever To correct, remove link and dress down burrs to remove all bind

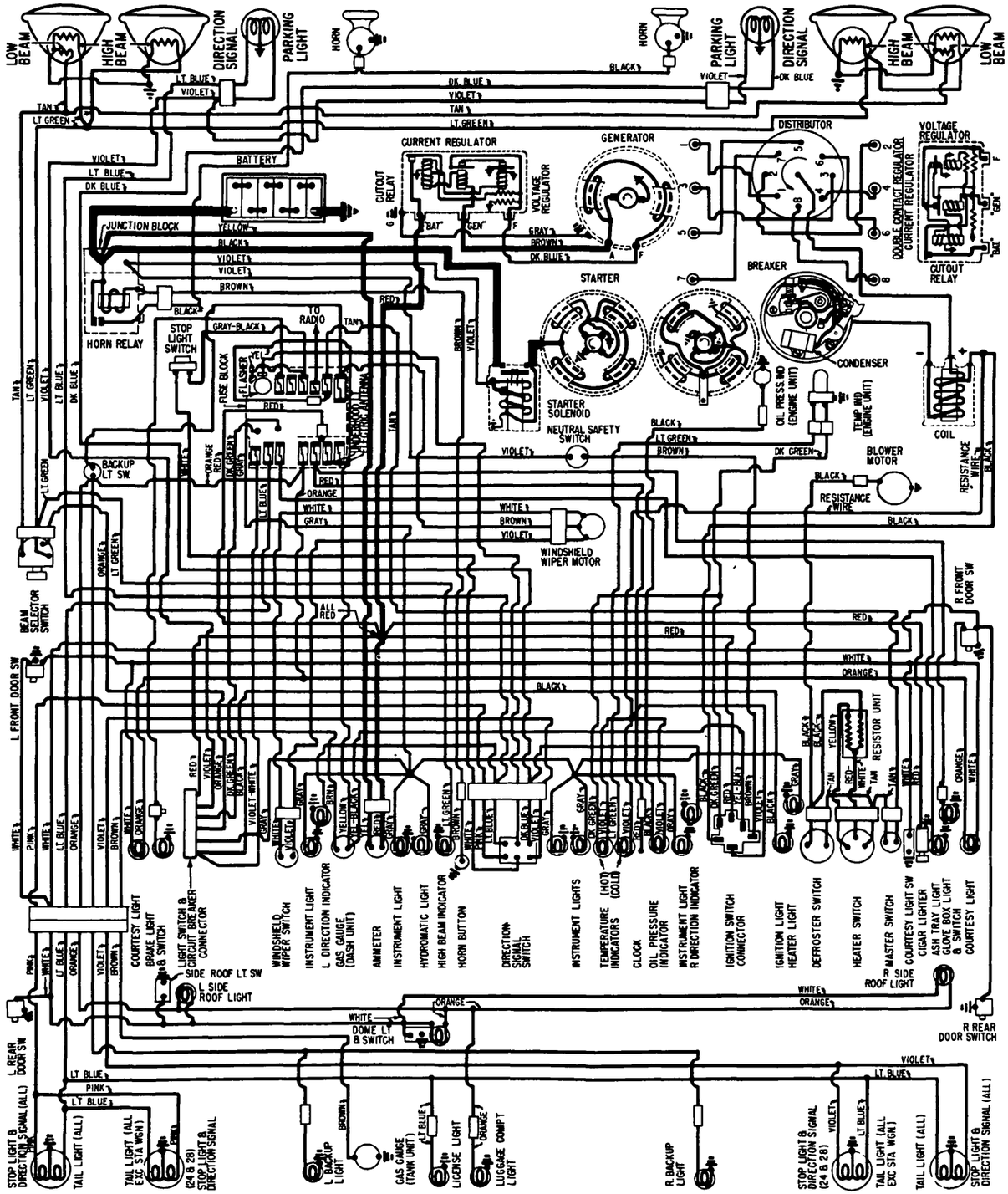
►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7*

Idle Setting - Initial setting 2 turns open from a lightly seated position Turn screws out for richer mixture

Idle Speed - 480-500 RPM Synchro-mesh & Hydra-Matic in either "DR" position, 540-560 RPM Air Conditioning "OFF" and Hydra Matic in either "DR" position

►***IDLE SPEED ADJUSTING NOTE (7015070, 72 Carbs. with "Idle Air Bypass")*** **For first setting, open idle** mixture screws and idle air bypass screw 2 turns from a lightly seated position, then with engine at normal operating temperature, choke fully open, carburetor off fast idle, adjust idle air screw to obtain proper engine RPM (see above) Adjust mixture screws for highest engine RPM, then reset idle air screws for proper idle speed *NOTE* - Recheck idle mixture setting after adjusting idle air screw

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Fl at L v l - With air horn inverted, gasket in place, and needle seated, there should be 11/16"±1/16" clearance (7015062 & 7015073), 5/8"±1/16" clearance (7015070, 72) between bottom of float seam (sharp edge) at toe end and air horn gasket. Use Gauge BT-176, Pontiac No. J-8557 (7015062, 73 Carbs.), BT-177, Pontiac No. J-8556 (7015070, 72 Carbs.). To adjust, bend float tang.

Float Drop - 1¾" (All Carbs.) from bottom of float at free end to gasket on cover with float hanging freely below bowl cover. Use Float Level Gauge (setting indicated by scribed line on gauge leg).

Fast Idle (7015070, 72): With hot idle speed and mixture properly adjusted, move fast idle cam so highest step is under end of fast idle screw. Adjust fast idle screw to obtain an engine speed of 2700 RPM.

Fast Idle (7015062 & 7015073): No separate adjustment required (will be correct when hot or slow idle speed correct).

Automatic Choke Setting: Centered at index.

Throttle Linkage Adjustment: *S CARBURETOR abov .*

►*OTHER DATA: See "Rochest r 2G & 2GC Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB No. 2975S (Synchr -m sh), 2976S (Hydra-Matic), 3010S (Special Equipm nt).

►*ACCELERATION FLAT SPOT OR STUMBLE CORRECTION:* Caused by collapsed "S" link (connecting pump lever and plunger), or by turned leather on pump plunger. Correct by replacing "S" link or pump plunger. *NOTE* - Lower end of link must point toward air horn to avoid contact with bowl cover casting.

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barr ls f d 1-4-6-7.*

►*IDLE SPEED ADJUSTMENT NOTE (AFB No. 2975S, 2976S): Idle Air Bypass scr w on throttl body is us d to adjust idle speed. Throttl valv s ar normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB 4-Barr l Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter AFB 4-Barrel Carbur t rs" in Carburetion Section.*

TRIPLE CARBURETORS
(Rochester 2G & 2GC)

Engine & Trans.	Roch st r Carbur t r N . Fr nt	C nt r	R ar
Synchro-mesh	7013063	7015068	7013065
Hydra-Matic (Early)	7013063	7015066	7013065
Hydra-Matic (Later)	7013063	7015076	7013065

Idle Speed - Same as other models (see Rochester 2GC data above).

For complete adjustment data on these carburetors (including linkage adjustment to insur correct synchronization), see "Rochester Tripl Carbur tors" in Carburetion Section.

CARB. EQUIPMENT

Fu l Pump: AC No. 4512. Fuel only.

Pr ssur - 5¼-6½ lbs. at 500-1000 RPM.

Se "Fuel Pumps" in Carburetion Section.

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Fuel Filter: AC No. GF-61P. Located near fuel pump in line between pump and carburetor Replace at 15,000 mile intervals or yearly.

Gasoline Gauge: AC Electric type.

Dash Unit - AC No. 5643163

Tank Unit - Used as follows

Model	AC No.
All (Exc. Sta. Wgn. & Air Cond.)	5640329
All Air Cond. (Exc. Sta. Wgn.)	5640330
Sta. Wgn. (6 Pass. Exc Air Cond.)	5640209
Sta. Wgn. (9 Pass Exc Air Cond.)	5640357
Sta. Wgn. (6 Pass Air Cond.)	5640210
Sta. Wgn. (9 Pass. Air Cond.)	5640358

See "Fuel Gauges" in Carburetion Section

Air Cleaner: Standard - Oil wetted type Service Spring and Fall or every 10,000 miles. *NOTE - In dusty areas, service very 2,000 miles or oftener.* Clean by immersing element in gasoline or kerosene and reoiling with engine oil

Heavy Duty - Paper element type, replace or clean every 15,000 miles or yearly *CAUTION* - Clean by blowing air on inner circumference of filter element

►*POLYURETHANE ELEMENT NOTE & CLEANING CAUTION*· Plastic type May be used to replace other elements and may be found on cars in service. Clean element by removing it from screen and washing in solvent (such as kerosene at room temperature) and squeezing dry (*CAUTION - DO NOT wring dry*). Dip element in SAE 10W-30 oil, squeeze to remove excess oil, reinstall element on screen with sealing edges evenly overlapping the screen

BATTERY

Delco . Used as follows

Synchro-mesh Cars - 2SMR53, No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr rate).

Hydra-Matic Cars - No. 558. 12 volt, 11 plate, 63 ampere hour capacity (20 hr rate)

Extra Duty Battery - 3SMR72, No. 670. 12 volt, 11 plate, 72 ampere hour capacity (20 hr rate)

Battery Ground - Negative, to battery support bracket & engine.

STARTER

Delco-Remy No. 1107661 (8.6-1 ratio, exc. 425E Eng. with Air Cond.); No. 1107777 (All Others).

Armature - Delco-Remy 1932185 (1107661 Starter), No 1941888 (1107777 Starter).

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 35 ozs minimum

Performance Data - 1107661

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107777

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

Ⓒ - Includes Solenoid

Starting Switch: Delco-Remy Solenoid No 1119798 (Synchro-mesh), No. 1114257 (Auto Trans.) mounted on starter and controlled by Ignition & Starter Switch

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998705 located at lower end of steering column. Connected in starter circuit so that starter operates only when selector lever is in "N" or "P" positions.

Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy No. 1102203 or 204 (Std.), No. 1102200 (Optional), No. 1102143 (H.D. & Air Cond.).

►*30-40 AMPERE GENERATOR ENDPLATE ASSEMBLY NOTE:* The two spring bushings must be in place when reassembling endplates with 5/16" bolts.

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit is protected by a 45 amp. fuse (Std. Reg.), 60 amp. fuse (Double Contact Reg.) clipped to "BAT" terminal of generator regulator Check for blown fuse when diagnosing generator, regulator or battery failure.*

Armature - Delco-Remy 1946931 (1102203 & 204 Gen.), 1946719 (1102200 Gen.), 1939837 (1102143 Gen.)

Performance Data

Generator	Amperes	Volts	RPM
1102203, 204	30	14.0	2240
1102200	35	14.0	2630
1102143	45	14.0	2520

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 amps (1102203, 204, 1102200), 2.66-2.86 amps (1102143) at 12 volts and 80°F

Belt Adjustment: ¼" deflection with approximately 5-6 lbs pressure midway between pulleys, or 70-75 lbs. pressure with Burroughs Gauge

REGULATOR

Delco-Remy. Used as follows·

Regulator	Generator
1119001 or 1119263	1102203, 204
1119002 or 1119264	1102200
1119623	1102143

NOTE - Regulator 1119623 is "Double Contact" type.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*REGULATOR CAUTION· Regulators must be used with generators as indicated above DO NOT interchange regulators.*

►*REGULATOR ADJUSTMENT NOTE:* Regulators (except Double Contact type) may be "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment

NOTE - Specifications below are "Normal" settings.

Cutout Relay

Cuts In - 11.8-13.5 volts (Exc. 1119623), 11.8-13.0 volts (1119623), hot

Contact Gap - .020".

Air Gap - .020" with contacts just closed

Voltage Regulator

Setting (Exc. 1119623) - 13.8-14.8 volts at an ambient temperature of 125°F

Setting (1119623) - 13.8-14.6 volts operating on upper contacts. 1-3 volts lower operating on lower contacts. At an ambient temperature of 125°F.

Contact Gap (1119623) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (Exc. 1119623), .067" (1119623), with armature pressed down to point where contacts just touch

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119001 & 1119263) - 27-33 amps. (adjust to 30 amps.) hot.

Setting (1119002 & 1119264) - 32-37 amps. (adjust to 35 amps.) hot.

Setting (1119623) - 38-45 amps hot.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*LOCKING TYPE ELECTRICAL CONNECTORS CAUTION:* It will be necessary to straighten "Finger Clips" press in on "Thumb Release", remove "Wire Clip" or lift up on "Locking Tab" before attempting to separate connectors.

Directional Signals: *See Electrical Section.*

"Guide-Matic" Headlight Control: *See Electrical Section.*

Lighting Switch Removal: Remove one battery cable from battery. Pull headlight switch knob to "ON" position Push latch button on side of switch assembly and pull out switch knob assembly Screw bushing from switch assembly allowing switch to be removed from instrument panel.

Stop Light Switch Location: Mechanical type switch located on bracket attached to steering column behind instrument panel.

Back-up Light Switch: Located on steering column and actuated by gearshift lower lever.

CIRCUIT BREAKER: 22 Ampere - Headlights, Parking lights, High Beam Indicator. On lighting switch.

FUSES: *All fuses located in fuse block in passenger compartment, on left side of car. Fuses placed to right of names.*

25 Ampere - Windshield wiper & washer. and back-up lights.

14 Ampere - Tail and license lights.

14 Ampere - Direction signals and stop lights.

14 Ampere - Dome & courtesy lights, and trunk light.

14 Ampere - Lighter and ash tray lights.

14 Ampere - Glove box light and clock

14 Ampere - Spot and Underhood lights.

14 Ampere - Power antenna.

14 Ampere - Safeguard speedometer and heater motor.

14 Ampere - Parking brake warning light.

4 Ampere - All instrument panel lights (including rheostat).

4 Ampere - Radio.

Cigar Lighter - Fuse or circuit breaker on forward end of lighter housing.

Horn Relay: Delco-Remy 1116970

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8, valve-in-head. All engines are basically the same with modifications

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and optional equipment as indicated. *See "Engine Identification Letter Code" under MODEL IDENTIFICATION above. Reference will be made to Letter Code to indicate on which engines various items will be found.*

►*425A ENGINE NOTE:* These engines are Letter Codes F4, M4, F1, M1.

►*425E ENGINE NOTE:* This engine is Letter Code E3.

Engine	Bore	Stroke	Displacement	Rated HP
All	4 1/16"	3 3/4"	389 cu. ins.	52.8

Engine ℂ	Compr. Ratio	Developed HP
425E (2-bbl., H-M) ②	8.6-1	215 at 3600 RPM
Std. (2-bbl., S-M) ③	8.6-1	215 at 3600 RPM
Std. (2-bbl., H-M) ③	10.25-1	283 at 4400 RPM
Std. (4-bbl., S-M) ④	8.6-1	281 at 4400 RPM
Std. (4-bbl., H-M) ⑤	10.25-1	303 at 4600 RPM
Std. (3 Carbs., S-M or H-M) ②	10.75-1	318 at 4600 RPM
425A (4-bbl., S-M or H-M) ②	10.75-1	330 at 4800 RPM
425A (3 Carbs., S-M or H-M) ②	10.75-1	345 at 4800 RPM

ℂ - S-M- Synchro-mesh; H-M - Hydra-Matic.
② - Optional on all cars.
③ - Catalina, Ventura & Star Chief Std.
④ - Bonneville Std.
⑤ - Std. Bonneville, Optional Others.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

OIL PAN REMOVAL: Remove fan, drain radiator and remove radiator hoses. Place car on jack stands and drain oil. Disconnect crossover and exhaust pipes at exhaust manifolds, and remove crossover pipe. Remove flywheel housing front shield and housing lower cover. Disconnect clutch linkage. Disconnect right idler arm bracket from frame. Remove front engine mount bolts and loosen rear mount bolts. Disconnect oil cooler lines from clips on timing gear cover. Loosen Hydra-Matic oil filler tube bracket. Install a 1958 front engine support on timing gear cover to use as a lifting pad and raise engine with a screw type jack so oil pan clears upper edge of front crossmember. Remove pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, tin plated, with piston pin offset 1/16" to right. *See "Piston Note" below.*

►*PISTON NOTE:* Various types used as follows:

Low Compression (8.6-1 Ratio) - Pistons have recess or dish in head and are identified by TWO notches at front of piston head and mark "L" on rear piston pin boss. *These pistons must not be used in 10.25 & 10.75-1 ratio engines.*

High Compression (10.25 & 10.75-1) - Two types used (later type has vertical steel strut in place of radial band and does not have cast relief under oil ring groove). Pistons have valve clearance reliefs on head and are identified by ONE notch at front of piston head. Both types interchangeable and later type was intermixed in production starting with Engine No. 68163 (used exclusively beginning Engine No. 112800).

1959 Type High Compression Pistons - Used in complete sets in some engines. These engines identified by "X" stamped after engine number.

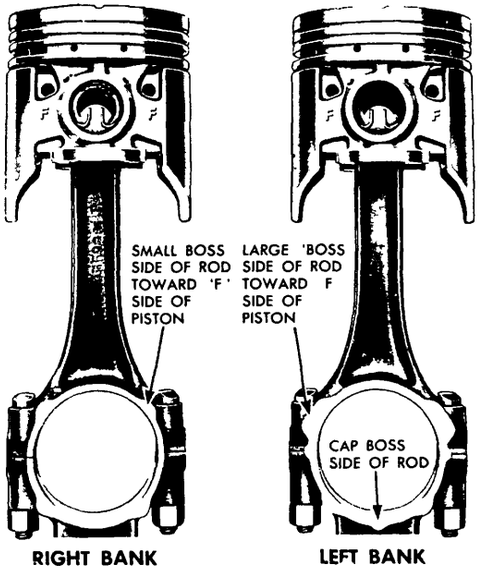
Removal - Pistons and rods removed from above.

Piston Clearance - .0007-.0013" (Std. Eng.), .0022-.0027" (Police, T425A & Three 2-Bbl. Carb.), measured perpendicular to pin boss (pin removed) and 3/16" below oil pocket.

Installing Pistons: Install pistons with one notch (High Comp.) two notches (Low Comp.) in piston head and "F" mark on piston pin boss toward front of engine. *See Rod Installation.*

Replacement Pistons: Police, T425A & Three 2-Bbl. Carb. - Furnished Std. (4.060", 4.061", 4.062" "Flat Top") and .005", .010", .020", .030" Oversize.

All Others - Furnished Std. (4.061", 4.062", 4.063" "Flat" or "Recessed" Top) and .005", .010", .020", .030" Oversize.



PONTIAC PISTON & ROD ASSY.

PISTON PIN

Pin is press fit in rod.

Diameter - .9802". **Length** - 3.25".

Pin Fit in Piston - .0003-.0005" loose. Piston must turn freely on pin.

Pin Fit in Rod - .0008-.0016" press fit.

Piston Pin Removal & Installation - *See "Piston Pins" in Pontiac Special Data.*

Replacement Pins: Furnished Std. and .001", .003" Oversize.

PISTON RINGS

Compression rings are cast iron, taper faced. No. 1 has thick chrome, No. 2 has Lubrite finish. Oil ring is segmented spring steel with chrome face on rails.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.078"	.016-.026"	.0015-.0030"
Compr. (2)	.078"	.013-.025"	.0015-.0035"
Oil	.184"	.015-.035"	.0015-.0085"

Installing Rings - Step or chamfer on upper compression ring and letter "T", dot, or word "TOP" on lower compression ring toward the top.

Replacement Rings: Std. and .005", .010", .020", .030" Oversize.

CONNECTING ROD

Length - 6.63" (center-to-center)

Crankpin Journal Diameter - 2.2492-2.2502".

Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims.

Clearance - .0005-.0025".

Sideplay - .006-.011"

Replacement Bearings: Std., .001" and .002" Undersize.

Installing Rods: Pistons have "F" marks and one notch (10.0-1 & 10.5-1 ratios), two notches (8.6-1 ratio) on front. Install rods so that LARGE machined boss at lower end of rod on same side as "F" mark and notch in piston (Left bank cyls. 1-3-5-7), on opposite side of piston from "F" mark and notch (Right bank cyls 2-4-6-8). Install assemblies in engine with "F" marks and notches on piston toward front of engine and oil groove in lower end of rod toward center of engine.

CRANKSHAFT

Journal Diameter - 3.000". Five bearings.

Bearings - M-400 (No. 4) Durex 100-A (Others). Steel backed inserts, precision type, no shims.

Clearance - .0005-.0025" (Front), .0005-.003" (All Others).

End Thrust: Taken by No. 4 (rear center) main bearing.

End Play - .0035-.0085".

Replacement Bearings: Furnished Std. and .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

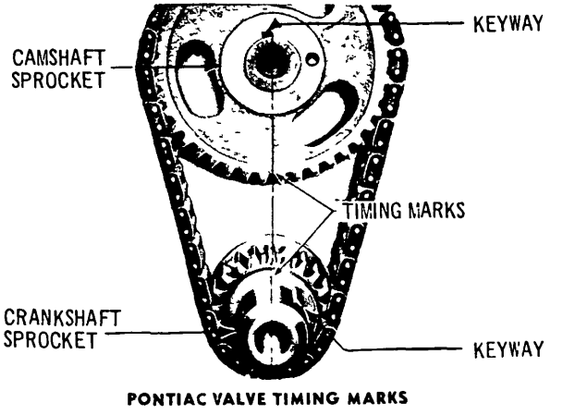
CAMSHAFT

►*CAMSHAFT IDENTIFICATION & APPLICATION NOTE:* Different camshafts used on these engines identified by number stamped on end of shaft as follows:

Early 425E & All Synchro-mesh Engines	1
Later 425E Engines (Hydra-Matic)	0
Hydra-Matic Engines (exc. 425A) ℂ	4
425A Engine	6

ℂ - Also used on Synchro-mesh Engines C4, M4, P4.

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PONTIAC VALVE TIMING MARKS

CONTINUED FROM PRECEDING PAGE

Journal Diameter - 1.8987-1.8997". Five bearings.
Clearance - .0015-.0030".
End Thrust - Taken by thrust plate behind camshaft sprocket.
Endplay - 003-.007",
Timing Chain: Length 60 links. **Width** .88" (Morse), 1" (Link Belt). **Pitch** .375".
►*TIMING CHAIN REMOVAL CAUTION:* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons or both will result due to piston striking valve To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage.
Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

►***1959-EARLY 1960 PONTIAC INTAKE VALVE VENT NOTE:*** **To prevent excessive wear caused by abrasives entering the small holes drilled in cylinder head (to vent the intake valve guides), the manufacturer recommends that a tapered steel plug, Part No. 534989 be installed. Insert plugs in vent holes (4 per head) and tap in flush with casting. On air conditioned cars it is not necessary to install a plug in vent hole located under the compressor. Later 1960 engines (after Oct. 15, 1959) will not have the vent holes.**

Tappet Clearance : Zero lash, hydraulic lifters

Valve	Head Diam	①Stem Diam.	Length
Intake	1.88"	.3407-.3414"	②5.32"
Exhaust	1.60"	.3402-.3409"	③5.30"

Valve	Seat Angl	Lift	Stem Clearance
Intake	30°④	⑥	0016-.0033"
Exhaust	45°⑤	⑥	.0021-.0038"

① - Std Valve. Also furnished with .001", .003", .005" (Int & Exh), plus .015" (Int. only) Oversize Stems.
② - 5.35" on 425A Engine or 3-Carburetor Option
③ - 5.34" on 425A Engine or 3-Carburetor Option.
④ - Valve Face Angle 29°
⑤ - Valve Face Angle 44°
⑥ - Synchro-mesh & Early 425E Camshaft .33", Later 425E Camshaft .373". H-M & 425A Camshaft .40".
Valve Seat Width - 3/64-1/16" Intake, 1/16" Exhaust.
Replacement Valves: Furnished Std .001", .003", .005" (All Valves), plus .015" (Int only) Oversize stems.
Valve Stem Oil Seals: Used on all valves as follows:
Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup). *Omitted on 425A Engines.*
Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks)
Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data.*
Valve Springs: Single or double (Inner and outer) springs used as follows **Spring Specifications**

Synchro-mesh Eng. & Early 425E Camshaft

Valve	Pressure	Length
Closed	80 lbs	1.53"
Open	171 lbs	1.20"

Later 425E Camshaft

Inner Spring		Outer Spring	
Pressure	Length	Pressur	Length
Closed 26 lbs.	1.48"	Closed 58 lbs.	1.53"
Open 57 lbs.	1.15"	Open 102 lbs.	1.20"

Std. Hydra-Matic Eng. Camshaft

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"
Open 64 lbs.	1.08"	Open 114 lbs.	1.12"

①Special Heavy Duty Springs

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 32 lbs.	1.48"	Closed 62 lbs.	1.52"
Open 96 lbs.	1.08"	Open 131 lbs.	1.12"

①- Used on Police Cars, Code Letters P1 & P4, Special Option, Code Letter C4, and 425A Engines, Code Letters F1, F4, M1, M4.

Valve Guides: Cast integral with cylinder head. *NOTE* - "Vented" intake valve guide not used on engines produced after October 15, 1959. *See "ROUGH ENGINE IDLE, VACUUM LEAKS & VALVE TRAIN NOISE CORRECTION (Early Cars)" below.*
Valve Stem Clearance in Guide: .0016-.0033" (Int.), .0021-.0038" (Exh.). Oversize reamers ream guides to provide these clearances.
►*ROUGH ENGINE IDLE, VACUUM LEAKS & VALVE TRAIN NOISE CORRECTION (Early Cars):* Caused by excessive valve stem and guide wear on cars with vented guides. To correct, install tapered steel plug Part No. 534989 (lots of 25) in vent holes in cylinder head (four per head). Air Cond. Cars do not require plug in vent hole under compressor. Install oversize valve stem, using Valve Guide Reamer J-5830-1(003"),J-6621 (.005"), J-5830-2 (.015") oversize in sequence.
Hydraulic Lifters: Standard on all models
Diameter - .8424 .8427" **Length** - 2"
Clearance in Lifter Boss - .0013-.0028"
Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data*
Rocker Arms: Mounted individually on studs pressed into cylinder head.
Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15-25 ft. lbs. torque.
Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*
Rocker Arm Lubrication: Oil from cylinder head oil galleries flows through hollow rocker arm studs to 1/16" hole at upper end of stud to lubricate ball seat and flows through groove in ball to fill rocker arm. Oil flows from hydraulic lifter boss through hollow pushrods for pushrod end lubrication.
Oil Passage Plug Removal & Installation - With rocker arm cover removed, insert easy-out in hole in plug, turn counterclockwise and pull out. Coat plug with gasket paste and drive in place with flat piece of metal or hard wood until plug is flush with outer surface.

VALVE TIMING

See "Camshaft Setting" and "Camshaft Identification & Application Note" under CAMSHAFT above.

①Synchro-mesh & Early 425E Camshaft
Intake Valves - Open 14° BTDC Close 58° ALDC.
Exhaust Valves - Open 48° BLDC. Close 24° ATDC.

④Later 425E Camshaft
Intake Valves - Open 22° BTDC. Close 67° ALDC.
Exhaust Valves - Open 63° BLDC. Close 27° ATDC.

②Hydra-Matic Camshaft
Intake Valves - Open 30° BTDC. Close 63° ALDC.
Exhaust Valves - Open 77° BLDC. Close 25° ATDC.

③425A Engine Camshaft
Intake Valves - Open 29° BTDC. Close 74° ALDC.
Exhaust Valves - Open 82° BLDC. Close 31° ATDC.

① - Camshaft marked "1". ② - Camshaft marked "4".
③ - Camshaft marked "6". ④ - Camshaft marked "0".

OILING SYSTEM

►***ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.***
Crankcase Capacity: 5 qts. refill. Add 1 qt. when changing filter element.
Normal Oil Pressure: 30-40 lbs. at 2600 RPM.
Pressure Regulator - In oil pump body. Not adjustable.
Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.
Pump Overhaul - *See "Oiling System" in Pontiac Special Data.*
Oil Filter: Full Flow type. Replace element every 15,000 miles or once a year. Use only AC PF-5 filter element.
Crankcase Ventilation: Filter element in oil filler caps in each rocker arm cover, and ventilator pipe at rear of engine. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. *NOTE* - Filter element for outlet pipe available as an accessory.
►*VENTILATOR OUTLET PIPE CAUTION:* If pipe is removed from pushrod cover, make sure that when it is installed, it is not pushed down into cover beyond the two locating points on pipe. Excessive oil consumption at high speeds will result.
Oil Pressure Indicator: Warning light on instrument panel controlled by pressure switch on oil filter pad. Light goes on when ignition turned on, goes out when oil pressure reaches 5 lbs.±1.5 lbs

COOLING

Water Capacity: 21½ qts. Add 1 qt. for heater.
Pressure Valve: Radiator filler cap. 12-15 lbs. (Std.), 14-17 lbs (Air Cond.).
Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly.
Thermostat: Pellet type, in water outlet passage in intake manifold. 170°F (Pontiac No. 3148225) Std., 180°F (No. 3149016) Optl. for use with permanent anti-freeze.
Temperature Gauge: Two-light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 113°±2°F, RED light remains off during normal engine operation but will come on when engine temperature reaches 238°±2°F *NOTE* - Red light will light up when ignition switch turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine is started). *See Miscellaneous Section.*
Engine Unit - Delco-Remy 1998189 (Std.-238°), 1998707 (Air Cond. Cars - 244°).

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CLUTCH

Borg & Beck 11A9W. Assembly No. 365100 (Std.), No. 361485 (Heavy Duty). Single plate, semi-centrifugal, dry disc type.

►*SERVICING NOTE:* Manufacturer recommends that clutch cover assembly and driven member be serviced by replacement.

Driven Disc - Borg & Beck No. 289302.

Pedal Adjustment: Pedal free travel should be ¾". To adjust, loosen adjusting nut locknut on clutch fork rod at clutch fork, turn adjusting nut to remove all freeplay (release bearing contacting clutch pressure plate levers), then back off adjusting nut 3½ turns (5 turns with new driven plate) to provide correct free travel. Tighten locknut to 60-120 in. lbs. Check pedal height.

Pedal Height Adjustment - Distance from under surface of pedal pad to floor pan should be 6 3/8-6 5/8". To adjust, loosen pedal rod upper trunnion jam nuts and adjust rod as required. Tighten locknut to 60-120 in. lbs. torque.

Removal: Remove transmission (see "Transmission Removal" below) and clutch housing bottom cover. Disconnect return spring and remove fork and fork ball support. Remove release bearing. *CAUTION - Bearing lubricated for life. Do not degrease.* Mark cover and flywheel to maintain proper balance at reinstallation. Loosen cover bolts evenly one turn at a time, then remove. Move clutch assembly away from bottom of flywheel, remove driven member, then remove cover and pressure plate from car.

Clutch Installation Note - Position clutch disc so that long end of hub is in flywheel and cover assembly marks line up with marks on flywheel. Use spare transmission main drive gear in spline of driven disc to insure proper alignment and tighten cover bolts one turn at a time until tight. Coat entire outer diameter of release bearing support with high melting point wheel bearing grease. Do not overlubricate. Confine grease to inner diameter only of release bearing. Use new gasket and install support and bearing. Install bearing support spring washer. Coat release fork fingers and release fork ball fulcrum with same type grease and install fork. Lockwasher must be under screw fastening fork ball fulcrum to clutch housing.

SYNCHRO-MESH TRANSMISSION

Own. 3-Speed Standard & Heavy Duty types or 4-Speed "Close-Ratio" used.

See "Pontiac Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Remove propeller shaft assembly (see *"Propeller Shaft Removal" below). NOTE - On heavy duty transmission front propeller shaft connected to yoke flange at transmission. On standard transmission yoke slides on main shaft.* Disconnect speedometer cable and control linkage. Remove upper mounting bolts and install Aligning Studs, Tool J-1126. Remove lower bolts and remove transmission by sliding on aligning studs until shaft clears clutch.

HYDRA-MATIC DRIVE

Dual-Coupling, four-speed, hydraulically controlled automatic transmission of same design used previously.

►*DIPSTICK OIL LEVEL NOTE:* Dipstick oil level mark on some early cars measured 19 5/32" from top of cup to center of top-ball of dipstick "dumbbell". Later dipstick measured 18 27/32". *Fill transmission having* early dipstick to 5/16" above full mark.

►*SHIFT CONTROL SPLASH SHIELD RATTLE CORRECTION:* Caused by flexing or drumming of shield. To correct, dimple early type shield to firm up metal or replace shield with Part No. 536464 having more ribbings.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

Lubrication - Check fluid every 2,000 miles, drain and refill every 25,000 miles. Use Automatic Transmission Fluid Type, "A" Suffix "A", or Type "A" with no Suffix.

Checking Fluid Level - Check fluid level with engine running at idle speed, **engine and transmission at normal operating temperature,** and selector lever in "P" (Park) position. *NOTE - Only 1 pint of fluid is required to bring level from "Add" to "Full" marks on dipstick. DO NOT overfill.*

Capacity - 9 qts. refill, 10½ qts. after overhaul.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER HYDRA-MATIC SERVICE DATA: See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

UNIVERSALS

Saginaw. Needle bearing type. Three used.

►*CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload which must be readjusted whenever nut is loosened.

Replacement Universal Joints - Universal joints furnished with new propeller shafts. Universal joint repair kits and parts can be obtained separately.

Lubrication - Disassemble and repack every 25,000 miles. *See "Propeller Shaft Removal" below.*

PROPELLER SHAFT

Two-piece propeller shaft with three universal joints used. Center bearing bracket and support assembly attached to frame bracket inside frame tunnel.

Removal: Loosen bolts securing center bearing and bracket to tunnel bracket a few turns. Remove "U"-bolts and lock plates from rear axle drive pinion flange. On heavy duty transmission cars, disconnect front universal joint from yoke flange at transmission. Hold bearings on journals with wire or rubber bands. Remove stone and splash shield from front end of frame tunnel. Remove complete drive line assembly by sliding it rearward out of frame tunnel. *CAUTION - Note number of shims under bracket and reinstall as found to insure proper alignment of propeller shaft.*

Propeller Shaft Alignment & Center Bearing Assembly: *See "Propeller Shaft Notes" in Pontiac Special Data.*

REAR AXLE

Own. Semi-floating, hypoid gear type. "Safe-T-Track" Differential is optional.

See "Pontiac Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.

Axle Identification - Axle ratio indicated by **color** mark on end of axle shaft and by **code number** stamped on pad on differential carrier flange (lower right side). Safe-T-Track differential axles are identified by tag near oil filler plug.

Axle Ratio	Code	©Color
2.69-1 (43-16)	2	Red
2.87-1 (43-15)	7	Orange
3.08-1 (40-13)	0	Yellow
3.23-1 (42-13)	9	Brown
3.42-1 (42-12)	8	White
3.64-1 (40-11)	6	Blue

© - Safe-T-Track axles have additional color Green.

Backlash - .005-.009".

Axle Shaft Removal: Raise body to provide clearance and remove wheel. Clean dirt from end of housing to protect wheel bearing and remove brake drum. Remove bearing outer retainer bolt nuts. Use Puller J-942-1, if necessary, to remove axle shaft. *CAUTION - DO NOT dislodge backing plate or brake pipe may be damaged.*

Wheel Bearing Adjustment: None.

Differential Carrier Assembly Removal: Remove axle shafts and disconnect rear propeller shaft at companion flange. Drain oil, remove capscrews, and remove assembly.

►*CAUTION: Rear universal joint companion flange nut controls rear axle pinion bearing preload. Readjust whenever nut is loosened.*

SHOCK ABSORBERS

Delco. Direct acting, non-adjustable. Serviced by replacement.

Shock Absorbers (Pontiac Nos.)

Model	Front	Rear
Pass. Car ©	5552311	5552312
Conv. Cpe.	5552346	5552347
4-Dr. Vista Hd. Top	5552313	5552314
Sta. Wgn. Std.	5552313	5552315
Taxi-Pol. & H.D. Ch.	5532346	②5552320

① - Exc. the following. ② - Sta. Wgns. 5552315.

FRONT SUSPENSION

Independent. "Ball-joint" type with spherical ball joints in upper and lower control arms.

See "Pontiac Front Suspension" in Suspension & Wheel Alignment Section.

►*VIBRATION & SHAKE CORRECTION:* Caused by loose upper shock absorber mounting stud nut. Draw nut down until it bottoms on ends of threads, then torque to 60-120 in. lbs.

Kingpin Inclination - 4°50' at 0° camber.

Caster - Neg. 1½°±½°.

Camber - Pos. ¼°±½°. Camber on left side should be ¼° greater than on right side.

Toe-In - 0" to 1/16" measured 9" above floor.

Toe-Out on Turns - With inner wheel turned 20°, outer wheel should be turned 19°.

Wheel Bearing Adjustment: Tighten adjusting nut to 27 ft. lbs. torque and rotate hub to insure seating of all parts, back off nut until it can be turned with the fingers, then tighten nut to 25-35 **In. Lbs.** torque. If slot in nut does not line up with cotter pin hole in spindle, **tighten** nut just enough to align nearest slot with hole, install cotter pin. *CAUTION - DO NOT exceed 110 In. Lbs. tightening torque to align slot.*

REAR SUSPENSION

Coil springs with one upper and two lower control arms.

See "Pontiac Rear Suspension" in Suspension & Wheel Alignment Section.

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STEERING

Manual: Saginaw Ball Bearing Worm & Nut. Recirculating ball worm & nut.
See "Saginaw Ball Bearing Worm & Nut" Steering Gear in Steering Section.

Power Steering: Saginaw (Rotary Valve) integral type.
See "Saginaw (Rotary Valve) Power Steering" in Steering Section.

►*POWER STEERING OIL LEAK CORRECTION:* If unit leaks oil at filler cap vent when steering turned without pump running, install later production flow control valve, Part No. 5688755, having a slot in one end (pumps with this valve installed have daub of yellow paint at rear of filler neck).

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

Steering Gear Removal: *See "Saginaw Ball Bearing Worm & Nut" in Steering Section.*

BRAKES

Bendix Hydraulic. Duo-servo, single anchor (without eccentric adjustment). Hand brake applies rear wheel service brakes.

See "Bendix Hydraulic Single Anchor (Without Eccentric)" Brakes in Brake Section.

►*BRAKE ADJUSTMENT NOTE:* Early type has adjustable anchor pin, later type has fixed anchor pin eliminating anchor pin adjustment.

►*BRAKE FLUID PIPE CHAFING CORRECTION (Early Cars):* Pipe may chafe where it passes between frame and body on 122" WB. chassis. To correct, install special protector sleeve Part No. 535584 (used on later cars).

►*FRONT BRAKE SUPPORT PLATE & GASKET CHANGE:* Support plate flanged area (around steering knuckle) eliminated and new gasket serviced with removable center section. Remove center section after plate installed.

Drum Diameter - 11" front & rear.
Master Cylinder Bore Diameter - 1".
Wheel Cylinder Bore - 1 3/16" (front), 1" (rear).
Braking Power - 58.5%. Front, 41.5% Rear

Lining: Molded asbestos, riveted to shoes.
Thickness - .220".

Shoe	Lining Width & Length Front Wheel	Rear Wheel
Primary	2.5" x 9.29"	2.0"x9.29"
Secondary	2.5" x 11.94"	2.0"x11.94"

Clearance - Adjusting screw backed off 12 notches from point where wheel can just be turned by hand.

Standard Master Cylinder: Forward of brake pedal on engine side of firewall.

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" from gasket surface of filler neck.

Power Brakes: New Bendix or Moraine Power Units.
See "Bendix Hydraulic (Disc) Reaction Type" or "Morain Hydraulic (Diaphragm) Reaction Type" Power Units in Brake Section.

Checking Fluid Level - Maintain fluid level in master cylinder reservoir to within 1" of top of filler cap opening.

Removal of Power Unit - Disconnect pushrod at brake pedal, vacuum hoses from vacuum exhaust tube, and pipe from master cylinder hydraulic port (cover all openings). Remove power cylinder from adapter plate on firewall.

MISC. MECHANICAL

Windshield Wiper: Electric type. Single-speed (with separate motor driven washer), or Two-speed type (with washer unit mounted on wiper motor).
See "Windshield Wipers" in Miscellaneous Section.

Air Conditioning: *"Frigidaire & Harrison". See "Air Conditioning" in Miscellaneous Section.*
Power Top Control: Hydro-Lectric type. *See "Power Top Controls" in Miscellaneous Section.*

Power Window Regulators: Electric type with individual motor in each window. Power rear window available on Station Wagons. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjuster: Electric. Four & Six-Way types used. Six-Way has "Single Motor" or "Three Motor" types. Three motor type has individual motor for each basic seat movement.
See "Power Seat Controls" in Miscellaneous Section.

TIGHTENING SPECIFICATIONS

1954 PACKARD MODELS

	Ft. Lbs.	In. Lbs.
Cylinder Head Stud Nuts	60-62	720-744
Main Bearing Capscrews	90-95	1080-1680
Connecting Rod Nuts (7/16)	60-65	720-780
Connecting Rod Nuts (3/8)	45-46	540-552
Camshaft Sprocket Nut	140-160	1680-1920
Timing Chain Cover	15-18	180-216
Intake & Exhaust Manifold	25-30	300-360
Vibration Dampener Screw	130-150	1560-1800
Flywheel to Crankshaft		
Screws (1/2)	70-80	840-960
Screws (7/16)	55-60	660-720
Oil Pan	15-18	180-216
Spark Plugs (10 mm.)	10-14	120-168

1955-56 PACKARD MODELS

	Ft. Lbs.
Cylinder Head	55-60
Intake Manifold	25-30
Exhaust Manifold	25-30
Oil Pan	15-18
Main Bearing Caps	90-95
Flywheel	55-60
Vibration Dampener	130-150
Con Rod Caps	40-45
Camshaft Sprocket ①	25-30
Rocker Arm Support Bracket	55-60
Upper Valve Tappet Cover ②	15-18
Rocker Arm Cover ②	15-18
Engine Front Cover	15-18
Water Pump Manifold	25-30
Water Pump Mounting	15-18
Oil Pump Mounting	25-30

① —Fuel Pump eccentric retaining screw.
②—To obtain proper seal, tighten these screws to required torque three successive times.

1954-60 STUDEBAKER MODELS
1957-58 PACKARD MODELS

	Ft. Lbs. 6 Cyl.	Ft. Lbs. V8
Cylinder Head	46-50	55-65
Intake Manifold		26-30
Exhaust Manifold	25-30	25-30
Oil Pan	13-17	13-17
Main Bearing Caps	85-95	85-95
Flywheel	33-35	33-35
Vibration Damper	130-140	130-140
Connecting Rod Caps	28-32	52-54
Piston Pin Clamp Bolt	20-25	20-25
Camshaft Gear	20-25	20-25
Rocker Arm Support Bracket		13-17
Rocker Arm Cover		19-21 Inch Lbs.
Engine Front Cover	13-17	13-17
Water Pump	13-17	13-17
Oil Pump	13-17	13-17
Oil Filter Cover	20-25	20-25
Engine Front Mount	20-25	20-25
Engine Rear Mount Bolt (S.M. & O.D.)	70-80	70-80
Engine Rear Mount Cage Bolt (S.M. & O.D.)	30-35	30-35
Engine Rear Mount Bolt (Auto. Trans.)	45-50	45-50
Engine Rear Mount Screw (Auto. Trans.)	45-50	45-50
Clutch Housing ①	28-32	28-32
Clutch Housing ②	13-17	
Transmission Mounting	60-70	60-70

① - To Cylinder Block.
② - To Engine Plate. Plate Dowel Bolt Nut 28-32 ft. lbs.

ENGINE

1954 PACKARD MODELS

ENGINE REMOVAL: Remove hood assembly. Disconnect and remove battery. Drain cooling system and remove radiator core. (NOTE—Radiator core, cradle, grille and front fenders may be removed as an assembly). Disconnect propeller shaft and remove transmission (see Transmission Removal). Use a jack or auxiliary support beam to support rear end of engine while transmission is being removed. Remove carburetor air cleaner, and crankcase ventilator tube. Disconnect heat indicator sending unit lead wire. Disconnect wire at oil pressure indicator sending unit. Disconnect electrical leads at generator, starter and ignition coil. Disconnect clutch linkage and remove clutch torsion shaft bearing bracket from upper flywheel housing. Remove engine front support insulator-to-upper bracket attaching nuts. Using an engine lifting bracket and a chain hoist, raise engine off support insulators. Remove auxiliary support beam from frame and remove engine.

Installation—Reverse removal instructions and note the following: Lower and locate engine in its approximate position by allowing the pilots in the support insulators (front) to protrude through the center hole in engine front support bracket.

1954 STUDEBAKER MODELS

ENGINE REMOVAL: Drain cooling system and crankcase, and remove radiator inlet hose. Remove wiring junction block and horn relay from fan shroud. Pry open wiring harness clips and move harness out of way. Remove fan blades and pulley. Remove cap screws which hold radiator core to support, remove core. Disconnect Climatizer hoses (if so equipped) from water pump and cylinder head. Disconnect and remove battery. Remove carburetor air cleaner, fuel pipe between pump and carburetor. Disconnect fuel pipe-to-pump, and oil pressure gauge flexible couplings, windshield wiper hose (if used), and electric cables. Separate horn cable at connector. (On V8 remove spark modifier pipe between distributor and carburetor, remove distributor.) Disconnect accelerator cross shaft. Remove upper stud nuts from engine front support insulators. Disconnect engine ground strap from right front engine support bracket. Disconnect flexible coupling in fuel line. Remove exhaust pipe flange-to-manifold nuts and U-clamp at clutch or converter housing bracket. Lower pipe off manifold studs. (On V8 remove exhaust cross-over pipe.) Disconnect front propeller shaft from transmission companion flange and remove propeller shaft stud nuts. Slide propeller shaft assembly rearward on slip yoke splines. Tape bearings to hold in place. Move shaft to one side as far as possible and tie in position. Disconnect transmission linkage and remove speedometer cable and pinion from transmission case. Disconnect rod from clutch release shaft lever. Remove two screws holding clutch operating shaft, bracket and bearing assembly to transmission case and pull bracket and bearing assembly off shaft. (**Automatic Drive**) Remove four engine rear support screws which hold insulators to converter housing. (**Standard or Overdrive**) Remove two bolts which hold insulator and cage assembly to engine rear support crossmember. Turn wheels to right to clear oil pan. (On Champion replace center, No. 1, cylinder head cap screw with engine lifting eyebolt.) (On V8 attach sling to intake manifold and hoist.) Slowly hoist engine up and forward until transmission clears rear support crossmember, remove engine.

1955-56 PACKARD MODELS

ENGINE REMOVAL: *(NOTE—On Synchro-mesh cars, Engine and transmission can be removed as an assembly providing front fenders and grille are first removed).*

1) Drain engine oil pan. Remove hood assembly and drain cooling system. Remove radiator core. Disconnect heater hose at cylinder head and remove water pump and manifold assembly. Remove battery and carburetor air cleaner.

2) Remove coil, bracket, distributor cap and ignition wiring as an assembly. Remove carburetor assembly. Disconnect power brake vacuum line at power cylinder (if car so equipped). Disconnect vacuum hose at windshield wiper motor. Disconnect flexible fuel pump line.

3) Remove generator assembly. Disconnect wire leads to water temperature and oil pressure indicator sending units. Disconnect engine ground wire at dash. If car equipped with Power Steering, remove screws at pump bracket and place pump pressure lines and hose assembly out of way.

4) Remove valve tappet cover vent tube. Remove starting motor and flywheel housing lower cover. Disconnect exhaust pipe from exhaust manifold. Drain transmission oil pan and remove transmission filler tube assembly. Disconnect oil cooler lines at transmission. Loosen transmission rear support bracket, *but d n t remove bolts.* Support transmission using a block of wood and a jack. Disconnect throttle control valve linkage at transmission.

5) Remove converter clutch housing to flywheel retaining nuts, and bell housing to flywheel housing capscrews. Disconnect front motor supports at frame. Install a flexible lifting cable or rope around intake manifold and attach a chain fall or hoist. Clamp or wire converter to transmission case to keep converter from sliding out of transmission. Raise engine and slide forward to clear transmission and slide out of chassis.

1955-60 STUDEBAKER 6 CYL. MODELS

ENGINE REMOVAL: *NOTE*—If same engine block is to be reinstalled, engine should be disconnected at junction of clutch housing or torque converter housing

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(torque converter should be disconnected from engine drive plate so that converter will remain on transmission splines when engine removed). If new block to be installed, clutch housing or converter housing can be removed with engine, after removing transmission (this will allow housing alignment to be checked before engine reinstalled).

1) Remove hood and upper air deflector. On sedans and station wagons, remove radiator core. Disconnect Climatizer hoses (if so equipped) from water pump and cylinder head elbows. On coupe and hardtop models, remove fan blade assembly and fan shroud. Disconnect and remove battery and remove carburetor air cleaner.

2) Disconnect windshield wiper hose and oil pressure gauge line from the flexible coupling. Disconnect cables from generator, starter solenoid, ignition coil, and heat indicator engine unit

3) Remove cotter key and take out clevis pin connecting accelerator cross shaft to bellcrank rod. Remove lower stud nut from engine front support insulators and disconnect engine ground strap from right front engine support bracket

4) Remove exhaust pipe flange to manifold nuts, remove U-clamp at clutch or converter housing bracket, and lower exhaust pipe off manifold studs. Remove starter motor. On coupes and hardtops turn front wheels all the way to the right. On sedans and station wagons, disconnect one end of the front tie rod, remove shaft from steering bellcrank and remove bellcrank out of way to provide clearance for oil pan. Disconnect gas tank to fuel pump line at flexible coupling.

5) Remove center (No. 1) cylinder head capscrew and replace it with an engine lifting eyebolt. Attach lifting device and raise engine just enough to take weight off front supports.

6) On Automatic Drive models, disconnect wire from anti-creep switch and disconnect accelerator bellcrank to transmission rod. Remove converter housing lower plate, and disconnect torque converter from torque converter drive plate *(see "Studebaker Automatic Transmission" in Transmission Section).*

7) Remove clutch housing to engine bolts and drive out clutch housing dowel pins. Raise engine slightly and move it forward sharply to break it loose from clutch housing. Continue to push engine forward until transmission spline clears clutch assembly, then lift engine out of car.

1955-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

ENGINE REMOVAL: *NOTE*—If same engine block is to be reinstalled, engine should be disconnected at junction of clutch housing or torque converter housing (torque converter should be disconnected from engine drive plate so that converter will remain on transmission splines when engine removed). If new block to be installed, clutch housing should be removed with the engine for checking alignment. On cars with air conditioning, remove compressor mounting bracket and compressor as an assembly without disconnecting refrigerant lines (see Compressor Removal under "Studebaker Air Conditioning" in Miscellaneous Section). Move assembly to position on front of right fender, being careful to keep compressor crankcase lower than compressor cylinder head, so that oil will not leak into chamber above compressor pistons.

1) Remove hood, upper air deflector and fan shroud. Disconnect and remove battery. On sedan and station wagon models, remove radiator core and water pump manifold. On coupe and hardtop models, remove fan blade assembly. Disconnect Climatizer hoses (if so equipped) from water manifold Remove generator and fan belt.

2) Remove starter and remove exhaust crossover pipe. On sedan and station wagon models, remove steering bellcrank shaft. On coupe and hardtop models, turn steering gear all the way to left to provide clearance.

3) Remove carburetor air cleaner, fuel pump to carburetor pipe, and the spark modifier pipe. Unhook spark plug wires, remove spark plug cable support brackets from rocker arm cover, remove distributor clamp screw and remove distributor Disconnect fuel pump inlet line at flexible coupling, and disconnect any vacuum connections at intake manifold.

4) Disconnect oil pressure gauge line at flexible coupling and disconnect wires at heat indicator gauge and ignition coil. Disconnect accelerator pushrod at throttle control bellcrank. On cars equipped with overdrive, disconnect wire at kick-down switch. On cars with Automatic Drive, disconnect the wire at anti-creep switch and disconnect accelerator bellcrank to transmission rod at bellcrank. Remove converter drive plate to torque converter bolts *(see "Studebaker Automatic Transmission" in Transmission Section).*

5) Remove upper stud nuts from engine front support insulators and disconnect engine ground strap. Place a sling under intake manifold, attach hoist and raise engine just enough to take weight off engine supports. Remove clutch housing to engine bolts and take off the clutch housing front cover plate.

6) If clutch housing to be removed with engine, remove transmission. Remove the two capscrews holding clutch operating shaft, bracket, and bearing assembly to transmission case. Remove cotter key and clevis pin from inner end of clutch operating shaft sleeve and move clutch operating shaft away from clutch release shaft.

7) On models equipped with Automatic Transmission, remove the four engine rear support insulator capscrews which hold insulators to converter housing. On models equipped with overdrive or standard transmission, remove the two bolts which hold insulator and cage assembly to engine rear support crossmember.

8) On coupe and hardtop models, turn wheels to right to move steering bellcrank off to the side to provide additional clearance for oil pan. Push engine sharply forward to disengage clutch housing dowels. Continue to push engine forward until transmission spline is clear, then raise engine out of car.

OIL PAN

1954 PACKARD MODELS

OIL PAN REMOVAL: Place car to position hoist over engine. Disconnect steering idler lever support from frame side rail and lower steering linkage. Remove flywheel housing lower cover and take out oil pan screws. Lower oil pan and if necessary, rotate crankshaft to place counterweights up for clearance (use pry bar at flywheel housing engaging teeth on flywheel). If pan requires additional clearance, attach hoist to front of engine (do not disturb front engine support bolts), raise engine just enough to relieve load on support, pan should then come out.

1954 STUDEBAKER 6 CYL. MODELS

OIL PAN REMOVAL & INSTALLATION: ***NOTE—it is not necessary to remove engine to remove oil pan.***

Removal: Remove oil level gauge Raise car and support it with stands, and drain oil from crankcase On 1953 Long Wheelbase models, swing wheels to right and remove oil pan screws and remove pan. On other models, disconnect tie rods and reach rod from steering bell-crank Remove retaining pinch bolt and remove bell-crank from shaft. On 1950-52 models, remove shaft and bracket assembly from bell-crank and swing bell-crank to left as far as possible If necessary, remove front splash pans for access to front screws in oil pan. Remove screws and oil pan

Installation: Filler block should be removed for proper installation of oil pan side gaskets Remove the four filler block block-to-engine plate screws and remove filler block. If filler block adheres to front engine plate gasket, use a thin spatula and carefully separate gasket and filler block If gasket is damaged, cut away exposed section, then cut the amount required from a new gasket and fit it into place Clean oil pan and mounting flanges of block. Apply Perfect Seal or its equivalent to flanges and position new side gaskets Place filler block on front plate and install a screw in one of the upper holes Using a hardwood stick, pry upward against filler block and install opposite screw Install two remaining screws and tighten until heads of screws just engage lock washers With all gaskets in position, install oil pan After tightening oil pan screws securely, tighten the four support-to-filler block screws Install front splash pan

1954 STUDEBAKER V8 MODELS

OIL PAN REMOVAL: Support car on jacks and drain the oil. Disconnect one of the battery cables and remove the starter. Disconnect one end of the right tie rod and the reach rod from the steering bellcrank. Remove the steering bellcrank shaft and bracket and swing the bellcrank out of the way to the left side of the car. Remove the exhaust crossover pipe. Remove oil pan screws and drop the pan.

Installation Oil Pan Gaskets: The front filler block must be removed to install the side pan gaskets. Remove the four screws holding the filler block to the timing gear cover, and using a thin spatula carefully separate the filler block from the timing gear cover gasket. If this gasket is damaged, cut away the exposed portion of the gasket and then from a new gasket, cut the required amount and fit it to the timing gear cover using Perfect Seal or its equivalent Clean oil pan and oil pan mounting flanges of the block Apply sealer to the flanges and place new gaskets on the side flanges. Place filler block against timing gear cover and install a screw in one of the upper holes. Using a hardwood stick, pry upward against the filler block and install the opposite upper screw. Install the remaining two

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screws and tighten until the heads just touch the lock washers. With all the gaskets in position install the oil pan and tighten the pan screws evenly. Then tighten the four timing gear cover-to-filler block screws.

1955-57 STUDEBAKER 6 CYL. MODELS

OIL PAN REMOVAL (CHAMPION): Remove oil level gauge. Raise car and support it with stands, drain oil, and remove splash pans. On sedans, and station wagons, swing wheels to right to move steering bellcrank out of the way. Remove oil pan screws and remove pan.

1955-56 PACKARD MODELS

OIL PAN REMOVAL: Drain engine oil and remove screws attaching steering idler lever to frame and lower steering linkage. Remove engine oil level indicator. On cars not equipped with the dual exhaust system the crossover pipe from left to right banks must be removed, on cars with dual exhaust, remove left exhaust pipe. Remove starting motor and flywheel lower housing. Remove attaching screws and washers and remove oil pan.

1955-57 STUDEBAKER V8 MODELS

OIL PAN REMOVAL (COMMANDER & PRESIDENT): Remove oil level gauge and adapter tube. Disconnect one battery cable. Raise car, drain oil and remove starter. On coupe and hardtop models, swing wheels to right to move steering bellcrank out of way On sedans and station wagons, remove steering bellcrank assembly. Remove exhaust crossover pipe. Remove oil pan cap screws and remove pan.

1955-60 STUDEBAKER MODELS
1957-58 PACKARD MODELS

INSTALLATION (ALL MODELS): For installation of oil pan, the filler block must be removed. Remove the four screws holding filler block to engine front cover (V8), or to engine front plate (6 Cyl.). With a thin spatula or putty knife, carefully separate filler block from engine front cover gasket (V8) or engine front plate gasket (6 Cyl.). If this gasket is damaged, cut away the exposed portion of the gasket. Then cut the required amount from a new gasket and fit it in place as necessary using Perfect Seal or its equivalent to secure gasket in place Clean oil pan mounting flange on block, install new pan side gaskets on block using Prefect Seal or equivalent to retain gaskets *(NOTE* - Forward end of side gaskets seal filler block) Apply sealer to threads of four timing gear cover-to-filler block capscrews, place filler block in position against timing gear cover and install one upper screw, then pry upward against filler block and install other upper screw *(NOTE* - This will compress gasket and align filler block) Install remaining filler block screws, tighten all screws until heads just contact lockwashers Install oil pan and tighten all pan screws evenly to correct torque Then tighten the four timing gear cover-to-filler block screws to correct torque *See Tightening Specifications*

CYLINDER HEAD & MANIFOLD

ALL MODELS

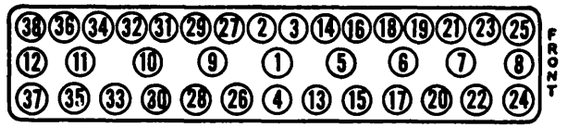
CYLINDER HEAD GASKET: Coat lower face of gasket and face of cylinder head with Perfect Seal gasket cement before installing (use sparingly and see that it does not enter screw holes and water passage openings).

1954 PACKARD MODELS

CYLINDER HEAD INSTALLATION: Use Torque Indicating Wrench to tighten cylinder head stud nuts, tighten in correct sequence as shown in the diagrams. Procedure for tightening Cast Iron and Aluminum heads is as follows:

Cast Iron Heads—With engine cold, tighten all nuts evenly to correct tension. Then run engine until it is thoroughly warmed up and recheck all nuts (additional tightening may be necessary for correct tension).

Aluminum Heads—With the engine cold, tighten all nuts to correct tension. Run engine until thoroughly warm, allow engine to cool off, and then recheck all nuts. Do not tighten aluminum heads when warm.

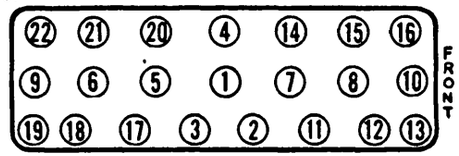


1954 PACKARD CYLINDER HEAD

1954-60 STUDEBAKER 6 CYL. MODELS

CYLINDER HEAD INSTALLATION: Use Torque Indicating Wrench to tighten cylinder head capscrews, tighten in correct sequence as shown in diagram. With engine cold, tighten all nuts evenly to correct tension. Then run engine until it is thoroughly warmed up and recheck all capscrews (additional tightening may be necessary for correct tension).

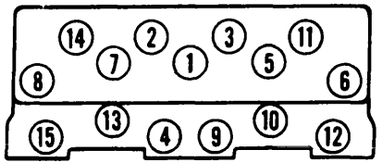
Tightening Torques—*See "Tightening Specifications" above.*



STUDEBAKER 6 CYL. CYLINDER HEAD

1955-56 PACKARD MODELS

CYLINDER HEAD: Removal—Drain cooling system. Remove generator (if removing right bank head), or fan belt (if removing left bank head). Remove fan, water pump, and manifold assembly. Remove air cleaner. Remove ignition coil and bracket, disconnect ignition cables and place the coil and wiring out of way. Remove carburetor and intake manifold assembly. Remove valve cover and remove bolts attaching rocker lever shaft to cylinder head, and lift off the rocker lever shaft assembly Disconnect exhaust manifold from exhaust pipe. Remove cylinder head bolts. Install Cylinder Head Lifter J-4159 in the front and rear spark plug holes and lift off cylinder head. *NOTE*—To remove right bank head it will be necessary to remove heater and oil level indicator. On cars equipped with Twin Ultramatic Transmission the filler tube assembly will have to be removed. On removing the left bank head, the oil filter and bracket will have to be loosened from cylinder head, On cars equipped with Power Steering the bracket bolts will have to be removed and pump and hose assembly will have to be moved out of way



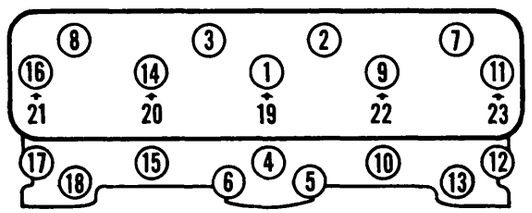
1955-56 PACKARD CYLINDER HEAD

Installation: Clean gasket surfaces of cylinder head and engine block. Coat gasket with Perfect Seal No. 3 and install on block. Install cylinder head over dowels (dowels are drilled for oil return from rocker arm chamber). Install flat washers on head bolts and start the five medium length bolts in center holes of head. Install valve pushrods making sure they engage in sockets in valve lifters, and carefully install rocker shaft lever assembly. The two end rocker shaft mounting brackets are doweled to line up with bosses on cylinder head *(NOTE* - Left Front and Right Rear brackets provide oil lead to hollow rocker arm shafts for rocker arm lubrication). **Install four longest bolts in rocker arm brackets, engage pushrods in rocker arm sockets and tighten bolts evenly. Install short cylinder head bolts along lower edge of cylinder head. Tighten all bolts in sequence shown in diagram to correct torque (see Tightening Specifications).**

STUDEBAKER V8 MODELS

CYLINDER HEAD INTERCHANGEABILITY (RIGHT TO LEFT BANK): Both cylinder heads are identical (water pump ports are provided at front and rear of all heads). It is necessary to block off the rear port not in use with a dummy plate and gasket. *NOTE*—Heat indicator engine unit must be mounted in the water outlet opening cover plate at rear of the left bank cylinder head.

►*AIR CONDITIONED CAR CAUTION:* When removing cylinder head, air conditioning compressor must first be removed from its mounting bracket. *See "Stud bak r Air Conditioning" in Miscellaneous Section.*



1954-60 STUDEBAKER V8,
1957-58 PACKARD CYLINDER HEAD

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1954-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

CYLINDER HEAD INSTALLATION: Clean all threads using a tap and die. Check head for warping *(NOTE–* If necessary, head can be planed 015 ' Apply gasket compound to gasket and install. *(CAUTION–Be sure main oil gallery-to-rocker arm assembly oil passage at rear of the right bank (on front of left bank) is not blocked by gasket).* Install cylinder head on the hollow dowel. Dip capscrews in engine oil and install the nine short screws in the two outer rows of holes and the five medium length screws in the center row of holes and tighten finger tight. Install rocker arm assembly (see "Rocker Arm Assembly"). Install and tighten long head screws finger tight. Insert rocker arm assembly capscrews through rocker arm brackets. Tighten all cylinder head capscrews in correct sequence as shown in diagram Tighten water pump manifold screws alternately until they are tight.
Tightening T rques– *See "Tightening Specifications" above.*

ORIGINAL BORE & PISTONS

1954 PACKARD MODELS

ORIGINAL BORE & PISTON SIZES: Mark stamped on piston head and cylinder block indicate size variation in relation to nominal size. (See below).

Piston Mark Location—Stamped in piston head.

Cylinder Bor Mark Location—Stamped on top left face of cylinder block.

NOTE—Piston and Bore marks should correspond on engines that have neither been bored nor honed.

PISTON & BORE MARKING
(FOR SIZE VARIATION)

AA—.00025" Under Nominal Size.
A—Nominal Size
BB—.00025" Over Nominal Size.
B—.0005" Over Nominal Size.
CC—.00075" Over Nominal Size.
C—.001" Over Nominal Size.
DD—.00125" Over Nominal Size.
D—.0015" Over Nominal Size.

NOMINAL SIZE

Bore	Piston	Bore
3 1/2" ..	3.49875-3 49900"..	3.49975-3 50000"

►.020" Oversize Bore Engines—Marked by ★ following engine serial number.

1954 STUDEBAKER MODELS

ORIGINAL BORE & PISTON SIZES: Bore Sizes: Marked by figure stamped on top face of cylinder block next to each cylinder bore as follows

Champion

Mark	Size
0	3 000"
05	3 0005"
1	3 001"
15	3 0015"
2	3 002"
25	3 0025"

Commander V8

Mark	Size
50	3.375"
55	3 3755"
60	3 376"
65	3 3765"
70	3 377"

Original Pistons—Stamped with size of cylinder bore in which pistons are installed.

Replacement Pistons—Stamped figure on top indicates actual size of piston. Pistons furnished std. & .002", .004", .010", .015", .020", .030" oversize.

1955-60 STUDEBAKER MODELS
1957-58 PACKARD MODELS

ORIGINAL BORE & PISTON SIZES. Cylinder bore sizes are marked by a figure stamped on top face of cylinder block next to each cylinder bore as indicated below. Replacement pistons corresponding to these sizes are available under the part number for standard size pistons. The oversize is marked on the top of each piston. *NOTE–When replacing pistons in an engine which has been in use, the cylinder bore markings can no longer be used as a guide. It is important that pistons be selected to fit the cylinder bore. See "Fitting Pistons" on car model page.*

Cylinder & Piston Markings: Cylinder bores may vary in size from Standard to 0025" oversize in increments of 0005" Champion bore sizes vary from 3 000" (stamped "0"), to 3 0025" (stamped "25"). V8 engine bore sizes vary from 3 5625" (stamped "25"), to 3 5645" (stamped "45")

PISTONS

1954 PACKARD MODELS

REPLACEMENT ALUMINUM ALLOY & CAST IRON PISTONS:—Finished aluminum alloy or cast-iron replacement pistons are stamped on head with decimal figure (.005, .010, etc.) indicating nominal oversize and one or two letters (AA, A, BB, B, CC, C, DD, D) which indicates the actual size variation (in 00025" steps) of the piston from indicated nominal oversize. See oversizes listed below and size variations for each letter (in table).

NOTE—This system of marking makes it possible to order a finished piston (using number and letter) for any particular bore size within these limits.

Piston Oversizes (Figures Stamped on Piston Head)—Furnished in Standard size and the following oversizes: .003", .005", .010", .015", .020", .030", .040".

PISTON MARKING (FOR SIZE VARIATION)
(Letters Stamped on Piston Head)
For All Models and Piston Oversizes

AA—.00025" Under marked size.
A—Same as marked size.
BB—.00025" Over marked size.
B—.0005" Over marked size.
CC—.00075" Over marked size.
C—.001" Over marked size.
D—.00125" Over marked size.
DD—.0015" Over marked size.

PISTON PINS

1954 PACKARD MODELS

PISTON PIN BUSHING INSTALLATION: Two-piece bushing used in rod. Use Piston Pin Bushing Replacement Set J-2555 (consists of: Remover, Replacer, Plate, Burnisher), and Piston Pin Bushing Reamer J-874-18. Press old bushings out with Remover and arbor press. *(CAUTION*—Each half of bushing must be installed and burnished separately so that oil channel formed between inner ends of bushing halves will not close up). Install one half of bushing flush with outer end of rod, then using Plate of tool under end of rod, push Burnisher through from inner end of bushing. Install second half of bushing and burnish in place from inner end working through bushing half already in place. Ream bushing for size-to-size fit with piston pin using Reamer J-874-18. Check pin fit as follows:

Piston Pin Fit in Rod Bushing—With lower bearing inserts and cap installed on rod, insert piston pin in rod, clamp pin in vise with lead jaws placing rod in horizontal position. Rod should hold in this position, but should fall down of own weight when tapped down by hand.

1955-56 PACKARD MODELS

PISTON PIN BUSHING (IN CONNECTING ROD) INSTALLATION· After pressing old bushing out with an arbor press, install new bushing so that it is flush with both sides of rod Position Burnisher Tool J-6055 in bushing, then applying plate of the tool under the rod, push burnisher through bushing with an arbor press. After bushing has been burnished, and before reaming bushing, the oil hole in bushing should be drilled using a 3/16" drill

1954-60 STUDEBAKER MODELS
1957-58 PACKARD MODELS

PISTON PIN REMOVAL & INSTALLATION: Use Tool J-1293-A (6 Cyl.), J-1293-C (V8).

Removal–Place rod and piston assembly on assembling fixture. Remove lock nut and star washer from clamp screw, and by tightening lock nut on other end of clampscrew, loosen clampscrew in hole in connecting rod Remove clampscrew from rod, slide piston and rod off piston pin

Installation - Place piston pin on assembling fixture, slide piston and connecting rod into position on pin *(CAUTION* - Make certain piston and rod are in correct relative positions) Insert piston pin clampscrew in rod so that nut will be installed on slotted side of piston (Champion Rods Nos 1 3, 5, All rods on V8), or on solid side of piston (Champion Rods Nos 2, 4, 6) Make certain that flat on clampscrew mates with flat on pin Install star washer and nut Tighten nut to correct torque *See Tightening Specifications*

PISTON RINGS

1954 PACKARD MODELS

TRIPLE ACTION PISTON RING SETS: Service Sets.—These rings furnished in packaged sets for all models and should be installed on aluminum pistons only as directed below. CAUTION—Do not use these rings with Cast Iron pistons.

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Oil Ring—Spring expander type oil ring used consisting of top and bottom rails with a spring assembled between two rails. Two tabs in each rail engage a loop in spring expander when assembly installed in ring groove. Install ring on piston as follows: Place lower rail with locking tabs up (45° to right of thrust face or left side of piston) on piston slightly below lower ring groove. Insert spring expander in oil ring groove with end gap centered on thrust or left side of piston. Install upper rail in ring groove with locking tabs down so as to engage first loop in spring to left of spring end gap. Move lower rail up into ring groove with tabs in rail engaging first loop in spring expander to right of spring end gap. Press upper and lower rails down firmly on spring so that rails are properly seated on spring and are free in groove.

#2 Compression Ring—Assemble ring in #2 ring groove with groove on outer edge down.

Top Compression Ring—Assemble ring in top ring groove with groove on inner edge up.

CRANKSHAFT & MAIN BEARINGS

1954 PACKARD MODELS

CRANKSHAFT FRONT SEAL: Installed on front end behind timing chain cover. To replace seal remove radiator core, vibration dampener (puller J-2636 for fluid type dampener), and timing chain cover. Remove old seal and install new seal over end of shaft. Place cover aligning arbor over end of shaft, install cover and tighten cover screws. Insert feeler gauge between arbor and hole in cover, run gauge around arbor, if clearance not uniform, loosen cover screws and shift cover until clearance uniform.

1954 PACKARD MODELS

REAR MAIN BEARING OIL SEAL REPLACEMENT (Engine in Car): Raise car on stands at all four corners, keeping engine in its normal position and on a level plane. Remove transmission and oil pan. Remove rear main bearing cap. ***Do not remove other main bearing caps.*** Loosen each main bearing cap attaching screw just enough to "break loose" each screw from its tightened position. Alternately back off each main bearing cap screw ½ turn at a time until crankshaft has been lowered evenly ½". Remove rear main bearing seal (upper) from its groove in crankcase, using a pointed tool. Remove seal from rear main bearing cap, and remove the wooden side seals. To install upper seal, first form it to shape using the lower bearing cap. With a round wood block, 2¾" diameter, press seal into bearing cap with an arbor press. After seal has been shaped, feed it up into upper groove around crankshaft. When seal has been positioned, tighten each bearing cap attaching screw alternately ½ turn to raise crankshaft evenly to its normal position. Rotate crankshaft to burnish seal into position. Continue tightening bearing cap screws until torque of 90-95 ft. lbs. is obtained. Cut off ends of seal flush with split line of bearing. Form seal into lower bearing groove in same manner as with upper seal. While holding seal in position with round wood block and arbor press, trim end of seal so that 1/16" of seal extends above bearing split line at each end. Install bearing cap and torque to 90-95 ft. lbs. Install wood side seals in bearing cap by driving them into grooves in cap, then trim them off flush with bearing cap. Install oil pan and transmission.

1954 STUDEBAKER V8 MODELS

►*V8 ENGINE OIL LEAK AT REAR OF ENGINE:* May be caused by step on rear bearing cap interfering with oil pan and preventing pan from compressing gasket properly Check step on right rear corner of bearing cap and eliminate interference by grinding step down to a depth of 1/8" or even with crankcase flange (start grinding at rear of cap and extend relief forward to approximately center of capscrew boss).

1955-56 PACKARD MODELS

CRANKSHAFT: Removal (With Engine in Car)—Remove transmission. Drain cooling system and remove radiator core. Drain and remove engine oil pan. Remove water pump and manifold assembly. Remove fuel pump. Remove engine vibration dampener, engine front cover, timing chain and sprockets. Remove oil and vacuum pump assembly. Remove spark plugs. Disconnect connecting rods and push piston assemblies up into cylinder bores so that crankshaft can be removed without interfering with connecting rods. Remove front and rear main bearing caps. Support crankshaft at front and rear journals and remove the three intermediate bearing caps. Carefully lower crankshaft and flywheel assembly.

Installation: Install new rear main bearing seals in upper crankcase and in bearing cap (See Rear Main Bearing Oil Seal Installation below). Install new front crankshaft seal in engine front cover. Reverse removal procedure indicated above.

1955-56 PACKARD MODELS

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Apply Lubriplate to groove in bearing cap and install oil seal. Using Oil Seal Installer J-3048-A and a hammer, drive seal into place With seal still in place, trim ends of seal flush with surface of cap. To install upper half of seal in crankcase, remove crankshaft and install in same manner as for bearing cap.

1954-59 STUDEBAKER MODELS

1957-58 PACKARD MODELS

REAR MAIN BEARING OIL SEAL INSTALLATION: *NOTE*—Seal assembly consists of three types used together (1) Cork Seals between sides of bearing cap and block, (2) Neoprene seals in groove in face of bearing cap, (3) "Brummer" type seal on crankshaft journal (installed in block and bearing cap). Install seals as follows

Neoprene Seals—Place new seals in cross grooves of bearing cap with inner end of seal not more than 1/16" from inner end of groove, press seals firmly and uniformly into grooves and trim outer ends flush with sides of bearing cap. *CAUTION*—Seals must not be more than 1/16" from inner edge of bearing cap and must not be so long as to interfere with Brummer seal.

"Brummer" Type Seal—Remove old seal, thoroughly clean seal channel just forward of rear flange by using a swab saturated with alcohol or similar solvent, dry channel thoroughly. Blunt the sharp edge of the flange on which the seal is mounted using the flat side of a screwdriver blade or similar tool (this will prevent scuffing inner edge of seal during installation). Install seal DRY as follows Insert upper half between crankshaft and block at the rear flange with the wiping lip of the seal pointing forward or away from the flywheel, work seal around crankshaft until ends are horizontal and in line with the bearing cap face (see V8 Engine Note below), use great care to avoid scuffing the soft center sealing cushion at the bottom of the seal groove. Install lower half of seal on bearing cap flange, oil wiping edge of seal and crankshaft journal, install bearing cap and tighten bearing cap bolts to correct torque.

Cork Seals—After bearing cap installed, drive new cork seals down into grooves between sides of bearing cap and block (use drift and light hammer). *CAUTION*—Use care not to split or damage these seals.

Oil Leak Check—After installing new seals, run engine for approximately 45 minutes, then check for oil leaks.

►*V8 ENGINE NOTE:* To facilitate installation of the upper half of the Brummer seal, the three intermediate bearing cap screws can be loosened two turns. *CAUTION*—Do not loosen these intermediate bearing caps more than indicated or front bearing may be damaged.

1960 STUDEBAKER MODELS

►*REAR BEARING CAP SEAL PRODUCTION CHANGE & INSTALLATION NOTE:* Later cars have Brummer seal with integral cross seals. No Neoprene seals are used. Install seal in usual manner, with cross seals in cap grooves and trimmed flush with cap.

REAR MAIN BEARING OIL SEAL INSTALLATION: Loosen intermediate bearing cap screws 2 turns nly to aid installation. Install seals as follows:

Neoprene Seals - Install in cap grooves so inner ends are flush or not more than 1/32" from inner ends of grooves. Trim outer ends flush with cap.

Brummer Seal - With seal grooves in block and cap clean and dry, blunt sharp edge of flange at rear of block and carefully insert seal in block so wiping lip of seal contacting crankshaft points away from flywheel. Trim ends flush with block. Install seal in bearing cap and align with block seal. Apply oil to wiping edge of seal and install bearing cap making sure exposed part of seal smoothly straddles rear flange of bearing cap.

Cork Seals - Drive into grooves between sides of cap and block. Do not damage or split seals. Tighten intermediate bearing caps.

►*LEAK TEST NOTE:* After new seals installed, run engine for 45 minutes before checking for leaks.

VIBRATION DAMPENER

1955-56 PACKARD MODELS

VIBRATION DAMPENER: Removal—Drain cooling system, remove radiator core and top splasher Remove fan assembly. Remove vibration dampener retainer screw and washer and if car is equipped with Power Steering or Air Conditioning, remove the drive pulleys by prying them off dampener assembly. Install center adapter J-5992-2 in threads of crankshaft. Install screw assembly J-5995-3 in remover body J-5992-1 and remove dampener.

Installation: Lubricate oil seal in engine front cover, and position dampener over crankshaft and tap it into

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place by tapping it with a rawhide hammer. Assemble Vibration Dampener Installer J-5992 by placing the 3/4" nut on screw assembly J-5992-3 and slide spacer J-5992-4 over screw assembly. Start screw in end of crankshaft and tighten until it bottoms in the threads. With one end of the spacer against dampener, turn nut on screw until dampener hub bottoms the crankshaft oil slinger against a shoulder on the crankshaft. Install Power Steering and/or Air Conditioning Pulleys, retainer washer and screw. Tighten retainer screw to 130-150 ft. lbs.

1954-60 STUDEBAKER MODELS
1957-58 PACKARD MODELS

VIBRATION DAMPENER & PULLEY ASSEMBLY: (Removal)—Remove fan shroud. Straighten edges of capscrew lock plate and remove vibration dampener capscrew and washer. Remove the six nuts from bolts in fan belt pulley hub and remove capscrew lock plate, pulley, and vibration dampener from bolts.

Installation—When assembling rubber cushions and dampener flywheel, be certain the cushions are seated in dampener to assure proper vibration control. Dampener and pulley must be assembled with bolt holes aligned. When installing vibration dampener on bolts, place lock plate against rubber cushion with mark on lock plate facing away from flywheel and pointing toward "IGN" mark on flywheel. Then install dampener on bolts so "IGN" mark is approximately aligned with keyway in hub. When pushing dampener on the bolts, lockplate prevents rubber cushion from being pushed out of flywheel holes. Place pulley on bolts and install capscrew lock plate (be sure lockplate is not installed on the offset bolts as it will interfere with installation of one of the nuts). Install and tighten vibration dampener nuts to 13-17 ft. lbs.

ENGINE FRONT COVER

1955-56 PACKARD MODELS

ENGINE FRONT COVER: Removal—Remove vibration dampener (see above), and water pump manifold assembly. Disconnect and remove fuel pump. Remove screws attaching front cover to block, loosen engine oil pan, remove cover.

Installation: Using a new gasket, install engine front cover in place and start capscrews in threads, *but do not tight n.* Lubricate oil seal in cover, and install vibration dampener assembly, using hub on dampener as a pilot to align front cover. Complete installation by reversing removal procedure.

1955-56 PACKARD MODELS

ENGINE FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Remove engine front cover (see above), drive out old seal with a hammer and punch, being careful not to damage cover. Install a new seal using tool J-5983, pressing seal into place with an arbor press.

1954-60 STUDEBAKER 6 CYL. MODELS

ENGINE FRONT COVER: Removal—Remove fan shroud, radiator core, and vibration dampener. Using Puller Set HM-925, remove the crankshaft pulley (use HM-925-12 to prevent damage to crankshaft threads). Take out cover retaining screws and bolts and remove the cover.

Engine Front Cover Seal (Crankshaft Front S al) Installation: Install new felt oil seal in cover, using hub of crankshaft pulley to seat it in recess in cover.

Engine Front Cover Installation: Install cover on engine using a new gasket. Install all the retaining bolts, leaving them finger tight so cover can center itself as the crankshaft pulley is installed. Using Pusher Set J-4704, press crankshaft pulley into position. Tighten cover bolts and screws securely and install vibration dampener, radiator core and shroud.

1954-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

ENGINE FRONT COVER: Removal—Drain cooling system and remove fan shroud and radiator core. Remove fan belt and power steering belt (if so equipped). Remove fan blade assembly and take off the water manifold. Remove fuel pump to carburetor pipe and remove fuel pump. Remove vibration dampener and fan pulley hub (on Power Steering cars a second pulley is used). Remove cover screws and remove cover.

Engine Front Cover Seal (Crankshaft Front Seal) Installation: Remove felt oil seal with an ice pick and clean out the recess in cover before installing new seal *(NOTE—Do not remove the four self tapping screws holding the seal retainer plate in position).* Install a new seal and wet it with clean engine oil. Insert crankshaft pulley hub to locate seal in center position.

Engine Front Cover Installation: Install cover on engine, using a new gasket, and install cover screws, but do not tighten. Using Pusher Set J-4704, install crankshaft pulley hub to locate hub and center cover properly. Tighten cover screws. Install fuel pump and the fuel pump to carburetor pipe. Assemble and install vibration dampener and tighten retaining screws to proper torque. Install water manifold assembly using new gaskets, and replace fan blade assembly. Install fan belt and adjust it to proper tension. Install power steering belt (if so equipped) and adjust it to proper tension. Install radiator core and fan shroud.

CAMSHAFT & BEARINGS

1954 PACKARD MODELS

CAMSHAFT REMOVAL: Remove cylinder head, raise front end of car and place stands under front suspension. Remove right front wheel from hub and drum, and right front fender splash apron cover plate. Disconnect and remove fuel pump and oil pump. Remove valve spring chamber cover. Raise valve with lifter HM-536. DO NOT REMOVE VALVE LOCKS. Insert two blocks of wood between valve head and block to hold valves open (wood block should be approximately ⅜" thick, ⅛" wide, 1" long). Raise all valves and block them up with similar blocks of wood. Lift valve tappets up by hand, retaining them with spring-loaded type clothespins. Remove camshaft thrust plate from front end of engine block. Carefully remove camshaft, rotating it as it is withdrawn, to prevent scoring or damaging bearings.

Camshaft Bearing Removal & Replacement: Remove oil pan and camshaft (see Camshaft Removal above). Drive out old camshaft bearing using a smooth faced drift of smaller diameter than outside diameter of bearings. Replace new bearings by using similar drift with larger outside diameter than outside of bearings. CAUTION—Be sure oil holes in bearings line up with passages in block.

Cleaning & Inspection—Clean camshaft, and inspect cams and bearing surfaces for wear, scores, or pits. Inspect oil pump drive gear for nicks, scores, pits or wear. Camshaft to bearing clearance should be .001-.003". If tappets removed (see Hydraulic Valve Lifters, below).

Camshaft Installation: Reverse removal procedure, and check camshaft endplay (see Car Pages for Camshaft Endplay specifications). If endplay not within limits, replace camshaft thrust plate.

1954 STUDEBAKER 6 CYL. MODELS

CAMSHAFT (Removal—With Engine Out of Car): Remove vibration dampener assembly, and then remove fan drive pulley, using Universal Puller HM-925. Remove timing gear cover, and using Universal Puller, remove crankshaft gear (do not remove camshaft gear). Remove cylinder head, valves, and valve springs, and oil pump, and invert engine so lifters will not interfere with camshaft removal. Remove capscrews and lockwashers attaching timing gear thrust plate to cylinder block. Remove camshaft carefully to avoid damaging bearings.

Installation—Reverse removal procedure outlined above. Adjust camshaft endplay (see Camshaft Endplay following). Make sure that camshaft and crankshaft gears are aligned with marked tooth on camshaft gear meshed between two marked teeth on crankshaft gear.

1954 STUDEBAKER V8 MODELS

CAMSHAFT (Removal): Turn crankshaft until timing marks show "IGN" mark directly under pointer on timing gear cover, and the distributor rotor is in the No. 6 firing position. Remove rocker arm assemblies, push rods, and valve lifters. Remove timing gear cover. Turn camshaft just enough to expose thrust plate retaining screws (do not remove camshaft gear), and remove thrust plate screws (turn camshaft back to align timing marks of the two gears). Remove gear and shaft as a unit. CAUTION—After camshaft removed, be very careful not to disturb position of distributor rotor.

Installation—Install camshaft, positioning "O" mark on camshaft gear between timing marks on crankshaft gear. Check distributor rotor to make sure it is pointing directly to rear (No. 6 firing position). Turn camshaft to expose thrust plate screw holes in block. Position thrust plate and install capscrews and lockwashers. Check camshaft endplay (see Camshaft Endplay following): Install timing gear cover, valve lifters, rocker arm assemblies and pushrods.

1955-56 PACKARD MODELS

CAMSHAFT: Removal (With Engine in Car)—Drain and remove radiator. Remove fan, water pump and manifold assembly. Remove air cleaner, ignition coil, carburetor and intake manifold. Remove vacuum line to distributor, disconnect ignition cables and place out of way. Remove distributor. Remove valve rocker covers, the

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four rocker lever shaft capscrews (both banks), and lift off shaft assemblies. Remove upper valve tappet cover and breather tube, and remove the lower cover. Remove pushrods and hydraulic lifters (keeping them in sequence so they will be installed in the same location). Remove vibration dampener (see above). Drain engine oil and remove oil pan. Remove engine front cover (see above). Pry off oil slinger from end of crankshaft. Remove fuel pump drive eccentric. Rotate engine to line up marks on camshaft and crankshaft sprockets so marks are adjacent and in line across shaft centers. Remove the sprockets by alternately prying on them and slide chain and sprocket assembly off the shafts. Remove the three camshaft retainer plate screws and remove plate and camshaft spacer. Carefully pull camshaft forward into the radiator grille far enough to clear engine block, taking care not to damage camshaft or bearings.

Installation: Reverse removal procedure and note the following: Install camshaft gear about 1/16" beyond a position flush with camshaft end, to allow mounting of fuel pump eccentric.

1955-60 STUDEBAKER 6 CYL. MODELS

CAMSHAFT REMOVAL (Champion): *NOTE–Camshaft can be removed with the engine in the chassis by removing fender, grille, and radiator core as an assembly.* Remove cylinder head, manifold assembly and valve cover plates. Take out valve locks, valves and valve spring retainers. Turn cylinder block over so that valve lifters will fall free of camshaft. If engine not removed from car, tie or block valve lifters so they will not interfere with cam lobes during removal. Remove oil pan, oil pump, and oil pump drive shaft. Remove vibration dampener, fan drive pulley and engine front cover. Unless camshaft is to be replaced, it is not necessary to remove camshaft gear. Turn crankshaft until camshaft thrust plate cap screws are visible through spokes of timing gear. Remove capscrews and lockwashers retaining thrust plate and carefully slide camshaft and gear out of cylinder block, being careful not to nick or scratch camshaft journals, lobes, or bearings.

1955-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

CAMSHAFT REMOVAL (Engine in Car): As follows: Turn crankshaft until timing mark shows directly under pointer on engine front cover and distributor rotor is in the No. 6 firing position (in this position the timing mark on the camshaft gear is aligned between the marks on the crankshaft gear). On coupe and hardtop models, remove the fan shroud. On all models remove the radiator core, fan blade assembly and water manifold. Remove rocker arm covers, rocker arm assemblies and pushrods. Remove carburetor and intake manifold assembly. Remove breather pipe, valve lifter cover, and take out the valve lifters. Remove fuel pump and take off engine front cover (see "Engine Front Cover" above). Turn camshaft just enough to expose thrust plate retaining screws and remove screws. Turn gear back to align timing marks of the two gears. Remove camshaft and gear as an assembly, being careful not to damage camshaft bearings. *CAUTION–With camshaft r moved, d not mov crankshaft or disturb position of distributor rotor.*

1954-60 STUDEBAKER 6 CYL. & V8 MODELS
1957-58 PACKARD MODELS

CAMSHAFT ENDPLAY: Endplay regulated by thickness of spacer installed on camshaft directly behind timing gear and is equal to amount by which thickness of spacer exceeds thickness of thrust plate bolted on cylinder block. When installing new parts, measure both thrust plate and spacer with a micrometer, select parts so that endplay is .003-.006" (1952-58 Champion); .005-.007" (1951-54 V8); .003-.006" (1955-58 V8). The endplay is the difference in thickness of spacer and thrust plate, with the thrust plate being the thicker.

TIMING CHAIN

1955-56 PACKARD MODELS

TIMING CHAIN: Removal–Remove engine front cover (see above). Pry off oil slinger from end of crankshaft and remove fuel pump eccentric. Rotate engine to line up marks on sprockets so marks are adjacent and in line across shaft centers. Remove sprockets by alternately prying on them and slide chain and sprocket assembly off the shafts.

Installation: Install camshaft and crankshaft sprocket keys being sure they are properly seated in keyways. Rotate engine crankshaft to bring No. 1 cylinder to firing position. Slide crankshaft sprocket part way on the crankshaft and assemble camshaft sprocket in chain, locating and lining up the "O" marks on the sprockets in line with camshaft and crankshaft centers. Position chain on crankshaft sprocket and start camshaft sprocket on camshaft. Using a rawhide hammer, alternately tap both sprockets into proper position. Camshaft gear must be installed about 1/16" beyond a position flush with end of camshaft for installation of fuel pump eccentric. Complete installation by reversing removal procedure.

TIMING GEARS

1954-60 STUDEBAKER 6 CYL. & V8 MODELS
1957-58 PACKARD MODELS

TIMING GEAR REMOVAL: Remove engine front cover (see above). Remove gear retaining screw, lock, and flatwashers. On V8 engines remove fuel pump cam and lockplate. With Puller HM–925 (6 Cyl.), J–8111 (V8), remove camshaft gear. Remove crankshaft pulley key and oil slinger and remove crankshaft gear with Tool J–8111 (All Engines.) Use Adapter Plug HM–925–12 to protect crankshaft threads.

VALVE SYSTEM

1954-60 STUDEBAKER 6 CYL. MODELS

►*OIL LEAKAGE OR SEEPAGE AT VALVE COVER PLATE CORRECTION (All Engs. before No. S-82962):* Leakage at lower edge of valve cover plate (when not due to defective gasket or improperly tightened cover bolts) can be corrected by removing cover and installing aluminum plugs, Studebaker No. 1549330 in each of the valve lifter oil holes in the cylinder block. Use small punch to drive plugs in tight and flush with the cylinder block. *NOTE - Th s plugs used in producti n beginning Engin No. S-82962 (Lat 1959).*

VALVE TAPPET ADJUSTMENT
1955-56 PACKARD MODELS

VALVE TAPPET ADJUSTMENT: *NOTE–Ch cking must be done with no oil in compr ssion chamb r of tapp t and the plunger completely bottomed, with tapp t on base circle of cam.* With piston on compression stroke and both valves closed, press downward on the pushrod end of rocker arm to compress plunger spring and force plunger to its bottom position. While still holding down on rocker arm, measure the lash. The clearance between valve stem end and rocker arm tip should be .050" to .210".

VALVE STEM SEALS
1954 STUDEBAKER V8 MODELS

VALVE STEM SEAL TESTING: Using vacuum equipment on distributor analyzer, remove valve covers and rocker arm assembly. Wipe excess oil from top of valve spring retainers. Adjust vacuum control on analyzer to indicate 15" with hose closed off. Using a high tension cable nipple as an adapter on the end of the vacuum hose, place adapter in center of valve spring retainer, over valve stem. Vacuum on gauge should read 15" if seal is in good condition. *NOTE–* A fast check of seals can be made by compressing a small vacuum cup over valve spring retainer. If there is leakage, vacuum cup will not stay compressed.

VALVE SPRINGS
1954-57 STUDEBAKER 6 CYL. MODELS

VALVE SPRING INSTALLATION: Springs should be installed with closed-coil end of spring upward.

Valve Lifter Tension Spring. Consists of 'U' shaped flat spring installed so as to engage lower end of valve stem and upper end of lifter (spring tension keeps lifter on cam lobe). Make certain that tension springs in place when valves and springs installed.

1954 STUDEBAKER V8 MODELS

VALVE SPRING ASSEMBLY INSTALLATION: Install dampers on "closed coil" end of spring so that damper fingers contact sides of spring. Place springs on valve stem so damper is next to the cylinder head. Install the valve spring retainers on the springs making sure the retainers with the skirts are on the intake valves. Compress the spring until the retainer is past the inner groove of the valve stem far enough to permit installing the rubber seal. Place the keepers in position and slowly release the spring.

►*CAUTION*—Always install new rubber seals whenever valve springs have been removed.

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VALVE GUIDES

1955-56 PACKARD MODELS

CHECKING VALVE STEM CLEARANCE: After valves have been removed from head, and with valve stems and guides clean, install valve in respective guide bore and measure side-to-side play crosswise to the cylinder head using a dial indicator or thin strips of feeler gauge material placed between stem and guide bore. If clearance is greater than .004" (intake), or .005" (exhaust) guides should be reamed and oversize valves installed.

1955-56 PACKARD MODELS

VALVE GUIDE REAMING: Four oversize reamers are available in Valve Guide Set J-6042 which will provide the desired clearance of .001-.002" (Intake), and .002-.003" (Exhaust) between stem and guide. After checking clearance, select the proper oversize reamer and pilot for the oversize valve to be installed.

1954-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

VALVE GUIDE REMOVAL AND INSTALLATION: Valve guide tool J-4673 is used to remove and install the valve guides. Drive guide out of cylinder head from the combustion chamber side.

►*NOTE:* **Intake and exhaust valve guides *not* interchangeable. Intake guides are longer.**

Installation—Coat valve guide lightly with white lead and start chamfered end into cylinder head from the combustion chamber side. Place the installing plate on the face of the head so that the long side of the plate is paralliel to the end of the head and the bore of the plate centered over the guide bore. The plate is marked "Intake" on one side and "Exhaust" on the other side. Be sure that the exposed mark of the plate corresponds to the valve guide being installed so that the depth of the counterbore of the plate will control the depth to which the guide is driven into the head. Insert the driver through the plate and into the guide. Drive the guide into the head until the shoulder of the driver contacts the bottom of the counterbore in the plate.

ROCKER ARMS

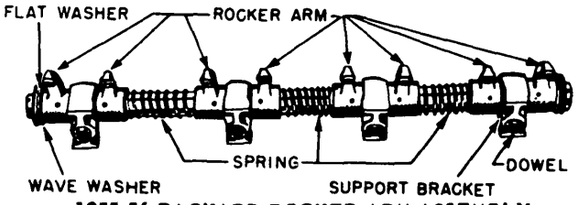
1955 PACKARD MODELS

►*IMPROVED OIL CONTROL ROCKER ARM SHAFT PRODUCTION CHANGE & CORRECTION ON EARLY CARS:* Three types of rocker arm shafts have been used in production with different number and size of rocker arm oil holes. For all replacement use, use LATEST type shaft, Part No. 440466, which may be identified by ALL oil holes being of the same size (.062").

1955-56 PACKARD MODELS

ROCKER ARM AND SHAFT: Disassembly—Remove rocker arm and shaft assembly from cylinder head. Remove cotter pins, and flat and wave washers from end of shaft. Remove rocker arms, springs and supports, keeping all parts in order so they can be replaced in original position.

Inspection: Clean and inspect all parts, making sure that all oil holes are open. Inspect shaft and arms for wear. Inspect rocker arm radius at valve stem end, and if worn replace the rocker arm. Inspect plugs at each end of shaft for tightness.



1955-56 PACKARD ROCKER ARM ASSEMBLY

Reassembly: Reverse disassembly procedure and note the following: Rocker arm shaft must be assembled with the grooved oil hole in the downward position, or facing the cylinder head.

►***CAUTION: There is a right and left rocker arm and if reversed in assembly they will not properly contact the valve stem.***

1954-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

ROCKER ARM ASSEMBLY: Two identical hollow steel shafts (ends plugged) are used. Four removable supports doweled to each shaft with cylinder head capscrews. Three springs used to position rocker arms against supports. Lubrication is supplied by oil from the main oil galleys to a passage in the cylinder head which leads the oil up around the relieved capscrew shank in the rocker arm front support on the left bank and the rocker arm rear support on the right bank. The bracket is drilled to connect the capscrew hole with the rocker arm shaft hole. The oil flows under pressure to the rocker arms and through holes drilled in the rocker arms to the adjusting screws and through the center of the adjusting screws to the push rods.

►*DISASSEMBLY CAUTION:* Mark rocker arms, brackets, and the rocker arm shaft so that they can be reassembled in their original position.

Reassembly—Make certain the oil holes and grooves in the rocker arm shaft and the oil holes in the brackets rocker arms and adjusting screws are clean. Check rocker arms and shaft clearance which should be .0005" to .0025". Test springs. It should require 9-1/2 to 10-1/2 lbs. to compress springs to 2-1/32". If not within these limits, replace spring. Assemble all parts in order as shown in illustration observing the following points: Adjusting screw end of rocker arm must be on same side of shaft as cylinder capscrew groove in shaft and oil groove side of shaft must be at bottom of rocker arm. When assemblies installed on cylinder head, flat side on end of rocker arm shaft should be toward rear of engine (right bank), toward front of engine (left bank).

VALVE LIFTER

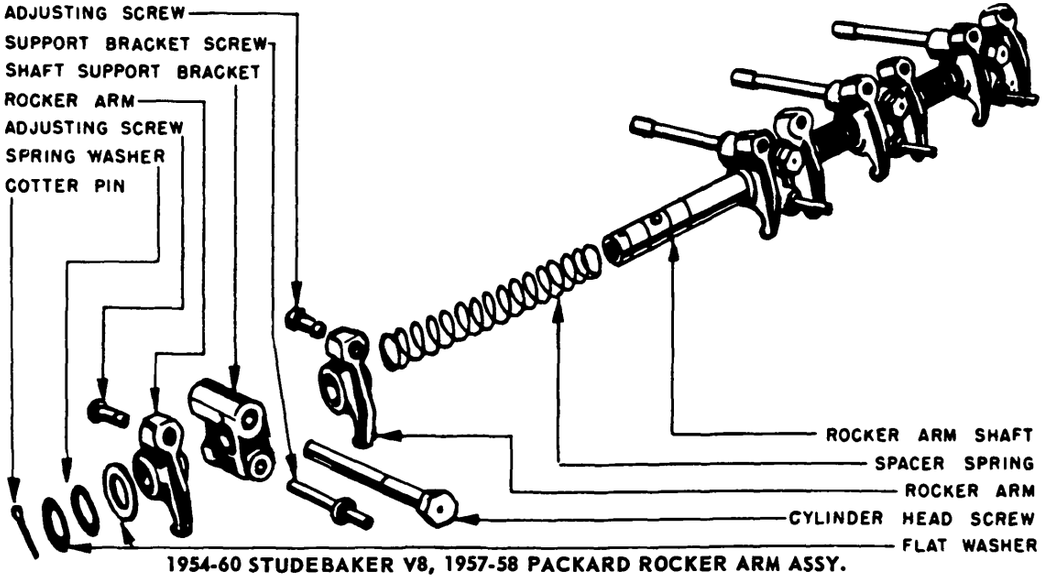
1954 PACKARD MODELS

HYDRAULIC VALVE LIFTERS ("Wilcox-Rich"): Mushroom type lifters, removed from below with camshaft out of engine. Lifter is composed of three major units: tappet body, cylinder, and plunger. Oil is introduced to lower part of lifter body from main oil pressure system, and then through a ball check valve to cylinder below plunger.

Removal: Remove camshaft (see Camshaft Removal above), and oil pan. Lifters can then be removed from below.

Disassembly: ***(CAUTION—Plungers and cylinders are selectively fit at the factory and must not be interchanged. Disassemble one unit at a time to avoid mixing parts).*** To remove plunger from cylinder, twist plunger in a direction that would "wind-up" the

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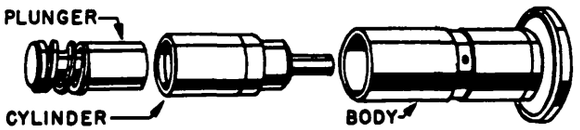


1954-60 STUDEBAKER V8, 1957-58 PACKARD ROCKER ARM ASSY.

Form 33 B

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spring and pull outward at the same time. If plunger is stuck in cylinder, clean all carbon and varnish from lifter and then insert a match in oil inlet hole at bottom of lifter and raise check valve ball, allowing oil to drain out. If lifter remains stuck, soak in a carbon solvent.



1954 PACKARD HYDRAULIC LIFTER

Cleaning & Inspection: Clean all lifter parts in clean solvent and check for scoring, burrs, wear or foreign matter. Blow parts dry with compressed air.

Testing: Make sure there is no oil on lifter parts, then with cylinder held upright in one hand, start plunger into cylinder with the other. Depress plunger and release it quickly. Plunger should yield slightly to finger pressure but should "kick-back" immediately upon release of pressure. If it does not, place finger over oil inlet hole and repeat the test. If "kick-back" does not occur on second test, thoroughly re-clean lifter to eliminate the possibility of dirt causing check valve to leak. Again check lifter, and if "kick-back" is not felt, it must be assumed that lifter check valve is damaged. Replace entire hydraulic unit.

Reassembly: Clean plunger and cylinder, and blow completely dry with air. Avoid touching plunger with fingers to prevent oil film, and place plunger in cylinder, pushing it down until air escapes, then place unit in lifter body. CAUTION—It is important to keep plunger and cylinder assembly free of oil, as a dry assembly will bleed quicker and prime quicker, eliminating excessive noise when engine first started.

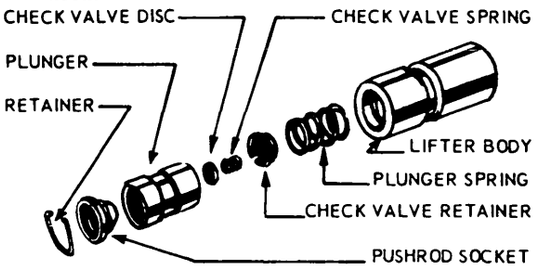
Initial Adjustment (after Valves Ground or New Parts Installed): Check the take-up reserve of each hydraulic valve lifter after valves and valve seats have been refaced or new lifter parts installed. Remove hydraulic plunger and cylinder from lifter body (valve springs and retainers removed from valve stems). Bring piston of cylinder to top of its compression stroke (this must be done on each cylinder when checking the respective valves) which will place lifters on heel of cam lobe. Check valve clearance by inserting Plug Gauge of Hydraulic Gauge Set J-4540 or J-2553 (which ever required) in lifter body. Check clearance between gauge plug and valve stem (with valve held down on seat) using feeler gauge supplied with gauge set. **Clearance should be .030" to .070".** If under .030", grind off end of valve stem with valve refacer. NOTE—Feeler gauge marked "GO" and "NO GO."

►*CAUTION*—When checking other valves, make certain piston for that cylinder is at top of compression stroke.

1955-56 PACKARD MODELS

►*TOOL J-5978 & J-5978-A TOOL NOTE:* Two types of lifters used. Tool J-5978 can be used with early type lifter. Tool J-5978-A must be used with later type lifter and can be used with early type. New valve lifters have narrower oil groove in body and groove is raised slightly. If Tool J-5978-A not available, Tool J-5978 can be reworked as follows for use with later type lifter. Grind two ears of lower jaw down to a 5/32" thickness (grind away lower surface of jaw) and back 5/8". Use Adapter J-5978-6 with modified tool.

HYDRAULIC VALVE LIFTERS: Removal—Remove valve rocker covers and rocker arm shaft mounting bracket bolts and lift off rocker arm shaft assembly. Remove upper valve tappet cover and breather tube and then remove lower valve tappet cover. Remove pushrods and hydraulic valve lifters keeping pushrods and lifters in sequence so they can be replaced in the same relative position. *NOTE*—Lifters can be removed from block with Valve Lifter Remover J-5962 or a wire hook.



1955-56 PACKARD HYDRAULIC LIFTER

Disassembly: Press down on valve pushrod socket and use a pair of needle nose pliers to remove the lock ring. Remove pushrod socket, plunger, and plunger spring. Remove check valve assembly from plunger being careful not to lose the small flat valve and coil spring. *(CAUTION–Disassemble one lifter at a time to avoid mixing plungers and bodies. These parts are selectively fitted and must not be interchanged).* Use clean solvent and thoroughly wash all parts. Remove any varnish or gum deposits.

Inspection: Inspect plunger and walls of body for scratches (if plunger or body are scratched, replace complete unit). Try the plunger for fit in body. If check valve assembly removed from plunger, inspect flat disc valve, spring and seat.

Reassembly: Reverse disassembly procedure. See illustration for correct sequence.

Testing: Use a clean container deep enough to cover the lifter assembly (in an upright position). Fill container with clean kerosene. Remove the pushrod socket and place lifter in kerosene in an upright position, allowing it to fill up. Remove lifter and replace pushrod socket. Place lifter assembly between jaws of checking tool (see J-5978 & J-5978-A Tool Note below) Check leakdown by depressing the tool. A decided resistance should be felt. If plunger collapses immediately, the lifter should be checked again. Replace if no resistance felt.

1954-60 STUDEBAKER 6 CYL. & V8 MODELS 1957-58 PACKARD MODELS

VALVE LIFTER INSTALLATION: Thoroughly clean lifter bores in cylinder block and inspect for smoothness. With lifter and bore clean and dry, check lifter fit and select correct lifter size. Lifters furnished Std., .001", .005" oversize. See ".005" Oversize Lifter Installation" below.

Checking Lifter Fit in Bore—When properly fitted, the valve lifter should just slide into place from its own weight. If .001" oversize lifter does not restore proper clearance, bore must be reamed to .005" oversize, and .005" oversize lifters installed.

1954-60 STUDEBAKER 6 CYL. & V8 MODELS 1957-58 PACKARD MODELS

OVERSIZE VALVE LIFTER INSTALLATION: Special reamers required for reaming engine block bores .005" oversize as follows: 32L-STB (6 Cyl.), 1356-STB (1954 V8), 1352-STB (1956-60 V8). These reamers will provide correct lifter to engine block clearance.

OILING SYSTEM

►*1959 STUDEBAKER LARK 6 CYL. OIL PRESSURE INDICATOR LIGHT STAYING ON AT IDLE SPEED CORRECTION:* On cars with PB-50 type oil filter, install oil filter inlet Pipe Nipple, Part No. 1549669,, which has a .0456" restriction. *NOTE* - Before installing the nipple make sure proper grade of oil is used and that engine idle speed is properly adjusted.

ENGINE LUBRICATION

STUDEBAKER 6 CYL. ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve lifters. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase draws oil through floating oil strainer and intake pipe in crankcase which terminates at inlet port in pump mounting base. Oil from pump flows through outlet passage in pump body and mounting pad directly to main oil gallery which extends longitudinally along right side of crankcase (oil pressure regulator is located in crankcase at forward end of this oil gallery). At rear of engine, a transverse passage connects main oil gallery with lifter oil gallery which also extends entire length of engine block on inner side of lifter chamber. Oil is distributed through these oil galleries as follows:

Crankshaft & Camshaft Bearings - Lubricated through drilled passages in each crankcase web extending from main oil gallery to camshaft bearing bore and then down to corresponding main bearing bore (rear camshaft bearing is lubricated from passage connecting main oil gallery to lifter oil gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with crankpin oil hole.

Valve Lifters - Each lifter lubricated through short oil passage extending from lifter oil gallery to lifter bore.

Timing Gears - Lubricated by oil return from pressure regulator valve. Valve bypass port discharges into channel formed by groove in front of block behind engine front plate through which oil is directed onto timing gears. *NOTE* - Small bleed hole in valve plunger provides lubrication for gears at low speeds when pressure regulator valve is closed.

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STUDEBAKER V8 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters, and valve mechanism on cylinder head. All other parts are lubricated by oil spray or oil return flow.

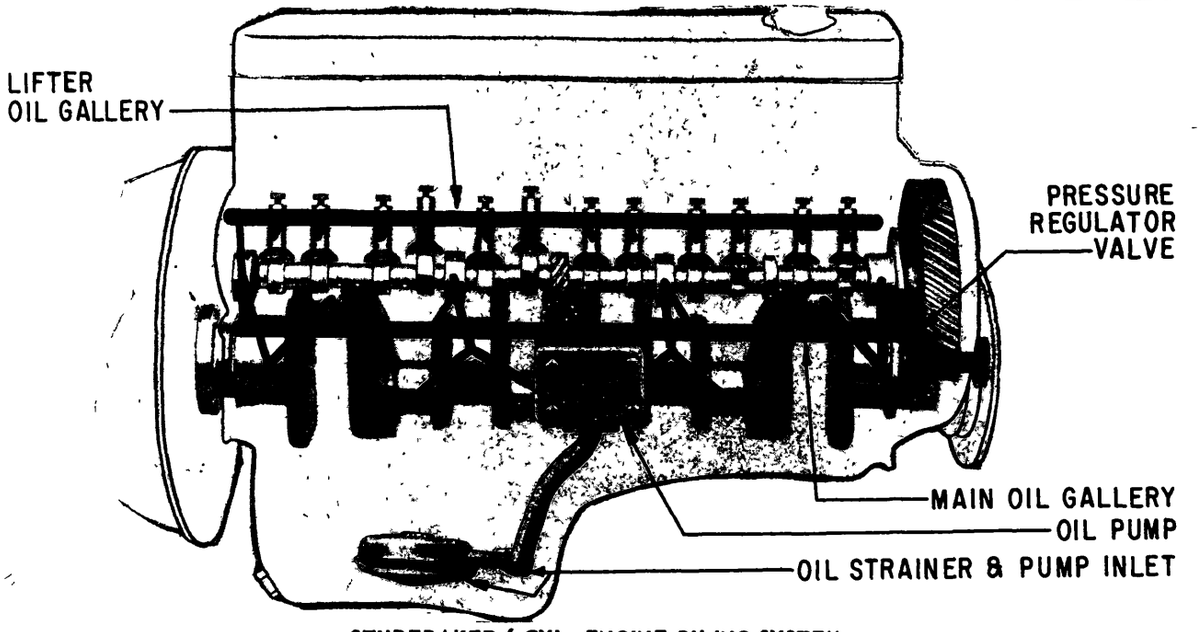
OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in rear bearing cap and engine block to rear end of right main oil gallery which extends along entire length of engine. At forward end of the engine, two intersecting cross-passages connect the right main oil gallery with the left main oil gallery which also extends along entire length of the engine. Oil is distributed from these oil galleries as follows:

Crankshaft & Camshaft Bearings - Lubricated through drilled passage in each crankcase web extending from **right hand** main oil gallery to corresponding camshaft and crankshaft bearings. *NOTE* - Rear camshaft bearing is lubricated by separate cross-passage from right main oil gallery.

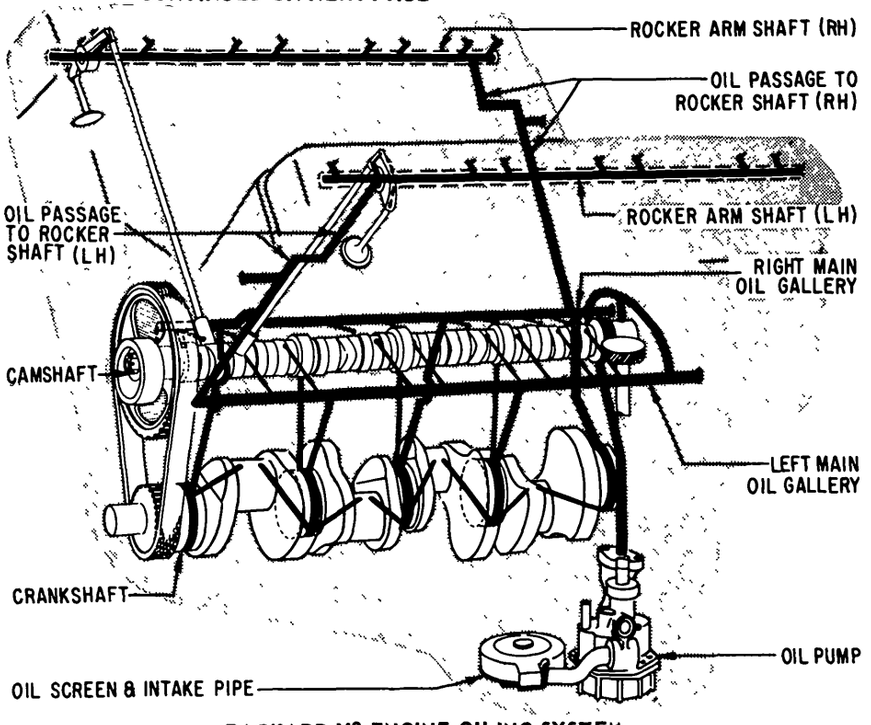
Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole in shaft from adjacent main bearing.

Pist ns & Pins - Lubricated by oil spray thrown on cylinder wall from spray hole in lower end of connecting rod when this hole registers with oil hole in crankpin.

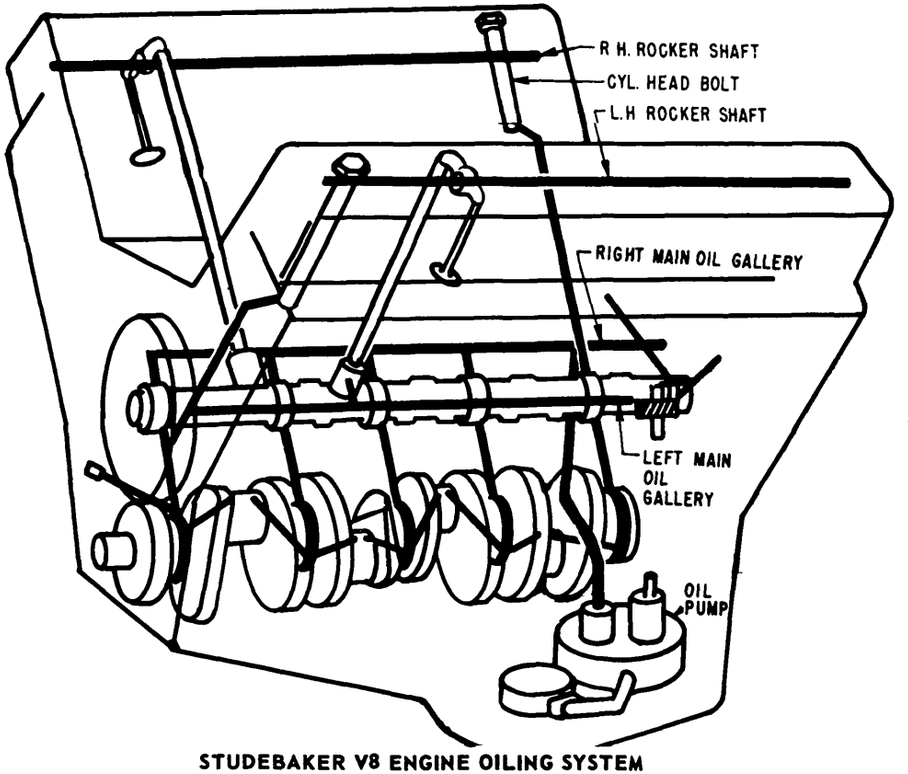
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STUDEBAKER 6 CYL. ENGINE OILING SYSTEM



PACKARD V8 ENGINE OILING SYSTEM



STUDEBAKER V8 ENGINE OILING SYSTEM

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Valv Lifters - Lifters are lubricated through short vertical passage leading from adjacent main oil gallery.
Rocker Arms, Pushrods, & Valves - Drilled passages in block at forward end of left main oil gallery (for left bank), and at rear end of right main oil gallery (for right bank) extend up to matching passages in cylinder head and rocker shaft support brackets (front bracket on left head, rear bracket on right head). Passage in head and support bracket is around relieved shank of cylinder head bolt which passes thr ugh bracket. Oil flowing through this passage enters hollow rocker arm shaft through angle passage in bracket. Drilled holes in shaft and in rocker arm and tappet adjusting screw provide lubrication for rocker arm, pushrod socket, and valve tip. Drain hole at rear end of each cylinder head and matching passage in block drain excess oil back into lifter chamber (drain hole in head is through hollow dowel). An oil return hole in the lifter chamber permits oil to drain back into oil pan. *NOTE* -Early engines had drain hole at each end of each cylinder head.
Timing Gears - Lubricated by oil bypassed by pressure regulator valve (pressure regulator mounted on right front corner of engine block and oil return passage directs oil on timing gears). Valve plunger has small bleed hole to provide lubrication for gears at low speeds when regulator valve is closed.
Camshaft Gear Thrust Face - Groove in front camshaft bearing permits oil to flow out and through hole in camshaft thrust plate. Two grooves in front face of plate distribute oil over face of thrust plate on which camshaft gear hub rides.
Distributor Drive Shaft & Gear - Lubricated through passage from rear of rear camshaft bearing.

OIL FILTER: Partial flow type mounted on bracket on cylinder head. Oil inlet line is connected to drilled hole at front of left cylinder head and filter outlet pipe returns oil to crankcase filler pipe.

PACKARD V8 ENGINES

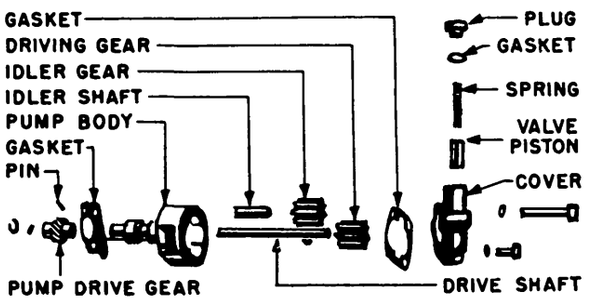
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic lifters, and rocker arm assemblies. All other parts are lubricated by oil spray or oil return flow.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through floating strainer and inlet pipe attached to pump body and delivers oil up through a passage in the pump body, bearing cap, and crankcase directly to the rear end of the right hand main oil gallery which extends along the full length of the engine block. A cross-passage at the rear of the engine connects right main oil gallery with left main oil gallery which extends full length of engine block on left side. Oil is distributed from these galleries as follows:
Crankshaft Bearings - Lubricated through drilled passages in crankcase webs by which oil is fed from main oil galleries to each crankshaft bearing as follows: Nos. 1,3,5 - Right Bank Oil Gallery; Nos. 2 & 4 - Left Bank Oil Gallery.
Camshaft B arings - All camshaft bearings except No. 5 (rear) are lubricated from corresponding main bearing through vertical passages in crankcase webs. Rear camshaft bearing is lubricated directly from main oil gallery line through short vertical passage above bearing bore.
C nnecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole from adjacent main bearing.
Pistons & Pins - Lubricated by oil spray thrown on cylinder wall by same cylinder of opposite bank. Spray hole consists of groove in bearing cap through which oil is sprayed when this groove lines up with oil hole in crankpin. *NOTE* - Rods must be installed with this groove upward toward camshaft to effect this cross-lubrication.
Valve Lifters - Lifters are supplied with oil through short passage from adjacent main oil gallery.
Rocker Arms, Pushrods, & Valves - Drilled passages in block at forward end of left main oil gallery (for left bank) and at rear end of right main oil gallery (for right bank) extend up to matching passages in cylinder head (passage in head is around relieved shank of cylinder head bolt). Passage in head extends to rocker arm shaft bracket mounting bolt hole (front bracket left bank, rear bracket right bank) through which oil flows into hollow rocker arm shaft. Drilled holes in shaft and passages in rocker arm provide lubrication for rocker arms, pushrods, and valves. Drain holes are provided in cylinder head and block for oil drainage back to oil pan (hole consists of drilled dowel in front end of head (right bank), rear end of head (left bank).
Timing Chain & Sprockets - Grooved channel and spray hole in camshaft retainer plate provide lubrication for chain and sprockets from forward end of right main oil gallery (camshaft retainer plate acts as cover for forward end of main oil galleries). Fuel pump eccentric is lubricated similarly by spray hole in retainer plate.

OIL PUMP

1954 PACKARD MODELS

OIL PUMP: Removal—Set engine in firing position for #1 cylinder (6° BTDC.), remove distributor cap and mark rotor position on distributor housing. Wi h pump cover off, mark pump driving gear position on pump body (check to this mark when re-assembling since pump must be rotated 180° on some cars to clear frame when removing pump from engine).



1954 PACKARD OIL PUMP ASSY.

Disassembly: Remove pump cover and gasket. Place a straight-edge across pump body, and with a feeler gauge, measure clearance between pump gears and straight-edge. Clearance should be .002" or less. Clearance between gears and pump body should be .005" or less. Holding hand under pump body, rotate drive shaft until driven gear falls out. Drive out driving gear retaining pin and press out drive gear. Driving gear may be pressed from shaft if necessary.
Reassembly: Assemble shaft and drive pump gear and install in oil pump body. Press drive gear on shaft until endplay of shaft measures .003-.010". Measure this clearance between drive gear and pump body, using a feeler gauge. If a new pump drive shaft installed, drill a ⅛" hole through drive gear and shaft, install pin and peen it over on both ends. Install oil pump idler gear. Lubricate pump with clean engine oil and install pump cover, using a new gasket. Torque attaching screws to 25-30 ft. lbs. Clean and inspect relief valve by removing valve piston, spring, and plug from pump cover. Check piston for scores and for improper seating. Check pump cover for dirt or foreign material and clean thoroughly. If necessary crocus cloth can be used to polish relief valve piston.
Installation: Correct engaging position of pump drive is with driving blade in pump drive gear parallel with camshaft, and punch mark on end of drive gear at top. Reassemble to marks made at time pump removed, and with engine in firing position for No. 1 cylinder. If pump does not engage slot in distributor shaft, remove pump and turn pump drive one tooth and reinstall, making certain that distributor is at No. 1 firing position.

1955-56 PACKARD MODELS
1956 STUDEBAKER GOLDEN HAWK

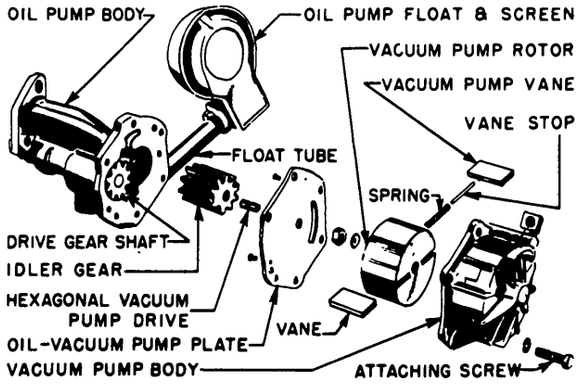
►*NOTE:* Studebaker Golden Hawk has a cover plate on bottom of oil pump in place of the vacuum pump used on Packard Models.

OIL PUMP: Removal—Remove engine oil pan. Disconnect vacuum pump line to crankcase. Remove the two screws attaching oil pump to rear main bearing cap and remove oil pump, vacuum pump and strainer assembly.
Disassembly: Remove screws attaching vacuum pump to oil pump body and remove vacuum pump. Do not lose the small hexagonal drive. Remove idler gear. Remove pin from shaft and drive off sleeve. Remove upper and lower oil pump driving shaft and gear. If necessary, press shaft out of gear. If necessary to to remove the float assembly, the tube can be unscrewed from pump.
Inspection: Wash all parts in clean solvent and blow dry with air. Inspect float for leaks. Inspect strainer. Inspect pump shaft and gears for wear, scores or pits. Check clearance between gears and pump housing using a feeler gauge. This clearance should not exceed .005". Check gear endplay using a straightedge across gears and housing. Endplay should not exceed .003". Check clearance between shaft and body. Clearance should not exceed .003". Inspect pressure relief valve piston for scores. Inspect relief valve spring. Free length of spring should be approximately 3-19/64". When compressed to 1-3/8", pressure should be 9—9-1/2 lbs. Inspect pump cover for wear. Dress down on a surface plate if necessary.
Reassembly: If float and suction tube removed from pump body, special care should be taken when installing to see that suction tube is tight in threads of pump body, and that float is properly positioned. To position

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float and tube (vacuum pump must be removed), measure the distance between machined face of pump housing and top edge of float. This distance must be 3/4" *(CAUTION–When positioning float, do not unscrew tub to position float, but continue one more turn).*



1955-56 PACKARD OIL & VACUUM PUMP ASSY.
1956 STUDEBAKER GOLDEN HAWK OIL PUMP ASSY.

Install key in pump shaft keyway and press driving gear on shaft until flush with bottom of gear. Install upper and lower shafts and gear in pump body. Install sleeve on shaft. Install pin in sleeve and stake both ends of pin. Install idler gear and hexagonal drive in end of gear. Position vacuum pump on oil pump body to line up with dowel pins and install attaching screws.

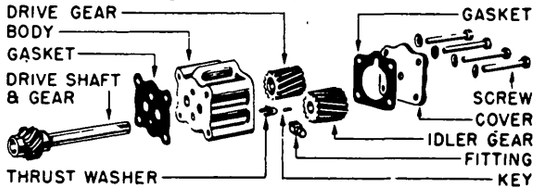
Installati n: Start oil pump driving shaft in hole in rear main bearing cap and turn shaft to engage mating end on distributor shaft. Start the two screws and lockwashers and tighten screws to 25-30 ft. lbs. Connect vacuum pump line to crankcase. Install engine oil pan.

1954-60 STUDEBAKER 6 CYL. MODELS

OIL PUMP: R m val & Disassembly–Disconnect oil pressure pipe. After removing four cover screws and washers, remove pump body cover, gasket and idler gear. Remove drive gear using tool J-2959. Remove Woodruff key and horseshoe shaped thrust washer to permit removal of oil pump body and gasket. If it is necessary to remove pump drive shaft and gear, the oil pan must be removed. Turn crankshaft away from No. 1 TDC position (to provide clearance between counterweight and engine block). Remove distributor and push oil pump drive shaft inward, and remove it from the crankcase. To remove gear from oil pump drive shaft, press out the gear-to-shaft pin and then press shaft out of gear.

Insp cti n: Inspect pump cover for flatness and deep scratches or score marks. Check clearance between oil pump gears and pump body by placing a .005" feeler gauge between teeth of oil pump gear and body on each side of pump. The pump should be locked tight. The total clearance should not exceed .010". If pump gears can be rotated with the two .005" feelers in place, the pump body is worn and should be replaced. Check gears for smoothness, deep scratches and score marks. Replace all defective parts. Clearance between end of gears and cover plate must not exceed .007". To check this clearance, the lower ends of the gears should be exactly flush with the lower surface of pump body when gears are resting against the upper part of pump body. A new gasket .004-.006" thick, when compressed will provide proper clearance.

Installation & Reassembly: *(CAUTION–If oil pump drive shaft removed, install EXACTLY as described below to obtain correct ignition timing).*



STUDEBAKER 6 CYLINDER OIL PUMP

Oil Pump Drive Shaft Installation - Install drive shaft, temporarily engaging camshaft gear and oil pump drive gear with crankshaft turned away from No. 1 TDC position (necessary to provide clearance at crankshaft center counterweight). Then turn the crankshaft until No. 1 piston is on compression stroke and "UDC 1-6" mark on vibration dampener is directly under pointer on engine front cover. Slide the oil pump drive shaft away from camshaft to disengage the camshaft gear and turn drive shaft until keyway is pointing directly upward when the two gears start to engage. Pull the shaft into position so that the two gears fully mesh (the drive shaft will rotate so that the keyway is toward rear of engine). Install distributor to hold oil pump drive shaft in position while installing remainder of pump assembly (with slot in end of distributor shaft engaged, rotor should line up with No. 1 terminal in distributor cap).

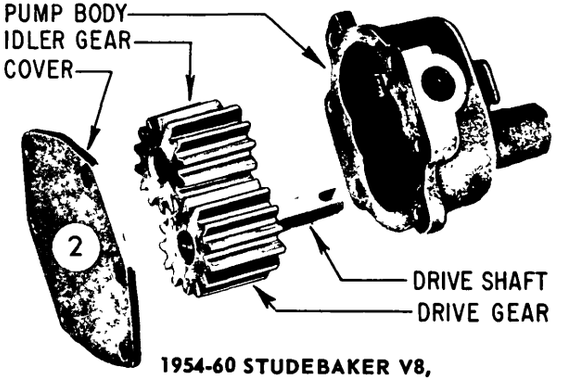
Oil Pump Assembly–Dip each part of pump in clean engine oil before assembly. Place a new gasket and oil pump body over pump shaft and install horseshoe washer, woodruff key, and drive gear. Install idler gear, new cover gasket, and pump body cover. Secure entire assembly in place with the four cover screws. Remove oil pressure pipe fitting from pump body and prime pump with clean engine oil. Install fitting and oil pressure pipe.

Oil Strainer & Suction Pipe - Furnished as an assembly (strainer is stationary type). To remove this assembly, take out suction pipe flange-to-block capscrew, lift assembly off, remove flange gasket. Use new gasket when installing assembly.

1954-60 STUDEBAKER V8 MODELS
1957-58 PACKARD MODELS

►*NOTE:* For 1956 Golden Hawk Oil Pump, *see 1955-56 Packard Models.*

OIL PUMP: R m val–Remove oil pan and take out the two oil pump retaining nuts and lockwashers. Slip pump assembly off mounting pad studs and remove gasket.



1954-60 STUDEBAKER V8, 1957-58 PACKARD OIL PUMP ASSY.

Disassembly: If necessary to remove oil suction pipe and strainer, use pipe wrench to turn pipe out of pump body *(NOTE* - Strainer is fixed type and is furnished as an assembly with the suction pipe). Remove cover screws and pump body cover. Remove idler gear, drive gear and shaft *(NOTE* - Do not disassemble drive gear and shaft). Clean oil strainer with solvent and dry it thoroughly.

Inspection: Inspect pump cover for deep scratches or scores and for flatness. Check clearance between oil pump gears and pump body by placing a .005" feeler gauge between teeth of oil pump gear and body on each side of pump. If pump gears can be rotated with the two .005" feelers in place, the pump body is worn and should be replaced. Check gears for smoothness, deep scratches and score marks. Replace all defective parts. With weight of gears resting against upper part of pump body, place a straightedge across face of pump body and measure distance between gear face and straightedge. This clearance should not exceed .007".

Reassembly: Place drive gear and shaft assembly in pump body. Install idler gear on idler shaft. Install pump body cover and cover screws (no gasket is used between body and cover. Then proceed as follows:

1954-55 Models - Insert pipe of floating oil strainer in cover inlet, with ears of strainer flange straddling projection on cover inlet and install 1/8" cotter key.

1956-57 Models - Insert pipe of floating oil strainer in cover inlet (finger tight) and set strainer at proper position. Hold assembly with strainer up against upper stop. Lower surface should be parallel with and 1 7/8" below cover. Scribe marks on pump and pipe, then use pipe wrench to tighten pipe with marks in line.

1958-60 Models - Install oil strainer and pipe assembly by threading pipe into pump body. Use pipe wrench and tighten to 30 ft. lbs. torque with strainer parallel to cover. *CAUTION - DO NOT back pipe out to align strainer.*

Installation: Clean all trace of old gasket off pump mounting flange and rear bearing cap pad. Install a new gasket and position slot in pump drive gear shaft so it will mate with tongue of the oil pump drive shaft

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and coupling, and install pump on mounting studs. Install nuts and lockwashers and tighten securely to 13-17 ft. lbs.

COOLING SYSTEM

1958 PACKARD HAWK

FAN NOISE REDUCTION & IMPROVED COOLING CORRECTION (Packard Hawk before Serial No. 58L-1465): To correct complaints of fan noise or overheating, ALL of the modifications listed below should be made. *These changes were made in production on cars beginning with Serial No. 58L-1465.*

1) Upper Air Deflector Openings. Open hood and prop it up securely (do not use regular hood support rod). Mark off two 3" x 5" openings in upper air deflector (one each side of center hood lock plate), cut these openings with a hacksaw blade or cutting tool, (air deflector is fiber glass).

2) Radiator Upper Air Baffle Assembly (Part No. 1328378). Install this baffle on upper air deflector, using two rear outer upper deflector attaching screws (located at opposite ends of radiator core) and rear grille support screws (located at end of hood lock plate) to attach baffle. Route wiring harness through baffle openings and secure it in clips provided.

3) Four-Blade Fan Assembly (Part No. 535257). Remove original five-blade fan assembly and replace it with the above four-blade type *See Overheating Correction*

OVERHEATING CORRECTION (Packard Hawk beginning Serial No. 58L-1465): To correct complaints of overheating in hot climates, or in congested traffic operation, on these cars with modified fan and air deflectors *(See "Fan Noise Reduction &, Improved Cooling Correction" above),* replace four-bladed fan assembly No. 535157), with five-blade fan assembly (original equipment on first cars).

1956-58 STUDEBAKER MODELS
1959-60 STUDEBAKER HAWK MODELS

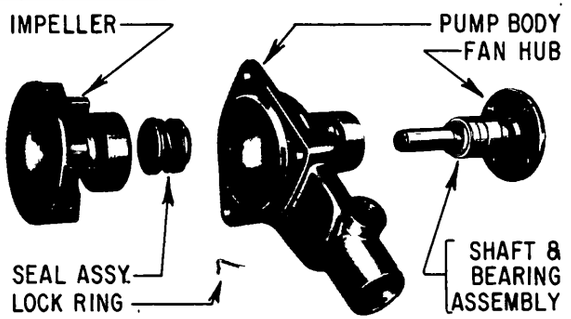
RADIATOR & FAN SHROUD REMOVAL & INSTALLATION: Shroud (Coupe & Hardtop) - Drain radiator and remove inlet hose. Remove wiring junction block from fan shroud. Pry open wiring harness clips and move harness out of way. Remove fan-to-hub screws and remove fan blades. Remove four capscrews holding shroud to radiator core support and remove fan shroud. To install, reverse removal procedures.

Radiator (All Models) - Drain cooling system disconnect battery and tie up hood. Remove horn relay and headlamp junction block screws, and free wires across top of shroud from clips. Except on Champion models, remove gasoline pipe clip screw. If car has power steering, free upper hose from hose support. Remove fan blade assembly. Disconnect upper and lower hoses from radiator. Remove screws and remove radiator core. To reinstall, reverse removal procedure.

WATER PUMP

1954-60 STUDEBAKER 6 CYL. MODELS

WATER PUMP: Removal - Drain cooling system, remove fan belt, fan blades and pulley. Disconnect heater hose and generator adjusting arm. Disconnect radiator-to-pump hose. Remove water pump.



STUDEBAKER 6 CYLINDER WATER PUMP

Disassembly: Remove bearing lock ring, place pump in an arbor press and press shaft, bearing and hub assembly through impeller and front of housing. Press hub from shaft.

Reassembly: Press new hub on shaft until flush with end of shaft. Install shaft and lock ring in housing. Use new seal and impeller and press impeller on shaft to obtain .015-.031" clearance between impeller and housing (rotate shaft when checking clearance).

Installation: Reverse removal procedure.

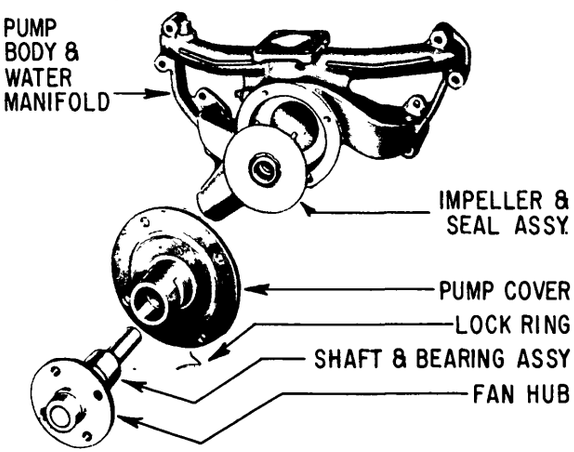
1954-60 STUDEBAKER V8 MODELS
1955-58 PACKARD MODELS

WATER PUMP: Removal - Drain cooling system, remove belt and fan and pulley. On Hawk, remove fan shroud (see below). Remove pump-to-manifold screws and remove water pump.

Disassembly: Remove bearing lock ring and press hub, shaft and bearing assembly out through front of housing. Press hub from shaft.

Reassembly: Use a new hub and press on shaft until flush with end of shaft. Install shaft in housing, install new seal in impeller. Press impeller on shaft until flush with end of shaft. Impeller-to-housing clearance should not exceed .090".

Installation: Reverse removal procedure.



STUDEBAKER V8 ENGINE WATER PUMP

IGNITION NOTES

1954-60 STUDEBAKER V8 MODELS (EXC. 1956 GOLDEN HAWK) 1957-58 PACKARD MODELS

DISTRIBUTOR DRIVE SHAFT ASSEMBLY: Removal - Turn crankshaft until "IGN" mark on vibration dampener is directly under pointer on engine front cover and distributor rotor is in line with No. 1 spark plug terminal of cap. Remove cap from distributor housing and carburetor air cleaner from carburetor. Disconnect wires and vacuum line. Remove distributor clamp capscrew and lift distributor out.

Installation: The "IGN" mark on vibration dampener must be directly beneath pointer. Position distributor so that spark modifier is to front and pointing slightly toward right. Turn rotor approximately 30° clockwise and insert the oil pump drive shaft and coupling into cylinder block opening. When the teeth on the distributor shaft gear contact the teeth on the camshaft gear, the rotor will turn counter-clockwise, and as the teeth mesh, the distributor assembly will seat on the cylinder block. At the same time the tongue of the oil pump drive shaft will enter the groove of the oil pump shaft. The rotor will now point directly forward and be in line with the No. 1 terminal of the distributor cap. (NOTE—Very slight misalignment may cause difficulty in engaging the oil pump drive shaft tongue with the groove of the oil pump shaft). After the distributor gear is in mesh with the camshaft gear, the engine may be cranked to give proper alignment. Maintain a light pressure on the distributor while cranking the engine to facilitate the engagement. Install distributor clamp and capscrew. Connect wiring and check ignition timing.

1955-56 PACKARD 1956 STUDEBAKER GOLDEN HAWK

DISTRIBUTOR DRIVE SHAFT ASSEMBLY: Removal - Turn crankshaft until ignition mark on vibration damper is directly under 5° mark and distributor rotor is in line with No. 1 spark plug terminal of cap. Unsnap retainer springs and remove distributor cap from housing. Remove carburetor air cleaner. Disconnect coil-to-distributor cable at distributor. Disconnect spark modifier pipe. Remove distributor clamp capscrew and clamp. Lift distributor out of block.

Installation: Line up ignition indicator mark on vibration damper with 5° timing mark with No. 1 cylinder on firing stroke. With distributor cap removed, insert distributor to engage oil pump drive shaft by turning distributor rotor. With rotor pointing at right cylinder bank, select proper tooth so that when distributor is placed in full mesh with the camshaft gear, rotor will be pointing to the right bank and 37° rearward from the transverse line. This will also be the position for the No. 1 spark plug wire terminal. **Line up, but d n t conn ct spark modifier pipe.** After distributor is in its bottom position, install retainer clamp, washer and screw. Install distributor cap, making sure that each of spark plug wires is tight in cap. Install coil-to-distributor cable. Before installing spark modifier pipe, check ignition timing and adjust. Install spark modifier pipe.

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FUEL SYSTEM NOTES

1954 STUDEBAKER V8 MODELS

►**FUEL PUMP SUPPORT BRACKET PRODUCTION CHANGE:** Several changes have been made during production as follows:

Support Change (Beginning Eng. No. V-96218): Part No. 531650. design changed to provide for closer or dowel fit of attaching bolts to provide uniform location of pump on support for better control of pump stroke.

Support Gask t Change (Beginning Eng. No. V-97480): New gasket, Part No. 531640, which is .007" thick used to insure support being firmly bolted in place and to provide desired fuel pump stroke. This gasket should always be used with Support No. 531650.

CAUTION—Whenever this No. 531640 gasket used with previous type fuel pump support, make certain that support is not positioned too close to block which **might result in excessive fuel pump stroke and damage to the pump.**

1954 STUDEBAKER V8 MODELS

FUEL PUMP SUPPORT BRACKET CHECKING: Check support to assure correct fuel pump stroke as follows: Place support on flat surface and measure height from bottom of support perpendicularly to line across bottom of pump mounting holes. This distance must be 4 35/64". *CAUTION*—Gasket No. 531640 (.007" thick) must be used when installing support on engine.

Fuel Pump Push Rod Checking—When support removed, check push rod for straightness and evidence of scoring.. If rod scored, polish scored areas until rod slides freely in guide bore. If rod bent, replace with new rod No. 529123.

CLUTCH NOTES

1954 PACKARD MODELS

CLUTCH PEDAL OVER-CENTER SPRING: New adjustable type over-center (booster) spring. Adjustment provided at spring eye-bolt nut (front end of spring) and by turn buckle type pedal-to-relay lever link (controls over-center point). To adjust, proceed as follows:

Clutch Pedal Linkage Adjustment: Check over-center eye bolt (should be 1 5/8" from end of bolt to head of nut—adjust if necessary). Back off locknut and adjusting nut on rod at throwout lever and unhook pedal retracting spring from throwout lever. Adjust pedal-to-relay lever link turnbuckle so that over-center spring will pull pedal down after pedal moved down one inch from toeboard (make certain throwout lever does not contact adjusting nut and locknut backed off above). Hook pedal retracting spring to throwout lever. Adjust pedal for 1¼-1⅜" free play at pedal pad. Check over-center spring hold-in position by pulling pedal to floor and hooking spring at bend in pedal arm. Adjust eye bolt nut to hold pedal down with seven lbs. pull on scale.

1954 STUDEBAKER MODELS

►***CLUTCH PEDAL REWORK (To Prevent Spring Breakage):*** Hook of clutch pedal pull-back spring tends to open each time pedal is depressed, rather than slip in groove of anchor stud, causing spring end of hook to bend a slight amount and eventually causing spring wire fatigue and hook breakage. To prevent recurrence of condition with a new spring, it is necessary only to reduce contact area between anchor stud and the hook by cutting away the metal of the stud as follows: Start two 30° chamfers at two opposite ridges of hexagonal stud ½" from shoulder, and toward end of stud. Cut these chamfers equally to a point where a ⅛" thick section of the grooved end of the stud remains when metal toward end of stud and on each side of ⅛" section is cut away.

PROPELLER SHAFT NOTES

1954-55 STUDEBAKER MODELS

PROPELLER SHAFT ALIGNMENT CHECKING (To Correct Vibration): Check propeller shaft with dial indicator at three positions as follows: Front end of shaft, center of shaft, and rear end of shaft. For accuracy, shaft should be sandpapered at all positions, and measurements should be taken approximately 1½" back of welded joint on shaft. Maximum run-out for the front propeller shaft is .010" at any of the three positions. Maximum run-out for rear shaft is .010" (front & rear end), and .015" at the center. Check transmission and differential flanges by checking run-out of propeller shaft at the flange. Note amount of run-out and mark high side on propeller shaft. Change shaft location 180° in flange and again check shaft run-out. If run-out follows position marked on shaft and is approximately the same amount of run-out, it can be assumed that flange is satisfactory. If run-out remains on same side of flange as formerly, although not necessarily in the same amount, it can be assumed flange is causing the run-out. If checking indicates that shaft run-out is not within limits indicated above, replace shaft, flange, or both.

1956-57 STUDEBAKER MODELS
1957 PACKARD MODELS

PROPELLER SHAFT & SUPPORT BEARING ASSEMBLY: Propeller shaft is a two unit type (separate front & rear shafts) with intermediate bearing in Support Assembly on frame crossmember.

Propeller Shaft & Support Bearing Removal: Mark yokes of universal joints to assure original position at reassembly. Disconnect rear propeller shaft from rear axle companion flange. Remove shaft support stud nuts, lock washers, and plain washers. Disconnect front propeller shaft from transmission companion flange. Remove bearing cups and bearings or tape them securely in place on joint crosses. Then move assembly rearward, slipping the shaft support off the cushions and threading the front shaft rearward through center crossmember.

Installati n—Reverse removal procedure.

R ar Shaft R m val: Straighten ear of lockplate, loosen grease washer nut and unscrew it from shaft. Mark universal joint flange and rear axle companion flange to assure original position and balance at reassembly. Remove U-bolts holding rear joint bearing cups and cross to rear axle flange. Shift shaft forward and separate joint by prying with a suitable bar between companion flange and universal cross. Hold bearing cups on the cross while separating joint to avoid dropping cups and spilling bearings. Then remove bearing cups and bearings or tape them securely in place on cross. Slide shaft rearward, slipping end of slip yoke out of splines of front shaft. To remove grease washer nut from slip yoke, first remove cork grease washer and washer retainer from within the nut and slide nut off slip yoke. Cork grease washer and washer retainer are split to facilitate removal.

Installation—Reverse removal procedure. Tighten U-bolts and nuts to 20-22 ft. lbs. torque.

Front Shaft Removal: Remove rear shaft and shaft support assembly. Mark front shaft universal joint flange and transmission companion flange. Remove U-bolts holding joint bearing cups and cross to transmission companion flange. Separate joint by prying with suitable bar between companion flange and universal cross. Hold bearing cups on cross while separating joint to avoid spilling bearings. Remove bearing cups and bearings or tape them in place on the cross. Then slide rear end of shaft out of crossmember and remove from chassis.

Installation—Reverse removal procedure. Tighten U-bolts and nuts to 20-22 ft. lbs. torque.

Support Bearing Servicing: Bearing is sealed type (prepacked with lubricant) **and must never be washed in gasoline or other solvents.**

►*CAUTION: Do not re-install support bearing which has been washed in gasoline or solvent.*

Support Bearing Removal: Remove rear shaft. Remove lock plate and spacer from projecting end of front shaft, and remove shield. Remove shaft support stud nuts, lockwashers, and plain washers. Slide bearing and support assembly off front shaft and support cushions. Remove dust shields from front shaft. To remove support bearing from support use a suitable tube which will fit the outer race of the bearing and, with an arbor press, remove the bearing. NOTE—Use care not to damage bearing seal.

Installation—Reverse removal procedure. NOTE—Press bearing into support so that it is laterally centered in the support. Install dust shields on front shaft with concave side of shield against shoulder on shaft. If shaft support cushions removed, be sure to install studs in same holes from which removed.

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1958 STUDEBAKER & PACKARD HAWK MODELS

PROPELLER SHAFT NOISE CORRECTION: Caused by interference between front end of propeller shaft and body floor pan clearance tunnel (All Models) or center arm rest attaching screws (Packard Hawk) *NOTE* - Later cars (after Serial Nos listed below) have production changes to correct these conditions and corrections will not be required

1) Interference between propeller shaft and body floor pan clearance tunnel (Silver Hawk before Serial No. 7211198, Golden Hawk before Serial No. 6104735, Packard Hawk before Serial No. 1181). With car standing on floor or supported by all four wheels on hoist, check clearance between propeller shaft and all points in floor pan clearance tunnel Clearance must be 5/16" minimum Mark all points of insufficient clearance, then remove propeller shaft and bump out these points to secure at least 5/16" clearance *NOTF* - Later Golden Hawk and Packard Hawk cars have 3¼" diameter propeller shaft (reduced from 3½") to provide greater clearance (All Silver Hawk propeller shafts are 3¼" diameter)

►*RFPLACEMENT PROPELLER SHAFT NCTE (Golden Hawk & Packard Hawk):* This 3¼" propeller shaft (see above) Part No 1544461, is interchangeable with previous 3½" type and will be furnished for service

2) Interference between propeller shaft and center arm rest attaching screws (Early Packard Hawk). On these cars, screws attaching right side of center arm rest to floor pan may extend through far enough to interfere with propeller shaft Correct by removing screws and drilling out screw holes to take 3/16" bolts Install bolts from below with bolt heads on underside of floor pan Use lockwashers under nuts and cut off ends of bolts flush with nuts after nuts have been tightened *NOTE* - On later cars, extensions are welded on attaching screw tabs which lower the attaching screws approximately 1 23/32" so that no interference with the propeller shaft can occur

1958 STUDEBAKER SCOTSMAN MODELS

DRIVE LINE VIBRATION CORRECTION (Early Scotsman with Overdrive Transmission): A "rhythmic beat" vibration at 32-40 MPH in overdrive can be corrected by installing 2° wedge shims at spring seats on rear axle to change rear universal joint angularity as directed below *NOTE - Cars beginning Serial No. G-1408561 have changed spring pad angle on rear axle housing and do not require this correction. These cars marked by yellow paint on one spring pad.*

Wedge Shim Installation - Raise car to remove load from rear springs, support car under both frame side rails Disconnect rear shock absorbers and loosen rear spring clip nuts. Install 2° wedge plate (1 5/8" wide) between spring and spring pad on axle with thick end of wedge plate to front of car Tighten spring clip nuts to 47-50 ft lbs torque and connect shock absorbers

1959-60 STUDEBAKER MODELS

►*UNIVERSAL JOINT "PHASE ANGLE" & PROPELLER SHAFT REPLACEMENT CAUTION:* Shaft assemblies with **different** phase angles used with each rear axle model. Specifications for some propeller shafts may appear the same but they MUST NOT BE INTERCHANGED. Phase angles are as follows:

1959 Models

Car Model	Rear Axle Model	Phase Angle
6 Cyl. (Exc. Taxi)	23—1	0°
6 Cyl. (Exc. Taxi) Ⓒ	23—1	9°
6 Cyl. Taxi	44—3	12°
V8 (Exc. Taxi & Sta. Wgn.)	23—1	0°
V8 Taxi & Sta. Wgn.	44—3	12°

Ⓒ — Later W6 Sedans & Station Wagons with Overdrive. *See "Production Changes" below.*

1960 Models

Rear Axle Model	Phase Angle
23	0°
44	12°

►*1959 PROPELLER SHAFT PRODUCTION CHANGES & RECOMMENDED CORRECTION FOR "RHYTHMIC BEAT" NOISE IN DRIVE LINE (6 CYL.):* New propeller shaft assembly with 9° phase angle used in production on Overdrive cars as follows: **W6 Sedans** — Part No. 1547663 at Serial No 59S—86244; **D4 &D6 Station Wagons** — Part No. 1547662 at Serial No. 59S—88600. New shaft used to correct vibration and noise. If conditions encountered on other models with Overdrive (exc. Hawk & Taxi), install new shaft assemblies (use Shaft 1547663 for F & J models). *NOTE — New shafts must be installed as follows:*

1) Raise car on hoist and make sure clutch housing-to-rear engine plate bolts and capscrews are tight. Remove rear universal joint U-bolt nut and U-bolt and remove propeller shaft assembly.

2) Install new shaft and be sure retaining strap for rear universal joint bearing caps is in notches of rear axle companion flange.

3) Install U-bolts and nuts and tighten **not to exceed 10—12 ft. lbs.** Then check universal joint angles as detailed below.

DRIVE LINE ALIGNMENT: Raise rear wheels off floor and put transmission in neutral. Clean shaft with sandpaper. With dial indicator measure runout of propeller shaft at front, center and rear, while turning shaft slowly by hand. *NOTE — Make end measurements about 1½" back from weld joint.* Maximum runout should be .010" at front or rear and .015" at center. If not within limits check flanges of transmission and differential. Measure shaft runout and end nearest flange and mark flange at highest runout. Disconnect universal joint, rotate flange 180° and reassemble Check runout again. If high side of runout is still on same side, flange is at fault. If rotating flanges does not correct runout, replace shaft and/or flanges.

DRIVE LINE ANGLE CHECKING & ADJUSTMENT: Check angles with level gauge or protracter. *NOTE — Manufactur r r comm nds us f sp cial Protract r Gaug J—7181 for b st r sults.* With car at normal road load, proceed as follows:

Front (Engine-to-Pr pell r Shaft) Angl : Raise car with weight supported on all wheels. Jounce car to allow springs to equalize. Do not move car body while measuring angles. Place Gauge on clean surface on bottom of propeller shaft so pendulum is free to swing. Rotate protractor to bring 90° mark under pointer. Without disturbing protractor position, place Gauge up against starter housing so pendulum is free and read the number of degrees that pointer is away from the 90° mark. This reading indicates front universal joint angle. This angle should be 4-5°. To change angle, add or remove shims at engine rear support insulators.

Rear (Propeller Shaft-to-Rear Axle Pini n Shaft) Angl : With Gauge protractor set as for front angle check, place Gauge vertically against forward edge of differential housing in back of rear universal joint. GAUGE MUST NOT TOUCH PINION BEARING OIL SEAL. Allow pendulum to swing free and come to rest. The degrees pointer is away from 180° mark on protractor is the rear universal joint angle. This should be 4½-5½°. *NOTE - This r ading should b ½ gr at r than for front angle for b st p rf rmance.* To change angle, add or remove wedge type shims (thick end to front of car) at axle pad and rear springs.

SHOCK ABSORBER NOTES

1957-58 STUDEBAKER & PACKARD MODELS

SHOCK ABSORBER "CHUCKLE" OR SIMILAR NOISE CORRECTION (1957-58 CARS): On rear shock absorbers, check and correct alignment (see below) and rubber bushings can be replaced using new parts as follows:

Shock Abs rb r Bushings

Part	Stud bak r Part N .
Bushing (Upper & Lower Rear)	419932
Bushing (Lower Front)	419932
Sleeve (Upper Rear)	1544480
Sleeve (Lower Rear)	1544479

Shock Absorber Alignment (R ar): Raise car by wheels or axles so that it remains in road load position Disconnect rear shock absorbers at spring clip plates Bend shock absorber mounting ear on spring plate so that ear is positioned 90° to spring plate Replace original lower mounting bolt with new bolt, Part No G181678 (7/16-20 x 3"), install Spacer, Part No 524832 (½" wide), between shock absorber mounting sleeve and spring plate Check shock absorber alignment. When hanging free, shock should be adjacent to spacer, Correct by bending crossmember in area of upper mounting as required Connect shock absorber and tighten lower mounting bolt to 45-50 ft lbs torque

►*NOTE:* Front shock absorbers with forked type lower mounting bar cannot have bushings changed and must be replaced if noise develops.

Shock Absorber Bushing Installation (R ar): With the shock absorber removed from the car, press out old sleeve and bushing. Dip new bushing in gasoline and install by using pliers to twist bushing into place in shock absorber eye. Press sleeve in place in bushing (use new sleeve if original sleeve damaged).

►*1954 AIR-CONDITIONED CAR SERVICE CAUTION Use extreme care when disconn cting any part of air conditioning equipment or lines. See "Frigidaire Air Conditioning" in Miscellaneous S ction.*

►*ELECTRICAL EQUIPMENT NOTE:* Auto-Lite Equipment used on Clipper Special (5400), Clipper Deluxe (5401), and Commercial (5433). Other models use Delco-Remy Equipment.

MODEL IDENTIFICATION

M d l	Chassis Symbol
Clipper Special	5400
Clipper DeLuxe	5401
Cavalier	5402
Patrician	5406
Clipper Super	5411
Commercial (359 cu. in.)	5413
Custom	5426
Packard	5431
Commercial (288 cu. in.)	5433

SERIAL NUMBER: Stamped on plate mounted on left front door pillar post.

ENGINE NUMBERS: Stamped on left side of engine opposite #8 cylinder.

TUNE-UP

COMPRESSION PRESSURE: All cylinders should be equal within 10 lbs.

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE (5400, 5401, 5411, 5433): .007" Intake, .010" Exhaust. Engine warm.

VALVE TAPPET CLEARANCE (Others): Hydraulic lifters used. No adjustment required.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. No adjustment required.

IGNITION

FIRING ORDER: 1-6-2-5-8-3-7-4. See diagram.

SPARK PLUG GAP: .023-.028".

Spark Plug—Champion J8. 14mm.

AUT -LITE

COIL: Aut -Lit CR-4001A.

Igniti n Curr nt—1.5 amperes idling, HOT.

DISTRIBUTOR: Aut -Lit IGP-4502E.

C nd ns r—Auto-Lite IG-2671K. **Capacity** .20-.25 mfd.

C ntact P int Set—Auto-Lite IGP-3028KS.

Br ak r Gap—.015-.019". Set maximum gap to .017".

Cam Angl —27°±3°. Do not exceed gap limits to obtain dwell.

Br ak r Arm Spring T nsi n—17-20 ozs.

R tati n—Counter-clockwise viewed from above.

Aut matic Advance (Auto-Lite)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		375	2		750
3.75		550	7.5		1100
7		1350	14		2700
8		1600	16		3200

Fu l C mp nsat r: 40° range of adjustment on quadrant at vacuum link connection. *See Ignition Timing.*

Vacuum Spark C ntrol: Aut -Lit . Mounted on hold-down plate and linked to adjusting quadrant on distributor.

Vacuum Advance (Aut -Lit)

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6
1	2	6 3/4
3	6	8 3/8
4	8	9 1/4
5	10	10

DELCO-REMY

COIL: Delco-Remy 1115376.

Ignition Current—1.5 amperes idling, HOT.

DISTRIBUTOR: Delco-Remy 1110841 & 1110848.

Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set—Delco-Remy 1918148.

Breaker Gap—.016".

Cam Angle—Test limits with .016" gap, 26-33°

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance—1110841

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		375	0-4		750
2.5-4.5		550	5-9		1100
5-7		1100	10-14		2200
7-9		1600	14-18		3200

Automatic Advance—1110848

Degrees	Distr.	RPM	Degrees	Eng.	RPM
.5-2.5		350	1-5		700
2-4		400	4-8		800
7-9		800	14-18		1600
9-11		950	18-22		1900

Vacuum Spark Control: Delco-Remy 1116070 (use with 1110841 Distr.). Delco-Remy 1116087 (use with 1110841 Distr.). Integral type mounted on distributor and linked directly to breaker plate.

Plunger Travel—7/64" (1116070), 3/16-13/64" (1116087).

Vacuum Advance—1116070

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
5	10	9.5-11

Vacuum Advance—1116087

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
9	18	12-14.5

IGNITION TIMING

Setting—(5400, 5401, 5411, 5402, 5433) 6° BTDC. **(5431, 5406, 5426, 5431)** TDC. *NOTE*—Modify this setting for special fuel and altitude conditions. See Fuel Compensator Setting (below).

Timing Mark—"# 1 UP.DC" with fifteen 1° graduations ahead of mark.

Fuel Compensator Setting: Should be set for slight ping when accelerating engine with wide open throttle. To adjust, loosen vacuum unit link screw in distributor quadrant (Auto-Lite Distributors), advance arm hold-down screw (Delco-Remy Distributors), rotate distributor one graduation at a time counter-clockwise (if ping too severe), clockwise (if no ping) until correct performance secured.

CARBURETOR

CARTER 2-BARREL

Carter WGD (5400, 5433) 986S. (5401, 5411) 2102S. Dual downdraft types with Carter Climatic Control.

Idl S tting—1/2 to 1 1/2 turns open. Turn screws out for richer mixture.

Idl Spe d—400-450 RPM. (Std. & Overdrive), 375 RPM. (Ultramatic).

Float Level—13/64" between top of float and bowl cover (Gauge T109-39), with bowl cover inverted and needle seated.

Accelerating Pump—No seasonal adjustment.

Fast Idle Setting With thermostatic coil housing, gasket and baffle plate removed, crack throttle valve and hold choke valve closed. Then close throttle. There should now be .023" clearance (Gauge T109-189) between throttle valve and bore of carburetor (side opposite idle ports). Adjust by bending choke connector rod at lower angle.

Automatic Choke Setting: Set one point rich.

►*OTHER DATA: See "Carter WGD" Carburetor in Carburetor Section.*

Fuel Pump Pressure: 3½-5½ lbs.

CARTER 4-BARREL

Carter WCFB (5402) 2103S & 2142S, (5406, 5413, 5426, 5431) 2112S. Four-barrel downdraft types with Carter Climatic Control.

Idle Setting—(2103S) 1¼-2¼ turns open, (2112S) ¾-1¾ turns open, (2142S) 1-2 turns open. Turn screws out for richer mixture.

Idle Speed—400-450 RPM. (Std. & Overdrive, 375 RPM. (Ultramatic).

►*OTHER DATA: See "Carter WCFB" Carburetor in Carburetor Section*

Fuel Pump Pressure: 4-5 lbs.

CARB. EQUIPMENT

Fuel Pump: (5400, 5401, 5411, 5433) Carter M2049S, **(Others)** AC No. 1539920.

Pressure—(Carter) 3½-5½ lbs., (AC) 4-5 lbs.

See "Fuel Pumps" in Carburetion Equipment Section.

Gasoline Gauge: King-Seeley Electric "CV" (constant-voltage) type with voltage regulator. *See MISC. ELECTRICAL for regulator data.*

Dash Unit—(5400, 5401, 5411) K-S No 46595, (Others) K-S No. 46570.

Tank Unit—K-S No 44517

See "Fuel Gauges" in Carburetion Equipment Section.

BATTERY

(5400, 5401, 5402, 5411, 5433) Auto-Lite 2L-100, National 2L-S-100, or Willard SW-2L-100. 6 volt, 17 plate, 100 ampere hour capacity.

(5406, 5413, 5426, 5431) Auto-Lite 2FH-120, National 2F-S-120, or Willard HW-2F-120. 6 volt, 17 plate, 120 ampere hour capacity.

Battery Ground—Positive.

Engine Ground—Left front of engine.

STARTER

AUTO-LITE

Auto-Lite MCL-6129. Armature - MCH-2028.

Drive—Bendix No. A1792.

R tati n—Counter-clockwise at commutator end

Brush Spring T nsi n—42-53 ozs

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P rformanc Data–MCL-6129

Torque	R.P.M.	Volts	Amperes
0 ft. lbs.	4900	5.0	65
8 ft. lbs.	Lock	2.0	410

Starting Switch: Auto-Lite SST-4010. Magnetic switch. Key starting. See *"Starter Controls" in Electrical Equip. Section.*

Ultramatic Neutral Safety & Backup Light Switch: See *Delco-Remy Starter data below.*

DELCO-REMY

Delco-Remy 1108027. Armature–1917855.

Drive—Delco-Remy 1873789. Overrunning clutch (solenoid pinion shift)

Rotation—Counter-clockwise at commutator end

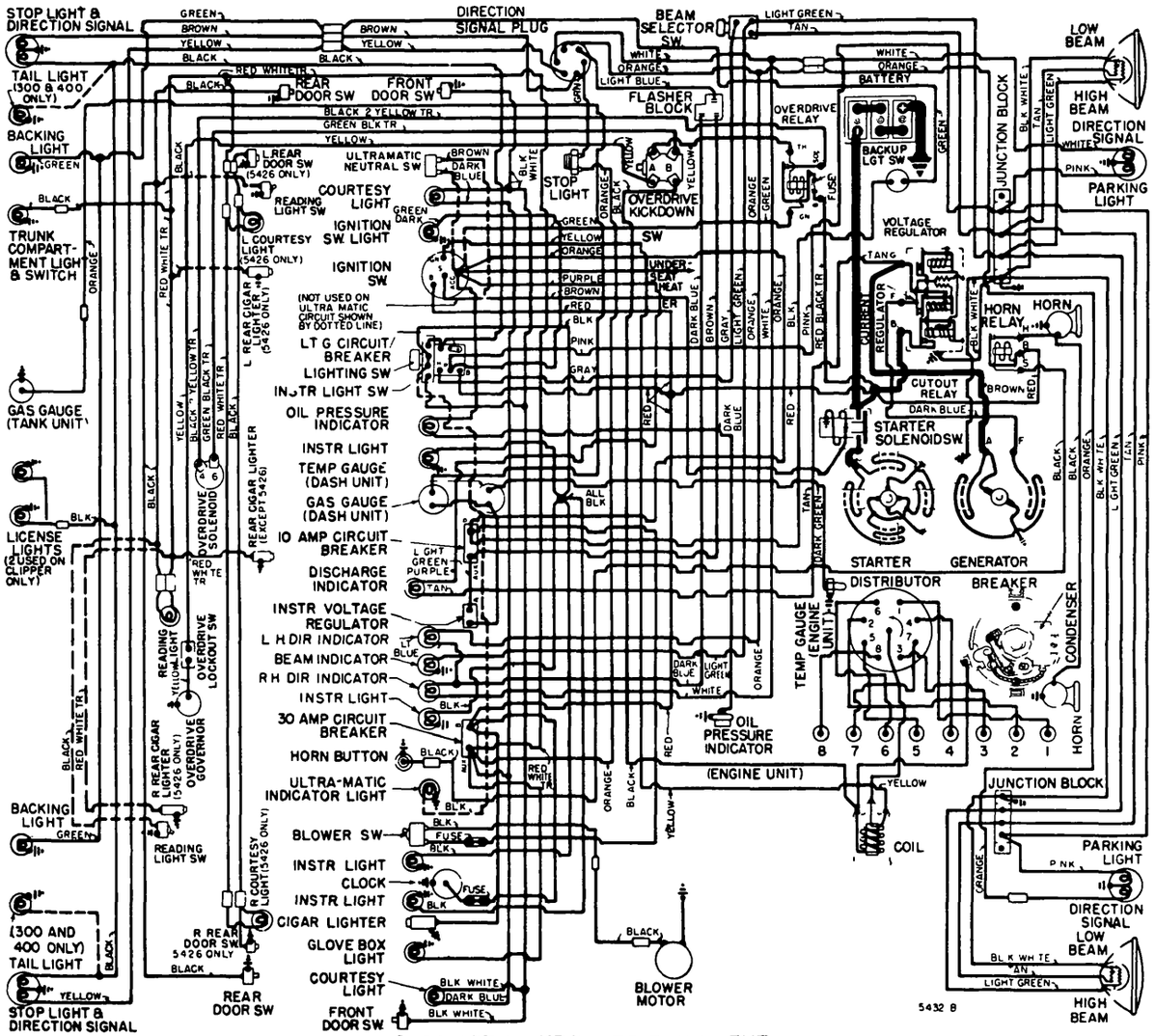
Brush Spring T nsi n—24-28 ozs

Performance Data–1108027

Torque	R.P M	Volts	Amperes
0 ft lbs	5500	5.65	70
12 ft lbs	Lock	3.15	570

Starting Switch: Delco-Remy 1118136. Key starting with solenoid pinion shift. See *"Starter Controls" in Electrical Equip. Sect.*

Neutral Safety Switch: Mounted on left side of transmission case Connected in starter control circuit so that starter operative only with selector lever in "N" or "P" positions



CARS WITH AUTO-LITE EQUIPMENT

GENERATOR

AUTO-LITE

Auto-Lite GGW-6003A. Armatur –GGW-2006F.

Performance Data (Aut -Lit)

Amperes	Volts	Cold - R.P.M. - Hot
0	6.4	870-970 950-1050
40	8.0	1800-2000 2150-2350
45①	8.0	1925-2125 2350-2550

①—Do not operate at higher output and do not operate at this voltage without ventilating fan.

Brush Spring Tension—35-53 ozs. with new brushes.

Field Current —1.4-1.5 amperes at 5.0 volts (70° F).

Motoring Current—4.8-5.3 amperes at 5.0 volts (70° F.) with field terminal grounded to frame.

Rotation—Counter-clockwise at commutator end

Belt Adjustment: Loosen two generator bracket screw nuts 2-3 turns. Loosen generator strap screw, then loosen generator-to-water pump screw. Place Tool J-4714 over the head of the generator bracket front screw and rotate the tool clockwise until the arm of the tool contacts edge of generator drive end plate. Using torque wrench with a 7/8" socket over the tool, rotate the wrench clockwise and move the generator outward until 15 ft. lbs torque is indicated on the scale The adjusting strap to generator screw should be tightened to hold the generator in this position while maintaining the 15 ft. lbs. torque.

DELCO-REMY

Delco-Remy 1102778. Armatur –1921621.

Performanc Data–1102778

	Amperes	Volts	R.P.M.
Cold	45①	8.0	2450

①—Not maximum. See Regulator.

Brush Spring Tension—28 ozs.

Field Current—1.87-2.0 amperes at 6.0 volts

Rotation—Counter-clockwise at commutator end.

Belt Adjustment: Same as Auto-Lite (above).

REGULATOR

AUTO-LITE

Auto-Lite VBE-6102A (for Auto-Lite GGW-6003A Gen.)

Cutout R lay

Cuts In—6.3-6.8 volts.

Cuts Out—4 1-4 8 volts

Contact Gap—.015" minimum

Air Gap— 031-.034" (check at hinge end of core).

Voltage Regulat r

Setting—7.2-7.5 volts at 70° F. *after 15 minutes operation charging at 1/2 maximum rate.*

Air Gap—.048-.052" with contacts just opening (check at brass armature stop pin).

Checking & Adjusting—*See Electrical Equip. Section.*

Curr nt Regulat r

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70° F.*

Test A	Op rating Amp r s	Test B
52 amperes		45 (43-47)

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T st A—After 15 minutes operation charging at 1/2 maximum rate.

T st B—After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6.7-6.9 volts).

Air Gap—.048- 052" with contacts just opening.

Ch cking & Adjusting—*See Electrical Equip. Section.*

DELCO-REMY

Delc -R my 1118829 (for Delco-Remy 1102778 Gen.) New "1118825 Series" regulator.

►*REGULATOR NOTE Checking procedure is different than for pr vious models. See "Delco-Remy 1118825 Series Regulator" in Electrical Equip. Section. All sp cifications are "Normal" settings.*

Cutout Relay

Cuts In—6.4 volts (hot).

C ntact Gap—.020"

Air Gap—.020" (with contacts just closed).

Voltage Regulator

Setting—7.3 volts (hot).

Air Gap—.075" with armature pressed down to point where contacts just touching.

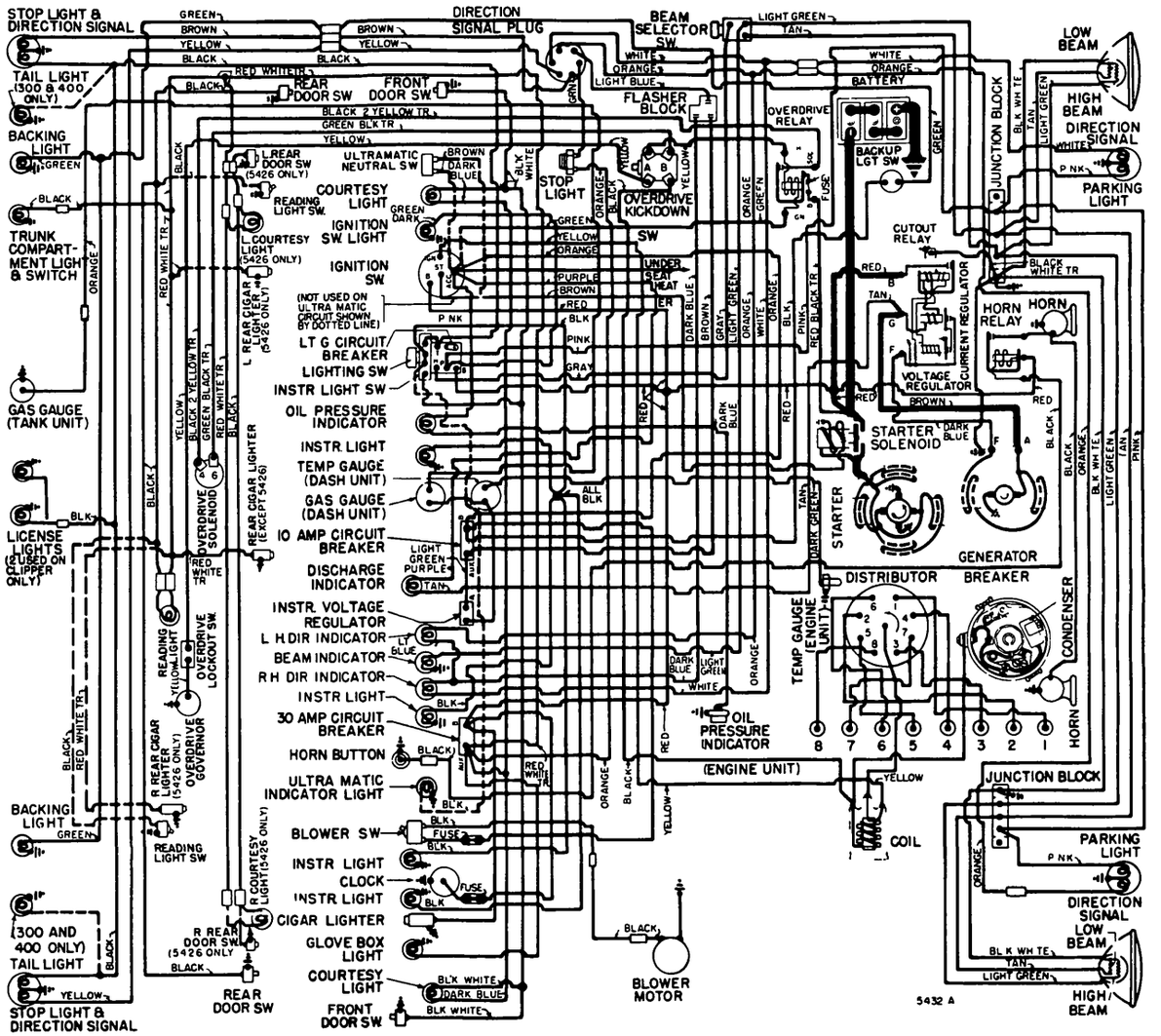
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator

Setting—47 amperes (hot).

Air Gap—.075" with armature pressed down to point where contacts just touching.

Checking & Adjusting—*See Electrical Equip. Section.*



CARS WITH DELCO-REMY EQUIPMENT

MISC. ELECTRICAL

H adlamps: Sealed Beam. *S El ctrical Equip. Section.*

Dir cti n Signal: *S e El ctrical Equip. S ction.*

Lighting Switch Removal: Remove knob, then remove mounting nut on instrument panel with special wrench. Remove switch.

Stop Light Switch Location: At brake master cylinder outlet tee.

FUSES: Clock—AGA 3 amps. In clock lead.
Overdrive—SFE 30 amps. On overdrive relay.
Heater—SFE 20 amps. In cable near Ign. Switch.

CIRCUIT BREAKERS: Lighting—30 amps. On lighting switch.
Accessory (Body & Stop Lamps)—30 amps. Behind instrument panel below gauges.
Hydro-Electric Power (Convertible)—On engine side of dash on pump upper bracket.
Direction Signal—10 amps. On instrument cluster.

HORNS: Sparton. Dual horns operated by relay.

Horn Relay: Delco-Remy 1116775.

GAUGE VOLTAGE REGULATOR: King-Seeley 45677. Consists of a thermo-bi-metal interrupter unit designed to maintain a constant voltage of 5 volts (regardless of generator charging voltage fluctuation) on gauge feed circuit.

ENGINE

►*AIR-CONDITIONED CAR SERVICE CAUTION: Us extreme care when disconnecting any part of air conditioning system. See "Frigidaire Air Conditioning" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: 8 Cylinder, "L" Head.

Series	Bore	Stroke	Displmnt.
5400, 33	3 1/2"	3 3/4"	288 cu. ins.
5401, 11	3 1/2"	4 1/4"	327 cu. ins.
5402	3 1/2"	4 1/4"	327 cu. ins.
5406, 13, 26, 31	3 9/16"	4 1/2"	359 cu. ins.

Series	Rated HP	Dev. HP.	Comp. Rati
5400, 33	39.2	150 at 4000 RPM.	7.7-1
5401, 11	39.2	165 at 3600 RPM.	8.0-1
5402	39.2	185 at 4000 RPM.	8.0-1
5406, 13, 26, 31	40.6	212 at 4000 RPM.	8.7-1

Compression & Vacuum Reading—*See TUNE-UP.*

►*HYDRAULIC VALVE LIFTERS Standard on all engin s except 5400, 5401, 5411, & 5433.*

PISTONS

Autothermic strut type, aluminum alloy.

Original Bore & Pistons—*See Packard Special Data.*

Weight—(5400, 01, 02, 11, 33) 25.5 ozs. (Others) 25 7 ozs Includes rings, pin and locks

Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance .0005-.001", ¾" from bottom of piston Insert 0015" x 1/2" feeler between piston and cylinder wall on side opposite slot. Pull to withdraw feeler should be 10-16 lbs. NOTE—Piston should hold in any portion of bore of own weight but should move with one or two finger pressure (cylinder bore vertical)

►*NOTE:* Cylinder bore out-of-round limit 004", taper limit 010'

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►*PISTON SKIRT EXPANDER NOTE:* If cylinder diameter over .006" greater than piston skirt diameter (measured beside upper end of skirt slot) skirt expanders should be installed.

►*RING GROOVE NOTE:* Check ring grooves by installing new piston ring in groove—if .006" feeler can be inserted 1/16", wear is excessive and piston should be replaced. Check top groove when testing.

Installing Pistons: Slot toward camshaft.

PISTON PINS

Floating type retained by lock ring at each end. Split type bushing used in upper end of rod.

Diameter—7/8". Length—3 1/64"

Pin Fit in Piston—Palm push fit at 160° F. (heat piston in water only).

Pin Fit in Rod—Finger push fit.

Replacement Pins: Std., .003", .006" Oversize.

PISTON RINGS

Models 5400, 5401, 5402, 5411, 5433

Ring	Width	End Gap	Side Clr.
Compr. (#1, #2)	.0925-.0935"	.0054-.0207"	①
Oil	.1860-.1865"	.0054-.0207"	①

Models 5406, 5413, 5426, 5431

Ring②	Width	End Gap	Side Clr.
Compr. (#1)	.0775-.078"	.0084-.0247"	①
Compr. (#2)	.0775"-.0785"	.0084-.0247"	①
Oil	.1860-.1865"	.0084-.0247"	①

①—With new ring installed in top groove (greatest wear in this groove), insert .006" feeler in this groove. If feeler can be inserted 1/16", side clearance is too great and piston should be replaced.

②—Top compression ring is chrome type.

Replacement Rings: Furnished in sets Std. .020", .030", .040" Oversize.

Installing Rings: Install top (#1) compression ring and oil ring with ring gap opposite slotted side of piston and midway between piston pin bosses. Install lower (#2) compression ring with gap toward slotted side of piston and midway between piston pin bosses.

CONNECTING RODS

Length—(5400, 5433) 7 15/16". **(Others)** 7 11/16". Measured center to center. *CAUTION*—5400, 5433 rods **not interchangeable** with others.

Weight—(5400, 5433) 36.5 ozs. **(Others)** 36 ozs.

Crankpin Journal Diameter—2.250".

Lower Bearing—Shimless precision, steel backed. No adjustment. Replace bearings.

Clearance—.0005-.0025". **Endplay**—.003-.011".

Replacement Bearings: Std., .001, .002", .020" Undersize.

Installing Rods: Oil hole toward camshaft.

CRANKSHAFT

Journal Diameter—2.7465". (5400, 01, 02, 11, 33) Five bearings. (Others) Nine bearings.

Bearings—Interchangeable, shimless, precision. No adjustment. Replace bearings.

Clearance—.0005-.0025".

Replacement Bearings: Std., .001", .002", .020" Undersize.

End Thrust: Taken by center bearing.

Endplay—.0035-.0085".

CAMSHAFT

Five bearing.

Bearings—Steel-backed babbitt lined bushings.

Clearance—.001-.003".

End Thrust—Taken by thrust plate in back of camshaft sprocket. **Endplay**—.004-.006".

Timing Chain: Morse. **Width**—1". **Pitch**—.375". **Length**—58 links.

Camshaft Setting: Install chain and sprockets together with "O" marks on sprockets adjacent and in line with straightedge across shaft centers.

VALVES

Tappet Clearance: (5400, 01, 11, 33) .007" Intake, .010" Exhaust, engine warm. **(Others)** None (hydraulic lifters).

Valves	Head Diameter	Stem Diameter	Length
Intake	1 51/64"①	.3417"	5 7/8"
Exhaust	1 7/16"	.3398"	5 7/8"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	.342"	.0005-.0031"
Exhaust	45°	.342"②	.0024-.005"

①—Head Diameter 1 43/64" on 5400, 01, 02, 11, 33.

②—Lift .337" on 5402 exhaust valve.

Valve Springs: Single spring used on all valves. Intake and exhaust springs interchangeable. Shakeproof type washer between top of valve spring and cylinder block seat.

Valve Spring Specifications

Valve	Spring Pressure	Spring Length
Closed	60-66 lbs.	1 3/4"
Open	135-145 lbs.	1 13/32"

Valve Guides: If guides to be removed with lifters in engine, use Valve Guide Remover J-2580 to drive guide down to just clear tappet (with tappet on heel of cam). Score guide with chisel through valve chamber, then break off lower end, finally driving remainder of guide out. If lifters out, guide can be driven down and out without breaking. To install, press guide into block with upper end 31/32" below top of block, using Valve Guide Driver J-2577. This gauge properly positions guides when gauge seated in block. Ream guides after installation with 11/32" (.3437") reamer. Upper end of exhaust guide counter-bored.

Valve Lifters (5400, 5401, 5411, 5433): Conventional mushroom type (Standard). Hydraulic type (Optional). Standard type removed from below with camshaft out. To remove Hydraulic type see below.

Valve Lifters (Others): Wilcox-Rich "Zero Lash" hydraulic type (mushroom type body). Hydraulic unit can be removed from above. Lifter body removed from below with camshaft out.

Diameter—.6236-.6239". **Clearance in Block**—.0001-.0016".

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

5400, 5433 Valve Timing

Intake Valves—Open 15° BTDC. Close 45° ALDC.

Exhaust Valves—Open 50° BLDC. Close 9° ATDC.

5401, 5411 Valve Timing

Intake Valves—Open 10° BTDC. Close 50° ALDC.

Exhaust Valves—Open 45° BLDC. Close 14° ATDC.

5402 Valve Timing

Intake Valves—Open 10° BTDC. Close 48° ALDC.

Exhaust Valves—Open 48° BLDC. Close 9° ATDC.

5406, 5413, 5426, 5431 Valve Timing

Intake Valves—Open 22° BTDC. Close 65° ALDC.

Exhaust Valves—Open 55° BLDC. Close 15° ATDC.

Valve Timing Check (5400, 5401, 5411, 5433): Set No. 1 intake valve tappet to .0125" (cold) and turn engine over until No. 1 intake valve just begins to open. Valves are properly timed and the camshaft and crankshaft sprockets properly related when the No. 1 intake valve starts to open at 15° (5400, 5433), 10° (5401, 5411) BTDC as indicated on timing scale on vibration damper.

Valve Timing Check (Others): Turn engine over until No. 8 exhaust valve has fully opened and continue turning the engine until valve is nearing its closed position. At this time, tappet plunger should not be able to be turned by finger pressure. While maintaining steady finger pressure to turn plunger, turn engine over until plunger suddenly "breaks loose" (plunger can be turned). At this point valve is closed. Pointer should register 9° (5402), 15° (5406, 5413, 5426, 5431) as noted on vibration damper.

►*VALVE TIMING NOTE:* If valves open or close in excess of 8° before or after their specified opening or closing positions, the camshaft and crankshaft sprockets are not properly related. *See "Camshaft Setting" under CAMSHAFT above.*

OILING SYSTEM

Crankcase Capacity: 7 quarts. One quart additional when filter changed.

Normal Oil Pressure: 40 lbs. at normal driving speed.

Pressure Regulator Valve—In oil pump cover. Not adjustable.

Oil Pressure Indicator—Red light on left side of instrument panel. Lighted when oil pressure less than 10 lbs. (lights when ignition turned on, goes out when pressure exceeds 10 lbs.).

Oil Pressure Switch (Engine Unit)—King-Seeley 47140. Contacts open when pressure exceeds 10 lbs.

Oil Pump: Gear type mounted externally on right side of engine.

Oil Filter: Purolator P-70. Optional on 5400, 5401, 5411. Standard on other models. Replace filter element every 8000 miles or more often as required.

Replacement Filter Element—AC P-31C or C-316.

Crankcase Ventilation: Filter element in oil filler cap (air intake). Outlet pipe in valve compartment in rear.

COOLING

Water Capacity: 20 quarts (20 2/3 quarts with heater).

Pressure Valve: Radiator filler cap. 12 lb. type.

Thermostat: "Capsule" type. In cylinder head water outlet flange. Starts to open 167-173°F. (Standard), 177-182°F. (Optl.).

Water Pump: Centrifugal, belt driven, packless type. *See "Water Pumps" in Packard Special Data.*

Pump Removal—Disconnect hose from water pump. Remove nut and washers attaching battery ground cable to water pump. Remove screws holding water pump to front face of engine cylinder block. Lift pump out.

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Temperature Gauge: King-Seeley "CV" (constant voltage) electric type with Gauge Voltage Regulator. See *MISC. ELECTRICAL for regulator data.*

Dash Unit—(5400, 5401, 5411) K-S No. 46597, **(Others)** No. 46573. **Engine Unit—**K-S No. 44225.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Synchro-mesh Transmission Cars. (5400, 5433) Long Model 10CF-TI, Assy. No. 267954, (Others) Long Model 11CF-10½TI, Assy. No. 268349.

See "Long Clutches" in Clutch Section.

Clutch Disc No. —Long (10CF-TI) 287952, (11CF-10½ TI) 287951.

Pedal Adjustment: 1¼-1½" free travel. Adjustment nut rod at throw-out lever.

Removal: Remove transmission (See Transmission Removal following). Remove flywheel lower housing, clutch release bearing and sleeve. Mark clutch cover plate and flywheel. Loosen capscrews that attach clutch cover to the flywheel in succession (to release tension evenly) until clutch cover is free. Remove clutch cover and pressure plate and clutch driven plate from flywheel housing. Remove clutch shaft pilot bearing using tool J-164 or J-489.

SYNCHRO-MESH TRANSMISSION

Own. See *"Packard Synchro-mesh" in Transmission Section.*

Removal: Disconnect speedometer cable, gear shift rods from levers on transmission case, and propeller shaft at rear universal joint. Remove propeller shaft completely by slipping the front universal joint flange off the transmission main shaft. *(CAUTION—*Wire or tape the two bearings of the universal joints together to prevent them from falling off). Support rear of engine with a jack. Remove rear engine support mounting and support cross members. Remove cap screws attaching transmission to flywheel housing. Using two pilots in the bolt holes, slip the transmission to the rear, so that the clutch release bearing pull-back spring may be unhooked. Remove transmission.

OVERDRIVE

Warner Type AS8-R11. Planetary gear type with solenoid operation

See "Warner R11" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting overdrive control

ULTRAMATIC DRIVE

Own. Torque Converter (with hydraulically operated Direct Speed Clutch) and hydraulically operated planetary unit with manual control.

►*TESTING & TROUBLE SHOOTING: See "Ultramatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level—*(CAUTION—Fluid must only be checked at normal operating temperature and after engine has been idling at 800 RPM. for at least one minute with selector lever in "N" position).* Stop engine, check level by removing dipstick from filler hole on left side of transmission(accessible from under car—release cap by turning ½ turn counter-clockwise). Add fluid as required to bring level up to FULL mark on dipstick.

Capacity—Approximately 12 qts. *Use only Packard Ultramatic Drive or any Type "A" Transmission Fluid which has an AQ-ATF number embossed on container.*

►*OTHER "ULTRAMATIC" SERVICE DATA: See "Ultramatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer (Cross Type), **Detroit Universal** (Ball & Trunnion Type), **Mechanics** (Cross Type).

►*CAUTION:* Rear universal flange nut controls rear axle pinion bearing preload which **must be adjusted whenever nut is loosened.** *See "Packard Hypoid" in Rear Axle Section.*

REAR AXLE

Own. Semi-floating, hypoid gear type with Hotchkiss Drive.

See "Packard Hypoid" in Rear Axle Section.

Standard Axle Ratios

Model	Std. O.D. Cars	Ultramatic
5400, 5402, 5431	3.9-1	4.1-1	3.54-1
5401, 5411	3.9-1	4.1-1	3.23-1
5406			3.54-1
5413	4.54-1	4.7-1	4.36-1
5426	4.1-1	4.55-1	3.9-1
5433	4.55-1	4.55-1	4.1-1

Optional Axle Ratios (Exc. 5426)

Standard	Overdrive	Ultramatic
4.1-1	3.9-1	3.23-1, 3.54-1
	3.54-1	3.9-1, 4.1-1

Backlash—.004-.008".

Carrier Removal: Remove axle shafts (see Axle Shaft Removal below). Disconnect rear universal (wire trunnions), wire or prop propeller shaft up against floor pan with a 2x4 inserted inside frame X-member. Drain differential, replace drain plug. Clean off housing, take off carrier mounting nuts, lift carrier assembly out.

Axle Shaft Removal: Remove wheel and brake drum (use screw type puller J-4153—do not use knock-out type puller or thrust block may be damaged). Disconnect brake line at wheel cylinder. Remove nuts at oil seal guard and take off seal guard, gasket, retainer, oil seal, brake support plate, and bearing shims. Remove axle shaft and bearing using Puller J-2552 (do not drag shaft on inner seal).

Wheel Bearing Adjustment: Endplay controlled by shims between flanged end of housing and brake backing plate. Add or remove shims (furnished .005", .007", .020" thick) at one wheel if .050" or under, at both wheels if over .050" to secure .004-.007" endplay.

Endplay—.004-.007".

SHOCK ABSORBERS

Delco or Monroe. Direct acting hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. Coil spring and direct acting shock absorbers. *See "Packard" in Front Suspension Section.*

Kingpin Inclination—(5413, 5433) 2°30'. **(Others)** 5°50'.

Caster—(5413, 5433) Neg. 2°±½°. **(Others)** Neg.1°±½°.

Camber—0° (Pos. ¾° to Neg. ¼° range).

Toe-In—0" (plus 1/16", minus 0"). Adjust by turning adjuster at outer end of each tie rod equally.

Turning Radius—Inside wheel at 23¾° with outside wheel at 20°.

STEERING

Manual: Gemmer. Worm and three-tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Bendix. Linkage type.

See "Bendix Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Service: Bendix hydraulic, Duo-Servo, Single Anchor type without eccentric adjustment. Hand lever applies rear wheel service brakes.

See "Bendix Hydraulic" in Brake Section.

Lining Width	Front	Rear
5400, 5401, 5411	2½"	2"
5402, 5406, 5426, 5431	2¼"	2"
5413, 5433	2½"	2¾"

Lining Thickness—(5413, 5433) ¼". **(Others)** 3/16".

Lining Length (per shoe)	Primary	Secondary
5400, 5401, 5411	9 5/16"	12"
5402, 5406, 5426, 5431	11 1/2"	13"
5413, 5433	13" (Fr.)	13" (Fr.)
5413, 5433	14 3/4" (Rr.).	14 3/4" (Rr.)

Clearance—.015" at both ends of secondary shoe with primary shoe forced out against drum.

Standard Master Cylinder: On bracket on left side of frame near transmission support.

Checking Fluid—Access hole in front floor pan at left corner of driver's seat.

Removal—Disconnect brake lines from master cylinder. Disconnect push rod at pedal. Remove gearshift selec-linkage bell crank from mounting bolt stud. Remove mounting bolts and master cylinder.

Power Brakes: Bendix Easamatic. Combination power cylinder and hydraulic master cylinder unit..

See "Bendix Power Unit" in Brake Section.

Checking Fluid—Check level every 1000 miles. If level not up to full mark, add brake fluid.

Removal of Power Unit—Disconnect hose line and electrical wiring from power unit (raise hydraulic line above level of junction assembly to prevent fluid leakage). Disconnect and remove brake and accelerator pedals. Remove steering column grommet retainers, slide grommet up out of way. Remove carpet retainers and fold back carpet. Remove cover plate screws, then remove power brake and cover as an assembly, take out mounting screws and remove power brake from cover.

MISC. MECHANICAL

Windshield Wipers: Vacuum type, cable operated. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Frigidaire. *See "Frigidaire" Air Conditioning in Miscellaneous Section.*

Window Regulators, Safety Control, Convertible Top Control: Hydro-Lectric type (hydraulic type with motor driven pump supplying oil under pressure). *See "Hydro-Lectric Top Controls" and "Hydro-Lectric Window & Seat Regulators" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
1954	15G
1955 ①	16G6

①—Early & Later Series. *NOTE*—Late series cars are "Ultra-Vista" models except for Coupe & Hardtop.

SERIAL NUMBER: Located on left front door pillar post.

Starting Serial Numbers

Assembly Plant	1954	1955 Early	1955 Late
South Bend	G-1274001	G-1316501.	G-1326201
Los Angeles	G-927401	G-932501.	G-933601
Hamilton	G-753301	G-758201	G-759101

ENGINE NUMBER: Stamped on pad at upper front left corner of engine block.

Starting Engine Numbers

Assembly Plant	1954	1955
South Bend	1090001	1138001
Los Angeles	1090001	L-101
Hamilton		C-60501

►*1954 ENGINE NUMBER NOTE: Letter "A" following engine number indicates crankshaft main bearing journals are .005" Undersize.*

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM. Variation limit between cylinders should not exceed 10 lbs.

VACUUM READING: 17-18" at idle speed.

VALVE TAPPET CLEARANCE: .016" cold (Intake & Exhaust).

MANIFOLD HEAT CONTROL: Automatic thermostatic type.

Checking Thermostatic Coil Spring—With outer end of coil free from anchor, and valve closed (counterweight up), hook end of coil spring should be 90° clockwise from anchor post at 70°F.

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: .030" Limits 028-.033"

Spark Plug—Champion J7 Tighten to 25-30 ft lbs

COIL: Auto-Lite CR-6007.

Ignition Current—1½-2½ Amps idling, 5-6 stopped

DISTRIBUTOR: Auto-Lite IAT-4010 (Early 1954), IAT-4201 (Late 1954 & 1955).

Condenser—IAT-3076L (IAT-4010), IAT-2015L (IAT-4201).

Capacity—.21-.25 mfd.

Contact Point Set—Auto-Lite IGW-3028AS.

Breaker Gap—.020".

Cam Angle—38-40°.

Breaker Arm Spring Tension—17-20 ozs.

Rotation—Counter-clockwise viewed from above.

►*DISTRIBUTOR SETTING & TIMING NOTE See "Oil Pump Removal & Installation Change" under ENGINE below*

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0	800
2	680	4	1360
4	975	8	1950
6	1265	12	2530
7	1400	14	2800

Vacuum Spark Control· Auto-Lite. Integral type

Vacuum Advance

Distr Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4
1	2	4 7/8
4	8	7 1/2
8	16	11 1/8
9	18	12

IGNITION TIMING

Setting—2° BTDC

Timing Mark—On vibration damper "IGN" mark in line with pointer (left side of timing cover)

Timing—Disconnect vacuum advance pipe at carburetor. Install plug in carburetor With engine at idling speed, timing light should show index mark nearest IGN mark, directly under pointer.

CARBURETOR

Throttle Linkage Adjustment (Automatic Transmission): Adjust engine idle speed to 500-550 RPM (with engine at normal operating temperature, choke valve in wide open position and fast idle inoperative).

1) Disconnect accelerator cross shaft-to-bellcrank rod by removing clevis pin at cross shaft end of rod. Disconnect wire at Anti-Creep Switch on cross shaft bracket.

2) Hold contact plate on cross shaft lever firmly against end of Anti-Creep Switch, measure distance between contact plate and cross shaft bracket. If this measurement not ¼", adjust switch by loosening locknut and turning switch in or out of bracket, tighten locknut after correct ¼" clearance secured.

►*NOTE:* If ¼" clearance cannot be secured by adjusting switch, disconnect accelerator cross shaft-to-transmission rod at transmission end and check push rod and cross shaft for interference. *Do not bend contact plate or cross shaft bracket to secure correct switch setting.*

3) Connect accelerator cross shaft-to-bellcrank rod by installing clevis pin but **do not** install cotter pin at this time. Make certain that carburetor throttle valve in fully closed position (stopscrew on low end of fast idle cam and choke valve wide open).

4) With accelerator control fully released and carburetor throttle in fully closed slow idle position, check position of spring-loaded swivel on accelerator bellcrank end of carburetor throttle rod. Swivel should be close to, **but not touching** the swivel sleeve on carburetor side of rod. If swivel position not correct, disconnect accelerator cross shaft-to-bellcrank rod clevis, adjust clevis on rod until carburetor rod swivel position is correct. Tighten clevis locknut, connect bellcrank rod and install clevis cotter pin.

5) Place selector lever in Park "P" position. Set adjusting tool J-4391 at maximum length, hook one end of tool over cross shaft lever to which the transmission rod is connected, hook opposite end of tool over upper right rear corner of battery box, (this will rotate lever and partially open carburetor throttle). Shorten tool length by turning the turnbuckle until carburetor throttle valve is just wide open (at this point further movement will compress spring on throttle rod without changing throttle position). Leave tool in place to hold throttle linkage in this position if "Accelerator-to-Governor Linkage" is going to be adjusted.

CARTER WE

Model	Carter No.
1954 (Early)	989SA
1954 (Late)①	2108S
1954 (Late)②	2190S
1955 (All Models)	2108S

①—Except 2-Door & 4-Door Custom Sedan, after approximately Feb. 15, 1954

②—2-Door & 4-Door Custom Sedan after Feb. 15, 1954.

Idle Setting—½-1½ turns open. Turn screw out for richer mixture.

Idle Speed—550-600 RPM (Std. Trans. & Overdrive). 500-550 (Automatic Trans.).

Float Level—3/8" (Gauge T-109-80) measured from top of projection on bowl cover to top of soldered seam on free end of float with needle valve seated and bowl cover inverted.

Accelerating Pump—No seasonal adjustment.

Fast Idle: .046" throttle valve opening with choke closed To check, crack throttle valve, hold choke closed, measure on side opposite idle ports using gauge T109-158 Adjust by bending connector rod

Unloader Adjustment: After fast idle adjusted, hold throttle valve wide open and close choke valve as far as possible Clearance between lower edge of choke valve and air horn wall should be 3/16" (Gauge T109-28) Adjust by bending arm on choke trip lever (use Tool T109-214)

Automatic Choke Setting: Set 1 point lean.

Throttle Linkage Adjustment (Automatic Trans.): *See "Carburetor" above.*

►*OTHER DATA: See "Carter WE Carburetor" in Carburetor Section.*

Fuel Pump Pressure: 4-5 lbs. (1954), 4-5½ lbs. (1955).

CARB. EQUIPMENT

Fuel Pump: AC No. 527 (1954), N. 4156 (1955). Fuel only.

Fuel Pump Pressure—4-5 lbs. (1954), 4-5½ lbs. (1955). *See "Fuel Pumps" in Carburetion Equipment Section.*

Gasoline Gauge: Stewart Warner Electric Type.

Dash Unit—Studebaker No. 532593 (1954), 536929 (1955).

Tank Unit—Studebaker No. 525548 (2-Dr & 4-Dr., and Landcruiser). No. 532261 (Hardtop, 5-Pass. Coupe & Station Wagon).

See "Fuel Gauges" in Carburetion Equipment Section.

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Air Cl an r: Dry Type or Oil Bath type

►*DRY TYPE FILTER CAUTION.* Remove filter element every 1,000 miles and shake thoroughly to remove dirt. DO NOT WASH. Replace filter every six months or 10,000 miles

BATTERY

Willard HDW-1-100. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate)
Battery Gr und—Positive
Engine Gr und—Left front of engine

STARTER

Aut -Lit N . MZ-4157. Armature—MZ-2211.
Drive—Bendix A1792 Barrel type drive
R tati n—Counter-clockwise at commutator end
Brush Spring T nsi n—42-53 ozs

P rf rmance Data

Torque	RPM	Volts	Amperes
0 ft lbs	4000	5 0	68
4 4 ft lbs	Lock	2 0	280

Start r Switch (1954): Magnetic switch, Studebaker No. 191939, mounted on starter and controlled as follows:
Synchr -m sh Transmissi n Cars—Auto-Lite SW-4016 (Studebaker No. 519829) mounted on toe-board under clutch pedal and operated by fully depressing clutch pedal.
Aut matic Transmissi n Cars—Studebaker No. 513183 pull switch on instrument panel and Delco-Remy 1998038, Neutral Safety Switch (without Power Steering), No. 1998059 (with Power Steering) mounted on steering column. Starter is operative only with transmission selector lever in "N" or "P" position.
Starting Switch (1955): Magnetic Switch, Studebaker No. 536127, mounted on starter and controlled by combination Starter & Ignition Switch (Studebaker No. 536139 On cars with Automatic Transmission, Delco-Remy 1998038, Neutral Safety Switch (without PowerSteering), No. 1998059 (with Power Steering) mounted on steering column. Starter is operative only with transmission selector lever in "N" or "P" position.
Neutral Saf ty Switch (Aut matic Transmission Cars): Adjust switch so starter is operative only in "N" or "P" positions.

GENERATOR

Auto-Lit GGW-4801E. Armature GGW-2006F.

P rformance Data

Amperes	Volts	Cold —RPM— Hot	
0	6 4	870-970	950-1050
40	8 0	1800-2000	2150-2350
45	8 0	1925-2125	2350-2550

Brush Spring T nsi n—35-53 ozs (new brushes)
Fi ld Curr nt—1 6-1 7 amperes at 5 0 volts
Motoring Curr nt—5.0-5.5 amperes at 5.0 volts
Rotation—Counter-clockwise at commutator end
B lt Adjustment—3/8-1/2" deflection midway between generator and fan pulleys

REGULATOR

Auto-Lit VBE-6101A.

Cut-Out R lay

Cuts In—6 3-6.8 volts
Cuts Out—4.1-4 8 volts (approx. 4-6 amps disch.).
Contact Gap—.015' minimum
Air Gap— 031-.034" with contacts open (check at hinge)

Voltage Regulator

Setting—7.35 volts *after 15 minutes operation charging at ½ maximum rate*
Contact Gap—.015' (armature against stop pin)
Air Gap—.048-.052" with contacts just opening
Ch cking & Adjusting—*S El ctrical Equip. Section.*

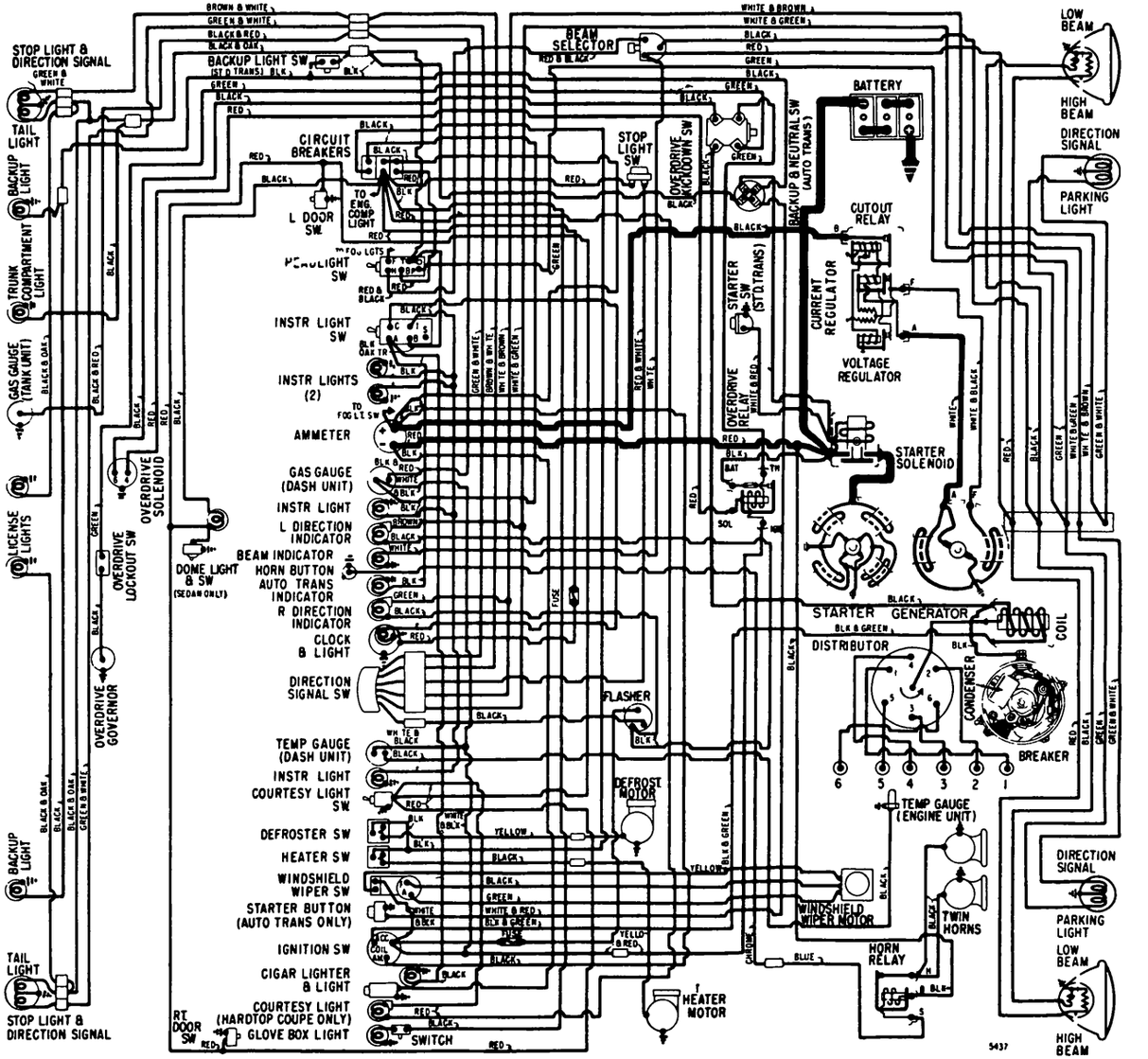
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►*SETTING CAUTION. "T mp ratur Comp nsat d" type Set to following specifications at 70°F*

Test A	Operating Amperes	Test B
52		45 (43-47)

Test A—After 15 minutes operation charging at ½ maximum rate
Test B—After 15 minutes additional operation with current regulator operating (load applied to hold voltage 6.7-6.9 volts)

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1954 MODELS

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C ntact Gap– 015" minimum (armature against stop pin)

Air Gap–.048-.052" with contacts just touching

Checking & Adjusting–See *Electrical Equip. Section.*

MISC. ELECTRICAL

H adlamps: Sealed beam. See *Electrical Equip. Section.*

Direction Signal: See *Electrical Equip. Section*

Lighting Switch Removal: (Toggle type)–Remove retaining nut. Remove lower panel cover screws and covers. Slide toggle switch back through panel and disconnect wires **(Knob type)–**Use stiff wire to remove spring from back side of switch knob and pull knob from shaft Remove bezel nut and shove switch assembly back through panel and remove wires

Stop Light Switch Location: Inner side of left frame rail just forward of steering gear housing, except on Power Brake equipped cars, where it is screwed into rear end of power unit, located under hood on left front fender apron

FUSES: Overdrive–30 ampere on overdrive relay
Fog Lights–30 ampere in feed wire
Clock–2 ampere in feed wire
Direction Signal–14 amperc in flasher feed wire
Heater (Ultra-Vista Models)–20 amp. on heater switch
Defroster (Ultra-Vista Models)–20 amp on switch

CIRCUIT BREAKER: Capacity and location as follows:
Lighting (Ultra-Vista Models)–30 amp. on main light switch
Lighting (Except Ultra-Vista Models)–30 amp. on bracket attached to dash behind instrument panel
Body & Stop Lights (Ultra Vista Models)–20 amp. on back side of instrument panel
Body & Stop Lights (Except Ultra-Vista Models)–20 amp. on bracket attached to dash behind instrument panel.
Heater & Defroster (Except Ultra-Vista Models)–20 amp on bracket attached to dash behind instrument panel

HORNS: Sparton (Types A & B), Delco-Remy or Auto-Lite used. **Low Note** horn standard, **High Note** horn accessory

	Low Note	High Note
Sparton (Studebaker Nos) Type A	674005	674006
Sparton (Studebaker Nos.) Type B	536769	536768
Delco-Remy Nos.	1999683	1999684
Auto-Lite (Can.) Studebaker Nos	530209	530208

Horn Relay: Delco-Remy 1116775

ENGINE

ENGINE SPECIFICATIONS: Own. 6 cyl. "L" head.

Model	Bore	Stroke	Displacement
1954	3"	4"	169.6"
1955	3"	4 3/8"	185.6"

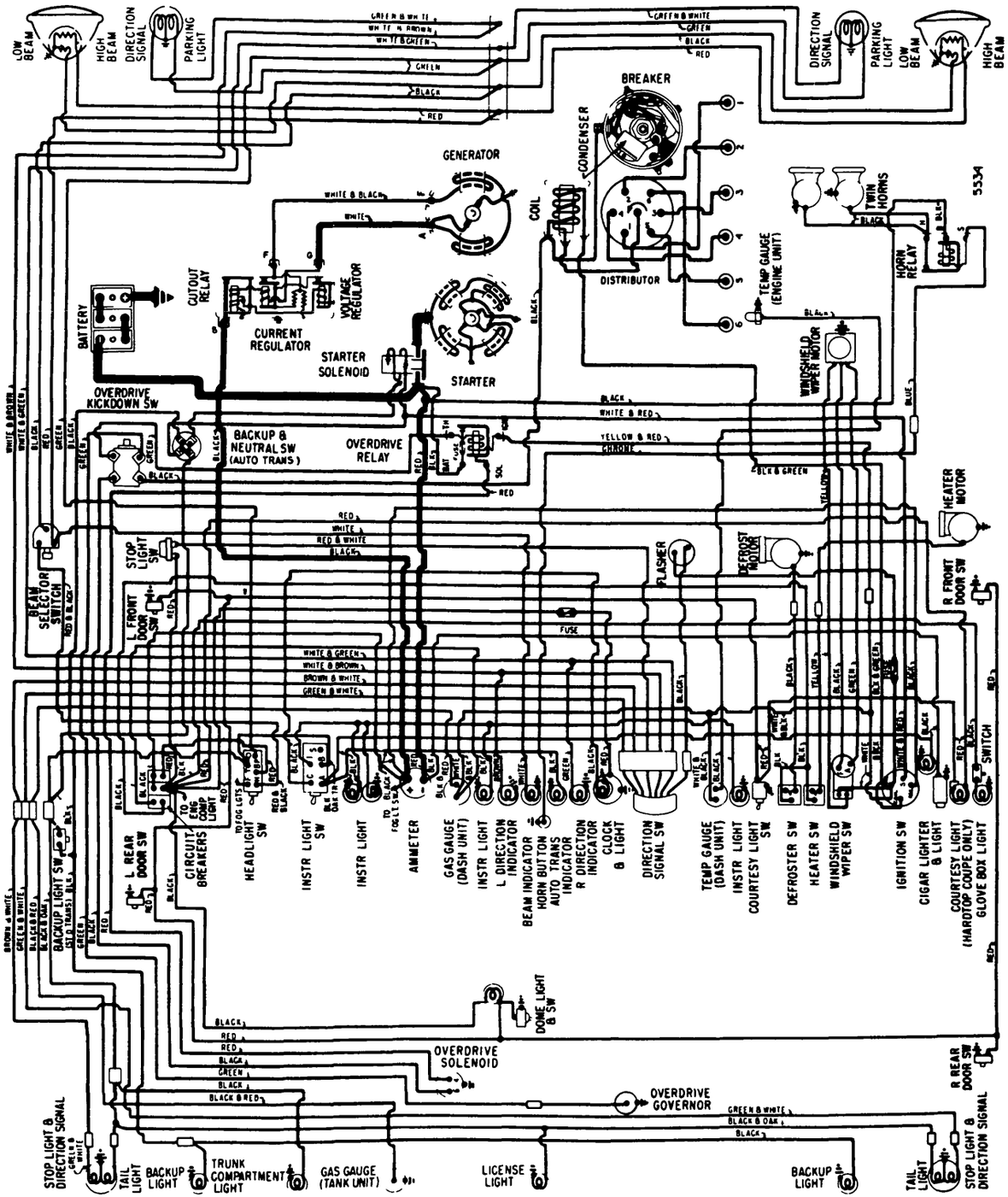
Model	Compr.Ratio	Rated HP	Developed HP
1954	7.5-1	21.6	85 at 4000 RPM
1955	7.5-1	21.6	101 at 4000 RPM

Compression & Vacuum Reading–See *TUNE-UP*

►*OIL SEEPAGE AT VALVE COVER PLATE CORRECTION: See "Oiling Syst m" in Stud baker Sp cial Data.*

OIL PAN REMOVAL: Se *"Oiling Syst m" in Stud bak r Sp cial Data*

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1955 MODELS

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ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data*

PISTONS

Aluminum alloy, tin plated, cam ground and "T" slotted. Three ring type.

►*NOTE: 1955 pistons are 5/16" shorter than 1954 pistons and the side of the pistons have been cut away to provide clearance for the connecting rod and crankshaft. Do not use 1954 pistons in 1955 engines.*

Original Bore & Pistons—*See "Original Bore & Pistons" in Studebaker Special Data.*

Removal—Piston and rods removed from above.

Fitting New Pistons: Clearance—Selective feeler fit Use feeler 1" wide, 002" thick, and 12" long inserted on camshaft side of cylinder bore Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore Pull required to remove feeler with properly fit piston should be 11 to 16 lbs

Replacement Pistons: Std. .010", .020", .030" and 040" Oversize

Installing Pistons: Install piston in cylinder bore with "T" slot away from camshaft side *See Rod Installation*

PISTON PINS

Pin is locked in rod by tapered pin and locknut

►*PISTON PIN LOCKSCREW WASHER CHANGE: Early type washers were internal tooth, later production uses external tooth washer.*

Diameter—.7491-.7495". **Length** 2 625"

Clearance in Piston—0001-0003" (selective fit) Light thumb push fit at 70°F

Piston Pin Removal & Installation—*See "Piston Pins" in Studebaker Special Data*

Replacement Pins: Std. & 0025", .005" Oversize

PISTON RINGS

1954 Models

Ring	Width	End Gap	Side Clearance
Compr.#1	3/32"	.007-.017"	.002-.006"
Compr.#2	1/8"	.007-.017"	.002-.006"
Oil	5/32"	.007-.017"	.0015-.006"

1955 Models

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.007-.017"	002-.005"
Compr #2	1/8"	007-017"	002-005"
Oil	5/32"	.007-017"	0015-004"

Replacement Rings: Std., .020", 030", & .040" Oversize, in sets

Installing Rings: Top compression ring has step at the inside which must be installed up Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point

CONNECTING RODS

Length—(Center-to-center) 6 3/8". **Weight**—19.04 ozs.

Crankpin Journal Diameter—1.81175-1 81275"

Bearings—Steel backed, Microbabbitt lined, no shims

Clearance—.0005-.002"

Side Play—.005-.009"

Replacement Bearings: Std., .001", 002", 005", .010" & .020" Undersize

Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod Insert tapered end of clamp screw toward heavy boss on rod With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6)

►*REPLACEMENT ROD NOTE:* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders

CRANKSHAFT

Journal Diameter—**(1954)** 2.4370-2.4375", **(1955)** 3.0623-3.0628". Four bearings.

►*1954 MAIN BEARING NOTE: Letter "A" following engine number indicates crankshaft main bearing journals are .005" Undersize.*

►*1955 FRONT MAIN BEARING CAP REMOVAL NOTE:* Remove engine front plate cork gasket and turn crankshaft until No. 1 rod journal is at 5 o'clock position or downward and toward camshaft. Separate bearing cap from block and swing end that is away from camshaft toward rear of engine, crossing the crankshaft cheek. Turn free end of bearing cap toward cylinder bore, and at the same time bring other end over crankshaft. Relieved bearing cap and crankshaft provide for this procedure.

►*MAIN BEARING CAPSCREW NOTE:* Lock wire not used with plain capscrew

Clearance—.0005-.0025"

Replacement Bearings: Std., .001", .010", .020", and .030" Undersize

End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear. Controlled by shims between thrust washer and main bearing journal

End Play—.003-.006"

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data*

CAMSHAFT

Journal Diameters—**(1)** 1.7475-1.7478", **(2)** 1.7162-1.7170", **(3)** 1.6857-1.6865", **(4)** 1.6232-1.6240".

Bearings—Steel backed babbitt lined bushings

Clearance—No 1—.0007-.0022", Nos. 2,3,4—0010-.0027"

End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft behind gear hub) Tighten capscrews alternately a few turns at a time to prevent distortion of plate

End Play—.003-.006"

►*1954 TIMING GEAR COVER LEAK CORRECTION:* When replacing cover, use four screws, Part No. 1-0512 (1/8" shorter than standard screws) at top of cover to prevent bottoming of screws before cover is securely sealed.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub

Backlash—.001-.003"

Replacement Gears—Camshaft gear furnished in two sizes Standard & High limit Crankshaft gear furnished standard size only

Camshaft Setting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance: .016" cold Intake & exhaust

Valve	Head Diameter	Stem Diameter	Length
Intake	1 11/32"	5/16"	4 11/32"
Exhaust	1 9/32"	5/16"	4 11/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	11/32"	0015-0035"
Exhaust	45°	11/32"	0015-0035"

Valve Seat Width—1/16-3/32'

►*1954 VALVE COMPARTMENT COVER PRODUCTION CHANGE:* Effective at Engine No. 1106516, new valve compartment covers, gaskets and screws are being used to prevent distortion that might result in oil leaks. New gaskets and screws can be used with original covers.

►*RECONDITIONING VALVE CAUTION:* If reconditioning results in knife edge at top of valve, valve must be replaced

Valve Springs: Install springs so that flanged edge of retainer fits over flat surface of lower coil spring Tongue on lower side of retainer must fit in groove in spring retainer lock

Valve Spring Specifications—93-103 lbs. ± 10% when compressed to a length of 1 5/16"

Valve Guides: Use Tool No. J-2034 and drive old guide down and out from top of block into valve spring chamber Use Collar J-2034-5, guide pilot J-2034-2 on driver J-2034-1 and drive new guide down until driver bottoms against spacing collar

Valve Lifters: Mushroom type Remove from below with camshaft out of engine

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Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std., .001" & .005" Oversize.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 15° BTDC. Closes 49° ALDC.

Exhaust Valves—Open 54° BLDC. Closes 10° ATDC.

Valve Timing Check—Adjust No. 1 Intake valve at .020" cold. Rotate engine until No. 6 piston is on compression stroke (the IN-OP 1-6 marking on dampener should be several inches from pointer), then while moving lifter up and down continue to rotate crankshaft. Valve timing will be correct if lifter stops moving as above marking is directly below pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 qts. refill.

Normal Oil Pressure: 40 lbs. at 1400-1600 RPM (1954 & early 1955); 25-50 lbs. at 40 MPH (Late 1955). *See Production Change Note below.*

►*1955 OIL PUMP PRESSURE PRODUCTION CHANGE:* Beginning with Engine No. 1165924 (So. Bend), L-1550 (Los Angeles), C64038 (Canada), a heavier oil pump relief valve spring, Part No. 536670 entered production and was made available for service replacement on previous models. *See "Normal Oil Pressure" above.*

Pressure Regulator Valve: On lower right front corner of engine. For access, remove engine front cover bolt. If spring is weak replace it, do not stretch spring.

Oil Pressure Indicator—Studebaker No. 536923. Not electrical.

Oil Pump: Helical gear type. Mounted on right side of crankcase.

Pump Removal, Overhaul & Installation—*See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial Flow. Replace filter cartridge at 5000-6000 mile intervals. Change more often in dusty areas.

Replacement Filter Element—Studebaker No. 520829 (F3 Filter); No. 520830 (F4 Filter); No. 196646 (F4 Filter, Waste Type).

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in breather pipe at left rear of engine (air outlet). Filter element in breather pipe replaceable.

COOLING

►*1954 FAN SHROUD REWORK ON HARDTOP & COUPE (To prevent interference with radiator core): See "Radiator" in Studebaker Special Data.*

Water Capacity: 10 qts. (11½ qts. with heater).

Pressure Valve: Radiator filler cap. (1954) Studebaker No. 531826 (stamped "7" opens at 7 lbs.). (1955) Studebaker No. 536502 (opens at 13 lbs.).

Thermostat: Studebaker No. 531470 (opens at 155°), No. 532017 (opens at 177°).

Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*

Pump Removal—Remove shroud, *See "Cooling System" in Studebaker Special Data.* Loosen generator and remove belt. Remove fan-to-hub capscrews and remove fan blades and pulley. Disconnect Climatizer hose, and generator adjusting arm. Disconnect outlet hose and remove mounting capscrews.

Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*

Temperature Gauge: Electric type.

Dash Unit—(1954) Studebaker No. 532597; (1955) 536930.

Engine Unit—Studebaker No. 532579.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck 8A7. Assembly No. 980 (1954). 9A7. Assembly No. 1365 (1955). Single plate dry disc type. **Clutch Disc No.**—Borg & Beck 382276.

►*1954 CLUTCH PEDAL REWORK (To prevent spring breakage): See "Clutch Notes" in Studebaker Special Data.*

Pedal Adjustment: Free Travel ½-1". To adjust, unhook pull-back spring on outside of frame rail, loosen locknut at adjusting clevis and remove clevis pin at inner end of pedal shaft, turn clevis on rear end of pedal shaft-to-operating shaft rod for correct clearance, reassemble linkage.

►*HILL-HOLDER NOTE:* Check setting whenever clutch pedal adjusted and adjust Hill-holder to release just as clutch engages. Make sure Hill-holder operating rod installed with rod to inside (toward center of car) of clutch release shaft lever.

Housing Removal: Remove oil level gauge and tube. Remove starter mounting screws (only) and tie starter and cables up out of the way. Remove floor plate and clutch housing top capscrews. Remove transmission. *See "Transmission Removal" under Transmission.* Disconnect pedal rod at operating shaft-to-release sleeve, pull operating shaft out, remove sleeve. Remove two bolts holding rear engine support insulator cage to crossmember. Support engine at rear of oil pan (use block of wood on jack to protect oil pan). Remove crossmember. Remove two clutch housing bolts releasing exhaust pipe support bracket. Loosen clamp bolt and swing bracket out of way. Remove remaining housing bolts and remove housing. *NOTE*—Remove dowel bolts first.

►*INSTALLATION CAUTION:* Align clutch housing to rear engine plate with two tapered drifts, then install the dowel bolts. Draw dowel bolts in place by tightening the nuts—**do not drive them into place.**

Clutch Removal: Remove clutch housing (above), remove six screws evenly to relieve spring pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model AS1-T96 (Std.), AS24-T96 with R10 type Overdriv .

See "Warner Synchro-mesh Transmission" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

►*1954 HARD SHIFTING (FROM LOW TO 2ND GEAR) CORRECTION: See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission case. Disconnect universal joint from transmission companion flange and remove propeller shaft support stud nuts and plain washer. Move front propeller shaft and support assembly rearward on slip yoke splines. Move end of shaft to one side as far as possible and tie it in position. Disconnect shift rods from shift levers and remove speedometer cable from transmission case. Remove speedometer pinion. Remove capscrews which hold transmission case to clutch housing. Remove clutch operating shaft, bracket, and bearing from the transmission case. Then move case rearward until main drive pinion clears clutch pressure plate and remove unit from car.

NOTE—On Coupes and Hardtops, it will be necessary to remove additional frame crossmember before removing transmission.

OVERDRIVE

Warner R10. Governor controlled, solenoid operation with throttle controlled "kick-down".

See "Warner R10 Overdrive" in Transmission Section.

►*OVERDRIVE PRODUCTION CHANGE:* Reverse lockout switch discontinued, affecting the shift rail, control shaft assembly and the use of different overdrive housing. Complete units are interchangeable

Overdrive Control: *See "Warner R10 Overdrive Control" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

AUTOMATIC TRANSMISSION

Torque converter and 3-speed automatic transmission with hydraulic control. Has mechanical parking lock and Anti-creep device which holds brakes applied when car standing and ignition "on".

See "Studebaker Automatic Transmission" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Studebaker Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Studebaker Automatic Transmission" in Transmission Section.*

Lubrication: Check Oil Level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 15,000 miles.

Checking Fluid Level—Oil must be warm (set parking brake, place selector lever in "L" position, idle engine until normal operating temperature reached). Remove inspection cover on front floor carpet over transmission case, clean all dirt from around inspection hole, check oil level with dipstick gauge. Add oil to bring level up to "Full" mark on dipstick

Capacity—9½ quarts. *Use Automatic Transmission Fluid Type A (in containers with "AQ-ATF" symbol).*

►*OTHER AUTOMATIC TRANSMISSION DATA: See "Studebaker Automatic Transmission" in Transmission Section.*

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UNIVERSALS

Spicer. Needle bearing cross type. Three used with intermediate universal at propeller shaft support bearing on crossmember (see Propeller Shaft)

Propeller Shaft & Support Bearing: Two shafts used 1) Front shaft with intermediate universal yoke bolted on rear end (no slip-joint)
2) Rear shaft with slip-joint on forward end at intermediate universal

Propeller Shaft & Support Bearing Removal & Servicing—See *"Propeller Shaft" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive.

See *"Spicer Hypoid" in Rear Axle Section*

Axle Ratios

Transmission	Std. Ratio	Opt. Ratio
Synchro-mesh (1954-55)	4.10-1	4.56-1
Overdrive (1954)	① 4.56-1	②
Overdrive (1955)	4.56-1	4.10-1, 4.88-1
Automatic	③	④

①—4.27-1 (1954 2 Dr. & 4 Dr. Custom). 4.88-1 (1954 Sta. Wgn.).

②—4.56-1, 4.10-1, 4.88-1 (2 Dr. & 4 Dr. Custom) 4.10-1, 4.27-1, 4.88-1 (Others except Sta. Wgn.).

③—4.10-1 (1954), 3.54-1 (1955).

④—3.54-1 (1954), 4.56-1 (1955).

NOTE—Rear axle ratio stamped on plate attached to axle by cover capscrew and also on gears

Backlash—.003-.006" Shim adjustment

Axle Shaft Removal: Remove wheel, remove wheel hub (use puller J-1644-B) Take out backing plate retaining bolts, remove outer oil seal Pull backing plate out over end of axle shaft and wire plate to frame (*CAUTION*—Do not lose adjusting shims located between backing plate and axle housing flange), pull axle shaft with puller HM-931

Rear Axle Assembly Removal: Remove hub caps, take out cotter pin from axle nut, loosen rear wheel nuts Place car on stands on frame just ahead of rear springs, Remove wheels, hubs and drums Disconnect hand brake cable, take out backing plate bolts from backing plates free hydraulic brake line from axle housing clips (do not disconnect brake line from wheel cylinders) Disconnect rear universal Remove rear spring "U" bolts, disconnect lower shock absorber links, remove rear axle assembly from car

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims .003", .005", .010", .030" thick)

End Play—.003-.006"

SHOCK ABSORBERS

Direct Acting type. See table below

1954 Models

U.S. Cars	Front Studebaker Nos.	Rear
Standard	535318	534320
Heavy Duty (Houde)	532746	532747
Heavy Duty (Monroe)	530508	532751
Heavy Duty (Gabriel)	536398	536399
Canadian Cars	**Front**	**Rear**
Std. (Exc. Cpe. & Hardtop)	532742	532750
Std. (Cpe. & Hardtop)	532743	532750

1955 Models

U.S. Cars	Front	Rear
Standard	535403	534964
Heavy Duty (Houde)	532746	532747
Heavy Duty (Gabriel)	536398	536399
Canadian Cars	**Front**	**Rear**
Standard	535401	534965
Heavy Duty	530508	532751

FRONT SUSPENSION

Independent. Coil spring suspension with front shock absorbers located within coil springs

See *"Studebaker" in Front Suspension Section*

Kingpin Inclination—5¼°.

Caster—Neg 1°—Neg. 2½°. Not more than ¾° variation between wheels

Camber—0° to Pos 1°. ½° more camber favored on drivers side

Toe-In—1/16" to 1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for wheel straight ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm are parallel. **RHD Car Note**—Make toe-in adjustment at left hand tie rod

Toe-Out on Turns—With outer wheel at 20°, Inner wheel should be turned 22½-23½°

►*FRONT END NOISE CORRECTION:* Install hardened washer, Studebaker No 1539073 between inner shaft boss of lower control arm assembly and hug nuts, to prevent movement at this point Late production cars have these washers installed

STEERING

Manual: Ross Cam & Twin Lever or Saginaw Worm & Roller Types.

See *"Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section*

Power Steering: Saginaw. Integral type

See *"Saginaw (G.M.) Power Steering" in Steering Section*

Steering Linkage: See *"Steering Linkage" in Steering Section*

Steering Wheel & Horn Button Removal: See *"Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section*

Steering Gear Removal: See *"Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section*

BRAKES

Wagner Lockheed Hydraulic Self-centering (With Bendix type shoes) Parking lever applies rear wheel brakes.

See *"Wagner Lockheed Self-centering" in Brake Section.*

Drums—Diameter (Front) 10", (Rear) 9"

Wheel Cylinder Diameter—1" (Front), 7/8" (Rear 1954), 13/16" (Rear 1955).

►*1954-55 PARKING BRAKE LEVER CLIP (IN REAR WHEEL BRAKE ASSEMBLY) BREAKING OFF CORRECTION:* This is due to incorrect assembly of shoe return springs The proper method is to assemble rear shoe return spring to shoe and its spring retainer first, then assemble the front shoe return spring.

►*1955 FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 1/4" thick, (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeal. This lining is applied the full length of the shoe and is marked "secondary" and "top" and should be installed as marked.

►*1955 PRIMARY REPLACEMENT CAUTION:* Early models may have either short or long primary lining installed. When relining, the primary lining must be the same length for both front wheels and for both rear wheels.

Lining Width & Length	Front Wheel	Rear Wheel
Primary Shoes	2" x 10 29/32"	2" x 9 27/32"
Secondary Shoes	2" x 10 29/33"	2" x 9 27/32"

Thickness—3/16" (except 1955 model front wheel secondary which is 1/4").

Clearance—Lock shoes against drum then turn adjusting screw back eight notches or more as required.

Hill Holder: Used on Synchro-mesh Trans. Cars. See *"Hill-holder" in Brake Section for data*

Anti-Creep: Used on Automatic Trans. Cars. See *"Anti-creep" in Brake Section for data*

Standard Master Cylinder: On frame left side rail at base of brake pedal

Checking Fluid—Access hole in front floor pan at left corner of drivers' seat. Fluid should be maintained at level ½" below top of filler opening

Removal—Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap Remove brake pedal pullback spring by unhooking it first from frame bracket and then from spring clip which is attached to master cylinder-to-pedal rod Disconnect fluid line or lines at rear of master cylinder (NOTE—Hill-holder equipped cars have one line, Automatic Drive cars have two lines) Remove brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder

Power Brakes: (1955 Models)—Hydrovac Power unit used in conjunction with standard master cylinder and located under hood on left front fender apron.

See *"Hydrovac Power Unit" in Brake Section.*

Removal—Disconnect vacuum and brake lines, stop light wires, remove power unit-to-bracket bolts.

►*POWER BRAKE CONTROL CHANGE FOR SOFTER BRAKE ACTION (First Cars):* 7/16" control valve installed in production starting with Serial No. G-1334649 to give softer brake action. Conversion kit No. 537939 is available for use on early production cars that were equipped with 3/8" control valve. *NOTE—Use this conversion kit on factory installed power brake units ONLY. Not recommended for use with power brakes.*

MISC. MECHANICAL

Windshield Wipers: Trico. Vacuum link and crank type (Standard) **Auto-Lite or Redmond.** Electric (Optional).

See *"Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators: Electrical, with reversible motors in each window. Individual switches at each door and master switch on left front door. See *"Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Two-way electric type.

See *"Power Seat Adjusters" in Miscellaneous Section*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconn cting any part of air conditioning quipm nt or lin s f r acc ss to engine, see "Air C nditioning Service Cautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
1954 Commander	5H
1954 Land Cruiser	5HY
1955 Commander	16G8
1955 President	6H
1955 President Speedster	6HK7

NOTE - Late Series 1955 Models are "Ultra-Vista" models, except for Coupe & Hardtop.

SERIAL NUMBER: Stamped on plate on left front door hinge post.

Starting Serial Numbers - As follows:

Assembly Plant	1954 Models	First Number
South Bend		8354901
Los Angeles		8836801
Hamilton, Ont.		8956741

1955 Commander

Assembly Plant	Early Series	Late Series
South Bend	8380601	8397201
Los Angeles	8841201	8843001
Hamilton, Ont.	8957601	8958101

1955 President

Assembly Plant	Early Series	Late Series
South Bend	7150001	7155401
Los Angeles	7805001	7805901
Hamilton, Ont.	7900001	7900201

ENGINE NUMBER: Stamped on cylinder block to left and in front of oil filler pipe.

Starting Engine Numbers

Model	South Bend	Los Angeles	Canada
1954 Models..	V-282501	V-282501	V-282501
1955 Comm.	① V-312701	② V-312701	③ VC-5701
1955 Pres.	P-101	PL-101	PC-101

① —Second series engine number starts at V-331101.
② —Second series engine number starts at VL-101.
③ —Second series engine number starts at VC-6201.

TUNE-UP

►*1955 COMMANDER & PRESIDENT V8 HARD STARTING:* On early cars, this may be caused by fuel pump not priming quickly (due to valve warpage). On cars with fuel pump code dated before J-5-1 or J-5-2, improved fuel pump, Studebaker No. 535541, can be installed when this trouble experienced. All pumps code dated J-5-1 or J-5-2 and later are of this improved type.

COMPRESSION PRESSURE: 120-140 lbs. at 150 RPM.

VACUUM READING: Steady 18-20" idling at 8 MPH.

VALVE TAPPET CLEARANCE: (1954) .021-.023" All valves (Engine Hot). .023-.025" All valves (Engine Cold). Self-locking tappet screws used. *NOTE* - Clearance setting instruction plates no longer used.
(1955) .023-.025" engine hot, .025-.027" engine cold.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located on right bank exhaust manifold outlet.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylind rs—RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7,

SPARK PLUG GAP: .033-.038".
Spark Plug—Champion H-11, 14mm. Tighten to 25-30 ft. lbs.

COIL: Delco-Remy 1115392.
Ignition Current—2-1/2 amps. idling, 4-5 amps. stopped.

DISTRIBUTOR: Delco-Remy 1110839.
Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set—Delco-Remy 1918148.
Breaker Gap—.013".
Cam Angle—28-34° (with .013" gap).
Breaker Arm Spring Tension—19-23 ozs.
Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	1-5	700
2-4	400	4-8	800
10-12	1050	20-24	2100
15-17	1450	30-34	2900

Vacuum Spark Control: Delco-Remy 1116058. Integral type.
Plunger Travel—11/64—3/16".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum ("of HG)
Start	0	4-6
7-8	14-16	10.5-12.5

Distributor Removal & Installation: See *"Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Model	Std. Ign. Setting
1954 All	4° BTDC
1955 Comm. (Early Series)	4° BTDC
1955 Comm. (Late Series)	8° BTDC
1955 President & Speedster	8° BTDC

Timing Mark—"IGN" mark on vibration dampener.
Timing—Line up "IGN" mark on vibration dampener with pointer at left side of engine front cover, *after vacuum advance pipe has been disconnected and plugged at carburetor connection.*

►*IGNITION TIMING CAUTION: The manufacturer recommends that no attempt be made to time the engine except with a suitable timing light and that the timing mark on vibration dampener be directly under the pointer. DO NOT SET TIMING BY THE "PING" METHOD.*

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg 2-Barrel Carburetor used on Commander and Carter 4-Barrel Carburetor used on President Models. NOTE—A Carter 4-Barrel Carburetor is optional equipment on Commander 1955 Models.*

►*1954 COMMANDER HESITATION OR LIGHT MISS AT 30-45 MPH. WITH CONSTANT THROTTLE (Cars with Stromberg Code 6-112 & 6-113 Carburetors):* If not corrected by careful tune-up of engine, this condition may be caused by a lean-limit carburetor and can be corrected by installing slightly richer Main Metering Jet. *See "1954 Stromberg WW (Studebaker)" in Carbur tor S ction.*

►*POROUS FUEL BOWL CAUTION:* Excessive cranking to start engine or indication of wetness of manifold or spark plugs may indicate a porous fuel bowl. *To ch ck, s Stromb rg "WW" Carbur tor in Carbur tor S ction.*

►*ENGINE RACING WHEN BRAKES APPLIED CORRECTION: Adjust throttl linkag xactly as utlin d below. This condition is caus d by to tight s tting f throttle linkage.*

►*1954 STATION WAGON THROTTLE LINKAGE RETURN SPRING INSTALLATION CORRECTION:* On a few station wagon models before Serial No. 8355631, throttle linkage return spring may have been incorrectly installed resulting in throttle not returning to idle position when accelerator released. Stronger of two springs (with opening close to spring's coil) should be attached to throttle shaft. Spring with 1" straight section between open end and spring coil should be connected to bellcrank at rear of engine block.

THROTTLE LINKAGE ADJUSTMENT (SYNCHRO-MESH & OVERDRIVE MODELS): Loosen stop screw at throttle cross shaft bracket on firewall, then making sure that carburetor throttle adjusting screw is on low step of choke cam, turn throttle adjusting screw as required to obtain an idle speed of 550 RPM. Turn stop screw in bracket until throttle actuating spring is taut and the idle adjusting screw just starts to move away from choke cam, then back off screw **n full turn** and secure with locknut. To adjust kick down switch, open throttle to full open position and turn kick down adjusting screw until pad on adjusting screw contacts plunger of kickdown switch.

THROTTLE LINKAGE ADJUSTMENT (AUTOMATIC DRIVE MODELS): With throttle valve closed and idle adjusting screw on low step of fast idle cam, adjust engine idle speed to 550 RPM. Adjust anti-creep switch until actuating spring is taut and the idle adjusting screw just starts to move away from fast idle cam, then back off the anti-creep switch **3 r 4 turns.** Position fast idle cam so that the adjusting screw contacts fourth step on cam. Adjust throttle return check screw so it just contacts tab on throttle lever arm. *Use a wrench t h ld shaft when turning throttle check screw.* Hold accelerator pedal in the full wide open position without extending actuating spring, and turn transmission governor control lever on side of transmission forward until resistance of detent is felt. Adjust ball joint until stud is properly aligned with hole in governor lever.

►**Throttle Actuating Spring Not :** Throttle actuating spring is preloaded and acts as a rod until 8-1/2 lbs., or more tension is applied. In all positions from closed to wide open throttle the spring remains solidly coiled. A bracket mounted under left rocker arm cover has four holes for spring adjustment.

STROMBERG WW

Model	Str mberg C d N.
1954 Comm. & Land Cruiser (Early)	6-112-B
1954 Comm. (Late)	6-112-C
1954 Land Cruiser (Late)	6-113
1955 Comm. (Early)	6-112-C, D, E, F
1955 Comm. (Late)	6-115
1955 Comm. Ultra-Vista (Auto. Trans.)	6-116

NOTE - Throttle Return Check used on Auto. Trans. Cars.

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►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barr l f eds Cyl. 1-4-6-7, LEFT barr l 2-3-5-8.*

Idle S tting–Initial setting, 1-3/4 turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idl Speed - 550-600 RPM (Synchro-mesh), 500-550 RPM (1954 Auto. Trans.), 550-600 RPM (1955 Auto. Trans.) with selector lever in Neutral "N" position on Auto. Trans. Cars.

Fl at L v l–3/16" from top edge of bowl to top of float with needle valve seated. To check, remove air horn and bowl cover, remove gasket, place float level gauge T-25569 (Studebaker No. J-5475) squarely on top edge of float bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required using bending tool T-24733 (Studebaker No. KMO-269-S5).

Acc lerating Pump–Center hole–Normal Setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idl S tting: With choke valve fully closed and fast idle cam in fast idle position, one-half diameter of button at end of throttle stop screw should rest against step of fast idle cam. If contact between button and cam not as indicated, bend choke ear up or down as required.

Unload r Adjustm nt: With choke valve tightly closed, open throttle valves to point where throttle lever stop rests against stop on throttle body. The choke valve should open sufficiently to allow a No. 1 drill to be inserted between choke valve and inner wall of air horn. Adjust as necessary by bending throttle lever ear which contacts choke lever.

Aut matic Ch k Setting: Centered (arrow on edge of cover aligned with boss on air cleaner end of housing).

Thr ttl Linkag Adjustm nt: *See "Carburetor" above.*

►*OTHER DATA: S "Stromberg WW Carburetor" in Carbur t r S ction.*

CARTER WCFB

M d l	Carter No.
Synchro-mesh	2219S, SA
Automatic Drive	2214S, SA
All Models	2330S

►**R plac m nt Carbur t r N te**–2219SA can be used to replace 2214S, SA, when used with Carter Unitized Pkg. 202-81U (Throttle Return Check Assembly).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels f ed Cy. 1-4-6-7, LEFT barrels 2-3-5-8.*

►*EXCESSIVE FUEL CONSUMPTION CORRECTION: May be caus d by impr p rly installed air cleaner-to-carbur t r gask t. S "Carter WCFB Carburetor" in Carburet r Secti n.*

►*STALLING ON SHARP LEFT TURN CORRECTION: Se "Cart r WCFB 4-Barr l Carburetors" in Carburetion S ction.*

Idl Setting–1/2–1-1/2 turns open. Turn screws out for richer mixture.

Idl Sp d–550-600 RPM (all models).

Thr ttl Linkage Adjustm nt: *S "Carbur tor" abov .*

Fu l Pump Pr ssur : 4-5 lbs.

►*OTHER DATA: S "Cart r WCFB Carbur tor" in Carbur tor S ction.*

CARB. EQUIPMENT

Fuel Pump: (1954) AC No. 9647. (1955) Carter No. 2211S. Diaphragm types. *NOTE - For 1954 pump installation, see "Fuel System" in Studebaker Special Data.*

Pressure - 4-5½ lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Stewart-Warner Electric Type.

Dash Unit - (1954) Studebaker No. 532593.

(1955 Exc. Speedster) Studebaker No. 536929.

(1955 Sp dst r) Studebaker No. 536838.

Tank Unit - (1954) Studebaker No. 525548 (exc. Coupe & Hardtop). No. 532261 (Coupe & Hardtop).

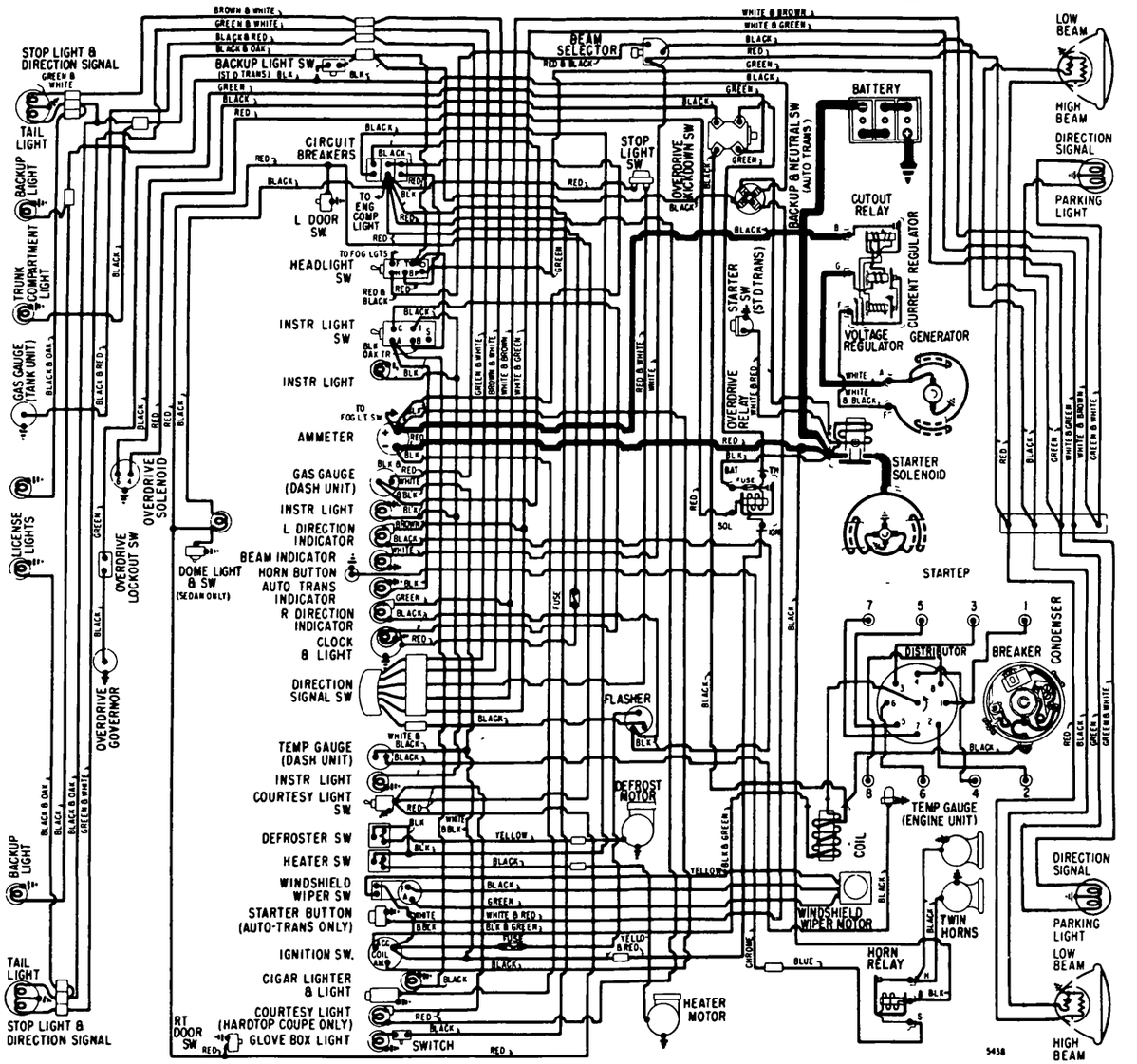
(1955) Studebaker No. 425548 (2-Dr., 4-Dr., and Land Cruiser). No. 532261 (Hardtop, 5-Pass. Coupe and Station Wagon).

See "Fuel Gauges" in Carburetion Section.

BATTERY

Willard HDW-1-100. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).

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1954 MODELS

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Battery Ground–Positive.
Engine Ground–Right front of engine.

STARTER

Delco-Remy 1107115 (Std. Trans.), 1107116 (Automatic Drive).
Armature–Delco-Remy 1878077.
Drive–Bendix "Folo-thru" type. No. A3281.
Rotation–Counter-clockwise at commutator end.
Brush Spring Tension–24-28 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5500	5.65	70
11 ft. lbs.	Lock	3.25	550

Starting Switch: (1954) Magnetic switch, Studebaker No. 532874 (exc. Coupe & Hardtop). No. 530039 (Coupe & Hardtop) Mounted on Dash and controlled by manual switch.
Starting Switch: (1955) Delco-Remy 1494, internal ground, magnetic type controlled by combination Ignition and Starting Switch. Turn key full right to start engine.
Automatic Transmission Neutral Safety Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in neutral position.
Neutral Safety Switch Adjustment–*See "Studebaker Automatic Transmission" in Transmission Section.*

GENERATOR

Delco-Remy 1102778. Armature–No. 1921621.

Performance Data

	Amperes ①	Volts	RPM
Cold	45	8.0	2450

① –Not maximum output. See Current Regulator.

Brush Spring Tension–28 ozs.
Field Current–1.87-2.0 amperes at 6.0 volts (80° F).
Rotation–Counter-clockwise at commutator end.
Belt Adjustment: Hook spring scale to belt midway between generator and fan pulleys. Adjust tension on belt so that pull of 14 lbs. on scale will lift belt 1/2".

REGULATOR

Delco-Remy 1118950. *NOTE–Regulator is "1118825 Series". Specifications below are for "Normal" settings.*
►*EARLY 1954 MODEL NOTE: If Delco-Remy 1118730 Regulator found on early cars, see "Delco-Remy 1118700 Series Regulator" in Electrical Equipment Section.*

Cutout Relay

Cuts In–5.9-6.7 volts (hot).
Contact Gap–.020".
Air Gap–.020" (with contacts just closed).

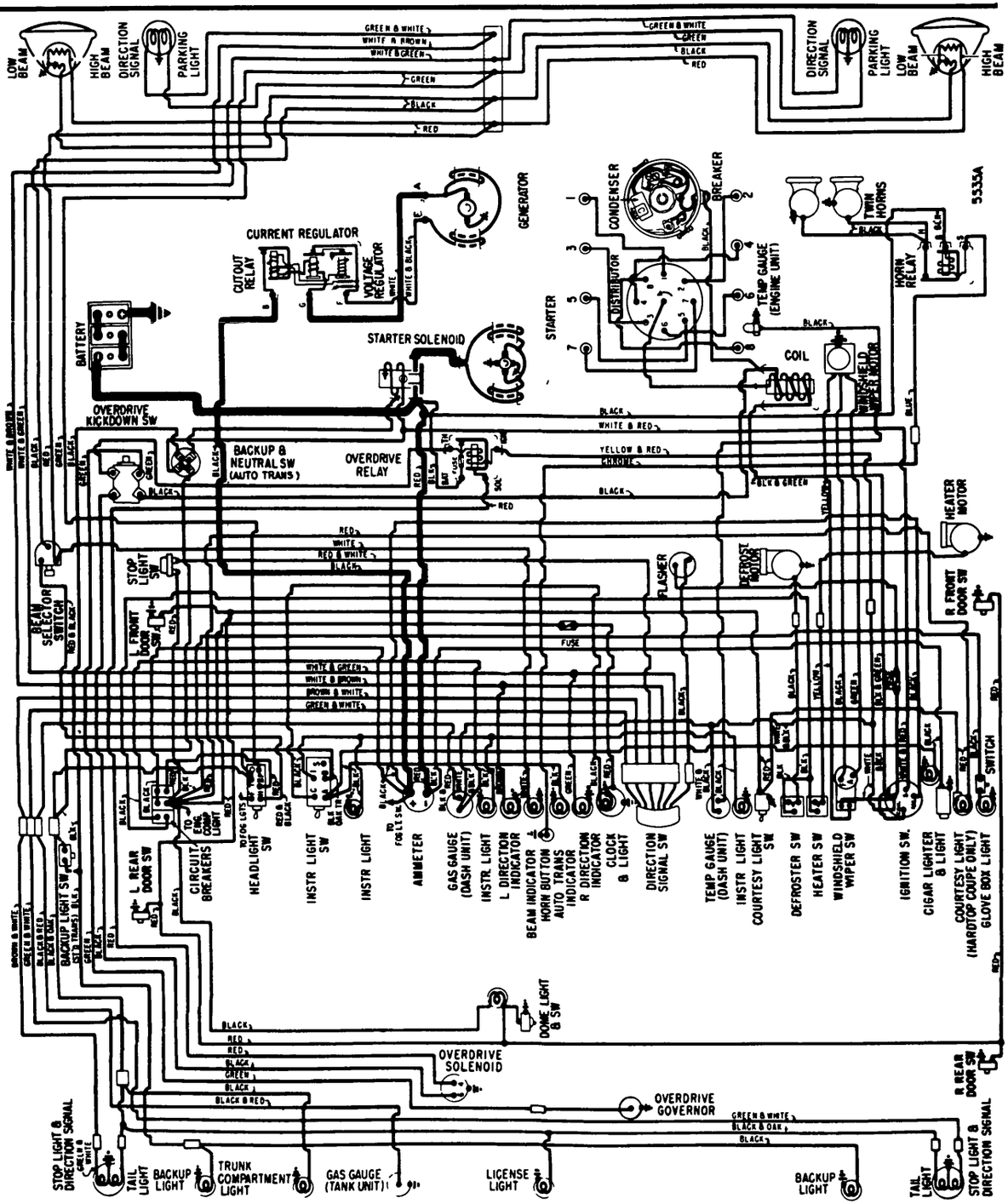
Voltage Regulator

Setting–6.9-7.4 volts (hot).
Air Gap–.075" with armature pressed down to point where contacts just touching.
Checking & Adjusting–See *Electrical Equip. Section.*

Current Regulator

Setting–42-47 amperes (hot)
Air Gap–.075" with contacts pressed down to point where contacts just touching.
Checking & Adjusting–*See Electrical Equip. Section.*

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1955 MODELS

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MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Equip. Section.*

Direction Signal: *See Electrical Equipment Section.*

Lighting Switch Removal: Toggle Type—Remove switch retaining nut. Push switch sleeve back into panel and disconnect wires from switch.

Push-pull Type—With a pointed tool, lift spring in back side of switch knob and remove knob from shaft. Remove bezel nut and bezel plate. Push switch out of instrument panel and remove wires.

Stop Light Switch Location: On inner side of left frame rail just forward of steering gear housing. *NOTE*—If stop light switch removed it is necessary to bleed front brakes after re-installing switch.

FUSES: Overdrive - 20 amp. (1954), 30 amp. (1955). On Overdrive Relay.

Fog Lights—30 amp. in feed wire.

Radio—14 amp. in feed wire.

Clock—3 amp. in feed wire.

Direction Signal—14 amp. in flasher feed wire.

Heater (Ultra-Vista Models)—20 amp. on heater switch.

Defroster (Ultra-Vista Models)—20 amp. on defroster switch.

CIRCUIT BREAKERS: Capacity and location as follows:

Lighting (Ultra-Vista Models)—30 amp. on main light switch.

Lighting (Except Ultra-Vista Models)—30 amp. on bracket attached to dash behind instrument panel.

Body & Stop Lights (Ultra-Vista Models)—20 amp. on back side of instrument panel.

Body & Stop Lights (Except Ultra-Vista Models)—20 amp. on bracket attached to dash behind instrument panel.

Heater & Defroster (Except Ultra-Vista Models)—20 amp. on bracket attached to dash behind instrument panel.

HORNS: Three horns used on President Models, two horns used on Commander Models.

Make	Studebaker Part No. ①Low Tone	②High Tone
Delco-Remy (1954 Models)	1999683	1999684
Sparton (Comm. & Pres.)	③ 674005	674006
Sparton (Comm. only)	536769	536768
Delco (Comm. only)	531757	531756
Auto-Lite (Comm. Canada)	530209	530208

① —Left Horn. ② —Right Horn.
③ —Sparton (Stude. No. 537015), Center horn on Pres. models.

Horn Relay: Delco-Remy 1116775.

Contacts Close—2.75-4.0 volts.

Contact Gap—.025". **Air Gap**—.015" (closed).

ENGINE

►*ENGINE PRODUCTION CHANGES: "Early" & "Late" Series cars have different engines as listed below.*

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own V8, Valve-in-head.

1954 Models

Engine	Bore	Stroke	Displacement
All	3 3/8"	3 1/4"	332.6 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
All	7.5-1	36.4	120 at 4000 RPM

1955 Models

Engine	Bore	Stroke	Displacement
Pacesetter ①	3-9/16"	2-13/16"	224.3 cu. ins.
Wildcat ②	3-9/16"	3-1/4"	259.2 cu. ins.
Bearcat ③	3-9/16"	3-1/4"	259.2 cu. ins.
Passmaster ④	3-9/16"	3-1/4"	259.2 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
Pacesetter ①	7.5-1	40.6	140 at 4500 RPM
Wildcat ②	7.5-1	40.6	175 at 4500 RPM
Bearcat ③	7.5-1 ⑤	40.6	162 at 4500 RPM
Passmaster ④	7.5-1 ⑤	40.6	185 at 4500 RPM

① —Early Series Commander. ② —Early Series Pres.
③ —Late Series Commander. ④ —Late Series President.
⑤ —8.0-1 Optl. Equipment.

Compression & Vacuum Reading: *See Tune-Up.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*

►*PISTON REPLACEMENT CAUTION: "Early Series" Commander (short stroke engine) pistons are not interchangeable with other 1955 engines. These pistons are longer than used in other engines and would cause damage to engine.*

Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance is selective fit. With piston inverted, slotted side away from camshaft, and with bottom of piston about 1" below top of block, insert a .002" x 1" x 12" feeler on camshaft side of piston. Pull to withdraw feeler should be 8-13 lbs. *NOTE*—This supersedes previous fitting specification of 11-16 lbs. pull.

Replacement Pistons: Std. size, .010", .020", .030", .040" oversize.

Installing Pistons: Install piston on rod with slot on same side as nut on piston pin clampscrew (away from oil squirt hole in rod). Install piston in cylinder with slot toward left side of engine (all pistons). *See Rod Installation.*

PISTON PINS

Pin is locked in rod by tapered pin and locknut. *NOTE*—The internal tooth "shakeproof" lockwasher has been replaced in production with an external tooth lockwasher.

Diameter—.8741-.8745". **Length**—2-7/8".

Clearance in Piston—.0001-.0003" or light finger push fit at room temperature (70°F).

Replacement Pins: Std. size, .0025", .005" oversize.

Removal & Installation: *See "Piston Pins" in Studebaker Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compression	5/64"	.008-.016"	.0025-.006"
Oil	3/16"	.008-.016"	.002-.006"

Replacement Rings: *See Studebaker Special Data.*

Installing Rings: Install rings with chamfered side of compression rings upward.

CONNECTING RODS

Length (Center-to-Center)—6-5/8". **Weight**—23.71 ozs.

Crankpin Journal Diameter—1.99925-2.00025".

Lower Bearing—Interchangeable. Steel backed, micro-babbitt lined type. No shims.

Clearance—.0005-.002". **Sideplay**—.007-.012".

Replacement Bearings: Std. size, .001", .005", .010", .020" undersize.

Installing Rods: Number on rod and bearing cap must be on same side and rod installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods) and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear (right bank), toward front (left bank).

►*NEW (UNMARKED) ROD NOTE: Hold rod upright with oil hole toward you. Narrow part of offset will be to right on rods for right bank, and to left for rods on left bank.*

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

CRANKSHAFT

►*MAIN BEARING CAPSCREW LOCKWIRE PRODUCTION CHANGE: The lockwire used in main bearing capscrews is not used in later production engine.*

Journal Diameter—2.4995-2.5000".

Clearance—.0005-.0025".

Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.

End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal.

Endplay—.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

►*VIBRATION DAMPER NOTE:* Vibration damper flywheel marked H-4 or 6H (underlined) are interchangeable. Those marked 6H are replacements for H-4 when supplies of latter are exhausted.

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CAMSHAFT

►*CAMSHAFT REPLACEMENT CAUTION: Cast Iron and Forged Steel Camshafts furnished for service replacement. Different type valve lifters required for each type. See "Valve Lifters" below.*

Journal Diameters—(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings—Precision type, steel backed babbitt lined.

Clearance – .00075-.00225" (No. 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

Endplay - .005-.007" (1954), .003-.006" (1955).

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.

Backlash—.001-.003".

Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.

Engine Front Cover Removal: *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance - (1954) .021-.023" All valves (engine hot). .023-.025" All valves (engine cold).
(1955) .023-.025" All valves (engine hot), .025-.027" All valves (engine cold).

1954 Models

Valve	Head Diameter	Stem Diameter	Stem Clearance
Intake	1 13/32"	11/32"	.0015-.0035"
Exhaust	1 9/32"	11/32"	.0015-.0035"

1955 Models

Valve	Head Diam.	Stem Diam.	Stem Clearance
Intake	1-21/32"	11/32"	.0015-.0035"
Exhaust	1-17/32"	11/32"	.0015-.0035"

Seat Angle—45° (all valves).

Lift—23/64" (all valves).

Valve Seat Width—1/16-3/32".

Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

Valve Springs: Single spring used. Replace spring if 10% weaker than pressure listed. *NOTE—dampener installed on lower end of all springs.*

Valve	Spring Pressure	Length
Closed	45-55 lbs	2 1/32"
Open	105-115 lbs	1 43/64"

Valve Guides: Pressed in head from underside.

Guide Removal & Installation—*See "Valve System" in Studebaker Special Data.*

Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.

►*1954 VALVE LIFTER REPLACEMENT CAUTION:* Different lifters used with Cast Iron and Forged Steel Camshafts. "Step Type" lifters, Part Nos. 536508 (Std.), 536669 (.001" O.S.), 536638 (.005" O.S.) **used with Cast Iron Camshafts only.** "Plain Barrel" lifters, Part No. 531696 (Std.), 531722 (.001" O.S.), 536637 (.005" O.S.) **used with Forged Steel Camshafts only.**

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std. size, .001", .005" oversize.

►*CAUTION—When lifters removed, make sure they are installed in original positions.*

Rocker Arms: *See "Valve System" in Studebaker Special Data.*

►*1955 V8 ENGINE ROCKER ARM RETURN PASSAGE CAUTION:* Beginning with 1955 production, front oil return passages in cylinder block were discontinued to improve coolant circulation around No. 1 & 2 cylinders. A single oil return passage is used for each cylinder bank at the rear of the block. *DO NOT attempt to drill out front oil passages on these engines (would break through into water jacket).*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

1954 Models

Intake Valves—Open 11° BTDC. Close 54° 36' ALDC.
Exhaust Valves—Open 51° 36' BLDC. Close 14° ATDC.

1955 "Early Series" Commander

Intake Valves—Open 19° BTDC. Close 46°36' ALDC.
Exhaust Valve—Open 59° 36' BLDC. Close 6° ATDC.

1955 President & "Late Series" Commander

Intake Valves—Open 11° BTDC. Close 54° 36' ALDC.
Exhaust Valves—Open 51° 36' BLDC. Close 14° ATDC.

Valve Timing Check—Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

►*OIL LEAKAGE AT REAR MAIN BEARING CAP: See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankcase Capacity: 6 quarts (refill).

Normal Oil Pressure: (Early Cars) 40 lbs. at 1400-1600 RPM. (Later Cars) 25-50 lbs. at 40 MPH. See following production change note.

►*OIL PRESSURE RELIEF VALVE SPRING PRODUCTION CHANGE NOTE:* A new valve spring, Studebaker No. 536670 increases the normal oil pressure to 25-50 lbs. at 40 MPH. This change became effective in production at Commander Engine No. V348336 (South Bend), VL-3155 (Los Angeles), VC-7316 (Canada). At President Engine No. P-15929 (South Bend), PL-1576 (Los Angeles), PC-404 (Canada). The new spring can be used as a replacement on all prior models.

Pressure Regulator Valve—Located on right side at front of engine block slightly above crankcase flange.

Oil Pressure Indicator—Not electrical.

Oil Pump: Helical Gear type. Mounted on rear main bearing cap and driven by camshaft gear.

►*OIL FLOAT INSTALLATION CAUTION:* **The correct cotter pin to use when installing the float assembly is 1/8".** If a smaller cotter pin is used float can become disengaged from oil pump, causing damage to engine.

Pump Removal, Overhaul & Installation—*See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial flow. Replace filter cartridge at 5000-6000 mile intervals. Change more often in dusty areas.

Replacement Filter Element—Studebaker No. 520830 or 196646.

Crankcase Ventilation: Filter element in oil filler cap (air intake) and breather tube at rear of engine (air outlet).

►*BREATHER TUBE FILTER NOTE: Remove filter element (retained in lower end of tube by cotter pin) for servicing.*

COOLING

Water Capacity: 17-1/4 qts. (18-3/4 qts. with heater).

Pressure Valve: Radiator filler cap. Opens at 7 lbs. (1954), 12-15 lbs. (1955).

Thermostat: **(1954)** Choke type, opens at 152-163°F. **(1955)** Bellows type, opens at 158-163°F.

Water Pump: Packless. Sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*

Pump Removal—Drain cooling system. Loosen generator, push it inward to relieve tension on fan belt, remove fan belt. Remove fan-to-hub screws and remove fan and pulley. Remove fan shroud. Disconnect radiator outlet hose and Climatizer hose (if so equipped). Remove generator adjusting arm from top stud, then remove water pump manifold screws. Remove water pump manifold and four gaskets from engine block.

Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*

Temperature Gauge: Stewart-Warner Electric type.

Dash Unit - (1954) Studebaker No. 532597. **(1955 exc. Speedster)** Studebaker No. 536930. **(Speedster)** Studebaker No. 536832).

Engine Unit - Studebaker No. 532579 (1954), 536837 (1955).

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 9A7. Assembly No. 926 (All 1954 Models & Early 1955 Commander). Model 10A7. Assembly No. 361371 (Late 1955 Commander & 1955 President).

Clutch Disc - Borg & Beck 381662 (1954 & 1955 Early Commander), 382315 (1955 Late Commander & President). *See "Borg & Beck" in Clutch Section.*

Pedal Adjustment: Pedal free travel 1/2-1". To make adjustment, loosen locknut securing clevis to rod connecting release shaft lever to clutch operating shaft lever and remove the clevis pin. Turn clevis

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to shorten or lengthen rod as necessary for correct pedal free travel.

►*CLUTCH PEDAL REWORK (To Prevent Spring Breakage): See "Clutch Notes" in Studebaker Special Data.*

►*HILL-HOLDER NOTE:* Check setting whenever clutch pedal adjusted and adjust Hill-holder to release just as clutch engages. Make sure Hill-holder operating rod installed with rod to inside (toward center of car) of clutch release shaft lever.

Clutch Housing Removal: Remove starter. Remove floor plate and clutch housing top capscrews. Remove clutch operating shaft. Remove transmission (see Synchro-mesh Transmission Removal below). Remove two bolts holding engine rear support insulator cage to crossmember. Place a small hydraulic jack at rear of oil pan and insert a block between jack pad and oil pan to prevent damage to pan. Raise engine just enough to take weight of engine off crossmember. Remove support crossmember-to-frame bolts and remove cross member. Remove the two clutch housing bolts retaining exhaust pipe support bracket. Loosen clamp bolt and swing support bracket out of way. Remove clutch housing cover plate. Remove remaining housing mounting bolts or capscrews and remove clutch housing.

Clutch Removal: Remove clutch housing (above), remove six screws evenly to release pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model AS53-T86E (Std.), AS54-T86E with R10 type Overdrive. *See "Warner Synchro-mesh Transmission" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Drain transmission case. Disconnect universal joint from transmission companion flange and remove propeller shaft support stud nuts and plain washer. Move front propeller shaft and support assembly rearward on slip yoke splines. Move end of shaft to one side as far as possible and tie it in position. Disconnect shift rods from shift levers and remove speedometer cable from transmission case. Remove speedometer pinion. Remove capscrews which hold transmission case to clutch housing. Remove clutch operating shaft, bracket, and bearing from transmission case. *NOTE*—On Coupes and Hardtops, it will be necessary to remove additional frame crossmember before removing transmission.

OVERDRIVE

Warner R10 Type (part of AS54-T86E Transmission). Governor controlled, with electric solenoid operation and throttle controlled "kickdown".

See "Warner R10" Overdrive in Transmission Section.

►*OVERDRIVE REVERSE LOCKOUT SWITCH PRODUCTION CHANGE:* Reverse lockout switch discontinued in production. Later type overdrive units are interchangeable in complete assemblies with earlier type.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

AUTOMATIC TRANSMISSION

Torque converter and three speed automatic transmission with hydraulic control, mechanical parking brake, and "Anti-Creep" device which holds brakes applied when car is standing and ignition "on".

NOTE—Early Commander transmission is different than Late Commander and President models. Service procedures are the same.

►*CONVERTER HOUSING SCREEN PRODUCTION CHANGE: Screen is not being installed in production and is not required to be replaced on earlier models in service.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Studebaker Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Studebaker Automatic Transmission" in Transmission Section.*

Lubrication: Check oil level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 15,000 miles.

►*FLUID LEVEL CHECKING NOTE (To obtain accurate level reading): To prevent oil spray and torque converter drain back causing inaccurate dipstick reading, fluid level must be checked as indicated below, immediately after engine is stopped.*

Checking Fluid Level—With car on a level floor, set hand brake firmly. Place selector lever in "L" position and allow engine to warm up to normal operating temperature and then run engine at idle speed. Clean area around inspection hole and top of fluid level gauge. Remove gauge and wipe it dry. *Stop engine and immediately insert and withdraw gauge.* If any additional fluid is required, add it and then repeat the checking procedure. Use only Automatic Transmission Fluid Type "A", bearing an AQ-ATF symbol on the container.

Capacity—9-1/2 quarts, Automatic Transmission Fluid Type "A".

►*OTHER AUTOMATIC TRANSMISSION SERVICE DATA: See "Studebaker Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. Three used with intermediate universal at propeller shaft support bearing on crossmember.

Propeller Shaft & Support Bearings: Two shafts used.

1) Front shaft with intermediate universal yoke bolted to rear end (no slip-joint).

2) Rear shaft with slip-joint on forward end at intermediate universal.

Propeller Shaft & Support Bearing Removal: *See "Propeller Shaft Notes" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive. *See "Spicer Hypoid" in Rear Axle Section.*

►*REAR AXLE RATIO PRODUCTION CHANGE NOTE: Axle ratios were changed on some models (as indicated below) at beginning of "Late Series" production.*

1954 Rear Axle Ratios

Standard Axle Ratios

Model	Synchro-mesh	Overdrive	Automatic
All (Exc.Land Cruiser)	4.09-1	①4.27-1	②3.54-1
Land Cruiser	4.09-1	4.09-1	3.54-1

Optional Axle Ratios

Model	Synchro-mesh	Overdriv
All (Exc.Land Cruiser)	4.55-1	4.55-1
	4.27-1	4.09-1
Land Cruiser	4.55-1	4.27-1
	4.27-1	4.55-1

①—4.55-1 on Station Wagon. ②—4.09-1 Optl.

1955 Rear Axle Ratios

Early Series (Std.)	①SM	②OD	③AUTO
Comm. (Exc. Sta. Wgn.)	4.10-1	4.27-1	3.54-1
Comm. Sta. Wag.	4.09-1	4.55-1	3.54-1
President	3.92-1	4.27-1	3.54-1

Early Series (Optl.)	①SM	②OD	③AUTO
Comm. (Exc. Sta. Wgn.)	④	⑤	⑥
Comm. Sta. Wgn.	⑦	4.27-1	⑥
President	⑧	⑨	⑥

Late Series (Std.)	①SM	②OD	③AUTO
Comm. ⑩	3.73-1	3.54-1	3.07-1
Comm. ⑪	3.73-1	3.54-1	3.31-1
Comm. Sta. Wgn.	3.92-1	3.73-1	3.31-1
President ⑫	3.92-1	4.27-1	3.31-1
President ⑬	3.92-1	4.27-1	3.54-1

Late Series (Optl.)	①SM	②OD	③AUTO
Comm. ⑩	⑭	3.54-1	3.31-1
Comm. ⑪	⑭	3.54-1	3.07-1
Comm. Sta. Wgn.	3.73-1	3.73-1	⑥

①—Synchro-mesh. ②—Overdrive. ③—Automatic Trans.
④—4.56-1 & 4.27-1. ⑤—4.56-1 & 4.10-1.
⑥—None available. ⑦—4.27-1 & 4.55-1.
⑧—4.09-1 & 4.27-1. ⑨—4.55-1 & 4.09-1
⑩—2-Dr. & 4-Dr. Ultra-Vista Models.
⑪—Except 2-Dr. & 4-Dr. Ultra-Vista Models.
⑫—4-Dr. Deluxe Ultra-Vista Models.
⑬—Except 4-Dr. Deluxe Ultra-Vista Models.
⑭—3.73-1 & 3.92-1.

Rear Axle Ratio Identification: Rear axle ratio stamped on plate attached to axle by cover cap screw and also on ring and pinion gears.

Backlash—.003-.006".

Axle Shaft Removal: Remove wheel and wheel hub (use Puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire to frame out of the way (*CAUTION*—Do not lose adjusting shims located between backing plate and axle housing flange). Pull axle shaft with Puller HM-931.

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Rear Axle Assembly Removal: Remove hub caps and axle shaft cotter pin. Loosen wheel nuts. Place car on stands (stands under frame just ahead of rear springs) and remove wheels, hubs, and drums. Disconnect hand brake cables, take out backing plate bolts and free hydraulic brake lines from axle housing clips (do not disconnect brake lines from wheel cylinders). Disconnect rear universal joint (wire caps or use clamps to prevent losing bearing rollers). Remove rear spring U-bolts, disconnect lower shock absorber links, remove rear axle assembly from car.

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003", .005", .010", .030" thick). **Endplay**—.001-.005".

SHOCK ABSORBERS

Houde, Monroe or Gabriel. Direct acting hydraulic.

1954 Studebaker Shock Absorber Nos.

U.S. Cars	Front	Rear
Standard	535318	534320
Heavy Duty	536398	536399
Canadian Cars		
Std (Exc. Coupe & Hardtop)	532742	532750
Std. (Coupe & Hardtop)	532743	532750
Heavy Duty	530508	532751

1955 Studebaker Shock Absorber Nos.

U.S. Cars	Front	Rear
Standard (Sedans)	535403	534964
Standard (Cpe. & Hardtop)	534319	534964
Heavy Duty (Houde)	532746	532747
Heavy Duty (Gabriel)	536398	536399
Canadian Cars	**Front**	**Rear**
Standard (Sedan)	535401	534965
Standard (Cpe. & Hardtop)	534329	534965
Heavy Duty (Monroe)	530508	532751

FRONT SUSPENSION

Independent. Coil spring suspension with front shock absorbers located within the springs. *See "Studebaker" in Front Suspension Section.*

►*FRONT END NOISE CORRECTION ("Chuckling" sound or a sharp "cracking" noise):* May be caused by looseness of lower support arm inner shaft attaching bolt nuts. Correct by installing a plain hardened steel washer, Studebaker No. 1539073 against the inner shaft boss. Install hug nut and tighten to 60-65 ft. lbs. Later production cars have hardened washer installed.

►*SPEEDSTER FRONT SPRING SPACER NOTE:* Two front spring spacers, Studebaker Part No. 526830 are used on the left side only. One spacer is located between lower suspension arm and insulator, and the other is located between frame and upper insulator. These spacers used in production beginning with Car Serial 7166614.

►*CAR LEVELING NOTE. Speedster Front Spring Spacers, Part No. 526830 can be used to level any 1950-55 model passing car.*

Kingpin Inclination - 6° (1954), 5¼° (1955) at 0° camber

Caster—Neg. 1° to Neg. 2-1/2°. Not more than 3/4° variation between wheels.

Camber—0° to Pos. 1°. 1/2° more camber favored on driver's side.

Toe-In—1/16-1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel. **RHD Car Note**—Make toe-in adjustments at left hand tie rod.

Toe-Out on Turns—With outer wheel at 20°, inner wheel should be 22-1/2—23-1/2°.

STEERING

Manual: Ross Cam & Twin Lever or Saginaw Worm & Roller types.
See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.

Power Steering: Saginaw. Integral type. Power unit and control valve assembly built into steering gear.
See "Saginaw (GM) Power Steering" in Steering Section.

►*POWER STEERING PUMP BRACKET STUD BREAKING CORRECTION.* Breakage of these two special screws (either above or below the hex head) may be due to looseness of the screws in the block. Make sure both screws are tightened to the same torque as other cylinder head screws. It is important to keep these bolts tight.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking brake applies rear wheel service brakes.
See "Wagner Lockheed Self-Centering" in Brake Section.

►*1954 PARKING BRAKE LEVER CLIP (IN REAR WHEEL BRAKE ASSEMBLY) BREAKING OFF CORRECTION:* This is due to incorrect assembly of shoe return springs The proper method is to assemble rear shoe return spring to shoe and its spring retainer first, then assemble the front shoe return spring

►*LINING PRODUCTION CHANGE & REPLACEMENT CAUTION See "Wagner Lockheed Self-centering" in Brake Section.*

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeak. This lining is applied to the full length of the shoe and is marked "secondary" and "top", and should be installed as marked.

►*PRIMARY LINING REPLACEMENT CAUTION.* Early models may have either long or short primary lining installed. When relining, the primary lining must be the same length for both front wheels and for both rear wheels.

Drums—Diameter 11"(front), 10"(rear).

Braking Power—62% (front), 38% (rear).

Wheel Cylinder Diameter—1-1/16"(front), 7/8"(rear).

Lining Dimensions	Width	① Length	Thickness
Front Wheels	2-1/4"	12"	② 3/16"
Rear Wheels	2"	10-29/32"	3/16"

①—See "Lining Length Note" above.

②—Front wheel secondary lining is 7/32". See "Front Wheel Secondary Lining Note" above.

Clearance—Lock shoes against drum with adjusting screw, then back off adjusting screw 8 notches, or more notches as required to free drum.

Standard Master Cylinder: On frame left side rail at base of brake pedal.

Checking Fluid—Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal—Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder. *(NOTE*—Hill-holder equipped cars have one line, Automatic Drive cars have two lines). Remove brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolt to hold hill holder (or Anti-Creep solenoid valve) while master cylinder is off car.

Power Brakes: Hydrovac power unit used with standard master cylinder.
See "Hydrovac Power Unit" in Brake Section.

Checking Fluid—Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit—Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite, Redmond and Bosch Electric type. *See "Auto-Lite Windshield Wiper 'Single End' Motors" and "Redmond Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electrical, with individual reversible motors in each window. Control switches at each door with a master control switch located on left front door. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Two-way electric type with curved seat tracks for seat adjustment (seat raises and lowers with a tilting action).
See "Power Seat Adjusters" in Miscellaneous Section.

►*TORSION LEVEL SUSPENSION CAR SERVICING CAUTION.* Do not jack car up in rear with jack placed under rear load arms or any part of torsion level suspension assembly Rear load arm link may become disengaged from arm

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines, see "Air Conditioning Service Cautions in Miscellaneous Section.*

►*ELECTRICAL EQUIPMENT NOTE Both Auto-Lite and Delco-Remy electrical equipment used.*

MODEL IDENTIFICATION

Model	1955 Model Designation	Series
Clipper Deluxe	5522	5540
Clipper Super	5542, 5547	5540
Clipper Custom	5562, 5567	5560
Packard	5582, 5587	5580
Caribbean	5588	5580
Model	**1956 Model Designation**	**Series**
Clipper Deluxe	5622	5640
Clipper Super	5642 5647	5640
Clipper Custom	5662, 5667	5660
Packard (290 HP)	5682, 5687	5680
Packard (310 HP)	5697 5699	5688
Packard Executive	5672A, 5677A	5670

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post

ENGINE NUMBER: Stamped on front end of engine block between cylinder banks, directly behind water pump

►*DETONATION CORRECTION (First Cars in Low Octane Areas)* If detonation not eliminated by correcting other engine conditions (carbon deposits etc.), early Distributors can be converted to later type with different advance performance. *See Auto-Lite & Delco-Remy Distributors below.*

TUNE-UP

►*ROUGH IDLE, OR POOR PERFORMANCE OR GASOLINE ECONOMY (Cars with Carter 2284S Carburetor) See "Carter WCFB 4-Barrel" in Carburetor Section.*

COMPRESSION PRESSURE: 120 lbs minimum at 150 RPM Variation between cylinders should not exceed 10 lbs

VACUUM READING: 18-21" at idling speed

VALVE TAPPET CLEARANCE: None required in service (hydraulic)

MANIFOLD HEAT CONTROL: Thermostatic spring type mounted between right bank exhaust manifold and exhaust pipe With heater valve in closed position, hook in end of coil should assume a position approximately 90° clockwise from coil anchor pin at normal room temperatures Valve should operate freely

►*NOTE* When valve is closed most exhaust gases are discharged through left exhaust pipe

IGNITION

FIRING ORDER 1-8-4-3-6-5-7-2
Cylinders—RIGHT BANK 2-4-6-8 LEFT BANK 1-3-5-7

SPARK PLUG GAP 033- 037"

Spark Plugs - Champion H-10 (1955), Champion N-18 (1956) 14mm Torque to 26-30 ft lbs

AUTO-LITE

COIL: Auto-Lite CAD-4001 (1955), CAD-4004 (1956).
Ignition Current - 1 25 amps (1955), 2 2 amps (1956) (Hot)
Resistor—Auto-Lite PU-4001

►*COIL RESISTOR NOTE* Resistor is connected in series with primary circuit between battery and coil Resistor is by-passed during cranking by lead from starter solenoid to coil

DISTRIBUTOR: Auto-Lite. 12 Volt.

Model	Auto-Lite Distributor No.
1955 Cyl Head No 440689 (Early)	IBJ-4001
1955 Cyl Head No 440854 (Late)	IBJ-4001-B
5640 Series (Early)	IBJ-4001-D
5660 Series (Early)	IBJ-4001-C
5640,60,70 Series (Later)	IBJ- 4001-E

NOTE - Delco-Remy Distributor 1110865 also used on later 5640,60,70 Series.

►*DISTRIBUTOR CONVERSION TO CORRECT DETONATION (IBJ-4001C & IBJ-4001D)* Install all parts furnished in conversion kit for each distributor as listed below. Install new IBJ-4001E nameplate (furnished in kit) and check advance performance which should agree with IBJ-4001E data below.

IBJ-4001C Conversion – Install all parts furnished in Conversion Kit No. 6484609 as follows Distributor Stop & Cam Plate, Governor Weight Springs (Weak & Heavy Spring), Vacuum Advance Unit Spring, and small parts

IBJ-4001D Conversion – Install all parts furnished in Conversion Kit No. 6484607 as follows Vacuum Advance Unit, Vacuum Spring, Governor Weight Springs (Weak & Heavy Spring), and small parts.

Condenser – Auto-Lite IBB-2015L. **Capacity** .25-.28 mfd.
Contact Point Set - Auto-Lite No IGW-2028HS (1-24)
Breaker Gap– 017"
Cam Angle–31°±3°
Breaker Arm Spring Tension–17-20 ozs
Rotation–Counter-clockwise viewed from above

Automatic Advance–IBJ-4001

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		325	2		650
11		600	22		1200
19		1135	38		2270
20		1200	40		2400

Automatic Advance–IBJ-4001B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		375	2		750
8		850	16		1700
15		1650	30		3300
16		1750	32		3500

Automatic Advance–IBJ-4001C

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		300	0		600
1		350	2		700
10		850	20		1700
14		1765	28		3530
15		2000	30		4000

Automatic Advance–IBJ-4001D

Start	300	0	600
1	350	2	700
10	850	20	1700
13	1485	26	2970
14	1700	28	3400

Automatic Advance – IBJ-4001E

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		375	2		750
8		900	16		1800
13		2275	26		4550
14		2550	28		5100

Vacuum Spark Control. Integral type

Vacuum Advance– IBJ-4001

Distr. Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6
1	2	6-3/8
3	6	7
5	10	7-5/8
6	12	8

Vacuum Advance–IBJ-4001B

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6 1/4
1	2	6 5/8
6	12	9
11	22	12 1/8
12	24	13

Vacuum Advance–IBJ-4001C

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	7
1	2	7 1/2
5	10	9 5/8
9	18	12 1/8
10	20	13

Vacuum Advance–IBJ-4001D

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	6
1	2	6 3/8
6	12	8 5/8
11	22	11 5/8
12	24	12 1/2

Vacuum Advance – IBJ-4001E

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	8
1	2	8 5/8
5	10	11 1/4
9	18	14 3/4
10	20	16

Distributor Removal & Installation: *See "Ignition Notes" in Packard Special Data*

DELCO-REMY

COIL: Delco-Remy 1115084 (1955), 1115087 (1956).
Ignition Current–1 25 amps idling HOT
Resistor–Delco-Remy 1927809

►*COIL RESISTOR NOTE* Resistor is connected in series with primary circuit between battery and coil Resistor is by-passed during cranking by lead from starter solenoid to coil

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DISTRIBUTOR: Delco-Remy No. 1110854 (All 1955). Delco-Remy No. 1110865 (5680 Early, 5640,60,70 Later), 1110873 (5688 Early), 1110880 (5680,88 Later). *NOTE* - Auto-Lite Distributors also used on 5640,60,70 Series.

► *DISTRIBUTOR CONVERSION TO CORRECT DETONATION (Early Distributors):* Install all parts furnished in Conversion Kit No. 6484596.

Condenser—Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set-Delco-Remy 1118148 (1955), 1918148 (1956).

Breaker Gap—.016".

Cam Angle—26-33°.

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance—1110854

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	350	0-4	700
11-13	1300	22-26	2600
15-17	2100	30-34	4200

Automatic Advance - 1110865

Degrees Distr.	RPM	Degrees Eng.	RPM
1-3	450	2-6	900
7-9	900	14-18	1800
9.5-11.5	1600	19-23	3200
11-13	2000	22-26	4000

Automatic Advance - 1110873

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
10	1300	20	2600

Automatic Advance - 1110880

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	625	0-4	1250
4-6	1100	8-12	2200
7-9	1800	14-18	3600

Vacuum Spark Control: Delco-Remy 1116101 (1110865 Distr.).

Plunger Travel - 11/64-3/16" (1116101).

Vacuum Spark Control: Delco-Remy 1116093. Integral type mounted on distributor and linked directly to breaker plate.

Plunger Travel—17/64".

Vacuum Advance—1116093

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
12	24	13-15

Vacuum Advance - 1110865

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6-8
8.75	17.5	14.5-15.5

Vacuum Advance - 1110873

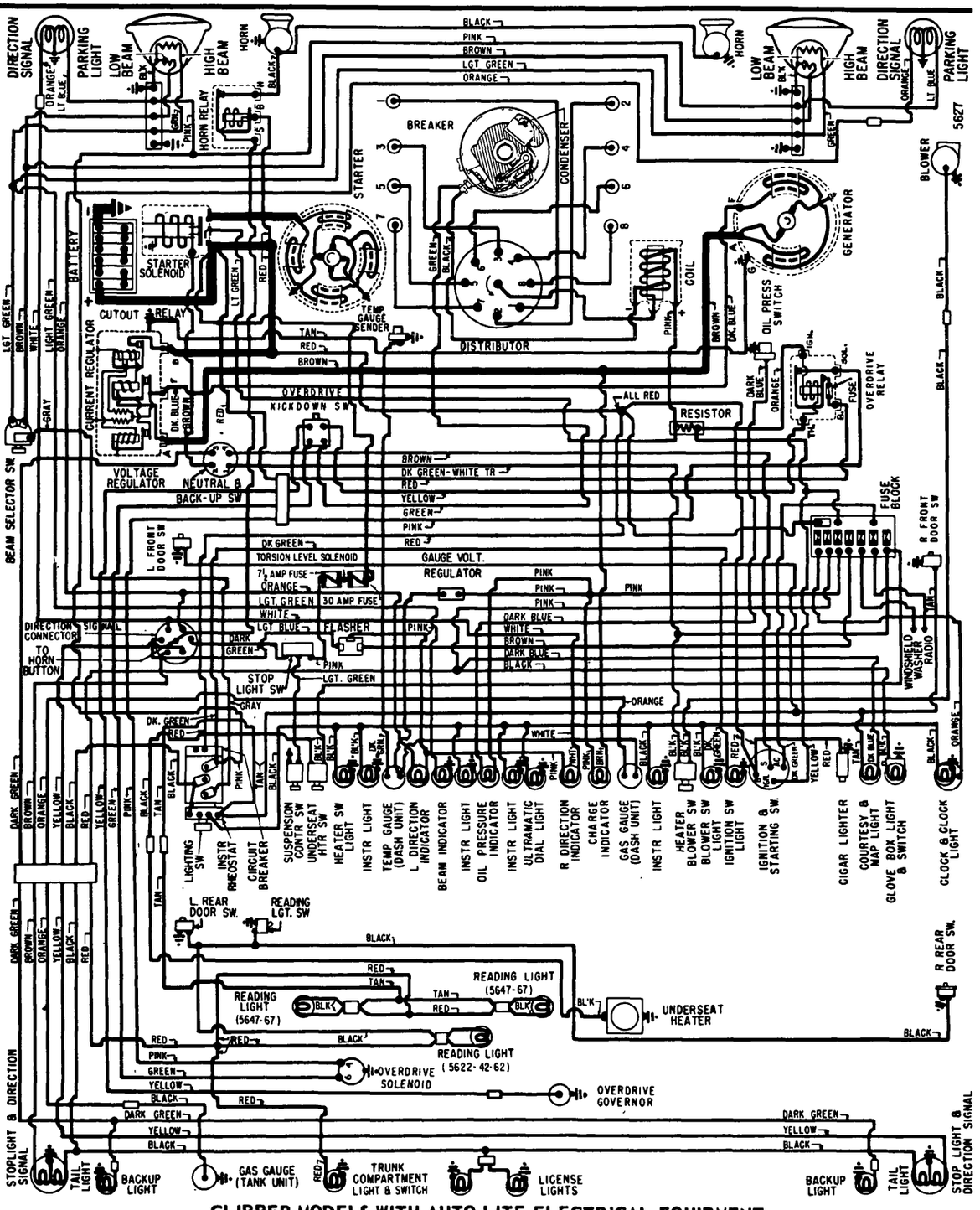
Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
5	10	16

Vacuum Advance — 1110880

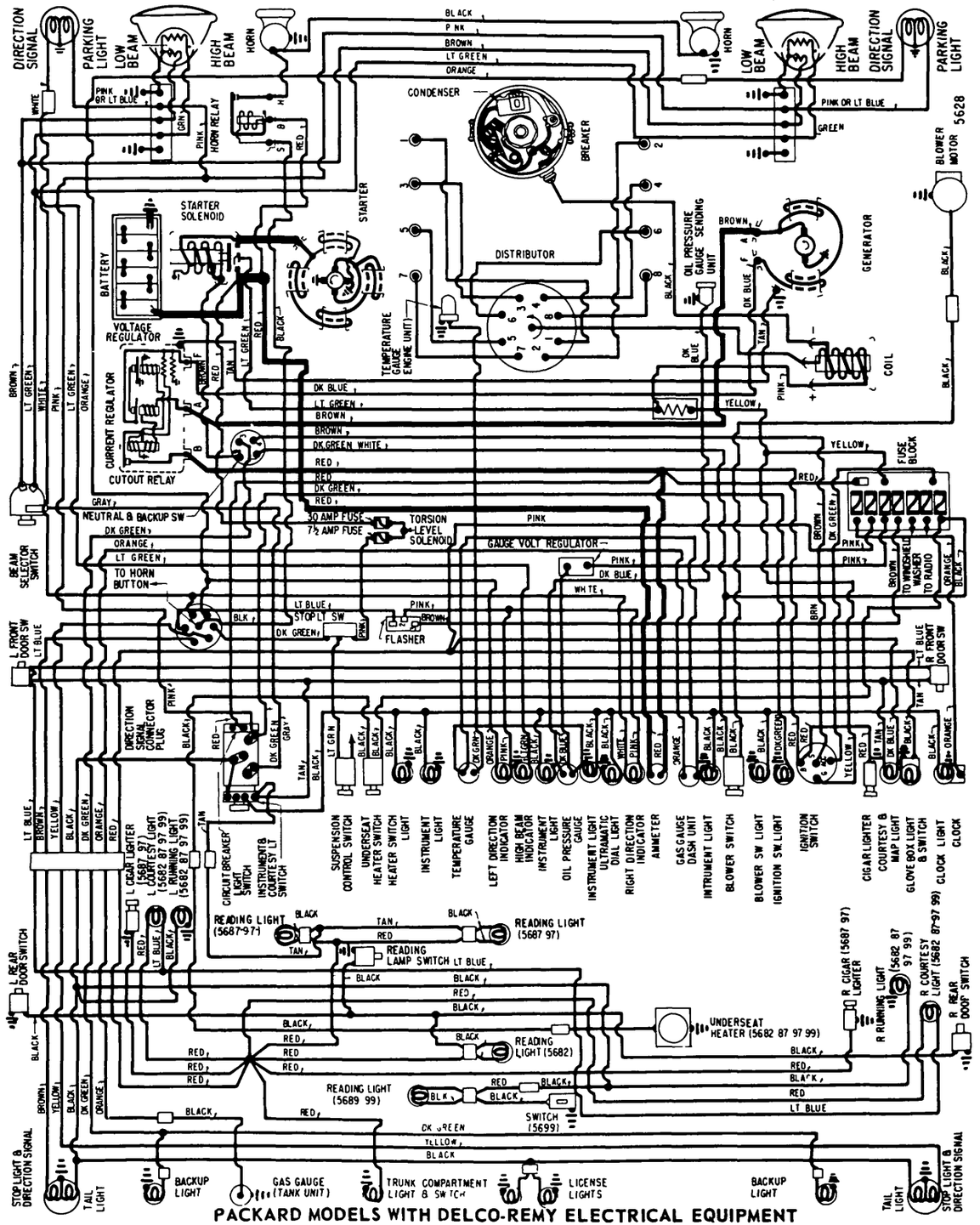
Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	6-8
9-11	18-22	12-13.75

Distributor Removal & Installation: *See "Ignition Notes" in Packard Special Data.*

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CLIPPER MODELS WITH AUTO-LITE ELECTRICAL EQUIPMENT



PACKARD MODELS WITH DELCO-REMY ELECTRICAL EQUIPMENT

CONTINUED FROM PRECEDING PAGE

IGNITION TIMING

Model	ℂ Ignition Setting
1955 Models	② 5° BTDC
5640,60,70 (A-L Distr)	5° BTDC
5680,88 to Eng. No D-1834 (D-R Distr)	5° BTDC
5680,88 Eng No D-1834 Up (D-R Distr.)	10° BTDC
5640,60,70 (D-R Distr.)	10° BTDC

ℂ - See Timing procedure following
② - With engine running at 400 RPM.

Timing - When setting timing, disconnect vacuum advance line at carburetor, place selector button or lever in "H" (Ultramatic), idle engine at 450-500 RPM (Synchro-mesh & Overdrive Cars), 450 RPM (Ultramatic Cars)

► *TIMING NOTE* - 10° setting should be altered, as necessary, in areas where octane rating of fuel is lower than average

Timing Mark–Timing indicator on chain cover marked "0", "5", "10", "15", Align index mark (groove) on vibration damper with correct mark on indicator

CARBURETOR

► *CARBURETOR APPLICATION Carter & Roch st r Two and Four Barrel Carburetors used as follows·*

1955 Car Model	Carburetors
5540,60	Carter WCFB 2232S & 2284S
5580	Rochester 4GC 7007230
5588	Rochester 4GC 7008230 & 7008231

1956 Car Model	Carburetor
5640	Carter WGD 2393S
5660, 5670	Carter WCFB 2394S
5680	Rochester 4GC 7008610
5688	Rochester 4GC 7009600 & 7009601

THROTTLE LINKAGE ADJUSTMENT (Ultramatic Driv Cars): With engine at normal operating temperature, choke valve fully open and throttle in the slow idle position, set engine idle speed to correct RPM (See "Carburetor" below for idle adjustment and Carburetor Synchronizing) Loosen the two locknuts (4 or 5 turns) that position the transmission throttle control rod cross shaft adjuster on accelerator-to-carburetor rod Make sure that adjuster is free to move back and forth Move transmission throttle shaft outer lever on right side of transmission so that it is at its rearward position With carburetor throttle adjusting screw against its stop, adjust the throttle operating rod turnbuckle so that accelerator pedal rod lever just touches underside of the floorboard (this point is where rod from accelerator pedal extends through the floorboard), **then lengthen turnbuckle one full turn** to provide clearance. Tighten locknut on turnbuckle. Apply a slight forward pressure on transmission throttle rod adjuster and move rear locknut up to the adjuster. Move the front locknut up to the adjuster and tighten securely.

CARTER WGD 2-BARREL
No 2393S

► *MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyl 2-3-5-8, LEFT barrel 1-4-6-7*

Idle Setting–¾ to 1¾ turns open Turn screws out for richer mixture

Idl Sp d (Synchr -mesh & O D)–450-500 RPM

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Idl Spe d (Ultramatic Trans.)–450 RPM with selector lever or button in "H" range.

Fl at L vel: With bowl cover gasket removed, bowl cover inverted and needle seated, distance between top of float and bowl cover should be 3/16" Adjust by bending float lever

Accelerating Pump–No seasonal adjustment

Fast Idle Setting: 024" clearance (Gauge T109-189) between throttle valve and bore of carburetor (side opposite idle port) with choke valve tightly closed Adjust by bending choke connector rod at lower angle (Use bending tool T109-213)

Automatic Choke Setting: Two points rich

Throttle Linkage Adjustment (Ultramatic): *See CARBURETOR above*

► *OTHER DATA See "Carter WGD" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 3½-5 lbs. at 500 RPM.

CARTER WCFB 4-BARREL
No. 2232S, 2284S & 2394S

► *CARBURETOR PRODUCTION CHANGE: Carter No. 2232S used with first No. 440689 Cyl. Hd., No. 2284S used with later No. 440854 Cyl. Hd.*

► *CARTER 2284S HIGH VACUUM AT DISTRIBUTOR VACUUM PORT (Causing Rough Idle, Poor Performance or Poor Gasoline Economy): See "Carter WCFB 4-Barrel" in Carburetor Section for test and correction.*

► *ROUGH IDLE CORRECTION (Cars before Engine No. B-1792 with Carter 2394S Carburetor):* Rough engine idle on these cars may be caused by slight opening of secondary throttle valves and can be corrected by increasing wind-up on secondary throttle valve return springs from ½ to 1½ turns. *NOTE* - On cars after Eng. No. B-1792, the return spring has this additional wind-up.

► *ENGINE CUTTING OUT ON LEFT TURN CORRECTION: See "Carter WCFB 4-Barrel" Carburetor in Carburetion Section.*

► *MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 2-3-5-8, LEFT barrels 1-4-6-7*

Idle Setting - ½-1½ (1955), ¾-1¾ (1956) turns open. Turn screws out for richer mixture.

Idle Speed (1955) - SM & OD. 400-450 RPM, Ultramatic 400 RPM with selector lever or push button in "H" range.

(1956) SM. & OD. 450-500 RPM, Ultramatic 450 RPM with selector lever or push button in "H" range.

Throttle Linkage Adjustment (Ultramatic): *See CARBURETOR above.*

► *OTHER DATA. See "Carter WCFB 4-Barrel" in Carburetion Section.*

Fuel Pump Pressure: 3½-5 lbs. at 500 RPM.

ROCHESTER 4GC 4-BARREL
No. 7007230 & 7008610

► *MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT Barrels Feed Cyl. 2-3-5-8, LEFT Barrels 1-4-6-7.*

Idle Setting – 1 - 1½ turns open. Turn screws out for richer mixture.

Idle Speed - 400 (1955), 450 (1956) RPM with selector lever or push button in "H" range, 400-450 RPM (1955 SM).

Thr ttl Linkag Adjustm nt (Ultramatic): *See CARBURETOR above.*

► *OTHER DATA· See "Rochester 4GC 4-Barrel" in Carburetion Section.*

Fuel Pump Pressure: 3½-5 lbs. at 500 RPM.

ROCHESTER 4GC (CARIBBEAN)
No. 7008230 & 7008231
No. 7009600 (Front), 7009601 (Rear)

► *CARBURETOR ADJUSTMENT CAUTION· Carburetor linkage must be adjusted to synchronize carburetion as directed below.*

► *MANIFOLD FUEL DISTRIBUTION. Carburetor RIGHT barrels feed Cyl. 2-3-5-8. LEFT barrels 1-4-6-7*

Idle Setting–1–1-1/2 turns out. Turn screws out for richer mixture.

Idle Speed - 400 (1955), 450 (1956) RPM with selector lever or push button in "H" range

Synchronizing Carburetors: 1) Loosen both jam nuts on throttle rod at front carburetor throttle valve lever and both jam nuts at forward end of transmission throttle rod (where it connects with accelerator pedal rod), several turns.

2) Back out front and rear carburetor idle speed adjusting screws until throttle valves are closed. While holding the front carburetor throttle valves tightly closed, adjust jam nuts on throttle rod at front carburetor throttle lever so that pin fits freely in lever, then tighten jam nuts.

3) Turn in the idle speed screw on **front** carburetor until it makes contact and then turn it in **one additional turn.** Turn the four idle mixture screws (two each carburetor) all the way in and then **back them out one full turn.**

4) After engine is warm, adjust **Front Carburetor** idle speed screw to obtain 400 (1955), 450 (1956) RPM (selector in "D" or push button in "H" range).

NOTE–The rear carburetor idle speed screw is not used and should therefore remain in the "backed out" position.

5) Adjust the idle mixture screws to obtain a smooth idle in the following recommended manner Turn each idle mixture screw in until the lean "drop-off" point (as noticed by a drop in the tachometer and vacuum gauge readings), counting the turns while turning the needle out to its rich "drop-off" point, then returning the screw to a position midway between the two "drop-off" points. Repeat with each idle mixture screw in the following sequence· right rear, right front, left front, left rear. Adjust for the highest possible RPM and vacuum reading. Readjust front carburetor idle speed screw to 400 (1955), 450 (1956) RPM if necessary.

6) Raise the **rear** carburetor fast idle cam so that the idle speed adjusting screw rests on the high step of the cam. Adjust fast idle screw to obtain 2300-2350 engine RPM and then drop cam away from the screw. Repeat this procedure with the **front** carburetor, adjusting the screw to obtain 1850 RPM, drop cam away from the screw. *NOTE–Because of the inaccessibility of th fast idle screws on both carburetors at low idl position, it will b n c ssary to shut th ngine ff and partially op n th throttl to adjust th fast idl screws.*

Thr ttl Linkag Adjustm nt (Ultramatic): *S e CARBURETOR abov .*

► *OTHER DATA S "Roch st r 4GC" Carbur tors in Carbur tion Section.*

Fuel Pump Pressure: 3½-5 lbs. at 500 RPM.

CARB. EQUIPMENT

Fuel Pump: Carter (Fuel Only). Vacuum pump is part of engine oil pump assembly.

Replacement Fuel Pump - Carter No. M-2198S.

Fuel Pump Pressure - 3½-5 lbs. at 500 RPM.

See "Fuel Pumps" in Carbur ti n S cti n.

Gasoline Gauge: King-Seeley electric "CV" (constant voltage) type with voltage regulator.

Dash Unit - King-Seeley No. 46924 (1955) & 49546 (1956) on 40,60,70 Series, and 46884 (1955), 49506 (1956) on 80 & 88 Series.

Tank Unit - King-Seeley No. 44517 (1955), 44519 (1956).

BATTERY

Auto-Lite 3EA-60 or Willard HDW-3KM-60. 12 Volt, 9 plate, 60 ampere hour capacity (20 hr. rate).

Battery Ground - Positive (1955), Negative (1956).

Engine Ground - Cylinder head to dash panel

STARTER

AUTO-LITE

Auto-Lite No. MDD-6301 (1955), MDF-6008 (1956).

Armature - Auto-Lite No. MDC-2037 (1955), MDF-2122 (1956)

Drive - Bendix A-3467 (1955), Solenoid pinion shift and over-running clutch (1956).

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 42-53 ozs

	Performanc Data		
Torque	**RPM**	**V lts**	**Amperes**
0ft. lbs.	.3200 min.	10.0	60 max.
6 5 ft. lbs.min.	Lock	4 0	240 max.

Starting Switch: Auto-Lite No SSW-4101 (1955), SAD-4101 (1956). Key starting. *S "Starter Controls" in Electrical Section.*

Ultramatic Neutral Safety & Back-up Light Switch: *S e "Delco-Remy Starter" data b low.*

DELCO-REMY

Delco-Remy No. 1107635 (1955), 1107656 (1956).

Armature - Delco-Remy No. 1926626

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension - 35 ozs. min.

	Performanc Data		
Torque	RPM	Volts	Amperes
0 ft. lbs.	3240	10.6	91
	Lock	3.5	395

Starting Switch: Delco-Remy 1119760 solenoid switch, mounted on starter and controlled by Ignition & Starter Switch. Turn key full RIGHT to start. *Se "Start r Controls" in Electrical Section.*

Ultramatic Neutral Safety & Back-up Light Switch: Delco-Remy 1998118. Located on lower end of steering column. Connected in starter control circuit so that starter operative in "N" or "P" only.

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GENERATOR

AUTO-LITE

Aut -Lit GJC-6001A (Early), GJC-7002F(Later). *12 Volt.*
Armatur - Auto-Lite GJC-2006F (GJC-6001A Gen.), GJC-2030F (GJC-7002F Gen.).
Maximum Charging Rate - *See Voltage Regulator.*

P rformance Data

Amperes	Volts	RPM
20 Ⓒ	15.0	1750 max.
30 Ⓒ	15 0	2050-2250

Ⓒ - Do not operate at high output without ventilating fan for any length of time. To do so may result in burned armature and fields.
Brush Spring T nsi n - 35-53 ozs. (GJC-6001A), 18-36 ozs. (GJC-7002F), with new brushes.
Fi ld Curr nt - 1 2-1 3 amps. at 10.0 volts (70°F.).
M toring Curr nt - 3 4-3.9 amps. at 10.0 volts (70°F.).
Rotati n - Counter-clockwise at commutator end.
B lt Adjustm nt: Loosen generator-to-mounting bracket bolts and adjusting arm screw. Place Fan Belt Adjusting Tool J-4672 over head of front mounting bolt and rotate tool until arm of tool contacts edge of generator end plate. Then using torque wrench, turn tool counter-clockwise until a 20-25 ft. lbs. torque is indicated on wrench scale. While holding wrench at proper torque, tighten adjusting arm screw securely. Remove tool and tighten the generator-to-mounting bracket bolts.

DELCO-REMY

Delco-Remy 1102022 (1955), 1102003 (1956).
Armature - Delco-Remy No 1923535
Maximum Charging Rate - *See Voltage Regulator.*

P rf rmance Data–Cold

Amperes	Volts	RPM
30	14 0	2150

Rotati n - Counter-clockwise at commutator end.
Brush Spring T nsi n - 28 ozs.
Fi ld Current - 1.48-1.62 amps. at 12.0 volts (80°F.).
B lt Adjustm nt: Same as for Auto-Lite above.

REGULATOR

AUTO-LITE

Auto-Lit VRX-6007-A (1955), VRX-6009-A (1956).

Cut ut Relay

Cuts In - 13.0-13 7 volts.
Cuts Out - 8 2-9.3 volts.
C ntact Gap - .015" minimum.
Air Gap - .031-.034".

V ltag Regulator

S tting - 14.2-14.8 volts at 80°F., *unit operating normally whil charging at 10 amps. or with a .25 ohm resistor b twe n r gulator and battery.*
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Ch cking & Adjusting - *See Electrical Section.*

Current Regulator

► *SETTING CAUTION "Temperature Compensated" type, S t t following sp cifications at 70°F.*

Test A	Op rating Amper s	Test B
36 amps.		30 (28-32)

T st A - After 15 minutes operation charging at 10 amps.
T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See Electrical Section.*

DELCO-REMY

Delco-Remy 1118953 (1955), 1119123 (1956). *See specifications below for "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (Hot).
Contact Gap - .020".
Air Gap - .020" (with contacts just closed).

Voltage Regulator

Setting - 13.8-14.8 volts (Hot).
Air Gap - .075" with armature pressed down to point where contacts just touching.
Checking & Adjusting - *See "1118825 Series" (1955), "1119000 Series" (1956) Regulators in Electrical Section.*

Current Regulator

Setting - 27-33 amps. (Hot).
Air Gap - .075" with armature pressed down to point where contacts just touching.
Checking & Adjusting - *See "1118825 Series" (1955), "1119000 Series" (1956) Regulators in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signal: *See Electrical Section.*
Lighting Switch Removal: Remove knob, then remove nut on instrument panel with special wrench. Remove switch.
Stop Light Switch Location: On brake master cylinder outlet tee.
FUSES: All fuses, except as noted are located on a fuse block under instrument panel.
Stop Light - AGW-7½ amps. (SFE-20 amps. fuse with Spring Suspension on Clipper Deluxe 4-Dr. Sedan).
Body Wiring - SFE-20 amps.
Dome Light - SFE-20 amps.
Direction Signal - SFE-9 amps.
Courtesy Light - SFE-20 amps.
Clock - AGA-2 amps.
Overdrive - AGC-15 amps., on relay on dash panel.
Instruments - AGW-7½ amps.
Windshield Washer - SFE-9 amps.
Heater - AGC-15 amps.
Radio - AGW-7½ amps.
Antenna (Electric) - SFE-20 amps.
Torsion Level Motor - AGC-20 (1955), 30 (1956) amps in container near starter
Torsion Level Control - 20 amps. (1955), 7½ amps. (1956)
CIRCUIT BREAKERS: Lighting - 20 ampere circuit breaker on headlight switch protects head, tail, and parking lights.
Power Seat & Windows - 30 amps., located on engine side of dash.
HORNS: Spart n. Dual horns with relay.
H rn R lay: Delco-Remy 1116781.

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION: Bef re disc nn cting any part f air conditi ning quipm nt or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*
► *SERIES 5540 CYLINDER HEAD PRODUCTION CHANGE:* Cyl. Head No. 440689 used on first cars, No. 440854 used on later cars. Different Distributor and Carburetor used with each head.
► *IMPROVED OIL CONTROL PRODUCTION CHANGE & CORRECTION ON EARLY CARS:* THREE types of rocker arm shafts have been used in production and latest type should be installed if trouble experienced on cars with previous type shafts *See "Rocker Arms" under VALVE SYSTEM in Packard Special Data.*

1955 ENGINE SPECIFICATIONS: Own. Valve in head.

Series	Bore	Stroke	Displacement
5540	3-13/16"	3-1/2"	320 cu. ins.
5560, 5580, 5588	4"	3-1/2"	352 cu. ins.

Series	Rated HP	Compr. Ratio	Developed HP
5540	46.5	8.5-1	225 at 4600 RPM
5560	51.2	8.5-1	245 at 4600 RPM
5580	51.2	8.5-1	260 at 4600 RPM
5588	51.2	8.5-1	275 at 4800 RPM

1956 ENGINE SPECIFICATIONS: Own. 90° V8.

Model	Bore	Stroke	Displmnt.
5640, 60, 70	4"	3½"	352 cu. ins.
5680, 5688	4 1/8"	3½"	374 cu. ins.

Model	Rated HP	Compr. Ratio	Developed HP
5640	51.2	9.5-1	240 at 4600 RPM
5660, 70	51.2	9.5-1	275 at 4600 RPM
5680	54.45	10.0-1	290 at 4600 RPM
5688	54 45	10 0-1	310 at 4600 RPM

Compression & Vacuum Reading–*See TUNE-UP.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Packard Special Data.*
ENGINE REMOVAL: *See "Engine" in Packard Special Data.*
OIL PAN REMOVAL: *See "Oiling System in Packard Special Data*
CYLINDER HEAD REMOVAL & INSTALLATION: *S "Cylinder Head & Manifolds" in Packard Special Data.*

PISTONS

Aluminum alloy, cam ground, Autothermic flat head, slipper skirt, tin plated.
Weight - 22 293 ozs. (5540), 24 763 ozs. (Other 1955). 24 762 ozs (5540,60,70), 26.067 ozs. (5680,88)
Removal - Pistons and rods removed from above.
Clearance - .000-.0015" at bottom of skirt.
Fitting New Pistons: Using a .0015 x 1/2" feeler gauge placed against side of cylinder wall, insert piston without rings, in an inverted position in cylinder bore. Push piston down until bottom of skirt is slightly below top of cylinder block and piston pin bore is parallel to crankshaft. Pull to withdraw feeler should be 6-11 lbs.
Installing Pistons: Install with "F" cast in piston strut, and notch in piston head, toward front of engine. *Se Rod Installation b low.*
R plac m nt Pist ns: Std size, 010", .020", 030" oversize

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PISTON PIN

Floating type retained by lock ring at each end. Split type bushing used at upper end of rod. Pin is offset 0625" toward thrust side.

►*PISTON PIN LOCK CAUTION:* 5640 60, 70 (4" bore) engines prior to Engine Plant Nos. A-1347 and B-1196 use piston pin locks, Part. No. 440847 (.080" wire size). All 5680 & 5688 engines and 5640, 60, 70 engines beginning at above Engine Plant Nos. use piston pin locks, Part No. 440995 (.063" wire size).

Pin Fit in Piston–(Clearance) .0000"-.0002" Hand push fit with piston heated to 160°F

Pin Fit in Connecting Rod–(Clearance) .0000"-.0004". With pin held in a vise and connecting rod horizontal, rod should fall slowly of its own weight

Replacement Pins: Std size, 003", 006" oversize.

Piston Pin Bushing (In Connecting Rod) Installation: *See "Piston Pins" in Packard Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	078"	①	.0015-.005"
Oil	.186"	②	.0015-.005"

① - .015" (5540), .018" (5680,88), .019" (Other Series).
② - .015"(5540 & All 1956 Series), 018" (Other Series).

Replacement Rings: Std size, 010", .020", 030" oversize

Installing Rings: Install upper compression ring and oil ring with gap toward camshaft side of engine Install lower compression ring with gap toward opposite side from camshaft All gaps should be midway between pin bosses Grooves on inner diameter of compression rings should be toward top of engine.

CONNECTING RODS

Length–6-25/32", (center-to-center). **Weight–**26.688 ozs.

Crankpin Journal Diameter–2.250".

Lower Bearing–Replaceable precision type.

Clearance–.0005-.0025". **Sideplay–**.003-.011".

Replacement Bearings: Std. size, .001", .002", .020" Undersize.

Installing Rods: Install odd numbered rods in left bank and even numbered rods in right bank, with numbers on rods facing down and away from block and milled oil groove in connecting rod cap upward and toward crankshaft.

CRANKSHAFT

Journal Diameter–2.4990". Five bearings.

Bearings–Precision type. The four front crankshaft bearings are interchangeable.

Clearance - 003-.0023" (1955), .0005-.0025" (1956).

Replacement Bearings: Std. size, .001", .002", .020" undersize.

End Thrust: Taken by No. 5 (rear) main bearing.

Endplay–.0035-.0085".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Packard Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Packard Special Data.*

Crankshaft Removal & Installation (With Engine in Car): *See "Crankshaft & Main Bearings" in Packard Special Data.*

Vibration Damper: *See "Vibration Dampener" in Packard Special Data.*

CAMSHAFT

Bearings–Five, steel-backed babbitt lined precision bearings.

Clearance–.0005-.0045".

End Thrust: Taken by thrust plate behind camshaft sprocket.

Endplay - 0035-.0065" (1955), .004-.006" (1956).

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Packard Special Data.*

Timing Chain: Morse. **Width–**1". **Pitch–**.375". **Length–**64 links.

Engine Front Cover Removal: *See "Engine Front Cover" in Packard Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Packard Special Data.*

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers.

Timing Chain & Sprocket Removal: *See "Timing Chain" in Packard Special Data.*

VALVES

►*INTAKE VALVE STEM OIL DEFLECTOR PRODUCTION CHANGE:* Starting with Engine No. P-13644, Intake Valve Stem Oil Deflector, Part No 6476056, entered production The deflector, a rubber cap, is located over valve stem and installed on top section of cast valve guide. This deflector can be installed on all earlier engines for improved oil control

Tappet Clearance: Hydraulic lifters. Adjustment not required unless cylinder head removed or valve lifters replaced. *See "Valve Tappet Adjustment" in Packard Special Data.*

1955 Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	1.937"	.3725"	5.712"
Exhaust	1.687"	.3715"	5.690"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	.374"	.001-.002"
Exhaust	45°	.374"	.002-.003"

1956 Valves

Valve	Head Diam.	Stem Diam.	Length
Intake	.2"	.3725"	5.712"
Exhaust	1.687"	.3715"	5.690"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	.398"	.001-.002"
Exhaust	45°	.388"	.002-.003"

Valve Seat Width - 3/64" (Intake), 5/64" (Exhaust).

Valve Springs: Single springs used. Install springs with the two closely wound coils against cylinder head.

1955 Valve Spring Specifications

Valve	Spring Pressure	Spring Length
Closed	78-86 lbs.	1-3/4"
Open	158-172 lbs.	1-3/8"

1956 Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	87-97 lbs.	1 3/4"
Open	173-187 lbs.	1 3/8"

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance excessive. Valves are furnished with .003", .010", .020", .030" oversize stems.

Checking Valve Stem Clearance and Reaming Guides for Oversize Valve Stems: *See "Valve System" in Packard Special Data.*

Valve Lifters: Hydraulic type.

Hydraulic Lifter Removal, Overhaul & Testing–*See "Valve System" in Packard Special Data.*

Rocker Arm Assembly: *See "Valve System" in Packard Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

1955 Valve Timing

Intake Valves - Open 14° BTDC. Close 56° ALDC.
Exhaust Valves - Open 52° BTDC. Close 18°ALDC.

1956 Valve Timing

Intake Valves - Open 14° BTDC, Close 62° ALDC.
Exhaust Valves - Open 54° BLDC, Close 18° ATDC.

Valve Timing Check - Remove left bank rocker arm cover. Turn engine until No. 1 cylinder intake valve is open. Let engine stand for several minutes, until hydraulic lifter has leaked down completely. Then hold pressure against the top of the pushrod to keep lifter from refilling, and turn engine until valve closes. Insert tip of a screwdriver between end of valve stem and rocker arm to keep plunger in lifter bottomed, and turn engine until just before mark on timing gear reaches the 15° mark on the timing chain case cover as No. 6 cylinder comes up on compression stroke. Attach a dial indicator to the flange on cylinder head so that it will read any movement of the No. 1 intake valve rocker arm at the pushrod end of the arm. Turn engine very slowly until rocker arm just starts to move. At this point, mark on damper should be just 14° BTDC. *NOTE* - Maximum deflection of timing chain should be ½". If deflection is greater, it will cause a variation in the valve timing.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Packard Special Data.*

Crankcase Capacity: 5 qts. (refill).

Normal Oil Pressure: 45 lbs. at 2800 RPM.

Pressure Regulator Valve –In pump body. Not adjustable.

Pressure Relief Valve Spring–3-19/64" (free length). Compressed to 1-3/8", pressure should be 9–9-1/2 lbs.

Oil Pressure Indicator (Clipper Series)–Red light on instrument panel. Lighted when oil pressure low.

Oil Pressure Switch Engine Unit: King-Seeley No. 47195.

Oil Pressure Gauge (Packard Series): King-Seeley "CV" (Constant Voltage) electric type with Gauge Voltage Regulator.

Dash Unit - King-Seeley No. 46889 (1955), 49512 (1956)

Engine Unit - K-S No. 44000.

See "Oil Pressure Gauges" in Miscellaneous Section.

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Oil Pump: Gear type. Located on rear main bearing cap and driven through distributor drive and camshaft gears. A vacuum pump is attached to oil pump cover plate and is driven by oil pump idler gear.

Oil Pump R moval, Ov rhaul & Installation—See *"Oiling System" in Packard Special Data.*

Vacuum Pump: Attached to engine oil pump. Serviced only as an assembly. Remove and install in same manner as oil pump. See *"Oiling System" in Packard Special Data.*

Crankcas V ntilati n: Filter element in oil filler cap (air intake). Outlet pipe in valve tappet cover.

COOLING

Wat r Capacity: 26 qts. Additional pint for each heater.

Pr ssur Valv : Radiator filler cap. 12 lbs. type.

Th rm stat: Capsule type. Starts to open 167-173°F (Std.), 177-182°F (High Std.).

Water Pump: Packless type with sealed ball bearing. S *"Wat r Pumps" in Packard Special Data.*

Temperature Gaug : King-Seeley "CV" (Constant Voltage) electric type with Gauge Voltage Regulator.

Dash Unit - King-Seeley No. 46927 (1955 Clipper), 49550 (1956 Clipper). 46892 (Other 1955 Series), 49516 (Other 1956).

Engin Unit - King-Seeley No. 44235.
Se "T mperatur Gauges" in Miscellaneous Section.

CLUTCH

L ng 11CF, Assembly No. 268349 (1955-56 Clipper Seri s).
Se "L ng" Clutch s in Clutch Section.

Clutch Disc - Long No. 284330 (11" Diam. 1955 Clipper Custom), 284339 (10½" 1955 Del. & Super), 284340 (11" 1956).

P dal Adjustm nt: 1-1/4—1-1/2" free travel.

R moval: Remove transmission (see below). Remove flywheel lower housing, and clutch release bearing. Mark flywheel and clutch cover. Remove clutch cover to flywheel bolts evenly to relieve tension.

SYNCHRO-MESH TRANSMISSION

Own. See *"Packard Synchro-mesh" in Transmission Section.*

Transmissi n Controls: See *"Transmission Controls" in Transmission Section.*

R m val: Disconnect speedometer cable, gear shift rods from levers on transmission case, and propeller shaft at rear universal joint. Remove propeller shaft completely by slipping front universal joint flange off the transmission main shaft. *(CAUTION*—Wire or tape the two bearings of the universal joint together to prevent them from falling off). Support rear of engine with a jack. Remove rear engine support mounting and support crossmember. Remove capscrews attaching transmission to flywheel housing. Using two pilots in bolt holes, slip transmission to rear so that clutch release bearing pull back spring may be unhooked. Remove transmission.

OVERDRIVE

Warner R11 Type. Planetary gear type with solenoid operation and accelerator pedal controlled kickdown. Overdrive lockout switch not used.
See "Warner R11" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after disconnecting overdrive control cable from lever on right side of overdrive case, electric leads at governor and solenoid. Remove governor, then remove solenoid.

ULTRAMATIC DRIVE

Own. "Twin Ultramatic", Torque converter (with hydraulically operated direct speed clutch) and hydraulically operated planetary unit with manual control.
See "Twin Ultramatic Transmission" in Transmission Section.

►*TESTING & TROUBLE SHOOTING: See "Twin Ultramatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level—*(CAUTION—Fluid level must be checked at normal operating temperatures and after engine has been idling at 800 RPM. for at least one minute to completely fill the transmission).* Run engine at low idle speed while fluid level is being checked, using the dipstick located in engine compartment. Add fluid through dipstick tube as required to bring level to "Full" mark on dipstick.
NOTE—If fluid level doubtful due to bent or distorted dipstick tube, check actual fluid level in transmission as follows: Place car on level floor and allow engine to run at idle speed for five minutes in "N" (neutral). Place a pan under rear of transmission and remove plug in rear of transmission case. If no oil runs out of opening, add oil until it begins to run out, install plug, then ADD ONE QT. If oil does run out when plug removed at rear of transmission, allow to drain to level of hole, then ADD ONE QT.

Capacity—Approximately 11 qts. Use only Packard Ultramatic Drive or any Type "A" Automatic Transmission Fluid which has an AQ-ATF number embossed on container.

►*OTHER TWIN ULTRAMATIC SERVICE DATA: S e "Twin Ultramatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer (Std. & Overdrive Cars), Universal Products (Ultramatic Drive Cars).

►*CAUTION:* Rear universal joint flange nut controls rear axle pinion bearing preload which **must be adjusted** whenever nut is loosened. *See "Packard Hypoid" in Rear Axle Section.*

REAR AXLE

1955

Own. Semi-floating hypoid gear type with Hotchkiss Drive.
See "Packard Hypoid" in Rear Axle Section.

Axle Ratios

Model	Std.	O.D. Cars	Ultramatic
5522	3.9-1	3.9-1	3.07-1
5542, 47	3.9-1	3.9-1	3.23-1
5562, 67	3.9-1	3.9-1	3.23-1
5582, 87, 88			①3.07-1

①—3.23-1 & 3.54-1 optional ratios.
Backlash—.004-.008".

1956

Spicer. Semi-floating, hypoid gear, with Hotchkiss drive. *See "Spicer Hypoid" in Rear Axle Section.*
Axle Ratios - Optional ratios available as follows:
Synchro-mesh - 3.54-1, 4.09-1.
Overdrive - 3.54-1, 4.09-1.
Ultramatic - 2.87-1, 3.07-1, 3.31-1, 3.54-1, 4.09-1.
Backlash - .003-.006"

Carrier Removal: Remove axle shafts (see Axle Shaft Removal below). Disconnect rear universal (wire trunnions), wire or prop propeller shaft up against floor pan with a 2 x 4" inserted inside frame crossmember. Drain differential, replace drain plug. Clean off housing, take off carrier mounting nuts, lift carrier assembly out.

Axle Shaft Removal: Remove wheel and brake drum (use screw type puller J-4153 (do not use knock-out type puller or thrust block may be damaged). Disconnect brake line at wheel cylinder. Remove nuts at oil seal guard and take off seal guard, gasket, retainer, oil seal, brake support plate, and bearing shims. Remove axle shaft and bearing using Puller J-2552 (do not drag shaft on inner seal). Use Tool J-943-B to remove inner seal.

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Form 34 B

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Wheel Bearing Adjustment: Endplay controlled by shims between flange end of housing and brake backing plate. Add or remove shims (furnished .005", .007", .020" thick) at one wheel if .050" or under, at both wheels if over .050" to secure .004-.007" endplay. Normally adjust by tightening nut to 20 ft. lbs. and back off one hex and lock.

Endplay - .004-.007".

SHOCK ABSORBERS

Delco or Monroe. Direct acting hydraulic type. Serviced by replacement.

FRONT SUSPENSION

Independent. Coil Springs Series 55 & 5640, "Torsion Level Suspension" (Others).

See "Packard" & "Packard Torsion Level Suspension" in Suspensions & Wheel Alignment Section.

Kingpin Inclination– 5° 50'.

Caster–Neg. 1° ± 1/2°.

Camber–0° (Pos. 3/4° to Neg. 1/4° range).

Toe-In–0" (plus 1/16", minus 0").

STEERING

Manual: Gemmer. Worm and three tooth roller.

See "Gemmer Worm & Roller" in Steering Section.

Power Steering: Bendix or Monroe Linkage Types. *NOTE* - Gemmer Worm & 2-Tooth Roller Steering Gear used with both types.

See "Bendix Linkage Type" or "Monroe Linkage Type" Power Steering in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Gemmer Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Gemmer Worm & Roller" in Steering Section.*

BRAKES

Bendix Hydraulic. Single Anchor (without eccentric) Hand lever applies rear wheel service brakes rear wheel service brakes.

See "Bendix Hydraulic" in Brake Section.

Drum Diameter - 11" (40,60,70 Series), 12" (80 Series).

Lining Width	**Front**	**Rear**
40, 60, 70 Series	2½"	2"
80 Series	2¼"	2"

Lining Thickness - 3/16" (All Series).

Lining Length	℄**Primary**	℄**Secondary**
40, 60, 70 Series	9 5/16"	12"
80 Series	11 1/2"	13"

℄ - Front & Rear Wheels.

Clearance - Turn brake adjusting screw until wheel can just be turned by hand, then back off shoe until wheel turns free.

Standard Master Cylinder: On bracket on left side of frame near transmission support.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat.

Removal–Remove brake lines from master cylinder. Disconnect pushrod at pedal. Remove gearshift selector linkage bellcrank from mounting bolt stud. Remove mounting bolts and master cylinder.

Power Brakes: Bendix. Combination power cylinder and hydraulic master cylinder.

See "Bendix Power Unit" in Brake Section.

Checking Fluid–Check level every 1000 miles Add fluid to bring level to full mark.

Removal of Power Unit–Disconnect hose line and electrical wiring from power unit (raise hydraulic line above level of junction assembly to prevent fluid leakage). Disconnect and remove brake and accelerator pedal. Remove steering column grommet retainers, slide grommet out of way. Remove carpet retainers and fold carpet back. Remove cover plate screws, then remove power brake and cover as an assembly, take out mounting screws and remove power brake from cover

MISC. MECHANICAL

Windshield Wipers: Vacuum type, cable operated. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: Harrison. *See "Frigidair & Harrison" Air Conditioning in Miscellaneous Section.*

Power Window Regulators. Electric type with individual motors in each window. *See "Electric Window Regulators" in Miscellaneous Section.*

Power Seat Controls: Individual electric motors for horizontal and vertical seat adjustment. *See "Electric Seat Controls" in Miscellaneous Section.*

Power Top Controls: Hydro-Lectric type. *See "Hydro-Lectric Top Controls" in Miscellaneous Section.*

MODEL IDENTIFICATION

Mod l	Mod l D signati n
Champion (All Models)	56 G

SERIAL NUMBER: Located on left front door pillar post.

Ass mbly Plant	Starting Numbers
South Bend	G 1,357,501
Los Angeles	G 936,701
Hamilton	G 763,701

ENGINE NUMBER: Stamped on pad on upper front left corner of engine block.

Starting Engin Numb r—1180251 (South Bend), L-3201 (Los Angeles).

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM. Variation limit (between cylinders) 10 lbs.

VACUUM READING: 17-18" idle speed.

VALVE TAPPET CLEARANCE: .016" cold. Intake & exhaust.

MANIFOLD HEAT CONTROL: Automatic thermostatic type.

Ch cking Th rm static Coil Spring — With outer end of coil free from anchor, and valve closed (counter-weight up), hooked end of coil should be 90° clockwise from anchor post at 70° F.

IGNITION

FIRING ORDER: 1–5–3–6–2–4.

SPARK PLUG GAP: .030". Limits .028-.033"

Spark Plug — Champion J 7.

COIL: Aut -Lit CAF-4004. *12 Volt.*

Igniti n Curr nt — 4 Amps. (Idling).

►*IGNITION RESISTOR NOTE: Resistor not used.*

DISTRIBUTOR: Aut -Lit IAT-4201. *12 Volt.*

C nd ns r—Auto-Lite IAT-2015L. **Capacity** .21-.25 mfd.

Contact P int Set — Auto-Lite IGW-3028AS.

Br ak r Gap — .020"

Cam Angle - 39°±3°.

Br ak r Arm Spring Tension - 17-20 ozs.

R tati n - Counter-clockwise viewed from above.

►*DISTRIBUTOR SETTING & TIMING NOTE: See "Oil Pump R m val & Installation Change" under OILING SYSTEM b low.*

Aut matic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
2		680	4		1360
4		975	8		1950
6		1265	12		2530
7		1400	14		2800

Vacuum Spark C ntr l: Auto-Lite, Integral type.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4
1	2	4 7/8
4	8	7 1/2
8	16	11 1/8
9	18	12

IGNITION TIMING

S tting — 2° BTDC.

Timing Mark — On vibration damper. "IGN" mark in line with pointer (left side of timing cover).

Timing — Disconnect vacuum advance pipe at carburetor. Install plug in carburetor. With engine at idling speed, timing light should show index mark nearest IGN mark, directly under pointer.

CARBURETOR
CARTER WE

Car Model	Carter Carburetor
56G (to Serial No. G-1,182,938)	2108S
56G (After above Number)	2417S

Idle Setting — ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed — 550 RPM. (With selector lever in "N" or "P" position on "Flightomatic" or "Automatic Transmission" cars).

Float Level — 3/8" measured from top of projection on bowl cover to top of soldered seam on free end of float with needle valve seated and bowl cover inverted.

Accelerating Pump — No seasonal adjustment.

Fast Idle: .046" throttle valve opening with choke valve closed. To check, crack throttle valve, hold choke closed, measure on side opposite idle ports using Gauge T109-158. Adjust by bending connector rod.

Automatic Choke Setting: 1 point lean.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With transmission selector lever in "N" (Neutral) or "P" (Park) position, engine at normal operating temperature and choke valve wide open, proceed as follows:

1) Disconnect rod which connects accelerator bracket on firewall to auxiliary bellcrank on side of engine.

2) Connect a tachometer to engine and set engine idle speed at 550 RPM by adjusting the carburetor idle speed screw. Disconnect the rod which connects the main bellcrank on firewall to auxiliary bellcrank on engine by removing the main bellcrank ball joint stud from main bellcrank lever. Adjust the screw on main bellcrank to provide a 5/16" clearance between bellcrank and pad (use a 5/16' drill as a gauge).

3) Adjust the ball joint on main bellcrank-to-auxiliary bellcrank rod until ball joint freely enters hole in main bellcrank lever. During this adjustment the carburetor idle speed screw must be against its stop and the 5/16" gap at the bellcrank must be maintained.

4) Disconnect and adjust length of the main bellcrank-to-throttle valve outer lever (on transmission) so that ball joint stud freely enters the throttle valve outer lever. During this adjustment the throttle valve outer lever must be against its internal stop (outer lever held to rear of transmission). Remove the ball joint stud from the throttle valve outer lever **and shorten the rod four complete turns** of the ball joint assembly. Reinstall the ball joint stud and tighten nut. Hold accelerator bracket arm approximately 3 7/8" from the firewall and adjust bracket-to-auxiliary bellcrank rod clevis until clevis pin freely enters clevis and bracket arm

AUTOMATIC TRANSMISSION THROTTLE LINKAGE ADJUSTMENT: *See "Stud baker Automatic Transmission" in Transmission Section.*

►*OTHER DATA· See "Carter WE" Carburetors in Carburetion Section.*

Fu l Pump Pr ssur : 3½-5 lbs.

CARB. EQUIPMENT

Fu l Pump: AC No. 4156. Fuel only.

Fu l Pump Pr ssur : 3½-5 lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.

Dash Unit — Studebaker No. 1541286 (Sedans & Sta. Wgn.), 1539880 (Hard Top "Hawk").

Tank Unit — Studebaker No. 1540262 (Sedans & Hard Top "Hawk"), 1540263 (Station Wagon).

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry Type or Oil Bath type

►*DRY TYPE FILTER CAUTION:* Remove filter element every 1,000 miles and shake thoroughly to remove dirt DO NOT WASH. Replace filter every six months or 10,000 miles

BATTERY

Willard HDW-2SM-50. *12 Volt,* 9 plate, 50 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

►*CAUTION: This is reversed from previous mod ls.*

Engine Ground - Right front of engine

STARTER

Auto-Lite MBG-4103. *12 Volt.* **Armature** MZ-2367.

Drive - Bendix A-3519. Barrel-Anchor Plate type.

Rotation - Counter-clockwise at commutator end.

Brush Spring Tension — 42-53 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55 max.
5.2 ft. lbs.min.	Lock	4.0	235 max.

Starter Switch; Magnetic Switch mounted on starter and controlled by combination Starter & Ignition Switch. *NOTE* - Automatic drive cars have Neutral Safety and Back-up Light Switch.

Automatic Transmission Neutral Safety Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in "N" or "P" position.

Adjustment - *See "Studebaker Automatic" or "Flight-matic" Transmission in Transmission Section.*

GENERATOR

Auto-Lite GJC-7002-F. *12 Volt.* **Armature** GJC-2030F.

Performance Data

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250
35.0	15.0	2250-2650

Brush Spring Tension - 18-36 ozs.

Field Current - 1.2-1.3 amps. at 10.0 volts (70°F.).

Motoring Current - 3.4-3.9 amps. at 10.0 volts (70°F.).

Rotation - Counter-clockwise at commutator end.

Belt Adjustment: 3/8-1/2" deflection midway between generator and fan pulleys.

REGULATOR

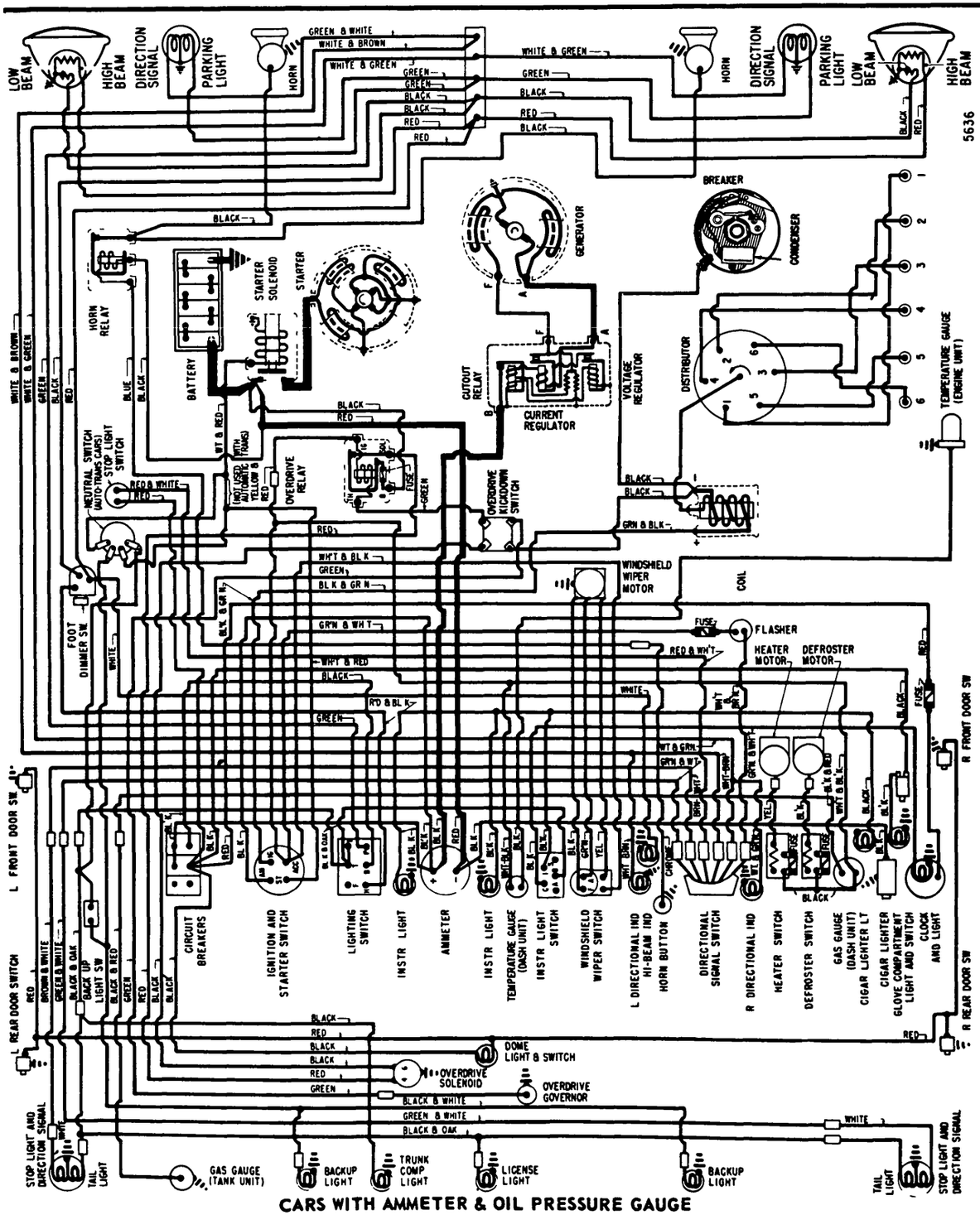
Auto-Lite VRX-6008A. *12 Volt.*

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3-5 amps. discharge current after charge of 7 amps.

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CARS WITH AMMETER & OIL PRESSURE GAUGE

CONTINUED FROM PRECEDING PAGE

C ntact Gap- .015" minimum.
Air Gap - .031-.034".

Voltage R gulator

Setting - 14.2-14.8 volts at 80°F., unit perating normally while charging at 7 amperes or with a .25 ohm resister between regulator and battery.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See El ctrical Section.*

Current R gulat r

► *SETTING CAUTION: "Temperatur Compensated" typ . Set to following specifications at 70°F.*

Test A	Operating Amp r s	Test B
44 amps. .		35 (33-37) amps.

Test A - After 15 minutes operation charging at 10 amps.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See El ctrical S ction.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. ***See El ctrical Section.***
Direction Signals: ***See Electrical Secti n.***

Lighting Switch Removal: (Toggl type)—Remove retaining nut. Remove lower panel cover screws and covers. Slide toggle switch back through panel and disconnect wires. **(Knob type)**—Use stiff wire to remove spring from back side of switch knob and pull knob from shaft. Remove bezel nut and shove switch assembly back through panel and remove wires.

Stop Light Switch Location: Inner side of left frame rail just forward of steering gear housing, except on Power Brake equipped cars, where it is screwed into rear end of power unit, located under hood on left front fender apron.

FUSES: Located as follows:
Overdrive - 20 amps. (in relay on dash panel).
Radio - 9 amps. (in lead behind instrument panel).
Direction Signal - 14 amps. (in bracket behind instrument panel).
Electric Clock - 3 amps. (in lead behind instrument panel).
Climatizer & Defroster - 14 amps. (Coupe & Hardtop); 15 amps. (Other Models), (on Climatizer & Defroster switch).

CIRCUIT BREAKERS: Located as follows:
1) — **Head, Parking & Instrument Lights** - 18 amps. (on main lighting switch).
2) - **Body & Stop Lights** - 15 amps. (below headlight switch on instrument panel).
3) - **Windshield Wiper** - 5 amps. (in wiper switch).
4) - **Window Lift** - 20 amps. (on left cowl panel).
5) - **Seat Adjuster** - 20 amps. (on left cowl panel).

HORNS: Dual horns with relay (Exc. Champion Custom models which have one horn).

Delco-R my No.	L w Note	High N te
All Models	1999757	1999758

H rn Relay: Delco-Remy 1116781. *12 Volt.*

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ENGINE

ENGINE SPECIFICATIONS: "Sw epstak s 185". 6 Cyl. "L" head.

Bor	Stroke	Displacement
3"	4-3/8"	185.6 cu. ins.
C mpr. Rati	**Rated HP**	**Developed HP**
7.5-1 Ⓒ	21.6	101 at 4000 RPM

Ⓒ — 8.0-1 Optl. compression ratio.

C mpr ssi n & Vacuum Reading—See *TUNE-UP.*

►*OIL SEEPAGE AT VALVE COVER PLATE COR-RECTION:* Se *"Oiling System" in Studebaker Special Data.*

ENGINE REMOVAL: S *"Engine" in Studebaker Special Data.*

OIL PAN REMOVAL: S *"Oiling System" in Studebaker Sp cial Data.*

CYLINDER HEAD: Se *"Cylinder Head & Manifold" in Stud bak r Sp cial Data.*

TIGHTENING TORQUES: See *"Tightening Specifi-cati ns" in Stud bak r Special Data.*

PISTONS

"T" slotted, cam ground, tin plated aluminum alloy. Three ring type.

Original Bor & Pist ns—See *"Original Bore & Pistons" in Studebak r Sp cial Data.*

Removal—Pistons and rods removed from above.

Fitting N w Pist ns: Clearance—Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to re move feeler with properly fit piston should be 11 to 16 lbs.

R plac ment Pistons: Std. .010", .020", .030" and .040" Oversize.

Installing Pist ns: Install piston in cylinder bore with "T" slot away from camshaft side. *See Rod Instal-lati n.*

PISTON PINS

Pin is locked in rod by tapered pin and locknut.

Diameter—.7491-.7495". **Length** 2.625".

Clearanc in Piston—.0001-.0003" (selective fit). Light thumb push fit at 70°F.

Pist n Pin Removal & Installation—See *"Piston Pins" in Stud bak r Sp cial Data.*

R placement Pins: Std. & .0025", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.007-.017"	.002-.005"
Compr. #2	1/8"	.007-.017"	.002-.005"
Oil	5/32"	.007-.017"	.0015-.004"

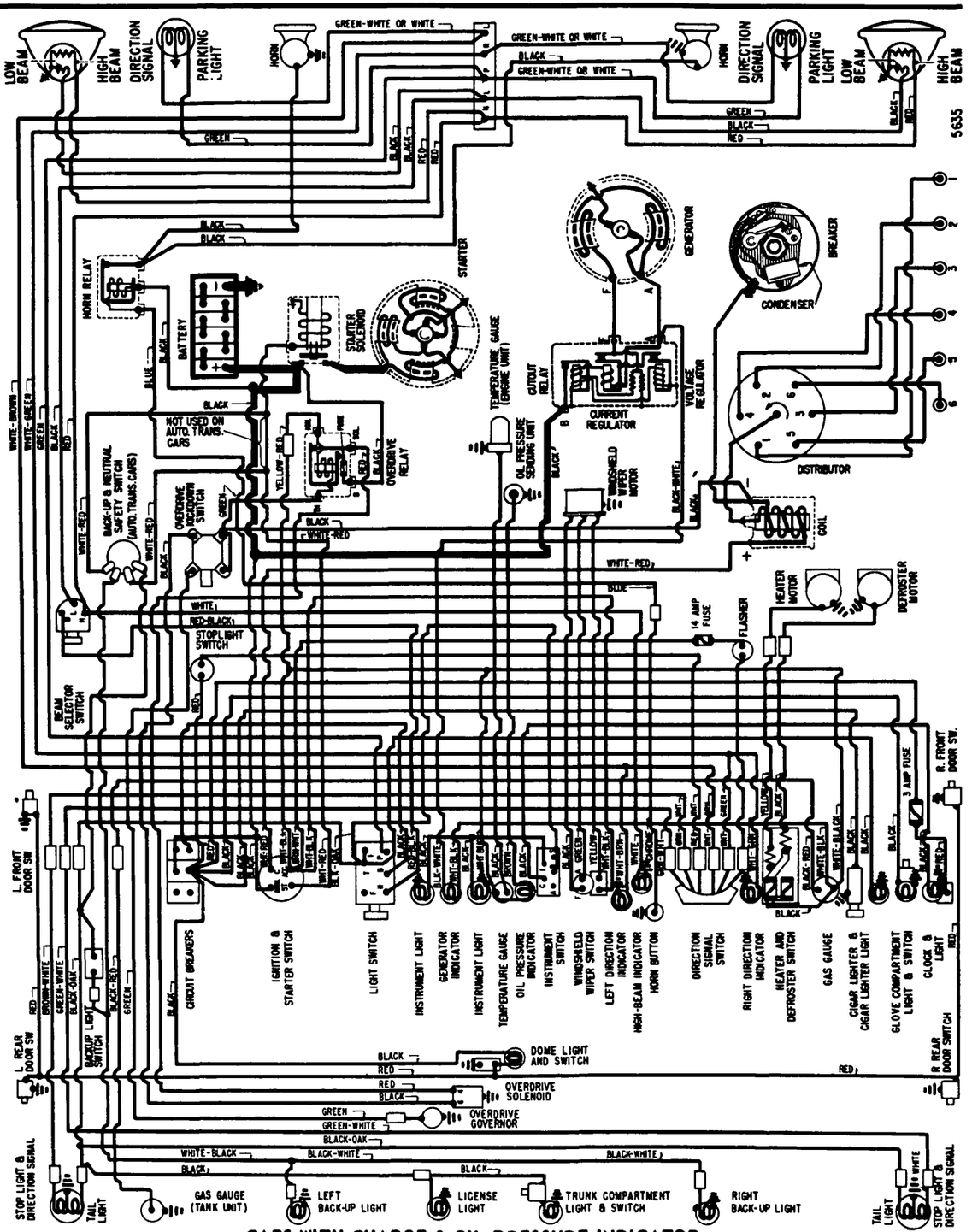
R plac ment Rings: Std., .020", .030", & .040" Over-size, in sets.

Installing Rings: Top compression ring has step at the inside which must be installed up. Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point.

C NNECTING RODS

L ngth—(Center-to-center) 6 3/8". **W ight**—19.04 ozs.

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CARS WITH CHARGE & OIL PRESSURE INDICATOR

CONTINUED FROM PRECEDING PAGE

Crankpin J urnal Diam t r—1.81175-1.81275"

B arings—Steel backed, Microbabbitt lined, no shims.

Clearanc —.0005-.002".

Side Play—.005-.009".

R placement Bearings: Standard & .001", .002", .010", .020" Undersize.

Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6).

►*REPLACEMENT ROD NOTE:* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders.

CRANKSHAFT

Journal Diameter—3.0623-3.0628". Four bearings.

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.

Clearance—.0005-.0025".

R placement Bearings: Std., .001", .010", .020", and .030" Undersize.

End Thrust: Taken by thrust washer assembled betweer front main bearing and crankshaft gear. Controlled by shims between thrust washer and main bearing journal.

End Play—.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".

Bearings—Steel backed babbitt lined bushings.

Clearance—No.1—.0007-.0022", Nos. 2,3,4—.0010-.0027".

End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft behind gear hub). Tighten capscrews alternately a few turns at a time to prevent distortion of plate.

End Play—.003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub.

Backlash—.001-.003".

R plac m nt G ars—Camshaft gear furnished in two sizes: Standard & High limit. Crankshaft gear furnished standard size only.

Camshaft S tting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear.

Engine Fr nt C v r Oil Seal (Crankshaft Fr nt S al): *S "Engin Front C v r" in Stud bak r Sp cial Data.*

VALVES

Tappet Clearance: .016" cold. Intake & exhaust.

Valve	Head Diameter	Stem Diameter	Length
Intake	1 11/32"	5/16"	4 11/32"
Exhaust	1 9/32"	5/16"	4 11/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	11/32"	.0015-.0035"
Exhaust	45°	11/32"	.0015-.0035"

Valve Seat Width— 1/16-3/32".

►*RECONDITIONING VALVE CAUTION:* If reconditioning results in knife edge at top of valve, valve must be replaced.

Valve Springs: Install sprngs so that flanged edge of retainer fits over flat surface of lower coil spring. Tongue on lower side of retainer must fit in groove in spring retainer lock.

Valve Spring Specifications—93-103 lbs. ± 10% when compressed to a length of 1 5/16".

Valve Guides: Use Tool No. J-2034 and drive old guide down and out from top of block into valve spring chamber. Use Collar J-2034-5, guide pilot J-2034-2 on driver J-2034-1 and drive new guide down until driver bottoms against spacing collar.

Valve Lifters: Mushroom type. Remove from below with camshaft out of engine.

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std., .001" & .005" Oversize.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 15° BTDC. Closes 49° ALDC.

Exhaust Valves—Open 54° BLDC. Closes 10° ATDC.

Valve Timing Check—Adjust No. 1 Intake valve at .020" cold. Rotate engine until No. 6 piston is on compression stroke (the IN-OP 1-6 marking on dampener should be several inches from pointer), then while moving lifter up and down continue to rotate crankshaft. Valve timing will be correct if lifter stops moving as above marking is directly below pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 quarts refill.

Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.

Pressure Regulator Valve: On lower right front corner of engine. For access, remove engine front cover bolt. If spring is weak, replace it (do not stretch spring).

Oil Pressure Indicators: Coupe & Hardtop Models—Direct reading, non-electric type gauge.

Oth r Than C up & Hardt p M d ls—Red indicator light on instrument panel. If light on at highway speeds, after warm-up, low oil level or other difficulty is indicated.

Oil Pr ssur Switch—Studebaker No. 1539898.

Oil Pump: Helical gear type. Mounted on right side of crankcase.

Pump R m val, Ov rhaul & Installati n: *S "Oiling System" in Studebaker Special Data.*

►*OIL PUMP REMOVAL & INSTALLATION CHANGE:* Turn crankshaft away from No. 1 TDC position to give clearance between counterweight and cylinder block. Have crankshaft in same position for replacement of oil pump. With pump and gear entered with shaft in this position, turn engine to No. 1 TDC position. Disengage pump shaft and gear from camshaft, turn pump shaft until keyway in shaft points toward bottom of engine. Draw pump shaft and gear into engagement with camshaft. This will turn the keyway toward the rear of the engine. This will be the correct location for distributor setting and timing.

Oil Filter: Partial Flow. Replace filter element at 5000 mile intervals. Change more often in dusty areas.

Replacement Filter Elem nt: AC No. P-203X (Std.), No. P-209 (Optl.)

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in breather pipe at left rear of engine (air outlet). Filter element in breather pipe replaceable.

COOLING

Water Capacity: 11 qts. (with heater 12½ qts.).

Pressure Valve: Radiator filler cap. 13 lb. type.

Thermostat: Choke type. (170° Std.), 155° & 177° (Optl.).

Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Stud bak r Sp cial Data.*

Pump Removal—Remove shroud. *S "Cooling Syst m" in Studebaker Special Data.* Loosen generator and remove belt. Remove fan-to-hub capscrews and remove fan blades and pulley. Disconnect Climatizer hose, and generator adjusting arm. Disconnect outlet hose and remove mounting capscrews.

Radiator & Fan Shroud Rem val: *S "Cooling Syst m" in Studebaker Special Data.*

Temperature Indicators: Coup & Hardt p M d ls—Direct reading, electric type gauge.

Other Than Coupe & Hardt p M d ls—Red-green indicator on instrument panel. Electric type. When indicator shows any green, engine is operating at normal temperature. If it turns red through entire range, engine operating temperature is above normal.

Dash Unit—Studebaker No. 1541287 (Sedans & Sta. Wgn.), 1539879 (Hard Top "Hawk").

Engine Unit—Studebaker No. 1539876 (All Models). *See "Temperature Gauges" in Misc llane us S ction.*

CLUTCH

Borg & Beck 9A7. Assy. No. 361365 (U.S.), No. 361379 (Canada). Single plate, dry disc type.

Clutch Disc. No.—Borg & Beck No. 382276.

Pedal Adjustment: Free Travel ½-1". To adjust, unhook pull-back spring on outside of frame rail, loosen locknut at adjusting clevis and remove clevis pin at inner end of pedal shaft, turn clevis on rear end of pedal shaft-to-operating shaft rod for correct clearance, reassemble linkage.

►*HILL-HOLDER NOTE:* Check setting whenever clutch

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pedal adjusted and adjust Hill-holder to release just as clutch engages. Make sure Hill-holder operating rod installed with rod to inside (toward center of car) of clutch release shaft lever.

H using Rem val: Remove oil level gauge and tube. Remove starter mounting screws (only) and tie starter and cables up out of the way. Remove floor plate and clutch housing top capscrews. Remove transmission. *Se "Transmission R moval" under Transmission.* Disconnect pedal rod at operating shaft-to-release sleeve, pull operating shaft out, remove sleeve. Remove two bolts holding rear engine support insulator cage to crossmember. Support engine at rear of oil pan (use block of wood on jack to protect oil pan). Remove crossmember. Remove two clutch housing bolts releasing exhaust pipe support bracket. Loosen clamp bolt and swing bracket out of way. Remove remaining housing bolts and remove housing. *NOTE*–Remove dowel bolts first.

►*INSTALLATION CAUTION:* Align clutch housing to rear engine plate with two tapered drifts, then install the dowel bolts. Draw dowel bolts in place by tightening the nuts–**do n t driv them into place.**

Clutch Removal: Remove clutch housing (above), remove six screws evenly to relieve spring pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warn r M del AS1-T96 (Std.), AS24-T96 with R10 type Ov rdriv .

S "Warn r Synchro-m sh Transmission" in Transmission Section.

Transmissi n C ntrols: *S e "Transmission Controls" in Transmission Section.*

R moval: Drain transmission case. Disconnect universal joint from transmission companion flange and remove propeller shaft support stud nuts and plain washer. Move front propeller shaft and support assembly rearward on slip yoke splines. Move end of shaft to one side as far as possible and tie it in position. Disconnect shift rods from shift levers and remove speedometer cable from transmission case. Remove speedometer pinion. Remove capscrews which hold transmission case to clutch housing. Remove clutch operating shaft, bracket, and bearing from the transmission case. Then move case rearward until main drive pinion clears clutch pressure plate and remove unit from car.

NOTE–On Coupes and Hardtops, it will be necessary to remove additional frame crossmember before removing transmission.

OVERDRIVE

Warner R10. Governor controlled, solenoid operation with throttle controlled "kick-down".

S "Warner R10 Ov rdrive" in Transmission Section.

Ov rdriv Contr l: *See "Warner R10 Overdrive Control" in Transmission Section.*

R m val: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

AUTOMATIC TRANSMISSION

►*AUTOMATIC TRANSMISSION DISCONTINUANCE NOTE:* Effective Serial No. G-1360743 (Coupe & Conv.) & No. G-1361697 (Others) South Bend produced models, all cars will be equipped with the Flightomatic Transmission as optional equipment. The Studebaker Automatic Transmission is no longer used. *See "Flightomatic Transmission" below.*

Torque converter and 3-speed automatic transmission with hydraulic control. Has mechanical parking lock and Anti-creep device which holds brakes applied when car standing and ignition "on".

See "Studebaker Automatic Transmission" in Transmission Section.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Studebaker Automatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Studebaker Automatic Transmission" in Transmission Section.*

Lubrication: Check Oil Level every 1000 miles and maintain oil level at "Full" mark on dipstick. Drain and refill every 15,000 miles.

Capacity–9½ quarts. *Use Automatic Transmission Fluid Type A (in containers with "AQ-ATF" symbol).*

Checking Fluid Level–Oil must be warm (set parking brake, place selector lever in "L" position, idle engine until normal operating temperature reached). Remove inspection cover on front floor carpet over transmission case, clean all dirt from around inspection hole, check oil level with dipstick gauge. Add oil to bring level up to "Full" mark on dipstick (1 pint between "LOW" and "FULL").

►*OTHER AUTOMATIC TRANSMISSION DATA: See "Studebaker Automatic Transmission" in Transmission Sect.*

FLIGHTOMATIC TRANSMISSION

►*NOTE: See "Automatic Transmission Discontinuance Note" under AUTOMATIC TRANSMISSION above.*

Hydraulic torque converter and a hydraulically controlled automatic three-speed planetary type transmission which provides automatic operation in "D" range, and additional "Lo", "R", and "P" ranges which are controlled manually. In "D" position, the car starts in low gear and progresses to intermediate and high as car speed is increased.

See "Flightomatic" Transmission in Transmission Sect.

►*"NO REVERSE" CORRECTION: See "Flightomatic" Transmission in Transmission Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Flightomatic" Transmission in Transmission Section.*

Lubrication: Check fluid every 1000 miles, drain and refill every 15,000 miles. Use Automatic Transmission Fluid Type "A" (container marked AQ-ATF).

Checking Fluid Level – Place selector lever in "P" position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Clean all dirt and foreign material from dipstick. Apply parking brake and foot brake, and move selector lever slowly from "P" position to "R" position, then back to "D" position. Remove dipstick, wipe clean, and install in transmission and **turn cl ckwis t l ck p siti n.** Remove dipstick and read fluid level. Add fluid to bring level to "FULL" mark on dipstick (1½ pints between "LOW" and "FULL" marks on dipstick).

Capacity – 9 qts. Use Automatic Transmission Fluid Type "A" (container marked AQ-ATF).

►*OTHER FLIGHTOMATIC DATA: See "Flightomatic" Transmission in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. Three used with intermediate universal at propeller shaft support bearing on crossmember (see Propeller Shaft).

Propeller Shaft & Support Bearing: Two shafts used: 1) Front shaft with intermediate universal yoke bolted on rear end (no slip-joint).

2) Rear shaft with slip-joint on forward end at intermediate univers al.

Propeller Shaft & Support Bearing Removal & Servicing–*See "Propeller Shaft" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive.

See "Spicer Hypoid" in Rear Axle Section.

Axle Ratios

Transmission	Standard	Opti nal
Standard	4.10-1	4.56-1
Overdrive	4.56-1	4.10, 4.88-1
Automatic	3.54-1	4.10-1

NOTE–Rear axle ratio stamped on plate attached to axle by cover capscrew and also on ring and pinion gears.

Backlash–.003-.006". Shim adjustment.

Axle Shaft Removal: Remove wheel, remove wheel hub (use puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire plate to frame (*CAUTION*–Do not lose adjusting shims located between backing plate and axle housing flange), pull axle shaft with puller HM-931.

Rear Axle Assembly Removal: Remove hub caps, take out cotter pin from axle nut, loosen rear wheel nuts. Place car on stands on frame just ahead of rear springs, Remove wheels, hubs and drums. Disconnect hand brake cable, take out backing plate bolts from backing plates. free hydraulic brake line from axle housing clips (do not disconnect brake line from wheel cylinders). Disconnect rear universal (wire caps or use clamp to prevent losing rollers). Remove rear spring "U" bolts, disconnect lower shock absorber links, remove rear axle assembly from car.

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims .003", .005", .010", .030" thick).

End Play – .001-.006".

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SHOCK ABSORBERS

Houde, Monroe, or Delco. Direct acting, hydraulic type. Serviced by replacement. *NOTE* - Heavy Duty Shocks are Gabriel.

Houde Shocks (Studebaker Nos.)

	Front	Rear
2 Dr. Sedanet & "Hawk" Ⓒ	537021	537025

Monroe Shocks (Studebaker Nos.)

Station Wagon	1539527	1539545
Others Ⓒ	1539525	1539543

Delco Shocks (Studebaker Nos.)

All (Exc. Sta. Wgn.) Ⓒ	1539987	1539997

Gabriel Shocks (Studebaker Nos.)

Heavy Duty (Non-Adj.)	536398	536399
Heavy Duty (Adj.)	537712	537714

Ⓒ – Before Serial No. G-1,359,504.
Ⓒ – After above No. on 2 Dr. Sedanet & "Hawk".

FRONT SUSPENSION

Independent. Coil spring suspension with front shock absorbers located within coil springs.
See "Studebaker" in Suspensions & Wheel Alignmt Sect.

►*FRONT SUSPENSION NOISE CORRECTION (Due to Looseness of Bushing at Upper Control Arm Inner Shaft): See "Studebaker" in Suspensions & Wheel Alignment Section.*

Kingpin Inclination–5¼°.
Caster–Neg. 1°–Neg. 2½°. Not more than ¾° variation between wheels.
Camber–0° to Pos. 1°. ½° more camber favored on drivers side.
Toe-In–1/16-1/8".
Toe-Out on Turns–With outer wheel at 20°, Inner wheel should be turned 22½-23½°.

STEERING

Manual: Ross Cam & Twin Lever or Saginaw Worm & Roller Types. *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

Power Steering: Saginaw. Integral type.
See "Saginaw (G.M.) Power Steering" in Steering Section.

►*POWER STEERING GEAR "CHUCKLE" CORRECTION: See "Saginaw (GM)" Power Steering in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Wagner Lockheed Hydraulic Self-centering (With Bendix type shoes). Parking lever applies rear wheel service brakes.
See "Wagner Lockheed Self-centering" in Brake Section.
Drums–Diameter (Front) 10", (Rear) 9".
Wheel Cylinder Diameter–(Front) 1", (Rear) 13/16".

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary is ¼" thick, (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeal. This lining is applied to the full length of the shoe, and is marked "secondary" and "top" and should be installed as marked.

Braking Power – 62% (front wheels), 38% (rear wheels).

Lining Width & Length

	Front Wheel	Rear Wheel
Primary Shoes	2" x 10 29/32"	2" x 9 27/32"
Secondary Shoes	2" x 10 29/32"	2" x 9 27/32"

Thickness–3/16" (all except front wheel secondary), ¼" front wheel secondary.
Clearance–Lock shoes against drum then turn adjusting screw back eight notches or more as required to free drum.

Hill Holder: Used on Synchro-mesh Trans. Cars. *See "Hill-holder" in Brake Section for data.*

Standard Master Cylinder: On frame left side rail at base of brake pedal.
Checking Fluid–Access hole in front floor pan at left corner of drivers' seat. Fluid should be maintained at level ½" below top of filler opening.
Removal–Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from frame bracket and then from spring clip which is attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder. (*NOTE*–On cars equipped with Hill-holder, only one line is connected to master cylinder). Remove brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolting bolt to hold Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Power Unit. Used in conjunction with standard master cylinder and located under hood on left front fender apron.
See "Hydrovac Power Unit" in Brake Section.
Removal–Disconnect vacuum and brake lines, stop light wires, remove power unit-to-bracket mounting bolts.

MISC. MECHANICAL

Windshield Wipers: Trico. Vacuum link and crank type (Standard) **Auto-Lite or Redmond.** Electric type (Optional).
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electrical, with reversible motors in each window. Individual switches at each door and master switch on left front door. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Two-way electric type with curved seat tracks for seat adjustment.
See "Power Seat Adjusters" in Miscellaneous Section.

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Misc. Section.*

MODEL IDENTIFICATION

Model	Model Designation
Commander	56B
President	56H

SERIAL NUMBER: Stamped on plate on left front door hinge post.

Starting Serial Numbers—As follows:

Assembly Plant	Commander	President
South Bend	8429601	7171001
Los Angeles	8849101	7808501
Hamilton	8960001	7900601

ENGINE NUMBER: Stamped on cylinder block to left and in front of oil filler pipe.

Starting Engin Numbers—As follows:

Assembly Plant	Commander	President
South Bend	V-363751	P-22001
Los Angeles	VL-6301	PL-2701
Hamilton	VC-8101	PC-601

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM cranking speed.

VACUUM READING: Steady 18-20" at idling.

VALVE TAPPET CLEARANCE: .023-.025" engine hot and idling. .025-.027" (cold).

MANIFOLD HEAT CONTROL: Automatic Thermostatic type located in right bank exhaust manifold outlet. Single exhaust with cross-over pipe standard on Commander models. Dual exhaust standard on President models.

►*DUAL EXHAUST NOTE:* When control valve closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders—RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plug—Champion H-11, 14mm. Torque to 30 ft. lbs. or seat spark plug on new gasket finger tight, then tighten an additional ½ turn.

COIL: Delco-Remy 1115087. *12 Volt.*

Ignition Current—3.8 amps. (idling).

Resistor—Delco-Remy 1927809. Located on firewall.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. Resistor is by-passed during cranking by lead from starter-solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110864. *12 Volt.*

Condenser—Delco-Remy 1869704. **Capacity**—.18-.23 mfd.

Contact Point Set—Delco-Remy 1918148.

Breaker Gap—.015".

Cam Angle—26°-33° (with .016" gap).

Breaker Arm Spring Tension—19-23 ozs.

Rotation—Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Control: Delco-Remy 1116058. Integral type.

Plunger Travel—11/64-3/16".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	4-6
8	16	10-11.5

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting—4° BTDC with vacuum line to distributor disconnected and opening in carburetor plugged. Engine at normal idle speed.

Timing Mark—"IGN" mark on vibration dampener.

Timing—Line up "IGN" mark on vibration dampener with pointer at left side of engine front cover, *after vacuum advance pipe has been disconnected and plugged at carburetor connection.*

►*IGNITION TIMING CAUTION: The manufacturer recommends that no attempt be made to time the engine except with a suitable timing light and that the timing mark on vibration dampener be directly under the pointer. DO NOT SET TIMING BY THE "PING" METHOD.*

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg 2-Barrel Carburetor standard on all models except President Skyhawk & 4-Door Sedan. Carter 4-Barrel Carburetors standard on President Skyhawk & 4-Door Sedan and optional on all other models.*

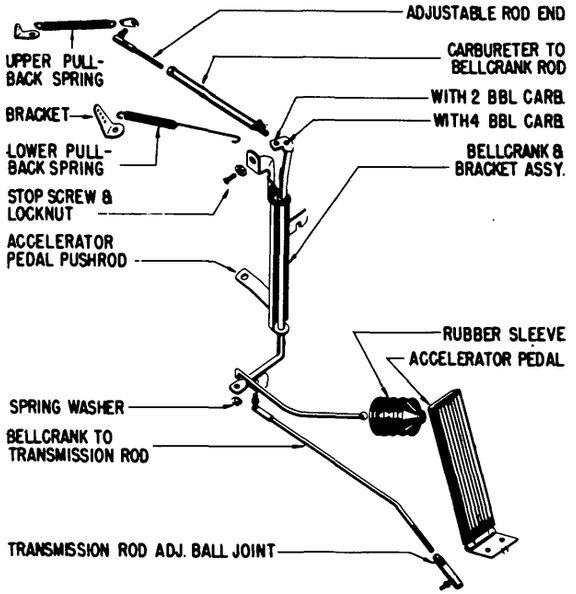
FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position. Set the stop on the bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position. Make sure that the carburetor-to-bellcrank rod ball joint is in the outer hole of the bellcrank pad (away from centerline of engine), and that the ball joint is on the underneath side of the lever.

►*2-BARREL CARBURETOR NOTE:* It may be found to be impossible to shorten accelerator cross shaft-to-carburetor rod sufficiently to obtain proper bellcrank pad-to-stopscrew adjustment. If condition encountered, cut off ¼" of threaded portion of adjustment rod of cross-shaft-to-carburetor rod.

2) Adjust the carburetor-to-bellcrank rod until the idle speed adjusting screw just begins to leave its stop.

3) With the carburetor on the low step of the idle cam, hold the transmission throttle valve lever against its stop and adjust the bellcrank-to-transmission throttle valve lever rod until the ball joint stud enters the throttle valve lever freely. Shorten the rod by turning the ball joint assembly **three complete turns** (4-Barrel Carburetor); **four complete turns** (2-Barrel Carburetor). Install ball joint stud in throttle lever and install the stud nut.



FLIGHTOMATIC THROTTLE LINKAGE

THROTTLE RETURN CHECK (4-BARREL CARBURETOR) ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust the return check in the bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly relative to bracket, then turn check assembly **1¼ to 2 turns toward lever.** Tighten locknut.

THROTTLE RETURN CHECK (2-BARREL CARBURETOR) ADJUSTMENT: Place idle speed adjusting screw on fourth step of fast idle cam (lowest step being No. 1). Adjust throttle return check screw until it just contacts the pad on throttle shaft lever.

STROMBERG WW

Model	Stromberg Code No.
Comm. (To Eng. No. V-336979)	6-115, 115A
Comm. (After above No.)	6-117, 117A
President	6-117, 117A

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8.*

►*CARBURETOR 6-117A & B CUTTING OUT ON LEFT TURN CORRECTION: See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section.*

Idle Setting—Initial setting, 1-3/4 turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed—550-600 RPM (with selector lever in neut-

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ral "N" position on Automatic Drive Cars).

Float Level—3/16" from top edge of bowl to top of float with needle valve seated. To check, remove air horn and bowl cover, remove gasket, place float level gauge T-25569 (Studebaker No. J-5475) squarely on top edge of float bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required using bending tool T-24733 (Studebaker No. KMO-269-S5).

Accelerating Pump—Center hole—Normal Setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: With choke valve fully closed and fast idle cam in fast idle position, one-half diameter of button at end of throttle stop screw should rest against step of fast idle cam. If contact between button and cam not as indicated, bend choke ear up or down as required.

Automatic Choke Setting: (6-115) Centered with arrow on cover aligned with boss on housing. (6-117) 1 point lean with arrow on cover one notch lean from boss on housing.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Stromberg WW Carburetor" in Carburetion Section.*

Fuel Pump Pressure: 3½-5 lbs.

Model	CARTER WCFB	Carter No.
Synchro-mesh & Overdrive		2219SA, SB
Flightomatic		2214SA, SB

►*STALLING ON SHARP LEFT TURN CORRECTION: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

►*REPLACEMENT CARBURETOR NOTE:* 2219SB can be used to replace 2214SA, SB when used with Carter Unitized Pkg. 202-81U (Throttle Return Check Assy.).

►*"BACKFIRING" CORRECTION: See Carter WCFB" Carburetors in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl 1-4-6-7, LEFT barrels 2-3-5-8.*

Idle Setting—½-1½ turns open. Turn screws out for richer mixture.

Idle Speed—550-600 RPM (all models)

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter WCFB" Carburetors in Carburetion Section.*

Fuel Pump Pressure: 3½-5 lbs.

CARB. EQUIPMENT

Fuel Pump: Carter No. M2211S. Diaphragm type.

Pressure – 3½-5 lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.

Dash Unit – Studebaker No. 1541286 (Sedans & Station Wagon), 1539880 (Hard Top "Hawks").

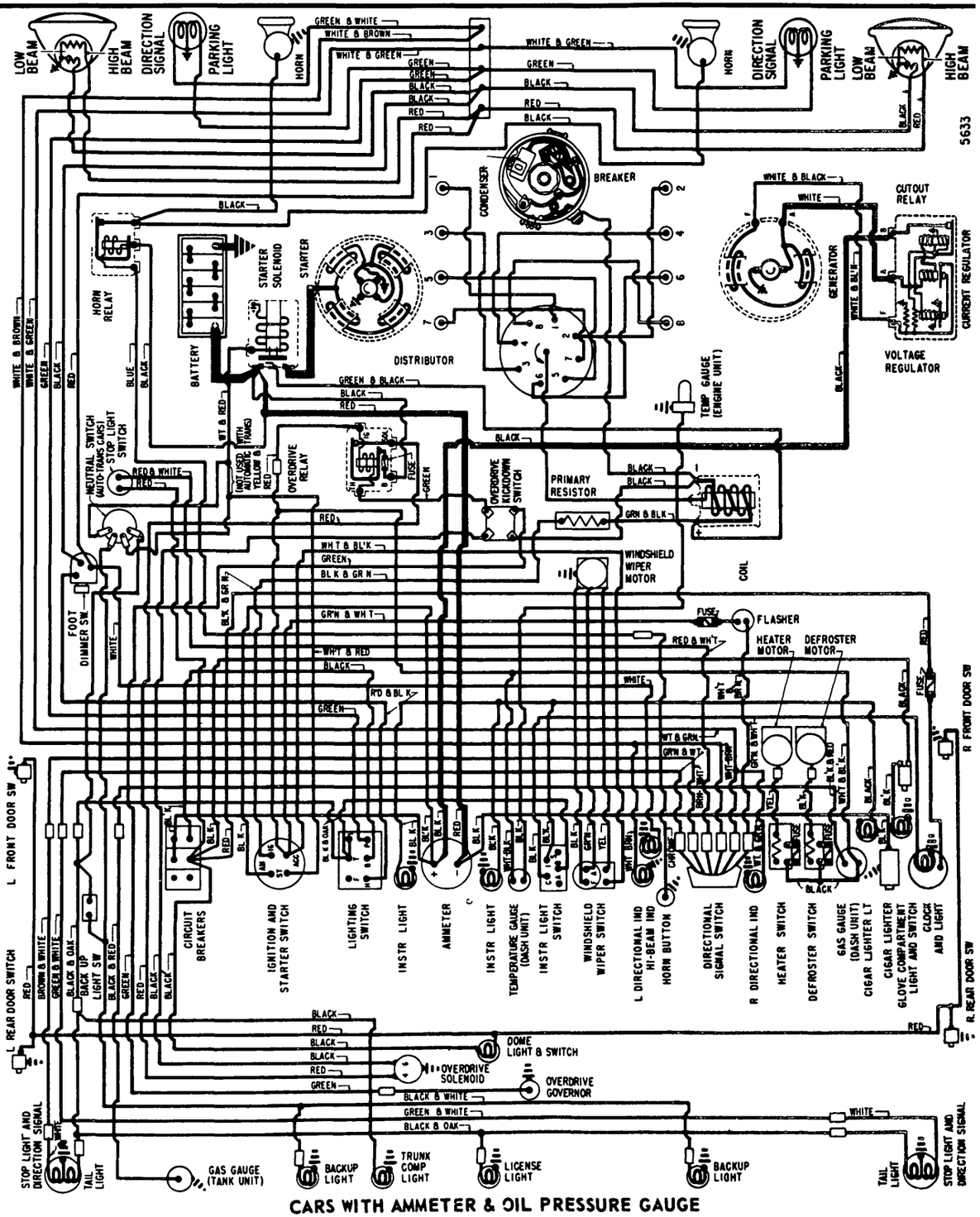
Tank Unit – Studebaker No. 1540262 (Sedans), 1540263 (Station Wagon & Hard Top "Hawks").

See "Fuel Gauges" in Carburetion Section.

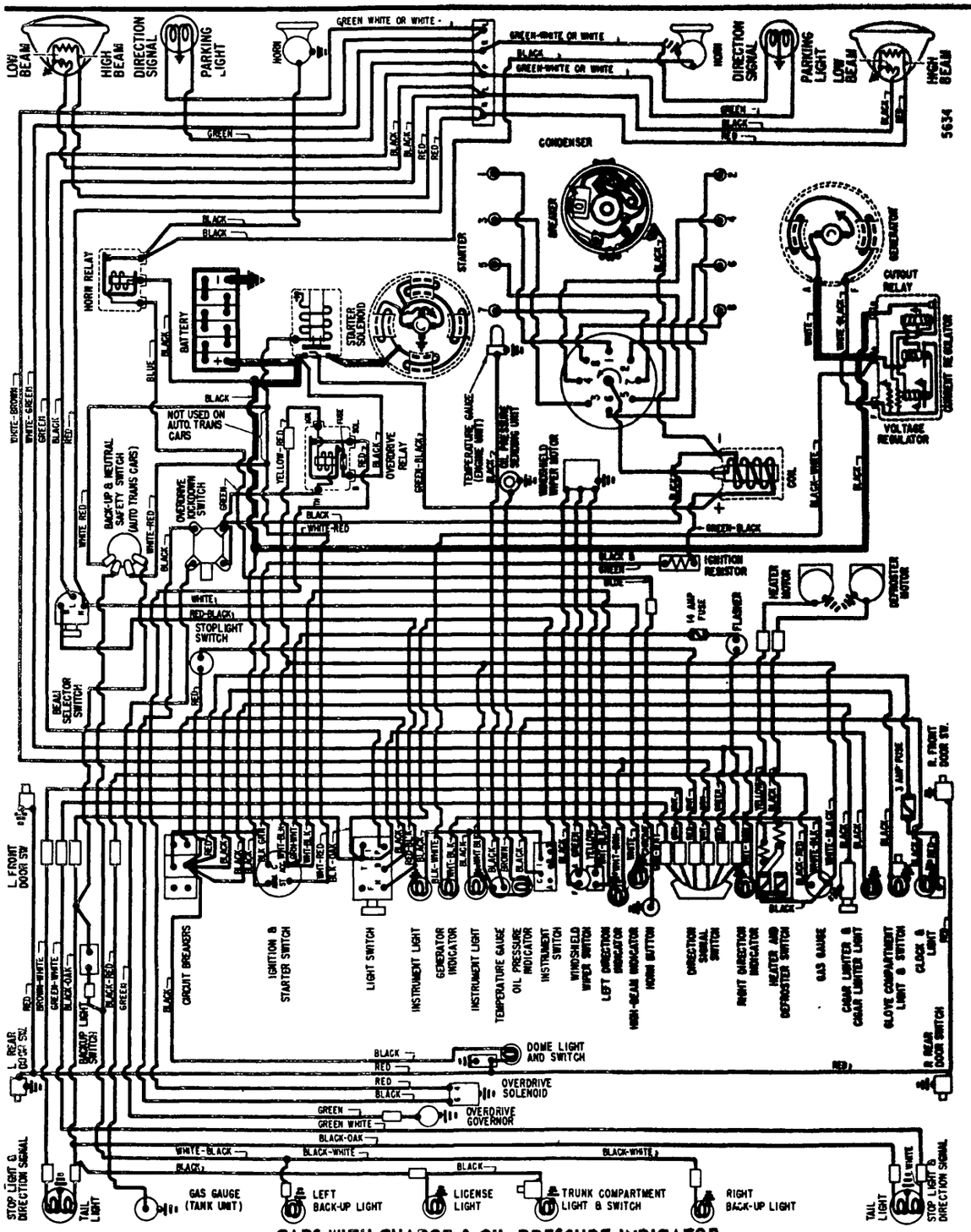
Air Cleaner: Dry type or Oil Bath Type.

►*DRY TYPE FILTER CAUTION:* Remove filter element every 1000 miles and shake thoroughly to remove dirt. DO NOT wash element or blow out with compressed

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CARS WITH AMMETER & OIL PRESSURE GAUGE



CARS WITH CHARGE & OIL PRESSURE INDICATOR

CONTINUED FROM PRECEDING PAGE

air. Replace filter every six months or 10,000 miles.

BATTERY

Willard HDW-2SM-50. *12 Volt,* 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground – Negative.
► *CAUTION: This is reversed from previous models.*
Engine Ground – Right front of engine.

STARTER

Delco-Remy 1107650 (Synchro-mesh & Overdrive), 1107651 (Flightomatic). *12 Volt.* Armature 1933789.
Drive – Bendix "Folo-thru" type.
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 35 ozs. minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic type switch, controlled by combination Ignition & Starting Switch. Turn key full right to start engine.
Automatic Transmission Neutral Safety Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in "N" or "P" position.
Adjustment: *See "Flightomatic" Transmission in Transmission Section.*

GENERATOR

Delco-Remy 1102003. *12 Volt.* Armature 1923535.
Maximum Charging Rate – *See Voltage Regulator.*

Performance Data - Cold

Amperes	Volts	RPM
30	14.0	2240

Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amps. at 12 volts and 80°F.
Rotation – Counter-clockwise at commutator end.
Belt Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".

REGULATOR

Delco-Remy 1119123. *12 Volt. NOTE - Regulator is "1119000 Series". Specifications below are for "Normal" Settings.*

Cutout Relay

Cuts In – 11.8-13.5 volts (hot).
Contact Gap – .020"
Air Gap – .020" with contacts just closed.

Voltage Regulator

Setting – 13.8-14.8 volts (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

Current Regulator

Setting – 27-33 amps. (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

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MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Direction Signals: *See Electrical Section.*
Lighting Switch Removal: Toggle Type—Remove switch retaining nut. Push switch sleeve back into panel and disconnect wires from switch.
Push-pull Type—With a pointed tool, lift spring in back side of switch knob and remove knob from shaft. Remove bezel nut and bezel plate. Push switch out of instrument panel and remove wires.
Stop Light Switch Location: On inner side of left frame rail just forward of steering gear housing. On models with power brakes, switch is screwed into hydraulic cylinder of power brake unit.
FUSES: Located as follows:
Overdrive – 20 amps. (in relay on dash panel).
Radio – 9 amps. (in lead behind instrument panel).
Direction Signal – 14 amps. (in bracket behind instrument panel).
Electric Clock – 3 amps. (in lead behind instrument panel).
Climatizer & Defroster – 14 amps. (Coupe & Hardtop); 15 amps. (Other Models), (On Climatizer & Defroster Switch).
CIRCUIT BREAKERS: Located as follows:
1) **Head, Parking & Instrument Lights** – 18 amps. (On main lighting switch).
2) **Body & Stop Lights** – 15 amps. (below headlight switch on instrument panel).
3) **Windshield Wiper** – 5 amps. (in wiper switch).
4) **Window Lift** – 20 amps. (on left cowl panel).
5) **Seat Adjuster** – 20 amps. (on left cowl panel).

HORNS: Dual horns with relay. *12 Volt.*

Delco-Remy No.	Low Note	High Note
All Models	1999757	1999758

Horn Relay: Delco-Remy 1116781. *12 Volt.*

ENGINE

► *AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: "Sweepstakes 259" & "Sweepstakes 289". V8, valve-in-head.

Engine	Bore	Stroke	Displacement
259	3 9/16"	3 1/4"	259.2 cu. ins.
289	3 9/16"	3 5/8"	289 cu. ins.

Engine	Compr. Ratio	Rated HP	Dev. HP
259	7.8-1 ℂ	40.6	ℭ
289	7.8-1 ℂ	40.6	ℭ

ℂ – 8.3-1 Optional.
ℭ – 170 HP at 4500 RPM with 2-Barrel Carburetor. 185 HP at 4500 RPM with 4-Barrel Carburetor.
ℭ – 195 HP at 4500 RPM with 2-Barrel Carburetor. 210 HP at 4500 RPM with 4-Barrel Carburetor.
Compression & Vacuum Reading – *See TUNE-UP.*

OIL PAN REMOVAL: *See "Oil Pan" in Stud bak r Special Data.*

ENGINE REMOVAL: *See "Engin " in Stud bak r Special Data.*

CYLINDER HEAD: *S "Cylinder Head & Manif lds" in Stud bak r Special Data.*

TIGHTENING TORQUES: *S "Tightening Specifications" in Studebaker Special Data.*

PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*

► *PISTON REPLACEMENT CAUTION: "259" & "289" Engine pistons are NOT INTERCHANGEABLE. "Flat Head" piston used on 259" Engine. "Concave Head" Piston used on 289" Engine.*

Fitting New Pistons: Clearance is selective fit. With piston inverted, slotted side away from camshaft, and with bottom of piston about 1" below top of block, insert a .002" x 1" x 12" feeler on camshaft side of piston. Pull to withdraw feeler should be 8-13 lbs.
Replacement Pistons: Std. size & .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.
Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PISTON PINS

Locked in rod by tapered pin and locknut.
Diameter – .8741-.8745". **Length** – 3 1/16".
Clearance in Piston – .0001-.0003" (selective fit). Light finger push fit at 70° F.
Replacement Pins: Std. size & .0025", .005" oversize.
Removal & Installation: *See "Piston Pins" in Studebaker Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compression	5/64"	.008-.016"	.002-.005"
Oil	3/16"	.008-.016"	.0015-.005"

Replacement Rings: *See Studebaker Special Data.*
Installing Rings: Install rings with chamfered side of compression rings upward.

CONNECTING RODS

Length (Center-to-Center)—6-5/8". **Weight**—23.71 ozs.
Crankpin Journal Diameter—1.99925-2.00025".
Lower Bearing—Interchangeable. Steel backed, micro-babbitt lined type. No shims.
Clearance – .0005-.002". **Sideplay** – .008-.013".
Replacement Bearings: Std. size, .001", .002", .010", .020" undersize.
Installing Rods: Number on rod and bearing cap must be on same side and rod installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods) and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear (right bank), toward front (left bank).

► *NEW (UNMARKED) ROD NOTE: Hold rod upright with oil hole toward you. Narrow part of offset will be to right on rods for right bank, and to left for rods on l ft bank.*

► *CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

CRANKSHAFT

Journal Diameter—2.4995-2.5000".
Clearance—.0005-.0025".
Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.
End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal.
Endplay—.003-.006".
Crankshaft Rear Main Bearing Oil Seal: *S "Crankshaft & Main Bearings" in Stud bak r Sp cial Data.*
Crankshaft Front Oil Seal: *S "Engin Front Cov r" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".
Bearings—Precision type, steel backed babbitt lined.
Clearance – .00075-.00225" (No. 1), .001-.00275" (Others).
End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.
Endplay—.003-.006".
Camshaft Removal & Installati n: *See "Camshaft & Bearings" in Studebaker Sp cial Data.*
Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.
Backlash—.001-.003".
Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.
Engine Front Cover Removal: *See "Engine Front Cov r" in Studebaker Special Data.*
Engine Front Cover Oil S al (Crankshaft Front S al): *See "Engine Front Cov r" in Stud bak r Sp cial Data.*

VALVES

► *VALVE NOISE CORRECTION (Wh n Du to Cupp d Valve Stem Ends):* Valve stem caps, Part No. 536426 are available to correct above condition. Caps should be installed in complete sets. It is not necessary to disassemble rocker assembly to install caps. Loosen rocker arm bracket screws and cylinder head capscrews that hold rocker assembly to head, insert caps, retighten capscrews. Readjust valve clearance to original specifications.

► *1955-56 ROCKER ARM OIL RETURN PASSAGE CAUTION:* On these engines there is but one return hole in each bank of cylinders for oil from rocker arm chamber to crankcase. **Thes are at th r ar.** Any attempt to drill front oil passages through into block would result in a passage into engine water jacket.
Tappet Clearance—.023-.025" (Engine hot, running). .025-.027" (Engine cold, standing).

Valv	Head Diam.	St m Diam.	St m Clearance
Intake	1-21/32"	11/32"	.0015-.0035"
Exhaust	1-17/32"	11/32"	.0015-.0035"

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Seat Angle–45° (all valves).
Lift–23/64" (all valves).
Valve Seat Width–1/16-3/32".
Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.
Valve Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below. *NOTE* - Damper installed on lower (close-coiled) end of all springs.
Valve Spring Specifications–110 lbs., ± 5 lbs., when compressed to 1-43/64".
Valve Guides: Pressed in head from underside.
Guide Removal & Installation–*See "Valve System" in Studebaker Special Data.*
Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.
►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*
Valve Lifter Installation & Fitting–*See "Valve System" in Studebaker Special Data.*
Replacement Lifters–Std. size, .001", .005" oversize.
►*CAUTION–When lifters removed, make sure they are installed in original positions.*
Rocker Arms: *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves–Open 11° BTDC. Close 54° 36' ALDC.
Exhaust Valves–Open 51° 36' BLDC. Close 14° ATDC.
Valve Timing Check–Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*
Crankcase Capacity: 5 qts. (add one quart when filter changed).
Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.
Pressure Regulator Valve – Located on right side at front of engine block slightly above crankcase flange.
Oil Pressure Indicator – Coupe & Hardtop Models – Direct reading, non-electric type gauge. Studebaker No. 1539878.
Other Than Coupe & Hardtop Models – Red indicator light on instrument panel controlled by pressure switch, Studebaker No. 1539898, on engine. Light should go on when ignition turned on but should not be lighted with engine running.
Oil Pump: Spur gear type. Mounted on rear main bearing cap and driven by camshaft gear.
Pump Removal, Overhaul & Installation: *See "Oiling System" in Studebaker Special Data.*
Oil Filter: Partial Flow. Replace filter element at 5000 mile intervals. Change more often in dusty areas.
Replacement Filter Element – AC No. P-209.
Crankcase Ventilation: Filter element in oil filler cap (air intake) and breather tube at rear of engine (air outlet).

COOLING

Water Capacity: 17 qts. (18.5 qts. with heater).
Pressure Valve: Radiator filler cap. 13 lb. type.
Thermostat: Choke type. 170° (Std.), 160° & 180° (Optl.).
Water Pump: Packless type. Sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*
Pump Removal – Drain cooling system. Loosen generator, remove belt. Remove fan-to-hub screws and remove fan and pulley. On Coupe and Hardtop models, remove shroud. Remove four capscrews retaining pump cover to water pump manifold. Remove pump from manifold.
Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*
Temperature Indicators: Coupe & Hardtop Models – Direct reading, electric type gauge.
Other Than Coupe & Hardtop Models – Red-green indicator on instrument panel. Electric type. When indicator shows any green, engine is operating at normal temperature. If it turns red through entire range, engine operating temperature is above normal.
Dash Unit – Studebaker No. 1541287 (Sedans & Station Wagon), Studebaker No. 1539879 (Hard Top "Hawks").
Engine Unit – Studebaker No. 1539876 (All Models).
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. Single plate, dry disc type.

Series	Clutch Model	Assy. No.	Disc No.
Commander	10A7	361371	382315
President	10A6	361386	382389

See "Borg & Beck" in Clutch Section.
Pedal Adjustment: Pedal free travel 1/2-1". To make adjustment, loosen locknut securing clevis to rod connecting release shaft lever to clutch operating shaft lever and remove the clevis pin. Turn clevis to shorten or lengthen rod as necessary for correct pedal free travel. *NOTE–If car is equipped with "Hill-Holder", adjust "Hill-Holder" operating rod as outlined in Brake Section.*
Clutch Housing Removal: Remove starter. Remove floor plate and clutch housing top capscrews. Remove clutch operating shaft. Remove transmission (see Synchro-mesh Transmission Removal below). Remove two bolts holding engine rear support insulator cage to crossmember. Place a small hydraulic jack at rear of oil pan and insert a block between jack pad and oil pan to prevent damage to pan. Raise engine just enough to take weight of engine off crossmember. Remove support crossmember-to-frame bolts and remove cross member Remove the two clutch housing bolts retaining exhaust pipe support bracket. Loosen clamp bolt and swing support bracket out of way. Remove clutch housing cover plate. Remove remaining housing mounting bolts or capscrews and remove clutch housing
Clutch Removal Remove clutch housing (above), remove six screws evenly to release pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model AS53-T86E (Std.), AS54-T86E with R10 type Overdrive.
See "Warner Synchro-mesh Transmission" in Transmission Section.
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: Drain transmission case. Disconnect universal joint from transmission companion flange and remove propeller shaft support stud nuts and plain washer. Move front propeller shaft and support assembly rearward on slip yoke splines. Move end of shaft to one side as far as possible and tie it in position. Disconnect shift rods from shift levers and remove speedometer cable from transmission case. Remove speedometer pinion. Remove capscrews which hold transmission case to clutch housing. Remove clutch operating shaft bracket, and bearing from transmission case. Move case rearward until the main drive pinion clears clutch pressure plate and remove unit from car.

OVERDRIVE

Warner R10 Type (part of AS54-T86E Transmission). Governor controlled, with electric solenoid operation and throttle controlled "kickdown"
See "Warner R10" Overdrive in Transmission Section.
Overdrive Controls. *See "Overdrive Controls" in Transmission Section.*
Removal Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

FLIGHTOMATIC TRANSMISSION

Hydraulic torque converter and a hydraulically controlled three-speed planetary type transmission which provides automatic operation in "D" range and additional 'Lo", "R', and "P" ranges which are controlled manually. In "D' position, the car starts in low gear and progresses to intermediate and high as car speed is increased.
►*See "Flightomatic" Transmission in Transmission Sect.*
►*"NO REVERSE" CORRECTION See "Flightomatic" Transmission in Transmission Section.*
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic" Transmission in Transmission Section.*
►*TESTING & TROUBLE SHOOTING See "Flightomatic" Transmission in Transmission Section.*
Lubrication: Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type 'A" (marked AQ-ATF on container).
Checking Fluid Level – Place selector lever in 'P' position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Apply parking brake and foot brake, move selector lever slowly from 'P" position to "R' position, then back to 'D' position. Remove dipstick and read fluid level. Add fluid to bring level to 'FULL' mark on dipstick (1½ pints between "LOW' and "FULL' marks on dipstick).

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Capacity – 9 qts. Use Automatic Transmission Fluid Type "A" (marked AQ-ATF on container).

►*OTHER FLIGHTOMATIC DATA: See "Flightomatic" Transmission in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. Three used, with intermediate universal at propeller shaft support bearing on crossmember.

Propeller Shaft & Support Bearings: Two shafts used.

1) Front shaft with intermediate universal yoke bolted to rear end (no slip-joint).

2) Rear shaft with slip-joint on forward end at intermediate universal.

Propeller Shaft & Support Bearing Removal: *See "Propeller Shaft Notes" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive. *See "Spicer Hypoid" in Rear Axle Section.*

Series	Std.	O.D.	Auto.
Commander	3.54-1	3.92-1	3.31-1
President (Exc. 4-Dr. Classic)	3.54-1	3.92-1	3.31-1
President (4-Dr. Classic)	3.54-1	4.09-1	3.31-1

Rear Axle Ratio Identification: Rear axle ratio stamped on plate attached to axle by cover cap screw and also on ring and pinion gears.

Backlash–.003-.006".

Axle Shaft Removal: Remove wheel and wheel hub (use Puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire to frame out of the way *(CAUTION*–Do not lose adjusting shims located between backing plate and axle housing flange). Pull axle shaft with Puller HM-931.

Rear Axle Assembly Removal Remove hub caps and axle shaft cotter pin. Loosen wheel nuts. Place car on stands (stands under frame just ahead of rear springs) and remove wheels, hubs, and drums. Disconnect brake pipes at wheel cylinders, remove backing plate bolts from both backing plates. Remove brake pipe clamps and capscrew which holds brake pipe tee to housing, remove brake pipe from housing. Remove backing plate and shims (suspend from frame). Remove rear universal joint U-bolts and nuts, disconnect rear propeller shaft and move to one side. Remove rear spring U-bolts and disconnect shock absorbers from spring plate. On President models, disconnect stabilizer shaft from spring plates. Remove rear axle assembly.

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003" .005" .010" .030" thick). **Endplay** – .001-.006".

SHOCK ABSORBERS

Houde, Monroe, or Delco. Direct acting, hydraulic type. *NOTE* - Heavy Duty Shocks are Gabriel.

Houde Shocks (Studebaker Nos.)

	Front	Rear
Comm. "Hawk" ℂ	537021	537025
Comm. 2 Dr. Sedans	537022	537026

Monroe Shocks (Studebaker Nos.)

Comm. "Hawk" ℭ	1539526	1539544
Comm. 2 Dr. Sedans	1539526	1539544
Comm. & Pres. Sta. Wgn.	1539527	1539545
Comm. & Pres. Others	1539526	1539544

Delco Shocks (Studebaker Nos.)

Comm. "Hawk" ℭ	1539986	1539996
Comm. 2 Dr. Sedans	1539986	1539996
Comm. & Pres. Others	1539986	1539996

Gabriel Heavy Duty Shocks

Comm. & Pres. (Non-Adj.)	536398	536399
Comm. & Pres. (Adj.)	537712	537714

ℂ - Before Serial No. 8,430,316

ℭ – Beginning with above number.

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs.

See "Studebaker" in Suspensions & Wheel Alignmt. Sect.

►*FRONT SUSPENSION NOISE CORRECTION (Due to Bushing Looseness at Upper Control Arm Inner Shaft): See "Studebaker" in Suspensions & Wheel Alignmt. Sect.*

Kingpin Inclination–5-1/4° at 0° camber.

Caster–Neg. 1° to Neg. 2-1/2°. Not more than 3/4° variation between wheels.

Camber–0° to Pos. 1°. 1/2° more camber favored on driver's side.

Toe-In–1/16-1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.

RHD Car Note–Make toe-in adjustments at left hand tie rod.

Toe-Out on Turns–With outer wheel at 20°, inner wheel should be 22-1/2–23-1/2°.

STEERING

Manual: Ross Cam & Twin Lever or Saginaw Worm & Roller types.

See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.

Power Steering: Saginaw (G.M.). *See "Saginaw(G.M.) Power Steering" in Steering Section.*

►*POWER STEERING "CHUCKLE" CORRECTION: See "Saginaw(G.M.) Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking brake applies rear wheel service brakes.

See "Wagner Lockheed Self-Centering" in Brake Section.

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeak. This lining is applied to the full length of the shoe and is marked "secondary" and "top", and should be installed as marked.

Drums – Diameter 11" (front), 10" (rear).

Braking Power – 62% (front), 38% (rear).

Wheel Cylinder Diameter – 1 1/16" (front), 7/8" (rear).

Lining Dimensions	Width	Length	Thickness
Front Wheels	2¼"	12"	ℂ 3/16"
Rear Wheels	2"	10 29/32"	.3/16"

ℂ – Front wheel secondary lining is 7/32" See "Front Wheel Secondary Lining Note" above.

Clearance–Lock shoes against drum with adjusting screw, then back off adjusting screw 8 notches, or more notches as required to free drum.

Standard Master Cylinder: On frame left side rail at base of brake pedal.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal–Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder.

(NOTE - One line with Hill-holder). Remove the brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolt to Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Power Unit. Used with standard master cylinder.

See "Hydrovac Power Unit" in Brake Section.

Checking Fluid–Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit–Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

MISC. MECHANICAL

Windshield Wipers: Auto-Lite, Redmond and Bosch Electric type. *See "Auto-Lite Windshield Wiper 'Single End' Motors" and "Redmond Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electrical, with individual reversible motors in each window. Control switches at each door with a master control switch located on left front door. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seats Adjusters. Two-way electric type with curved seat tracks for seat adjustment (seat raises and lowers with a tilting action).

See "Power Seat Adjusters" in Miscellaneous Section.

STUDEBAKER GOLDEN HAWK 1956

MODEL IDENTIFICATION

M d l	M d l ld ntificati n
Golden Hawk (Hardtop)	56J

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.

Starting S rial Numb rs–6,030,001 (South Bend), 6,800,001 (Los Angeles).

ENGINE NUMBER: Stamped on front end of engine block between cylinder banks, directly behind water pump.

Starting Engin Numb rs (South Bend & Los Angeles): K-1001 (Overdrive), S-1001 (Ultramatic).

TUNE-UP

►*DETONATION CORRECTION (In Low Octane Areas):* If detonation not caused by carbon deposits, rough combustion chamber, or sharp edges in cylinder head, convert original Distributor IBJ-4001C to later IBJ-4001E performance (see DISTRIBUTOR below). If detonation still present, Ignition Timing may be retarded slightly from standard 5° BTDC setting.

COMPRESSION PRESSURE: 120 lbs. minimum at 150 RPM. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-21" at idling speed.

VALVE TAPPET CLEARANCE: None (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic spring type mounted between right bank exhaust manifold and exhaust pipe. With heater valve in closed position, hook in end of coil should assume a position approximately 90° clockwise from coil anchor pin at normal room temperatures. Valve should operate freely.

►*NOTE:* With valve in closed position, most exhaust gases are discharged through the left exhaust pipe.

IGNITION

►*ENGINE "MISS" CORRECTION:* May be caused by cross-fire between No. 5 & 7 cylinders. Correct by installing new brackets and cables as follows:

Transmissi n	Cabl Set	Rt. Bracket	Left Bracket
Overdrive	6484554	6489377	6489917
Ultramatic	6484554	6489377	

NOTE - Eight No. 6489378 grommets also used.

►*ENGINE FAILURE TO START CORRECTION (Due to Moistur in Distributor Cap):* Remove tachometer drive unit assembly and drill two 7/64" holes in groove adjacent to outer rim.

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylind rs–RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plugs–Champion N8-67B. 14mm. Torque to 30 ft. lbs. *NOTE* - Champion N8-64B can be used if colder plug desirable.

COIL: Aut -Lit CAD-4004. 12 Volt.

Igniti n Current–2.2 amps. idling HOT.

R sist r–Auto-Lite PU-4001.

►*COIL RESISTOR NOTE:* Resistor is connected in series with primary circuit between battery and coil. Resistor is by-passed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Auto-Lit IBJ-4001C r IBJ-4001E 12 Volt. Single breaker type.

►*DISTRIBUTOR CONVERSION TO CORRECT DETONATION (IBJ-4001C):* Install all parts furnished in Conversion Kit, No. 6486409, as follows: Distributor Stop & Cam Plate, Governor Weight Springs (Weak & Heavy Springs), Vacuum Spring, and small parts. Install new IBJ-4001E nameplate (furnished in kit). Check Automatic & Vacuum Advance which should agree with IBJ-4001E specifications below.

Condenser–Auto-Lite IBB-2015L. **Capacity**– .25-.28 microfarad.

Contact Point Set–Auto-Lite IGW-2028HS.

Breaker Gap–.017".

Cam Angle–31°±3°.

Breaker Arm Spring Tension–17-20 ozs.

Rotation–Counter-clockwise viewed from above.

Automatic Advance–IBJ-4001C

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	350	2	700
10	850	20	1700
14	1765	28	3530
15	2000	30	4000

Automatic Advance - IBJ-4001E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
8	900	16	1800
13	2275	26	4550
14	2550	28	5100

Vacuum Spark Control: Auto-Lite. Integral type.

Vacuum Advance–IBJ-4001C

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	7
1	2	7 1/2
5	10	9 5/8
9	18	12 1/8
10	20	13

Vacuum Advance - IBJ-4001E

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	8
1	2	8 5/8
5	10	11 1/4
9	18	14 3/4
10	20	16

IGNITION TIMING

Setting–5° BTDC with engine idling at 550-600 RPM with transmission in neutral. Before checking setting, disconnect vacuum advance pipe at carburetor.

►*DETONATION NOTE* - Timing may be retarded slightly from standard 5° BTDC setting if necessary to correct detonation. *See Detonation Correction.*

Timing Mark–Timing indicator on chain cover marked "0", "5", "10", "15". Align index mark (groove) on vibration damper with correct mark on indicator.

CARBURETOR

Carter WCFB-2394S. Four-barrel downdraft type

►*ENGINE CUTTING OUT ON LEFT TURN CORRECTION: See "Carter WCFB 4-Barrel" Carburetor in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barr ls f d Cyl. 2-3-5-8, LEFT barr ls 1-4-6-7.*

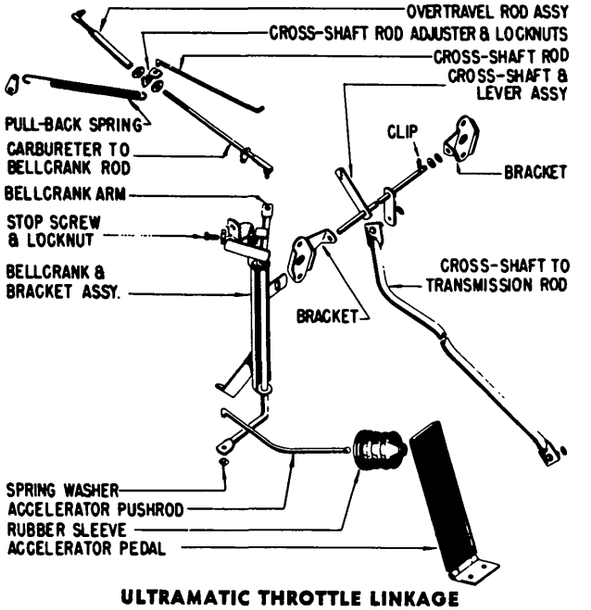
Idle S tting–¾-1¼ turns open. Turn screws out for richer mixture.

Idl Sp d–550-600 RPM with transmission in neutral.

►*OTHER DATA: See "Cart r WCFB" Carburet r in Carbur tion Section.*

Fuel Pump Pr ssure: 3½-5 lbs.

Throttle Linkage Adjustment (Ultramatic): Replace any excessively worn linkage, check for free action without bind, bring engine to operating temperature. Set engine speed at 400 RPM (selector lever in "D" Drive position) with choke in wide open position. Apply brakes, block open choke valve, disconnect rod at throttle valve outer lever (rear of transmission), hold lever against its stop, straight edge against milled surface of transmission case. Taper end of lever should just contact straight edge. To correct, loosen lever clamp nut, turn shaft to left against stop, reposition lever on shaft to proper position and secure clamp nut. With adjuster to cross-shaft rod in the center in cross-shaft lever *(Supersedes the lower hole specification used previously)*, both locknuts at adjuster released 4 or 5 turns, disconnect carburetor bell crank rod ball joint at bell crank, set stop to provide ¼" gap at bell crank. Hold carburetor idle screw against its stop (¼" gap at bell crank), loosen overtravel end assembly and adjust until ball joint stud on carburetor to bell crank rod freely enters hole in bell crank arm. Lock nut at overtravel end assembly. Hold cross shaft lever forward and tighten rear locknut against adjuster, then secure front nut.



ULTRAMATIC THROTTLE LINKAGE

CARB. EQUIPMENT

Fuel Pump: AC No. 4299. Fuel only.

Fuel Pump Pressure - 3½-5 lbs.

See "Fuel Pumps" in Carburetion Section.

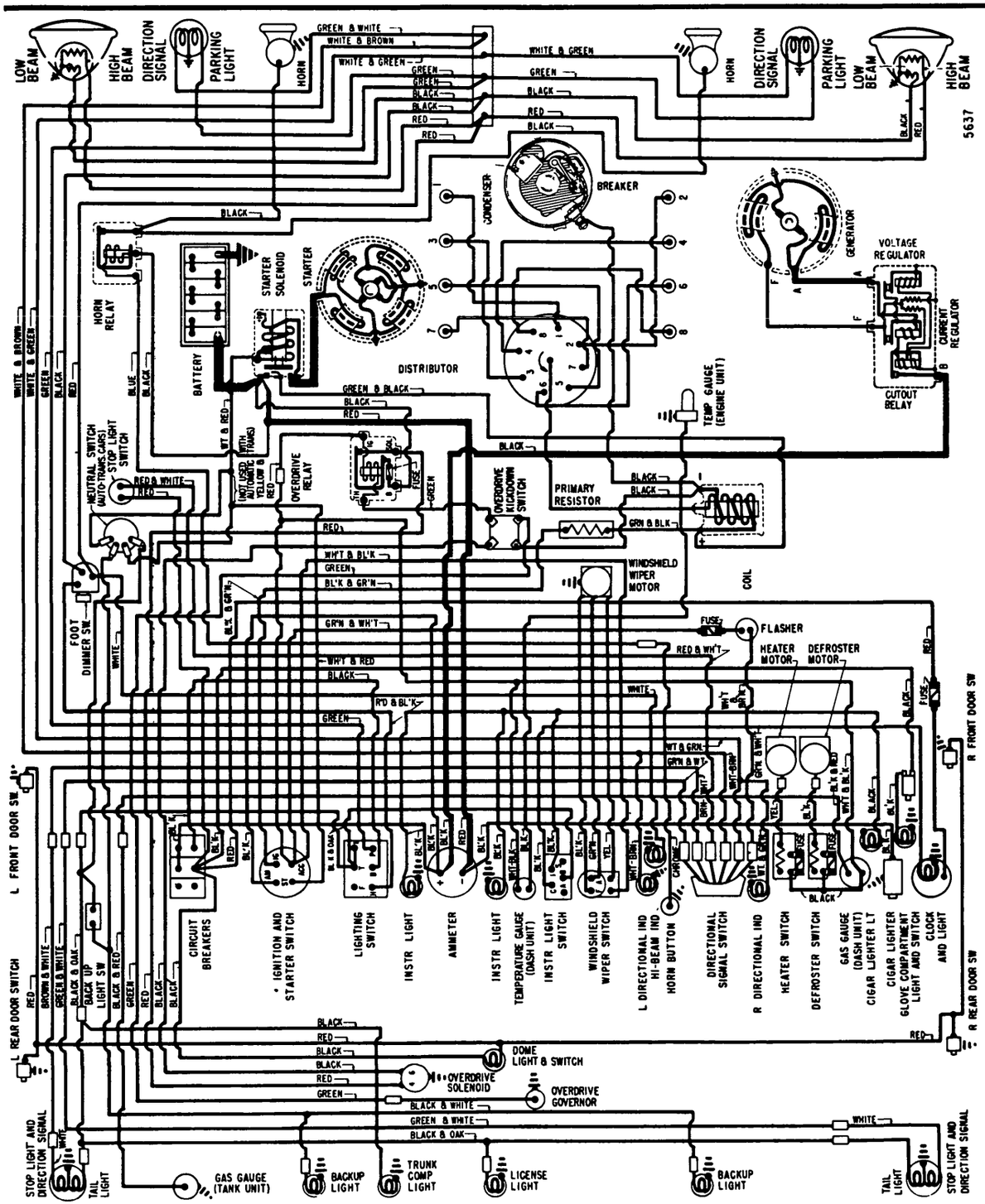
Gas line Gauge: Electric type.

Dash Unit - Studebaker No. 1539880.

Tank Unit - Studebaker No. 1540263.

See "Fu l Gauges" in Carbureti n S ction.

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BATTERY

Willard HDW-2SM-60. *12 Volt,* 9 plate, 60 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Cylinder head to dash.

STARTER

Auto-Lite MDF-6008. *12 Volt.* **Armatur** MDF-2122.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counter-clockwise at commutator end.
Brush Spring Tension - 42-53 ozs. with new brushes.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200 min.	10.0	60 max.
6.5 ft. lbs. min.	Lock	4.0	240 max.

Starting Switch: Auto-Lite SAD-4101 Solenoid Switch, mounted on starter and controlled by Ignition & Starter Switch. Turn key full RIGHT to start. S *"Start r Controls" in Electrical Secti n.*
Ultramatic Neutral Safety & Back-up Light Switch: Delco-Remy 1998038 (Without power steering), 1998059 (With power steering). Located at base of steering column jacket. Connected in starter control circuit so that starter operative only in "N" or "P" position.
Adjustment - *See "Ultramatic" Transmissi n in Transmission Section.*

GENERATOR

Auto-Lite GJC-7002F. *12 V lt.* **Armature** GJC-2030F.

Performanc Data - C ld

Amperes	Volts	RPM
20 Ⓒ	15.0	1750 max.
30 Ⓒ	15.0	2050-2250

Ⓒ - Do not operate at high output for any length of time without ventilating fan. To do so may result in burned armature and fields.
Brush Spring Tension - 18-36 ozs. with new brushes.
Field Current - 1.2-1.3 amperes at 10.0 volts (70°F.).
Motoring Current - 3.4-3.9 amps. at 10.0 volts (70°F.).
Rotation - Counter-clockwise at commutator end.
Belt Adjustment: Loosen generator-to-mounting bracket bolts and adjusting arm screw. Place Fan Belt Adjusting Tool J-4672 over head of front mounting bolt and rotate tool until arm of tool contacts edge of generator end plate. Then using torque wrench, turn tool counter-clockwise until a 20-25 ft. lbs. torque is indicated on wrench scale. While holding wrench at proper torque, tighten adjusting arm screw securely. Remove tool and tighten the generator-to-mounting bracket bolts.

REGULATOR

Auto-Lite VRX-6008A. *12 Volt.*

Cutout R lay

Cuts In - 12.6-13.6 volts
Cuts Out - 3-5 amps. discharge current after charge of 7 amps.
Contact Gap - .015".
Air Gap - .031-.034".

Voltage R gulat r

Setting - 14.2-14.8 volts at 80°F., unit operating n rmally while charging at 7 amperes or with a .25 ohm resister between regulator and battery.
Air Gap - .048-.052" with contacts just opening

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Checking & Adjusting - S El ctrical S ction.

Curr nt Regulator

►*SETTING CAUTION: "T mperature Compensated" type. S t t f llowing sp cifications at 70°F.*

Test A	Operating Amperes	Test B
44 amps.		35 (33-37) amps.

Test A - After 15 minutes operation at 10.0 amps.

T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).

Air Gap - .048-.052" with contacts just opening.

Ch cking & Adjusting - S e Electrical Section.

MISC. ELECTRICAL

Headlamps: Sealed Beam. See Electrical Section.

Directi n Signals: S Electrical Section.

Lighting Switch R moval: Toggle Type - Remove switch retaining nut. Push switch sleeve back into panel, disconnect wires from switch.

Stop Light Switch Locati n: Located on inner side of left frame rail just forward of steering gear housing (except cars with power brakes). On cars with power brakes, switch is located in end of hydraulic cylinder of power brake unit.

FUSES: Located as follows:

Ov rdrive - 20 amps. (in relay on dash panel).

Radi - 9 amps. (in lead behind instrument panel.)

Direction Signal - 14 amps. (in bracket behind instrument panel).

El ctric Clock - 3 amps. (in lead behind instrument panel).

Climatiz r & Defr st r - 14 amps. (on Climatizer & Defroster switch.)

CIRCUIT BREAKERS: Located as follows:

1) - H ad, Parking & Instrument Lights - 18 amps. (on main lighting switch).

2) - B dy & Stop Lights - 15 amps. (below headlight switch on instrument panel).

3) - Windshield Wip r - 5 amps. (in wiper switch).

4) - Wind w Lift - 20 amps. (on left cowl panel).

5) - Seat Adjuster - 20 amps. (on left cowl panel).

HORNS: Dual horns with relay.

High Pitch - Delco-Remy 1999758.

L w Pitch - Delco-Remy 1999757.

Horn Relay: Delco-Remy 1116781. *12 Volt.*

ENGINE

ENGINE SPECIFICATIONS: 90° V8.

B re	Str k	Displmnt.	Rated HP
4"	3½"	352 cu. ins.	51.2

C mpr. Rati	Developed HP
9.5-1	275 at 4600 RPM

C mpression & Vacuum R ading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove steering bellcrank assembly. Remove left exhaust pipe, starter motor, and flywheel lower housing. Remove oil pan and screws.

►*OTHER ENGINE DATA: See Packard 5660 Engine Data in "1955-56 PACKARD" car model pages.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 qts. (refill).

Normal Oil Pr ssur : 45-50 lbs. at 2800 RPM.

Pressur R gulat r Valv - In pump body. Not adjustable.

Pressure Relief Valve Spring - 3 19/64" (free length). Compressed to 1 3/8", pressure should be 9-9½ lbs.

Oil Pressure Gauge: Studebaker No. 1539878. Not electric.

Oil Pump: Spur gear type. Located on rear main bearing cap and driven through distributor drive and camshaft gears.

Oil Pump Removal, Overhaul & Installation - *See "Oiling System" in Studebaker Special Data.*

Crankcase Ventilation: Filter element in oil filler cap (air intake). Outlet pipe in valve tappet cover.

COOLING

►*FAN BLADE ASSEMBLY PRODUCTION CHANGE (To Correct Cracks & Breakage):* A new fan assembly, Part No. 1542138-P, entered production effective with Car Serial No. 6033140. New assembly uses 15 instead of 14 gauge steel, and has 8 instead of 4 rivets.

Water Capacity: 25 quarts (1½ qts. additional with heater).

Pressure Valve: Radiator filler cap. 13 lb. type.

Thermostat: 170° F. (Std.), 160° & 180° F. (Optional).

Water Pump: Packless type with sealed ball bearing. *See "Water Pumps" in Stude baker Special Data.*

Temperature Gauge: Electric type.

Dash Unit - Studebaker No. 1539879.

Engine Unit - Studebaker No. 1539876.

See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Long 11CF. Single plate, dry disc type.

Assembly No. Studebaker No. 403502. **Disc No.** 473176. *See "Long" Clutches in Clutch Section.*

Pedal Adjustment: 1½" free travel.

Removal: *(NOTE* - Clutch housing and transmission removed as an assembly). Remove transmission and clutch housing (see Synchro-mesh Transmission below). Remove cover retaining screws by alternately backing off screws until spring pressure is released. Remove clutch pressure plate assembly and driven plate. *See "Hill-holder" in Brake Section for adjustment.*

SYNCHRO-MESH TRANSMISSION

Warner. 3-Speed, helical gear type with Overdrive (Std.). *See "Warner Synchro-mesh" Transmission in Transmission Section.*

Transmission Controls: See "Transmission Controls" in Transmission Section.

Removal: *(NOTE* - Clutch housing and transmission with overdrive must be removed as an assembly.).

1) Disconnect clutch adjusting rod from release bearing lever. Remove operating shaft support bracket-to-transmission screws, swing bracket down and slip the bracket and ball stud out of operating shaft. Disconnect shift rods from shift levers. Disconnect propeller shaft from transmission. Disconnect overdrive wiring and control cable.

2) Using jack or suitable lift to support engine, remove engine rear support mounting bolts, remove crossmembers.

3) Remove capscrews which attach bellhousing to flywheel housing and remove housing and transmission as an assembly.

4) Disconnect release lever pull-back spring and remove release bearing from transmission front flange. Remove transmission screws and remove housing.

OVERDRIVE

Warner R10 Type. Governor controlled, with electric solenoid operation and throttle controlled "kick-down". *See "Warner R10" Overdrive in Transmission Section.*

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

ULTRAMATIC TRANSMISSION

"Twin Ultramatic". Torque converter with hydraulically operated direct speed clutch and hydraulically operated planetary unit with manual control. *See "Twin Ultramatic" Transmission in Transmissi n Section.*

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Twin Ultramatic" in Trans. Section.*

►*TESTING & TROUBLE SHOOTING: See "Twin Ultramatic" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level - Place selector lever in "P" position, start engine and operate for approximately four minutes or until engine and transmission have reached operating temperature. Remove inspection hole cover from floor pan above transmission. Clean area around inspection hole. Apply parking and foot brakes and move selector lever from "P" position to "R" position and back to the "D" position. Remove dipstick, wipe clean, and reinstall in transmission. Remove and read dipstick. Add fluid through dipstick hole to bring level to "F" mark (Fluid required to raise level from "L" to "F" mark is 1½ quarts). *Use only Automatic Transmission Fluid Type "A" (marked AQ-ATF on container).*

Capacity - Approximately 11 quarts.

►*OTHER TWIN ULTRAMATIC SERVICE DATA: S "Twin Ultramatic" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing type.

Propeller Shaft & Support Bearings: Two shafts used.

1) Front shaft with intermediate universal yoke bolted to rear end (no slip-joint).

2) Rear shaft with slip-joint on forward end at intermediate universal.

Propeller Shaft & Support Bearing Removal: *See "Propeller Shaft Notes" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive. *See "Spicer Hypoid" in Rear Axle Section.*

Rear Axle Ratios: 3.92-1 (Overdrive), 3.07-1 (Ultramatic).

Identification - Rear axle gear ratio stamped on plate attached to assembly by cover cap screw and also on ring and pinion gears.

Backlash—.003-.006".

Axle Shaft Removal: Remove wheel and wheel hub (use Puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire to frame out of the way *(CAUTION*—Do not lose adjusting shims located

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between backing plate and axle housing flange). Pull axle shaft with Puller HM-931.

Rear Axle Assembly Removal· Remove hub caps and axle shaft cotter pin. Loosen wheel nuts. Place car on stands (stands under frame just ahead of rear springs) and remove wheels, hubs, and drums. Disconnect brake pipes at wheel cylinders, remove backing plate bolts from both backing plates. Remove brake pipe clamps and capscrew which holds brake pipe tee to housing, remove brake pipe from housing. Remove backing plate and shims (suspend from frame). Remove rear universal joint U-bolts and nuts, disconnect rear propeller shaft and move to one side. Remove rear spring U-bolts and disconnect shock absorbers from spring plate. Remove rear axle assembly.

Wheel Bearing Adjustment. Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003", .005", 010", .030" thick). **Endplay** - .001-.006".

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type. Serviced by replacement. *NOTE* - Heavy duty shocks are Gabriel.

Shock Absorbers (Studebaker Nos.)

	Front	Rear
Monroe (Std.)	1539527	1539543
Gabriel (H D)	536398	536399
Gabriel (H D Adj.)	537712	537714

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs.

See "Studebaker" in Suspensions & Wheel Alignment Section.

►*FRONT SUSPENSION NOISE CORRECTION (Due to Bushing Looseness At Upper Control Arm Inner Shaft). See "Studebaker" in Suspensions & Wheel Alignment Section.*

Kingpin Inclination–5-1/4° at 0° camber
Caster–Neg. 1° to Neg. 2-1/2°. Not more than 3/4° variation between wheels
Camber–0° to Pos 1° 1/2° more camber favored on driver's side.
To -In–1/16-1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.
RHD Car Note–Make toe-in adjustments at left hand tie rod.
Toe-Out on Turns–With outer wheel at 20°, inner wheel should be 22-1/2–23-1/2°

STEERING

Manual· **Ross Cam & Twin Lever or Saginaw Worm & Roller types.**
See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.

Power Steering: Saginaw (G.M.). *See "Saginaw (G.M.)" Power Steering in Steering Section.*

►*POWER STEERING "CHUCKLE" CORRECTION See "Saginaw (G.M.)" Power Steering in Steering Section.*

Steering Linkage *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

Steering Gear Removal *See "Ross Cam & Twin Lever" or "Saginaw Worm & Roller" in Steering Section.*

BRAKES

Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking brake applies rear wheel service brakes.
See "Wagner Lockheed Self-Centering" in Brake Section.

►*FRONT WHEEL SECONDARY LINING NOTE* Front wheel secondary lining is 7/32" thick (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeak. This lining is applied to the full length of the shoe and is marked "secondary" and "top", and should be installed as marked.
Drums - Diameter 11" (front), 10" (rear).
Braking Power - 62% (front), 38% (rear).
Wheel Cylinder Diameter - **1 1/16" (front), 7/8" (rear).**

Lining Dimensions	Width	Length	Thickness
Front Wheels	2¼"	12"	Ⓒ 3/16"
Rear Wheels	2"	10 29/32"	3/16"

Ⓒ - Front wheel secondary lining is 7/32". See "Front Wheel Secondary Lining Note" above.

Cl aranc –Lock shoes against drum with adjusting screw, then back off adjusting screw 8 notches, or more notches as required to free drum.
Standard Master Cylinder: On frame left side rail at base of brake pedal.
Checking Fluid–Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.
Removal–Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder. *(NOTE* - **One line with Hill-holder).** Remove the brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position remove master cylinder. Insert forward mounting bolt to Hill-holder while master cylinder is off car.
Power Brakes: Hydrovac P wer Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brake Section.
Checking Fluid–Same as for Manual Brakes (same master cylinder used).
Removal of Power Unit–Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

MISC. MECHANICAL

Windshield Wipers· Auto-Lite, Redmond and Bosch Electric type. *See "Auto-Lite Windshield Wiper 'Single End' Motors" and "Redmond Windshield Wipers" in Miscellaneous Section.*

Power Window Regulators Electrical, with individual reversible motors in each window. Control switches at each door with a master control switch located on left front door *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters Two-way electric type with curved seat tracks for seat adjustment (seat raises and lowers with a tilting action).
See "Power Seat Adjusters" in Miscellan ous Section.

MODEL IDENTIFICATION

Model	1957 MODELS	Model Symbol
Champion	Cus. & Deluxe	57G(F & W)
Champion	Pelham	57G(D)
Champion	Silver Hawk	57G(C)
Scotsman		57G (F1, D1, W1)

Model	1958 MODELS	Model Symbol
Champion		58G-F4, W4
Scotsman		58G-F1, W1, D1
Silver Hawk		58G-C3
Econ-O-Miler (Taxicab)		58G-Y1

SERIAL NUMBER: Located on left front door pillar post.

Assembly Plant	Starting Numbers
South Bend	G-1379201 (1957), G-1405401 (1958)
Canada	G-769101 (1957), G-772301 (1958)

ENGINE NUMBER: Stamped on pad on upper front left corner of cylinder block.

Assembly Plant	Starting Numbers
South Bend	1202101 (1957), 1228401 (1958)
Canada	C-71401 (1957), C-74701 (1958)

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs.

VACUUM READING: 17-18" at idle speed.

VALVE TAPPET CLEARANCE: .016" cold, all valves.

MANIFOLD HEAT CONTROL: Automatic thermostatic type.

Checking Thermostatic Coil Spring - With outer end of coil free from anchor, and valve closed (counter-weight up), hooked end of coil should be 90° clockwise from anchor post at 70°F.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .030". Limits .028-.033".

Spark Plugs - Champion J7. 14 mm. Torque 25-30 ft.lbs.

COIL: Auto-Lit CAF-4004 or CAG-4003A.

Ignition Current - 4 amps. (idling).

►*IGNITION RESISTOR NOTE: Resistor not used.*

DISTRIBUTOR: Aut-Lit IAT-4201.

Condenser - Auto-Lite IAT-2015L. **Capacity** .21-.25 mfd.

Contact Point Set - Auto-Lite IGW-3028AS.

Breaker Gap - .020".

Cam Angle - 38-40°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance					
Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
2		680	4		1360
4		975	8		1950
6		1265	12		2530
7		1400	14		2800

Vacuum Spark Control: Auto-Lite, Integral type.

Vacuum Advance		
Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4
1	2	4 7/8
4	8	7 1/2
8	16	11 1/8
9	18	12

IGNITION TIMING

Setting - 2° BTDC idling at 550 RPM *with vacuum line (to vacuum spark control) disconnected.*

Timing Mark - On vibration damper. "IGN" mark in line with pointer (left side of timing cover).

Timing - Disconnect vacuum advance pipe at carburetor. Install plug in carburetor. With engine at idling speed, timing light should show index mark nearest IGN mark, directly under pointer.

CARBURETOR

►*CARBURETOR APPLICATION: Carter single barrel downdraft types used as follows:*

Model	Carter Carb. No.
Champion & Silver Hawk	WE 2417S
Scotsman	BBR1 2764S, Ⓒ 2724S
Econ-O-Miler	BBR1 2724S & 2808S

Ⓒ - Optional equipment.

►*COLD STARTING CORRECTION (Scotsman & Econ-O-Miler with BBR1 Manual Choke Carburetors): See CHOKE ADJUSTMENT under BBR1 Carburetors below.*

►*CARBURETOR ICING CORRECTION (Scotsman):* Can be minimized by careful adjustment of engine idle speed. Use tachometer and set idle speed at 525-550 RPM.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With transmission selector lever in "N" (Neutral) or "P" (Park) position, engine at normal operating temperature, choke wide open, proceed as follows:

1) Disconnect rod which connects accelerator bracket on firewall to auxiliary bellcrank on side of engine.

2) Connect a tachometer to engine and set engine idle speed at 550 RPM by adjusting the carburetor idle speed screw. Disconnect the rod which connects the main bellcrank on firewall to auxiliary bellcrank on engine by removing the main bellcrank ball joint stud from main bellcrank lever. Adjust the screw on main bellcrank to provide 5/16" clearance between bellcrank and pad (use a 5/16" drill as a gauge).

3) Adjust the ball joint on main bellcrank-to-auxiliary bellcrank rod until ball joint freely enters hole in main bellcrank lever. During this adjustment the carburetor idle speed screw must be against its stop and the 5/16" gap at the bellcrank must be maintained.

4) Stop engine and remove the 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by the foot brake. Adjust length of the main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge. Stop engine, remove gauge, and install the pipe plug in side of transmission. Hold the accelerator bracket arm (on firewall) approximately 3 7/8" from face of firewall and adjust the accelerator-to-auxiliary bellcrank rod clevis until clevis pin freely enters clevis and bracket arm.

CARTER WE No. 2417S

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM. On Flightomatic cars, selector lever should be in "N" or "P" position.

Float Level - 3/8" measured from top of projection on bowl cover to top of soldered seam on free end of float with needle valve seated and bowl cover inverted.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .046". Throttle valve opening with choke valve closed. To check, crack throttle valve, hold choke closed, measure on side opposite idle ports (Gauge T109-188). Adjust by bending connector rod.

Automatic Choke Setting: 1 point lean.

►*OTHER DATA: See "Carter WE Carburetors" in Carburetion Section.*

CARTER BBR1 2724S, 2764S, 2808S

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed - 550-600 RPM (Synchro-mesh Cars), 550 RPM with selector lever in "P" or "N" position (Flightomatic Cars).

Float Level - 5/64" (2724S & 2764S), 1/8" (2808S) plus or minus 1/64" from top of float (at each side of seam) to top edge of bowl with needle valve seated.

Accelerating Pump - Seasonal setting, Inner Hole (Summer), Outer Hole (Winter).

Fast Idle: No adjustment. Fast idle cam is rotated to fast idle position when choke closed for cold starting.

Choke Adjustment: To aid cold engine starting, choke should be adjusted as follows: Position choke wire conduit so that end of conduit is 1-1 1/8" beyond conduit clamp. This will provide a stop for the choke which will prevent locking choke valve when control is pulled out fully.

►*OTHER DATA: See "Carter BBR1 Carburetors" in Carburetion Section.*

FUEL PUMP PRESSURE: 3½-5½ lbs.

CARB. EQUIPMENT

Fuel Pump: AC. Fuel only. Replacement Pump 4156.

Fuel Pump Pressure - 3½-5½ lbs.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.

Model	Dash Unit	Tank Unit
1957 Sedans	1542342	1540262
1957 Station Wagons	1542342	1540263
1957 Hawk	1539880	1540263
1958 Champion	1545445	Ⓒ 1544826
1958 Scotsman & Econ-O-Miler	1542342	Ⓒ 1544826
1958 Silver Hawk	1539880	Ⓒ 1544825

Ⓒ - Except Station Wagons. Ⓒ - Including Station Wagons.

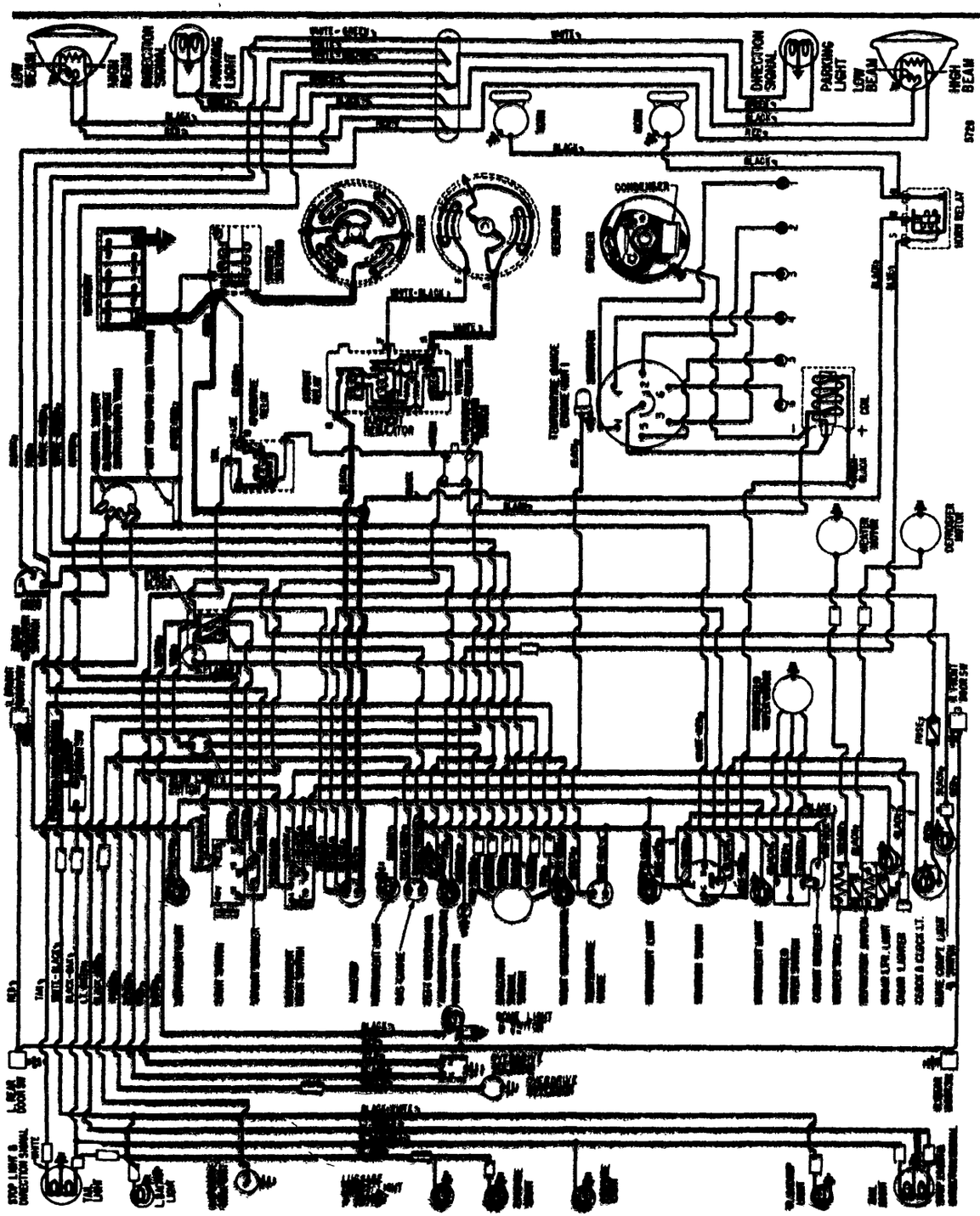
See "Fuel Gauges" in Carburetion Section.

Air Cleaner (1957): Oil Wetted type (Scotsman); Dry type (Others - Std.); Oil Bath (Others - Optl.).

Air Cleaner (1958): DRY FILTER ELEMENT type (All Models). Clean every 1000 miles, replace element every six months or 10,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash

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1957 CHAMPION HAWK (SEE V8 DIAGRAM FOR OTHER MODELS)

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element in solvent or other liquids and DO NOT oil or lubricate.

BATTERY

Willard HDW-2SM-50 (1957), HO-11-50 (1958 Exc. Ec n-O-Miler), HO-11-60 (Econ-O-Mil r). 12 volt, 9 plate, 50 ampere hour capacity (HDW-2SM-50 & HO-11-50), 60 ampere hour capacity (HO-11-60). All at 20 hr. rate.
Battery Ground - Negative.
Engine Ground - Right front of engine.

STARTER

Auto-Lite MBG-4103. Armature MZ-2367.
Drive - Bendix A-3519. Barrel-Anchor Plate type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs.

Performanc Data.

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55 max.
5.2 ft. lbs. min.	Lock	4.0	235 max.

Starter Switch: Magnetic switch, Studebaker No. 1539452, mounted on starter and controlled by combination Ignition & Starter Switch.
Autometic Transmission Neutral Saf ty Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in "N" or "P" position.

GENERATOR

Auto-Lite GJC-7002-F. Armatur GJC-2030-F.

Performanc Data

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250
35.0	15.0	2250-2650

Brush Spring Tension - 18-36 ozs.
Field Current - 1.2-1.3 amps. at 10.0 volts (70°F).
Metering Current - 3.4-3.9 amps. at 10.0 volts (70°F).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 3/8-1/2" deflection midway between generator and fan pulleys with 10 lbs. pull on belt.

REGULATOR

Auto-Lite VRX-6008-A.

Cutout R lay

Cuts In - 12.6-13.6 volts.
Cuts Out - 3.0-5.0 amps. discharge.
Contact Gap - .015" minimum.
Air Gap - .031-.034".

Voltage R gulat r

Setting - 14.2-14.8 volts at 80°F., unit operating normally while charging at 7 amperes or with a .25 ohm resistor between regulator and battery.
Air Gap - .048-.052" with contact just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite Regulators" in Electrical Section.*

Current R gulator

►*SETTING CAUTION: "Temperatur Comp nsat d" typ . Set to following specifications at 70°F.*

Test A	Op rating Amp r s	Test B
44 amps.		35 (33-37) amps.

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T st A - After 15 minutes operation charging at 10 amps.

T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Ch cking & Adjusting - *See "Auto-Lite Regulators" in Electrical S ction.*

MISC. ELECTRICAL

H adlamps: Sealed Beam type (Single Headlights). If 4-Headlights (Dual Headlights) installed, *see "4-Headlight Syst m" in El ctrical Section.*

Dir ction Signal: *See El ctrical Section.*

Lighting & Instrum nt Light Switch Removal: Remove switch retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board.

St p Light Switch: Located on inner side of left frame rail forward of steering gear housing (except Silver Hawk), in elbow fitting on Power Brake Unit (Silver Hawk).

CIRCUIT BREAKERS: Used as follows:

20 Ampere - Protects head, parking, tail, back-up and instrument lights. Located on headlight switch.

5 Amp r - Protects windshield wipers. Located on windshield wiper switch.

FUSES: Used as follows:

15 Amp r - Protects body and stop lights. Located in fuse block behind instrument panel.

15 Ampere - Protects directional signals. Located in fuse block behind instrument panel.

14 Amper - Protects overdrive circuit.

14 Amp r - Protects heater circuit (Scotsman). Located on heater switch.

14 Amp re - Protects Climatizer & Defroster. Located on switch.

3 Amp r - Protects clock and clock light. Located in lead behind instrument panel.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extr m car wh n disconnecting any part of air conditioning q uipment or lin s f r access to engine, see "Air C nditi ning Servic Cautions" in Miscellaneous S ction.*

ENGINE SPECIFICATIONS: "Sweepstakes 185". 6 Cyl. "L" head.

B r	Str k	Displacement
3"	4 3/8"	185.6 cu. ins.

C mpr ssi n Ratio	Rated HP	Developed HP
7.8-1 ①	21.6	101 at 4000 RPM

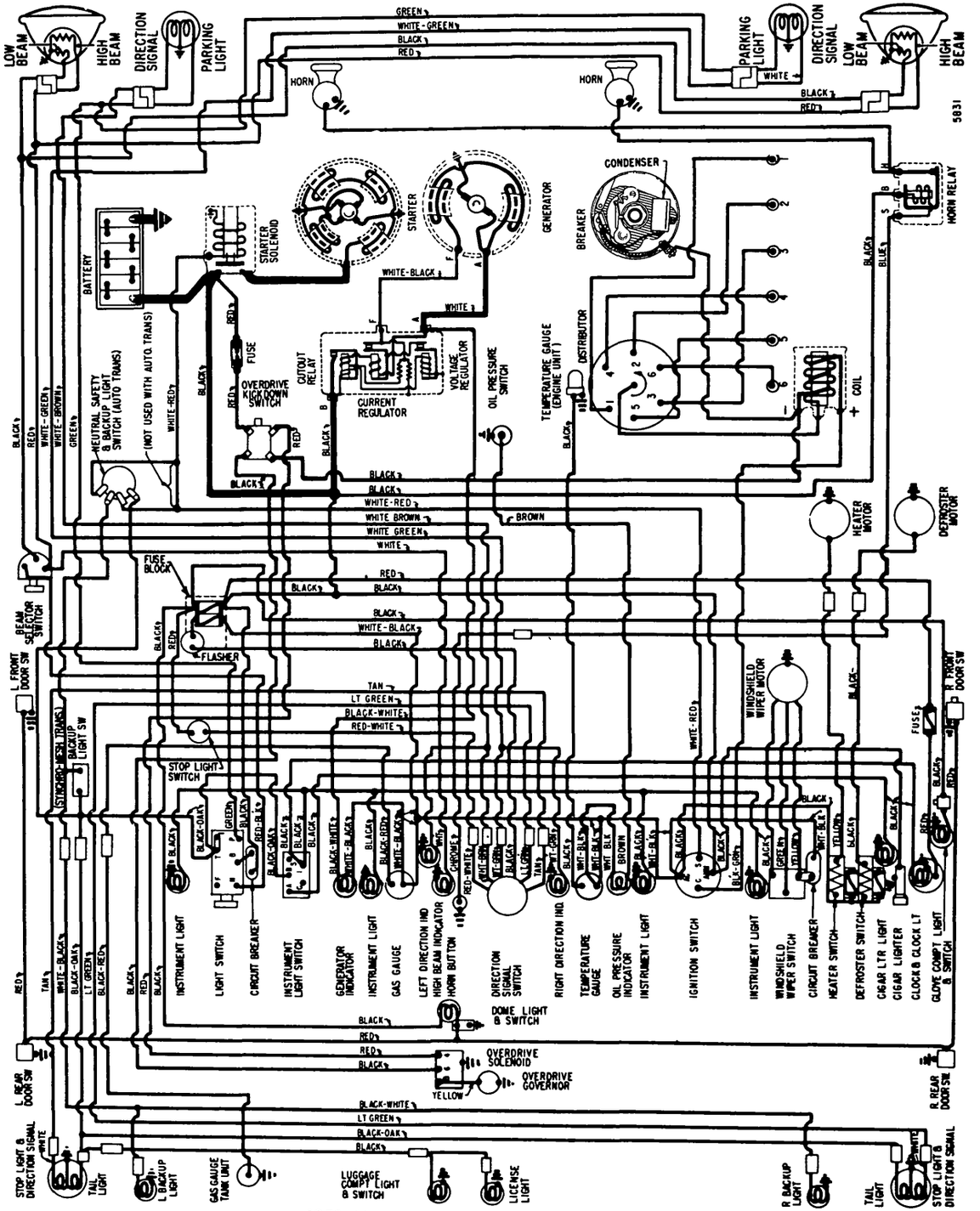
① - 7.1-1 optional compression ratio.

C mpr ssion & Vacuum Reading - *See TUNE-UP.*

►*OIL SEEPAGE AT VALVE COVER PLATE CORRECTION: S "Oiling Syst m" in Studebaker Special Data.*

OIL PAN REMOVAL: Remove oil level gauge. Raise car and support it with stands, drain oil. On long wheelbase models, swing wheels to right to move steering bellcrank out of way. On short wheelbase models, disconnect tie rods and reach rod from steering bellcrank, remove re-

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1958 ALL SIX CYLINDER MODELS

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taining pinch bolt and remove bellcrank from shaft. Then remove oil pan capscrews and remove pan.

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

PISTONS

"T" slotted, cam ground, tin plated aluminum alloy. Three ring type.

Original Bore & Pistons—*See "Original Bore & Pistons" in Studebaker Special Data.*

Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance—Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 11 to 16 lbs.

Replacement Pistons: Std. .010", .020", .030" and .040" Oversize, Pistons furnished with pins.

Installing Pistons: Install piston in cylinder bore with "T" slot away from camshaft side. *See Rod Installation.*

PISTON PINS

Pin is locked in rod by tapered pin and locknut.

Diameter—.7491-.7495". **Length** 2.625".

Clearance in Piston—.0001-.0003" (selective fit). Light thumb push fit at 70°F.

Piston Pin Removal & Installation—*See "Piston Pins" in Studebaker Special Data.*

Replacement Pins: Std. & .0025", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.007-.017"	.002-.005"
Compr. #2	1/8"	.007-.017"	.002-.005"
Oil	5/32"	.007-.017"	.0015-.004"

Replacement Rings: Std., .020", .030", & .040" Oversize, in sets.

Installing Rings: Top compression ring has step at the inside which must be installed up. Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point.

CONNECTING RODS

Length—(Center-to-center) 6 3/8". **Weight**—19.04 ozs.

Crankpin Journal Diameter—1.81175-1.81275"

Bearings—Steel backed, Microbabbitt lined, no shims.

Clearance—.0005-.002".

Side Play—.005-.009"

Replacement Bearings: Std., .001", .002", .010", .020" Undersize.

Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6).

►*REPLACEMENT ROD NOTE:* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders.

CRANKSHAFT

Journal Diameter—3.0623-3.0628". Four bearings.

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.

Bearings - Steel-backed, micro-babbitt lined. No shims.

Clearance - .0003-.0024".

Replacement Bearings: Std., .001", .010", .020", and .030" Undersize.

End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear. Controlled by shims between thrust washer and main bearing journal.

End Play—.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".

Bearings—Steel backed babbitt lined bushings.

Clearance—No. 1—.0007-.0022", Nos. 2, 3, 4—.0010-.0027".

End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft behind gear hub). Tighten capscrews alternately a few turns at a time to prevent distortion of plate.

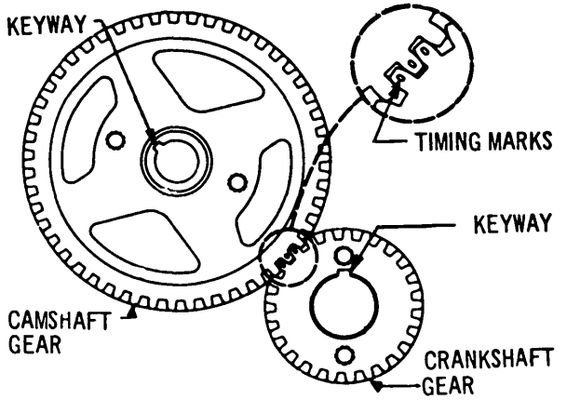
End Play—.003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub.

Backlash—.001-.003".

Camshaft Setting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear.



6 CYL. VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance: .016" cold. Intake & exhaust.

Valve	Head Diameter	Stem Diameter	Length
Intake	1 11/32"	5/16"	4 11/32"
Exhaust	1 9/32"	5/16"	4 11/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	11/32"	.0015-.0035"
Exhaust	45°	11/32"	.0015-.0035"

Valve Seat Width—1/16-3/32".

►*RECONDITIONING VALVE CAUTION:* If reconditioning results in knife edge at top of valve, valve must be replaced.

Valve Springs (1957): Install springs so that flanged edge of retainer fits over flat surface of lower coil spring. Tongue on lower side of retainer must fit in groove in spring retainer lock.

Valve Springs (1958): Springs do not have flat ground on lower coil (see Replacement Caution following).

►*VALVE SPRING & RETAINER REPLACEMENT CAUTION:* 1958 Springs (No. 512074) do not have flat ground on lower coil and are used with Retainer (No. 194505) which does not have matching locking flat. DO NOT use previous type retainer (with locking flat) with new springs. *NOTE* - Previous type springs will be furnished for service and can be used with either type retainer (new type retainer will be furnished when stock of previous type retainer exhausted).

Valve Spring Specifications

	Pressure	Length
Valve Closed	49-54 lbs.	1 21/32"
Valve Open	93-103 lbs.	1 5/16"

Valve Guides: Use Tool No. J-2034 and drive old guide down and out from top of block into valve spring chamber. Use Collar J-2034-5, guide pilot J-2034-2 on driver J-2034-1 and drive new guide down until driver bottoms against spacing collar.

Valve Lifters: Mushroom type. Remove from below with camshaft out of engine.

►*VALVE LIFTER SPRING NOTE:* Valve lifter tension springs are NOT used on 1958 engines.

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std., .001" & .005" Oversize.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore):* *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 15° BTDC. Closes 49° ABDC.

Exhaust Valves—Open 54° BLDC. Closes 10° ATDC.

Valve Timing Check—Adjust No. 1 Intake valve at .020" cold. Rotate engine until No. 6 piston is on compression stroke (the IN-OP 1-6 marking on dampener should be several inches from pointer), then while moving lifter up and down continue to rotate crankshaft. Valve timing will be correct if lifter stops moving as above marking is directly below pointer.

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ILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Studebak r Sp cial Data*

Crankcase Capacity: 5 quarts refill, 1 quart additional with filter change.

Normal Oil Pr ssur : 20-40 lbs at 2000 RPM.

Pr ssur R gulat r Valv · Opens at 40 lbs. Under plug on lower right front corner of engine. For access, remove engine front cover bolt Replace weak spring (do not attempt to stretch spring).

Oil Pr ssur Indicator: (Silver Hawk) Direct reading, non-electric type gauge, Studebaker No. 1539878.

(Oth r Models) Indicator light on instrument panel. If light on at highway speeds, low oil pressure or other difficulty indicated Oil Pressure Switch on Engine Studebaker No 1539898

Oil Pump: Helical gear type. On right side of crankcase.

Pump R moval, Ov rhaul, & Installation - *See "Oiling System" in Studebaker Special Data.*

Oil Filt r: Partial Flow Either replaceable element or disposable type used on 1957 Disposable type usedon 1958 Replace element at 5000 mile intervals or sooner if needed

R plac ment Filt r El ment: Replaceable element Studebaker No. SP 50090 (Filcron) or No 50053 (Waste)

Disp sabl Unit Studebaker No 1542739

Crankcas Ventilati n: Filter element in oil filler cap (air intake) and in breather pipe at left rear of engine (air outlet). Filter element in breather pipe is replaceable (retained by cotter pin)

COOLING

Wat r Capacity: 11 quarts without heater 12½ qts (Champion Silver Hawk & Econ-O-Miler), 11½ qts. (Scotsman) with heater

Pressure Valv : Radiator filler cap. 13 lb. (12-15) type Studebaker No. 536502

Th rmostat: Choke type in water outlet on cylinder head. Studebaker No 440066 (170°) Std - 1957, No 1542838 (170°) Std - 1958, No 531470 (160°) and No 532017 (180°) Optional

Wat r Pump: Packless, sealed ball bearing type *See "Wat r Pumps" in Stud baker Special Data.*

Pump R moval - Remove shroud *See "Cooling System" in Stud bak r Special Data* Loosen generator and remove belt Remove fan-to-hub capscrews and remove fan blades and pulley Disconnect Climatizer hose, and generator adjusting arm Disconnect outlet hose and remove mounting capscrews

Radiator & Fan Shroud R moval: *See "Cooling System" in Studebaker Sp cial Data*

T mp ratur Gaug : Direct reading, electric type (Exc Scotsman & 1957 Sedans and Station Wagons) On these models, indicator should show some green with engine at normal operating temperature If indicator shows red throughout entire range, engine temperature is above normal

Dash Unit - Studebaker No 1545446 (1958 Champion), No 1542343 (Scotsman & 1957 Sedans & Station Wagons), No 1539879 (Hawks)

Engin Unit - Studebaker No 1545220 (All Models) S *"T mperature Gauges" in Miscellaneous Section*

CLUTCH

B rg & B ck. M d l 9A7 (Std. - Early Cars), **8.5A6** (Std. - Later Cars & All O.D. Cars), **9A7** (Econ-O-Miler Taxicab). *NOTE* - Different size Driven Members (discs) used with these clutches as listed below.

Borg & Beck Clutch Nos.

Model	Cover Assy.	Clutch Disc
All Exc Taxi (Std) ①	361365	①382276
All Exc Taxi (Std) ②	361369	②382768
All exc. Taxi (O.D. Cars)	361369	②382783
Econ-O-Miler Taxicab	361480	③381812

① - 9 1/8" O.D. ② - 8½" O.D. ③ - 9¼" O.D.
① - 1957 & Farly 1958 ② - Later 1958

►*CLUTCH LINKAGE PRODUCTION CHANGE TO CORRECT GEAR CLASHING (Taxicabs)* **Install new Clutch Operating Shaft and Lever Assembly, Part No 1546329 Lever radius is 2" on new parts. Assembly installed in production at Serial No G-1428648**

Pedal Adjustment: Free Travel ½-1' To adjust, unhook pull-back spring on outside of frame rail, loosen locknut at adjusting clevis and remove clevis pin at inner end of pedal shaft, turn clevis on rear end of pedal shaft-to-operating shaft rod for correct clearance, reassemble linkage

►*HILL-HOLDER NOTE* Check setting whenever clutch pedal adjusted and adjust Hill holder to release just as clutch engages Make sure Hill-holder operating rod installed with rod to inside (toward center of car) of clutch release shaft lever

Housing Removal Remove oil level gauge and tube Remove starter mounting screws (only) and tie starter and cables up out of the way Remove floor plate and clutch housing top capscrews Remove transmission. *See "Transmission Removal" under Transmission.* Disconnect pedal rod at operating shaft-to-release sleeve, pull operating shaft out remove sleeve Remove two bolts holding rear engine support insulator cage to crossmember Support engine at rear of oil pan (use block of wood on jack to protect oil pan). Remove crossmember. Remove two clutch housing bolts releasing exhaust pipe support bracket Loosen clamp bolt and swing bracket out of way Remove remaining housing bolts and remove housing *NOTE*–Remove dowel bolts first

►*INSTALLATION CAUTION* Align clutch housing to rear engine plate with two tapered drifts, then install the dowel bolts Draw dowel bolts in place by tightening the nuts–**do not drive them into place**

Clutch Removal· Remove clutch housing (above), remove six screws evenly to relieve spring pressure, lift off clutch assembly and driven member

SYNCHRO-MESH TRANSMISSION

Warner Model T96 (Exc. Taxicab), T90 (Econ-O-Miler Taxicab) 3-Speed Used with R10 Overdrive (Opti). *See "Warner Synchro-mesh" in Transmission Section.*

►*HARD SHIFTING INTC REVERSE (CARS WITH OVERDRIVE TRANSMISSION).* If shifting into reverse difficult with Overdrive Control in "IN" position, correct by installing new Low & Reverse Outer Shift Lever, No 1546796, and new Low & Reverse Outer Shift Lever Shaft Assembly, No 1547057. Adjust transmission control after installing parts. *NOTE* -Shift lever has shaft slot rotated 16° and cam on inner shaft lever has wider face and different contour to prevent possibility of binding. *DO NOT install thes parts on other than 1958 T,6 Transmissions.*

►*GEAR CLASHING CORRECTION (Taxicabs): See CLUTCH above*

Transmission Control: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect propeller shaft at rear universal joint flange, pull shaft to rear to disengage splined joint at transmission extension, remove shaft. Disconnect shift rods at transmission case shift levers, disconnect speedometer cable at transmission case, remove speedometer pinion. Drain transmission. Support transmission and remove capscrews mounting transmission on clutch housing. Remove clutch operating shaft, bracket, and bearing from transmission case. Move transmission straight back until main drive pinion clears clutch driven member, then lower transmission and remove from beneath car.

NOTE–On Coupes and Hardtops, it will be necessary to remove additional frame crossmember before removing transmission

OVERDRIVE

Warner R10. Governor controlled, solenoid operation with throttle controlled kick-down. *NOTE* - Relay is not used in overdrive control circuit. See wiring diagram for new control circuit.

See "Warner R10 Overdrive" in Transmission Section.

Overdrive Control: *See "Warner R10 Overdrive Control" in Transmission Section.*

Removal: Remove as unit with transmission. Disconnect control wiring and cable, then proceed as for transmission removal (above).

FLIGHTOMATIC TRANSMISSION

Warner Model AS4-5H (Exc. Econ-O-Miler), AS6-7A (Econ-O-Miler Taxicab). Torque converter and hydraulically controlled three-speed planetary transmission. *NOTE* - Transmission starts in low with selector lever in "D" range

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Flightomatic" Transmission in Transmission Section.*

Lubrication: Check fluid every 1000 miles, drain and refill every 15,000 miles. Use Automatic Transmission Fluid Type "A" (container marked AQ-ATF).

►*INSPECTION HOLE COVER NOTE·* Later cars have rubber covered inspection hole cover installed over floor mat which can be removed for fluid checking without disturbing floor mat.

Checking Fluid Level–Place selector lever in "P" position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Clean all dirt and foreign material from dipstick. Apply parking brake and foot brake, and move selector lever slowly

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from "P" position to "R" position, then back to "D" position. Remove dipstick, wipe clean, and install in transmission and **turn clockwise to lock position.** Remove dipstick and read fluid level. Add fluid to bring level to "FULL" mark on dipstick (1½ pints between "LOW" and "FULL" marks on dipstick).

Capacity - 9 qts. (Exc. Econ-O-Miler Taxicab), 9½ qts. (Econ-O-Miler). Use only Automatic Transmission Fluid Type A (in container marked AQ-ATF).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER FLIGHTOMATIC DATA: See "Flightomatic Transmission" in Transmission Section.*

UNIVERSALS

►*LATE 1957 & 1958 UNIVERSAL JOINT REPLACEMENT CAUTION:* Universal joints, with and without grease fittings were used in production on some models (some propeller shafts had both types) When replacing a universal joint, install the same type as removed

Spicer. Needle bearing cross type Three used with intermediate universal at propeller shaft support bearing on 1957 Models Two used with one-piece propeller shaft on 1958 Models.

►*UNIVERSAL LUBRICATION NOTE:* **Universals should be disassembled, cleaned, and repacked with special Universal Joint Lubricant at 20,000 mile intervals.**

Propeller Shaft & Support Bearing (1957): Two shafts used

1) Front shaft with intermediate universal yoke bolted on rear end (no slip-joint)

2) Rear shaft with slip-joint on forward end at intermediate universal

Propeller Shaft & Support Bearing Removal & Servicing—*See "Propeller Shaft" in Studebaker Special Data.*

Propeller Shaft (1958): One-piece type No center bearing

►*DRIVE LINE VIBRATION CORRECTION (Scotsman Cars with Overdrive Transmission): See Rear Axle (below).*

REAR AXLE

Spicer Model 23-1 (Exc. Econ-O-Miler Taxicab), 44-3 (Econ-O-Miler). Semi-floating, hypoid gear with Hotchkiss Drive.

See "Spicer Hypoid" in Rear Axle Section.

►*"TWIN-TRACTION" DIFFFRENTIAL NOTE:* Optl on all models. Identified by decal next to ignition switch (early cars), by emblem on deck lid (all cars) *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

►*DRIVE LINE VIBRATION CORRECTION (Scotsman Overdrive Transmission Cars before Serial No. G-1408561):* 32-40 MPH "rhythmic beat" vibration in overdrive can be corrected by installing 2° wedge shims between rear spring and axle pad. *See "Rear Axle Notes" in Studebaker Special Data for procedure. NOTE - Later cars (with modified spring pad angle) are marked by yellow paint on one spring pad and do not require this correction.*

Axle Ratios (1957)

Transmission	Standard	Optional
Standard	4.10-1	4.56-1
Overdrive	4.56-1	4.10, 4.88-1
Automatic	3.54-1	4.10-1

Axle Ratios (1958)

Model	Synchro-mesh	Overdrive
All (exc. below)	①4.10-1 (41-10)	②4.56-1 (41-9)
Scotsman Sedans	③3.54-1 (46-13)	③3.54-1 (46-13)
Econ-O-Miler Taxi	④4.09-1 (45-11)	
		Flightomatic Trans.
All Models		3.54-1 (46-13)

Twin-Traction Axle Ratios

Model	Synchro-mesh	Overdrive
All (exc. below)	⑤4.09-1 (45-11)	⑥4.55-1 (50-11)
Scotsman Sedans	⑦3.54-1 (46-13)	⑦3.54-1 (46-13)

Optional Ratios (for above tables) as follows:
① - 3.54-1, ② - 4.10-1, ③ - 4.10-1 & 4.56-1, ④ - 4.27-1, ⑤ - 3.54-1 & 4.55-1, ⑥ - 4.09-1, ⑦ - 4.09-1 & 4.55-1.

►*REAR AXLE RATIO NOTE:* Ratio is stamped on plate attached to axle by cover capscrew and also stamped on ring and pinion gears.

Backlash - .003-.006".

Axle Shaft Removal: Remove wheel, remove wheel hub (use puller J-1644-B) Take out backing plate retaining bolts, remove outer oil seal Pull backing plate out over end of axle shaft and wire plate to frame (*CAUTION*—Do not lose adjusting shims located between backing plate and axle housing flange), pull axle shaft with puller HM-931

Rear Axle Assembly Removal: Remove hub caps, take out cotter pin from axle nut, loosen rear wheel nuts. Place car on stands on frame just ahead of rear springs, Remove wheels, hubs and drums. Disconnect hand brake cable, take out backing plate bolts from backing plates free hydraulic brake line from axle housing clips (do not disconnect brake line from wheel cylinders) Disconnect rear universal (wire caps or use clamp to prevent losing rollers) Remove rear spring "U" bolts, disconnect lower shock absorber links, remove rear axle assembly from car

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims .003", .005", .010", .030" thick).

End Play — .001-.006".

►*REAR WHEEL BEARING LUBRICATION CAUTION:* No lubrication plug provided on 1958 Models, but bearings are NOT lubricated for life Remove, clean, and repack bearings at 25,000 mile intervals

SHOCK ABSORBERS

Gabriel or Monroe. Direct acting, hydraulic type. Serviced by replacement. *NOTE* - Gabriel Heavy Duty Adjustable type used on Econ-O-Miler Taxicab. See Adjustment below.

►*1957-58 SHOCK ABSORBER NOISE CORRECTION:* Chuckle or similar noise may be caused by shock absorber rubber bushings and may be corrected by installing new bushings. *See "Shock Absorber Notes" in Studebaker Special Data for bushing installation.*

1957 Monroe Shocks (Stud bak r N.)

	Front	Rear
Station Wagon	1541904	1541913
Others	1541904	1541911

1957 Gabriel Shocks (Stud bak r N.)

	Front	Rear
Heavy Duty (Non-Adj.)	1541958	1541959
Heavy Duty (Adj.)	1541901	1541910

1958 Shock Absorbers (Stud bak r N.)

Model	Front	Rear
All (exc. below) Gabriel	1545055	①1545050
All (exc. below) Monroe	1545047	1545044
Econ-O-Miler Taxi Gabriel	1544410	1544411

① - No. 1545987 on Scotsman Station Wagon.

Adjustment (Econ-O-Miler) - Disconnect one end of shock absorber and collapse it fully to engage internal coupling, then rotate lower shaft until arrow on body lines up with "Soft", "Normal", or "Firm" arrow on dustcover.

FRONT SUSPENSION

Independent. Coil spring suspension with front shock absorbers located within coil springs. *NOTE* - Sedan models have variable rate front springs. These have coils closer together at one end and must be installed toward top.

See "Studebaker" in Suspensions & Wheel Alignment Section

Kingpin Inclination - 6° at 0° camber.

Caster - Neg. 1° to Neg 2½° Not more than ¾° variation between wheels.

Camber - 0° to Pos. 1°. ½° more camber favored on driver's side.

Toe-In - 1/16"-1/8".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be turned 23½-24½° (1958), 22½-23½°(1957).

STEERING

►*POWER LOSS ON LEFT TURN CORRECTION. See "Saginaw Power Steering (Not In Line)" in Steering Section*

Manual: Ross TL-12(All exc. Econ-O-Miler), **SL-54** (Econ-O-Miler & All Cars with Power Steering). *NOTE* - TL-12 is Cam & Twin Lever type. SL-54 is Cam & Single Lever (with roller stud)

See "Ross Cam & Twin Lever" in Steering Section.

Power Steering (1957): Saginaw (Not In Line) *See "Saginaw Power Steering (Not In Line)" in Steering Section.*

Power Steering (1958): Bendix Linkage Type Used with conventional steering gear *NOTE* - Power steering not available on Scotsman models *See Bendix Linkage Type Power Steering" in Steering Section*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Twin Lever" in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Twin Lever" in Steering Section.*

BRAKES

►*BRAKE LINE INTERFERENCE CORRECTION:* Interference may occur between brake line and exhaust pipe at point where brake line held in clip on right side of differential housing. If clip upward so that brake line above level of differential housing, remove housing screw and reverse clip so that brake line is below top of housing.

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Servic : Wagn r Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking lever applies rear wheel service brakes.
See "Wagner Lockheed S lf-centering Brakes" in Brake S ction.
Drum Diam t r - (Econ-O-Miler) Front 11", Rear 10"; (Others) Front 10", Rear 9".
Master Cylind r B r Diameter - 1" (All Models).
Wh el Cylind r Diam t r - (Econ-O-Miler) 1 1/16" Front, 7/8" Rear. (Others) 1" Front, 13/16" Rear.

Brak Lining: Marshall Eclipse molded lining used on all shoes. *ECON-O-MILER NOTE* - Brake shoes with heavy duty BONDED lining used in production on later cars and furnished for service.

►*1957 PRIMARY BRAKE SHOE LINING LENGTH PRODUCTION CHANGE:* Primary shoe lining length has been changed to· 8 5/32" (Front) and 7 1/4" (Rear) on later cars.

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 1/4" thick (exc. Econ-O-Miler), 7/32" (Econ-O-Miler), (3/16" on all other shoes) and is pre-ground off-center at the factory to eliminate brake squeal. This lining is applied to the full length of the shoe, and is marked "secondary" and "top" and should be installed as marked.

1957 Lining Width & Length

	Fr nt Wheel	Rear Wheel
Primary Shoes ①	2" x 10 29/32"	2" x 9 27/32"
Secondary Shoes	2" x 10 29/32"	2" x 9 27/32"

① Early Cars. For later cars See *"Production Change" above.*

1958 Lining Width & L ngth

(Champi n & Sc tsman)

	Fr nt Wh l	R ar Wh l
Primary Shoes	2" x 8 15/32"	2" x 7 9/16"
Secondary Shoes	2" x 10 53/64"	2" x 9 3/4"

(Econ-O-Miler)

Primary Shoes	2 1/4" x 9 21/64"	2" x 8 15/32"
Secondary Shoes	2 1/4" x 11 57/64"	2" x 10 27/32"

Thickness - 3/16" (exc. front wheel secondary), 1/4" front wheel secondary, (except Econ-O-Miler 7/32").

Clearance - Lock shoes against drums, then turn adjusting screw back eight notches or more as required to free drum.

Braking Power - 62% Front wheels, 38% Rear wheels.

Hill Holder: Used on Synchro-mesh Trans. Cars. *See "Hill-holder" in Brake Section for data*

Standard Master Cylinder: On frame left side rail at base of brake pedal

Checking Fluid—Access hole in front floor pan at left corner of drivers' seat. Fluid should be maintained at level ½" below top of filler opening

Removal—Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from frame bracket and then from spring clip which is attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder *(NOTE*—On cars equipped with Hill-holder, only one line is connected to master cylinder). Remove brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder Insert forward mounting bolt ing bolt to hold Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Power Unit. Used in conjunction with standard master cylinder and located under hood on left front fender apron.
See "Hydrovac Power Unit" in Brake Section.

Removal—Disconnect vacuum and brake lines, stop light wires, remove power unit-to-bracket mounting bolts

MISC. MECHANICAL

Windshield Wiper: (Champion & Silver Hawk) Auto-Lite or Bosch Electric type, (Scotsman & Econ-O-Miler Taxicab) Trico Vacuum type.
See "Windshield Wipers" in Miscellaneous Section.

Power Window Regulators: Electrical, with reversible motors in each window. Individual switches at each door and master switch on left front door. *See "P wer Window Regulators" in Miscellaneous Section.*

Power S at Adjusters: Two-way electric type with curved seat tracks for seat adjustment.
See "Power Seat Adjusters" in Miscellaneous Section.

MODEL IDENTIFICATION

Model	Model Designation
Comm. Cust. & Deluxe	57B(F & W)
Comm. Parkview	57B(D)
Comm. Provincial	57B(P)
President	57H(F & W)
Pres. Classic	57H(Y)
Pres. Broadmoor	57H(P)
Pres. Silverhawk	57H(C)

SERIAL NUMBER: Stamped on plate on left front door hinge post.

Starting Serial Numbers - As follows:

Assembly Plant	Commander	President
South Bend	8454101	7188901
Canada	8962601	7901501

ENGINE NUMBER: Stamped on cylinder block to left and in front of oil filler pipe.

Starting Engine Numbers — As follows:

Assembly Plant	Commander	President
South Bend	V-390001	P-39601
Canada	VC-10701	PC-1501

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. (approximately) at cranking speed (150 RPM).

VACUUM READING: Steady 18-20" at idling.

VALVE TAPPET CLEARANCE: .023-.025" engine hot and idling, .025-.027" engine cold.

MANIFOLD HEAT CONTROL: Automatic Thermostatic type located in right bank exhaust manifold outlet.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plug - Champion H-11. Torque to 30 ft. lbs. or seat spark plug on new gasket finger tight, then tighten an additional ½ turn.

COIL: Delco-Remy 1115087 or 1115096.

Ignition Current - 3.8 amps. (idling).

Resistor - Delco-Remy 1931614 (1115087 Coil), 1927809 (1115096 Coil). 1.4-1.65 ohms at 75°F.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. Resistor is bypassed during cranking by lead from starter-solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110864.

Condenser — Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set — Delco-Remy 1918148.

Breaker Gap — .013-.018".

Cam Angle - 26-33° with .016" gap.

Breaker Arm Spring Tension — 19-23 ozs.

Rotation — Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-3	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Control: Delco-Remy 1116058. Integral type.

Plunger Travel — 11/64-3/16".

Vacuum Advanc

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.50

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting — 4° BTDC with vacuum line to distributor disconnected and opening in carburetor plugged. Engine at normal idle speed.

Timing Mark — "IGN" line on vibration dampener aligned with pointer on timing gear cover.

►*IGNITION TIMING CAUTION:* The manufacturer recommends that no attempt be made to time the engine except with a suitable timing light and that timing mark on vibration dampener be directly under pointer. *DO NOT SET TIMING BY THE "PING" METHOD.*

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg 2-barrel and Carter 4-barrel used as follows:*

Model	Optional	Standard
Comm. (All)	Carter	Stromberg
Pres. & Broadmoor	Carter	Stromberg
Pres. (Classic & Silverhawk)		Carter

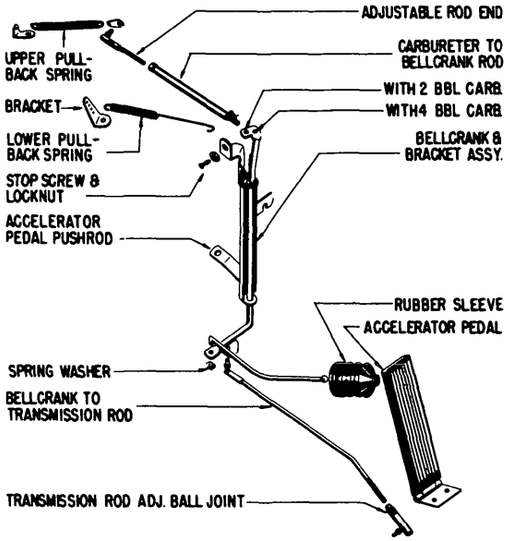
►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position. Set the stop on the bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position. Make sure that the carburetor-to-bellcrank rod ball joint is in the outer hole of the bellcrank pad (away from centerline of engine), and that the ball joint is on the underneath side of the lever.

2) Adjust the carburetor-to-bellcrank rod until the idle speed adjusting screw just begins to leave its stop.

3) After stop is adjusted, hold in this position. *(NOTE - Make sure that carburetor-to-bellcrank rod ball joint is in the inner hole of bellcrank pad on cars with 2-barrel carburetors, and in the outer hole on cars with 4-barrel carburetors. In both cases, the ball joint must be located on the underneath side of bellcrank).* Adjust the carburetor-to-bellcrank rod until the idle speed screw on carburetor throttle lever just begins to leave the stop. Stop the engine and remove the 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by the foot brake. Adjust length of the main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. pressure on cars with heavy duty transmissions such as used on police cars). Stop the engine, remove gauge, and install the pipe plug in side of transmission.



FLIGHTOMATIC TRANSMISSION THROTTLE LINKAGE

THROTTLE RETURN CHECK (4-BARREL CARBURETOR) ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust the return check in the bracket until plunger just breaks contact with with tab on throttle lever. Mark position of check assembly relative to bracket, then turn check assembly **1¾ to 2 turns toward lever.** Tighten locknut.

THROTTLE RETURN CHECK (2-BARREL CARBURETOR) ADJUSTMENT: Place idle speed adjusting screw on fourth step of fast idle cam (lowest step being No. 1). Adjust throttle return check screw until it just contacts the pad on throttle shaft lever.

STROMBERG WW

Stromberg Series WW, Code 6-117A. Throttle return Check used on all models with Flightomatic Transmissions.

►*CARBURETOR 6-117A & B CUTTING OUT ON LEFT TURN CORRECTION: See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section.*

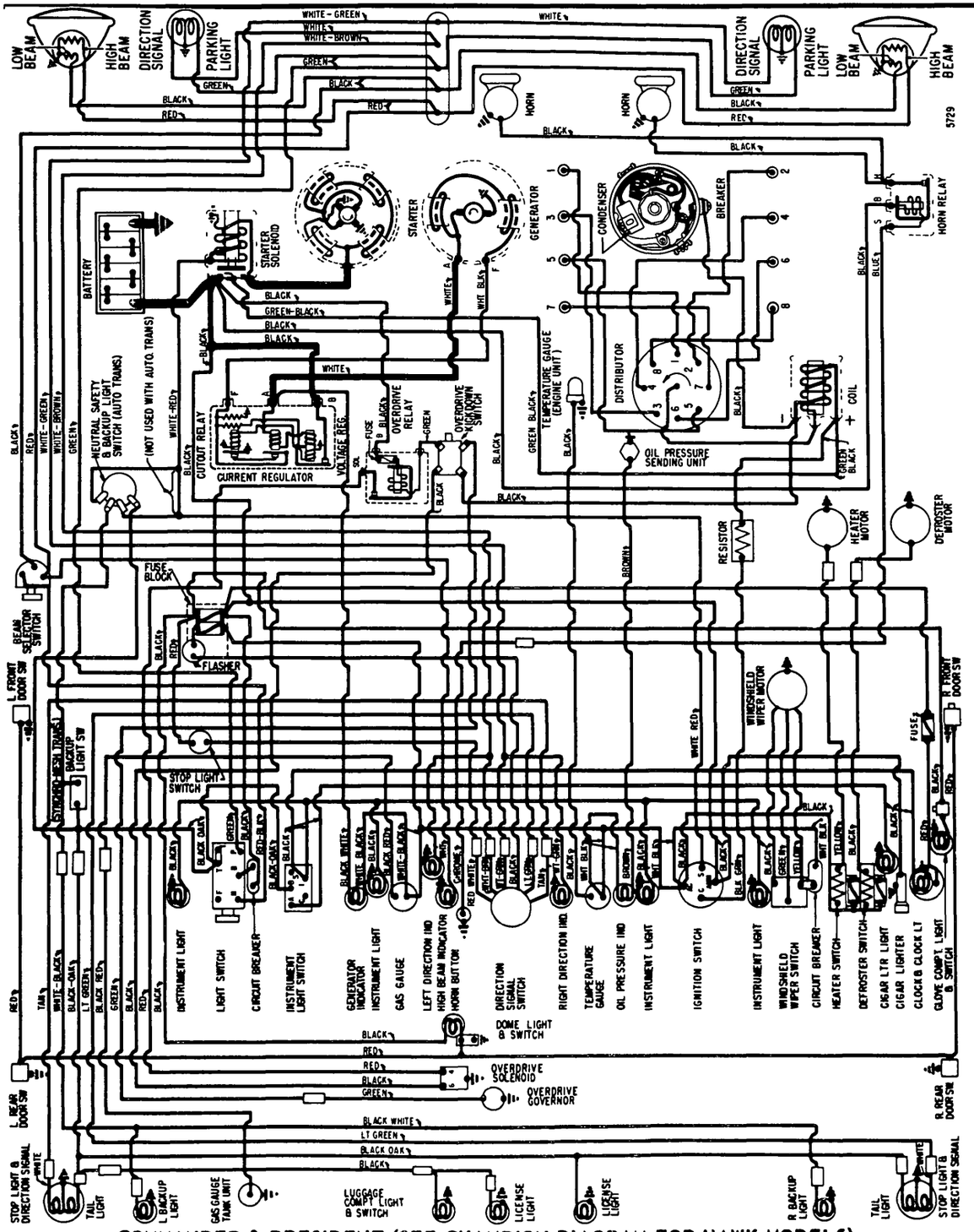
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting — Initial setting, 1¾ turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed — 550-600 RPM (with selector lever in neutral "N" position on Flightomatic).

Float Level — 3/16" from top edge of bowl to top of float with needle valve seated. To check, remove air horn and bowl cover, remove gasket, place float level gauge T-25569 (Studebaker No. J-5475) squarely on top edge of float bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required using bending tool

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COMMANDER & PRESIDENT (SEE CHAMPION DIAGRAM FOR HAWK MODELS)

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T-24733 (Studebaker No. KMO-269-S5).

Acc l rating Pump – Center hole – Normal Setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: With choke valve closed and fast idle cam in fast idle position, one-half diameter of button at end of throttle stop screw should rest against step of fast idle cam. If contact between button and cam not as indicated, bend choke ear up or down as required

Automatic Choke Setting: 1 point lean with arrow on cover one notch lean from boss on housing.

Throttle Linkage Adjustment: *See CARBURETOR above.*

► *OTHER DATA: See "Stromberg WW Carburetors" in Carburetion Section*

CARTER WCFB

Carter WCFB 2219SB (Std. & O.D.), 2214SB (Aut. Trans.).

► *MANIFOLD FUEL DISTRIBUTION. Carburetor RIGHT barrels feed Cyl 1-4-6-7, LEFT barrels 2-3-5-8*

Idle Setting - ½-1½ turns open Turn screws out for richer mixture

Idle Speed - 550-600 RPM (all models)

Throttle Linkage Adjustment: *See CARBURETOR above*

► *OTHER DATA: See "Carter WCFB Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter No M2211S or M2573S Fuel Only

Pressure - 3½-5½ lbs (All models)

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Electric type

Dash Unit - Studebaker No 1542342 (Sedans & Sta Wgn), No 1539880 (Hard Top "Hawk")

Tank Unit - Studebaker No 1540262 (Sedans), No 1540263 (Coupes Hard Tops & Sta Wgns)

See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY TYPE (Plasticized Paper) standard on all Commander Models President & Broadmoor OIL BATH TYPE Sandard on President Classis & Silver Hawk, Optional on all other models

► *DRY TYPE FILTER CAUTION:* Remove filter element every 1000 miles and shake thoroughly to remove dirt DO NOT wash element or blow out with compressd air Replace filter every six months or 10,000 miles

BATTERY

Willard HDW-2SM-50. *12 Volt,* 9 plate, 50 ampere hour capacity (20 hr. rate).

Battery Ground – Negative.

► *CAUTION: This is reversed from previous models.*

Engine Ground – Right front of engine.

STARTER

Delco-Remy 1107650 (Synchro-mesh & Overdrive), 1107651 (Flightomatic). *12 Volt.* **Armature 1933789.**

Drive – Bendix "Folo-thru" type.

Rotation – Counter-clockwise at commutator end.

Brush Spring Tension – 35 ozs. minimum

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Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic type switch, controlled by combination Ignition & Starting Switch. Turn key full right to start engine.

Automatic Transmission Neutral Safety Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in "N" or "P" position.

Adjustment: *See "Flightomatic" Transmission in Transmission Section.*

GENERATOR

Delco-Remy 1102003. *12 Volt.* **Armature 1923535.**
Maximum Charging Rate – *See Voltage Regulator.*

Performance Data - Cold

Amperes	Volts	RPM
30	14.0	2240

Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amperes at 12 volts and 80°F.
Rotation – Counter-clockwise at commutator end.
B lt Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".

REGULATOR

Delco-Remy 1119123. *12 Volt. NOTE - Regulator is "1119000 Series". Specifications below are for "Normal" Settings.*

Cutout Relay

Cuts In – 11.8-13.5 volts (hot).
Contact Gap – .020"
Air Gap – .020" with contacts just closed.

Voltage Regulator

Setting – 13.8-14.8 volts (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

Current Regulator

Setting – 27-33 amps. (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See Electrical Section.*
Directional Signal: *See Electrical Section.*
Light Switch Removal: Remove switch retaining nut. Push switch sleeve back into panel and disconnect wires from switch.
St p Light Switch: Located on inner side of left frame rail just forward of steering gear housing. On models with power brakes, switch is screwed into hydraulic cylinder of power brake unit.
FUSES: Body & Stop Lights 15 amps. in block in bracket behind instrument panel.
Direction Signal - 15 amps. in block in bracket behind instrument panel.
Overdriv - 15 amps. in relay on dash panel.
Cl ck - 1 amp. in lead behind instrument panel
CIRCUIT BREAKERS: H ad, Parking, Tail & Instrum nt Lights - 18 amps. on headlight switch.
Windshield Wiper - 5 amps. in wiper switch
Horn Relay: Delco-Remy No. 1116781.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting and part of air conditioning equipment or lines for access to engine, See "Air Conditioning Service Cautions" in Misc. Sect.*

ENGINE SPECIFICATIONS: "Sweepstakes 259" & "Sweepstakes 289". V8, valve-in-head.

Engine	Bore	Stroke	Displacement
259	3-9/16"	3-1/4"	259.2 cu. ins.
289	3-9/16"	3-5/8"	289 cu. ins.

Engine	Compr. Ratio	Rated HP	Dev. HP
259	8.0-1 ①	40.6	②
289	8.0-1 ①	40.6	③

① – 7.5-1 Optional
② – 180 HP at 4500 RPM with 2-Barrel Carburetor, 195 HP at 4500 RPM with 4-Barrel Carburetor.
③ – 210 HP at 4500 RPM with 2-Barrel Carburetor, 225 HP at 4500 RPM with 4-Barrel Carburetor.

Compression & Vacuum Reading – *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

OIL PAN REMOVAL: *See "Oiling System" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*

►*PISTON REPLACEMENT CAUTION: "259" & "289" Engine pistons are NOT INTERCHANGEABLE. "Flat Head" piston used on 259" Engine. "Concave Head" Piston used on 289" Engine.*

Weight - 16.2 ozs.
Removal - Pistons & rods remove from above.
Fitting New Pistons: Clearance - Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 8-13 lbs.
Replacement Pistons: Std. size & .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.
Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PISTON PINS

Locked in rod by tapered pin and locknut.
Diam t r – .8741-.8745". **L ngth** – 3 1/16".
Cl aranc in Pist n – .0001-.0003" (selective fit). Light finger push fit at 70° F.
R plac m nt Pins: Std. size & .0025", .005" oversize.
R m val & Installati n: *See "Piston Pins" in Studebak r Sp cial Data.*

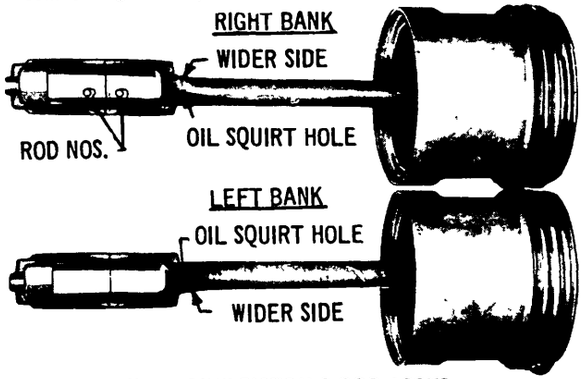
PISTON RINGS

Ring	Width	End Gap	Sid Cl aranc
Compression	.077-.078"	.008-.016"	.002-.005"
Oil	.1855-.1865"	.088-.016"	.0015-.005"

Replacement Rings: Sets of Std., .020", .030" and .040" Oversize.
See "Piston Rings" in Studebak r Special Data.
Installing Rings: Install compression rings with chamfered side of ring upward. Gaps of inner and outer oil rings must not come at same point.

CONNECTING RODS

Length - 6 5/8" center-to-center. **W ight** - 23.71 ozs.
Crankpin J ournal Diameter - 1.99925-2.00025".
Lower Bearing - Interchangeable. Steel backed, micro-babbitt lined type. No shims.
Clearance - .0005-.002". **Sideplay** - .008-.013".
Replacement Bearings: Std., .001", .002", .010" and .020" Undersize.
Installing Rods: Number on rod and bearing cap must be on same side. Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank.



V8 ENGINE PISTON & ROD ASSYS.

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

►*REPLACEMENT ROD IDENTIFICATION NOTE:* Replacement rods are unnumbered. To identify, hold rod upright with oil hole toward you. Wide part of offset will be to right on left bank rods to left on right bank rods.

CRANKSHAFT

Journal Diameter–2.4995-2.5000".
Clearance–.0005-.0025".
Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.
End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by

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shims between thrust plate and face of main bearing journal. **Endplay**—.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings—Precision type, steel backed babbitt lined.

Clearance — .00075-.00225" (No 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

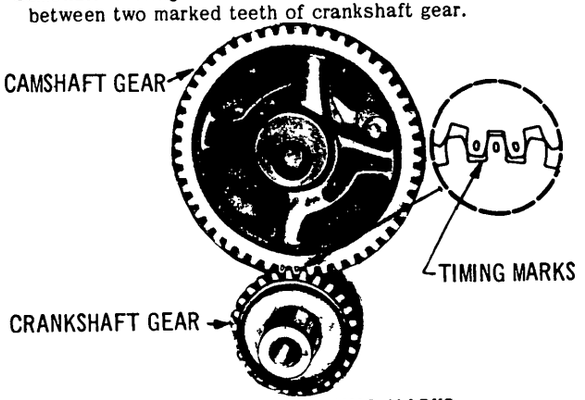
Endplay—.003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.

Backlash—.001-.003".

Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.



V8 ENGINE VALVE TIMING MARKS

Engine Front Cover Removal: *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

►*ROCKER ARM ADJUSTING SCREW PRODUCTION CHANGE* Effective Eng. No V-396500 (259"), P-45703 (289") & PS-2415 (Golden Hawk) rocker arm adjusting screw No 1541806, entered production. Screw has recessed head to prevent pushrod from slipping out of socket if a valve sticks, and to prevent bent pushrods.

Tappet Clearance: 023-025" (Hot) 025-027" (Cold)

Valve	Head Diam.	Stem Diam.	Stem Clearance
Intake	1-21/32"	11/32"	.0015-.0035"
Exhaust	1-17/32"	11/32"	.0015-.0035"

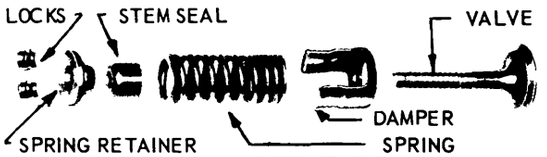
Seat Angle—45° (all valves) **Lift**—23/64" (all valves).

Valve Seat Width—1/16-3/32".

Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

Valve Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below. *NOTE* - Damper installed on lower (close-coiled) end of all springs.

Valve Spring Specifications - 106-112 lbs when compressed to 1 43/64".



V8 ENGINE VALVE ASSY.

Valve Guides Pressed in head from underside.

Guide Removal & Installation—*See "Valve System" in Studebaker Special Data.*

Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore). See "Valve System" in Studebaker Special Data.*

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std. size, .001", .005" oversize.

►*CAUTION—When lifters removed, make sure they are installed in original positions.*

Rocker Arms *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 11° BTDC. Close 54°36' ALDC.

Exhaust Valves—Open 51°36' BLDC. Close 14° ATDC.

Valve Timing Check—Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 qts. (add one quart when filter changed).

Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.

Pressure Regulator Valve — Located on right side at front of engine block slightly above crankcase flange.

Oil Pressure Indicator: Coupe & Hardtop Models - Direct reading, non-electric type gauge

Sedans & Station Wagons - Indicator light on instrument panel

Oil Pressure Switch - Studebaker No 1539898

Oil Pump: Spur gear type. Mounted on rear main bearing cap and driven by camshaft gear.

Pump Removal, Overhaul & Installation: *See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial Flow. Either replaceable element or disposable type used. Replace filter or element at 5000 mile intervals or sooner if needed.

Replacement Filter Element: Replaceable Element Studebaker No SP 50090 (Filcron) or No 50053 (Waste)

Disposable Unit Studebaker No 1542739

Crankcase Ventilation: Filter element in oil filler cap (air intake) and breather tube at rear of engine (air outlet).

COOLING

Water Capacity: 17 qts. (18.5 with heater)

Pressure Valve: Radiator filler cap 13 lb. type

Thermostat: Choke type. Studebaker No 1540787 (170°) Std. No 533247 (160°) and No 533257 (180°) Optl.

Water Pump: Packless sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*

Pump Removal: Drain cooling system. Loosen generator, remove belt. Remove fan-to-hub screws and remove fan and pulley. On Coupe and Hardtop models, remove shroud. Remove four capscrews retaining pump cover to water pump manifold. Remove pump.

Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*

Temperature Indicators: Coupe & Hardtop Models - Direct reading electric type gauge

Sedans & Station Wagons - Red-green indicator on instrument panel. Electric type. When indicator shows any green, engine is operating at normal temperature. If it turns red through entire range, engine operating temperature is above normal.

Dash Unit - Studebaker No 1542343 (Sedans & Station Wagons), No 1539879 (Coupes & Hardtops)

Engine Unit - Studebaker No 1539876 (All Models). *See "Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Borg & Beck. Single plate dry disc type.

Series	Clutch Model	Assy No.	Disc No.
Commander	10A7	361454	382650
Pres. "Classic"	10A6	361456	382389
Pres. (Others)	10A6	361386	382389
Golden Hawk	10.5A8	361451	382643
Packard	10.5A8	361451	382643

See "Borg & Beck" in Clutch Section.

Pedal Adjustment: Pedal free travel 1/2-1". To make adjustment, loosen locknut securing clevis to rod connecting release shaft lever to clutch operating shaft lever and remove the clevis pin. Turn clevis to shorten or lengthen rod as necessary for correct pedal free travel. *NOTE—If car is equipped with "Hill-Holder", adjust "Hill-Holder" operating rod as outlined in Brake Section.*

Clutch Housing Removal. Remove starter. Remove floor plate and clutch housing top capscrews. Remove clutch operating shaft. Remove transmission (see Synchro-mesh Transmission Removal below). Remove two bolts holding engine rear support insulator cage to crossmember. Place a small hydraulic jack at rear of oil pan and insert a block between jack pad and oil pan to prevent damage to pan. Raise engine just enough to take weight of engine off crossmember. Remove support crossmember-to-frame bolts and remove cross member. Remove the two clutch housing bolts retaining exhaust pipe support bracket. Loosen clamp bolt and swing support bracket out of way. Remove clutch housing cover plate. Remove remaining housing mounting bolts or capscrews and remove clutch housing.

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Clutch R moval. Remove clutch housing (above), remove six screws evenly to release pressure, litt off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model T86 (Commander), T86E (President). T85 with Overdrive (Golden Hawk and Packard). *See "Warner Synchro-mesh Transmission" in Transmission Section.*

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

R moval: Drain transmission case. Disconnect universal joint from transmission companion flange and remove propeller shaft support stud nuts and plain washer. Move front propeller shaft and support assembly rearward on slip yoke splines. Move end of shaft to one side as far as possible and tie it in position. Disconnect shift rods from shift levers and remove speedometer cable from transmission case. Remove speedometer pinion. Remove capscre vs which hold transmission case to clutch housing. Remove clutch operating shaft bracket, and bearing from transmission case. Move case rearward until the main drive pinion clears clutch pressure plate and remove unit from car.

OVERDRIVE

Warner R10 Type (Part of T85 & T86E Trans.). Governor controlled, with electric solenoid operation and throttle controlled "kickdown"

See "Warner R10" Overdrive in Transmission Section.

Overdrive Controls: *See "Overdrive Controls" in Transmission Section.*

R moval: Same as for Synchro-mesh Transmission (above) after control wiring and cable have been disconnected.

FLIGHTOMATIC TRANSMISSION

Hydraulic torque converter and a hydraulically controlled three-speed planetary type transmission which provides automatic operation in "D" range and additional "Lo", "R", and "P" ranges which are controlled manually. In "D" position, the car starts in low gear and progresses to intermediate and high as car speed is increased.

► *"NO REVERSE" CORRECTION: See "Flightomatic" Transmission in Transmission Section.*

► *PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic" Transmission in Transmission Section.*

► *TESTING & TROUBLE SHOOTING: See "Flightomatic" Transmission in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A" (marked AQ-ATF on container).

Checking Fluid Level – Place selector lever in "P" position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Apply parking brake and foot brake, move selector lever slowly from "P" position to "R" position, then back to "D" position. Remove dipstick and read fluid level. Add fluid to bring level to "FULL" mark on dipstick (1½ pints between "LOW" and "FULL" marks on dipstick)

Capacity - 9 qts Use Automatic Transmission Fluid Type "A" (marked AQ-ATF on container)

Throttle Linkage Adjustment: *S CARBURETOR abov*

► *OTHER FLIGHTOMATIC DATA: See "Flightomatic" Transmissi on in Transmission Section.*

UNIVERSALS

► *LATE 1957 & 1958 STUDEBAKER UNIVERSAL JOINT REPLACEMENT CAUTION:* Universal joints, with and without grease fittings were used in production on some models (some propeller shafts had both types). When replacing a universal joint, install the same type as removed.

Spicer. Needle bearing cross type. Three used, with intermediate universal at propeller shaft support bearing on crossmember.

Propeller Shaft & Support Bearings: Two shafts used.

1) Front shaft with intermediate universal yoke bolted to rear end (no slip-joint).

2) Rear shaft with slip-joint on forward end at intermediate universal.

Propeller Shaft & Support Bearing Removal: *See "Propeller Shaft Notes" in Studebaker Special Data.*

REAR AXLE

Spicer. Semi-floating, hypoid gear, with Hotchkiss Drive *See "Spicer-Hypoid" in Rear Axle Section*

► *TWIN-TRACTION DIFFERENTIAL NOTE:* Twin-Traction differential is optional with same gear ratios as conventional differential For Service Information *See "Spicer Power-Lock Differential" in Rear Axle Section*

► *TWIN-TRACTION REAR AXLE IDENTIFICATION NOTE:* Cars with Twin-Traction Differential will have a Red Sticker on front door rear face just above door lock and small tag attached to differential cover screw with the letter "T" stamped on it.

Rear Axle Ratio: Rear axle ratio stamped on plate attached to axle by cover cap screw and also on ring and pinion gears.

Standard Ratios

Series	Std.	O.D.	Auto.
Commander	3 54-1	3 92-1	3 31-1
Pres. (Exc.4-Dr.Classic)	3 54-1	3 92-1	3 31-1
Pres. (4-Dr. Classic)	3 54-1	4 09-1	3 31-1
Golden Hawk	4.27-1		3.31-1
Packard Clipper	4.27-1		3.31-1

Optional Ratios

Series	Std.	O.D.	Auto.
Commander	3.92-1	①	3.07-1
Pres.(Exc.4-Dr.Classic)	3.92-1	②	3.07-1
Pres.(4-Dr.Classic)	3 92-1	③	3.07-1
Golden Hawk		④	
Packard Clipper		⑤	⑥

① - 3.54-1, 4.27-1.
② - 3.54-1, 4 27-1, 3.73-1, 4.09-1.
③ - 3.54-1, 4.27-1, 3.73-1.
④ - 3.54-1, 3.92-1, 3.73-1, 4.09-1, 4 55-1
⑤ - 3.92-1, 4.55-1.
⑥ - 3.07-1, 3 54-1.

Backlash—.003-.006".

Axl Shaft R m val: Remove wheel and wheel hub (use Puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire to frame out of the way *(CAUTION*—Do not lose adjusting shims located between backing plate and axle housing flange). Pull axle shaft with Puller HM-931.

Rear Axle Assembly Removal: Remove hub caps and axle shaft cotter pin. Loosen wheel nuts. Place car on stands (stands under frame just ahead of rear springs) and remove wheels, hubs, and drums. Disconnect brake pipes at wheel cylinders, remove backing plate bolts from both backing plates. Remove brake pipe clamps and capscrew which holds brake pipe tee to housing, remove brake pipe from housing. Remove backing plate and shims (suspend from frame). Remove rear universal joint U-bolts and nuts, disconnect rear propeller shaft and move to one side. Remove rear spring U-bolts and disconnect shock absorbers from spring plate. On President models, disconnect stabilizer shaft from spring plates. Remove rear axle assembly.

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003" .005" .010" .030" thick). **Endplay** – .001-.006".

SHOCK ABSORBERS

► *1957 STUDEBAKER SHOCK ABSORBER "CHUCKLE" OR SIMILAR NOISE CORRECTION: S Stud bak r Special Data.*

Monroe, Delco or Gabriel. Direct acting, hydraulic type Serviced by replacement *NOTE* - Heavy Duty shocks are Gabriel

Monroe Shocks (Studebak r N .)

	Front	R ar
Clipper	1543702	1543704
Sedans	1541903	1541911
Station Wagons	1541904	1541913
Coupes & Hardtops	1539526	1539544

Delco Shocks (Studebaker No.)

	Front	R ar
Coupes & Hardtops	1539986	1539996

Gabriel Shocks (Stud baker No.)

	Front	R ar
Non-Adjustable	1541958	1541959
Adjustable	1541901	1541910

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs.

See "Studebaker" in Suspensions & Wh l Alignm nt Section

► *"VARIABLE RATE" FRONT SPRING INSTALLATION CAUTION:* This type used on sedan models Install with closed coils at the top and the coil ends toward the inside (centerline) of car

Kingpin Inclination - 6° at 0° camber

Caster - Neg 1° to Neg 2½° Not more than ¾° variation between wheels

Camber - 0° to Pos 1° ½° more camber favored on driver's side

Toe-In - 1 16-1/8" **Adjust right hand ti rod nly** for toe-in after left hand tie rod has been adjusted for

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straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.

RHD Car Not - Make toe-in adjustments at left hand tie rod.

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 22½°-23½°

STEERING

Manual: R ss Mod l SL-54 Cam & Single Lever Roller Stud. Roller stud mounted on tapered roller bearings. *See "Ross Cam & Singl Lever" in Steering Section.*

Pow r Steering: Saginaw (Not l n Line). *See "Saginaw Power Steering (N t In Line)" in Steering Section.*

►*POWER LOSS ON LEFT TURN CORRECTION: See "Saginaw Pow r Steering (Not in Line)" in Steering S ction*

Steering Linkag : *See "Steering Linkage" in Steering S ction.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Singl L ver" in Steering Section.*

Steering G ar R m val: *See "Ross Cam & Single Lever" in Steering S ction.*

BRAKES

Wagn r L ckh d Hydraulic. Self-centering (with Bendix type shoes). Parking brake applies rear wheel service brakes.

See "Wagn r Lockh ed S lf-Centering" in Bra ke Section.

Drum Diam t r - 11" (Front), 10" (Rear).

Wh l Cylind r Diam t r - 1 1/16" (Front), 7/8" (Rear).

Braking P w r - 62% (Front), 38% (Rear).

►*PRIMARY BRAKE SHOE LINING LENGTH PRODUCTION CHANGE:* Primary shoe lining length has been changed to: 8 5/32" (Front), and 7¼" (Rear) on later cars.

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeak. This lining is applied to the full length of the shoe and is marked "secondary" and "top" and should be installed as marked.

Lining Width & Length

	Front Wheels	Rear Wheels
Primary Shoes ©	2¼" x 12"	2" x 10 29/32"
Secondary Shoes	2¼" x 12"	2" x 10 29 32"

© - Early cars only. For later cars, see Production Change Note above.

Thickness - 3/16" (all except front wheel secondary). 7/32" (front wheel secondary).

Clearance—Lock shoes against drum with adjusting screw, then back off adjusting screw 8 notches, or more notches as required to free drum.

Standard Master Cylinder: On frame left side rail at base of brake pedal.

Checking Fluid—Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal—Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder.

(NOTE - One line with Hill-holder). Remove the brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolt to Hill-holder while master cylinder is off car.

P w r Brak s: Hydr vac P w r Unit. Used with standard master cylinder.

S "Hydr vac P w r Unit" in Brak S ction.

►*POWER BRAKE NOISE CORRECTION: See "Hydrovac Power Unit" in Brake Section.*

Checking Fluid—Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit—Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

Hill Holder: Used on Synchro-mesh and Overdrive Transmission cars. *See "Hill-Holder" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers: Auto-Lite or Bosch. Electric type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electrical, with individual reversible motors in each window. Control switches at each door with a master control switch located on left front door. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Two-way electric type with curved seat tracks for seat adjustment (seat raises and lowers with a tilting action). *See "Power Seat Adjusters" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	M d l Id ntificati n
Packard Clipper, Town Sedan	57L-Y8
Packard Clipper, Country Sedan	57L-P8
Studebaker Golden Hawk	57H-K7

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.
Starting Serial Number – (Packard) 57L-1001, (Studebaker) 6,100,001.

ENGINE NUMBER: Stamped on machined pad at left of oil filler tube mounting on top of cylinder block.
Starting Engine Number – (Packard) LS-101, (Studebaker) PS-1001.

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM.
VACUUM READING: Steady 18-21" at idling speed.
VALVE TAPPET CLEARANCE: .023-.025" (Hot), .025-.027" (Cold).
MANIFOLD HEAT CONTROL: Dual exhaust used. Automatic thermostatic type control valve located in right bank exhaust manifold outlet. When control valve is closed, most exhaust gases are discharged through left exhaust pipe.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders – RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .033-.038".
Spark Plug – Champion H-10. 14 mm. Torque to 25-30 ft. lbs.
►*PACKARD AIR CONDITIONED CAR SPARK PLUG REMOVAL:* On RIGHT bank, remove air cleaner, then remove inner rear bolt retaining compressor base to support bracket. This bolt is directly above No. 1 plug. Remove plug with a deep 3/8" drive - 13/16" socket. Then remove remaining three plugs. On LEFT bank, remove battery, then remove plugs.

COIL: Delco-Remy 1115087 or 1115096.
Ignition Current - 3.8 amps. (idling).
Resistor - Delco-Remy 1931614 (1115087 Coil), 1927809 (1115096 Coil). 1.4-1.65 ohms at 75°F.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch to coil Resistor is by-passed during cranking by lead from starter solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110864.
Condenser – Delco-Remy 1869704. **Capacity** .18-.23 mfd.
Contact Point Set – Delco-Remy 1918148.
Breaker Gap – .013-.018".
Cam Angle – 28-34°.
Breaker Arm Spring Tension – 19-23 ozs.
Rotation – Counter-clockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Contr l: Delco-Remy 1116058. integral type.
Plung r Travel – 11/64-3/16".

Vacuum Advanc

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.50

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting – 4° BTDC with distributor vacuum line disconnected and carburetor connection plugged. Engine should be idled at 600 RPM. *NOTE –* Reset idling speed to 550 RPM after timing completed.
Timing Mark – "IGN" line on vibration dampener aligned with pointer on timing gear cover.

CARBURETOR

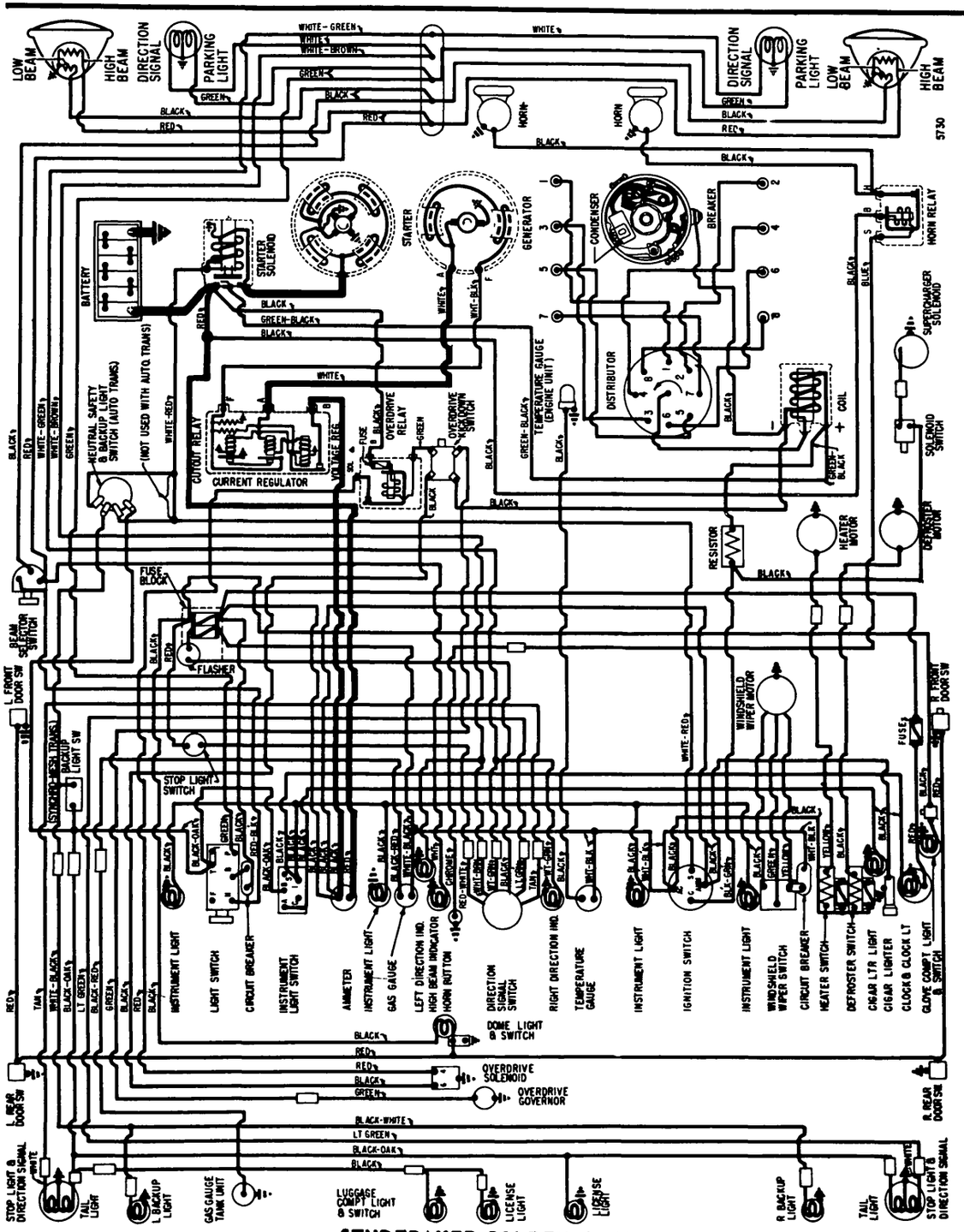
Stromberg WW 6-121, A, B, C (Early), 6-122 (Later).
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 1-4-6-7, LEFT barrel 2-3-5-8.*
►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE: Special cleaning procedure required. See AIR CLEANER below.*
►*FUEL PUMP NOTE:* Carter M2573-S Pump used but is modified to accommodate a supercharger. Pump is provided with fitting in cover to permit supercharger pressure to act on diaphragm to increase fuel pressure as required. Pump does not have vent hole and uses a different diaphragm spring.
►*EARLY CARBURETOR "IDLE SETTING" & "IDLE SPEED" NOTE:* To reach adjusting screws on early model carburetors, remove two pipe plugs in forward side of air chamber base (IDLE SETTING), left rear of air chamber cover (IDLE SPEED). Use flexible screwdriver through plug openings. Later model carburetor has extensions for adjusting Idle Setting and Idle Speed. Adjusting screw is outside cover.
►*ENGINE STALLING (Left Turn) CORRECTION & CHANGES TO IMPROVE PERFORMANCE & ECONOMY:* Install New Type Air Horn Gasket No. 1543362 and Baffle No. 1543363 (Baffle between float and float needle valve), to correct left turn stalling. To improve Performance and Economy a 1/4" hole placed in choke butterfly, Choke Stove-to-Carburetor pipe shortened 1-1/4" and choke setting changed to Center on Index Mark. Change in tension of Vacuum Power Piston assembly spring improves economy.
►*HOT ENGINE HARD STARTING CORRECTION: See "Stromberg WW Carburetors" in Carburetion Section.*
Idle Setting – Initial setting, 3/4-1 turn open. Final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.
Idle Speed - 575 RPM with transmission in neutral. *NOTE* - This supersedes previous setting of 550 RPM and is to correct hard starting when engine hot.
Float Level – 7/32" from top edge of bowl to top of float with needle valve seated (Guage J-6646).
Accelerating Pump – Center hole – normal setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.
Fast Idl S tting: Set engine idle speed at 550 RPM. Stop engine, Close choke valve, back off fast idle screw until Idle Speed screw just contacts stop, the turn fast idle screw in 7½ turns. This will give a .030-.031" throttle valve opening.
Aut matic Ch k S tting: One point lean with arrow on cover one notch lean from boss on housing (Early Cars), Centered on Index (Later Cars with new type choke).
Throttle Return Check Adjustm nt: Remove carburetor air chamber cover. Loosen return check assembly screw locknut. Adjust assembly in bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly with relation to bracket, then turn check assembly 1¾-2 turns toward lever. Tighten locknut, install cover.
Throttle Linkage Adjustment: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:
1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position. Set the stop on the bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge. After stop is adjusted, hold in this position. Make sure that carburetor-to-bellcrank rod is in the outer hole of bellcrank pad (away from centerline of engine), and that ball joint is on the upper side of bellcrank lever.
2) Adjust carburetor-to-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave the stop. Stop the engine and remove the 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by the foot brake. Adjust length of the main bellcrank-to-transmission throttle valve outer lever rod to obtain 95-100 lbs. pressure on gauge. Stop the engine, remove gauge, and install the pipe plug in side of transmission.
►*OTHER DATA: See "Stromb rg WW Carbur tors" in Carburetion Section.*
FUEL PUMP PRESSURE: 6-7 lbs.

SUPERCHARGER

McCulloch VS-57S. Variable ratio type. Mounted on bracket located on top of engine water pump manifold at water outlet opening.
►*SUPERCHARGER AIR CHAMBER BASE AND COVER PRODUCTION CHANGE:* Vent valves removed and Idle Mixture Adjusting Screw Extensions Part No. 1542985 (Right), 1542986 (Left) added starting with Engine No. PS-2197 and Serial No. 6101154. Drain Pipe added in base now serves as drain and vent, and used starting with Engine No. PS-2375 and Serial No. 6101368. To replace Base Assembly No. 1542839 on engines prior to No. PS-2375, add Base Drain Pipe Assembly No. 1543107, Pipe Nipple base End No. 1543108 and Drain Pipe-to-Timing Gear Cover Clip No. 182317.
►*AIR CHAMBER VENT VALVE "FLUTTER" AT IDLE SPEED:* When "Flutter" not caused by insufficient supercharger output or too slow an engine idle, check "REST" position of Vent Valve. Distance from top of valve to base or cover should be 1/4". To adjust, bend Vent Valve Flat Spring.
Kick-down Switch Adjustm nt: Loosen locknuts on each side of switch bracket. With wide open throttle, switch

CONTINUED ON NEXT PAGE

Form 35 A



STUDEBAKER GOLDEN HAWK

CONTINUED FROM PRECEDING PAGE

plunger should be depressed and auxiliary throttle outer lever should rest against threaded sleeve of the kick-down switch.

Belt Tensioning Check: With engine at rest or idling, belt should be in bottom of groove (high blower position). With engine running at approximately 1500 RPM, belt should start to leave bottom of groove and begin to climb up. With engine at 3500 RPM (no l ad), belt should be running near top of pulley (low blow r position). With engine at 3500 RPM, manually operate kick-down switch. Belt should go immediately to bottom of pulley groove (high blower position). Releasing kick-down switch should allow belt to return immediately to top (low blower position).

Lubrication: Capacity – 8 ozs. of "Type A" automatic transmission fluid.

Checking Fluid Level – Check oil level every 1000 miles. Maintain oil level between two punch marks on dipstick. Drain and refill every 15,000 miles.

► *OTHER DATA. See "McCulloch Supercharger" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. M2623S. Fuel Only.
Pressure - 5-7 lbs.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge (Studebaker Golden Hawk): Direct reading electric type.
Dash Unit - Studebaker No. 1539880.
Tank Unit - Studebaker No. 1542895.
See "Fuel Gauges" in Carburetion Section.

Gasoline Gauge (Packard): King-Seeley "CV" electric type with Gauge Voltage Regulator.
Dash Unit - K-S No. 49546 (Studebaker No. 6484332).
Tank Unit - Studebaker No. 1543524 (Sedans), 1543616 (Station Wagon).
See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY TYPE (Plasticized paper).

► *DRY TYPE FILTER CAUTION:* Remove filter element every 1000 miles and shake thoroughly to remove dirt. DO NOT wash element or blow out with compressed air. Replace filter every six months or 10,000 miles.

BATTERY

Willard HDW-2SM-50. *12 Volt,* 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground – Negative.
Engine Ground - Rear of engine to dash.

STARTER

Delco-Remy 1107650 (Synchro-mesh & Overdriv), 1107651 (Flightomatic). *12 Volt.* **Armature 1933789.**
Drive – Bendix "Folo-thru" type.
Rotation – Counter-clockwise at commutator end.
Brush Spring Tension – 35 ozs. minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic type switch, controlled by combinati n Ignition & Starting Switch. Turn key full right to start engine.

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Aut matic Transmissi n Neutral Safety Switch: Delco-Remy 1998038 (without Power Steering), No. 1998059 (with Power Steering). Mounted on lower end of steering column. Starter will operate only when selector lever is in "N" or "P" position.

Adjustment: *See "Flightomatic" Transmission in Transmission Section.*

GENERATOR

Delco-Remy 1102003. *12 Volt.* **Armature 1923535.**
Maximum Charging Rate – *See Voltage Regulator.*

Performance Data - Cold

Amperes	Volts	RPM
30	14.0	2240

Brush Spring Tension - 28 ozs.
Field Current - 1 69-1.79 amps. at 12 volts and 80°F.
Rotation – Counter-clockwise at commutator end.

B it Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".

REGULATOR

Delco-Remy 1119123. *12 Volt. NOTE - Regulator is "1119000 Series". Specifications below are for "Normal" Settings.*

Cutout Relay

Cuts In – 11.8-13.5 volts (hot).
Contact Gap – -020"
Air Gap – .020" with contacts just closed.

Voltage Regulator

Setting – 13.8-14.8 volts (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

Current Regulator

Setting – 27-33 amps. (hot).
Air Gap – .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting – *See "1119000 Series" Regulator in Electrical Section.*

MISC. ELECTRICAL

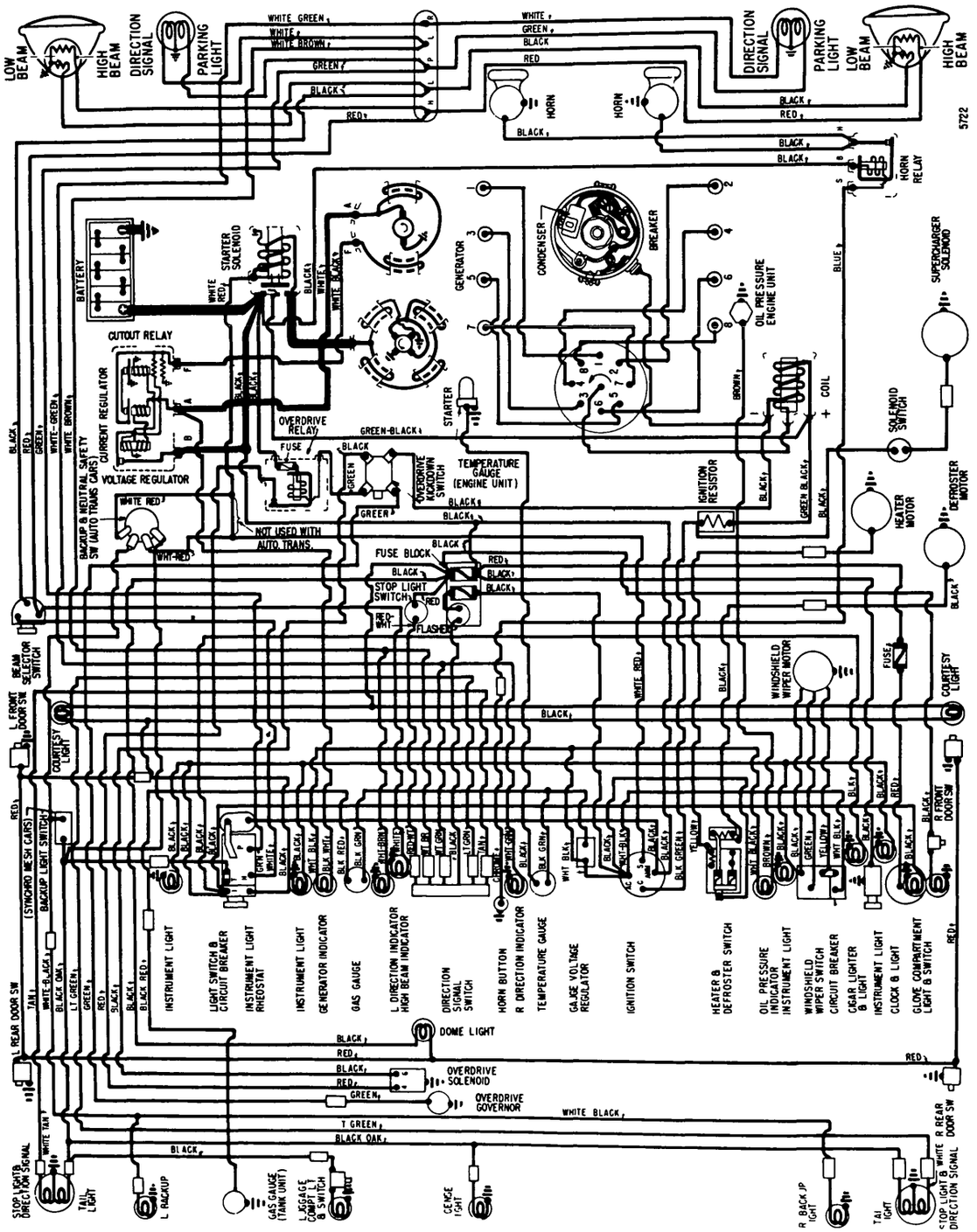
Headlamps: Sealed Beam *See Electrical Section*
Directional Signal: *See Electrical Section*

Light Switch Removal: Packard Clipper - Insert small screwdriver into notch at back edge of knob and press inward toward shaft, at same time pull off knob. Insert special wrench Tool No. J-5986 over light switch shaft. Hex of tool will fit into a concealed nut in bezel which holds switch in place. Turn wrench counterclockwise, remove bezel. Move switch back from panel and remove **Studebaker "Golden Hawk"** - Remove switch retaining nut. Push switch sleeve back into panel and disconnect wires from switch.

FUSES: Body & Stop Lights 15 amps in block in bracket behind instrument panel
Direction Signal - 15 amps in block in bracket behind instrument panel
Overdrive - 15 amps in relay on dash panel
Cl ck - 1 amp in lead behind instrument panel

CIRCUIT BREAKERS: H ad, Parking, Tail & Instrum nt Lights - 18 amps on headlight switch

CONTINUED ON NEXT PAGE



PACKARD CLIPPER

CONTINUED FROM PRECEDING PAGE

Windshi ld Wiper - 5 amps. in wiper switch.
Horn R lay: Delco-Remy No. 1116781.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconn cting any part f air conditioning equipment or lines f r acc ss t ngine, see "Air Conditioning S rvic Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: "Sweepstakes 289". V8, valve-in-head, supercharged.

B r	Str k	Displacement
3 9/16"	3 5/8"	289 cu. ins.

Compr. Rati	Rated HP	De veloped HP
7.5-1 ①	40.6	② 275 at 4800 RPM

① - 7.0-1 Optional. ② - Supercharged.

C mpressi n & Vacuum Reading – *See TUNE-UP.*

ENGINE REMOVAL: *S "Engine" in Studebaker Special Data.*

OIL PAN REMOVAL: *See "Oiling System" in Studebaker Special Data.*

CYLINDER HEAD: *S "Cylinder Head & Manifolds" in Studebak r Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Sp cial Data.*

►*OTHER ENGINE DATA: Se "1957 STUDEBAKER COMMANDER & PRESIDENT" car m del pag s (preceding).*

ILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 quarts refill, 1 quart additional with filter change.
Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.
Pressure Regulator Valve: Located on right side at front of engine block slightly above crankcase flange.
Oil Pressure Indicator: **Studebaker "Golden Hawk"** - Direct reading, non-electric type gauge.
Packard Clipper - Indicator light on instrument panel.
Oil Pressure Switch - Studebaker No. 1539898.
Oil Pump: Spur gear type. Mounted on rear main bearing cap and driven by camshaft gear.

COOLING

Water Capacity: 17 qts. (18.5 with heater).
Pressure Valve: Radiator filler cap. 13 lb. type.
Thermostat: Choke type. Studebaker No. 1540787 (170°) Std., No. 533247 (160°) and No. 533257 (180°) Optional.
Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*
Pump R m val - Drain cooling system. Loosen generator, remove belt. Remove fan-to-hub screws and remove fan and pulley. On Studebaker "Golden Hawk" remove fan shroud. Remove four capscrews retaining pump cover to water pump manifold. Remove pump from manifold.
Radiator & Fan Shroud Removal: *See "Cooling Syst m" in Studebaker Special Data.*
Temperature Indicators: **Studebaker "Golden Hawk"** - Direct reading, electric type gauge.
Packard Clipper - King-Seeley "CV" electric type with Gauge Voltage Regulator.
Dash Unit - Studebaker "Golden Hawk" - Studebaker No. 1539879. **Packard Clipper** - King-Seeley No. 49550 (Studebaker No. 6484335).
Engine Unit - Studebaker "Golden Hawk" - Studebaker No. 1542895. **Packard Clipper Sedans** - Studebaker No. 1543524, **Packard Clipper Station Wagons** - Studebaker No. 1543616.
See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*FOR ALL CLUTCH, TRANSMISSION, OVERDRIVE, UNIVERSALS, REAR AXLE, SHOCK ABSORBER, SUSPENSION, STEERING, BRAKE & MISC. MECHANICAL DATA, see "1957 Studebaker Commander & President" car model pages (preceding).*

MODEL IDENTIFICATION

STUDEBAKER

Model	Model ID signation
Commander	58B-W4, J4, P4
President	58H-Y6, J6
Silver Hawk	58H-C3
Marshall Police Car	58H-W1, F1, D1

PACKARD

Sedan & Hard Top	58L-Y8, J8
Station Wagon	58L-P8

SERIAL NUMBER: Stamped on plate on left front door hinge post.

Starting Serial Numbers - As follows:

	South Bend	Canada
Commander	8471601	8965101
President	7210001	7902001
Packard	58L-6101	

ENGINE NUMBER: Stamped on machined pad at upper left front of cylinder block.

Starting Engine Numbers - As follows:

	South Bend	Canada
Commander	V-407501	VC-13301
President	P-60 701	PC-2001
Packard	L-101	

TUNE-UP

►*ENGINE CUTTING OUT ON LEFT TURN (Commander & Police Cars with Stromberg WW 6-117B Carburetor):* *See Stromberg WW Carburetor data below.*

►*COLD ENGINE ACCELERATION HESITATION (President & Packard with Carter 4-Barrel Carburetor):* *See Carter WCFB Carburetor data below.*

COMPRESSION PRESSURE: 130-150 lbs. (approximately) at cranking speed (150 RPM).

VACUUM READING: Steady 18-20" at idle.

VALVE TAPPET CLEARANCE: .023-.025" engine hot and idling, .025-.027" engine cold.

MANIFOLD HEAT CONTROL: Automatic Thermostatic type located in right bank exhaust manifold outlet.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plug - Champion H-18Y. Torque to 25-30 ft. lbs.

►*SPARK PLUG REPLACEMENT NOTE:* Some early cars had plug No. H-11. Use H-18Y for replacement and to reduce fouling.

►*SPARK PLUG CABLE CAUTION(PACKARD MODELS):* "Resistance type" cables (identified by letters "TVRS" stamped on cable) used on all models. Cable conductor consists of graphite impregnated nylon cord and following precautions should be observed: DO NOT cut cables or attempt to replace terminals. DO NOT substitute other type of cable (cables have definite electrical resistance for radio noise suppression).

COIL: Delco-Remy 1115096 or 1115087.

Ignition Current - 3.8 amperes idling.

Resistor - Delco-Remy 1927809 (1115096 Coil), 1931614 (1115087 Coil). 1.4-1.65 ohms at 75°F

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch to coil. Resistor is by-passed during cranking by lead from starter solenoid to coil.*

DISTRIBUTOR: Delco-Remy 1110864, 1110899 (Exp.).

Condenser - Delco-Remy 1869704. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1918148.

Breaker Gap - .013-.018".

Cam Angle - 26-33° with .016" gap.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110864

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-3	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Automatic Advance - 1110899

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	350	1-3	700
2-4	400	4-8	800
5-7	650	10-14	1300

Vacuum Spark Control: Delco-Remy 1116058.

Plunger Travel - 11/64-3/16".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.50

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting - 4° BTDC with vacuum line to distributor disconnected and opening in carburetor plugged. Engine at normal idle speed.

Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover.

►*IGNITION TIMING CAUTION:* Manufacturer recommends that no attempt be made to time engine except with a suitable timing light and that timing mark on vibration damper be directly under pointer. *DO NOT SET TIMING BY THE "PING" METHOD.*

CARBURETOR

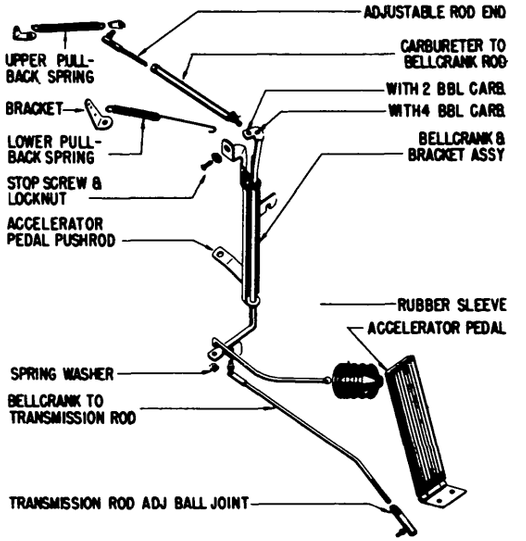
►*CARBURETOR APPLICATION:* As follows:

Model	Carburetor
Commander	Stromberg WW 6-117B, C
Pres. Silver Hawk & Police	Stromberg WW 6-117B, C
Pres. (Others) S.M. & O.D.	Carter WCFB 2219SB,2574S
Pres. (Others) Auto. Trans.	Carter WCFB 2214SB,2575S
Packard (S.M. & O.D.)	Carter WCFB 2219SB,2574S
Packard (Auto. Trans.)	Carter WCFB 2214SB,2575S

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 575-600 RPM with transmission selector lever in "N" (Neutral) position. Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position. Make sure that carburetor-to-bellcrank rod ball joint is in outer hole of bellcrank pad (away from centerline of engine), and that ball joint is on underneath side of lever.

2) Adjust carburetor-to-bellcrank rod until idle speed adjusting screw just begins to leave its stop.



FLIGHTOMATIC TRANSMISSION THROTTLE LINKAGE

3) After stop is adjusted, hold in this position. *NOTE Make sure that carburetor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetors, and in outer hole on cars with 4-barrel carburetors. In both cases, ball joint must be located on underneath side of bellcrank.* Adjust carburetor-to-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave stop. Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. pressure on cars with heavy duty transmissions such as used on police cars). Stop engine, remove gauge, and install pipe plug in side of transmission.

THROTTLE RETURN CHECK (4-BARREL CARBURETOR) ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly relative to bracket, then turn check assembly 1¼ to 2 turns toward lever. Tighten locknut.

THROTTLE RETURN CHECK (2-BARREL CARBURETOR) ADJUSTMENT: Place idle speed adjusting screw on fourth step of fast idle cam (lowest step being No. 1). Adjust throttle return check screw until it just contacts pad on throttle shaft lever.

STROMBERG WW

Stromberg WW, Code 6-117B (Early), 6-117C (Later). Throttle return check used on Flightomatic Transmission Cars.

►*ENGINE CUTTING OUT ON LEFT TURNS (Stromberg WW 6-117B Carburetor):* Caused by gasoline foam being ejected into air horn through bowl vent due to float

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dropping on turns and allowing hot gasoline to enter bowl. Correct by installing new Air Horn Gasket and Float Chamber Baffle (same parts as used in supercharged carburetors). This change made in production on later 6-117C carburetors. *See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section for modification data.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE Special cleaning procedure required. See AIR CLEANER below.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting - Initial setting, 1¾ turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed - 550 RPM. On Flightomatic cars, selector lever should be in "N".

Float Level - 3/16" from top edge of bowl to top of float with needle valve seated. To check, remove air horn and bowl cover, remove gasket, place float level gauge T-25569 (Studebaker No. J-5475) squarely on top edge of float bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required using bending tool T-24733 (Studebaker No. KMO-269-S5).

Accelerating Pump - Center hole, normal setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: With choke valve closed and fast idle cam in fast idle position, one-half diameter of button at end of throttle stop screw should rest against step of fast idle cam. If contact between button and cam not as indicated, bend choke ear up or down as required.

Automatic Choke Setting: 1 Point Lean with arrow on cover 1 notch lean from boss on housing.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section.*

CARTER WCFB

Carter WCFB, No. 2219SB or 2754S (Synchro-mesh & Overdrive), 2214SB or 2575S (Flightomatic Cars).

►*COLD ENGINE ACCELERATION HESITATION* To correct stumbling or hesitation when rapidly accelerating a cold engine, install new Choke Piston, No.160-117 and change automatic choke setting to 2 Points Rich (Std. setting is 1 Point Rich). *See "Carter WCFB 4-Barrel Carburetor" in Carburetion Section for disassembly of automatic choke.*

►*CARBURETOR AIR CLEANER (DRY TYPE) NOTE· Special cleaning procedure required. See AIR CLEANER below.*

►*MANIFOLD FUEL DISTRIBUTION· Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

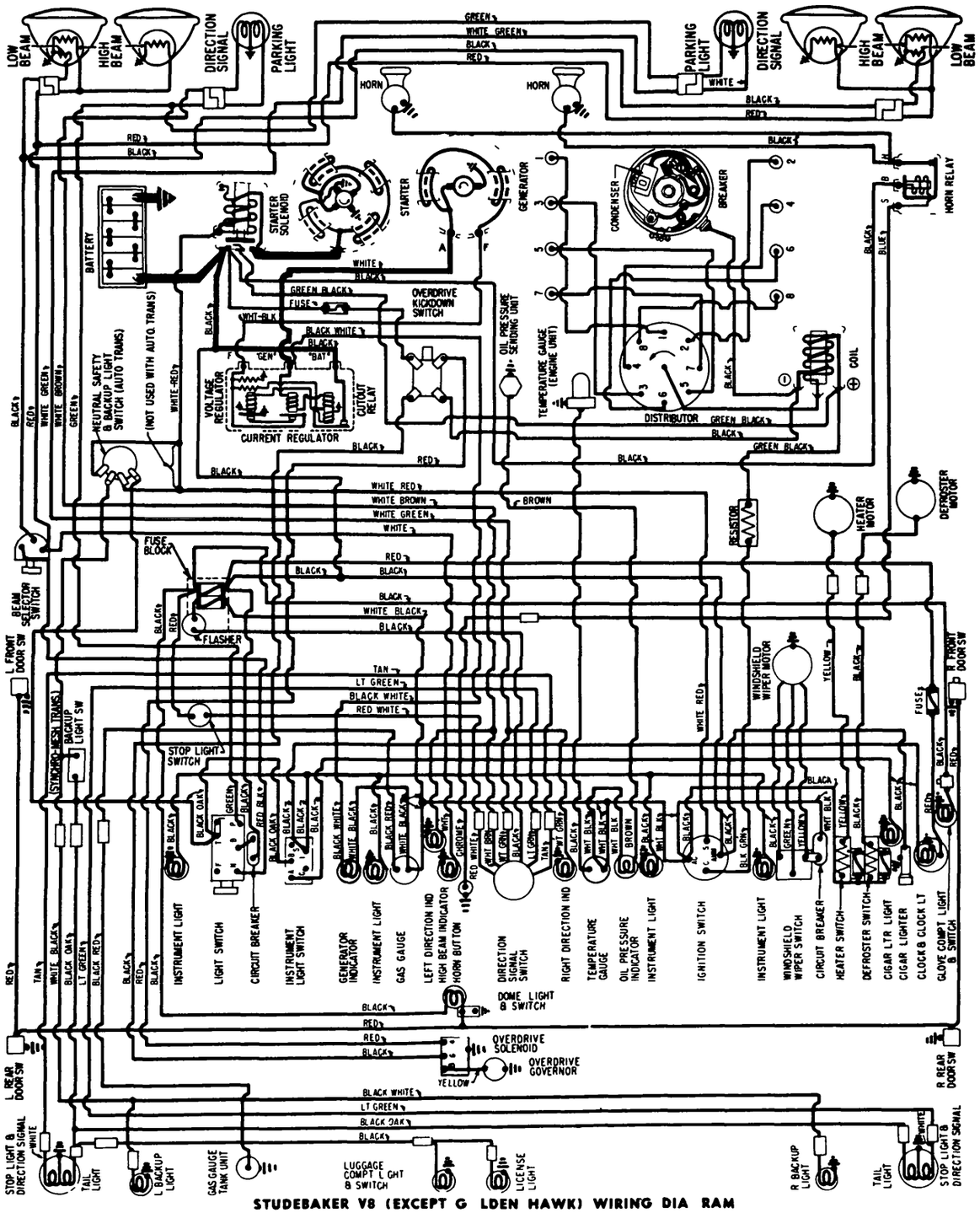
Idle Setting - ½-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 550 RPM. On Flightomatic cars, selector lever should be in "N".

Throttle Linkage Adjustment· S *CARBURETOR above.*

►*OTHER DATA S "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

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STUDEBAKER V8 (EXCEPT GOLDEN HAWK) WIRING DIAGRAM

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CARB. EQUIPMENT

Fu l Pump: Carter No. 2573S. Fuel only.
Pressure - 3½-5½ lbs.
S e "Fuel Pumps" in Carburetion Section.

Gas line Gauge (Studebaker): Electric type.
Dash Unit - Studebaker No. 1539880 (Silver Hawk), 1545445 (Other Models).
Tank Unit - Studebaker No. 1544825 (Silver Hawk & Station Wagon). 1544826 (Other Models).

Gasoline Gauge (Packard): King-Seeley "CV" Constant Voltage electric type with Gauge Voltage Regulator, King-Seeley No. 45677.
Dash Unit - King-Seeley No. 49546 (Packard No. 6484332).
Tank Unit - Packard No. 1545004 (Sedan & Hardtop), 1545003 (Station Wagon).
S e "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY TYPE (Plasticized paper) Standard. Oil Bath type Optional. Clean dry type filter element every 1000 miles, replace element every six months or 10,000 miles.
►*CLEANING CAUTION (DRY TYPE):* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hour rate).
Battery Ground - Negative.
Engine Ground - Strap at right front corner of engine.

STARTER

D lco-Remy 1107650 (Synchro-mesh & Overdrive), 1107651 (Flightomatic). Armature - 1933789.
Drive - Bendix "Folo-thru" No. A3474.
R tation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

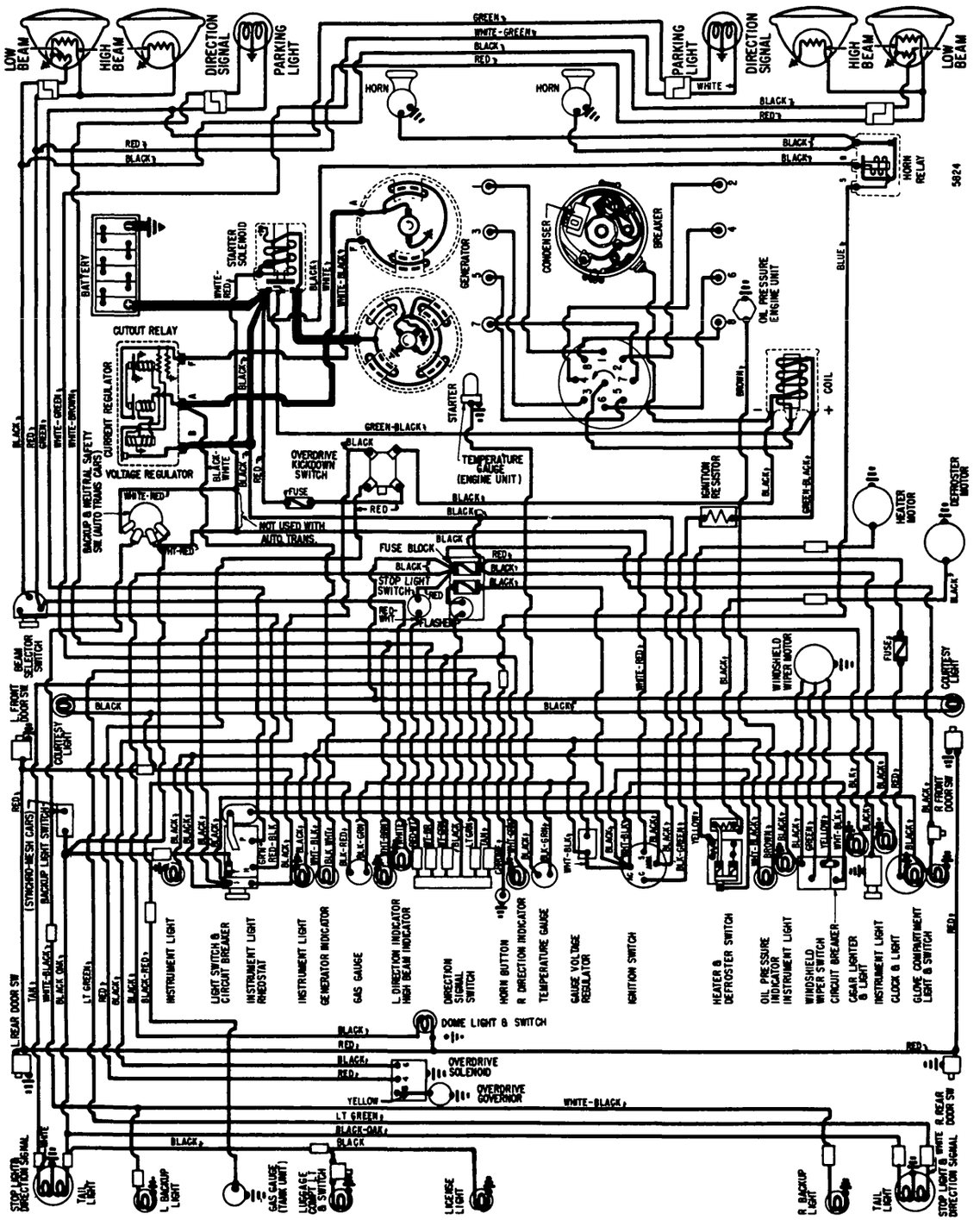
Starting Switch: Magnetic Switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition & Starter switch.

Aut matic Transmission Neutral Safety Switch: Studebaker No. 533321 (exc. Saginaw Pwr. Strg.), 534390 (Cars with Saginaw Integral Power Steering). Mounted on steering column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.

GENERATOR

D lco-Remy 1102003 (Std.,), 1102094 (Cars with Air C nditioning & Power Steering). *NOTE* - 1102094 Generator has Power Steering Pump mounted on commutator end of generator.
Armatur - Delco-Remy 1923535 (1102003 Generator).

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PACKARD (EXCEPT HAWK) WIRIN DIA RAM

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Performanc Data - C ld

Amperes	Volts	RPM
30	14.0	2240

Brush Spring T nsi n - 28 ozs.
Fi ld Current - 1.69-1.79 amps. at 12 volts and 80°F.
R tati n - Counter-clockwise at commutator end.
B lt Adjustm nt: ½" deflection midway between fan and generator pulleys with 14 lbs. side pull on belt.

REGULATOR

D lco-R my 1119123. *NOTE - Specifications below are "N rmal" s ttings.*

Cut ut Relay

Cuts In - 11.8-13.5 volts (hot).
C ntact Gap - .020".
Air Gap - .020" with contacts just closed.

V ltage Regulator

Setting - 13.8-14.8 volts (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Ch cking & Adjusting - *See "Delco-Remy 12 Volt Regulat rs" in El ctrical S ction.*

Current Regulator

Setting - 27-33 amperes hot (after 15 minutes continuous current regulator operation).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Ch cking & Adjusting - *See "Delco-Remy 12 Volt Regulat rs" in El ctrical S ction.*

MISC. ELECTRICAL

Headlights: Dual Headlights (4-Headlight System) used on all models except Silver Hawk & Police Cars.
S "4-H adlight Syst m" in Electrical Section.
Dir cti n Signal: *S El ctrical Section.*
Lighting & Instrument Switch Removal: Remove retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat in instrument board.
St p Light Switch: Located on inner side of left frame rail forward of steering gear housing (exc. Power Brake Cars), in elbow fitting on Power Brake Unit (with Power Unit).

CIRCUIT BREAKERS: Used as follows:
20 Amp r (Studebakers), 18 Ampere (Packard) - Protects head, parking, tail, back-up and instrument lights. Located on headlight switch.
5 Ampere - Protects windshield wipers. Located on windshield wiper switch.

FUSES: Used as follows:
15 Ampere - Protects body & stop lights. Located in fuse block behind instrument panel.
15 Ampere - Protects directional signals. Located in fuse block behind instrument panel.
15 Ampere (Packard), 14 Ampere (Studebakers) - Protects Climatizer & Defroster. Located on switch.
14 Amper - Protects overdrive circuit.
3 Amper - Protects clock & clock light. Located in lead behind instrument panel.

Horn R lay: Delco-Remy 1116781.
Cl sing V ltag - 5.0-9.5 volts.
Contact Gap - .027". **Air Gap** - .014".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: "Sweepstakes 259" & "Sweepstakes 289". V8, valve-in-head.

Engine	Bore	Stroke	Displacement
259	3 9/16"	3 1/4"	259 cu. ins.
289	3 9/16"	3 5/8"	289 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
259	8.0-1 ①	40.6	180 at 4500 RPM
289	8.0-1 ①	40.6	②

① - 7.5-1 optional
② - 210 at 4500 RPM with 2-barrel carburetor. 225 at 4500 RPM with 4-barrel carburetor.
Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove oil level gauge and adapter tube clamp. Disconnect one battery cable. Raise car and support with stands, then drain oil. Remove starter. On Coupe & Hardtop models, swing front wheels to right to move steering bellcrank out of way, and remove oil pan. On Station Wagon and Sedan models, remove steering bellcrank assembly. Remove exhaust crossover pipe, then remove oil pan.

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*

►*PISTON REPLACEMENT CAUTION: "259" & "289" Engine pistons are NOT INTERCHANGEABLE. "Flat Head" piston used on 259" Engine. "Concave Head" Piston used on 289" Engine.*

Weight - 16.21 ozs. (259 Eng.), 16.22 ozs. (289 Eng.).
Removal - Pistons & rods remove from above.
Fitting New Pistons: Clearance - Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 8-13 lbs.
Replacement Pistons: Std. size & .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.
Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PIST N PINS

Locked in rod by tapered pin and locknut.
Diam t r – .8741-.8745". **L ngth** – 3 1/16".
Clearance in Piston – .0001-.0003" (selective fit). Light finger push fit at 70° F.
Replac ment Pins: Std. size & .0025", .005" oversize.
Removal & Installati n: *See "Piston Pins" in Studebak r Special Data.*

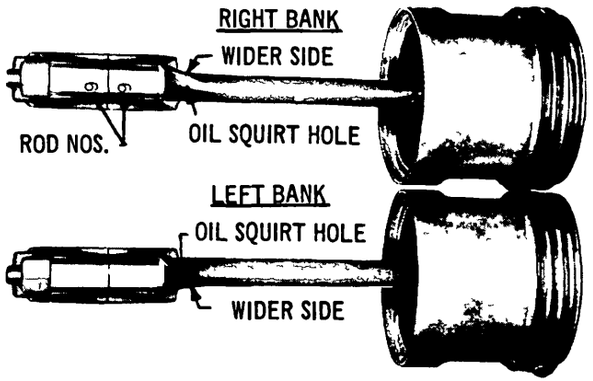
PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compression	.077-.078"	.008-.016"	.002-.005"
Oil	.1855-.1865"	.008-.016"	.0015-.005"

Replacement Rings: Sets of Std., .020", .030" and .040" Oversize.
Installing Rings: Install compression rings with chamfered side of ring upward. Gaps of inner and outer oil rings must not come at same point.

CONNECTING RODS

Length - 6 5/8" center-to-center. **Weight** - 23.71 ozs.
Crankpin Journal Diameter - 1.99925-2.00025".
Lower Bearing - Interchangeable. Steel backed, micro-babbitt lined type. No shims.
Clearance - .0005-.002". **Sideplay** - .008-.013".
Replacement Bearings: Std., .001", .002", .010" and .020" Undersize.
Installing Rods: Number on rod and bearing cap must be on same side. Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank.



V8 ENGINE PISTON & ROD ASSYS.

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

►*REPLACEMENT ROD IDENTIFICATION NOTE:* Replacement rods are unnumbered. To identify, hold rod upright with oil hole toward you. Wide part of offset will be to right on left bank rods, to left on right bank rods.

CRANKSHAFT

Journal Diameter–2.4995-2.5000".
B arings - Steel-backed, micro-babbitt lined. No shims.
Cl aranc –.0005-.0025".

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R plac m nt B arings: Std. size, .001", .010", .020", .030" undersize.

End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal. **Endplay**—.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings—Precision type, steel backed babbitt lined.

Clearance — .00075-.00225" (No. 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

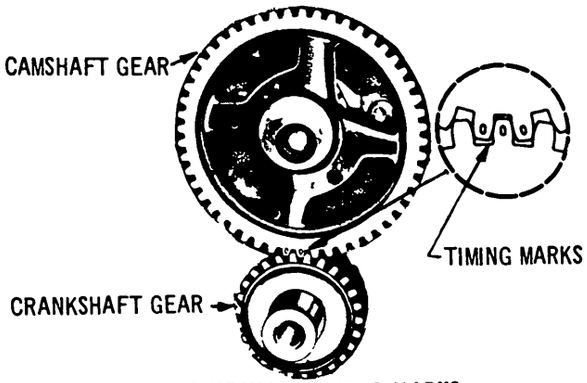
Endplay—.003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.

Backlash—.001-.003".

Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.



V8 ENGINE VALVE TIMING MARKS

Engine Front Cover Removal *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal). *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance - .023-.025" (Hot), .025-.027" (Cold).

Valve	Head Diameter	Stem Diameter	Length
Intake	1 21/32"	11/32"	5 5/32"
Exhaust	1 17/32"	11/32"	5 5/32"

Valve	Seat Angle	Lift	Stem Clearance
All	45°	23/64"	.0015-.0035"

Valve Seat Width—1/16-3/32".

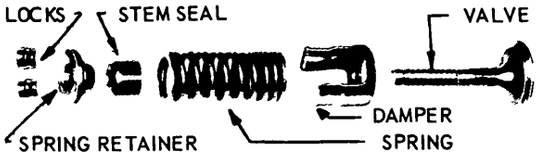
Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

Valv Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below.

NOTE - Damper installed on lower (close-coiled) end of all springs.

Valv Spring Specificati ns

	Pressure	Length
Valve Closed	45-55 lbs.	2 1/32"
Valve Open	105-115 lbs.	1 43/64"



V8 ENGINE VALVE ASSY.

Valve Guides: Pressed in head from underside.

Guide Removal & Installation—*See "Valve System" in Studebaker Special Data.*

Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore). See "Valve System" in Studebaker Special Data.*

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std. size, .001", .005" oversize.

►*CAUTION—When lifters removed, make sure they are installed in original positions.*

Rocker Arms: *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 11° BTDC. Close 54° 36' ALDC.

Exhaust Valves—Open 51° 36' BLDC. Close 14° ATDC.

Valve Timing Check—Set tappet clearance of No. 1 intake valve at 030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 qts. (add one quart when filter changed).

Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.

Pressure Regulator Valve — Located on right side at front of engine block slightly above crankcase flange.

Oil Pressure Indicator: (Packard & Studebaker exc. Silver Hawk) - Indicator light on instrument panel controlled by Oil Pressure Switch, Studebaker No. 1539898. If light on at highway speeds, low oil pressure or other difficulty is indicated.

(Studebaker Silver Hawk) - Direct reading, non-electric type gauge, Studebaker No. 1539878.

Oil Pump: Helical gear type. Mounted on rear main bearing cap in crankcase. *NOTE* - Stationary type oil strainer used which is a unit with the intake pipe.

Pump R m val, Ov rhaul, & Installation: *S "Oiling Syst m" in Stud bak r Special Data.*

Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.

Replacement Filter El ment - Studebaker No. 1542739.

Crankcase Ventilation: Filter element is located in oil filler cap (air intake). Breather pipe (air outlet) is connected at rear of valve chamber cover plate.

COOLING

Water Capacity: 17 qts. without heater, 18.5 qts. with heater.

Pressure Valve: Radiator filler cap. 13 lb. (12-15) type. Studebaker No. 536502.

Thermostat: Choke type Studebaker No 1540787 (170°) Std No 533247 (160°) and No 533257 (180°) Optl

Water Pump: Packless sealed ball bearing type *See "Water Pumps" in Stud baker Special Data.*

Pump Removal: Drain cooling system Loosen generator remove belt Remove fan-to-hub screws and remove fan and pulley On Coupe and Hardtop models, remove shroud Remove four capscrews retaining pump cover to water pump manifold Remove pump.

Radiator & Fan Shroud Rem val: *See "Cooling Syst m" in Studebaker Special Data*

Temperature Gauge (Studebak r): Direct reading electric type.

Dash Unit - Studebaker No. 1539879 (Silver Hawk), 1545446 (Other Models).

Engine Unit - Studebaker No. 1545220 (All Models).

Temperature Gauge (Packard): King-Seeley "CV" Constant Voltage electric type with Gauge Voltage Regulator, King-Seeley No. 45677.

Dash Unit - King-Seeley No 49950.

Engine Unit - King-Seeley No. 44664.

See "Temperature Gauges" in Misc llan ous S ction.

CLUTCH

Borg & Beck Models 10A7 (10"), 10A6 (10¼") & 10.5A8 (10½"). Single plate types. Used as follows.

Model	Clutch Assy.	Clutch Disc
Comm. (Std.)	10A7 361454	382650
Comm. (HD), Pres (Std)	10A6 361456	382389
Packard	10A6 361456	382389
Packard Hawk	10.5A8 361451	382643
Golden Hawk	10.5A8 361451	382643

See "Borg & Beck" in Clutch S ction.

Pedal Adjustment: Pedal free travel 1/2-1". To make adjustment, loosen locknut securing clevis to rod connecting release shaft lever to clutch operating shaft lever and remove the clevis pin. Turn clevis to shorten or lengthen rod as necessary for correct pedal free travel. *NOTE—If car is equipp d with "Hill-Holder", adjust "Hill-Holder" operating rod as outlined in Brake Section.*

Clutch Housing Removal Remove starter. Remove floor plate and clutch housing top capscrews. Remove clutch operating shaft. Remove transmission (see Synchro-mesh Transmission Removal below). Remove two bolts holding engine rear support insulator cage to crossmember. Place a small hydraulic jack at rear of oil pan and insert a block between jack pad and oil pan to prevent damage to pan. Raise engine just enough to take weight of engine off crossmember.

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Remove support crossmember-to-frame bolts and remove cross member. Remove the two clutch housing bolts retaining exhaust pipe support bracket. Loosen clamp bolt and swing support bracket out of way. Remove clutch housing cover plate. Remove remaining housing mounting bolts or capscrews and remove clutch housing.

Clutch Removal: Remove clutch housing (above), remove six screws evenly to relieve pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model T85 & T86. Three-speed synchro-mesh type. Used with R10 Overdrive (Optl.).

See "Warner Synchro-mesh" in Transmission Section.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

Removal: Disconnect propeller shaft at rear universal joint flange, pull shaft to rear to disengage splined joint at transmission extension, remove shaft. Drain transmission case. Disconnect shift rods at transmission case shift levers, disconnect speedometer cable at transmission case, remove speedometer pinion. Support transmission and remove capscrews mounting transmission on clutch housing. Remove clutch operating shaft, bracket, and bearing from transmission case. Move transmission straight back until main drive gear clears clutch driven member, then lower transmission and remove from beneath car.

OVERDRIVE

Warner R10. Part of transmission assembly. Governor controlled solenoid operation with throttle controlled kick-down. *NOTE* - Relay is not used in overdrive control circuit. See wiring diagram for new control circuit.

Overdrive Control: *See "Warner R10 Overdrive Control" in Transmission Section.*

Removal: Remove as unit with transmission. Disconnect control wiring and cable, then proceed as for Transmission Removal (above).

FLIGHTOMATIC TRANSMISSION

Warner Model AS2-5J (Early Commander), AS2-5P (Later Commander, All Pr sident), AS6-7A (Packard & Golden Hawk). Torque converter and hydraulically controlled three-speed planetary transmission.

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION* See *"Flightomatic" Transmission in Transmission Section.*

►*TESTING & TROUBLE SHOOTING* See *"Flightomatic" Transmission in Transmission Section.*

Lubrication Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type A' (marked A-ATF on container).

►*INSPECTION HOLE COVER NOTE* Later cars have rubber covered inspection hole cover installed over floor mat which can be removed for fluid checking without disturbing floor mat

Checking Fluid Level – Place selector lever in 'P' position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Apply parking brake and foot brake, move selector lever slowly from "P" position to "R" position, then back to 'D' position. Remove dipstick and read fluid level. Add fluid to bring level to "FULL" mark on dipstick (1½ pints between "LOW" and "FULL" marks on dipstick. **Capacity - 9 qts (Studebaker V8 & Packard, except police cars which take 9½ qts.). 9½ qts. (Golden & Packard Hawks). Use only Auto. Trans. Fluid Type "A".**

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Flightomatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. TWO used (with new one-piece type propeller shaft).

►*UNIVERSAL JOINT LUBRICATION NOTE:* Universals should be disassembled, cleaned, and repacked with special universal joint lubricant at 20,000 mile intervals.

PROPELLER SHAFT

Propeller Shaft: New one-piece type. No center bearing used.

►*PROPELLER SHAFT NOISE CORRECTION:* May be caused by interference between front end of propeller shaft and body floor pan clearance tunnel (All Cars), or interference between propeller shaft and center arm rest attaching screws (Packard). *See "Propeller Shaft Notes" in Studebaker Special Data for corrective procedure. NOTE - On later cars, these conditions eliminated by production changes (new smaller diameter propeller shaft and relocated arm rest screws).*

REAR AXLE

Spicer Model 44-3 (All Models). Semi-floating, hypoid gear with Hotchkiss Drive.

See "Spicer Hypoid" in Rear Axle Section.

►*"TWIN-TRACTION" DIFFERENTIAL NOTE:* Optl on all models Identified by decal next to ignition switch (early cars), by emblem on deck lid (all cars) *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

Standard & Twin Traction Axle Ratios

Model	Synchro-mesh	Overdrive
Commander	①3.54-1 (46-13)	②3.73-1 (41-11)
President	①3.54-1 (46-13)	③3.92-1 (47-12)
Police Cars	3.54-1 (46-13)	3.92-1 (47-12)
Packard		④4.09-1 (45-11)
Golden & Packard Hawks		⑨4.09-1 (45-11)
Model		**Flightomatic Trans.**
All Models		⑤3.31-1 (43-13)

Optional Ratios (for above table)/① - 3.92-1,② - 3.54-1, 3 92-1, 4 09-1, 4.27-1, ③ - 3.54-1, 3 73-1, 4.09-1, 4.27-1, ④ - 3.54-1, 3.73-1, 3 92-1, 4.27-1, ⑤ - 3.54-1.

►*REAR AXLE RATIO NOTE* Ratio is stamped on plate attached to axle by cover capscrew and is also stamped on ring and pinion gears

Backlash - 003- 006"

Axle Shaft Removal Remove wheel and wheel hub (use Puller J-1644-B). Take out backing plate retaining bolts, remove outer oil seal. Pull backing plate out over end of axle shaft and wire to frame out of the way *(CAUTION–Do* not lose adjusting shims located between backing plate and axle housing flange). Pull axle shaft with Puller HM-931.

Rear Axle Assembly Removal: Remove hub caps and axle shaft cotter pin. Loosen wheel nuts. Place car on stands (stands under frame just ahead of rear springs) and remove wheels, hubs, and drums. Disconnect brake pipes at wheel cylinders, remove backing plate bolts from both backing plates. Remove brake pipe clamps and capscrew which holds brake pipe tee to housing, remove brake pipe from housing. Remove backing plate and shims (suspend from frame). Remove rear universal joint U-bolts and nuts, disconnect rear propeller shaft and move to one side. Remove rear spring U-bolts and disconnect shock absorbers from spring plate. On President models, disconnect stabilizer shaft from spring plates. Remove rear axle assembly.

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003" .005" .010" .030" thick). **Endplay – .001-.006".**

►*REAR WHEEL BEARING LUBRICATION CAUTION:* No lubrication plug provided but bearings are NOT lubricated for life. Remove, clean, and repack bearings at 25,000 mile intervals.

SHOCK ABSORBERS

Gabriel or Monroe. Direct acting, hydraulic type. Serviced by replacement. *NOTE* - Gabriel Heavy Duty Adjustable type are special equipment on all models.

►*1957-58 SHOCK ABSORBER NOISE CORRECTION:* Chuckle or similar noise may be caused by shock absorber rubber bushings and can be corrected by installing new bushings. *See "Shock Absorber Notes" in Studebaker Special Data for bushing installation.*

Shock Absorbers (Studebaker Nos.)

Model	Front	Rear
All (exc. below) Gabriel	1545056	1545050
All (exc. below) Monroe	1545058	1545044
Station Wgns - Gabriel	1545055	1545051
Hawk - Gabriel	1545055	1545050
Hawk - Monroe	1545047	1545044
All Models - Gabriel Adj.	1544410	1544411

Adjustment (Gabriel Adj. Type) - Disconnect one end of shock absorber and collapse it fully to engage internal coupling, then rotate lower shaft until arrow on body lines up with "Soft", "Normal", or "Firm" arrow on dustcover.

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs

See "Studebaker" in Suspensions & Wheel Alignment Section

►*"VARIABLE RATE" FRONT SPRING INSTALLATION CAUTION* This type used on sedan models Install

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with closed coils at the top and the coil ends toward the inside (centerline) of car.

Kingpin Inclination - 6° at 0° camber.

Caster - Neg. 1° to Neg. 2½°. Not more than ¾° variation between wheels.

Camber - 0° to Pos. 1°. ½° more camber favored on driver's side.

Toe-In - 1 16-1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.

RHD Car Note - Make toe-in adjustments at left hand tie rod.

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be 23½-24½°.

STEERING

Manual: Ross Model SL-54. Cam & Single Lever Roller Stud. Roller stud is mounted on taper roller bearings. *See "Ross Cam & Lever" in Steering Section.*

Power Steering (Studebaker): Bendix Linkage type. Used with conventional steering gear. *See "Bendix Linkage Type Power Steering" in Steering Section.*

Power Steering (Packard): Saginaw (Not in Line). Recirculating ball nut and worm type steering gear with integral power unit. Replaces regular steering gear.

See "Saginaw (Not in Line) Power Steering" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

BRAKES

►*BRAKE LINE INTERFERENCE CORRECTION:* Interference may occur between brake line and exhaust pipe at point where brake line held in clip on right side of differential housing. If clip upward so that brake line above level of differential housing, remove housing screw and reverse clip so that brake line is below top of housing.

Service: Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking lever applies rear wheel service brakes. *See "Wagner Lockheed Self-centering Brakes" in Brake Section.*

Drum Diameter - 11" (Front), 10" (Rear).

Master Cylinder Bore Diameter - 1" (All Models).

Wheel Cylinder Diameter - 1 1/16" (Front), 7/8" (Rear).

Brake Lining: Marshall Eclipse molded lining used on all shoes. *NOTE* - Brake shoes with Heavy Duty BONDED lining available for service. Recommended for Taxicab, Police Car, and other severe service.

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (3/16" on all other shoes), and is pre-ground off-center at the factory to eliminate brake squeak. This lining is applied to full length of shoe, and is marked "secondary" and "top", and should be installed as marked.

Lining Width & Length

	Front Wheel	Rear Wheel
Primary Shoes	2 1/4" x 9 21/64"	2" x 8 15/32"
Secondary Shoes	2 1/4" x 11 57/64"	2" x 10 27/32"

Thickness - 3/16" (all exc. front wheel secondary), 7/32" (front wheel secondary).

Clearance - Lock shoes against drums, then turn adjusting screw back eight notches or more as required to free drum.

Braking Power - 62% Front wheels, 38% Rear wheels.

Standard Master Cylinder: On frame left side rail at base of brake pedal.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal–Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder. (*NOTE* - One line with Hill-holder). Remove the brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolt to Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Power Unit. Used with standard master cylinder. *See "Hydrovac Power Unit" in Brake Section.*

Checking Fluid–Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit–Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

Hill Holder: Used on Synchro-mesh and Overdrive Transmission cars. *See "Hill-Holder" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers: Auto-Lite or Bosch. Electric type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section.*

Power Window Regulators: Electrical with individual reversible motors in each window. Control switches at each door with a master control switch located on left front door. *See "Power Window Regulators" in Miscellaneous Section.*

Power Seat Adjusters: Two-way electric type with curved seat tracks for seat adjustment (seat raises and lowers with a tilting action). *See "Power Seat Adjusters" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
Studebaker Golden Hawk	58H-K7
Packard Hawk	58L-K9

SERIAL NUMBER: Stamped on plate on left front door hinge post.

Starting Serial Numbers - Studebaker 6104501, Packard 58LS-1001.

ENGINE NUMBER: Stamped on machined pad at upper left front of cylinder block.

Starting Engine Numbers - Studebaker PS-5501, Packard LS-5201.

TUNE-UP

COMPRESSION PRESSURE: 130-150 lbs. (approximately) at cranking speed (150 RPM).

VACUUM READING: Steady 18-20" at idle.

VALVE TAPPET CLEARANCE: .023-.025" engine hot and idling, .025-.027" engine cold.

MANIFOLD HEAT CONTROL: Automatic Thermostatic type located in right bank exhaust manifold outlet.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plug - Champion H-18Y. Torque to 25-30 ft. lbs.

►*SPARK PLUG REPLACEMENT NOTE:* Some early cars had plug No. H-11. Use H-18Y for replacement and to reduce fouling.

►*SPARK PLUG CABLE CAUTION (PACKARD):* "Resistance type" cables (identified by letters "TVRS" stamped on cable) used on all models. Cable conductor consists of graphite impregnated nylon cord and following precautions should be observed: DO NOT cut cables or attempt to replace terminals. DO NOT substitute other type of cable (cables have definite electrical resistance for radio noise suppression).

COIL: Delco-Remy 1115087 or 1115096.

Ignition Current - 3.8 amperes (idling).

Resistor - Delco-Remy 1931614 (1115087 Coil), 1927809 (1115096 Coil). 1.40-1.65 ohms at 75°F.

►*COIL RESISTOR NOTE: Resistor is connected in lead from ignition switch-to-coil. Resistor is by-passed during cranking by lead from starter-solenoid-to-coil.*

DISTRIBUTOR: Delco-Remy 1110864 or 1110899 (Exp.)

►*TACHOMETER DRIVE UNIT NOTE:* Tachometer Drive Unit is installed on distributor housing (driven by breaker shaft) with distributor rotor and cap installed on top of tachometer drive unit. Lift off tachometer drive unit for access to breaker plate.

Condenser - Delco-Remy 1869704. **Capacity** - .18-.23 mfd.

Contact Point Set - Delco-Remy 1918148.

Breaker Gap - .013-.018".

Cam Angle - 26-33° with .016" gap.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110864

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-3	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Automatic Advance - 1110899

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	350	1-3	700
2-4	400	4-8	800
5-7	650	10-14	1300

Vacuum Spark Control: Delco-Remy 1116058.

Plunger Travel - 11/64-3/16".

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.50

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting - 4° BTDC with distributor vacuum line disconnected (plug carburetor connection) and engine idling at 600 RPM. *NOTE* - Reset idling speed to 550 RPM after timing completed.

Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover.

CARBURETOR

Stromberg WW 6-122A (Supercharged). *NOTE* - This carburetor has all modifications (including venting to improve hard hot starting) as recommended to be made on 1957 Code 6-121 carburetors.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 575-600 RPM with transmission selector lever in "N" (Neutral) position. Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position. Make sure that carburetor-to-bellcrank rod is in outer hole of bellcrank pad (away from centerline of engine), and that ball joint is on upper side of bellcrank lever.

2) Adjust carburetor-to-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave stop. Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 95-100 lbs. pressure on gauge Stop engine, remove gauge and install pipe plug.

THROTTLE RETURN CHECK: Remove carburetor air chamber cover. Loosen return check assembly screw locknut. Adjust assembly in bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly with relation to bracket, then turn check assembly 1¾-2 turns toward lever. Tighten locknut, install cover.

STROMBERG WW

Stromberg Series WW, Code 6-122A. Throttle return check used on all models with Flightomatic Transmission.

►*CUTTING OUT ON ACCELERATION & ROUGH IDLE CORRECTION:* **Install new dual electric fuel pump kit, Part No. 1547161. Instructions contained in kit.**

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel 2-3-5-8.*

Idle Setting - Initial setting, ¾-1 turn open. Final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed - 550-575 RPM. On Flightomatic Cars, selector lever should be in "N" position.

Float Level - 7/32" from top edge of bowl to top of float with needle valve seated (Gauge J-6646).

Accelerating Pump - Center hole - normal setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: Set engine idle speed correctly. Stop engine, close choke valve. Back off fast idle screw until idle speed screw just contacts stop, then turn fast idle screw in 7½ turns. This will give a .030-.031" throttle valve opening.

Automatic Choke Setting: Centered on Index.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Stromberg WW Carburetors" in in Carburetion Section.*

SUPERCHARGER

McCulloch VS-57S. Variable ratio type. Mounted on bracket located on top of engine water pump manifold at water outlet opening.

Kickdown Switch Adjustment: Loosen locknuts on each side of switch bracket. With wide open throttle, switch plunger should be depressed and auxiliary throttle outer lever should rest against threaded sleeve of kickdown switch.

Belt Tensioning Check: With engine at rest or idling, belt should be in bottom of groove (high blower position). With engine running at approximately 1500 RPM, belt should start to leave bottom of groove and begin to climb up. With engine at 3500 RPM (no load), belt should be running near top of pulley (low blower position). With engine at 3500 RPM, manually operate kickdown switch. Belt should go immediately to bottom of pulley groove (high blower position). Releasing kickdown switch should allow belt to return immediately to top (low blower position).

Pressure Check: Remove pipe plug on rear of carburetor cover, install low-reading pressure gauge at this point. With engine operating at 3500 RPM in high blower position (kick-down switch closed), pressure should be 5 lbs.

Lubrication: Capacity - 8 ozs. of "Type A" automatic transmission fluid.

Checking Fluid Level: Check oil level every 1000 miles. Maintain oil level between two punch marks on dipstick. Drain and refill every 15,000 miles.

►*OTHER DATA: See "McCulloch Supercharger" in Carburetion Section.*

FUEL PUMP PRESSURE: 5½-7 lbs.

CARB. EQUIPMENT

Fuel Pump: Carter M2623S. Fuel only. *NOTE* - Pump does not have vent hole and pump cover is connected to supercharger by pressure line so that supercharger pressure increases fuel pressure as required.

Fuel Pressure - 5½-7 lbs.

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See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.

Dash Unit - Studebaker No. 1539880.

Tank Unit - Studebaker No. 1544825.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY TYPE (Plasticized Paper). Clean every 1000 miles, replace element every six months or 10,000 miles.

►*CLEANING CAUTION (DRY TYPE):* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hour rate).

Battery Ground - Negative.

Engine Ground - Strap at right front corner of engine.

STARTER

Delco-Remy 1107650 (Synchro-mesh & Overdrive), 1107651 (Flightomatic). Armature - 1933789 (All).

Drive - Bendix "Folo-thru" No. A3474.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic Switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition & Starter Switch.

Automatic Transmission Neutral Safety Switch: Studebaker No. 533321 (exc. Saginaw Pwr. Strg.), 534390 (Cars with Saginaw Integral Power Steering). Mounted on steering column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.

GENERATOR

Delco-Remy 1102003 (Std.), 1102094 (Cars with Air Conditioning & Power Steering). *NOTE* - 1102094 Generator has Power Steering Pump mounted on commutator end of generator.

Armature - Delco-Remy 1923535 (1102003 Generator).

Performance Data - Cold

Amperes	Volts	RPM
30	14 0	2240

Brush Spring Tension - 28 ozs

Field Current - 1 69-1 79 amps at 12 volts and 80°F

Rotation – Counter-clockwise at commutator end.

Belt Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".

REGULATOR

Delco-Remy 1119123. *12 Volt. NOTE - Regulator is "1119000 Series". Specifications below are for "Normal" Settings.*

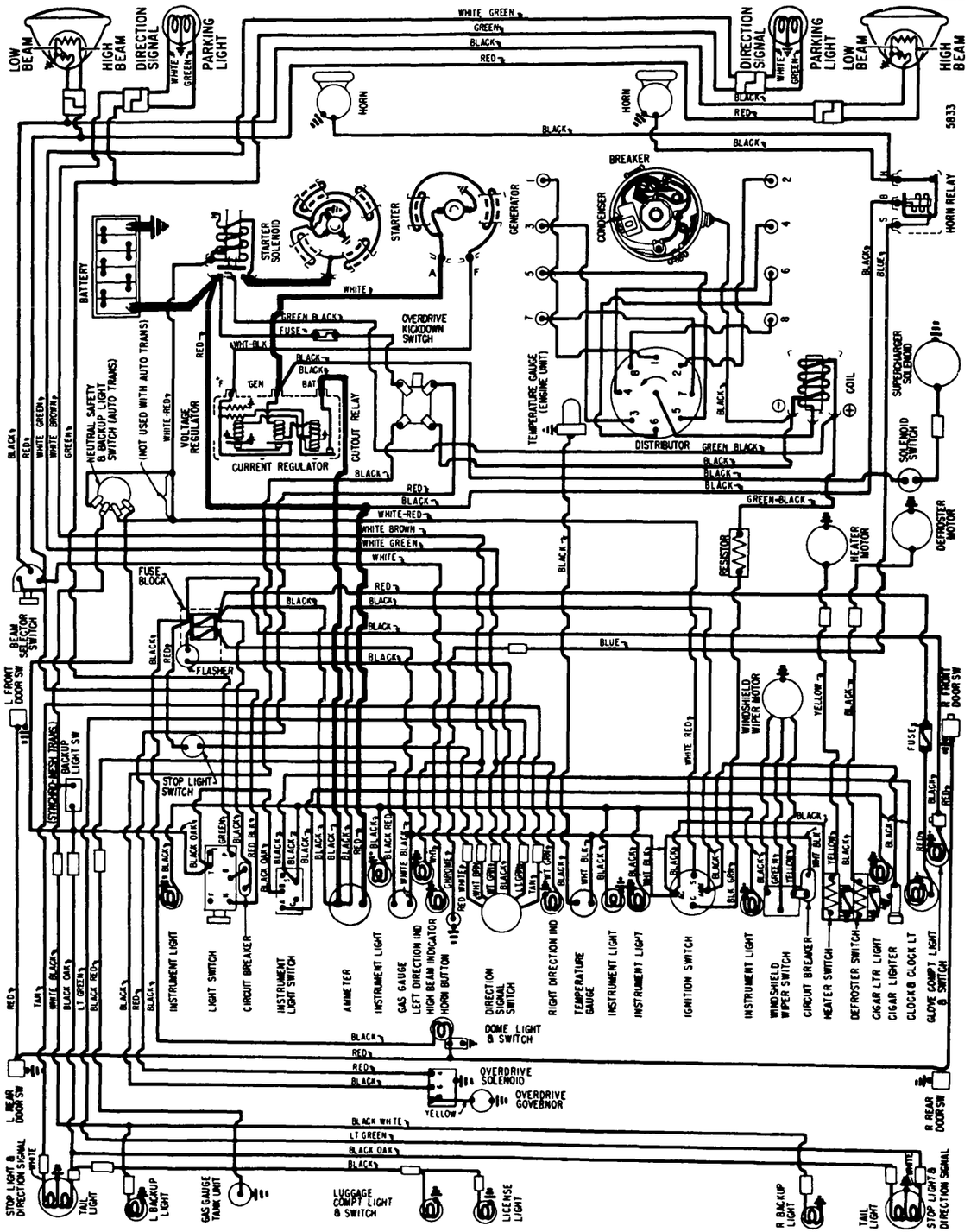
Cut ut Relay

Cuts In – 11.8-13.5 volts (hot).

Contact Gap – -020"

Air Gap – .020" with contacts just closed.

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V ltage R gulat r

Setting - 13.8-14.8 volts (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Ch cking & Adjusting - *See "Delco-Remy 12-Volt Regulators" in El ctrical S ction.*

Curr nt Regulator

Setting - 27-33 amperes hot (after 15 minutes continuous current regulator operation).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Ch cking & Adjusting - *See "Delco-Remy 12-Volt R gulators" in El ctrical Section.*

MISC. ELECTRICAL

H adlights: Sealed Beam. Single headlight in each front fender.
Direction Signals: *See El ctrical Section.*
Lighting & Instrument Switch Removal: Remove retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat in instrument board.
Stop Light Switch: Located on inner side of left frame on inner side of left frame rail forward of steering gear housing (exc. Power Brake Cars), in elbow fitting on Power Brake Unit (with Power Brakes).
CIRCUIT BREAKERS: Used as follows:
20 Amper - Protects head, parking, tail, license, back-up, and instrument lights. Located on headlight switch.
5 Amp r - Protects windshield wiper. Located on switch.
FUSES: Used as follows:
15 Amp r - Protects body & stop lights. Located in fuse block behind instrument panel.
15 Amp re - Protects directional signals. Located in fuse block behind instrument panel.
14 Ampere - Protects overdrive circuit.
14 Ampere - Protects Climatizer & Defroster. Located on switch.
3 Amper - Protects clock. Located in lead behind instrument panel.

H rn R lay: Delco-Remy 1116781.
Cl sing V ltag - 5.0-9.5 volts.
Contact Gap - .027". **Air Gap** - .014".

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: "Sweepstakes 289". V8, valve-in-head, supercharged.

Bore	Stroke	Displacement
3 9/16"	3 5/8"	289 cu. ins.

Compr. Ratio	Rated HP	Developed HP
7.5-1 ①	40.6	② 275 at 4800 RPM

① - 7.0-1 Optional. ② - Supercharged.

Compression & Vacuum Reading – *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

OIL PAN REMOVAL: Remove oil level gauge and adapter tube clamp. Disconnect battery cable. Raise car and support on stands. Drain oil. Remove starter. Swing front wheels to right to move steering bellcrank out of the way. Remove oil pan.
Oil Pan Installation - *See "Oiling System" in Studebaker Special Data for front filler block installation.*

CYLINDER HEAD: *See "Cylinder Heaa & Manifolds" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

►*OTHER ENGINE DATA: See "1958 STUDEBAKER V8 & PACKARD" car model pages (preceding).*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 quarts refill, 1 quart additional with filter change.
Normal Oil Pressure: 40 lbs. at 1400-1600 RPM.
Pressure Regulator Valve: Located on right side at front of engine block slightly above crankcase flange.
Oil Pressure Indicator: Direct reading, non-electric type gauge, Studebaker No. 1539878.
Oil Pump: Helical gear type. Mounted on rear main bearing cap in crankcase. *NOTE* - Stationary type oil strainer used which is integral with intake pipe.
Pump Removal, Overhaul, & Installation - *See "Oiling System" in Studebaker Special Data.*
Oil Filter: Partial flow. New disposable type. Replace entire unit at 5000 mile intervals or sooner if needed.
Replacement Filter - Studebaker No. 1542739.
Crankcase Ventilation: Filter element in oil filler cap (air intake) and breather tube at rear of engine (air outlet).

COOLING

►*FAN NOISE CORRECTION & IMPROVED COOLING (Packard Hawk before Serial No. 58LS-1465): See "Cooling System Notes" in Studebaker Special Data for recommended corrections. NOTE - Cars after abov serial number have this modification made in production.*

Water Capacity: 17 qts. (18.5 with heater).
Pressure Valve: Radiator filler cap. 13 lb. type.
Thermostat: Choke type. Studebaker No. 1540787 (170°) Std., No. 533247 (160°) and No. 533257 (180°) Optional.
NOTE - Thermostat located in side of supercharger mounting bracket (water outlet manifold).
Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Studebaker Special Data.
Pump Removal - Drain cooling system. Loosen generator, remove belt. Remove fan-to-hub screws and remove fan and pulley. On Studebaker "Golden Hawk" remove fan shroud. Remove four capscrews retaining pump cover to water pump manifold. Remove pump from manifold.
Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*
Temperature Gauge: Direct reading, electric type.
Dash Unit - Studebaker No. 1539879.
Engine Unit - Studebaker No. 1545220 used with Adapter, No. 1543523.
See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*FOR ALL CLUTCH, TRANSMISSION, OVERDRIVE, UNIVERSALS, REAR AXLE, SHOCK ABSORBER, SUSPENSION, STEERING, BRAKES & MISC. MECHANICAL DATA, see "1958 Studebaker V8 & Packard" car model pages (preceding).*

►*ELECTRICAL EQUIPMENT PRODUCTION CHANGE & CAUTION D lco-Remy equipm nt us d on cars b ginning Serial No 59S-23905 Specifications for this equipment differ from those for Auto-Lite equipment and different make units MUST NOT be intermixed on same car*

MODEL IDENTIFICATION

Model	Model Designation
LARK	
Deluxe 4-Door Sedan	59S-W4
Regal 4-Door Sedan	59S-W6
Deluxe 2-Door Sedan	59S-F4
2-Door Hardtop	59S-J6
Deluxe 2-Door Station Wagon	59S-D4
Regal 2-Door Station Wagon	59S-D6
Taxicab 4-Door Sedan	59S-Y1
HAWK	
Silver Hawk Coupe	59S-C6

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post

Assembly Plant	Starting Numbers
South Bend	59S-1001
Canada	59SC-1001

ENGINE NUMBER: Stamped on pad at upper left front of block

Assembly Plant	Starting Numbers
South Bend	S-10001
Canada	SC-10001

►*DETONATION AT LIGHT THROTTLE CORRECTION See DISTRIBUTOR below for correction*

TUNE-UP

►*ENGINE STALLING AFTER COLD START CORRECTION & IMPROVED WARM-UP PERFORMANCE See "Carter AS Carburetor" in Carburetion Section for recommended changes*

►*IMPROVED HOT ENGINE STARTING See "Carter AS Carburetor" in Carburetion Section for recommended changes and starting procedure*

COMPRESSION PRESSURE: 130-150 lbs at 150 RPM Maximum variation between cylinders 10 lbs

VACUUM READING: 17-18" at idle speed

VALVE TAPPET CLEARANCE: 018" cold, all valves

►*NOTE Disregard 016" specification stamped on valve cover*

MANIFOLD HEAT CONTROL: Automatic thermostatic type

Checking Thermostatic Coil Spring - With outer end of coil free from anchor, and valve closed (counterweight up), hooked end of coil should be 90° clockwise from anchor pin at 70°F

IGNITION

AUTO-LITE

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 028–033"

Spark Plugs - Champion J7 14 mm Torque to 30 ft lbs

COIL: Auto-Lite CAF-4003A.

Ignition Current - 4 0 amps idling

►*IGNITION RESISTOR NOTE Resistor not used*

DISTRIBUTOR· Aut -Lite IAT-4201 r IAT-4403 (Exc. Taxi). IAT-4403A (Taxi).

►*DETONATION AT LIGHT THROTTLE CORRECTION* Install Spark Modifier Kit, Studebaker Part No 1552852 (spring & washers) and s e *Modifi d Vacuum Advanc Tabl below for n w Advanc Curve data*

Condenser - Auto-Lite IAT-2015L (IAT-4201 Distr), No 2-32 (IAT-4403,A Distr) **Capacity** - 21- 25 mfd

Contact Point Set - Auto-Lite IGW-3028AS (IAT-4201 Distr), No 1-47 (IAT-4403,A Distr)

Breaker Gap - 020"

Cam Angle - 38-40°

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance - IAT-4201

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
2		680	4		1360
4		975	8		1950
6		1265	12		2530
7		1400	14		2800

Automatic Advance - IAT-4403, 4403A

Automatic Advance					
Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		400	0		800
2		680	4		1360
4		975	8		1950
6		1265	12		2530
7		1400	14		2800

Vacuum Spark Control: Autolite integral type

Vacuum Advance - IAT-4201

Dist Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4
1	2	4 7/8
4	8	7 1/2
8	16	11 1/8
9	18	12

Vacuum Advance - IAT-4403, 4403A

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4
1	2	5 1/4
3	6	7 1/2
6	12	10 7/8
7	14	12

Modified Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8
4¼	8½	11
8	16	13

DELCO-REMY

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 028- 033"

Spark Plugs - Champion J7 14 mm Torque to 30 ft lbs

COIL: Delco-Remy 1115043

►*IGNITION RESISTOR NOTE Resistor not used*

DISTRIBUTOR· Delco-Remy 1110229

Br ak r Gap - 022"

Cam Angl - 31-37°

Break r Arm Spring Tensi n - 17-21 ozs

R tation - Counterclockwise viewed from above

Automatic Advanc

Degrees Distr	RPM	Degrees Eng	RPM
0-2	550	0-4	1100
3-5	975	6-10	1950
6-8	1400	12-16	2800

Vacuum Spark Control: Delco-Remy 1116063

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	3-5
9	18	12½

IGNITION TIMING

Setting - 2° BTDC

Timing Mark - On vibration damper "IGN" mark in line with pointer of left side of timing cover

Timing - Disconnect vacuum advance pipe at carburetor Install plug in carburetor With engine at idling speed, timing light should show index mark nearest IGN mark, directly under pointer

CARBURETOR

►*CARBURETOR APPLICATION Carter AS, single barrel used*

►*LACK OF CONTROL PRESSURE & IMPROPER TRANSMISSION OPERATION CORRECTION* May be caused by right hand carburetor-to-bellcrank rod installed on a left hand drive car To check for proper rod, use spring scale t check pull required to start rod to move to overtravel position. Pull for left hand rod should be 8-10 lbs , for right hand rod 4-6 lbs.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With transmission selector lever in "N" (Neutral) or "P" (Park) position, engine at normal operating temperature, choke wide open, proceed as follows

1) Adjust carburetor-to-bellcrank rod so length between centerline of ball stud and centerline of cotter pin hole is 11 1/16" *Do not change this length during following adjustments*

2) Connect a tachometer to engine and set engine idle speed at 550 RPM Disconnect rod which connects main bellcrank on firewall to auxiliary bellcrank on engine by removing main bellcrank ball joint stud from main bellcrank lever Adjust screw on main bellcrank to provide 5/16" clearance between bellcrank and pad (use a 5/16" drill as a gauge)

3) Adjust ball joint on main bellcrank-to-auxiliary bellcrank lever *Carburetor idle speed screw must be against its stop and 5/16 ' gap at bellcrank maintained*

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs pressure on gauge Stop engine remove gauge and install pipe plug

5) Hold accelerator bracket arm (on firewall) approximately 3 5/8-3 3/4" from face of firewall and adjust accelerator-to-auxiliary bellcrank rod clevis until clevis pin freely enters clevis and bracket arm

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CARTER AS NO. 2876S

►*CARTER NO. 2876S CARBURETOR PRODUCTION CHANGES & RECOMMENDED CHANGES FOR IMPROVED PERFORMANCE, STALLING & HARD HOT STARTING CORRECTIONS: See "Carter AS Carburetors" in Carburetion Section.*

Idl S tting - ¼-1¾ turns open. Turn screw out for richer mixture.

Idle Speed - 550 RPM with selector lever in "N" or "P" on Flightomatic cars.

Fl at L v l - ¼" (Gauge T109-282) from top of each float (at free end) to top of casting. To adjust, bend float lip.

Acc l rating Pump - Pump arm on lifter link should be parallel to top of casting. To adjust, bend pump arm.

Fast Idl : .045" (Gauge T109-158) between lower edge of valve and bore with fast idle link on high step of cam. To adjust, bend choke connector rod.

Aut matic Ch k S tting: Centered at index.

Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fu l Pump: AC. Fuel only. Replacement Pump 4703.

Fu l Pump Pr ssur - 3½-5½ lbs.

See "Fuel Pumps" in Carburetion Section.

Gas lin Gauge: Electric type.

Dash Unit - Studebaker No. 1548689 (Exc. Silver Hawk), No. 1539880 (Silver Hawk).

Tank Unit - Studebaker No. 1544825 (All).

See "Fuel Gauges" in Carburetion Section.

Air Cl an r: DRY FILTER ELEMENT TYPE Std., Oil Bath type optional. Clean element every 1,000 miles, replace dry type every 10,000 miles.

►*DRY TYPE CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate, or blow out with compressed air.*

BATTERY

Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engin Gr und - Right front engine support bracket to frame.

AUTO-LITE STARTER

Aut -Lit MBG-4103. Armature MZ-2367.

Drive - Bendix A-3519. Barrel-Anchor type.

R tati n - Counterclockwise at commutator end.

Bru h Spring Tension - 42-53 ozs.

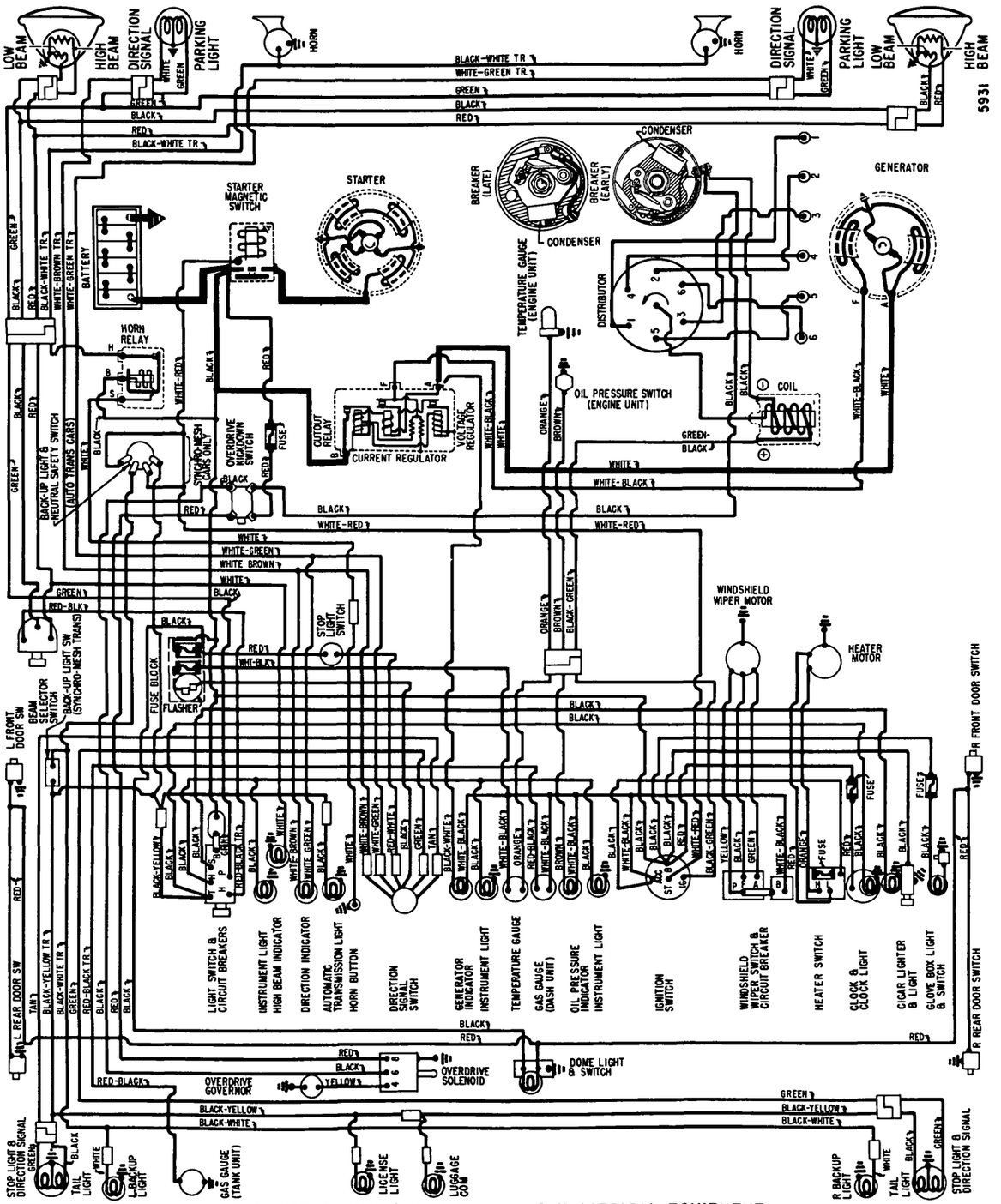
P rf rmance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55 max.
5.2 ft. lbs. min.	Lock	4.0	235 max.

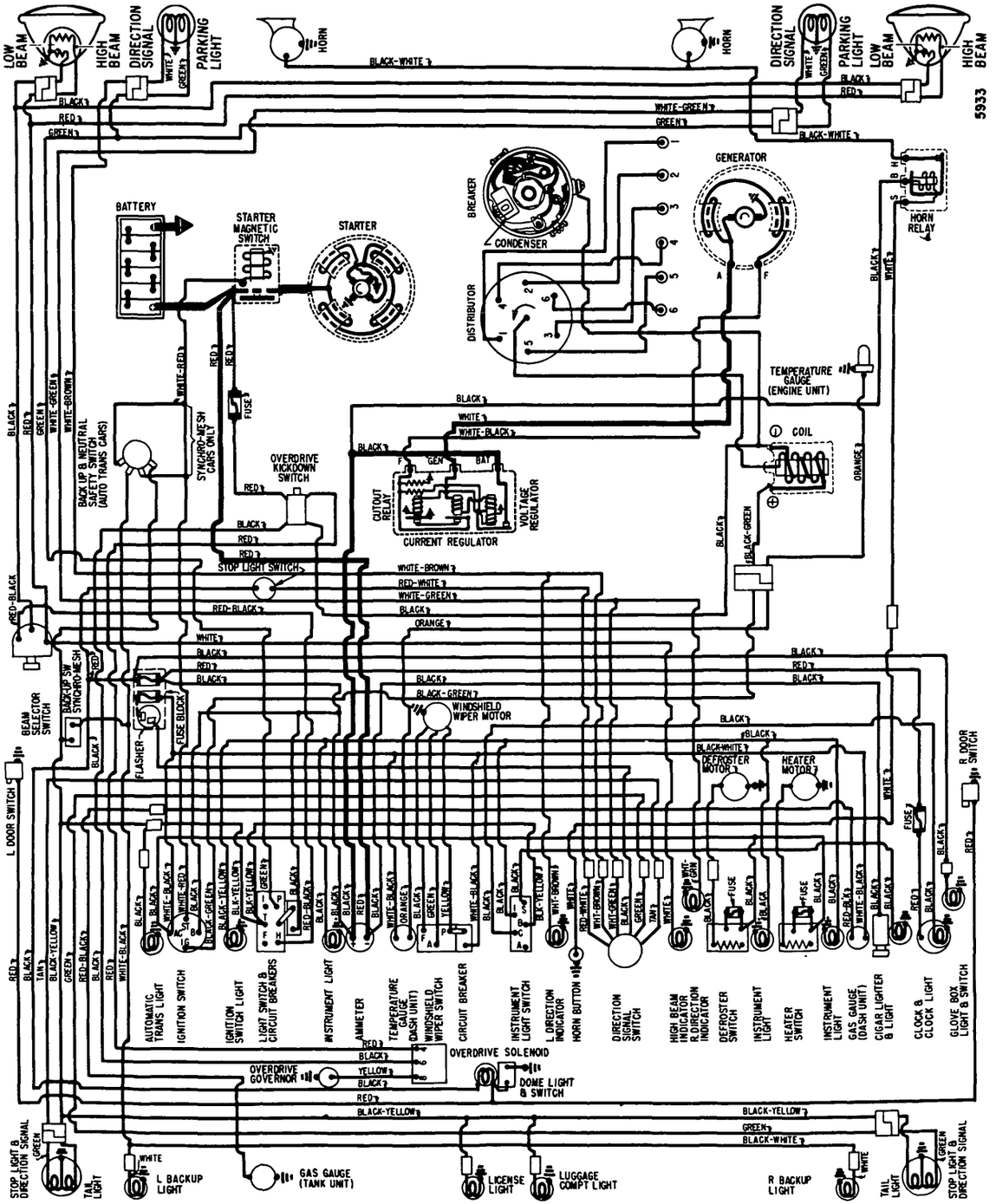
Start r Switch: Magnetic switch, Studebaker No. 1539716 mounted on starter and controlled by combination Ignition & Starter Switch.

Aut matic Transmission N utral Safety Switch: Studebaker No. 533321. Combination Neutral Safety and Back-up Light switch mounted on lower end of steer-

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STUDEBAKER LARK 6 WITH AUTO-LITE ELECTRICAL EQUIPMENT
(SEE HAWK FOR DELCO-REMY ELECTRICAL EQUIPMENT)



STUDEBAKER SILVER HAWK 6 WITH DELCO-REMY ELECTRICAL EQUIPMENT
(SEE LARK FOR AUTO-LITE ELECTRICAL EQUIPMENT)

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ing column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.

Adjustment - See *"Studebaker Flightomatic" in Transmission Section.*

GENERATOR

Auto-Lite GJC-7002-F. Armature GJC-2030-F.

Performance Data

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250
35.0	15.0	2250-2650

Brush Spring Tension - 18-36 ozs.
Field Current - 1.2-1.3 amps. at 10.0 volts (70°F).
Motoring Current - 3.4-3.9 amps. at 10.0 volts (70°F).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 3/8-1/2" deflection midway between generator and fan pulleys with 10 lbs. pull on belt.

REGULATOR

Auto-Lite VRX-6008-A.

Cutout R lay

Cuts In - 12.6-13.6 volts.
Cuts Out - 3.0-5.0 amps. discharge.
Contact Gap - .015" minimum.
Air Gap - .031-.034".

Voltage Regulat r

Setting - 14.2-14.8 volts at 80°F., unit operating normally while charging at 7 amperes or with a .25 ohm resistor between regulator and battery.
Air Gap - .048-.052" with contact just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" typ . Set to following specifications at 70°F.*

Test A	Operating Amper s	Test B
44 amps.		35 (33-37) amps.

Test A - After 15 minutes operation charging at 10 amps.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Auto-Lite R gulators" in Electrical Section.*

DELCO-REMY STARTER

Delco-Remy 1107748 (Std.), 1107650 (Taxi with H avy Duty Clutch).
Armature - Delco-Remy 1933789 (1107650).
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum (1107650).

Performance Data - 1107650

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Start r Switch: Same as Auto-Lite Starter (above).

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GENERATOR

D lc -Remy No. 1102003. Armatur No. 1923535.
Performance Data - Cold

Amperes	Volts	RPM
30	14 0	2240

Brush Spring Tension - 28 ozs
Field Curr nt - 1 69-1 79 amps at 12 volts and 80°F
R tati n - Counterclockwise at commutator end
B lt Adjustm nt: Same as Auto-Lite Generator (above)

REGULATOR

D lc -R my 1119123. *NOTE - Specifications below are ar normal s ttings*

Cut ut Relay
Cuts In - 11 8-13 5 volts (Hot)
C ntact Gap - 020"
Air Gap - 020" with contacts just closed

V ltag Regulator
S tting - 13 8-14 8 volts (Hot)
Air Gap - 075" with armature pressed down to point where contacts just touch
Ch cking & Adjusting - *See "Delco-Remy 1119000 Seri s R gulators" in El ctrical Section*

Curr nt Regulator
S tting - 27-33 amperes (Hot)
Air Gap - 075" with armature pressed down to point where contacts just touch
Ch cking & Adjusting - *See "Delco-Remy 1119000 S ri s R gulators" in El ctrical Section*

MISC. ELECTRICAL

H adlamps: Sealed Beam type (Single Headlights)

Dir ction Signal: *See El ctrical Section.*

Lighting & Instrum nt Light Switch Removal: Remove switch retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board.

St p Light Switch: Located on inner side of left frame rail forward of st ering gear housing (except Silver Hawk), in elbow fitting on Power Brake Unit (Srlver Hawk).

CIRCUIT BREAKERS: Used as follows
20 Amp r - Protects head, parking, tail, back-up, and instrument lights Located on headlight switch
5 Amp r - Protects windshield wiper Located in wiper switch

FUSES: Used as follows
15 Amper - Protects body and stop lights Located in block behind instrument panel
15 Amp r s - Protects directional signal Located in fuse block behind instrument panel
14 Amp r s - Protects overdrive circuit Located in kick-down switch-to-solenoid cable
14 Amp r s - Protects Climatizer & Defroster Located on switch
7 Amp r s - Protects radio Located in lead behind instrument panel
3 Amp r s - Protects clock Located in lead behind instrument panel

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Us extr m caution wh n disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions' in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 6 Cyl "L" head

Bore	Stroke	Displacement
3"	4"	170 cu ins
Compression Ratio	**Rated HP**	**Developed HP**
8 3-1©	21 6	90 at 4000 RPM

© - 7 0-1 Optional

Compression & Vacuum Reading - *See TUNE-UP*

►*OIL LEAKAGE OR SEEPAGE AT VALVE COVER PLATE CORRECTION (First Cars)* Leakage at lower edge of valve cover plate (when not due to defective gasket or improperly tightened cover bolts) can be corrected by removing cover and installing aluminum plugs, No 1549330 (furnished 12 in pkg), in each of the 12 valve lifter oil holes in the cylinder block Use small punch to drive plugs in tight and flush with the cylinder block *NOTE - These plugs installed in production beginning Engine No S-82962*

►*ENGINE VIBRATION CORRECTION (Cars with Flightomatic Trans)* Excessive engine vibration, particularly at lower speeds, can be corrected by installing new Front Engine Mounts of 40 durometer material These mounts are Part No 1548274 (marked "40")

►*ENGINE REAR SUPPORT INSULATOR CHANGE FOR SMOOTHER ENGINE OPERATION (Y1 Taxicab Models)* New Engine Rear Support Insulator, Part No 1548995 (40 durometer hardness), used in production beginning Serial No 59S-38215 Supersedes Part No 1547196 (60 durometer hardness)

OIL PAN REMOVAL: Remove oil level gauge. Raise car and support it with stands, drain oil. On long wheelbase models, swing wheels to right to move steering bellcrank out of way. On short wheelbase models, disconnect tie rods and reach rod from steering bellcrank, remove retaining pinch bolt and remove bellcrank from shaft. Then remove oil pan capscrews and remove pan.

OIL PAN INSTALLATION· *See "Oil Pan" in Studebaker Special Data*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data*

PISTONS

"T" slotted, cam ground, tin plated aluminum alloy

Original Bore & Pistons—*See "Original Bore & Pistons" in Studebaker Special Data*

Removal—Pistons and rods removed from above

Fitting New Pistons: Clearance—Selective feeler fit Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore Pull required to remove feeler with properly fit piston should be 11 to 16 lbs

R plac ment Pist ns: Std. .010", .020", 030" and 040" Oversize, Pistons furnished with pins.

Installing Pist ns: Install piston in cylinder bore with "T" slot away from camshaft side *Se R d Installation.*

PISTON PINS

Pin is locked in rod by tapered pin and locknut.
Diameter—.7491-.7495". **Length** 2.625"
Clearance in Piston—.0001- 0003" (selective fit)
Light thumb push fit at 70°F
Piston Pin Removal & Installation—*See "Piston Pins" in Studebaker Special Data*
Replacement Pins: Std. & 0025", .005" Oversize

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1 ...	3/32"	.007-.017"	. .002-.005"
Compr #2	1/8"	007- 017"	002- 005"
Oil	5/32"	.007-.015"	0015- 004"

Replacement Rings: Std , .020", .030", & .040" Oversize, in sets

Installing Rings: Top compression ring has step at the inside which must be installed up Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point

CONNECTING RODS

Length—(Center-to-center) 6 3/8". **Weight**—19.04 ozs.
Crankpin Journal Diameter—1 81175-1 81275"
Bearings—Steel backed, Microbabbitt lined, no shims
Clearance— 0005-.002"
Side Play—.005-.009"

Replacement Bearings: Std., .001", .002", .010", .020" Undersize.

Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod Insert tapered end of clamp screw toward heavy boss on rod With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6)

►*REPLACEMENT ROD NOTE.* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders

CRANKSHAFT

Journal Diameter—3 0623-3.0628" Four bearings

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.

Bearings - Steel-backed, micro-babbitt lined No shims
Clearance - 0005- 002"

Replacement Bearings Standard & 001" 010" 020", 030" Undersize

End Thrust· Taken by thrust washer assembled between front main bearing and crankshaft gear controlled by shims between thrust washer and main bearing journal These shims furnished 003" 005" 007" thick
Endplay - 003- 006"

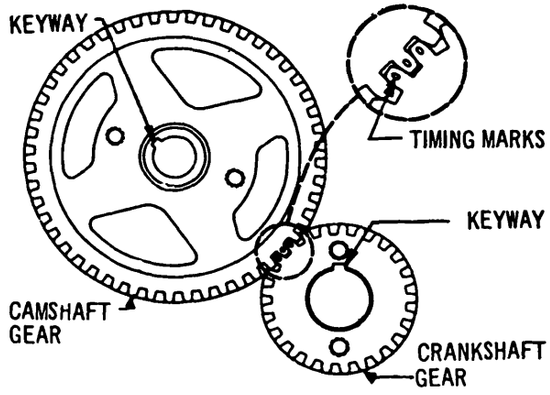
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Crankshaft R ar Main B aring Oil Seal: S *"Crankshaft & Main B arings" in Stud bak r Special Data*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data*

CAMSHAFT

Journal Diameters—(1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".
Bearings—Steel backed babbitt lined bushings
Clearance—No.1—.0007-.0022", Nos. 2,3,4—.0010-.0027".
End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft between gear hub and front bearing journal controls endplay) Adjust endplay by replacing thrust plate or spacer When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting the plate
End Play—.003-.006"
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data*
Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub
Timing Gear Removal & Installation—*See "Timing Gears" in Studebaker Special Data*
Backlash—.001-.003"
Camshaft Setting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear



6 CYL. VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance: 018" Intake and Exhaust, COLD
►*CAUTI ON Disregard 016" specification stamped on valve cover on some engines*

Valve	Head Diameter	Stem Diameter	Length
Intake	1 11/32"	5/16"	4 11/32"
Exha ist	1 9/32'	5/16"	4 11/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	11/32"	0015- 0035"
Exhaust	45°	11/32"	0015- 0035"

Valv Seat Width— 1/16-3/32'

►*RECONDITIONING VALVE CAUTION:* If reconditioning results in knife edge at top of valve, valve must be replaced
Valve Springs: Single spring used on all valves
►*VALVE SPRING LOCK INSTALLATION CAUTION* When installing lock in recess of lower spring retainer, groove in lock must engage tongue in retainer

Valve Spring Specifications

	Pressure	Length
Valve Closed	49-54 lbs.	1 21/32"
Valve Open	93-103 lbs.	1 5/16"

Valve Guides: Use Tool No. J-2034 and drive old guide down and out from top of block into valve spring chamber. Use Collar J-2034-5, guide pilot J-2034-2 on driver J-2034-1 and drive new guide down until driver bottoms against spacing collar
Valve Lifters: Mushroom type Remove from below with camshaft out of engine
Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*
Replacement Lifters—Std., .001" & .005" Oversize
►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves—Open 15° BTDC Closes 49° ALDC
Exhaust Valves—Open 54° BLDC. Closes 10° ATDC
Valve Timing Check—Adjust No. 1 Intake valve at .020" cold Rotate engine until No 6 piston is on compression stroke (the IN-OP 1-6 marking on dampener should be several inches from pointer), then while moving lifter up and down continue to rotate crankshaft Valve timing will be correct if lifter stops moving as above marking is directly below pointer

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*
Crankcase Capacity: 5 quarts refill, 1 quart additional with filter change.
Normal Oil Pressure: 20-40 lbs. at 2000 RPM.
Pressure Regulator Valve: Opens at 40 lbs. Under plug on lower right front corner of engine. For access, remove engine front cover bolt. Replace weak spring (do not attempt to stretch spring).
Oil Pressure Indicator: (Silver Hawk) Direct reading, non-electric type gauge, Studebaker No. 1539878.
(Other Models) Indicator light on instrument panel. If light on at highway speeds, low oil pressure or other difficulty indicated. Oil Pressure Switch on Engine Studebaker No. 1539898.
Oil Pump: Helical gear type. On right side of crankcase.
Pump Removal, Overhaul, & Installation - *See "Oiling System" in Studebaker Special Data.*
Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.
Replac m nt Filt r El m nt - Studebaker No. 1542739.
Crankcase V ntilati n: Filter element in oil filler cap (air intake) and in breather pipe at left rear of engine (air outlet). Filter element in breather pipe is replaceable (retained by cotter pin).
Filt r El m nt S rvicing - Remove filter in breather pipe by removing cotter pin and pulling filter out with a hooked wire Clean filters by washing in kerosene or solvent, drain thoroughly and re-oil by coating with engine oil

COOLING

Water Capacity: 11 qts without heater Add 1 qt (Exc Silver Hawk), 1½ qts (Silver Hawk) with heater
Pressure Valve: Radiator filler cap. 13 lb. (12-15) type. Studebaker No. 536502.
Thermostat: Choke type in water outlet on cylinder head. Studebaker No. 1542838 (170°) Std., No. 531470 (160°) and No. 532017 (180°) Optional.
Water Pump: Packless, sealed ball bearing type
See "Water Pumps" in Stud bak r Sp cial Data.
Pump Removal - Remove shroud. *See "Cooling System" in Studebaker Special Data* Loosen generator and remove belt. Remove fan-to-hub capscrews and remove fan blades and pulley Disconnect Climatizer hose, and generator adjusting arm Disconnect outlet hose and remove mounting capscrews.
Radiator & Fan Shroud Removal: S e *"Cooling System" in Studebaker Special Data*
Temperature Gauge: Direct reading, electric type
Dash Unit - Studebaker No 1548690 (Exc Silver Hawk), 1539879 (Silver Hawk)
Engine Unit - Studebaker No 1549452 (marked "362-AR" on one face of hex head) *NOTE* - This unit supersedes previous type, No 1545220, and should be used for replacement
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Borg & Beck Model 8.5A6 (Exc. Y1), 9A7 (Y1 Taxicab). Single plate, dry disc type
See "Borg & Beck" in Clutch Section
Pedal Adjustment: Free travel ½-1" To adjust, loosen locknut on rod connecting clutch release shaft lever to clutch operating shaft lever Turn opposite nut in or out to shorten or lengthen rod as required, tighten locknut securely against swivel
►*HILL-HOLDER NOTE.* Check setting whenever clutch pedal adjusted and adjust Hill-holder to release just as clutch engages Make sure Hill-holder operating rod installed with rod to inside (toward center of car) of clutch release shaft lever
Housing Removal: Remove oil level gauge and tube Remove starter mounting screws (only) and tie starter and cables up out of the way Disconnect clutch pedal free travel adjusting rod at operating shaft inner lever On cars with Hill Holder, disconnect operating rod from operating shaft outer lever Remove operating shaft sleeve pin (in sleeve at frame end of shaft), remove support bracket capscrews (on bottom of transmission case), lower support bracket and slip operating shaft sleeve off shaft, remove operating shaft assembly Remove transmission (see below) Remove two bolts or nuts holding rear support insulator to the crossmember Support engine weight with a jack placed under the rear of the oil pan (use block on jack to prevent damage to pan) Remove support crossmember-to-frame bolts and remove crossmember Remove clutch housing bolts

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or capscrews (*CAUTION* - Remove dowel bolts first), remove clutch housing

►*INSTALLATION CAUTION* Align clutch housing to rear engine plate with two tapered drifts, then install the dowel bolts Draw dowel bolts in place by tightening the nuts—d n t driv them into place

Clutch Rem val Remove clutch housing (above),remove six screws evenly to relieve spring pressure, lift off clutch assembly and driven member

SYNCHRO-MESH TRANSMISSION

Warner Mod l T96 (Exc Taxicab), T90B (Y1 Taxicab) Three-speed synchro-mesh

See Warner Transmissions in Transmission Section

►*TAXICAB TRANSMISSION IDENTIFICATION NOTE* This T90B transmission is installed in case marked "T86" Types used can be identified by letters stamped on metal tag attached to one cover capscrew as follows "EE - Used with 9A7 (9½") Clutch 'L' - Used with 10 5A8 (10½") Clutch

Transmission C ntr l: S *"Transmission Controls" in Transmission S ction.*

R m val: Disconnect propeller shaft at rear universal joint flange, pull shaft to rear to disengage splined joint at transmission extension, remove shaft. Disconnect shift rods at transmission case shift levers, disconnect speedometer cable at transmission case, remove speedometer pinion. Drain transmission. Support transmission and remove capscrews mounting transmission on clutch housing. Remove clutch operating shaft, bracket, and bearing from transmission case. Move transmission straight back until main drive pinion clears clutch driven member, then lower transmission and remove from beneath car.

OVERDRIVE

Warn r R10. Governor controlled, solenoid operation with throttle controlled kick-down. *NOTE* - Relay is not used in overdrive control circuit. See wiring diagram for new control circuit.

See "Warner R10 Overdrive" in Transmission Section.

Ov rdriv Contr l: Se *"Warner R10 Overdrive Control" in Transmission S ction.*

R m val: Remove as unit with transmission. Disconnect control wiring and cable, then proceed as for transmission removal (above).

FLIGHTOMATIC TRANSMISSION

Warner M del AS4-5H (Exc. Taxicab), AS2-7E (Y1 Taxicab) Torque converter and hydraulically controlled 3-speed planetary gear transmission

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION:* S e *"Flight matic" Transmission in Transmissi n S cti n.*

►*TESTING & TROUBLE SHOOTING: See "Flightomatic" Transmissi n in Transmission Section.*

Lubricati n: Check fluid every 1000 miles, drain and refill every 15,000 miles. Use Automatic Transmission Fluid Type A - Suffix A

►*INSPECTION HOLE COVER NOTE* Later cars have rubber covered inspection hole cover installed over floor mat which can be removed for fluid checking without disturbing floor mat.

Ch cking Fluid L v l – Place selector lever in "P" position. Start engine and operate it for approximately four minutes or until engine and transmission have reached operating temperature. Remove floor mat from right side and remove oil inspection hole cover. Clean all dirt and foreign material from dipstick. Apply parking brake and foot brake, and move selector lever slowly from "P" position to "R" position, then back to "D" position. Remove dipstick, wipe clean, and install in transmission and **turn clockwise to lock position.** Remove dipstick and read fluid level. Add fluid to bring level to "FULL" mark on dipstick (1½ pints between "LOW" and "FULL" marks on dipstick).

Capacity - 9 qts (Exc Taxicab), 9½ qts (Y1 Taxicab)

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER FLIGHTOMATIC DATA: See "Flightomatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. TWO used (with new one-piece type propeller shaft).

►*UNIVERSAL LUBRICATION NOTE* · Universals should be disassembled, cleaned, and repacked with special Universal Joint Lubricant at 20,000 mile intervals.

PROPELLER SHAFT

►*DRIVE LINE ANGLES CHECKING & ADJUSTMENT See 'Propeller Shaft Notes" in Studebaker Special Data CAUTION - Incorrect angles may cause drive line or chassis vibration*

►*UNIVERSAL JOINT "PHASE ANGLE" & PROPELLER SHAFT REPLACEMENT CAUTION* Shaft assemblies with different universal joint phase angles used on some models *See "Propeller Shaft Notes" in Studebaker Special Data for complete data on each model*

►*PROPELLER SHAFT PRODUCTION CHANGE & RECOMMENDED CORRECTION FOR "RHYTHMIC BEAT" NOISE IN DRIVE LINE See "Propeller Shaft Notes" in Studebaker Special Data for new Propeller Shaft Assemblies and special installation procedure*

REAR AXLE

Spicer Model 23-1 (Exc. Taxicab), Model 44-3 (Y1 Taxicab). Semi-floating, hypoid gear, with Hotchkiss Drive *See "Spicer Hypoid" in Rear Axle Section*

►*"TWIN-TRACTION" DIFFERENTIAL NOTE* Optional Can be identified by letter "T" or figure "45" stamped on tag attached to axle housing by one cover screw (*NOTE* - Separate tag used to indicate axle ratio) *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

►*PINION BEARING OIL SEAL LEAK CORRECTION See "Spicer Hypoid" in Rear Axle Section*

Axle Ratio Identification - Stamped on tag attached to axle housing by one cover screw (*NOTE* - Separate tag used to indicate "Twin-Traction" Differential)

►*AXLE RATIO PRODUCTION CHANGE* Later cars have new axle ratio of 3 73-1 (Synchro-mesh & Flightomatic Transmission)

Axl Rati s - Synchr -m sh Trans. Cars

Car M d l	ℂ Std. Rati	Optl. Rati s
W4,F4 Sedans	3 54-1	4 10-1 & 3 73-1
W6 Regal Sedan	3 73-1	3 54-1 & 4 10-1
J6 Hardtop	3 73-1	3 54-1 & 4 10-1
D4 Station Wagon	3 73-1	4 10-1 & 4 27-1
Silver Hawk	4 10-1	3 73-1 & 4 27-1
Taxicab	4 09-1	4 41-1
Overdrive Cars		
W4,F4 Sedans	3 73-1	3 54-1 & 4 10-1
W6 Regal Sedan	4 10-1	3 54-1 & 3 73-1
J6 Hardtop	4 10-1	3 54-1 & 3 73-1
D4 Station Wagon	4 27-1	3 73-1 & 4 10-1
Silver Hawk	4 27-1	3 73-1 & 4 10-1
Flightomatic Cars		
All Models	3 54-1 (Early)	3 73-1 (Later)

ℂ - See Axle Ratio Production Change Note above

Backlash - 003- 006"

Axle Shaft Removal: Remove wheel, remove wheel hub using Puller J-1644-S Take out backing plate retaining bolts, remove outer washer, retainer, reinforcing plate, and felt washer (discard this washer) Free hand brake cable from equalizer and frame guides, disconnect hydraulic brake line at wheel cylinder Pull backing plate out over end of axle shaft and tie it up out of the way Remove endplay adjusting shims (*CAUTION* - Save these shims for reinstallation) Use Puller J-7935 with Hammer J-2619 to remove axle shaft

Rear Axle Assembly Removal: Remove hub caps, loosen wheel nuts and remove axle shaft nut Raise rear of car and support on stands under frame just ahead of rear springs Remove wheels, hubs, and drums Disconnect brake line at each rear wheel cylinder, remove brake pipe clamps and free brake line from rear axle housing Take out backing plate bolts pull backing plate out over end of axle shaft and tie up out of the way Remove adjusting shims located beneath backing plate (*CAUTION* - Save these shims for reinstallation) Disconnect propeller shaft by removing rear universal joint U-bolts and nuts (wire caps together) Remove rear spring U-bolts from axle housing, disconnect rear shock absorbers Remove rear axle assembly from beneath car

Wheel Bearing Adjustment: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims .003", 005", 010", 030" thick).

End Play – .001-.006".

►*REAR WHEEL BEARING LUBRICATION CAUTION:* No lubrication plug provided but bearings are NOT lubricated for life. Remove, clean, and repack bearings at 25,000 mile intervals.

SHOCK ABSORBERS

Gabriel (U.S. Cars), Monroe (Canadian Cars). Direct acting, Hydraulic, Non-adjustable (Exc Taxicab), Adjustable (Y1 Taxicab & Optl Heavy Duty on other cars)

CONTINUED ON NEXT PAGE

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Gabri l Sh ck Abs rb rs (Stud bak r N s.)

Car Model	Front	Rear
Sedans & Hardtop	1545057	1545052
Station Wagon	1545057	1545053
Silver Hawk (Early)Ⓒ	1545055	1545050
Silver Hawk (Later)	1545057	1545053
TaxicabⓆ	1548550	1548549
All (Heavy Duty)Ⓒ	1544410	1544411

Monroe Shock Absorbers (Canada)

Sedans & Hardtop	1547458	1545045
Sta Wgn & Silver Hawk	1547458	1545046

Ⓒ - First 557 cars only Ⓒ - Adjustable type

FRONT SUSPENSION

Independent. Coil spring type with shock absorbers located within springs

►*VARIABLE RATE COIL SPRING NOTE* All springs except Heavy Duty type are Variable Rate with closer coils at upper end.

S e "Studebaker" in Suspensions & Wheel Alignment S ction

Kingpin Inclination - 6° at 0° camber

Caster - Neg 1½° to Neg 3°. Maximum variation between wheels ¾° *NOTE - Above specifications supersede previous data.*

Camber - 0° to Pos. 1°. ½° more camber favored on driver's side

Toe-In - 1/16"-1/8".

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be turned 23½-24½°.

STEERING

Manual: Ross TA-12 & TL-12 Cam & Twin Lever or SL-54 Cam & Single Lever Roller Stud. Used as follows

Car Model	Ross Strg. Gear Model
Sedans & Station Wagons (LHD)	TA-12
Sedans & Station Wagons (RHD)	SL-54
Silver Hawk & Taxicab (LHD)	SL-54
Silver Hawk (RHD)	TL-12

See "Ross Steering Gears" in Steering Section

P wer Steering: Bendix Linkage Type Used with standard steering gear

See "Bendix Linkage Type Power Steering" in Steering Section.

St ering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & H rn Butt n R m val: *See "R ss Cam & Twin Lev r" in Steering Section.*

Steering G ar R moval: *S e "R ss Cam & Twin L v r" in Steering Section.*

BRAKES

Service: Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes) Parking lever applies rear wheel service brakes

See "Wagner Lockheed Self-centering Brakes" in Brake Section

►*BRAKE THUMP CORRECTION (All Models)* A thumping or bumping noise on brake application which increases as car is slowed down can be corrected as follows Remove wheel and brake drum assembly, remove all tool marks in brake drum by cross-sanding the drum with emery cloth If all tool marks cannot be removed by this method, use a light lathe cut

Drum Diameter	Frt. Whls.	Rear Whls.
All (Exc Taxicab)	10"	9"
Y1 Taxicab	11"	10"

Master Cyl. Bore Diameter - 1 000" (All)

Wheel Cylinder Diameter	Frt. Whls.	Rear Whls.
All (Exc Taxicab)	1 000"	812"
Y1 Taxicab	1 062"	875"

Braking Power - 62% Front, 38% Rear

Brake Lining: Marshall-Eclipse lining used on all models Lining is riveted (Exc Taxicab), Bonded (Y1 Taxicab with heavy duty lining)

►*FRONT WHEEL SECONDARY LINING NOTE (Exc Y1 Taxicab)* Lining on this shoe is 1/4" thick (3/16" on all other shoes) and is pre-ground off-center to eliminate brake squeal This lining marked "Secondary" and "Top" and should be installed as marked

►*BRAKE LINING THICKNESS CAUTION (Y1 Taxicab)* **Front** wheel lining thickness is 9/32", **Rear** wheel lining thickness 3/16" DO NOT interchange these linings

Lining Width & Length (All Models except Taxicab)

Shoe	Front Wheel	Rear Wheel
Primary	2" x 8 15/32"	2" x 7 9/16"
Secondary	2" x 10 53/64"	2" x 9 3/4"
	(Y1 Taxicab)	
All Shoes	2 1/4" x 11 1/2"	2" x 10 7/16"

Thickness - 3/16" except as noted above *See Brak Lining Notes and Cautions above*

Clearance - Lock wheels by turning shoes out against drum, then back off adjusting screw 8 notches or more as required to free the drum

Hill Holder: Used on Synchro-mesh Trans. Cars. *See "Hill-holder" in Brake Section for data*

Standard Master Cylinder On frame left side rail at base of brake pedal

Checking Fluid—Access hole in front floor pan at left corner of drivers' seat Fluid should be maintained at level ½" below top of filler opening

Removal—Remove from beneath car Disconnect clutch pedal pullback spring from master cylinder support strap Remove brake pedal pullback spring by unhooking it first from frame bracket and then from spring clip which is attached to master cylinder-to-pedal rod Disconnect fluid line or lines at rear of master cylinder *(NOTE*—On cars equipped with Hill-holder, only one line is connected to master cylinder). Remove brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder Insert forward mounting bolt ing bolt to hold Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Power Unit. Used in conjunction with standard master cylinder and located under hood on left front fender apron.

See Hydrovac P wer Unit" in Brak Section.

Removal—Disconnect vacuum and brake lines, stop light wires, remove power unit-to-bracket mounting bolts

MISC. MECHANICAL

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section*

Windshield Wiper: (Deluxe Models) Vacuum Link & Crank Arm type (Others) Auto-Lite or Bosch Electric Two-speed type

See "Windshield Wipers" in Miscellan ous S ction.

MODEL IDENTIFICATION

LARK

Model	Model Designation
2-Door Sedan Ⓒ	59V-F4
4-Door Sedan Ⓒ	59V-W4
4-Door Sedan	59V-W6
2-Door Hardtop Sedan	59V-J6
2-Door Station Wagon Ⓒ	59V-D4
2-Door Station Wagon	59V-D6
Taxicab 4-Door Sedan Ⓒ	59V-Y1

Ⓒ - Fleet Sales only

HAWK

Silver Hawk Coupe	59V-C6

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post

Assembly Plant	Starting Numbers
South Bend	59V-1001
Canada	59VC-1001

ENGINE NUMBER: Stamped on pad at upper left front of block

Assembly Plant	Starting Numbers
South Bend	V-418701
Canada	VC-14701

TUNE-UP

►*DETONATION AT LIGHT THROTTLE CORRECTION* *See DISTRIBUTOR below for correction*

►*STUMBLE OR HESITATION ON COLD START CORRECTION:* Install new choke piston *See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

COMPRESSION PRESSURE: 140-160 lbs at 150 RPM Maximum variation between cylinders 10 lbs

VACUUM READING: 18-20" at idle speed

VALVE TAPPET CLEARANCE: 023-025" engine hot and idling, 025-027" engine cold

MANIFOLD HEAT CONTROL: Automatic thermostatic type Located in right bank exhaust manifold outlet

Checking Thermostatic Coil Spring - With outer end of coil free from anchor, and valve closed (counterweight forward), hooked end of coil should be 90° clockwise from anchor pin at 70°F

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 033-038"

Spark Plugs - Champion H18-Y 14 mm Torque to 25-30 ft lbs

COIL: Delco-Remy 1115122.

Ignition Current - 3 8 amps idling

Resistor - Delco-Remy 1927809 1 4-1 65 ohms at 75°F

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Bypassed during cranking by lead from starter solenoid to coil

DISTRIBUTOR: Delco-Remy 1110864.

►*DETONATION AT LIGHT THROTTLE CORRECTION* Install Spark Modifier Assembly, Studebaker Part No 1553390 and *refer to Modified Vacuum Advance Table below for new Advance Curve data*

Condenser - Delco-Remy 1869704 **Capacity** 18-23 mfd

Contact Point Set - Delco-Remy 1918148

Breaker Gap - 013-018"

Cam Angle - 26-33° with 016" breaker gap

Breaker Arm Spring Tension - 19-23 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0 5-2 5	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Control: Delco-Remy 1116058

Plunger Travel - 11/64-3/16"

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10 25-11 5

Modified Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8
4¼	8½	11
8	16	13

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data*

IGNITION TIMING

Setting - 4° BTDC at 550 RPM Vacuum line to distributor disconnected and opening in carburetor plugged

Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover

CARBURETOR

►*CARBURETOR APPLICATION* *Stromberg WW 2-Barrel Standard on all models, Carter WCFB 4-Barrel Optional on all models except Taxi*

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows

1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge) After stop is adjusted, hold in this position

2) *NOTE - Make sure that carburetor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetor, and in outer hole on cars with 4-barrel carburetor In both cases, ball joint must be on underneath side of bellcrank lever*

3) Adjust carburetor-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave its stop

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs pressure on gauge (95-100 lbs on Taxi) Stop engine, remove gauge and install plug

THROTTLE RETURN CHECK ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on throttle lever Mark position of check assembly relative to bracket, then turn check assembly 1¾ to 2 turns toward lever. Tighten locknut

STROMBERG WW

Stromberg Series WW, Code 6-123. Throttle return check used on all models with Flightomatic Transmission

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyls 1-4-6-7, LEFT barrel 2-3-5-8*

Idle Setting – Initial setting 1¼ turns open final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars

Float Level - 3/16" from top edge of main body to top of float To check, remove bowl cover and place float level gauge of Tool J-7477 across top edge of main body Float should just touch gauge To adjust, bend float lip

Accelerating Pump - Center hole, normal setting For less fuel install rod in inner hole, for more fuel install rod in outer hole

Fast Idle Setting: With choke valve closed and highest part of high idle cam contacting fast idle screw, adjust fast idle screw so 030" wire (Tool J-7477) can be inserted freely between throttle valve and throttle body on idle port side

Automatic Choke Setting: Centered on index

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section*

CARTER WCFB

Carter WCFB No. 2829S (Std. & O.D. Trans.), No. 2830S (Flightomatic).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls 1–4–6–7, LEFT barrels feed 2–3–5–8*

►*STUMBLE OR HESITATION ON COLD START CORRECTION:* Install new choke piston *See "Carter WCFB 4–Barrel Carburetors" in Carburetion Section*

Idle Setting – Initial setting 1 turn open Turn screws out for richer mixture

Idle Speed – 550–600 RPM with selector lever in "N" on Flightomatic cars

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA: See "Carter WCFB 4–Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter No 2573S Fuel only

Pressure - 3½-5½ lbs

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type

Dash Unit – Studebaker No 1539880 (Hawk) No 1548689 (others)

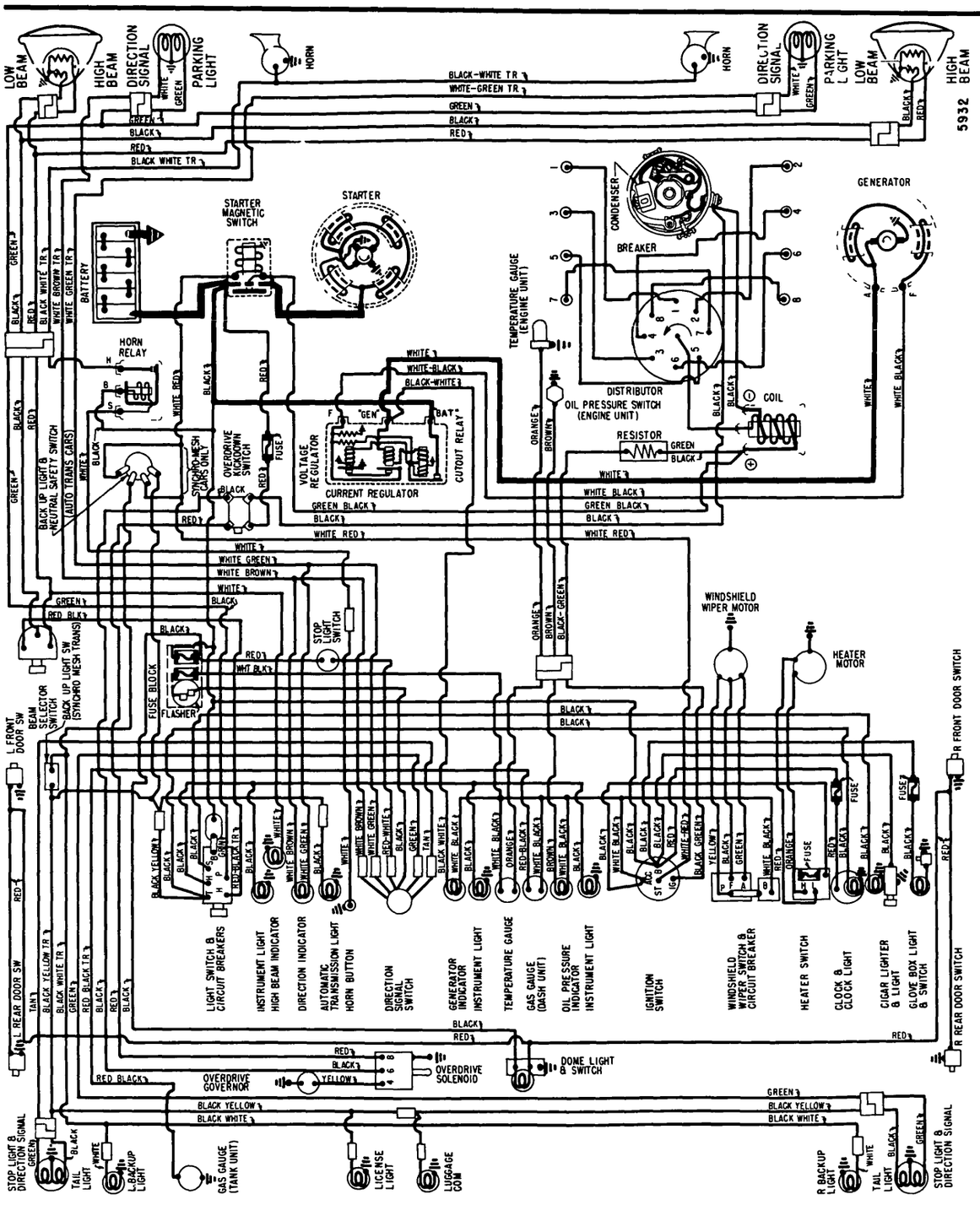
Tank Unit – Studebaker No 1544825

See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY TYPE (Plasticized paper) Standard. Oil Bath type Optional Clean dry type filter element every 1000 miles, replace element every six months or 10,000 miles

►*CLEANING CAUTION (DRY TYPE)* Clean filter element by tapping and shaking to remove dirt particles *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

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STUDEBAKER LARK V8

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BATTERY

Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hour rate).
Battery Ground - Negative.
Engine Ground - Strap at right front corner of engine.

STARTER

Delco-Remy 1107650 (Synchr -mesh & Ov rdriv), 1107651 (Flightomatic). Armature - 1933789.
Drive - Bendix "Folo-thru" No. A3474.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

► *STARTER MOTOR CABLE-ACCELERATOR LINKAGE INTERFERENCE CORRECTION & PRODUCTION CHANGE:* Install new longer starter motor cable, Part No. 1539935, and route cable through body hold-down bracket. Cable installed on cars after Serial No. 59V—26047.

Starting Switch: Magnetic Switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition & Starter switch.

Automatic Transmission Neutral Saf ty Switch: Studebaker No. 533321 (exc. Saginaw Pwr. Strg.), 534390 (Cars with Saginaw Integral Power Steering). Mounted on steering column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.
Adjustment - *See "Studebaker Flightomatic" in Transmission Section.*

GENERATOR

Delco-Remy No. 1102003. Armatur N . 1923535.

Performance Data - C ld

Amperes	Volts	RPM
30	14.0	2240

Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amps. at 12 volts and 80°F.
Rotation - Counter-clockwise at commutator end.
Belt Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".

REGULATOR

Delco-Remy 1119123. *NOTE - Specifications below are "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (hot).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulat r

Setting - 13.8-14.8 volts (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 12 Volt Regulators" in Electrical Section.*

Current R gulator

Setting - 27-33 amperes hot (after 15 minutes continuous current regulator operation).
Air Gap - .075" with armature pressed down to point where contacts just touch
Ch cking & Adjusting - *See 'Delco-Remy 12 Volt Regulat rs" in Electrical Section*

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MISC. ELECTRICAL

Headlights: Two headlights, one in each fender.

Direction Signal: See *Electrical Section.*

Lighting & Instrument Switch Removal: Remove retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat in instrument board.

Stop Light Switch: Located on inner side of left frame rail forward of steering gear housing (exc. Power Brake Cars), in elbow fitting on Power Brake Unit (with Power Unit).

CIRCUIT BREAKERS: 20 Ampere – Headlights, High beam indicator, Parking, Tail, License, and All Instrument lights. On headlight switch.
5 Amp r – Windshield wiper. On wiper switch.

FUSES: 15 Amp r – Direction signals, Stop lights, and Interior lights. In fuse block behind instrument panel.
14 Amp r – Overdrive. In kickdown switch-to-starter solenoid cable.
14 Amp r – Heater. On heater switch.
1 Amp r – Clock. In lead behind instrument panel.

H rn R lay: Studebaker No. 1547377.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme car when disconnecting any part of air conditioning equipment or lines for access to engine, See "Air Conditioning S rvice Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8, valve-in-head.

B r	Str k	Displacement
3 9/16"	3 1/4"	259.2 cu. in.
C mpr. Rati ℂ	**Rat d HP**	**Developed HP**
8.8-1 (2-Bbl. Carb.)	40.6	180 at 4500 RPM
8.8-1 (4-Bbl. Carb.)	40.6	195 at 4500 RPM

ℂ - 7.0-1 & 7.5-1 Optional.

C mpr ssion & Vacuum R ading - See *TUNE-UP.*

OIL PAN REMOVAL: Remove dipstick and adapter tube (remove head bolt to remove tube clamp). Disconnect battery. Drain crankcase. Remove starter. On Hawk, swing wheels to right to move steering bellcrank out of way. On Other Models, remove steering bellcrank assembly and exhaust crossover pipe. Remove oil pan screws and pan.

OIL PAN INSTALLATION: *See "Oil Pan" in Studebaker Special Data for special procedure.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *S e "Cylinder Head & Manifolds" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

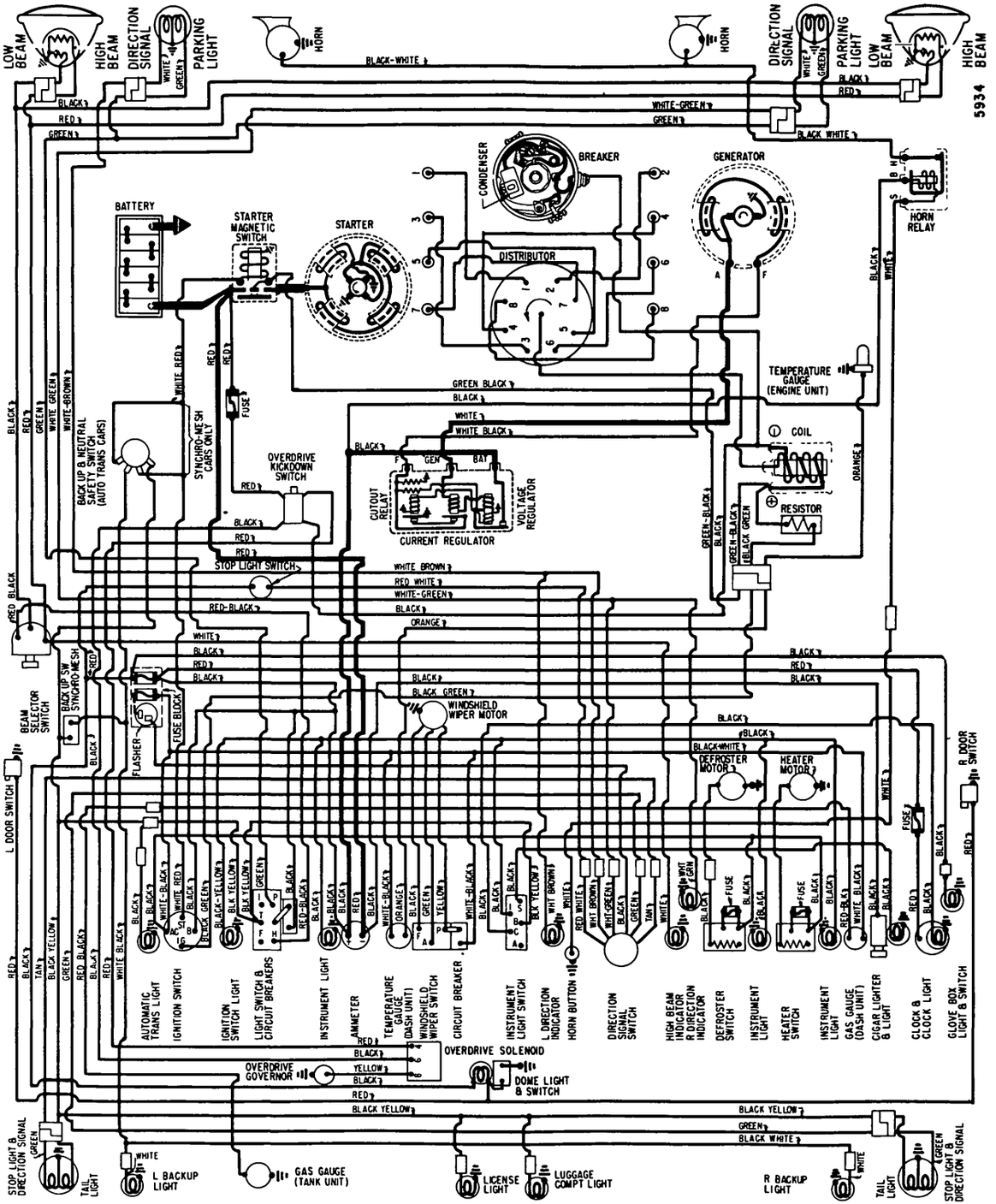
PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*

W ight – 16.21 ozs.

R m val - Pistons & rods remove from above.

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STUDEBAKER SILVER HAWK V8

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Fitting New Pistons: Clearance - Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 7–12 lbs.

Replacement Pistons: Std. size & .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.

Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PISTON PINS

Locked in rod by tapered pin and locknut.

Diameter – .8741-.8745". **Length** – 3 1/16".

Clearance in Piston – .0001-.0003" (selective fit). Light finger push fit at 70° F.

Replacement Pins: Std. size & .0025", .005" oversize.

Removal & Installation: *See "Piston Pins" in Studebaker Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compression	.077-.078"	.008-.016"	.002-.005"
Oil	.1855-.1865"	.008-.016"	.0015-.005"

Replacement Rings: Sets of Std., .020", .030" and .040" Oversize.

Installing Rings: Install compression rings with chamfered side of ring upward. Gaps of inner and outer oil rings must not come at same point.

CONNECTING RODS

Length - 6 5/8" center-to-center. **Weight** - 23.71 ozs.

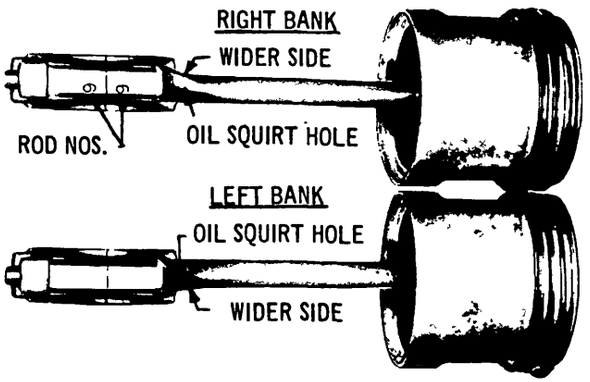
Crankpin Journal Diameter - 1.99925-2.00025".

Lower Bearing - Interchangeable. Steel backed, micro-babbitt lined type. No shims.

Clearance - .0005-.002". **Sideplay** - .008-.013".

Replacement Bearings: Std., .001", .002", .010" and .020" Undersize.

Installing Rods: Number on rod and bearing cap must be on same side. Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine.



V8 ENGINE PISTON & ROD ASSYS.

Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank.

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

►*REPLACEMENT ROD IDENTIFICATION NOTE:* Replacement rods are unnumbered. To identify, hold rod upright with oil hole toward you. Wide part of offset will be to right on left bank rods, to left on right bank rods.

CRANKSHAFT

Journal Diameter–2.4995-2.5000".

Bearings - Steel-backed, micro-babbitt lined. No shims.

Clearance–.0005-.0025".

Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.

End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal. **Endplay**–.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters–(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings–Precision type, steel backed babbitt lined.

Clearance – .00075-.00225" (No. 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

Endplay–.003-.006".

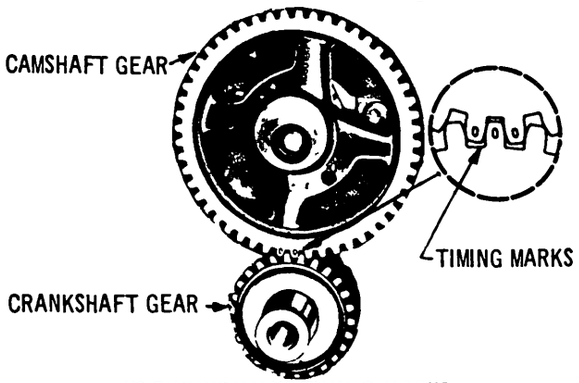
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.

Timing Gear Removal & Installation–*See "Timing Gears" in Studebaker Special Data.*

Backlash–.001-.003".

Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.



V8 ENGINE VALVE TIMING MARKS

Engine Front Cover Removal: *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance - .023-.025" (Hot), .025-.027" (Cold).

Valve	Head Diameter	Stem Diameter	Length
Intake	1 21/32"	11/32"	5 5/32"
Exhaust	1 17/32"	11/32"	5 5/32"

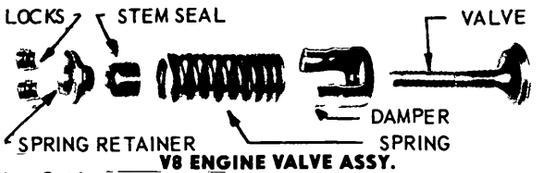
Valve	Seat Angl	Lift	Stem Clearance
All	45°	.23/64"	.0015-.0035"

Valve Seat Width–1/16-3/32".

Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

Valve Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below. *NOTE* - Damper installed on lower (close-coiled) end of all springs. **Valve Spring Specifications**

	Pressure	Length
Valve Closed	45-55 lbs.	2 1/32"
Valve Open	105-115 lbs.	1 43/64"



V8 ENGINE VALVE ASSY.

Valve Guides: Pressed in head from underside.

Guide Removal & Installation–*See "Valve System" in Studebaker Special Data.*

Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*

Valve Lifter Installation & Fitting–*See "Valve System" in Studebaker Special Data.*

Replacement Lifters–Std. size, .001", .005" oversize.

►*CAUTION–When lifters removed, make sure they are installed in original positions.*

Rocker Arms: *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 11° BTDC. Close 54°36' ALDC.

Exhaust Valves–Open 51°36' BLDC. Close 14° ATDC.

Valve Timing Check–Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" and "OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 qts. (add one quart when filter changed).

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Normal Oil Pressure – 20–40 lbs. at 40 MPH.
Pressure Regulator Valve – Located on right side at front of engine block slightly above crankcase flange.
Oil Pressure Indicator (Exc. Hawk): Indicator light on instrument panel controlled by Oil Pressure Switch, Studebaker No. 1539898. If light on at highway speeds, low oil pressure or other difficulty is indicated.
Oil Pressure Indicator (Hawk): Direct reading, non-electric type gauge, Studebaker No. 1539878.
Oil Pump: Helical gear type. Mounted on rear main bearing cap in crankcase. *NOTE* - Stationary type oil strainer used which is a unit with the intake pipe.
Pump Removal, Overhaul, & Installation: *See "Oiling System" in Studebaker Special Data.*
Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.
Replacement Filter Element - Studebaker No. 1542739.
Crankcase Ventilation: Filter element is located in oil filler cap (air intake). Breather pipe (air outlet) is connected at rear of valve chamber cover plate.

COOLING

Water Capacity: 17 qts. without heater, 18.5 qts. with heater (Hawk), 18 qts. with heater (Others).
Pressure Valve: Radiator filler cap. 13 lb. (12–15) type. Studebaker No. 536502.
Thermostat: Choke type. Studebaker No. 1540787 (170°) Std., No. 533247 (160°) and No. 533257 (180°) Opt.
Water Pump: Packless, sealed ball bearing type.
See "Water Pumps" in Studebaker Special Data.
Pump Removal – Drain cooling system. Loosen generator, remove belt. Remove fan-to-hub screws and remove fan and pulley. On Hawk, remove shroud. Remove capscrews retaining pump cover to water manifold and remove pump.
Radiator & Fan Shroud Removal: *See "Cooling System" in Studebaker Special Data.*
Temperature Gauge: Direct reading, electric type.
Dash Unit – Studebaker No. 1539879 (Hawk), No. 1548690 (Others).
Engine Unit – Studebaker No. 1545220 (All Models).
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck Model 10A7 (Std.), 10.5A6 (Taxi). Single plate, dry disc type.
Clutch Assy. – Borg & Beck No. 361454 (10A7).
Clutch Disc – Borg & Beck No. 382650 (10A7).
See "Borg & Beck" in Clutch Section.
Pedal Adjustment: Free travel ½–1". To adjust, loosen locknut on rod connecting clutch release shaft lever to clutch operating shaft lever. Turn opposite nut in or out to shorten or lengthen rod as required. Tighten locknut securely against swivel. *NOTE – If car is equipped with "Hill-Holder", adjust "Hill-Holder" operating rod as outlined in Brake Section.*
Clutch Housing Removal: Disconnect battery ground cable and remove starter. Remove clutch operating shaft by disconnecting clutch pedal free travel adjusting rod at operating shaft inner lever. On cars with Hill-Holder, disconnect operating rod from operating shaft outer lever. Remove operating shaft sleeve pin (in sleeve at frame end of shaft) and support bracket capscrews. Lower support bracket and slip operating shaft sleeve off pedal shaft and remove assembly. Remove transmission (see below). Remove two bolts or nuts holding rear support insulator to crossmember. Support engine weight with a jack under rear of oil pan (use wood block to prevent damage to pan). Remove support crossmember-to-frame bolts and remove crossmember. Remove clutch housing cover plate. Remove housing mounting bolts or capscrews and remove clutch housing.
Clutch Removal: Remove clutch housing (above), remove screws evenly to relieve pressure, lift off clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

Warner Model T86 (Exc. Taxi), T89-C (Taxi). Three-speed synchro-mesh type.
See "Warner Synchro-Mesh" in Transmission Section.
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: Disconnect propeller shaft at rear universal joint flange, pull shaft to rear to disengage splined joint at transmission extension, remove shaft. Drain transmission case. Disconnect shift rods at transmission case shift levers, disconnect speedometer cable at transmission case, remove speedometer pinion. Remove clutch operating shaft, bracket, and bearing from transmission case. Support transmission and remove capscrews mounting transmission on clutch housing. Move transmission straight back until main drive gear clears clutch driven member, then lower transmission and remove from beneath car.

OVERDRIVE

Warner R10. Part of transmission assembly. Governor controlled solenoid operation with throttle controlled kick-down. *NOTE* - Relay is not used in overdrive control circuit. See wiring diagram for new control circuit.
Overdrive Control: *See "Warner R10 Overdrive Control" in Transmission Section.*
Removal: Remove as unit with transmission. Disconnect control wiring and cable, then proceed as for Transmission Removal (above).

FLIGHTOMATIC TRANSMISSION

Warner Model AS6-5P (Exc. Taxi), AS10-7A (Taxi). Torque converter and hydraulically controlled three-speed planetary transmission.
►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic Transmission" in Transmission Section.*
►*TESTING & TROUBLE SHOOTING: See "Flightomatic Transmission" in Transmission Section.*
Lubrication: Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A"; or Type "A", Suffix "A".
Checking Fluid Level – Operate engine with selector lever in "P" for 4 minutes or until engine and transmission reach operating temperature. Apply brakes, move selector lever from "P" to "R" and then to "D" slowly. Check fluid level on dipstick (under inspection hole cover on right side of front floor). Add fluid as necessary to bring to "F" mark on dipstick (1½ pints between "L" and "F" marks).
Capacity – 18 pints (exc. Taxi), 19 pints (Taxi).
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Flightomatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. Two used (with one-piece propeller shaft).
►*UNIVERSAL JOINT LUBRICATION NOTE:* Universals should be disassembled, cleaned, and repacked with special universal joint lubricant at 20,000 mile intervals.

PROPELLER SHAFT

One-piece type, with a universal joint at each end.
►*DRIVE LINE ANGLES CHECKING & ADJUSTMENT: See "Propeller Shaft Notes" in Studebaker Special Data. CAUTION – Incorrect angles may cause driveline or chassis vibration.*
►*UNIVERSAL JOINT "PHASE ANGLE" & PROPELLER SHAFT REPLACEMENT CAUTION:* Shaft assemblies with different universal joint phase angles used on some models. *See "Propeller Shaft Notes" in Studebaker Special Data for complete data on each model.*

REAR AXLE

Spicer Model 44–3 (Taxi & Station Wagons), 23–1 (Others). Semi-floating, hypoid gear, with Hotchkiss Drive.
See "Spicer Hypoid" in Rear Axle Section.
►*"TWIN-TRACTION" DIFFERENTIAL NOTE:* Optional on all models. Identified by "45" or "T" stamped on a plate attached to cover capscrew. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

Conventional & Twin-Traction Axle Ratios

Std. Axle Ratios

Model	S.M. Trans.	Overdriv
W,F,J,D,Y1	3.31-1	3.54-1
C	3.54-1	3.73-1
		Flightomatic
All Models		3.31-1

Optional Axle Ratios

Model	S.M. Trans.	Overdriv
W,F,J,D,Y1	3.54-1, 3.73-1	3.31-1, 3.73-1
C	3.31-1, 3.73-1	3.31-1, 3.54-1
		Flightomatic
All Models		3.54-1

►*REAR AXLE RATIO NOTE:* Ratio is stamped on plate attached to axle by cover capscrew and is also stamped on ring and pinion gears.

Backlash -.003-.006".

Axle Shaft Removal: Remove wheel and wheel hub using Puller J–1644–S. Remove brake backing plate retaining bolts and remove outer washer, retainer, reinforcing plate and felt washer (discard this washer). Free hand brake cable from equalizer and frame guides and disconnect hydraulic brake line at wheel cylinder. Pull backing plate out over end of axle shaft and tie it up out of way. Remove endplay adjusting shims *(CAUTION – Save for reinstallation).* Use Puller J–7935 with Hammer J–2619 to remove axle shaft.

Rear Axle Assembly Removal: Remove hub caps, loosen wheel nuts and remove axle shaft nut. Raise rear of car and support on stands under frame just ahead of rear springs. Remove wheels, hubs, and drums. Disconnect brake line at each rear wheel cylinder, remove brake pipe clamps and free brake line from rear axle housing. Take out backing plate bolts, pull backing plate out over end of axle shaft and tie up out of way. Remove adjusting shims located beneath backing plate. *(CAUTION – Save for reinstallation).* Disconnect propeller shaft by removing rear universal joint U-bolts and nuts (wire caps together). Remove rear spring U-bolts from axle housing, disconnect rear shock absorbers. Remove rear axle assembly from beneath car.

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Wh l Bearing Adjustm nt: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003". .005". .010". .030" thick). **Endplay** – .001-.006".

►*REAR WHEEL BEARING LUBRICATION CAUTION:* No lubrication plug provided but bearings are NOT lubricated for life. Remove, clean, and repack bearings at 25,000 mile intervals.

SHOCK ABSORBERS

Gabriel (U.S. Cars), Monroe (Canadian Cars). Direct acting, hydraulic, non-adjustable (Exc. Taxi), Adjustable (Taxi & Optl. Heavy Duty on other cars).

Gabriel Shock Absorbers (Studebaker Nos.)

Car Model	Front	Rear
Sedans & Hardtop	1545057	1545053
Station Wagons	1545057	1545053
Hawk (Early) Ⓒ	1545055	1545050
Hawk (Later)	1545057	1545052
Taxi ②	1548550	1548549
All (Heavy Duty)②	1544410	1544411

Monroe Shock Absorbers (Canada)

All (Exc. Hawk)	1547458	1545046
Hawk	1547458	1545045

Ⓒ — First 660 cars only. ② — Adjustable type.

Adjustment (Gabriel Adj. Type) - Disconnect one end of shock absorber and collapse it fully to engage internal coupling, then rotate lower shaft until arrow on body lines up with "Soft", "Normal", or "Firm" arrow on dustcover.

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs.
See "Studebaker" in Suspensions & Wheel Alignment Section.

►*VARIABLE RATE COIL SPRING NOTE:* All springs except Heavy Duty type are Variable Rate with closer coils at upper end.

►*FRONT SPRING NOISE CORRECTION (LARK):* May be caused by too much paint on upper coils. To correct, apply engine oil to these coils.

Kingpin Inclination - 6° at 0° camber.

Caster - Neg. 1½° to Neg. 3°. Maximum variation between wheels ¾°. *NOTE - Above specifications supersede previous data.*

Camber - 0° to Pos. 1°. ½° more camber favored on driver's side.

Toe-In - 1 16-1/8". **Adjust right hand tie rod only** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.

RHD Car Note - Make toe-in adjustments at left hand tie rod.

Toe-Out on Turns - With outer wheel at 20°, inner wheel should be turned 23½-24½°.

STEERING

Manual: Ross Model SL–54. Cam & Single Lever Roller Stud. Roller stud is mounted on taper roller bearings. *See "Ross Cam & Lever" in Steering Section.*

Power Steering: Bendix Linkage Type. *NOTE – Saginaw (Not In Line) type used on Hawk models prior to Serial No. 59V–34592.*
See "Bendix Linkage Type" or "Saginaw (Not In Line)" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

BRAKES

Service: Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking lever applies rear wheel service brakes.
See "Wagner Lockheed Self-Centering Brakes" in Brake Section.

►*BRAKE THUMPING CORRECTION (ALL MODELS):* Thumping or bumping noise on brake application which increases when car slows down, can be corrected by sanding all tool marks from brake drum with emery cloth or cutting lightly with a lathe.

Drum Diameter – 11" Front, 10" Rear. All Models.
Master Cylinder Bore Diameter – 1". All Models.
Wheel Cylinder Diameter – 1 1/16" Front, 7/8" Rear.
Braking Power – 62% Front, 38% Rear.

Brake Lining: Marshall-Eclipse lining used on all models. Lining is riveted (Exc. Taxi), bonded (Taxi with Heavy Duty lining).

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (Exc. Taxi), 9/32" (Taxi- all shoes). 3/16" thick on all other shoes. Lining is pre-ground off-center at the factory to eliminate brake squeal. Lining applied to full length of shoe, and is marked "secondary" and "top" and should be installed as marked.

Lining Width & L ngth (Exc pt Taxi)

	Fr nt Wh el	R ar Wh l
Primary Shoes	2 1/4" x 9 21/64"	2" x 8 15/32"
Secondary Shoes	2 1/4" x 11 57/64"	2" x 10 27/32"

(Taxi)

	Front Wh l	R ar Wh l
All Shoes	2 1/4" x 11 1/2"	2" x 10 7/16"

Thickness – 3/16" except as noted above under "Secondary Lining Note".

Clearance – Lock shoes against drums, then turn adjusting screw back eight notches or more as required to free drum.

Standard Master Cylinder: *On frame left side rail at* base of brake pedal.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal–Remove from beneath car. Disconnect clutch pedal pullback spring from master cylinder support strap. Remove brake pedal pullback spring by unhooking it first from its frame bracket and then from spring clip attached to master cylinder-to-pedal rod. Disconnect fluid line or lines at rear of master cylinder. *(NOTE* - One line with Hill-holder). Remove the brake pedal clevis pin and disconnect brake pedal-to-master cylinder rod at brake pedal. Remove mounting nut bolts and washers, swing support strap down out of position, remove master cylinder. Insert forward mounting bolt to Hill-holder while master cylinder is off car.

Power Brakes: Hydrovac Pow r Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brak S ction.

Checking Fluid–Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit–Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

Hill Holder: Used on Synchro-mesh and Overdrive Transmission cars. *See "Hill-Hold r" in Brak S cti n.*

MISC. MECHANICAL

Windshield Wipers: (Deluxe Models) Vacuum Link & Crank Arm type. (Others) Auto-Lite or Bosch Electric Two-Speed type. *See "Windshield Wip rs" in Miscellaneous Section.*

Air Conditioning: *See "Studebak r Air Conditioning" in Miscellaneous Section.*

MODEL IDENTIFICATION

Model	Model Designation
Deluxe 4-Door Sedan	60S-W4
Regal 4-Door Sedan	60S-W6
Deluxe 2-Door Sedan	60S-F4
Regal 2-Door Hardtop	60S-J6
Regal 2-Door Convertible	60S-L6
Deluxe 2-Door Station Wagon	60S-D4
Deluxe 4-Door Station Wagon	60S-P4
Regal 4-Door Station Wagon	60S-P6
Taxicab 4-Door Sedan	60S-Y1

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Assembly Plant	Starting Numbers
South Bend	60S-1001
Canada	60SC-1001

ENGINE NUMBER: Stamped on pad at upper left front of cylinder block.

Assembly Plant	Starting Numbers
South Bend	S-106001
Canada	SC-15501

TUNE-UP

►*DETONATION AT LIGHT THROTTLE CORRECTION: See DISTRIBUTOR below for correction.*

COMPRESSION PRESSURE: 130-150 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs

VACUUM READING: 17-18" at idle speed.

VALVE TAPPET CLEARANCE: 018" cold, all valves.

MANIFOLD HEAT CONTROL: Automatic thermostatic type.

Checking Thermostatic Coil Spring - With outer end of coil free from anchor, and valve closed (counterweight up), hooked end of coil should be 90° clockwise from anchor pin at 70°F.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .028-.033".

Spark Plugs - Champion J7. 14 mm. Torque to 30 ft. ft. lbs.

COIL: Autolite No. 200562.

Ignition Current - 4.0 amps idling.

►*IGNITION RESISTOR NOTE: Resistor not used.*

DISTRIBUTOR: Autolite IAT-4403.

►*DETONATION AT LIGHT THROTTLE CORRECTION:* Install Spark Modifier Kit, Studebaker Part No 1552852 (spring & washers) and see *Modified Vacuum Advance Table below for new Advance Curve data*

Condenser - Autolite No. 2-32. **Capacity** .21-.25 mfd

Contact Point Set - Autolite No. 1-47

Breaker Gap - .020"

Cam Angle - 38-40°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
2	680	4	1360
4	975	8	1950
6	1265	12	2530
7	1400	14	2800

Vacuum Spark Control: Autolite integral type

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4
1	2	5 1/4
3	6	7 1/2
6	12	10 7/8
7	14	12

Modified Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
4¼	8½	11
8	16	13

IGNITION TIMING

Setting - 2° BTDC.

Timing Mark - On vibration damper. "IGN" mark in line with pointer on left side of timing cover.

Timing - Disconnect vacuum advance pipe at carburetor. Install plug in carburetor. With engine at idling speed, timing light should show index mark nearest IGN mark, directly under pointer.

CARBURETOR

►*CARBURETOR APPLICATION: Carter AS, single barrel used.*

►*EXCESSIVE ACCELERATOR PEDAL OPERATING EFFORT CORRECTION:* To correct hard accelerator pedal operation grind off sufficient rubber at bottom of pedal (5/32" down from hinge and 7/16" in from centerline of hinge) so pedal will lie flat on floor pan.

►*THROTTLE LINKAGE BINDING OR STICKING CORRECTION:* May be caused by interference between accelerator pushrod and boot at opening in floor pan, in wide open or kickdown position. To correct, remove accelerator pedal and slot mounting holes approximately 1/8" toward pedal hinge. Install pedal as far rearward as possible. Lubricate pushrod with Lubriplate and make sure throttle linkage correctly adjusted.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With transmission selector lever in "N" (Neutral) or "P" (Park) position, engine at normal operating temperature, choke wide open, proceed as follows:

1) Adjust carburetor-to-bellcrank rod so length between centerline of ball stud and centerline of cotter pin hole is 11 1/16". *Do not change this length during following adjustments.*

2) Connect a tachometer to engine and set engine idle speed at 550 RPM. Disconnect accelerator-to-auxiliary bellcrank rod clevis. Disconnect rod which connects main bellcrank on firewall to auxiliary bellcrank on engine by removing main bellcrank ball joint stud from main bellcrank lever. Adjust screw on main bellcrank to provide 5/16" clearance between bellcrank and pad (use a 5/16" drill as a gauge).

3) Adjust ball joint on main bellcrank-to-auxiliary bellcrank lever so ball joint stud freely enters hole in lever. *Carburetor idle speed screw must be against its stop and 5/16" gap at bellcrank maintained*

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge. Stop engine, remove gauge and install pipe plug

5) Hold accelerator bracket arm (on firewall) approximately 3 5/8 - 3 3/4" from face of firewall and adjust accelerator-to-auxiliary bellcrank rod clevis until clevis pin freely enters clevis and bracket arm.

CARTER AS NO. 2934S, SA

►*PRODUCTION CHANGE NOTE: Carburetor 2934SA used in production beginning Serial No. 60S-40716 and has corrections listed below. To convert early 2934S carburetor to 2934SA, see "Carter AS Carburetors" in Carburetion Section.*

►*2934S STUMBLE ON ACCELERATION AND ENGINE STOPPING AFTER COLD START CORRECTION:* Install new Choke Improvement Kit and new Accelerating Improvement Kit. *See "Carter AS Carburetors" in Carburetion Section*

►*2934S FLAT SPOT DURING LIGHT TO MEDIUM THROTTLE OPENING CORRECTION:* New pump piston spring and other adjustments necessary. *See "Carter AS Carburetors" in Carburetion Section.*

Idle Setting - Initial setting ¼-1¾ turns open from a lightly seated position. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh), 575-590 RPM (Flightomatic in "N").

Float Level - ¼" (Gauge T109-282) from top of each float at free end to top of casting. To adjust, bend float arm lever.

Accelerating Pump - Pump arm on lifter link should be parallel to top of casting. To adjust, bend pump arm

Fast Idle: .065" clearance between throttle valve and side of body measured opposite idle ports, with fast idle link on high step of cam. To adjust, bend choke connector rod

Automatic Choke Setting: 1 notch rich (2934S), Centered at index (2934SA)

Throttle Linkage Adjustment: See *CARBURETOR above*

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Fuel only Replacement Pump 4703.

Fuel Pump Pressure - 3½-5½ lbs

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.

Dash Unit - Studebaker No. 1548689

Tank Unit - Studebaker No 1544825

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: DRY FILTER ELEMENT TYPE Std., Oil Bath type optional. Clean element every 1,000 miles, replace dry type every 10,000 miles.

►*DRY TYPE CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate, or blow out with compressed air*

BATTERY

Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Right front engine support bracket to frame

STARTER

Autolite MBG-4113 (Before Serial No. 60S-27643). MDU-7005 (Beginning Serial No. 60S-27643).

Armature - Autolite No 16-54 (MBG Starter).

Drive - Bendix type.

►*STARTER DRIVE REPLACEMENT NOTE:* Use only improved "Folo-Thru" type, Studebaker No, 1551230, for service replacement on MBG starters.

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Shunt Fi ld Draw (MDU-7005) - 4.4-5.1 amps. at 10 volts.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 42-53 ozs. (MBG-4113), 31-47 ozs. (MDU-7005).

Performance Data - MBG-4113

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55 max.
5.2 ft. lbs.	Lock	4.0	235 max.

Performance Data - MDU-7005

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50 max.
6.2 ft. lbs.	Lock	4.0	280 max.

Starter Switch: Magnetic switch, Studebaker No 1539716 mounted on starter and controlled by combination Ignition & Starter Switch.

Automatic Transmission Neutral Safety Switch: Studebaker No. 533321. Combination Neutral Safety and Back-up Light switch mounted on lower end of steering column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.

Adjustment - *See "Studebaker Flightomatic" in Transmission Section.*

GENERATOR

Autolite. Used as follows:

Model	Autolite No.
Std. (Up to Serial No. 60S-28727)	GJC-7002F
Std. (Beginning Serial No. 60S-28727)	GJP-7102C
Taxi	GGA-6001SN

►*GENERATOR GJP-7102C CAUTION: This generator is "B" circuit type and must be used with Regulator VBO-6201A.*

►*OPTIONAL GENERATOR NOTE: For optional Delco-Remy generators No. 1102127 and No. 1106981, see Studebaker V8 Pages.*

Armature - Autolite No. 10-53 (GJC Gen.), No. 10-24 (GGA Gen.).

Brush Spring Tension - 18-36 ozs. (GJC & GJP), 34-41 ozs. (GGA).

Field Current - 1.2-1.3 amps. (GJC), 1.6-1.7 amps. (GJP), 1.1-1.3 amps. (GGA), at 10.0 volts (70°F).

Motoring Current - 3.4-3.9 amps. (GJC), 3.1-3.5 amps. (GJP), 2.3-2.6 amps. (GGA), at 10.0 volts (70°F).

Rotation - Counterclockwise at commutator end.

Performance Data - GJC-7002F

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0	15.0	2050-2250
35.0	15.0	2250-2650

Performance Data - GJP-7102C

Amperes	Volts	RPM
16 min.	15.0	1750
30	15.0	2300 max.
35	15.0	2600-max.

Performance Data - GGA-6001SN

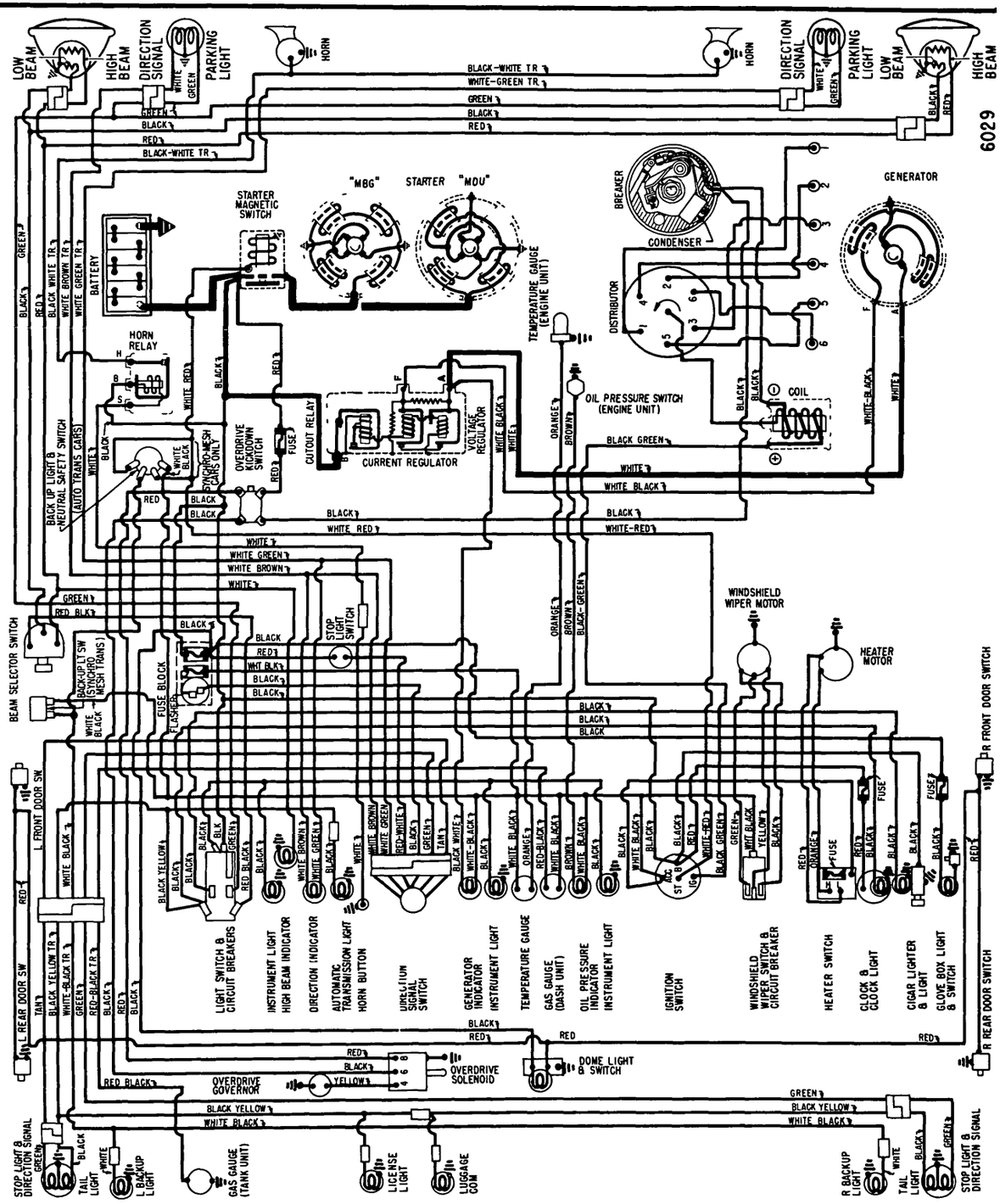
Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

Belt Adjustment: 3/8-1/2" deflection midway between generator and fan pulleys.

REGULATOR

Aut lit N . VBO-4202B-1 (GJC Gen.), N . VBO-6201A (GJP G n.), N . VBO-4202A (GGA G n.). *NOTE - Reg-*

CONTINUED ON NEXT PAGE



(SEE 1959 DIAGRAM FOR FIRST TYPE "A" CIRCUIT GENERATOR & REGULATOR)

CONTINUED FROM PRECEDING PAGE

ulator VBO-6201A is "B" circuit typ and must b us d with G n rator GJP-7102C.

►*OPTIONAL REGULATOR NOTE: For D lco-R my r gulators us d with optional Delco-Remy generators, s Stud bak r V8 Pag s.*

Cut ut Relay

Cuts In - 12.5-13.5 volts.

Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.

C ntact Gap - .015" minimum.

Air Gap - .025-.027",

V ltag Regulator

Setting - 14.2-14.8 volts at 80°F, unit operating normally while charging at 7 amperes or with a .25 ohm resistor between regulator and battery.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Ch cking & Adjusting (VBO-4202B-1 & 4202A) - *See "Aut lit 12-Volt R gulators" in Electrical Section.*

Ch cking & Adjusting (VBO-6201A) - *See "Autolite B Circuit R gulat rs" in El ctrical Section.*

Curr nt Regulator

►*SETTING CAUTION: "T mperature Compensated" type. S t to following specifications at 70°F.*

R gulator	Test A - Operating Amperes -	Test B
VBO-4202B-1	44	35 (33-37)
VBO-6201A	44	35 (33-37)
VBO-4202A	49	40 (38-42)

T st A - After 15 minutes operation charging at 7 amps.

T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Checking & Adjusting (VBO-4202B-1 & 4202A) - *See "Aut lit 12-Volt R gulators" in Electrical Section.*

Ch cking & Adjusting (VBO-6201A) - *See "Autolite B Circuit R gulators" in El ctrical Section.*

MISC. ELECTRICAL

Headlights: Sealed beam type, one in each fender.

Dir cti n Signals: *See El ctrical Section.*

►*DIRECTION SIGNAL CANCELS TOO SOON ON LEFT TURN CORRECTION:* May be caused by bent switch plate. To correct, raise front of car and remove steering wheel. Insert screwdriver under switch plate midway between ends of plate and press down on right end of plate near cancelling lever.

Lighting & Instrum nt Light Switch Removal: Remove switch retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board.

Sp ed met r & Instrum nt Removal: Units can be removed separately without disturbing other parts.

St p Light Switch: Located on inner side of left frame rail forward of steering gear housing (Std. Brakes), mounted in elbow fitting on power brake unit (Power Brakes).

CIRCUIT BREAKERS: 20 Ampere - Headlights, High beam indicator, Parking, Tail, License, and All Instrument lights. On headlight switch.

5 Amp r - Windshield wiper. On wiper switch.

FUSES: 15 Amp r - Body and Stop lights. In fuse block behind instrument panel.

15 Amp r - Direction signal. In fuse block behind instrument panel.

15 Amp r - Heater and defroster. On heater switch.

14 Ampere - Overdrive. In kickdown switch-to-starter solenoid cable.

1 Ampere - Clock. In lead behind instrument panel.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme caution when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 6 Cyl. "L" head.

Bore	Stroke	Displacement
3"	4"	170 cu. ins.
Compression Ratio	**Rated HP**	**Developed HP**
8.3-1℃	21.6	90 at 4000 RPM

℃ - 7.0-1 Optional.

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove oil level gauge. Raise car and support it with stands, drain oil. On long wheelbase models, swing wheels to right to move steering bellcrank out of way. On short wheelbase models, disconnect tie rods and reach rod from steering bellcrank, remove retaining pinch bolt and remove bellcrank from shaft. Then remove oil pan capscrews and remove pan.

OIL PAN INSTALLATION: *See "Oil Pan" in Studebaker Special Data.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Studebaker Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data.*

PISTONS

"T" slotted, cam ground, tin plated aluminum alloy.

Original Bore & Pistons—*See "Original Bore & Pistons" in Studebaker Special Data.*

Removal—Pistons and rods removed from above.

Fitting New Pistons: Clearance—Selective feeler fit. Use feeler 1" wide, .002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 11 to 16 lbs.

Replacement Pistons: Std. .010", .020", .030" and .040" Oversize, Pistons furnished with pins.

Installing Pistons: Install piston in cylinder bore with "T" slot away from camshaft side. *See Rod Installation.*

PISTON PINS

Pin is locked in rod by tapered pin and locknut.

Diameter—.7491-.7495". **Length** 2.625".

Clearance in Piston—.0001-.0003" (selective fit). Light thumb push fit at 70°F.

Piston Pin Removal & Installation—*See "Piston Pins" in Studebaker Special Data.*

Replacement Pins: Std. & .0025", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Sid Clearanc
Compr. #1	3/32"	.007-.017"	.002-.005"
Compr. #2	1/8"	.007-.017"	.002-.005"
Oil	5/32"	.007-.017"	.0015-.004"

R placement Rings: Std., .020", .030", & .040" Oversize, in sets.

Installing Rings: Top compression ring has step at the inside which must be installed up. Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point.

CONNECTING RODS

Length—(Center-to-center) 6 3/8". **Weight**—19.04 ozs.

Crankpin Journal Diameter—1.81175-1.81275"

Bearings—Steel backed, Microbabbitt lined, no shims.

Clearance—.0005-.002".

Side Play—.005-.009"

Replacement Bearings: Std., .001", .002", .010", .020" Undersize.

Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6).

►*REPLACEMENT ROD NOTE:* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders.

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION:* If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap. Drill and file hole to correct.

Journal Diameter—3.0623-3.0628". Four bearings.

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.

Bearings - Steel-backed, micro-babbitt lined. No shims.

Clearance - .0005-.002".

Replacement Bearings: Standard & .001", .010", .020", .030" Undersize.

End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear, controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.

Endplay - .003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters—(1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".

Bearings—Steel backed babbitt lined bushings.

Clearance—No. 1—.0007-.0022", Nos. 2, 3, 4—.0010-.0027".

End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer

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assembled on shaft between gear hub and front bearing journal controls endplay) Adjust endplay by replacing thrust plate or spacer When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting the plate

End Play—.003-.006"

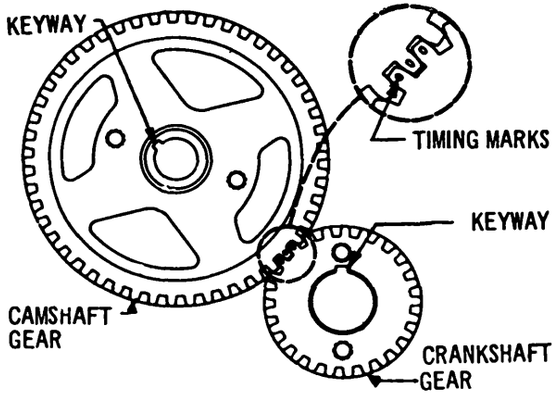
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub

Timing Gear Removal & Installation—*See "Timing Gears" in Studebaker Special Data*

Backlash—.001-.003"

Camshaft Setting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear



6 CYL. VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance: 018" Intake and Exhaust, COLD

Valve	Head Diameter	Stem Diameter	Length
Intake	1 11/32"	5/16"	4 11/32"
Exhaust	1 9/32"	5/16"	4 11/32"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	11/32"	0015- 0035"
Exhaust	45°	11/32"	0015- 0035"

Valve Seat Width— 1/16-3/32'

►*RECONDITIONING VALVE CAUTION:* If reconditioning results in knife edge at top of valve, valve must be replaced

Valve Springs: Single spring used on all valves

►*VALVE SPRING LOCK INSTALLATION CAUTION* When installing lock in recess of lower spring retainer, groove in lock must engage tongue in retainer

Valve Spring Specifications

	Pressure	Length
Valve Closed	49-54 lbs.	1 21/32"
Valve Open	93-103 lbs.	1 5/16"

Valve Guides: Use Tool No. J-2034 and drive old guide down and out from top of block into valve spring chamber. Use Collar J-2034-5, guide pilot J-2034-2 on driver J-2034-1 and drive new guide down until driver bottoms against spacing collar

Valve Lifters: Mushroom type Remove from below with camshaft out of engine

Valve Lifter Installation & Fitting—*See "Valve System" in Studebaker Special Data.*

Replacement Lifters—Std., .001" & .005" Oversize

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore): See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves—Open 15° BTDC Closes 49° ALDC

Exhaust Valves—Open 54° BLDC. Closes 10° ATDC

Valve Timing Check—Adjust No. 1 Intake valve at .020" cold Rotate engine until No 6 piston is on compression stroke (the IN-OP 1-6 marking on dampener should be several inches from pointer), then while moving lifter up and down continue to rotate crankshaft Valve timing will be correct if lifter stops moving as above marking is directly below pointer

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 quarts refill, 1 quart additional with filter change.

Normal Oil Pressure: 20-40 lbs. at 2000 RPM.

Pressure Regulator Valve: Opens at 40 lbs. Under plug on lower right front corner of engine. For access, remove engine front cover bolt. Replace weak spring (do not attempt to stretch spring).

Oil Pressure Indicator: Indicator light on instrument panel controlled by oil pressure switch, Studebaker No. 1539898, on left side of engine.

Oil Pump: Helical gear type. On right side of crankcase. **Pump Removal, Overhaul, & Installation** - *See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.

►*OIL FILTER INSTALLATION CAUTION.* **Lubricate gasket with engine oil and tighten filter by hand ½-turn after gasket seats on base.** ***Do not cross-thread or overtighten.***

Replacement Filter Element - Studebaker No. 1542739.

Crankcase Ventilation: Filter element in oil filler cap (air intake) and in breather pipe at left rear of engine (air outlet). Filter element in breather pipe is replaceable (retained by cotter pin).

Filter Element Servicing - Remove filter in breather pipe by removing cotter pin and pulling filter out with a hooked wire Clean filters by washing in kerosene or solvent, drain thoroughly and re-oil by coating with engine oil

COOLING

Water Capacity: 11 qts. refill. Add 1 qt. for heater.

Pressure Valve: 14 lb. radiator filler cap, Studebaker No. 1551190. *Supersedes 13-15 lb. cap, No. 1548915.*

Thermostat: Choke type in water outlet on cylinder head. Studebaker No. 1542838 (170°) Std., No 531470 (160°) and No. 532017 (180°) Optional

Water Pump: Packless, sealed ball bearing type. *See "Water Pumps" in Studebaker Special Data.*

Temperature Gauge: Direct reading, electric type.

Dash Unit - Studebaker No. 1548690.

Engine Unit - Studebaker No. 1549452 (marked "362-AR" on one face of hex head).

See "Temperature Gauges" in Miscellaneous Section.

MECHANICAL

►*SEE STUDEBAKER V8 PAGES FOLLOWING FOR ALL CLUTCH, SYNCHRO-MESH TRANSMISSION, OVERDRIVE, FLIGHTOMATIC, UNIVERSALS, PROPELLER SHAFT, REAR AXLE, SHOCK ABSORBERS, FRONT SUSPENSION, STEERING, BRAKES & MISC. MECHANICAL DATA.*

MODEL IDENTIFICATION

Model	LARK	Model Designation
Deluxe 2-Door Sedan ©		60V-F4
Deluxe 4-Door Sedan ©		60V-W4
Regal 4-Door Sedan		60V-W6
Deluxe 2-Door Station Wagon ©		60V-D4
Deluxe 4-Door Station Wagon		60V-P4
Regal 4-Door Station Wagon		60V-P6
Regal 2-Door Hardtop		60V-J6
Regal 2-Door Convertible		60V-L6
Taxicab 4-Door Sedan ©		60V-Y1
HAWK		
Hawk Sport Coupe		60V-C6

© - Fleet Sales Only.

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Assembly Plant	Starting Numbers
South Bend	60V-1001
Canada	60VC-1001

ENGINE NUMBER: Stamped on machined pad at upper left front of cylinder block.

Assembly Plant	Starting Numbers 259" Eng.	289" Eng.
South Bend	V-454701	P-70501
Canada	VC-16701	PC-2201

TUNE-UP

►*DETONATION AT LIGHT THROTTLE CORRECTION: See DISTRIBUTOR below for correction.*

COMPRESSION PRESSURE: 140-160 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-20" at idle speed.

VALVE TAPPET CLEARANCE: .023-.025" engine hot and idling, .025-.027" engine cold.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located in right bank exhaust manifold outlet.

Checking Thermostatic Coil Spring - With outer end of coil free from anchor, and valve closed (counterweight forward), hooked end of coil should be 90° clockwise from anchor pin at 70°F.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plugs - Champion H-18Y (Up to Serial No. 60V-30000), H-14Y (Beginning Serial No. 60V-30000). *Use only H-14Y for service replacement.* 14mm. Torque to 25-30 ft. lbs.

COIL: Delco-Remy 1115122.

Ignition Current - 3.8 amps. idling.

Resistor - Resistance (pink) wire (1.52 ohms) from coil to ignition switch. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy 1110969 (Exc. Hawk), 1110864 (Hawk). *NOTE - Distributor 1110969 is "Window" type with external adjustments. See "Delco-Remy (Window) Distributors" in Electrical Section.*

►*DETONATION AT LIGHT THROTTLE CORRECTION:* Install Spark Modifier Assembly, Studebaker Part No. 1553389 (Exc. Hawk), No. 1553390 (Hawk) and *refer to Modified Vacuum Advance Table below for new Advance Curve data.*

Condenser - Delco-Remy 1869704 (1110864 Distr.),

Condenser Capacity - .18-.23 mfd.

Contact Point Set - Delco-Remy 1918148 (1110864 Distr.),

Breaker Gap (1110864) - .013-.018".

Breaker Gap (1110969) - Gap (.016") will be correct when cam angle correctly set (see below).

Cam Angle (1110864) - 26-33° with .016" breaker gap.

Cam Angle (1110969) - 28-32°. Set at 30°. Will give .016" breaker gap.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
0.5-2.5	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Control: Delco-Remy 1116058 (1110864 Distr.), 1116169 (1110969 Distr.).

Plunger Travel - 11/64-3/16" (1116058),

Vacuum Advance - 1110864 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.5

Modified Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
4¼	8½	11
8	16	13

Distributor Removal & Installation: *See "Ignition Notes" in Studebaker Special Data.*

IGNITION TIMING

Setting - 4° BTDC. Set timing at 600 RPM with vacuum line disconnected and carburetor opening taped closed. *After timing correctly set, reduce engine speed to 550 RPM.*

Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover.

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg WW 2-Barrel Standard on all models; Carter WCFB 4-Barrel Optional on all models except Taxi.*

►*EXCESSIVE ACCELERATOR PEDAL OPERATING EFFORT CORRECTION:* To correct hard accelerator pedal operation, grind off sufficient rubber at bottom of pedal (5/32" down from hinge and 7/16" in from centerline of hinge) so pedal will lie flat on floor pan.

►*THROTTLE LINKAGE BINDING OR STICKING CORRECTION:* **1)** May be caused by interference where accelerator pedal pushrod attaches to accelerator bellcrank lower lever. If this attachment cannot be made with the proper wave washer and flat washer without binding, replace pushrod. If pushrod does not fit freely into a 9/32" diameter hole, replace rod.

2) May be caused by interference between accelerator pushrod and boot at opening in floor pan, in wide open or kickdown position. To correct, remove accelerator pedal and slot mounting holes approximately 1/8" toward pedal hinge. Install pedal as far rearward as possible. Lubricate pushrod with Lubriplate and make sure throttle linkage correctly adjusted.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position. Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position.

2) *NOTE - Make sure that carburetor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetor, and in outer hole on cars with 4-barrel carburetor. In both cases, ball joint must be on underneath side of bellcrank lever.*

3) Adjust carburetor-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave its stop.

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. on Taxi). Stop engine, remove gauge and install plug.

THROTTLE RETURN CHECK ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly relative to bracket, then turn check assembly **1¼ to 2 turns toward lever.** Tighten locknut.

STROMBERG WW

Stromberg Series WW, Code 6-123 or 6-123A. Throttle return check used with Flightomatic Transmission.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1¼ turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.

Float Level - 3/16" from top edge of main body to top of float. To check, remove bowl cover and place float level gauge of Tool J-7477 across top edge of main body. Float should just touch gauge. To adjust, bend float lip.

Accelerating Pump - Center hole, normal setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: With engine running at normal operating temperature, back out fast idle screw a few turns and set engine idle speed to 550 RPM with idle speed screw. Turn fast idle screw in until setscrew just touches low step of fast idle cam, then turn fast idle screw back (counterclockwise) ½-turn.

Automatic Choke Setting: Centered on index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section.*

CARTER WCFB

Carter WCFB 2829S (Std. & O.D. Trans.), 2830S (Flightomatic).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7. LEFT barrels feed 2-3-5-8.*

Idle Setting - Initial setting ½-1½ turns open. Turn screws out for richer mixture.

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

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CARB. EQUIPMENT

Fuel Pump: Carter No. 2573S. Fuel only.
Pressure - 3½-5½ lbs.
See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Electric type.
Dash Unit – Studebaker No. 1539880 (Hawk), No. 1548689 (others).
Tank Unit – Studebaker No. 1544825.
See "Fuel Gauges" in Carburetion Section

Air Cleaner: DRY TYPE (Plasticized paper) Standard. Oil Bath type Optional. Clean dry type filter element every 1000 miles, replace element every six months or 10,000 miles.

►*CLEANING CAUTION (DRY TYPE)*·Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hour rate).
Battery Ground - Negative.
Engine Ground - Strap at right front corner of engine.

STARTER

Delco-Remy 1107650 (Synchro-mesh & Overdrive), 1107651 (Flightomatic). Armature - 1933789.
Drive - Bendix "Folo-thru" No. A3474.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic Switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition & Starter Switch

Automatic Transmission Neutral Safety Switch: Studebaker No. 533321, mounted on steering column.
Adjustment - *See "Studebaker Flightomatic Transmission" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows

Model	Generator No.
Standard	1102003
Optional Heavy Duty	① 1102127
Optional Low Cut-In	② 1106981

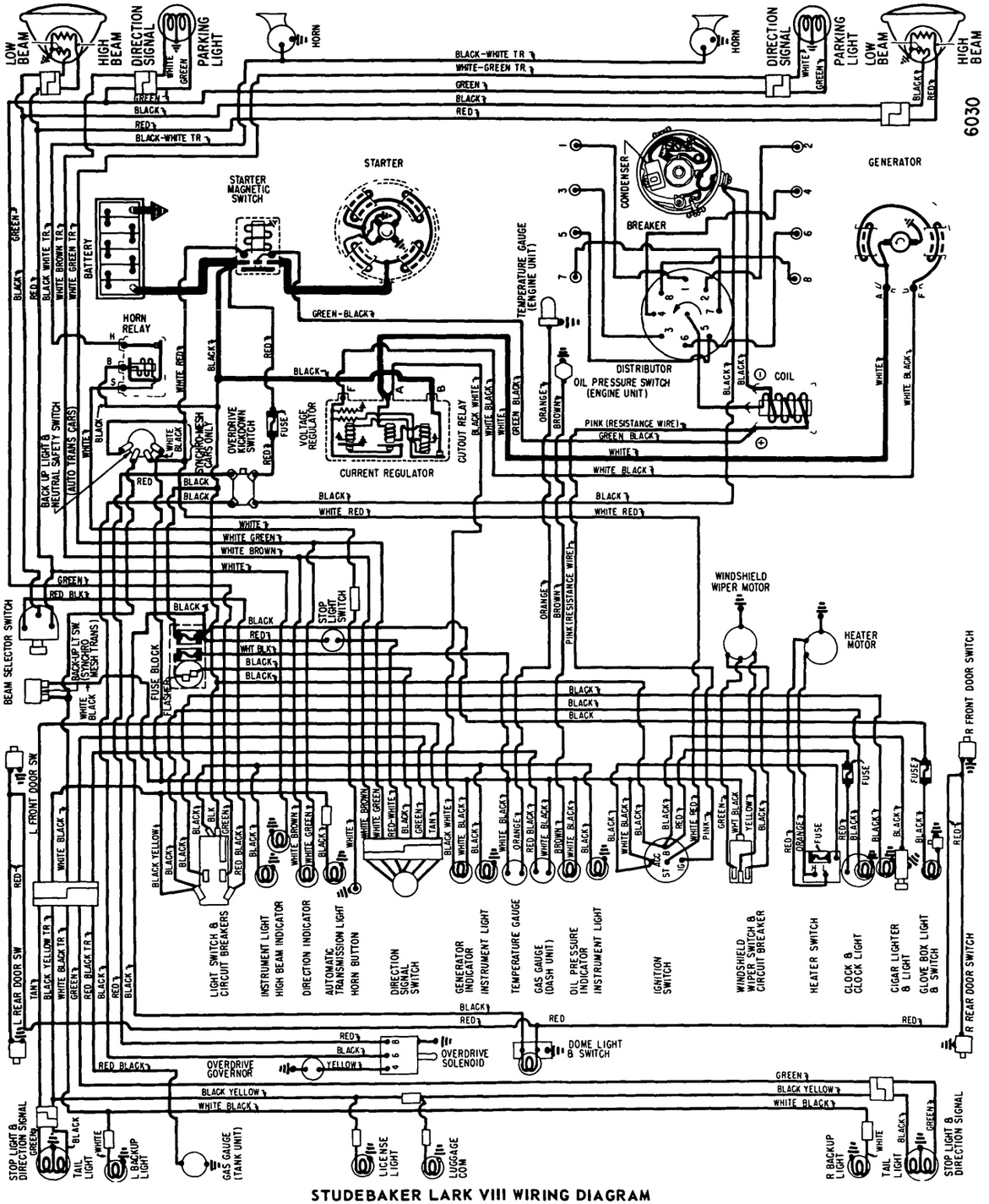
① - When used on 6 Cyl. cars, this generator is made low cut-in type by use of a special drive pulley
② - Also used on 6 Cyl. cars

Performance Data - Cold

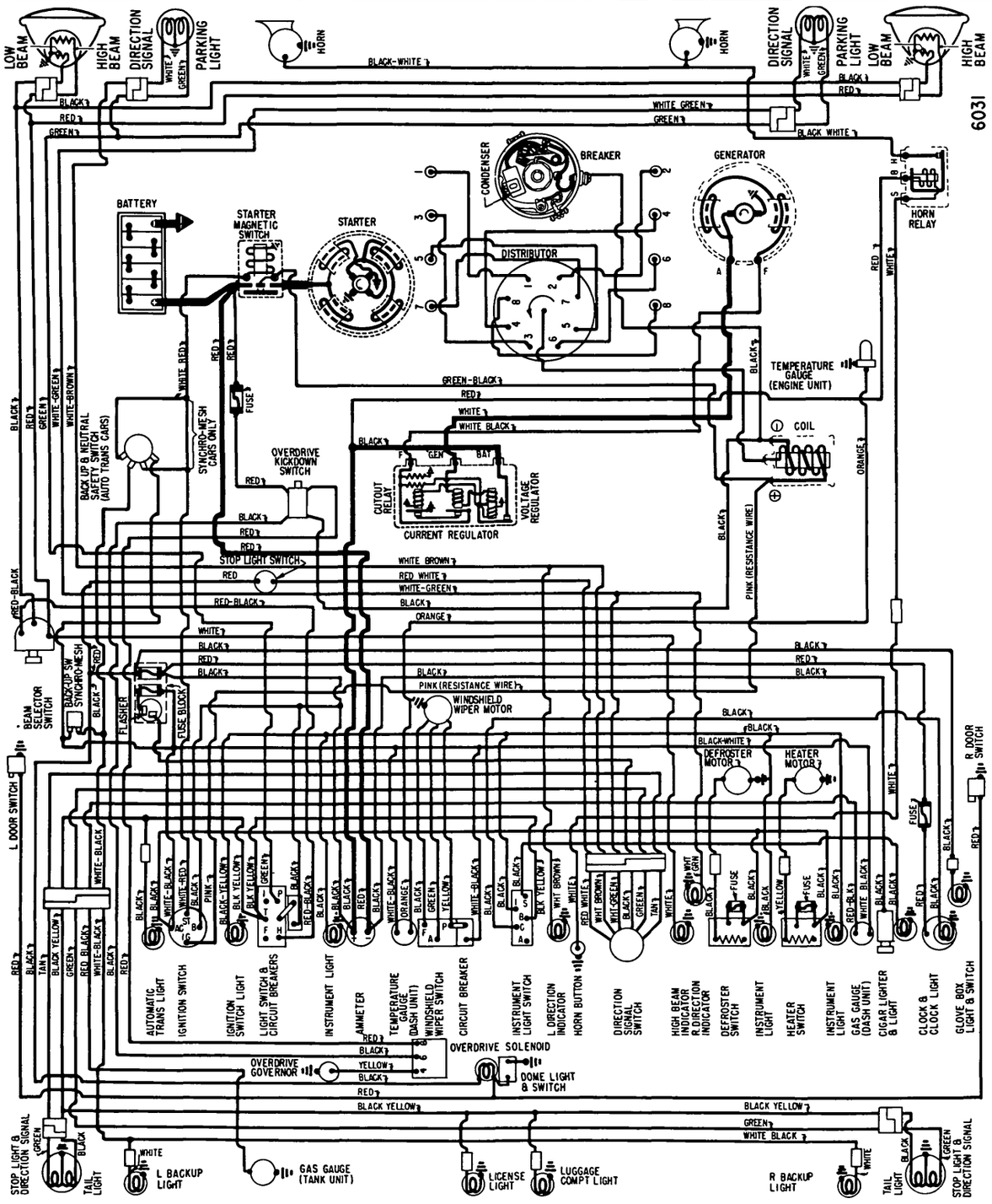
Generator	Amperes	Volts	RPM
1102003	30.0	14.0	2240
1102127	45.0	14 0	2600

Brush Spring Tension - 28 ozs (1102003 & 1102127)
Field Current - 1 69-1 79 amps. (1102003), 2 66-2.86 amps (1102127) at 12 0 volts
R tati n - Counterclockwise at commutator end
B lt Adjustm nt: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs on scale will lift belt ½"

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STUDEBAKER LARK VIII WIRING DIAGRAM



STUDEBAKER V8 HAWK WIRING DIAGRAM

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REGULATOR

Delco-Remy No. 1119123 (1102003 Gen.).
NOTE - Specifications below are "Normal" settings.

Cutout Relay

Cuts In - 11.8-13.5 volts (hot).
Contact Gap - .020".
Air Gap - .020" with contacts just closed

Voltage Regulator

Setting - 13.8-14 8 volts (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

Current Regulator

Setting - 27-33 amperes hot (after 15 minutes continuous current regulator operation).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: Sealed beam type, one in each fender.
Direction Signals: *See Electrical Section.*
►*DIRECTION SIGNAL CANCELS TOO SOON ON LEFT TURN CORRECTION*· May be caused by bent switch plate. To correct, raise front of car and remove steering wheel. Insert screwdriver under switch plate midway between ends of plate and press down on right end of plate near cancelling lever.
Lighting & Instrument Light Switch Removal: Remove switch retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board.
Speedometer & Instrument Removal: Units can be removed separately without disturbing other parts.
Stop Light Switch: Located on inner side of left frame rail forward of steering gear housing (Std. Brakes), mounted in elbow fitting on power brake unit (Power Brakes).
CIRCUIT BREAKERS: 20 Ampere - Headlights, High beam indicator, Parking, Tail, License, and All Instrument lights On headlight switch
5 Ampere - Windshield wiper. On wiper switch.
FUSES: 15 Ampere - Body and Stop lights. In fuse block behind instrument panel.
15 Ampere - Direction signal. In fuse block behind instrument panel.
15 Ampere - Heater and defroster. On heater switch.
14 Ampere - Overdrive. In kickdown switch-to-starter solenoid cable.
1 Ampere - Clock. In lead behind instrument panel.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, See "Air Conditioning Service Cautions" in Miscellaneous Section.*
ENGINE SPECIFICATIONS: Own. V8, valve-in-head. Two engines used. 289" Engine used in Hawk Sports

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Coupe and available on Police Cars, 259" Engine used in all other models.

Engine	Bore	Stroke	Displacement
259"	3 9/16"	3 1/4"	259.2 cu. ins.
289"	3 9/16"	3 5/8"	289 cu. ins.

Engine	Compr. Ratio①	Rated HP	Developed HP
259"	8.8-1②	40.6	180 at 4500 RPM
259"	8.8-1③	40.6	195 at 4500 RPM
289"	8.8-1②	40.6	210 at 4500 RPM
289"	8.8-1③	40.6	225 at 4500 RPM

① - 7.5-1 Optional. ② - 2-Bbl. Carb. ③ - 4-Bbl. Carb.

Compression & Vacuum Reading - See *TUNE-UP.*

OIL PAN REMOVAL: Remove dipstick and adapter tube (remove head bolt to remove tube clamp). Disconnect battery. Drain crankcase Remove starter. On Hawk, swing wheels to right to move steering bellcrank out of way. On Other Models, remove steering bellcrank assembly and exhaust crossover pipe. Remove oil pan screws and pan.

OIL PAN INSTALLATION: *See "Oil Pan" in Studebaker Special Data for special procedure.*

ENGINE REMOVAL: *See "Engine" in Studebaker Special Data*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Studebaker Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data*

PISTONS

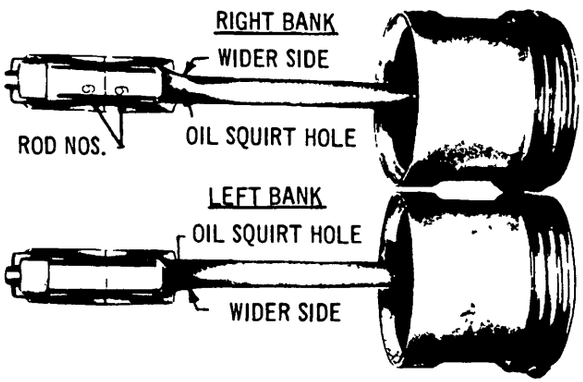
Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data*

►*PISTON INTERCHANGEABILITY CAUTION:* Pistons for 289" engine have a dished head. 259" pistons have flat head. DO NOT interchange between engines.

Weight – 16.21 ozs.

Removal - Pistons & rods remove from above.

Fitting New Pistons: Clearance - Selective feeler fit. Use feeler 1" wide, 002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore Pull required to remove feeler with properly fit piston should be 7–12 lbs.



V8 ENGINE PISTON & ROD ASSEMBLY

Replacement Pistons: Std. size & .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.

Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PISTON PINS

Locked in rod by tapered pin and locknut.

Diameter – .8741-.8745". **Length** – 3 1/16".

Clearance in Piston – .0001-.0003" (selective fit). Light finger push fit at 70° F.

Replacement Pins: Std. size & .0025", .005" oversize.

Removal & Installation: *See "Piston Pins" in Studebaker Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compression	.077-.078"	.008-.016"	.002-.005"
Oil	1855-.1865"	...008-.016"	.....0015-.005"

Replacement Rings: Sets of Std., .020", 030" and .040" Oversize.

Installing Rings: Install compression rings with chamfered side of ring upward. Gaps of inner and outer oil rings must not come at same point.

CONNECTING RODS

Length - 6 5/8" center-to-center. **Weight** - 23 71 ozs.

Crankpin Journal Diameter - 1.99925-2 00025".

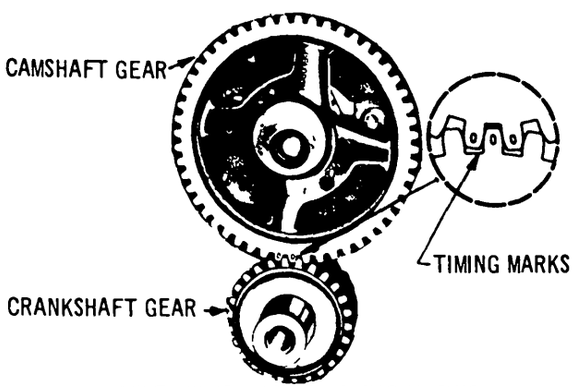
Lower Bearing - Interchangeable. Steel backed, micro-babbitt lined type. No shims.

Clearance - 0005- 002". **Sideplay** - .008- 013".

Replacement Bearings: Std., 001", 002", .010" and 020" Undersize.

Installing Rods: Number on rod and bearing cap must be on same side. Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank.

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.



V8 ENGINE VALVE TIMING MARKS

►*REPLACEMENT ROD IDENTIFICATION NOTE:* Replacement rods are unnumbered. To identify, hold rod upright with oil hole toward you. Wide part of offset will be to right on left bank rods, to left on right bank rods.

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION:* If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap. Drill and file hole to correct.

Journal Diameter–2.4995-2.5000".

Bearings - Steel-backed, micro-babbitt lined. No shims.

Clearance–.0005-.0025".

Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.

End Thrust: Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal. **Endplay**–.003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters–(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings–Precision type, steel backed babbitt lined.

Clearance – .00075-.00225" (No. 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

Endplay–.003-.006".

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.

Timing Gear Removal & Installation–*See "Timing Gears" in Studebaker Special Data.*

Backlash–.001-.003".

Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.

Engine Front Cover Removal: *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance - .023-.025" (Hot), .025-.027" (Cold).

Valve	Head Diameter	Stem Diameter	Length
Intake	1 21/32"	11/32"	5 5/32"
Exhaust	1 17/32"	11/32"	5 5/32"

Valve	Seat Angle	Lift	Stem Clearance
All	45°	23/64"	.0015-.0035"

Valve Seat Width–1/16-3/32".

Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

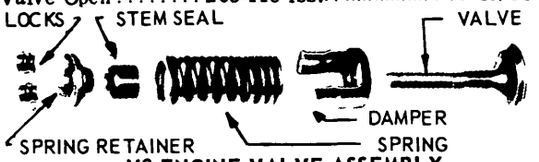
Valve Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below *NOTE* - Damper installed on lower (close-coiled) end of all springs.

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Valve Spring Specifications

	Pressure	Length
Valve Closed	45-55 lbs.	2 1/32"
Valve Open	105-115 lbs.	1 43/64"



V8 ENGINE VALVE ASSEMBLY

Valve Guides: Pressed in head from underside.
Guide Removal & Installation–See *"Valve System" in Studebaker Special Data.*
Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.
►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore):* See *"Valve System" in Studebaker Special Data.*
Valve Lifter Installation & Fitting–See *"Valve System" in Studebaker Special Data.*
Replacement Lifters–Std. size, .001", .005" oversize.
►*CAUTION–When lifters removed, make sure they are installed in riginal positions.*
Rocker Arms: See *"Valve System" in Studebaker Special Data.*
►*ROCKER ARM COVER & GASKET PRODUCTION CHANGE:* Beginning Serial No. 60V-13001, new rocker arm cover and gasket were used in production. New cover has only two retaining stud holes and gasket is wider Install new gasket, Part No. 1550521, in cover with gasket retaining notches toward center of engine.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves–Open 11° BTDC. Close 54° 36' ALDC.
Exhaust Valves–Open 51° 36' BLDC. Close 14° ATDC.
Valve Timing Check–Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Studebaker Special Data.*
Crankcas Capacity: 5 qts. (add one quart when filter changed).
Normal Oil Pressure – 20–40 lbs. at 40 MPH.
Pressure Regulator Valve – Located on right side at front of engine block slightly above crankcase flange.
Oil Pressure Indicator (Lark): Indicator light on instrument panel controlled by oil pressure switch, Studebaker No 1539898
Oil Pressure Indicator (Hawk): Direct reading, non-electric type gauge, Studebaker No. 1539878.
Oil Pump: Helical gear type. Mounted on rear main bearing cap in crankcase. *NOTE* - Stationary type oil strainer used which is a unit with the intake pipe.
Pump Removal, Overhaul, & Installation: *See "Oiling System" in Studebaker Special Data.*
Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under sever conditions.
►*OIL FILTER INSTALLATION CAUTION:* Lubricate gasket with engine oil and tighten filter **by hand ½-turn after gasket seats on base.** *Do not cross-thread or overtighten.*
Replacement Filter Element - Studebaker No. 1542739.
Crankcase Ventilation: Filter element is located in oil filler cap (air intake). Breather pipe (air outlet) is connected at rear of valve chamber cover plate.

COOLING

Water Capacity: 17 qts. without heater. 18 qts. with heater (Lark), 18½ qts. with heater (Hawk).
Pressure Valve: 14 lb. radiator filler cap, Studebaker No. 1551190. *Supersedes 13-15 lb. cap, No. 1548915.*
Thermostat: Choke type. Studebaker No. 1540787 (170°) Std., No. 533247 (160°) and No. 533257 (180°) Optl.
Water Pump: Packless, sealed ball bearing type.

See "Water Pumps" in Studebaker Special Data.

Radiator & Fan Shroud Removal - *See "Cooling System" in Studebaker Special Data.*
Temperature Gauge: Direct reading, electric type.
Dash Unit - Studebaker No. 1548690 (Lark), No. 1539879 (Hawk).
Engine Unit - Studebaker No. 1545220 (All).
See "Temperature Gauges" in Miscellaneous Section.

CLUTCH

Borg & Beck. Used as follows:

Car Model	Clutch Model
6 Cyl. Lark Std.	8A7
6 Cyl. Lark H.D.	9A7
6 Cyl. Taxi Early Ⓣ	9A7
6 Cyl. Taxi Later Ⓣ	10.5A6
V8 Lark	10A7
V8 Taxi	10.5A6
V8 Hawk	10A6

Ⓣ - See Production Change Note below.
See "Borg & Beck" in Clutch Section.
►*6 CYL. TAXI CLUTCH PRODUCTION CHANGE & EXCESSIVE RELEASE EFFORT CORRECTION:* Different type clutches used. *See "Borg & Beck" in Clutch Section.*
Pedal Adjustment: Free travel ½-1". To adjust, loosen locknut on rod connecting clutch release shaft lever to clutch operating shaft lever. Turn opposite nut in or out to shorten or lengthen rod as required. Tighten locknut.
►*HILL HOLDER NOTE:* Check setting whenever clutch pedal adjusted and adjust operating rod so Hill Holder releases at same time clutch is engaged
Clutch Housing Removal: Disconnect battery. On 6 Cyl. remove dipstick and tube and starter mounting capscrews (do not disconnect cables) and tie starter out of way. On V8, remove starter. On all models, remove clutch operating shaft. Remove transmission (see below). Disconnect engine rear support from crossmember. Raise engine at oil pan and remove crossmember. On V8, remove clutch housing cover plate. Remove clutch housing. *NOTE* - On 6 Cyl., remove dowel bolts first.
►*6 CYL. TAXI CLUTCH REMOVAL NOTE:* If engine rear support insulator is attached to clutch housing by two accessible capscrews, clutch can be removed without removing crossmember and clutch housing as follows: Disconnect insulator from clutch housing and crossmember. Raise engine and slide insulator forward and remove it. Push clutch housing to rear and rotate until starter area is adjacent to crossmember. Remove pressure plate from flywheel. Remove driven plate. To remove pressure plate assembly, move it toward starter area in clutch housing and slip out between clutch housing and engine rear plate.
Clutch Removal: Remove clutch housing (see above), remove screws evenly to relieve pressure, remove clutch.

SYNCHRO-MESH TRANSMISSION

Warner. Used as follows:

Car Model	Transmission Mod l
6 Cyl. Except Taxi	T-96
6 Cyl. Taxi	T-90
V8 Except Taxi	T-86
V8 Taxi	T-89

See "Warner Synchro-mesh" in Transmission Section.
►*REAR BEARING SMALL SNAP RING BREAKING OR COMING OUT CORRECTION (6 Cyl.):* Install improved snap ring, Part No. 1550544. *See "Warner Synchro-mesh" in Transmission Section.*
►*SECOND-TO-HIGH GEAR CLASH CORRECTION (V8):* May be due to improperly adjusted shift linkage or mainshaft-drive pinion interference. *See "Warner Synchr - mesh" in Transmission Section.*
►*TRANSMISSION OIL LEAK CORRECTION.* If oil leakage occurs between rear oil seal and transmission rear housing or between transmission case and rear housing, use a non-hardening sealer such as Permatex No. 2 between rear seal and transmission housing and on transmission main case capscrews.
►*LUBRICANT LEVEL CHECKING & FILLING CAUTION:* On transmissions with drain and filler plugs in **both** transmission main case and extension housing, lubricant must be checked, added, and drained from each unit separately to assure proper lubrication for all parts.
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
►*GEAR SHIFT CONTROL PRODUCTION CHANGE & PARTS REPLACEMENT CAUTION:* Later cars have new transmission remote control assembly which has a nylon bearing between shift lever support and upper bearing bracket. First 2300 cars with new assembly have no external identification. Later cars identified by letter "D" on underside of shift lever boss on shift lever support. Parts for early and later assemblies are **not** interchangeable.
Removal: Disconnect propeller shaft at rear universal joint flange, pull shaft to rear to disengage splined joint at transmission extension, remove shaft. Drain transmission case. Disconnect shift rods at transmission case shift levers, disconnect speedometer cable at transmission case, remove speedometer pinion. Remove clutch operating shaft, bracket, and bearing from transmission case. Support transmission and remove capscrews mounting transmission on clutch housing. Move transmission straight back until main drive gear clears clutch driven member, then lower transmission and remove from beneath car.

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OVERDRIVE

Warner R10. Governor controlled solenoid operation with throttle controlled kickdown. *NOTE* - Relay is not used in overdrive control circuit. See wiring diagram for control circuit.

Overdrive Control: *See "Warner R10 Overdrive Control" in Transmission Section.*

R moval: Same as for synchro-mesh transmission (above) after disconnecting control cable and wiring.

FLIGHTOMATIC TRANSMISSION

Warner. Torque converter and hydraulically controlled three-speed planetary transmission. Used as follows:

Car Model	Transmission Model
6 Cyl. Except Taxi	AS6-5H
6 Cyl Taxi	AS2-7E
V8 Except Taxi	AS6-5P
V8 Taxi	AS10-7A

►*PRODUCTION CHANGES & REPLACEMENT PARTS CAUTION: See "Flightomatic Transmission" in Transmission Section.*

►*TESTING & TROUBLE SHOOTING: See "Flightomatic Transmission" in Transmission Section.*

Lubrication: Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A"; or Type "A", Suffix "A".

Checking Fluid Level – Operate engine with selector lever in "P" for 4 minutes or until engine and transmission reach operating temperature. Apply brakes, move selector lever from "P" to "R" and then to "D" slowly. Check fluid level on dipstick (under inspection hole cover on right side of front floor). Add fluid as necessary to bring to "F" mark on dipstick (1½ pints between "L" and "F" marks).

Capacity – 18 pints (exc. Taxi), 19 pints (Taxi).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Flightomatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Needle bearing cross type. Two used (with one-piece propeller shaft).

►*UNIVERSAL JOINT LUBRICATION NOTE:* Universals should be disassembled, cleaned, and repacked with special universal joint lubricant at 20,000 mile intervals.

PROPELLER SHAFT

One-piece type, with a universal joint at each end.

►*DRIVE LINE ANGLES CHECKING & ADJUSTMENT: See "Propeller Shaft Notes" in Studebaker Special Data. CAUTION – Incorrect angles may cause drive line or chassis vibration.*

►*UNIVERSAL JOINT "PHASE ANGLE" & PROPELLER SHAFT REPLACEMENT CAUTION:* Shaft assemblies with different universal joint phase angles used on some models. *See "Prop ll r Shaft Notes" in Stud - bak r Special Data for compl t data n ach mod l.*

REAR AXLE

Spic r. Semi-floating, hypoid gear with Hotchkiss Drive. Used as follows:

Car Model	Rear Axle Model
6 Cyl. Except Taxi	23-1 or 27
6 Cyl. Taxi.	44-3
V8 Except Taxi & Station Wagon	23-1 or 27
V8 Taxi & Station Wagon	44-3

See "Spicer Hypoid" in Rear Axle Section.

►*REAR AXLE PINION SEAL OIL LEAK CORRECTION:* If oil leaks between rear axle pinion seal and axle housing, apply non-hardening sealer such as Permatex No. 2 between seal and housing.

►*"TWIN-TRACTION" DIFFERENTIAL NOTE:* Optional on all models. Identified by "45" or "T" stamped on a tag under a cover capscrew. *See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*AXLE RATIO IDENTIFICATION NOTE:* Gear ratio stamped on a tag attached by a cover capscrew.

Axle Ratios

Model	Synchro-mesh	Overdrive	Flightomatic
6 Cyl. W,F,J	① 3.73-1	② 4.10-1	③ 3.73-1
6 Cyl. D, P	② 4.10-1	④ 4.27-1	③ 3.73-1
6 Cyl. L	② 4.10-1	⑤ 4.56-1	③ 3.73-1
6 Cyl. Y	⑤ 4.09-1		⑥ 3.73-1
V8 Except Y	⑦ 3.31-1	⑦ 3 54-1	⑧ 3.07- 1
V8 Y	⑨ 3.31-1		⑥ 3.31-1

① - Optional: 3.54-1; 4.10-1; 4.27-1; 4.56-1.
② - Optional: 3.73-1; 4.27-1, 4.56-1.
③ - Optional: 3.54-1, 4.10-1.
④ - Optional: 4.10-1; 4.56-1.
⑤ - Optional: 4.27-1.
⑥ - Optional: 3.54-1.
⑦ - Optional: 3.07-1, 3.73-1.
⑧ - Optional: 3.31-1; 3.54-1.
⑨ - Optional: 3.54-1, 3.73-1.

Backlash -.003-.006".

Axle Shaft Removal: Remove wheel and wheel hub using Puller J–1644–S. Remove brake backing plate retaining bolts and remove outer washer, retainer, reinforcing plate and felt washer (discard this washer). Free hand brake cable from equalizer and frame guides and disconnect hydraulic brake line at wheel cylinder. Pull backing plate out over end of axle shaft and tie it up out of way. Remove endplay adjusting shims *(CAUTION – Save for reinsfallation).* Use Puller J–7935 with Hammer J–2619 to remove axle shaft.

Rear Axle Assembly Removal: Remove hub caps, loosen wheel nuts and remove axle shaft nut. Raise rear of car and support on stands under frame just ahead of rear springs. Remove wheels, hubs, and drums. Disconnect brake line at each rear wheel cylinder, remove brake pipe clamps and free brake line from rear axle housing. Take out backing plate bolts, pull backing plate out over end of axle shaft and tie up out of way. Remove adjusting shims located beneath backing plate. *(CAUTION – Save for reinstallation).* Disconnect propeller shaft by removing rear universal joint U-bolts and nuts (wire caps together). Remove rear spring U-bolts from axle housing, disconnect rear shock absorbers. Remove rear axle assembly from beneath car.

Wh l Bearing Adjustm nt: Use dial indicator to check axle shaft endplay. Adjust by removing backing plate (see Axle Shaft Removal above), and adding or removing shims located between backing plate and axle housing flange (shims furnished .003". .005". .010". .030" thick). **Endplay –** .001-.006".

►*REAR WHEEL BEARING LUBRICATION CAUTION:* No lubrication plug provided but bearings are NOT lubricated for life. Remove, clean, and repack bearings at 25,000 mile intervals.

SHOCK ABSORBERS

Gabriel (U.S. Cars), Monr (Canadian Cars). Direct acting, hydraulic, non-adjustable (Exc. Taxi), Adjustable (Taxi & Optl. Heavy Duty on other cars).

Gabriel Shock Absorb rs (Stud bak r N s.)

Car Model	Front	Rear
Sedans & Hardtop	1545057	1545053
Station Wagons	1545057	1545053
Hawk (Early) ①	1545055	1545050
Hawk (Later)	1545057	1545052
Taxi ②	1548550	1548549
All (Heavy Duty)②	1544410	1544411

Monroe Shock Abs rbers (Canada)

All (Exc. Hawk)	1547458	1545046
Hawk	1547458	1545045

① – First 660 cars only. ② – Adjustable type.

Adjustment (Gabriel Adj. Typ) - Disconnect one end of shock absorber and collapse it fully to engage internal coupling, then rotate lower shaft until arrow on body lines up with "Soft", "Normal", or "Firm" arrow on dustcover.

FRONT SUSPENSION

Independent. Coil spring suspension with shock absorbers mounted within coil springs.
See "Studebaker" in Suspensions & Wh l Alignm nt Section.

►*FRONT SPRING NOISE CORRECTION:* If caused by coil-to-coil contact of upper four coils of spring, install rubber insulators, No. 526249, at top and bottom of each spring.

►*VARIABLE RATE COIL SPRING NOTE:* All springs except Heavy Duty type are Variable Rate with closer coils at upper end.

Kingpin Inclination - 6° at 0° camber.

Caster - Neg. 1½° to Neg 3° Not more than ¾° variation between wheels. *Supersed s pr vious sp cifications of Neg. 1° to Neg. 2½°.*

Camber - 0° to Pos. 1° ½° more camber favored on driver's side.

Toe-In - 1 16-1/8" **Adjust right hand ti rod nly** for toe-in after left hand tie rod has been adjusted for straight-ahead position (with steering wheel centered) and center auxiliary tie rod has been adjusted so that steering gear arm and auxiliary steering arm parallel.

RHD Car Note - Make toe-in adjustments at left hand tie rod.

T e-Out on Turns - With outer wheel at 20°, inner wheel should be turned 23½-24½°.

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STEERING

Manual: Ross TA-12 & TL-12 Cam & Twin Lever or SL-54 Cam & Single Lever Roller Stud. Used as follows:

Car Model	Ross Strng. Gear Model
6 Cyl. Exc. Convert. & Taxi (LHD)	TA-12
6 Cyl. Convert. & Taxi (LHD)	SL-54
6 Cyl. (RHD)	SL-54
V8 (All)	SL-54

See "Ross Steering Gears" in Steering Section.

Power Steering: Bendix Linkage Type. *See "Bendix Linkage Type Power Steering" in Steering Section.*

►*HISSING NOISE IN STRAIGHT AHEAD DRIVING CORRECTION & CONTROL VALVE PRODUCTION CHANGE: See "Bendix Linkage Type Power Steering" in Steering Section.*

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Lever" Steering Gear in Steering Section.*

BRAKES

Service: Wagner Lockheed Hydraulic. Self-centering (with Bendix type shoes). Parking lever applies rear wheel service brakes.

See "Wagner Lockheed Self-Centering Brakes" in Brake Section.

►*BRAKE USAGE NOTE: 6 Cyl. Taxi models use same size brakes as V8 cars. Specifications below for V8 cars apply also to 6 Cyl. Taxi.*

Drum Diameter - 10" front, 9" rear (6 Cyl.); 11" front, 10" rear (V8).

►*BRAKE DRUM NOTE:* Air cooled rib type drums used on all Taxi and Hawk models.

Master Cylinder Bore Diameter - 1" All Models.

Wheel Cylinder Diameter - 1" front, 13/16" rear (6 Cyl.); 1 1/16" front, 7/8" rear (V8).

Braking Power - 62% front, 38% rear. All Models.

Brake Lining: Marshall-Eclipse lining used on all models. Lining is bonded to shoe (Taxi), riveted to shoe (Others).

►*FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is 7/32" thick (All Shoes on Taxi), and 3/16" thick on all other shoes. Lining is pre-ground off-center at the factory to eliminate brake squeal Lining applied to full length of shoe, and is marked "secondary" and "top" and should be installed as marked.

Lining Width & Length (Except Taxi)

Shoe	Front Wheel	Rear Wheel
6 Cyl. Primary	2"x8 15/32"	.2" x 7 9/16"
6 Cyl.Secondary	2" x 10 53/64"	2" x 9 3/4"
V8 Primary	2 1/4" x 9 21/64"	2" x 8 15/32"
V8 Secondary	2 1/4" x 11 57/64"	2" x 10 27/32"
(Taxi)		
All Shoes	2 1/4" x 11 1/2"	2" x 10 7/16"

Thickness – 3/16" except as noted above under "Secondary Lining Note".

Clearance – Lock shoes against drums, then turn adjusting screw back eight notches or more as required to free drum.

Standard Master Cylinder: On frame left side rail at base of brake pedal.

Checking Fluid–Access hole in front floor pan at left corner of drivers seat. Fluid should be maintained 1/2" below top of filler opening.

Removal: Disconnect clutch pedal retracting spring from master cylinder support strap, unhook spring from frame bracket and then from spring clip on pedal rod. Disconnect fluid lines from master cylinder. Remove brake pedal clevis pin and disconnect pedal rod at brake pedal. Remove attaching bolts, swing support strap down, and remove master cylinder. *NOTE* - Reinsert forward mounting bolt to support Hill Holder.

Power Brakes: Hydrovac Power Unit. Used with standard master cylinder.

See "Hydrovac Power Unit" in Brake Section.

Checking Fluid–Same as for Manual Brakes (same master cylinder used).

Removal of Power Unit–Disconnect manifold vacuum supply hose at the power unit and disconnect stop light switch wires. Disconnect hydraulic lines from power unit (lines leading to master cylinder and to wheel cylinders). Remove power unit-to-bracket mounting bolts and remove unit from car.

Hill Holder: Used on Synchro-mesh and Overdrive Transmission cars *See "Hill-Holder" in Brake Section.*

MISC. MECHANICAL

Windshield Wipers: Autolite or Bosch Electric Two-Speed type. *See "Windshield Wipers" in Miscellaneous Section.*

Air Conditioning: *See "Studebaker Air Conditioning" in Miscellaneous Section.*

Power Top: Autolite, electric-hydraulic type.
See "Power Top Controls" in Miscellaneous Section.

TIGHTENING SPECIFICATIONS
ALL MODELS

TIGHTENING TORQUES: When tightening capscrews or bolt nuts retaining the parts listed below, use a torque indicating wrench and tighten to tensions listed.

4 CYL. ENGINES

	Ft. Lbs.
Cylinder Head Stud Nuts or Screws	60-70
Main Bearing Cap Bolts	65-75
Con. Rod Cap Bolt Nut 3/8"	35-40
Con. Rod Cap Bolt Nut 7/16"	50-55
Con. Rod Cap Bolt Nut 11/32"	33-38
Crankshaft Counterweight Bolt	60-70
Flywheel to Crankshaft Bolts	36-40
Camshaft Thrust Plate Bolts	20-26
Camshaft Gear to Camshaft Bolt	30-40
Intake & Exhaust Manifold Bolts	31-35
Rocker Arm Bracket to Head Nuts	30-36
Spark Plugs	25-30

6 CYL. ENGINES (EXC. 6226)

	Ft. Lbs.
Cylinder Head Stud Nut or Screw	60-70
Main Bearing Cap Bolts	65-75
Con Rod Cap Bolt Nut 3/8"	35-40
Con Rod Cap Bolt Nut 7/16"	50-55
Con Rod Cap Bolt Nut 11/32"	33-38
Crankshaft Counterweight Bolt	60-70
Flywheel to Crankshaft Bolt	36-40
Camshaft Thrust Plate Bolt	14-20
Camshaft Gear To Camshaft Bolt	30-40
Int. & Exh. Manifold Bolts	31-35
Rocker Arm Bracket To Head Nuts	30-36
Spark Plugs	25-30

6 CYL. 6226 ENGINE

	Ft. Lbs.
Cyl. Head Bolts	35-45
Con Rod Cap Bolts	40-45
Main Bearing Cap Bolts	85-95
Camshaft Thrust Plate Bolts	12-15
Camshaft Sprocket Nut	35-40
Timing Chain Cover Screws	12-15
Flywheel Mounting Bolts	35-40
Int & Exh. Manifolds	30-35
Vibration Dampener Bolt	100-130
Oil Pan Screws	12-15
Valve Chamber Cover	7-10
Water Pump	12-15

ENGINE
UNIVERSAL JEEP

ENGINE REMOVAL: To remove engine from chassis as required for such engine items as crankshaft and camshaft overhaul, perform the following operations in sequence.

1)—Drain cooling system, and remoye battery. Disconnect and remove upper and lower radiator hoses, stay rod, radiator hold down bolts, and lift radiator out.

2)—Remove air cleaner. Disconnect cable at starter terminal and remove starter. Disconnect generator leads and ignition coil leads, and remove heat indicator bulb at cylinder head, and oil gauge pressure line. Disconnect engine ground strap, and remove two bolts in engine mounting on each side.

3)—Disconnect throttle control and choke control rods at carburetor, governor dash control at governor. Remove horn. Disconnect fuel and windshield wiper lines at fuel pump. Disconnect exhaust pipe at manifold.

4)—Disconnect rear end of engine stay cable at frame cross-member, and remove bell housing **leaving one bolt at each side to support engine weight.**

5)—Attach chain hoist to engine and take up just enough to support engine without binding remaining bell housing bolts, and remove, these bolts. Swing engine forward to withdraw clutch shaft from bushing in flywheel, lift engine from chassis.

►*INSTALLATION CAUTION*—Place small amount of grease in clutch shaft bushing in flywheel before installing engine.

STA. WGN., SEDAN DEL., TRUCKS

ENGINE REMOVAL: NOTE—It is recommended that engine be removed from chassis for overhauling.

1)—Disconnect battery, drain cooling system, and remove the bolts and nuts attaching hood to hinge and remove hood. Remove radiator brace rods, and both upper and lower radiator hoses (heater hoses if so equipped). Remove radiator attaching screws and remove radiator.

2)—Disconnect fuel line and flexible windshield wiper hose at fuel pump. Remove carburetor air cleaner, and disconnect the carburetor choke and throttle controls.

3)—Remove starter motor wires and starting motor. Disconnect generator wires at generator, and coil wires at coil. If car is equipped with overdrive, tag overdrive control wires and remove them. Disconnect heat indicator and oil gauge wires.

4)—Disconnect exhaust pipe at manifold, and remove the nuts and bolts from front engine supports. Remove flywheel-to-bell housing attaching bolts.

5)—Attach a suitable lifting sling on engine, and raise engine high enough to release weight from front engine supports, then pull engine forward until clutch clears the bell housing. Lift engine from chassis.

FORWARD CONTROL FC-150 & FC-170

ENGINE REMOVAL: *NOTE* - Remove engine, transmission and transfer case as a unit as follows:

1) Drain cooling system, remove driver seats, engine hood and panel (FC-170), panels (FC-150). Disconnect battery.

2) Remove air cleaner assembly (FC-150) and bracket (FC-170), choke and throttle controls, and on FC-150 remove fuel line at pump.

3) Remove carburetor, radiator and heater hoses then remove surge tank

4) On FC-150, remove wires from coil, starter, generator and remove oil filter and bracket.

5) On FC-170, remove distributor, oil filler tube, coil, oil filter and bracket, temperature and starter to solenoid wires, generator access panel, generator, bracket and pulley.

6) On FC-150, disconnect accelerator control wire at engine bell crank and disconnect oil sender unit.

7) On FC-170, disconnect radiator brace at engine and loosen at radiator and move out of way. Remove radiator hose at water pump, then remove fan belt and blade assembly from fan shaft. Disconnect vacuum outlet hose and fuel line from pump and plug line. Remove fuel line (pump to carburetor).

8) On FC-170, disconnect exhaust pipe at manifold, remote control rod at transfer case, oil pressure unit wire and engine ground strap. Disconnect two remote control rods at transmission and move out of way.

9) On FC-150, disconnect exhaust pipe at manifold, raise front of vehicle on jacks and remove front and rear exhaust pipes.

10) On FC-170, disconnect clutch control cross shaft and remove hand brake, release spring, cable brackets at bell housing and frame crossmember and cable adjusting rod at lever.

11) On FC-150, disconnect brake and clutch cables and springs, remote control cable rod at transfer case and remove front propeller shaft.

12) On FC-170, disconnect rear propeller shaft at transfer case and secure out of way. Disconnect speedometer cable and front propeller shaft at transfer case and remove engine bolts.

13) On FC-150, disconnect battery cable at bell housing, remove fan belt, loosen and raise generator then remove two front motor mount bolts and engine ground strap at frame. Disconnect spark plug wires and clamp and remove valve cover and speedometer cable. Remove propeller shaft. Disconnect shift control rods at transmission levers and secure out of way.

14) Attach lifting brackets to engine at head bolt locations so engine will be well balanced, then use crane or "A" frame and chain hoist to support engine. Disconnect rear engine support (frame crossmember) at rails. Lift front of engine and remove two rubber front mounts.

15) Raise vehicle as necessary to lower and remove engine from below. *NOTE* - On FC-170 models it may be necessary to raise front of vehicle to loosen front spring clips on front axle so axle may be moved forward to length of brake hose. Reverse procedure to reinstall.

CYLINDER HEAD
ALL MODELS

►*6 CYL. HEAD TIGHTENING SEQUENCE CHANGE:* New sequence is indicated in diagram and supersedes previous instructions.

►*CYLINDER HEAD BOLT TIGHTENING CAUTION:* On F4-134 engine, one cylinder head nut is under carburetor so that carburetor must be removed to torque this nut. On L6-226 engine, one cylinder head bolt is close to distributor adapter so that adapter must be removed to torque this bolt.

CYLINDER HEAD INSTALLATION: Tighten stud nuts and capscrews in sequence shown in diagram to correct torque (see above). *NOTE* – On 6 Cyl. engine, bolts

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No. 24 & 26 are of smaller diameter than the others. Use guide pins in these holes when installing head to assure accurate alignment with block and to prevent gasket failure.

Tightening Torque - See *Tightening (Torque Wrench) Specifications*

ORIGINAL BORE & PISTONS

ALL MODELS (EXC. 6226 ENGINE)

BORE & PISTON SIZES: Engines originally equipped at factory with special oversize pistons may be identified by code letter stamped on engine following the engine number:

"B"—Pistons are .002" Oversize.

"AB"—Pistons .002" Oversize. Main and connecting rod bearings are Undersize (see Original Bearing Sizes following).

"C"—Piston Pins .002" Undersize.

4 CYLINDER MODELS

STANDARD BORE & PISTON SIZE VARIATION: bores and pistons are graded in four .0005" steps as shown in table below and are marked as follows:

Piston—Letter stamped on piston head.

Cylinder Bore—Letter stamped on top of block between valve ports and bore at center.

4 Cylinder Bore & Piston Sizes

Letter	Cylinder Bore Size	Piston Size
A	3.1255-3.1250"	3.1235-3.1230"
B	3.1260-3.1255"	3.1240-3.1235"
C	3.1265-3.1260"	3.1245-3.1240"
D	3.1270-3.1265"	3.1250-3.1245"

6 CYL. MODELS (EXC. 6226 ENG.)

STANDARD BORE & PISTON SIZE VARIATION: Cylinder bore and pistons are graded in six .0004" steps and are marked as follows:

Piston—Letter stamped on piston head.

Cylinder Bore—Similar letter stamped on top of block between valve ports and bore.

ORIGINAL BEARING SIZES

ALL MODELS (EXC. 6226 ENGINE)

MAIN & CONNECTING ROD BEARING SIZES: Engines originally equipped with special undersize mains and connecting rod bearings can be identified by code letter stamped on engine following the engine number:

"A"—Main & Con. Rod Bearings .010" Undersize.

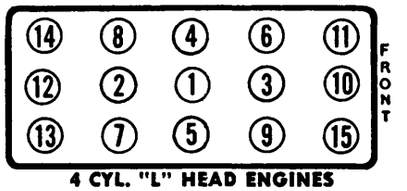
"AB"—Main & Con. Rod Bearings .010" Undersize and Pistons Oversize (see Original Bore & Pistons).

"D"—Main Bearings .010" Undersize.

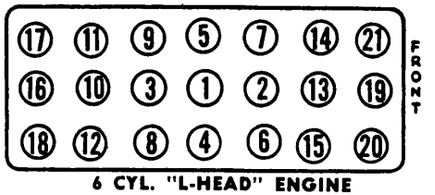
"E"—Connecting Rod Bearings .010" Undersize.

CRANKSHAFT & MAIN BEARINGS

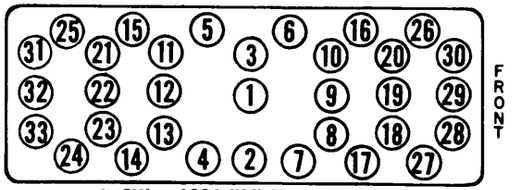
►*MAIN BEARING CAP LOCATING DOWEL CAUTION* Raise main bearing cap up evenly to eliminate possibility of bending dowels Bent dowels will cause misalignment of bearing cap and result in rapid bearing wear and need for early bearing replacement Install new dowels when old dowels are bent



4 CYL. "L" HEAD ENGINES



6 CYL. "L-HEAD" ENGINE



6 CYL. 6226 "L" HEAD ENGINE

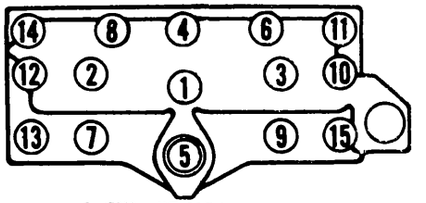
ALL MODELS (EXC. 6226 ENGINE)

►*MAIN BEARING CAP IDENTIFICATION CAUTION* Cylinder block center crankshaft bearing web and bearing caps marked with daub of paint to indicate that caps are to be used with that block only *DO NOT USE CAPS WITH ANY OTHER COLOR THAN SHOWN ONWEB*

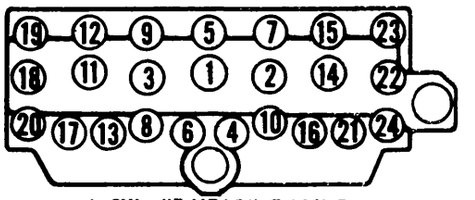
CRANKSHAFT SERVICING: Bearing Replacement – Engine must be removed from car for bearing replacement (bearings "doweled" in case and crankshaft must be taken out to remove and install bearings). Make certain that oil holes in bearings line up with oil holes in crankcase, and that bearings fit snugly on dowel pins in crankcase and bearing caps.

Rear Bearing Oil Seal (Neoprene Type—*NOTE Upper and lower halves of seal can be replaced without removing crankshaft from engine.* Seal is neoprene with a steel back Upper half of seal can be removed by using a suitable piece of strap steel (hack saw blade with teeth ground off) Rotate upper half of seal around shaft with steel strap until opposite end protrudes far enough to grasp end and remove To install, coat both parts of seal with grease and install upper half by rotating it around crankshaft until it is in position with ends even at the engine block Coat both ends of lower seal with Permatex before installing to insure good seal with upper half

Rear Bearing Cap Seal—Bearing cap sealed by cylindrical rubber packing strips inserted in holes between cap and case. When installing bearing cap, coat upper face lightly with sealing compound, insert new packing strips after cap is in place. Packing strips should protrude ¼" to provide proper compression when oil pan installed. CAUTION—Do not cut off this protruding portion of the packing.



4 CYL. "F-HEAD" ENGINE



6 CYL. "F-HEAD" ENGINE

6226 ENGINE

►*REAR BEARING OIL SEAL ASSEMBLY PRODUCTION CHANGE & INSTALLATION CAUTION* New Rear Bearing Oil Seal Assembly (to eliminate oil seal leakage) used starting with Engine Serial Nos SW-6-L-13542, TW-6-L-T-74176 and TW-6-L-F-13756 New Filler Block No 733560 has aligning pins and pre-installed seall New Guard Assembly No 733547 has pre-installed seals and holes for filler block pins Oil Pan Side Gaskets No. 733542 have 125" hole for aligning pins Kit No 917608 contains above items plus Gasket 910220 Replace all old type Seal Assemblies (for oil leak correction) with new Kit No 917608 Use replacement seals No 731046 only, to correct oil leakage with new type seal assemblies

►*FRONT FILLER BLOCK (LOWER) OIL SEAL PRODUCTION CHANGE:* Effective in 1956 production new type seal used to prevent leakage between filler blocks and oil pan. To install new seal on earlier models, coat inner surfaces of filler block with gasket cement. Install seals in grooves evenly centered so that each end extends an equal distance of 1/16" above faces of filler block ends. Be sure they are well seated in grooves and allow cement to dry. Do not trim off ends. If necessary to use cork seals, follow procedure outlined below, **but first soak cork seals in water for a minimum of three hours to make them sufficiently pliabl f r satisfactory use.**

1954-57 6226 MODELS

FRONT & REAR FILLER BLOCKS: Lower filler blocks (front and rear) are bolted on lower face of crankcase to close oil pan opening (filler blocks must be removed to replace pan gasket) Rear filler blocks (additional **upper filler block guard** in crankcase) are grooved for cork oil seals which bear on polished surface of crankshaft directly behind oil slinger. Filler blocks can be removed and replaced without disturbing crankshaft as follows

Front Filler Block (Lower) Servicing: Remove by taking out mounting capscrews and timing gear cover

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capscrews which enter the filler block. When installing filler block, first install oil pan side gaskets (No. 200266), install filler block (use Perma-tex), install new end gasket (No. 200267) on block.

Rear Filler Block (Lower) Servicing: Same as for the lower front block (above) except for crankshaft oil seal (square cork gasket or graphite impregnated seal). Remove and discard old gasket or seal. Install new seal (no. 204654) in same manner as described below for Rear Filler Block (Upper) Guard. Install lower filler block **after** upper filler block guard has been installed.

Rear Filler Block (Upper) Guard Servicing: Guard is seated in groove in crankcase and can be "rotated" out without disturbing crankshaft after lower filler block removed. Remove and discard old gasket or seal, clean out seal groove. Install new graphite impregnated seal (no. 204654), flatten seal slightly and use mandrel or rod to seat seal in groove by rolling from ends toward the center (ends must extend slightly above flat surface of guard). **Do not use shellac or sealing compound in groove.**

►*CAUTION*—Oil seal in both Upper Filler Block Guard and Rear Filler Block must be centered with crankshaft. If necessary, seal can be built up using 1/32" thick gasket material, 3/16" wide, as shims shellacked to groove in block or guard behind seal.

1958-60 6226 MODELS

FRONT & REAR FILLER BLOCKS: Lower filler blocks (front & rear) are bolted on lower face of crankcase to close oil pan opening (filler blocks must be removed to replace pan gasket). Rear filler blocks (additional upper filler block guard in crankcase) are grooved for cork oil seals which bear on polished surface of crankshaft directly behind oil slinger. Filler blocks can be removed and replaced without disturbing crankshaft as follows:

Front Filler Block (Lower) Servicing: Remove by taking out mounting screws and timing gear cover screws which enter the filler block. When installing filler block, first install oil pan side gaskets (No. 733542), install filler block (use Permatex) and install new end gasket on block.

Rear Filler Block (Lower) Servicing: Same as for the lower front block (above) except for crankshaft oil seal (square cork gasket or graphite impregnated seal). Remove and discard old gasket or seal. Install new seal (No. 731046) in same manner as described below for Rear Filler Block (Upper) Guard. Install lower filler block **after** upper filler block guard has been installed.

Rear Filler Block (Upper) Guard Servicing: Guard is seated in groove in crankcase and can be rotated out without disturbing crankshaft after lower filler block removed. Remove and discard old gasket or seal, clean out seal groove. Install new graphite impregnated seal, No. 731046, flatten seal slightly and use mandrel or rod to seat seal in groove by rolling from ends toward center (ends must extend slightly above flat surface of guard). Do not use shellac or sealing compound in groove.

►*CAUTION:* Oil seal in both Upper Filler Block Guard and Rear Filler Block must be centered with crankshaft. If necessary, seal can be built up using 1/32" thick gasket material, 3/16" wide, as shims shellacked to groove in block or guard behind seal.

OIL PAN TO FILLER BLOCK GASKET INSTALLATION. Install Neoprene Rubber gasket in each filler block (use Gasket Cement in grooves) With each end extending an equal amount (1/16") above faces of filler block ends. Allow cement to dry.

ENGINE FRONT COVER

ALL MODELS (EXC. 6226 ENGINE)

FRONT COVER OIL SEAL: Cover has double metal baffle and spring-loaded leather seal which contacts polished surface of crankshaft pulley hub. When installing seal, make certain that seal lip is inward or toward rear of engine.

6 CYL. 6226 ENGINE

FRONT COVER OIL SEAL: Drive out old seal using Oil Seal Driver KF-44. Place cover with opening flange on flat surface. Coat outer edge of new seal with sealing compound, place seal in opening with seal lip toward rear and drive seal in place.

CAMSHAFT & BEARINGS

4 CYL. ENGINES

CAMSHAFT SERVICING: Removal - Drain radiator and cylinder block, remove radiator and grille, cylinder head, manifold, valves, and valve springs. Remove oil pump, oil pan, crankshaft pulley (use puller), fan drive belts and fan assembly. Remove timing gear cover, camshaft gear and thrust plate and spacer. Block-up all valve lifters (can be tied up with string to manifold studs). Remove camshaft through front of engine.

Camshaft Front Bearing - Consists of steel backed babbitt lined bushing, staked in place to prevent rotation or endwise movement, with oil hole in bushing lined up with oil hole in crankcase.

Camshaft Thrust Plate - Thrust plate assembled behind camshaft gear with a spacer to control endplay. Add shim behind spacer to increase clearance, dress down spacer to reduce clearance. Beveled edge of spacer must be to rear.

6 CYL. 6226 ENGINE

CAMSHAFT SERVICING: Removal - Drain cooling system, remove radiator, vibration dampener, timing chain cover, timing gear and chain. Remove fuel pump, cylinder head, oil pan and oil pump. Remove valve cover, valves and spring. Hold lifters up (use spring type clothes pins) while carefully removing camshaft.

VALVE SYSTEM

VALVE TAPPET ADJUSTMENT

6226 ENGINE

TAPPET CLEARANCE ADJUSTMENT PROCEDURE: Car manufacturer recommends valves be adjusted in order listed (see table below). Remove right front wheel and access cover in fender splash shield for access to valve compartment. Remove spark plugs so that engine can be turned over by moving fan or fan belt. By setting valves in fully raised position (left hand column), **valves in right hand column will be on "low" side of cam in position for tappet adjustment.**

Fully Raise Valve	Then ADJUST Valve:
Nos. 1 and 3	Nos. 10 and 12
Nos. 8 and 9	Nos. 4 and 5
Nos. 2 and 6	Nos. 7 and 11
Nos. 10 and 12	Nos. 1 and 3
Nos. 4 and 5	Nos. 8 and 9
Nos. 7 and 11	Nos. 2 and 6

ROCKER ARMS

4 & 6 CYL. "F" HEAD ENGINES

ROCKER ARM ASSEMBLY REMOVAL: Lock rocker arms, shaft, brackets and springs together as a unit by removing cover studs in front and rear rocker arm shaft brackets and installing 5/16"-24 thread set screws in the front and rear brackets in same manner set screws are installed in center brackets. Remove nuts on bracket studs and lift entire assembly off studs as a unit.

Installation: Check push rods, straighten or replace any that are bent. Place push rods in holes in head and block, being sure that they are properly seated in intake valve tappets. Place rocker arm assembly on its studs, seat intake valve adjusting screws in tops of push rods before installing nuts on bracket studs. Torque nuts to 30-36 ft. lbs. Remove extra set screws from front and rear rocker arm shaft brackets, install cover studs in front and rear brackets with short end of stud down.

OILING SYSTEM

ENGINE LUBRICATION

4 CYL. ENGINES

►*"L" HEAD & "F" HEAD ENGINE NOTE:* These engines have similar oiling systems with exception of cylinder head valve mechanism oiling (Pushrods, Rocker Arms, Valve Tips) used on "F" head engines only.

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, timing gears, and rocker arm assembly ("F" Head engines only). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted externally on left side of crankcase draws oil through floating type oil screen mounted on lower face of crankcase in oil pan (passage from oil intake pipe to pump is through drilled passages in crankcase). Pump delivers oil through passage in pump body directly to main oil gallery which extends along left side of crankcase. Oil is distributed through this oil gallery as follows:

Crankshaft Bearings - Each main bearing supplied with oil from main oil gallery through angle passage in crankcase web extending down from oil gallery to main bearing bore.

Camshaft Bearings - Front & Rear camshaft bearings supplied with oil through short oil passage intersecting corresponding main bearing oil passage. Intermediate camshaft bearings are supplied with oil directly from

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main oil gallery by passages extending down from the oil gallery to the camshaft bearing bores.

C nnecting R d B arings - Crankshaft is drilled and each rod bearing is lubricated through passage extending from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lines up with oil hole in crankpin.

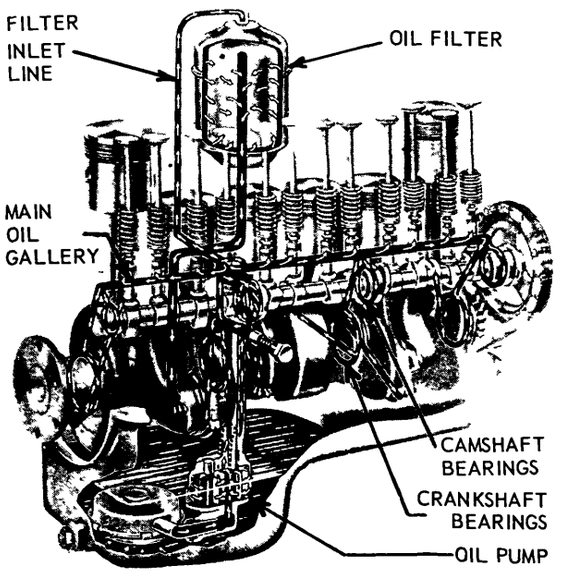
Valv Lift rs - Lubricated from oil reservoir trough cast in crankcase which is filled by oil spray from connecting rod bearings. Lifter guides are drilled to permit oil flow from trough to lifter bore (lifters have oil groove at center for uniform lubrication of lifter bore).

Timing G ars - Lubricated by oil jet from nozzle threaded in front face of engine block which directs oil on camshaft gear at point where gears mesh. Oil is supplied to nozzle through drilled passage from front main bearing oil passage.

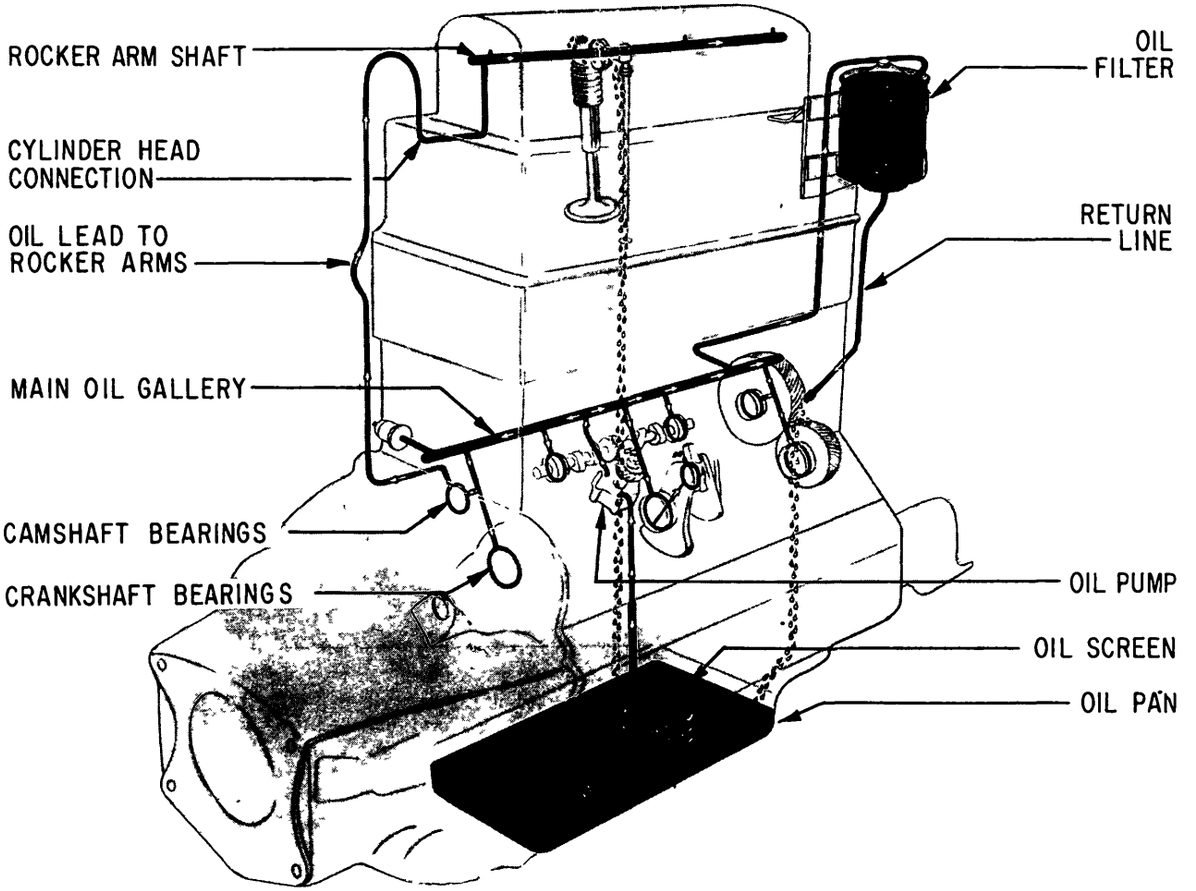
►*TIMING GEAR OIL JET PRODUCTION CHANGE & REPLACEMENT CAUTION:* Beginning with 1960 Engines, Nos. 3J-166871 & 4J-250095, Timing Gear Oil Jet Part No. 924335 (with .040" aperature) was used to prevent oil pressure fluctuations at No. 1 connecting rod bearing. When replacing scored or burned No. 1 rod bearings, check timing gear oil jet and install new type with .040" aperature.

Pushr ds, R cker Arms & Intake Valves ("F" Head Engin) - External oil pipe connects fitting at rear of cylinder block with fitting on top of cylinder head at rear end behind rocker cover. Oil supplied through this line is metered by rear camshaft bearing. Passages in head conduct oil to rear rocker shaft support bracket mounting pad and drilled hole in support bracket and rocker shaft permit oil to flow into hollow rocker shaft. Shaft and rocker arms are drilled for lubrication of rocker arms, pushrod sockets, and valve tips. Excess oil drains back into crankcase through pushrod holes.

OIL FILTER: Partial flow type mounted on bracket on engine. Filter inlet pipe is connected at fitting on left side of crankcase and draws oil directly from main oil gallery. Outlet pipe returns oil to crankcase.



WILLYS 6 CYL. 6226 ENGINE OILING SYSTEM



WILLYS 4 CYL. "F" HEAD ENGINE OILING SYSTEM

6 CYL. 6226 ENGINE

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve lifters. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on lower face of crankcase in oil pan draws oil through floating oil screen and intake pipe mounted on pump cover and delivers oil directly to main oil gallery which extends along right side of crankcase to left of lifter bores (oil flows up around shaft in pump body to outlet hole which registers with oil passage in block when pump installed). *See Caution below.* Pressure regulator valve is located under plug on right side of crankcase at end of pump outlet cross-passage and returns excess oil directly to oil pan. Oil is distributed through the main oil gallery as detailed below.

►*OIL PUMP BUSHING CAUTION:* Pump bushing (installed in block) must be tight and installed flush with bottom of cylinder block. Loose or improperly installed bushing may restrict main oil gallery.

Crankshaft Bearings - Main bearings supplied with oil from main oil gallery through angle passage in crankcase web extending down from oil gallery to main bearing bore. *NOTE* - No. 3 crankshaft bearing is lubricated directly from pump outlet cross-passage (above).

Camshaft Bearings - Each camshaft bearing supplied with oil directly from main oil gallery by passage in crankcase web extending down from oil gallery to camshaft bearing bore.

Conn cting R d B arings - Crankshaft is drilled and each rod bearing is lubricated through passage extending from adjacent main bearing.

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Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lines up with oil hole in crankpin

Valve Lifters - Lubricated directly from main oil gallery through cross-passage drilled through each lifter boss *NOTE* - Oil holes extend completely through lifter bosses and first two groups (Cyl Nos 1 through 4) are shielded by sheet metal oil shields held in place by spring clips on underside of shield No shield is used on rear group (Cyl Nos 5 & 6)

Timing Chain & Sprockets - Lubricated by continuous flow of oil from engine oiling pressure system

OIL FILTER: Partial flow type mounted on bracket on left side of engine Filter inlet pipe is connected to fitting on left side of block and draws oil directly from main oil gallery Outlet pipe returns oil directly to oil pan

OIL PUMP
ALL MODELS (EXC. 6226 ENGINE)

OIL PUMP REMOVAL & OVERHAUL: (Removal)—Rotate engine until distributor rotor points to No 1 firing position and timing mark on flywheel or vibration dampener is directly under pointer On 4 Cyl Models do not remove distributor (pump must be installed so gears mesh without moving rotor for correct engine timing) On 6 Cyl Models, remove distributor (CAUTION—Engine must not be rotated with oil pump removed) Remove pump mounting bolts and pull pump out as far as possible Place a short jack between front suspension support and front lower edge of block and push engine to right until pump is free (Note—It may be necessary to loosen engine support bolts for more movement) Check pump shaft for wear before disassembling pump by mounting it in a vise with a dial indicator bearing against shoulder on gear, at right angles to relief valve housing Move gear toward, then away from indicator and note total reading If this play exceeds 010", replace complete pump

Disassembly: Remove cover screws, cover and gasket and shake outer rotor from housing Remove relief valve retainer, gasket, shims, spring, and plunger If rotor is to be replaced, file off one end of gear retaining pin, pull gear off shaft and remove shaft and inner rotor from housing Clean all parts in solvent and check for wear, pits and scoring

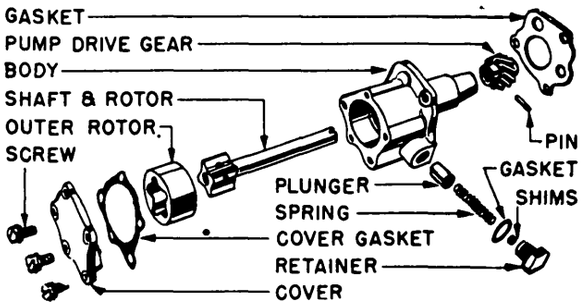
Inspection: Measure clearance between outer rotor and pump body Replace body if clearance exceeds 012" Check cover to make certain that inner surface is not rough or scored and that inner face is flat within 001" Rotors must be within 001" thickness of each other with gear installed on pump shaft clearance between gear and pump body should be 003- 010"

Checking Rotor Clearance Position inner rotor with one lobe engaged between lobes of outer rotor then measure clearance of opposite inner rotor lobe and lobe of outer rotor This clearance should be 010" To check end clearance install the cover without gasket and tighten screws If shaft can be turned by hand end clearance is excessive Install new cover and repeat test If rotors still not tight replace rotors

Reassembly: Install relief valve, spring, gasket and retainer If shims were removed, install them between spring and retainer If new rotors installed, slide gear on shaft after installing shaft and rotor in housing Position gear so there is not over 010" clearance between gear and pump housing and drill a 5/32" hole through pump shaft for retaining pin Install pin and peen ends Install cover and gasket and tighten screws

Installation (4 Cyl. Models): Check to see that timing marks on flywheel or vibration dampener are directly under pointer and distributor rotor is pointed toward No 1 firing position Insert pump in block with pump gear positioned so that it will engage camshaft gear and the distributor shaft drive key without moving distributor rotor Installation can be made only in one position without moving distributor rotor as slot in drive gear and key on distributor shaft is machined off-center

Installation (6 Cyl. Models): Make certain that No 1 piston is on top dead center and that timing mark on flywheel or vibration dampener is directly under pointer Install new gasket between pump and block and be sure that gasket matches pump intake and discharge ports Start pump into mounting hole but do not engage gears Insert a long screw driver through distributor hole and engage slot in pump drive gear Rotate pump gear so that when meshed with camshaft gear, slot will be practically vertical with off-set to rear, as it enters camshaft gear As pump is pushed in and gears are fully meshed, slot will be about 45° from vertical position (NOTE—If gear is meshed one tooth away from the correct position, slot will be 36° off, which is readily noticeable) Install distributor and check ignition timing



OIL PUMP (ALL ENGINES EXC. 6226)

6226 ENGINE

OIL PUMP SERVICING Pump can be removed from engine (with oil pan off) by taking off retaining nut on stud on #3 main bearing cap and pulling pump straight down to disengage drive gear and distributor drive coupling Service pump as follows:

Disassembly—Take out cotter pin and remove screen float assembly Remove cover and gasket. Drive out pin holding upper drive gear on shaft (pin peened in place), drive out shaft from gear. remove idler gear (remove idler shaft if required) Take off lower drive gear (press fit and keyed to shaft)

Oil Pump Clearances—Check as follows.

1)—Pump Body Bushing if over 005" clearance between pump body and ends of lower drive gear teeth, replace bushing and ream to 500- 501"

2)—Pump Shaft: shaft diameter .4990-.4985".

3)—Lower Drive Gear: end of gear should be .001-.006" beyond gasket seat on pump body.

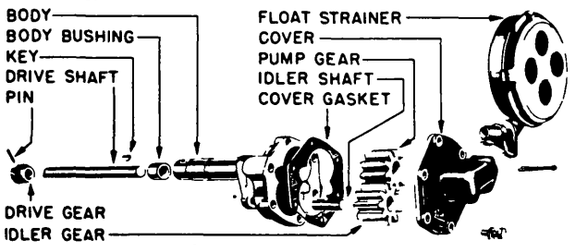
4)—Upper Drive Gear: .002- 004" clearance between underside of gear and upper end of pump body. Controlled by pressing lower drive gear on shaft until this clearance obtained.

NOTE—Cover plate should be replaced if worn from contact with gears, or if cracked.

Oil Pump Bushing (in Cylinder Block)—Replace if worn or loose (can restrict oil gallery if loose). Replace by using drift inserted in distributor drive shaft bore from top of block. Install new bushing from below (must be flush with bottom of block).

Reassembly—Press upper drive gear on shaft with pin hole at right angles to tongue on shaft. Insert new pin and peen ends flush with gear. Install shaft and gear in pump body. Press lower drive gear on shaft (with key in place) until .002-.004" clearance obtained between upper drive gear and upper end of pump body. Press idler gear shaft in body, install idler gear. Install cover using new gasket and pin oil screen float assembly on cover. Check shaft and gears—must rotate freely when turned by hand.

Oil Pump Installation—Set #1 piston at top dead center. Insert distributor main drive shaft from top of block. Install pump with pump drive shaft tongue engaging slot in lower end of distributor main drive shaft and in such a position that when installed, slot in upper end of distributor main drive shaft will be approx. parallel to side of block (slot pointing fore-and-aft), install lock washer, tighten mounting nut. Remove distributor shaft for cyl. head installation.



6226 ENGINE OIL PUMP

COOLING SYSTEM

WATER PUMP

1954-60 4 CYL. ENGINE

DESCRIPTION: Packless type with special double row ball bearing shaft (shaft serves as inner race, bearing is sealed type and packed with lubricant at assembly) Shaft and bearing cannot be dismantled and serviced as an assembly No lubrication required in service Various type seals used (See Notes below)

4 Cylinder Seal Note - Seal is one of two types, either "U" shaped with spring within seal or bellows type with spring assembled on outer circumference of seal

OVERHAUL: Disassembly - Use special W 116 puller and pull impeller off shaft, lift out bakelite seal washer Remove bearing lock ring from slot in bearing hub on

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pump housing support pump housing in arbor press, press shaft and bearing assembly out of pump housing toward forward end To remove fan pulley from shaft, use any regular puller (special W-115 puller furnished for this purpose) to pull pulley off shaft Do not attempt to remove bearing from shaft (shaft and bearing serviced as assembly)

Servicing - If rear face of pump housing is not smooth and flat, resurface with special Tool C-551 or install new pump body

Pump Reass mbly: Install shaft and bearing assembly in pump housing (long end of shaft to rear) so that outer end of bearing is flush with front end of housing Install seal assembly in impeller (dip seal parts in brake fluid before installing), press impeller on shaft until end of shaft is flush with face of impeller hub Press fan pulley c- orward end of shaft until end of shaft is flush with fa of pulley Check location of locking ring groove i earing with respect to slot in housing, align groove ar lot, install bearing locking wire

1954-55 6 CYL. "F" HEAD ENGINE

DESCRIPTION: Similar to 4 cylinder type except for seal assembly

6 Cylinder Seal N te - Seal assembly consists of sleeve seated in recess in pump body with a rubber seal ("U" Section with spring within "U") and seal washer between seal and impeller A slinger is used on shaft just behind bearing

OVERHAUL: Disass mbly - Take out bearing snap ring from hole or slot in pump body (pulley may have to be removed for access to snap ring) Pull impeller off shaft Take out seal washer Press shaft and bearing assembly out through forward end of pump

R assembly - Carefully seat new seal assembly in pump body Press shaft assembly into pump until front face of bearing aligned with front end of pump See that seal washer is in place and press impeller on rear end of shaft until flush with end of shaft Install bearing snap ring in pump body (align groove in bearing with slot in pump body) Press pulley on front end of shaft if removed

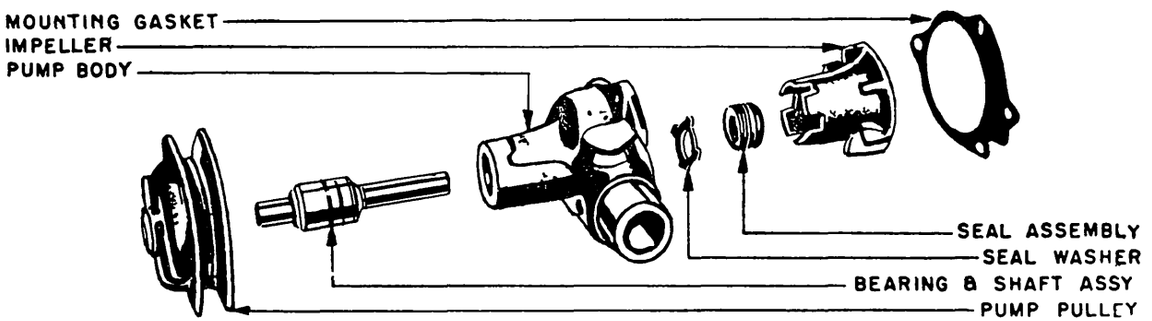
1954-60 6 CYL. "L" HEAD ENGINE

DESCRIPTION: Packless type with double row ball bearing Pump shaft and bearing assembly are integral and cannot be disassembled Seal assembly is self contained pressed into pump body

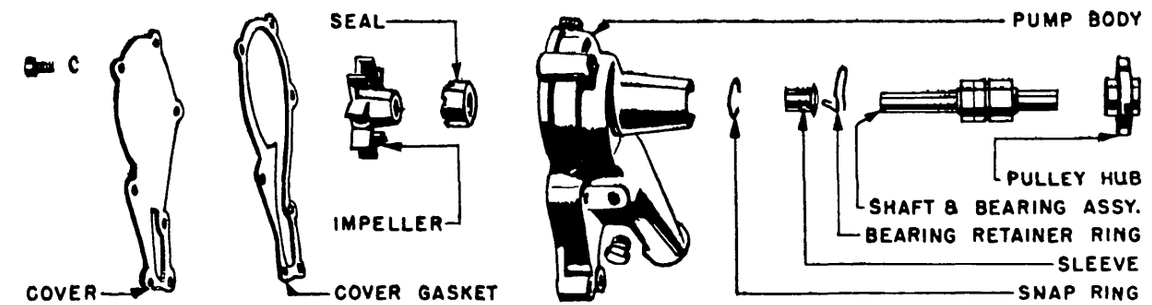
OVERHAUL: Disassembly - Remove fan and pulley from pulley hub Remove pump cover and gasket With Puller KF-29 and adapter, KF-113, remove impeller from shaft Remove bearing retainer ring from slot in housing and press shaft assembly out front of housing Press or drive seal assembly from pump body

Reassembly: Press seal assembly carefully into pump housing Apply oil or graphite to face of carbon seal washer Press pump shaft and bearing assembly into pump housing just far enough to insert retaining ring, insert ring Press impeller on until flush with shaft end Check impeller position to be sure it clears cover

Pulley Hub Installation - Press hub on shaft so fan mounting face is 5 7/32" from rear face of rear cover plate Install cover gasket and cover



4 CYLINDER ENGINE WATER PUMP



6 CYLINDER ENGINE WATER PUMP

FRONT AXLE UNIVERSALS

ALL 4-WHEEL DRIVE MODELS

BENDIX CONSTANT-VELOCITY

NOTE: This 'constant velocity' universal joint used only on front axle shafts (at each front wheel).

SERVICING: With axle shaft assembly removed from housing, service universal as follows:

Disassembly: Drive out retainer pin locking center ball pin in outer axle shaft (pin located within shaft end yoke—use pin punch). Strike outer end of axle shaft on block of wood to cause center ball pin to move into recess in shaft and free center ball. Pull halves of joint apart as far as possible and bend shafts at sharp angle. Rotate center ball until grooved side lines up with one of the ball raceways, move adjacent ball past center ball and remove from joint. Remaining balls (including center ball) will then drop out.

Inspection & Servicing: Inspect raceways for wear, replace complete axle shaft and universal assembly if badly worn. Inspect center ball pin for wear, inspect all balls, replace balls if rough, grooved or with flat spots CAUTION—If one or more balls being replaced, measure old ball with micrometer and replace with ball of exact same size unless larger balls needed to take up play. See Ball Service note following Reassembly (below).

Reassembly: If original balls not being re-used, see Ball Servicing Note below for selection of correct size balls. Clamp inner axle shaft in vise with universal yoke upward, place center ball in socket in end of shaft with groove and pin turned to one side. Drop center ball pin in recess in end of outer (wheel end) axle shaft, position this shaft on center ball, insert balls in three raceways. Bend shafts at sharp angle, turn center ball until groove lines up with fourth raceway, insert ball. Straighten shafts, turn center ball to align hole with center ball pin, install retainer pin, prick punch ends of pin to hold it in place securely. CAUTION—always use new retainer pin.

Ball Servicing Note: Standard balls are .875" in diameter. If universal worn so that play evident, and raceways are in good condition, one or two larger balls (preferably 001", not more than 002" larger) may be used to take up play. Measure old ball with micrometer (std. diameter .875"). Balls are furnished in 001" steps from .003" undersize to .003" oversize. If all balls not same size, install larger balls diametrically opposite each other CAUTION—all balls used must be within 001" of same size and total variation should not exceed 002".

►*INSTALLATION NOTE: For axle shaft endplay adjustment (to center universal joint), see "FRONT AXLE" below.*

RZEPPA CONSTANT-VELOCITY

NOTE: This 'Constant Velocity' universal used only on front axle shafts (at each front wheel).

SERVICING: Axle shaft assembly removed from housing, service universal as follows

Disassembly: Remove three screws retaining inner axle shaft in universal inner race, pull shaft out (retainer can be removed from shaft by taking out retainer ring on shaft). Lift out axle centering pin.

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Manipulate inner race and cage until all six balls have been taken out. Rotate inner race and cage assembly until pilot cup is exposed, lift pilot cup out. Turn cage until two of the bosses on outer race drop into elongated holes in cage, lift cage and inner race out. Remove inner race by rotating it until one boss drops into one of the elongated holes in the cage, shift race to one side and lift it out.

Inspection & Servicing: Inspect all parts for wear. Replace balls if rough, chipped, or with flat spots.

Reassembly: Reverse disassembly directions given above. Do not force parts into place which may cause damage.

►*INSTALLATION NOTE: For axle shaft endplay adjustment (to center universal joint), see "FRONT AXLE" below.*

FRONT AXLE

ALL 4-WHEEL DRIVE MODELS

Steering Knuckle Bearings: Steering knuckle pivots on tapered roller bearings. To adjust bearings, remove hub and brake drum assembly, wheel bearings, axle shaft, spindle, steering tie rod and steering knuckle.

Disassembly - Remove eight screws which hold oil seal retainer in place. Remove four screws that hold lower pivot pin bearing cap. Remove four screws that hold upper bearing cap in place and remove bearing cap. Remove steering knuckle from axle.

Cleaning & Inspection - Wash all parts in solvent and replace all damaged or worn parts. Inspect bearing and races for scores, cracks or chips. Remove damaged cups with Special Driver, Tool W-138.

Reassembly - Reverse disassembly procedure with sufficent shims under top cap to obtain correct preload on bearings. Shims are available in .003", .005", .010" and .030" thicknesses. Install one each of the above shims at the top only. *NOTE - A shim pack of .058" thickness is added to the bottom face of kingpin boss on steering knuckles in production which must be maintained. Make all adjustments at top only.* Install bearing caps, lockwashers, and screws and tighten securely. Hook spring scale in hole in knuckle arm (tie rod socket hole) and take scale reading when knuckle has just started its sweep. Load should be 6-9 lbs. without oil seal installed. Remove or add shims (at top) as required to obtain this preload.

Oil Seal Replacement - Remove old seal by removing eight screws which hold it in place. *NOTE* - Earlier production vehicles have seal consisting of two halves. Later production vehicles have seal assemblies consisting of a split oil seal and backing ring assembly, an oil seal felt, and two seal retainer plate halves. Check spherical surface of axle for scores or scratches and remove damaged surfaces with emery cloth. *NOTE* - Before installing seal felt, make a diagonal cut across top side of felt so it may be slipped over axle. Install oil seal assembly in sequence given above making sure that backing ring (of oil seal and backing ring assembly) is toward wheel. *CAUTION* - After driving in wet freezing weather swing wheels from right to left to remove moisture adhering to oil seal and spherical surface of axle housing, to prevent freezing. When storing vehicle for long periods of time, coat surfaces with light grease to prevent rusting.

Wheel Bearing Adjustment: Jack up front wheel, remove hub cap, axle shaft nut and washer, driving flange capscrews, and flange (use puller on flange). Bend lip of adjusting nut lockwasher back to free nut, remove locknut. Tighten adjusting nut until wheel binds (turn wheel while tightening nut), back off nut 1/6 turn or until wheel rotates freely. Replace lockwasher and locknut, tighten locknut securely and bend ear of lockwasher up against nut to prevent loosening in service. Check adjustment of bearings by grasping front and rear of tire and shaking wheels from side to side. A barely perceptible shake should be felt in the bearings. Install flange shims and flange. On cars prior to Serial No. 37549 (CJ-3A), No. 44074 (4-WD), and No. 14284 (4-463), with Bendix Universals, check axle shaft endplay (below) before completing assembly. *NOTE* —On cars with Rzeppa Universals, disregard endplay note below and install shim pack of .060" under flange. No shims used in later cars, see "4-Wheel Drive Front Axle Change" below.

Axle Shaft Endplay Check (With Bendix Universal Joints)—Tighten the flange nut (do not install lockwasher), swing wheel to maximum left or right position with punchmark on end of axle shaft straight up or down. Back off flange nut until clearance between nut and flange is .050" (measure with feeler gauge). Tap end of shaft with a soft hammer (shaft will move in an amount equal to the endplay). Recheck clearance between nut and flange with a feeler gauge. Subtract this measured clearance from the original .050" clearance. If resulting figure is less than .015", add shims to shim pack under flange, if figure is more than 035", remove shims from shim pack under flange. With correct thickness of shim pack under flange, install axle shaft lockwasher, nut, and cotter pin.

4-Wheel Drive Front Axle Change—A change in endplay control of front axle shafts beginning with Serial No. 37549 (CJ-3A), No. 44074 (4-WD), and 14284 (4-463), eliminated the shim pack for endplay adjustment formerly located behind drive flange and added a flanged bushing on outer side of Universal Joint and thrust washer on inner side, centering Universal Joint directly under center line of spindle pivot points and allowing axle shaft to float in driving flange. This same change was made in the Rzeppa type, plus a snap ring added at outer end of shaft, giving the endplay control between the flanged bushing and the snap ring. In both types, replace the flanged bushing when endplay is excessive.

SUSPENSION NOTES

FRONT WHEEL SHIMMY CORRECTION (CJ-5 & FC-150 FOUR-WHEEL DRIVE MODELS): Check all items listed below.

1) Remove both steering knuckles and inspect the upper and lower kingpin bearings (cups for brinnelling, pitting, or fretting) and replace if they show slightest imperfection.

2) Adjust kingpin bearing preload (add or remove shims), with axle shafts removed to 12-16 pounds load (maximum preferred). *NOTE - Hook scal in hol in arm for* tie rod socket Read scale after knuckle has been started

3) Replace original Steering Knuckle Oil Seals with Kit Part No. 915-664 if seals show wear.

4) Steering bell crank and/or double tie rod socket should be replaced when slightest rocking action or looseness observed when turning wheels under normal load.

5) Adjust drag link to maximum safe tightening at both ends and adjust steering gear.

6) See "Vehicle Leans to Left", "Shimmy due to Loose Steering Arm", and "Tie Bar Installation" below.

VEHICLE LEANS TO LEFT (FC-150): Install Axle Shim Part No. 915858 with Spring Clip Front No. 808460 and Clip No. 808461, placing shim between spring and spring saddle on right front side of vehicle. Locate shim in saddle and torque to 50-55 ft. lbs.

SHIMMY DUE TO LOOSE STEERING ARM: Permanently correct condition by replacing two bolts in steering arm with two additional dowel studs and taper face nuts Ream holes in steering arm to 60° taper for proper seating of taper face nuts.

TIE BAR INSTALLATION (FC-150): Installing Tie Bar will stabilize frame and reduce possibility of shimmy developing. Secure 29½" length of 2" x ½" hot or cold rolled #11 steel channel and proceed as follows:

1) Remove radiator guard screen and place Tie Bar up against front spring hanger brackets.

2) Set front wheels in straight ahead position, hold Tie Bar level and provide 3/8" clearance between Tie Bar and steering connecting rod

3) Arc weld Tie Bar to hanger brackets at outside and inside rear edges of both brackets

ALL 4-WHEEL DRIVE MODELS

4-WHEEL DRIVE CHATTER CORRECTION: When front end chatters on extreme turns on 4-wheel drive vehicles it is due to excessive turning angle (controlled by stop screws mounted on axle housing). Check turning angle, see table below, and correct by breaking weld securing stop screw and changing adjustment and rewelding screw to housing.

Vehicle	Turning Angl
L6-226 4WD & 4X4	29°
F4-134 4WD & 4X4	29°
CJ-3B, CJ-5, CJ-6	27½°
FC-150-57" tread	29°
FC-150-48" tread	27°
FC-170	29°

►*NOTE:* When turning angle too small, excessively large radius is required to make turns.

TRANSMISSION NOTES

HARD SHIFTING, SHIFTING INTO TWO GEARS & SLIPPING OUT OF GEAR CORRECTION (TWO-WHEEL DRIVE MODELS): Proceed as follows for each model:

L6-226 (4x2) & DJ-3A Mod ls - 1) Disconnect transmission shift rods from remote control levers and check

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for binding of remote control shaft on steering column and correct as necessary.

2) Check operation of remote control levers and clutches and reconnect shift levers.

3) Disconnect rods from levers at transmission, insert ¼" pin through remote control levers and bracket on steering gear housing Place transmission in neutral, adjust rods so clevis pin will enter clevis and lever freely.

4) If lever sticks in first gear or is hard to shift from first to second gear, shorten low and reverse shift rod one turn at a time (3 turns usually required) until improvement is obtained.

FC-150 Models - 1) Disconnect control rods from shift lever at cab and check free operation of shift lever.
2) Adjust shift rods with transmission in neutral.
3) Check clutch pedal adjustment.

All Models (with Two Wheel Drive) - When minimum clearance (.001-.007") between end of interlock sleeve and transmission shift levers (with longest sleeve Part No. 641310), cannot be obtained, remove original interlock pin from shift lever poppet spring and replace it with a Transfer Case Intermediate Gear Needle Bearing Roller Part No. 809294 which has been ground down to a length of .780". Assemble transmission so shift action can be checked. If pin is too long causing a bind, reduce length of pin from .780" until smooth ball and detent engagement is obtained.

FC-150 TRANSFER CASE OPERATING LEVER VIBRATION: To correct vibration noise caused by operating lever vibrating against, or transmitting vibration to body panel, proceed as follows:

1) Install sound deadening material between the two transfer case lever shaft brackets and body panel. Use Dust Cover material Part No. A-622 or a piece of rubber 3" square, 1/16" thick.

2) File body opening to obtain clearance for transfer lever when in "2WD High"

3) Install Grommet Part No. 670543 on lever at body opening as dust seal and possible vibration dampener.

SPRING SHACKLES

JEEP & TRUCK MODELS

SPRING SHACKLES: Springs are fitted with "U" type shackle (front end of front springs, rear end of rear springs on Jeep; front end of front springs only on Trucks). Opposite end of all springs fitted with bronze bushing and conventional pivot bolt (rear shackle of rear springs on Trucks has same type bushing and bolt).) CAUTION—When removing springs, remove pivot bolt first, then remove bushings from "U" shackle. Install springs as follows:

Pivot Bolt Installation—Install bolts with head and grease fitting toward outside, tighten bolt nut with a torque indicating wrench to 27-30 ft.lbs.

"U" Shackle Installation—Install grease seal retainer and grease seal on each leg of "U" shackle, insert shackle through inner face of frame hanger and spring eye (threaded bushings installed with hexagonal head toward outside), hold shackle tightly against frame and start upper bushing on shackle (see Bushing Caution below) taking care that bushing is not cross-threaded on shackle or in spring eye. Turn bushing on shackle approximately halfway, then start lower bushing similarly, turn both bushings in alternately and evenly until heads of bushings are snug against frame bracket and bushing in spring eye is 1/32" away from spring (measured from inside hexagonal head to spring). Lubricate bushing with high-pressure lubricant, check shackles for binding by flexing spring. If shackle is tight, remove and re-install bushing.

BUSHING CAUTION—Left-hand threaded "U" shackles are used at left front spring and right rear spring (Jeep), at left front spring only (Trucks) with the left-hand threaded end down (toward spring eye) and special left-hand threaded bushings must be used with these shackles. Shackles may be identified by small boss forged on lower shank and bushings identified by groove around head. Right-hand shackles and bushings are unmarked.

SILENT BLOC BUSHING TYPE SPRING SHACKLE: Silent-bloc bushing type shackle replaces U-type. Service Kit Part No. 916646 (2 silent bloc bushings and new type shackle) will replace one shackle only. When replacing threaded shackle, ream out frame bracket to .875" and press silent bloc bushing into bracket and spring eye. *NOTE* - Lockwasher included for spacer at the spring.

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STARTER

Auto-Lite No. MCH-6207 (CJ-3B & CJ-5).
Armature—Auto-Lite No. MCH-2088 (MCH-6207).
Drive (MCH Starter)—Bendix "Folo-thru" type.
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—42-53 ozs. with new brushes.

Performance Data—MCH-6207

	RPM	Volts	Amperes
0 ft. lbs.	4300	5.0	65
6.0 ft. lbs.	Lock	2.0	335

Starting Switch—(CJ-3B) Auto-Lite SW-4015 (Early), SW-4015A (Later).

GENERATOR

Auto-Lite No. GDZ-6001D (CJ-3A & Early CJ-3B). GGW-4801D (Late CJ-3B & CJ-5). Two brush type with voltage & Current regulation.
Armature—GGY-2006F (for GDZ-6001D). **GGW-2006F** (for GGW-4801D).
Maximum Charging Rate—(GDZ-6001D) 35 amperes. (GGW-4801D) 45 amperes, both at 8.0 volts cold with discharged battery (controlled by regulator).
Charging Rate Adjustment—None (see Regulator).

Performance Data—GDZ-6001D

Amperes	Volts	Cold — R.P.M. — Hot
0	6.4	870-970 — 950-1050
17.0	8.0	1350-1500 — 1550-1700
35.0	8.0	1800-2000 — 2150-2350

Performance Data—GGW-4801D

Amperes	Volts	Cold — R.P.M. — Hot
0	6.4	870-970 — 950-1050
40.0	8.0	1800-2000 — 2150-2350
45.0	8.0	1925-2125 — 2350-2550

Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—35-53 ozs. with new brushes.
Field Current—(GDZ) 1.3-1.5 amps. (GGW) 1.4-1.5 amps., both at 5.0 volts.
Motoring Current—(GDZ) 3.9-4.4 amps. (GGW) 4.1-4.6 amps., both at 5.0 volts.
Belt Adjustment: ½-⅝" deflection with thumb pressure midway between generator and pump pulley.

REGULATOR

Auto-Lite VRP-6003A (used with GDZ-6001D generator). VBE-6105A (used with GGW-4801D generator). Voltage & Current type. On right side of engine compartment.
See El ctrical Equipment Section for complete data.
NOTE—Regulator cover sealed. Warranty void if seal broken.

Cutout Relay

Cuts In—6.3-6.8 volts (set to 6.4-6.6 volts).
Cuts Out—4.1-4.8 volts (approx. 4-6 amps. disch.).
Contact Gap—.015" minimum.
Air Gap—.031-.034" with contacts open (measured at hinge end of core).

Voltage Regulator

S tting—7.2-7.5 volts at 70°F. after 15 minutes operation charging at 10 amperes (VRP), one-half maximum rate (VBE).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator—(VRP)

Setting—34-36 amperes (marked '35' on cover).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

Current Regulator—(VBE)

►*SETTING CAUTION—"Temperature Compensated" type. Set to following specifications at 70°F.*

	Test A—Operating Amperes	Test B
VBE-6105A	52	45 (43-47)

Test A—After 15 minutes operation charging at ½ maximum rate.
Test B—After fifteen minute additional operation with current regulator operating (load applied to hold voltage to 6.7-6.9 volts).
Air Gap—.048-.052" with contacts just opening.
Checking & Adjusting—*See Electrical Equip. Section.*

LIGHTING

Headlamps: "Sealed Beam" type. Upper and lower beams controlled by Beam Selector Switch on toe board.
See Electrical Equipment Section for complete data.
Beam Indicator—On left side of instrument panel. Lighted when upper beam in use.

Switches

Lighting—Willys No. 801274. Instrument light controlled by rotating switch knob.
Beam Selector—Willys No. 801903.

MISC. ELECTRICAL

LIGHTING CIRCUIT BREAKER: 30 ampere type. Mounted on lighting switch. Vibrating thermostatic type. Protects lighting circuits. No adjustment.
FUSES: Overdrive—20 amperes. On control relay.
HORNS: Auto-Lite No. HA-4037.

ENGINE

ENGINE SPECIFICATIONS: 4 Cyl. "L" Head, and 4 Cyl. "F" Head engines of own make.
►*NOTE—4 Cyl. "L-Head" Engine used on CJ-3A Jeep, 4 Cyl. "F-Head" Engine used on CJ-3B Jeep.*
Bore—3⅛". Stroke—4⅜".
Displacement—134.2 cu. ins. **Rated H.P.**—15.63.

Model	Compr. Ratio	Developed HP
CJ-3B	6.9-1①	72 at 4000 RPM
CJ-5	6.9-1①	... 75 at 4000 RPM

①—7.4-1 & 7.8-1 optional ratios.
Compression Ratio ("F" Head Engine)—Cast iron head. Heads painted to indicate ratio: 6.9-1 (Blue); 7.4-1 (Black), 7.8-1 (Yellow).
CYLINDER HEAD & TIGHTENING TORQUES: *See Willys Special Data.*
ENGINE REMOVAL: *See Willys Special Data.*
PISTONS: Lo-Ex Aluminum alloy (Lynite, Bohn, Permite, or Arrowhead), "T" slot, cam ground, tin plated type with heat insulation groove above top piston ring. **Length—3¾".**
►*PISTON OVERSIZE NOTE—Letter "B" or "AB" following engine number indicates that cylinders and pistons are .010" OVERSIZE.*
►*CAUTION—"L" Head & "F" Head pistons are different, do not interchange.*
Removal—Pistons and rods removed from above.
Clearance—Top Land—.017-.019". **Skirt**—.003.
Replacement Pistons: Finished pistons furnished .010". .020". .030". .040" Oversize.
CAUTION—Piston must not be lapped in. This will destroy tin plated surface.
Fitting New Pistons: Use .003" feeler stock, ½" wide, inserted between piston and cylinder wall on opposite side from "T" slot. Pull required to withdraw feeler must be within 5-10 lbs. at 70°F.
Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).
PISTON RINGS: Two compression, one oil control ring per piston, all above pin (piston has narrow heat insulation groove above top ring groove). Oil ring groove drilled with oil drainage holes.

Ring	Width	End Gap	Side Clearance
Compr. (#1)	3/32"	.007-.015"	.002-.004"
Compr. (#2)	3/32"	.007-.015"	.0015-.0035"
Oil Contr.	3/16"	.007-.015"	.001-.0015"

Installing Rings: Install compression rings with mark "TOP" (on side) toward top. Rings have taper face and must be installed correctly. Top ring inner bevel edge must be up.
Replacement Rings: For Rebored Cylinders—Furnished Std. and .010", .020", .030", .040" Oversize. **Servicing Ring Sets**—Furnished in following sizes for oversize range noted: Standard (0 to .010" O.S.), .020" O.S. (.011" to .024"), .030" O S. (.025" to .034"), .040" O.S. (.035" to .049").
PISTON PIN: Diameter .8117-.8119". Length 2 25/32". Pin is locked in connecting rod by clampscrew.

NOTE—On new pistons, pin hole is .8120-.8122" in diameter and is diamond-bored and tin-plated.
Pin Fit in Piston—.0001-.0005" clearance or light thumb push fit with piston and pin at 70°F.
Replacement Pins: No oversizes are available.
CONNECTING ROD: Length 9 3/16" center-to-center. **Weight**—33.4 ozs.
►*JOURNAL DIAMETER UNDERSIZE NOTE—The letter 'A' following the engine number indicates that main and connecting rod journals are .010" UNDERSIZE.*
Crankpin Journal Diameter—1.9385-1.9375".
Lower Bearing—Steel-backed, babbitt-lined, replaceable type. CAUTION—Oil spray hole in upper half of bearing must line up with oil spray hole in rod.
Clearance—.0001-.0025". **Sideplay**—.004-.010".
Bearing Adjustment: None (no shims). Replace bearings. Do not file connecting rods or bearing caps.
NOTE—Replace bearings when clearance exceeds .005" or sideplay exceeds .013".
Replacement Bearings: Furnished Standard & .010", .020", .030" Undersize.
Installing Rods: Lower bearing offset. Install rods with short side of bearing toward nearest main bearing or toward front of engine (#1, 3), toward rear (#2, 4). Oil spray hole in lower end of rod toward right of engine (away from camshaft) on all rods.
CRANKSHAFT: Three bearing type with removable counter-weights.
►*JOURNAL DIAMETER UNDERSIZE NOTE—The l tter 'A' following the engine number indicates that main and connecting rod journals are .010" UNDERSIZE.*
Journal Diameters—2.3341-2.3331" (all main journals).
Bearings—Steel backed, babbitt-lined, replaceable type. Bearing shells are dowelled in bearing caps and crankcase.
Clearance—.0014-.0029".
NOTE—Replace bearings when clearance exceeds .006" or when endplay exceeds .018".
Rear Bearing Oil Seals—*See Crankshaft & Main Bearings in Willys Special Data.*

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►*REAR MAIN OIL SEAL PRODUCTION CHANGE—Neoprene type seal replaces rope type. See Willys Special Data.*

Bearing Adjustment: None (no shims). Replace bearings. Do not file bearing caps. *See Crankshaft Servicing instructions in Willys Special Data.*

NOTE—Engine must be removed from chassis for bearing replacement and crankshaft servicing.

Replacement Bearings: Furnished Standard & .010", .020", .030" Undersize.

End Thrust: Taken by flanged faces of #1 (front) bearing. Adjustable by adding or removing shims between crankshaft sprocket thrust washer and sprocket.

Endplay—.004-.006".

►*FLYWHEEL RING GEAR REPLACEMENT CAUTION:* Different flywheels used as follows: **97 teeth** (CJ-3A with Old Type Std. Bendix Drive); 124 teeth (CJ-3A through Serial Number 30973 with overrunning clutch type drive); **129 teeth** (All Models after CJ-3A, Serial No. 30973 with Bendix "Folo-thru" type drive. *CAUTION—Replacement ring gear must have the same number teeth as the original.*

CAMSHAFT: Four bearing, helical gear drive.

Journal Diameters—#1 2.1855-2.1860", #2 2.1215-2.1225", #3 2.590-2.600", #4 1.6225-1.6230".

Bearings—Removable steel-backed, babbitt-lined bushing (front), machined in crankcase (all others).

Clearance—.001-.0025". Service limit .006" (front), .008" (all others).

Camshaft Removal—*See Willys Special Data.*

End Thrust: Taken by thrust plate behind camshaft gear. Endplay controlled by spacer between camshaft gear and shoulder on shaft. Endplay can be increased by installing shim between spacer and shaft, or decreased by dressing off spacer. NOTE - Inner beveled edge of spacer must be toward crankcase.

Endplay—.003-.0055".

Timing Gears: Crankshaft gear, steel. Camshaft gear, fibre with steel hub.

Gear Backlash—.000-.002".

Camshaft Setting: Mesh marked tooth of camshaft gear with marked space (between teeth) on crankshaft gear.

VALVES: ("L" Head Engine)

Valve	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.3725"	5 51/64"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	23/64"	.0015-.00325"
Exhaust	45°	23/64"	.0025-.0045"

Valves ("F" Head Engine)

Valve	Head Diam.	Stem Diam.	Length
Intake	2"	.3733-.3738"	4.937"
Exhaust	1 15/32"	.371-.372"	5.909"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	.260"	.0007-.0022"
Exhaust	45°	.351"	.002-.00375"

►*EXHAUST VALVES ("F" HEAD ENGINE) NOTE—Thompson "Roto-Valve" or Eaton "Free Valve" rotators used.*

Valv Guides ("L" Head Engines): Removable type. Remove guides from above with puller, install new guides with driver or press guides down in place to following dimensions:

Intake Guide—Top of guide 1 5/16" below top face of block. The shorter, smaller-diameter section end of guide should be up.

Exhaust Guide—Top of guide 1" below top face of block. Taper end (counter-bored end) of guide should be up.

Valve Guides ("F" Head Engine): Removable type. Drive guides out with Tool W-240. To install, use W-240 with correct adapters to install guides:

Intake Guide—Drive guide in with taper end toward valve seat until inner end flush with port wall at guide hole.

Exhaust Guide—Drive guide down in block with taper end up toward valve seat until upper end 1" below top face of cylinder block.

Valve Springs: *CAUTION—Intake valve springs on "F" Head Engines are different than other valve springs. See Spring Data below.*

Valve Springs ("L" Head Engine)

Free Length—2½" (Intake and Exhaust).

Intake & Exhaust	Spring Pressure	Length
Valve Closed	53 lbs.	2 7/64"
Valve Open	120 lbs.	1¾"

Valve Springs ("F" Head Engine)

Free Length—1 31/32" (Intake), 2½" (Exhaust).

Intake	Spring Pressure	Length
Valve Closed	73 lbs.	1 21/32"
Valve Open	160 lbs.	1 3/8"
Exhaust	**Spring Pressure**	**Length**
Valve Closed	53 lbs.	2 7/64"
Valve Open	120 lbs.	1 3/4"

Valve Lifters: Mushroom type operating in reamed holes in block. Serviced by installing oversize lifters. Lifters furnished .004" oversize.

Lifter Diameter—.6240-.6245".

Lifter Clearance—.0005-.002".

NOTE—Camshaft must be removed for lifter removal and replacement.

VALVE TIMING

Tappet Clearance: ("L" Head Engine)—.016", all valves hot or cold. ("F" Head Engine)—.018" (Intake), .016" (Exhaust—With "Thompson Roto-Valve"), .012" (Exhaust—With "Eaton Free Valve"). Adjust "F" Head Engine valves with engine cold.

NOTE—Adjusting screws are self-locking type.

Valve Timing: See Camshaft Setting above.

Intake Valves—Open 9° BTDC. Close 50° ALDC.

Exhaust Valves—Open 47° BLDC. Close 12° ATDC.

Valve Timing Check—Adjust No. 1 cylinder Intake valve lash to .020" ("L" Head Engine), .026" ("F" Head Engine) with tappet resting on low side of cam lobe. Rotate crankshaft until No. 1 cylinder is coming toward top of cylinder on exhaust stroke, then continue to rotate crankshaft until No. 1 intake tappet is JUST TIGHT against valve stem indicating that valve is about to open. Check position of ignition timing mark on crankshaft pulley (5° BTDC) and estimate crankshaft position (5° mark should be approximately ¼" before reference point on timing gear cover). Reset tappet clearance to correct running clearance as given above.

LUBRICATION

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Willys Sp cial Data.*

Crankcas Capacity - 4 qts.

Normal Oil Pr ssure - 35 lbs. at 35 MPH.

Oil Pressur Regulator—Under plug on side of pump housing. Opens at 40 lbs. Adjustable by adding or removing shims located above spring in plug.

Oil Pump: Rotor type pump mounted on left side of crankcase.

Oil Pump Overhaul—*See Willys Special Data.*

Oil Filter: Purolator. On cylinder head bracket at right front corner of cylinder head with oil outlet connected to timing gear cover.

►*CAUTION*—Filter should be drained at each crankcase oil change (2000 mile intervals) and filter element replaced every 8000 miles (normal service).

Oil Pressure Gauge: (CJ-3A)—Auto-Lite No. 121250-A; (Early CJ-3B)—Auto-Lite No 11987-A; (Late CJ-3B & CJ-5)—Auto-Lite No. 121250-A. Bourdon tube type, not electric

COOLING

Cooling System: Pressure type with pressure valve (relief valve) in filler cap.

Capacity—11 qts. (12 qts. with Heater).

Pressure Valve—Radiator filler cap. Opens at 7 lbs.

Water Pump: Centrifugal, packless, ball bearing type. *See Water Pump in Willys Special Data.*

Removal—Loosen and remove drive belt, disconnect hose. Remove pump mounting screws, lift out pump

Belt Adjustment—See Generator Belt Adjustment.

Thermostat: Harrison. In water outlet elbow in cylinder head. Starts to open at 151°F (148°F min.).

Temperature Gauge (Exc. CJ-5): Auto-Lite No. 12149-A (CJ-3A); No 11986-A (Early CJ-3B); No. 12149-A (Late CJ-3B). Bourdon tube type. Not electric

Temperature Gauge (CJ-5): King-Seeley "CV" (Constant Voltage) electric type

Dash Unit—K-S No 46832 (with 100 MPH Speedometer). No. 46833 (with 80 MPH Speedometer)

Engine Unit—K-S No. 44230.

CLUTCH

Auburn 8501-23 & 8501-39 or Rockford Model 8½RM. Used with Borg & Beck driven member. Single plate, dry disc type.

See Clutch Section for complete data.

Facings—Woven asbestos. I.D. 5⅛". O.D. 8½".

Thickness .135" (.132-.138").

Pedal Adjustment: Set pedal free travel to 1" (to provide 1/16" clearance between release bearing and clutch release levers). Adjust length of clutch control cable at clevis. Screw cable end in or out of clevis. Tighten locknut

Removal: Remove transmission (Transmission & Case Assembly), see below. Remove flywheel bell housing. Mark clutch pressure plate and flywheel to insure installation in same position. Remove clutch cover screws evenly to remove spring pressure, then remove clutch assembly and driven member.

TRANSMISSION

Warner Model AS1-T90C (Floor Mounted Gearshift). Three speed type. Constant-mesh, synchro-mesh, helical gears (second & high), sliding spur gear (low & reverse).

See Transmission Section for complete data.

Transfer Case: Spicer or Warner. Two-speed auxiliary transmission and front-wheel drive unit mounted on rear of transmission case. Separate control levers provided for Low-High range (right hand lever), and front-wheel drive engagement (left hand lever).

See Transmission Section for complete data.

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Removal: Transmission and transfer case are removed as an assembly. Disconnect front and rear propeller shafts at universal joints (NOTE—If equipped with Power Take-off drive, remove front end of power take-off propeller shaft assembly). Disconnect speedometer cable at transfer case, brake cable, transmission shift rods at transmission case levers, and clutch release cable at cross-shaft bell-crank. Place support jacks under engine and transmission, remove transfer case rubber snubber bolt nut (on right side) and rear mounting bolt nuts at cross-member under transmission case. Remove floor board inspection plate. Drain radiator and loosen upper radiator hose. Remove transfer case shift lever pivot pin screw, remove pin and shift levers (NOTE—if Power Take-off used, remove power take-off shift lever plate screws and lift lever out). Remove bolts holding center cross-member at frame side rails and remove cross-member (CAUTION—with cross-member removed, engine and transmission weight will rest on support jacks). Remove bolts holding transmission on bell housing force transmission to right until ball stud end can be disengaged from end of clutch control cross-shaft. Lower support jacks under engine and transmission and slide transmission and transfer case assembly to rear until clutch shaft clears bell housing, remove assembly from beneath car.

UNIVERSALS

Front & Rear Drive Propeller Shaft Joints: Spicer needle roller bearing type.

Front Axle Shaft Joint: Bendix or Rzeppa Constant Velocity type. One joint used at outer end of each shaft (within steering knuckle housing).

See "Universal Joints" in Willys Special Data.

Power Take-off Propeller Shaft Joints: Detroit Ball-and-Trunnion type. Two used (one at each end of shaft—no splined joint used).

FRONT AXLE

Spicer (Salisbury) Model 25—Full-floating, hypoid gear type. Differential assembly (ring and pinion gear assembly) is identical with Spicer Model 23-2 and is serviced in same manner.

See Spicer (Salisbury) Full Floating Rear Axle in Rear Axle Section for complete data.

Ratio—5.38-1.

Backlash—.005-.007". Shim adjustment.

Removal: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross-member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower the springs, remove axle assembly from beneath car.

Axle Shaft & Universal Joint Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange capscrews and remove flange with a puller *(CAUTION*—do not lose shim pack under drive flange). Bend lip on bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly *(CAUTION*—use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION*—Adjust front wheel bearings and bleed brakes after installation completed.

Wheel Bearing Adjustment: Tighten inner adjusting nut until wheel binds (turn wheel while adjusting), then back nut off 1/6 turn, install lockwasher and locknut and make certain nut locked by turning lockwasher ear up. Check axle shaft endplay.

Axle Shaft Endplay Checking & Adjustment—Tighten the axle shaft nut against the flange (do not install lockwasher), swing wheel to maximum left or right position with punchmark on end of axle shaft straight up or down. Back off flange nut until clearance between nut and flange is .050" (measure with feeler gauge). Tap end of shaft with a soft hammer (shaft will move in an amount equal to the endplay). Recheck clearance between nut and flange with a feeler gauge. **Subtract this measured clearance from the original .050" clearance.** If resulting figure is less than .015", add shims to shim pack under flange, if figure is more than .035", remove shims from shim pack under flange. With correct thickness of shim pack under flange, install axle shaft lockwasher, nut, and cotter pin.

Steering Knuckle Bearing Disassembly & Adjustment: *See "Front Axle" in Willys Special Data.*

REAR AXLE

Spicer Model 23-1, 41-2, or 44-2. Semi-floating, hypoid gear type with Hotchkiss drive.

See "Spicer Rear Axle" in Rear Axle Section.

Ratio—5.38-1.

Backlash—.004-.008". Shim adjustment.

Removal: Support rear end of truck securely, remove rear wheels, disconnect rear shock absorbers, rear brake line (at frame connection on right side), rear brake cables and propeller shaft at rear universal. Place support jacks under axle housing to relieve springs of weight, remove nuts on spring "U" bolts, remove pivot bolt at front end of springs, lower springs to floor. Remove axle assembly.

Axle Shaft Removal: Remove wheel and hub assembly (use wheel puller), remove nuts on bolts holding backing plate and brake assembly, remove dust shield, oil seal, and backing plate. Remove axle shaft and wheel bearing. CAUTION—Do not lose shims.

Wheel Bearing Adjustment—Endplay .003-.005". Adjust by adding or removing shims between backing plate and flange on axle housing.

NOTE—Shims installed on **left hand** end of axle housing only in production. Shims can be installed on right hand end of axle housing, if necessary, for correct endplay.

SHOCK ABSORBERS

Monroe. Direct acting, hydraulic type. Not adjustable or refillable. Serviced by replacement.

FRONT SUSPENSION

Front Axle: Spicer (Salisbury) Model 25. Special full-floating driving unit. *See Front Axle data (above).*

Front Suspension: Special front-wheel drive unit with semi-elliptic springs. Steering knuckle mounted on taper roller bearings carried on two stub shafts.

Endplay—.001-.003".

Kingpin Inclination—7½° crosswise.

Caster—3°. No adjustment. If caster incorrect, check front end, correct by installing new parts.

Camber—1½°. No adjustment. Correct by installing new parts. Do not attempt to correct camber by cold bending or heating of parts.

Toe-In—3/64-3/32" (1/32" each wheel). To adjust, first set each front wheel straight ahead (see Note below), then set toe-in by shortening **each** tie rod approximately ½ turn. This procedure necessary to maintain correct position of steering idler arm.

NOTE—To set front wheels straight ahead, first set tie rod end of steering bell crank (idler lever on frame front cross-member) exactly at right angles to front axle. Check front wheels by using a straight edge or sighting along rear and front wheels. Adjust each tie rod (loosen end clamp bolts and turn rod) until front wheels are exactly straight ahead. Then make toe-in adjustment as directed above. Tie rod lengths between ball end centers should be 20⅞" (left), 25⅝" (right).

Toe-out on Turns—With inner wheel turned 20°, outer wheel should be turned exactly 18°30'.

STEERING GEAR

Steering Gear: Ross Model T-12. Cam-and-Twin Lever

See Steering Gear Section for complete data.

BRAKES

Service Brakes (CJ-3B & CJ-5 Jeeps): Bendix-Lockheed hydraulic, self-centering type. Hand lever applies independent brake on drive shaft at rear of transfer case.

See "Bendix-Lockheed" in Brake Section.

Drum Diameter—9".

Whl. Cyl. Diameter—1" (Front), ¾" (Rear).

Lining—Molded asbestos. Width 1¾", Thickness .206-.216", Length per shoe 10 7/32" (primary or forward shoe), 6 39/64" (secondary or rear shoe).

Clearance—.008" toe, .005" heel, for each shoe.

NOTE—On self-centering type brakes, centralize shoes by hard brake application before making adjustment.

Braking Power—65% Front, 35% Rear.

Hand Brake: Mechanical type. Two-shoe internal expanding type with drum mounted on drive shaft at rear of transfer case (See Hand Brake Adjustment following).

Drum Diameter—8".

Lining—Width 1¾", Thickness .206-.216", Length per shoe 8⅛".

HAND BRAKE ADJUSTMENT

Hand Brake (Adjustment for W ar)—Make certain that hand brake cable and linkage operate freely. Lubricate if sticking or binding is evident. Place brake handle on instrument panel in "off" position. Rotate brake drum until one pair of adjusting holes (three pairs located on back face of drum) is opposite the adjusting screws (notched wheels) within the brake. Insert a screwdriver or adjusting tool through each hole and turn each adjusting screw equally until the brake shoes are snug against the drum (NOTE—with tool against edge of hole as a fulcrum, move outer end of tool out away from center of driveshaft to expand shoes). **Back off each adjusting screw 7 notches** to provide correct shoe clearance.

MISC. MECHANICAL

Windshield Wipers: Vacuum type, individual wiper motors.

See Miscellaneous Section for complete data.

MODEL IDENTIFICATION

1954 MODELS

M d l D signati n	Body Typ & Engine
475-4WD	Truck (4 Cyl. F-Hd)
6226-4WD	Truck (6 Cyl. L-Hd)
4X475-SW	Sta. Wgn. (4 Cyl. F-Hd)
4X475-SD	Sedan Del. (4 Cyl. F-Hd)
4X6-226-SW	Sta. Wgn. (6 Cyl. L-Hd)
4X6-226-SD	Sedan Del. (6 Cyl. L-Hd)
685-SW	Deluxe Sta. Wgn. (6 Cyl. F-Hd)

►*1954 MODEL NOTE: All m dels are 4-Wheel Drive except D Lux Station Wagon.*

1955 MODELS

Type	Engine	Model Desig.
475 Sta. Wgn.	4 cyl. "F"	54747
475 Sedan Del.	4 cyl. "F"	54847
475 2x4 Sta. Wgn.	4 cyl. "F"	54147
475 2x4 Sedan Del.	4 cyl. "F"	54247
475 4x4 Sta. Wgn.	4 ctl. "F"	54148
475 4x4 Sedan Del.	4 cyl. "F"	54248
475 4WD	4 cyl. "F"	55148
6-226 2x4 Sta. Wgn.	6 cyl "L"	54167
6-226 2x4 Sedan Del.	6 cyl. "L"	54267
6-226 4x4 Sta. Wgn.	6 cyl. "L"	54168
6-226 4x4 Sedan Del.	6 cyl. "L"	54268
6-226 4WD Truck	6 cyl. "L"	55168
685 Sta. Wgn.	6 cyl. "F"	54727
685 Sedan Del.	6 cyl. "F"	54827

SERIAL NUMBER: Located as follows:

All Stati n Wag ns—On plate mounted on riser to left of drivers seat.

All 475-4WD Trucks—On plate mounted on dash under hood near steering tube.

M d l 6226-4WD Truck—On plate mounted on dash near right hood hinge.

ENGINE NUMBER: Located as follows:

4 Cyl. "F" h ad. Stamped in top of water pump boss.

6 Cyl. 6-226 "L" h ad. Right top of cylinder block near front.

6 Cyl. 685 "F" H ad. Stamped on right side of cylinder block at upper front.

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:

"A" .010" main & connecting rod journals undersize.

"B" .010" cylinder bore and pistons oversize.

"AB" Both above conditions exist.

TUNE-UP

COMPRESSION PRESSURE: Taken with wide open throttle. Should be equal to within 10 lbs. with 100 lbs. minimum.

Engin	Comp. Press.
475	125 lbs. at 185 RPM
6226	120 lbs. at 70 RPM
685	155 lbs. at 185 RPM

VACUUM READING: 17-21" at idling speed.

VALVE TAPPET CLEARANCE: Taken with engine cold.

Engin	Intak	Exhaust
475	.018"	.016"
685	.018"	.016"
6226	.014"	.014"

MANIFOLD HEAT CONTROL: (474 & 685) water thermostat controlled. (6226) none used.

IGNITION

FIRING ORDER: (4 cyl.) 1-3-4-2. (6 cyl.) 1-5-3-6-2-4. See diagram.

SPARK PLUG GAP: .030".

Spark Plug—Champion J8, 14mm.

COIL: Auto-Lite CR-6009.

Ignition Current—2.5 amperes idling, 5 amperes at 6.3 volts stopped.

DISTRIBUTOR: Autolite. Used as follows:

Model	1954	1955
475	A-L No. IAT-4008B	A-L No. IAT-4204A
685	A-L No. IAT-4017A	A-L No. IAT-4205A
6226	A-L No. IAT-4019	A-L No. IAT-4206

Condenser—Auto-Lite No. IAT-3076A. **Capacity** .23 -.25 mfd.

Contact Point Set—Auto-Lite IGW-3028SA.

Breaker Arm Spring Tension—17-20 ozs.

Breaker Gap—.020".

Rotation—Counter-clockwise viewed from above.

Automatic Advance (IAT-4008B & 4204A)

Degrees Distr.	R.P.M.	Degrees Eng.	R.P.M.
Start	300	0	600
1	425	2	850
6	1050	12	2100
10	1575	20	3150
11	1700	22	3400

Automatic Advance (IAT-4017A & 4205A)

Degrees Distr.	R.P.M.	Degrees Eng.	R.P.M.
Start	300	0	600
1	400	2	800
4	725	8	1450
8	1150	16	2300
9.5	1300	19	2600

Automatic Advance (IAT-4019 & 4206)

Degrees Distr.	R.P.M.	Degrees Eng.	R.P.M.
Start	325	0	650
1	450	2	900
6.5	1200	13	2400
8	1475	16	2950
9	1675	18	3350

Vacuum Spark C ntr l: Aut -Lite IAT-2023LE (Exc. IAT-4019 & 4206); **IAT-2023LD** (IAT-4019 & 4206).

Vacuum Advanc (Exc pt IAT-4019 & 4206)

Distr. Degrees	Eng. Degrees	Vacuum ("of HG)
Start	0	5-1/8
1	2	6-5/8
3	6	9-5/8
5	10	12-1/2
6	12	14

Vacuum Advance (IAT-4019 & 4206)

Distr. Degrees	Eng. Degrees	Vacuum ("of HG)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

IGNITION TIMING

Setting—5° BTDC (Exc. 6226 Eng.). 4° BTDC (6226 Eng.).

Timing Mark (475)—Timing gear cover. Notch on rim of fan pulley to align with correct mark on timing gear cover. Two lines on cover marked 5° (5° BTDC) and T(TDC).

6226 & 685—Vibration dampener. Align correct graduation with pointer on timing gear cover. Damper marked "0" at TDC with 1° graduations before and after this point.

CARBURETOR

Model	Carter Carburetor No.
475 (1954-55)	YF-951S
685 (1954-55)	YF-2071S
6226 (Early 1954)	WGD-2052S, SA
6226 (Late 1954 & 1955)	WCD-2204S

CARTER YF

►*1955 MODEL "FLAT SPOT" ON ACCELERATION CORRECTION: See "Carter YF" in Carburetor Section.*

Idle Setting—¾-1¾ turns open (951S), 1-2 turns open (2071S). Turn screw out for richer mixture.

Idle Speed—600 RPM.

Float Level—(951S) 5/16"; (2071S) 9/32" from top of float at free end to gasket seat on cover with assembly inverted and float resting freely on intake needle.

CAUTION—Do not compress spring in intake needle.

Fast Idle: With choke held in wide open position, lip on fast idle arm should contact boss on body casting. Adjust by bending at offset of fast idle link.

Automatic Choke Setting: None, Manual Choke.

►*OTHER DATA: See "Carter YF" in Carburetor Section.*

Fuel Pump Pressure: 3½-5½ lbs. at 1800 RPM.

CARTER WGD

Idle Setting—1/2-1-1/2 turns open. Turn out for richer mixture.

Idle Speed—550 RPM.

Float Level—9/32" between top of float and bowl cover with gasket removed and cover inverted.

Acc l rating Pump—No seasonal adjustment.

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Fast Idle: .018-.023" throttle valve opening gauge T109-29) with choke valve closed and thermostatic coil housing, gasket and baffle plate removed.
Automatic Choke Setting: Set two points rich.
►*OTHER DATA: See "Carter WGD" in Carburetor Section.*
Fuel Pump Pressure: 3½-5½ lbs. at 1800 RPM.

CARTER WCD

Idle Setting—1-2 turns open Turn screws out for richer mixture
Idle Speed—500 RPM.
Float Level—3/16" between top of float and machined surface of casting (Gauge T109-28)
Accelerating Pump—No seasonal adjustment
Fast Idle Setting: Two settings required
Cam Clearance—Loosen choke valve lever clamp-screw on choke valve, insert .040" feeler gauge (T109-193) between lip of fast idle cam and boss on flange casting, hold choke valve tightly closed, remove all slack from linkage by pressing choke valve lever toward closed position, tighten choke valve lever clamp-screw
Screw Setting—Hold choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening or clearance between edge of valve and carburetor bore on side opposite ports is 016" (T109-29) Be sure fast idle adjusting screw is on high step of cam while making this adjustment
Automatic Choke Setting: Centered (At Index)
►*OTHER DATA: See "Carter WCD" carburetors in Carburetor Section*
Fuel Pump Pressure: 3½-5½ lbs at 1800 RPM

CARB. EQUIPMENT

Fuel Pump: AC No. 9562 (475), fuel & vacuum. **Carter No. M893S** (685), fuel only. **Carter No. M794S** (685), fuel & vacuum. **Carter No. M957S** (6226), fuel & vacuum.
Pressure—3½-5½ lbs. at 1800 RPM.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: King-Seeley "CV" (Constant Voltage) electric type with voltage regulator.
Dash Unit—K-S No. 45727 (all models).
Tank Unit—K-S No. 44506 (Exc. Trucks).
Tank Unit—K-S No. 44508 (Trucks).
See "Fuel Gauges" in Carburetion Section.

BATTERY

Auto-Lite or Willard. 6 volt, 15 plate, 100 ampere (20 hr. rate).
Battery Ground—Negative (—) ground. (4 cyl. Eng.) right side of engine. (6 cyl. Eng.) left side of engine.
Engine Ground—Strap from engine to frame at right front engine mounting.

STARTER

Auto-Lite Numbers	Starter	Armature
475	MCH-6207	MCH-2088
6226	MCH-6210	MCH-2088
685 . .	MCH-6203	MCH-2088

Drive—Bendix A3281 "Follow-thru" type.
Rotation—Counter-clockwise at commutator end.
Brush Spring Tension—42-53 ozs.

Performance Data

Torque	R.P.M.	Volts	Amperes
0	4300	5.0	65
6.0	Lock	2.0	335

Starting Switch: Auto-Lite SSW-4012. Key starting (magnetic switch controlled by turning ignition switch past "ON" position.

GENERATOR

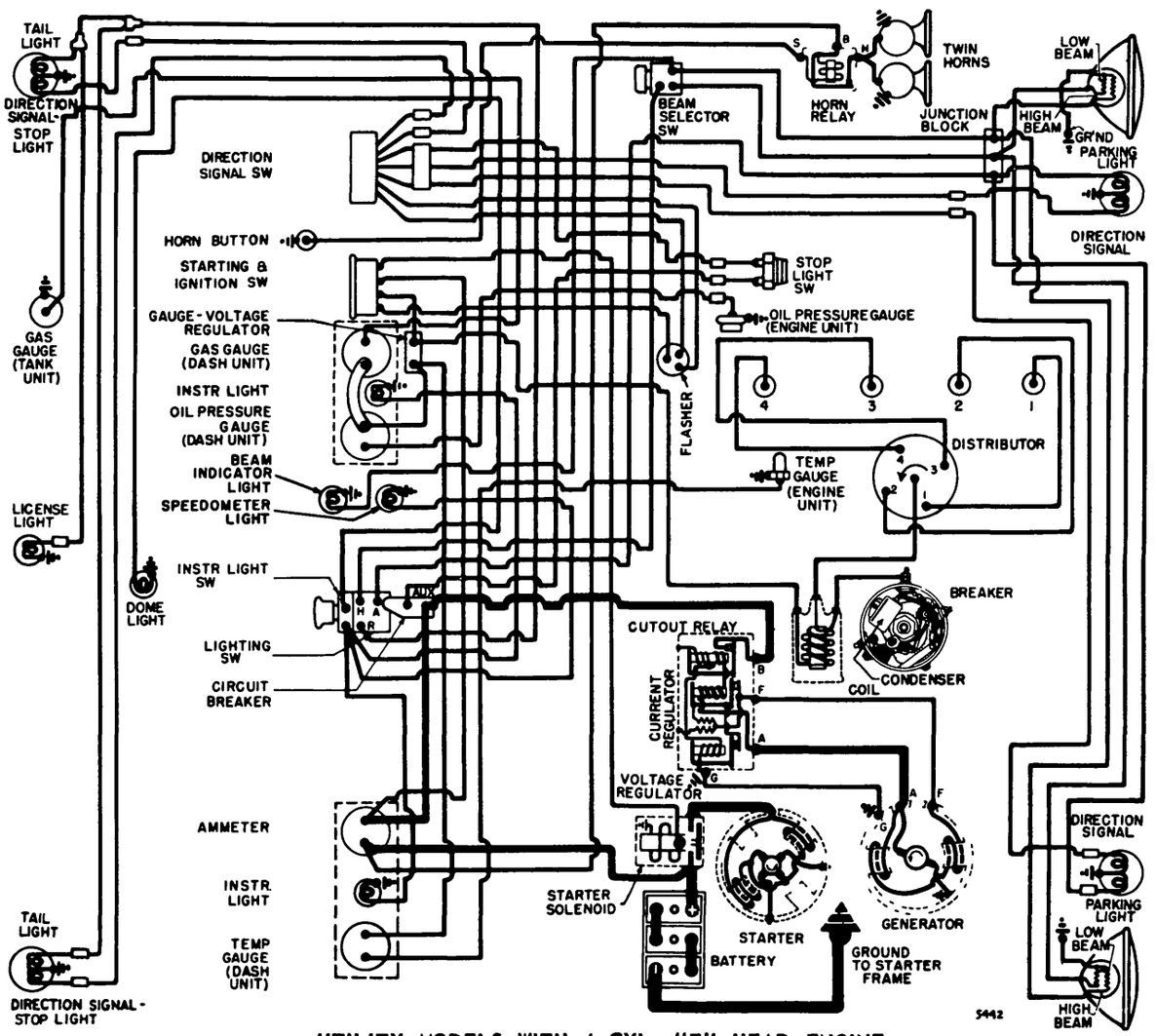
Auto-Lite GGW-4801D (475 & 685-B Eng.). **GGW-4801EN** (6226 Eng.).
Armature—Auto-Lite GGW-2006F (All Cars).

Performance Data

Amperes	Volts	Cold —RPM—	Hot
0	6.4	870-970	950-1050
40.0	8.0	1800-2000	2150-2350
45.0	8.0	1925-2125	2350-2550

Brush Spring Tension—35-53 ozs.
Field Current—1.4-1.5 Amperes at 5.0 volts.
Rotation—Counter-clockwise at commutator end.

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UTILITY MODELS WITH 4 CYL. "F" HEAD ENGINE
(SEE PASS. CAR DIAGRAM FOR 6 CYL. 6226 "L" HEAD ENGINE)

CONTINUED FROM PRECEDING PAGE

Belt Adjustm nt: 1/2-5/8" deflection with thumb pressure midway between generator and pump pulleys.

REGULATOR

Aut -Lit VBE-6105A. Voltage & Current type with "Temperature Compensated" Current Regulator.

Cut ut Relay

Cuts In–6.3-6.8 Volts (set to 6.4-6.6 volts).
Cuts Out–4.1-4.8 Volts (4.6 amps. discharge).
Contact Gap–.015" minimum.
Air Gap–.031-.034" with contacts open (check at hinge end of core).

V ltag Regulator

Setting–7.2-7.5 volts at 70° F *after 15 minutes operation charging at 1/2 maximum rate.*
Air Gap–.048-.052" with contacts just touching.
Ch cking & Adjusting–*See Electrical Equip. Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" typ . Set to following sp cifications at 70° F.*

	Test A	–Operating Amperes–	Test B
VBE-6105A	52		45 (43-47)

T st A–After 15 minutes operation with current at 1/2 maximum rate.
T st B–After 15 minutes additional operation with current regulator operating (load applied to hold to 6.7-6.9 volts).
Air Gap–.048-.052" with contacts just touching.
Ch cking & Adjusting–*S Electrical Equip. Section.*

MISC. ELECTRICAL

H ad Lamps: Sealed Beam. *See Electrical Equip. Section.*
Dir cti nal Signals: *S Electrical Equip. Section.*
Lighting Switch R m val: Loosen set screw on side of control knob and remove knob. Remove retaining nut and push switch through panel.
Stop Light Switch L cati n: At front end of brake master cylinder.
CIRCUIT BREAKER: 30 ampere. Thermal type on light switch.
FUSES: Dir cti n Signal–14 amp., in flasher lead.
Radi –9 amp., in lead in radio.
Ov rdrive–20 amp., at overdrive relay.
Heater–14 amp. in lead to heater.
HORNS: Auto-Lite HAB-4603 (Low Pitch), HAB-4604 (High Pitch).

ENGINE

►*THREE DIFFERENT ENGINES USED AS FOLLOWS:*

6 CYL. "L" HEAD (6226 ENG.)

B re–3-5/16", **Str k** –4-3/8".
Displac m nt–226.2 cu. ins. **Rated HP**–26.3.
D v l p d H rsepow r–115 at 3650 RPM.
Compressi n Rati –7.3-1.

►*OTHER ENGINE DATA: S "1956-57 WILLYS JEEP, UTILITY, & FORWARD CONTROL" car model pages (following)*

4 CYL. "F" HEAD (475 ENG.)

B r –3 1/8". **Strok** –4 3/8".
Displac ment–134.3 cu. ins. **Rat d HP**–15.63.
D v l ped H rs p w r–75 at 4000 RPM.
C mpressi n Ratio–6.9-1 (Std.). 7.4-1 (Optional).

►*OTHER ENGINE DATA: Se "1956-57 WILLYS JEEP, UTILITY, & FORWARD CONTROL" car model pag s (following).*

6 CYL. "F" HEAD (685 ENG.)

Bore	Stroke	Displmnt.
3 1/8"	3½" ..	161 Cu. Ins.

Compr. Ratio	Rated HP	Developed HP
7.6-1	23 44	90 at 4200 RPM

Compression & Vacuum Reading–*See TUNE-UP*

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following.
"A" .010" Undersize main and connecting rod journals.
"B" .010" Oversize cylinder bore and pistons.
"AB" both above conditions exist.

CYLINDER HEAD & GASKETS: *See "Cylinder Head & Manifolds" in Willys Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Willys Special Data*

PISTONS

Aluminum alloy, cam ground, T slot, Tin or Brass plated.

►*PISTON OVERSIZE NOTE:* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.

Weight–10.9 ozs.
Removal–Pistons and rods removed from above.
Fitting New Pistons: Place .003 x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove ribbon feeler should be 5 to 10 lbs.
Replacement Pistons: Std. and .010", .020", .030" and .040" Oversize.
Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).

PISTON PINS

Locked in rod with clamp screw.
Diameter–.7496-.7498".
Clearance in Piston–.0000-.0004" max. Push fit at 70° F.
Replacement Pins: Not furnished separately.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (Top)	3/32"	.007-.023"	.002-.004"
Compr. (2nd)	3/32"	.007-.023"	.0015-.0035"
Oil	3/16"	.007-.023"	.001-.0025"

Replacement Rings: Ring sets furnished in following sizes for oversize noted. Standard (0-.010" O.S.), .020" O.S. (.011-.024"), .030" O.S. (.025-.034"), .040" O.S. (.035-.049").
Installing Rings: Compression ring marked "Top" (on side of ring) and bevel on inner edge must be up.

CONNECTING RODS

Length–6.345" (Center to Center).
Crankpin Journal Diameter–1.875".

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following engine number indicates that main and connecting rod journals are .010" Undersize.
B arings–Steel Backed Babbitt.
Cl aranc –.0001-.0025". **Side Play**–.004-.010".
Replac m nt Bearings. Std., .001", .002", .010", .011", .012", .020" and .030" Undersize.
Installing R ds: Rods not offset. Install with spray hole in lower end toward right side (away from camshaft) on all rods.

CRANKSHAFT

Journal Diameter–2.25" all bearings.
►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following the engine number indicates that the main and connecting rod journals are .010" Undersize.
Bearings–Steel Backed Babbitt.
Clearance–.0009-.003".
Replacement Bearings: Std., .001", .002", .010", .011", .012", .020" and .030" Undersize.
End Thrust: Taken by No. 1 (front main bearing), and thrust washer in back of crankshaft gear. Adjusted by removing or adding shims behind thrust washer. Shims furnished .002" thick.
NOTE–Crankshaft gear must be removed with gear puller for end play adjustment
End Play–.004-.006".
Crankshaft Rear Main Bearing Oil Seal: *See "Front & Rear Filler Blocks" under "Crankshaft & Main Bearings" in Willys Special Data*

CAMSHAFT

Journal Diameters–(1) 1.8770-1.8765", (2) 1.8445-1.8435", (3) 1.8130-1.8120", (4) 1.6260-1.6255".
►*CAUTION: 675-B and 685-B camshafts not interchangeable.*
Bearings–#1 steel backed babbitt. #2, 3, & 4 cast iron.
Clearance–.001-.0025".
End Thrust: Taken by thrust plate behind camshaft gear with spacer assembled behind plate. If end thrust not within these limits, replace timing gear and thrust plate. Dressing face of thrust plate may be required to reduce thickness for correct clearance.
End Play–.004-.007".
Timing Gears: Crankshaft gear Cast Iron, Camshaft gear fibre
Gear Backlash–.000- 002"
Camshaft Setting: Mesh marked tooth of camshaft gear with marked space (between teeth) on crankshaft gear.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data*

VALVES

Tappet Clearance: Intake 018", Exhaust 016" Cold

Valve	Head Diam.	Stem Diam.	Length
Intake	1 3/4'	3733- 3738"	4 17/32"
Exhaust	1 9/32"	3395- 3405	4 5/8'

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	260"	0007- 0022'
Exhaust	45°	360"	0025- 0045'

►*EXHAUST VALVE NOTE* Thompson type rotators used on exhaust valves
Valve Seat Width: 3/64" (All valves)
Valve Springs: Intake & Exhaust springs not interchangeable See table below

Valve Spring Specifications

Valv	Intak	Exhaust
Closed	73 lbs at 1 66'	50 lbs at 1 5/8
Open	153 lbs at 1 40'	105 lbs at 1 21 64

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Fr L ngth–1.968" (Intake), 1.890" (Exhaust).
Valv Guid s: Removable type. Drive guides out with Tool W-240. To install, use Tool W-240 with correct adaptors and drive guides into head and cylinder block until top of guide is 7/8" from top of valve seat (taper end toward seat).
R cker Arm Assembly Removal: *See "Valve System" in Willys Special Data.*
Valve Lifters: Mushroom type, in reamed holes in block. Service by installing oversize lifters.
Lifter Removal–Camshaft must be removed first. *See "Camshaft & Bearings" in Willys Special Data.*
Lifter Diameter–.6240-.6245". **Length**–2".
Clearance in Block–.0005-.002".

VALVE TIMING

See "Camshaft Setting" under Camshaft.
Intake Valves–Open 9° BTDC. Close 50° ALDC.
Exhaust Valves–Open 47° BLDC. Close 12° ATDC.
NOTE–Set Intake valve tappet for timing .026" Cold.
Valve Timing Check–Set Intake tappet clearance as given above with tappet resting on low side of cam lobe. Rotate crankshaft until No. 1 piston is coming toward top of cylinder on Exhaust stroke, then continue to rotate crankshaft until the 9° BTDC mark on dampener is aligned with pointer on timing gear case. With crankshaft in this position No. 1 Intake tappet should be JUST TIGHT against valve stem if timing is correct. Reset tappet clearance to .018". *See "Camshaft Setting" under Camshaft.*

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Willys Special Data.*
Crankcase Capacity: 4 quarts.
N rmal Oil Pressure: 35 lbs. at 30 MPH (2000 RPM).
Pressure Regulator–Under plug on side of pump housing. Adjust to 35 lbs. pressure by adding or removing shims located above spring in plug.
Oil Pressure Indicator: King-Seeley "CV" (Constant Voltage) electric type with voltage regulator.
Dash Unit–K-S No. 45729.
Engine Unit–K-S No. 44030.
See "Oil Pressure Gauges" in Miscellaneous Section.
Oil Pump: Rotor type. On left side of crankcase.
Pump Overhaul–*See "Oil Pump" in Willys Special Data.*
Oil Filter: Fram or Purolator. Located on cylinder head bracket at right front corner of cylinder head with oil outlet connected to timing gear cover.

COOLING

Water Capacity: 12 quarts. Add 1 quart for heater.
Pressure Valve: Radiator filler cap. Opens at 7 lbs.
Thermostat: Harrison. In water outlet elbow in cylinder head. Opens at 163-168°.
Water Pump: Centrifugal, packless, ball bearing type.
See "Water Pumps" in Willys Special Data.
T mp ratur Gaug : King-Seeley "CV" (Constant Voltage) electric type with voltage regulator.
Dash Unit–K-S No. 45734.
Engin Unit–K-S No. 44220.
S "T mperature Gaug s" in Misc llaneous Section.

CLUTCH

R ckford 8½ RM, Auburn 8501-39, Borg & Beck 10A7, Single Plate type. Use as follows:
475 & 685 Engines–Rockford 8½ RM or Auburn 8501-39.
6226 Engine–Borg & Beck 10A7. Assembly No. 982. *See Clutch Section for complete data.*
Clutch Disc–As follows: *(NOTE–Borg & Beck Clutch Disc used with Rockford Clutch).*

Engine	Borg & Beck No.	Auburn No.
475	381580	100020
685	382113 & 382231	100043
6226	381806	

Pedal Adjustment: 1¼" free travel (475 & 685 Engines). 1" free travel (6226 Engine). Loosen two locknuts on pedal adjusting link and adjust as necessary.
Removal: Remove transmission (and transfer case on 4-wheel drive models). See Transmission Removal (below). Remove flywheel bellhousing. Mark clutch and flywheel for installation in the same position. Remove clutch cover screws evenly to remove spring pressure, then remove clutch assembly and driven member.

SYNCHRO-MESH TRANSMISSION

4 WHL. DRIVE

Warner AS1-T90J (6226 Eng.), **AS1-T90C** (475 Eng.). Three speed type. Constant mesh, synchro-mesh, helical gears (second & high), sliding spur gear (low & reverse).
See "Warner Transmissions" in Transmission Section.
Transfer Case: Spicer or Warner. Two speed auxiliary transmission and front wheel drive unit mounted on rear of transmission case. Separate control levers provided for Low-High range (right hand lever), and front wheel drive engagement (left hand lever).
See Transmission Section for complete data.
Transmission Controls: *See "Transmission Controls" in Transmission Section.*
Removal: (4 Whl. Drive) Transmission and transfer case are removed as an assembly. Disconnect front and rear propeller shafts at universal joints *(NOTE–If* equipped with Power Take-off drive, remove front end of power take-off propeller shaft assembly). Disconnect speedometer cable at transfer case, brake cable, and clutch release cable at cross shaft bell crank (Jeep), Place support jacks under engine and transmission, remove transfer case rubber snubber bolt nut (on right side) and rear mounting bolt nuts at cross member under transmission case. Remove floor board inspection plate. Drain radiator and loosen upper radiator hose. Remove transfer case shift lever pivot pin screw, remove pin and shift levers *(NOTE–If* Power Take-off used, remove power take-off shift lever plate screws and lift lever out). Remove bolts holding center cross-member at frame side rails and remove cross-member *(CAUTION* -With cross-member removed, engine and transmission weight will rest on support jacks). Remove bolts holding transmission on bell housing, force transmission to right until ball stud end can be disengaged from end of clutch control cross shaft. Lower support jacks under engine and transmission and slide transmission and transfer case assembly to rear until clutch shaft clears bell housing, remove assembly from beneath car.

2-WHL. DRIVE

Warner AS50-T96 with Ov rdriv (685 Engine). Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse), all helical gear type.
Transmission Control: Remote control type with gear-shift lever on steering column. *See "Transmission Controls" in Transmission S ction.*
Removal: (2 Whl. Drive) Remove floor boards, take off bell housing inspection cover, disconnect clutch throw-out bearing retracting spring. Disconnect transmission control rods and speedometer cable at transmission case. Disconnect propeller shaft at universal joints and remove shaft. Support engine with jack placed under bell housing, remove rear engine support bolts from cross-member under transmission case, raise rear end of engine so transmission clears cross-member *(CAUTION* –Use care that fan blades do not damage radiator). Remove transmission bell housing bolts, pull transmission straight back to clear clutch shaft, remove from car.

OVERDRIVE

Warner R10. Part of transmission assembly. *NOTE–Lockout Switch not used on 1955 models.*
See "Warner R10 Overdriv " in Transmission S ction.
Overdrive Controls: *See "Warner R10 & R11 Ov rdriv Controls" in Transmission Section.*
Removal: Same as for standard transmission after control wiring and cables removed.

UNIVERSALS

2-WHL. DRIVE

Spicer (Cross) or Detroit (Ball & Trunni n). One at each end of propeller shaft.

4 WHL. DRIVE

Drive Shaft Joints–Spicer (Cross) One used at front and rear of both front and rear propeller shafts.
Front Axle Shaft Joint–Rzeppa Constant Velocity type. One joint used at outer end of each shaft (within steering knuckle housing).
See "Universal Joints" in Willys Special Data.
Power Take-off Shaft Joints–Detroit Ball-and-Trunnion type. Two used (one at each end of shaft-no splined joint used).

FRONT AXLE

4 WHL. DRIVE

Spicer (Salisbury) Model 25. Full floating, Hypoid gear type. Differential assembly (ring and pinion gear assembly) is serviced in same manner as Spicer Rear Axles.
See "Spicer (Salisbury)" in Rear Axl S cti n.
Ratio–5.38-1 (Exc. 6226-4X4SW, 4WD). 4.88-1 (6226-4X4SW, 4WD).
Backlash–.004-.007". Shim Adjustment.
Rem val: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and

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steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axl Shaft & Univ rsal J int Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller, (*CAUTION*–do not lose shim pack under drive flange). Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly.((*CAUTION*–use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION:* Adjust front wheel bearings and bleed brakes after installation completed.

Wheel Bearing Adjustm nt: Tighten inner adjusting nut until wheel binds (turn wheel while adjusting), then back nut off 1/6 turn, install lockwasher, locknut, and make certain nut locked by turning lockwasher ear up.

St ering Knuckl B aring Disassembly & Adjustment: *See "Front Axl " in Willys Special Data.*

REAR AXLE

Spic r M d l 44-2 (Exc. 475-4WD & 6226-4WD). Model 53 (475-4WD & 6226-4WD). Semi-floating hypoid gear type with Hotchkiss drive.

►*TIMKEN SPIRAL BEVEL REAR AXLE NOTE: These used int rmittantly in production on 4-WD Trucks. See "Spic r Hypoid S mi-Floating" or "Timken Semi-Floating" in Rear Axle S ction.*

Axl Ratios

Mod l	Std. Trans.	O.D. Trans.
2-Wheel Drive	4.88-1	©4.88-1
4 Cyl. 4-Wheel Drive	5.38-1	
6 Cyl. 4-Wheel Drive	4.88-1©	

©–5.38-1 Optional.

Backlash–.004-.007". Shim adjusted.

Axl Shaft Removal (Semi-floating Axle): Remove axle shaft nut, then use puller to remove wheel hub. Remove bolts retaining dust shield, grease and bearing retainers, and brake assembly. *CAUTION* - Do not disturb backing plate. Remove shield and retainer then pull axle shaft, being careful not to lose adjusting shims.

R ar Axl Ass mbly R m val: Support rear end of car securely, remove rear wheels, disconnect rear shock absorbers, rear brake line (at frame connection on right side), rear brake cables, and propeller shaft at rear universal joint. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring "U" bolts, remove pivot bolt at front end of springs, lower springs. Remove axle assembly from beneath car.

Wheel Bearing Adjustment: End Play .003-.007". Adjust by adding or removing shims between backing plate and axle housing flange at each wheel. See "Axle Shaft Removal" above.

SHOCK ABSORBERS

Monroe or Gabriel. Direct acting type.

FRONT SUSPENSION

2 WHL. DRIVE

Planadyne Type. Independent, linked parallelogram type with transverse spring (spring acts as lower control arm).

See "Willys Front Suspension" in Front Suspension Section.

Kingpin Inclination–5° crosswise.

Caster–1° No adjustment.

Camber–1°.

Toe-in–1/16-1/8". *See "Willys Planadyne" in Front Suspension Section for Toe-in Adjustments.*

4 WHL. DRIVE

Special front-wheel drive unit with semi-elliptic springs. Steering knuckle mounted on taper roller bearings carried on two stub shafts.

End Play–.001-.003".

Kingpin Inclination–7-1/2°.

Caster–3°. No adjustment. If caster incorrect, check front end, correct by installing new parts.

Camber–1-1/2°. No adjustment. Correct by installing new parts. Do not attempt to correct camber by cold bending or heating of parts.

Toe-in–3/64-3/32". (1/32" each wheel) To adjust first set each front wheel straight ahead (see note below), then set toe-in by shortening each tie rod approximately 1/2 turn. This procedure necessary to maintain correct position of steering idler arm.

NOTE–To set front wheels straight ahead, first set tie rod end of steering bell crank (idler lever on frame cross member) exactly at right angles to front axle. Check front wheels by using a straight edge or sighting along rear and front wheels. Adjust each tie rod (loosen end clamp bolts and turn rod) until front wheels are exactly straight ahead. Then make toe-in adjustment as directed above. Tie rod lengths between ball end centers should be 20-7/8" (left), 25-5/8" (right).

Toe-Out on Turns–With inner wheel turned 20°, outer wheel should be turned exactly 19°.

STEERING

Ross T-12, No. 13108. Cam & *Twin* Lever type.
See "Ross Cam & Twin Lever" in Steering Section.

Steering Linkage: *See "Steering Linkage" in Steering Section.*

Steering Wheel & Horn Button Removal: *See "Ross Cam & Twin Lever" in Steering Section.*

Steering Gear Removal: *See "Ross Cam & Twin Lever" in Steering Section.*

BRAKES

Bendix-Lockheed (Self-Centering). Without anchor pin adjustment. Hand lever applies rear service brakes (Exc. Jeep). Independent brake on drive shaft at rear of transfer case (Jeep).

See "Bendix-Lockheed (Self-Centering)" in Brake Section.

Drums–Diameter 10" (2-Whl. Drive); 11" (4-Whl. Drove).

Wheel Cylinder Diameter–(Front) 1 1/8". (Rear) 1".

Model	Lining Length Primary	Secondary
2 Whl. Drive	10 11/16"	8 5/8"
4 Whl. Drive	12 1/4"	10"

Thickness–.212" (2 Whl. Drive); .187" (4 Whl. Drive).

Width–1¾" (2-Whl. Drive); 2" (4-Whl. Drive).

Braking Power–Front 65%, Rear 35% (2-Whl. Drive); Front 57%, Rear 43% (4-Whl. Drive).

Clearance–.005-.008" all models.

MISC. MECHANICAL

Windshield Wipers: Vacuum type. Single motor operates wiper arms by cable control.
See "Windshield Wipers" in Miscellaneous Section.

MODEL IDENTIFICATION

Model	Series Symbol
F4-134 4x2 & 4x4 Jeep Utility	54
L6-226 4x2 & 4x4 Jeep Utility	54
F4-134 & L6-226 4WD Truck	55
DJ-3A Jeep Dispatcher	56
CJ-3B, CJ-5, CJ-6 Universal Jeep	57
FC-150 Forward Control	65
FC-170 Forward Control	61

SERIAL NUMBER: On metal plate attached to top of front wheel housing inside cab beside drivers seat (Series 61, 65), at drivers seat (Series 54), on dash (Others)

►*SERIAL NUMBER NOTE:* Serial number (example 54548-10001), lists the following data in sequence:

Serial①	Body Style②	Engine③	Drive④	⑤
54	5	4	8	10001

① - See "Series Symbol" in Model Table above.
② - See "Body Style" in Body Style Table below.
③ - See "Engine Symbol" in Engine Designation Table.
④ - 2 Whl. Dr. - 1 or 7 (LHD), 5(RHD).
4 Whl. Dr. - 2 or 8 (LHD), 6(RHD).
⑤ - Factory Unit Production Number.

Engine Designation Table

Engine Type	Engine Symbol
4 Cyl. 134 Cu. in. "L" Head	3
4 Cyl. 134 Cu. in. "F" Head	4
6 Cyl. 226 Cu. in. "L" Head	6

Body Style Table

Body Style	Series - 54	55	56	57	61	65
Utility Wagon	①					7
Utility Delivery	②					6
F F Cowl	4	4			2	2
Cowl & Windshield	5	5	5		3	3
Stripped Chassis	6	6		③	1	1
All	9	9		9		
Special Jobs	0	0		0		
Cab & Chassis		1				
Pickup Truck		2			⑤	⑤
Stake Truck		3				
Open Body			3	④		

① - 1 (2Door), 7 (2 Door Plan).
② - 2 (2 Door), 8 (2 Door Plan).
③ - 4 (CJ-3B), 6 (CJ-5), 8 (CJ-6).
④ - 3 (CJ-3B), 5 (CJ-5), 7 (CJ-6).
⑤ - 4 (Open Cab), 5 (Closed Cab).

ENGINE NUMBER: Located as follows:
4 Cyl. Engines - Stamped on top of water pump boss at front of engine.
6 Cyl. Engine - Stamped on boss on left front corner of engine block above generator.

TUNE-UP

COMPRESSION PRESSURE:	Pressure & Speed
4 Cyl. "L" head	90-110 lbs. at 185 RPM
4 Cyl. "F" head	130-140 lbs at 185 RPM
6-226 "L" head	120-130 lbs. at 185 RPM

VACUUM READING: 17-21" at idling speed.

VALVE TAPPET CLEARANCE:	Intake	Exhaust
4 Cyl. "L" Hd.	.016" ①	①.016"
4 Cyl. "F" Hd.	.018" ①	①.016
6-226 "L" Hd.	.014" ②	②.014"

①—Hot or Cold. ②—Cold.

MANIFOLD HEAT CONTROL: Used as follows—
4 Cyl. "L" Head. Thermostatic coil on manifold.
4 Cyl. "F" Head. Water jacketed intake manifold.
6-226 "L" Head. Exhaust heat from No. 3 & No. 4 cylinders enters heat chamber under intake manifold

IGNITION

FIRING ORDER: 1-3-4-2 (4 cyl.), 1-5-3-6-2-4 (6 Cyl.).

SPARK PLUG GAP: .030".
Spark Plug - Auto-Lite A7 or Champion J8. 14 mm. Torque to 28-30 ft. lbs.

COIL: Auto-Lite CR-6009 (Early), CAL-4001A (Later).
Ignition Current - 2.5 amperes idling, 5 amperes at 6.3 volts stopped.

DISTRIBUTOR:	Auto-Lite No.
4 Cyl. "L" Jeep	IAY-4012
4 Cyl. "F" Univ. Jeep	IAD-4041
4 Cy. "F" Others	IAT-4204A
6-226 "L" All	IAT-4206

Condenser—Auto-Lite (IAY Distr.) IAT-3076LA, (IAD Distr.) IGW-3139, (IAT Distr.) IAT-2015L.
Capacity—(IAT-3076LA) .25-.28 mfd. (IGW-3139) .23-.26 mfd. (IAT-2015L) .21-.25 mfd.
Contact Point Set—Auto-Lite (IAY Distr.) IGW-3028DS, (IAD Distr.) IGP-3028FS, (IAT Distr.) IGW-3028AS.
Breaker Gap—.020".
Cam Angle - 39-45° (4 Cyl.), 36-42° (6 Cyl.).
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Counter-clockwise viewed from above.

Automatic Advance
(IAY-4012, IAD-4041, IAT-4204A)

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	300	0	600
1	425	2	850
6	1050	12	2100
10	1575	20	3150
11	1700	22	3400

Automatic Advance - IAT-4205

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	325	0	650
1	450	2	900
6.5	1200	13	2400
8	1475	16	2950
9	1675	18	3350

Vacuum Spark Control: None used on IAY, IAD Distr.

Vacuum Advance—IAT-4204A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	5 1/8
3	6	9 5/8
6	12	14

Vacuum Advance—IAT-4206

Start	0	10
3	6	13
5	10	15

IGNITION TIMING

Setting - 5° BTDC (All 4 Cyl.), 4° BTDC (1956 6 Cyl.), 5° BTDC (1957 6 Cyl.).
Timing Mark - **(All 4 Cyl. Eng.).** Notch on rim of fan pulley to align with 5° mark on timing gear cover Cover has two marks 5° and T (Top dead Center)
(6 Cyl. Eng.). Align correct graduation with pointer on timing gear cover Damper marked "O" at TDC with 1° graduations before and after this point.

CARBURETOR

►*AIR CLEANER TO CARBURETOR HOSE PRODUCTION CHANGE & CAUTION (FC-150):* To prevent hose from collapsing under high temperature conditions, install Reinforcing Spring Part No. 914965 in hose. FC-150 vehicles produced after Serial No. 65548-11274 have this spring installed.

►*FLAT SPOT OR STUMBLE CORRECTION (V hicl s with Carter YF 938S, SA; 951S Carbur tors):* See *"Carter YF Carburetors" in Carbur ti n Secti n.*

Model	Cart r Carb. N .
4 Cyl. "L" Jeep Dispatcher	YF 2392S
4 Cyl. "F" Univ. Jeep	YF 938SA
4 Cyl. "F" 4X2, 4X4, 4WD	YF 951S
4 Cyl. "F" Fwd. Control	YF 938SA
6 Cyl. (Early 1956)	WCD 2204S
6 Cyl. (Later 1956-57)	YF 2467S

CARTER YF
Idle Setting - ¾-1¾ turns open (938SA, 951S). ½-2 turns open (2392S), 1-2½ turns open (2467S). Turn screw out for richer mixture.
Idle Speed - 600 RPM (4 Cyl.), 550 RPM (6 Cyl.)
Float Level - 9/32" (Gauge T109-126) from top of float at free end to gasket seat on cover with assembly inverted and float resting freely on intake needle.
Fast Idle: With choke held in wide open position, lip on fast idle arm should contact boss on body casting.
►*OTHER DATA: See "Carter YF Carburetor" in Carburetion Section.*

CARTER WCD
Idle Setting—1-2 turns open. Turn screws out for richer mixture.
Idle Speed—500 RPM.
Float Level—3/16" (Gauge T109-28) from top of each float to gasket seat on cover with assembly inverted.
Fast Idle Setting Hold choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening or clearance between edge of valve and carburetor bore on side opposite ports is .016" (T109-29)
Automatic Choke Setting: Centered (At Index).
►*OTHER DATA: See "Carter WCD" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2195S Fuel Only (1956 DJ-3A, 1957 All 4 Cyl.). AC No. 4032 (1956 Jeep & Utility). Carter No. M957S (All 6 Cyl.) Fuel & Vacuum.
Pressure - (4 Cyl.) 2½-3¾ lbs. at 1800 RPM, (6 Cyl.) 3½-5½ lbs. at 1800 RPM.
See "Fuel Pumps" in Carburetion Section.
Gasoline Gauge: King-Seeley "CV" (Constant Voltage) type with Voltage Regulator contained within Gauge (FC-170) separate Regulator (Others)

Model	Dash Unit	Tank Unit
Jeep	49452	44556
Truck	45727	44508
Station Wagon	45727	44506

See "Fuel Gauges" in Carburetion Section.

CRANKCASE VENTILATOR

Sealed Positive Ventilation (4 Cyl.). Clean air is drawn into oil filler tube and rocker arm cover through a hose to the air cleaner All connections and gasket on filler tube must be air tight. The crankcase is ventilated

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by a sealed system from air cleaner tube to intake manifold A valve is attached to valve spring cover in the line to air cleaner This valve must be free of carbon and operate freely at all times to obtain smooth idle Remove and clean valve every 5000 miles or more often if engine must run at idle speed excessively or is used for stationary power

BATTERY

Auto-Lit 1H-100 or Willard 1-M-100. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).
Batt ry Ground - Negative
Engine Ground - Left front engine support (6-226) right front engine support (Others)

STARTER

Auto-Lite. Used as follows

Model	Starter	Armature
4 Cyl (All)	MCH-6203 or 6207	MCH-2088
6 Cyl	MCH-6210	MCH 2088

Driv - Bendix "Folo-Thru" type. No. A3281.
R tation - Counterclockwise at commutator end
Brush Spring T nsion - 42-53 ozs

Performance Data

Torque	RPM	Volts	Amperes
0	4300	5 0	65
6 0	Lock	2 0	335

Starting Switch· Auto-Lite SST-4012 (MCH-6203), Key starting (Magnetic switch controlled by turning key past "Ignition On" position) Auto-Lite SW-4015A (MCH-6207) Foot operated

GENERATOR

Aut -Lite GGW-4801D (4 Cyl.), GGW-4801EN (6 Cyl.).
Armatur - Auto-Lite GGW-2006F (All Cars)

Performance Data

Amperes	Volts	Cold	RPM	Hot
0	6.4	870-970		950-1050
40.0	8.0	1800-2000		2150-2350
45.0	8.0	1925-2125		2350-2550

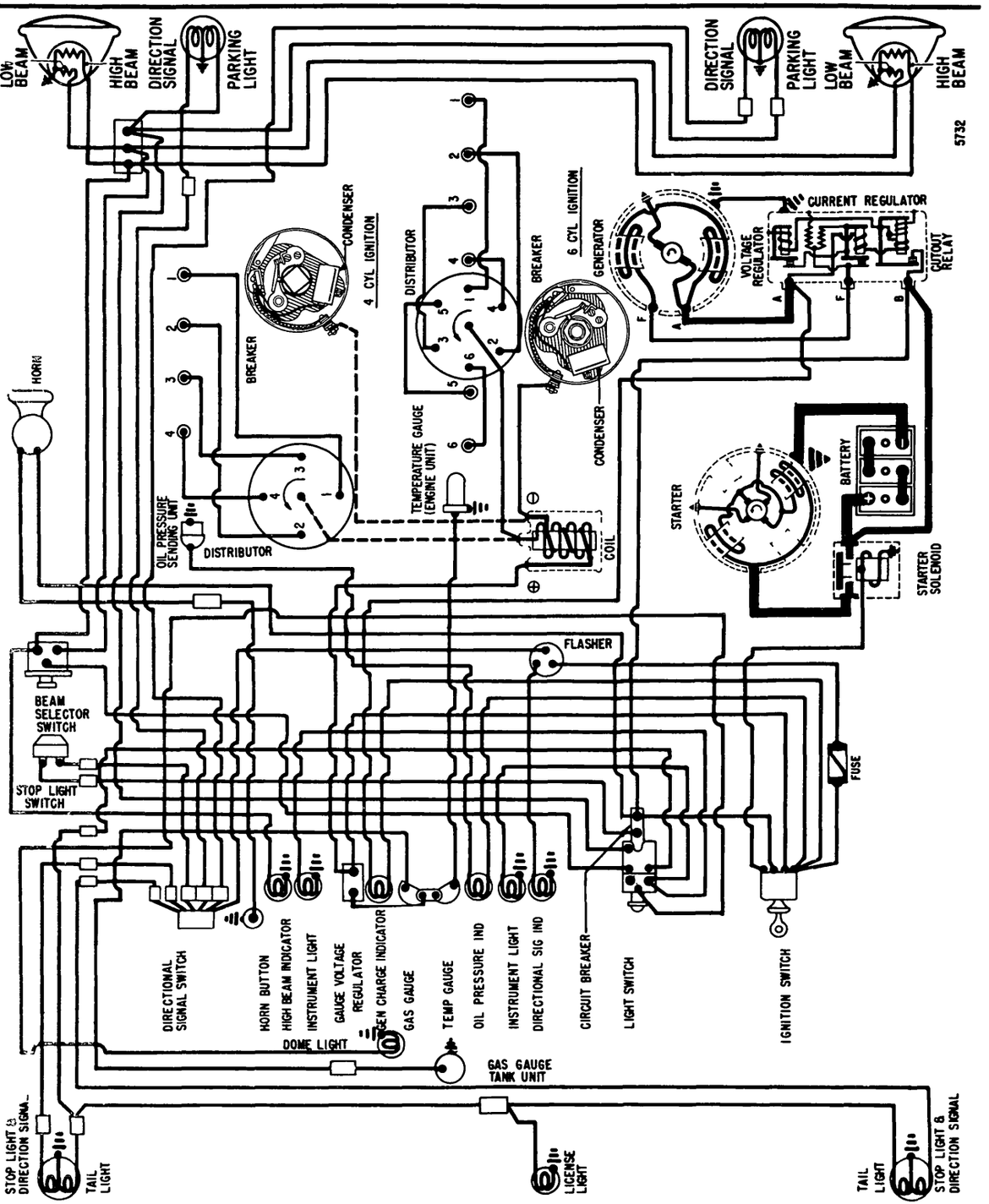
Brush Spring T nsi n—35-53 ozs.
Fi ld Curr nt - 1.6-1.7 amperes at 5.0 volts.
M toring Curr nt - 5.0-5.5 amperes at 5.0 volts.
Rotati n—Counter-clockwise at commutator end.
Belt Adjustm nt: ½-5/8" deflection with thumb pressure midway between generator and pump pulleys

REGULATOR

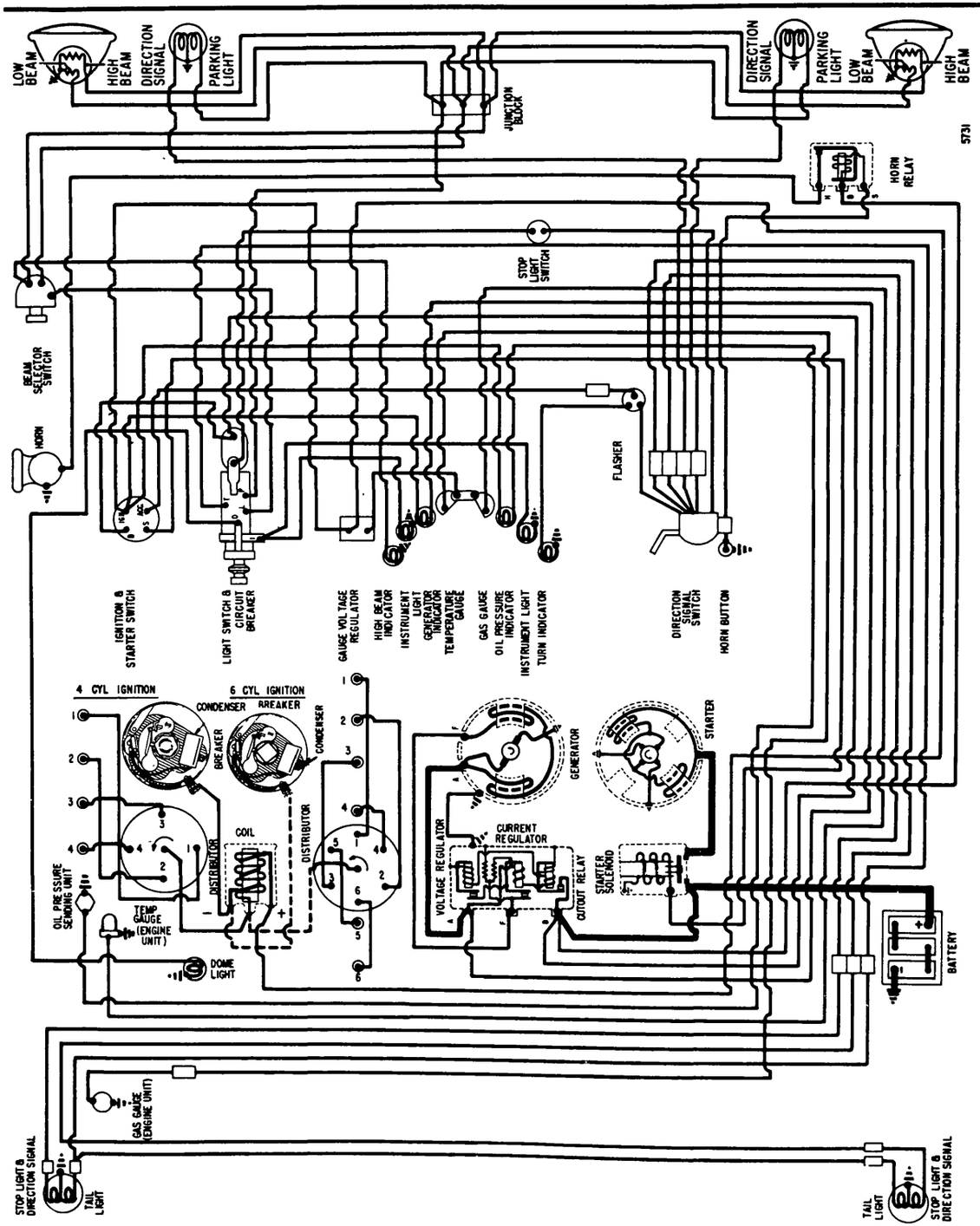
Aut -Lit VBE-6105A. Voltage & Current type with "Temperature Compensated" Current Regulator

Cut ut Relay
Cuts In—6.3-6.8 Volts (set to 6.4-6 6 volts).
Cuts Out—4.1-4.8 Volts (4.6 amps.discharge).
C ntact Gap— 015" minimum
Air Gap— 031-.034" with contacts open (check at hinge end of core). **Voltag Regulator**
Setting - 7.2-7.5 volts at 70°F after 15 minutes operation charging at 10 amperes.
Air Gap - 048-052" with contacts just touching.
Ch cking & Adjusting - *Se "Auto-Lit 6-Volt Regulators" in El ctrical S ction.*

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WILLYS UTILITY MODELS (EXC. FORWARD CONTROL)



WILLYS FORWARD CONTROL MODELS FC-150 & FC-170

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Curr nt R gulat r

►*SETTING CAUTION: "T mp ratur Comp nsat d" type. Set to following specifications at 70°F.*

	Test A–Op rating Amp r s	Test B
VBE-6105A	52	45 (43-47)

Test A–After 15 minutes operation with current at 10 amperes.

Test B–After 15 minutes additional operation with current regulator operating.

Air Gap–.048-.052" with contacts just touching.

Checking & Adjusting - *See "Auto-Lit 6-Volt R gulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Sealed Beam. *See El ctrical S ction*

Directional Signal: *See Electrical S ction.*

Lighting Switch Removal: Loosen set screw on side of control knob and remove knob. Remove retaining nut and push switch through panel.

Stop Light Switch Location: On brake master cylinder.

CIRCUIT BREAKER: 30 ampere. Thermal type on light switch.

FUSES: Directional Indicator - SFE-14 ampere in flasher lead.
Radio - SFE-9A ampere in lead to radio.
Heater - SFE-10 (FC-150,170), SFE-14 (Others).
Overdrive - SFE-20 at overdrive relay.

ENGINE

►*THREE DIFFERENT ENGINES USED: S "Mod l Identification" for application.*

4 CYL. "F" HEAD

Model	Bore	Str k	Displac m nt
F4-134 (All)	3.125"	4.375"	134.2 cu. ins.

Model	Compr. Ratio	Rat d HP	D v l ped HP
F4-134 4x2	7.4-1①	15.63	75 at 4000 RPM
F4-134 Others	6.9-1②	15.63	72 at 4000 RPM

① - 7.8-1 Optl. ② - 7.4-1 Optl.

Compression & Vacuum Reading–*See "TUNE-UP" above.*

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:
"A" .010" main & connecting rod journals Undersize.
"B" .010" cylinder bore and pistons Oversize.
"AB" both above conditions exist.

CYLINDER HEAD & GASKET INSTALLATION: *See Willys Special Data.*

TIGHTENING TORQUES: *See Willys Special Data.*

PISTONS

Aluminum alloy, cam ground, T slot, Tin or Brass plated.

►*PISTON OVERSIZE NOTE:* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.
W ight–13.5 ozs.
R m val–Pistons & Rods removed from above.

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Fitting New Pist ns: Place 003" x 3/4" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove ribbon feeler should be 5 to 10 lbs.

R plac m nt Pistons: Std. and .010", .020", .030" and .040" Oversize.

Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).

PISTON PINS

Locked in rod with clamp screw.

Diam t r- .8118-.8120". **L ngth-**2-25/32".

Clearanc in Pist n-.0002-.0004". Thumb push fit at 70° F.

Replac ment Pins: No oversizes available.

PIST N RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.007-.017"	002- 004"
Compr #2	3/32"	.007-.017"	.0015- 0035"
Oil	3/16"	.007-.017"	001- 0025'

Replacem nt Rings: (F r rebored cylinders)—Furnished .010", .020", .030" and .040" Oversize.

Servic Type Rings—(For Cylinders not Rebored)—Furnished Std. (.000-.009"), .010" (.010-.019"), .020" (.020-.029"), .030" (.030-.039"), .040" (.040-.049") Oversize.

Installing Rings· Install compression rings with mark "Top" (on side) toward top. Rings have tapered face and must be installed correctly. Top ring inner bevel edge must be up.

CONNECTING RODS

L ngth (Center t Center) - 9.1845-9.1905. **Weight** - 32 ozs.

Crankpin J urnal Diamet r - 1.9375".

►*JOURNAL DIAMETER UNDERSIZE NOTE.* The letter "A" or "AB" following the engine number indicates that main and connecting rod journals are .010" Undersize.

B arings—Steel backed babbitt.

Clearanc - 0001- 0025"

Sid Play - 004- 010"

Replac m nt Bearings: Std., 010", .020" & 030" Undersize

Installing R ds: Lower bearing offset. Install rods with short side of bearing toward nearest main bearing or toward front of engine (#1, 3), and toward rear (#2, 4). Oil spray hole in lower rod bearing toward right of engine (away from camshaft) on all rods.

CRANKSHAFT

J urnal Diam ter—2.3341-2.3331". All main bearings.

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following engine number indicates that main and connecting rod journals are .010" Undersize.

B arings—Steel backed babbitt.

Clearance—.0003-.0029".

Replacem nt B arings: Std , 010", 020" & 030" Undersize

Crankshaft S rvicing: *See "Crankshaft & Main B arings" in Willys Sp cial Data.*

End Thrust: Taken at #1 main bearing. Shims between crankshaft thrust washer and shoulder on the crank. Endplay—.004-.006".

Crankshaft Rear Main Bearing Oil S al: *See "Crankshaft & Main B arings" in Willys Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1860-2.1855", **(2)** 2.1225-2.1215", **(3)** 2.0600-2 0590", **(4)** 1 6230-1 6225".

Bearings—#1 steel backed babbitt. #2, 3 & 4 cast iron.

Clearance—.001-.0025".

End Thrust: Taken by thrust plate behind camshaft gear Endplay controlled by spacer between camshaft gear and shoulder on shaft Endplay can be increased by installing shim between spacer and shaft, or decreased by dressing off spacer *NOTE* - Inner beveled edge of spacer must be toward crankcase

End Play—.004-.007".

Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data.*

Timing Gears: Crankshaft gear, steel. Camshaft gear, fibre with steel hub.

Camshaft Setting: Mesh marked tooth of camshaft with marked space (between teeth).

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data.*

VALVES

Tappet Clearance: Intake .018", Exhaust .016" Cold.

Valve	Head Diameter	Stem Diameter	Length
Intake	2"	.3733-.3738"	4.781"
Exhaust	1-15/32"	.371-.372"	5 909"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.260"	.0007-.0022"
Exhaust	45°	.351"	.0025-.0045"

►*EXHAUST VALVE NOTE* Thompson Valve Rotators used.

Valve Seat Width—3/64".

Valve Springs: Install with closed coil upward toward block (Exhaust), down towards head (Intake).

Free Length—1 31/32' (Intake), 2½ (Exhaust)

Valve Spring Specifications

Valve	Intake	Exhaust
Closed	73 lbs at 1 21/32"	53 lbs at 2 7/64"
Open	153 lbs at 1 13/32"	120 lbs at 1¾"

Valve Guides. Use Tool W-177 to remove and install guides. Drive Exhaust guide down into valve compartment to remove. Drive new Exhaust guide to 1" below surface of cylinder block and new Intake guide flush with bottom of valve guide bore in cylinder head.

Rocker Arm Assembly Removal *See "Valve System" in Willys Special Data.*

Valve Lifters Mushroom type operating in reamed holes in block. Serviced by installing oversize lifters. Lifters furnished .004" Oversize.

Diameter—.6240-.6245". **Clearance**—.0005-.002".

►*NOTE.* Camshaft must be removed for lifter removal.

VALVE TIMING

See "Camshaft Setting" under "CAMSHAFT" above.

Intak Valves—Open 9° BTDC. Close 50° ALDC.

Exhaust Valves—Open 47° BLDC. Close 12° ATDC.

Valv Timing Check—Set Intake valve clearance at .026". Rotate engine clockwise until No. 1 cylinder is ready for intake stroke. Intake opens 9° BTDC. Note the distance between TDC and the 5° mark and estimate 9° from this distance. With the crankshaft in this position timing is correct if lifter is just tight against valve stem.

ENGINE

4 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L4-134	3.125"	4.375"	134.2 cu. ins.
Model	**Compr. Ratio**	**Rated HP**	**Developed HP**
L4-134	6.48-1	15.63	60 at 4000 RPM

►*OTHER ENGINE DATA See "4 Cyl. "F" Head" above and note the following differences*

►*ENGINE NUMBER NOTE Letters stamped after engine number denote the following*

"A" - .010" undersize main & connecting rod bearings.
"B" - .010" oversize cylinder bore.
"AB" - Both above conditions exist.
"C" - .002" undersize piston pin.
"D" - .010" undersize main bearing journals only.
"E" - .010" undersize connecting rod bearing journals only.

VALVES: Tappet Clearance - .016" Cold (Intake & Exhaust).

Valve	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.3715"	5 51/64"
Valve	**Seat Angle**	**Lift**	**Stem Clearanc**
Intake	45°	.351"	.0007-.0022"
Exhaust	45°	.351"	.0025-.0045"

Valve Seat Width - 3/64".

Valve Springs: Free Length - 2½".

Valve Spring Specifications

Valve	Intake	Exhaust
Closed	53 lbs. at 2 7/64"	53 lbs. at 2 7/64"
Open	120 lbs. at 1 3/4"	120 lbs. at 1 3/4"

Valve Guides: Use W-177 to remove and install guides. Drive guides into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block and new intake guide 1 5/16" below surface of cylinder block.

Valve Timing Check: Set No. 1 cylinder intake valve tappet clearance to .020" for check. After check made, reset No. 1 cylinder intake valve tappet clearance to a running clearance of .016".

ENGINE

6 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L6-226	3.3125"	4.375"	226.2 cu. ins.
Model	**Compr. Ratio**	**Rated HP**	**Developed HP**
L6-226	6.86-1③	26.33	105 at 3600 RPM

③ - 7.3-1 Optl.

Compression & Vacuum Reading—See *TUNE-UP above.*

►*ENGINE NUMBER NOTE* Letters following engine number denote the following

"A" .010" Undersize main and connecting rod journals.
"B" .010" Oversize cylinder bore and pistons.
"AB" Both above conditions exist.

CYLINDER HEAD & GASKET INSTALLATION· *See "Cylind r Head & Manif lds" in Willys Sp cial Data*

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TIGHTENING TORQUES: *See "Tight ning Sp cifi- cati ns" in Willys Special Data*

►*FILLER BLOCK-OIL PAN OIL SEAL PRODUCTION CHANGE (To Prevent Oil Leakage Between Filler Block & Oil Pan).* Neoprene oil seal, Part No. 910220, was placed in early production and is available for installation on earlier models. Replaces earlier type cork seal. To install new seal, coat inner surfaces of filler block grooves with gasket cement. Install gaskets in grooves evenly centered so each end extends 1/16" above faces of filler block ends. Do not trim off ends. Install filler blocks, dust gaskets with graphite and install oil pan.

PISTONS

Aluminum alloy, steel band, T-slot Cam Ground. Tin Plated.

►*PISTON OVERSIZE NOTE* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.

Weight–15.312 ozs. Less rings and pin.

Removal–Pistons and rods removed from above.

Fitting New Pistons: Place 0015" x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove feeler should be 5 to 10 lbs.

Piston Replacement–Std., .010", .020", .025 .030", 040", 050", and .060" Oversize

Installing Pistons. Slot in skirt toward left or away from camshaft.

PISTON PINS

Floating type with lock ring at each end.

Diameter - .8591-.8593". **Length** - 2.779".

Clearance in Piston - .0002" Selective fit. Push fit at 160°F.

Clearance in Rod - .0002-.0006". Press fit.

Replacement Pins: Std. .003" and .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0930-.0935"	.008-.016"	.002-.004"
Compr. (Lower)	.0930- 0935"	.008-.016"	.003-.007"
Oil (Top ring)	.1545-.1550"	.008-.016"	.006-.010"
Oil (Bottom ring	.1545-.1550"	.008-.016"	.0025-.004"

Replacement Rings: Ring sets and single rings furnished in following sizes for oversize ranges indicated Std. (Std.-.009"), .020" (.010-.029"), .030" (.030-.039"), .040" (.040-.049"), .060" (.050-.069").

Installing Rings. Side marked "Top" (compression rings) upward. Chrome plated ring must be installed in top (#1) ring groove.

CONNECTING RODS

Length–6.998"- 7.002" (Center to center).

Crankpin Journal Diameter–2.0619 - 2.0627".

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AB" following engine number indicates that the main and connecting rod journals are .010" Undersize.

Bearings–Steel Backed Babbitt.

Cl arance - .0018" maximum. **Sid play** - .006- 011"

Replacem nt B arings Std. and .001", .002", .010" and .012" Undersize.

Installing Rods· Mark rods and bearing caps. Install with marks together and toward camshaft in same order as when removed. Oil spray hole in lower end of rod toward camshaft. *NOTE*–Lower bearings offset with narrow side of rod toward nearest main bearing (#1, 3, 5 forward), (#2, 4, 6 toward rear).

CRANKSHAFT

Journal Diameter–2.3744-2.3752".

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AB" following the engine number indicates that the main and connecting rod journals are .010" Undersize.

Bearings–Steel Backed Babbitt.

Clearance - .0007-.0020"

Replacement Bearings Std. and .001", .002", 010" and .012" Undersize.

End Thrust Taken by #4 rear main bearing which is flanged type.

End Play– 002-.006".

Rear Bearing Oil Seal Installation *See "Crankshaft and Main Bearings" in Willys Special Data.*

CAMSHAFT

Journal Diameters–(1) 1.8725-1.8735". (2) 1.8095-1.8105". (3) 1.7472-1.7485". (4) 1.2475-1.2485".

Bearings–Steel Backed Babbitt.

Clearance–.001-.003".

End Thrust Taken by thrust plate on front of engine (between front bearing journal and hub of sprocket)

End Play–.003-.007".

Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data*

Timing Chain Non-adjustable type. Width 1". Pitch .500". Length 23" or 46 links.

►*TIMING CHAIN CAUTION Morse and Link Belt chains used. Chains and sprocket interchangeable only in COMPLETE SETS*

Camshaft Setting. Mesh chain with 9 links (or 10 link pins inclusive of pins opposite marks) between marks on sprockets with #6 piston at top dead center on compression stroke.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data*

VALVES

Tappet Clearance: Intake and Exhaust .014" Cold.

►*TAPPET CLEARANCE ADJUSTMENT PROCEDURE: See "Valve System" in Willys Special Data*

Valve	Head Diam.	Stem Diam.	Length
Intake	1 520"	3402-.3410"	5.187"
Exhaust	1 328"	.3382- 3390"	5.205 '
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°	284"	001- 003"
Exhaust	45°	284"	0032- 0050"

Valve Seat Width 5/64-3/32" (intake), 3/32-7/64" (exhaust).

NOTE–Rotators used on Exhaust valves.

Valve Guides Pressed in block. Replace when stem clearance exceeds maximum (above). Ream new guides to inside diameter of 3432-3422".

Replacem nt Guid s–Std., .0005" (marked "A"), .0055" (marked "L") to insure .0005-.003" press fit.

Guid Installation–Place guide (tapered end of guide toward top) in position in bore and drive in to correct position of 1-7/32" below top face of cylinder block.

Valv Springs: Intake & Exhaust valve, spring interchangeable

Free Length–1-31/32".

Valve Spring Sp cifications

Valve	Lbs. Pr ss.	L ngt
Closed	51	1.672'
Open	118	1.312

Valve Lifters: Mushroom type with self locking adjusting screws.

Diameter–.6855-.6860".

Clearance–Selective fit. Lifter should rotate in bore with slight drag. Service by installing oversize lifter.

Replacement Lifters–Furnished in Std. and the following oversizes marked as indicated "B" is .001", "D" is .002", and "K" is .005" O.S.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE:* **Specifications are with tappet clearance as follows Intake 018", Exhaust 020"**

Intake Valves - Open 2° BTDC Close 42° ALDC

Exhaust Valves - Open 42° BLDC Close 8° ATDC

Valve Timing Check–With .020" tappet clearance, #1 exhaust valve should close with piston 10° or .045" after top dead center with ten-degree mark, after top dead center "0" mark on dampener aligned with pointer at front of engine. Reset tappet to .014" clearance COLD.

OILING SYSTEM

►*ENGINE OILING SYSTEM· See "Engine Lubrication" under OILING SYSTEM in Willys Special Data*

Crankcase Capacity: (4 Cyl) 4 qts , (6 Cyl) 5 qts (refill)

Normal Oil Pressure: 35 lbs at 2000 RPM (4 Cyl), 1700 RPM (6 Cyl)

Pressure Regulator - In pump housing (4 Cyl), right side of cylinder block below valve chamber to rear of engine (6 Cyl)

Oil Pressure Indicator (Jeeps & Dispatch r): Red telltale light in instrument cluster operated by oil pressure switch, King-Seeley No. 47150 Light comes on when ignition switch turned on and goes out when oil pressure reaches 6 lbs.

Oil Pressure Indicator (Others): King-Seeley "CV" (Constant Voltage) electric type with gauge voltage regulator

Dash Unit - King-Seeley No 45729

Engine Unit - King-Seeley No 44030

See "Oil Pressure Gauges" in Misc llan ous S ction.

Oil Pump: Rotor type on left side of engine (4 Cyl), gear type attached to rear intermediate main bearing (6 Cyl)

Pump Overhaul - *See "Oiling Syst m" in Willys Special Data*

Oil Filter: Located on bracket attached to cylinder head (4 Cyl) On bracket on left side of cylinder head (6 Cyl)

Crankcas V ntilati n: (4 Cyl) See Crankcase Ventilator above (Others) Filter in oil filler cap and outlet tube from crankcase ventilator baffle on valve side cover

CONTINUED ON NEXT PAGE

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COOLING

Wat r Capacity: (FC-150) 10 qts (FC-170) 11 qts (Other 4 Cyl) 11 qts (Other 6 Cyl) 12 qts Add 1 qt for heater

Pr ssure Valv : (FC-150 170) 9 lbs (Other 4 & 6 Cyl) 7 lbs Radiator filler cap

Th rm stat: Harrison In water outlet elbow in cylinder head Opens at 163-168°F

Wat r Pump· Centrifugal packless ball bearing type S *"Wat r Pumps" in Willys Special Data*

►*FC-150 FAN PULLEY NOTE:* Install fan pulleys on both water pump and fan shaft assemblies with offset to front of engine to eliminate interference with generator pulley Adjust fan belt to ¼-½" deflection with light thumb pressure by pulling shaft housing to right side of frame

T mp ratur Gaug : King-Seeley "CV" (Constant Voltage) type FC-170 has Voltage Regulation contained within Gauge Other models have separate Voltage Regulator

King-Se l y No.	Dash Unit	Engine Unit
DJ-3A, CJ-5, 6, 3B	49454	44230
Other 4 Cyl	45734	44230
6 Cyl (Exc FC-170)	45734	44214

S *Temperature Gauges" in Miscellaneous Section.*

CLUTCH

Auburn 8501-39, R ckford 8½ RM, Borg & Beck 9A7 & 10A7. Single plate types Used as follows

4 Cyl. (All) - Auburn 8501-39 or Rockford 8½ RM 8½"

6 Cyl. Utility (4x2) - Borg & Beck 9A7 Assy No 951

6 Cyl. Utility (4x4) & Trucks (4WD) - Borg & Beck 10A7 Assy No 360982

S e Clutch S cti n f r complete data

Clutch Disc - (4 Cyl) B & B No 382298 (6 Cyl 4x2) B & B No 381929, (6 Cyl 4x4 & 4WD) B & B No 381806

Pedal Adjustment: 4 Cyl. (Exc. Trks. & Sta Wgns). 1½" pedal freeplay To adjust freeplay loosen yoke locknut on cable between throwout lever and cross shaft lever and turn cable

4 Cyl. (Trks. & Sta. Wgns. exc. FC-150) - 1½" pedal freeplay To adjust loosen locknut on adjusting rod (between clutch control lever and clutch control tube lever) and turn adjusting nut to increase or decrease rod length

6-226 Mod ls (Exc. 4x2 and FC-170) - 1" pedal freeplay To adjust, loosen locknuts on pedal adjusting rod turn nuts forward to increase or backward to decrease freeplay

6-226 (4x2) - 5/8-3/4" pedal freeplay Adjustment same as other 6-226 models

FC-150 & FC-170 -½" pedal freeplay To adjust loosen locknut on cable between clutch pedal and cross shaft lever and adjust length of cable

►*FC-150 CLUTCH PEDAL MODIFICATION* Late model FC 150 clutch pedals have approximately ¼" stock at extreme upper end which contacts pedal stop On pedals with ½" stock at this point grind off ¼" of stock to give pedal longer stroke to insure adequate clutch plate separation Reset cable length to obtain correct pedal freeplay *NOTE* - To remove lever loosen left headlight and move forward Separate heater blower wire if necessary Remove lever assembly from bracket and cable from lever

SYNCHRO-MESH TRANSMISSION

4 WHEEL DRIVE

Warner. Three speed type Constant mesh synchro-mesh helical gears (second and high) sliding spur gear (low and reverse) Used as follows

Model	Warner No.
Jeep	T90C
F4-134	T90C
6-226	T90J
FC-150 (3-speed)	T90A
FC-170 (3-speed)	T90J

NOTE - 4-speed Optional on FC-150 & FC-170

See "Warner Transmission" in Transmission Section

►*VIBRATION CORRECTION (4x4 Utility Models "Coasting Down Hill" with closed throttle)* May be due to endplay in transfer case output shaft. To correct, remove shims from between rear bearing cap and transfer case housing, so that when bearing cap is pulled up tight against case, endplay in shaft and bearings is just eliminated Shims are in sets consisting of four 003", two 010', and two 031" *CAUTION* - Output shaft must roll freely by hand **after** bearing capscrews are tightened securely.

►*TRANSFER CASE SHIFT LINKAGE CAUTION (FC-150)* Attach linkage lever to outer hole (two in shift rod nearest transmission) to eliminate hard transfer case shifting For correct linkage adjustment *See "Transfer Case" in Transmission Section*

►*TRANSFER CASE OPERATING LEVER VIBRATION ON ACCELERATION OR DECELERATION CORRECTION* When light hand pressure (either forward or backward) minimizes vibration insulate transfer case lever shaft brackets from body panel *See 'Transmission Notes" in Willys Special Data*

►*TRANSFER CASE OUTFUT SHAFT OIL LEAKAGE CORRECTION* Install additional seal Part No 811687 on both ends of output shaft in addition to standard seal seal guard and seal retainer New seal goes between seal retainer and seal guard

►*FOUR SPEED TRANSMISSION LUBRICATION CAUTION* Since there is no passage between 4-speed transmission and transfer case it is necessary to check fluid level at both transmission and transfer case fill points Fluid capacity is 4-Speed Transmission - 6¾ pints Transfer Case 3½ pints

Transfer Case· Spicer Model 18. Two speed auxiliary transmission and front wheel drive unit mounted on rear of transmission case. Separate control levers provided for Low-High range (right hand lever), and front wheel drive engagement (left hand lever).

See Transmission Section for complete data.

Transmission Controls: *See "Transmission Controls" in Transmission Section.*

R moval· (4 Whl. Drive) Transmission and transfer case are removed as an assembly. Disconnect front and rear propeller shafts at universal joints *(NOTE*–If equipped with Power Take-off drive, remove front end of power take-off propeller shaft assembly). Disconnect speedometer cable at transfer case, brake cable, and clutch release cable at cross shaft bell crank (Jeep), Place support jacks under engine and transmission, remove transfer case rubber snubber bolt nut (on right side) and rear mounting bolt nuts at cross member under transmission case. Remove floor board inspection plate. Drain radiator and loosen upper radiator hose. Remove transfer case shift lever pivot pin screw, remove pin and shift levers *(NOTE*–If Power Take-off used, remove power take-off shift lever plate screws and lift lever out). Remove bolts holding center cross-member at frame side rails and remove cross-member *(CAUTION* -With cross-member removed, engine and transmission weight will rest on support jacks). Remove bolts holding transmission on bell housing, force transmission to right until ball stud end can be disengaged from end of clutch control cross shaft. Lower support jacks under engine and transmission and slide transmission and transfer case assembly to rear until clutch shaft clears bell housing, remove assembly from beneath car.

2 WHEEL DRIVE

Warner. Three speed type Constant mesh synchro-mesh, helical gear (second & high) sliding spur gear (low & reverse) Used as follows

Model	Warner Type
Jeep Dispatcher	T90
F4-134	T96
6-226	T86

See "Warner Transmissions" in Transmission Section

►*HARD SHIFTING, SHIFTING INTO TWO GEARS OR JUMPING OUT OF GEAR CORRECTIONS* For trouble shooting above difficulties on 2-wheel drive models *See "Transmission Notes" in Willys Special Data*

Transmission Control· Remote control type with gear-shift lever on steering column. *See "Transmission Controls" in Transmission Section.*

Removal: (2 Whl. Drive) Remove floor boards, take off bell housing inspection cover, disconnect clutch throw-out bearing retracting spring. Disconnect transmission control rods and speedometer cable at transmission case. Disconnect propeller shaft at universal joints and remove shaft. Support engine with jack placed under bell housing, remove rear engine support bolts from cross-member under transmission case, raise rear end of engine so transmission clears cross-member *(CAUTION* –Use care that fan blades do not damage radiator). Remove transmission bell housing bolts, pull transmission straight back to clear clutch shaft, remove from car.

OVERDRIVE

Warner R10. *See "Warner R10" in Transmission Section.*

Overdrive Control· *See "Warner R10 & R11 Overdriv Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (2 Wheel Drive above) after disconnecting control cable and wiring.

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UNIVERSALS

2 WHEEL DRIVE

Spicer. Cross type. One at each end of propeller shaft.

4 WHEEL DRIVE

Drive Shaft Joints - Spicer. Cross type. One used at front and rear of both front and rear propeller shafts.
Front Axle Shaft Joints - Rzeppa. Constant velocity type. One joint used at outer end of each shaft (within steering knuckle housing).
See "Universal Joints" in Willys Special Data.
Power Take-off Shaft Joints - Detroit Ball-and-Trunion type. Two used (one at each end of shaft - no splined joint used).

FRONT AXLE

4 WHEEL DRIVE

Spicer Model 44(FC-170), Model 25(All Others). Full floating, Hypoid gear type. Differential assembly (ring and pinion gear assembly) is serviced in same manner as Spicer Rear Axles.
See "Spicer" in Rear Axle Section.
Ratio - (F-134, FC-150) 5.38-1; 6-226 (4x4) 4.27-1, (4WD & FC-170) 4.88-1. *NOTE* - FC-170 Optional Ratios - 4.27-1, 5.38-1

Removal: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axle Shaft & Universal Joint Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller, (*CAUTION*–do not lose shim pack under drive flange). Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly.((*CAUTION*–use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out.

Wheel Bearing Adjustment: Tighten inner adjusting nut until wheel binds (turn wheel while adjusting), then back nut off 1/6 turn, install lockwasher, locknut, and make certain nut locked by turning lockwasher ear up.
Axle Shaft End Play–No adjustment. Shims (.060") between driving flange and wheel hub establish correct endplay.

St ering Knuckle Bearing Disassembly & Adjustment: *See "Front Axle" in Willys Special Data.*

REAR AXLE

Spicer. Hypoid Semi-floating with Hotchkiss drive.

►*NOTE:* 6 Cyl. 4WD may have Timken Spiral Bevel as alternate equipment.

Mod l	Spic r No.
DJ-3A	25
F4-134 & 6-226 (4x4), FC-170	53
All Other Models	44

S "Spic r Hypoid Semi-floating" in Rear Axl Section.

►*"POWER-LOK" DIFFERENTIAL:* Optl equipment. Can be installed on vehicles not so equipped (Axle shafts must be replaced if they do not have involute splines). *See "Spicer Power-Lock Differential" in Rear Axle Section.*

►*POWER-LOK DIFFERENTIAL CAUTION: DO NOT use the engine to spin a rear wheel with one wheel raised off the ground. Always remove rear wheels when balancing them.*

►*AXLE SHAFT GREASE RETAINER PRODUCTION CHANGE:* Use only new axle shaft grease retainer Part No. 914802 to correct grease leaks.

►*RING GEAR BOLT LOCKING STRAP NOTE:* Replace drive gear screws and install locking straps when overhauling early production ring gear assemblies. Late type have locking straps.

Axle Ratios

Model	Std.	Optl.
F-134 (4x4,4WD)	5 38-1	.
F-134 (4x2)	4 89-1	5.38-1
DJ-3A	4 56-1	
FC-150, CJ-5, 6, 3B	.5.38-1	
6-226 (4x4, 4x2) Ⓒ	4 27-1	4 89-1 or 5 38-1
6-226 (4WD), FC-170	4.88-1	4,27-1 or 5 38-1

Ⓒ - With Overdrive 4,89-1 (Std), 5 38-1 (Optl.).

Axle Shaft Removal (Semi-floating Axle): Remove axle shaft nut, then use puller to remove wheel hub. Remove bolts retaining dust shield, grease and bearing retainers, and brake assembly. *CAUTION* - Do not disturb backing plate. Remove shield and retainer then pull axle shaft, being careful not to lose adjusting shims.

Rear Axle Assembly Removal: Support rear end of car securely, remove rear wheels, disconnect rear shock absorbers, rear brake line (at frame connection on right side), rear brake cables, and propeller shaft at rear universal joint. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring "U" bolts, remove pivot bolt at front end of springs, lower springs. Remove axle assembly from beneath car.

Wheel Bearing Adjustment: End Play .003-.007". Adjust by adding or removing shims between backing plate and axle housing flange at each wheel. See "Axle Shaft Removal" above.

SHOCK ABSORBERS

Monroe or Gabriel. Direct acting type.

FRONT SUSPENSION

2 WHEEL DRIVE

Conventional I-Beam with Reverse-Elliot ends and semi-elliptical springs.
Kingpin Inclination - 7°30'.
Caster - 3°. **Camber** - 1° (Dispatcher), 1°30' (Others).
Toe-In - .047-.094".
Toe-Out on Turns - Outer wheel 20°, inner wheel 22°.

4 WHEEL DRIVE

Special front wheel drive unit with semi-elliptical springs. Steering knuckle mounted on taper roller bearings carried on two stub shafts.
Kingpin Inclinati n - 7½°.
Cast r - 3° **Camber** - 1½° **T -In** - 047- 094".
T -Out n Turns -Outer wheel 20°, Inner wheel should be 20° (Exc. Jeep), Jeep 22°.

►*OTHER DATA: S e "Front Axl " in Willys Special Data.*

STEERING

Ross. Cam and Twin Lever type.
See "Ross Cam & Twin Lev r" in St ring S ction.
Steering Linkage: *See "Ste ring Linkage" in Steering Section.*
Steering Wheel & Horn Button R m val: *S "R ss Cam & Twin Lever" in Steering S ction.*
Steering Gear Removal: *See "Ross Cam & Twin L v r" in Steering Section.*

BRAKES

Bendix-Lockheed (Self-Cent ring). Hand brake applies rear service brakes(Exc. Univ. Jeep) Independent brake on drive shaft at rear of transfer case (Univ. Jeep). *NOTE* - Drive shaft brake optional on FC-150.
See "Bendix-Lockheed (Self-C nt ring)" in Brak S ction.

►*FC-150 HAND BRAKE BRACKET BREAKAGE CORRECTION:* Reweld bracket to Rail Reinforcement Assembly, then weld an additional reinforcement bracket between top of mounting bracket and Rail Reinforcement Assembly.

Drums - 9" (CJ-3B 5 6; DJ-3A), 11" (Others)

Wheel Cyl. Diameter -	Fr nt	R ar
CJ-3B,5,6,	1"	3/4"
DJ-3A	1 1/8"	13/16"
Others	1 1/8"	1"

Lining Length & Width

Model	Primary	Sec ndary
CJ-3B 5,6	10 7/32" x 1 3/4"	6 39/64" x 1 3/4"
DJ-3A	9 7/8" x 2"	7.11/16" x 1 3/4"
Others	12 1/4" x 2"	10 1/32" x 2"

Thickness - .206- 216" (CJ-3B,5,6); .214" (DJ-3A); 212" (Others).
Braking Power - Front 65%, Rear 35% (CJ-3B,5,6,DJ-3A); Front 57%, Rear 43% (Others).
Clearance - Tur n eccentric until shoe contacts drum, then back off until wheel turns freely.

Power Brake: Hydrovac Power Unit. Used with standard master cylinder.
See "Hydrovac Power Unit" in Brak S ction.

Parking Brake (Independent Typ): Be certain hand brake cable and linkage operate freely. Lubricate if sticking or binding is evident. Place brake handle on instrument panel to "OFF" position. Rotate brake drum until one pair of adjusting holes (three pairs located on back face of drum) is opposite the adjusting screws (notched wheels) within the brake. Insert a screwdriver or adjusting tool through hole and turn each adjusting screw equally until the brake shoes are snug against drum (*NOTE* - With tool against edge of hole as a fulcrum, move outer end of tool out away from center of driveshaft to expand shoes). **Back ff ach adjusting screw 7 notches** to provide correct shoe clearance.

MISC. MECHANICAL

Windshield Wipers: Vacuum type.
(Univ. J p) - Individual motors operate wiper arms.
(Oth r Mod ls) - Single motor operates wiper arms by cable control.
S "Windshield Wipers" in Misc llane us S ction.

►*ELECTRICAL EQUIPMENT NOTE 12-Volt system used on all models except EARLY Forward Control FC-150 & FC-170 Data on both 6-volt and 12-volt equipment are listed below*

MODEL IDENTIFICATION

Mod l	Series Symbol
F4-134 4x2 & 4x4 Jeep Utility	54
L6-226 4x2 & 4x4 Jeep Utility	54
F4-134 & L6-226 4WD Truck	55
DJ-3A Jeep Dispatcher	56
CJ-3B, CJ-5, CJ-6 Universal Jeep	57
FC-150 Forward Control	65
FC-170 Forward Control	61

SERIAL NUMBER: Stamped on plate on floor riser on left side directly behind drivers seat (Utility Wagon & Delivery), on right side of dash in engine compartment (Jeeps & Truck), on top of right front wheel housing beside passenger seat (FC-150), on top of left front wheel housing beside drivers seat (FC-170) *NOTE* - Serial number (example below) includes identification data as indicated ① ② ③ ④ - ⑤

54 5 4 8 - 10001

① - See "Series Symbol" in Model Table above.
② - See "Body Style" in Body Style Table below.
③ - See "Engine Symbol" in Engine Designation Table.
④ - 2 Whl. Dr. - 1 or 7 (LHD), 5(RHD).
4 Whl. Dr. - 2 or 8 (LHD), 6(RHD).
⑤ - Factory Unit Production Number First Nos for 1958 Models as follows **1958 Numbers**

4 Cyl Utility Wagon 4x2 - 10280 4x4 - 13907
4 Cyl Utility Dlvry 4x2 - 10223 4x4 - 10510
6 Cyl Utility Wagon 4x2 - 10469 4x4 - 18094
6 Cyl Utility Dlvry 4x2 - 10138 4x4 - 10851
Truck (Pickup) 4 Cyl - 11781 6 Cyl - 22248
Truck (Platform Stake) 6 Cyl - 10761
Truck (Chassis & Cab) 6Cyl - 11189
Jeep CJ-3B - 25017 CJ-5 - 25675 CJ-6 - 10016
Jeep Dispatcher DJ-3A - 10067
Forward Control FC-150 - 10001 FC-170 - 10001

Engin D signation Table

Engin Typ	Engine Symbol
4 Cyl. 134 Cu. in. "L" Head	3
4 Cyl. 134 Cu. in. "F" Head	4
6 Cyl. 226 Cu. in. "L" Head	6

B dy Style Table

Body Style	S ri s - 54	55	56	57	61	65
Utility Wagon	①					6
Utility Delivery	②					7
F F Cowl	4	4			2	2
Cowl & Windshield	5	5	5		3	3
Stripped Chassis	6	6		③	1	1
All	9	9		9		
Special Jobs	0	0		0		
Cab & Chassis		1			⑤	⑤
Pickup Truck		2			⑤	⑤
Stake Truck		3			⑤	⑤
Open Body			3	④		

① - 1 (2Door), 7 (2 Door Plan).
② - 2 (2 Door), 8 (2 Door Plan).
③ - 4 (CJ-3B), 6 (CJ-5), 8 (CJ-6).
④ - 3 (CJ-3B), 5 (CJ-5), 7 (CJ-6).
⑤ - 4 (Open Cab), 5 (Closed Cab).

ENGINE NUMBER: Located as follows:
4 Cyl. Engin s - Stamped on top of water pump boss at front of engine.
6 Cyl. Engine - Stamped on boss on left front corner of engine block above generator.
NOTE - Letters following engine number designate special cylinder bore and bearing oversizes or undersizes

TUNE-UP

COMPRESSION PRESSURE:	Pressure & Speed
4 Cyl "L" Head	90-110 lbs at 185 RPM
4 Cyl "F" Head	115-145 lbs at 185 RPM
6-226 "L" Head	120-130 lbs at 185 RPM

NOTE - Pressure in all cylinders should be uniform within 10 lbs

VACUUM READING: 18-21" steady at idling speed

TAPPET CLEARANCE:	Intake	Exhaust
4 Cyl "L" Head	016"	016"
4 Cyl "F" Head	018"	016"
6-226 "L" Head	014"	014"

NOTE - Set tappet clearance with engine COLD and not running

►*VALVE TAPPET ADJUSTMENT (FORWARD CONTROL MODELS)* Access panel provided in right front wheel housing for valve tappet adjustment Install jack stand under right frame rail remove right front wheel, remove wheel housing access panel (both sections of split panel), remove fuel pump and valve covers Tappet clearance can then be adjusted

MANIFOLD HEAT CONTROL: Used as follows—
4 Cyl. "L" Head. Thermostatic coil on manifold.
4 Cyl. "F" Head. Water jacketed intake manifold.
6-226 "L" Head. Exhaust heat from No. 3 & No. 4 cylinders enters heat chamber under intake manifold

IGNITION

FIRING ORDER: 1-3-4-2 (4 cyl.), 1-5-3-6-2-4 (6 Cyl.).

SPARK PLUG GAP: 030".
Spark Plug - Auto-Lite A7 or Champion J8. 14 mm. Torque to 28-30 ft. lbs.

COIL: Auto-Lite. *NOTE* Different coils used for 6-volt and 12-volt systems as follows

Model	6-Volt	Auto-Lite Coil No.
FC-150, FC-170		CR-6009
	12-Volt	
Sta Wgn & Trk (4 Cyl)		CAG-4002A
Sta Wgn & Trk (6 Cyl)		CAJ-4002A
Jeeps		CAF-4003

Ignition Current - (6 Volt) 2 5 amps idling, 5 amps at 6 3 volts stopped **(12 Volt)** 2 5 amps at 12 5 volts stopped

DISTRIBUTOR: Auto-Lite. *NOTE* - Same distributors used on both 6-volt and 12-volt systems as follows

Engin	Auto-Lite Distr. No.
4 Cyl "L" Hd Jeep	IAY-4012
4 Cyl "F" Hd Jeep	IAD -4041
4 Cyl "F" Hd Others	IAT-4204A
6 Cyl "L" Hd All	IAT-4206B

C nd ns r - Auto-Lite

	Condenser No.	Capacity
"IAY" Distr	IAT-3076-LA	25- 28 mfd
"IAD" Distr	IGW-3139	23- 26 mfd
"IAT" Distr	IBB-2042-SS1	21- 25 mfd

Contact Point Set - Auto-Lite

	Auto-Lite No.
"IAY" Distr	IGW-3028-DS
"IAD" Distr	IGP-3028-FS
"IAT" Distr	IGW-3028-AS

Breaker Gap - 020" Limits 018- 022"
Cam Angle - 37 43° (All 4 Cyl), 36 42° (6 Cyl)
Breaker Arm Spring Tension—17-20 ozs.
Rotation—Counter-clockwise viewed from above

Automatic Advance
(IAY-4012, IAD-4041, IAT-4204A)

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		425	2		850
6		1050	12		2100
10		1575	20		3150
11		1700	22		3400

Automatic Advance - IAT-4206B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
1		375	2		750
4		600	8		1200
6		1175	12		2350
7.5 -		1700	15		3400

Vacuum Spark Control: None used on IAY, IAD Distr.

Vacuum Advance—IAT-4204A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	5 1/8
3	6	9 5/8
6	12	14

Vacuum Advance - IAT-4206A

Start	0	10
3	6	13
5	10	15

IGNITION TIMING

Setting - 5° BTDC (All Models)
Timing Mark (All 4 Cyl Engines) - Notch on rim of crankshaft pulley and pointer on timing gear cover marked by two lines "T" (Top dead center) and "5" (5°BTDC) Align notch with "5" mark
(6 Cyl. Eng.). Align correct graduation with pointer on timing gear cover Damper marked "O" at TDC with 1° graduations before and after this point

CARBURETOR

►*FORWARD CONTROL FC-150 ACCELERATOR CONTROL ASSEMBLY (To prevent control wire breakage) See "Fuel System Notes" in Willys Special Data for correct assembly of control system*

►*FLAT SPOT OR STUMBLE CORRECTION (Vehicl s with Carter YF 938S, SA; 951S Carburetors): S e "Carter YF Carburetors" in Carburetion Section.*

Carburetor Application

Model	Carter Carb. N .
4 Cyl. "L" Jeep Dispatcher	YF 2392S
4 Cyl. "F" Univ Jeep	YF 938SA
4 Cyl. "F" 4X2, 4X4, 4WD	YF 951S
4 Cyl. "F" Fwd. Control	YF 938SA
6 Cyl. 6-226 "L" All	YF 2467 S

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Idl Setting - ¾-1¾ turns open (938SA, 951S). ½-2 turns open (2392S), 1-2½ turns open (2467S). Turn screw out for richer mixture.

Idle Speed - 600 RPM (4 Cyl), 550 RPM (6 Cyl)

Float Level - (2392S, 2467S) 9/32" - Gauge T109-126, (938SA, 951S) 5/16" - Gauge T109-107. From top of float at free end to gasket seat on cover with assembly inverted and float resting freely on intake needle.

Fast Idle: With choke held in wide open position, lip on fast idle arm should contact boss on body casting.

► *OTHER DATA· See "Carter YF Carburetor" in Carburetion Section*

FUEL PUMP PRESSURE: (4 Cyl.) 2½-3¾ lbs. at 1800 RPM. (6 Cyl.) 3½-5½ lbs. at 1800 RPM.

CARB. EQUIPMENT

Fu l Pump: (4 Cyl) Carter M2195S, Fuel only (6 Cyl) Carter M957S, Fuel & Vacuum

Pressure - (4 Cyl) 2½-3¾ lbs at 1800 RPM, (6 Cyl) 3½-5½ lbs at 1800 RPM

See "Fuel Pumps" in Carburetion Section

Gasoline Gauge: Stewart-Warner Electric type

See "Fuel Gauges" in Carburetion Section

CRANKCASE VENTILATOR

Sealed Positive Ventilation (4 Cyl.). Clean air is drawn into oil filler tube and rocker arm cover through a hose to the air cleaner All connections and gasket on filler tube must be air tight The crankcase is ventilated by a sealed system from air cleaner tube to intake manifold A valve is attached to valve spring cover in the line to air cleaner This valve must be free of carbon and operate freely at all times to obtain smooth idle Remove and clean valve every 5000 miles or more often if engine must run at idle speed excessively or is used for stationary power

6-VOLT ELECTRICAL SYSTEM

BATTERY

Auto-Lite or Willard Type 1-M-100. 6 volt 15 plate, 100 ampere hour capacity (20 hr rate)

Battery Ground - Negative

Engine Ground - Left front engine support (6-226), right front engine support (Others)

STARTER

Auto-Lite MCH-6203 (4 Cyl.), MCH-6210 (6 Cyl.)

Armature Auto-Lite MCH-2088 (All)

Drive - Bendix "Folo-Thru" type

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 42-53 ozs

Performance Data

Torque	RPM	Volts	Amperes
0	4300	5 0	65
6 0	Lock	2 0	335

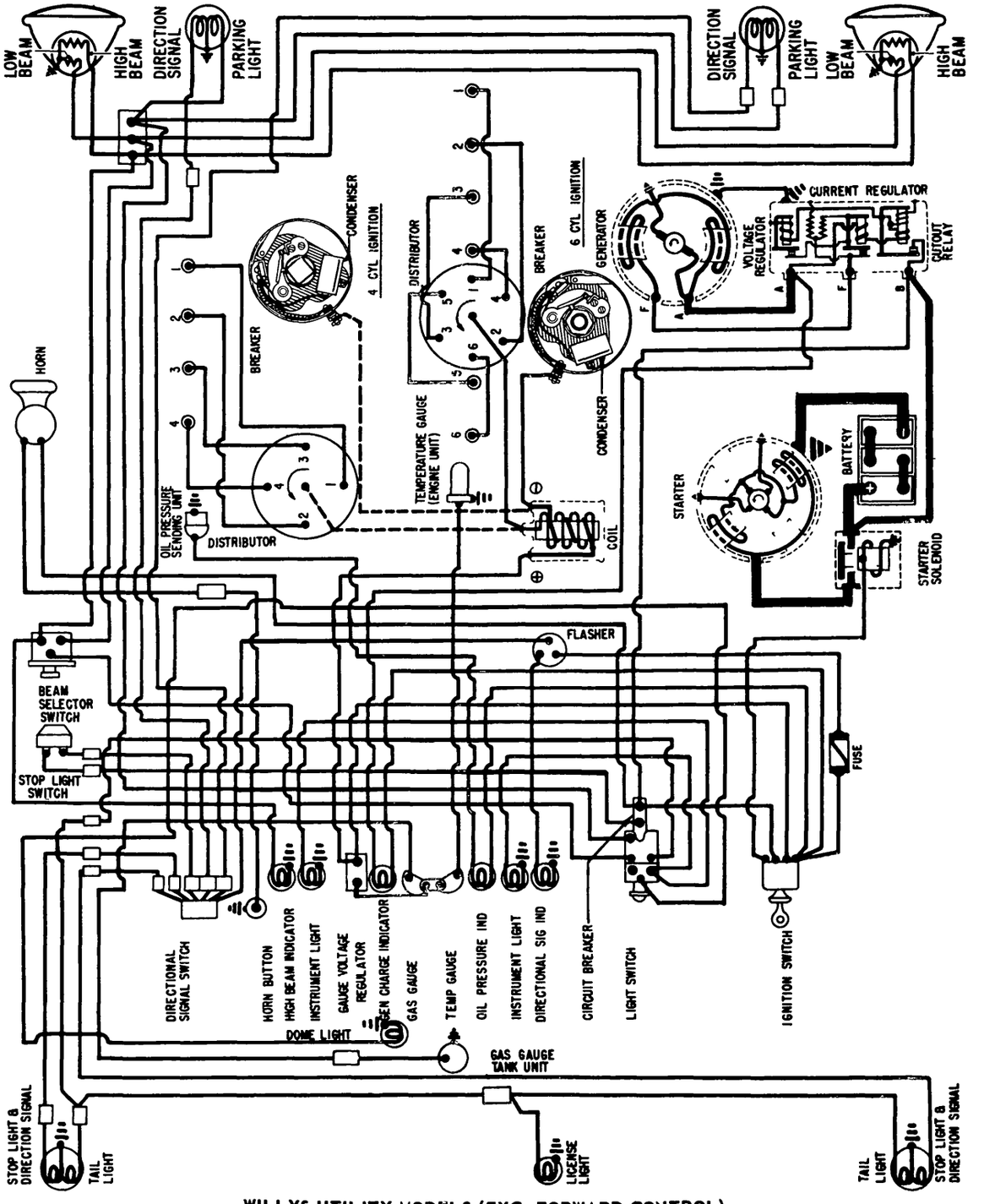
Starting Switch: Auto-Lite SST-4012 (MCH-6203), Key starting (Magnetic switch controlled by turning key past "Ignition On" position)

GENERATOR

Aut -Lit GGW-4801D (4 Cyl.), GGW-4801EN (6 Cyl.).

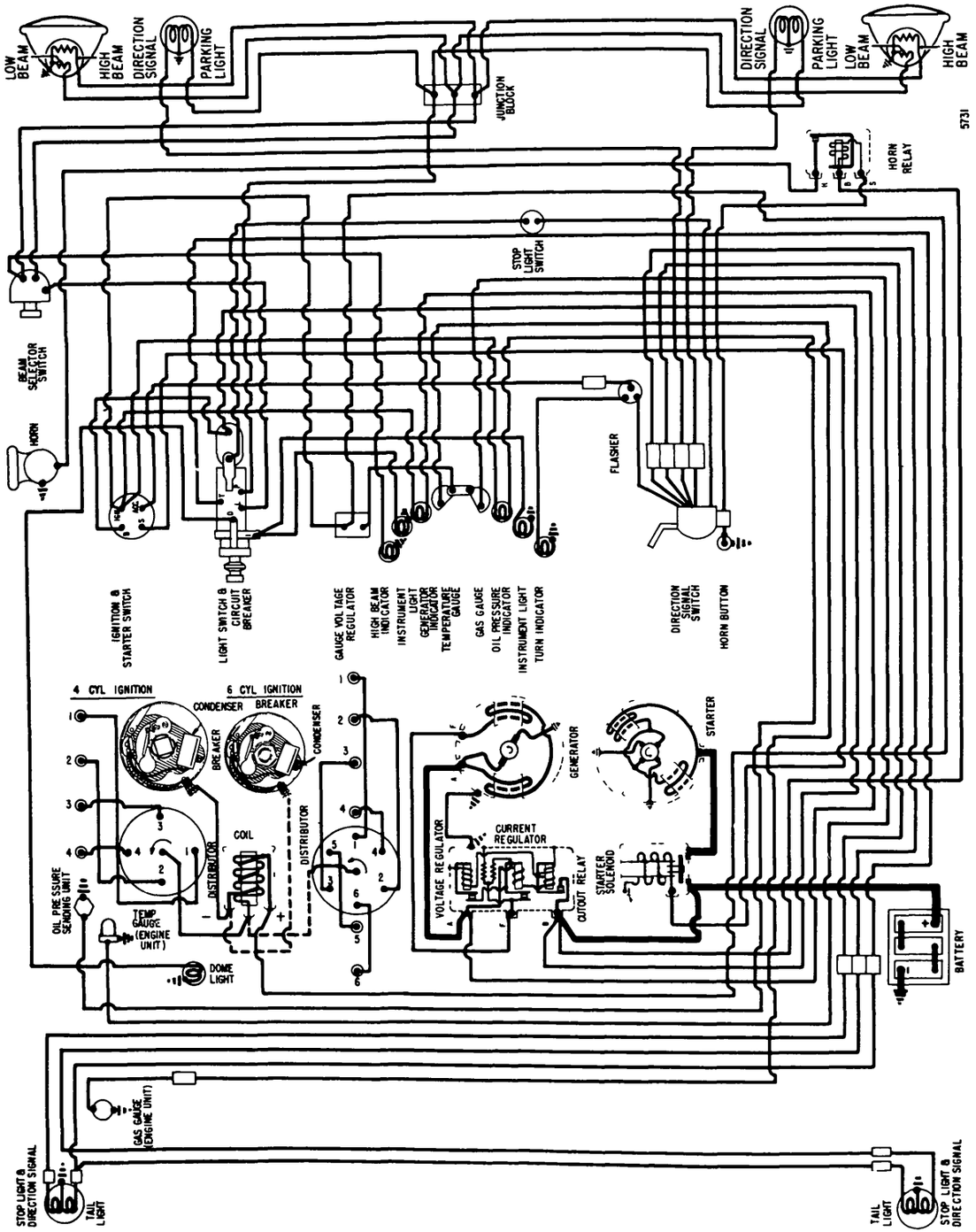
Armatur - Auto-Lite GGW-2006F (All Cars)

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WILLYS UTILITY MODELS (EXC. FORWARD CONTROL)

Form 37 A



WILLYS FORWARD CONTROL MODELS FC-150 & FC-170

CONTINUED FROM PRECEDING PAGE

Performance Data

Amperes	Volts	Cold	RPM	Hot
0	6.4	870-970		950-1050
40.0	8.0	1800-2000		2150-2350
45.0	8.0	1925-2125		2350-2550

Brush Spring Tension—35-53 ozs
Field Current - 1 6-1 7 amperes at 5 0 volts
Motoring Current - 5 0-5 5 amperes, 5 0 volts at 70°F
Rotation—Counter-clockwise at commutator end.
Belt Adjustment: ½-5/8" deflection with thumb pressure midway between generator and pump pulleys

REGULATOR

Auto-Lite VBE-6105A. Voltage & Current type with "Temperature Compensated" Current Regulator

Cutout Relay

Cuts In—6.3-6.8 Volts
Cuts Out—4 1-4 8 Volts
Contact Gap— 015" minimum
Air Gap— 031- 034" with contacts open (check at hinge end of core)

Voltage Regulator

Setting—7.2-7.5 volts at 70°F *after 15 minutes operation charging at 10 amperes*
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Auto-Lite 6-Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type Set to following specifications at 70°F.*

	Test A—Operating Amperes—	Test B
VBE-6105A	52	45 (43-47)

Test A - After 15 minutes operation charging at 10 amperes
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 6 7-6 9 volts)
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting - *See "Auto-Lite 6-Volt Regulators" in Electrical Section*

12-VOLT ELECTRICAL SYSTEM

BATTERY

Auto-Lite 11-HS-50. 12 Volt, 9 Plate, 50 ampere hour capacity (20 hour rate)
Battery Ground - Negative
Engine Ground - Left front engine support (6-226), right front engine support (Others)

STARTER

Auto-Lite MDM-6005 (4 Cyl.), MDM-6006 (6 Cyl.).
Armature - Auto-Lite MDL-2048 (All)
Drive - Bendix "Folo-Thru" type
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data

Torque	RPM	Volts	Amperes
0 ft lbs	4400	10 0	50
5 0 ft lbs	Lock	4 0	210

CONTINUED ON NEXT PAGE

Form 37 B

CONTINUED FROM PRECEDING PAGE

Starting Switch: Auto-Lite SAE 4005 (MDM 6005) Key starting (Magnetic switch controlled by turning key past "Ignition On" position)

GENERATOR

Auto-Lite GJC-7002J (4 Cyl.), GJC-7002K (6 Cyl.)

Armature - Auto-Lite GJC-2030F (All Models).

Performance Data

Amperes	Volts	RPM
0.0	12.8	1225-1325
30.0 -	15.0	2050-2250

Brush Spring Tension - 18-36 ozs.

Field Current - 1.2-1.3 amps. at 10.0 volts (70°F).

Rotation - Counterclockwise at commutator end.

Belt Adjustment: 1/2-5/8" deflection with thumb pressure midway between generator and water pump pulleys.

REGULATOR

Auto-Lite VRX-6009B. 12 Volt Voltage and current type with "Temperature Compensated" Current Regulator

Cutout Relay

Cuts In - 12.6-13.6 volts.

Cuts Out - 3.0 - 5.0 amps. discharge after a charge of **Contact Gap** - .015" minimum. **Air Gap** - .031-.034".

Voltage Regulator

Setting - 14.5 volts at 80°F, unit operating while charging at 10 amperes or with a .25 ohm resistor between regulator and battery.

Air Gap - .048-.052" with contacts just opening.

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amperes	Test B
37 amps. max.		28-32 amps.

Test A - After 15 minutes operation charging at 10 amps.

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).

Air Gap - 048-052" with contacts just opening

Checking & Adjusting - *See "Auto-Lite 12-Volt Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlamps: Sealed Beam *See Electrical Section*

Directional Signal: *See Electrical Section*

Lighting Switch Removal: Loosen set screw on side of control knob and remove knob Remove retaining nut and push switch through panel

Stop Light Switch Location: On brake master cylinder

CIRCUIT BREAKER: 30 ampere Thermal type on light switch

FUSES: Directional Indicator - SFE-14 ampere in flasher lead

Radio - SFE-9A ampere in lead to radio

Heater - SFE-10 (FC-150,170), SFE-14 (Others)

Overdrive - SFE-20 at overdrive relay

ENGINE

►*THREE DIFFERENT ENGINES USED: See "Model Identification" for application*

4 CYL. "F" HEAD

Model	Bore	Stroke	Displacement
F4-134 (All)	3.125"	4.375"	134.2 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
F4-134 4x2	7.4-1①	15.63	75 at 4000 RPM
F4-134 Others	6.9-1②	15.63	72 at 4000 RPM

① - 7.8-1 Optl. ② - 7.4-1 Optl.

Compression & Vacuum Reading—*See "TUNE-UP" above.*

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following.

"A" .010" main & connecting rod journals Undersize.

"B" .010" cylinder bore and pistons Oversize.

"AB" both above conditions exist.

ENGINE REMOVAL (FC-150 FORWARD CONTROL): *See "Engine" in Willys Special Data*

CYLINDER HEAD & GASKET INSTALLATION: *See Willys Special Data.*

TIGHTENING TORQUES: *See Willys Special Data.*

PISTONS

Aluminum alloy, cam ground, T slot, Tin or Brass plated Piston has heat insulating groove above top piston ring groove

►*PISTON OVERSIZE NOTE:* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.

Weight—13.5 ozs.

Removal—Pistons & Rods removed from above.

Fitting New Pistons: Place 003" x 3/4" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove ribbon feeler should be 5 to 10 lbs.

Replacement Pistons: Std. and .010", .020", .030" and .040" Oversize.

Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).

PISTON PINS

Locked in rod with clamp screw.

Diameter - .8118-.8120". **Length**—2-25/32".

Clearance in Piston—.0002-.0004". Thumb push fit at 70° F.

Replacement Pins: No oversizes available.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr #1	3/32"	007-.017"	002- 004"
Compr #2	3/32'	.007-.017"	.0015- 0035'
Oil	3/16'	007- 017"	001- 0025

Replacement Rings (For rebored cylinders)—Furnished .010", .020", .030" and .040" Oversize.

Service Type Rings—(For Cylinders not Rebored)—Furnished Std. (.000-.009"), .010" (.010-.019"), .020' (.020-.029"), 030" (.030-.039"), .040" (.040-.049") Oversize.

Installing Rings Install compression rings with mark "Top" (on side) toward top. Rings have tapered face and must be installed correctly. Top ring inner bevel edge must be up.

CONNECTING RODS

Length (Center to Center) - 9.1845-9.1905 **Weight** - 32 ozs.

Crankpin Journal Diameter - 1.9375"

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AB" following the engine number indicates that main and connecting rod journals are .010" Undersize.

Bearings—Steel backed babbitt.

Clearance - 0002- 0025"

Sideplay - 005- 009"

Replacement Bearings: Std and 010", 020" 030" Undersize

Installing Rods: Lower bearing offset. Install rods with short side of bearing toward nearest main bearing or toward front of engine (#1, 3), and toward rear (#2, 4). Oil spray hole in lower rod bearing toward right of engine (away from camshaft) on all rods.

CRANKSHAFT

Journal Diameter—2.3341-2.3331". All main bearings.

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AB" following engine number indicates that main and connecting rod journals are .010" Undersize.

Bearings—Steel backed babbitt.

Clearance - 0014 0029"

Replacement Bearings: Std and 010", 020", 030" Undersize

Crankshaft Servicing: *See "Crankshaft & Main Bearings" in Willys Special Data*

End Thrust: Taken by thrust washer between crankshaft gear and front bearing Endplay controlled by shims between thrust washer and shoulder on crankshaft *NOTE* - Thrust washer must be installed with inner beveled edge toward front bearing

Endplay—.004-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Willys Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1860-2.1855", **(2)** 2.1225-2.1215", **(3)** 2.0600-2.0590", **(4)** 1.6230-1.6225".

Bearings - No 1 steel-backed, babbitt (replaceable bushings), Nos 2, 3 4 cast iron (precision bored in block)

Clearance - 001- 0025"

End Thrust: Taken by thrust plate behind camshaft gear Endplay controlled by spacer between camshaft gear and shoulder on shaft Endplay can be increased by installing shim between spacer and shaft or decreased by dressing off spacer *NOTE* Inner beveled edge of spacer must be toward crankcase

End Play—.004-.007".

Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data.*

Timing Gears: Crankshaft gear, steel. Camshaft gear, fibre with steel hub.

Gear Clearance - 000 002"

Camshaft Setting. Mesh marked tooth of camshaft gear with marked space (between teeth) of crankshaft gear

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data.*

VALVES

Tappet Clearance Intake .018", Exhaust .016" Cold.

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Valv	H ad Diamet r	St m Diam t r	L ngth
Intake	2"	.3733-.3738"	4.781"
Exhaust	1-15/32"	.371-.372"	5 909'

Valv	Seat Angl	Lift	Stem Clearance
Intake	45°	.260"	.0007-.0022"
Exhaust	45°	.351"	.0025-.0045"

►*EXHAUST VALVE NOTE* Thompson Valve Rotators used.

Valve S at Width–3/64".

Valv Seat Ins rts - Used for all exhaust valves

Valve St m S als (Intake Valves) - Rubber seal ring installed on upper end of valve stem directly below valve locks When installing valves install spring and retainer compress spring install seal in groove before installing locks

Valve Springs Install with closed coil upward toward block (Exhaust), down towards head (Intake).

Fr L ngth–1 31/32 (Intake), 2½' (Exhaust)

Valv Spring Specifications

Valve	Intake	Exhaust
Closed	73 lbs at 1 21 32"	53 lbs at 2 7/64"
Open	160 lbs at 1 3/8"	120 lbs at 1 3/4"

Valve Guides Use Tool W-177 to remove and install guides. Drive Exhaust guide down into valve compartment to remove. Drive new Exhaust guide to 1" below surface of cylinder block and new Intake guide flush with bottom of valve guide bore in cylinder head.

R cker Arm Ass mbly Removal *See "Valve System" in Willys Special Data.*

Valv Lift rs Mushroom type operating in reamed holes in block. Serviced by installing oversize lifters. Lifters furnished .004" Oversize.

Diam t r–.6240-.6245". **Clearance**–.0005-.002".

►*NOTE.* Camshaft must be removed for lifter removal.

VALVE TIMING

S e "Camshaft Setting" under "CAMSHAFT" above.

Intak Valv s–Open 9° BTDC. Close 50° ALDC.

Exhaust Valves–Open 47° BLDC. Close 12° ATDC.

Valve Timing Ch ck–Set Intake valve clearance at .026". Rotate engine clockwise until No. 1 cylinder is ready for intake stroke. Intake opens 9° BTDC. Note the distance between TDC and the 5° mark and estimate 9° from this distance. With the crankshaft in this position timing is correct if lifter is just tight against valve stem.

ENGINE

4 CYL. "L" HEAD

Mod l	Bor	Stroke	Displacement
L4-134	3.125"	4.375"	134.2 cu. ins.
Mod l	**C mpr. Rati**	**Rated HP**	**Developed HP**
L4-134	6.48-1	15.63	60 at 4000 RPM

►*ENGINE NUMBER NOTE Letters stamped after engine number denote the following*

"A" - .010" undersize main & connecting rod bearings.
"B" - .010" oversize cylinder bore.
"AD" - Both above conditions exist.
"C" - 002" undersize piston pin
"D" - 010" undersize main bearing journals only
"E" - 010" undersize connecting rod bearing journals only

►*OTHER ENGINE DATA S "4 Cyl. "F" H ad" abov and note the foll wing differences*

VALVES: Tapp t Cl aranc - .016" Cold (Intake & Exhaust).

Valve	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.3715"	5 51/64"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	45°	351"	0015- 00325"
Exhaust	45°	351"	0025- 00375"

Valve Seat Width - 3/64"

Valve Springs: Install all springs with closed coil end up toward cylinder block **Free Length** - 2½"

Spring Specifications (All Valves)

Valve	Pressure & Length
Closed	53 lbs at 2 7/64"
Open	120 lbs at 1 3/4"

Valve Guides: Use W-177 to remove and install guides. Drive guides into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block and new intake guide 1 5/16" below surface of cylinder block.

VALVE TIMING: *Same as on 4 Cyl "F" Head Engine*

Valve Timing Check - Set tappet clearance of No 1 cylinder intake valve at 020" Rotate engine until No 1 cylinder is entering intake stroke (9° BTDC) Note distance between TDC and 5° mark on timing gear cover, estimate position of 9° point With crankshaft in this position, timing is correct if lifter is just tight against valve stem Reset tappet clearance to 016"

ENGINE

6 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L6-226	3.3125"	4.375"	226.2 cu. ins.
Model	**Compr. Ratio**	**Rated HP**	**Developed HP**
L6-226	6.86-1③	26.33	105 at 3600 RPM

③ - 7.3-1 Optl.

Compression & Vacuum Reading–*See TUNE-UP above.*

►*BEARING PRODUCTION CHANGE & REPLACEMENT CAUTION (Beginning Engine Number TW-6L-226-47787 and SW-6L-226-12252)* New improved Connecting Rod and Main Bearings used in production to provide increased bearing life When replacing ALL bearings in earlier engines, install late type bearings *CAUTION - If only partial replacement made, use SAME type bearings as originally installed Early and late type bearings MUST NOT BE INTER-MIXED*

►*ENGINE REAR BEARING OIL LEAK CORRECTION (Engines before No SW-6-L-13542, TW-6-L-T-74176, and TW-6-L-F-13756)* If these engines do not have improved Rear Bearing Filler Block (with alignment pins which engage holes in guard assembly), install all parts of new Rear Oil Seal Service Kit, Part No 917608 *See "Crankshaft & Main Bearings" in Willys Special Data for installation data*

►*ENGINE NUMBER NOTE* Letters following engine number denote the following

"A" 010" Undersize main and connecting rod journals
"N" 020" Oversize bore and pistons
"AN" Indicates both "A" and "N" conditions

ENGINE REMOVAL (FC-170 FORWARD CONTROL): *S e "Engine" in Willys Special Data*

CYLINDER HEAD & GASKET INSTALLATION: *See "Cylinder Head & Manifolds" in Willys Special Data*

TIGHTENING TORQUES: *See "Tightening Sp cifications" in Willys Special Data*

PISTONS

Aluminum alloy, T slot, Cam ground Tin-plated

►*PISTON OVERSIZE NOTE* Letters "N" or "AN" following engine number indicates that cylinder bore and pistons are 020" Oversize

Weight - 15 187-15 437 ozs (less rings and pin)

Removal - Pistons and rods removed from above

Fitting New Pistons: Place 0015" x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove feeler should be 5 to 10 lbs.

Piston Replacement–Std., .010", .020", .025 .030", 040", 050", and .060" Oversize

Installing Pistons. Slot in skirt toward left or away from camshaft.

PISTON PINS

Floating type with lock ring at each end.

Diameter - .8591-.8593". **Length** - 2.779".

Clearance in Piston - .0002". Selective fit. Push fit at 160°F.

Clearance in Rod - .0002-.0006". Press fit.

Replacement Pins. Std., .003" and .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr. (Upper)	.0930-.0935"	.008-.016"	.002-.004"
Compr. (Lower)	.0930-.0935"	.008-.016"	.003-.007"
Oil (Top ring)	.1545-.1550"	.008-.016"	.006-.010"
Oil (Bottom ring	.1545-.1550"	.008-.016"	.0025-.004"

Replacement Rings: Ring sets and single rings furnished in following sizes for oversize ranges indicated Std. (Std.-.009"), .020" (.010-.029"), .030" (.030-.039"), .040" (.040-.049"), .060" (.050-.069").

Installing Rings Side marked "Top" (compression rings) upward. Chrome plated ring must be installed in top (#1) ring groove.

CONNECTING RODS

Length–6.998"- 7.002" (Center to center)

Crankpin Journal Diameter–2.0619- 2.0627".

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AN" following engine number indicates that the main and connecting rod journals are .010" Undersize.

Bearings–Steel Backed Babbitt.

Clearance - 0018" maximum. **Sideplay** - .006-.011".

Replacement Bearings Std. and .001", .002", .010" and .012" Undersize.

Installing Rods. Mark rods and bearing caps. Install with marks together and toward camshaft in same order as when removed. Oil spray hole in lower end of rod toward camshaft. *NOTE*–Lower bearings offset with narrow side of rod toward nearest main bearing (#1, 3, 5 forward), (#2, 4, 6 toward rear).

CRANKSHAFT

Journal Diam ter–2.3744-2.3752".

►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AN" following the engine number indicates

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that the main and connecting rod journals are .010" Undersize.

Bearings—Steel Backed Babbitt.

Clearance - .0007-.0020".

Replacement Bearings· Std. and .001", .002", .010" and .012" Undersize.

End Thrust: Taken by #4 rear main bearing which is flanged type.

End Play— 002-.006".

R at Bearing Oil Seal Installation· *See "Crankshaft and Main Bearings" in Willys Special Data.*

►*REAR BEARING OIL SEAL PRODUCTION CHANGE (B ginning Engine No SW-6-L-13542, TW-6-L-T-74176, and TW-6-L-F-13756)* New Rear Bearing Filler Block with alignment pins, and Rear Bearing Guard Assembly (with mating holes) *See "Crankshaft & Main Bearings" in Willys Special Data for installation of this assembly on earlier engines*

CAMSHAFT

Journal Diameters—(1) 1.8725-1.8735". (2) 1.8095-1.8105". (3) 1.7472-1.7485". (4) 1.2475-1.2485".

B arings—Steel Backed Babbitt.

Cl arance—.001-.003".

End Thrust· Taken by thrust plate on front of engine (between front bearing journal and hub of sprocket)

End Play—.003-.007".

Camshaft Servicing: See *"Camshaft & Bearings" in Willys Special Data*

Timing Chain: Non-adjustable type. Width 1". Pitch .500". Length 23" or 46 links.

►*TIMING CHAIN CAUTION. Morse and Link Belt chains used. Chains and sprocket interchangeable only in COMPLETE SETS*

Camshaft Setting: Mesh chain with 9 links (or 10 link pins inclusive of pins opposite marks) between marks on sprockets with #6 piston at top dead center on compression stroke.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *Se "Engine Front Cover" in Willys Special Data*

VALVES

Tappet Clearance: Intake and Exhaust .014" Cold.

►*VALVE TAPPET ADJUSTMENT (FORWARD CONTROL MODELS)* Access panel provided in right front wheel housing for valve tappet adjustment Install jack stand under right frame rail, remove right front wheel, remove wheel housing access panel (both sections of split panel), remove fuel pump and valve covers Tappet clearance can then be adjusted

►*TAPPET CLEARANCE ADJUSTMENT PROCEDURE: S e "Valve System" in Willys Special Data*

Valve	Head Diam.	Stem Diam.	Length
Intake	1.520"	.3402-.3410"	5.187"
Exhaust	1.328"	.3382-.3390"	5 205 '

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	284"	001 003"
Exhaust	45°	284"	0032- 0050"

Valve Seat Ins rts - Used for all exhaust valves on later engines

Valv S at Width: 5/64-3/32" (intake), 3/32-7/64" (exhaust).

NOTE—Rotators used on Exhaust valves.

Valve Guides: Pressed in block. Replace when stem clearance exceeds maximum (above). Ream new guides to inside diameter of .3432-3422".

Replacement Guides—Std., .0005" (marked "A"), .0055" (marked "L") to insure .0005-.003" press fit.

Guide Installation—Place guide (tapered end of guide toward top) in position in bore and drive in to correct position of 1-7/32" below top face of cylinder block.

Valve Springs: Intake & Exhaust valve, spring interchangeable

Free Length—1-31/32".

Valve Spring Specifications

Valve	Lbs. Press.	Length
Closed	51	1.672'
Open	118	1.312

Valve Lifters: Mushroom type with self locking adjusting screws.

Diameter—.6855-.6860".

Clearance—Selective fit. Lifter should rotate in bore with slight drag. Service by installing oversize lifter.

Replacement Lifters—Furnished in Std. and the following oversizes marked as indicated: "B" is .001", "D" is .002", and "K" is .005" O.S.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE:* **Specifications are with tappet clearance as follows: Intake 018", Exhaust 020"**

Intake Valves - Open 2° BTDC Close 42° ALDC

Exhaust Valves - Open 42° BLDC Close 8° ATDC

Checking Valve Timing - Set tappet clearance of No 1 exhaust valve to 020" Turn crankshaft until No 1 intake valve just starts to open, turn crankshaft further until No 1 exhaust valve just closes This point should be 8° ATDC plus or minus 2° Reset tappet clearance to 014"

OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Willys Special Data.*

Crankcase Capacity - 4 qts (4 Cyl), 5 qts (6 Cyl) refill

Normal Oil Pressure: 35 lbs at 2000 RPM (4 Cyl), 1700 RPM (6 Cyl)

Pressure Regulator - In pump housing (4 Cyl), right side of cylinder block below valve chamber to rear of engine (6 Cyl)

Oil Pressure Indicator: Red telltale light in Instrument Cluster operated by Oil Pressure Switch Light comes on when Ignition Switch turned on and goes out when oil pressure reaches 6 lbs

Oil Pump: Rotor type on left side of engine (4 Cyl), gear type attached to rear intermediate main bearing in crankcase (6 Cyl)

►*OIL PUMP PRODUCTION CHANGE & RECOMMENDED CORRECTION (6 Cyl. "L" Head Engine)*: Beginning Engine No SW-6-L-13509 TW-6-L-T-74081, & TW-6-L-F-13736, tab lockwasher was installed under each oil pump cover screw to prevent loosening of the cover Whenever oil pan removed on earlier engines, install these lockwashers, Part No 916879, on pump cover screws if not previously installed *NOTE* - Pump cover bolts was over-all length of 3/4" (Part No 911097) must be used with these lockwashers Torque cover bolts to 7-10 ft lbs

Oil Pump Overhaul - *See "Oiling Syst m" in Willys Special Data*

Oil Filter: Partial flow type ("Disposable" type used on some cars) *NOTE* - When replacing disposable type filter, tighten filter by hand until gasket contacts mounting flange, then tighten one-half turn additional

Crankcase Ventilation: (4 Cyl) See Crankcase Ventilator above (Others) Filter in oil filler cap and outlet tube from crankcase ventilator baffle on valve side cover

COOLING

►*COOLING SYSTEM FILLING CAUTION (FC-150 & FC-170)* These models have separate "surge tank" and cooling system should be checked and filled as follows Fill surge tank to the top replace cap, run engine at medium speed for one minute remove cap and recheck coolant level, add more coolant as necessary to bring level to top of tank *NOTE* - If system filled with engine cold recheck coolant level after engine run for one minute **aft r th rmostat pens.**

►*RADIATOR BYPASS VALVE CAUTION (FC-170)* This valve located on water pump can be closed for cold weather operation for more efficient heater operation but VALVE MUST BE OPEN IN WARM WEATHER FOR PROPER COOLING

►*FAN BOLT PRODUCTION CHANGE & RECOMMENDED CORRECTION (FC 170)* Elastic stop nuts, Part No 54066, used on later engines to prevent fan loosening in service If loose fan blade attaching bolts noted on earlier engines replace original nuts and lockwashers with these elastic stop nuts

►*FC-150 FAN PULLEY NOTE*· Install fan pulleys on both water pump and fan shaft assemblies with offset to front of engine to eliminate interference with generator pulley Adjust fan belt to ¼-½" deflection with light thumb pressure by pulling shaft housing to right side of frame

Water Capacity: (FC-150) 10 qts (FC-170) 11 qts , (Other 4 Cyl) 11 qts , (Other 6 Cyl) 12 qts without heater Add 1 qt for heater (except FC-170 - ½ qt)

Pressure Valve: Radiator filler cap, 7 lbs (FC-150, FC-170), 13 lbs (6 Cyl) 7 lbs (4 Cyl)

Thermostat: Harrison In water outlet elbow in cylinder head Opens at 163-168°F

Water Pump: Centrifugal packless ball bearing type. *See "Water Pumps" in Willys Sp cial Data.*

Temperature Gauge: Stewart-Warner Electric type *See "Temperature Gauges" in Misc llane us S ction*

CLUTCH

Auburn, Rockford 8½ RM, Borg & B ck 10A7. Single plate types

See Clutch Section for complet data

►*CLUTCH PRODUCTION CHANGE NOTE (6 Cyl)* Improved Clutch Pressure Plate, Willys No 917257 (Auburn), No 917262 (Borg & Beck), used on Models 6-226 4x4, & 4WD beginning Engine No TW-6-L-T-75827 and on FC-170 beginning Engine No TW-6-L-F-13801

►*CLUTCH VIBRATION CORRECTION:* Replace clutch disc *See "Willys" in Clutch S cti n*

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Pedal Adjustm nt: 4 Cyl. (Exc. Trks. & Sta Wgns.). 1½" pedal freeplay To adjust freeplay loosen yoke locknut on cable between throwout lever and cross shaft lever and turn cable

4 Cyl. (Trks. & Sta. Wgns. exc. FC-150) - 1½" pedal freeplay To adjust loosen locknut on adjusting rod (between clutch control lever and clutch control tube lever) and turn adjusting nut to increase or decrease rod length

6-226 Mod ls (Exc. 4x2 and FC-170) - 1" pedal freeplay To adjust, loosen locknuts on pedal adjusting rod turn nuts forward to increase or backward to decrease freeplay

6-226 (4x2) - 5/8-3/4" pedal freeplay Adjustment same as other 6-226 models

FC-150 & FC-170 -½" pedal freeplay To adjust loosen locknut on cable between clutch pedal and cross shaft lever and adjust length of cable

R m val (4 Cyl.): Remove transmission (see Transmission Removal below) Remove engine from chassis (labor will be saved if engine removed without bell housing) Take out clutch cover mounting screws (turn all screws out evenly to relieve spring pressure), remove cover assembly and clutch disc from flywheel

R m val (6 Cyl.): *NOTE* - This engine has split bell housing and it is not necessary to remove engine or transmission for clutch removal Disconnect both front and rear propeller shafts, pull transmission and transfer case to rear sufficiently so that drive gear shaft clears clutch *(CAUTION - Support transmission securely)*, remove bell housing bottom pan Mark clutch cover and flywheel, take out clutch cover mounting screws (turn out all screws evenly to relieve spring pressure), remove cover assembly and clutch disc through bottom of bell housing

SYNCHRO-MESH TRANSMISSION

4 WHEEL DRIVE

Warner. Three speed type Constant mesh synchro-mesh helical gears (second and high) sliding spur gear (low and reverse) Used as follows

	Warner No.
Jeep	T90C
F4-134	T90C
6-226	T90J
FC-150 (3-speed)	T90A
FC-170 (3-speed)	T90J

NOTE - 4-speed Optional on FC-150 & FC-170 S *"Warner Transmission" in Transmission Section*

► *TRANSFER CASE OPERATING LEVER VIBRATION ON ACCELERATION OR DECELERATION CORRECTION (FC-150)* If light hand pressure (in either direction) minimizes vibration, insulate transfer case lev r shaft brackets from body panel *See "Transmissi n N t s" in Willys Special Data*

► *FOUR SPEED TRANSMISSION LUBRICATION CAUTION* Since there is no passage between 4-speed transmission and transfer case it is necessary to check fluid level at both transmission and transfer case fill points Fluid capacity is 4-Speed Transmission - 6¾ pints Transfer Case - 3½ pints

Transfer Cas · Spicer Mod l 18. Two speed auxiliary transmission and front wheel drive unit mounted on rear of transmission case
See Transmission Section for complete data

► *TRANSFER CASE SHIFT LINKAGE ADJUSTMENT (FC-150)* Attach linkage lever to outer hole (two in shift rod nearest transmission) to eliminate hard transfer case shifting Adjust shift rod assembly as follows Set transfer case hand shift lever in neutral loosen adjusting nuts at transfer case end of remote control rod move shift lever at transfer case to neutral position, tighten adjusting nuts being careful not to disturb shift lever position at either end of remote control rod

Removal (4 Whl Drive): Transmission and transfer case are removed as an assembly. Disconnect front and rear propeller shafts at universal joints *(NOTE*–If equipped with Power Take-off drive, remove front end of power take-off propeller shaft assembly). Disconnect speedometer cable at transfer case, brake cable, and clutch release cable at cross shaft bell crank (Jeep), Place support jacks under engine and transmission, remove transfer case rubber snubber bolt nut (on right side) and rear mounting bolt nuts at cross member under transmission case. Remove floor board inspection plate. Drain radiator and loosen upper radiator hose. Remove transfer case shift lever pivot pin screw, remove pin and shift levers *(NOTE*–If Power Take-off used, remove power take-off shift lever plate screws and lift lever out). Remove bolts holding center cross-member at frame side rails and remove cross-member *(CAUTION* -With cross-member removed, engine and transmission weight will rest on support jacks). Remove bolts holding transmission on bell housing, force transmission to right until ball stud end can be disengaged from end of clutch control cross shaft. Lower support jacks under engine and transmission and slide transmission and transfer case assembly to rear until clutch shaft clears bell housing, remove assembly from beneath car.

2 WHEEL DRIVE

Warner. Three speed type Constant mesh synchro-mesh helical gear (second & high) sliding spur gear (low & reverse) Used as follows

Model	Warner Type
Jeep Dispatcher	T90
F4-134	T96
6-226	T86

See "Warner Transmissions" in Transmission Section

► *HARD SHIFTING, SHIFTING INTO TWO GEARS OR JUMPING OUT OF GEAR CORRECTIONS* For trouble shooting above difficulties on 2-wheel drive models *See "Transmission Notes" in Willys Special Data*

Transmission Control· Remote control type with gearshift lever on steering column. *See "Transmission Controls" in Transmission Section.*

Removal (2 Whl Drive): Disconnect shift control rods at transmission case levers On Overdrive cars, disconnect and tag wires at solenoid and governor, disconnect overdrive control cable and conduit Disconnect propeller shaft at front universal joint Disconnect speedometer cable at transmission *(CAUTION - Plug cable opening in case with a cork to prevent lubricant loss)* On Overdrive cars, remove rubber mounted support at rear end of overdrive case *(CAUTION Do not los spacers)*, and remove governor Install jack under bell housing and lift engine just enough to remove weight from crossmember, remove crossmember and rubber insulators Support engine with jack Unscrew four screws attaching transmission to bell housing approximately ¾", pull transmission back to bolt heads *(CAUTION - Screws must have sufficient thread engagement to support transmission weight)* Use a long screwdriver inserted between transmission and bell housing to pry clutch release fork from clutch release bearing carrier leaving fork in bell housing Remove transmission mounting screws, pull transmission straight back until drive gear shaft clears bell housing, lower transmission and remove from beneath

OVERDRIVE

Warner R10. *See "Warner R10" in Transmissi n Section.*

Overdrive Control: *See "Warner R10 & R11 Overdriv Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (2 Wheel Drive above) after disconnecting control cable and wiring.

UNIVERSALS

2 WHEEL DRIVE

Spicer. Cross type. One at each end of propeller shaft.

4 WHEEL DRIVE

Drive Shaft Joints - Spicer. Cross type. One used at front and rear of both front and rear propeller shafts.

Front Axle Shaft Joint - Spicer. Cross type with needle bearings Similar to joints used in front and rear propeller shafts *NOTE* - Bendix & Rzeppa constant velocity type optional *See "Universal Joints" in Willys Special Data*

Power Take-off Shaft Joints - Detroit. Ball-and-Trunnion type One used at each end of shaft (no splined joint required)

FRONT AXLE

4-WHEEL DRIVE

Spicer Model 44(FC-170), Model 25(All Others). Full floating Hypoid gear type Differential assembly (ring and pinion gear assembly) is serviced in same manner as Spicer Rear Axles
See "Spicer" in Rear Axle Section

► *"POWER-LOCK" DIFFERENTIAL (FC-170) Optl on this model only (not available for Model 25 Axleus d on other models) See "Power Lock Differential (Plat Clutch Type)" in Rear Axle Section*

► *"POWER-LOCK" DIFFERENTIAL IDENTIFICATION & LUBRICATION CAUTION See same note under R ar Axle below*

Axle Ratios	
CJ-3B, CJ-5, CJ-6 Jeep	5 38-1
F4-134 (4x4 & 4WD)	5 38-1
6-226 (4x4)	4 27-1 (4 89-1, 5 38-1 Optl)
6-226 (4WD)	4 88-1 (4 27-1, 5 38-1 Optl)
FC-150	5 38-1
FC-170	4 88-1 (4 27-1, 5 38-1 Optl)

Removal: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs re-

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lieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axle Shaft & Universal Joint Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller, Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly.(*(CAUTION*–use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION:* Adjust front wheel bearings and bleed brakes after installation completed.

St ring Knuckle Bearing Disassembly & Adjustment: *See "Front Axle" in Willys Special Data.*

Wheel Bearing Adjustment: Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back nut off 1/6 turn, install locking washer and nut, tighten locknut securely and bend lockwasher over the locknut

REAR AXLE

Spicer. Hypoid gear, semi floating type with Hotchkiss Drive. Various models used as follows

M del	Spicer Axle No.
DJ-3A Jeep Dispatcher	23
DJ-3B, CJ-5, CJ-6 Jeeps	44
F4-134 & 6-226 Sta Wgns & Del	44
FC-150	44
F4-134 & 6-226 Trucks	53
FC-170	53

See "Spicer Hypoid Semi-Floating" in Rear Axle S ction

►*"POWER-LOCK" DIFFERENTIAL* Optional on all models (Rear Axle), some models only (Front Axle). *See "Power Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*POWER-LOCK DIFFERENTIAL IDENTIFICATION & LUBRICATION CAUTION:* Axles with Power-Lock differential can be identified by brass tag stamped "T" attached to housing by one carrier housing cover bolt Use only Special Power-Lock Differential Oil furnished in pint cans, Willys No 94557

Axle Ratios

DJ-3A Jeep Dispatcher	4 56-1
CJ-3B, CJ-5, CJ-6 Jeep	5 38-1
F4-134 (4x2)	4 89-1 (5 38-1 Optl)
F4-134 (4x4 & 4WD)	5 38-1
6-226 (4x2 & 4x4)	4 27-1 (4 89-1, 5 38-1 Optl)
With Overdrive	4 89-1 (5 38-1 Optl)
6-226 (4WD)	4 88-1 (4 27-1, 5 38-1 Optl)
FC-150	5 38-1
FC-170	4 88-1 (4 27-1, 5 38-1 Optl)

Axl Shaft R moval (S mi-fl ating Axl): Remove axle shaft nut, then use puller to remove wheel hub. Remove bolts retaining dust shield, grease and bearing retainers, and brake assembly *CAUTION* - Do not disturb backing plate Remove shield and retainer then pull axle shaft, being careful not to lose adjusting shims

Rear Axle Assembly Removal: Support rear end of car securely, remove rear wheels, disconnect rear shock absorbers, rear brake line (at frame connection on right side), rear brake cables, and propeller shaft at rear universal joint. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring "U" bolts, remove pivot bolt at front end of springs, lower springs. Remove axle assembly.

Wheel Bearing Adjustment: End Play .003-.007". Adjust by adding or removing shims between backing plate and axle housing flange at each wheel.

SHOCK ABSORBERS

Monroe or Gabriel. Direct acting type.

FRONT SUSPENSION

2-WHEEL DRIVE

Conventional I-Beam with Reverse-Elliot ends and semi-elliptical springs

Kingpin Inclination - 7°30' **Caster** - 3° **Camber** - 1°

Toe-In - 3/64-3/32" Adjust both tie rods alike (approximately 1/2 turn from point where front wheels are "straight ahead")

Toe-Out on Turns -Outer wheel 20° Inner wheel should be 21°45'

4-WHEEL DRIVE

►*LEANING-TO-LEFT CORRECTION (FC-150 FORWARD CONTROL) Can be corrected by installing shim under right front spring saddle See "Suspension Notes" in Willys Special Data*

►*FRONT WHEEL SHIMMY CORRECTION (CJ-5 & FC-150)· See "Suspension Notes" in Willys Special Data*

Front Axle: Special driving unit with semi-elliptical springs Steering knuckle mounted on taper roller bearings carried on two stub shafts **End Play** - 001- 003"

Kingpin Inclination - 7½° **Caster** - 3° **Camber** - 1½°

Toe-In - 3/64-3/32" Adjust both tie rods alike (approximately 1/2 turn from point where front wheels are "straight ahead")

Toe-Out on Turns - Outer wheel 20° Inner wheel should be 22° (Jeeps), 20° (All other models)

►*OTHER DATA See "Front Axle" (above)*

STEERING

Ross. Cam and Twin Lever type

See "Ross Cam & Twin Lever" in Steering Section

St ring Linkag : *S e "St ring Linkage" in Ste ring S ction*

St ring Wh l & Horn Butt n R m val: *S "Ross Carr & Twin Lev r" in Steering Section*

Steering Gear Removal: *See "Ross Cam & Twin L v r" in Steering Section*

BRAKES

Bendix-Lockheed (Self-Cent ring). Hand brake applies rear service brakes(Exc Univ Jeep) Independent brake on drive shaft at rear of transfer case (Univ Jeep) *See "Bendix-Lockheed (Self-C nt ring)" in Brak S ction*

Drums - 9" (CJ-3B 5,6, DJ-3A), 11" (Others).

Wheel Cyl. Diameter -	Fr nt	R ar
CJ-3B 5,6,	1"	3/4"
DJ-3A	1 1/8"	13/16"
Others	1 1/8"	1"

Lining Length & Width

Model	Primary	Sec ndary
CJ-3B 5 6	10 7/32" x 1 3/4"	6 39/64" x 1 3/4"
DJ 3A	9 7/8" x 2"	7 11/16" x 1 3/4"
Others	12 1/4" x 2"	10 1/32" x 2"

Thickness - 206- 216" (CJ 3B 5 6); 214" (DJ-3A); 212" (Others)

Braking Power - Front 65% Rear 35% (CJ-3B 5,6,DJ-3A), Front 57% Rear 43% (Others)

Clearance - Turn eccentric until shoe contacts drum then back off until wheel turns freely

Power Brake: Hydrovac Power Unit Used with standard master cylinder

See "Hydrovac Power Unit" in Brak S ction

Parking Brake (Independent Typ): Two shoe, internal expanding type on shaft at rear of transmission

Lining - One piece per shoe (two shoes) Width 1¾", Length 8 1/8", Thickness 211"

Adjustment - Lubricate linkage and make certain the linkage operates freely Place brake handle on instrument panel to "OFF" position Rotate brake drum until one pair of adjusting holes (three pairs located on back face of drum) is opposite the adjusting screws (notched wheels) within the brake Insert a screwdriver or adjusting tool through hole and turn each adjusting screw equally until the brake shoes are snug against drum *(NOTE* - With tool against edge of hole as a fulcrum, move outer end of tool out away from center of driveshaft to expand shoes) **Back ff ach adjusting screw 7 notches** to provide correct shoe clearance

MISC. MECHANICAL

Windshield Wipers: Vacuum type

(Univ. Jeep) - Individual motors operate wiper arms.

(Other Models) - Single motor operates wiper arms by cable control

See "Windshield Wipers" in Misc llan ous S cti n

►*ELECTRICAL EQUIPMENT NOTE: Both Auto-Lit and Delco-Remy equipment used and may be intermixed on same vehicle, but g n rat r and regulat r of sam mak must b us d t g ther. 12-VOLT system is standard. 6-VOLT syst m with either type equipment is optional on all mod ls. Data for all types of equipment is listed below.*

MODEL IDENTIFICATION

M d l	Series Symbol
F4-134 4x2 & 4x4 Jeep Utility	54
L6-226 4x2 & 4x4 Jeep Utility	54
F4-134 4 x 2 Jeep Utility "Maverick"	58
L6-226 4 x 2 Jeep Utility "El Gaucho"	58
F4-134 & L6-226 4WD Truck	55
DJ-3A & DJ-6A Jeep Dispatcher	56
CJ-3B, CJ-5, CJ-6 Universal Jeep	57
FC-150 Forward Control	65
FC-170 Forward Control	61

SERIAL NUMBER: Stamped on metal plate attached in various locations:

CJ-3B & DJ-3A to **right** side of dash under hood.
CJ-5, CJ-6 & DJ-6A to **left** side of dash under hood.
FC-150 & FC-170 to cab floor above wheel housing at right door.
All 4WD Trucks on floor riser under **left** side of driver's seat.
All Utility Wag ns on floor riser to **left** and directly behind **back** of driver's seat.

NOTE - Numb r (xampl below) includes identification data.

① ② ③ ④ ⑤ ⑥
54 5 4 8 13 10001

① - See "Series Symbol" in Model Table above.
② - See "Body Style" in Body Style Table below.
③ - Engine Type. **3** - 4 Cyl. 134 cu. in. "L" Head. **4** - 4 Cyl. 134 cu. in. "F" Head. **6** - 6 Cyl. 226 cu. in. "L" Head.
④ - 2 Wheel Drive - 1 or 7 (LHD), 5 (RHD).
4 Wheel Drive - 2 or 8 (LHD), 6 (RHD).
⑤ - Indicates H.D. FC-170 with Dual Rear Wheels. Number **not** used on other models.
⑥ - Factory Unit Production Number.

B dy Style Table

B dy Styl	Series-54-55-56-57-58-61-65			
Wagon	1	①		
Delivery	2			
Flat Faced Cowl	4	4		
Cowl Windshield	5	5		
Stripped Chassis	6	6	③	1 1
Cab Chassis	1		5	5
Pick-Up	2		5	5
Stake	3		5	5
Platform			5	5
Open Body or Canvas Top		②		
Hard Top		④		

① - 1 ("Maverick"), 5 ("El Gaucho").
② - 3 (CJ-3B, DJ-3A), 5 (CJ-5), 7 (CJ-6), 6 (DJ-6A).
③ - 4 (CJ-3B, DJ-3A), 6 (CJ-5), 8 (CJ-6), 7 (DJ-6A).
④ - 5 (CJ-5), 3 (DJ-3A).

ENGINE NUMBER: Located as follows:

4 Cyl. Engin s - Stamped on top of water pump boss at front of engine.

6 Cyl. Engin s - Stamped on boss on left front corner of engine block above generator.

NOTE - Letters following engine number designate special cylinder bore and bearing oversizes or undersizes. *See "Engine Specifications".*

TUNE-UP

►*STUMBLE ON HARD ACCELERATION IN COLD WEATHER CORRECTION:* Can be caused by poor exhaust heat chamber efficiency. To correct, remove manifolds and enlarge the two holes in exhaust manifold heat chamber to 5/8". Install manifolds. Attach a sheet metal plate to engine under water pump attaching bolts so blasts of cold air will be deflected around manifolds.

►*HEAT CONTROL VALVE PRODUCTION CHANGE (L6-226 ENG.):* Beginning Serial Nos. SW-6-L-226-14346, TW-6-K-226-95379, and FW-6-L-16220 a new exhaust manifold heat control valve was installed on engines to improve warm-up characteristics. To install on earlier models use kit, Part No. 921550.

COMPRESSION PRESSURE	Pressure & Speed
4 Cyl. "L" Head	105 lbs. at 185 RPM
4 Cyl. "F" Head	120-130 lbs. at 185 RPM
6 Cyl. "L" Head	155 lbs. at 185 RPM

NOTE - All cylinders must be equal within 10 lbs.

VACUUM READING: Steady 18-21" at idle speed.

TAPPET CLEARANCE:	Intake	Exhaust
4 Cyl. "L" Head	.016"	.016"
4 Cyl. "F" Head	.018"	.016"
6 Cyl.	.014"	.014"

NOTE - Set clearance with engine COLD not running.

►*TAPPET ADJUSTMENT (FORWARD CONTROL MODELS):* Access panel provided in right front wheel housing.

MANIFOLD HEAT CONTROL: Used as follows:

4 Cyl. "L" Head - Thermostatic coil on manifold.
4 Cyl. "F" Head - Water jacketed intake manifold.
6 Cyl. – Exhaust heat control valve with spring tension of 180° wind-up on manifold.

►*HEAT CONTROL VALVE STICKING ON L6-226 ENGINES:* Should heat control valve stick with shaft and bushings properly lubricated and spring tension at 180° wind-up, check distance between inside edges of valve bushings and exhaust manifold for proper distance of 2.902"–2.910". If necessary, force bushings outward until proper distance obtained.

IGNITION

►*DISTRIBUTOR WIRING SHORT CAUTION:* Some Model DJ-3A Dispatchers are equipped with fresh air heaters from which the temperature control Bowden wire passes over cylinder head near the distributor. If wire is not properly insulated there is danger of shorting distributor wiring. Wire may be insulated with 3/16" I.D. x 10" long loom, or with friction tape.

►*PLASTIC COVERED HARNESS NOTE:* Plastic covered harness requires use of rubber insulated wire clips. When servicing this type harness use rubber insulated clips Part No. 664721.

FIRING ORDER: 1-3-4-2 (4 Cyl.), 1-5-3-6-2-4 (6 Cyl.).
SPARK PLUG GAP: .030".

Spark Plugs - Auto-Lite A7 or Champion J8. 14mm. Torque to 28-30 ft. lbs.

COIL: Aut -Lit . N . CAL-4001A (6-V lt), CAG-4002A (12-V lt).

Ignition Current - 6-Volt - 2.5 amps. idling, 5 amps. at 6.3 volts stopped. **12-Volt** - 2.8-2.9 amps. at 12.5 volts idling or stopped.

DISTRIBUTOR: Autolite. *NOTE* - Same distributor used in both 6-volt and 12-volt systems.

Engine	Autolite Distr. No.
4 Cyl. Jeeps	IAY-4012 or 4401
4 Cyl. Others	IAT-4204A or 4405
6 Cyl.	IAT-4206B or 4404A

Condenser - Autolite IAT-3076-LA (IAY Distr.), IBB-2042-SS1 (IAT Distr.). **Capacity** - .25-.28 mfd. (IAY Distr.), .21-.25 mfd. (IAT Distr.).

Contact Point Set - Auto-Lite IGW-3028-DS (IAY Distr.), IGW-3028-AS (IAT Distr.).

Breaker Gap - .020". Limits .018-.022"..

Cam Angle - 37-43° (4 Cyl.), 36-42° (6 Cyl.).

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - IAY-4012,4401; IAT-4204A, 4405

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	425	2	850
6	1050	12	2100
10	1575	20	3150
11	1700	22	3400

Automatic Advance - IAT-4206B, 4404A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
4	600	8	1200
6	1175	12	2350
7.5	1700	15	3400

Vacuum Spark Control: Auto-Lite integral type.

Vacuum Advance - IAT-4204A, 4405

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5 1/8
1	2	6 5/8
3	6	9 5/8
5	10	12 1/2
6	12	14

Vacuum Advance - IAT-4206B, 4404A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

DISTRIBUTOR: DELCO-REMY. *NOTE - Same Distributor used in both 6-volt and 12-volt systems.*

Engine	Delco-Remy Distr. N .
4 Cyl. Jeeps	1112432
4 Cyl. Others	1110255
6 Cyl.	1110249

►*DISTRIBUTOR INSTALLATION NOTE:* Oil pump gear must be rotated 1 tooth counterclockwise (viewed from

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top of engine) from original position. This will put No. 1 spark plug lead at front of engine and position vacuum advance so same vacuum line from Auto-Lite distributors can be used.

Breaker Gap - .022".

Cam Angle - 25-34° (4 Cyl.), 31-37° (6 Cyl.).

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110255 & 1112432

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	425	0-4	850
4-6	925	8-12	1850
10-12	1700-1950	20-24	3400-3900

Automatic Advance - 1110249

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-4	750
2-4	500	4-8	1000
3-5	800	6-10	1600
5-7	1300	10-14	2600

Vacuum Spark Control: Delco-Remy 1116052 (1110255 Distr.), 1116160 (1110249 Distr.). None used on 1112432 Distr.

Vacuum Advance - 1116052

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	3-5
6	12	9-14

Vacuum Advance - 1116160

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	9-11
5	10	14-18

IGNITION TIMING

Setting - 5° BTDC (All Models).

Timing Mark (4 Cyl. "F" Head) - Notch on rim of fan pulley to align with 5° mark on pointer on timing gear cover. Two marks on pointer - 5° and T (TDC).

Timing Mark (4 Cyl. "L" Head) - 5° mark on flywheel is in center of timing hole in flywheel housing. Flywheel marked T.C. (TDC) and 5° (5° BTDC).

Timing Mark (6 Cyl.) - Align correct graduation with pointer on timing gear cover. Damper marked "O" at TDC with 1° graduations before and after this point.

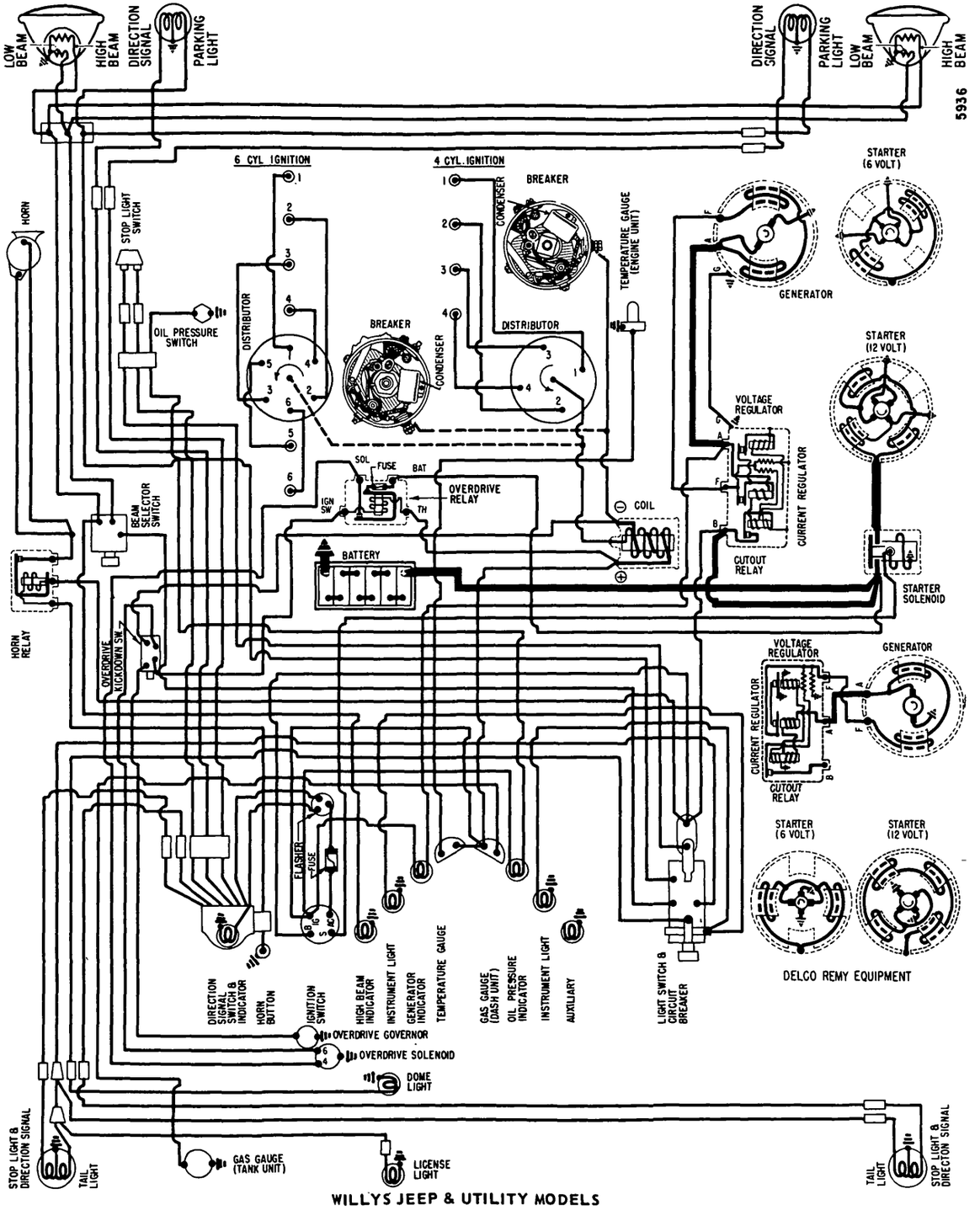
CARBURETOR

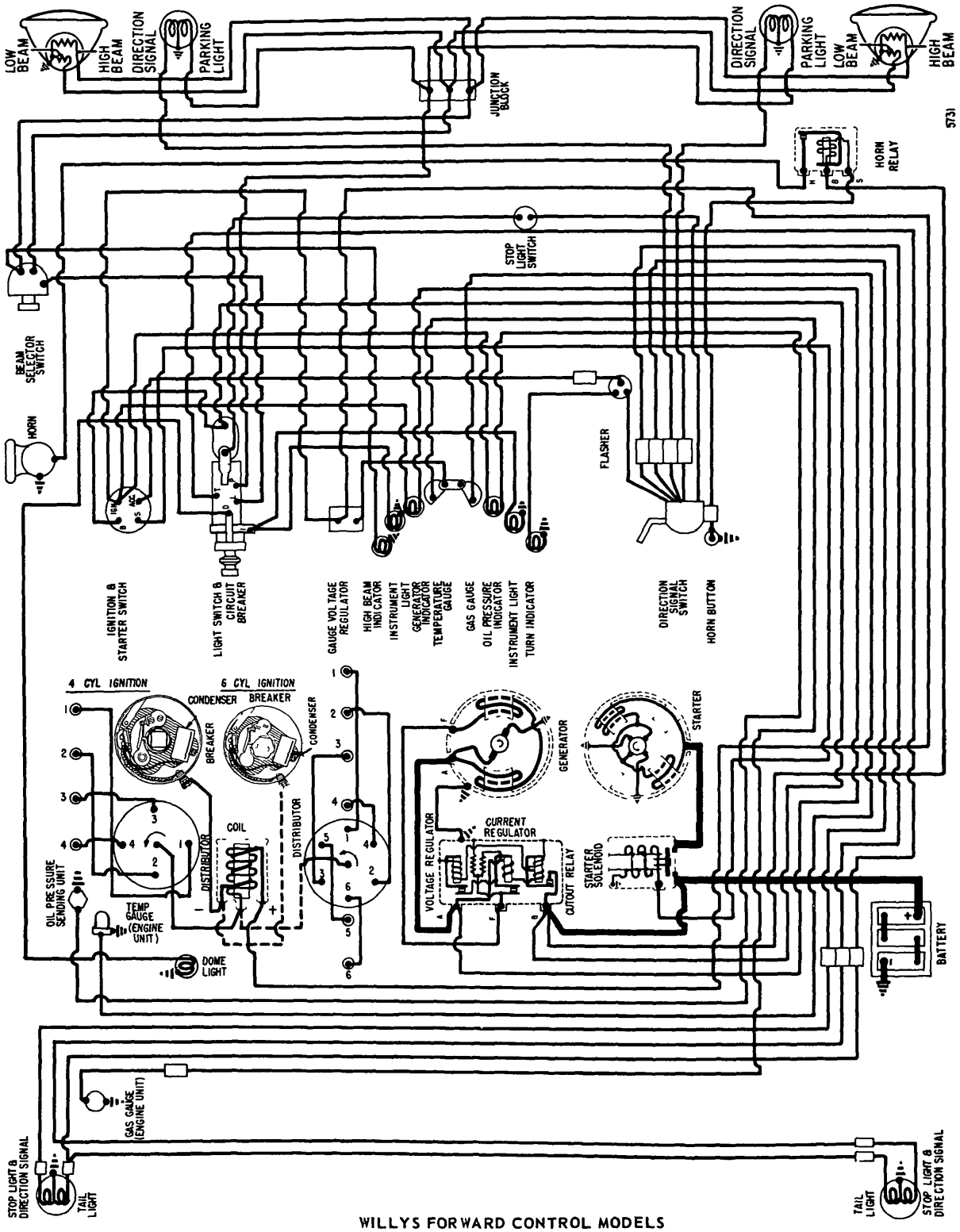
Model	Carter Carb. No.
4 Cyl. "L" Head Jeep Dispatcher	YF 2392S
4 Cyl. "F" Head Universal Jeep	YF 938SA,SC,SD
4 Cyl. "F" Head 4x2, 4x4, 4WD	YF 951S,SA
4 Cyl. "F" Head Foward Control	YF 938SA,SC,SD
6 Cyl.	YF 2467S

►*FLAT SPOT OR SURGE CORRECTION (Jeep & Forward Control FC-150 Models with 938SA Carburetor):* If condition not corrected by thorough Engine Tune-Up (including carburetor adjustment), see "Carter YF Carburetor" in Carburetion Section for recommended modification. NOTE - Later 938SC carburetors have these changes made in production.

►*ENGINE SURGE CORRECTION (Utility & Truck Models with Carter 951S Carburetor):* This surge will be noted at 35-40 MPH when cruising or when accelerating after

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WILLYS FORWARD CONTROL MODELS

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coasting If condition not corrected by thorough Engine Tune-Up (including carburetor adjustment), see *"Carter YF Carburetor" in Carburetion Section for recommended modification. NOTE - Later 951SA carburetors have these changes made in production.*

►*CARBURETOR PRODUCTION CHANGE (YF 951S and YF 938SC superseded by YF 951SA and YF 938SD):* Carter YF 938SD and YF 951SA have all modifications recommended for "Flat Spot & Stumble Correction" below.

►*FLAT SPOT OR STUMBLE CORRECTION (All vehicle with Carter YF 938S, SA, SC; 951S Carburetors):* Before modifying Carburetor, thoroughly tune up engine, check carburetor metering rod and float level settings, adjust engine idling speed, and make certain that cooling system thermostat operating correctly. If flat spot or stumble persists, modify carburetor. *See "Carter YF Carburetors" in Carburetion Section.*

Idle Setting - ¾-1¼ turns open (938SA,SC,SD, 951S,SA). ½-2 turns open (2392S). 1-2½ turns open (2467S). Turn screws out for richer mixture.

Idle Speed - 600 RPM (4 Cyl.), 550 RPM (6 Cyl.).

Float Level - (2392S, 2467S) 9/32" - Gauge T109-126, (938SA,SC,SD, 951S,SA) 5/16" - Gauge T109-107. From top of float at free end to gasket seat on cover with assembly inverted and float resting freely on intake needle.

Fast Idle: With choke held in wide open position, lip on fast idle arm should contact boss on body casting.

►*OTHER DATA: See "Carter YF Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC & Carter used as follows:

Model	AC No.	Carter N .
Jeep Univ. ①	4032	M2195S
Jeep Dispatcher ②	9716	M2195S
Fwd. Control (FC-150) ①	4080	M2195S
Utility (4-Cyl.) ①	4080	M2195S
Fwd. Control (FC-170) ①	4318	M957S
Utility (6-Cyl.) ①	4318	M957S

① - Fuel & Vacuum. ② - Fuel only.

Pressure - 2½-3¾ lbs. (AC), 3½-5½ lbs. (Carter), all at 1800 RPM.
See "Fuel Pumps" in Carburetion Section.

►*FUEL FILTER NOTE:* Filter Spool located inside fuel tank on all models exc. Univ. Jeep & Jeep Dispatcher.

Gasoline Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator on back of instrument panel or fuel gauge.
See "Fuel Gauges" in Carburetion Section.

AIR CLEANER: Oil bath type. Service at regular intervals.

►*AIR CLEANER NOTE:* Improved oil bath air cleaner Part No. 923388 used on Univ. Jeep and FC-170 Fwd. Control beginning with Serial Numbers - 57348-63433, 57548-113195, 57748-18223, 65548-23109. This cleaner is provided with a water deflector.

►*AIR CLEANER WING NUT CAUTION (L6-226 ENGINES):* Wing nut attaching cover to air cleaner on L6-226 Engines should be tightened to only 5 to 7 in. lbs. torque (finger tight). Excessive tightening of nut may

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crack weld at base of stud causing it to fall into carburetor, jamming throttle valve.

CRANKCASE VENTILATOR

Sealed Positive Ventilation (4 Cyl.). Clean air is drawn into oil filler tube and rocker arm cover through a hose to the air cleaner. All connections and gasket on filler tube must be air tight. The crankcase is ventilated by a sealed system from air cleaner tube to intake manifold. A valve is attached to valve spring cover in the line to air cleaner. This valve must be free of carbon and operate freely at all times to obtain smooth idle. Remove and clean valve every 5000 miles or more often if engine must run at idle speed excessively or is used for stationary power.

6-VOLT ELECTRICAL SYSTEM
AUTO LITE
BATTERY

Autolite 1M-100. 6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front of engine support (6-226), right front engine support (Others).

STARTER

Autolite MCH-6203 (4 Cyl.), MCH-6210 (6 Cyl.).
Armature - Autolite MCH-2088,
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4300	5 0	65
6.0 ft lbs.	Lock	2.0	335

Starting Switch: Autolite SST-4012 (MCH-6203) Key starting (Magnetic switch controlled by turning key past "Ignition On" position).

GENERATOR

Autolite GGW-4801D, 7404A (4 Cyl.), GGW-4801EN, 7404B (6 Cyl.).
Armature - Autolite GGW-2006F (GGW-4801D, EN)

Performance Data - GGW-4801D, EN

Amperes	Volts	Cold RPM	Hot
0	6.4	870-970	950-1050
40.0	8.0	1800-2000	2150-2350
45.0	8.0	1925-2125	2350-2550

Brush Spring Tension (GGW-4801D, EN) - 35-53 ozs.
Field Current (GGW-4801D, EN) - 1.6-1.7 amperes at 5.0 volts.
Motoring Current (GGW-4801D, EN) - 5.0-5 5 amperes at 5.0 volts.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure.

REGULATOR

Autolite VBE-6105A (Early), VBO-4601C (Late)

Cutout Relay

Cuts In - 6.3-6.8 volts (All).
Cuts Out - 4.1-4.8 volts (VBE-6105A), 4-6 amps. discharge current after a charge of 10 amps. (VBO-4601C).
C ntact Gap - .015" minimum.
Air Gap - .025-.027" (VBO-4601C), .030-.034" (VBE-6105A), with contacts open (check at hinge end of core).

V ltag R gulat r

Setting - 7.2-7.5 volts at 70°F (VBE-6105A), 7.2 volts at 80°F (VBO-4601C), after 15 minutes operation charging at 10 amperes.
Air Gap - .048-.052" with contacts just opening (Check at brass armature stop pin).
Checking & Adjusting - *See "Autolite 6-Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F (VBE-6105A), 80°F (VBO-4601C).*

Operating Amperes

Model	Test A	Test B
VBE-6105A	52 amperes max.	45 (43-47)
VBO-4601C	54 amperes max.	45 (43-47)

Test A - After 15 minutes operation with current at 10 amperes
Test B - After 15 additional minutes operation with current regulator operating (load applied to hold voltage to 6.7-6.9 volts).
Air Gap - .048-.052" with contacts just opening (Check at brass armature stop pin).
Checking & Adjusting - *See "Autolite 6-Volt Regulators" in Electrical Section.*

6-VOLT ELECTRICAL SYSTEM
DELCO-REMY
STARTER

Delco-Remy 1108077 (4 Cyl.), 1108078 (6 Cyl.).
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 24 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6000	5.0	60
15.0 ft. lbs.	Lock	3.0	600

GENERATOR

Delco-Remy 1102832 (4 Cyl.), 1102831 (6 Cyl.).
Replacement Generator Without Pulley - 1102811 (All).

Performance Data

Amperes	Volts	RPM
45	8.0	2350

Brush Spring Tension - 28 ozs.
Field Current - 1.87-2.0 amps. at 6.0 volts.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure.

REGULATOR

Delco-Remy 1972063.

Cutout Relay

Cuts In - 5.9-6.7 volts.
Contact Gap - .020". **Air Gap** - .020".

Voltage Regulator

Setting - 6.9-7.4 volts.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 6-Volt Regulators" in El ctrical Section.*

Curr nt Regulator

Setting - 42-47 amperes.
Air Gap - .075" with armature pressed down to point where contacts just touch

Ch cking & Adjusting - *See "Delco-Remy 6-Volt Regulators" in Electrical Section.*

12-VOLT ELECTRICAL SYSTEM
AUTO LITE
BATTERY

Autolite 11-HS. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front of engine support (6 Cyl.) right front engine support (4 Cyl.).

STARTER

Autolite MDM-6005, MDU-7004 (4 Cyl.), MDM-6006, MDU-7003 (6 Cyl.).
Armature - Autolite MDL-2048 (MDM-6005, 6).
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 31-47 ozs.

Performance Data (MDM-6005,6)

Torque	RPM	Volts	Amperes
0 ft. lbs.	4400	10.0	50
5.0 ft. lbs.	Lock	4.0	210

Performance Data (MDU-7003,4)

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Autolite SAE-4005 (MDM-6005) Key starting (Magnetic switch controlled by turning key past "Ignition On" position).

GENERATOR

Autolite GJC-7002J; GJP-7202A (4 Cyl.). GJC-7002K; GJP-7202B (6 Cyl.).
Replacement Generator Without Pull y - GJC-7002S (All GJC generators).
Armature - Autolite GJC-2030F (GJC generators).

Performance Data - GJC-7002J, K, S

Amperes	Volts	RPM
0.0	12.8	1225-1325
15.0	15.0	1700-2000
30.0	15.0	2050-2250

Performance Data - GJP-7202A,B

Amperes	Volts	RPM
16	15 0	1750
30	15 0	2300
35	15.0	2600

Brush Spring Tension - 18-36 ozs.
Field Current - 1.2-1.3 amps (GJC-7002J,K,S), 1.6-1 7 amps. (GJP-7202A,B), at 10.0 Volts (70°F).
Motoring Current - 3.4-3.9 amps. (GJC-7002J,K,S), 3 1-3.5 amps. (GJP-7202A,B), at 10.0 volts (70°F).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 1/2-5/8" deflection midway between generator and water pump pulleys with normal thumb pressure.

REGULATOR

Autolite VRX-6009B (Early), VBO-4201E (Lat).

Cut ut R lay

Cuts In - 12.6-13.6 volts (VRX), 12.5-13.5 volts (VBO).
Cuts Out - 3-5 amps. discharge after charge of 7 amps.
Contact Gap - .015" min. **Air Gap** - .031-.034" (VRX), .025-.027" (VBO).

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Voltage Regulator

Setting - 14.5 volts at 80°F, unit operating while charging at 7 amperes or with a .25 ohm resistor between regulator and battery.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 70°F.

Operating Amperes

Model	Test A	Test B
VRX-6009B	37 amps. max.	30 (28-32) amps.
VBO-4201E	44 amps. max.	35 (33-37) amps.

Test A - After 15 minutes operation charging at 10 amps.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite 12-Volt Regulators" in Electrical Section.*

12-VOLT ELECTRICAL SYSTEM

DELCO-REMY STARTER

Delco-Remy 1107746 (4 Cyl.), 1107747 (6 Cyl.).
Rotation - Counterclockwise at commutator end.
Drive - Bendix "Folo-Thru" type.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

GENERATOR

Delco-Remy 1102172 (4 Cyl.),1102171 (6 Cyl.).
Replacement Generator Without Pulley - 1102096 (All).

Performance Data

Amperes	Volts	RPM
30	14.0	2240

Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amps. at 12 volts (80°F).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure.

REGULATOR

Delco-Remy 1972029.

Cut out Relay

Cuts In - 11.8-13.5 volts.
Contact Gap - .020". **Air Gap** - .020".

Voltage Regulator

Setting - 13.8-14.8 volts.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

Current Regulator

Setting - 27-33 amperes.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

Directional Signals: *See Electrical Section.*
Lighting Switch Removal: Loosen set screw on side of control knob and remove knob. Remove retaining nut and remove switch through panel.
Stop Light Switch Location: On brake master cylinder.
CIRCUIT BREAKER: 25 Ampere - Protects lighting circuits. Integral with headlight switch.
FUSES: Located in lead except overdrive fuse, which is at overdrive relay. See table below.

Fuse Specifications

Item	6 Volt	12 Volt
Overdrive	SFE 20	SFE 14
Dir. Signal	SFE 14	SFE 9
Heater (Exc. Fwd. Contr.)	SFE 14	SFE 9
Heater (Fwd. Contr.)	SFE 10	AGC 10
Radio	SFE 9	①

① - AGA-5 (Fwd. Contr.), AGC-7½ (Utility).

ENGINE

►*THREE DIFFERENT ENGINES USED: See "Model Identification" for application.*

4 CYL. "F" HEAD

Model	Bore	Stroke	Displacement
F4-134 (All)	3.125"	4.375"	134.2 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
F4-134 4x2	7.4-1①	15.63	75 at 4000 RPM
F4-134Others	6.9-1②	15.63	72 at 4000 RPM

① - 7.8-1 Optl. ② - 7.4-1 Optl.

Compression & Vacuum Reading—*See "TUNE-UP" above.*

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:
"A" .010" main & connecting rod journals Undersize.
"B" .010" cylinder bore and pistons Oversize.
"AB" both above conditions exist.

►*TIMING GEAR OIL JET PRODUCTION CHANGE & CAUTION:* Smaller jet (.040") Part No. 924335 entered production with engine Nos. 3J-16687 and 4J-250095. When necessary to replace No. 1 Con Rod bearing, replace the .070" jet with the new .040" jet at the same time.

ENGINE REMOVAL (Utility & Forward Control Models): *See "Engine" in Willys Special Data.*
CYLINDER HEAD & GASKET INSTALLATION: *See Willys Special Data.*
TIGHTENING TORQUES: *See Willys Special Data.*

PISTONS

Aluminum alloy, cam ground, T slot, Tin or Brass plated Piston has heat insulating groove above top piston ring groove.

►*PISTON OVERSIZE NOTE:* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.
Weight—13.5 ozs.
Removal—Pistons & Rods removed from above.
Fitting New Pistons: Place .003" x 3/4" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove ribbon feeler should be 5 to 10 lbs.
Replacement Pistons: Std. and .010", .020", .030" and .040" Oversize.
Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).

PISTON PINS

Locked in rod with clamp screw.
Diameter—.8118-.8120". **Length**—2-25/32".
Clearance in Piston—.0002-.0004". Thumb push fit at 70° F.
Replacement Pins: No oversizes available.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. #1	3/32"	.007-.013"	.002-.004"
Compr. #2	3/32"	.007-.013"	.0015-.0035"
Oil	3/16"	.007-.013"	.001-.0025"

Replacement Rings: (For rebored cylinders)—Furnished .010", .020", .030" and .040" Oversize.
Service Type Rings—(For Cylinders not Rebored)—Furnished Std. (.000-.009"), .010" (.010-.019"), .020" (.020-.029"), .030" (.030-.039"), .040" (.040-.049") Oversize.
Installing Rings: Install compression rings with mark "Top" (on side) toward top. Rings have tapered face and must be installed correctly. Top ring inner bevel edge must be up.

CONNECTING RODS

Length (Center to Center) - 9.1845-9.1905".
Weight - 32 ozs.
Crankpin Journal Diameter - 1.9375".

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following the engine number indicates that main and connecting rod journals are .010" Undersize.
Bearings—Steel backed babbitt.
Clearance - .001-.0019".
Sideplay - .004"-.010".
Replacement Bearings: Std. and .001", .002", .010", .020", .030" Undersize.
Installing Rods: Lower bearing offset. Install rods with short side of bearing toward nearest main bearing or toward front of engine (Nos. 1 & 3), toward rear of engine (Nos. 2 & 4). Oil spray hole in lower end of rod must be toward right of engine (away from camshaft) on all rods.

CRANKSHAFT

Journal Diameter - 2.333-2.334". All main bearings.

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following engine number indicates that main and connecting rod journals are .010" Undersize.
Bearings—Steel backed babbitt.
Clearance - .0003-.0029".
Replacement Bearings: Std. and .001", .002", .010", .020", .030" Undersize.
Crankshaft Servicing: *See "Crankshaft & Main Bearings" in Willys Special Data*
End Thrust: Taken by thrust washer between crankshaft gear and front bearing. Endplay controlled by shims between thrust washer and shoulder on crankshaft.
NOTE - Thrust washer must be installed with inner beveled edge toward front bearing
Endplay—.004-.006".
Crankshaft Rear Main Bearing Oil Seal: Knurls added to rear seal surface on crankshaft. *See "Crankshaft & Main Bearings" in Willys Special Data.*

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Engin Fr nt C v r Oil S al (Crankshaft Fr nt S al): S *"Engine Front Cover" in Willys Special Data.*

CAMSHAFT

Journal Diameters - (1) 2.1860-2.1855", (2) 2.1225-2.1215", (3) 2.0600-2.0590", (4) 1.6230-1.6225".

Bearings - No. 1 steel-backed, babbitt (replaceable bushings), Nos. 2, 3, 4 cast iron (precision bored in block).

Clearance - .001-.0025".

End Thrust: Taken by thrust plate behind camshaft gear Endplay controlled by spacer between camshaft gear and shoulder on shaft Endplay can be increased by installing shim between spacer and shaft, or decreased by dressing off spacer NOTE - Inner beveled edge of spacer must be toward crankcase

End Play—.004-.007".

Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data.*

Timing Gears: Crankshaft gear, steel. Camshaft gear, fibre with steel hub.

Gear Clearance - 000- 002"

Camshaft Setting: Mesh marked tooth of camshaft gear with marked space (between teeth) of crankshaft gear

VALVES

Tappet Clearance: Intake 018", Exhaust 016" Cold

Valve	Head Diameter	Stem Diameter	Length
Intake	2"	.3733-.3738"	4.781"
Exhaust	1-15/32"	.371- 372"	5.909"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	260"	.0007-.0022"
Exhaust	45°	.351"	0025- 0045"

►*EXHAUST VALVE NOTE:* Thompson Valve Rotators used.

Valve Seat Width—3/64".

Valve Seat Inserts - Used for all exhaust valves

Valve Stem Seals (Intake Valves) - Rubber seal ring installed on upper end of valve stem directly below valve locks When installing valves, install spring and retainer, compress spring, install seal in groove before installing locks

Valve Springs. Install with closed coil upward toward block (Exhaust), down towards head (Intake).

Free Length—1 31/32" (Intake), 2½" (Exhaust).

Valve Spring Specifications

Valve	Intake	Exhaust
Closed	73 lbs at 1 21/32"	53 lbs at 2 7/64"
Open	160 lbs at 1 3/8"	120 lbs at 1 3/4"

Valve Guides: Use Tool W-177 to remove and install guides. Drive Exhaust guide down into valve compartment to remove. Drive new Exhaust guide to 1" below surface of cylinder block and new Intake guide flush with bottom of valve guide bore in cylinder head.

Rocker Arm Assembly Removal: *See "Valve System" in Willys Special Data.*

Valve Lifters: Mushroom type operating in reamed holes in block. Serviced by installing oversize lifters. Lifters furnished .004" Oversize.

Diameter—.6240-.6245". **Clearance**—.0005-.002".

VALVE TIMING

See "Camshaft Setting" und r "CAMSHAFT" abov .

Intak Valves—Open 9° BTDC. Close 50° ALDC.

Exhaust Valves—Open 47° BLDC. Close 12° ATDC.

Valve Timing Check—Set Intake valve clearance at .026". Rotate engine clockwise until No. 1 cylinder is ready for intake stroke. Intake opens 9° BTDC. Note the distance between TDC and the 5° mark and estimate 9° from this distance. With the crankshaft in this position timing is correct if lifter is just tight against valve stem.

ENGINE

4 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L4-134	3.125"	4.375"	134.2 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
L4-134	6.48-1	15.63	60 at 4000 RPM

►*ENGINE NUMBER NOTE: Letters stamped after engine number denote the following:*

"A" - .010" undersize main & connecting rod bearings.
"B" - .010" oversize cylinder bore.
"AB" - Both above conditions exist.
"C" - .002" undersize piston pin.
"D" - .010" undersize main bearing journals only.
"E" - .010" undersize connecting rod bearing journals only.

►*TIMING GEAR OIL JET PRODUCTION CHANGE & CAUTION:* Smaller jet (.040") Part No. 924335 entered production with engine Nos. 3J-16687 and 4J-250095. When necessary to replace No. 1 Con Rod bearing, replace the .070" jet with the new .040" jet at the same time.

►*OTHER ENGINE DATA: See "4 Cyl. "F" Head" above and note the following differences:*

VALVES: Tappet Clearance - .016" Cold (Intake & Exhaust).

Valve	Head Diam.	Stem. Diam	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.371-.372"	5 51/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.351"	.0007-.0022"
Exhaust	45°	.351"	.0025-.0045"

Valve Seat Width - 3/64"

Valve Springs: Install all springs with closed coil end up toward cylinder block **Free Length** - 2½"

Spring Specifications (All Valves)

Valve	Pressure & Length
Closed	53 lbs. at 2 7/64"
Open	120 lbs at 1 3/4"

Valve Guides: Use W-177 to remove and install guides. Drive guides into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block and new intake guide 1 5/16" below surface of cylinder block.

VALVE TIMING: *Same as on 4 Cyl. "F" Head Engine.* **Valve Timing Check** - Set tappet clearance of No. 1 cylinder intake valve at 020" Rotate engine until No 1 cylinder is entering intake stroke (9° BTDC). Note distance between TDC and 5° mark on timing gear cover, estimate position of 9° point. With crankshaft in this position, timing is correct if lifter is just tight against valve stem Reset tappet clearance to 016".

ENGINE

6 CYL. "L" HEAD

Model	Bore	Str k	Displac m nt
L6-226	3.3125"	4.375"	226.2 cu. ins.

Model	Compr. Ratio	Rat d HP	D v l p d HP
L6-226	6.86-1③	26.33	105 at 3600 RPM

③ - 7.3-1 Optl.

Compression & Vacuum Reading—S e *TUNE-UP above.*

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:

"A" 010" Undersize main and connecting rod journals.
"N" 020" Oversize bore and pistons
"AN" Indicates both "A" and "N" conditions

►*ENGINE SERIAL NUMBER PLATE REPLACEMENT CAUTION:* When installing a new cylinder block, old engine serial number plate must be transferred and installed on new block to prevent oil leakage at drilled holes provided in new block.

►*EXHAUST PIPE SUPPORT BRACKET PRODUCTION CHANGE:* New bracket used on later vehicles to reduce exhaust pipe flange breakage.

ENGINE REMOVAL (Utility & Forward Contr l M d ls): *See "Engine" in Willys Special Data.*

CYLINDER HEAD & GASKET INSTALLATION: *See "Cylinder Head & Manifolds" in Willys Sp cial Data.*

TIGHTENING TORQUES: *Se "Tight ning Specifications" in Willys Special Data.*

PISTONS

Aluminum alloy, T-slot, cam ground, tin or brass plated.

►*PISTON OVERSIZE NOTE:* Letters "N" or "AN" following engine number indicates that cylinder bore and pistons are 020" Oversize

Weight - 15 187-15 437 ozs (less rings and pin)

Removal - Pistons and rods removed from above

Fitting New Pistons: Place 0015" x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove feeler should be 5 to 10 lbs.

Piston Replacement—Std., .010", .020", .025 , .030", .040", .050", and .060" Oversize.

Installing Pistons: Slot in skirt toward left or away from camshaft.

PISTON PINS

Floating type with lock ring at each end.

Diameter - .8591-.8593". **L ngth** - 2.779".

Clearance in Piston - .0002". Selective fit. Light thumb push fit.

Clearance in Rod - .0002-.0006". Hand press fit at room temperature.

Piston Pin Fitting - *See "Piston Pin Not s" in Willys Special Data.*

Replacement Pins: Std., .003" and .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0930-.0935"	.008-.016"	.002-.004"
Compr. (Lower)	.0930-.0935"	.008-.016"	.003-.007"
Oil (Top ring)	.1545-.1550"	.008-.016"	.006-.010"
Oil (Bottom ring	.1545-.1550"	.008-.016"	.0025-.004"

Replacement Rings: Ring sets and single rings furnished in following sizes for oversize ranges indicated: Std. (Std.-.009"), .020" (.010-.029"), .030" (.030-.039"), .040" (.040-.049"), .060" (.050-.069").

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Installing Rings Side marked "Top" (compression rings) upward. Chrome plated ring must be installed in top (#1) ring groove.

CONNECTING RODS

Length–6.998"- 7.002" (Center to center)
Crankpin Journal Diameter–2.0619- 2.0627".
►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AN" following engine number indicates that the main and connecting rod journals are .010" Undersize.
Bearings–Steel Backed Babbitt.
Clearance - 0007- 0025" maximum **Sideplay** - 006- 011"
Replacement Bearings Std. and .001", .002", .010" and 012", 020" Undersize
Installing Rods Mark rods and bearing caps. Install with marks together and toward camshaft in same order as when removed. Oil spray hole in lower end of rod toward camshaft. *NOTE*–Lower bearings offset with narrow side of rod toward nearest main bearing (#1, 3, 5 forward), (#2, 4, 6 toward rear).

CRANKSHAFT

Journal Diameter - 2 374-2 375"
►*JOURNAL DIAMETER UNDERSIZE NOTE* The letter "A" or "AN" following the engine number indicates that the main and connecting rod journals are .010" Undersize.
Bearings–Steel Backed Babbitt.
Clearance - 0008- 0028"
Replacement Bearings Std. and .001", .002", 010" and 012", 020" Undersize
End Thrust Taken by #4 rear main bearing which is flanged type.
Endplay - 003- 006"
Rear Bearing Oil Seal Installation *See "Crankshaft and Main Bearings" in Willys Special Data*

CAMSHAFT

Journal Diameters–(1) 1.8725-1.8735". (2) 1.8095-1.8105". (3) 1.7472-1.7485". (4) 1.2475-1.2485".
Bearings–Steel Backed Babbitt.
Clearance – 001-.003".
End Thrust Taken by thrust plate on front of engine (between front bearing journal and hub of sprocket)
End Play–.003-.007".
Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data*
Timing Chain: Non-adjustable type Width 1" (Early), 875" (Late) Pitch 500"
Length 23" or 46 links.
►*TIMING CHAIN CAUTION Morse and Link Belt chains used. Chains and sprocket interchangeable only in COMPLETE SETS*
Camshaft Setting Mesh chain with 9 links (or 10 link pins inclusive of pins opposite marks) between marks on sprockets with #6 piston at top dead center on compression stroke.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data*

VALVES

Tappet Clearance : Intake and Exhaust .014" Cold.
►*VALVE TAPPET ADJUSTMENT (FORWARD CONTROL MODELS)* Access panel provided in right front wheel housing for valve tappet adjustment Install jack stand under right frame rail remove right front wheel remove wheel housing access panel (both sections of split panel), remove fuel pump and valve covers Tappet clearance can then be adjusted
►*TAPPET CLEARANCE ADJUSTMENT PROCEDURE: See "Valve System" in Willys Special Data*

Valve	Head Diam.	Stem Diam.	Length
Intake	1.520"	.3402-.3410"	5.187"
Exhaust	1.328"	.3382- 3390"	5 205

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	284"	001- 003"
Exhaust	45°	284"	0032- 0050"

Valve Seat Inserts - Used for all exhaust valves
Valve Seat Width- 5/64-3/32" (intake), 3/32-7/64" (exhaust).
NOTE–Rotators used on Exhaust valves.
Valve Guides Pressed in block. Replace when stem clearance exceeds maximum (above). Ream new guides to inside diameter of .3432-3422".
Replacement Guides–Std., .0005" (marked "A"), .0055" (marked "L") to insure .0005-.003" press fit.
Guide Installation–Place guide (tapered end of guide toward top) in position in bore and drive in to correct position of 1-7/32" below top face of cylinder block.
Valve Springs: Intake & Exhaust valve spring interchangeable
Free Length–1-31/32".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	51	1 672"
Open	107	1 312"

Valve Lifters Mushroom type with self locking adjusting screws.
Diameter–.6855-.6860".
Clearance–Selective fit. Lifter should rotate in bore with slight drag. Service by installing oversize lifter.
Replacement Lifters–Furnished in Std. and the following oversizes marked as indicated "B" is .001", "D" is .002", and "K" is .005" O.S.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above
►*VALVE TIMING NOTE:* Specifications are with tappet clearance as follows Intake 018", Exhaust 020"
Intake Valves - Open 2° BTDC Close 42° ALDC
Exhaust Valves - Open 42° BLDC Close 8° ATDC
Checking Valve Timing - Check timing marks on vibration damper to be sure they are correct when No 1 Piston is at TDC Adjust No 1 intake and exhaust valve clearance to 0175" Remove spark plugs and turn engine until No 1 intake has zero clearance then continue to turn engine until No 1 intake just starts to open Timing indicator should show 2°±2° BTDC Continue to turn engine Exhaust valve should be closed when indicator shows 8°±2° ATDC

OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" and OILING SYSTEM in Willys Special Data*
Crankcase Capacity - 4 qts (4 Cyl) 5 qts (6 Cyl) refill
Normal Oil Pressure : 35 lbs at 2000 RPM (4 Cyl), 1700 RPM (6 Cyl)
Pressure Regulator - In pump housing (4 Cyl), right side of cylinder block below valve chamber to rear of engine (6 Cyl)
Oil Pressure Indicator: Red telltale light in Instrument Cluster operated by Oil Pressure Switch Light comes on when Ignition Switch turned on and goes out when oil pressure reaches 6 lbs
Oil Pump: Rotor type on left side of engine (4 Cyl), gear type attached to rear intermediate main bearing in crankcase (6 Cyl)
Oil Pump Overhaul - *See "Oiling System" in Willys Special Data*
Oil Filter: Partial flow type ("Disposable" type used on some cars) *NOTE* - When replacing disposable type filter tighten filter by hand until gasket contacts mounting flange then tighten one-half turn additional
Crankcase Ventilation: (4 Cyl) See Crankcase Ventilator above (Others) Filter in oil filler cap and outlet tube from crankcase ventilator baffle on valve side cover

COOLING

►*COOLING SYSTEM FILLING CAUTION (FC 150 & FC 170)* These models have separate "surge tank" and cooling system should be checked and filled as follows Fill surge tank to the top replace cap run engine at medium speed for one minute remove cap and recheck coolant level add more coolant as necessary to bring level to top of tank *NOTE* If system filled with engine cold recheck coolant level after engine run for one minute **after thermostat opens**
►*RADIATOR BYPASS VALVE CAUTION (FC 170)* This valve located on water pump can be closed for cold weather operation for more efficient heater operation but VALVE MUST BE OPEN IN WARM WEATHER FOR PROPER COOLING
►*FC-150 FAN PULLEY NOTE* Install fan pulleys on both water pump and fan shaft assemblies with offset to front of engine to eliminate interference with generator pulley Adjust fan belt to ¼-½" deflection with light thumb pressure by pulling shaft housing to right side of frame
Water Capacity. (FC-150) 10 qts (FC 170) 11 qts (Other 4 Cyl) 11 qts (Other 6 Cyl) 12 qts without heater Add 1 qt for heater (except FC-170 ½ qt)
Pressure Valve: 7 lb. (Jeep & Jeep Dispatcher), 7 lb. (Jeep Utility Exc 6 Cyl 4 x 4) 13 lb. (Jeep Utility 4 x 4) 9 lb. Forward Control (Exc FC-170 with Air Intake Modification Kit) 13 lb (Forward Control with Air Intake Modification Kit)
Thermostat: Harrison In water outlet elbow in cylinder head Opens at 163-168°F
Water Pump: Centrifugal packless ball bearing type *See "Water Pumps" in Willys Special Data*
Temperature Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator on back of instrument panel or fuel gauge
See "Temperature Gauges" in Miscellaneous Section

CLUTCH

Auburn, Rockford 8½RM, Borg & Beck 10A7. Single plate types
See Clutch Section for complete data

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►*CLUTCH CONTROL LINKAGE PRODUCTION CHANGE (L6-226 Utility):* New linkage used starting with Serial Nos 58167-10698, 54167-15682, 54267-11617, 54168-53268, 54268-13779, 55268-58604 Kit Part No 924263 (L6-226 4 x 2), Kit No 92464 (L6-226 4 x 4 & 4 WD) may be installed on earlier models to reduce linkage breakage *NOTE - Installation instructions contained in Kit*

Pedal Adjustment: 4 Cyl. (Exc. Trks. & Sta. Wgns). 1" pedal freeplay To adjust freeplay, loosen the yoke locknut on cable between throwout lever and cross shaft lever and turn cable

4 Cyl. (Trks. & Sta. Wgns. Exc. FC-150) - 1" pedal freeplay To adjust, loosen locknut on adjusting rod (between intermediate shaft lever and clutch fork) and turn adjusting nut to increase or decrease rod length

6-226 Models (Exc. FC-170) - 1" pedal freeplay To adjust, loosen locknuts on pedal adjusting rod, turn nuts forward to increase or backward to decrease freeplay

FC-150 & FC-170 - ½" pedal freeplay To adjust loosen locknut on cable between clutch pedal and cross shaft lever and adjust length of cable

R moval (4 Cyl.): Remove transmission (see Trans mission Removal below) Remove engine from chassis (labor will be saved if engine removed without bell housing) Take out clutch cover mounting screws (turn all screws out evenly to relieve spring pressure) remove cover assembly and clutch disc from flywheel

R moval (6 Cyl.): *NOTE* - This engine has split bell housing and it is not necessary to remove engine or transmission for clutch removal Disconnect both front and rear propeller shafts, pull transmission and transfer case to rear sufficiently so that drive gear shaft clears clutch *(CAUTION - Support transmission securely),* remove bell housing bottom pan Mark clutch cover and flywheel, take out clutch cover mounting screws (turn out all screws evenly to relieve spring pressure) remove cover assembly and clutch disc through bottom of bell housing

SYNCHRO-MESH TRANSMISSION

4 WHEEL DRIVE

Model	Warner No.
Jeep (3 Spd)	T90C
Jeep (4 Spd)	T98A
F4-134	T90C
6-226	T90J
FC-150,170 (3 Spd)	T90A
FC-150,170 (4 Spd) ①	T98A

① - Mandatory with Optional FC-150 6100 GVW and FC-170 9000 GVW

See "Warner Transmission" in Transmission Section

►*TRANSFER CASE OPERATING LEVER VIBRATION ON ACCELERATION OR DECELERATION CORRECTION (FC-150)* If light hand pressure (in either direction) minimizes vibration, insulate transfer case lever shaft brackets from body panel *See "Transmission Notes" in Willys Special Data*

►*FOUR SPEED TRANSMISSION LUBRICATION CAUTION* Since there is no passage between 4-speed transmission and transfer case it is necessary to check fluid level at both transmission and transfer case fill points Fluid capacity is 4-Speed Transmission - 6¾ pints Transfer Case - 3½ pints

Transfer Case: Spicer Model 18. Two speed auxiliary transmission and front wheel drive unit mounted on rear of transmission case

See Transmission Section for complete data

►*TRANSFER CASE SHIFT LINKAGE ADJUSTMENT (FC-150)* Attach linkage lever to outer hole (two in shift rod nearest transmission) to eliminate hard transfer case shifting Adjust shift rod assembly as follows Set transfer case hand shift lever in neutral loosen adjusting nuts at transfer case end of remote control rod move shift lever at transfer case to neutral position tighten adjusting nuts being careful not to disturb shift lever position at either end of remote control rod

Removal (4 Whl. Drive): Drain transmission and transfer case, then replace plugs Remove transmission access cover from floor pan Remove shift lever, housing assembly, and gasket Remove setscrew from transfer case shift lever pivot pin Remove pivot pin, shift levers, and springs If vehicle is equipped with power take-off, remove the shift lever plate screws and lift out lever Disconnect front and rear propeller shaft from transfer case Disconnect speedometer cable at case and front and rear hand brake cables at lever Place jacks under transmission and engine, protecting engine oil pan with block of wood Remove transfer case snubbing rubber bolt nut and bolts holding frame center crossmember to frame side rail, then remove crossmember Remove bolts holding transmission to flywheel bell housing and force transmission to right to disengage clutch control lever tube ball joint Lower jacks under engine and transmission, slide transmission and transfer case assemblies toward rear of vehicle until clutch shaft clears bell housing Then lower jack under transmission and remove transmission and transfer case as an assembly

2 WHEEL DRIVE

Warner Three speed type Constant mesh, synchro-mesh, helical gear (second & high), sliding spur gear (low & reverse) Used as follows

Model	Warner Type
Jeep Dispatcher	T96
F4-134	T96
6-226	T86

Transmission Control: Remote control type with gear-shift lever on steering column. *See "Transmission Controls" in Transmission Section.*

Removal (2 Whl. Drive): Disconnect remote control shift rods from control levers and two wires from solenoid Tag wires and terminals for reassembly Disconnect two wires from overdrive rail switch if vehicle is so equipped Disconnect propeller shaft front universal joint at transmission Disconnect speedometer cable, overdrive control cable, and conduit Remove rubber mounted saddle support at rear end of overdrive and take out overdrive governor assembly Place jack under flywheel bell housing and raise sufficiently to be tight under housing Remove frame crossmember with rubber insulators attached Place jack under engine to support it when transmission is removed Protect oil pan with block of wood Thread out screws attaching transmission to bell housing as far as possible and support weight of transmission Pull transmission back to bolt heads which will provide approximately ¾" opening between two housings Insert long screwdriver through opening in side of bell housing and pry clutch release fork from engagement with clutch release bearing carrier Remove transmission attaching screws, pull transmission back until clutch shaft clears bell housing, then remove assembly

OVERDRIVE

Warner R10. *See "Warner R10" in Transmission Section.*

Overdrive Control: *See "Warner R10 & R11 Overdrive Controls" in Transmission Section.*

Removal: Same as for Synchro-mesh Transmission (2 Wheel Drive above) after disconnecting control cable and wiring.

UNIVERSALS

2 WHEEL DRIVE

Spicer. Cross type One at each end of propeller shaft.

4 WHEEL DRIVE

Drive Shaft Joints - Spicer. Cross type. One used at front and rear of both front and rear propeller shafts.

Front Axle Shaft Joint - Spicer. Cross type with needle bearings Similar to joints used in front and rear propeller shafts *NOTE* - Bendix & Rzeppa constant velocity type optional *See "Universal Joints" in Willys Special Data*

Power Take-off Shaft Joints - Dana. Ball-and-Trunnion type One used at each end of shaft (no splined joint required)

FRONT AXLE

4-WHEEL DRIVE

Spicer Model 44F (FC-150, 170), Model 25 (All Others). Full floating Hypoid gear type Differential assembly (ring and pinion gear assembly) is serviced in same manner as Spicer Rear Axles

See "Spicer" in Rear Axle Section

►*"POWER-LOCK" DIFFERENTIAL. Optional. See "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*

►*"POWER-LOCK" DIFFERENTIAL IDENTIFICATION & LUBRICATION CAUTION See same note under Rear Axle below*

Axle Ratios

Model	Ratio
CJ-3B,5,6	5 38-1 (8-43)
F4-134 4 x 4, 4WD	5 38-1 (8-43)
L6-226 4 x 4	① 4 27-1 (11-47)
L6-226 4WD	② 4 88-1 (8-39)
FC-150	③ 5 38-1 (8-43)
FC-170 Std	④ 4 89-1 (9-44)
FC-170 H D Modification	③ 4 89-1 (9-44)

① - 4 88-1 (8-39) or 5 38-1 (8-43) Optl
② - 5 38-1 (8-43) or 4 27-1 (11-47) Optl
③ - 5 89-1 (9-53) Optl
④ - 4 27-1 (11-47) or 5 38-1 (8-43) Optl

Removal: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip

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"U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axle Shaft & Universal J int Assy. Removal. Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller, Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly.(*(CAUTION*–use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION.* Adjust front wheel bearings and bleed brakes after installation completed.

St ring Knuckle B aring Disassembly & Adjustment: *See "Front Axle" in Willys Special Data*

Wh l B aring Adjustment: Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back nut off 1/6 turn, install locking washer and nut, tighten locknut securely and bend lockwasher over the locknut

REAR AXLE

Spic r. Hypoid gear, semi-floating type (Exc 70) with Hotchkiss Drive Various models used as follows

Model	Spicer Axle No.
CJ3B, 5,6	44-2
DJ-3A,6A	23
F4-134 4 x 2 & 4 x 4	44
F4-134 4WD Std	①53-2
FC-150	44-1
FC-170 Std	53
FC-170 H D Modification	②70

① - 53 Optional ② - Full Floating

See 'Spicer Hypoid' in Rear Axle Section

M del	Axl Ratios	Ratio
CJ-3B,5,6		5 38-1(8-43)
DJ-3A,6A		4 56-1(9-41)
F4-134 4 x 4, 4WD		5 38-1(8-43)
F4-134 4 x 2		①4 89-1(9-44)
L6-226 4 x 2, 4 x 4		②4 27-1(11-47)
L6-226 4WD		③4 88-1(8-39)
FC-150		④5 38-1(8-43)
FC-170 Std		③4 88-1(8-39)
FC-170 H D Modification		⑤4 88-1(8-39)

① - 5 38-1 (8-43) Optl
② - 4 89-1 (9-44) or 5 38-1 (8-43) Optl
③ - 5 38-1 (8-43) or 4 27-1 (11-47) Optl
④ - 5 89-1 (9-53) Optl
⑤ - 5 87-1 (8-47) Optl

►*"POWER-LOCK" DIFFERENTIAL* Optional on all models except DJ3A,6A (Rear Axle), *see "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section*

►*"POWER-LOCK" DIFFERENTIAL IDENTIFICATION & LUBRICATION CAUTION* Axles with Power-Lock differential can be identified by brass tag stamped "T" or reading "USE LIMITED SLIP DIFF LUBE ONLY" attached to one of gear cover screws

Axl Shaft R m val (S mi-fl ating Axl): Remove axle shaft nut, then use puller to remove wheel hub Remove bolts retaining dust shield, grease and bearing retainers and brake assembly *CAUTION* - Do not disturb backing plate Remove shield and retainer then pull axle shaft, being careful not to lose adjusting shims

Full-Floating Axles - To remove the axle shaft it is not necessary to jack up the rear wheel Remove the 8 axle flange nuts and 16 lockwashers holding the axle shaft flange Pull axle from housing

Rear Axle Assembly Removal: Raise rear end of vehicle with hoist and support frame ahead of rear springs Remove wheels and disconnect propeller shaft at rear universal joint companion flange Disconnect brake hydraulic hoses, remove spring to axle "U"-bolt clips and slide assembly from underneath the vehicle

Wheel Bearing Adjustment (Semi-floating Axles): Endplay 003- 007" Adjust by adding or removing shims between backing plate and axle housing flange at each wheel

Full-Floating - Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back nut off 1/6 turn, install locking nut and washer, tighten locknut securely and bend lockwasher over the locknut

SHOCK ABSORBERS

Monroe or Gabriel. Direct acting type

FRONT SUSPENSION

2-WHEEL DRIVE

Conventional I-Beam with Reverse-Elliot ends and semi-elliptical springs

Kingpin Inclination - 7°30' **Caster** - 3° **Camber** - 1°

Toe-In - 3/64-3/32" Adjust both tie rods alike (approximately 1/2 turn from point where front wheels are "straight ahead")

Toe-Out on Turns - Outer wheel 20°, inner wheel should be 22° (Dispatcher), 21°45' (Utility)

4-WHEEL DRIVE

►*FRONT WHEEL SHIMMY CORRECTION (CJ-5 & FC-150) See 'Suspension Notes" in Willys Special Data*

Front Axle: Special driving unit with semi-elliptical springs Steering knuckle mounted on taper roller bearings carried on two stub shafts **End Play** - 001- 003" **Kingpin Inclination** - 7°30' **Caster** - 3°. **Camber** - 1°30' **Toe-In** - 3/64-3/32" Adjust both tie-rods alike (approx-approximately 1/2 turn from point where front wheels are "straight ahead")

Toe-Out on Turns - Outer wheel 20°, inner wheel should be 20°

►*OTHER DATA See "Front Axle (above)*

STEERING

Ross. Cam and Twin Lever type

See "Ross Cam & Twin Lever" in Steering Section

►*STEERING GEAR ASSEMBLY PRODUCTION CHANGES·* Two different steering gear assemblies and remote control assemblies used in production The type used is determined by the distance between bottom edge of steering hub and top of remote control shift shaft upper bracket On Dispatcher Models, the distance should be less than 2" on one type and greater than 2" on the other On 4 x 2 Utility models the distance should be 1 1/2-1 5/8" on one type and 1 7/8"-2" on the other The parts of the two types in each case are n t interchangeable

St ring Linkag · *S e "St ering Linkage" in Ste ring S ction*

St ring Wh l & Horn Butt n R m val: *S "R ss Cam & Twin L v r" in St ring S ction*

Steering Gear Removal: *See "Ross Cam & Twin Lev r" in Steering Section*

BRAKES

Bendix (Lockheed) Self-Centering. Hand brake lever applies rear service brakes (Jeep Utility and some Forward Control Models), applies transmission mounted brake (Jeep Models and some Forward Control Models)

See "Bendix-Lockheed (Self-Centering)" in Brake S ction

Drums - 9" front and rear (CJ-3B,5,6, DJ-3A,6A), 12" front, 13" rear (FC-170 with Dual Wheels), 11" front and rear (Others)

Wheel Cyl. Diameter	Front	Rear
CJ-3B,5,6	1"	3/4"
DJ-3A, 6A	1 1/8"	13/16"
Utility & Truck	1 1/8"	1"
FC 150	1 1/8"	7/8"
FC 170	1 1/8"	1"
FC 170 (Dual Wheels)	1 1/8"	1 1/4"

Lining Length & Width
(Exc. FC-170 with Dual Rear Wheels)

Model	Primary	Secondary
CJ-3B,5,6	10 7/32" x 1 3/4"	6 39/64" x 1 3/4"
DJ-3A, 6A	9 7/8" x 2"	7 11/16" x 1 3/4"
Others	12 1/4" x 2"	10 1/32" x 2"

Lining Width & Length
(FC-170 With Dual Rear Wheels)

	Front	Rear
Primary Shoe	11 5" x 2"	12 67" x 2 5"
Secondary Shoe	13 0" x 2"	13 94" x 2 5"

Thickness - 211" (CJ-3B,5,6), 214" (DJ-3A,6A), 238" (FC-170 with dual wheels), 212" (Others)

Braking Power - Front 65%, rear 35% (CJ-3B,5,6, DJ-3A,6A), 50% Front and Rear (FC-170 with Dual Wheels), Front 57%, Rear 43% (Others)

Clearance - Turn eccentric until shoe contacts drum then back off until wheel turns freely

Power Brake: Hydrovac Power Unit Used with standard master cylinder

See "Hydrovac Power Unit" in Brake Section

Parking Brake (Independent Type): Two shoe internal expanding type on shaft at rear of transmission

Lining - One piece per shoe (two shoes) Width $1\frac{3}{4}$", Length 8 1/8" Thickness 211"

Adjustment - Lubricate linkage and make certain the linkage operates freely Place brake handle on instrument panel to "OFF" position Rotate brake drum until one pair of adjusting holes (three pairs located on back face of drum) is opposite the adjusting screws (notched wheels) within the brake Insert a screwdriver or adjusting tool through hole and turn each adjusting screw equally until the brake shoes are snug against drum *(NOTE* With tool against edge of hole as a fulcrum move outer end of tool out away from center of driveshaft to expand shoes) **Back off each adjusting screw 7 notches** to provide correct shoe clearance

MISC. MECHANICAL

Windshi ld Wipers: Vacuum type

(Univ J p) - Individual motors operate wiper arms.

(Oth r Mod ls) - Single motor operates wiper arms by cable control

See "Windshi ld Wipers" in Misc llan ous S ction

MODEL IDENTIFICATION

Model	Model Designation
4-Door Sedan, "L" Head Engine	A-10L
4-Door Sedan, "Valve-in-Head" Engine	A-10
4-Door Station Wagon, Either Engine	A-10W

►*ENGINE REFERENCE NOTE: In the following data, reference to engines will be: A-10L for "L" Head, A-10 for "Valve-in-Head".*

SERIAL NUMBER: Stamped on plate attached to dash panel under hood. Number (example below) includes identification data as follows:

① ② ③
A-10L 456 34534

①- Model & Engine Designation. *See table above.*
②- Production Order Number.
③- Vehicle Unit Number.

ENGINE NUMBER: Stamped on left side of cylinder block and on serial number plate on dash.

TUNE-UP

VALVE TAPPET CLEARANCE: A-10L - .014" Intake & Exhaust hot and idling. **A-10** - .017" Intake, .023" Exhaust, hot and idling.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type with counterweight (A-10L); Water jacketed intake manifold (water circulated from cylinder head through manifold to water pump) used on A-10 engine.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .028-.030" (A-10L), .032-.033" (A-10).

Spark Plug (A-10L) - Champion UD-16. 18 mm. Torque to 40 ft. lbs.

Spark Plug (A-10) - Champion N-8. 14 mm. Torque to 30 ft. lbs.

COIL: Autolite No. 200574.

Ignition Current - 2.0 amps. idling, 2.6 amps. stopped.

Resistor - None used.

DISTRIBUTOR: Autolite IGC-6002-1AC (A-10L), IAT-4021 (A-10 Early), IAT-4406 (A-10 Later). *NOTE* - IGC Distributor has Centrifugal Advance only.

Condenser - Autolite.

Condenser Capacity - .25-.28 mfd. (IGC Distr.), .21-.25 mfd. (IAT Distr.).

Contact Point Set - Autolite.

Breaker Gap - .018-.022". Set at .020".

Cam Angle - 36-42°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - IGC-6002-1AC

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	275	0	550
1	430	2	860
5	1060	10	2120
8	1525	16	3050
9	1685	18	3370

Automatic Advance - IAT-4021, 4406

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250	0	500
1	310	2	620
8	730	16	1460
15	1160	30	2320
16.5	1250	33	2500

Vacuum Spark Control: Autolite integral type used on IAT Distributor only. None used on IGC Distributor.

Vacuum Advance - IAT-4021, 4406

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

IGNITION TIMING

Setting - 4° BTDC (A-10L), 3½° BTDC (A-10) at 350 RPM.

Timing Mark - Marks on vibration damper and pointer on engine front cover. Align correct mark with pointer. *NOTE* - Facing the car, rear or left mark is TDC.

CARBURETOR

►*CARBURETOR APPLICATION: Zenith single barrel used on A-10L, Carter AS single barrel used on A-10.*

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS. CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

ZENITH

Zenith Model 228BV10C. Single barrel downdraft type with automatic choke. *NOTE* - Automatic choke has an electric heating coil.

►*HARD STARTING CORRECTION:* May be due to improperly adjusted automatic choke. If thermostat eye does not stay within ± 2 points from zero setting at 65-70°F, set choke 19 points rich from observed zero position of thermostat eye.

Idle Setting - Initial setting ¾-1½ turns out. Turn screw out for richer mixture.

Idle Speed - Initial setting 1½ turns in from point where throttle stopscrew contacts stop on throttle body. Idle speed should be 375 RPM (Auto. Trans. in N).

Float Level - 1½"±1/32" from machined surface of air horn casting to top of float. To adjust, bend float lever.

Accelerating Pump - Install hairpin cotter pin in proper groove in pump guide rod as follows: Bottom groove for full stroke (Winter), middle groove for ¾ stroke (Normal), upper groove for ½ stroke (Summer).

Fast Idle: No adjustment. Fast idle will be correct when slow idle correctly set.

Automatic Choke Setting: 15 points rich.

►*OTHER DATA: See "Zenith Carburetors" in Carburetion Section.*

CARTER

Carter AS No. 2858S. Single barrel downdraft type with automatic choke.

Idle Setting - Initial setting 1/2-1 3/4 turns open. Turn screw out for richer mixture.

Idle Speed - 400 RPM (Auto. Trans. in "N").

Float Level - ¼" (Gauge T109-282) from top of each float at free end to top of casting. To adjust, bend float lip. After adjustment made, clearance between overlapping tangs on float levers should be .010-.015". To adjust, bend long tang on left float.

Accelerating Pump - Pump arm on lifter link should be parallel to top of casting. To adjust, bend pump arm.

Fast Idle: .030" (Gauge T109-29) between lower edge of valve and bore with fast idle link on high step of cam. To adjust, bend choke connector rod.

Automatic Choke Setting: One notch rich.

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. M873S. Fuel & Vacuum.

Fuel Pump Pressure - 3-5 lbs. at 500 RPM.

See "Fuel Pumps" in Carburetion Section.

Gasoline Gauge: Stewart-Warner electric type.

Dash Unit - Stewart-Warner No. 441193.

Tank Unit - Stewart-Warner No. 390-X.

See "Fuel Gauges" in Carburetion Section.

Air Cleaner: Dry filter element type. Clean element every 5000 miles (2000 miles under severe dust conditions). *NOTE* - Oil bath type optional on A-10L.

►*CLEANING CAUTION:* Clean element by tapping lightly or blowing out with a low pressure stream of air directed from the inside surface of element. DO NOT oil, wash or lubricate element.

BATTERY

Willard H-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate). *NOTE* - 80 ampere battery optional.

Battery Ground - Negative, to cylinder block.

STARTER

Autolite No. MDL-6025 (Synchro-mesh), MDL-6023 (Aut. Trans.).

Drive - Bendix "Folo-Thru" type.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Starting Switch: Magnetic Switch, Checker No. 93993, controlled by Ignition & Starter Switch, Checker No. 93738. Neutral Safety Switch No. 02909 (Driv-er-matic), No. 02943 (Dual-Range), mounted at lower end of steering column.

GENERATOR

Autolite. Used as follows:

Model	Generator No.
A-10L Manual Steering	GHM-6016S
A-10L Manual Steering, A-10	GGA-6001SN
A-10L Power Steering	GHM-6017A
A-10L Power Steering	GGA-6002S
A-10, A-10L (Early)	GJC-7008A
A-10, A-10L (Later)	GJP-7103A

►*GJP GENERATOR NOTE: "B" Circuit typ. See "Autolite B Circuit Regulators" in Electrical Section.*

Performance Data - GHM (Cold - 70°F)

Amperes	Volts	RPM
5.0	14.0	875
25.0	15.0	1350
30.0	15.0	1500

Performance Data - GJC (Cold - 70°F)

Amperes	Volts	RPM
0.0	12.8	1225-1325
15.0	15.0	1700-2000
30.0	15.0	2050-2250
35.0	15.0	2250-2650

Performance Data - GGA (Cold - 70°F)

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

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Performance Data - GJP (Cold - 70 F)

Amperes	Volts	RPM
16.0 Min.	15.0	1750
35.0	15.0	2600 Max.

Brush Spring Tension - 35-53 ozs. (GHM), 18-36 ozs. (GJC & GJP), 34-41 ozs. (GGA).
Field Current - 1.1-1.3 amps. (GHM & GGA), 1.2-1.3 amps. (GJC), 1.6-1.7 amps. (GJP) at 10.0 volts and 70°F.
Motoring Current - 3.0-3.5 amps. (GHM), 3.4-3.9 amps. (GJC), 3.1-3.5 amps. (GJP), 2.3-2.6 amps. (GGA) at 10.0 volts and 70°F.
Rotation - Counterclockwise at commutator end.

REGULATOR

Autolite. Used as follows:

Regulator	Generator
VBO-4201D	GHM (30 Amp.)
VBO-4202B	GJC (35 Amp.)
VBO-4202A	GGA (40 Amp.)
VBO-6201A	GJP (35 Amp.)

►*VBO REGULATOR NOTE: "B" Circuit type.*

Cutout Relay

Cuts In - 12.5-13.5 volts.
Cuts Out - 3-5 amps. discharge current after charging at 7 amps.
Contact Gap - .015" minimum.
Air Gap - .025-.027".

Voltage Regulator

Setting - 14.3-14.8 volts charging at 7 amperes and 80°F or with a .25 ohm resistor in series between regulator and battery.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
See "Autolite 12-Volt A Circuit Regulators" or "Autolite 12-Volt B Circuit Regulators" in Electrical Section.

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

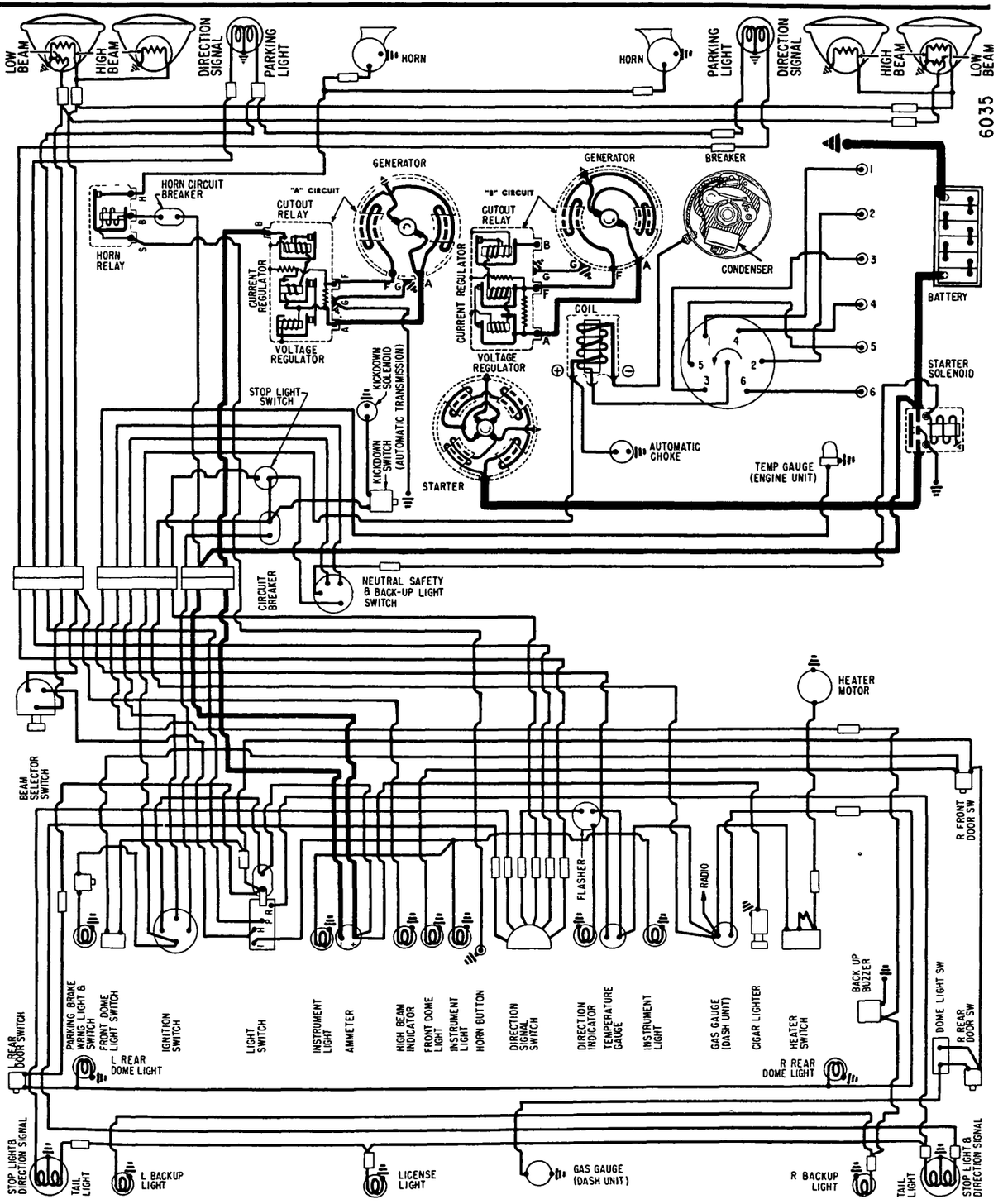
Regulator	Test A - Operating Amperes	Test B
VBO-4201D	37	30 (28-32)
VBO-4202B, 6201A	44	35 (33-37)
VBO-4202A	49	40 (38-42)

Test A - After 15 minutes operation charging at 7 amps.
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
See "Autolite 12-Volt A Circuit Regulators" or "Autolite 12-Volt B Circuit Regulators" in Electrical Section.

MISC. ELECTRICAL

Headlights: 4-Headlight System. *See "4-Headlight Systems" in Electrical Section.*
Direction Signals: *See Electrical Section.*
CIRCUIT BREAKERS: 15 Ampere - Entire lighting system. In headlight switch.
15 Ampere - Back-up lights and heater.
15 Ampere - Horns. Located above horn relay on left wheelhouse panel.
FUSES: 15 Ampere - Overdrive.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Continental Motors Model F6226. 6 Cylinder with either "L" Head or Overhead Valve system.

Bore	Stroke	Displacement	Rated HP
3 5/16"	4 3/8"	226 cu. ins.	26.33

Engine	Compr. Ratio	Developed HP
"L" Head (A-10L)	7.3-1	95 at 3100 RPM
Overhead Valve (A-10)	8.0-1	125 at 4000 RPM

CYLINDER HEAD & MANIFOLD: Tighten cylinder head bolts from center outward to 45 ft. lbs. Tighten intake and exhaust manifold bolts to 25-30 ft. lbs.

FLYWHEEL: Tighten flywheel-to-crankshaft bolts to 35-40 ft. lbs.

OIL PAN: Tighten oil pan bolts to 15-20 ft. lbs.

PISTONS

Aluminum alloy, flat head, cam ground with T-slot. A-10L engine has five rings per piston with 5th ring on piston skirt below piston pin. A-10 engine has standard four ring piston.

Weight - 16.448 ozs. (A-10L), 15.312 ozs. (A-10).

Clearance - .0010-.0020" at bottom of skirt. Pull required to withdraw .002" feeler gauge inserted between piston and cylinder wall should be 5-10 lbs.

Replacement Pistons: A-10L - Furnished in 14 sizes in .0005" steps from 3.31095" to 3.31745" for engines "A" through "N".

A-10 - Furnished Std. size only finished or semi-finished with or without rings and pin.

PISTON PIN

Floating type with retaining ring at each end.

Diameter - 55/64". **Length** - 2 13/16".

Clearance in Piston - .0001-.0003" (A-10L), .0002" (A-10). Light push fit.

Clearance in Rod - .0003-.0005".

Replacement Pins: Furnished Std., & .003", .005" Oversize.

PISTON RINGS

A-10L - Nos. 1, 2, 3, 5 are compression rings. No. 4 is oil ring.

A-10 - Nos. 1 & 2 are compression rings, Nos. 3 & 4 are oil rings.

A-10L Engine

Ring	Width	End Gap
Compr. (1)	3/32"	.010-.020"
Compr. (2 & 3)	1/8"	.010-.020"
Oil (4)	1/4"	.010-.018"
Compr. (5)	5/32"	.010-.020"

A-10 Engine

Ring	Width	End Gap
Compr. (1 & 2)	3/32"	.010-.020"
Oil (3 & 4)	5/32"	.010-.018"

Replacement Rings: A-10L - Std. & .020", .040", .060" Oversize. **A-10** - Furnished Std. size only.

CONNECTING ROD

Length (Center-to-Center) - 7".

Weight - 32.24 ozs.

Crankpin Journal Diameter - 2 1/16".

Lower Bearing - Babbitt lined steel back type.

Clearance - .0027". **Sideplay** - .006-.010".

►*BEARING INTERCHANGEABILITY NOTE:* Bearings No. 1, 3, 5 are not interchangeable with bearings No. 2, 4, 6.

Connecting Rod Bearing Cap Bolt Torque - 35-40 ft. lbs.

Replacement Bearings: Furnished Std. & .020" Undersize.

CRANKSHAFT

Journal Diameter - 2 3/8".

Bearings - Babbitt lined steel back type.

Clearance - .0034".

Replacement Bearings: Furnished Std. & .020" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Bearings No. 2 & 3 are interchangeable.

Main Bearing Cap Bolt Torque - 85-95 ft. lbs.

End Thrust (A-10L): Taken by thrust washers, shims, and thrust plate assembled behind crankshaft timing gear. Shims furnished in .002" & .008" thicknesses.

Endplay - .004-.006".

End Thrust (A-10): Taken by flanged rear main bearing.

Endplay - .002-.006".

Crankshaft Rear Oil Seal Replacement: Remove filler block and oil guard and clean thoroughly. Crush new jute seal in a vise until narrow enough to fit grooves in filler block and oil guard. Press seal in until firmly seated and expanded to seize sides of block and guard. Cut ends of seal so they protrude 1/32" above surface of castings. Insert guard into cylinder block. Hold neoprene filler block-to-oil pan seal in place with a small spot of non-hardening cement at center of seal and insert into groove in filler block. Install front filler block seal in same manner. Tighten filler block retaining bolts to 15-20 ft. lbs.

CAMSHAFT

Bearings - Steel back babbitt lined bushings.

Clearance - .001-.003" except No.3 bearing. No. 3 bearing .001-.0027".

End Thrust: Controlled by thrust plate located behind camshaft sprocket.

Timing Chain: Width 7/8". Pitch 1/2". Length 46 links.

Engine Front Cover Bolt Torque - 15-20 ft. lbs.

Vibration Damper Bolt Torque - 15-20 ft. lbs.

VALVES

Tappet Clearance: A-10L - .014" Intake & Exhaust, hot and idling.

A-10 - .017" Intake, .023" Exhaust, hot and idling.

Valve Specifications - A-10L Engine

Valve	Head Diam	Stem Diam.	Length
Intake	1 33/64"	11/32"	5 3/16"
Exhaust	1 21/64"	11/32"	5 11/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	.284"	.0012-.0030"
Exhaust	45° ①	.284"	.0032-.0050"

① - Valve Face Angle 44°.

Valve Specifications - A-10 Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	1 25/32"	11/32"	4.941"
Exhaust	1 27/64"	11/32"	5.396"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	.4088"	.0012-.0030"
Exhaust	45° ①	.4088"	.0032-.0052"

① - Valve Face Angle 44°.

Exhaust Valve Seat Inserts - Used on A-10 engine. Replacement inserts furnished .010" Oversize for shrink fit.

Valve Stem Oil Seal - "O" ring seal used on stems of intake valves on A-10 engine.

Valve Rotators - Used on exhaust valves on A-10 engine.

Valve Guides - Pressed in block or head.

Valve Springs: Single spring used on all valves.

Spring Specifications - A-10L Engine

Valve	Pressure	Length
Closed	47-53 lbs.	1 21/32"
Open	103-110 lbs.	1 3/8"

Spring Specifications - A-10 Engine

Valve	Pressure	Length
Closed	72.5-79.5 lbs.	1.817"
Open	174.3-175.7 lbs.	1.405"

Spring Free Length (A-10L) - 1 31/32".

Valve Lifters: Mechanical barrel type used on all engines.

Rocker Arm Assembly (A-10): Rear end bracket is drilled for oil supply line to rocker shaft assembly. Front end bracket is drilled for locating plug to retain rocker shaft in position. These brackets are not interchangeable with other support brackets.

VALVE TIMING

Valve Timing Specifications - A-10L Engine

Intake Valves - Open 2° BTDC. Close 42° ALDC.

Exhaust Valves - Open 42° BLDC. Close 8° ATDC.

Valve Timing Specifications - A-10 Engine

Intake Valves - Open 17° BTDC. Close 54° ALDC.

Exhaust Valves - Open 62° BLDC. Close 9° ATDC.

OILING SYSTEM

Crankcase Capacity: 5 qts. refill.

Normal Oil Pressure: 20 lbs. at 375 RPM.

Oil Pressure Relief Valve (A-10) - In pump body, not adjustable.

Oil Pressure Indicator: Direct reading, non-electric type gauge.

Dash Unit - Checker No. 93941.

Oil Pump: Gear type. Mounted on center main bearing cap (A-10L), on right side of cylinder block (A-10).

Oil Pump Attaching Bolt Torque - 25-30 ft. lbs. (A-10L), 15-20 ft. lbs. (A-10).

Oil Filter: Partial flow type optional.

Crankcase Ventilation: Filter element in oil filler cap and breather tube in engine right side cover. Clean filter in filler cap by washing in solvent and oiling with light engine oil.

COOLING

Water Capacity: 12 qts. Add 1 qt. for heater.

Pressure Valve: 4 lb. radiator filler cap.

Thermostat: Choke type located in water outlet elbow. **A-10L** - 170° type, Part No. 93025, starts to open at 167-172°F. **A-10** - 180° type, Part No. 93026, starts to open at 177-182°F.

Water Pump: Packless sealed ball bearing type. No lubrication required.

Pump Removal & Disassembly - Remove fan hub and remove pump from engine. Remove pump cover and gasket and pull impeller from shaft. Remove seal and shedder, shaft and bearing retaining rings and press shaft through front of body.

Water Pump Attaching Bolt Torque - 25-30 ft. lbs.

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Temperature Gaug : Stewart-Warner direct reading electric type.
Dash Unit - Checker No. 93944.
Engin Unit - Checker No. 93946. Located between No.5 and No. 6 spark plugs.
See "T mp rature Gauges" in Miscellaneous Section.

CLUTCH

B rg & B ck 10A7. Single plate, dry disc type.
Cover No. - Borg & Beck No. 361538.
Disc N . - Borg & Beck No. 382903.
S "B rg & Beck" in Clutch Section.
P dal Freeplay Adjustm nt: With engine running at idle speed and car supported with front wheels off floor, lengthen clutch throwout adjusting rod until throwout bearing contacts clutch pressure plate release levers and turns clutch. Now shorten adjusting rod until bearing is slightly free of contact and stops turning. Tighten adjusting rod locknut and lower car. This procedure will provide correct ½-1" pedal freeplay. *NOTE - In fully rel s d position, clutch pedal must touch floor board, pedal pad plat must be parallel to floor board (bend to c rrect), and throwout bearing must provide 7/16" forward trav l of clutch release levers.*

SYNCHRO-MESH TRANSMISSION

Warn r Mod l T-90. 3-speed constant mesh, all helical gear type.
S "Warn r Synchro-m sh Transmission" in Transmissi n S ction.

AUTOMATIC TRANSMISSION

Driv- r-matic and **Dual-Range** three-speed automatic transmission with torque converter. Dual-Range type has two manually selected Drive positions.
►*TESTING & TROUBLE SHOOTING: See "Superba Automatic Transmissi n" in Transmission Section.*
Lubricati n: Check fluid level every 1000 miles, drain and refill every 15,000 miles.
Ch cking Fluid - With engine and transmission at normal operating temperature, engine idling and hand brake applied, move selector lever through all ranges to assure fluid distribution. Maintain fluid at "F" mark on dipstick. *Use only Automatic Transmission Fluid Type "A", Suffix "A".*
►*OTHER DATA: See "Superba Automatic Transmission" in Transmission Section.*

UNIVERSALS

Spicer. Three cross type universal joints used (two-piece propeller shaft).

REAR AXLE

Spicer Model 44. Semi-floating, hypoid gear with Hotchkiss Drive. *NOTE -* "Power-Lock" differential optional. *See "Spicer Hypoid" and "Power-Lock Differential (Plate Clutch Type)" in Rear Axle Section.*
►*AXLE RATIO IDENTIFICATION NOTE:* Ratio stamped on a tag attached to a differential cover capscrew.
Axle Ratios: As follows:

Transmission	Standard Ratio	Optional Ratio
Synchro-mesh	3.73-1 (41-11)	4.09-1, 4.55-1
Overdrive	4.09-1 (45-11)	3.73-1
Automatic	3.31-1 (43-13)	3.54-1

SHOCK ABSORBERS

Gabriel. Direct acting hydraulic type. Serviced by replacement.

Replacement Shock Absorbers - Checker Nos.

Model	Front	Rear
Standard	93959	94409
Heavy Duty	95092	95091

FRONT SUSPENSION

Independent ball joint type with shock absorbers mounted within coil springs.
See "Superba Front Suspension" in Suspension & Wheel Alignment Section.

Steering Axis Inclinati n - 7° at 1° camber. Not adjustable.
Caster - Pos. 2° (Superba), Pos. 1° (Checker Cab).
Camber - Pos. ½° to Pos. 1½° (Superba), 0° to Pos. 1° (Checker Cab).
Toe-In - 1/16" to 1/8". *NOTE -* On cars with power steering, engine must be running when toe-in checked.
Toe-Out on Turns - With inner wheel at 20°, outer wheel should be at 17°30'.

STEERING

Manual: Gemmer. Worm & Roller type.
See "Gemmer Worm & Roller" in Steering Section.
Power Steering: Bendix Linkage type.
See "Bendix Linkage Type Power Steering" in Steering Section.

BRAKES

Service: Wagner Lockheed Self-Centering. Self-centering with Bendix type shoes. Parking lever applies rear wheel service brakes.
See "Wagner Lockheed Self-Centering Brakes" in Brak Section.
Drum Diameter - 11" front & rear.
Wheel Cylinder Diameter - 1" front, 7/8" rear.
Lining - Molded asbestos bonded to shoe.

Lining Width & Length

Wheel	Primary Shoe	Secondary Sho
Front	9 5/16" x 2 1/4"	12" x 2 1/4"
Rear	9 5/16" x 2 1/4"	12" x 2 1/4"

Lining Thickness - 7/32" front wheel, 3/16" rear wheel.
Clearance - With wheel locked against drum back off adjusting star wheel until no drag is felt.
Master Cylinder - Located on engine side of firewall.
Power Brakes: "Treadle-Vac" type. Mounted on firewall.
See "Bendix Power Brake Unit (Hydraulic Reacti n Type)" in Brake Section.

MISC. MECHANICAL

Windshield Wiper: Vacuum Link & Crank Arm type.
See "Windshield Wipers" in Miscellaneous Section.

1961 FINAL
NATIONAL SERVICE DATA

NATIONAL AUTOMOTIVE SERVICE
BERKELEY 10, CALIFORNIA

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►IMPORTANT FACT RY PRODUCTI N & RECOMMENDED CHANGES (S N xt Pag)

FORM 1A

IMPORTANT FACTORY PRODUCTION & RECOMMENDED CHANGES

FOR PREVIOUS MODELS & 1961 MODELS

AMERICAN MOTORS

►*1958-60 AMBASSADOR TRANSMISSION CHANGE FOR IMPROVED SHIFTING:* To decrease shifting effort from Low to 2nd. Gear, longer shift lever (Second & High Gear Shift Lever Part No. 3155833) can be installed to replace original low and reverse lever. *NOTE* - This longer lever used in production on later cars.

►*1961 & EARLIER 6 CYL. ENGINE MAIN BEARING CAPSCREW INSTALLATION CAUTION:* On Series 6110 and earlier Rambler American and Series 10 engine (cast iron block), the main bearing capscrews used at both intermediate bearing caps are longer than those used at front and rear main bearing caps. Make sure screws are used in their proper location.

CHRYSLER CORP.

►*1960-61 TORQUEFLITE 8 GOVERNOR "BUZZ" CORRECTION: See "Torqu Flite 8 Transmission" on Page 433.*

►*1959 & LATER HARD COLD WEATHER STARTING CORRECTION:* On cars with carburetor unloader piston integral with carburetor air horn, remove gum formation from piston by squirting carburetor cleaner, lacquer thinner or alcohol through piston link opening in air horn while operating choke valve back and forth to flush out unit.

►*1959-61 350", 361", 383" & 413" V8 ENGINE ROCKER ARM SHAFT INSTALLATION CAUTION:* To insure correct installation (regardless of arrow identification marks on ends of shafts), install shafts as follows: Install rocker arm shafts so that 3/16" diameter rocker arm lubrication holes point downward into rocker arm and so that the 15° angle of these holes points toward valve end of rocker arms. *NOTE - 15° angle of lubrication hol s is determined from centerline of shaft and bracket attaching bolts.*

►*1960-61 (ALL MODELS) TEMPERATURE & FUEL GAUGE NOTE: See "T mperature & Fuel Gauges" on Pag 270.*

►*1958-61 POWER STEERING GEAR LEAKAGE CORRECTIO N: See "C nstant Control Power Steering" on Pag 384.*

►*1957 & LATER REAR SPRING "U" BOLT NUT TIGHTENING TORQUE SPECIFICATION CHANGE:* To prevent damage to rear axle housing, "U" bolt nut tightening torque has been reduced to 50 ft. lbs.

►*1959-61 BRAKE SHOE DRAG CORRECTION (CARS WITH 11" THREE PLATFORM BRAKES): See "Three Platform Total Contact Brakes" on Page 309.*

►*1960-61 ALTERNATOR VOLTAGE REGULATOR FUSE WIRE REPLACEMENT: See "Chrysler Corp. Alternator & R gulator" on Pag 275.*

►*1960-61 POWER BRAKE LOSS OF POWER ASSIST ON INITIAL STOP CORRECTION:* This condition may occur during cold weather and can be corrected by installing a new type check valve in vacuum line. Use Part No. 2074934 (Lancer & Valiant); 1944089 (All Others).

►*1960-61 6 CYL. ENGINE POOR PERFORMANCE & FUEL ECONOMY CORRECTION: See 1961 Dodg & Plymouth 6 Cyl. Car M del pag s.*

►*1960-61 DODGE & PLYMOUTH 6 CYL. ENGINE IGNITION TIMING CHANGE (FOR IMPROVED PERFORMANCE):* On cars with automatic transmission, set timing at 5° BTDC. This setting supersedes previous setting of 2½°.

►*1960 PLYMOUTH 318" ENGINE HARD STARTING CORRECTION & CARBURETOR AIR CLEANER INSTALLATION NOTE:* To prevent air cleaner from interfering with choke lever, position air cleaner so "looped" end of clamp is located on right side approximately 2" rearward of centerline of air cleaner.

►*1960 TORQUEFLITE 6 "NO DRIVE" CORRECTION NOTE: See "TorqueFlite Six Transmission" on Page 428.*

►*1960 6 CYL. ENGINE OIL LEAKAGE (AT DISTRIBUTOR) CORRECTION:* On early distributors with either a cork gasket or a large rubber "O" ring, position a new smaller "O" ring, Part No. 2095630 on distributor housing against retainer flange, then install a new larger rubber "O" ring, Part No. 2095740. Install distributor. *NOTE - Later distributors have the small "O" ring installed in machined groove in distributor shank.*

►*1960 VALIANT TORQUEFLITE SIX TRANSMISSION FLUID LEVEL CHECKING NOTE: See "TorqueFlite Six Transmission" in 1960 Annual Data, Page 449, or later Manual edition for correct procedure.*

►*1960 VALIANT REAR AXLE PINION BEARING PRELOAD SPECIFICATION CHANGE (USED BEARINGS): See "Lancer & Valiant Hypoid" on Page 328.*

►*1960 DODGE & PLYMOUTH SYNCHRO-MESH TRANSMISSION HARD SHIFT OR GEAR DAMAGE CORRECTION: Adjust shift linkage in same manner as for 1961 models. See Transmission Section.*

FORD MOTOR CO.

►*1960 COMET STEERING POOR RECOVERING-TO-STRAIGHT AHEAD POSITION:* Loosen idler arm retaining nut and retighten to 45-60 ft. lbs. *CAUTION - Do not exceed 60 ft. lbs.*

►*1960 COMET FRONT SUSPENSION BALL JOINT ATTACHING BOLT TIGHTENING CHANGE:* Tighten upper and lower ball joint attaching bolts to 12-15 ft. lbs. *NOTE* - This supersedes previous specification of 12-17 ft. lbs. (Upper Ball Joint); 28-45 ft. lbs. (Lower Ball Joint).

►*1960-EARLY 1961 COMET FRONT SUSPENSION BALL JOINT SEAL REPLACEMENT NOTE: For installation of later type seals, see "Comet & Falcon Front Suspension" on Page 363.*

►*1960 COMET .& FALCON BRAKE SQUEAK CORRECTION: See "Ford Bendix Hydraulic" on Page 315.*

►*1960 COMET & FALCON VALVE TAPPET CLEARANCE ADJUSTMENT CHANGE:* .016" all valves. Use step-type feeler gauge (.015" GO, .017" NO GO). If tappet clearance set with engine cold, reset clearance after operating engine for 30 minutes at 1200 RPM to stabilize temperature.

►*1960 FALCON SYNCHRO-MESH TRANSMISSION INTERMEDIATE & HIGH GEAR CLASH CORRECTION:* Install later type synchronizer blocker ring, Part No. CODR-7107-B.

►*1960 FORD PASS. CAR (EXC. THUNDERBIRD) FRONT END ALIGNMENT SPECIFICATION CHANGE:* Adjust Caster to Pos. 3/4° - 1 1/4°. Camber to Pos. 1/2° - 1°. Toe-In to 1/8-1/4". This supersedes all previous 1960 specifications.

►*1958-60 LINCOLN 430" & MERCURY 383" ENGINE VALVE STEM SEAL APPLICATION:* When replacing valve stem seals, the correct seals must be used with each type valve spring as follows: **Intake Valves** - Use 13/16" long seal with Maroon or Grey spring (with damper); and with Blue spring (without damper). **Exhaust Valves** - Use 17/32" long seal with Maroon or Grey spring (with damper). Use 13/16" long seal with Blue spring (without damper).

►*1958-60 LINCOLN 430" ENGINE INTAKE MANIFOLD TIGHTENING SEQUENCE CHANGE:* Use same tightening sequence and procedure as for 1961 models. *See 1961 Lincoln Special Data.*

►*1958-60 LINCOLN 430" & MERCURY 383" & 430" ENGINE MAIN BEARING BOLT REPLACEMENT NOTE:* It is recommended that when main bearing bolts are removed, new bolts, Part No. COSZ-6065-A (13/16" across flats) should be installed to prevent bolt heads brinnelling into main bearing caps, causing a loss of torque on bolt.

►*1959-EARLY 1961 TWO-SPEED AUTOMATIC TRANSMISSION FRONT PUMP CHECK VALVE SPRING REPLACEMENT NOTE:* It is recommended that Front Pump Check Valve Spring, Part No. B9A-77455-A be used to replace spring, Part No. B9A-7A205-A which has a smaller diameter at the end that contacts the check valve. The larger size spring prevents excessive tilting of check valve in its bore.

►*1959-60 MERCURY REAR AXLE "START-UP" NOISE CORRECTION:* This noise is similar to a "groan" and is evident when car is under load and is started into motion in low or reverse. To correct, add a four ounce bottle of lubricant, Part No. C1AA-19B546 to existing axle lubricant.

►*1961 & EARLIER MERCURY MANUAL TRANSMISSION CLUSTER GEAR REPLACEMENT CAUTION:* When replacing cluster gear, make sure that either cluster gear or cluster gear thrust washer has oil grooves in thrust face. Later type service replacement cluster gears are built without oil grooves and it is necessary to use thrust washer, Part No. C1AR-7119-A with this gear It is permissible to have oil grooves in both parts, but no assembly should be made unless one surface has oil grooves.

GENERAL MOTORS

►*1961 BUICK SPECIAL ENGINE-TO-DASH GROUND STRAP CAUTION:* This ground strap is connected between rear end of right hand cylinder head and the dash. Make very sure this strap is properly connected at all times and is not damaged, as it provides the only ground circuit between voltage regulator and generator frame. If strap is disconnected, the increased voltage will cause failure of generator, lamp bulbs and excessive pitting of distributor contact points.

CONTINUED ON NEXT PAGE

IMPORTANT FACTORY PRODUCTION & RECOMMENDED CHANGES

FOR PREVIOUS MODELS & 1961 MODELS

GENERAL MOTORS (C ntinu d)

►*1961 BUICK (EXCEPT SPECIAL) STEERING GEAR REMOVAL & INSTALLATION CAUTION:* On some cars, a .030" spacer is used between steering gear and frame at each of the bolt locations. It is very important that these spacers be reinstalled if steering gear is removed.

►*1961 BUICK (EXCEPT SPECIAL) GENERATOR BELT ADJUSTMENT NOTE:* If proper adjustment is not possible on early production cars, replace generator belt with Part No. 1163447.

►*1957-60 BUICK ENGINE CLEANING CAUTION (DURING FREEZING TEMPERATURE):* To prevent water entering (and freezing) the fuel pump through two small vent holes in top of fuel pump casting, tapered plastic plugs or equivalent should be used to plug these holes before cleaning engine. *Be sure to remove plugs after cleaning.*

►*1961 & EARLIER CADILLAC ROCKER ARM SHAFT INSTALLATION NOTE:* For proper installation, install shaft so that oil grooves on shaft face downward, and the chamfered oil holes point toward center of engine.

►*1960 (LATE) CADILLAC HYDRA-MATIC 2-3 SHIFT VALVE BINDING CORRECTION:* On later 1960 transmissions with spacer installed in 2-3 shift valve bore, install 2-3 shift valve spring, Part No. 8620807 (with redesigned end coils) to prevent end of spring hanging up on step in valve bore.

►*1958-60 CADILLAC AIR SUSPENSION CAR CONVERSION:* When air suspension cars converted for use with coil springs, shock absorbers must also be changed (air suspension shock absorbers cannot be used with coil springs). Use Conversion Kits, Part No. 3631824 (1958), No. 3631825 (1959-60).

►*1959-61 CHEVROLET PASS. CARS (6 CYL. ENG.) INCONSISTENT CHOKE OPENING DURING ENGINE WARM-UP CORRECTION:* On all Rochester "BC" carburetors, install new choke piston, Part No. 7020438. The later type piston can be identified by a distance of 9/32" measured from lever attaching hole in piston to shoulder of piston. Early type pistons have a 7/32" measurement at this point.

►*1955-61 CHEVROLET 6 CYL. ENGINE TIMING MARK (ON FLYWHEEL) NOTE:* Some replacement flywheels for automatic transmission cars do not have a steel timing ball embedded in flywheel. If there is no timing ball, look for a .190" diameter circle stamped to indicate TDC.

►*1959 290 HP & 1960 315 HP CORVETTE FUEL INJECTION FUEL ENRICHMENT THERMOSTATIC COIL SETTING CHANGE:* Adjust thermostat cover to 3½ notches lean from index mark on housing. This supersedes previous setting of 1½ notches rich.

►*1959-60 CHEVROLET PASS. CARS & 1960 CORVAIR REVISED BRAKE ADJUSTMENT SPECIFICATION CHANGE: Use 1961 brake adjustment specifications for th s mod ls. See "Ch vrolet-Bendix Hydraulic Brakes" n Pag 312.*

►*1960-61 CHEVROLET (EXC. CORVAIR) ENGINE IGNITION TIMING SERVICE SETTING RANGE LIMIT NOTE:* Ignition timing should be within following specifications when "tailoring" for particular operating conditions: **235" Eng.** (0° to 8° BTDC); **283" Eng. with 2-Bbl. Carb.** (4° to 8° BTDC); **283" & 348" Engs. with 4-Bbl. Carbs.** (4° to 10° BTDC).

►*1960 CHEVROLET TRUCK "TWINPLEX" BRAKE BLEEDING PROCEDURE NOTE: For correct brake bleeding procedure, see 1961 "Chevrolet Truck Twinplex Brakes" on Page 314.*

►*1960 CORVAIR AUTOMATIC TRANSMISSION ENDPLAY CHANGE: Endplay specification is same as for 1961 models. See "Corvair Transaxle" on Page 423.*

►*1961 CORVAIR ENGINE IGNITION TIMING SERVICE SETTING RANGE LIMIT NOTE:* Ignition timing should be within following specifications when "tailoring" for particular operating conditions: **Turbo-Air Eng. with Std. Trans.** (4° to 10° BTDC); **Turbo-Air Eng. with Auto. Trans.** (13° to 18° BTDC); **Super Turbo-Air Eng. with Std. & Auto. Trans.** (13° to 18° BTDC).

►*1958-59 OLDSMOBILE COIL SPRING CONVERSION KIT (FOR NEW-MATIC SUSPENSION CARS):* Kits consisting of four coil springs, front lower control arms and other necessary parts to convert air suspension cars to conventional suspension are available for field installation.

►*1958 OLDSMOBILE AIR CONDITIONING COMPRESSOR REPLACEMENT CAUTION:* When replacing a 1958 air conditioning compressor with a 1961 service replacement compressor, it is also necessary to install a new Coil Housing, Part No. 5914557 to prevent refrigerant leakage.

►*1961 PONTIAC TEMPEST TIMING CHAIN BUMPER & BRACKET PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (4 CYL. ENG.):* To avoid timing chain failure on these engines, install new type chain bumper bracket, Part No. 543285 and bumper spring damper, Part No. 543287. *CAUTION - These new parts should be installed whenever timing chain cover is removed from engine. Cars built after Engine No. 116591 have the parts installed in production.*

►*1961 PONTIAC TEMPEST (LATER CARS) UPPER CONTROL ARM RETAINING BOLT REMOVAL & INSTALLATION NOTE:* There are no access holes to front suspension upper control arm retaining bolts on later cars and it will be necessary to cut 1¼" holes in inner fender panel opposite the bolts in order to remove and install. Install plug, Part No. 540402 in each hole after control arm has been reinstalled.

►*1961 PONTIAC HYDRA-MATIC (4-BARREL CARB. MODELS) THROTTLE LINKAGE ADJUSTMENT NOTE:* Throttle control rod assembly connecting carburetor throttle valve lever to idler lever at rear of engine may be too short after adjustment, for proper security. Lengthen rod by using hex connector assembly from throttle rod, Part No. 537182 in place of connector used in production.

STUDEBAKER-PACKARD

►*1959-60 STUDEBAKER DETONATION AT LIGHT THROTTLE CORRECTION:* On 6 cyl. models, install Spark Modifier Kit, Part No. 1552852. On all 1959 V8 models and 1960 Hawk models, install complete Modifier Assembly, Part No. 1553390. On 1960 Lark models, install complete Modifier Assembly, Part No. 1553389. Vacuum advance curves for modifier kit or assemblies will be the same as for 1961 models. See 1961 Car Model pages.

►*1961 STUDEBAKER 6 CYL. NOISY MANIFOLD HEAT VALVE, POOR PERFORMANCE & LOW TOP SPEED CORRECTION:* Remove and disassemble manifold and check for loose valve-to-shaft lock screw, or for valve being off shaft. If lock screw is missing, replace with a 12-28 x ½" filister head screw. If necessary, replace heater valve parts as necessary so that all parts operate properly.

►*1960 STUDEBAKER LARK 6 CYL. DISTRIBUTOR REPLACEMENT CAUTION:* DO NOT install 1961 Distributor, Autolite No. IAT-4403-B on 1960 cars. A severe loss of power will result if this distributor used.

►*1959-60 STUDEBAKER FRONT SPRING NOISE CORRECTION:* Coil-to-coil contact of front spring can be eliminated by installing Insulator, Part No. 526249 as follows: Raise front end of car so spring coils are separated, then cut through one of the insulators so it forms one long section of rubber. Place insulator on top center coil so inner flange of insulator is down, then thread insulator upward as far as possible (weight of car will hold insulator in place). If necessary, install second insulator adjacent to first to completely eliminate noise.

►*1958-60 STUDEBAKER SYNCHRO-MESH TRANSMISSION (EXC. V8 TAXI & OVERDRIVE) REAR BEARING RETAINER SNAP RING SERVICE REPLACEMENT CAUTION:* To prevent snap rings from coming out of grooves, a new tubular retainer is used. S "Warn r 3-Speed Transmissions" on Pag 403.

►*1960 STUDEBAKER 6 CYLINDER ENGINE POOR MILEAGE OR PERFORMANCE CORRECTION:* This condition may be caused by felt pad on underside of air cleaner top cover sagging between retaining fingers and restricting the flow of air. Install new top cover if necessary.

WILLYS MOTORS

►*1960 WILLYS ELECTRICAL EQUIPMENT PRODUCTION CHANGE: New Aut lit lectrical quipm nt used in later production. S Willys car mod l pag s for specifications on this equipment.*

►*1961 & EARLIER WILLYS L6-226 ENGINE REAR OIL SEAL LEAKAGE CORRECTION:* A new Crankshaft Rear Oil Seal Kit, Part No. 925958 is available to correct rear oil seal leakage.

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	Stromberg WW (2-Bbl.)	265
	Carter AFB (4-Bbl.)	225
46, 47, 4800	Carter AFB (4-Bbl.)	225
	Rochester 4GC (4-Bbl.)	251
CADILLAC		
All Engines	Carter AFB (4-Bbl.)	225
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V8 283"	Rochester 2GC (2-Bbl.)	255
	Rochester 4GC (4-Bbl.)	251
	Carter WCFB (4-Bbl.)	231
V8 348"	Carter AFB (4-Bbl.)	225
	Carter WCFB (4-Bbl.)	231
	Rochester 4GC (4-Bbl.)	251
	Rochester 2GC (3 Carb.)	258
V8 409"	Carter AFB (4-Bbl.)	225
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6 Cyl. Std.	Rochester B (1-Bbl.)	261
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V8 283"	Rochester 2G (2-Bbl.)	255
CHRYSLER & IMPERIAL		
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	Stromberg WWC (2-Bbl.)	267
383"	Carter BBD (2-Bbl.)	240
413" (Exc. 300G)	Carter AFB (4-Bbl.)	225
413" (300G)	Carter AFB (2 Carbs.)	225
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COMET		
All	Holley Visi-Flo (1-Bbl.)	249
CORVAIR		
All	Rochester H (2 Carbs.)	259
DESOTO		
All	Carter BBD (2-Bbl.)	240
	Stromberg WWC (2-Bbl.)	267
DODGE & DART		
6 Cyl.	Carter BBS (1-Bbl.)	242
V8 318"	Carter BBD (2-Bbl.)	240
	Stromberg WW (2-Bbl.)	265
	Carter AFB (4-Bbl.)	225
V8 361"	Carter BBD (2-Bbl.)	240
	Stromberg WWC (2-Bbl.)	267
	Carter AFB (4-Bbl.)	225
V8 383"	Carter AFB (4-Bbl.)	225
	Carter AFB (2 Carbs.)	225
V8 413"	Carter AFB (4-Bbl.)	225
	Carter AFB (2 Carbs.)	225
Ram Induction	Carter AFB (2 Carbs.)	225
FALCON		
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6 Cyl.	Carter BBS (1-Bbl.)	242
V8 318"	Carter BBD (2-Bbl.)	240
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V8 383"	Carter AFB (4-Bbl.)	225
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V8 413"	Carter AFB (4-Bbl.)	225
	Carter AFB (2 Carbs.)	225
Ram Induction	Carter AFB (2 Carbs.)	225
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6 Cyl.	Carter AS (1-Bbl.)	237
V8	Stromberg WW (2-Bbl.)	269
	Carter WCFB (4-Bbl.)	231
TEMPEST		
4 Cyl.	Rochester B & BC (1-Bbl.)	261
	Rochester 4GC (4-Bbl.)	251
V8	Rochester 2GC (2-Bbl.)	255
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Std.	Carter BBS (1-Bbl.)	242
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© - With threads dry.

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ALUMINUM ENGINE SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Note the following:

1) Do not drop or slide machined surfaces on bench or floor.

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation).

3) Lubricate all bolts or screws entering an aluminum part. See "Bolt Thread Lubrication Note" below.

4) Tighten bolts and nuts to the specified torque. DO NOT overtighten. Torque valves are for clean lubricated threads.

►*BOLT THREAD LUBRICATION NOTE:* Use engine oil or special thread lubricant on all threads entering an aluminum part.

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum. The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole. This brings hole back to original thread size. See following table for inserts and tools required.

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

ENGINE

6 CYL. ENGINE

ENGINE REMOVAL: 1) Remove hood assembly, drain cooling system and engine oil. Remove air cleaner, starter and radiator core. Disconnect exhaust pipe at manifold and remove flywheel housing screws and flywheel mud pan.

2) On Auto. Trans. Cars, disconnect thrust rod assembly from bracket on lower left side of block and drain torque converter and transmission and remove flywheel drive plate-to-converter assembly screws.

3) Remove front engine support upper nuts. Disconnect all wiring, lines, and hoses from engine and power steering assembly. Remove Air Conditioning compressor and bracket assembly. *NOTE* - DO NOT DISCHARGE system.

4) Attach lifting hook, lift engine upward and forward to clear clutch shaft pilot bushing.

V8 ENGINE

ENGINE REMOVAL: 1) Remove battery and hood assembly. Drain oil and cooling system. On Auto. Trans. Cars, drain transmission and disconnect cooler lines at radiator and straps on engine oil pan. On Air Conditioned Cars, remove air compressor and mounting bracket from engine and move compressor and hoses to one side.

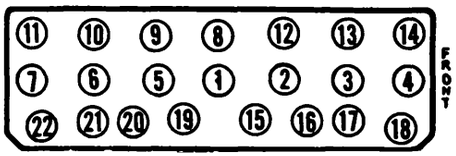
2) Remove water pump upper and lower hoses and hoses at fuel pump, heater control valve and cylinder head. Remove radiator core and loosen exhaust pipes at mufflers and exhaust manifolds at cylinder heads and push them out toward wheel house panels.

3) Disconnect all wiring and hose connections from engine, coil primary, heat sending unit, oil sending unit, vacuum safety switch, generator, etc.

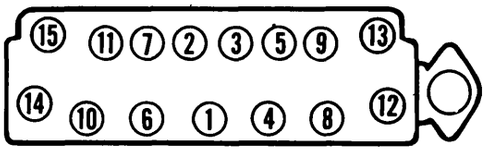
4) Remove starter. Loosen flywheel housing and remove flywheel mud pan.

5) On Auto. Trans. Cars, drain torque converter and loosen flywheel drive plate from converter.

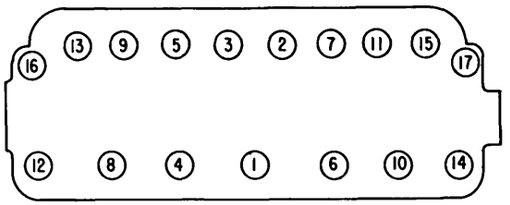
6) Attach lifting fixture to engine, loosen rear engine support cushions at r ar crossmember. Support transmission and torque tube and remove rear crossmember. Loosen front engine support cushions, raise engine upward and forward through hood opening.



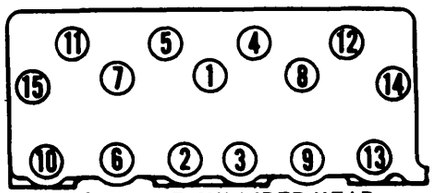
6 CYL. "L-HEAD" CYLINDER HEAD



6 CYL. (CAST IRON) CYLINDER HEAD



6 CYL. (ALUMINUM) CYLINDER HEAD



V8 ENGINE CYLINDER HEAD

CYLINDER HEAD & MANIFOLD

6 CYL. ENGINE

CYLINDER HEAD INSTALLATION: Use torque indicating wrench to tighten cylinder head studs in sequence shown in cylinder head diagram. Torque specifications are for engine at operating temperature.

Cylinder Head Gasket - Always use new gasket. Coat gasket with non-hardening gasket paste to insure tight seal between cylinder head and block.

V8 ENGINE

CYLINDER HEAD INSTALLATION: Cylinder block has two sleeve locating dowels to assist in lining up cylinder head and gasket during installation. Coat gasket with non-hardening gasket paste, install gasket with marks "AM" and "TOP" upward. Install cylinder head, pushrods, and rocker arm assembly (*CAUTION* - Special drilled capscrew must be installed in rear rocker arm support bracket to provide lubrication for rocker arms). Tighten head bolts in sequence shown in diagram to correct torque. See Tightening Specifications.

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PISTON PINS

ALL ENGINES

PISTON PIN: Pin is press fit in connecting rod and no clamp bolt or locking rings are used to retain the pin. Piston pin must be removed and installed as detailed below to prevent distortion or damage to piston.

Removal - Remove pins with special Piston Pin Remover J-6360 and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver.

Installation - Place piston pin pilot in support, insert piston and connecting rod. This aligns piston and connecting rod piston pin bores. Press piston pin into connecting rod and piston assembly until lower pilot bottoms in support which will properly center rod on pin.

► *CAUTION:* Pin must be tight press fit in connecting rod.

CRANKSHAFT & MAIN BEARINGS

6 CYL. ENGINE

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Packing in groove in block and cap behind oil slinger on crankshaft. Cap sealed with rubber plugs in groove on each side where cap fitted in recess in block. Use Tool J-1610 to install packing in groove in block and cap. Place packing in groove (with bearing shell removed), place small diameter of tool over packing, hit end of tool with lead hammer to seat packing, cut ends of packing flush with bearing cap seat, remove tool. Repeat operation for groove in block. Install rubber seal plugs on each side of bearing cap (where angle seal used, make certain that seal also seated in horizontal groove in block).

V8 ENGINE

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Install hemp packing in block and in bearing cap using Tool J-3048-A to seat packing in groove. Trim excess packing off flush with face of cap. Rubber seals are installed in side grooves of bearing cap.

ENGINE FRONT COVER

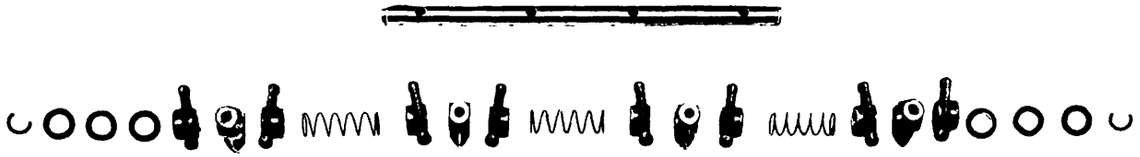
V8 ENGINE

ENGINE FRONT COVER: Removal - Remove water pump, fuel pump assembly and vibration damper. Remove cover-to-cylinder block screws and remove cover. **Installation** - Locate dowels in cylinder block and leave cover screws loose until vibration damper is partially installed. This prevents damage to oil seal and aligns cover properly. Then tighten cover screws and install fuel and water pumps.

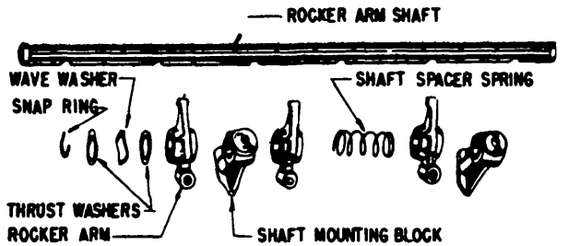
CAMSHAFT & BEARINGS

V8 ENGINE

CAMSHAFT REMOVAL: Remove rocker arm covers, spark plug wires, rocker arm assemblies, intake manifold and carburetor. Remove upper oil breather and lifter assembly cover. Remove spring and lower oil baffle and pushrods. Keep pushrods in order for reinstallation in original positions. Remove hydraulic lifters, keeping them in order for reinstallation. Remove fuel pump, vibration damper, and engine front cover. Remove water pump and cylinder head water distributing manifold. Crank engine to bring timing marks adjacent and in line across shaft centers and remove fuel pump eccentric, crankshaft and camshaft sprockets and timing chain assembly. Remove camshaft thrust retainer plate and withdraw camshaft.



V8 ENGINE ROCKER ARM ASSEMBLY



6 CYL. ROCKER ARM ASSEMBLY

6 CYL. "L" ENGINE

CAMSHAFT LOBE LIFT: With cylinder head removed and all valve lash adjusted to zero, rotate engine until cam lobe to be checked has the basic circle (opposite nose of cam) under valve tappet. Install a dial indicator so arm rests on head of valve, and adjust dial indicator to zero. Rotate engine to point where maximum upward movement of valve occurs. This reading should be .340"±.006" for all cam lobes (intake and exhaust).

"OHV" 6 V8 ENGINES

CAMSHAFT LOBE LIFT: Remove rocker arm covers and install dial indicator with contact arm directly over pushrod end of rocker arm to register upward movement of pushrod. Zero dial indicator with all valve lash removed on 6 cyl. engine or with hydraulic lifter collapsed on V8 engine. Rotate engine to point where maximum upward pushrod movement occurs and note dial reading. Reading should be as shown in table (plus or minus .006").

Cam Lobe Lift	
6 Cyl. & V8 Ser. 20 (Intake)	℄.262"
6 Cyl. & V8 Ser. 20 (Exhaust)	℄.263"
V8 Ser. 80 (All Valves)	.254"

℄ - .250"±.006" Aluminum Eng.(Int. & Exh.).

VALVE SYSTEM

ROCKER ARMS

6 CYL. ENGINE

ROCKER ARM ASSEMBLY: Rocker arm shaft is one piece type and entire rocker arm assembly can be removed after taking out mounting bolts in shaft brackets.

Disassembly & Inspection: Remove snap ring on end of shaft, slide thrust washers, wave washer, rocker arms.

Reassembly & Installation: Install all parts in same relative positions. *CAUTION* - Rocker arms are "Right" and "Left" and must not be exchanged. On Aluminum engines the support blocks must be installed with the word "Front" facing forward. Install assembly with rocker arm lubricating holes in shaft down or toward cylinder head. Oil is supplied through front rocker arm shaft support block.

V8 ENGINE

ROCKER ARM ASSEMBLY: Complete assembly mounted on cylinder head by four long cylinder head retaining capscrews (*CAUTION* - Rear bolt is special hollow type for rocker arm lubrication). Assembly can be removed by taking out the retaining screws.

Disassembly & Inspection: Remove snap ring on end of shaft and slide all parts off shaft. Keep all parts in order so they can be reassembled in same relative positions. Clean and inspect all parts for wear. Inspect rocker arm radius at valve stem end for wear and replace worn rocker arms. Make certain that plugs are tight in ends of shaft.

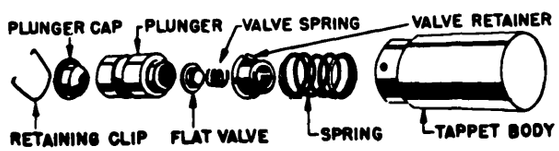
Reassembly & Installation: Install all parts in same relative positions. *CAUTION - Rock r arms ar "Right" and "Left" and will not c ntact valve st m properly if interchanged. However, rock r arm ass mbli s are interchangeable from bank to bank.* When installing assembly, make certain that special hollow bolt is installed in rear support bracket (necessary for correct rocker arm lubrication).

HYDRAULIC LIFTERS

V8 ENGINE

HYDRAULIC VALVE LIFTERS: R m val - Remove rocker arm covers, spark plug wires, rocker arm assemblies, intake manifold and carburetor. Remove upper oil breather and lifter assembly cover. Remove spring and lower baffle and pushrods. Keep pushrods in order for installation in original positions. Remove hydraulic lifters, keeping them in order for reinstallation.

Disassembly: Press down on valve pushrod socket and use a pair of needle nose pliers to remove the lock ring. Remove pushrod socket, plunger, and plunger spring. Remove check valve assembly from plunger being careful not to lose the small flat valve and coil spring. *(CAUTION–Disass mble one lifter at a time to avoid mixing plungers and bodi s. Thes parts are selectively fitted and must not be int rchanged).* Use clean solvent and thoroughly wash all parts. Remove all varnish and gum deposits.



V8 HYDRAULIC VALVE LIFTER

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Inspection: Inspect the plunger and wall of body for scratches (if plunger or body is scratched, replace complete unit). Try the plunger for fit in body. If check valve removed from plunger, inspect flat disc valve, spring and seat.

Reassembly: Reverse disassembly procedure. See illustration for correct sequence.

Testing: Fill body with kerosene and install plunger return spring, plunger assembly, and pushrod socket (do not install snap ring). Place lifter between jaws of Checking Tool J-5790 and check leakdown by depressing tool. A decided resistance should be felt. If lifter leaks down rapidly, or collapses immediately, it should be rechecked and/or replaced with a complete new lifter assembly. Normal lifter should require 10-45 seconds to leak down when filled with kerosene (.125" travel with 50 lb. load).

Installation: Lifters should be pre-lubricated and installed in engine WITHOUT being filled with oil. They will normally charge themselves in 3 to 8 minutes of engine operation.

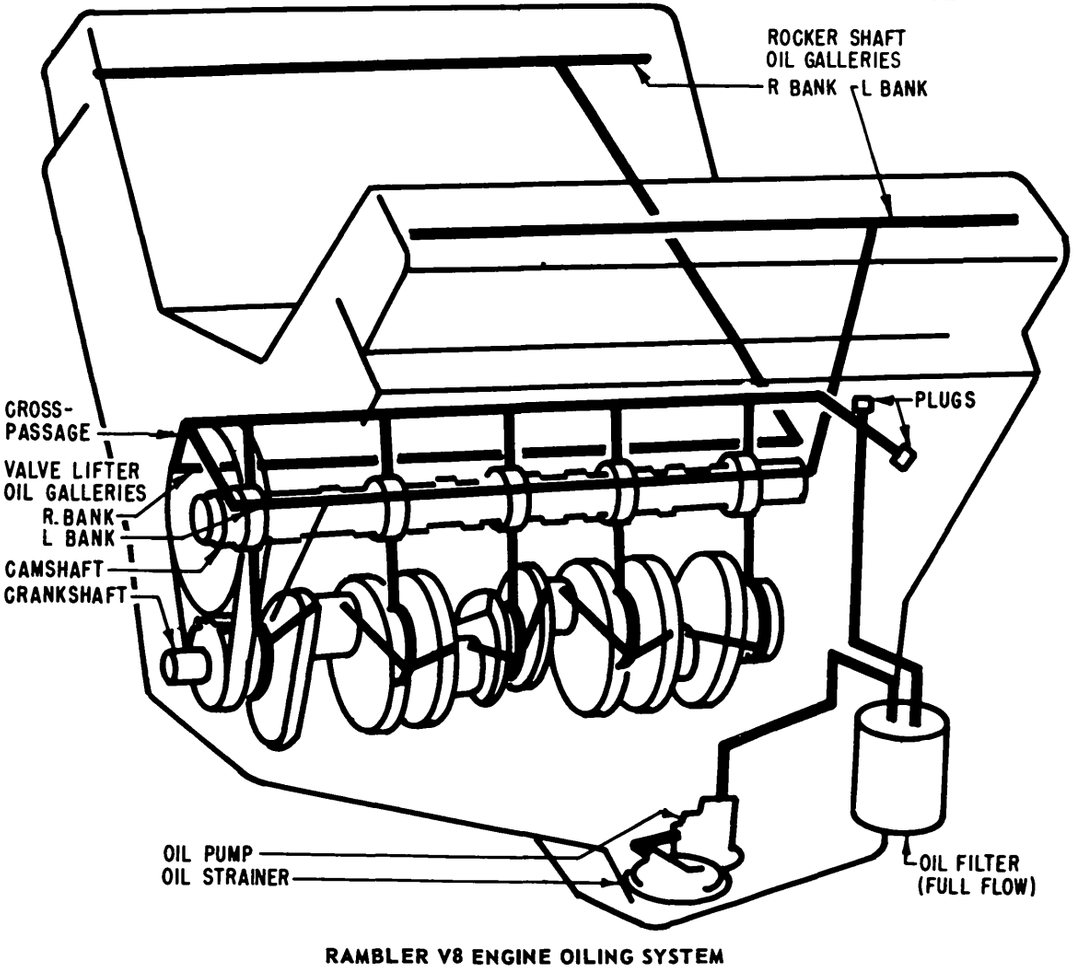
OILING SYSTEM

ENGINE LUBRICATION

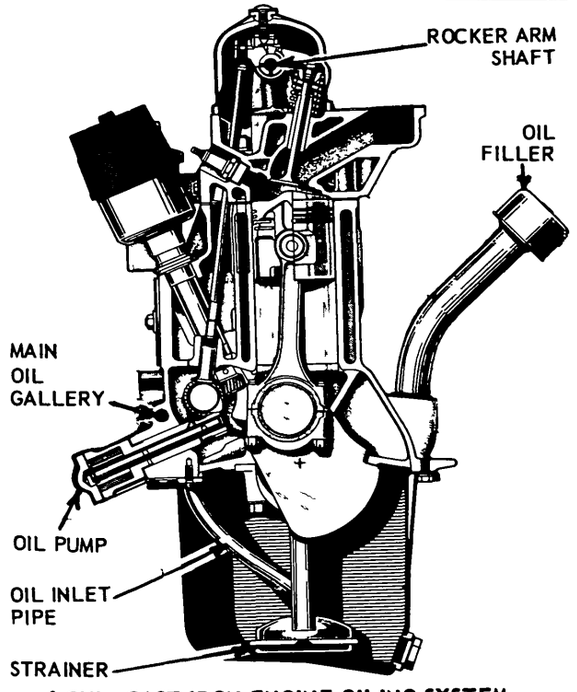
6 CYL. ENGINES (CAST IRON)

▸*OVERHEAD VALVE & "L" HEAD (AMERICAN) ENGINE NOTE:* Oiling systems for both engines are similar except for cylinder head rocker arm and valve lubrication used on Overhead Valve Engines only.

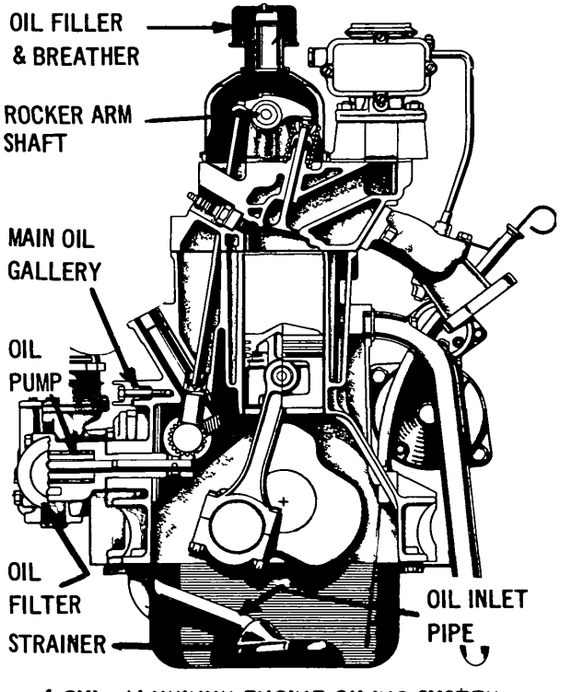
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RAMBLER V8 ENGINE OILING SYSTEM



6 CYL. CAST IRON ENGINE OILING SYSTEM



6 CYL. ALUMINUM ENGINE OILING SYSTEM

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ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve mechanism on cylinder head (Overhead Valve Engines only). All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage around pump body hub to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve (under plug on right side of crankcase) regulates pressure by bypassing oil from main oil gallery back into oil pan. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects lower part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Valve Lifters, Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings.

Rocker Arms, Pushrods & Valve Stems (Overhead Valve Engine) - Oil tube connected to main oil gallery (at front of engine) and to fitting on side of cylinder head (at forward end directly above No. 1 spark plug) supplies oil to passage in cylinder head and through front rocker arm shaft support block to hollow rocker shaft. Rocker shafts have drilled oil holes at each rocker arm. Rocker arms are drilled (upper hole in arm allows oil to run down flat machined surface to each end of arm for pushrod and valve stem lubrication).

OIL FILTER: Partial flow type mounted on bracket on engine. Intake pipe is connected to main oil gallery and return pipe is connected to fitting on crankcase.

6 CYL. ENGINES (ALUMINUM)

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters, and valve mechanism on cylinder head. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage in pump body to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve in pump cover regulates pressure by bypassing oil back into oil intake passage. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects upper part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings .

Rocker Arms, Pushrods, & Valve Stems - An oil gallery (vertical) located in right front corner of cylinder block distributes oil from main longitudinal oil gallery, through the hollow locator pin into the cylinder head where a pair of drilled passages connect into the front valve rocker arm support block and into the hollow rocker arm shaft. Each rocker arm is drilled to direct oil to flat machined surface of top, then to each pushrod, valve stem and spring. Holes on top of cylinder head drain oil back into oil pan.

Valve Lifters - Ports in main oil gallery supply lubrication to valve lifters.

OILFILTER: Externally mounted, full flow type located on adapter on oil pump body.

V8 ENGINES

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arm and valve mechanism on cylinder head. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed strainer and intake pipe assembly mounted on pump cover. Oil pressure regulator is located in pump body with oil pipe through which oil is bypassed back into oil pan. Pump delivers oil through passage in bearing cap and block to full flow type oil filter mounted externally on left side of engine block. From the filter, oil flows through transverse and vertical passages in block to main oil gallery extending full length of block directly above camshaft. Main gallery feeds two lifter galleries (on either side of main gallery and extending full length of block) through grooved channel in rear face of camshaft thrust plate which serves as a cover for the galleries on front face of engine block. Oil is distributed through these galleries as follows:

Crankshaft & Camshaft Bearings - Oil passage in each crankcase web connects main oil gallery with camshaft bearing and corresponding main bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from grooved passage in bearing cap of rod for opposite bank of cylinders (groove in rod must be upward or toward center of engine for this cross-lubrication).

Timing Chain & Sprockets - Lubricated through drilled passage in camshaft front bearing journal. This oil is metered by camshaft bearing.

Valve Lifters - Lifter oil galleries intersect lifter bores for direct oil supply to the hydraulic lifters.

Rocker Arms, Pushrods & Valv Stems - Oil passage in block at rear end of each lifter oil gallery connects with rear cylinder head and rocker shaft bracket bolt hole in block. Special drilled bolts used in these holes which permit oil to flow upward, through and around undercut bolt stem, and through bracket to hollow rocker arm shaft. Shaft is drilled at each rocker arm. Rocker arms have drilled oil hole on upper side which permits oil to flow over top of arm for pushrod and valve stem lubrication. Drain holes in lower corners of cylinder head provide a return passage to oil pan.

OIL FILTER: Full flow type mounted on pad on left side of engine block. Bypass valve located in filter adapt r mounted on filter pad (bypass valve allows oil to flow directly to outlet passage).

►*OPTIONAL FILTER NOTE:* On engines where filter was optional equipment, a cover with a grooved channel connecting the inlet and outlet ports on the filter pad was installed on engine block when a filter was not used.

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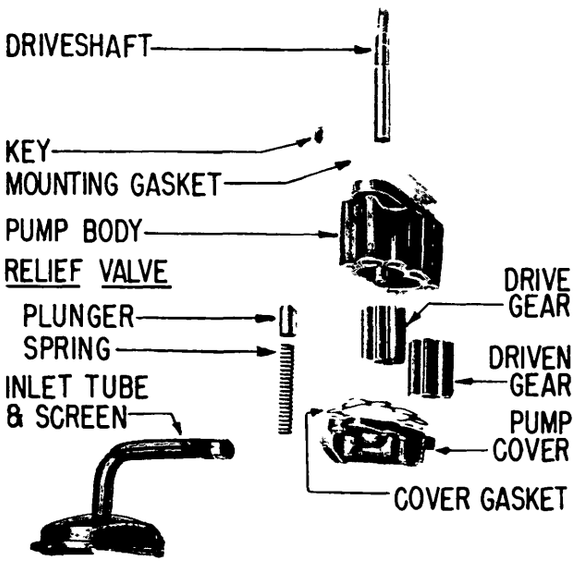
OIL PUMP

V8 ENGINE

OIL PUMP: Removal - Remove oil pan and screws retaining oil pump to rear main bearing cap, remove oil pump. *NOTE* - Oil pump is driven by distributor drive shaft so removal of oil pump does not affect ignition timing.

Disass mbly - Remove inlet tube and screen assembly from pump cover. Remove cover retaining screws, cover, pump gears, relief valve spring and plunger.

Insp ction - Check gear to cover clearance by placing straight edge across pump body with gears in operational cavity. Clearance should not exceed .004". A clearance of .008" maximum should exist between gears and walls of gear cavity opposite point of gear mesh.



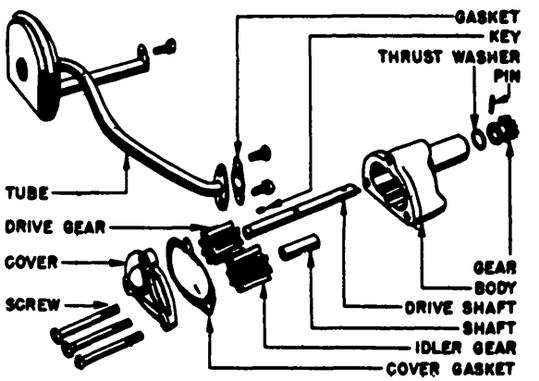
V8 ENGINE OIL PUMP

Reass mbly & Installation - Reverse disassembly procedure. Install cover with pump ut of engine, and check pump for free operation before installing on engine.

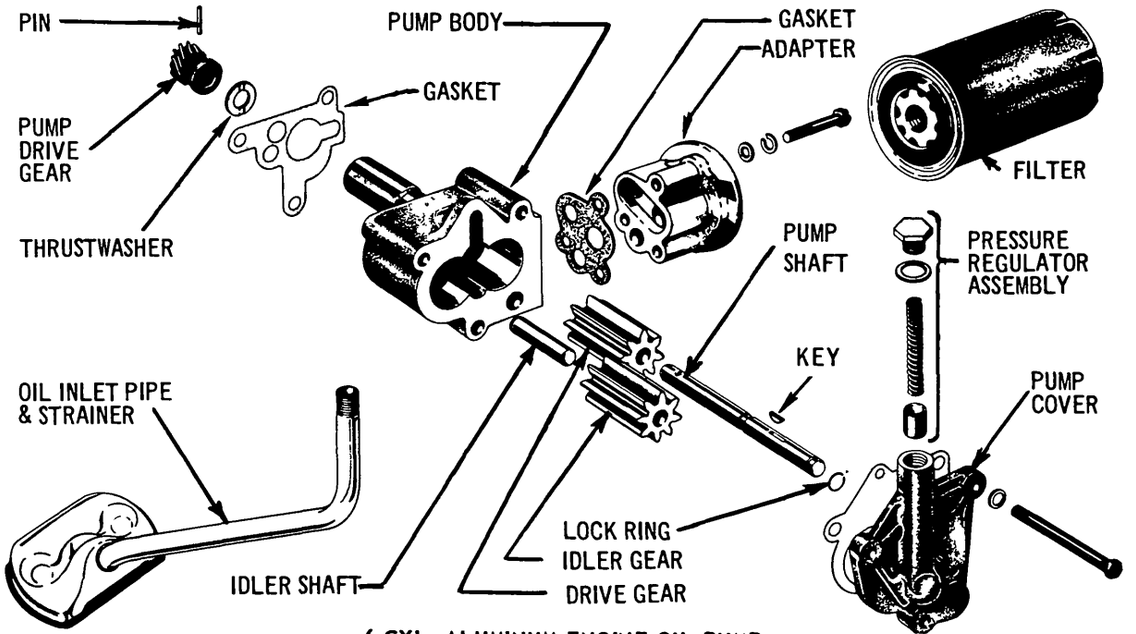
6 CYL. ENGINE

OIL PUMP: Removal - Pump mounted externally on right side of engine. Remove pump by taking out three capscrews in pump cover.

Overhaul: Remove pump cover and gasket. Lift out pump drive gear, idler gear, and idler gear shaft. Remove key from keyway in shaft. Remove shaft and driving gear assembly through upper end of pump body (*NOTE* - Driving gear is held on shaft by a pin). Remove thrustwasher from shaft. Reassemble pump by reversing this disassembly procedure.



6 CYL. CAST IRON ENGINE OIL PUMP



6 CYL. ALUMINUM ENGINE OIL PUMP

►*AMERICAN CUSTOM SERIES NOTE:* This model has 6 Cyl. Overhead Valve Engine and Delco-Remy electrical equipment. *S "Rambl r Am rican Cust m & Rambler Six" (following) for all data on this model.*

MODEL IDENTIFICATION

Model	Series
Rambler American (Deluxe & Super)	6101

NOTE - "L" Head engine used in these models.

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel.
Starting Serial Number - B-221001 (Dom.), BK-10701 (Exp.).

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar post. Indicates date of manufacture, not used for licensing.

Engine Code Number: Stamped on machined pad on upper left front corner of cylinder block below cylinder head. Indicates date of manufacture, not used for licensing.

►*ENGINE NUMBER LETTERS (Adjacent to Engine Code Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" - Standard. "B" - .010" Undersize.. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. min. at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-20" at idling speed.

VALVE TAPPET CLEARANCE: .016" Intake, .018" Exhaust, Cold.

MANIFOLD HEAT CONTROL: None used.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.037"
Spark Plugs - Autolite AL-7, AL-82, ARL-82 or Champion H-10, H18Y. 14mm. Torque to 30 ft. lbs.

COIL: Autolite CAG-20613.
Ignition Current - 3.0 amps. stopped.
Resistor - None used.

DISTRIBUTOR: Autolite IAT-4402-1. Pivoted breaker plate type with centrifugal and vacuum advance.
Condenser - Autolite 2-32. **Capacity** .18-.23 mfd.
Contact Point Set - Autolite No. 1-47.
Breaker Gap - .018-.022". *NOTE* - Set gap with engine stopped and use feeler gauge or dial indicator.
Cam Angle - 36-42°. *CAUTION -Use breaker gap setting only, see above.*
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance.

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	420	0	840
1	540	2	1080
2.5	700	5	1400
6	1700	12	3400
7	2000	14	4000

Vacuum Spark Control: Autolite integral type.

Vacuum Advanc

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5
1	2	5 7/8
2	4	6 3/4
4	8	9
5.5	11	11

IGNITION TIMING

Setting - 3° BTDC (Reg. Fuel), 6° BTDC (Prem. Fuel).
Timing Mark - Vibration damper has five notches (TDC, 3°, 5°, 8°, 10° BTDC). Align correct notch with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF single barrel carburetor used.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

CARTER YF

Carter YF 2014S. Single barrel, downdraft type.
Idle Setting - ½-1½ turns open. Turn screw out for richer mixture.
Idle Speed - 550 RPM (Synchro-mesh), 475 RPM (Flash-O-Matic in "N"), 500 RPM (Air Cond. "ON").
Float Level - ½" (Gauge T109-83) from top of float at free end to top surface of bowl cover (air horn and float assembly inverted and gasket removed). To adjust, bend float lip.
Accelerating Pump - No seasonal adjustment.
Fast Idle: .054" throttle valve opening (Gauge T109-193) with choke valve tightly closed. Adjust by bending fast idle connector link at lower angle.
Automatic Choke Setting: One notch lean.
►*OTHER DATA: See "Carter YF Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter MODF-3184S. Fuel & Vacuum, diaphragm type.
Pressure - 4-5½ lbs. maximum, measured 16" above pump outlet with engine running at 1800 RPM.

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with gauge Voltage Regulator, King-Seeley No. 57603.
Dash Unit - King-Seeley No. 57592.
Tank Unit - King-Seeley.

Air Cleaner: Oil Bath and Dry Filter Element types used. Dry filter element type should be removed every 1,000 miles for cleaning and replaced every 6 months or 10,000 miles whichever occurs first.

►*PAPER ELEMENT AIR CLEANER CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate or blow out with compressed air.

BATTERY

Autolite. Used as follows:

Model	Bat. No.	Plates	①Hr. Capacity
Standard	11-MS-40	7	40 Amps.
Air Cond	11-HS-60	11	60 Amps.
Fleet-Hvy.Dty.	11-HS-70		70 Amps.

① - At 20 hour rate.

Batt ry Gr und - Negative to cylinder head.
Engin Gr und - Transmission case to rear engine crossmember.

STARTER

Autolite MEC-6002. Armatur - Autolit N. 16-77.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs.
Shunt Field Current Draw - 4.4-5.1 amps. at 10 volts.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	48
6.5 ft. lbs.	Lock	4.0	285

Starter Switch: Autolite Solenoid No. 15-65 mounted on starter and controlled by Ignition & Starter Switch Rambler No. 3158414 and Neutral Safety & Back-up Switch (Auto. Trans.) No. 3202684. Starter operative only in "N" or "P".
Neutral Safety Switch Adjustment - *See "Rambler Automatic Transmission" in Transmission S ction.*

ALTERNATOR & REGULATOR

Leece-Neville. Alternator N. A0012036 with R gulat r No. R-0013533.
Rotation - Clockwise at drive end.
Field Current - 2.5-3.0 Amps. at 12 Volts.
Rated Output - 60 Amps. at 14 Volts at 4400 RPM, (1800 Eng. RPM).
►*OTHER DATA: See "Leece-N vill Alternator & Regulator" in Electrical Section.*

GENERATOR

Autolite GJO-7101A. Armatur - Aut lite No. 10-72.
►*CHARGING CIRCUIT CAUTION: "B" typ circuit used with generator field ground d in generat r. F r wiring diagrams and testing cautions, s "Autolite B Circuit Regulators" in Electrical S cti n.*

Performance Data - Cold (70°F)

Amperes	Volts	RPM
13.0	15.0	1750
25.0	15.0	2300

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 18-36 ozs.
Field Current - 1.6-1.7 amperes at 10.0 volts.
Motoring Current - 2.9-3.3 amps. at 10.0 volts.

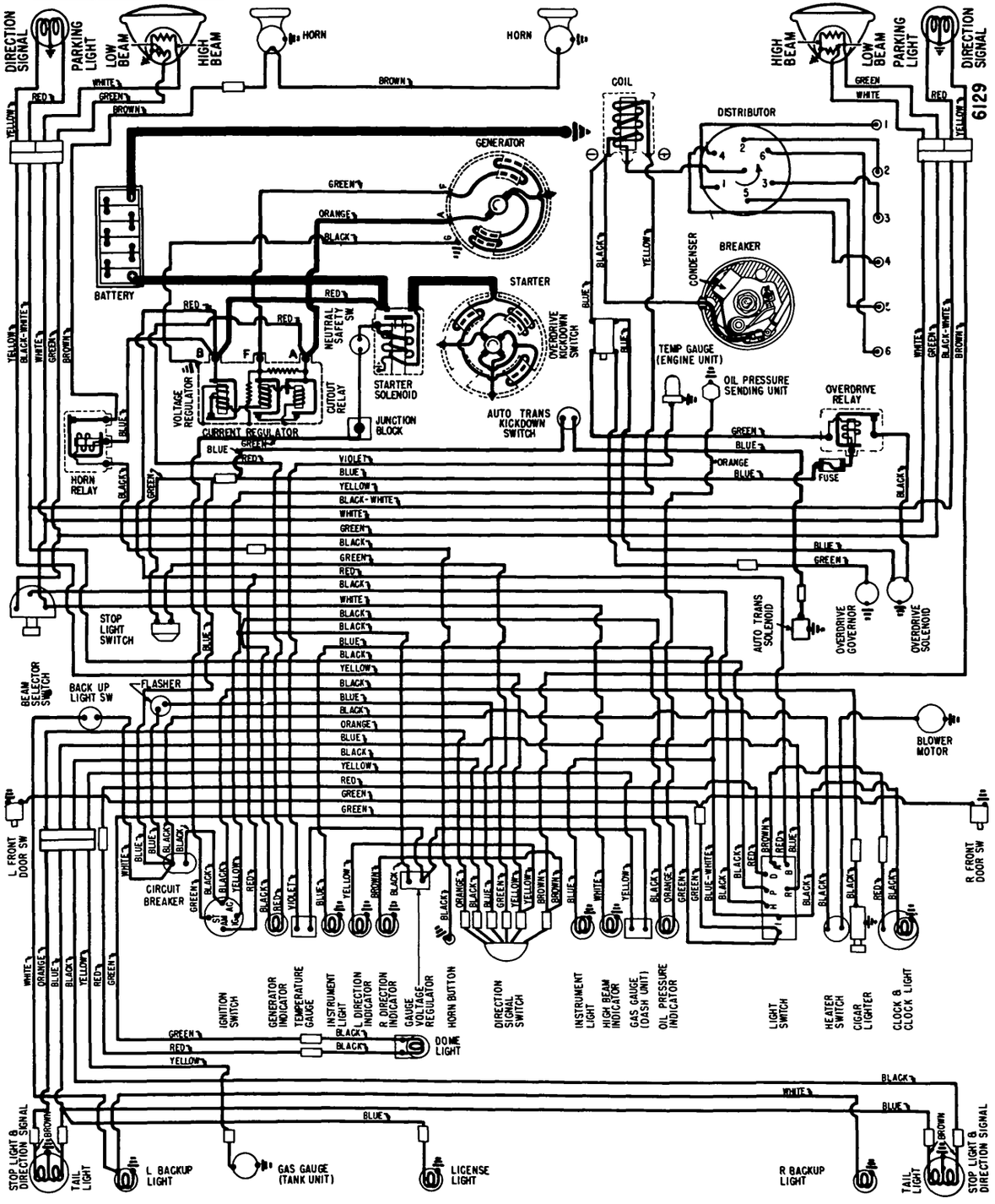
Belt Adjustment: 110-120 lbs. (new belt), 70-80 lbs. (used belt) strand tension using a belt tension gauge. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

GENERATOR REGULATOR

Autolite VBO-6201C (Early), 6221C-1 (Lat) I ss Air Cond.; VBO-6201B-2 (Early), 6221B-1 (Late), with Air Cond.
►*CHARGING CIRCUIT CAUTION: "B" typ circuit us d with generator field ground d in generator. For wiring diagrams and testing cauti ns, see "Aut lit B Circuit Regulators" in Electrical S cti n.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for compl te CARBURETION, ELECTRICAL, MECHANICAL data.



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Cutout Relay

Cuts In - 12.5-13.5 volts.
Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.
Contact Gap - .015".
Air Gap - .025-.027".

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes, or with .25 ohm resistor in series with regulator and battery.
Air Gap - .048-.052" (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite B Circuit Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Regulator	Test A Operating Amperes	Test B
VBO-6201C, 6221C-1	.32 max.	25 (23-27)
VBO-6201B-2, 6221B-1	.37 max.	30 (28-32)

Test A - After 15 minutes operation charging at 7 amps.
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
Checking & Adjusting - *See "Autolite B Circuit Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: Two headlights, one in each fender. Sealed beam.

Light Switch Removal: Disconnect battery, place switch in full "Off" position and press button (on top of switch) to release switch shaft and knob assembly, then remove (French) nut. Remove switch and disconnect wires.

Stop Light Switch: Located at front end of master cylinder. Use thread sealer when installing new switch.

CIRCUIT BREAKERS: 18 Amperes. Headlights & High Beam Indicator. In light switch.
12 Ampere. Parking, Tail, License Plate, Instrument, Dome and Clock lamps. In light switch.
30 Ampere. Stop, Direction, Back-up lamps. On ceiling of cowl beneath dash panel.

FUSES: AGA-5. In radio lead.
AGC-15. Overdrive. Clipped to "B" terminal of relay.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning system or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own, 6 cyl. "L" head.

Bore	Stroke	Displacement
3 1/8"	4 1/4"	195.6 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0-1	23.4	90 at 3800 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing pan.

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ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, tin plated type with flat top.

Original Bore & Piston Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification, above.*

Clearance - .0006"-.0012" at bottom of skirt.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry.

Replacement Pistons: Std., .002", .005", .010", and .020" Oversize. Furnished with fitted pins.

Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .8595-.8598". **Length** - 2.75".

Clearance in Piston - Palm press fit in piston at room temperature.

Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data.*

Replacement Pins: Furnished Std. and .001", .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0930-.0935"	.010-.020"	.003-.005"
Compr.(2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3)①	.0245"	.015-.055"	.0008-.004".

① - Three-piece steel rail.

Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

Length - 6.625" center-to-center. **Weight** - 23 ozs.

Crankpin Journal Diameter - 2.0948-2.0955".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed babbitt. No shims.

Clearance - .001-.0015". **Side Play** - .005-.015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Identification marks (raised surface on center of rod and cap) toward front of engine.

CRANKSHAFT

Journal Diameter - 2.4791-2.4798". Four bearing.

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed babbitt. No shims.

Clearance - .001-.0015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

End Thrust: Taken by flanged front main bearing.

Endplay - .003-.008".

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

►*CRANKSHAFT OIL SHEDDER NOTE:* Oil shedder, Part No. 3102770, installed on crankshaft with concave section toward the front, beginning with engine Code No. 20107.

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*

Bearings - Steel-backed babbitt bushings.

Clearance - .001-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.

Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Cover oil seal can be replaced without removing cover by using Remover J-9256 and Installer J-9163.

VALVES

Tappet Clearance: .016" Intake, .018" Exhaust.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.469"	.3407-.3412"	4.781"
Exhaust	1.281"	.3407-.3412"	4.7835"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°①	.340"	.002-.0035"
Exhaust	45°①	.340"	.002-.0035"

① - Valve Face angle 44°.

►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top valve to less than 1/32".

Valve Seat Width - 5/64-3/32".

Valve Stem Oil Seal - None used.

Valve Springs: Single spring used on each valve. Specifications as follows:

Valve	Lbs. Pressure	Length
Open	75-82	1 7/16"
Closed	37-41	1 3/4"

Valve Guides: Use Tool J-1429-1 to remove and replace guides. Guides should be flush with guide bore opening in block. Finish ream all guides after installation.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valves - Open 10° BTDC, Close 58° ALDC.

Exhaust Valves - Open 49° BLDC, Close 19° ATDC.

Valve Timing Check - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 12 lbs. minimum at 600 RPM, 50 lbs. at 3000 RPM.

Pressure Regulator Valv - Non-adjustable spring loaded valve located in cylinder block just ahead of oil pump.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on right side of block to rear of fuel pump.

Oil Pump: Gear type. Mounted on right side of engine. *See "Oiling System" in Rambl r Sp cial Data.*

Oil Filter: Partial flow type. Replace element every 4000 miles or sooner as needed.

►*OIL FILTER NOTE:* Oil pressure line should be connected to outer fitting on filter, and return line to center fitting. If lines found reversed, connect properly and install new element.

Replacement Filter Element - Rambler No. 8990508.

Crankcase Ventilation: Standard Cars - Filter in crankcase filler cap and breather tube in valve chamber front side plate.

Positive Crankcase Ventilati n Cars - Usual breather tube in valve chamber front side plate replaced by vacuum line to manifold, with valve in line to vary the air flow through crankcase to meet changing conditions at all engine speeds and loads. *S "Closed Crankcas Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. Add 1 qt. for heater.

Pressure Valve: 12-15 lb. radiator cap, Rambler No. 3160667.

Thermostat: Dole - 150° Rambler No. 3201251, 167-173° No. 3201249, 177-182° No. 3201250, 192-197° No. 3202389; **Thompson** 177-183° No. 3155883.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57596.

Engine Unit - King-Seeley No. 44255.

LUBRICATION

FLASH-O-MATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Apply parking brake and run engine until normal operating temperature attained. Move selector lever through all positions and back to "N". Check fluid level and add fluid as required. Level should be maintained at "F" mark on dipstick. 1½ pints fluid required to raise level from "L" to "F" mark.

Capacity - 10 qts.

S INDEXES on Pgs. 4 to 9 for compl te CARBURETION, ELECTRICAL, MECHANICAL data.

►*AMERICAN DELUXE & SUPER NOTE:* These models have "L" Head engine and Autolite electrical equipment. *Se "Rambler American (Deluxe & Super)" for all data.*

MODEL IDENTIFICATION

M d l	Series
Rambler American (Custom)	① 6101
Rambler Classic 6	② 6110

① - Overhead Valve Engine. 6101-2 (Custom).
② - Cast Iron & Aluminum Blocks used, see data below.

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel.

Starting Serial Numb rs - Custom - B-221001 (Dom.) BK-10701 (Exp.); **Classic 6** - C-400001 (Dom.), CK-10401 (Exp.).

Car C de Number: Stamped on bottom of body and number plate located on left front door hinge pillar post. Number indicates date of manufacture but is not used for licensing.

Engin Code Numb r: Stamped on machined pad on upper left front corner of cylinder block below cylinder head. Indicates date of manufacture but is not used for licensing.

ENGINE NUMBER LETTERS: Located at upper left front (Early Aluminum Block), upper left rear (Later Aluminum Block), left fr nt (Other 6 Cyl.) corner of cylinder block. First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not so marked are standard in all respects. "A" - Standard, "B" - .010" Undersize, "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 120 lbs. min. at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-20" at idling speed.

VALVE TAPPET CLEARANCE: Classic 6 & American (Ov rh ad Valv & Cast Iron Block). .012" Intake, .016" Exhaust. Hot.

Classic 6 (Aluminum Bl ck). "O" lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: American - Water heater tube incorporated in intake manifold. **Classic** - None used. Intake manifold cast as integral part of engine.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.037".

Spark Plugs - Autolite AL-7, AL-82, ARL-82, or Champion H-10, H18Y. 14 mm. Torque to 30 ft. lbs.

COIL: D lco-R my 1115066.

Igniti n Curr nt - 1.7 amps. idling, 3.75 amps. stopped.

R sistor - Delco-Remy 1927809. 1.52±.04 ohms at 80°F.

►*COIL RESISTOR NOTE:* Resistor connected in series between ignition switch and coil. Bypassed during cranking by direct lead from solenoid to coil.

DISTRIBUTOR: Delco-R my 1112434.

C nd ns r - Delco-Remy 1928111. **Capacity** .18-.23 mfd.

Contact P int Set - Delco-Remy 1924571 or 1944375 (pre-assembled).

Breaker Gap - .016".

Cam Angle - 28-35°.

Breaker Arm Spring Tension - 17-21 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	600	1-5	1200
5-7	900	10-14	1800
7.5-9.5	1500	15-19	3000
10-12	2100	20-24	4200

Vacuum Spark Control: Delco-Remy 1116174.

Vacuum Advance

Distr. Degrees	Engine Degrees	Vacuum (" of Hg)
1	2	5-7
11	22	16-17

IGNITION TIMING

Series	Ignition Setting Regular - Fuel - Premium
American (S.M. Trans.)	8° BTDC ..... 12° BTDC
American (Auto. Trans.)	10° BTDC ..... 14° BTDC
Classic	①5° BTDC ..... 8° BTDC

① - Supersedes previous setting of 8° BTDC. *NOTE* - Cars are set 8° BTDC at factory.

Timing Mark - Vibration damper has five notches (TDC, 3°, 5°, 8°, 10° BTDC). Align notch with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION:* Carter & Holley Single & Dual Carburetors used as follows:

Model	Carburetor
American & Classic (Std. Trans.)	Holley
Classic (Auto. Trans.)	Carter AS
Classic Optl. (All Trans.)	Carter WCD

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

CARTER AS

Carter AS 3169S (Early), AS 3206S (Later). Single Barrel Downdraft type.

Idle Setting - ½-1¼ turns open. Turn screw out for richer mixture.

Idle Speed - 475 RPM (Flash-O-Matic in "N"), 500 RPM (Air Cond. "ON").

Float Level - ¼" (Gauge T109-282, 3169S), 5/32" (3206S), from top of each float (at free end) to top of casting with carburetor inverted. To adjust, bend float lip.

Accelerating Pump - No seasonable adjustment.

Fast Idle: .037" (Gauge T109-193) between lower edge of throttle valve and bore with fast idle link on high step of cam. To adjust bend choke connector rod. Fast idle speed on car is 1800-2000 RPM with engine hot and fast idle link on high step of fast idle cam.

Automatic Choke Setting: Center on index.

►*OTHER DATA: See "Cart r AS Carbur t rs" in Carbur r tion Section.*

HOLLEY SINGLE BARREL

H ll y M d l 1908FC. No. R-2269-A (Early American), No. R-2381-1 (Later American); No. R-2138-1 (Classic). Single barrel, downdraft type. Similar in design to Holley "Visi-Flo" except for design of float.

Idle Setting - 1¼ turns (R-2269-A & R-2381-1), 1 turn (R-2138-1) open approximately. Set idle adjusting needle to give highest vacuum or smoothest running and maximum idle speed. If idle speed too high, reset idle speed screw and again adjust idle setting needle, leaving it slightly on rich side.

Idle Speed - 550 RPM (Std. Trans.), 475 RPM (Auto. Trans. in "N"), 500 RPM with Air Cond. "ON".

Fuel Level - 3/4"±1/32" (Gauge J-10231) measured through economizer hole at 4½ lbs. pressure.

Accelerating Pump - No seasonable adjustment.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Automatic Choke Setting: Center on index (2138, 2269), 3 notches lean (2381).

►*OTHER DATA: See "Holley Visi-Flo" in Carburetion Section.*

CARTER WCD

Carter WCD 3170S. 2-Barrel, downdraft type.

Idle Setting - ½-2 turns out. Turn screws out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.) 475 RPM (Flash-O-Matic in "N"), 500 RPM (Air Cond. "ON").

Float Level - 5/32" (Gauge T109-196). Distance from top of each float and machined surface of casting.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .010" (Gauge T109-200) clearance between lip of fast idle cam and boss on body with choke valve closed (loosen clampscrew and adjust lever on choke shaft). .020" (Gauge T109-29) between throttle valve and bore (side opposite idle port) with choke fully closed (adjust fast idle screw) with idle adjusting screw on high step of fast idle cam.

Automatic Choke Setting: Centered on index.

►*OTHER DATA: See "Carter WCD Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: (American) - Carter MDOF-3184S. Fuel & Vacuum, diaphragm type. **(Classic)** - Carter No. MPF-3025-S. Fuel & Vacuum, with piston type vacuum pump.

Pressure - 4-5½ lbs. minimum at 16" above inlet at 1800 RPM (American), 4-5½ lbs. maximum, using 6" hose and "T" fitting 6" above carb. inlet (Classic 6).

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57592.

Tank Unit - King-Seeley No. 59040 (Pass.), No. 59050 (Sta. Wgn.).

Air Cleaner: Replaceable element (Dry type) or oil bath type used. Clean replaceable element type every 1,000 miles, service oil bath type every 2,000 miles. Replace dry type filter element every 6 months or at 10,000 mile intervals whichever occurs first.

►*DRY TYPE CLEANING CAUTION:* Remove filter element, tap lightly to remove dirt particles, DO NOT use compressed air or liquid solvents to clean element.

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BATTERY

Autolit . Used as follows.

Model	Bat.No.	Plates	℄Hr. Capacity
Amer.&Classic ②	11-HS-45	7	45 Amp.
All with AC	11-HS-60	11	60 Amp.
Fleet Hvy. Duty	11-HS-70		70 Amp.

℄ - 20 hr. rate. ② - Less Air Cond.

Battery Ground - Negative to cylinder head.

Engine Ground - Transmission case to rear engine crossmember.

STARTER

Delco-Remy 1107201.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	℄Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

℄ - Includes Solenoid.

Starter Switch: Delco-Remy Solenoid No. 1119798 mounted on starter and controlled by Ignition & Starter Switch Rambler No. 3158414 for key starting (Synchro-mesh). Automatic Trans. Cars controlled as follows:

American - Same as Synchro-mesh above with Neutral Safety & Back-Up Light Switch Rambler No. 3202684.

Classic - Neutral Safety Switch No. 3201826 (Early Dom.), No. 3201827 (Early Exp.), No. 3203007 (Late Dom.), No. 3203008 (Late Exp.) and Relay No. 3156115 with Push Button Control. Switch mounted on gear shift control and operated by pushing in "Neutral Button" with ignition turned "ON". Vacuum Switch prevents starter operation with engine running.

►*VACUUM NEUTRAL STARTER SWITCH CAUTION:* DO NOT apply a hot lead direct to switch for test purpose as it will overheat loading spring and/or burn contacts. Disconnect lead to switch and ground lead to to engine. If engine will start, switch is defective. Switch opens at 11-14" of vacuum. Starter gear clash that occurs when engine started Cold and on low fast. idle setting with choke fully closed is the result of low engine vacuum and is normal.

Neutral Safety Switch Adjustment (American) - *See "Rambler Automatic Transmission" in Transmission Section.*

ALTERNATOR & REGULATOR

Leece-Neville. Alternator A0012036 with Regulator R-0013533.

Rotation - Clockwise at drive end.

Field Current - 2.5-3.0 Amps. at 12 Volts.

Rated Output - 60 Amps. at 14 Volts at 4400 RPM (1800 Eng. RPM).

►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

Delco-Remy. Alternator No. 1117070 with Regulator No. 9000552.

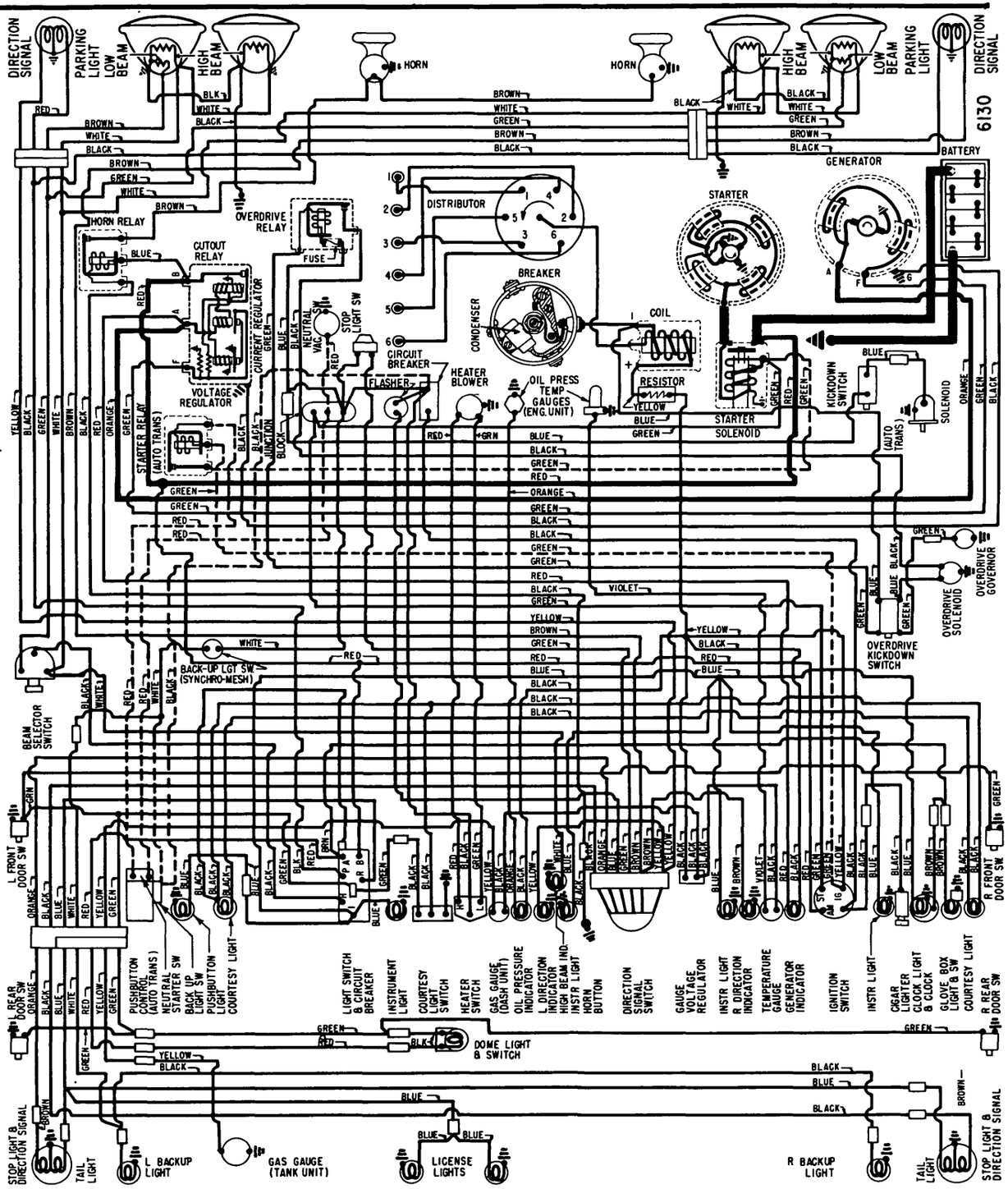
Rotation - Clockwise at drive end.

Brush Spring Tension - 20 ozs.

Field Current - 5.6-6.3 amps. at 12 volts (80°F).

Rated Output - 58 amps. (cold), 60 amps. (hot) at 14 volts and 2500 RPM.

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►*OTHER DATA: See "Delco-Remy 12-Volt Alternator (Internal Rectifier) & Transistorized Regulator" in Electrical Section.*

GENERATOR

Delco-Remy. Used as follows:

Model	Generator	Armature
Standard	1100324	1928952
Air Cond.	1102113	1923535
Heavy Duty	1102123	

Performance Data

Generator	Amperes	Volts	RPM
1100324	25	14.0	2570
1102113	30	14.0	2240
1102123	45	14.0	2600

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.5-1.62 Amps. (1100324), 1.69-1.79 Amps. (1102113), 2.66-2.86 Amps. (1102123), at 12 volts and 80°F.
Belt Adjustment: 110-120 lbs. (New), 70-80 lbs. (Used) tension, using a belt tension gauge at center of longest span between pulleys. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

GENERATOR REGULATOR

Delco-Remy. Used as follows:

Model	Regulator	Generator
Standard	1119122	1100324
Air Cond.	1119003	1102113
Heavy Duty	1119600	1102123

►*DOUBLE CONTACT REGULATOR NOTE:* Regulator 1119600 has double contacts for voltage regulation. *NOTE* - Specifications below are for "NORMAL" settings.

►*REGULATOR ADJUSTMENT NOTE (1119003,122):* "Post Type" design with nylon adjusting nuts above voltage & current regulation units for air gap adjustment.

Cut out Relay

Cuts In - 11.8-13.5 volts (1119003, 122), 11.8-13.0 volts (1119600).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting - (1119003, 122) - 13.8-14.7 volts at 125°F.
Setting (1119600) - 13.8-14.6 volts operating on upper contacts, .1-.3 volts lower on lower contacts. At ambient temperature of 125°F.
Contact Gap (1119600) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .075" (1119003, 122) .067" (1119600) with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

Current Regulator

Setting (1119122) - 23-27 amperes (hot).
Setting (1119003) - 27-33 amperes (hot).
Setting (1119600) - 38-45 amperes (hot).
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlamps: (American) Two headlights, one in each fender. **(Classic)** Dual headlights. (4-Headlight System).
Light Switch Removal: Disconnect battery, place switch in full "Off" position and press button (on top of Switch) to release switch shaft and knob assembly, then remove (French) nut. Remove switch and disconnect wires.
Stop Light Switch: Located on fitting at front end of master cylinder (American), in fitting located on front face of firewall (Classic). Use thread sealer when installing new switch.
CIRCUIT BREAKERS: 18 Ampere. Headlights & High Beam Indicator. In light switch.
12 Ampere. Parking, Tail, License Plate, Instrument, Dome and Clock lamps. In light switch.
30 Ampere. Stop, Direction, Back-up lamps. On ceiling of cowl beneath dash panel.
FUSES: AGA-5. In Radio lead.
AGC-15. Overdrive. Clipped to "B" terminal of relay.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head.

►*SERIES 6110 ENGINE NOTE:* Both Cast Iron and Aluminum blocks used. Specifications are the same for either type block except as noted below.

Bore	Stroke	Displacement
3.125"	4.25"	195.6 cu. ins.

Model	Compr. Ratio	Rater H.P.	Developed H.P.
All ①	8.7-1	23.44	127 at 4200 RPM
Classic ②	8.7-1	23.44	138 at 4500 RPM

① - 1-Bbl. Carb. ② - 2-Bbl. Carb.

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE SERVICE NOTE: For Aluminum Engine Service Cautions see "Engine" in Rambler Special Data.*

►*SERIES 6110 ALUMINUM BLOCK OIL SEEPAGE AT RIGHT FRONT CORNER CORRECTION:* Remove cylinder head and install new dowel pin Part No. 3164362 (with the two "O" ring seals). Sharp edges of dowel pin holes should be chamfered with crocus cloth to save damage to seals. Either the earlier or later type gasket Part No. 3161430 (with head along push-rod side) may be used. Apply "Perfect Seal" sealing compound on both sides of gasket.

►*SERIES 6101 & 6110 CAST IRON ENGINE BREATHER TUBE PRODUCTION CHANGE AND OIL LEAKAGE AT HIGH SPEED CORRECTION:* New Breather Tube Part No. 3203458 (2 5/16" shorter and without 45° angle cut at lower end), used in production starting with Engine No. 30601. To correct loss of oil on earlier models, cut 2 5/16" off lower end of old breather tube, cutting at right angles to tube (not 45°)

►*SERIES 6110 ALUMINUM ENGINE VALVE SPRING PRODUCTION CHANGE & LOSS OF POWER CORRECTION:* New Valve Spring Part No. 3163019 (Int. & Exh.), with increased spring tension (identified by strip of white paint) used in production starting with Engine No. 31027. Replace early type valve spring with this part No. for correcting power loss due to sticking valves.

►*SERIES 6101 & 6110 CAST IRON ENGINE MAIN BEARING CAP SCREW LENGTH AND LOCATION CAUTION:* Use shorter (2 7/16") cap screw Part No. 3105769 for front and rear main bearing caps **only.** Use capscrew Part No. 3148821 (2 13/16") long for both intermediate bearing caps. Longer capscrews will bottom in front & rear positions before bearing cap is tight.

►*ENGINE THRUST ROD ASSEMBLY (Series 6110 with Auto. Trans.):* Limits forward movement of engine. Attached by bracket to lower left side of block and to front suspension crossmember at rear.

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*
CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, steel strut, tin plated type with contoured top.
Original Bore & Pistons - *See "ENGINE NUMBER LETTER" under Model Identification above.*
Clearance - .0006-.0012" at bottom of skirt.
Weight (Piston only) - 14.7 ozs.
Removal - Pistons and rods removed from above.
Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry
Replacement Pistons: Std., .002", .005", .010" and .020" Oversize. Furnished with fitted pins.
Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.
Diameter - .8595-.8598". **Length** - 2.75".
Clearance in Piston - Palm press fit in piston at room temperature.
Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data.*
Replacement Pins: Furnished Std. and .001", .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring per piston.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0930-.0935"	.010-.020"	.003-.005"
Compr. (2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3) ①	.0245"	.015-.055"	.0001-.0084".

① - Three-piece steel rail.

Installing Rings: *NOTE* - Top compression ring outer edges beveled. Install both compression rings with inner notched edge up.
Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

Length - 6.625" center-to-center. **Weight** - 23 ozs.
Crankpin Journal Diameter - 2.0948-2.0955".
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

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Bearings - Steel-Backed "Mircro-Babbitt" (Cast Iron Eng.), "Sintered Copper-Lead" (Aluminum Eng.). No shims.
Clearance - .001-.0015". **Sideplay** - .005-.015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Install rods in respective cylinders with cylinder numbers on rods and caps toward camshaft side of engine and notch in top of piston to front of engine.

CRANKSHAFT

Journal Diameter - 2.4791-2.4798". Four Bearing.
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*
Bearings - Steel-Backed "Micro-Babbitt" (Cast Iron Eng.). "Sintered Copper-Lead" (Aluminum Eng.). No shims.
Clearance - .001-.0015".

End Thrust: Taken by flanged front main bearing
Endplay - .003-.008".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

►*CRANKSHAFT OIL SHEDDER NOTE:* Oil shedder Part No. 3102770 installed on crankshaft with concave section toward the front, beginning with engine Code No. 20107.

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*
Bearings - Steel-backed babbitt bushings.
Clearance - .001"-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.
Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): Cover oil seal can be replaced without removing cover by using Remover J-9256 and Installer J-9163.

VALVES

Tappet Clearance: (Cast Iron Eng.) .012" Intake, .016" Exhaust, with engine hot and running.
(Series 6110 Aluminum Block) "0" lash, hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.341-.342"	4.791"
Exhaust	③	.3405-.3415"	②

Valve	Seat Angle	Lift	Stem Clearance
Intake	①45°	④	.002-.0035"
Exhaust	①45°	⑤	.0025-.004"

① - Valve face angle 44° Intake & Exhaust.
② - 4.791" Cast Iron Eng., 4.808" Aluminum Eng.
③ - 1.343" Cast Iron Eng., 1.250" Aluminum Eng.
④ - .371" Cast Iron Eng., .388" Aluminum Eng.
⑤ - .369" Cast Iron Eng., .388" Aluminum Eng.

Valve Seat Width - .078-.093".

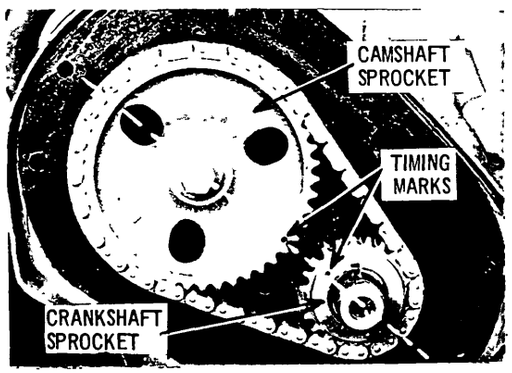
►*VALVE GRINDING CAUTION:* Replace valves when refacing reduces distance from top of valve face to top of valve to less than 1/32".
Valve Stem Oil Seals - Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Single spring used on each valve. Specifications as follows:

Valve	Lbs. Pressure	Length
Open	115-125	1 7/16"
Closed	65-70	1 13/16"

Valve Guides: Use Tool J-1429-B to remove and install all guides. Install guide so it extends 23/32" above surface of cylinder head. Finish ream all guides after installation.

Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*



RAMBLER SIX VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Cast Iron Engine

Intake Valves - Open 12°39' BTDC. Close 51°30' ALDC.
Exhaust Valves - Open 53°30' BLDC. Close 10°30' ATDC.

Aluminum Engine

Intake Valves - Open 15° BTDC. Close 55° ALDC.
Exhaust Valves - Open 55° BLDC. Close 15° ATDC.

Valve Timing Check - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*
Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.
Normal Oil Pressure (Cast Iron Engine) - 12 lbs. at 600 RPM, 50 lbs. at 3000 RPM.
Normal Oil Pressure (Aluminum Engine) - 15 lbs. at 600 RPM, 55 lbs. at 3000 RPM.
Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block (Cast Iron Engine), in oil pump cover (Aluminum Engine).
Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on right side of engine block.
Oil Pump: Gear type, mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*
Oil Filter: Partial flow type optional (Cast Iron Eng.), full flow standard (Aluminum Engine). Replace element at 4,000 mile intervals.
►*FULL-FLOW OIL FILTER BYPASS VALVE NOTE & FILTER CHANGE CAUTION:* When making filter change, check to be sure that bypass valve is properly secured in retainer.
Replacement Filter Element - Rambler No. 8990508 (Cast Iron Eng.), No. 8990873 (Alum. Eng.).
Crankcase Ventilation: Standard Cars - Filter in crankcase filler cap and breather tube in valve tappet cover.
Positive Crankcase Ventilation Cars - Usual breather tube in valve chamber front side plate replaced by vacuum line to manifold with valve in line to vary the air flow through crankcase to meet changing conditions at all engine speeds and loads. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 10 qts. Add 1 qt. for heater.
Pressure Valve: 12-15 lb. radiator cap. Rambler No. 3160667.
Thermostat: Dole 150° Rambler No. 3201251, 167-173° No. 3201249, 167-172° No. 3201255, 177-182° No. 3201250, 192-197° No. 3202389, 192-197° No. 3202647; Thompson 177-183° No. 3155883.
Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.
Dash Unit - King-Seeley No. 57592.
Engine Unit - King-Seeley.

LUBRICATION

FLASH-O-MATIC TRANSMISSION LUBRICATION: Check fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".
Checking Fluid Level - With engine running and engine and transmission at normal operating temperature, shift transmission into all ranges and then place in "N" position for fluid check. Maintain level at "F" mark. Approximately 1½ pints required to raise level from "L" to "F" mark.
Capacity - 10 qts.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

Model	Series
Classic V8	6120
Ambassador V8	6180

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood

Starting Serial Numbers - (Ser. 20) A-118001 (Dom) AK-10001 (Exp) **(Ser. 80)** H-125001 (Dom), HK-10001 (Exp)

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar post Number indicates date of manufacture but is not used for licensing

Engine Code Number: Stamped on plate attached to generator support bracket Number indicates date of manufacture but is not used for licensing

►*ENGINE NUMBER LETTERS (Adjacent to Engine Code Number)* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings Engines not so marked are standard in all respects "A" - Standard "B" - 010" Undersize "C" - 010" Oversize

TUNE-UP

COMPRESSION PRESSURE: 140 lbs minimum at 315 RPM (cranking speed) with throttle wide open

VACUUM READING: 18-21" at idle speed

VALVE TAPPET CLEARANCE: Classic - 012" Intake 014" Exhaust, HOT and running **Amb. -** Zero lash, hydraulic lifters

MANIFOLD HEAT CONTROL: Automatic thermostatic type Located between left bank exhaust manifold and exhaust crossover pipe (exhaust gases diverted through heat passages in manifold when valve closed)

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 033- 037"

Spark Plugs - Autolite AL-7, AL-82, ARL-82 or Champion H-10, H-18-Y 14 mm Torque to 30 ft lbs

COIL: Autolite No. 200571.

Ignition Current - 3 amps at 12 5 volts with resistor in circuit

Resistor - Autolite No PU-5003

►*COIL RESISTOR NOTE* - Connected in circuit between positive terminal of coil and ignition switch *Resistor must be in circuit when testing coil output*

DISTRIBUTOR: Autolite IBP-4107.

Condenser - Autolite 2-32 or 2-34 **Capacity** 18- 23 mfd

Contact Point Set - Autolite No 1-47

Breaker Gap - 017" **Cam Angle** - 29°

Breaker Arm Spring Tension - 17-20 ozs

Rotation - Counterclockwise viewed from above

Automatic Advance - IBP-4107

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	350	2	700
8	750	16	1500
17	1775	34	3550
18	1900	36	3800

Vacuum Spark Control: Autolite integral type

Vacuum Advance - IBP-4107

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6
1	2	6 7/8
5	10	10 3/8
9	18	14
10	20	15

IGNITION TIMING

Series	Ignition Setting Regular - Fuel - Premium
6120 (S M Trans)	TDC 3° BTDC
6120 (Auto Trans)	5° BTDC 8° BTDC
6180 (S M Trans) ①	TDC 3° BTDC
6180 (Auto Trans) ①	5° BTDC 8° BTDC
6180 (All Trans) ②	5° BTDC

① - 2-Barrel Carb ② - 4-Barrel Carb

Timing Mark - Timing indicator on front cover and three grooves on vibration damper Groove painted white is TDC, other grooves indicate 5° and 10° BTDC

CARBURETOR

►*CARBURETOR APPLICATION Holley 2-Barrel carburetor standard, Holley 4-Barrel optional*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): None required Transmission shift points controlled by Vacuum & Solenoid Unit on transmission

HOLLEY 2 & 4-BARREL

	Holley Carb. No.
2-BARREL CARBURETOR	
Series 20 & 80 (Std)	Model 2300, No 2228
4-BARREL CARBURETOR	
Series 20 Optl	Model 4150C, No 1958-1
Series 80 Optl	Model 4150C, No 1957-1

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

Idle Setting - Initial setting 1 turn open Turn screws out for richer mixture

Idle Speed - 550 RPM (Synchro-mesh & O D), 475 RPM (Flash-O-Matic in Neutral), 500 RPM (Air Conditioning "ON")

►*OTHER DATA See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: Carter No MPF-3158-S Fuel & Vacuum, with piston type vacuum pump

Pressure - 4-5½ lbs maximum, using 6" hose and "T"

Gasoline Gauge: King-Seeley Electric Constant-Voltage ("CV") type with Gauge Voltage Regulator, King-Seeley No 57603

Dash Unit - King-Seeley No 57592

Tank Unit - King-Seeley No 59040 (Pass), No 59050 (Sta Wgn)

Air Cleaner: Replaceable element (dry type) used for all models Clean element every 1,000 miles, replace element every 6 months or at 10,000 mile intervals whichever occurs first

►*DRY TYPE CLEANING CAUTION* Clean filter element by tapping and shaking to remove dirt particles DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate or blow out with compressed air

BATTERY

Autolite 11-HS-50 (Ser. 20, Std.), 12 volts, 9 plate, 50 ampere hour capacity (20 hr rate)

Autolite 11-HS-60 (Ser. 20 Air Cond.; Ser. 80 Std.).

Autolite 11-HS-70 (Fleet Hvy. Duty), 12 volts, 70 ampere hour capacity (20 hr rate)

Battery Ground - Negative to cylinder block

Engine Ground - Transmission case to rear engine crossmember

STARTER

Autolite MEC-6003 (Ser. 20), MDY-6009 (Ser. 80).

Armature - Autolite 16-77 (MEC & MDY)

Drive - Overrunning clutch (solenoid pinion shift)

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 42-53 ozs

Performance Data - MEC-6003

Torque	RPM	Volts	Amperes
0 ft lbs	5300	10 0	48
6 5 ft lbs	Lock	4 0	285

Performance Data - MDY-6009

Torque	RPM	Volts	Amperes
0 ft lbs	4200	10 0	60
9 0 ft lbs	Lock	4 0	405

Starter Switch: Autolite Solenoid No 15-70 (MEC, MDY) mounted on starter and controlled by Ignition & Starter Switch Rambler No 3158414 (Synchro-mesh) On Auto Trans Cars, Solenoid controlled by Ignition Switch Rambler No 3158613, a Neutral Safety Switch No 3201826 (Early Dom), No 3201827 (Early Exp), No 3203007 (Late Dom), No 3203008 (Late Exp) and a Relay No 3156115 with Push Button Control Neutral Switch is mounted on gear shift control and operated by pushing in "Neutral Button" with ignition "ON" Vacuum Switch prevents starter operation with engine running

►*VACUUM NEUTRAL STARTER SWITCH CAUTION* DO NOT apply a hot lead direct to switch for test purpose as it will overheat loading spring and/or burn contacts Disconnect lead to switch and ground lead to engine If engine will start, switch is defective Switch opens at 11-14" of vacuum Starter gear clash that occurs when engine started "Cold" and on low fast idle setting with choke fully closed is the result of low engine vacuum and is normal

ALTERNATOR & REGULATOR

Leece-Neville. Alternator A0012036 with Regulator R-0013533.

Rotation - Clockwise at drive end

Field Current - 2 5-3 0 Amps at 12 Volts

Rated Output - 60 Amps at 14 Volts at 4400 RPM (1800 Eng RPM)

►*OTHER DATA See "Leece-Neville Alternator & Regulator" in Electrical Section*

Delco-Remy. Alternator No. 1117070 with Regulator No. 9000552.

Rotation - Clockwise at drive end

Brush Spring Tension - 20 ozs

Field Current - 5 6-6 3 Amps at 12 Volts (80°F)

Rated Output - 58 Amps (cold), 60 Amps (hot) at 14 Volts and 2500 RPM

►*OTHER DATA See "Delco-Remy 12-Volt Alternator (Internal Rectifier) & Transistorized Regulator" in Electrical Section*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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GENERATOR

Autolite GJO-7101A (Ser. 20 Std.), GJP-7101A (Ser. 20 Air Cond. & Ser. 80 Std.).

Armature - Autolite 10-72 (GJO) 10-53 (GJP).

►*CHARGING CIRCUIT CAUTION:* "B" type circuit used with generator field grounded in generator. For wiring diagrams and testing cautions, see *"Autolite B Circuit Regulators" in Electrical Section.*

Performance Data - GJO (Cold - 70°F)

Amperes	Volts	RPM
13 min.	15.0	1750
25	15.0	2300
30	15.0	2700

Performance Data - GJP (Cold - 70°F)

Amperes	Volts	RPM
16 min.	15.0	1750
30	15.0	2300
35	15.0	2600

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amperes at 10.0 volts.

Motoring Current (GJO) - 2.9-3.3 amperes at 10.0 volts.

Motoring Current (GJP) - 3.1-3.5 amperes at 10.0 volts.

B It Adjustment: 110-120 lbs. (new belt), 70-80 lbs. (used belt) strand tension using a belt tension gauge. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

GENERATOR REGULATOR

Autolite. Used as follows:

Model	Early Regulator	Later
Ser. 20	VBO-6201B-2	VBO-6221B
Ser. 80	VBO-6201A-2	VBO-6221A

Cutout Relay

Cuts In - 12.5-13.5 volts.

Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.

Contact Gap - .015".

Air Gap - .025-.027".

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes, or with a .25 ohm resistor in series with regulator and battery.

Air Gap - .048-.052" (check at brass armature stop pin).

Checking & Adjusting - See *"Autolite B Circuit Regulators" in Electrical Section.*

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

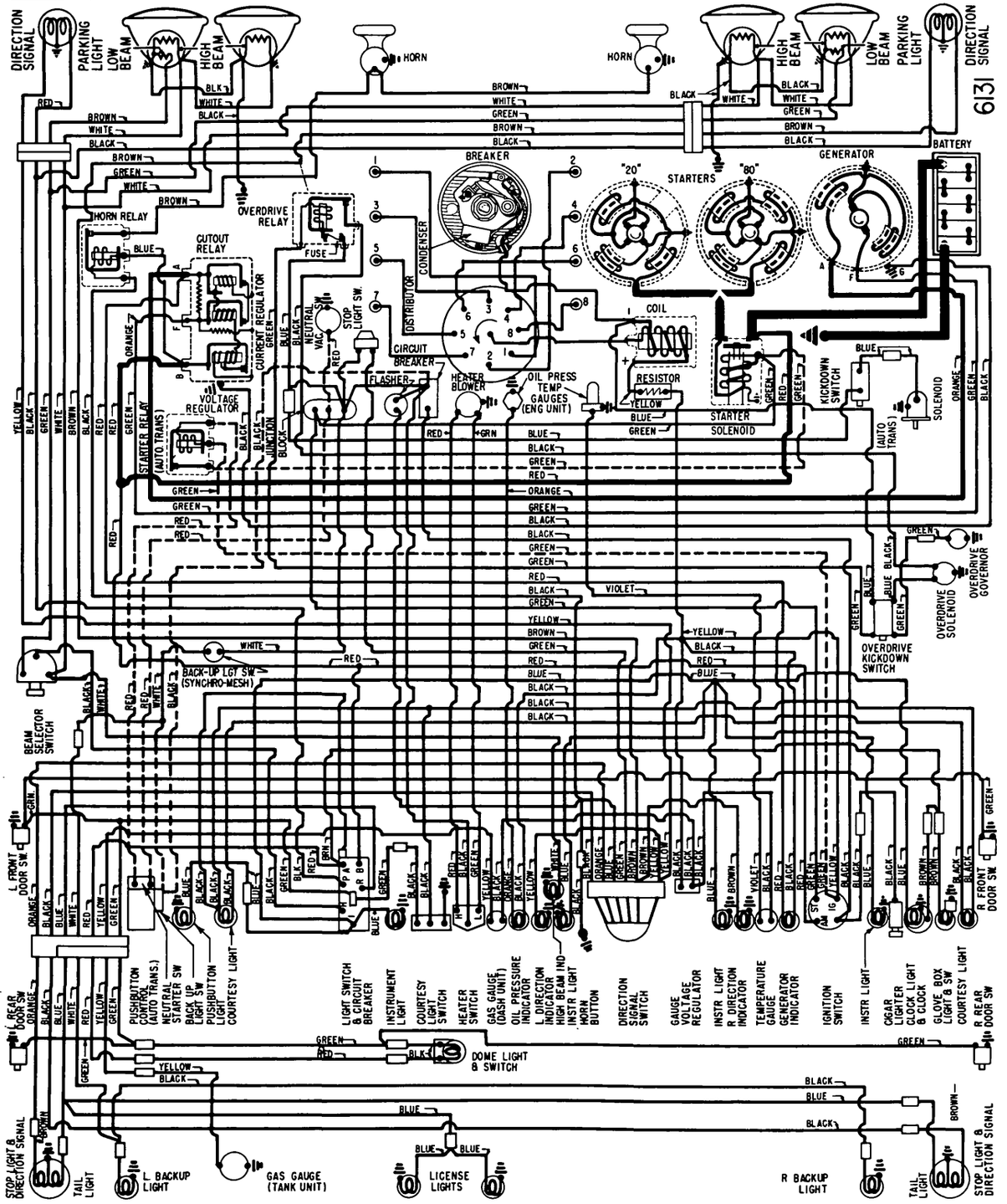
Regulator	Test A - Operating Amperes	Test B
VBO-6201A-1	44 Max.	35 (33-37)
VBO-6201B-1	37 Max.	30 (28-32)

Test A - After 15 minutes operation charging at 7 amps.

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

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►*OTHER DATA: See "Autolite "B" Circuit Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: Dual headlights (4-Headlight System).

Light Switch Removal: Disconnect battery, place switch in full "Off" position and press button (on top of switch) to release switch shaft and knob assembly, then remove (French) nut. Remove switch and disconnect wires.

Stop Light Switch: Located in fitting on front face of firewall. Use thread sealer when installing new switch.

CIRCUIT BREAKERS: 18 Ampere. Headlights & High Beam Indicator. In light switch.

12 Ampere. Parking, Tail, License Plate, Instrument, Dome and Clock lamps. In light switch.

30 Ampere. Stop, Direction, Back-up lamps. On ceiling of cowl beneath dash panel.

FUSES: AGA-5. In Radio lead.

AGC-15. Overdrive. Clipped to "B" terminal of relay.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme caution when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own, V8, valve-in-head.

Series	Bore	Stroke	Displacement
20	3½"	3¼"	250 cu. ins.
80	4"	3¼"	327 cu. ins.

Series	Compr. Ratio	Rated HP	Developed HP
20 (2-Bbl. Carb.)	8.7-1	39.2	200 at 4900 RPM
20 (4-Bbl. Carb.)	8.7-1	39.2	215 at 4900 RPM
80 (2-Bbl. Carb.)	8.7-1	51.2	250 at 4700 RPM
80 (4-Bbl. Carb.)	9.7-1	51.2	270 at 4700 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset to thrust side of piston.

Original Bore & Piston Size - *See "ENGINE NUMBER LETTER" under Model Identification, above.*

►*AMBASSADOR LOW COMPRESSION (8.7-1) PISTON IDENTIFICATION:* This piston has two notches in piston head.

Weight - 18 ozs. (Ser. 20), 23-45 ozs. (Ser. 80).

Removal - Pistons and rods removed from above.

Clearance - .0009-.0015" (skirt bottom).

Installing Pistons: Install with "F" cast in piston strut and notch in piston head toward front of engine. *See Rod Installation.*

Replacement Pistons: Furnished Std. and .002", .005", .010", .020" (All), plus .030" (Ser. 80 with 4-Bbl. Carb.).

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .9307". **Length** 3.1870".

Pin Fit in Piston - Palm press fit at room temperature.

Pin Fit in Connecting Rod - Tight press fit, no locking device used.

Piston Pin Removal & Installation - Tool Set 6360 should be used to prevent damage to piston. *See "Piston Pins" in Rambler Special Data.*

Replacement Pins: Std. and .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	①
Compr. (2)	.0775-.0780"	.010-.020"	②
Oil (3)	.0245"③	.015-.055"	.0001-.0079"

① - (Ser. 20) .002-.0035". (Ser. 80) .002-.006".

② - (Ser. 20) .002-.004". (Ser. 80) .002-.006".

③ - Each rail.

Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edge on inside diameter up.

Replacement Rings: Sets of Std. and .020", .030" Oversize.

CONNECTING ROD

Length - 6.3750" center-to-center. **Weight** - 27.6 ozs.

Crankpin Journal Diameter - 2.2483-2.2490".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Lower Bearing - Steel-backed, sintered copper lead alloy precision type.

Clearance - .0007-.0028". **Side Clearance** - .004-.012".

Replacement Bearings: Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Assemble connecting rod to piston with notch in piston to front of engine. Cylinder numbers on connecting rod and cap should be toward outside bank in which they are installed.

CRANKSHAFT

Journal Diameter - 2.4983-2.4990".

Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-backed, sintered copper lead alloy, precision type.

Clearance - .0006-.0032".

Replacement Bearings: Std., .001", .002", .010", .012" Undersize.

End Thrust: Taken by No. 1 flanged bearing.

Endplay - .003-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*

Bearings - Steel-backed babbitt lined bushings.

Clearance - .001-.003".

End Thrust: Taken by thrust plate behind camshaft sprocket.

Endplay - .003-.006".

Timing Chain: Non-adjustable side guide type. **Width** .875". **Pitch** .375". **Length** 23¼" or 62 links.

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. To check assembly, rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Rambler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): Cover oil seal can be replaced without removing cover by using Remover J-9256 and Installer J-9163.

VALVES

Tappet Clearance: Ser. 20 - .012" Intake, .014" Exhaust. Hot and running. **Ser. 80** - Zero lash, hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.787"	.3715-.3725"	4.859"
Exhaust	1.406"	.3715-.3725"	4.859"
Valve	**Seat Angle**	**Lift**	**Stem Clearance**
Intake	30°①	.375"	.0015-.0025"
Exhaust	45°②	.375"	.0015-.0025"

① - Valve face angle 29°. ② - Valve face angle 44°.

Valve Seat Width - .078-.093" (Int.), .093-.140" (Exh.).

Valve Stem Seals - Rubber deflector installed on valve stem and over top of valve guide on all valves.

Valve Springs: Install springs with closed coil end against cylinder head. **Free Length** - 2.20".

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85-91 lbs.	1 13/16"
Open	150-160 lbs.	1 7/16"

Valve Guides: Drive old guides out, drive new guides in to a height of 3/4"±1/64" above cylinder head (measured from top of guide to flat machined surface for lower spring retainer on head). Finish ream all guides after installation.

Valve Lifters: Amb. - Hydraulic type.

Hydraulic Valve Lifter Removal, Overhaul & Testing - *See "Valve System" in Rambler Special Data.*

Rocker Arm Assembly: *See "Valve System" in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Intake Valve - Open 12°30'BTDC. Close 51°30' ALDC.

Exhaust Valves - Open 53°30'BLDC. Close 10°30'ATDC.

Valve Timing Check: Remove rocker arm cover and spark plugs. Turn crankshaft to bring No. 6 piston to TDC of compression stroke (No. 1 will be on exhaust stroke in overlap position). Rotate crankshaft 90° **counterclockwise.** Install dial indicator on No. 1 intake rocker arm pushrod end. Crank engine in a **clockwise** direction until dial indicator indicates pushrod movement (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* - If more than ½" variation in either direction, remove timing chain cover and inspect timing chain for stretch. Chain deflection should not exceed ½". Replace as necessary.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure - 10 lbs. at 600 RPM, 55 lbs. at 3000 RPM.

Pressure Regulator - In oil pump. Opens at 55-60 lbs. Not adjustable.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on engine block.

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft. Removal of oil pump does not disturb ignition timing.

Oil Pump Removal, Overhaul & Installation: *See "Oiling System" in Rambler Special Data.*

Oil Filter: Full-flow, disposable type with bypass valve incorporated in filter adapter.

►*FULL-FLOW OIL FILTER BYPASS VALVE NOTE & FILTER CHANGE CAUTION:* When making filter change, check to be sure that bypass valve is properly secured in retainer. Loss of bypass valve will result in loss of filter action.

Replacement Filter Element - Rambler No. 8890688.

Crankcase Ventilation: Standard Cars - Filter element in oil filler cap and breather pipe attached to valve lifter cover.

Positive Crankcase Ventilation Cars - Usual breather tube normally at rear of engine is replaced by vacuum line to carburetor base insulator with valve in line to vary air flow through crankcase to meet changing conditions at all engine speeds and loads. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 19 qts. (Classic), 18 qts. (Amb.). Add 1 qt. for heater.

Pressure Valve: 12-15 lb. radiator cap, Rambler No. 3160667.

Thermostat: Dole 167-172° Rambler No. 3201255, 177-182° No. 3201245; **Thompson** 177-182° No. 3201252.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Serviced as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57596.

Engine Unit - King-Seeley No. 44255.

"Power-Saver" Fan (Amb. with Air Cond.): Fan operates normally up to 2600 RPM ± 100 RPM and then the viscuous fluid clutch will slip to maintain speed of 2600 RPM. Serviced as an assembly.

LUBRICATION

FLASH-O-MATIC TRANSMISSION LUBRICATION: Check Fluid level every 1000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - With engine running and engine and transmission at normal operating temperature, shift transmission into all ranges and then place in "N" position for fluid level check. Maintain level at "F" mark. Approximately 1½ pints required to raise level from "L" to "F" mark.

Capacity - 10 qts. (Classic V8), 11 qts. (Ambassador).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

6 CYLINDER ENGINE

	Inch Lbs.	Ft. Lbs.
Cylinder Head		65
Exh Manifold		10
Intake-to-Exhaust Manifold	200	
Oil Pan	200	
Main Bearing Cap		①
Rear Main Bearing Seal Retainer		30
Con Rod Cap		45
Camshaft Sprocket		35
Rocker Shaft Support Bracket		30
Rocker Arm Cover	40	
Engine Front Cover	200	
Water Pump		30
Oil Pump	200	
Oil Filter Stud		30
Engine Front Mount-to-Frame		85
Engine Front Mount-to-Block		45
Engine Rear Mount		35

① - 85 ft lbs (Cast Iron Block), 50 ft lbs (Aluminum block)

V8 ENGINES

	318"	Ft. Lbs. 361",383",413"
Cylinder Head	①85	①70
Intake Manifold	30	40
Exhaust Manifold	30	30
Oil Pan	15	15
Main Bearing Cap	85	85
Rear Bearing Seal Retainer		30
Pulley-to-Vibration Damper	200 In Lbs	15
Pulley or Vibration Damper	135	135
Con Rod Cap	②	②
Camshaft Sprocket	35	35
Camshaft Thrust Plate	210 In Lbs	
Rocker Shaft Support Bracket		30
Rocker Arm Cover	36 In Lbs	40 In Lbs
Engine Front Cover	35	15
Water Pump	30	30
Oil Pump	35	35
Oil Filter	30	

① - Tighten all bolts twice in sequence when installing cylinder head
② - 45 ft lbs plain, 40 ft lbs treated (CST Black)

ALUMINUM ENGINE SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring Note the following

1) Do not drop or slide machined surfaces on bench or floor
2) Do not use gasket cement (Except as indicated under Cylinder Head Installation)
3) Lubricate all bolts or screws entering an aluminum part See "Bolt Thread Lubrication Note" below
4) Tighten bolts and nuts to the specified torque DO NOT overtighten Torque valves are for clean lubricated threads

►*BOLT THREAD LUBRICATION NOTE* Use engine oil or special thread lubricant on all threads entering an aluminum part

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole This brings hole back to original thread size See following table for inserts and tools required

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

ENGINE

6 CYLINDER ENGINE

REMOVAL: Remove hood, drain cooling system, remove battery and air cleaner Remove radiator (plug transmission oil cooler lines) Remove crankcase vent pipe and disconnact all lines, wires, cables and linkage from engine Disconnect exhaust pipe from manifold Remove clutch torque shaft, brake cables and rods, speedometer cable, gear shift rods, transmission oil cooler lines and filler tube (drain transmission and torque converter), and push button cable Support rear of engine (Support Tool C-3806). Remove transmission. Attach Lifting Fixture C-3804 to cylinder head and disconnect engine front mounts Remove engine

V8 ENGINES

REMOVAL: Remove hood, drain cooling system, remove battery, fan shroud, and radiator (plug transmission oil cooler lines) Disconnect all lines, wires, cables and linkage from engine Remove carburetor Attach Lifting Fixture C-3466 to carburetor flange studs and disconnect engine front mounts Remove No 6 spark plug Disconnect exhaust pipes from manifolds Support rear of engine with Tool C-3487 and remove engine rear crossmember Remove transmission Remove engine

CYLINDER HEAD & MANIFOLD

6 CYLINDER ENGINE

CYLINDER HEAD· Removal - Drain cooling system disconnect all lines and wires on cylinder head *(CAUTION Disconnect spark plug cables by pulling straight out in line with plug)* Remove carburetor air cleaner disconnect exhaust pipe at exhaust manifold flange remove carburetor as a unit with intake and exhaust manifolds Remove rocker arm cover Remove rocker arm assembly by taking out bolts in rocker shaft support pedestals Remove pushrods *(CAUTION Keep pushrods in order and reinstall in same positions)* Take out bolts and remove cylinder head

Installation: Coat new head gasket with suitable sealer, install gasket and head over dowels in block *(CAUTION - Rocker arm oil feed hole at right rear corner of head must register with oil hole in block)* Tighten all cylinder head bolts in sequence shown in diagram to 65 ft lbs then retighten all bolts in same sequence to 65 ft lbs *NOTE* - Use Sealing Compound Part No 1057794 on both sides and place copper side of gasket toward cylinder block

MANIFOLD ASSEMBLY: Installation - *CAUTION - Loosen 3 intake manifold-to-exhaust manifold bolts before installing assembly (necessary to maintain correct alignment) and also note "Manifold Stud Replacement" note below* Install manifold and carburetor assembly on cylinder head with cup side of conical bolt washers against manifold. Tighten nuts to 15 ft lbs, then tighten intake manifold-to-exhaust manifold bolts to 15 ft lbs

318" ENGINE

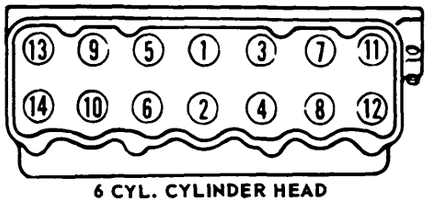
CYLINDER HEAD INSTALLATION: Coat new gasket with sealer and install on block Assemble rocker arm shaft assembly in cylinder head struts *(see "Valve System" below)* Install cylinder head on block and tighten attaching bolts to specified torque in sequence shown in diagram **Retighten in same sequence to same torque.** Install pushrods with small ends in lifters (use Valve Spring Compressor Tool C-3695 to position large end of pushrod under rocker arm and make sure low point of camshaft lobe is under lifter) Complete reassembly procedure

361", 383" & 413" ENGINES

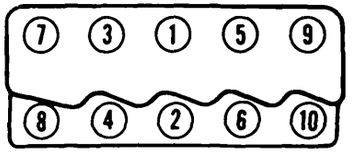
CYLINDER HEAD: *REMOVAL NOTE* - On air conditioned cars, No 8 cylinder exhaust valve must be open to provide removal clearance between rocker arm cover and heater housing

Installation: Coat new head gasket with Mopar Sealer No 1122893 Install cylinder head and tighten bolts to correct torque in sequence shown in diagram **Retighten in same sequence to same torque.** Complete reassembly procedure

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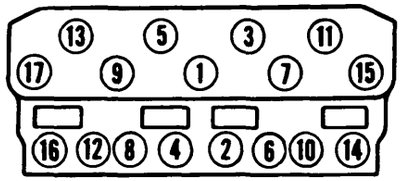


6 CYL. CYLINDER HEAD



V8 318" ENGINE CYLINDER HEAD

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V8 361", 383", & 413" ENGINE CYLINDER HEAD

PISTON PINS

6 CYLINDER ENGINE
361" & 383" ENGINES

PISTON PIN REMOVAL: Use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration to remove pin from piston and rod. *CAUTION* - When pin falls freeof rod, stop press to prevent damage to anvil of tool.

PISTON PIN INSTALLATION: *CAUTION - DO NOT ream pistons or connecting rods.* Lubricate pin bores in piston and rod and use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration. Notch or "front" on piston must face upwards when assembled in tool and with connecting rod properly positioned (see below), press piston pin in until pin bottoms on pilot.

►*CONNECTING ROD POSITION:* **6 Cyl.** - With notch on piston to front of engine, oil hole in rod must be to left side of engine. **V8** - For right bank cylinders, large chamfer on lower end of connecting rod must be opposite to notch in piston head (rod facing downward in tool). For left bank cylinders, large chamfer on rod must be on same side as piston head notch (rod facing upward in tool).

T sting For Proper Fit - Assemble piston and rod with tool in same manner as for pin removal (see illustration). Clamp screw shaft end of tool in a vise. With torque wrench at nut (anvil end of tool), apply 15 ft. lbs. torque. If pin does not move, fit is correct. If pin moves in rod, fit is incorrect and rod should be replaced.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

►*TOOL NOTE:* Use Seal Installer C-3743 for 6 Cyl., C-3511 for 318" engine, C-3625 for 361", 383" & 413" engines. *NOTE* - On 6 Cyl., 361", 383" & 413" engines, use bridge of tool over seal retainer when installing seal, but **do not** use bridge when installing seal int block.

REAR MAIN BEARING OIL SEAL: Install new seal in block and cut off ends of seal flush with block. Install new seal in cap or seal retainer in same manner and cut off ends of seal flush with cap or retainer. Install side seals in cap or retainer. *NOTE - On 318" engine, short cap seal must be on doweled side of cap.*

ENGINE FRONT COVER

6 CYLINDER ENGINE

ENGINE FRONT COVER: R m val - Drain cooling system and remove radiator and fan. Remove vibration damper (Puller Tool C-3732). Loosen oil pan attaching bolts to provide clearance. Remove engine front cover.

Installati n: Reverse removal procedure and make sure mating surfaces of cover and block are free of burrs.

FRONT OIL SEAL: R m val - Use Tool C-3506. With inside of cover up, put puller screw through seal and position puller blocks directly opposite each other under flange of seal retainer. With washer and nut on puller screw tighten nut so puller blocks distort seal retainer lip. Place sleeve over retainer and place removing and installing plate into sleeve. Place flat washer and nut on puller screw, hold center screw and tighten nut to remove seal.

Installation: Insert puller screw through removing and installing plate so thin shoulder faces up. Insert assembly through seal opening in front cover (inside of cover up), and place seal in opening with neoprene part of seal down. Place seal installing plate into seal with protective recess toward lip of seal retainer. With flat washer and nut on puller screw, hold screw and tighten nut until neoprene is tight against face of front cover. If a .0015" feeler gauge **cannot** be inserted between neoprene and cover, seal is installed correctly.

V8 ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator and fan, fan shroud and belts. Remove water pump and housing. On 361" & 383" engines, remove crankshaft pulley from vibration damper. On all engines, pull damper or pulley with Puller C-3033. Remove engine front cover.

Installation: Reverse removal procedure and tighten bolts to specified torque. Use extreme care not to damage oil pan gasket.

FRONT OIL SEAL: Removal - *See 6 Cyl. above.*

Installation: *See 6 Cyl. above.*

CAMSHAFT & BEARINGS

6 CYLINDER ENGINE

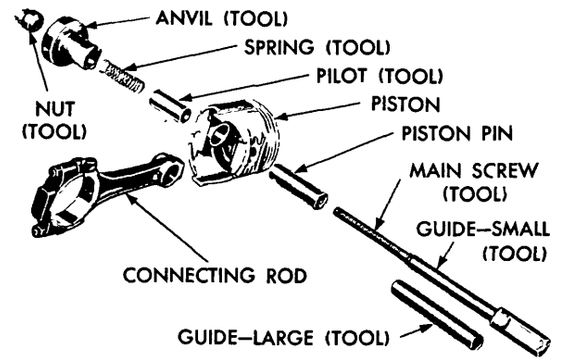
►*ALUMINUM ENGINE CAMSHAFT REAR PLUG REMOVAL NOTE:* To prevent damage to aluminum block, punch a hole in center of plug with 1/8" sharp punch (do not drill hole), then tap hole for threads with 10-24 tap. Use a steel bar 1/4"x1"x6" with 1/4" hole drilled in center, across supports to plug pull with a 10-24 x 1 1/8" long screw placed in hole in bar. Remove all foreign material from block before inserting new plug.

CAMSHAFT REMOVAL: Remove engine. Remove valve lifters with Lifter Removing Tool C-3661 (after removing rocker arm shaft assembly and pushrods). Remove engine front cover, timing sprockets, distributor, oil pump, and fuel pump. Remove camshaft carefully.

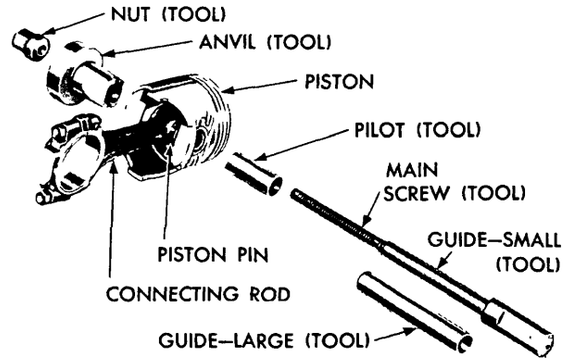
Bearing Installation: Use Tool C-3132A to install bearings. No. 1 bearing must be installed 3/32" in from front face of cylinder block. Make sure oil holes in bearings index with oil holes in block. Use Tool C-897 to install rear welch plug.

318" ENGINE

CAMSHAFT: Removal - Remove engine. Back off valve lash adjusting screws, slide rocker arms to one side and remove pushrods. Remove valve lifters (accessible after intake manifold removed). Remove timing sprockets, distributor, and distributor-oil pump drive gear. Remove camshaft.



PISTON PIN INSTALLATION



PISTON PIN REMOVAL

Installation: Lubricate cam lobes and bearing journals and install camshaft. When shaft within 1¾-1½" of final position, install Camshaft Holding Tool C-3509 to prevent disturbing welch plug at rear of block and causing oil leak as follows: Install tool in place of distributor drive gear and against rear side of cam gear, and attach with distributor retainer plate bolt. Now push camshaft in to final position and leave tool in place until sprockets and timing chain are installed.

361", 383" & 413" ENGINES

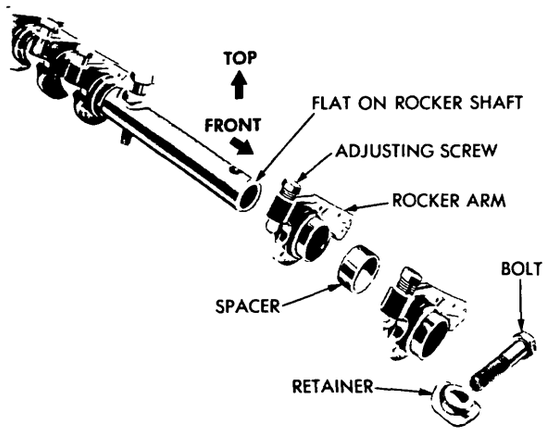
CAMSHAFT: Removal - Remove engine. Remove lifters (see below). Remove timing sprockets, distributor, oil pump-distributor drive shaft, and fuel pump. Remove camshaft.

Installation: Modify Tool C-3509 by grinding off index lug holding upper arm on tool and rotate arm 180°. Sliding bar will now extend outward in direction opposite to fixed tongue. Proceed as for 318" engine above.

►*BEARING INSTALLATION NOTE:* No. 1 bearing must be 1/32" in from front face of cylinder block.

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6 CYL. ROCKER ARM ASSEMBLY

VALVE SYSTEM

318" ENGINE

►*VALVE SERVICE NOTE:* For access to valve assemblies or for pushrod removal without removing rocker arm shaft assembly or cylinder head, back off valve lash adjusting screw and slide rocker arm to one side.

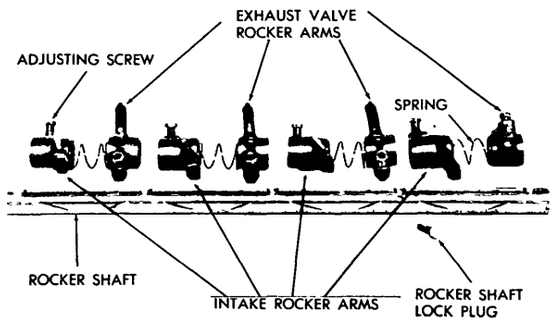
ROCKER ARMS

6 CYLINDER ENGINE

ROCKER ARM SHAFT ASSEMBLY: Installation - Install assembly with flat on end of rocker shaft upward and toward front of engine. *CAUTION - This is necessary to provide correct lubrication of rocker arms.* Make certain that shaft retainers are seated on shaft **between** extended bushings of adjacent rocker arms. Long rocker shaft retainer bolt is at rear of engine. Tighten bolts to specifications.

318" ENGINE

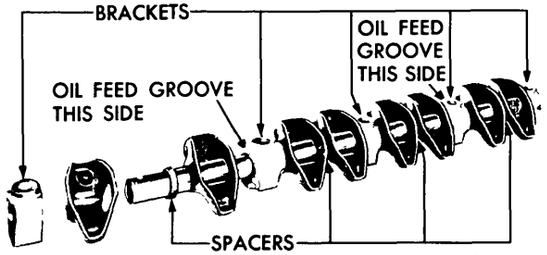
ROCKER ARM SHAFT ASSEMBLY: Installation - Slide rocker arm shaft into bore of strut, engage intake rocker arm. Install spring and engage exhaust rocker arm. Repeat this procedure until all intake and exhaust rocker arms are installed. Make sure that rocker shaft bolt grooves align with head bolt holes in rocker shaft struts. *NOTE* - The plug hole in strut must align with hole in rocker shaft. Install new rocker shaft plug.



V8 318" ROCKER ARM ASSEMBLY

361", 383" & 413" ENGINES

ROCKER ARM SHAFT ASSEMBLY: Installation - Install rocker shafts so that the 3/16" lubrication holes point downward into rocker arms and 15° angle of holes points outward toward valve end of rocker arm. Disregard arrows stamped on shafts when determining shaft position. This procedure supersedes all previous data on installation.



V8 361", 383" & 413" ENGINE ROCKER ARM ASSY.

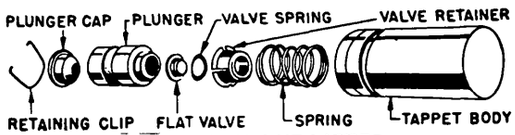
HYDRAULIC LIFTERS

361", 383" & 413" ENGINES

Removal: *NOTE - Unnecessary to remove cylinder heads or intake manifold if following procedure observed:* Remove rocker arm shaft assembly and pushrods. Slide Puller C-3661 through pushrod hole in cylinder head and seat firmly in lifter. Remove lifter with a twisting motion. *Keep lifters and pushrods together and reinstall in bores from which removed.*

Disassembly: *CAUTION - Disassemble one lifter at a time to avoid intermixing parts (parts not interchangeable between lifters).* Pry out plunger retainer spring clip. Invert body and remove plungercap, plunger, check valve, check valve spring, check valve retainer, and plunger spring. Separate plunger, check valve retainer, and check valve spring.

Inspection: Clean all parts in solvent and check for any nicks, scratches or wear. Replace entire lifter if any parts damaged.



HYDRAULIC VALVE LIFTER

Reassembly: Reverse disassembly procedure making sure lifter is assembled as shown in illustration.

Testing: With cap removed from plunger, submerge upright lifter completely in a pan of clean kerosene and allow to fill. Replace cap. Place lifter upright in Lifter Testing Pliers C-3160 and check leakdown. If lifter collapses immediately, disassemble, clean and test again. If leakdown persists, replace lifter.

Installati n: Lubricate lifters and reverse removal procedure.

OILING SYSTEM

ENGINE LUBRICATION

6 CYLINDER ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied to all crankshaft, connecting rod, and camshaft bearings, and to valve mechanism on cylinder head (metered by rear camshaft bearing). All other points are lubricated by spray or oil mist in crankcase.

OPERATION: Rotor type oil pump mounted externally on right side of crankcase (assembly consists of oil pump, oil filter, and oil pressure regulator). Pump draws oil from oil pan through fixed strainer and intake pipe screwed into crankcase wall at pump mounting pad. Pump delivers oil directly into main oil gallery extending along right side of crankcase (slot in gallery registers with pump outlet port when pump installed). Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil channel in each crankcase web furnishes oil from main oil gallery to each crankshaft and camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provides continuous flow of oil to crankshaft passages.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on left (upper) side of connecting rod when this hole registers with oil passage in connecting rod journal.

Timing Chain & Sprockets - Lubricated by oil from front main bearing (bearing is chamfered to provide this oil spray).

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows up through vertical channel in block and head, and through rear rocker shaft bracket to hollow rocker shaft. Rocker arms are lubricated through oil hole in shaft and each rocker arm has trough on upper surface (for adjusting screw and pushrod lubrication) and oil hole (for valve tip lubrication). Excess oil drains down through pushrod chamber to valve lifters and returns to crankcase.

Valve Lifters - Lubricated by connecting rod oil spray and oil drainage from rocker arm chamber on head.

OIL FILTER: Full flow type mounted on oil pump body. Integral relief valve permits oil to bypass filter if element is clogged.

V8 ENGINE (318")

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted on rear main bearing cap, draws oil through floating oil strainer and intake pipe mounted on pump cover and delivers oil through a channel in pump body and rear main bearing cap to oil filter intake port (filter is mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross channel and vertical

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channel connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward end of this gallery, a "V" channel connects to the front main bearing and the forward end of the left main oil gallery which extends back the full length of the engine. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical channel connecting to an extension of the horizontal cross channel leading from the oil filter outlet port (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (an additional channel at the front crankshaft bearing supplies oil to the left main oil gallery).

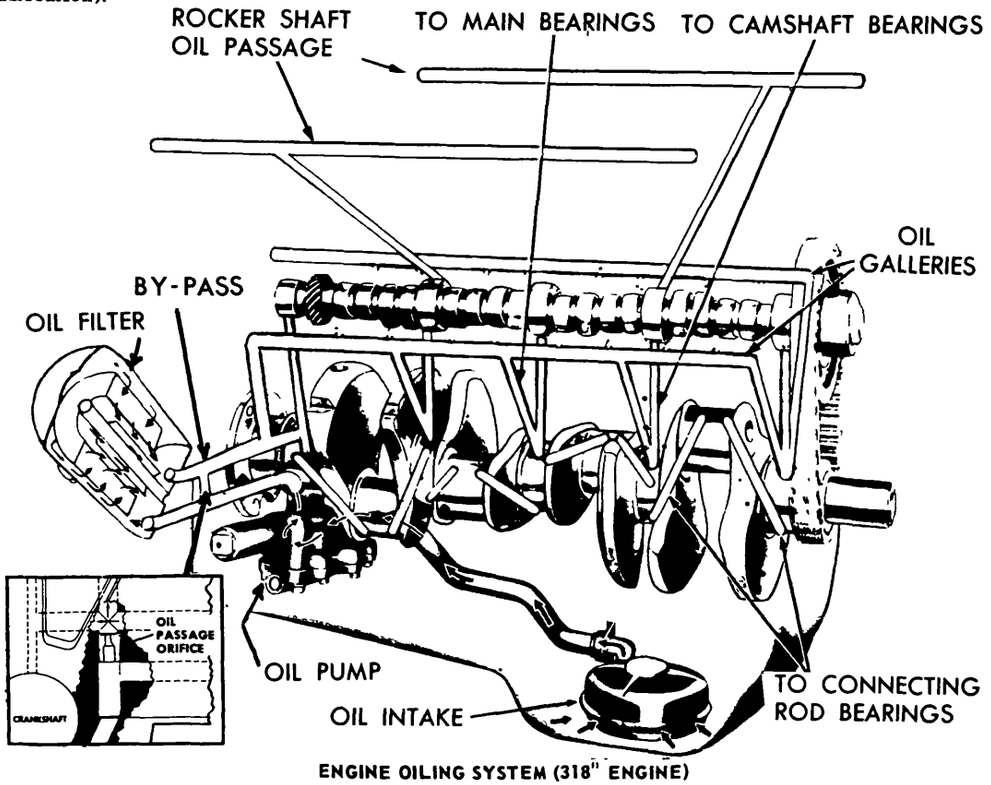
Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod bearing is lubricated by passage from **adjacent** main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of rod bearing cap of the rod for opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication).

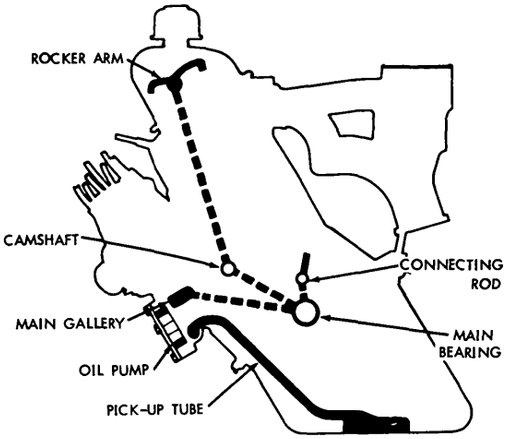
Valv Lifters - Right and left main oil galleries intersect lifter bores so that separate oil passage to each lifter is not required.

Rocker Arms, Pushrods, & Valves - On these engines oil channel from No. 4 camshaft bearing (for left bank), No. 2 camshaft bearing (for right bank) connect with cylinder head bolt holes in block (Nos. 3 & 5 bolts as shown in Cylinder Head Diagram). These bolt holes in block and head are oversize so that oil passes up around bolts to angle passage in shaft bracket and through this drilled hole into the hollow rocker arm shaft *(NOTE - A setscrew in the shaft bracket positions shaft and aligns these oil holes).* All rocker arms have drilled passage to pushrod socket end. Intake arms have drilled passage terminating at end of arm directly above valve stem contact point. Exhaust arms have drilled hole from rocker arm bushing to upper surface of arm and valve stems are lubricated by gravity flow of oil from this oil hole.

OIL FILTER: Shunt type used. Filter mounted on pad at right rear corner of engine crankcase. Bypass passage in block has restriction or metering orifice which controls oil flow directly into engine or through oil filter.



ENGINE OILING SYSTEM (318" ENGINE)



ENGINE OILING SYSTEM (6 CYLINDER ENGINE)

V8 ENGINES (361", 383" & 413")

►*ENGINE IDENTIFICATION:* These engines may be identified by distributor mounting (at front of engine) and oil pump and filter assembly mounted externally at left front corner of engine block.

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted externally on left front corner of block draws oil through fixed oil strainer and intake pipe in crankcase. From the pump, oil flows through filter (Filter, bypass valve, and oil pressure regulator valve are located in pump body) and then through transverse channels in front end of block to the right main oil gallery extending the full length of engine block just below right bank valve lifters. At rear end of right main oil gallery, two angled transverse channels connect the right and left main oil galleries. Left main oil gallery extends full length of engine block just below left bank valve lifters. Oil is distributed from these main oil galeries as follows:

Crankshaft & Camshaft Bearings - Front crankshaft and camshaft bearings are lubricated by a vertical channel intersecting the transverse channel in the front of the block (feed to right main oil gallery). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the corresponding camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod is lubricated by passage from **adjacent**

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main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap for rod of opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Right and left main oil galleries intersect lifter bores for direct oil supply to lifters.

Rocker Arms, Pushrods, & Valves - Hollow rocker arm shaft on each head is supplied with oil through channel in block leading from No. 4 camshaft bearing (both banks - camshaft journal is drilled and registers with each channel in turn as camshaft rotates). Channel in block registers with drilled hole in head which terminates at rocker shaft support bracket pad on head (oil holes provided at Nos. 2 and 4 brackets - one hole and oil lead in head will register with channel in block when head installed). Nos. 2 and 4 (wider) rocker shaft support brackets have oil passage connecting oil lead in head with rocker arm shaft (*CAUTION* - These brackets must be installed with oil passage toward center of engine to align with oil hole in head). Rocker arms are stamped steel with channel section which forms oil reservoir. Oil flows from valve tip end of arm to lubricate valve stem and through hole at pushrod end of arm to lubricate pushrod seat.

OIL FILTER: Full flow and shunt types used. Filter has bypass valve (full flow type), bypass passage (shunt type), which ensures engine lubrication if filter element is clogged.

OIL PUMP

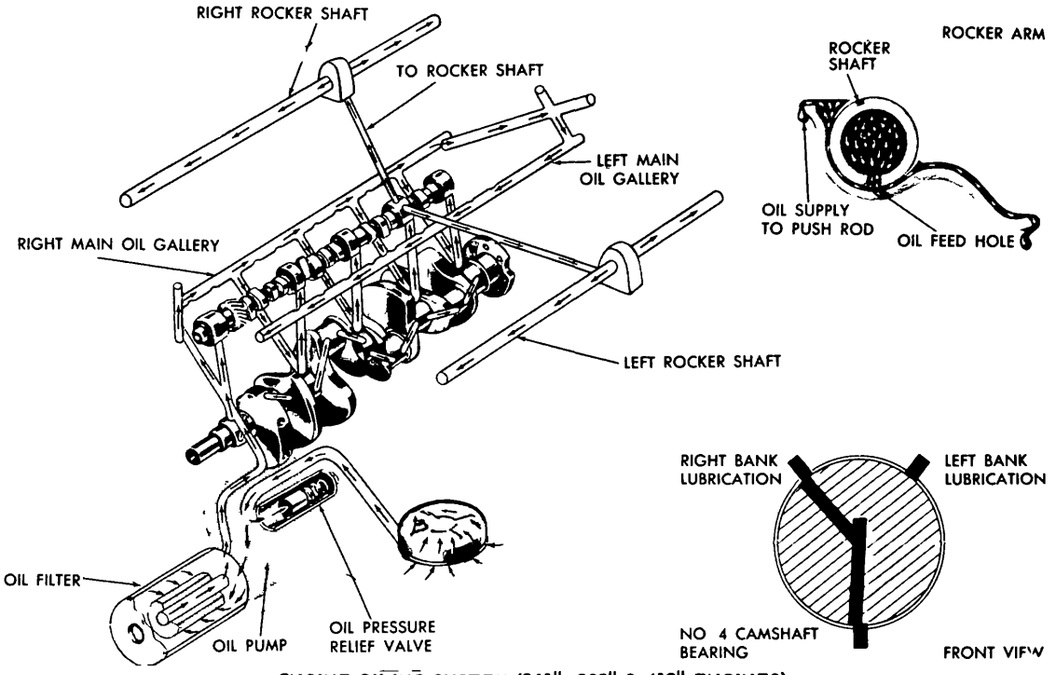
ALL ENGINES

OIL PUMP: Removal (6 Cyl., 361", 383", 413") - Remove attaching bolts and remove oil pump and filter assembly.

Removal (318") - Remove oil pan (see Car Model Pages), and remove pump from rear main bearing cap.

Disassembly (All Engines): Remove cover. On 6 Cyl., press off drive gear (support gear to keep load off aluminum housing). Remove inner rotor and shaft and outer rotor. Remove pressure relief valve plug and and valve assembly.

Inspection (All Engines): Clean all parts. Replace cover if mating surface scratched or grooved. Lay a straightedge across cover. If .0015" feeler gauge can be inserted between cover and straightedge, replace cover. Measure thickness of inner and outer rotors, and diameter of outer rotor. *NOTE - Minimum dimensions listed in table below. Replace rotors if measurements below these specifications.* With inner and outer rotors assembled in pump body, place a straightedge across surface of body and rotors. If a .004" feeler gauge can be inserted under straightedge, replace pump body. Remove inner rotor and press outer rotor against pump body. If clearance between outer rotor and body is more than .012", replace body. If clearance between inner and outer rotors is more than .010", replace both rotors. Test pressure relief valve spring (see below), and replace spring (if necessary) with same type previously used.

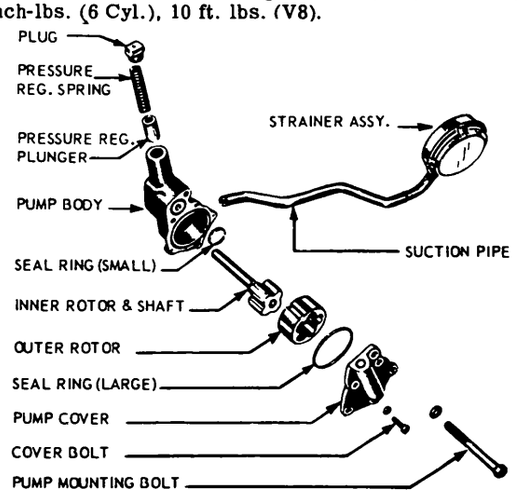


ENGINE OILING SYSTEM (361", 383" & 413" ENGINES)

Oil Pump Rotor Specifications

Engine	Rotor Thickness	Outer Rotor Diameter
6 Cyl.	.649"	2.469"
318"	.998"	2.244"
361", 383" & 413"	.943"	2.469"

Reassembly (All Engines): Reverse disassembly procedure. On 6 Cyl., press drive gear on shaft until it is flush with end of shaft. Tighten cover screws to 130 inch-lbs. (6 Cyl.), 10 ft. lbs. (V8).



V8 318" ENGINE OIL PUMP

Installation (All Engines): Reverse removal procedure.

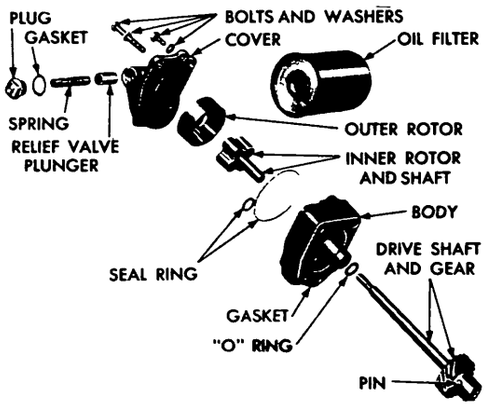
ALL ENGINES

OIL PRESSURE RELIEF VALVE: Three types of springs are available. Replace with correct type as follows:

Relief Valve Spring Specifications
(6 Cyl., 361", 383" & 413" Engines)

Color	Free Length	Load Length
Gray (Light)	2 3/16"	1 39/64" at 11.85-12.85 lbs.
Red (Std.)	2 19/64"	1 39/64" at 14.85-15.85 lbs.
Brown (Heavy)	2 25/64"	1 39/64" at 17.90-18.90 lbs.

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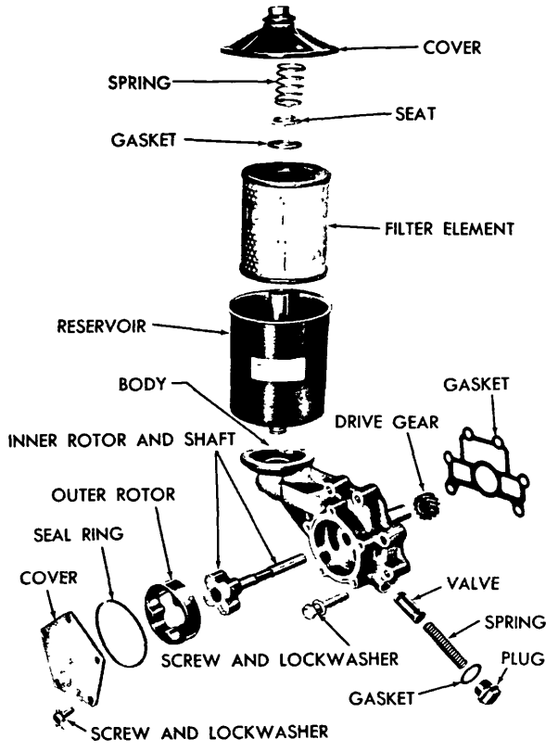


V8 361", 383" & 413" ENGINE OIL PUMP

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(318" Engine)

Col r	Free Length	L ad Length
Gray (Light)	.....3 1/32"	2 1/16" at 16.1-17.1 lbs.
Red (Std.)	.....2 27/32"	2 1/16" at 19.5-20.5 lbs.
Brown (Heavy)	...2 31/32"	2 1/16" at 22.9-23.9 lbs.



6 CYL. OIL PUMP

COOLING SYSTEM
WATER PUMP
6 CYLINDER ENGINE

►*SERVICE NOTE:* Water pump body and shaft and support plate are serviced as an assembly only. Only impeller. seal. and hub are replaceable.

Hub Replacement: Use Puller Tool C-412 to remove hub from shaft. To install hub, support pump body on impeller end of shaft to avoid damage to body and press hub on shaft until shaft projects 13/32" beyond front face of hub.

Impeller & Seal Replacement: Support pump at hub end and remove impeller by breaking it away from metal insert. With Splitter C-3773, split metal insert and remove from shaft. Remove rubber part of shaft seal. Use Puller C-3753 to pull retainer part of seal (do not pry from pump body), then remove thrower. Install new thrower over shaft and press new seal into body with Seal Installer C-3775. Support pump body on shaft, use a sleeve which will bear on impeller metal insert only and press impeller in flusn with end of shaft.

Installati n: Reverse removal procedure.

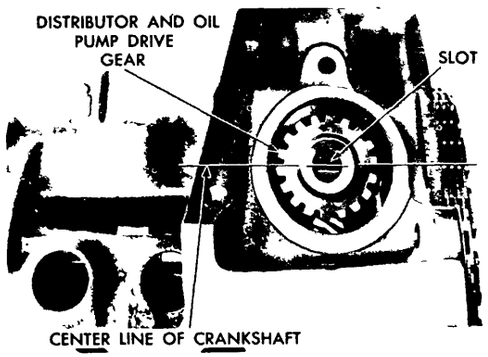
V8 ENGINES

Disassembly: Remove fan hub with Puller C-412. Support hub end of pump and remove impeller by breaking it away from metal insert. Remove seal by sliding over shaft and insert. With Splitter C-3476, split metal insert and remove from shaft. Support hub end of pump body and press shaft and bearing through **front** of pump.

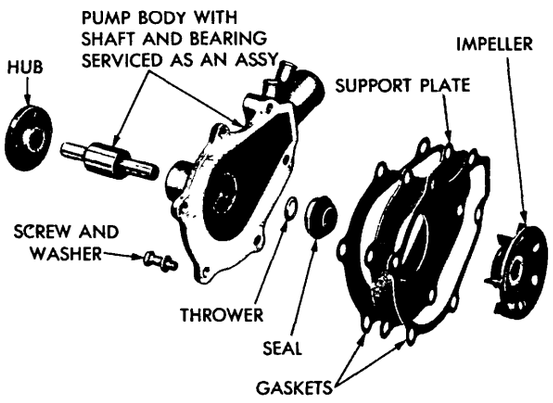
Reassembly: With pump body supported as close to center bore of pump as possible, press shaft and bearing assembly into body with Sleeve C-3468 and a press. **Distance from shoulder of seal retainer to front face of pump body must be .090".** Reface pump seal seat of housing (see below). Install new seal into impeller with ears on retaining washer engaged in slots in impeller. Support shaft at hub end and press impeller on shaft until it is flush with end of shaft. Support impeller end of shaft and press hub on shaft until shaft projects .330" beyond front face of hub.

Refacing Seal Seat - Place Tool C-551 over pump shaft. Turn tool in an even continuous clockwise motion until smooth surface is obtained. Remove tool and install abrasive disc SP-1527 over end of tool and down against cutters. Polish seat surface to a high polish. **Turn by hand in a clockwise direction. Do not use motor.** Blow out with compressed air.

Installation: Reverse removal procedure.



V 8 ENGINE DISTRIBUTOR D RIVE SHAFT



6 CYL. WATER PUMP

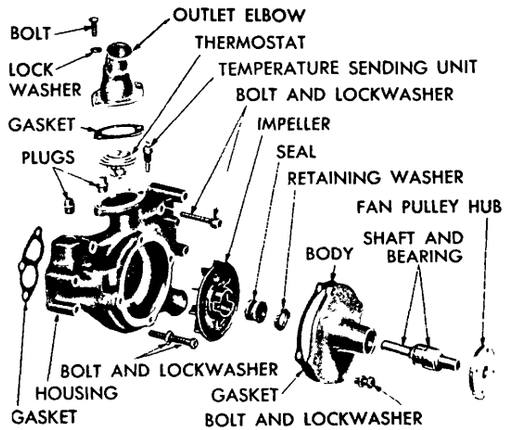
IGNITION NOTES
V8 ENGINES

DISTRIBUTOR-OIL PUMP DRIVE SHAFT BUSHING:

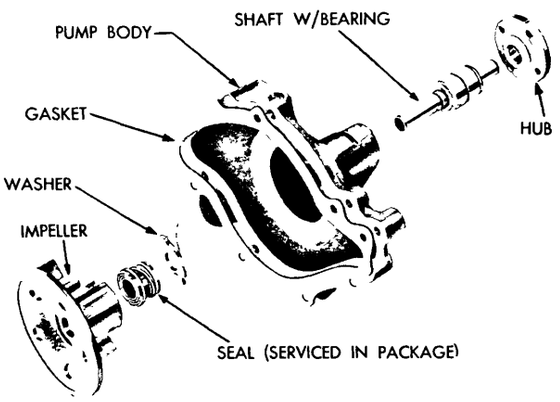
Removal - Thread Tool C-3052 into bushing, hold puller screw and tighten puller nut to remove bushing.

Installation: Slide new bushing over burnishing end of Tool C-3053. Insert tool and bushing into bore of block. Drive bushing and tool down into position using a soft hammer. As the burnisheris pulled through the bushing by pressure applied to puller nut, tool will wedge bushing tight in its bore and will burnish bore to correct size. *DO NOT REAM THE BUSHING.*

DISTRIBUTOR BASIC TIMING: Before installing distributor, time the engine as follows: Place No. 1 piston at TDC of firing stroke. Mark on vibration damper should be under DC mark on timing pointer. Coat shaft and drive gear with engine oil. Install shaft so that, after gear spirals into place indexing with oil pump shaft, slot in top of drive gear will point to first intake manifold bolt on left side of engine (318"), will be parallel to centerline of crankshaft (361", 383" & 413").



361", 383" & 413" ENGINE WATER PUMP



V8 318" ENGINE WATER PUMP

►*JACKING & HOISTING CAUTION: Be for jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Model	Model Designation
Chrysler Newport	RC-1-L
Chrysler Windsor	RC-2-M
Chrysler New Yorker	RC-3-H
Chrysler 300G	RC-4-P
Imperial Custom	RY-1-L
Imperial Crown	RY-1-M
Imperial LeBaron	RY-1-H
DeSoto (All Models)	RS-1-L

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
8 3 1 3 100001

① - Car Make. 6 DeSoto, 8 Chrysler, 9 Imperial.
② - Model Series. 1 DeSoto, Chrysler Newport, Imperial Custom. 2 Chrysler Windsor, Imperial Crown. 3 Chrysler New Yorker, Imperial LeBaron. 4 Chrysler 300G. 5 Chrysler Newport Station Wagon. 7 Chrysler New Yorker Station Wagon.
③ - Year. 1 1961.
④ - Assembly Plant. 3 Jefferson (Detroit), 4 Imperial (Detroit), 5 Los Angeles, 6 Delaware, 7 St. Lous, 8 Wyoming, 9 Canada.
⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped on boss on top right side of cylinder block just behind water pump. Number (example below) includes identification data.

① ② ③ ④ ⑤
R 38 ... 8 4

① - Year. R 1961.
② - Displacement. 36 361 cu. ins., 38 383 cu. ins., 41 413 cu. ins.
③ - If this space blank, engine is standard. *For identifying marks see below.*
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 4 4th day, etc.

►*ENGINE NUMBER MARKS: Identified as follows:*
"A" - All cylinder bores .020" oversize.
"Malt s Cross" - One or more bearing journals .001" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"X" & "Maltes Cr ss" - One or more bearing journals .010" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"♦" - One or more valve lifters .008" oversize. *See "Valve Lifters" below.*
"H.P." - High Performance Engine.

TUNE-UP

►*HARD COLD WEATHER START CORRECTION (Carburetors with Choke Vacuum Unloader Piston in Air Horn):* Hard starting caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting Carburetor Cleaner, Lacquer Thinner or Alcohol through piston link opening, while operating choke valve to flush out gum formation.

COMPRESSION PRESSURE: 135-165 lbs. (361"), 150-180 lbs. (383" & 413") at 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 20 lbs. (361"), 25 lbs. (383" & 413").

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters. *NOTE - Optional mechanical lifters on 300G, .016" Intake, .028" Exhaust, COLD.*

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with special lubricant, Part No. 1879318), Coil spring should have approximately ¾ turn wrap with manifold heat control in closed position. *300G NOTE - Coil should have approximately 182° wrap counterclockwise right manifold, clockwise left manifold.*

►*300G (RAM MANIFOLD) HEAT CONTROL VALVE NOTE:* Two heat control valves used, one in each cylinder bank exhaust manifold outlet. When valve is closed, exhaust gases are diverted through bypass pipe around hot spot in intake manifold.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs - Autolite A42 (All except 300G). Autolite A32 - Hydraulic Lifters, Autolite A901 or Champion J79 - Mechanical Lifters (300G). 14mm. Torque to 30 ft. lbs. *CAUTION* - Do not use higher heat range spark plugs to correct spark plug fouling on 300G (severe engine damage may result).
COIL: Autolite No. 200567 or Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501. 0.6 ohms. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler Own or Autolite. As follows:

Engine	Distributor No.
361" & 383"	Autolite **IBP-4005E**
413" ②	Chrysler **2095530** or ① Autolite **IBP-4006C**
413" (300G)	③ Autolite **IBS-4011**

① - Used between Eng. No. R41-10-13 & R41-10-17 with white paint on Engine No. pad.
② - Except 300G. ③ - "Double Breaker" type.

Condenser - Autolite 2-32. **Capacity** .25-.285 mfd.
Contact Point Set - Autolite 1-47 (IBP), 1-43 (IBS).
Breaker Gap - .014-.019".
Cam Angle (Single Breaker) - 27-32° with vacuum line disconnected.
Cam Angle (Double Breaker) - 27-32° (single set of points), 31-37° (both sets operating together).
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance - IBP-4005E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250-450	0	500-900
0-2	450	0-4	900
2½-4½	700	5-9	1400
10-12	2050	20-24	4100

Automatic Advance - 2095530 & IBP-4006C

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	310-490	0	620-980
0-2	490	0-4	980
3½-5½	800	7-11	1600
8½-10½	2300	17-21	4600

Automatic Advance - IBS-4011

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	440	2	880
5½	600	11	1200
9	2000	18	4000
10	2400	20	4800

Vacuum Spark Control: Integral type.

Vacuum Advance - IBP-4005E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.0-8.1
6-9	12-18	12.0
10.5-13.0	21-26	16.0

Vacuum Advance - 2095530 & IBP-4006C

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7.4-9.0
4.5-7.8	9-15.6	12.0
8.3-11.0	16.6-22.0	15.0

Vacuum Advance - IBS-4011

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 5/8
5	10	11 3/8
8	16	13 3/4
9	18	14 1/2

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Chrysler Corp. Special Data.*

IGNITION TIMING

Setting (Exc. 300G) - 10° BTDC at 475-500 RPM with vacuum line disconnected.
Setting (300G) - 5° BTDC (TorqueFlite), 10° BTDC (Synchro-mesh). Set timing with vacuum line disconnected and engine idling below 600 RPM (transmission in neutral and air conditioning compressor off). After timing correctly set, readjust engine idle speed to 725-750 RPM.
Timing Mark - Mark on vibration damper and pointer on chain case cover. Align vibration damper mark with correct mark on pointer.

CARBURETOR

►*CARBURETOR APPLICATION: As follows:*

Engine	Carburetor
361"	One Carter or Stromberg 2-Barrel
383"	One Carter 2-Barrel
413" (Except 300G)	One Carter 4-Barrel
413" (300G)	Two Carter 4-Barrel

►*IDLE SETTING CAUTIONS:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars (except 300G), loosen nut on sliding link of carburetor-to-bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

carburetor throttle rod to rear against its stop and tighten locknut.

THROTTLE LINKAGE ADJUSTMENT (EXCEPT 300G): Loosen locknuts on carburetor throttle rod and on transmission throttle rod. Insert a 3/16" diameter rod 10" long into holes in accelerator shaft bracket and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut. Disconnect accelerator pedal rod at one end and adjust rod to give accelerator pedal angle of 113°-115°. Remove 3/16" rod. Make sure carburetor is on slow idle, move carburetor throttle rod rearward against stop and tighten carburetor throttle rod locknut.

THROTTLE LINKAGE ADJUSTMENT (300G WITH RAM INDUCTION): Bring engine to normal operating temperature with carburetor off fast idle and transmission in "N", then proceed exactly as follows:

1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod. Insert a 3/16" diameter rod into holes in accelerator shaft bracket and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut.

2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator pedal. Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket.

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficiently so bellcrank will pivot (hold dashpot push-rod when turning setscrew to prevent damage to diaphragm). Pivot bellcrank so 3/16" diameter rod can be inserted through hole in bellcrank and into locating hole in intake manifold. Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors. Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod. Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten adjusting link locknut.

4) Start engine and adjust idle speed to 725-750 RPM with engine warm and transmission in neutral.

5) Adjust anti-stall dashpot as follows: Disconnect vacuum tube to anti-stall dashpot and tape open end of tube to prevent air leaks. Anti-stall plunger will extend and increase engine speed. Adjust plunger length so that engine speed is no higher than 1500 RPM. Reconnect vacuum tube (engine idle speed should return to 725-750 RPM).

STROMBERG WWC 2-BARREL
361" Engine

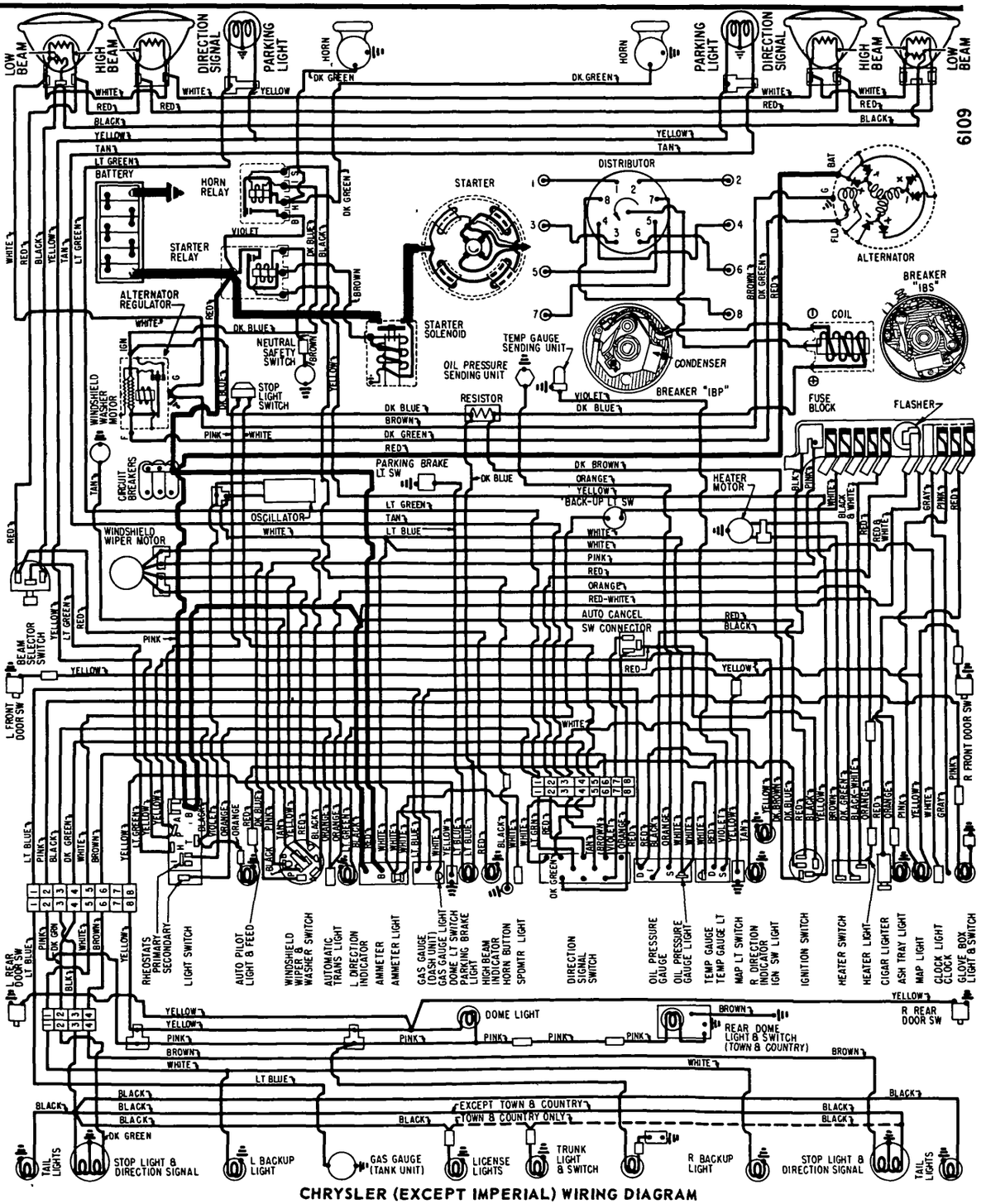
Stromberg WWC, Code 3-188 (All Trans.). Downdraft type with automatic choke. *NOTE - Cars with Closed Crankcase Ventilation use Carter BBD, see below.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 1/2-5/8 turns open. Adjust both screws alike. Turn screws out for richer mixture.

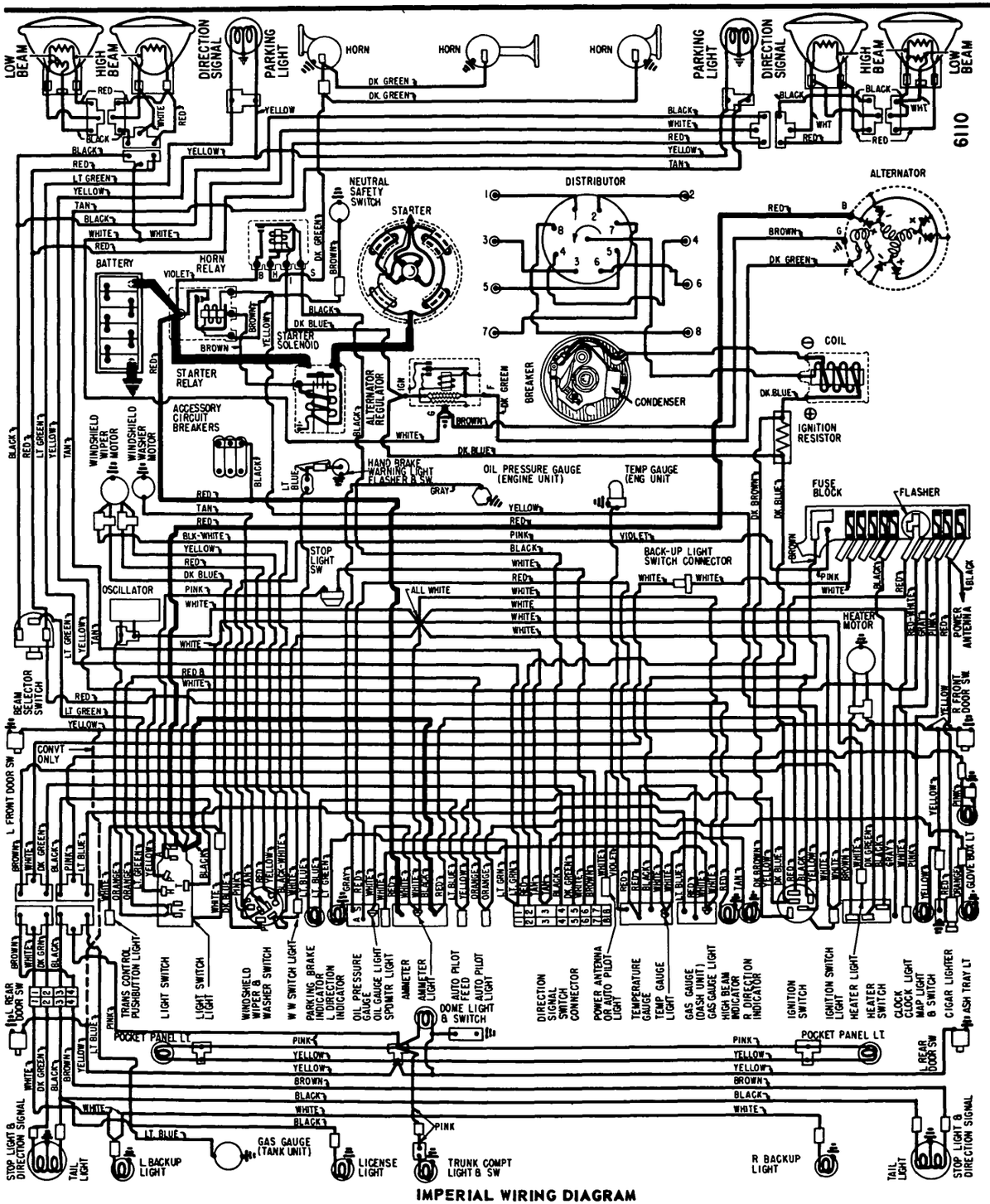
Idle Speed - 500 RPM (550 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N", headlights on High Beam, and carburetor throttle rod locknut loosened, see *"Cautions"* above.

CONTINUED ON NEXT PAGE



CHRYSLER (EXCEPT IMPERIAL) WIRING DIAGRAM

Form 2-A



IMPERIAL WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Float Lev l - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (On Car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to top of float at center should be 1/8" or use Gauge 73725. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Pump connector rod in center hole in pump lever (normal setting).

Fast Idle Speed: 1375-1425 RPM with fast idle adjusting screw on high step (against shoulder) of fast idle cam.

Automatic Choke: "Cross-Over" type. Set 1 notch rich.

Throttle Linkage Adjustment: See CARBURETOR abov .

►*OTHER DATA: See "Stromberg WWC Carburetors" in Carburetion Section.*

CARTER BBD 2-BARREL
361" (Late) & 383" Engines

Carter BBD No. 2923SA (Late 361" & 383"), No. 3132S (361" & 383" Closed Crankcase Ventilati n Cars).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 1/8-1 1/2 turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (575 RPM on Air Cond. cars with Air Cond."ON"), with automatic transmission in "N", **headlights on High Beam, and carburetor throttl rod locknut loosened, see "Cautions" above.**

Float Level - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (On Car), and with float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 9/32" measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float l vel setting will result.*

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever.

Fast Idle Speed: 1375-1425 RPM with engine at operating temperature and fast idle adjusting screw contacting top step of fast idle cam at index mark.

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: See CARBURETOR abov .

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
413" Engine (Except 300G)

Carter AFB No. 3108S (Std.), No. 3134S (Closed Crankcase Ventilation).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - 1-2 turns open. Turn screws out for richer mixture.

Idle Speed - 500 RPM (550 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N", **h adlights n High B am, and carburet r throttl r d l cknut l sened, see "Cautions" abov .**

Thr ttl Linkage Adjustm nt: See CARBURETOR abov .

►*OTHER DATA: See "Cart r AFB 4-Barrel Carburetors" in Carburetion Section.*

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CARTER AFB 4-BARREL
300G With Ram Manifold

Carter AFB No. 2903S (TorqueFlite), No. 3084S (Synchro-mesh). Two carburetors (one for each bank).

▶*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor feeds left bank cylinders, LEFT carburetor feeds right bank cylinders.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage & Carburetor Interconnecting Linkage Adjustments: *See CARBURETOR above.*

▶*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. M2769S.
Fuel Pump Pressure - 3½-5 lbs.

Fuel Filter: Disposable type located in carburetor inlet line. Replace every 10,000 miles or if clogged. Do not attempt to clean.

Gasoline Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside t mperature gauge (Imperial), fuel gauge (DeSoto).
Dash Unit - Part No. 2258137 (Chrysler), No. 2197225 (Imperial), No. 2197059 (DeSoto).
Tank Unit - King-Seeley. Chrysler No. 2240547 (Chrysler exc. Suburban & Imperial), No. 2240548 (Chrysler Suburban). No. 2240549 (DeSoto).

Air Cleaner: Paper element type. Clean every 6000 miles, replace element every 15,000 miles or sooner if needed.

▶*CLEANING CAUTION:* Clean filter element by blowing ut with compressed air from ihside surface of element. Hold air nozzle 2" from element to avoid damage. DO NOT oil, lubricate or wash element.

Auto Pilot: Automatic speed control unit. *See "Auto Pilot" in Carburetion Section.*

BATTERY

361", 383". Autolite 11-HS-59B or Gould 11-B-OE-59 or Willard MB-24-59. 12 volt, 11 plate, 59 ampere hour capacity (20 hr. rate).
413". Autolite 13-HB-70B or Willard MB-27-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front of engine.

STARTER

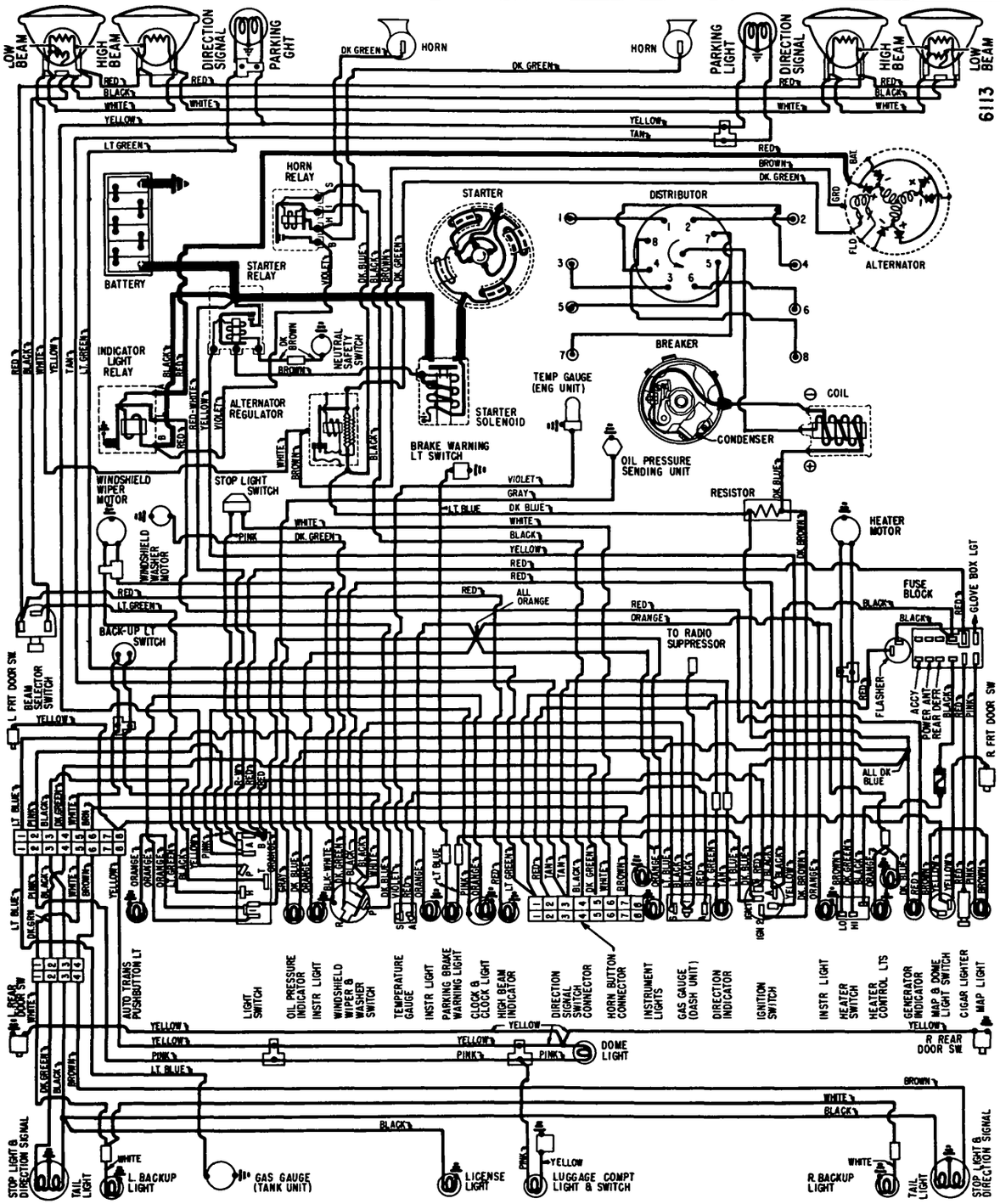
Chrysler Own No. 1889200. Armature No. 1889079.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800 Min.	11.0	78 Max.
8.5 ft. lbs.	Lock	4.0	350

Starter Switch: Solenoid, Chrysler & DeSoto No. 1889146, mounted on starter and controlled by Ignition & Starter Switch, Chrysler & DeSoto No. 2097628. Neutral Safety Switch, Chrysler & DeSoto No. 1704283, mounted on transmission on automatic transmission cars.
Neutral Safety Switch Adjustment - *S "Torqu Flit Six", "Pow rFlit " & "Torqu Flit " in Transmissi n Secti n.*

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DESOTO WIRING DIAGRAM

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ALTERNATOR

Chrysler Own. Three-phase AC unit with full-wave rectifier Used as follows

Model	Chrysler No.
Standard	2095060
Air Conditioning	2095100
Special Equipment Heavy Duty	2095425

Rotation - Clockwise at drive end

Rated Output - 35 amperes (2095060), 40 amperes (2095100 & 2095425)

Field Coil Draw - 2 38-2 75 amps at 12 volts (alternator turned by hand), 2 97-3 43 amps at 15 volts, 70°F & 750 Alternator RPM

►*OTHER DATA See "Chrysler Alternator & Regulator" in Electrical Section*

Belt Adjustment: Use Torque or Deflection methods as follows

Belt Torque Specifications - Ft. Lbs.

Belt	New	Used
Alternator (No Air Cond.)	30	20
Alternator (With Air Cond.) ©	60	40
Fan Idler (Water Pump)	50	35

© - Supersedes previous specification of 100 & 65 lbs

Belt Deflection Specifications

Belt	New	Used
Alternator (No Air Cond.)	1/8"	1/4"
Alternator (With Air Cond.)	1/4"	3/8"
Fan Idler (Water Pump)	1/16"	1/8"

REGULATOR

Chrysler Own Part No. 2095700 (All Models).

Field control type No Cutout Relay or Current Regulator

Air Gap - 048-052" **Point Gap** - 014-016"

Voltage Setting - 13 7-14 3 volts at 75°F

►*OTHER DATA See "Chrysler Alternator & Regulator" in Electrical Section*

MISC. ELECTRICAL

Headlights: 4-Headlight System

Automatic Beam Changer: *See Electrical Section*

Electronic Rear View Mirror: *See Electrical Section*

Instrument Panel Lighting (Chrysler & Imperial): *See "Chrysler & Imperial Panelescent Lighting" in Electrical Section*

Stop Light Switch Location: Hydraulic type (early cars) located on forward end of hydraulic master cylinder Mechanical type (later cars) mounted on brake pedal lever bracket

Adjustment (Mechanical Type) - *NOTE* - Switch bracket mounting hole on brake pedal lever bracket is slotted for switch position adjustment Adjust position of switch in slotted hole with switch plunger extended correct distance (from bracket surface to tip of plunger) See table below for position and distance

	Hole Position	Distance
Standard Brakes	Rearward	© 86"
Power Brakes	Forward	78"

© - With switch No 2257769 78" with switch No 2257770

Instrument Cluster & Speedometer (Chrysler): Removal - 1) Disconnect battery ground cable Remove steering wheel and steering jacket tube cover and disconnect all wires at terminals and the instrument ground wire 2) Remove instrument cluster bezel and disconnect speedometer cable Remove steering tube collar and remove two screws and spacers that attach dome and cluster assembly to support 3) Remove plastic dome to instrument panel screws and carefully release base of dome from supports (use pointed instrument), and move dome away from panel opening Tip cluster outward to reach parking brake warning lamp socket *NOTE* - If dome fits tightly into support it may be necessary to remove cluster-to-dome screws and push cluster up into dome so dome can be compressed to clear supports 4) Snap out lamp socket and bulb and remove dome and cluster assembly 5) Remove speedometer head assembly

Installation - Reverse removal procedure

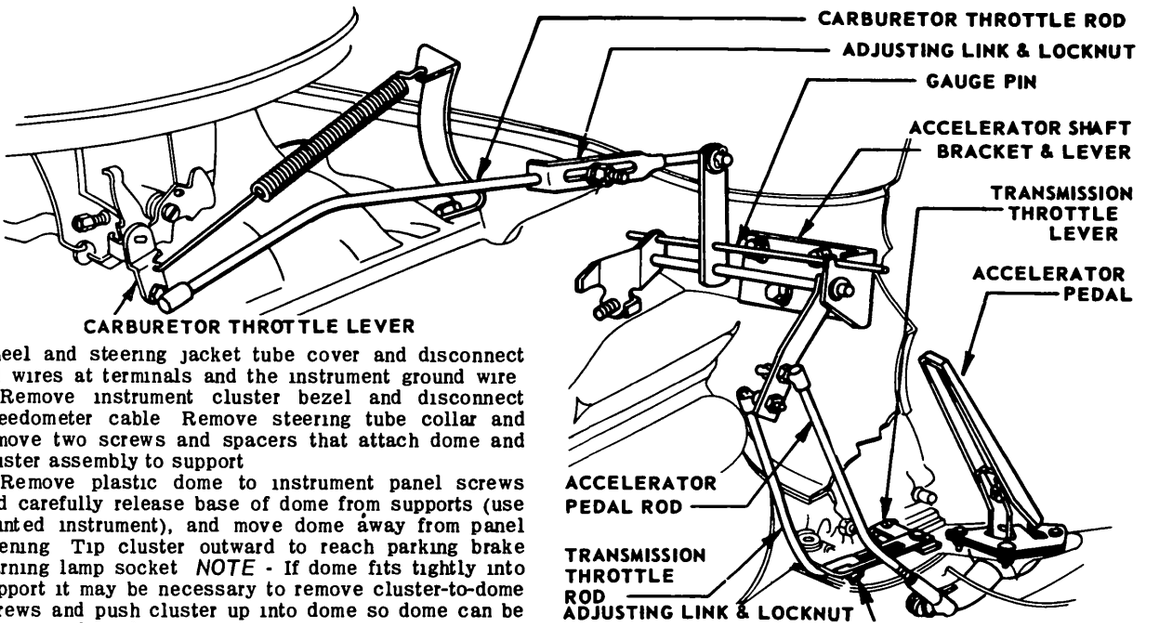
Instrument Cluster & Speedometer (Imperial): Removal - 1) Disconnect battery ground cable *NOTE - When equipped with Heater and/or Air Cond., remove defroster and spot cooler hoses* 2) Disconnect speedometer cable at head and odometer reset cable at instrument panel cluster *NOTE - Mask steering jacket tube* 3) Remove instrument cluster-to-panel screws and remove cluster by tilting lower end outward 4) Disconnect all electrical connections and disengage wire harness loom from clips and remove cluster

Installation - Reverse removal procedure

Instrument Cluster and Speedometer (DeSoto): Removal - 1) Disconnect battery positive cable and mask jacket tube area to protect paint, then remove cluster-to-panel screws 2) Remove panel slightly at center to release overlap clip at center of gauge housing, then carefully pull gauge housing out of panel recess by tilting cluster down to disconnect the lamp sockets and the connectors, then remove gauge housing assembly 3) Remove heater switch trim plate and heater push buttons Remove transmission push button trim plate and push buttons 4) Remove two nuts and washers that attach push button bracket and three screws that attach heater switch and heater control cable bracket to upper instrument panel *NOTE - Do not remove push button bezel or heater switch bezel*

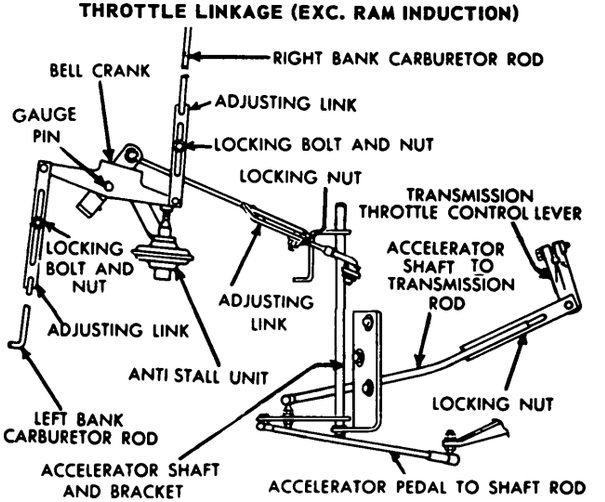
5) Remove five screws attaching upper housing to lower housing and remove upper housing, speedometer, and transmission push button bezel and heater push button bezel as an assembly (raise assembly straight up until speedometer clears lower housing) Remove screws securing speedometer to upper housing

Installation - Reverse removal procedure



CARBURETOR THROTTLE LEVER

THROTTLE LINKAGE (EXC. RAM INDUCTION)



THROTTLE LINKAGE (RAM INDUCTION)

CIRCUIT BREAKERS: 22.5 Ampere - Headlights & High Beam Indicator On headlight switch

15 Amp - Parking, Tail, Stop, License, Instrument Panel Oscillator (Chrysler & Imperial), Instrument Panel lights (DeSoto) On headlight switch

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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8 Ampere - Rear cigar lighter (Imperial).
6 Ampere - Variable speed windshield wiper & DeSoto Back-up lights. On wiper switch.
5 Ampere - Single speed windshield wiper & DeSoto Back-up lights. On wiper switch.

FUSES: *On Chrysler & Imperial, fuses are in fuse block behind instrument panel to left of radio.*
20 Ampere - Heater.
20 Ampere - Front Air Conditioner.
20 Ampere - Rear Air Conditioner.
14 Ampere - Front Cigar Lighter (Chrysler & Imperial).
10 Ampere - Rear Cigar Lighter (Chrysler).
10 Ampere - Auto-Pilot. **7.5 Ampere** - Radio
7.5 Ampere - Rear Window Defroster (DeSoto).
6 Ampere - Rear Window Defroster (Chrysler & Imperial)
6 Ampere - Back-up lights (Chrysler & Imperial).
6 Ampere - Body, Glove Box, Trunk, Map lights.
2 Ampere - Mirror-Matic. **1 Ampere** - Clock.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Misc. Sect.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. Different engines used as follows:

Car Model	Engine
DeSoto, Chrysler Newport	361"
Chrysler Windsor	Ⓒ 383"
Chrysler New Yorker, 300G, Imperial	413"

Ⓒ - See Note below for partial production.

►*WINDSOR ENGINE NOTE:* Some cars have 383" engine (4.031" x 3.75") used in early 1960 production. Engine number pad stamped "RB-38". *For all data on this engine, See 1960 Chrysler & Imperial car pages.*

►*300G ENGINE NOTE:* Engine used on this model is same as standard 413" engine except for Ram Induction Manifold (two carburetors) and High Performance Camshaft (different valve specifications).

Engine	Bore	Stroke	Displacement
361"	4.125"	3.375"	361 cu. ins.
383"	4.250"	3.375"	383 cu. ins.
413"	4.190"	3.750"	413 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
361"	9.0-1	54.3	265 at 4400 RPM
383"	10.1-1	57.8	305 at 4800 RPM
413" (Exc.300G)	10.1-1	55.9	350 at 4600 RPM
413" (300G) Ⓒ	10.1-1	55.9	375 at 5000 RPM
413" (300G) ②	10-1-1	55.9	400 at 5200 RPM

Ⓒ - Ram Induction and TorqueFlite.
② - Ram Induction and Synchro-mesh.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL: Remove dipstick, drain crankcase, disconnect battery ground cable and remove No. 6 spark plug. Raise car and disconnect steering linkage from idler and pitman arms. Remove outlet breather pipe and disconnect exhaust pipe branches from manifolds. Remove exhaust pipe and converter dust shield. On DeSoto, Newport and Windsor, remove engine front mount retaining nuts and raise engine about 2". Remove oil pan bolts. Rotate crankshaft so front counterweight and connecting rods are at highest position and lower pan, turning counterclockwise to clear oil screen and suction pipe. *NOTE* - When installing, bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block.

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel strut.

►*CYLINDER BORE OVERSIZE NOTE:* Letter "A" within engine number indicates that cylinder bores are .020" Oversize.

Weight - 25.3 ozs. (361"), 27.2 ozs. (383"), 27.5 ozs. (413").

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance - .0005-.0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall, crosswise to engine.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8). *See Rod Installation.*

Replacement Pistons: Furnished Std., .005", .020" & .040" Oversize with fitted pins.

PISTON PIN

Pin is tight press fit in connecting rod and special removal and installation procedures are required. Piston pins are available only with new pistons.

Diameter - 1.0935-1.0937".
Length - 3.555-3.575".
Clearance in Piston - .00045-.00075". Light thumb press fit at 70°F.
Clearance in Rod - .0007-.0012" interference fit.
Piston Pin Removal & Installation - *See "Piston Pins" in Chrysler Special Data.*

Replacement Pins: Furnished standard size only with new pistons.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1 & 2)	.0775-.0780"	.013-.025"	.0015-.0030"
Oil (3)	.1860-.1865"	.013-.025"	.0010-.0030"

Installing Rings: Install compression rings with "Top" mark toward top of piston.

Replacement Rings: Furnished for oversize ranges of: Std. to .009", .020" to .029", .040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.766-6.770".
Weight - 29.4 ozs.
Crankpin Journal Diameter - 2.374-2.375".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Lower Bearing - Removable precision type. Lead base babbitt on steel.
Clearance - .0005-.0015". Wear limit .0025".
Sideplay - .009-.017". Total for both rods.

Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.

Replacement Bearings: Std., & .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

Journal Diameter - 2.6245-2.6255" (361",383"), 2.7495-2.7505" (413").

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.001" UNDERSIZE** - Indicated by "Maltese Cross" within engine number. **.010" UNDERSIZE** - Indicated by "X" and "Maltese Cross" within engine number. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Clearance - .0005-.0015".
Wear Limit - .0025". **Endplay** - .002-.007".
End Thrust - Taken by No. 3 (center) main bearing.

Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper bearings 1,2,4 & 5 are interchangeable. Lower bearings 1,2,4 & 5 are interchangeable. Upper and lower No. 3 bearings are not interchangeable with other bearings or in position.

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*

CAMSHAFT

►*NOTE:* Special "High Performance" Camshafts used on 300G.

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.748-1.749".
Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.750-1.751".
Bearings - Removable, lead base babbitt on steel.
Clearance - .001-.003". Wear limit .005".

End Thrust: Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain: Width .88". **Pitch** .50". **Length** 50 links.

Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Chrysler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters. **300G - (Optl. Mechanical Lifters)** .016" Intake, .028" Exhaust.

Valve	Head Diam.	Stem Diam.	Length
Intake	2.08"	.372-.373"	4.87"
Exhaust	1.60" Ⓒ	.371-.372"	4.89"

Ⓒ - 1.74" on 300G with mechanical lifters.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valve	Seat Angl	Lift	St m Cl aranc
Intake	45°	①.389"	③④.001-.003"
Exhaust	45°	②.389"	⑤.002-.004"

① - .430" (300G with hydraulic lifters), .449" (300G with mechanical lifters).
② - .430" (300G with hydraulic lifters), .454" (300G with mechanical lifters). ③ - .002-.004" on 300G.
④ - Wear limit .004". ⑤ - Wear limit .006".

Valv Seat Width - .060-.085" Intake, .040-.060" Exhaust.

Valv Stem Oil Seal - Cup type seals used on all valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

Valv Springs: Damper springs used inside valve springs on 300G.

Spring Specifications (Except 300G)

Valv	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	187-203 lbs.	1.47"

①Spring Specifications (300G)

Valv	Pressure	Length
Closed	92-105 lbs.	1.86"
Open	197-213 lbs.	1.43"

① - Includes damper.

Spring Free Length - 2.38" (300G), 2.34 (Others).

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 29/32" (300G), 1 57/64" (Others), install 1/16" spacer under spring to bring height within limits of 1 53/64-1 57/64".

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "fill-up" will restrict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installati n: Install all springs with closed coil end toward cylinder head.

►*CAUTION:* Spring ends must be square within 1/16".

Valv Guid s: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005"), C-3430 (.015"), and C-3427 (.030") to ream guides in progressive steps of .005", .015" & .030".

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

Hydraulic Valve Lifters: Used on all engines except special mechanical lifter option (300G).

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" Oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Diameter - .9040-.9045". **Clearanc** - .0005-.0018".

R placement Lifters - Furnished Std. & .001", .008", .030" Oversize.

Lifter Overhaul & Testing - S *"Valve System" in Chrysler Corp. Special Data.*

Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

①Valve Timing Specifications (Except 300G)

Intake Valves - Open 15° BTDC. Close 57° ALDC.
Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

(300G With Hydraulic Lifters)

Intake Valves - Open 20° BTDC. Close 68° ALDC.
Exhaust Valves - Open 60° BLDC. Close 28° ATDC.

(300 With Mechanical Lifters)

Intake Valves - Open 25° BTDC. Close 79° ALDC.
Exhaust Valves - Open 74° BLDC. Close 30° ATDC.

① - With valve train solid.

Valve Timing Check: Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted .024" (300G), .017" (Others). Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION - Remove spacer before turning crankshaft any further in normal direction.*

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Gauge (Chrysler & Imperial): Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial). **Dash Unit** - Chrysler No. 2258138 (Chrysler), No. 2197222 (Imperial).
Engine Unit - King-Seeley No. 44060. Chrysler No. 1972241.

Oil Pressure Indicator (DeSoto): Warning light on instrument panel operated by Oil Pressure Switch, Part No. 1818830.

Oil Pump: Rotor type mounted on cylinder block at lower left front side of engine.
Pump Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow disposabl type. Replac filter every 4000 miles to coincide with engine oil change.

►*OIL FILTER INSTALLATION CAUTION:* Before installing, make sure that drain-back valve is free by unseating valve with blunt instrument inserted in four holes in oil filter base. Screw new filter on base until gasket contacts base. **Tighten ½ turn additional by hand.** DO NOT overtighten.

Crankcase Ventilation: Standard Cars - Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap at every oil change or sooner under heavy dust conditions.
Positive Crankcase Ventilation Cars - A vacuum tub is connected to air outlet vent cap on right valve rocker and to lower part of carburetor throttle body. A ventilation valve is installed in outlet cap to regulate crankcase ventilation. *See "Closed Crankcase Ventilati n Systems," in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 16 qts. Add 1 qt. for heater.

►*AIR CONDITIONING OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

Thermostat: Pellet type. Located in water outlet housing. (160°F) Chrysler No. 1734957, (180°F) No. 1735011.

Water Pump: Sealed ball bearing type. No lubrication.
Water Pump Removal - Drain cooling system and remove upper half of fan shroud. Remove all belts. Remove fan, spacer, and pulley. Remove water pump from housing. *NOTE* - On Air Conditioned cars, remove pulley from fan hub and then remove fan drive.
Water Pump Overhaul - *See "Cooling System" in Chrysler Corp. Special Data.*

Fluid Fan Drive: Used on air conditioned cars and standard and all 300G models.

Temperature Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial), inside fuel gauge (DeSoto).

►*INACCURATE TEMPERATURE READING CORRECTION (Air Cond. Cars):* Caused by sending unit interference with air cond. compressor. To correct, install NEW Temperature Gauge Sending Unit Part No. 2256302 for air conditioned models. Part No. 2240744 may be used for other models.
Dash Unit - Part No. 2257660 (Chrysler), 2197224 (Imperial). 2197060 (DeSoto).
Engine Unit - King-Seeley 44265, Chrysler 2240744.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles, drain and refill every 10,000 miles or sooner if used in heavy duty service.
Checking Fluid Level - Bring engine and transmission to normal operating temperature with parking brake applied. Push selector buttons in turn to assure fluid distribution and check fluid in "N" (engine idling). Maintain fluid level at (or slightly below) "F" mark on dipstick. *NOTE* - If fluid checked with transmission cold, maintain fluid level at (or slightly below) "L" mark. Us nly Automatic Transmissi n Fluid Typ "A", Suffix "A".

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

DODGE DART

Model	Model Identification
Seneca	RD3-L
Pioneer	RD3-M
Phoenix	RD3-H

PLYMOUTH

Savoy; Deluxe Suburban	RP1-L
Belvedere; Custom Suburban	RP1-M
Fury; Sport Suburban	RP1-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 1 1 1 100001

① - Car Make. 2 Plymouth 6 Cyl. 4 Dodge Dart 6 Cyl.
② - Model Series. 1 Seneca or Savoy. 2 Pioneer or Belvedere. 3 Phoenix or Fury. 5 Seneca Station Wagon or Savoy Suburban. 6 Pioneer Station Wagon or Belvedere Suburban. 8 Taxi. 0 Fleet. ③ - Model Year. 1 1961
④ - Assembly Plant. 1 Plymouth (Detroit). 2 Dodge (Detroit). 5 Los Angeles. 6 Delaware. 7 St. Louis. 8 Wyoming. 9 Canada.
⑤ - Beginning vehicle number at each assembly plant regardless of car make or model.

ENGINE NUMBER: Stamped on right side of block below cylinder head opposite No. 1 cylinder. Number (example below) includes identification data.

① ② ③ ④ ⑤
R 22 ... 8 1

① - Year. R 1961.
② - Displacement. 22 225 cu. ins. 17 170 cu. ins.
③ - If this space blank, engine is standard. *For identifying marks see below.*
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 4 4th day, etc.

►*ALUMINUM ENGINE NOTE:* Engines with Aluminum block are identified by prefix "A" in engine serial number (AR-22 for aluminum engines, R22 cast iron engines).

►*ENGINE NUMBER MARKS: Identified as follows:*
"A" - All cylinder bores .020" oversize.
"Maltese Cross" - One or more bearing journals .001" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"X" and "Maltese Cross" - One or more bearing journals .010" undersize. *See "Connecting Rods" and "Crankshaft" below.*
"♦" - One or more valve lifters .008" oversize. *See "Valve Lifters" below.*

►*HARD COLD WEATHER START CORRECTION (Carburetors with Choke Vacuum Unloader Piston in Air Horn):* Hard starting caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting Carburetor Cleaner, Lacquer Thinner or Alcohol through piston link opening, while operating choke valve to flush out gum formation.

►*HARD STARTING & STALLING IN WET WEATHER CORRECTION:* Caused by moisture entering coil and distributor towers. To correct, install Coil Secondary Cable Package Part No. 2084428 consisting of cable, nipples and terminals. In this package, the distributor nipples are 1.315" long (were 1.19") and terminal nipples are 1.50" and are redesigned neoprene.

►*POOR FUEL ECONOMY OR PERFORMANCE CORRECTION:* Caused by use of incorrect gasket between carburetor and intake manifold or incorrect installation of correct gasket. Use Gasket Part No. 2205582 with single small hole to left front of car.

TUNE-UP

COMPRESSION PRESSURE: 130-160 lbs. at 150 RPM (plugs removed). Maximum variation between cylinders 20 lbs.

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust, Hot.

►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal temperature, remove rocker arm cover and operate engine for additional 5 minutes at 550 RPM before making adjustments.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Spark Plugs - Autolite AG-52 (AG-82 on Taxi). "Long Reach" 14 mm type. Plugs are installed in aluminum sleeves which serve as plug gaskets. Torque to 30 ft. lbs.

COIL: Autolite No. 200567 or Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501. 0.6 ohms. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler Own. No. 2095270 (225" Eng.), No. 1889750 (170" Eng. on Plymouth Taxi).
Condenser - Chrysler 1818757. Capacity .25-.285 mfd.
Contact Point Set - Chrysler No. 1838643.
Breaker Gap - .017-.023".
Cam Angle - 36-42°.
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 2095270

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250-450	0	500-900
0-2	450	0-4	900
5.5-7.5	1000	11-15	2000
10.5-12.5	2200	21-25	4400

Automatic Advance - 1889750

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325-475	0	650-950
0-2.5	475	0-5	950
6-8	820	12-16	1640
11.5-13.5	1925	23-27	3850

Vacuum Spark Cntrl: Integral type.

Vacuum Advanc - 2095270

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.9-6.9
4.5-7	9-14	9.5
7.8-10.3	15.6-20.6	12

Vacuum Advanc - 1889750

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.7-7.1
5.5-8	11-16	11
9.5-12.5	19-25	14.5

IGNITION TIMING

Transmission Type	Ignition Setting
Synchro-mesh	2½° BTDC
TorqueFlite 6	Ⓒ 5° BTDC

Ⓒ - Supersedes previous setting of 2½° BTDC for improved performance and economy.

►*TIMING NOTE:* Set timing with vacuum line disconnected at distributor and engine idling at 500 RPM with transmission in Neutral.

Timing Mark - Timing tab on chain case cover marked "O" and "10" with 5° marks before and after "10". Align timing mark on vibration damper with correct mark on tab.

CARBURETOR

►*CARBURETOR APPLICATION: One Carter BBS single barrel carburetor used.*

►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, screw ball joint up or down until ball on bellcrank will mate exactly with socket.

THROTTLE LINKAGE ADJUSTMENT: Loosen locknut on sliding link at idler bellcrank-to-transmission rod and unsnap ball joint connection of accelerator shaft rod at accelerator shaft bellcrank. Insert a 3/16" diameter rod through holes in idler bellcrank bracket and lever, move transmission lever forward against transmission internal stop and tighten sliding link locknut. Remove 3/16" rod. Adjust accelerator shaft-to-bellcrank rod by rotating ball joint socket so socket will mate exactly with ball (pull upward on rod to take up all freeplay in linkage). Snap ball joint connection together. Unsnap accelerator pedal-to-accelerator shaft bellcrank rod and rotate threaded end of rod to obtain accelerator pedal angle of 114° between floor pan and flat face of pedal. Connect rod.

CARTER BBS

Carter BBS. Used as follows:

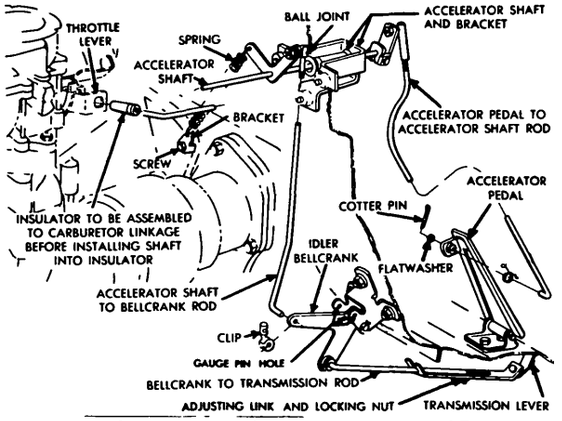
Model	Carburetor No.
Std. Synchro-mesh	BBS 3098S
Std. TorqueFlite	BBS 3099S
Closed Crankcase Vent. All Trans.	BBS 3128S
Taxi All Trans.	BBS 3097S
Taxi All Trans. Closed Crankcase Vent.	BBS 3129S

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Idle Setting - ½-1½ turns open (3098S, 3099S, 3128S), 1-2 turns open (3097S, 3129S). With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.



TORQUEFLITE 6 THROTTLE LINKAGE

Idle Speed - 550 RPM with headlights on High Beam, and accelerator shaft rod ball joint unsnapped, see *"Cautions"* above.

Float Level - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (On Car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 7/32" (3098S, 3099S, 3128S), 9/32" (3097S, 3129S) measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install throttle connector rod in center hole (3098S, 3099S, 3128S), upper hole (3097S, 3129S) of throttle lever.

Fast Idle : 1800 RPM (Synchro-mesh Trans.), 1600 RPM (Auto. Trans.) with adjusting screw on second step of fast idle cam.

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter BBS Carburetors" in Carburetion Section.*

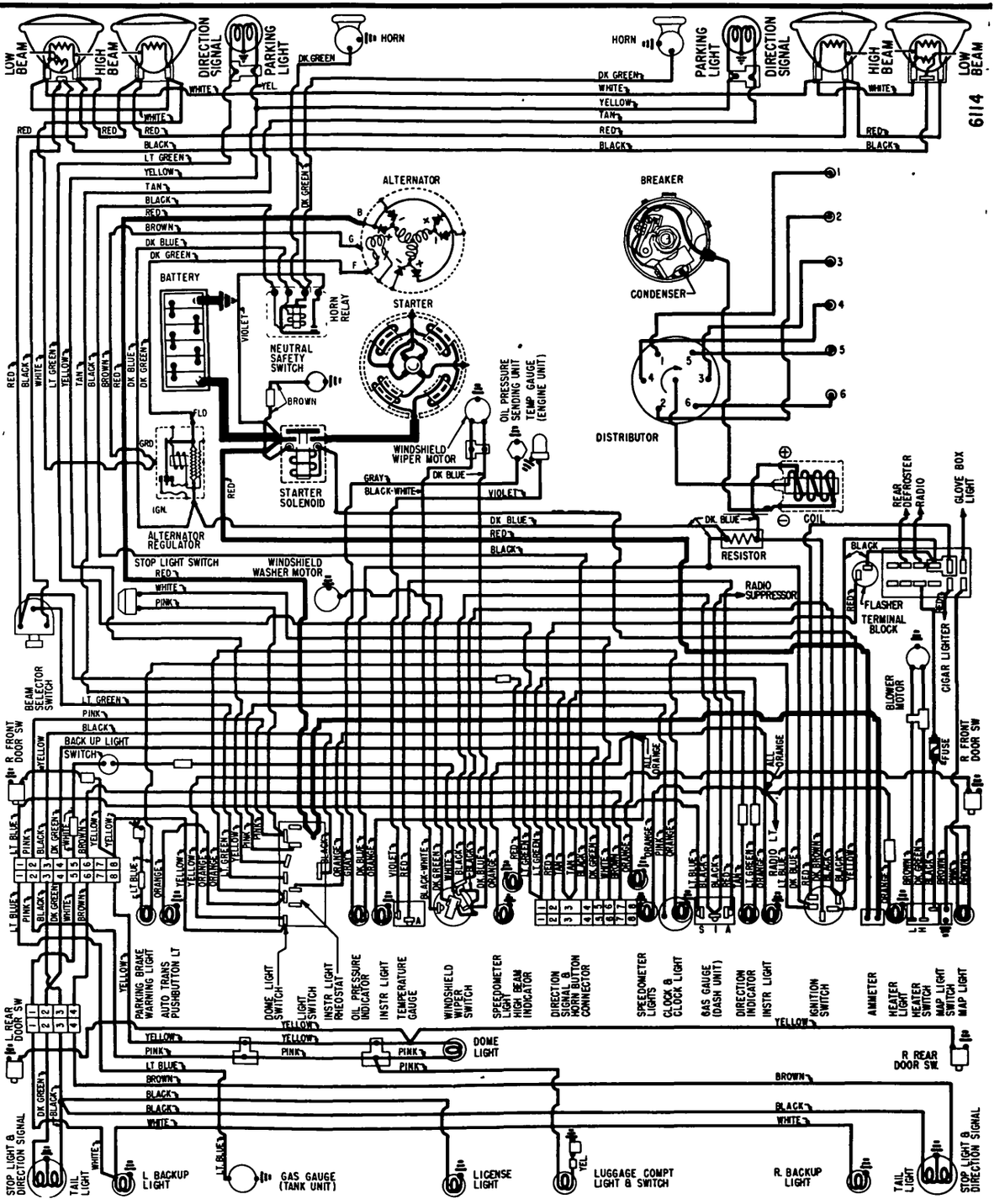
CARB. EQUIPMENT

Fuel Pump: Carter M2996S. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.

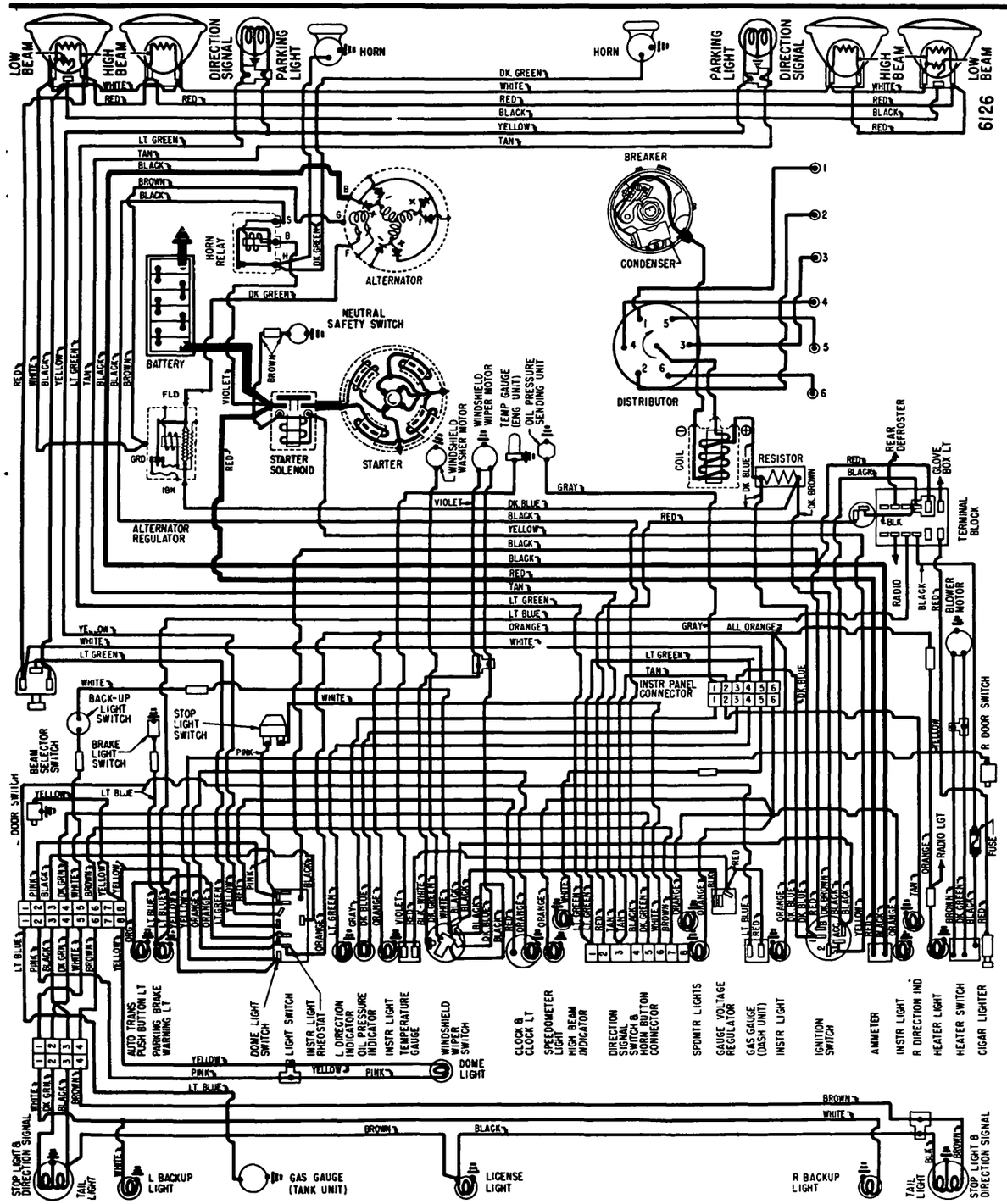
Fuel Filter: Disposable paper type, located in fuel line between pump and carburetor. Replace every 10,000 miles.

Gasoline Gauge (Dodge Dart): Constant Voltage type with voltage regulator inside gauge.
Dash Unit - Dodge No. 2197059.
Tank Unit - King-Seeley No. 59200 (Pass.), 59210 (Sub.), 59205 (Sp.Tank).

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DODGE 6 CYL. WIRING DIAGRAM



PLYMOUTH 6 CYL. WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Gas lin Gaug (Plymouth): King-Seeley Electric "CV" (Constant Voltage) type with separate Voltage Regulator King-Seeley No. 57918.
Dash Unit - King-Seeley No. 57890.
Tank Unit - King-Seeley No. 59200 (Pass.), 59210 (Sub.), 59205 (Sp. Tank).

Air Cleaner: Paper element type, clean every 5,000 miles, replace element every 15,000 miles. More frequent servicing may be necessary under severe operation.

►*CLEANING CAUTION:* Remove filter element from housing. Blow compressed air gently from inside out (2" away) to remove dust particles. DO NOT tap these filters to loosen dirt and DO NOT immerse in any fluid.

BATTERY

Standard: Autolite 11-HS-50B r Willard MB-24-50 r Gould 11B-OE-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Optional: Autolite 11-HS-70B r Willard MB-27-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.

STARTER

Autolite MDT-7002. Armatur - Autolite N . 16-84.
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 31-47 ozs.

Performanc Data.

Torque	RPM	Volts	Amperes
0 ft. lbs.	3600	10.0	56
8.5 ft. lbs.	Lock	4.0	350

Starting Switch: Dodge & Plymouth Part No. 2095607 (Synchro-mesh), No. 2095606 (Auto. Trans.). Magnetic switch controlled by Ignition & Starter Switch No. 2097628. Neutral Safety Switch No. 1704283 mounted mounted on transmission on automatic transmission cars.
Neutral Safety Switch Adjustment - *S e "TorqueFlit Six", "PowerFlite" & "TorqueFlite" in Transmission Section.*

ALTERNATOR

Chrysler Own. Three-phase A.C. unit with full-wave rectifier. Used as follows:

Model	Chrysl r N .
Standard	2095060
Special Equipment Heavy Duty	2095425

Rotation - Clockwise at drive end.
Rated Output - 35 amperes (2095060), 40 amperes (2095425).
Field Coil Draw - 2.38-2.75 amps. at 12 volts (alternator turned by hand); 2.97-3.43 amps. at 15 volts, 70°F & 750 Alternator RPM.
Checking & Adjusting - *Se "Chrysl r Alt rnat r & Regulator" in Electrical S ction.*

Belt Adjustment: Use Torque or Deflection methods as follows:

Belt Torque (Ft. Lbs.)		Belt D flecti n	
N w	Us d	N w	Us d
30	20	5/32"	1/4"

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REGULATOR

Chrysler Own N . 2095700 (All Mod ls). Field Control type. No Cutout Relay or Current Regulator.
Air Gap - .048-.052". **P int Gap** - .014-.016".
V ltage Setting - 13.7-14.3 volts at 70°F.
Ch cking & Adjusting - *See "Chrysler Alternator & R gulator" in El ctrical Section.*

MISC. ELECTRICAL

H adlights: 4-Headlight System.
El ctr nic Rear Vi w Mirror: *See Electrical Section.*
Lighting Switch Rem val: Disconnect battery. Pull switch knob out and rotate until flat on shaft is down. Push knob all the way in. Disconnect wires, press spring-loaded release button on top center of switch, and pull shaft and knob out of switch. Remove switch mounting bezel on instrument panel and remove switch.
St p Light Switch L cati n: Hydraulic type (early cars) located on forward end of hydraulic master cylinder. Mechanical type (later cars) mounted on brake pedal lever bracket.
Adjustment (Mechanical Type) - *NOTE* - Switch bracket mounting hole on brake pedal lever bracket is slotted for switch position adjustment. Adjust position of switch in slotted hole to "REAR" for Std. brakes, to "FRONT" for Power brakes.
Gaug H using Assembly (Dodge Dart): Removal - 1) Disconnect positive battery cable, tape jacket area with masking tape and remove eight instrument cluster to panel screws.
2) Raise panel slightly at center to release overlap (at center of gauge housing) and carefully pull gauge housing from panel recess by tilting cluster down to reach lamp sockets and connectors.
3) Disconnect wire connectors and lamp sockets and remove gauge housing.
Installati n - Reverse removal procedure.
Sp d meter (D dg): R m val - 1) Remove gauge housing, see above, then remove heater switch trim plate screw and remove trim plate and heater push buttons.
2) Remove transmission push button trim plate screws and remove trim plate and push buttons.
3) Work through gauge housing opening to remove two push button bracket and three heater switch and control bracket to upper instrument housing screws. *NOTE - DO NOT remov transmission push button or heater b zel.*
4) Remove five upper housing to lower housing screws and remove upper housing, speedometer and transmission push button and heater switch bezels as an assembly, by raising assembly straight up until bottom of speedometer clears lower housing. Remove assembly then remove speedometer to upper housing screws and remove speedometer.
Installati n - Reverse removal procedure.
Clust r & Speed m ter (Plymouth): Removal - 1) Disconnect negative battery terminal and remove four speedometer and instrument panel cover to base screws. *NOTE - Two screws ar located at front face of instrument clust r b z l and two screws attach speedometer and instrum nt pan l cover t speedomet r and instrum nt pan l at front corn rs of pan l and base (ne ach sid).* To remove panel cover raise front edge slightly to clear instrument cluster and carefully push the panel toward windshield to disengage retaining spring clips from speedometer and instrument panel base.
2) Disconnect high beam indicator wire, ammeter wires and lamp bulb and oil pressure light socket and bulb.
3) Remove four speedometer and instrument cluster and bezel to speedometer and instrument panel base screws. *NOTE - Two screws are located at rear of instrument clusters (one each side) and two screws attach cluster bezel to base at front of bezel. Remove cluster and bezel as an assembly.*
4) Disconnect speedometer cable and lamp connectors at speedometer head. Remove four speedometer to speedometer and instrument panel base screws and remove speedometer assembly.
Installation - Reverse removal procedure.
CIRCUIT BREAKERS: 22.5 Ampere - Headlights & High Beam Indicator. In headlight switch.
15 Ampere - Parking, Tail, Stop, Instruments & Interior lights. In headlight switch.
6 Ampere - Variable speed windshield wiper & Back-up lights. On wiper switch.
5 Ampere - Single speed windshield wiper & Back-up lights. On wiper switch.
FUSES: 20 Ampere - Heater. In feed wire.
7.5 Ampere - Radio. In feed wire.
1 Ampere - Clock. In feed wire.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*
ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head, inclined 30° to right, of same design used previously.
►*ALUMINUM ENGINE NOTE:* Aluminum (die-cast) block engine used in partial production. Specifications are same as for Cast Iron engine except as noted below.
►*ALUMINUM ENGINE NOTE:* Engine block is die cast aluminum with iron cylinder bore liners molded in block and with a cast iron cylinder head. This head carries the word "Special" cast between lifting pads on pads on left side. Use this head on either aluminum or cast iron block but do not use a cast iron engine cylinder head on an aluminum block. Cylinder head bolts are longer and are not interchangeable with bolts for cast iron engine. .Aluminum engine is identified by the Engine Code AR-22 followed by Eng. Ser. No.
►*ALUMINUM ENGINE SERVICE CAUTIONS: See "Aluminum Engine Service Cautions" in Chrysler Corp. Special Data.*
►*PLYMOUTH TAXI NOTE:* 170" Engine optional on this model. Specifications below apply to both engines (225" & 170").

Engine	Bore	Stroke	Displacement
225"	3.40"	4.12"	225 cu. ins.
170"	3.40"	3.12"	170 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
225"	8.2-1	27.7	145 at 4000 RPM
170"	8.2-1	27.7	101 at 4400 RPM

Compression & Vacuum R ading - *See TUNE-UP.*
►*170" ENGINE NOTE: F r all oth r 170" Engin Servic Data, see Dodge Lanc r & Valiant.*
►*ENGINE OIL LEAK AT DISTRIBUTOR CORRECTION:* A large "O" ring Part No. 2095740 and a small "O" ring No. 2095630 have been released for correction of oil leaks at distributor. To correct oil leak, remove distributor and remove cork gasket or early large "O" ring. Install small "O" ring on distributor housing against retainer flange then install large "O" ring. Reinstall distributor and set ignition timing.
►*ENGINE "CHUCKING" OR "HEAVY KNOCK" CORRECTION:* Chucking or heavy knock is caused by loose vibration damper (crack in damper hub). Replace damper making sure that keyway is aligned and that damper is square with shaft at time of installing.
OIL PAN REMOVAL: Remove tie rod at steering and idler arms. Support engine and remove front engine mounting-to-frame bolts, disconnect and remove left side support (connecting converter housing and cylinder block). Raise engine approximately 2". Drain crankcase. Remove oil pan bolts, lower pan and remove it toward the rear. *CAUTION: Do not turn oil pick-up tube and strainer out of position.*
►*OIL PAN INSTALLATION CAUTION (225" Eng.):* To minimize possibility of oil leaks at oil pan gasket, tighten retaining capscrews to specified torque and in following sequence: 1) Left rear. 2) 2nd. from right front corner. 3) 2nd from left front corner. 4) Right rear. 5 & 6) All along right and left side rails – either side first. 7) Remaining capscrews on rear edge. 8) Across front edge.
CYLINDER HEAD: Cast Iron Engine - Either the Std. Cast iron head or the "Special" cast iron head (Aluminum Eng.) may be used.
Aluminum Engine - Cast Iron Head with word "Special" cast between lifting pads on left side of head. Use only this head on Aluminum block.
See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.
TIGHTENING TORQUES: *See "Tightening Specificati ns" in Chrysler Corp. Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, slipper type skirt. Thermally controlled by steel struts.
►*OVERSIZE CYLINDER BORE CAUTION:* Letter "A" (A or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates all cylinder bores and pistons are .020" Oversiz .
Weight - 16.3 ozs.
Removal - Pistons and rods removed from above.
Clearance - .0005-.0015" at top of skirt.
Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure piston at top of skirt at right angles to pin hole, measure cylinder bore halfway down and at right angles to crankshaft.
Installing Pistons - Notch in piston head must be toward front of engine. *See Rod Installation.*
Replacement Pistons: Furnished with pins in Std. size and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

PISTON PIN

Press fit in connecting rod.
Diam ter - .9007-.9009". **Length** - 2.955-2.975".

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Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.
Pin Fit in Rod - .0007-.0012" Interference fit. Special procedure and tools used for removal & installation. *See "Piston Pins" in Chrysler Corp. Special Data.*
Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

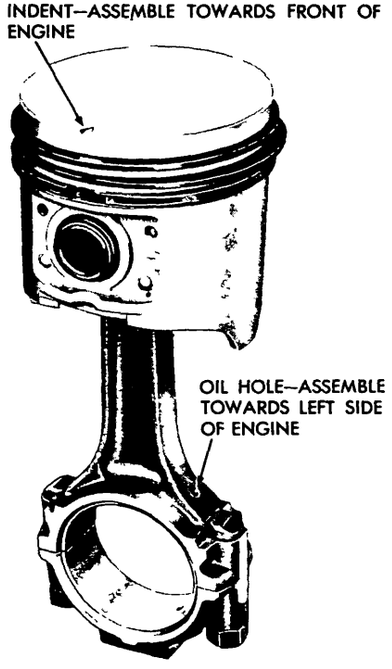
Compression rings are cast iron (No. 1 is taper twist, tin plated, No. 2 is reverse twist, lubrite coated). Oil ring is three-piece (two-chrome plated rails with stainless steel expander-spacer).

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	.010-.020"	.0015-.003"
Oil	.1860-.1865"	.015-.055"	.0010-.003"

Installing Rings - Mark "Top" on compression rings must be toward top of engine.
Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020" to .029",.040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.699".
Weight - 27.34 ozs.
Crankpin Journal Diameter - 2.1865-2.1875". Taper and out-of-round limits .001".
►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*
Pin Bore in Rod - .8995-.9000".



6 CYL. PISTON ASSEMBLY

Clearance - .0005-.0015". Wear limit .0025".
Side Clearance - .006-.012".
Bearing Adjustment - None, replace bearings.
Installing Rods - Notch in head of piston must be to front of engine, oil squirt hole in lower end of rod must be toward left side of engine.
Replacement Bearings: Std. and .001", .002", .010", Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505". Taper and out-of-round limit .001".
Bearing Type - Removable, precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-based babbitt on steel.
►*ALUMINUM ENGINE MAIN BEARING NOTE:* Same as for cast iron engine except that oil feed holes in bearings are in a different location and require special inserts. *CAUTION - DO NOT use cast iron block original main bearing inserts in aluminum block.* Upper and lower bearing caps are case iron and are line bored in complete sets. If replacement is required, all four upper and lower main bearing caps must be replaced with a matched set for proper alignment. Identification numbers are stamped on upper caps and cast into lower caps. When upper and lower caps are installed, bearing tab slots should be on left side of engine.
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*
.010" UNDERSIZE (All Main & Connecting Rod Journals) - Letter "B" (B or AB) incorporated in Engine Number (see Engine Number under MODEL IDENTIFICATION above) indicates that ALL Main and Connecting Rod Journals are .010" undersize.
.001" UNDERSIZE (ONE OR MORE Main & Connecting Rod Journals) - Letter (M - Main Journal, R - Connecting Rod Journal) and Number (designates particular journal) stamped on center counterweight of crankshaft indicate that particular journal is .001" Undersize and fitted with .001" thicker wall bearing insert.
►*MAIN BEARING NON-INTERCHANGEABILITY CAUTION:* Nos. 1 & 2 **upper** bearings are chamfered along right inside edge at tab end and are interchangeable. No. 4 **upper** bearing is not chamfered and is NOT interchangeable with other bearings *(NOTE* - This bearing identified by blue marking on edge). No. 3 **upper** and **lower** bearings are flanged and NOT interchangeable with other bearings. **Upper** and **lower** bearing halves are NOT interchangeable (upper bearings grooved, lower bearings plain). Nos. 1, 2, 4 **lower** bearings are interchangeable. *CAUTION - Use of No. 1 or 2 upper bearing in No. 4 position may cause oil leak, use of No. 4 upper bearing in No. 1 position would prevent proper lubrication of timing chain and sprockets.*
Clearance - .0005-.0015".
End Thrust - Taken by No. 3 (rear intermediate) flanged bearing. **Endplay** - .0035-.0085".
Replacement Bearings: Std. and .001", .002", .010" Undersize.
►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

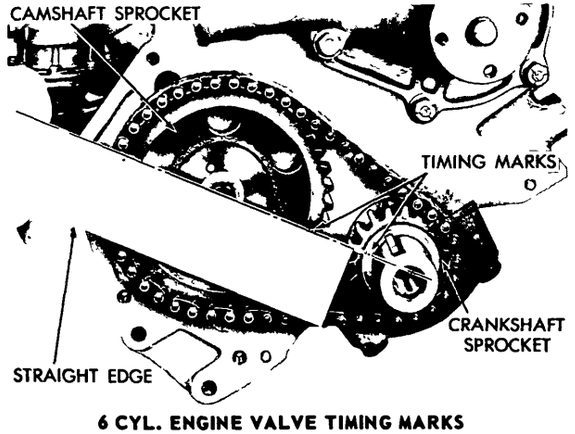
CAMSHAFT

Journal Diameters - (1) 1.998-1.999", (2) 1.982-1.983", (3) 1.967-1.968", (4) 1.951-1.952".
Bearings (Cast Iron Eng.) - Lead - based babbitt on steel.
Bearings (Aluminum Eng.) - Bearing inserts not used. Camshaft bearing journals run directly in finished bores in block.
Clearance - .001-.003". **Wear Limit** - .005".
End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.
Timing Chain: Side guide type. **Width** .88", **Pitch** .50", **Length** 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold) crankshaft sprocket stationary, use torque wrench to turn camshaft in both directions applying 30 ft. lbs. turning torque (if cylinder head installed), 15 ft. lbs. turning torque (if head off).
Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*
Tappet Clearance: **(Cast Iron Eng.)** - .010" Intake, .020" Exhaust. Hot.
(Aluminum Eng.) - Same as for Cast Iron Eng. *See below.*
►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal temperature, remove rocker arm cover and operate engine for an additional 5 minutes at 550 RPM before making adjustments.
Camshaft Setting: Marks on sprockets must be adjacent and in line across shaft centers.
Engine Front Cover Installation: *See "Engine Front Cover" in Chrysler Corp. Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

Valve	Head Diam.	① Stem Diam.	Length
Intake	1.615-1.625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

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6 CYL. ENGINE VALVE TIMING MARKS

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Valve	Seat Angle④	Lift	Stem Clearance
Intake	45°	.375"	②.001-.003"
Exhaust	45°	.360"	③.002-.004"

① - Std. Also furnished .005", .015", .030" Oversize. ② - Wear Limit .004". ③ - Wear Limit .006". ④ - Valve face angle 45° (Int.), 47° (Exh.).

Valve Seat Width: 5/64-3/32" Int., 3/64-1/16" Exh.

Valve Stem Oil Seals: Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valve Springs: Free Length 2".

Valve Spring Specifications

Valve	Pressure	Length
Closed	68-76 lbs.	1 11/16"
Open	160-172 lbs.	1 5/16"

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer) If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16"

Valve Lifters: Barrel type, removed from above.

Rocker Arm Assembly: See *"Valve System" in Chrysler Corp. Special Data.*

VALVE TIMING

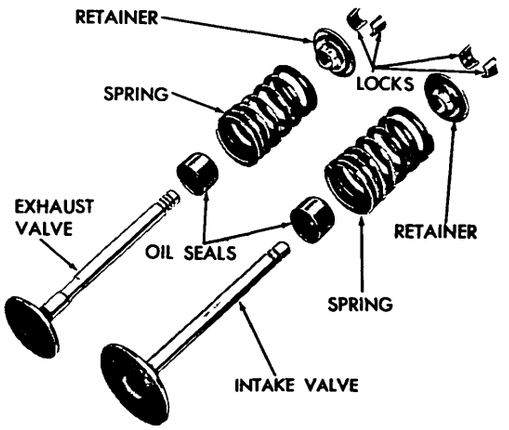
See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 8° BTDC. Close 44° ALDC.

Exhaust Valves - Open 48° BLDC. Close at TDC.

Valve Timing Check - Turn crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Install dial indicator so pointer contacts No. 1 intake valve spring retainer parallel to axis of valve stem. Turn No. 1 intake valve adjusting screw one full turn to remove all lash, zero dial indicator and rotate crankshaft clockwise (normal running direction) until valve has lifted .018". Timing on timing tab should read from 12° BTDC to TDC.



6 CYL. VALVE ASSEMBLY

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

►*ALUMINUM ENGINE OILING SYSTEM NOTE:* Same as for Cast Iron Eng. except that oil to main bearings passes through upper main bearing caps, then to bearings.

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Located in pump body.

►*RELIEF VALVE SPRING NOTE:* Three types of springs available. Replace with same color spring, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Indicator light on Instrument panel operated by Oil Pressure Switch, Autolite No. 14272A. On oil pump on right side of block.

Oil Pump: Rotor type. On right side of crankcase.

Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow type. Replace filter element every 4,000 miles, to correspond with oil changes.

Crankcase Ventilation: (Standard Cars) - Filter in filler cap (air intake) and outlet vent tube extending from rocker arm cover to right rear of engine. Wash filler cap in kerosene and re-oil every 5000 miles or more often in dusty areas.

Positive Crankcase Ventilation Cars - Vacuum tube connects outlet breather cap with lower part of throttle body. A ventilation valve is located in outlet vent cap and regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 13 qts. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.

►*FAN-RADIATOR CORE CLEARANCE CAUTION:* Clearance should be ¾"±¼". Use thinner fan spacer, Part No. 2120510 to correct.

Pressure Valve: 14 lb. radiator cap (All Models).

Thermostat: Pellet type. In water outlet connection on cylinder head (160°F) Dodge & Plymouth No. 2129206, (180°F) No. 2129205.

Water Pump: Sealed ball bearing, packless type. No lubrication required.

See "Cooling System" in Chrysler Corp. Special Data.

Pump Removal - Drain cooling system, remove shroud (Air Conditioned Cars), loosen fan belt and idler (Air Conditioned Cars). Remove fan spacer and pulley. Remove retaining bolts and washer and remove pump.

Temperature Gauge: (Dodge) - Constant voltage type with voltage regulator inside gas gauge for instruments.

Dash Unit - Dodge No. 2197060.

Engine Unit - King-Seeley No. 44265.

Temperature Gauge (Plymouth): King-Seeley ("CV") Constant Voltage with separate Voltage Regulator King-Seeley No. 57918.

Dash Unit - King-Seeley No. 57891.

Engine Unit - King-Seeley No. 44265.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Bring engine and transmission to normal operating temperature with parking brake applied. Push all selector buttons in turn to insure fluid distribution, then check fluid level in "N" with engine idling. Maintain fluid level between "Add 1 Pint" and "Full" marks on dipstick. *CAUTION* - Dipstick on 1961 models is 2½" shorter than on 1960 models (do not intermix).

NOTE - If fluid level checked with transmission cold, level should be at "Add 1 pint" mark or slightly below.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, working under car, see "Jacking & Hoisting Precautions" in Miscellaneous Section.*

MODEL IDENTIFICATION

DODGE

Model	Model Identification
Polara	RD1-L

DODGE DART

Seneca	RD4-L
Pioneer	RD4-M
Phoenix	RD4-H

PLYMOUTH

Savoy; Deluxe Suburban	RP2-L
Belvedere; Custom Suburban	RP2-M
Fury; Sport Suburban	RP2-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
5 1 1 2 100001

① - Car Make. 3 Plymouth V8. 5 Dodge & Dodge Dart V8.
② - Model Series. 1 Seneca or Savoy. 2 Pioneer or Belvedere. 3 Phoenix or Fury. 4 Polara. 5 Seneca Station Wagon or Savoy Suburban. 6 Pioneer Station Wagon or Belvedere Suburban. 7 Fury Suburban. 8 Taxi. 9 Police. 0 Fleet.
③ - Model Year. 1 1961.
④ - Assembly Plant. 1 Plymouth (Detroit). 2 Dodge (Detroit). 5 Los Angeles. 6 Delaware. 7 St. Louis. 8 Wyoming. 9 Canada.
⑤ - Beginning vehicle number at each assembly plant

ENGINE NUMBER: (Exc. 318" Engine) - Stamped on boss on top right side of cylinder block just behind water pump. Number (example below) includes identification data.

① ② ③ ④ ⑤
R 36 ... 8 4

① - Year. R 1961.
② - Displacement. 36 361 cu. in., 38 383 cu. in., 41 413 cu. in.
③ - If this space blank, engine is standard. *For identifying marks see below.*
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 4 4th day, etc.

318" Engine: Stamped on front face of left hand cylinder block. Number (example below) includes identification data.

① ② ③
R 318 0001

① - Year. R 1961.
② - Engine Displacement. 318 318 cu. ins.
③ - Beginning sequence number.

►*318" ENGINE NUMBER NOTE: To identify marks following the engine number, see "Engine Number Marks"*

►*ENGINE NUMBER MARKS: Identified as follows:*
"A" - All cylinder bores .020" oversize.
"Maltese Cross" - One or more bearing journals .001" undersize. *See "Connecting Rods" and "Crankshaft"*
"X" and "Maltese Cross" - One or more bearing journals .010" undersize. *See "Connecting Rods" and "Crankshaft" below.*
"♦" - One or more valve lifters .008" oversize. *See "Valve Lifters" below.*
"SP" - Special Police cars. "HP" - High Performance

TUNE-UP

►*HARD COLD WEATHER START CORRECTION (Carburetors with Choke Vacuum Unloader Piston in Air Horn):* Hard starting caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting Carburetor Cleaner, Lacquer Thinner or Alcohol through piston link opening, while operating choke valve to flush out gum formation.

►*HARD STARTING - STALLING IN WET WEATHER CORRECTION:* Caused by moisture entering coil and distributor towers. To correct, install Coil Secondary Cable Package Part No. 2084428 consisting of a cable, nipples and terminals. In this package the distributor nipples are 1.315" long (were 1.19") and terminal terminal nipples are 1.50" and are redesigned neoprene.

►*318" ENGINE (2-BARREL CARB.) HARD START CORRECTION:* Caused by improperly positioned air cleaner. To index air cleaner properly, place loop end of clamp so it is located on right side 2" to rear of center line of air cleaner.

COMPRESSION PRESSURE: 135-165 lbs. (318" & 361"), 150-180 lbs. (383") at 150 RPM (plugs removed, throttle wide open). Maximum variation between cylinders 20 lbs. (318" & 361"), 25 lbs. (383" & 413").

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: 318" .010" Intake, .018" Exhaust, Hot.

361", 383" & 413" - Zero lash, hydraulic lifters. *NOTE* - On High Performance engines with Mechanical Lifters, .016" Intake, .028" Exhaust, COLD.

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with special lubricant, Part No. 1879318). Coil spring should have approximately ¾ turn wrap with manifold heat control in closed position. *RAM MANIFOLD NOTE - Coil should have approximately 182° wrap counterclockwise on right manifold, clockwise on left manifold.*

►*RAM MANIFOLD HEAT CONTROL VALVE NOTE:* Two heat control valves used, one in each cylinder bank exhaust manifold outlet. When valve is closed, exhaust gases are diverted through bypass pipe around hot spot in intake manifold.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - Autolite A42 (318" & 361" with 2-Bbl. Carb.), A32 (All Others). 14 mm. Torque to 30 ft. lbs.

COIL: Autolite No. 200567 or Essex No. 62-160-2 (Std.), No. 62-160-3 (Ram Induction).
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501. 0.6 ohms. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler Own & Autolit. Used as follows:

Engine	Distributor No.
318" 2-Bbl. (Synchro-mesh)	Chrysler 2095647
318" 2-Bbl. (Auto. Trans.)	Chrysler 1838505
318" 4-Bbl. (All Trans.)	Chrysler 1889710
361" 2-Bbl.	Autolite IBP-4005E
361" & 383" (Exc. Ram Ind.)	Autolite IBS-4006F
383" (Ram Induction)	Autolite IBS-4006E
413" (Exc. Ram Ind.)	IBS-4006-F
413" (Ram Induction)	IBS-4006-E

NOTE - "IBS" distributors are double breaker type.
Condenser - Autolite No. 2-32 (Chrysler No. 1818757). Used on all distributors. **Capacity** - .25-.285 mfd.
Contact Point Set - Chrysler No. 1838643 (Chrysler Distr.), Autolite No. 1-47 (IBP), No. 1-43 (IBS).
Breaker Gap - .014-.019".
Cam Angle (Single Breaker) - 27-32° with vacuum line disconnected.
Cam Angle (Double Breaker) - 27-32° (single set of points), 34-40° (both sets operating together).
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance - 2095647

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	270-430	0	540-860
0-2	430	0-4	860
4.5-6.5	800	9-13	1600
10.5-12.5	2300	21-25	4600

Automatic Advanc - 1838505

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	335-565	0	670-1130
0-2	565	0-4	1130
2-4	800	4-8	1600
8-10	2300	16-20	4600

Automatic Advanc - 1889710

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	295-405	0	590-810
0-2	405	0-4	810
3.5-5.5	600	7-11	1200
7.5-9.5	2200	15-19	4400

Automatic Advanc - IBP-4005E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
1	450	2	900
3.5	700	7	1400
10	1875	20	3750
11	2050	22	4100

Automatic Advanc - IBS-4006F

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	350	0	700
8	750	16	1500
12	2050	24	4100

Automatic Advanc - IBS-4006E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	400	0	800
1	440	2	880
5.5	600	11	1200
9	2000	18	4000
10	2400	20	4800

Vacuum Spark Control: Integral type

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Vacuum Advanc - 2095647 & 1838505

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.8-9.2
6.5-9.5	13-19	13
12-15	24-30	17

Vacuum Advance - 1889710

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-6.6
4-7	8-14	9.5
8.5-11.5	17-23	13.2

Vacuum Advance - IBP-4005E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7
1	2	7 1/2
5	10	10 1/8
10	20	14 1/8
11.5	23	16

Vacuum Advance - IBS-4006F

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8 3/8
9	18	14 1/2

Vacuum Advance - IBS-4006E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
1	2	8 5/8
5	10	11 3/8
8	16	13 3/4
9	18	14 1/2

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Nts" in Chrysler Corp. Special Data.*

IGNITION TIMING

Engin	Standard Setting
318" 2-Bbl. (Synchro-mesh)	① 5° BTDC
318" 2 or 4-Bbl. (Auto. Trans.)	① 10° BTDC
361" All Carbs.	① 10° BTDC
383", 413" 1 Carb.	① 7½°
383", 413" Ram Ind.	② 7½°
383", 413" 2 Carb.	③ 7½°

① - At 500 RPM with vacuum line disconnected.

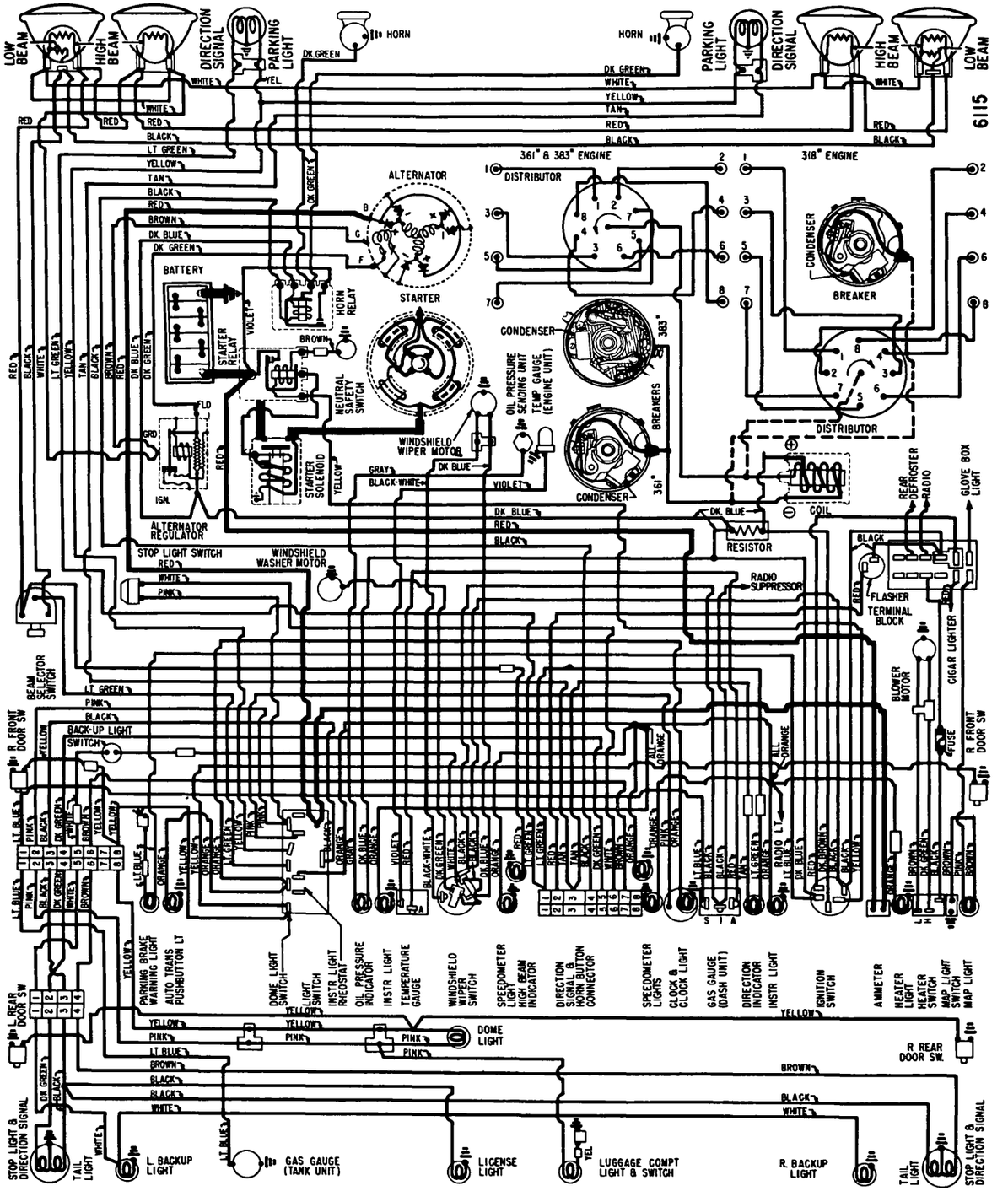
② - Set timing with vacuum line disconnected and engine idling below 600 RPM (transmission in neutral and air conditioning compressor off). After timing correctly set, readjust engine idle speed to 725-750 RPM.

③ - At 600 RPM with vacuum line disconnected.

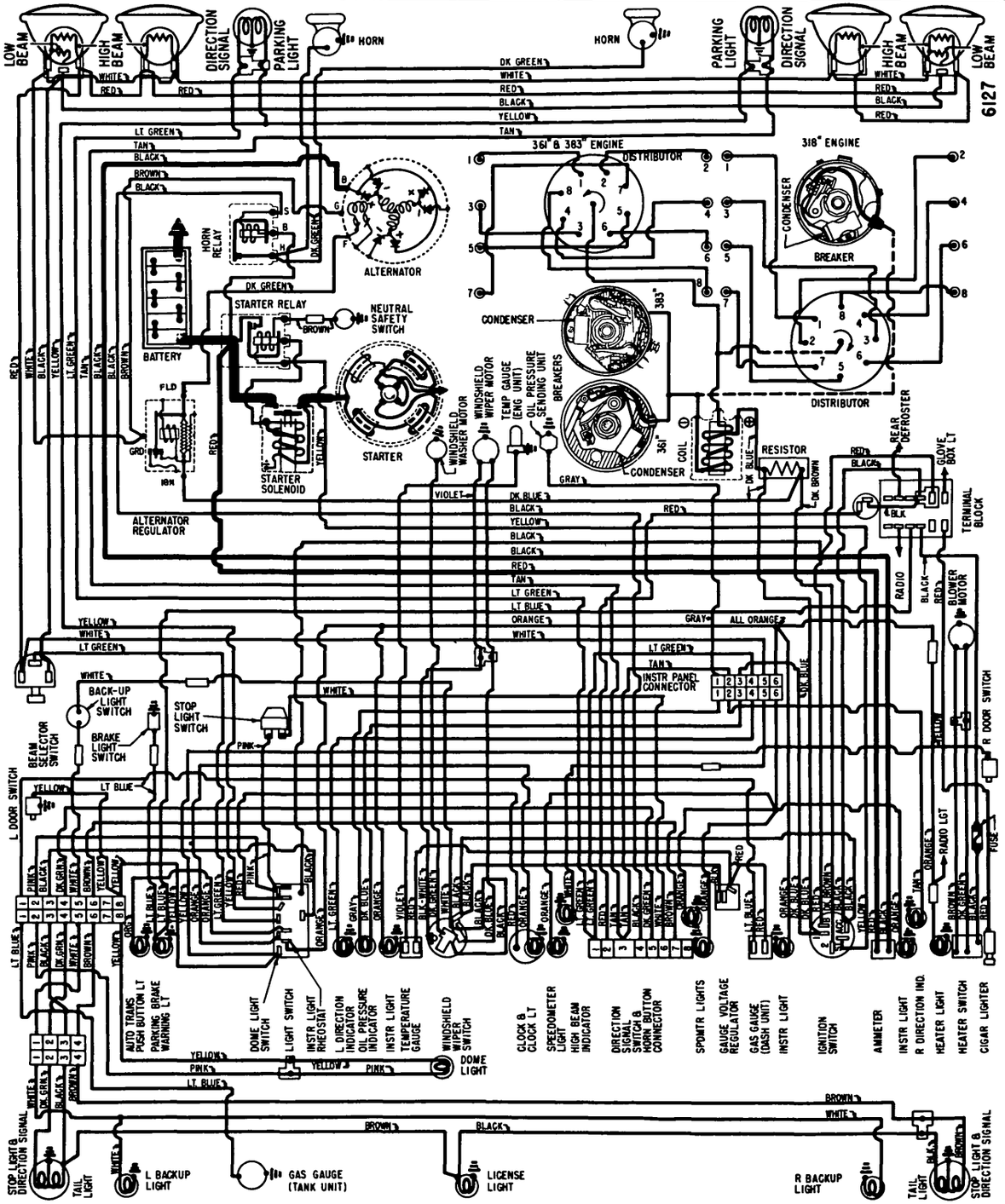
Timing Mark (318") - Graduation marks on crankshaft pulley and pointer on chain case cover. Align proper mark on pulley with pointer.

Timing Mark (361",383",413")- Mark on vibration damper and graduations on indicator on timing chain cover. Align vibration damper mark with proper mark on indicator.

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DODGE & DART V8 WIRING DIAGRAM



PLYMOUTH V8 WIRING DIAGRAM

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CARBURETOR

►*CARBURETOR APPLICATION: Carter and Stromberg carburetors used as follows:*

Engine	Carburetor
318" Std.	One Carter BBD or Stromberg WW 2-Bbl.
318" Power Pack	One Carter AFB 4-Bbl.
361" Dodge Std.	One Stromberg WWC 2-Bbl.
361" Dodge CCV ①	One Carter BBD 2-Bbl.
361" High Performance	One Carter AFB 4-Bbl.
383", 413", High Perf. & Police....	One Carter AFB 4-Bbl.
383", 413" Police (2 Carbs.)	②Two Carter AFB 4-Bbl.
313", 413" High Perf. & Police....	③Two Carter AFB 4-Bbl.

① - With Closed Crankcase Ventilation.

② - Carburetors mounted front & rear on a single manifold.

③ - Ram Induction Manifold.

►*IDLE SETTING CAUTIONS:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars (except Ram Induction), loosen nut on sliding link of carburetor-to-bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut.

THROTTLE LINKAGE ADJUSTMENT (EXCEPT RAM INDUCTION): Loosen locknuts on carburetor throttle rod and on transmission throttle rod. Insert a 3/16" diameter rod 10" long into holes in accelerator shaft brackets and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut. Disconnect accelerator pedal rod at one end and adjust rod to give accelerator pedal angle of 113-115°. Remove 3/16" rod. Make sure carburetor is in slow idle, move carburetor throttle rod rearward against stop and tighten carburetor throttle rod locknut.

THROTTLE LINKAGE ADJUSTMENT (RAM INDUCTION): Bring engine to normal operating temperature with carburetors off fast idle and transmission in "N", then proceed exactly as follows:

1) Loosen locknuts on transmission throttle rod and on bellcrank-to-accelerator shaft rod. Insert a 3/16" diameter rod into holes in accelerator shaft bracket and lever. Move transmission throttle lever forward against its stop and tighten transmission throttle rod locknut.

2) With accelerator pedal disconnected from accelerator shaft rod, adjust length of rod so accelerator pedal is 114° to horizontal measured on flat face of accelerator pedal. Reconnect rod and remove 3/16" diameter rod from accelerator shaft bracket.

3) Loosen locknuts on both right and left carburetor-to-bellcrank rods and back off anti-stall dashpot plunger sufficiently so bellcrank will pivot (hold dashpot pushrod when turning setscrew to prevent damage to diaphragm). Pivot bellcrank so 3/16" diameter rod can be inserted through hole in bellcrank and into locating hole in intake manifold. Make sure choke valves are open, fast idle cams released and throttle valves are closed on both carburetors. Tighten carburetor-to-bellcrank rod locknuts and remove 3/16" diameter rod.

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Now push adjusting link on bellcrank-to-accelerator shaft rod rearward until stop is felt and tighten adjusting link locknut.

4) Start engine and adjust idle speed to 725-750 RPM with engine warm and transmission in neutral.

5) Adjust anti-stall dashpot as follows: Disconnect vacuum tube to anti-stall dashpot and tape open end of tube to prevent air leaks. Anti-Stall plunger will extend and increase engine speed. Adjust plunger length so that engine speed is no higher than 1500 RPM. Reconnect vacuum tube (engine idle speed should return to 725-750 RPM).

CARTER BBD

Carter BBD. Used as follows:

Engine	Carter Carburetor No.
318" Dart & Plymouth (Synchro-mesh)	BBD 2921S
318" Dart & Plymouth (Auto. Trans.)	BBD 2922S
361" Dodge (Closed Crankcase Vent.)	BBD 3132S

NOTE - Dart & Plymouth with Closed Crankcase Ventilation use Stromberg WW (following).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 1/8-1 1/2 turns open (3132S); 1 turn open (2921S, 2922S). With engine at normal operating temperature, adjust idle mixture screws for highest RPM, then turn in until speed drops. Turn out just enough to recover lost engine speed. Readjust idle speed screw for correct engine idle speed.

Idle Speed - 500 RPM Std., 550 RPM (2921S, 2922S), 575 RPM (3132S) Air Cond. with headlights on high beam and carburetor throttle rod locknut loosened, see *"Cautions" above.*

Float Level - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant floats hold float lip firmly against fuel inlet needle (On Car), and with float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 9/32" measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever. On 2921S & 2922S, if connector rod moved to other holes, bowl vent clip must be changed correspondingly.

Fast Idl (2921S, 2922S): 1400 RPM with fast idle adjusting screw aligned with index mark on cam.

Fast Idl (3132S): 1375-1425 RPM with fast idle adjusting screw touching top step of fast idle cam.

Automatic Ch k : "Cross-Over" type. Set at index.

Throttl Linkag Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

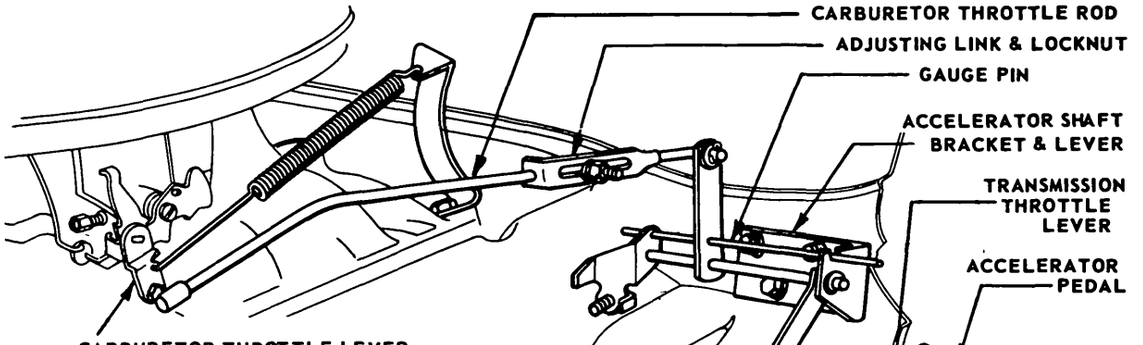
STROMBERG WW 2-BARREL

Stromberg WW. Used as follows:

Engine	Stromberg Code No.
318" Dart & Plymouth (Synchro-mesh)	15-43
318" Dart & Plymouth (Auto. Trans.)	15-44
318" Dart & Plymouth (Closed Crankcase Vent.)Ⓒ	15-45

Ⓒ - All Transmissions.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*



CARBURETOR THROTTLE LEVER

Idle Setting - 1¼ turns open. With engine at normal operating temperature, adjust idle mixture screws for highest RPM, then turn mixture screws in until speed starts to drop. Turn screws out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idle Speed - 500 RPM (550 RPM with Air Cond.), with headlights on high beam and carburetor throttle rod locknut loosened, see *"Cautions" above.*

Float Level - With main body inverted and float hanging freely and float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to top of float at center should be 7/32" measured with Gauge 73725. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever. If connector rod moved to other holes, bowl vent clip must be changed correspondingly.

Fast Idle: 1250 RPM with fast idle adjusting screw contacting top step of fast idle cam.

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW (Buick, Dodge, Plymouth) Carburetors" in Carburetion Section.*

STROMBERG WWC 2-BARREL

Stromberg WWC, Code 3-188A (361" Eng., Dodge, All Trans.). *NOTE - Cars with Closed Crankcase Ventilation use Carter BBD (above).*

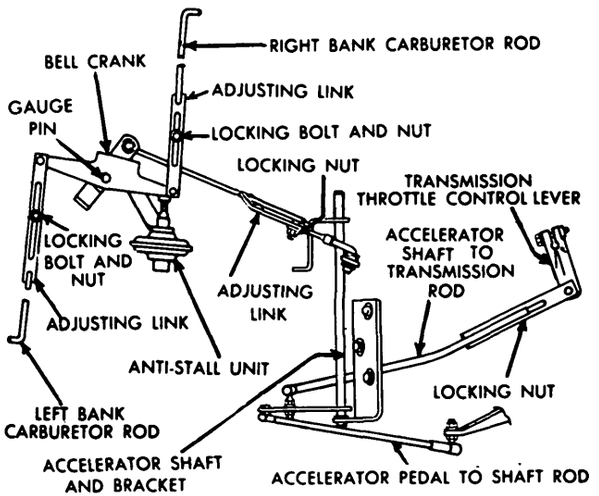
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 1/2-5/8 turns open. With engine at normal operating temperature, adjust idle mixture screws for highest RPM, then turn mixture screws in until speed starts to drop. Turn screws out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idle Speed - 500 RPM (550 RPM with Air Cond.) with headlights on high beam and carburetor throttle rod locknut loosened, see "Cautions" above.

Float Level - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant floats holds float lip firmly against fuel inlet needle (On Car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to top of float at center should be

THROTTLE LINKAGE (EXC. RAM INDUCTION)



THROTTLE LINKAGE (RAM INDUCTION)

1/8" or use Gauge 73725. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install connector rod in center hole of pump arm.

Fast Idle: 1375-1425 RPM with fast idle adjusting screw contacting top step of fast idle cam.

Automatic Ch k : "Cross-Over" type. Set 1 notch rich.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Throttle Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Stromberg WWC (Dodge) Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Single Carburetor)

Engine	Carter Carburetor No.
318" Power Pack (Auto. Trans.)	3103S
318" Power Pack (Auto. Trans.) CCV Ⓒ	3131S
361" High Perf. (Synchro-mesh)	3105S
361" High Perf. (Auto. Trans.)	3106S
361" High Perf. (All Trans.) CCV Ⓒ	3140S
383" High Perf. (All Trans.) ②	3152S
383" Police Special (All Trans.)	2968S
383" High Perf. & Police (All Trans.) CCV Ⓒ	3133S
383", 413" Optl.	AFB-3113S
413" High Perf.	AFB-3108S

Ⓒ - With Closed Crankcase Ventilation.
② - Not used on Plymouth.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - For initial idle screw setting, see table below. With engine at normal operating temperature, adjust idle mixture screws for highest RPM, then turn mixture screws in until speed starts to drop. Turn screws out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idle Mixture Screw Setting

Carburetor	Idle Screw Opening
3103S, 3131S	¾-2¾ turns
3105S, 3106S, 3140S, 3152S, 3133S	¾-2¼ turns
2968S	⅛-1¾ turns

Idle Speed - 500 RPM (550 RPM with Air Cond.) with headlights on high beam and carburetor throttle rod locknut loosened, *see "Cautions" above.*
Throttle Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Ram Induction With Two Carburetors)

Carter AFB-2903S (All Rams), AFB-3084S (Short Ram) 383", 413" Eng. Two carburetors used, one each side of engine.

►*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor feeds left bank cylinders. LEFT carburetor feeds right bank cylinders.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*
Throttle Linkage & Carburetor Interconnecting Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Front & Rear Carburetors)

Carter AFB, No. 2790S (Front), 2791S (Rear) used in Plymouth 383" Engine Special Police Package.

Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane. Correct either bent or damaged levers. *NOTE* - Install interconnecting rod with slotted end connected to **lower hole** in **front** carburetor throttle lever, and end connected at **top hole** of **rear** carburetor throttle lever. Hold **rear** carburetor throttle wide open (choke in full open position) and adjust slotted end of rod so **front** carburetor throttle valves will also be in wide open position. Tighten locknut and check operation. Interconnecting rod must rotate slightly on pivots without bind in any position.

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*
Throttle Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2999GS. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.
Fuel Filter: Disposable paper type, located in fuel line between pump and carburetor. Replace every 10,000 miles.
Gasoline Gauge: (Dodge): Constant Voltage type with voltage regulator in gauge.
Dash Unit - Dodge No. 2197059.
Tank Unit - King-Seeley No. 59200 (Pass.), 59210 (Sub.), 59205 (Sp. Tank).
Gasoline Gauge (Plymouth): King-Seeley Electric "CV" (Constant Voltage) type with separate Voltage Regulator King-Seeley No. 57918.
Dash Unit - King-Seeley No. 57890.
Tank Unit - King-Seeley No. 59200 (Pass.), 59210 (Sub.), 59205 (Sp. Tank).
Air Cleaner: Paper element type, clean every 5,000 miles, replace element every 15,000 miles. More frequent servicing may be necessary under severe operation.

►*INSTALLATION CAUTION: See 318" (2-Bbl. Carb.) Hard start correction, under "Tune-Up" above.*

►*CLEANING CAUTION:* Remove filter element from housing. Blow compressed air gently from inside out (2" away) to remove dust particles. DO NOT tap these filters to loosen dirt and DO NOT immerse in any fluid.
Fuel Filter: Disposable type in carburetor inlet line. Replace every 10,000 miles or if clogged.
Auto Pilot (Polaris): Automatic speed control unit. *See "Auto Pilot" in Carburetion Section.*

BATTERY

318" - Autolite 11-HS-50 or Willard MB-24-50 or Gould 11B-OE-50. 12 volt, 9 plate, 50 ampere capacity (20 hr. rate).
361", 383", 413" (Exc. High Perf. & Police) - Autolite 11-HS-59B or Willard MB-24-59 or Gould 11B-OE-59. 12 volt, 11 plate, 59 ampere hour capacity (20 hr. rate).
383", 413" High Perf. & Police - Autolite 12-HBR-70B or Willard MB-27-70R. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Optional (All Eng. except High Perf. & Police) - Autolite 12-HB-70B or Willard MB-27-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.

STARTER

Chrysler Own No. 1889100 (318"), 1889200 (361, 383" & 413"). Armature - No. 1889079 (All Engins).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800 Min.	11.0	78 Max.
8.5 ft. lbs.	Lock	4.0	350

Starting Switch: Solenoid, Dodge & Plymouth No. 1889146 mounted on starter and controlled by Ignition & Starter Switch, Dodge & Plymouth No. 2097628. Neutral Safety Switch, Dodge & Plymouth No. 1704283, mounted on transmission on automatic transmission cars.
Neutral Safety Switch Adjustment - *See "TorqueFlite Six", "PowerFlite" & "TorqueFlite" in Transmission Section.*

ALTERNATOR

Chrysler Own. Three-phase A.C. unit with full wave rectifier. Used as follows:

Model	Chrysler No.
All Engines, Std.	2095060
All Engines, Air Cond.	2095100
All Engines, Sp. Equip. H.D.	2095425

Rotation - Clockwise at drive end.
Rated Output - 35 amperes (2095060), 40 amperes (2095100 & 2095425).
Field Coil Draw - 2.38-2.75 amps. Max., at 12 volts (Alternator turned by hand), 2.97-3.42 amps. Min., at 15 volts, 70°F & 750 RPM.
►*OTHER DATA: See "Chrysler Alternators & Regulators" in Electrical Section.*
Belt Adjustment: Measure deflection of belt midway between pulleys under 5 lbs. load.

Belt	318" Engine New	318" Engine Used	361", 383", 413" Engs. New	361", 383", 413" Engs. Used
Altnr. No. A.C.	5/32"	1/4"	5/32"	1/4"
Altnr. A.C.	1/8"	3/16"	1/4"	3/8"
Idler Ⓒ	3/32"	3/16"	1/16"	1/8"

Ⓒ - Water Pump Idler Pulley on Air Cond. cars.

REGULATOR

Chrysler Own No. 2095700 (All Models). Field control type. No Cutout Relay or Current Regulator.
Air Gap - .048-.052". **Point Gap** - .015"±.001".
Voltage Setting - 13.7-14.3 volts at 70°F.
►*OTHER DATA: See "Chrysler Alternators & Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.
Electronic Rear View Mirror: *See Electrical Section.*
Lighting Switch Removal: Disconnect battery. Pull switch knob out and rotate until flat on shaft is down. Push knob in all the way. Disconnect wires, press spring-

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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loaded release button on top center of switch, and pull shaft and knob out of switch. Remove switch mounting bezel on instrument panel and remove switch.

Stop Light Switch Location: Hydraulic type (early cars) located on forward end of hydraulic master cylinder. Mechanical type (later cars) mounted on brake pedal lever bracket.

Adjustment (Mechanical Type) - *NOTE* - Switch bracket mounting hole on brake pedal lever bracket is slotted for switch position adjustment. Adjust position of switch in slotted hole to "REAR" for Std. brakes, to "FRONT" for Power brakes.

Gauge Housing Assembly (Dodge): Removal - 1) Disconnect positive battery cable, tape jacket area with masking tape and remove eight instrument cluster to panel screws.

2) Raise panel slightly at center to release overlap (at center of gauge housing) and carefully pull gauge housing from panel recess by tilting cluster down to reach lamp sockets and connectors.

3) Disconnect wire connectors and lamp sockets and remove gauge housing.

Installation - Reverse removal procedure.

Speedometer (Dodge): Removal - 1) Remove gauge housing, see above, then remove switch trim plate screw and remove trim plate and heater push button.

2) Remove transmission push button trim plate screws and remove trim plate and push buttons.

3) Work through gauge housing opening to remove two push button bracket and three heater switch and control bracket-to-upper instrument housing screws. *NOTE - DO NOT remove transmission push button or heater bezel.*

4) Remove five upper housing-to-lower housing screws and remove upper housing, speedometer and transmission push button and heater switch bezels as an assembly, by raising assembly straight up until bottom of speedometer clears lower housing. Remove assembly, then remove speedometer to upper housing screws and remove speedometer.

Installation - Reverse removal procedure.

Cluster & Speedometer (Plymouth): Removal - 1) Disconnect negative battery terminal and remove four speedometer and instrument panel cover and base screws. *NOTE - Two screws are located at front face of instrument cluster bezel and two screws attach speedometer and instrument panel cover to speedometer and instrument panel at front corners of panel and base (one each side).* To remove panel cover, raise front edge slightly to clear instrument cluster and carefully push the panel toward windshield to disengage retaining spring clips from speedometer and instrument panel base.

2) Disconnect high beam indicator wire, ammeter wires, and lamp bulb and oil pressure light socket and bulb.

3) Remove four speedometer and instrument cluster and bezel to speedometer and instrument panel base screws. *NOTE - Two screws are located at rear of instrument clusters (one each side) and two screws attach cluster bezel to base at front of bezel. Remove cluster and bezel as an assembly.*

4) Disconnect speedometer cable and lamp connectors at speedometer head. Remove four speedometer to speedometer and instrument panel base screws and remove speedometer assembly.

Installation - Reverse removal procedure.

CIRCUIT BREAKERS: 22.5 Amper - Headlights & High Beam Indicator. In headlight switch.

15 Ampere - Parking, Tail, Stop, Instruments & Interior lights. In headlight switch.

6 Ampere - Variable speed windshield wiper & back-up lights. On wiper switch.

5 Ampere - Single speed windshield wiper & back-up lights. On wiper switch.

FUSES: 20 Ampere - Heater. In feed wire.

7.5 Ampere - Radio. In feed wire.

1 Ampere - Clock. In feed wire.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 318", 361", 383" & 413" engines of same design used previously.

Engine	Bore	Stroke	Displacement
318"	3.910"	3.310"	318 cu. in.
361"	4.125"	3.375"	361 cu. in.
383"	4.250"	3.375"	383 cu. in.
413"	4.180"	3.750"	413 cu. in.

Dart V8 & Plymouth V8

Engine	Compr. Ratio	Rated HP	Developed HP
318" 2-Bbl. (Std.)	9.0-1	48.9	230 at 4400 RPM
318" 4-Bbl. (Optl.) ①	9.0-1	48.9	265 at 4400 RPM
318" 4-Bbl. (Optl.) ②	9.0-1	48.9	260 at 4400 RPM

Dodge Polara V8

361" 2-Bbl.	9.0-1	54.3	265 at 4400 RPM

High Performance & Police Options (All Cars)

361" 4-Bbl.	9.0-1	54.3	305 at 4800 RPM
383" 4-Bbl.	10.0-1	57.8	325 at 4600 RPM
383" Ram Ind.	10.0-1	57.8	330 at 4800 RPM
338" 2 Carbs. ③	10.0-1	57.8	330 at 5200 RPM
383" 2 Carbs. ④	10.0-1	57.8	340 at 5000 RPM
413" 4-Bbl.	10.0-1	57.8	350 at 4600 RPM
413" 2 Carbs. ④	10.0-1	57.8	375 at 5000 RPM
413" 2 Carbs. ③	10.0-1	57.8	375 at 5200 RPM

① - Dart. ② - Plymouth. ③ - Runner (Front & Rear).
④ - Short Ram.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL (318" Engine): Remove dipstick, drain crankcase and disconnect steering linkage from steering arm. Remove starter, exhaust crossover pipe, and converter dust shield. Disconnect front engine mounts and raise engine about 1¼". Remove oil pan bolts and remove pan, turning sideways to clear crossmember. *NOTE* - When installing, bottom surface of oil strainer must be parallel to lower machined surface of cylinder block.

OIL PAN REMOVAL (361", 413" Eng.): Disconnect battery. Raise car and disconnect steering linkage from idler and steering arms. Remove outlet breather pipe and disconnect exhaust pipe branches from both manifolds. Remove exhaust pipe. Drain crankcase and remove converter dust shield. Remove oil pan bolts and remove pan, turning counterclockwise to clear oil screen and suction pipe. *NOTE* - When installing, bottom surface of oil strainer must be on a horizontal plane with machined surface of cylinder block.

PISTONS

Aluminum alloy, elliptically turned, tin-plated, thermally controlled by steel band (318"), steel struts (361", 383", 413").

►*CYLINDER BORE OVERSIZE NOTE:* Letter "A" within engine number indicates that cylinder bores are .020" Oversize.

Weight - 20.9 ozs. (318"), 25.3 ozs. (361"), 27.2 ozs. Standard, 27.5 ozs. Optional (383", 413").

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance (318") - .0005-.0015" on thrust side at top of skirt. With .0015" x ½" feeler inserted between cylinder wall and piston at thrust face, pull to withdraw feeler should be 5-10 lbs. **Clearance (361", 383", 413")** - .0005-.0010" between thrust face of piston and cylinder wall, measured at top of skirt on piston and halfway down cylinder wall, crosswise to engine.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders, 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders, 2-4-6-8). *See Rod Installation.*

Replacement Pistons: Furnished Std., .005", .020" & .040" Oversize with fitted pins.

PISTON PIN

318" Engine - Floating type with lock ring at each end.

361", 383" & 413" - Piston pin is tight press fit in connecting rod and special removal and installation procedures required. Piston pins furnished with new pistons.

Diameter - .9842" (318"), 1.0935-1.0937" (361", 383" & 413").

Length - 2.995" (318"), 3.555-3.575" (361", 383", & 413").

Clearance in Piston (318") - .0000-.0004" (selective). Thumb press fit at 70°F.

Clearance in Piston (361", 383" & 413") - .00045-.00075" Light thumb press fit at 70°F.

Clearance in Rod (318") - .0001-.0004" (selective). Thumb press fit at 70°F.

Clearance in Rod (361", 383", 413") - .0007-.0012" interference fit.

Piston Pin Removal & Installation (361", 383", 413") - *See "Piston Pins" in Chrysler Corp. Special Data.*

Replacement Pins: Std. .003", .008" Oversize (318"). Furnished only with new pistons (361", 383", 413").

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	①	.0015-.0030"
Oil (3)	.1860-.1865"	①	.0010-.0030"

① - .010-.020" (318"), .013-.025" (361", 383" & 413").

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Installing Rings: Install compression rings with "Top" mark toward top of piston.

Replacement Rings: Furnished for oversize ranges of: Std. to .009", .020" to .029", .040-.049".

CONNECTING ROD

Length (Center-to-Center) - 6.123" (318"), 6.36" (361" & 383"), 6.77" (413").

Weight - 25.6 ozs. (318"), 28.6 ozs. (361" & 383"), 29.8 ozs. (413").

Crankpin Journal Diameter - 2.124-2.125" (318"), 2.374-2.375" (361", 383" & 413").

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE):* See CRANKSHAFT below.

Lower Bearing - Removable precision type. Bi-metal Grid (318"), Lead base babbitt on steel (361", 383" & 413").

Clearance - .0005-.0015". Wear limit .0025". All Engines.

Sideplay - .006-.014" (318"), .009-.017" (361", 383" & 413"). Total for both rods.

Installing Rods: With pistons correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.

Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

Journal Diameter - 2.4995-2.5005" (318"), 2.6245-6255" (361" & 383"), 2.75" (413").

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.001" UNDERSIZE** - Indicated by "Maltese Cross" within engine number. **.010" UNDERSIZE** - Indicated by "X" and "Maltese Cross" within engine number. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

Bearings - Removable precision type. Tin based babbitt on steel (No. 3 thrust bearing), lead based babbitt on steel (Others).

Clearance - .0005-.0015". Wear limit .0025" All Engines.

Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves of any bearing are not interchangeable. No. 3 bearing is not interchangeable with other bearings. On 318" engine, No. 5 bearing is not interchangeable with other bearings.

End Thrust: Taken by flanged No. 3 (center) main bearing.

Endplay - .002-.007".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

CAMSHAFT

►*CAMSHAFT USAGE NOTE:* Various camshafts used depending on carburetion, lifters or other equipment. *See "Valves" and "Valve Timing" below for lift, springs, and valve timing specifications.*

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.5605-1.5615" (318"), 1.748-1.749" (361",383", & 413").

Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.5625-1.5635" (318"), 1.750-1.751" (361",383" & 413").

Bearings - Removable, lead base babbitt on steel.

Clearance - .001-.003". Wear limit .005".

End Thrust (318"): Taken by thrust plate behind camshaft sprocket hub. **Endplay** - .002-.006". Wear limit .010".

End Thrust (361", 383" & 413"): Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain (318"): Width 1.02". **Pitch** .375". **Length** 68 links.

Timing Chain (361",383" & 413"): Width .88". **Pitch** .50" **Length** 50 links.

Camshaft Setting: Marks on sprockets adjacent and in line with straightedge across shaft centers.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

318" Engine

Valve	Head Diameter	Stem Diameter	Length
Intake	1.844"	.372-.373"	4.60"
Exhaust	1.563"	.371-.372"	4.54"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	③ .001-.003"
Exhaust	45°	②	④ .002-.004"

316", 383" & 413" Engines

Valve	Head Diameter	Stem Diameter	Length
Intake	2.08"	.372-.373"	4.87"
Exhaust	1.60"	.371-.372"	4.89"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	⑤	③ .001-.003"
Exhaust	45°	⑤	④ .002-.004"

① - .380" (2-Bbl. Carb.), .400" (Pwr. Pkg.).
② - .386" (2-Bbl. Carb.), .406" (Pwr. Pkg.).
③ - Wear limit .004". ④ - Wear limit .006".
⑤ - .389" All valves (361" 2-Bbl. Carb. Hydr. Lifters). .430" All Valves (361", 383", 413" All 4-Bbl. & Hydr. Lifters).
.446" Int., .458" Exh. (361", 383", 413" 4-Bbl. Carbs., Std. Man., or Long Ram, Mech. Lifters).
.448" Int., .454" Exh. (383", 413", 4-Bbl. Carbs., Short Ram, Mech. Lifters).

Valve Seat Width - .060-.085" Intake, .040-.060" Exhaust.

Valve Stem Oil Seal - Cup type seals used on all intake valves (All engines), on exhaust valves (361", 383" & 413" engines only).

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylindrical gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

Valve Springs: Damper springs used inside all valve springs on High Perf. & Special Police Packages.

Spring Specifications - 318" Engine

Valve	Pressure	Length
Closed	78-88 lbs.	1 11/16"
Open	170-184 lbs.	1 5/16"

Spring Specifications - 361" (2-Bbl.)

Valve	Pressure	Length
Closed	95-105 lbs.	1.86"
Open	187-203 lbs.	1.47"

①Spring Specifications - 361", 383" & 413" (High Perf. & Sp. Police)

Valve	Pressure	Length
Closed	100 lbs.	1.86"
Open	195 lbs.	1.47"

① - Includes damper.

Spring Free Length - 2.34" (361", 383" & 413").

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 11/16" (318"), 1 57/64" (361", 383" & 413"), install a 1/16" spacer under spring to bring height within limits of 1 5/8-1 11/16" (318"), 1 53/64-1 57/64" (361", 383" & 413").

►*VALVE SPRING LOAD CAUTION:* Hydraulic valve lifter "Fill-up" will strict engine speed and cause valves to burn if spring loads are not maintained.

Spring Installation (361", 383", 413"): Install all springs with closed coil end toward cylinder head.

►*CAUTION:* Spring ends must be square within 1/16" (all engines).

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005" OS.), C-3430 (.015" OS.), C-3427 (.030" OS.) to ream guides in progressive steps.

►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (318" Eng.):* "I" or "E" on boss above nearest appropriate valve guide indicates that valve stem is .005" Oversize.

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

Hydraulic Valve Lifters: Used on all 361", 383" & 413" engines. *NOTE* - Mechanical lifters also used on 361", 383" & 413" engines with one 4-Bbl. Carb., 383" & 413" with two 4-Bbl. Carbs. and either "Runner" or "Short Ram" Manifold.

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicated that lifters are .008" Oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Diameter - .9040-.9045". **Clearance** - .0005-.0018".

Replacement Lifters - Furnished Std. & .001", .008", & .030" Oversize.

Lifter Overhaul & Testing - *See "Valve System" in Chrysler Corp. Special Data.*

Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

①Valve Timing Specifications

(318" Engine With 2-Bbl. Carb.)

Intake Valves - Open 17° BTDC. Close 47° ALDC.
Exhaust Valves - Open 55° BLDC. Close 9° ATDC.

(318" Engine With 4-Bbl. Carb.)

Intake Valves - Open 13° BTDC. Close 55° ALDC.
Exhaust Valves - Open 51° BLDC. Close 17° ATDC.

(361" Engine With 2-Bbl. Carb.)

Intake Valves - Open 15° BTDC. Close 57° ALDC.
Exhaust Valves - Open 57° BLDC. Close 15° ATDC.

361", 383", 413" Engines With One 4-Bbl. or 2 Carbs. Less Ram Induction

Intake Valves - Open 24° BTDC. Close 64° ALDC.
Exhaust Valves - Open 64° BLDC. Close 24° ATDC.

383", 413" Engines With Ram Induction & Mechanical Lifters

Intake Valves - Open 20° BTDC. Close 68° ALDC.
Exhaust Valves - Open 60° BLDC. Close 28° ATDC.

383", 413" Engines With Ram Induction & Hydraulic Lifters

Intake Valves - Open 25° BTDC. Close 79° ALDC.
Exhaust Valves - Open 74° BLDC. Close 30° ATDC.

① - With valve train solid.

Valve Timing Check (318"): Rotate crankshaft until No. 6 exhaust valve is closing and the No. 6 intake valve is opening. Install a dial indicator on No. 1 intake valve so indicator pointer contacts spring retainer as nearly perpendicular as possible. Turn No. 1 intake valve adjusting screw in one full turn. Adjust indicator to zero. Turn crankshaft clockwise until valve has lifted .033" (2-Bbl.), .024" (4-Bbl.). Timing on timing indicator should read from 10° BTDC to 2° ATDC.

Valve Timing Check (361", 383", 413"): Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so pointer contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted .017" (361" with 2-Bbl. Carb.) .025" all other engines. Timing on timing indicator should read 10° BTDC to 2° ATDC. *CAUTION* - Remove spacer before turning crankshaft any further in normal direction.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-65 lbs. at 40-50 MPH.
Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Warning light on instrument panel operated by Oil Pressure Switch Part No. 2256300 (King-Seeley No. 44265).

Oil Pump (318"): Mounted on rear main bearing cap. Rotor type with strainer mounted on pump body. Strainer must be installed parallel with bottom of cylinder block.

Oil Pump (361",383",413"): Rotor type mounted on cylinder block at lower left front side of engine. **Pump Overhaul (All Pumps)** - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter (318"): Partial flow type. Replace filter element every 4000 miles to coincide with engine oil change.

Oil Filter (361",383",413"): Full-flow disposable type. Replace filter element every 4000 miles to coincide with engine oil change.

►*OIL FILTER REPLACEMENT CAUTION (361", 383", 413"):* Use only Filter Element Part No. 1851658 for service replacement. Before installing, make sure that drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base.

►*OIL FILTER INSTALLATION CAUTION (361", 383", 413"):* Screw new filter on base until gasket contacts base. Tighten ½-turn additional by hand. DO NOT overtighten.

Crankcase Ventilation (Standard Cars): Filter element in crankcase filler cap and breather tube in right valve rocker arm cover. Clean filter in filler cap every 5000 miles or sooner under heavy dust conditions.
Positive Crankcase Ventilation Cars - Breather tube replaced by tube connecting breather tube with lower part of carburetor throttle body. Ventilation valve located in outlet vent cap regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 20 qts. (318"), 16 qts. (361", 383" & 413"). Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.

►*FAN-RADIATOR CORE CLEARANCE CAUTION:* Clearance should be ¾"-1¼". Use thinner fan spacer, Part No. 2120510 to correct.

Pressure Valve: 14 lb. radiator cap. (All Models).

Thermostat: Pellet type. In water outlet connection on cylinder head. Starts to open at 177-182°F.

Water Pump: Sealed ball bearing, packless type. No lubrication required.

See "Cooling System" in Chrysler Corp. Special Data.
Pump Removal - Drain cooling system, remove shroud (Air Conditioned Cars), loosen fan belt and idler (Air Conditioned Cars). Remove fan spacer and pulley. Remove retaining bolts and washer and remove pump.

Fluid Fan Drive: Used on air conditioned cars.

Temperature Gauge (Dodge): Constant voltage type with voltage regulator inside gas gauge for instruments.
Dash Unit - Dodge No. 2197060.
Engine Unit - King-Seeley No. 44265.

Temperature Gauge (Plymouth): King-Seeley "CV" (Constant Voltage) type with separate Voltage Regulator King-Seeley No. 57918.
Dash Unit - King-Seeley No. 57891.
Engine Unit - King-Seeley No. 44265.

LUBRICATION

POWERFLITE & TORQUEFLITE TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 10,000 miles or 12 months. Use only Automatic Transmission Fluid Type "A", Suffix "A".
Checking Fluid Level - Bring engine and transmission to normal operating temperature and with parking brake applied, push selector buttons slowly returning to "N" position. With engine idling, check level on dipstick. Maintain fluid level at (or slightly below) "F" mark. If checking fluid level with transmission cold, level should be at (or slightly below) "Add One Pint" mark on dipstick. DO NOT OVERFILL.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

DODGE LANCER

Body Style	Series 170	Series 770
2-Door Sedan	RW1-L-21	
2-Door Hardtop		RW1-H-23
4-Door Sedan	RW1-L-41	RW1-H-41
4-Door Station Wagon	RW1-L-45	RW1-H-45

VALIANT

Body Style	Series V100	Series V200
2-Door Sedan	RV1-L-21	
2-Door Hardtop		RV1-H-23
4-Door Sedan	RV1-L-41	RV1-H-41
4-Door Station Wagon	RV1-L-45	RV1-H-45

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 3 1 1 100001

① - Car Make. 1 Valiant. 7 Lancer.
② - Model Series. 1 2 or 4-Door Sedan (Series 170 & V100). 3 2-Door Hardtop or 4-Door Sedan (Series 770 & V200). 5 Station Wagon (Series 170 & V100). 7 Station Wagon (Series 770 & V200). 8 Taxi. 9 Police. 0 Fleet.
③- Model Year. 1 1961.
④ - Assembly Plant. 1 Plymouth (Detroit). 2 Dodge (Detroit). 5 Los Angeles. 6 Delaware. 7 St. Louis. 8 Wyoming. 9 Canada.
⑤ - Beginning vehicle number at each assembly plant regardless of car make or model.

ENGINE NUMBER: Stamped on right side of block below cylinder head opposite No. 1 cylinder. Number (example below) includes identification data.

① ② ③ ④ ⑤
R 17 ... 8 1

① - Year. R 1961.
② - Displacement. 17 170 cu. ins. 22 225 cu. ins. (Cast Iron). AR22 225 cu. ins. (Aluminum).
③ - If this space blank, engine is standard. *For identifying marks see below.*
④ - Month Assembled. 8 August, etc.
⑤ - Day Assembled. 4 4th day, etc.
►*ENGINE NUMBER MARKS: Identified as follows:*
"A" - All cylinder bores .020" oversize.
"Maltese Cross" - One or more bearing journals .001" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"X" and "Maltese Cross" - One or more bearing journals .010" undersize. *See "Connecting Rods" and "Crankshaft" below.*
"♦" - One or more valve lifters .008" oversize. *See "Valve Lifters" below.*

TUNE-UP

►*HARD COLD WEATHER START CORRECTION (Carburetors with Choke Vacuum Unloader Piston in Air Horn):* Hard starting caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting Carburetor Cleaner, Lacquer Thinner or alcohol through piston link opening, while operating choke valve to flush out gum formation.
►*HARD STARTING & STALLING IN WET WEATHER CORRECTION:* Caused by moisture entering coil and distributor towers. To correct, install Coil Secondary Cable Package Part No. 2084428, consisting of cable, nipples and terminals. In this package the distributor nipples are 1.315" long (were 1.19") and terminal nipples are 1.50" and redesigned neoprene.
►*POOR FUEL ECONOMY OR PERFORMANCE:* Caused by use of incorrect gasket between carburetor and intake manifold or incorrect installation of correct gasket. Use Gasket Part No. 2205582 with single small hole to left front of car

COMPRESSION PRESSURE: 130-160 lbs. at 150 RPM (plugs removed). Maximum variation between cylinders 20 lbs.
VACUUM READING: 19.5" at idle speed.
VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust, Hot.
►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal operating temperature, remove rocker arm cover and operate engine for additional 5 minutes at 500 RPM before making adjustments.
MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud.
CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: .035".
Spark Plugs - Autolite AG-52 (Std.), AG-32 (Hyper Pack), AG-82 (Taxi). "Long Reach" 14mm. type. Plugs are installed in aluminum sleeves which serve as plug gaskets. Torque to 30 ft. lbs.
COIL: Autolite No. 200567 or Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501. 0.6 ohms. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler Own. No. 1889750 (170" Eng.), No. 2095270 (225" Eng.).

Condenser - Chrysler 1818757. **Capacity** .25-.285 mfd.
Contact Point Set - Chrysler No. 1838643.
Breaker Gap - .017-.023".
Cam Angle - 36-42°.
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1889750

Degrees Start	Distr. RPM	Degrees Eng.	RPM
	325-475	0	650-950
0-2.5	475	0-5	950
6-8	820	12-16	1640
11.5-13.5	1925	23-27	3850

Automatic Advance - 2095270

Degrees Start	Distr. RPM	Degrees Eng.	RPM
	250-450	0	500-900
0-2	450	0-4	900
5.5-7.5	1000	11-15	2000
10.5-12.5	2200	21-25	4400

Vacuum Spark Control: Integral type.

Vacuum Advance - 2095270

Distr. Degrees Start	Eng. Degrees	Vacuum (" of Hg)
	0	4.9-6.9
4.5-7	9-14	9.5
7.8-10.3	15.6-20.6	12

Vacuum Advance - 1889750

Distr. Degrees Start	Eng. Degrees	Vacuum (" of Hg)
	0	4.7-7.1
5.5-8	11-16	11
9.5-12.5	19-25	14.5

IGNITION TIMING

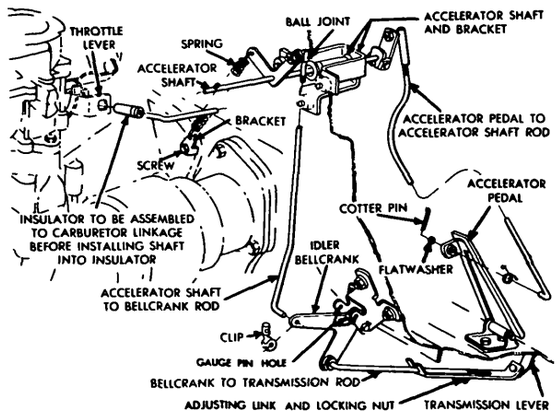
Engine	Std. Ignition Setting
170" & 225" Std. Synchro-mesh	2½° BTDC
170" TorqueFlite	2½° BTDC
225" TorqueFlite	5° BTDC
170" & 225" Hyper Pack	10° BTDC

NOTE - Set timing with distributor vacuum line disconnected and engine idling at 500 RPM (700 RPM on Hyper Pack) with transmission in Neutral.
Timing Mark - Timing tab on chain case cover marked "O" and "10" with 5° marks before and after "10". Align timing mark on vibration damper with correct mark on tab.

CARBURETOR

►*CARBURETOR APPLICATION: On Carter BBS single barrel carburetor used (Std.); One Carter AFB 4-Bbl. carburetor used on Hyper Pack.*
►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars unsnap ball joint connection at accelerator shaft bellcrank (Lancer), loosen

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LANCER THROTTLE LINKAGE

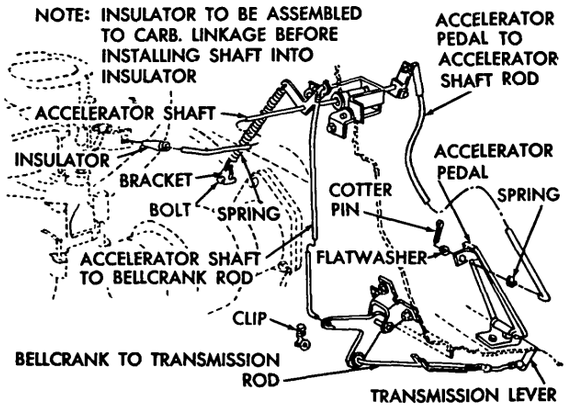
See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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sliding link of bellcrank-to-transmission rod (Valiant) so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, screw ball joint up or down until ball on bellcrank will mate exactly with socket (Lancer), tighten sliding link locknut (Valiant).

THROTTLE LINKAGE ADJUSTMENT (LANCER): Loosen locknut on sliding link at idler bellcrank-to-transmission rod and unsnap ball joint connection of accelerator shaft rod at accelerator shaft bellcrank. Insert a 3/16" diameter rod through holes in idler bellcrank bracket and lever, move transmission lever forward against transmission internal stop and tighten sliding link locknut. Remove 3/16" rod. Adjust accelerator shaft-to-bellcrank rod by rotating ball joint socket so socket will mate exactly with ball (pull upward on rod to take up all freeplay in linkage). Snap ball joint connection together. Unsnap accelerator pedal-to-accelerator shaft bellcrank rod and rotate threaded end of rod to obtain accelerator pedal angle of 114° between floor pan and flat face of pedal. Connect rod.

THROTTLE LINKAGE ADJUSTMENT (VALIANT): Adjust engine idle speed (see below). With engine at operating temperature, and throttle stopscrew on low step of fast idle cam, loosen locknut and move transmission throttle control lever forward until it stops, tighten locknut. Set protractor at 115° and place lengthwise on flat surface of accelerator pedal. Disconnect accelerator pedal rod and adjust length of rod so that pedal will be in correct 115° position when rod connected. Reconnect rod.



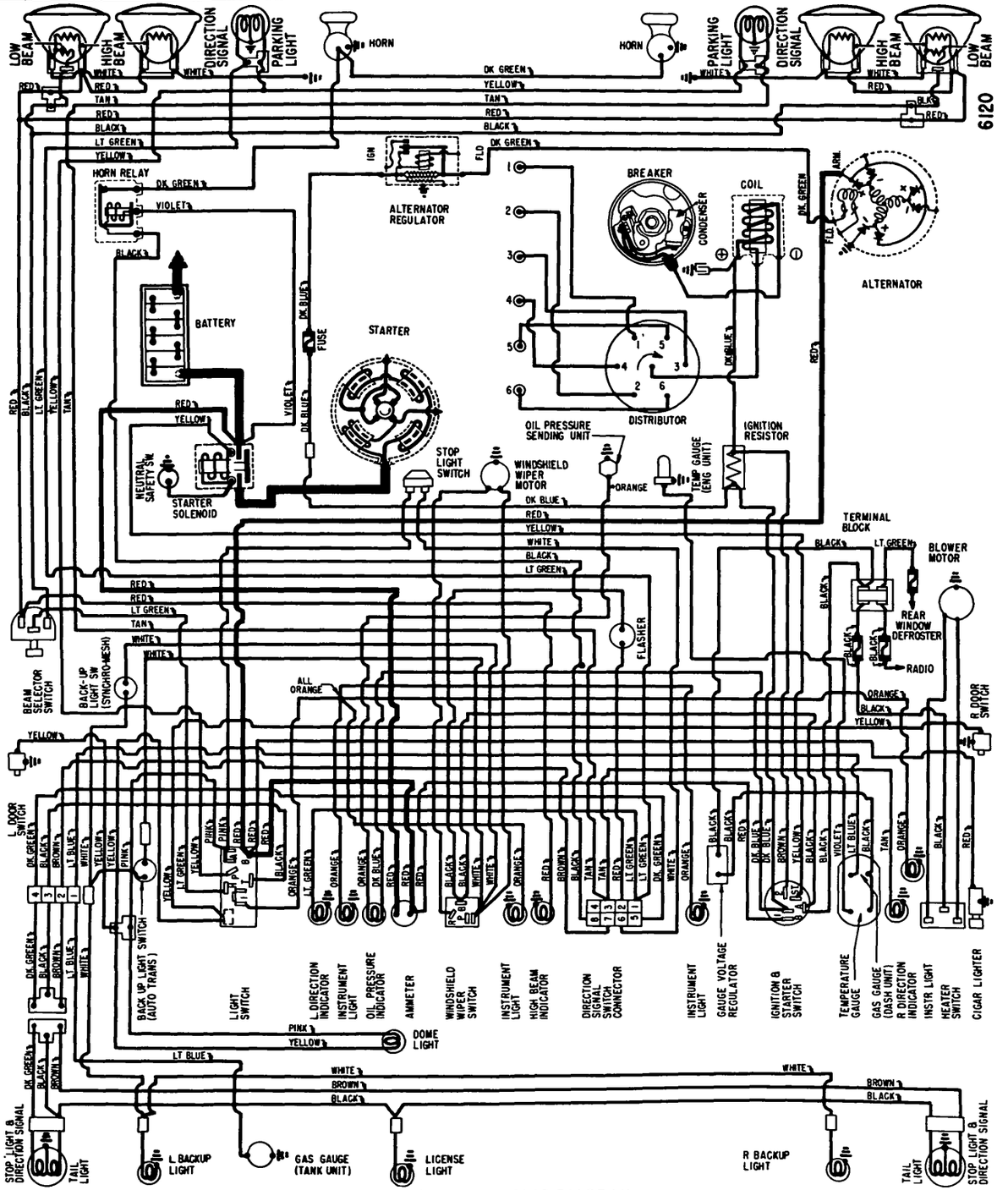
VALIANT THROTTLE LINKAGE

CARTER BBS

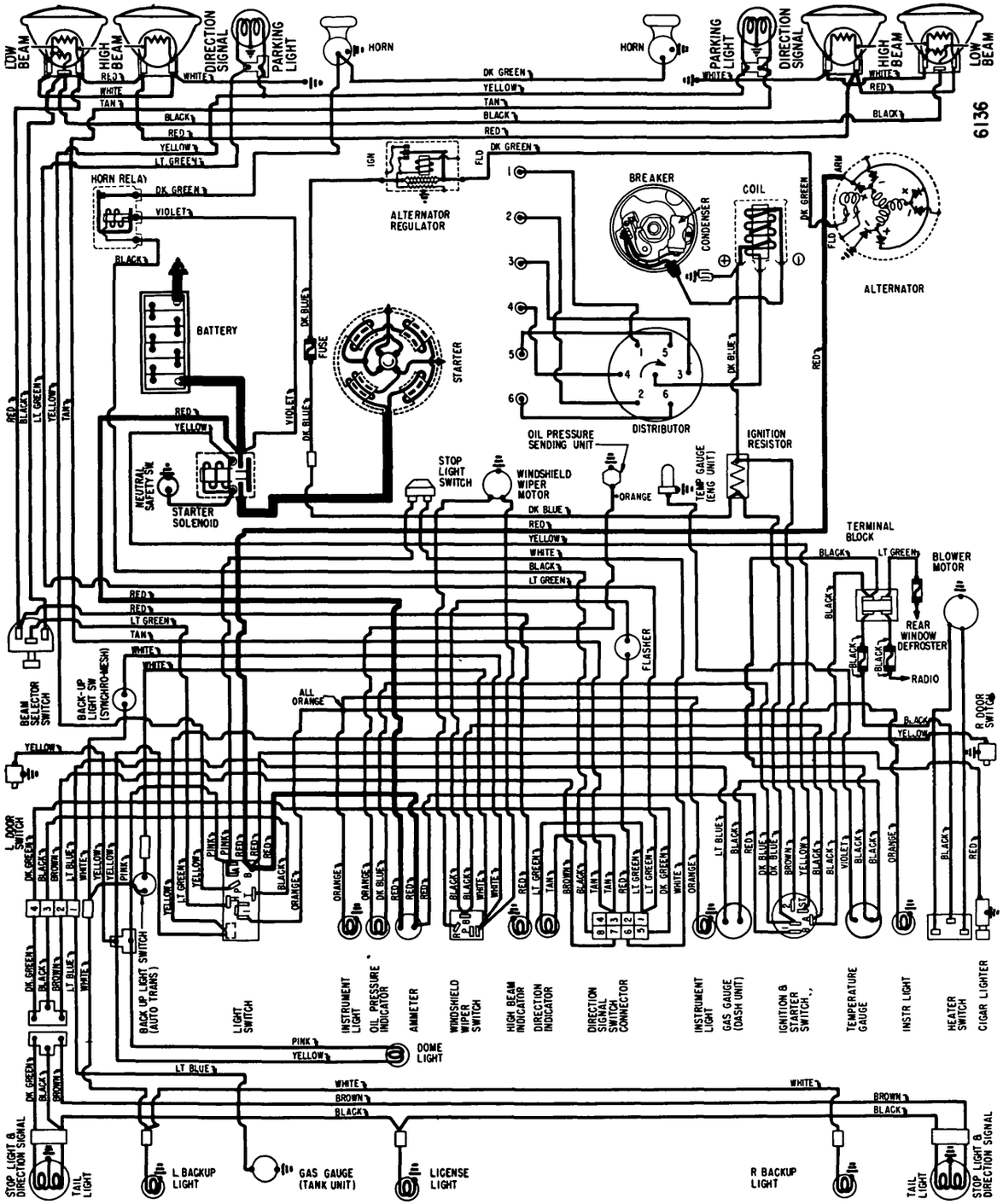
Cart r BBS. Used as follows:

Mod l	Carburetor No.
170" Synchro-mesh	3093S
170" TorqueFlite	3094S
170" Closed Crankcase Ventilation (All Trans.)	3127S
225" Synchro.mesh	3098S
225" TorqueFlite	3099S
225" Closed Crankcase Ventilation (All Trans.)	3128S
Taxi All Trans.	3097S
Taxi All Trans. Closed Crankcase Ventilation	3129S

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LANCER WIRING DIAGRAM



VALIANT WIRING DIAGRAM

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Idl Setting - ⅛-1½ turns open (3093S, 3094S, 3127S), ½-1½ turns open (3098S, 3099S, 3128S), 1-2 turns open (3097S, 3129S). With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idle Speed - 550 RPM with headlights on High Beam, and accelerator shaft rod ball joint unsnapped or transmission rod locknut loosened, *see "Cauti ns" abov .*

Float Level - With main body inverted and float hanging freely (Off Car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (On Car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 7/32" (Except 3097S, 3129S), 9/32" (3097S, 3129S) measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip f fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install throttle connector rod in center hole (Except 3097S, 3129S), upper hole (3097S, 3129S) of throttle lever.

Fast Idle: 1800 RPM (Synchro-mesh & Taxi), 1600 RPM (Auto. Trans.) with adjusting screw on second step of fast idle cam.

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter BBS Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB, No. 3083S (All Hyp r Pack Engines). Four barrel downdraft type with manual choke.

Idle Speed - 700 RPM with headlights on high beam and transmission rod sliding link locknut loosened, *see "Cautions" above.*

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter AFB 4-Barr l Carbur tors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2996S. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.

Gasoline Gauge: (Lancer) - King-Seeley Electric "CV" (Constant Voltage) type with separate Voltage Regulator King-Seeley No. 58245.
Dash Unit - King-Seeley No. 58203 (With Temp. Gauge).
Tank Unit - Dodge No. 2208462 (Std.), No. 2208458 (Suburban).

Gasoline Gauge: (Valiant) - Constant Voltage type with voltage regulator in temperature gauge.
Dash Unit - Chrysler No. 2209203.
Tank Unit - Chrysler No. 2209296.

Air Cleaner: Paper element type. Clean every 5,000 miles, replace element every 15,000 miles. More frequent servicing may be necessary under severe conditions.

►*CLEANING CAUTION:* Remove filter element from housing. Blow compressed air gently from inside out

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(2" away) to remove dust particles. DO NOT tap these filters to loosen dirt and DO NOT immerse in any fluid.

BATTERY

Standard - Autolite 11-HS-50B, Willard MB-24-50 or Gould 11B-OE-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Optional - Autolite 12-HB-70B or Willard MB-27-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.

STARTER

Autolite. As follows:

Engine	Autolite Starter No.
170" Synchro-mesh	MDU-7020
170" TorqueFlite Six	MDT-7009
225" All Trans.	MDT-7002

Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 31-47 ozs.

Performance Data - MDU

Torque	RPM	Volts	Amperes
0 ft. lbs.	3600	10.0	56
8.5 ft. lbs.	Lock	4.0	350

Performance Data - MDT

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Dodge & Plymouth Part No. 2095624 (Synchro-mesh), No. 2095625 (Auto. Trans.). Magnetic Switch controlled by Ignition & Starter Switch No. 2097628. Neutral Safety Switch No. 1704283 mounted on transmission on automatic transmission cars.
Neutral Safety Switch Adjustment - *See "TorqueFlite Six", "PowerFlite", & "TorqueFlite" in Transmission Section.*

ALTERNATOR

Chrysler Own. Three-phase A.C. unit with full-wave rectifier. Used as follows:

Model	Chrysler No.
Standard	2095060
Special Equipment Heavy Duty	2095425

Rotation - Clockwise at drive end.
Rated Output - 35 amperes (2095060), 40 amperes (2095425).

Field Coil Draw - 2.38-2.75 amps. at 12 volts (alternator turned by hand); 2.97-3.43 amps. at 15 volts, 70°F & 750 Alternator RPM.
Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section.*

Belt Adjustment: Use Torque or Deflection methods as follows:

Belt Torque (Ft. Lbs.)		Belt Deflection	
New	Used	New	Used
30	20	5/32"	1/4"

REGULATOR

Chrysler Own. No. 2095700 (All Models).
Air Gap - .048-.052". **Point Gap** - .014-.016".
Vltag Setting - 13.7-14.3 volts at 70°F.
Checking & Adjusting - *See "Chrysler Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.

Lighting Switch Removal (Valiant): With switch knob in full "IN" position, depress spring-loaded retainer on switch body to release knob stem and pull knob and stem out. Remove switch bezel, remove switch from instrument panel and disconnect wires.

Lighting Switch Removal (Lancer): Remove Instrument Cluster, see below, then push switch in to full "IN" position. Depress release button on body of switch and pull out switch knob. Disconnect wires, remove switch body nut and remove switch.

Ignition & Starter Switch: Removal - Remove Instrument Cluster, see below, remove spanner nut, push switch towards cowl to release switch from panel and disconnect wires and remove switch through cluster housing opening.

Stop Light Switch Location: Hydraulic type (early cars) located on forward end of hydraulic master cylinder. Mechanical type (later cars) mounted on brake pedal lever bracket.
Adjustment (Mechanical Type) - *NOTE* - Switch bracket mounting hole on brake pedal lever bracket is slotted for switch position adjustment. Adjust position of switch in slotted hole to "REAR" for std. brakes, to "FRONT" for Power Brakes.

Instrument Cluster (Lancer): Removal - 1) Disconnect positive battery cable and tape upper part of jacket tube and cover jacket tube area between steering wheel and instrument panel.
2) Remove two heater to trim plate screws and remove plate and felt. Remove two transmission push button trim plate screws and remove trim plate and felt.
3) Loosen panel to steering jacket tube clamp screws several turns (DO NOT REMOVE) and remove steering wheel.
4) Loosen steering jacket to lower end of panel bracket screws (DO NOT REMOVE). Work speedometer cable through cowl panel to allow pulling cluster forward to disconnect speedometer cable at speedometer head.
5) Remove three instrument cluster bezel to cluster housing screws and pull cluster panel and lower casting forward and tilt left side of cluster far enough to allow access to speedometer head.
6) Pull cluster and casting from instrument panel housing, separate cluster panel from panel cluster casting by removing the four attaching screws. Disconnect all electrical connections. Snap out lamp bulb sockets and remove instrument panel cluster.
Installation - Reverse removal procedure.

Speedometer (Lancer): Removal - Remove instrument cluster, see above, and remove four slotted head screws that attach instrument bezel to cluster base and remove bezel. Remove nuts and flat insulators that attach gauges to cluster base and remove gauges from base. Remove two screws, washers and rubber bushings and harness clip then remove speedometer from cluster base.

Cluster & Speedometer (Valiant): Removal - 1) Disconnect negative battery cable and remove headlamp switch knob by placing switch in "ON" position and depressing release on knob stem.
2) Remove four instrument cluster attaching screws and pull top of cluster forward to disconnect speedometer cable at speedometer and connectors to instruments and switches.
3) Remove cluster, then remove speedometer head from cluster.

CIRCUIT BREAKERS: 22.5 Ampere - Headlights & High Beam Indicator. In headlight switch.
15 Ampere - Parking, Tail, Stop, License, Instruments and Interior lights. In headlight switch.
6 Ampere - Variable speed windshield wiper & Back-up lights. On wiper switch.
5 Ampere - Single speed windshield wiper & Back-up lights. On wiper switch.
FUSES: 20 Ampere - Heater. In feed wire.
7.5 Ampere - Radio. In feed wire.
1 Ampere - Clock. In feed wire.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*ENGINE OIL LEAK AT DISTRIBUTOR CORRECTION:* A large "O" ring Part No. 2095740 and a small "O" ring No. 2095630 have been released for correction of oil leaks at distributor. To correct oil leak, remove distributor and remove cork gasket or early large "O" ring. Install small "O" ring on distributor housing against retainer flange then install large "O" ring. Reinstall distributor and set ignition.

►*ENGINE "CHUCKING" or "HEAVY KNOCK" CORRECTION:* Chucking or heavy knock is caused by loose vibration damper (crack in damper hub). Replace damper making sure that keyway is aligned and that damper square with shaft at time of installation.

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head, inclined 30° to right, of same design used previously.

►*ALUMINUM 225" ENGINE NOTE:* Aluminum (die-cast) block engine used in partial production.

►*ALUMINUM ENGINE NOTE:* Engine block is die cast aluminum with iron cylinder bore liners molded in block and with a cast iron cylinder head. This head carries the word "Special" cast between lifting pads on left side. Use this head on either aluminum or cast iron block but DO NOT use a cast iron engine cylinder head on an aluminum block. Cylinder head bolts are longer and are not interchangeable with bolts for cast iron engine. Aluminum engine is identified by Engine Code AR-22 followed by engine serial number. *See "ENGINE" in Chrysler Corp. Special Data.*

Car Model	Engine
Lancer & Valiant Std. (1-Bbl. Carb.)	170"
Lancer & Valiant Optl. (1-Bbl. Carb.)	225"
Lancer Hyper Pack (4-Bbl. Carb.)	170" or 225"
Valiant Hyper Pack (4-Bbl. Carb.)	170"

Engine	Bore	Stroke	Displacement
170"	3.40"	3.12"	170 cu. ins.
225"	3.40"	4.12"	225 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
170" (1-Bbl.)	8.2-1	27.7	101 at 4400 RPM
170" (4-Bbl.)	8.2-1	27.7	148 at 5200 RPM
225" (1-Bbl.)	8.2-1	27.7	145 at 4000 RPM
225" (4-Bbl.)	8.2-1	27.7	196 at 5200 RPM

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

CYLINDER HEAD: Cast Iron Engine - Either the Std. cast iron head or the "Special" cast iron head (Aluminum Eng.) may be used.

Aluminum Engine - Cast Iron Head with word "Special" cast between lifting pads on left side of head. Use only this head on Aluminum block.

See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL: Disconnect battery, drain cooling system and disconnect both radiator hoses. Move alternator as close to engine as possible. Disconnect throttle rod at carburetor and exhaust pipe at manifold. With Tie Rod Puller C-3742 remove steering and idler arm ball joints from steering linkage center link. Disconnect engine front mounts and raise front of engine about 2". *CAUTION - Raise engine with wood block under oil pan. DO NOT raise at vibration damper.* Let engine rest on 2" wood blocks under front mounts. Remove clutch or converter cover plates. Drain crankcase and remove pan, moving down and forward, then lowering rear.

►*OIL PAN INSTALLATION CAUTION (225" Eng.):* To minimize possibility of oil leaks at oil pan gasket, tighten retaining capscrews to specified torque and in the following sequence: 1) Left rear. 2) 2nd from right front corner. 3) 2nd from left front corner. 4) Right rear. 5 & 6) All along right & left side rails - either side first. 7) Remaining capscrews on rear edge. 8) Across front edge.

PISTONS

Aluminum alloy, steel strut, elliptically turned, tin plated, slipper type.

►*CYLINDER BORE OVERSIZE CAUTION:* Letter "A" or "AB" incorporated in Engine Number indicates all cylinder bores and pistons are .020" oversize.

Weight - 16.4 ozs.

Removal - Pistons and rods removed from above.

Clearance - .0005-.0015" at top of skirt.

Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure cylinder bore halfway down and at right angles to crankshaft.

Installing Pistons - Notch in piston head must be toward front of engine.

Replacement Pistons: Furnished with pins in Std. and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

PISTON PIN

Press fit in connecting rod.

Diameter - .9007-.9008". **Length** - 2.995-2.975".

Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

Pin Fit in Rod - .0007-.0012" interference fit. Special procedure and tools used for removal and installation. *See "Piston Pins" in Chrysler Corp. Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

(170" Engine) - Compression ring cast iron, low taper and twist, tin plated. Oil ring single piece cast iron.

(225" Engine) - No. 1 compression ring taper twist, tin plated, No. 2 compression ring reverse twist, taper face, Lubrite coated. Oil ring, three-piece with two chrome plated rails and stainless steelexpander (spacer).

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0775-.0780"	.010-.020"	.0015-.003"
Oil (3)	.1860-.1865"	.010-.020"	.0010-.003"

Installing Rings - Mark "Top" on compression rings must be toward top of engine.

Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020-.029", .040-.049".

CONNECTING ROD

Length (Center-to-Center) - **(170")** 5.707", **(225")** 6.999".

Weight - **(170")** 25.68 ozs. **(225")** 27.3 ozs.

Journal Diameter - 2.187". Out of round limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals machined UNDERSIZE):* See *CRANKSHAFT below.*

Clearance - .0005-.0015".

Side Clearance - .006-.012"

Bearing Adjustment - None, replace bearings.

Installing Rods: Notch in head of piston must be toward front of engine and oil squirt holes in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010" Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505".

Bearing Type - Removable precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-base babbitt on steel.

►*ALUMINUM ENGINE MAIN BEARING NOTE:* Same as for cast iron engine except that oil feed holes in bearings are in a different location and require special inserts. *CAUTION* - DO NOT use cast iron block original main bearing inserts in aluminum block. Upper and lower bearing caps are cast iron and are line bored in complete sets. If replacement is required, all four upper and lower main bearing caps must be replaced with a matched set for proper alignment. Identification numbers are stamped on upper caps and cast into lower caps. When upper and lower caps are installed, bearing tab slots should be on left side of engine.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.001" UNDERSIZE** - Indicated by "Maltese Cross" within engine number. **.010" UNDERSIZE** - Indicated by "X" and "Maltese Cross" within engine number. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.

►*MAIN BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves are not interchangeable. No. 1 upper bearing is not interchangeable. No. 3 bearing shells are not interchangeable with any other bearing. No. 1, 2, & 4 lower halves are interchangeable. No. 2 & 4 upper halves are interchangeable.

Clearance - .0005-.0015". Wear limit .0025".

Endplay - .0035-.0085".

End Thrust - Taken by No. 3 (rear intermediate) main bearing.

Replacement Bearings: Std. and .001", .002", .010" Undersize.

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

CAMSHAFT

Journal Diameter - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952".

Bearings (Cast Iron Eng.) - Lead-based babbitt on steel.

Bearings (Aluminum Eng.) - Bearing inserts not used. Camshaft bearing journals run directly in finished bores in block.

Clearance - .001-.003". Wear limit .005".

End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.

Timing Chain: Side guide type. **Width** .88". **Pitch** .50", **Length** 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold crankshaft sprocket stationary, use torque wrench to turn camshaft in both directions applying 30 ft. lbs. turning torque (if cylinder head installed), 15 ft. lbs. turning torque (if head off).

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*

Camshaft Setting: Marks on sprockets must be adjacent and in line across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

Tappet Clearance: (Cast Iron Eng.) - .010" Intake, .020" Exhaust. Hot.

(Aluminum Eng.) - Same as for Cast Iron Eng. *See below.*

►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal temperature, remove rocker arm cover and operate engine for an additional 5 minutes at 550 RPM before making adjustments.

Valve	Head Diameter	① Stem Diameter	Length
Intake	1.615-1.625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

Valve	Seat Angle ②	Lift	Stem Clearance
Intake	45°	.375" ⑤	③ .001-.003"
Exhaust	45°	.360" ⑤	④ .002-.004"

① - Std. Also furnished .005", .015", .030" Oversize.

② - Valve face angle 47° Intake & Exhaust.

③ - Wear limit .004". ④ - Wear limit .006".

⑤ - All Hyper Pack are .430".

Valve Seat Width - .070-.090" Intake, .040-.060" Exhaust.

Valve Stem Oil Seals - Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valve Springs: Free length 2". *NOTE* - Damper spring used inside valve spring on Hyper Pack engine.

Valve Spring Specifications
(All Models Except Hyper Pack)

Valve	Pressure	Length
Closed	68-76 lbs.	1 11/16"
Open	160-172 lbs.	1 5/16"

(All Hyper Pack)

Valve	Pressure	Length
Closed	91 lbs.	1.66"
Open	226 lbs.	1.22"

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer). If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16".

Valve Lifters: Mechanical type on all engines.

►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.

Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications
(All 170" & 225" Std. Engines)

Intake Valves - Open 8° BTDC. Close 44° ALDC.
Exhaust Valves - Open 48° BLDC. Close at TDC.

(All 170" & 225" Hyper Pack Engines)

Intake Valves - Open 22° BTDC. Close 74° ALDC.
Exhaust Valves - Open 66° BLDC. Close 22° ATDC.

Valve Timing Check - Turn crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Install dial indicator so pointer contacts No. 1 intake valve spring retainer parallel to axis of valve stem. Turn No. 1 intake valve adjusting screw one full turn to remove all lash, zero dial indicator and rotate crankshaft clockwise (normal running direction) until valve has lifted .018". Timing on timing tab should read from 12° BTDC to TDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

►*ALUMINUM ENGINE OILING SYSTEM NOTE:* Same as for Cast Iron Eng. except that oil to main bearings passes through upper main bearing caps, then to bearings.

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

►*RELIEF VALVE SPRING NOTE:* Three types of springs available. Replace with same color spring, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Indicator light on Instrument Panel operated by Oil Pressure Switch, Autolite No. 14272A. On oil pump on right side of block.

Oil Pump: Rotor type. On right side of crankcase.
Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow type. Replace filter element every 4,000 miles, to correspond with oil changes.

Crankcase Ventilation: (Standard Cars) - Filter in filler cap (air intake) and outlet vent tube extending from rocker arm cover to right rear of engine. Wash filter cap in kerosene and re-oil every 5,000 miles or more often in dusty areas.
Positive Crankcase Ventilation Cars - Vacuum tube connects outlet breather cap with lower part of throttle body. A ventilation valve is located in outlet vent cap and regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 13 qts. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) for summer operation.

►*FAN-RADIATOR CORE CLEARANCE CAUTION:* Clearance should be ¾"±¼". Use thinner fan spacer. Part No. 2120510 to correct.

Pressure Valve: 14 lb. radiator cap. (All Models).

Thermostat: Pellet type. In water outlet connection on cylinder head. 160°F Dodge & Plymouth No. 2129206, 180°F, No. 2129205.

Water Pump: Sealed ball bearing, packless type. No lubrication required.
See "Cooling System" in Chrysler Corp. Special Data.
Pump Removal - Drain cooling system, remove shroud (Air Conditioned Cars), loosen fan belt and idler (Air Conditioned Cars). Remove fan spacer and pulley. Remove retaining bolts and washer and remove pump.

Temperature Gauge: (Lancer) - King-Seeley ("CV") Constant Voltage, with separate Voltage Regulator King-Seeley No. 58245.
Dash Unit - King-Seeley No. 58203 (with Gas Gauge).
Engine Unit - King-Seeley No. 44265.

Temperature Gauge: (Valiant) - Constant voltage type with Voltage Regulator in Dash Unit.
Dash Unit - Chrysler No. 2209204.
Engine Unit - King-Seeley No. 44265.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 10,000 miles or sooner if needed. Use only Automatic Transmission Fluid Type "A", Suffix "A".
Checking Fluid Level - Bring engine and transmission to normal operating temperature. With parking brake applied, push selector lever buttons in turn to assure fluid distribution and check fluid in "N" position (with engine idling). Maintain fluid level between "Add 1 Pint" and "Full" marks on dipstick. *CAUTION* - Dipstick on 1961 models is 2½" shorter than on 1960 models (do not intermix).
Capacity - 14 pints.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

Engine	144" & 170"	223" & 262"	292"	352" & 390"	430"
	Foot- Pounds Torque				
Cylinder Head	Ⓒ	Ⓒ	Ⓒ	Ⓒ	Ⓒ
Intake Manifold		23-28	23-28	32-35 ②	25-28
Exhaust Manifold	13-18	23-28	23-28	23-28	15-21
Oil Pan	7-9	9-13	9-13	9-13	4-6
Main Bearing Caps	65-75	95-105	80-90	95-105	95-105
Flywheel	75-85	75-85	75-85	75-85	75-85
Vibration Damper or Pulley	45-55	70-79	70-90	70-90	75-90
Connecting Rod Caps	19-24	40-45	40-45	40-45	40-45
Camshaft Sprocket	35-45	35-45	35-45	35-45	12-15
Camshaft Thrust Plate	12-15	12-15	12-15		
Rocker Arm Cover	3-5	4-7	2-2½	4-7	2½-4
Rocker Shaft Support Bracket	30-35	45-55	12-15	40-45	45-50
Pushrod Chamber Cover		2-2½	2-2½		3½-5
Engine Front Cover	6-9	6-9	③	12-15	10-13
Water Outlet Housing	12-15	23-28	12-15	12-15	④ 8-13
Water Pump	12-15	23-28	12-15	23-28	23-28
Oil Pump	12-15	⑤	12-15	⑥	23-28
Oil Filter Adapter	50-60	50-60	50-60	12-15	10-13
Oil Filter Center Bolt		20-25	20-25		
Flywheel Housing	40-50	40-50	40-50	40-50	40-50
Transmission Mounting	32-36	37-42 ⑦	37-42 ⑦	37-42	37-42

Ⓒ - See "Cylinder Head Installation" below for tightening procedure. Three different applications must be made.
② - Cast Iron Manifold. 12-15 ft. lbs. for Aluminum type.
③ - 12-15 ft. lbs. (5/16" bolts); 23-28 ft. lbs. (3/8" bolts).
④ - Radiator Supply Tank-to-Intake Manifold.
⑤ - 30-35 ft. lbs. (223" Eng.); 12-15 ft. lbs. (262" Eng.).
⑥ - 23-28 ft. lbs. (352" Eng.); 12-15 ft. lbs. (390" Eng.).
⑦ - Passenger Cars. Trucks as follows: **Bolts** 7/16" - 30-38 ft. lbs., 9/16" - 70-90 ft. lbs.,5/8" - 96-120 ft. lbs. **Nuts** 7/16" - 35-45 ft. lbs., 9/16" - 81-102 ft. lbs., 5/8 - 115-140 ft. lbs.

ENGINE

COMET & FALCON

ENGINE REMOVAL: *NOTE* - Engine only is removed. D not remove transmission. Proceed as follows:

1) Remove hood, drain cooling system and crankcase, remove air cleaner and disconnect battery ground cable. Remove radiator, drive belt, fan and pulley. Disconnect heater hoses at water pump and at carburetor heater spacer outlet, generator and starter wires at units, accelerator rod and choke control cable at carburetor.

2) Disconnect windshield wiper hose at vacuum pump. Remove fuel pump bowl and disconnect flexible fuel line from tank line (plug tank line). Disconnect primary wire at coil and oil and temperature sending unit wires at units. Remove starter and dust seal.

3) Disconnect clutch retracting spring and remove equalizer shaft and arm bracket from underbody rail. Remove flywheel or converter upper retaining bolts (accessible through floor pan) and disconnect exhaust pipe from manifold. Disconnect engine mounts and remove flywheel or converter housing cover. Remove flywheel housing lower bolts (synchro-mesh), disconnect converter from flywheel and remove converter housing lower bolts (auto. trans.).

4) Support transmission and flywheel or converter, attach lifting hooks under exhaust manifold, remove engine.

FORD 6 CYLINDER CARS

ENGINE REMOVAL: *NOTE - Unnecessary to remov transmission. Procedure bel w is for removal of engin only.* Drain cooling system and crankcase. Disconnect all wires, cables, and hoses from engine units (also disconnect and plug automatic transmission oil cooler lines at radiator). Remove radiator and air cleaner. Disconnect accelerator and throttle linkage (tie accelerator bracket to dash). Disconnect exhaust manifold, remove starter and automatic transmission filler tube bracket. Remove engine rear plate upper right bolt and disconnect clutch linkage (remove bracket from rear of engine). Remove flywheel or converter housing cover. Remove flywheel-to-converter nuts and hold converter in housing. Disconnect flywheel or converter housing from engine, support transmission and remove rest of engine rear plate bolts. Disconnect engine front mounts and remove engine (Lifting Hook, T52L-6000-C, may be used).

MERCURY 6 CYLINDER CARS

ENGINE REMOVAL: *NOTE - Procedure below is for removal of engine only.* 1) Remove hood. Drain cooling system and crankcase. Disconnect all wires, cables, and hoses from engine units (also disconnect and plug automatic transmission oil cooler lines at radiator). Remove radiator and fan guard assembly, and air cleaner. Disconnect accelerator and throttle linkage from carburetor and engine. Disconnect power steering pump from water pump and position out of way so oil will not drain out (unnecessary to disconnect hoses). Remove starter and dust seal and crankcase ventilation tube. Disconnect exhaust pipe from exhaust manifold. Disconnect engine front mounts at frame.

2) **Synchr -m sh Cars** - Disconnect clutch linkage from flywheel housing. Remove propeller shaft. Disconnect shift rods, wires, and cables from transmission. Support rear of engine and disconnect engine rear mount from transmission. Remove flywheel housing lower cover. Disconnect transmission from flywheel housing and slide transmission rearward so input shaft clears housing. Disconnect engine front mount brackets from engine and remove engine. *NOTE* - Lifting Bracket 6000-AB may be attached to cylinder head bolts (after valve rocker cover removed) to aid in lifting engine.

3) **Automatic Transmission Cars** - Remove converter housing bolts. Support transmission, remove converter housing lower cover, and disconnect converter from flywheel. Secure converter in housing. Attach Lifting Bracket 6000-AB to cylinder head bolts (remove valve rocker cover), and remove engine.

FORD V8 CARS & THUNDERBIRD

ENGINE REMOVAL: *NOTE - Procedure b l w is f r removal of engine only.* Drain crankcase and cooling system. Remove hood and air cleaner. Disconnect all wires, hoses, cables, lines, and brackets from engine (do not disturb radiator supply tank, remove with engine). Remove dipstick. Disconnect accelerator and throttle linkage from carburetor and engine (remove accelerator cross shaft bracket). Remove power steering pump from engine and position to prevent loss of oil (unnecessary to disconnect hoses). Isolate air conditioning compressor and disconnect hoses. *See "Ford Motor Co. Air Conditioning" in Miscellaneous Section.* Swing coil out of way (292"), remove coil (352" & 390"). Place distributor cap near center of engine (292"). Remove flywheel or converter housing-to-engine upper bolts. Remove starter, dust seal, and automatic transmission filler tube bracket. Remove oil filter (292"). Disconnect muffler inlet pipes from exhaust manifolds and engine support insulators from frame. Remove flywheel housing lower cover, disconnect clutch linkage (remove bracket from engine), disconnect converter from flywheel(secure converter in housing), and remove remaining flywheel or converter-to-engine bolts. Support transmission, attach lifting hooks, Tool T53L-6000-B (292"), T58P-6000-A (352" & 390"), and sling T53-L-300-A, and remove engine.

MERCURY V8 CARS

ENGINE REMOVAL: *NOTE - Proc dur b l w is for removal of engine only.* 1) Remove hood, battery, and battery carrier. Drain cooling system and crankcase. Remove radiator. Remove fan, spacer, and pulley assembly from water pump. Remove oil filter (292"). Remove coil (352" & 390"). Remove crankcase and automatic transmission dipstick. Isolate air conditioning compressor and disconnect hoses. *See "Ford Motor Co. Air Conditioning" in Miscellaneous Section.* Remove power steering pump from engine and position to prevent loss of oil (unnecessary to disconnect hoses). Place distributor cap near center of engine (292"). Disconnect all wires, hoses, cables, lines, and brackets from engine. Disconnect accelerator and throttle linkage from carburetor and engine (remove accelerator cross shaft bracket). Disconnect exhaust pipes from exhaust manifolds. Disconnect engine front mounts from engine.

2) **Synchro-m sh Cars** - Remove flywheel housing lower cover. Disconnect clutch linkage from flywheel housing.

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Disconnect shift rods and speedometer cable from transmission. Remove propeller shaft. Disconnect engine rear mount from transmission and disconnect transmission from flywheel housing. Slide transmission rearward until input shaft clears flywheel housing. With Lifting Hooks, 6000-E (292"), 6000-BD (352" & 390"), and Lifting Sling, 6000-BA, remove engine.

3) Aut matic Transmission Cars - Remove converter housing lower cover and disconnect converter from flywheel. Secure converter in housing. Disconnect converter housing from engine (support transmission and converter, and rear of engine). With Lifting Hooks, 6000-E (292"), 6000-BD (352" & 390"), and Lifting Sling, 6000-BA, remove engine.

LINCOLN CONTINENTAL

ENGINE REMOVAL: *NOTE - Following procedure is for removal f engine nly.* Remove hood. Drain cooling system and crankcase. Remove air cleaner and air intake duct assembly. Remove speed control unit. Remove battery. Disconnect all wires, lines, hoses, cables, and brackets from engine (disconnect and plug transmission oil cooler line at radiator). Remove transmission fluid filter. Remove fuel pump heat shield and fan shield. Remove fan, fluid fan drive and pulley as an assembly. Remove radiator. Isolate air conditioning compressor and disconnect hoses. *See "Ford Motor Co. Air Conditioning" in Miscellaneous Section.* Remove compressor and mounting bracket. Disconnect accelerator and throttle linkage from carburetor and engine (tie linkage to dash for clearance). Remove converter housing access cover and underbody splash shield from lower front of transmission. Disconnect exhaust pipes from exhaust manifolds. Disconnect power steering pump outlet line from pump. Remove oil filter. Disconnect engine front mounts from engine. Remove starter and dust seal, and generator splash shield. Disconnect converter from flywheel, engine lateral restrictor from converter housing, and remove converter housing lower retaining bolts. Support transmission and remove converter housing-to-engine upper bolts. Secure converter in housing. Install lifting eyes in each cylinder head lower front mounting bolt hole, and in rear of each exhaust manifold. With suitable lifting chains and hooks, remove engine from car.

ECONOLINE TRUCKS

ENGINE REMOVAL: *NOTE - Following procedure is for r moval of engine and transmission assembly.* Drain cooling system and crankcase, and remove air cleaner. Disconnect all wires, hoses, cables, and lines from engine. Raise and support truck. Remove propeller shaft. Disconnect transmission shift rods from transmission. Disconnect clutch linkage from flywheel housing and underbody. Remove exhaust pipe, muffler, and tail pipe assembly. Lower truck after half-way for safety. Use Transmission Jack KRW-7020 and Engine Adapter T61E-6000-A or other suitable equipment and support engine and transmission assembly after securing engine to adapter. Disconnect engine right and left front mounts from engine, and remove right and left support members from underbody. Disconnect transmission extension from hanger bracket. Lower jack and raise truck to remove engine assembly from beneath truck.

FORD 6 CYLINDER TRUCKS

ENGINE REMOVAL (F & B SERIES): Procedure is same as for Ford 6 Cyl. Cars after removing hood, fan, spacer, and pulley.

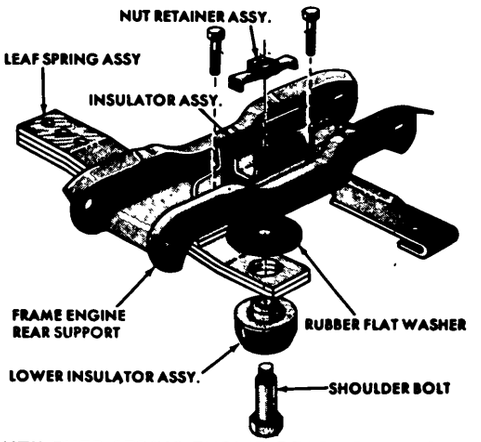
ENGINE REMOVAL (P SERIES): *NOTE - Procedure below is for removal of engine only.* Drain cooling system and crankcase. Remove driver's seat assembly, master cylinder inspection cover, and steering column cover plates. Disconnect accelerator linkage from pedal and all wires from headlight dimmer switch. Remove left wheelhouse panel and center floor plate, disconnect right side of engine rear cover panel from right wheelhouse panel, and rear flange of engine rear cover from frame crossmember and center floor plate front bracket. Remove air cleaner tube (leave air cleaner attached to engine cover). Remove engine rear cover plate (wedge frame gussets open so rear flange will clear slots). Remove accelerator bracket assembly and carburetor. Disconnect throttle control rod. Disconnect exhaust manifold from muffler inlet pipe. Disconnect all wires, cables, lines, and hoses from engine. Remove starter, radiator and fan. Disconnect engine from front mounts. Remove flywheel or converter housing cover and disconnect housing from engine. Disconnect converter from flywheel. Remove crankcase ventilation tube. Remove automatic transmission filler tube and drain transmission. Loosen engine rear support screws, raise transmission, remove engine (swing 30° to right and lift rear to clear compartment).

FORD V8 TRUCKS

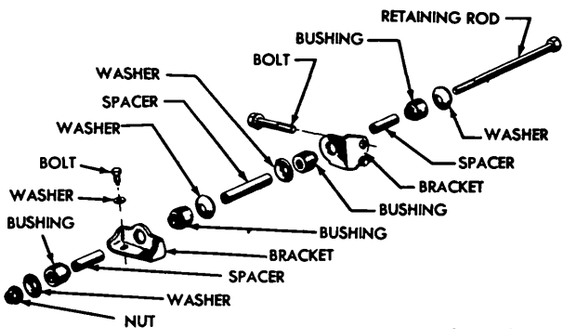
ENGINE REMOVAL (F & B SERIES): Procedure is the same as for Ford V8 Cars except the following: Remove radiator and shroud assembly, fan, spacer, and belt. Disconnect power steering hoses and let system drain (unnecessary to remove pump). *NOTE* - Access cover provided in floor pan to remove converter housing bolts, accelerator assembly, and other parts.

ENGINE REMOVAL (C SERIES): Tilt the cab and drain cooling system and crankcase. Remove radiator and shroud assembly, fan, and air cleaner. Remove all wires, cables, clips, lines, and hoses from engine. Remove clutch release lever retracting spring and starter. Disconnect exhaust pipes from manifolds. Remove flywheel housing inspection cover and disconnect engine from flywheel and front mounts (support transmission). With lifting hooks (Tool T53L-6000-B) and sling (Tool T53L-300-A) remove engine.

ENGINE REMOVAL (P SERIES): *NOTE - Procedure below is for removal of engine and transmission as an assembly.* Drain cooling system and crankcase. Remove driver's seat, master cylinder inspection cover, steering column cover plate, left wheelhouse panel, and center floor plate. Disconnect accelerator linkage at pedal and all wires from headlight dimmer switch. Disconnect right side of engine rear cover from right wheelhouse panel, rear flange of engine rear cover from crossmember and center floor plate front bracket. Remove engine rear cover plate (wedge frame gussets open so plate will clear slots). Remove crossmember and air cleaner. Disconnect all wires, cables, lines, and hoses from engine and transmission (remove radiator hoses, hand brake cable and bracket). Disconnect engine from front mounts and exhaust pipes from manifolds. Remove air cleaner stud. Disconnect engine rear support, front universal joint, transmission shift rods, and clutch slave cylinder hose. With lifting hooks (Tool T53L-6000-B), sling (Tool T53L-300-A), and floor crane, remove engine and transmission assembly.



CANTILEVER SPRING ENGINE REAR MOUNT ASSEMBLY



LINCOLN CONTINENTAL LATERAL RESTRICTOR

ENGINE MOUNTINGS

COMET & FALCON

ENGINE REAR MOUNT (CANTILEVER SPRING TYPE): Consists of a leaf type spring mounted on rear support and extending to front of car. Spring is bolted to transmission extension. Spring is insulated from support by two rubber insulators and a rubber flat washer. Spring-to-support attaching bolt is a shoulder type bolt.

Installation - *CAUTION - To prevent high frequency high speed vibration caused by transmission extensi n contact with rear mount, ¼" minimum clearance must b maintained between rear mount upper insulator and transmission extension.* Tighten spring-to-support attaching shoulder bolt until bolt bottoms (22-32 ft. lbs. torque). *CAUTION - Do not add washers between lower insulator and spring as noise and vibration would result.* Tighten other bolts to specified torque *(see "Engine Mounting Tightening Table" below).*

LINCOLN CONTINENTAL

►*1961 LINCOLN CONTINENTAL 45-80 MPH MOAN, ROAR OR VIBRATION CORRECTION & ENGINE REAR MOUNT PRODUCTION CHANGE:* To correct noise and vibration, install later design engine rear mount, Lincoln Kit No. C1VY-6A024-A. This design mount

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has a bracket between transmission extension and insulators and redesigned support. Later type mount used in production after April 15, 1961.

ENGINE LATERAL RESTRICTOR: Consists of rubber bushed rods and spacers mounted on brackets from converter housing to underbody side rail to restrict engine side movement.

Removal - Remove outer bracket from underbody side rail. Remove inner bracket from converter housing. Remove lateral restrictor assembly.

Disassembly - Remove restrictor rod retaining nut and disassemble unit. Clean all parts in solvent and replace worn or damaged parts.

Reassembly - With head of large restrictor rod in a vise, assemble all parts in same order as removed (see illustration). *NOTE - Lips of rubber bushings must be seated properly in bores of inner and outer brackets.* Torque retaining nut to 13-18 ft. lbs.

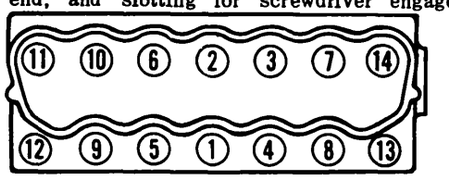
Installation - Position unit on car with outer bracket resting on underbody side rail. Insert inner bracket dowel pin into converter housing, install inner bracket retaining bolt and torque to 40-50 ft. lbs. Torque outer bracket retaining bolts to 13-18 ft. lbs.

CYLINDER HEAD & MANIFOLD

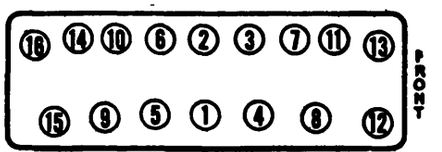
6 CYLINDER ENGINES

►*223" & 262" ENGINES CYLINDER HEAD BOLT NOTE:* All 262" and later production 223" engines have cylinder heads with 1/2" bolts. Previous bolt size was 7/16". Bolt torque specifications for each size bolt are different. *See below.*

CYLINDER HEAD: Removal - When removing head, install guide studs in front and rear cylinder head bolt holes on manifold side of head. Make guide studs from 7/16" - 14 x 6" or 1/2" - 13 x 6" bolts, depending on cylinder head bolt size, by cutting off bolt head, tapering end, and slotting for screwdriver engagement.



144" & 170" CYLINDER HEAD



223" & 262" CYLINDER HEAD

Installation - Coat both sides of new gasket with head gasket sealer. *CAUTION - "Sandwich" type gasket (steel core bonded between rubber-asbestos sheets) used on 223" and all 262" engines. DO NOT use sealer on this gasket.* On 144" & 170" engines, coat right side front and rear head bolts with sealer. On 223" & 262" engines, coat all left side bolts with sealer. Install head over guide studs (see "Removal" above), install two end bolts finger tight to hold head, then install remaining bolts. Tighten bolts in sequence shown in diagrams in three steps to torque limits shown in table below. **Do not disturb bolts after final step completed.**

ENGINE MOUNTINGS TORQUE SPECIFICATION TABLE

(Specifications Listed Are For Foot-Pounds Torque)

FRONT MOUNT	Comet	Falcon	Econoline	Ford & Mercury 6 Cyl.	Ford & Mercury V8	T-Bird	Lincoln
Insulator or Bracket-To-Engine	23-28	18-24	23-28	35-40 ①	35-40 ①	34-40	50-65
Insulator or Bracket-To-Frame	11-15	11-15	11-15	40-45	35-45	②	
Insulator-To-Bracket			50-60				45-60

REAR MOUNT Early Type	Comet	Falcon
Support-To-Insulator (Sedans)		11-15
Support-To-Crossmember (Sedans)		10-15
Insulator-To-Trans. (Sedans)		18-24
Insulator-To-Support & Bracket ③	23-29	18-24
Bracket-To-Trans. (Synchro mesh)	37-42	37-42
Bracket-To-Trans. (Auto. Trans.)	23-28	18-24
Later Spring Type		
Upper Insulator-To-Support	11-15	11-15
Support-To-Crossmember	10-15	10-15
Spring-To-Transmission	18-28	18-28
Spring Shoulder Bolt	22-32	22-32

REAR MOUNT	Econoline
Insulator-To-Support & Bracket	23-29
Bracket-To-Transmission	37-42

REAR MOUNT	Ford 6 Cyl.	Ford V8	Mercury
Insulator-To-Transmission	40-45 ④	④	
Insulator-To-Crossmember	12-15		
Support Retainer-To-Trans.	40-45		25-30
Support-To-Frame	12-15		40-45

REAR MOUNT	⑤ Linc In	T-Bird
Support Bracket-To-Body	20-30	
Support-To-Bracket	13-18	30-42
Insulator-To-Bracket	20-30	
Insulator-To-Transmission	20-30	
Support Retainer-To-Trans.		25-30

① - Trucks: 1/2" - 45-55 ft. lbs.; 7/16" - 35-45 ft. lbs.
② - Insulator-To-Intermediate Bracket 30-42 ft. lbs.; Bracket-To-Crossmember 30-42 ft. lbs.
③ - Comet All Models; Falcon Station Wagon & Ranchero.
④ - Trucks: 70-90 ft. lbs.
⑤ - Early type mount, *see "Production Change & Noise Correction".*

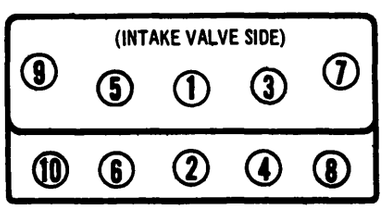
V8 ENGINES

CYLINDER HEAD: Removal - *NOTE - On 352" & 390" engines, observe rocker arm shaft removal procedure detailed below.*

Installation - Coat new gasket on both sides with head gasket sealer. Gasket must be installed with "Front" to front of engine, and "Top" facing upwards. On 292" engine, install long cylinder head bolts at the dowel locations. On all engines, tighten bolts in sequence shown in diagrams in **three** steps to torque limits shown in table below. **Do not disturb bolts after final step completed.**

Head Bolt Torque Specifications (Ft. Lbs.)

Engine	Step 1	Step 2	Step 3
144" & 170"	55	65	75
223" (7/16" bolts)	55	65	75
223" (1/2" bolts)	95	105	115
262"			65-75
292" Cars	55	65	75
292" MD Trucks	55	65	75
292" HD Trucks	65	75	85
352" & 390"	70	80	90
430"	85	95	105



V8 ENGINES CYLINDER HEAD

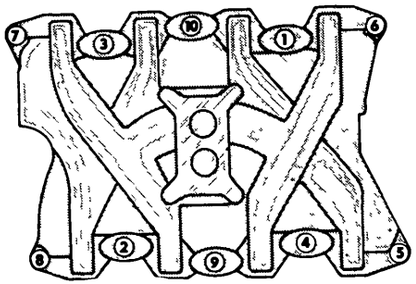
V8 ENGINES

INTAKE MANIFOLD: Removal (352" & 390") - *Observe rocker arm shaft removal procedure detailed below.*

Installation (292") - Make sure gaskets are in place and tighten manifold attaching bolts to correct torque, starting from the center bolts.

Installation (352" & 390") - Coat mating surfaces of manifold and cylinder heads with oil resistant sealer. Make sure front and rear manifold seals do not slip out of place when installing manifold. Tighten manifold attaching bolts to correct torque, starting from the center bolts.

Installation (430") - Manifold gaskets must be installed with "Front" to front of engine. Tighten attaching bolts to correct torque, and in correct sequence (see diagram).



430" ENGINE INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS

FITTING PISTONS: To check piston fit in cylinder and to determine clearance between piston and cylinder walls, position a length of ½" wide feeler stock (see

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table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *NOTE - F eler must extend entire length f piston.* Pull feeler from cylinder with a spring scale and note reading. Specifications should agree with table below.

PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0 0007	7	0 0025	7	0.0049
6	0.0004	6	0.0010	6	0 0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0 0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065

PISTON PINS

144" & 170" ENGINES

►*TOOL T60K-6135-A MODIFICATION NOTE:* If tool not previously modified to prevent damage to piston, make following modification so piston will not be damaged when Detail 2 of tool seats against piston pin boss: Grind a 1/16" - 45.° chamfer around outer edge of Detail 2.

REMOVAL: Press pin out of piston and connecting rod using Tool T60K-6135-A and vise and wrench, or Tool 6135-J and arbor press, as shown in illustrations.

INSTALLATION: Lightly coat all parts with engine oil, assemble piston and connecting rod correctly and press pin into piston and connecting rod as follows: 1) With Tool T60K-6135-A and vise and wrench, draw pin into assembly until pin seats in Detail 2. 2) With Tool 6135-J and arbor press, press pin into assembly until Detail 2 is seated firmly in Detail 1. See *illustrations.*

430" ENGINE

REMOVAL: Press or pull pin out of piston and connecting rod assembly with Piston Pin Remover and Replacer Set, Tool 6135-F, using an arbor press or vise and wrench as shown in illustrations.

INSTALLATION: Press or pull pin into piston and connecting rod with Tool 6135-F and an arbor press or vise and wrench as shown in illustrations. Pin must be ⅛" beyond face of piston boss. To check pin fit install all parts of Tool 6135-F for vise installation and place in a vise. Turn nut with torque wrench until pilot (Part No. 2 of tool) bottoms in anvil (Part No. 1 of tool). Minimum torque required to s at pilot is 20 ft. lbs. If less torque required replace c nnecting rod.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

►*MAIN BEARING CAP INSTALLATION NOTE:* Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine.

CRANKSHAFT THRUST BEARING ALIGNMENT: Install all bearing caps except thrust bearing cap and torque to specifications. Install thrust bearing cap with bolts finger tight. Pry crankshaft forward against upper half of bearings, then pry bearing cap to rear to align thrust surfaces of both bearing halves. While holding crankshaft forward, tighten thrust bearing cap bolts to specifications. Move crankshaft to rear of engine and check crankshaft endplay.

REAR MAIN BEARING OIL SEAL: *NOTE - On 292" engine, coat entire mating surface of seal retainer with oil resistant sealer before installation. On other engines, coat only rear mating surface of cap with sealer - do not use sealer forward of side seal groove. Use of sealer prevents oil leaks.*

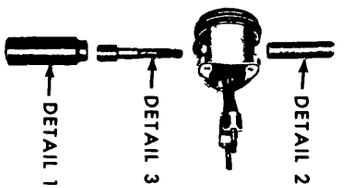
►*OVERSIZE REAR MAIN BEARING SEAL NOTE:* When main bearing cap side seal does not compress firmly when forced into cap (cause of oil leak), an oversize seal is available for installation. DO NOT use oversize seal unless inspection shows that standard seal does not function properly.

Upper & L w r Seal Installati n: *CAUTION - Us Installing & Forming Tool as listed bel w and foll w procedure listed exactly to prevent seal shift and il leaks.* Preform seal by hand and install into block or cap (or retainer) with thumbs, seating seal at center and then working from the ends toward the center. Now place installing tool properly in block or cap as follows: Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap or retainer for lower seal. Tool flanges must bottom on seal groove rear flange and bearing saddle (insert removed). Hold tool firmly and strike top of tool sharply. Cut seal ends flush with block or cap (or retainer). Trim frayed ends. Install cap or retainer and tighten bolts to specifications.

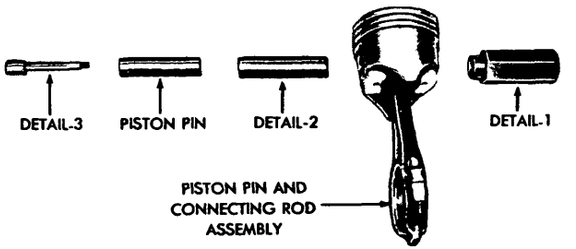
Side Seal Installation: Dip side seals in light engin oil and install **immediately** into grooves. *CAUTION - DO NOT use sealer. Seals expand with oil.* Tap seals firmly into position. Do not trim ends.

Testing Seal Installation - Squirt a few drops of oil into parting lines between cap and cylinder block from the outside. Blow compressed air against seals from the inside of block. If air bubbles appear in oil, it is an indication of oil leakage.

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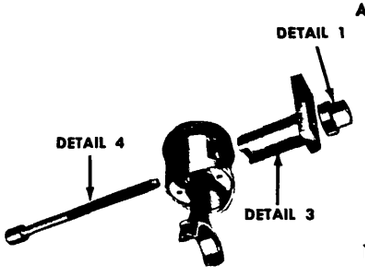


REMOVAL

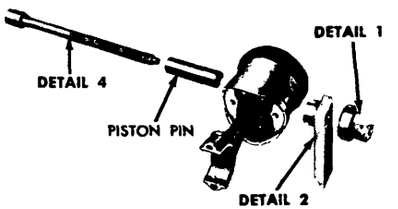


INSTALLATION

ARBOR PRESS METHOD

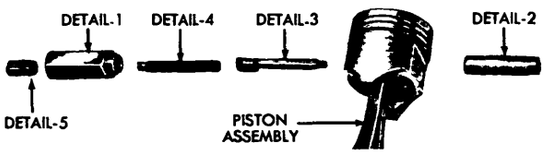


REMOVAL

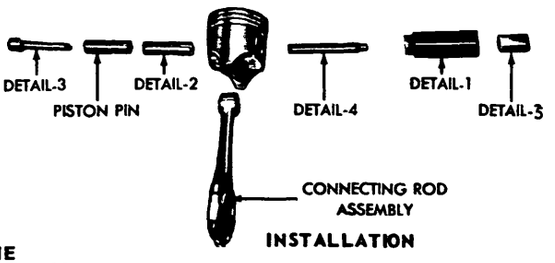


INSTALLATION

144" & 170" ENGINES



REMOVAL



INSTALLATION

430" ENGINE
VISE & WRENCH METHOD

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Crankshaft Rear Seal Installing Tool

Engine	Tool No.
144" & 170"	T60K-6701-A or 6701-D
223", 262", & 292"	T52L-6701-AGD or 6701-A
352" & 390"	T58P-6701-A or 6701-C
430"	6701-B

ENGINE FRONT COVER

6 CYLINDER ENGINES (EXCEPT TRUCKS)

ENGINE FRONT COVER: Removal - Drain crankcase and cooling system. Remove radiator, fan, belt, pulley, and damper. Remove water pump. Remove oil pan *(see individual Car Model Pages)*. Remove front cover. **Installation** - Use Pilot, T61K-6019-A or 6059-E (144" & 170"), T52L-6059-AEE or 6059-B (223") to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete installation.

292" V8 ENGINE (EXCEPT TRUCKS)

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator, fan, belt, pulley, spacer, power steering pump pulley, and pull crankshaft damper. Remove oil pan *(see Car Model Pages)*, and fuel pump. Disconnect hoses from water pump. Disconnect power steering pump from water pump (place so oil will not drain). Move generator support bracket and adjusting arm out of way. Remove front cover and water pump assembly. *NOTE* - Air conditioner compressor brackets are attached by front cover screws.

Installation - Place large diameter end of Cover Aligning Tool T52L-6059-AEE or 6059-B in bore of cover and place cover on block. Push in on tool and tighten cover bolts to specifications. Complete installation by reversing removal procedure.

352" & 390" V8 ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator. Remove belts. Remove water pump, fan, pulley, and generator adjusting arm as an assembly. Remove power steering pump pulley. Pull crankshaft damper. Remove oil pan *(see Car Model Pages)*. Remove fuel pump (unnecessary to disconnect flexible line). Remove stepped-down crankshaft sleeve with a three-jawed puller. Remove non-stepped-down sleeve with Puller, Tool T56P-6362-A. Remove front cover. *NOTE* - Air conditioner compressor brackets are attached by front cover bolts.

Installation - Use Pilot, Tool T61P-6019-B or 6059-F to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete installation.

430" ENGINE

ENGINE FRONT COVER: Removal - Drain cooling system and disconnect battery. Remove radiator supply tank, fan shield, drive belts, fluid fan and pulley assembly. Remove water pump (loosen power steering reservoir bracket mounting bolts for clearance). Remove crankshaft damper. Remove power steering pump (disconnect and plug lines). Remove fuel pump heat shield and fuel pump. Remove cup type plug from top of front cover and then remove fuel pump pushrod. Remove engine front cover.

Installation - Reverse removal procedure and note the following: 1) Power steering pump rubber insulators must be properly installed. 2) Lips of front cover seal must maintain proper contact with power steering pump.

6 CYL. & V8 TRUCK ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system and crankcase. On P Series, remove hood, then remove grille, headlights, parking lights, wind deflector and hood lower weatherstrip as an assembly. Remove accelerator cross shaft. On all trucks, remove radiator, fan shroud, fan, spacer, brackets, pulleys, and damper. On V8 trucks, remove fuel pump, disconnect engine front mounts and raise engine slightly. On all trucks, remove oil pan and flywheel housing inspection cover. Remove engine front cover.

Installation - *See 292" V8 Engine above for aligning tool and procedure.* Reverse removal procedure to complete installation.

ALL ENGINES

FRONT COVER OIL SEAL REPLACEMENT: *NOTE - On 430" engine, seal must be seated in cover. No special tool required. For other engines, proceed as follows:* Remove old seal with punch and clean recess in cover. Drive new seal in cover with proper tool (see below) until seal is fully seated and make sure spring is positioned properly in seal.

Front Cover Seal Installing Tool

Engine	Tool No.
144" & 170"	T60K-6700-A or 6700-C
223", 262", 292"	T52L-6700-BEE or 6700-B
352" & 390"	T58P-6700-B or 6700-B

CAMSHAFT & BEARINGS

►*CAMSHAFT REMOVAL PROCEDURE NOTE: See other sections of this Special Data for removal of Cylinder Head, Engine Front Cover, Intake Manifold, Rocker Arm Shaft Assembly, and Oil Pump. See individual Car Model pages for Oil Pan removal.*

144" & 170" ENGINES

CAMSHAFT REMOVAL: On Econoline, remove front passenger seat and engine cover. On Comet & Falcon, remove grille. On all models, remove radiator, engine front cover, oil pan and oil pump, sprockets and timing chain, distributor, fuel pump, oil filter, rocker arm shaft assembly, pushrods, cylinder head, lifters, and camshaft thrust plate. Remove camshaft.

223" & 262" ENGINES

CAMSHAFT REMOVAL: Remove headlight trim rings and grille, radiator, engine front cover, oil pan, dampers and pulleys, rocker arm shaft assembly, pushrods, distributor, fuel pump, oil filter, pushrod chamber cover, sprockets (or gears) and timing chain, and camshaft thrust plate and spacer. Raise and hold lifters clear of camshaft. On F Series Truck, disconnect engine front mounts and raise engine so camshaft can be removed through grille opening. On all models, remove camshaft.

292" V8 ENGINES

CAMSHAFT REMOVAL: Remove grille, radiator, engine front cover and water pump, intake manifold, oil pan, rocker arm shaft assemblies, pushrods, pushrod chamber cover, distributor, sprockets and timing chain, camshaft thrust plate and spacer. Raise and hold lifters clear of camshaft. Remove camshaft.

352" & 390" V8 ENGINES

CAMSHAFT REMOVAL: Remove grille (unnecessary on T-Bird), radiator, engine front cover, sprockets and timing chain, distributor, rocker arm shaft assemblies, pushrods, intake manifold, lifters, and oil pan and screen. Remove camshaft.

430" ENGINE

CAMSHAFT REMOVAL: Remove hood, air conditioning condenser (unnecessary to disconnect lines), radiator, lower center grille, engine front cover, sprockets and timing chain, rocker arm shaft assemblies, pushrods, and lifters. Remove chamshaft.

ALL ENGINES

►*CAMSHAFT BEARING INSTALLATION CAUTION:* When installing bearings, special care must be taken to align oil holes in bearings with drilled oil passages in cylinder block bearing bore. Also, bearings with 2 holes provide lubrication to valve system and extensive engine damage would result if these holes were blocked. *DO NOT install any bearing with 1 hole in a 2 hole bearing position.*

CAMSHAFT BEARING REPLACEMENT: 144" & 170" - Use Tool 6261-M & Adapter Set 6261-AB. No. 1 & No. 4 bearings are not interchangeable with any other bearing. No. 1 bearing must be installed to .100-.140" below front face of bearing bore in block. No. 4 bear- No. 4 bearing has two oil holes and must be installed so forward edge of bearing is $24\frac{3}{4}$"±1/64" from thrust plate mounting surface of block.

223" & 262": Use Tool T52L-6261-CEE & Adapter Set T54L-6250-B or Tool 6261-C. No. 1 bearing is not interchangeable with other bearings. No. 1 bearing must be installed to .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes.

292": Use Tool T52L-6261-CEE or 6261-C & Adapter Set T54L-6250-B or 6261-E. No. 1 & No. 3 bearings are not interchangeable with other bearings. No. 1 bearing must be installed to .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes.

352" & 390": Use Tool T52L-6261-CEE or 6261-F & Adapter Set T54L-6250-B or 6261-E. None of the bearings are interchangeable. No. 1 bearing must be installed to .005-.020" below front face of cylinder block.

430": Use Tool 6261-F & Adapter Set 6261-AC. *NOTE - Camshaft bearing journals and I.D. of bearings are stepped (largest journal and smallest bearing at front). DO NOT interchange bearings. Position number of bearing is stamped on each bearing.* No. 1 bearing must be installed with notch on bearing to front of engine and facing down toward bottom of block; and bearing must be .005-.020" below front face edge of cylinder block bearing bore. On other bearings, split in bearing must be up toward top of cylinder block.

VALVE SYSTEM

ALL ENGINES

ROTATABLE VALVES: Valves operate directly in valve guide holes in cylinder head. Remove and install as follows:

Valve Removal: Use Tool 6513-EE to compress valve springs. Remove all parts of assembly.

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Valve Installation: Lubricate valve guides and stems with engine oil. Apply Lubriplate to valve stem tip. Install all parts in same order as removed, making sure closed coil end of valve spring is toward cylinder head and damper spring, if used, is not caught in valve spring.

262" & 292" HD TRUCK ENGINES EXHAUST VALVES

FREE TURNING VALVE CAP CLEARANCE CHECK: Clearance between end of valve stem and inside surface of cap with valve locks and spring retainer installed should be .0002-.004" measured with Tool 6513-CE-2. Lap open end of cap if clearance more than .004".

EXHAUST VALVE SEAT INSERT INSTALLATION: Counterbore the recess in head about .001-.002" below old counterbore depth to clean recess. Clean all chips and oil from recess. Chill new oversize insert and tool in dry ice for ½ hour. Place insert on tool with small radius on outer edge facing outward, pilot tool in guide and drive insert into recess until fully seated. DO NOT peen around insert. Reface insert. *CAUTION - Installation must be made quickly after tool and insert removed from dry ic .*

VALVE GUIDES

ALL ENGINES

VALVE GUIDE REAMING (To Install Valves With Oversiz St ms): Reamers are furnished .003" oversize with standard diameter Pilot, .015" oversize reamer with .003" oversize pilot, and .030" oversize reamer with .015" oversize pilot. Always use reamers in sequence and reface valve seat after valve guide is reamed. Use Reamer Tool as follows:

Valv Guid Reaming Tool

Engin	Tool No.
144" & 170"	T60K-6085-A or 6085-AE
223" & 262"	T52L-6085-AEE or 6085
292"(Except HD Truck Exhaust)	T52L-6085-AEE or 6085
292" (HD Truck Exhaust)	T56T-6085-A
352" & 390"	T58P-6085-B or 6085-H
430"	6085-H

VALVE TAPPET ADJUSTMENT & CHECKING

MECHANICAL LIFTER TYPE ENGINE

"CONVENTIONAL" TYPE ROCKER ARMS

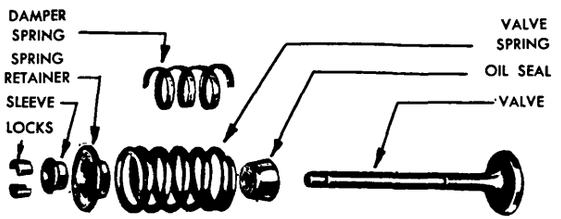
INITIAL VALVE LASH ADJUSTMENT (After Overhaul): Check rocker arm adjusting screw for proper setting. Torque required to turn screw after interference noted must be 3 ft. lbs. minimum. Replace adjusting screw or rocker arm if necessary.

6 Cylinder: Adjust intake and exhaust valves of each cylinder in firing order (1-5-3-6-2-4) with each piston at TDC of compression stroke.

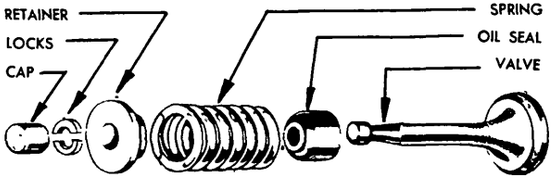
292" V8: 1) Place No. 1 piston at TDC of compression stroke. Adjust following valve clearances: No. 1,4,5 Exhaust; No. 1,2,7 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at TDC). Adjust following valve clearances: No. 6 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valve clearances: No. 2,3,7 Exhaust; No. 3,6,8 Intake.



ROTATABLE VALVE ASSY. (WITH DAMPER)



FREE-TURNING VALVE ASSY.

390"V8: 1) Place No. 1 piston at TDC of compression stroke. Adjust following valve clearances: No. 1,4,5 Exhaust; No. 1,7,8 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at TDC). Adjust following valve clearances: No. 2 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valve clearances: No. 3, 7, 8 Exhaust; No. 2, 3, 6 Intake.

All Engines: Make final clearance check. *See TUNE-UP on Car or Truck Model Pages.*

"ZERO LASH" TYPE ROCKER ARM ENGINES

INITIAL VALVE LASH ADJUSTMENT (After Overhaul): Adjust intake and exhaust valves of each cylinder in turn in firing order (1-5-3-6-2-4) with each piston at TDC at end of compression stroke as follows:

1) Push rocker arm eccentric in toward rocker arm until recess mark on eccentric is inboard of valve stem tip (eccentric will remain in position when released and should be near limit of its travel). Push eccentric end of rocker arm down until eccentric contacts valve stem tip and all vertical and horizontal clearance in eccentric is removed.

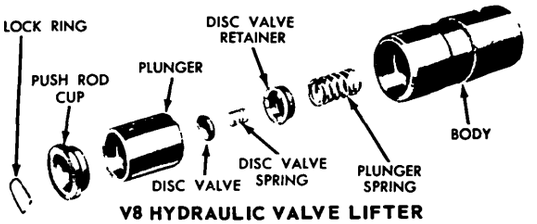
2) Tighten rocker arm adjusting screw to remove all lash between screw and pushrod socket. *CAUTION - Do not turn screw beyond this position or valve will be forced open.* Push outward slightly on eccentric. If all vertical clearance was not removed, eccentric will move out slightly until upper edge of eccentric bottoms in rocker arm. but recess mark must still be inboard of valve stem tip.

3) Continue to push eccentric outward and loosen rocker arm adjusting screw until recess mark in eccentric is centered directly over valve stem tip. Tighten adjusting screw locknut.

Final Adjustment - With engine idling at normal temperature, make minor adjustment with adjusting screw until eccentric recess mark is centered over valve stem tip during entire valve cycle of operation. Tighten adjusting screw locknut to 35 ft. lbs.

HYDRAULIC LIFTER TYPE ENGINE

HYDRAULIC LIFTER OPERATING RANGE CHECK: Clearance between valve stem and rocker arm should



V8 HYDRAULIC VALVE LIFTER

be .078-.218" with lifter fully collapsed. To check operating range of lifter, proceed as follows:

1) Place No. 1 piston at TDC of compression stroke. Following valves will be adjusted: No. 1, 3, 7, 8 Intake; No. 1, 4, 5, 8 Exhaust. Bleed lifter down with Tool T58P-6565-A or 6513-K and hold collapsed. Insert first step of gauge part of Tool T58P-6565-A or .078" feeler gauge between valve stem and rocker arm. If first step or gauge enters, use standard length pushrod. If first step or gauge does not enter, use .060" **shorter** pushrod (coded White). If second step of tool or .218" gauge can be inserted between valve stem and rocker arm, operating range is excessive (incorrect pushrod, excessive wear on pushrods, rocker arms, or valve stems). If all other parts of valve train are within limits, install .060" **longer** pushrod (coded Yellow).

2) Repeat above procedure with No. 6 piston at TDC of compression stroke and check the following valves: No. 2, 4, 5, 6 Intake; No. 2, 3, 6, 7 Exhaust.

►*CAUTION:* To avoid damage to valve or piston when compressing spring to remove pushrod, make sure piston is below TDC.

HYDRAULIC LIFTERS

352", 390", & 430" ENGINES

►*CAUTION:* Observe the following cautions when servicing hydraulic lifters: 1) Lifters must be reinstalled in bores from which removed. 2) DO NOT intermix parts of one lifter with parts of any other lifter. 3) Absolute cleanliness must be observed to keep lifters free of lint, dust, or other foreign material.

HYDRAULIC LIFTER OVERHAUL: Removal - Lifters can be removed with a magnet after removal of intake manifold (352" & 390" Engines), through pushrod holes (430" Engine).

Disassembly: Remove lock ring (depress plunger fully if necessary), pushrod cup, plunger and spring. Invert plunger and remove disc valve retainer (pry up gently with a screwdriver), disc valve and spring.

Reassembly: With plunger inverted, install disc valve, spring, and retainer. Insert plunger spring and plunger (open end up) into lifter body. Place pushrod cup on plunger and install lock ring (closed end first).

Lifter Testing: Leakdown rate should be 10-80 seconds under a 50 lb. load. Use a lifter tester according to directions of manufacturer.

ROCKER ARMS

►*1961 COMET & FALCON INSUFFICIENT ROCKER ARM SHAFT LUBRICATION & EXCESSIVE WEAR CORRECTION & PRODUCTION CHANGE:* 1) If there is excessive wear, noise, or insufficient lubrication of valve train parts, check first for clear passages in camshaft rear bearing journal and that rear camshaft

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bearing has been properly installed with both oil holes properly aligned with holes in block *(s "Camshaft & B arings" above).*

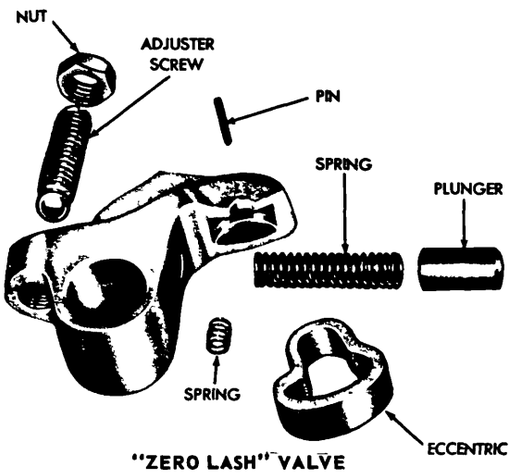
2) Cars built after February 28, 1961 (Comet), May 1, 1961 (Falcon) have revised rear rocker arm shaft support bracket to correct above conditions and following procedure should **not** be performed (will cause high oil consumption).

3) On early cars without new design rear bracket, proceed as follows: Remove rear support bracket retaining bolt and grind two flats on bolt threads (with flat centers 180° apart) to root diameter of bolt threads from chamfered part of shank to 2 7/16" from base of bolt head. Reinstall bolt and check for adequate lubrication.

223" 6 CYL. ENGINES

"ZERO LASH" TYPE ROCKER ARMS: Conventional type aluminum rocker arm modified to hold a spring-loaded hardened eccentric cam between rocker arm and valve stem. Plunger and spring mounted on underside or rocker arm work against eccentric and hold eccentric outward during engine cycle of rocker arm movement maintaining zero clearance at valve stem tip.

Overhaul - Disassemble rocker arm and eccentric assembly by removing eccentric retaining pin. Eccentric recess depth in rocker arm should not exceed .300" measured from radius corners of front cutout (below pin hole) perpendicular to greatest depth of recess. Reassemble all parts in correct positions (see illustration). *For rocker arm shaft assembly overhaul, see "6 Cyl. & 292" V8 Engines" below.*

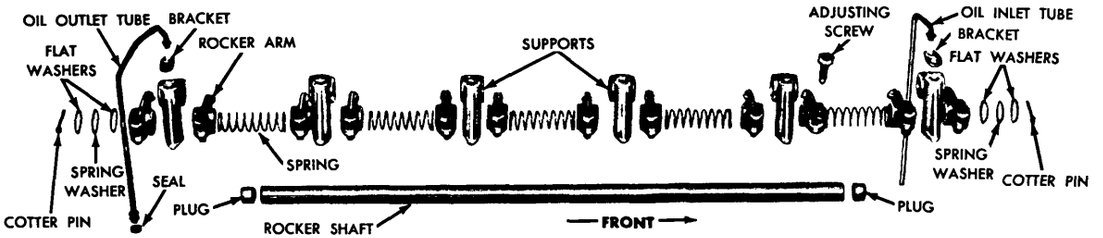


"ZERO LASH" VALVE ROCKER ARM ASSEMBLY

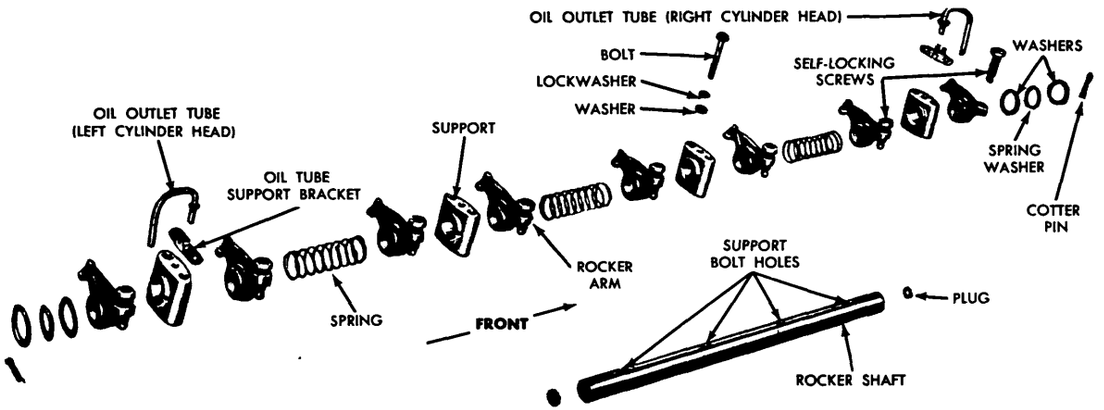
6 CYL. & 292" ENGINES

ROCKER ARM ASSEMBLY OVERHAUL: Removal - Remove oil inlet and outlet pipes. Loosen rocker arm adjusting screws to relieve spring tension. Loosen rocker arm shaft support retaining bolts evenly in turn, then remove rocker arm shaft assembly.

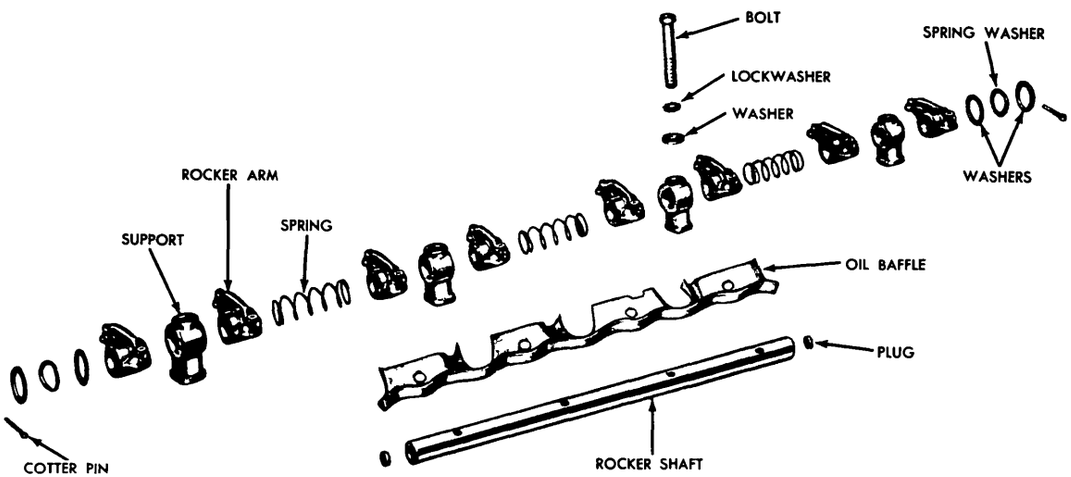
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6 CYLINDER 223" & 262" ROCKER ARM ASSEMBLY



V8 292" ENGINE ROCKER ARM ASSEMBLY



V8 352", 390" & 430" ENGINE ROCKER ARM ASSEMBLY

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Disass mbly: Remove cotter pins from ends of shaft and remove all parts, noting order in which assembled. To remove plugs from ends of shaft, pierce one plug and remove and push out other plug with a rod.

R ass mbly: Lubricate all moving parts with engine oil and apply Lubriplate to rocker arm pads. Install shaft end plugs with cup side out. Install all parts in same order as removed, with oil holes in shaft facing downward.

Installation: Reverse removal procedure, making sure that inlet line "0" ring seals are in place, and that support end of outlet pipe enters locating hole in shaft to position shaft properly.

352", 390" & 430" ENGINES (MECHANICAL LIFTERS)

ROCKER ARM ASSEMBLY OVERHAUL: Removal Loosen rocker arm adjusting screws to relieve spring tension. Loosen rocker arm shaft support retaining bolts evenly in turn, then remove rocker arm shaft assembly.

Disass mbly: S *"6 Cyl. & 292" V8 Engines" above.*

R ass mbly: S *"6 Cyl. & 292" V8 Engines" above.*

Installati n: Reverse removal procedure.

352", 390" & 430" ENGINES (HYDRAULIC LIFTERS)

ROCKER ARM ASSEMBLY OVERHAUL: Removal - *CAUTION - Foll w procedure below exactly to prev nt damag to valv train parts.* Place No. 1 piston at TDC at end of compression stroke and rotate crankshaft damper an additional 45°. Loosen right bank rocker arm shaft support bolts in sequence 2 turns at a time, starting at No. 4 (rear) cylinder. When bolts are loosened, remove rocker arm shaft assembly. Follow same procedure for right bank rocker arm shaft bolts, starting at No. 5 (front) cylinder.

Disass mbly: *"6 Cyl. & 292" V8 Engines" above.*

R ass mbly: *Se "6 Cyl. & 292" V8 Engines" above.* *430" ENGINE NOTE* - Identification notch on rocker arm shaft must be down and to rear of engine on left bank, down and to front of engine on right bank.

Installati n: *CAUTION - Follow procedure below exactly to p rmit hydraulic lifters to leak down and to pr vent damage to valve train parts.* Place No. 1 piston at TDC of compression stroke and rotate crankshaft damper an additional 45°. Tighten right bank rocker arm shaft support bolts in sequence, 2 turns at a time, starting at No. 4 (rear) cylinder, until torque specification is reached. Follow same procedure for right bank rocker arm shaft support bolts, starting at No. 5 (front) cylinder.

OILING SYSTEM

ENGINE LUBRICATION

144" & 170" ENGINES

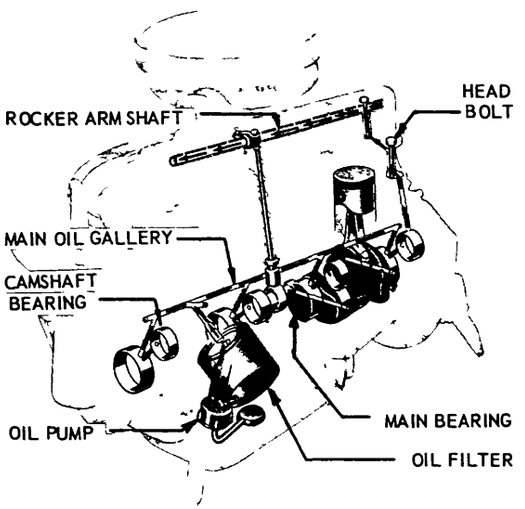
ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil under reduced pressure (metered by camshaft bearing) lubricates distributor drive gear and valve mechanism on cylinder head. All other parts are lubricated by oil spray or splash.

OPERATION: Rotor type oil pump mounted in crankcase at left front corner of engine. Pump draws oil through fixed strainer and intake pipe mounted on pump cover and delivers oil to full flow type filter mounted externally on front left side of crankcase. From the filter, oil passes through transverse passage to main oil gallery extending along full length of engine block directly above the camshaft. Oil is distributed through main oil gallery as follows:

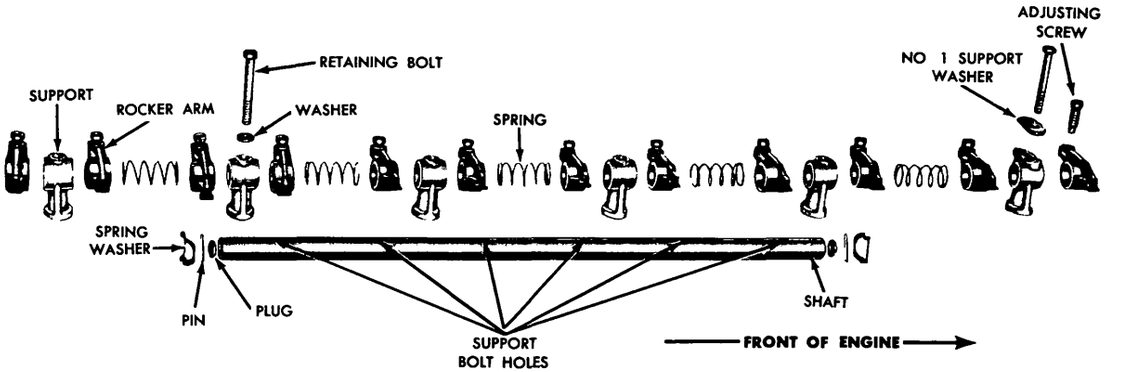
Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main gallery to each crankshaft bearing and then up to corresponding camshaft bearing. Distributor drive gear is lubricated from front camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provide continuous flow of oil to connecting rod bearings.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on right side of rod when this hole registers with oil hole in connecting rod journal.



144" & 170" ENGINE OILING SYSTEM



6 CYLINDER 144" & 170" ENGINE ROCKER ARM ASSEMBLY

Timing Chain & Sprockets - Lubricated by splash from oil pan.

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows through vertical passage in block and around left rear corner cylinder head bolt to oil port at rear rocker arm shaft bracket pad. Oil then flows around this bracket bolt to hollow rocker arm shaft, and is distributed to each rocker arm for rocker arm, pushrod, and valve tip lubrication. Excess oil is discharged from rocker arm shaft at front shaft bracket. Oil from rocker chamber runs down pushrods to lubricate pushrod seat and lifter and drains back into the oil pan through cored openings in the block.

OIL FILTER: Full flow type. Mounted externally on left front corner of engine. Filter has integral bypass valve and anti-drain back diaphragm.

223" & 262 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil metered by No. 3 camshaft bearing lubricates rocker arms, pushrods, and valve stems. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Gear type oil pump mounted in crankcase on right hand side draws oil through fixed oil inlet and strainer mounted on pump cover and delivers all oil through a passage in the pump body and crankcase wall to the oil filter intake port (filter mounted on pad on right side of crankcase). Filter outlet port on filter pad is connected to main oil gallery by a vertical passage and cross-passage in the block. Main oil gallery extends along right side of crankcase and oil is distributed from this gallery as follows:

Crankshaft & Camshaft Bearings - Lubricated by drilled passages in each crankcase web through which oil is supplied from main oil gallery to each crankshaft bearing. A transverse passage connects this passage with each camshaft bearing.

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with connecting rod bearing lubricating hole.

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Timing Chain & Sprock ts - Lubricated through drilled passage in front end of block which directs oil from front camshaft bearing to crankshaft sprocket (camshaft journal has flat which registers with bearing supply oil hole and timing chain lubrication hole once in each revolution). Oil slinger on front end of crankshaft also throws oil onto chain.

R cker Arms. Pushrods, & Valves - Drilled passage in No. 3 (rear intermediate) camshaft journal feeds oil at reduced pressure to drilled passage in block. A tube extending up through block and cylinder head directs this oil to the No. 6 (rear) rocker shaft bracket and into the hollow rocker arm shaft. Oil then flows through drilled passages in rocker arm to lubricate rocker arm bushing, pushrod socket and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker arm shaft flows through outlet pipe at No. 1 (front) rocker shaft bracket. This pipe terminates at drilled hole in lifter chamber directly above distributor driveshaft for distributor and drive gear lubrication (see below).

►*"ZERO LASH" ROCKER ARM NOTE:* Spring in rocker arm recess between arm and eccentric separates arm and eccentric for increased oil flow around eccentric. Rocker arm plunger and spring assembly is filled with oil to provide a cushioning effect to eccentric movement.

Valv Lifter & Fu l Pump Ecc ntric - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. A drilled hole in the lifter chamber floor directly above fuel pump eccentric on camshaft provides lubrication for the eccentric. A return hole at rear of lifter chamber allows oil to drain back into the crankcase.

Distributor & Drive Gear - Oil return pipe from rocker arm shaft terminates at drilled hole in lifter chamber. This hole is directly above distributor drive gear on camshaft and gears are lubricated by this return oil. A transverse passage in the block at the oil return pipe location in the lifter chamber directs drain oil to relieved section of distributor housing. Oil holes in housing direct oil to distributor lower bushing and drive gear.

OIL FILTER: Full-flow type mounted on pad on right side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when engine is started up.

292" V8 ENGINE

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil metered by camshaft bearings lubricates rocker arms, pushrods, and valves. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted externally on left side of crankcase draws oil through fixed oil strainer in oil pan and external oil pipe (passes through or attached to side of oil pan) and delivers all oil through a port in the pump mounting base and passages in crankcase to oil filter intake port (filter mounted on pad on left side of crankcase). Filter outlet port on crankcase connects directly with main oil gallery extending along left side of crankcase. Oil is distributed from this main oil gallery as follows:

Crankshaft & Camshaft Bearings - Lubricated by drilled passage in each crankcase web through which oil is supplied from main oil gallery to intersecting passage leading to corresponding main and camshaft bearings.

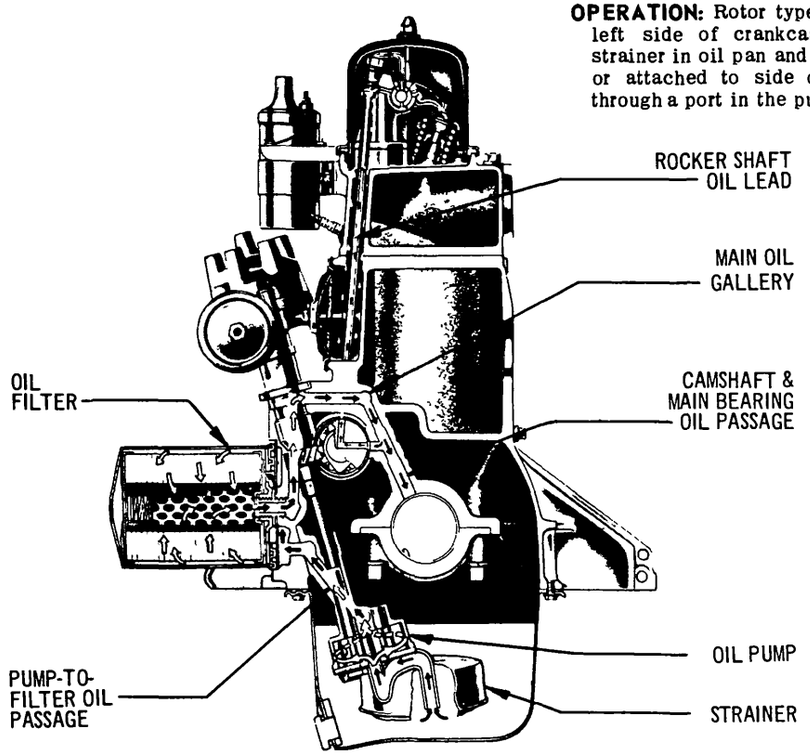
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in side of connecting rod lower end when this hole lines up with oil hole in crankpin.

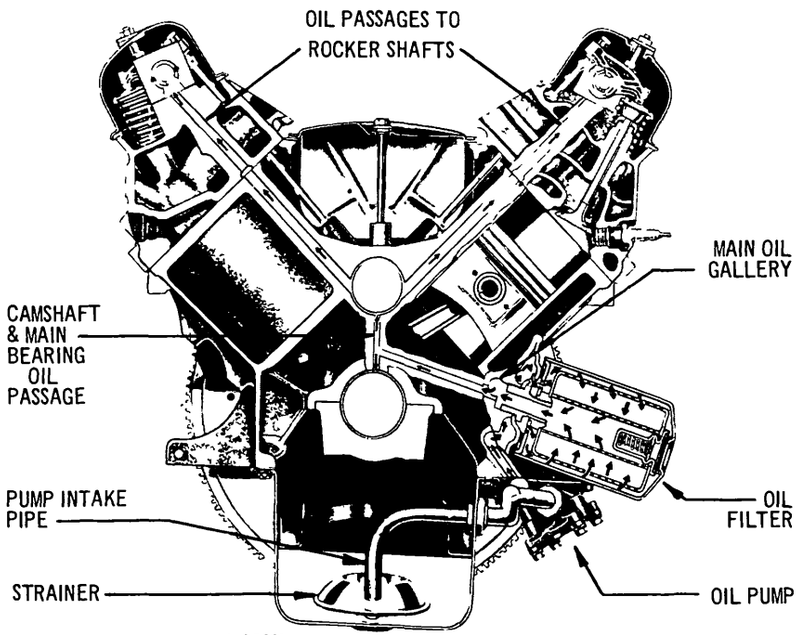
Rocker Arms, Pushrods & Valv s - Drilled passages in block at No. 3 camshaft bearing extend up through block and matching passages in cylinder heads (with offset formed by channel on lower face of head) and oil then flows up through drilled passage in No. 2 rocker shaft support bracket (Right Bank), No. 3 rocker shaft support bracket (Left Bank) to hollow rocker arm shaft. Oil holes in shaft and rocker arm provide lubrication for rocker arm bushing, pushrod ball end and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker shaft flows through outlet pipe at No. 1 rocker shaft bracket (Right Bank), No. 4 rocker shaft bracket (Left Bank) for timing chain and distributor lubrication (see below).

Valve Lifters & Pushrod Seats - Oil drainage from rocker arm flows down pushrods into lifter chamber for

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223" & 262" ENGINE OILING SYSTEM



V8 292" ENGINE OILING SYSTEM

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valve lifter and pushrod seat lubrication. Oil for this purpose is also supplied by rocker shaft outlet pipes which terminate in lifter chamber. Oil in lifter chamber is returned to oil pan through large opening at rear of chamber. This oil lubricates distributor drive gear.

Distributor, Intermediate Shaft & Bushing - Lubricated by oil supplied through drilled passage from No. 5 camshaft bearing (camshaft journal is drilled and oil flows through this passage from camshaft bearing oil hole to distributor oil passage). *NOTE* - Distributor drive gear is lubricated by oil return from lifter chamber to oil pan through large opening at rear of lifter chamber.

Timing Chain & Sprockets - Oil return from right bank rocker chamber (outlet pipe at No. 1 rocker shaft bracket) is channeled by trough in lifter chamber to hole in front cylinder block wall through which the oil is directed on timing chain and sprockets. Oil slinger on crankshaft also throws oil on timing chain.

OIL FILTER: Full-flow type mounted on pad on left side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when the engine is started up.

352" & 390" V8 ENGINES

►*MECHANICAL LIFTER ENGINE NOTE:* On engines with mechanical lifters, engine oiling system is changed as follows: 1) Jiggle pin in main oil gallery replaced by a cap plug. 2) Passages from main oil galleries to right and left lifter galleries are plugged.

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arms. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted in crankcase draws oil through fixed intake pipe and oil strainer mounted on pump body and delivers oil through passage in crankcase to oil filter inlet port on filter mounting pad. From the filter, oil flows through transverse passages in the front wall of the cylinder block to forward end of main oil gallery which extends the entire length of the crankcase in the floor of the lifter chamber. At a point near the rear of the engine, cross-passages connect the main gallery with the right and left valve lifter galleries which extend along the length of the crankcase in line with the valve lifters. Oil is distributed through these galleries as follows:

Crankshaft & Camshaft Bearings - Front camshaft and crankshaft bearings are lubricated directly from the oil filter outlet passage (vertical passage in front cylinder wall between bearings intersects the filter cross-passage). **Other** camshaft and crankshaft bearings are lubricated through vertical passage in crankcase web at each bearing which extends down from main oil gallery to corresponding camshaft and crankshaft bearings (camshaft bearing bore in block is grooved to permit oil flow around bearing and on to the crankshaft bearing).

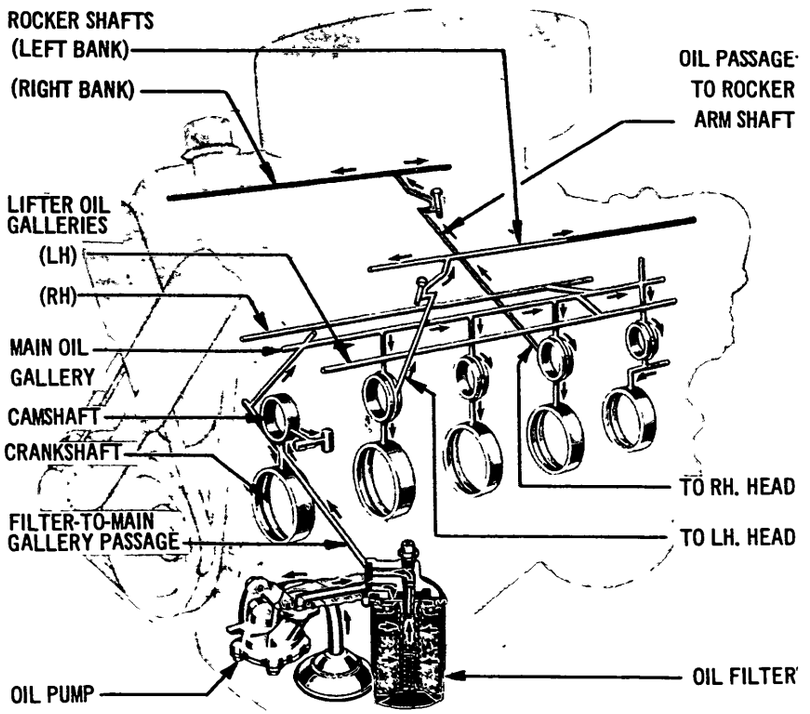
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall by connecting rod of the same cylinder in opposite bank. Spray hole consists of a slot in parting face of rod bearing cap through which oil is sprayed when this slot lines up with oil hole in crankpin. *NOTE - Rods must be installed with this slot upward toward camshaft to effect this cross-lubrication.*

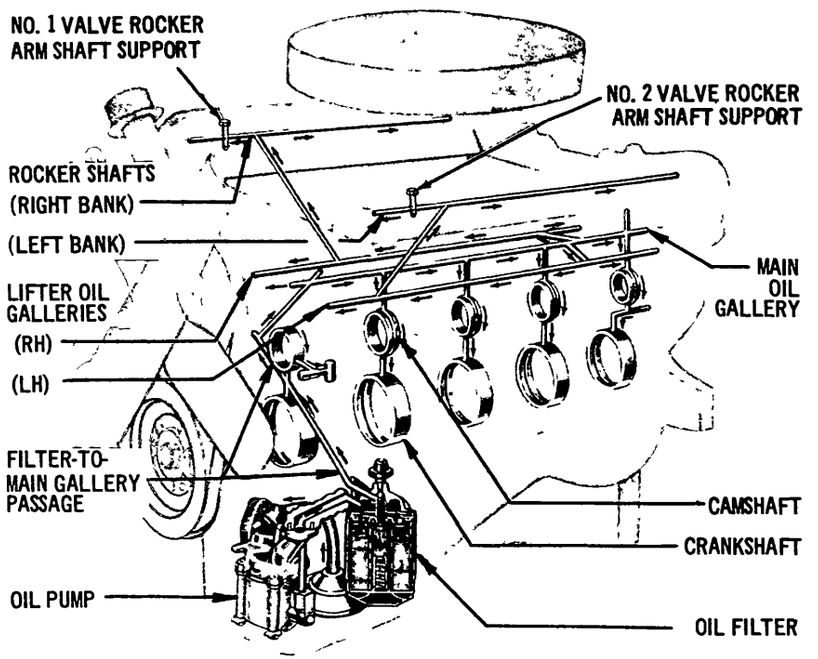
Valve Lifters - Right and left lifter oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank) extends up through block and matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect this bolt hole with passage in block). An angle passage in the head connects cylinder head bolt hole with rocker shaft support bolt hole (No. 2 support bracket for left bank, No. 3 bracket for right bank). Oil then flows up around bracket bolt and through an angle passage into the hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips (baffle under rocker shaft assembly shields valve stems from oil splash). Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber is returned to oil pan through drain holes at each end of cylinder head and in lifter chamber.

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V8 352" & 390" ENGINE OILING SYSTEM



V8 430" ENGINE OILING SYSTEM

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Timing Chain & Sprockets - Plug at forward end of main oil gallery has vent hole and jiggle pin to vent air trapped in gallery. Oil passing through this vent lubricates timing chain and sprockets.

Distributor & Drive Gear - Lubricated through cross-passage from No. 1 camshaft bearing (see illustration).

OIL FILTER: Full flow type mounted on adapter at right front of crankcase. Relief valve in filter assures engine lubrication if filter element clogged.

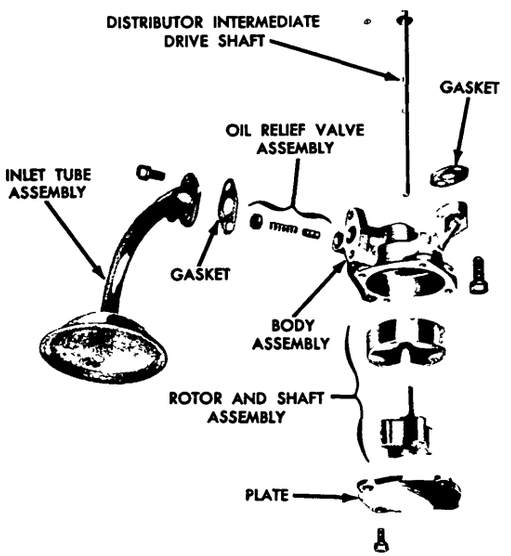
430" V8 ENGINE

DESCRIPTION: *Oiling system for this engine is same as for 352" & 390" V8 Engines (see above) except for the following details:*

Crankshaft & Camshaft Bearings - All bearings are lubricated through vertical passages from main oil gallery (oil flow from filter is direct to main oil gallery).

Rocker Arms, Pushrods, & Valves - Drilled passages in block lead from right and left lifter oil galleries and connect with matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect passage in block with this bolt hole). An angle passage in the head connects the cylinder head bolt with the rocker shaft support bracket hole (No. 1 support bracket for right bank, No. 2 bracket for left bank). Oil then flows up around bracket bolt and through angle passage in bracket into hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips. Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber drains back into lifter chamber through holes at front and rear lower corners of head.

Timing Chain & Sprockets - Oil draining from front camshaft bearing flows onto thrust face of camshaft sprocket and is sprayed on timing chain and crankshaft sprocket.



V8 352", 390" & 430" ENGINE OIL PUMP

OIL PUMP

►*6 CYLINDER ENGINE GEAR TYPE OIL PUMP NOTE: For data on this type pump, see "Ford Special Data" in 1960 Final Data or later Manual edition.*

ALL ENGINES

OIL PUMP: Removal - Remove oil pan. On 223" Engine, remove distributor. On all 6 Cyl. & 292" V8 Engines, remove oil pump and intermediate shaft. On 352", 390", & 430" V8 Engines, remove oil pump after oil pan removed, or drop oil pump into pan while removing pan.

Disassembly: Remove inlet tube and cover. Remove inner rotor and shaft, then remove outer race. Remove relief valve chamber cap with self-threading screw, then remove relief valve spring and plunger.

Inspection: Clean all parts and dry thoroughly. Check all parts for wear or damage and replace as necessary. Check clearances as given in table below. Rotor endplay is measured with straightedge across housing with pump assembled. *NOTE* - Outer race, inner rotor and shaft are serviced as an assembly only.

Oil Pump Specifications

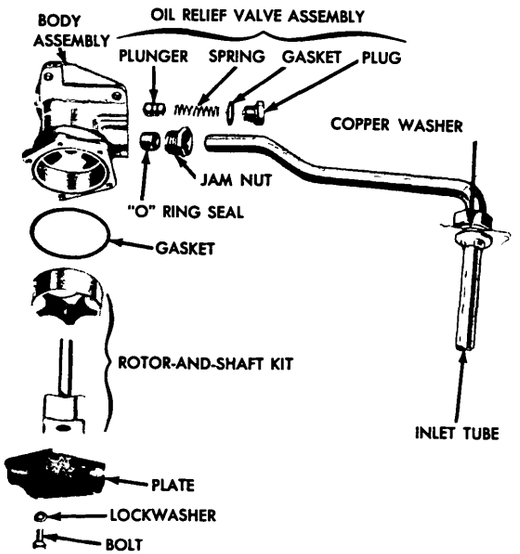
Item	All Engines
Outer Race-To-Housing	① .006-.012"
Rotor Endplay	② .0011-.0041"
Shaft-To-Housing	③ .0015-.0029"
Relief Valve-To-Bore	.0015-.0029"

① - .003-.008" (V8 Truck). ② - .0010-.0035" (V8 Truck). ③ - .0025-.0039" (223" & 262" Engines).

Relief Valve Spring Specifications

Engine	Lbs. Pressure	Length
144" & 170"	8.6-9.5	1.078"
223" & 262"	9.0-9.6	1.53"
292"	8.7-9.9	1.71"
352", 390", 430"	9.0-9.6	1.53"

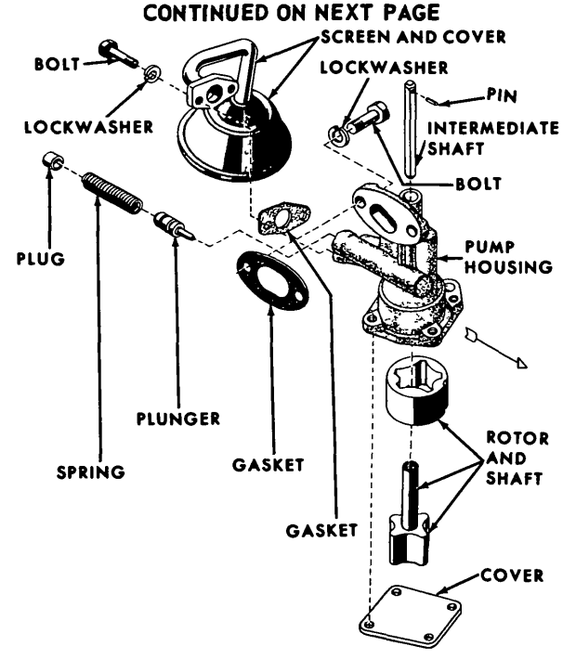
Reassembly: Reverse disassembly procedure. Torque cover attaching screws to 6-9 ft. lbs. (except 430" Eng.), 90-100 inch-lbs. (430" Engine).



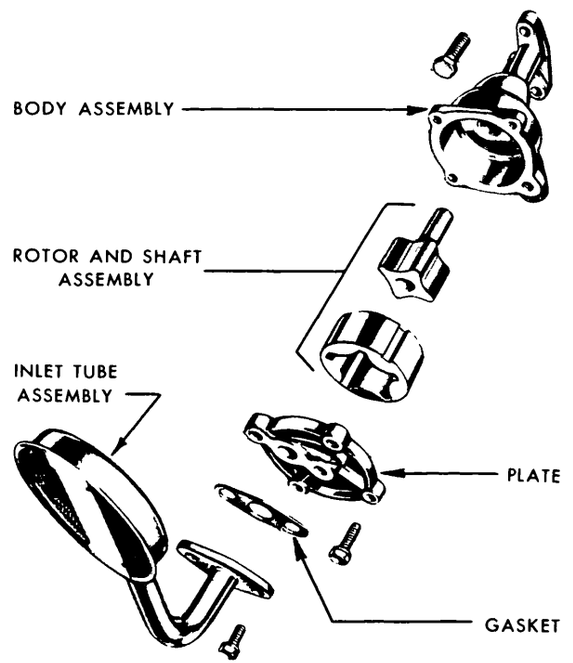
V8 292" ENGINE OIL PUMP

Installation: Reverse removal procedure.

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223" & 262" ENGINE OIL PUMP (ROTOR TYPE)



144" & 170" ENGINE OIL PUMP

CONTINUED FROM PRECEDING PAGE

ENGINE COOLING SYSTEM

WATER PUMP

ALL ENGINES

►*TOOL NOTE:* Special tool sets are available for water pump overhaul. Other suitable support plates and drivers may be used providing they support and apply pressure properly to shaft, bearing, housing, and other parts.

WATER PUMP OVERHAUL: Removal - Drain cooling system and disconnect hoses from pump. Remove belt, fan, and water pump pulley. Remove any other brackets or accessories attached to water pump (unnecessary to disconnect power steering pump hoses). Remove radiator supply tank on Continental. Remove water pump.

Disassembly: Remove back plate (if equipped). Press or pull hub or pulley from shaft. Support housing and press shaft and bearing out of impeller, seal, and housing (or press shaft from housing, then press impeller from shaft). Press seal from housing. Remove slinger from shaft if slinger damaged.

Reassembly: *NOTE - See table below for specifications.* Support shaft and press new slinger on shaft for specified clearance between underside of slinger flange to end of bearing race (144" & 170"), or specified distance from slinger flange to end of shaft (Others). On 144" & 170" Engines, coat shaft and bearing with a light coat of grease and press shaft into housing, with housing properly supported. On all engines, coat seal with waterproof sealer and press into housing, applying pressure to seal flange only. On all other engines, support housing and press shaft and bearing into housing until bearing is flush with hub edge of housing. On all engines, coat rubbing face of impeller with grease and press impeller on shaft with shaft properly supported until impeller-to-housing clearance is as specified. *NOTE - On pumps without back plate, impeller clearance is between front face of impeller to rear mounting face of housing. On pumps with back plate, impeller clearance is distance rear face of impeller is below housing mounting face.* Support shaft and press hub on shaft to dimension specified from front face of hub to pump housing mounting face (front face of pulley to face of housing mounting legs on 430" Engine).

Installation: Reverse removal procedure.

Water Pump Dimensions & Clearances

Engine	Slinger	Impeller	Hub
144" & 170"	.220"	.005-.025"	3.94"
223" Pass.	1.94"	.015-.025"	4.32"
223" Truck	1.76"	.020-.030"	4.36"
262"		.020-.030"	4.70"
292" Pass.	1.94"	.025-.035"	4.48"
292" Truck	1.94"	.030-.040"	4.48"
352" & 390"	1.94"	.070-.080"	8.65"
430"		.105-.115"	7.094"

POWER BOOSTER FAN

FORD & MERCURY

POWER BOOSTER FAN: Fluid coupling filled with silicone oil attached to water pump pulley at input side and to fan at output side. Unit is designed to provide driving force for maximum fan operation at low speeds and to limit top speeds of fan at higher engine speeds. This is accomplished by the torque carrying capacity of the fluid and also by the amount of fluid admitted to the coupling depending on various engine and ambient temperatures. A bi-metal strip on front of clutch moves out under higher temperatures and allows metal rod in center of clutch to move out. This rod actuates a valve inside clutch to control amount of fluid admitted to coupling from a reserve chamber. This action increases fan speed when air becomes hotter. Reverse action takes place under colder temperatures. Maximum fan speed is reached at approximately 3700 Engine RPM. Maximum fan speed at about 75MPH under extremely high ambient temperatures is 2700 RPM. Under low ambient temperatures, maximum fan speed is approximately 1500 RPM.

Trouble Shooting & Diagnosis: Poor cooling or noise may be caused by: Actuating rod sticking; Bi-metal strip deformed or kinked; Excessive fluid leakage from clutch unit.

Disassembly: Push bi-metal strip from retaining brackets and remove. Clean clutch unit with rag dipped in solvent. *CAUTION - DO NOT immerse clutch unit in any kind of liquid. Clean unit before removing actuating rod to prevent damage.* Remove actuating rod with fingers or needle-nose pliers.

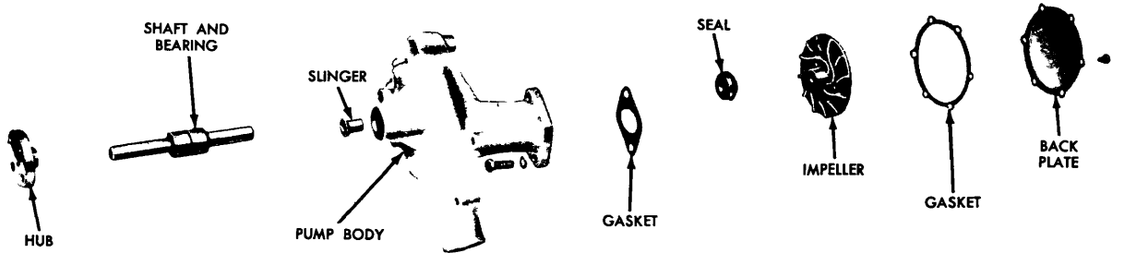
Inspection: Replace entire clutch assembly if there is excess fluid leakage or if bi-metal strip kinked or bent. *NOTE - Bi-metal strips not interchangeable among units.* Clean actuating rod bore in clutch with crocus cloth. Clean rod in solvent and make sure rod moves freely in clutch bore. Replace damaged rod with replacement rod. *CAUTION - Replacement rod must be same length as old rod. Adjust Allen screw in service rod to obtain proper length.*

Reassembly: Reverse disassembly procedure.

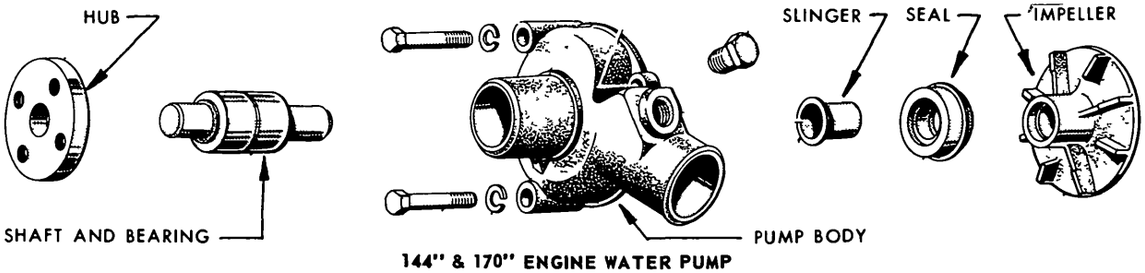
LINCOLN CONTINENTAL

POWER BOOSTER FAN: Fluid coupling mounted between fan and water pump pulley. Unit is regulated by underhood temperatures to control fan RPM as engine cooling requirements change. Bi-metal coil spring on clutch front cover expands under higher temperatures and

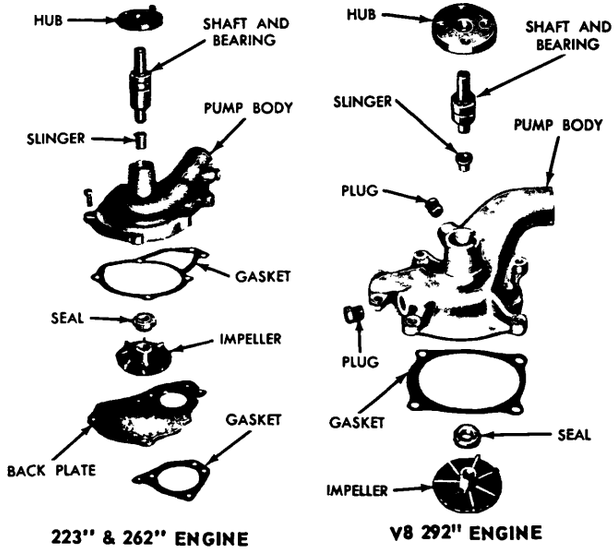
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V8 352", 390" & 430" ENGINE WATER PUMP



144" & 170" ENGINE WATER PUMP



223" & 262" ENGINE

V8 292" ENGINE

WATER PUMPS

CONTINUED FROM PRECEDING PAGE

causes a plate inside unit to uncover opening between reserve and drive chambers and control amount of fluid in drive chamber. Reverse operation takes place under lower temperatures.

►*SAFETY CAUTION: Do not permit silicone oil to come in contact with the eyes as irritation will result.*

►*TESTING CAUTION:* Before testing, oil in unit must have minimum temperature of 65-70°F (park in heated garage overnight or operate engine at 1000 RPM for 20 minutes); and fan unit must be warm (operate for at least 5 minutes regardless of ambient air temperatures).

T sting & Trouble Shooting: *NOTE - Unit cannot be repaired and is serviced as an assembly only. If unit does not operate properly under any of the following t sts, it must be replaced.*

1) With engine stopped, fan should rotate under light finger pressure. If unit locked, replace it.

2) Make sure belt tension is properly adjusted and thermostatic spring is free of dirt and other foreign matter. Disengage spring from adjusting slot and rotate spring counterclockwise (toward No. 1 cylinder of engine) until internal valve is felt seating against a stop. Tape spring in this position. Unit should not provide engine torque to fan regardless of underhood temperatures.

3) Mark one fan blade with chalk, connect a tachometer to engine and a timing light to No. 1 spark plug. Start engine and hold light beam at fan. Marked blade of fan should be stopped between 1700 and 1900 engine RPM. If above or below this range, replace unit. Remove tape from spring and insert spring in proper adjustment position (see below).

Adjustment: Three adjustment slots in coil spring retaining bracket. End of spring should be positioned in proper slot depending on engine cooling requirements and ambient air temperaturds as follows:

Position A - Left hand slot when viewed from front of fan. Lowers underhood temperature requirements necessary to engage coupling to fan. Use this slot for high ambient air temperature zones and on cars with high engine operating temperatures.

Position B - Center slot. Use under normal operating conditions.

Position C- Right hand slot when viewed from front of fan. Permits higher underhood temperatures before drive torque applied to fan. Use in low ambient air temperature zones to increase engine operating temperature.

FUEL SYSTEM NOTES

430" ENGINE

CARBURETOR AIR INTAKE DUCT ASSEMBLY (WITH THERMOSTAT CONTROL): Thermostatically controlled valve in air intake duct assembly should be fully closed at temperatures below 75°F (for air intake from rear "heated" opening) and should start to open at 85°F. Valve should be wide open at 100°F (for air intake from outside through left radiator side air deflector). If valve does not operate satisfactorily, remove duct assembly and test operation as follows:

Duct Assembly Removal: Loosen clampscrew and slide flexible hose off end of duct. Remove wing nut retaining air cleaner on carburetor, remove nut and washer retaining duct assembly on bracket. Lift air cleaner and duct assembly off engine. Loosen two clampscrews and slide duct assembly from air cleaner.

Testing: Place duct assembly in pan of water at temperature below 75°F. (thermostat must be covered by water). Valve should be in closed "heat on" position. Heat the water slowly. At temperature of 85°F, valve should start to open *(NOTE* - If valve does not start to open, hold water temperature at 85°F for eight minutes before discarding thermostat as defective). Increase water temperature to 100°F. Valve should now be wide open in "heat off" position *(NOTE* - If valve not wide open, hold water temperature at 100°F for eight minutes before discarding thermostat as defective). If valve operation not satisfactory, remove thermostat and spring assembly and check valve shaft for binding. If valve moves freely, replace thermostat and duct assembly. If valve does not operate correctly, adjust thermostat rod as follows:

Adjustment: Increase rod length to move valve toward "heat off" position, decrease rod length to move valve toward "heat on" position.

►*JACKING & HOISTING CAUTION: B fore jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

M d l	Series
Passenger Cars	10
Station Wagons & Falcon Ranchero	20

SERIAL NUMBER: Stamped on patent plate on rear face of left front door inner panel. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 H 12 S 100001

① - Year. 1 1961.
② - Assembly Plant. H Lorain, K Kansas City, R San Jose, S Pilot Plant, T Metuchen.
③ - Model Series. 11 2-Door Sedan, 12 4-Door Sedan, 21 2-Door Station Wagon, 22 4-Door Station Wagon, 27 Falcon Ranchero.
④ - Engine. S 144 cu. ins., D 144 cu. ins. (Low Compr. Ratio), U 170 cu. ins., E 170 cu. ins. (Low Compr. Ratio).
⑤ - Beginning vehicle number at each assembly plant (100001 for Falcon; 800001 for Comet).

ENGINE IDENTIFICATION NUMBER: Stamped on top of block on front left side near crankcase breather pipe. Designates Engine Plant, Year, Month & Day of manufacture, and Inspector's Identification. Not used for licensing. *NOTE* - Letter stamped on this boss to rear of Identification Number indicates engine type as follows: N - 144" engine, T - 170" engine.

►*ENGINE IDENTIFICATION NOTE (COMET):* Carburetor Air Cleaner and Valve Rocker Cover painted yellow (144"), silver (170").

TUNE-UP

COMPRESSION PRESSURE: 170 lbs. ± 20 lbs. All cylinders must be equal within 10 lbs.

VACUUM READING: Steady 18" at idle speed.

VALVE TAPPET CLEARANCE: .016" All Valves. Use step-type feeler gauge (.015" GO, .017" NO GO). If tappet clearance set with engine cold, reset clearance after operating engine for 30 minutes at 1200 RPM to stabilize temperature.

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: "Hot Spot" in intake manifold at lower center and engine coolant heated spacer between carburetor and intake manifold.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for carburetion and ignition troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .032-.036".

Spark Plugs - Champion F-14Y or 870. 18 mm. Torque to 15-20 ft. lbs. *NOTE* - Plugs have tapered seat and do not require a gasket. Correct torque is important.

COIL: C met & Falcon No. B6A-12029-B.

Igniti n Current - 2.5 amps. idling, 4.5 amps. stopped.

R sist r - Comet & Falcon No. COLF-12250-A- Pink resistance wire in harness between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.

DISTRIBUTOR: F rd. "Loadomatic" type of same design used previously. As follows:

Engine & Transmission	① Distributor No.
144" Eng. S.M. ②	CODF-12127-A, ③ C1DF-12127-A
144" Eng. A.T. ④	CODF-12127-B, C1DF-12127-D
170" Eng. Synchro-mesh	C1DF-12127-B
170" Eng. Auto. Trans.	C1DF-12127-C

① - Stamped on distributor housing for identification.
② - Synchro-mesh Transmission.
③ - Replaced by CCDF-12127-A on Falcon.
④ - Automatic Transmission.

Condenser - Comet & Falcon No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Comet & Falcon No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand

① CODF & C1DF-12127-A			② C1DF-12127-B		
Distr. Degrees	Vacuum (" of Hg)	Distr. RPM	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.33	400	1½-2½	0.43	700
½-1½	0.78	600	5¼-6¼	0.92	1000
3½-4½	1.30	800	7½-8¾	1.50	1300
10-11¼	3.45	1400	10-11¼	2.40	1700
12½-13¾	5.00	1800	11-12¼	3.00	2000
12¾-14	5.35	2000			

① - Set test stand to 0° at 300 RPM & 0" of Hg.
② - Set test stand to 0° at 450 RPM & 0" of Hg.

Advance Performance
►With Distributor On Test Stand

③ C1DF-12127-C			④ CODF-12127-B and C1DF-12127-D		
Distr. Degrees	Vacuum (" of Hg)	Distr. RPM	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.43	700	0	0.65	700
¾-1¾	0.76	900	1¼-2¼	1.27	1000
4½-5½	1.50	1300	4¾-5¾	2.93	1600
7-8¼	2.40	1700	5¾-7	3.94	2000
8½-9¾	3.00	2000			

③ - Set test stand to 0° at 600 RPM & 0.21" of Hg.
④ - Set test stand to 0° at 600 RPM & 0.48" of Hg.

IGNITION TIMING

Setting - 4° BTDC (Synchro-mesh), 10° BTDC (Auto. Trans.). *NOTE - Allowable range 2° to 10° BTDC. Set timing with engine idling and vacuum line disconnected. Set timing at 10° BTDC on all engines when operated over 5000 ft. alt.*

Timing Mark - Notch in crankshaft pulley and timing pointer on left side of chain case cover. Pointer marked "TDC", "2" (Falcon), "3" (Comet), "6", "10". Align pulley notch with correct mark on pointer.

CARBURETOR

►*CARBURETOR APPLICATION: Holley "Visi-Flo" single barrel carburetor used on all models.*

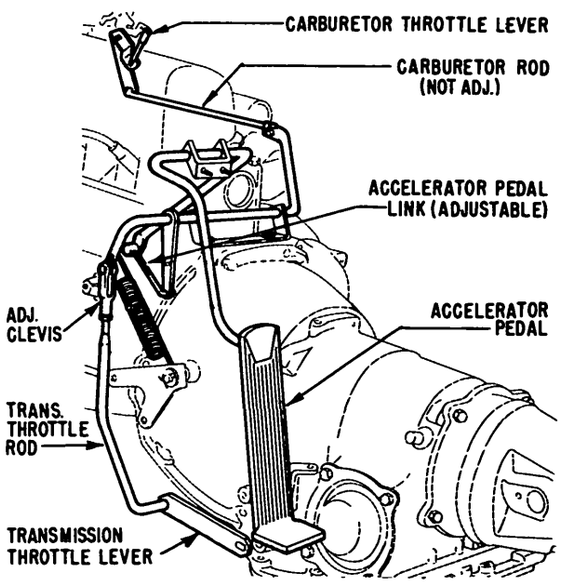
►*HIGH FUEL CONSUMPTION CORRECTION:* May be caused by improperly installed power valve or damaged power valve diaphragm. *See "Holl y Visi-Flo Carbur tors" in Carbur tion Secti n.*

►*INCONSISTENT RETURN TO IDLE SPEED CORRECTION (Cars Without Vacuum Controlled Thr ttl Linkage):* If engine fails to return to same idle speed every time, check for sticking carburetor throttle plates, binding carburetor throttle shaft, binding throttle linkage, and proper dashpot adjustment before replacing dashpot. A synchro-mesh transmission accelerator retracting spring, No. CODD-9737-E, cut and formed to old spring dimensions, may also be installed to correct this condition.

►*1961 COMET & FALCON AUTOMATIC TRANSMISSION & THROTTLE LINKAGE PRODUCTION CHANGE:* Beginning April 16, 1961 (Falcon) approximately May 1, 1961 (Comet), transmission throttle valve is controlled by a vacuum unit at rear of transmission case. *Thr ttl linkage adjustment procedures for non-vacuum and for vacuum controlled throttle valve transmission are different as detailed below.*

THROTTLE LINKAGE ADJUSTMENT (Non-Vacuum Controlled Type): With engine at normal operating temperature, idle speed correctly set, and anti-stall dashpot correctly adjusted (see below), proceed as follows: Disconnect throttle control rod at clevis and push rod downward so transmission throttle lever is against stop in transmission. Hold pressure on rod and adjust length of throttle control rod so clevis pin fits freely, **then turn clevis 3½ turns clockwise to shorten rod.** Install clevis pin. Accelerator pedal height should be 4" from top front corner of pedal to floor mat (Comet); 4¼" from top rear corner of pedal to floor pan (Falcon). To adjust, turn threaded trunnion at accelerator connecting link. *Make final adjustment using pressure method as follows:* Connect a tachometer to engine, remove cap from pressure tube fitting at rear of engine and install Pressure Gauge 77820-B and Adapter

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THROTTLE LINKAGE (NON-VACUUM TYPE)

S e INDEXES on Pgs. 4 to 9 for complet CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

77820-C (Comet), Adapter T60L-7000-B and Pressure Gauge Hose T57L-77230-A (Falcon). Apply parking brake and accelerate engine to 1200 RPM with selector lever in "D". If pressure below 53 lbs. (144"), 77 lbs. (170" Comet), 78 lbs. (170" Falcon), shorten throttle control rod. If pressure above 57 lbs. (144"), 84 lbs. (170" Comet), 82 lbs. (170" Falcon), lengthen throttle control rod. *CAUTION - If correct pressure cannot be secured within 2½ turn range either way from preliminary setting, other transmission trouble is indicated.*

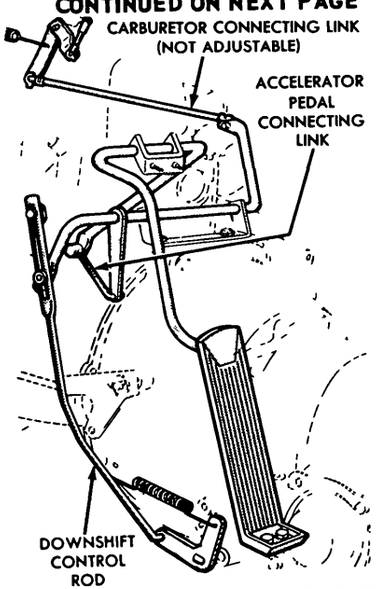
THROTTLE LINKAGE ADJUSTMENT (Vacuum Controlled Type): With engine at normal operating temperature, hot idle speed correctly set, and anti-stall dashpot correctly adjusted (see below), stop engine and proceed as follows:

Accelerator Pedal Height Adjustment - Distance from top front corner of accelerator pedal to floor mat should be 4½" (Falcon) 4 5/16" (Comet). To adjust, turn threaded trunnion on accelerator connecting link. With accelerator pedal fully depressed, make sure carburetor throttle plate is fully open. Readjust pedal height as necessary.

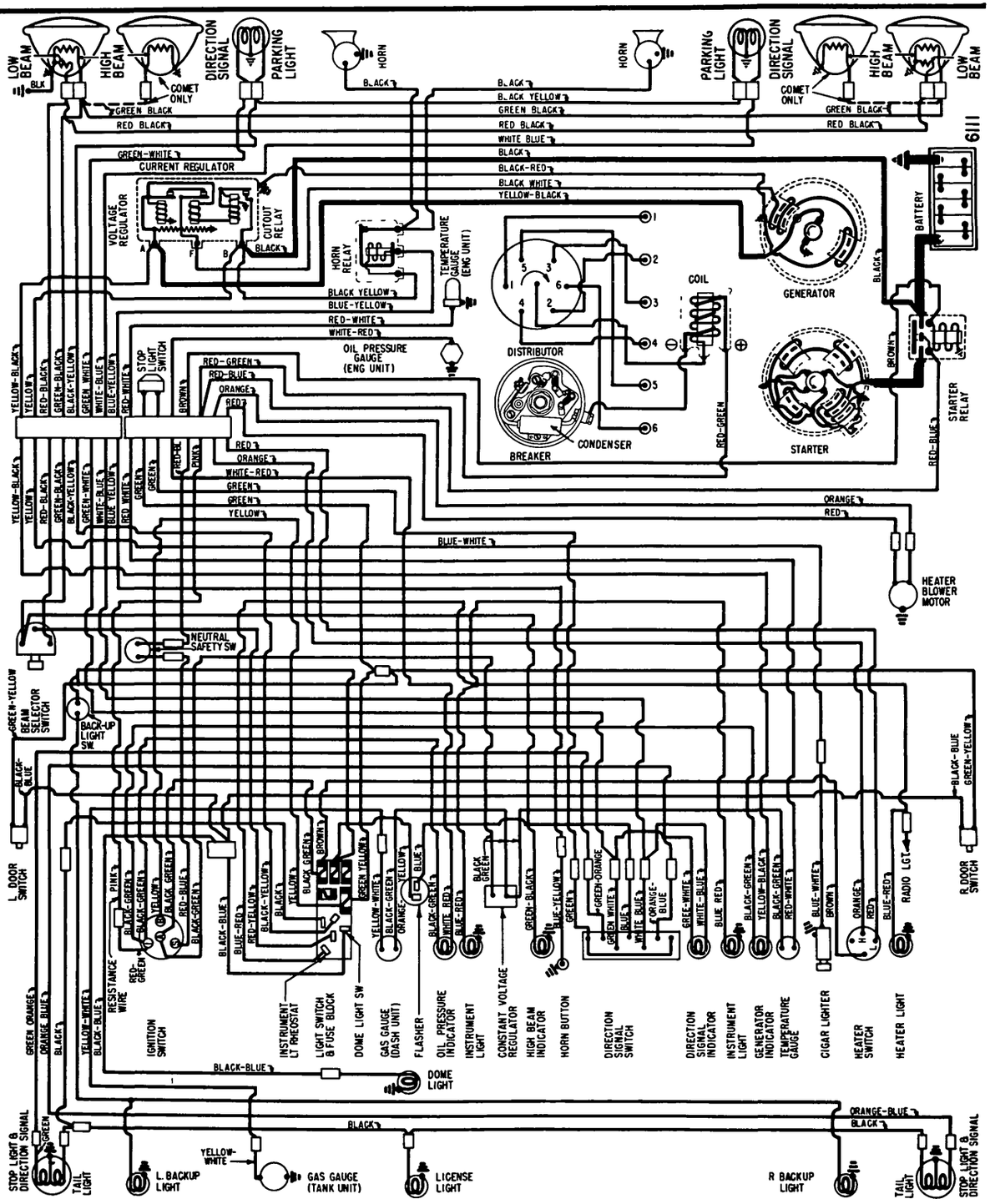
Downshift Rod Adjustment - Disconnect accelerator return spring at manifold, and kickdown spring at transmission. Loosen sliding stop bolt on downshift rod and "Z" bar. Pull downshift rod and "Z" bar up to full limit of travel (or hold accelerator pedal depressed and pull on downshift rod only). Slide stop bolt down against "Z" bar and tighten bolt securely. Install return springs. Check throttle and downshift linkage for full travel and see that no bind exists in linkage.

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between end of dashpot plunger and adjusting screw in throttle lever with dashpot plunger fully depressed should be .120-.150". To adjust, turn adjusting screw in throttle lever.

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THROTTLE LINKAGE (VACUUM TYPE)



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Manual Throttle Control Adjustment (Air Conditioned Cars): Attach a tachometer to engine and place transmission selector lever in "N" or "P". Turn air conditioning unit on and make sure magnetic clutch is engaged. Using hand throttle, bring engine speed up to 700 RPM and secure stop on bowden wire against cable armor so engine cannot be operated above 700 RPM with hand throttle.

HOLLEY "VISI-FLO"

Engine & Trans.	FALCON	Carburetor No.
144" Synchro-mesh	Ⓒ	CODE-9510-C
144" Auto. Trans.	Ⓒ	CODE-9510-D
144" Synchro-mesh (CCV)②	Ⓒ	C1DE-9510-A
144" Auto. Trans. (CCV)②	Ⓒ	C1DE-9510-B
144" All Trans.	Ⓒ	C1DZ-9510-A
170" Synchro-mesh	③	C1DE-9510-C
170" Auto. Trans.	③	C1DE-9510-D
170" Synchro-mesh (CCV)②	③	C1DE-9510-E
170" Auto. Trans. (CCV) ②④	③	C1DE-9510-F

COMET

Engine & Trans.	Carburetor No.
144" Synchro-mesh (CCV)②	ⒸC1GE-9510-A
144" Auto. Trans. (CCV) ②④	ⒸC1GE-9510-B
144" Synchro-mesh	ⒸC1GE-9510-C
144" Auto. Trans.	ⒸC1GE-9510-D
170" Synchro-mesh	ⒸC1GE-9510-E
170" Auto. Trans.	ⒸC1GE-9510-F
170" Synchro-mesh (CCV)②	ⒸC1GE-9510-G
170" Auto. Trans. (CCV) ②④	ⒸC1GE-9510-H

Ⓒ - Stamped on fuel inlet boss.
② - With Closed Crankcase Ventilation.
③ - Stamped on main body.
④ - When used with Synchro-mesh, remove dashpot and attaching parts.

Idle Setting - Initial setting 1-1½ turns open. With engine at normal operating temperature, adjust idle speed, then turn mixture adjusting screw in until engine runs roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Then turn screw in until engine runs smoothly. Favor a slightly rich mixture. Recheck idle speed.

Idle Speed - 500-525 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans. in "D").

Fuel Level - 23/32"±1/32" below power valve mounting surface (remove power valve and use Tool 9550-AE-4 Comet, T52L-9550-AEE Falcon. Fuel should touch end of "low" pin, but not touch end of "high" pin.

Accelerating Pump Setting - Connect link in inner hole of throttle lever for average or hot weather operation, outer hole for cold weather operation.

Fast Idle (Falcon): No adjustment (will be correct when hot or slow idle correctly set).

Fast Idle (Comet): Adjust fast idle screw for 1600 RPM with screw on first (lowest) step of fast idle cam.

Automatic Choke Setting (Comet): At Index.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Comet & Falcon No. CODE-9350-J (Fuel & Vacuum), No. CODE-9350-K (Fuel Only).

Fuel Pump Pressure - 3½-5½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator. Comet & Falcon No. B9MF-10804-A.

Dash Unit - Comet No. C1KF-9280-A (Comet); Falcon No. CODF-9280-B (Falcon).

Tank Unit - Comet & Falcon No. CODZ-9275-A (Sedans); No. C1DF-9275-A (Station Wagons & Ranchero).

Fuel Filter: Disposable type in fuel inlet line. Replace filter every 8000 miles (Falcon), 12,000 miles (Comet) or if clogged. *NOTE - Filter must be installed with arrow on filter case pointing toward carburetor.*

Air Cleaner: Dry filter element type. Clean every 4000 miles, replace every 24,000 miles.

►*CLEANING CAUTION:* Clean filter element by shaking or tapping squarely on a flat surface. If compressed air used, direct air stream against inside of element (reversed from normal air flow). *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

►*INSTALLATION CAUTION:* Locating notch in carburetor and mating tab on air cleaner must be engaged and mark "FRONT" must be to front of engine.

BATTERY

Comet & Falcon No. CODZ-10654-A (Std.). 12 volt, 9 plate, 40 ampere hour capacity (20 hr. rate).

Comet & Falcon No. CODZ-10654-B (Optl.). 12 volt, 9 plate, 55 ampere hour capacity (20 hr. rate).

NOTE - Batteries listed are dry type for service replacement.

Battery Ground - Negative, to right front corner of cylinder head.

STARTER

Comet & Falcon No. CODF-11001-A (Falcon Synchro-mesh, Comet All Trans.); Falcon No. CODF-11001-D (Falcon Auto. Trans.) Starter & Drive Assembly. Integral Positive Engagement type.

Armature - Comet & Falcon No. CODF-11005-A.

Drive - Integral Positive Engagement type, Comet & Falcon No. CODF-11350-A.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs.

Cranking Speed - 250-290 RPM, 150 amperes maximum.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	Ⓒ	12.0	70
15.5 ft. lbs.		5.0	670

Ⓒ - With starter on engine and engine idling.

Starting Switch: Magnetic type, Comet & Falcon No. B6A-11450-A, controlled by ignition switch.

Neutral Safety Switch: Comet & Falcon No. C1KF-7A217-A (With Back-up Lights); No. CODF-7A217-A (Without Back-up Lights).

Adjustment - *See "Ford Motor Co. 2-Speed Automatic Transmission" in Transmission Section.*

GENERATOR

Ford. Used as follows:

Generator	Armature	Rating
CODF-10000-C	ⒸC1TF-10005-A	25 Amp.
C1DF-10000-A③	②C1TF-10005-A	25 Amp.
CODF-10000-D	②C1TF-10005-A	30 Amp.
C1DF-10000-B③	②C1TF-10005-A	30 Amp.

Ⓒ - Serviced by No. C1DF-10002-A, replacing No. CODF-10002-C.
② - Or No. C1TF-10027-A (Armature & Bearing Assy.).
③ - Serviced by No. C1DF-10002-A.

Performance Data

Generator	Amperes	Volts	Gen. RPM
25 Amp.	25	15.0	2450
30 Amp.	30	15.0	2550

Brush Spring Tension - 32-40 ozs.

Field Current - 1.2-1.8 amps. at 12.0 volts, hot.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Use Burroughs Belt Tension Gauge No. 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Engine	Ⓒ New Belt	Ⓒ Used Belt
All	90-120	60-90

Ⓒ - Run belt for 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer.

REGULATOR

Ford. As follows:

Regulator	Rating
CODF-10505-A	25 Amp.
B7A-10505-B or C1TZ-10505-A	30 Amp.

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.4-13.2 volts.

Cuts Out - 6-9 amperes discharge current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current Regulator

Setting - 23-27 amps. (25 Amp.), 28-32 amps. (30 Amp.).

►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 2-Headlight System (Falcon), 4-Headlight System (Comet).

Stop Light Switch Location: On forward end of brake master cylinder.

Lighting Switch: Combination lighting switch and fuse junction block.

Removal - Disconnect battery. Remove switch control knob and shaft by pressing spring-release button on top of switch (switch in "off" position). Unscrew retaining nut and remove switch. Separate switch from fuse junction block.

Speedometer Removal: Disconnect speedometer cable, remove instrument cluster bezel retaining screws and remove bezel, lens, and cluster mask plate from cluster housing. Remove speedometer retaining screws and remove speedometer.

CIRCUIT BREAKERS: 18 Ampere - Integral with headlight switch, protects headlight circuit.

12 Ampere - Electric windshield wipers. On right side of instrument panel near ignition switch.

FUSES: *Fuses located in fuse junction block of lighting switch.*

15 Ampere - Parking, Tail, Instrument Panel, and Dome lights.

14 Ampere - Direction Signals and Back-up Lights.

14 Ampere - Heater Blower.

7.5 Ampere - Radio.

Cigar Lighter - Sulphur disc on back of lighter.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTIONS: Use extreme care when disconnecting air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head, 144" and 170" engines of same design used previously.

Engine	Bore	Stroke	Displacement
144"	3.50"	2.50"	144 cu. ins.
170"	3.50"	2.94"	170 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
144"	8.7-1	29.4	Ⓒ
170"	8.7-1	29.4	101 at 4400 RPM

Ⓒ - Comet - 90 at 4200 RPM; Falcon - 85 at 4200 RPM.

Compression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

►*ENGINE REAR MOUNT PRODUCTION CHANGE & INSTALLATION CAUTION: See "Engine Mounts" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (COMET): Drain crankcase and remove dipstick. Disconnect engine front mounts, raise engine and place 2" wood blocks between mounts and engine. Let engine rest on blocks. Remove stabilizer bar attaching nuts and pull stabilizer bar down. Remove oil pan. *NOTE* - Rotate crankshaft as necessary to provide clearance.

OIL PAN REMOVAL (FALCON): Drain crankcase and remove dipstick. Remove clutch retracting spring. Remove front crossmember. Remove stabilizer bar retaining nuts and pull stabilizer bar down. Remove oil pan. *NOTE* - Rotate crankshaft as necessary to provide clearance.

PISTONS

Solid skirt type with three rings.

Removal - Pistons and rods removed from above.

Clearance - .0021-.0027" (Comet), .0018-.0036" (Falcon & Trucks) at bottom of skirt.

Checking Clearance & Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*

Replacement Pistons: Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040", .060" Oversize with fitted pins.

Installing Pistons: Notch on piston head should be to front of engine. *See Rod Installation.*

PISTON PIN

Press fit in connecting rod, no locking device used.

Diameter - .9120-.9123" (rod hole diameter .9107-.9112").



PISTON & ROD ASSEMBLY

Length - 3.010-3.030".

Pin Fit in Piston - .0001-.0003". Wear limit .0008".

Pin Removal & Installation - *See "Piston Pins" in Ford Motor Co. Special Data.*

Replacement Pins: Furnished in assembly with new pistons. *See "Replacement Pistons" above.*

PISTON RINGS

Top compression ring is chrome plated, lower compression ring is phosphate coated. Oil ring is three-piece type with chrome plated rails.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0774-.0781"	.010-.020"	.0024-.0041"
Compr. (2)	.0770-.0780"	.010-.020"	.0025-.0045"
Oil (3)		.015-.055"	Ⓒ

Ⓒ - Snug (side sealing type ring).

Replacement Rings: Furnished Std. & .020", .030", .040", .060" Oversize.

CONNECTING ROD

Length (Center-to-Center) - 4.854-4.856" (144" Eng.); 4.714-4.716" (170" Eng.). *DO NOT interchange rods between engines.*

Journal Diameter - 2.1236-2.1240" (Code Red), 2.1232-2.1236" (Code Blue). Taper wear limit .001", Out-of-round wear limit .0006".

Clearance - .0005-.0027".

Side Clearance - .004-.011". Wear limit .014".

Installing Rods - Numbers on rods and caps must be on same side and installed in same numbered cylinder. Oil squirt hole should be toward right side of engine on all rods and notch in piston head toward front of engine.

Replacement Bearings: Furnished Std. (2 sizes - Red & Blue), & .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

CRANKSHAFT

Journal Diameter - 2.2486-2.2490" (Code Red), 2.2482-2.2486"(Code Blue). Taper wear limit .001", Out-of-round wear limit .0006".

Bearings - Steel backed copper lead alloy.

Clearance - .0006-.0025",

Replacement Bearings: Furnished Std. (2 sizes – Red & Blue), & .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

End Thrust: Taken by No. 3 main bearing.

Endplay - .004-.008". Wear limit .012".

Thrust Bearing Alignment - *See "Crankshaft & Bearings" in Ford Motor Co. Special Data.*

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Bearings" in Ford Motor Co. Special Data*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated in front of crankshaft sprocket to reduce oil leakage at front oil seal.

CAMSHAFT

Journal Diameter - 1.8095-1.8105".

Clearance - .001-.003". Wear limit .006".

End Thrust: Taken by thrust plate and spacer behind camshaft sprocket.

Endplay - .003-.007". Wear limit .012".

Replacement Bearings: Furnished Std. & .015" Undersize. *NOTE* - No. 4 bearing has two oil holes and is not interchangeable with other bearings.

Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Camshaft Setting: Marks on both sprockets must be adjacent and in line with straightedge across shaft centers.

Timing Chain: Side guide type, 50 links.

►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

►*1961 INSUFFICIENT ROCKER ARM SHAFT LUBRICATION & EXCESSIVE WEAR CORRECTION & PRODUCTION CHANGE: See "Valve System" in Ford Motor Co. Special Data.*

Tappet Clearance: .016" All Valves, Hot & Cold. *See TUNE-UP.*

Valve	Head Diameter	① Stem Diameter
Intake	②	.3100-.3107"
Exhaust	1.261-1.271"	.3090-.3097"

Valve	Seat Angle	③ Lift	④ Stem Clearance
Intake	45°⑤	⑥ .2405"	.0008-.0025"
Exhaust	45°⑤	⑦ .2395"	.0018-.0035"

① - Std. Also furnished .003", .015", .030" Oversize.
② - 1.462-1.472" (144" Eng.), 1.522-1.532" (170" Eng.).
③ - Cam Lobe Lift. Maximum allowable lift loss .005".
④ - Wear limit .0045" Intake, .0055" Exhaust.
⑤ - Valve Face Angle 44°.
⑥ - Valve Lift .361". ⑦ - Valve Lift .359".

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Seat Width - .070-.080".

Valve Stem Oil Seals - Cup type seals installed on all valve stems below upper spring retainer.

Valve Springs: Free Length - 2.00" approximately.

Valve Spring Specifications

Valve	Pressure	Length
Closed	① 47.75-56.25 lbs.	1.585"
Open	② 112-122 lbs.	1.222"

① - Wear limit 40 lbs. at 1.585".
② - Wear limit 101 lbs. at 1.222".

Valve Spring Installation: Valve spring ends must be square within .069". Install springs with damper (closed) coil end down toward head. Check installed height of spring from surface of cylinder head spring pad to underside of spring retainer. If height greater than 1 39/64", install .030" spacers as necessary on head under spring to bring height within limits of 1 9/16-1 39/64". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Barrel type. Remove from above after removing cylinder head.

Clearance - .0005-.0020". Wear limit .004".

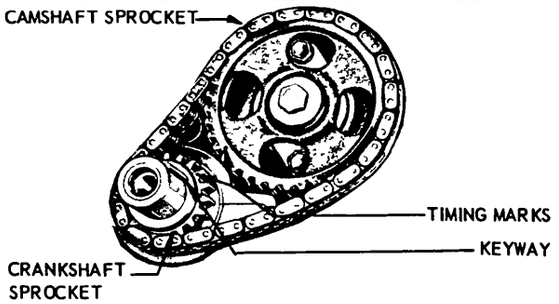
Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications

Intake Valves - Open 15° ① BTDC. Close 37° ② ALDC.
Exhaust Valves - Open45° ① BLDC. Close 7° ③ ATDC.
① - Camlift .012". ② - Camlift .015". ③ - Camlift .014".



VALVE TIMING MARKS

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 3½ qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 35-55 lbs. (hot) at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel, controlled by Engine Oil Pressure Switch, Comet & Falcon No. B6A-9278-B, located on left rear side of engine to rear of coil.

Oil Pump: Rotor type, located in crankcase.

Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow disposable type. Replace every 4000 miles to coincide with engine oil change.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket face of filter with engine oil. Install filter on adapter until gasket contacts adapter face. Then tighten ½-turn by hand. *Do not overtighten.*

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet (road draft) tube at left front corner of engine. Clean filter in filler cap at 4000 mile intervals.

Positive - Road draft tube replaced by an adapter tubing, and hose routed to ventilation valve installed in spacer between carburetor and intake manifold. Service system at regular intervals check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 8.7 qts. Add 1 qt. for heater.

Pressure Valve : 12-15 lb. radiator filler cap, Comet & Falcon No. B8A-8100-A.

Thermostat: Comet & Falcon No. CODE-8575-A (157-162°) Standard. No. CODE-8575-B (173-183°) for use with permanent type anti-freeze.

Water Pump: Packless, sealed ball bearing type.

Pump Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Comet & Falcon No. B9MF-10804-A.

Dash Unit - Comet No. C1KF-10883-A (Comet); Falcon No. CODF-10883-B (Falcon).

Engine Unit - Comet & Falcon No. CODF-10884-A.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: *Check fluid level every 1,000 miles, drain and refill interval not recommended by manufacturer.* Use only Automatic Transmission Fluid Type C1AZ-19582-A or Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - With transmission at normal operating temperature, move selector lever through all ranges, then back to "P" position. With engine idling, check fluid level and add as necessary to maintain level at "F" mark on dipstick. DO NOT OVERFILL.

Capacity - 6¼ qts. (approx.).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

FORD MODELS

Fairlane	Series 30	Fairlane 500	Series 40
2-Door Club Sedan	31	2-Door Club Sedan	41
4-Door Town Sedan	32	4-Door Town Sedan	42

Galaxie	Series 50
2-Door Club Sedan	51
4-Door Town Sedan	52
2-Door Club Victoria Starliner	53
4-Door Town Victoria	54
Sunliner Convertible	55
2-Door Club Victoria	57

Station Wagons	Series 60
2-Door Ranch Wagon	61
4-Door Ranch Wagon	62
4-Door 6 Pass. Country Sedan	64
4-Door 9 Pass. Country Sedan	66
4-Door 6 Pass. Country Squire	67
4-Door 9 Pass. Country Squire	68
2-Door Courier (Commercial Wagon)	69

MERCURY MODELS

Meteor 600	Series 40	Meteor 800	Series 50
2-Door Sedan	41	2-Door Sedan	51
4-Door Sedan	42	4-Door Sedan	52
Station Wagons Series 70		4-Door Hardtop	54
Meteor 600 4-Door	72	2-Door Hardtop	57
Meteor 800 4-Door	74		

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 E 32 V 100001

① - Year. 1961.
② - Assembly Plant. See below.
③ - Body Series. See table above.
④ - Engine. V 6 Cyl., 223 cu. ins.
⑤ - Beginning vehicle number at each assembly plant (100001 for Ford, 500001 for Mercury).

Assembly Plant Designation

A - Atlanta	H - Lorain	S - Pilot Plant
C - Chester	J - Los Angeles	U - Louisville
D - Dallas	K - Kansas City	W - Wayne
E - Mahwah	N - Norfolk	Z - St. Louis
F - Dearborn	P - Twin City	
G - Chicago	R - San Jose	

TUNE-UP

COMPRESSION PRESSURE: 150 lbs. ± 10 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18" at idle speed.

►*1961 FORD & MERCURY ROCKER ARM PRODUCTION CHANGES:* "Zero Lash" type used on later production engines. See *"Valve System" in Ford Motor Co. Special Data for description and initial adjustment. See "Valve Tappet Clearance ("Zero Lash" Type)" below for minor operating adjustment.*

VALVE TAPPET CLEARANCE (Conventional Type): .019" Intake & Exhaust (Hot & Cold). Adjust all tappets to .019" clearance while engine is cold, then again check all tappets for .019" clearance after running engine for 30 minutes to normalize temperature.

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

VALVE TAPPET CLEARANCE ("Zero Lash" Type): Long recess mark on lower side of rocker arm eccentric cam must be centered over valve stem when engine is idling. To make minor adjustment, turn rocker arm adjusting screw. *For initial adjustment and checking, see "Valve System" in Ford Motor Co. Special Data.*

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾ turn windup and hooked over stop pin. Valve must operate freely. Lubricate every 4000 miles with special Exhaust Gas Control Valve Solvent, Ford & Mercury Part No. COAA-19A501-A.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .032-.036".

Spark Plugs - Champion 870 (Ford - Std.), F-14Y (Ford with Econ. Carb.), 860 (Mercury). 18 mm. Torque plugs to 15-20 ft. lbs.

NOTE - When new plug is installed in a replacement cylinder head, torque plug to 20-30 ft. lbs.

COIL: Ford & Mercury No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.

Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from multiple connector to starter solenoid.

DISTRIBUTOR: Ford. Used as follows:

Model	Distributor No.	Type
Synchro-mesh	①COAF-12127-G	Loadomatic
Auto. Trans.	①C1AF-12127-D	Step-Stop

① - Stamped on distributor housing for identification.

Condenser - Ford & Mercury No. 7RA-12300-C.

Condenser Capacity - .21-.25 mfd.

Contact Point Set - Ford & Mercury No. FAA-12171-A.

Breaker Gap - .024-.026".

Cam Angle - 35-38°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand
①COAF-12127-G

Distr. Degrees	Vacuum ("of Hg)	Distr. RPM
0	0.38	450
2½-3½	0.79	650
6¾-7¾	2.85	1100
8¾-9¾	4.33	1400
10¼-11¼	5.99	1800

②C1AF-12127-D

Test	Distr. Degrees	Vacuum ("of Hg)	Distr. RPM
A	3½-4½	1.08	800
A	6¼-7¼	1.70	1000
B	7½-8½	2.38	1200
C	7½-8½	5.63	2000
C	13	6.50	1450

A - Adjust primary spring. **B** - Adjust stop washers. **C** - Adjust spring washers.

① - Set test stand to 0° at 200 RPM and 0" Hg.

② - Set test stand to 0° at 400 RPM and 0" Hg.

►*DISTRIBUTOR INSTALLATION CAUTION:* Be sure oil pump intermediate shaft engages the seat in oil pump. Rotate engine with starter if necessary after distributor gear partially engaged to seat shaft fully in oil pump.

IGNITION TIMING

Setting - 4° BTDC (Synchro-mesh & Overdrive), 10° BTDC (Auto. Trans.). *NOTE - Allowable range 2° to 10° BTDC. Set timing with engine idling and vacuum line disconnected.*

Timing Mark - Vibration damper marked "TDC", "3", "5", "7", "9". Align correct mark with pointer on engine front cover.

CARBURETOR

►*CARBURETOR APPLICATION: On Holley "Visi-Flo" 1-barrel carburetor used on all models.*

►*HIGH FUEL CONSUMPTION CORRECTION:* May be caused by improperly installed power valve or damaged power valve diaphragm. *See "Holley Visi-Flo Carburetors" in Carburetion Section.*

►*INCONSISTENT RETURN TO IDLE SPEED CORRECTION:* If engine fails to return to same idle speed every time, check for sticking carburetor throttle plates, binding carburetor throttle shaft, binding throttle linkage and proper dashpot adjustment before replacing dashpot.

►*1961 FORD & MERCURY AUTOMATIC TRANSMISSION & THROTTLE LINKAGE PRODUCTION CHANGE:* Beginning March 20, 1961, transmission throttle valve is controlled by a vacuum unit at rear of transmission case. Throttle linkage adjustment procedures for non-vacuum and for vacuum controlled throttle valve transmissions are different as detailed below.

THROTTLE LINKAGE ADJUSTMENT (Non-Vacuum Controlled Type): With engine at normal operating temperature, hot idle speed correctly set and anti-stall dashpot correctly adjusted (see below), proceed as follows: Remove turnbuckle lock on upper end of throttle control rod, loosen locknut and disconnect turnbuckle from lever. Pull throttle control rod upward to hold throttle control lever against transmission internal stop, rotate turnbuckle so pin freely enters hole in lever, **then lengthen throttle control rod by 3½ turns of turnbuckle.** Secure turnbuckle and tighten locknut. Distance from top rear corner of accelerator pedal to floor mat should be 3½". Adjust by turning threaded trunnion on accelerator connecting link. Connect a tachometer to engine and install a pressure gauge with Adapter T60L-7000-B (Ford), 77820-C (Mercury) to transmission testing line at lower end of accelerator connecting link. With parking brake applied and selector lever in "D", accelerate engine to 1000 RPM. Pressure should be 77-84 lbs. If too low, lengthen throttle control rod; if too high, shorten rod. *CAUTION - If correct pressure cannot be obtained by rotating turnbuckle 2½ turns in either direction from preliminary setting above, other transmission trouble is indicated.*

THROTTLE LINKAGE ADJUSTMENT (Vacuum Controlled Type): With engine at normal operating temperature, hot idle speed correctly set and anti-stall dashpot correctly adjusted (see below), stop engine and proceed as follows:

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data

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Accelerator Pedal Height Adjustment (Ford & Mercury) - Distance from top front corner of accelerator pedal to floor mat should be 3¾". To adjust, turn threaded trunnion on accelerator connecting link.

Downshift Rod Adjustment (Ford) - Disconnect downshift rod from accelerator bellcrank and block accelerator pedal to floor mat. Push downshift rod down to limit of its travel and adjust sleeve on rod until end of rod freely enters bellcrank. Tighten locknut and release accelerator pedal.

Downshift Rod Adjustment (Mercury) - Insert ¼" gauge pin through gauging holes in bellcrank and downshift rod actuating lever. Disconnect downshift rod from bellcrank. With downshift rod in full "up" position, adjust length of rod so it fits freely in bellcrank lever. Tighten locknut.

Anti-Stall Dashpot Adjustment: With carburetor hot (slow) idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

Manual Throttle Control Adjustment (Air Conditioned Cars): Attach a tachometer to engine and place transmission selector lever in "N" or "P". Turn air conditioning unit on and make sure magnetic clutch is engaged. Using hand throttle, bring engine speed up to 700 RPM and secure stop on bowden wire against cable armor so engine cannot be operated above 700 RPM with hand throttle.

HOLLEY "VISI-FLO"

Model	① Carburetor No.
Synchro-mesh & O.D. ②	COAE-9510-E or U
Auto. Trans. ②	COAE-9510-Z
Economy ②	COAE-9510-Y
Synchro-mesh & O.D. ③	C1AE-9510-E
Auto. Trans. ③	C1AE-9510-F
Economy Synchro-mesh & O.D. ③	C1AE-9510-G
Economy Auto. Trans. ③	C1AE-9510-H
Economy Auto. Trans. ③	⑨ C1AE-9510-H
Economy All Trans. ③	C1AE-9510-AR

① - Stamped on fuel inlet boss.
② - Without Closed Crankcase Ventilation.
③ - With Closed Crankcase Ventilation.
⑨ - Replaced by C1AE-9510-AR.

Idle Setting - Initial setting 1-1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll from rich mixture. Turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - 500-525 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans. in "D").

Fuel Level - 11/16"±1/32" below power valve mounting surface (remove power valve and use Tool T52L-9550-AEE for Ford, 9550-AE-3 for Mercury). Fuel should touch end of "low" pin, but not touch end of "high" pin.

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment (will be correct when hot or slow idle correctly set).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Ford & Mercury No. COAE-9350-D (Fuel & Vacuum), No. COAE-9350-C (Fuel Only).
Fuel Pump Pressure - 3½-5½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford & Mercury No. B9MF-10804-A.
Dash Unit - Ford & Mercury No. C1AF-9305-A.
Tank Unit - Ford No. COAZ-9275-B (Early Ford Pass. Cars), Ford & Mercury No. COAZ-9275-C (Later Ford Pass. Cars & All Mercury Pass Cars); Ford & Mercury No. C1AF-9275-A (All Station Wagons).

Fuel Filter: Disposable type (except Taxicab), replaceable element type (Taxicab) in fuel inlet line. Replace filter or element every 8000 miles or if clogged. *NOTE - Disposable type filters must be installed with arrow on filter case pointing toward carburetor.*

Air Cleaner: Dry filter element type. Clean every 4000 miles, replace element every 25-30,000 miles or sooner if needed.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. If compressed air used, direct air stream from inside surface of filter element. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

ELECTRICAL

►*SEE FORD & MERCURY V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, ALTERNATOR, REGULATOR & MISCELLANEOUS ELECTRICAL DATA.*

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

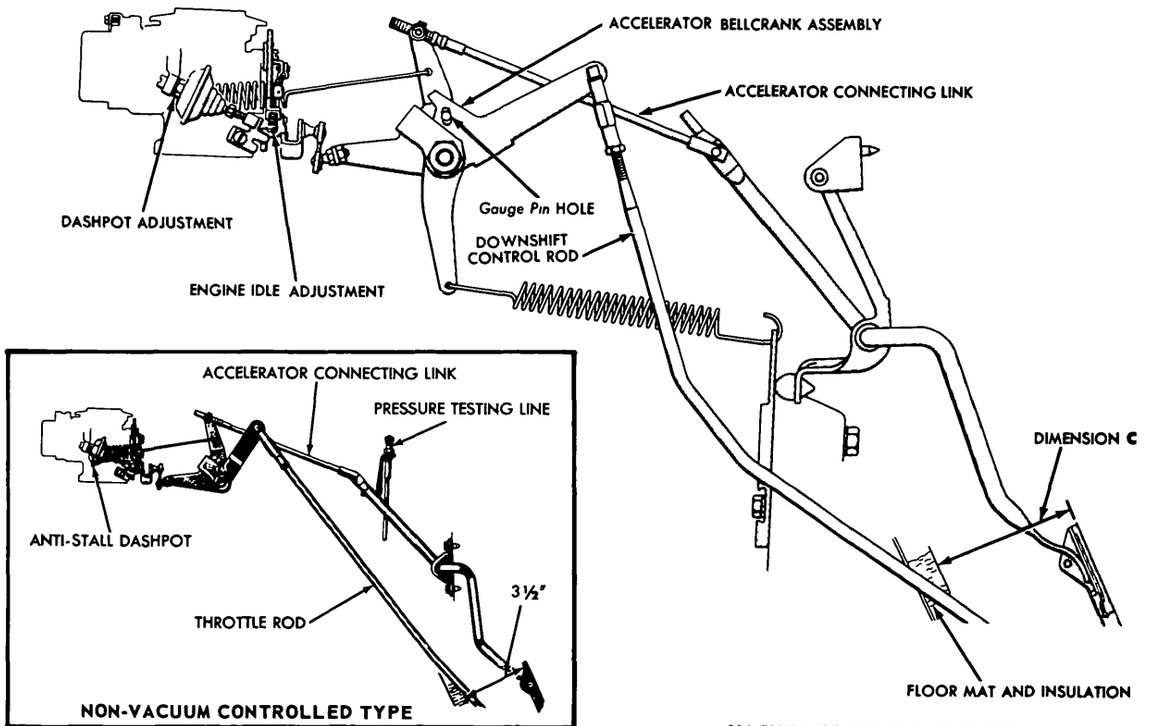
ENGINE SPECIFICATIONS: Own. 6 Cyl., Valve-in-head.

Bore	Stroke	Displacement
3.62"	3.60"	223 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.4-1	31.54	135 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE NOISE CORRECTION:* May be caused by upper part of valve pushrod grounding against pushrod hole in cylinder head. If pushrods are not bent and cylinder head is properly installed and noise continues, enlarge pushrod hole with a rat-tail file. *CAUTION - Cylinder head must be properly installed, using guid pins for proper alignment, to prevent the above condition. See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

►*ROCKER ARM COVER INSTALLATION NOTE:* Torque cover attaching bolts to specifications twice, once initially and again after two minutes from initial torquing to prevent oil leaks.



FORD & MERCURY 6 CYL. AUTOMATIC TRANS. THROTTLE LINKAGE

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*1961 CYLINDER HEAD PRODUCTION CHANGES & CAUTIONS:* Some early engines with conventional (adjustable) type rocker arms use cylinder heads with 7/16" head bolts. Later engines with either adjustable or "zero lash" type rocker arms use cylinder heads with ½" head bolts. "Zero lash", ½" bolt heads are of two designs: 1) With cast valve guide bosses as used previously. 2) With new machined valve guide bosses for improved valve stem seal and oil consumption. Type 2) heads can be used with later improved valve springs and valve stem seals. *See "Valves" below for data on springs and seals. CAUTION - 1) Do not interchange adjustable and "zero lash" type cylinder heads. 2) Cylinder head bolt torque specifications differ for 7/16" and 1/2" bolt heads. See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

►*1961 CYLINDER HEAD GASKET PRODUCTION CHANGE & CAUTION:* New cylinder head gasket, Part No. C1AZ-6051-A, with steel core bonded between synthetic rubber- asbestos sheets used in later production ½" bolt type heads for improved sealing. Use this gasket for service replacement. *DO NOT use sealer on this gasket.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (FORD): Drain crankcase and remove flywheel housing inspection cover and dipstick. On Station Wagons; remove stabilizer bar-to-lower control arm and frame rail retaining nuts and move stabilizer bar as far forward as possible. On All Models, remove crankcase ventilation tube assembly. Remove oil pan retaining screws, rotate crankshaft for clearance, and remove oil pan.

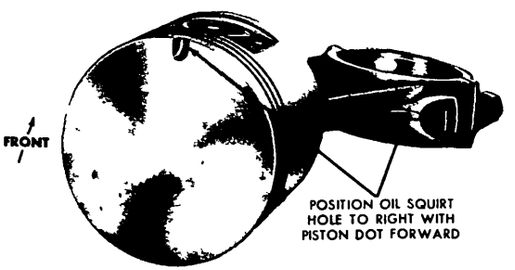
OIL PAN REMOVAL (MERCURY): Drain crankcase and remove dipstick. Remove stabilizer bar-to-lower control arm nuts and loosen right and left stabilizer bar-to-frame clamps. Pry stabilizer bar to right and pull arms downward for clearance. Remove oil pan.

PISTONS

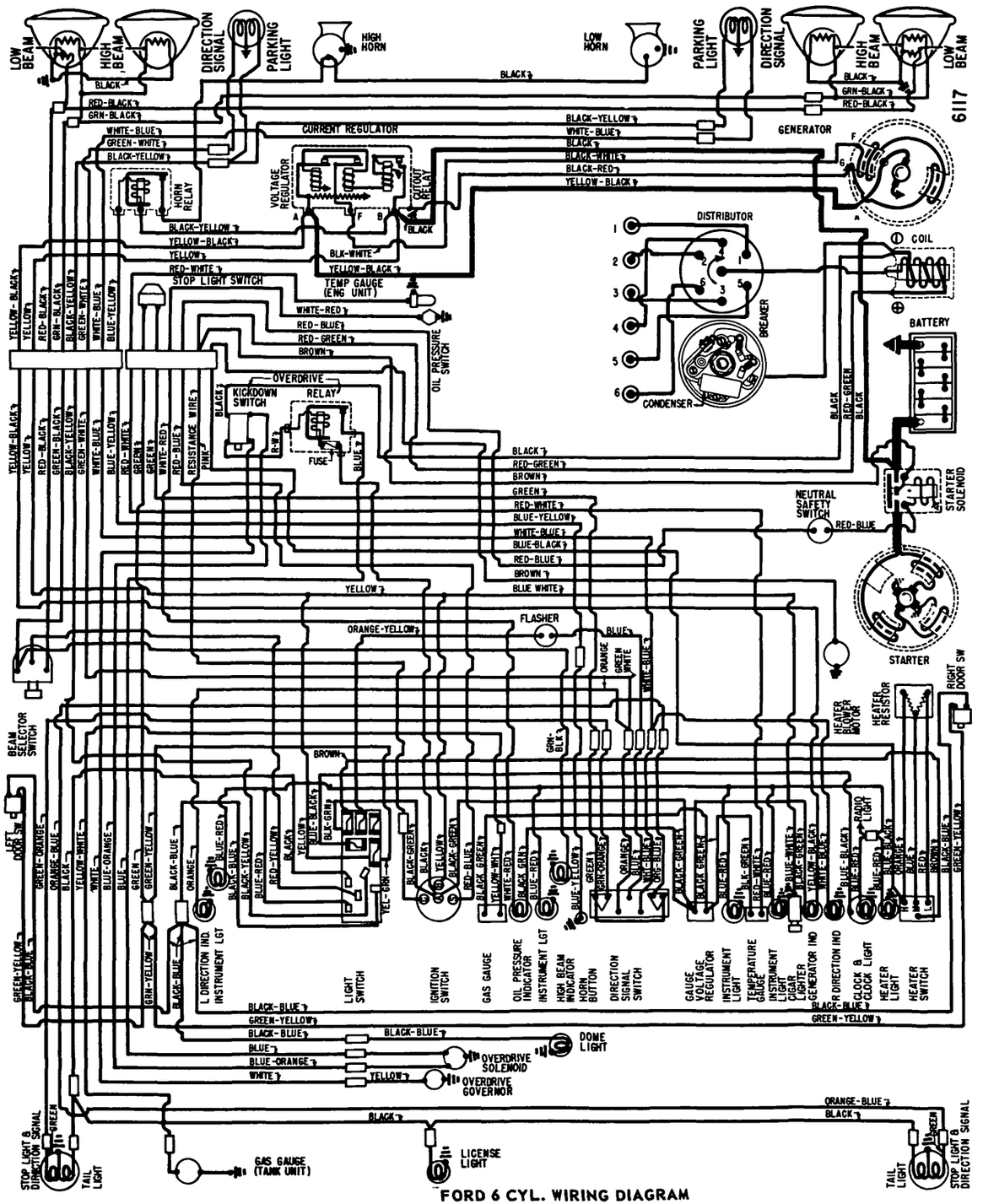
Autothermic type. Solid skirts with three rings.

►*ORIGINAL BORE & PISTON NOTE:* Production standard cylinder bore range is 3.6250-3.6274". Pistons used in this standard bore are 2 sizes: 3.6236-3.6242" (color coded Red), and 3.6248-3.6254" (Color coded

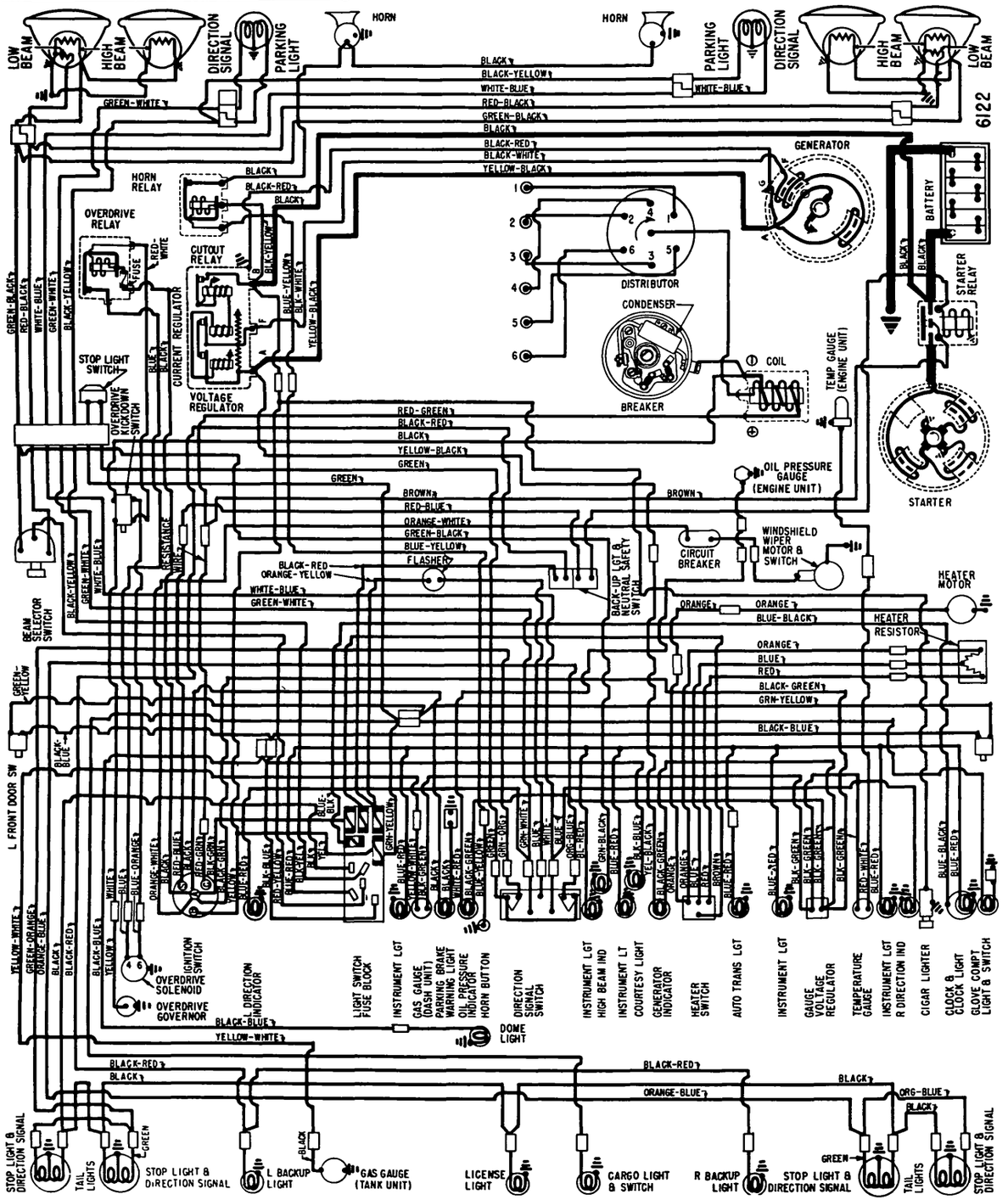
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PISTON & ROD ASSEMBLY



FORD 6 CYL. WIRING DIAGRAM



MERCURY 6 CYL. WIRING DIAGRAM

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Blue). Production cylinder bore also may be .003" Oversize (3.6274-3.6286") with .003" Oversize pistons (3.6260-3.6266").

Removal - Pistons and rods removed from above.

Clearance - .0008-.0026" at bottom of skirt.

Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*

Replacement Pistons: Ford - Furnished Std. (1 size only), and .020", .030", .040", .060" Oversize with fitted pins. **Mercury** - Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040" Oversize with fitted pins.

Installing Pistons: Install piston with indentation in head of piston toward front of engine. *See Rod Installation.*

PISTON PIN

Floating type with lock ring at each end.

Diameter - .9120-.9123". **Length** - 3.010-.3.030".

Pin Fit in Piston - .0001-.0003". Wear limit .0008".

Pin Fit in Rod Bushing - .0001-.0005". Wear limit .001".

Replacement Pins: Std. (Code Green), .001" (Code Blue), .002" (Code Yellow) Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compr. (1)	.0929-.0936"	.010-.020"	①.0019-.0036"
Compr. (2)	.0930-.0940"	.010-.020"	①.0015-.0035"
Oil (3)		.015-.055"	②

① - Wear limit .006".

② - Snug - side sealing type ring.

Replacement Rings: Std., & .020", .030", .040" Oversize. Also .060" Oversize on Ford.

CONNECTING ROD

Journal Diameter - 2.2984-2.2988" (Red), 2.2980-2.2984" (Blue).

Clearance - .0006-.0025". Wear limit. .0035".

Side Clearance - .003-.009". Wear limit .012".

Length - 6.258-6.262" center-to-center.

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

Installing Rods: Install rod in piston so that oil squirt hole is to **right** when indentation on piston head is to front of engine. Rods and caps are numbered 1 to 6. Numbers on rods and caps must be on same side and installed in same numbered cylinders.

CRANKSHAFT

Journal Diameter - 2.4984-2.4988" (Red), 2.4980-2.4984" (Blue).

Bearings - Steel backed copper lead alloy.

Clearance - .0006-.0028". Wear limit .0038".

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

End Thrust: Taken by rear intermediate (No. 3) bearing.

Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Endplay - .004-.008". Wear limit .012".

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

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►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

►*CAMSHAFT NON-INTERCHANGEABILITY CAUTION:* Different camshafts used in Adjustable and Zero Lash type engines. DO NOT interchange camshafts unless rocker arm and shaft assemblies are also changed.

Journal Diameter - 1.9255-1.9265".
Clearance - .001-.003". Wear limit .006".

End Thrust: Taken by thrust plate and spacer behind camshaft sprocket. *NOTE* - Chamfer on inside of spacer must be toward camshaft journal.
Endplay - .001-.007". Wear limit .012".
Replacement Bearings: Finished bearings furnished Std. & .015" Undersize. *CAUTION* - No. 3 bearing is not interchangeable with other bearings.

Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Timing Chain: Side guide type, 56 links. Replace chain when side deflection exceeds ½" on slack side (establish reference mark on block with sprocket turned so that all slack removed, then turn sprocket in opposite direction so that slack is present, measure deflection by pressing out on chain midway between sprockets).

Camshaft Setting: Sprockets are marked by "0" at one tooth. Mesh chain so that there are 12 pins between "0" marks with marks on driving side of chain.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

Tappet Clearance: Conventional (Adjustable) Type - .019" Intake & Exhaust, Hot. *See TUNE-UP.*

"Zero Lash" Type - For initial adjustment and checking, *see "Valve System" in Ford Motor Co. Special Data.* For minor operating adjustment, *see TUNE-UP above.*

Valve	Head Diameter	①Stem Diameter
Intake	1.775-1.785"	.3416-.3423"
Exhaust	1.505-1.520"	.3398-.3405"

Valve	Seat Angle	②Lift	③Stem Clearance
Intake	45°④	⑤	.0010-.0024"
Exhaust	45°④	⑤	.0028-.0042"

① - Furnished also with .003", .015", .030" Oversize stems.
② - Cam Lobe Lift. Wear limit .005".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.
⑤ - .273" Adjustable Lash type; .260" "Zero Lash" type.

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Stem Seals - Umbrella type seals used on all valve stems. Install with cupped side down. *See "Production Change" below.*

►*1961 VALVE STEM SEAL PRODUCTION CHANGE:* New Valve Stem Seal, Part No. C1AE-6571-H, with three inner ribs and longer overall height of .610" (increased from .450") used on later production "Zero Lash" engines for improved valve stem sealing and to minimize oil consumption. *CAUTION - Use this seal only on "Zero Lash" type engines.*
Valve Seat Width - .070-.090", all valves.

Valve Springs: Free Length - 2.09" (All Adjustable & Early "Zero Lash" engines); 2.33" (Later "Zero Lash" engines). *See "Production Change" below.*

►*1961 VALVE SPRING PRODUCTION CHANGE:* New Valve Spring, Part No. C1AE-6513-R, identified by color code red with pink stripe, used on later production "Zero Lash" engines to reduce valve burning and float at high speed. This spring has different free length (see above) and different pressure specifications (see below). *CAUTION - Use this spring only on "Zero Lash" type engines.*

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Spring ends must be square within .073". Install springs with damper (closed) coil end down toward head. Check installed height of spring which must not exceed 1 25/32" (from surface of cylinder head spring pad to underside of spring retainer). If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 3/4-1 25/32". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Spring Specifications

(2.09" Free Length Type)

Valve	Lbs. Pressure	Length
Closed	①71-79	1.780"
Open	②161-177	1.390"

(2.33" Free Length Type)

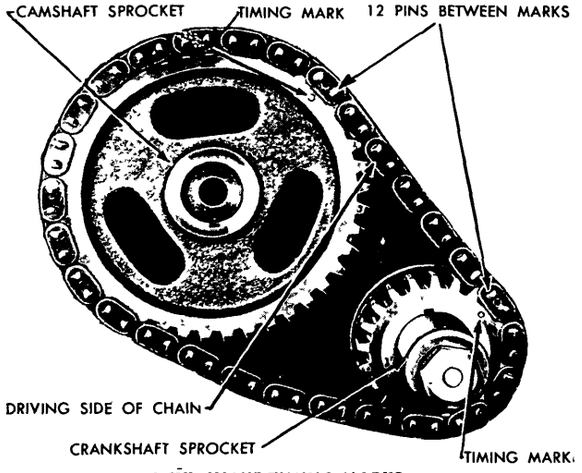
Valve	Lbs. Pressure	Length
Closed	③97-105	1.780"
Open	④160-178	1.410"

① - Wear limit 64 lbs. at 1.780".
② - Wear limit 145 lbs. at 1.390".
③ - Wear limit 90 lbs. at 1.780".
④ - Wear limit 152 lbs. at 1.410".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Mushroom type. Remove from below with camshaft out.
Clearance - .0011-.0027". Wear limit .0055".

Rocker Arm Assembly: Two different types used. Type 1 is conventional type with adjusting screw for tappet clearance adjustment. Type 2 is "Zero Lash" type to provide no valve operating clearance. *See "Valve System" in Ford Motor Co. Special Data.*



6 CYL. VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications

Intake Valves - Open 23°①BTDC. Close 59°②ALDC.
Exhaust Valves - Open 71°①BLDC. Close 10°②ATDC.
① - Camlift .002". ② - Camlift .005".

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel controlled by Oil Pressure Switch, Ford & Mercury No. B6A-9278-B, mounted on right rear side of engine above starter.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Oil Pump: Gear type early, Rotor type later. Rotor type only furnished for replacement. Pump located in crankcase.
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Disposable type. Replace every 4000 miles.
Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on insert by hand until gasket contacts adapter surface, then tighten filter an additional ½-turn. **Do not overtighten.**

►*OIL LEAK AT OIL FILTER CORRECTION:* If no diaphragm plate installed between cylinder block and filter, install diaphragm plate included in Filter Adapter Kit, No. B7A-6882-A.

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet pipe in rear of crankcase at left side. Clean filter in filler cap every 4000 miles.
Positive - Outlet pipe replaced by adapter and tube into intake manifold just below carburetor. Ventilation valve located at manifold end of tube. Service system at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 15 qts. Add 1 qt. for heater.
Thermostat: Ford & Mercury No. COAZ-8575-A (160°), or No. COAZ-8575-B (178°) for use with permanent type anti-freeze.
Pressure Valve: Radiator filler cap, Ford & Mercury No. B8A-8100-A. 12-15 lb. type.
Water Pump: Packless, sealed ball bearing type.
Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Ford & Mercury No. B9MF-10804-A.
Dash Unit - Ford & Mercury No. C1AF-10970.A.
Engine Unit - Ford & Mercury No. B7A-10884-A.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level at 4,000 mile intervals. Drain and refill transmission only when disassembled for repair. Use only Ford Automatic Transmission Fluid C1AZ-19582-A or Automatic Transmission Fluid Type A, Suffix A.
Checking Fluid Level: With parking brake applied, engine and transmission at normal operating temperature, engine idling at normal idle speed, and car on level floor, shift transmission selector lever through all positions, then place selector lever in P position. Check fluid level on dipstick. Add sufficient fluid through filler tube to bring level to F mark on dipstick. *CAUTION - Do not overfill.*
Capacity: 9 qts. approximately.
CHASSIS LUBRICATION: The steering knuckle ball joints and steering connector rod ends are packed with special lubricant and sealed. Lubrication fittings have been eliminated at these points. However, service plugs are provided in steering knuckle ball joints and steering connector rod ends so they may be repacked when necessary.
►*LUBRICATION CAUTION: Engine accessories (generator, distributor, etc.), steering gear, wheel bearings, transmission, rear axle and universal joints must be checked and lubricated at intervals recommended by manufacturer.*
►*SPECIAL LUBRICANT RECOMMENDATION CAUTION: Only the recommended lubricants (see below) are to be used when servicing steering knuckle ball joints and steering connector rod ends. Other lubricants will cause early failure of parts.*
Lubrication (Ford & Mercury): Every 30,000 miles or 2 years, remove lubrication service plugs (threaded) from upper and lower steering knuckle ball joints (four locations) and from steering connector rod ends (five locations) and install lubrication fittings. Lubricate all fittings with Lubricant, Part No. C1AZ-19590-A. then replace threaded service plugs.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*THUNDERBIRD JACKING & HOISTING PRECAUTIONS: Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

FORD MODELS

Fairlane	Series 30	Fairlane 500	Series 40
2-Door Club Sedan	31	2-Door Club Sedan	41
4-Door Town Sedan	32	4-Door Town Sedan	42

Galaxie	Series 50
2-Door Club Sedan	51
4-Door Town Sedan	52
2-Door Club Victoria Starliner	53
4-Door Town Victoria	54
Sunliner Convertible	55
2-Door Club Victoria	57

Station Wagons	Series 60
2-Door Ranch Wagon	61
4-Door Ranch Wagon	62
4-Door 6 Pass. Country Sedan	64
4-Door 9 Pass. Country Sedan	66
4-Door 6 Pass. Country Squire	67
4-Door 9 Pass. Country Squire	68
2-Door Courier (Commercial Wagon)	69

THUNDERBIRD MODELS

Thunderbird	Series 70
2-Door Hardtop	71
2-Door Convertible	73

MERCURY MODELS

Meteor 600	Series 40
2-Door Sedan	41
4-Door Sedan	42

Meteor 800	Series 50	Monterey	Series 60
2-Door Sedan	51	4-Door Sedan	62
4-Door Sedan	52	4-Door Hardtop	64
4-Door Hardtop	54	2-Door Convertible	65
2-Door Hardtop	57	2-Door Hardtop	67

Station Wagons	Series 70
4-Door Meteor 600	72
4-Door Meteor 800	74
4-Door Colony Park	76

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 E 52 W 100001

① - Year. 1961.
② - Assembly Plant. *See below.*
③ - Body Series. *See table above.*
④ - Engine. *See below.*
⑤ - Beginning vehicle number at each assembly plant (100001 for Ford & Thunderbird, 500001 for Mercury).

Assembly Plant Designation

A - Atlanta	H - Lorain	S - Pilot Plant
C - Chester	J - Los Angeles	U - Louisville
D - Dallas	K - Kansas City	W - Wayne
E - Mahwah	N - Norfolk	Y - Wixom
F - Dearborn	P - Twin City	Z - St. Louis
G - Chicago	R - San Jose	

Engine Code Designation

Engine	Code Letter
292" Engine 2-Bbl. Carb.	W
292" Engine 2-Bbl. Carb. (Export)	T
352" Engine 2-Bbl. Carb.	X
390" Engine 4-Bbl. Carb.	Z
390" Engine 4-Bbl. Carb. (Export)	R

►*ENGINE IDENTIFICATION NOTE:* Valve Rocker Arm Cover and Carburetor Air Cleaner painted as follows: **Ford 390** - Silver; **Mercury 292** - Ivory; **Mercury 352** - Turquoise; **Mercury 390** - Gold Bronze.

Engine Production Code Numbers: Indicates place, day and month of engine manufacture. Not used for licensing.

►*ENGINE DESIGNATION NOTE: On the following data pages, engines will be referred to as follows:*

Engine	Designation
292" V8	292
352" V8	352
390" V8 (Std. Engine) ①	390 Std.
390" V8 (Police Interceptor)	390 Police
390" V8 (High Performance)	390 High Perf.

① - If specifications apply to all three 390" V8 Engines, designation will be **390.**

TUNE-UP

COMPRESSION PRESSURE: 292 - 160±10 lbs. **352 & 390** - 180±20 lbs. All at cranking speed. Maximum variations between cylinders 10 lbs.

VACUUM READING: 18" at idle speed.

VALVE TAPPET CLEARANCE: 292 - .019" Hot & Cold, All Valves. Adjust to .019" clearance while engine is cold, then again check for .019" clearance after running engine for 30 minutes to normalize temperature. Minimum torque required to turn self-locking tappet adjusting screw must be 3 ft. lbs. minimum after interference noted.

352 & 390 Std. - Zero lash, hydraulic lifters.

390 High Perf. & Police - .028" Cold, .025" Hot, All Valves.

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight located in right exhaust manifold (left manifold on some 390" Engines). Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾ turn windup and hooked over stop pin. Valve must operate freely. Lubricate every 4000 miles with special Exhaust Gas Control Valve Solvent, Ford & Mercury No. COAA-19A501-A.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 292 - 1-5-4-8-6-3-7-2. **352 & 390** - 1-5-4-2-6-3-7-8.

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036".

Spark Plugs - 292 - Champion F-14Y; **352 & 390 Std.** - Champion F-11Y. **390 High Perf. & All Police** - F-9Y. All plugs 18 mm. with tapered seat. No gasket used. Torque to 15-20 ft. lbs.

►*390 POLICE ENGINE SPARK PLUG FOULING CORRECTION:* If plugs foul because of prolonged idling, install hotter plug, No. F-11Y.

COIL: Ford & Mercury No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.

Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from multiple connector to starter solenoid.

DISTRIBUTOR: Ford. Used as follows:

Engine	① Distributor No.
292	COAF-12127-A
352 Synchro-mesh	COAF-12127-E
352 Auto. Trans.	COAF-12127-D
390 Std. & Police	C1SF-12127-A
390 High Perf.	② COAF-12127-K

① - Stamped on distributor housing for identification.
② - Double Breaker type with Centrifugal Advance only.

Condenser - Ford & Mercury No. B9AF-12300-A (Except COAF-12127-K), No. 7RA-12300-C (COAF-12127-K).

Condenser Capacity - .21-.25 mfd.

Contact Point Set - Ford & Mercury No. B7A-12171-A (Except COAF-12127-K), No. FDS-12171-A (COAF-12127-K - 2 sets required).

Breaker Gap - .014-.016" (Except COAF-12127-K), .019-.021" (COAF-12127-K). Set both sets of points to same gap on double breaker distributor.

Cam Angle (Single Breaker) - 26-28½°.

Cam Angle (Double Breaker) - 26-28½° for each set of points operating separately. Maximum variation between point sets 1°. Total angle 33° (both sets operating together).

Breaker Arm Spring Tension - 17-20 ozs. (exc. Double Breaker), 27-32 ozs. (Double Breaker).

Rotation - Counterclockwise viewed from above.

Automatic Advance - COAF-12127-A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	500	0	1000
1¼-2¼	800	2½-4½	1600
5-6¼	1300	10-12½	2600
10¼-11¾	2000	20½-23½	4000

Automatic Advance - COAF-12127-E

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	500	0	1000
1-2	775	2-4	1550
5-6¼	1250	10-12½	2500
11½-13	2000	23-26	4000

Automatic Advance - COAF-12127-D

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	300	0	600
¾-1¾	500	1½-3½	1000
5-6¼	1100	10-12½	2200
11½-13	2000	23-26	4000

Automatic Advance - C1SF-12127-A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	275	0	550
1-2	400	2-4	800
3-4	475	6-8	950
6-7¼	850	12-14½	1700
10¾-12¼	2000	21½-24½	4000

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Automatic Advanc - COAF-12127-J & K

Degrees Distr.	RPM	Degrees Eng.	RPM
2¼-3¾	650	4½-6½	1300
5-6½	800	10-13	1600
7¾-9	1125	15½-18	2250
11½-13	2000	23-26	4000

Vacuum Spark Contr l: Diaphragm type. Mounted on distributor and linked directly to breaker plate.

Ⓒ Vacuum Advance - COAF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	7
5-8	10-16	12½
8-11	16-22	16
9½-12½	19-25	20

Ⓒ Vacuum Advanc - COAF-12127-E & D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
5-8	10-16	10
8-11	16-22	13½
9½-12½	19-25	17

Ⓒ Vacuum Advance - C1SF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-3	0-6	9
5-8	10-16	15
6-9	12-18	17

Ⓒ - With distributor speed of 1000 RPM.

IGNITION TIMING

Engin & Trans.	Standard Setting
292, 352 Synchro-mesh	Ⓒ 3° BTDC
390 Std. & P lic Synchro-mesh	Ⓒ 3° BTDC
292 Auto. Trans.	Ⓒ 10° BTDC
352, 390 Std. & P lic Auto. Trans.	Ⓒ 6° BTDC
390 High Performanc	10-14° BTDC

Ⓒ - Allowable range 2-10° BTDC. Set timing with vacuum line disconnected.

Timing Mark - Timing pin located in crankshaft pulley and pointer on engine front cover marked 0, 3, 6, 10. Align pin with correct mark on pointer.

CARBURETOR

►*CARBURETOR APPLICATION: As follows:*

Engin	Carburetor
292, 352	One Ford 2-Bbl.
390 Std. & Police	One Ford 4-Bbl.
390 High Performance	One Holley 4-Bbl.
390 High Performance	Three Holley 2-Bbl.

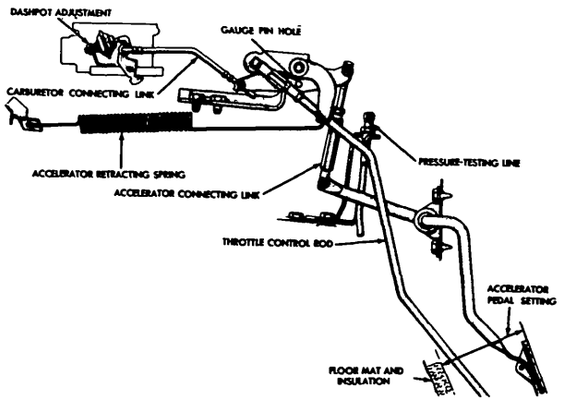
►*1961 HARD COLD START CORRECTION:* May be caused by incorrect automatic choke thermostatic spring. See *"Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*INCONSISTENT RETURN TO IDLE SPEED CORRECTION:* If engine fails to return to same idle speed every time, check for sticking carburetor throttle plates, binding carburetor throttle shaft, binding throttle linkage and proper dashpot adjustment before replacing dashpot.

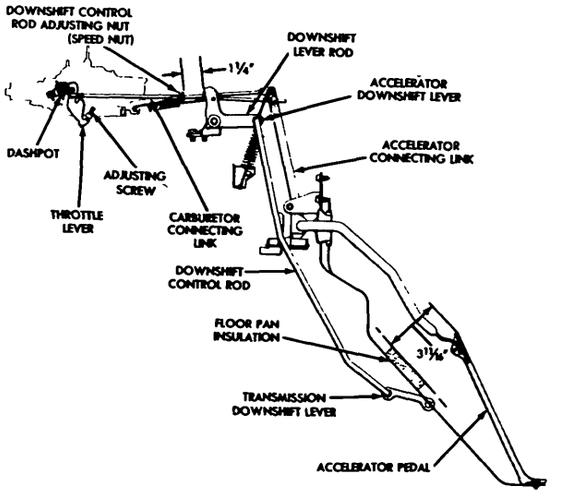
►*1961 FORD & MERCURY 2-SPEED AUTOMATIC TRANSMISSION & THROTTLE LINKAGE PRODUCTION CHANGE:* Beginning March 20, 1961, transmission throttle valve is controlled by a vacuum unit at rear of transmission case. Throttle linkage adjustment procedures for non-vacuum and for vacuum controlled throttle valve transmissions are different as detailed below.

THROTTLE LINKAGE ADJUSTMENT (Non-Vacuum Contr lled Type): Make correct idle speed adjustment, stop the engine, and make anti-stall dashpot adjustment (see below), then proceed as follows: Disconnect throttle control rod at upper end and disconnect carburetor connecting link from carburetor lever. Insert ¼" gauge pin through holes in carburetor lever and bracket. With carburetor connecting link held in normal position, push forward on link so throttle lever is firmly against carburetor idle adjusting screw and adjust length of carburetor connecting link so it fits freely into carburetor lever. Then lengthen link 1 full turn. Remove gauge pin and connect link to lever. Make sure gauge pin holes are aligned (readjust carburetor connecting link if necessary). Pull upward on throttle control rod until transmission lever is held against transmission internal stop. Rotate turnbuckle on throttle control rod so pin fits freely in carburetor lever, then lengthen rod by 3½ turns of turnbuckle. Connect throttle control rod. Distance from top rear corner of accelerator pedal to floor mat should be 3½". Adjust by turning threaded trunnion on accelerator connecting link. *Make final adjustment using pressure method as follows:* Connect a tachometer to engine and install a pressure gauge with Adapter T60L-7000-B (Ford), 77820-C (Mercury) to transmission testing line at lower end of accelerator connecting link. With parking brake applied and selector lever in "D", accelerate engine to 1000 RPM. Pressure should be 77-84 lbs. (2-Speed), 80-85 lbs. (3-Speed). If too low, lengthen throttle control rod; if too high, shorten rod (rotate turnbuckle). *CAUTION - If correct pressure cannot be obtained by rotating turnbuckle 2½ turns in either direction from preliminary setting above, other transmission trouble is indicated.*

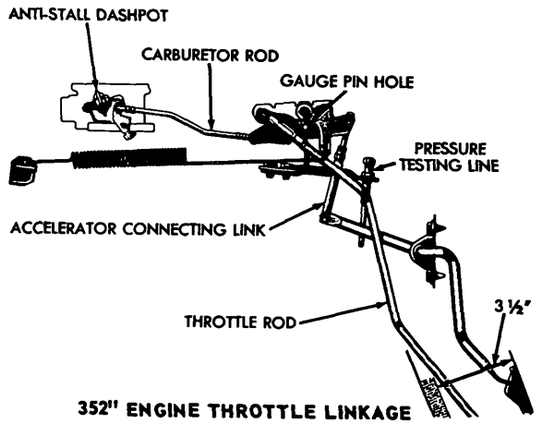
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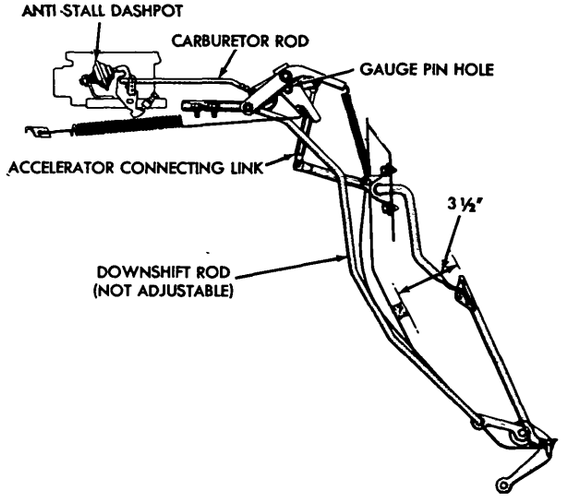
292" ENGINE THROTTLE LINKAGE (NON-VACUUM CONTROLLED TYPE)



THUNDERBIRD THROTTLE LINKAGE



352" ENGINE THROTTLE LINKAGE (NON-VACUUM CONTROLLED TYPE)



VACUUM CONTROLLED TYPE THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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THROTTLE LINKAGE ADJUSTMENT (Vacuum Controlled Type): Make engine idle speed and anti-stall dashpot adjustments (see below), then make carburetor rod, accelerator pedal, and downshift rod adjustments as follows:

1) Ford & Mercury - Disconnect carburetor connecting link from carburetor lever. Insert ¼" gauge pin through holes in carburetor lever and bracket. With carburetor connecting link held in normal position, push forward on link so throttle lever is firmly against carburetor idle adjusting screw and adjust length of carburetor connecting link so it fits freely into carburetor lever. Then lengthen link 1 full turn. Remove gauge pin and connect link to lever. Make sure gauge pin holes are aligned (readjust carburetor connecting link if necessary).

2) All Cars - Distance from top rear corner of accelerator pedal to floor mat should be 3¾" (Ford 2-Speed), 3½" (Mercury 2 & 3-Speed), 3 11/16" (Ford & T-Bird 3-speed). Adjust by turning threaded trunnion on accelerator connecting link (Ford & Mercury), carburetor connecting link (T-Bird).

3) Thunderbird - Position speed nut on downshift lever rod 1¼" from forward face of bushing in downshift lever.

4) Ford & Mercury - Tailor transmission "kickdown" operation after road test by adjusting accelerator pedal height.

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

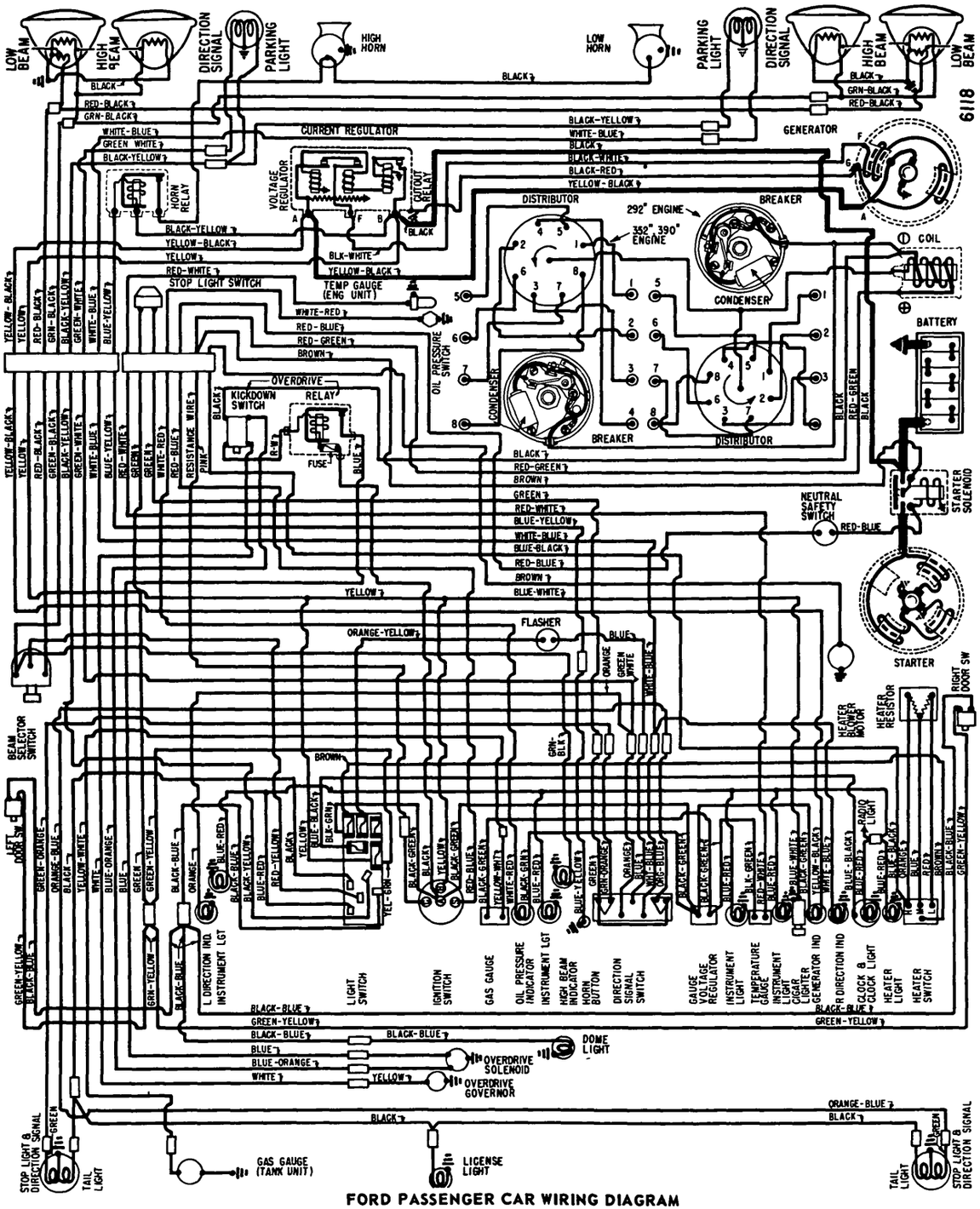
Manual Throttle Control Adjustment (Air Conditioned Cars): Attach a tachometer to engine and place transmission selector lever in "N" or "P". Turn air conditioning unit on and make sure magnetic clutch is engaged. Using hand throttle, bring engine speed up to 700 RPM and secure stop on bowden wire against cable armor so engine cannot be operated above 700 RPM with hand throttle.

FORD 2-BARREL CARBURETORS

FORD & LATER MERCURY	①Carburetor No.
292 Synchro-mesh	C1AE-9510-Y
292 Synchro-mesh (CCV)②	C1AE-9510-AA
292 Auto. Trans.	C1AE-9510-Z
292 Auto. Trans. (CCV)②	C1AE-9510-AB
352 Synchro-mesh	C1AE-9510-AC
352 Synchro-mesh (CCV)②	C1AE-9510-AE
352 Auto. Trans.	C1AE-9510-AD
352 Auto. Trans. (CCV)②	C1AE-9510-AF

① - Part No. stamped on left side of fuel bowl.
② - With Closed Crankcase Ventilation System.

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FORD PASSENGER CAR WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

FORD 2-BARREL CARBS. (C nt.)

MERCURY (EARLY)	①Carbur t r N .
292 Synchro-mesh	COAE-9510-AF
292 Auto Trans	COAE-9510-AG
292 All Trans Serv Repl	COAZ-9510-A
292 Synchro-mesh (CCV)②	C1AE-9510-J
292 Auto Trans (CCV)②	C1AE-9510-K
352 Synchro-mesh	COAE-9510-AB
352 Auto Trans	COAE-9510-AC
352 All Trans Serv Repl	COAZ-9510-B
352 Synchro-mesh (CCV)②	C1AE-9510-L
352 Auto Trans (CCV)②	C1AE-9510-M

FORD 4-BARREL CARBURETORS

FORD & THUNDERBIRD	①Carburetor No.
390 Std. Synchro-mesh (CCV)②	C1AE-9510-AG
390 Std. Auto Trans (CCV)②	C1AE-9510-AH
390 P lic Synchro-mesh (CCV)②	C1AE-9510-AK
390 P lic Auto Trans (CCV)②	C1AE-9510-AL
MERCURY	
390 Std. Auto Trans (CCV)② Early	C1AE-9510-B
390 Std. Auto Trans (CCV)② Later	C1AE-9510-AH
390 P lic Synchro-mesh (CCV)②	C1AE-9510-AK
390 P lic Auto Trans (CCV)②	C1AE-9510-AL

HOLLEY 2-BARREL CARBURETORS

FORD PASS. CARS	Carburetor No.
390 High P rf. Triple Carbs Center	C1AE-9510-AV
Front & Rear	C1AE-9510-AU

HOLLEY 4-BARREL CARBURETORS

FORD P ASS. CARS	③Carburetor No.
390 High P rformanc (CCV)②	C1AE-9510-AM

① - Part No stamped on left side of fuel bowl

② - With Closed Crankcase Ventilation

③ - Part No stamped on left side of choke flange

►*MANIFOLD FUEL DISTRIBUTION (292)· Carburetor RIGHT barr l f eds Cyls 2-3-5-8, LEFT barrel 1-4-6-7*

►*MANIFOLD FUEL DISTRIBUTION (352 & 390)· Carbu- r tor RIGHT barrels feed Cyls 1-4-6-7, LEFT barrels 2-3-5-8*

Idl S tting - Initial setting 1-1½ turns open With engine at normal operating temperature, turn both idle adjusting screws in until engine runs roughly from lean mixture, then turn screws out until engine begins to roll Finally, turn screws in just enough for smooth running (favor a slightly rich mixture)

Idl Sp d - 292 & 352 Synchro-mesh - 500-525 RPM **390 Std. & P lice Synchro-mesh** - 575-600 RPM **390 High P rformanc Synchro-mesh** - 700 RPM **All Engines Auto. Trans.** - 450-475 RPM in "D" (Drive)

►*AIR CONDITIONED CAR IDLE SPEED NOTE* Operate air conditioner at least 20 minutes before setting idle speed

Thr ttl Linkag Adjustment: See *CARBURETOR* above

►*OTHER DATA* Se *"Ford 2 & 4-Barrel Carburetors" or "Holley 2 & 4-Barrel Carburetors" in Carburetion Section*

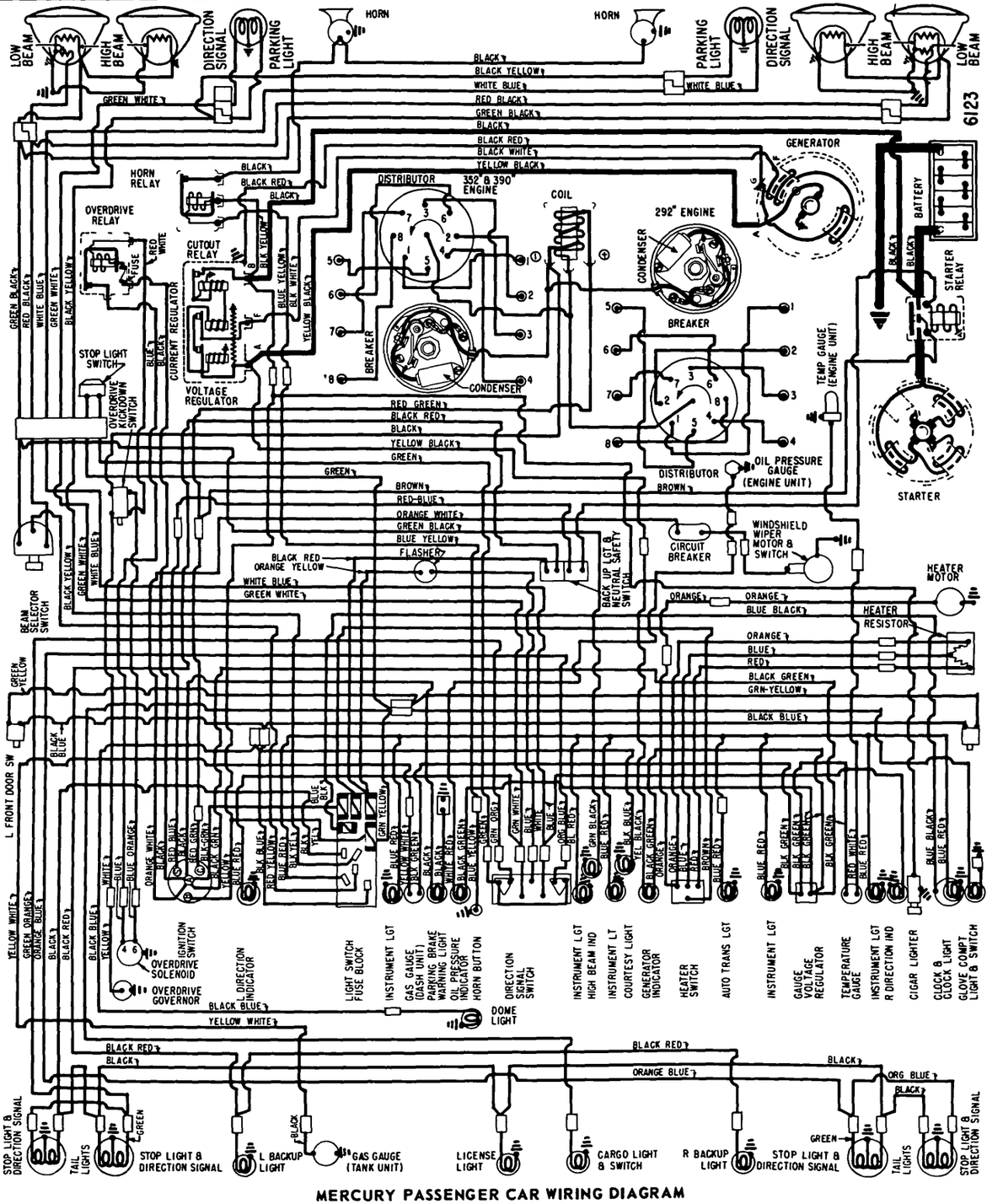
CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum as follows

Fuel & Vacuum - F rd & Mercury No. -	Fuel Only
COAE-9350-A	COAE-9350-E or B
C1AE-9350-A	C1SE-9350-A

Fuel Pump Pressure - 4 6 lbs at 500 RPM

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MERCURY PASSENGER CAR WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Gas lin Gaug : King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford & Mercury No B9MF-10804-A.

Dash Unit - Ford & Mercury No. C1AF-9305-A (Pass.), Ford No. C1SF-9307-A (T-Bird - Fuel & Temp. Gauge Unit).

Tank Unit - Ford No. COAZ-9275-B (Early Ford Pass. Cars), Ford & Mercury No. COAZ-9275-C (Later Ford Pass. Cars & All Mercury Pass. Cars); Ford & Mercury No. C1AF-9275-A (All Station Wagons), Ford No. C1SF-9275-C (T-Bird).

Fu l Filter: Disposable type (except Taxicab & 390 High Perf. Engine), replaceable element type (Taxicab & 390 High Perf. Engine) in fuel inlet line. Replace filter or element every 8000 miles or if clogged. *NOTE - Disposable type filters must be installed with arrow on filter case pointing toward carburetor.*

Air Cleaner: Dry filter element type. Clean every 4000 miles, replace element every 25-30,000 miles or sooner if needed.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. If compressed air used, direct air stream from inside surface of filter element. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

BATTERY

Ford Part No. ①	Volts	Plates	②Capacity
B9A-10654-D③	12	11	55 Ampere Hr.
B9A-10654-E④	12	13	65 Ampere Hr.
B9A-10654-F⑤⑥	12	11	70 Ampere Hr.

① - Numbers are for dry type batteries for service replacement. ② - At 20 hour rate.
③ - Replaces original battery with red filler caps.
④ - Replaces original battery with gray filler caps.
⑤ - Replaces original battery with yellow filler caps.
⑥ - Optional on Ford & Thunderbird For Mercury, optional battery is 13 plate, 75 amp. type.

Battery Ground - Negative, to engine.

Engine Ground - Converter or flywheel housing to frame (6 Cyl.), Rear of cylinder head or intake manifold to body (Ford & Mercury V8), Generator mounting bracket to underbody (T-Bird)

STARTER

Ford No. B6A-11002-A (Ford Pass.), Ford & Mercury No. FAY-11002-A (Mercury & T-Bird). *NOTE - Starter FAY-11002-A identified by No. FAY-11001-A on tag attached to frame of starter.*

Armature - Ford No. B6A-11005-B (All).
Drive - Bendix "Folo-Thru". Ford No. 1CM-11350-C.

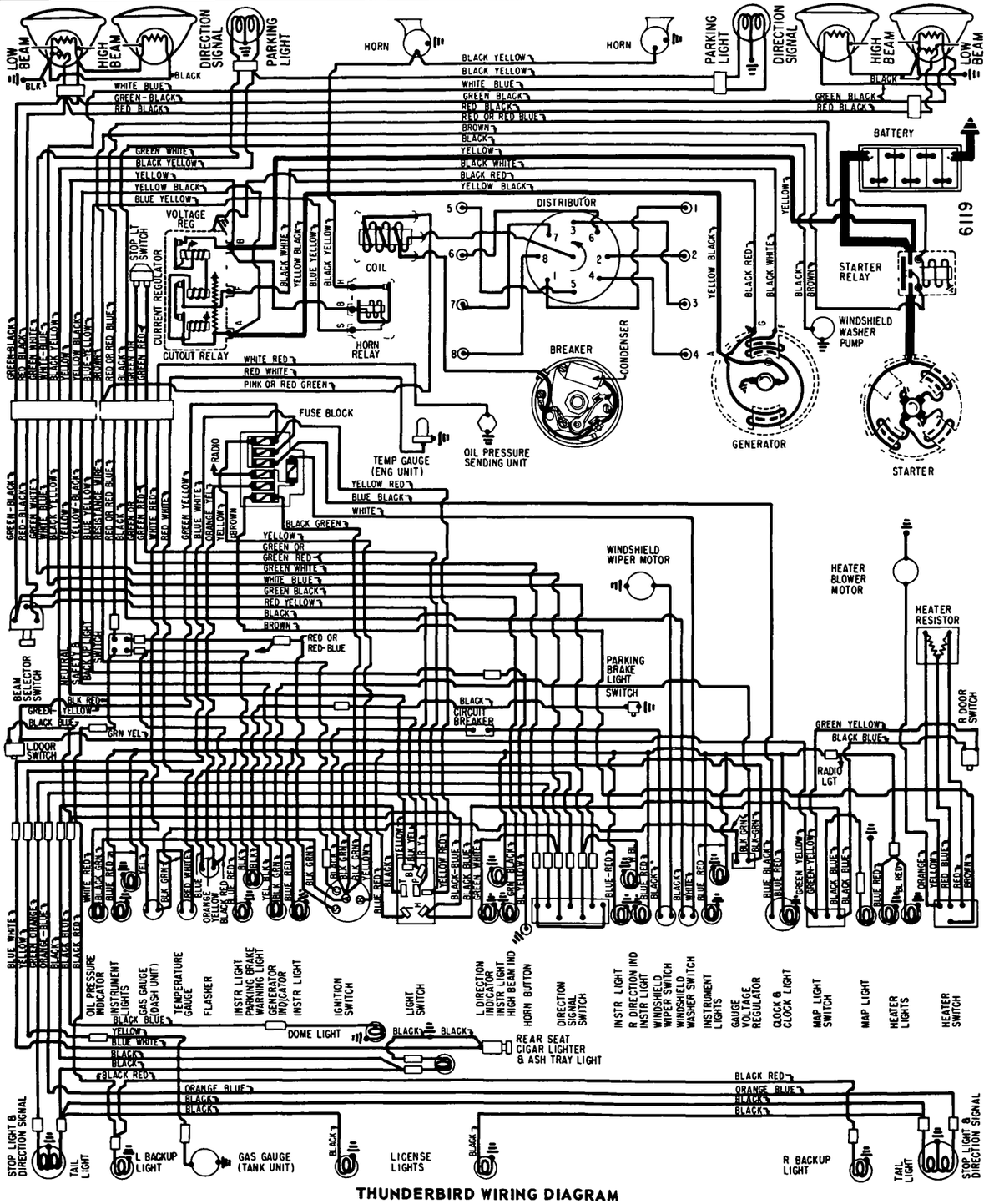
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 48-56 ozs.

Cranking Speed - 150-180 RPM, 155-190 amperes.

Performance Data - B6A-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	80-110
14.8 ft. lbs.		5.0	580

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THUNDERBIRD WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Performance Data - FAY-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	80-85
15.5 ft. lbs.		5.0	550

① - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford & Mercury No. B6A-11450-A, controlled by ignition switch.

Neutral Safety Switch (Aut. Trans.): As follows:

Car & Transmission	Ford & Mercury No.
Ford (2-Speed)	C1AA-7A247-A
Mercury Meteor 600 (2-Speed)	C1AA-7A247-A
Ford (3-Speed, Dual Range)	C1AA-7A247-B
Mercury Meteor 600 (3-Speed,DualRange)	C1AA-7A247-B
Other Mercury (3-Speed, Single Range)	C1MF-7A247-B
Other Mercury (3-Speed, Dual Range)	C1MF-7A247-A
Thunderbird (3-Speed, Dual Range)	C1SF-7A217-B

Adjustment - *See "Ford Motor Co. Automatic Transmissions" in Transmission Section.*

GENERATOR

Ford, Autolite & Delco-Remy. Used as follows:

Generator	Armature	Regulator
B9A-10002-A①	B6A-10005-C	B7A-10505-B
COTF-10002-C①	C1TF-10005-A	B7A-10505-B
C1TF-10002-A①	C1TF-10005-A	B7A-10505-B
C1TZ-10002-A①	C1TZ-10005-A	B7A-10505-B
COAF-10002-A②	B8A-10005-A	COMF-10505-A
COAZ-10002-C②	B8A-10005-A	COMF-10505-A
B8QH-10002-A③	B8QH-10005-A	B8E-10505-C
COTF-10002-B③	B8QH-10005-A	B8E-10505-C
B6A-10002-F④	B6C-10005-C	C1TF-10505-D
COAF-10002-B⑤	C1AF-10005-A	COAF-10505-B

① - 30 Amp. Ford type. ② - 35 Amp. Ford type.
③ - 40 Amp. Ford type. ④ - 40 Amp. Autolite type.
⑤ - 40 Amp. Delco-Remy type.

►*CHARGING CIRCUIT FUSE CAUTION (DELCO-REMY REGULATOR): Battery charging circuit protected by fuse, Ford & Mercury No. COAF-10602-A, clipped to BAT terminal of generator regulator. Check for blown fuse when diagnosing battery, generator, or regulator failure.*

Performance Data

Generator	Amperes	Volts	Gen. RPM
Ford 30 Amp.	30	15.0	2525
Ford 35 Amp.	35	15.0	2670
Ford 40 Amp.	40	15.0	2650
Autolite 40 Amp.	40	15.0	1800
Delco-Remy 40 Amp	40	15.0	2300

Brush Spring Tension - Ford 32-40 ozs., Autolite 34-41 ozs., Delco-Remy 28 ozs.

Field Current - 1.2-1.8 amps. (Ford & Autolite), 2.4-3.0 amps. (Delco-Remy), at 12 volts, Hot.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Use Burroughs Belt Tension Gauge No. 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Engine	①New Belt	②Used Belt
223, 292 (Exc. 40 Amp. Gen.)	90-120	60-90
223 (40 Amp. Gen.)	100-120	80-110
352, 390	100-130	80-110

① - Run belt for 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer.

GENERATOR REGULATOR

Regulator	Generator
B7A-10505-B①	B9A-10002-A, COTF-10002-C
B7A-10505-B①	C1TF-10002-A, C1TZ-10002-A
COMF-10505-A②	COAF-10002-A,COAZ-10002-C
B8E-10505-C③	B8QH-10002-A, COTF-10002-B
C1TF-10505-D④	B6A-10002-F
COAF-10505-B⑤	CCAF-10002-B

① - Ford 30 Amp. ② - Ford 35 Amp. ③ - Ford 40 Amp.
④ - Autolite 40 Amp. ⑤ - Delco-Remy 40 Amp.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE (DELCO-REMY).*

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.0-12.8 volts (30 Amp.), 12.4-13.2 volts (35 Amp.), 12.3-13.5 volts (40 Amp. Ford & Delco-Remy), 12.5-13.9 volts (40 Amp. Autolite).

Cuts Out - 6-9 amps. (30 Amp.), 8 amps. (35 Amp., 40 Amp. Ford & Delco-Remy), 2-6 amps. (40 Amp. Autolite) reverse current.

Voltage Regulator

Setting (Ford & Autolite) - 14.6-15.4 volts (Ford), 14.2-14.9 volts (Autolite) at 75°F ambient temperature.

Setting (Delco-Remy) - 14.6-15.4 volts at 75°F ambient temperature when operating on upper contacts. .1-.3 volts lower when operating on lower contacts.

Current Regulator

Setting (30 Amp.) - 28-32 amperes.

Setting (35 Amp.) - 33-37 amperes.

Setting (40 Amp.) - 38-42 amperes (Autolite), 39.5-44.2 amperes (Ford & Delco-Remy), at 75°F ambient temperature.

►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators", or "Autolite 6 & 12-Volt B Circuit Regulators", or "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

ALTERNATOR & REGULATOR

Leece-Neville Type. Ford & Mercury No. C1AF-10346-A with Regulator No. B8Q-10505-A. Three phase type with externally mounted rectifier.

►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.

Stop Light Switch Location: On forward end of brake master cylinder.

Lighting Switch: Combination lighting switch and fuse junction block.

Removal - Disconnect battery. Remove switch control knob and shaft by pressing spring-release button on top of switch (switch in "off" position). Unscrew retaining nut and remove switch. Remove retaining clip (Ford & Mercury) and separate switch from fuse junction block (All Cars).

Instrument Cluster Removal: Ford - Disconnect battery and remove steering column cover plate. Turn automatic transmission indicator needle down on shifting shaft. Disconnect speedometer cable and instrument cluster wiring harness from retaining clips at rear of panel. Protect steering column from scratches. Remove instrument panel retaining screws and pull cluster from panel and lay on steering column. Disconnect the wires to the gauges and instruments, remove the lights, and remove cluster assembly. *NOTE* - Individual instruments may be removed after assembly removed from car.

Mercury - Disconnect battery. Disconnect speedometer cable and remove wires from retaining clip on clock right hand retaining nut. Remove wires from two clips holding harness to back of instrument cluster. Protect steering column from scratches. Remove automatic transmission selector lever cover as follows: On Meteor 600, remove cover attaching screws and remove cover. On other models, pull trim from below selector dial, remove pointer mechanism attaching screws from bottom of steering column and remove selector cover-to-instrument panel attaching screws. Remove selector cover. *NOTE - May be necessary to remove screw on bottom side of steering column which attaches shroud to steering column.* On Meteor 600, place selector lever in "Low" position. On all cars, remove instrument cluster-to-instrument panel retaining screws (four long screws on top, four short screws on bottom, two screws just above steering column). On Meteor 600, turn transmission pointer to one side. On all cars, pull instrument cluster forward and lay on steering column. Remove wires from gauges and lights or individual instrument as necessary.

Speedometer Removal (Thunderbird): Remove chrome trim ring (attached by one screw). Remove speedometer mounting screws and pull speedometer from instrument panel so speedometer cable can be disconnected and pilot lights removed. Remove speedometer. *NOTE - When installing, pilot lights must be secure in mounting holes. Top pilot light is high beam indicator.*

Cruise Control: Automatic speed control and warning device. *See "Cruise Control" in Carburetion Section.*

CIRCUIT BREAKERS: 1) Circuit breaker (18 Ampere - Mercury) built into lighting switch protects headlights. **2) 12 Ampere** - Windshield wiper. On lower edge of instrument panel.

FUSES: *NOTE - On Ford & Mercury, fuses are located in fuse junction block of lighting switch. On Thunderbird, fuses are in fuse block on left hand air duct. All fuses are in above locations except as noted.*

15 Ampere - Parking, Tail, Stop, Instrument Panel, & Interior lights.
15 Ampere - Overdrive circuit. On overdrive relay.
14 Ampere - Heater Blower.
14 Ampere - Direction Signals & Back-up lights.
14 Ampere (T-Bird) - Windshield Washer Pump.
7.5 Ampere (Ford & Mercury) - Windshield Washer Pump. In feed wire.
7.5 Ampere - Radio.
1 Ampere - Clock.
Cigar Lighter - Sulphur disc or reset circuit breaker on back of lighter.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 292", 352" & 390" engines of same design used previously.

Engine	Bore	Stroke	Displacement
292	3.75"	3.30"	292 cu. ins.
352	4.00"	3.50"	352 cu. ins.
390	4.05"	3.78"	390 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
292	8.8-1	45.00	175 at 4200 RPM
352	8.9-1	51.20	220 at 4400 RPM
390	9.6-1	52.49	300 at 4600 RPM
390 ①	9.6-1	52.49	330 at 5000 RPM
390 ②	10.6-1	52.49	375 at 6000 RPM

① - Police Special. ② - High Performance.

Compression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

►*1961 352 & 390 ENGINES OIL LEAK AT OIL PAN CORRECTION:* If oil leak exists at screws holding oil pan to rear main bearing cap, install plastic coated spring washer, No. 373994-S, on oil pan retaining capscrews. *NOTE* - I.D. of washer is smaller than O.D. of capscrew, making it necessary to thread washer onto screw.

OIL PAN REMOVAL: 292 - Drain crankcase and disconnect oil pump inlet tube at oil pump. Remove oil pan retaining screws and remove oil pan. *NOTE* - On Mercury, remove ends of stabilizer bar from mounting studs and pull ends of bar down to provide clearance for oil pan removal.

352 & 390 (Except T-Bird) - Drain crankcase and remove dipstick. Place No. 1 piston at TDC. On Ford, remove flywheel housing lower cover. On Mercury, remove stabilizer bar from mounting studs and pull ends of bar down for clearance. On all cars, remove oil pan retaining screws and let pan rest on frame crossmember. Swing oil pump pick-up tube and screen out of way or let drop into oil pan. Remove oil pan by moving forward and tilting down.

390 (T-Bird) - Drain crankcase and cooling system. Disconnect radiator upper hose at supply tank. Remove oil pan retaining screws and let pan rest on underbody crossmember. Rotate crankshaft so counterweight will clear pan and move pan forward. Raise engine so there is tension on front engine mounts, disconnect mounts and raise engine so oil pump retaining bolts can be removed. Remove oil pan and pump.

PISTONS

Autothermic type. Solid skirts with three rings.

►*ORIGINAL BORE & PISTON NOTE:* Production standard cylinder bore range is .024" on all engines. Pistons used in this standard bore are 2 sizes, coded Red and Blue. Production cylinder bore may also be .003" Oversize with .003" Oversize pistons. *See tables below for specifications.*

Production Cylinder Bore Range

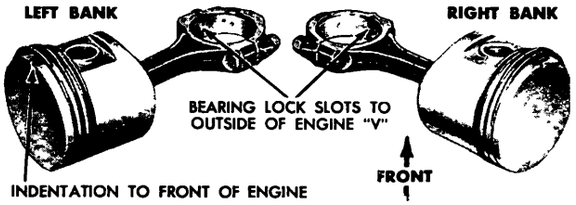
Engine	Standard	.003" Oversize
292	3.7500-3.7524"	3.7524-3.7536"
352	4.0000-4.0024"	4.0024-4.0036"
390	4.0500-4.0524"	4.0524-4.0536"

Production Piston Sizes

Engine	Red - Standard - Blue	.003" Oversize
292	3.7486-3.7492"	3.7498-3.7504"	3.7510-3.7516"
352	3.9982-3.9988"	3.9994-4.000"	4.0006-4.0012"
390	4.0477-4.0483"	4.0489-4.0495"	4.0501-4.0507"

Removal - Pistons and rods removed from above.

Clearance - **292** .0008-.0026", **352** .0012-.0030", **390** .0017-.0035". Wear limit .006" (All).



V8 ENGINE PISTON & ROD ASSY.

Checking Clearance & Fitting New Pistons - *See "Original Bore & Pistons" in Ford Motor Co. Special Data.*

Installing Pistons - Install pistons with notch in piston head toward front of engine. *See Rod Installation.*

Replacement Pistons: Ford - Furnished Std. (1 size only), and .020", .030", .040" (All), .060" (292 & 352) Oversize with fitted pins.

Mercury - Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040" Oversize with fitted pins.

PISTON PIN

Floating type with lock ring at each end.

Diameter - **292** .9120-.9123", **352 & 390** .9750-.9753".

Length - **292** 3.010-3.030", **352 & 390** 3.156-3.170".

Clearance in Piston - .0001-.0003". Wear limit .0008". Thumb press fit at 70°F.

Clearance In Rod - .0001-.0005". Wear limit .001". Light thumb press fit at 70°F.

Replacement Pins: Std. (Code Green), .001" (Code Blue), .002" (Code Yellow) Oversize.

PISTON RINGS

Two compression rings and one oil ring per piston. Oil ring is "Side Sealing" type (two steel rails with spring spacer between).

292 Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	①.0020-.0035"
Compr. (2)	.0770-.0780"	.010-.020"	①.0020-.0040"
Oil (3)		.015-.055"	②

352 & 390 Engines

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0774-.0781"	.015-.025"	①.0024-.0041"
Compr. (2)	.0930-.0940"	.015-.025"	①.0020-.0040"
Oil (3)		.015-.055"	②

① - Wear limit .006".

② - Snug. Side sealing type ring.

Replacement Rings: Furnished Std. & .020", .030", .040" Oversize. Also .060" Oversize for Ford 292 & 352 engines.

CONNECTING ROD

Length (Center-to-Center) - **292** 6.320-6.324", **352** 6.538-6.542", **390** 6.486-6.490".

Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.1884-2.1888"	2.1880-2.1884"
352 & 390	2.4384-2.4388"	2.4380-2.4384"

Lower Bearing - Steel backed, copper lead alloy lined type. Upper and lower halves interchangeable.

Clearance - **292** .0005-.0024". Wear limit .0034". **352 & 390 (Exc. T-Bird)** .0006-.0026". Wear limit .0038". **390 (T-Bird)** .0006-.0031". Wear limit .0038".

Sideplay - .006-.016". Wear limit .019".

Installing Rods - Install rods in correct numbered cylinder with oil squirt hole to center of engine, bearing lock slots to outside of engine, and notch in piston head to front of engine.

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030", .040" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

CRANKSHAFT

Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.4984-2.4988"	2.4980-2.4984"
352 & 390	2.7488-2.7492"	2.7484-2.7488"

Bearings - Steel backed copper lead alloy.

Engine	Main Bearing Clearance	Wear Limit
292	.0006-.0032"	.0042"
352	.0006-.0031"	.0039"
390 T-Bird	.0007-.0029"	.0039"
390 Police	.0008-.0012" (No. 1)	
	.0006-.0027" (Others)	
390 Others	.0006-.0031"	.0039"

Replacement Bearings: Furnished Std. (2 sized marked Red and Blue), and .002", .010", .020", .030", .040" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

End Thrust: Taken by No. 3 (center) main bearing.

Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Endplay - .004-.008". Wear limit .012".

Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil

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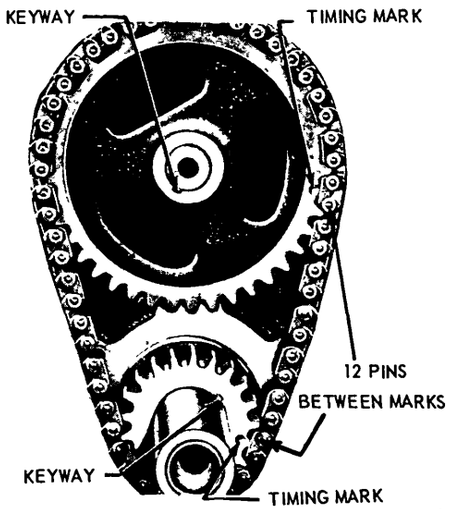
See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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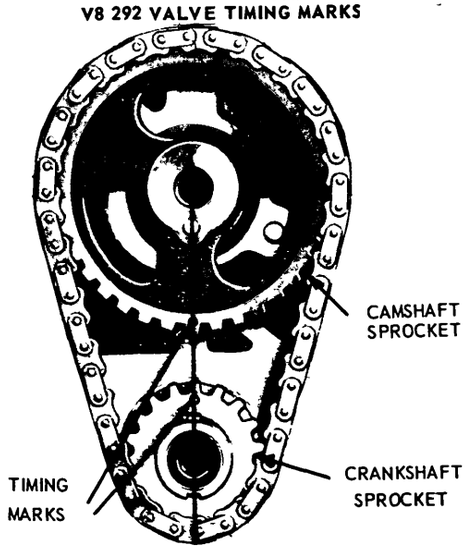
leakage at front oil seal. Slinger is held in place by crankshaft pulley hub and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

Journal Diameter - 292 1.9255-1.9265", **352 & 390** 2.1238-2.1248".
Bearings - Steel backed babbitt lined bushings.
Clearance - .001-.003". Wear limit .006".
End Thrust: 292 Taken by thrust plate and spacer located between camshaft sprocket and shoulder on camshaft. **Endplay** - .001-.007". Wear limit .012". **352 & 390** - Controlled by spring-loaded thrust button on fuel pump eccentric bolt.
Replacement Bearings: Std. & .015" Undersize.
Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Timing Chain: Side guide type. **Length** - 56 links (292) 48 links (352 & 390).
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.
Camshaft Setting (292): Sprockets marked by round depression on one tooth. Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are on drive side.
Camshaft Setting (352 & 390): Timing marks on both sprockets adjacent and in line with straightedge across shaft centers.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*



V8 292 VALVE TIMING MARKS



V8 352" & 430" ENGINE VALVE TIMING MARKS

VALVES

Tappet Clearance: 292 .019" Hot & Cold, All Valves. *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*
352 & 390 Std. - Zero lash, hydraulic lifters. *For hydraulic lifter operating range check, see "Valve System" in Ford Motor Co. Special Data.*
390 High Perf. & Police - .028" Cold, .025" Hot, All Valves. *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*

292 Engine

Valve	Head Diameter	① Stem Diameter
Intake	1.642-1.652"	.3416-.3423"
Exhaust	1.505-1.520"	.3398-.3405"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°③	.264"	④ .0010-.0024"
Exhaust	45°③	.262"	⑤ .0028-.0042"

352 Engine

Valve	Head Diameter	① Stem Diameter
Intake	2.022-2.2037"	.3711-.3718"
Exhaust	1.551-1.566"	.3693-.3700"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°③	.232"	④ .0010-.0024"
Exhaust	45°③	.232"	⑤ .0028-.0042"

390 Engine

Valve	Head Diameter	① Stem Diameter
Intake	2.022-2.037"	.3711-.3718"
Exhaust	1.551-1.566"	.3693-.3700"

Valve	Seat Angle	② Lift	Stem Clearance
Intake	45°③	⑥ .2316"	④ .0010-.0024"
Exhaust	45°③	⑥ .2316"	⑤ .0028-.0042"

① - Furnished with .003", .015" & .030" Oversize stems.
② - Cam lobe lift. Wear limit .005".
③ - Valve Face Angle 44°.
④ - Wear limit .0045". ⑤ - Wear limit .0055".
⑥ - Std. Engine. .298" High Perf., .264" Police.

Valve Seat Width - .070-.090" All Engines, All Valves.
Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over valve guide.
►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Motor Co. Special Data.*
Valve Springs: Single spring used on 292 & 352 engines. Spring and damper used on all 390 engines.
Spring Free Length - 292 2.09", **352** 2.26", **390 Std.** 2.15", **390 High Perf. & Police** 2.09".

Spring Specifications - 292

Valve	Spring Pressure	Length
Closed	71-79 lbs. ①	1.780"
Open	161-177 lbs. ②	1.390"

Spring Specifications - 352

Valve	Spring Pressure	Length
Closed	94-104 lbs. ③	1.820"
Open	180-198 lbs. ④	1.420"

⑤ **Spring Specifications - 390 Std.**

Valve	Spring Pressure	Length
Closed	74-85 lbs. ⑥	1.820"
Open	190-208 lbs. ⑦	1.420"

⑤ **Spring Specifications - 390 High Perf. & Police**

Valve	Spring Pressure	Length
Closed	80-90 lbs. ⑧	1.820"
Open	255-280 lbs. ⑨	1.320"

① - Wear limit 64 lbs. at 1.780".
② - Wear limit 145 lbs. at 1.390".
③ - Wear limit 89 lbs. at 1.820"
④ - Wear limit 163 lbs. at 1.420".
⑤ - Spring and damper assembly together.
⑥ - Wear limit 62 lbs. (Ford), 67 lbs. (Mercury & T-Bird) at 1.820".
⑦ - Wear limit 171 lbs. at 1.420".
⑧ - Wear limit 72 lbs. at 1.820".
⑨ - Wear limit 230 lbs. at 1.320".
Valve Spring Installation: Spring ends must be square within .073" (292), .072" (352), .075" (390). Install springs with damper (closed) coil end down toward cylinder head. *NOTE - On 390 Engines, end of damper spring coil must be 135° counterclockwise from coil end of valve spring.* Check installed height of spring which must not exceed 1 25/32" (292), 1 27/32" (352, 390) from surface of cylinder head spring pad to underside of spring retainer. If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 3/4-1 25/32" (292), 1 13/16-1 27/32" (352 & 390). *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*
Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*
Valve Lifters (292): Mechanical, mushroom type. Remove from below after camshaft removed.
Clearance - .0011-.0027". Wear limit .0055".
Valve Lifters (352 & 390): Hydraulic (Std. Engine), Mechanical (High Perf. & Police Engines) barrel type. Can be removed through pushrod holes without disturbing valve chamber cover or manifold.
Clearance - .0005-.0020". Wear limit .005".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Hydraulic Lifter Overhaul - *See "Valve System" in Ford Motor Co. Special Data.*
Hydraulic Lifter Operating Range - *See "Valve System" in Ford Motor Co. Special Data.*
Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications - 292
Intake Valves - Open 12° ① BTDC. Close 54° ② ALDC.
Exhaust Valves - Open 58° ③ BLDC. Close 8° ④ ATDC.

Valve Timing Specifications - 352
Intake Valves - Open 22° ⑤ BTDC. Close 68° ⑥ ALDC.
Exhaust Valves - Open 68° ⑤ BLDC. Close 22° ⑥ ATDC.

Valve Timing Specifications - 390 Std.
Intake Valves - Open 26° ⑤ BTDC. Close 64° ⑦ ALDC.
Exhaust Valves - Open 67° ⑤ BLDC. Close 23° ⑦ ATDC.

Valve Timing Specifications - 390 High Perf. & Police
Intake Valves - Open 28° ⑧ BTDC. Close 73° ⑨ ALDC.
Exhaust Valves - Open 76° ⑧ BLDC. Close 25° ⑨ ATDC.

① - Camlift .016". ② - Camlift .019". ③ - Camlift .015".
④ - Camlift .018". ⑤ - Camlift .002". ⑥ - Camlift .005".
⑦ - Camlift .004". ⑧ - Camlift .008". ⑨ - Camlift .011".

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*
Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.
Normal Oil Pressure: 292, 352, 390 Std. 35-55 lbs. at 2000 RPM. **390 High Perf. & Police** 52-72 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator: Indicator light on instrument panel controlled by Engine Oil Pressure Switch, Ford & Mercury No. B6A-9278-B.
Oil Pump: Rotor type driven by distributor through intermediate drive shaft. Located outside crankcase on left side (292), inside crankcase at front (352 & 390).
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*
Oil Filter: Full flow, disposable type. Replace every 4000 miles.
Filter Replacement - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter face, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - Do not overtighten.*
Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and ventilation (road draft) tube at rear of engine. Clean and lubricate filler cap filter every 4000 miles.
Positive - Road draft tube replaced by an adapter, tubing, and hose routed to ventilation valve installed in intake manifold. Service system at regular intervals and check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*
►*OIL FILLER CAP & PIPE CAUTION:* Oil filler cap used on Closed Crankcase Ventilation engines has a rectangular opening on each side of retaining spring clip. DO NOT use this cap on engines with conventional ventilation system. Oil filler pipe on all 352 engines and 390 engines with conventional ventilation system has an air scoop. When installing this pipe, open end of air scoop must be to front of engine.

ENGINE COOLING SYSTEM

Water Capacity: 19 qts. Add 1 qt. with heater.
Pressure Valve: Ford & Mercury No. B8A-8100-A. 12-15 lb. radiator filler cap.
Thermostat: Located in water outlet connector. Ford & Mercury No. COAZ-8575-A (160°) Std. No. COAZ-8575-B (178°) for use with permanent type anti-freeze.
Water Pump: Packless, sealed ball bearing type.
Pump Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*
Fluid Fan Drive: Used on Air Conditioned Cars. *See "Cooling System Notes" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Ford & Mercury No. B9MF-10804-A.
Dash Unit - Ford & Mercury No. C1AF-10970-A (Pass.), Ford No. C1SF-9307-A (T-Bird - Fuel & Temp. Gauge Unit).
Engine Unit - Ford & Mercury No. B7A-10884-A (Std.), No. C1AZ-10884-A (Air Cond.).

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level at 4,000 mile intervals. Drain and refill transmission only when disassembled for repair. Use only Ford Automatic Transmission Fluid C1AZ-19582-A or Automatic Transmission Fluid Type A, Suffix A.

Checking Fluid Level: With parking brake applied, engine and transmission at normal operating temperature, engine idling at normal idle speed, and car standing on a level floor, shift transmission selector lever through all positions, then place selector lever in "P" (Park) position. Check fluid level on dipstick. Add sufficient fluid through filler tube to bring level to "F" (Full) mark on dipstick. *CAUTION - Do not overfill.*

Capacity: 10 qts. approximately.

CHASSIS LUBRICATION: The steering knuckle ball joints and steering connector rod ends are packed with special lubricant and sealed. Lubrication fittings have been eliminated at these points. However, service plugs are provided in steering knuckle ball joints and steering connector rod ends so they may be repacked when necessary.

►*LUBRICATION CAUTION: Engine accessories (generator, distributor, etc.), steering gear, wheel bearings, transmission, rear axle and universal joints must be checked and lubricated at intervals recommended by manufacturer.*

►*SPECIAL LUBRICANT RECOMMENDATION CAUTION: Only the recommended lubricants (see below) are to be used when servicing steering knuckle ball joints and steering connector rod ends. Other lubricants will cause early failure of parts.*

Lubrication (Except T-Bird): Every 30,000 miles or 2 years, remove lubrication service plugs (threaded) from upper and lower steering knuckle ball joints (four locations) and from steering connector rod ends (five locations) and install lubrication fittings. Lubricate all fittings with Lubricant, Part No. C1AZ-19590-A. then replace threaded service plugs.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*"ECONOLINE" TRUCK NOTE: This model is E-100 Series. Data for this series is listed below.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on rear face of left front door inner panel, or on left front cab pillar, or glove box door, or right hand dash panel, depending on truck model. *Number (example below) includes identification data.* ① ② ③ ④

C55 C U 100001

① - Letter and number (first two digits of series designation). See Truck Model Table below.
② - Engine Type Code. See Engine Code Table below.
③ - Assembly Plant. See Assembly Plant Table.
④ - Consecutive Unit No. Code. Starting with 100,001 for October 1960 through 249,999 for December 1961.

Engine Code Table

Letter	Engine Type	Sales Designation
S		144 Six
A	(Economy)	223 Six
J	(Standard)	223 Six
B		262 Six
C	(2-Bbl. Carb.)	292 V8
D	(4-Bbl. Carb.)	292 V8

Truck Model

Letter	Type	Letter	Type
E	Econoline	B	School Bus
F	Conventional	P	Parcel Delivery
C	Tilt Cab		

Number	Size
100, 250, 350, 400	Light Duty
500, 550, 600	Medium Duty

Assembly Plant

A - Atlanta	H - Lorain	E - Mahwah
G - Chicago	U - Louisville	R - San Jose
D - Dallas	N - Norfolk	S - Pilot Plant
K - Kansas City	P - St. Paul	

►*ENGINE DESIGNATION NOTE: In the following data pages, engines will be referred to as follows:*

Engine	Designation
6 Cyl. 144"	144
6 Cyl. 223"	223
6 Cyl. 262"	262
V8 292" 2-Bbl. Carb. Medium Duty	292MD
V8 292" 4-Bbl. Carb. Heavy Duty	292HD

TUNE-UP

COMPRESSION PRESSURE: 144 170±20 lbs., 223, 262, 292 150±20 lbs. All at cranking speed. Cylinders must be equal within 10 lbs.

VACUUM READING: 18" at idle speed (All Engines).

VALVE TAPPET CLEARANCE: Can be set with engine cold but must be rechecked with engine at operating temperature (30 minutes operation at 1200 RPM) and idling. Use step-type feeler gauge only (.001" undersize for "go"; .001" oversize for "no go").

Cold Clearance - 144 .018" All Valves. 223, 262, 292 .019" All Valves.

Hot Clearance - 144 .018" All Valves. 223, 262 .019" All Valves. 292 .018" All Valves.

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw (after interference noted) must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: 144 - "Hot Spot" in intake manifold at lower center and engine coolant heater spacer between carburetor and intake manifold.

223 & 292MD - Automatic thermostatic type located at center of exhaust manifold (6 Cyl.), between crossover pipe and right exhaust manifold (292MD). Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾-turn windup and hooked over stop pin. Valve must operate freely. Lubricate every 4000 miles with special Exhaust Gas Control Valve Solvent, Ford No. COAA-19A501-A.

262 - Automatic thermostatic type as for 223 & 292MD above, and also engine coolant heater spacer between carburetor and intake manifold.

292HD - None used.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

6 CYLINDER ENGINES

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: 144 .032-.036". 223, 262 .028-.032".

Spark Plugs - Champion F14-Y (144 & 170), 860 (223), F10 (262). 18 mm. Torque to 15-20 ft. lbs. *NOTE* - Plugs have tapered seat, no gasket used. Correct torque is important.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Ford No. COLF-12250-A. 1.30-1.40 ohms at 75°F. Pink resistance wire in harness between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.

DISTRIBUTOR: Used as follows:

Engine	Type	① Distributor No.
144	Loadomatic	CODF-12127-A
223	Loadomatic	COAF-12127-G
262	"Step Stop"	C1TF-12127-C
262	"Step Stop"	② C1TF-12127-D

① - Stamped on distributor housing for identification.
② - Also daub of blue paint on distributor housing.
Condenser - Ford No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford No. FAA-12171-A.
Cam Angle - 35-38°.
Breaker Gap - .024-.026".
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

① Advance Performance - CODF-12127-A

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.33	400
½-1½	0.78	600
3½-4½	1.30	800
10-11¼	3.45	1400
12½-13¾	5.00	1800
12¾-14	5.35	2000

① - Set test stand at 0° at 300 RPM and 0" Hg.

② Advance Performance - COAF-12127-G

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.38	450
2½-3½	0.79	650
6¾-7¾	2.85	1100
8¾-9¾	4.33	1400
10¼-11¼	5.99	1800

② - Set test stand at 0° at 450 RPM and 0" Hg.

③ Advance Performance - C1TF-12127-C

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	0-1¼	0.42	400
A	5-6	1.03	800
A	7½-8½	1.62	1000
B	8½-9½	2.32	1200
C	8½-9½	5.65	2000
C	10½-11¾	7.30	1600
D	13	10.00	1600

③ - Set test stand at 0° at 250 RPM and 0" Hg.
A - Adjust primary spring. **B** - Adjust stop washers.
C - Adjust spring washers. **D** - Replace breaker plate assembly.

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION:* Scribe marks on distributor body to indicate rotor-to-body position and body-to-block position before removing. Align marks when installing. Make sure oil pump intermediate shaft engages distr. shaft properly.

V8 ENGINES

FIRING ORDER: 1-5-4-8-6-3-7-2.
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .028-.032".
Spark Plugs - Champion 860 (292MD), F10 (292HD). 18 mm. Torque to 15-20 ft. lbs. *NOTE* - Plugs have tapered seat, no gasket used. Correct torque is important.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Ford No. COLF-12250-A. 1.30-1.40 ohms at 75°F. Pink resistance wire in harness between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.

DISTRIBUTOR: Centrifugal & Vacuum Advance type used on 292MD, Centrifugal Advance only type used on 292HD, as follows:

Engine	① Distributor No.
292MD	COTF-12127-B
292HD	COTF-12102-C

① - Stamped on distributor housing for identification.
Condenser - Ford No. B9TF-12300-A (COTF-12127-B), No. B7A-12300-C (COTF-12102-C). **Capacity** - .21-.25 mfd.
Contact Point Set - Ford No. B7A-12171-A (COTF-12127-B). No. B8Q-12171-A (COTF-12102-C).
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance
① COTF-12127-B

Degrees Distr.	RPM	Degrees Eng.	RPM
0	550	0	1100
¾-1¾	700	1½-3½	1400
3¼-4¼	900	6½-8½	1800
5½-6½	1150	11-13	2300
8½-10	1600	17-20	3200
9¼-10¾	1800	18½-21½	3600

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Automatic Advance
©COTF-12102-C

Degrees	Distr. RPM	Degrees	Eng. RPM
0	400	0	800
½-1½	500	1-3	1000
5½-6½	900	11-13	1800
8½-9½	1250	17-19	2500
10¾-12¼	2000	11½-24½	4000

© - Set Test Stand to 0° at 250 RPM.

Vacuum Spark Control (292 MD): Integral type.

Vacuum Advance
②(COTF-12127-B)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
3¾-6¾	7½-13½	10
5½-8½	11-17	13

② - Set Test Stand to 0° at 1000 RPM and 0" of Hg.

►*DISTRIBUTOR REMOVAL & INSTALLATION CAUTION: See 6 Cyl. above.*

IGNITION TIMING

Engine	Std. Ignition Setting
144	4° BTDC
223 Synchro-mesh	4° BTDC
223 Auto. Trans.	6° BTDC
262	© 2° BTDC
292	6° BTDC

© - Allowable range 2-6° BTDC.

►*TIMING SETTING CAUTION:* Set timing with engine idling and vacuum line disconnected. Check advance operation by accelerating engine after vacuum line connected.

Timing Mark (144 & 292) - Notch or pin in crankshaft pulley and timing pointer on chain case cover. Pointer marked "0", "3", "6", "10". Align pulley notch or pin with correct mark on pointer.

Timing Mark (223) - Vibration damper marked by lines TDC (Long Mark) & 3°, 5°, 7°, 9°, BTDC (Short Marks). Align pointer on chain case cover with correct mark (or space between marks) on pointer.

Timing Mark (262) - Same as for 223 above except that vibration damper marks (after long mark) are 2°, 4°, 6°, 8°, 10°.

CARBURETOR

►*CARBURETOR APPLICATION: Holley carburetors used. "Visi-Flo" (1-Bbl.) used on 6 Cyl. 2-Barrel used on 292 MD, 4-Barrel used on 292 HD.*

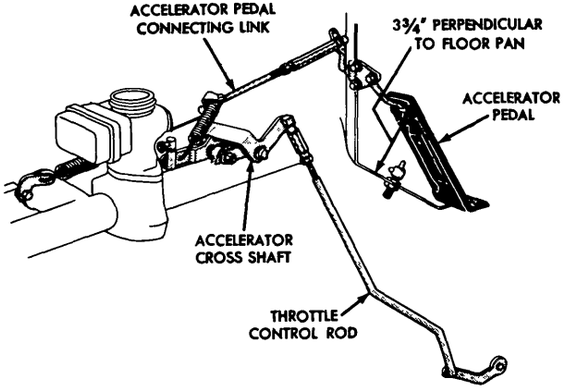
Throttle Linkage Adjustment (6 Cyl. Fordomatic & Cruise-O-Matic): Adjust engine idle speed to 475-525 RPM in Drive and make anti-stall dashpot adjustment (see below). With engine stopped and carburetor on hot idle, remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut. Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission. Turn throttle rod clevis until pin enters hole in lever and **lengthen throttle rod 3 turns.** Connect throttle control rod, tighten locknut, install clevis lock. Measure accelerator pedal height from point where linkage connects to pedal to floor mat. Distance should be 3¾" (Exc. "P" Series). On "P" Series, measure distance from center of hole in cross shaft (for accelerator rod) to a line parallel to bottom line of bracket. Distance should be 1 7/8". To adjust, turn threaded adjusting sleeve on accelerator pedal adjusting link. Adjust pedal detent so it barely contacts pedal at full throttle. Make final adjustment by pressure method, see below.

Throttle Linkage Adjustment (V8 Fordomatic & HD Cruise-O-Matic: Adjust idle to 475-525 RPM in Drive range. Disconnect throttle control rod and carburetor connecting rod from cross shaft assembly. Insert a ⅛" gauge pin (¼" drill) through gauge holes. Hold connecting rod to normal operation position so throttle lever is solidly against idle adjusting screw. Adjust connecting rod length to fit freely into accelerator assembly lever, then turn adjusting sleeve **one full turn counterclockwise to lengthen rod.** Remove gauge pin and connect rod. Check alignment of gauge pin holes, and set throttle to hot idle position. Pin must enter freely. Readjust connecting rod as necessary. Remove gauge pin, pull upward on throttle control rod, so transmission lever is against its internal stop. Rotate adjusting sleeve so rod fits freely into accelerator lever assembly. Lengthen throttle control rod (turn adjusting sleeve counterclockwise) **three turns for approximate setting.** Connect control rod to accelerator assembly lever. Adjust pedal height to 3¾" measured from floor mat to point where linkage connects to pedal (Except "P" Series, so center of hole in cross shaft lever (for pedal rod) is 9/16" above horizontal ("P" Series). To adjust height, turn sleeve on accelerator pedal connecting rod. Adjust pedal detent so it just contacts pedal at full throttle. Make a final adjustment of throttle linkage by pressure method, see below.

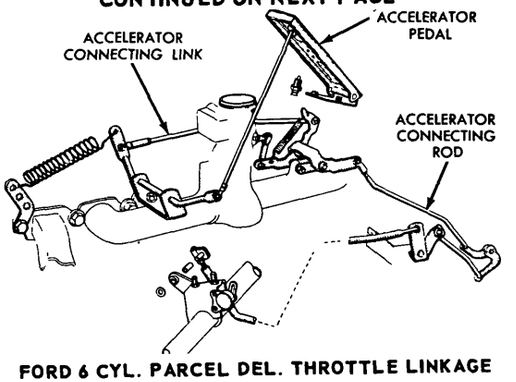
Pressure Method of Throttle Linkag Adjustm nt: With carburetor or accelerator pedal linkage adjusted and transmission at normal operating temperature, apply parking brake. Stop engine, and remove threaded cap from pressure linkage tube (in engine compartment) and connect pressure gauge to tube using Tool T60L-7000-B so it can be read from drivers seat, then connect tachometer to engine. Note gauge reading at 1000 RPM. If pressure below 80 lbs. lengthen throttle rod by rotating sleeve. If pressure is over 85 lbs. shorten rod. Tighten locknut to hold rod adjustment.

Anti-Stall Dashpot Adjustment: After engine idle speed has been adjusted to specifications, loosen dashpot locknut. Hold throttle in hot-idle position, bottom dashpot plunger. Distance from plunger to throttle shaft lever should be .060-.090". Adjust by turning dashpot or dashpot adjusting nut.

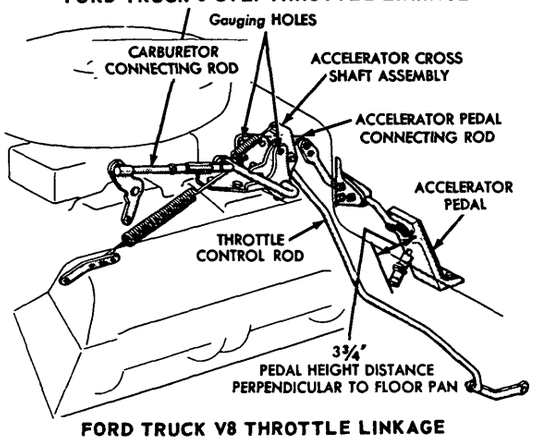
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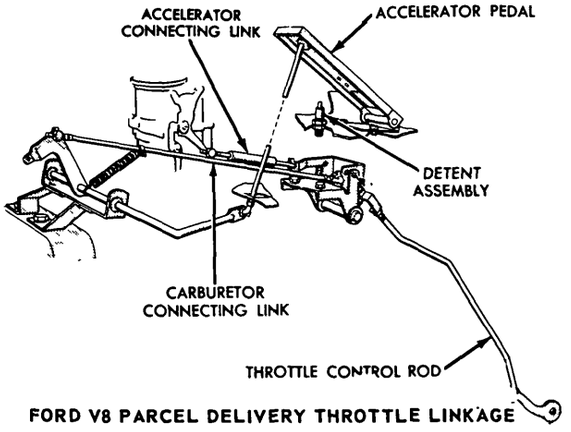
FORD TRUCK 6 CYL. THROTTLE LINKAGE



FORD 6 CYL. PARCEL DEL. THROTTLE LINKAGE



FORD TRUCK V8 THROTTLE LINKAGE



FORD V8 PARCEL DELIVERY THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE
HOLLEY "VISI-FLO"

Engine & Series	Carburetor No.
144 (E-100 Series)	①C1UE-9510-A
144 (P-100 Series)	②C1DE-9510-A
223 (All Series)③S M	①⑪C1TE-9510-V
223 (All Series)③A T	①⑪C1TE-9510-Y
223 (All Series)③(CCV)⑥S M	①⑪C1TE-9510-AC
223 (All Series)③(CCV)⑥S M	①⑪C1TE-9510-Z
223 (All Series)③(CCV)⑥A T	①⑪C1TE-9510-AD
223 (All Series)③Service	①⑪C1TE-9510-AL
223 (P Series)⑤(CCV)⑥S M	① C1TE-9510-AK
223 (P Series)⑤(CCV)⑥A T	①C1TE-9510-AJ
223 (P-100 Series Economy)	②C1TE-9510-AR
262 (CCV)⑥	①⑦C1TE-9510-AA
262(CCV)⑥	①C1TE-9510-BD

S.M. - Synchro-mesh A.T. - Automatic Transmission

① - Number stamped on main body
② - Number stamped on fuel inlet boss
③ - Including P Series before Feb 1, 1961
⑪ - Part No C1TZ-9510-A
⑤ - After Feb 1, 1961
⑥ - With Closed Crankcase Ventilation
⑦ - Replaced by C1TE-9510-BD

Idl Setting - Initial setting 1-1½ turns open Turn mixture screw in until engine runs rough (lean mixture), then back out screw until engine rolls (rich mixture) Turn screw in until engine runs smoothly Favor a rich mixture

Idl Sp ed - **144** 550-575 RPM **223, 262 Synchro-mesh** 500-550 RPM **223 Auto. Trans.** 475-525 RPM in "D" (Drive)

Fuel L v l - Use Gauge T52L-9550-AEE to measure distance below power valve diaphragm cover mounting surface as follows

Carburetor	Fuel Level Setting	Setting
C1DE-9510-A, C1UE-9510-A		①23/32"
C1TE-9510-AC,AD,AJ,AK,AL,AR,V,Y,Z		①11/16"
C1TE-9510-AA, BD		3/4"

①±1/32"

Acc l rating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation

Fast Idl : Integral type operated by choke valve No adjustment required

Throttl Linkag Adjustm nt: *See CARBURETOR above*

►*OTHER DATA Se "Holley Visi-Flo Carburetors" in Carburetion Section*

HOLLEY 2-BARREL CARBURETORS

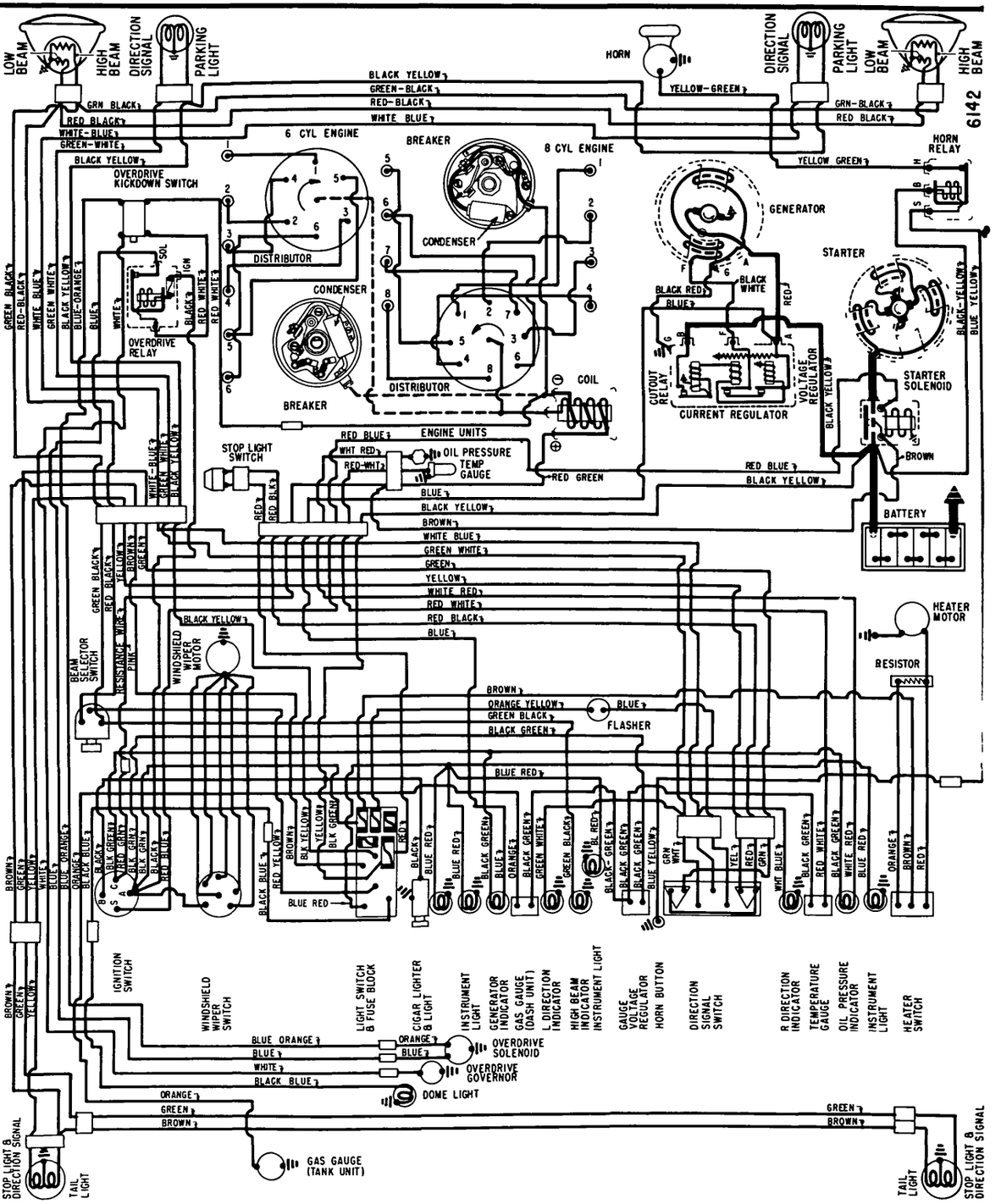
Engine & Transmission	①Carburetor No.
292MD Synchro-mesh	②C1TE-9510-E
292MD Auto Trans	②C1TE-9510-L
292MD All Trans	③C1TE-9510-K
292MD Synchro-mesh (CCV)⑪	② C1TF-9510-AG
292MD Auto Trans (CCV)⑪	②C1TE-9510-AF
292MD All Trans (CCV)⑪	③C1TE-9510-AE

HOLLEY 4-BARREL CARBURETORS

Engine & Transmission	①Carburetor No.
292HD All Trans (CCV)⑪	⑤C1TE-9510-A
292HD All Trans	C1TE-9510-AM

①- Number stamped on choke plate flange
②- Part No C1TE-9510-L ③- Part No C1TE-9510-K
⑪- With Closed Crankcase Ventilation
⑤- Replaced by C1TE-9510-AM

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FORD TRUCK (CONVENTIONAL) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyl. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - *NOTE - Idle mixture adjusting needles used only on SECONDARY side (one on each side of Fuel Metering Block).* Initial setting 1-1½ turns open. Turn mixture needles in until engine runs rough (lean mixture), then back needles out until engine begins to roll (rich mixture). Turn needles in until engine runs smoothly. Always favor a rich mixture.

Idle Speed - (292 MD Synchro-mesh) 500-550 RPM, (292 HD (Synchro-mesh) 525-575 RPM, (All with Auto. Trans.) 475-525 RPM in Drive.

Fuel Level - At lower edge of sight plug opening (on side of bowl) ±1/16". To adjust, loosen lock screw on top of fuel bowl just enough to permit rotation of adjusting nut underneath. 1/6 turn of nut changes level 3/64". To lower level always lower float 1/2 turn, then raise in 1/6 turns as necessary.

Accelerating Pump - Inner hole (closest to throttle shaft) is for warm weather, Outer hole is for cold weather.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum as follows:

Engine	Ford Pump No.
144 Fuel Only	C1UE-9350-A
223 Fuel Only	B8A-9350-E
223 Fuel & Vacuum	B9A-9350-B
262 Fuel Only	C1TE-9350-A
262 Fuel Only (Carter)	C1TE-9350-C
292MD Fuel Only	B9TE-9350-A
292HD Fuel Only	B8T-9350-B

Fuel Pump Pressure - 144, 223, 262, 292MD - 3½-5½ lbs. at 500 RPM. **292HD** - 3½-6½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator as follows:

Series & Body Type	Ford Regulator No.
E Series	B7A-10804-B
F & B Series (Cowl, No Windshield)	B7A-10804-B
F & B Series (Others)	B9MF-10804-A
P Series	B7J-10804-A
C Series	C0MF-10804-A

Dash Unit - As follows:

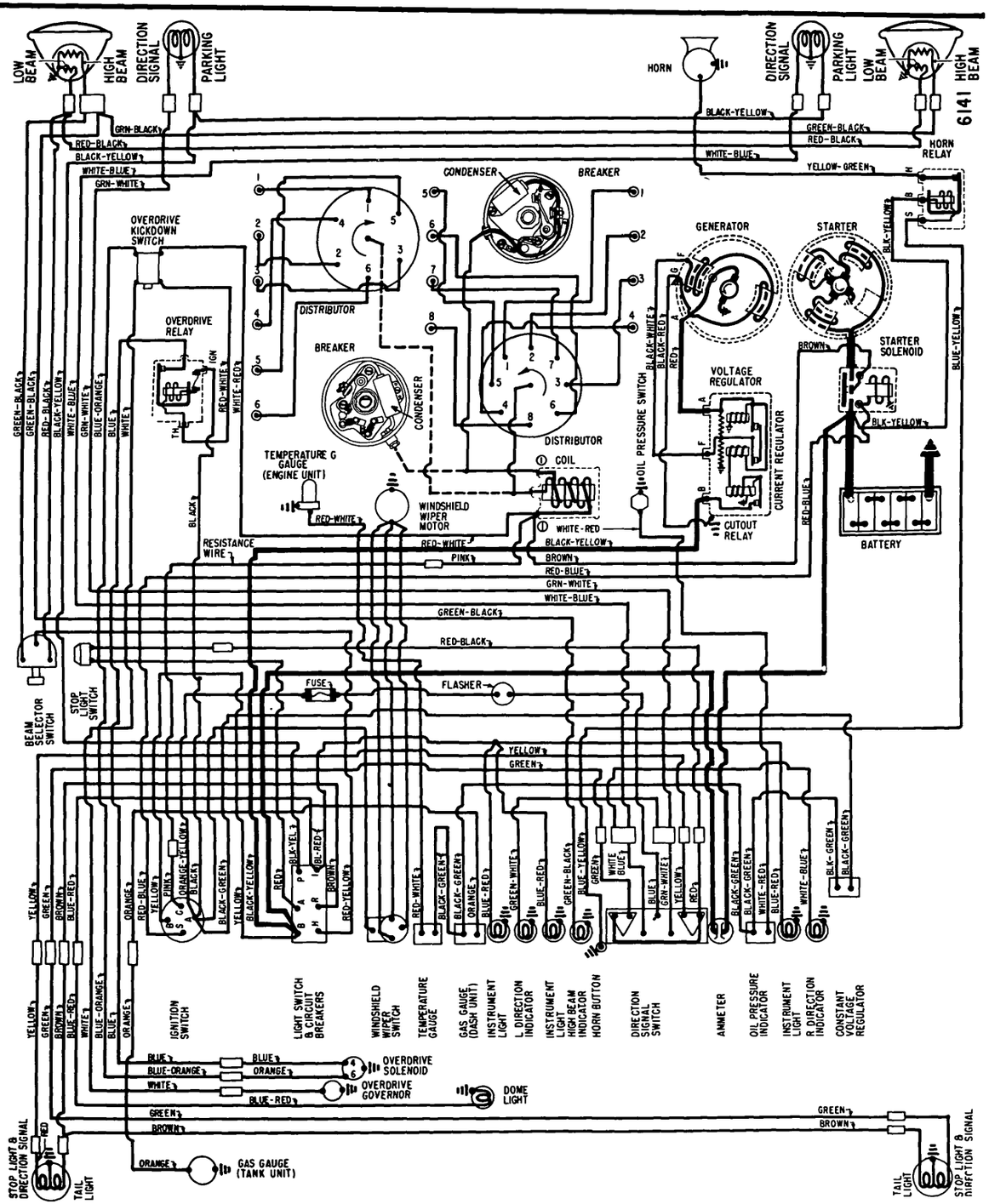
Series & Body Type	Ford Gauge No.
E Series	C1TF-9280-A
F & B Series (Cowl, No Windshield)	C1TF-9280-A
F & B Series (Others)	C1TF-9280-C
P Series	B7J-9280-A
C Series	C1TF-9280-B

Tank Unit - As follows:

Series & Body Type	Ford Gauge No.
E Series	C0DZ-9275-A
F & B Series ①②	C1TF-9275-C
F-100, 250, 350; All P Series ③④	B8C-9275-A
F-350③; F-500, 600; B-500, 600⑤	B8T-9275-A
C Series ⑤⑥	B8T-9275-A
P-350, 400, 500; F-500, 600; B-500, 600⑥	B8T-9275-A

① - Conventional Closed Cab & Pickups.
② - 18 gallon "in cab" tank. ③ - Without Cab.
④ - 17 gallon tank mounted inside frame.
⑤ - 18 gallon side mounted tank. ⑥ - 30 gallon tank.

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FORD TRUCK (PARCEL DELIVERY) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Fu l Filt r: Disposable or replaceable element type in fuel inlet line, or magnetic type in fuel pump bowl, depending on truck model. Clean filter (except disposable type) every 8000 miles (On Highway), 4000 miles (Off Highway). Replace disposable type every 12,000 miles. Replace element type every 12,000 miles (Off Highway), 24,000 miles (On Highway).

Air Cl an r: Oil Bath and Dry Filter Element types used. Clean and replace as follows:

Air Cl an r Service Interval (Miles)

	On Highway		Off Highway	
Typ	Cl an	R place	Clean	Replace
Oil Bath	4,000		500	
Dry Type	4,000	24,000	500	12,000

►*DRY TYPE CLEANING CAUTION:* Clean element by directing a stream of compressed air from inside surface of element. DO NOT wash in solvent or other liquids. DO NOT oil or lubricate.

BATTERY

F rd N . CODZ-10654-A (E Series). 12 volt, 9 plate, 40 ampere hour capacity (20 hr. rate).

F rd N . CODZ-10654-B (E Series). 12 volt, 9 plate, 55 ampere hour capacity (20 hr. rate).

F rd N . B9A-10654-D (Exc. E & B Series). 12 volt, 11 plate, 55 ampere hour capacity (20 hr. rate).

F rd N . B6A-10654-C (Exc. E & B Series). 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).

F rd N . B9A-10654-F (B Series). 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

►*NOTE:* Batteries are dry type for service replacement.

Battery Gr und - Negative.

Engin Gr und - At flywheel housing (6 Cyl.), at left cylinder head (V8).

STARTER

Engin & Trans.	Starter No.
144 E Series, Synchro-mesh	① CODF-11001-D
144 P Series, Synchro-mesh	② B6A-11002-A
223, 262, 292 Synchro-mesh	② B6A-11002-A
223 Auto. Trans.	③ B8C-11002-A
292 Auto. Trans.	④ B7T-11002-A

① - Ford Integral Positive Engagement type.
② - Ford Conventional type.
③ - Autolite No. MDF-6013.
④ - Delco-Remy type.

Armature - Ford No. CODF-11005-A (CODF-11001-D); No. B6A-11005-B (B6A-11002-A; No. B9TF-11005-B (B8C-11002-A); No. B8C-11005-A (B7T-11002-A).

Driv (CODF-11001-D) - Integral Positive Engagement type. Ford No. CODF-11350-A.

Drive (B6A-11002-A) - Bendix "Folo-Thru" type. Ford No. 1CM-11350-C.

Driv (B8C-11002-A) - Autolite Solenoid Pinion Shift type. Ford No. B6C-11350-A.

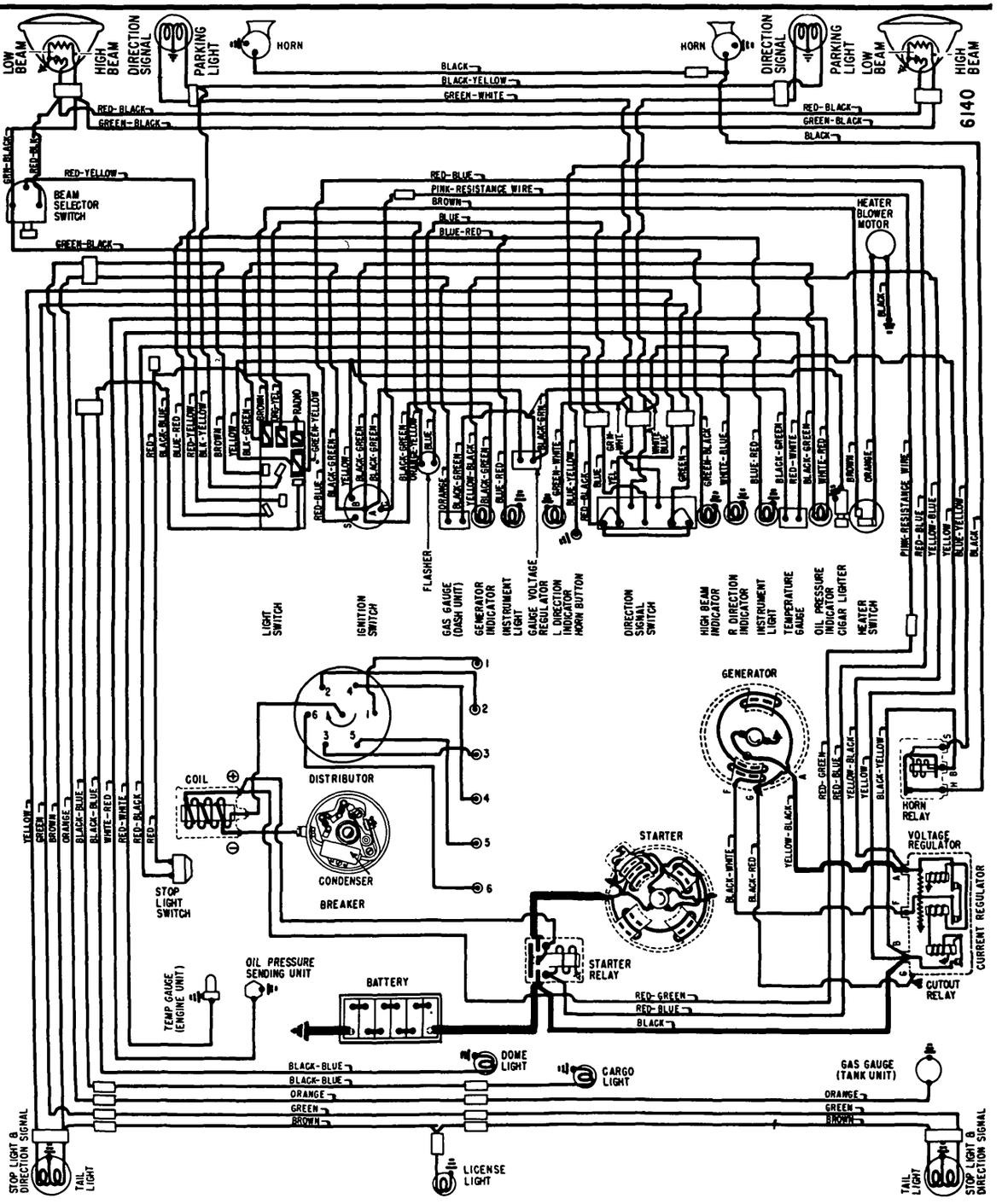
Driv (B7T-11002-A) - Delco-Remy Solenoid Pinion Shift type. Ford No. B8C-11350-A.

Rotation- Counterclockwise at commutator end.

Brush Spring Tension - 48-56 ozs. (CODF-11001-D & B6A-1002-A); 42-53 ozs. (B8C-11002-A); 35 ozs. (B7T-11002-A).

Cranking Speed - 250-290 RPM (CODF-11001-D); 150-180 RPM (B6A-11002-A); 140-160 RPM (B8C-11002-A); 150-160 RPM (B7T-11002-A).

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ECONOLINE WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

P rformanc Data - CODF-11001-D

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
15.5 ft. lbs		5.0	670

Performance Data - B6A-11002-A & B8C-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	2
15.5 ft. lbs.	Lock	5.0	550

Performance Data - B7T-11002-A

Torque	RPM	Volts	③ Amperes
0 ft. lbs.		12.0	80
14.2 ft. lbs.	Lock	5.0	525

① - With starter on engine and engine idling.
② - 80 amps. (B6A-11002-A); 85 amps. (B8C-11002-A).
③ --Includes Solenoid

Starting Switch (Ford Starter): Magnetic type, Ford No. B6A-11450-A, controlled by ignition switch.

Starting Switch (Autolite & Delco-Remy Starters): Solenoid Switch, No. B9TF-11390-A (B8C-11002-A), No. B8C-11390-A (B7T-11002-A), controlled by Magnetic Switch, No. B6A-11450-A, operated by ignition switch.

N utral Safety Switch: Ford No. C1TF-7A247-A or B8A Z-7A247-B (Cruise-O-Matic).

Adjustment - *See Ford Motor Co. Automatic Transmissions in Transmission Section.*

GENERATOR

F rd. Used as follows:

Generator	Armature	Rating
CODF-10000-C①	B6A-10005-C	25 Amp.
C1DF-10000-A②	B6A-10005-C	25 Amp.
CODF-10000-D①	B6A-10005-C	30 Amp.
C1DF-10000-B②	B6A-10005-C	30 Amp.
C1TF-10000-A③	B6A-10005-C	30 Amp.
COAF-10000-B, G③	B6A-10005-C	30 Amp.
COTF-10000-J③	B6A-10005-C	30 Amp.
C1TF-10000-A③	B6A-10005-C	30 Amp.
C1TF-10000-H, K, L, M, AA④	C1TF-10005-A	30 Amp.
COTF-10000-C⑤	B8QH-10005-A	40 Amp.

① - Serviced by C1DF-10002-A, replacing CODF-10002-C.
② - Serviced by C1DF-10002-A.
③ - Serviced by COTF-10002-C, replacing B9A-10002-A.
④ - Serviced by COTF-10002-C.
⑤ - Serviced by COTF-10002-B, replacing B8QH-10002-A.

Performance Data

Generator	Amperes	Volts	Gen. RPM
25 Amp.	25	15.0	2450
30 Amp. ①	30	15.0	2550
30 Amp. ②	30	15.0	2525
40 Amp.	40	15.0	2650

① - No. CODF-10000-D & C1DF-10000-B.
② - Others.

Brush Spring Tension - 20-26 ozs. (C1TF-10000-H, K, L, M, AA); 32-40 ozs. (Others).

Field Current - 1.2-1.8 amps. at 12.0 volts, hot.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: ½" deflection measured midway between generator and water pump pulleys with light thumb pressure (or use Tension Gauge No. 33-73F).

GENERATOR REGULATOR

F rd. As follows:

Regulator	Rating
CODF-10505-A	25 Amp.
B7A-10505-B, C1TZ-10505-A, C1TF-10505-A, B	30 Amp.
B8E-10505-C	40 Amp.

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.4-13.2 volts.

Cuts Out - 6-9 amperes discharge current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current Regulator

Setting - 23-27 amps. (25 Amp.). 28-32 amps. (30 Amp.), 38-42 amps. (40 Amp.).

►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators" in Electrical Section.*

ALTERNATOR & REGULATOR

Leece-Neville Type. Three phase type with internal rectifier and three-unit regulator. As follows:

Alternator - Ford Nos. -	Regulator
C1TF-10300-D, E, G, H①②	PB8M-10316-A
COTF-10300-E; C1TF-10300-C, K ①③	PB8M-10316-A
C1TF-10300-F, J, M①④	PB8M-10316-A

① - 60 Amp. Type.
② - Serviced by No. C1TF-10346-B.
③ - Serviced by No. C1TF-10346-C.
④ - Serviced by No. C1TF-10346-D.

►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.

Stop Light Switch Location: On brake master cylinder or on frame left side rail at brake pipe connector.

Lighting Switch Removal: Removal control knob and shaft by pressing spring-release button on switch housing (knob in "off" position). Turn shaft slightly and pull from switch. Remove retaining nut and remove switch, disconnecting wires, or unplugging fuse block.

Speedometer & Instrument Cluster Removal: *NOTE - Individual gauges (except speedometer) may be removed without removing instrument cluster.* Disconnect battery. Remove instrument cluster bezel mounting screws and tilt cluster toward steering column. Disconnect speedometer cable and remove speedometer mounting plate and all gauges from cluster. Remove speedometer retaining screws and remove speedometer.

CIRCUIT BREAKERS: 1) 12 Ampere - In headlight switch, protects headlight circuit and instrument panel lights.
2) 12 Ampere - On windshield wiper motor mounting bracket, protects electric windshield wiper.
3) 12 Ampere - On P Series only, in headlight switch, protects auxiliary lights.

FUSES: E, F, B, C Series - *Fuses located in fuse junction block of lighting switch except as noted.*
15 Amp re - Interior & Tail lights.
15 Amp r - Overdrive. On overdrive relay.
14 Amp re - Direction Signals (E Series).
14 Amp r - Heater Blower.
10 Amp r - Windshield Wiper Vacuum Pump. In feed wire.
7.5 Ampere - Direction Signals (F, B, C, Series).
7.5 Ampere - Radio.
P Series: 7.5 Ampere - Direction Signals. In lead from ignition switch.

ENGINE

ENGINE SPECIFICATIONS: Own. Valve-in-head. 6 Cyl. 144", 170", 223 & 262", and V8 292" engines used.

Engine	Bore	Strok	Displac ment
144	3.50"	2.50"	144 cu. ins.
170	3.50"	2.94"	170 cu. ins.
223	3.625"	3.60"	223 cu. ins.
262	3.718"	4.03"	262 cu. ins.
292	3.75"	3.30"	292 cu. ins.

Engine	Compr. Ratio	Rat d HP	D v l p d HP
144	8.7-1	29.4	90 at 4200 RPM
170	8.7-1	29.4	101 at 4400 RPM
223	8.4-1	31.50	135 at 4000 RPM
262	8.0-1	33.18	152 at 4000 RPM
292MD①	8.0-1	44.60	160 at 4000 RPM
292HD②	8.0-1	44.60	173 at 4000 RPM

① - Medium Duty - With 2-Bbl. Carburetor.
② - Heavy Duty - With 4-Bbl. Carburetor.

Compression & Vacuum Reading - *See TUNE-UP.*

►*ROCKER ARM COVER INSTALLATION NOTE (6 CYL.):* Torque cover attaching bolts to specifications twice, once initially and again after two minutes from initial torquing, to prevent oil leaks.

►*1961 223" & 262" ENGINES CYLINDER HEAD GASKET PRODUCTION CHANGE & INSTALLATION CAUTION:* "Sandwich" type gasket with steel core bonded between synthetic rubber-asbestos sheets for improved sealing used in all P Series trucks with 223" engine and in all 262" engines. Gasket also used in later production 223" engines used in all series trucks. Use this gasket for service replacement. *DO NOT us sealer on this gasket, and obs rv cylinder head tightening sequence and bolt torqu specifications. See "Cylinder Head & Manif ld" in Ford Motor Co. Special Data.*

CYLINDER HEAD: *See "Cylinder H ad & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tight ning Sp cifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engin " in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (6 Cyl.): Drain crankcase and remove oil level dipstick. Remove flywheel housing inspection cover. Remove oil pan retaining screws and remove oil pan.

OIL PAN REMOVAL (V8): Drain crankcase and remove dipstick. Remove converter housing dust cover (Auto. Trans. Trucks). On C Series, position No. 1 piston at TDC. On all trucks, disconnect oil inlet tube from oil pump and remove "0" ring seal from tube. Remove oil pan retaining screws and remove oil pan.

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S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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144" & 170" 6 CYLINDER ENGINES

►*See 1961 Comet & Falcon Passenger Car Pages.* Engines are similar to those used on these cars, and all car engine data applies to truck engines.

223" 6 CYLINDER ENGINE

►*See 1961 Ford & Mercury 6 Cylinder Passenger Car Pages.* Engine is similar to that used in 1961 Passenger Cars, and all car engine data applies to truck engine, *except the following*

Piston Clearance: .0008-.0023". Wear limit .005".
Piston Ring Gap: Compression Rings - .010-.020". **Oil Ring** - .015-.062".

262" 6 CYLINDER ENGINE

This 262" 6 Cylinder Engine is similar in design to 223" 6 Cylinder Engine. The camshaft is driven directly by a gear in mesh with the crankshaft gear instead of by a timing chain. The exhaust valves are "free turning" type.

►*See 1961 Ford & Mercury 6 Cylinder Passenger Car Pages for data on this engine. Specifications for 262" engine which differ from the 223" engine are listed below.*

Piston Clearance : .0008-.0023". Wear limit .005"
Cylinder Standard Bore : 3.7190-3.7214".
Connecting Rod Length (Center-To-Center): 6.043-6.047".
Crankshaft Journal Diameter: 2.4980-2.4984" (Code Red), 2.4976-2.4980" (Code Blue).
Main Bearing Clearance : .0005-.0027".
Timing Gear Backlash: .002-.004"
VALVES: *NOTE - Following valve data is complete data for 262" engine.*
Tappet Clearance : .019" All Valves, Cold & Hot. *See TUNE-UP.*

Valve	Head Diameter	①Stem Diameter
Intake	1.775-1.785"	.3710-.3720"
Exhaust	1.505-1.515"	.3693-.3703"

Valve	Seat Angl	②Lift	③Stem Clearance
Intake	45°④	.273"	.0008-.0025"
Exhaust	45°④	.273"	.0025-.0042"

① - Furnished also with .003", .015", .030" Oversize stems.
② - Cam Lobe Lift Wear limit .005".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.

►*ROTATABLE & FREE TURNING VALVE NOTE:* Free turning type valve (cap over end of valve stem) used on exhaust valves. Intake valves are "rotatable" type sleeve between spring retainer and lock). *See "Valve System" in Ford Motor Co. Special Data.*

Exhaust Valve Cap Clearance: *See "Valve System" in Ford Motor Co. Special Data.*
Exhaust Valve Insert Installation: *See "Valve System" in Ford Motor Co. Special Data.*
Valve Stem Seals - Umbrella type seals used on all valve stems. Install with cupped side down.
Valve Seat Width - .070-.090" Intake, .090-.110" Exhaust.
Valve Springs: Free Length - 1.96".

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Spring ends must be square with .068". Install springs with damper (closed) coil end down toward head. Check installed height of spring which must not exceed 1 11/16" from surface of cylinder head spring pad to underside of spring retainer. If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 5/8-1 11/16". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	①71-79	1.65"
Open	② 161-177	1.26"

① - Wear limit 64 lbs. at 1.65".
② - Wear limit 145 lbs. at 1.26".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*
Valve Lifters: Mushroom type. Remove from below with camshaft out.
Clearance - .0005-.0021".
Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*
VALVE TIMING: *Checking timing by use of quadrant on pulley not recommended by manufacturer. See "Camshaft Setting" below and alignment of timing gear marks, and "Lift" under VALVES for checking of camshaft lobe wear.*
Camshaft Setting: Mesh marked tooth of crankshaft gear with marked notch in camshaft gear, with marks in line with shaft centers.

292" V8 ENGINES

►*See 1961 Ford & Mercury V8 Passenger Car Pages.* Engines are similar to 1961 292" passenger car engine, and all passenger car engine data applies to truck engine, *except as follows:*

Piston Rings: Compression Ring Side Clearance - .0019-.0036".
Compression Ring End Gap - .010-.025".
Oil Ring End Gap - .015-.062".
Connecting Rod Length (Center-To-Center): 292MD 6.320-6.324". **292HD** - 6.250-6.254".

►*PISTON & CONNECTING ROD NON-INTERCHANGEABILITY CAUTION:* Higher pistons and shorter connecting rods used in 292HD engine. DO NOT interchange with those used in 292MD engine.

Exhaust Valve Length (292HD): 4.92".
Exhaust Valve Stem Diameter (292HD): .4343-.4350".
Exhaust Valve Stem Clearance (292HD): .0018-.0032" Wear limit .0055".
Valve Seat Width (All Engines): .055-.085" Intake, .065-.095" Exhaust.
Lifter-To-Bore Clearance (All Engines): .0005-.0021". Wear limit .0055"
Exhaust Valve Cap Clearance (292HD): *See "Valve System" in Ford Motor Co. Special Data.*
Exhaust Valve Insert Installation (292HD): *See "Valve System" in Ford Motor Co. Special Data.*

►*ROTATABLE & FREE TURNING VALVE NOTE:* Free turning type valve (cap over end of stem) used for sodium cooled exhaust valves on 292HD engine. All other valves (both engines) are "rotatable" type (sleeve between spring retainer and lock).

►*EXHAUST VALVE CAUTION (292HD):* Exhaust valves are sodium cooled and require special disposal handling to prevent fire or explosion due to chemical reaction. DO NOT DISCARD SODIUM COOLED VALVES with other scrap material. Bury in ground not subjected to excavation or in deep water not subjected to dredging.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*
Crankcase Capacity: 144 & 170 - 3½ qts. refill. **223 & 292** - 5 qts. refill. **262** - 6 qts. refill. Add 1 qt. with filter change on all engines.
Normal Oil Pressure: 35-55 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator (E & F Series): Indicator light on instrument panel controlled by Engine Oil Pressure Switch, Ford No. B6A-9278-A (E Series), No. B6A-9278-B (F Series)

Oil Pressure Indicator (B, C. & P Series): King-Seeley Electric "CV" (Constant Voltage) type with a gauge voltage regulator. *See "Gasoline Gauge" under CARB. EQUIPMENT above for Gauge Voltage Regulator application.*
Dash Unit - Ford No. C1TF-9273-A (B Series), No. C1TF-9273-B (C Series), No. B7J-9273-A (P Series).
Engine Unit - Ford No. B7T-9278-A (B, C & P Series).

Oil Pressure Engine Unit Location: On right side of engine above starter (6 Cyl.), at rear of oil filter (V8).

Oil Pump: Rotor type. Mounted in crankcase (6 Cyl.), outside crankcase on left side (V8).
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full flow replaceable element or "disposable" type. Replace element or filter every 4000 miles (On Highway), 2000 miles (Off Highway), or sooner under severe operating conditions.

Disposable Filter Replacement - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter face, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - Do not overtighten.*

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet pipe at rear of engine. Clean system every 4000 miles (On Highway) 500 miles (Off Highway), or sooner under severe operating conditions.
Positive - Road draft tube replaced by an adapter, tubing, and hose routed to ventilation valve installed in intake manifold or in spacer between carburetor and intake manifold Service system at regular intervals and check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

Form 4-B

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ENGINE COOLING SYSTEM

Cooling System Capacity

Truck Model	Capacity
144 E Series	①8 7 qts
223 F & B Series	②18 qts
223 P-350, 400, 500	②18 5 qts
292MD F-100, 250, 350③	②17 5 qts
292MD F-350④, F-500, 600, B-500, 600	②⑤21 5-22 qts
292MD P-350③	②⑤21 5-22 qts
292MD P-350④, P-400, 500	②23 qts
292MD C Series	②⑤28 qts
292HD F-500, 600, B-500, 600	②⑤21 5-22 qts
292HD C Series	②⑤28 qts

① - Add 2 qts for heater
② - Add 1 qt for heater
③ - With single rear wheels
④ - With dual rear wheels
⑤ - Add 1½ qts with Transmatic Drive

Pressure Valve: Radiator filler cap Ford No C1UU-8100-A (E Series - 12-15 lbs), No B8A-8100-A (P-100), No OL-8100-A (Others - 7 lbs)

Thermostat: As follows

Model	Low Temp.	High Temp.
E Series	C1UE-8575-B①	②C1UE-8575-A
F, B, P, C Series	COAZ-8575-A①	②COAZ-8575-B

① - 160°type
② - 178° type for use with permanent type anti-freeze

Water Pump: Packless, sealed ball bearing type
See "Cooling System" in Ford Motor Co. Special Data.

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with a gauge voltage regulator. *See "Gasoline Gauge" under CARB EQUIPMENT above for Gauge Voltage Regulator application*

Dash Unit - As follows

Series & Body Type	Ford Gauge No.
E Series	C1UF-10883-A
F & B Series (Cowl, No Windshield)	C1TF-10883-A
F & B Series (Others)	C1TF-10883-C
P Series	B7J-10883-A
C Series	C1TF-10883-B

Engine Unit - Ford No CODF-10884-A (E & P-100 No B7A-10884-A (Others)

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 4,000 miles (On highway), every 500 miles (Off highway). Periodic change of fluid not recommended When adding fluid, use Ford Automatic Transmission Fluid C1AZ-19582-A or Automatic Transmission Fluid Type "A", Suffix "A"

Checking Fluid Level - Truck should be level and the hand brake firmly applied With engine and transmission at normal operating temperature, shift selector lever through all positions and back to "P". With engine idling, check fluid level and add fluid as needed through the filler tube to bring level up to "F" mark on dipstick. DO NOT OVERFILL

Capacity - 10 qts , drain and refill

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on Patent Plate riveted to base of left front body pillar. *NOTE* - Number (example below) includes identification data.

① ② ③ ④ ⑤
1 Y 82 H 400001

① - Year. 1 1961.
② - Assembly Plant. Y Wixom.
③ - Body Series. See Body Series table below.
④ - Engine. H 430" Domestic. K 430" Export.
⑤ - Beginning Vehicle Number.

Body Series Table

Body Type	Code No.
4-Door Sedan	82
4-Door Hardtop	84
4-Door Convertible	86

VEHICLE SPECIFICATION CODE: Vehicle specification codes (on Patent Plate) contain Body Style, Color, Trim and Day and Month vehicle was assembled.

Engine Production Code Number: Stamped on cylinder block directly in front of left hand cylinder head and indicates place, year, month, day of month and plant inspector. Not used for licensing.

TUNE-UP

►*1961 (EARLY PRODUCTION) MODEL SLUGGISH PERFORMANCE OR INSUFFICIENT TOP SPEED CORRECTION:* Resonator inlet pipe may be restricted or collapsed. Check by rolling a 1" diameter steel ball through exhaust pipe (long resonator inlet pipe). If restriction exists, replace with new pipes, Lincoln Part No. C1VV-5218-F (R.H.), C1VV-5A265-F (L.H.). New pipes in production about April 1, 1961.

►*1961 CARS PARTIAL LOSS OF POWER OR COLLAPSED FUEL TANK:* A crimp or kink in vent hose between fuel and surge tanks may cause fuel tank ventilation loss, or collapse the tank. On cars built before Nov. 18, 1960, shorten hose 3". On later cars, correct the bind.

►*FUEL FILTER NOTE:* Detachable fuel tank filter assembly located at Fuel Gauge sender unit and outlet tube assembly. Serviced as separate unit.

COMPRESSION PRESSURE: 180±20 lbs. All cylinders must be equal within 10 lbs.

VACUUM READING: Steady17-18" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve.

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See FUEL SYSTEM NOTES in Ford Motor Co. Special Data.*

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. Recommended servicing intervals is 6000 miles or 6 months. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-4-2-6-3-7-8.
Cylinders - RIGHT BANK 1-2-3-4; LEFT BANK 5-6-7-8.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Champion F-11Y. 18 mm. Tapered seat, no gasket used. Torque to 15-20 ft. lbs.
COIL: Lincoln No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - COLF-12250-A (Resistance Wire). 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* Pink Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to a multiple quick disconnect at left side of dash panel. Resistor Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Lincoln No. C1VF-12127-A.
Condenser - Lincoln No. B9AF-12300-A.
Capacity - .21-.25 mfd.
Contact Point Set - Lincoln No. B8Q-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance ①

Degrees	Distr. RPM	Degrees	Eng. RPM
0	300	0	600
1-2	550	2-4	1100
6-7¼	1100	12-14½	2200
14½-15¾	2000	29-31½	4000

① - Adjust Test Stand to 0° at 200 RPM, with vacuum diaphragm disconnected.

Vacuum Spark Control: Integral type mounted in distributor housing and linked directly to breaker plate.

Vacuum Advance ②

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
½-3½	1-7	7
6-9	12-18	12
8½-11½	17-23	16
9½-12½	19-25	18

② - Adjust Test Stand to 0° at 1000 RPM and 0" of Hg.

IGNITION TIMING

Setting - 6° BTDC. Range 2°-10°. Set with vacuum line disconnected and carburetor opening taped closed.
Timing Mark - Ball pin on damper to be aligned with 0,3,6,10 sawtoothed marks of pointer on cover.

CARBURETOR

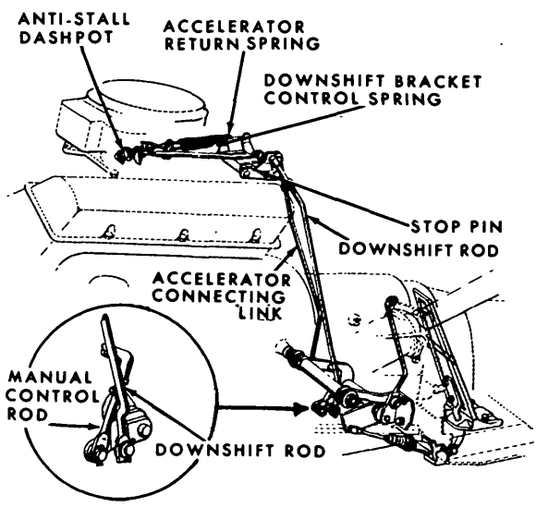
►*CARBURETOR APPLICATION:* New design Carter ABD 2-Barrel Carburetor with an air conditioning idle speed-up device and a bypass idle air system. *NOTE* - A green-colored date code tag attached to air horn screw indicates carburetor adapted to "Closed Crankcase Ventilation" system.

►*HIGH ALTITUDE CARBURETOR IDENTIFICATION:* Identify by red tag attached to carburetor air horn. Accelerator pump rod and throttle closing spring should be positioned to the summer (S) position. Designed to operate at 5000 ft. elevation.

►*LOSS OF KICKDOWN AND/OR UPSHIFT:* May be caused by binding or rust in throttle linkage. Lubricate pivot points with good grade light weight engine oil.

Throttle Linkage Adjustment: Make adjustments in the following sequence.
Engine RPM Adjustment - Bring engine to normal operating temperature, connect tachometer and place selector lever in D2. Hold throttle lever against hot idle screw and adjust engine idle speed to 450-475 RPM. *NOTE* - Trip fast idle cam to be sure automatic choke has positioned the lever against hot idle screw.
Anti-Stall Dashpot Adjustment - With carburetor lever against hot idle screw and dashpot plunger fully depressed, clearance between dashpot plunger and lever should be .090-.120". To adjust, loosen locknut and turn dashpot in mounting bracket.
Down Shift Rod Adjustment - Loosen downshift rod locknut and disconnect rod from ball stud on bellcrank assembly, then slide spring clip off rod. *NOTE* - Be sure movable outer bracket of bellcrank is against stop pin on inner mounting bracket on bellcrank assembly. Hold downshift rod upward against transmission internal stop and adjust length of rod until hole in rod is aligned with ball stud on bellcrank assembly. Lengthen rod one turn and position it on ball stud. Slide spring clip over end of rod to lock rod to ball stud. Tighten locknut securely. *CAUTION* - If bellcrank outer bracket does not remain against stop pin, lengthen downshift rod an additional turn.
Accelerator Pedal Height Adjustment - *CAUTION - Make this adjustment at the accelerator connecting link only.* Stop engine and measure distance from top of accelerator pedal to carpet. **Nominal measurement should be approximately 3¾".** Depress accelerator pedal and

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LINCOLN CONTINENTAL THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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check detent feel and kickdown action of bellcrank. Adjust height to obtain proper downshift rod operation. *NOTE* - Throttle plates in carburetor must be fully opened before making this adjustment. Road test to check kickdown operation.

CARTER ABD 2-BARREL

Carter ABD 3148S (Without Air Cond.); ABD 3149S (With Air Cond.). Similar in design to carburetors used on 1960 models except for the following features:

Idle Air Bypass System - Throttle valves are completely closed at slow (hot) idle speed. An Idle Air System is used consisting of an air bypass passage through which air for closed throttle operation is taken from top pf primary venturi through an adjustable orifice to throttle bores below throttle valves. An Idle Air Speed Screw controls adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used).

Idle Speed-Up (Air Conditioned Cars) - Consists of two separate devices as follows:

Initial Assist (Carburetor) - Consists of an external air bypass passage and solenoid controlled valve on the carburetor which provides additional air below throttle valves when compressor clutch is engaged. Upper end of tube is located in air horn and vacuum can be checked with air cleaner removed. With air conditioner operating, suction should be felt at end of tube and engine speed should decrease approximately 30-40 RPM when tube closed with the finger. *NOTE - It is no longer necessary to operate air conditioner when adjusting slow (hot) idle speed.*

Supplemental Assist (Throttle Linkage) - Consists of a vacuum diaphragm operated rod connected to the throttle linkage. Diaphragm operation is controlled by a solenoid valve in the vacuum line so that the rod is pulled down and the engine speed increased only when the engine is idling with the transmission selector lever in Park or Neutral. *See "Idle Speed-Up Control Adjustment" below.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Adjustments: Idle Mixture and Speed Setting - Turn idle mixture screws (one for each throttle bore) 1-1½ turns open from a lightly seated position, then turn Idle Air Speed Screw 3½ turns open from a lightly seated position. *NOTE - On air conditioned cars, remove air cleaner and turn air conditioner off.* With engine at normal operating temperature, adjust Idle Air Screw for correct idle speed of 450-475 RPM (Transmission selector lever in "D" position), or 500-550 RPM (Transmission selector lever in "N"). Adjust each idle mixture screw for smooth idling and highest vacuum reading and engine RPM. Recheck and if necessary, reset idle speed, then recheck idle mixture setting.

Float Level - With bowl cover gasket removed, distance from top machined surface of main body to top of each float at free end with float shaft retainer pressed down and float assembly in uppermost position against inlet needle. Use 5/16" tab of Gauge 9550-DB to check level.

Acc l rating Pump - With pump operating rod in hole furthest from throttle shaft (marked "W") and throttle lever in closed position, distance from top of accelerator plunger to top surface of fuel bowl cover should be 17/32". To adjust, bend pump operating rod.

Fast Idle: With fast idle adjusting screw on low step of fast idle cam, engine speed should be 600-650 RPM (Transmission selector lever in "D2" range).

Automatic Choke: Centered at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

Idle Speed-Up Control Adjustment (Air Conditioned Cars): *NOTE* - This unit mounted on bracket bolted to left rear cylinder block. Check idle speed after other carburetor adjustments completed by idling engine with transmission selector lever in Park or Neutral and air conditioner on. Idle speed should be 800-900 RPM. To adjust, loosen locknut on upper end of operating rod and turn adjusting nut down to increase engine speed or up to decrease engine speed. Tighten locknut after adjustment completed.

►*IDLE SPEED-UP CONTROL (AIR CONDITIONED CARS) PRODUCTION CHANGE:* The above unit was discontinued in production approximately June 15, 1961.

►*OTHER DATA: See "Carter ABD 2-Bbl. Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Lincoln No. C1VE-9350-B. Fuel only.
Pressure - 4.5-6.5 lbs. at 500 RPM.

DISPOSABLE TYPE FUEL FILTER: Lincoln No. CODE-9155-A.

Installation - To save damage to filter and possibility of leaks, proceed as follows:

1) Use only the filter hex connection adjacent to mating part for applying torque.

2) Bend filter line so that normal free floating position of the end of line is in proper alignment with filter to avoid induction stress on filter case.

3) Use second wrench on filter hex connection to avoid transferring stress through filter case and tighten fuel filter inlet to fuel pump hand tight plus 2½ turns. Tighten fuel filter outlet to fuel line to 180-200 inch lbs.

Replacement - Remove fuel filter to carburetor fuel tube, and old filter assembly. Remove brass nipple from pump outlet. Install new filter in fuel pump outlet. *CAUTION - DO NOT transfer force through filter case when installing filter or fuel tube.* Assemble filter to carburetor fuel tube at filter end then to carburetor. Check for leaks.

DISPOSABLE FUEL FILTER FLOW CHECKS: Check fuel flow at both inlet and outlet side of fuel filter Minimum flow required for engine operation is 1 pint within 20 seconds at 500 RPM. Static pressure will not vary because of restricted filter. Procedure for checking fuel pump pressure remains the same.

Gas lin Gaug : King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Lincoln No. B9MF-10804-A.
Dash Unit - Lincoln No. C1VF-9280-B.
Tank Unit - Lincoln No. C1VF-9275-F

Air Cleaner: Dry filter element type. Clean every 2,000 miles, replace every 20,000 miles.

►*AIR CLEANER SERVICE NOTE:* Filter element can be cleaned by tapping or shaking or by using compressed air directed opposite to air intake flow. Use care not to rupture element. *DO NOT wash element in solvent or other liquid and DO NOT oil or lubricate.*

►*AIR CLEANER PRE-FILTER ELEMENT NOTE:* Synthetic fibre, wrap-around element Part No. B8A-9601-A is available for use with dry-type cleaner element, in abnormally dusty areas.

►*PRE-FILTER ELEMENT INSTALLATION & SERVICING:* Remove dry element and slip pre-filter element over outer surface, locating it between upper and lower gasket surfaces. To clean pre-filter element, remove it from dry element and wash or rinse it in plain water. Use a detergent to remove contaminated oil. DO NOT WASH dry element.

Automatic Speed Control: *See "Cruise Control" in Carburetion Section.*

BATTERY

Lincoln No. C1VY-10655-A. 12 volt, 13 plate, 80 ampere hour capacity (20 hr. rate).
Battery Ground - Negative to generator adjusting strap mounting screw.
Body Ground - Body to generator adjusting strap mounting screw.

STARTER

Lincoln No. C1VY-11001-D. Armatur - C1VF-11005-A.
Drive - Lincoln No. C1VF-11350-A. Solenoid pinion shift.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs.
Cranking Speed - 150 RPM (warm engine). 9.5 volts, 250 amps. draw.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	9500	12.0	70

Starting Switch: Lincoln No. B6A-11450-A, magnetic type, controlled by ignition and starter switch Lincoln No. COLF-11572-A and Neutral Safety Switch Terminal Block Lincoln No. C1VP-7B217-B.

Neutral Safety Switch Terminal Bl ck Adjustm nt: *Se "Lincoln Automatic Transmission" in Transmission Section.*

GENERATOR

Lincoln No. C1VF-10002-A. Armatur - Linc ln N. C1VF-10027-A.

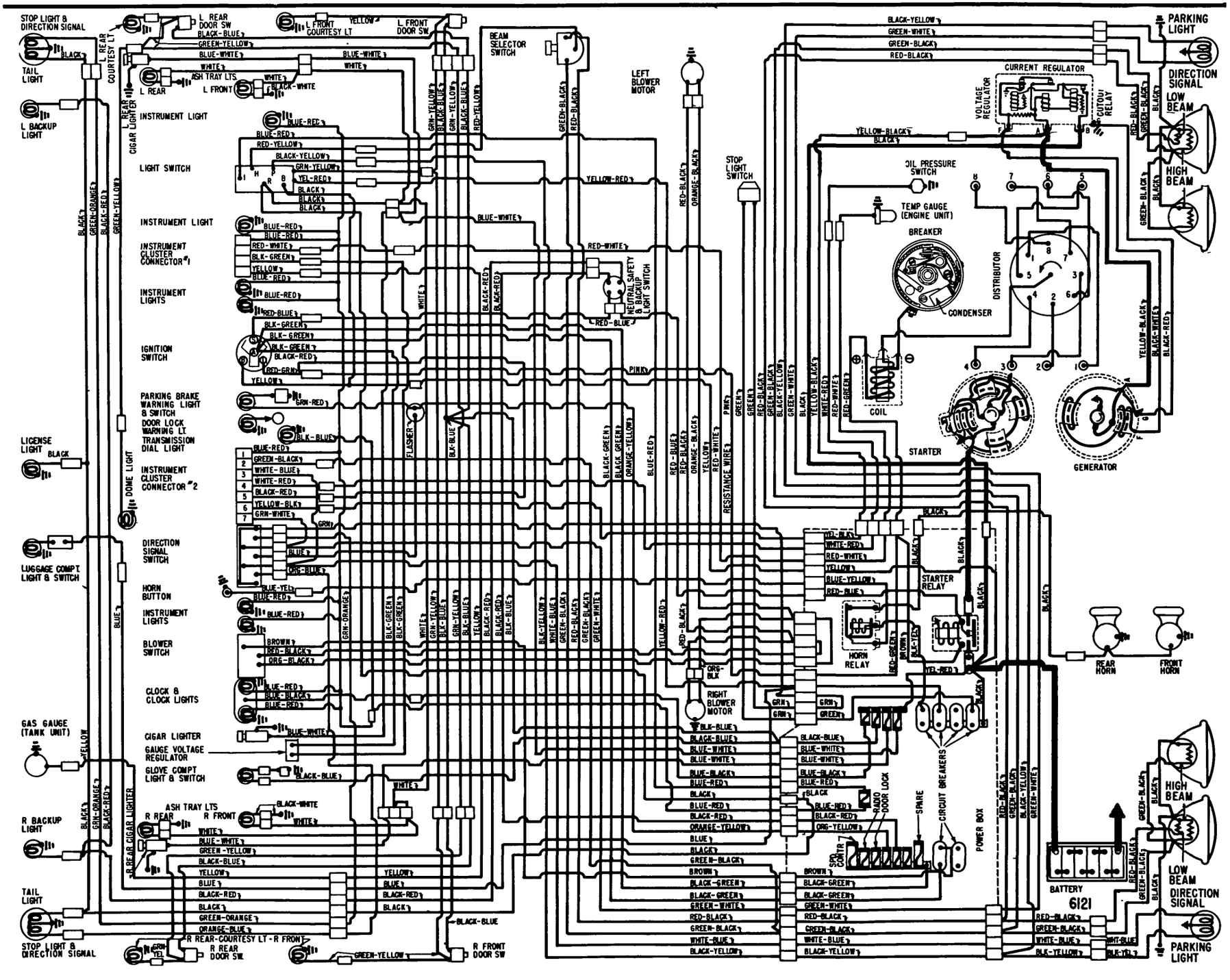
Performanc Data

Generator	Amperes	Volts	RPM
C1VF-10002-A	40	15.0	2650

Brush Spring Tension - 20 ozs. minimum.
Field Current - 1.5-2.0 Amps. at 10 Volts.
R tati n - Counterclockwise at commutator end.

CONTINUED ON NEXT PAGE

Se INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
L BACKUP LIGHT
LICENSE LIGHT
LUGGAGE COMPT LIGHT & SWITCH
GAS GAUGE (TANK UNIT)
R BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
L REAR DOOR SW
L FRONT COURTESY LT
L FRONT DOOR SW
L REAR COURTESY LT
ASH TRAY LTS
L REAR
L FRONT
CIGAR LIGHTER
DOME LIGHT
INSTRUMENT LIGHT
LIGHT SWITCH
INSTRUMENT LIGHT
INSTRUMENT CLUSTER CONNECTOR #1
INSTRUMENT LIGHTS
IGNITION SWITCH
PARKING BRAKE WARNING LIGHT & SWITCH
DOOR LOCK WARNING LT
TRANSMISSION DIAL LIGHT
INSTRUMENT CLUSTER CONNECTOR #2
DIRECTION SIGNAL SWITCH
HORN BUTTON
INSTRUMENT LIGHTS
BLOWER SWITCH
CLOCK & CLOCK LIGHTS
CIGAR LIGHTER
GAUGE VOLTAGE REGULATOR
GLOVE COMPT LIGHT & SWITCH
R REAR CIGAR LIGHTER
R REAR COURTESY LT - R FRONT
R REAR DOOR SW
R FRONT DOOR SW
BEAM SELECTOR SWITCH
FLASHER
LEFT BLOWER MOTOR
RIGHT BLOWER MOTOR
STOP LIGHT SWITCH
NEUTRAL SAFETY & BACKUP LIGHT SWITCH
RESISTANCE WIRE
OIL PRESSURE SWITCH
TEMP GAUGE (ENGINE UNIT)
BREAKER
CONDENSER
DISTRIBUTOR
COIL
STARTER
GENERATOR
CURRENT REGULATOR
VOLTAGE REGULATOR
CUTOUT RELAY
STARTER RELAY
HORN RELAY
REAR HORN
FRONT HORN
POWER BOX
CIRCUIT BREAKERS
SPARE
RADIO
DOOR LOCK
AIR CONTR
BATTERY
6121
PARKING LIGHT
DIRECTION SIGNAL
LOW BEAM
HIGH BEAM

CONTINUED FROM PRECEDING PAGE

Belt Adjustm nt: Use Tool 33-73F (Borroughs) or proper substitute for belt tension measurement. 110-120 lbs. (new belt), 90-100 lbs. (used belt). Reset New Belt tension to 90-100 lbs. after 15 minutes operation.

GENERATOR REGULATOR

Lincoln No. C1VF-10505-A. *NOTE* - Double Contact Voltage Regulator and new terminal arrangement, may be used with earlier generators (40 amp.). However, **do not use** earlier regulators with new generators (new 6 Ohm field coil).

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F, ambient (engine compartment) temperature after 15-20 minutes operation (at fast idle) until regulator temperature gauge reads steady for 5 minutes.

Cutout Relay

Cuts In - 12.3-13.0 volts.
Cuts Out - 8 amps. (discharge current).

Voltage Regulator

Setting - 14.7-15.3 volts at 75°F, not to exceed .3 volts variation between upper and lower contacts.
Air Gap - .037" (Lower Contacts Closed), .040" (Upper Contacts Closed).

Current Regulator

Setting - 38-42 amperes.

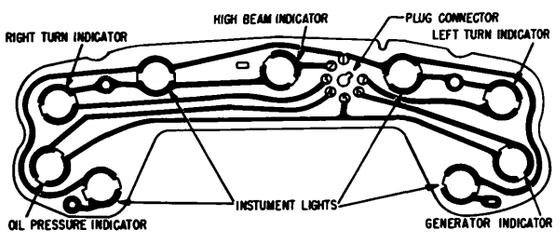
►*OTHER DATA: See "Lincoln 12-Volt (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

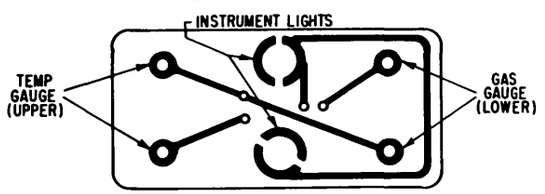
Instrument panel has upper and lower clusters. Upper cluster (three housings) can be serviced from front. Lower cluster (controls) removable in two sections.

Sp edometer Removal: Loosen screws on bottom of housing and pull bezel away. Remove light shields. Remove attaching screws and pull speedometer from housing. To install, reverse removal procedure.

Speedometer Housing Printed Circuit Board Removal: Remove negative cable from battery. Remove clock by removing attaching screw and lifting up and away. Remove attaching wires. Remove speedometer cable from speedometer housing. Remove hood release handle from bracket and remove lower left instrument panel cover. Remove lower section of left vent from car. Remove main light switch from lower left cluster and remove ignition switch. With 5/16" socket, remove mounting plate-to-speedometer housing screws. Disconnect plug from printed circuit board then remove housing. Remove bulb sockets, then remove attaching screws. To install reverse removal procedure.



INSTR. CLUSTER PRINTED CIRCUIT (2)



INSTR. CLUSTER PRINTED CIRCUIT (1)

Gauge Housing Printed Circuit Board Removal: Loosen screw below gauge housing and pull bezel out. Remove plate attaching screws and pull gauges from housing. Disconnect connector from printed circuit board, then remove lamp sockets. Remove gauges from printed circuit board, then remove attaching screw. Remove printed circuit board from plate. To install, reverse removal procedure.

Instrument Lamp Removal: Fuel & Temperature Gauge - Loosen screw below housing and pull bezel out. Remove plate attaching screws and pull gauges from housing. Disconnect connector from printed circuit board, then remove socket and replace lamp(s).

Speedometer Housing - Loosen screws below housing and pull bezel out. Carefully replace lamp (s). *NOTE - Do not press socket out of printed circuit board.* To replace high beam or two upper background lights, remove speedometer.

Clock - Remove screw below clock and remove clock. disconnect wires, then replace bulb.

►*POWER BOX NOTE:* A power box mounted on right side of dash panel in engine compartment contains fuse panel, starter and horn relays, power circuit breakers and dash panel wiring connector assemblies. Power box acts as a distribution point for all circuits. A decal inside cover gives circuit breaker and fuse application, ratings, location, and wiring color codes. Fuses may be removed by using ignition key. Heater and air conditioning circuit breakers are installed individually and can be lifted from their spring-loaded holders. Other circuit breakers are mounted on a bus bar and should be removed from holder as an assembly.

Lighting Switch Removal: Disconnect battery negative (ground) cable. Press inward on headlamp switch spring release button and carefully remove switch knob and shaft. Remove switch bezel nut and bezel. Lower switch below panel, note wire color codes and disconnect wires.

Stop Light Switch Location: On lower side of brake master cylinder. *CAUTION - After replacing switch, brakes must be bled.*

CIRCUIT BREAKERS: 18 Ampere. Integral with Light Switch. Protects Headlamps.
12 Ampere. In Power Box, protects Instrument Panel, Dome, Luggage, Rear, License, and Parking lamps.

FUSES: In Power Box except as noted.
AGW 4 Amp. Instrument panel (Rheostat).
SFE 14 Amp. Interior lamps.
SFE 7.5 Amps. Turn Signal & Stop lamps.
SFE 7.5 Amps. Back-up Lamps.
SFE 14 Amps. Speed Control.
1AG2 or AGA2. Clock.
3AG15 r AGC15. Instrument Panel & L. Rear Door Cigar Lighter.
3AG15 r AGC15. R. Rear Door Cigar Lighter.
SFE 7.5 Amps. Radio.
Sulphur Disc or Reset Circuit Br ak r. In lighter socket of cigar lighter.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. Se "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own V8, valve-in-head, of same design as previous models.

Bore	Stroke	Displacem nt
4.30"	3.70"	430 cu. ins.
Compr. Ratio	**Rated HP**	**D v l ped HP**
10.0-1	59.17	300 at 4100 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove dipstick, and turn crankshaft so No. 1 piston is 15° BTDC (use crankshaft timing marks). Remove generator splash shield and auto. trans. line bracket bolt. Remove engine front support insulator-to-mounting pad nut. Raise engine approximately 1" (use block of wood on jack placed under leading edge of oil pan), and insert a ¾" wood block between insulator and underbody engine support pads. Remove both stabilizer arm bolts, washers, insulators, spacers, and nuts. Lower stabilizer arms for clearance. Remove oil pan bolts and free oil pan from block. Remove oil pump pick-up tube and screen assembly bolts, and drop assembly in oil pan. Remove oil pan from under vehicle.

►*1961 CAR OIL PAN REINFORCEMENT (BOLT-LOAD SPREADER):* When replacing oil pan bolt, use new spreader Lincoln Part No. C1VY-6A674-A. Oil pan retaining bolts torque remain 50-70 in. lbs.

►*1961 LINCOLN CONTINENTAL 45-80 MPH MOAN, ROAR OR VIBRATION CORRECTION & ENGINE REAR MOUNT PRODUCTION CHANGE: S "Engin M unt-ings" in Ford Motor Co. Special Data.*

ENGINE LATERAL RESTRICTOR: *S "Engin M unt-ings" in Ford Motor Co. Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Sp cifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engin " in Ford Motor Co. Special Data.*

PISTONS

Step head, slipper type, aluminum alloy with a steel strut. Piston pin is interference fit in piston. Retaining rings are not used.

Removal - Piston & Rod removed from above.
Clearance - .0017-.0035".

Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*

Installing Pistons: Pistons for right and left hand cylinders are NOT interchangeable. Install piston so indentation notch on head of piston is toward front of engine. *See Rod Installation.*

R placement Pist ns: Std., .003", .020", .030", .040" Oversize.

CONTINUED ON NEXT PAGE

S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

PISTON PIN

Press fit in connecting rod, no retaining device.
Diamet r - .9749-.9752". **Length** - 3.48-3.50".
Cl arance in Piston - .0002-.0004". **Wear Limit** - .0008".
Pist n Pin R m val & Installation: *See "Piston Pins" in Ford Motor Co. Special Data.*
Replac m nt Pins: Standard size. Furnished with new pistons only.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0774-.0781"	.015-.025"	① .0014-.0031"
Compr.(2)	.0930-.0940"	.015-.025"	① .0010-.0030"
Oil (3)		.025-.038"	②

① - Wear limit .006". ② - Snug. Side sealing type.

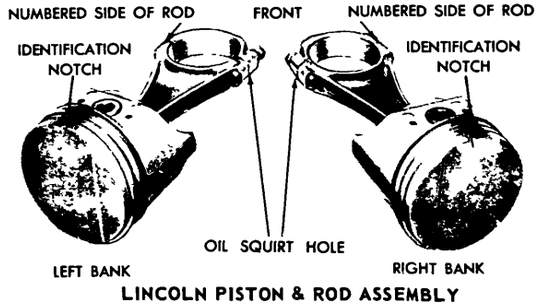
Installing Rings: Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap.
Replac ment Rings: Furnished Std. .020", .030", .040" Oversize.

CONNECTING ROD

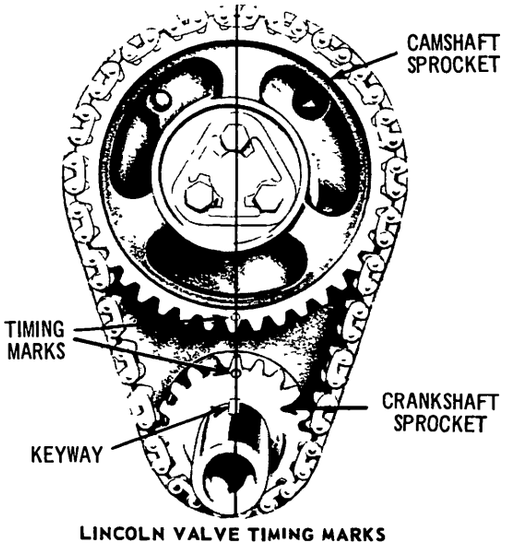
L ngth (Cent r-to-C nter) - 6.599-6.601".
J urnal Diamet r - 2.5998-2.6001" (Code Red), 2.5992-2.5995" (Code Blue).
L wer B aring - Copper lead alloy, steel back.
Cl aranc - .0007-.0020". **Wear Limit** - .0038".
Side Clearance - .005-.015". **Wear Limit** - .018".
R placement B arings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.
►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings.
Installing R ds: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole in rod facing inward and rod number facing outward toward outer side of cylinder block.

CRANKSHAFT

J urnal Diameter - 2.9000-2.9003" (Code Red), 2.8994-2.8997" (Code Blue).
Out- f-R und Limits - .0004". **Wear Limit** - .0006".
B arings - Copper-lead alloy, steel back.
Clearance - .0008-.0024". **Wear Limit** - .0039".



LINCOLN PISTON & ROD ASSEMBLY



LINCOLN VALVE TIMING MARKS

End Thrust: Taken by No. 3 (center) main bearing.
Endplay - .004-.008". **Wear Limit** - .012".
Crankshaft Thrust Bearing Alignment: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.
►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearances. If necessary, regrind journals and install undersize bearings.
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

CAMSHAFT

Journal Diameter - (1) 2.3243-2.3248", (2) 2.3093-2.3098", (3) 2.2943-2.2948", (4) 2.2793-2.2798", (5) 2.2643-2.2648".
Out-of-Round Limits - .0005". **Wear Limit** - .001".
Bearings - Babbitt lined, steel backed.
Clearance - .0012-.0027". **Wear Limit** - .005".
Endplay - Thrust to rear. Taken by thrust face of camshaft sprocket riding against front surface of block.
Camshaft Bearing Service: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Replacement Bearings: Std. and .015" Undersize.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Camshaft Setting - Timing marks should be adjacent and in line with straightedge across shaft centers.

Timing Chain Deflection: Not more than ½" deflection from straight to outward deflected position.
Timing Chain Cover Seal Installati n (Crankshaft Front S al): *See "Engine Front Cover" in Ford Motor Co. Special Data.*
Engin Fr nt Cov r Removal & Installation: *See "Engin Front Cover" in Ford Motor Co. Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	Stem Diamet r
Intake	1.955-1.970"	①
Exhaust	1.645-1.660"	②

Valve	③Seat Angle	④Lift	Stem Clearanc
Intake	45°	.2316"	⑤ .0008-.0018"
Exhaust	45°	.2316"	⑥ .002-.003"

① - Std., .3712-.3717" (Code Red), .3717-.3722" (Code Green) and .003", .015", .030" Oversize.
② - Std., .3701-.3705" (Code Red), .3705-.3709" (Code Green) and .003", .015", .030" Oversize.
③ - Face angle 44° (Intake & Exhaust).
④ - Cam lobe lift. Wear loss limit .005".
⑤ - Wear limit. 0045". ⑥ - Wear limit .0055".

Valve Seat Width - .070-.090" Intake and Exhaust.
►*VALVE TRAIN NOTE:* Valve rocker arms and shafts have been modified for improved lubrication. Use new rocker arm and shaft in conjunction only.
Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over guide.
►*PUSHROD COVER BOLT & ROCKER ARM COVER BOLT LOAD SPREADERS NOTE:* When removing or replacing these parts use new bolt load spreader (pushrod cover bolt), 3/8" flat washer between bolt load spreader and cover (rocker arm cover bolts).
Oversize Valve Stem Installation: *See "Valve System" in Ford Motor Co. Special Data.*
Valve Springs: Roto-Coil design valve rotators used on all exhaust valves eliminating spring retainer and sleeve. No damper springs used.

Valve Spring Specifications

Valve	Lbs. Pressure	L ngth
Closed	65-75 ①	1.640"
Open	179-199 ②	1.230"

① - Wear limit 58 lbs. at 1.640".
② - Wear limit 161 lbs. at 1.230".

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum .0045" (Intake), .0055" (Exhaust), ream valve guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*
Valve Lifters: Hydraulic barrel type. No adjustment.
Diameter - .8740-.8745".
Clearance in Lifter Bore - .0005-.0020".
Wear Limit - .005".
Hydraulic Lifter Operating Range Check - *See "Valv System" in Ford Motor Co. Special Data.*
Hydraulic Lifter Overhaul - *See "Valve System" in Ford Motor Co. Special Data.*
Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
►*VALVE TIMING NOTE: Following valve opening and closing p ints ar with camlift as indicated.*

CONTINUED ON NEXT PAGE

S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Valve Timing Specifications

Intake Valves - Open 22° BTDC ①. Close 68° ALDC ②.
Exhaust Valves - Open 63° BLDC ①. Close 27° ATDC ②.

① Camlift .002". ② - Camlift .005".

Valve Timing Check: Install a quadrant on crankshaft damper. Remove right rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers cam lobe lift shown in Valve Timing Table above. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner. If reading not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.
Normal Oil Pressure: 35-55 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Light on instrument panel. Light goes on when ignition switch turned on or when oil pressure is low.
Oil Pressure Switch - Lincoln No. B6A-9278-B.

Oil Pump: Rotor type mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.

Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow disposable type. Mounted on lower left front corner of cylinder block. Replace element every 4000 miles or 4 months. *NOTE* - Replacement filter Lincoln No. C1AZ-6731-A. Use no other filter.
Installation - Coat gasket with light film of oil. Screw filter onto adapter (by hand) until snug. Then tighten ¼ turn additional. DO NOT OVERTIGHTEN.
►*OIL FILLER CAP NOTE:* Disposable type. Replace every 12,000 miles or 12 months.
Crankcase Ventilation: Standard Cars - Filter in oil filler cap and ventilator tube at rear of engine. Replace oil filler cap every 12,000 miles or 12 months.
Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

NOTE - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 23 qts. without heater, 26 qts. with heater or air conditioning.

Pressure Valve: Radiator filler cap, Lincoln No. LA-8100-A. Operating pressure 12-15 lbs.
Thermostat: 157-162°F (No. 8BE-8575-B); 175°F (B9S-8575-A): Located in water outlet connection. Two 137-142°F (B9S-8575-B) thermostats located in front face of cylinder banks.

Water Pump: Packless, sealed ball bearing type. *See "Cooling System" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley electric Constant Voltage ("CV") type with Gauge Voltage Regulator Lincoln No. B9MF-10804-A.
Dash Unit - Lincoln No. C1VF-10883-A.
Engine Unit - Lincoln No. CODF-10884-A.
Power Booster Fan: Standard on Air Conditioned Cars. *See "Cooling System" in Ford Motor Co. Special Data.*

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 6,000 miles or 6 months. Add fluid as necessary. Use only Automatic Transmission Fluid. Lincoln Part No. C1AZ-19582-A or Automatic Transmission Fluid Type A, Suffix A. *CAUTION - Drain and refill only after disassembly for repair. Do not overfill.*
Checking Fluid Level - Bring transmission to operating temperature by running engine with selector lever in neutral position. Move selector lever through all ranges to assure fluid distribution, then place lever in "P" position. Maintain level to "FULL" mark on dipstick.
Capacity - 10.5 qts. (approx.).

CHASSIS LUBRICATION: The steering knuckle ball joints and steering connector rod ends are packed with special lubricant and sealed. Lubrication fittings have been eliminated at these points. However, service plugs are provided in steering knuckle ball joints and steering connector rod ends so they may be repacked when necessary.

►*LUBRICATION CAUTION: Engine accessories (generator, distributor, etc.), steering gear, wheel bearings, transmission, rear axle and universal joints must be checked and lubricated at intervals recommended by manufacturer.*

►*SPECIAL LUBRICANT RECOMMENDATION CAUTION: Only the recommended lubricants (see below) are to be used when servicing steering knuckle ball joints and steering connector rods. Other lubricants will cause early failure of parts.*

Lubrication: Every 30,000 miles or 2 years, remove lubrication service plugs (threaded) from upper and lower steering knuckle ball joints (four locations) and from steering connector rod ends (five locations) and install lubrication fittings. Lubricate steering knuckle ball joint fittings with Lubricant, Part No. C1AZ-19590. Lubricate steering connector rod ends with Lubricant, Part No. C1VV-19B545. Replace lubrication fittings with threaded service plugs.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

SPECIAL 40, 4100 SERIES

	Ft. Lbs.
Cylinder Head	50-55
Rocker Arm Bracket	25-30
Rocker Arm Cover	3-5
Intake Manifold	25-30
Carb to Int. Man	12-15
Water Outlet to Int Man	20-25
Exhaust Manifold	10-15
Oil Pan	6-15
Engine Front Cover	20-25
Oil Pump Cover	10-15
Fuel Pump to Front Cover	20-25
Water Pump to Front Cover	6-8
Main Bearing Caps (Exc Rear)	50-60
Main Bearing Cap (Rear Only)	65-70
Connecting Rods	30-35

44, 46, 47, 4800 SERIES

Cylinder Head	65-75
Intake Manifold	25-30
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps	100-110
Flywheel	50-60
Harmonic Balancer	Ⓒ 200-220
Con Rod Caps	40-45
Rocker Arm Support Brackets	30-35
Rocker Arm Cover	3-5
Valve Lifter Cover	3-5
Water Manifold	25-30

Ⓒ - No lockwasher used on later cars (specification unchanged)

ALUMINUM ENGINES SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines, to prevent damage by scratching, nicking, or scoring Note the following

1) Do not drop or slide machined surfaces on bench or floor

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation)

3) Lubricate bolts and screws entering any aluminum part *See "Bolt Thr ad Lubrication Note" below*

4) Tighten bolts and nuts to the specified torque DO NOT overtighten Torque values are for clean lubricated threads

►*BOLT THREAD LUBRICATION NOTE* Use "Buick Special Thread Lubricant"

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum The repair consists of drilling out worn or damaged threads tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole This brings hole back to original threaded size See following table for inserts and tools required

"Heli-C il" Thread Inserts

Thread Siz	Insert Part N .	Drill Siz	Sp cial Tap Part N .	Ins rting T I N .
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

ENGINE MOUNTINGS

44, 46, 47, 4800 SERIES

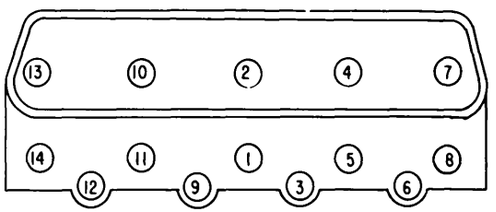
►*ENGINE MOUNTING NOTE:* When properly aligned, engine and transmission should rest in normal position without any strain on the rubber mounting pads Engine alignment is determined by transmission support location Before loosening or removing support, mark support and frame at each end to insure reinstallation in original position with exact number and location of shims used originally

ENGINE MOUNTINGS: Adjustment - Disconnect exhaust pipe from exhaust manifold and loosen four engine mount-to-frame bolts. With support shims in place, support in original position (fore and aft), and transmission support-to-frame bolts tight, raise engine to allow mounts to normalize, then lower engine and tighten mount-to-frame bolts Reassemble exhaust system making certain system is free of binding and that there is no interference between exhaust pipes and chassis members

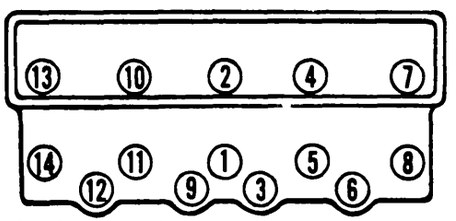
CYLINDER HEAD & MANIFOLD

SPECIAL 40, 4100 SERIES

CYLINDER HEAD & GASKET INSTALLATION: Install new cylinder head gasket over dowels on block *CAUTION - DO NOT use sealing compound of any kind* Install cylinder head, then coat threads of cylinder head bolts with Buick Perfect Seal Install and tighten bolts a little at a time about three times around in sequence indicated in diagram, then tighten



BUICK SPECIAL CYLINDER HEAD



BUICK (EXC. SPECIAL) CYLINDER HEAD

bolts in same sequence to specifications *CAUTION - DO NOT ov rtighten*

44, 46, 47, 4800 SERIES

CYLINDER HEAD & GASKET: When handling the thin crimped steel gasket, use care not to damage lacquered surface coat or kink sealing rings stamped in gasket. *(CAUTION* - Do not coat lacquered surface of gasket with any sealing material and DO NOT RE-USE THE OLD GASKET as stamped sealing rings ar flattened in a used gasket). Right and left cylinder heads are identical except that the water inlet port is open at front end and is plugged at rear end as installed on engine. After installation of cylinder head, tighten bolts a little at a time, three times around in sequence shown in diagram, then in same sequence to specifications After engine brought to operating temperature, recheck head bolts to specifications

►*CYLINDER HEAD REMOVAL NOTE:* All of the cylinder head bolts and pushrods cannot be removed with head in place. When removing head, pull pushrods part way out and tape in place. These same pushrods must be in head before head installation.

PISTON PINS

SPECIAL 40, 4100 SERIES

►*PRESS-FIT PISTON PIN REMOVAL & INSTALLATION: CAUTION - Special tools must be used to avoid damag to piston assembly parts*

Pin Removal: Place Support J-8754-1 in press with full radial face up and install spring in support Place piston, pin and rod in press with Driver J-8355-3 inserted in pin Press out piston pin

Pin Installation: Place Pilot J-8754-2 and spring in Support J-8754-1 and position Support so Pilot J-8754-2 is located in piston pin bore, then place in arbor press Coat pin and connecting rod lightly with graphite lubricant and place Driver J-8355-3 in pin and press pin into piston and connecting rod until pin bottoms against Pilot J-8754-2

44, 46, 47, 4800 SERIES

PRESS-FIT PISTON PIN REMOVAL & INSTALLATION: *CAUTION - Special tools must be used to avoid damag to piston assembly parts.*

Pin Removal: Place Piston Support J-6047-17 in press with radial face up. Place piston assembly on Support and press out pin with Drive Pin J-6047-4. *NOTE* - Guide Pin J-6047-16 is not used for pin removal.

Pin Installation: 1) Place Piston Support J-6047-16 (364" Eng), J-6047-18 (401" Eng), in base plate of press with Piston Support full radial face upward

2) Place rod in piston, with spurt notch on same side as valve depressions in piston dome. Lubriplate pin and enter in boss, forcing rod against opposite boss.

3) Place small end of Drive Pin J-6047-4 in top end of pin and place assembly in press.

4) Be sure all parts are aligned correctly, then force pin through rod and piston bosses until Guide Pin J-6047-16 (364" Eng J-6047-18 (401" Eng) stops downward travel

5) Remove assembly and rotate piston on pin to check fit between piston and pin.

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CRANKSHAFT & MAIN BEARINGS

CRANKSHAFT REAR OIL SEAL: Braided fabric seals pressed into grooves in crankcase and rear bearing cap at rear of oil collecting groove. Neoprene seals are placed in sides of bearing cap. Crankshaft must be removed to replace braided seal in crankcase.

ALL SERIES

Installation - Place new seal in groove in cap and force down with hammer handle or smooth stick until seal projects above groove not more than 1/16". Cut ends of seal flush with surface of cap. Replace seal in crankcase in same manner. *CAUTION - Engine must be operated at slow speed after new braided seal installed.* Neoprene seals are slightly longer than grooves in bearing cap. Seals must **not** be cut to length. Lubricate seals and install in bearing cap with upper ends protruding approximately 1/16". After cap is installed, force seals up into cap with blunt instrument to provide seal at parting line between cap and case.

ENGINE FRONT COVER

SPECIAL 40, 4100 SERIES

TIMING CHAIN COVER: Removal - 1) Drain cooling system, disconnect hoses and remove radiator. Remove fan, pulley and belts.

2) Remove crankshaft pulley and reinforcement, and harmonic balancer.

3) On Pwr. Steering Cars, remove steering pump bracket bolts at timing cover and loosen or remove other bolts so that pump may be moved out of way.

4) Remove fuel pump and generator (not the generator brackets).

5) Remove distributor cap and pull spark plug wires off rocker arm cover brackets. Swing cap and wires out of way and disconnect distributor primary wire. Remove distributor.

6) When timing chain and sprockets are not to be disturbed, note position of distributor rotor for reinstallation in same position.

7) Loosen and slide thermostat bypass front hose clamp rearward. Remove timing cover to engine block bolts and two oil pan to timing cover bolts. Remove cover assembly and gasket.

FRONT OIL SEAL: Removal & Installation - Use a punch to drive out old seal and shedder from front toward rear of cover. To install, coil new packing around opening so ends are at top. Drive in shedder with punch. Stake shedder in place in at least three places. Use hammer handle or other smooth object to size packing until balancer hub can be inserted through opening.

44, 46, 47, 4800 SERIES

TIMING CHAIN COVER: Removal - Drain cooling system, remove radiator core, shroud, fan belt, fan and pulley, vibration dampener. Remove all bolts attaching timing chain cover and water pump manifold to upper and lower crankcase and cylinder heads. *NOTE* - DO NOT REMOVE water pump from chain cover. Remove cover and manifold carefully, making sure not to damage lower crankcase gasket.

FRONT OIL SEAL: Installation - After removing braided fabric packing with a screwdriver and tapping pressed steel shedder out of timing chain cover, work the new packing into the shedder, then drive the shedder into recess in cover with Installer J-5250-1. Push Packing Expander J-5250-2 through seal to expand packing into place and size the opening for the crankshaft. Apply a light coat of vaseline to packing.

FLYWHEEL

SPECIAL 40, 4100 SERIES

FLYWHEEL REPLACEMENT (Auto. Trans. Cars): *Installation same as 44, 46, 47, 4800 Series below.*

44, 46, 47, 4800 SERIES

FLYWHEEL REPLACEMENT: Flywheel or Ring Gear must be replaced as an assembly (gear is welded in place and not furnished separately).

►*FLYWHEEL REPLACEMENT NOTE:* 364" and 401" engine flywheels are not interchangeable. 401" engine flywheel is identified by four scallops cut in edge of flywheel between 1 o'clock and 9 o'clock legs, while 364" engine flywheel has all sides straight.

Installation of Flywheel: Make certain that flywheel and crankshaft are clean and free from burrs which might cause run-out (remove burrs with a mill file). Install flywheel and tighten bolts evenly to specifications. Mount Dial Indicator so stem of indicator bears against float surface of flywheel at inner side of bolt holes. Hold crankshaft end thrust in one direction and turn flywheel to check runout. Runout should not exceed .015". When runout exceeds .015", tap high side of flywheel with mallet. If not corrected, remove flywheel and check for burrs between flywheel and face of crankshaft flange. If not corrected by removing burrs, check runout of flange.

Engine Vibtation: When engine vibration introduced by installation of flywheel, proceed as for "Engine Unbalance" below.

Misaligned Flywheel: Loosen one flywheel attaching bolt and check contact between flywheel legs and converter pump cover. A .010" feeler should slip between flywheel and cover with slight drag. Pry leg away when too much contact exists, or insert ¼" diameter rod on each side of bolt and tighten bolt to spring leg to increase contact. Recheck other legs, to obtain equal contact.

ENGINE BALANCING

►*IF VIBRATION NOTED AFTER INSTALLATION OF CRANKSHAFT, FLYWHEEL, OR OTHER ROTATING PARTS, CORRECT THIS UNBALANCED CONDITION AS FOLLOWS:*

Critical Speed of Vibration - Determine speed at which vibration is most evident (use tachometer) and operate engine at this speed to check results from the following corrective procedures.

►*CAUTION:* Procedure below will correct minor unbalance caused by replacement of individually balanced parts. Extreme vibration caused by parts abnormally out of balance, or different in weight from corresponding parts, should be corrected by replacement of these parts.

1) Remove bell housing cover and install one balance weight (.060" thick) under head of two converter pump cover bolts, and tighten bolts to 25-30 ft. lbs. *(CAUTION - Do not place a weight at a flywheel-to-converter driving bolt as these bolts are not long enough for addition of weights).*

2) Run engine at critical speed and carefully compare vibration with that obtained without the weight, then stop engine. Mark location of balance weight on converter pump, remove weight and tighten bolt to 25-30 ft. lbs. Install the weight at other converter pump cover bolts and compare vibration produced at critical speed.

3) At the point where valance weight produced greatest improvement in vibration, install weights of proper thickness to eliminate objectionable vibration. Balance weights are furnished in the following thicknesses:

Balance Weight Part Nos.

Thickness	Part No.
.009"	1178106
.018"	1178107
.0345"	1178108
.060"	1178109
.120"	1178110

NOTE: When factory balancing of converter pump is changed to balance an engine, the pump cannot be used with any other engine.

VALVE SYSTEM
ROCKER ARMS

SPECIAL 40, 4100 SERIES

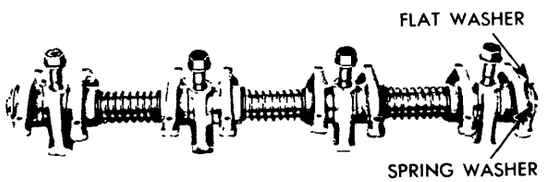
ROCKER ARM ASSEMBLY: Removal - Pull spark plug wires from brackets on rocker arm covers and swing wires and retainer out of way. On right side, remove vent pipe, then remove rocker arm cover and gasket. Remove four rocker arm shaft to cylinder head bolts and remove rocker arm and shaft assembly. *NOTE - Vent pipe oil baffle is mounted under rear bolts on right rocker arm and shaft assembly.*

Disassembly - Remove cotter pin, plain washer and spring washer from each end of shaft. Remove bracket bolts and slide rocker arm, springs and brackets off shaft.

Reassembly - Assemble springs, rocker arms and brackets as shown in diagram. *NOTE - Two types of rocker arms are used, and valve ends of rocker arms slant away from brackets.* Install spring washer, flat washer and cotter pin on each end of shaft in the order named. Install bolts with plain washers through brackets and shaft so notch in one end of shaft is up and at the front (right hand shaft), up and at the rear (left hand shaft).

NOTE - Vent pipe oil baffle is mounted under rear bolts on right rocker arm and shaft assembly.

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BUICK SPECIAL ROCKER ARM ASSEMBLY

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44, 46, 47, 4800 SERIES

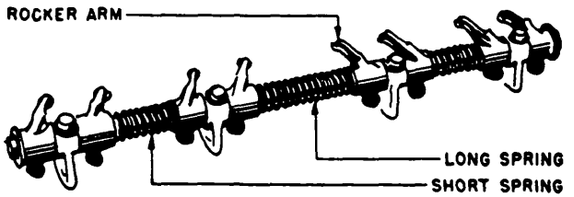
ROCKER ARM ASSEMBLY: One assembly mounted on each cylinder head (see illustration).

Disassembly: Remove cotter pin, flat washer, and spring washer from each end of shaft. Pull mounting bolts out of support brackets and slide rocker arms, springs and brackets off shaft.

Reassembly: See illustration for location of parts. Install longer spring at center of shaft and install rocker arms with offset (slant) toward center of shaft (two types of rocker arms used—see table below for proper location of each type). Turn shaft so that notch in one end of shaft is upward or toward top of bracket and install bolt through bracket and shaft to maintain this position *(CAUTION*—Notch must be upward to place rocker shaft oil holes in proper relationship to rocker arms).

Rocker Arms

Part No.	Location
1173808	4 Right Front & 4 Left Rear
1173809	4 Left Front & 4 Right Rear



BUICK (EXC. SPECIAL) ROCKER ARM ASSEMBLY (ONE ASSEMBLY FOR EACH BANK)

Installation: Make certain that notch in one end of rocker arm shaft is upward, position assembly on head with dowels engaging blind holes in brackets, tighten all bracket bolts evenly to 30-35 ft.lbs.

HYDRAULIC LIFTERS

SPECIAL 40, 4100 SERIES

Removal: *CAUTION - Use air and clean cloths to remove all dirt from cylinder heads and adjacent parts.*

1) Drain cooling system, remove air cleaner and silencer, disconnect all pipes and hoses from carburetor. Remove coil and disconnect temperature wire at switch.

2) Disconnect accelerator and transmission linkage and throttle return spring. Slide front bypass hose clamp rearward and disconnect upper radiator hose at outlet.

3) Disconnect heater hose at thermostat control valve inlet (push hose down to drain intake manifold).

4) Remove twelve intake manifold-to-cylinder head bolts and remove intake manifold and carburetor assembly (slide rearward to disconnect bypass hose from water pump).

5) Remove intake manifold gasket (sound absorber). Remove intake manifold gasket clamps and gasket and remove rubber gasket seal.

6) Remove rocker arm covers, and rocker arm and shaft assemblies. Remove pushrods and valve lifters. *NOTE - Keep lifters separat (in order) so th y will be returned to original positions in engine.*

44, 46, 47, 4800 SERIES

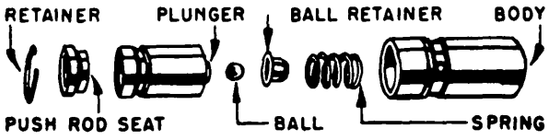
Removal: Remove air cleaner, disconnect all pipes from carburetor and intake manifold. Disconnect wires from accelerator vacuum switch and remove throttle return spring. Remove coil and equalizer shaft bracket from intake manifold and move them out of way. Remove intake manifold and carburetor as an assembly. Thoroughly clean cylinder heads, rocker arm covers and adjacent areas to prevent dirt entering engine. Remove rocker arm cover and rocker arm assemblies, remove pushrods. Remove valve lifter cover, lift out individual valve lifters and place them in numbered compartments of a holding fixture to insure re-installation in original position in engine.

ALL SERIES

Disassembly: Use a push rod to hold down the push rod seat in lifter while removing plunger retainer from body with Retainer Remover J-5238. Remove push rod seat and plunger from lifter body. Body bore above plunger may be caked with carbon and varnish. In this case, place lifter in large end of Tool J-4160 (Special), J-4160-A (Std.) with plunger inward. While holding lifter with thumb, rap open end of remover against a block of wood with just enough force to jar plunger from body.

►*IMPORTANT NOTE*—Disassemble one lifter at a time to avoid interchanging parts. Be careful not to score or nick lifter parts.

Cleaning and Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or identations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install



HYDRAULIC VALVE LIFTER (ALL)

plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: *NOTE - Current type of ball retainers eliminate need for check of ball travel unless retainer is badly worn or damaged.* It is recommended that all parts be rinsed in clean kerosene and then assembled without drying (this will eliminate all lint and dust adhering to parts). Hold plunger in vertical position with feed hole up, install check ball, ball retainer, spring, and body over plunger. Install pushrod seat and plunger retainer in end of body, use handle of Tool J-5238 to depress parts until retainer engages groove in body. Test lifter for leakdown rate, see below. Protect lifter assembly by wrapping it in clean paper until ready to test or install in engine.

Leakdown Rate - 1) Clean cup of Test Fixture J-5095 and fill it to ½" of top with "Hydraulic Lifter Test Fluid" (Kent-Moore No. J 5268).

2) Remove rubber washer (used for larger lifters) and install Gauge Sleeve J 5180-5 in cup and install Buick V8 Gauge Rod Nose J 5180-15 in ram.

3) Swing arm out of way, raise ram and place lifter (top side up) in Sleeve J-5180-5. *NOTE* - Lifter must be completely covered by fluid during test.

4) Lower ram to rest in lifter pushrod seat, then lower weight arm to rest on roller of ram.

5) Operate lifter plunger, through full travel to force all air out of lifter, until considerable resistance is built up in lifter and a definite grab point is felt at top of stroke when indicator pointer is at bottom of scale.

6) Finally operate lifter plunger approximately 10 additional strokes to be sure all air is out of lifter. *NOTE* - When one stroke (of last ten) has noticeable weak resistance, replace check ball and repeat above procedure.

7) Remove weight arm to allow lifter plunger to come up to its retainer, then lower arm to rest on ram roller. As pointer starts moving upward, start rotating fluid cup by turning handle one revolution every two seconds.

8) Use stop watch to check time required for pointer to move from lower to upper mark on scale (Marked Buick V8).

9) Leakdown rate (time between marks) must be between 12 and 40 seconds for satisfactory lifter operation.

►*LIFTER REPLACEMENT CAUTION:* A doubtful lifter should be checked 3-4 times before deciding to replace it.

OILING SYSTEM

ENGINE LUBRICATION

SPECIAL 40, 4100 SERIES

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to crankshaft, connecting rod and camshaft bearings and to valve lifters. Oil is supplied under controlled pressure to rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. See *Engine Oil Flow Diagram.*

OPERATION: Gear type oil pump located in timing chain cover, draws oil through screen and pipe assembly (or over top of screen if clogged) and a drilled passage in crankcase connecting, to drilled passage in timing chain cover. All oil is discharged from pump to cover assembly. Spring loaded relief valve (in cover) limits oil pressure to a maximum of 33 lbs. per square inch. A bypass valve (in cover) opens when filter becomes clogged (4½-5 lbs. pressure difference between filter inlet and outlet) to bypass unfiltered oil directly to oil galleries in engine. Oil from filter (mounted on oil pump cover) supplies oil through oil pump cover and drilled passages in crankcase to two main oil galleries that run full length of the crankcase.

Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

Connecting Rod & Pistons - Main bearings supply oil through drilled passages in crankshaft to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through small notch in connecting rod bearing parting surface that registers with hole in crankshaft every revolution. Piston pins are lubricated by splash.

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Timing Chain & Sprockets - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.

Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries.

Rocker Arms, Valves and Pushrods - These items receive oil from main oil galleries through drilled holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) t hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil trhough hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.

44, 46, 47, 4800 SERIES

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to crankshaft, connecting rods, and camshaft bearings, and under controlled volume to valve lifters, rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. *See "Engine Oil Flow" diagram.*

OPERATION: Gear type oil pump at lower side of crankcase (at rear end) draws oil from crankcase sump through screen (or over top of screen if clogged) and delivers it through oil passages in pump body and crankcase to full flow filter. By-pass ball type valve in filter base opens to by-pass filter element when clogged or when difference in oil pressure between inlet and outlet ports is 4½-5½ lbs. Oil from filter passes into main oil gallery (full length of crankcase below camshaft) and through drilled passages in crankcase at full pressure to all crankshaft and camshaft bearings, where it is distributed to all moving parts of engine.

Crankshaft, Connecting Rods & Pistons - Holes drilled in crankshaft carry oil from main bearings to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through squirt hole in parting surface of connecting rod that registers with hole in crankshaft at each revolution of crankshaft. Pistons are lubricated by splash.

Camshaft, Sprockets, Lifters - Oil from front camshaft bearing, flows down front face of crankcase to drop on sprocket that transfers it to chain. Oil holes in crankcase and camshaft front bearing align with groove in camshaft bearing journal which meters flow of oil from main gallery to valve lifter oil galleries in each bank of cylinders. The full length of cylinder bank oil gallery cuts into lower sides of all valve lifter guide holes to supply low pressure oil to each lifter.

Rocker Arms, Valves & Pushrods - These items receive low pressure oil from valve lifter gallery through connecting passages drilled in front end of cylinder block and head. Oil passage in cylinder head ends in a counterbored recess surrounding front rocker arm shaft bracket bolt. Oversize bolt hole in bracket permits oil to flow into hollow rocker arm shaft (plugged at each end). Holes in rocker arm shaft allow oil to flow to each rocker arm. Oil is metered to pushrod ball seat and to valve stem through drilled holes in rocker arm. Excess oil drains off and returns to oil pan through pushrod opening in cylinder head and block.

OIL PUMP

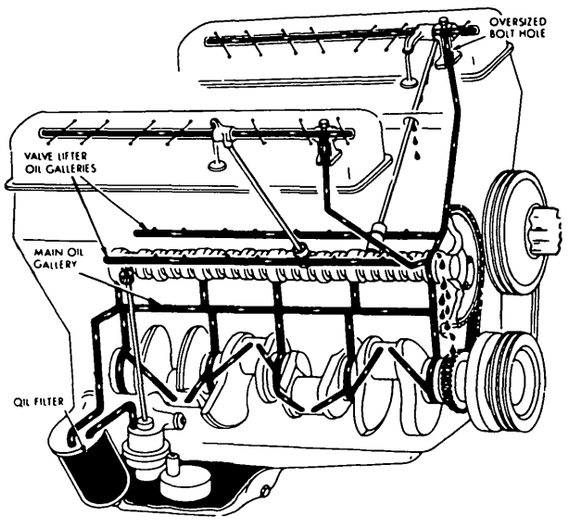
SPECIAL 40, 4100 SERIES

►*OIL PUMP COVER SPACER INSTALLATION CAUTION (Police Cars):* Spacer must be installed between oil pump cover gasket and spacer gasket and the cover must be installed with switch away from alternator.

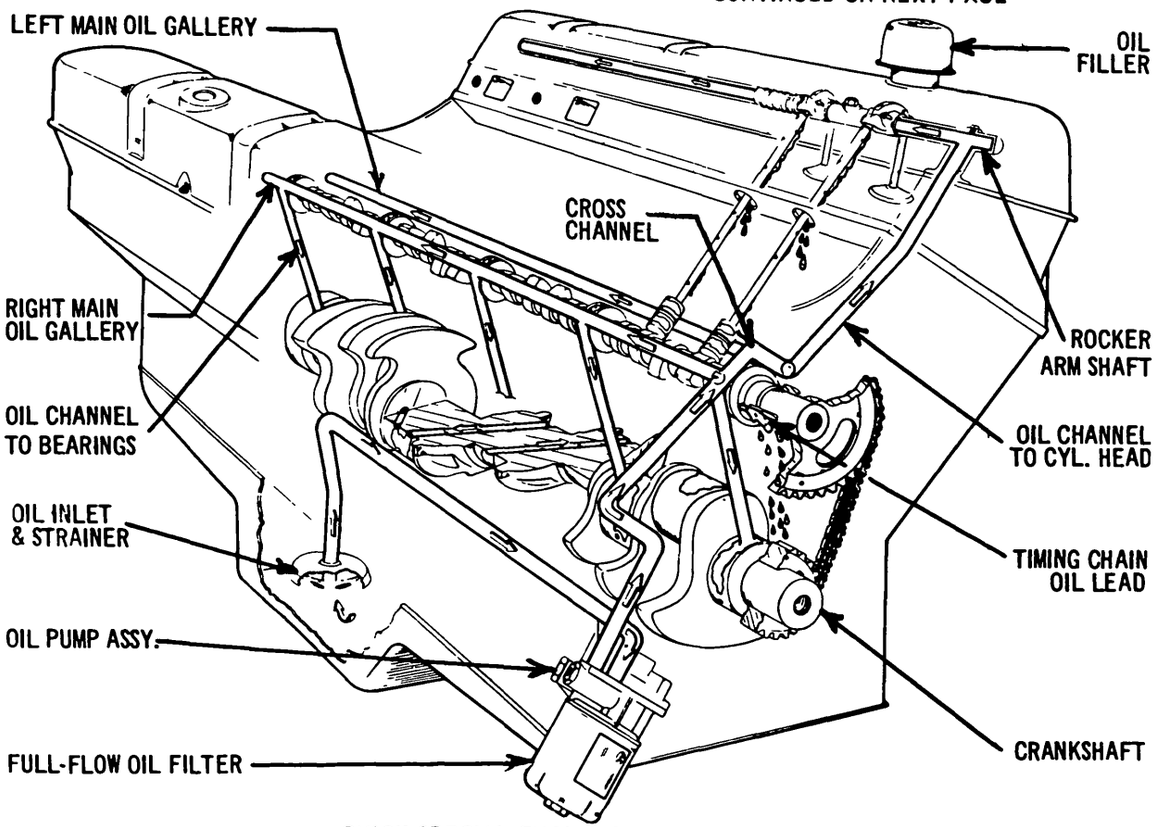
OIL PUMP: Removal & Disassembly - Remove oil filter and disconnect pressure switch wire at bypass valve cap. Remove oil pump cover assembly-to-timing chain cover screws, then remove cover assembly and slide out oil pump gears. Remove oil pressure relief valve cap, spring and valve. Remove oil filter bypass valve cap, spring and valve.

Inspection - Wash all parts thoroughly and inspect all parts for wear or scoring. Replace any relief valve spring that shows side wear or is questionable. Clean screen staked in bore. Valve should be an easy slip fit in bore. Check bypass valve for cracks, nicks or

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BUICK (EXC. SPECIAL) ENGINE OILING SYSTEM

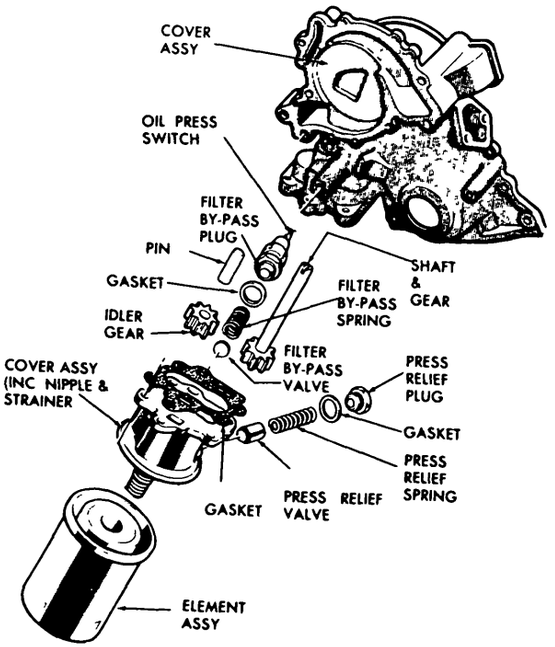


BUICK SPECIAL ENGINE OILING SYSTEM

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warping. Valve should be flat and the face free of nicks or scratches.

Assembly & Installation - Reverse removal and disassembly procedure and note the following: Lubricate relief valve before installation and tighten relief valve and bypass valve caps to 30-35 ft. lbs. *NOTE - Relief valve cap has no hole tapped for pressure switch.* Place straightedge across gears. Clearance between straightedge and gasket surface of timing chain cover should be .0018-.0058". If less, remove gears and check chain cover for wear. If satisfactory, remove gears, fill gear pocket full of petrolatum jelly and force gears into cavity. *CAUTION - This is important as pump will not prime itself with air in cavity.* Install gasket and tighten cover-to-timing chain cover screws alternately and evenly to 10-15 ft. lbs. Install filter and connect switch wire.



BUICK SPECIAL OIL PUMP

44, 46, 47, 4800 SERIES

OIL PUMP: Removal & Disassembly - Remove oil pan, then remove oil pump. Remove screen and screen housing, then remove gasket, pipe, and cover from pump body. Remove gears. Remove hex cap, spring and ball valve from pump body.

Reassembly - Install gear and shaft and idler assembly in pump body with chamfered end of idler gear teeth inward away from cover. Use straightedge across pump that it has not collapsed. Check ball for wear and that it seats properly. Inspect body, cover, gears and shaft for wear or scoring. Replace all worn or damaged parts.

Cleaning & Inspection - Clean all parts in solvent and blow dry with air. Check for wear on side of spring and body to check clearance of gears and cover. Clearance should not be more than .005" or less than .0005". Lubricate and assemble parts to pump body by reversing removal procedure. When completely reassembled, pump shaft should turn freely and have slight endplay (.0005-.005").

Installation - Install pump with new gasket, tightening screws while turning shaft back and forth through gear lash. *NOTE* - If pump shaft tends to bind as bolts are tightened, rap body lightly with plastic mallet to free shaft. Shaft must be free of bind when bolts are tight.

COOLING SYSTEM

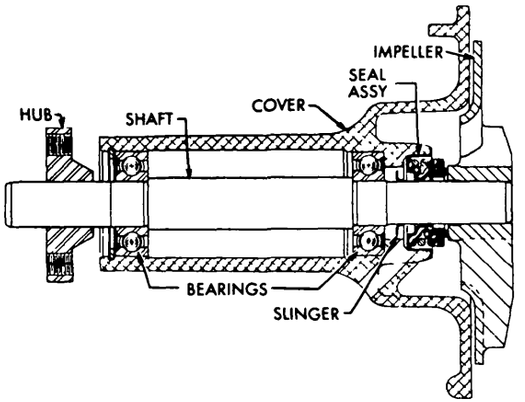
ALL SERIES

WATER PUMP: *NOTE* - Water pump cover is die cast aluminum in which pump bearings are shrunk fit. The cover, shaft, bearings, and hub are not servicable. Seal and impeller are only servicable parts

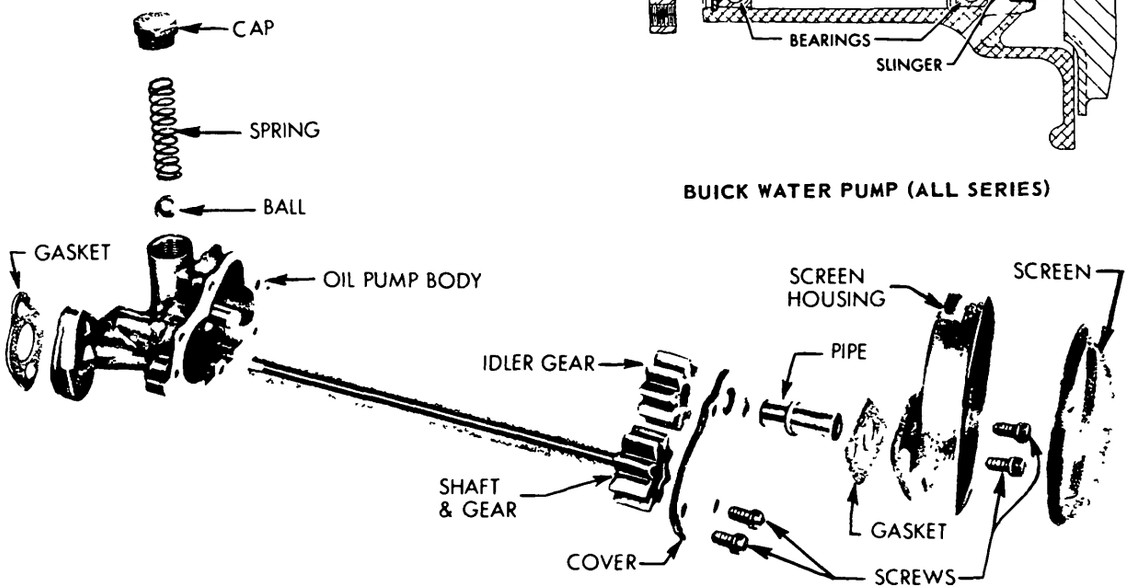
Disassembly - Pull impeller from pump shaft (avoid end thrust on bearings). Remove carbon washer, rubber bellows and spring from brake sleeve. When necessary to replace sleeve, use drift through vent hole in pump body. *NOTE* - DO NOT use solvent to clean parts as it will destroy bearing lubricant.

Reassembly - Press new brass seal sleeve into body using thick walled tube. When old sleeve not removed, separate new seal bellows from seal bellows by soaking it in hot water to soften cement. Install bellows and spring in sleeve with notches in washer engaging driving dents of sleeve. Coat face of washer and impeller hub with rust preventative and press impeller on shaft until rear face is flush with end of shaft. *CAUTION - Avoid any thrust on shaft bearings.*

Installation - Clean gasket surfaces and use new gasket. Bolts with lockwashers must be tightened uniformly.



BUICK WATER PUMP (ALL SERIES)



BUICK (EXC. SPECIAL) OIL PUMP

►*JACKING & HOISTING CAUTION: Before jacking, hoisting or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Designation
LeSabre	4400
Invicta	4600
Electra	4700
Electra "225"	4800

ENGINE & SERIAL NUMBER: Stamped on plate attached to left upper shroud surface adjacent to body number plate, and on top surface of crankcase forward of valve lifter cover on left side. Number (example below) includes identification data.

① ② ③ ④
4 H 1 001001

① - Series. **4** 4400. **6** 4600. **7** 4700. **8** 4800
② - Year Model. **H** 1961.
③ - Assembly Plant. **1** Flint. **2** South Gate. **3** Linden. **4)** Kansas City. **5)** Wilmington. **6)** Atlanta. **8)** Arlington.

④ - Beginning vehicle number at each assembly plant.

Engine Production Code Number: Stamped on same surface as Engine & Serial Number but on **right** side. When viewed from front of engine, number is upside down. Number is **not** used for licensing.

►*ENGINE PRODUCTION CODE NUMBER IDENTIFYING MARKS:* Used as follows
3H - 364" Eng. Std. 10.25-1 Compr Ratio (prefix).
L3H - 364" Eng. Low 9.0-1 Compr. Ratio (prefix).
4H - 401" Eng. 10.25-1 Compr. Ratio (prefix).

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel): See Note under Engine Specifications for recommended changes.*

►*FUEL CONSUMPTION CORRECTION (Early Cars):* Caused by failure of distributor vacuum advance diaphragm. Later cars have improved vacuum advance units.

►*THROTTLE LINKAGE INTERFERENCE WITH SPARK PLUG WIRES CORRECTION (4-Bbl. Carb. Cars):* Short spark plug wire bracket should be replaced with longer bracket, Part No. 1349147, furnished for either side of engine.

COMPRESSION PRESSURE: 160 lbs. (9.0-1 ratio), 180 lbs. (10.25-1 ratio) at cranking speed of 160 RPM. Cylinders must be equal within 15 lbs.

VACUUM READING: 14" Min. at 525 RPM.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely (lubricate shaft at each chassis lubrication). Check thermostat at 70°F (room temperature). There should be 180° wrap on spring.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "TUNE-UP" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.
Cylinders - RIGHT BANK 1-3-5-7, LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .035".
Spark Plugs - AC No. 44S (Std.), No. AC-42 (High Speed Driving). 14 mm. Torque to 25-30 ft. lbs.

COIL: Delco-Remy No. 1115100.
Ignition Current - 3.7 amps. (stopped), 1.7 amps. (idling) all at 12 6 volts
Resistor - Resistance wire (1.80±.05 ohms) connected in circuit from coil to IGN.1 terminal of ignition switch. Bypassed during cranking by lead from IGN.2 terminal of switch to coil.

►*IGNITION CIRCUIT NOTE:* When ignition switch is in "Lock" position, coil resistance wire is grounded.

DISTRIBUTOR: Delco-Remy No. 1110962 (364" Eng. 9.0-1 Ratio), No. 1110961 (All Others).

►*DISTRIBUTOR IDENTIFICATION NOTE:* No. 1110962 has Zinc color oiler, No. 1110961 has Copper color oiler.
Condenser - Delco-Remy. **Capacity** .18-.23 mfd.
Breaker Gap - Gap (.016") will be correct when cam angle correctly set.
Cam Angle - 28-32° Set at 30° (will give .016" point opening).
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110961 & 962

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	450	0-4	900
3-5	950	6-10	1900
6-8	1425	12-16	2850
9-11	1900	18-22	3800

Vacuum Spark Control: Delco-Remy 1116163 (1110961 Distr.), No. 1116164 (1110962 Distr.).

Vacuum Advance - 1116163

Distr Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
8-10	10-20	16.25-18

Vacuum Advance - 1116164

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
6.5-8.5	13-17	12-14

IGNITION TIMING

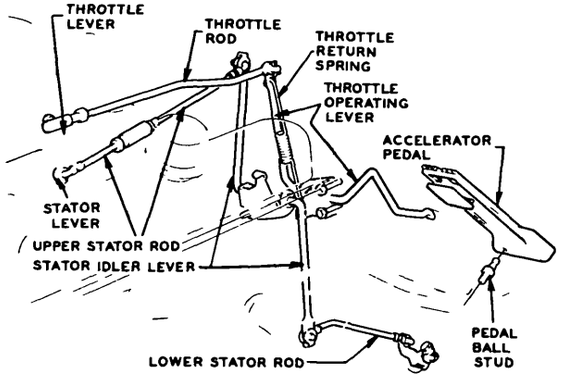
Setting - 12° BTDC at 400 RPM.
Timing Mark - Timing indicator on chain case cover marked "O" (TDC) "5" (5° BTDC), and "12" (12° BTDC) Align correct mark with yellow paint filled groove on harmonic balancer

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg, Carter & Rochester carburetors used as follows:*

Engine & Compr. Ratio	Carburetor
364" (9.0-1)	Rochester 2GC or Stromberg WW 2-Bbl.
364" (10.25-1 Std.)	Rochester 2GC or Stromberg WW 2-Bbl.
364" (10.25-1 Power Pack)	Carter AFB 4-Bbl.
401" (10.25-1 All)	Rochester 4GC or Carter AFB 4-Bbl.

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Make sure stator linkage is properly adjusted (see below). Then proceed as follows: Disconnect carburetor throttle rod from throttle operating lever. Hold accelerator pedal firmly against floor mat and throttle in wide open position Now hold throttle rod at hole in lever. **Rod must be 1/16" short of notch in lever.** Readjust rod as necessary. Connect rod to lever and again check for wide open throttle with accelerator against floor mat. Check and adjust choke unloader if necessary. Check for smooth operation of linkage Desired wide open throttle position should be when accelerator pedal strikes floor mat rather than stop on throttle lever striking hard against boss on throttle body.



THROTTLE LINKAGE (AUTO. TRANS.)

Stator Linkage Adjustment - Hold upper end of stator idler lever forward against spring tension. Hold throttle lever in wide open position. Throttle lever should just make contact with stator lever on carburetor. Rotate turnbuckle to lengthen upper stator rod when there is clearance or to shorten upper stator rod should contact be made before throttle reaches wide open position. Tighten locknut and recheck for wide open throttle position.

Anti-Stall Dashpot Adjustment - After stator and throttle linkage properly adjusted, engine at normal operating temperature and idle speed correctly set, proceed as follows. Open throttle to clear fast idle cam and rotate cam to extreme fast idle position Let throttle close against cam. Adjust dashpot until it just touches throttle lever . Tighten locknut. Put transmission in "D" with brakes applied and jab accelerator pedal and release quickly. If engine stalls, adjust dashpot toward throttle lever, if too much time necessary for return to idle, move dashpot away from throttle lever. *Always tighten locknut after each adjustment.*

STROMBERG WW 2-BARREL

Stromberg WW, Code 7-114A (364" Eng. Exc. Power Pack).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Idl Setting - 1½ turns out. Adjust both screws alike. Turn screws out for richer mixture.
Idl Speed - 525 RPM (575 RPM on Air Cond. cars) in "N".
Fl at L vel - 3/16" from top of float at center to top of float bowl (gasket removed) with needle seated. To adjust, bend float arm tang.
Acc l rating Pump - Install pump connector rod in center hole of throttle lever.
Fast Idl : With engine at normal operating temperature, rotate fast idle cam so fast idle screw fully contacts low step of cam at edge. Adjust fast idle screw to obtain engine speed of 625 RPM.
Aut matic Ch k Setting: Centered at index.
Thr ttl Linkag Adjustm nt: *See CARBURETOR above.*
►*OTHER DATA: See "Stromberg WW (Buick, Dodge, Plymouth) Carbur tors" in Carburetion Section.*

ROCHESTER 2GC 2-BARREL

R chester 2GC, N . 7019042 (364" Eng. Exc. Power Pack).
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr l fe ds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*
Idl S tting - 1½ turns open. Turn screws out for richer mixture.
Idl Sp d - 525 RPM (575 RPM on Air Cond. cars) in "N".
Fl at Level - 11/16" (Gauge BT-184) from air horn gasket to lower (sharp) edge of float seam at outer end of float with air horn inverted. To adjust, bend float arm at rear.
Fl at Dr p - 1 29/32" (Gauge BT-184) from air horn gasket to bottom of float with air horn upright and float hanging freely. To adjust, bend float tang.
Acc lerating Pump - No seasonal adjustment.
Fast Idl : No adjustment (will be correct when hot or slow idle correctly set).
Automatic Ch ke Setting: One notch rich.
Thr ttle Linkag Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "R chester 2GC 2-Barrel Carburetors" in Carbur ti n Section.*

CARTER AFB 4-BARREL

Cart r AFB. Used as follows:

Engin	Carter No.
364" (10.25-1 Power Pack)	3089S
401" (10.25-1 All)	3088S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*
►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.
Idl Setting - 3/4 turn open. Adjust both the screws (primary side only) alike. Turn screws out for richer mixture.
Idl Sp d - 525 RPM (575 RPM on Air Cond. cars) in "N".
Thr ttl Linkag Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter AFB 4-Barrel Carbur tors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

R ch ster 4GC, No. 7019040 (401" Engin).
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*
►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.
Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.
Idle Speed - 525 RPM (575 RPM on Air Cond. Cars) in "N".
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Rochester 4G & 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Type HE. No. 4706.
Pressure - 4¾-6½ lbs. at carburetor height.
Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Some Air Cond. cars have special filter with metering outlet in top and rubber hose for vapor fume return to gas tank.
►*FUEL FILTER NOTE:* Inspect every 1,000 miles, clean if necessary. Drain, clean bowl, and replace element every 5,000 miles.
►*FUEL FILTER ELEMENT REMOVAL CAUTION:* Turn thumbscrew to loosen bail by placing screwdriver in notch of thumbscrew and using bail as fulcrum. DO NOT ROTATE filter assembly on its threads.

Gasoline Gauge: AC electric type.
Dash Unit - AC No. 5643079 (4400, 4600), 5643424 (4700, 4800). *NOTE* - Gauge is a unit with printed circuit.

Tank Unit - AC. *NOTE* - Tank unit on early 4700, 4800 cars is "2-wire" type. *See diagram.*

AC Tank Unit No.

Model	Std. Car	Air Cond. Car
4400, 4600	5641447	5641448
4400 Sta. Wgn.	5641627	5641628
4700, 4800 Ⓒ	5641406	5641407

Ⓒ - "2-Wire" type. Later cars have "1-Wire" type (same as 4400, 4600 Series).

Air Cleaner: Oil wetted plastic foam type. Clean and reoil every 5,000 miles or sooner if needed.

►*AIR CLEANER INSTALLATION CAUTION (2-Bbl. Carb.):* Locate air cleaner with intake pointed about 45° to left of center line of engine and tighten wing nut by hand. On Pwr. Steering cars the intake will be located about 1 inch to rear of power steering pump.

►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from mesh support and wash in nonflammable solvent. Kerosene or Oleum Spirits may be used if fire hazard precautions are observed. Squeeze element (do not wring out) to remove all solvent and reoil with 10W-30 engine oil. Element should not drip oil.

BATTERY

Delc N . 562 (W t), N . 563 (Dry). 12 volt, 11 plate 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative to cylinder head.
Engine Ground - From rear of each cylinder head to dash.

STARTER

Delco-Remy No. 1107800 (364" Eng.), No. 1107876 (401" Eng.).
Armature - Delco-Remy No. 1935851 (4400 Ser. less Air Cond.), No. 1945688 (All Others).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. (1107876), 40 ozs. (1107800), minimum.

Performance Data - 1107800

Torque,	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107876

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid No. 1114279 (364" Eng.) No. 1114272 (401" Eng.), controlled by combination Ignition & Starter Switch (Key starting) No. 1116588.
Neutral Safety & Back-up Light Swifch (Auto. Trans.): Buick No. 1178138. Mounted on steering column under cowl. Connected in starter control circuit so that starter operates only when selector lever is in "N" or "P" Parking position.
Adjustment - *See "Buick (Twin Turbine) Dynaflow" in Transmission Section.*

GENERATOR

Delco-Remy No. 1102181 (Std.), No. 1102215 (Air Cond.).
Armature - Delco-Remy No. 1946719 (Std.), No. 1939837 (Air Cond.).
►*CHARGING CIRCUIT FUSE CAUTION:* Battery charging circuit protected by a 40 Amp. (Std. Regulator). 50 Amp. (Air Cond. Regulator) fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing battery, generator or regulator failure.

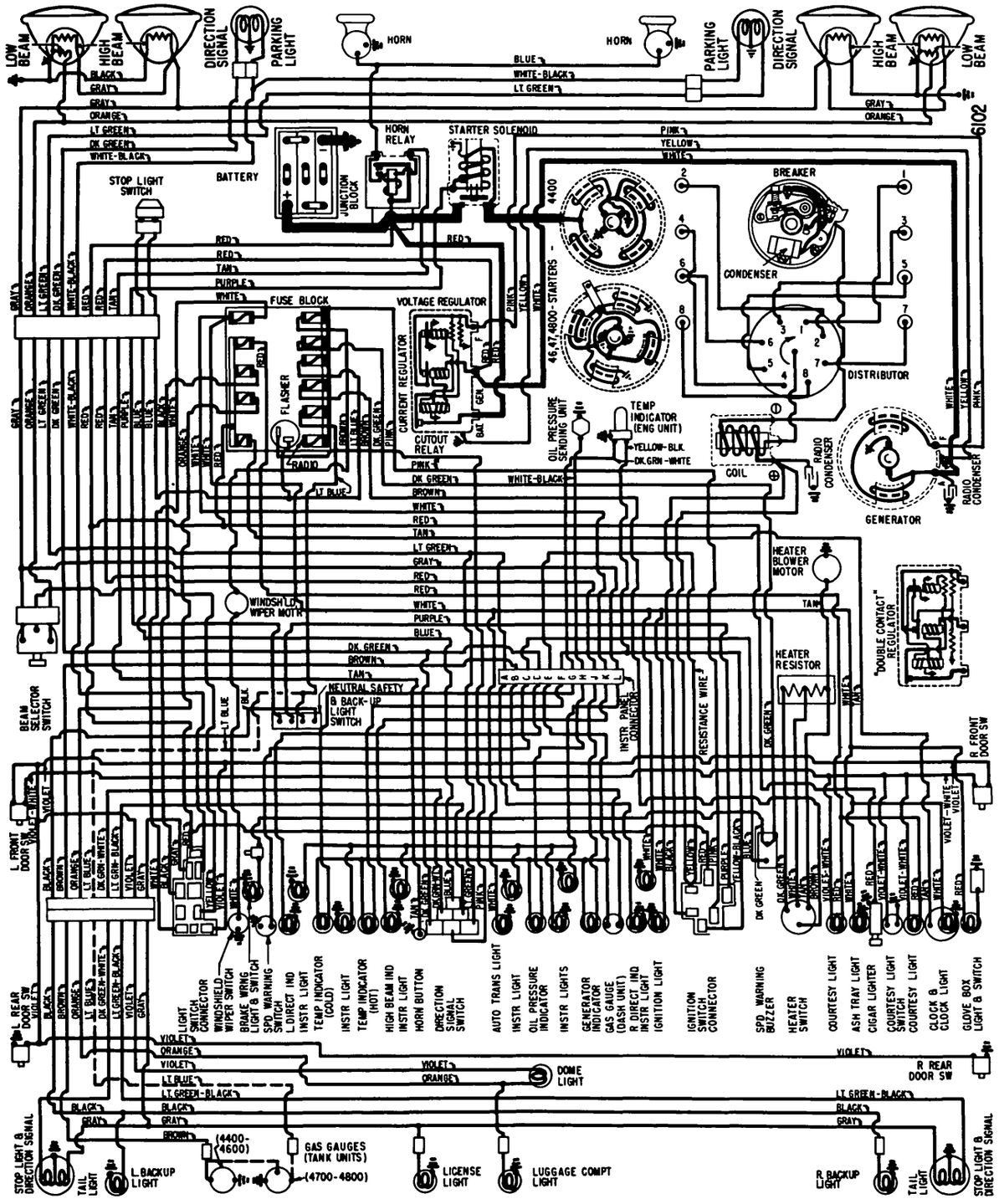
Performance Data

Generator	Amperes	Volts	RPM
1102181	35	14.0	2630
1102215	45	14.0	2400

Field Current - 1.69-1.79 Amps. (1102181), 2.66-2.86 Amps. (1102215) at 12 volts and 85°F.
Brush Spring Tension - 28 ozs.
Rotation - Counterclockwise at commutator end.

Belt Adjustment: Tension Gauge J-7316 should read "70" on Std. Cars midway between water pump and generator pulleys, "90" on Air Cond. Cars midway between water pump and compressor pulleys.

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GENERATOR REGULATOR

Delco-Remy No. 1119168 (Non Fuse), No. 1119277 (With Fuse) Std. Cars; No. 1119659 Air Cond. Cars.
NOTE - No. 1119659 is "Double Contact" type.

►*REGULATOR 1119168 & 1119277 ADJUSTMENT NOTE:* "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for voltage and current adjustment.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

NOTE - Specifications below are "Normal" settings.

Cutout Relay

Cuts In - 11.8-13.5 volts (1119168,227), 11.8-13.0 (1119659).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119168,227) - 13.8-14.7 volts at 125°F ambient ambient temperature.
Setting (1119659) - 13.8-14.6 volts at 125°F ambient temperature on upper contacts. .1-.3 volts lower, operating on lower contacts.
Contact Gap (1119659) - .016".
Air Gap - .075" (1119168,227), .067" (1119659) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119168,227) - 31.0-35.5 amps. at 125°F.
Setting (1119659) - 42.5-47.0 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy (Single Contact) Regulators" and "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

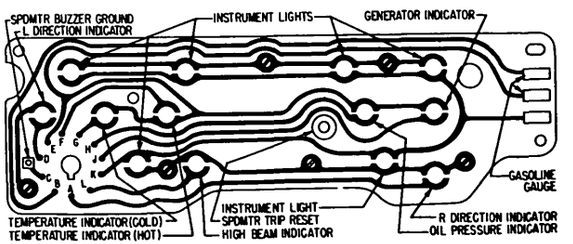
►*INSTRUMENT CLUSTER ASSEMBLY NOTE:* It is necessary to remove Instrument Cluster Assembly to replace printed circuit and fuel gauge. Light bulb sockets are accessible by lowering either right or left lower plate and are removed by turning bulb socket counterclockwise.

Instrument Cluster Assembly: Removal - 1) Remove Instrument panel screws (4 along front edge) and position mirror in its rearmost position.

2) Lift up cover and pull it toward rear of car to remove it, then disconnect clock wiring connectors.

3) Lower left control plate and disconnect printed circuit plug. *CAUTION* - Use care to prevent damaging pins on printed circuit.

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BUICK INSTRUMENT CLUSTER PRINTED CIRCUIT

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4) Remove knob and nut from end of speedometer reset shaft and unplug parking brake warning light socket (if used) from panel.

5) Remove three screws securing cluster to instrument panel and lift cluster up to disconnect speedometer cable and remove assembly.

►*PRINTED CIRCUIT REMOVAL CAUTION:* Safety Buzzer ground wire (if used) must be disconnected from pin on underside of printed circuit before removing printed circuit.

Installation - Reverse removal procedure aligning projection on disconnect plug with keyway when assembling plug on connector pins and be sure that ground clip is installed correctly.

Speedometer Removal: Speedometer can be removed from cluster assembly after assembly removed.

"Guid-Matic" Headlight Control: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery ground cable. Remove light switch and vent control plate to instrument panel screws and pull plate out from instrument panel. Unplug multiple connector and pull switch out to last notch, then depress latch button on top of switch as you draw rod and knob assembly out of switch. *CAUTION - DO NOT depress latch button prior to pulling on knob and rod.* Remove switch escutcheon with wrench J-8563, then remove nut with wide blade screwdriver. Remove switch plate.

CIRCUIT BREAKERS: 15 Ampere - Headlights & High Beam Indicator, Parking & Tail lights. In headlight switch. *NOTE - Tail lights also protected by 10 Amp. fuse in fuse block (see below).*

Special - Cigar lighter. On back of lighter.

FUSES: *NOTE - All fuses in fuse block mounted under instrument panel on left side.*

30 Amper - Heater Blower.
25 Amper - Windshield Wiper.
20 Amper - Dome & Trunk lights.
10 Amper - Tail lights. *Also protected by headlight switch circuit breaker (see above).*
10 Amper - Direction Signals & Stop lights.
10 Amper - Back-up lights & 4700 Series Gas Gauge Tank Unit lead.
7.5 Amper - Radio.
5 Amper - Map & Glove Box lights.
5 Amper - Brake Warning Light & Speed Warning Buzzer.
3 Amper - Instrument Panel Lights.
2 Amper - Clock.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: **Own.** 90°V8, valve-in-head. 364" & 401" engines of same design used previously.

Engin	Bor	Stroke	Displacement
364"	4.125"	3.4"	364 cu. ins.
401"	4.1875"	3.64"	401 cu. ins.

Engin	Compr. Rati	Rated HP	Developed HP
364" 2-Bbl. ①	9.0-1	54.45	235 at 4400 RPM
364" 2-Bbl. ②	10.25-1	54.45	250 at 4400 RPM
364" 4-Bbl. ③	10.25-1	54.45	300 at 4400 RPM
401" 4-Bbl.	10.25-1	56.11	325 at 4400 RPM

① - Regular Fuel Option. ② - Std. Engine.
③ - Power Pack

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel octane rating for satisfactory operation is 93 for Series 4400 (364" Eng.), 99 for Series 46, 47, 4800 (401" Eng.). If satisfactory fuel cannot be secured for 9.0-1 ratio engines, installation of .045" thick cylinder head gasket will improve performance. For all engines, lower compression ratio to 8.75-1 by using export pistons and head gaskets as listed below. *NOTE - Compression ratio for all export engines is 8.75-1.*

Engine	Piston	Head Gasket
364"	1388541	① 1185646 (.015")
401"	1388539	① 1185646 (.015")

① - All head gaskets are the same.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*

CYLINDER HEAD & GASKET: Cylinder heads are interchangeable between engines. All engines use a .015" cylinder head gasket and lower compression ratio used with Regular Gas Option, is obtained by use of lower dome height pistons. *See "Engine Operation in Low Octane Areas (Foreign Travel)" above.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Aluminum alloy, cam ground - transverse-slot, divorced skirt.

Clearance - .0008-.0014" (364"), .001-.0016" (401"). Measure clearance at right angle to piston pin ¼" below top of skirt.

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. and .001", .005", .010", .020" & .030" Oversize. *NOTE - Pistons furnished only with fitted pins.*

Installing Pistons: Install pistons and rods with valve depressions in head of piston on same side as oil spurt notch in lower end of rod. *See Rod Installation.*

PISTON PIN

Pin is press fit in connecting rod.

Diameter - .9994-.9997". **Length** - 3.520".

Clearance in Piston - .0001". Finger push fit.

Clearance in Rod - .0007-.0015". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.077-.078"	.015-.025"	.003-.005"
Oil	.181-.187"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE:* **364" Eng.** - Install both (identical) compression rings with inner bevel toward bottom of piston. **401" Eng.** - Install compression rings with side of ring up which is marked either with a dimple, a letter "T", a letter "O" or word "TOP". Top ring with inner bevel toward top of piston and second ring with inner bevel toward bottom of piston.

Replacement Rings: Furnished Std. and .010", .020", .030" Oversize.

CONNECTING ROD

Length - (361") 6.100", (401") 6.220" Center-to-center.

Crankpin Journal Diameter - 2.249-2.250". Out-of-round limit .0015".

Bearings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.

Clearance - .0002-.0023". Wear limit .003".

Sideplay - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020" and .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with spurt notch in lower end of rod and valve depressions in pistons on the high side of cylinder bore. This will bring all spurt notches and valve depressions in piston toward camshaft. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars): See "Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2.499". Five bearings. Out-of-round limit .0015".

Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE:* Bearing upper halves can be rotated out and in by using Tool KMO-734 in oil hole.

Clearance - .0005-.0021".

Replacement Bearings: Furnished Std. and .001", .002". .003" Undersize.

End Thrust: Taken by No. 5 (364"), No. 3 (401") main bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data.*

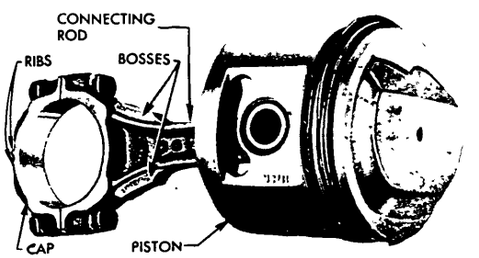
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

Camshaft Part No. 1196037 (4400 Series), No. 1185918 (Others).

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BUICK PISTON & ROD ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*CAMSHAFT SPROCKET NOTE:* Two types of die-cast nylon sprockets used on later cars. A thrust washer must be used with plain hub (1st. type) sprocket. Later type, Part No. 1350597, has raised thrust surface (no thrust washer required) and will be furnished as replacement on all 1957-61 cars.

Journal Diameters - (1) 1.785-1.786", (2) 1.755-1.756", (3) 1.725-1.726", (4) 1.695-1.696", (5) 1.665-1.666".

Bearings - Steel-backed babbitt lined bushings.

►*BEARING REPLACEMENT NOTE:* Camshaft bearings must be line reamed after being pressed into block.

Clearance - .0005-.0035". Service limit .0015-.004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .864", **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: "O" marks on camshaft and crankshaft sprockets in line with straightedge across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: None in service (Hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	①	4.785"
Exhaust	1.500"	②	4.785"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	③	⑤
Exhaust	45°	④	⑥

① - Top .373", Bottom .3715".
② - Top .372", Bottom .3705".
③ - .443" (364" Eng.) .439" (401" Eng.).
④ - .439" (364" Eng.), .441" (401" Eng.).
⑤ - (Top) .001-.003". (Bottom) .002-.004".
⑥ - (Top) .0015-.0035", (Bottom) .0025-.0045".

Valve Seat Width - 1/16" average (3/64-5/64").

►*VALVE GRINDING CAUTION:* Normal height of valve stem above rocker arm gasket surface is 1.540". When valve facing or seat grinding raises valve stem height more than .050" above normal, grind off end of valve stem or replace valve.

Valve Springs: Inner and outer springs used on all valves. Install with closed coils against cylinder head.

	Inner Spring		Outer Spring	
Valve	Lbs. Press.	Length	Lbs. Press.	Length
Closed	23-28	1.69"	39.5-44.5	1.60"
Open	73-79	1.25"	93-99	1.16"

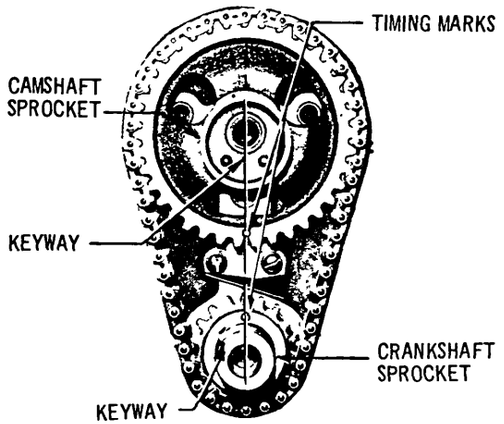
Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3..

Hydraulic Valve Lifters: Barrel type.

Diameter - .8425". **Clearance in Block** - .0015-.003".

Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*



BUICK VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

(364" Engine)

Intake Valves - Open 31° BTDC. Close 77° ALDC.
Exhaust Valves - Open 69° BLDC. Close 41° ATDC.

(401" Engine)

Intake Valves - Open 33° BTDC. Close 77° ALDC.
Exhaust Valves - Open 75° BLDC. Close 44° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. dry engine. Add 1 qt. for filter change.

Normal Oil Pressure; 40 lbs. at 1600 RPM.

Pressure Regulator Valve - In oil pump body. Not adjustalbe.

Oil Pressure Indicator: Oil pressure warning light on instrument panel and oil pressure switch in oil gallery at right rear of engine. Lights when oil pressure below a safe level.

Engine Unit - AC No. 1508753.

Oil Pump: Spur-gear type oil pump mounted at rear end of crankcase and driven by distributor drive shaft.

Oil Pump Removal & Overhaul - *See "Oiling System" in Buick Special Data.*

Oil Filter: AC full-flow type, mounted on right rear of engine. **Replace element every other oil change.** *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

►*OIL FILTER PRODUCTION CHANGE:* Larger and stronger welded hex Filter AC-PF-7 No. 5577410 used on later cars and for replacement of early filter AC-PF-5 Part No. 5575198.

Replacement Filter Element - AC-PF-5 (Early), AC-PF-7 (Later).

►*OIL FILTER INSTALLATION CAUTION:* DO NOT use a wrench to tighten filter. Tighten by hand until gasket contacts sealing face, then tighten an additional 2/3 turn. This supersedes previous installation instruction.

Crankcase Ventilation: Standard Cars - Air enters through two ventilating type filter caps at top of each rocker arm cover. Air is drawn out through metal gauze filled filter located at rear end of valve lifter cover and ventilator pipe extending down from lifter cover.

Positive Crankcase Ventilation Cars - Same as for standard cars except that ventilator pipe is removed and a vent tube adapter, valve assembly and hose is connected to intake manifold adapter. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Temperature Controlled Fan Clutch (AC Cars): Air Cond. cars equipped with 20" fan have a torque sensitive fan clutch. Flow of silicone (governing fan speed) controlled by temperature sensitive coil. When air through radiator is 80°F or below, fan speed is 800-1200 RPM. At higher temperatures speed of fan into a maximum of 2100 RPM.

Fan Clutch Adjustment - Normal position is in center slot of tab. For hotter fan cut-in, place spring end in right hand slot (facing engine). For colder fan cut-in place spring end in left hand slot (facing engine). To reposition spring, bend retaining tab just enough to move spring.

Water Capacity: 17 qts. Add 1½ qts. for heater.

Pressure Valve: Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Poppet type, located in water manifold above pump. Opens at 167-172°F.

Water Pump: Packless sealed ball bearing type with aluminum housing. *NOTE* - Shaft seal and impeller are the only replaceable parts.

See "Cooling System" in Buick Special Data.

Pump Removal - Drain cooling system. loosen belts, and remove fan blade, spacer, and pulleys from water pump hub on pump shaft. Remove belts. Disconnect hose from pump inlet and heater hose from nipple. Remove bolts, then remove pump assembly and gasket from timing chain cover.

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes out when engine temperature reaches 110°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 245°F. *NOTE* - Red light circuit is connected to Oil Pressure sender line through a vacuum switch so that the light will come on when ignition switch is turned on (this checks bulb and circuit each time engine is started). As soon as engine starts and manifold vacuum builds up, vacuum switch opens this circuit and red light will go out.

Engine Unit - AC No. 1998746.

LUBRICATION

TWIN-TURBINE AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type A. Suffix A.

Checking Fluid Level: Check with engine idling and transmission at normal operating temperature with selector lever in "P" (Park) position. Maintain fluid level on dipstick under hood on right side of engine between "Add Oil" and "Full" marks. Do not fill above "Full" mark. Use Automatic Transmission Fluid Type A, Suffix A. *NOTE* - One pint of fluid will raise level from "Add Oil" to "Full" mark.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*STARTING CAR BY PUSHING NOTE (AUTOMATIC TRANSMISSION CARS): Because of transmission design, car cannot be started by pushing.*

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Designation
Special (Standard)	4000
Special (Deluxe)	4100

SERIAL NUMBER: Stamped on left hand cowl-to-frame brace in engine compartment (Early Cars), on plate attached to left front door hinge pillar (Later Cars). This number also stamped on crankcase just forward of right cylinder head. Number (example below) includes identification data.

① ② ③ ④
0 H 1 001001

① - Series. **0** - 4000. **1** - 4100.
② - Year **H** - 1961.
③ - Assembly Plant. **1** - Flint. **2** - South Gate.
④ - Beginning vehicle number.

ENGINE NUMBER: Same as Serial Number above.

Engine Production Code No. Stamped on same surface of engine as Engine & Serial No. When viewed from front of engine, number is upside down. Standard compression engines have an "H" prefix. Low compression engines have a prefix "LH". *NOTE - ¼" dash following code number indicates .010" oversize cylinder bores.*

TUNE-UP

►*FUEL CONSUMPTION CORRECTION (Early Cars):* Caused by failure of distributor vacuum advance diaphragm. Later cars have improved vacuum advance unit.

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel): See note under Engine Specifications for recommended changes.*

COMPRESSION PRESSURE: 160 lbs. minimum (standard compression ratio) at normal cranking speed. Cylinders must be equal with 15 lbs.

VACUUM READING: 14" minimum at 525 RPM.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: None used. Intake manifold is heated by engine coolant.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 45FFS (Std. Eng.), AC No. 44FFS (Hi Perf. Eng.). Tighten to 20 ft. lbs. (Lubricated).14mm.

COIL: Delco-Remy 1115136.

Ignition Current - 1.7 amps. idling. 3.7 amps. stopped.

Resistor - Resistance wire (1.80±.05 ohms) connected in circuit from ignition switch to coil. Bypassed during cranking.

DISTRIBUTOR: Delco-Remy 1110977.

Condenser - Delco-Remy. **Capacity** .18-.23 mfd.

Breaker Gap - .013-.019". Gap will be correct when cam angle properly set.

Cam Angle - 28°-32°. Set to 30°.

Breaker Arm Spring Tension - 19-23 ounces.

Rotation - Clockwise when viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	525	0-4	1050
6.5-8.5	1050	13-17	2100
12-14	1850	24-28	3700

Vacuum Spark Control: Delco-Remy 1116182.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
8	16	14.5-15.75

IGNITION TIMING

Setting - As follows:

Std. Engine	①BTDC	RPM
All Trans.	7½°	1050
or ③	5°	400
Hi. Perf. Engines		
S.M. Trans.	7½°	1050
Auto. Trans.	②10°	1050
or ④	7½°	400

① - With vacuum line disconnected.
② - This supersedes previous specification of 7½°.
③ - 1050 RPM setting preferred. If 400 RPM setting used, idle speed must be reset after timing completed.
④ - For improved low speed operation. Idle speed must be reset after timing completed.

Timing Mark - Timing indicator on chain case cover marked "O" (TDC), "5" (5° BTDC), "10" (10° BTDC). Align correct mark with yellow paint filled groove on harmonic balancer.

CARBURETOR

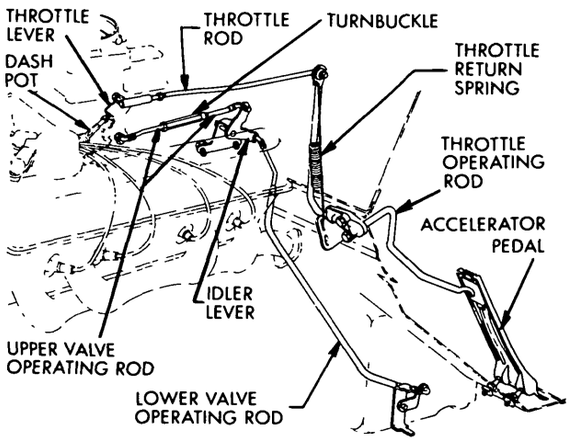
►*CARBURETOR APPLICATION: Rochester 2-Barrel Carb. (Std. Eng.), 4-Barrel Carb. (Hi Perf. Eng.).*

►*CARBURETOR THROTTLE LEVER BIND CORRECTION:* Loosen upper bearing block bolt and insert a paper shim (.010") and retighten bolt. If not corrected, remove both blocks and remove all burrs or tool marks from operating lever and reassemble.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed Cyls. 2-3-5-8.*

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Move throttle lever to wide open position and make sure carburetor-to-transmission linkage does not prevent throttle from opening completely. *NOTE - If throttle does not open completely, adjust carburetor-to-transmission linkage (see below).* Disconnect rear end of throttle rod from throttle operating lever, then with accelerator pedal pressed firmly against floor mat, hold throttle in wide open position and hold rear end of throttle rod at hole in throttle operating lever. **Rod end must be approximately 1/16" short of entering hole in lever.** Adjust rod length as necessary, then connect rod to lever and secure with cotter pin. With accelerator pedal pressed to floor mat, recheck throttle for wide open position.

TRANSMISSION LINKAGE ADJUSTMENT (AUTO. TRANS.): Hold throttle in wide open position, check adjustment by pushing transmission idler lever fully forward (through detent). Linkage should have all play just taken out, but not adjusted so short that stop in transmission prevents carburetor from reaching wide open throttle. When throttle does not reach wide open position **lengthen** rod by rotating turnbuckle. When there is any play in linkage, **shorten** rod. Tighten jam nut and recheck linkage operation. *CAUTION* - Never drive car with linkage misadjusted or disconnected as line pressure will be too low and result in burnt clutches.



AUTO. TRANS. THROTTLE LINKAGE

ROCHESTER 2GC 2-BARREL

Rochester 2GC No. 7019093 (Synchro-mesh); No. 7019090 (Auto. Trans.).

Idle Setting - 1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.

Idle Speed - 525 RPM (575 RPM Air Cond. Cars) with transmission selector lever in Neutral or Park position.

Float Level - With air horn assembly inverted, position Float Level Gauge J-9161-1 (1 17/64") over float so it rests against pump side of power piston shaft, with outer leg in line with center of float. To adjust, bend float arms.

Float Drop - Hold air horn assembly upright and measure distance from gasket to bottom of float pontoon at outer end. The distance should be 1 29/32". To adjust, bend tang on float arm.

Fast Idle - Fast idle speed will be correctly set if slow (hot) idle speed is properly adjusted.

Accelerating Pump - Install rod in outer hole. *CAUTION* - Inner hole is not to be used under any circumstances.

Automatic Choke Setting: Centered on index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7020045 (Synchro-mesh), No. 7020043 (Auto. Trans.).

►*IDLE COMPENSATOR CAUTION:* Idle compensator

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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(thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or other suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike.

Idle Speed - 525 RPM (575 RPM on Air Cond. Cars) with selector lever in Neutral or Park Position.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Type HQ. No. 4827.

Pressure - 4½-5¾ lbs. at pump outlet.

Fuel Line Filter: Located in fuel line between fuel pump and carburetor. *NOTE* - Woven plastic filter located at lower end of fuel pick-up pipe in gas tank.

►*FUEL LINE FILTER ELEMENT REMOVAL CAUTION:* Turn thumbscrew to loosen bail by placing screwdriver in notch of thumbscrew and using bail as fulcrum. DO NOT rotate filter assembly on its threads.

►*FUEL FILTER NOTE:* To clean, remove glass bowl and soak bowl in cleaning solvent to loosen any deposits. Replace element (AC type GF-124) every 5000 miles, or more frequently when contamination has entered fuel system.

Gasoline Gauge: AC electric type.

Dash Unit - AC No. 5643354.

Tank Unit - AC No. 5641760 (exc. Air Cond.), 5641818 (Air Cond. Cars).

Air Cleaner: Oil wetted plastic foam type. Clean and reoil every 5,000 miles or sooner if needed.

►*AIR CLEANER INSTALLATION CAUTION:* No locating tabs used. Install air cleaner on carburetor and securely tighten wing nut **by hand.** The word "FRONT" must be located on the forward center line of engine.

►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from mesh support and wash in nonflammable solvent. Kerosene or Oleum Spirts may be used if fire hazard precautions are observed. Squeeze element (do not wring out) to remove all solvent and reoil with 10W-30 engine oil. Element should not drip oil.

BATTERY

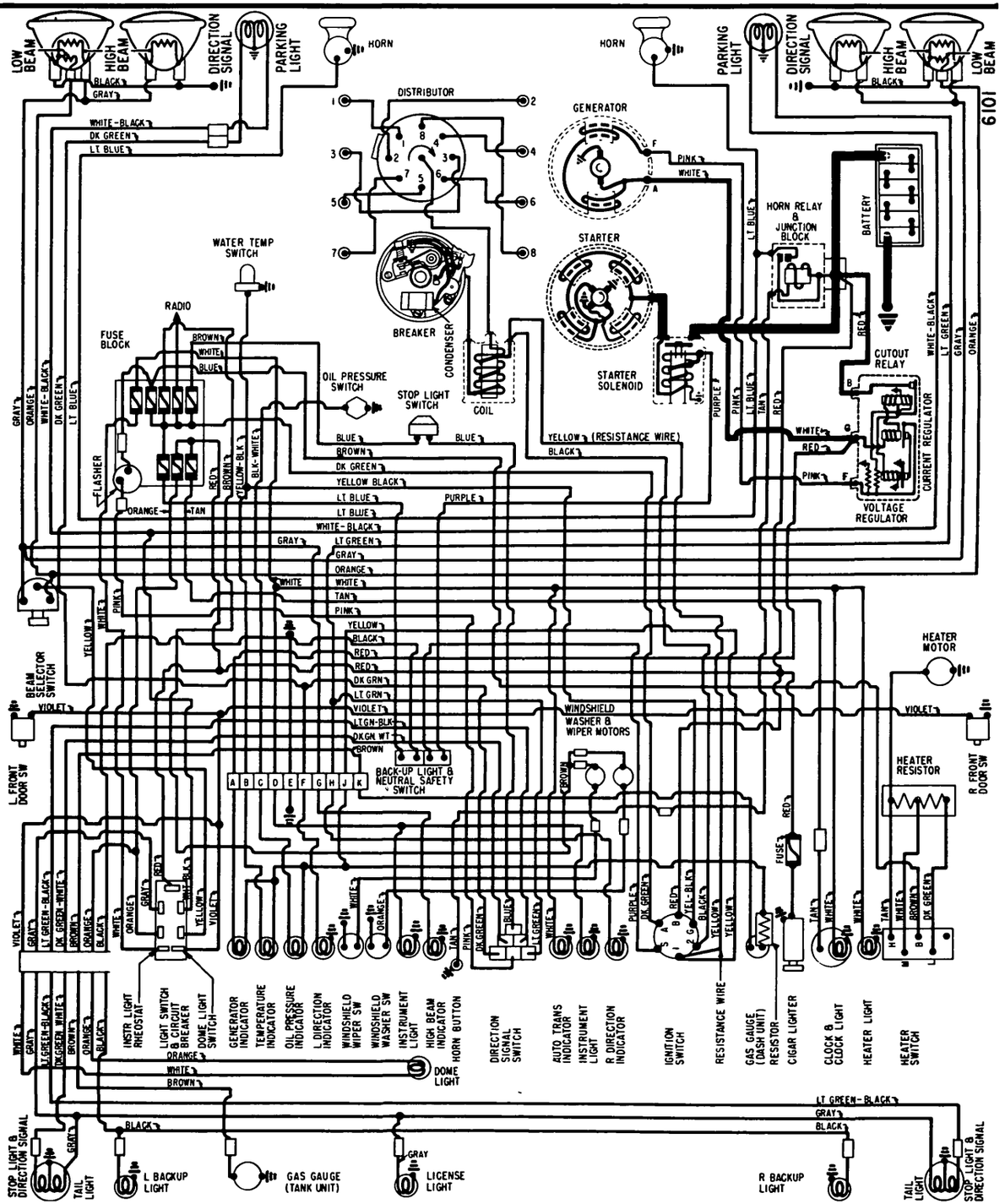
Delco-Remy No. 454 (Wet), No. 455 (Dry). 12 volt, 9 plate, 40 ampere hour capacity (20 hr rate).

Battery Ground - Negative, to Cylinder head bolt.

►*BATTERY GROUND CABLE PRODUCTION CHANGE:* Later cable has a No. 14 wire at battery terminal end connected to horn and junction block bracket by the bracket mounting screw. This wire properly grounds wiper motor and prevents burning out of voltage regulator should body ground strap be broken.

Engine Ground - Engine to dash ground strap at rear end of right cylinder head and dash. An additional ground strap from front suspension crossmember to frame crossmember at front suspension mount (under grille at front of car) is used.

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STARTER

Delco-Remy No. 1108303.
Armature - Delco-Remy No. 1935829.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. min.

Performance Data

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

℄ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid No. 1114266, mounted on starter and controlled by combination Ignition & Starter Switch Delco-Remy No. 1116588.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1347209 (without Back-up Lights), No. 1349888 (with Back-up Lights) mounted on steering column under cowl. Connected in starter control circuit so that starter operates only when selector lever is in "N" or "P" position.

Adjustment - *See "Buick Special Automatic Transmission" in Transmission Section.*

GENERATOR

Delco-Remy No. 1100389 & 393 (Early Cars without Air Cond.); 1102235 (Oth rs).
Armature - Delco-Remy No. 1948005 (1102235 Gen.), No. 1951267 (1100389 & 393 Gen.).

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit protected by a 40 amp. fuse clipped to "BAT" terminal of generator. Check for blown fuse when diagnosing battery, generator or regulator failure.*

►*GENERATOR & EXHAUST MANIFOLD PRODUCTION CHANGE:* To improve low speed output, a 1" longer generator used on later cars. The right exhaust manifold boss was shortened 1" to accommodate the longer generator. Both the 11" Part No. 1100389 & 1100393 and the 12" Part No. 1102235 generators will be furnished but only the later type manifold. Use a Generator Spacer Part No. 1348889 and bolt No. 9417281 when installing an 11" generator with later type manifold.

Performance Data

Generator	Amperes	Volts	RPM
1100389 & 393	35	14.0	2670
1102235	35	14.0	2630

Field Current - 1.69-1.79 amps. at 12 volts and 80°F.
Brush Spring Tension - 28 ozs.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: Tension reading on Gauge J-7316 should be 60 lbs. when placed midway between generator and water pump pulleys.

GENERATOR REGULATOR

Delco-Remy 1119277.

►*REGULATOR ADJUSTMENT NOTE:* "Post Type" design with nylon adjusting nuts above Voltage & Current Regulator units for voltage and current adjustment.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

NOTE - Specifications below are "Normal" settings.

Cut out Relay
Cuts In - 11.8-13.5 volts.
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator
Setting - 13.8-14.7 volts at 125°F ambient temperature.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Current Regulator
Setting - 31.0-35.5 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy (Single Contact) Regulators" in Electrical Section.*

ALTERNATOR & REGULATOR

Delco-Remy Alternator No. 1117070 with Transistorized Regulator No. 9000554 and separately mounted Field Relay No. 1116895.
Rated Output - 60 amperes (hot) - 58 amperes at 14 volts and 2500 RPM (Cold - 70°F).
Rotation - Clockwise at drive end.

►*OTHER DATA: See "Delco-Remy (Internal Rectifier) ►Alternators & Transistorized Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT CLUSTER ASSEMBLY NOTE:* This assembly is made of plastic and contains speedometer, indicator lights, fuel gauge, light switch, wiper & washer switch, ignition & starter switch and lighter. It is necessary to remove instrument cluster to remove printed circuit which is a part of speedometer housing. Light bulbs are accessible without removing cluster by turning sockets counterclockwise. An external ground is used for lights, switches and lighter. *CAUTION* - Disconnect battery ground cable at battery before removing any instrument panel unit or wiring.

Instrument Cluster Assembly: Removal - 1) Install two pieces of cloth tape 1" wide x 4" long (double thickness) over lower flange of instrument panel to prevent damage to harness.

2) Remove cluster hood, then remove two nuts from under panel that retain cluster at each side. Remove two lower edge of cluster to instrument panel tie bar screws.

3) Disconnect wiring harness connectors from headlight switch, windshield wiper switch, ignition switch and lighter. Disconnect speedometer cable and printed circuit plug.

4) Remove cluster by pulling rearward and upward.

Installation - Reverse removal procedure being careful to line up disconnect plug with keyway in printed circuit when assembling plug on connector pins.

Speedometer Removal: Remove Instrument Cluster Assembly, see above, then remove speedometer from cluster.

Lighting Switch Removal: Disconnect battery ground cable, unplug multiple connector from switch. Pull switch out to last notch and depress loaded latch button on left side of switch while pulling rod and knob assembly out of switch. Remove switch escutcheon with wrench J-8563 and remove switch from instrument panel.

CIRCUIT BREAKERS: 15 Ampere. Headlight & Front Parking Lights. In headlight switch.

FUSES: All fuses in fuse block mounted under instrument panel on left side.
25 Ampere - Wiper & Washer motor.
20 Ampere - Direction Signal, Signal Indicator & Stop Lights.
20 Ampere - Heater, Air Cond. Blower & Compressor Clutch.
9 Ampere - Back-up Lights.
9 Ampere - Tail, License & Dome Lights.
4 Ampere - Radio.
3 Ampere - Panel Lights & Rheostat.
2 Ampere - Clock.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. Cylinder block is Aluminum (with cast-in cylinder liners). Cylinder head is also Aluminum.

Series	Bore	Stroke	Displacement
4000, 4100	3.5"	2.80"	215 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
Standard	8.8-1	39.2	155 at 4600 RPM
Hi-Perf.	10.25-1	39.2	185 at 4800 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE SERVICE NOTE:* For Aluminum Engine *Service Cautions see ENGINE in Buick Special Data.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel octane rating (research method) for satisfactory operation is 93. If satisfactory fuel cannot be obtained, compression ratio can be decreased to 7.6-1 by installing export pistons, Part No. 1389596. Fuel of 83 octane (research method) may be used with engine having the lower compression ratio.

►*OIL PAN PRODUCTION CHANGE & CAUTION:* Later type oil pan does **not** have oil baffles and the drain plug has been moved rearward. A different oil screen housing pipe and flange used and a different oil gauge rod. Only second type oil pan will be furnished. When installing late type oil pan on early engine, also change oil screen housing pipe and gauge rod to later type.

OIL PAN REMOVAL: Drain oil and remove steering idler arm bracket-to-crossmember attaching bolts, then remove lower flywheel housing. Remove oil pan bolts and lower pan enough to remove oil pump pipe and screen-to-cylinder block bolts. Rotate crankshaft for maximum clearance of forward end of oil pan. Move front of pan to right and lower pan through opening between crossmember and steering intermediate shaft.

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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PISTONS

Aluminum alloy, cam ground, transverse slot, divorced skirt.

Clearance - .001-.0015" measured as follows: **On piston,** ¼" below oil ring groove at right angles to piston pin. **In bore,** at right angles to crankshaft 1½-2" from top of cylinder bore. Piston and bore should be at same temperature.

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. & .010" Oversize.

Installing Pistons: Pistons may be installed on rods in either direction. Piston pins are not offset and pistons are concentric. *See Rod Installation.*

PISTON PIN

Pin is pressed fit on connecting rod.

Diameter - .8747-.8750". **Length** - 2.870".

Clearance in Piston - .0001" select. At 70°F.

Clearance in Rod - .0005-.0013". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

Replacement Pins: Furnished in Std. size only.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.077-.078"	.010-.020"	.003-.005"
Oil (3)	.181-.187"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE: Install both rings with identification mark up.*

Replacement Rings: Furnished Std. & .010" Oversize.

CONNECTING ROD

Length - 5.660" (Center to Center).

Crankpin Journal Diameter - 2.000".

Bearings - Steel backed Durex 100A. Precision type.

Clearance - .0002-.0022".

Side Play - .006-.014" (Total both rods).

Replacement Bearings: Furnished Std., .001", .002", .010", .020", .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with boss on rod and cap **forward** (right hand cylinders), **rearward** (left hand cylinders) with oil spurt hole upward.

CRANKSHAFT

Journal Diameter - 2.2983". Five bearings.

Bearings - Steel backed Durex 100A. Precision type. Bearing halves are not alike and not interchangeable in cap and crankcase. Front two and rear two assemblies are identical, center bearing flanged for end thrust control. *CAUTION - Ends extend slightly beyond parting surface to fit tightly and not turn. DO NOT FILE FLUSH WITH PARTING SURFACE.*

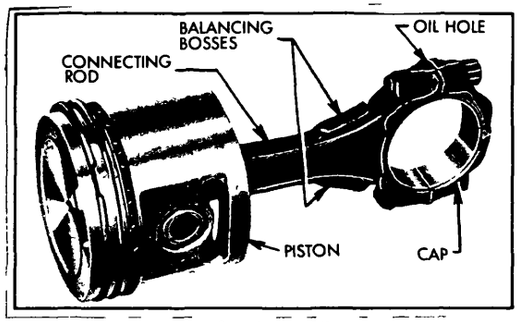
Clearance - .0005-.0021".

Replacement Bearings: Furnished Std., .001", .002", .003", .010" Undersize.

End Thrust: Taken by center No. 3 main bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*



PISTON & ROD ASSEMBLY

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

Journal Diameters - 1) 1.785-1.786". 2) 1.755-1.756". 3) 1.725-1.726". 4) 1.695-1.696". 5) 1.665-1.666".

Bearings - Steel backed babbitt. *NOTE* - Bearings must be line reamed after installation.

Clearance - .0005-.0035". Wear limit .0015-.004".

Endplay - .004-.008".

Timing Chain: Link belt. **Width** - .875". **Pitch** - .375". **Length** - 54 links.

Camshaft Setting: "O" marks on camshaft and crankshaft sprockets adjacent and in line across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: *None in service (hydraulic).*

Valve	Head Diam.	Stem Diam.	Length
Intake	1.500"	①	4.605"
Exhaust	1.3125"	③	4.605"

	Seat Angle	Lift	Stem Clearance
Intake	45°	.383"	②
Exhaust	45°	.383"	④

① - .3412" (top), .3407" (bottom).
② - .0005-.0025" (top), .0015-.0035" (bottom).
③ - .3407" (top), .3397" (bottom).
④ - .001-.003" (top), .002-.004" (bottom).

Valve Seat Width - 1/16-5/64" (all valves).

►*VALVE SEAT NOTE: Seats are "Sintered Iron" shrunk fit at time of assembly and are not replaceable.*

►*VALVE GRINDING CAUTION:* Normal height of valve stem above valve spring seat surface is 1.825". Grind off stem or replace valve when stem is raised more than .050" above normal.

Valve Springs: Single valve spring used (no inner spring or damper). Install with closed coil end toward cylinder head.

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	64	1.640"
Open	168	1.260"

Valve Guides: Drive out old guide from combustion chamber side with Tool J-267. Lubricate and install new guide with Tool J-8813. Tool will bottom when guide properly installed. *NOTE* - Service guides are .001" larger outside diameter for good fit in aluminum head. Ream valve guides to correct size after installation with Reamer J-8814.

Hydraulic Valve Lifters: Barrel type.

►*HYDRAULIC VALVE LIFTER PRODUCTION CHANGE:* Lifter body has a longer oil groove on later type and incorporates a spring loaded ball check valve. Later types are identified by a copper plated retaining ring. **Diameter** - .8422-.8427". **Clearance in Block** - .0015-.003".

Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

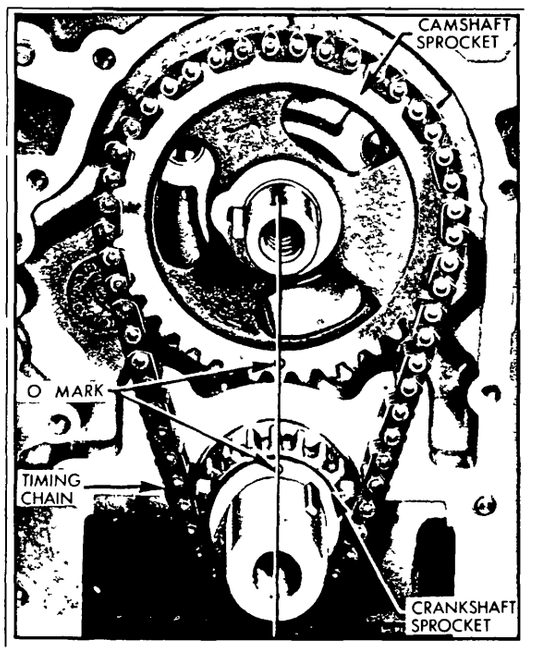
See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 29° BTDC, Close 71° ATDC.

Exhaust Valves - Open 67° BLDC, Close 33° ATDC.

CONTINUED ON NEXT PAGE



VALVE TIMING MARKS

S INDEXES on Pgs. 4 to 9 for complet CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcase Capacity: 4 qts. (refill), 5 qts. (dry). Add 1 qt. with filter change.

Normal Oil Pressure: 33 lbs. at 2400 RPM.

Pressure Regulator Valve - In oil pump cover. *NOTE* - Regulator relief valve cap not drilled for pressure indicator switch. Switch located in bypass valve cap.

Oil Pressure Indicator: Oil pressure indicator light in Instrument Cluster controlled by oil pressure switch in cap of oil bypass valve in oil pump cover. Lights when ignition turned on and goes out when oil pressure reaches a safe level.

Engine Unit - AC No. 1194214.

Oil Pump: Spur gear type, mounted in engine front cover and driven by distributor drive shaft.

Oil Pump Overhaul - *See "Oiling System" in Buick Special Data.*

Oil Filter: AC full-flow type, mounted on oil pump cover at right front of engine. Replace element every 4,000 miles. *NOTE* - Bypass valve in oil pump cover bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

►*OIL FILTER PRODUCTION CHANGE:* Larger and stronger molded hex Filter AC-PF-7 Part No. 5577410 used on later cars and for replacement of early filter (AC-PF-5 Part No. 5575198).

Replacement Filter Element - AC-PF-5 (Early), AC-PF-7 (Later).

►*OIL FILTER INSTALLATION CAUTION:* DO NOT use a wrench to tighten filter. Tighten by hand until gasket contacts sealing face, then tighten an additional 2/3 turn. This supersedes previous instructions.

Crankcase Ventilation: Standard Cars - Air is drawn in through a ventilation cap in left rocker arm cover and drawn out through right rocker arm cover vent pipe, past a baffle that prevents oil being exhausted through vent pipe. Vent pipe extends down from lifter cover.

Positive Crankcase Ventilation Cars - Same as above, except that right rocker arm vent is connected by hose directly to plate located between carburetor and intake manifold. A spring loaded check valve is used to restrict ventilation system flow whenever intake manifold vacuum is high. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 12 qts. Add 1½ qts. for heater.

Pressure Valve: Radiator filler cap. 15 lbs. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Pellet type, located in forward (outlet) end of intake manifold. Opens at 167-172°F.

Water Pump: Packless sealed ball bearing type with aluminum housing. *NOTE* - Shaft seal and impeller are the only replaceable parts.

See "Cooling System" in Buick Special Data.

Pump Removal - 1) Drain cooling system, loosen belts and remove fan blade and pulleys from hub on water pump shaft and remove belts.

2) Disconnect hose from water pump inlet and heater hose from nipple. Remove water pump-to-timing chain cover bolts and remove pump.

Temperature Indicator: Temperature indicator light in Instrument Cluster controlled by water temperature switch in intake manifold. Bulb will light when starter switch turned on(grounded circuit) to test bulb, and when water temperature reaches 248°F (indicating cooling system not functioning properly).

Engine Unit - AC No. 1993518.

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check transmission fluid level every 1000 miles with transmission at normal operating temperature. Drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type A, Suffix A.

Checking Fluid Level: With engine idling and selector lever in "P" (Park) position, check fluid level on dipstick in filler pipe in engine compartment on right side. If oil level below "Add" mark, add sufficient fluid to bring level to "Full" mark on dipstick. Use only Automatic Transmission Fluid Type A, Suffix A.

Capacity - Approximately 5 pts. (transmission only), 13 pints (transmission and converter).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	Ft. Lbs.
Cylinder Head	65-85
Intake Manifold Bolts	25-35
Intake Manifold Nuts	20-30
Exhaust Manifold	30-35
Oil Pan Screws & Nuts	6-12
Main Bearing Caps	80-105
Vibration Damper	100-120
Connecting Rod Caps	40-50
Camshaft Sprocket	15-20
Rocker Arm Cover Ⓒ	20-30 inch-lbs.
Engine Front Cover	5-15
Water Pump	25-30
Oil Pump	25-35
Flywheel Housing Plate - Lower	10-20
Flywheel Housing to Crankcase	40-50
Flex Plate to Crankshaft	65-85
Engine Front Mount Stud Nut	50-100
Engine Front Mount to Cushion	25-30
Engine Rear Mount Cushion Retainer	50-60
Engine Rear Mount Cushion to Crossmember	50-60
Engine Rear Mount Crossmember to Frame	25-30

Ⓒ - Retorque after running engine.

ENGINE

ENGINE REMOVAL (WITH TRANSMISSION): *CAUTION - Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.* Proceed as follows:

1) Drain cooling system, crankcase and transmission. Remove hood top panel, disconnect battery and wires from generator. Remove upper and lower radiator hoses **and remove radiator core. Remove fan and vibration dampener and loosen distributor.**

2) Disconnect power steering pump to valve body hoses at pump and install caps on fittings to prevent oil leakage. Disconnect refrigerant lines, see Caution above. Disconnect all heater hoses at water pump, power brake vacuum line at intake manifold. Remove carburetor air cleaner, disconnect carburetor linkage and fittings and remove carburetor.

3) Remove transmission linkage slush deflector and disconnect throttle valve levers and speedometer cable at transmission. Disconnect flexible fuel line at steel fuel line and engine to cowl ground straps, primary wire at coil, oil pressure and cooling system temperature switch wires. Remove coil and disconnect wire to porcelain resistor.

4) Remove two center-bearing-support to frame bolts (Nuts are tack welded and should remain fastened to support), "U"-bolts and locks at rear axle pinion, slide propeller shaft and front yoke off transmission mainshaft and through frame tunnel section. DO NOT nick yoke. Remove intermediate support.

5) Remove wires from starter and disconnect exhaust pipe at exhaust manifolds. Disconnect front motor support screws at frame idler arm support screws from frame and lower idler arm and steering connecting link.

6) Install rope or chain around intake manifold, attach **hoist and take weight off engine supports. Disconnect and remove rear engin support bracket from frame and extension housing. Lift engine with transmission ut**

CYLINDER HEAD & MANIFOLD

CYLINDER HEAD REMOVAL: There are six lengths of cylinder head screws used. Carefully note length and position of each cylinder head screw for correct reinstallation.

CYLINDER HEAD INSTALLATION: Use a Torque Wrench and tighten cylinder head capscrews starting from the center row of bolts and working outward and toward each end

Cylinder Head Gasket -Install with side stamped "Top" UP

Tightening Torque - See Tightening (Torque Wrench) Specifications.

ORIGINAL BORE & PISTONS

ORIGINAL PRODUCTION ENGINE BORE & PISTON SIZES: Piston and cylinder bore size indicated by a letter ("A" through "M", 10 sizes), stamped on top face of block either to right or left of each cylinder bore. Sizes range from 4.0000-4.0002" to 4.0018-4.0020" (Cylinder Size), 3.9985-3.9987" to 4.0003-4.0005" (Piston Size). Only "L" and "M" piston sizes available for service. *NOTE* - An "AA" indicates .010" oversize over letter "A" for example: 4.0100-4.0102" (Cylinder Size), 4.0085-4.0087" (Piston Size).

PISTONS

FITTING NEW PISTONS: Pistons should be fitted by Micrometer Gauge Method or Feeler Gauge Method as described below. Piston skirt clearance is .0015" at top of skirt, and .000" at bottom (with proper allowance for temperature variation).

Feeler Gauge Method:—Use ½" feeler stock .002", .0025", or .003" thick (see Feeler Gauge Note and table below) on side of piston directly over "T" slot (center feeler on slot) with lower rounded end of feeler extending ½" down on piston skirt past horizontal slot (feeler must not extend further down on piston skirt because skirt is tapered with greater diameter at bottom). Install piston and feeler in cylinder with piston right side up and feeler toward side, measure pull required to withdraw feeler. Pull will vary in accordance with thickness of feeler gauge used and with piston temperature. See table below for correct pull for each feeler gauge thickness to obtain proper skirt clearance listed above.

Feeler Pull	Piston Clearance (70°F.)		
(In lbs.)	.002" Feeler	.0025" Feeler	.003" Feeler
1	.00225"	.00275"	.00326"
2	.002"	.00252"	.00304"
3	.00175"	.00228"	.0028"
4	.0015"	.00205"	.00258"
5	.00125"	.00182"	.00235"
6	.001"	.00157"	.00213"
7	.00075"	.00133"	.0019"

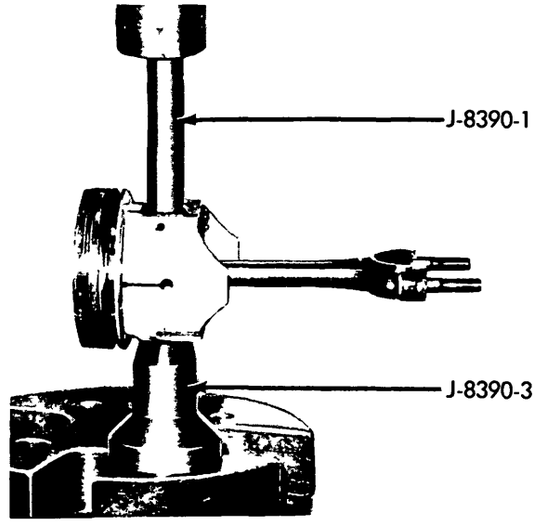
PISTON PINS

PISTON PIN FITTING: *NOTE* - Special Tool J-8390 is required to fit pins to connecting rods. See following for removal & installation:

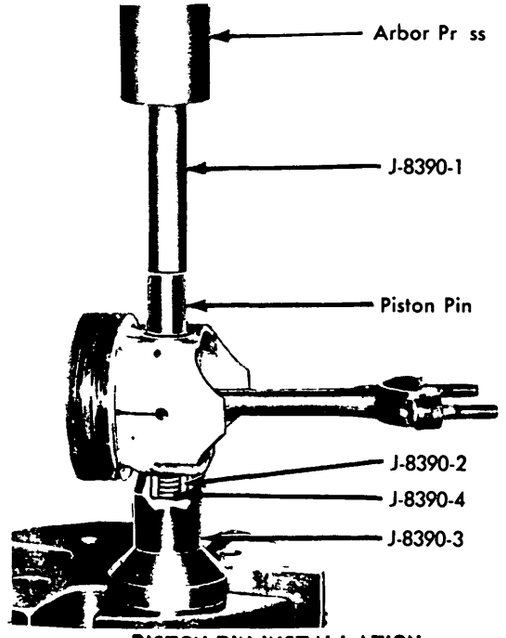
Removal - Place Piston Pin Support J-8390-3 on arbor press and place piston assembly on support with "REAR" mark resting on support. Insert pilot end of Remover J-8390-1 into piston pin and press pin out of piston. *NOTE* - Keep pins in order for reinstallation.

Installati n - Lubricate piston pin and holes in piston, place Support J-8390-3 on press with Spring J-8390-4 and Spacer J-8390-2 in position on support. Place connecting rod on its respective piston with "REAR" mark on piston toward rear of engine with number on lower end of rod down. *NOTE* - Nos. 1,3,5,7 are in left bank, 2,4,6,8 in right bank. Place assembly on Support and place pin in piston. Place Pin Remover & Installer J-8390-1 on piston pin and press pin in until it bottoms on spacer in Support.

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PISTON PIN REMOVAL



PISTON PIN INSTALLATION

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CRANKSHAFT & MAIN BEARINGS

CRANKSHAFT REMOVAL (Engine in Car): Place stands under car at all four wheels. Remove timing chain and sprockets. Remove transmission and flywheel flex plate. Remove steering gear idler arm from right frame side bar and lower steering linkage to floor. Remove oil pan, oil pan baffle and oil pump. Remove spark plugs, disconnect connecting rods and push piston assemblies up into cylinder bores. Remove front and rear main bearing caps support crankshaft at front and rear and remove three remaining bearing caps Lower crankshaft.

REAR MAIN BEARING OIL SEAL: Raise car on stands and remove oil pan, oil baffle and oil pump. Remove rear main bearing cap and discard seal. Remove and discard upper seal from cylinder block. *NOTE* - Grooves in bearing cap and cylinder block must be clean, dry and free from burrs. Upper and lower seal are identical. **Upper Half Installation** - Start seal in groove in block and rotate seal into position. Press firmly on both ends so it protrudes evenly on each side.

Lower Half Installation - Install lower half in cap with lip facing forward and one end of seal over ridge and flush with split line. Hold this end from slipping and push seal into position with pressure on other end. Seal must be pressed down firmly and protrude uniformly on each side. *NOTE* - DO NOT apply pressure on lip. Coat surface of cap and block with .010" thick film of rubber cement but do not get cement on seal lip or bearing surface. Lubricate lip of seal with thin film of engine oil.

►*REAR MAIN BEARING INSTALLATION CAUTION:* For proper alignment of thrust surfaces of rear main bearing proceed as follows: Install upper and lower inserts in block and bearing cap. With rear oil seal in place and mating surfaces clean, install bearing cap and tighten screws to 1-2 ft. lbs. torque. Using a plastic hammer, drive crankshaft forward, then rearward, then forward again (*CAUTION* - Pound on counterweights, not on connecting rods). Tighten bolts evenly to specifications. Check to make sure crankshaft is not binding.

CAMSHAFT & BEARINGS

CAMSHAFT REMOVAL: Remove Air Conditioner Condenser, *see "Air Conditioning" in Miscellaneous Section.* Remove radiator, timing chain and sprockets and remove valve lifters. Remove fuel pump and fuel pump pushrod. Slide camshaft forward carefully out of engine. *CAUTION* - DO NOT scratch camshaft bearings with camshaft lobes.

Camshaft Bushing Removal & Installation: Use Bearing Remover & Installer Tool J-3063 to pull old bushings out. Install new bushings with same tool and see that oil holes in bushing line up with oil holes in block (check oil leads with piece of wire after tool removed).

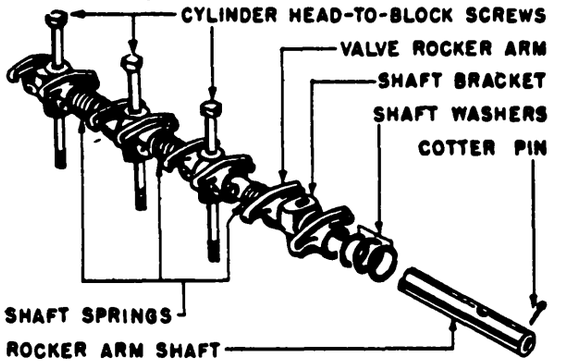
Camshaft Installation: Lower camshaft into position between radiator grille and engine and guide it carefully into cylinder block. Be sure distributor is timed correctly when inserting camshaft. Reverse removal procedure.

VALVE SYSTEM

ROCKER ARMS

ROCKER ARM ASSEMBLY: Remove rocker arm covers. Remove secondary wiring and distributor cap as an assembly. Remove four cylinder head cap screws which hold rocker arm assembly to cylinder head and remove rocker arm assembly.

Disassembly & Reassembly: See illustration for correct order of parts. Parts can be removed from shaft by removing cotter pin at end.



CADILLAC ROCKER ARM ASSEMBLY

Installation: Install rocker arm assembly in position on cylinder head with notches on each end of rocker shaft pointing downward and toward center of engine, and rocker arm brackets with larger machined surface next to head. Install four cylinder head screws and tighten to specifications. Install rocker arm covers and secondary wiring with distributor cap assembly. Tighten cover screws to specifications.

HYDRAULIC LIFTERS

VALVE LIFTERS: Hydraulic, Barrel Type. Consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (See illustration). Oil is introduced to this unit from main oil gallery through hole in side of lifter plunger and body.

Testing Leak Down Rate (On Engine): *NOTE - Procedure below requires use of Lifter Leak Down Rate Tester J-3074 which is designed for this purpose.* 1) On Air Cond. Cars, remove rear bracket and loosen generator. Remove resistor wire from porcelain resistor at coil. Remove distributor cap, coil, and rocker arm covers. Set timing at "C" mark and observe position of distributor rotor. Check each lifter as outlined in the following table:

With rotor at No. 1 firing position (pointing toward rear of engine), check each lifter as shown in (2) below.

No. 1 Intake	No. 3 Exhaust	No. 6 Exhaust
No. 1 Exhaust	No. 4 Exhaust	No. 7 Intake
No. 2 Intake	No. 5 Intake	No. 8 Intake
No. 2 Exhaust	No. 6 Intake	No. 8 Exhaust

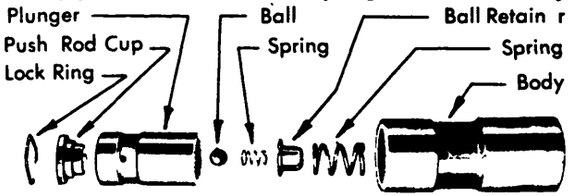
Rotate crankshaft one complete turn and with rotor at No. 6 firing position (pointing toward front of engine) check:

No. 3 Intake	No. 5 Exhaust
No. 4 Intake	No. 7 Exhaust

2) Insert feeler gauge of tool between valve stem and rocker arm, at the same time compress the tool "pop-out" spring against the valve spring retainer. *NOTE* - Tool should be installed as quickly as possible to avoid any unnecessary leak down of lifter. Note the interval of time during which tool is held in place by valve spring pressure. It will be found through this test that noisy lifter or lifters will have the shortest leak down time.

Removal - Pushrod holes in cylinder block enlarged to permit removal of valve lifters without removing intake manifold. Remove rocker arm assembly and pushrods, then remove lifters with mechanical finger or magnet attached to long rod.

Disassembly: Press down on center of valve lifter pushrod cup, and with pointed tool remove lockwire from groove. Invert lifter and slide out pushrod cup, plunger, ball, snap spring, ball retainer and spring. *NOTE* - If plunger is stuck in body, place lifter, pushrod end down, in Valve Plunger Remover Tool J-4160. Holding tool firmly in hand with thumb over lifter body, strike tool sharply on block of wood until plunger falls out of body.



HYDRAULIC VALVE LIFTER

Cleaning & Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or indentations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: Place ball on its seat in lower end of plunger while holding plunger upside down. Place small spring on ball. Position ball retainer over ball and end of plunger. Move retainer up and down to be sure spring is in working order. Place spring over ball retainer. Lower lifter body over plunger assembly on an angle to seat spring. If necessary probe with a small wire through oil hole to allow assembly to be seated. Turn assembly right side up and fill plunger with clean engine oil. Jiggle ball with a small piece of wire until oil drains out of plunger into body and trapped air is released from body. Refill plunger with oil and place push rod cup on plunger. Position lock wire over cup. Using Valve Lifter Lock Wire Installer J-2730, press lock wire into groove.

OILING SYSTEM

ENGINE LUBRICATION

ENGINE LUBRICATION: Force feed type of lubrication with oil supplied under pressure to crankshaft, connecting rod, and camshaft bearings, valve lifters, rocker arm bearings and metered to upper rocker arms for pushrod surface and valve lubrication. Oil is sup-

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plied from rear main bearing for lubrication of oil pump drive shaft. All other moving parts of engine are lubricated by gravity flow or splash. See "Engine Oil Flow" diagram.

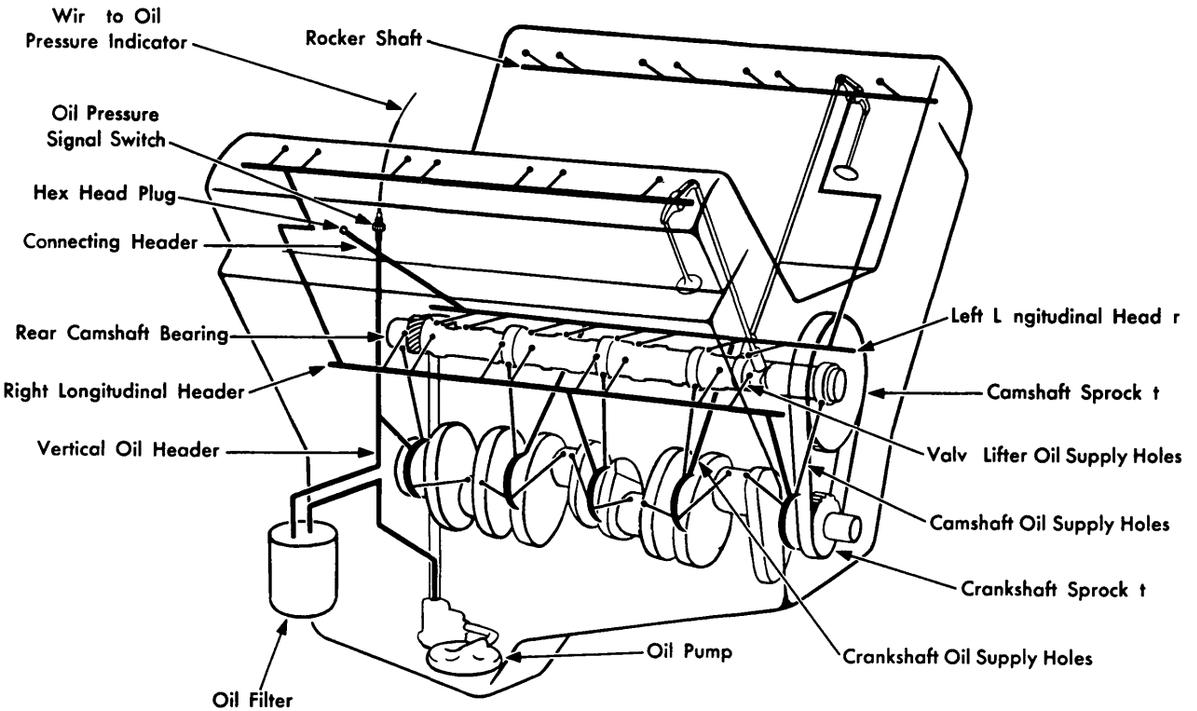
OP ERATION: Gear type oil pump mounted on rear main bearing cap (driven by distributor drive shaft) draws oil through a screened intake floating on oil in crankcase and delivers it through full flow oil filter and to vertical oil header which feeds rear main bearing. This header delivers oil to an intersecting Right Longitudinal Header and through a connecting header, to the Left Longitudinal Header. Upper end of vertical header is plugged. Rear end of right longitudinal header supplies oil through cylinder block and head to right rocker arm shaft, left longitudinal header supplies oil at front end through cylinder block to left rocker arm shaft. Oil from cylinder heads drains back directly to crankcase through left front and both rear holes in each cylinder head. The hole in front end of right cylinder head drains oil back through head and matching hole in block to engine front cover for lubrication of timing chain and sprockets. A drilled hole at rear of valve lifter compartment returns lifter compartment excess oil to crankcase.

Crankshaft, Connecting Rods & Pistons - Vertical header at rear main bearing supplies oil to rear main bearing. The right longitudinal header supplies oil to the front and center main bearings. The left longitudinal header supplies oil to the two intermediate main bearings. Drilled passages in crankshaft supply oil from main bearing journal to connecting rod journal for connecting rod bearing lubrication. Oil is forced out groove in connecting rod bearing cap against cylinder walls for piston lubrication. Piston pins receive oil through drilled passage in piston.

Camshaft, Sprockets and Lifters - Rear camshaft bearing is supplied oil from the connecting header. All other camshaft bearings receive oil from drilled passages in block from respective main bearing. Oil pressure switch is screwed into upper end of connecting header. Drain back hole in front end of right cylinder head returns surplus oil to engine front cover for timing chain and sprocket lubrication. Each longitudinal header supplies oil through drilled passages in block to its respective bank of valve lifters.

R cker Arms, Valves & Pushrods - Oil is supplied to rocker arm shaft on right bank from rear end of right longitudinal header through a vertical branch in cylinder block and head. The left rocker arm shaft is supplied through a vertical branch in cylinder block and head at front end of left longitudinal header. Rocker arm shafts are plugged at each end. One hole in bottom of rocker arm shaft intersects a 45° groove and supplies oil evenly under loaded area of each rocker arm. The other hole is mismatched with an angular passage in the arm and meters oil to the pushrod end of the arm for lubrication of the pushrod surface in the arm. From this point oil flows down to the opposite end of the arm for valve tip lubrication.

OIL FILTER: Full Flow Type - Mounted on pad on right rear side of crankcase. Oil inlet (from pump) and outlet (to engine oiling system) channels are located in mounting pad and filter mounting bracket.



CADILLAC ENGINE OILING SYSTEM

OIL PUMP

Oil Pump Specifications-Backlash between drive gears - .008-.012". Clearance drive shaft to pump body - .0010-.0025", wear limit .005". Clearance pump body to gears - .003-.005", wear limits .005". Endplay in pump gears - .001-.004", wear limit .006".

Pressure Regulator Specifications - Clearance valve plunger and housing - .0020-.0035" wear limits .005". **Spring Free Length** - 2.65". **Spring Pressure** - 5.28-5.78 lbs. at 1.443".

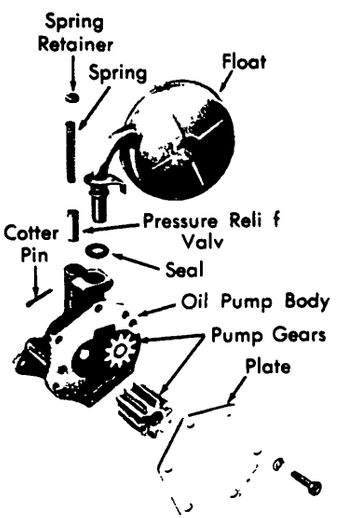
OIL PUMP REMOVAL: Remove oil pan, oil pan baffle and two nuts holding oil pump to rear main bearing cap and remove oil pump, oil float, and screen assembly.

Disassembly: Remove cotter pin securing float to pump body and remove float and felt seal. Remove cotter pin securing oil pressure regulator valve spring and spring retainer in body and remove valve and spring. *NOTE* - DO NOT lose retainer when removing cotter pin. Unlock and remove six cover plate to housing screws and remove plate. Slide idler gear off idler shaft in pump and press collar off drive shaft. Slide pump drive gear out of pump body.

Inspection: Inspect strainer screen for dirt and float for leaks and check float connection seal. *NOTE* - A leaky float will produce air bubble when dipped in water. Inspect oil pressure regulator valve for nicks and burrs. Check free length of regulator valve spring. Inspect drive gear and idler gear for nicks and burrs.

Ass mbly: Install oil pump drive gear in oil pump body. Press collar on end of shaft and slide idler gear into pump body meshing gear with drive gear. Install oil pump cover plate and secure screws with new locks. Slide regulator valve, spring, and spring retainer into pump body and install cotter pin. Check that seal is located correctly.

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OIL PUMP ASSEMBLY

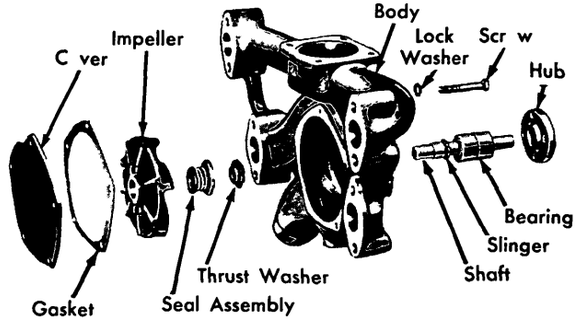
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Installation: Install oil pump drive shaft. Place pump assembly over studs so drive shaft does not bind against block and install two nuts and lockwashers and tighten to specifications.

COOLING SYSTEM

WATER PUMP REMOVAL: Non-Air Conditioned Cars - Remove air cleaner, drain cooling system, and disconnect all hoses from water pump. Remove steering pump and generator belts. Disconnect throttle return spring, disconnect steering pump bracket and move pump and bracket to one side (do not disconnect hoses). Remove water pump attaching screws and remove pump and fan.

Air Conditioned Cars - Remove air cleaner, drain cooling system and disconnect all hoses from water pump. Remove all belts. Remove fan, fan clutch, and pulley. Remove fan shroud. Move power steering pump and bracket to one side (do not disconnect hoses). Remove water pump-to-cylinder block screws which also hold Freon compressor front mounting bracket to water pump flanges. Remove compressor front mounting bracket-to-cylinder head screw. Remove water pump attaching screws and remove pump.



WATER PUMP ASSEMBLY

Disassembly: Remove thermostat housing, thermostat, fan blade assembly, cover plate and gasket. With Impeller Puller J-3211 remove impeller. Remove seal, dampener, and seal washer assembly from body. Remove hub, shaft, slinger, and bearing assembly with an arbor press.

Inspection: Check impeller blades for improper clearance, or excessive wear, and spring-loaded seal for wear and cracks. Check shaft bearing for roughness or excessive endplay. Refinish seal surface with Refinisher Tool No. J-8957 to remove scratches or nicks.

Reassembly: Press new bearing, shaft, and slinger assembly in body with Shaft Installer & Hub Spacer Tool No. J-3249, supporting housing on Fixture J-6855-1. Install washer and seal assembly over driving lugs of slinger (washer should slide freely). Press impeller on shaft until outer face is .005-.010" below face of pump (use straightedge and feeler). Press hub on shaft until it is flush with top of shaft. *NOTE - On Air Cond. Cars, insert a .094" Hub Spacer Shim, Tool J-6855-2 inside Tool J-3249 and proceed as follows:* Place .160" Hub Spacer, Tool J-3249-3 on bottom of Hub Installer, place assembly on hub and shaft and press until tool bottoms on shaft. Install cover and gasket. Check shaft for free operation and impeller for proper clearance. Install pulley and fan assembly. Install thermostat and housing and tighten housing screws to 10-12 ft. lbs. *CAUTION - Thermostat spring strap must be parallel to centerline of car (fore & aft).*

Installation: Reverse removal procedure. Run engine and check for leaks.

►*JACKING & HOISTING (ALL MODELS): Before jacking, hoisting, towing or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING: Car CANNOT be started by pushing because of transmission design.*

►*PARKING BRAKE VACUUM RELEASE CAUTION: Before working on engine with engine running and car in gear, disconnect vacuum supply hose from right hand connector of vacuum switch on neutral safety switch and tape switch opening closed.*

MODEL IDENTIFICATION

ENGINE SERIAL NUMBER: Stamped on lower left hand side of cylinder block between two welch plugs just above edge of oil pan, and on top of frame on left hand side member just behind radiator. *NOTE* - Number (example below) includes identification data as follows:

① ② ③
61 L 000001

① - Year model - 1961.
② - Body Code - *See Series Designation Table below.*
③ - Beginning Engine Serial Number.

Series Designation

Series	Body Style	Body Code
60	6039 Sedans, Sixty Special	M
62	6229 Sedan, 6-Window	K
62	6237 Coupe	G
62	6239 Sedan, 4-Window	A
62	6267 Convertible	F
62	6299 Sedan, Short Deck	C
62	6329 Sedan DeVille, 6-Window	L
62	6337 Coupe DeVille	J
62	6339 Sedan DeVille, 4-Window	B
62	6367 Eldorado Biarritz Convertible	E
75	6723 Sedan, 9-Pass	R
75	6733 Limousine, 9-Pass.	S
CC	6890 Comm. Chassis	Z

Engine Unit Number: Stamped on bell housing portion of crankcase behind left hand cylinder block directly above cast rib. *NOTE* - "L.C." after unit number indicates low compression engine. Mark * following unit number indicates .010" oversize cylinder bore and pistons.

Body Style	Engine Unit Prefix
6039; 6229,37,39,67,99; 6329,37,39,67 (Less AC)	16X
6039; 6229,37,39,67,99; 6329,37,39,67(With AC)	16K
6723,33; 6890 (Less AC)	17X
6723,33; 6890 (With AC)	17K

TUNE-UP

►*VALVE NOISE CORRECTION:* May be diagnosed as engine valve train noise but may be caused by noisy manifold heat control valve. *See "Manifold Heat Control" below.*

COMPRESSION PRESSURE: 165-185 lbs. (Cranking speed), 212-230 lbs. (1000 RPM) with throttle wide open. Maximum variation between highest and lowest cylinders should be not more than 20 lbs.

VALVE TAPPET CLEARANCE: None. Hydr. lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Valve diverts exhaust gases of left hand cylinder bank through carburetor heating passages in intake manifold to right hand exhaust system during warm-up.

►*VALVE NOISE CORRECTION:* May be diagnosed as engine valve train noise but may be caused by noisy manifold heat control valve. To check, hold heat control valve weight stationary while engine is running. If noise stops, replace heat control valve assembly with Part No. 3631814. Do not attempt to repair valve.

CRANKCASE VENTILATION VALVE: Check condition of valve before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs - AC No. 44. 14mm. Torque to 20-30 ft. lbs.
COIL: Delco-Remy No. 1115134 (Service Replacement).
Ignition Current - 1.25 amps. idling.

►*IGNITION COIL NOTE:* Identified by Brown Bakelite Insulator. DO NOT use these higher inductance coils and 1.35 ohm ignition feed harness on 1959 and earlier cars.

DISTRIBUTOR: Delco-Remy 1110932. "Window" type.

►*DISTRIBUTOR VACUUM DIAPHRAGM FAILURE CORRECTION & PRODUCTION CHANGE:* Improved vacuum diaphragm installed in production at approximately Engine No. 050869 to prevent diaphragm failure. Later units marked "M" stamped on mounting bracket. To correct failure on early cars, install new assembly.

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.
Contact Point Set - Delco-Remy 1931988.
Breaker Gap - Breaker gap will be correct (.016") when cam angle correctly set.
Cam Angle - 28-32°. Set to 30°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-1½	400	0-3	800
2½-4	600	5-8	1200
5-7	1400	10-14	2800
7-9	2000	14-18	4000

Vacuum Spark Control: Delco-Remy 1116149.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
11¼	21-24	13.25-15.25

IGNITION TIMING

Setting - 5° BTDC.

►*SETTING NOTE:* When fuel of 100 octane rating or better is not available, retard setting toward "C" mark to eliminate detonation.

Timing - Disconnect vacuum line to distributor (tape pipe). Adjust timing with engine idling at 480 RPM.
Timing Marks - Timing indicator on chain case cover and harmonic balancer marked "C", "5" and "10". "5" & "10" are degrees ahead of "C" mark (TDC).

CARBURETOR

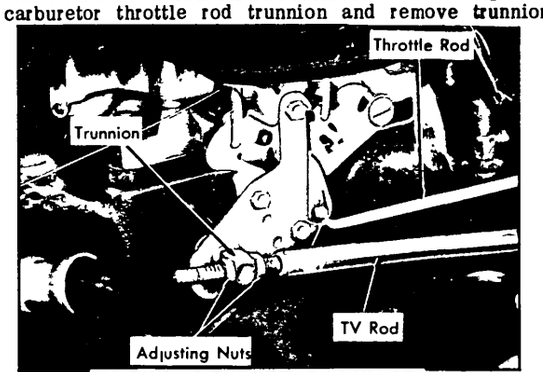
►*CARBURETOR APPLICATION: Carter Rochester 4-Barrel carburetors used.*

►*CARBURETOR NOTE:* On cars with Postive Crankcase Ventilator Unit, check Ventilator Unit before servicing carburetor for carburetion difficulties.

Idle Speed-Up Control Adjustment (Cars With Air Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air conditioner "ON" and place transmission selector lever in "N" position. Adjust engine idle speed to 900-950 RPM by loosening locknut on diaphragm shaft and turning nut to obtain specified RPM. Tighten locknut.

Throttle Return Check Adjustment: Allow engine to idle and make sure that throttle check plunger is not in contact with throttle relay lever. Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out. Let throttle snap shut and observe delay caused by throttle check. If engine races, throttle check plunger is too long. If engine stalls, plunger is too short. Adjust screw on relay lever as necessary. Clearance between throttle return check plunger and relay with engine running should be approximately .190".

THROTTLE LINKAGE ADJUSTMENT: Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash). Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket. With engine running, set throttle lever to hot idle position (Air Conditioner turned "OFF"). Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip. Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop. Bring front jam nut on throttle valve rod against trunnion until all slack is taken up. **Then tighten nut 3 full turns.** Tighten rear jam nut.

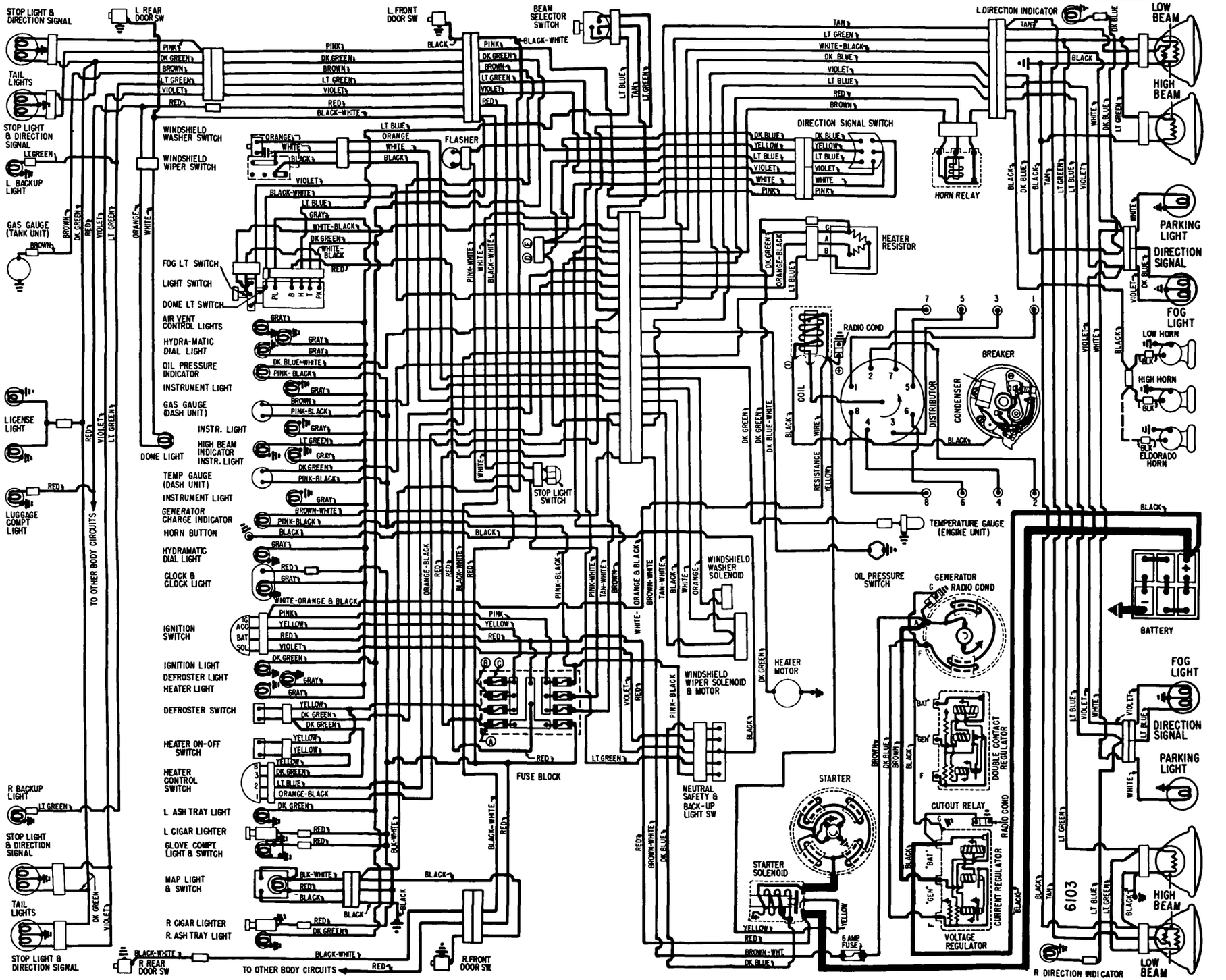


CADILLAC THROTTLE LINKAGE ADJUSTMENT POINTS

Accelerator Pedal Height Adjustment - Install ¼" drill shank in gauging hole in dash relay bracket and relay lever. Remove cotter key from trunnion on inner side of accelerator pedal arm and remove trunnion from arm. Adjust trunnion up or down as required to obtain wide open throttle with pedal fully depressed. Assemble linkage, install slush deflector and remove drill shank.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.


STOP LIGHT & DIRECTION SIGNAL
L REAR DOOR SW
L FRONT DOOR SW
BEAM SELECTOR SWITCH
L DIRECTION INDICATOR
LOW BEAM
HIGH BEAM
TAIL LIGHTS
STOP LIGHT & DIRECTION SIGNAL
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
WINDSHIELD WASHER SWITCH
WINDSHIELD WIPER SWITCH
FLASHER
DIRECTION SIGNAL SWITCH
HORN RELAY
HEATER RESISTOR
PARKING LIGHT
DIRECTION SIGNAL
FOG LIGHT
FOG LT SWITCH
LIGHT SWITCH
DOME LT SWITCH
AIR VENT CONTROL LIGHTS
HYDRA-MATIC DIAL LIGHT
OIL PRESSURE INDICATOR
INSTRUMENT LIGHT
GAS GAUGE (DASH UNIT)
INSTR. LIGHT
HIGH BEAM INDICATOR INSTR. LIGHT
TEMP GAUGE (DASH UNIT)
INSTRUMENT LIGHT
GENERATOR CHARGE INDICATOR
HORN BUTTON
HYDRAMATIC DIAL LIGHT
CLOCK & CLOCK LIGHT
IGNITION SWITCH
IGNITION LIGHT
DEFROSTER LIGHT
HEATER LIGHT
DEFROSTER SWITCH
HEATER ON-OFF SWITCH
HEATER CONTROL SWITCH
L ASH TRAY LIGHT
L CIGAR LIGHTER
GLOVE COMPT LIGHT & SWITCH
MAP LIGHT & SWITCH
R CIGAR LIGHTER
R ASH TRAY LIGHT
DOME LIGHT
LOW HORN
HIGH HORN
ELDORADO HORN
RADIO COND
COIL
DISTRIBUTOR
CONDENSER
BREAKER
RESISTANCE WIRE
STOP LIGHT SWITCH
TEMPERATURE GAUGE (ENGINE UNIT)
OIL PRESSURE SWITCH
GENERATOR
BATTERY
WINDSHIELD WASHER SOLENOID
HEATER MOTOR
WINDSHIELD WIPER SOLENOID & MOTOR
NEUTRAL SAFETY & BACK-UP LIGHT SW
FUSE BLOCK
STARTER
STARTER SOLENOID
6 AMP FUSE
DOUBLE CONTACT REGULATOR
CUTOUT RELAY
CURRENT REGULATOR
VOLTAGE REGULATOR
LICENSE LIGHT
LUGGAGE COMPT LIGHT
R BACKUP LIGHT
TO OTHER BODY CIRCUITS
R REAR DOOR SW
R FRONT DOOR SW
R DIRECTION INDICATOR
6103

CONTINUED FROM PRECEDING PAGE

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7019030 (Std.), 7019031 (Air Cond.):
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*
►*IDLE ADJUSTMENT NOTE: See "Parking Brake Vacuum Release Caution" above.* Hose must be disconnected and vacuum fitting taped.
►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed at slow idle.
►*HARD STARTING CORRECTION (Cars With Rochester Carb.):* May be caused by choke valve sticking. *See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*
Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Rochester 4GC-4-Barrel Carburetors" on Pg. 89.*
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB 3177S (Std.), 3178S (Air Cond.).
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed 2-3-5-8, LEFT barrels feed 1-4-6-7.*
►*IDLE ADJUSTMENT NOTE: See "Parking Brake Vacuum Release Caution" above.* Disconnecting hose at this location eliminates vacuum leakage at neutral switch while making idle mixture calibration.
►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed at slow idle.
Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 713. Fuel only.
Pressure - 5¼-6½ lbs. at idling speed.

Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Air Conditioned cars have special filter and orificed passages for returning fuel vapors to fuel tank.

WIRING DIAGRAM LEGEND

Ⓐ - Trunk Lid Lock circuit feed.
Ⓑ - Radio Antenna Motor Feed.
Ⓒ - Radio Feed.
Ⓓ - Instr. Panel Right Direction Indicator (when used).
Ⓔ - Instr. Panel Left Direction Indicator (when used).

Gasolin Gaug : AC electric type.
Dash Unit - AC No. 5640177 (exc. Comml. Chassis), 5643115 (Comml. Chassis).

Tank Unit - AC. Used as follows:

Model	Std. Car	Air Cond. Car
All (exc. below)	5640177	5640325
Sedan (Short Deck)	5641601	5641602
Comml. Chassis	1598929	

Air Cleaner: Replaceable oil-wetted Polyurethane Foam element type. Replace element every 30,000 miles.
►*CAUTION: Element should NOT be washed, oiled, tapped, or blown out with compressed air.*

Cruise Control: Automatic speed control and warning device. *See "Speed Controls" in Carburetion Section.*

BATTERY

Delco No. 562. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Engine to dash.

STARTER

Delco-Remy No. 1107799. Armature - No. 1950563.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 40 ozs. minimum.

Performance Data

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.6	65-100
②	Lock	3.5	300-360

① - Includes Solenoid. ② - Armature locked.

Starting Switch: Delco-Remy Solenoid Switch No. 1119910 mounted on starter and controlled by Ignition & Starter Switch Delco-Remy No. 1116594 (Series 75 & CC), No. 1116595 (Others).
Neutral Safety Switch: Combination Neutral Safety & Backup Light Switch mounted on steering column. Delco-Remy No. 1993560. *Supersedes previous numbers.*
Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows:

Series	Generator	Armature
60, 62 Std. ①	⑤ 1102170	1946719
60, 62 Air Cond. ②	⑥ 1102141	1939837
60, 62 Std. ③	⑦ 1102245	1946719
60, 62 Air Cond. ④	⑦ 1102246	1939837
75, CC ②	⑥ 1102141	1939837
75, CC ④	⑦ 1102246	1939837

① - Before Engine No. 049925.
② - Before Engine No. 049993.
③ - After Engine No. 049924.
④ - After Engine No. 049992.
⑤ - Replacement Generator without Fan & Pulley 1102168.
⑥ - Replacement Generator without Fan & Pulley 1102091.
⑦ - With Fan & Pulley.

Performance Data

Generator	Amperes	Volts	RPM
1102170, 1102245	35	14.0	2630
1102141, 1102246	45	14.0	2520

Rotati n - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Fi ld Curr nt - 1.69-1.79 amps. (1102170, 1102245), 2.66-2.86 amps. (1102141, 1102246) at 12 volts and 80°F.
B lt Adjustment: Use Universal Belt Tensioner J-7316 as follows: With tool midway between pulleys, tension should be 45-60 lbs. (used belt), 90 lbs. (new belt). Adjust by loosening belt tension adjusting screw and moving generator as required. Tighten tension adjusting screw to 15-20 ft. lbs.

GENERATOR REGULATOR

Delco-Remy No. 1119002 or 1119168 (Std. Gen.), N . 1119601 (Air Cond. & Series 75, CC Gen.) *NOTE - Regulator 1119601 is "Double Contact" type.*
►*NOTE: Specifications below are "Normal" settings.*

Cutout R lay

Cuts In - 11.8-13.5 volts (1119002, 168), 11.8-13.0 volts (1119601).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage R gulator

Setting (1119002, 168) - 13.8-14.7 volts at 125°F ambient temperature.
Setting (1119601) - 13.8-14.6 volts at 125°F ambient temperature when operating on upper contacts. .1-.3 volts lower when operating on lower contacts.
Contact Gap (1119601) - .016".
Air Gap - .075" (1119002, 168), .067" (1119601) with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Single Contact Regulators" or "D lco-R my 1119600 Series Double Contact R gulators" in Electrical Section.*

Current R gulator

Setting (1119002, 168) - 31.0-35.5 amps. at 125°F.
Setting (1119601) - 42.5-47.0 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.
Checking & Adjusting - *See "Delco-Remy 1119000 Series Single Contact Regulators" or "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

ALTERNATOR & REGULATOR

Alternator: Delco-Remy No. 1117082. Three phase type with internal rectifiers.
Rated Output - 60 amperes (hot) - 58 amperes at 14.0 volts and 2500 RPM.
Rotation - Clockwise at drive end.
Regulator: Delco-Remy No. 9000554. Transistorized two-unit type containing Voltage Regulator and Indicator Light Relay. Regulator is used with separately mounted Field Relay, Delco-Remy No. 1116895.
►*OTHER DATA: See "Delco-R my (Internal Rectifier) Alternators & Transistorized Regulators" in Electrical Section.*

MISC. ELECTRICAL

Instrument Panel & Cluster Rem val (1961 Seri s 60, 62):1) Upper Panel Cover - Disconnect battery and remove six screws holding upper panel cover to lower panel. Raise upper panel and disconnect multiple connector for map light and Guide-Matic. Unhook upper cover hooks from cowl retainers and remove cover.

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2) Instrument Cluster - Remove upper panel cover (see above) and disconnect odometer reset cable from lower instrument panel flange, and speedometer cable from speedometer head. Disconnect all wires from rear of cluster. Disconnect both lighting switch connectors. Remove clock by turning counterclockwise 90° and pulling from bezel, then disconnect wire connector from back of clock. Remove screws and bracket above radio holding bezel to instrument panel, then remove nut to left of bezel near headlight switch and remove bezel. Remove cluster-to-instrument panel retaining screws and remove cluster.

3) Fuel or Temperature Gauge - Remove upper panel cover (see above) and disconnect wires from gauge. Remove gauge-to-cluster retaining screws and remove gauge.

4) Speedometer - Remove instrument cluster (see above). Remove back plate from cluster housing, then remove speedometer from back plate.

Instrument Panel & Cluster Removal (1960 All Series, 1961 Series 75 & CC): Disconnect battery and remove lower steering column cover and Hydra-Matic indicator pointer. Remove panel cover-to-lower instrument panel screws. Raise front edge of cover and insert wood block. *NOTE - Above procedure provides access to components.* Disconnect two harness connectors at firewall, headlight feed connector, ignition switch connector, shift indicator light, speedometer cable, and trip mileage cable. Disconnect Guide-Matic and Cruise Control. Unhook panel cover hooks from cowl retainers and remove cover.

Instrument Cluster - After cluster and panel assembly removed (see above), separate cluster from panel after marking bulbs and cluster for reassembly.

Fuel & Temperatur Gauge - After cluster and panel assembly removed (see above), disconnect wires and remove gauges from cluster. If removed with cluster installed in car, raise panel cover (see above), loosen cluster harness from retaining clip for access, disconnect wires and remove gauge.

Speedometer - Separate speedometer from cluster after cluster and panel assembly have been removed (see above).

Headlights: Four headlights, two in each fender.

Stop Light Switch Location: Mounted on flange protruding from brake pedal support bracket below instrument panel.

Adjustment - Loosen switch mounting nut and adjust switch position so stop lights are on when brake pedal depressed ½".

CIRCUIT BREAKER: 20 Ampere - On Headlight switch. Protects Head, Fog, Instrument, Parking & Ash Tray Lights.

FUSES: All fuses located in fuse panel in center of dash unless otherwise noted.

25 Amper - Body Feed. Protects cigar lighters, clock, interior lights, glove box and map lights.

25 Amper - Heater and Air Conditioner.

25 Ampere - Windshield Wipers.

25 Ampere - Horn & Trunk Lock Motor. *NOTE* - When car equipped with Power Seats and/or Windows, this fuse is changed to a 40 amp. circuit breaker.

14 Ampere - Turn Signals, Stop Lights & Cruise Control. *NOTE* - Cruise Control also protected by a 4 amp. (before Engine No. 041719), 6 amp. (after Engine No. 041719), 6 amp. (after Engine No. 041719) in-line fuse.

9 Ampere - Instruments, Back-up Lights, Generator & Oil Pressure dash indicator lights. *NOTE* - Generator Teltale light also protected by 6 amp. fuse in the right dust shield.

7½ Ampere - Radio. **14 Ampere** - Antenna.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. V8, valve-in-head.

Bore	Stroke	Displacement
4"	3 7/8"	390 cu. ins.

Compr. Ratio	Rated HP	Developed HP
10.5-1Ⓒ	51.2	325 at 4800 RPM

Ⓒ - 8.75-1 Export.

Compression Pressure - *See TUNE-UP.*

►*OVERSIZE CYLINDER BORE CAUTION:* Engines with mark * following Engine Unit No. have .010" oversize cylinder bore and pistons.

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*

OIL PAN REMOVAL: Disconnect battery ground strap and drain oil. Remove starter and heat control valve (swing exhaust pipe away). Lower idler arm support from frame side bar and remove oil pan-to-cylinder block screws and nuts and remove oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifolds" in Cadillac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data.*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size 4.000-4.0020".

Original Bore & Pistons - *See "Original Bore & Pistons" in Cadillac Special Data.*

Pistons - Pistons have trough in head to provide fuel turbulance and clearance for valves at high speed.

Clearance - .0015" (Top of skirt), .000" (Bottom of skirt).

Removal - Piston and rod assemblies removed from above. Install connecting rod Guide Studs J-3224 on connecting rod bolts to guide rod out through bore without nicking or damaging it.

Fitting New Pistons: Use micrometer or feeler gauge. *See "Pistons" in Cadillac Special Data.*

Replacement Pistons: Standard (Code "L" or "M") and .010", .020", .030" Oversize with rings and pins.

Installing Pistons: Install in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Connecting Rods" (below) for installation on rods.*

PISTON PIN

Pin is pressed fit in connecting rod.

Diameter - .9994-.9997". **Length** - 3 3/32".

Pin Fit in Piston - .00005-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).

Pin Fit in Rod - *(NOTE - Special tools required). See "Pistons" in Cadillac Special Data.*

Replacement Pins: Furnished with new pistons only.

PISTON RINGS

Piston rings are 2-in-1 chrome set with side sealing type oil ring.

Ring	Width	End Gap	Side Clearanc
Compr. (1 & 2)	5/64"	.013-.023"	.0022-.0035"
Oil (3)	3/16"	.013-.023"	Ⓒ

Ⓒ - Three-piece type, side sealing.

Replacement Rings: Standard, .020" and .030" Oversize.

Installing Rings: Chamfered inner edge of both compression rings must be installed toward top of piston.

CONNECTING ROD

Length - 6.5" (center-to-center).

Crankpin Journal Diameter - 2.2488-2.2493".

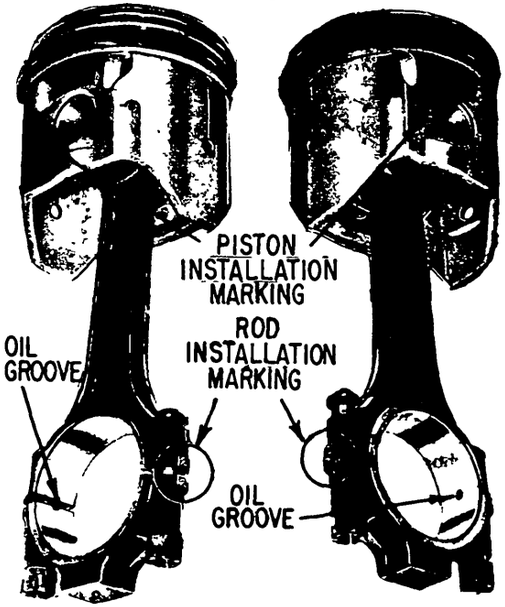
Out-of-Round Limits - .00025" maximum.

Bearings - Morgine-400. Bearing shell is steel backed aluminum. Bearing halves are interchangeable. No shims.

Clearance - .0005-.0020" (Service limit .0035").

Replacement Bearings: Furnished in standard size only.

Installing Rods: Install piston and rod in cylinder bore with REAR on piston toward rear of engine and numbers on lower end of rod down. Numbers 1, 3, 5, 7 are in left bank; 2, 4, 6, 8 are in right bank.



RIGHT BANK LEFT BANK

CADILLAC PISTON & ROD ASSY.

CRANKSHAFT

Journal Diameter - 2.625"

Out-of-Round Limits - .00025"

CONTINUED ON NEXT PAGE

S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Bearings - Rear, Moraine Durex 100A. All other bearings are Moraine 400 Aluminum
Clearance - .0008-.0025" Wear limit 0045".
Replacement Bearings: Furnished in standard size only
►*REAR MAIN BEARING ALIGNMENT NOTE* For thrust bearing surface alignment see *"Crankshaft & Main Bearings" in Cadillac Special Data*
End Thrust: Taken by flanged rear main bearing.
Endplay - .001-.007". Wear limit .010"
Crankshaft Removal: *See "Crankshaft & Main Bearings" in Cadillac Special Data*
Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage
Removal, Alignment & Installation - *See "Camshaft & Bearings" in Cadillac Special Data.*
Bearings - Steel backed babbitt bushings.
Clearance - .001-.0022" (service limit .004" max.).
Bearing Out-of-Round Limit - .002" max.
Timing Chain: Link-Belt side guide type. **Width** - 11/16", **Pitch** .500", **Length** 23" or 46 links.
Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.

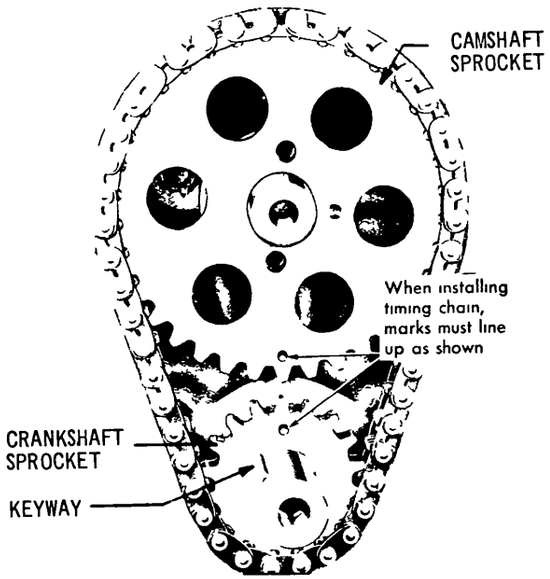
VALVES

Tappet Clearance: None in service, hydraulic.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	.3415-.3425"	4.717-4.688"
Exhaust	1.500"	.3415-.3420"	4.727-4.694"

Valve	Seat Angle	③Lift	Stem Clearance
Intake	①44°	.45"	②.0005-.0025"
Exhaust	①44°	.45"	② .0010-.0025"

① - New valve Valve may be refaced to 45°.
② - New valves & guides. Wear limit .005" max
③ - Cam lobe lift .273".
►*NEW VALVE SEAT CAUTION. DO NOT lap or grind so that seat width is more than 1/64" (due to difference of 1° between valve seat and valve which is designed to provide "hairline" contact.*
Valve Seat Recommendations - 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving) Cut seat so that distance from outer edge to edge of flange on valve head is no more than 1/32"
Valve Stem Oil Seal: Rubber "O" ring seal installed in lower groove on valve stem below valve keeper
Valve Stem Oil Seal Check & Installation - Place 1" diameter suction cup on valve spring retainer Cup will not stick to retainer when pumped up and down if seal leaks To install new seal without removing valve, proceed as follows Remove spark plug at affected cylinder, insert Valve Holder J-3213-1 in plug port to hold valve up and seated Reinstall nearest rocker arm bolt and position Valve Spring Compressor J-5892-1 under bolt head and depress valve spring Remove valve lock and seal Release spring tension to replace spring
Valve Guides: Pressed in cylinder head from combustion chamber side with longest chamfer end pointing toward rocker arm side of head. Use Remover Tool J-3062 to drive out old guide (toward top of head) and installer



CADILLAC VALVE TIMING MARKS

Tool J-3066 to drive new guide in (tool serves as stop for driver).
Valve Springs: Free length 2.25" approximately.

Valve Spring Specifications

	Pressure	Length
Valve Closed	60-65 lbs.	1.946"
Valve Open	155-165 lbs.	1.496"

►*SPRING INSTALLATION CAUTION:* Lower end of valve spring must be seated in cylinder head
Valve Lifters: Hydraulic.
See "Valve System" in Cadillac Special Data.
Valve Lifter Removal - *See "Valve System" in Cadillac Special Data.*
Rocker Arm Assembly: *See "Valve System" in Cadillac Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
►*VALVE TIMING NOTE Specifications are "Without Ramp"*
Intake Valves - Open 27° BTDC Close 75° ALDC.
Exhaust Valves - Open 73° BLDC Close 29° ATDC.
Valve Timing Check - Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing gears

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data*
Crankcase Capacity: 4 qts refill, 6 qts with filter change
Normal Oil Pressure 30-35 lbs min at 30 MPH 15 lbs at idling speed
Pressure Regulator Valve - On oil pump Not adjustable
Oil Pressure Indicator - Light on instrument panel controlled by pressure switch AC No. 1508767 mounted on engine
Oil Pump: Helical gear, mounted on rear main bearing cap
Oil Pump Removal & Overhaul - *See "Oiling System" in Cadillac Special Data*
Oil Filter: Full-flow disposable type located on right side of engine just ahead of flywheel housing. Replace filter every other recommended oil change (normal operation) or more frequently under severe driving conditions
►*OIL FILTER INSTALLATION CAUTION:* Screw new filter onto stud by hand until gasket touches filter base, then tighten element an additional 2/3 turn.
Crankcase Ventilation: Standard Cars - Air intake in oil filler cap (oil wetted type) with road draft tube from rear of valve rocker cover extending down below engine at right rear corner Clean and re-oil breather cap at every engine oil change.

Positive Crankcase Ventilation Cars - Air intake in oil filler cap with road draft tube replaced by a hose from rear of valve rocker cover to ventilation valve mounted between carburetor and intake manifold to provide complete recirculation of engine gases *CAUTION - On this system, fill r cap air intake must be serviced at recommended interval (whenever oil filt r changed - see Std. Cars above) to insure proper operation of system and to prevent other engine or carburetion troubles. Also, ventilation valve must be serviced at this time. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 18½ qts (All Series without heater), 19¼ qts (Series 60, 62, CC with heater), 20¾ qts (Series 75 with heater).
Pressure Valve: AC No RC-15, 13½-16½ lb. Radiator filler cap. Bayonet type with safety catch. Rotate to left against stop to relieve pressure before removing cap
Thermostat: Dole type, Cadillac No 3150205, in water outlet at top of pump body. Starts to open at 173-178°F Fully open at 198°F
Temperature Controlled Fan Clutch (Air Cond. Cars): Thermostatically controlled fan clutch. When ambient temperature around clutch coil is 130-140°F or more, or outside temperature above 80°F, clutch is engaged to limit fan speed to 3500 RPM maximum When ambient temperature around clutch coil is 115-125°F or below, or outside temperature below 70°F, clutch will disengage and limit fan speed to 1700 RPM maximum Unit is serviced as an assembly only
►*THERMOSTATICALLY CONTROLLED FAN CLUTCH NOTE* Use ethylene glycol base anti-freeze in cooling system (for cold weather protection) to protect engine from overheating with slow-warm-up before thermostat opens

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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\ater Pump· Packless type, with sealed ball bearings
R moval & Overhaul - *See Cooling System' in Cadillac Special Data*

f mp ratur Gaug · AC electric type
Dash Unit - AC No 1513993 (Series 75 & CC) No 1514468 (Others)
=ngin Unit - AC No 1513130

CHASSIS LUBRICATION

HYDRA-MATIC AUTOMATIC TRANSMISSION LUBRICATION: Check transmission fluid at every engine oil Change Drain and refill at 30,000 miles (original fluid), 16,000 miles (subsequently) or 1 year intervals For commercial use, heavy driving during hot weather or prolonged idling, all fluid changes should not exceed 16,000 miles

Checking Fluid L v l - Check only with transmission at Normal operating temperature (160-200°F) See OTHER TEMPERATURE NOTE below Run engine for 1½ minutes at 800 RPM with selector in "N" or "P" position Add or remove fluid (with engine running) to bring fluid level to the "F" mark One pint of oil is required to bring levelfrom"Add 1 pint" mark to "F" mark on dipstick DO NOT OVFRFILL Use Automatic Transmission Fluid Type "A" with Suffix A

►*OTHER TEMPERATURE NOTE* If transmission checked at other temperatures level should be as follows

Low Operating Temperature (80-100°F) - Level should be 1/8"below "Add 1 Pint" mark

Extreme Operating Temperature (260-300°F) - Level should be 1/2" above "F" mark

Capacity - 10 qts dry, 9 qts refill

CHASSIS LUBRICATION: The steering knuckle ball joints and steering connector rod ends are packed with special lubricant and sealed Lubrication fittings have been eliminated at these points However, service plugs are provided in steering knuckle ball joints and steering connector rod ends so they may be repacked when necessary

►*LUBRICATION CAUTION Engine accessories (generator, distributor, etc), steering gear, wheel bearings, transmission, r ar axl and universal joints must be ch cked and lubricat d at intervals r commended by manufactur r*

►*SPECIAL LUBRICANT RECOMMENDATION CAUTION. Only the recommended lubricants (see below) are to be used when servicing steering knuckle ball joints and steering connector rod ends Other lubricants will cause early failure of parts*

Lubrication: Every 30,000 miles or 2 years (more frequently if car is operated under severe conditions such as constant driving in wet or dusty areas), pry rubber plugs from upper and lower steering knuckle ball joints and repack with special (red label) lubricant, Cadillac Part No 1474829, using Repacking Gun, J-9280 Fill joint with lubricant but do not permit seal to balloon Pry rubber plugs from steering connector rod ends (five locations) and repack with special (blue label) lubricant, Cadillac Part No 1474830, using Repacking Gun, J-9281 Fill until clean lubricant flows out around seal Install new rubber plugs, Part No 5675444, at all locations *NOTE - Steering knuckle ball joint plugs are located on upper side of upper joint and on lower side of lower joint*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	6 Cyl. - Ft. Lbs.	V8
Cylinder Head	90-95	60-70
Intake Manifold	25-35	25-35
Exhaust Manifold	① 15-20	① 15-20
Oil Pan	② 12½-15	10-15
Main Bearing Caps ..	100-110	③
Flywheel	55-65	55-65
Crankshaft Pulley	15-20	15-20
Connecting Rod Caps	35-45	④
Camshaft Sprocket		15-25
Rocker Arm Support Bracket ..	25-30	
Rocker Arm Cover (Inch-Lbs.)	20-25	20-25
Engine Front Cover	6-7½	6-8
Water Pump	25-35	25-35
Oil Pump		45-50
Oil Filter		20-30
Clutch Housing	45-55	25-30

① - Tighten two center bolts to 25-30 ft lbs
② - Corner bolts. Other screws 6-7½ ft lbs.
③ - 60-70 ft. lbs (283"), 95-105 ft. lbs. (348")
④ - 30-35 ft. lbs. (283"), 35-45 ft. lbs (348").

ENGINE

PASS. CARS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission Remove hood, radiator (on Auto Trans Cars disconnect and plug cooler lines) Remove battery and all electric equipment, wires and remove air cleaner and filter Disconnect fuel and vacuum lines and remove exhaust pipe to manifold bolts Disconnect carburetor control rods at bellcrank, clutch control bellcrank, and transmission rods (overdrive wires and cables). Remove Auto. Trans. filler tube and plug opening. Disconnect speedometer cable, propeller shaft (and remove overdrive solenoid). On V8 cars, remove road draft tube, exhaust crossover pipe and manifold heat control valve. Install lifting hooks (Kit J-4536). Disconnect clutch idler shaft bracket, raise engine slightly and remove all engine and transmission mounting bolts. Remove engine and transmission.

6 CYL. TRUCKS

ENGINE REMOVAL: *NOTE - On Low Cab Forward Models, see "Front Sheet Metal Assembly Removal" below.* On Other Models, drain cooling system, crankcase and transmission. Remove hood, radiator hoses, radiator and shroud. On All Trucks, disconnect all electric equipment wires. Remove coil mounting screws and lay coil and wires out of way. Disconnect engine ground strap, fuel line, and remove air cleaner. Disconnect control cables from carburetor and oil pressure and vacuum lines. Remove exhaust pipe-to-manifold bolts, accelerator rod and on ½, ¾-Ton trucks, remove control rods from bellcrank on clutch housing. On Auto. Trans. Trucks, remove transmission and throttle linkage rods at transmission. On 1-Ton Trucks, remove coolant line clips from dash and frame panels. On All Other Models, remove floor mat and transmission floor pan cover. On 1-Ton Trucks, disconnect parking brake pull rod. On 1½ & 2-Ton Trucks, disconnect inner and outer levers from parking brake operating lever On 1, 1½, 2-Ton Trucks, remove transmission cover (with parking brake and gearshift levers). *NOTE - Cover opening to keep out dirt.* Disconnect speedometer cable, clutch slave cylinder hydraulic line and remove propeller shaft Remove rocker arm assemblies and pushrods. Install lifting Tool J-4536-A and raise engine slightly Remove engine mounts and remove engine and transmission

FRONT SHEET METAL ASSEMBLY REMOVAL (Low Cab Forward): Drain radiator and remove radiator hoses On Air Cond trucks, remove compressor lines Disconnect air cleaner intake hose at fender skirt (if so equipped) wire connectors at dash and toe panel, battery, generator and regulator leads Disconnect Power Steering Reservoir hose at pump Remove hood assembly at hinges, and remove front bumper Remove fender extension bolts (note number and location of shims for reinstallation) Remove fender upper edge-to-plenum and hinge pillar bolts Work from under rear of fender to remove two bolts and spacers at fender extension mounting bracket Remove bolt, locking tab, and flat washer from radiator support to crossmember Remove fender skirt mounting bolts and remove bolt, washer, spacer and grommet from fender skirt bracket Remove steering joint cover bolts and cover from fender skirt and remove snap in clip from seal to skirt. Spread seal from steering column and remove cover Remove sheet metal assembly with radiator, battery, horn and voltage regulator

V8 TRUCKS

ENGINE REMOVAL: Drain cooling system, crankcase and transmission Remove hood, battery cables and carburetor air cleaner Remove radiator and heater hoses, fan blade, spacer, pulley, fan shroud and radiator Remove power brake vacuum line, power steering return line and pump pressure line Remove all electrical equipment lines. Disconnect choke and throttle cables Remove accelerator rod from carburetor and dash bellcrank Remove road draft tube and disconnect exhaust pipe at manifolds. Remove transmission control rods and disconnect clutch slave cylinder hydraulic line. Disconnect and plug oil cooler lines (if so equipped). Disconnect speedometer cable and propeller shaft. Remove floor pan and sheet metal, *see "Front Sheet Metal Assembly Removal, Low Cab Forward" above* Remove engine front mount-to-frame crossmember bracket nut and washer, rocker arm covers. Install eye bolts (Kit J-4536-A) in head bolt holes. Raise engine slightly, remove crossmember. Remove engine and transmission as a unit.

OIL PAN

V8 PASS. CARS

OIL PAN REMOVAL: *NOTE - On Turboglide transmission cars, remove transmission control lever cross shaft at transmission shifter lever and shaft assembly in addition to following procedure.* Raise car, drain crankcase and radiator Disconnect radiator hoses at radiator Disconnect battery ground strap at engine Disconnect clutch pushrod at pedal control and disconnect intermediate lever and shaft. Remove clutch pedal control intermediate lever and shaft assembly from frame mounting bracket, but leave shaft assembly attached to engine. Remove carburetor fuel feed pipe at fuel pump and remove the fuel pump Remove the accelerator control rod from its lever On 348" engine, remove oil level gauge tube Remove power brake vacuum hose at check valve on manifold On 283" engine, remove power steering pump at generator and lay on upper control arm (unnecessary to disconnect hoses) On 348" engines, disconnect generator brace and rotate away from engine so power steering pump will clear brake master cylinder Remove transmission lower control rods at shift levers Disconnect exhaust pipes from manifolds and lower pipe and muffler assembly Remove oil filter Loosen transmission mounting bolts Remove long bolts from each front engine mount *NOTE - Turn crankshaft so harmonic balancer keyway slot is at bottom of engine to enable crankshaft counterweights to clear oil pan baffle* Raise engine at harmonic balancer approximately 3" (283"), 2¾" (348") until transmission housing contacts underbody toe pan *CAUTION - While raising engine watch clearance at fan blades and shroud* Remove oil pan bolts and remove pan with a tilting motion

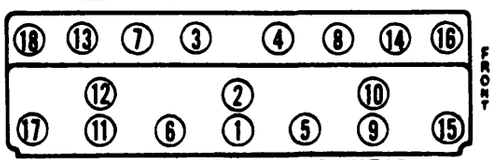
CYLINDER HEAD & MANIFOLD

ALL ENGINES

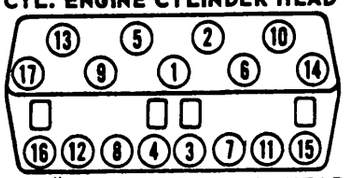
CYLINDER HEAD INSTALLATION (6 CYL. ENGINES): Use torque indicating wrench to tighten cylinder head cap screws in correct sequence as shown in diagram

CYLINDER HEAD INSTALLATION (V8 ENGINES): Coat steel gasket with a good grade of head gasket paste and install gaskets in position on cylinder block Install heads over dowels in block Coat threads of all bolts with Permatex No 3 (head bolts protrude into water passages) On 283" Engine, a shorter length head bolt goes in No 17 and No 14 positions Tighten bolts to correct specifications in sequence shown in diagram

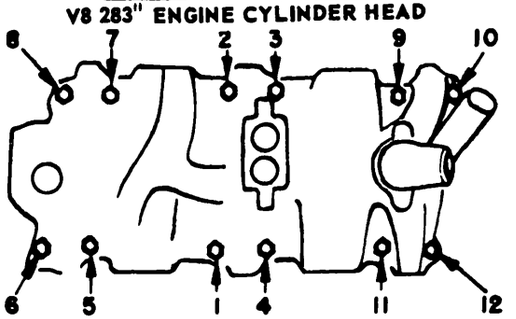
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6 CYL. ENGINE CYLINDER HEAD



V8 283" ENGINE CYLINDER HEAD

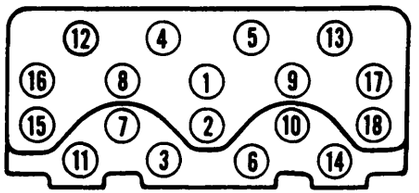


V8 283" ENGINE INTAKE MANIFOLD

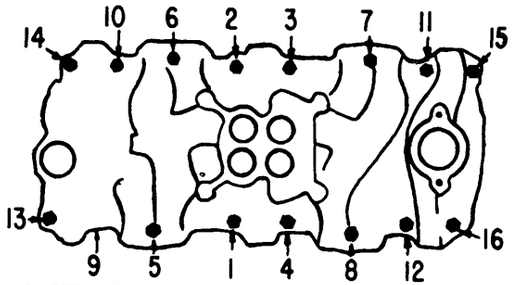
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►*REPLACEMENT CYLINDER HEAD NOTE (348" Eng.):* Service cylinder heads have increased water passages cast around spark plug openings but are not drilled for water passages from block. When this service cylinder head is to be used on a 1959-60 348" engine, drill ¼" (at drill spot near each spark plug) into water passage to match water hole in block. DO NOT drill holes when using this service head on a 1958 engine and DO NOT use a cylinder head gasket (without these holes) on 1959-60 engine. Long reach spark plugs must be used with this type head.

INTAKE MANIFOLD INSTALLATION (V8 ENGINES): Install manifold end gaskets on cylinder block. Coat ends of intake manifold side gaskets around water passages with a good sealing compound and install heads. Tighten bolts a little at a time to 25-35 ft. lbs. torque.



CHEVR LET V8 348" ENGINE CYLINDER HEAD



CHEVR LET V8 348" ENGINE INTAKE MANIFOLD

PISTON PINS
V8 ENGINES

PISTON PINS (283" Engine): Removal - Install pilot of Tool J-5538 (see the alteration note below) on the puller screw, with pilot, through piston and pin. Install tool support over threaded end of puller screw with small end of support against piston. Install nut loosely on puller screw and place assembly in arbor press so that pin can be pressed out through support.

►*283" PISTON PIN TOOL J-5538 ALTERATION NOTE:* Taper d end of support must be cut back at smaller angle to centerline of support to avoid breakage of bottom piston ring land.

Installati n: Lubricate pin holes and position connecting rod in its respective piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (cast depression in head of piston and "F" marks on piston struts) on #1-#3-#5-#7 pistons and rod flange to **rear** of piston on No. 2, No. 4, No. 6, No. 8 pistons. Install piston pin on adapter and pilot on screw. Install puller screw through piston and rod, indexing pilot through piston and rod. Install support over threaded end of puller screw with small diameter toward piston. Install in arbor press and press piston pin in until pilot bottoms in support.

PISTON PINS (348" Engine): Removal - Install pilot of piston pin Tool J-6994 on piston pin. Place piston and rod assembly on support and place assembly in arbor press. Press pin out of connecting rod.

Installation - Lubricate piston pin holes in piston and rod, position rod in respective piston, so flange or heavy side of rod (at bearing end) will be towards **front** of piston (cast depression in piston head and "F" mark on strut) on No. 1-3-5-7pistons,and rod flange or heavy side of rod, to **rear** on No. 2-4-6-8 pistons. Place piston pin on installer and pilot spring and pilot in support. Place piston and rod on support indexing pilot through piston and rod. Place support on arbor press, start pin into piston, and press pin into piston until pilot bottoms.

CRANKSHAFT & MAIN BEARINGS
ALL ENGINES

6 CYL. & V8 MAIN BEARING REPLACEMENT (With Engine in Car): Upper bearing halves can be "rolled" out for replacement. Proceed as follows:

1) Remove spark plugs and remove engine oil pan. Remove bearing cap and bearing shell.

2) Install main bearing shell removing and installing tool (or use a cotter pin bent as required). Rotate crankshaft in direction of usual rotation and roll upper bearing shell out of engine.

3) Oil new bearing shell and insert plain (un-notched) end of shell between crankshaft and block on the indented or notched side. Rotate bearing into place. Install new bearing shell in bearing cap.

REAR MAIN BEARING OIL SEAL (6 Cyl. Eng.): To replace rear bearing oil seal without removing engine proceed as follows:

1) Remove oil pan, oil pump assembly, rear main bearing cap (discard old seal). Loosen all bearing caps (to allow crankshaft to drop a slight amount). *NOTE* - Pry between crankshaft and block to force crankshaft down as necessary.

2) Use screwdriver or similar tool to force old seal out of upper bearing so it can be removed with a pair of pliers (rotate shaft to aid in removal of seal).

3) Pre-form new upper seal in cap.

4) Insert soft wire (tag wire) through new upper seal 1/4" from end and wrap wire around end of seal to keep seal from spreading. Lubricate entire surface of upper seal with lubricant and reform seal in lower cap.

5) Insert wire through seal opening in crankcase and around crankshaft. Use screwdriver or similar tool to start seal accurately, then pull seal into position (working seal into position with tool and rotating crankshaft as necessary). With seal centered, cut off ends ¼" below bearing edge.

6) Install new lower seal in bearing cap (force it into position with Tool J-5788) and cut ends off flush with surface of bearing cap. Tighten all bearing caps t specifications.

REAR MAIN BEARING OIL SEAL (V8 Eng.): To replace rear main bearing seal without removing engine, first remove oil pan (see above for Pass. Cars, or car model page for Trucks), then proceed as follows:

Cap Seal - Remove bearing cap and pry out old seal with screwdriver. Lubricate new seal (exc. parting surface) and roll seal into place without damaging bead of seal with seal tangs.

Block Seal - Use small drift to start seal out until it can be removed with pliers. Lubricate new seal (exc. parting surface) and gradually push seal in with hammer handle until seal rolls into place. DO NOT cut seal with seal retainer tang.

VIBRATION DAMPENER
6 CYL. ENGINE

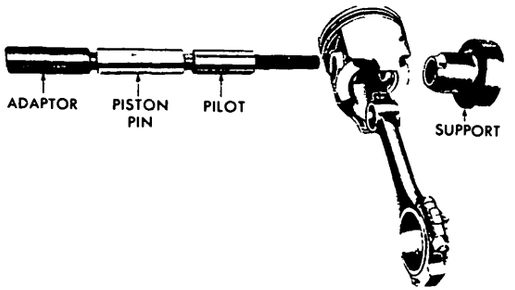
VIBRATION DAMPENER (6 CYL ENGINE): Removal - Drain radiator, disconnect hoses. On Automatic Transmission models, remove oil cooler lines. Remove radiator (note number of shims). Remove fan belt. Install Tool J-6978 or J-1287 and remove vibration dampener and pulley assembly.

Installation: Remove puller and install two 3/8"-16 x 1" (16 thread) capscrews in dampener to support wheel portion during installation. Position dampener on crankshaft with key and keyway on alignment and drive dampener on shaft until it bottoms against crankshaft gear. Use a heavy hammer and bar through the grille, taking care that a straight installation is made. Remove the two capscrews previously installed. Install radiator.

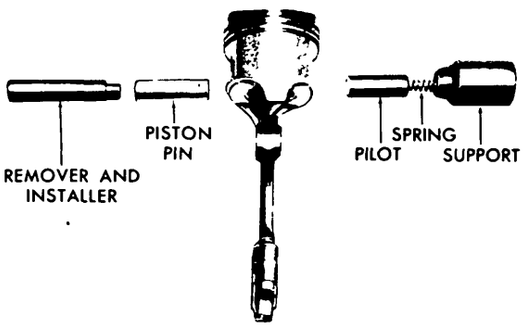
V8 ENGINE

VIBRATION DAMPENER (8 CYL. ENGINE): Removal - Remove radiator hoses. On Automatic Transmission

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PISTON PIN DISASSEMBLY



PISTON PIN ASSEMBLY

CONTINUED FROM PRECEDING PAGE

models, disconnect cooler lines from radiator core Remove battery, fan belt, fan and pulley Remove fan shroud bolts and remove radiator and fan shroud Remove vibration dampener pulley bolts and remove pulley Use Tool J-6978 to remove vibration dampener

Installation: Coat vibration dampener front cover seal contact with engine oil, align vibration dampener with crankshaft key and use Tool J-5590 to drive vibration dampener on crankshaft until dampener hub bottoms on crankshaft timing gear Install vibration dampener pulley, fan pulley, and fan Place fan shroud over fan blade and lower radiator into place Install bolts Install fan belt

ENGINE FRONT COVER

ALL ENGINES

FRONT OIL SEAL INSTALLATION: Pry old seal out of front cover. Install new seal so that open end of seal is toward inside of cover and drive it into position with Oil Seal Driver J-995 (6 Cyl), J-996 (V8) *CAUTION* - Support cover at sealing area while installing seal

CAMSHAFT & BEARINGS

CAMSHAFT LOBE LIFT (All Eng.): Remove rocker arm shaft and support assembly (6 Cyl) rocker arms and balls (V8) On 6 Cyl Eng install 3/8"-24-16 Stud Adapter from Tool J-8520 in rocker shaft support hole On all engines attach Tool J-8520 to adapter or stud and adjust dial indicator to seal in pushrod cup *NOTE - B sure pushrod is seated in lifter socket* Rotate crankshaft slowly (clockwise) until lifter is on heel of cam lobe (pushrod will be in its lowest position) Set dial indicator to Zero and slowly "BUMP" engine over until pushrod is in **FULLY** raised position Compare total lift on dial indicator with Specifications in "CAMSHAFT-WEAR LIMIT" table below *NOTE Continue to rotate engine until indicator reads Zero for accuracy check on dial indicator*

Camshaft Lobe Lift & Wear Limit

	Intake Lift		Exhaust Lift	
Engine	① New	② Worn	① New	② Worn
235" Pass	.222"	.217"	.222"	.217"
235" Trk.	.210"	.203"	.225"	.218"
261" Trk.	.274"	.269"	.280"	.273"
283"③⑤	222"	.217"	.222"	.217"
283"③⑤	.266"	.261"	.266"	.261"
283"⑥	.263"	.258"	.267"	.262"
348"⑤	.229"	.224"	.235"	.230"
348"⑥	.232"	.227"	.235"	.230"

① - Plus or Minus .002". ② - Plus .003", Minus .002".
③ - Pass. Cars with 2-Bbl. Carb.
④ - Pass. Cars (Exc. 2-Bbl. Carb.), Corvette & Trucks.
⑤ - With Hyd. Lifters. ⑥ - With Mech. Lifters.

6 CYL. ENGINES

CAMSHAFT REMOVAL & INSTALLATION: Drain crankcase and radiator Remove radiator and grille Remove rocker arm cover and rocker arm shaft assembly Remove coil and valve side cover, pushrods and lifters Remove vibration damper (see above). Remove oil pan and engine front cover (see above). Remove camshaft thrust plate screws and remove camshaft and gear *CAUTION - Support shaft carefully to prevent bearing damage* . To install, reverse removal procedure

6 CYLINDER CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Install No. 1 and No. 2 bearings first, then rear two bearings. *(CAUTION* - Align holes in bearings with oil holes in block before pulling into place). Install plug flush to 1/32" deep from clutch housing face of case.

V8 ENGINES

CAMSHAFT REMOVAL & INSTALLATION: 1) Drain radiator, remove outlet and inlet hoses On Auto Trans models, remove oil cooler lines from radiator and plug lines and fittings Remove attaching bolts and lift radiator straight up to remove

2) Remove air cleaner, disconnect throttle rod at carburetor (On Auto Trans models, disconnect lower transmission throttle lever rod) Disconnect fuel, vacuum, and choke lines at carburetor coil primary wires, and coil to distributor secondary wires Remove distributor

3) On overdrive models, disconnect kickdown switch wires at switch

4) Remove spark plugs, water and heater hoses, and temperature indicator unit from intake manifold Remove intake manifold

5) Remove fan belt, exhaust manifold to exhaust crossover pipe stud nuts and lower crossover pipe Remove exhaust manifold heat control valve from right exhaust manifold

6) Disconnect generator wires, remove exhaust manifolds, choke heat tube and remove rocker arm covers

7) Loosen rocker arm nuts, pivot rocker arms and remove pushrods and valve lifters *NOTE* - Pushrod seats on solid lifters should remain with lifters

8) Remove fuel pump lines at fuel pump, pump mounting bolts, fuel pump, fuel pump pushrod adapter bolts adapter and pushrod

9) Remove bumper, grille-to-fender tie bar screws, grille-to-fender screw and screw and bolt at front end of grille From under fender, remove grille bracket to fender filler panel screw and fender and filler panel to grille screw

10) Remove grille filler panel-to-grille clips, hood lock plate-to-grille support assembly, and fender tie bar bolts

11) From under fender, remove tie bar-to-fender skirt bolts and front bolts at tie bar, then loosen rear bolt at each side Rack tie bar backward to clear top of grille Lift grille assembly to clear tabs at fillerpanel, unplug electrical connections and remove grille

12) Remove vibration dampener (see *"Vibration Dampner Removal"*), timing chain cover, timing chain and sprocket Install two bolts, 5/16"-18 x 4", in camshaft bolt holes and remove camshaft *NOTE* - All camshaft bearings are the same diameter Use care to avoid damage to bearings

V8 CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Remove bearing nearest center of block first, then No. 2 and No. 4 bearings, and finally front and rear bearings (with this sequence minimum number of turns are required to locate Remover & Replacer for removal of next bearing). When installing, install No. 1 or front bearing first. This bearing will act as guide for tool and center the No. 2 and No. 3 bearings being pulled into place. *(CAUTION*–Use care when installing rear bearing due to smaller size of oil pressure holes in rear bearing. When installing end plug, install flush to 1/32" deep to maintain level surface on rear of cylinder block).

TIMING GEARS

6 CYL. ENGINES

REPLACEMENT TIMING GEARS: Fibre type camshaft gear and steel crankshaft gear used on passenger cars. Aluminum camshaft gear and steel crankshaft gear used on trucks.

TIMING GEAR INSTALLATION: Gears are press fit on crankshaft and camshaft and must be removed and installed as follows·

Crankshaft Gear–To remove gear, attach Puller J-8105 to the gear and turn handle When installing gear, make certain that two woodruff keys are in the crankshaft, then drive gear on shaft until it bottoms against shoulder

Camshaft Gear–To remove gear, install Gear Remover J-971 on shaft in back of gear (remover consists of support sleeve), place camshaft assembly in arbor press *(CAUTION*–Thrust plate must be positioned so that it will not be damaged by woodruff key in shaft as shaft pressed out), press shaft out of gear. To install gear, place shaft in arbor press (support shaft securely directly back of front bearing journal), install gear spacer ring and thrust plate over end of shaft, and install woodruff key in shaft keyway. Install camshaft gear and press it on shaft until it bottoms against the gear spacer ring. End clearance of thrust plate should be 001 005" Install the camshaft assembly in engine block, being careful not to damage bearings or cams. With crankshaft installed turn camshaft and crankshaft so that valve timing marks on gear teeth will line up, then push camshaft into position. Install camshaft thrust plate-to-block screws and tighten securely. Camshaft and crankshaft gear runout should not exceed .004" for camshaft and .003" for crankshaft. Backlash between timing gear teeth should not be less than .004" nor more than .006". *CAUTION*–Press on hub only when installing camshaft gear.

TIMING CHAIN

V8 ENGINE

TIMING CHAIN: Removal–Remove vibration dampener, timing chain cover, and oil slinger Rotate engine until timing marks on sprockets are in alignment and adjacent Remove three camshaft sprocket screws and remove camshaft sprocket and chain together

Installation Install chain on camshaft sprocket Hold sprocket vertical with chain hanging below, and line

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up 'O' timing marks on both sprockets so they are adjacent and in line with a straight edge across shaft centers Align dowel in camshaft with dowel hole in sprocket and install sprocket on camshaft Draw camshaft sprocket onto shaft using the three mounting bolts Tighten to 15-20 ft lbs. *CAUTION–Do not attempt to drive sprocket onto shaft as welch plug at rear of engin can be dislodged.*

VALVE SYSTEM
VALVE STEM OIL SEALS
6 CYL. ENGINES

VALVE STEM OIL SEAL INSTALLATION: Seal consists of synthetic rubber ring installed in second groove of valve stem directly under valve locks on all valves. When assembling valves, install seal as follows· Install valve spring and spring retainer on valve stem, compress spring until lower groove on valve stem is exposed, install seal in this groove *(CAUTION* - Seal must seat flat in groove and not be twisted). Install valve locks in upper groove in valve stem, relieve spring tension, check to see that seal is properly retained in spring retainer and that locks are engaged.

V8 ENGINES

VALVE STEM OIL SEAL INSTALLATION: Seal consists of "O" ring installed in second groove of valve stem directly under valve locks on all valves, and cup shaped metal shield placed over outer end of valve spring under valve cap Install valve spring and damper, with close coiled end against cylinder head and place shield over spring. On trucks, place rotator in position (if used) Install cap, compress spring and install seal in lower groove on stem *NOTE* - Be sure seal is flat and not twisted in groove Install valve locks and release spring tension

VALVE GUIDES
6 CYL. ENGINES

VALVE GUIDE INSTALLATION: Press old guide from cylinder head with an arbor press and Tool J-5600 Press new guides (short guides for exhaust long guides for intake)into head with Tool J-5599 until top of guide is 15/16" (exhaust), 1" (intake) above head *NOTE - When using Tool J-5599, use a 1/16" shim und r tool for intake guides When using Tool J-5734, use a 1/16" shim under tool for exhaust guides* Finish ream all guides with 343" hand reamer, Tool J-4822

ROCKER ARMS
6 CYL. ENGINES

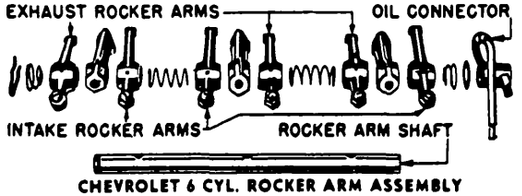
ROCKER ARMS (6 CYL. ENGINES): Diamond bored and "granodized" (no bushings) and fit directly on rocker arm shafts Different rocker arms used as follows and must be installed as indicated

R ck r Arm Identification

Typ	Cylinder No.	①Casting No.	Part No.
L H Intake	2-4-6	3764485	3764489
L H Exhaust	1-3-5	3764487	3764481
R H Intake	1-3-5	3764486	3764490
R H Exhaust	2-4-6	3764488	3764482

① - Last two digits (85, 87, etc) of this number stamped on rocker arm

Installation Assemble rocker arms as indicated in illustration with open end of shaft toward center, and baffle in rear shaft open end in vertical position



CHEVROLET 6 CYL. ROCKER ARM ASSEMBLY
(REAR ASSY. SHOWN—FRONT ASSY. SIMILAR)

V8 ENGINES

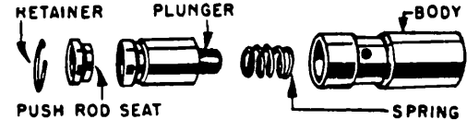
ROCKER ARM STUD REPLACEMENT (V8 ENGINES): Replacement studs furnished 003" & 013" Oversize
Removal - Remove old stud by placing Spacer J-5802 over stud, adding flat washer and nut and turning nut down to pull stud from head
Installation - Ream stud hole for correct oversize stud using Reamer J-5715 for 003", J-6036 for 013" oversize Coat press-fit part of stud with hypoid lubricant and use Tool J-6880 to install stud in head Tool should bottom on head

HYDRAULIC LIFTERS
6 CYL ENGINES

HYDRAULIC VALVE LIFTERS: Barrel type consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (see illustration) Oil is introduced to this unit through oil gallery in block

Removal· Remove rocker arm assemblies pushrod cover pushrods and valve lifters *NOTE* - Keep valve lifters and pushrods in order so they may be returned to original positions

Disassembly: Use Tool J-4274 and hold plunger down and remove plunger and pushrod seat retainer with a small screwdriver blade Remove pushrod seat, plunger,



CHEVROLET 6 CYL. HYDRAULIC VALVE LIFTER

ballcheck valve assembly, and plunger lifter spring Clean all parts in solvent and inspect each part for nicks or burrs and wear Replace lifter assembly if any part damaged or has excessive wear

Reassembly: Drop lifter spring into body Install plunger and ball check valve assembly into body, using care to align feed holes in body and plunger Fill lifter with SAE 10 oil, insert end of Tool J-4274 into plunger, and press down solidly Insert pin (part of J-4274) through oil feed holes to hold plunger against spring tension and remove other part of tool Fill lifter with SAE 10 oil and install pushrod seat and spring retainer Remove tool pin

V8 ENGINES

HYDRAULIC VALVE LIFTERS· Barrel type consisting of lifter body pushrod seat inertia valve check ball ball retainer pushrod seat retainer plunger and plunger spring Oil is supplied under pressure from main oil gallery line

►*HYDRAULIC LIFTER REPLACEMENT NOTE & INTERCHANGEABILITY CAUTION* Hydraulic Valve Lifter Assembly Part No 5231475 is slightly shorter than production lifter but has identical lift action and is completely interchangeable for use in all 1957-60 V8 engines

Removal: Remove rocker arm covers intake manifold back off rocker arm nuts until arms may be pivoted away to remove pushrods Remove hydraulic lifters

Disassembly: Hold plunger down with pushrod, then remove pushrod seat retainer, pushrod seat, inertia valve assembly, plunger and spring from lifter body Pull check valve ball retainer from plunger and remove ball and spring Clean all parts in solvent and inspect them carefully for wear or damage Replace lifter if damaged parts are found

Reassembly: Place check ball on small hole in bottom of plunger, check ball spring in ball retainer and place retainer over ball so spring rests on ball Squeeze retainer and press into position in plunger Place plunger spring over ball retainer and slide lifter body over spring and plunger Install pushrod seat and inertia valve assembly in open end of plunger, push plunger into body and install retainer Compress plunger to open holes and fill with SAE 10 oil Work plunger up and down and again refill

V8 ENGINES

►*1961 V8 ENGINE HYDRAULIC LIFTER PRODUCTION CHANGE & ADJUSTMENT CAUTION Early 283" engines up to Engine No F-0122 & T-0129 and early 348" engines up to Engine No F-, T-0129 use "long travel" lifters Later 283" engines beginning Engine No F-0123 & T-0130 and later 348" engines beginning Engine No F-, T-0130 have "short travel" lifters Procedures for lifter adjustment either with engine running or stopped, are different for each type lifter Severe engine damage will result if improper adjustment is made See below for lifter identification and adjustment*

"Long Travel" Lifter Identification (Lifter R m v d From Engine) - *Pushrod seats on all "long travel" lifters have less depth than seats on "short travel" lifters Identify "long travel" type as follows*

Part No. 5232100 - 1 hole body, 1 hole plunger, pushrod seat steel color, plunger retainer copper plated

Part No. 5232110 - 1 hole body, 6 hole plunger, pushrod seat and plunger retainer copper plated

Part No. 3789175 - 1 hole body, 6 hole plunger, 2 grooves at top of body

Lifter Identification (Engine Assembled) - See "Lifter Adjustment" below and proceed to point where all freeplay removed from valve train or until rocker arm clatter stops on all valves Now turn rocker arm stud adjusting nut an additional 2½ turns on all valves If engine runs smoothly after lifters have adjusted themselves, lifter is "long travel" type If engine runs roughly, lifter is "short travel" type *CAUTION - This procedure is for identification purposes only For proper adjustment, see "Lifter Adjustment" below*

►*HYDRAULIC LIFTER NON-INTERCHANGEABILITY CAUTION DO NOT intermix "long travel" and "short travel" lifters on any on engine*

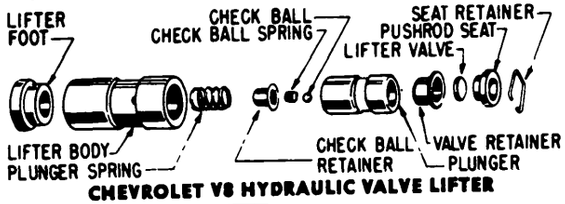
LIFTER ADJUSTMENT: Engine Stopp d - With No 1 cylinder at TDC firing position, adjust Exhaust Valves

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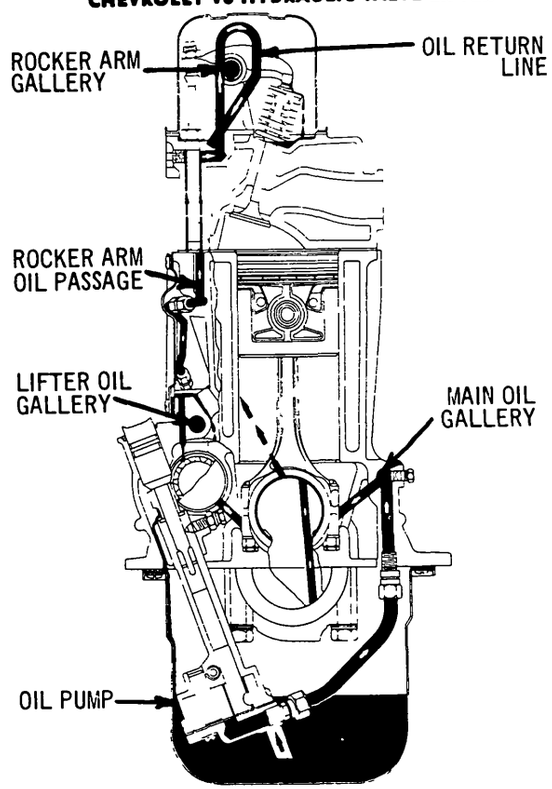
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1-3-4-8 and Intake Valves 1-2-5-7 as follows: Back off rocker arm stud adjusting nut until there is play in valve pushrod, then tighten nut until pushrod-to-rocker arm clearance is just removed. Then tighten nut an additional 1 turn (short travel lifters), 2 turns (long travel lifters). This procedure will place hydraulic lifter plunger in the center of its travel. No further adjustment is required. *NOTE - To identify lifters, see above.* Crank engine one complete revolution so No. 6 cylinder is at TDC firing position and adjust Exhaust Valves 2-5-6-7 and Intake Valves 3-4-6-8 in the same manner.

Engine Running - With engine at idle speed, back off rocker arm stud adjusting nuts one at a time until rocker arm starts to clatter. Then turn nut down until clatter just stops. Turn nut an additional 1 turn (short travel lifters), 2 turns (long travel lifters). *NOTE - To identify lifters, see above.*



CHEVROLET V8 HYDRAULIC VALVE LIFTER



6 CYL. ENGINE OILING SYSTEM

OILING SYSTEM

235" & 261" ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod and camshaft bearings, lifters and rocker arms. Restricted oil pressure supplied to valve stems and pushrod sockets and timing gears. All other parts oiled by spray or mist from engine crankcase.

OPERATION: Gear type oil pump, mounted on crankcase (at right side) and driven by distributor drive shaft, draws oil from oil pan through a floating oil screen and delivers it by pipe to fitting on lower end of passage, leading to a horizontal oil gallery at left side of crankcase. Pressure regulator valve located in oil pump body. Oil is distributed from main oil gallery as follows:

Crankshaft & Camshaft Bearings - An oil channel from main oil gallery through each crankcase web delivers oil to each crankshaft main bearing. A similar channel in opposite side of each web delivers oil from each crankshaft bearing to each camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled so that each connecting rod bearing is lubricated through passages from adjacent main bearing. Main bearings provide continuous flow of oil to connecting rod bearings.

Pistons & Pins - Oil spray is thrown on cylinder walls from an oil hole on left side of connecting rod when this hole registers with hole or passage in connecting rod journal.

Timing Chain & Sprockets - Oil from front camshaft bearing passes through a milled slot in rear surface of front engine plate and is directed by a nozzle at timing gears.

Lifter Oil Gallery - A horizontal lifter oil gallery, located directly above camshaft, receives oil from rear camshaft bearing (early cars) from both front and rear camshaft bearings (later cars). This gallery lubricates both mechanical and hydraulic valve lifters.

Rocker Arms, Pushrods, and Valve Stems - Oil is delivered to the horizontal lifter gallery by the front and rear camshaft bearings. A vertical oil gallery from center of lifter gallery, with an 11/32" orifice restriction, delivers oil to a matching passage in cylinder head to fitting on cylinder head. Oil is delivered from fitting on cylinder head through a pipe to a connector between hollow rocker arm shafts, then to return passage in cylinder head and block to crankcase. Oil passes through holes in hollow rocker arm shafts to rocker arms where bleeder holes supply oil for valve stem and pushrod socket lubrication.

OIL FILTER: 235" Eng. - Optional partial flow type mounted on engine bracket.

261" Eng. - A full flow type filter mounted on the intake manifold. Receives oil directly from passage in crankcase leading to main oil gallery and delivers it to main oil gallery. *NOTE* - When filter removed, connect inlet and outlet openings in crankcase with pipe and DO NOT plug openings at any time.

283" ENGINES

DESCRIPTION: Positive pressure lubrication is provided to all main, camshaft and connecting rod bearings and to all valve lifters and rocker arms. Three horizontal oil galleries are located in "V" at center of engine and distribute oil under pressure to all parts of engine.

OPERATION: Gear type oil pump mounted on rear main bearing cap draws oil from engine oil pan sump through a meshed screen intake (with bypass valve at center of screen) and delivers it through rear main bearing cap to a vertical passage leading to main oil gallery. On 1956 and later engines, this vertical oil passage is rerouted through a full flow filter mounting pad at left side of crankcase. Bypass valve is located between filter and mounting pad. Oil distribution from main oil gallery is as follows:

Crankshaft & Camshaft Bearings - An oil passage from vertical oil passage supplies oil to rear main bearing. Oil passages from main oil gallery supply oil to each camshaft bearing and to all except the rear main bearing.

Connecting Rods & Pistons - Oil is delivered from each main bearing to adjacent connecting rod bearing through drilled passages in crankshaft. A hole in connecting rod sprays oil onto cylinder walls, for piston and piston pin lubrication, when hole in rod matches hole in connecting rod journal.

Valve Lifters - Oil passage from rear camshaft bearing supplies oil to lifter oil galleries. Both mechanical and hydraulic valve lifters intersect the gallery. A recess in mechanical lifter permits oil to pass into lower end of pushrod. A larger passage in rear camshaft bearing permits more oil pressure for lubrication of hydraulic lifters. Hydraulic lifters contain an inertia valve which opens permitting oil to pass to hollow pushrods.

Rocker Arms & Valve Stems - Oil passes up through hollow pushrods to a hole in upper end that matches hole in rocker arm. Oil sprayed out this hole and across rocker arm lubricates valve stem tip.

OIL FILTER: Full flow type mounted on left side of crankcase. Receives oil direct from oil passage from oil pump and delivers it back to vertical oil passage. Bypass valve located between filter and mounting pad.

348" ENGINE

DESCRIPTION: 348" engine lubrication system is the same as for the 283" V8 Engine except for the following: The oil pump delivers oil through passage in rear main bearing cap to a filter mounting pad at left side of engine. A passage from filter pad leads to a horizontal main oil gallery running full length of engine. Oil from this main gallery is delivered through diagonal passages to vertical passages leading up to camshaft and down to crankshaft bearings.

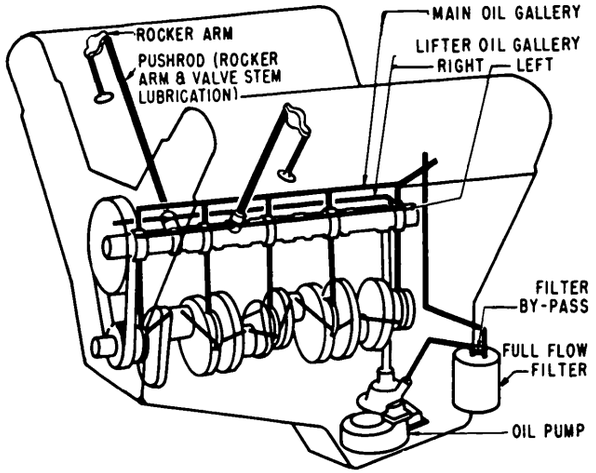
OIL FILTER: Full flow type mounted in recess on left lower side of crankcase with bypass valve located in recess. Receives oil through direct passage in bearing cap and crankcase and delivers it through passage to main oil gallery.

OIL PUMP

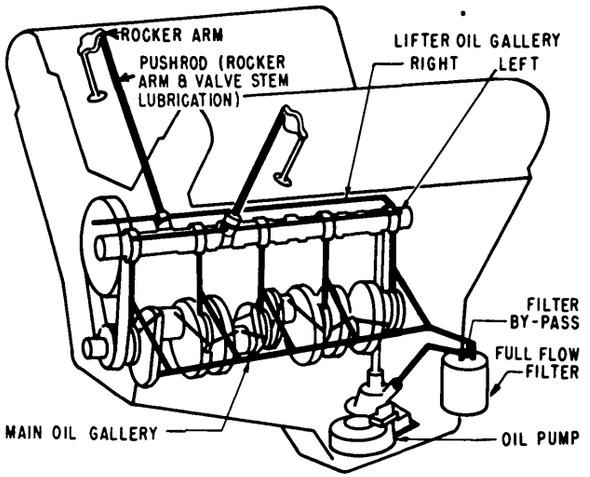
6 CYL. ENGINES

6 CYL. OIL PUMP (Removal & Disassembly): Drain oil, remove oil pan and disconnect oil pump-to-block oil line. Remove oil pump retaining sleeve lock screw and remove oil pump and oil pump-to-block oil line. Remove pressure oil line from pump and remove pump cover attaching screws, cover, gasket, idler gear and drive

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283" V8 ENGINE OILING SYSTEM



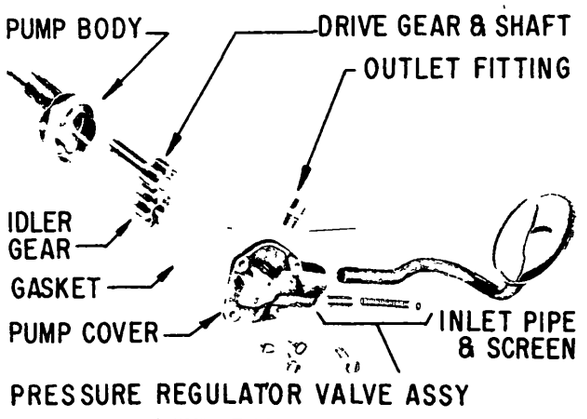
348" V8 ENGINE OILING SYSTEM

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gear and shaft. Remove regulator valve pin and valve parts. Remove intake pipe and fixed screen as an assembly. Wash all parts in solvent and inspect pump body for cracks or excessive wear. Check shaft for looseness in housing and gear and cover for wear.

Assembly: Install drive gear and shaft in body. Install idler gear with smooth side toward cover. Install cover and new gasket. Tighten screws securely and check to see that shaft turns freely Install regulator valve plunger, spring, retainer and pin. Install oil line to pump body loosely.

Installati n: Install pump in block and align oil lines and install retaining sleeve lock screw and tighten securely. *(CAUTION*–Make sure tapered end of lock screw draws down into hole in oil pump body. Tighten oil pump-to-block oil line and pump-to-screen oil line connector nuts securely. Replace intake pipe and screen.

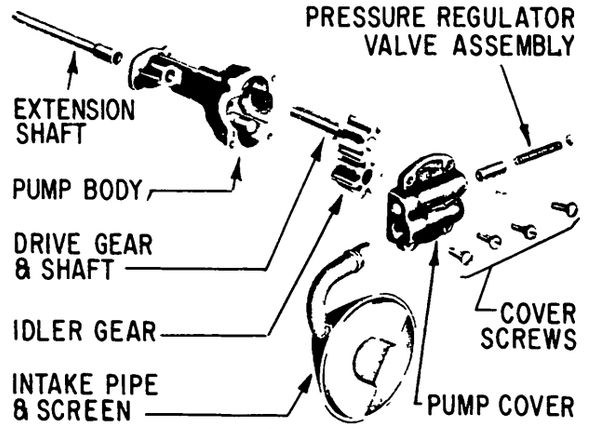


6 CYL. ENGINE OIL PUMP

V8 ENGINE

V8 OIL PUMP (Removal & Disassembly): Drain oil, remove oil pan and pump to rear bearing cap bolt Remove pump, extension shaft and collar Disconnect pump shaft from extension, remove pump shaft, pump cover, idler gear, drive gear and shaft If screen or pipe need replacing, hold cover (in soft jawed vise) and pull out pipe Wash all parts in solvent and inspect all parts for cracks, burrs or excessive wear

Reassembly: Assemble drive gear and shaft in body, install idler gear (with smooth side to cover) Install pickup screen and pipe on cover (if removed) but DO NOT twist or collapse suction tube Install cover and



CHEVROLET V8 OIL PUMP

tighten screws to 6-9 ft lbs (shaft must turn freely) Assemble collar end of extension shaft assembly over pump drive shaft, align tang with slot in pump drive shaft Assemble pump and extension shaft to rear bearing cap Align slot in extension shaft, install rear bearing cap bolt and tighten to specifications. *NOTE* - Bottom edge of screen must be parallel to oil pan rails

COOLING SYSTEM

WATER PUMP

ALL ENGINES

WATER PUMP REMOVAL: (All Eng.) Drain radiator, remove water inlet hose and heater hose from pump housing. Remove water pump to cylinder block bolts and remove pump from engine *NOTE* - On 6 Cyl. engine, pull pump straight out of block to avoid damage to impeller and shaft.

Disassembly - (All Eng.) Remove fan and pulley. On V8, remove back plate screws and gasket. Support hub in press and force shaft out of hub (use ½" x 2" pin). Support pump in press (use blocks under housing) and press shaft and impeller out of pump. *NOTE - Apply pressure on outer race of bearing only.* Place Tool J-5855 in press, support impeller on seal surface and press shaft out of impeller with ½" x 2" pin. Discard old seal.

Reassembly - 1) On 235", 261", 283" Eng., install shaft and bearing assembly into pump body (from front side) until bearing is flush with front of pump body. **On 348" Eng.,** install shaft and bearing assembly into pump body (from rear side) until bearing is flush with front of pump body. *CAUTION - Apply pressure to out r race of bearing only.*

2) Coat outer diameter of seal with sealing compound and press on outer flange with Tool J-5590 until seal bottoms with outer flange against pump body.

3) Press hub on shaft using Tool J-5775 (235", 261" and 283"), Tool J-7034 (348") to locate hub on shaft to insure proper belt alignment.

4) To check position of hub, place straightedge across front face of hub and insert correct tool (from rear) into one bolt hole. Straightedge should lightly contact short step on Tool J-5775(6 Cyl.), end of Tool J-5775 (283"), short step on Tool J-7034 (348") plus or minus .005".

5) Support pump on hub and install impeller. *NOTE - Clearance between vanes and pump body should b .010-.035". Bend feeler gauge to check 348".* Install cover and gasket, tightening screws diagonally. Install pulley and fan.

Installation - Reverse removal procedure using new gasket between pump and cylinder block. Adjust fan belt tension.

►*JACKING & HOISTING CAUTION (ALL MODELS) B for jacking or hoisting, se "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Secti n*

MODEL IDENTIFICATION

Model	Series
Biscayne, Brookwood ①	1100
Biscayne Fleetmaster	1300
Bel Air, Parkwood ①	1500
Impala, Nomad ①	1700

① - Station Wagons

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post *NOTE* - Number (example below) includes identification data

① ② ③ ④
1 1111 F 100001

① - Year 1 1961
② - Series Prefix See Series Prefix table below
③ - Assembly Plant See Assembly Plant Designation below
④ - Unit Number Continous for all cars at each assembly plant starting with 100001

Series Prefix

Biscayne	Series Prefix	Bel Air	Series Prefix
2-Dr Sedan	1111	2-Dr Sedan	1511
2-Dr Utility (3 Pass)	1121	4-Dr Sedan	1569
4-Dr Sedan	1169	Sport Coupe	1537
Fleetmaster 2-Dr Sedan	1311	Sport Sedan 4-Dr	1539
Fleetmaster 4-Dr Sedan	1369		
Station Wagons		**Impala**	
Brookwood 2-Dr 6 Pass	1115	2-Dr Sedan	1711
Brookwood 4-Dr 6 Pass	1135	4-Dr Sedan	1769
Brookwood 4-Dr 9 Pass	1145	Sport Coupe	1737
Parkwood 4-Dr 6 Pass	1535	Sport Sedan 4-Dr	1739
Parkwood 4-Dr 9 Pass	1545	Convertible	1767
Nomad 4-Dr 6 Pass	1735		
Nomad 4-Dr 9 Pass	1745		

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad on right side of engine block directly above oil level dipstick (to rear of distributor) *NOTE* - Number (example below) includes identification data

① ② ③
T 0101 A

① - Engine Plant **F** - Flint **T** - Tonawanda **C** - Engines built in Canada
② - Code number indicating month and day of manufacture This is not an individual or continuous number
③ - Engine type *See Engine Type table below*

Std. Engine & SM. Trans.

A - Basic Engine	**AJ** - H D Clutch, Pwr Strg , AC
AE - H D, Clutch	**AK** - Pwr Strg
AF - Air Cond	**AM** - H D Clutch, Pwr Strg
AG - H D Clutch & Air Cond	**AZ** - Pwr Strg Air Cond
1300 Engine & SM Trans.	**All Engines & Powerglide**
AP - Basic Engine	**B** - Basic Engine
AR - H D Clutch	**BE** - Pwr Strg
AS - Pwr Strg	**BG** - Air Cond ①
AT - H D Clutch & Power Strg	**BH** -Pwr Strg , Air Cond ①

① - Except 1300 Engine

►*1300 ENGINE NOTE:* This engine used in Biscayne 1300 Series Fleet Cars only Engine is basically the same as that used in standard cars except for use of economy carburetor and mechanical valve lifters (different valve lift and valve timing)

TUNE-UP

COMPRESSION PRESSURE: 130 lbs minimum at cranking speed with all cylinders equal within 20 lbs
VACUUM READING: 17-21" steady, at idling speed
VALVE TAPPET CLEARANCE: (Exc. 1300 with 3-Speed Trans.) - Zero lash Hydraulic lifters With engine at operating temperature and idling, loosen locknut and back off adjusting screw (one at a time) until rocker arm clatters, then turn adjusting screw down until clatter stops, plus 1½ turns and tighten locknut *For Initial Valve Adjustment, see VALVES*
(1300 with 3-Speed Trans.) 006- 011" Intake, 013- 018" Exhaust
MANIFOLD HEAT CONTROL: Thermostatic type Check for free operation Should require ½ turn from unhooked to hooked position Replace a distorted spring
CRANKCASE VENTILATION VALVE: Service at regulator intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 035"
Spark Plugs - AC No 45 (Std), No 46 (Hotter), No C-43COM or 44 (Colder) *C-43 COM preferred NOTE - These spark plugs supersede previous recommendations*
14mm Torque to 20-25 ft lbs
COIL: Delco-Remy 1115120.
Ignition Current - 1 8amps idling, 4 0 amps stopped
Resistor - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal
DISTRIBUTOR: Delco-Remy 1112403.
Condenser - Delco-Remy 1928111 **Capacity** 18- 23 mfd
Contact Point Set - Delco-Remy 1924571
Breaker Gap - 016"
Cam Angle - 28-35° with 016" gap
►*BREAKER GAP CAUTION* Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Clockwise viewed from above

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "O" position

Vacuum Spark Control: Delco-Remy No 1116140 or 1116089

Vacuum Advanc - 1116140

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
11	22	15-16

Vacuum Advance - 1116089

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
7 5	15	7 5-10

IGNITION TIMING

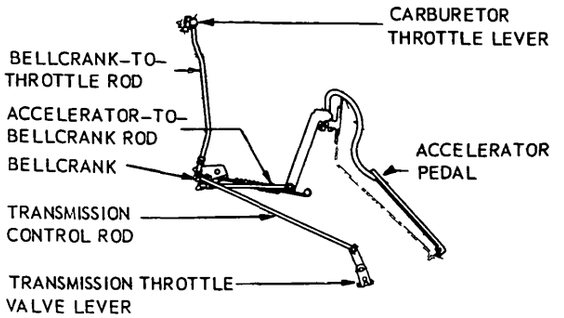
Setting - 5° BTDC at idle speed with vacuum line disconnected Allowable range 0° to 8° BTDC
Timing Mark - First short vertical line on flywheel, clockwise from steel ball (TDC) insert This line should align with pointer in inspection hole in right front face of housing with Octane selector set on "O"

CARBURETOR

►*CARBURETOR APPLICATION Roch st r BC singl barrel carburetor used*

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): 1) Disconnect control rod from throttle lever at transmission cover Remove lower bolt at rear of transmission side cover Rotate throttle valve control outer lever counterclockwise to open throttle position
2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7 09", measure distance from left side cover lower rear bolt to hole in throttle lever If pins of gauge will enter holes, adjustment is correct If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary Reconnect throttle rod
3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever Disconnect accelerator-to-bellcrank rod at bellcrank
4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position
5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank

CONTINUED ON NEXT PAGE



POWERGLIDE THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

ROCHESTER BC

►*INCONSISTENT CHOKE "COME-OFF" DURING ENGINE WARM-UP (All Carburetors)* On all carburetors not marked by change letter "A" or later on identification tag, choke operation during warm-up can be improved by installation of new choke vacuum piston This piston installed on carburetors marked "A" or later *See "Rochester B & BC Carburetor" in Carburetion Section for installation data*

R ch ster BC Single barrel carburetor used as follows

M d l	Rochester Carburetor No.
Synchro-mesh (Std)	7013003
Synchro-mesh (Governor)	7013005
Synchro-mesh (Economy)	7013955
Powerglide (Std)	7019000
Powerglide (Economy)	7013956
Powerglide (Governor)	7012502

Idl S tting - 1½ turns open 2½ turns open after engine temperature normal

Idl Sp d - 475 RPM Synchro-mesh, 450 RPM Powerglide in "D"

Fl at L v l - 1 9/32" (Gauge M-250) With air horn inverted and gasket in place, position Gauge M-250 over floats with tang inserted in discharge nozzle Bend float arms as necessary so that top of each float just touches gauge and float is centered between gauge legs

Fl at Dr p - Bend float tang as necessary to obtain a distance of 1¾" from gasket surface to bottom of float, with air horn upright and float hanging free

Aut matic Ch k Setting: 1 notch rich (Synchro-mesh), 2 notches rich (Powerglide exc 7012502), Index (7012502)

Fast Idl : With fast idle adjusting screw on second step and against high step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore To adjust, bend connector rod

Throttl Linkag Adjustm nt: *See CARBURETOR above*

►*OTHER DATA· See "Rochester BC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fu l Pump: AC Diaphragm type Fuel only

R plac m nt Fu l Pump - AC 4434

Pr ssur - 3½-4½ lbs. at 450-1000 RPM

Gas lin Gaug : AC Electric type

Dash Unit - AC No 5643416

Tank Unit - AC No 5641248 (Except Station Wagon), No 5641438 (Station Wagon)

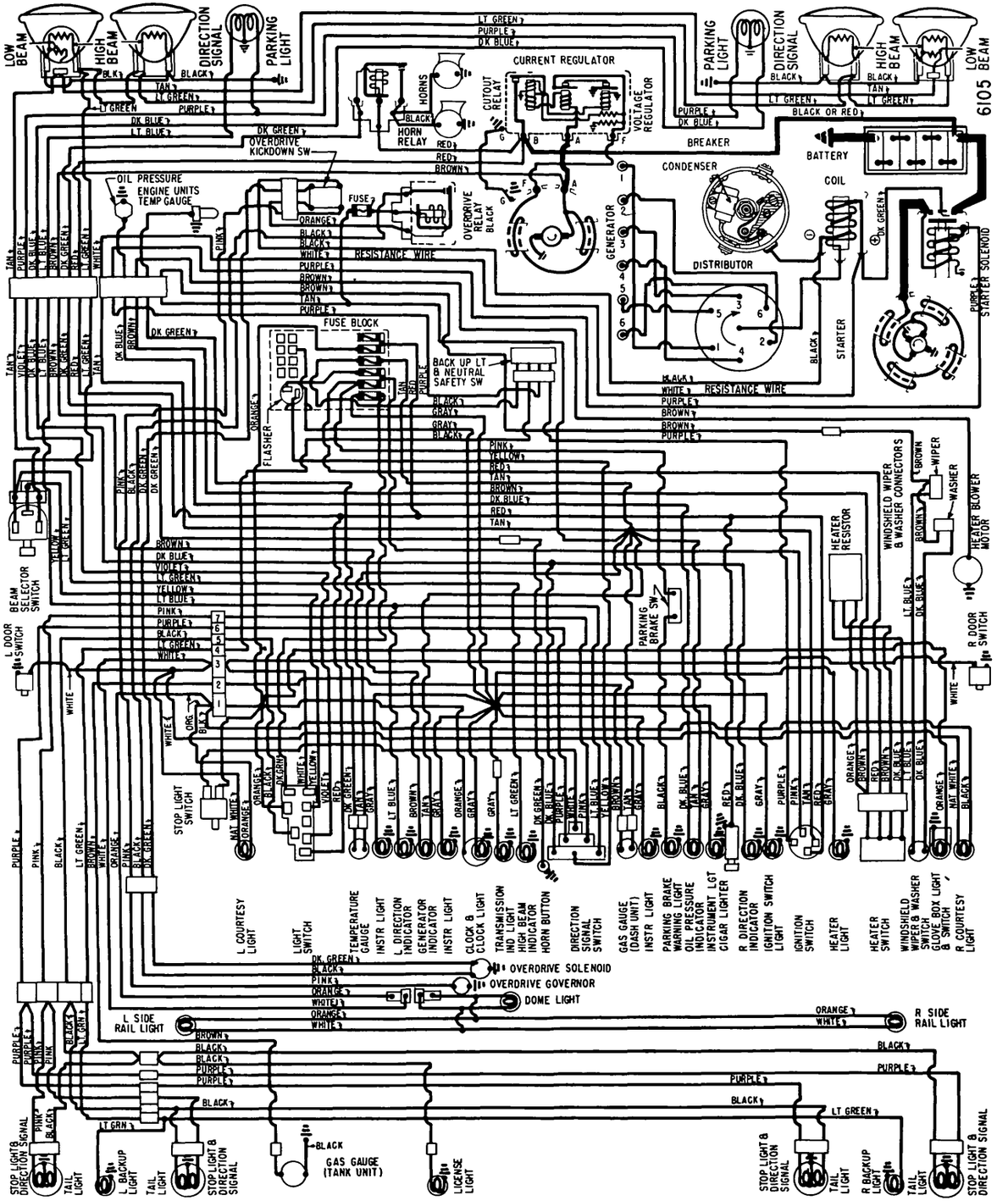
Fu l Filter: In fuel inlet line at carburetor Clean with solvent and compressed air Replace every 15,000 miles

Cruise Control: Automatic Speed Control *See "Cruise Control" in Carburetion Section*

ELECTRICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC ELECTRICAL DATA*

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTIONS: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own. 6 cyl. valve-in-head

Bore	Stroke	Displacement
3 9/16"	3 15/16"	235.5 cu. in.
Compr. Ratio	**Rated HP**	**Developed HP**
8.25-1	30.4	135 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data*

OIL PAN REMOVAL: Drain crankcase and cooling system, raise and support car, remove radiator. Disconnect battery ground strap at engine, fuel pump inlet line at pump, and accelerator control rod at accelerator control rod lever. Remove overdrive solenoid Disconnect power brake hose at check valve, and remove oil filter and support bracket assembly. Disconnect exhaust pipe from exhaust manifold, and transmission lower control rods at transmission shifter levers Disconnect clutch fork pushrod at clutch fork and all clutch controls from engine. Loosen transmission mounting bolts and disconnect engine front mounts from engine. Remove hood. Raise engine approximately 3" until valve rocker cover contacts dash upper panel Remove flywheel underpan extension and remove oil pan *NOTE* - Rotate crankshaft as necessary for oil pan to clear counterweights

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*ENGINE DATA NOTE:* Data following includes both Pass. Car & Trucks as noted.

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".

Removal - Pistons and rods removed from above.

Clearance - (235" Pass.) .0005-.0011"; (235" Trk.) .0006-.0010"; (261") .0012-.0016".

►*STANDARD & .001" PISTON NOTE:* Standard and .001" pistons are furnished in two sizes as follows:

235" Engine - Std. - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize** - Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").

261" Engine - Std. - Marked **S4** (3.7500-3.7505"), **S5** (3.7505-3.7510"), **.001" Oversize** - Marked **S6**(3.7510-3.7515"), **S7** (3.7515-3.7520").

Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with top surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.

Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.

Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize.

PISTON PIN

Locked in rod. No bushing used in piston

Diameter - 235" Eng. - .8660-.8665" **261" Eng.** - .9270-.9275".

Pin Fit in Piston - .00015-.00025" clearance. With both piston and pin at 70°F, and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure.

Replacement Pins: Furnished Std. & .0015", .003", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1 & 2).	.0930-.0935"	①	②
Oil (3)	③	④ .015-.055"	.000-.008"

① - (235") 007-.020" (Pass.), .0007-.017" (Trucks); (261") .015-.025" (Top), .010-.020" (No. 2).

② - (235") .002-.004". (261") 002-.0035".

③ - (235" Pass) .184-188", (235", 261" Truck) 177-182"

④ - On rails.

Replacement Rings: Furnished Std., .020", .030" and .040" Oversize.

►*RING INSTALLATION CAUTION* Install Compression rings with side marked "GM" up.

CONNECTING ROD

Length - 6.81" Center-to-center.

Crankpin Journal Diameter - 2.311-2.312".

Lower Bearing - Replaceable precision type.

Clearance - 001-.003" (New), .001-004" (Used).

Sideplay - .005-.012".

Replacement Bearings: Std. & .001", .002", .010", 020" Undersize.

Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft.

CRANKSHAFT

Journal Diameters - (1) 2.6835-2.6845", **(2)** 2.7145-2.7155", **(3)** 2.7455-2.7465", **(4)** 2.7765-2.7775".

Clearance - (235" Pass.) .0008-.0024" (No. 1,2), .0010-0026" (No 3,4)

(235", 261" Trk.) New - .001-.003". Used - (235") .001-.004", (261") .001-0045".

Bearing - Thin wall babbitt with steel back.

Bearing Adjustment: Precision type. Replace bearings.

End Thrust - Taken by No. 3 (rear intermediate) main bearing.

Endplay - .0035-.0095" (Pass.), .003-.009" (Trk.).

Replacement Bearings: Furnished Std. & 002", 010", .020", .030" Undersize.

Bearing Installation: Can be replaced without removing engine.

See "Crankshaft & Main Bearings" in Chevrolet Special Data

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data*

CAMSHAFT

Journal Diameters - (1) 2.1537-2.1547", **(2)** 2.0912-2.0922", **(3)** 2.0287-2.0297", **(4)** 1.9662-1.9672".

►*NOTE:* Journal out-of-round limits .001". Run-out limits .002"

Bearing Type - Steel backed babbitt lined bushings, no reaming required.

Clearance - .0015-.0035".

End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket.

Endplay - .001-.005".

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe *See "Camshaft & Bearings" in Chevrolet Special Data*

Timing Gear: Fibre camshaft gear, steel crankshaft gear.

Back Lash - .003-.005".

Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data*

Camshaft Setting: Timing is correct when timing marks on gears are together.

Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data*

VALVES

Tappet Clearance: (1300 with Synchro-mesh) 006-011" Intake, 013-018" Exhaust

Others - Zero lash, hydraulic lifters *NOTE - For "Initial Valve Adjustment" see below*

Initial Valve Adjustment (Hydraulic Lifters): Use distributor rotor position for determining when lifter is on base circle of cam. With rotor pointing at No 1 cylinder (points open) turn adjusting screw down until all lash is removed (by checking pushrod side play), then turn screw down an additional 1½ turns and tighten locknut. Repeat on other valve for that cylinder Continue to adjust valves for each cylinder using firing order sequence

Trucks - (235") .006" Intake, .018" Exhaust. (261") .006" Intake, 020" Exhaust. All Hot.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	3410-.3417"	①
Exhaust	1.495-1.505"	③	②

Valve	Seat Angle	Lift	Stem Clearance
Intake	④ 31°	⑤ .3275"	.0010-.0027"
Exhaust	④ 46°	⑤ .3275"	⑥

① - (235" Pass.) 6.376-6.396"; (235" & 261" Trk.) 6.364-6.394"

② - (235" Pass.) 4.913-4.933"; (235" Trk) 4.905-4.930", (261" Trk.) 4.902-4.932".

③ - .001" taper 3410-3417" (top), 3400-3407" (bottom)

④ - Valve face angle 30° Intake (All Engines), 45° Exhaust (235"), 46° (261" - see "Caution" below)

⑤ - (1300 with Synchro-mesh) .3105" Intake, .3325" Exhaust

⑥ - .0016-.0033" (Pass Cars), .0013-.0030" (Trucks)

►*VALVE GRINDING CAUTION:* Replacement valves are furnished with face angles of 30° and 45°. When seats are ground to recommendations of 30° and 45°. valves must be faced to recommended angle of 29° Intake, 44° Exhaust.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*VALVE STEM END GRINDING CAUTION (261" Eng)* DO NOT grind hardened valve stem tip excessively on 261" Engine

►*261" EXHAUST VALVE SEAT & FACE ANGLE NOTE & VALVE GRINDING CAUTION* **Exhaust valves** on 261" engine have 46° valve face and seat angles Exhaust valves have a hardened stellite face When refacing valves and seats, grind each to 46° angle for parallel fit

Valve Seat Width - 235" Eng 1/16-3/32" (Int & Exh) **261" Eng** - 1/16 3/32" (Int), 3/32 1/8" (Exh)

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data*

Valve Guides: Precision type, pressed in head

Valve Guide Installation - *See "Valve System" in Chevrolet Special Data*

Valve Springs: Install springs with closed coil end down **Free Length** - Pass 2 16" 235" truck 2 156" 261" truck 2 281"

Spring Specifications (Pass)

Valve	Pressure	Length
Closed	62 68 lbs	1 858"
Open	158-168 lbs	1 528"

Spring Specifications (Trucks)

Engine	Pressure	Length
235"	65 lbs	1 27/32"
261"	78 lbs	1 27/32"

►*VALVE SPRING HEIGHT CAUTION* Check installed height of valve springs If distance from spring seat in head to top of valve spring exceeds 1 7/8", install shims under spring to bring installed height within limits of 1 51/64-1 7/8"

Valve Lifters (Pass) Hydraulic standard except Biscayne Fleetmaster 1300 Series which has mechanical type *See 'Valve System' in Chevrolet Special Data* **(Trucks)** - Mechanical type

Valve Rotators: Rotocoil type used on some engines

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

Valve Timing Specifications (Pass. Exc 1300 with 3-Speed Trans.)

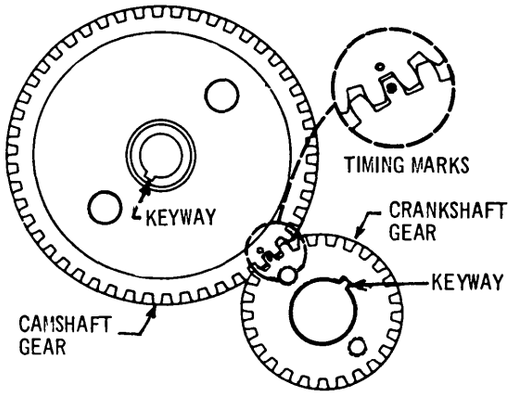
Intake Valves - Open 16° BTDC Close 48° ALDC
Exhaust Valves - Open 46° 30' BLDC Close 17° 30' ATDC

(1300 with 3-Speed Trans)

Intake Valves - Open 1° ATDC Close 39° ALDC
Exhaust Valves - Open 42° BLDC Close 9° ATDC

(235" Truck)

Intake Valves - Open 28° BTDC Close 68° ALDC
Exhaust Valves - Open 56°30'42" BLDC Close 23° 30'42" ATDC



CHEVROLET 6 CYL. VALVE TIMING MARKS

(261" Truck)

Intake Valves - Open 11°30' BTDC Close 52°30' ALDC
Exhaust Valves - Open 51° BLDC Close 13° ATDC
Valve Timing Check - *NOTE - Mechanical type lifter must be used when making valve timing check* Remove all tappet clearance from No 1 exhaust valve Turn engine over until this valve opens and just starts to close and until triangular flywheel mark (19° BTDC) lines up with pointer on right face of flywheel housing Mount dial indicator on rocker arm shaft with stem of indicator contacting No 1 exhaust valve adjusting screw and set dial indicator to 043" (235"), 063" (261") Turn crankshaft until indicator hand just stops moving Timing is correct if indicator reading is ZERO plus or minus 005" A greater or lesser reading indicates either excessive gear wear or improperly installed timing gears Reset tappet clearance to specifications

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data*

Crankcase Capacity: (235") 5 qts (261") 6 qts Add 1 qt for filter

Normal Oil Pressure: 35 lbs at 2000 RPM

Pressure Regulator Valve - In oil pump body Not adjustable

Oil Pressure Indicator - Light located on left side of instrument panel, controlled by pressure switch AC No 1508753 located in main oil gallery on left side of engine Switch closes when pressure drops to 4-7 lbs

Oil Pump: Gear type Located in crankcase, driven by distributor gear

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data*

Oil Filter Element: Replacement element AC No 115 Replace every 4000 miles

Crankcase Ventilation (Standard): Air intake through breather filter in valve rocker arm cover and outlet through crankcase breather pipe on right side of engine **Servicing** - Clean breather filter in a good solvent every 2,000 miles, then oil mesh with light engine oil

Crankcase Ventilation (Optional): Positive Type. Two types used as follows 1) Conventional road draft tube replaced by a crankcase outlet pipe with baffles in upper end Ventilation valve in upper end of outlet pipe is connected to intake manifold by a hose 2) Same as Type 1) above with additional fresh air intake from carburetor air cleaner to valve rocker cover Oil filler breather cap is replaced by solid non-breather type *Both types are serviced in same manner See "Closed Crankcase Ventilation Systems" in Carburetion Section*

ENGINE COOLING SYSTEM

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS) Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material*

Water Capacity: 17 qts (Synchro-mesh), 16½ qts (Powerglide) without heater Add 1 qt for heater

Pressure Valve: Radiator filler cap, AC No 850800 Type RC-6, 13 lb

Thermostat: Pellet type In cylinder head water outlet 170°F Std , 160°F & 180°F Optional Use 160°F thermostat with Methanol type anti freeze

Temperature Gauge: AC Electric

Dash Unit - AC No 1514346

Engine Unit - AC No 1513321

Water Pump: Packless type with sealed ball bearing *See "Cooling System" in Chevrolet Special Data*

LUBRICATION

POWERGLIDE AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1000 miles Drain and refill only when transmission removed and disassembled for repairs Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used)

Checking Fluid Level: Check with engine idling, transmission at normal operating temperature, and selector lever in "N" (neutral) position Dipstick located under hook on right side of engine Add fluid only when level near "Add" mark on dipstick, do not fill above "Full" mark on dipstick Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used)

Capacity - 3½ qts (transmission only), 10½ qts (transmission & converter)

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION (ALL MODELS)* *B fore jacking, hoisting, towing or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Model	Series
Corvette	897
Biscayne, Brookwood ①	1200
Biscayne Fleetmaster	1400
Bel Air, Parkwood ①	1600
Impala, Nomad ①	1800

① - Station Wagons

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post *NOTE* - Number (example below) includes identification data

① ② ③ ④
1 1211 F 100001

① - Year 1 1961
② - Series Prefix See Series Table below
③ - Assembly Plant See Assembly Plant Table below.
④ - Unit Number Continuous for each assembly plant (Passenger & Corvette separately) beginning with 100001

Series Prefix

Biscayne	Series Prefix	Impalla	Series Prefix
2-Dr Sedan	1211	2-Dr Sedan	1811
2-Dr Utility (3 Pass)	1221	4-Dr Sedan	1869
4-Dr Sedan	1269	4-Dr Sport Sedan	1839
Biscayne Fleetmaster		2-Dr Sport Coupe	1837
2-Door Sedan	1411	2-Dr Convertible	1867
4-Door Sedan	1419	**Bel Air**	
Station Wagons		2-Dr Sedan	1611
Brookwood 4-Dr 6 Pass	1235	4-Dr Sedan	1669
Brookwood 4-Dr 9 Pass	1245	4-Dr Sport Sedan	1639
Parkwood 4-Dr 6 Pass	1635	2-Dr Sport Coupe	1637
Parkwood 4-Dr 9-Pass	1645		
Nomad 4-Dr 6 Pass	1835	**Corvette**	
Nomad 4-Dr 9 Pass	1845	2-Pass Conv	0897

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad at front right hand side of cylinder block *NOTE* - Number (example below) includes identification data as indicated

① ② ③
T 0101 C

① - Engine Plant **F** - Flint **T** - Tonawanda **C** - Engines built in Canada
② - Code number indicating month and day of manufacture This is not an individual or continuous number
③ - Engine type See Engine Type Table Below

Engine Type
283" Pass. Car Engine

	3-Speed		Overdrive	
Carburetor Type	**2-Bbl.**	**4-Bbl.**	**2-Bbl.**	**4-Bbl.**
Conv Cars	C	CF	CD	CG
Air Cond Cars	CL	CM		
	Powerglide		**Turboglide**	
Carburet r Type	**2-Bbl.**	**4-Bbl.**	**2-Bbl.**	**4-Bbl.**
Conv Cars	D	DB	E	FB
Air Cond Cars	DK	DM	EG	FJ

283" Corv tt Engin

Carbur t r Typ	3-Sp d	P w rglid
One 4-Bbl Carb	CQ	DG
Two 4-Bbl Carbs	CT,CU③	DJ
Fuel Inj Carb ①	CR,CS③	
Fuel Inj Carb ②	CY,CZ③	

348" Pass. Car Engine

Carburetor Type	3-Speed	Powerglide	Turboglide
4-Bbl Carb (WCFB)	F		H
4-Bbl Carb (AFB)	FL,FJ③	GE,GD③	
Three 2-Bbl Carbs	FA③,FH④		HA

① -Cast Iron Head ② - Aluminum Head ③- Special Cam ④ - High Performance (Special Camshaft & Mechanical Lifters)

TUNE-UP

COMPRESSION PRESSURE: 283" Pass. - 2-Bbl Carb 150 lbs , 4-Bbl Carb & Fuel Injection 160 lbs
348" Pass. - 160 lbs Highest and lowest cylinder must be within 20 lbs

VALVE TAPPET CLEARANCE: Hydraulic Lifters - *See "Valve System" in Chevrolet Special Data and note "Production Change & Caution" below*
Mechanical Lifters - 348" & 409" - 008" Intake, 018" Exhaust, Hot **Corvette** - 012" Intake, 018" Exhaust, Hot

►*HYDRAULIC LIFTER PRODUCTION CHANGE & ADJUSTMENT CAUTION* Early cars use "long travel" lifters, later cars use "short travel" type Adjustment is different for each type and proper lifter identification must be made to prevent extensive engine damage *For lifter identification and adjustment, see "Hydraulic Lifter Adjustment" in Chevrolet Special Data*

MANIFOLD HEAT CONTROL: Heat control valve and thermostatic coil assembly located between right exhaust manifold and crossover pipe (Single Exhaust), exhaust pipe (Dual Exhaust) Assembly not used in fuel injection cars Make sure valve shaft is free to turn If sticking, free up with G M Manifold Heat Control Solvent or equivalent

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7
SPARK PLUG GAP: 035" (033- 038")
Spark Plugs - AC. Used as follows *NOTE - Following spark plugs supersede previous recommendations* 14mm Torque to 20-25 ft lbs

Model	Std.	Hotter	Colder
283" Pass (Std)	45	46	①C43COM
283" Corvette (1 or 2 Carbs)	45	46	②
283" Corvette (Fuel Inj)	44	45 or 46	②
348" Std Cam③	44N		43N
348" Special Cam④	43N	44N	C42N-COM

① - Or 44 C43COM preferred
② C43COM (Heavy Duty), C42-1COM (Road Racing)
③ - Except 3 Carb Engines FH, FJ, GD
④ - Including 3 Carb Engines FH, FJ GD

COIL: D lco-Remy. 283" - No 1115115
Corv tt - No 1115091 (Std), No 1115107 (Fuel Inj)
348" - No 1115083 (250,305 HP), No 1115156 (280 HP), No 1115107 (340 HP), No 1115157 (350 HP)
Ignition Current - 1 8 amps idling, 4 0 amps stopped
Resistor (348" Eng. with Thr 2-Bbl. Carbs. and Special Camshaft) - Delco-Remy No 1931385
Resistor (Others) - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal

DISTRIBUTOR: Delco-Remy. Used as follows

Application	D lco-R my No
283" (2-Bbl Carb)	1110947
283" (4-Bbl Carb)	1110946
348" (Std Cam)	1110948
348" (Sp Cam)	1110919
Corvette (4-Bbl Carb)	1110946
Corvette (Dual 4-Bbl Carb)	1110891
Corvette (Fuel Inj Std Cam)	1110915
Corvette (Fuel Inj Spec Cam)	1110914

►*DISTRIBUTOR NOTE* Different types used as follows
Models 1110915, 46, 47, 48 - External adjustment "Window" type
Models 1110891, 914, 919 - Double breaker with conventional distributor cap (not window type) Vacuum spark control not used (centrifugal weight advance only)
Condenser - Delco-Remy No 1932004 (Std), No 1869704 (2 Carb Engines), No 1942284 (348" & Fuel Inj)
Condenser Capacity - 18- 23 mfd
Contact Point Set - Delco-Remy No 1938330 - 2 sets (2 Carb Engines), No 1931988 - As Required (All (Others)
Breaker Gap (Window Typ) - Gap (016") will be correct when cam angle correctly set (see below)
Breaker Gap (Double Break r) - 014- 018" (new points)
Cam Angle (Window Type) - 28-32° Set at 30° Gives 016" point opening
Cam Angle (Double Breaker) - Adjust each set of points to 29°±1° with other set blocked open with 025" thick insulator Cam angle for both sets of points operating together should be 34°±1°
Breaker Arm Spring Tension - 19 23 ozs
Rotation - Clockwise viewed from above

Automatic Advanc - 1110891, 915, 946

Degrees	Distr	RPM	Degrees	Eng	RPM
5-2 5		400	1-5		800
6-8		750	12-16		1500
9 5-11 5		1300	19-23		2600
13-15		1850	26-30		3700

Automatic Advance - 1110914

Degrees	Distr	RPM	Degrees	Eng	RPM
Start		600	0-4		1200
1 5-3 5		750	3-7		1500
6-8		1950	12-16		3900
10-12		3000	20-24		6000

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Aut matic Advance - 1110919

Degrees Distr	RPM	Degrees Eng.	RPM
5-2 5	400	1-5	800
6 5-8 5	775	13-17	1550
9 5-11 5	1600	19-23	3200
13-15	2500	26-30	5000

Automatic Advance - 1110947

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-4	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3750

Automatic Advance - 1110948

Degrees Distr	RPM	Degrees Eng	RPM
Start	425	0-4	850
4 5-6 5	800	9-13	1600
8-10	1600	16-20	3200
11-13	2300	22-26	4600

Vacuum Spark C ntr l· Delco-Remy 1116134 (1110915 Distr), 1116148 (1110946, 947, 948 Distr) *NOTE - Vacuum unit not used on double breaker type distrib utors*

Vacuum Advance - 1116134

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	3 75-5 75
12	24	13-15

Vacuum Advance - 1116148

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	7-9
8 0	15	15-16

IGNITION TIMING

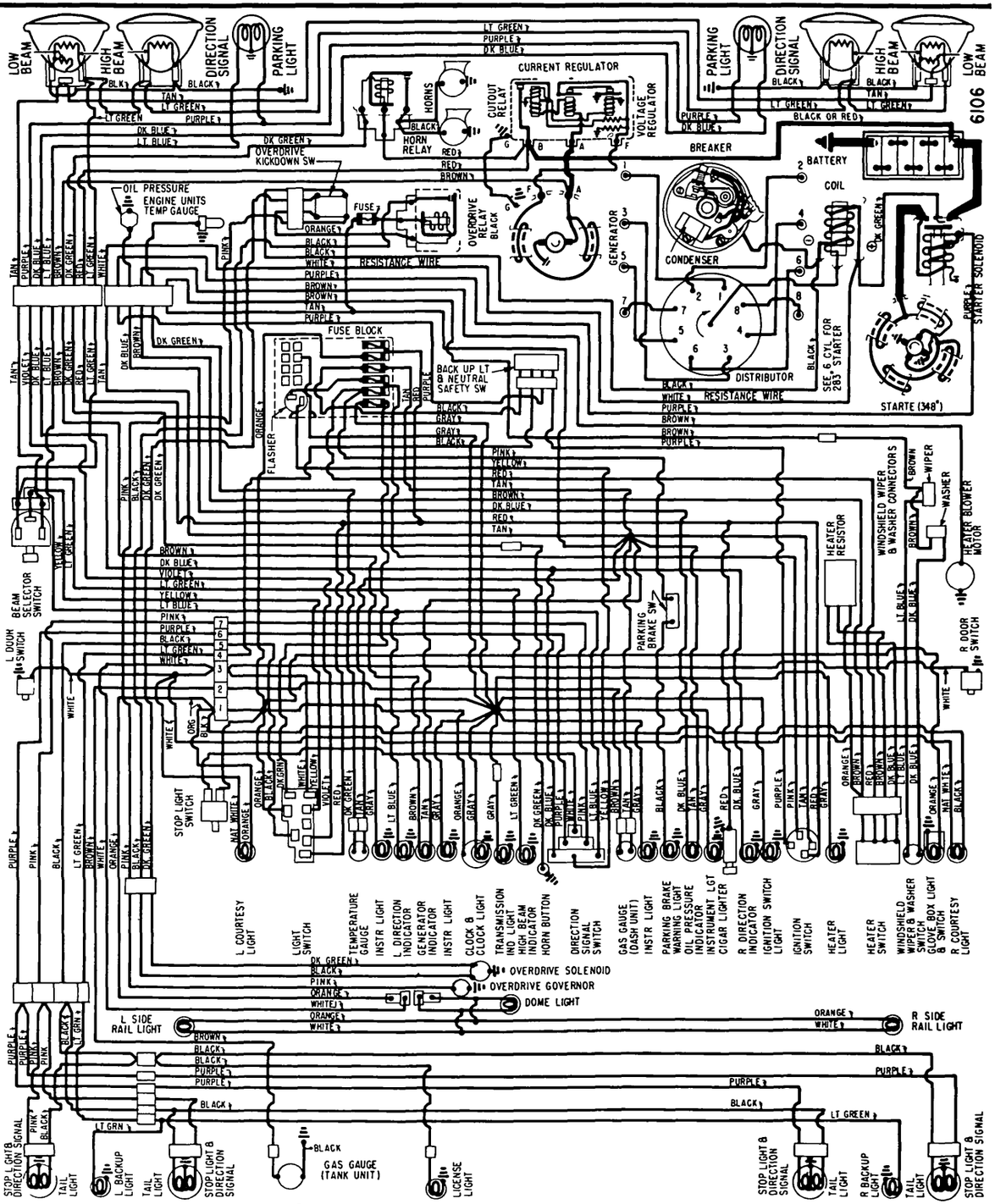
Engine	Std Setting
283" (2 or 4-Bbl Carb)	① 4° BTDC
Corvette (One 4-Bbl Carb)	① 4° BTDC
(2,4-Bbl Carb Reg Cam)	⑪ 12° BTDC
(2,4-Bbl Carb Sp Cam)	① 12° BTDC
(Fuel Inj Reg Cam)	⑰ 8° BTDC
(Fuel Inj Sp Cam)	② 18° BTDC
348" (Exc Sp Cam)	④ 8° BTDC
348" (Sp Cam)	② 12° BTDC
409"	⑨ 12° BTDC

① - Idling at 475 RPM (Std Trans), 450 RPM (Auto Trans in "D")
② - Idling at 600 RPM (Std 3, 4-Speed Trans)
③ - Idling at 475 RPM (Std 3, 4-Speed Trans)
④ - Idling at 650 RPM

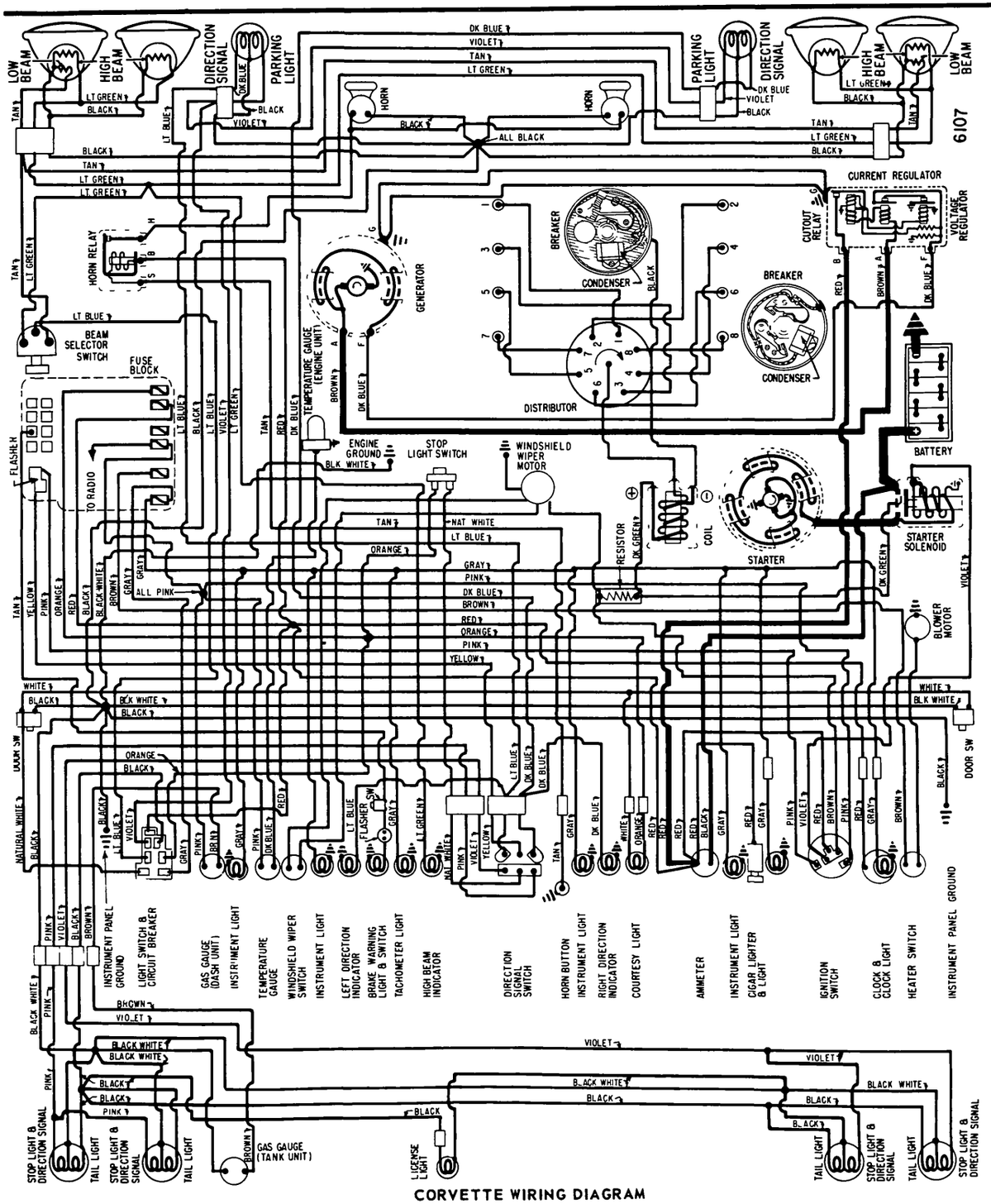
TIMING SETTING CAUTION Timing must be set with vacuum line disconnected and hollow stud on vacuum advance unit covered

Timing Mark - Mark on vibration damper and timing tab attached to engine front cover Timing tab marked "A" (Advance) "O" (TDC) and lines at 2° increments with greatest number of lines on advance or BTDC side

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CHEVROLET PASS. CAR WIRING DIAGRAM



CORVETTE WIRING DIAGRAM

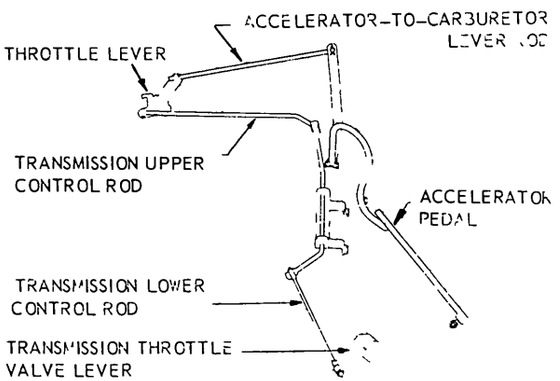
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CARBURETOR

Engine	Carburetor Application
283" Pass. Std,	One Rochester 2GC 2-Bbl.
283" Optl (Std.Trans.)	One Carter WCFB 4-Bbl.
(Auto. Trans.)	One Rochester 4GC 4-Bbl.
348" Std. (Std. Trans.)	One Carter WCFB 4-Bbl.
(Auto.Trans.)	One Roch. 4GC or Carter WCFB 4-Bbl
348" Optl.(All Trans)	Three Rochester 2GC 2-Bbl.
348" Optl.(Reg. Cam)	One Carter AFB 4-Bbl.
348" Optl. (Sp. Cam)	One Carter AFB 4-Bbl
348" Optl (Sp. Cam)	Three Rochester 2GC 2-Bbl
409"	One Carter AFB 4-Bbl
Corvette Std.	One Carter WCFB 4-Bbl
Optl. (Reg Cam)	Two Carter WCFB 4-Bbl
Optl. (Sp.Cam)	Two Carter WCFB 4-Bbl
Optl. (Reg. Cam)	Rochester Ramjet Fuel Injection
Optl. (Sp. Cam)	Rochester Ramjet Fuel Injection

►*AIR CONDITIONING FAST IDLE CAUTION:* Adjust stop on dash Fast Idle Control Wire to provide 900 RPM engine speed when knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustment and that Air Conditioning Fast Idle Control Linkage **does not** interfere.

THROTTLE LINKAGE ADJUSTMENT: Powerglide Cars - Remove lower control rod and loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotated counterclockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor and open throttle. Adjust upper control rod length for free entry into throttle lever. Check adjustment by releasing linkage to its idle position then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" (Pass Car), 85" (Corvette), wood block under accelerator pedal rod, depress accelerator against block and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length of accelerator rod when detent is not felt before reaching wide open throttle.

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POWERGLIDE & TURBOGLIDE THROTTLE LINKAGE

CONTINUED FROM PRECEDING PAGE

Turboglid Cars - Disconnect transmission throttle valve rod and accelerator rod from carburetor throttle lever Pull throttle valve rod forward to full limit of its travel and then adjust swivel for free entry into carburetor throttle lever with lever in wide open position Attach swivel to lever To check adjustment, put carburetor throttle lever in wide open position and push downward (counterclockwise) on transmission throttle valve lever If transmission throttle valve rod attached to carburetor throttle lever deflects (transmission not on internal stop) or carburetor throttle lever will not reach wide open position, repeat adjustment Now place carburetor throttle lever at wide open throttle and depress accelerator pedal to hold pedal lever in contact with stop Adjust swivel on accelerator rod for free entry into carburetor throttle lever Secure swivel to lever Depress accelerator pedal by hand Detent should be felt before accelerator pedal rod strikes carpet.

THROTTLE RETURN CHECK ADJUSTMENT (Turboglid Cars): With fast idle screw on high step of fast idle cam, hold plunger with an open end wrench and turn plunger screw so it just contacts carburetor throttle lever To check, make a full throttle start, then release accelerator and apply brakes simultaneously If engine remains at high RPM turn plunger screw clockwise ½-turn If engine stalls, turn screw ½-turn counterclockwise

ROCHESTER 2GC 2-BARREL

Rochester 2GC 7019007 (Std. Trans.), 7019008 (Auto. Trans.), 7019018 (Air Cond.). Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7*

►*IDLE COMPENSATOR CAUTION* When making idle Setting & Idle Speed adjustments, Idle Compensator must be in closed position Depress button on back side of float bowl

Idle Setting - Initial setting 1½ turns open Adjust both screws alike After idle speed set to correct specifications (see "Idle Speed" below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM *NOTE* - Approximate adjustment can be obtained by setting screws lean to moderate rough idle and then backing out ¼ turn

Idle Speed - 475 RPM (Std Trans) 450 RPM (Auto Trans in "D") with Idle Compensator button pushed in, on air conditioned car (Idle Compensator "off")

Float Level - 1 23/64" (Gauge BT-152) With air horn inverted and gasket in place, position float level gauge over float, so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float Bend float arm to adjust

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" (Gauge BT-152) from gasket surface to bottom of float, with air horn upright and float hanging free Use scale or scribed mark on float and pump gauge

Automatic Choke Setting: Centered at index (7019008, 9018) 1 notch lean (7019007)

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See 'Rochester 2G & 2GC Carburetors" in Carburetion Section*

ROCHESTER 4GC 4-BARREL

Engine	Rochester No.
283" Pass Auto Trans (Std) Early	7019004
283" Pass Auto Trans (Std) Later	7019014
283" Pass Auto Trans (Air Cond) Early	7015010
283" Pass Auto Trans (Air Cond) Later	7019010
348" Pass Auto Trans (Std)	7019006
348" Pass Auto Trans (Air Cond)	7015012

►*LATER PRODUCTION CARBURETOR NOTE* These carburetors provide smoother acceleration and improved wide open throttle torque

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making Idle Setting and Idle Speed adjustments Remove air cleaner and insert pencil or suitable tool in throttle bore

Idle Setting - Initial setting 1½ turns open After idle speed correctly set (see "Idle Speed" below), turn each idle mixture screw for smoothest idle with highest vacuum reading and RPM *NOTE* - Approximate adjustment can be obtained by setting screws lean to moderate rough idle and then backing out ¼ turn

Idle Speed - 450 RPM in "D" (Drive) with Idle Compensator closed

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Rochester 4G & 4GC Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL

Engine	Carter No.
283" Pass (Std Trans)	3059S
283" Corv (All Trans)	3059S
348" Pass (3,4-Speed Trans)	3060S
348" Pass (Auto Trans)	3061S

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

Idle Setting - ½-2 turns open Turn both screws alike Turn screws out for richer mixture

Idle Speed - 475 RPM (Std Trans), 450 RPM (Auto Trans in "D")

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA· See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Engine	Carter No.
348" (305 & 340 HP)	3012S
348" (305 HP 9 5-1 Early, 11-1 All)	3012S
348" (305 HP 9 5-1 Later)	3221S
348" (340 HP)	3012S
409"	3270S

Idle Setting - ½-2 turns open Turn both screws alike Turn screws out for richer mixture

Idle Speed - **(305 HP)** 475 RPM (Std Trans), 450 RPM (Auto Trans in "D")

(340 HP) 600 RPM (3,4-Speed Trans)

(409") - 650 RPM

Throttle Linkag Adjustment· *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

CARTER WCFB 4-BARREL (Tw Carbur tors)

Engin	Cart r Carb. N . Front	Rear
Corv Hyd Lifters	2626S	2627S
Corv Hyd Lifters Ⓒ	3181S	2627S
Corv Mech Lifters	2613S	2614S
Corv Mech Lifters Ⓒ	3182S	2614S

Ⓒ - With Crankcase Ventilation

Idle Setting - 1/8-1 1/4 turns open (2613S,2614S, 3182S), 1/4-1 1/4 turns (2626S,2627S,3181S) Adjust all four mixture screws equally

Idle Speed - (Hyd. Lifters) 475 RPM (Std Trans), 450 RPM (Auto Trans in "D")

(Mech. Lifters) 600 RPM

Interconnecting Linkage Adjustment: Adjust rear accelerator rod so that rear carburetor throttle valves are wide open when accelerator pedal is ¾" from toe board With rear carburetor throttle valves wide open, adjust front carburetor control shaft until throttle valves of front carburetor are wide open and adjust throttle stop When linkage properly adjusted, front carburetor throttle valves will be open when rear carburetor throttle valves are approximately at half throttle

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section*

TRIPLE CARBURETORS (Rochester 2G & 2GC)

Engine	Rochester Carburetor N . Front	Center	Rear
348" Synchro-mesh, Std	7013015	7013020	7013017
348" Synchro-mesh, Optl	7013973	7013974	7013975
348" Auto Trans ,Std	7013015	7013016	7013017

Idle Speed - Hyd. Lifters - 475 RPM (Synchro-mesh) 450 RPM (Auto Trans in "D") **Mech. Lifters** - 600 RPM *For complete adjustment data on these carburetors including linkage adjustment to secure correct synchronization, see "Rochester Triple Carburetors' in Carburetion Section*

ROCHESTER "RAMJET" (Fuel Injection)

Model	Rochester Fuel Injection N .
Corv (Hyd Lifters)	7017310
Corv (Mech Lifters)	7017320

►*NOTE For adjustments, see "Pochester Ramjet Fu l Injection" in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump: AC diaphragm type Fuel only

Replacement Pump - AC No 4701 (283"), No 4657 (348" except Sp Cam & SM), No 4799 (348" Sp Cam & SM)

Pressure - 5¼-6½ lbs (4701, 4657), 9¼ 10¾ lbs (4799)

Gasoline Gauge: AC Electric

Dash Unit - AC No 5643416 (Pass), No 5643258 (Corvette)

Tank Unit - See table below

Model	AC No
Pass (Except Sta Wgn & Dual Exhaust)	5641248
Pass Dual Exhaust (Except Sta Wgn)	5641461
Station Wagon (Except Dual Exhaust)	5641438
Station Wagon (With Dual Exhaust)	5641533
Corvette	1518785

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Air Cleaner: Pass Car - Dry paper element type Check for restriction every 5000 miles and replace as required
Corvette - With Carburetor - Oil wetted polyurethane element type Remove element from screen, rinse in solvent or kerosene every 5000 miles, squeeze lightly, reoil with clean engine oil, and carefully reinstall
With Fuel Injection - Dry paper element type Check for restriction every 5000 miles and replace as required
Fuel Filter, In fuel inlet line at carburetor Clean with solvent and compressed air Replace every 15,000 miles
Cruise Control: Automatic speed control *See 'Cruise Control" in Carburetion Section*

BATTERY

6 Cyl., 283" (Pass. & Corvette) - Delco No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr rate)
348" - Delco No. 558. 12 volt, 11 plate, 61 ampere hour capacity (20 hr rate)
Battery Ground - Negative, to engine
Engine Ground - Engine to cowl

STARTER

Delco-Remy. Used as follows

Engine	Delco-Remy No.
6 Cyl (All)	1107888 or 1107652
283" (Exc Turboglide)	1107889 or 1107664
283" (Turboglide)	1107892 or 1107694
348" (Exc Turboglide)	1107891 or 1107688
348" (Turboglide)	1107890 or 1107687

Armature - Delco-Remy 1932185 (6 Cyl), 1935829 (V8)
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 35 ozs minimum

Performance Data
(1107652,664,694,888,889,892)

Torque	RPM	Volts	℄ Amperes
0 ft lbs	6200-9400	10 6	49 76
	Lock	4 3	270-310

(1107687,688,890,891)

Torque	RPM	Volts	℄ Amperes
0 ft lbs	3600-5100	10 6	65-100
	Lock	3 5	300-360

℄ - Includes Solenoid

Starting Switch: Delco-Remy Solenoid Switch No 1119910 mounted on starter and controlled by Ignition Switch Delco-Remy No 1116592 (Pass), No 1116577 (Corvette)
Neutral Safety Switch: Combination neutral safety and back-up light switch, Delco-Remy No 1998677 (Pass), No 1993520 (Corvette) mounted on steering column under instrument panel **Adjustment** - *See "Powerglide" or "Turboglide" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows

Application	Generator	Armature
6 Cyl. Std	1102096	1923535
283" Std.	1102097	1923535
6 Cyl ,283" Air Cond	1102174	1948005
348" Std	1102097	1923535
348" Air Cond	1102174	1948005
348" Sp Cam	1102173	1948005
Optl	1105116	1940161
Optl	1106679	
Optl	1105123	1945922
Optl	1106681	1927074
Corvette Std	1102043	1929640
Corvette (Fuel Inj)	1102173	1940313

Performance Data

Generator	Amperes	Volts	RPM
1102043,96,97	30	14	2240
1102173,4	35	14	2630
1105123	40	14	1930
1106681	45	13	1400
1105116	35	14	1730
1106679	50	13	1600

Rotation - Counterclockwise at commutator end
Brush Spring Tension - 28 ozs
Field Current - 1 48-1 62 amps (1102043), 1 69-1 79 amps (1102096, 097, 173, 174), 2 73-3 00 amps (1105123,116), 2 14-2 28 amps (1106679,81) All at 12 volts and 80°F
Belt Adjustment: 3/8" (6 Cyl) 3/4" (283"), 13/16" (348") with 15 lb pressure, 7/16-1/2" (Corv) with light thumb pressure midway between generator and fan pulleys

GENERATOR REGULATOR

Delco-Remy. Used as follows

Regulator	Generator No.
1119001 (6 Cyl , 283")	1102043, 096, 097
1119261 (6 Cyl , 283") Replacement	1102043, 096, 097
1119002 (6 Cyl , 283")	1102173, 174
1119234 (348")	1102097
1119261 (348") Replacement	1102097
1119235 (348")	1102173, 174
1119002 (348") Replacement	1102173, 174
1119610	1105123
1119619	1106679 & 1106681
1119604	1105116

►*DOUBLE CONTACT REGULATOR NOTE Regulators 1119604, 610 & 619 have double contacts for voltage regulation*
NOTE - Specifications below are 'Normal settings

Cutout Relay

Cuts In - 11 8-13 5 volts (1119001, 002, 234, 235, 261) 11 8-13 0 volts (1119604,610,619)
Cuts Out (1119261) - 1-4 amperes reverse current at 12 5 volts for relay points to open
Contact Gap - 020"
Air Gap - 023" (1119261), 020" (Others)

Voltage Regulator

Setting (1119001, 002, 234, 235, 261) - 13 8-14 7 volts at 125°F
Setting (1119604,610,619) - 13 8-14 6 volts at 125°F ambient temperature when operating on upper contacts 1- 3 volts lower when operating on lower contacts
Contact Gap (1119604, 610 & 619) - 016" (upper contacts) with lower contacts just touching
Air Gap - 075" (1119001, 002, 234, 235, 261), 067" (1119604,610,619) with armature pressed down to point where contacts just touch

Current Regulator

Setting - 27 0-31 0 amps (1119001,234,261), 31 0-35 5 amps (1119002,235,604), 36 0-40 5 amps (1119610), 46 0-50 5 amps (1119619) at 125°F ambient temperature
Air Gap - 070" (1119261) 075" (Others) with armature pressed down to point where contacts just touch

►*OTHER DATA See "Delco-Remy 1119000 Series (Single Contact) Regulators" and "Delco-Remy 1119600 Series (Double Contact) Regulators" in Electrical Section*

ALTERNATOR & REGULATOR

Delco-Remy Alternator No. 1117070 with Transistorized Regulator No 9000554 and separately mounted Field Relay No. 1116895.
Rotation - Clockwise at drive end
Brush Spring Tension - 13 ozs
Field Current - 5 6-6 3 amperes at 12 volts and 80°F
Rated Output - 60 amperes (hot) - 58 amperes at 14 volts and 2500 RPM (Cold - 70°F)
►*OTHER DATA See "Delco-Remy Alternators (Internal Rectifier) and Transistorized Regulators" in Electrical Section*

MISC. ELECTRICAL

►*DIRECTION SIGNAL FLASHER USAGE CAUTION*
"Two Bulb" type (operates 1 parking light and 1 tail light at a time) used on Biscayne, Brookwood, Bel Air, and Parkwood models "Three Bulb" type (operates 1 parking light and 2 tail lights) used on Impala and Nomad models *DO NOT INTERCHANGE FLASHERS*
Autronic Eye - *See Electrical Section*
Lighting Switch Removal - Pull handle out to "ON" position Depress switch shaft retainer (under dash) and remove knob and shaft assembly Remove retaining ferrule and escutcheon then remove switch assembly Disconnect multi-plug connector *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch
Stop Light Switch Location Mechanical type mounted under dash in contact with brake pedal
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position
Instrument Cluster Console Removal Loosen and slide upwards upper mast jacket retaining clamp to release mast jacket Loosen lower mast jacket retaining clamp and drop mast jacket and steering wheel down Disconnect speedometer cable from speedometer Remove console-to-instrument panel attaching screws and lean console forward onto mast jacket Remove individual instruments as required or remove console as a unit by unsnapping all wire connectors

Speedometer Cluster Removal - After Instrument Cluster Console removed (above), unsnap instrument light sockets from speedometer cluster, remove two attaching nuts and remove cluster

CIRCUIT BREAKER 15 ampere circuit breaker in main lighting switch protects headlights, beam indicator and parking lights
FUSES - Fuses contained in fuse block located under dash on left side except as noted
15 Ampere - Tail, Stop, License, Body, Glove Box lights (also Corvette Parking Brake Warning Light)
10 Ampere - Back-up lights, Clock Parking Brake Warning light (Pass)
10 Ampere - Heater Blower
9 Ampere - Overdrive In wiring harness on engine side of dash
7 5 Ampere - Deluxe Radio
4 Amp r Standard Radio
3 Ampere - All Instrument Panel lights
20 Ampere Air Conditioning Blower

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

►*NOTE: Engines with special camshaft use mechanical valve lifters. In the following data, engines will be referred to by "Special Cam".*

ENGINE SPECIFICATIONS: Own V8, valve-in-head, 283" and 348" engines of same design used previously.

Engine	Bore	Stroke	Rated HP	Displacement
283"	3.875"	3.0"	48	283 cu. in.
348"	4.125"	3.25"	54.5	348 cu. in.

Engine	Compr. Ratio	Developed HP
283" Pass. ①	8.5-1	170 at 4200 RPM
283" Pass & Corv. ②	9.5-1	230 at 4800 RPM
283" Corv. ③	9.5-1	245 at 5000 RPM
283" Corv. ④	9.5-1	270 at 6000 RPM
283" Corv. ⑤	11.0-1	275 at 5200 RPM
283" Corv. ⑥	11.0-1	315 at 6200 RPM
348" Pass. ⑦	9.5-1	250 at 4400 RPM
348" Pass. ⑧	9.5-1	280 at 4800 RPM
348" Pass. ⑦	9.5-1	305 at 5200 RPM
348" ⑦ ⑩	11.0-1	305 at 5200 RPM
348" Pass. ⑦ ⑩	11.25-1	340 at 5800 RPM
348" Pass. ⑨	11.25-1	350 at 6000 RPM

① - One 2-Bbl. Carb. ② - One Carter WCFB 4-Bbl. Carb.
③ - Two 4-Bbl. Carbs.
④ - Two 4-Bbl. Carbs. & Sp. Camshaft.
⑤ - Fuel Injection & Std. Camshaft.
⑥ - Fuel Injection & Special Camshaft.
⑦ - One Carter AFB 4-Bbl. Carb.
⑧ - Three 2-Bbl. Carbs. & Std. Camshaft.
⑨ - Three 2-Bbl. Carbs. & Special Camshaft.
⑩ - Special Camshaft.

►*409" ENGINE NOTE:* This engine is basically the same as the 348" Engine with increased bore and stroke.

Compression & Vacuum Reading - *See TUNE-UP.*

►*CORVETTE (FUEL INJECTION) CYLINDER HEAD NOTE:* Aluminum cylinder head used with fuel injection high compression engines.

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Chevrolet Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Cast aluminum alloy, autothermic type with piston pin offset .060" toward major thrust side.

283" Eng. - Flat head, slipper skirt with machined relief for valve clearance (Std.) or domed piston having machined relief (Fuel Injection).

348" Eng. - Peak roof, slipper skirt (Std.), half flat with machined relief for valve clearance and half slanted downward 16° (With Special Cam).

Removal - Pistons & rods removed from above.

Replacement Pistons: Furnished Std., & .001", .020", .030", .040" Oversize (Exc. 283" Fuel Inj., or 348" Special Cam); Std., .001", .030" (283" Fuel Inj. or 348" Sp. Cam) with fitted pins.

►*STANDARD & .001" OVERSIZE PISTON NOTE:* These pistons furnished in TWO sizes as follows:

283" Eng. - Std. - Marked **S4** (3.8750-3.8755"); **S5** (3.8755-3.8760"); **.001" Oversize** - Marked **S6** (3.8760-3.8765"), **S7** (3.8765-3.8770").

348" Eng. - Std. - Marked **S4** (4.1250-4.1255"), **S5** (4.1255-4.1260"); **.001" Oversize** - Marked **S6** (4.1260-4.1265"), **S7** (4.1265-4.1270").

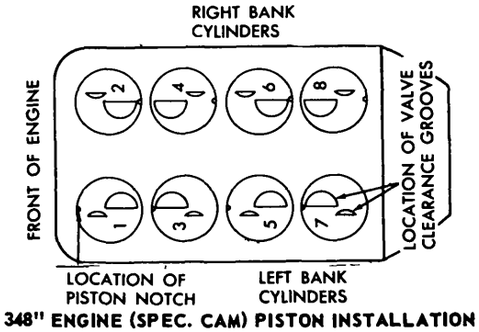
Clearance - As follows:

Engine	Piston Clearance
283" & 348" (8.5 & 9.5-1 ratios)	.0006-.0010"
283" Corvette (11.0-1 ratio)	.0016-.0020"
348" (11.0-1 & 11.25-1 ratios)	.0026-.0030"

Fitting New Pistons (.0006-.0010" Clearance): Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder until center of piston pin is flush with top of cylinder block (283"), flush with counterbore of cylinder block (348"), feeler 90° from pin hole. Pull required to withdraw feeler should be 4-6 lbs. (283"), 5-9 lbs. (348").

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block, except 348" Eng. with Special Cam (see NOTE below). *See Rod Installation.*

►*348" ENGINE WITH SPECIAL CAMSHAFT NOTE:* Pistons used with these engines extend into combustion chamber and must be installed as shown in diagram.



348" ENGINE (SPEC. CAM) PISTON INSTALLATION

PISTON PIN

Pin is press fit in connecting rod.

Diameter - (283" Eng.) .9270-.9273". (348" Eng.) .9895-.9898".

Length - (283" Eng.) 2.990-3.010". (348" Eng.) 3.250-3.270".

Pin Fit in Piston - .00015-.00025". With piston and pin at 60°F, and light film of oil on pin, pin should support own weight in either pin boss.

Pin Fit in Connecting Rod - Press fit in rod. Special procedure used for removal & installation, see *"Piston Pins" in Chevrolet Special Data.*

Replacement Pins: Furnished in assembly with new pistons. Replace with new piston and fitted pin assembly.

PISTON RINGS

Compression rings are plain cast alloy iron, with chrome plated upper and wear resistant coating lower. Oil ring is 3-piece type with chrome plate O.D. rails and stainless steel spacer. *NOTE* - 348" (Special Cam) has cast alloy oil ring.

283" Engine

Ring	Width	End Gap	Side Clearance
Comp. (1&2) ①	.0775-.0780"	.010-.020"	.0012-.0032"
Oil	.184-.188"	②.015-.055"	.0006-.0084"

348" Engine

Ring	Width	End Gap	Side Clearance
Comp. (1&2)	.0770-.0780"	.015-.025"	Free
Oil	③ .184-.188"	⑨.015-.055"	

① - Upper ring .0770-.0780" with Fuel Inj. & Special Cam
② - On rails.
③ - .0855-.1865" with Triple Carbs.
⑨ - .013-.025" with Triple Carbs.

Replacement Rings: Service type rings furnished Std., .020", .030", .040" Oversize.

Installing Rings: Install compression rings with mark "GM" up.

CONNECTING ROD

Length (Center-to-Center) - (283") 5.699-5.701". (348") 6.134-6.136".

Weight - (283") 19.02 ozs. (348") 19.20" ozs.

Crankpin Journal Diameter - (283") 1.999-2.000". (348") 2.199-2.200".

Lower Bearing - Replaceable precision type. **Std.** - Steel backed babbitt. **Special Cam Eng. (Exc. 348" with Auto. Trans.)** Premium aluminum bearings.

Clearance - .001-.003". Wear limit .004".

Sideplay - .008-.014" (two rods).

Replacement Bearings: Std., .001", .002", .010", .020" Undersize.

Installing Rods: *NOTE - See diagram for 348" Eng. (Special Cam) piston installation.* Install rod in piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (marked by cast depression in head of piston and "F" mark on piston strut) on Nos. 1-3-5-7 pistons, and flange on rod to **rear** of piston on Nos. 2-4-6-8 pistons. Install rod and piston assembly in cylinder with cast depression in head and "F" mark on strut toward front of cylinder block. Oil hole in connecting rod will be toward center of engine.

CRANKSHAFT

Journal Diameter - (283") 2.2978-2.2988", (348") 2.4980-2.4990".

Bearings - Replaceable precision type. **Std.** - Steel backed babbitt. **Special Cam Eng. (Exc. 348" with Auto. Trans.)** Premium aluminum bearings used No. 1 through No. 4. No. 5 steel backed babbitt.

Clearance - .0008-.0034". Wear limit .004".

End Thrust - Taken by rear (No. 5) main bearing.

Endplay - .002-.006" (283"); .002-.007" (348").

Replacement Bearings: Std., .001", .002", .010", .020", .030" Undersize.

Bearing Installation: Not necessary to remove engine from car, *see "Crankshaft & Main Bearings" in Chevrolet Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*

Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*SPECIAL CAMSHAFT NOTE: Special camshaft used in various engines. Mechanical valve lifters used with these camshafts.*

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. *See "Camshaft & Bearings" in Chevrolet Special Data.*

Journal Diameter - (All) 1.8682-1.8692".

Bearings - Steel backed babbitt lined bushings.

Clearance - .0015-.0035".

Replacement Bearings: "Precision" type (do not require reaming). Use Tool J-6098 to remove and install bearings.

Camshaft Setting: Both Sprockets marked "0". Install chain with sprocket marks adjacent and in line with straightedge across shaft centers.

►*CAUTION:* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket in place.

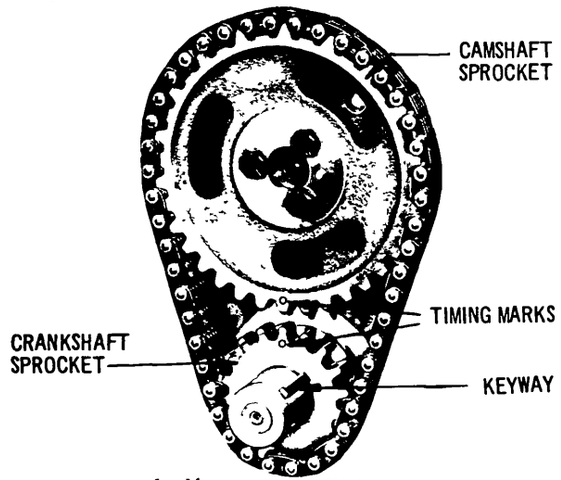
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link belt type. See below for specifications.

Engine	Width	Pitch	Length (Links)
283"	.875"	.500"	46
348"	.88"	.500"	48

Installation & Removal - *See "Timing Chain" in Chevrolet Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*



CHEVROLET V8 VALVE TIMING MARKS

VALVES

Tappet Clearance: Mechanical Lifters - 348" - .008" Intake, .018" Exhaust, Hot. **Corvette** - .012" Intake, .018" Exhaust, Hot.

Hydraulic Lifters - *See "Hydraulic Lifter Adjustment" in Chevrolet Special Data and note "Production Change & Caution" below.*

Valve Adjustment (Mechanical Lifters): Turn rocker arm stud nut as required for desired clearance.

Valve Adjustment (Hydraulic Lifters): *See "Hydraulic Lifter Adjustment" in Chevrolet Special Data and note "Production Change & Caution" below.*

►*HYDRAULIC LIFTER PRODUCTION CHANGE & ADJUSTMENT CAUTION:* Early cars use "long travel" lifters, later cars use "short travel" type. Adjustment is different for each type and proper lifter identification must be made to prevent severe engine damage. *For lifter identification and adjustment, see "Hydraulic Lifter Adjustment" in Chevrolet Special Data.*

283" Engine

Valve	Head Diam.	① Stem Diam.	Length
Intake	② 1.715-1.725"	.3410-.3417"	③ 4.9024-4.9224"
Exhaust	1.495-1.505"	④	⑤ 4.9130-4.9330"

Valve	Seat Angle	Lift	Stem Clearance
Intake	⑥ 46°	⑦	.0010-.0027"
Exhaust	⑥ 46°	⑦	.0016-.0033"

348" Engine

Valve	Head Diam.	① Stem Diam.	Length
Intake	⑧ 1.935-1.945"	.3715-.3722"	⑨ 5.10-5.11"
Exhaust	⑩ 1.655-1.665"	⑪	⑨ 5.11-5.12"

Valve	Seat Angle	Lift	Stem Clearance
Intake	⑥ 46°	⑪ .4005"	⑫ .0010-.0027"
Exhaust	⑥ 46°	⑪ .4119"	⑬ .0021-.0038"

① - Standard stem diameter. Furnished .003", .015" & .030" Oversize.

② - 1.935-1.945" Corvette with Fuel Inj. & Special Cam.

③ - 4.870-4.890" Corvette with Fuel Inj. & Special Cam.

④ - .001" taper. .3410-.3417" top, .3400-.3407 bottom.

⑤ - 4.891-4.911" Corvette with Special Cam.

⑥ - Valve Face Angle 45°.

⑦ - .330" (2-Bbl. Carb.); .3987" (1 or 2 4-Bbl. Carbs. Reg. Cam & Fuel Inj. Reg. Cam); .394" Intake, .400" Exhaust (Fuel Inj. & Special Cam).

⑧ - 2.065-2.070" on Special Cam (except 305 HP Special Cam) & 305 HP Std. Cam Engines.

⑨ - 5.09-5.11" on Special Cam (except 305 HP Special Cam) & 305 HP Std. Cam Engines.

⑩ - 1.715-1.725" on Special Cam (except 305 HP Special Cam) & 305 HP Std. Cam Engines.

⑪ - .4058" Intake, .4120" Exhaust on Special Cam Engines (except 305 HP Special Cam).

⑫ - Wear limit .004". ⑬ - Wear limit .005".

Valve Rotators - Used on some engines.

Valve Seat Width - 1/16-3/32" (283" All, 348" Exhaust); 3/64-1/16" (348" Intake).

Valve Stem Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .003", .015", .030" Oversize. Use Reamer Set J-5830 (283"), or J-7049 (348").

Valve Springs: Install springs with closed end of coil toward cylinder head and oil shield over spring.

►*348" ENGINE VALVE SPRING NOTE:* 305 HP Engine with Std. Cam, and Engines with Special Cam (except 305 HP with Special Cam) use inner and outer springs

283" Engine (2-Bbl. Carb.)

Valve	Lbs. Pressure	Length
Closed	76-84	1.696"
Open	155-165	1.366"

283" Engine (4-Bbl. Carb.) Corvette (All Equipment)

Valve	Lbs. Pressure	Length
Closed	69-79	1.696"
Open	159-169	1.306"

348" Engine - Single Springs

Valve	Lbs. Pressur	Length
Closed	78-86	1.626"
Open	184-196	1.230"

348" Engine - Inner & Outer Springs

	Outer Spring		Inner Spring	
Valve	Lbs. Pressure	Length	Lbs. Pressure	Length
Closed	76-84	1.696"	20-24	1.488"
Open	155-165	1.306"	55-61	1.06"

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve spring by measuring distance from surface of spring seat in head to top of valve spring shield. *NOTE - If measurement taken to top of valve spring, subtract 1/32" from specifications given below.* If measurement exceeds maximum, add 1/32" shims to bring height to preferred specifications (see below).

Valve Spring Height Specifications

Engine	Max. Height	Preferred Hgt.	Shim No.
283" All	1 23/32"	1 21/32"	3731058
348" Hydr. Lifters	1 23/32"	1 5/8"	3731058
348" Mech. Lifters	1 23/32"	1 21/32"	3764539

Valve Lifters: Hydraulic lifters standard except on engines with special camshaft. *See "Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement - *See "Valve System" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT below.

Valve Timing Specifications (283" Engine (2-Bbl. Carb.)

Intake Valves - Open 18° BTDC. Close 54° ALDC.

Exhaust Valves - Open 52° BLDC. Close 20° ATDC.

(283" Pass. & Corvette 4-Bbl. Carb.) (Corvette, Two 4-Bbl. Carbs. & Fuel Inj., Reg. Cam)

Intake Valves - Open 12°30' BTDC. Close 57°30' ALDC.

Exhaust Valves - Open 54°30' BLDC. Close 15°30' ATDC.

(348" Engine - Regular Cam)

Intake Valves - Open 18°30' BTDC. Close 67°30' ALDC.

Exhaust Valves - Open 68°30' BLDC. Close 25°30' ATDC.

(Corvette Two 4-Bbl. Carbs. & Fuel Inj. Sp. Cam)

Intake Valves - Open 35° BTDC. Close 72° ALDC.

Exhaust Valves - Open 76° BLDC. Close 31° ATDC.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

(348" Engine - Special Cam - except 305 HP)
Intake Valves - Open 49° 37' 40" BTDC. Close 86° 37' 40" ALDC.
Exhaust Valves - Open 77° 31' 38" BLDC. Close 32° 31' 38" ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*
Crankcase Capacity: 4 qts. (Pass.), 5 qts. (Corvette) refill. Add 1 qt. when filter changed.
Normal Oil Pressure - 45 lbs. at 2000 RPM.

Pressur Relief Valv - In oil pump. Not adjustable.
Oil Pressure Indicator (Std. V8) - Light located at left side of instrument panel, controlled by a pressure Switch AC No. 1508753 (283"), 1508754 (348") located in main oil gallery adjacent to distributor. Switch closes when pressure drops to 4-7 lbs.
Oil Pressure Gauge (Corvette) - AC No. 1508895.
Oil Filter: Full flow type standard on all V8 Engines. Replace element every 4,000 miles or less under extreme driving conditions.
Replacement Filter Element - AC No. PF-141.
Oil Pump: Spur gear type. Located in crankcase, driven by distributor gear.
Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Crankcas Ventilati n: Standard Cars - Air intake through oil filler breather cap and outlet at crankcase ventilator pipe.

Positiv Crankcase Ventilati n Cars - Road draft tube is replaced by an adapter to which is connected the ventilation valve and a hose which runs to an adapter plate between the carburetor and intake manifold. Fresh air is drawn into engine through oil filler breather cap. *To prevent ignition or carburetion troubles and to insure proper operation of system, entire system must be disassembled and cleaned every 10,000 miles or sooner if needed. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

►*RADIATOR REMOVAL CAUTION (Auto. Trans.):* Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.
►*WATER BY-PASS NOTE:* 283" engine utilizes hole in cylinder block for water by-pass. 348" engine has by-pass at top of water pump which is connected to inlet manifold which has crossover passages to cylinder head.
►*CORVETTE RADIATOR NOTE:* Aluminum cross-flow radiator used. Avoid use of salt based inhibited anti-freeze.
►*FLUID FAN NOTE:* Viscous Coupling Fan standard on 348" Engines and optional on all engines with Air Conditioning.
Water Capacity: Pass. - 17½ qts. (283" Synchro-mesh), 17¼ qts. (283" Auto. Trans.), 21 qts. (348"). **Corvette** - 15½ qts. **All Cars** - Add 1 qt. for heater.
Pressure Valve: Radiator filler cap, used as follows:

Model	AC No.	Pressure	AC Type
Pass. Cars	850800	13 lb.	RC-6
Corvette	861753	13 lb.	RC-21

Thermostat: Pellet type, in intake manifold water outlet. 170°F Part No. 3138868.

Temperatur Gaug : AC Electric.
Dash Unit - AC No. 1514346 (Pass.), No. 1514185 (Corvette).
Engine Unit - AC No. 1513321 (All).
Water Pump: Packless, sealed ball bearing type.
Overhaul - *See "Cooling System" in Chevrolet Special Data.*

LUBRICATION

POWERGLIDE & TURBOGLIDE AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1000 miles. Drain and refill only when transmission removed and disassembled for repairs. Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used).
Checking Fluid Level (Powerglide): Check with engine idling, transmission at normal operating temperature, and selector lever in "N" (Neutral) position. Dipstick located under hood on right side of engine. Add fluid only when level near "Add" mark on dipstick, do not fill above "Full" mark on dipstick. Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used).
Capacity - 3½ qts. (transmission only), 10½ qts. (transmission and converter).
Checking Fluid Level (Turboglide): Check with engine running at 800-1000 RPM, transmission at normal operating temperature, and selector lever in "N" (Neutral) position. Check fluid level on dipstick under hood at right side of engine and maintain level at "Full" mark on dipstick. Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used).
Capacity - 3½ qts. (transmission only), 9½ qts. (transmission and converter).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*FOR "GREENBRIER" & "95" TRUCKS, SEE CORVAIR DATA PAGES (FOLLOWING)*

►*JACKING & HOISTING NOTE: For jacking or hoisting, see "Jacking & Hoisting" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

APACHE (Light Duty)

Typing & Rating	Series
½ to 1½ Ton Conventional	C10, C20, C30, C40
½ & ¾ Ton 4-Wheel Drive	K10, K20
½ to 1 Ton Forward Control	P10, P20, P30

VIKING (Medium Duty)

2 Ton Std & Heavy Duty Conventional	C50, C60
2 Ton Std & Heavy Duty Low-Cab-Forward	L50, L60
2 Ton Std & Heavy Duty School Bus	S50, S60

SERIAL NUMBER: Stamped on plate on upper left hinge pillar (Exc Flat Face Cowl), left side of dash (Flat Face Cowl) ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

S 1 L 6 1 3 T 100001

① - **S** Indicates Std 2 Ton converted into a 1½Ton Special **H** Indicates a Std 2 Ton converted into 2 Ton Heavy Duty
② - **1** Indicates the year 1961
③ - Body Type See Body Type Table below
④ - Nominal Rating, see Nominal Rating Table Below
⑤ - CA Dimension Table below
⑥ - Model (Next to last digit removed), see Model Table below
⑦ - Assembly Plant, see Assembly Plant Table below
⑧ - Serial Number - Continuous starting with 100001 at each assembly plant

Body Type Table

C - Light Del & Conventional **K** - 4-Wheel Drive **P** - Forward Control **L** - Low Cab Forward **S** - School Bus

Nominal Rating Table

1 - ½-Ton **2** - ¾-Ton **3** - 1-Ton **4** - 1½-Ton **5** - 2-Ton **6** - 2-Ton H D

CA Dimension Table (2-Ton Models)

1 - 5 ft **2** - 6 ft **3** - 7 ft **5** - 8 ft **6** - 9 ft **8** - 10 ft

Model Table

02 - Flat Face Cowl **03** - Cab-Chassis **04** - Pickup **05** - Panel **06** - Sub Carryall **09** - Platform **12** - Windshield Cowl **16** - Sub Carryall **34** - Fleetside **42** - Forward Control Chassis **45** - Step-Van

Assembly Plant Table

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: 6 Cyl. Stamped on right side of block next to distributor

V8 Eng. Stamped on forward edge of block under right cylinder head

NOTE - Number (example below) includes identification data as indicated ① ② ③

F 1210 P

① - Engine Plant **F** - Flint **T** - Tonawanda
② - Code number indicating month (Dec) and day (10th) of manufacture This is not an individual or continuous number ③ - Engine Type See table below

Engin Typ

J, K - 235" (JB, JC, JG, JH, JK, KA indicate clutch and transmission options)
L - 261" (LB, LD, LE, LF, LG, LJ, LK, LM indicate transmission, brake and steering options)
M, N, P - 283" (MA, NA, NB, ND, NE, NF, NG, NH, NM, PA, PD indicate transmission and brake options)

TUNE-UP

COMPRESSION PRESSURE: 6 Cyl. 130 lbs min **V8** - 140 lbs min All cylinders alike within 20 lbs

VACUUM READING: 17-21" at idle speed

VALVE TAPPET CLEARANCE: 235" - 006" Intake, 018" Exhaust, Hot **261'** - 006" Intake, 020" Exhaust, Hot **283"** - Hydraulic lifters *See 'Valve System" in Chevrolet Special Data and note "Production Change & Caution" below*

►*HYDRAULIC LIFTER PRODUCTION CHANGE & ADJUSTMENT CAUTION* Early engines use "long travel" lifters, later engines use "short travel" type Adjustment is different for each type and proper lifter identification must be made to prevent extensive engine damage *For lifter identification and adjustment, see "Hydraulic Lifter Adjustment' in Chevrolet Special Data*

MANIFOLD HEAT CONTROL: Thermostatic coil spring type located between manifold and exhaust pipe Valve must operate freely

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems' in Carburetion Section*

IGNITION

FIRING ORDER: 6 Cyl. - 1-5-3-6-2-4 **V8** - 1-8-4-3-6-5-7-2. **Cylinders (V8)** - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 035"

Spark Plugs - Series 10, 20, 30, 40, 50 (235" & 283" Lt. Dty. Engines) - AC 45 (Std), AC 46 (Hotter), AC C43COM (Colder) 14mm torque to 20-25 ft lbs

Series 60 (261" & 283" Hvy. Dty. Engines) - AC C42-1COM (Std), AC C43COM (Hotter) 14mm torque to 20-25 ft lbs

COIL: Delco-Remy No. 1115087.

Ignition Current - 1 8 amps idling, 4 0 amps stopped

Resistor - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal

DISTRIBUTOR: Delco-Remy. Conventional type used on 6 Cyl models Two types of "Window" distributors used on V8 - centrifugal with vacuum Advance and centrifugal advance only

Delco-Remy Distributors

Engine	Delco-Remy No
6 Cyl	1112403
2800 RPM Sch Bus (Gov)	① 1112702
283" Std	1110947
2975 RPM	① 1112732
2 Bbl Carb Std Trans	① 1112725
2 Bbl Carb Auto Trans	① 1112720
2 Bbl Carb 2275 RPM Sch Bus	① 1112738

① Without Vacuum Control

Condenser - Delco-Remy No 1928111 (6 Cyl), No 1932004 (V8) **Capacity** - 18- 23 mfd

Contact Point Set - Delco-Remy (6 Cyl) No 1924571 (V8) No 1931988

Breaker Gap (6 Cyl.) - 019" (new points), 016"(used points)

Breaker Gap (V8) - Gap (016") will be correct when cam angle correctly set

Cam Angle - **(6 Cyl.)** 28-35°, **(V8)** 28-32° Set V8 distributors to 30° (gives 016" point opening)

Breaker Arm Spring Tension - 19-23 ozs

Rotation - Clockwise viewed from above

Automatic Advance - 1112403

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Automatic Advanc - 1112702

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		450	0-4		900
10-12		1200	20-24		2400
17-19		2000	34-38		4000

Automatic Advanc - 1110947

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
5-7		750	10-14		1500
10-12		1450	20-24		2900
13-15		1875	26-30		3750

Automatic Advance - 1112720, 25, 32, 38

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
5-7		750	10-14		1500
8-10		1175	16-20		2350
12-14		1750	24-28		3500

Vacuum Spark Control: Delco-Remy 1116089, 140, 143 (1112403 Distr) 1116148 (1110947 Distr)

Vacuum Advanc - 1116089

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	4-6
7 5			15	7 5-10

Vacuum Advanc - 1116140,143

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	4-6
11			22	15 16

Vacuum Advanc - 1116148

Distr	Degrees	Eng	Degrees	Vacuum (" of Hg)
Start			0	7 9
8 0			16	15-16

IGNITION TIMING

Setting - 5° BTDC (235") TDC (261") 4° BTDC (V8) Set timing at idle speed with vacuum line disconnected

Timing Mark (6 Cyl) - First vertical line on flywheel clockwise from steel ball (235") steel ball (261") Line up line or ball with pointer in flywheel housing with octane selector set at "0"

Timing Mark (V8) - Mark on vibration damper and timing tab attached to engine front cover Timing tab marked "A" (Advance) "O"(TDC) and lines in 2° graduations with greatest number of lines on advance or BTDC side

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARBURETOR

Engine	CARBURETOR APPLICATION	Carburetor
6 Cyl	(Exc. Fwd. Contr.)	Rochester B
6 Cyl.	(Fwd. Contr)	Carter BB
V8		Rochester 2G 2-Bbl

THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC):

Forward Control Models - With engine at normal operating temperature and idle speed set at 400-450 RPM. Insert 1/8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever Adjust length of throttle rod so that swivel just enters throttle lever Remove swivel from outer lever and move lever back against transmission stop. Check distance from hole in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole *CAUTION Do not apply force against stop at either end of lever travel* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever, then **shorten** throttle rod **three and one-half turns** of jam nut

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

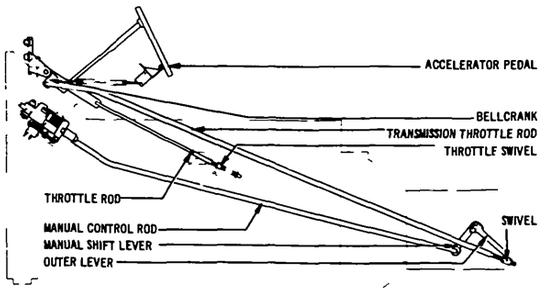
6 Cyl. - 1) Disconnect control rod from throttle lever at transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever counterclockwise to open throttle position. 2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7.09", measure distance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod.

3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.

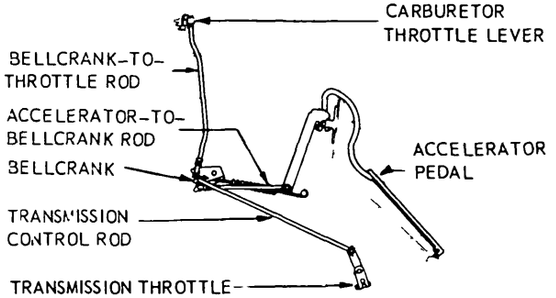
4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position. 5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

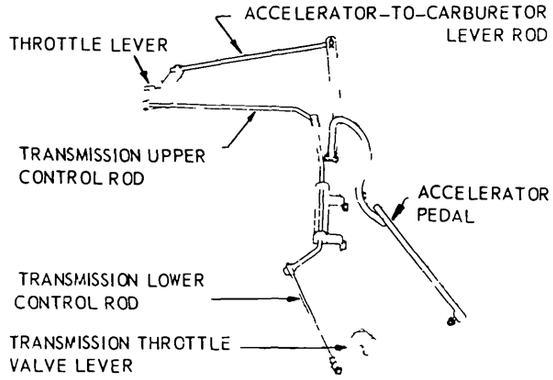
V8 - Remove lower control rod, loosen transmission throttle lever clamp screw Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline With gauge in place and holding lever clamp in full detent position (rotate clockwise), tighten lever to clamp and remove gauge Install lower control rod Disconnect upper control rod from throttle lever on carburetor Adjust upper control rod length for free entry into throttle lever with transmission throttle lever pulled forward against transmission internal stop Attach



6 CYL. (FORWARD CONTROL) HYDRA-MATIC THROTTLE LINKAGE



6 CYL. POWERGLIDE THROTTLE LINKAGE



V8 POWERGLIDE THROTTLE LINKAGE

throttle rod to carburetor lever Check adjustment by releasing linkage to its idle position, then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection Readjust upper throttle rod if rod deflects Place ½" wood block under accelerator pedal rod, depress accelerator against block, and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position Readjust length of accelerator rod when detent is not felt before reaching wide open throttle

ROCHESTER "B" (SINGLE BARREL)

Engine	Rochester Carb. No.
235" (Std.)	7015011
235" (Economy)	7015021
261"	7015013

Idle Setting - 1½-2½ turns open. Turn screw out for richer mixture.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto Trans. in "D").

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

►*CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump - No seasonal adjustment.

Choke Adjustment: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA See "Rochester B & BC Carburetors" in Carburetion Section*

ROCHESTER 2G (2-BARREL)

Engine	Rochester Carb. No.
283" Std.	7015015
283" (Velocity Governor)	7013011
283" (Vacuum Governor)	7015017

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8. LEFT barrel feeds 1-4-6-7.*

Idle Setting - Initial setting 1½ turns open. After idle speed set to correct specifications (see below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans, in "D").

Float Level - 1 23/64" (Gauge BT-152) with air horn inverted and gauge placed over float so it rests against pump side of power piston shaft and outer gauge leg in line with center of float. Adjust by bending float arm (Tool BT-69) between pivot and float.

Float Drop - 1 29/32" (Gauge BT-152) from air horn gasket to bottom of float with air horn held upright. To adjust, bend float tang.

Choke Setting: Manual choke used

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARTER BB (UPDRAFT)

Carter (BB) 871SC (Forward Control Models). Single barrel updraft type with manual choke.

Idle Setting - ½-1½ turns open (turn screw out for richer mixture).

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed).

Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter BB (Updraft) Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC used as follows:

Model	AC No.
6 Cyl. Std.	4434
6 Cyl. Fwd. Contr. & Flat Faced Cowl	4666
V8	4701

Pressure - 3½-4½ lbs. (6 Cyl.), 5¼-6½ lbs. (V8) steady at 450-1000 RPM.

Gasoline Gauge: AC Electric.

Dash Unit - (Flat faced cowl) AC No. 5643021. (Others) AC No. 5643018.

Tank Unit - Various types used. Replace with same type as original equipment.

BATTERY

Delco. 2SMR53, 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

668. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

3SMR72, 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).

Ground - Negative.

Engine Ground - Engine to frame (6 Cyl.), to dash (V8).

STARTER

Delco-Remy. As follows:

	Starter	Armature
6 Cyl. Std.	1107652	1932185
6 Cyl. Fwd. Contr.	1107677	1926626
V8	1107664	1935829

Drive - Overrunning clutch with solenoid pinion shift.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. min.

Performance Data - 1107652,64

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

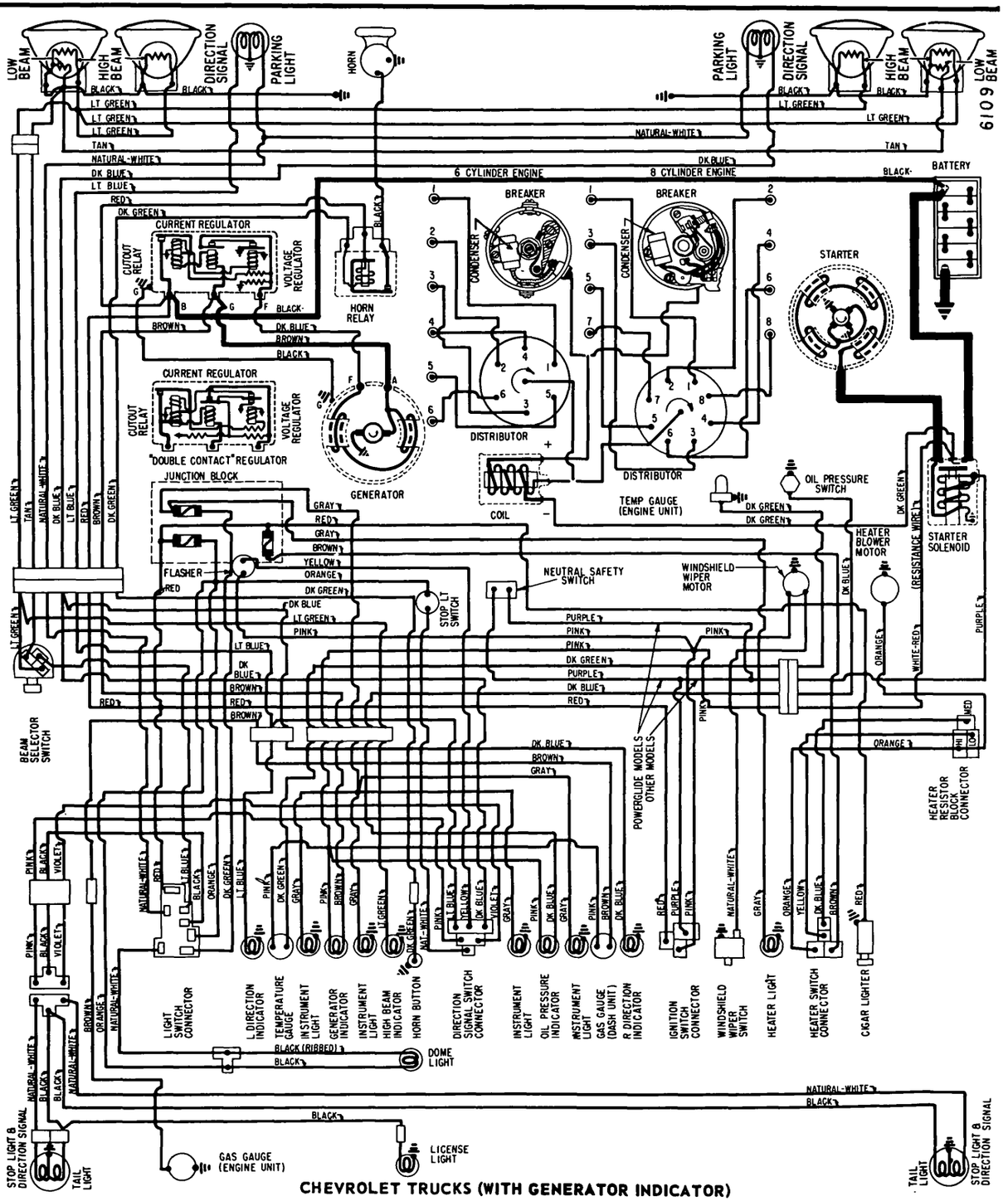
Performance Data - 1107677

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Ⓒ - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119910 (1107652 & 664 Starters), No. 1119793 (1107677 Starter) mounted on starter and controlled by Ignition & Starter

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CHEVROLET TRUCKS (WITH GENERATOR INDICATOR)

CONTINUED FROM PRECEDING PAGE

Switch, Delco-Remy No 1116579 (Forward Control), No 1116567 (Others)

N utral Safety Switch: Delco-Remy No 1998677 (Powerglide), No 1998110 (Hydra-Matic) mounted on steering column

Adjustm nt - *See "Powerglide" or "Dual-Range Hydra-Matic Drive" in Transmission Section*

GENERATOR

Delco-Remy. Used as follows

Applicati n	G nerator	Armature
6 Cyl & V8 Std.	1102096	1923535
6 Cyl & V8 Optl	1102173, 174	1948005
Special Equipment	1105123	1945922
Special Equipment	1106681	1927074

Perf rmance Data - Cold (70°F)

Generator	Amperes	Volts	RPM
1102096	30	14 0	2240
1102173, 174	35	14 0	2630
1105123	40	14 0	1930
1106681	45	13 0	1400

Rotation - Counterclockwise at commutator end

Brush Spring Tension - 28 ozs

Fi ld Current - 1 69-1 79 amps (1102096, 173, 174), 2 73-3 00 amps (1105123), 2 14-2 28 amps (1106681) All at 12 volts and 80°F

Belt Adjustm nt: 3/8" (6 Cyl), 3/4" (V8) deflection with light pressure midway between water pump and generator pulleys

►*GENERATOR PULLEY INSTALLATION CAUTION· To prev nt brin lling of b aring races, following pulley installation procedure must be followed exactly* Cradle generator in a fixture with a back-up plate against rear bearing cap Insert key into keyway in shaft, supporting lower side of shaft Align pulley with key and keyway and mount on shaft using steady pressure Tighten pulley attaching nut to 50-60 ft lbs

AMMETER: "Shunt" type with only small part of charging current routed through ammeter Ammeter is calibrated to indicate entire charging current rather than current actually in ammeter circuit

►*AMMETER WIRING CAUTIONS·* Red wire from ammeter to regulator must be connected to regulator "BAT" terminal If wire connected to another regulator terminal, a dead short would burn ammeter circuit instantly Ammeter circuit also protected by a 3 amp fuse in wiring harness just ahead of dash connector on engine side of firewall

GENERATOR REGULATOR

D lco-R my. Used as follows

Regulator	Generator No.
1119001 (30 Amp)	1102096
1119261 (30 Amp Replacement)	1102096
1119002 (35 Amp)	1102173, 174
1119610 (40 Amp)	1105123
1119619 (45 Amp)	1106681

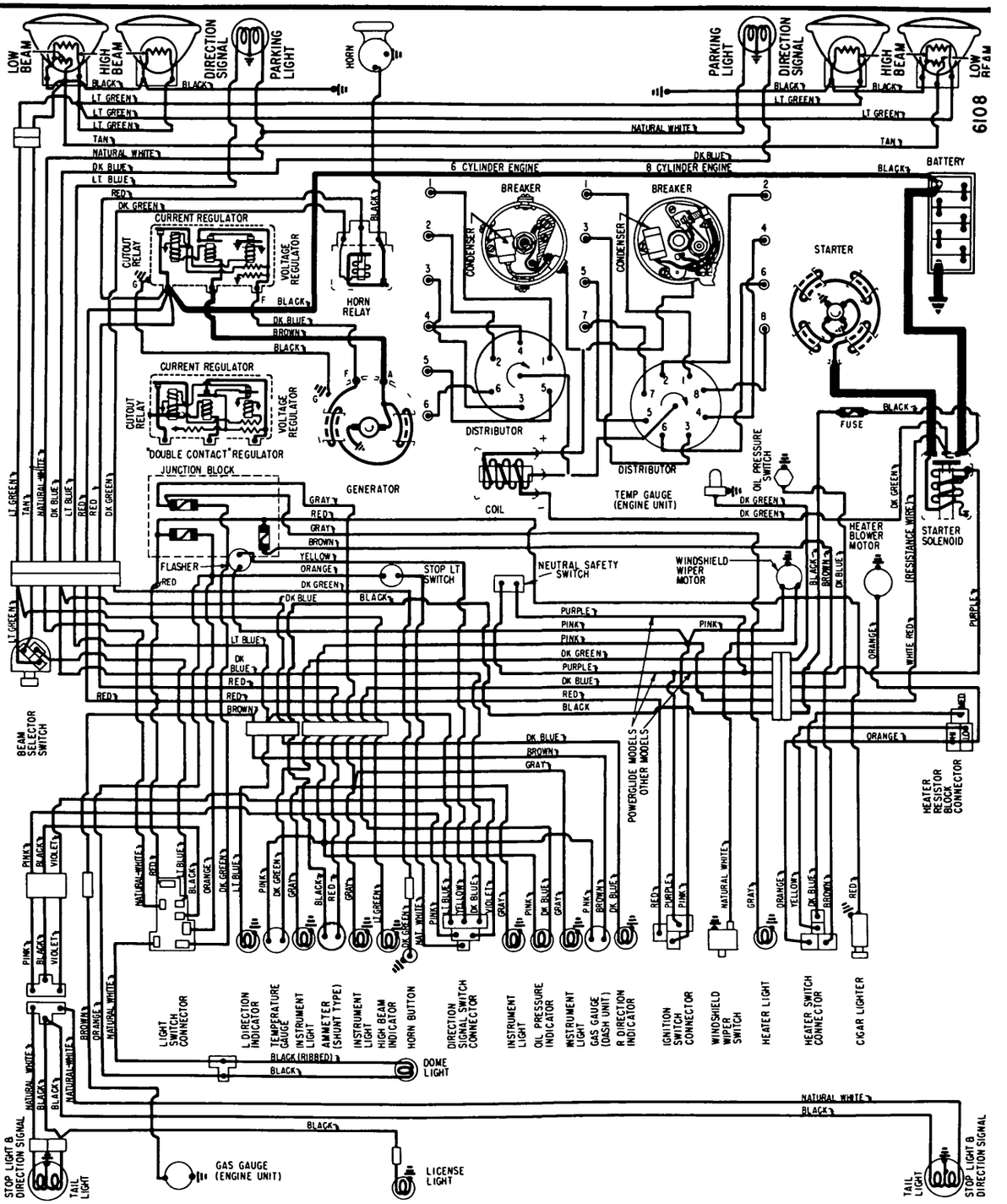
►*DOUBLE CONTACT REGULATOR NOTE Regulators 1119610 & 619 have double contacts for voltage regulation*

NOTE - Sp cifications b low are "Normal" setting

Cutout Relay

Cuts In - 11 8-13 5 volts (1119001, 002, 261), 11 8-13 0 volts (1119610 & 619)

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CHEVROLET TRUCKS (WITH AMMETER)

CONTINUED FROM PRECEDING PAGE

Cuts Out (1119261) - 1-4 amperes reverse current at 12.5 volts for relay points to open.
Contact Gap - .020".
Air Gap - .023" (1119261), .020" (Others).

Voltage Regulator

Setting (1119001, 002, 261) - 13.8-14.7 volts at 125°F.
Setting (1119610, 619) - 13.8-14.6 volts at 125°F ambient temperature when operating on upper contacts. .1-.3 volts lower when operating on lower contacts.
Contact Gap (1119610, 619) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .075" (1119001, 002, 261); .067" (1119610, 619) with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 27.0-31.0 amps. (1119001, 261); 31.0-35.5 amps. (1119002); 36.0-40.5 amps. (1119610); 46.0-50.5 amps. (1119619) at 125°F ambient temperature.
Air Gap - .070" (1119261), .075" (Others) with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy 1119000 Series (Single Contact) Regulators" and "Delco-Remy 1119600 Series (Double Contact) Regulators" in Electrical Section.*

ALTERNATOR & REGULATOR

Delco-Remy Alternator No. 1117070 with Transistorized Regulator No. 9000554 and separately mounted Field Relay No. 1116895.
Rated Output - 60 amperes (hot) - 58 amperes at 14 volts and 2500 RPM (Cold - 70°F).
Rotation - Clockwise at drive end.

►*OTHER DATA: See "Delco-Remy (Internal Rectifier) Alternators & Transistorized Regulators" in Electrical Section.*

MISC. ELECTRICAL

Lighting Switch Removal: Remove connector from switch. Depress switch shaft retainer (on top of switch) and remove knob and shaft. Remove retaining ferrule and switch assembly.
Stop Light Switch: Located on underside of dash panel brace. Adjust switch position to make electrical contact with 5/8" brake pedal travel.
Instrument Cluster Removal: Disconnect battery. Disconnect oil pressure line, speedometer cable, and air gauge pipe from instruments. Remove cluster-to-dash retaining screws. Remove cluster from panel, disconnect electrical leads and snap out bulb sockets. Individual instruments may be removed as required.

CIRCUIT BREAKERS: Located on lighting switch.

FUSES: Located on junction block mounted on upper inside of dash panel to left of steering column.

ENGINE

Engine Model	Type
Thriftmaster	235" 6 Cyl.
Jobmaster	261" 6 Cyl.
Trademaster	283" V8

ENGINE SPECIFICATIONS: 6 Cyl. & V8 Valve-in-Head.

Engine	Bore	Stroke	Displacement
Thriftmaster(Std.)	3 9/16"	3 15/16"	235 cu. in.
Thriftmaster(Econ.)	3 9/16"	3 15/16"	235 cu. in.
Jobmaster	3 3/4"	3 15/16"	261 cu. in.
Trademaster	3 7/8"	3"	283 cu. in.

Engine	Compr. Ratio	Rated HP	Valved HP
Thriftmaster(Std.)	8.25-1	30.4	135 at 4000 RPM
Thriftmaster(Econ.)	8.25-1	30.4	110 at 3200 RPM
Jobmaster	8.00-1	33.7	150 at 4000 RPM
Trademaster	8.50-1	48.0	160 at 4200 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: (6 Cyl. Engines) - Raise front of vehicle and place on stands, drain lubricant and remove bolts and screws. *NOTE* - Turn crankshaft as necessary to allow clearance at front crossmember.

OIL PAN REMOVAL: (V8 Engine) - Raise front of vehicle and place on stands. Drain lubricant. Remove bolts and screws and remove oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*OTHER 6 CYL. ENGINE DATA: See Chevrolet 6 Cyl. Car Model pages.*

►*OTHER V8 ENGINE DATA: See Chevrolet V8 Car Model pages.*

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 235" - 5 qts. refill. 261" - 6 qts. refill. 283" - 4 qts. refill. All - Add 1 qt. with filter change.
Normal Oil Pressure - 6 Cyl. - 35 lbs. at 2000 RPM. V8 - 30 lbs. at 1170-1200 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator (exc. Forward Control & Flat Cowl): Indicator light on instrument panel. Controlled by pressure switch, AC No. 1508753.
Oil Pressure Gauge (Forward Control & Flat Face Cowl Models): AC No. 1508246 (Forward Control), No. 1508014 (Flat Face Cowl). Not electric.
Oil Pump: Gear type. Located in crankcase, driven by distributor gear.
►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed so that bottom of pickup screen is parallel with oil pan rails.
Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*
Oil Filter: AC partial flow (235"), full flow (261" & 283").
Replacement Filter Element - (235") AC-P-115 or AC-P-117 partial flow. **(261" & 283")** AC-PF-141 full flow.
Filter Valve Replacement (283") - Drain crankcase, remove filter and cartridge. Remove oil filter valve bolts, valve and seal. *NOTE* - Check valve for cracks, replace if broken. A 10 lb. valve must be used. Position valve away from engine when reinstalling.
Crankcase Ventilation (Standard): Air intake through oil filler cap, outlet through road draft tube at rear of engine.
Servicing - Clean oil filler cap in solvent and reoil with light engine oil every 2000 miles, or more often if required by operating conditions.
Crankcase Ventilation (Optional): Positive Type (6 Cyl.). Two types used as follows: 1) Conventional road draft tube replaced by a crankcase outlet pipe with baffles in upper end. Ventilation valve in upper end of outlet pipe is connected to intake manifold by a hose.
2) Same as Type 1) above with additional fresh air intake from carburetor air cleaner to valve rocker cover. Oil filler breather cap is replaced by solid non-breather type. *Both types are serviced in same manner. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*
Positive Type (V8) - Road draft tube is replaced by an adapter to which is connected the ventilation valve and a hose which runs to an adapter plate between the carburetor and intake manifold. Fresh air is drawn into engine through oil filler breather cap. On some heavy duty applications, fresh air intake is through the carburetor air cleaner to the oil filler tube, with breather cap replaced by a solid type cap. *To prevent ignition or carburetion troubles and to insure proper operation of system, entire system must be disassembled and cleaned every 10,000 miles or sooner if needed. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: In quarts for each type engine.

Standard Cooling System

Series	235"	261"	283"
10, 20, 30 Synchro-mesh	17.25		17.25
10, 20 Auto. Trans.	17.75		18.25
40 Synchro-mesh	17.75		18.25
P20, P30 Synchro-mesh	17,00		
50 Synchro-mesh	17.25		18.25
60 Synchro-mesh (Exc. T60)	17.25		18.25
60 Auto. Trans. (Exc. T60)	21.25		
T60 Synchro-mesh	25.30		26.00
T60 Auto. Trans.			26.00

NOTE - Add 7/8 qt. for heater.

Pressure Valve: Radiator filler cap. 9 lb. (Std. Cooling System, except T60); 7 lb., AC No. RC 1 (T60 & Heavy Duty Cooling System).
Thermostat: Harrison poppet valve (235" & 283" except 5-speed trans.); Dole pellet bypass (261" & 283" with 5-speed trans.).
Replacement Thermostats - Harrison No. T180, Dole No. DV50. All thermostats start to open at 157-163°F and are fully open at 182°F.
Temperature Gauge: AC Electric type.
Dash Unit - AC No. 1513381 (Forward Control), 1513853 (Flat Face Cowl), 1513850 (Others).
Engine Unit - AC No. 1513321 (All Series).
Water Pump: Packless type with sealed ball bearing.
Pump Removal & Overhaul - *See "Cooling System" in Chevrolet Special Data.*

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles. Drain and refill every 25,000 miles (Hydra-Matic), only when transmission disassembled for repairs (Powerglide). Use Automatic Transmission Fluid Type A, Suffix A (Type A can be used).
Checking Fluid Level: Check with engine idling, Transmission at normal operating temperature, and selector lever in "N" (Neutral). Dipstick located under hood on right side of engine. Add fluid when level at "L" (1 qt. low) on Hydra-Matic Models or at "ADD" mark on Powerglide Models. Do not fill above full mark on dipstick. Use Automatic Fluid Type A, Suffix A (Type A can be used).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

►*TIGHTENING CAUTION: Due to use of aluminum crankcase, rear axle housing, cylinder heads, and other parts, bolt and stud torques must be held as close as possible to specifications in table below to avoid overstress of base metal parts and stripped threads.*

	Inch-Lbs.	Ft. Lbs.
Cylinder Head		27-33
Exhaust Manifold		23-27
Rocker Arm Stud		27-33
Rocker Arm Stud Nut	55-125	
Rocker Arm Cover	30-50	
Oil Pan	40-60	
Oil Cooler		8-12
Oil Cooler Adapter		7-13
Oil Cooler Shroud	60-80	
Oil Pump Cover	60-80	
Oil Filter & Gen. Adapter		7-13
Connecting Rod Caps		20-26
Crankcase Rear Housing		7-13
Crankcase Halves (7/16")		42-48
Crankcase Halves (5/16")		7-13
Crankcase Cover		7-13
Drive Flange or Flywheel		20-26
Flywheel Housing		20-30
Engine Rear Mount Bolt		50-60
Engine Rear Mount Bracket Nut		40-50
Engine Front Insulator-to-Frame		25-35
Engine Front Mount Bracket-to-Trans.		20-30
Engine Front Insulator-to-Bracket		60-80
Skid Plate-to-Rear Housing		20-30
Clutch Cover		15-20

POWER TRAIN

POWER TRAIN REMOVAL. *NOTE - Complete assembly (engine, transmission, and rear axle) must be removed from car as a unit. To separate transaxle from engine, see "Corvair Transaxle" in Transmission Section.*

PASSENGER CARS

1) Remove spare tire (coupe & sedan), engine access cover (station wagon). Remove carburetor air cleaners. Disconnect air heater return air hose. Remove engine-to-body front seal retainer. Disconnect left carburetor return spring and throttle rod at cross shaft. Disconnect main choke cable at firewall.

2) Make the following electrical disconnections: Battery positive terminal cable, generator ground strap and leads to voltage regulator, ignition leads from starter motor harness connector, right and left engine-to-body ground straps, coil and oil and temperature switch wires.

3) Raise car on hoist and remove battery cable and ignition leads from starter solenoid. Remove engine rear grille and skid plate, rear and side seal engine retainers. Disconnect parking brake spring from crossmember. Pull choke cable forward to clear front engine mount. Disconnect accelerator control rods at idler lever and push lever-to-carburetor rod into engine compartment. Disconnect fuel line and speedometer cable. Disconnect air heater flexible hoses from engine. Disconnect gasoline heater fuel line.

4) Remove axle shafts (see Rear Axle Section), and pull universal joints from differential carrier.

5) On Synchro-mesh cars, disconnect shift tube coupling at transmission shifter shaft, then loosen coupling clamp nut and push shift tube coupling into tube until clear of engine front mount. Disconnect clutch return spring and clutch pull rod. Remove clutch cross shaft from front mount. Unfasten clutch cable sheath clamp from engine front mount and drop clutch cable and cross shaft clear of power train. Remove back-up light switch from 4-speed transmission housing (switch is below normal oil level).

6) On Powerglide cars, disconnect transmission shift cable from transmission case. Rotate transmission throttle valve lever fully counterclockwise and remove cable from transmission case. Remove transmission filler tube (use a container to catch oil).

7) Position a hydraulic transmission jack stand under engine assembly, using Tool J-7894 (adapter), and lock tool in place with attached locking knob and additional bolt and nut. Remove cotter pins and castellated nuts from front engine mount (at transmission) and from rear engine mount. *NOTE - If front mounting bracket and shims are removed from transmission, the same amount of shims removed must be replaced. Rear "toe-in" will be affected if shims are changed.* Lower power train gradually and watch for possible interference at rear mount and left rear lower control arm. Remove exhaust pipe and muffler assembly.

TRUCKS

Procedure is same as for Passenger Car Power Train Removal except as noted below.

On Synchro-mesh trucks, disconnect clutch return spring at clutch housing and at pull rod idler lever. Remove clutch cable retainer from engine front mount, then remove pull rod clevis, idler lever and cable clevis. On Powerglide trucks, disconnect transmission oil cooler lines at transmission.

ENGINE SERVICE

►*ENGINE FRONT & REAR IDENTIFICATION: All reference to engine and components is to position installed in car. FRONT of engine is flywheel end toward front of car. REAR of engine is accessory drive end toward rear of car.*

►*ANTI-SEIZE COMPOUND NOTE: Permatex No. 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs and capscrews entering an aluminum part to prevent thread seizure and damage.*

►*ALUMINUM THREAD REPAIR NOTE: A thread repair kit, Part No. 3780960, is available for repairing stripped or damaged threads in aluminum parts.*

►*ALUMINUM PARTS CAUTION: Aluminum components of engine are relatively soft and easily damaged. Use extreme care not to nick, scratch or otherwise distort mating or bearing surfaces.*

CRANKCASE & CYLINDER HEAD STUD REPLACEMENT: Coat stud threads with anti-seize compound (see above) and install into cylinder head or crankcase with special detail of Tool J-8354 to projected length as follows: *NOTE - Measure projected length from shoulder of tool (installed on stud) to surface of crankcase or cylinder head.*

Stud	Projected Length	Tool Detail
Carb. Mounting (Outboard)	4 3/16"	2
Carb. Mounting (Inboard)	1 5/8"	2
Exhaust Manifold	31/32"	3
Cylinder (Long - Upper)	8 9/32"	1
Cylinder (Short - Lower)	7 9/16"	1
Rear Housing Mounting	4 9/16"	3
Distributor Holding	1 1/8"	

►*CYLINDER STUD TORQUE NOTE:* Maximum torque should be 30 ft. lbs., minimum torque 10 ft. lbs. If under 10 ft. lbs., install either .003" or .006" oversize studs as necessary.

EXHAUST MANIFOLD SLEEVE REPLACEMENT: *CAUTION - Remove sleeves from cylinder head only if absolutely necessary.* Remove sleeves by turning gradually with a pipe wrench. **Do not** pry or tap sleeves to remove. To install, coat new sleeves with anti-seize compound (see above). Insert sleeves into dry ice for about 10 minutes and at same time heat cylinder head to 200°F (do not use open flame). Remove sleeves from dry ice and tap into cylinder head bores making sure sleeves are true with bores, *NOTE - Replacement sleeves furnished Std., .002", & .010" Oversize.*

EXHAUST MANIFOLD INSTALLATION: Place manifold on sleeve gaskets, tap manifold lightly to insure alignment with gaskets, then firmly seat manifold with a soft hammer. Install manifold clamps and french locks. Torque attaching nuts to 23-27 ft. lbs., then bend tab on locks.

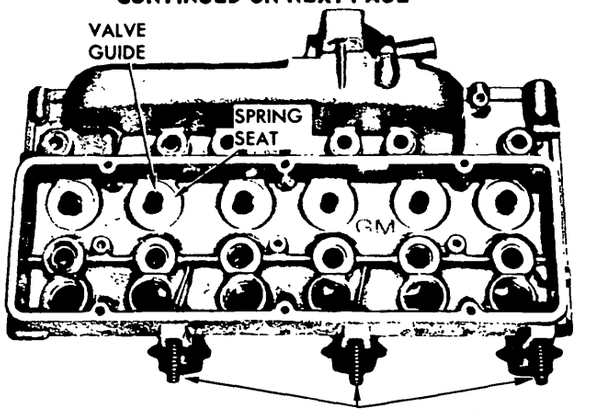
ENGINE MOUNTS: Front Mount Removal - Remove clutch lever control cable cross shaft ball stud at front mount bracket or Powerglide control cable. Support engine and remove insulator-to-bracket nuts. Remove shift rod coupling from transmission shift rod. Lower engine about 2" so front engine bracket clears mount stud. Disconnect parking brake cable from mounting bracket. Remove front mount and insulator. *CAUTION - Shims between transmission and mounting bracket control rear wheel toe-in and must be replaced in original positions.*

Rear Mount Removal: Support engine and remove rear center shield. Remove bracket-to-skid plate nuts; lower engine and remove engine-to-bracket mount assembly.

CRANKCASE COVER, BLOWER & BLOWER BEARING REMOVAL: **1)** Disconnect battery ground cable, accelerator and fuel lines, then remove oil level gauge and carburetor air cleaners and supports. Remove spare tire. Remove carburetor vacuum balance tube and retaining strap at engine upper shroud assembly and front shield.

2) Remove pulley belt and distributor wire harness, then remove carburetor cross shaft and choke cable assembly

CONTINUED ON NEXT PAGE



CORVAIR CYLINDER HEAD

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from carburetors. Disconnect generator brace and swivel it away from upper shroud. Remove engine upper shroud.

3) Remove four retaining bolts from blower pulley and remove pulley and blower from bearing hub assembly. Remove crankcase cover and blower bearing assembly as a unit. Remove crankcase-to-crankcase vent gasket and crankcase vent.

Blower Bearing Replacement: Use hypoid lubricant on bearing shaft and press bearing on crankcase cover so distance from crankcase cover gasket rail to top surface of large diameter of hub assembly is 4.520-4.530".

OIL COOLER REMOVAL: Remove all screws retaining cooler to engine shrouds, shields and cylinder head, then remove oil cooler access hole cover and remove long oil cooler mounting bolt. Remove oil cooler.

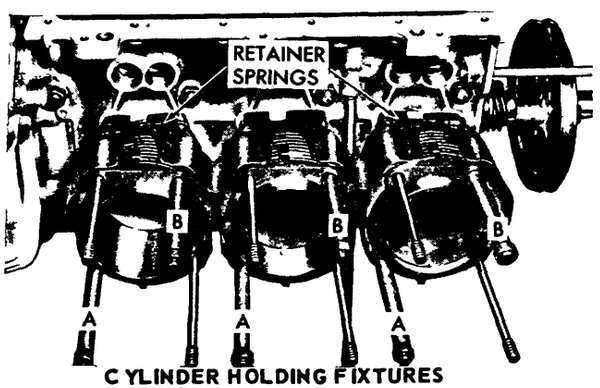
CYLINDER HEAD: Removal - *NOTE - When removing right hand cylinder head, disconnect coil, oil pressure and cylinder head temperature sending unit wires in addition to following procedure.*

1) Drain crankcase and disconnect battery cables from battery and generator. Disconnect radio ground strap. Remove air cleaner, accelerator return spring and air cleaner support. Disconnect accelerator rod from carburetor and remove cross shaft retainer at shaft support. Disconnect cross shaft support from carburetor. Disconnect fuel line and choke cable from carburetor. Remove carburetor and long (outboard) carburetor mounting stud from manifold. Disconnect vacuum balance tube from intake manifold.

2) Disconnect generator mounting bracket and swivel bracket up and away from engine upper shroud. Remove spark plugs. Remove engine side shield. Remove oil cooler.

3) Raise car on a hoist and attach Tool J-7894 (adapter) to underside of engine. Remove both engine side seal retainers and rear seal retainers. Remove engine rear center shield and seal assembly. Remove lower engine shroud and exhaust duct, then remove exhaust pipe-to-manifold nuts and remove exhaust manifold. Remove engine rear mounting nut and washer from below body rear mounting bracket.

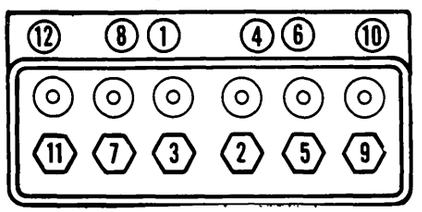
4) Remove valve rocker cover (catch oil draining from cylinder head), then remove rocker arms, pushrods, rocker arm studs and pushrod guides. Remove "O" rings from cylinder head and from bottom of pushrod drain tubes, then remove drain tubes.



CYLINDER HOLDING FIXTURES

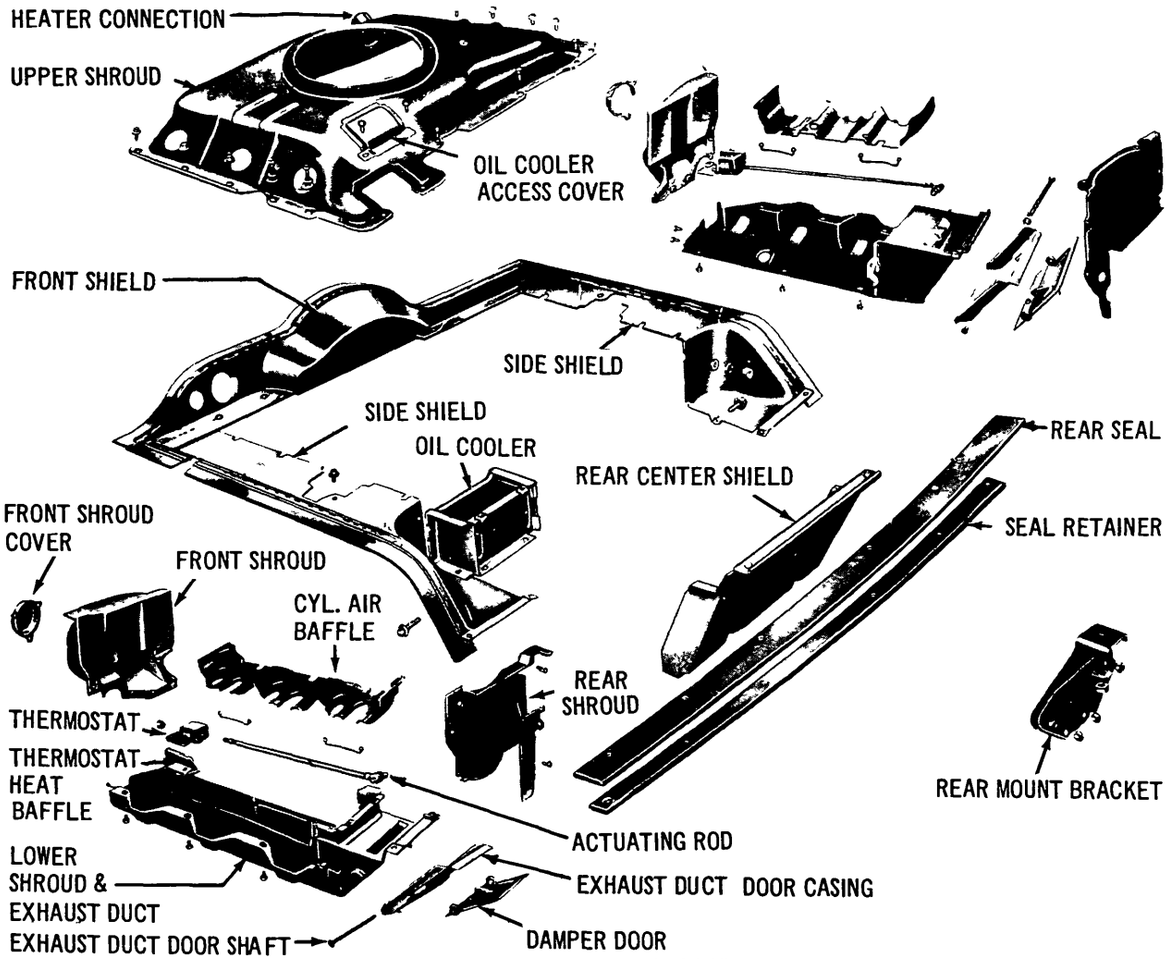
5) Remove cylinder head nuts and flat washers, then carefully lower engine assembly approximately 3" to clear cylinder head carburetor flange. Remove cylinder head from crankcase studs.

►*CAUTION: Do not rotate crankshaft with cylinder head removed unless holding fixtures are installed on studs to hold cylinder in place. ½" O.D. steel tubes 4¼" long should be installed on one long stud and ½" O.D. steel tubes 3½" long should be installed one diagonally opposite short stud of each cylinder. See Illustration.*



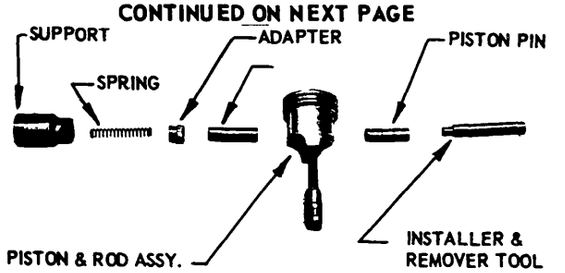
CORVAIR CYLINDER HEAD

Installation - To install head, reverse removal procedure and note the following: Use anti-seize compound



CORVAIR ENGINE SHROUDING

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CORVAIR PISTON PIN ASSEMBLY

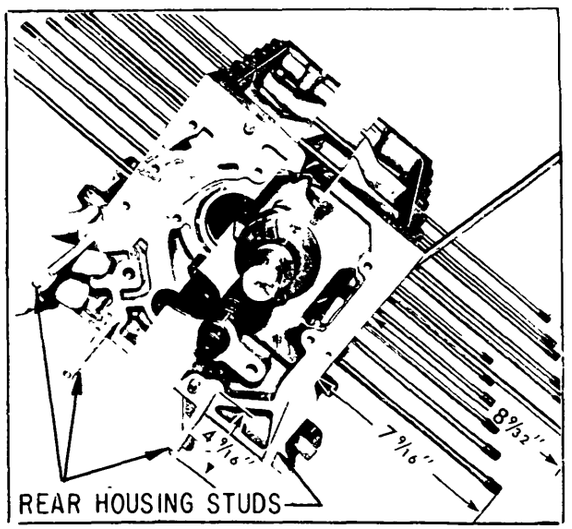
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such as Permatex No. 404 or its equivalent on the threads of all bolts, studs and capscrews entering aluminum parts. Tighten cylinder head retaining nuts and rocker arm stud nuts (rocker arm studs have internal threads at lower end that thread over cylinder head studs and act as cylinder head nuts) to 27-33 ft. lbs. in the sequence shown in diagram. Install pushrods with the .050" side oil hole upward (next to rocker arm). Install rocker arms and adjust to proper position *(see "Hydraulic Lifter Adjustment" below)*. Tighten rocker arm cover screws to 30-50 inch-lbs.

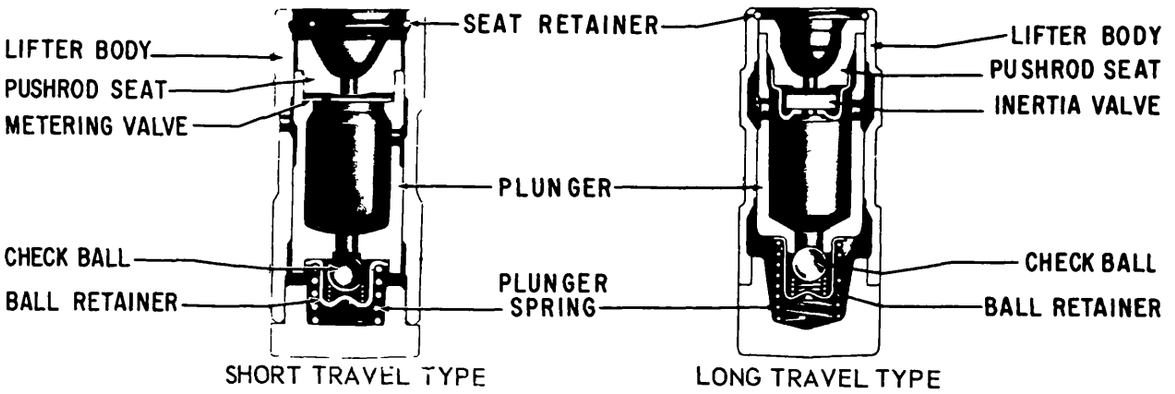
CYLINDER REMOVAL: *NOTE - Cylinder can be removed with engine in car.* Remove cylinder heads and install holding fixtures (see above). Remove crankcase cover and blower assembly (see above). Remove cylinder air baffles (secured by retainer spring clips at base of cylinder). Turn crankshaft and remove connecting rod caps. Remove cylinder holding fixture and remove cylinder, piston and rod as an assembly. *NOTE - If desired, cylinder can be removed without removing piston and connecting rod. In this case, use Tool J-8356 to compress piston rings when installing cylinder.* **Installation** - Install new copper gasket over cylinder pilot and install cylinder into crankcase. Reverse removal procedure.

PISTON PIN REMOVAL & INSTALLATION: Use Tool Set J-8355 to remove and install piston pin in piston and connecting rod (see illustration). When installing, press pin in until pilot of tool bottoms on adapter and support.

CONNECTING ROD BEARING REPLACEMENT: *NOTE - Bearings can be replaced without removing engine from car.* Remove crankcase cover and blower assembly (see above). Remove spark plugs. Remove connecting rod bearing caps (turn crankshaft to position rods for access to cap bolts).



CRANKCASE STUD DIMENSIONS



CORVAIR HYDRAULIC VALVE LIFTER

FLYWHEEL HOUSING: Crankshaft Front Oil Seal Replacement - Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-2221-A or suitable installer. *CAUTION : Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

ENGINE REAR HOUSING REPLACEMENT: Observe the following: 1) Grooved pin holding oil pump pressure regulator valve must be installed with a suitable drift. 2) Oil pump gallery plug must be flush with counterbore (use sealing compound). 3) Distributor holding stud should project 1 1/8" from distributor mounting pad on housing.

CRANKSHAFT PULLEY REMOVAL: *Following procedure supersedes previous recommendations.* Rework Crankshaft Pulley Remover J-6978-1 by drilling two 7/16" holes through puller. Place holes 180° apart on a 2¼" circle which is concentric with screw hole in center of tool. Proceed as follows:

1) Raise and support rear of car. Loosen blower belt, remove oil filter assembly, and remove engine grille. Remove engine rear sealing strip retainer and sealing strip, then remove engine rear center shield.

2) Support rear of engine, disconnect and remove rear engine mount and remove mount bracket from engine. *NOTE - On trucks, lower rear of engine to obtain sufficient clearance.* Remove pulley attaching bolt, then remove pulley using reworked Puller J-6978-1 (see above).

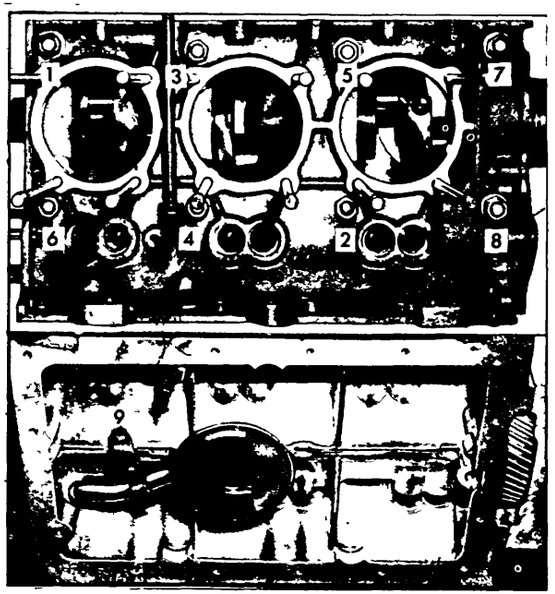
Crankshaft Rear Oil Seal: *See CAUTIONS below.* Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-270-6 or suitable installer. *CAUTION - Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

CRANKCASE SEPARATION: After cylinders, rear housing, and flywheel housing removed, loosen crankcase holding bolts. Tilt crankcase on right side at about 15° angle to prevent camshaft and crankshaft falling out. Remove holding bolts and remove crankcase left half.

CRANKCASE ASSEMBLY: Make sure split line surfaces are free of nicks and scratches. Install main bearing inserts in right half and install crankshaft. Install camshaft, guiding thrust washer into groove in crankcase and index timing marks on camshaft and crankshaft gears. Install main bearing inserts in left half and carefully install left half to right half. Torque holding nuts to proper specifications in sequence shown in diagram. *CAUTION - Hold bolt head and tighten nuts. DO NOT tighten at bolt head.*

MAIN BEARING REPLACEMENT: When testing bearing clearance, crankcase must be assembled without camshaft exactly as indicated under "Crankcase Assembly" above.

CRANKSHAFT DRIVE FLANGE: Drive flange and crankshaft timing gear are a one-piece unit with a tight press fit on crankshaft. A hydraulic press is necessary to remove and install gear and flange. To remove, use Support Plate J-358-1, Adapter Rings J-7028, and a



CRANKCASE TIGHTENING SEQUENCE

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hydraulic press. To install, support crankshaft between front crankshaft throw and front journal (support must clear thrust face of No. 6 crankpin). Install woodruff key and install crankshaft gear. Press gear on shaft with Tool J-6175 and a hydraulic press.

►*FLYWHEEL SEALING CAUTION:* Flywheel or flex plate-to-crankshaft gear bolts must have sealing compound applied before installation to prevent oil leakage.

CAMSHAFT GEAR REMOVAL & INSTALLATION: Remove gear by supporting gear with Tool J-971 and pressing out shaft with an arbor press. To install, support camshaft at back of front journal, install thrust washer and woodruff key and press gear on shaft with an arbor press (support gear with Tool J-971) until gear bottoms on thrust washer.

PUSHROD, PUSHROD GUIDE & DRAIN TUBE INSTALLATION: Place "O" rings on each end of drain tubes and install with long end of tube toward cylinder head. Insert pushrods into drain tubes with .050" side oil hole at rocker arm end (pushrod marked with blue paint). Install pushrod guides and rocker arm studs. Install rocker arms and make valve lifter adjustment.

HYDRAULIC LIFTER ADJUSTMENT: For initial adjustment after overhaul, proceed as follows: Set distributor at No. 1 firing position and crankshaft pulley notch at 0° on timing tab. Adjust No. 1, 3, 6 Intake and No. 1, 4, 5 Exhaust valves as follows: Turn rocker arm adjusting nut down until no axial movement of pushrod is felt, then turn adjusting nut 1 turn additional. With distributor at No. 2 firing position (pulley notch at 0°), adjust No. 2, 4, 5 Intake and No. 2, 3, 6 Exhaust valves. *NOTE - Above adjustment applies to all 1961 lifters, whether "long travel" or "short travel" or whether used in Std. or Hi Perf. engines.*

HYDRAULIC LIFTERS: Removal - Lifters are removed from lifter bores after pushrods and drain tubes removed by means of a magnet or wire hook and should be reinstalled in same bore from which removed.

Disassembly - Hold plunger down and remove pushrod seat retainer. Remove pushrod seat and inertia or metering valve assembly, plunger, and spring from lifter body. Remove check ball retainer, ball and spring. *NOTE* - Replace entire lifter if any part damaged.

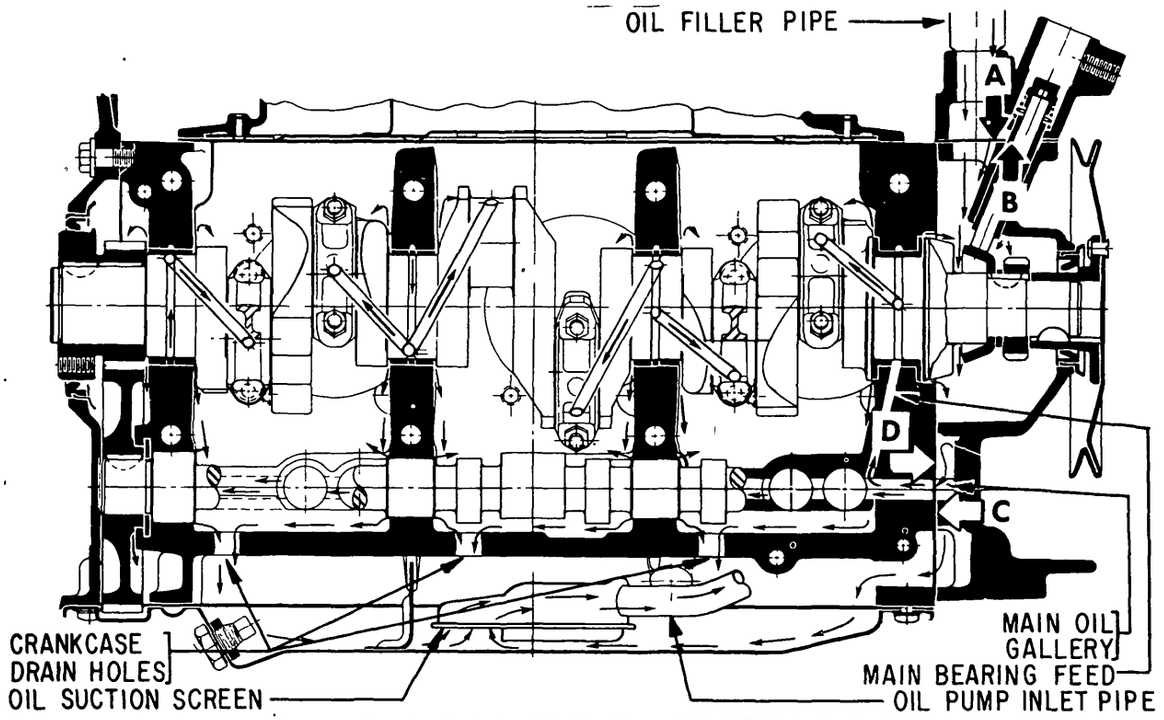
Reassembly - Insert check ball in plunger, place spring in seat in ball retainer and insert retainer on plunger. Place plunger spring over ball retainer and slide lifter body over spring and plunger. Install pushrod seat and inertia or metering valve assembly into plunger and install retainer. *NOTE - Fill lifter with SAE 10 engine oil at reassembly and before installing in engine.*

OILING SYSTEM

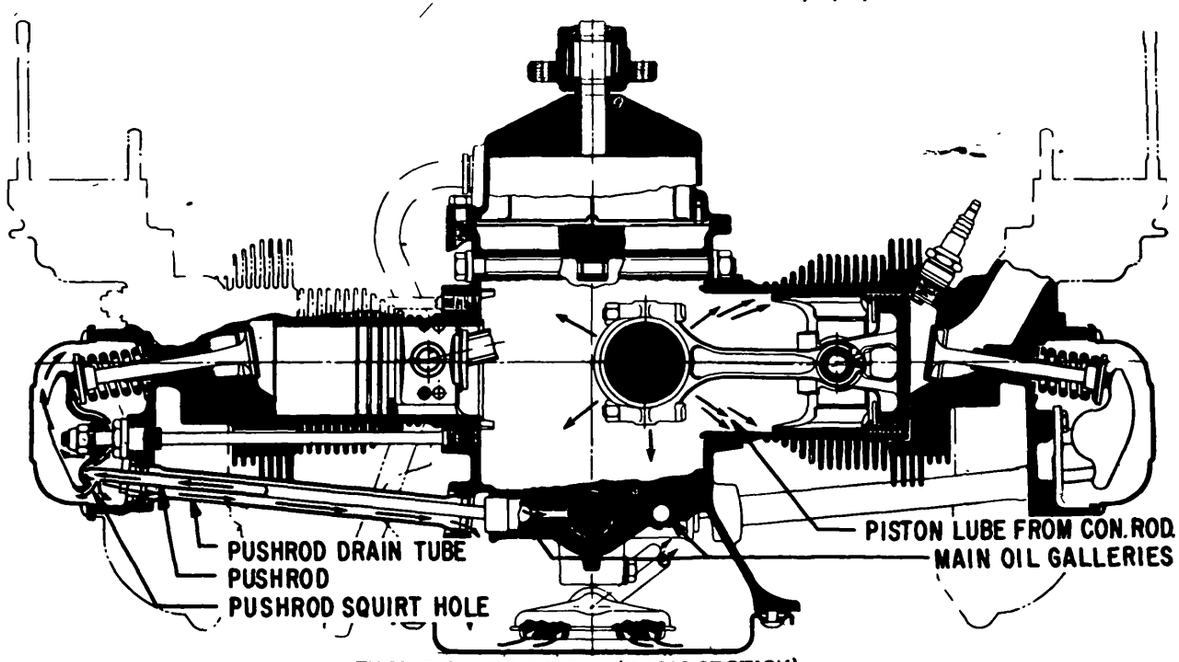
ENGINE LUBRICATION: Force feed type with oil under full pressure supplied to all crankshaft, camshaft, and connecting rod bearings, and to hydraulic valve lifters. Oil metered by lifters lubricates pushrods and rocker arms. All other parts are lubricated by oil spray.

OPERATION: Oil pump located in engine rear housing & driven by distributor shaft which is driven by crankshaft. Pump draws oil through fixed oil screen and intake pipe in crankcase and delivers oil to full-flow type filter mounted on Filter & Generator Adapter which is mounted on engine rear cover. Oil is then directed through oil cooler (mounted on side of engine

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ENGINE OILING SYSTEM (SIDE VIEW - SEE VIEWS A, B, C, D)



ENGINE OILING SYSTEM (CROSS SECTION)

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rear cover) and then to the two main oil galleries (one on either side of camshaft) which extend entire length of crankcase. Oil is distributed through the main galleries as detailed below. *NOTE - See Engine Rear Cover and Filter & Generator Adapter illustrations for location of chann ls and passages in these parts and for location of bypass valves for oil filter and oil cooler.*

Crankshaft & Camshaft Bearings - Lubricated through passages in crankcase webs from main oil galleries. Individual bearings are lubricated from right or left main oil galleries as follows: **Crankshaft Bearings** - Nos. 1 & 3 (right gallery), Nos. 2 & 4 (left gallery). **Camshaft B arings** - Nos. 1, 3, 4 (right gallery), No. 2 (left gallery).

C nn cting Rod B arings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

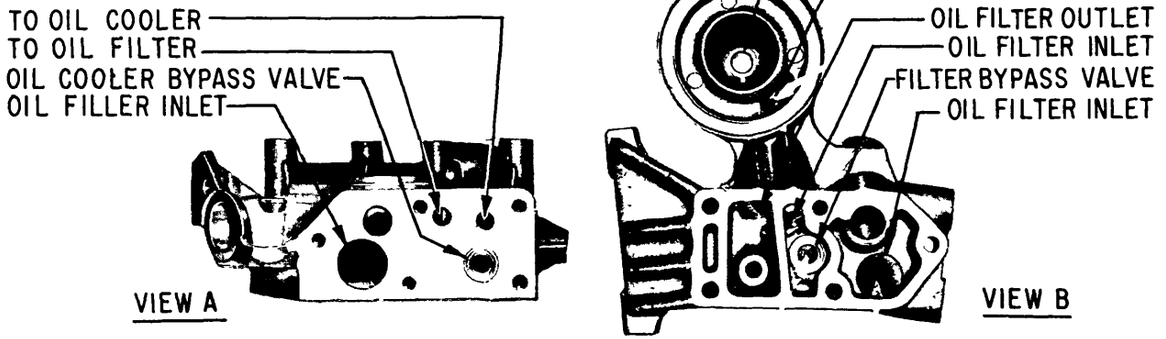
Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from ends of connecting rod bearings.

Timing Gears - Lubricated by oil spray from forward end of crankshaft and camshaft No. 1 bearings.

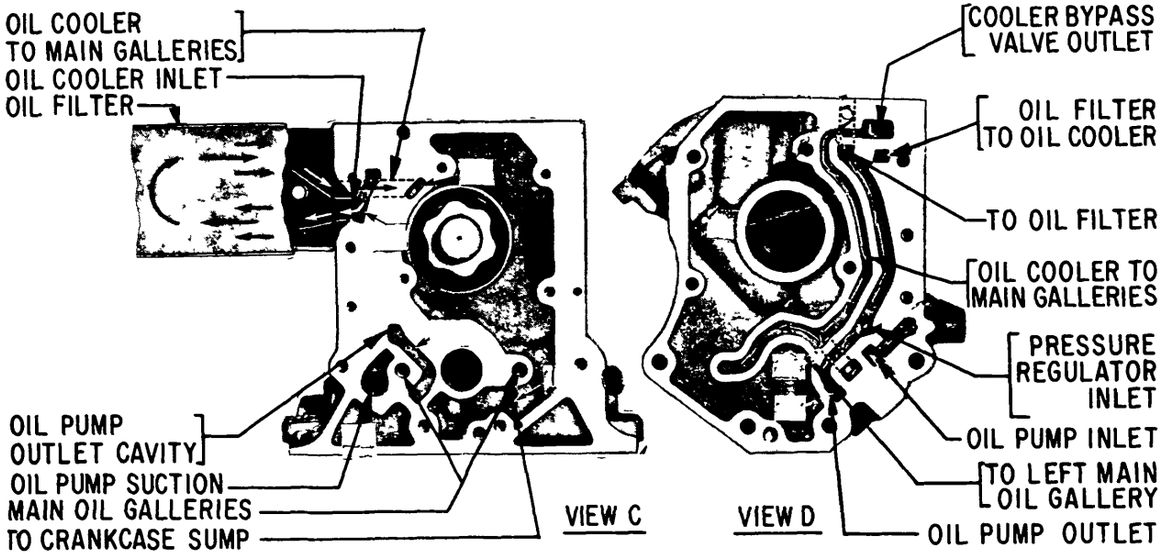
Fu l Pump Eccentric & Distributor Drive Gear - Lubricated through drilled orifice and pressed in nozzle in engine rear housing which directs oil on these parts (early cars), lubricated by overspray from No. 1 (rear) main bearing (later cars - orifice and nozzle omitted from rear housing).

Hydraulic Valve Lifters - Main oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods, & Valves - Pushrods are hollow and are supplied with oil from hydraulic lifter (inertia valve in upper end of lifter permits oil to flow through hole in end of pushrod). Upper end of pushrod has a side hole which sprays the valve chamber (lifter and pushrod rotate in operation and this oil spray is directed around valve chamber) and a through hole in the end which lubricates pushrod socket and rocker arm ball (pushrod hole registers with hole in rocker arm once during each revolution directing oil upward to the rocker arm ball). Oil in rocker arm chamber is returned to crankcase through the tubular pushrod drain tubes.



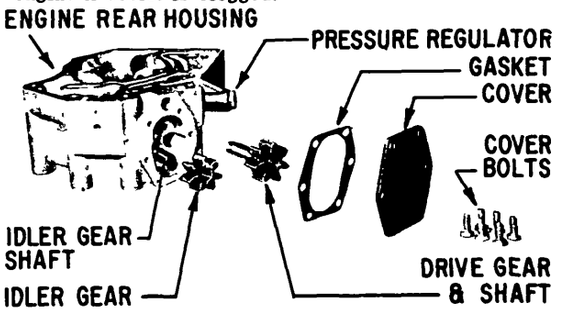
OIL FILTER-GENERATOR ADAPTER (SEE OILING SYSTEM SIDE VIEW)



ENGINE REAR HOUSING (SEE OILING SYSTEM SIDE VIEW)

OIL FILTER: Full-flow type mounted on Filter & Generator Adapter at rear of engine. Bypass valve (10 lb. type) located in adapter (see illustration) permits oil circulation through engine if filter element is clogged.

OIL COOLER: Finned cooler mounted on side of Engine Rear Housing in the engine cooling air stream. Bypass valve (10 lb. type) located in Filter & Generator Adapter (see illustration) permits oil circulation through engine if cooler is clogged.



CORVAIR OIL PUMP

OIL PUMP: Disassembly - Drain crankcase, remove rear grille, center shield and engine rear mount (support engine). Remove oil pump cover. Remove oil pump drive gear and shaft and idler gear from rear housing. Remove pressure regulator valve plug, gasket, spring,

Reassembly: Lubricate gears with engine oil. Install idler gear on idler shaft and make sure shaft is 010-.020" below housing gasket surface Insert drive gear and shaft in housing. Clearance between gears and housing should be .002-.005". Gear backlash should be .002-.008". *NOTE - Oil pump gears should extend .0025-.0045" above housing gasket surface for il pump prime. Gears of .001" oversize thickness are available.* Install oil pump gasket and cover and pressure regulator valve assembly.

ELECTRICAL NOTES

GENERATOR INSTALLATION: *CAUTION - If preload on generator exists, end frame will break. To pr vent this condition, use following installation procedure exactly.* Tighten generator-to-adapter bolts to 15-22 ft. lbs. and loosely assemble mounting bracket-to-generator bolt and nut (at commutator end of generator). Bracket must be able to move. Tighten generator bracket-to-cylinder head bolts finger tight. Now tighten bracket bolt at commutator end of generator to 8-11 ft. lbs. Tighten front bracket-to-cylinder head bolt to 15-22 ft. lbs. and rear bolt to same torque.

STARTER REMOVAL: *Following procedure is recommended as easiest method of removal and installation.* Disconnect battery and raise and support car. Disconnect rear throttle control rod from transmission bellcrank, and from carburetor cross shaft. Disconnect starter solenoid wires (use ¼" drive midget socket set). With 3/8" drive, 9/16" shallow socket on a 9" extension with ratchet, remove upp r starter mounting bolt. Then remove lower bolt. Pull starter forward and remove from engine compartment.

►*JACKING & HOISTING CAUTION (ALL MODELS) Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

►*1961 MONZA & HIGH PERFORMANCE ENGINES PRODUCTION CHANGE Later production Monza 2-Door engines with Powerglide, and all Monza 4-Door engines with Powerglide have compression ratio of 9 0-1 (changed from 8 0-1) Later production High Performance engines (see "Engine Suffix Table" below for serial numbers) also have 9 0-1 compression ratio (changed from 8 0-1) These engines are basically the same as previous Std and Hi Perf engines except for some differences which will be listed below In the following data, engines will be designated as Std (8 0-1), Std (9 0-1), Hi Perf (8 0-1), Hi Perf (9 0-1)*

MODEL IDENTIFICATION

Model	Body Style	Series	Series Prefix
527	Std 2-Dr Club Cpe	500	0527
535	Std 4-Dr Sta Wgn	500	0535
569	Std 4-Dr Sedan	500	0569
727	Deluxe 2-Dr Club Cpe	700	0727
735	Deluxe 4-Dr Sta Wgn	700	0735
769	Deluxe 4-Dr Sedan	700	0769
927	Monza 2-Dr Club Cpe	900	0927
969	Monza 4-Dr Sedan	900	0969
R1205	Corvan Panel	1200	R125
R1206	Greenbrier Sportswagon	1200	R126
R1244	Loadside Pickup	1200	R124
R1254	Rampside Pickup	1200	R124

SERIAL NUMBER: Stamped on plate attached to left lock pillar *NOTE - Number (example below) includes identification data as indicated*

① ② ③ ④
1 0569 W 100025

① - Year (last digit)
② - Series Prefix (on Passenger models, this number is same as model number except for a "0" prefix On Greenbrier and Commercial models, next to last digit of model number is dropped) *See Model Identification table above*
③ - Assembly Plant *See Assembly Plant Designation below*
④ - Serial Number *NOTE - Starting serial number at each assembly plant is 100001 with Commercial models and Greenbrier having a different sequence than Passenger Cars*

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on top of engine block immediately forward of generator-oil filter adaptor *NOTE* - Number (example below) includes identification data as indicated

① ② ③ ④
T 01 01 Y

① - Assembly Plant "F" (Flint), "T" (Tonawanda)
② - Month "01" (January)
③ - Day "01" (First)
④ - *See "Engine Suffix Table" below*

Engine Suffix Table

Series	Engine & Compr. Ratio	① Trans.	Suffix
All Cpe & Sed	Std 8 0-1	SM3	②Y
All Cpe & Sed	Std 8 0-1	SM	(14)YC
All Cpe & Sed,	Hi Perf 8 0-1③	SM	YD
All Cpe & Sed	Hi Perf 9 0-1④	SM	YN
All Cpe & Sed	Std 8 0-1⑤	SM	YL
All Cpe & Sed	Hi Perf 9 0-1⑤	SM	YM
All Cpe & Sed	Hi Perf 9 0-1⑥	PG	ZF
All Cpe & Sed	Hi Perf 9 0-1⑤	PG	ZG
500,700 Cpe & Sed	Std 8 0-1	PG	Z
500,700 Cpe & Sed	Std 8 0-1⑤	PG	ZD
500,700 Cpe & Sed	Hi Perf 8 0-1①	PG	ZD
500,700 Sta Wgn	Std 8 0-1	SM3	⑧YF
500,700 Sta Wgn	Std 8 0-1	SM	(14) YH
500,700 Sta Wgn	Hi Perf 8 0-1⑨	SM	YJ
500,700 Sta Wgn	Hi Perf 9 0-1 (10)	SM	YG
500,700 Sta Wgn	Std 8 0-1	PG	ZB
500,700 Sta Wgn	Hi Perf 8 0-1 (11)	PG	ZE
500,700 Sta Wgn	Hi Perf 9 0-1 (12)	PG	ZK
900 Coupe (Early)	Std 8 0-1 (13)	PG	Z
900 Coupe (Later)	Std 9 0-1	PG	ZH
900 Sedan	Std 9 0-1	PG	ZH
900 Coupe & Sedan	Std 9 0-1⑤	PG	ZJ
1200	Std 8 0-1	SM	V
1200	Std 8 0-1	PG	W

① - **SM3** - 3-Speed Synchro-mesh, **SM4** - 4-Speed Synchro-mesh, **SM** - 3 or 4-Speed Synchro-mesh, **PG** - Powerglide.
② - Superseded by **YC**
③ - Up to Engine No T-0109 Superseded by **YN**
④ - Beginning Engine No T-0109 Supersedes **YD.**
⑤ - With Air Conditioning
⑥ - Beginning Engine No T-0207 Supersedes **ZD (Hi Perf. 8.0-1).**
⑦ - Up to Engine No T-0207 Superseded by **ZF**
⑧ - Superseded by **YH**
⑨ - Up to Engine No T-0109 Superseded by **YG**
(10) - Beginning Engine No T-0109 Supersedes **YJ**
(11) - Up to Engine No T-0207 Superseded by **ZK**
(12) - Beginning Engine No T-0207 Supersedes **ZE**
(13) - Superseded by **ZH**
(14) - 4-Speed Trans (Early), 3 or 4-Speed Trans - (Later)

TUNE-UP

►*AIR CONDITIONED CAR ENGINE ACCESS PROCEDURE For access to engine for tune-up and other engine service on air conditioned cars without disconnecting refrigerant lines or purging system, use the following procedure* 1) Remove compressor mounting bracket pivot bolt nut and compressor-to-adjusting bracket attaching parts Remove compressor belt Disconnect wiring from compressor Remove triangular bracket from front of compressor Work mounting bracket pivot bolt forward until threaded end of bolt is out of compressor rear mounting boss Reposition compressor in engine compartment

2) Remove condenser and shroud assembly-to-bracket attaching screws Carefully lift assembly from engine and rotate toward right rear of car as far as refrigerant lines will permit

►*1961 CORVAIR (ALL SERIES) ERRATIC IDLE OR PERIODIC MISS CORRECTION* If smooth idle not obtained after correct adjustment of accelerator linkage and carburetor synchronization (with correct fast idle setting of 045"), throttle plates may be drilled *See 'Rochester H Carburetors" in Carburetion Section.*

COMPRESSION PRESSURE: 130 lbs minimum at cranking speed Variation between highest and lowest cylinders must not exceed 20 lbs

VACUUM READING: 14-18" maximum at idle speed

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters

Hydraulic Lifter Adjustment (Engin Running) - With engine at normal operating temperature and running at idle speed, back off rocker arm stud adjusting nut until rocker arm clatters against valve stem, then turn adjusting nut until clatter just stops Stop engine and turn adjusting nut an additional **1 full turn.** *NOTE - This adjustment applies to both "long travel" and "short travel' lifters*

MANIFOLD HEAT CONTROL: None used

POSITIVE CRANKCASE VENTILATION: Clean hose and pipe at 10,000 mile intervals or sooner if needed, and check cleanliness of system before performing a "Tune-Up" for ignition and carburetion troubles

IGNITION

FIRING ORDER: 1-4-5-2-3-6
Cylinders - RIGHT BANK 1-3-5 LEFT BANK 2-4-6
NOTE - Right rear cylinder is No 1 and l ft rear cylinder is No 2 Engine rotation, as viewed from rear of car, is counterclockwise

SPARK PLUG GAP: 035"
Spark Plugs - AC. 14 mm Torque to 20-25 ft lbs Used as follows

Engine	Standard	Cold r
Std (8 0-1)	46FF	①
Std (9 0-1)	44FF	42FF
Hi Perf (All)	44FF	42FF

① - 44FF (Heavy Duty), 42FF (Road Racing)

COIL: Delco-Remy 1115135.
Ignition Current - 1 8 amps idling, 4 0 amps stopped
Resistor - Resistance type cable (1 8 ohms resistance) used in harness between instrument panel disconnect plug and rear wiring harness connector Bypassed during cranking by lead from starter solenoid to coil

DISTRIBUTOR: Delco-Remy. Special "Window" type without external adjustment Used as follows

Engine & Transmission	Delco-Remy No.
Std (8 0-1) Synchro-mesh	1110258
Std (8 0-1) Powerglide	1110259
Std (9 0-1) Powerglide	1110275
Hi Perf (All)	1110260

Condenser - Delco-Remy 1928111 **Capacity** - 18- 23 mfd
Contact Point Set - 1945376
Breaker Gap - 019"(new points), 016" (used points)
Cam Angle - 31-35° Set at 33°
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Clockwise viewed from above

Automatic Advanc (1110258)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
7-9	1050	14-18	2100
15-17	1800	30-34	3600

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Automatic Advance (1110259)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	800	0-4	1600
5-7	1270	10-14	2540
11-13	1850	22-26	3700

Aut matic Advance (1110260)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	425	0-4	850
2.25-4.25	600	4.50-8.50	1200
6-8	1375	12-16	2750
11-13	2400	22-26	4800

Automatic Advance (1110275)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	850	0-4	1700
10	2050	20	4100

Vacuum Spark C ntr l: Delco-Remy 1116152 (1110258 & 1110260 Distr.), No. 1116177 (1110259 & 1110275).

Vacuum Advance (1116152)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11.5	23	14.5-16.0

Vacuum Advance (1116177)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
11.5	23	15.5-17.0

IGNITION TIMING

Ignition Timing Specifications

Distributor	ℂ Std. Setting	Allowable Range
1110258	4° BTDC	4-10° BTDC
1110259, 260, 275	13° BTDC	13-18° BTDC

ℂ - At idle speed without disconnecting vacuum advance hose.

CARBURETOR

►*CARBURETOR APPLICATION: Two Rochester Model "H" single barrel carburetors used.*

►*1961 CORVAIR (ALL SERIES) ERRATIC IDLE OR PERIODIC MISS CORRECTION:* If smooth idle not obtained after correct adjustment of accelerator linkage and carburetor synchronization (with correct fast idle setting of .045"), throttle plates may be drilled. *See "Rochester H Carburetors" in Carburetion Section.*

►*1961 CORVAIR ENGINE SURGE CORRECTION (Carburetors 7019100 & 7019107):* Install new main metering jet, venturi cluster, and other parts. *See "Rochester H Carburetors" in Carburetion Section.*

►*1961 CORVAIR FAST IDLE SETTING CHANGE:* Fast idle setting (clearance between fast idle speed screw and tang on throttle lever) has been changed from .030" (Synchro-mesh), .010" (Powerglide), to .045" for all carburetors.

►*1961 CORVAIR EXCESSIVE FAST IDLE RPM DURING COLD WARM-UP CORRECTION:* Readjust fast idle setting (clearance between fast idle speed screw and tang on throttle lever) to .045". This change made in production on later cars.

►*1961 CORVAIR FLAT SPOT ON ACCELERATION CORRECTION (Carburetor 7019100):* If this condition exists on carburetors with two holes in accelerating pump actuating lever, check if pump is on index (scribe mark on accelerator pump shaft lever in line with cast tang on carburetor bowl cover). If pump is on index, proceed as follows to correctly adjust pump stroke: Disconnect pump rod from inboard hole in lever and connect rod to outboard hole, then bend pump rod to align index mark with cast tang. Disconnect rod from outboard hole and connect to inboard hole of lever. Index markings should then be disregarded. DO NOT re-index.

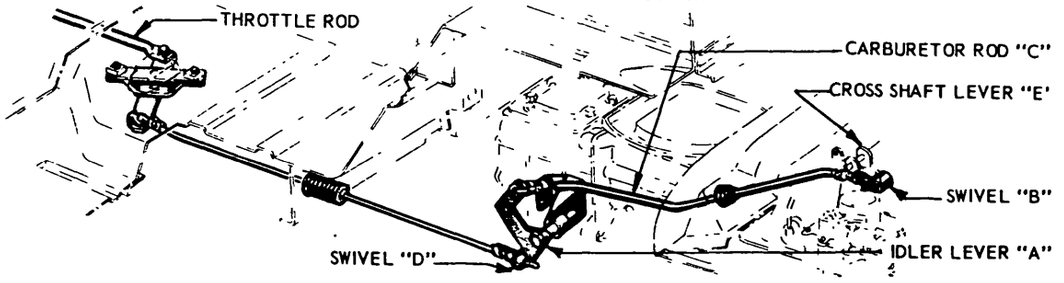
►*1961 CORVAIR CHOKE CABLE SEIZURE CORRECTION:* Make sure cables are not kinked, galled, or rusted in conduit. Make sure rear cable slider block is not binding and that there is no interference at rear cable wire ends. If slider block binds because of dirt, install a snap-on Choke Cable Dust Cover, Part No. 3813044. To prevent interference of control wires at carburetors, make sure that no more than ¼" of wire protrudes from carburetor choke levers.

►*1961 CORVAIR CHOKE ADJUSTMENT CHANGE: See "Choke Adjustment" below.*

ACCELERATOR CONTROL LINKAGE ADJUSTMENT: Remove mudguard over idler lever "A" (see illustration) on transmission, then disconnect swivel "D" from lever "A". Disconnect swivel "B" from left carburetor cross shaft lever "E". Pull rod "C" to wide open throttle (through detent for Powerglide and against stop for standard transmission) and turn lever "E" to wide open throttle position (carburetor throttle lever against the stop). Adjust swivel "B" to align with hole in lever "E", then lengthen rod "C" by backing off swivel **five full turns.** Position accelerator pedal by placing a block of wood 1" thick (Synchro-mesh). 1¼" thick (Automatic Trans.) between pedal and floor mat. Hold lever "A" in wide open throttle position (through detent for Powerglide) and turn swivel "D" to align with hole in lever "A". Install mudguard. *NOTE - This complete procedure provides proper clearance between accelerator pedal and floor mat at wide open throttle.*

CARBURETOR SYNCHRONIZATION, IDLE SPEED & FAST IDLE ADJUSTMENT: With engine off and both throttle rods disconnected at carburetor cross shaft levers, back idle speed and fast idle adjustment screws away from throttle shaft lever at each carburetor. Place a .003" feeler gauge between idle speed screw and throttle shaft lever. Turn screw in until it just contacts gauge, then remove gauge and **turn screw in 1½ turns.** Repeat procedure with opposite carburetor. With choke valve fully open, place .045" feeler gauge between fast idle speed screw and tang on throttle lever, then adjust screw until it just contacts gauge. Repeat with opposite carburetor. *NOTE - This .045" setting supersedes previous setting of .030" (Synchro-mesh), .010" (Powerglide), and will correct excessive fast idle RPM.* On both carburetors, turn idle mixture screws in lightly to its seat and back out 1½ turns. *CAUTION - Do not turn idle mixture screws in tightly against seats.* On right hand carburetor, connect throttle rod to carburetor cross shaft lever, then on left hand carburetor, rotate cross shaft (with accelerator rod) to insure positive closing of right hand carburetor throttle valve. Adjust throttle rod length in swivel until rod freely enters hole in carburetor cross shaft lever and secure rod with clip. *CAUTION - Following idle speed screw and mixture adjustments must be exactly duplicated on both carburetors to maintain proper synchronization.* Start engine and bring to normal operating temperature, then check and adjust ignition timing (see above). Connect vacuum gauge to adapter on vacuum balance tube and connect a tachometer to engine. Adjust idle speed screws equally on both carburetors to obtain an idle speed of 500 RPM (Std. Engine), 600 RPM (Hi Perf. Eng. - Synchro-mesh), 500 RPM (Hi Perf. Eng. - Powerglide), 650 RPM (Air Cond.) with Powerglide in "D". Adjust idle mixture screw on both carburetors equally to obtain peak steady vacuum at given idle speed. Remove vacuum gauge and close the adapter. Remove distributor vacuum advance hose from right hand carburetor and plastic cap from left hand carburetor spark port adapter tube, then connect vacuum gauge to adapter tube at each carburetor (use two equally calibrated gauges). Move accelerator rod to obtain 1200 RPM (transmission in neutral). Check vacuum reading at each carburetor and note differences. If vacuum difference is 1" or less, carburetors are properly synchronized. If difference is more than 1", return engine to proper idle speed and adjust **left hand carburetor** throttle rod one turn (up to increase left carburetor vacuum and down to decrease) and recheck carburetor vacuum difference at 1200 RPM (make adjustments by disconnecting rod at cross shaft end and rotating in swivel). Repeat adjustment as necessary. *NOTE - It is preferable to have higher vacuum reading on right hand carburetor (distributor advanc side).* Remove vacuum gauges and replace hose and cap on adapter tubes. *CAUTION - When making linkage adjustments, accelerate engine by moving accelerator rod only. DO NOT open throttle by grasping oth r portions of linkage as this may upset synchronization.* To make final adjustment, replace air cleaners and connect vacuum gauge to vacuum balance tube adapter, then with engine idling at 500 RPM (Std. Engine), 600 RPM (Hi Perf. Engine - Synchro-mesh), 500 RPM (Hi

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POWERGLIDE THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Perf Engine - Powerglide), 650 RPM (Air Cond Cars) with Powerglide in "D" (Drive), adjust idle speed and mixture screws equally on both carburetors to obtain highest steady vacuum reading between 14-18"

ROCHESTER MODEL "H"

Single barrel downdraft type similar in design to previous models Two carburetors used, one on each intake manifold Each carburetor is a complete assembly Choke control is manual type on each carburetor, controlled by a single knob on instrument panel Individual air cleaners connected by an air intake tube, are mounted on each carburetor Carburetors are used as follows

Engine & Transmission	Rochester No
Std (All), Synchro-mesh (Early)	7019101
Std (All), Synchro-mesh (Later)	7019111
Std (All), Powerglide (Early)	7019100
Std (All) Powerglide (Later)	7019110
Hi Perf (All) All Trans (Early)	7019107
Hi Perf (All), All Trans (Later)	7019117

Idle Speed & Mixture Setting - *See 'Carburetor Synchronization, Idle Speed & Fast Idle Adjustment' under CARBURETOR above*

►*CHOKE ADJUSTMENT NOTE Following procedure supersedes previous procedures*

Choke Adjustment - Move slider block on choke main cable housing at firewall to full forward position and tighten housing clamp to cable housing Move slide to 1/4" from rear of mounting bracket with instrument panel knob bottomed on bracket at instrument panel and tighten slide screw onto main choke cable wire Assemble cable and housing assemblies loosely at both carburetor mounting brackets Extend cable housing approximately 1/4" beyond mounting bracket clamp and tighten clamp at each carburetor With slide approximately 1/2" from rear of mounting bracket slot, tighten swivel at each choke lever and throttle kick cam when choke is fully open Cut cable wire so about 1/4" extends past swivel *NOTE - Do not bend cable wire Hold swivel with a wrench when tightening cable wire to prevent kinking* Pull choke knob to check for proper operation Choke should just begin to move when knob is 3/8" to 1/2" out *NOTE - During first 3/8' to 1/2' of knob travel, fast idle cam raises idle speed without moving choke valve Pull knob to end of travel and choke valve should be closed*

Throttle Linkage Adjustment - *See CARBURETOR above*

►*OTHER DATA See Rochester H Carburetors in Carburetion Section*

CARB. EQUIPMENT

Fuel Pump - AC No 4704 (Early) No 4886 (Later) Fuel only

Fuel Pump Pressure - 4-5 lbs at 500-1000 RPM

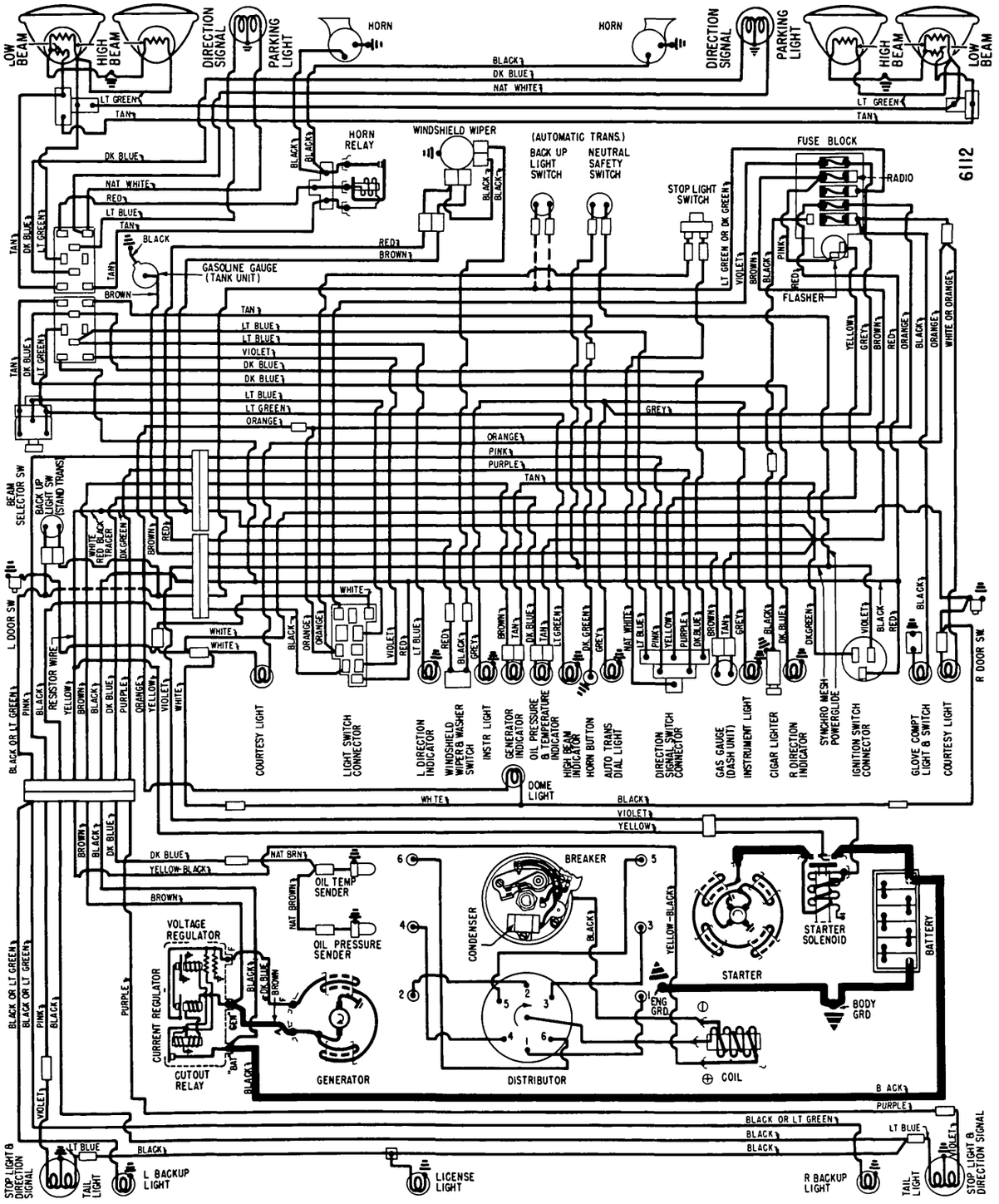
Gasoline Gauge AC Electric type

Dash Unit - AC No 5643032 (Pass) No 5643525 (Trucks)

Tank Unit - AC No 5641645 (Pass), No 5641632 (Trucks)

Fuel Filter In fuel inlet line of each carburetor Clean every 15,000 miles or sooner with solvent and compressed air Install with point of cone facing inlet line

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Air Cleaner: Oil wetted type with reusable Polyurethane element. One assembly mounted on each carburetor. Clean element every 2000 miles or sooner if needed.

►*CLEANING CAUTION* Clean element (after removing metal support) in **kerosene or mineral spirits only.** Squeeze out all solvent, then dip in light engine oil and squeeze out excess oil. DO NOT shake, swing or wring element. **Squeeze only.**

BATTERY

Delco No. 457 (Std.). 12 volt, 7 plate, 35 ampere hour capacity. **No. 557 (Optl.).** 12 volt, 9 plate, 42 ampere hour capacity. Identified by green paint on negative terminal. Both batteries at 20 hr rate. *NOTE* - Batteries are dry type for service replacement.

Battery Ground - Negative, to body and generator.

Engine Ground - Left and right sides of engine to body.

STARTER

Delco-Remy No. 1108306 (Synchro-mesh), No. 1108307 (Powerglide).

Armature - Delco-Remy No. 1946226 (All).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Ⓒ - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119910 mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No. 1116657.

Neutral Safety Switch: Delco-Remy No. 1998717 Combination neutral safety and back-up light switch. **Adjustment** - *See "Corvair Transaxle" in Transmission Section.*

Starter Removal: *See "Electrical Notes" in Corvair Special Data.*

GENERATOR

Delco-Remy No. 1102227 (Std.), No. 1105135 (Low Cut-In).

Armature - Delco-Remy No. 1952301 (1102227 Gen.), No. 1950521 (1105135 Gen.)

Performance Data

Generator	Amperes	Volts	RPM
1102227	30	14.0	2240
1105135	35	14.0	1730

Rotation - Clockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 amps. (1102227), 2.73-3.00 amps. (1105135) at 12 volts and 80°F.

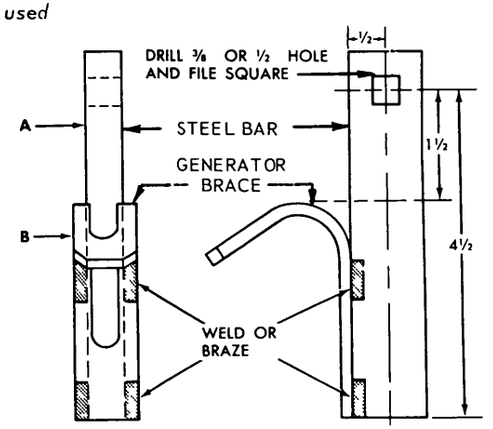
►*BLOWER BELT ADJUSTMENT NOTE Following procedures and specifications supersede previous recommendations.*

Blower Belt Adjustment: *NOTE - New belt is one installed for less than 1000 miles. Used belt is one installed for more than 1000 miles. Use either of two methods listed below for belt adjustment.*

Strand Tension Gauge Method - Use a variable reading strand tension gauge and adjust idler pulley to obtain 70 lbs. strand tension on **new** belt, or 50 lbs. strand tension on **used** belt.

Special Torque Tool Method - *Refer to "Tool Fabrication Note" and illustration below.* Place slot of hooked end of tool over reinforcing rib of pulley bracket with shank end of tool toward rear of car (relative to idler pulley installed position). Loosen idler pulley attaching bolt. Insert torque wrench into tool shank and pull wrench to rear of car to apply 20 lbs. torque for **new** belt, or 15 lbs. torque for **used** belt. Tighten the pulley attaching bolt and nut while holding tension load. *CAUTION - DO NOT allow torque to exceed specifications even momentarily. Any slight variation in tension will result in an excessively tight belt. If specifications are exceeded, complete readjustment is necessary.*

►*TOOL FABRICATION NOTE* Make tool shown in illustration from a steel bar ¼" thick, ¾" wide, and 5" long, and the slotted end of a generator brace, Part No. 3836330 or 3739845. Hook has a developed length of 5". *CAUTION - Hold dimensions shown in illustration to plus or minus 1/16" to assure correct tension when tool is used.*



BLOWER BELT ADJUSTING TOOL

►*NEW BLOWER BELT INSTALLATION NOTE* When a new belt is installed, adjust tension as for new belt (see above), then operate engine at 1500 RPM for a minute or two to seat belt, then readjust tension (new belt specifications). *NOTE - This procedure supersedes previous recommendations.*

Air Conditioning Compressor Belt Adjustment: ½-¾" deflection midway between compressor and crankshaft pulleys under a 15 lb. load.

►*GENERATOR PULLEY INSTALLATION CAUTION* Pulley nut has **left-hand threads.** DO NOT attempt to turn nut in opposite direction nor install a right-hand thread nut as severe damage to armature will result.

Generator Installation: *See "Electrical Notes" in Corvair Special Data.*

REGULATOR

Delco-Remy No. 1119001 or 1119261 (Std. Gen.). "Post Type" with nylon adjusting nuts above Voltage & Current Regulator units for air gap adjustment.

Delco-Remy No. 1119635 (Low Cut-In Gen.). "Double Contact" type.

Specifications below are "Normal" settings.

Cut-out Relay

Cuts In - 11.8-13.5 volts (1119001, 261), 11.8-13.0 volts (1119635).

Cuts Out (1119261) - 1-4 amperes reverse current at 12.5 volts for relay points to open.

Contact Gap - .020".

Air Gap - .020" (1119001), .023" (1119261 & 1119635).

Voltage Regulator

Setting (1119001, 261) - 13.8-14.7 volts at 125°F.

Setting (1119635) - 13.8-14.6 volts at 125°F ambient temperature when operating on upper contacts. 1-3 volts lower when operating on lower contacts.

Contact Gap (1119635) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (1119001, 261), .067" (1119635) with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 27.0-31.0 amps. (1119001, 261), 27.8-32.4 amps. (1119635) at 125°F ambient temperature.

Air Gap - .070" (1119261), .075" (1119001, 635) with armature pressed down to point where contacts just touch.

►*OTHER DATA - See "Delco-Remy 1119000 Series (Single Contact) Regulators" and "Delco-Remy 1119600 Series (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.

Stop Light Switch Location Under instrument panel.

Adjustment - Adjust switch in mounting bracket so electrical contact is made when brake pedal depressed ½-¾" from fully released position.

Lighting Switch Removal: Disconnect battery ground cable and pull switch to ON position. Depress switch shaft retaining button (top of switch under instrument panel) and remove shaft and knob. Remove switch retaining ferrule and bezel and remove switch.

Ignition Switch Removal: With negative cable disconnected at battery, position ignition switch in "Lock" and insert a wire in small hole in cylinder face. Depress plunger with wire and continue to turn key counterclockwise until cylinder can be removed. Use a spanner wrench (Tool J-7607 or J-5893, with inside of tangs filed off), and remove attaching nut, then remove switch. To remove "theft resistant" connector, use a piece of heavy wire stock and press on lock clip in slot in connector. Hold wire in place and work connector away from switch.

Instrument Cluster Removal (Pass. Cars): Disconnect battery ground cable and disconnect connectors from back of cluster. Pull wiring harness out of retaining clips on cluster. Disconnect speedometer cable. Remove lighting switch (see above). Remove cigar lighter attaching nut from behind panel and remove lighter. Lower mast jacket and steering wheel or remove steering wheel (see Steering Section). Remove instrument panel-to-cluster attaching screws and remove cluster, instrument center panel and seal by pulling straight out and turning slightly to clear transmission range selector. *NOTE - Individual bulb sockets and fuel gauge may be removed without removing cluster.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Instrument Cluster Removal (Gre nbrier & Trucks): Disconnect battery ground cable On Powerglide trucks, remove "C" clip holding transmission cable assembly to transmission control assembly Remove cable assembly attaching nut from control support arm Move selector lever to "Low" On all trucks, remove speedometer cable and cluster attaching screws Remove cluster from instrument panel, disconnect cluster wiring and remove from truck *NOTE* - When installing, Powerglide selector lever must be in full DOWN position

CIRCUIT BREAKER: 15 Ampere - Headlights, Parking Lights, High Beam Indicator, In headlight switch

FUSES: Located in junction block and fuse holder beneath instrument panel

10 Ampere - Heater Blower, Glove Box Light
10 Ampere - Tail, Stop, Dome Lights
20 Ampere - Heater System
4 Ampere - Radio
3 Ampere - All Instrument Panel Lights

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section*

►*CYLINDER HEAD EXCESSIVE TEMPERATURE INDICATOR NOTE:* A red indicator light on instrument panel will light when cylinder head temperature reaches 450°F A disc type sending unit on underside of right hand cylinder head, near No 3 cylinder controls this light This indicator light also serves dual purpose of indicating low oil pressure *See "Oiling System" and "Cooling" below.*

►*ALUMINUM THREAD REPAIR NOTE. A thread repair kit, Part No 3780960, is available for repairing stripped or damaged threads in aluminum parts*

►*ANTI-SEIZE COMPOUND NOTE· Permatex No 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs or capscrews entering an aluminum part to prevent thread seizure and damage*

DESCRIPTION: Own 6 cylinder, horizontal opposed, overhead valve, air-cooled aluminum type of same design used previously except for the following changes

Compression Ratio - Some later production engines have different compression ratio *See "Monza & High P rformance Engines Production Change" and "Engine Suffix Table" under MODEL IDENTIFICATION above, and also "Engine Specifications" below.*

Engine Shrouding - Engine lower shrouds and exhaust ducts are now one piece

Crankshaft - Front and rear oil slinger and retainer eliminated

Exhaust Manifold Sleeves - Press fit into exhaust manifold instead of sliding fit.

Co ling System - *See "Cooling" below for various changes*

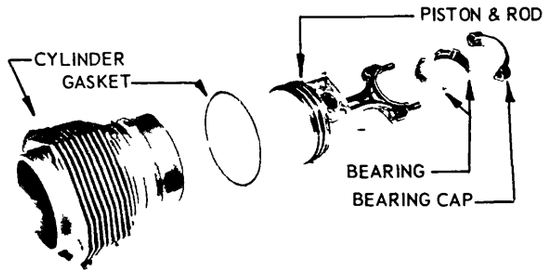
Engine Specifications

Engine	Bore	Stroke	Displacement
All	3 4375"	2 60"	145 cu ins
Engine	Compr. Ratio	Rated HP	Developed HP
Std ①	8 0-1	28 4	80 at 4400 RPM
Std ②	9 0-1	28 4	80 at 4400 RPM
Hi Perf ③	8 0-1	28 4	98 at 4600 RPM
Hi Perf ④	9 0-1	28 4	98 at 4600 RPM

① - All 500 & 700 Series, and Early 900 2-Door Series
② - Later 900 2-Door Series, and All 900 4-Door Series
③ - All Series, Up to Engine No T-0109 (Synchromesh), T-0207 (Powerglide)
④ - All Series, Beginning Engine No T-0109 (Synchromesh), T-0207 (Powerglide)

Compression & Vacuum Reading - *See TUNE-UP.*

►*STD. (9 0-1) & HI PERF. (ALL) ENGINES CYLINDER HEAD NOTE·* Cylinder heads used on these engines use different valve springs and valve spring shims than Std (8 0-1) engine *See below*



CORVAIR CYLINDER ASSEMBLY

ENGINE REMOVAL: *See "Power Train" in Corvair Special Data*

TIGHTENING TORQUES: *See "Tightening Specifications" in Corvair Special Data*

ENGINE MOUNTS: *See "Engine Service" in Corvair Special Data*

CRANKCASE COVER, BLOWER & BLOWER BEARING: *See "Engine Service" in Corvair Special Data*

OIL COOLER: *See "Engine Service" in Corvair Special Data*

CYLINDER HEAD: *See "Engine Service" in Corvair Special Data*

EXHAUST MANIFOLD: *See "Engine Service" in Corvair Special Data*

CRANKCASE & CYLINDER HEAD STUDS: *See "Engine Service" in Corvair Special Data.*

OIL PAN REMOVAL: Drain crankcase and remove oil pan retaining bolts Remove pan

CYLINDER

Individual cast iron type with integral cooling fins Replacement cylinders are furnished only as an assembly with piston and pin

Bore - 3 4370-3 4400" Maximum wear limit 005"

Removal - *See "Engine Service" in Corvair Special Data.*

PISTONS

Aluminum alloy, tin plated, slipper type skirt with steel strut Piston pin is offset toward major thrust side

Removal - Piston and rod removed as an assembly with cylinder *See "Engine Service" in Corvair Special Data*

Clearance - 0011- 0015" measured 2 20" from top of cylinder bores

Installing Pistons: Install piston with notch on top of piston toward front (flywheel end) of engine on both banks

Replac ment Pistons: Standard size only Piston, pin, and cylinder are furnished as a complete assembly

PISTON PIN

Pin is press fit in connecting rod

Diamet r - 7999- 8002" **L ngth** - 2 630-2 650"

Pin Fit in Piston - 00015- 00025" With piston and pin at 70°F and light film of oil on pin, pin should support own weight in either piston pin boss

Pin Fit in Connecting Rod - Press fit. *See "Engine Service" in Corvair Special Data.*

Replacement Pins: Standard size only furnished in assembly with piston and cylinder

PISTON RINGS

Compression rings are cast alloy iron with wear resistant coating Oil ring is a single piece, uncoated, with a slotted expander

Ring	Width	End Gap	Sid Clearance
Compr (1 & 2)	.0770- 0780"	010- 020"	0012- 0032"
Oil (3)	1860- 1865"	010- 020"	002- 0035"

Installing Rings - Install rings with identification marks and inside bevel **away fr m** top of piston *NOTE - Ring position is reversed from 1960 models*

Replacement Rings: Furnished Standard size only

CONNECTING ROD

Length - 4 719-4 721" center-to-center
Journal Diameter - 1 799-1 800"
Lower Bearing - Replaceable precision type
Clearance - 0007-.0027".
Sideplay - 005- 010"

Bearing Replacement: Furnished Std , 001", 002", 010", & 020" Undersize, To replace bearings, *see "Engine Service" in Corvair Special Data*

Installing Rods: No squirt hole Install in either direction

CRANKCASE

Cast aluminum alloy, vertically divided into two halves held together at parting line by bolts Studs for mounting cylinders, cylinder heads, rocker arms, and rear housing are mounted in each half and are replaceable Crankcase must be separated for service on either crankshaft or camshaft

Crankcase Separation: Crankcase can be separated after removal of cylinder heads, cylinders, rear housing, and clutch housing *See "Engine Service" in Corvair Special Data.*

Stud Replacement: *See "Engine Service' in Corvair Special Data*

CRANKSHAFT

Journal Diameter - 2 0978-2 0998" (No 1 & 2), 2 0983-2 0993" (No 3 & 4)

Bearings - Steel backed babbitt precision type No adjustment

Clearance - 0012- 0027" (No 1 & 2), 0007- 0022" (No 3 & 4)

Replacement Bearings: Furnished Std , 001", 002", 010", & 020" Undersize Also No 1 bearing furnished 003" Undersize To replace bearings, crankcase must be separated *See "Engine Service" in Corvair Special Data*

►*NO 4 MAIN BEARING NON-INTERCHANGEABILITY CAUTION* No 4 bearing upper half is 0015" thicker and lower half 0015" thinner than corresponding bearing halves of No 2 & 3 bearings to lower centerline of No 4 bearing No 4 bearing halves have brown dye on

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edges for identification DO NOT install a No 4 bearing in No 2 or 3 positions, nor a No. 2 or 3 bearing in No 4 position.

End Thrust - Taken by flanged type No 1 (rear) main bearing (at accessory drive end of engine).
Endplay - 002- 006"

Crankshaft Front & Rear Oil Seals: *See "Engine Service" in Corvair Special Data.*

Vibration Damper: None used

Crankshaft Drive Flange : Integral with steel timing gear. Pressed on crankshaft. *See "Engine Service" in Corvair Special Data*

Crankshaft Pulley Removal: Unnecessary to remove power train. *See "Engine Service" in Corvair Special Data.*

CAMSHAFT

Alloy cast iron camshaft located below crankshaft on split line of engine. Camshaft journals ride directly on machined base metal of crankcase and bearing inserts are not used. Exhaust valve lobes are twice the width of intake lobes and actuate a pair of exhaust valve lifters

►*HIGH PERF. ENGINE NOTE:* Special camshaft, Part No 3777255, used in this engine **Do not** interchange with Std Engine Camshaft, Part No. 3779332.

Journal Diameter - 1 4395-1 4405" (front), 1.1995-1 2005" (all others)

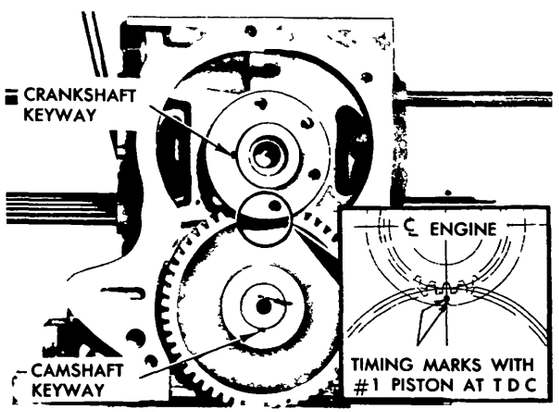
Clearance - 0015- 0035" (new), .002-.004" (used). *NOTE - If beyond the above limits, replace either crankcase or camshaft.*

End Thrust: Controlled by thrust washer located between camshaft gear and front bearing
Endplay - 002- 007"

Camshaft Removal: Crankcase must be separated. *See "Engine Service" in Corvair Special Data*

Timing Gear: Aluminum, with steel crankshaft gear, pressed on camshaft Replace gears in matched sets only To remove gear, remove camshaft and see *"Engine Service" in Corvair Special Data.*
Backlash - 002- 004"

Camshaft Setting: Align notch in crankshaft gear flange with mark in camshaft gear adjacent to each other across shaft centers Notches can be aligned only when crankcase reassembled. *See "Engine Service" in Corvair Special Data*



CORVAIR VALVE TIMING MARKS

VALVES

Valve	Head Diam.	℄ Stem Diam.	Length
Intake	1 335-1 345"	3415-.3422"	4.489-4.509"
Exhaust	1 235-1.245"	② .3410-.3417"	4 494-4.514"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°③	④ .314"	⑤ 0010-.0027"
Exhaust	45°③	④ 344"	⑥ .0014-.0030"

℄ - Standard Also furnished 003" & .010" Oversize (Intake), .003", .010", .020" Oversize (Exhaust).
② - Top of stem .3400-.3407" at bottom of stem. *NOTE - Valve stems are tapered .001".*
③ - Valve Face Angle 44°.
④ - 380" Intake & Exhaust on Hi Perf. Engines.
⑤ - Wear limit 004"
⑥ - *Supersedes previous 0015-.0032".* Wear limit .006".

Valve Seat Width - 1/32-3/32" Intake, 1/16-1/8" Exhaust.

Valve Seat Inserts: Steel, not replaceable.

Valve Guides: Pressed into cylinder head Not replaceable. Guides may be reamed for oversize valve stems if valve clearance excessive Intake valves furnished with .003" & 010" oversize stems, exhaust valves furnished with 003", 010" & 020" oversize stems. Use Reamer Set J-5830.

Valve Springs: Spring must be installed with a hardened shim (minimum 020" - furnished 030") under it to protect aluminum head.
Free Length - 1 74" (Std 8.0-1), 2.08" (Std. 9 0-1 & Hi Perf All)

Spring Specifications - Std. (8.0-1)

Valve	Lbs. Pressure	Length
Closed	58-64	1.508"
Open	141-149	1.148"

Spring Specifications - Std. (9.0-1) & Hi Perf. (All)

Valve	Lbs. Pressure	Length
Closed	69-79	1.696"
Open	159-169	1.306"

►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from spring seat on cylinder head to top of valve spring If this dimension exceeds "Preferred Height" listed in table below, install additional 1/32" shim, Part No 6255818 (Std. 8 0-1), No 3781876 (Std 9.0-1 & Hi Perf All), under valve spring to bring height within limits. *CAUTION - Do not add shims to bring height to less than "Minimum Height" below.*

Valve Spring Height Specifications

Engine	Valve	Preferred Height	Min. Height
Std (8 0-1)	Intake	1 15/32"	1 7/16"
	Exhaust	1 1/2"	1 15/16"
Std (9 0-1)	Intake	1 11/16"	1 21/32"
	Exhaust	1 11/16"	1 21/32"
Hi Perf (All)	Intake	1 11/16"	1 21/32"
	Exhaust	1 11/16"	1 21/32"

Pushrods: Externally mounted type between cylinder head and crankcase and enclosed in drain tubes. For servicing, see *"Engine Service" in Corvair Special Data.*

Valve Lifters: Hydraulic Both "long travel" and "short travel" type used in production. DO NOT intermix both type lifters on the same engine. *See "Engine Service" in Corvair Special Data.*
Hydraulic Lifter Adjustment - *See "Engine Service" in Corvair Special Data.*

Rocker Arms: Mounted individually on cylinder-cylinder head studs.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications (Std. 8.0-1 & 9.0-1 Ratio Engines)

Intake Valves - Open 43° BTDC. Close 93° ALDC.
Exhaust Valves - Open 87° BLDC. Close 69° ATDC.

(Hi Perf. 8.0-1 & 9.0-1 Ratio Engines)

Intake Valves - Open 54° BTDC. Close 118° ALDC.
Exhaust Valves - Open 95° BLDC. Close 78° ATDC

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Corvair Special Data.*

Crankcase Capacity: 4 qts refill, 5½ qts dry engine Add 1 pint with filter change.

Normal Oil Pressure: 35 lbs. at 2000 RPM
Pressure Relief Valve - In engine rear housing Not adjustable.

Oil Pressure Indicator: Light on instrument panel controlled by Oil Pressure Switch, No. 3751700 (Std.), No. 534598 (Air Cond.) Light comes on when ignition switch turned on but goes off during normal engine operation This light also serves dual purpose of indicating excessive cylinder head temperature *See "Cooling" below*

►*OIL PRESSURE SWITCH INSTALLATION CAUTION:* Switch is grounded through threads of body. **Do not** coat threads with sealer or anti-seize compound. Torque switch to 45-65 **inch-lbs.**

Oil Filter: Full-flow type Replace element every 4000 miles Use a new seal and tighten center bolt to 9-15 ft. lbs.
Replacement Filter Element - AC No. PF-4.

►*AIR CONDITIONED CAR OIL FILTER REPLACEMENT NOTE:* To prevent oil spilling into engine compartment when changing filter, remove both filter and adapter as a unit and separate filter from adapter at the bench.

Oil Pump: Gear type pump located in engine rear housing and driven by distributor shaft
Pump Overhaul - *See "Oiling System" in Corvair Special Data.*

Oil Cooler: Located at rear of engine left side shield. Clean every 5000 miles by removing access cover and removing dirt, twigs, etc.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Crankcas V ntilation: Standard - Air intake through oil filler cap and outlet pipe from top of crankcase cover and down on right side of engine

Positive - Outlet pipe replaced by a metal tube and flexible tubing from top of engine shroud to right carburetor air cleaner case No ventilation valve used Clean pipe and hose at 10,000 mile intervals or sooner if needed

ENGINE COOLING SYSTEM

Air cooled by blower mounted on top of engine Engine temperature regulated by a bellows type thermostat filled with butyl alcohol in each lower shroud exhaust duct Each thermostat operates a damper door at rear of each lower exhaust duct Exhaust damper doors restrict blower air exhaust until engine reaches operating temperature *NOTE - If thermostat fails, damper doors will remain open*

Th rmostat: Chevrolet No 3152003, bellows type filled with butyl alcohol under vacuum Two used, one in each engine lower shroud exhaust duct Thermostats control exhaust damper doors which restrict blower air exhaust until engine reaches operating temperature Thermostats start to open damper doors at 200-210°F and doors are fully open at 225-230°F If thermostats fail, atmospheric pressure causes damper doors to remain in open position

Exhaust Damper Door Adjustment - *Make this adjustment whenever a new thermostat is installed* With exhaust damper door fully open, pull thermostat actuating rod out to maximum travel (thermostat against bracket stop) With 2 11/32" opening from upper flat of damper door edge to exhaust duct top edge, adjust swivel on actuating rod until it enters damper door Install retaining clip

Temperature Indicator; Disc type switch, Part No 1993533 (Std), No 1993574 (Air Cond), on underside of right cylinder head near No 3 cylinder controls indicator light on instrument panel Light will come on if cylinder head temperature reaches 450°F This light serves dual purpose of indicating engine oil pressure *See "Oiling System" above*

►*TEMPERATURE INDICATOR SENDING UNIT INSTALLATION CAUTION.* Switch is grounded through threads of body **Do not** coat threads with sealer or anti-seize compound Torque switch to 10-15 ft lbs

LUBRICATION

LUBRICATION: Synchro-mesh Transmission (Checking Lubricant Level) - *NOTE - Synchro-mesh transmission and rear axle differential carrier assembly are connected by internal passages* Check lubricant level every 1000 miles, drain and refill every 10,000 miles Use only SAE 80 "Multi-Purpose" gear lubricant *CAUTION - Do not use "Straight Mineral Oil" gear lubricants or any "active sulphur soap" lubricants* With unit at normal operating temperature, check fluid level in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case) If level is low in differential case, also check level in transmission *NOTE - With unit at operating temperature, fluid should be level with bottom of filler plug hole If unit is cold, fluid should be ½" below filler plug hole*

Draining & Refilling - Remove drain plug in transmission housing and in differential carrier housing *NOTE - Transmission drain plug is on left side adjacent to idler arm on side of transmission cas* Refill by adding lubricant to both units (5 pints total) Check level at both units after refilling

Automatic Transmission (Ch cking Lubricant L vel): Check fluid level in transmission every 1000 miles With transmission selector lever in "N" position and transmission at normal operating temperature, engine idling, check fluid level on dipstick in filler tube Add fluid as necessary to bring level to "Full" mark on dipstick using Automatic Transmission Fluid Type "A" (Suffix "A") *NOTE - Automatic Transmission Fluid Type "A' may be substituted if necessary*

Draining & Refilling - *NOTE - Not required except at time of transmission overhaul* Drain oil by loosening filler tube attaching nut in oil pan Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel J-4264 Start engine and allow to idle 3-5 minutes, then add sufficient fluid to bring level to "Full" mark

Capacity - 6 pts (converter not drained), 13-14 pts (converter drained)

Differential Carrier With Pow rglid (Ch cking Lubricant Level): With unit at normal operating temperature, check fluid level in differential carrier (plug is adjacent to rear axle universal joint on left side of transmission case) *NOTE - With unit at operating temperature, fluid level should be even with bottom of filler plug hole If unit is cold, l vel should be ½" below filler plug hole*

Draining & Refilling - Drain carrier housing and replace drain plug Refill housing with 3 1 pts of recommended gear lubricant

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

88, SUPER 88 & 98

	Ft. Lbs.
Cylinder Head	60-80
Intake Manifold (Bolts & Nuts)	22-34
Exhaust Manifold (Bolts & Nuts)	19-25
Oil Pan	10-18
Main Bearing Caps (Exc Rear)	90-120
Main Bearing Caps (Rear)	130-160
Flywheel	85-95
Crankshaft Pulley	100 min.
Con Rod Caps	38-48
Camshaft Sprocket & Pump Eccentric	14-22
Rocker Arm Support Brackets	14-22
Rocker Arm Cover	4-7
Engine Front Cover	24-40
Water Manifold	22-26
Water Pump Mounting	14-22
Oil Pump Mounting	11-14
Oil Filter to Cylinder Block	28-38
Oil Filter to Housing Base	Hand Tight
Engine Front Mount to Bracket Nuts	35-50
Engine Front Mount Bracket to Cover Bolts	28-38
Front Mount to Frame Nuts	45-50
Engine Rear Mount to Flywheel Housing	50-60
Engine Rear Mount to Crossmember	40-56
Flywheel Lower Housing Cover Bolts	4-7
Flywheel Lower Housing to Block	50-55
Transmission Mounting	50-55

F-85 MODELS

Cylinder Head	45-55
Intake Manifold	25-30
Intake Manifold Gasket Clamp Bolt	25-30
Exhaust Manifold	18-24
Carburetor to Intake Manifold	14-17
Water Outlet to Intake Manifold	10-15
Oil Pan	6-15
Main Bearing Caps	50-60
Crankshaft Pulley (Balancer)	140-160
Connecting Rods	30-35
Rocker Arm Bracket	45-55
Rocker Arm Cover	3-5
Engine Front Cover	20-25
Filter to Front Cover	30-35
Oil Pump Cover	10-15
Oil Pump Screen to Block	10-15
Fuel Pump to Front Cover	20-25
Water Pump to Front Cover	6-8
Engine Front Mount to Block Bolts	50-55
Engine Front Mount to Crossmember	55-65
Engine Rear Mount to Transmission	30-40
Engine Rear Mount to Cross Support	30-35

ALUMINUM ENGINES SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring Note the following

1) Do not drop or slide machined surfaces on bench or floor

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation)

3) Lubricate all bolts or screws entering an aluminum part See "Bolt Thread Lubrication Note" below

4) Tighten bolts and nuts to the specified torque DO NOT overtighten Torque valves are for clean lubricated threads

►*BOLT THREAD LUBRICATION NOTE* Use engine oil or special thread lubricant on all threads entering an aluminum part

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole This brings hole back to original thread size See following table.

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

CYLINDER HEAD & MANIFOLD

88, SUPER 88, & 98

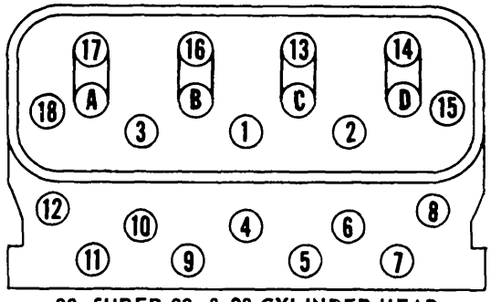
CYLINDER HEAD: Removal - Drain radiator and cylinder block Remove intake manifold and generator, disconnect exhaust pipes Remove valve covers On air conditioned cars, remove compressor bracket attaching bolts and tip compressor to rear to remove right valve cover On power steering cars, remove pump mounting bracket bolts and move assembly to one side to remove left valve cover Remove rocker arm shaft assembly Disconnect ground strap from rear of head Rock pushrods to break oil seal between rod and lifter seat (to avoid pulling lifter from bore), then remove pushrods and remaining cylinder head bolts Remove cylinder head with exhaust manifold attached

On Air Conditioned Cars - To remove right cylinder head, proceed as follows Loosen and remove all cylinder head bolts *NOTE - No 17 & 18 bolts cannot be removed because of blower duct assembly* Position rocker arm shaft away from head and remove pushrods Tip No 15 & 16 rocker arms to vertical position, tip their pushrods to within ½" of blower duct and tape in position Remove oil dipstick tube Lift head, rocker shaft assembly and exhaust manifold off dowel pins then move down and forward to clear blower duct

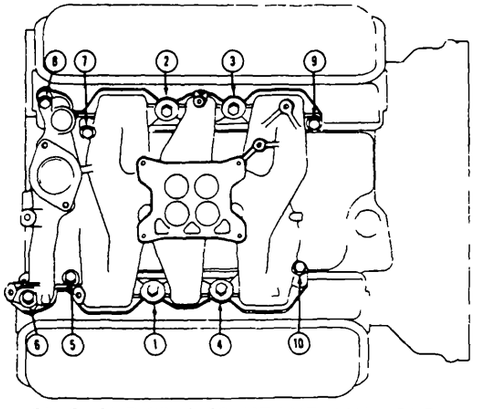
Installation - *NOTE* When new cylinder head is installed on left hand bank engine unit number must be transferred to new head Use Guide Studs J 3455 and apply P O B No 3 sealer to both sides of gasket Place gasket and head over studs and tighten all bolts snug Tighten **Numbered** bolts in sequence indicated in diagram to 50-60 ft lbs Tighten **Lettered** bolts in sequence shown in diagram to 14-22 ft lbs Retighten **Numbered** bolts in correct sequence to 60 80 ft lbs Retighten **Lettered** bolts in correct sequence to 14-22 ft lbs

INTAKE MANIFOLD Removal - Drain radiator disconnect upper radiator hose from water outlet Remove air cleaner and disconnect spark plug wires and throttle linkage Remove fuel and vacuum lines that interfere with manifold removal and disconnect primary coil wire and remove ignition wires from resistor On power steering cars disconnect power steering pump and bracket as an assembly On air conditioned cars remove external fuel filter Disconnect generator then remove attaching bolts and tip compressor and bracket rearward to obtain clearance for manifold removal Remove intake manifold with coil and carburetor attached Clean cylinder head and manifold machined surfaces

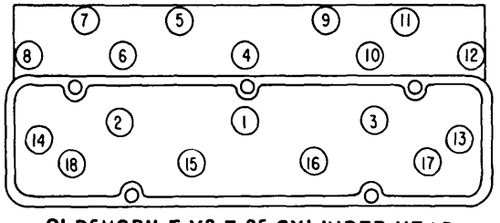
Installation - Reverse removal operations using new graphite coated metal gaskets Apply Permatex No 3 sealer or equivalent around gasket water holes Dip manifold bolts in C P No 9 sealer Install bolts and nuts and torque to specifications Adjust power steering belt tension adjust throttle linkage



88, SUPER 88, & 98 CYLINDER HEAD



88, SUPER 88, & 98 INTAKE MANIFOLD



OLDSMOBILE V8 F-85 CYLINDER HEAD

F-85 MODELS

►*ALUMINUM ENGINE CAUTION Use car in handling all aluminum parts*

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CYLINDER HEAD: R moval - Drain radiator and cylinder block. Remove intake manifold (see below), then disconnect exhaust pipe. Disconnect spark plug wires and remove valve cover.

To remove right cylinder head, remove generator rear mounting bracket bolt. Remove ground straps at front and rear of cylinder head. If equipped with heater, remove all head bolts except rear rocker arm shaft bracket bolt. Then **loosen** rear rocker arm shaft bracket bolt and raise shaft assembly from head and remove all pushrods except No. 16. Lift No. 16 to within 1" of blower case and tape to rocker shaft. Lift head, rocker shaft assembly, and exhaust manifold off dowel pins and remove as a unit by angling it forward to clear blower case.

To remove left cylinder head, remove power steering belt (if so equipped), then remove power steering pump bracket-to-cylinder head bolts. Remove rocker arm shaft assembly and push rods. Remove cylinder head bolts and cylinder head with exhaust manifold attached.

Installation - Head gaskets should be coated on both sides with POB No. 4 Sealer or equivalent. Likewise coat the cylinder head bolts and torque to specifications (*see diagram*). **F-85 MODELS**

INTAKE MANIFOLD: Removal - Drain radiator and disconnect upper hose from outlet. Disconnect heater hose at rear of manifold. Disconnect spark plug wires and remove carburetor cover. Disconnect throttle linkage from accelerator bellcrank and then disconnect choke heat tube and lower throttle rod. Remove fuel and vacuum lines from carburetor. Disconnect primary wiring from coil and secondary lead. Disconnect temperature gauge wire. Slide thermostat bypass hose clamp back on hose at water pump. Remove intake manifold bolts, then remove manifold with coil and carburetor attached. Remove intake manifold gasket clamp bolts, clamps, seals, and gasket.

Installation - Reverse removal procedure and note the following. Coat either side of gasket with POB No. 3 and install. Install end seals and clamps then lubricate clamp bolts with engine oil and torque to 10-15 ft. lbs. *NOTE - When tightening clamp bolts, intake gasket must be positioned so manifold-to-head bolt holes will be open.* After positioning intake manifold on engine and connecting thermostatic bypass hose to water pump, coat intake manifold bolts with engine oil and install. Torque bolts alternately to specifications.

PISTON PINS

F-85 MODELS

Piston Pin Removal: Place piston on Tool No. J-8754-1 with letter "F" on piston facing up. Press pin out with Tool No. J-8855-3.

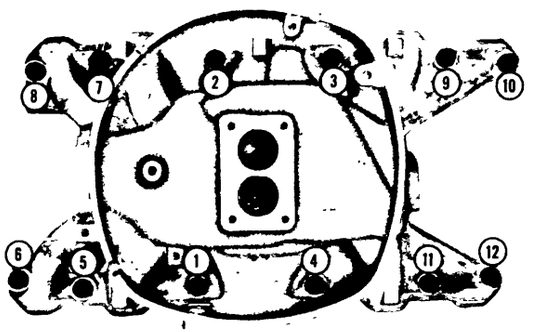
Installation - Place spring and guide stop Tool No. J-8751-2 in main body of Tool No. J-8754-1. Place piston on this tool and press pin in with Tool No. J-8855-3 until pin makes contact with guide stop tool in main body of Tool No. J-8754-1. This automatically centers pin in piston. Pin to connecting rod fit is .0007-.0013" tight.

CRANKSHAFT & MAIN BEARINGS

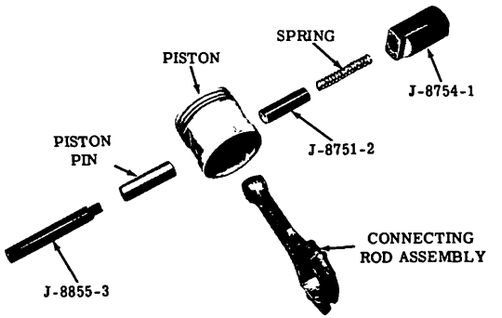
►*F-85 CRANKSHAFT ASSEMBLY REPLACEMENT PARTS CAUTION & BALANCING NOTE:* Crankshaft, balancer, and flywheel are balanced individually in production and complete assembly is then balanced by installation of unstaked pins in holes provided around rim of flywheel and balancer. *NOTE* - Flywheel is balanced individually in production by installation of **staked** pins in above holes. When replacing balancer or flywheel, maintain crankshaft assembly balance by transfering balance pins (unstaked) to new unit as follows:

Balancer - If no pins used on old balancer, install new balancer as is. If balance pins are found on old balancer, transfer these pins (unstaked) to corresponding position on new balancer.

Flywheel - If no balance pins (unstaked) found on old flywheel, install new flywheel as is. If balance pins (unstaked) found on old flywheel, transfer pins to corresponding position on new flywheel. *NOTE - If* the presence of a staked pin on new flywheel prevents transfer of balance pin, place unstaked pin in nearest corresponding hole.



F-85 INTAKE MANIFOLD



F-85 PISTON PIN ASSEMBLY

88, SUPER 88 & 98

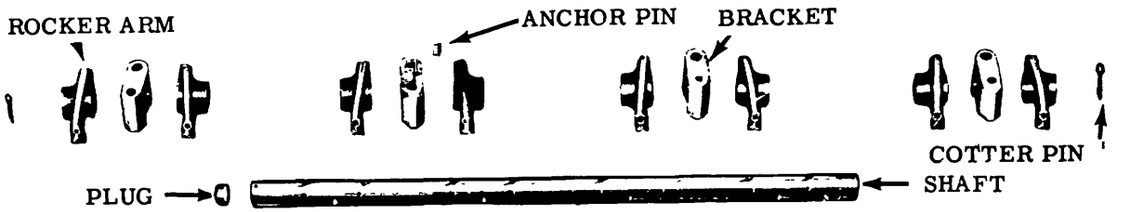
REAR MAIN BEARING OIL SEAL: Asbestos covered wiper seal installed in rear groove in bearing cap and block (oil slinger operates in front groove).

Oil Seal Installation - Crankshaft must be removed to replace upper half of seal. Place seal in groove in cap or block by hand, then drive tightly into groove by tapping Tool 23-18 with hammer. Seal is bottomed in cap or block when Tool 23-18 is seated in cap only and the undercut area of tool will pass over seal, when tool moved across cap or block. Hold Tool 23-18 tightly against seated seal and cut seal flush with parting line between upper and lower bearing. *NOTE* - Ends of seal must be cut clean (no frayed ends) and seal must entirely fill groove. After bearing cap installed, wipe DuPont Cement No. 5402 in grooves in block on both sides of bearing cap and press two cork seals into place in grooves.

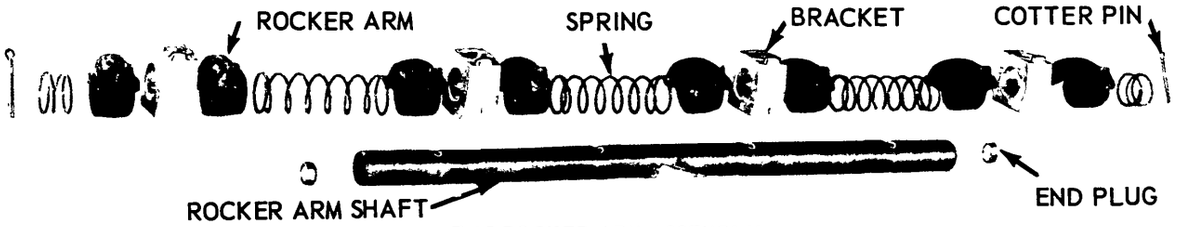
F-85 MODELS

REAR MAIN BEARING OIL SEAL: Replacement - Oil pan and rear main bearing cap, insert and seals must be removed. Install seal into bearing cap, packing by hand. Using Installer Tool No. J-8807, hammer seal into place. To check if seal is fully seated, slide tool away from seal. With tool seated fully in bearing cap, slide tool against seal. If undercut area of tool slides over seal, seal is fully seated. Rotate tool before cutting off excess seal packing. Cut seal 1/16" from bearing surface. Taper end of seal into a point.

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88, SUPER 88, & 98 ROCKER ARM ASSEMBLY



F-85 ROCKER ARM ASSEMBLY

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With screwdriver, pack fibers toward center, away from edges. Rotate tool to cut seal between notch and handle. Install two side bearing cap seals, leaving seal extended on each side. Coat back of insert with light film of oil and install in bearing cap. Clean crankshaft bearing journal and seal contact. Install bearing cap guide pins. Install bearing cap into place by tapping with wood block. Remove guide pins. Apply lubricant Part No. 980131 to cap bolts then torque to specifications. Do not trim ends of side seals.

►*NOTE: Seal in block installed with crankshaft removed.*

ENGINE FRONT COVER

88, SUPER 88, & 98

ENGINE FRONT COVER: Removal - Drain cooling system and disconnect lower radiator hose and heater hose from front cover. Disconnect generator link at generator and remove front engine mount to crossmember nuts. Use Tool J-8568 to raise engine to clear bolts of crossmember, then insert wood block 8" x 2" x 4" between each exhaust manifold and upper control arm and allow engine to rest on 2 x 4's. Remove oil pan, radiator assembly, fan blades and pulley, then remove crankshaft pulley. Remove distributor cap and rotate engine until rotor points toward cowl, then remove fuel pump assembly. Remove front cover attaching bolts and front cover assembly.

Installation - Reverse removal procedures and tighten belts to gauge line on Tool 33-70. *NOTE* - Use a new front oil seal and coat fuel pump rocker arm pad with Special Seal Lubricant Part No. 567196. Front cover bolts should be dipped in P.O.B. No. 3 Sealer and torqued to specifications. Coat on side of fuel and vacuum pump gasket with gasket cement such as P.O.B. No. 4.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: *NOTE - Front cover oil seal can be replaced without removing radiator or crankshaft pulley key as follows:* Remove crankshaft pulley and thread Pilot Bolt J-7583-3 into crankshaft. Thread Tool J-7583-1 into oil seal and then tighten Forcing Screw J-7583-2 until seal is free from front cover. Remove seal from tool and pilot bolt from crankshaft.

Installation - *NOTE - Two types seal (½" & ¾" thick) used in production. Both seals can be installed with Seal Installer J-7584-1 and Adapter Ring J-7584-2 must be used with ¾" seal.* Coat outer diameter of seal with P.O.B. No. 3 sealer and lips of seal with Special Lubricant, Part No. 567196. Position seal in front cover. If ¾" seal used, place Adapter Ring J-7584-2 between Installer J-7584-1 and seal. Place Installer over seal and thread Forcing Screw J-7584-3 into crankshaft until Installer contacts front cover. Remove tools and install pulley and belts.

F-85 MODELS

ENGINE FRONT COVER: Removal - Drain cooling system disconnect heater hose, bypass hose and radiator hoses and oil pressure switch wire. Remove crankshaft balancer, fan and fan pulley, generator and mounting bracket. Remove fuel pump and fuel pump hoses. Remove front oil pan bolts and cover-to-block attaching bolts and remove cover.

Installation - *NOTE - When front cover is removed, the oil pump cover must also be removed, and Petrolatum packed around pump gears. This will prevent loss of oil pump prime.* To install front cover, apply Permatex No. 2 to new gasket and place on block. Install front cover. Apply engine oil to bolts and torque evenly to specifications. Install balancer (see above). Connect oil pressure switch. Install generator, mounting bracket, and adjusting link. Install new fuel pump gasket using Permatex No. 2. Apply special seal lubricant on fuel pump arm. Torque to specifications. Connect other parts in reverse order of removal procedure.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: Remove front cover *(see above)*. Lay front cover flat on bench. Remove seal retainer with drift.

Installation - Assemble seal in retainer. Support front cover on wood block. Apply POB No. 4 sealer to outside of seal retainer. Place seal and retainer in cover with seal joint towards top of cover and install with Tool No. J-8753 until seated. Stake retainer securely. Place Tool No. J-8753-2 in seal and push tool, a little at a time, from both sides until tool goes through seal.

CAMSHAFT & BEARINGS

ALL MODELS

CAMSHAFT: Removal - Remove grille and radiator. Remove valve lifters as outlined in *HYDRAULIC LIFTERS* below. Remove distributor. Remove engine front cover as outlined in *ENGINE FRONT COVER* above. Remove camshaft assembly, fuel pump eccentric, camshaft sprocket and timing chain. Slide camshaft carefully out front of engine.

Installation - Coat camshaft liberally with engine oil mixed with GM Concentrate No. 582099. Reverse removal procedure being careful not to damage parts.

Camshaft Bearings Removal & Installation (88, SUPER 88, & 98): *NOTE - DO NOT replace bearings individually.* Use Tool Set No. J-4476 to replace bearings. DO NOT remove or disturb camshaft plug at rear of block.

Camshaft Bearings Removal & Installation (F-85): *NOTE - Bearings must be replaced in complete sets.* Remove bearings in numerical order. Drive them rearward out of their bores (exc. No. 5). To remove No. 5 bearing, drill a 3/16" hole in block (do not drill through the bearing) and with a small drift, dent the bearing enough to allow removal out front of bore. Install No. 5 bearing first (align all oil passages) then install other bearings opposite of removal sequence. Position bearings in block as follows: No. 5 bearing - 18 7/32", No. 4 - 13 13/32", No. 3 - 9 11/64", No. 2 - 4 15/16", No. 1 - 1/8", from front face of block.

VALVE SYSTEM

ROCKER ARMS

ROCKER ARM SHAFT ASSEMBLY: 88, Super 88, & 98 - Removal - Remove rocker arm cover. *NOTE* - On Air Cond. Cars it will be necessary to remove compressor and generator bracket bolts and tip compressor rearward to remove R.H. cover. On Power Steering Cars, it will be necessary to remove pump mounting bracket bolts and move assembly to one side to remove L.H. cover. Remove rocker arm bracket bolts. If equipped with Air Cond. (right side only), loosen all bracket bolts. Remove cotter key from rear of rocker shaft and remove rocker arms, springs or shaft as required. Remove rocker arm shaft assembly.

Disassembly - Remove cotter pins from ends of rocker shaft. Remove the brackets and the rocker arms from shaft. *NOTE* - One bracket is attached to shaft by anchor pin. When necessary to remove this bracket, insert drift through oil passage in bracket to drive out pin. If necessary to remove plug, punch hole in plug and pry plug from end of shaft.

Reassembly - Reverse disassembly procedure and note the following: Pinned bracket must have pin driven in flush with bracket. Rocker shaft plug must be driven in until outer shoulder is 9/32" into end of shaft.

ROCKER ARM SHAFT ASSEMBLY: F-85 Models - Removal - Remove carburetor cover. Disconnect heat tube from carburetor and manifold on right side. Disconnect spark plug wires and valve cover-to-cylinder head screws and rotate cover off breather pipe and remove cover. Remove rocker arm shaft bracket-to-head bolts. Remove heater blower assembly to remove right rocker arm assembly.

Disassembly - Remove cotter pins from ends of shaft. *NOTE* - Disassemble one shaft assembly at a time and mark for correct reinstallation. Remove springs, arms, and brackets from shaft. If necessary to remove shaft end plug, punch hole in plug, then pry plug from shaft.

Reassembly - If shaft plug was removed, drive new plug in shaft to clear cotter pin hole. Lubricate frictional surfaces of rocker arms and shaft with engine oil and reverse removal procedure.

Installation - Reverse removal procedure and note the following: Coat bolt threads with POB No. 4 Sealer or equivalent and torque to 45-55 ft. lbs. Engage shaft with dowel.

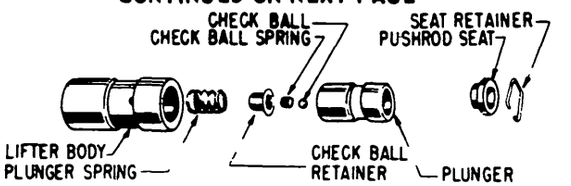
HYDRAULIC LIFTERS

VALVE LIFTERS: Hydraulic, Barrel Type. Consists of plunger and valve assembly operating in a cylinder formed by valve lifter body (see illustration). Oil is forced into lifter from main oil gallery through hole in side of body and plunger.

Removal - *NOTE - Keep lifters in order for reinstallation in original bores in block.* Remove intake manifold, *see "Intake Manifold"*, engine top cover, valve rocker arm covers and rocker arm shaft assemblies. To remove No. 8 intake or exhaust lifter on air conditioned cars proceed as follows: Loosen R.H. rocker shaft bracket bolts. Lift rocker shaft and pry rocker arms against springs and slide pushrod up between between rocker arm and bracket away from lifter then remove lifter. On all units remove pushrods and use "D-Carb." if necessary to assist in removing lifters.

Disassembly: Use Tool BT-31 or small screwdriver to remove retainer spring. Remove pushrod seat, plunger, and plunger spring. Remove ball check retainer from plunger, then remove ball and spring.

CONTINUED ON NEXT PAGE



HYDRAULIC VALVE LIFTER (TYPICAL)

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Cleaning & Inspecti n: Use cleaning brush J-5099 and clean solvent to remove all foreign material from all parts Check all parts for nicks, burrs, or scoring *NCTE* - Ball ball check retainer, springs, pushrod seat and snap ring are interchangeable or can be replaced individually Body and plunger are selective fit and are not interchangeable Replace lifter when body or plunger are worn or damaged *CAUTION - DO NOT replace lifter when a slight gap appears or lifter shows leakage where foot is welded to body unless leak-down is not within specifications* Place straightedge across lifter foot If light appears under straightedge placed across foot of lifter, it indicates a flat or concave surface and lifter should be replaced and camshaft lobe checked for wear Wear at camshaft cam center is normal, but wear across entire width of cam base circle requires replacing of camshaft

R assembly & Testing: Lifter must be assembled while submerged in test fluid to obtain accurate leak-down rate

1) Install Adapter 105-2 in reservoir of Tester BT-60, then fill reservoir with Hydraulic Lifter Test Fluid BT-59 to ½" of top of reservoir.

2) Assemble ball check, spring, and retainer into plunger with flange pressed tight against bottom of recess in plunger

3) Install spring over ball check retainer. Hold plunger with spring up and insert into lifter body (to prevent cocking spring) Place assembly in tester cup, then position pushrod seat into plunger Position ¼" steel test ball on pushrod seat and lower tester ram until it contacts steel ball *NOTE* - Allow ram to move downward by its own weight until air bubbles disappear

4) Raise ram, then allow it to lower Repeat several times or until all air is expelled from lifter *CAUTION - DO NOT ATTEMPT TO EXPEL AIR FROM LIFTER BY PUMPING RAM.*

5) When all air is removed, allow ram to bleed down lifter to expose ring groove and install retaining ring

6) Adjust ram screw so it contacts steel ball in pushrod seat when pointer is at start line Raise ram and start test by resting arm on steel ball

7) Rotate reservoir one revolution every two seconds, and time indicator from start to stop line. Allowable leak-down time is shown in table below *NOTE* - If lifter is within specifications, it can be placed in service without removing test fluid.

Lifter Leak-down Rate

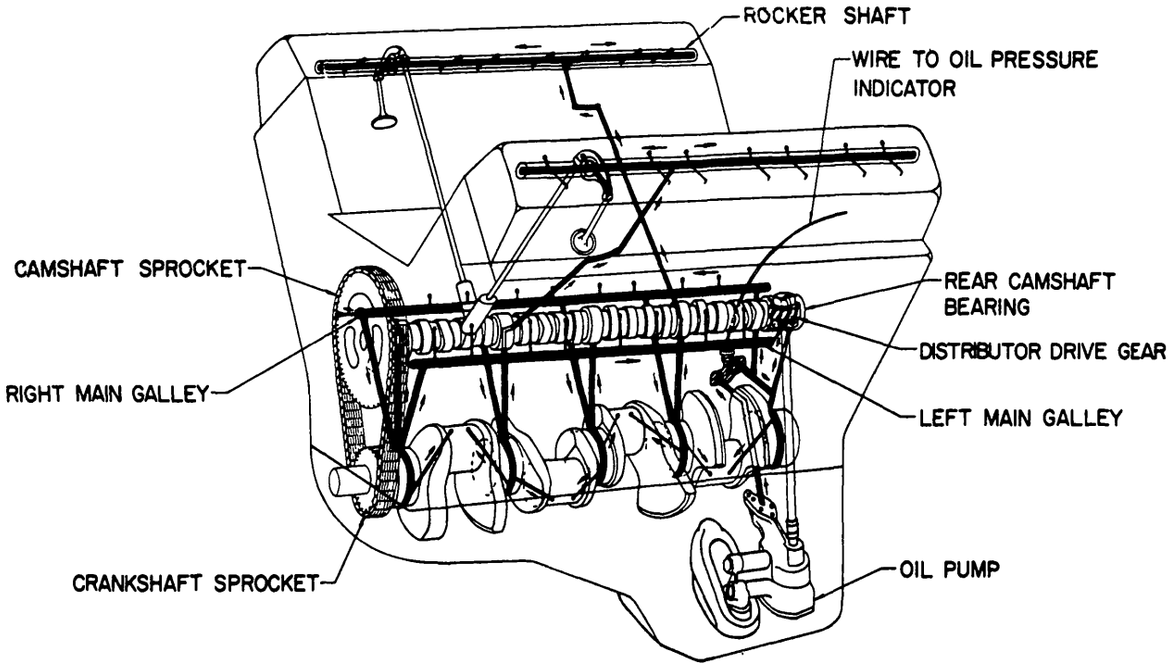
Model	Used Lifters	New Lifters
F-85	8-40 seconds	12-40 seconds
88, Super 88, 98	12-90 seconds	20-90 seconds

Lifter Identification (Exc. F-85)

Identification Note - Production engines used Standard, 001", or 010" oversize lifters Use correct size when replacing lifters All lifters have identification numeral (Except Standard) on lifter body Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover When no mark appears lifters are standard

Lifter Identification (F-85)

Standard size only (Heavy Duty lifters are mechanical type).



88, SUPER 88 & 98 ENGINE OILING SYSTEM

OILING SYSTEM
ENGINE LUBRICATION
88, SUPER 88 , & 98

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, camshaft bearings, and to hydraulic valve lifters, fuel pump eccentric and lever, and distributor drive gear. Oil metered by camshaft bearings lubricates other valve parts (rocker arms, pushrods, and valve stems). Other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed oil strainer and intake pipe mounted on pump cover and delivers oil through a passage in the pump body, rear main bearing cap, and crankcase to the oil filter intake port (filter mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross passage and vertical passage connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward end of this gallery, a "V" passage connects to front main bearing and to the forward end of the left main oil gallery extending back along the engine just below the left bank valve lifters. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical passage intersecting the horizontal cross passage from the oil filter (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil passage in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (additional passage at front crankshaft bearing supplies oil to left main oil gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap of rod for opposite bank of cylinders (slot in rod cap must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Each lifter supplied with oil through short passage leading upward from main gallery at point directly below lifter.

Rocker Arms, Pushrods & Valves - Hollow rocker arm shafts are supplied with oil through passage in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank), and connecting passage in head which registers with drilled oil passage in rocker shaft bracket (see Note below). Rocker arm is drilled to provide lubrication for pushrod socket and valve tip. Oil return holes are provided on lower side of heads.

ROCKER SHAFT BRACKET NOTE - Rocker shaft bracket with drilled oil lead has anchor pin which locates shaft properly so that oil hole in bracket and shaft line up (pin is driven in flush with top of bracket). This bracket is No. 2 or 3 (left bank), No. 4 or 3 (right bank) depending on whether end brackets are used (discontinued during 1960 production).

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Distributor Drive Gear - Lubricated from drilled hole in plug at rear end of left main oil gallery.

Timing Chain & Sprockets, Fuel Pump Lever & Eccentric - Lubricated from drilled hole in hexagonal headed plug which closes front end of right main oil gallery.

OIL FILTER: Full flow type mounted on pad on right rear of crankcase. Filter has bypass valve to ensure engine lubrication if filter element clogged.

►*CAUTION:* On cars where filter not used, a cover with a channel oil passage connecting the inlet and outlet ports is installed on filter pad to provide oil circulation. If cover removed, install with new gasket (coat both sides of gasket with POB No. 5 sealer), and torque cover bolts to 35-40 ft. lbs.

F-85 MODELS

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to crankshaft, connecting rod and camshaft bearings and to valve lifters. Oil is supplied under controlled pressure to rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. *See Engine Oil Flow Diagram.*

OPERATION: Gear type oil pump located in timing chain cover, draws oil through screen and pipe assembly (or over top of screen if clogged) and a drilled passage in crankcase connecting, to drilled passage in timing chain cover. All oil is discharged from pump to cover assembly. Spring loaded relief valve (in cover) limits oil pressure to a maximum of 33 lbs. per square inch. A bypass valve (in cover) opens when filter becomes clogged (4½-5 lbs. pressure difference between filter inlet and outlet) to bypass unfiltered oil directly to oil galleries in engine. Oil from filter (mounted on oil pump cover) supplies oil through oil pump cover and drilled passages in crankcase to two main oil galleries that run full length of the crankcase.

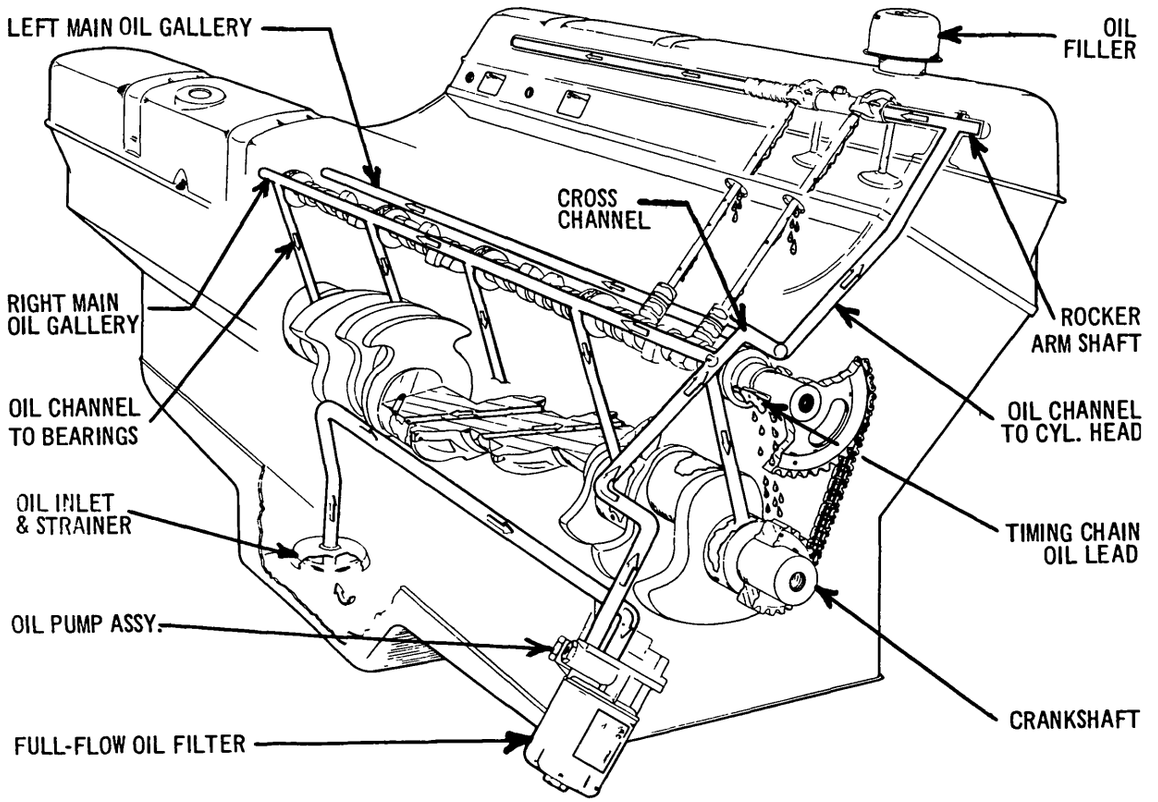
Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

Connecting Rod & Pistons - Main bearings supply oil through drilled passages in crankshaft to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through small notch in connecting rod bearing parting surface that registers with hole in crankshaft every revolution. Piston pins are lubricated by splash.

Timing Chain & Sprockets - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.

Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries.

Rocker Arms, Valves and Pushrods - These items receive oil from main oil galleries through drilled holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) to hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil through hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.



F-85 ENGINE OILING SYSTEM

OIL PUMP
88, SUPER 88 & 98

OIL PUMP: Removal & Disassembly - Remove oil pan, see car page, and remove three capscrews and lockwashers, then remove pump. Pull extension drive shaft from pump. *NOTE - Do not remove special washers from extension shaft (serviced as an assembly).* Remove oil screen lockwire and screen. Remove screen shroud attaching screws and remove shroud. Remove oil pump cover screws and cover, then remove oil pump gears. Remove pressure regulator nut, spring and valve.

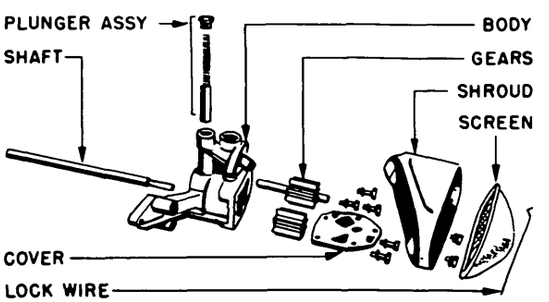
Cleaning & Inspection: Wash all parts in solvent and blow out passages with compressed air. Inspect all parts for scoring, clean up small imperfections with crocus cloth. Relief valve clearance should be .0025-.005". Gear end clearance should be .0025-.008".

Reassembly - Reverse disassembly procedure and tighten cover screws to 5-8 ft. lbs., shroud screws to 4-7 ft. lbs. *CAUTION* - The end of extension shaft nearest to special washers must be inserted into drive shaft.

F-85 MODELS

OIL PUMP: Removal & Disassembly - Disconnect pressure switch wire. Remove all dirt from connections and joints. Remove oil filter and pump cover-to-front cover attaching screws. Remove cover carefully, then slide idler and oil pump drive gears out. Remove oil filter

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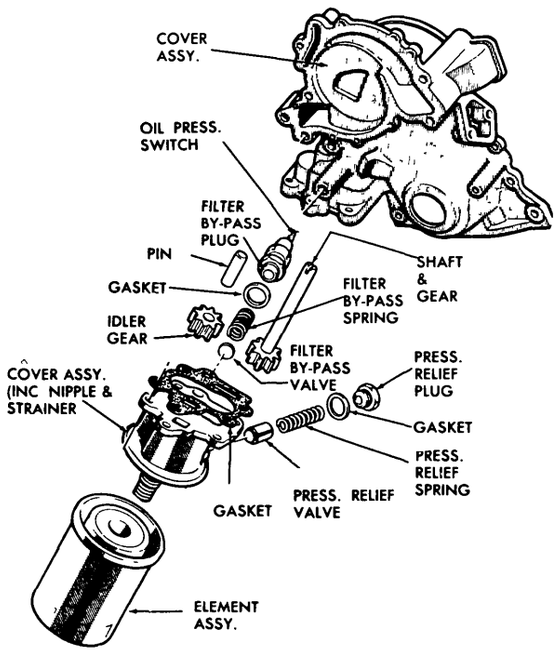
88, SUPER 88, & 98 OIL PUMP

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bypass valve cap, spring and valve. Remove oil pressure valve cap and spring. Remove pressure regulator valve by tapping housing in palm of hand.

Cleaning & Inspection: Wash all parts in solvent and blow dry with air. Inspect all parts for scoring, cracks, nicks, or warping. Check pressure relief valve clearance in bore. Clearance should be .0015-.0035". Gear end clearance should be .0015-.0075".

Reassembly - Install filter bypass valve into output passage bore (inside diameter ribs) seating valve squarely in bottom of passage. Install spring (light weight), gasket and cap. Replace gasket if damaged. Install pressure regulator valve (flat end first), pressure regulator spring, gasket and cap. Torque caps to 30-35 ft. lbs. Install pump drive gear and idler gear. Install new pump gasket. Fill gear pocket with petrolatum and force into every cavity and between gear teeth. *NOTE - Packed petrolatum helps in priming pump.*



F-85 OIL PUMP

COOLING SYSTEM

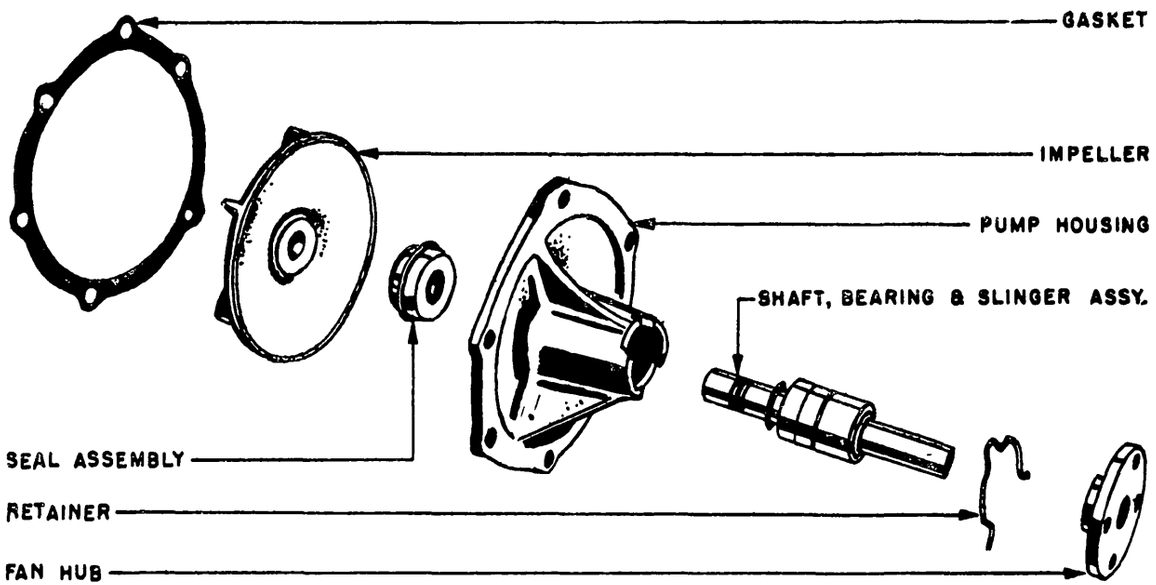
WATER PUMP

88, SUPER 88, & 98

WATER PUMP: Disassembly - Remove bearing retainer wire from front of housing. Support outside surface of pump housing in press and press shaft through impeller and housing pressing impeller end of shaft toward front of housing. Remove seal assembly from rear of housing by driving against face of seal with drift. Support hub and press shaft through hub to remove hub.

Reassembly - Place Gauge 33-68 in impeller side of housing, use driver, Tool 5175, to press shaft and bearing assembly into housing from opposite side until shaft bottoms on gauge. Install retainer wire. Support inner end of shaft on press and use Tool BT-16 to press hub on shaft. Coat outer diameter of new seal with C.P. No. 9 Sealer and use Tool 23-17 to press it into place. Clean mating surface of impeller of any foreign particles and use Tool BT-15 to support impeller while pressing shaft through impeller until bottom edges of vanes are 13/16" from machined face at edge of housing.

Installation - Use gasket cement on pump housing to retain gasket on housing, then install pump assembly in front cover and tighten 5/16" bolt to 14-22 ft. lbs., 7/16" bolts to 24-40 ft. lbs. Install fan pulley, spacer and fan. Tighten fan to hub bolts to 10-15 ft. lbs. Install pulley belts and adjust belt tension.



88, SUPER 88, & 98 WATER PUMP

►*JACKING & HOISTING CAUTION* Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section

►*STARTING CAR BY PUSHING CAUTION:* Hydra-Matic cars cannot be started by pushing because of transmission design

MODEL IDENTIFICATION

Series	①Designation	Engine
Dynamic 88	32	394"
Super 88	35	394"
98	38	394"

① - First two digits of series and body type designation following year number (61) under STYLE on body identification plate

SERIAL NUMBER: Stamped on plate on left front door pillar Number (example below) includes identification data

① ② ③ ④
61 2 M 01001

① - Year (1961)
② - Series - 2 - 88, 5 - Super 88, 8 - 98
③ - Assembly Plant M Lansing, A Atlanta K Kansas City, L Linden, C South Gate, W Wilmington, T Arlington
④ - Beginning Vehicle Number

Engine Unit Number: Stamped on pad located on top of center exhaust port of left cylinder bank

Starting Unit Number - 1001 with prefix and suffix letters as follows

Model	Prefix	Suffix	Carb.	Compr. Ratio
88	F	None	2-Bbl	8 5-1
88	F	H	2-Bbl	10 0-1
88	G	None	4-Bbl	10 0-1
S88, 98	G	None	4-Bbl	10 0-1
Exp 88	F	E	2-Bbl	8 3-1
Exp S88, 98	G	E	4-Bbl	8 3-1

TUNE-UP

COMPRESSION PRESSURE: 100 lbs minimum at cranking speed with throttle and choke open and spark plugs removed Reading on low cylinder must not be less than 80% of high cylinder

VALVE TAPPET CLEARANCE: Zero lash (hydraulic)

MANIFOLD HEAT CONTROL: Thermostatic coil type located on left side between exhaust manifold and exhaust pipe

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-8-7-3-6-5-4-2
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7

SPARK PLUG GAP: 030"
Spark Plugs - AC No 45 (Low compr engine), 44 (High compr engine), 46 (Export) 14 mm Torque to 18-34 ft lbs

COIL: Delco-Remy No. 1115087 (Std.), 1115091 (H.D.).
Ignition Current - 2 0 amps idling, 4 5 amps stopped
Resistor - Delco-Remy No 1948127 1 75-1 85 ohms at 80°F

►*COIL RESISTOR NOTE* Resistor is connected in lead from ignition switch to coil Bypassed during cranking by second lead from ignition switch

DISTRIBUTOR: Delco-Remy No. 1110968 (Std.), 1110978 (H.D.). Window type with external adjustments *NOTE* - Heavy Duty Distributor Double Breaker Type
Condenser - Delco-Remy No 1932004 (Std Distr)
Capacity - 18- 23 mfd
Contact Point Set - Delco-Remy No 1931988 (Std Distr)
Breaker Gap - 016" (Std), 014- 018" (Heavy Duty-Both sets)
Cam Angle - 28-32° (set to 30°) (Std) 29°±1° (Heavy Duty)
►*HEAVY DUTY DISTRIBUTOR NOTE:* After adjusting each breaker individually, cam angle with both breakers operating must be 34°±1°
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
6 5-8 5		975	13-17		1950
8-10		1200	16-20		2400
11-13		2200	22-26		4400

Vacuum Spark Control: Delco-Remy No 1116168 (Std 1110968 Distr)

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	8-10
11	22	19-21

►*VACUUM ADVANCE OPERATIONAL CHECK:* Vacuum advance operation should be checked whenever Ignition Timing is set After setting ignition timing (with vacuum advance cut off by disconnecting vacuum line), reconnect vacuum line and check ignition timing If vacuum advance operating correctly, engine RPM should increase and timing should advance, if not, vacuum unit is defective

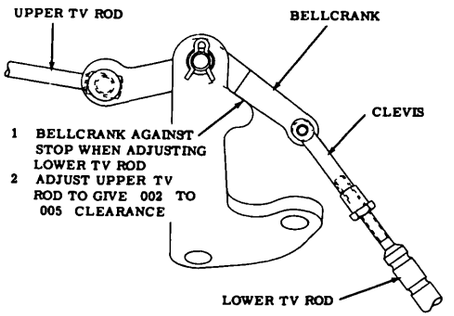
IGNITION TIMING

Setting - 5° BTDC (Low compr eng), 7½° BTDC (High compr eng), with engine idling at 850 RPM and vacuum line to distributor disconnected and vacuum line fitting taped closed After setting ignition timing, reconnect vacuum line and check vacuum unit operation *See above*
►*DETONATION NOTE:* If engine detonates due to low octane fuel or carbon build-up, retard timing 2½° from specified setting
►*HIGH OCTANE FUEL NOTE* When using extra high octane fuel, timing may be advanced providing spark knock is not encountered
Timing Mark - Three slots in rim of crankshaft balancer and pointer on upper left side of front cover Slots indicate 0°, 5° BTDC and 10° BTDC

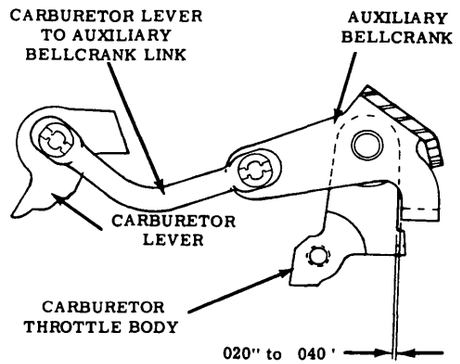
CARBURETOR

►*CARBURETOR APPLICATION:* Rochester carburetors are used Series 88 has one 2-barrel carburetor, Series S88 & 98 have one 4-barrel carburetor 4-barrel carburetor is optional on Series 88

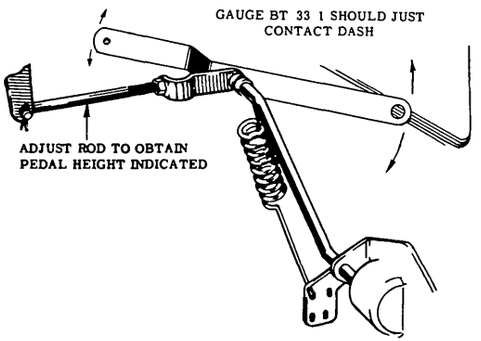
►*THROTTLE LINKAGE DISCONNECTION CAUTION:* Whenever linkage disconnected from transmission,



UPPER & LOWER THROTTLE VALVE ROD



CARBURETOR LEVER-BELLCRANK LINK



ACCELERATOR PEDAL ADJUSTMENT

clearance between end of manual shift rod and lower throttle valve rod must be 1/8" minimum (throttle valve rod pushed forward) To adjust, bend outer leg of shift relay bellcrank outward so 1/8-5/16" clearance obtained between manual shift rod cotter pin and throttle valve rod

Throttle Return Check Adjustment: With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1600

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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RPM (4-Bbl.), 1900 RPM (2-Bbl.). Turn off engine. Rotate fast idle cam so fast idle screw rests on highest step of fast idle cam. Clearance between contact screw and contact on throttle lever should be .020" (4-Bbl.), .050" (2-Bbl.). To adjust, turn contact screw using two wrenches so that diaphragm is not permitted to turn.

THROTTLE LINKAGE ADJUSTMENT: Transmission Throttle Lever Adjustment - Raise car and remove lower throttle valve relay rod from lever at side of transmission. Place short end of Gauge BT-33-1 into manual lever shaft. Hold throttle lever to end of its rearward travel and adjust lever (by bending as required) so that hole in throttle valve lever is visible within hole in gauge (not necessarily centered). Lower car and make the next three adjustments with carburetor throttle valves in closed position. To completely close throttle valves, start engine, remove air cleaner and block intermediate choke lever (at climatic control housing) to release fast idle cam. Use Tool J-6342-01 to hold plunger away from throttle lever. Stop engine, BACK OUT SLOW IDLE ADJUSTING SCREW UNTIL CARBURETOR THROTTLE VALVES ARE COMPLETELY CLOSED. There should now be clearance at end of fast idle screw, slow idle screw, and throttle return check plunger.

Lower Throttle Valve Rod Adjustment: Loosen jam nut on lower throttle valve rod and remove both rods from bellcrank. Hold throttle valve bellcrank and lower throttle valve rod against their rearward stops, adjust lower throttle valve rod clevis so that pin will enter freely into holes in clevis and throttle valve bellcrank. Install cotter pin and tighten jam nut.

Carburetor Lever to Auxiliary Bellcrank Link Adjustment: Bend link as necessary to obtain .020-.040" clearance as shown in diagram.

Upper Throttle Valve Rod Adjustment: Adjust length by rotating rod until bellcrank is .002-.005" off its stop with throttle valves closed. *NOTE - Do not apply pressure when making this adjustment.* Tighten jam nut.

Idle Speed Adjustment: Make this adjustment as shown below, then make Throttle Downshift Stop Screw Adjustment and Accelerator Pedal Alignment & Height Adjustment with choke completely off, fast idle off, and carburetor throttle valves in slow idle position.

Throttle Downshift Stopscrew Adjustment: Loosen jam nut and back out stopscrew (located in auxiliary bellcrank adjacent to carburetor throttle lever) several turns Hold throttle lever so that throttle valves are in wide open position, and rotate throttle valve bellcrank counterclockwise to point of maximum transmission lever travel. *NOTE - Do not bend or stretch linkage.* Hold linkage in this position and adjust stopscrew to just touch tang on downshift lever. Allow throttle valves to close, then turn screw in 1½-2 turns and tighten jam nut.

Accelerator Pedal Alignment & Height Adjustment: Bend left ball stud (located behind lower end of accelerator pedal) up or down as required to correct pedal alignment. Adjust accelerator rod to position rod to bellcrank bushing so that Gauge BT-33-1 just touches dash (see diagram). Lubricate linkage pivot points

ROCHESTER 2GC 2-BARREL

Rochester 2GC No. 7019052 (Std.), 7019058 (Air Cond.). 2-Barrel downdraft types with automatic choke.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel Cyls. 1-4-6-7*

►*IDLE COMPENSATOR CAUTION:* When making idle Setting and Idle Speed adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. Readjust if engine speed decreases.

Idle Setting - After idle speed set to correct specifications (see Idle Speed below), turn both idle mixture mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed - 550 RPM Synchro-mesh, 500 RPM Auto. Trans. in Drive. *NOTE - On cars with Idle Compensator, air conditioning must be turned OFF. On cars without Idle Compensator, air conditioning must be ON.*

Float Level - 11/16" (Carbs. with "A" or no letter on Ident. Tag - use Tool No. BT-179), 1/2" (Carbs. with "B" or higher on Ident. Tag - use Tool No. BT-197). With air horn inverted and gasket in place, place edge of gauge across air horn gasket at outer end of float with lower edge of float seam touching gauge. Bend float arm to adjust.

Float Drop - Bend float tang to obtain a distance of 1 29/32" (Carbs. with "A" or no marking on Ident. Tag), 1 13/16" (Carbs. with "B" or higher on Ident. Tag). This distance measured from surface of gasket to bottom of float with air horn upright and float hanging free.

Fast Idle - Rotate fast idle cam so fast idle screw is on high step of cam. With engine running at normal operating temperature and transmission in "N" (Neutral) adjust fast idle screw to obtain an engine speed of 1900 RPM (2200 RPM for sub-zero temperatures). Readjust throttle return check.

Automatic Choke Setting: Centered on index.

Throttle Linkage & Return Check Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7019050 (Std.), 7019054 (Air Cond.). 4-Barrel downdraft type. Idle compensator (thermostatically controlled idle air bypass) used on air conditioned (factory installed) cars.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed Adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed increases when air cleaner installed, do not decrease speed. Readjust if engine speed decreases.

Idle Setting - After idle speed set to correct specifications (See Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ⅛ turn.

Idle Speed - 550 RPM Synchro-mesh Trans., 500 RPM Auto. Trans. in Drive. *NOTE - On cars with Idle Compensator, air conditioning must be OFF, on cars without Idle Compensator, air conditioning must be ON.*

Automatic Choke Setting: Centered at index.

Throttle Return Check Adjustment (Hydra-Matic Cars): *See CARBURETOR above.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Two types used.

AC No.	Replacement Pumps	Type
3415 (Less Heater or A.C.)		Fuel Only
3416 (With Heater or A.C.)		ℂ Fuel & Vacuum

ℂ - Pulsator type pump with external fuel filter and return line to tank.

Pressure - 5-6 lbs. at 1800 RPM measured at upper end of pump-to-carburetor line.

Gasoline Gauge: AC electric type.

Dash Unit - AC No. 5643375.

Tank Unit - AC No. 5641245 (exc. Sta. Wgn.), 5641586 (Sta. Wgn.), 5641587 (Sta. Wgn. with Air Cond.). *NOTE* - Tank units on Station Wagon are "2-Wire" type.

Air Cleaner: Oil wetted type (Std. Series 88), Heavy Duty replaceable paper element type (Std. Super 88 & 98, Optl. Series 88).

►*HEAVY DUTY AIR CLEANER CAUTION:* Replace element at 10,000 mile intervals or oftener in dusty driving conditions. Remove air cleaner, remove element, clean body and install new element.

BATTERY

Series 88 - **Delco-Remy No. 463.** 12 volt, 9 plate, 62 ampere hour capacity (20 hr. rate).

Super 88 & 98 - **Delco-Remy No. 563.** 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Rear of right cylinder head to firewall.

STARTER

Delco-Remy No. 1107665 (Series 88), No. 1107776 (Super 88 & 98). *NOTE - 1107776 is a "Two-Shunt" type.*

Armature - Delco-Remy No. 1932185 (1107665), No. 1941888 (1107776).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 40 ozs. minimum (1107665), 35 ozs. minimum (1107776).

Performance Data - 1107665

Torque	RPM	Volts	ℂ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1107776

Torque	RPM	Volts	ℂ Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

ℂ - Includes Solenoid.

Starter Switch: Solenoid Switch, Delco-Remy No. 1119798 (1107665), No. 1114257 (1107776) mounted on starter and controlled by combination Starter & Ignition Switch, Delco-Remy No. 1116591 and Neutral Safety & Back-up Switch (see below.).

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Hydra-Matic Neutral Saf ty & Back-Up Light Switch: Oldsmobile No. 579408
Adjustm nt - *See "Dual-Coupling Hydra matic' in Transmission Section.*

GENERATOR

D lco-R my N . 1102217 (Std.), 1102187 (A.C. Cars).
Armatur - Delco-Remy No 1939837 (1102187), 1946719 (1102217).

►*CHARGING CIRCUIT FUSE CAUTION:* Battery charging circuit is protected by a 50 ampere fuse clipped to "BAT" terminal of generator regulator Check for blown fuse when diagnosing generator, regulator, or battery failure.

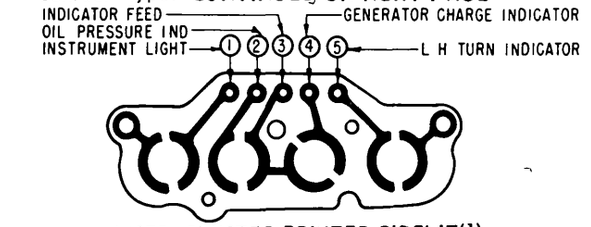
P rformance Data (Cold)

Generator	Amperes	Volts	RPM
1102217	35	14.0	2510
1102187	45	14.0	2520

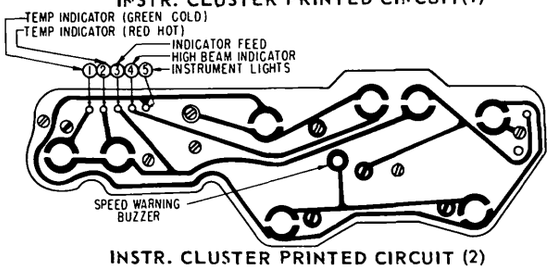
Brush Spring Tension - 28 ozs.
Fi ld Current - 1 62-1.82 amps. (1102217), 2 66-2 86 amps (1102187) at 12 volts and 80°F.
Rotati n - Counterclockwise at commutator end
Belt Adjustment: Place Tension Tool 33-70 on generator belt. Loosen generator adjusting link bolt Tighten belt until line on Tool 33-70 is even with pointer Tighten adjusting link bolt

GENERATOR REGULATOR

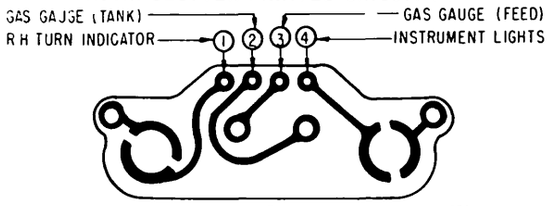
Delc-R my N . 1119253 (1102217 Gen.), 1119600 (1102187 Gen.). *NOTE - Regulator 1119600 is "Double Contact" type.* **CONTINUED ON NEXT PAGE**



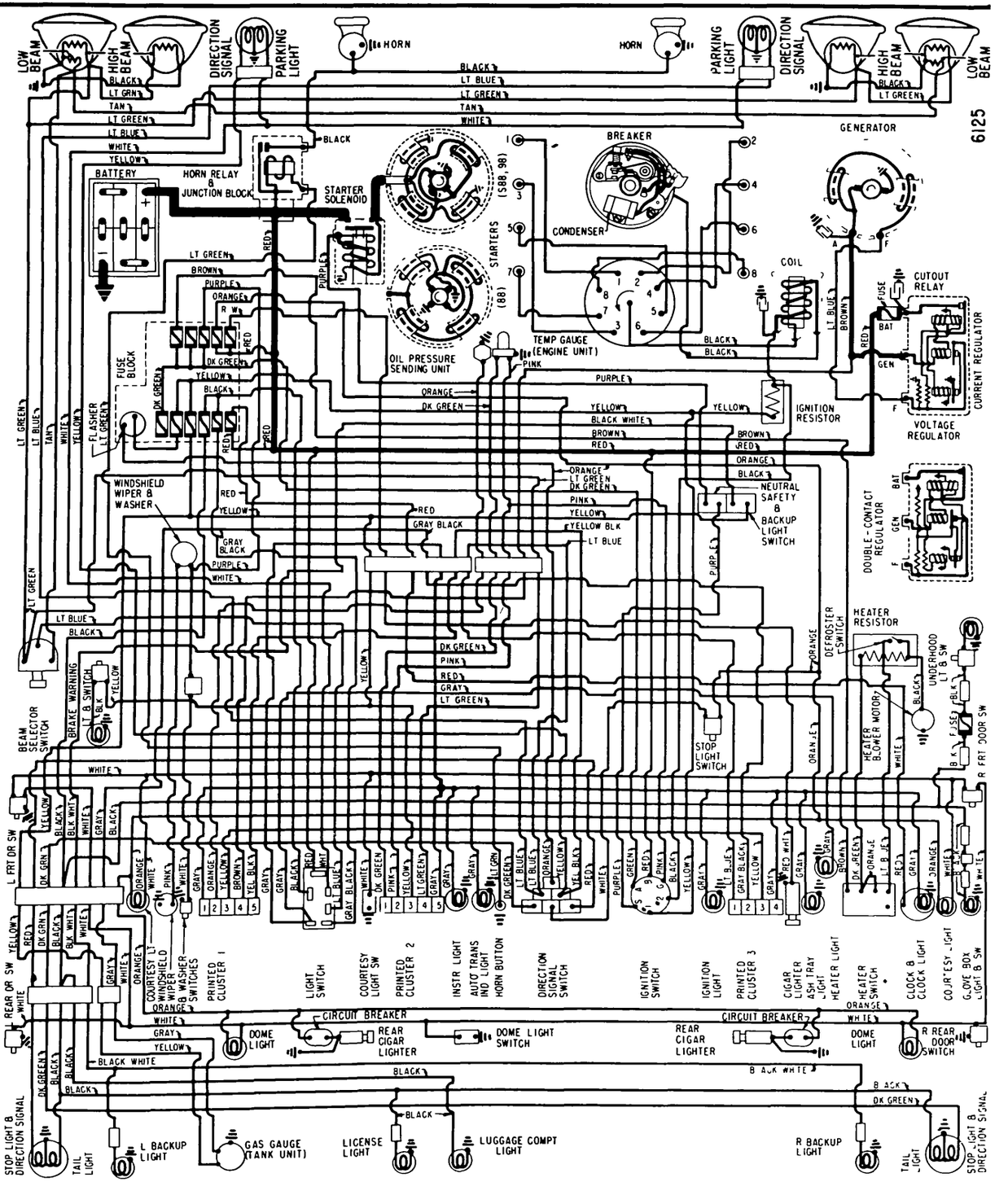
INSTR. CLUSTER PRINTED CIRCUIT(1)



INSTR. CLUSTER PRINTED CIRCUIT (2)



INSTR. CLUSTER PRINTED CIRCUIT (3)



CONTINUED FROM PRECEDING PAGE

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE*
►*REGULATOR CAUTION Regulators must be used with generators as indicated above DO NOT interchange regulators*
NOTE – Specifications below are Normal settings

Cutout Relay

Cuts In – 11 8–13 5 volts (1119253) 11 3–13 0 volts (1119600) hot
Contact Gap – 020"
Air Gap – 020" with contacts just closed

Voltage Regulator

Setting - (1119253) - 13 8-14 7 volts at ambient temperature 125°F
Setting (1119600) – 13 8–14 6 volts operating on upper contacts 1– 3 volts lower operating on lower contacts At an ambient temperature of 125°F
Contact Gap (1119600) – 016" (upper contacts) with lower contacts just touching
Air Gap – 075" (1119253) 067" (1119600) with armature pressed down to point where contacts just touch
Checking & Adjusting – *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators' in Electrical Section*

Current Regulator

Setting (1119253) - 32-37 amps (adjust to 35 amps) hot
Setting (1119600) - 38-45 amps (adjust to 40 amps) hot
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" and "Delco-Remy (Double Contact) Regulators' in Electrical Section*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE* Instrument "cluster" served by three printed circuits Service of printed circuits is by replacement only

Speedometer Head Assembly Removal: Disconnect parking brake assembly, then loosen it at cowl Disconnect L H instrument panel brace, headlight switch, and ventilation or A C controls Remove sockets, wiring harness and safety sentinel buzzer (if so equipped) from speedometer head assembly Remove mounting nuts and rotate top of assembly downward DO NOT DAMAGE PRINTED CIRCUIT Disconnect speedometer cable and withdraw assembly from under left side of steering column To install, reverse removal procedure

Speedometer Head Removal: Remove speedometer head assembly (see above) Remove safety sentinel control knob (if so equipped) Remove case-to-bezel attaching screws Remove speedometer head-to-case attaching screws Remove safety sentinel actuating wire from printed circuit (if so equipped) then remove speedometer head from housing

Speedometer Head Printed Circuit Removal - Remove speedometer head assembly (see above) Remove printed circuit attaching screws Remove safety sentinel actuating wire from printed circuit (if so equipped) To install, reverse removal procedure

Fuel Gauge or Warning Lights Assembly Removal: To remove an assembly disconnect wiring connector, remove nuts and washers, and withdraw assembly from front of instrument panel To install, reverse removal procedure

Fuel Gauge or Warning Lights Printed Circuit Removal - Remove affected assembly (see above) Remove light sockets Remove caps, nuts and washers from fuel gauge Remove attaching screws and remove printed circuit To install, reverse removal procedure

Fuel Gauge Removal - Remove case-to-gauge bezel screws and remove bezel, glass and retainer Remove face plate-to-case screws and remove face plate Remove caps, nuts and washers, then remove gauge from case To install, reverse removal procedure

Light Switch Removal: Disconnect battery Disconnect wires from light switch (push-in-type) Pull switch out to last position, then depress button on top of switch assembly and remove rod and knob Remove Guide-Matic switch knob setscrew (if so equipped) and remove knob Use screwdriver to remove sleeve, then remove escutcheon with Allen wrench Remove headlight switch from rear of instrument panel

Stop Light Switch Location: Mechanical type Mounted on pedal stop bracket above brake pedal arm

Adjusting - With brake pedal released, and adjusting screw backed out to point where lights are on, turn adjusting screw in until lights just go off, then back screw out exactly three turns

CIRCUIT BREAKERS: 20 Ampere Protects headlights, beam indicator and parking lights

FUSES: All fuses located in fuse panel on firewall behind instrument panel Color coded to simplify servicing
SFE 20 Ampere. Protects Tail, License Plate, Glove Comp , Hood and Trunk lights
SFE 20 Ampere (88,S88), AGC 25 (98). Protects Stop, Dome and Courtesy lights Also Rear Seat Cigar lighters (98)
AGA3. Protects Instr ,Ign ,Clock and Heat Control lights
SFE 9. Protects Back-Up, Indicator, Fuel Gauge and Parking Brake light
AGA 2. Protects Clock
AGN 4. (Std), 7 5 (Super Deluxe) Radio
SFE 20 Ampere. Wiper, Cigar Lighter and Heater/Air Cond

HORN RELAY: Delco-Remy No 1116946

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section*

ENGINE SPECIFICATIONS: Own 90° V8 Valve-in-head All Models use 394" engine

Engine	Bore	Stroke	Displacement
All 394"	4 1/8"	3 11/16"	394 cu ins

Engine	Compr.Ratio	Rated HP	Developed HP
394"(88)	8 5-1 ①	54	250 at 4200 RPM
394"(Optl 88)	10 0-1 ①	54	275 at 4200 RPM
394"(Optl 88)	10 0-1 ②	54	325 at 4400 RPM
394"(S88,98)	10 0-1 ②	54	325 at 4600 RPM
394"(Exp 88)	8 3-1 ①	54	
394"(Exp S88,98)	8 3-1 ②	54	

① - 2-Bbl Carb ② - 4-Bbl Carb

Compression & Vacuum Reading - *See TUNE-UP*

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* The following modifications should be made to the standard engine before attempting travel in low octane areas (Foreign Travel) to prevent excessive detonation and resultant engine damage Lower the compression ratio by making changes listed for fuel of octane rating indicated *TIMING NOTE* - Set ignition timing in range of 5° BTDC to 0° (TDC)

Octane Rating	Head Gasket	Piston Type	Compr. Ratio	Spark Plugs
98-95	Std ①	Std	9 75-1	Std.
87-84	②	Std	8 4-1	AC No 46
84-81	②	Export	7 8-1	AC No 46
80-77	③	Export	7 4-1	AC No 46

① - 025" thick
② - Use Parts Kit No 577044 consisting of 100" thick Head Gaskets, 060" thick Intake Manifold Gaskets, and set of longer Pushrods
③ - Use Parts Kit No 577046 consisting of 125" thick Head Gaskets, 060" thick Intake Manifold Gaskets, and set of longer Pushrods
CAUTION - When head gasket used is thicker than 060", longer pushrods, Part No 577049, must be installed

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data*

INTAKE MANIFOLD: *See "Cylind r Head & Manifold" in Oldsmobile Special Data*

TIGHTENING TORQUES: *S "Tightening Specifications" in Oldsmobile Special Data*

OIL PAN REMOVAL: Turn crankshaft to bring No 1 piston at bottom of stroke (so oil pan will clear counterweights on No 1 & 2 cyl) Disconnect battery cable and remove exhaust crossover pipe Disconnect idler arm support from frame Remove both front engine mount attaching nuts and use Tool J-8568 to raise engine so bolts will just clear crossmember Drain oil and remove pan *NOTE - Holes provided in front crossmember for access to front oil pan bolts*

PISTONS

Aluminum alloy, three-ring, autothermic, steel strut, slipper skirt, cam ground, tin plated

►*NOTE* Two types used Dished type (8 75-1 compr ratio), and flat type (10 0-1 compr ratio)
Length - 4 05" **Weight -** 27 76 ozs
Removal - Pistons & Rods removed from above

►*CAUTION* Mark pistons rods and bearing caps with number of cylinder before removing to insure correct reinstallation

Clearance - 0075- 00125" at thrust surface (selective fit) *NOTE* - Some engines may have 005" or 010" Oversize pistons
Fitting Pistons - Use a 0015" x ½" x 12" ribbon feeler between inverted piston (pin and rings removed) and cylinder wall at right angles to piston pin position Pull to withdraw feeler should be 3-12 lbs
Replacement Pistons. Furnished with fitted pins in Std , 010" 020" 030" Oversize

Standard Piston Sizes

Piston Code	Cyl Code	Piston Cod	Cyl. Cod
A	AA & A	W	WW & W
B	BB & B	X	XX & X
C	CC & C	Y	YY & Y
D	DD & D	Z	ZZ & Z
E	EE & E		

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Installing Pistons: Install piston on same numbered connecting rod with "F" on pin boss and notch or notches toward front of engine. See *Rod Installation.*

PISTON PIN

Floating type with lock ring at each end. Pins are offset in piston .090" toward right side of engine.

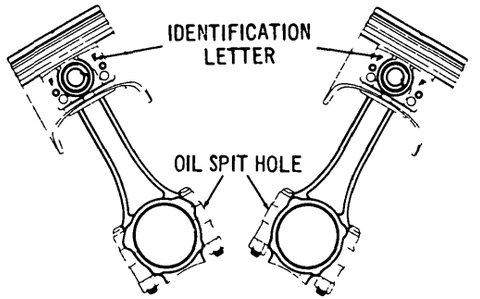
►*CAUTION:* Discard old lock rings and install new service type lock rings when installing pins.

Diameter - .9803" -.9807". **Length** - 3.126".

Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.

Pin Fit in Rod Bushing - .0003-.0005" loose.

Replacement Pins: Std., .001" & .003" Oversize.



OLDSMOBILE PISTON & ROD ASSY.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.078"	.013-.023"	.001-.004"
Compr. (2)	.0925-.0935"	.013-.023"	.001-.004"
Oil	①	.015-.055"	-0005-.007"

① - .1831-.1889" (Perfect Circle), .1840-.1890" (Sealed Power).

Replacement Rings: Std. and .010" Oversize.

Installing Rings: Install upper "Chrome" and lower "Parco Lubrite" compression rings with side up that is marked with a dimple (Sealed Power) or word "TOP" (Perfect Circle).

CONNECTING ROD

Length - 6.996-7.000" center-to-center. **Weight** - 34.55 ozs.

Crankpin Journal Diameter - 2.4992-2.5002".

Lower Bearing - Moraine 400 steel backed aluminum with babbitt overlay.

Clearance - .0005-.0026" (vertical), .0013-.0034" (horizontal).

Sideplay - .002-.011" (total both rods).

Replacement Bearings: Std. and .002", .010", .020" Undersize.

Installing Rods: Install connecting rod in engine with oil spit hole toward center of engine. Install connecting rod caps with bearing index notches in rod and cap on same side.

►*CAUTION: Use Guide Tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

CRANKSHAFT

Journal Diameter - 2.9990-3.000". Five bearings.

Bearings - Moraine 400 steel-backed aluminum with babbitt overlay (Nos. 1 through 4), Durex 100A steel-backed babbitt overlay (No. 5).

Clearance - .0005-.0021" (Nos. 1 & 2), .0008-.0024" (Nos. 3 & 4), .0020-.0034" (No. 5). **Wear Limit** - .0035" (Nos. 1 through 4), .0045" (No. 5).

►*MAIN BEARING CAUTION:* If main bearing clearance not within specifications (above), correct by use of selective bearing shells (see table below for sizes and specifications). **Replace both bearing halves (upper and lower shells) as a pair and do not attempt to shim behind shells.**

Main Bearing Identification

Thickness	Identification (on Tang)
Standard	None
.0005" Undersize	B
.0010" Undersize	C
.0015" Undersize	E

Replacement Bearings: Furnished Std. and .0005", .001", .0015", .002", .010" .020" Undersize. See table above for identification. **Install bearings in pairs (upper and lower shells).**

End Thrust: Taken by No. 5 (flanged) bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

CAMSHAFT

►*IDENTIFICATION NOTE: Camshaft used in Series 88 (with 2-Bbl. Carb.) is identified by step on thrust flange.*

Journal Diameter - 1.9977-1.9985".

Bearings - Steel-backed babbitt.

Clearance - .001-.0033".

End Thrust: Taken by flange at front of camshaft against front camshaft bearing. Camshaft held to rear by plunger and spring at front end of camshaft.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Oldsmobile Special Data.*

Timing Chain: Single flanged side guide type. **Width** - 27/32". **Pitch** - .50". **Length** - 24" or 48 links.

Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straightedge across shaft centers (or use Tool BT-11).

►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket with cupped side out.

►*CAMSHAFT REPLACEMENT CAUTION:* Coat camshaft liberally with engine oil mixed with G.M. Concentrate Part No. 567725 to insure proper installation and provide initial lubrication.

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: Two types used and either type can be removed and installed without removing Engine Front Cover. *See "Engine Front Cover" in Oldsmobile Special Data.*

VALVES

Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	.3427-.3432"	4.999"
Exhaust	1.557-1.567"	.3940-.3945"	4.999"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.437"	.0011-.0025"
Exhaust	45°	.435"	.0015-.0030"

Valve Seat Width - .037-.075", all valves.

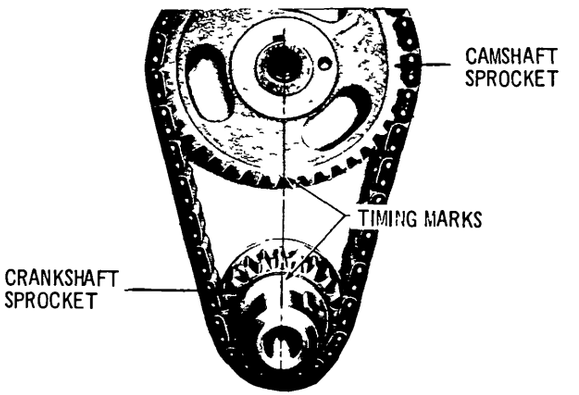
Valve Stem Seals - Cup type oil seal (deflector) installed cup side down on valve stem below valve spring retainer on all valves.

Valve Springs: Outside diameter at bottom is larger than at top. No damper springs used.

Valve Spring Specifications

Valve	Pressure	Length
Open	175-189 lbs.	1.437"
Closed	85-95 lbs.	1.837"

Free Length - 2.25".



OLDSMOBILE VALVE TIMING MARKS

Valve Guides: To remove old guides, support head and drive guides out through top of head using Remover Tool J-3062. Install new guides as follows: Place Gauge Washer J-5158-3 on valve spring seat. Use Valve Guide Installer Tool J-5158-2 to drive new guide in head (grooved end of guide up) until tool seats against gauge washer. This will correctly position guides in head (guide should extend 25/32" above face of valve spring seat).

►*OVERSIZE VALVE GUIDE NOTE:* Valve guides with .010" oversize outside diameter may be identified by a groove on guide.

Valve Lifters: Hydraulic lifters standard on all models.

►*HYDRAULIC LIFTER INSTALLATION CAUTION:* Production engines use Standard, .001" or .010" oversize lifters. Use correct size when replacing lifters. All lifters have identification numeral (Except Standard) on lifter body. Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover. When no mark appears, lifters are standard.

Diameter - .9210-.9215" (Std.). **Length** - 2.125".

Clearance in Block - .0005-.0020" (Selective)

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Replacement Lifters: Std., .001", 002", 003", 005" & 010" Oversize

Hydraulic Lifter Removal, Overhaul & Testing - See *"Valve System" in Oldsmobile Special Data.*

Rocker Arm Assembly: See *"Valve System" in Oldsmobile Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing (8.75-1 Eng.)

Intake Valves - Open 14°BTDC, Close 50°ALDC.
Exhaust Valves - Open 54°BLDC, Close 16° ATDC.

Valve Timing (10.0-1 Eng.)

Intake Valves - Open 11°BTDC, Close 59° ALDC.
Exhaust Valves - Open 59°BLDC, Close 20°ATDC.

Valve Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that No. 1 piston is on top dead center (firing stroke). Install Tool No. J-5374-01 in place of rear rocker shaft bracket with step plunger over No. 7 cylinder exhaust pushrod. The pilot at bottom of tool will fit into cylinder head bolt hole. Screw main body of gauge down so step plunger contacts pushrod and small diameter of plunger is flush with top of main body. Tighten clamp bolt. Rotate engine one complete revolution so that No. 1 piston is again at TDC (intake stroke). If timing chain is installed properly, third step of plunger will rise 1/32" above (8.75-1 Eng.), be nearly flush to (10.0-1 Eng.), top of main body. If plunger rises more, camshaft is advanced, and if less, camshaft is retarded.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts. refill. 5 qts. with filter change.

Normal Oil Pressure: 35-45 lbs. at 50 MPH

Pressure Regulator - In pump body. Not adjustable. Valve starts to open at 45 lbs. Maximum pump pressure is 45-55 lbs.

Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter. Lights when pressure below 3 lbs.

Engine Unit: AC No. 1508319

Oil Pump: Gear type. In crankcase at rear end.

Oil Pump Removal, Overhaul & Installation - See *"Oiling System" in Oldsmobile Special Data.*

Oil Filter: Full flow type. Replace element every 6,000 miles or sooner if needed. Located on lower right side of crankcase.

Replacement Filter Element - AC No. PF-7

Crankcase Ventilation: Standard Cars - Air intake in oil filler cap with oil-wetted cleaner, AC No. 1552233 (Std.), No. 1551509 (Heavy Duty). Outlet is connected to ventilating baffle at rear of block above right bank. Outlet pipe is push fit at ventilator and extends down below right rear corner of engine.

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 20 qts. (Less AC & Heater), 21¾ qts. (AC less Heater). Add 1 qt. for Heater.

Pressure Valve: Radiator filler cap. AC No. RC-6, 13 lbs. (Std.), AC No. RC-15, 15 lbs. (Air Cond.).

Thermostat: Choke type, 170°F.

Water Pump: Packless, sealed ball bearing type. See *"Cooling System" in Oldsmobile Special Data.*

Removal - Drain cooling system, and loosen belts. Remove fan, spacer and pulley from pump hub. Remove four pump housing to engine front cover bolts and two pump housing to block bolts, and remove pump.

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes out when engine temperature reaches 113°F±2°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 234°F. (Std.), 238°F. (Air Cond. Cars) plus or minus 2°F. *NOTE* - Red light will come on when ignition key turned to "Start" position (to test bulb and circuit) but should go out when key returned to running position.

Engine Unit - Delco-Remy No. 1998741

LUBRICATION

HYDRA-MATIC 3-SPEED TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 26,000 miles. Use only Automatic Transmission Fluid Type A, Suffix A.

Checking Fluid Level: Check fluid level with car on level floor, transmission at normal operating temperature, engine idling, and selector lever in "P" (Park) position. Maintain fluid level at "Full" mark on dipstick located at right rear corner of engine. Do not overfill. Use only Automatic Transmission Fluid Type A, Suffix A.

Capacity - Approx. 5½ qts. (transmission only), 6½ qts. (when pan removed), 9 qts. (after overhaul).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING: Before jacking, hoisting, or working under cars, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING NOTE (AUTOMATIC TRANSMISSION CARS): Because of transmission design, car cannot be started by pushing.*

MODEL IDENTIFICATION

Series	Series Designation
Standard	3000
Deluxe	3100

SERIAL NUMBER: Stamped on plate attached to left front door pillar. Number (example below) includes identification data.

① ② ③ ④
61 0 M 01001

① - Year (1961).
② - Series - 0 - 3000. 1 - 3100.
③ - Assembly Plant. M Lansing. C South Gate.
④ - Beginning vehicle number.

Engine Unit Number: Stamped on front of right hand cylinder head.

Starting Unit Number - S-001001. Suffix letter "E" indicates an Export Low Compression engine option.

TUNE-UP

VALVE TAPPET CLEARANCE: Zero lash, hydraulic.

MANIFOLD HEAT CONTROL: None used. Intake manifold is heated by engine coolant.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

►*ENGINE STARVATION OR CLOGGED FUEL FILTER (EARLY CARS) CORRECTION:* Install later car production fuel filter, Oldsmobile No. 583496, as follows: drain tank to 1 gal., remove tank. Flush thoroughly with gasoline (1 gal. in tank), remove old filter and replace.

►*HARD COLD STARTING CORRECTION (EARLY CARS):* On early cars with AC No. 46FF spark plugs, use new plugs No. 46FFX. *See SPARK PLUGS below.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .040".

Spark Plugs - AC No. 46FF (Early Cars), 46FFX (Later Cars). *NOTE* - Use only 46FFX plugs in replacement. 14mm, tighten to 15 ft. lbs.

COIL: Delco-Remy No. 1115087 (Std.), 1115091 or 1115160 (Heavy Duty - with 1110979 Distr.).

Ignition Current - 2.0 amps. idling, 4.5 amps. stopped.

Resistor (Std.) - Resistance wire (1.75-1.85 ohms) integral part of wiring harness connected in circuit between coil and No. 1 Terminal of ignition switch.

Resistor (Heavy Duty) - Delco-Remy No. 1931385.

DISTRIBUTOR: Delco-Remy No. 1110975 (Std. & Pwr. Pack), 1110979 (Heavy Duty).

►*NOTE: Heavy Duty Distributor Double Breaker Type.*

Point Set - Delco-Remy No 1931988 (Std. Distr.).

Condenser - Delco-Remy No. 1928111 (Std. Distr.).

Capacity - .18-.23 mfd.

Breaker Gap (Std. Distr.) - .016". Gap will be correct when cam angle properly set.

Breaker Point Setting (Heavy Duty Distr.) - .014-.018" (both sets).

Cam Angle - 28-32° (Std.), 29 ±1° (Heavy Duty).

►*NOTE:* Heavy Duty cam angle with both breakers operating must be 34 ±1°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise when viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		500	0-4		1000
5-7		1000	10-14		2000
11-13		2100	22-26		4200
11-13		2300	22-26		4600

Vacuum Spark Control: Delco-Remy No. 1116175 (Std. Distr.).

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of HG)
Start	0	5-7
12°	24	15.25-17.0

IGNITION TIMING

Setting - 5° BTDC at 850 RPM (Std. Eng.), 7½ BTDC at 850 RPM (Pwr. Pack Eng.). Distributor vacuum line disconnected, with pipe plugged.

►*DETONATION NOTE:* If engine detonates with above setting due to low octane fuel or carbon build-up, timing should be retarded to 2½° BTDC. If extra high-octane fuel is used, timing may be advanced beyond 5° BTDC setting if no detonation occurs.

Timing Mark - Timing indicator on chain case cover marked "0" (TDC), "5" (5° BTDC), "10" (10° BTDC). Align correct mark with groove on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester 2-Bbl (Std. Engs.), 4-Bbl. (Optional Pwr. Pack & Heavy Duty Engs.).*

THROTTLE LINKAGE ADJUSTMENT: Raise car and disconnect throttle valve rod from lever on transmission and position Gauge, BT-33-2, so index dowel of tool enters hole in boss on transmission case (forward and slightly above transmission throttle valve lever shaft). The hole in throttle valve lever must be within the hole on gauge (opposite end from dowel pin) when holding throttle valve lever in rearward position. If hole in lever does not fall within hole in gauge, bend lever with Bending Tool, BT-33-7. Lower car and disconnect upper throttle valve rod from throttle valve bellcrank, then disconnect lower throttle valve rod from bellcrank. While holding lower throttle valve lever downward and throttle valve bellcrank down at rear, clevis pin must be a free fit. If necessary, adjust clevis, then connect lower throttle valve lever to bellcrank. Remove air cleaner and block choke valve open, then back off idle adjusting screw until it is not touching idle cam when accelerator return spring is holding throttle valves closed. Bend auxiliary bellcrank link to obtain 020-.040" between auxiliary bellcrank and gauge surface of manifold. Adjust upper throttle valve rod clevis so pin is free at throttle valve bellcrank (bellcrank against stop at rear), **then adjust clevis ½ turn long.** Loosen throttle downshift stopscrew locknut and back off screw approximately 6 turns. With accelerator lever, move throttle to wide open and then over-travel the linkage to a point of maximum transmission throttle valve lever travel. *CAUTION - Do not stretch or bend linkage.* Hold accelerator lever in wide open position and adjust stopscrew to just touch downshift lever tang, **then turn stopscrew in an additional 1½ turns.** Hold choke valve in off position and adjust idle speed. Adjust Throttle Return Check (see below), then check and adjust accelerator pedal height as follows:

Accelerator Pedal Height - Use Tool BT-33-2, placing tool over throttle valve bellcrank pin (with hole nearest pin). Swing gauge in an arc and adjust length of accelerator lever rod (loosen locknut and turn rod in swivel) until end of gauge just touches nearest surface of cowl.

►*THROTTLE LINKAGE ADJUSTMENT CAUTION:* If a tang is on the auxiliary throttle bellcrank (some early production cars may have it), remove before making adjustments

THROTTLE RETURN CHECK ADJUSTMENT: Adjust throttle return check stopscrew to obtain .020" clearance at return check plunger with idle speed screw resting on highest step of fast idle cam.

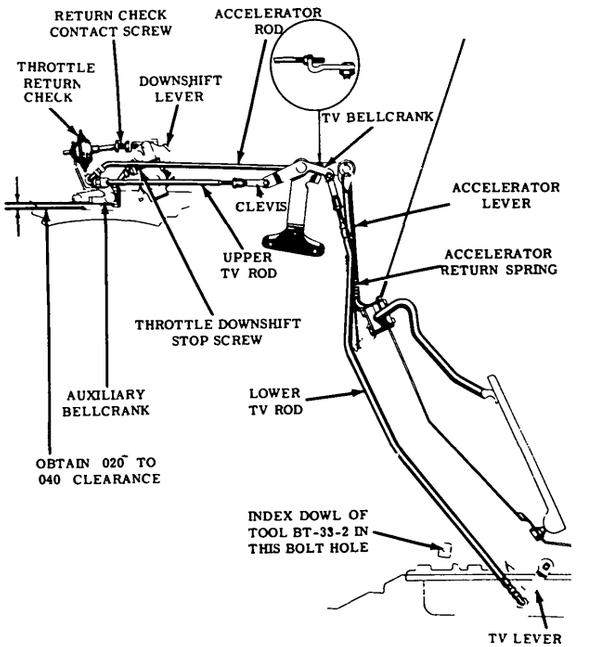
ROCHESTER 2GC 2-BARREL

Rochester 2GC No. 7019092 (Synchro-mesh), No. 7019095 (Auto. Trans.). Downdraft type with automatic choke

►*LOADING DURING WARM-UP CORRECTION:* Change unloader setting (to correct loading at ¾-full throttle) and automatic choke setting. *See below.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8. LEFT barrel feeds 1-4-6-7.*

Idle Setting - Initial setting 1½ turns open. Turn screws out for richer mixture.



OLDSMOBILE F-85 THROTTLE LINKAGE

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Idl Spe d - 550 RPM (Synchro-mesh), 500 RPM (Auto Trans without Air Cond) 550 RPM (Auto Trans with Air Cond) Transmission selector lever should be in "Dr" position on Auto Trans Cars

Float Level - 35/64" (Gauge BT-187) with air horn inverted and gasket installed measured between lower edge (sharp edge) of float seam at outer end of pontoon at toe, and air horn gasket To adjust, bend float arm at rear

Float Drop - 1 29/32" (Gauge BT-187) distance from gasket to bottom of float with air horn upright and gasket in place To adjust bend float tang

Unloader Setting Choke valve opening with throttle valve wide open should be .250" (¼" drill) measured between upper edge of choke valve and air horn wall *This supersedes previous setting of .160 and will correct loading during warm-up*

Fast Idle No adjustment, will be correct when hot or slow idle correctly set

Automatic Choke Setting 1 point lean *Supersedes centered setting and will correct loading during warm-up*

Carb-Airator Adjustment *NOTE - This is an external breather attached to carburetor on air conditioned cars to assist in reducing rich fuel and air mixture during hot idling* In extreme hot temperature (95°F or over) if hot idle is rough or erratic or stalling occurs tighten temperature screw (on side of unit) one turn and road test car *CAUTION - Do not upset normal idle setting and do not overtighten the screw* If engine idles too fast under these extreme hot temperatures tighten the air screw (directly below temperature screw on unit)

►*OTHER DATA See "Rochester 2G & 2GC Carburetors' in Carburetion Section*

ROCHESTER 4GC 4-BARREL

Rochester No 7019055 (Pwr Pack exc A C), 7019056 (Pwr Pack with A C), 7019057 (Heavy Duty)

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2-3-5-8 LEFT barrels feed 1 4 6-7*

►*IDLE COMPENSATOR CAUTION* Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making idle setting and idle speed adjustments Remove air cleaner and insert pencil or suitable tool in throttle bore

Idle Setting - Turn adjusting screws in or out for desired mixture

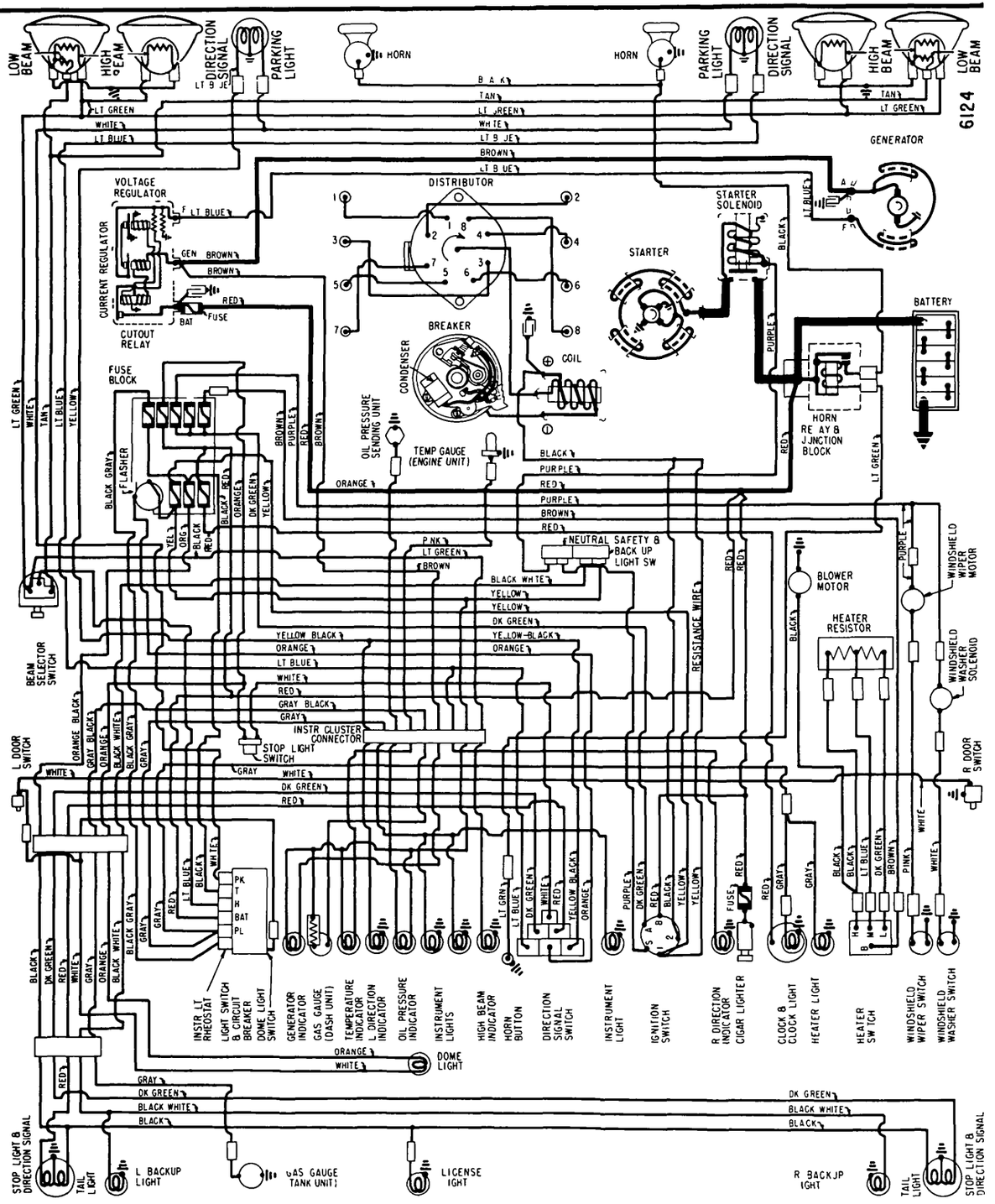
Idle Speed - 500 RPM (Automatic Trans in "Dr") 550 RPM (Synchro-mesh Trans in "Neutral") 550 RPM (All A C Cars with idle compensator closed)

Throttle Linkage Adjustment *See CARBURETOR above*

►*OTHER DATA See "Rochester 4GC Carburetors' in Carburetion Section*

CARB. EQUIPMENT

CONTINUED ON NEXT PAGE



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Air Cleaner: Polyurethane (Std. on 2-Bbl. Cars), Paper-disposable element (Std. on 4-Bbl. and optional on 2-Bbl., Cars). Service the foam element every 6000 miles by washing in kerosene and wringing dry. Oil element with SAE 20 engine oil then wring out excess. Replace disposable element every 16000 miles.

BATTERY

Delco-Remy No. 454. 12 volt, 9 plate, 40 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Rear of right hand cylinder head.

STARTER

Delco-Remy No. 1108302. Armature - No. 1935829.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Ⓒ - Includes solenoid.

Starter Switch: Delco-Remy No. 1114278 (solenoid switch) mounted on starter and controlled by combination Ignition & Starter Switch, Delco-Remy No. 1116587 and Neutral Safety & Back-up Light Switch (see below).

Hydra-Matic Neutral Safety & Back-up Light Switch: Delco-Remy No. 1993523 (Std. Trans. Back-up), Oldsmobile No. 579438 (Hydra-Matic).
Adjustment - *See "Oldsmobile F-85 Hydra-Matic Transmission" in Transmission Section.*

GENERATOR

Delco-Remy No. 1102236 (Std.), 1102230 (Police).
Armature - Delco-Remy No. 1948005.

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit protected by 45 amp. fuse No. 575532 on "BAT" terminal of generator regulator. Check fuse when diagnosing generator, regulator or battery failures.*

Performance Data

Model	Amperes	Volts	RPM
Std.	35	14.0	2630
Police	45	14.0	2520

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 (Std.), 2.66-2.86 (Police) amps. at 12 volts and 80°F.

Belt Adjustment: Place Tension Tool No. BT-33-70 on generator belt (from under car between generator and crankshaft pulley). Loosen generator adjusting link bolt and tighten belt until line on tool is even with pointer. Tighten adjusting link bolt to 14-17 ft. lbs.

GENERATOR REGULATOR

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*
Delco-Remy No. 1119253 (Std.), 1119600 (Police). "Post Type" with nylon adjusting nuts above voltage and current regulators for air gap adjustment.

►*DOUBLE CONTACT REGULATOR NOTE: Regulator 1119600 has double contact for voltage regulation. NOTE - Specifications below are for "Normal" settings.*

Cut out Relay
Cuts In - 11.8-13.5 volts (1119253), 11.8-13.0 volts (1119600).
Contact Gap - .020" (All).
Air Gap - .020" (All) with contacts just closed.

Voltage Regulator
Setting (1119253) - 13.8-14.7 volts at 125°F ambient temperature.
Setting (1119600) - 13.8-14.6 volts (upper contacts), .1-.3 volt lower (lower contacts) at 125°F ambient temperature.
Contact Gap - .016" (upper contacts) with lower contacts just touching.
Air Gap (1119253) - .075" with contacts just touching.
Air Gap (1119600) - .067" with contacts just touching.

Current Regulator
Setting (1119253) - 31.0-35.5 amps. at 125°F ambient temperature.
Setting (1119600) - 38.0-45.0 amps. at 125°F ambient temperature.
Air Gap - .075" (All) with contacts just touching.

►*OTHER DATA: See "Delco-Remy 1119000 Series Regulators" or "Delco-Remy (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Entire instrument cluster served by a printed circuit. All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly. Service of printed circuit is by **replacement only.**

Instrument Cluster Removal: Disconnect positive cable from battery. Remove cluster cover attaching screws. Disconnect wiring harness, clock and speedometer cable at cluster. Remove cluster-to-instrument panel attaching nuts and washers from under instrument panel. To install, reverse removal procedure.

Speedometer Head Removal (Cluster Removed): Remove instrument cluster bezel-to-case attaching screws. Remove bezel and face. Remove speedometer head attaching screws from case assembly, then remove speedometer head. To install, reverse removal procedure.

Speedometer Head Printed Circuit Removal (Cluster Removed): Remove all cluster lamp sockets and circuit attaching screws. Remove hex nuts from fuel gauge mounting studs. Remove printed circuit. To install, reverse removal procedure.

Fuel Gauge Assembly Removal: Disconnect positive cable from battery. Remove cluster cover. Disconnect fuel gauge wiring connector and light socket from printed circuit. Remove attaching nuts and withdraw fuel gauge from front of cluster. To install, reverse removal procedure.

Headlight Switch Removal: Disconnect positive cable from battery. Disconnect wiring from light switch. Remove knob and rod by first pulling out to "ON" position, then depressing button on top of switch assembly and pull rod out. Remove escutcheon with Tool No. J-6592-01. Remove headlight switch from rear of instrument panel. To install, reverse removal procedure.

Stop Light Switch Location: Mechanical type mounted on bracket on pedal stop above brake pedal arm.

Adjustment - Adjust switch in its mounting bracket by loosening locknuts.

CIRCUIT BREAKER: 20 Ampere - Headlights, High Beam Indicator, Parking & Tail Lights. In headlight switch. *NOTE - Tail lights also protected by 9 ampere fuse on fuse block.*

FUSES: All fuses located on fuse block attached to inside of cowl panel to left of steering column.
20 Ampere - Dome & Stop Lights.
20 Ampere - Heater & Air Conditioner.
20 Ampere - Windshield Wiper & Washer.
9 Ampere - Instrument & Back-up Lights.
9 Ampere - Tail Lights.
4 Ampere - Radio (Deluxe).
3 Ampere - Instrument Panel Lights & Clock Light.
2 Ampere - Electric Clock.
20 Ampere - Cigar Lighter (on back of lighter).

HORN RELAY: Delco-Remy 1116946.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Before disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. 90° valve-in-head aluminum block V8 with non-replaceable cast iron cylinder liners. Cylinder heads are aluminum.

Engine	Bore	Stroke	Displacement
All	3.5"	2.80"	215 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
Std.	8.75-1	39.2	155 at 4800 RPM
Power Pack	10.25-1	39.2	
Heavy Duty	11.0-1	39.2	

►*ENGINE SERVICE NOTE: For Aluminum Engine Service Cautions see "Engine" in Oldsmobile Special Data.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* The following modifications should be made before attempting travel in low octane areas to prevent excessive detonation and resultant engine damage. Lower the compression ratio by making changes listed for fuel or octane rating listed below. *NOTE* - "Normal" octane requirements are 90 for standard engine and 99 for Power Pack Engine.

8.75-1 Compr. Ratio Engine

Octane Rating	Head	Gasket Ⓒ	Compr. Ratio	Spark Plugs
86	no change	.045"②	8.25-1	47FF

10.25-1 Compr. Ratio Engine

88	8.75-1 Head	no change	8.5-1	47FF
85	8.75-1 Head	.045"②	8.0-1	47FF

Ⓒ - Std. Head Gasket Thickness .020".
② - Kit No. 583457 (incl. Head and Intake Manifold Gaskets).

►*MODIFIED ENGINE (FOREIGN TRAVEL) TIMING NOTE:* Ignition timing may have to be set in range of 5°BTDC to 0° TDC if detonation still occurs.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
INTAKE MANIFOLD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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OIL PAN REMOVAL: Raise car and drain oil, then disconnect relay rod from steering idler arm. Remove cover on front of lower flywheel housing and remove pan bolts. *NOTE* - On some types of lifts, it may be necessary to drop oil intake pipe and screen assembly into oil pan before removing pan. Position crankshaft so counterweights do not interfere with pan removal.

PISTONS

Aluminum alloy, All-Aluminum, cam ground, tin plated.
Weight - 14.78 ozs. (Std. Eng.).
R moval - Pistons & Rods removed from above.
►*CAUTION:* Mark pistons, rods, and bearing caps with number of cylinder before removing to insure correct reinstallation.
Clearance - .0005-.0011" at thrust surface.
Fitting Pistons - Use a .0015" x ½" x 12" feeler(ribbon) between inverted piston (pin and rings removed) and cylinder wall at right angles to piston pin position. Pull to withdraw feeler should be 3-8 lbs.
R placement Pistons: Furnished with fitted pins in Std., and .010" Oversize (Std. Eng.), .030" Oversize (H.D. Eng.).
Installing Pistons - Install piston on connecting rod with "F" on piston pin web and notch in head toward front of engine. *See Rod Installation.*

PISTON RINGS

Pressed in rod. Pins are offset in piston .040" to right of cylinder bore centerline.
Diameter - .8747-.8750". **Length** - 2.860-2.880".
Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.
Pin Fit in Rod Bushing - .0007-.0013" **interference fit.**
Replacement Pins: Standard only.
Piston Pin Installation - *See "Piston Pins" in Oldsmobile Special Data.*

PISTON PIN

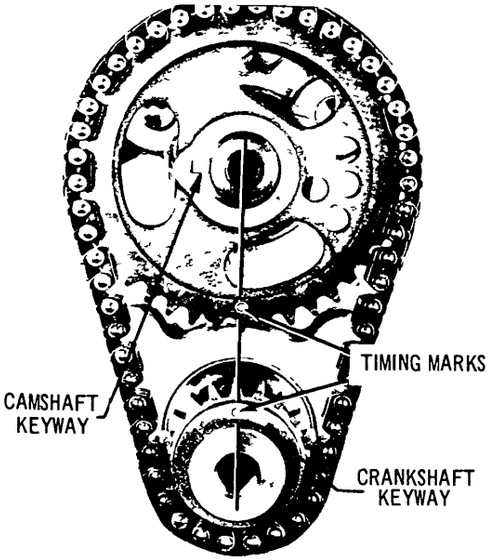
Two compression and one oil ring used. Upper ring chrome plated, lower ring Ferrox treated. Oil ring is spring steel.

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0780-.0785"	.010-.020"	.003-.005"
Oil (3)℄	.2184-.2319"	.015-.055"	.0005-.0055"

℄ - Three-piece, consisting of two rails and a spacer.
Replacement Rings: Std. & .010" oversize.

CONNECTING ROD

L ngth - 5.660" center-to-center.
Crankpin Journal Diameter - 1.999-2.000".
Bearing - Moraine 100 Durex with GM 4167-M Babbitt Overlay. Steel backed.
Clearance - .0002-.0022".
Endplay - .006-.014" (total for both rods).
Installing Rods - Install piston and rod assembly in engine with identification boss on rod and cap toward **front of engine** (Right Hand Cylinders), toward **rear of engine** (Left Hand Cylinders). Oil spurt hole in rod must be upwards.
Replacement Bearings: Std., .002", .010" & .020" Undersize.



VALVE TIMING MARKS

CRANKSHAFT

Journal Diameter - 2.298-2 299" Five bearings.
Bearings - Steel-backed Durex 100-A with Babbitt Overlay.
Clearance - .0008- 0024". **Wear Limit** - .0035"
►*CAUTION: UPPER AND LOWER MAIN BEARING SHELLS MUST BE INSTALLED IN MATCHED PAIRS.*
Replacement Bearings - Furnished in Std , .001", .002" & .010" Undersize.
End Thrust: Taken by No. 3 (center) main bearing.
Endplay - .004-.008".
Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*
►*BALANCER, CRANKSHAFT, FLYWHEEL REPLACEMENT CAUTION: See "Crankshaft & Bearings" in Oldsmobile Special Data.*

CAMSHAFT

►*HEAVY DUTY ENGINE NOTE:* Special camshaft No 583043 used
Journal Diameter - **(1)** 1.785-1.786", **(2)** 1 755-1 756", **(3)** 1 725-1.726", **(4)** 1 695-1 696", **(5)** 1 665-1 666"
Bearings - Five Steel Backed Babbitt.
Clearance - .0005-.0025" (1), .0005-.0035" (Others).
Endplay - .011-.059".
Camshaft Setting - Mesh chain with sprocket marks adjacent and in line with straightedge across shaft centers.
Timing Chain: Width - 875". **L ngth** - 54 links **Pitch** - 375"
Camshaft Rem val & Installation: *See "Camshaft & Bearings" in Oldsmobil Special Data.*
►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket with cupped side out.
►*CAMSHAFT REPLACEMENT CAUTION:* Coat camshaft liberally with engine oil mixed with GM Concentrate Part No 567725 to insure proper installation and provide initial lubrication.
Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*
Engine Front Cover Oil Seal (Crankshaft Fr nt S al). Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

VALVES

Tappet Clearance: None in service (Hydraulic).

Valve	Head Diam.	Stem Diam.	L ngth
Intake	1.517-1.527"	.3427-3432"	4.863"
Exhaust	1.348-1 358"	.3422-.3427"	4.861"

Valve	Seat ngle	Lift	St m Clearance
Intake	45°	384"	.0010-.0025"
Exhaust	45°	384"	.0015-.0030"

Valve Seat Width - .037-.075"
Valve Stem Seals: Inverted cup over upper end of valve, under valve spring retainer.
Valve Springs: Single spring used on all valves.

Spring Specifications

Valve	Lbs. Pressure	Length
Closed	70-80	1.750"
Open	160-175	1 350"

Free Length - 2 150"
Valve Guides: Press fit. To remove, support cylinder head and drive out valve guide with Tool No. BT-68-5A. To install, lubricate guide and bore with engine oil. Place valve guide into cylinder head with outside beveled end up. *NOTE* - Intake guides must be installed with grooved end up. Place guide installer Tool No. BT-68-5B over new guide and drive until tool makes contact with cylinder head This positions guide.
►*OVERSIZE VALVE GUIDE NOTE:* Oversize valve guides identified by 2 grooves (.001"OS), 1 groove (010"OS), 3 grooves (.011"OS). When replacing guides use .001" oversize guides.
Valve Lifters: Hydraulic lifters standard on all models. Mechanical lifters available with special camshaft on heavy duty engines
Diameter - 8422-.8427" **Length** - 1.997-2.007".
Clearance in Block - .0008- 0023" selective
Replacement Lifters: Standard only
Hydraulic Lifter Removal, Overhaul & T sting: *Se "Valve System" in Oldsmobile Special Data.*
Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

Valve Timing Sp cificati ns (Standard Engin)

Intake Valves - Open 22° BTDC Close 58° ALDC
Exhaust Valv s - Open 60° BLDC Close 20° ATDC

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.

Normal Oil Pressure: 30 lbs. at 2400 RPM.

Pressure Regulator - In pump body. Not adjustable.

Oil Pressure Indicator - Oil pressure warning lights on instrument panel and oil pressure switch on oil pump. Lights when pressure below 3 lbs.

Engine Unit - AC No. 1508319.

Oil Pump: Gear Type. Located in front engine cover.

Oil Pump Removal, Overhaul & Installation - *See "Oiling System" in Oldsmobile Special Data.*

Oil Filter: Full-flow type. Replace element every 6000 miles or sooner if needed. Located on oil pump cover.

Replacement Filter Element - AC PF-7.

Crankcase Ventilation: Standard Cars - Air intake in oil filler & breather cap with oil-wetted cleaner, AC No. 1552233. Outlet is connected to ventilating baffle at one rocker arm cover. Oil filler & breather cap at other rocker arm cover.

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to intake manifold with a valve in the line. *See "Positive Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 10.5 qts., add 1.5 qts. for heater, .05 qt. for air conditioning.

Pressure Valve: Radiator filler cap AC No. RC-6 (Std.), with air conditioning AC No. RC-15.

Thermostat: AC No. 1199784 (170°F). Located in water outlet on intake manifold.

Water Pump: Packless, sealed ball bearing type. Service by replacement only.

Removal - Drain cooling system, disconnect heater and lower radiator hose from pump. Loosen pulley belts, then remove fan and pulley from pump. Remove pump-to-front cover attaching bolts. Remove pump.

Temperature Indicator: Controlled by thermal switch in right front of intake manifold. A red light indicates temperature has reached 238°±2°F (cars without A.C.). Engine Unit - Delco-Remy 1993508 (Std.), 1993513 (A.C. Cars).

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 25,000 miles. Use only Automatic Transmission Fluid Type A, Suffix A.

Checking Fluid Level - Check with car level, transmission at normal operating temperature and selector lever in "P" position. Maintain level to FULL mark on dipstick located at right rear side of engine. *NOTE* - 1 pint fluid required to bring level from ADD mark to FULL mark on dipstick. With transmission cold, oil level should be at ADD mark. DO NOT OVERFILL.

Capacity - Approximately 7 qts.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

PONTIAC V8 & TEMPEST 4 CYLINDER

	Ft. Lbs.
Cylinder Head	85-100
Intake Manifold	30-45
Exhaust Manifold	20-35
Oil Pan	8-15
Main Bearing Cap (Rear)	110-130
Main Bearing Caps (Others)	90-110
Flywheel	85-100
Vibration Damper	130-190
Crankshaft Pulley	130-190
Con Rod Caps	40-46
Camshaft Sprocket	30-45
Rocker Arm Cover	25-70 in. lbs.
Pushrod Cover	25-70 in. lbs.
Engine Front Cover (To Oil Pan)	10-20
Water Pump	10-25
Oil Pump	20-35
Oil Filter	20-35
Clutch Housing (Pontiac V8)	60-90
Clutch Housing (Tempest 4 Cyl.)	40-60
Transmission to Clutch Housing (Pontiac V8)	45-60
Transmission to Clutch Housing (Tempest 4 Cyl.)	35-40

ENGINE

ENGINE REMOVAL: Pontiac - *NOTE* - Engine removed with or without transmission. Detail following includes transmission with engine.

1) Drain water, engine and transmission oil. Remove hood. Disconnect all wires, pipes and throttle linkage. Remove carburetor, crankcase ventilator pipe, heater hoses, cooler lines, radiator and fan, battery and cables.

2) On Power Steering Cars, remove pump belt and pump from mounting bracket and secure assembly out of way.

3) Disconnect exhaust pipe from crossover pipe, and disconnect gearshift linkage.

4) On synchro-mesh cars, disconnect clutch fork linkage and remove clutch countershaft bracket from flywheel housing.

5) Remove propeller shaft assembly. Raise engine slightly by hooking chain to intake manifold, threading chain through holes behind carburetor.

6) Remove front and rear insulator mounting screws. Disconnect cooler lines at timing cover.

7) On Auto-Trans cars, place transmission jack under transmission and remove frame crossmember. *CAUTION - Without jack for support, transmission will swing down when crossmember removed.*

8) Hoist engine and transmission out of chassis.

ENGINE REMOVAL: Tempest - Remove hood, drain and remove radiator. Disconnect heater hoses at engine. Disconnect all accessible wires. Disconnect fuel line at fuel pump, then disconnect vacuum modulator line (Auto Trans.). Disconnect battery ground strap. Remove front fender cross brace, fan and pulley, and disconnect accelerator rod at engine. Raise front of car. Disconnect clutch and shifting linkage (Synchro-mesh). Disconnect exhaust pipe at manifold. Place wooden block at rear of engine. Disconnect propeller shaft and torque tube from rear of engine. Disconnect engine support at crossmember. Carefully raise engine with chainfall or overhead hoist. Move engine forward to clear firewall and heater. To install, reverse removal procedure.

CYLINDER HEAD & MANIFOLD

►*CYLINDER HEAD PRODUCTION CHANGE:* New type right and left cylinder heads used on late model Pontiac V8 and Tempest 4 Cyl. cars. New heads are cast with an undercut at lower inboard edge, necessitating a revision of rocker arm and valve stem length checking procedures. *See VALVE SYSTEM below.*

CYLINDER HEAD: Removal - Remove intake manifold, pushrod and rocker arm cover. Loosen rocker arm retaining nuts and move rocker arms off pushrods. *NOTE - Remove pushrods but keep them separated for reinstallation in original position.* Remove crossover pipe to manifold attaching screws. Remove battery ground and engine ground straps on left head or engine ground strap and Hydra-Matic oil level indicator tube bracket on right head. Remove head screws (head held in place by dowels) and remove head with exhaust manifold attaching Hooks J-4266. *CAUTION - Handle head carefully as rocker arm studs are hardened and may crack if struck. NOTE* - Left head must be raised off dowels, moved forward and "jockeyed" to clear power steering and brake equipment.

Installation - Right and left heads are the same. *NOTE - When installing new head, transfer all serviceable parts to new head. Use new seals on all valve stems and new exhaust manifold gasket. Install new intake manifold mounting studs. Check rocker arm position with Gauge J-8928.* Reverse removal procedure and note the following. Head screws are of three different lengths and will project an equal distance from head. DO NOT use sealer of any kind on threads.

PISTON PINS

Removal: *NOTE - Piston Pin Remover & Replacer Set, J-6901 is used. Individual parts are marked with respective numbers.* Place plunger of Tool J-6901 into piston pin bore and position on arbor press. Put J-6901-5 between connecting rod and piston boss. Put J-6901-3 in pin and press until pin bottoms in J-6901. Remove J-6901-5 and plunger and spring from J-6901. Reposition on arbor press and press pin out of rod.

Installation: Place plunger and spring in J-6901 and place plunger in piston pin bore. Position on arbor press. Coat pin and rod lightly with graphite lubricant. Insert pin, put J-6901-3 in pin and press pin in until it bottoms against plunger of J-6901. Piston must turn freely on pin. *Pin must not move under 1500 lb minimum load after assembly.*

Oversize Pin Installation - 001" and 003" oversize pins can be installed. Connecting rod can be honed to fit **but must be 0008-.0016" smaller than the pin used.**

CRANKSHAFT & MAIN BEARINGS

REAR MAIN BEARING OIL SEAL REPLACEMENT:

1) Drain oil and remove oil pan, oil pump, and oil pump drive shaft. Remove oil baffle and cylinder block to oil baffle tube (lower oil level indicator tube). Remove transmission (See Synchro-mesh Transmission Removal on Car Page or Hydra-Matic Drive in Transmission Section). On 4 Cylinder cars, support engine and remove front crossmember assembly.

2) Remove rear center main bearing cap and upper half of rear center main bearing shell to allow crankshaft to be lowered and to prevent damage to thrust surfaces of bearing. Remove rear main bearing cap and loosen remaining bearing caps sufficiently to allow crankshaft to be lowered approximately ½" at rear.

3) With crankshaft lowered to provide clearance, remove upper half of rear main bearing oil seal and bearing shell.

4) Install seal in cap, compress with Tool J-7588, and trim one end flush with cap. *NOTE - On engines with no cast slots in seal groove in block, rotate seal in cap and recompress slightly to eliminate bumps caused by seal retention slots in cap.* Remove seal from cap and turn end-for-end and install in block by slipping up over crankshaft into seal cavity. Install rear center main bearing cap and bearing shell and torque to 95 ft. lbs. Trim both ends of seal flush with block.

5) Install a new seal in cap as above and trim flush with cap. Install cap with shell and tighten to 120 ft. lbs. Remove rear main bearing cap again and inspect split line to be certain that none of seal material has been compressed between cap and block. Make sure mating surfaces are clean.

6) **Next, apply a bead of sealer (Permatex No. 3) approx. 1/16" in diameter to mating surface of cap extending from packing seal groove outward to the groove for oil pan cork rear gasket.** Install rear main bearing cap and tighten to 120 ft. lbs. torque.

7) Remove rear center main bearing cap and reinstall upper half of bearing shell. Install cap and tighten to 95 ft. lbs. Tighten remaining bearing caps to 95 ft. lbs. Replace transmission, oil pump, oil pump drive shaft, oil baffle, oil pan and flywheel lower cover and shield.

►*CAUTION:* Seal must be installed exactly as detailed above to prevent oil leaks at rear bearing. Make certain that seals not cut too short and that mating surfaces of bearing cap and block are free of any packing material, dirt or oiliness (except for Permatex bead on cap) and that they are not scratched or burred.

VIBRATION DAMPENER

VIBRATION DAMPENER: Removal—Loosen generator at adjusting strap and remove fan belt from vibration dampener. On cars equipped with power steering, also remove power steering pump belt. Position fan so wide angles will be at top and bottom allowing access to dampener. Remove dampener attaching screw (15/16" socket) and retaining washer, and slide dampener off shaft.

Installation: Reverse the removal procedure.

ENGINE FRONT COVER

ENGINE FRONT COVER: Removal - Drain cooling system. Remove generator adjusting strap, fan and accessory belt, and fan pulley and fan from water pump. Disconnect radiator hoses and remove fuel pump and vibration damper. On 4 cylinder cars, loosen timing cover attaching bolts and loosen timing cover-to-intake manifold draw bolt, then remove cover. On V8, remove oil pan-to-cover screws, cover-to-oil cooler line screws, and cover-to-block screws and nuts, then pull cover forward to clear studs and remove.

CRANKSHAFT FRONT OIL SEAL REPLACEMENT: After front cover removed (above), slide old seal off end of crankshaft. Coat face of new seal with graphite

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lubricant and install on crankshaft before installing front cover.

CAMSHAFT & BEARINGS

►*NOTE:* Camshafts on 4 cylinder cars can be removed by first removing radiator grille lower panel, grille, and hood latch as an assembly. Then remove front bumper assembly, drain radiator and remove. Engine will then be accessible for camshaft removal.

CAMSHAFT REMOVAL & INSTALLATION: Drain radiator. Remove intake manifold, crankcase ventilator outlet pipe, pushrod cover and rocker arm covers. Disconnect and move spark plug wires out of way. Loosen rocker arm ball nuts so rocker arms can be disengaged from pushrods and turned sideways. Remove pushrods and hydraulic lifters. Mark or store pushrods and lifters so they can be installed in original positions Remove radiator and timing chain cover. Remove timing chain cover seal and fuel pump eccentric. Slide timing chain and sprockets off ends of crankshaft and camshaft. Remove distributor. Remove camshaft thrust plate attaching screws and remove thrust plate. Slide camshaft out of engine carefully, making sure not to damage bearings in block. Front of engine should be raised as necessary to permit shaft to slide between grille and hood catch support plate. To install, reverse removal procedure.

TIMING CHAIN TENSIONER (4 CYLINDER CARS): Removal - Right hand bumper must be removed first, because of hook in each end of spring. DO NOT attempt to remove spring by twisting or stretching spring. *To install, reverse removal procedure, and note the following:* Bumper bolts should not bottom in threads. If they do, tap deeper with bottoming tap. Check to see that two-bolt bumper bracket is wider than gap between each bolt head and block. The single bolt shoulder should bottom on block face, allowing bracket to rotate freely.

VALVE SYSTEM

CHECKING VALVE STEM LENGTH: Position rocker arm on stud and hold in place using Rocker Arm Stud Installer J-8927. Slip valve into place and hold it against valve seat. While holding rocker arm and valve in position securely, insert Valve Train Gauge J-8928 through pushrod hole and seat snugly in pushrod seat of rocker arm. With all parts seated, step end of gauge should be flush with gasket face of head *(See NOTE below)*, but should not project past step on gauge. If gauge projects too far (valve stem too long), grind off tip of valve stem as necessary. *CAUTION* - When grinding end of valve stem be careful not to overheat it (may soften hardened stem).

►*NOTE:* Late production cylinder head requires a straight edge at this point because of the undercut. Clamp straight edge on lower inboard side of head (flush with bottom of head). Use this point as the reference point.

ROCKER ARMS

ROCKER ARM STUD REPLACEMENT: *NOTE–Use oversize stud (.003") only when original stud is found to be loose in cylinder head. Use Std. size stud for replacement when original stud threads are damaged.*

Removal: 1) Remove cylinder head. With rocker arm removed, file two slots, 3/32"-1/8" deep, on opposite sides of rocker arm stud. Top of slots should be 1/4-3/8" below thread travel. Place washer J-8934-3 at bottom of rocker arm stud. Position rocker arm stud Remover J-8934-1 on rocker arm stud and tighten screws securely with 5/32" Allen wrench. Place spacer J-8934-2 over stud remover. Thread 7/8" standard nut on stud remover and turn nut until rocker arm stud is out of cylinder head. If oversize stud being installed, ream out stud hole with Reamer J-5715.

2) Remove plugs from ends of cylinder head oil gallery and thoroughly clean out metal deposits and foreign matter from cylinder head (head must be right side up so metal or foreign material will not lodge around studs).

Installation: 1) Position rocker arm on new rocker arm stud and place Rocker Arm Stud Installer on stud in place of rocker arm ball. Carefully press stud into head using a 2-ton press, until it is installed about half-way (7/16").

2) Position Valve Train Gauge in pushrod hole so that it seats properly in the rocker arm. With valve seated, slowly press rocker arm stud into cylinder head until gauge projects about midway between end of gauge and step with respect to gasket surface of cylinder head. *NOTE* - On late production cylinder heads, clamp straight edge on lower inboard side of head (flush) and use for reference point.

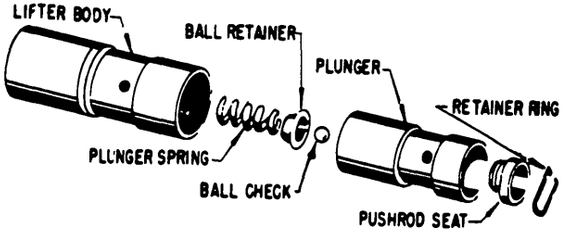
3) Remove Rocker Arm Stud Installer, rocker arm and ball. Blow air through hole in new stud to insure that passage is not restricted, and blow air through oil gallery. Replace plugs in ends of oil gallery. Check oil passages from oil gallery to all studs. Install rocker arm and ball and install nut loosely. Replace cylinder head.

HYDRAULIC LIFTERS

HYDRAULIC VALVE LIFTER OVERHAUL: Removal– Remove intake manifold, pushrod cover and rocker arm cover. Loosen rocker arm ball nut and move rocker arm off pushrod. Remove pushrods and lifters.

Disassembly: Remove pushrod seat retaining ring by holding down seat with pushrod while dislodging spring from lifter body with pointed tool (*NOTE*–it may be necessary to unseat lifter ball, using plunger unloader J-5097, before plunger can be pushed down). Invert lifter and allow plunger to slide out of body. If plunger sticks, place lifter in large end of Hydraulic Valve Lifter Plunger Remover J-4160-A, with pushrod end of lifter downward. Hold tool firmly in hand with thumb over lifter body and strike sharply against a block of wood until plunger falls out (it may be necessary to soak a lifter with a stuck plunger in cleaning solvent to loosen plunger in body). *CAUTION–If more than one lifter is being disassembled at a time make very sure that parts for each individual lifter be kept together so that parts are not intermixed.*

Inspection: Wash individual lifters separately, keeping parts for each lifter together. If necessary, soak lifter in suitable carbon solvent to dissolve varnish and carbon. Using a lint free cloth, clean each part with a hard wiping action. Use a bristle brush if required. Do not use a wire brush or sandpaper. Inspect lifter body for scoring, and check cam surface at end of lifter for wear. Check plunger, and using a



HYDRAULIC VALVE LIFTER

magnifying glass, inspect check ball seat for defects, and outer surface of plunger for scratches or scores. Inspect pushrod seat for roughness and make sure hole in seat is open. Inspect lifter ball for nicks or scoring. If any part of lifter is found defective, replace entire unit.

Assembly: Rinse all parts in clean kerosene before assembly and assemble without drying. Rinse plunger spring and ball retainer and position retainer in spring. Install ball in retainer. Rinse plunger and place on retainer so seat on plunger mates with ball. Invert plunger with parts assembled thus far and, after rinsing body, install body over spring and plunger. Place lifter body on clean paper; rinse and install pushrod seat and retainer ring.

Checking Leakdown Rate: Fill tester cup in Valve Lifter Leakdown Tester J-5790, to approximately 1 inch from top with special testing fluid. Swing weight arm up out of way, raise ram, and position lifter into boss in center of tester cup. Place 7.32" steel ball in pushrod seat of lifter and lower ram onto ball. Adjust ram (with weight arm clear of ram) so that pointer is positioned on set line (marked "S"). Tighten jam nut to maintain setting. Operate lifter through full travel of plunger by pumping weight arm to fill lifter with test fluid and force out air, (Lifter must be completely submerged at all times). Continue pumping for several strokes after definite resistance is felt (*NOTE–If noticeably weak resistance is felt during any one of last few strokes (of hard pumping), replace ball in lifter and repeat test to this point.* Raise weight arm to allow plunger spring to expand fully; lower arm onto ram and commence turning crank slowly (1 revolution every 2 seconds). Time indicator travel from lower line (first line above set line) to line marked .125" or 1/8", while still rotating cup with crank. Lifter is satisfactory if rate is between 12 and 40 seconds. Check a questionable lifter 3-4 times before discarding.

Installation: *(CAUTION–If new lifter is to be installed, remove sealer coating from new lifter, making sure that hole in pushrod seat is not plugged with seal coating. Check leakdown rate).* Place new lifter in lifter boss and replace pushrod exactly as removed (same end against rocker arm). Tighten rocker arm ball retaining nuts to 15 ft. lbs. Replace rocker arm cover, pushrod cover and intake manifold.

OILING SYSTEM

ENGINE LUBRICATION

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic valve lifters.

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Metered oil is supplied to pushrod seats, rocker arms, timing chain and sprockets, and distributor drive gear. All other parts are lubricated by oil spray.

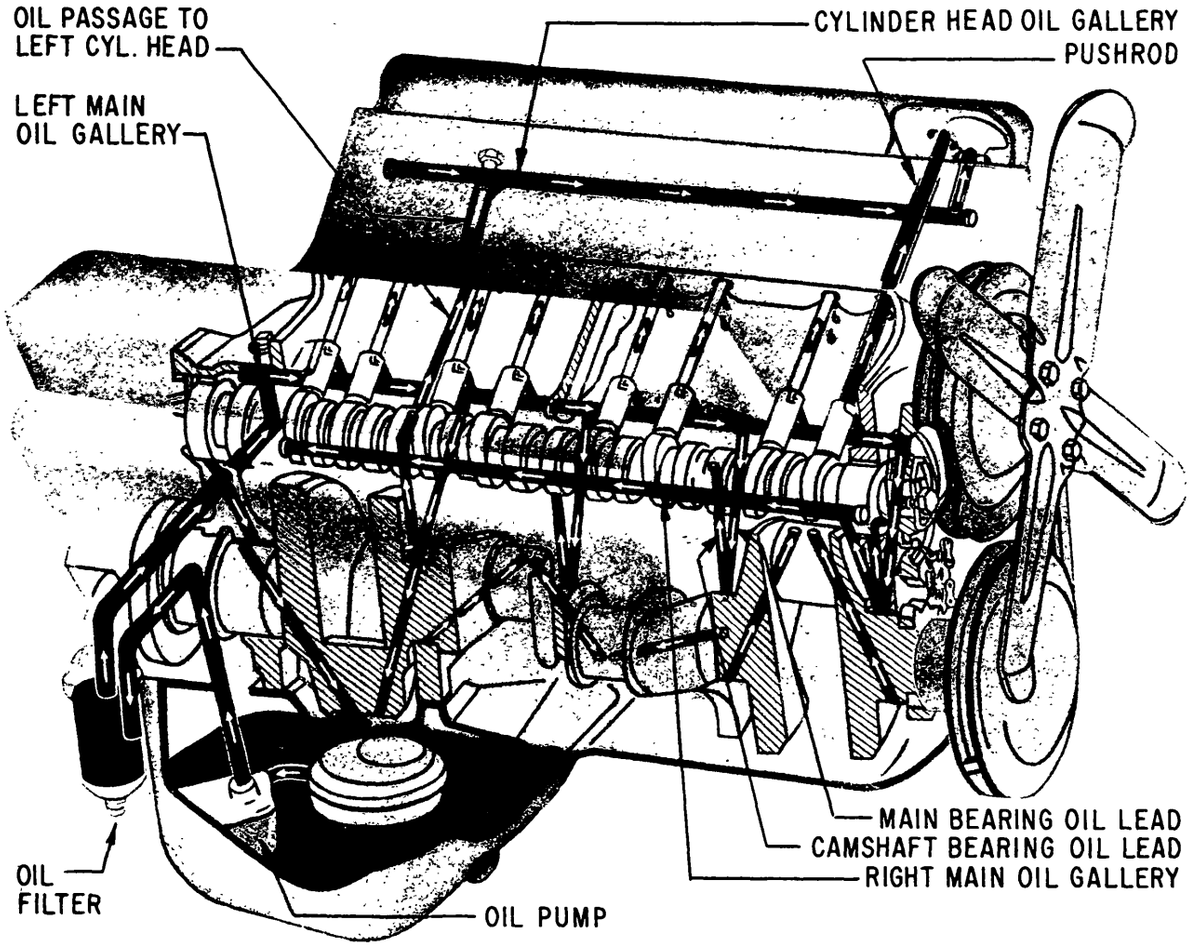
OPERATION: Gear type oil pump mounted on lower face of block in rear of crankcase draws oil up through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in pump body and crankcase to inlet port on oil filter mounting pad on right side of crankcase. From filter outlet, oil flows through transverse passage in rear end of block to rear end of left main oil gallery which extends along entire length of engine block. At forward end of left main oil gallery a "V" passage extends down to crankshaft bearing and up to forward end of right main oil gallery which also extends along entire length of engine block. Oil is distributed through these oil galleries as follows: **Crankshaft & Camshaft Bearings** - **Rear** bearings are lubricated through short vertical passage extending between crankshaft bearing bore and camshaft bearing bore and intersecting the oil filter outlet passage (above) from which oil is supplied to these bearings. **Other** bearings are lubricated by "V" passage in each crankcase web which extends down from left main oil gallery to crankshaft bearing bore and then up to camshaft bearing bore (additional passage at front crankshaft bearing supplies oil to right main oil gallery).

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole from adjacent main bearing.

Pistons & Pins - Lubricated by oil jet thrown on cylinder walls through groove between rod and bearing cap of connecting rod for opposite cylinder when this groove lines up with oil hole in crankpin journal. *NOTE* - Rods must be installed with this groove upward or toward camshaft for this cross-lubrication.

Pushrods, Rocker Arms, & Valves - Pushrods are filled with oil directly through small hole in top of lifter for lubrication of upper and lower pushrod seats. Vertical passages in block at No. 2 camshaft bearing (for right bank), and No. 4 camshaft bearing (left bank) extend up through engine block and matching passages in head (passage in head is around one cylinder head bolt with grooved channel in lower face of head to connect with hole in block) to connect with cylinder head oil gallery which extends along entire length of each cylinder head. Oil in this system is metered by camshaft bearing and is fed intermittenly when oil holes line up. Rocker arm studs (pressed in head) extend down into this cylinder head oil gallery and have drilled oil passage with side hole at rocker arm ball seat through which oil flows to lubricate ball seat and up through grooves in ball to fill channel section of arm. This oil overflows end of rocker arm to lubricate valve tip. Excess oil in rocker chamber drains down pushrod openings into lifter chamber and oil drain holes in floor of lifter chamber (at each side of center crankcase web) return oil to the oil pan.

Valv Lifters - Hydraulic valve lifters are supplied with oil through short vertical passage extending from main oil gallery directly to lefter bore.



PONTIAC V8 ENGINE OILING SYSTEM (4 CYL. ENGINE SIMILAR)

Timing Chain, Sprockets, & Fuel Pump Eccentric - Drilled holes in camshaft front journal provide a jet of oil when hole in journal lines up with oil hole in bearing. This jet strikes camshaft thrust plate and part of the oil is diverted downward through grooves in front face of engine block and thrust plate for sprocket and chain lubrication. An additional hole in the thrust plate permits an oil jet to pass through opening in camshaft sprocket and lubricate fuel pump eccentric and rocker arm.

Distributor Shaft & Bushings - Lubricated through passage in block from main oil gallery.

OIL FILTER: Full flow type mounted on base adapter bolted on right side of crankcase. Bypass valve located in filter base assures engine lubrication if filter element clogged.

4 CYLINDER ENGINE

Engine design and oiling system similar to Pontiac V8 except for absence of left bank. See above.

OIL PUMP

OIL PUMP OVERHAUL: Removal—Remove oil pan and remove oil pump attaching screws while holding pump in place. Carefully lower oil pump away from block with one hand while removing oil pump drive shaft with the other hand.

Disassembly: Remove cotter pin which retains floating screen to pump inlet and remove screen. Remove pressure regulator and spring retainer, spring and pressure regulator ball. Remove screws retaining cover to oil pump body and remove cover. Remove driven gear and drive gear with shaft.

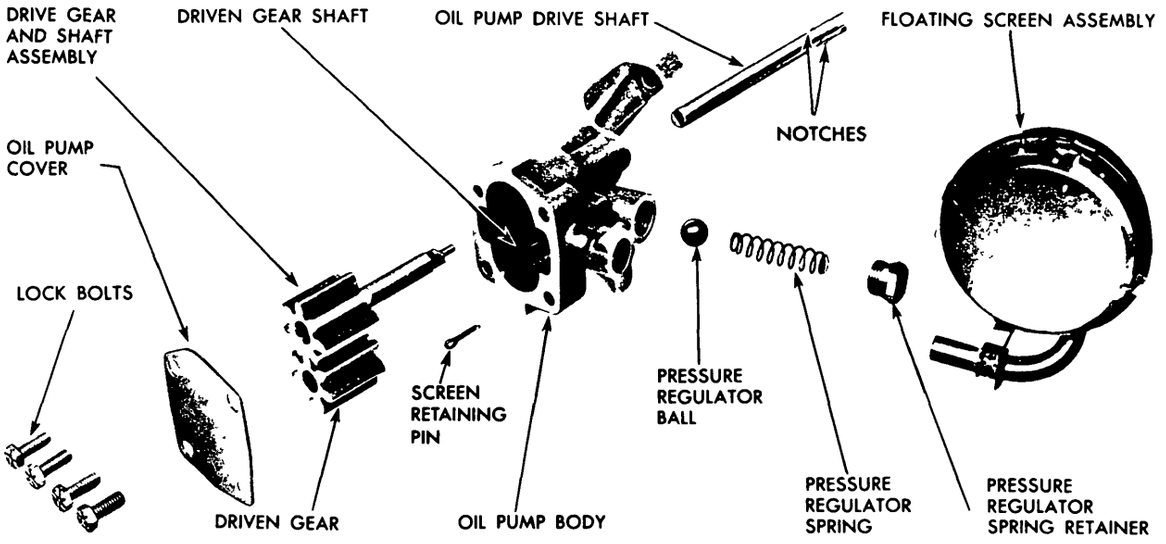
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Cleaning & Inspection: Clean all parts thoroughly (clean screen with Bendix Cleaner). Inspect pressure regulator spring for distortion, cracks, and wear on sides. Inspect pressure regulator ball for nicks or other damage. Inspect oil pump drive shaft (distributor to pump shaft) for wear or cracks. Inspect all other pump parts for wear. Replace parts as necessary.

Ass mbly: Install drive and driven gears. Install cover and turn drive shaft by hand to insure that it turns freely and has a slight amount of endplay. Install pressure regulator ball, spring and retainer using a new gasket on retainer. *(CAUTION–Do not attempt to change il pr ssur by varying length of pressure regulator spring).* Install screen assembly on oil pump and install new cotter pin retainer.

Installati n: To install pump, position drive shaft into position in distributor and oil pump drive gear, then position oil pump in place on block, indexing drive shaft with pump drive gear shaft. Install two attaching screws with lockwashers and tighten securely. *(NOTE–* Removal and installation of pump does not disturb distributor timing). Install oil pan.



PONTIAC OIL PUMP (ALL MODELS)

►*JACKING & HOISTING CAUTION: B fore jacking, hoisting, or working und r car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING CAUTION: Hydra-Matic cars CANNOT be started by pushing because of transmission design.*

►*HYDRA-MATIC TRANSMISSION USAGE NOTE:* **3-Speed type** used in Catalina & Ventura (23 & 25) Series; **4-Speed type** used in Star Chief & Bonneville (26,27 & 28) Series.

MODEL IDENTIFICATION

Series	①Series Designation
Catalina	23
Ventura	25
Star Chief	26
Bonneville Safari (Station Wagon)	27
Bonneville	28

① - First two digits of series and body style designation following "61" year number under STYLE on body identification plate.

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar post and on front of right bank of engine on lower outer edge near water pump outlet hose. (See also engine production Code Number below). Number (example below) includes identification data.

① ② ③ ④
3 61 P 1001

① - Series. **3** - 23, **5** - 25, **6** - 26, **7** - 27, **8**-28.

② - Model Year. **61** 1961.

③ - Assembly Plant. **P** Pontiac, **S** South Gate, **W** Wilmington, **K** Kansas City, **L** Linden, **D** Doraville, **A** Arlington.

④ - Beginning vehicle number for each prefix combination.

Engine Production Code Number: Stamped on front face of right cylinder bank on upper edge near water pump outlet. *Do not confuse this number with Serial and Engine Number.*

►*ENGINE IDENTIFICATION LETTER CODE:* Forty-three different engine combinations used. Letter code (A2, F4, etc.) stamped on small pad directly below Engine Production Code Number. Letter code indicates various items of equipment used in a particular engine and will be listed in following data.

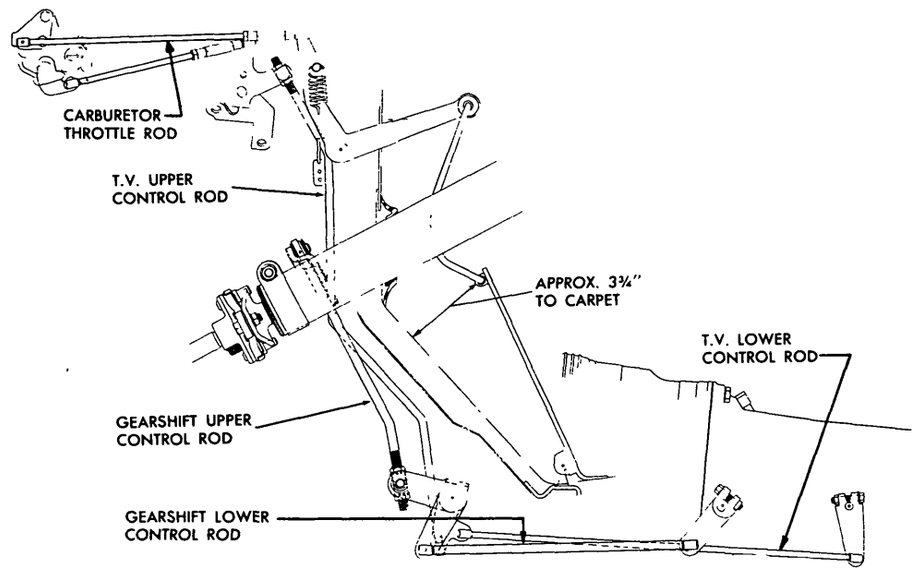
TUNE-UP

►*COLD START & TRANSMISSION FORCED DOWN-SHIFT IMPROVEMENT CHANGE (Cars with single 2-Bbl. or Triple 2-Bbl. Carburetors):* Throttle rod should be positioned in MIDDLE hole of carburetor throttle lever (was in top hole). Later cars have this change.

►*LEANNESS DURING WARM-UP CORRECTION (Early Cars with 2-Bbl. Carburetors): See "Rochester 2GC Carburetors" below.*

►*FLOODING CORRECTION (Early Cars with 2-Bbl. Carburetors): See "Rochester 2GC Carburetors" below.*

►*STALLING AFTER STARTING, LEANNESS DURING WARM-UP, OR "BUMP" ON ACCELERATION (Early Cars with 4-Bbl. Carburetors): S e "Cart r AFB Carbur t rs" below.*



HYDRA-MATIC THROTTLE LINKAGE

COMPRESSION PRESSURE: 140-150 lbs. (8.6-1 ratio), 155-165 lbs. (10.25-1 & 10.75-1 ratios) at 155-165 RPM. Lowest cylinder must not be less than 80% of highest cylinder.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Thermostatic coil type in right exhaust manifold outlet. Valve must operate freely and anti-rattle spring must be installed in a downward position. Bend anti-rattle bracket so counterweight strikes stop before heat valve strikes inside of manifold in closed position.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - AC No. 45S (No. 43S for high speed driving). 14 mm. Torque to 25 ft. lbs.

COIL: Delco-Remy No. 1115134.
Ignition Current - 2.1 amps. idling, 3.4 amps. stopped.
Resistor - Resistance wire (1.28-1.36 ohms) connected in circuit between coil and IGN.1 terminal of ignition switch. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Delco-Remy No. 1110971 (8.6-1 ratio), No. 1110970 (10.25-1 & 10.75-1 ratios), No. 1110976 (Racing). *NOTE* - Distributor 1110976 is Double Breaker type.

Condenser - Delco-Remy No. 1932004 (Distr. No. 1110971, 70).
Capacity - .18-.23 mfd.
Contact Point Set - Delco-Remy No. 1931988 (Distr. No. 1110971, 70).
Breaker Gap (1110970 & 71) - Gap (.016") will be correct when cam angle correctly set.
Breaker Gap (1110976) - .014-.018" (new points).
Cam Angle (1110970 & 71) - 28-32°. Set at 30°. Will give .016" breaker gap.
Cam Angle (1110976) - Adjust each set of points to 29°±1°, which should give cam angle of 34°±1° (both sets of points operating together).
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advanc - 1110971

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		450	0-4		900
6-8		1050	12-16		2100
9-11		1800	18-22		3600

Automatic Advanc - 1110970

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
4-6		750	8-12		1500
7-9		1000	14-18		2000
8-10		1450	16-20		2900

Automatic Advanc - 1110976

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		550	0-4		1100
7-9		950	14-18		1900
10.5-12.5		1675	21-25		3350
14-16		2400	28-32		4800

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Vacuum Spark Control: Delco-Remy 1116173 (1110971 Distr), 1116172 (1110970 Distr)

Vacuum Advance - 1116173

Distr	Degrees	Eng Degrees	Vacuum (" of Hg)
Start		0	6-8
10		20	13-15

Vacuum Advance - 1116172

Distr	Degrees	Eng. Degrees	Vacuum (" of Hg)
Start		0	8-10
10		20	14 75-16 75

IGNITION TIMING

Setting - 6° BTDC with engine at correct idle speed, at operating temperature, and with distributor vacuum line disconnected

►*IGNITION TIMING NOTE* The above timing setting (6° BTDC) is for operation on regular fuels (8 6-1 ratio engine), and for premium fuels (10 25-1 & 10 75-1 ratio engines) Do not retard later than 0° for any reason

Timing Marks - Two marks on harmonic balancer, TDC and 6° BTDC Pointer on timing sprocket cover aligned with correct mark on balancer

CARBURETOR

►*CARBURETOR APPLICATION Carter and Rochester carburetors used as follows·*

Model	Carburetor
All Models (Except Bonneville)	Rochester 2-Bbl
Bonneville	Carter AFB 4-Bbl
All Models (Optional)	Rochester Triple 2-Bbl

THROTTLE LINKAGE ADJUSTMENT: With engine and transmission at normal operating temperature, idle speed correctly set, proceed as follows Loosen both nuts on transmission throttle control rod trunnion Stop engine and install Linkage Adjusting Pin J-7687 through holes in throttle control lever and bracket *NOTE - On cars with throttle return check, remove throttle return check or install Holding Tool J-6342-01 over return check* Close throttle valves fully and loosen locknut on transmission throttle control rod Adjust length of rod so gauge pin is a free fit in holes Tighten locknut, but leave pin in place Push transmission throttle control rod down until transmission throttle control outer lever reaches end of its travel *CAUTION - Upper locknut must not touch trunnion* Hold rod and tighten upper and lower trunnion locknuts finger tight **Then shorten rod** by backing off lower nut 2½ turns Tighten upper nut securely Remove gauge pin Loosen locknut on carburetor throttle rod and adjust rod so there is 4 35/64" clearance from underside of attaching boss on accelerator pedal to body toe pan (3¾" to carpet) Tighten locknut Remove Tool J-6342-01

►*IMPROVED "FORCED DOWN-SHIFT" PERFORMANCE (Cars with singl 2-Bbl or Triple 2-Bbl Carburetors)* Make certain throttle rod is positioned in MIDDLE hole of carburetor throttle lever

►*THROTTLE LINKAGE ADJUSTMENT CAUTION (Cars with 4-Bbl Carburetor)* Throttle control rod assembly connecting throttle valve lever to idler lever at rear of engine may be too short for proper security (after adjustment) Lengthen rod by using hex connector assembly from throttle rod, Part No 537182, in place of connector used in production

THROTTLE RETURN CHECK ADJUSTMENT: Make carburetor fast idle adjustment (4-Bbl), then stop engine On 2-Bbl , rotate fast idle cam so idle speed screw rests on next to highest step of fast idle cam On 4-Bbl , rotate fast idle cam so fast idle screw rests on highest step of cam Clearance between contact screw and contact on throttle lever should be 062- 067" (2-Bbl with choke on throttle body), 090- 095" (2-Bbl with choke on air horn and all 4-Bbl) Adjust by turning contact screw (hold sleeve next to diaphragm bracket from turning)

ROCHESTER 2GC 2-BARREL

Car Model	Carburetor No.
Std Engine Synchro-mesh	Ⓒ 7019060
Std Eng H-M 4-Speed No Air Cond	② 7019070
Std Eng H-M 3-Speed No Air Cond	② 7019071
Std Eng H-M 4-Speed With Air Cond	② 7019072
Std Eng H-M 3-Speed With Air Cond	② 7019073
425E Eng H-M 4-Speed No Air Cond	Ⓒ 7019074
425E Eng H-M 3-Speed No Air Cond	Ⓒ 7019075
425E Eng H-M 4-Speed With Air Cond	Ⓒ 7019076
425E Eng H-M 3-Speed With Air Cond	Ⓒ 7019077

Ⓒ - 1 7/16" throttle bore with choke on air horn
② - 1 11/16" throttle bore with choke on throttle body

►*LEANNESS DURING WARM-UP CORRECTION (Cars with Automatic Transmission)* On carburetors prior to change "A" as indicated on carburetor identification tag modification kits can be installed Carburetors marked "A" or later have these changes made in production *See 'Rochester 2G & 2GC Carburetors in Carburetion Section*

►*FLOODING CORRECTION (Early Cars)* On carburetors with "flat" type bowl cover gasket, install later type "domed" gasket, Part No 7021007 to provide increased float clearance Later carburetors have this type gasket and modified float

►*PUMP DURATION SPRING CHANGE FOR IMPROVED ACCELERATION PERFORMANCE (Auto Trans Cars).* Carburetors marked "C" or later on identification tag have new Pump Duration Spring, Part No 7011385

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrel feeds Cyls 2-3-5-8, LEFT barrel feeds 1-4-6-7*

►*IDLE COMPENSATOR CAUTION* Idle Compensator (thermostatically controlled idle air bypass) used on all cars with Air Conditioning Compensator valve must be closed when making idle setting and idle speed adjustments Press on spring-loaded button on rear of carburetor throttle body

Idle Setting - Initial setting 1½ turns open Turn screw out for richer mixture

Idle Speed - 480-500 RPM with Hydra-Matic in "DR" 540-560 RPM with Air Cond "Off" and Hydra-Matic in "DR"

Float Level - 5/8"±1/16" (Std Eng Hydra-Matic), 11/16"±1/16" (Std Eng Synchro-mesh & 425E Eng) between bottom of float seam at toe end and air horn gasket with air horn inverted, gasket in place and needle seated Use Gauge J-8556(5/8"), J-8557 (11/16") To adjust, bend float arm

Float Drop - 1¾" (Gauge J-8556 or J-8557) from gasket surface to lowest point of float with air horn upright, gasket in place and float hanging free To adjust, bend float tang

Fast Idl : No adjustment Fast idle will be correct when hot or slow idle correctly set

Automatic Choke Setting: Centered at index

Throttle Linkage Adjustment: *See CARBURETOR abov*

►*OTHER DATA See "Rochester 2G & 2GC Carburetors" in Carburetion Section*

CARTER AFB 4-BARREL

Carter AFB 4-Barrel. Standard on Bonneville, Optional on all other models as follows

Transmission	Carburetor N .
Synchro-mesh	3123S, SA
Hydra-Matic 4-Speed	3124S, SA, SB
Hydra-Matic 3-Speed	3125S, SA, SB

►*"BUMP" ON ACCELERATION CORRECTION (Cars with 3123S, 3124S, 3125S Carburetors)* This condition noted when throttle fully opened above 30 MPH 1-5 miles after Cold Start Correct by installing new Secondary Clusters *See 'Carter AFB 4-Bbl Carburetors" in Carburetion Section*

►*STALLING AFTER START & LEANNESS DURING WARM-UP CORRECTION (Early Automatic Trans Cars) On 'S" and "SA" carburetors, see 'Carter AFB 4-Bbl Carburetors' in Carburetion Section for recommended Automatic Choke and Pump Connector Link settings NOTE - 'SB' carburetors have above settings and other production changes*

►*MANIFOLD FUEL DISTRIBUTION Carburetor RIGHT barrels feed Cyls 2-3-5-8, LEFT barrels feed 1-4-6-7*

►*IDLE SPEED ADJUSTMENT NOTE Idle Air Bypass screw on throttle body is used to adjust idle speed.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings *See 'Carter AFB 4-Barrel Carburetors' in Carburetion Section*

Throttle Linkage Adjustment: *See CARBURETOR above*

►*OTHER DATA See "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

TRIPLE CARBURETORS (Rochester 2G & 2GC)

	Rochester Carburetor N .		
Transmission	Front	Center	R ar
Synchro-mesh	7013063	7019064	7013065
Hydra-Matic 4-Speed	7013063	7019067	7013065
Hydra-Matic 3-Speed	7013063	7019069	7013065

Idle Speed - Same as other models (see 2GC data above)

For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), see "Rochester Triple Carburetors" in Carburetion Section

CARB. EQUIPMENT

Fuel Pump· AC No 4512 Fuel only
Pressure - 5¼-6½ lbs at 500-1000 RPM

Fuel Filter AC No GF-61P (exc Air Conditioning), No GF-73 (Air Conditioning) Located near fuel pump in line between pump and carburetor Replace at 15,000 miles or every 12 months

Gasoline Gauge: AC electric type
Dash Unit - AC No 5643436 (Std), 5643520 (Optl)

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Tank Unit - AC. Used as follows:

Model	Std. Cars	Air Cond. Cars
All exc. Sta. Wgn.	5641736	5641737
Station Wagon	5641570	5641571

Air Cleaner: Standard - Oil wetted type. Service Spring and Fall or every 10,000 miles. *NOTE - In dusty areas, service every 2,000 miles or oftener.* Clean by immersing element in gasoline or kerosene and reoiling with engine oil.

Heavy Duty - Paper element type, replace or clean every 15,000 miles or yearly. *CAUTION* - Clean by blowing air on inner circumference of filter element.

►*POLYURETHANE ELEMENT NOTE & CLEANING CAUTION:* Plastic type. May be used to replace other elements and may be found on cars in service. Clean element by removing it from screen and washing in solvent (such as kerosene at room temperature) and squeezing dry (*CAUTION - DO NOT wring dry*). Dip element in SAE 10W-30 oil, squeeze to remove excess oil, reinstall element on screen with sealing edges evenly overlapping the screen.

BATTERY

Delco. Used as follows:

Synchro-mesh Cars - 2SMR53, No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).

Hydra-Matic Cars - No. 558. 12 volt, 11 plate, 63 ampere hour capacity (20 hr. rate).

Extra Duty Battery - 3SMR72, No. 670. 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Left front corner of left cylinder head.

STARTER

Delco-Remy No. 1107791 (8.6-1 ratio except 425E Eng. with Air Cond.), No. 1107781 (All others). *NOTE - Starter No. 1107781 is "Two Shunt" type.*

Armature - Delco-Remy No. 1950563 (1107791 Str.), No. 1949770 (1107781 Str.).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107791

Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Performance Data - 1107781

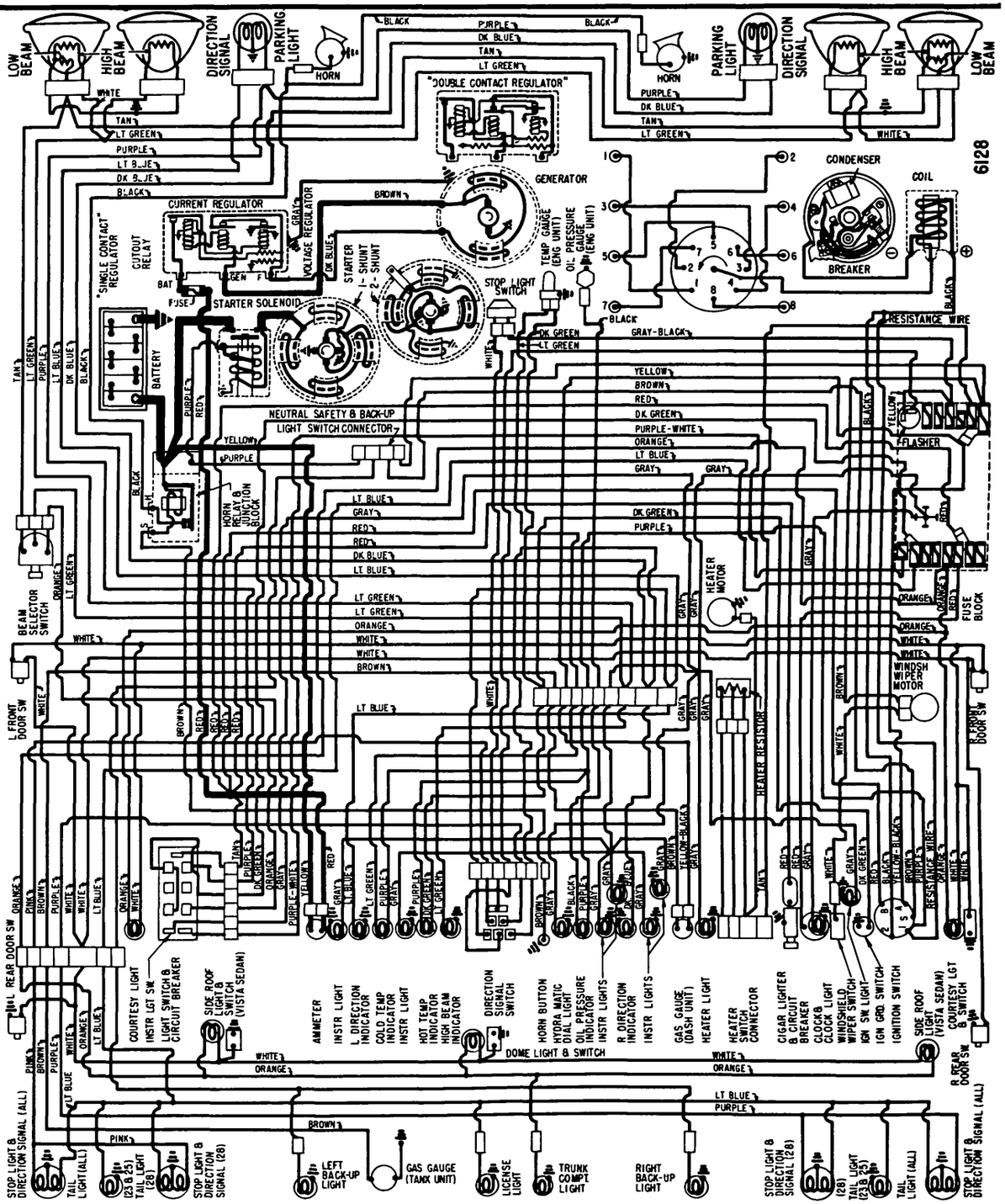
Torque	RPM	Volts	Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

Starting Switch: Delco-Remy Solenoid No. 1119798 (Synchro-mesh), No. 1114257 (Auto. Trans.) mounted on starter and controlled by Ignition & Starter Switch.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998705 located on steering column behind instrument panel.

Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

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GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION Battery charging circuit protected by a 45 amp fuse, No 1945172 (Std Reg), 60 amp fuse, No 1945171 (Double Contact Reg) clipped to 'BAT" terminal of generator regulator Check for blown fuse when diagnosing gen rator, regulator, or battery failure*

Ic -Remy Used as follows

Model	Early - Generator - Late	
Std Heater	1102203	1102263
Deluxe Heater	1102199	1102264
Hvy Duty & Air Cond	1102220	
Hvy Duty Low Cut-In	1105143	
3 2-Bbl Carbs ①	1102240	1102265

① - Also use with 425A Engine

►*GENERATOR VIBRATION CORRECTION (EARLY CARS)* To correct vibration or resonance at 30-50 MPH install Brace No 540599 from generator mounting bracket to cylinder head, and Brace No 540601 from bracket to exhaust manifold

Performance Data

Generator	Amperes	Volts	RPM
1102203	30	14 0	2240
1102263	30	14 0	2310
1102199 & 240	35	14 0	2630
1102264 & 265	35	14 0	2730
1102220 & 1105143	45	14 0	2520

Rotation - Counterclockwise at commutator end
Brush Spring Tension - 28 ozs
Field Current - 1 69-1 79 amps (1102203, 199 & 240) 2 66-2 86 amps (1102220 & 1105143), 1 48-1 62 amps (1102263, 264 & 265) at 12 volts and 80°F
Belt Adjustment - ¼" deflection with 5-6 lbs pressure midway between pulleys (Std), 1/8" deflection with 6-7 lbs pressure midway between pulleys (Air Cond)

GENERATOR REGULATOR

Delco-Remy. Used as follows

Regulator	Generator
1119001①	1102203 & 1102263
1119002②	1102199 240 264 & 265
1119600③	1102220 & 1105143
1119604④	1102199 240, 264 & 265
1119663⑤	1102203 & 1102263

① - Regulator Assembly No 1119263 (with fuse)
② - Regulator Assembly No 1119264 (with fuse)
③ - Regulator Assembly No 1119623 (with fuse)
④ - Used for Headlight Flicker Correction *See HEADLIGHT FLICKER CORRECTION under MISC ELECTRICAL below*

►*REGULATOR NOTE* Regulators 1119600, 1119604 & 1119663 are "Double Contact" type

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE*

NOTE - Specifications below are 'Normal ' settings

Cutout Relay

Cuts In - 11 8-13 5 volts (1119001 002) 11 8-13 0 volts (1119600, 604 663) hot
Contact Gap - 020"
Air Gap - 020" with contacts just closed

Voltage Regulator

Setting (1119001, 002) - 13 8-14 7 volts at 125°F ambient temperature
Setting (1119600, 604, 663) - 13 8-14 6 volts operating on upper contacts 1- 3 volt lower operating on lower contacts at 125°F ambient temperature
Contact Gap (1119600, 604, 663) - 016" (upper contacts) with lower contacts just touching
Air Gap - 075" (1119001, 002), 067" (1119600, 604, 663) with armature pressed down to point where contacts just touch

Current Regulator

Setting - 27 0-31 0 amps (1119001), 27 0-33 0 amps (1119663), 31 0-35 5 amps (1119002, 604), 38 0-45 0 amps (1119600) at 125°F ambient temperature
Air Gap - 075" with armature pressed down to point where contacts just touch

►*OTHER DATA See 'Delco-Remy 6 & 12-Volt Single Contact Regulators or 'Delco-Remy 12-Volt Double Contact Regulators ' in Electrical Section*

ALTERNATOR & REGULATOR

Delco-Remy Alternator No 1117070 with Regulator No 9000562.
Rotation - Clockwise at drive end
Brush Spring Tension - 13 ozs
Field Current - 5 6-6 3 amps at 12 volts and 80°F
Rated Output - 60 amps at 14 volts at 2500 RPM hot (58 amps Cold)

►*OTHER DATA See 'Delco-Remy (Internal Rectifier) Alternator & Transistorized Regulator in Electrical Section*

MISC. ELECTRICAL

►*HEADLIGHT DIMMING OR FLICKER CORRECTION* If this trouble not corrected by usual corrective procedure, replace single contact regulators, Nos 1119001 and 1119002 with Double Contact Regulator Nos 1119663 and 1119604 *See Regulator data above for application and specifications*

Headlights 4-Headlight System

Direction Signals Switch located on steering column behind instrument panel To remove, remove attaching screws and washers remove assembly and horn wire retainer from steering column housing To install, reverse removal procedure

►*FLASHER IDENTIFICATION NOTE* Use flasher unit marked AP 2 (on 23 & 25 Series), AP 3 (on 26 & 28 Series) Flasher mounted on fuse block located on dash shroud above front edge of left floor mat

Instrument Cluster Removal Disconnect battery Disconnect cluster wire at chassis wiring harness connection below plenum chamber On cars with Circ-L-Aire Conditioning remove instrument cluster pad and trim plate (retained with clutch head screws) Remove radio knob and retaining nut Push cluster toward front seat and using a sprin wrench or deep socket, remove lockwashers and nuts Disconnect speedometer cable and remove wire connector from ammeter terminals and other electrical connections On all cars without Circ-L-Aire Conditioning push cluster toward front of car, turn cluster upside down and remove To install, reverse removal procedure

Speedometer Removal (Cluster Removed) Disconnect Safeguard control cable (if so equipped) by pulling straight out Remove cluster face plate and lens by unsnapping face plate from housing Remove screws on back of cluster at speedometer cable fitting area Remove speedometer and instruments carefully If car is equipped with Safeguard speedometer, disconnect ground wire at clip terminal and also the wire retainer clip Carefully note routing of wires before removing ground wire Remove screws retaining numeral plate and remove speedometer head assembly To install, reverse removal procedure

Lighting Switch Removal: Disconnect battery Pull headlight switch knob "ON" Push latch button on side of switch assembly and pull out switch knob assembly Screw bushing from switch assembly, freeing switch from instrument panel

Stop Light Switch Location Mechanical type located on bracket attached to steering column behind instrument panel
Adjustment - Loosen locknut and position switch thread 3/16" to pedal arm with brake fully released *NOTE - Switch must not restrict pedal action*

CIRCUIT BREAKER- 22 Ampere - Headlights High beam indicator Parking & Tail lights In headlight switch *NOTE - Tail lights also protected by 14 ampere fuse in fuse block*

FUSES: *All fuses located in fuse block behind brake & clutch pedals on dash panel inside car Fuses are on RIGHT side of names*
25 Ampere - Back-up lights, windshield wiper & washer
14 Ampere - Tail & License lights
14 Ampere - Stop lights & Direction signals
14 Ampere - Dome & Courtesy lights, trunk light
14 Ampere - Clock & Glove Box lights
7.5 Ampere - Radio
4 Ampere - All Instrument Panel lights (including Rheostat)
Cigar Lighter - Fuse or circuit breaker on forward end of lighter housing

Horn Relay Delco Remy 1116970

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine See 'Air Conditioning Service Cautions in Miscellaneous Section*

►*CYLINDER HEAD PRODUCTION CHANGE* New type left and right cylinder heads used in production on later models New heads are cast with an undercut at lower inboard edge For revised procedures in checking rocker arm stud length and valve stem length, *see "Valves" in Pontiac Special Data*

ENGINE SPECIFICATIONS- Own. V8, valve-in-head All engines are basically the same with modifications and optional equipment as indicated *See Engine Identification Letter Code under MODEL IDENTIFICATION above Reference will be made to Letter Code to indicate on which engines various items will be found*

►*425A ENGINE NOTE* These engines are Letter Codes F4, M4, RM4, FO MO U9 V9 RMO RV9

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See INDEXES on Pgs 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data

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►*425E ENGINE NOTE* These engines are Letter Codes E3, E7, W3, W7

Engine	Bore	Stroke	Displacement	Rated HP
All	4 1/16"	3 3/4"	389 cu ins	52 8

Engine©	Compr. Ratio	Developed HP
Std (2-Bbl , S-M)	8 6-1	215 at 3600 RPM
Std (4-Bbl , S-M)	8 6-1	235 at 3600 RPM
425E (2-Bbl , H-M)	8 6-1	230 at 4000 RPM
Optl (2-Bbl , H-M)	10 25-1	267 at 4200 RPM
Optl (4-Bbl , H-M 3-Spd)	10 25-1	287 at 4400 RPM
Optl (4-Bbl , H-M 4-Spd)	10 25-1	303 at 4600 RPM
Optl (3 Carbs , All Trans)	10 75-1	318 at 4600 RPM
425A (4-Bbl , All Trans)	10 75-1	333 at 4800 RPM
425A (3 Carbs , All Trans)	10 75-1	348 at 4800 RPM

© - S-M (Synchro-mesh), H-M (Hydra-Matic)

Compression & Vacuum Reading - *See TUNE-UP*

►*ENGINE WHINE AT 800-900 RPM CORRECTION:* Noise may sound like propeller shaft or transmission front bearing noise Caused by interference between engine oil pan and oil pump To correct, tap lightly on rear of oil pan on **left** side of dimple to relieve pan on right side of dimple

OIL PAN REMOVAL: Drain radiator and crankcase Remove hood and air cleaner Disconnect battery ground cable and radiator hoses Move coil away from body Disconnect exhaust manifolds from exhaust pipes Lower idler arm and tie rod by disconnecting idler arm bracket from frame Disconnect engine front mounts Lower starter from clutch housing Remove oil pan retaining bolts Remove clutch housing lower cover Raise engine as high as possible and remove flywheel cover Let oil pan drop from block Remove front main bearing cap and position crankshaft at No 1 firing position Hold crossover pipe and tie rod down and remove oil pan-

Installation - Use new gaskets and cement gasket in rear main bearing cap 1-1¼" from both sides of groove Push pan into place (hold crossover pipe and tie rod down) and install front main bearing cap *NOTE - Place a jack stand under front frame and lower engine to torque cap bolts to 95 ft lbs* Reverse removal procedure to complete installation

CYLINDER HEAD: *See "Cylinder Head & Manifold' in Pontiac Special Data*

TIGHTENING TORQUES: *See 'Tightening Specifications' in Pontiac Special Data*

PISTONS

Aluminum alloy, tin plated, with piston pin offset 1/16" to right *See "Piston Note" below*

►*PISTON NOTE* Various types used as follows

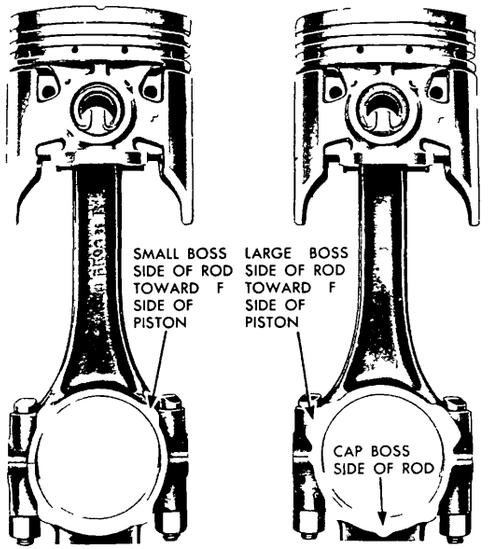
Low Compression (8.6-1 Ratio) - Pistons have recess or dish in head and are identified by TWO notches at front of piston head and mark "L" on rear piston pin boss *These pistons must not be used in 10 25 & 10 75-1 ratio engines*

High Compression (10.25 & 10.75-1 ratios) - "Flat Top" type Pistons have valve clearance reliefs machined on head and are identified by ONE notch at front of piston head

Removal - Pistons and rods removed from above

Piston Clearance - 0007- 0013" measured 1 18" below top of skirt Fit pistons with 0015" x ½" feeler Pull to withdraw feeler should be 8-15 lbs *NOTE - 0022-0027" clearance on 425A engines, police cars, and 3 carb synchro-mesh engines*

Installing Pistons - Install piston with notches in piston head and "F" mark on piston boss toward front of engine *See Rod Installation*



PONTIAC PISTON & ROD ASSY

Replacement Pistons: Police, T425A & Three 2-Bbl. Carb. - Furnished Std (4 060", 4 061", 4 062" "Flat Top") and 005", 010", 020", 030" Oversize

All Others - Furnished Std (4 061", 4 062", 4 063" "Flat" or "Recessed" Top) and 005", 010", 020", 030" Oversize

PISTON PIN

Pin is press fit in rod

Diameter - 9802" **Length** - 3 25"

Pin Fit in Piston - 0003 0005" loose Piston must turn freely on pin

Pin Fit in Rod - 0008- 0016" press fit

Piston Pin Removal & Installation - *See "Piston Pins' in Pontiac Special Data*

Replacement Pins: Furnished Std and 001", 003" Oversize

PISTON RINGS

Compression rings are cast iron, taper faced No. 1 has thick chrome, No. 2 has Lubrite finish. Oil ring is segmented spring steel with chrome face on rails.

Ring	Width	End Gap	Side Clearance
Compr. (1)	078"	.016-.026"	.0015-.0030"
Compr. (2)	.078"	.013-.025"	.0015-.0035"
Oil	184"	.015-.035"	.0015-.0085"

Installing Rings - Step or chamfer on upper compression ring and letter "T", dot, or word "TOP" on lower compression ring toward the top.

Replacement Rings: Std. and 005", .010", .020", .030" Oversize

CONNECTING ROD

Length - 6 63" (center-to-center)

Crankpin Journal Diameter - 2.2492-2.2502".

Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims

Clearance - 0005-.0025"

Sideplay 006 011"

Replacement Bearings: Std 001" and 002" Undersize

Installing Rods: Pistons have "F" marks and one notch (10 0 1 & 10 5-1 ratios) two notches (8 6 1 ratio) on front Install rods so that LARGE machined boss at lower end of rod on same side as "F" mark and notch in piston (Left bank cyls 1 3 5 7) on opposite side of piston from "F" mark and notch (Right bank cyls 2-4 6 8) Install assemblies in engine with "F" marks and notches on piston toward front of engine and oil groove in lower end of rod toward center of engine

CRANKSHAFT

Journal Diameter - 3 000" Five bearings.

Bearings - M-400 (No 4) Durex 100-A (Others) Steel backed inserts, precision type, no shims.

Clearance - 0005- 0025" (Front), 0005- 003" (All Others)

End Thrust: Taken by No 4 (rear center) main bearing

End Play - 0035- 0085"

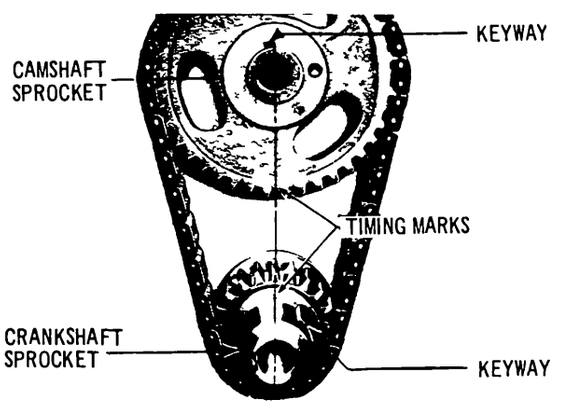
Replacement Bearings: Furnished Std and 001", .002" Undersize

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data*

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data*

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PONTIAC VALVE TIMING MARKS

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CAMSHAFT

►*CAMSHAFT IDENTIFICATION & APPLICATION NOTE:* Different camshafts used on these engines identified by number stamped on end of shaft as follows

Engine	Camshaft No.
Synchro-mesh Engines	1
Hydra-Matic 3-Speed Engines	0
425E Engines (All Trans.)	0
Hydra-Matic 4-Speed Engines ①	4
425A Engines	6

① - Also used on Synchro-mesh Engines C4,P4,R2 R2*, RC4

Journal Diam. - 1.8987-1.8997" Five bearings
Clearance - .0015-.0030"
End Thrust - Taken by thrust plate behind camshaft sprocket
Endplay - .003-.007",
Timing Chain: **Length** 60 links **Width** .88" (Morse), 1" (Link Belt) **Pitch** .375"
►*TIMING CHAIN REMOVAL CAUTION.* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons or both will result due to piston striking valve. To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage
Camshaft Setting: Both sprockets marked "O" Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data*
Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data*
Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters

Valves	Head Diam.	Stem Diam.	Length
Intake	1.88"	.3407-.3414"	①4.85"
Exhaust	1.60"	.3402-.3409"	②4.84"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°③	⑤	.0016-.0033"
Exhaust	45°④	⑤	.0021-.0038"

① - 4.89" on 425A Engines ② - 4.87" on 425A Engines
③ - Valve Face Angle 29° ④ - Valve Face Angle 44°
⑤ - .33" (Synchro-mesh Camshaft), .37" (425E & Hydra-Matic 3-Speed Camshaft), .40" (425A & Hydra-Matic 4-Speed Camshafts)

Valve Seat Width - .045-.071" Intake, .048-.070" Exhaust
Replacement Valves: Furnished Std., .001", .003", .005" Oversize stems
Valve Stem Oil Seals: Used on all valves as follows
Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup)
Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks)
Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data*
Valve Springs: Single or double (Inner and outer) springs used as follows

Spring Specifications

①**Synchro-mesh Engine Camshaft**

Valve	Pressure	Length
Closed	80 lbs.	1.53"
Open	171 lbs.	1.20"

②**425E & Hydra-Matic 3-Speed Camshaft**

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 26 lbs.	1.48"	Closed 58 lbs.	1.53"
Open 61 lbs.	1.11"	Open 107 lbs.	1.16"

③**Hydra-Matic 4-Speed Camshaft**

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"
Open 64 lbs.	1.08"	Open 114 lbs.	1.12"

④**425A Engine Camshaft**

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 32 lbs.	1.48"	Closed 62 lbs.	1.52"
Open 96 lbs.	1.08"	Open 131 lbs.	1.12"

① - *See "Camshaft Identification & Application Note"*
Valve Guides: Cast integral with cylinder head
Valve Stem Clearance in Guide: .0021-.0038" (Intake), .0026-.0043" (Exhaust). Oversize reamers ream guides to next oversize
Hydraulic Lifters: Standard on all models
Diameter - .8424-.8427" **Length** - 2"
Clearance in Lifter Boss - .0013-.0028"
Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data*
Rocker Arms: Mounted individually on studs pressed into cylinder head.
Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15-25 ft. lbs. torque
Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

VALVE TIMING

See 'Camshaft Setting" and 'Camshaft Identification & Application Note' under CAMSHAFT above

①**Synchro-mesh Camshaft**
Intake Valves - Open 14° BTDC. Close 58° ALDC.
Exhaust Valves - Open 48° BLDC. Close 24° ATDC.

②**425E & Hydra-Matic 3-Speed Camshaft**
Intake Valves - Open 22° BTDC. Close 67° ALDC.
Exhaust Valves - Open 63° BLDC. Close 27° ATDC.

③**Hydra-Matic 4-Speed Camshaft**
Intake Valves - Open 30° BTDC. Close 63° ALDC.
Exhaust Valves - Open 77° BLDC. Close 25° ATDC

④**425A Engine Camshaft**
Intake Valves - Open 29° BTDC. Close 74° ALDC.
Exhaust Valves - Open 82° BLDC. Close 31° ATDC.
① - Marked "1". ② - Marked "O"
③ - Marked "4". ④ - Marked "6".

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM* *See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data*
Crankcase Capacity: 4 qts. refill, add 1 qt. when changing filter element
Normal Oil Pressure: 30-40 lbs. at 2600 RPM
Pressure Regulator - In oil pump body. Not adjustable
Oil Pump Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump
Pump Overhaul - *See "Oiling System" in Pontiac Special Data*
Oil Filter: Full-flow type. Replace element every 15,000 miles or once a year. Use only AC No. PF-7 filter element
Crankcase Ventilation: Standard Cars - Filter elements in oil filler caps in each rocker arm cover, and ventilator pipe at engine rear. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. Re-oil with engine oil
Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section*
Oil Pressure Indicator: Warning light on instrument panel controlled by pressure switch on oil filter pad. Light goes on when ignition turned on, goes out when oil pressure reaches 5 lbs. ±1.5 lbs.
►*LOW OIL PRESSURE CORRECTION* If oil pressure indicator remains on, clean oil pump thoroughly. Dirt or chips may be lodged in oil pressure regulator ball seat.

ENGINE COOLING SYSTEM

Water Capacity: 18½ qts., add 1 qt. for heater
Pressure Valve: Radiator filler cap 12-15 lbs. (Std.), 14-17 lbs. (Air Cond.)
Thermostat: Pellet type, in water outlet passage in intake manifold. 170°F (Pontiac No. 3148225) Std., 180°F (No. 3149016) Optl. for use with permanent anti-freeze
Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly
Temperature Gauge: Two-light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 113°±2°F, RED light remains off during normal engine operation but will come on when engine temperature reaches 238°±2°F. *NOTE* - Red light will light up when ignition switch turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine is started)
Engine Unit - Delco-Remy No. 1993521 (Std.), No. 1993522 (Air Conditioning)

LUBRICATION

HYDRA-MATIC 3-SPEED & 4-SPEED TRANSMISSION LUBRICATION: Check fluid level every 2,000 miles, drain and refill every 25,000 miles (remove and clean oil pan and replace oil intake strainer). Use only Automatic Transmission Fluid, Type A, Suffix A
Checking Fluid Level: With car on level floor and transmission at normal operating temperature, run engine at idle speed with selector lever in "P" (Park) position. Check fluid level on dipstick at right rear of engine. Add fluid as necessary to bring level to "Full" mark on dipstick. DO NOT OVERFILL. *NOTE* - When transmission cold, fluid level should be at "Add" mark on dipstick. 1 pint required to raise level from Add to Full mark. Use only Automatic Transmission Fluid Type A, Suffix A
Capacity (3-Speed) - Approx. 4½ qts. (after draining) 8½ qts. (after overhaul)
Capacity (4-Speed) - Approx. 10 qts. (after oil pan & torus drained), 10½ qts. (after overhaul).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series No.	Body Style No.
2-Door Coupe (Std.)	21	27
2-Door Coupe (Custom)	21	17
4-Door Sedan	21	19
4-Door Station Wagon	21	35

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar post and on pad on front face of cylinder block (4 Cyl.), on front face of right cylinder bank (V8). *See also Engine Production Code Number below.* Number (example below) includes identification data.

① ② ③ ④
1 61 P 1001

① - Series. 1 21 (Tempest).
② - Year. 61 1961.
③ - Assembly Plant. P Pontiac, S South Gate.
④ - Beginning vehicle number

Engine Production Code Number: Stamped on pad on front face of cylinder block (4 Cyl.), on front face of right cylinder bank (V8). *Do not confuse this number with Serial and Engine Number.*

►*ENGINE IDENTIFICATION LETTER CODE:* Twelve different engine combinations used. Letter Code (DA, DS etc.) stamped on small pad directly below Engine Production Code Number. Letter code indicates various items of equipment used in a particular engine

TUNE-UP

►*ACCELERATION STUMBLE, LEANNESS, OR STALLING DURING WARM-UP: See MANIFOLD HEAT CONTROL below for recommended correction.*

COMPRESSION PRESSURE (4 Cyl.): 140-160 lbs. (8.6-1 ratio), 155-165 lbs. (10.25-1 ratio) at 155-165 RPM. Lowest cylinder must be within 80% of highest cylinder.

VALVE TAPPET CLEARANCE: Zero lash (hydraulic).

MANIFOLD HEAT CONTROL: 4 Cyl. - Thermostatic coil spring type in exhaust manifold outlet. Make sure valve operates freely. **V8** - None used.

►*THERMOSTATIC SPRING CHANGE TO CORRECT ACCELERATION STUMBLE DURING COLD WEATHER:* On cars before Engine No. 71188, install new slower-opening spring, No. 531972, to replace No. 539233. This spring used on later cars.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

►*POOR IDLING CORRECTION (POSITIVE CRANKCASE VENTILATION CARS):* Replace old crankcase ventilator outlet valve with new valve, Pontiac Part No. 5647362.

IGNITION

FIRING ORDER: 4 Cyl. - 1-3-4-2. **V8** - 1-8-4-3-6-5-7-2.

Cylinders (V8) - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs (4 Cyl.) - AC 45S. 14mm. Torque to 25 ft. lbs.

Spark Plugs (V8) - AC 45FFS. 14mm. Torque to 15-20 ft. lbs. *CAUTION - Use thread lubricant.*

COIL: Delco-Remy 1115138 (4 Cyl.), 1115136 (V8).

Ignition Current - 3.4 amps. idling, 3.5 amps. stopped (1115138); 2.1 amps. idling, 3.7 amps. stopped (1115136).

Resistor - Resistance wire (1.80 ohms) integral part of wiring harness connected in circuit between coil and spliced to IGN. 1 terminal of ignition switch at temperature and oil indicator feed. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Delco-Remy 1110254 (4 Cyl. 8.6-1 ratio); 1110261 (4 Cyl. 10.25-1 ratio), 1110977 or 1110983 (V8). Window type with external adjustment.

Condenser - Delco-Remy No. 1928111. **Capacity** - .18-.23 mfd.

Contact Point Set - Delco-Remy.

Breaker Gap - Gap (.016") will be correct when cam angle correctly set.

Cam Angle (4 Cyl.) - 74-76°. Set at 75°. Will give .016" breaker gap.

Cam Angle (V8) - 28-32°. Set at 30°. Will give .016" breaker gap.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise (4 Cyl.), clockwise (V8) viewed from above.

Automatic Advance - 1110254

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
7.5-9.5	1000	15-19	2000
12-14	2125	24-28	4250

Automatic Advance - 1110261

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
7-9	1000	14-18	2000
9-11	1875	18-22	3750

Automatic Advance - 1110977, 983

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	500	0-4	1000
6.5-8.5	1050	13-17	2100
12-14	1850	24-28	3700

Vacuum Spark Control: Delco-Remy No. 1116173 (1110254 & 1110261 Distr.), 1116182 (1110977 Distr.), 1116190 (1110983 Distr.). Integral type.

Vacuum Advance - 1116173

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	6-8
10	20	13-15

Vacuum Advance - 1116182, 190

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
Start	0	6-8
8	16	14.50-15.75

IGNITION TIMING

Setting - 6° BTDC (4 Cyl.), 5° BTDC (V8) at hot idle speed with vacuum line disconnected and manifold opening taped closed.

Timing Marks (4 Cyl.) - Pointer on engine front cover and TDC & 6° BTDC (top mark) on vibration damper.

Timing Marks (V8) - Mark on vibration damper to be aligned with 5° mark cast in block.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester B or BC 1-Barrel Standard on 4 Cyl., Rochester 4GC 4-Barrel Optional. Rochester 2GC 2-Barrel used on V8.*

►*ROCHESTER "B" OR "BC" SINGLE BARREL CARBURETOR LEAN DURING WARM-UP (AUTO. TRANS.) OR STUMBLE AT PART THROTTLE (SYNCHRO-MESH TRANS.): See Manifold Heat Control thermostatic spring change (above).*

►*ROCHESTER 4-BBL. CARBURETOR SURGE CORRECTION:* A surge condition when operating under a load at cold temperature may be corrected by replacing jets. *See "Rochester 4GC 4-Bbl. Carburetors" in Carburetion Section.*

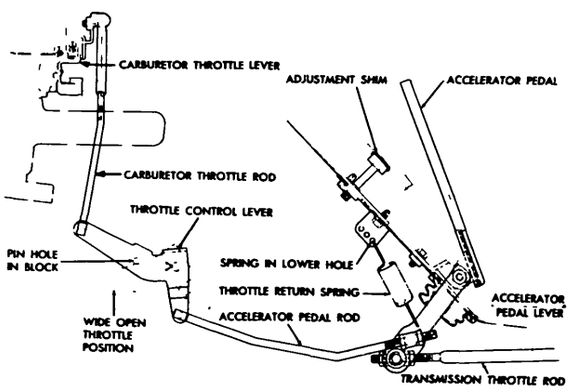
►*ROCHESTER 4GC 4-BARREL CARBURETOR STALLING OR LEANNESS DURING WARM-UP OR STUMBLE ON ACCELERATION:* Change Choke Setting to 1 Notch Rich and increase fast idle speed to 2800 RPM (Synchro-mesh Cars), change Choke Setting to 2 Notches Rich (Auto. Trans. Cars). On early carburetors, install new Choke Piston, No. 7020357, to replace piston No. 7019552. On Synchro-mesh Cars, also see Manifold Heat Control Thermostatic Spring Change (above). *NOTE - Carburetors marked "B" or later on identification tag have later type Choke Piston installed.*

THROTTLE LINKAGE ADJUSTMENT: *FOLLOWING PROCEDURE SUPERSEDES PREVIOUSLY PUBLISHED PROCEDURES:*

1) With carburetor throttle wide open, insert ¼" gauge pin, Tool J-7687 (4 Cyl.), J-9257 (V8), in hole in block directly above throttle control lever (see illustration), Adjust carburetor throttle rod (loosen locknut and turn fitting at upper end) so that upper surface of throttle control lever is against pin, then remove gauge pin.

2) Measure height of accelerator pedal stop (under pedal) and adjust as necessary by loosening locknut and turning stop up or down for height of 1 11/16" from toe pan. Tighten locknut securely. Install .060" shim on top of pedal stop, hold or block accelerator pedal down against shim on stop.

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TEMPEST THROTTLE LINKAGE
4 CYL. (V8 SIMILAR)

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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3) With pedal down against shim on stop, adjust trunnion on transmission throttle rod (loosen one nut and tighten opposite nut) so that transmission throttle valve lever is against wide open throttle stop in transmission *(this is a positive stop - do not confuse this with detent resistance)*. Adjust trunnion on throttle control so that carburetor throttle valve is in wide open position. Check to make certain that carburetor and transmission throttle valve lever reach wide open throttle position at the same time. Remove shim from accelerator pedal stop.

4) Check setting by running engine and slowly moving selector lever to "L" position. If engine speed increases, readjust linkage.

►*THROTTLE CONTROL LINKAGE SPLASH SHIELD:* Splash shield package Pontiac Part No. 541713 available for protection of throttle control linkage (will not protect T.V. linkage under body floor).

THROTTLE RETURN CHECK ADJUSTMENT (4 CYL): Set fast idle adjustment (4 Bbl.), slow idle adjustment (1 Bbl.), then place transmission in neutral. With engine running, disconnect vacuum hose from throttle return check and plug end of vacuum hose. Adjust contact screw of throttle return check to obtain 1175 RPM (1 Bbl.), 1050 RPM (4 Bbl.). *NOTE - Hold sleeve next to diaphragm to prevent turning while adjusting contact screw.*

ANTI-STALL DASHPOT ADJUSTMENT (V8): With throttle linkage and idle speed correctly set, place idle speed adjusting screw on high step of fast idle cam. Adjust dashpot plunger to obtain a clearance of .000-.010" between plunger and throttle lever.

ROCHESTER B & BC

Mod l — **Rochester Carburetor No.**

Synchro-mesh (Manual Choke)..... B 7019061

Automatic Trans. (Automatic Choke).....BC 7019062

►*LEANNESS DURING WARM-UP & PART THROTTLE STUMBLE CORRECTION: See CARBURETOR above.*

Idl S tting - Initial setting 1½ turns open. Turn screw out for richer mixture.

Idl Sp ed - 680-700 RPM (Synchro-mesh with Air Conditioning Off); 580-600 RPM (Auto. Trans. in "D"); 630-650 RPM (Auto. Trans. in "D" and Air Conditioning Off);

Fl at L v l - 1 9/32" (Gauge J-9190) with air horn inverted and gasket in place. To adjust, bend float arms.

Float Drop - 1¾" (Gauge J-9190) from gasket surface to bottom of float with air horn upright and float hanging free. To adjust, bend float tang.

Fast Idl : No adjustment, will be correct when hot or slow idle correctly set.

Automatic Ch k Setting: 2 Notches Rich (supersedes previous Centered Setting).

Thr ttle Linkag Adjustm nt: *See CARBURETOR above.*

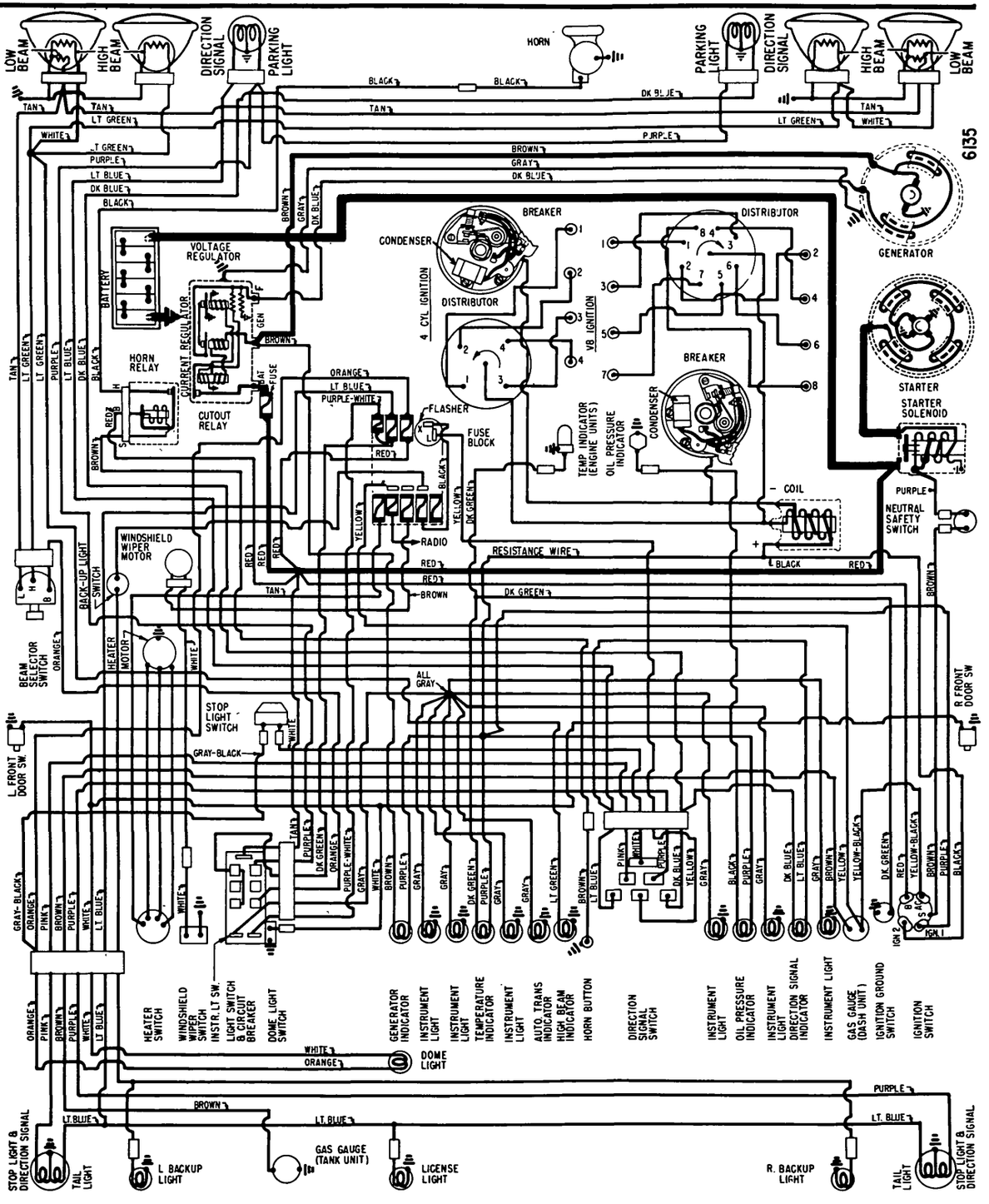
►*OTHER DATA: See "Rochester B & BC Carburetors" in Carbur tion Section.*

ROCHESTER 2GC 2-BARREL

R ch ster 2GC N . 7019863 (Synchro-mesh), No. 7019860 (Automatic). Downdraft type with automatic choke.

►*CHOKE SETTING "TAILORING" FOR CLIMATE AND TEMPERATURE CONDITIONS:* Moving intermediate rod to next OUTER hole (away from choke shaft) will provide richer mixture during warm-up for acceleration

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or load. Moving intermediate rod to next INNER hole will provide leaner mixture under same operating conditions.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8., LEFT barrel feeds 1-4-6-7.*

Idl Setting - Initial setting 1½ turns open. Turn screw out for richer mixture.

Idl Speed - 580-600 RPM with Auto. Trans. in "D" and Air Conditioning Off.

Fl at Level - 1 17/64" (Gauge J-9191). With air horn inverted and gasket in place, gauge should be over float so it rests against pump side of power piston shaft with outer leg in line with center of float. To adjust, bend float arm.

Fl at Drop - 1 29/32" (Gauge J-9191) distance from gasket to bottom of float with air horn upright and gasket in place. To adjust, bend float tang.

Fast Idle: No adjustment, will be correct when hot or slow idle correctly set.

Aut matic Choke Setting: At index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

R chester 4GC No. 7019079 (Synchro-mesh). No. 7019066 (Auto. Trans.). Optional on 4 Cyl. Engine.

►*STALLING OR LEANNESS DURING WARM-UP OR STUMBLE ON ACCELERATION CORRECTION: S e CARBURETOR above.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor FRONT barrels feed Cyls. 2 & 3, REAR barrels feed 1 & 4.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body is used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Rochester 4GC Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fu l Pump: AC No. 4843 (4 Cyl.), 4827 (V8). Fuel only.
Pressure - 4-5¼ lbs. at 1800 RPM.

Fu l Filter: AC No. GF-61 (4 Cyl.), No. GF-67 (V8 & 4 Cyl. 4-Bbl.). GF-61 filter integral in carburetor fuel inlet. Replace at 15,000 miles intervals. GF-67 (2 & 4-Bbl.) filter disposable type in carburetor inlet line. Replace at 10,000 miles intervals.

Gasoline Gauge: AC Electric.
Dash Unit - AC No. 5643436.
Tank Unit - AC No. 5641735 (Std.), 5641843 (V8 with Air Cond.).

Air Cleaner: Oil-wetted mesh type used on 4 Cyl. with 1-Bbl. Carb. Oil-wetted polyurethane type used on all other options.

►*POLYURETHANE ELEMENT CLEANING CAUTION:* Clean element every 15,000 miles or sooner if needed. Wash in kerosene and oil with SAE 10W-30 oil. *Squeeze element, DO NOT WRING.*

BATTERY

D lc N . 454. 12 volt, 9 plate 42 ampere hour capacity (20 hr. rate).

►*HEAVY DUTY BATTERY CAUTION: Delco-Remy Battery No. 459 must be used with 35 amp. generator and double contact voltage regulator. S e below.*

Battery Ground - Negative.

Engine Ground - To crossmember on each side of engine.

STARTER

Delco-Remy No. 1107796 (4 Cyl.), 1108303 (V8).

Armature - Delco-Remy No. 1932185 (1107796 Str.), 1935829 (1108303 Str.).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 40 ozs. min. (1107796 Str.), 35 ozs. min. (1108303 Str.).

Performance Data - 1107796

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data - 1108303

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy No. 1116590 Ignition & Starter Switch Assembly controls Delco-Remy Solenoid No. 1119798 (4 Cyl. exc. AC), No. 1114257 (V8). Solenoid mounted on starter.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998717 (Auto. Trans.), 1993530 (Synchro-mesh). Located on steering column behind instrument panel. Back-up light switch located on transmission case (Synchro-mesh).

Adjustment - *See "Pontiac Tempest Transaxle" in Transmission Section.*

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION: Battery Charging Circuit protected by 45 amp. fuse, No. 1945172, clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnoising generator, regulator, or battery failure.*

Delco-Remy used as follows:

Model	Generator No.
4 Cyl.	1102224 (Early), 1102266 (Late)
V8	1102237 (Early), 1102267 (Late)
Heavy Duty (35 amp.)	1105145

►*HEAVY DUTY GENERATOR NOTE: Generator No. 1105145 requires double contact Regulator No. 1119641.*

Performance Data

Generator	Amperes	Volts	RPM
1102224, 37	30	14.0	2240
1102266, 67	30	14.0	2310
1105145	35	14.0	1730

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 amps. (1102224, 37). 1.48-1.62 amps. (1102266, 67), 2.73-3.0 amps. (1105145) at 12 volts and 80°F.

Belt Adjustment: ¼" deflection with approximately 5-6 lbs. pressure midway between pulleys; or 70-75 lbs. pressure with Burroughs Gauge.

GENERATOR REGULATOR

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Delco-Remy No. 1119263 (All exc. 1105145 G n.), 1119641 (1105145 Gen.), 1119663 (Sp cial - see N te).

►*REGULATOR 1119663 NOTE: See HEADLIGHTS DIMMING CORRECTION in Miscellaneous Electrical (below) for use of this regulator.*

►*REGULATOR CAUTION: Regulators 1119641 & 1119663 are Double Contact type and must be used with generators listed. DO NOT interchange regulators. NOTE - Specifications below are for "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119263), 11.8-13.0 volts (1119641, 63), hot.

Contact Gap - .020".

Air Gap - .020" with contacts just closed.

Voltage R gul t r

Setting (1119263) - 13.8-14.7 volts at 125°F ambient temperature.

Setting (1119641) - 13.5-14.4 volts (upper contacts), .1-.3 volt lower (lower contacts) at 125°F ambient temperature.

Setting (1119663) - 13.8-14.6 volts (upper contacts), .1-.3 volt lower (lower contacts) at 125°F ambient temperature.

Contact Gap (1119641, 63) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (1119263), .067" (1119641,63) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119623) - 27.0-31.0 amps. at 125°F ambient temperature.

Setting (1119641) - 31.0-35.5 amps. at 125°F ambient temperature.

Setting (1119663) - 27.0-33.0 amps. at 125°F ambient temperature.

Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy 1119600 (Double Contact) Regulators" and "D lco-Remy 1119000 Series Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*HEADLIGHTS DIMMING OR FLICKER CORRECTION:* On car equipped with standard 30 ampere generators, if trouble not corrected by usual corrective procedure, replace single contact regulator, No. 1119263, with Double Contact Regulator No. 1119663. *S e specifications above.*

Headlights: 4-Headlight system.

Direction Signals: Switch located on steering column jacket behind instrument panel. To remove switch, loosen clamp screw and remove control cable assembly from switch. To install, reverse removal procedure, making sure switch and lever are in neutral position before tightening switch clamp screws.

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Lighting Switch Removal: Unhook one battery cable. Pull headlight switch to "ON" position. Push latch button on bottom of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly allowing switch to be removed from instrument panel.

Instrument Cluster Removal: Disconnect battery. Remove upper and lower retaining screws, and remove screws from lower steering column bezel. Remove speedometer cable. Pull cluster and housing out from instrument panel opening to gain access to wiring. Remove bulbs and wiring. Remove retaining screws (cluster-to-housing). To install, reverse removal procedure.

Speed meter Removal: Remove instrument cluster (see above) then remove all speedometer head retaining screws. Remove speedometer. To install, reverse removal procedure.

Fuel Gauge Removal: Remove instrument cluster (see above) then remove wire connector and bulb. Remove retaining screws, then remove gauge. To install, reverse removal procedure.

Stop Light Switch Location & Adjustment: Mechanical type located on bracket attached to steering column behind instrument panel. To adjust, loosen locknut and position switch thread 3/16" to pedal arm with brake released. *NOTE - Switch must not restrict pedal pedal action.*

CIRCUIT BREAKER: 22 Ampere - Headlights, High Beam Indicator, Parking & Tail Lights. In Headlight Switch. *NOTE - Tail lights also protected by 9 ampere fuse on fuse block.*

FUSES: *All fuses located on fuse block on left side of dash inside car.*

25 Amp re - Windshield wiper & washer, Parking brake warning light.
20 Ampere - Direction signals and back-up lights.
20 Amp re - Cigar lighter.
20 Ampere - Heater & Air Conditioner blowers.
9 Amper - Tail and License lights.
9 Amp re - Dome and Stop lights.
4 Amp r - All instrument panel lights.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extrem care when disconnecting any part of air conditioning equipment or lines for access to engine. See "Air Conditioning Service Cautions" in Miscellaneous Section.*

ENGINE SPECIFICATIONS: Own. Two engines used as follows:

4 Cylinder - Valve-in-head Inclined 45° to right
V8 Engin - Valve-in-head Aluminum block and cylinder head with cast-in (non-replaceable) cylinder liners.

Engine	B r	Stroke	Displacement
4 Cyl.	4 1/16"	3 3/4"	195 cu. ins.
V8	3 50"	2.80"	215 cu. ins.

Engine	Compr.Ratio	Rated HP	Developed HP
4 Cyl. (1-Bbl.)④	8.6-1	26 4	110 at 3800 RPM
4 Cyl.(1-Bbl)①	10.25-1	26 4	120 at 3800 RPM
4 Cyl.(1-Bbl.)②	10 25-1	26 4	140 at 4400 RPM
4 Cyl.(4-Bbl.)③	10.25-1	26.4	155 at 4800 RPM
V8 (2-Bbl.)	8 8-1	39.2	155 at 4400 RPM

① - **OS** Engine. ② - **OA** Engine. ③ - **XS & XA** Engines. ④ - **DA & DS** (Domestic) Engines, **ZS & ZA** (Export-7.6-1 ratio) Engines.

►*ENGINE IDENTIFICATION LETTER CODE NOTE: Located below Engine Production Code No. See Engine Identification above.*

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Drain crankcase. On 4 Cyl., remove exhaust crossover pipe, flywheel housing front shield, and lower cover. On all cars, remove front crossmember assembly as follows: *NOTE - Crossmember assembly includes entire front suspension system.* Raise car, support crossmember and install an engine support Remove wheels. Disconnect tie rod ends, engine mounts, engine ground straps, and brake lines at crossmember. Remove fuel line from clip on crossmember. Remove retaining bolts and remove crossmember assembly. Remove attaching bolts and remove oil pan.

Installation - Reverse removal procedure. Tighten crossmember retaining bolts to 70-85 ft. lbs., engine front mounts to 30-45 ft. lbs., tie rod end nuts to 55 ft. lbs. (do not back off nut when aligning holes for cotter pin). Tighten V8 oil pan bolts to 6-15 ft. lbs. and use special bolt thread lubricant.

V8 ENGINE

See "Buick Special" car model pages for all data on this engine. NOTE - For engine removal, see "Engine" in Pontiac Special Data.

4 CYLINDER ENGINE

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, cam ground, slipper type with steel struts, tin plated. *NOTE* - 8.6-1 ratio pistons have dished head, two notches in front of piston, and "L" on rear of piston near pin boss, and must not be used in 10.25-1 ratio engines. Pistons for these engines have reliefs machined in piston head for valve clearance and have a notch in front of piston

Fitting New Pistons - Measure piston skirt perpendicular to piston pin boss (pin removed) and 1¼" below oil ring groove. Micrometer must be in full contact. Clearance between piston and cylinder bore .0007-.0013" (actually measured).

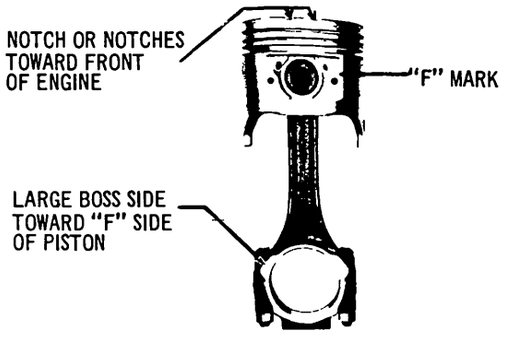
Installing Pistons: Install pistons with notch or notches in piston head and "F" mark on piston boss toward front of engine. *See Rod Installation.*

Replacement Pistons: Furnished Std. (4.060", 4.061", 4.062", 4.063" "Flat" or "Recessed Top") and .005", .010", .020", and 030" oversizes.

PISTON PIN

Diameter - 9802" **Length** - 3.25".
Clearance in Piston - .0003-.0005" loose.
Clearance in Rod - .0008-.0016" interference fit. Pin is a press fit in rod.
Piston Pin Removal & Installation - *See "Piston Pins" in Pontiac Special Data.*

Replacem nt Pins: Furnished Std. and .001", .003" oversize



PISTON & ROD ASSEMBLY

PISTON RINGS

Compression rings are cast iron, taper faced. No. 1 has thick chrome, No. 2 has Lubrite finish. Oil ring is segmented spring steel with chrome face on rails.

Ring	Width	End Gap	Side Clearanc
Compr. (1)	.078"	.016-.026"	.0015-.0030"
Compr. (2)	.078"	.013-.025"	.0015-.0035"
Oil	.184"	.015-.035"	.0015-.0085"

Installing Rings - Step or chamfer on upper compression ring and letter "T", dot, or word "TOP" on lower compression ring toward the top.

Replacement Rings: Std. and .005", 010", .020", .030" Oversize.

CONNECTING ROD

Length - 6 63" (center-to-center)
Crankpin Journal Diameter - 2.2492-2.2502".
Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims.
Clearance - .0005-.0025".
Sideplay - .0045-.0085".

Replacement Bearings: Std. and 001" & .002" undersize.

Rod Installation: Install rods in pistons so that LARGE machined boss at lower end of rod is on same side as "F" mark on piston and toward front of engine.

CRANKSHAFT

Journal Diameter - 3.000". Five bearings.
Bearings - M-400 (No. 4) Durex 100-A (Others) Steel backed inserts, precision type, no shims.
Clearance - .0005-.0025" (Front), 0005-.003" (All Others).

End Thrust: Taken by No. 4 (rear center) main bearing.
End Play - .0035-.0085".

Replacement Bearings: Furnished Std. and 001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data*

Vibrati n Damp n r R m val & Installati n: *See "Vibration Dampener" in Pontiac Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CAMSHAFT

►*CAMSHAFT APPLICATION NOTE: Special camshaft No. 539099 used on engines marked OA, XS & XA. No. 537995 used on all other models.*

Journal Diameter - 1.8987-1.8997". Five bearings.

Clearance - .0015-.0030".

End Thrust - Taken by thrust plate behind camshaft sprocket.

Endplay - .003-.007".

Timing Chain: Length - 60 links.

Timing Chain Tensioner - Consists of a fixed bumper on drive side of front face and a spring loaded bumper on slack side of timing chain. *See "Timing Chain" in Pontiac Special Data.*

►*TIMING CHAIN REMOVAL CAUTION:* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons or both will result due to piston striking valve. To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage.

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valves	Head Diam.	Stem Diam.	Length
Intake	1.88"	3407-.3414"	4.85"
Exhaust	1.60"	3402-.3409"	4.84"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30° ①	③	.0021-.0038"
Exhaust	45° ②	③	.0026-.0043"

① - Valve face angle 29°. ② - Valve face angle 44°.
③ - .33" Synchro-mesh; .40" Auto. Trans.

Valve Seat Width - .048-.070".

Replacement Valves: Furnished Std., .001", .003", .005" Oversize stems.

Valve Stem Oil Seals: Used on all valves as follows:

Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup).

Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks).

Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Single or double (inner and outer) springs used as follows:

Spring Specifications
(DS,DA,ZS,ZA,OS - Std. Camshaft Engs.)

Valve	Pressure	Length
Closed	80 lbs.	1.53"
Open	171 lbs.	1.20"

(OA,XA,XS - Spec. Camshaft Engs.)

Inner Spring		Outer Spring	
Pressure	Length	Pressure	Length
Closed 26 lbs.	1.48"	Closed 60 lbs.	1.52"
Open 64 lbs.	1.08"	Open 114 lbs.	1.12"

Valve Guides: Cast integral with cylinder head. *NOTE* - Ream guides for next oversize using tools No. J-5830-1 (.003" OS), and J-6621 (.005" OS).

Hydraulic Lifters: Standard on all models.

Diameter - .8424-.8427". **Length** - 2".

Clearance in Lifter Boss - .0013-.0028".

Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15-25 ft. lbs. torque.

Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

VALVE TIMING

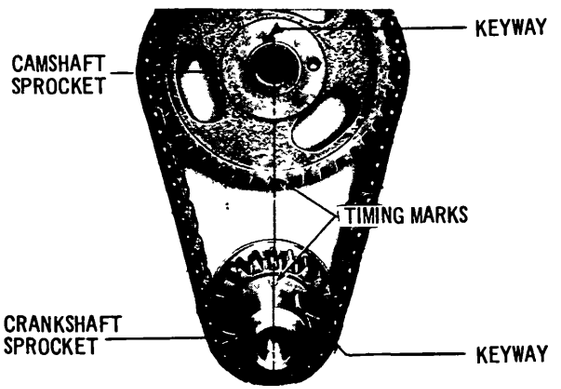
See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications
(DS,DA,ZS,ZA,OS - Std. Camshaft Engs.)

Intake Valves - Open 14° BTDC. Close 58° ALDC.
Exhaust Valves - Open 48° BLDC. Close 24° ATDC.

(OA,XA,XS - Spec. Camshaft Engs.)

Intake Valves - Open 30° BTDC. Close 63° ALDC.
Exhaust Valves - Open 77° BLDC. Close 25° ATDC.



VALVE TIMING MARKS

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.

Normal Oil Pressure: 30-40 lbs. at 2600 RPM.

Pressure Regulator - In oil pump body, not adjustable.

►*LOW OIL PRESSURE CORRECTION:* If oil pressure indicator flickers or remains ON, dirt or chips may be lodged in oil pressure regulator ball seat. To correct, clean oil pump thoroughly.

Oil Pump: Spur gear type. 4 Cyl. pump located on right rear lower face of cylinder block and driven by distributor drive gear. V8 oil pump located in timing chain cover.

Pump Overhaul - *See "Oiling System" in Pontiac Special Data.*

Oil Filter: AC PF-7. Full Flow Type. Replace element every 15,000 miles or sooner if needed.

Crankcase Ventilation (Standard Cars): Filter elements located in oil filler cap on left rocker arm cover (V8), front of rocker arm cover (4 Cyl.). Oil baffles in rocker arm cover prevent oil from being exhausted with air through vent pipe. Clean filter element every 12,000 miles or sooner if needed by washing in solvent, blowing dry and re-oiling.

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

Oil Pressure Indicator: Warning light on instrument panel controlled by switch in oil filter pad (4 Cyl.), in oil pump cover (V8). Light goes on when ignition turned on, goes out when oil pressure reaches 5±1½ lbs. *NOTE - If light remains on or flickers, clean oil pump thoroughly. See-LOW OIL PRESSURE CORRECTION above.*

ENGINE COOLING SYSTEM

Water Capacity: 11½ qts., with heater 12½ qts., add ½ qt. with Air Conditioning.

Pressure Valve: Radiator filler cap 14-17 lbs.

Thermostat: Pellet type in water outlet passage in intake manifold. Std. 170°F (Pontiac No. 3148225), Optl. 180°F (Pontiac No. 3149016) for permanent anti-freeze.

Water Pump: Packless, sealed double row ball bearing shaft. Service as an assembly.

Temperature Gauge: Warning light on instrument panel goes on when ignition turned on. When engine temperature reaches 248°F the light goes off. Service thermal switch by replacement.

Engine Unit - Delco-Remy No. 1993508 (4 Cyl. exc. A.C.), 1993513 (4 Cyl. with A.C.), No. 1993518 (V8).

LUBRICATION

TEMPEST TRANSAXLE LUBRICATION: Check each unit as follows:

Synchro-mesh Transmission: Check fluid level at 2,000 mile intervals. Use only SAE 80 or 90 "Multi-Purpose" gear lubricant. DO NOT use straight mineral oil or "active sulphur soap" type lubricants.

Checking Lubricant Level - Maintain lubricant level even with filler plug opening on left side of transmission case. **Capacity** - 2.8 pints.

Automatic Transmission: Check fluid level every 2,000 miles or each time chassis lubricated. No periodic drain or refill is recommended. To drain transmission for removal or overhaul, loosen filler tube attaching nut and allow case to drain.

Checking Fluid Level - *NOTE - On Sedans, dipstick located under access plate in trunk behind and slightly above spare tire; on Station Wagons, dipstick is in spare tire compartment.* Check with engine and transmission at normal operating temperature with selector lever in "N" (Neutral) position. Maintain fluid level at "Full" mark on dipstick (1 pint will raise level from "Add" to "Full" mark). DO NOT OVERFILL. Use Automatic Transmission Fluid Type A, Suffix A (Type A fluid may be used). **Capacity** - 6 pints (refill).

Differential Assembly: Check fluid level at 2,000 mile intervals. Use only SAE 80 or 90 "Multi-Purpose" gear lubricant. DO NOT use straight mineral oil or "active sulphur soap" type lubricants.

Checking Lubricant Level - Maintain lubricant level even with filler plug opening on left side of differential case below universal joint.

Capacity - 3 pints (refill).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	Ft. Lbs. 6 Cyl.	V8
Cylinder Head	46-50	55-65
Intake Manifold		26-30
Exhaust Manifold	25-30	25-30
Oil Pan	13-17	13-17
Main Bearing Caps	85-95	85-95
Flywheel	33-35	33-35
Vibration Damper	130-140	130-140
Connecting Rod Caps	28-32	52-54
Piston Pin Clamp Bolt	20-25	20-25
Camshaft Gear	20-22	20-25
Rocker Arm Support Bracket	13-17	13-17
Rocker Arm Cover	*19-21 Inch Lbs.*	
Engine Front Cover	13-17	13-17
Water Pump	13-17	13-17
Oil Pump	13-17	13-17
Oil Filter Cover	20-25	20-25
Engine Front Mount	20-25	20-25
Engine Rear Mount Bolt (S.M. & O.D.)	70-80	70-80
Engine Rear Mount Cage Bolt (S.M. & O.D.)	30-35	30-35
Engine Rear Mount Bolt (Auto. Trans.)	45-50	45-50
Engine Rear Mount Screw (Auto. Trans.)	45-50	45-50
Clutch Housing ①	28-32	28-32
Clutch Housing ②	13-15	
Transmission Mounting	60-70	60-70

① - To Cylinder Block.
② - To Engine Plate. Plate Dowel Bolt Nut 28-32 ft. lbs.

ENGINE

►*AIR CONDITIONED CAR CAUTION:* When removing engine, air conditioning compressor must first be removed from its mounting bracket. *See "Studebaker Air Conditioning" in Miscellaneous Section.*

6 CYLINDER ENGINE

ENGINE REMOVAL: Remove hood, radiator, battery and carburetor air cleaner. Disconnect heater hoses from water pump and cylinder head. Drain crankcase. Disconnect all lines, wires, cables, and hoses from engine. Remove clevis pin connecting accelerator cross shaft and bellcrank rod. Disconnect engine front mounts and engine ground strap from right front mount. Disconnect exhaust pipe from manifold (remove "U" clamp at clutch or converter housing bracket to lower pipe). Remove starter motor. Disconnect one end of right tie-rod, remove shaft from steering bellcrank, and move bellcrank to clear oil pan. Install engine lifting eyebolts in place of Nos. 15 & 20 cylinder head bolts and raise engine so weight is off the front mounts.

On automatic transmission cars, disconnect accelerator bellcrank-to-transmission rod. Remove converter housing lower plate and disconnect torque converter from drive plate. On all cars, remove clutch or converter housing attaching bolts and drive out dowel pins. Remove engine.

V8 ENGINE

ENGINE REMOVAL: Remove hood, upper air deflector, and fan shroud. Remove battery. On Hawk, remove fan blade assembly. On other cars, remove radiator and water pump manifold. On all cars, remove generator, starter, and exhaust crossover pipe. Turn wheels to extreme right (Hawk), remove steering bellcrank shaft (Others). Remove carburetor air cleaner, fuel pump-to-carburetor pipe, spark modifier pipe, and spark plug cable support brackets from rocker arm covers. Disconnect all hoses, lines, wires, and cables from engine. On automatic transmission cars, disconnect accelerator bellcrank rod at bellcrank. On all cars, disconnect both engine front mounts and engine ground strap. With a sling under intake manifold, raise engine to take weight off front mounts. Remove clutch or converter housing cover plate. Disconnect torque converter from drive plate. Disconnect clutch or converter housing from engine. Push engine forward to disengage clutch housing dowels and until transmission splines are clear. Remove engine.

OIL PAN

ALL ENGINES

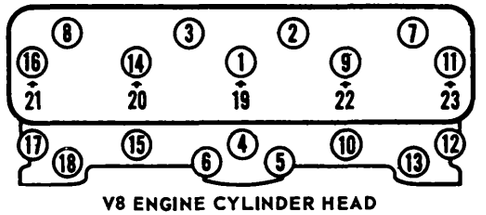
OIL PAN INSTALLATION: To install oil pan gaskets, filler block must be removed. Remove filler block attaching screws and carefully separate gasket and filler block. If gasket damaged, replace with correct portion of a new front cover gasket. Clean oil pan and mounting flanges of block and apply a sealer such as Perfect Seal to block flanges. Install oil pan gaskets. Install filler block on front cover and install one upper screw. Pry upward on filler block with a stick and install opposite upper screw. *This procedure will compress gasket ends and align filler block.* Install lower screws and tighten all screws until screw heads just engage lockwashers. Install oil pan, tighten mounting screws to specifications and then tighten filler block attaching screws securely.

CYLINDER HEAD & MANIFOLD

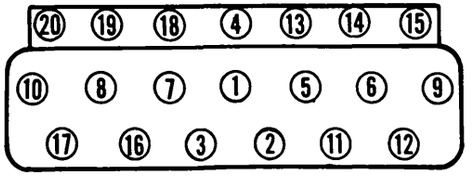
►*AIR CONDITIONED CAR CAUTION:* When removing cylinder head, air conditioning compressor must first be removed from its mounting bracket. *See "Studebaker Air Conditioning" in Miscellaneous Section.*

6 CYLINDER ENGINE

CYLINDER HEAD INSTALLATION: Insert dowel studs in capscrew holes Nos. 1, 15 & 17. Coat both sides of gasket with a thin coat of Perfect Seal, install gasket and place cylinder head over dowel studs. Coat capscrews with oil or graphite paste and install. Partially tighten all screws in sequence (see diagram), then again to specifications.



V8 ENGINE CYLINDER HEAD



6 CYL. ENGINE CYLINDER HEAD

V8 ENGINE

CYLINDER HEAD INSTALLATION: *CAUTION - Right and left cylinder heads are interchangeable. Block off rear water pump port on both heads with a dummy plat and gasket. Heat indicator unit is mounted in left head dummy plate.* Coat gasket with Perfect Seal and install. Coat cylinder head capscrews with oil or graphite paste and install nine short screws in outer two rows of holes in head, five medium length screws in center row and tighten finger tight. Install pushrods. Install rocker arm assembly with the four long screws and tighten finger tight. Install rocker arm support bracket screws and tighten alternately to specifications. Tighten cylinder head screws to specifications in sequence shown in diagram. Complete reassembly.

ORIGINAL BORE & PISTONS

ALL ENGINES

ORIGINAL BORE & PISTON SIZES: Standard cylinder bores may vary from 3.0000" to 3.0025" (6 Cyl.), 3.5625" to 3.5645" (V8) oversize in .0005" increments (not more than .001" variation in any one block). Bore size is stamped on top face of cylinder next to bore. *Example: "25" on cylinder indicates bore size 3.0025" (6 Cyl.), 3.5625" (V8).* Replacement pistons furnished for these oversizes under the standard size part number and size is marked on top of piston.

PISTON PINS

ALL ENGINES

PISTON PIN: Removal - Place Removing & Installing Tool J-1293-C in a vise and place piston and rod assembly through tool. *CAUTION - Do not overtight n tool retaining nut as piston pin may be expanded.* Remove locknut and washer from piston pin clamp-screw and install on opposite end of screw. Tighten locknut to remove screw and then separate piston, pin, and rod.

Installation: Use Tool J-1293-C in same manner as for removal. Oil squirt hole in rod must be on solid side of piston. Clampscrew should be installed from slotted side of piston (all V8 pistons and 6 Cyl. pistons Nos. 1, 3, 5); from solid side of piston (6 Cyl. piston Nos. 2, 4, 6). Align flat surface of piston pin with flat surface of clampscrew. Tighten clampscrew locknut to specifications.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

REAR MAIN BEARING OIL SEAL INSTALLATION: Loosen intermediate bearing cap screws 2 turns nly to aid installation. Install seals as follows:

CONTINUED ON NEXT PAGE

CONTINUED FROM PRECEDING PAGE

Brumm r S al - With seal grooves in block and cap clean and dry, blunt sharp edge of flange at rear of block and carefully insert seal in block so wiping lip of seal contacting crankshaft points away from flywheel. Trim ends flush with block. Install seal in bearing cap and align with block seal. Apply oil to wiping edge of seal and install bearing cap making sure exposed part of seal smoothly straddles rear flange of bearing cap.

Cork Seals - Drive into grooves between sides of cap and block. Do not damage or split seals. Tighten intermediate bearing caps.

►*LEAK TEST NOTE:* After new seals installed, run engine for 45 minutes before checking for leaks.

ENGINE FRONT COVER

6 CYLINDER ENGINE

ENGINE FRONT COVER: Removal - Remove radiator, vibration damper, fan pulley (Puller J-8111) and protect threaded end of crankshaft. Remove attaching bolts and remove cover.

Installation: Install cover on engine leaving attaching bolts loose so cover will center itself when fan pulley installed. Install fan pulley (Pusher Set J-4704-A). Reverse removal procedure.

FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Install new felt seal in cover using fan pulley hub to seat it properly.

V8 ENGINE

ENGINE FRONT COVER: Removal - Remove fan shroud (Hawk), radiator, all belts, fan blade assembly, water manifold fuel pump, pump-to-carburetor pipe, vibration damper, and fan pulley hub (Puller J-8111). Remove attaching screws and remove front cover.

Installation: Install front cover and leave attaching screws loose until fan pulley hub installed so seal and cover will be properly centered. Install fan pulley hub (Pusher Set J-7404). Reverse removal procedure.

FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Install new felt seal in cover and wet with engine oil. Use fan pulley hub to seat seal properly.

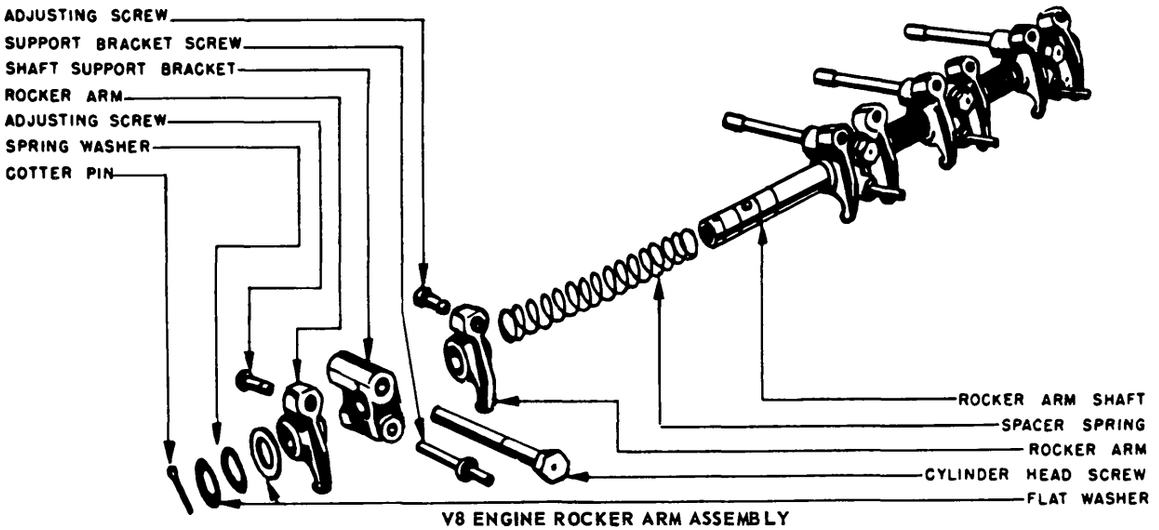
CAMSHAFT & BEARINGS

6 CYLINDER ENGINE

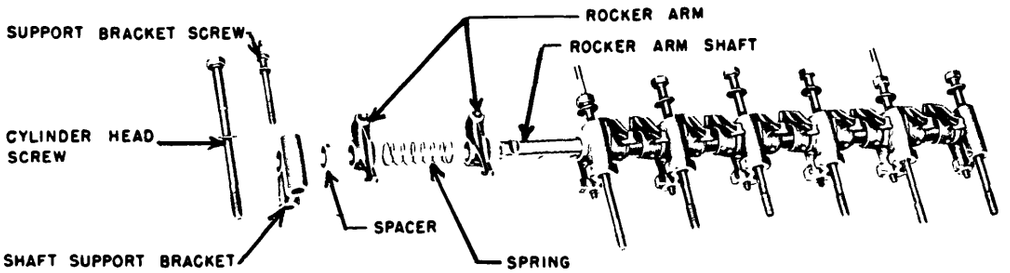
CAMSHAFT REMOVAL: *NOTE - If necessary to remove camshaft without removing engine, remove fenders, grille and radiator as an assembly. Then proceed as follows:* Remove cylinder head, manifold assembly, and valve cover plates. Remove valve assemblies and either turn engine over so lifters will fall free or block lifters up away from camshaft lobes. Remove oil pan, oil pump, and pump drive shaft. Remove timing gear cover (see above). Turn crankshaft until camshaft thrust plate screws can be seen through spokes of camshaft gear. Remove capscrews and remove camshaft and gear.

V8 ENGINE

CAMSHAFT REMOVAL: Position IGN mark on vibration damper directly under timing pointer and distributor in No. 6 firing position. Remove fan shroud (Hawk), radiator, fan blade and water manifold assemblies. Remove rocker arm assemblies and pushrods, carburetor and intake manifold assemblies, lifter cover, valve lifters, fuel pump and timing gear cover. Turn camshaft just enough so thrust plate retaining screws can be exposed and removed, then return camshaft to original position. Carefully remove camshaft and gear.



V8 ENGINE ROCKER ARM ASSEMBLY



170" OHV 6 CYLINDER ROCKER ARM

ALL ENGINES

TIMING GEAR REMOVAL: Remove front cover (see above), camshaft gear retaining screw, lock and flat washer, and fuel pump eccentric and lock plate. Use Puller No. J-8111 to remove camshaft gear. Remove crankshaft pulley key and oil slinger and pull crankshaft gear with Tool No. J-8111.

VALVE SYSTEM

VALVE GUIDES

ALL ENGINES

VALVE GUIDE REMOVAL & INSTALLATION: Use Tool J-4673 (V8), J-9265 (6 Cyl.) to drive guides out combustion chamber side of cylinder head. *NOTE - Intake valve guides are longer than exhaust valve guides. Do not interchange.* To install valve guides with Tool J-4673, coat outside of guide lightly with white lead and insert chamfered end of guide from combustion chamber side. Place installing plate on head with "Intake" or "Exhaust" mark up depending on guide being installed, so long side of plate is parallel to end of head and plate bore aligns with guide bore. Insert driver through plate and drive guide into head until shoulder of driver contacts bottom of counterbore in plate.

ROCKER ARMS

ALL ENGINES

►*ROCKER ARMS & ADJUSTING SCREWS PRODUCTION CHANGE:* Beginning Eng. No. V-511761 (259" Eng.), P-7484 1 (289" Eng.), rocker arms and adjusting screws were standardized with the Six Cylinder OHV Engine. All rocker arms and adjusting screws are now identical. *NOTE - Both V8 Engines with new rocker arms require slightly longer pushrods and different rocker arm shafts. Take care correct related parts are used. See following table.*

Part	Part Numb rs Early V8	Late V8	6 Cyl.
Rocker Arm w/screw	536222	1550621	1550621
Adjusting Screw	1541806	1550360	1550360
Pushrod Ⓒ	527890	1550303	1549588
Rocker Arm Shaft	527182	1550946	1550361

Ⓒ - Pushrod length: 11 11/64-11 7/32" (Early V8), 11 21/64-11 3/8"(Late V8), 11 19/32-11 41/64"(6 Cyl.).

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6 CYLINDER ENGINES

ROCKER ARM ASSEMBLY: R m val - Remove air cleaner, rocker arm retaining nuts and washers. Unscrew rocker arm bracket screws from head, then unscrew cylinder head capscrews-to-rocker arm assembly. Remove rocker arm assembly with capscrews remaining in rocker arm shaft brackets.

Disassembly: Mark rocker arm, brackets, and rocker arm shaft for easy reassembly. Press in on one end shaft bracket, then remove cylinder head capscrew. Gradually release spring and carefully remove bracket, spacer, first rocker arm, compression spring, and next rocker arm from the rocker arm shaft. Proceed to next set.

R ass mbly: Clearance between rocker arm shaft and rocker arms must be .0005-.0025". Install rear rocker arm shaft support bracket and insert cylinder head capscrew through bracket to hold in place. Install spacer next to end support, then install a rocker arm on the shaft next to spacer. Bottom of rocker arm must be on oil groove side of shaft and the valve stem end of rocker arm must be on same side of shaft as cylinder head capscrew groove in shaft. Install spacer spring next to rocker arm then install second rocker arm and one center support bracket and secure with cylinder head capscrew. Install remainder in same manner. *NOTE* - Install spacer between end rocker arm and end bracket.

Installation: Reverse removal procedure. Tighten cylinder head capscrews finger tight and tighten bracket screws alternately to avoid distortion. Then torque cylinder head capscrews 46-50 lbs. (refer to torque tightening sequence diagram in this section). Tighten rocker arm shaft bracket screws to a torque of 13-17 ft. lbs. Before installing rocker arm cover, check and adjust valve clearances. Install a new rocker arm cover gasket in cover flange. Torque rocker arm screws three times to 20 in. lbs., tightening rear nut last. Install air cleaner.

V8 ENGINE

►*V8 ROCKER ARM COVER PRODUCTION CHANGE:* New Rocker Arm Cover No. 1554092 is in production and provides for more space between rocker arms and cover. When interference between cover and rocker arms encountered, replace old cover No. 1549230 with new No. 1554092. *NOTE - Do Not use two gaskets under old cover to provide clearance.*

ROCKER ARM ASSEMB LY: Removal - Remove air cleaner, disconnect spark plug wires, drain cooling system and remove rocker arm covers. Remove rocker arm bracket screws and the four rocker arm-cylinder head capscrews. Remove rocker arm assembly.

Disassembly: Mark rocker arms, brackets and rocker shaft for reassembly. Remove cotter pin from end of shaft and slide all parts off shaft, removing cylinder head screws when necessary.

Reassembly: Rocker arm springs should require 9½-10½ lbs. pressure to be compressed to length of 2 1/32". Replace spring if not within specifications. Clearance between rocker arm shaft and rocker arms must be .0005-.0025". Lubricate all parts with oil. Reverse removal procedure. Install parts in order shown in illustration and make sure bottom of rocker arm is on oil groove side of shaft and adjusting screw end of rocker arm is on same side of shaft as cylinder head capscrew groove in shaft. When correctly assembled, flat on end of rocker shaft will be to rear on right bank, to front on left bank.

Installati n: Reverse removal procedure, tightening rocker arm bracket screws alternately to avoid distortion.

VALVE LIFTERS
ALL ENGINES

VALVE LIFTER INSTALLATION: Thoroughly clean lifter bores in cylinder block and inspect for smoothness. With lifter and bore clean and dry, check lifter fit and select correct lifter size. Lifters furnished Std., .001" and .005" oversize. *See .005" Oversize Lifter Installation below.*

Checking Lifter Fit in Bore: With proper fit, lifter should just slide into place from its own weight. If .001" oversize lifter does not restore proper clearance, bore must be reamed to .005" oversize and .005" oversize lifters installed.

►*.005" OVERSIZE LIFTER INSTALLATION:* Special reamers are required for reaming lifter bores as follows: 32L-STD (6 Cyl.), 1352-STD (V8). These reamers will provide correct lifter clearance.

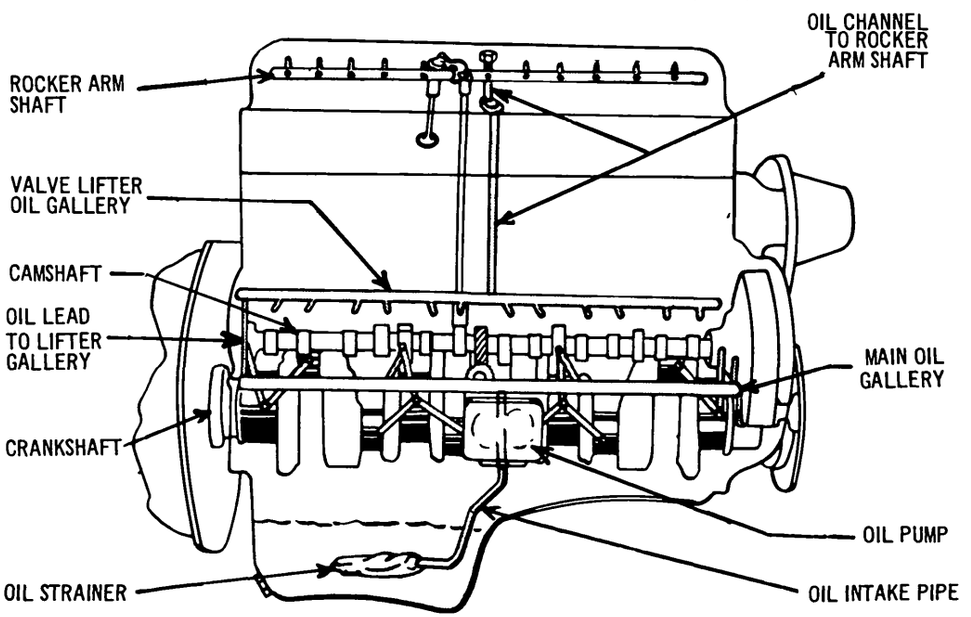
OILING SYSTEM

ENGINE LUBRICATION
6 CYLINDER ENGINES

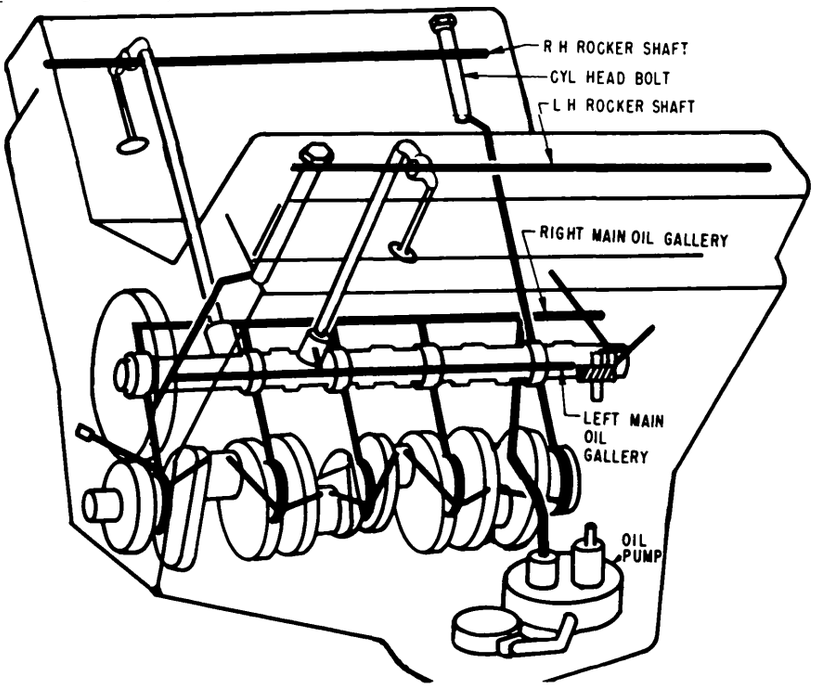
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve lifters. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase draws oil through floating oil strainer and intake pipe in crankcase which terminates at inlet port in pump mounting base. Oil from pump

CONTINUED ON NEXT PAGE



STUDEBAKER 6 CYLINDER ENGINE OILING SYSTEM



STUDEBAKER V8 ENGINE OILING SYSTEM

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flows through outlet passage in pump body and mounting pad directly to main oil gallery which extends longitudinally along right side of crankcase (oil pressure regulator is located in crankcase at forward end of this oil gallery). At rear of engine, a transverse passage connects main oil gallery with lifter oil gallery which also extends entire length of engine block on inner side of lifter chamber. Oil is distributed through these oil galleries as follows:

Crankshaft & Camshaft Bearings - Lubricated through drilled passages in each crankcase web extending from main oil gallery to camshaft bearing bore and then down to corresponding main bearing bore (rear camshaft bearing is lubricated from passage connecting main oil gallery to lifter oil gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with crankpin oil hole.

Valve Lifters - Each lifter lubricated through short oil passage extending from lifter oil gallery to lifter bore.

Rocker Arms, Pushrods & Valves - A vertical oil passage in center of cylinder block connects valve lifter oil gallery with passage in cylinder head. This passage leads the oil up and around the relieved cylinder head capscrew shank to the rocker arm shaft center bracket. The bracket is drilled to connect the capscrew hole with the rocker arm shaft hole. The oil enters the shaft and flows to the rocker arms through small holes drilled in the rocker arm shaft. The rocker arms are drilled from the pushrod ends to the bore and allow the oil to flow to the pushrods. Oil from rocker arm assembly returns to the oil pan through the pushrod passages in the cylinder head and block.

Timing Gears - Lubricated by oil return from pressure regulator valve. Valve bypass port discharges into channel formed by groove in front of block behind engine front plate through which oil is directed onto timing gears. *NOTE* - Small bleed hole in valve plunger provides lubrication for gears at low speeds when pressure regulator valve is closed.

V8 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters, and valve mechanism on cylinder head. All other parts are lubricated by oil spray or oil return flow.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in rear bearing cap and engine block to rear end of right main oil gallery which extends along entire length of engine. At forward end of the engine, two intersecting cross-passages connect the right main oil gallery with the left main oil gallery which also extends along entire length of the engine. Oil is distributed from these oil galleries as follows:

Crankshaft & Camshaft Bearings - Lubricated through drilled passage in each crankcase web extending from **right hand** main oil gallery to corresponding camshaft and crankshaft bearings. *NOTE* - Rear camshaft bearing is lubricated by separate cross-passage from right main oil gallery.

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole in shaft from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spray hole in lower end of connecting rod when this hole registers with oil hole in crankpin.

Valve Lifters - Lifters are lubricated through short vertical passage leading from adjacent main oil gallery.

Rocker Arms, Pushrods, & Valves - Drilled passages in block at forward end of left main oil gallery (for left bank), and at rear end of right main oil gallery (for right bank) extend up to matching passages in cylinder head and rocker shaft support brackets (front bracket on left head, rear bracket on right head). Passage in head and support bracket is around relieved shank of cylinder head bolt which passes through bracket. Oil flowing through this passage enters hollow rocker arm shaft through angle passage in bracket. Drilled holes in shaft and in rocker arm and tappet adjusting screw provide lubrication for rocker arm, pushrod socket, and valve tip. Drain hole at rear end of each cylinder head and matching passage in block drain excess oil back into lifter chamber (drain hole in head is through hollow dowel). An oil return hole in the lifter chamber permits oil to drain back into oil pan. *NOTE* -Early engines had drain hole at each end of each cylinder head.

Timing Gears - Lubricated by oil bypassed by pressure regulator valve (pressure regulator mounted on right front corner of engine block and oil return passage directs oil on timing gears). Valve plunger has small bleed hole to provide lubrication for gears at low speeds when regulator valve is closed.

Camshaft Gear Thrust Face - Groove in front camshaft bearing permits oil to flow out and through hole in camshaft thrust plate. Two grooves in front face of plate distribute oil over face of thrust plate on which camshaft gear hub rides.

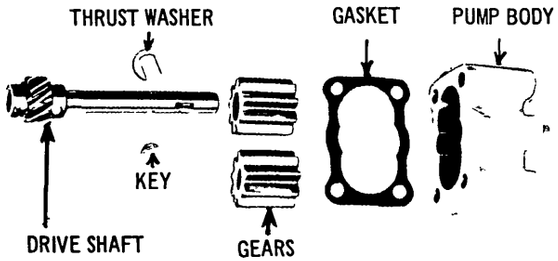
Distributor Drive Shaft & Gear - Lubricated through passage from rear of rear camshaft bearing.

OIL FILTER: Partial flow type mounted on bracket on cylinder head. Oil inlet line is connected to drilled hole at front of left cylinder head and filter outlet pipe returns oil to crankcase filler pipe.

OIL PUMP

6 CYLINDER ENGINE

OIL PUMP: Removal & Disassembly - Disconnect oil pressure pipe and remove pump cover, gasket, and idler gear. Remove drive gear with Tool J-2959. Remove woodruff key and U-shaped thrust washer and remove pump body. To remove pump drive shaft and gear, remove oil pan and distributor. Push drive shaft inward and remove from inside crankcase.



6 CYLINDER ENGINE OIL PUMP

Inspection: Clearance between cover plate and ends of gears should be no more than .007". Lower ends of gears should be flush with cover surface of pump body with gears resting on lower part of body. Total clearance between pump gears should be no more than .010". To check, place a .005" feeler gauge between teeth of gear and body on each side of pump. If gears rotate, replace pump body.

Installation & Reassembly: Reverse removal procedure, dipping each part in oil and using new gaskets. *CAUTION - Install oil pump drive shaft exactly as follows to obtain correct ignition timing.* Install drive shaft and engage camshaft gear and pump drive gear in any position. Position No. 1 Piston at TDC of compression stroke and UDC 1-6 mark on vibration damper directly under pointer on front cover. Disengage pump gear from camshaft gear and turn shaft so keyway points directly to bottom of engine when gears start to engage. Mesh gears (keyway will point to rear of engine). Install distributor. When slot in distributor shaft engages tang on pump drive shaft, distributor rotor should line up with No. 1 terminal in distributor cap.

V8 ENGINE

OIL PUMP: Removal - Remove oil pan. Remove retaining nuts and remove pump.

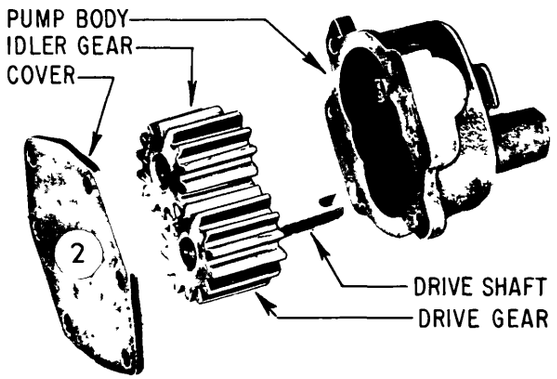
Disassembly: Remove oil strainer and pipe. Remove cover, idler gear, and drive gear and shaft (do not separate shaft from gear).

Inspection: Inspect cover for scratches or deep scores. Maximum clearance between ends of gears and cover plate is .007" measured with weight of gears on upper part of pump body and a straightedge across body. Total gear-to-body clearance should be not more than .010" measured with a .005" feeler between each gear and body. If gears rotate, replace pump body.

Reassembly: Reverse disassembly procedure and tighten strainer pipe to 30 ft. lbs.

Installation: Reverse removal procedure.

CONTINUED ON NEXT PAGE



V8 ENGINE OIL PUMP

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COOLING SYSTEM

WATER PUMP

6 CYLINDER ENGINE

WATER PUMP: R moval - Drain cooling system, remove fan belt, fan blades and pulley. Disconnect heater hose and generator adjusting arm. Disconnect radiator-to-pump hose. Remove water pump.

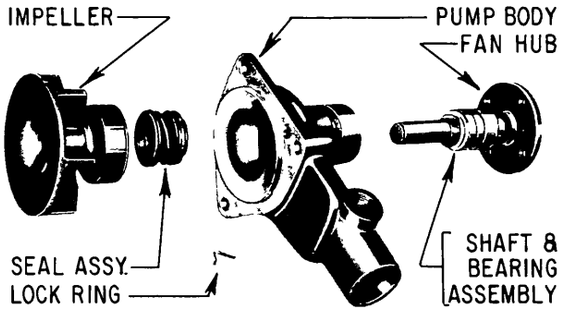
Disass mbly: Remove bearing lock ring, place pump in an arbor press and press shaft, bearing and hub assembly through impeller and front of housing. Press hub from shaft.

R ass mbly: Press n w hub on shaft until flush with end of shaft. Install shaft and lock ring in housing. Use new seal and impeller and press impeller on shaft tc obtain .015-.031" clearance between impeller and housing (rotate shaft when checking clearance).

Installation: Reverse removal procedure.

V8 ENGINE

WATER PUMP: R moval - Drain cooling system, remove belt and fan and pulley. On Hawk, remove fan shroud



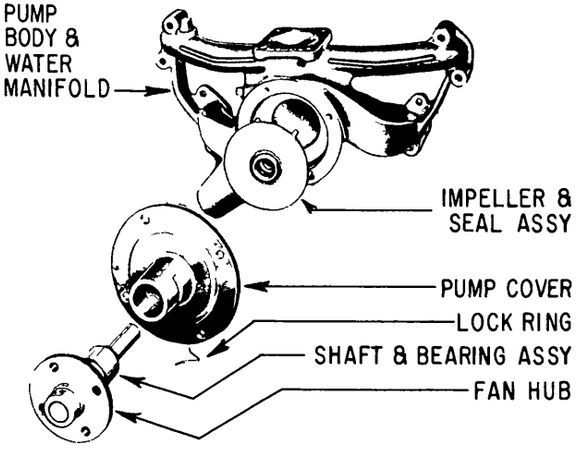
6 CYL. ENGINE WATER PUMP

(see below). Remove pump-to-manifold screws and remove water pump.

Disassembly: Remove bearing lock ring and press hub, shaft and bearing assembly out through front of housing. Press hub from shaft.

Reassembly: Use a new hub and press on shaft until flush with end of shaft. Install shaft in housing, install new seal in impeller. Press impeller on shaft until flush with end of shaft. Impeller-to-housing clearance should not exceed .090".

Installation: Reverse removal procedure.



V8 ENGINE WATER PUMP

HAWK MODELS

FAN SHROUD REMOVAL: Drain radiator and remove radiator inlet hose. Remove wiring from shroud and move wiring harness out of way. Remove fan blades. Remove fan shroud attaching screws and remove shroud.

MODEL IDENTIFICATION

Mdl	Mdl Dsignation
Deluxe 4-Door Sedan	61S-W4
Regal 4-Door Sedan	61S-W6
Deluxe 2-Door Sedan	61S-F4
Deluxe 2-Door Hardtop	61S-J6
Deluxe 2-Door Sta Wgn	61S-D4
Deluxe 4-Door Sta Wgn	61S-P4
Regal 4-Door Sta Wgn	61S-P6
Deluxe 4-Door Sedan (Exp Only)	61S-Y6
Regal 2-Door Convertible	61S-L6
Taxicab 4-Door Sedan	61S-Y1

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post

Assembly Plant	Starting Numbers
South Bend	61S-1001
Canada	61SC-1001

ENGINE NUMBER: Stamped on pad at upper left front of cylinder block

Assembly Plant	Starting Numbers
South Bend	S-172601
Canada	SC-20101

►*ENGINE IDENTIFICATION* The following chart helps to identify engine types

Engine Type	③Identifying Mark
Heavy Duty	Clover leaf ①
7 0-1 (Special Export)	X ②
7 0-1 & Heavy Duty (Special Export)	X & Clover Leaf ②

① - On head just below heater water outlet tapped hole & on block just suffixing engine serial number
② - On block just suffixing engine serial number
③ - Standard engines have no special markings

TUNE-UP

►*HARD COLD STARTING CORRECTION:* On cars built before Feb 13, 1961 install new ignition coil and resistor *See Ignition Coil below for data*

COMPRESSION PRESSURE: 140-160 lbs at 150 RPM Maximum variation between cylinders 10 lbs

VALVE TAPPET CLEARANCE: 025- 027" (Cold), 023-025" (Hot), All Valves

►*TAPPET CLEARANCE ADJUSTING SCREW CAUTION:* Screws are located on underside of rocker arm and are self-locking type Torque required to turn screw must be 30 In lbs minimum

MANIFOLD HEAT CONTROL: Automatic thermostatic type

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

►*Y1 TAXICAB POOR GAS MILEAGE COMPLAINT* When investigating such a complaint, check the "hiss-pad" on the underside of the top cover of the Carburetor Air Cleaner Replace the top cover with Studebaker Part No 1545297 if "drooping" exists

►*SPARK KNOCK CORPECTION & Y1 TAXI PRODUCTION CHANGE·* If objectionable spark knock is encountered and higher octane gasoline not available or desirable, install a slightly thicker Cylinder Head gasket, Studebaker Part No 1693440 (reduces compression ratio from 8 5 to 8 0-1) This Cylinder Head Gasket is standard on all Y1 Taxicabs after engine Serial No S-189501

►*ENGINE WARM-UP PERIOD PERFORMANCE IMPROVEMENTS* The following changes in production, as of Jan 16, 1961, can be made on engines built prior to that date **1)** Plain washer, Studebaker No 41X243 has been installed between each manifold retaining clamp and retaining nut These washers (6 per car) minimize possibility of leaks at manifold port flanges **2)** Plain washer Studebaker Part No 41X106 is installed on heat riser valve shaft between the manifold heater valve pad and the thermostatic spring Washer acts as a baffle to deflect heat **away from** thermostatic spring **3)** An external tooth lock washer, Studebaker Part No G-125774, is installed under exhaust manifold heat riser valve set screw to prevent possibility of set screw loosening

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 033- 038"

Spark Plugs - Champion H-14Y 14mm Torque to 25-30 ft lbs Permanent type steel gasket

►*GASKET REPLACEMENT NOTE* If necessary to remove gasket, remove with a cutter Replace with conventional steel gasket Studebaker Part No 536599

COIL: Autolite. Used as follows

Model	Coil No.	Resistor No.
Lark (Early)	200636	None used
Lark (Late)	①200657	1550556
Y1 Taxi	200639	1550556

① - Used to correct hard cold starting on early models

Ignition Current - 4 0 amps idling

DISTRIBUTOR: Autolite IAT-4403B.

Condenser - Autolite No 2-32 **Capacity** 18- 23 mfd
Contact Point Set - Autolite No 1-47
Breaker Gap - 017- 022"
Cam Angle - 37-41°
Breaker Arm Spring Tension - 17-22 ozs
Rotation - Counterclockwise viewed from above

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
2	400	4	800
4	500	8	1000
8	700	16	1400
12	900	24	1800

Vacuum Spark Control: Autolite integral type

Vacuum Advance

Distr Degrees	Eng Degrees	Vacuum (" of HG)
Start	0	8
4¼	8½	11
8	16	13

IGNITION TIMING

Setting - 2° BTDC
Timing Mark - On vibration damper "IGN" mark in line with pointer on left side of timing cover
Timing - Disconnect vacuum advance pipe at carburetor Install plug in carburetor With engine at idling speed, timing light should show index mark nearest IGN mark directly under pointer

CARBURETOR

►*CARBURETOR APPLICATION: Cart r AS, singl barr l used as follows.*

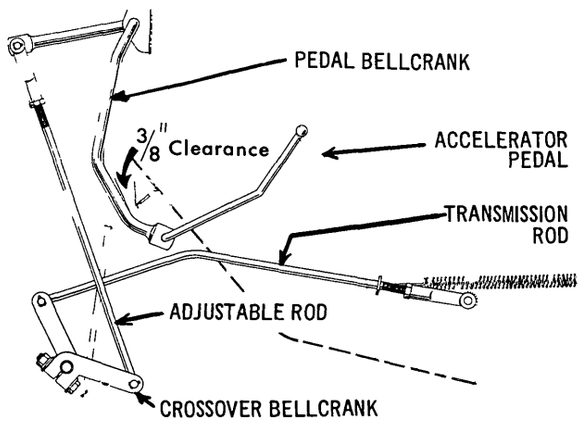
Model	Carb. Mdl
Pass Cars Exc Taxi(Less Pos Crankcase Vent)	AS 3159S & 3160S
Pass Cars (With Pos Crankcase Vent)	AS 3161S
Taxicab	AS 3186S

►*FLAT SPOT OR ENGINE SURGE CORRECTION & CAUTION·* Use new metering rod Part No 1553351 (AS 3159S & 3160S), 1553350 (AS 3161S) to correct condition (will result in a slight reduction in fuel economy)

►*FUEL LINE STOPPAGE CORRECTION:* Kinked fuel line at either tank or pump can be corrected by installation of new flexible hose, Part No 1543933x2

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature and carburetor off fast idle, proceed as follows

1) On right hand side of engine, disconnect adjustable rod from manifold bellcrank and adjust engine idle to 550 RPM with selector lever in "P" or "N" position Hold bellcrank against stop plate (with engine idling at 550 RPM), adjust length of crossover bellcrank-to-manifold bellcrank rod so end of rod will slide into manifold bellcrank freely *NOTE - Engine idle should not change and bellcrank should not leave its stop when rod is connected*



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

2) On left side of engine, adjust length of rod between accelerator pedal bellcrank and crossover bellcrank to provide 3/8" clearance between rib on floor pan and accelerator bellcrank arm *CAUTION - This adjustment must be accurate to prevent engine race on hard brake application or improper kickdown operation*

3) Install pressure gauge on transmission at left front corner of case in front of selector lever Operate engine at 1000 RPM in "D" range (block wheels), adjust rod connecting crossover bellcrank to transmission throttle valve control lever for pressure of 70-75 lbs Remove gauge

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*ADJUSTABLE CONTROL ROD (FROM MANIFOLD BELLCRANK) OVERTRAVEL CAPSULE STICKING CORRECTION:* If sticking condition found on models built prior to Engine No. S-203551, remove adjustable rod from manifold bellcrank, discard old stype adjustable end and replace with new end Studebaker No. 1554371 and new pullback spring clip No. 167320. Install with capsule end **upward.** Adjust throttle control and transmission control linkage.

CARTER AS 3159S, 3160S, 3161S, 3186S

Idl Setting - Initial setting approximately 1 turn open from a lightly seated position. Turn screw out for richer mixture.

Idl Speed - 550 RPM (All Trans.) Flightomatic in "P" or "N" position.

Fl at L v l - ¼" (Gauge T109-282) from top of each float at free end to top of casting. To adjust, bend float arm lever.

Acc l rating Pump - Pump arm on lifter link should be parallel to top of casting. To adjust, bend pump arm.

Fast Idl : .065" clearance between throttle valve and side of body measured opposite idle ports, with fast idle link on high step of cam. To adjust, bend choke connector rod.

Automatic Ch ke Setting: 1 pt. lean.

Thr ttl Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: S "Carter AS Carburetors" in Carbur tion Secti n.*

CARB. EQUIPMENT

Fu l Pump: AC. Fuel only. Replacement Pump 4703.
Fu l Pump Pr ssur - 3½-5½ lbs.

Gas lin Gauge: Electric type.
Dash Unit - Studebaker No. 1552983.
Tank Unit - Studebaker No. 1549575.

Air Cl an r: DRY FILTER ELEMENT TYPE Std., Oil Bath type optional. Clean element every 1,000 miles, replace dry type every 10,000 miles.

►*DRY TYPE CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil, lubricate, or blow out with compressed air.*

BATTERY

Willard HO-11-50. 12 Volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Batt ry Gr und - Negative.
Engin Gr und - Right front engine support bracket to frame.

STARTER

Autolit MDU-7005. Armature - Autolite No. 16-75.

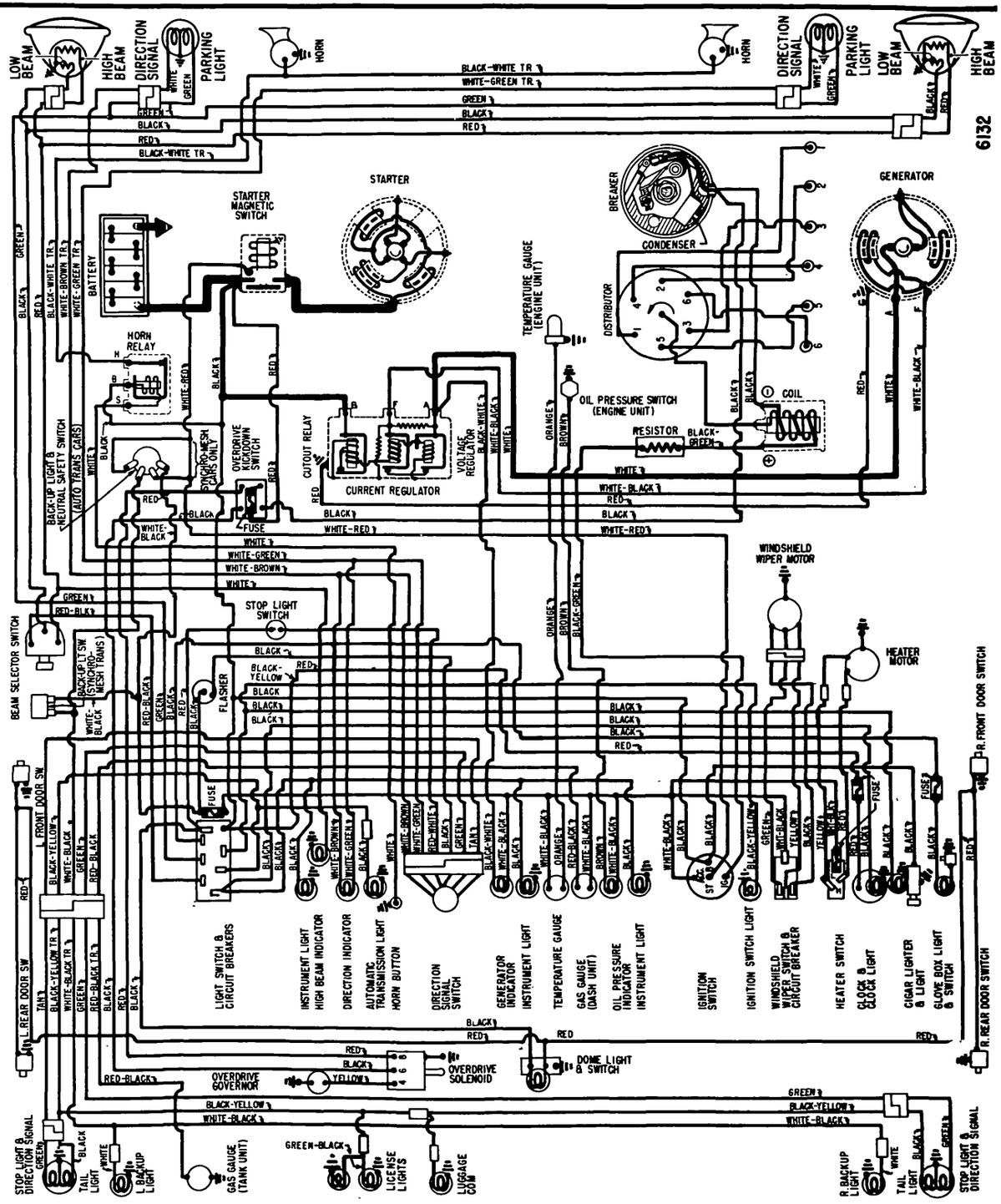
►*TAXICAB STARTER NOTE: When Delco-Remy starters used, see Lark V8 for service data.*

Driv - Bendix "Folo-Thru" type.
Shunt Field Draw - 4.4-5.1 amps. at 10 volts.
R tation - Counterclockwise at commutator end.
Brush Spring Tensi n - 31-47 ozs.

Performanc Data - MDU-7005

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50 Max.
6.2 ft. lbs.	Lock	4.0	280 Max.

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Starter Switch: Magnetic switch, Studebaker No 1550558 mounted on starter and controlled by combination ignition and starter switch.

Automatic Transmission Neutral Safety Switch: Studebaker No. 1552780. Combination Neutral Safety and Back-Up Light Switch mounted on lower end of steering column. Adjust switch so that starter operative only with selector lever in "N" or "P" position.

GENERATOR

Autolite used as follows

Model	Generator No.
Standard	GJP-7102C ① ②
Low Cut-In	GGA-6001-SN ③

① - "B" circuit type. Use only "B" circuit regulator.
② - Serv. No. GJP-7102S.
③ - "A" circuit type. Use only "A" circuit regulator.

►*OPTIONAL DELCO-REMY GENERATOR NOTE: For data on these generators, see Lark V8 pages following.*

Armature - Autolite No. 10-53 (GJP-7102C), 10-24 (GGA-6001SN).

Brush Spring Tension - 18-36 ozs. (GJP-7102C), 34-41 ozs. (GGA-6001SN).

Field Current - 1 6-1.7 amps. (GJP-7102C), 1.1-1.3 amps. (GGA-6001SN) at 10.0 volts (70°F).

Motoring Current - 3.1-3.5 amps (GJP-7102C), 2.3-2.6 amps. (GGA-6001SN) at 10.0 volts (70°F).

Rotation - Counterclockwise at commutator end.

Performance Data - GJP-7102C

Amperes	Volts	RPM
16 min.	15.0	1750
30	15.0	2300 max.
35	15.0	2600 max.

Performance Data - GGA-6001SN

Amperes	Volts	RPM
4.0	14.6	950
40.0	14.6	1600
40.0	15.0	1600

B lt Adjustment: ¼" deflection with 10 lb. pull midway between generator and water pump pulleys.

REGULATOR

Autolite No. VBO-6201A-1 (GJP Gen.). No. VBO-4202A (GGA Gen.). *NOTE - Regulator VBO-6201A-1 is "B" circuit type (use only with GJP Gen.), and Regulator VBO-4202A is "A" circuit type (use only with GGA Gen).*

►*OPTIONAL DELCO-REMY REGULATOR NOTE: For data see Lark V8 pages following.*

Cutout Relay

Cuts In - 12 5-13 5 volts
Cuts Out - 3-5 amps discharge current after a charge of 7 amps
Contact Gap - 015" minimum
Air Gap - 025- 027"

Voltage Regulator

Setting - 14 2-14 8 volts at 80°F, unit operating normally while charging at 7 amperes or with a 25 ohm resistor between regulator and battery
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting (VBO-4202A) - *See "Aut lit 12-V lt Regulators" in El ctrical Secti n.*
Ch cking & Adjusting (VBO-6201A) - *See "Autolit B Circuit R gulators" in El ctrical S cti n*

Current Regulator

►*SETTING CAUTION· "Temperature Compensated" type Set to following specifications at 70°F*

Regulator	Test A - Operating Amperes - Test B
VBO-6201A	44 35 (33-37)
VBO-4202A	49 40 (38-42)

Test A - After 15 minutes operation charging at 7 amps
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13 6-13 8 volts)
Air Gap - 048- 052" with contacts just opening (check at brass armature stop pin)
Checking & Adjusting (VBO-4202A) - *See "Autolite 12-Volt Regulators" in Electrical Section.*
Checking & Adjusting (VBO-6201A) - *See "Autolite B Circuit Regulators" in Electrical Section*

MISC. ELECTRICAL

Headlights: Single & Dual (4-Headlight system)

Lighting & Instrument Light Switch Removal· Remove switch retaining nut, push switch back through instrument board, disconnect wires *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board

Speedometer & Instrument Removal· Units can be removed separately without disturbing other parts

Stop Light Switch Located on inner side of left frame rail forward of steering gear housing (Std Brakes), mounted in elbow fitting on power brake unit (Power Brakes)

►*BACK-UP LIGHT SWITCH REMOVAL WHEN ADJUSTING TRANSMISSION SHIFTING LEVER RODS· See "Lighting System Notes" in Studebaker Special Data.*

CIRCUIT BREAKERS: 18 Ampere. In headlight switch Protects headlights
12 Ampere . In headlight switch Protects Dome, Stop, Instruments, Park & Tail lights
5 Ampere. In windshield wiper switch

FUSES: SFE 14. Protects overdrive In kickdown switch
AGW 7½ Protects radio In lead behind instrument panel
1AG3. Electric clock In lead behind instrument panel
AGC 15. Climatizer & Defroster In switch
Thermal. Cigar lighter On back of lighter socket
SFE 9. Directional Signals & Backup lights On headlight switch

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION Use extreme caution when disconnecting any part of air conditioning equipment or lines for access to engine See "Air Conditioning Service Cautions in Miscellaneous Section*

►*Y1 TAXICAB COMPRESSION RATIO CHANGE: See "Spark Knock Correction & Y1 Taxi Production Change" under TUNE-UP*

ENGINE SPECIFICATIONS: Own. New 6 Cyl Overhead Valve type *NOTE - Y1-taxicab model (heavy duty engin) has an aluminum camshaft timing gear, top compression ring is chrom , and heavy duty intake and xhaust valves are us d*

Bor	Str k	Displacement
3"	4"	170 cu In

Compression Ratio	Rated HP	D v lop d HP
8 5-1 ①	21 6	112 at 4500 RPM

① - 7 0-1 Optional

Compression & Vacuum Reading - *See TUNE-UP*

OIL PAN REMOVAL: Remove oil dipstick and drain oil On long wheelbase models, move wheels to right to move steering bellcrank out of way On other models, disconnect tie rods and reach rod from steering bellcrank Remove retaining pinch bolt and remove bellcrank from shaft Remove oil pan screws and remove pan

OIL PAN INSTALLATION *Se Oil Pan' in Studebaker Special Data*

ENGINE REMOVAL: *See "Engine" in Stud bak r Special Data*

CYLINDER HEAD: *See "Cylinder H ad & Manif ld" in Studebaker Special Data.*

TIGHTENING TORQUES: *S "Tight ning Sp cifications" in Studebaker Special Data*

PIST NS

T-slotted, cam ground, tin plated aluminum alloy with one oil and two compression rings. Heat dam at top of piston controls heat at top ring *NOTE* **- 7-1 compression ratio has crater-head type piston.**

Fitting Pistons - Use a 002" x 1" x 12" feeler gauge inserted on camshaft side of cylinder Insert piston (inverted) in cylinder bore with slotted side away from camshaft and bottom edge of piston 1" below top edge of bore Pull required to withdraw feeler should be 7-12 lbs

Installing Pistons - Oil squirt hole and number on connecting rod should be on solid side of piston *See Rod Installation*

Replacement Pistons: Std., .001", .0025", .010", .020", 030", and 040" Oversize. Pistons furnished with pins

Installing Pistons: Install piston in cylinder bore with "T" slot away from camshaft side *S Rod Installation,*

PISTON PINS

Pin is locked in rod by tapered pin and locknut.
Diameter– 7491-.7495" **Length** 2 625"
Clearance in Piston– 0001- 0003" (selective fit) Light thumb push fit at 70°F
Piston Pin Removal & Installati n–*S "Pist n Pins" in Studebaker Special Data*
Replacement Pins: Std. & 0025', 005" Oversize

PISTON RINGS

Two compression rings (Cast Iron-Ferrex) and one oil ring (Cast Iron-Blued). *NOTE* - Y1 Taxi has Chrome top (No 1) compression ring.

Ring	Width	End Gap	Sid Clearanc
Compr. #1	3/32"	007- 017'	002- 005"
Compr #2	1/8'	007- 017'	002- 005"
Oil	5/32'	007- 017"	0015- 004"

Replacement Rings: Std , 020", 030', & .040" Oversize, in sets

Installing Rings· Top compression ring has step at the inside which must be installed up Second compression ring has step at outside which must be installed down. Inner and outer oil ring end gaps must not come at the same point

S e INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CONNECTING RODS

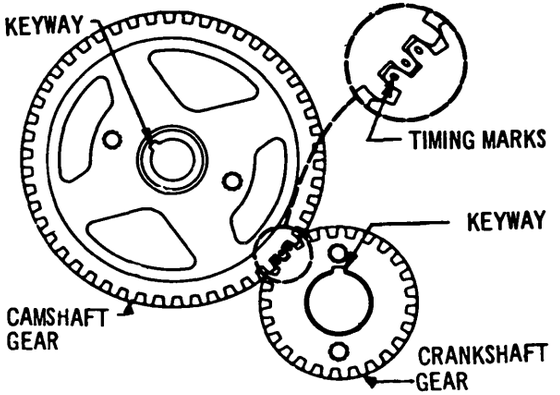
L ngth—(Center-to-center) 6 3/8". **Weight**—19.04 ozs.
Crankpin J urnal Diamet r—1.81175-1.81275"
Bearings—Steel backed, Microbabbitt lined, no shims.
►*HEAVY-DUTY ALUMINUM BEARING NOTE:* New type bearings are available for all 170 OVH 6 Cylinder Engines and went into production on 1961 S-Y1 Taxicabs beginning Engine Serial No. 61S-196221. These bearings are steel-backed, lined with aluminum alloy with a flash of babbitt over the aluminum.
Cl aranc—.0005-.002".
Sid Play—.005-.009".
R plac m nt Bearings: Std., .001", .002", .010", .020" Undersize.
Installing Rods: Assemble piston and pin on rod so "T" slot of piston on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, the narrow part of rod offset will be to right on odd numbered rods, to left on even numbered rods. Rods (#1, 3, 5) cannot be interchanged with rods (#2, 4, 6).
►*REPLACEMENT ROD NOTE:* (Unnumbered Rods)—With spit hole toward you, narrow part of offset will be to the right for odd numbered cylinders, and to the left for even numbered cylinders.

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION:* If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap. Drill and file hole to correct.
J urnal Diameter—3.0623-3.0628". Four bearings.
►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.
Bearings - Steel-backed, micro-babbitt lined. No shims.
►*HEAVY-DUTY ALUMINUM BEARING NOTE (Nos. 2 & 3 Bearings):* Steel-backed, aluminum alloy bearings (with flash of babbitt over the aluminum) used in production on 1961 Y-1 Taxicabs beginning with Engine No. 61S-196221. *Th se bearings available for service.*
Cl aranc - .0005-.002".
Replacement B arings: Standard & .001", .002", .010", .020", .030" Undersize.
End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear, controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.
Endplay - .003-.006".
Crankshaft R ar Main B aring Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*
Crankshaft Fr nt Oil S al: *See "Engine Front Cover" in Stud bak r Special Data.*

CAMSHAFT

J urnal Diam t rs—(1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".
B arings—Steel backed babbitt lined bushings.
Clearance—No.1—.0007-.0022", Nos. 2,3,4—.0010-.0027".
End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft between gear hub and front bearing journal controls endplay). Adjust endplay by replacing thrust plate or spacer. When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting the plate.
End Play—.003-.006".
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Studebaker Special Data.*
Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub.
Timing Gear Removal & Installation—*See "Timing Gears" in Studebaker Special Data.*
Backlash—.001-.003".
Camshaft Setting: Mesh marked tooth on camshaft gear between two marked teeth of crankshaft gear.



6 CYL. VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Valve	Head Diam.	Stem Diam.	Length
Intake	1.593"	.3415"	5.250"
Exhaust	1.406"	.3415"	5.250"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.359"	.0015-.0035"
Exhaust	45°	.359"	.0015-.0035"

Valve Seat Width - 1/16-3/32".
Valve Springs: Single spring used on all valves.

►*VALVE SPRING LOCK INSTALLATION CAUTION:* When installing lock in recess of lower spring retainer, groove in lock must engage tongue in retainer.

Valve Spring Specifications

Valve	Pressure	Length
Open	105-115 lbs.	1.671"
Closed	45-55 lbs.	2.031"

►*EXCESSIVE VALVE GUIDE WEAR CORRECTION:* Caused by insufficient lubrication at the valve stem and guide. Remove worn valve guide and replace with Tool No. J-9265. Replace related valve and spring, and install new Rocker Arm Shaft, Studebaker No. 1550361. New Rocker Arm Shaft diameter has been reduced .0005" to insure proper lubrication to valve stem and guides.

Valve Guides: Use Tool No. J-9265 to drive guide out of cylinder head from combustion chamber side. Coat outside of guide with white lead, then start chamfered end into head from combustion chamber side. Drive new guide in until driver bottoms on counterbore in plate.

►*OVERSIZE VALVE GUIDE NOTE:* Engines with .010" oversize valve guides have a letter "0" stenciled in pad located at left rear of cylinder head below climatizer outlet elbow connection. All guides will be .010" oversize.
Valve Lifters: Straight Barrel Type. Interchangeable.

►*VALVE TRAIN PARTS CAUTION:* Later rocker arm and adjusting screw assemblies are interchangeable and pushrods and rocker arm shafts are **NOT** interchangeable between 6 Cyl. and V8 engines.
Valve Lifter Installation & Fitting - *See "Valve System" in Studebaker Special Data.*
Replacement Lifters - Std., .001" & .005" Oversize.

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" Oversize Lifters requiring Reaming of Lifter Bore):* *See "Valve System" in Studebaker Special Data.*
Rocker Arm Assembly: *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 15°BTDC. Close 50°30' ALDC
Exhaust Valves - Open 55°36' BLDC. Close 10°ATDC.
Valve Timing Check - Adjust No. 1 intake valve at .030". Rotate engine until No. 6 piston is on the compression stroke (the IN-OP 1-6 marking on damper should be several inches from pointer). Then, while moving pushrod up and down, continue to rotate crankshaft. Valve timing will be correct if pushrod stops moving as above marking is directly below pointer.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

Crankcase Capacity: 5 quarts refill, add 1 quart with filter change.

Normal Oil Pressure: 30 lbs. min. at 2000 RPM.
Pressure Regulator Valve: Opens at 50 lbs. Under plug on lower right front corner of engine. For access, remove engine front cover bolt. Replace weak spring (do not attempt to stretch spring).

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S e INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Oil Pr ssure Indicator: Indicator light on instrument panel controlled by oil pressure switch, Studebaker No. 1539878, on left side of engine.

Oil Pump: Spur gear type, driven by a gear on camshaft.

Pump Removal, Overhaul, & Installation - *See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.

►*OIL FILTER INSTALLATION CAUTION:* **Lubricate gasket with engine oil and tighten filter by hand ½-turn after gasket seats on base.** *Do not cross-thread or overtighten.*

Crankcase Ventilation: Standard Cars - Filter element in oil filler cap (air intake) and in breather pipe at left of engine (air outlet). Filter element in breather pipe is replaceable (retained by cotter pin).

P sitive Crankcas Ventilati n Cars - These cars have replaced the road draft tube with a hose to the manifold incorporating a valve in the line.
See "Closed Crankcase Ventilation Systems" in Carburetion Section.

Filter Element Servicing - Remove filter in breather pipe by removing cotter pin and pulling filter out with a hooked wire. Clean filters by washing in kerosene or solvent, drain thoroughly and re-oil by coating with engine oil.

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. refill. Add 1 qt. for heater.
Pressure Valve: 13 lb. radiator filler cap, Studebaker No. 1551190.

Thermostat: Choke type in water outlet on cylinder head. Studebaker No. 1550956 (170°) Std., No. 1551141 (160°) and No. 1551140 (180°) Optional.

Water Pump: Packless, sealed ball bearing type.
Pump Removal & Overhaul - *See "Cooling System" in Studebaker Special Data.*

T mp rature Gauge: Direct Reading, electric type.
Dash Unit - Studebaker No. 1552984.
Engin Unit - Studebaker No. 1549452 (Marked "362-AR" on one face of hex head)

LUBRICATION

AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Operate engine with selector lever in "P" position until engine and transmission are at normal operating temperatures. Apply brakes, then move selector lever through all positions slowly. Check fluid level on dipstick and add fluid as necessary to bring level to "F" mark. 1½ pints between "L" and "F" marks.
Capacity - 18 pints (Exc. Taxi & H.D.), 19 pints (Taxi & H.D.).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

Mod l	M d l D signati n
LARK	
Deluxe 2-Door Sedan	61V-F4
Deluxe 4-Door Sedan	61V-W4
Deluxe 2-Door Sta. Wgn.	61V-D4
Deluxe 4-Door Sedan	61V-W6
Deluxe 4-Door Sta. Wgn.	61V-P4
Deluxe 4-Door Sta. Wgn.	61V-P6
Deluxe 2-Door Hardtop	61V-J6
Regal 2-Door Convertible	61V-L6
Taxicab 4-Door Sedan	61V-Y1
Deluxe 4-Door Sedan (Cruiser)	61V-Y6
HAWK	
Regal Sport Coupe	61V-C6

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.

Ass mbly Plant	Starting Numbers
South Bend	61V-1001
Canada	61VC-1001

ENGINE NUMBER: Stamped on machined pad at upper left of cylinder block.

Ass mbly Plant	Starting Numbers 259" Eng.	289" Eng.
South Bend	V-510401	P-74701
Canada	VC-18501	PC-2501

►*ENGINE IDENTIFICATION NOTE:* Heavy Duty Engines have a Clover Leaf on the head just below the water heater outlet tapped hole and on the block just suffixing the engine serial number. Low Compression Engines are identified by cast-in part number on cylinder head.

TUNE-UP

COMPRESSION PRESSURE: 140-160 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18-20" at idling speed.

VALVE TAPPET CLEARANCE: .025-.027" (Cold). .023-.025" (Hot). All valves.

►*TAPPET CLEARANCE ADJUSTING SCREW CAUTION:* Screws are located on underside of rocker arm and are self-locking type. Torque required to turn screw must be 30 In. Lbs. minimum.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located in right bank exhaust manifold outlet. **Checking Th rmostatic Coil Spring -** With outer end of coil free from anchor and valve closed (counterweight forward), hooked end of coil should be 90° clockwise from anchor pin at 70°F.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylind rs - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".

Spark Plugs - Champion H-14Y. 14 mm. Torque to 30 ft. lbs.

►*SPARK PLUG GASKET NOTE:* A permanent type steel gasket is used. If necessary to remove, use a pair of diagonal cutters and replace with conventional steel gasket, Studebaker No. 536599.

COIL: D lc -R my 1115154.

Igniti n Curr nt - 3.8 amps. idling.

R sist r - Resistance wire (Pink, 1.8 ohms) from coil to ignition switch. Bypassed during cranking by lead from starter solenoid to coil.

►*RESISTOR SERVICE REPLACEMENT NOTE:* A new service Ignition Switch-to-Coil Cable, Studebaker Part No. 1554167, is to be used in place of resistance wire. Cable is 81" long, has a resistance of 1.8 ohms, and must not be shortened, but rather folded and taped.

DISTRIBUTOR: Delco-Remy 1110969 or 1110981 (Lark), 1110864 or 1110980 (Hawk).

Condenser - Delco-Remy 1932004 (1110969 Distr.), 1869704 (1110864 Distr.). **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988 (1110969 Distr.), 1918148 (1110864 Distr.).

Breaker Gap - .016" All Models. *See Cam Angle.*

Cam Angle (1110864 & 1110980) - 26-33° with .016"gap.

Cam Angle (1110969 & 1110981) - 28-32°. Set at 30° which will give breaker gap of .016".

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - (All)

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	350	1-5	700
2-4	400	4-8	800
7-9	800	14-18	1600
11-13	1125	22-26	2250

Vacuum Spark Control: Delco-Remy Nos. 1116058 (1110864 Distr.), 1116169 (1110969 Distr.), 1116185 (1110980 Distr.), 1116186 (1110981 Distr.). Integral type.

Vacuum Advance - 1110864 & 969

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	10.25-11.5

Vacuum Advance - 1110980 & 981

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
4	8	10.5
8	16	13

IGNITION TIMING

Setting - 4° BTDC at 600 RPM. Vacuum line to distributor disconnected and opening in carburetor plugged. *After timing set, readjust to 550 RPM.*

Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover.

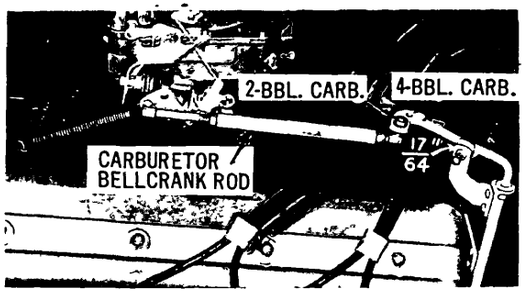
CARBURETOR

►*CARBURETOR APPLICATION: Stromberg WW 2-Barrel Standard on all models; Carter WCFB 4-Barrel Optional on all models except Taxi.*

►*FUEL LINE STOPPAGE CORRECTI ON:* Kinked fuel line at either tank or pump can be corrected by installation of new flexible hose Part No. 1543933x2.

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:

1) Adjust engine idle speed to 550 RPM with transmission selector lever in "N" (Neutral) position. Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position.



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

2) *NOTE - Make sure that carburetor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetor, and in outer hole on cars with 4-barrel carburetor. In both cases, ball joint must be on underneath side of bellcrank lever.*

3) Adjust carburetor-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave its stop.

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. on Taxi). Stop engine, remove gauge and install plug.

THROTTLE RETURN CHECK ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on throttle lever. Mark position of check assembly relative to bracket, then turn check assembly **1¼ to 2 turns toward lever.** Tighten locknut.

STROMBERG WW

Stromberg WW 6-123A & B, and 6-125 & A (Positiv Crankcase Ventilation). Throttle return check used with Flightomatic Transmission.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1¼ turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.

Float Level - 3/16" from top edge of main body to top of float. To check, remove bowl cover and place float level gauge of Tool J-7477 across top edge of main body. Float should just touch gauge. To adjust, bend float lip.

Accelerating Pump - Center hole, normal setting. For less fuel install rod in inner hole, for more fuel install rod in outer hole.

Fast Idle Setting: Close the choke so the highest part of high idle cam contacts fast idle screw. Adjust fast idle screw so that a .025" wire can be inserted freely between throttle valve and throttle body on the idle port side.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Automatic Choke Setting: Centered on index
Throttle Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Stromberg WW (Studebaker) Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL

Carter WCFB. Used as follows:

Transmission Type	Carter Carb. No.
Std. & Overdrive	2829S (Std.), 3165S (CCV Ⓒ)
Flightomatic	2830S (Std.), 3166S (CCV Ⓒ)

Ⓒ - Closed Crankcase Ventilation.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7. LEFT barrels feed 2-3-5-8.*
Idle Setting - Initial setting ½-1½ turns open. Turn screws out for richer mixture.
Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.
Throttle Linkage Adjustment: See CARBURETOR above.
►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. 2573S. Fuel only.
Pressure - 3½-5½ lbs.
Gasoline Gauge: Electric type.
Dash Unit – Studebaker No. 1539880 (Hawk), No. 1548689 (others).
Tank Unit – Studebaker No. 1544825.
Air Cleaner: DRY TYPE (Plasticized paper) Standard. Oil Bath type Optional. Clean dry type filter element every 1000 miles, replace element every six months or 10,000 miles.
►*CLEANING CAUTION (DRY TYPE):* Clean filter element by tapping and shaking to remove dirt particles. *DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.*

BATTERY

Willard HO-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hour rate).
Battery Ground - Negative.
Engine Ground - Front engine support bracket to frame

STARTER

Delco-Remy 1107900 (Synchro-mesh & Overdrive). 1107899 (Flightomatic).
Drive - Bendix "Folo-thru" No. A3474.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

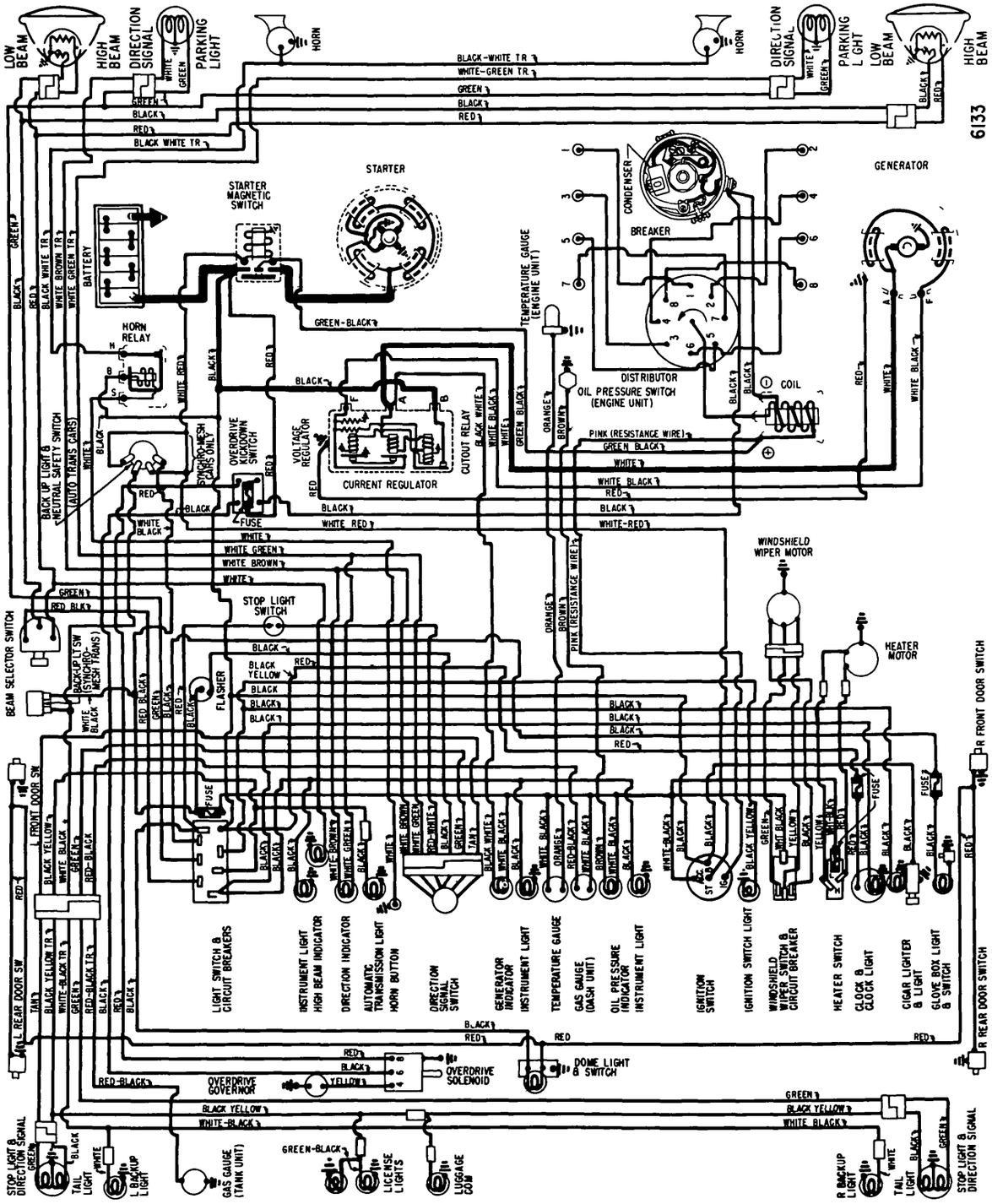
Torque	RPM	Volts	Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft. lbs.	Lock	5.8	435

Starting Switch: Magnetic Switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition & Starter Switch.
Automatic Transmission Neutral Safety Switch: Studebaker No 1552780 (Exc Hawk), 1549665 (Hawk) on steering column. **Adjustment** - *See "Studebaker Flightomatic Transmission" in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows
►*OPTIONAL AUTOLITE "LOW CUT-IN" GENERATOR NOTE: See Studebaker 6 Cylinder Car Model Pages.*

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Mod l	Generator N .
Standard	1102248①③
Heavy Duty	1102127②③⑨

① - Serv. No. 1102269. ② - Serv. No. 1102223.
③ - "A" circuit type. Use only "A" circuit regulators.
⑨ - When used on 6 cyl. cars, use of special drive pulley makes it a "low cut-in" type.

Performance Data - Cold

Generator	Amperes	Volts	RPM
1102248	30.0	14.0	2310
1102127	45.0	14.0	2600

Brush Spring Tensi n - 28 ozs.
Field Current - 1.48-1.62 amps. (1102248), 2.66-2.86 amps. (1102127) at 12.0 volts.
Rotati n - Counterclockwise at commutator end.
Belt Adjustment: Hook a spring scale to belt midway between generator and fan pulleys, then adjust belt tension so that pull of 14 lbs. on scale will lift belt ½".
►*FAN BELT REPLACEMENT CAUTION:* Use only Studebaker No. 529374 Fan Belt for replacement on cars with Generator, Studebaker Part No. 1553181 (Delco-Remy Nos. 1102248 or 1102269). The smaller generator pulley diameter requires this slightly shorter belt.

REGULATOR

Delco-Remy N . 1119001 & 03 (1102248 Gen.), 1119610 (1102127 Gen.). All are "A" circuit types.
NOTE - Specificati ns below are "Normal" settings. Delco-R my Regulator No. 1119610 is double contact.

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001 & 03), 11.8-13.0 volts (1119610) Hot.
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

V ltage Regulator

Setting - 13.8-14.7 volts (1119001 & 03), 13.8-14.6 volts (1119610) Hot. .1-.3 volt lower on lower contacts.
Contact Gap - .016".
Air Gap - .075" (1119001 & 03), .067" (1119610) with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 27-31 amps. (1119001 & 03), 36.0-40.5 amps. (1119610) Hot (after 15 minutes continuous operation).
Air Gap - .075" with armature pressed down to point where contacts just touch.
►*OTHER DATA: Se "D lco-Remy 1119000 Series Regulators" or "D lco-R my 1119600 (Double Contact) Seri s Regulators" in El ctrical Section.*

MISC. ELECTRICAL

Headlights: Single & Dual (4-headlight system).
Direction Signals: *F r all data except following note, see Electrical Secti n.*

►*DIRECTION SIGNALS OVER-CANCELLING CORRECTION AND PRODUCTION CHANGE:* On some early model cars the switch might go through the detent position upon recovery from a turn. If this occurs, install a new Switch & Cable Assembly Studebaker No 1551930. New switch & cable assemblies in production and for replacement are pink or red, whereas old style are black or white.

Lighting & Instrument Light Switch Removal: Remove switch retaining nut, push switch back through instrument board, disconnect wires. *NOTE* - When installing switch, align flat on switch sleeve with corresponding flat on board.
Speedometer & Instrument Removal: Units can be removed separately without disturbing other parts.
Stop Light Switch: Located on inner side of left frame rail forward of steering gear housing (Std. Brakes), mounted in elbow fitting on power brake unit (Power Brakes).
►*CIRCUIT BREAKER & FUSE NOTE: For Lark V8 models, see STUDEBAKER LARK 6.*
CIRCUIT BREAKERS (Hawk): 20 Ampere. In headlight switch. Protects Headlights, Beam Indicator, Park, Tail, License Plate, Instruments and Clock lights.
5 Ampere. In Windshield Wiper Switch.
FUSES (Hawk): AGC 15. Protects Stop, Directional Indicator, Dome and Glove Compartment lights.
1AG3. In clock lead.
4 Ampere. In radio lead.
SFE 14. Protects overdrive. In kickdown switch.
AGC 15. Climatizer & Defroster. In switch.

ENGINE

►*AIR CONDITIONED CAR SERVICE CAUTION: Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, See "Air Conditioning Service Cautions" in Miscellaneous Section.*
►*REAR ENGINE INSULATOR PRODUCTION CHANGE & VIBRATION CORRECTION:* New softer insulator Part No. 1553609 used in production starting Eng. Nos. V-522748 and P-77221 (Synchro-mesh & Overdrive Models). New insulator eliminates excessive engine vibration on early cars.
ENGINE SPECIFICATIONS: Own. V8, valve-in-head. Two engines used: 289" Engine used in Hawk Sports Coupe and Optional on Cruiser Model; 259" Engine used on all other models.

Engine	Bore	Stroke	Displacement
259"	3 9/16"	3 1/4"	259.2 cu. ins.
289"	3 9/16"	3 5/8"	289 cu. ins.

Engine	Compr. Ratio①	Rated HP	Developed HP
259"	8.8-1②	40.6	180 at 4500 RPM
259"	8.8-1③	40.6	195 at 4500 RPM
289"	8.8-1②	40.6	210 at 4500 RPM
289"	8.8-1③	40.6	225 at 4500 RPM

① - 7.5-1 Optional. ② - 2-Bbl. Carb. ③ - 4-Bbl. Carb.
Compression & Vacuum Reading - *See TUNE-UP.*
OIL PAN REMOVAL: Remove dipstick and adapter tube (remove head bolt to remove tube clamp). Disconnect battery. Drain crankcase. Remove starter. On Hawk, swing wheels to right to move steering bellcrank out of way On Other Models, remove steering bellcrank assembly and exhaust crossover pipe. Remove oil pan screws and pan.
OIL PAN INSTALLATION: *S "Oil Pan" in Stud bak r Special Data for sp cial procedure.*
ENGINE REMOVAL: *See "Engine" in Studebak r Special Data.*
CYLINDER HEAD: *See "Cylinder H ad & Manifolds" in Studebaker Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Studebaker Special Data*

PISTONS

Aluminum alloy, cam ground, T-slot, three ring type. *See "Original Bore & Pistons" in Studebaker Special Data.*
►*PISTON INTERCHANGEABILITY CAUTION:* Pistons for 289" engine have a dished head. 259" pistons have flat head. DO NOT interchange between engines.
Weight – 16.21 ozs.
Removal - Pistons & rods remove from above.
Fitting New Pistons: Clearance - Selective feeler fit. Use feeler 1" wide, 002" thick, and 12" long inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler with properly fit piston should be 7-12 lbs.
Replacement Pistons: Std. size & .001", .002", .010", .020", .030", .040" oversize. Pistons furnished with fitted pins.
Installing Pistons: Install piston on rod so that solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with the slot toward the left side of engine. *See Rod Installation.*

PISTON PINS

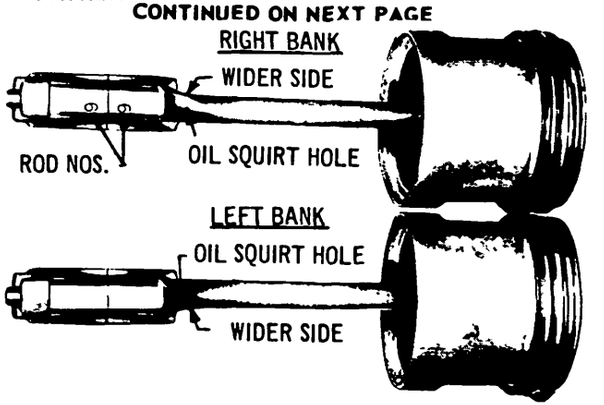
Locked in rod by tapered pin and locknut.
Diameter – .8741-.8745". **Length** – 3 1/16".
Clearance in Piston – .0001-.0003" (selective fit). Light finger push fit at 70° F.
Replacement Pins: Std. size & .0025", .005" oversize.
Removal & Installation: *See "Piston Pins" in Studebak r Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearanc
Compression	.077-.078"	.008-.016"	.002-.005"
Oil	.1855-.1865"	.008-.016"	.0015-.005"

Replacement Rings: Sets of Std., .020", .030" and .040" Oversize.

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V8 ENGINE PISTON & ROD ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Installing Rings: Install compression rings with chamfered side of ring upward Gaps of inner and outer oil rings must not come at same point

CONNECTING RODS

Length - 6 5/8" center-to-center **Weight** - 23 71 ozs
Crankpin Journal Diameter - 1 99925-2 00025"
Lower Bearing - Interchangeable Steel backed micro-babbitt lined type No shims
Clearance - 0005- 002" **Sideplay** - 008- 013"
Replacement Bearings: Std , 001", 002", 010" and 020" Undersize
Installing Rods: Number on rod and bearing cap must be on same side Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank

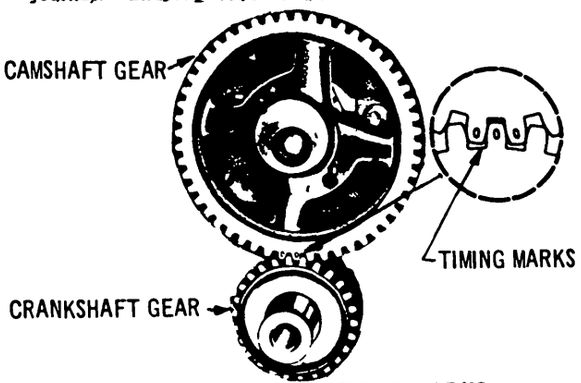
►*CAUTION.* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore Insert tapered end of clamp screw so it will be toward heavy boss Be careful to align flat surface of screw with flat on piston pin Bearing cap must be assembled on rod with groove in cap and rod on same side

►*REPLACEMENT ROD IDENTIFICATION NOTE.* Replacement rods are unnumbered To identify, hold rod upright with oil hole toward you Wide part of offset will be to right on left bank rods to left on right bank rods

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION* If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap Drill and file hole to correct

Journal Diameter–2.4995-2.5000".
Bearings - Steel-backed, micro-babbitt lined. No shims.
Clearance–.0005-.0025".
Replacement Bearings: Std. size, .001", .010", .020", .030" undersize.
End Thrust Taken by thrust plate assembled between front main bearing and crankshaft gear. Controlled by shims between thrust plate and face of main bearing journal. **Endplay**–.003-.006".



V8 ENGINE VALVE TIMING MARKS

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Stud bak r Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

Journal Diameters–(1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".
Bearings–Precision type, steel backed babbitt lined.
Clearance – .00075-.00225" (No. 1), .001-.00275" (Others).
End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.
Endplay–.003-.006".
Camshaft Removal & Installation. *See "Camshaft & Bearings" in Studebaker Special Data.*
Timing Gears: Cast iron crankshaft gear and "Celeron" camshaft gear.
Timing Gear Removal & Installation–*See "Timing Gears" in Studebaker Special Data.*
Backlash–.001-.003".
Camshaft Setting: Mesh marked tooth of camshaft gear between two marked teeth of crankshaft gear.
Engine Front Cover Removal *See "Engine Front Cover" in Studebaker Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal) *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

Tappet Clearance - .023-.025" (Hot), .025-.027" (Cold).

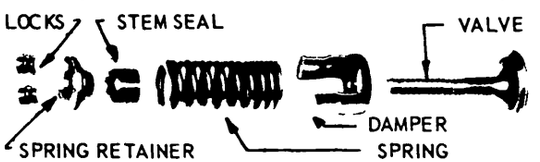
Valve	Head Diameter	Stem Diameter	Length
Intake	1 21/32"	11/32"	5 5/32"
Exhaust	1 17/32"	11/32"	5 5/32"

Valve	Seat Angle	Lift	Stem Clearance
All	45°	23/64"	.0015-.0035"

Valve Seat Width–1/16-3/32".
Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.
Valve Springs Single spring used. Replace spring if 10% weaker than pressure given in specifications below. *NOTE* - Damper installed on lower (close-coiled) end of all springs.

Valve Spring Specifications

	Pressure	Length
Valve Closed	45-55 lbs.	2 1/32"
Valve Open	105-115 lbs.	1 43/64"



V8 ENGINE VALVE ASSEMBLY

Valve Guides Pressed in head from underside
Guide Removal & Installation–*See "Valve System" in Studebaker Special Data.*
Valve Lifters Straight barrel type. Remove from above. Not necessary to remove camshaft

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" oversize lifters requiring reaming of lifter bore) See "Valve System" in Studebaker Special Data.*
Valve Lifter Installation & Fitting–*See "Valve System" in Studebaker Special Data.*
Replacement Lifters–Std size, 001", 005" oversize
►*CAUTION–When lifters removed, make sure they are installed in original positions.*
Rocker Arms *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves–Open 11° BTDC Close 54°36' ALDC
Exhaust Valves–Open 51°36' BLDC Close 14° ATDC
Valve Timing Check–Set tappet clearance of No 1 intake valve at 030" Turn crankshaft until No 6 piston is on compression stroke and vibration dampener mark "IN OP 1" is approaching pointer on timing gear cover continue to turn crankshaft slowly while working No 1 intake rocker arm up and down to determine point at which all clearance is taken up Dampener mark "IN OP 1" should be directly under pointer

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Stud bak r Special Data.*
Crankcase Capacity 5 qts. (add one quart when filter changed)
Normal Oil Pressure – 20–40 lbs at 40 MPH
Pressure Regulator Valve – Located on right side at front of engine block slightly above crankcase flange
Oil Pressure Indicator (Lark) Indicator light on instrument panel controlled by oil pressure switch, Studebaker No 1539898
Oil Pressure Indicator (Hawk): Direct reading, non-electric type gauge Studebaker No 1539878

Oil Pump: Spur gear type, on rear main bearing cap in crankcase.
Pump Removal, Overhaul & Installation: *See "Oiling System" in Studebaker Special Data.*

Oil Filter: Partial flow, "disposable" type (replace element and housing as a unit). Replace element at 5000-6000 mile intervals or more often under severe conditions.

►*OIL FILTER INSTALLATION CAUTION:* Lubricate gasket with engine oil and tighten filter **by hand ½-turn after gasket seats on base.** *Do not cross-thread or overtighten*
Replacement Filter Element - Studebaker No 1542739

Crankcase Ventilation: Standard Cars - Filter element is located in oil filler cap (air intake). Breather pipe (air outlet) is connected at rear of valve chamber cover plate.

Positive Crankcase Ventilation Cars - The road draft tube has been replaced by a hose to the manifold utilizing a valve in the line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE COOLING SYSTEM

Water Capacity: 17 qts. without heater. 18 qts. with heater (Lark), 18½ qts. with heater (Hawk).

Pressur Valve: 14 lb. radiator cap, Studebaker No. 1551190.

Therm stat: Choke type Studebaker No. 1550956 (170° Std.), 1551141 (160°), 1551140 (180°) Optional.

►*REPLACEMENT THERMOSTAT NOTE:* Use only Dole Valve Company Thermostats as replacements. Fulton Sylphon Thermostats can be used on 6 Cylinder Models.

Water Pump: Packless, sealed ball bearing type.

Pump Removal & Overhaul - *See "Cooling System" in Studebaker Special Data.*

Radiator & Fan Shroud Removal - *See "Cooling System" in Studebaker Special Data.*

Temperature Gauge: Direct reading, electric type.

Dash Unit - Studebaker No. 1552984 (Lark), No. 1538879 (Hawk).

Engine Unit - Studebaker No. 1545220 (All).

LUBRICATION

FLIGHTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles, drain and refill every 15,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Checking Fluid Level - Operate engine with selector lever in "P" position for 4 mihutes or until engine and transmission reach normal operating temperature. Apply brakes, move selector lever from "P" to "R" and then to "D" position slowly. Check fluid level on dip-stick (Located under hood). Add fluid as necessary to bring level to "F" mark (1½ pints between "L" and "F" marks.

Capacity - 9 qts. (Std.), 9½ qts. (Taxi) drain and refill.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS
ALL MODELS

TIGHTENING TORQUES When tightening capscrews or bolt nuts retaining parts listed below use torque indicating wrench and tighten to tensions listed

	Ft. Lbs. 4 Cyl.	6 Cyl.
Cylinder Head	60—70	35—45
Intake & Exhaust Manifolds	29—35	30—35
Oil Pan	9—14	12—15
Main Bearing Caps	65—75	85—95
Crankshaft Counterweight Bolt	60—70	
Flywheel	35—41	35—40
Vibration Damper		100—130
Con Rod Caps (3/8")	40—45	35—45
Piston Pin Clamp Bolt	35—41	
Camshaft Sprocket	30—40	35—40
Rocker Arm Support Bracket	30—36	
Valve Chamber Cover		7—10
Engine Front Cover 5/16"		7-10
Engine Front Cover 7/16"		40-50
Water Pump	12—17	15—20
Oil Pump		30—35

ENGINE
FC-150 & FC-170 MODELS

ENGINE REMOVAL *NOTE* Remove engine transmission and transfer case as a unit as follows

1) Drain cooling system remove driver seats engine hood and panel (FC-170) panels (FC-150) Disconnect battery

2) Remove air cleaner assembly (FC-150) and bracket (FC-170), choke and throttle controls, and on FC-150 remove fuel line at pump

3) Remove carburetor, radiator and heater hoses then remove surge tank

4) On FC-150, remove wires from coil, starter, generator and remove oil filter and bracket

5) On FC-170, remove distributor, oil filler tube, coil oil filter and bracket, temperature and starter to solenoid wires, generator access panel, generator, bracket and pulley.

6) On FC-150, disconnect accelerator control wire at engine bell crank and disconnect oil sender unit

7) On FC-170, disconnect radiator brace at engine and loosen at radiator and move out of way Remove radiator hose at water pump then remove fan belt and blade assembly from fan shaft Disconnect vacuum outlet hose and fuel line from pump and plug line Remove fuel line (pump to carburetor)

8) On FC 170 disconnect exhaust pipe at manifold remote control rod at transfer case oil pressure unit wire and engine ground strap Disconnect two remote control rods at transmission and move out of way

9) On FC 150 disconnect exhaust pipe at manifold raise front of vehicle on jacks and remove front and rear exhaust pipes

10) On FC-170 disconnect clutch control cross shaft and remove hand brake, release spring, cable brackets at bell housing and frame crossmember and cable adjusting rod at lever

11) On FC-150 disconnect brake and clutch cables and springs remote control cable rod at transfer case and remove front propeller shaft

12) On FC-170 disconnect rear propeller shaft at transfer case and secure out of way Disconnect speedometer cable and front propeller shaft at transfer case and remove engine bolts

13) On FC-150 disconnect battery cable at bell housing remove fan belt loosen and raise generator then remove two front motor mount bolts and engine ground strap at frame Disconnect spark plug wires and clamp and remove valve cover and speedometer cable Remove propeller shaft Disconnect shift control rods at transmission levers and secure out of way

14) Attach lifting brackets to engine at head bolt locations so engine will be well balanced, then use crane or "A" frame and chain hoist to support engine Disconnect rear engine support (frame crossmember) at rails Lift front of engine and remove two rubber front mounts

15) Raise vehicle as necessary to lower and remove engine from below *NOTE* - On FC-170 models it may be necessary to raise front of vehicle to loosen front spring clips on front axle so axle may be moved forward to length of brake hose Reverse procedure to reinstall

UTILITY MODELS

ENGINE REMOVAL: Drain cooling system. Remove hood fan, radiator and shroud. Disconnect battery and disconnect wires from overdrive, temperature unit oil pressure unit, starter, generator, coil, and secondary distributor wire. Remove air cleaner Disconnect accelerator linkage at bellcrank, fuel and vacuum lines and ground strap. Disconnect clutch linkage exhaust pipe and front engine supports. Raise engine with sling attached to head bolts and remove bell housing-to-engine bolts Raise engine and move forward to clear bell housing and dash and remove from car

FLEETVAN (U.S. POST OFFICE)

ENGINE REMOVAL: Remove engine, torque converter and transmission as a unit Unit must be lowered with a floor jack and crane or suitable substitute Drain cooling and oiling systems then plug openings Disconnect battery at positive terminal Remove carburetor Remove radiator and heater hoses Disconnect accessible cables and wires Remove cover panels and brake pedal cover plate, then loosen dash lower center panel Disconnect electrical wire from transmission diaphragm solenoid Remove exhaust pipe from muffler and exhaust manifold flange Remove transmission oil cooler tubes and carburetor-to-transmission vacuum line Disconnect all remaining wires Disconnect fuel tank-to-pump line at pump hose Disconnect linkages Disconnect propeller shaft from transmission, slide sleeve back and tie out of way With engine and transmission unit evenly supported, remove transmission-to-frame crossmember bolts then remove bolts attaching front engine supports to frame Move vehicle forward or engine rearward about four inches, then lower engine and transmission unit Raise vehicle away from detached unit Remove torque converter and transmission as a unit from engine

CYLINDER HEAD & MANIFOLD
ALL MODELS

►*CYLINDER HEAD BOLT TIGHTENING CAUTION* On F4-134 engine, one cylinder head nut is under carburetor so that carburetor must be removed to torque this nut On L6-226 engine, one cylinder head bolt is close to distributor adapter so that adapter must be removed to torque this bolt

CYLINDER HEAD INSTALLATION: Tighten stud nuts and capscrews in sequence shown in diagram to correct torque (see above) *NOTE* – On 6 Cyl engine, bolts No. 24 & 26 are of smaller diameter than the others. Use guide pins in these holes when installing head to assure accurate alignment with block and to prevent gasket failure

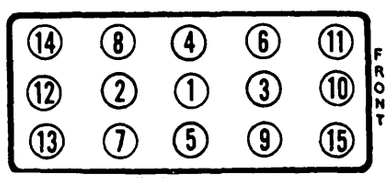
►*HEAD GASKET (4 CYLINDER) INSTALLATION CAUTION:* Install gasket with crimped edges down to prevent gases reaching asbestos *NOTE - Use no sealant*

CRANKSHAFT & MAIN BEARINGS
4 CYL. ENGINES

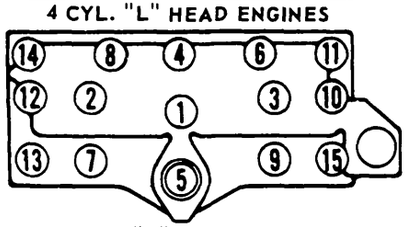
CRANKSHAFT SERVICING: Bearing Replacement – Engine must be removed from car for bearing replacement (bearings "doweled" in case and crankshaft must be taken out to remove and install bearings). Make certain that oil holes in bearings line up with oil holes in crankcase, and that bearings fit snugly on dowel pins in crankcase and bearing caps.

►*MAIN BEARING CAP IDENTIFICATION CAUTION* Cylinder block center crankshaft bearing web and bearing caps marked with daub of paint to indicate that caps are to be used with that block only *DO NOT USE CAPS WITH ANY OTHER COLOR THAN SHOWN ON WEB*

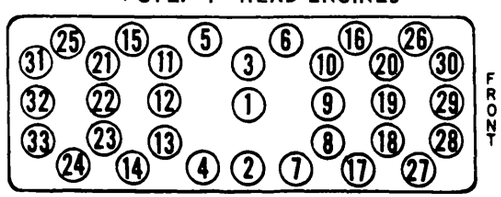
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4 CYL. "L" HEAD ENGINES



4 CYL. "F" HEAD ENGINES



6 CYL. 6-226 "L" HEAD ENGINE

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Rear Bearing Oil Seal (Neoprene Type—*NOTE Upper and lower halves of seal can be replaced without removing crankshaft from engine.* Seal is neoprene with a steel back. Upper half of seal can be removed by using a suitable piece of strap steel (hack saw blade with teeth ground off). Rotate upper half of seal around shaft with steel strap until opposite end protrudes far enough to grasp end and remove. To install, coat both parts of seal with grease and install upper half by rotating it around crankshaft until it is in position with ends even at the engine block. Coat both ends of lower seal with Permatex before installing to insure good seal with upper half.

Rear Bearing Cap Seal—Bearing cap sealed by cylindrical rubber packing strips inserted in holes between cap and case. When installing bearing cap, coat upper face lightly with sealing compound, insert new packing strips after cap is in place. Packing strips should protrude ¼" to provide proper compression when oil pan installed. CAUTION—Do not cut off this protruding portion of the packing.

►*MAIN BEARING CAP LOCATING DOWEL CAUTION:* Raise main bearing cap up evenly to eliminate possibility of bending dowels. Bent dowels will cause misalignment of bearing cap and result in rapid bearing wear and need for early bearing replacement. Install new dowels when old dowels are bent.

6 CYL. ENGINES

►*CRANKSHAFT REAR OIL SEAL LEAK CORRECTION:* **A new kit Part No. 925958 contains all parts necessary to correct rear bearing oil leak.**

►*OVERHAUL NOTE:* **When overhauling an engine using the new oil seal Part No. 925958 (see above), it is necessary to use Engine Overhaul Gasket Set No. 925956 & Oil Pan Gasket Set No. 925957.**

REAR BEARING OIL SEAL INSTALLATION: Crankshaft rear oil seal installed as follows:

OIL PAN TO FILLER BLOCK GASKET INSTALLATION. Install Neoprene Rubber gasket in each filler block (use Gasket Cement in grooves) With each end extending an equal amount (1/16") above faces of filler block ends. Allow cement to dry.

FRONT & REAR FILLER BLOCKS: Lower filler blocks (front & rear) are bolted on lower face of crankcase to close oil pan opening (filler blocks must be removed to replace pan gasket). Rear filler blocks (additional upper filler block guard in crankcase) are grooved for cork oil seals which bear on polished surface of crankshaft directly behind oil slinger. Filler blocks can be removed and replaced without disturbing crankshaft as follows:

Front Filler Block (Lower) Servicing: Remove by taking out mounting screws and timing gear cover screws which enter the filler block. When installing filler block, first install oil pan side gaskets (No. 733542), install filler block (use Permatex) and install new end gasket on block.

Rear Filler Block (Lower) Servicing: Same as for the lower front block (above) except for crankshaft oil seal (square cork gasket or graphite impregnated seal). Remove and discard old gasket or seal. Install new seal (No. 731046) in same manner as described below for Rear Filler Block (Upper) Guard. Install lower filler block after upper filler block guard has been installed.

Rear Filler Block (Upper) Guard Servicing: Guard is seated in groove in crankcase and can be rotated out without disturbing crankshaft after lower filler block removed. Remove and discard old gasket or seal, clean out seal groove. Install new graphite impregnated seal, No. 731046, flatten seal slightly and use mandrel or rod to seat seal in groove by rolling from ends toward center (ends must extend slightly above flat surface of guard). Do not use shellac or sealing compound in groove.

►*CAUTION:* Oil seal in both Upper Filler Block Guard and Rear Filler Block must be centered with crankshaft. If necessary, seal can be built up using 1/32" thick gasket material, 3/16" wide, as shims shellacked to groove in block or guard behind seal.

ENGINE FRONT COVER

4 CYL. ENGINES

FRONT COVER OIL SEAL: Cover has double metal baffle and spring-loaded leather seal which contacts polished surface of crankshaft pulley hub. When installing seal, make certain that seal lip is inward or toward rear of engine.

6 CYL. ENGINES

FRONT COVER OIL SEAL: Drive out old seal using Oil Seal Driver KF-44 Place cover with opening flange on flat surface Coat outer edge of new seal with sealing compound, place seal in opening with seal lip toward rear and drive seal in place.

CAMSHAFT & BEARINGS

4 CYL. ENGINES

CAMSHAFT SERVICING: Removal - Drain radiator and cylinder block, remove radiator and grille, cylinder head, manifold, valves, and valve springs. Remove oil pump, oil pan, crankshaft pulley (use puller), fan drive belts and fan assembly. Remove timing gear cover, camshaft gear and thrust plate and spacer. Block-up all valve lifters (can be tied up with string to manifold studs). Remove camshaft through front of engine.

Camshaft Front Bearing - Consists of steel backed babbitt lined bushing, staked in place to prevent rotation or endwise movement, with oil hole in bushing lined up with oil hole in crankcase.

Camshaft Thrust Plate - Thrust plate assembled behind camshaft gear with a spacer to control endplay. Add shim behind spacer to increase clearance, dress down spacer to reduce clearance. Beveled edge of spacer must be to rear.

6 CYL. ENGINES

CAMSHAFT SERVICING: Removal – Drain cooling system and remove radiator, vibration damper, engine front cover, timing chain and gears. Remove fuel pump, cylinder head, oil pan and oil pump. Remove valve chamber cover, valves and springs. Hold valve lifters in fully up position. Remove camshaft thrust plate and carefully withdraw camshaft from engine.

VALVE SYSTEM

VALVE TAPPET ADJUSTMENT

6 CYL. ENGINES

TAPPET CLEARANCE ADJUSTMENT PROCEDURE: Car manufacturer recommends valves be adjusted in order listed (see table below). Remove right front wheel and access cover in fender splash shield for access to valve compartment. Remove spark plugs so that engine can be turned over by moving fan or fan belt. By setting valves in fully raised position (left hand column), **valves in right hand column** will be on "low" side of cam **in position for tappet adjustment.**

Fully Raise Valve	Then ADJUST Valve:
Nos. 1 and 3	Nos. 10 and 12
Nos. 8 and 9	Nos. 4 and 5
Nos. 2 and 6	Nos. 7 and 11
Nos. 10 and 12	Nos. 1 and 3
Nos. 4 and 5	Nos. 8 and 9
Nos. 7 and 11	Nos. 2 and 6

ROCKER ARMS

4 CYL. "F" HEAD ENGINES

ROCKER ARM ASSEMBLY REMOVAL: Lock rocker arms, shaft, brackets and springs together as a unit by removing cover studs in front and rear rocker arm shaft brackets and installing 5/16"-24 thread set screws in the front and rear brackets in same manner set screws are installed in center brackets. Remove nuts on bracket studs and lift entire assembly off studs as a unit.

Installation: Check push rods, straighten or replace any that are bent. Place push rods in holes in head and block, being sure that they are properly seated in intake valve tappets. Place rocker arm assembly on its studs, seat intake valve adjusting screws in tops of push rods before installing nuts on bracket studs. Torque nuts to 30-36 ft. lbs. Remove extra set screws from front and rear rocker arm shaft brackets, install cover studs in front and rear brackets with short end of stud down.

OILING SYSTEM

ENGINE LUBRICATION

4 CYL. ENGINES

►*"L" HEAD & "F" HEAD ENGINE NOTE:* **These engines have similar oiling systems with exception of cylinder head valve mechanism oiling (Pushrods, Rocker Arms, Valve Tips) used on "F" head engines only.**

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, timing gears, and rocker arm assembly ("F" Head engines only). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted externally on left side of crankcase draws oil through floating type oil screen mounted on lower face of crankcase in oil pan (passage from oil intake pipe to pump is through drilled passages in crankcase). Pump delivers oil through passage in pump body directly to main oil gallery which extends along left side of crankcase. Oil is distributed through this oil gallery as follows:

Crankshaft Bearings - Each main bearing supplied with oil from main oil gallery through angle passage in crankcase web extending down from oil gallery to main bearing bore.

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Camshaft B arings - Front & Rear camshaft bearings supplied with oil through short oil passage intersecting corresponding main bearing oil passage. Intermediate camshaft bearings are supplied with oil directly from main oil gallery by passages extending down from the oil gallery to the camshaft bearing bores.

Connecting Rod Bearings - Crankshaft is drilled and each rod bearing is lubricated through passage extending from adjacent main bearing.

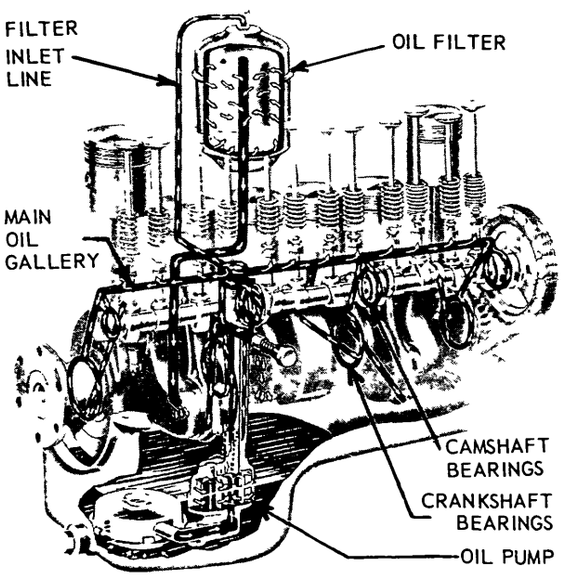
Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lines up with oil hole in crankpin.

Valve Lifters - Lubricated from oil reservoir trough cast in crankcase which is filled by oil spray from connecting rod bearings. Lifter guides are drilled to permit oil flow from trough to lifter bore (lifters have oil groove at center for uniform lubrication of lifter bore).

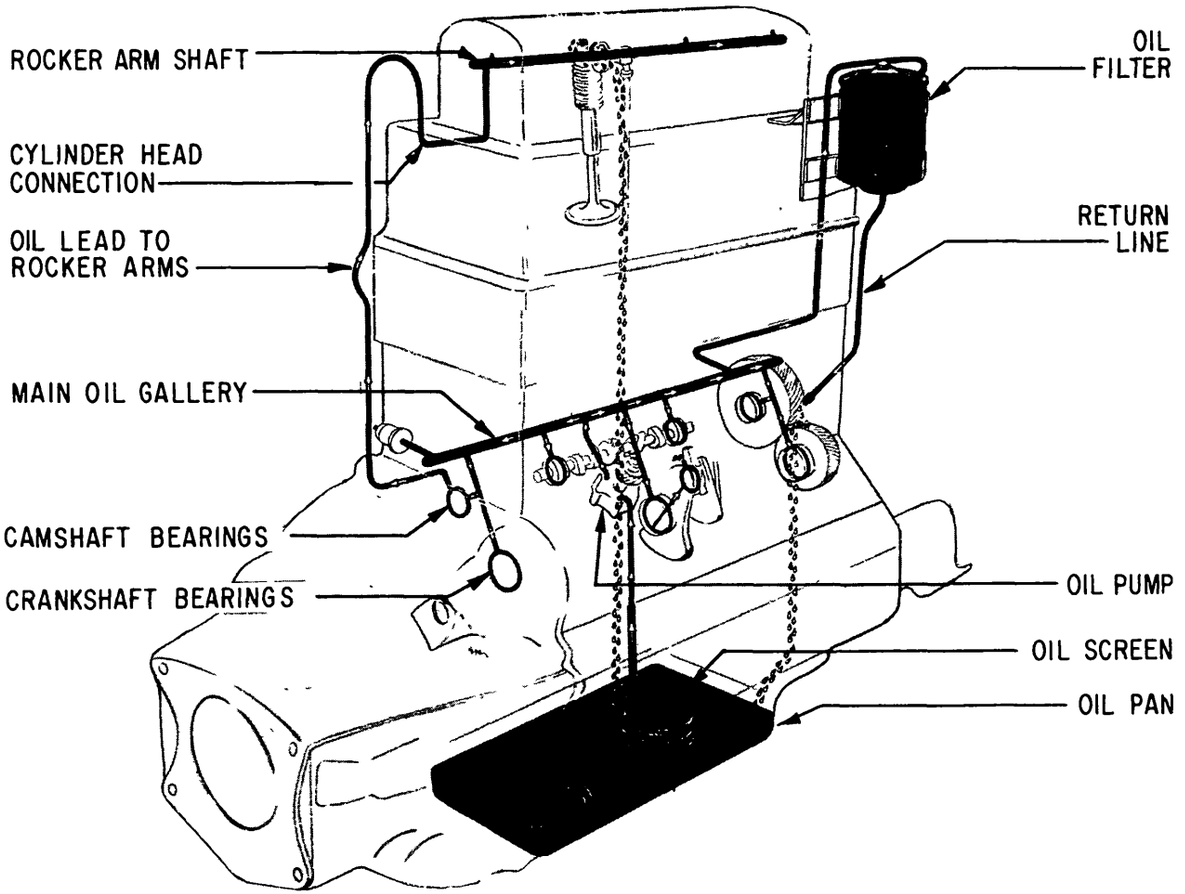
Timing Gears - Lubricated by oil jet from nozzle threaded in front face of engine block which directs oil on camshaft gear at point where gears mesh. Oil is supplied to nozzle through drilled passage from front main bearing oil passage.

►*TIMING GEAR OIL JET PRODUCTION CHANGE & REPLACEMENT CAUTION:* Beginning with 1960 Engines, Nos. 3J-166871 & 4J-250095, Timing Gear Oil Jet Part No. 924335 (with .040" aperature) was used to prevent oil pressure fluctuations at No. 1 connecting rod bearing. When replacing scored or burned No. 1 rod bearings, check timing gear oil jet and install new type with .040" aperature.

Pushrods, Rocker Arms & Intake Valves ("F" Head Engine) - External oil pipe connects fitting at rear of cylinder block with fitting on top of cylinder head at rear end behind rocker cover. Oil supplied through this line is metered by rear camshaft bearing. Passages in head conduct oil to rear rocker shaft support bracket mounting pad and drilled hole in support bracket and rocker shaft permit oil to flow into hollow rocker shaft. Shaft and rocker arms are drilled for lubrication of rocker arms, pushrod sockets, and valve tips. Excess oil drains back into crankcase through pushrod holes.



WILLYS 6 CYL. 6226 ENGINE OILING SYSTEM



WILLYS 4 CYL. "F" HEAD ENGINE OILING SYSTEM

OIL FILTER: Partial flow type mounted on bracket on engine. Filter inlet pipe is connected at fitting on left side of crankcase and draws oil directly from main oil gallery. Outlet pipe returns oil to crankcase.

6 CYL. 6226 ENGINE

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve lifters. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on lower face of crankcase in oil pan draws oil through floating oil screen and intake pipe mounted on pump cover and delivers oil directly to main oil gallery which extends along right side of crankcase to left of lifter bores (oil flows up around shaft in pump body to outlet hole which registers with oil passage in block when pump installed). *See Caution below.* Pressure regulator valve is located under plug on right side of crankcase at end of pump outlet cross-passage and returns excess oil directly to oil pan. Oil is distributed through the main oil gallery as detailed below.

►*OIL PUMP BUSHING CAUTION:* Pump bushing (installed in block) must be tight and installed flush with bottom of cylinder block. Loose or improperly installed bushing may restrict main oil gallery.

Crankshaft Bearings - Main bearings supplied with oil from main oil gallery through angle passage in crankcase web extending down from oil gallery to main bearing bore. *NOTE* - No. 3 crankshaft bearing is lubricated directly from pump outlet cross-passage (above).

Camshaft Bearings - Each camshaft bearing supplied with oil directly from main oil gallery by passage in crankcase web extending down from oil gallery to camshaft bearing bore.

C nn cting R d B arings - Crankshaft is drilled and

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each rod bearing is lubricated through passage extending from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lines up with oil hole in crankpin.

Valve Lifters - Lubricated directly from main oil gallery through cross-passage drilled through each lifter boss. *NOTE* - Oil holes extend completely through lifter bosses and first two groups (Cyl. Nos. 1 through 4) are shielded by sheet metal oil shields held in place by spring clips on underside of shield. No shield is used on rear group (Cyl. Nos. 5 & 6).

Timing Chain & Sprockets - Lubricated by continuous flow of oil from engine oiling pressure system.

OIL FILTER: Partial flow type mounted on bracket on left side of engine. Filter inlet pipe is connected to fitting on left side of block and draws oil directly from main oil gallery. Outlet pipe returns oil directly to oil pan.

OIL PUMP

4 CYL. ENGINE OIL PUMP

OIL PUMP REMOVAL & OVERHAUL: (Removal)—Rotate engine until distributor rotor points to No. 1 firing position and timing mark on flywheel or vibration dampener is directly under pointer (do not remove distributor, pump must be installed so gears mesh without moving rotor for correct engine timing). *CAUTION*—Crankshaft must not be rotated with oil pump removed). Remove pump mounting bolts and pull pump out as far as possible. Place a short jack between front suspension support and front lower edge of block and push engine to right until pump is free (Note—It may be necessary to loosen engine support bolts for more movement). Check pump shaft for wear before disassembling pump by mounting it in a vise with a dial indicator bearing against shoulder on gear, at right angles to relief valve housing. Move gear toward, then away from indicator and note total reading. If this play exceeds .010", replace complete pump.

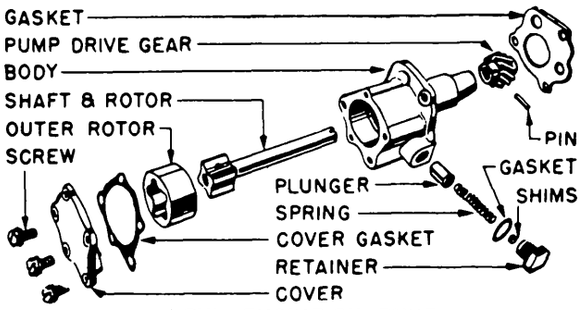
Disassembly: Remove cover screws, cover and gasket and shake outer rotor from housing. Remove relief valve retainer, gasket, shims, spring, and plunger. If rotor is to be replaced, file off one end of gear retaining pin, pull gear off shaft and remove shaft and inner rotor from housing. Clean all parts in solvent and check for wear, pits and scoring.

Inspection: Measure clearance between outer rotor and pump body. Replace body if clearance exceeds .012". Check cover to make certain that inner surface is not rough or scored and that inner face is flat within .001". Rotors must be within .001" thickness of each other. With gear installed on pump shaft, clearance between gear and pump body should be .003-.010".

Checking Rotor Clearance: Position inner rotor with one lobe engaged between lobes of outer rotor, then measure clearance of opposite inner rotor lobe and lobe of outer rotor. This clearance should be .010". To check end clearance, install the cover without gasket and tighten screws. If shaft can be turned by hand, end clearance is excessive. Install new cover and repeat test. If rotors still not tight, replace rotors.

Reassembly: Install relief valve, spring, gasket and retainer. If shims were removed, install them between spring and retainer. If new rotors installed, slide gear on shaft after installing shaft and rotor in housing. Position gear so there is not over .010" clearance between gear and pump housing and drill a 5/32" hole through pump shaft for retaining pin. Install pin and peen ends. Install cover and gasket and tighten screws.

Installation (4 Cyl. Models): Check to see that timing marks on flywheel or vibration dampener are directly under pointer and distributor rotor is pointed toward No. 1 firing position. Insert pump in block with pump gear positioned so that it will engage



4 CYL. ENGINE OIL PUMP

camshaft gear and the distributor shaft drive key without moving distributor rotor. Installation can be made only in one position without moving distributor rotor as slot in drive gear and key on distributor shaft is machined off-center.

6 CYL. ENGINE OIL PUMP

OIL PUMP SERVICING: Pump can be removed from engine (with oil pan off) by taking off retaining nut on stud on #3 main bearing cap and pulling pump straight down to disengage drive gear and distributor drive coupling. Service pump as follows:

Disassembly—Take out cotter pin and remove screen float assembly. Remove cover and gasket. Drive out pin holding upper drive gear on shaft (pin peened in place), drive out shaft from gear. remove idler gear (remove idler shaft if required). Take off lower drive gear (press fit and keyed to shaft).

Oil Pump Clearances—Check as follows:

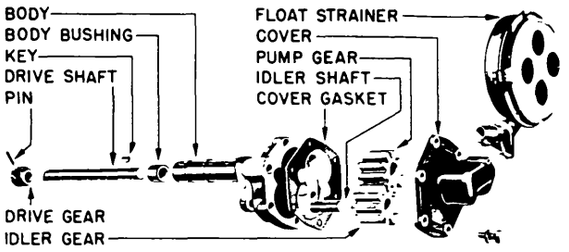
1)—Pump Body Bushing: if over .005" clearance between pump body and ends of lower drive gear teeth, replace bushing and ream to .500-.501".

2)—Pump Shaft: shaft diameter .4990-.4985".

3)—Lower Drive Gear: end of gear should be .001-.004" beyond gasket seat on pump body.

4)—Upper Drive Gear: .002-.004" clearance between underside of gear and upper end of pump body. Controlled by pressing lower drive gear on shaft until this clearance obtained.

NOTE—Cover plate should be replaced if worn from contact with gears, or if cracked.



6 CYL. ENGINE OIL PUMP

Oil Pump Bushing (in Cylinder Block)—Replace if worn or loose (can restrict oil gallery if loose). Replace by using drift inserted in distributor drive shaft bore from top of block. Install new bushing from below (must be flush with bottom of block).

Reassembly—Press upper drive gear on shaft. Insert new pin and peen ends flush with gear. Install shaft and gear in pump body. Press lower drive gear on shaft (with key in place) until .002-.004" clearance obtained between upper drive gear and upper end of pump body. Press idler gear shaft in body, install idler gear. Install cover using new gasket and pin oil screen float assembly on cover. Check shaft and gears—must rotate freely when turned by hand.

Oil Pump Installation—Set #1 piston at top dead center. Insert distributor main drive shaft from top of block. Install pump with pump drive shaft tongue engaging slot in lower end of distributor main drive shaft and in such a position that when installed, slot in upper end of distributor main drive shaft will be approx. parallel to side of block (slot pointing fore-and-aft), install lock washer, tighten mounting nut. Remove distributor shaft for cyl. head installation.

COOLING SYSTEM

WATER PUMP

4 CYL. ENGINE

OVERHAUL: Disassembly - Use special W-116 puller and pull impeller off shaft, lift out bakelite seal washer. Remove bearing lock ring from slot in bearing hub on pump housing, support pump housing in arbor press, press shaft and bearing assembly out of pump housing toward forward end. To remove fan pulley from shaft, use any regular puller (special W-115 puller furnished for this purpose) to pull pulley off shaft. Do not attempt to remove bearing from shaft (shaft and bearing serviced as assembly).

Servicing - If rear face of pump housing is not smooth and flat, resurface with special Tool C-551 or install new pump body.

Pump Reassembly: Install shaft and bearing assembly in pump housing (long end of shaft to rear) so that outer

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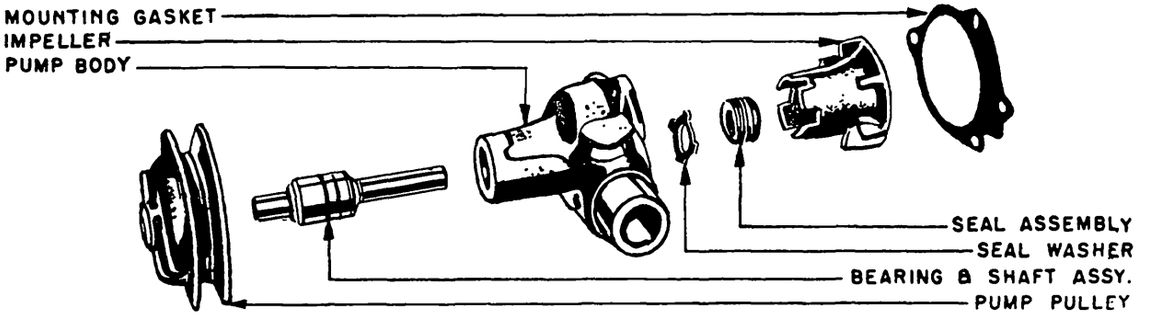
end of bearing is flush with front end of housing. Install seal assembly in impeller (dip seal parts in brake fluid before installing), press impeller on shaft until end of shaft is flush with face of impeller hub. Press fan pulley on forward end of shaft until end of shaft is flush with face of pulley. Check location of locking ring groove in bearing with respect to slot in housing, align groove and slot, install bearing locking wire.

6 CYL. ENGINE

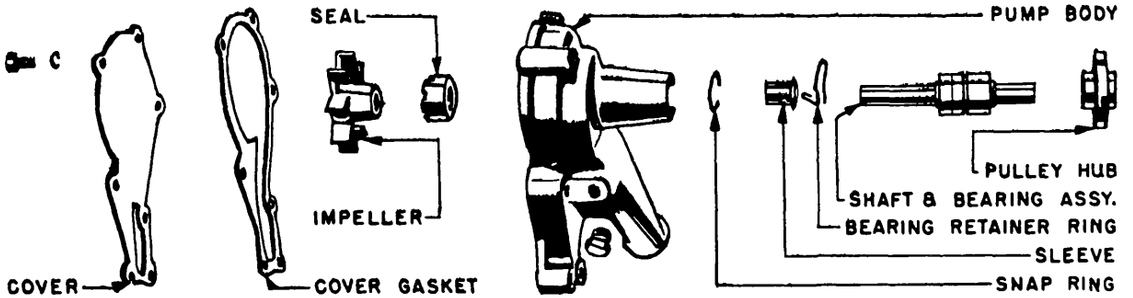
OVERHAUL: Disassembly - Remove fan and pulley from pulley hub. Remove pump cover and gasket. With Puller KF-29 and adapter, KF-113, remove impeller from shaft. Remove bearing retainer ring from slot in housing and press shaft assembly out front of housing. Press or drive seal assembly from pump body.

R assembly: Press seal assembly carefully into pump housing. Apply oil or graphite to face of carbon seal washer. Press pump shaft and bearing assembly into pump housing just far enough to insert retaining ring, insert ring. Press impeller on until flush with shaft end. Check impeller position to be sure it clears cover.

Pulley Hub Installation - Press hub on shaft so fan mounting face is 5 7/32" from rear face of rear cover plate. Install cover gasket and cover.



4 CYLINDER ENGINE WATER PUMP



6 CYLINDER ENGINE WATER PUMP

►*ELECTRICAL EQUIPMENT NOTE: Both Auto-Lite and Delco-Remy equipment used and may b intermixed on same vehicle, but g n rator and r gulat r f sam mak must be us d tog ther. 12-VOLT system is standard. 6-VOLT system with either type equipment is optional on all models. Data for all types of equipment is listed below.*

MODEL IDENTIFICATION

M d l	Series Symbol
F4-134 4x2 & 4x4 Jeep Utility	54
L6-226 4x2 & 4x4 Jeep Utility	54
F4-134 4 x 2 Jeep Utility "Maverick"	58
L6-226 4 x 2 Jeep Utility "El Gaucho"	58
F4-134 & L6-226 4WD Truck	55
DJ-3A Jeep Dispatcher	56
FJ-3 Fleetvan (U S. Post Office)	62
CJ-3B, CJ-5, CJ-6 Universal Jeep	57
FC-150 Forward Control	65
FC-170 Forward Control	61

SERIAL NUMBER: Stamped on metal plate attached in various locations
CJ-3B & DJ-3A to **right** side of dash under hood.
CJ-5 & CJ-6 to l ft side of dash under hood **FJ-3** on **right** side of dash below dimmer switch
FC-150 & FC-170 to cab floor above wheel housing at right door.
All 4WD Trucks on floor riser under **left** side of driver's seat.
All Utility Wag ns on floor riser to **left** and directly behind **back** of driver's seat.
NOTE - Number (example below) includes identification data.

① ② ③ ④ ⑤ ⑥
54 5 4 8 13 10001

① - See "Series Symbol" in Model Table above.
② - See "Body Style" in Body Style Table below.
③ - Engine Type. **3** - 4 Cyl. 134 cu. in. "L" Head. **4** - 4 Cyl 134 cu. in. "F" Head. **6** - 6 Cyl. 226 cu. in "L" Head.
④ - 2 Wheel Drive - 1 or 7 (LHD), 5 (RHD).
4 Wheel Drive - 2 or 8 (LHD), 6 (RHD).
⑤ - Indicates H.D. FC-170 with Dual Rear Wheels Number n t used on other models.
⑥ - Factory Unit Production Number.

B dy Style Table

B dy Styl	Series-54	55-56	57-58	61-65
Wagon	1		①	
Delivery	2			
Flat Faced Cowl	4	4		
Cowl Windshield	5	5		
Stripped Chassis	6	6	③	1 1
Cab Chassis		1		5 5
Pick-Up		2		5 5
Stake		3		5 5
Platform				5 5
Open Body or Canvas Top		②		
Hard Top		④		

① - 1 ("Maverick"), 5 ("El Gaucho").
② - 3 (CJ-3B, DJ-3A), 5 (CJ-5), 7 (CJ-6),
③ - 4 (CJ-3B, DJ-3A), 6 (CJ-5), 8 (CJ-6),
④ - 5 (CJ-5), 3 (DJ-3A).

ENGINE NUMBER: Located as follows·
4 Cyl. Engines - Stamped on top of water pump boss at front of engine.
6 Cyl. Engines - Stamped on boss on left front corner of engine block above generator.
NOTE -- Letters following engine number designate special cylinder bore and bearing oversizes or undersizes. *See "Engine Specifications".*

TUNE-UP

COMPRESSION PRESSURE: 4 Cyl. "L" Head 90-110 lbs.
4 Cyl. "F" Head 115-145 lbs (6.9-1 Ratio), 120-130 lbs. (7 4 or 7 8-1 Ratio).
6 Cyl. "L" Head 120-130 lbs. (6 86-1 ratio), 125-140 lbs (7 3-1 ratio)
NOTE - All cylinders must be equal within 10 lbs

VACUUM READING: Steady 18-21" at idle speed.

TAPPET CLEARANCE:	Intake	Exhaust
4 Cyl. "L" Head	.016"	.016"
4 Cyl. "F" Head	.018"	.016"
6 Cyl.	.014"	.014"

NOTE - Set clearance with engine COLD not running.

►*TAPPET ADJUSTMENT (FORWARD CONTROL MODELS):* Access panel provided in right front wheel housing-

MANIFOLD HEAT CONTROL: Used as follows
4 Cyl. "L" Head - Thermostatic coil on manifold.
4 Cyl. "F" Head - Water jacketed intake manifold.
6 Cyl. – Exhaust heat control valve with spring tension of 180° wind-up on manifold.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-3-4-2 (4 Cyl.), 1-5-3-6-2-4 (6 Cyl)
SPARK PLUG GAP: .030".
Spark Plugs - Auto-Lite A7 or Champion J8 14mm. Torque to 28-30 ft. lbs.

COIL: Autolite Coils used on both 6 Cyl & 4 Cyl cars
Replacement Service Coils - Autolite Nos 5-8 (6 volt), 5-10 (12 volt)
Ignition Current - 6 Volt - 2 5 amps idling, 5 amps at 6 3 volts stopped **12 Volt** - 2 8-2 9 amps at 12 5 volts idling or stopped

DISTRIBUTOR: Autolite. *NOTE* - Same distributor used in both 6-volt and 12-volt systems

	Autolite Distr. No.
4 Cyl Jeeps	IAY-4401
4 Cyl Others	IAT-4405
6 Cyl	IAT-4404A

Condenser - Autolite No 2-32 **Capacity** 21-25 mfd
Contact Point Set - Autolite No 1-45 (IAY Distr), No 1-47 (IAT Distr)
Breaker Gap - 020"
Cam Angle - 42°(4 Cyl,), 39° (6 Cyl) plus or minus 3°
Br ak r Arm Spring Tensi n - 17-22 ozs
R tati n - Counterclockwise viewed from above

Aut matic Advanc - IAY-4401, IAT-4405

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	425	2	850
6	1050	12	2100
10	1575	20	3150
11	1700	22	3400

Automatic Advance - IAT-4404A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
4	600	8	1200
6	1175	12	2350
7 5	1700	15	3400

Vacuum Spark Control: Autolite (integral type). Not used on IAY-4401 Distributor

Vacuum Advance - IAT-4405

Distr Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5 1/8
1	2	6 5/8
3	6	9 5/8
5	10	12 1/2
6	12	14

Vacuum Advance - IAT-4404A

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

DISTRIBUTOR: DELCO-REMY. *NOTE - Same Distributor used in both 6-volt and 12-volt systems.*

Engine	Delco-Remy Distr. N .
4 Cyl Jeeps	1112432
4 Cyl Others	1110255
6 Cyl	1110249

►*DISTRIBUTOR INSTALLATION NOTE:* Oil pump gear must be rotated 1 tooth counterclockwise (viewed from top of engine) from original position This will put No. 1 spark plug lead at front of engine and position vacuum advance so same vacuum line from Auto-Lite distributors can be used
Breaker Gap - 022"
Cam Angle - 25-34° (4 Cyl), 31-37° (6 Cyl).
Breaker Arm Spring Tension - 19-23 ozs
Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110255 & 1112432

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	425	0-4	850
4-6	925	8-12	1850
10-12	1700-1950	20-24	3400-3900

Automatic Advance - 1110249

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	375	0-4	750
2-4	500	4-8	1000
3-5	800	6-10	1600
5-7	1300	10-14	2600

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Vacuum Spark Control: Delco-Remy 1116052 (1110255 Distr.), 1116160 (1110249 Distr.). None used on 1112432 Distr.

Vacuum Advance - 1116052

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	3-5
6	12	9-14

Vacuum Advance - 1116160

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	9-11
5	10	14-18

IGNITION TIMING

Setting - 5° BTDC (All Models).

Timing Mark (4 Cyl. "F" Head) - Notch on rim of fan pulley to align with 5° mark on pointer on timing gear cover. Two marks on pointer - 5° and T (TDC).

Timing Mark (4 Cyl. "L" Head) - 5° mark on flywheel is in center of timing hole in flywheel housing. Flywheel marked T.C. (TDC) and 5° (5° BTDC).

Timing Mark (6 Cyl.) - Align correct graduation with pointer on timing gear cover. Damper marked "O" at TDC with 1° graduations before and after this point.

CARBURETOR

Model	Carter Carb. No.
4 Cyl. "L" Hd. Jeep Dispatcher	YF 2392S
4 Cyl. "F" Hd. Universal Jeep	YF 938SD
4 Cyl. "F" Hd. 4x 2, 4x4, 4WD	YF 951SA
4 Cyl. "F" Hd. Fleetvan	YF 3200S
4 Cyl. "F" Hd. Forward Control	YF 938SD
6 Cyl. "L" Hd. All Models	YF 2467S

Idle Setting - Initial setting ¾ to 1¼ turns open (938SD, 3200S & 951SA), ½ to 2 turns open (2392S), 1 to 2½ turns open (2467S). Turn screw out for richer mixture.

Idle Speed - 600 RPM (4 Cyl.), 550 RPM (6 Cyl.). *NOTE* - Fleetvan (Auto. Trans.) selector lever in "N" (neutral).

Fl at Level - 5/16" - Gauge T-109-107 (938SD, 951SA, 3200S), 9/32" - Gauge T-109-126 (2392S, 2467S), from top of float at free end to gasket seat on cover with assembly inverted and float resting on intake needle.

Crankcase Ventilation Valve - *See TUNE-UP.*

Fast Idle: With choke held in wide open position. lip on fast idle arm should contact boss on body casting.

►*OTHER DATA: See "Carter YF Carburetors" in Carbu r tion Section.*

CARB. EQUIPMENT

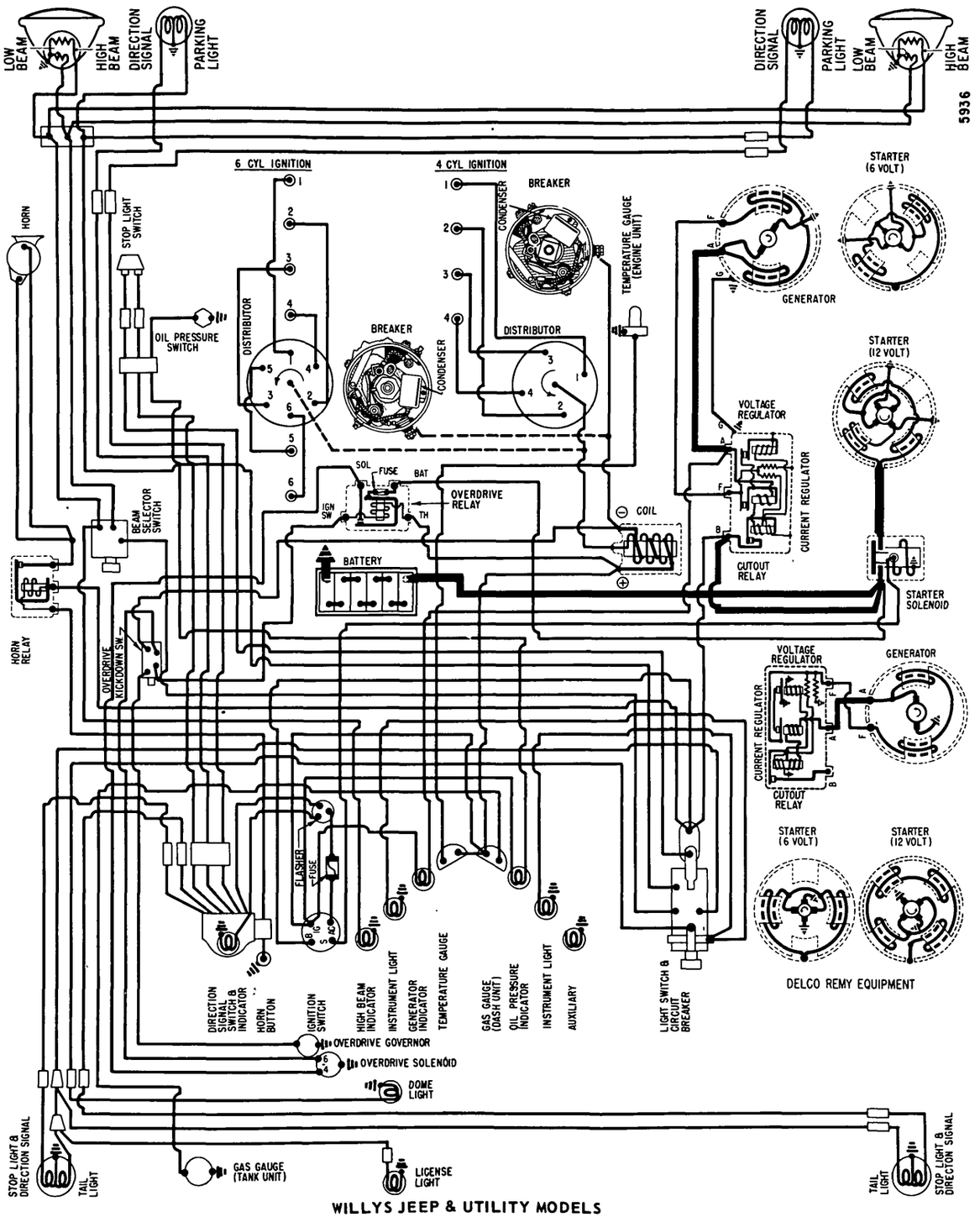
Fu l Pump: AC & Carter used as follows:

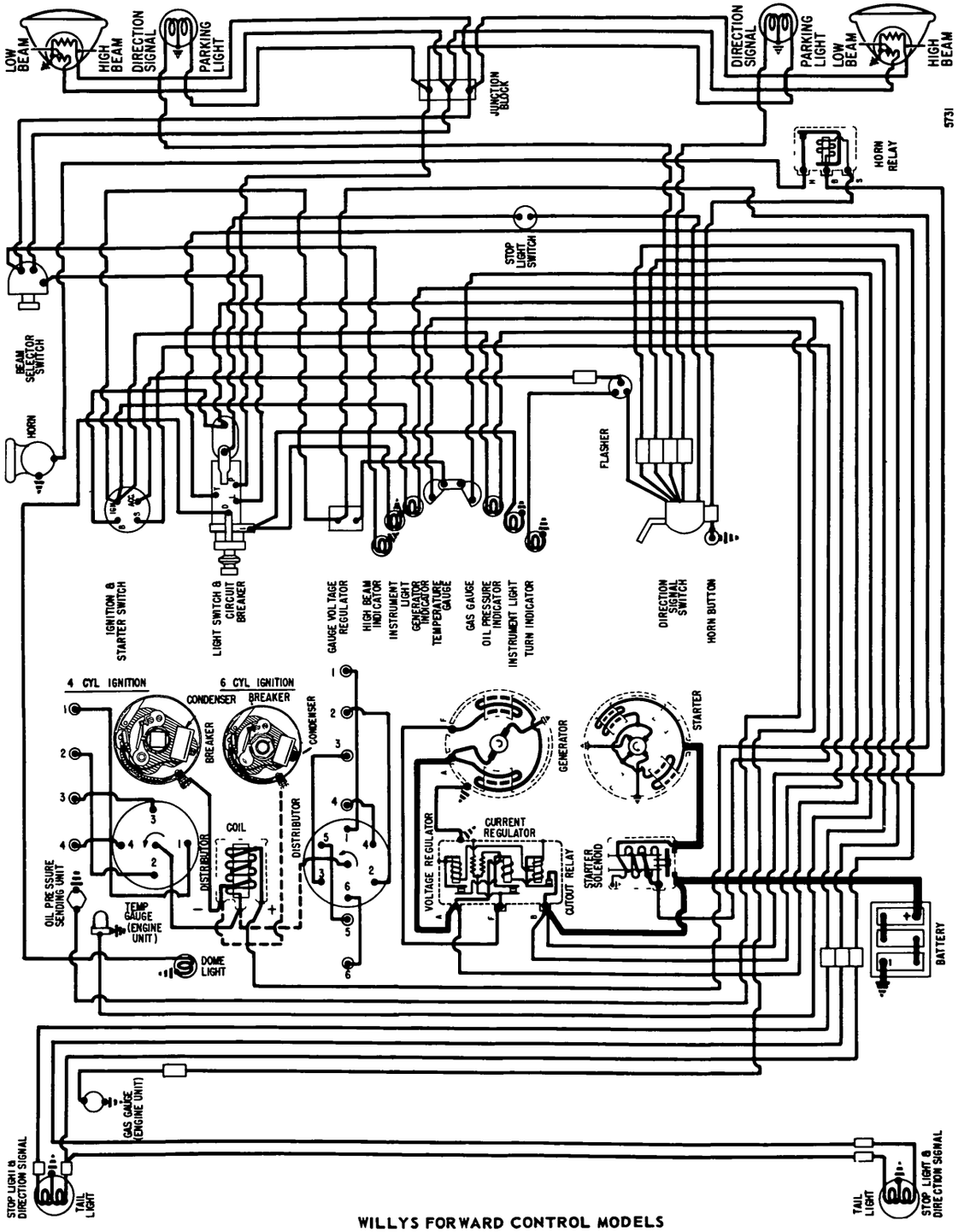
M del	AC No.	Carter No.
Univ. Jeep ①	4032	
Fleetvan (U.S. Post Office) ②	9716	
Jeep Dispatcher ②	9716	
Fwd. Control (FC-150) ①	4080	
Utility (4 Cyl.) ①	4080	
Fwd. Control (FC-170) ①		M957S
Utility (6 Cyl.) ①		M957S

① - Fuel & Vacuum. ② - Fuel only.

Pr ssur - 2½-3¾ lbs. (AC), 3½-5½ lbs. (Carter), all at 1800 RPM.

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WILLYS FORWARD CONTROL MODELS

CONTINUED FROM PRECEDING PAGE

►*FUEL FILTER NOTE:* Filter Spool located inside fuel tank on all models exc. Univ. Jeep & Jeep Dispatcher.

Gasoline Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator on back of instrument panel or fuel gauge.

AIR CLEANER: Oil Bath Type (Exc. DJ-3A). Dry Type (DJ-3A). Service at regular intervals.

6-VOLT ELECTRICAL SYSTEM
AUTO LITE
BATTERY

Autolite 1M-100R (FC-150 & 170), 1M-100 (Others).
6 volt, 15 plate, 100 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front engine support (6-226), right front engine support (Others).

STARTER

Autolite MCH-6215 (4 Cyl.), MCH-6210 (6 Cyl.).
Armature - 16-19 (All).
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 42-53 ozs.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	4300	5.0	65
6.0 ft. lbs.	Lock	2.0	335

Starting Switch: Autolite No. 15-31 (MCH-6215 Starter). Key starting (Magnetic switch controlled by turning key past "Ignition On" position).

GENERATOR

Autolite No. GGW-7404A (4 Cyl.), GGW-7404B (6 Cyl.).
Armature - Autolite No. 10-76 (All).

Performance Data

Amperes	Volts	Cold	RPM	Hot
0	6.4	870-970		950-1050
40.0	8.0	1800-2000		2150-2350
45.0	8.0	1925-2125		2350-2550

Brush Spring Tension - 18-36 ozs.
Field Current - 1.6-1.7 amperes at 5.0 volts.
Motoring Current - 5.0-5.5 amperes at 5.0 volts.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure.

GENERATOR REGULATOR

Autolite No. VBO-4601C.

Cutout Relay

Cuts In - 6.3-6.8 volts.
Cuts Out - 4-6 amps. discharge current after charging at 10 amperes.
Contact Gap - .015" minimum.
Air Gap - 025-.027" with contacts open (check at hinge end of core).

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V ltag Regulator

S tting - 7 2 volts (7 0-7 4) at 80° and charging at 10 amperes or with 25 ohm resistor in charging line

Air Gap – 048– 052" with contacts just opening (check at brass armature stop pin)

Current Regulator

►*SETTING CAUTION· "Temperature Compensated" type Set to following specifications at 70°F*

Test A	Operating Amperes	Test B
54 Amperes max		45 (43-47)

T st A - After 15 minutes operation with current at 10 amperes.

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold to 6 7-6 9 volts).

Air Gap – 048– 052" with contacts just opening (check at brass armature stop pin)

Checking & Adjusting - *See "Auto-Lite 6-Volt Regulators" in Electrical Section*

6-VOLT ELECTRICAL SYSTEM
DELCO-REMY
STARTER

Delco-Remy 1108077 (4 Cyl.), 1108078 (6 Cyl.).
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 24 ozs minimum

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs	6000	5 0	60
15 0 ft lbs	Lock	3 0	600

GENERATOR

D lco-Remy 1102832 (4 Cyl.), 1102831 (6 Cyl.).
Replacement Generator Without Pulley - 1102811 (All)

Performance Data

Amperes	Volts	RPM
45	8 0	2350

Brush Spring Tension - 28 ozs
Field Current - 1 87-2 0 amps at 6 0 volts.
Rotation - Counterclockwise at commutator end
B lt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure

REGULATOR

Delco-Remy 1972063.

Cutout Relay

Cuts In - 5.9-6 7 volts
Contact Gap - .020" **Air Gap** - 020"

Voltage Regulator

Setting - 6.9-7 4 volts
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "Delco-Remy 6-Volt Regulators" in Electrical Section.*

Current Regulator

Setting - 42-47 amperes.
Air Gap - 075" with armature pressed down to point where contacts just touch
Ch cking & Adjusting - *See "D lco-R my 6-Volt R gulators" in El ctrical S ction*

12-VOLT ELECTRICAL SYSTEM
AUTOLITE
BATTERY

Autolite No. 11-HS used as follows: (All Exc. Fleetvan) - 12 volt, 9 plate, 50 ampere hour capacity (20 hr rate)
(Fleetvan) - Autolite 11-HS. 12 volt, 11 plate, 70 ampere hour capacity (20 hr rate)
Battery Ground - Negative
Engine Ground - Left front engine support (6 Cyl), right front engine support (4 Cyl)

STARTER

Autolite No. MDU-7004 (4 Cyl.), MDU-7003 (6 Cyl.).
Armature - Autolite No 16-82 (All)
Drive - Bendix "Folo-Thru" type
Rotation - Counterclockwise at commutator end
Brush Spring Tension - 31-47 ozs

Performance Data (MDU-7003,4)

Torque	RPM	Volts	Amperes
0 ft lbs	5300	10 0	50
6 2 ft lbs	Lock	4 0	280

Starting Switch· Autolite SAE-4005 (MDM-6005) Key starting (Magnetic switch controlled by turning key past "Ignition On" position)

ALTERNATOR & REGULATOR

Autolite No. ALC-5001 used with Regulator No. 8-106 (VBS-6201A).
Rotation - Clockwise at drive end
Field Current - 2 32-2 43 amps at 10 volts
Rated Output - 42 amps at 14 2 volts at 4200 RPM
►*OTHER DATA See "Autolite Alternator & Regulator" in Electrical Section.*

GENERATOR

Autolite No. GJP-7402A (4 Cyl.), GJP-7402B (6 Cyl.).
Armature - Autolite No 10-53 (All)

Performance Data

Amperes	Volts	RPM
16	15 0	1700
30	15 0	2300
35	15 0	2600

Brush Spring Tension - 18-36 ozs
Field Current - 1 6-1 7 amps at 10 0 volts
Motoring Current - 3 1-3 5 amperes at 10 0 volts
Rotation - Counterclockwise at commutator end

Belt Adjustment: ½–5/8" deflection midway between generator and water pump pulleys with normal thumb pressure

GENERATOR REGULATOR

Autolite No. VBO-4201E-4A.

Cutout Relay

Cuts In - 12 5-13 5 volts
Cuts Out - 3-5 amps discharge after charging at 7 amperes
Contact Gap - 015" Minimum
Air Gap - 025- 027" with contacts open (check at hinge end of core)

V ltag R gulat r

S tting - 14 2-14 8 volts at 80°F and charging at 7 amperes or with 25 ohm resistor in charging line
Air Gap - 048- 052" with contacts just opening

Current Regulat r

►*SETTING CAUTION "Temperature Compensat d type Set to following specifications at 70°F*

Test A	Operating Amperes	Test B
44 Amperes max		35 (33-37) Amps

Test A - After 15 minutes operation charging at 10 amps

Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13 6-13 8 volts)

Air Gap - 048- 052" with contacts just opening

Checking & Adjusting - *See 'Autolite 12-Volt Regulators" in Electrical Section*

12-VOLT ELECTRICAL SYSTEM
DELCO-REMY
STARTER

Delco-Remy 1107746 (4 Cyl), 1107747 (6 Cyl)
Rotation - Counterclockwise at commutator end
Drive - Bendix "Folo-Thru" type
Brush Spring Tension - 35 ozs minimum

Performanc Data

Torque	RPM	Volts	Amperes
0 ft lbs	6900	10 3	75
10 5 ft lbs	Lock	5 8	435

GENERATOR

Delco-Remy 1102172 (4 Cyl.),1102171 (6 Cyl.).
Replacement Generator With ut Pull y - 1102096 (All)

Performanc Data

Amperes	Volts	RPM
30	14 0	2240

Brush Spring Tension - 28 ozs
Field Current - 1 69-1 79 amps at 12 volts (80°F)
Rotation - Counterclockwise at commutator end
Belt Adjustment: 1/2-5/8" deflection midway between generator and fan pulleys with normal thumb pressure

REGULATOR

Delco-Remy 1972029.

Cutout R lay

Cuts In - 11 8-13 5 volts
Contact Gap - 020" **Air Gap** - 020"

Voltage R gulator

Setting - 13 8-14 8 volts
Air Gap - 075" with armature pressed down to point where contacts just touch
Checking & Adjusting - *See "D lco-R my 1119000 Series Regulators" in Electrical S ction*

Current R gulat r

Setting - 27-33 amperes
Air Gap - 075" with armature pressed down to point where contacts just touch
Ch cking & Adjusting - *See "Delco-Remy 1119000 Series Regulators" in Electrical Section*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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MISC. ELECTRICAL

Lighting Switch Removal: Loosen set screw on side of control knob and remove knob. Remove retaining nut and remove switch through panel.

Stop Light Switch Location: On brake master cylinder.

CIRCUIT BREAKER: 25 Ampere - Protects lighting circuits. Integral with headlight switch.

FUSES: Located in lead except overdrive fuse, which is at overdrive relay. See table below.

Fuse Specifications

Item	6 Volt	12 Volt
Overdrive	SFE 20	SFE 14
Dir. Signal	SFE 14	SFE 9
Heater (Exc. Fwd. Contr.)	SFE 14	SFE 9
Heater (Fwd. Contr.)	SFE 10	AGC 10
Radio	SFE 9	①

① - AGA-5 (Fwd. Contr.), AGC-7½ (Utility).

ENGINE

►*THREE DIFFERENT ENGINES USED: See "Model Identification" for application.*

4 CYL. "F" HEAD

Model	Bore	Stroke	Displacement
F4-134 (All)	3.125"	4.375"	134.2 cu. ins.

Model	Compr. Ratio	Rated HP	Developed HP
F4-134 4x2	7.4-1①	15.63	75 at 4000 RPM
F4-134 Others	6.9-1②	15.63	72 at 4000 RPM

① - 7.8-1 Optl. ② - 7.4-1 Optl.

Compression & Vacuum Reading—See *"TUNE-UP"* above.

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:
"A" .010" main & connecting rod journals Undersize.
"B" .010" cylinder bore and pistons Oversize.
"AB" both above conditions exist.

ENGINE REMOVAL (Utility & Forward Control Models): See *"Engine" in Willys Special Data.*

CYLINDER HEAD & GASKET INSTALLATION: See *Willys Special Data.*

TIGHTENING TORQUES: See *Willys Special Data.*

PISTONS

Aluminum alloy, cam ground, T slot, Tin or Brass plated Piston has heat insulating groove above top piston ring groove

►*PISTON OVERSIZE NOTE:* Letter "B" or "AB" following engine number indicates that cylinder bore and pistons are .010" Oversize.

Weight—13.5 ozs.

Removal—Pistons & Rods removed from above.

Fitting New Pistons: Place 003" x 3/4" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove ribbon feeler should be 5 to 10 lbs.

Replacement Pistons: Std. and .010", .020", .030" and .040" Oversize.

Installing Pistons: "T" slot toward valve (left side) of engine (opposite side from oil spray hole in connecting rod lower end).

PISTON PINS

Locked in rod with clamp screw.

Diameter—.8118-.8120". **Length**—2-25/32".

Clearance in Piston - .0001-.0003". Thumb push fit at 70°F.

Replacement Pins - No oversizes available.

PISTON RINGS

Standard Engine

Ring	Width	End Gap	Side Clearance
Compr.(1)	3/32"	.007-.017"	.002-.004"
Compr. (2)	3/32"	.007-.017"	.0015-.0035"
Oil	3/16"	.007-.017"	.001-.0025"

Fleetvan Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	3/32"	.010-.020"	.002-.004"
Compr. (2)	3/32"	.010-.020"	.0015-.0035"
Oil	3/16"	.015-.055"	①

① - Steel Rail, Chrome-plated.

Replacement Rings: (For rebored cylinders)—Furnished .010", .020", .030" and .040" Oversize.

Service Type Rings—(For Cylinders not Rebored)—Furnished Std. (.000-.009"), .010" (.010-.019"), .020" (.020-.029"), .030" (.030-.039"), .040" (.040-.049") Oversize.

Installing Rings: Install compression rings with mark "Top" (on side) toward top. Rings have tapered face and must be installed correctly. Top ring inner bevel edge must be up.

CONNECTING RODS

Length (Center to Center) - 9.1845-9.1905"

Weight - 32 ozs.

Crankpin Journal Diameter - 1.9375".

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following the engine number indicates that main and connecting rod journals are .010" Undersize.

Bearings—Steel backed babbitt.

Clearance - .0003-.0025".

Sideplay - .004"-.010".

Replacement Bearings: Std. and .001", 002", .010", .020", .030" Undersize.

Installing Rods: Lower bearing offset. Install rods with short side of bearing toward nearest main bearing or toward front of engine (Nos. 1 & 3), toward rear of engine (Nos. 2 & 4). Oil spray hole in lower end of rod must be toward right of engine (away from camshaft) on all rods.

CRANKSHAFT

Journal Diameter - 2.333-2.334". All main bearings.

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AB" following engine number indicates that main and connecting rod journals are .010" Undersize.

Bearings—Steel backed babbitt.

Clearance - .0003-.0029".

Replacement Bearings: Std. and .001", .002", .010", .020", .030" Undersize.

Crankshaft Servicing: See *"Crankshaft & Main Bearings" in Willys Special Data*

End Thrust: Taken by thrust washer between crankshaft gear and front bearing Endplay controlled by shims between thrust washer and shoulder on crankshaft. *NOTE* - Thrust washer must be installed with inner beveled edge toward front bearing Endplay—.004-.006".

Crankshaft Rear Main Bearing Oil Seal: Knurls added to rear seal surface on crankshaft. See *"Crankshaft & Main Bearings" in Willys Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Willys Special Data.*

CAMSHAFT

Journal Diameters - **(1)** 2.1860-2.1855", **(2)** 2.1225-2.1215", **(3)** 2.0600-2.0590", **(4)** 1.6230-1.6225".

Bearings - No. 1 steel-backed, babbitt (replaceable bushings), Nos. 2, 3, 4 cast iron (precision bored in block).

Clearance - .001-.0025".

End Thrust: Taken by thrust plate behind camshaft gear Endplay controlled by spacer between camshaft gear and shoulder on shaft Endplay can be increased by installing shim between spacer and shaft, or decreased by dressing off spacer *NOTE* - Inner beveled edge of spacer must be toward crankcase

End Play—.004-.007".

Camshaft Servicing: See *"Camshaft & Bearings" in Willys Special Data.*

Timing Gears: Crankshaft gear, steel. Camshaft gear, fibre with steel hub.

Gear Clearance - 000-002"

Camshaft Setting: Mesh marked tooth of camshaft gear with marked space (between teeth) of crankshaft gear

VALVES

Tappet Clearance: Intake 018", Exhaust 016" Cold

Valve	Head Diameter	Stem Diameter	Length
Intake	2"	3733-3738"	4.781"
Exhaust	1-15/32"	371-372"	5.909"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	260"	0007-.0022"
Exhaust	45°	351"	.0025-.0045"

►*EXHAUST VALVE NOTE* Thompson Valve Rotators used

Valve Seat Width—3/64".

Valve Seat Inserts - Used for all exhaust valves

Valve Stem Seals (Intake Valves) - Rubber seal ring installed on upper end of valve stem directly below valve locks When installing valves, install spring and retainer, compress spring, install seal in groove before installing locks

Valve Springs. Install with closed coil upward toward block (Exhaust), down towards head (Intake).

Free Length—1 31/32" (Intake), 2½" (Exhaust).

Valve Spring Specifications

Valve	Intake	Exhaust
Closed	73 lbs. at 1 21/32"	53 lbs. at 2 7/64"
Open	153 lbs. at 1 13/32"	120 lbs. at 1 3/4"

Valve Guides: Use Tool W-238 to remove and install guides. Drive Exhaust guide down into valve compartment to remove. Drive new Exhaust guide to 1" below surface of cylinder block and new Intake guide flush with bottom of valve guide bore in cylinder head.

Rocker Arm Assembly Removal: See *"Valve System" in Willys Special Data.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Valv Lift rs: Mushroom type operating in reamed holes in block. Serviced by installing oversize lifters. Lifters furnished .004"Oversize.
Diameter–.6240-.6245". **Clearance**–.0005-.002".
►*NOTE:* Camshaft must be removed for lifter removal.

VALVE TIMING

See "Camshaft Setting" under "CAMSHAFT" above.
Intake Valves–Open 9° BTDC. Close 50° ALDC.
Exhaust Valves–Open 47° BLDC. Close 12° ATDC.
Valve Timing Check–Set Intake valve clearance at .026". Rotate engine clockwise until No. 1 cylinder is ready for intake stroke. Intake opens 9° BTDC. Note the distance between TDC and the 5° mark and estimate 9° from this distance. With the crankshaft in this position timing is correct if lifter is just tight against valve stem.

ENGINE

4 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L4-134	3.125"	4.375"	134.2 cu. ins.
Model	**Compr. Ratio**	**Rated HP**	**Developed HP**
L4-134	6.48-1	15.63	60 at 4000 RPM

►*ENGINE NUMBER NOTE: Letters stamped after engine number denote the following:*
"A" - .010" undersize main & connecting rod bearings.
"B" - .010" oversize cylinder bore.
"AB" - Both above conditions exist.
"C" - .002" undersize piston pin.
"D" - .010" undersize main bearing journals only.
"E" - .010" undersize connecting rod bearing journals only.

►*OTHER ENGINE DATA: See "4 Cyl. "F" Head" above and note the following differences:*

VALVES: Tappet Clearance - .016" Cold (Intake & Exhaust).

Valve	Head Diam.	Stem. Diam	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.371-.372"	5 51/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.351"	.0007-.0022"
Exhaust	45°	.351"	.0025-.0045"

Valve Seat Width - 3/64"
Valve Springs: Install all springs with closed coil end up toward cylinder block **Free Length** - 2½"

Spring Specifications (All Valves)

Valve	Pressure & Length
Closed	53 lbs at 2 7/64"
Open	120 lbs at 1 3/4"

Valve Guides: Use W-177 to remove and install guides. Drive guides into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block and new intake guide 1 5/16" below surface of cylinder block.
VALVE TIMING: *Same as on 4 Cyl. "F" Head Engine.* **Valve Timing Ch ck** - Set tappet clearance of No 1 cylinder intake valve at 020" Rotate engine until No 1 cylinder is entering intake stroke (9° BTDC). Note distance between TDC and 5° mark on timing gear cover, estimate position of 9° point With crankshaft in this position, timing is correct if lifter is just tight against valve stem Reset tappet clearance to 016".

ENGINE

6 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L6-226	3.3125"	4.375"	226.2 cu. ins.
Model	**Compr. Ratio**	**Rated HP**	**Developed HP**
L6-226	6.86-1③	26.33	105 at 3600 RPM

③ - 7.3-1 Optl.

Compression & Vacuum Reading–*See TUNE-UP above.*

►*VALVE CHAMBER COVER STUDS LEAKING CORRECTION AND PRODUCTION CHANGE:* A new oil seal Willys No. 927013 and washer No. G-120395 replace Gasket No. G-137281 in production beginning Eng. Serial Nos. S-16471, T-134501 & F-20951. Oil leakage at valve chamber cover studs can be corrected on earlier models by replacing gasket with new oil seal and washer.

►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:
"A" 010" Undersize main and connecting rod journals
"N" 020" Oversize bore and pistons
"AN" Indicates both "A" and "N" conditions

►*ENGINE SERIAL NUMBER PLATE REPLACEMENT CAUTION:* When installing a new cylinder block, old engine serial number plate must be transferred and installed on new block to prevent oil leakage at drilled holes provided in new block.

ENGINE REMOVAL (Utility & Forward Control Models): *See "Engine" in Willys Special Data.*
CYLINDER HEAD & GASKET INSTALLATION: *See "Cylinder Head & Manifolds" in Willys Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Willys Special Data.*

PISTONS

Aluminum alloy, T-slot, cam ground, tin or brass plated.
►*PISTON OVERSIZE NOTE:* Letters "N" or "AN" following engine number indicates that cylinder bore and pistons are 020" Oversize
Weight - 15 187-15 437 ozs (less rings and pin)
Removal - Pistons and rods removed from above
Fitting New Pistons: Place 0015" x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove feeler should be 5 to 10 lbs.
Piston Replacement–Std., .010", .020", .025, .030", .040", .050", and .060" Oversize.
Installing Pistons: Slot in skirt toward left or away from camshaft.

PISTON PINS

Floating type with lock ring at each end.
Diameter - .8591-.8593". **Length** - 2.779".
Clearance in Piston - .0002". Selective fit. Light thumb push fit.
Clearance in Rod - .0002-.0006". Hand press fit at room temperature.
Pist n Pin Fitting - Palm push fit. Ream connecting rod bushing for proper fit of oversized pins.
Replacem nt Pins: Std., .003" and .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (Upper)	.0930-.0935"	.008-.016"	.002-.004"
Compr. (Lower)	.0930-.0935"	.008-.016"	.003-.007"
Oil (Top ring)	.1545-.1550"	.008-.016"	.006-.010"
Oil (Bottom ring	.1545-.1550"	.008-.016"	.0025-.004"

Replacement Rings: Ring sets and single rings furnished in following sizes for oversize ranges indicated: Std. (Std.-.009"), .020" (.010-.029"), .030" (.030-.039"), .040" (.040-.049"), .060" (.050-.069").
Installing Rings: Side marked "Top" (compression rings) upward. Chrome plated ring must be installed in top (#1) ring groove.

CONNECTING RODS

Length–6.998"- 7.002" (Center to center)
Crankpin Journal Diameter–2.0619- 2.0627".
►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AN" following engine number indicates that the main and connecting rod journals are .010" Undersize.
Bearings–Steel Backed Babbitt.
Clearance - .0007-.0025" maximum. **Sideplay** - .006-.011".
Replacement Bearings: Std. and .001", .002", .010" and .012", .020" Undersize.
Installing Rods: Mark rods and bearing caps. Install with marks together and toward camshaft in same order as when removed. Oil spray hole in lower end of rod toward camshaft. *NOTE*–Lower bearings offset with narrow side of rod toward nearest main bearing (#1, 3, 5 forward), (#2, 4, 6 toward rear).

CRANKSHAFT

Journal Diameter - 2.374-2.375".
►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letter "A" or "AN" following the engine number indicates that the main and connecting rod journals are .010" Undersize.
Bearings–Steel Backed Babbitt.
Clearance - .0008-.0028".
Replacement Bearings: Std. and .001", .002", .010" and .012", .020" Undersize.
End Thrust: Taken by #4 rear main bearing which is flanged type.
Endplay - .003-.006".
Rear Bearing Oil Seal Installati n: *See "Crankshaft and Main Bearings" in Willys Special Data.*

CAMSHAFT

Journal Diameters–(1) 1.8725-1.8735", (2) 1.8095-1.8105", (3) 1.7472-1.7485", (4) 1.2475-1.2485".
Bearings–Steel Backed Babbitt.
Clearance–.001-.003".
End Thrust: Taken by thrust plate on front of engine (between front bearing journal and hub of sprocket).
End Play–.003-.007".
Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data.*
Timing Chain: Non-adjustable type. Width 1" (Early), .875" (Late). Pitch .500".
Length 23" or 46 links.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

►*TIMING CHAIN CAUTION. Morse and Link Belt chains used. Chains and sprock t int rchangeabl only in COMPLETE SETS*

Camshaft S tting· Mesh chain with 9 links (or 10 link pins inclusive of pins opposite marks) between marks on sprockets with #6 piston at top dead center on compression stroke.

Engine Fr nt C v r Oil S al (Crankshaft Front Seal): *Se "Engin Front C v r" in Willys Special Data*

VALVES

Tapp t Cl arance: Intake and Exhaust .014" Cold.

►*VALVE TAPPET ADJUSTMENT (FORWARD CONTROL MODELS)* Access panel provided in right front wheel housing for valve tappet adjustment Install jack stand under right frame rail, remove right front wheel, remove wheel housing access panel (both sections of split panel), remove fuel pump and valve covers Tappet clearance can then be adjusted

►*TAPPET CLEARANCE ADJUSTMENT PROCEDURE: S "Valv Syst m" in Willys Special Data*

Valv	H ad Diam.	Stem Diam.	Length
Intake	1 520"	.3402-.3410"	5.187"
Exhaust	1.328"	.3382-.3390"	5.205 '

Valv	S at Angle	Lift	Stem Clearance
Intake	30°	284"	001- 003"
Exhaust	45°	284"	0032- 0050"

Valv S at Ins rts - Used for all exhaust valves

Valv S at Width: 5/64-3/32" (intake), 3/32-7/64" (exhaust).

NOTE–Rotators used on Exhaust valves.

Valve Guid s: Pressed in block. Replace when stem clearance exceeds maximum (above). Ream new guides to inside diameter of .3432-3422".

R placement Guides–Std., .0005" (marked "A"), .0055" (marked "L") to insure .0005-.003" press fit.

Guide Installati n–Place guide (tapered end of guide toward top) in position in bore and drive in to correct position of 1-7/32" below top face of cylinder block.

Valv Springs: Intake & Exhaust valve, spring interchangeable

Fr L ngth–1-31/32".

Valv	Valv Spring Specifications Lbs. Pressure	Length
Closed	51	1 672"
Open	107	1 312"

Valv Lifters: Mushroom type with self locking adjusting screws.

Diamet r–.6855-.6860".

Clearance–Selective fit. Lifter should rotate in bore with slight drag. Service by installing oversize lifter.

Replacement Lifters–Furnished in Std. and the following oversizes marked as indicated "B" is .001", "D" is .002", and "K" is .005" O.S.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

►*VALVE TIMING NOTE:* Specifications are with tappet clearance as follows. Intake 018", Exhaust 020"

Intake Valves - Open 2° BTDC Close 42° ALDC

Exhaust Valves - Open 42° BLDC Close 8° ATDC

Checking Valve Timing - Check timing marks on vibration damper to be sure they are correct when No 1 Piston is at TDC Adjust No 1 intake and exhaust valve clearance to 0175" Remove spark plugs and turn engine until No 1 intake has zero clearance then continue to turn engine until No 1 intake just starts to open Timing indicator should show 2°±2° BTDC Continue to turn engine Exhaust valve should be closed when indicator shows 8°±2° ATDC

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM· See "Engine Lubrication" under OILING SYSTEM in Willys Special Data*

Crankcase Capacity - 4 qts (4 Cyl), 5 qts (6 Cyl , refill

Normal Oil Pressure: 35 lbs at 2000 RPM (4 Cyl), 1700 RPM (6 Cyl)

Pressure Regulator - In pump housing (4 Cyl), right side of cylinder block below valve chamber to rear of engine (6 Cyl)

Oil Pressure Indicator: Red telltale light in Instrument Cluster operated by Oil Pressure Switch Light comes on when Ignition Switch turned on and goes out when oil pressure reaches 6 lbs

Oil Pump: Rotor type on left side of engine (4 Cyl), gear type attached to rear intermediate main bearing in crankcase (6 Cyl)

Oil Pump Overhaul - *See "Oiling System" in Willys Special Data*

Oil Filter: Partial flow type ("Disposable" type used on some cars) *NOTE* - When replacing disposable type filter, tighten filter by hand until gasket contacts mounting flange then tighten one-half turn additional

Crankcase Ventilation: Standard Cars - Filter in oil filler cap and outlet tube from crankcase ventilator baffle on valve side cover

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

►*COOLING SYSTEM FILLING CAUTION (FC 150 & FC-170)* These models have separate "surge tank" and cooling system should be checked and filled as follows Fill surge tank to the top replace cap run engine at medium speed for one minute remove cap and recheck coolant level add more coolant as necessary to bring level to top of tank *NOTE* - If system filled with engine cold recheck coolant level after engine run for one minute **after thermostat opens**

►*RADIATOR BYPASS VALVE CAUTION (FC-170)* This valve located on water pump can be closed for cold weather operation for more efficient heater operation but VALVE MUST BE OPEN IN WARM WEATHER FOR PROPER COOLING

►*FC-150 FAN PULLEY NOTE* Install fan pulleys on both water pump and fan shaft assemblies with offset to front of engine to eliminate interference with generator pulley Adjust fan belt to ¼-½" deflection with light thumb pressure by pulling shaft housing to right side of frame

Water Capacity: (FC-150) 10 qts (FC 170) 11 qts (Other 4 Cyl) 11 qts (Other 6 Cyl) 12 qts without heater Add 1 qt for heater (except FC 170 ½ qt)

Pressure Valve: 7 lb. (Jeep & Jeep Dispatcher), 7 lb. (Jeep Utility Exc 6 Cyl 4 x 4) 13 lb. (Jeep Utility 4 x 4) 9 lb. Forward Control (Exc FC-170 with Air Intake Modification Kit) 13 lb (Forward Control with Air Intake Modification Kit)

Thermostat: Harrison In water outlet elbow in cylinder head Opens at 163-168°F

Water Pump: Centrifugal packless ball bearing type *See "Cooling System" in Willys Special Data*

Temperature Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator on back of instrument panel or fuel gauge

LUBRICATION

FLEETVAN AUTOMATIC TRANSMISSION LUBRICATION: Check fluid level every 1,000 miles, drain and refill every 10,000 miles. Use only Automatic Transmission Fluid Type "A", Suffix "A"

Checking Fluid Level - With engine and transmission at normal operating temperatures, and engine running, move gearshift lever through all positions Return selector lever to "N" (neutral). Remove dipstick and check fluid level, which should be on the "F" FULL mark Add oil, if needed, through dipstick tube.

Capacity - 8½ qts., drain and refill capacity.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

1961 CARTER AFB 4-BARREL CARBURETORS

	Cart r Carb. N .
BUICK	
Series 4400 (Power Pack)	3089S
Series 4600, 4700, 4800	3088S
CADILLAC	
All Series (Exc Air Cond.)	3177S
All Series (Air Cond.)	3178S
CHEVROLET 348" ENG.	
305 & 340 H.P. Engines ③	3012S
305 H.P. Engine (Early) ④	3012S
305 H.P Engine (Late) ④	3221S
CHEVROLET 409" ENG.	
Std.	3270S
CHRYSLER	
New Yorker & Imperial	3108S
New Yorker & Imperial (CCV) ①	3134S
300G (Synchro-mesh)	(Two) 3084S
300G (Auto. Trans.)	(Two) 2903S
DODGE & DODGE DART	
318" Eng. (Auto. Trans.)	3103S
318" Eng. (Auto. Trans.) (CCV) ①	3131S
361" Eng. (Synchro-mesh)	3105S
361" Eng. (Auto Trans)	3106S
361" Eng. (S.M. & A.T) (CCV) ①	3140S
383" Eng. (S M. & A.T)	3152S
383" Eng. (S M. & A.T.) (CCV) ①	3133S
383" Eng (Spec. Police)	2968S
383" & 413" Engs. (Optl.)	3113S
413" (High Perf.)	3108S
383" & 413" Engs. (Ram Ind.)	(Two) 2903S
383" & 413" Engs. (High Perf. & Police) ②	(Two) 3084S
PLYMOUTH	
318" Eng. (Auto. Trans.)	3103S
318" Eng. (Auto. Trans.) (CCV) ①	3131S
361" Eng. (Synchro-mesh)	3105S
361" Eng. (Auto. Trans.)	3106S
361" Eng. (S.M. & A T.) (CCV) ①	3140S
383" Eng (Spec. Police)	2968S
383" Eng. (Spec. Police) (CCV) ①	3133S
383" Eng (Spec. Police) (Front) 2790S, (Rear)	2791S
383" & 413" Engs. (Optl.)	3113S
413" (High Perf.)	3108S
383" & 413" Engs. (Ram Ind.)	(Two) 2903S
383" & 413" Engs. (High Perf. & Police) ②	(Two) 3084S
PONTIAC	
Synchro-mesh (Early)	3123S
Synchro-mesh (Late)	3123SA
4-Spd. Auto. Trans. (Early)	3124S
4-Spd. Auto. Trans. (Late)	3124SA
4-Spd. Auto. Trans (Later)	3124SB
3-Spd. Auto. Trans. (Early)	3125S
3-Spd. Auto. Trans. (Late)	3125SA
3-Spd. Auto. Trans. (Later)	3125SB
VALIANT	
Hyper-Pack	3083S

① - Closed crankcase ventilation (CCV).
② - Special "Short" Ram Induction engine.
③ - 305 H.P. engine with 11.00-1 compression ratio.
④ - 305 H.P. engine with 9.25-1 compression ratio

►CHANGES, CAUTIONS, CORRECTIONS

►*BUICK CARBURETOR INSTALLATION CAUTION:* Make sure the tin-coated plate located between carburetor and intake manifold is installed with smaller holes toward front. If plate is installed backward, plate will extend ¼" at rear edge of carburetor.

►*1961 PONTIAC (AUTO. TRANS. CARS) STALLING & LEANNESS DURING WARM-UP CORRECTION & CARBURETOR PRODUCTION CHANGES:* As follows: **3124S,SA & 3125S,SA Carbs.** - Set choke 3 notches rich from index. On 3124S, 3125S Carbs., install accelerator pump link in inner hole and adjust pump stroke setting to 5/16". *NOTE - On 3124SA, 3125SA Carbs., vacuum piston has been revised and accelerator pump rod is installed in inner hole in production.* **3124SB & 3125SB Carbs.** - A new choke coil is installed on these carburetors in addition to changes made on 3124SA & 3125SA Carburetors.

►*1961 PONTIAC (3123S, 3124S, 3125S CARBS.) "BUMP" WHEN THROTTLE IS FULLY OPENED ABOVE 30 MPH (1 to 5 MILES AFTER COLD START) CORRECTION:* Install new secondary clusters, Pontiac Part No 535370 (choke side), Pontiac Part No. 535371 (pump side) These new clusters have enlarged auxiliary feed. *NOTE - On later 3123SA, 3124SA, 3125SA Carbs., the new clusters are installed in production. In addition, new secondary metering jets, Pontiac Part No. 7011193 (3123SA), 3742270 (3124SA & 3125SA) have been installed.*

DESCRIPTION: Four barrel downdraft type with automatic choke, similar in design to previous AFB carburetors with the following features

Idle Air System (Cadillac 3177S, 3178S; Chrysler 3084S; Chrysler, Dodge, Plymouth 2903S; Plymouth 2790S, 2791S; Pontiac 3123S, 3124S, 3125S): Throttle valves are completely closed at low idle speed and air is admitted through Idle Air System which consists of an air bypass passage (primary side only) through which air for closed throttle operation is taken from above throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore An Idle Speed Screw (single screw for both primary bores) controls adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used) Throttle valves are completely closed at slow idle speed

Three Stage Step-Up Rod: (Chrysler 3108S, 3134S; Dodge and Plymouth 3103S, 3105S, 3106S, 3131S, 3133S, 3140S): Step-up rods in these carburetors have three step-up stages. Other AFB carburetors have two step-up stages

Idle Compensator Valve (Buick 3088S, 3089S; Cadillac 3177S, 3178S; Pontiac 3124S, 3125S): Assembly is mounted between main venturi on secondary side and consists of a valve, bi-metal strip, holder and mounting bracket Unit is not adjustable and must be replaced if faulty Purpose of compensator is to admit additional air under hot idling conditions and to prevent stalling With high air temperature in carburetor, the valve opens and allows additional air to be drawn into carburetor bores below throttle valves to offset enrichening effect of hot idle. *CAUTION - Idle compensator must be closed while adjusting idle speed.*

Cross-Over Type Automatic Choke (Chrysler, Dodge & Plymouth Carburetors Except 2790S & 2791S): This type automatic choke is a separate unit mounted in a well in intake manifold (at exhaust cross-over passage) and linked to choke valve lever by a connector rod Choke vacuum piston is located in a cylinder in carburetor air horn and linked directly to choke valve. *See "Carter Cross-Over Type Automatic Choke" in 1957 Annual Data or later Manual edition*

ADJUSTMENTS: *Make all adjustments as indicated below.*

►*CHRYSLER, DODGE & PLYMOUTH IDLE SETTING CAUTION:* When making idle speed and mixture adjustments, observe the following **1)** Turn headlights on to high beam to compensate for alternator load (Alternator charges battery at idle speed). **2)** On automatic transmission cars (except models with Ram Manifold), loosen carburetor throttle rod locknut in sliding link so transmission internal stop will not interfere with carburetor throttle lever When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut

►*IDLE SPEED ADJUSTMENT NOTE (CARS WITH IDLE AIR BY-PASS SYSTEM):* These carburetors have a single Idle Air By-pass Screw which is used for all idle speed adjustments (there is no throttle stopscrew). Turning the idle air adjustment screw outward increases engine speed but also leans out the mixture supplied to engine which must be compensated for by the adjustment of idle mixture screws.

Idle Mixture & Speed Adjustment (Cars with On Carburetor): *CAUTION - On cars with Idl Comp nsator, th the compensator valve must be held clos d whil adjusting idle speed (use pencil or oth r instrum nt to hold compensator down on its seat). On cars with Idle Air System, adjusting the air adjustm nt scr w (t adjust engine speed) will chang the idle mixtur setting and this should always b r ch ck d aft r an engine speed adjustment has b n mad .* If initial adjustment required to allow engine to be warmed up, turn both idle mixture adjusting screws in until lightly seated, then back screws out the correct number of turns shown in table below Run the engine until it reaches normal operating temperature with choke valve wide open and fast idle inoperative (engine idling at hot or slow idle speed). Then proceed as follows: Connect vacuum gauge and tachometer. Adjust engine idle speed to correct figure shown in table below with transmission selector lever in proper rangeas indicated. Make this adjustment by turning throttle stopscrew (or Idle Air Bypass Adjusting Screw on carburetors with this adjustment). Adjust each idle mixture adjusting screw in or out for smooth idling and highest vacuum reading and engine RPM. *(NOTE* - On Buick, set each screw midway between points where engine runs irregularly due to lean and rich mixture). Recheck and if necessary reset idle speed, then recheck idle mixture setting. *CAUTION* - On cars with Idle Air Bypass Adjusting screw, always recheck idle mixture adjustment **after** changing setting of idle air adjusting screw. On cars with automatic transmission, check and adjust Throttle Linkage. *See Throttl Linkage Adjustment under CARBURETOR on each car mod l page.*

Idle Mixture & Speed Adjustm nt (Chrysl r, D Soto, Dodge, Dodge Dart, Plymouth with Tw Carbur t rs): *NOTE - Th s carburetors hav an Idl Air Bypass Screw for idle speed adjustment* Before adjusting carburetors, check and adjust carburetor interconnect-

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1961 CARTER AFB 4-BARREL CARBURETORS (C nt.)

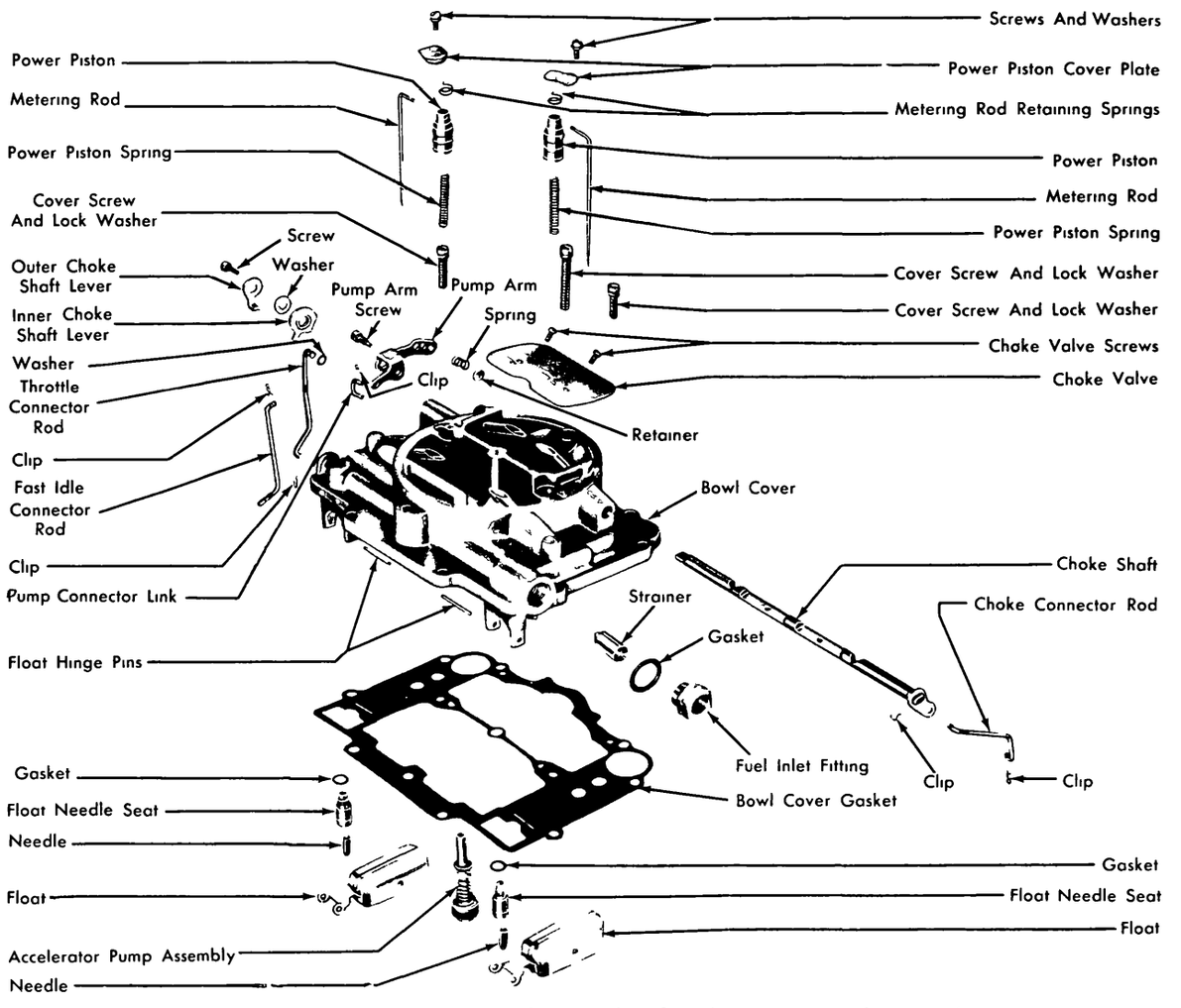
ing linkage (s *"Throttle Linkage Adjustment" under CARBURETOR on car model pages),* and ignition timing *NOTE - If pr liminary adjustment required to enabl ngine to b started for warm-up, set all idle mixtur scr ws 1-2 turns open from a lightly seated position and s t idl air bypass screws (1 on each carbur t r) 1 turn p n.* Connect a tachometer, then operate engine until it reaches normal operating temperature Turn engine off and disconnect each carburetor throttle rod at bellcrank on manifold. Turn all adjusting screws (mixture and bypass) in finger tight, then open idle air bypass screw (1 on each carburetor) 1 full turn. Open each idle mixture screw (2 on each carburetor) ¾ turn Start the engine and turn idle mixture screws on left carburetor 1/8 turn at a time until smoothest idle is obtained. Repeat this procedure on right hand carburetor, keeping mixture screws with 1/8 turn of each other With transmission in "N" (Neutral), air conditioner compressor ON (if so equipped), adjust idle speed to 750 RPM by adjusting idle air bypass screw on each carburetor equally Repeat the idle mixture adjustment and idle speed adjustment until a smooth idle is obtained at 750 RPM Connect each carburetor throttle rod at bellcrank

Idl Mixture Screw Setting

Car & Carb.	Idle Screw Opening
Buick 3088S, 3089S	¾ turns
Cadillac 3177S, 3178S	1-2½ turns
Chevrolet 3012S, 3221S	½-2 turns
Chevrolet 3270S	¼-1½ turns
Chrysler 2903S, 3084S	1/8-1½ turns
Chrysler 3108S, 3134S	¾-2¼ turns
Dodge 3103S, 3131S	¾-2¾ turns
Dodge 3105S, 3106S, 3140S	¾-2¼ turns
Dodge 3133S, 3152S	¾-2¼ turns
Dodge 2968S	¼-1¾ turns
Dodge 2903S	1/8-1½ turns
Plymouth 3103S, 3131S, 3133S	¾-2¼ turns
Plymouth 3105S, 3106S, 3140S	¾-2¼ turns
Plymouth 2968S	¼-1¾ turns
Plymouth 2903S	1/8-1½ turns
Plymouth 2790S, 2791S	½-2 turns
Pontiac (All Carbs)	¼-1¾ turns

①Idle Speed Setting

Car Model	S-M Trans.	Auto. Trans.
Buick (Std)		⑪525 RPM
Buick (Air Cond)		②⑥575 RPM
Cadillac (All Models)		③⑤480 RPM
Chevrolet 3012S	600 RPM	550 RPM
Chevrolet 3221S	475 RPM	450 RPM
Chevrolet 3270S	650 RPM	
Chrysler (1-Carb) ⑦ &	③500 RPM	③⑥500 RPM
Chrysler (2 Carbs) &	③750 RPM	③⑥750 RPM
Dodge (1 Carb) ⑦ &	③500 RPM	③⑥500 RPM
Dodge (2 Carbs) &	③750 RPM	③⑥750 RPM
Plymouth (1 Carb) ⑦ &	③500 RPM	③⑥500 RPM
Plymouth (2 Carbs) &	③750 RPM	③⑥⑨750 RPM
Pontiac (Std)	480-500 RPM	⑨480-500 RPM
Pontiac (Air Cond)	②540-560 RPM	②⑨540-560 RPM
Valiant (Hyper-Pack) &	700 RPM	700 RPM



CARTER AFB 4-BARREL CARBURETOR AIR HORN & FLOAT ASSEMBLY (TYPICAL)

① - Throttle Stopscrew or Idle Air Adjusting Screw.
② - Air Conditioner turned OFF.
③ - Air Conditioner turned ON.
④ - Transmission in "N" (Neutral) or "P" (Park).
⑤ - Transmission in "D" (Drive).
⑥ - Transmission in "N" (Neutral).
⑦ - 550 RPM for Air Cond. Cars. Transmission in "D" (Drive) or "R" (Reverse) and Air Conditioning turned on.
⑧ - With Headlights turned ON.
⑨ - 600 RPM on engines with "runner" type intake manifold (carburetor at front and rear)

►*1961 CADILLAC IDLE SPEED ADJUSTMENT CAUTION:* Due to vacuum released parking brake, it is impossible to set the brake with transmission selector lever in "DR" position unless vacuum release is disconnected Disconnect diaphragm at neutral safety switch and tape switch opening to prevent any air leak

►*1961 CHRYSLER, DODGE & PLYMOUTH IDLE SPEED ADJUSTMENT CAUTION See "Idle Setting Caution" above*

Anti-Stall Dashpot (Throttle Return Check): Dashpot is a separate unit mounted on carburetor or elsewhere in throttle linkage *For adjustment, see "Throttle Linkage Adjustment" under CARBURETOR on car model pages*

Idle Speed-Up Control (Cadillac Air Conditioned Cars): This unit increases engine idling speed with air conditioning turned on and transmission selector lever in Neutral. For adjustment, see *CARBURETOR on Cadillac car model page.*

Met ring R ds: No adjustment required. Metering rods not used on secondary side.

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1961 CARTER AFB 4-BARREL CARBURETORS (C nt.)

Float Setting: *(NOTE - Before adjusting float level and float drop, floats must be aligned as follows).* Align floats by sighting down side of float to determine if side of float is parallel to outer edge of horn casting. To adjust, bend float lever by applying pressure to end of float shell with finger while supporting float lever with thumb (CAUTION - Apply only enough pressure to bend float lever). After aligning float, remove as much clearance as possible between arms of float lever and support lugs on air horn by bending both arms of the lever. Arms should be parallel to inner surfaces of support lugs and float must operate freely without excess clearance on hinge pin.

►*1961 CHRYSLER, DODGE, PLYMOUTH FLOAT SETTING CAUTION: Fuel inlet needles on these carburetors have a "Viton" (resilient synthetic rubber) tip. When bending float lever to adjust height, DO NOT allow float lever to contact inlet needle as tip can be compressed enough to cause a false setting. After being compressed, needle tip is very slow to recover its original shape.*

Fl at Level - Both floats are set to the same height. With air horn inverted, bowl cover gasket in place and needle seated, measure distance from top of float at outer end to air horn gasket with proper gauge (see table below). Adjust by bending float arm.

Float Level Setting

Car & Carb.	℄Height	Gauge No.
Buick 3088S, 3089S	7/32"	T109-106
Cadillac 3177S, 3178S	5/16"	T109-107
Chevrolet 3012S, 3221S, 3270S	7/32"	T109-106
Chrysler 3108S, 3134S	7/32"	T109-106
Chrysler 2903S, 3084S	9/32"	T109-126
Dodge (Exc. 2903S)	7/32"	T109-106
Dodge 2903S	9/32"	T109-126
Plymouth (Exc.2790S, 2903S)	7/32"	T109-106
Plymouth 2790S, 2903S	9/32"	T109-126
Pontiac 3123S, SA	9/32"	T109-126
Pontiac 3124S, SA, SB; 3125S,SA,SB	21/64"	T109-294

℄ - Plus or minus 1/64".

Fl at Drop - With bowl cover held in upright position so that floats hang down at lower end of travel, measure from outer (free) end of float to float bowl gasket. This should be 23/32" plus or minus 1/16" for all models.

Acc lerating Pump Stroke: This is a pump stroke adjustment and not a seasonal setting. On all models with provision for seasonal setting, make certain that connector rod engaged in correct hole in pump arm as listed below. Back out throttle stopscrew so that throttle valves fully seated. Use scale to measure from top surface of bowl cover to top of pump plunger stem. If this distance not correct as shown in table below, adjust by bending connector rod at lower angle using T109-213 bending tool.

Pump Str k S tting

Car & Carb.	Plung r H ight	C nn ct r R d
Buick (All Carbs.)	7/16"	Center
Cadillac (All Carbs.)	15/32"	Inner
Chevrolet (All Carbs.)	33/64"	Non-Adj.
Chrysler(Exc.2903S & 3084S)	7/16"	Center
Chrysler 2903S, 3084S	27/64"	Center
Dodge (Exc. 2903S)	7/16"	Center
Dodge (2903S)	27/64"	Center
Plymouth (Exc. 2903S)	7/16"	Center
Plymouth 2903S	27/64"	Center
Pontiac 3123S, 24S, 25S	31/64"	℄Center
Pontiac 3123SA, 3124SA, SB	5/16"	Inner
Pontiac 3125SA, SB	5/16"	Inner

℄ - See "Changes, Cautions, Corrections" above.

Automatic Choke (Cross-Over Type): This choke assembly is mounted in well in manifold casting. To adjust with unit off engine, loosen mounting post locknut and turn mounting post with screwdriver until index mark on disc positioned opposite correct mark on scale (see table below for proper setting). When choke is installed on engine, lift cover disc and open and close choke manually to make sure connector rod clears sides of hole in housing cover. If rod does not clear, replace unit (bending the rod will affect choke calibration).

Automatic Choke (Integral Type): *Adjust AFTER Choke Piston Lever Adjustment or Choke Countershaft Adjustment has been completed.* Settings are shown in table below. Adjust by loosening choke cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Car & Carb.	Choke Setting
Buick 3088S, 3089S	Centered
Cadillac 3177S, 3178S	1 Point Rich
Chevrolet 3012S, 3221S	Centered
Chevrolet 3270S	1 Point Rich
Chrysler 3108S, 3134S	℄2 Points Rich
Chrysler 2903S, 3084S	℄1 Point Rich
Dodge 3103S, 3131S	℄ Centered
Dodge 3105S, 3106S, 3140S	℄ Centered
Dodge 3133S, 3152S, 2968S	℄2 Points Rich
Dodge 2903S	℄1 Point Rich
Plymouth 3103S, 3131S	℄ Centered
Plymouth 3105S, 3106S, 3140S	℄ Centered
Plymouth 2968S, 3133S	℄2 Points Rich
Plymouth 2791S	℄1 Point Rich
Plymouth 2903S	1 Point Rich
Pontiac 3123S,SA, 3124S,SA,3125S,SA	②1 Point Rich
Pontiac 3124SB, 3125SB	1 Point Rich

℄ - "Cross-Over" type Automatic Choke.
② - See "Changes, Cautions, Corrections" above.

Choke Piston Linkage Adjustment: Remove choke cover and coil assembly, gasket, and baffle plate for access to choke piston.

Buick - Bend a .026" wire gauge (Tool T109-189) at a 90° angle approximately 1/8" from end, then open choke valve and insert wire gauge so that bent portion is between top of slot in choke piston cylinder and bottom of slot in piston. Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. There should be 3/32" (Gauge T109-125) between top of choke valve and air horn. To adjust, bend choke connector rod.

Cadillac - With choke valve closed choke piston should be flush with top of piston housing. To adjust, bend choke connector rod. *NOTE - Choke valve should be held closed by applying pressure to piston l ver in piston housing.*

Chevrolet (Exc. 3270S) - Close choke valve tightly and hold in this position by pressing on choke piston lever in choke housing. Clearance between choke piston lever and stop in housing should be .010". To adjust, bend choke connector rod.

Chevrolet 3270S - Bend a .026" wire gauge (Tool T-109-189) at a 90° angle approximately 1/8" from end, then open choke valve and insert wire gauge so that bent portion is between top of slot in choke piston cylinder and bottom of slot in piston. Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. There should be 7/32" (Gauge T109-106) between top of choke valve and air horn. To adjust, bend choke connector rod.

Chrysler, Dodge & Plymouth 2903S, 3084S - Use a .026" wire gauge (T109-189) with 1/8" section at end bent at 90° angle. Set throttle valve ¼ open, open choke valve wide. Insert wire gauge into choke piston slot so that hooked end enters slot in cylinder wall. Close choke valve by pressing on choke lever until wire is gripped between piston and cylinder with linkage hanging free. Clearance between choke valve and upper edge of air horn should be 1/8". Adjust by bending choke connector rod at angle.

Pontiac - Open throttle so fast idle cam does not contact adjusting screw, then close valve by pressing piston lever in choke housing. Top of choke piston should be flush with top of piston cylinder when choke valve is closed. To adjust, bend choke connector rod.

Fast Idle Linkage: This adjustment must be made before checking and adjusting Fast Idle and Unloader. Adjust each model as follows:

Buick 3088S, 3089S; Chrysl r 3108S, 3134S; D dg & Plymouth 2968S, 3105S, 3106S, 3133S, 3140S, 3152S - With choke valve closed, index mark on fast idle cam should align with adjusting screw. To adjust, bend fast idle connector rod.

Cadillac 3177S, 3178S; Dodg & Plymouth 3103S, 3131S; Plymouth 2791S - With choke valve tightly closed and lug on outer choke shaft lever contacting stop on inner choke shaft lever, align center of fast idle screw with index mark on cam. To adjust, bend choke fast idle connector rod.

Chevrolet 3012S, 3221S - With slight clearance between lug on fast idle cam and stop on casting, and inner choke shaft lever contacting lug on outer choke shaft lever, align index mark on cam with adjusting screw. To adjust, bend fast idle connector rod.

Chevrolet 3270S - With choke valve closed, index mark on fast idle cam should align with adjusting screw. To adjust, bend fast idle connector rod.

Chrysler, Dodge & Plymouth 2903S; Pontiac 3123S, 3124S, 3125S - With choke valve tightly closed, trip lever and cam arm in alignment, align center of fast idle screw with index mark on cam. To adjust, bend fast idle connector rod.

CONTINUED ON NEXT PAGE

1961 CARTER AFB 4-BARREL CARBURETORS (C nt.)

Fast Idl Setting: *This adjustment can be made with the carburetor on the bench (Off Engine) but setting should b check d aft r th carburetor installed (On Engine) as f ll ws:*

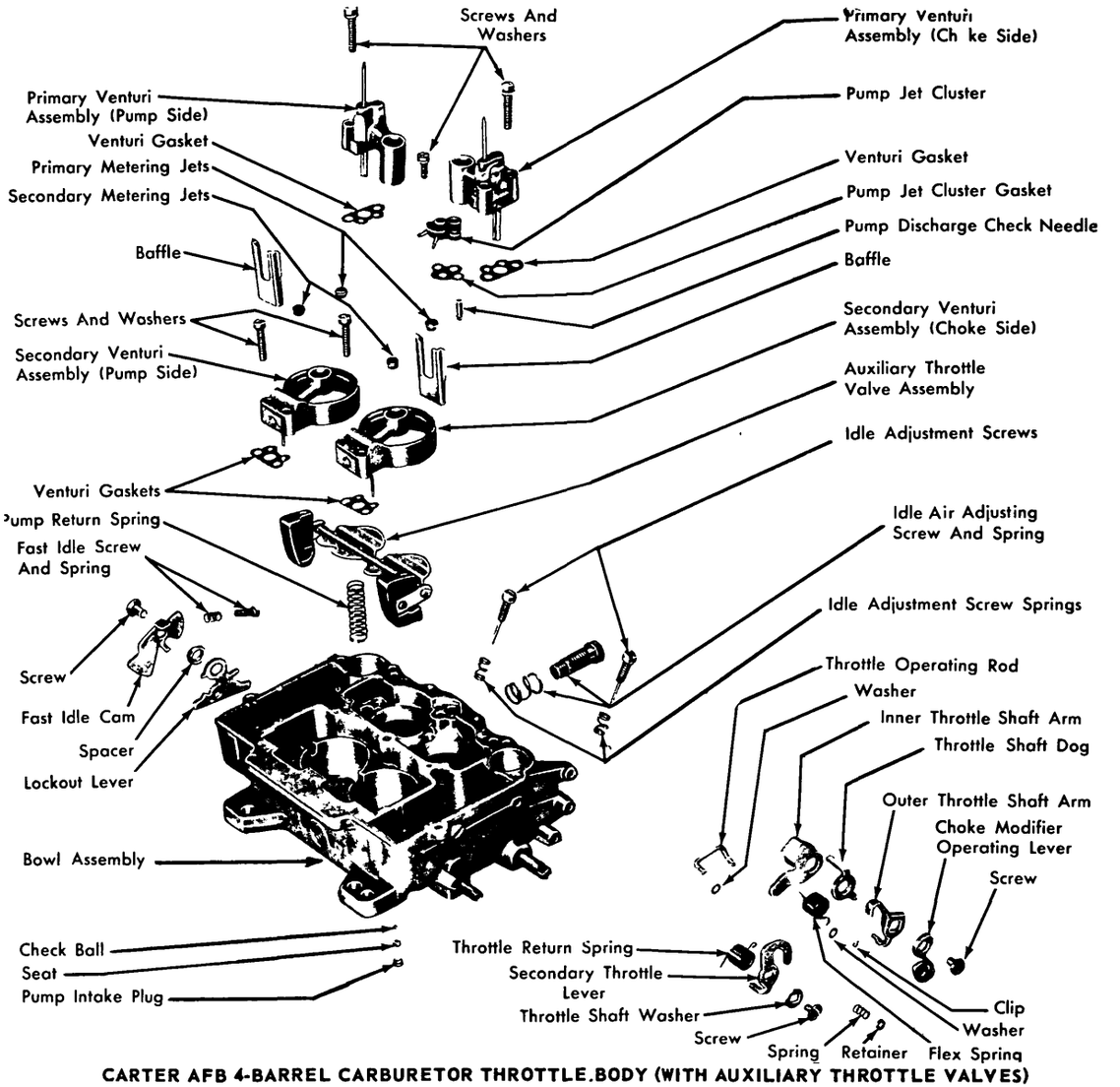
Fast Idle Adjustm nt (Off Engine) - Open throttle and close choke valve tightly (this will allow fast idle cam to assume fast idle position). With choke valve closed and index mark on fast idle cam in alignment with fast idle adjusting screw, turn screw in or out until throttle valve opening or clearance between lower edge of valve and carburetor wall is correct as shown in table below.

Fast Idle Setting (Off Engine)

Car & Carb.	Valve Opening	Checking Gauge
Buick 3088S, 3089S	.030"	T109-29
Cadillac 3177S, 3178S	.023"	T109-189
Chevrolet (All Carbs.)	.025"	T109-125
Chrysler 3108S, 3134S	.020"	T109-29
Chrysler 2903S, 3084S	.010"	T109-200
Dodge (Exc. 2903S)	.020"	T109-29
Dodge 2903S	.010"	T109-200
Plymouth (Exc. 2903S, 2791S)	.020"	T109-29
Plymouth 2903S	.010"	T109-200
Plymouth 2791S	.012"	T109-200
Pontiac (All Carbs.)	.026"	T109-189

Fast Idl Adjustm nt (On Engine - Except Chrysler, Dodg , Plym uth with Ram Induction) - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of cam and in alignment with index mark (Except Buick). On Buick, place fast idle adjusting screw on lowest (last) step of fast idle cam. On all models, operate engine and adjust fast idle screw for correct engine speed as listed below.

Fast Idl Adjustment (On Engine - Chrysler, Dodge, Plymouth with Ram Induction) - *NOTE - Make fast idle adjustment on each carburetor individually.* With engine at normal operating temperature and idling at 750 RPM, transmission in "N" (Neutral) with air conditioner compressor "ON" (if so equipped). Turn compressor "OFF" (if so equipped) and remove both air cleaners. Disconnect throttle rods at bellcrank and open throttle valves of left hand carburetor far enough to allow positioning of fast idle cam to cam index mark. *NOTE - Right hand carburetor should remain at curb idle position.* Adjust fast idle screw to obtain the correct idle speed indicated in table below. *NOTE - The indicated fast idle speed is for ONE carburetor with the other carburetor on slow idle speed. There is no specification for engine RPM with both carburetors simultaneously set at fast idl position.* Place left hand carburetor in slow idle position (off fast idle), then repeat the above adjusting procedure on right hand carburetor. *NOTE - It is important that both carburetors have identical idle speeds.*



CARTER AFB 4-BARREL CARBURETOR THROTTLE BODY (WITH AUXILIARY THROTTLE VALVES)

Fast Idle Setting (On Engine)

Car Model	Engine RPM
Buick	②650
Cadillac	1700-1750
Chevrolet (Exc. 3270S)	1600-1800
Chevrolet (3270S)	1700
Chrysler (Exc. Ram Induction)	1800
Chrysler (Ram Induction)	①1400
Dodge (Exc. Ram Induction)	③1800
Dodge (Ram Induction)	①1500
Plymouth (Exc. Ram Induction)	③1800
Plymouth (Ram Induction)	①1500
Pontiac	2200

① - Fast idle speed with one carburetor on fast idle and the other on slow idle. There is no specification for engine RPM with both carburetors simultaneously set at fast idle position.

② - With fast idle screw on lowest (last) step of fast idle cam.

③ - For all models except models with 361" engine and synchro-mesh transmission or 3140S carburetor.

Unloader: After fast idle linkage adjusted (above), rotate primary throttle valves to wide open position and check choke valve opening or clearance between upper edge of valve and air horn wall using gauge listed in table below. If clearance not correct, adjust by bending un-

CONTINUED ON NEXT PAGE

1961 CARTER AFB 4-BARREL CARBURETORS (C nt.)

loader lip on primary throttle lever using bending tool T109-214.

►*PONTIAC NOTE:* Manufacturer recommends that throttle valves be opened by depressing accelerator pedal (to simulate actual driving conditions and insure unloader functioning properly in service).

Car Model	Unloader Setting Choke Opening	Checking Gauge
Buick	7/32"	T109-106
Cadillac	5/16"	T109-107
Chevrolet	1/4"	T109-31
Chrysler	1/4"	T109-31
Dodge	1/4"	T109-31
Plymouth	1/4"	T109-31
Pontiac	5/32"	T109-154

Auxiliary Throttle Valves: Velocity type valves (counterweighted free valves without linkage). No adjustment required. Used on all models except as indicated in following note. *NOTE - Auxiliary throttle valves used on Chrysler, Dodge & Plymouth 2903S & 3084S carburetors. Not used on other Chrysler, Dodge & Plymouth carburetors.*

Secondary Throttle Lever Adjustment: This adjustment required to insure correct action of primary and secondary throttle valves. Check and adjust each model as follows:

Chevrolet - Primary and secondary throttle valves must reach wide open position at the same time. To adjust, bend secondary operating rod. *NOTE - Secondary throttle valves will be a few degrees from wide open when primary valves are wide open.* Upper edge of secondary valve should just contact auxiliary valves when both valves are wide open and the wide open stop lug on secondary throttle lever should contact boss on flange to prevent further secondary valve movement. Adjust by bending stop lug. Check and adjust throttle lever closing shoes (see below).

Buick, Cadillac, Chrysler, Dodge, Plymouth & Pontiac - Block choke valves wide open. Open throttle valves until clearance between lower edge of valve and throttle bore on side opposite idle port is correct as shown in table below. Secondary valves should just start to open at this point. Adjust by bending secondary throttle operating rod using Tool T109-213. Open primary valves fully. On Buick, Cadillac & Pontiac, secondary valves should be a few degrees from wide open position with primary throttle valves wide open. On all other carburetors, both primary and secondary valves should be vertical in wide open position. Then check and adjust throttle lever closing shoes (below).

Car & Carb.	Secondary Throttle Lever Setting Primary Throttle Opening
Buick (All)	23/64"
Cadillac (All)	23/64"
Chrysler (Exc. 2903S, 3084S)	3/8"
Chrysler 2903S, 3084S	29/64"
Dodge (Exc. 2903S)	3/8"
Dodge 2903S	29/64"
Plymouth (Exc. 2903S, 2790S, 2791S)	3/8"
Plymouth 2903S	29/64"
Plymouth 2790S, 2791S	23/64"
Pontiac (All)	7/16"

Secondary Throttle Lockout Adjustment: Open throttle valves slightly to clear fast idle cam, open and close choke valve manually. Lockout tang on secondary throttle lever should freely engage in notch of lockout dog. Adjust by bending tang on secondary throttle lever. On some carburetors, additional adjustment required as follows:

Cadillac 3177S, 3178S; Plymouth 2791S - Hold lockout dog tight against stop on flange. With secondary valves partially open, clearance between secondary throttle lever and lockout arm should be .026" (Cadillac); .020" (Plymouth). Use gauge T109-29. To adjust, bend arm at slot on lockout dog. *NOTE - Fast idle cam may be removed to make this adjustment.*

Primary & Secondary Throttle Lever Closing Shoe Adjustment: With primary and secondary throttle valves closed, check clearance between positive closing shoes on throttle levers using Gauge T109-29 (.020"). Clearance at closest point should be .010-.030". Adjust by bending shoe on secondary lever.

OVERHAUL: *See 1957 Annual Data, Page 229, or later Manual editions.*

SERVICE PARTS: Gasket Sets - Carter No. 293A (3123S, SA, 3124S,SA,SB, 3125S,SA,SB;) No. 319 (2790S); No. 320 (2791S); No. 323A (3012S, 3221S, 3270S); No. 337 (2903S); No. 342 (3105S, 3106S, 3140S); No. 343 3103S, 3131S); No. 344 (3108S, 3134S, 3152S, 3133S, 2968S); No. 345 (3177S, 3178S); No. 358 (3088S, 3089S).

Re-Carburetion Kit - Carter No. 5040N (3123S, 3124S, 3125S); No. 5041 (3088S); No. 5042 (3089S); No. 5030 (3177S, 3178S).

Zip-Kit - Carter No. 900-62A (3012S); No. 900-101 (2968S); No. 900-120 (3177S, 3178S); No. 900-125 (3088S, 3089S).

1961 CHRYSLER, IMPERIAL, DODGE AUTO-PILOT SPEED CONTROL

Chrysler & Imperial (1961)
Dodge Polara (1961)

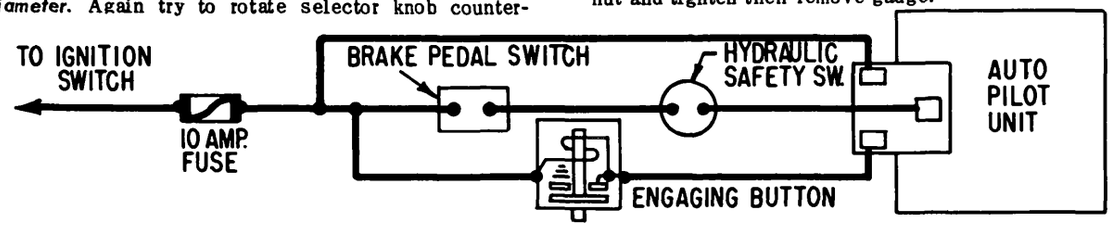
DESCRIPTION: Same design as previous units having the automatic lock-in feature. With this feature, the automatic speed control will be maintained until pressure is exerted on brake pedal or by pushing in knob in center of speed selector, however, depressing the brake pedal will not cancel the automatic lock-in feature. To cancel the lock-in feature, it will be necessary to push in knob on speed selector or turn off engine ignition.

OPERATION: *See 1958 Annual Data, Page 300, or later Manual edition.*

TROUBLE SHOOTING & DIAGNOSIS: *See 1958 Annual Data, Page 300, or later Manual edition.*

ADJUSTMENTS: Control Cable Adjustment - Turn selector knob counterclockwise as far as it will go without forcing, then hold dust shield so that it will not rotate when unscrewing clamp nut. Let nut slide down control cable. Remove clamp nut and pull control cable out of dust shield until ferrule on end of cable is free from bottom of dust shield. *NOTE - If ferrule is tight in dust shield, carefully pry the four fingers apart until ferrule slides out freely. If necessary remove dust shield from unit to pry fingers apart. If shield is removed, hold hex fitting at top of shield so it cannot turn while unscrewing shield from unit.* Reinsert ferrule in dust shield and push in lightly on control cable until it stops. *CAUTION - Do not force cable beyond this position. Fingers of dust shield must clamp ferrule on its largest diameter.* Again try to rotate selector knob counterclockwise to make sure it is at low setting, then tighten clamp nut on bottom of dust shield securely.

Linkage Adjustment: With carburetor at slow (hot) idle position, remove nut from link ball joint and pull link ball joint from armature lever. Insert sleeve gauge, Tool C-3844 over gauge bolt and hold armature lever securely against sleeve gauge. Adjust link ball joint until it will freely enter hole in armature lever. Replace nut and tighten then remove gauge.



CHRYSLER, IMPERIAL & DODGE AUTO-PILOT WIRING DIAGRAM

1961 CRUISE CONTROL & AUTOMATIC SPEED CONTROL

Cadillac (1961)
Chevrolet (1961)
Linc ln (1961)
Mercury (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 CADILLAC CRUISE CONTROL FUSE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A 6 amp. fuse is used in production beginning with Engine No. 041719. When replacing the early 4 amp. fuse, it is recommended that the 6 amp. fuse be installed.

DESCRIPTION: Electrically controlled speed warning devise and automatic speed control of same design used on previous models.

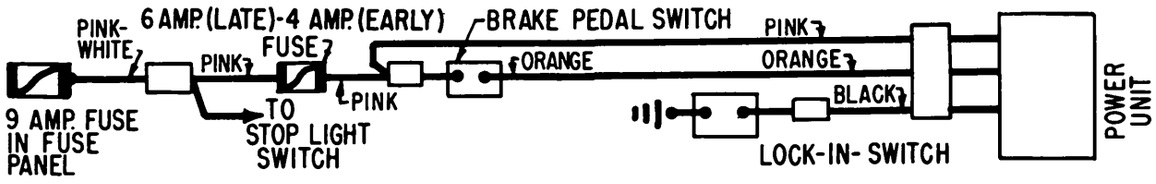
OPERATION: *Same as for 1959 Cadillac Cruise Control. See 1959 Annual Data, Page 259, or later Manual edition and note the following.*

Chevrolet (Synchro-mesh Trans. Cars): A clutch switch is used in addition to brake switch to disengage unit from automatic control.

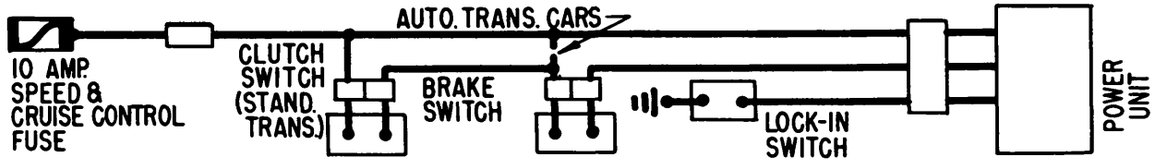
TROUBLE SHOOTING & DIAGNOSIS: *Same as for 1959 Cadillac Cruise Control. See 1959 Annual Data, Page 259, or later Manual edition.*

ADJUSTMENTS: Accelerator Linkage (Cadillac) - With transmission throttle control rod properly adjusted (see "Carburetor" on Car Model page), start engine and operate at slow idle speed with transmission selector lever in "P" (Park) or "N" (Neutral). Remove cotter pin securing accelerator linkage trunnion on locking arm plate, remove washers, and separate linkage from locking arm. Insert Locking Arm Gauge, J-7652, over stop stud and hold locking arm plate securely against gauge. Turn trunnion on accelerator linkage until it aligns with and enters hole in locking arm plate freely, then install washers on trunnion and connect trunnion to locking arm plate. Install cotter pin and remove gauge.

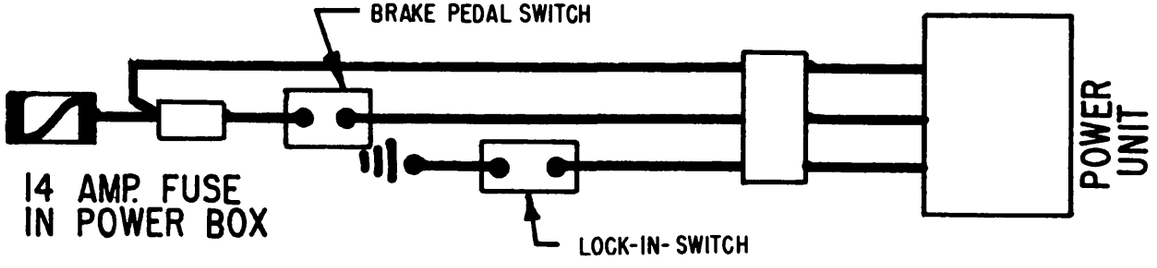
Chevrolet - Remove cotter pin from swivel and remove swivel from regulator lever, then start engine and run at slow idle speed. Insert gauge pin *(NOTE - This is a .0625" pin furnished with accessory package)* over gauge bolt (located on housing adjacent to regulator lever) and hold regulator lever securely against gauge pin. Adjust swivel on long regulator rod until it will assemble to regulator lever. Replace swivel and cotter pin, then remove gauge pin.



CADILLAC CRUISE CONTROL WIRING DIAGRAM



CHEVROLET CRUISE CONTROL WIRING DIAGRAM



LINCOLN & MERCURY SPEED CONTROL WIRING DIAGRAM

Lincoln & Mercury - Remove cotter pin from accelerator linkage and pull linkage from exterior arm, then start and run engine until it operates at slow idle. Insert gauge pin over gauge bolt and hold exterior arm securely against gauge pin. *NOTE - Gauge pin is made from a 2" length of 5/16" copper tubing, and is supplied in Speed Control Kits.* Adjust swivel on throttle linkage until linkage will assemble to exterior arm. Replace linkage and cotter pin and remove gauge.

Control Cable: Cadillac, Chevrolet, Lincoln & Mercury - Turn selector knob counterclockwise as far as it will go without forcing, hold dust shield so it will not rotate and unscrew clamp nut. Let clamp nut slide down cable. *NOTE - This nut holds control cable in bottom of dust shield.* Pull control cable out of dust shield until ferrule at end of cable is free from bottom of dust shield. *NOTE - If ferrule is tight in dust shield, carefully pry the four fingers apart until ferrule slides out freely. In some cases it may be necessary to unscrew the dust shield from unit in order to pry the fingers apart. Hold hex fitting at top of dust shield so it cannot turn when unscrewing dust shield.* Reinsert ferrule in dust shield and push in lightly on control cable until it stops. *CAUTION* - Do not force cable beyond this point. Fingers of dust shield must clamp ferrule on its largest diameter. Again try to rotate selector knob counterclockwise only, in order to make sure it is at low setting (this will position control cable to dust shield). Tighten clamp nut on bottom of dust shield securely.

1961 CARTER WCFB 4-BARREL CARBURETORS

CHEVROLET		Carter No.
283" Pass Cars (Std Trans)		3059S
348" Pass Cars (Std Trans)		3060S
348" Pass Cars (Auto Trans)		3061S
283" Corvette ①	(Front) 2626S, (Rear)	2627S
283" Corvette ①③	(Front) 3181S, (Rear)	2627S
283" Corvette ②	(Front) 2613S, (Rear)	2614S
283" Corvette ②③	(Front) 3182S, (Rear)	2614S
STUDEBAKER		
Lark & Hawk (Synchro-mesh Trans)		2829S
Lark & Hawk (Synchro-mesh Trans)③		3165S
Lark & Hawk (Auto Trans)		2830S
Lark & Hawk (Auto Trans)③		3166S

① - Hydraulic Lifters
② - Mechanical lifters and special cam
③ - With closed crankcase ventilator

DESCRIPTION: 4-barrel downdraft types of same general design used on previous models having the following special features In addition, some of the carburetors have a connection for closed crankcase ventilator tube

Auxiliary Throttle Valves: Velocity type valve located directly over secondary throttle valves in main body Auxiliary throttle valves action is controlled by counterweight on shaft and valve are not operated by throttle linkage On Chevrolet 3059S, 3060S, 3061S, auxiliary throttle valves are locked out when choke is operating and this lockout must be adjusted *See Adjustments below*

ADJUSTMENTS: *Make all adjustments in sequence indicated below*

Idling Adjustment: If necessary, make preliminary idle mixture and idle speed adjustments to enable engine to be warmed up Run engine until it reaches normal operating temperature with choke valve wide open and fast idle inoperative Then make adjustments as follows

Chevrolet (Single Carburetor) - Connect vacuum gauge and tachometer Set throttle stopscrew for correct idling speed Adjust each idle mixture screw for highest RPM and vacuum reading Reset idle speed

Chevrolet (Two Carburetors) - Set throttle stopscrew on **rear** carburetor for correct idle speed *(NOTE* - Throttle valves on **front** carburetor should be closed at idle speed) Adjust all idle mixture screws individually (rear carburetor first, front carburetor last) for best performance and engine idle "feel" Reset throttle stopscrew for correct engine RPM, readjust idle mixture screws, finally reset engine idle speed

Stud bak r - Set throttle stopscrew for correct idle speed Adjust both idle mixture screws equally for smooth idling performance, then turn screws out (richer mixture) until engine RPM shows a slight drop Reset engine idle speed

Idle Mixture Setting

Car & Carb.	Idle Screw Opening
Chevrolet 3059S, 3060S, 3061S	½-2 turns
Chevrolet 2613S, 2614S, 2626S, 2627S	¼-1¼ turns
Chevrolet 3181S, 3182S	¼ 1¼ turns
Studebaker 2829S, 2830S	½-1½ turns
Studebaker 3165S, 3166S	¼-1½ turns

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
Chev Pass Car	475	① 450
Corvette (1 Carb)	475	① 450
Corvette (2 Carbs) ③	475	① 450
Corvette (2 Carbs,) ⑨	600	① 600
Studebaker	550-600	② 550-600

① - Transmission selector lever in "D" (Drive)
② - Transmission selector lever in "N" (Neutral)
③ - With hydraulic lifters and standard camshaft
⑨ - With mechanical lifters and special camshaft

Throttle Return Check (Dashpot) Adjustment: *Used with Automatic Transmission See "Throttle Linkage" under CARBURETOR on each car model page*

Accelerating Pump Stroke: *This is a linkage adjustment and not a seasonal change recommendation, and is dependent on operating conditions* Remove dust cover, place connector link in hole indicated in table below

Car & Carb.	Initial Stroke Setting
Chevrolet 2613S, 2614S, 2626S, 2627S	Inner Hole
Chevrolet 3059S, 3060S, 3061S	Outer Hole
Chevrolet 3181S, 3182S	Inner Hole
Studebaker (All)	Outer Hole

Pump Stroke Adjustment - Back off throttle stopscrew so that primary throttle valves are fully seated Hold a straightedge across dust cover boss at pump arm Flat on top of arm should be parallel with straightedge Adjust by bending pump connector link at lower angle

Metering Rods (Primary Side): No gauge required for this adjustment and no metering rods are used on secondary side With dust cover removed and primary throttle valves fully seated (as for Pump Stroke Adjustment), loosen setscrew in metering rod arm on pump countershaft just enough so that arm has a slight bind on shaft, then lift arm slightly and depress metering rod link until metering rods just bottom in bowl casting Position metering rod arm so that it just contacts link and tighten arm setscrew Adjust Atmospheric Idle Vent (below)

Float S tting: *CAUTION - Primary and secondary floats must be checked and adjusted separat ly and both Float L v l and Float Drop must b ch cked for each ass mbly*

Fl at L vel - Check and adjust as follows Remove bowl cover gasket (take out float hinge pins, remove float assemblies and intake needles attached, remove gasket, reinstall floats). Invert bowl cover. Install correct gauge for each float assembly (see table below) on bowl cover under center of floats with notched ends of gauge fitted tightly against sides of bowl cover casting. Both floats should just clear horizontal section of gauge (adjust by bending float arms as required) and each float should barely touch vertical uprights on gauge (bend arms sideways for this clearance). This sideways adjustment is extremely important to prevent floats hanging up on sides of bowl casting.

Float Level Setting

Primary Fl ats

Car & Carb.	H ight	Gaug N .
Chevrolet 2613S,14S,26S,27S	1/8"	T109-232
Chevrolet 3059S,60S,61S	5/32"	T109-236
Chevrolet 3181S,82S	1/8"	T109-232
Studebaker (All)	3/16"	T109-222

Secondary Fl ats

Car & Carb.	H ight	Gaug N .
Chevrolet 2613S,14S,26S,27S	1/4"	T109-223
Chevrolet 3059S,60S,61S	9/32"	T109-284
Chevrolet 3181S,82S	1/4"	T109-223
Studebaker (All)	3/16"	T109-222

Float Drop: Hold bowl cover assembly upright so floats hang down freely Use a scale to measure distance from machined surface of bowl cover (gasket removed) to bottom of float at free end (Chevrolet 3059S, 3060S, 3061S), to top of floats at center (Others) If distance not correct (see table below), adjust by bending stop tabs on float bracket

Float Drop Setting

Car & Carb.	Pri. Fl at	Sec. Fl at
Chevrolet 2613S,14S,26S,27S	5/8"	3/4"
Chevrolet 3059S,60S,61S	① 2"	① 2"
Chevrolet 3181S, 3182S	5/8"	3/4"
Studebaker (All)	11/16"	11/16"

① - See "Float Drop" above

Bowl Vapor Vent (Atmospheric Idl V nt) Adjustment (Exc. Studebaker): With dust cover and gasket installed, back out throttle lever stopscrew so that primary throttle valves are fully closed Check clearance between lower edge of vapor vent valve and dust cover Vent clearance should be 1/16" (2613S 2614S, 2626S, 2627S, 3181S,3182S), 3/32" (3059S, 3060S, 3061S) Adjust by removing dust cover and bending vapor vent valve

Automatic Choke· See table below for settings Adjust by loosening choke cover screws and rotating cover and coil assembly, then adjust connector rod

Automatic Ch k Setting

Car & Carb.	Ch k Setting
Chevrolet (All)	Centered
Studebaker (All)	1 Point Lean

CONTINUED ON NEXT PAGE

1961 CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Ch k R d: This adjustment is preliminary to checking and adjusting fast idle, unloader, and secondary throttle lockout. Loosen choke lever clamp screw and insert .020" wire gauge, Tool T109-29, between tang on fast idle cam and boss on throttle body casting (hold gauge in place by pressure on choke lever) and take up all slack in linkage. Hold choke valve tightly closed and tighten clamp screw.

Ch k Pist n L v r Adjustment (3059S, 3060S, 3061S): Bend a .026" wire gauge (T109-189) at a 90° angle 1/8" from end, then remove choke housing, gasket, baffle plate and block throttle valve about half open so fast idle cam does not contact adjusting screw. Open choke valve and insert wire gauge so bent portion is between top of slot in choke piston cylinder and bottom of slot in choke piston. Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. Clearance between top of choke valve and air horn should be .080" (Gauge T109-234). To adjust, bend choke connector rod.

Fast Idl (Off Engin): Carb. No. 2614S, 2627S - With choke rod properly adjusted (see above) and choke valve tightly closed, bend fast idle adjusting tang until there is .018" clearance between throttle valve and bore of carburetor on side opposite idle port. *NOTE* - Make sure adjusting tang is on high step of cam while making adjustment.

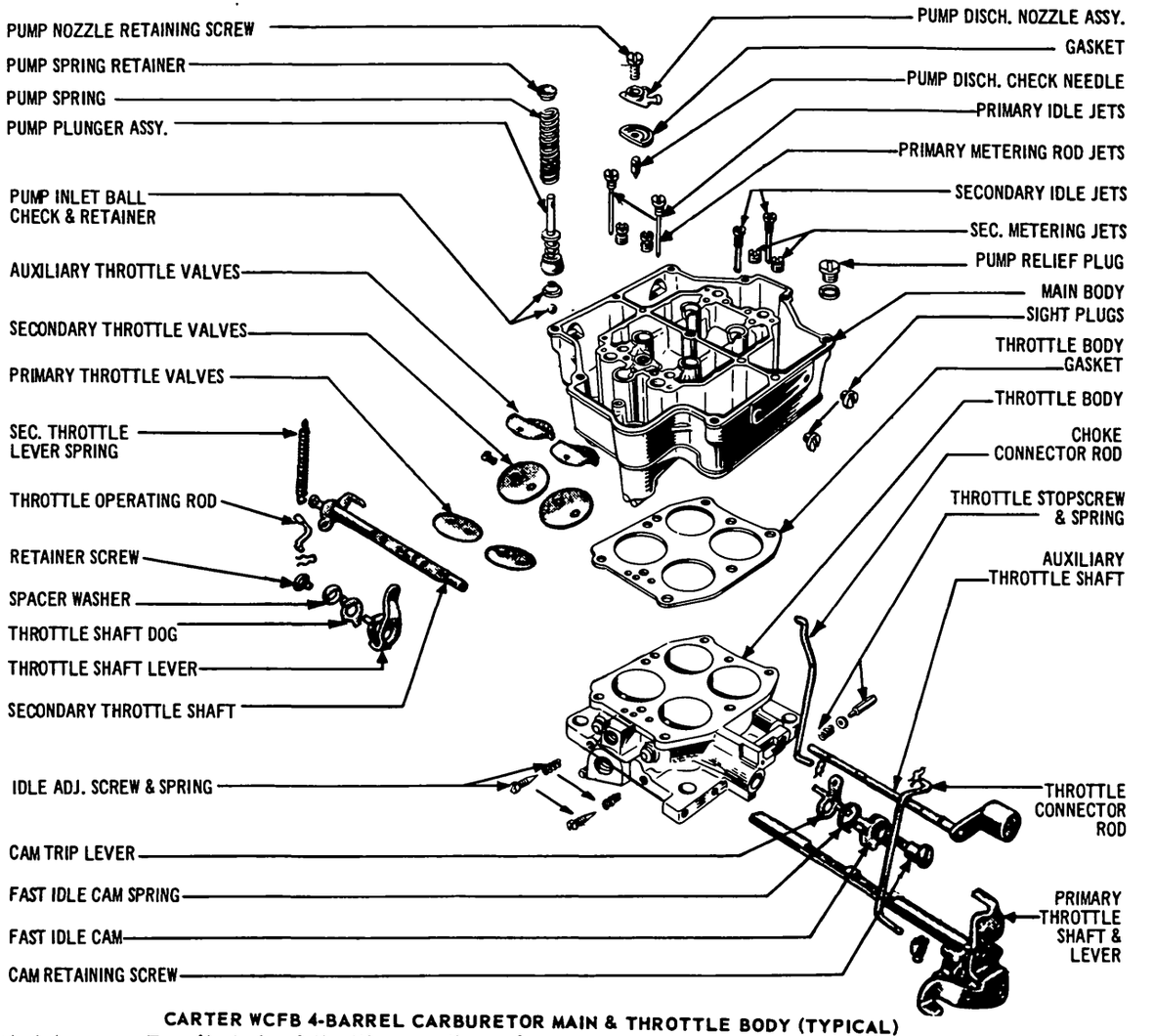
Stud bak r (All) - With fast idle screw on high step of fast idle cam, there should be a clearance of .023" between throttle valve and bore on side opposite idle port. To adjust, turn fast idle screw.

Fast Idl (On Engin): Carb. No. 2614S, 2627S, 3059S, 3060S, 3061S - With idle adjusting tang on high step of fast idle cam, engine speed should be 1800 RPM (2614S, 2627S); 1600-1800 RPM (3059S,3060S,3061S). To adjust, bend fast idle adjusting tang.

Unl ad r: After choke rod adjusted (see above), rotate primary throttle valves to wide open position and close choke. Clearance between upper edge of choke valve (Chevrolet), lower edge of choke valve (Studebaker), should be 3/16" (2614S, 3059S, 3060S, 3061S (1/8" (2627S); 9/16" (All Studebaker carburetors). Adjust by bending unloader tang on throttle shaft lever with Tool T109-41. With correct setting, choke valve should have a slight drag on gauge.

S c ndary Thr ttl L v r Adjustment (Chevrolet 2613S, 2614S, 2626S, 2627S, 3081S, 3082S, 2829S; Studebaker 2830S, 3165S, 3166S): Primary and secondary valves should reach wide open at the same time. *NOTE - Secondary valves will be a few degrees from wide open position.* To adjust, bend throttle operating rod at upper angle with Tool T109-213. With primary and secondary throttle valves in tightly closed position, there should be .010-.030" clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.

Chevrolet 3059S, 3060S, 3061S - Block choke valve wide open and back out throttle stopscrew so primary valves are seated in bores. With primary valves open 7/32" (Gauge T109-125), secondary valves should just start to open. To adjust, bend throttle operating rod. *NOTE - Secondary valves will be a few degrees from wide open position when primary throttle valves are wide open.* With primary and secondary valves tightly closed, there should be .010-.030" (Gauge T109-29) clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.



CARTER WCFB 4-BARREL CARBURETOR MAIN & THROTTLE BODY (TYPICAL)

Secondary Throttle Lockout Adjustment (Chevrolet 2614S, 2627S; Studebaker 2829S, 2830S, 3165S, 3166S): Crack throttle valves and hold choke valve closed, then close throttle. Tang on secondary throttle lever should engage notch in lockout lever. To adjust, bend tang on secondary throttle lever. *NOTE* - With choke open, lockout lever should fall free allowing secondary throttle valves to open before primary valves reach wide open position.

Auxiliary Throttle Lockout Adjustment (Chevrolet 3059S, 3060S, 3061S): Crack throttle valves and hold choke valve tightly closed, then close throttle. Tang on lockout arm should freely engage notch in auxiliary throttle shaft dog. To adjust, bend tang on lockout arm.

OVERHAUL: *See 1957 Annual Data, Page 221, or later Manual edition.*

SERVICE PARTS: Gasket Set - Carter No. 286B, 307 or 359 (2613S, 2614S, 2626S, 2627S, 3181S, 3182S); No. 347 (3059S); No. 348 (3060S, 3061S); No. 303 (2829S, 2830S, 3165S, 3166S).

R carbur ti n Kit: Carter No. 1870N (2626S,2627S,3181S); No. 5023N (3059S); No. 5024N (3060S, 3061S).

Zip-Kit: Carter No. 900-112 (3059S); No. 90013 (3060S, 3061S).

1961 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.		Metering Jet Size	Metering Jet No.	Step-Up Rod No.	Venturi Assembly Low Spd. Jet	Venturi Assembly ① Part No. ②	Pump Jet Assy. Size	Pump Jet Assy. No.
2790S	Pri.	.089"	120-159	16-40 ③	.031"	58-324S	.031"	48-258S
	Sec.	.055"	120-174			58-221S		
2791S	Pri.	.089"	120-159	16-26 ⑭	.031"	58-324S	.031"	48-258S
	Sec.	.055"	120-174			58-221S		
2903S	Pri.	.089"	120-159	16-119	.035"	58-461S	.028"	48-270S
	Sec.	.0595"	120-196			58-347S		
2968S	Pri.	.0895"	120-159	16-122	.035"	58-463S	.031"	48-258S
	Sec.	.070"	120-128			58-232S		
3012S	Pri.	.0935"	120-166	16-92	.0465"	58-496S	.028"	48-264S
	Sec.	.086"	120-165			58-151S		
3088S	Pri.	.092"	120-256	16-167	.033"	58-536S	.028"	48-264S
	Sec.	.082"	120-158			58-347S		
3089S	Pri.	.092"	120-256	16-168	.033"	58-536S	.028"	48-264S
	Sec.	.0846"	120-257			58-347S		
3103S	Pri.	.089"	120-252	16-160 ⑤	.032"	58-560S	.028"	48-270S
	Sec.	.057"	120-193			58-208S		
3105S	Pri.	.089"	120-252	16-162 ⑧	.033"	58-521S	.031"	48-258S
	Sec.	.065"	120-226			58-254S		
3106S	Pri.	.089"	120-252	16-161 ⑨	.032"	58-508S	.031"	48-258S
	Sec.	.0635"	120-176			58-232S		
3108S	Pri.	.089"	120-252	16-171 ⑤	.032"	58-556S	.031"	48-258S
	Sec.	.065"	120-226			58-232S		
3123S	Pri.	.0935"	120-166	16-169	.043"	58-548S	.028"	48-270S
	Sec.	.081"	120-233			58-475S		
3123SA	Pri.	.0935"	120-166	16-169	.043"	58-548S	.028"	48-270S
	Sec.	.0785"	120-194			58-587S		
3124S	Pri.	.0935S	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.	.0785"	120-194			58-475S		

Carb. No.		Metering Jet Size	Metering Jet No.	Step-Up Rod No.	Venturi Assembly Low Spd. Jet	Venturi Assembly ① Part No. ②	Pump Jet Assy. Size	Pump Jet Assy. No.
3124SA	Pri.	.0945"	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.		120-177			58-587S		
3124SB	Pri.	.0935"	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.		120-177			58-587S		
3125S	Pri.	.0935"	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.	.0785"	120-194			58-475S		
3125SA	Pri.	.0935"	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.		120-177			58-587S		
3125SB	Pri.	.0935"	120-166	16-169	.035"	58-526S	.028"	48-270S
	Sec.		120-177			58-587S		
3131S	Pri.	.089"	120-252	16-165 ⑥	.032"	58-515S	.028"	48-270S
	Sec.	.065"	120-226			58-232S		
3133S	Pri.	.089"	120-252	16-157 ⑦	.035"	58-538S	.031"	48-258S
	Sec.	.069"	120-228			58-232S		
3134S	Pri.	.089"	120-252	16-171 ⑤	.032"	58-556S	.031"	48-258S
	Sec.	.065"	120-226			58-232S		
3140S	Pri.	.089"	120-252	16-159 ⑨	.032"	58-542S	.031"	48-258S
	Sec.	.065"	120-226			58-254S		
3152S	Pri.	.089"	120-252	16-158 ⑤	.033"	58-540S	.031"	48-258S
	Sec.	.067"	120-185			58-232S		
3177S	Pri.	.098"	120-163	16-170	.032"	58-492S	.028"	48-270S
	Sec.	.082"	120-158			58-270S		
3178S	Pri.	.098"	120-163	16-170	.032"	58-492S	.028"	48-270S
	Sec.	.082"	120-158			58-270S		
3221S	Pri.	.104"	120-161	16-191	.040"	58-595S	.028"	48-264S
	Sec.	.0689"	120-228			58-151S		
3270S	Pri.	.1015"	120-162	16-193	.040"	58-595S	.028"	48-264S
	Sec.	.086"	120-165			58-151S		

① - Choke side of carburetor.
② - Pump side of carburetor
③ - 1 size lean 16-109. 2 sizes lean 16-81.
⑤ - 1 size lean 16-171. 2 sizes lean 16-175.
⑥ - 1 size lean 16-162. 2 sizes lean 16-172.
⑦ - 1 size lean 16-174. 2 sizes lean 16-176.
⑧ - 1 size lean 16-172. 2 sizes lean 16-178.
⑨ - 1 size lean 16-173. 2 sizes lean 16-177.
⑭ - 1 size lean 16-17. 2 sizes lean 16-110.

1961 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.		Metering Jet Size	Metering Jet No.	Metering Rods Std.	Metering Rods 1 Size Lean	Low Speed Jet Size	Low Speed Jet No.	Pump Jet Size	Pump Jet No.
2613S	Pri.	.1065"	120-171	75-1374		.035"	11-287S	.024"	48-233S
	Sec.	.061"	120-186						
2614S	Pri.	.1065"	120-171	75-1374		.035"	11-287S	.024"	48-233S
	Sec.	.061"	120-186						
2626S	Pri.	.0935"	120-166	75-1350		.031"	11-302S	.024"	48-233S
	Sec.	.053"	120-217						
2627S	Pri.	.0935"	120-166	75-1350		.031"	11-302S	.024"	48-233S
	Sec.	.053"	120-217						
2829S	Pri.	.089"	120-159	75-1345	75-1377①	.035"	11-294S	.035"	48-243S
	Sec.	.0635"	120-176						
2830S	Pri.	.089"	120-159	75-1345	75-1377①	.035"	11-294S	.035"	48-243S
	Sec.	.0635"	120-176						
3059S	Pri.	.086"	120-165	75-1421	75-1471②			.024"	48-233S
	Sec.	.0635"	120-176						

Carb. No.		Metering Jet Size	Metering Jet No.	Metering Rods Std.	Metering Rods 1 Size Lean	Low Speed Jet Size	Low Speed Jet No.	Pump Jet Size	Pump Jet No.
3060S	Pri.	.086"	120-165	75-1443	75-1469③			.024"	48-233S
	Sec.	.070"	120-222						
3061S	Pri.	.086"	120-165	75-1443	75-1469③			.024"	48-233S
	Sec.	.070"	120-222						
3165S	Pri.	.089"	120-159	75-1547	75-1548⑭	.037"	11-321S	.035"	48-243S
	Sec.	.0635"	120-176						
3166S	Pri.	.089"	120-159	75-1547	75-1548⑭	.037"	11-321S	.035"	48-243S
	Sec.	.0635"	120-176						
3181S	Pri.	.0935"	120-166	75-1350		.031"	11-302S	.024"	48-233S
	Sec.	.053"	120-217						
3182S	Pri.	.1065"	120-171	75-1374		.035"	11-287S	.024"	48-233S
	Sec.	.061"	120-186						

① - 2 Sizes Lean 75-1378U.
② - 2 Sizes Lean 75-1472.
③ - 2 Sizes Lean 75-1470.
⑭ - 2 Sizes Lean 75-1549U.

CARTER DUAL "WCD"

RAMBLER — **Carter No.**
Classic 6 Cyl — 3170S

DESCRIPTION: Dual downdraft carburetors with automatic choke. Same design as used on previous models.

ADJUSTMENT: *Make all adjustments exactly as follows*
Idling Adjustment: Warm up engine thoroughly so that choke valve wide open and fast idle inoperative. Adjust throttle stopscrew for correct engine speed, then adjust both idle mixture screws equally for smooth running and highest RPM. Turn screws out for richer mixture. Recheck idle speed.

Idle Mixture Screw Setting

Car	Idle Screw Opening
Rambler	½-2 turns

Idle Speed Setting

Car	Synchro-mesh	Auto. Trans.
Rambler	550 RPM	② 475RPM

① - With selector lever in Neutral
② - 500 RPM with Air Conditioning turned ON

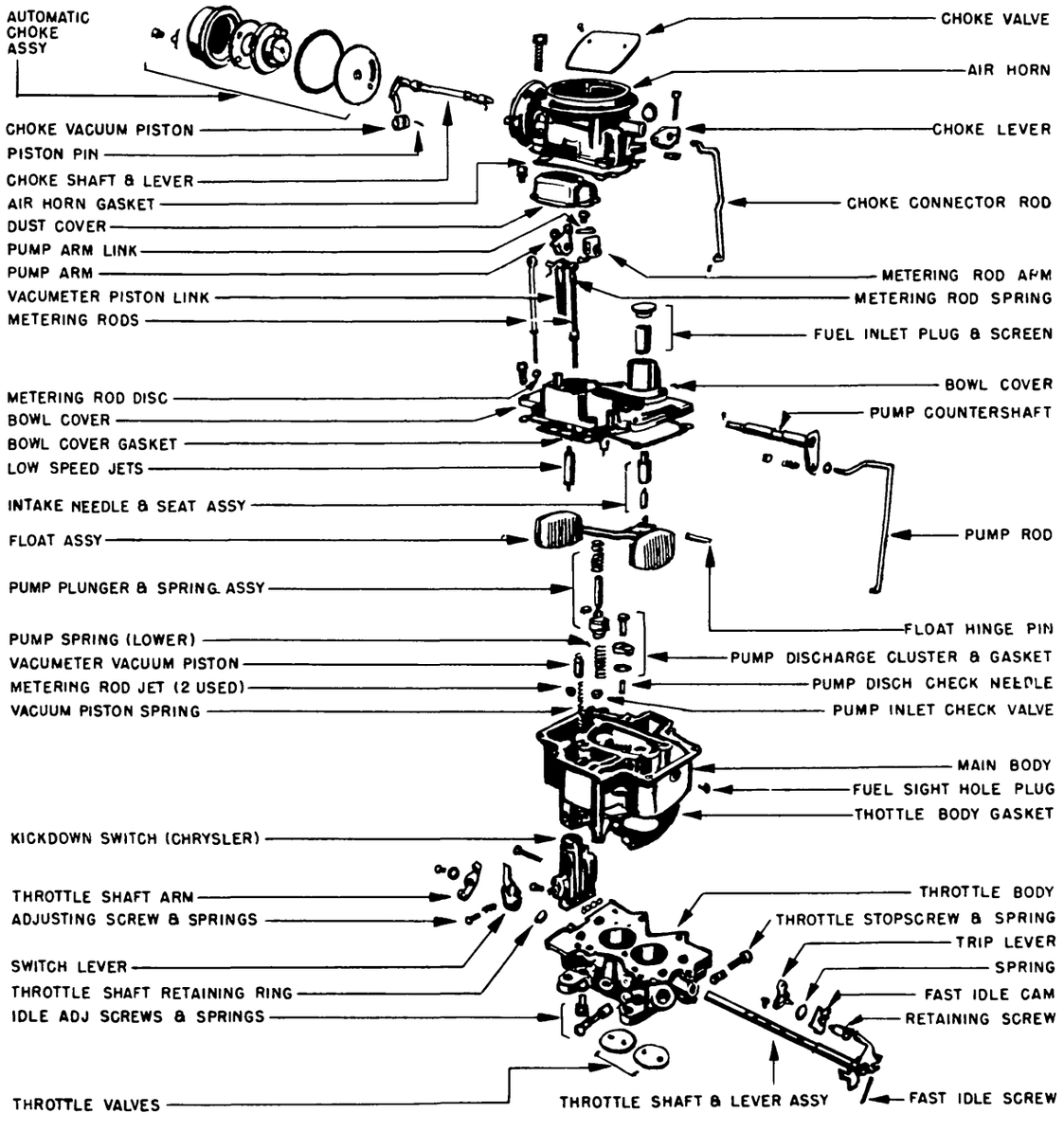
Accel erating Pump: Check and adjust pump stroke as follows. With pump connector link installed in outer hole (long stroke) of pump arm under dust cover on bowl cover, back off throttle stopscrew so that throttle valves fully closed. Place straightedge across dust cover boss directly above pump arm. Flat on top of pump arm should be parallel to straightedge. Adjust by bending throttle connector rod at upper angle using bending tool T109-213.

Metering Rods: *CAUTION - Check and adjust metering rods after Pump Stroke Adjustment has been completed.* **Metering Rod Adjustment** - No gauge required. With throttle stopscrew backed off and throttle valves fully closed, loosen metering rod arm clampscrew (on countershaft under dust cover on bowl cover). Press down on vacumeter link until both metering rods just bottom in carburetor casting, then rotate metering rod arm until finger on arm contacts lip on vacumeter link, carefully tighten clampscrew. *CAUTION* - Do not disturb arm position.

Float Level: *NOTE* - Float assembly consists of two floats (right and left hand) and auxiliary lever. Floats are adjusted separately and should be set for uniform height (float level or vertical adjustment).

Float Level Setting - With bowl cover and float assembly removed from carburetor, invert assembly, remove cover gasket, install correct gauge (see table below) on cover directly below floats with notched portions of gauge fitted over edge of cover casting. Make vertical and lateral adjustments on each float.

Vertical Adjustment - Top of each float should just clear horizontal portion of gauge. Adjust by bending float arms. *CAUTION* - Adjust both floats evenly.



CARTER "WCD" DUAL CARBURETOR

Lateral Adjustment - Sides of floats should barely touch vertical uprights of float gauge (necessary to prevent floats hanging up in bowl). Adjust by bending float arms.

Float Level Setting

Car	Float Level	Checking Gauge
Rambler	5/32"	T109-196

Fast Idle: *CAUTION - Two settings (1) and (2) required.*

(1) Fast Idle Cam Clearance - Loosen choke lever clampscrew on choke valve shaft, insert correct gauge (see Checking Gauge (1) in table below) between lip

CONTINUED ON NEXT PAGE

CARTER "WCD" (Cont.)

on fast idle cam and boss on flange casting. Hold choke valve tightly closed and remove all slack from linkage by pressing choke lever toward closed position, tighten choke lever clampscrew.

(2) Fast Idle Screw Setting - With choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening or clearance between edge of valve and carburetor bore on side opposite idle ports is correct (see Checking Gauge (2) in table below).

Fast Idle Setting & Checking Gauge

Car	(1)	(2)
Rambler	.010"	T109-200 .020" T109-29

Unloader: Hold throttle valve wide open and check choke valve opening or clearance between edge of valve and air horn wall. Adjust by bending unloader lip on throttle lever using bending tool T109-41.

Unloader Setting

Car	Choke Opening	Checking Gauge
Rambler	3/16"	T109-28

Automatic Choke: Adjust by loosening choke cover screws and rotating cover and coil assembly.

Automatic Choke Setting

Rambler ..... Centered (At Index)

THROTTLE VALVE SETTING: Check when overhauling carburetor.

Throttle Valve Setting

Car	Idle Port	Vacuum Spark Port
Rambler	① .095-.101"	② .028-.038"

① - Opening above upper edge of throttle valve.
② - Top of port above top edge of valve.

OVERHAUL: *See 1955 Annual Data, Pag 257, or later Manual edition.*

Service Parts

Gasket Set - Carter No. 360.
Re-Carburetion Kit - Carter No. 5043N.
Zip Kit - 900-126.

1961 CARTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Standard Metering Rod Part No.	Standard Metering Jet Size	Standard Metering Jet Part No.	Main Vent Tube Size	Main Vent Tube Part No.	Venturi Assembly Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.	Idle Tube Size	Idle Tube Part No.	Venturi Cover Screw Part No.	Venturi Cover Screw Idl Air Bleed	Venturi Cover Screw Idl Restriction
938SD	YF	75-1500	.0935"	120-166				.028"	11-163S	.031"						
951SA	YF	①75-1500	.0935"	120-166				.028"	11-163S	.031"						
2392S	YF	③75-708	.096"	120-160				.031"	11-160S	.025"						
2467S	YF	②75-1279	.098"	120-163				.028"	11-163S	.028"						
2858S	AS	75-1384S	.1065"	120-171				.028"	11-290S	.028"						
2921S	BBD	75-1442	④	120-213S	.0393"		58-127S	.0255"		.0275"				101-440	.059"	.055"
2922S	BBD	75-1429	④	120-213S	.0393"		58-127S	.0255"		.0275"				101-440	.059"	.055"
2923S	BBD	75-1482		120-245S	.0292"		58-426S	.0295"		.0275"				101-454	.059"	.051"
3093S	BBS	75-1208	⑤	120-212S	.0354"	145-91		.0295"		.0275"	48-194	.0295"	123-84S		.061"	.057"
3094S	BBS	75-1489	⑤	120-212S	.0354"	145-91		.028"		.0275"	48-194	.028"	123-76S		.061"	.057"
3097S	BBS	75-1208	⑧	120-209S	.0354"	145-91		.028"		.0275"	48-194	.028"	123-76S		.061"	.057"
3098S	BBS	75-999	⑥	120-206S	.0354"	145-136		.0295"		.0275"	48-194	.028"	123-76S		.0629"	.057"
3099S	BBS	75-1426	⑥	120-206S	.0354"	145-136		.0295"		.0275"	48-194	.228"	123-76S		.0629"	.057"
3127S	BBS	75-1207	⑤	120-212S	.0354"	145-91		.0295"		.0275"	48-194	.0295"	123-84S		.061"	.057"
3128S	BBS	75-991	⑥	120-206S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.057"
3129S	BBS	75-1208	⑧	120-209S	.0354"	145-91		.028"		.0275"	48-194	.028"	123-76S		.061"	.057"
3132S	BBD	75-1525	⑦	120-249S	.0354"		58-426S	.0295"		.0275"				101-450	.055"	.051"
3148S	ABD	75-1468		120-255S		145-227	58-531S	.031"		.0292"				101-476	.0635"	
3149S	ABD	75-1468		120-255S		145-227	58-531S	.031"		.0292"				101-476	.0635"	
3159S	AS	⑨75-1536S		120-170				.028"		.026"						
3160S	AS	⑨75-1536S		120-170				.028"		.026"						
3161S	AS	⑩75-1537S		120-161				.037"		.026"						
3169S	AS	⑩75-1552S		120-171				.031"		.032"						
3170S	WCD	⑪75-1431		120-159				.026"	11-293S	.0292"	48-282S					
3186S	AS	⑫75-1542S														

① - 1 Size Lean 75-808. 1 Size Rich 75-913.
② - 1 Size Lean 75-1339. 2 Sizes Lean 75-1340.
③ - 1 Size Lean 75-720.
④ - 1 Size Lean 120-212S. 2 Sizes Lean 120-209S.
⑤ - 1 Size Lean 120-209S. 2 Sizes Lean 120-211S.
⑥ - 1 Size Lean 120-215S. 2 Sizes Lean 120-214S.
⑦ - 1 Size Lean 120-251S. 2 Sizes Lean 120-259S.
⑧ - 1 Size Lean 120-211S. 2 Sizes Lean 120-210S.
⑨ - 1 Size Lean 75-1531S. 2 Sizes Lean 75-1532S. 1 Size Rich 75-1562S.
⑩ - 1 Size Lean 75-1538S. 2 Sizes Lean 75-1539S. 1 Size Rich 75-1564S.
⑪ - 1 Size Lean 75-1464. 2 Sizes Lean 75-1465.
⑫ - 1 Size Lean 75-1543S. 2 Sizes Lean 75-1544S.

CARTER ABD 2-BARREL CARBURETORS

LINCOLN CONTINENTAL	Carter No.
430" Engine (Exc. Air Cond.)	3148S
430" Engine (Air Cond.)	3149S

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 LINCOLN "HIGH ALTITUDE" CARBURETOR IDENTIFICATION NOTE & SERVICE ADJUSTMENT CAUTION:* Production carburetors equipped with high altitude jets will be identified by a RED tag attached to carburetor air horn. On these carburetors, the accelerator pump rod and throttle closing spring should be positioned in summer (S) position regardless of ambient temperatures.

►*1961 LINCOLN CARBURETOR-TO-SPACER GASKET REWORK:* On engines having a carburetor spacer without the partial web, a gasket furnished in gasket and repair kits may be reworked, if necessary, for use on these engines by removing excess gasket material as follows: Install gasket on carburetor mounting studs over the spacer, then hold gasket firmly and cut contoured portion of gasket inner diameter so both sides are straight and parallel.

DESCRIPTION: Design is same as used on previous models except for the following new features:

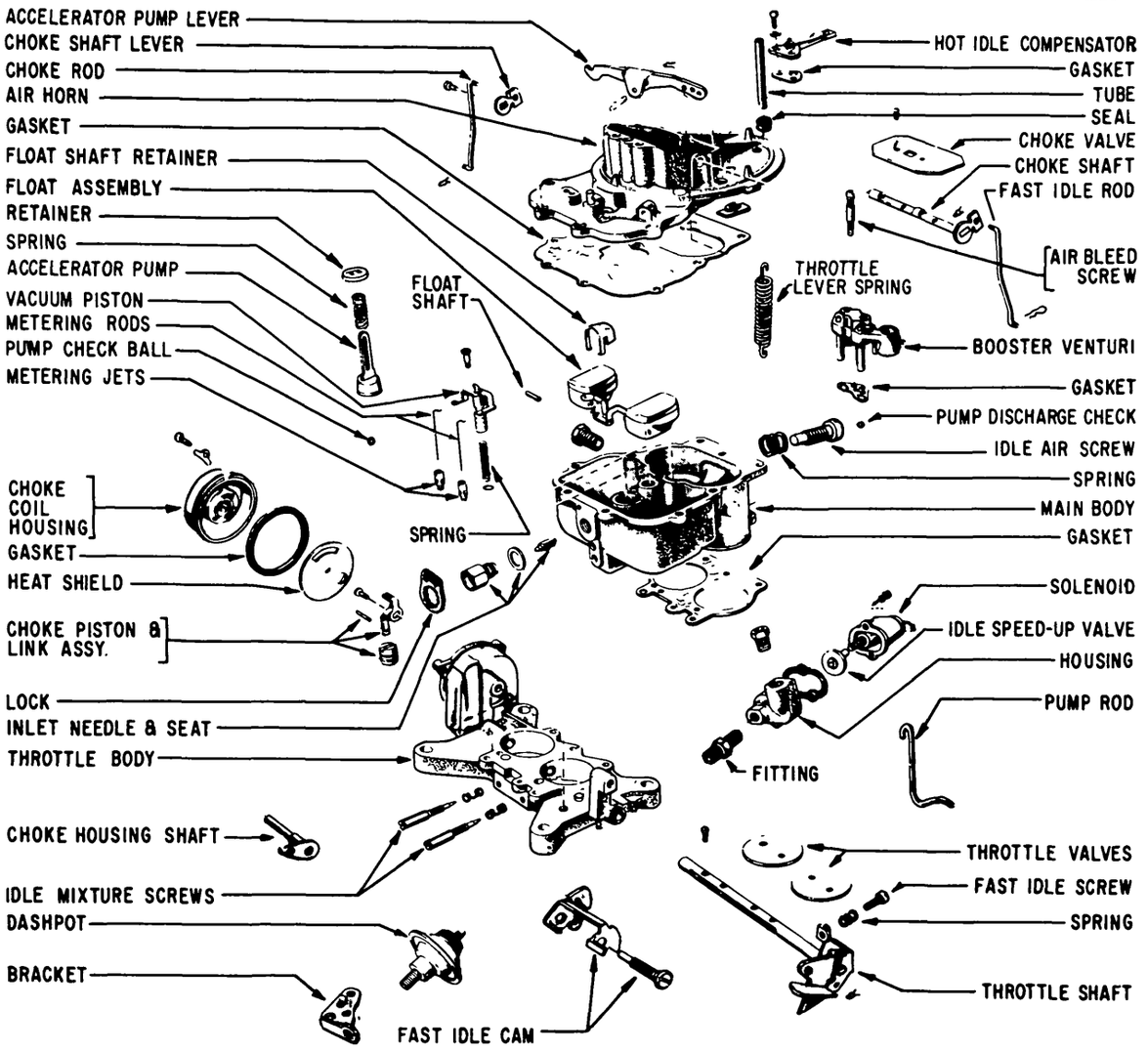
Idle Air Bypass Syst m: Throttle valves are completely closed at slow idle speed. Air for closed throttle operation is taken from top of primary venturi through an adjustable orifice to throttle bores below throttle valves. An Idle Air Speed Screw controls the adjustable orifice and all idle speed adjustments are made with this screw. Throttle stop screw not used.

Idl Sp d-Up (Air C nditioned Cars): Consists of two separate devices as follows:

Initial Assist (Carbur t r) – An external air bypass passage and solenoid controlled valve on carburetor provides additional air below throttle valves when air conditioning compressor clutch is engaged. Upper end of tube is located in air horn. To check operation, remove air cleaner, then with air conditioner compressor operating, close end of tube with finger. Engine speed should decrease 30–40 RPM. *NOTE – It is not necessary to operat air conditioner when adjusting slow (hot) idl speed.*

Suppl mental Assist (Throttle Linkage) – Consists of a vacuum diaphragm operated rod connected to throttle linkage. Operation of vacuum diaphragm is controlled by a solenoid valve in vacuum line so that rod is pulled down and engine speed increased only when engine is idling with transmission selector lever in "P" (Park) or "N" (Neutral). *See "Idle Speed-Up Control Adjustment" below.*

ADJUSTMENTS: *NOTE – All adjustm nts xc pt float s tting and fast idle throttle clearance can be mad with carburetor installed on engin .*



CARTER ABD 2-BARREL CARBURETOR ASSEMBLY

Idle Mixture & Speed Setting: For initial adjustment, turn idle mixture screws (one for each throttle bore) 1–1½ turns open from a lightly seated position, then turn Idle Air Speed Screw 3½ turns open from a lightly seated position. *NOTE – On Air Conditioned cars, remove air cleaner and turn air conditioner off.* For final adjustment, with engine at normal operating temperature, adjust Idle Air Screw for correct idle speed of 450–475 RPM (transmission selector lever in "D"), or 500–550 RPM (transmission selector lever in "N"). Adjust each idle mixture screw for smooth idling and highest vacuum reading and engine RPM. Recheck and if necessary, reset idle speed, then recheck idle mixture setting.

Fast Idle Speed: With engine at normal operating temperature, transmission selector lever in "D" (Drive) and fast idle screw on lowest (slowest) step of cam, adjust fast idle screw to obtain 600-650 RPM.

Anti-Stall Dashpot: .090–.120" clearance between dashpot plunger and throttle operating lever with dashpot plunger held in to limit of travel and with throttle valves closed. To adjust, loosen locknut and rotate dashpot in bracket.

Ch k S tting: Centered (at index).

CONTINUED ON NEXT PAGE

CARTER ABD 2-BARREL CARBURETORS (Cont.)

Accelerating Pump: 17/32" from top of accelerator pump plunger to top of bowl cover with pump operating rod in outer hole (marked "W") of throttle lever with throttle valve closed. *NOTE – Accelerator pump lever has one hole for throttle return spring marked "W" (for Winter setting) and one hole marked "S" (Summer setting). If either the accelerator pump rod or throttle return spring is set in "W" or "S", the other must correspond.*

►*1961 LINCOLN "HIGH ALTITUDE" CARBURETOR IDENTIFICATION NOTE & SERVICE ADJUSTMENT CAUTION:* Production carburetors equipped with high altitude jets are identified by a RED tag attached to carburetor air horn. On these carburetors, the accelerator pump rod should be positioned in inner hole (marked "S") of throttle lever, and throttle closing spring should be positioned in hole marked "S" on accelerator pump lever, regardless of ambient temperatures.

Choke Valve & Piston Lever Linkage: Bend 1/8" of end of Tool T109-189 (.026" wire gauge) at a 90° angle, then insert bent end of gauge into choke housing piston bore so that it is between bottom of slot in choke piston and top edge of vacuum slot in choke housing. Close choke valve by pressing on piston lever until it stops, then check clearance between upper edge of choke valve and air horn which should be 5/32" (Tool T109-154). To adjust, use parallel jaw pliers and bend choke operating lever at the reduced area to obtain proper adjustment.

Unloader: 1/8" clearance between upper edge of choke valve and wall of air horn with throttle valves wide open. To adjust, use 1/8" gauge, Tool T109-36 or a 1/8" drill to check clearance. Bend tang on choke unloader lever as required.

Fast Idle Cam: With choke valve closed, fast idle adjusting screw should rest at index mark on high step of fast idle cam. To adjust, bend fast idle cam pickup lug on choke unloader lever as required.

Fast Idle Throttle Valve Clearance: With fast idle adjusting screw on index mark of cam, clearance between lower edge of valve and throttle bore should be .015".

Float Level: 5/16" measured at free end of float as follows: Press down on float shaft retainer and hold float and lever assembly in uppermost position against fuel inlet needle. Distance between top of float (end furthest from hinge pin) and top machined surface of main body should be 5/16" (Tool T109–280). Bend float lever arm as required to obtain proper alignment (parallel). Bend inlet needle tab as required for correct float level.

OVERHAUL: *See 1960 Annual Data, Page 268, or later Manual edition.*

SERVICE PARTS: Gasket Set – Carter No. 351.
Re–Carburetion Kit – Carter No. 5031N.
Zip–Kit – Carter No. 900–117.

CHECKER SUPERBA	Carter No.
Model A10	2858S
RAMBLER	
Classic Six, Auto. Trans. (Early)	3169S
Classic Six, Auto. Trans. (Late)	3206S
STUDEBAKER	
Lark 6 Cyl. (Exc. Taxi)	3159S
Lark 6 Cyl. (Exc. Taxi) ①	3161S
Lark 6 Cyl. (Taxi) ①	3186S
Lark 6 Cyl. (With Governor)	3160S

① - With Closed Crankcase Ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 RAMBLER CARBURETOR PRODUCTION CHANGE:* Carter Carburetor No. 3206S, replaced carburetor No. 3169S in production beginning with Engine Date Code 21111. Design of the later carburetor has been changed to eliminate the fuel bowl baffle and increase overall size of floats. Bowl venting has been changed to include an additional outside bowl vent passage.

►*1961 STUDEBAKER SIX FLAT SPOT OR ENGINE SURGE CORRECTION:* Install Metering Rod, Studebaker Part No. 1553351 (3159S); No. 1553350 (3161S). *NOTE* - This new metering rod will result in a slight reduction in fuel economy.

►*1961 STUDEBAKER FUEL LINE STOPPAGE CORRECTION:* Kinked fuel line at either tank or fuel pump can be corrected by installing a new type flexible hose, Part No. 1543933X2.

DESCRIPTION: Single barrel downdraft type with automatic choke.

ADJUSTMENT: Make all adjustments exactly as follows:

Idling Adjustment: Warm up engine thoroughly, so that choke valve is wide open and fast idle inoperative. See table for idle screw setting. Turn screw out for richer mixture. See car model pages for complete tune-up data.

Idle Mixture Setting

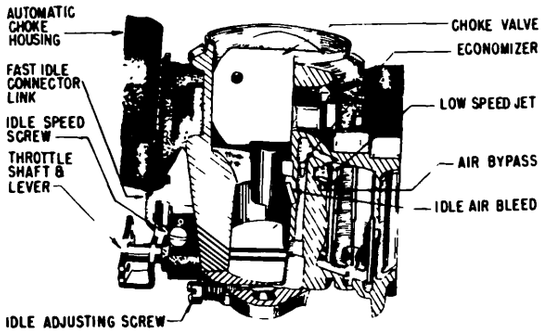
Car & Carb.	Idl Scr w Op ning
Checker 2858S	½-1¾ turns
Rambler (All)	1/2-1 1/4 turns
Studebaker (Exc. 3186S)	1/8-1 1/2 turns
Studebaker 3186S	1/2-2 turns

CARTER "AS" CARBURETORS

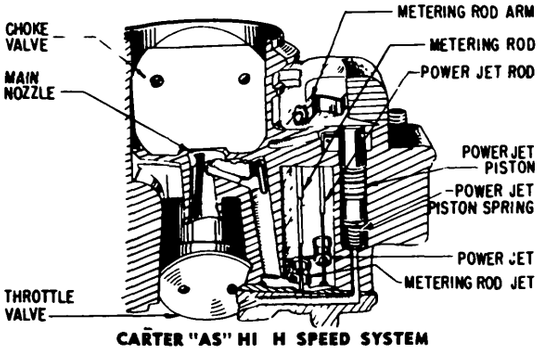
Idle Speed Setting

Car	
Checker	①400 RPM
Rambler (Exc. Air Cond.)	①475 RPM
Rambler (Air Cond.)	①③500 RPM
Studebaker (All Trans.)	②550 RPM

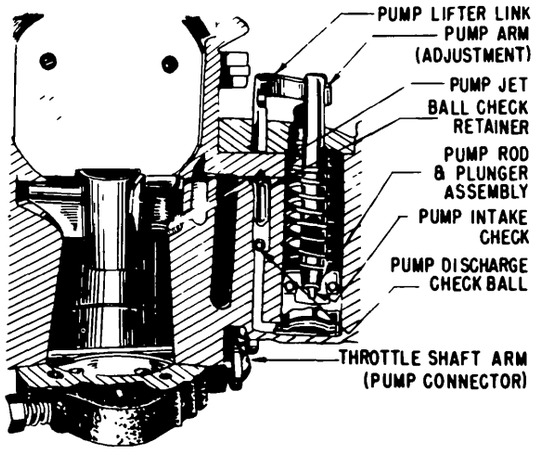
① - Auto. Trans. in "N" (Neutral).
② - Auto. Trans. in "N" (Neutral) or "P" (Park).
③ - With Air Conditioner turned on.



CARTER "AS" LOW SPEED SYSTEM



CARTER "AS" HIGH SPEED SYSTEM



CARTER "AS" PUMP SYSTEM

Float Level: "Split Type" float used on Checker Superba, "Single Type" float used on Rambler and Studebaker.

"Split Type" Floats - Remove bowl cover gasket and float pin retainer. Check each float separately while holding lip of float arm against seated needle. *CAUTION - Float pin must be at bottom of guide slots.* Place gauge squarely on top edge of bowl at free end of float. Ridge on top of float should just contact step of gauge. Adjust by bending lip on float arm. Make certain that floats clear sides of bowl. Adjust by bending float arms. Install float pin retainer, invert carburetor so that both floats rest against seated needle. Clearance between overlapping tangs on float levers should be .010"-.015". Adjust by bending long tang on left hand float. Recheck float level.

"Single Type" Floats - Check floats for side clearance. Bend float arms as required for free operation. Hold float pin retainer in place so pin is at bottom of slots, then invert carburetor so weight of floats alone seats the intake needle. The distance from top surface of body casting to top of each float at free end should

CONTINUED ON NEXT PAGE

CARTER "AS" CARBURETORS (C ntinued)

be as indicated in table below. Adjust by bending lip on float arm.

Fl at Setting

Car & Carb.	Checking Gauge	Float Setting
Checker 2858S	T109-282	1/4"
Rambler 3169S	T109-282	1/4"
Rambler 3206S	T109-196	5/32"
Studebaker(Exc.3186S)	T109-282	1/4"
Studebaker 3186S	T109-280	5/16"

Pump Adjustm nt: Top of pump arm that engages slot in pump shaft must be parallel to top surface of bowl cover with throttle in wide open position. Adjust by bending pump arm up or down as necessary.

M t ring R d Adjustment: With throttle wide open, metering rod should just bottom in carburetor casting. To adjust bend metering rod arm. When metering rod is properly adjusted, some movement can be noted around eye of metering rod retainer clip when throttle is moved slightly from wide open position. If rod is too low, it will tend to push metering rod retainer clip up. If rod is too high, it will be possible to push rod down.

Fast Idl Adjustm nt: Remove thermostat coil housing, gasket and baffle plate. Crack throttle valve and hold choke valve closed to rotate fast idle cam to fast idle position. Close throttle. Measure clearance between throttle valve and bore of carburetor (side opposite idle port) using gauge listed in table below. Adjust by bending choke connector rod at lower angle using bending tool T109-213.

Fast Idle Setting

Car & Carb.	Checking Gauge	Throttle Opening
Checker (All Carbs.)	T109-29	.030"
Rambler (All Carbs.)	T109-193	037"
Studebaker (All Carbs.)	T109-234	.065"

Unload r Adjustm nt: Hold throttle valve wide open and close choke valve without forcing it. Measure clearance between upper edge of choke valve and inner wall of carburetor air horn. See table below. To adjust, bend choke shaft unloader arm.

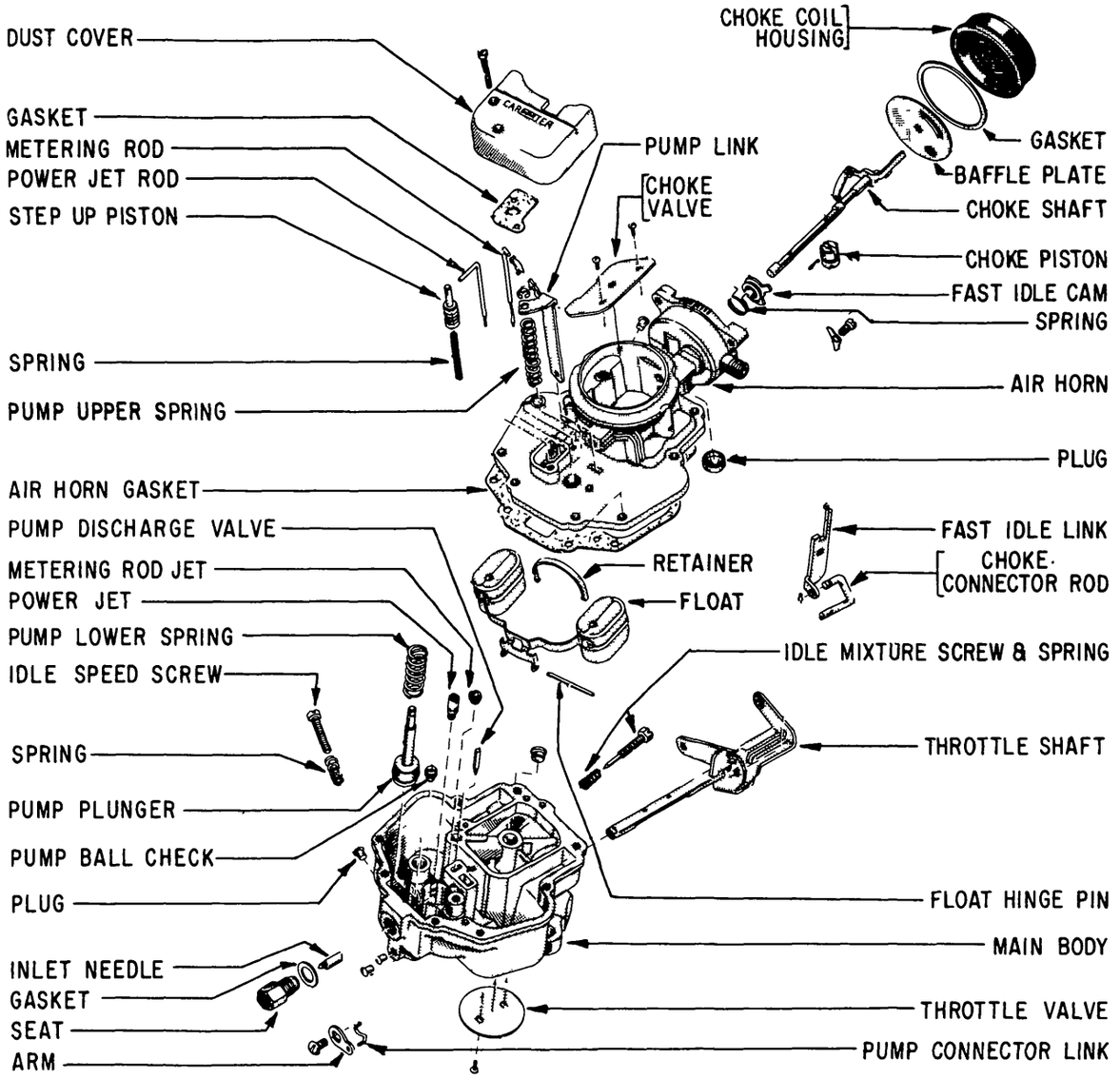
Unloader Setting

Car & Carb.	Checking Gauge	Choke Opening
Checker (All Carbs.)	T109-34	9/64"
Rambler (All Carbs.)	T109-36	1/8"
Studebaker (All Carbs.)	T109-28	3/16"

Aut matic Ch ke: Adjust by loosening cover screws and rotating cover and thermostatic coil assembly.

Automatic Ch k Setting

Car & Carb.	Setting
Checker 2858S	1 Point Rich
Rambler (All Carbs.)	Centered (On Index)
Studebaker (All Carbs.)	1 Point Lean



CARTER "AS" CARBURETOR

OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Take out two dust cover retaining screws, remove dust cover and gasket. Remove step-up jet piston, rod and spring from bowl cover. Disconnect spring clip from actuating link and remove metering rod and spring clip retainer. Take out throttle shaft arm screw, remove throttle shaft arm and pin assembly. Remove choke piston link-to-throttle valve arm lever connector rod retainer and remove rod. Take out cover retaining screws and remove bowl cover and gasket. Push accelerating pump plunger toward cover and disconnect it from actuating link, remove plunger and actuating link. Remove spring from pump plunger. Take out choke cover retaining screws, remove choke cover and coil assembly, gasket, and baffle. Slip fast idle link out of housing. Remove staking from ends of choke valve screws, remove screws, lift choke valve out. Disconnect fast idle cam spring from choke shaft lever, rotate choke shaft to withdraw choke piston from cylinder, re-

CONTINUED ON NEXT PAGE

CARTER "AS" CARBURETORS (Con.inued)

move choke shaft, lever, and piston assembly from housing. Disconnect piston by pushing out piston pin. Remove fast idle cam and spring assembly from choke housing. Remove float lever pin retainer, remove needle valve and seat assembly, remove float and pin assembly. Separate floats by taking out the retaining pin. Remove metering rod jet, step-up jet, and low speed jet. Remove pump discharge ball retainer and check ball. Remove idle mixture adjusting screw and spring, and idle speed screw and spring,

Inspection: Thoroughly clean and inspect all carburetor parts. *CAUTION* - Take care not to damage percolator tube which extends above top surface of carburetor bowl. Replace all worn or damaged parts.

Reassembly: Use all new gaskets. Reassemble all parts in reverse order to disassembly procedure and note the following points:

Accelerating Pump Jet Aim (Studebaker) - Check pump discharge jet by filling bowl with clean gasoline and operating pump plunger with several quick full strokes. Pump jet should be parallel to choke shaft and stream should strike side of small venturi about 1/8" down from top edge. Adjust by bending pump jet tube. *CAUTION - Use care not to damage metering end of tube.*

Assembling Air Horn to Body - Install body gasket on air horn. Install metering rod retainer on pump lifter link but **do not install metering rod**, insert pump lifter link through operating slot in air horn, place pump spring over pump plunger and install plunger in air horn, install fast idle link in choke piston housing. Hold pump plunger, lifter link, and gasket in position and lower air horn and bowl cover onto carburetor body.

Metering Rod Installation - Place metering rod retainer in position on actuating link. Lower metering rod into place until end of rod enters hole in retainer, push metering rod and retainer down into operating position, push retainer toward rod until retainer ears engage slot in arm on lifter link.

Carburetor Adjustments - Make all adjustments as listed above in ADJUSTMENT section.

Servic Parts

Gasket Sets - Carter No. 332 (2858S); No. 361 (3169S); No. 350 (3159S, 3161S, 3186S).

Re-Carburetion Kit - Carter No. 1936 (2858S); No. 5046 (3169S); No. 5034N (3159S); No. 5035N (3161S); No. 5036N (3186S).

Zip Kit - Carter No. 900-121 (3159S, 3161S); No. 900-128 (3186S); No. 900-127 (3169S).

CARTER "YF" CARBURETORS

RAMBLER	Carter No.
American (Deluxe & Custom)	2014S
WILLYS	
4 Cyl. "L" Head Jeep Dispatcher	2392S
4 Cyl. "F" Head Universal Jeep	938SD
4 Cyl. "F" Head 4x2, 4x4, 4WD	951SA
4 Cyl. "F" Head Fleetvan	3200S
4 Cyl. "F" Head Forward Control	938SD
6 Cyl. "L" Head All Models	2467S

DESCRIPTION: Single barrel downdraft type with automatic choke (Rambler), manual choke control (Willys). Same design as used on previous models.

ADJUSTMENT: *Make all adjustments exactly as follows:*

Idling Adjustment: Warm up engine thoroughly so that choke valve wide open and fast idle inoperative. Adjust throttle stopscrew for correct engine idle speed, then adjust idle mixture screw for smoothest running and highest RPM. Turn screw for richer mixture. Recheck idle speed.

Idle Mixture Screw Setting

Car & Carb.	Idle Screw Opening
Rambler 2014S	½-1½ turns
Willys 938SD, 951SA, 3200S	¾-1¾ turns
Willys 2392S	½-2 turns
Willys 2467S	1-2½ turns

Float Setting Adjustment: Invert air horn and float cover assembly allowing float to hang freely, then measure from top of float at free end to bowl cover (gasket removed). Adjust by bending lip which contacts intake needle (do not bend float arm).

►*CAUTION: On models with spring loaded intake needle, do not compress this spring when checking float level (will result in false reading and incorrect float setting).*

Idle Speed Setting

Car	Synchro-mesh	Auto. Trans.
Rambler	① 550 RPM	①② 475 RPM
Willys 4 Cyl.	600 RPM	② 600 RPM
Willys 6 Cyl.	550 RPM	

① - 500 RPM (Air Cond. Cars) with compressor operating.

② - Transmission selector lever in "N" (Neutral).

Accelerating Pump: Diaphragm type pump on all models, with ball check discharge valve (except 2467S), discharge needle (2467S). *CAUTION - On 2467S only, check pump adjustment whenever carburetor disassembled or pump linkage disturbed BEFORE checking and adjusting Metering Rod.*

Pump Adjustment (2467S) - With idle screw backed out so that throttle valves are fully seated, press down on upper end of diaphragm shaft until it is bottomed in diaphragm housing (Tool T109-212 may be used to hold diaphragm shaft down in this position). In this position, metering rod arm should contact lifter link at outer end nearest the springs. Adjust by bending pump connector link at lower angle using bending Tool T109-213. *CAUTION - Bending link at any other point may cause binding of pump lifter link.*

Metering Rod Adjustment: With throttle valve seated in bore of carburetor, press down on upper end of diaphragm shaft until diaphragm bottoms in vacuum chamber. Tool T109-212 may be used to hold diaphragm shaft down while adjusting metering rod. Metering rod should contact bottom of metering rod well and metering rod arm should contact lifter link at outer end nearest the springs and at supporting lug. Adjust by bending lip of metering rod arm to which metering rod is attached.

Automatic Choke: *Used on Rambler 2014S only, Willys carburetors have manual choke control.* Adjust by loosening cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Rambler 2014S	1 Point Lean

Fast Idle Adjustment (Manual Choke Control): With choke valve in wide open position, check to see that lip on fast idle arm is in contact with boss on carburetor body casting. To adjust, bend fast idle arm rod at lower offset.

Fast Idle Adjustment (Automatic Choke Control): Remove thermostatic coil housing gasket and baffle plate. Crack throttle and hold choke valve fully closed, then close throttle. With fast idle cam revolved to fast idle position, hold choke valve and throttle valve closed as far as possible, there should be .054" clearance (Gauge T109-193) between throttle valve and bore of carburetor (side opposite idle ports). Adjust by bending connector link at lower angle.

Unloader Adjustment (Automatic Choke Control Carbs.): *NOTE - This adjustment must be made after fast idle adjustment.* Hold throttle valve in wide open position and close choke valve as far as possible without forcing. Clearance between lower edge of choke valve and inner wall of air horn should be 9/32" (Gauge T109-126). Adjust by bending arm of choke trip lever.

Float Level Setting

Car & Carb.	Float Setting	Checking Gauge
Rambler 2014S	1/2"	T109-83
Willys 938SD, 951SA, 3200S	5/16"	T109-107
Willys 2392S, 2467S	9/32"	T109-126

OVERHAUL: *See 1956 Annual Data, Page 258, or later Manual edition.*

Servic Parts

Gasket Set: Carter No. 206S (938SD, 951SA); No. 216 (2014S) No. 200 (2392S); No. 241 (2467S).

Re-Carburetion Kit - Carter No. 1764R (938SD, 951SA); No. 1590N (2014S); No. 1546N (2392S); No. 1849N (2467S).

Zip-Kit - Carter No. 900-31 (938SD, 951SA); No. 900-38 (2014S); No. 900-77 (2392S); No. 900-78 (2467S).

CARTER BBD DUAL

CHRYSLER & DESOTO	Carter No.
361" & 383" Engs. (Std.)	2923SA
361" & 383" Engs. (CCV) ①	3132S
DODGE V8	
318" Eng., Synchro–mesh (Std.)	2921S
318" Eng., Auto. Trans. (Std.)	2922S
361" Eng. (CCV) ①	3132S
PLYMOUTH	
318" Eng., Synchro–mesh (Std.)	2921S
318" Eng., Auto. Trans. (Std.)	2922S

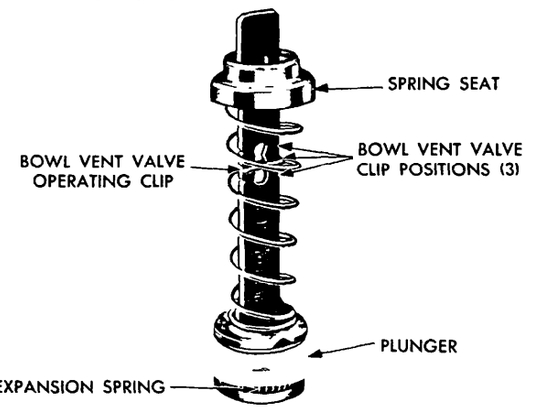
① – Closed Crankcase Ventilation.

►*1961 DODGE & PLYMOUTH 318" ENGINE HARD STARTING CORRECTION:* Hard starting may be caused by an improperly positioned air cleaner. To index air cleaner properly, place loop end of clamp so it is positioned on right side, 2" to rear of centerline of air cleaner.

►*HARD COLD WEATHER STARTING CORRECTION:* This condition may be caused by choke vacuum unloader piston sticking. To correct, remove air cleaner and squirt a suitable carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke valve to flush out gum formation.

DESCRIPTION: Two–barrel downdraft type with "Cross–Over" type automatic choke. Design is similar to previous models having the following features:

Bowl Vapor Vent (2923SA, 3132S): Consists of an atmospheric vent in bowl cover flange which is closed by a rubber grommet on a spring arm (saxophone key). A loose lever on pump countershaft opens bowl vent when throttle valve is closed. Bowl vapor vent adjustment should be checked whenever accelerator pump setting is changed.



ACCELERATING PUMP PLUNGER ASSEMBLY

Bowl Vapor Vent (2921S, 2922S): Consists of an atmospheric vent in bowl cover flange at slot for accelerator pump shaft. The vent valve which is installed over the accelerator pump shaft is operated by a special clip (adjustable) on pump shaft that opens vent when throttle valves are closed. *NOTE – If pump rod is installed in either the long or short stroke hole in throttle lever, it will be necessary to move clip (located under vent valve) either up or down to compensate for change in pump stroke.*

Fast Idle (2923SA, 3132S): Fast idle cam is located directly on end of choke shaft. Fast idle lever is pivoted on side of main body and is linked to throttle lever by a fast idle connector rod. The fast idle adjustment screw is located on upper end of fast idle lever and contacts the fast idle cam. *See "Fast Idle Adjustment" below.*

Fast Idle (2921S, 2922S): Fast idle cam is located on carburetor main body adjacent to throttle lever and is linked to choke valve shaft lever by a connector rod. The fast idle lever is pivoted on throttle valve shaft and contacts the fast idle cam. The fast idle adjusting screw is on fast idle lever. *See "Fast Idle Adjustment" below.*

Automatic Choke (Cross-Over Type) All Models - This type of automatic choke is a separate unit located in well in intake manifold (in exhaust cross-over passage) and is linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder on the air horn and is linked directly to choke valve. *See "Carter Cross–Over Type Automatic Choke" in 1957 Annual Data, Page 244, or later Manual editions.*

ADJUSTMENTS: *Make all adjustments exactly as detailed below.*

►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, note the following: Turn headlights on High Beam to compensate for alternator load (alternator charges battery at idle speed). On automatic transmission cars (except Ram Induction Engines), loosen nut on sliding link of carburetor–to–bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut.

Idle Adjustment: Make preliminary setting of both idle mixture screws by turning each screw in until it is lightly seated and then backing screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative.

Idle Mixture - With engine at normal operating temperature and idling at correct idle speed, adjust idle mixture screws until engine operates smoothly. Recheck engine idle speed, adjust for correct engine RPM.

Idle Mixture Setting

Carburetor	Idle Screw Opening
2921S, 2922S	1 turn
2923SA, 3132S	1/8–1½ turns

Idle Speed Setting

Car	Synchro-mesh	① Auto. Trans.
Chrysler		② 500 RPM
DeSoto	500 RPM	② 500 RPM
Dodge & Plymouth	500 RPM	③ 500 RPM

① - Automatic transmission in "N" (Neutral) position.

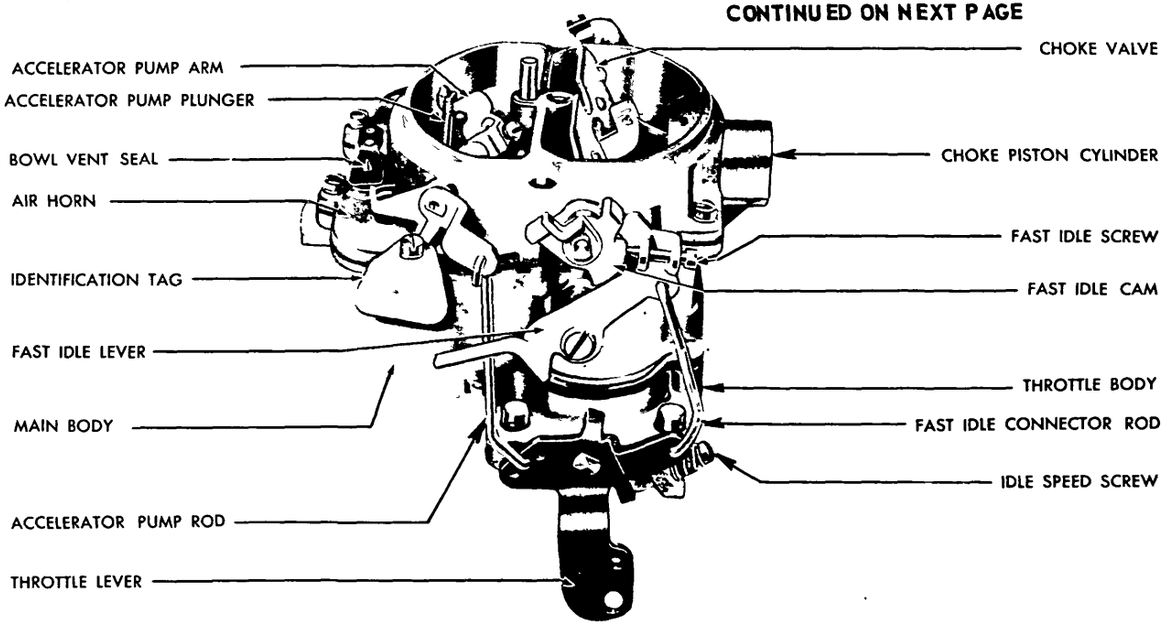
② - 575 RPM on Air Conditioned cars.

③ – 550 RPM (2921S, 2922S); 575 RPM (3132S) on Air Conditioned cars.

Accelerating Pump (2923SA, 3132S): Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as indicated below: *CAUTION – Bowl vapor vent adjustment must be checked whenever pump setting is changed.*

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that pump connector rod engaged in center hole (medium stroke) of throttle lever. Use scale to measure distance from top surface of bowl cover to top of pump plunger shaft (within air horn - remove air cleaner for access). This distance should be 1"±1/64" (all models). Adjust by bending connector rod at lower angle.

CONTINUED ON NEXT PAGE



CARTER BBD CARBURETOR ASSEMBLY (2923SA & 3132S)

CARTER BBD DUAL (C nt.)

Pump Seasonal Setting - Standard setting is with connector rod engaged in center hole of throttle lever (medium stroke). Outer hole will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

Accelerating Pump (2921S, 2922S): Three holes in throttle lever and two holes provided in pump arm for connector rod engagement to provide seasonal setting as indicated below. *CAUTION – Bowl vapor vent adjustment must be checked whenever pump setting is changed.*

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that connector rod engaged in center hole of throttle lever and inner hole of pump arm Use scale to measure the distance from top surface of bowl cover to top of pump plunger shaft. This distance should be 1 1/8" (All models) Adjust by bending connector rod at lower angle.

Pump Seasonal Setting - Std setting is with connector rod engaged in center hole of throttle lever and inner hole of pump arm (Medium Stroke) Outer hole in throttle lever will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

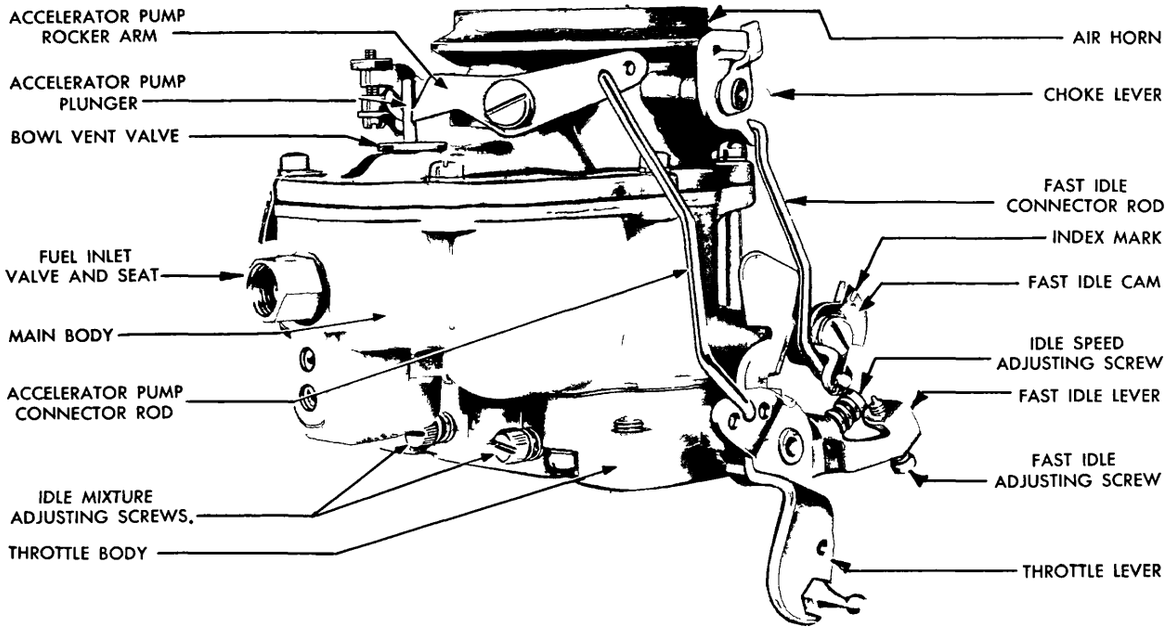
Float Level: To check float level, remove air horn and bowl cover assembly, and gasket Place gauge (see table below) squarely on edge of bowl at free end of floats Hold float arm lip firmly against seated needle valve Ridge or crown on each float should just touch step on gauge Adjust by bending float lip *(NOTE* - If one float lower than the other, first equalize floats by bending float arm, then adjust floats by bending lip).

Float Level Setting

Carburetor	Checking Gauge	Float Level
2921S, 2922S	T109–239	9/32"
2923SA, 3132S	T109–280	5/16"

Bowl Vapor Vent Adjustment (2923SA, 3132S): With throttle valves fully closed, vapor vent opening or clearance between heel of rubber grommet on vent arm and seat on cover should be .067–.080" (Gauge T109–234) Adjust by bending lip on vapor vent arm. *CAUTION - Setting should be checked whenever pump stroke setting is changed.*

2921S, 2922S – With throttle valves held closed, clearance between bowl vent valve and air horn should be .060" (use a .060" drill shank). To adjust, bend accelerator pump rod at lower angle. *CAUTION – If pump rod is installed in either the long or short stroke hole, it will be necessary to move the hairpin clip located directly under the bowl vent valve, either up or down to compensate for change in pump stroke and to maintain proper adjustment.*



CARTER BBD CARBURETOR ASSEMBLY (2921S & 2922S)

Fast Idle (On Car): With engine at normal operating temperature, adjust speed to 1375-1425 RPM with fast idle screw on index mark of cam.

Fast Idle (Off Car): Two adjustments required as follows:

Fast Idle Linkage Adjustment (2923SA, 3132S) - With choke valve tightly closed and lug on fast idle cam contacting lug on outer lever, align index mark on fast idle cam with center of fast idle adjusting screw. To adjust, bend lip on choke shaft lever.

Fast Idle Adjustment (2921S, 2922S) - With choke valve tightly closed and lip on inner choke shaft lever contacting lug on outer lever, align index mark on fast idle cam with adjusting screw To adjust, bend lip on inner choke shaft lever.

Fast Idle Setting

Carburetor	Checking Gauge	Throttle Opening
2923SA, 3132S	T109-44	.018"
2921S, 2922S	T109-44	.015"

Fast Idle Throttle Valve Opening (All Models) - Back out idle speed adjusting screw, close choke valve tightly. Fast idle screw should be in line with index mark on fast idle cam (highest step of cam). Turn fast idle screw in or out until correct throttle valve opening is secured (see table above). Check by inserting gauge between lower edge of throttle valve and carburetor wall on side opposite idle ports.

Unloader: To check, close choke valve tightly, open throttle valves wide (choke valve will open slightly). Check choke valve opening or clearance by inserting gauge (see table below) between upper edge of choke valve and air horn wall. Adjust by bending unloader finger on fast idle arm.

Unload r Setting

Carburetor	Checking Gaug	Chok Setting
2923SA, 3132S	T109-32	15/64"
2921S, 2922S	T109-31	1/4"

Automatic Choke: Cross-over type. *See "Carter Cross-Over Type Automatic Choke"*

Automatic Chok S tting

All Models	Centered (At Index)

OVERHAUL: *See 1959 Final Data, Page 269, or later Manual edition.*

SERVICE PARTS: Gasket Set – Carter No. 300 (2921S, 2922S), No. 335 (2923SA), No. 353 (3132S).

Re–Carburetion Kit – Carter No. 1988N (2921S, 2922S), No. 1993N (2923SA).

1961 CARTER BB UPDRAFT CARBURETOR JET SPECIFICATIONS

Car Mod l	Yr.	Carb. No.	Main Metering Screw: Standard Fl w Part N.	Main Metering Screw: 1 Size Lean Part N.	Main Metering Screw: 2 Sizes Lean Part N.	Main Nozzle Siz	Main Nozzle Part N.	Step Up Jet Power Orifice Siz	Step Up Jet Power Orifice Part N.	Idle Orifice Tube Siz	Idle Orifice Tube Part N.	Idl Passag Tub	Pump Valv Siz	Pump Valv Part N.
CHEVROLET Trk. 6 Cyl Fwd Cont.	(1961)	871SC	339-343cc	159-100	159-129	159-35	①	12-505	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S

① - Inside Diameter .150-.152".

CARTER BB UPDRAFT CARBURETOR

CHEVROLET TRUCKS — **Carter No.**

1961 6 Cyl. Forward Control Models 871SC

►**ACCESS TO CARBURETOR (for Adjustment or Removal):** **Forward Control Models**—Remove toe pan attaching screws, disconnect wires at stop light switch, disconnect accelerator pedal rod from throttle control rod, remove toe pan.

DESCRIPTION: Plain tube, updraft type of same design as used on previous Chevrolet models

ADJUSTMENT & SERVICING: *See complete "Carter (BB) Updraft Type" carburetor in Carburetor Section of Manual and set this carburetor to the following specifications:*

IDLING ADJUSTMENT

Idle Screw Setting—½-1½ turns open (turn screw out for richer mixture).

Idle Speed—450-500 RPM (Std. Trans.), 400-450 RPM (Auto. Trans. in Neutral).

FLOAT LEVEL SETTING

Float Level—0-1/32" (Carter Gauge T109-49 or Chevrolet J-818-13A) from top of float to top edge of bowl with needle valve seated.

CAUTION—Use 1/32" side of gauge (other side used for 1/16" settings).

Intake Needle & Seat Assembly— Carter No. 25-44S

ACCELERATING PUMP

Pump Seasonal Setting—Short Stroke—Summer, Long Stroke—Winter.

Pump Stroke - 9/16" (Short Stroke) with connecting screw in holes in throttle lever and pump link nearest throttle shaft, 1" (Long Stroke) with screw in holes farthest from shaft.

THROTTLE VALVE SETTING

Idle Port—.005-.009" from top of lower idle port to lower edge of throttle valve.

Vacuum Spark Port—.000-.004" top of port below lower edge of throttle valve.

NOTE—Above specifications apply with throttle valve tightly closed.

SERVICE PARTS

Gasket Set - Carter No. 202.

Repair Pkg. (With Std. Metering Jet) - Carter No. 1539A.

CARTER "BBS" CARBURETORS

DODGE DART 6 & PLYMOUTH 6 — **Carter No.**

Synchro—mesh (Std.)	3098S
Auto. Trans. (Std.)	3099S
Synchro—mesh & Auto. Trans. (CCV) ①	3128S
Taxi (Std.)	3097S
Taxi (CCV) ①	3129S

LANCER & VALIANT

170" Eng., Synchro—mesh (Std.)	3093 S
170" Eng., Auto. Trans. (Std.)	3094 S
170" Eng., Synchro—mesh & Auto. Trans. (CCV) ①	3127 S
225" Eng., Synchro—mesh (Std.)	3098 S
225" Eng., Auto. Trans. (Std.)	3099 S
225" Eng., Synchro—mesh & Auto. Trans. (CCV) ①	3128 S
170" & 225" Taxi, S.M. & Auto. Trans. (Std.)	3097 S
170" & 225" Taxi, S.M. & Auto. Trans. (CCV) ①	3129 S

① — Closed Crankcase Ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*HARD COLD WEATHER STARTING CORRECTION:* This condition may be caused by choke vacuum unloader piston sticking. To correct, remove air cleaner and squirt a suitable carburetor cleaner, lacquer thinner or alcohol through piston link opening while operating choke valve to flush out gum formation.

DESCRIPTION: Single barrel downdraft type similar to design used on previous models.

ADJUSTMENTS: *Make all adjustments exactly as listed below.*

Idle Adjustment: Make preliminary setting of idle adjusting screw by turning screw in until it is lightly seated and then turn screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative. Set engine idle speed to correct figure, then adjust idle mixture as follows:

Idle Mixture Setting - With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idle Mixture Setting

Carburetor	Idle Screw Setting
All (Exc. 3097S & 3129S)	¼—1½ turns
3097S, 3129S	1—2 turns

►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, turn headlights on (high beam) to compensate for alternator load (alternator charges battery at idle speed). On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank (except Valiant); loosen sliding link of bellcrank —to—transmission rod (Valiant), so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, screw ball joint up or down until ball on bellcrank will mate exactly with socket (except Valiant); tighten sliding link locknut (Valiant).

Idle Speed — 550 RPM (All Models). *See "Idle Setting Caution" above.*

Accelerating Pump: Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as listed below.

Pump Stroke Adjustment — Back off throttle stop-screw so that throttle valve fully closed. Make certain that connector rod engaged in center hole (Exc. 3097S & 3129S); in upper hole (3097S, 3129S) of throttle lever. Use a scale to measure distance from top surface of bowl cover to top of pump plunger shaft. This distance should be 27/32" (Exc. 3097S & 3129S); ¾" (3097S & 3129S). If height not correct, adjust by bending rod at lower angle using Tool T109—213.

Pump Seasonal Setting - Standard setting is with pump connector rod engaged in center hole of throttle lever. Outer hole in throttle lever will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

Float Level: To check float level, remove air horn and bowl cover assembly, and gasket. Place gauge (see table below) squarely on top edge of bowl at center of floats. Remove float pin retainer, hold float arm lip firmly against seated needle valve with float pin at bottom of the guide slots. Ridge or crown on each float should just touch step on gauge. Adjust by bending float lip (*NOTE* - If one float lower than the other, first equalize floats by bending float arm then adjust both floats by bending the lip). Reinstall float pin retainer.

Float Level — (All Exc. 3097S & 3129S) 7/32" (Gauge T109—239). **(3097S & 3129S)** 9/32" (Gauge T109—239).

Fast Idle Cam Index Setting - With choke valve tightly closed and choke connector rod in upper end of slot in cam, align center of adjusting screw with index mark on cam. To adjust, bend throttle connector rod.

Fast Idle Throttle Valve Clearance — With adjusting screw on index mark of cam, there should be .030" — Gauge T109—29 (Exc. 3097S & 3129S); .026" — Gauge T109—189 (3097S & 3129S) clearance between lower edge of throttle valve and bore.

Fast Idle Speed — 1800 RPM (Synchro—mesh), 1600 RPM (Auto. Trans.) with adjusting screw on second step of fast idle cam.

Unloader: After completing fast idle adjustment (above), hold throttle valve in wide open position, close choke valve as far as possible without forcing. Measure choke valve opening or clearance between upper edge of valve and air horn wall using gauge listed in table below. Adjust by bending arm on choke trip lever which actuates choke lever using bending tool T109-214. Reassemble and adjust automatic choke (below).

Unloader Setting

Carburetor	Checking Gauge	Choke Opening
All (Exc. 3097S & 3129S)	T109—166	11/64"
3097S & 3129S	T109—28	3/16"

Automatic Choke: The automatic choke is a separate "Cross-Over" type mounted in a well directly over exhaust passage in exhaust manifold and linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in carburetor air horn and linked directly to choke valve. *See "Carter Cross-Over Type Automatic Choke" in 1957 Annual Data, Pag 244, or later Manual editions.*

Automatic Choke Setting

All Models	Centered (At Index)

OVERHAUL: *See 1960 Annual Data, Page 277, or later Manual edition.*

Service Parts

Gasket Set — Carter No. 362 (3098S, 3099S); No. 363 (3093S, 3094S, 3097S); No. 354 (3128S, 3129S); No. 355 (3127S).

1961 FORD 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

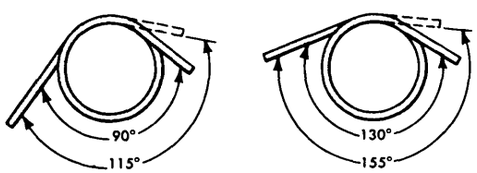
FORD & LATER MERCURY	①Carburetor No.
292" Eng. Std. Trans.	C1AE-9510-Y
292" Eng. Std. Trans. (CCV)②	C1AE-9510-AA
292" Eng. Auto. Trans.	C1AE-9510-Z
292" Eng. Auto. Trans. (CCV)②	C1AE-9510-AB
352" Eng. Std. Trans.	C1AE-9510-AC
352" Eng. Std. Trans. (CCV)②	C1AE-9510-AE
352" Eng. Auto. Trans.	C1AE-9510-AD
352" Eng. Auto. Trans. (CCV)②	C1AE-9510-AF
MERCURY (EARLY)	
292" Eng. Std. Trans.	COAE-9510-AF
292" Eng. Auto. Trans.	COAE-9510-AG
292" Eng. Std. & Auto. Trans.③	COAZ-9510-A
292" Eng. Std. Trans. (CCV)②	C1AE-9510-J
292" Eng. Auto. Trans. (CCV)②	C1AE-9510-K
352" Eng. Std. Trans.	COAE-9510-AB
352" Eng. Auto. Trans.	COAE-9510-AC
352" Eng. Std. & Auto. Trans.③	COAZ-9510-B
352" Eng. Std. Trans. (CCV)②	C1AE-9510-L
352" Eng. Auto. Trans. (CCV)②	C1AE-9510-M

4-BARREL CARBURETORS

FORD & THUNDERBIRD	①Carburetor No.
390" Eng. Std. Trans. (CCV)②	C1AE-9510-AG
390" Eng. Auto. Trans. (CCV)②	C1AE-9510-AH
390" Eng. Police Std. Trans. (CCV)②	C1AE-9510-AK
390" Eng. Police Auto. Trans.(CCV)②	C1AE-9510-AL
MERCURY	
390" Eng. Auto. Trans.(CCV)②Early	C1AE-9510-B
390" Eng. Auto. Trans.(CCV)②Late	C1AE-9510-AH
390"Eng.Police Synchro-mesh(CCV)②	C1AE-9510-AK
390"Eng.Police Auto.Trans.(CCV)②	C1AE-9510-AL

① - Part No. stamped on left side of fuel bowl.
② - With Closed Crankcase Ventilation.
③ - Service Replacement.

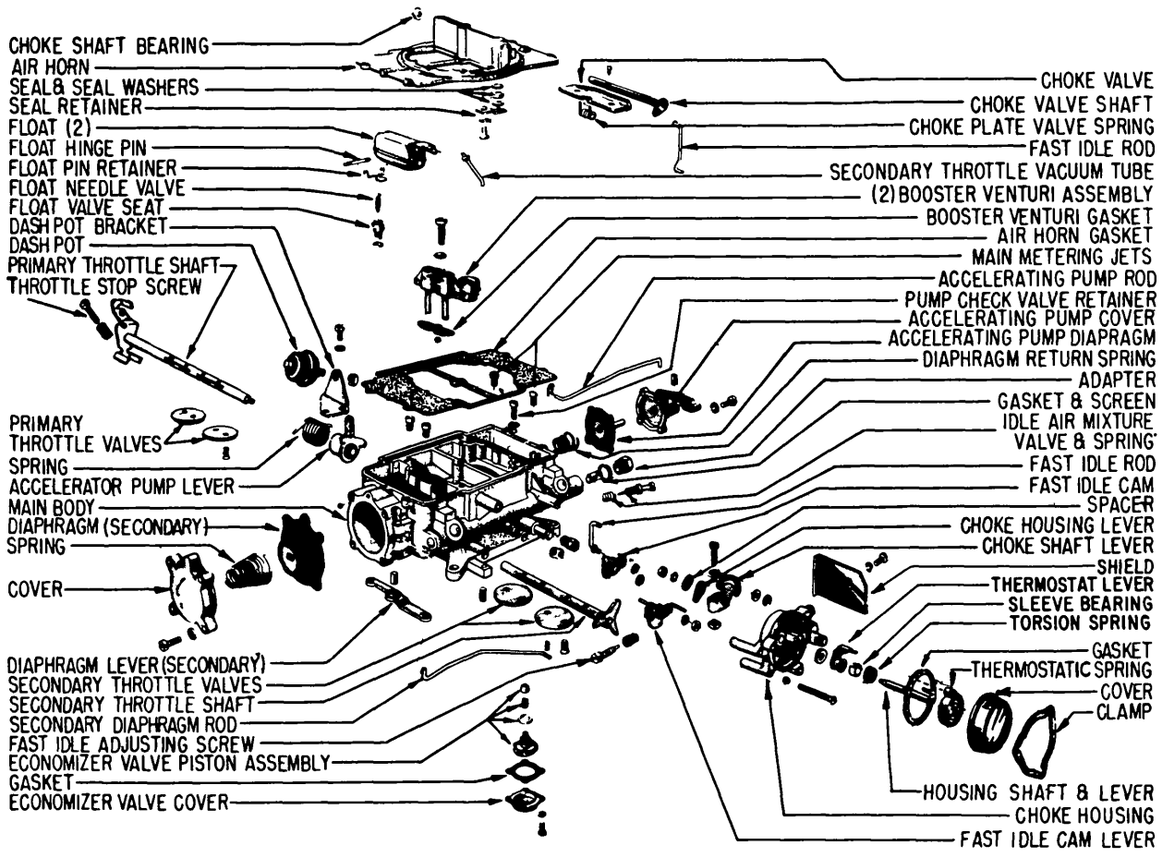
►*1961 FORD & MERCURY V8 HARD COLD STARTING CORRECTION:* This condition may be due to choke valve not closing completely because of a defective thermostatic coil spring or dirt and oil between choke housing shaft and bushing. Check spring as follows: Remove thermostatic coil housing and gasket, then unhook long tank of choke spring contacting bent lug on thermostat lever. If the included angle of tang ends do not compare with those shown in illustration, replace the spring. If spring is satisfactory, thoroughly clean choke components, shaft and bushing, then check and adjust all required settings in choke linkage. Use spring, Part No. C1AE–9A590–B (292" & 352" Engs.); C1AE–OA590–A (390" Eng.).



C1AE 9A590-B SPRING
292 AND 352 C.I.D. CARBURETORS
COLOR-PLAIN TIN PLATED

C1AE 9A590-A SPRING
390 C I D CARBURETORS
COLOR-YELLOW DI-CHROMATE

THERMOSTATIC COIL SPRING



FORD 4-BARREL CARBURETOR ASSEMBLY

DESCRIPTION: Same design as used on previous models.

ADJUSTMENTS: Adjustments are the same for 2–Barrel and 4–Barrel carburetors except as noted below.

Idle Mixture Setting: Initial setting is 1–1½ turns open from a lightly seated position. With engine at normal operating temperature, turn both idle mixture screws in until engine runs roughly from lean mixture, then turn screws out until engine begins to roll. Finally turn screws in just enough for smooth running (favor a slightly rich mixture).

Idle Speed Setting (Hot Engine): 292" & 352" Synchro–mesh – 500–525 RPM. **390" Std. & Police Synchro–mesh** – 575–600 RPM. **390" High Performance Synchro–mesh** – 700 RPM. **All Engines Auto. Trans.** – 450–475 RPM with selector lever in "D" (Drive).

►*AIR CONDITIONED CAR IDLE SPEED NOTE: Operate air conditioner at least 20 minutes before setting idle speed.*

Anti-Stall Dashpot (Auto. Trans. Cars): *See Car Model pages for adjustment specifications.*

Acc l rating Pump Str k : Install pump operating rod in No. 4 (top) hole for winter operation and in No. 2 hole for summer operation. *NOTE - On V8 engine operating in an ambient temperature of 75°F or over, install operating rod in No. 1 hole.* Opposite end of rod must be installed in outer hole of pump arm for summer and winter operation.

►*ACCELERATING PUMP PLUNGER TRAVEL NOTE:* Pump plunger travel should be 5/32" ± 1/64" when throttle lever is moved from normal closed idle to fully open position with pump operating rod in top hole of overtravel lever and in outer hole of pump operating link. If not within limits, move rod to inner hole of operating link and recheck. If still not within limits, bend overtravel lever tab that contacts throttle lever to provide proper travel.

Float Level: To check float level, remove air horn and bowl cover, then hold float in upper position with needle valve closed. Measure from gasket surface on main body to top of float, not on end of radius (2-Barrel); 1/8" from free end of float and 5/16" from side of float adjacent to inside wall of fuel bowl (4-Barrel). Distance should be 29/64" ± 1/64" (2–Barrel); 21/32" ± 1/64" (4–Barrel). To adjust, bend tab on float arm.

Fuel Level: With correct float setting, fuel level should be 29/32"±1/32" below machined surface of main body. *NOTE - Fuel level is the same for secondary float on 4-Barrel carburetors.*

CONTINUED ON NEXT PAGE

1961 FORD 2 & 4-BARREL CARBURETORS (C nt.)

valves in closed position and fast idle screw resting on step of fast idle cam, turn fast idle screw to obtain 1500 RPM (synchro-mesh transmission cars); 1700 RPM (automatic transmission cars).

► *FAST IDLE ADJUSTMENT NOTE:* For a more accurate fast idle setting, it is recommended that engine be stopped when turning the fast idle screw. Check fast idle speed after each adjustment. If necessary to change the adjustment, stop engine and estimate the amount fast idle screw must be turned for desired speed. Repeat as necessary.

Automatic Ch k : Loosen thermostatic coil housing clamp retaining screws and align index mark on coil housing with middle index on choke housing (synchro-mesh cars, except 390" engine); 2 points lean (automatic transmission cars and all 390" engines).

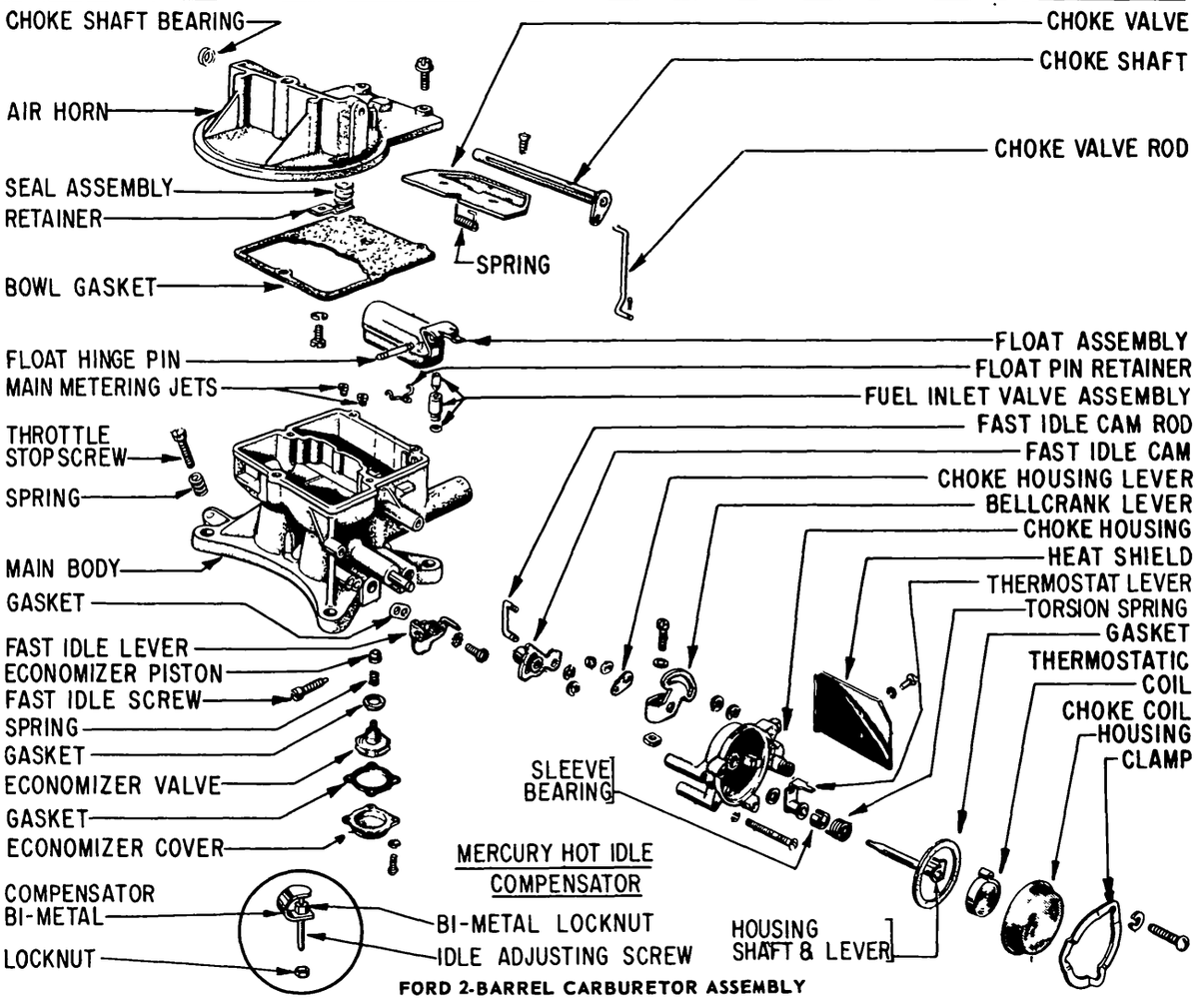
Fast Idl Cam & B llcrank Lever Adjustment: Loosen bellcrank lever clampscrew and open throttle valve slightly, then manually close choke valve. Rotate bellcrank lever on choke housing shaft in the direction that will lift fast idle cam rod. Position bellcrank lever on choke housing shaft so a clearance of .040" will be obtained between fast idle cam and cam stop on rear of choke housing. *NOTE – To maintain proper vertical alignment between bellcrank lever and fast idl cam, th b llcrank lev r must be positioned against "E" ring retain r on choke housing shaft.* Tighten bellcrank lever clamp sufficiently to prevent lever turning on shaft.

S c ndary Thr ttle Valv Adjustment (4–Barrel Carbs.): Hold secondary throttle valves closed and turn secondary throttle shaft lever adjusting screw out until secondary throttle valves stick in bores and there is a .009" clearance between the screw and secondary throttle lever. **Th n turn scr w in one full turn.**

Chok Plate–t –Ch ke H using Shaft Adjustment: Rotate thermostatic coil housing 90° counterclockwise (in rich direction), then press choke plate open until resistance is felt. At this point there should be .110" (Ford 292" Eng.); 140" (Ford 352" & 390" Eng.); 1/8" (Mercury 292" Eng.); 5/32" (Mercury 352" Eng.); 3/16" (Mercury 390" Eng.) clearance between front lower edge of choke plate and vertical wall of air horn. If clearance less than specified, remove choke coil housing and hold thermostat coil lever firmly against stop in housing, then press choke plate with enough force to bend tang on choke housing shaft lever required amount. If clearance is more than specified, first reduce clearance to less than required amount by holding thermostat coil lever clockwise as far as it will go, then move choke plate toward closed position to bend tang on shaft lever more than required amount. Recheck clearance and adjust as indicated above for clearance less than specified.

OVERHAUL: *See 1958 Annual Data, Page 269, or later Manual dition and not th following:*

Ch k H using R m val & Disassembly: Remove choke shield, then disconnect fast idle cam pickup lever at fast idle cam. Remove thermostatic coil spring housing and gasket. Remove choke housing-to-main body screws and lockwashers and remove choke housing. Remove choke housing lever attaching nut, spacer and lever, then loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft and lever assembly. Remove retainer from choke housing shaft and lever assembly and slide shaft out of choke housing. Remove thrust washer from choke housing shaft. Slide thermostatic coil lever and bushing assembly off choke housing shaft (allow for twisting action of torsion spring when parts are separated). Remove torsion spring and white sleeve bearing from thermostatic coil lever and bushing assembly. To reassemble and install, reverse above procedure.



FORD 2-BARREL CARBURETOR ASSEMBLY

Choke Housing Reassembly & Installation: Install white sleeve bearing and torsion spring on thermostat lever and bushing assembly. *NOTE :* Long tang of spring should be positioned against stop on thermostat lever. Slide thermostat lever, bushing and spring assembly on choke housing shaft. Engage short tang of spring on tang of integral choke shaft lever and wind the spring up approximately one-half revolution by turning choke housing shaft as thermostat lever is positioned against choke shaft lever. Engage tang of choke shaft lever in slot provided in thermostat lever. Install thin thrust washer on choke shaft, then install complete choke housing shaft and lever assembly in choke housing so that thermostat lever is at top of choke housing. Install choke housing shaft retainer. Install bellcrank lever assembly on choke housing shaft and position it so that lever is against shaft retainer and the slot portion is to front of choke housing. Tighten clampscrew sufficiently to hold bellcrank lever in position, then adjust *(see "Fast Idle Cam & Bellcrank Lever Adjustment" above).*

SERVICE PARTS: Gasket Set – Ford & Mercury Part No. COAZ–9502–A (COAE–9510–AB, AC, AF, AG, COAZ–9510–A, C1AE–9510–AA, AB, AC, AD, AE, AF, Y, Z,). C1AZ–9502–A (C1AZ–9510–AG, AH, AK, AL).
Repair Packag – Ford & Mercury Part No. C1AZ–9590–D (COAE–9510–AF, AG, COAZ–9510–A, C1AE–9510–AA, AB, Z, Y). C1AZ–9590–E (COAE–9510–AB, AC, C1AE–9510–AC, AD, AE, AF). C1AZ–9590–F (C1AE–9510–AG, AH, AK, AL).

1961 FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No. ©	Pump Nozzle Part No.
C0AE-9510-AB	2-Bbl.	.056"	78-9533-E	.054"	06H-9533	.052"	86H-9533	C0AE-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C0AE-9510-AC	2-Bbl.	.055"	B4T-9533-A	.053"	B4T-9533-B	.051"	59A-9533-A	C0AE-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C0AE-9510-AF	2-Bbl.	.047"	59A-9533-C	.045"	59A-9533-D	.043"	922A-9533-A	C0AE-9A523-B	C0AE-9A565-B	C0AE-9B529-A
C0AE-9510-AG	2-Bbl.	.046"	78-9533-C	.044"	B7A-9533-B	.043"	922A-9533-A	C0AE-9A523-B	C0AE-9A565-B	C0AE-9B529-A
C0AZ-9510-A	2-Bbl.	.047"	59A-9533-C	.045"	59A-9533-D	.043"	922A-9533-A	C0AE-9A523-B	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-Y	2-Bbl.	.040"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C1AZ-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-Z	2-Bbl.	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	.043"	C1AZ-9533-J	C1AZ-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AA	2-Bbl.	.049"	C1AZ-9533-C	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	C1AZ-9A523-B	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AB	2-Bbl.	.040"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C1AZ-9A523-B	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AC	2-Bbl.	.056"	C1AZ-9533-D	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	C0AE-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AD	2-Bbl.	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	.051"	C1AZ-9533-M	C0AE-9A523-A	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AE	2-Bbl.	.057"	C1AZ-9533-E	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	C1AZ-9A523-C	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AF	2-Bbl.	.056"	C1AZ-9533-D	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	C1AZ-9A523-C	C0AE-9A565-B	C0AE-9B529-A
C1AE-9510-AG Pri.	4-Bbl.	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	.051"	C1AZ-9533-M	C1AZ-9A523-D	C0AE-9A565-B	C0AE-9B529-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C1AE-9510-AH Pri.	4-Bbl.	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	.050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-B	C0AE-9B529-A
Sec.		.062"	C1AE-9533-D	.060"	C1AZ-9533-S	.058"	C1AZ-9533-U	.....	.....	.....
C1AE-9510-AK Pri.	4-Bbl.	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	.051"	C1AZ-9533-M	C1AZ-9A523-D	C0AE-9A565-B	C0AE-9B529-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C1AE-9510-AL Pri.	4-Bbl.	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	.050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-B	C0AE-9B529-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....

© - Use C0AE-9A565-C (5,000-10,000 Ft. Alt.). C0AE-9A565-C (10,000-15,000 Ft. Alt.).

1961 HOLLEY (FORD) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.
C1AE-9510-AM	4-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	B9LE-9A511-A	COAE-9A565-A ©	50420-S7
C1AE-9510-AU	2-Bbl.	.061"	B4Q-9533-A	.....	.....	.....	.....	C1AZ-9A511-B	COAE-9A565-A ©	50420-S7
C1AE-9510-AV	2-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	C1AZ-9A511-A	COAE-9A565-A ©	50420-S7
C1TE-9510-A Pri.	4-Bbl.	.052"	86H-9533	.050"	78-9533-A	.048"	78-9533-B	C1TZ-9A511-C	B8TZ-9A565-A	B8A-9577-B
Sec.		.058"	78-9533-F	.056"	78-9533-E	.054"	06H-9533	B9TE-9A513-A	.....	.....
C1TE-9510-E	2-Bbl.	.050"	78-9533-A	.048"	78-9533-B	.046"	78-9533-C	C1TZ-9A511-A	B7TZ-9A511-A	B8A-9577-B
C1TE-9510-K	2-Bbl.	.051"	59A-9533-A	.049"	59A-9533-B	.047"	59A-9533-C	C1TZ-9A511-B	B7TZ-9A565-A	B8A-9577-B
C1TE-9510-L	2-Bbl.	.050"	78-9533-A	.048"	78-9533-B	.046"	78-9533-C	C1TZ-9A511-A	B7TZ-9A565-A	B8A-9577-B
C1TE-9510-AE	2-Bbl.	.051"	59A-9533-A	.049"	59A-9533-B	.047"	59A-9533-C	C1TZ-9A511-B	B7TZ-9A565-A	B8A-9577-B
C1TE-9510-AF	2-Bbl.	.050"	78-9533-A	.048"	78-9533-B	.046"	78-9533-C	C1TZ-9A511-K	B7TZ-9A565-A	B8A-9577-B
C1TE-9510-AG	2-Bbl.	.050"	78-9533-A	.048"	78-9533-B	.046"	78-9533-C	C1TZ-9A511-K	B7TZ-9A565-A	B8A-9577-B
C1TE-9510-AM Pri.	4-Bbl.	.051"	59A-9533-A	.049"	59A-9533-B	.047"	59A-9533-C	C1TZ-9A511-C	B7TZ-9A565-A	B8A-9577-B
Sec.		.058"	78-9533-F	.056"	78-9533-E	.054"	06H-9533	B9TE-9A513-A	.....	.....

© - C0AE-9A565-B (5,000-10,000 ft. Alt.). C0AE-9A565-C (10,000-15,000 ft. Alt.).

1961 HOLLEY (RAMBLER) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Type	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Choke Coil Housing Part No.
R-1957-1A Pri.	4150-C	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A	21R-572-21	47R-116A
Sec.			.035"	22R-40-35	34R-1942A	25R-237A	.....	47R-116A
R-1958-1A Pri.	4150-C	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A	21R-572-21	47R-116A
Sec.			.035"	22R-40-35	34R-1942A	25R-237A	.....	47R-116A
R-2228A	2300-C	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-21	47R-116A

1961 HOLLEY 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

FORD PASS. CARS – TRIPLE CARBURETORS — **Ford Carb. No.**

390" Eng. (High Perf.) .....(Center) C1AE–9510–AV
390"Eng.(High Perf.).....(Front & Rear) C1AE–9510–AU

FORD TRUCKS — **Ford Carb. No.**

292" Eng. (Synchro-mesh) Ⓒ C1TE-9510-E
292" Eng. (Synchro-mesh) Ⓒ(CCV)③ C1TE-9510-AG
292" Eng. (Auto. Trans.) Ⓒ C1TE-9510-L
292" Eng. (Auto. Trans.) Ⓒ(CCV)③ C1TE-9510-AF
292" Eng. (All Trans.) ② C1TE-9510-K
292" Eng. (All Trans.) ②(CCV)③ C1TE-9510-AE

RAMBLER — **Holley Carb. No.**

Series 20 ..... 2300 No. 2228
Series 80 .....2300 No. 2228

4-BARREL CARBURETORS

FORD PASS. CARS — **Ford Carb. No.**

390" Eng. High Performance (CCV)③ C1AE-9510-AM

FORD TRUCKS

292" Eng. (All Trans.) C1TE-9510-AM
292" Eng. (All Trans.) (CCV)③..... C1TE-9510-A

RAMBLER — **Holley Carb. No.**

Series 20 ..... 4150-C No. 1958-1
Series 80 ..... 4150-C No. 1957-1

Ⓒ - Without hand throttle. ② - With hand throttle.
③ - Closed Crankcase Ventilation.

DESCRIPTION: 2&4–Barrel carburetors are of same design used on previous models except as follows:

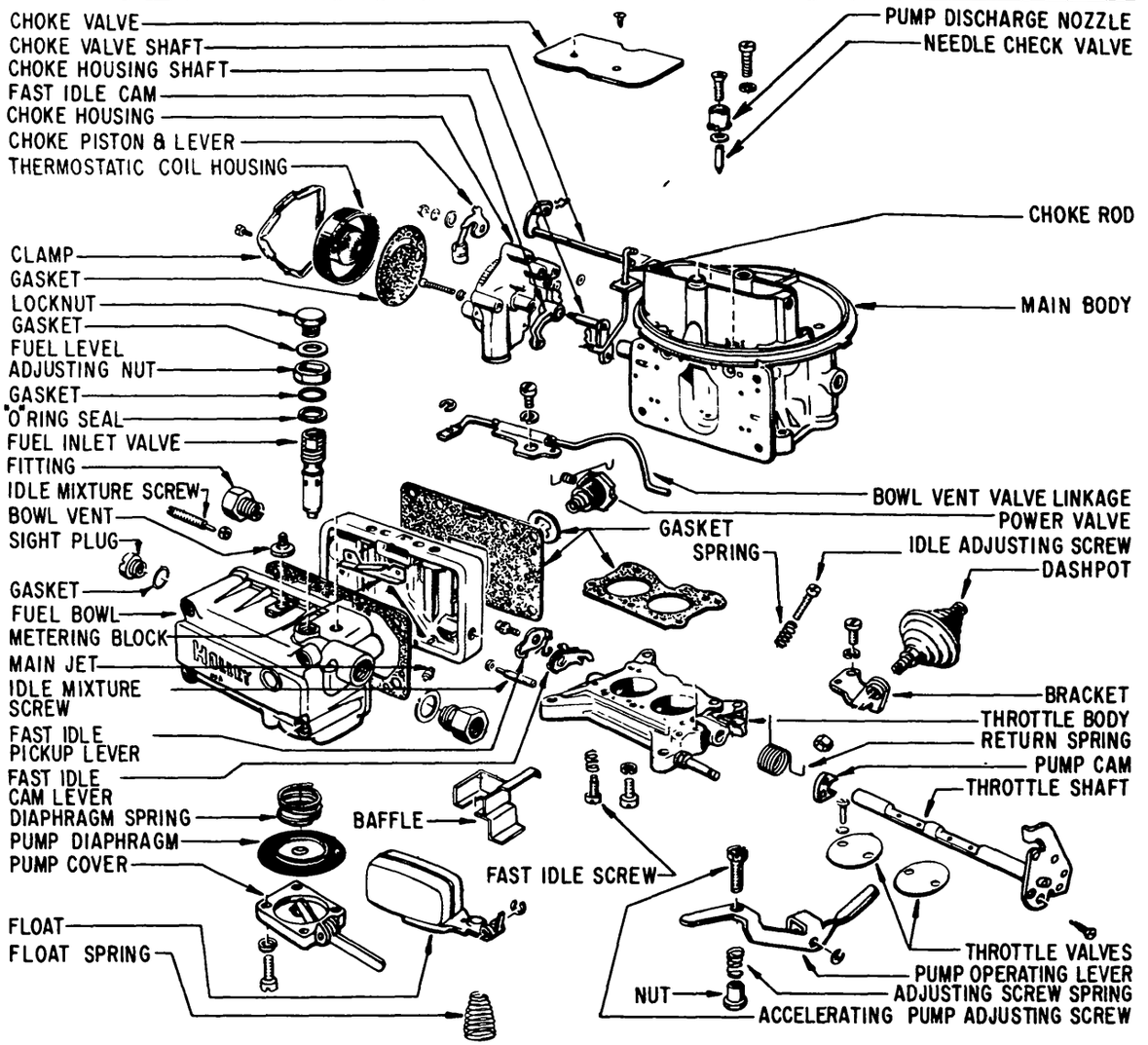
Front & Rear Carburetors (Ford 390" High Performance Engin): These carburetors are same as the center carburetor except that choke system and fast idle mechanism have been eliminated.

ADJUSTMENTS: Idl Mixtur Setting (Exc. Ford Triple Carbs.)– Initial adjustment is 1 turn open (Rambler); 1–1½ turns open (Ford Pass. Cars & Truck) from a lightly seated position. For final adjustment, bring engine to normal operating temperature and place transmission selector lever in "N" (neutral). Turn both idle mixture screws in until engine runs rough from a lean mixture, then turn screws out until engine rolls from rich mixture. Finally turn screws in just enough for smooth idling at highest RPM and highest vacuum. Reset engine idle speed to correct RPM (see table below).

Idl Mixtur S tting (F rd Triple Carbs.): Initial adjustment is ¾ turn open (front & rear carburetors); 1 turn open (center carburetor) from a lightly seated position. For final adjustment, proceed as for other models (see above), adjusting each carburetor individually, starting with the center carburetor, followed by front carburetor, then rear carburetor.

Initial Idl Sp d Setting (F rd Triple Carbs.): Back off idle speed adjusting screws on front and rear carburetors enough to allow throttle plates to seat in throttle bores, then turn idle speed screws inward until screw end just touches throttle shaft arm. **Turn screws in n additi nal full turn.**

Synchr nizing Thr ttl Linkag (F rd Tripl Carbs.): Disconnect linkage at front and rear carburetors and at bellcrank lever (center carburetor–to–bellcrank rod). Adjust length of front carburetor rod so that, when installed, throttle lever on front carburetor will be against wide open throttle stop when center throttle lever is in wide open position against stop. Adjust length of rear carburetor rod in same manner, then install front and rear carburetor rods on throttle levers and tighten rod lock nuts. Adjust length of center carburetor–to–bellcrank rod to 7¼" (center–to–center) and install rod on bellcrank lever. Disconnect accelerator–to–bellcrank lever rod at bellcrank lever, then on standard transmission cars, adjust length of accelerator–to–bellcrank rod to obtain wide open throttle when accelerator pedal is depressed to floor. On Overdrive transmissions, depress accelerator pedal enough to close overdrive kickdown switch, then with accelerator in this position, adjust length of accelerator–to–bellcrank rod to obtain wide open throttle on center carburetor. *NOTE – With the above adjustm nt, it will n t b p s- sible to obtain maximum throttle (in overdrive). To obtain maximum throttle position (in overdrive), it will be necessary to shorten the accelerator rod to prevent engagement of overdrive switch (thus eliminating any kickdown).* Assemble rod to bellcrank lever and tighten clevis locknut.



HOLLEY 2-BBL. CARBURETOR (TYPICAL)

Idle Speed (Hot Engine) Setting: With engine at normal operating temperature, fast idle screw backed off so it does not touch fast idle cam, choke valve wide open, and transmission in neutral (Synchro-mesh), in proper range (Auto. Trans. - see table below), adjust engine idle speed to correct RPM (see table below).

CONTINUED ON NEXT PAGE

1961 HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

Car Model	S.M. Trans.	Auto. Trans.
Ford Pass. Car ..... ④	575-600 RPM	①450-475 RPM
Ford Truck (2-Bbl.Carb.)	500-550 RPM	①475-525 RPM
Ford Truck (4-Bbl.Carb.)	525-575 RPM	①475-525 RPM
Rambler	③550 RPM	②③475 RPM

① - Transmission in "D" (Drive).
② - Transmission in "N"(Neutral).
③ - 500 RPM on Air Cond. Cars (compressor on).
④ – 750 RPM (390" Eng. with Triple Carburetors). Idle speed adjusting screw on center carburetor only.

Anti-Stall Dashpot (Automatic Transmission Cars): *See "Carburetor" on individual car model pages.*

Accelerating Pump Over-Ride Adjustment: Hold throttle valves wide open and depress pump arm fully. Distance between pump lever adjusting screw hex head and pump arm should be .015" (Exc. Rambler 2-Barrel Carbs.). To adjust, hold hex nut stationary and turn screw on pump lever. On Rambler 2-Barrel carburetors, turn screw on pump lever in until it just contacts pump lever, then tighten screw ¼ turn. Check accelerating pump to make sure that when throttle lever starts to move that pump lever also starts to operate.

Accelerating Pump Stroke Adjustment: *NOTE - This is a s asonal setting on all models.*

Normal (Summer) Setting - Install pump cam screw in No. 1 hole in cam. *NOTE - This provides minimum stroke.*

Winter Setting - Install pump cam screw in No. 2 hole in cam. *NOTE - This provides maximum stroke.*

Fu l Bowl Vent Setting (Rambler): With throttle valves fully closed, distance between top of fuel bowl and vent button should be .050-.070". To adjust, bend vent arm of accelerating pump lever. *CAUTION - Do not bend vent valve rod.*

Fl at Level (Dry Setting - On Bench): *NOTE - Float level settings are intended for initial bench adjustment only. After carburetor installed on engine, the fuel level must be checked and the necessary float level adjustments made. See "Fuel Level" below. Float level will be correct when fuel level is adjusted.* With fuel bowl inverted lower side of float should be parallel to fuel bowl (except Ford 390" Eng. with Triple Carbs. & Ford Trucks). On Ford 390" Eng. with Triple Carbs. & Ford Trucks, distance from lower side of float to fuel bowl should be 7/8" (2–Barrel Carbs. & Primary Float on 4–Barrel Carbs.); ¾" (Secondard Float on 4–Barrel Carbs.). To adjust level, loosen top lock screw on needle and seat assembly and rotate adjusting nut as necessary.

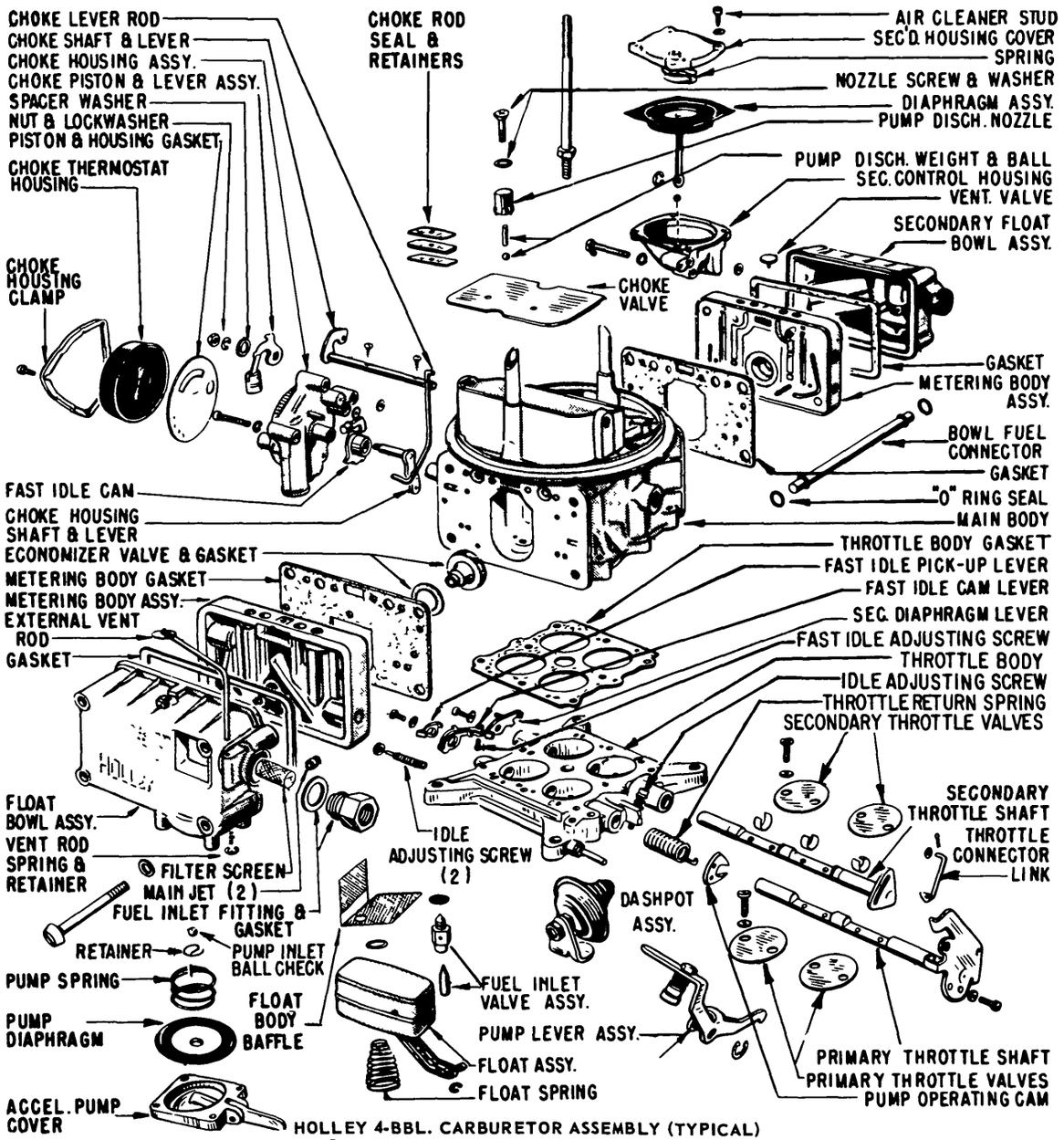
Fuel Level: With vehicle on a level floor, bring engine to normal operating temperature, then remove air cleaner and stop engine. Remove sight plug in end of fuel bowl (use container to catch fuel). Fuel level within bowl should be at lower edge of sight plug hole (+1/16"). To adjust, proceed as follows:

Fuel Level Too High - With engine stopped, loosen lockscrew on top of fuel bowl just enough to allow rotation of nut underneath. *CAUTION - Do not loos n lockscrew or attempt to adjust fuel level with engine running.* Turn adjusting screw ½ turn clockwise to lower fuel level below specifications. Tighten lockscrew, then run engine to stabilize fuel level. Check fuel level at sight plug hole. If level is not below specified level, repeat above step. With fuel level below specified level, turn adjusting nut in increments of 1/6 turn until correct fuel level is obtained. *NOTE - 1/6 turn of adjusting nut will change fuel level at sight plug opening 3/64".*

Fu l L v l T Low - Proceed as for "Fuel Level Too High" except that it will not be necessary to initially decrease fuel level below specifications.

Unloader (Rambler): With throttle valves in wide open position, distance from top of choke valve to wall of air horn should be 3/16". To adjust, bend tab on throttle shaft lever (where it contacts fast idle cam).

Fast Idle - Off Engin (Rambler): With choke valve fully closed and fast idle adjusting screw on high step



HOLLEY 4-BBL. CARBURETOR ASSEMBLY (TYPICAL)

CONTINUED ON NEXT PAGE

1961 HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

of fast idle cam, the clearance between throttle valve and bore on side opposite idle ports should be .024" (Rambler 2-Barrel); .016" (Rambler Series 20 4-Barrel); .025" (Rambler Series 80 4-Barrel). To adjust, turn fast idle adjusting screw.

Fast Idl – On Engin : (F rd Pass. Cars, except 390" Eng. with Tripl Carbs.) – With fast idle cam in slow idle position (bottom step on cam contacting fast idle screw), turn fast idle screw until it just touches lowest step on fast idle cam, then back screw off ¼ turn.

F rd Pass. Cars With 390" Eng. and Triple Carbs. – With fast idle screw on top step of fast idle cam and engine at normal operating temperature, adjust fast idle screw to obtain an engine speed of 1800 RPM.

Ford Trucks - *NOTE - On 2-Barrel carburetors, fast idle will be properly adjusted when engine hot idle is adjusted.* On 4-Barrel carburetors proceed as follows: With engine at normal operating temperature and "hot" idle speed adjusted, place primary throttle valves in closed position and check clearance between fast idle cam and head of fast idle screw. Clearance should be .010-.015". If clearance not correct, remove governor housing and insert a .060" rod into hole in end of fast idle screw fitting to prevent it turning, then turn fast idle screw as necessary for desired clearance. *NOTE - ¼ turn of screw (in or out) will change clearance approximately .008".*

Rambler - With engine at normal operating temperature, place fast idle screw on high step of fast idle cam and adjust engine RPM to approximately 1700 RPM.

Automatic Choke Setting (Exc. Ford Trucks): Loosen choke cover retaining clamp screws and rotate cover to align index mark on cover with correct mark on choke housing as indicated in table below.

Aut matic Ch k S tting

Car & Carb.	Ch ke Setting
Ford Pass. (Exc. Triple Carbs.)	1 notch rich
Ford Pass. (Triple Carbs.)	Centered (At Index)
Rambler (2–Bbl. Carb.)	1 notch rich
Rambler (4–Bbl. Carb.)	1 notch lean

OVERHAUL: *See 1958 Annual Data, Page 274, or later Manual editions and note the following:*

Balance Tube (Ford Truck): Install balance tube "O" rings and washers so balance tube extends equally from faces of primary and secondary metering bodies.

SERVICE PARTS: Gasket Set – Ford No. C1AZ–9502–B (C1AE–9510–AM); No. C1TZ–9502–A (C1TE–9510–A, AM); No. B9A–9502–A (C1TE–9510–AE, AF, AG, E, K, L, C1AE–9510–AU, AV). Holley No. 85G–963 (1957–1, 1958–1).

Repair Kit–Ford No. C1AZ–9590–G (C1AE–9510–AM); No. C1TZ–9590–A (C1TE–9510–A, AM); No. C1TZ–9590–J, (C1TE–9510–AE, AF, AG, E, K, K). Holley No. 85R–962 (1957–1, 1958–1).

1961 HOLLEY (FORD) VISI-FLO CARBURETOR JET SPECIFICATIONS

Carb. No.	Main Metering Jet: Standard Size	Standard Part No.	1 Size Lean Size	1 Size Lean Part No.	2 Sizes Lean Size	2 Sizes Lean Part No.	Power Jet No.
COAE-9510-E	.060"	1GA-9533-C	.058"	78-9533-F	.056"	78-9533-E	①
COAE-9510-U	.060"	1GA-9533-C	.058"	78-9533-F	.056"	78-9533-E	①
COAE-9510-Z	.060"	1GA-9533-C	.059"	B4Q-9533-B	.057"	26H-9533	②
COAE-9510-Y	.048"	78-9533-B	.....	.....	.....	.....	..
CODE-9510-C	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533-A	②
CODE-9510-D	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533-A	②
C1AE-9510-E	.063"	5GA-9533-B	.061"	B4Q-9533-A	.059"	B4Q-9533-B	①
C1AE-9510-F	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.057"	26H-9533	①
C1AE-9510-G	.048"	78-9533-B	.....	.....	.....	.....	③
C1AE-9510-H	.048"	78-9533-B	.....	.....	.....	.....	③
C1AE-9510-AR	.048"	78-9538-B	.....	.....	.....	.....	③
C1DE-9510-A	.053"	B4T-9533-B	.052"	86H-9533	.051"	59A-9533-A	②
C1DE-9510-B	.053"	B4T-9533-B	.052"	86H-9533	.051"	59A-9533-A	②
C1DE-9510-C	.060"	1GA-9533-C	.059"	B4Q-9533-B	.058"	78-9533-B	④
C1DE-9510-D	.060"	1GA-9533-C	.059"	B4Q-9533-B	.058"	78-9533-B	④
C1DE-9510-E	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.058"	78-9533-B	④
C1DE-9510-F	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.058"	78-9533-B	④
C1DZ-9510-A	.053"	B4T-9533-B	.052"	86H-9533	.051"	59A-9533-A	②
C1GE-9510-A	.057"	26H-9533	.055"	B4T-9533-A	.054"	06H-9533	⑤
C1GE-9510-B	.056"	78-9533-E	.054"	06H-9533	.053"	B4T-9533-B	⑥
C1GE-9510-C	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	⑤
C1GE-9510-D	.055"	B4T-9533-A	.054"	06H-9533	.053"	B4T-9533-B	⑥
C1GE-9510-E	.060"	1GA-9533-C	.059"	B4Q-9533-B	.....	.....	④
C1GE-9510-F	.060"	1G-9533-C	.059"	B4Q-9533-B	.....	.....	④

Carb. No.	Main Metering Jet: Standard Size	Standard Part No.	1 Size Lean Size	1 Size Lean Part No.	2 Sizes Lean Size	2 Sizes Lean Part No.	Power Jet No.
C1GE-9510-G	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.....	.....	④
C1GE-9510-H	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.....	.....	④
C1TE-9510-V	.065"	5GA-9533-A	.063"	5GA-9533-B	.061"	B4Q-9533-A	①
C1TE-9510-Y	.065"	5GA-9533-A	.063"	5GA-9533-B	.061"	B4Q-9533-A	①
C1TE-9510-Z	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑦
C1TE-9510-AA	.069"	B7T-9533-A	.....	.....	.....	.....	①
C1TE-9510-AC	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑧
C1TE-9510-AD	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑧
C1TE-9510-AJ	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑩
C1TE-9510-AK	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑩
C1TE-9510-AL	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	⑦
C1TE-9510-AR	.051"	59A-9533-A	.049"	59A-9533-B	.047"	59A-9533-C	⑨
C1TE-9510-BD	.065"	5GA-9533-A	.063"	5GA-9533-B	.061"	B4Q-9533-A	①
C1UE-9510-A	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	⑪

① - B8A-9594-B
② - CODZ-9584-A
③ - B5AE-9594-A
④ - C1DZ-9594-A
⑤ - C1KE-9594-A
⑥ - C1KE-9594-B
⑦ - C1TZ-9594-A
⑧ - C1TZ-9594-B
⑨ - C1TZ-9594-C
⑩ - C1TZ-9594-D
⑪ - C1DE-9594-E

1961 HOLLEY (RAMBLER) VISI-FLO JETS

Carb. No.	Model	Std. Main Metering Jet Size	Std. Main Metering Jet Part No.	Main Well & Economizer Part No.	Pwr. Valve Restriction Size	Economizer Stem Assy. Part No.
R-2138-1	1908-FC	.055"	22R-40-44	34R-3016A	.037"	25R-166A
R-2269-A	1908-FC	.051"	22R-40-51	34R-3151A	.042"	25R-166A
R-2381-1	1908-FC	.051"	22R-40-51	34R-3386A	.032"	25R-166A

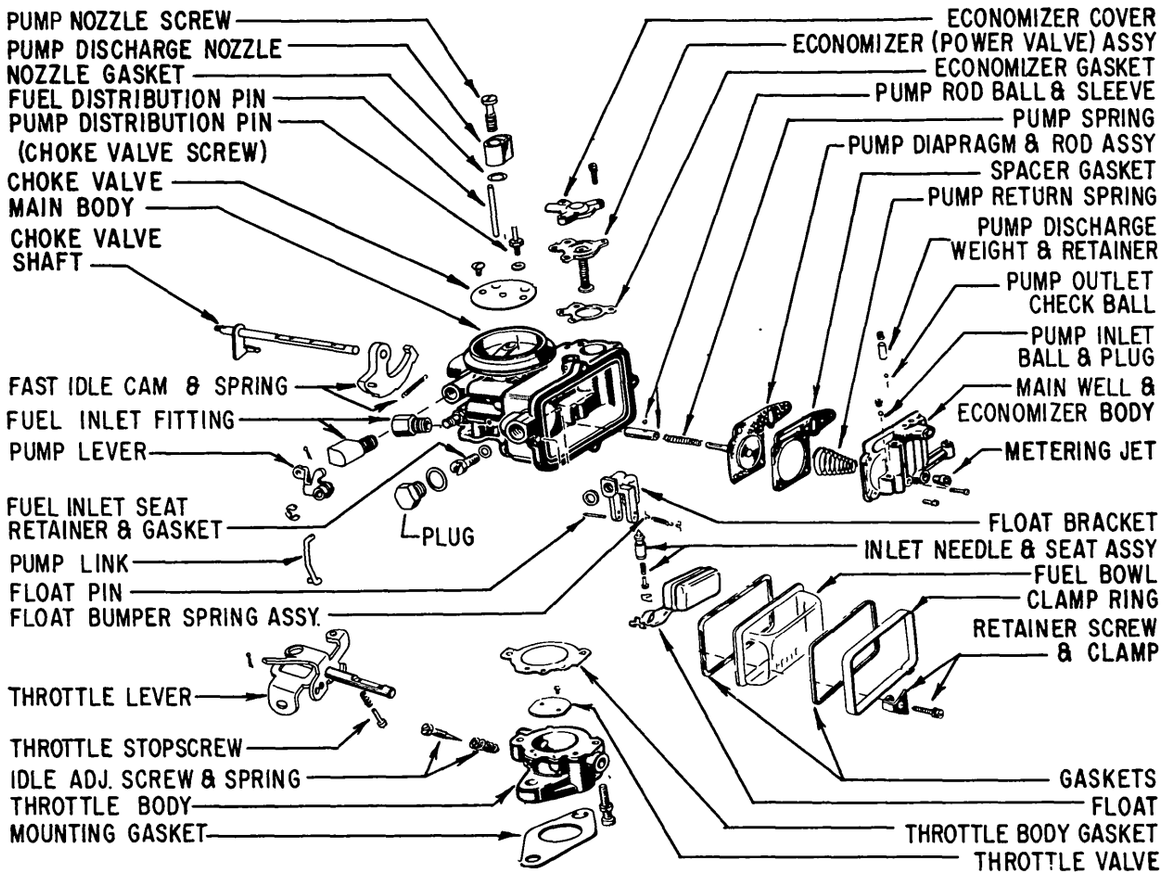
1961 HOLLEY "VISI-FLO" CARBURETORS

COMET	©Comet Part No.
144" Engine, Synchro-mesh (CCV)②	C1GE-9510-A
144" Engine, Auto. Trans.(CCV)②	C1GE-9510-B
144" Engine, Synchro-mesh	C1GE-9510-C
144" Engine, Auto. Trans.	C1GE-9510-D
170" Engine, Synchro-mesh	C1GE-9510-E
170" Engine, Auto. Trans.	C1GE-9510-F
170" Engine, Synchro-mesh (CCV)②	C1GE-9510-G
170" Engine, Auto. Trans. (CCV)②	C1GE-9510-H
FALCON	**©Ford Part No.**
144" Engine, Synchro-mesh	CODE-9510-C
144" Engine, Auto. Trans.	CODE-9510-D
144" Engine, Synchro-mesh (CCV)②	C1DE-9510-A
144" Engine, Auto. Trans.(CCV)②	C1DE-9510-B
144" Engine (Replacement)	C1DZ-9510-A
170" Engine, Synchro-mesh	C1DE-9510-C
170" Engine Auto. Trans.	C1DE-9510-D
170" Engine, Synchro-mesh (CCV)②	C1DE-9510-E
170" Engine, Auto. Trans. (CCV)②	C1DE-9510-F
FORD 6 CYL. PASS. CARS & MERCURY 6 CYL.	**©Ford Part No.**
223" Engine, Synchro-mesh & O.D.	COAE-9510-E or-U
223" Engine, Auto. Trans.	COAE-9510-Z
223" Engine, Economy	COAE-9510-Y
223" Engine, Synchro-mesh (CCV)②	C1AE-9510-E
223" Engine, Auto. Trans. (CCV)②	C1AE-9510-F
223" Engine, Econ. Synchro-mesh (CCV)②	C1AE-9510-G
223" Engine, Econ. Auto. Trans.(CCV)②	C1AE-9510-H
223" Engine, Econ. Replacement(CCV)②	C1AE-9510-AR
FORD 6 CYL. TRUCKS	**©Ford Part No.**
144" Engine, Econoline	C1UE-9510-A
144" Engine, Others	C1DE-9510-A
223" Engine, Synchro-mesh	C1TE-9510-V
223" Engine, Auto. Trans.	C1TE-9510-Y
223" Engine, Synchro-mesh (CCV)②	C1TE-9510-AC
223" Engine, Synchro-mesh (CCV)②	C1TE-9510-Z
223" Engine, Auto. Trans. (CCV)②	C1TE-9510-AD
223" Engine, Replacement	C1TE-9510-AL
223" Engine, Synchro-mesh (CCV)②	C1TE-9510-AK
223" Engine, Auto. Trans. (CCV)②	C1TE-9510-AJ
223" Engine, Economy	C1TE-9510-AR
262" Engine (CCV)②	C1TE-9510-AA
262 Engine (CCV)②	C1TE-9510-BD
RAMBLER	**Holley Part No.**
American Custom, Synchro-mesh (Early)	R-2269-A
American Custom, Synchro-mesh (Late)	R-2381-1
Classic Six. Synchro-mesh	R-2138-1

© - Part No. stamped on carburetor.
② - Closed Crankcase Ventilation.

►*CARBURETOR IDENTIFICATION NOTE: Part number is stamped on flat surface of main body at fuel inlet.*

►*HIGH FUEL CONSUMPTION CORRECTION (EXC. ECONOMY CARBS):* Power valve may be damaged or improperly installed. Check diaphragm for tears and replace if necessary, then install as follows: Be sure there are no restrictions in vacuum passages of cover, then install screws through cover. Carefully thread screws through diaphragm and plate and install gasket next to plate. Hold assembly together (do not allow diaphragm to drop away from cover) and locate the assembly squarely on carburetor bowl and tighten the screws to 13-17 inch pounds evenly. *CAUTION - Do not overtighten cover screws.*



HOLLEY MODEL 1904 "VISI-FLO" CARBURETOR (WITH MANUAL CHOKE)

DESCRIPTION: Single barrel downdraft type with either manual or automatic choke. Designs are similar to previous models and have the following features:

Holley Model 1904: Main nozzle tube is pressed into venturi wall directly below choke valve axis and discharges into a cutout section of choke valve. A fuel distribution pin (crosswise in choke shaft) extends into air stream and improves nozzle action. Pump discharge nozzle is a separate part mounted on upper ledge of venturi and is retained by a special nozzle retainer screw. *NOTE - This nozzle must be adjusted after carburetor is installed on engine.*

Holley Model 1908: Main nozzle tube and pump discharge nozzle are pressed into wall of venturi and are not removable. Choke valve plate is linked to choke shaft and lever assembly, choke valve plate is mounted in upper part of air horn. On models with automatic choke, fast idle cam is mounted on choke shaft (behind choke housing) and, on Rambler models, serves as a stop for idle speed adjusting screw (separate fast idle adjustment not required). On Comet models, a separate fast idle adjusting screw is provided.

Spark Control Valve (Holley 1904 & 1908 Models, Except Rambler): This unit is a spring loaded diaphragm type valve located in distributor control vacuum passage terminating at throttle valve edge (manifold vacuum). The valve is normally open but closes momentarily during acceleration (when manifold vacuum drops) to prevent excessive distributor advance (second port terminating at venturi provides vacuum to control distributor under these conditions). The valve also provides an intermediate distributor retard position under load conditions when normal spark advance would be too great and where wide open throttle spark retard is not required. No adjustment is provided.

ADJUSTMENT: Make all adjustments as follows:

Idling Adjustment: If initial adjustment required to warm engine, turn idle mixture screw in until lightly seated, then back screw out 1-1½ turns (Exc. Rambler); 1¼ turns (Rambler). Operate engine at fast idle until normal operating temperature reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature (choke valve wide open, fast idle inoperative), adjust idle speed (see below), turn idle mixture adjusting screw in until engine runs rough from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough so that engine

CONTINUED ON NEXT PAGE

HOLLEY "VISI-FLO" CARBURETORS (C ntinued)

idles smoothly. This will provide a slightly rich mixture which is desired. Recheck idle speed.

Idle Speed -With engine at normal operating temperature so that throttle stopscrew resting on lowest point of fast idle cam (choke lever), adjust stopscrew for correct idle speed as listed in table below. *NOTE* - On Fordomatic cars, set hand brake to hold car and place selector lever in Neutral, then recheck idle speed with selector lever in Drive "D" position.

	Idl Speed Setting	
Car Mod l	Synchro-mesh	Auto. Trans.
Comet & Falcon	500-525 RPM	②475-500 RPM
Ford & Mercury	500-525 RPM	②475-500 RPM
Ford Trucks	500-550 RPM	②475-525 RPM
Rambler	①550 RPM	③①475 RPM

① - 500 RPM on Air Conditioned Cars, with compressor operating.
② - Transmission in "D" (Drive) Range.
③ - Transmission in "N" (Neutral).

Anti-Stall Dashpot Adjustment (Exc. Rambler): *See CARBURETOR on Car Mod l pages.*

Accelerating Pump: Seasonal adjustment provided by two holes in throttle lever for pump link engagement:
Inner Hole - Normal or hot weather (short stroke).
Out r Hole - Cold weather operation (long stroke).

Fu l L v l: *See tabl below for fuel level and checking gaug* . To check fuel level, remove Power Valve diaphragm cover and valve assembly. Install checking gauge in this opening and crank engine to fill bowl. Fuel in bowl should touch "Low" gauge pin and should not touch "High" gauge pin. If adjustment required, remove float bowl and install dummy bowl (with open top) using three of the regular retaining screws. Adjust by using bending tool to bend float arm tab, recheck fuel level before installing regular bowl.

RAMBLER NOTE - Use scale inserted through power valve mounting hole to measure fuel level.

	Fu l Level Setting	
Car M d l	①② Fuel Level	Checking Gauge
Comet	23/32"	9550-AE-4
Falcon	23/32"	T52L-9550-AEE
Ford Pass.	11/16"	T52L-9550-AEE
Mercury	11/16"	9550-AE-3
Econoline Trucks	23/32"	T52L-9550-AEE
Ford Trucks (Exc. 262" Eng.)	11/16"	T52L-9550-AEE
Ford Trucks (262" Eng.)	3/4"	
Rambler	3/4"	Use Scale

① - Plus or Minus 1/32".
② - Below mounting surface of power valve.

Fl at Level: *This is a bench check and Fuel Level should be checked after carburetor has been installed on engine.* On all models, use float gauge furnished in repair package (see table below). *NOTE - On Rambler models, if gauge is not furnished with repair package, us Holley Tool No. indicated in table.* With bowl removed and carburetor inverted, place gauge on bowl mounting flange at free end of float. Lowest point on float should clear lower leg of gauge. Adjust by bending small tab on float lever that contacts head of fuel inlet needle.

	Float L v l Setting	
Car Model	① Float L v l	Checking Gaug
Comet & Falcon	11/64"	MC-157
Ford Pass. Cars	13/64"	MC-157
Ford Trucks	13/64"	MC-157
Mercury	13/64"	9590-1
Rambler		②J-10-231

① - Plus or minus 1/64". ② - Holley Tool number.

Power Valve: *NOTE - Used on all carburetors except "Economy Models".* No adjustment provided. Power valve opens when manifold vacuum drops to 4-7" Hg.

Spark Control Valve (Except Rambler): Spark control valve is not adjustable.

Automatic Choke (Rambler & Comet): Adjust by loosening cover retaining screws and rotating choke cover and thermostatic coil assembly. Choke should be set at Index (Exc. Rambler R-2381-1); 3 point Lean (Rambler R-2381-1). *NOTE* - On Comet models, do not vary choke setting more than two points

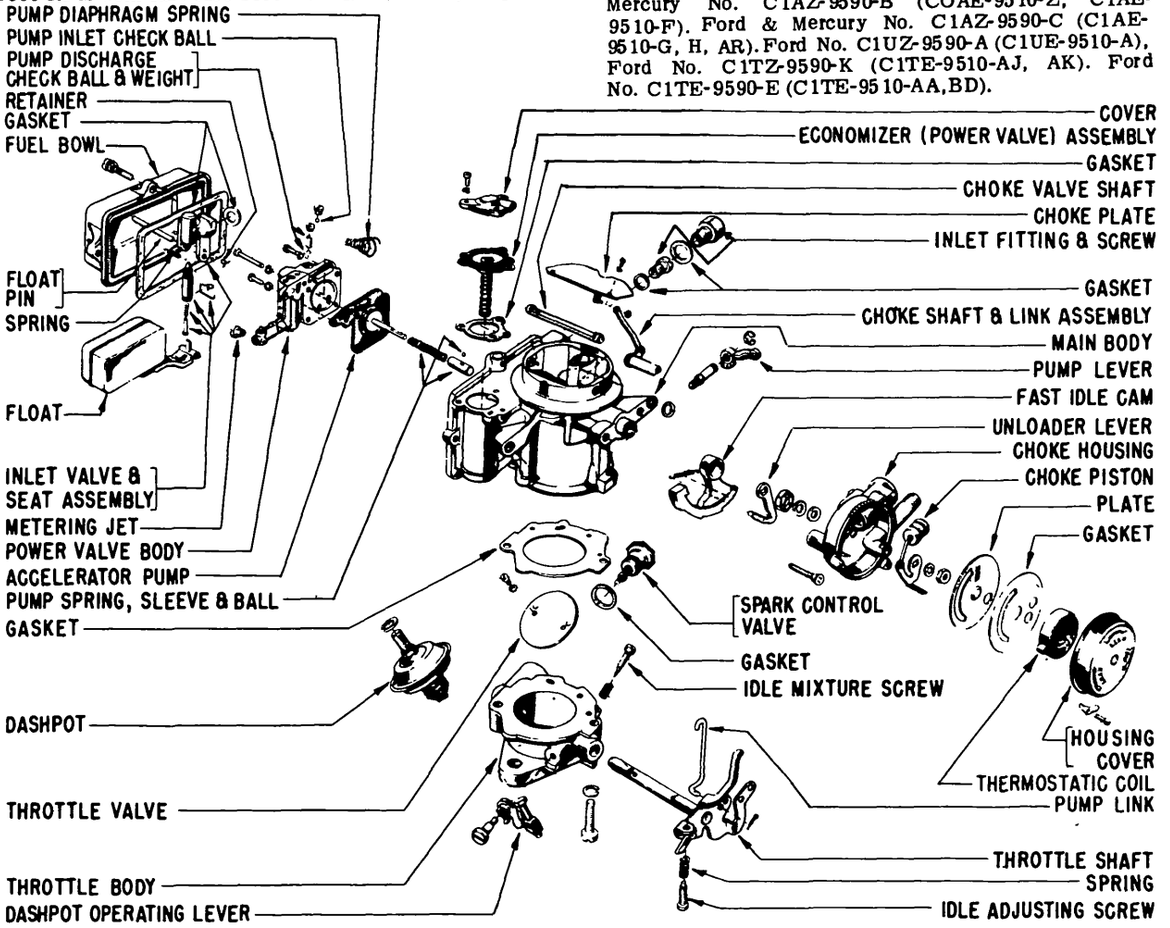
Fast Idle (Except Comet): No adjustment required.

Fast Idle (Comet): After hot (slow) idle speed properly adjusted, adjust fast idle screw for an engine speed of 1600 RPM with fast idle screw on first (lowest) step of fast idle cam.

Unload r (Comet & Rambler): With throttle valve in wide open position and choke valve closed against unloader lever, clearance between edge of choke valve and wall of air horn should be 1/4" (Comet), 7/16" (Rambler). To adjust, bend unloader tab on throttle lever.

OVERHAUL: *See 1960 Annual Data, Page 289, or later Manual edition.*

SERVICE PARTS: Gasket Set - Comet No. C1KY-9502-A (C1GE-9510-A,B,C,D,E,F,G,H). Ford No. CODZ-9502-A (CODE-9510-A,B,C,D, C1DE-9510-A,C,D,E,F, C1TE-9510-AR, C1UE-9510-A). Ford & Mercury No. B8A-9502-C (COAE-9510-E,U,Z, C1AE-9510-E,F). Ford No. C1TZ-9502-B (C1TE-9510-V,Y,Z,AA,AC,AD,AJ, AK,AL,BD).
Repair Kit - Comet No. C1GY-9590-A (C1GE-9510-A, B,C,D), Comet No. C1GY-9590-B (C1GE-9510-E,F,G,H). Ford No. C1DZ-9590-A (CODE-9510-C, C1DE-9510-A, C1TE-9510-AR). Ford No. C1DZ-9590-B (CODE-9510-A, B,D). Ford No. C1DZ-9590-C (C1DE-9510-C,D,E,F). Ford & Mercury No. C1AZ-9590-A (COAE-9510-E, U, C1AE-9510-E, C1TE-9510-Y,V,Z,AC,AD,AL). Ford & Mercury No. C1AZ-9590-B (COAE-9510-Z, C1AE-9510-F). Ford & Mercury No. C1AZ-9590-C (C1AE-9510-G, H, AR). Ford No. C1UZ-9590-A (C1UE-9510-A), Ford No. C1TZ-9590-K (C1TE-9510-AJ, AK). Ford No. C1TE-9590-E (C1TE-9510-AA,BD).



HOLLEY MODEL 1908 "VISI-FLO" CARBURETOR (WITH AUTOMATIC CHOKE)

1961 ROCHESTER 4GC 4-BARREL CARBURETORS

BUICK (EXC. SPECIAL)	Rochester Carb. No.
Series 4600, 4700, 4800	7019040
Service Replacement	7016100
BUICK SPECIAL	
Synchro-mesh Trans.	7020045
Auto. Trans.	7020043
Service Replacement (Synchro-mesh)	7016151
Service Replacement (Auto. Trans.)	7016150
CADILLAC	
All Series (Without Air Cond.)	7019030
All Series (Air Cond.)	7019031
Service Replacement	7016101
CHEVROLET	
283" Eng. (Without Air Cond.) Early	7019004
283" Eng. (Without Air Cond.) Late	7019014
283" Eng. (Air Cond.) Early	7015010
283" Eng. (Air Cond.) Late	7019010
348" Eng. (Without Air Cond.)	7019006
348" Eng. (Air Cond.)	7015012
283" Eng. Service Replacement	7015907
348" Eng. Service Replacement	7015908
OLDSMOBILE (EXC. F-85)	
Super 88 & 98 (Without Air Cond.)	7019050
Super 88 & 98 (Air Cond.)	7019054
Service Replacement	7016107
OLDSMOBILE F-85	
Without Air Cond	7019055
Air Conditioning	7019056
Heavy Duty	7019057
Service Replacement	7016119
PONTIAC TEMPEST	
4 Cyl. Eng. (Synchro-mesh)	7019079
4 Cyl. Eng. (Auto. Trans.)	7019066
Service Replacement (Synchro-mesh)	7016104
Service Replacement (Auto. Trans.)	7016118

►CHANGES, CAUTIONS, CORRECTIONS

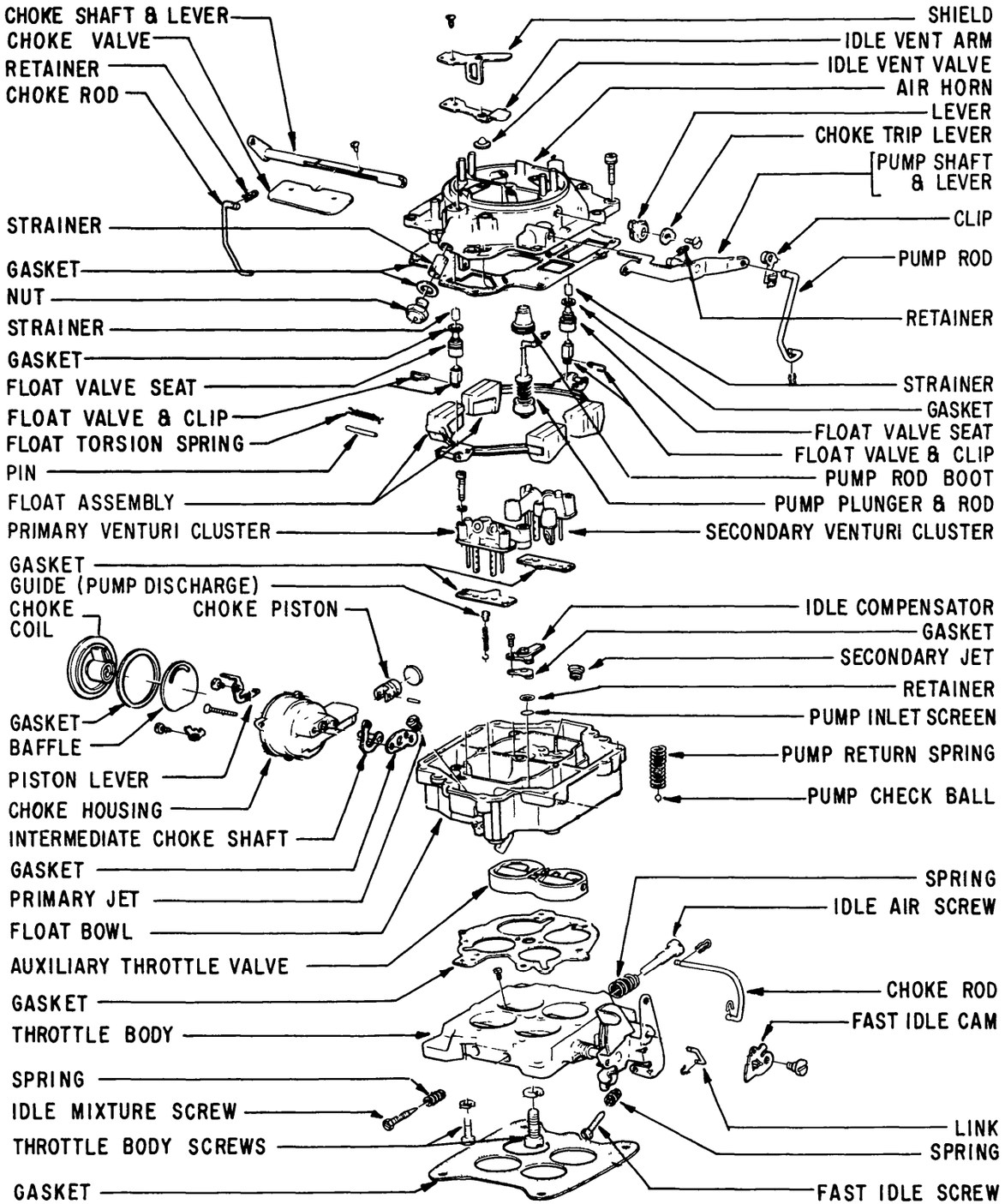
►*1961 CADILLAC HARD COLD STARTING CORRECTION:* Hard starting may be caused by choke valve sticking in a slightly open position (as little as 1/32" open from a fully closed position will cause hard starting). To check for sticking, hold throttle valve slightly open and by pushing on choke valve, feel for interference. Correct by removing choke valve and filing off the burr or contact point, using a fine toothed file. *NOTE - A bright or polished area on air horn will indicate point of interference.*

►*BUICK HARD "HOT" STARTING & POOR IDLE CORRECTION:* On later carburetors, make sure the throttle body gasket is a "vented" type having vent slots adjacent to secondary throttle bore holes in gasket. Early type gaskets were "solid" and should be used only on carburetors having four drilled vent holes.

►*1961 PONTIAC TEMPEST ENGINE SURGE CONDITION CORRECTION:* A surge condition when operating under a load at cold temperature can be corrected by installing jets, Part No. 7001860 jets to replace jets, Part No. 7001498. Later production carburetors have the new jet.

►*1961 PONTIAC TEMPEST 4-CYL. (AUTOMATIC TRANS.) STALL AFTER START CORRECTION:* Set choke 2 notches rich from index. On carburetors not

CONTINUED ON NEXT PAGE



ROCHESTER 4-BBL. CARBURETOR (TYPICAL)

1961 ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

having change letter "B" or higher on tag, install new choke piston, Part No. 7020357 in addition to setting choke 2 notches rich.

►*1961 PONTIAC TEMPEST 4-CYL. (SYNCHRO-MESH TRANS.) STALL AFTER START & LEAN DURING WARM-UP CORRECTION:* On carburetors not having change letter "B" or higher, set choke one notch rich from index. Change fast idle speed from 2500 to 2800 RPM. Install Exhaust Manifold Heat Control Valve Thermostat Spring, Part No. 531972. Install Choke Piston, Part No. 7020357. *NOTE - Carburetors with change letter "B" or later on tag should be set to the above specifications.*

DESCRIPTION: 4-barrel downdraft type with automatic choke. Design is similar to carburetors used on corresponding previous models.

ADJUSTMENTS: *Make all adjustments in sequence given below (except for Idle Speed & Mixture adjustments).*

►*CADILLAC & PONTIAC TEMPEST IDLE SPEED SETTING NOTE:* Throttle valves are completely closed at low idle speed and air is admitted through Idle Air System which consists of a bypass passage (primary side only) through which air for closed throttle operation is taken from above the throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore. An idle speed screw (single screw for both primary bores) controls the adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used).

►*IDLE SETTING CAUTION (CARS WITH IDLE COMPENSATOR):* Make sure that idle compensator is closed when adjusting idle speed. If necessary, idle compensator valve can be closed with a pencil. After idle speed is adjusted, press down on idle compensator valve to see if speed is affected. If speed drops, readjust idle speed, being sure that compensator valve is closed.

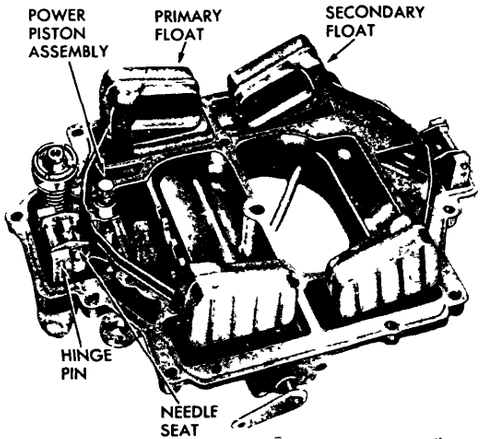
Idl Sp ed & Mixture Setting (Except Cadillac & Pontiac Tempest): If preliminary adjustment required to warm up engine, set both idle mixture screws 1½ turns open from a lightly seated position. With engine at normal operating temperature (choke valve wide open and fast idle inoperative so that engine idles at hot or slow idle speed), set throttle stopscrew for correct idle speed as listed below. Adjust both primary idle mixture adjusting screws equally so that engine idles smoothly and RPM is at maximum (see special notes below). Recheck idle speed.

►*BUICK NOTE:* Turn each adjusting screw in until engine begins to lag or run unevenly from lean mixture then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough to provide smoothest operation. Adjust both screws alike.

►*CHEVROLET NOTE:* Turn adjusting screw in to lean mixture until engine is moderately rough (slight vacuum and RPM drop), then turn screw out ¼ turn to enrich mixture. Adjust both screws alike.

►*OLDSMOBILE NOTE:* After adjusting idle mixture screws (above) for smoothest idle with highest RPM, turn each adjusting screw out ¼ turn (vacuum and RPM will drop off slightly).

Idle Speed & Mixture Setting (Cadillac & P ntiac T mp st): *CADILLAC NOTE - Disconnect parking brake vacuum diaphragm line from neutral safety switch and tape over switch opening to prevent any air leak (hose must be disconnected at this connection only).* With engine at normal operating temperature, transmission in "N" (Neutral), choke valve fully open and carburetor on "slow" idle (throttle valves fully closed), connect a tachometer to engine. On Cadillac, loosen front and rear throttle valve jam nuts at carburetor throttle lever trunnion. On all cars, place automatic transmission in "D" (Drive), then adjust engine idle to specified idle speed (see below) using the idle air bypass screw (idle speed adjusting screw) on throttle body. Turn one idle mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with other idle mixture screw. Check and reset engine idle speed. Repeat idle mixture adjustment until turning the idle mixture adjusting screws will not increase engine RPM and the smoothest engine idle is obtained. *CAUTION - Idle mixture screws must be adjusted last and must always be readjusted when the idle speed screw setting is changed.*



FLOAT ASSEMBLY WITH "VACUUM ASSIST" PRIMARY FLOATS

Idle Speed Setting

Car Model	Engine Speed (RPM) Synchro-mesh	Auto. Trans.
Buick (Exc. Air Cond.)	525	②525
Buick (Air Cond.) ①	575	②575
Cadillac ③		④450-480
Chevrolet ③	475	④450
Oldsmobile ⑤	550	④500
Oldsmobile F-85 ⑤	550	④⑥500
Tempest (Exc. Air Cond.)	680-700	580-600
Tempest (Air Cond.) ①	680-700	④630-650

① - With Air Conditioner turned OFF.
② - Selector lever in "N" (Neutral) or "P" (Park).
③ - With Air Conditioner operating.
④ - Selector lever in "D" (Drive).
⑤ - Air Conditioner turned OFF (Carburetors with Idle Compensator), turned ON (Carburetors without Idle Compensator).
⑥ - 550 RPM on Air Conditioned Cars.

Anti-Stall Dashp t & Thr ttl R turn Check Adjustment: *See "Throttle Linkag Adjustment" under CARBURETOR on each car model page.*

Float Setting: *Both Primary and Secondary Float Assemblies must be checked and adjusted separately and FLOAT LEVEL & FLOAT DROP (Vacuum Assist Spring on carburetors with this feature) must be check d for each assembly.* Remove bowl cover and float assemblies from carburetor but do not remove bowl cover gasket.

Primary Float Level Adjustment (Exc. Chevrolet & Pontiac Tempest): *NOTE - Pump side of gauge should always face pump assembly when checking float adjustment.* With air horn inverted and gasket in place, install float level gauge under heel of primary float. With gauge vertical, float should just touch gauge. To adjust, bend float arms at rear. Slide gauge under toe of floats. Lower surface of floats should just touch gauge. Bend float arm adjacent to float as necessary. Lower surface of floats should be parallel with air horn surface and gauge should slide freely under floats. With gauge still under floats, hold lug on lower surface of gauge against outside of air horn casting. Floats should center in cutout portion between gauge legs. To adjust, bend float arms horizontally until floats are centered at heel and toe. Move float assembly from side to side at hinge pin and check to make sure floats do not rub sides of gauge legs.

Primary & Secondary Float Level Adjustment (Chevrol t & Pontiac Tempest): *Both floats are adjusted in same manner. On Chevrolet carburetors, different gauges and settings are required for primary and secondary floats as listed in table below.* With bowl cover and float assembly inverted and gasket in place, install correct float level gauge over floats and against curvature of air horn so that gauging legs rest on cover gasket with locating lugs on inner legs extending into air horn. Make two adjustments as follows: 1) With gauge vertical, upper surface of floats should just touch edge of cutouts in float gauge. Adjust by bending arm at rear. 2) With gauge still in place and centered in air horn, floats should be centered between gauge legs. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub on sides of gauge legs.

Secondary Float Level Adjustment (Exc. Chevrolet & Pontiac Tempest): After checking primary floats (above) invert float gauge and install over heel end of secondary floats so that gauging legs rest on cover gasket with locating lugs on inner gauge legs extending into air horn. Make two adjustments as follows: 1) With gauge vertical, upper surface of floats should just touch edge of cutouts in gauge. Adjust by bending float arm at rear. 2) With gauge still in place and centered in air horn, floats should be centered between gauge legs. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub on sides of gauge legs. Then check and adjust float toe (following).

Secondary Float Toe Adjustment (Buick): With air horn inverted and gasket in place, distance from center of dimple on side of float at toe to gasket should be 3/8". To adjust, bend toe of float as necessary while holding float arm adjacent to float. Recheck float heel adjustment if toe adjustment is necessary.

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1961 ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

Primary & Secondary Float Toe Adjustment (Pontiac T mpest): Measure and adjust in same manner as for Buick above. Distance from gasket to dimple should be 9/16" (both float assemblies).

S c ndary Float Toe Adjustment (Cadillac & Oldsmobile): With bowl cover and float assembly inverted, raise gasket and sight across flat surface of cover at toe end of secondary floats. Toe end of each float must be FLUSH with this surface. Adjust by bending float arm at point close to float. *CAUTION - After making this adjustment, recheck float level and adjust if necessary.*

Float Level Setting

Car M del	Primary Height & Gauge No.	Secondary Height & Gauge No.
Buick (All)	9/64" BT-178	1 3/8" BT-171
Cadillac	15/64" BT-172	1 3/8" BT-172
Chevrolet	1 33/64" BT-182	1 37/64" BT-183
Oldsmobile	9/32" BT-171	1 3/8" BT-171
Oldsmobile F-85	7/32" BT-198	1 3/8" BT-198
Pont. Tempest	1 21/64" BT-196	1 21/64" BT-196

Primary Float Vacuum Assist Spring Adjustment (Cadillac & Oldsmobile): With bowl cover and float assembly held upright, hold vacuum piston in full up position, jounce floats slightly to make certain that the vacuum assist spring cup is not binding on piston stem. Use a scale to measure from face of gasket to center of dimple on side of primary float at toe (free end) with power piston held in up position. If this dist ance is not 1 3/32" (Cadillac), 1 3/64" (Oldsmobile, Exc. F-85), 29/32" (Oldsmobile F-85), adjust by bending tang on float arm which engages power piston stem. Use bending tool BT-142,

Fl at Drop Setting: *Check the Float Drop after Float L vel Setting & Vacuum Assist Spring adjustments have been made.*

Primary & Secondary Float Drop Adjustment (Except Ch vrolet) - *NOTE - On carburetors with Vacuum Assist Spring Primary Floats, vacuum assist piston must be fully extended in the "down" position when ch cking float drop of primary floats.* With bowl cover and float assembly held upright, use a scale to measure from face of gasket to center of dimple on side of floats at toe (free end). *CAUTION - On vacuum assist spring type primary floats, make certain that piston is fully extended so that float is positioned by stop tang on rear of float arm rather than by tang engaging vacuum piston stem.* If this distance not correct as shown in table below, adjust as follows: Bend tang at rear of float arm toward needle seat(or balance spring) to decrease drop and away from needle seat(or balance spring) to increase drop.

Float Drop Setting

Car Model	Primary Floats	Secondary Floats
Buick (Exc.Spec.)	1 7/16"	1 5/16"
Buick Special	1 9/16"	1 7/16"
Cadillac	1 1/2"	1 5/16"
Chevrolet	2 1/4"	2 1/4"
Oldsmobile(Exc.F-85)	1 1/2"	1 5/16"
Oldsmobile F-85	1 1/2"	1 3/8"
Pontiac Tempest	1 1/4"	1 1/4"

Primary & Sec ndary Fl at Dr p Adjustm nt (Chevr let) - With bowl cover and float assembly held upright, use a scale to measure from face of gasket to lowest portion of float(bottom of float at center). This distance should be as indicated in table (above). Adjust by bending tang at rear of float arm toward needle seat to decrease float drop, away from needle seat to increase float drop.

Accelerating Pump Adjustment (Except Buick, Buick Special, Oldsmobile F-85 & Pontiac Tempest): *CAUTION - This is a linkage adjustment and not a seasonal change recommendation.* Back out slow idle speed and fast idle speed screws until throttle valves are completely closed. *NOTE - On Oldsmobile (Except F-85), pump rod must be connected in INNER hole of pump arm.* Hold throttle valves in closed position and place correct gauge(see table below)on top of air horn next to pump plunger. End of plunger shaft should slide freely into hole on gauge marked "Pump". If height not correct (see table below), adjust by bending pump rod with bending tool BT-18.

Buick, Buick Special, Oldsmobile F-85 & Pontiac Tempest - Back out slow idle speed and fast idle speed screws until throttle valves are completely closed. Pump rod must be connected in CENTER hole of pump arm (Buick and Buick Special); in OUTER hole of pump arm, furthest from pump arm shaft (Oldsmobile F-85). *NOTE - Single hole only in pump arm of Pontiac Tempest.* Hold throttle valves closed, then measure distance between top surface of air horn and bottom of horizontal portion of pump plunger shaft. If distance not correct (see table below), adjust by bending pump rod.

Accelerating Pump Stroke Setting

Car Model	Gauge No.	Pump Shaft Height
Buick (Exc. Spec.)	Scale	① 1 1/64"
Buick Special	Scale	① 61/64"
Cadillac	BT-180	27/32"
Chevrolet	BT-145	1 1/16"
Oldsmobile(Exc.F-85)	BT-166A	② 1 1/64"
Oldsmobile F-85	Scale	③ 1 1/64"
Pontiac Tempest	Scale	15/16"

① - With pump rod in center hole of pump arm.
② - With pump rod in inner hole of pump arm.
③ - With pump rod in outer hole of pump arm (furthest from pump arm shaft).

Atmospheric Idle Vent Adjustment: Cadillac & Oldsmobile F-85 - *NOTE - Make fast idle adjustment before adjusting idle vent.* With fast idle screw on high step of fast idle cam, vent valve should just be closed. To adjust, bend tang on pump lever.

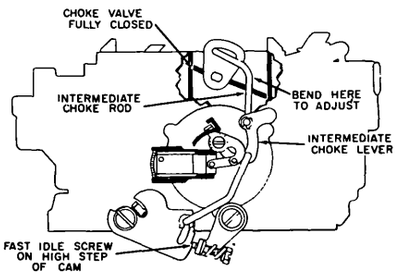
Chevrolet & Oldsmobile (Exc. F-85) - Place combination "Pump" and "Vent" gauge, BT-145 (Chevrolet); BT-166A (Oldsmobile) next to pump plunger shaft. Open throttle valves to point where vent valve is just closed. With throttle valves held in this position, hole in gauge marked "Vent" should slide freely over pump shaft. To adjust, bend tang on pump lever. If a scale is used, distance from top of air horn to bottom of pump plunger shaft should be 3/32" (Chevrolet); 29/32" (Oldsmobile).

Pontiac Tempest - Measure distance from top of air horn casting to bottom of pump plunger rod (primary throttle valves opened to a point where idle vent valve just closes). This distance should be 55/64". To adjust, bend tang on pump lever.

Interm diat Ch k R d Adjustm nt (Exc pt Oldsm bil): *NOTE - This rod connects l ver on choke valv shaft to choke lever on automatic choke housing.* Hold choke valve completely closed and bend intermediate choke rod as necessary so choke piston is flush with end of choke piston sleeve.

Oldsmobile & Oldsmobile F-85 - *NOTE - Mak fast idle adjustment before adjusting int rm diat ch k rod (see below).* With fast idle properly adjusted, place fast idle screw on high step of fast idle cam and raise intermediate choke lever to its full up position. Make sure all lash is removed from rods in slots. Choke piston should be flush with end of choke piston sleeve. To adjust, bend intermediate choke rod to correctly position choke piston.

Automatic Choke Setting (All Mod ls): Loosen three retaining screws and rotate thermostat cover until index mark is in line with correct mark on housing (see table below). Tighten cover retaining screws. *NOTE - "Centered" point on housing is indicated by a raised section on housing casting.*



OLDSMOBILE CHOKE & FAST IDLE LINKAGE

Automatic Ch k Setting

Car Model	Ch k S tting
Buick (All)	Centered (At Index)
Cadillac	1 Point Rich
Chevrolet	Centered (At Index)
Oldsmobile (All)	Centered (At Index)
Pontiac Tempest(Synchro-mesh)	① 1 Point Rich
Pontiac Tempest(Auto. Trans.)	① 2 Points Rich

① - Supersedes previous setting of "Centered (At Index)".

Fast Idle Setting: *NOTE - Chevrolet Fast Idle adjustment will be correct when "slow idle" speed and choke rod adjustments have been made. On other models, the "On Engine" fast idle adjustment must be made after carburetor installed to insure proper warm-up p rformance.*

"Off Engine" Adjustment - Turn fast idle screw against high step of fast idle cam until throttle valve opening or clearance between edge of throttle valve and bore on side opposite idle mixture adjusting screws is correct as shown in table below.

Fast Idle Setting

Car Model	Throttl Valv Op ning	Ch cking Gaug
Buick (Exc. Spec.)	.028"	BT-79
Buick Special (Auto. Trans.)	.028"	BT-79
Buick Special (S.M. Trans.)	.020"	BT-67
Cadillac	.024"	BT-90
Oldsmobile (All)	.024"	BT-90
Pontiac Tempest	.028"	BT-79

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1961 ROCHESTER 4GC 4-BARREL CARBURETORS (Cont.)

"On Engine" Adjustment - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of cam (except Buick & Buick Special); on low step of cam (Buick & Buick Special). Start engine and adjust fast idle screw for correct engine RPM as shown in table below. *NOTE - On Chevrolet, fast idle engine RPM will be correct after hot or slow idle speed has been correctly set.*

Fast Idle Speed

Car Model	Engine RPM
Buick (All)	①650
Cadillac	1700
Oldsmobile (Exc. F-85)	1600
Oldsmobile F-85	1900
Pontiac Tempest (Synchro-mesh)	②2800
Pontiac Tempest (Auto. Trans.)	3000

① - With fast idle screw on low step of fast idle cam.
② - Supersedes previous fast idle speed of 2500 RPM.

Choke Rod Adjustment: *NOTE - On all cars except Oldsmobile & Oldsmobile F-85, this rod connects choke valve shaft to fast idle cam. On Oldsmobile and Oldsmobile F-85, the rod connects intermediate choke lever to fast idle cam.* Rotate choke valve and fast idle cam until fast idle screw (slow idle screw on Chevrolet) is in contact with SECOND step of fast idle cam and against shoulder of highest step of cam. On Oldsmobile, raise intermediate choke lever to full up position making sure intermediate rod and choke rod are at upper limit of travel in the slots and that all lash in removed. On all models, bend choke rod to obtain specified clearance between choke valve and dividing wall of air horn. See table below.

Choke Rod Setting

Car Model	Choke Opening	Gauge No.
Buick (Exc. Special)	.052"	BT-68
Buick Special	.045"	BT-131
Cadillac	.040"	BT-102
Chevrolet	.043"	BT-131
Oldsmobile (All)	.052"	BT-68
Pontiac Tempest	.055"	BT-68

Unloader Adjustment: After choke rod adjusted (see above), move throttle lever to wide open position and make sure that choke trip lever is in contact with choke counterweight. Measure choke valve clearance between upper edge of choke valve and dividing wall of air horn (see table below for gauge and clearance specifications). Adjust by bending tang on fast idle cam using Tool BT-69.

Unloader Setting

Car Model	Choke Opening	Gauge No.
Buick (All)	.128"	BT-135
Cadillac	.125"	BT-102
Chevrolet	.235"	BT-131
Oldsmobile (All)	.115"	BT-90
Pontiac Tempest	.152"	BT-119

Secondary Throttle Lockout Adjustment: Close choke valve fully so that lockout lever tang is engaged in slot of fast idle cam. Measure clearance between side of lockout lever tang and edge of slot in cam (use feeler gauge). Clearance should be .015" (all models). Adjust by bending tang on fast idle cam using Tool BT-91A (Exc. Oldsmobile), BT-69 (Oldsmobile).

Secondary Throttle Contour Adjustment: Open choke valve fully so that tang on lockout lever is positioned over contoured section of fast idle cam. Measure clearance between tang and edge of fast idle cam (use feeler gauge). If clearance is not .030" (Buick & Oldsmobile); .015" (others), adjust by bending tang up or down using bending tool BT-91-A.

Secondary Actuating Lever (Oldsmobile): Back off slow idle adjusting screw so throttle valves are tightly closed (fast idle cam must be in hot or slow idle speed position). Hold throttle valves closed and measure clearance between tang at bottom of secondary actuating lever and primary throttle valve lever with a feeler gauge. This clearance should be .005-.025" and uniform over full length of tang. To adjust, hold throttle open and bend tang on actuating lever using bending tool BT-18.

OVERHAUL: *See 1958 Annual Data, Page 279, or later Manual editions.*

Service Parts

Gasket Kit - Rochester No. 7015940 (Buick, Exc. Special); No. 7016154 (Buick Special); No. 7015941 (Cadillac); No. 7015947 (Chevrolet 283" Eng.); No. 7015948 (Chevrolet 348" Eng.); No. 7015954 (Oldsmobile, Exc. F-85); No. 7016145 (Oldsmobile F-85); No. 7016144 (Pontiac Tempest).

Repair Kit - Rochester No. 7015920 (Buick, Exc. Special); No. 7016153 (Buick Special); No. 7015921 (Cadillac); No. 7016036 (Chevrolet 283" Eng.); No. 7016037 (Chevrolet 348" Eng.); No. 7015934 (Oldsmobile, Exc. F-85); No. 7016131 (Oldsmobile F-85); No. 7016130 (Pontiac Tempest).

Off-Car Kit - Rochester No. FR-104 (Buick, Exc. Special); No. FR-105 (Buick Special); No. FR-204 (Cadillac); No. FR-305 (Chevrolet 283" Eng.); No. FR-306 (Chevrolet 348" Eng.); No. FR-504 (Oldsmobile, Exc. F-85); No. FR-505 (Oldsmobile F-85); No. FR-603 (Pontiac Tempest).

1961 ROCHESTER FUEL INJECTION

Corvette (1961)

DESCRIPTION: Fuel injection design is similar to design used on previous models.

ADJUSTMENT

►*ADJUSTMENT NOTE: Make all adjustments in the order indicated below.*

Idle Speed & Mixture: For an initial adjustment, turn both the idle air adjustment screw (located below and to rear of fuel enrichment housing and facing left side of car), and the idle fuel adjustment screw (located below and to rear of fuel enrichment housing - this screw faces rear of car and is closer to side of engine than idle air adjustment screw), two full turns open from a fully seated position. With engine at normal operating temperature and running, adjust air adjusting screw to obtain best possible idle speed. Adjust idle fuel adjusting screw to smooth out the idle speed. Readjust idle air adjusting screw and fuel adjusting screw until best idle is obtained at approximately 500 RPM (Auto. Trans. in "DR"), 600 RPM (Std. Trans.), 700 RPM (with solid lifter camshaft).

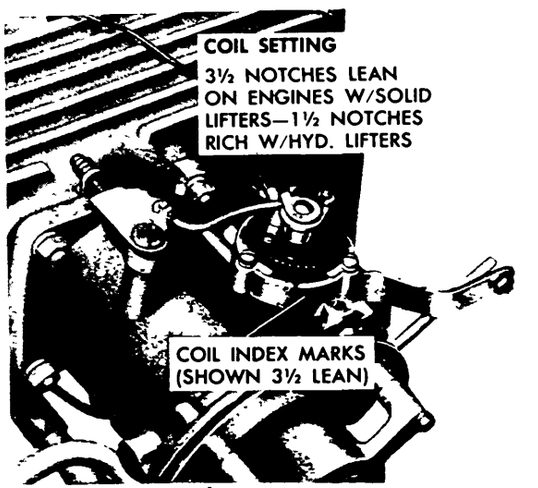
Throttle Linkage Adjustment (Synchro-mesh Trans.): With accelerator pedal pressed to floor and throttle bellcrank rotated so throttle valves are in wide open position, adjust upper bellcrank rod for free entry into bellcrank lever.

Throttle Linkage Adjustment (Automatic Trans.): *See "CARBURETOR" on car model page.*

Cold Enrichment Coil Adjustment: Scribe mark on coil cover should be set 1½ notches rich (Exc. 315 HP Eng.); 3½ notches lean (315 HP Eng.) from scribe mark on housing.

Cold Enrichment Rod Adjustment (Corvette): To hold trip lever and the counterweight tab together, twist the attaching screw its full limit clockwise. Note point where fast idle screw contacts cam. If rod length is correct, fast idle screw will just touch at center of high step of cam. Otherwise bend rod to lengthen or shorten as required to provide correct adjustment.

TROUBLE SHOOTING & DIAGNOSIS: *See 1959 Annual Data, Page 287, or later Manual edition.*



CORVETTE FUEL INJECTION COLD ENRICHMENT SETTING

ROCHESTER DUAL 2G & 2GC

	Rochester Carb. No.
BUICK (EXC. SPECIAL)	
1961 364" Engine	2GC 7019042
Service Replacement	2GC 7016112
BUICK SPECIAL	
1961 Synchro-mesh	2GC 7019093
1961 Auto. Trans.	2GC 7019090
Service Replacement (7019093)	2GC 7016103
Service Replacement (7019090)	2GC 7016102
CHEVROLET PASS. CARS (283" ENG.)	
1961 Synchro-mesh	2GC 7019007
1961 Auto. Trans.	2GC 7019008
1961 Air Conditioned	2GC 7019018
Service Replacement (7019007)	2GC 7015904
Service Replacement (7019008)	2GC 7015905
Service Replacement (7019018)	2GC 7015906
CHEVROLET PASS. CARS (348" ENG.)	
1961 Triple Carburetor Option	①
CHEVROLET TRUCKS (283" ENG.)	
1961 Standard	2G 7015015
1961 Velocity Governor	2G 7013011
1961 Vacuum Governor	2G 7015017
Service Replacement (7015015)	2G 7016006
Service Replacement (7013011)	2G 7015913
Service Replacement (7015017)	2G 7016007
OLDSMOBILE (EXC. F-85)	
1961 Series 88 (No Air Cond.)	2GC 7019052
1961 Series 88 (Air Cond.)	2GC 7019058
Service Replacement (7019052 & 7019058)	2GC 7016106
OLDSMOBILE F-85	
1961 Synchro-mesh	2GC 7019092
1961 Auto. Trans.	2GC 7019095
Service Replacement (7019092)	2GC 7016114
Service Replacement (7019095)	2GC 7016115
PONTIAC (EXC. TEMPEST)	
1961 Std. Eng. (Synchro-mesh)	2GC 7019060
1961 Std. Eng. (4-Spd. Auto. Trans.) ②	2GC 7019070
1961 Std. Eng. (3-Spd. Auto. Trans.) ②	2GC 7019071
1961 Std. Eng. (4-Spd. Auto. Trans.) ③	2GC 7019072
1961 Std. Eng. (3-Spd. Auto. Trans.) ③	2GC 7019073
1961 425E Eng. (4-Spd. Auto. Trans.) ②	2GC 7019074
1961 425E Eng. (3-Spd. Auto. Trans.) ②	2GC 7019075
1961 425E Eng. (4-Spd. Auto. Trans.) ③	2GC 7019076
1961 425E Eng. (3-Spd. Auto. Trans.) ③	2GC 7019077
1961 Triple Carburetor Option	①
Service Replacement (7019060)	2GC 7016108
Service Replacement (7019070, 71, 72, 73)	2GC 7016109
Service Replacement (7019074, 75, 76, 77)	2GC 7016110
PONTIAC TEMPEST V8	
1961 Synchro-mesh	2GC-7019863
1961 Auto. Trans.	2GC 7019860
Service Replacement (7019863)	2GC 7016134
Service Replacement (7016860)	2GC 7016133

① - See SEPARATE "Rochester Triple 2-Barrel Carburetor" data.
② - Without Air Conditioning.
③ - With Air Conditioning.

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 OLDSMOBILE SERIES 88 FLOAT LEVEL & FLOAT DROP PRODUCTION CHANGE & SERVICE CAUTION:* Float level and float drop settings are different for early and later carburetors. *See "Float Level" & "Float Drop" Adjustments below.*

►*1961 OLDSMOBILE F-85 CARBURETOR LOADING AT 3/4 TO FULL THROTTLE DURING WARM-UP CORRECTION:* Adjust unloader setting to .250". This setting supersedes previous setting of .160".

►*1961 OLDSMOBILE F-85 CARBURETOR LOADING DURING CHOKE OPERATION CORRECTION:* Adjust automatic choke setting to 1 notch lean. This setting supersedes previous setting of "Centered (On Index)".

►*1961 PONTIAC (EXCEPT TEMPEST) WITH AUTOMATIC TRANSMISSION, LEAN CONDITION DURING WARM-UP CORRECTION:* On carburetors prior to change "A" as indicated on carburetor identification tag, install the following modification kit: Part Nos. 7020464 (Carb. No. 7019070, 7019071, 7019072 & 7019073); Part No. 7020465 (Carb. Nos. 7019074, 7019075, 7019076 & 7019077).

►*1961 PONTIAC (EXCEPT TEMPEST) CARBURETOR FLOODING CORRECTION & PRODUCTION CHANGE:* On early carburetors with a "flat" type bowl cover-to-float bowl gasket, install later type "domed" gasket. Part No. 7021007. This new gasket increases clearance between top of float and bowl cover.

►*1961 PONTIAC TEMPEST "STUMBLE" (IN HIGH TEMPERATURE AREAS) CORRECTION:* Install accelerating pump connector rod in INNER hole of pump shaft lever. *CAUTION - Do not make pump rod adjustment (see below) with connector rod in inner hole.*

►*1961 PONTIAC (EXCEPT TEMPEST) THROTTLE ROD INSTALLATION CHANGE FOR IMPROVED COLD STARTING:* On early cars with throttle rod connected in upper hole of carburetor throttle lever, change it to the middle hole. Later cars have the change made in production.

DESCRIPTION: Dual (2-Barrel) downdraft carburetor with manual choke control (2G), automatic choke (2GC). Carburetors are similar to previous models and have the following features.

Idle Air Compensator (Chevrolet 7019018, Oldsmobile 7019058, & Pontiac 7019072, 7019073, 7019076, 7019077) - Consists of a thermostatically controlled idle air bypass which opens during prolonged hot idling to supply additional air at a point below the throttle valves to offset enriching effects of high engine temperature. This idle compensator must be held closed when making idle mixture adjustment.

Idle Compensator (Oldsmobile F-85) - This "Carb-Airator" is a separate unit attached to carburetor on air conditioned cars to assist in reducing rich fuel and air mixture during hot idling. *See "Carb-Airator Adjustment" below.*

Automatic Choke Assembly (Oldsmobile 7019052, 7019058, Pontiac 7019070, 7019071, 7019072 & 7019073) - Choke assembly is mounted on throttle body and linked to choke shaft lever by an intermediate choke rod. This intermediate choke rod must be adjusted for correct choke operation.

Automatic Choke Assembly (Except Above) - Choke assembly is mounted on air horn and directly connected to choke shaft. Intermediate rod adjustment not required.

ADJUSTMENT: *Make all adjustment exactly as follows:*

Idling Adjustment (Except Pontiac 7015070 & 7015072 Carburetors): If preliminary adjustment required to warm up engine, turn both idle mixture screws in until lightly seated, then back each screw out 1½ turns. Operate engine until normal operating temperature is reached with choke valve wide open and fast idle inoperative. Connect tachometer and vacuum gauge to engine, then adjust throttle stopscrew for correct engine idle speed (see table below). Adjust each idle mixture screw for smoothest idle performance with highest manifold vacuum and engine RPM (see special notes below).

Idling Adjustment: If preliminary adjustment required to warm engine, turn both idle mixture screws in until lightly seated, then back each screw out 1½ turns. Operate engine until normal operating temperature is reached with choke valve wide open and fast idle inoperative. Connect tachometer and vacuum gauge to engine, then adjust throttle stopscrew for correct engine idle speed (see table below). Adjust each idle mixture screw for smoothest idle performance with highest manifold vacuum and engine RPM *see special notes below.* *CAUTION - On cars with Idle Air Compensator, hold compensator valve closed by pressing in on spring-loaded button on side of main body (Chevrolet), removing air cleaner and pressing down on valve in air horn (Oldsmobile).* Recheck engine idle speed. *CHEVROLET NOTE* - Idle mixture adjustment can be made by leaning the mixture (turn screws in) for a moderate rough idle with slight vacuum and RPM loss, and then richening the mixture by turning the screws out ¼ turn.

OLDSMOBILE NOTE - After adjusting both idle mixture screws for highest manifold vacuum and engine RPM, turn each screw out ¼ turn for slightly richer mixture. Recheck idle mixture and idle speed after air cleaner installed.

Car Model	Idle Speed Setting Synchro-mesh	Auto. Trans.
Buick (Exc. Spec.)		①②525 RPM
Buick Special	525 RPM	①②525 RPM
Chevrolet Pass.	475 RPM	③450 RPM
Chevrolet Truck	475 RPM	③450 RPM
Oldsmobile (Exc. F-85)	550 RPM	③500 RPM
Oldsmobile F-85	550 RPM	③④500 RPM
Pontiac (Exc. Tempest)	⑤480-500 RPM	③⑤480-500 RPM
Pontiac Tempest	⑥580-600 RPM	③⑥580-600 RPM

① - 575 RPM on Air Conditioned cars.
② - Transmission selector lever in "N" or "P".
③ - Transmission selector lever in "D".
④ - 500 RPM on Air Conditioned cars.
⑤ - 540-560 on Air Conditioned cars with Air Cond. OFF.
⑥ - With Air Conditioner OFF.

Throttle Return Check (Dashpot) Adjustment: Used on Chevrolet and Oldsmobile with automatic transmission. *See "Throttle Linkage Adjustment" under CARBURETOR on each car model page for adjustment data.*

Float Level: *CAUTION - Two separate adjustments (Float Level & Float Drop) required.*

Float Level Setting (Chevrolet Pass. Cars & Truck, Buick Special & Pontiac Tempest) - Remove and invert bowl cover and float assembly but DO NOT remove cover gasket. Install correct float gauge (see table below) over float with side of gauge resting against pump side of power piston shaft, and with outer leg of gauge in line with center of float. Bend float hinge arm so float just clears top edge of gauge cutout and sides of float are parallel with gauge legs.

Float Level Setting (Buick, Exc. Special; Oldsmobile, & Pontiac, Exc. Tempest) - Remove and invert bowl cover and bowl assembly but DO NOT remove gasket. Install correct float gauge (see table below) on bowl gasket at free end of float. Lower edge (sharp edge) of float seam should just touch gauge. Adjust by bending float hinge arm.

CONTINUED ON NEXT PAGE

ROCHESTER 2G & 2GC (C nt.)

Fl at Lev l Setting

Car & Carb.	Float Level	Checking Gauge
Buick 7019042	11/16"	BT-184
Buick Special (All)	1 17/64"	BT-188
Chevrolet Pass. (All)	1 23/64"	BT-152
Chevrolet Truck (All)	1 23/64"	BT-152
Oldsmobile 88 (All) Early ①	11/16"	BT-179
Oldsmobile 88 (All) Later ②	1/2"	BT-197
Oldsmobile F-85 (All)	35/64"	BT-187
Pontiac 7019070,71,72,73	5/8"	BT-177
Pontiac 7019060,74,75,76,77	11/16"	BT-176
Pontiac Tempest (All)	1 17/64"	BT-188

① - Carburetors with "A" or no letter on tag.
② - Carburetors with "B" or later on tag.

Float Drop Setting (All Models) - Hold bowl cover and float assembly upright so that float hangs down at bottom of travel. Measure distance from lower face of cover gasket to bottom of float at free end using a scale or combination gauge (see table below). Adjust by bending tang on rear of float hinge arm toward intake needle seat to decrease drop, or away from needle seat to increase drop.

Fl at Drop Setting

Car & Carb.	Float Drop	Checking Gauge
Buick 7019042	1 29/32"	BT-184
Buick Special (All)	1 29/32"	BT-188
Chevrolet Pass. (All)	1 29/32"	BT-152
Chevrolet Truck (All)	1 29/32"	BT-152
Oldsmobile 88 (All) Early ①	1 29/32"	
Oldsmobile 88 (All) Later ②	1 13/16"	
Pontiac, Exc. Tempest (All)	1 3/4"	BT-177
Pontiac Tempest (All)	1 29/32"	BT-188

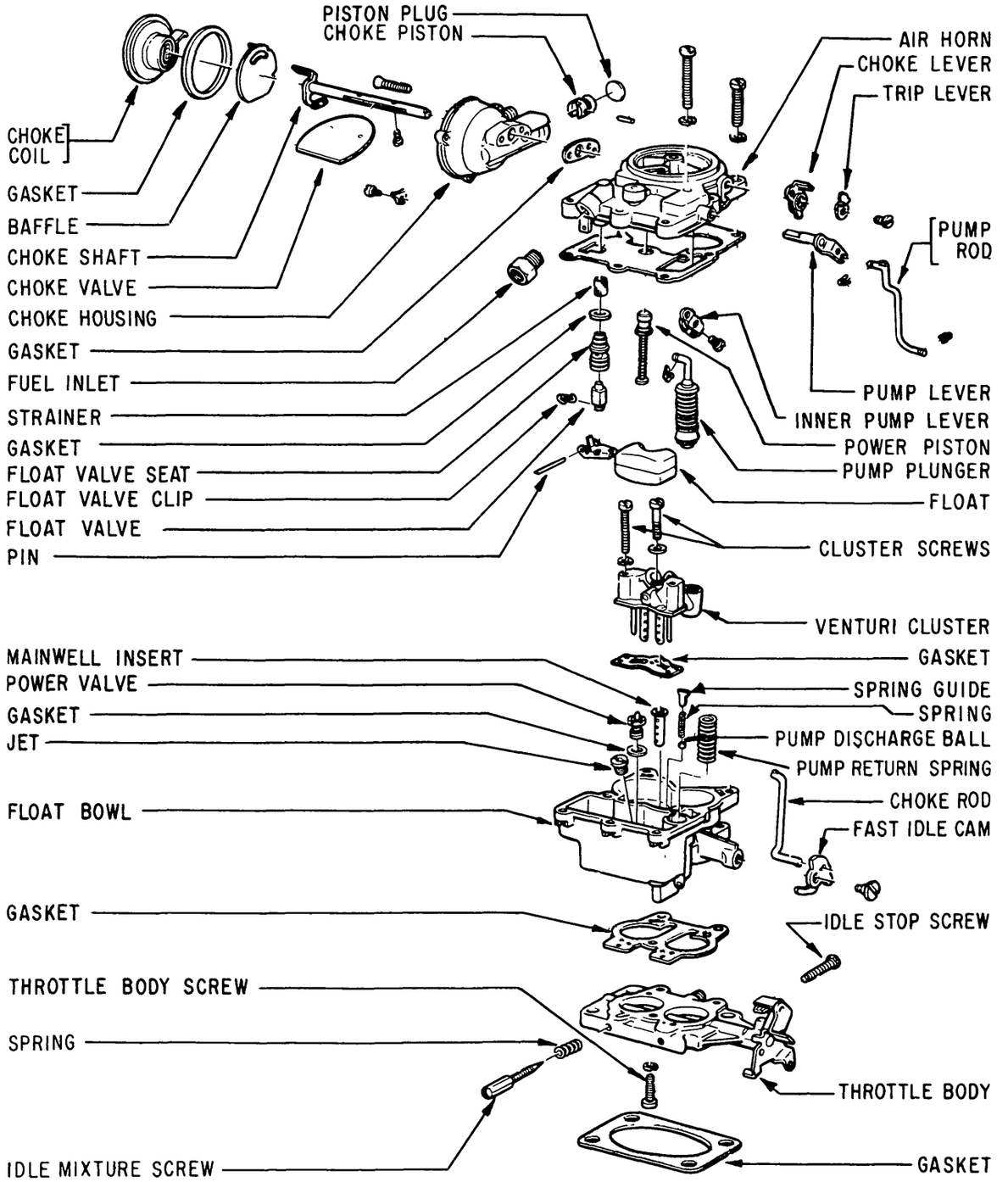
① - Carburetors with "A" or no letter on tag.
② - Carburetors with "B" or later on tag.

Accelerating Pump R d: *CAUTION - On Buick Special, Oldsmobile F-85 & Pontiac Tempest, pump connector rod MUST be positioned in OUTER hole (furthest from pump shaft) of accelerating pump shaft lever. Other carburetors have a single hole.* With throttle stopscrew (and Fast Idle Screw on Oldsmobile Series 88) backed out so that throttle valves are completely closed, measure distance from top of air horn ring (Buick, except Special, Oldsmobile 88 & Pontiac, except Tempest); from top of air horn surface (Oldsmobile F-85); from top of pump housing (Buick Special, Chevrolet Pass. Cars & Trucks, and Pontiac Tempest) to top of pump connector rod with a scale or combination gauge (see below). *NOTE - If gauge is used, leg of gauge should just touch top of connector rod.* To adjust, bend pump connector rod with Tool BT-18.

Acc lerating Pump Rod Setting

Car & Carb.	Pump Rod Setting	Checking Gauge
Buick 7019042	1 1/8"	BT-184
Buick Special	1 3/32"	BT-188
Chevrolet Pass. Cars	57/64"	BT-152
Chevrolet Trucks	57/64"	BT-152
Oldsmobile 88	1 7/16"	BT-179 or 197
Oldsmobile F-85	59/64"	BT-187
Pontiac 7019070,71,72,73	1 21/64"	BT-177
Pontiac 7019060,74,75,76,77	1 1/8"	BT-176
Pontiac Tempest	1 3/32"	BT-188

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ROCHESTER "2GC" CARBURETOR (TYPICAL)

ROCHESTER 2G & 2GC (C nt.)

Idl Vent: Adjust only after Accelerating Pump Rod Setting has been checked and adjusted. Use the same gauge (installed in same manner) as for pump rod setting (above). *NOTE - On Oldsmobile (Exc. F-85) & Pontiac, invert gauge so that leg marked "Vent" is down toward pump connector rod.* Slowly open throttle valves to point where vent valve just closes (rubber valve seats on pump housing on air horn). At this point, edge of cutout in gauge marked "Vent" (Chevrolet), or lower end of gauge marked "Vent" (Oldsmobile 88 & Pontiac), should just touch top of pump connector rod. Adjust by bending tang on pump lever which contacts vent valve arm.

Idle Vent Setting

Car & Carb.	Vent Setting	Checking Gauge
Chevrolet (All)	49/64"	BT-152
Oldsmobile 88	1 11/32"	BT-179 or 197
Pontiac 7019060,74,75,76,77	1 5/64"	BT-176
Pontiac 7019070,71,72,73	1 17/64"	BT-177

Intermediate Choke Rod Adjustment: Oldsmobile 7019092 & 7019058 - *NOTE - Vacuum piston has two grooves at outer end, and choke shaft lever has three holes for installation of intermediate rod.* With intermediate choke rod installed in inboard hole (nearest choke shaft), piston must be flush to 1/32" out of piston bore. With intermediate rod in center hole, first "V-groove" in piston must be flush with edge of piston bore. With intermediate rod in outboard hole, second "V-groove" must be flush with edge of piston bore. To adjust, bend intermediate choke rod. *NOTE - Normal position of rod in choke lever is "center" hole. To tailor for temperature and climatic conditions, see "Automatic Choke Setting" below.*

Intermediate Choke Rod Adjustment: Pontiac 7019070, 71,72 & 73 - Remove choke cover and thermostatic coil assembly, gasket and baffle plate. Hold choke valve completely closed by lifting up on intermediate lever. In this position, inner end of vacuum piston should be flush with end of choke piston bore. Adjust by bending intermediate choke rod.

Automatic Choke Setting (All 2GC Carburetors): Adjust by loosening retainer screws on choke cover and rotating cover and coil assembly. Centered setting is with scribed index mark on cover in line with center (longest) mark on housing. *NOTE* - Choke valve should be lightly closed at room temperature (75°F).

Automatic Choke Setting

Car Model	Setting
Buick (Exc. Special)	1 Point Rich
Buick Special	Centered (At Index)
Chevrolet Pass. (7019008,18)	Centered (At Index)
Chevrolet Pass. (7019007)	1 Point Lean
Oldsmobile 88	Centered (At Index)
Oldsmobile F-85	ℂ 1 Point Lean
Pontiac & Pontiac Tempest	Centered (At Index)

℃ - Supersedes previous setting of "Centered" (At Index).

► *1961 OLDSMOBILE (EXC. F-85) CHOKE SETTING "TAILORING" FOR CLIMATIC & TEMPERATURE CONDITIONS:* Moving intermediate choke rod to next OUTER hole (away from choke shaft) will provide richer mixture during warm-up for acceleration or load. Moving intermediate rod to next INNER hole will provide leaner mixture under same operating conditions.

Fast Idle (2GC Carburetors): Adjust each model as follows:

All Models (Except Oldsmobile 88) - No separate fast idle adjustment required as fast idle speed is automatically set when hot (or slow) idle speed is adjusted (same screw controls both settings).

Oldsmobile 88 - As a preliminary adjustment (with carburetor off engine), close choke valve and place fast idle screw on high step of fast idle cam. Adjust fast idle screw for a throttle valve opening of .030" (Gauge BT-121) measured between edge of valve and carburetor bore on side opposite idle adjusting screw. Make final adjustment with carburetor on engine as follows: Connect tachometer, place transmission selector lever in "N" (Neutral) position, then rotate fast idle cam so fast idle screw is on high step of cam. With engine at normal operating temperature, adjust fast idle screw for an engine speed of 1900 RPM. *NOTE - Set engine speed at 2200 RPM for sub-zero operation.*

Choke Rod: Buick (Exc. Special), Oldsmobile F-85 & Pontiac (Exc. Tempest) - Turn idle screw into normal idle position (1½ turns open), then place idle screw on second step of fast idle cam and against shoulder of high step. Distance between upper edge of choke valve and wall of air horn should be as indicated in table (see below). To adjust, bend counterweight tang.

Buick Special, Chevrolet, Oldsmobile 88 & Pontiac Tempest - Position fast idle screw (Oldsmobile 88), idle speed screw (others), on second step of fast idle cam, then close choke valve until screw is against shoulder of high step. *NOTE - On Oldsmobile 88, press up on intermediate choke lever and make sure that intermediate rod is at end of slot in intermediate lever.* In this position, choke valve opening, or clearance between upper edge of choke valve and air horn wall should be as indicated in table (see below). To adjust, bend choke lever tang (Exc. Oldsmobile 88); choke rod (Oldsmobile 88).

Choke Rod Setting

Car & Carb.	Choke Valve Opening	Checking Gauge
Buick (Exc. Special)	.036"	BT-185
Buick Special	.052"	BT-190
Chevrolet Pass.	.089"	BT-108
Oldsmobile 88	.150"	BT-159
Oldsmobile F-85	.082"	BT-191
Pontiac 7019070,71,72,73	.080"	BT-195
Pontiac 7019060,74,75,76,77	.056"	BT-167
Pontiac Tempest	.052"	BT-190

Unloader (2GC Carburetors): Move throttle valves to wide open position (see Pontiac Note below) so that choke valve is partially open. Measure the choke valve opening or clearance between upper edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever using bending tool BT-69.

PONTIAC CHECKING NOTE - It is recommended that the throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in driver's seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. Above procedure will eliminate all variances in linkage, floor mat, or pedal location.

Unloader Setting

Car Model	Choke Valve Opening	Checking Gauge
Buick (Exc. Special)	.081"	BT-186
Buick Special	.157"	BT-189
Chevrolet	.360"	BT-108
Oldsmobile 88	.163"	BT-162
Oldsmobile F-85	ℂ .250"	Use ¼" drill
Pontiac (Exc. Tempest)	.163"	BT-168
Pontiac Tempest	.157"	BT-189

℃ - Supersedes previous setting of .160".

OVERHAUL: *See 1960 Annual Data, Page 301, or later Manual edition.*

SERVICE PARTS: Gasket Sets - Rochester No. 7015952 (Carb. No. 7019007, 7019008, 7019018); No. 7015969 (Carb, No. 7015015, 7013011); No. 7015970 (Carb. No. 7015017); No. 7016040 (Carb. No. 7019052, 7019058); No. 7016041 (Carb. No. 7019070, 7019071, 7019072, 7019073); No. 7016140 (Carb. No. 7019076, 7019077); No. 7016141 (Carb. No. 7019093. 7019090, 7019092, 7019095); No. 7016147 (Carb. No. 7019060, 7019074, 7019075); No. 7016152 (Carb. No. 7019042); No. 7016141 (Carb. No. 7019863, 7019860).

Off-Kar Kit - Rochester No. TR-100 (Carb. No. 7019042); No. TR-304 (Carb. No. 7019007, 7019008, 7019018); No. TR-305 (Carb. No. 7013011, 7015015); No. TR-508 (Carb. No. 7019093, 7019090, 7019092, 7019095, 7019863, 7019860); No. TR-509 (Carb. No. 7019052, 7019058); No. TR-610 (Carb. No. 7019076, 7019077); No. TR-612 (Carb. No. 7019060); No. TR-614 (Carb. No. 7019070, 7019071, 7019072, 7019073); No. TR-615 (Carb. No. 7019074, 7019075).

Repair Kit - Rochester No. 7015924 (Carb. No. 7019007); No. 7015926 (Carb. No. 7015015, 7013011); No. 7015932 (Carb. No. 7015017); No. 7015951 (Carb. No. 7019008, 7019018); No. 7016120 (Carb. No. 7019060); No. 7016121 (Carb. No. 7019076, 7019077); No. 7016126 (Carb. No. 7019060, 7019863, 7019860); No. 7016127 (Carb. No. 7019092, 7019093, 7019095); No. 7016132 (Carb. No. 7019042); No. 7016135 (Carb. No. 7019052, 7019058); No. 7016137 (Carb. No. 7019070, 7019071, 7019072, 7019073); No. 7016138 (Carb. No. 7019074, 7019075).

Form 9-A

1961 ROCHESTER TRIPLE CARBURETORS

CHEVROLET (348" ENGINE)	Rochester Carb. No.
Synchro-mesh Cars (Standard Engine)	
Front	2G 7013015
Center	2GC 7013020
Rear	2G 7013017
Synchro-mesh Cars (High Perf. Engine)	
Front	2G 7013973
Center	2GC 7013974
Rear	2G 7013975
Automatic Transmission Cars	
Front	2G 7013015
Center (No Air Cond.)	2GC 7013016
Center (With Air Cond.)	2GC 7013026
Rear	2G 7013017
PONTIAC	
Synchro-mesh Cars	
Front	2G 7013063
Center	2GC 7019064
Rear	2G 7013065
Automatic Transmission Cars	
Front	2G 7013063
Center (3-Spd. Hydra-Matic)	2GC 7019069
Center (4-Spd. Hydra-Matic)	2GC 7019067
Rear	2G 7013065

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 PONTIAC (EARLY) THROTTLE ROD INSTALLATION CHANGE FOR IMPROVED COLD STARTING:* If throttle rod is attached in top hole of carburetor throttle lever, change it to the middle hole. Cars built after Oct. 10, 1960 have the throttle rod installed in middle hole during production.

►*1961 PONTIAC 7013063 & 7013065 CARBURETORS FLOODING CORRECTION & PRODUCTION CHANGE:* On early carburetors with "flat" type bowl cover–to–float bowl gasket, install later type "domed" gasket, Part No. 7021007. This new gasket increases clearance between top of float and bowl cover.

DESCRIPTION: Carburetor design is same as used on previous models.

ADJUSTMENTS: Idle Speed & Mixture - *CAUTION - Make sure that front and rear carburetor throttle valves are fully closed.* With engine at normal operating temperature, automatic choke not operating (choke valve wide open and fast idle inoperative so engine idles at hot or slow idle speed), and transmission selector lever in "D" (Drive) range on automatic transmission cars, proceed as follows: *NOTE - Carburetor air cleaner must be installed.* Set idle speed to correct engine RPM (see table below). Turn one idle mixture screw in or out to obtain highest vacuum and engine RPM, then repeat with other idle mixture screw (center carburetor only). Reset engine idle speed, then readjust idle mixture screws until highest engine RPM and smoothest idle is obtained with the highest vacuum.

►*IDLE SPEED ADJUSTMENT NOTE (Carburetors With Idle Compensator):* **This valve must be closed when idle speed is adjusted.** Press in on button located in in idle compensator cover plate to hold valve closed during idle speed adjustment.

Idle Speed Setting

Car Model	Synchro-mesh Trans.	Automatic Trans.
Chevrolet (Std. Engine) ①	475 RPM	③450 RPM
Chevrolet (High Perf. Eng.) ①	600 RPM	③600 RPM
Pontiac (No Air Cond.)	480-500 RPM	③480-500 RPM
Pontiac (With Air Cond.) ②	540-560 RPM	③540-560 RPM

① - With Air Conditioner turned "ON".
② - With Air Conditioner turned "OFF".
③ - Transmission selector lever in "D" Drive Range.

Throttle Return Check Adjustment: *See CARBURETOR on car model pages.*

Float Level: *CAUTION - Two separate adjustments (Float Level & Float Drop) required. Float level adjusted differently on Chevrolet as detailed below.*

Float Level Setting (Chevrolet) - Remove and invert bowl cover and float assembly but do not remove cover gasket. Install correct float gauge (see table below) over float next to power piston stem. Top of float should just clear top edge of gauge cutout and sides of float should be parallel to gauge legs. Adjust by bending float hinge arm.

Float Level Setting (Pontiac) - Remove and invert float bowl cover and float assembly but do not remove cover gasket. Install correct float gauge (see table below) on cover gasket at free end of float with longer leg of gauge "T" seating squarely on gasket. Edge of seam on float should just clear upper edge of gauge. Adjust by bending float hinge arm near hinge pin.

Float Level Setting

Car & Carb.	Float Level	Checking Gauge
Chevrolet (End Carbs.)	1 27/64"	BT-157
Chevrolet (Center Carb.)	1 21/64"	BT-153
Pontiac (All Carbs.)	23/32"	BT-175

Float Drop Setting (All Models) - Hold bowl cover and float assembly upright so float hangs down at bottom of travel. Measure distance from lower face of cover gasket to bottom of float at free end using a scale or the float level gauge (with end of longer leg of gauge against gasket bottom of float should be even with scribed line on gauge). Adjust by bending tang on rear of float arm toward intake needle seat to decrease drop or away from needle seat to increase drop.

Float Drop Setting

Car Model	Float Drop	Checking Gauge
Chevrolet (All)	1 29/32"	BT-157
Pontiac (All)	1 3/4" Min.	BT-175

Accelerating Pump Rod: *CAUTION - This is a linkage adjustment and not a seasonal setting.* With throttle valves completely closed (throttle stopscrew and fast idle screw backed off on center carburetor), check distance from top of air horn or pump housing to top of pump connector rod as follows: On Chevrolet, invert float gauge (see table below) and place gauge on top of pump housing on air horn with extended leg of gauge down toward pump connector rod. On Pontiac, place float gauge squarely across top edge of air cleaner ring on air horn with "Pump" end of gauge "T" down toward connector rod. On all models, end of gauge should just touch top of pump connector rod. Adjust by bending pump connector rod.

Accelerating Pump Rod Setting

Car Model	Setting	Checking Gauge
Chevrolet (All)	15/16"	BT-157
Pontiac (Center Carb.)	1 1/8"	BT-175
Pontiac (End Carbs.)	55/64"	BT-175

Idle Vent (Pontiac Cent r Carb.): *NOTE - Adjust only after Accelerating Pump Rod Setting has been checked and adjusted.* Use same gauge installed in same manner as for pump rod setting check (above) except that gauge should be inverted so that leg marked "Vent" is down toward connector rod. Slowly open throttle valves to point where vent valve just closes (rubber valve seats on pump housing on air horn). At this point, top of connector rod should just touch end of gauge. Adjust by bending tang on pump lever which contacts vent valve arm. Vent setting should be 1 1/32" (Gauge BT-175).

Vacuum Switch Setting (Center Carb.): *Check and adjust each model as follows:*

Chevrolet - With throttle valves completely closed and actuating post in vacuum switch in extreme "up" position, clearance between tang on pump lever and vacuum switch actuating post should be 1/32". Adjust by loosening switch retaining screws and moving switch assembly up or down as required. Tighten retaining screws.

Pontiac - With throttle valves wide open, measure distance from top of switch housing to top of sliding switch post. This distance should be 1 3/32". To adjust, loosen two switch retaining screws holding switch on bracket, then move switch up or down as required. Check adjustment by opening and closing throttle valves with sliding switch post in upward position. Inside edge of vacuum switch closing tang must clear side of switch post.

Automatic Choke (Center Carb.): Adjust by loosening choke cover retaining screws and rotating cover thermostatic coil assembly. Center setting is with scribed index mark on cover in line with center mark on housing. *NOTE* - With this setting, choke valve should be lightly closed at 75°F.

Automatic Choke Setting

All Models	Centered (At Index)

Fast Idle Setting: *NOTE - Chevrolet & Pontiac fast idle adjustment will be correct after "slow idle" speed and choke rod adjustments have been made (see below).*

Choke Rod (Center Carb.): Place idle screw on second step of fast idle cam next to high step. With choke trip lever in contact with choke counterweight lever, clearance between upper edge of choke valve and air horn wall should be as indicated in table below. To adjust, bend tang on choke counterweight.

Choke Rod Setting

Car Model	Clearance	Checking Gauge
Chevrolet	.089"	BT-108
Pontiac	.056"	BT-167

Unloader (Center Carburetor): With throttle valves held wide open, clearance between upper edge of choke valve and side of air horn wall should be as indicated in table below. To adjust, bend tang on throttle lever as necessary to obtain correct clearance.

►*PONTIAC CHECKING NOTE:* It is recommended that the throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in drivers seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. Above procedure will eliminate all variances in linkage, floor mat, or pedal location.

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1961 ROCHESTER TRIPLE CARBURETORS (C nt.)

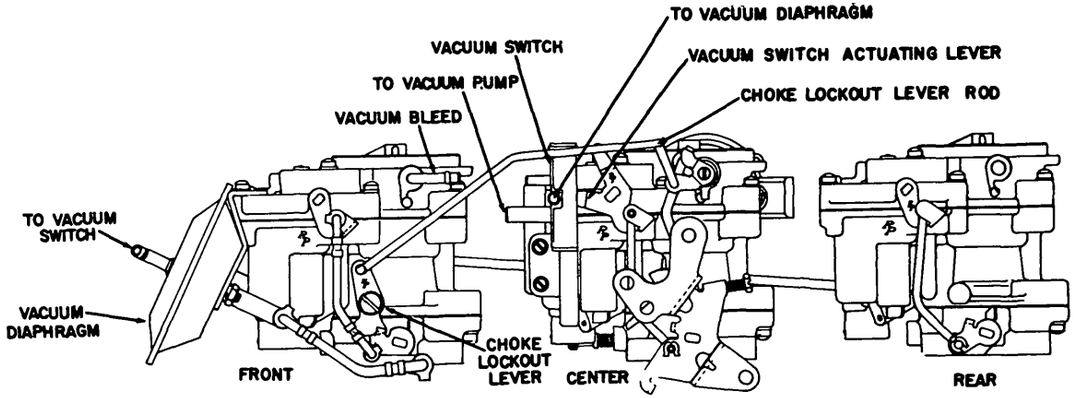
Car Model	Unloader Setting Clearance	Checking Gauge
Chevrolet	.360"	BT-108
Pontiac	.163" ①	BT-168

① - .143-.183" permissible.

Ch ke Lockout (Chevrolet): *NOTE - This adjustment n t required on Pontiac models as the end carburetors ar locked out by temperature controlled vacuum valve.* This adjustment will insure that end carburetors are locked out and center carburetor only will operate during automatic choke operation. To check setting, hold choke valve (center carburetor) in wide open position, hold throttle valves in front carburetor slightly open, then measure clearance between lockout lever and throttle lever on front carburetor, This clearance should be .030". Adjust by bending lockout rod.

Ch ke Lockout Lever Contour (Chevrolet): Hold throttle valves in front carburetor completely closed. With choke valve on center carburetor completely closed and lockout lever rod connected, clearance between contoured portion of lockout lever and tang on throttle lever of front carburetor should be .015". Adjust by bending tang on throttle lever up or down as required.

Throttle Linkage (Front-to-Rear Carburetors): Disconnect throttle rod at rear carburetor throttle lever. With front and rear carburetor throttle valves completely closed, throttle rod end should center in slot in the throttle lever. Adjust by bending rod at existing bend, then connect rod.



ROCHESTER TRIPLE CARBURETOR INSTALLATION (TYPICAL)

Vacuum Diaphragm Link: With end carburetor throttle valves completely closed and vacuum diaphragm stem fully extended, end of vacuum unit actuating link should fit freely in hole in throttle lever on front carburetor. Adjust by bending actuating link.

OVERHAUL: *See 1960 Annual Data, Page 301, or later manual edition.*

SERVICE PARTS: Gasket Sets – Rochester Part No. 7015956 (Carb. No. 7013026); No. 7015957 (Carb. No. 7013063, 7013065); No. 7015972 (Carb. No. 7013015, 7013017); No. 7015973 (Carb. No. 7013016, 7013020); No. 7016146 (Carb. No. 7013064); No. 7016148 (Carb. No. 7019067, 7019069).

Off-Kar Kit – Rochester Part No. TR–607 (Carb. No. 7013026, 7013065); No. TR–611 (Carb. No. 7013063); No. TR–613 (Carb. No. 7019067, 7019069).

Repair Kit – Rochester Part No. 7015923 (Carb. No. 7013016, 7013020, 7013974); No. 7015939 (Carb. No. 7013063, 7013065); No. 7013953 (Carb. No. 7013026); No. 7015971 (Carb. No. 7013015, 7013017); No. 7016124 (Carb. No. 7019067, 7019069); No. 7016125 (Carb. No. 7013064).

ROCHESTER "H" CORVAIR CARBURETOR

CORVAIR PASS. CARS & TRUCKS	Rochester Carb. No.
Std. Eng., Synchro–mesh (Early)	7019101
Std. Eng., Synchro–mesh (Late)	7019111
Std. Eng., Powerglide (Early)	7019100
Std. Eng., Powerglide (Late)	7019110
High Perf. Eng. (Early)	7019107
High Perf. Eng. (Late)	7019117

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 CORVAIR (ALL SERIES) ERRATIC IDLE OR PERIODIC MISS CORRECTION:* If smooth idle not obtained after correct adjustment of accelerator linkage and carburetor synchronization (with correct fast idle setting of .045"), drill throttle plates as follows: Remove carburetors from engine and drill a 1/16" hole (80 HP Eng.); 3/32" hole (98 HP Eng.) in each throttle plate ¼" from edge in vicinity of carburetor idle air bleed passage (see illustration below for exact location). *NOTE – It is not necessary to remove throttle plates for drilling.* Clean burrs from drilled holes and blow out throttle bore with air. Reinstall carburetor, check synchronization and fuel mixture.

►*1961 CORVAIR ENGINE SURGE CORRECTION (CARB. NOS. 7019100 & 7019107):* On Carburetor No. 7019100, install Main Metering jet, Part No. 7002650 and Venturi Cluster, Part No. 7020344 to replace the original parts. On Carburetor No. 7019107, install Main Metering Jet, Part No. 7002651, Venturi Cluster, Part Nq. 7020342, Cluster Gasket, Part No. 7020195, and Main Well Insert, Part No. 7009212.

►*1961 FAST IDLE SETTING SPECIFICATION CHANGE:* Fast idle setting (clearance between fast idle speed screw and tang on throttle lever) has been changed from .030" (Synchro–mesh); .010" (Powerglide), to .045" for all carburetors. This increased clearance will correct excessive fast idle speed during engine warm–up.

►*1961 CORVAIR FLAT SPOT ON ACCELERATION CORRECTION (CARB. NO. 7019100):* If this condition exists on carburetors with two holes in accelerating pump actuating lever, check to see if pump is on index (scribe mark on accelerator pump shaft lever in line with cast tang on carburetor bowl cover). If pump is on index, proceed as follows to correctly adjust pump stroke: Disconnect pump rod from inboard hole in lever and connect rod to outboard hole, then bend pump rod to align index mark with cast tang. Disconnect rod from outboard hole and connect to inboard hole of lever. *Index markings should then be disregarded. DO NOT RE–INDEX.*

DESCRIPTION: Single barrel downdraft type with manual choke assembly. Similar to design of previous models.

ADJUSTMENTS: Make all adjustments in the order indicated below.

Synchronizing Carburetors & Final Idle Speed, Fast Idle, & Mixture Adjustments: *See CARBURETOR on car model page.*

Initial Adjustments: *NOTE – For final adjustments and carburetor synchronizing, see CARBURETOR on car mod l pag .*

Idl Sp d – Place a .003" feeler gauge between idle speed screw and carburetor throttle shaft lever, then turn screw in until it just contacts gauge. Remove gauge and turn screw in 1½ additional turns.

Fast Idle – With choke valve fully open, place a .045" feeler gauge between fast idle screw and tang on throttle lever, then turn fast idle screw in until it just contacts gauge.

Idle Mixture – 1½ turns open from a lightly seated position.

Idle Speed (Final): The idle speeds indicated in table below are the final engine speeds which should be obtained after carburetors have been properly synchronized.

Engine	Idle Speed Final S tting Synchr –m sh	①Aut . Trans.
80 HP Eng	500 RPM	500 RPM
98 HP Eng	600 RPM	500 RPM
All (With Air Cond.)	② 650 RPM	②650 RPM

① – Transmission selector lever in "D" (Drive).
② – Air Conditioner turned OFF.

Fast Idle Speed (Final): *NOTE – Sam as for "initial adjustment".* With choke valve fully open, place a .045" feeler gauge (supersedes previous .010" & .030" settings for auto. trans. and synchro–mesh respectively) between fast idle screw and tang on throttle lever, then turn fast idle screw in until it just contacts gauge.

Float Level: With bowl cover inverted, gasket in place, distance from top of float (at highest point) to gasket on bowl cover should be 1 13/64" (Gauge BT–174). *NOTE – Floats must be parall l within 1/32" and must be centered between gaug l gs.* To adjust, bend float tang.

Fl at Drop: With bowl cover held upright and float hanging free, distance between cover gasket and bottom

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ROCHESTER "H" CORVAIR CARBURETOR (C nt.)

of float (at free end) should be 1¼". To adjust, bend tang at end of float hinge arm.

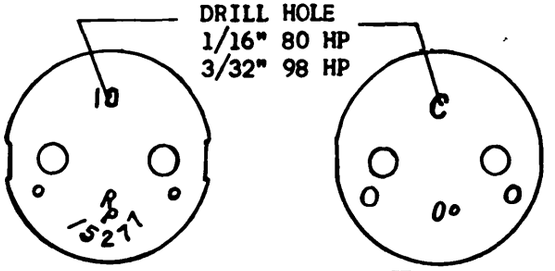
Pump R d: Back off idle speed screw until throttle valve is completely closed, then while holding throttle valve closed, check to see that scribe mark on accelerator pump lever is aligned with the mark cast into bowl cover. To adjust, bend pump rod at lower end.

► *1961 CORVAIR FLAT SPOT ON ACCELERATION CORRECTION (CARB. NO. 7019100): See "Changes, Cautions, Corr ctions" above.*

OVERHAUL: Disass mbly – Disconnect pump rod from pump lever, then remove fuel inlet nut, gasket, filter element, and spring. Remove bowl cover assembly and gasket (note location of the two longer screws on either side of accelerator pump). Remove floats and float needle. If necessary, needle seat and gasket may be removed with a large screwdriver. To remove accelerator pump, remove "C" clip, then remove shaft and lever. Remove two screws attaching venturi cluster to bowl assembly and lift out cluster, gasket and main well insert. Remove pump discharge valve, idle mixture adjusting screw and spring. If necessary, remove choke valve retaining screws and slide choke valve out of shaft. Remove choke shaft, spring, choke lever and throttle kick cam from air horn. Remove fast idle cam attaching screw, spring and throttle kick lever. If necessary, remove throttle valve retaining screws and remove throttle valve and shaft assembly.

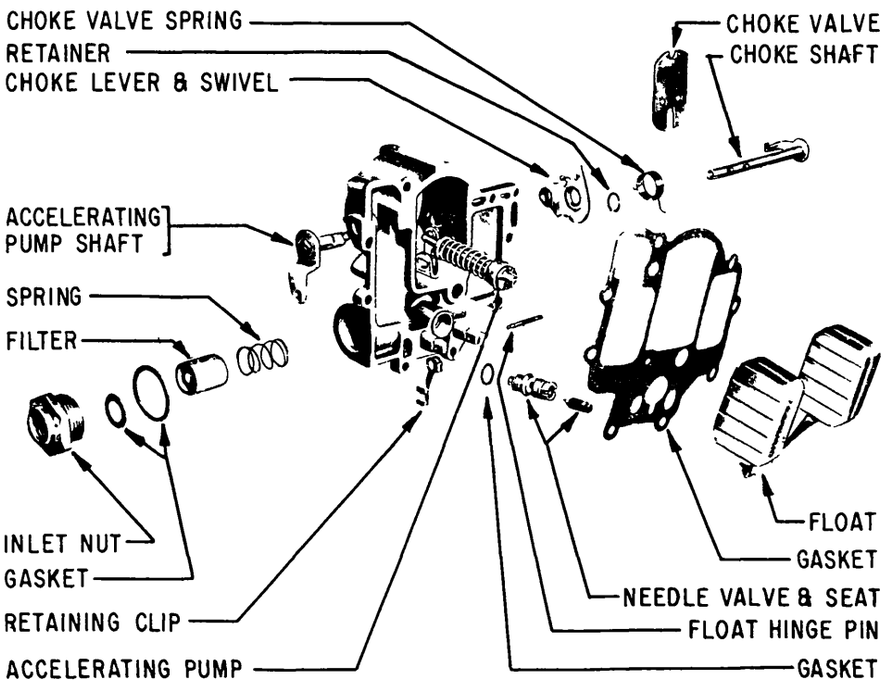
Inspection: Clean all parts in solvent or carburetor cleaner (do not immerse pump plunger or gaskets in carburetor cleaner). Blow out all passages with air. Check all parts for wear and replace as necessary. Check to see that main well tube is not bent. It should be exactly 90° from body.

Reassembly: Install throttle shaft and valve, if removed, carefully centering valve in bore. Replace main well insert, venturi cluster and gasket in bowl assembly and install the two screws and lockwashers. *NOTE*–Holes in main well insert must be aligned with holes in main well tube. Install accelerating pump and "C" clip, making sure that return spring is in place in bowl assembly. Install pump discharge valve. Replace needle. seat and float needle, float, pin, and new gasket, then adjust float level and float drop. Replace filter, gasket, and inlet nut. With a new gasket installed on bowl cover assembly, install cover assembly on bowl. Install six screws and lockwashers (install the two longer screws in original positions on either side of accelerating pump). Install pump and pump rod lever and secure with clip.

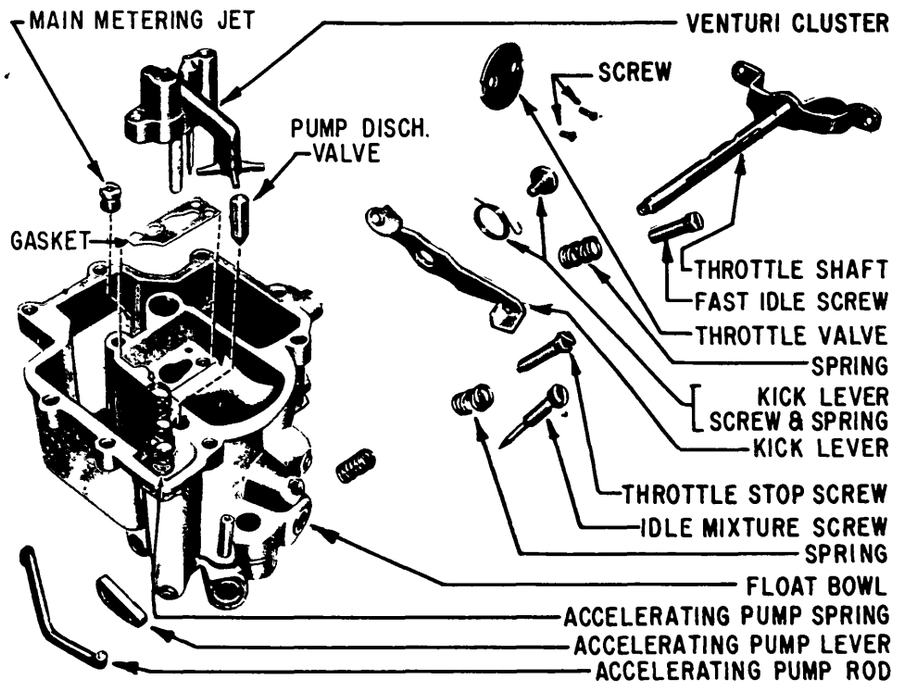


THROTTLE VALVE PLATES

SERVICE PARTS: Gasket Sets – Rochester No. 7016149 (All Carbs.).
Off-Kar Kit – Rochester No. SR–305 (All Carbs.).
Repair Kit – Rochester No. 7016136 (All Carbs.).



ROCHESTER "H" CARBURETOR COVER ASSEMBLY



ROCHESTER "H" CARBURETOR COVER ASSEMBLY

ROCHESTER "B" & "BC"

CHEVROLET PASS. CARS	Rochester Carb. No.
1961 6 Cyl. Synchro–mesh (Std.)	7013003
1961 6 Cyl. Synchro–mesh (Gov.)	7013005
1961 6 Cyl. Synchro–mesh (Econ.)	7013955
1961 6 Cyl. Powerglide (Std.)	7019000
1961 6 Cyl. Powerglide (Gov.)	7012502
1961 6 Cyl. Powerglide (Econ.)	7013956
Service Replacement (7013003)	7015911
Service Replacement (7013955)	7015975
Service Replacement (7019000)	7015902
Service Replacement (7013956)	7015974
CHEVROLET TRUCKS	
1961 6 Cyl. 235" Eng. All Trans.(Std.)	7015011
1961 6 Cyl. 235" Eng. Economy	7015021
1961 6 Cyl. 261" Eng. All Trans	7015013
Service Replacement (7015011)	7016001
Service Replacement (7015021)	7016003
Service Replacement (7015013)	7016004
PONTIAC TEMPEST	
1961 4 Cyl. Synchro–mesh	7019061
1961 4 Cyl. Auto. Trans.	7019062
Service Replacement (7019061)	7016116
Service Replacement (7019062)	7016117

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 CHEVROLET PASS. CAR INCONSISTENT AUTOMATIC CHOKE "COME–OFF" DURING ENGINE WARM–UP CORRECTION:* Install later type choke piston, Part No. 7020438, identified by a distance of 9/32" between lever pin hole and shoulder on piston (this measurement on early pistons was 7/32"). Carburetors stamped "A" or later on brass identification tag have the above change made in production.

DESCRIPTION: Single barrel downdraft carburetor with manual choke control (Model B), automatic choke (Model BC). Design is similar to previous carburetors except that the Model B carburetor used on Pontiac Tempest has an adjustable positive idle stop (eccentric washer).

►*FUEL STRAINER NOTE:* Strainer screen (under fuel inlet fitting nut) can be removed for cleaning. Replace filter every 15,000 miles or sooner if needed.

ADJUSTMENTS: Make all adjustments exactly as detailed below.

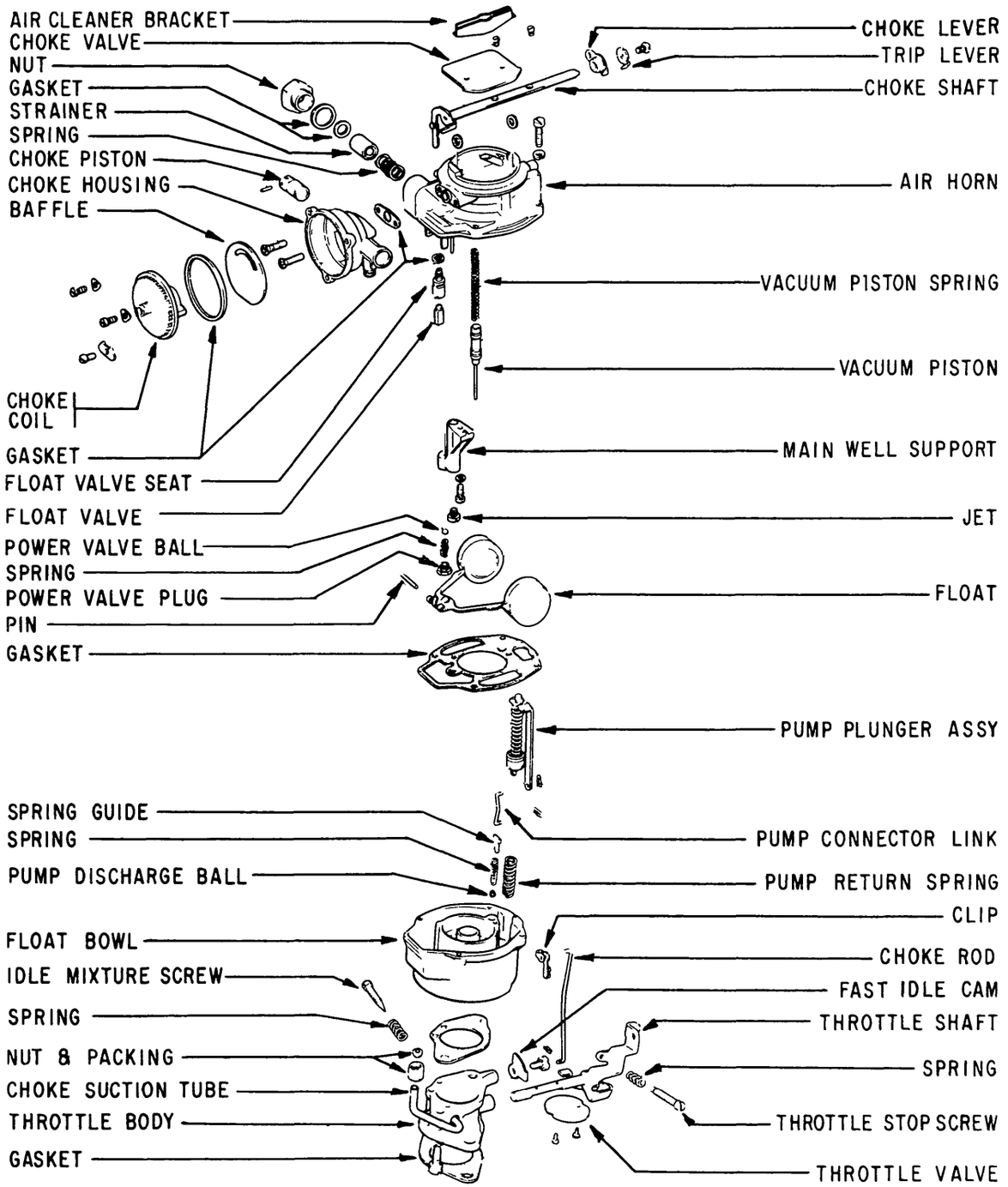
Idling Adjustment: If preliminary setting is required to warm up engine, turn idle mixture screw in until lightly seated, then back screw out correct number of turns (see table below). Start engine and allow to idle until normal operating temperature is reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature and idling at correct speed (see below), turn idle mixture adjusting screw in or out until smoothest engine performance is secured. Recheck idle speed.

Idle Mixture Setting

Car Model	Idle Screw Opening
Chevrolet Pass	1½ turns
Chevrolet Truck	1½–2½ turns
Pontiac Tempest	1½ turns

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ROCHESTER "BC" CARBURETOR (TYPICAL)

ROCHESTER "B" & "BC" (C ntinu d)

Idle Speed - With engine at normal operating temperature, adjust throttle stopscrew for correct idling speed as listed below (*CAUTION* - On "BC" carburetors, stopscrew must be resting on lowest step of fast idle cam when adjustment being made)

Idl Speed Setting

Car M d l	Synchro–mesh	Auto. Trans.
Chevrolet Pass.	475 RPM	①450 RPM
Chevrolet Trucks	475 RPM	①450 RPM
Pontiac Tempest	③680–700 RPM	①②580–600RPM

① – Automatic transmission in "D" (Drive).
② – 630–650 RPM on Air Conditioned Cars.
③ – Air Conditioner turned off.

Throttle Return Check (Pontiac "BC" Carbs.): *See CARBURETOR on car model page.*

Float Level *CAUTION - Two separate adjustments required as follows*

1) Fl at L vel S tting - *CAUTION - When removing air horn and bowl cover on 'BC' carburetors, disconnect heat suction tube at upper coupling nut and use care not to disturb seal at lower end of tube* Invert bowl cover and float assembly but DO NOT remove cover gasket Install gauge (see table below) over floats with center tang on gauge in main discharge nozzle on cover Bend float arms **v rtically** so that each float just touches top of cut-out in gauge, bend arms **horizontally** so that each float is centered in gauge cut-out Check setting by tilting assembly 90° to each side to make certain that floats do not touch gauge *(CAUTION* - This setting necessary to insure that floats will not rub on sides of float bowl).

Fl at Level Setting

Mod l	Ch cking Gauge	Float Setting
All Carbs	③ M-250	1 9/32"

③ – Chevrolet No. 3696192. Pontiac No. J–9190.

2) Fl at Drop S tting - Hold bowl cover assembly upright so that floats drop down to limit of travel Measure distance from lower face of gasket on cover to bottom of floats at center using a scale This distance should be 1¾" (All Carburetors) Adjust by bending tang at rear of float assembly

P sitive Idl Stop Eccentric (Pontiac Tempest Manual Chok Carbs.): *NOTE – Not necessary to adjust unless eccentric becomes loose or is removed.* With choke valve wide open, rotate eccentric washer to a position where a clearance of 001–.006" is maintained between upper end of "kick–lever" and the "kick–cam". Secure eccentric washer in place with screw.

Fast Idl ("BC" Carburetors) *NOTE* - Fast idle speed is automatically set when hot or slow idle speed is adjusted (same screw controls both settings) Adjust fast idle cam position as follows

Fast Idl Cam P siti n - Rotate fast idle cam until throttle stopscrew is on second (next to highest) step of cam and against the shoulder of the highest step Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below) If clearance not correct, adjust by bending choke connector rod at central angle using bending tool BT–18.

Fast Idle Cam Setting

Car & Carb.	Choke Opening	Checking Gauge
Chevrolet "BC" Carbs	.040"	BT–102
Pontiac "BC" Carbs	.081"	BT–193

Unloader ("BC" Carburetors)· Open throttle valves to wide open position which will open choke valve slightly Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below) If clearance not correct, adjust by bending tang on throttle lever which contacts fast idle cam with bending tool BT–69.

Unloader Setting

Car & Carb.	Choke Opening	Checking Gauge
Chevrolet "BC" Carbs	230"	BT–99
Pontiac Tempest "BC" Carbs	161"	BT–195

Automatic Choke· Adjust by loosening three retainer screws on choke cover and rotating cover and coil assembly Centered setting is with scribed index mark on cover in line with longest (center) cast mark of scale on housing

Choke Setting

Model	Choke Setting
Chevrolet Pass. (Synchro–mesh)	1 notch rich
Chevrolet Pass. (Auto. Trans. Exc. Gov.)	2 notches rich
Chevrolet Pass. (Auto. Trans. & Gov.)	Centered (At Index)
Pontiac Tempest (All Trans.)	① 2 notches rich

① – Supersedes previous setting at index.

OVERHAUL: Disassembly – On manual choke carburetors, remove choke control bracket and air horn attaching screws, then hold throttle kicker in vertical position (free of cam) and lift bowl cover assembly off fuel bowl being careful not to damage floats. *NOTE – It is not necessary to remove eccentric washer (positive throttle stop) on Pontiac carburetors.* On automatic choke carburetors, disconnect choke heat suction tube at choke housing, then remove choke coil cover assembly, gasket and baffle plate. *CAUTION – Do not disconnect choke heat suction tube from throttle body.* On Pontiac automatic choke carburetors, remove throttle return check and bracket. On all automatic choke carburetors, remove fast idle connector rod, and retaining screw on opposite end of choke shaft, then remove choke trip lever, washer and counterweight. Remove choke valve screws and remove valve, then rotate shaft until vacuum piston clears housing bore and remove shaft assembly from air horn. Remove air horn, being careful not to damage floats. On manual choke carburetors, remove choke valve screws and valve, then remove retaining ring from groove in shaft boss and slide shaft, spring, and lever assembly out of air horn. Remove throttle kicker, lever and spring. On all carburetors, hold pump plunger down in cylinder and remove retainer from pump link, then remove link from throttle lever and plunger and lift plunger from bowl. Remove plunger spring and ball check from bottom of pump cylinder. Turn pump discharge guide until it can be removed, then remove discharge spring and ball by inverting the assembly. Remove throttle body, idle mixture screw and spring. On automatic choke carburetors, remove fast idle cam. On all carburetors, remove float hinge pin from air horn and remove float assembly, then remove needle seat and gasket. Remove main metering jet and power valve from main well support, being careful not to lose check ball and spring when removing power valve. Remove main well attaching screw, support, and gasket, then remove power piston and spring. *CAUTION – Do not remove idle tube which is pressed into air horn ass mbly.*

►*THROTTLE VALVE ASSEMBLY CAUTION: Do not remove throttle valve. If throttle valve assembly is damaged or worn, replace complete throttle body assembly.*

Cleaning & Inspection: Wash all parts except choke coil housing and pump plunger in carburetor cleaning solvent and blow dry with air. Blow out all passages with air and inspect for carbon deposits. Inspect all parts for wear or damage.

Reassembly: Reverse disassembly procedure and note the following

Choke Valve – Install choke valve with "RP" mark on valve toward top of carburetor.

Pump Intake Ball Check – If ball check is aluminum, install ball in bottom of pump cylinder and see that it lifts freely from its seat.

►*HEAT SUCTION TUBE SERVICING NOTE:* If tightening of loose seal with Tool BT–45 does not correct leakage, install new seal as follows. With carburetor fully assembled, loosen throttle body–to–bowl casting screws, then insert flared end of heat suction tube into hole in throttle body and tap seal lightly into position with Tool BT–45. Rotate tube while tapping to insure starting uniformly into throttle body. Tighten coupling nut at upper end of tube finger tight, using new packing on tube. Use a light hammer and Tool BT–45 to spread seal securely in throttle body (rotate tool to secure uniform spreading of seal). Loosen coupling nut at upper end of tube and check tube tightness in throttle body (tube should not turn). Tighten coupling nut securely, then tighten throttle body–to–bowl casting screws. Check seal for leaks after carburetor installed on engine.

SERVICE PARTS: Gasket Sets – Rochester No. 7015965 (Carb. No. 7015011, 7015021), No. 7006126 (Carb. No. 7015013), No. 7015966 (Carb. No. 7013003, 7013005, 7013955, 7019000, 7013956), No. 7016142 (Carb. No. 7019061, 7019062).

Off–Kar Kits–Rochester No. SR–302 (Carb. No. 7013003, 7013005, 7013955, 7019000, 7013956), No. SR–603 (Carb. No. 7019061, 7019062).

R pair Kits–Rochester No. 7009312 (Carb. No. 7015013), No. 7015936 (Carb. No. 7013003, 7013005, 7019000), No. 7015964 (Carb. No. 7015011, 7015021), No. 7016128 (Carb. No. 7019061), No. 7016129 (Carb. No. 7019062).

1961 ROCHESTER SINGLE DUAL & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. N.		Mdl	Main Mtring Jet Siz	Part N.	Venturi Cluster	Main Well Support	Pwr Valv	Pwr Piston & Spring	Pump Assembly	Float Needl & Seat
7012502		BC	.054"	7002954	.....	7011493	7006121	7010002	7010012	7002359
7013003		BC	.057"	7002957	.....	7013609	7006121	7010002	7010012	7002359
7013005		BC	.057"	7002957	.....	7013609	7006121	7010002	7010012	7002359
7013011		2G	.060"	7001860	7012486	.....	7010918	7006323	7009353	7012524
7013015		2G	.060"	7002960	7013895	.....	.....	.....	7012456	.....
7013016		2GC	.060"	7002660	7013896	.....	7011989	7006323	7005032	.....
7013017		2G	.060"	7002960	7013895	.....	.....	.....	7012456	.....
7013020		2GC	.063"	7002663	7013894	.....	7011989	7006323	7005032	.....
7013026		2GC	.060"	7002660	7013896	.....	7011989	7006323	7005032	.....
7013063		2G	.066"	7008666	7013381	.....	.....	.....	7019519	7013787
7013065		2G	.066"	7008666	7013381	.....	.....	.....	7019519	7013787
7013955		BC	.042"	7002642	.....	7015291	7002360	7010002	7010012	7002359
7013956		BC	.042"	7002642	.....	7015291	7002360	7010002	7010012	7002359
7013973		2G	.063"	7008663	7016072	.....	.....	.....	7012432	7012603
7013974		2GC	.060"	7002960	7015896	.....	7011989	7006321	7012432	7012603
7013975		2G	.062"	7008662	7016072	.....	.....	.....	7012432	7012603
7015010	Pri.	4GC	.047"	7002647	7012191	.....	7011989	7009718	7000208	7012144
	Sec.		.098"	7001498	7012260	.....	.....	.....	.....	7012144
7015011		B	.060"	7001860	.....	7016884	.....	7005601	7002091	7002359
7015012	Pri.	4GC	.056"	7002656	7013674	.....	7011989	7009718	7011392	7012144
	Sec.		.067"	7008667	7013662	.....	.....	.....	.....	7012144
7015013		B	.064"	7002964	.....	7016883	.....	7005601	7002091	7002359
7015015		2G	.060"	7001860	7012486	.....	7010918	7006323	7009353	7012524
7015017		2G	.054"	7002954	7016695	.....	7010918	7006323	7009353	7012524
7015021		B	.043"	7002943	.....	7015198	.....	7005601	7002091	7002359
7019000		BC	.056"	7002956	.....	7019736	7006121	7010002	7010012	7002359
7019004	Pri.	4GC	.047"	7002647	7012191	.....	7011989	7009718	7000208	7012144
	Sec.		.098"	7001498	7012260	.....	.....	.....	.....	7012144
7019006	Pri.	4GC	.056"	7002656	7013674	.....	7011989	7009718	7011392	7012144
	Sec.		.068"	7008668	7013662	.....	.....	.....	.....	7012144
7019007		2GC	.058"	7002958	7013635	.....	7006381	7006323	7019162	7012524
7019008		2GC	.060"	7001860	7013640	.....	7006381	7020296	7019164	7012524
7019010	Pri.	4GC	.049"	7002949	7020565	.....	7011989	7009718	7000208	7012144
	Sec.		.056"	7002656	7013662	.....	.....	.....	.....	7012144
7019014	Pri.	4GC	.049"	7002949	7020565	.....	7011989	7009718	7000208	7012144
	Sec.		.056"	7002656	7013662	.....	.....	.....	.....	7012144
7019018		2GC	.060"	7001860	7013640	.....	7006381	7020296	7019018	7012524
7019030	Pri.	4GC	.058"	7002658	7013909	.....	7010918	7011947	7016986	7012144
	Sec.		.078"	7008678	7015142	.....	.....	.....	.....	7012144
7019031	Pri.	4GC	.058"	7002658	7013909	.....	7010918	7011947	7016986	7012144
	Sec.		.078"	7008678	7015142	.....	.....	.....	.....	7012144
7019040	Pri.	4GC	.052"	7002652	7017411	.....	7010918	7017406	7012417	7012907
	Sec.		.076"	7008676	7013463	.....	.....	.....	.....	7012906
7019042		2GC	.059"	7002659	7019463	.....	7010918	7012266	7015871	7019218
7019050	Pri.	4GC	.056"	7002656	7013785	.....	7011994	7011947	7013472	7012207
	Sec.		.080"	7008680	7013475	.....	.....	.....	.....	7012144

CONTINUED ON NEXT PAGE

1961 ROCHESTER SINGLE DUAL & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.		Model	Main Metering Jet Size Part No.	Venturi Cluster	Main Well Support	Power Valve	Power Piston & Spring	Pump Assembly	Flood Needle & Seat
7019052		2GC	.062" 7008662	7019145	.....	7011989	7006011	7016475	7019932
7019054	Pri.	4GC	.056" 7002656	7013785	.....	7011994	7011947	7013472	7012207
	Sec.		.080" 7008680	7013475	.....	.....	.....	.....	7012144
7019055	Pri.	4GC	.044" 7002644	7020323	.....	7011989	7011947	7020248	7012207
	Sec.		.060" 7008660	7020320	.....	.....	.....	.....	7012144
7019056	Pri.	4GC	.044" 7002644	7020323	.....	7011989	7011947	7020248	7012207
	Sec.		.060" 7008660	7020320	.....	.....	.....	.....	7012144
7019058		2GC	.062" 7008662	7016267	.....	7011989	7006011	7016475	7019932
7019060		2GC	.062" 7008662	7019588	.....	7011989	7006011	7019518	7012253
7019061		B	.058" 7002658	.....	7019782	7006121	7010002	7019828	7002359
7019062		BC	.058" 7002658	.....	7019782	7006121	7010002	7019828	7002359
7019064		2GC	.063" 7008663	7019478	.....	7017950	7011478	7019518	7012602
7019066	Pri.	4GC	.060" 7001860	7019198	.....	.....	.....	7019655	7012144
	Sec.		.069" 7008669	7019201	.....	.....	.....	.....	7012144
7019067		2GC	.062" 7008662	7019746	.....	7011989	7006011	7019518	7012602
7019069		2GC	.062" 7008662	7019746	.....	7011989	7006011	7019518	7012602
7019070		2GC	.061" 7008661	7020456	.....	7011989	7012266	7020584	7012253
7019071		2GC	.061" 7008661	7020456	.....	7011989	7012266	7020584	7012253
7019072		2GC	.061" 7008661	7020456	.....	7011989	7012266	7020584	7012253
7019073		2GC	.061" 7008661	7020456	.....	7011989	7012266	7020584	7012253
7019074		2GC	.061" 7008661	7020457	.....	7011989	7006011	7020585	7012253
7019075		2GC	.061" 7008661	7020457	.....	7011989	7006011	7020585	7012253
7019076		2GC	.061" 7008661	7020457	.....	7011989	7006011	7020585	7012253
7019077		2GC	.061" 7008661	7020457	.....	7011989	7006011	7020585	7012253
7019079	Pri.	4GC	.057" 7002657	7019888	.....	.....	.....	7019655	7012144
	Sec.		.069" 7008669	7020244	.....	.....	.....	.....	7012144
7019090		2GC	.046" 7002946	7019718	.....	7006331	7006323	7015871	7012524
7019092		2GC	.046" 7002646	7019954	.....	7006331	7006323	7019486	7012524
7019093		2GC	.048" 7002948	7019575	.....	7006331	7006323	7019486	7012524
7019095		2GC	.046" 7002646	7019954	.....	7006331	7006323	7019486	7012524
7019100		H	.049" 7002649	7019500	.....	.....	.....	7019457	7015789
7019101		H	.050" 7002650	7019501	.....	.....	.....	7019457	7015789
7019110		H	.049" 7002649	7020342	.....	.....	.....	7019457	7015789
7019111		H	.050" 7002650	7020344	.....	.....	.....	7019457	7015789
7019860		2GC	.046" 7002946	7019574	.....	7006331	7006323	7015871	7012524
7019863		2GC	.046" 7002946	7019574	.....	7006331	7006323	7015871	7012524
7020043	Pri.	4GC	.047" 7002647	7019831	.....	7010918	7020338	7020246	7012906
	Sec.		.098" 7001498	7020332	.....	.....	.....	.....	7012906
7020045	Pri.	4GC	.048" 7002648	7020475	.....	7010918	7020338	7020246	7012906
	Sec.		.107" 7001607	7020332	.....	.....	.....	.....	7012906

1961 STROMBERG "WW" BUICK, DODGE, PLYMOUTH

BUICK	Stromberg Code No.
1961 364" Eng	WW 7–114A
DODGE DART & PLYMOUTH	
1961 V8 318" Eng. (Synchro–mesh)	WW 15–43
1961 V8 318" Eng. (Auto. Trans.)	WW 15–44
1961 V8 318" Eng. (All Trans.) CCV①	WW 15–45

① – Closed crankcase ventilation.

► *1961 DODGE & PLYMOUTH HARD COLD WEATHER START CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke to flush out gum formation.

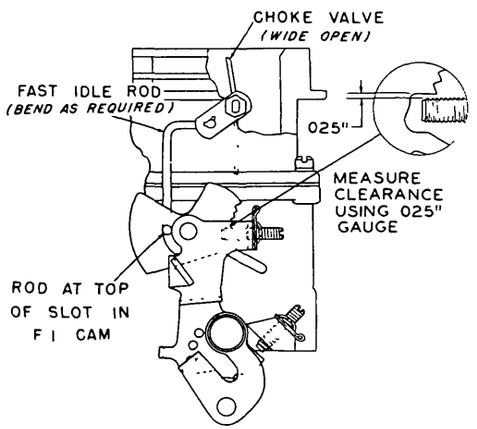
► *1961 DODGE & PLYMOUTH HARD STARTING CORRECTION:* This condition may be caused by interference between air horn and choke lever. When properly positioned, looped end of air cleaner clamp should be on right side approximately 2" to rear of centerline of air cleaner.

DESCRIPTION: Dual downdraft of same design used previously. On Buick, integral choke is mounted on throttle body. On Dodge and Plymouth, automatic choke is "Cross–Over" type mounted in well in intake manifold. On all models, the automatic choke assembly is connected to choke shaft lever by linkage.

ADJUSTMENTS: Make all adjustments as outlined below.

► *1961 DODGE & PLYMOUTH IDLE SETTING CAUTION:* When making Idle Speed & Idle Mixture adjustments, turn headlight high beam on to compensate for alternator load. On automatic transmission cars, loosen nut on sliding link of carburetor–to–bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move sliding link to rear against its stop and tighten locknut.

Idle Adjustment: For initial setting, turn idle mixture screws 1½ turns open (Buick); 1¼ turns open (Dodge & Plymouth) from a lightly seated position. Bring engine to normal operating temperature with choke valve wide open and fast idle inoperative. Set engine idle speed (see below), then adjust idle mixture as follows:



BUICK FAST IDLE

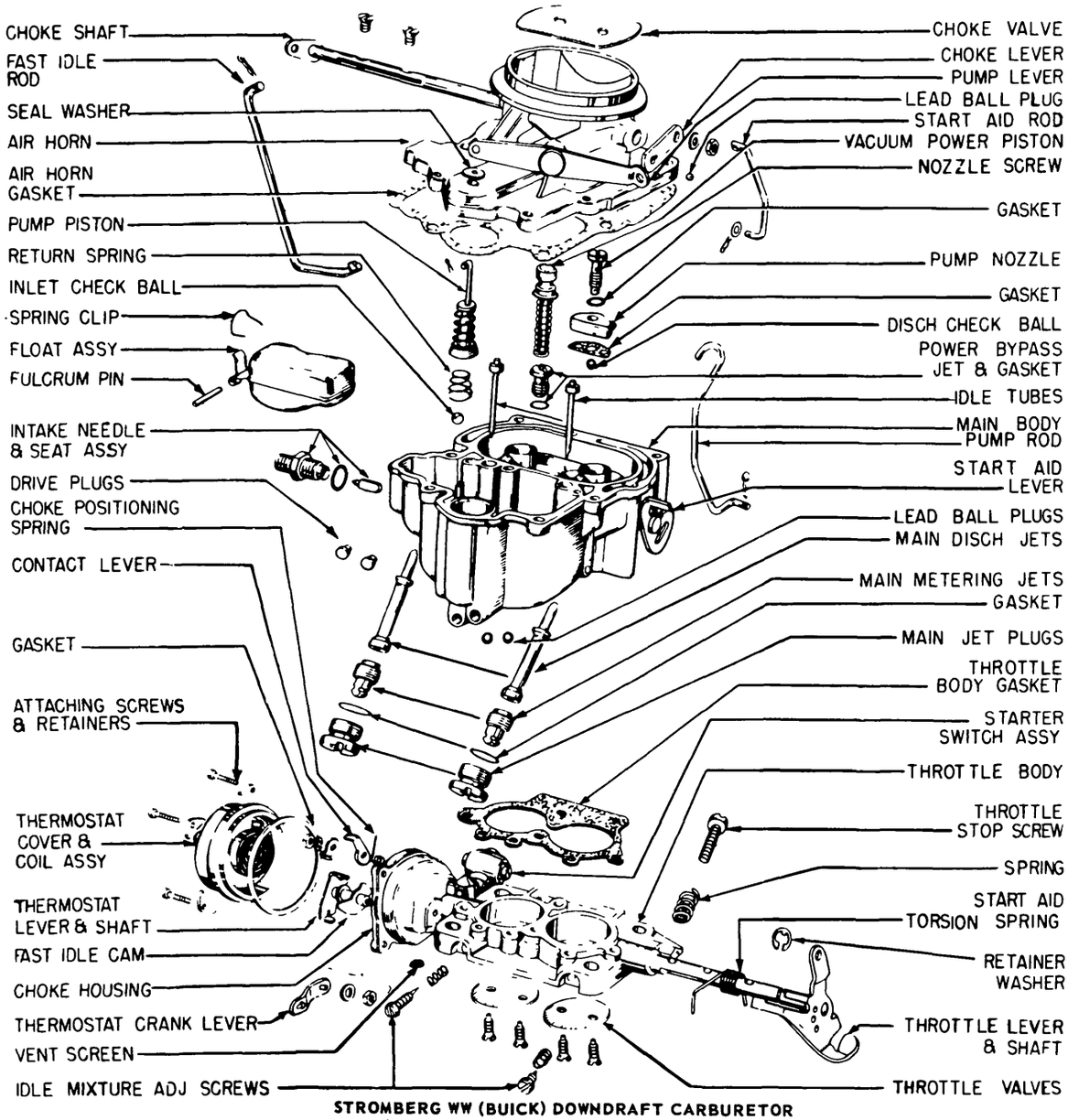
Idle Mixture – Turn both idle mixture adjusting screws in equally until engine begins to run roughly from lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about halfway between these positions where smoothest idle is obtained. On Buick, favor a slightly rich mixture. Recheck idle speed.

Idle Speed – Adjust by turning throttle stop screw located on boss on throttle body for desired speed as follows:

Car Model	Idle Speed Setting Engine Speed
Buick	①② 525 RPM
Dodge & Plymouth	③④ 500 RPM

① – With transmission in "N" or "P".
② – 575 RPM on Air Conditioned cars.
③ – 550 RPM on Air Conditioned cars.
④ – Headlights turned on. See *"Idle Setting Caution"* above.

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STROMBERG WW (BUICK) DOWNDRAFT CARBURETOR

1961 STROMBERG "WW" (Cont.) BUICK, DODGE, PLYMOUTH

Fast Idl (On Car): Buick – With engine at normal operating temperature and automatic transmission in "D" (Drive) or "P" (Park), place fast idle adjusting screw on lowest step of fast idle cam, then adjust fast idle screw to obtain an engine speed of 625 RPM.

D dg & Plym uth – With engine at normal operating temperature and fast idle adjusting screw contacting top step of fast idle cam, adjust engine speed to 1250 RPM.

Fl at L v l: Buick – Hold float arm tang against float needle, then check float level with Gauge J–9311–1 (without float bowl gasket). Top of float at highest point should just touch center of gauge (3/16" below float bowl gasket surface). To adjust, bend float arm tang. Make sure float is centered and does not rub walls of bowl.

D dg & Plym uth – *NOTE – Fuel inlet needle is rubb r tipp d. Do not allow more than weight of float to r st on n dl wh n checking float level.* Invert float bowl and check distance between surface of fuel bowl (gasket removed) and top of float at center with Gauge 73605 or a "T" scale. This measurement should be 7/32". To adjust, hold float at bottom of *bowl and bend tang on float as necessary. CAUTION – When b nding float tang, do not allow tang to push against n edl . When float is correctly set, float tang should b p rp ndicular to n dle or slanted not more than 10° away from n dl .*

► *ADJUSTMENT NOTE: Make following adjustments in th order indicated.*

Fast Idl Cam: Buick – With choke valve held wide open and fast idle rod at top of slot in fast idle cam, fast idle screw must clear lowest step of cam with a clearance of .025" (between upper side of fast idle screw and cutout section of cam). See illustration. To adjust, bend fast idle rod at upper angle with Tool J–5197.

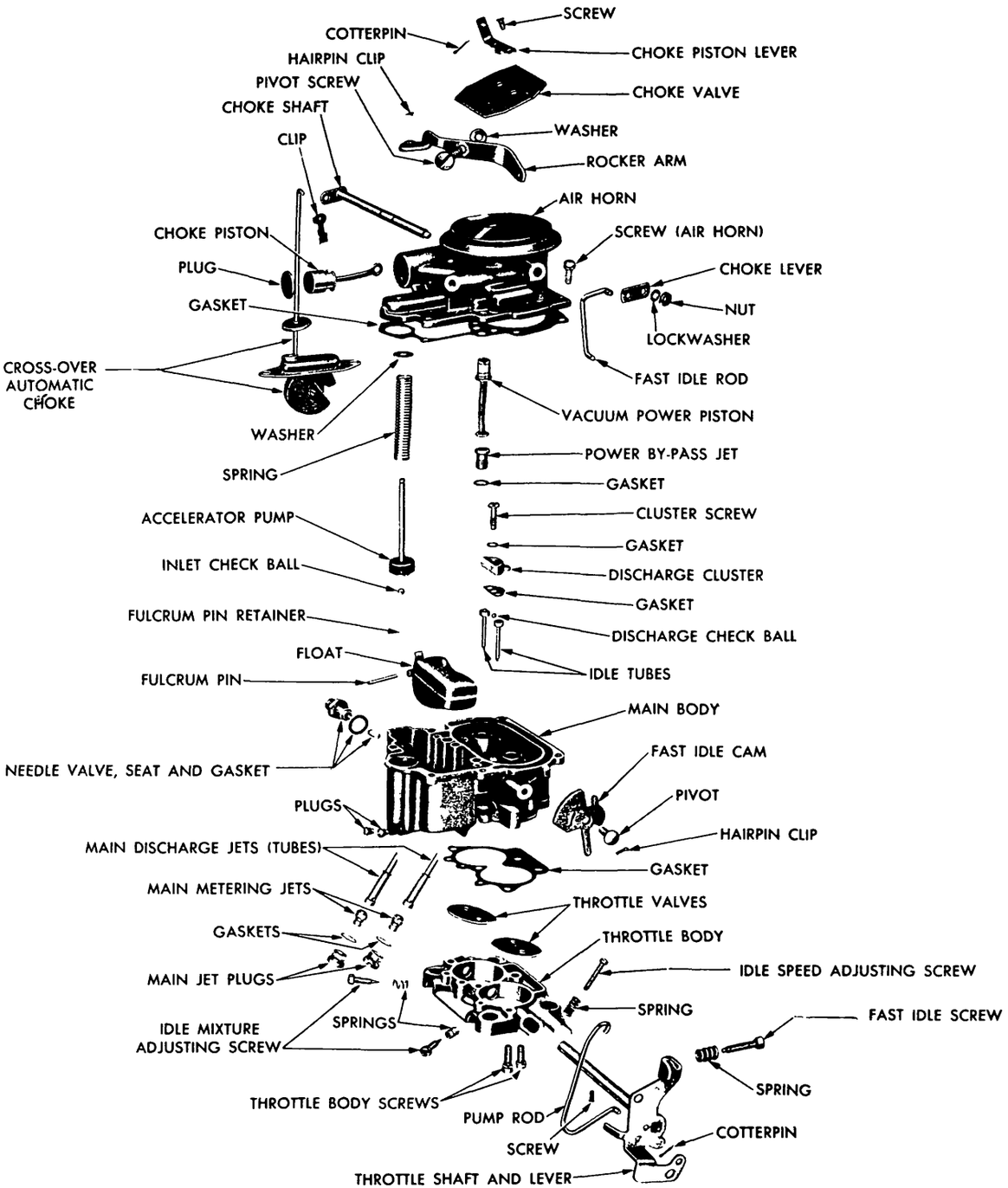
Fast Idl (Off Car) & Cam Position Adjustment: Dodge & Plym uth – Back throttle stop screw out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw out so it can be positioned on **s c nd st p** (against top step), and **turn fast idle scr w in 8 turns.** Distance between edge of choke valve and air horn wall should be 13/64". To adjust, bend fast idle rod at upper angle.

Unl ad r: Buick – Close choke valve lightly, then fully open throttle to kick choke valve open. Clearance between choke valve and wall of air horn should be .144" (No. 27 drill). To adjust, bend ear of throttle lever as required.

D dg & Plym uth – Close choke valve lightly, then fully open throttle valves. Clearance between choke valve and wall of air horn should be 15/64" (No. 1 drill). To adjust, bend tang on throttle lever

Chok Vacuum Piston: All Models – Bend a .040" wire gauge so it will engage in slot at bottom of choke vacuum piston cylinder, then with gauge in place, lightly close choke valve until inner end of piston grips gauge at end of slot. Measure choke valve opening or clearance between upper edge of choke valve and air horn wall using correct size gauge or drill rod (see table below). To adjust, bend ear on piston lever.

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STROMBERG WW (DODGE & PLYMOUTH) DOWNDRAFT CARBURETOR WITH CROSS-OVER CHOKE

1961 STROMBERG "WW" (C nt.) BUICK, DODGE, PLYMOUTH

Choke Vacuum Piston Setting

Car Model	Choke Opening
Buick (All)	.425"
Dodge & Plymouth (All)	31/64"

Accelerating Pump: Buick – With throttle valves fully closed (throttle stopscrew backed out) and pump rod in center hole, measure distance from top of accelerator pump plunger rod to top of air horn. This measurement should be 7/8". To adjust, bend pump rod at lower angle. *NOTE – After pump rod adjustment, turn throttle stop screw (with throttle valves closed) in to just contact throttle lever, then turn screw in 1½ turns for initial idle speed setting.*

Accelerating Pump & Idle Vent: Dodge & Plymouth – *NOTE – This is a combination adjustment. Accelerating pump travel is automatically set when bowl vent is properly adjusted.* Back off idle adjusting screw and open choke valve so that when throttle valves closed, fast idle screw will not contact cam. Place pump rod in center hole in throttle lever and pump vent clip (located on pump stem under bowl vent valve) in center notch. With throttle valves closed tightly, clearance between bowl vent and bowl vent seat should be 5/64" (pump travel should measure 9/32" – 5/16"). To adjust, bend pump rod at lower angle with Tool T109–213.

►*DODGE & PLYMOUTH ACCELERATING PUMP ADJUSTMENT CAUTION: If pump rod is moved to either the short or long stroke position, a corresponding change must be made in location of bowl vent clip, and the amount of lift of bowl vent rechecked and adjusted.*

Choke Thermostat Lever: Buick – Close choke valve by applying a light pressure to thermostat lever, then measure distance from lower edge of thermostat coil spring pick–up lever (inside choke housing) to center of bottom thermostat cover retaining screw hole. This distance should be 1". To adjust, bend choke rod at upper angle with Tool J–5197.

Automatic Choke: Buick – Centered (On Index).

Automatic Choke: Dodge & Plymouth – "Cross–Over" type mounted in well in intake manifold. *See "Stromberg Cross–Over Automatic Choke".*

Anti–Stall Dashpot: Buick – *See CARBURETOR on car model page.*

OVERHAUL: Buick – *See 1958 Annual Data, Page 292, or later Manual editions and see additional overhaul data below.*

Dodge & Plymouth: *See 1958 Annual Data, Page 294, or later Manual editions.*

►*BUICK OVERHAUL NOTE:* Accelerating pump lever fulcrum screw has a left hand thread. Choke piston assembly can be removed by driving a sharp awl through center of plug and prying plug out. To install, insert piston and lever assembly, then install a new aluminum expansion plug and expand it firmly in place.

SERVICE PARTS: Gasket Sets – Buick No. 1348370 (WW 7–114A); Mopar No. 1631368 (WW 15–43 & 45); Mopar No. 2275255 (WW 15–44).

Repair Kits – Buick No. 1348163 (WW 7–114A); Mopar No. 2240455 (WW 15–43 & 45); Mopar No. 2240457 (WW 15–44).

1961 STROMBERG "WWC" CHRYSLER, DE SOTO, DODGE CARBURETORS

CHRYSLER, DESOTO, DODGE	Stromberg No.
361" Engine	WWC 3-188, 188A

►*1961 DODGE HARD COLD WEATHER START CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke to flush out gum formation.

DESCRIPTION: 2–Barrel downdraft type of same design as previous models.

ADJUSTMENT: Make all adjustments as follows:

Idle Setting: For initial setting, set idle mixture screws (located in throttle body below float chamber) ½ to 5/8 turn open from a lightly seated position, then bring engine to normal operating temperature with choke fully open and carburetor off fast idle.

Idle Speed – 500 RPM with transmission in "N" (Neutral). *NOTE – 550 RPM with air conditioning compressor operating (if so equipped).* Adjust idle speed with throttle stop screw on throttle body casting.

Idle Mixture – Turn both idle mixture screws in equally until engine begins to run rough, then turn screws out until engine rolls (from rich mixture). Now turn screws in to a point about halfway between these two positions where smoothest idle is obtained. *NOTE – Both screws must turn equally.* Recheck idle speed.

Fast Idle Speed (On Car): With engine at normal operating temperature and fast idle screw on TOP step of fast idle cam, adjust fast idle screw to obtain an engine speed of 1400 RPM.

Fast Idle (Off Car) & Cam Position Adjustment: Back throttle stop screw out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw out so it can be positioned on **second step** of cam (against top step), and **turn fast idle screw in 3½ turns.** Distance between edge of choke valve and air horn wall should be ¼". To adjust, bend fast idle rod at upper angle.

Unloader: With choke valve held lightly closed, open throttle valves to wide open position. Clearance between top edge of choke valve and wall of air horn should be ¼" (use ¼" drill to measure). To adjust, bend tang (long narrow extension) on throttle lever with Tool T109–214. Make sure throttle valves fully open and close when choke valve is wide open.

Accelerating Pump: With throttle valves fully closed, pump travel from fully closed to fully open positions should be 9/16", measured at small raised boss near connecting rod end of pump lever. To adjust, bend pump rod at right angle bend. *NOTE – Pump rod must be installed in center slot of pump arm.*

Bowl Vent Valve: With idle speed screw backed out, hold throttle valves in closed position and choke valve wide open. Opening of vent valve at center of hole, with rubber valve hanging free, should be 5/64". To adjust, bend bowl vent lever (extension of accelerator pump lever).

►*CAUTION: Make sure the vent valve is not distorted and that it properly seals the bowl vent hole when throttle valve is open.*

Choke Vacuum Piston: With bowl cover removed, insert a No. 59 drill (.041") through vacuum passage on underside of choke piston cylinder and engage the top groove of vacuum piston. Apply a light pressure against choke valve to take up slack, then measure clearance between top of choke valve and wall of air horn which should be .182" (No. 14 drill). To adjust, bend ear on choke connector rod bracket on choke valve.

Float Level: With float installed in float bowl and lip of float held against inlet needle, distance from top of float at center to top of float bowl (gasket removed) should be 1/8". Use Gauge 73725 or "T" scale. To adjust, bend lip of float with Tool 73605.

►*FLOAT LEVEL CHECKING NOTE:* With carburetor installed on engine, the air horn can be removed as follows: Remove three short air horn-to-main body attaching screws, then remove one long air horn-to-throttle body screw next to fuel bowl. Assemble a short screw through main body flange and thread into throttle body. Remove long screw from side away from fuel bowl and on opposite side, then assemble a short screw through main body flange. Securely tighten the short screws, then remove remaining two long screws and lift off air horn. Assemble air horn to main body by reversing removal procedure.

Automatic Choke: Cross–Over type mounted in well in intake manifold. *See "Stromberg (Cross–Over) Typ Automatic Choke".*

OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Remove hairpin from fast idle rod and from pump rod, then remove rods. Remove three air horn attaching screws, four main body-to-throttle body screws, then lift off air horn assembly and gasket. Remove main body and gasket from throttle body.

Air Horn - Remove accelerating pump piston and spring from air horn, then remove spring from pump piston. Remove vacuum power piston using a block of wood and small open end wrench as a pry. Remove choke lever attaching nut and lockwasher and remove lever. Remove vacuum piston link cotter pin, then remove choke valve plate, choke valve, and choke shaft. Remove welch plug and choke piston. Remove pump lever, external vent attaching screw, external vent spring and grommet.

Main Body - Remove baffle, fulcrum pin spring, float, and fulcrum pin. Remove needle valve, seat and gasket. Invert carburetor and catch pump inlet ball check. Remove venturi cluster attaching screws, cluster assembly, and gasket. Remove power bypass jet and gasket, then use Tool T109-173 and remove the two main metering jets.

Throttle Body - Remove idle mixture screws and springs from throttle body. *NOTE - It is not advisable to remove throttle shaft or valves unless necessary to install new parts.* If these parts must be removed, scribe throttle valves along side of throttle shaft and mark valves and throttle body to assure reassembly in same position and barrel, then remove screws, throttle valves, throttle shaft and lever.

Cleaning & Inspection: Clean all metal parts in Bendix Metaclean. *CAUTION - Do not use metaclean to clean non-metallic parts.* Blow out drilled passages and

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STROMBERG "WWC" (CHRYSLER, DE SOTO, DODGE) (C ntinued)

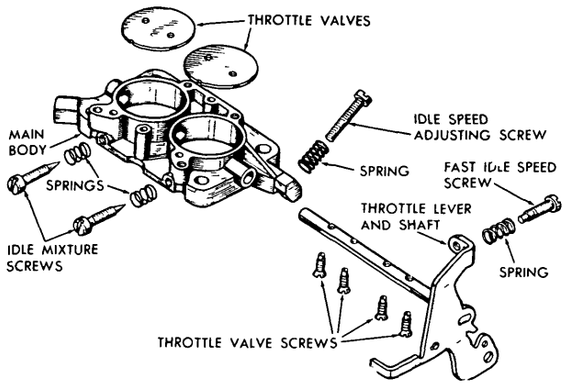
parts with air. Inspect housing for damage, wear, burrs or warpage. Check throttle shaft for excessive wear in throttle body. If wear is extreme, it is recommended that throttle body be replaced rather than installing a new shaft in throttle body.

Reassembly: Throttle Body - If throttle shaft and valves were removed, insert throttle shaft in throttle body and assemble throttle valves in same position and barrel that valves were removed from, leaving screws loose. Close throttle, align valves to scribe marks and check for best closing before tightening screws. *NOTE - Throttle valves must be installed with notch toward idle discharge holes.* Replace idle mixture screws and springs. Turn each needle valve in lightly against its seat, then back out each valve one full turn. If removed, replace slow idle stop screw, fast idle stop screw, and springs.

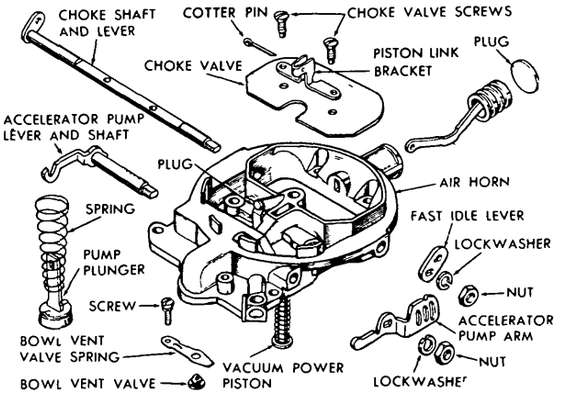
Main Body - Replace drive plugs and lead plugs if removed, then assemble main metering jets in main body and tighten securely with Tool T109-173. Install power bypass jet and new gasket and tighten securely. Install accelerator pump inlet check ball (1/8") in pump well, and discharge check ball (3/8") in discharge passage.

Air Horn - Slide choke shaft and lever into air horn with choke lever pointing down and away from air horn, then slide choke valve down into slot in shaft. Hold choke valve closed, then position choke piston bracket and install new screws (do not tighten). Hold valve in a closed position and tap gently with a screwdriver to center and locate the valve. Tighten attaching screws securely, then stake in place by squeezing with pliers. Install fast idle lever and secure with lockwasher and nut. Check accelerator pump leather for cracks or wear and hardness. If necessary, install a new pump plunger. *NOTE - If a new pump plunger is installed, flex leather several times before installing in air horn.* Slide compression spring over plunger shaft, then slide plunger over hook and into position. Install a new air horn gasket, then install vacuum power piston in air horn. Lock in position by prick punching on retaining rim. Compress piston plunger to make sure no binding exists. If piston sticks or binds enough to cause rough operation, install a new piston assembly.

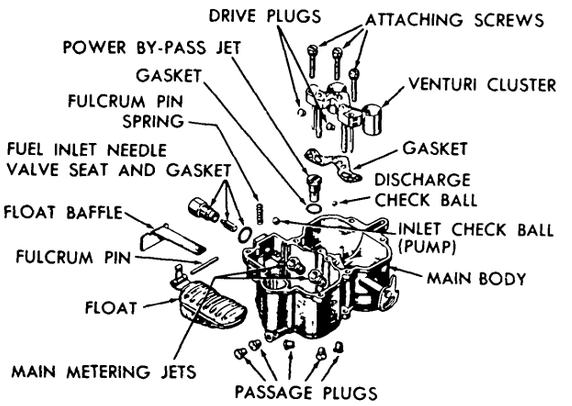
SERVICE PARTS: Gasket Set - Mopar No. 2084728 (WWC 3-188, 188A).
Repair Kit - Mopar No. 2084725 (WWC 3-188, 188A).



THROTTLE BODY (EXPLODED VIEW)



AIR HORN (EXPLODED VIEW)



MAIN BODY (EXPLODED VIEW)

1961 STROMBERG DUAL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Standard Metering Jet Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power-Jet (Two-Stage) Size
3-188A	WWC	.068"	.066"	.064"	.040" & .063"
6-123A	WW	.054"	.052"	.050"	.055"Ⓒ
6-123B	WW	.054"	.052"	.052"	.055"Ⓒ
6-125	WW	.054"	.052"	.052"	.....

Carb. No.	Model	Standard Metering Jet Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power-Jet (Two-Stage) Size
7-114A	WW	.060"	.058"	.....	.022" & .047"
15-43	WW	.053"	.051"	.049"	.028" & .0465"
15-44	WW	.051"	.049"	.047"	.033" & .055"
15-45	WW	.053"	.051"	.049"	.028" & .0465"

Ⓒ - Single stage.

STROMBERG "WW" STUDEBAKER CARBURETORS

STUDEBAKER	Stromberg Carb. No.
V8 Engine (Early)	WW 6–123A
V8 Engine (Late)	WW 6–123B
V8 Engine (CCV) ①	WW 6–125 & 125A

① – Closed Crankcase Ventilation.

DESCRIPTION: Dual downdraft type with straight air Horn (vertical air intake) and fast idle cam mounted on main body above throttle lever and linked to choke valve lever. Automatic choke housing mounted on air horn and linked directly to choke shaft. Carburetor contains conventional single float, idle system, main metering system, power system, accelerating system and automatic choke.

ADJUSTMENT: Make all adjustments exactly as detailed below.

Idl Setting: For initial setting, set idle adjusting screws (located in throttle body below float chamber) 1¼ turns out from a lightly seated position. Bring engine to normal operating temperature with carburetor air cleaner in place, choke fully open, and carburetor off fast idle.

Idle Speed – 550–600 RPM with selector lever in "N" on Flightomatic cars. Set idle speed by turning throttle stopscrew located on boss on throttle body until correct speed is obtained.

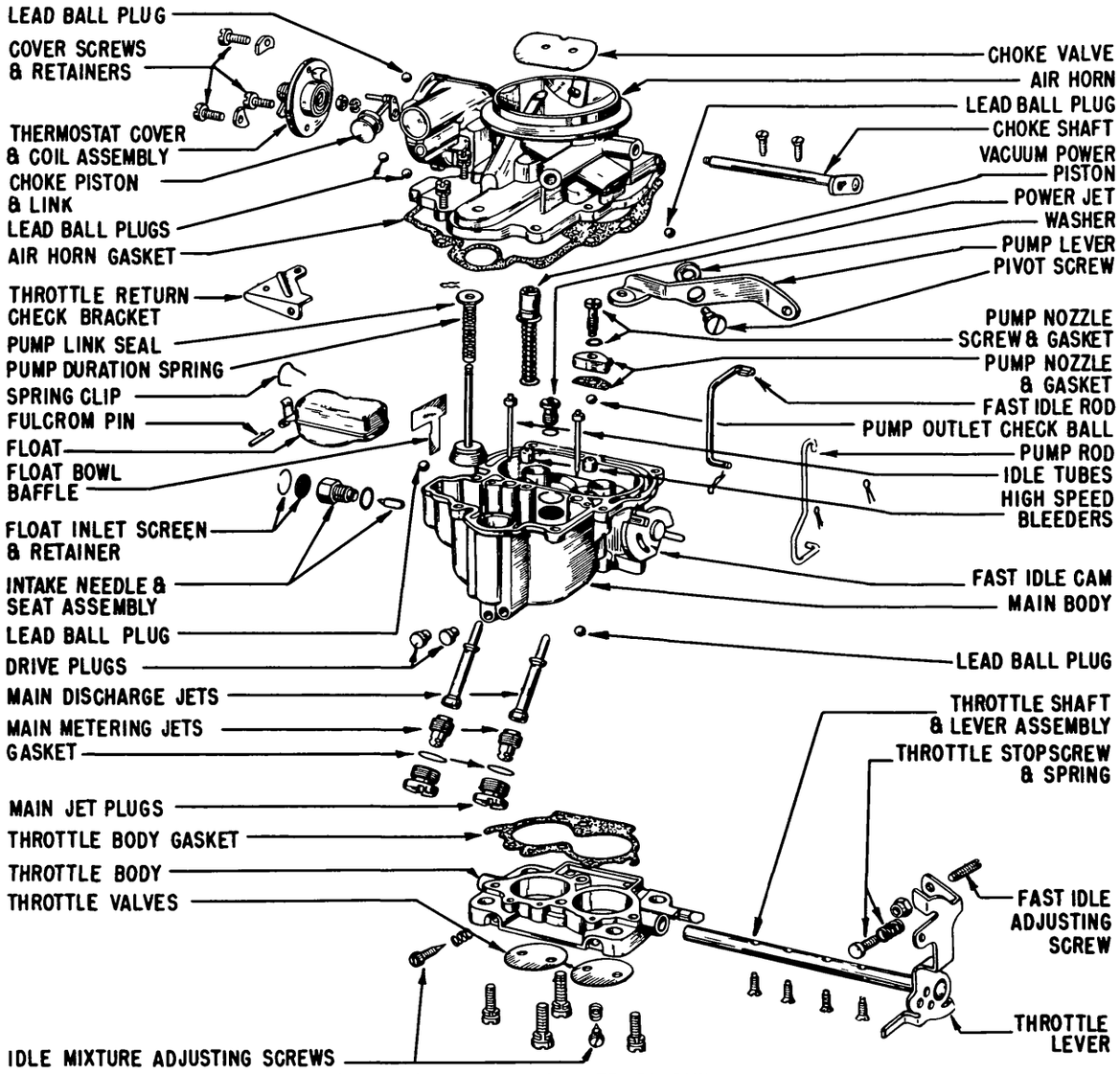
Idle Mixture – Turn both screws in equally until engine begins to run roughly from lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about halfway between these positions where smoothest idle is obtained. Both screws must be turned equally. Recheck idle speed.

Accelerating Pump: No seasonal adjustment. Three holes provided in throttle lever for pump connector rod engagement.
C nter Hole – Normal operating conditions.
Upper Hole – Shorter stroke, less fuel discharge.
L wer Hole – Longer stroke, more fuel discharge.

Fl at Level: 3/16" from top of float to top of main body with air horn and gasket removed. Use Gauge J–7477. Top of float should just touch gauge. To adjust, bend float lip.

Fast Idle: With choke valve closed and high step of fast idle cam touching fast idle screw, adjust fast idle screw so .025" wire gauge can be inserted freely between throttle valve and throttle body on idle port side. *NOTE - This setting supersedes previous setting of .030".*

Unloader (Dechoke) Setting: To check setting, hold choke valve closed lightly. Open throttle valve to wide open position so throttle lever stop rests on throttle body stop. Choke valve should now be open enough to allow. .192" gauge of Tool J–7477 to be inserted between choke valve and inner wall of air horn. To adjust, bend throttle lever ear.



STROMBERG WW (STUDEBAKER) CARBURETOR

Automatic Choke: Centered at index. To change setting, loosen cover screws and rotate housing as required.

Throttle Return Check (Flightomatic Cars): Consists of a dashpot unit mounted on carburetor with dashpot plunger contacting throttle lever. Will prevent too-rapid closing of throttle and keep engine from stalling. *See "Throttle Linkage Adjustment" under CARBURETOR on car model page.*

OVERHAUL: *See 1959 Annual Data, Page 300, or later Manual edition.*

SERVICE PARTS: Gasket Set – Stromberg No. 381500 or Studebaker No. 1550308 (WW 6–123A & 125).
Repair Kits – Stromberg No. RK–274 or Studebaker No. 1550307 (WW 6–123A); Stromberg No. RK–278 or Studebaker No. 1552221 (WW 6–125).

CHRYSLER CORP.
ELECTRIC TYPE

►CHANGES, CAUTIONS, CORRECTIONS

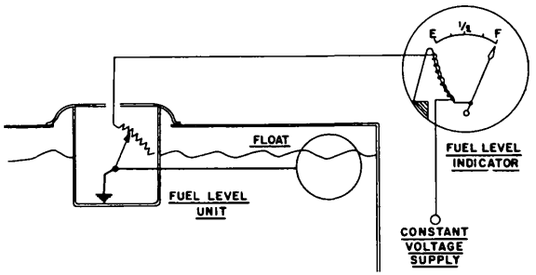
►*1960-61 INACCURATE TEMPERATURE INDICATOR READING CORRECTION (AIR COND. CARS):* May be caused by temperature indicator sending unit grounding on air conditioning compressor. To correct, install special Air Conditioned Car Temperature Indicator Sending Unit, Part No. 2256302.

►*1960-61 INACCURATE FUEL GAUGE READING CORRECTION:* If dash unit, tank unit, and wiring are in good condition, trouble may be caused by high resistance between fuel tank and car body. To correct, install Fuel Tank Grounding Clip, Part No. 2258412, over rubber hose connector of fuel supply line at tank gauge unit. This clip installed in production on 1961 models.

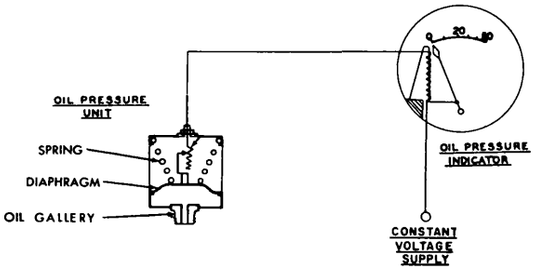
►*1960 CHRYSLER GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE & OIL PRESSURE GAUGE INSTALLATION CAUTION:* External type gauge voltage regulator mounted on speedometer case beginning Serial No. 03148732 with Prefixes 81, 82, 83, 84, 85, 87. New type oil pressure gauge without internal voltage regulator also used. In case of oil pressure gauge failure on later cars, early type gauge, Part No. 2258138, may be installed if short auxiliary wiring to external voltage regulator is removed and instrument panel wiring connected directly to oil pressure gauge.

►*1960 DE SOTO FUEL GAUGE RADIO CONDENSER CAUTION:* A .5 mfd. condenser is installed on fuel gauge on radio equipped cars to suppress rapid clicking noise in radio caused by gauge voltage regulator in fuel gauge. When installing condenser, ground negative side of condenser to fuel gauge and install positive lead at ignition terminal of gauge with a pal nut to allow gauge wiring connection to be installed properly.

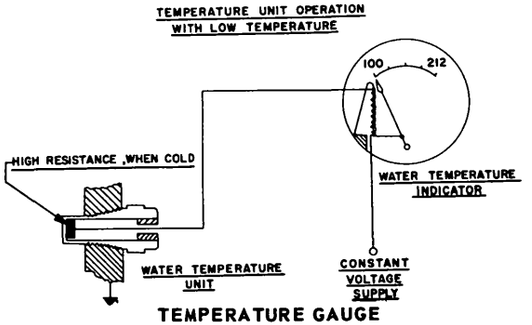
DESCRIPTION: Thermal type, constant voltage units operated by variable resistance type sending units which are sensitive to fuel level, engine temperature, and engine oil pressure. Constant voltage is supplied by a Constant Voltage Regulator built into one of the dash units (except some Chrysler cars – see "Production Change" above) and connected in series to each gauge which provides the same regulator voltage to each gauge regardless of line voltage fluctuations. *See individual Car Model pages for gauge application, part numbers, and to determine which gauge has the internal voltage regulator.* The gauge with the internal constant voltage regulator also may be identified by three terminals marked "A" (output voltage from regulator), "I" (input voltage to regulator), and "S" (connection to gauge sending unit). Other gauges have only "A" and "S" terminals. *NOTE – On Chrysler and Imperial cars with Panel set Instrument lighting, there is an additional terminal on each gauge for lighting connection.*



GASOLINE GAUGE



OIL PRESSURE GAUGE



TEMPERATURE GAUGE

►*GAUGE TESTER NOTE:* A special Gauge Tester, Tool C-3826, is available for testing gauge dash and sending unit. Procedures for use of tester are detailed below.

►*TESTING CAUTION: DO NOT ground tank or engine sending unit or wire as dash unit will be damaged.*

ALL GAUGES: Trouble – High (against peg), no, or inaccurate reading after ignition switch turned on.

Cause – Defective constant voltage regulator, or open circuit on input side of regulator. Replace dash unit in which regulator is located or correct open circuit in wiring connections.

Testing – Check voltage output at "A" terminal of regulator. Voltage should fluctuate between 0 and 7.0 volts. A steady voltage reading of 12 volts indicates faulty regulator.

FUEL GAUGE: Trouble 1 – Higher or lower fuel level reading than actually exists.

Cause – Defective tank or dash unit. Replace as necessary.

Testing – Connect Tester C-3826 to disconnected tank unit wire and to ground at car body; or connect a known good tank unit to disconnected tank unit wire and to ground at car body. Move tester knob to "L" or tank unit to empty and turn on ignition. Dash gauge unit reading should be "E" to -3/32". With tester knob at "H" or tank unit moved to full, gauge reading should be "F" to +3/32". *NOTE - With the tester knob at "M", gauge reading should be Half-way ±1/16".* If dash unit readings are correct, replace tank unit. If dash unit readings are incorrect, replace dash unit.

Trouble 2: Fuel gauge erratic operation.

Cause – Loose or dirty connections, or faulty tank unit.

Testing – Clean and tighten all connections. Test sending unit (see Trouble 1 above). Make sure tank unit is grounded to tank and tank is grounded to frame. *See "Inaccurate Fuel Gauge Reading Correction" above for installation of grounding clip.*

TEMPERATURE GAUGE: Trouble 1 – Higher or lower temperature reading than actual engine temperature.

Cause – Defective dash or engine units.

Testing – Connect Tester C-3826 to disconnected sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and ground. Turn on ignition switch and move tester knob to "L" or tank unit to empty. Dash gauge should read "C" ± 1/8". Move tester knob to "H" or tank unit to full. Dash unit should read "H" ± 1/8". *NOTE – With tester knob at "M", dash unit should read Half-way ±1/8".* If dash unit reads correctly, replace engine unit. If dash unit reads incorrectly, replace dash unit.

OIL PRESSURE GAUGE: Trouble – No or low oil pressure reading.

Cause – Faulty dash or sending unit or engine oiling system.

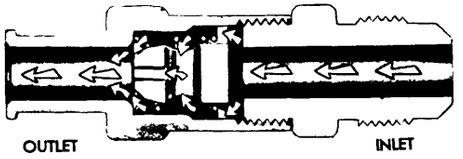
Testing – Make sure engine oil is at proper level and that engine oiling system is functioning properly *(see Car Model pages for correct oil pressure).* Connect Tester C-3826 to disconnected oil pressure engine sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and to ground. Move tester knob to "L" or tank unit to empty. Dash gauge unit should show no pressure. Move tester knob to "H" or tank unit to full. Dash unit should show high pressure. If dash unit operates correctly, replace engine unit. If dash unit not correct replace dash unit.

CLOSED CRANKCASE VENTILATION SYSTEMS (ALL CAR MODELS)

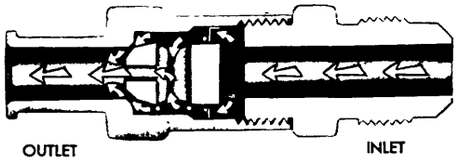
DESCRIPTION: Closed crankcase ventilation systems utilize vacuum in intake manifold to remove unburned gases from engine crankcase and return them to the combustion chambers to be burned. This unit which consists of a check valve, hose, and carburetor adapter or carburetor connection, replaces the conventional crankcase ventilator tube.

OPERATION: The crankcase vent valve assembly automatically meters flow of gases so that normal operation of engine is not disturbed. Under high vacuum conditions such as at idle or during deceleration, the valve is held closed and only small amounts of gases are allowed to pass through a metered orifice and into intake manifold. During periods of low vacuum in intake manifold, a spring holds the valve open and larger amounts of gases pass through to intake manifold. Fuel vapor is prevented from entering crankcase by the crankcase vent valve which is held closed by any reverse air flow.

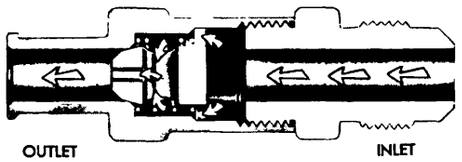
SERVICING: See table below for servicing intervals. *NOTE - Indicated intervals are for normal operation. If car is operated under low temperature conditions; in "stop and go" service, or in dusty areas, ventilation system should be cleaned or serviced more frequently. A clogged system will result in erratic idle speed, stalling at low speed, or stumble on acceleration.* Remove ventilator hose from connections and blow out with air (replace hose if necessary). Remove crankcase vent valve and disassemble by unscrewing connector and removing check valve and spring. *NOTE - A "crimped type valve assembly is used on Lincoln, Pontiac & Tempest 4 Cyl. These valves cannot be disassembled and must be replaced.* Clean all parts in solvent or carburetor cleaner and blow dry with air. Clean out metering orifice using a suitable size drill to remove varnish and carbon accumulation. *CAUTION - Do not enlarge metering hole.* Inspect all parts for damage or excessive wear and replace if necessary. Install spring on valve until spring is properly seated in groove in valve, then place valve and spring in valve body and install connector. *CAUTION - Do not stretch or distort valve spring. If damaged, replace assembly.* Clean crankcase and intake manifold (or carburetor) connectors. Clean crankcase oil filler cap in solvent and blow dry with air. *NOTE - On Lincoln models, install new oil filler cap.* Reinstall ventilating system.



LOW VACUUM

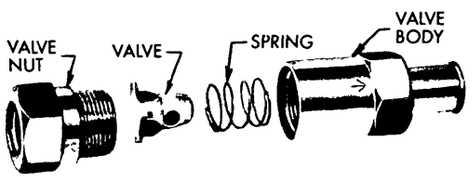


INTERMEDIATE VACUUM



HIGH VACUUM

CRANKCASE VENT VALVE OPERATION



CRANKCASE VENT VALVE ASSY. (TYPICAL)

►*CADILLAC NOTE: It is rec mmend d that crankcas vent valve be removed and cl aned v ry 8,000 mil s by sloshing it in carburetor cleaner and blowing dry with air. Do not disassemble unless absolutely necessary. Clean out hose and connections with air. Us a drill to clean out metering orifice.*

①Maximum Servicing Intervals

Car	Mil ag
Buick	5,000 miles
Cadillac	③ 8,000 miles
Chevrolet Pass. Cars	10,000 miles
Chevrolet Trucks	10,000 miles
Chrysler, DeSoto, Dodge, Plymouth	10,000 miles
Comet	8,000 miles
Falcon	8,000 miles
Ford Pass. Cars	8,000 miles
Ford Trucks	8,000 miles
Lancer	10,000 miles
Lincoln	④ 6,000 miles
Mercury	10,000 miles
Oldsmobile	10,000 miles
Pontiac & Tempest (4 Cyl.)	②⑤ 12,000 miles
Pontiac Tempest (V8)	⑤ 12,000 miles
Rambler	10,000 miles
Studebaker	10,000 miles
Valiant	10,000 miles
Willys	⑥

① - If car is operated in cold temperature, "stop & go" service, or in dusty areas, clean system more frequently.
② - Vent valve cannot be disassembled, replace unit.
③ - See "Cadillac Note" above.
④ - Clean system every 6000 miles. Replace vent valve, which cannot be disassembled, every 12,000 miles.
⑤ -Every 12,000 miles or 12 months.
⑥ - At each tune-up, overhaul, or as required.

CHRYSLER CORP. DISTRIBUTORS

Chrysler (1961)
Dodge & Plymouth (1960-61)
Lancer (1961)
Valiant (1960-61)

DESCRIPTION: Single breaker type distributor with a "pivoted" type breaker plate. The breaker plate assembly consists of a support plate which is attached rigidly to distributor housing and a movable breaker plate which is pivoted on support plate at a point under the condenser. Distributor primary lead is a continuous wire which enters housing through an insulating grommet.

DISASSEMBLY: Remove rotor, then remove clip attaching vacuum control unit to breaker advance arm and remove vacuum control unit from distributor housing. Remove primary lead terminal at terminal screw and remove primary lead wire and grommet as an assembly from distributor housing. Remove two screws and lockwashers attaching breaker plate assembly to housing and lift out the complete assembly including points and condenser. Remove oil wick from distributor cam, then remove wire clip from well in cam and remove cam, yoke and spacer. Clamp distributor in a vise (with soft jaws) and attach a dial indicator to body of distributor with indicator plunger resting against distributor shaft. Hook a spring scale over shaft and pull on a line with plunger of gauge. Apply a 5 lb. pull and check movement of distributor shaft. If side play exceeds .005", replace bushings and shaft. Remove distributor drive gear (six cylinder) or collar (V8) retaining pin and slide gear or collar off shaft. *NOTE - Support hub of gear or collar s pin can b driv n out without damaging parts.* Clean burrs from around pin hole and remove lower thrust washer. Push shaft up and remove through top of distributor, then remove upper thrust washers, shaft oiler and oiler wick.

BUSHING REPLACEMENT: Remove upper and lower bushings with Tool C-3744. *CAUTION - Do not drive bushings out f housing.* Before installing new bushings, soak in light engine oil for approximately 15 minutes. Position upper bushing with slot in bushing up and in line with oil hole in housing. Press bushing into housing with Tool C-3041 and adaptor (flat face of adaptor contacting bushing). When properly installed, upper end of bushing should be 1.613" from top of distributor housing (measured from bottom edge of straightedge to top of bushing. Invert distributor and install lower bushing flush with face of distributor base. *NOTE* - Insert a 3/32" rod through housing oiler hole to see if slot in bushing indexes with oiler hole in housing. If rod cannot be inserted through housing and bushing, drill a 1/8" hole through upper bushing by drilling through oil wick hole (remove burrs caused by drilling). Install burnishing tool, C-3041 and press burnisher through both bushings.

REASSEMBLY: Check operation of centrifugal weight and check weight springs for distortion. Lubricate governor weights and inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness. Install spacer on distributor shaft, then slide cam and yoke assembly on distributor shaft and engage weight lugs with slots in yoke. Install cam retaining spring clip, then lubricate and install upper thrust washers on shaft and slide shaft into distributor body. Position lower thrust washer and drive gear on lower end of shaft and install roll pin. *NOTE - Support hub of gear when installing pin so gear will not be damaged.* Install oiler wick and oiler, then install breaker plate assembly. Align condenser lead, breaker point spring, and primary lead, install attaching screws. Install felt wick in top of distributor cam. Attach vacuum control unit to breaker plate and install retainer clip and washer, then install vacuum unit attaching screws. Check breaker arm spring tension (see below) and adjust point gap. Lubricate felt pad in top of distributor cam with 3 to 5 drops of light engine oil and install rotor.

PERFORMANCE DATA: *See Car Model pages for Automatic & Vacuum Advance specifications.*

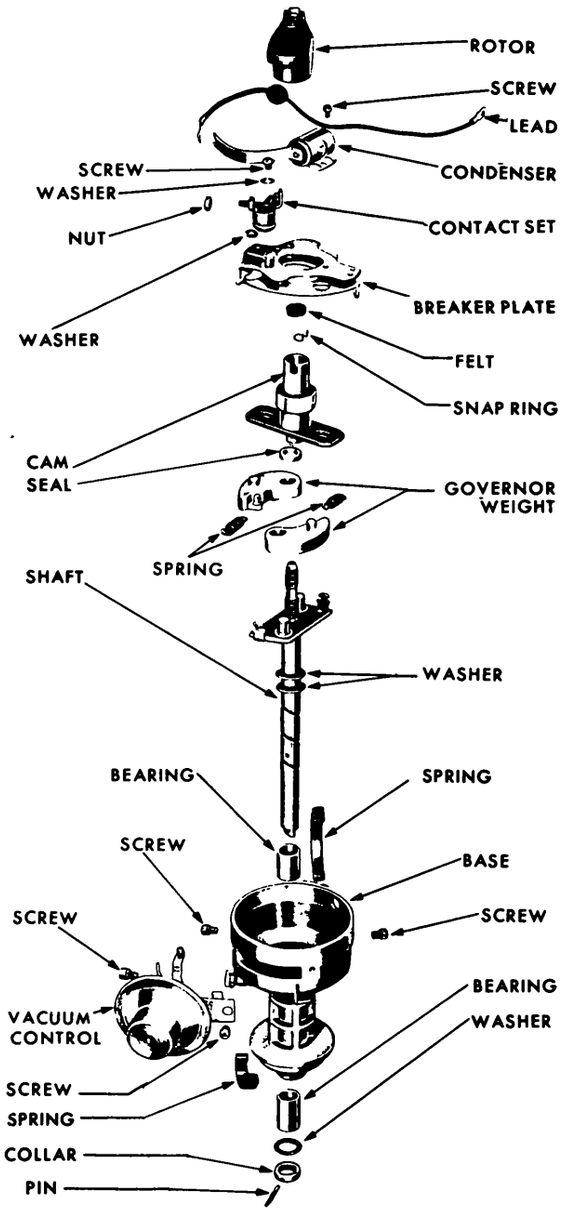
►*DISTRIBUTOR POINT GAP & DWELL NOTE:* Point gap and dwell must be within specifications at the same time (see Car Model pages for data). If this cannot be accomplished, either wrong points are installed or cam lobes are badly worn. Check dwell with engine idling at 475-500 RPM. *Dwell variation at speeds above 1500 RPM is not an indication of distributor wear.*

BREAKER ARM SPRING TENSION: Hook spring scale, Tool MTU-36 on breaker arm and pull in a straight line at a right angle to point surfaces. Take a reading as points start to separate. Spring tension should be 17-21.5 ozs. If not within limits, loosen screw holding end of point spring and slide end of spring in or out as necessary. Tighten screw and recheck spring tension.

LUBRICATION: Add 3 to 5 drops of SAE 10W oil to oiler on outside of distributor base and to felt wick under rotor in top of distributor cam. Wipe old grease from surface of breaker cam and apply a light film of new distributor cam grease. *CAUTION - Do not over-lubricate.*

VACUUM CONTROL UNIT: This unit cannot be disassembled or adjusted. If not within specifications, replace complete vacuum control unit.

HIGH TENSION CABLES: These cables have a non-metallic string type conductor for improved radio noise suppression. Do not jerk cables off spark plugs or out of distributor cap towers as cables may pull out of terminals or be damaged. Check cables for excessive resistance or open circuit. Replace cable if resistance is greater than 30,000 ohms or if terminal has pulled off.



CHRYSLER CORP. DISTRIBUTOR ASSY.
(V8 SHOWN - 6 CYL. SIMILAR)

AUTOLITE ALTERNATOR & REGULATOR

Car Model	Alternator N.	R gulator N.	P larity
Checker	ALD-5001	VBT-6201A	Neg.
Willys	ALC-5001	Ⓒ VBS-6201A	Neg.

Ⓒ - With charge indicator light relay.

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Alternator polarity (see above) determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or rectifiers will be damaged.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

Booster Battery (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

DESCRIPTION: Main alternator components are the stator, rotor, slip ring end housing, drive end housing and rectifiers (diodes). Alternator voltage is controlled by varying the field current through a double contact voltage regulator unit. Because the rectifiers permit current flow in only one direction, no current can flow from battery to alternator and no circuit breaker (cutout relay) is needed. The self-limiting current characteristics of the alternator eliminate the need for a current regulator.

Stator - Consists of a laminated iron core with three phase windings electrically 120° apart wound in slots around inside circumference. A pair of leads are connected to each of the three points of the windings and one of each pair of leads connects to a negative rectifier and one to a positive rectifier.

R tor - Consists of a single field coil encased between two four-fingered overlapping iron sections assembled on a shaft. The two ends of field coil are connected to two slip rings insulated from each other and the shaft. Battery is connected to field coil through brushes and the slip rings.

Slip Ring End Housing - Supports rectifier heat sinks, pre-lubricated roller bearing for rotor shaft, brush holders and brushes, and field and output terminals.

Drive End Housing - Supports pre-lubricated ball bearing for rotor shaft. Through bolts hold entire assembly together.

Rectifiers - Six silicone diode rectifiers are pressed into heat sinks in slip ring end housing. Three rectifiers have negative polarity and their heat sink is grounded to end housing. The other three rectifiers have positive polarity and their heat sink is insulated from end housing and connected to alternator output terminal.

SPECIFICATIONS

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	Alt. RPM
ALD-5001	38 min.	14.2	Ⓒ4200
ALC-5001	42 min.	14.2	Ⓒ4200

Ⓒ - 1750 Engine RPM.

Rotation - Clockwise at drive end.

Rated Output - 40 Amps. (ALD-5001), 45 Amps. (ALC-5001).

Field Coil Draw - 2.34-2.42 amps. (ALD-5001), 2.32-2.43 amps. (ALC-5001) at 10.0 volts and 70°F.

Capacitor Capacity - .1 mfd.

TROUBLE SHOOTING & DIAGNOSIS

ALTERNATOR DOES NOT CHARGE: Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

LOW OR UNSTEADY CHARGING RATE: Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

LOW OUTPUT & LOW BATTERY: High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

EXCESSIVE CHARGING RATE: Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator winding open. Rectifier open.

REGULATOR CONTACTS OXIDIZED: Regulator setting too high or air gap incorrect. Rotor field coil winding shorted.

REGULATOR CONTACTS BURNED: Regulator setting too high. Rotor field coil winding shorted.

REGULATOR COIL WINDING BURNED: Regulator setting too high.

ALTERNATOR NOISY: Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

TESTING

►*CAUTION: 1) Do not ground fi ld circuit b tween alt rnator and voltage regulator asr gulator will b damaged.*

2) Do not ground alternator output t rminal or alt rnator and circuit will be damaged (no circuit break r used and battery applied to output t rminal at all tim s).

3) Do not operate alternator on op n circuit with fi ld winding energized.

4) Do not polarize alternator as it is not r quir d and doing so will damage entire system.

5) Before making test connections, ignition switch must be off and battery ground cabl disconn ct d from battery.

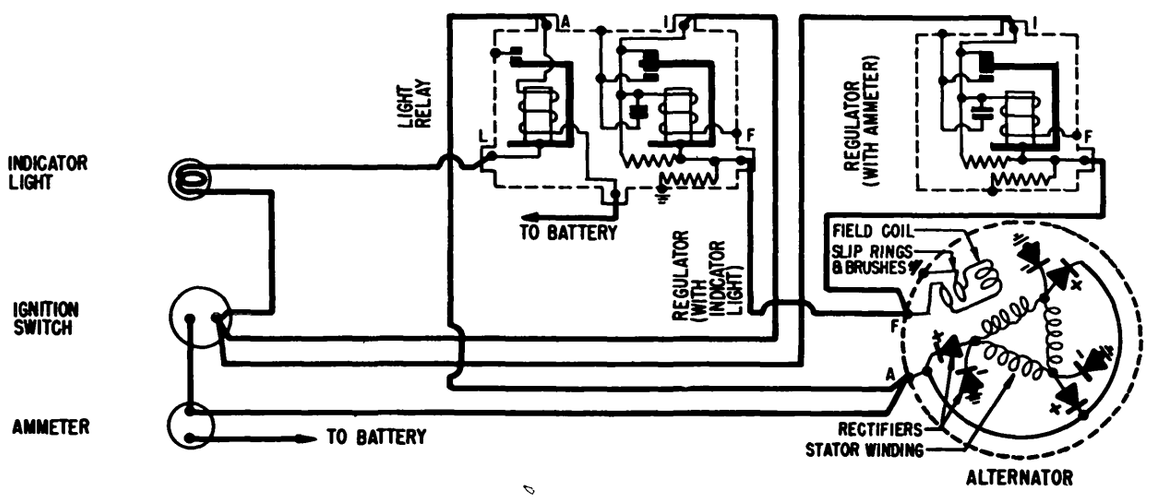
ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

Charging Circuit Resistance: 1) Connect an ammeter in series between alternator output terminal and charging circuit lead with lead disconnected from terminal. Connect a voltmeter across charging circuit (negative lead of voltmeter to positive terminal of battery and positive lead of voltmeter to alternator output terminal lead). Disconnect lead from regulator field terminal and from alternator field terminal. Connect a jumper wire between alternator field and output terminals. Connect battery ground cable and adjust engine speed and electrical load to obtain 10 amperes in charging circuit. Voltmeter reading should not exceed .3 volt. If more, inspect, clean, and tighten all connections in charging circuit.

2) With same conditions as above, connect voltmeter from negative (grounded) battery terminal to alternator frame, and then from alternator frame to regulator base. With 10 amperes in charging circuit, voltage reading in either case should not exceed .04 volt. If more, correct high resistance ground connections.

Current Output: Leave ammeter and jumper wire connected as in "Charging Circuit Resistance" above. Connect voltmeter with negative lead to ground at alternator frame and positive lead to alternator output terminal. Connect a carbon pile rheostat across battery and a tachometer to engine. Adjust engine to 1750 RPM and rheostat to obtain 14.2 volts on voltmeter. Current output shown on test ammeter should be within specifi-

CONTINUED ON NEXT PAGE



AUTOLITE ALTERNATOR & REGULATOR INTERNAL WIRING DIAGRAM

AUTOLITE ALTERNATOR & REGULATOR (Continued)

cations (see Performance Data above). A slightly low reading may mean an open rectifier and a considerably lower reading may mean a shorted rectifier,

ALTERNATOR OFF CAR: Field Coil Draw (Testing For Shorted Rotor) - Connect an ammeter and a rheostat in series between outer slip ring and battery. Connect other battery terminal to inner slip ring. Connect a voltmeter lead to each slip ring. With rheostat, adjust voltage to 10 volts and read field current draw on ammeter. If higher than specifications (see above) rotor field coil winding is shorted.

Rotor Test (For Grounds): Make test with a 110-volt test bulb with one probe on a slip ring and other probe on rotor core. If bulb lights, rotor winding is grounded.

Stator Test: Test for shorted windings with an internal-external growler. Test for grounds with a 110-volt test bulb and test probes. *Make both tests with stator leads disconnected from rectifiers.*

Rectifier (Diode) Test: *Make initial test without disconnecting stator leads from rectifiers. This will eliminate need for complete disassembly. To find which rectifier is bad, stator leads must be disconnected and each rectifier tested individually.* Use a No. 57 test bulb in series with a 12-volt battery and test probes. Touch one test probe to rectifier heat sink and other probe to a rectifier lead in same heat sink. Reverse the probes. If lamp lights in **one** direction, rectifier is good. If lamp does **not** light in either direction, rectifier is open. If lamp lights in **both** directions, rectifier is shorted.

►*RECTIFIER TESTING TOOL NOTE: Diode Testing Tool C-3829 is available for testing rectifiers without disconnecting stator leads.*

OVERHAUL

►*TOOL NOTE:* Tools listed in following procedures are Miller Manufacturing Co. tools. Similar tools are also available from Draf Tool Co. as follows:

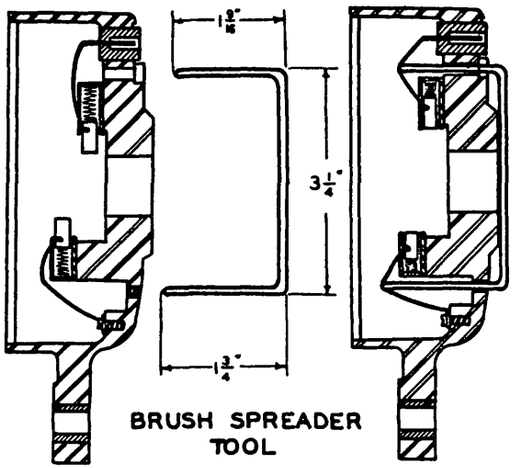
Tool Name	Draf No.	Miller No.
Drive End Bearing Installer	VA-603	C-3769
Roller Bearing Remover	VA-604	C-3770
Roller Bearing Installer	VA-605	C-3770
Housing Support	VA-606	C-3770
Rectifier Remover Support	VA-607	C-3771
Rectifier Remover	VA-608	C-3771
Rectifier Installer	VA-609	C-3772

DISASSEMBLY: Remove through bolts, tap end housings lightly with soft hammer to separate them from stator, and remove drive end housing and rotor assembly. Disconnect positive and negative rectifier heat sink studs from end housing and remove stator. If brushes are worn to 5/16" or less, replace them. Grip insulated brush at brass terminal and pull it from field terminal insulated bushing. Remove ground brush lead attaching screw. *Do not lose brush springs when removing brushes from holders.* Clamp rotor in a vise (with protective jaws), remove pulley with puller or arbor press, and remove fan and woodruff key from shaft. Remove shaft from drive end housing and bearing assembly with a puller which grips under bearing retainer plate. *CAUTION - Do not support housing and press on rotor shaft as end housing and retainer screws will be damaged.* Remove screws from retainer plate and press drive end bearing from housing with Tool C-3769. Remove roller bearing from slip ring end housing with Tool C-3770.

Rectifier Replacement: *NOTE - Positive rectifiers have red marks, negative rectifiers have black marks. Positive heat sink has larger studs. All rectifiers are replaced in same manner.* Cut rectifier wire as near crimped sleeve connector as possible. Support heat sink on Support Tool C-3771 and press rectifier out of heat sink with Remover Tool C-3772. *CAUTION - Do not hammer on tool or rectifier will be damaged. Use a press only.* To install rectifier, support heat sink with Support Tool C-3771 and press rectifier into sink with Installer Tool C-3772. Strip insulation on stator leads about ¼" and connect them to rectifiers by crimping connector sleeves. *CAUTION - DO NOT solder connections as heat will damage rectifiers.*

REASSEMBLY: *NOTE - Bearings are pre-lubricated and no further lubrication is required.* 1) Install needle roller bearing in slip ring end housing so enclosed end of bearing is flush with outer surface of housing. Use same tools used for removal. Install felt washer and retainer into drive end housing and press ball bearing into housing (use a block of wood so pressure is exerted on bearing outer race only). Install retainer plate and gasket on end housing. With snap ring and retainer on rotor shaft, press housing on shaft with Tool C-3769 which fits over shaft and against bearing center race. Bearing must be against snap ring retainer. Install spacer, woodruff key, fan and pulley and pulley nut

2) Install brush springs and brushes. Ground brush is fastened to end housing with a screw. Insulated brush has blade terminal which is pushed into slot in field terminal insulator bushing and a tab on blade terminal snaps into insulator bushing. Install both rectifier heat sinks into end housing and install insulator bushings, washers and nuts. Push stator into housing by hand. Install drive end housing and rotor assembly into slip ring end housing and stator assembly using brush spreader tool as shown in illustration. *CAUTION - Make sure through bolt holes line up as no locator pins are used.* Install through bolts. Remove brush spreader tool and see that brush leads do not drag on rotor and that rotor turns freely when rotated by hand.



BRUSH SPREADER TOOL

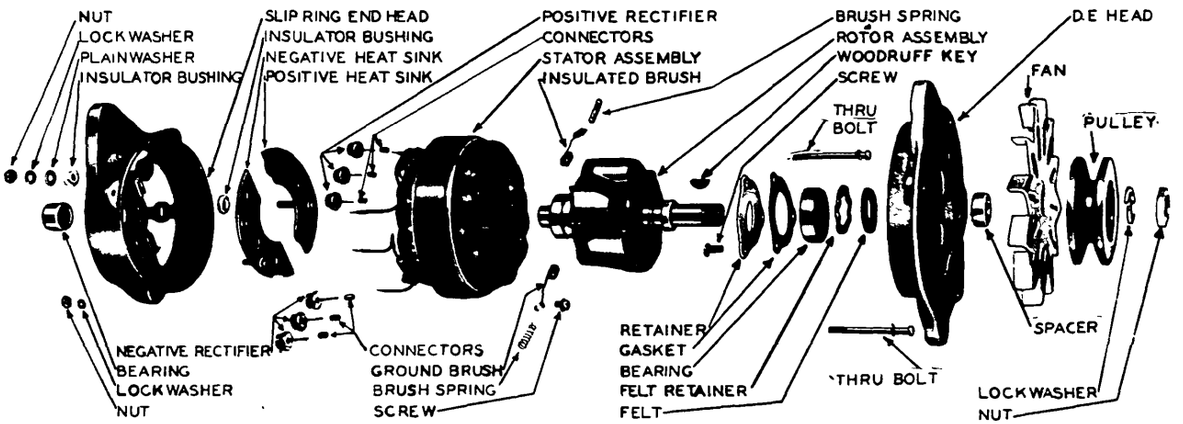
VOLTAGE REGULATOR

DESCRIPTION: Regulator - Field control type. Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature. Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows:

Upper Contact Operation (Low Speed & High Load) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current.

Lower Contact Operation (High Speed & Low Load) - Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open), and limiting field current.

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AUTOLITE ALTERNATOR ASSEMBLY - TYPICAL (EXPLODED)

AUTOLITE ALTERNATOR & REGULATOR (C ntinu d)

Indicator Light Relay: On cars with a charge indicator light in place of an ammeter a relay is used to operate the light. Relay has a single heavy winding in series with charging circuit with a moveable contact on an armature and a grounded stationary contact. Relay contacts are in series with indicator light which is connected to battery through ignition switch. With ignition switch on, light is grounded through contacts & lights up. When alternator charges, current flow through relay winding pulls armature down, opening the contacts and making light go out as long as alternator is charging.

CHECKING & ADJUSTING (ON CAR): Regulator - Disconnect alternator output terminal and install an ammeter between lead and terminal. Connect a voltmeter positive lead to regulator "BAT" terminal and negative lead to alternator frame. Adjust engine speed to 750 RPM and adjust load so there is a 10 ampere charge rate. Operate for 15 minutes to stabilize temperature. Note voltmeter reading. Cycle system by stopping and restarting engine and increase engine speed to 1500 RPM. Turn off all lights and accessories. Voltage should increase and amperage decrease. Voltage difference between readings of both tests should be .1-.3 volt. If greater or less, remove cover and move stationary contact support up or down (loosen support screw). Raising support will increase voltage. Replace cover, operate engine at 750 RPM and note voltage reading which should be as in table below. To adjust, bend lower spring hanger. *CAUTION - Do not short circuit between spring hanger and base or spring. Use an insulated bending tool.*

►*AMBIENT TEMPERATURE NOTE: The ambient temperature is the temperature registered on a reliable thermometer positioned 2" from regulator cover.*

Voltage Setting - Ambient Temp.

Temp. (°F)	Voltage	Temp. (°F)	Voltage
50°	14.1-14.5	110°	13.7-14.1
80°	13.9-14.3	140°	13.5-13.9

Indicator Light Relay: Disconnect field lead from both alternator and regulator. Connect an ammeter between disconnected alternator output terminal lead and alternator output terminal. Connect a carbon pile rheostat from output terminal lead to alternator field terminal. *NOTE - If dash indicator light cannot be seen during this test, use a 12-volt test lamp with a No. 57 bulb between regulator "L" and "B" terminals.* With rheostat resistance turned in, bring engine speed to 800 RPM and slowly turn resistance out of circuit until indicator light goes out. Ammeter reading should be as indicated below. To adjust, bend lower armature spring hanger. Increasing spring tension raises setting.

Relay Opens - 2.0-2.5 amperes.

Relay Closes - 1.5 amperes minimum.

ADJUSTMENTS (OFF CAR): *NOTE - Regulator must be reinstalled and final "On Car Adjustments" (see above) made after following "Off Car" adjustments completed.*

Regulator Lower Contact Gap: .010" measured between lower moveable contact and lower stationary contact with upper contacts closed. To adjust, bend upper stationary contact arm.

Regulator Air Gap (Upper C ntacts): .034-.038". Check air gap with test lamp (No. 57 bulb) in series with battery between regulator field terminal and regulator base. Insert a .034" wire gauge between armature and magnet core on contact side of brass stop rivet. Press armature down against gauge. Lower moveable contact should barely touch lower stationary contact and lamp should light. Insert a .038" wire gauge in same position. Light should go out. To adjust, loosen stationary bracket attaching screw and move bracket up or down.

Indicator Relay Air Gap: .015-.020" measured with flat gauge between armature and magnet core. To adjust, bend stationary contact arm up or down.

CHRYSLER CORP. ALTERNATOR & REGULATOR

CHRYSLER	Chrysler No.
Imperial & 300F	① 2095100
VALIANT	
Std. Engine	② 2095060
Hyper Pack Engine	② 2095557

① - Use Part No. 2095300 for service replacement.
② - Use Part No. 2095000 for service replacement.

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Negative battery terminal must be connected to GROUND. Positive terminal must be connected to starter lead. *DO NOT REVERSE BATTERY LEADS.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

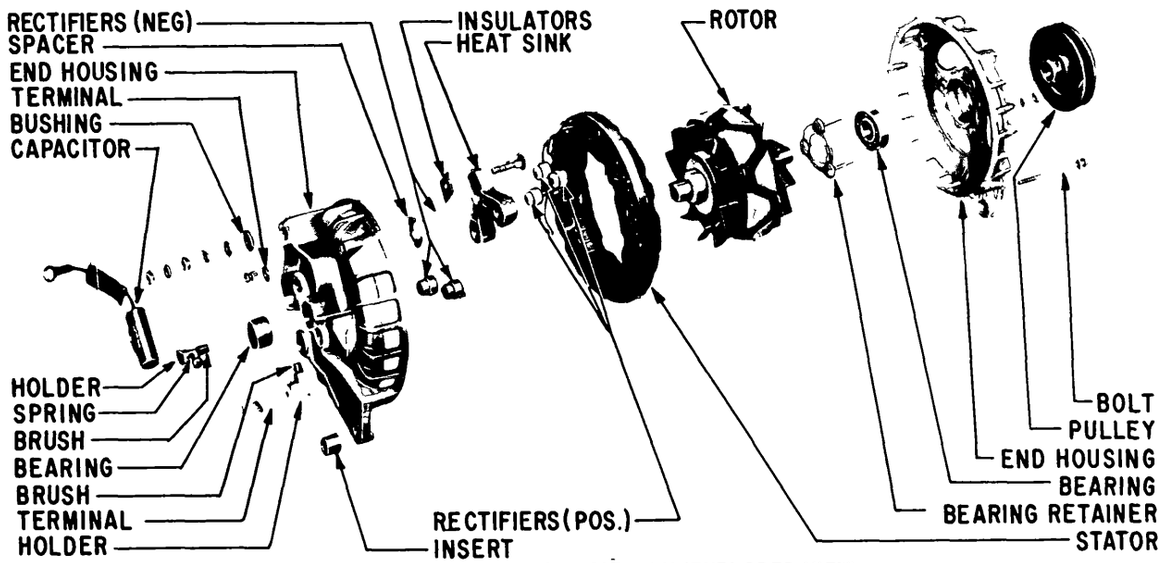
Booster Battery (Used To Start Engine) - Booster battery must be connected with negative lead to negative (ground) terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

►*EXCESSIVE AMMETER FLUCTUATION CORRECTION:* For tests and voltage regulator modification necessary, see *"Voltage Regulator"* below.

►*ALTERNATOR OUTPUT TERMINAL GROUNDING & INSULATOR CAUTION:* Output terminal of alternator must not be grounded under any circumstances (will severely damage alternator and regulator). To prevent accidental grounding of terminal, make sure that Output Terminal Insulator, Part No. 2258754, is installed on "BAT" terminal of alternator.

DESCRIPTION: Main alternator components are the two end housings, stator, rotor, and rectifiers. Housings are vented at both ends and around the circumference and held together by three through bolts. The rotor consists of a field coil encased between two six-fingered, overlapping sections which are the pole pieces, and produces a 12 pole magnetic field. Ends of the field coil are connected to slip rings and the battery is connected to field windings through brushes and the slip rings. The rotor shaft is supported at drive end by a ball bearing and at the opposite end by a roller bearing. Both bearings are pre-lubricated. Three silicon diode rectifiers having negative polarity are pressed into the end housing, and three similar diodes having positive polarity are pressed into a die cast aluminum sink. Alternator output is controlled by a voltage regulator (current regulator and cutout relay are not required).

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CHRYSLER ALTERNATOR ASSEMBLY (EXPLODED VIEW)

CHRYSLER CORP. ALTERNATOR & REGULATOR (Cont.)

SPECIFICATIONS

Performance Data (Cold - 70°)

Alternator	Amperes	Volts	Eng. RPM
2095060	35.0	15.0	1250
2095100	40.0	15.0	1250

Rotation - Clockwise at drive end.

Rated Output - 35 Amps. (2095060), 40 Amps. (2095100).

Field Coil Draw - 2.38 Amps. (min.) to 2.75 Amps. (max.) at 12 volts, with alternator rotor turned manually. 2.97 Amps. (min.) to 3.43 Amps. (max.) at 15 volts with alternator operating at 750 RPM at 70°F.

Rectifier Resistance - 4-10 ohms in forward direction. Infinity in reverse direction.

Capacitor Capacity - .158 microfarad, minimum (internally installed), .5 microfarad (externally installed).

Fuse : 7½ ampere fuse in line between regulator "IGN" terminal and ignition resistor (Regulator No. 1889960), or two fusible wires inside regulator cover (Regulator No. 2095700). *See "Fusible Wire Replacement Note" under VOLTAGE REGULATOR below.*

TROUBLE SHOOTING & DIAGNOSIS

ALTERNATOR DOES NOT CHARGE: Blown fuse or fusible wire. Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

LOW OR UNSTEADY CHARGING RATE: Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

LOW OUTPUT & LOW BATTERY: High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

EXCESSIVE CHARGING RATE: Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator winding open. Rectifier open.

REGULATOR CONTACTS OXIDIZED: Regulator setting too high or air gap incorrect. Rotor field coil winding shorted.

REGULATOR CONTACTS BURNED: Regulator setting too high. Rotor field coil winding shorted.

REGULATOR COIL WINDING BURNED: Regulator setting too high.

ALTERNATOR NOISY: Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

TESTING

ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

►*CAUTION: Do not ground field circuit between alternator and voltage regulator as regulator will be damaged.*

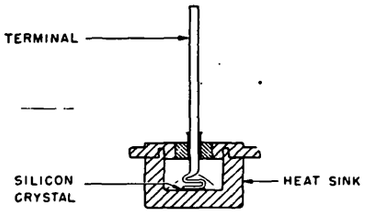
Charging Circuit Resistance: Disconnect lead at alternator output terminal and connect a 0-50 ampere scale D.C. ammeter in series between output terminal and output lead (lead disconnected from terminal). Connect positive lead of test voltmeter to output lead and connect negative voltmeter lead to battery positive terminal. Operate engine to obtain 10 amps. from alternator. *NOTE - The voltmeter reading should not exceed .2 volt.* If a higher voltage drop is indicated, inspect, clean and tighten all connections in charging circuit.

Current Output: Disconnect battery ground and disconnect alternator output lead at terminal on alternator. Connect a 0-75 ampere scale D.C. ammeter in series between alternator output terminal and output lead. Connect positive lead of test voltmeter to output lead and connect negative lead of test voltmeter to ground. Disconnect field lead at alternator and at regulator, then connect a jumper wire from alternator field terminal to alternator output terminal. Connect engine tachometer and connect battery ground cable. Connect a battery-starter tester (with variable carbon pile) to battery terminals. Operate engine at 1250 RPM, then adjust carbon pile to obtain a reading of 15 volts on test voltmeter. Current output as indicated on test ammeter should be within specifications (see Performance Data above). If output is slightly less than specified, it may be an indication of possible "open" rectifier or other alternator internal condition. If output is considerably lower, it may be an indication of a possible shorted rectifier.

Field Coil Draw: With ammeter connected in circuit as for "Current Output" above, stop engine and note the reverse current reading on ammeter, and battery voltage reading on voltmeter. The rotor field coil should draw 2.38 to 2.75 amperes at 12 volts. A low field coil draw is an indication of high resistance in field coil circuit which may be caused by brushes, slip ring, or field coil connections. A high rotor field coil draw indicates a possible shorted coil.

ALTERNATOR ON BENCH: Field Coil Draw - Connect a source of 12 volt D.C. current and a test ammeter in series to field terminal and to ground. Slowly rotate alternator rotor by hand. The test ammeter reading should be 2.38 to 2.75 amperes at 12 volts.

Rectifier (Diode) Test: Rectifiers may be tested with a test lamp or with Tester Tool C-3829 as follows: *NOTE - The usual cause of an open or blown rectifier is a defective capacitor or a battery installed with reversed polarity. If battery is installed correctly and rectifiers are open, test capacitor capacity.*



TYPICAL RECTIFIER (DIODE)

Test Lamp Method - Disassemble alternator and separate wires at "Y" connector of stator. Use a test lamp with a No. 67 (4 cp.) bulb and a 12-volt battery. Test each rectifier in turn as follows: Touch outer case of rectifier with one probe and wire in center of rectifier with other probe. Reverse the probes, moving the probe from outer case to rectifier wire and the probe at rectifier wire to outer case. If lamp lights in **one** direction, the rectifier is good. If lamp **does not** light in either direction, the rectifier is open. If lamp lights in **both** directions, the rectifier is shorted.

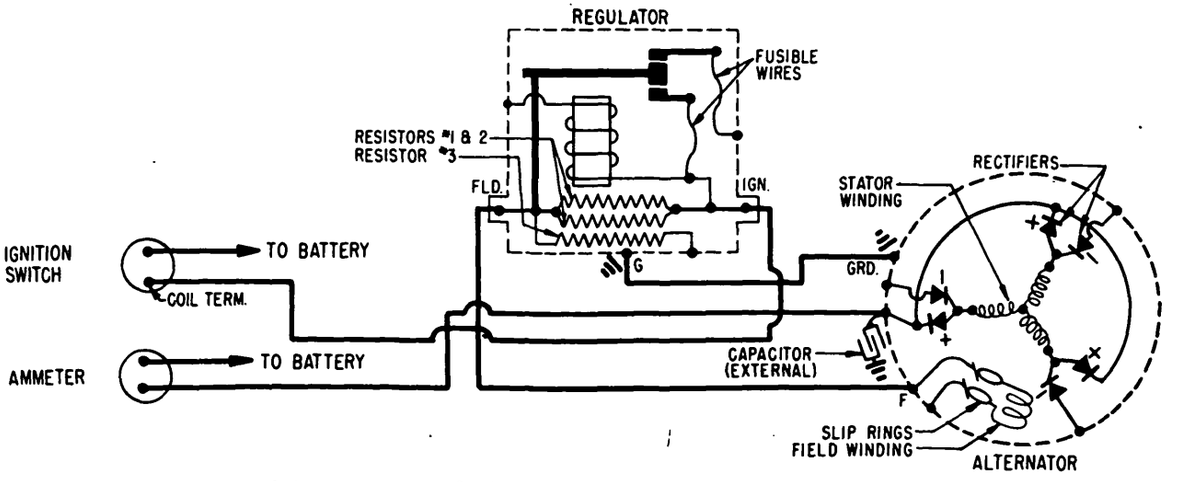
Tester Tool C-3829 Method - Remove brushes and alternator through bolts and separate rectifier end housing and stator from drive end housing and rotor.

Positive Rectifiers - With stator assembly on an insulated surface, connect tool test lead clip to alternator "BAT" (output) terminal and plug tool into 110-volt A.C. power supply. Touch probe to **bare wire connection** of each rectifier. *CAUTION* - DO NOT break sealing around rectifier lead wire or on inner end of rectifier (will accelerate corrosion).

Negative Rectifiers - Connect tool test lead clip to rectifier end housing and touch bare wire connection of each rectifier with probe.

Test Results - Good rectifiers will produce a reading of 2 amperes or more and will be approximately the

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CHRYSLER CORP. ALTERNATOR & REGULATOR INTERNAL WIRING DIAGRAM

CHRYSLER CORP. ALTERNATOR & REGULATOR (C nt.)

same for the three rectifiers tested If two rectifiers are good and one is shorted, the reading on the good rectifiers will be low and the shorted one will be zero (with bad rectifier disconnected, reading on other two will be satisfactory) If one rectifier is open, its reading will be approximately 1 ampere and the other two rectifiers will show a satisfactory reading Positive and negative rectifiers will read on opposite side of scale on tool

►*RECTIFIER RESISTANCE NOTE.* A rectifier should have 4-10 ohms resistance in forward direction and infinite resistance in reverse direction Replace rectifiers with more than 10 ohms resistance in forward direction

Stator Test: Test stator for grounds with a 110-volt test lamp *Insulate stator from rectifier end housing.* With one probe of test lamp on stator pole frame, touch each of the stator leads with other probe If lamp lights, stator windings are grounded To test windings for continuity, touch one lamp probe to **all three** stator leads at "Y" connection and other probe to each of three stator leads (disconnected from rectifiers) If lamp does **not** light at each of the three rectifier leads, stator winding is open

OVERHAUL

►*AIR CONDITIONED CAR PULLEY REMOVAL NOTE:* Double sheave pulley on air conditioned cars is smaller in diameter and requires use of modified puller blocks SP-3002 (part of Puller C-3615)

►*ALTERNATOR BEARING LUBRICATION & REPLACEMENT CAUTION:* Alternator front and rear bearings are lubricated for life If bearings become dry, install new bearings *DO NOT attempt to lubricate NOTE* - When replacing front bearing, use only Part No 2095653 which has a protective shield and install bearing with shielded side toward rotor

►*RECTIFIER (DIODE) INSTALLATION CAUTION & TOOL MODIFICATION NOTE* Design of rectifier has been changed which requires a modification to Rectifier Installing Tool C-3772 to prevent damage to rectifier seal or core To modify Increase diameter of hole in driving end of tool from 3/8" to 515" (33/64") and increase depth to 1¼" *DO NOT use smaller diameter (unmodified) tool on later design rectifiers*

DISASSEMBLY: Remove insulated brush holder retaining screw, flat washer, nylon washer, and field terminal and carefully lift plastic brusn holder (with spring and brush assembly) from end housing Remove retaining screw from ground brush holder, then lift clip, spring and brush assembly from end housing Remove through bolts and pry between stator and drive end housing with a thin blade screwdriver *CAUTION - Stator is laminated, do not burr stator or end housing* Carefully separate drive end housing, pulley and rotor assembly from stator and rectifier housing assembly Remove three nuts and washers and while supporting the end frame, tap rotor shaft with a plastic hammer and separate rotor and end housing To remove drive end bearing from rotor shaft, use Tool C-3615 and adapters C-3375 *CAUTION - Make sure lower end of adapters are equally spaced under the bearing and that tool sleeve is bottomed on bearing* Remove DC output terminal nuts and washers, terminal screw (and inside capacitor, if so equipped) If necessary, heat sink and insulator can be removed To remove rectifiers from heat sink or end housing, cut rectifier wire at point of crimp, then support rectifier housing on Tool C-3771 *NOTE - This tool is cutaway and slotted to fit over wires and around bosses in housing.* Make sure that bore of tool completely surrounds rectifier, then press rectifier out of housing with Tool SP-3380 To remove roller bearing in end housing, support housing with Tool SP-3383, then press bearing out with Tool C-3770

REASSEMBLY: Support heat sink or rectifier end housing on circular plate, Tool SP-3377 Check rectifier identification to make sure correct rectifier is being used *NOTE - Identifying part numbers are stamped on case of rectifier Rectifiers are also identified by paint marks Red for positive and black for negative* Start new rectifier in casting squarely and press in with Tool C-3772 (see note) Crimp rectifier wires to wires disconnected at removal Repeat as necessary for other rectifiers in either the end housing or heat sink Support end housing on Tool SP-3383 so that notch in support tool will clear raised section of heat sink and press bearing into position with Tool SP-3381 *NOTE - Bearings are prelubricated and additional lubrication is not required* Insert drive end bearing in drive end housing and install bearing plate, washer and nuts to hold bearing in position Position bearing and drive end housing on rotor shaft and while supporting base of rotor shaft, press bearing and housing in position on rotor shaft with arbor press and Tool C-3769 *CAUTION - Make sure bearing is installed squarely Bearing must be pressed on shaft until it contacts shoulder on shaft* Install pulley on rotor shaft (support rotor so that all pressing force is on pulley hub and rotor shaft), then press into position with an arbor press *CAUTION - Do not use a force greater than 6,800 lbs* Pulley should just contact bearing inner race Install the heat sink and insulator, then install output terminal screw, insulating washers, lockwashers, and nuts *NOTE - Some alternators have the capacitor mounted internally On these units, the capacitor is mounted on top of the heat sink insulator and is held in position with the terminal screw* Make sure heat sink and insulator are in position and tighten the locknut Position the stator on rectifier end housing *CAUTION - Make sure all of the rectifier connectors and phase leads do not interfere with rotor fans and that the capacitor (internal) lead has clearance* Position rotor assembly in rectifier end housing and align the through bolt holes in stator, rectifier end housing and drive end housing Enter stator shaft in rectifier end housing, compress stator and both end housings manually and install through bolts, washers, and nuts Install insulated brush and terminal attaching screw, then install ground brush and attaching screw Rotate pulley slowly to be sure that fans do not hit rectifier and stator connectors

VOLTAGE REGULATOR

CHRYSLER	Chrysler No.
Imperial & 300F	1889960
VALIANT	
Early Cars	① 1889960
Later Cars	② 2095700

① - With "In-Line" fuse
② - With fusible wire in regulator

►*EXCESSIVE AMMETER FLUCTUATION CORRECTION:* This condition usually indicated by excessive ammeter pointer flutter, headlight flicker and heater blower motor speed variations at steady engine speeds, and may be caused by high resistance in field circuit to alternator or voltage regulator improperly set For proper diagnosis and correction, proceed as follows Run engine at various steady speeds with heavy electrical load (headlights and accessories on) to determine degree of fluctuation Stop engine, disconnect lead at "IGN" terminal of regulator and install a jumper wire from "IGN" terminal to positive terminal of battery Operate engine at 1250 RPM and observe flutter

1) If ammeter is normal, trouble is corrosion or other high resistance in field circuit connectors Clean and tighten all connections *NOTE* - On cars with 7½ ampere fuse in circuit, clean fuse and holder terminals and tape fuse holder to prevent dirt and moisture entry
2) If jumper wire did not correct the trouble or if ammeter fluctuation is excessive regardless of engine speed or electrical load, remove voltage regulator from car and solder a piece of copper wire between 38 ohm resistor terminal connected to "IGN" terminal of regulator and regulator base *CAUTION* - Use only rosin core solder and be sure regulator base is heated enough for proper metal fusion
3) Install regulator and adjust according to procedures and specifications below

►*REGULATOR 2095700 FUSIBLE WIRE REPLACEMENT NOTE·* To replace fusible wire, proceed as follows Cut blown wire from connection at rivet in regulator base (do not unsolder as voltage coil wire may be damaged), and unwind wire from regulator contact bracket Use rosin core solder only, tin one end of Fusible Wire No 2275242 and hold wire in recess in rivet against old fuse wire Put a drop of solder on wires When cool, pull fusible wire up and wrap around contact bracket and solder wire to bracket to be sure of a good connection

DESCRIPTION: Field control type Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature On Regulator 2095700, upper stationary contact bracket is connected to "IGN" terminal by a fusible wire, and lower stationary contact bracket connected to ground by another fusible wire (Regulator 1889960 has 7½ ampere fuse in line between "IGN" terminal and ignition resistor instead of fusible wires) Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows

Upper Contact Operation (Low Speed & High Load) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current

CONTINUED ON NEXT PAGE

CHRYSLER CORP. ALTERNATOR & REGULATOR (C nt.)

L w r Contact Operation (High Speed & Low Load). Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open), and limiting field current.

CHECKING REGULATOR: Connect an ammeter in series with alternator output terminal (BAT) and the wire disconnected from alternator DC output terminal. Connect a DC voltmeter positive lead to alternator output terminal and ground the voltmeter negative lead to alternator frame or regulator base. Start engine and adjust engine speed to 1250 RPM. *NOTE - No reading on ammeter indicates blown fuse or fusible wire in regulator.* Turn on lights and electrical accessories to create enough electrical load that 15 minutes operation will stabilize the regulator temperature. Adjust electrical load so that there will be 15 amperes flowing in circuit with a fully charged battery. Voltmeter reading should be as indicated in the following table for the ambient temperature in which the regulator is operating.

►*AMBIENT TEMPERATURE NOTE: The ambient temperature is the temperature registered on a reliable thermometer positioned 2" from regulator cover.*

Voltage Setting - Ambient Temp.

Temp. (°F)	©Voltage	Temp. (°F)	©Voltage
0°	14.0-14.6	95°	13.6-14.2
25°	13.9-14.5	118°	13.5-14.1
48°	13.8-14.4	140°	13.4-14.0
70°	13.7-14.3		

© - There will be a slightly higher voltage at higher engine speeds, however, this must not exceed .7 volts at any temperature range.

ADJUSTMENT: Voltag - Adjust voltage by bending lower spring hanger of regulator **d wn** to increase voltage, up to decrease voltage. *CAUTION - Do not short circuit between spring hanger and base or spring. Use an insulated bending tool.*

Armature Air Gap: .048-.052". Check air gap with test lamp connected between ignition and field terminals on regulator. Insert a .048" wire gauge between armature and magnet core at hanger side of nylon stops. Press armature plate down. Upper contacts should open and test lamp should go dim. Insert a .052" wire gauge in the same position and depress armature. Upper contacts should remain closed and test lamp should remain bright. To adjust, bend upper contact support (1889960), loosen contact bracket attaching screw and adjust contact bracket (2095700).

Lower Contact Clearance: .015"±.001" with armature pressed down so armature rests on nylon stop. To adjust, bend lower contact arm. *NOTE - Press down on armature and not on contact spring.*

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR

► CAUTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Batt ry Installati n - Alternator polarity determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or rectifier assembly will be damaged.*

Charging Battery - If a "Fast Charger" is used, both of the car battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

Boost r Batt ry (Used T Start Engine) - Booster battery must be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

DESCRIPTION: Main alternator components are the stator, rotor, brushes, slip rings, slip ring end housing and drive end housing. Rectifier assembly is an externally mounted dry plate type which is connected to the three output terminals of the alternator. Alternator voltage and field circuit is controlled by a voltage regulator unit (see "Voltage Regulator" below for further description). *NOTE - Alternators may be either "A" circuit or "B" circuit types. Data below applies to "A" circuit types only.*

Stat r - Consists of an iron core with three phase windings electrically 120° apart wound in slots around inside circumference and forming the alternator frame. Stator leads are connected to terminal posts in slip ring end housing and these leads are connected to the external rectifier assembly by additional leads.

Rotor - Consists of a single field coil encased between two six-fingered overlapping iron sections assembled on a shaft. Some field coils contain a main field winding and a reverse high resistance shunt winding connected in parallel to the main winding to insure positive voltage control at high speeds. Other field coils have a single main winding only. Field coil leads are connected to three slip rings (two rings for main winding, one ring for reverse winding) which are insulated from each other and from the shaft. Battery is connected to field coil through brushes and the slip rings. *NOTE - Some alternators have a "double" rotor which has two main field windings and two reverse field windings.*

Slip Ring End Housing - Supports rotor shaft rear ball bearing, brush holders and brushes, and all terminals for lead connections.

Drive End Housing - Supports rotor shaft front ball bearing, pulley fan, and pulley. Through bolts hold entire assembly together.

Rectifier - Dry plate, three phase, full wave, bridge type, selenium rectifier mounted separately from alternator and connected to it by three leads from stator phase windings. Two output terminals are mounted on rectifier to connect to car wiring.

SPECIFICATIONS

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	RPM
1117083	©58	14.0	2500
1117102	②50	14.0	1250
1117103	③100	14.0	2250
1117104	②50	14.0	1250
1117105, 106	③100	14.0	2250
1117107	©40	14.0	1150
1117109, 110	④37	14.0	1150
1117111	©40	14.0	1150

© -Rated output hot 60 amps.
② - Rated output hot 55 amps.
③ - Rated output hot 105 amps.
④ - Rated output hot 50 amps.

Rotation - Counterclockwise at drive end (1117083); Either Rotation (1117102, 103, 104, 105, 106, 107, 109, 110, 111).

Brush Spring Tensi n - 13 ozs. (1117083); 9 ozs. (1117102, 103, 104, 105, 106, 107, 109, 110, 111).

Field Current Draw (80°F)

Alternator	Amperes	Volts
1117083	5.6-6.3	12.0
1117102, 103, 104, 105, 106	© 1.23-1.33	12.0
1117107, 111	1.23-1.33	12.0
1117109, 110	1.4-1.6	12.0

© - Reverse field draw .14-.15 amps. at 12 volts (8 °F).

TESTING & TROUBLE SHOOTING

►*CAUTION: 1) Do not ground alternator output terminal or alternator and circuit will be damaged.*
2) Do not polarize alternator as it is not required and doing so will damage entire system.
3) Before making test connections, ignition switch must be off.

Current Output Test: With alternator, rectifier, regulator, and battery connected in the usual manner, check current output with an ammeter. *See "Specifications" above. NOTE* - Specifications apply to alternator when operating with full field current determined only by the resistance of main field winding.

Rectifier Test: Clean gently between rectifier plates to remove dirt, using care not to damage painted surfaces. Test as follows: Connect an ammeter and a .1 ohm fixed resistor (75 ampere capacity) in series across output side of rectifier. Connect a battery and carbon pile rheostat with all resistance turned in across two of the input terminals. Adjust rheostat to test voltage shown in "Voltage & Current Specification Table" below and note the current reading. *NOTE - Mak checks quickly (within 15 seconds) to avoid overheating rectifier.* Repeat test for each of six tests (A through F) as shown in "Test Connection Table", below, reversing ammeter connections to obtain current reading. Replace rectifier if current reading not within specifications. *CAUTION - DO NOT apply more voltage than specified to input terminals as excessive current draw resulting from higher voltag will burn out rectifier.*

►*RECTIFIER TERMINAL NUMBERING NOTE:* In the following table, rectifier input terminals are numbered

CONTINUED ON NEXT PAGE

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR (Cont.)

from left to right with rectifier viewed with positive output terminal at upper left.

Test Connection Table

Test	Post. Lead to Terminal	Neg. Lead to Terminal
A	No. 1	No. 2
B	No. 2	No. 1
C	No. 1	No. 3
D	No. 3	No. 1
E	No. 2	No. 3
F	No. 3	No. 2

Voltage & Current Specification Table

Rectifier	Test Volts	Min. Current	Max. Variation
1924332	5.75	29.5 amps.	6 amps.
1926291	5.0	16.0 amps.	3.5 amps.
1930086	5.75	29.5 amps.	6 amps.
1930522	11.5	30.5 amps.	5 amps.
1932630	5.75	19.8 amps.	8 amps.
1934404	5.75	24.0 amps.	6.5 amps.

HIGH CHARGING RATE TO FULLY CHARGED BATTERY: Voltage regulator setting too high or regulator faulty. Overheated battery. Alternator field circuit grounded in alternator, regulator, or wiring.

Checking - If battery not overheated, operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, and disconnect lead from regulator "F" terminal. If output drops, regulator is faulty. If output remains high, disconnect field circuit at alternator. If output drops, wiring is grounded. If output remains high, field circuit is grounded in alternator.

►*REVERSE WINDING NOTE:* If reverse field winding is open, high charging rate to fully charged battery will be present at high speeds even though all other parts of the system function properly.

LOW CHARGING RATE & LOW BATTERY: Wiring damaged or has high resistance. Faulty battery. Drive belt loose. Alternator or regulator faulty.

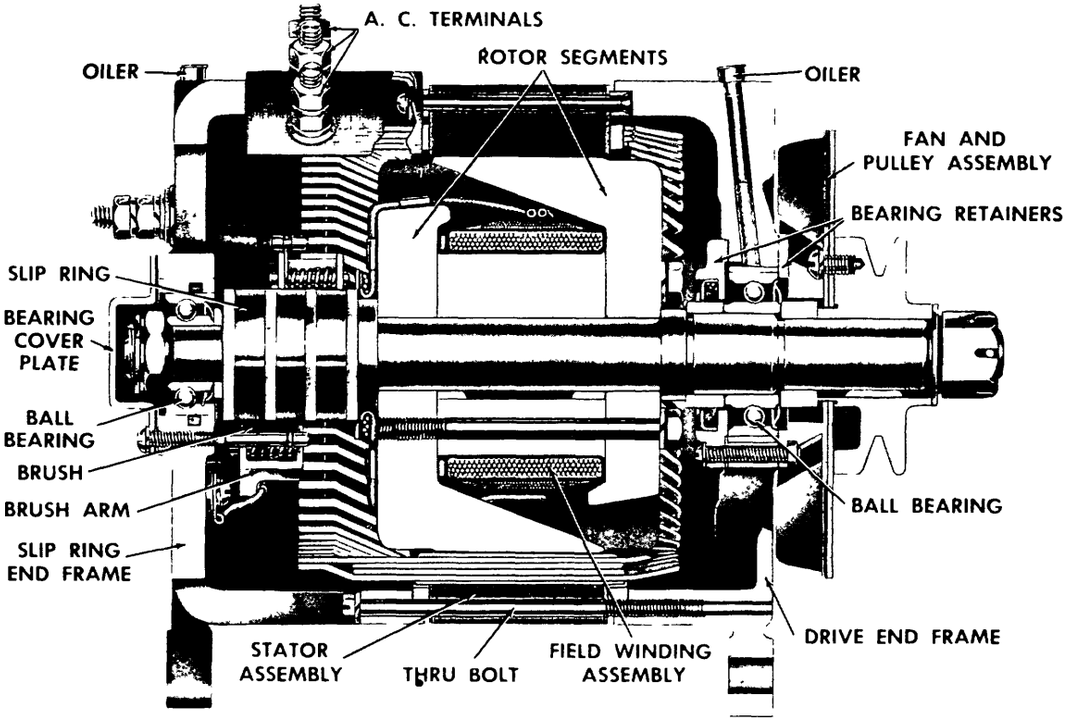
Checking - If wiring, battery, and drive belt are satisfactory, operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, turn on a 30 ampere load and momentarily ground "F" terminal of regulator. If output does not increase to approximately 30 amperes, alternator is faulty. If output increases with "F" terminal of regulator grounded, regulator setting is too low or points are oxidized.

LOW BATTERY & NO CHARGING RATE: Wiring damaged or has high resistance. Battery faulty. Rectifier faulty. Alternator or regulator faulty.

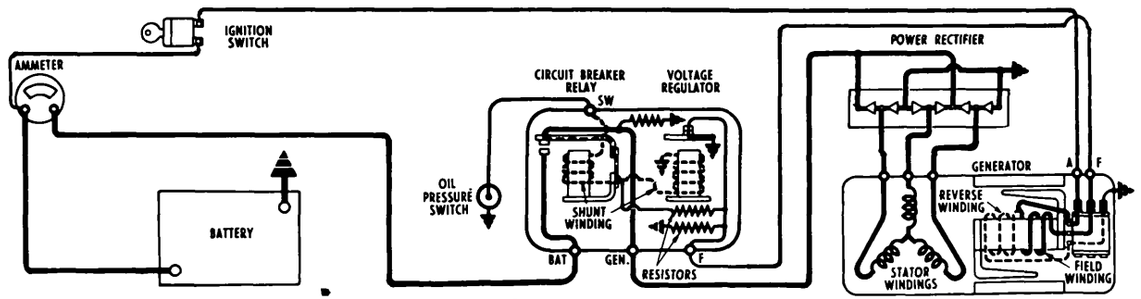
Checking - If wiring and battery are satisfactory, proceed as follows: 1) Operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, and measure output voltage at rectifier. If voltage sufficient to charge battery, alternator and rectifier are good.

2) Oil Pressure Switch Control Type Circuit - Check oil pressure switch by connecting a jumper wire from

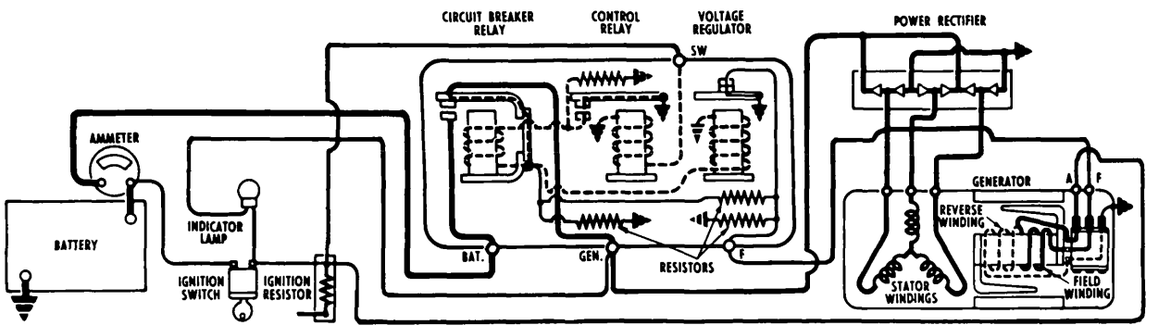
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TYPICAL DELCO-REMY ALTERNATOR (SECTIONAL VIEW)



DELCO-REMY ALTERNATOR & 2-UNIT REGULATOR WIRING DIAGRAM



DELCO-REMY ALTERNATOR & 3-UNIT REGULATOR WIRING DIAGRAM

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR (Cont.)

"SW" terminal of regulator to ground If alternator charges, replace oil pressure switch If oil pressure switch good, circuit breaker relay in regulator is faulty

3) R gulat r C ntr l R lay Type Circuit - If control relay contacts are closed but circuit breaker relay contacts are open circuit breaker relay winding is open If control relay contacts do not close, control relay winding is open If both control relay and circuit breaker relay contacts are closed, there is an open series circuit in regulator

4) Check field current draw by disconnecting rectifier from alternator, operating alternator at idle speed and connecting a low reading ammeter in series with the field circuit at regulator "F" terminal If field current less than specified (see "Specifications" above), ground regulator "F" terminal and recheck If field current remains low, alternator field circuit is faulty If field current increases to specifications, regulator has an open field circuit or oxidized contact points

5) If field current normal, check stator winding voltages at alternator output terminals with rectifier disconnected from alternator If voltages vary more than 2 volt, stator windings are shorted If stator windings are satisfactory, reconnect rectifier and recheck If voltages vary more than 1 volt with a charge rate of 30 amperes, rectifier is faulty (see "Rectifier Test" above) If voltages vary less than 1 volt with rectifier connected, regulator has a low voltage setting

EXCESSIVE REGULATOR CONTACT POINT ARCING: Regulator resistors open Alternator main field winding shorted

OVERHAUL

Disass mbly: Remove through bolts and separate end housings from stator Remove rotor from stator Use a gear puller or arbor press to remove bearings from end housings or rotor shaft For rotor disassembly, see "Field Coil Replacement" below

B arings: Replace bearings if worn or defective

Brush s: Brushes should be a free fit in holders Replace brushes if worn to less than ½ original length (compare with new brushes) Check brush spring tension (see "Specifications" above) and bend spring as required

Slip Rings· If rough or out-of-round, slip rings can be trued in a lathe **if outside diameter is never reduced below 1 560'**. If slip rings cannot be trued to maintain minimum diameter, replace as follows Remove glass twine between slip ring assembly and rotor segment and unsolder leads Pull slip ring assembly from shaft with a gear puller *Note position of leads in relation to tab to which connected DO NOT shorten leads* Clean shaft and rotor segment surfaces in contact with slip rings of varnish to assure proper fit of new assembly Press new assembly on shaft using keyway as a guide Solder field leads using rosin flux wrap several layers of glass or cotton twine between tabs and rotor, and coat twine with glyptol or varnish Turn slip rings in a lathe to 1 625" diameter and polish smooth with No 00 sandpaper

Stat r: Use a 110-volt test lamp and check for circuit between each stator terminal and frame If lamp lights, stator winding is grounded Check circuit between each two stator terminals If lamp does not light, stator winding is open To test for short circuited stator, see step **5)** under LOW BATTERY & NO CHARGING RATE above

Rotor: Use a 110-volt test lamp and check rotor field windings for ground by connecting test lamp between each slip ring and rotor shaft or segments If lamp lights, reverse or main field winding is grounded Check for open field winding by connecting test lamp between each two slip rings If lamp does not light when connected to any two slip rings, a field winding is open To check for shorted field windings, check field current draw (see "Specifications" above) by connecting voltmeter to both slip rings If rotor has also a reverse field winding, connect voltmeter as follows Number slip rings with other ring as No 1, middle ring No 2, and ring nearest rotor segment No 3 To check main field, connect rings No 2 & 3 To check reverse field, connect rings No 1 & 3 If current draw is more than specified, a winding is shorted *CAUTION - To insure accurate measurement, connect voltage source directly to slip rings*

Field Coil Replacement - Disassemble rotor assembly by removing slip ring assembly, pressing rotor shaft out with an arbor press, and removing through bolts holding rotor segments together Note relative position of parts for reassembly *CAUTION - Use a soft hammer only if necessary to tap parts loose* Wash all metal parts in caustic solution to remove varnish At reassembly, be sure that rubber washer fits **around** rotor core After reassembly, dip rotor assembly in a modified phenolic varnish and bake to prevent movement of winding in any direction

Reassembly· Reverse disassembly procedure, installing all parts in proper order Hold brushes away from slip rings to prevent damage when installing rotor When pressing fan and pulley on shaft, support shaft, not end housing to prevent brush damage

VOLTAGE REGULATOR

DESCRIPTION: Two and three unit types used **Two unit type** has a voltage regulator of conventional design and a circuit breaker relay to control the D C current between the rectifier and battery Circuit breaker relay is operated by D C voltage from rectifier when engine oil pressure switch completes circuit to ground **Three unit types** have same type voltage regulator and circuit breaker relay as two unit type, and in addition, a circuit breaker control relay which closes and opens the ground circuit of circuit breaker relay when ignition switch is turned on or off

SPECIFICATIONS

Voltage Regulator

Normal Setting - 13 8-14 8 volts at 125°F ambient temperature

Air Gap - 075" with armature pressed down until contacts just touch

Circuit Breaker Relay

Closing Voltage - 7 5-10 5 volts (1119159 160), 7 5-9 5 volts (Others)

C ntact Gap - 027" (1119159, 160), 032" (Others) with armature against upper armature stop

Air Gap - 013" (1119159 160), 017" (Others) with armature pressed down until contacts just touch

Contr l Relay

Closing Voltage - 7 5-10 5 volts

C ntact Gap - 025" with armature against upper armature stop

Air Gap - 035" with armature pressed down until contacts just touch

TESTING & TROUBLE SHOOTING: *See "Testing & Trouble Shooting" above*

ADJUSTMENT

►*ADJUSTMENT CAUTIONS* **1)** Before checking or adjusting, bring regulator to operating temperature of 125°F by connecting a ¼ ohm resistance in series with battery and operating regulator for 15 minutes with cover in place and no other load than ignition until regulator heated and temperature stabilized

2) Voltage regulator checks must be made at alternator speed of 3000 RPM or at maximum operating speed of alternator, whichever is lower

3) Alternator must be cycled after each electrical adjustment and before each check reading is made as follows Connect a 25 ohm, 25 watt rheostat in series with field circuit Reduce voltage below 4 volts by setting variable resistance at maximum, opening circuit to "IGN" or "SW" terminal of regulator by disconnecting lead or turning off ignition, and reconnecting circuit or restarting engine and bringing voltage up by decreasing resistance

ELECTRICAL CHECKS & ADJUSTMENTS: Voltage Regulator - *See 'Delco-Remy 1119000, 1119100, 1119200, 1972000 Series Single Contact Regulators in this section*

Control Relay: Adjust closing voltage as follows With "BAT" and "SW" terminal leads disconnected, connect a jumper wire between "GEN" and "SW" terminals, and a voltmeter between "SW" terminal and ground Connect a 25 phm, 25 watt variable resistor in field circuit at "F" terminal with all resistance turned in With alternator at idle speed, decrease resistance until contacts close and note voltage reading Adjust by turning spring adjusting screw Increase spring tension to increase setting Remove jumper lead and reconnect "SW" lead to terminal

Circuit Breaker Relay: Disconnect lead from regulator "BAT" terminal **On Oil Pressure Switch control,** connect a jumper between "SW" terminal and ground and a voltmeter between "SW" and "GEN" terminals **On Control Relay control,** connect a voltmeter between "GEN" terminal and regulator base **On all types** connect a 12-volt lamp between "BAT" terminal and regulator base With a 25 ohm, 25 watt variable resistor in field circuit at "F" terminal and alternator at idle speed slowly decrease resistance until lamp lights and note voltage Adjust by turning spring adjusting screw Increase spring tension to increase setting

MECHANICAL ADJUSTMENTS: Make adjustments as follows

Air Gap· With armature pressed down until contacts just close, measure gap between armature and core *See Specifications* Adjust as follows

Voltage Regulator - Loosen upper contact mounting screws and raise or lower contact as required

Circuit Breaker Relay - Loosen adjusting screws on back of relay and raise or lower armature as required

Contr l Relay - Bend lower contact support

Contact Gap: Check with armature against upper armature stop and adjust by bending upper armature stop *See Specifications*

DELCO-REMY ALTERNATOR (INTERNAL RECTIFIER) & TRANSISTORIZED REGULATOR

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION Reversed polarity or excessive voltage will result in extensive damage to alternator system NOTE THE FOLLOWING TO PREVENT DAMAGE*

Battery Installation - Alternator polarity determines which battery terminal is grounded For negative polarity alternators, **negative** battery terminal must be grounded *DO NOT REVERSE BATTERY LEADS or rectifiers will be damaged*

Charging Battery - If a "Fast Charger" is used, both car battery cables must be disconnected from battery *DO NOT use a 'Fast Charger" to provide starting voltage*

Booster Battery (used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery *DO NOT REVERSE BATTERY LEADS*

DESCRIPTION· Main alternator components are the stator, rotor, slip ring end housing, drive end housing and rectifiers (diodes) Rectifiers are mounted in slip ring end housing Alternator voltage and output is controlled by a transistorized voltage regulator unit and a separate field relay unit on some applications (see "Voltage Regulator" below for further description) *NOTE - Alternators may be either "A" circuit or "B' circuit types Data below applies only to "A' circuit negative ground types*

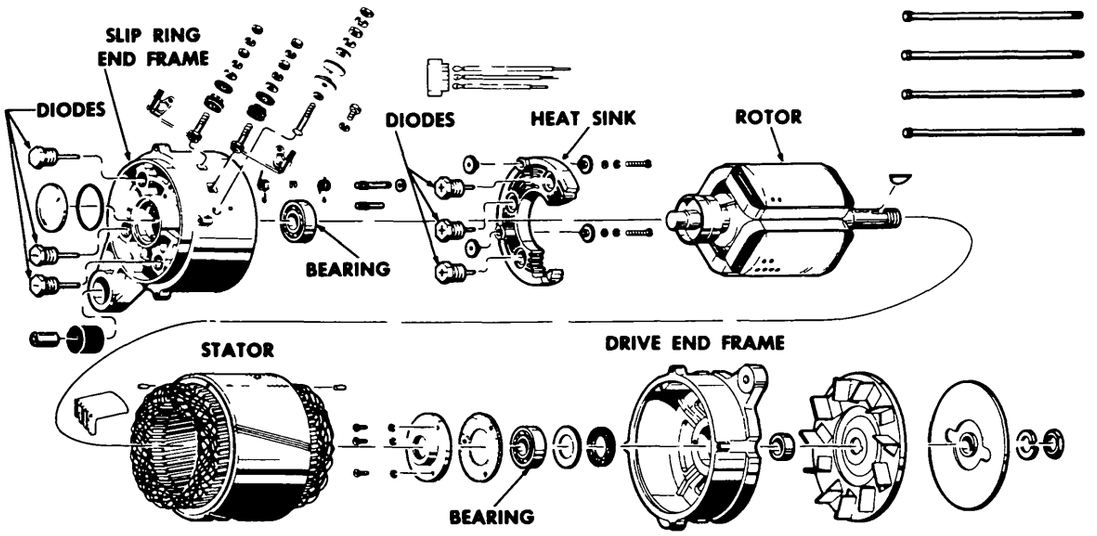
Stator - Consists of a laminated iron core with three phase windings electrically 120° apart wound in slots around inside circumference of core Outer surface of core forms the alternator frame One end of each stator winding is connected to a pair of rectifiers in the slip ring end housing The other ends of the stator windings are connected together

Rotor - Two types used **1)** Consists of four field windings wound on a four pole rotor and shaft **2)** Consists of a single field coil encased between two six-fingered overlapping iron sections assembled on a shaft **On all r tors,** the ends of the field coils are connected to two slip rings insulated from each other and the shaft Battery is connected to field coils through two brushes and the slip rings

Slip Ring End Housing - Supports rectifiers, ball bearing for rotor shaft, brush holders and brushes, and field and output terminals *NOTE - Some alternators have three A C terminals in addition to output ('BAT') terminal so a transformer may be connected to step up A C voltage*

Drive End Housing - Supports ball bearing for rotor shaft Through bolts hold entire assembly together

Rectifiers (Diodes) - Three rectifiers with "—" case mark and right hand threads have negative polarity and are mounted in the slip ring end housing and grounded through the end housing The other three rectifiers are marked "+" on case, have left hand threads and have positive polarity They are mounted in a nylon heat sink which is mounted in but insulated from the slip ring end housing The positive rectifiers are connected through the heat sink to alternator output terminal A negative and a positive rectifier are connected to each of the three stator windings *NOTE - Rectifier lead has opposite polarity to polarity of the rectifier case*



DELCO-REMY ALTERNATOR (WITH INTERNAL RECTIFIERS)

SPECIFICATIONS

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	RPM
1117070, 077, 078	①58	14 0	2500
1117081, 082	①58	14 0	2500
1117114, 116	②47	14 0	1500
1117115, 117	③98	14 0	2500
1117125, 126	125	14 0	2500

① - Rated output hot 60 amps
② - Rated output hot 50 amps
③ - Rated output hot 105 amps

Rotation - Clockwise at drive end (1117070, 078, 081, 082, 114, 115, 116, 117, 125, 126) Counterclockwise at drive end (1117077)

Brush Spring Tension - 13 ozs (1117070, 114, 115, 116, 117, 125, 126), 15 ozs (1117077, 078, 081, 082)

Field Current Draw (80°F)

Alternator	Amperes	Volts
1117070,077,078,081,082	5 6-6 3	12 0
1117114, 116	1 8-2 0	12 0
1117115, 117	1 23-1 33	12 0
1117125	2 07-2 23	12 0
1117126	2 07-2 33	12 0

TESTING & TROUBLE SHOOTING

►*CAUTION* **1)** *Do not ground alternator output terminal or alternator and circuit will be damaged*

2) *Do not polarize alternator as it is not required and doing so will damage entire system*

3) *Before making test connections, ignition switch must be off*

Current Output Test: On 4-terminal r gulat rs, connect an ammeter in circuit at alternator "BAT" terminal, a voltmeter from alternator "BAT" terminal to ground connect regulator "BAT" and "F2" leads together and disconnect and ground regulator "F1" lead Connect a carbon pile rheostat across battery to prevent high voltage **On 3-terminal regulators,** connect ammeter, voltmeter and carbon pile rheostat as in 4-terminal type above Disconnect "F2" and "BAT" leads from regulator "BAT" terminal but leave the leads connected to each other Disconnect and ground regulator "F" (alternator "F1") lead **On all units,** slowly increase alternator speed and check for rated output *See Specifications CAUTION - Alternator voltage must not exceed recommended voltage regulator setting*

BATTERY UNDERCHARGED· Drive belt loose Battery faulty Field relay faulty High circuit resistance Alternator faulty Regulator contact points oxidized Regulator transistor open Regulator diode shorted Voltage regulator setting too low

Checking - **1)** Check field relay as follows Connect a voltmeter from alternator "F2" terminal to ground Turn on ignition switch Voltmeter will indicate battery voltage if relay contacts are closed If no reading obtained contacts are open and relay is faulty

2) Check alternator output (see "Current Output Test" above) If battery is good, all circuit connections are satisfactory, field relay operates correctly and alternator is satisfactory other regulator trouble is indicated Proceed as follows

3) With all leads disconnected from regulator, connect negative terminal of a 12 volt battery to regulator base From positive terminal of battery connect an ammeter and a 2 6 ohm 50-75 watt resistor in series with regulator "F" (3-terminal type) "F1" (4-terminal type) terminal Ammeter reading less than 4 1 amperes

CONTINUED ON NEXT PAGE

DELCO-REMY ALTERNATOR (INTERNAL RECTIFIER) & TRANSISTORIZED REGULATOR (C ntinued)

indicates high resistance in voltage regulator contacts or in transistor. Ground base terminal of transistor with a jumper wire. *NOTE - Base terminal is the soldered connection inside regulator common to the two wire-wound resistors.* If ammeter reading increases to 4.1 amperes or more, voltage regulator contact circuit has high resistance. If current does not increase to 4.1 amperes, transistor has high resistance and must be replaced. *See "Voltage Regulator" below for transistor replacement.*

4) If regulator contacts and transistor are satisfactory, check for shorted diode as follows: Disconnect all leads from regulator. **On 4-terminal types,** connect ohmmeter positive lead to "F2" terminal and negative lead to "F1" terminal. **On 3-terminal types,** connect ohmmeter positive lead to "BAT" terminal and negative lead to "F" terminal. If there is no resistance reading, diode is shorted and must be replaced. *CAUTION - It is very important to determine ohmmeter polarity before making this test or regulator will be damaged.*

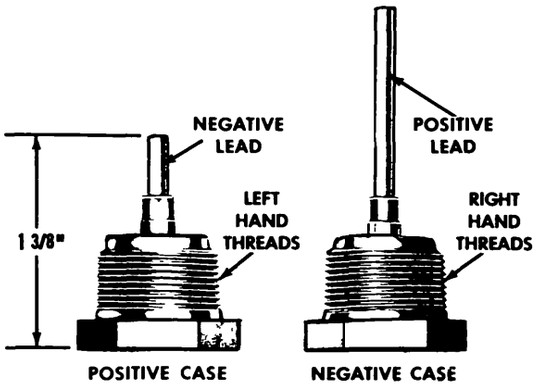
BATTERY OVERCHARGED: Battery faulty. Alternator field circuit grounded. High charging circuit resistance. Regulator transistor shorted. Regulator diode open (resulting in shorted transistor). Voltage regulator setting too high.

Checking - 1) If battery in good condition, check for grounded alternator field circuit. *NOTE - Alternator must be disassembled to make this test. See "Overhaul" below for procedure.*

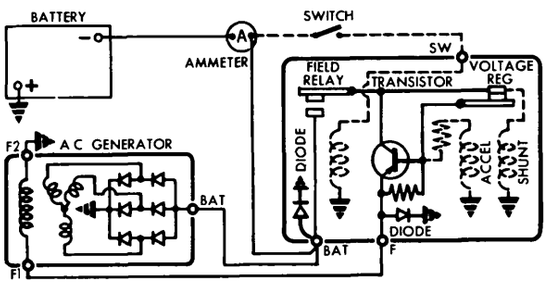
2) Check for high circuit resistance as follows: Connect an ammeter in circuit at alternator "BAT" terminal and a voltmeter from alternator "BAT" terminal to ground. Connect a carbon pile rheostat across battery. Connect another voltmeter from regulator "BAT" terminal to battery positive post. Slowly increase alternator speed to obtain alternator rated output. *CAUTION - Alternator voltage must not exceed recommended voltage regulator setting.* Maximum voltage drop should not exceed .3 volt.

3) Check for shorted transistor as follows: With all leads disconnected from regulator, connect an ohmmeter positive lead to transistor base (junction point common to the two wire-wound resistors) and ohmmeter positive lead to regulator "F1" (4-terminal type), "F" (3-terminal type) terminal. Note ohmmeter reading. Place ohmmeter negative lead on regulator base (ground) and note reading. Then leave ohmmeter negative lead at ground and move positive lead to "F1" or "F" terminal and note reading. *NOTE - Hold voltage regulator contacts open during all three checks.* A zero reading for any of the three checks indicates a shorted transistor. *CAUTION - Ohmmeter polarity must be determined before making above tests.*

4) If shorted transistor is found in above test, check alternator field for short (see "Overhaul" below), and check regulator diode for open condition as follows: Reverse ohmmeter connections used for checking for shorted diode (see **4** under BATTERY UNDERCHARGED above). Diode is open if reading is approximately 20-60 ohms.



DIODE (RECTIFIER) IDENTIFICATION



ALTERNATOR & REGULATOR WIRING DIAGRAM

►*VOLTAGE SETTING TAILORING NOTE:* If no circuit defects are found during all of the above tests and battery remains constantly over, or undercharged, voltage regulator setting may be raised or lowered .3 volt to compensate for various operating conditions.

OVERHAUL

Disassembly: Remove through bolts and remove drive end housing and rotor assembly from stator and slip ring end housing assembly. Separate rotor and drive end housing by removing bearing retainer plate screws, pulley nut, pulley, fan, and woodruff key. Bearings may be removed from shaft by pressing shaft from bearings supporting **inner race** of bearing only to prevent damage. Separate slip ring end housing and stator assembly by removing three A.C. terminal leads (if equipped) and prying both parts apart slowly, using a screwdriver to pry apart nylon stator winding-to-rectifier connector.

Rectifier Checking: *CAUTION - Use ohmmeter with 1½-volt cell and a scale on which 300 ohm value is at or near mid-scale and can be accurately read. Ohmmeter polarity MUST be determined before checks are made. DO NOT use 110-volt test lamp or other high voltage. Observe the following procedures exactly.* Check rectifiers for **sh rts** as follows: On **negativ** rectifiers, connect ohmmeter negative lead to rectifier case, and positive ohmmeter lead to rectifier lead. For **p sitive** rectifiers, reverse ohmmeter connections. Ohmmeter readings may vary among rectifiers, but a reading below 300 ohms indicates a shorted rectifier. To check for **p n circuit** on **negative** rectifiers, connect ohmmeter negative lead to rectifier lead, and ohmmeter positive lead to rectifier case. **Reverse** connections for **positiv** rectifiers. If ohmmeter indicates an infinite resistance, rectifier is open.

Rectifier Replacement - *Observe the following whil replacing rectifiers:* When cutting rectifier leads, leave ½" of lead on each side of rectifier lead to match new rectifier. Coat new rectifier threads lightly with silicone grease or light engine oil before installing. Torque new rectifier to 200 inch-lbs. Do not bend rectifier lead. Use only 60% tin, 40% lead solder, or other solder with 360°F or above melting point. Negative rectifiers have right hand threads, positive rectifiers have left hand threads. Replace as follows:

Negative Rectifiers - Clip leads on each side of rectifier lead and replace rectifier, observing cautions listed above.

Positive Rectifiers - Clip lead midway between each pair of negative and positive rectifiers. Remove nylon stator terminal holder from housing and leads from holder. Remove heat sink and "BAT" terminal attaching screws and remove heat sink from end housing. Replace rectifier, observing cautions listed above.

Rotor: Use a 110-volt test lamp and check as follows: for grounded coils, connect test lamp from either slip ring to rotor shaft or to laminations. If lamp lights, field is grounded. For open circuit, connect test lamp to each slip ring. If lamp does not light, field circuit is open. For short circuit, check field current draw by connecting a battery and ammeter in series with the two slip rings. Current draw should be as specified. *S Specifications.* If reading higher than specified, field windings are shorted. Replace rotor assembly or field winding as necessary.

Stator: Use a 110-volt test lamp and check as follows: For grounded windings, connect test lamp from any stator terminal to stator frame. If lamp lights, windings are grounded. For open circuit, connect test lamp successively between each pair of stator terminals. If lamp does not light, windings are open. A short circuit in stator may be assumed if all other electrical checks are normal and alternator does not produce rated output.

Slip Rings: If slip rings rough or out-of-round, true in a lathe. Remove no more than .001" (4-coil rotor type), .002" (single field rotor type) maximum diameter from slip rings. To replace slip rings, pull old assembly from shaft after leads unsoldered. Press new assembly on shaft using a sleeve over shaft so pressure applied to slip ring inner collar only. Use only pure tin solder when making connections. New slip rings **must** be trued in a lathe and polished.

Brushes: Replace brushes if worn to less than ½ original length (compare with new brushes). Check brush spring tension *(see Specifications)* and replace springs if necessary.

Reassembly: Reverse disassembly and note the following: **B arings** - Fill each bearing lubricant reservoir **half full** with Delco-Remy Lubricant No. 3 (No. 1948791) and pack bearings with same lubricant. Make sure sealed

CONTINUED ON NEXT PAGE

DELCO-REMY ALTERNATOR (INTERNAL RECTIFIER) & TRANSISTORIZED REGULATOR (Continued)

side of slip ring end housing bearing is installed away from grease reservoir and open side toward reservoir

Brushes - Lift brushes from slip rings when installing rotor to prevent brush and slip ring damage

TRANSISTORIZED VOLTAGE REGULATOR

DESCRIPTION: Transistorized type with diode Transistor works with a conventional type voltage regulator unit to limit alternator voltage to pre-set value The diode reduces arcing at voltage regulator contacts by dissipating energy created in alternator field windings when voltage regulator contacts separate The two types of transistorized regulators are used.

4-Terminal Type - Used in circuits with an ammeter Assembly contains a conventional vibrating type voltage regulator and a field relay Terminals are marked "BAT", "F1", "F2", "SW"

3-Terminal Type - Used in circuits with either an ammeter or charge indicator light Assembly contains a conventional vibrating type voltage regulator and an indicator light relay Terminals are marked "L", "F", "BAT" When an ammeter is used instead of a charge indicator light, the indicator light relay is not used and no connection is made at the "L" terminal On all charging system circuits using this type regulator, an additional separately mounted field relay is used to energize alternator field circuit

SPECIFICATIONS

Voltage Regulator
(Regulator No. 9000552, 562, 563, 554)

Normal Setting - 13 0-13 6 volts, adjust to 13 4 volts (9000552, 563, 554) 13 9-14 6 volts, adjust within range regardless of temperature (9000562)

Air Gap - 075" (9000552, 563, 554), 070" (9000562) with armature pressed down to point where contacts just touch

Field Relay (Integral)
(Regulator No. 9000552, 562, 563)

Closing Voltage - 5 0-9 5 volts
Air Gap - 014" with points just touching
Contact Gap - 027"

Field Relay (Separate)
(Relay No. 1116895)

Closing Voltage - 7 0-9 0 volts
Sealing Voltage - 11 volts maximum
Air Gap - 010" with contacts just touching
Contact Gap - 015- 025"

Indicator Light Relay
(Regulator No. 9000554)

Voltage Setting - Contacts should close 2 volts lower than voltage regulator setting

Air Gap - 075" with armature pressed down to point where contacts just touch

TESTING & TROUBLE SHOOTING: *See "Testing & Trouble Shooting" above*

CHECKING & ADJUSTMENT

►*ADJUSTMENT CAUTIONS* **1) 4-Terminal Type** - *DO NOT short across "F1" and "F2" terminals of either alternator or regulator*

2) 3-Terminal Type - *DO NOT short across "F" and "BAT" regulator terminals, or across "F1" and "F2" alternator terminals*

3) *DO NOT attempt to polarize alternator*

4) Before checking or adjusting, bring regulator to operating temperature of 125°F by connecting a ¼ ohm resistor in series with battery and operating alternator at 3000 RPM for 15 minutes with 3-10 amperes output, with regulator cover in place, until regulator heated and stabilized After warm-up completed, cycle alternator by stopping and restarting alternator

4-Terminal Regulator

Voltage Regulator Air Gap - Push armature down against a wire gauge until contacts just touch Adjust upper contact support for proper gap with contacts aligned *See Specifications*

Voltage Setting - Bring regulator to ambient temperature as described under "Adjustment Cautions" above Connect an ammeter in circuit at alternator "BAT" terminal and a voltmeter from regulator "BAT" terminal to regulator base (ground) With alternator operating at 3000 RPM and charging at 3-10 amperes, cycle alternator, bring back to 3000 RPM and 3-10 amperes charge and note voltmeter reading and regulator temperature If not within range shown in "Setting Table" below, adjust armature spring tension by turning adjusting screw as required Cycle alternator, bring back to 3000 RPM and 3-10 amperes charge and note reading Make final adjustment as required *CAUTION - Always make final setting by turning adjusting screw clockwise to hold spring holder against screw head*

Voltage Setting Table

Temperature (°F)	Setting Range
145°	12 7-13 3 volts
125°	13 0-13 6 volts
105°	13 3-13 9 volts
85°	13 6-14 2 volts
65°	13 9-14 5 volts
45°	14 2-14 8 volts
25°	14 5-15 1 volts

►*VOLTAGE SETTING TAILORING NOTE* If battery consistently over- or undercharged after voltage regulator properly set and all other checks indicate no circuit defects, voltage regulator setting may be raised or lowered 3 volt to compensate for various underhood temperatures and other operating conditions Allow reasonable length of time to check performance Proper setting is obtained when battery remains fully charged with minimum use of water

Field Relay Air Gap - Measure air gap with armature pressed down to point where contacts just touch *See Specifications NOTE - If point opening and closing voltage within specifications, relay will operate satisfactorily even if air gap not exactly within specifications*

Contact Gap - Check with feeler gauge *See Specifications* To adjust, bend flat contact support spring

Closing Voltage - *Make this check after setting voltage regulator and before unit cools* Connect a 50 ohm variable resistor in circuit from ignition switch and "SW" terminal of regulator Connect a voltmeter from "SW" terminal to regulator base (ground) With all resistance turned into circuit, turn on ignition switch and slowly decrease resistance until relay contacts close and note voltage If not as specified, adjust by bending armature spring post as required *See Specifications*

3-Terminal Regulator

Voltage Regulator Air Gap - Push armature down against a wire gauge until contacts just touch Adjust upper contact support for proper gap with contacts aligned *See Specifications*

Voltage Setting - Make connections as follows Connect an ammeter in circuit at "BAT" alternator terminal, and a voltmeter from regulator "BAT" terminal to regulator base (ground) *Adjustment procedures and cautions are the same as for "4-Terminal Regulator" above*

Indicator Light Relay Air Gap - With armature pressed down to point where contacts just touch, measure air gap with a wire gauge Adjust upper contact support for proper gap with contacts aligned *See Specifications*

Closing Voltage - *Make this check after setting voltage regulator and before unit cools* Disconnect alternator "F2" lead from regulator "BAT" terminal and connect a 50 ohm variable resistor in circuit from regulator "BAT" terminal to separately mounted field relay Connect a voltmeter from regulator "BAT" terminal to regulator base (ground) *CAUTION - Do not operate alternator with resistor in circuit* With all resistance turned out of circuit, turn on ignition switch *NOTE - Battery must have sufficient charge to cause contacts to open when resistance out of circuit* Slowly increase resistance and note voltage when contacts close Closing voltage should be 2 volts lower than voltage regulator setting *See Specifications*

Field Relay (Separately Mounted Type): Air Gap - With upper contacts pushed down until contacts just touch, adjust gap between armature and core by bending lower contact support *See Specifications*

Contact Gap - With armature against upper armature stop, measure contact gap with a feeler gauge, and bend upper armature stop to adjust *See Specifications*

Closing Voltage - Connect a variable resistor in circuit from field relay to indicator light, and a voltmeter from same relay terminal to relay base (ground) With all resistance turned into circuit, turn on ignition switch and slowly decrease resistance until relay points close and note voltage *See Specifications* To adjust, bend armature spring post

Sealing Voltage - After contact points have closed in "Closing Voltage" check above, continue to decrease resistance until armature seals to core and note voltage *See Specifications* To adjust, decrease air gap slightly by bending lower contact support *Readjust contact gap if air gap changed*

UNIT REPLACEMENT

Transistor Replacement - Remove two attaching screws on underside of regulator and unsolder connections inside regulator, directly above transistor *CAUTION - Hold soldering time as short as possible as transistors are easily damaged by excessive heat*

Diode Replacement. *NOTE - Diode mounted on underside of regulator on some early types, and inside regulator near voltage regulator unit on later types* Unsolder both diode connections and replace with new diode *CAUTION - Hold soldering time as short as possible as diodes are easily damaged by excessive heat*

LEECE-NEVILLE ALTERNATOR & REGULATOR

FORD CARS & TRUCKS

Alternator	Leece-Neville No.	Ford No.
30 Amp	5432-G6	B8TZ-10346-A
30 Amp	5392-GB6	B8TZ-10346-E
50 Amp	A0015468-GA	① B8TZ-10346-G
50 Amp	5428-G6	B8TZ-10346-F
60 Amp	A0012088-AA	② C1TF-10346-B
60 Amp	A0012072-AA	③ C1TF-10346-C
60 Amp	A0012106-AA	④ C1TF-10346-D
100 Amp ⑤	5440-G6	B8TZ-10346-C
100 Amp ⑤	5412-GA6	⑥ B8TZ-10346-D

RAMBLER

Alternator	Leece-Neville No.	Rambler No.
50 Amp	A0015428-GA⑦	3156484
60 Amp	A0012036-AA	3159384

STUDEBAKER

Alternator	Leece-Neville No.	Studebaker No.
50 Amp Std	5270-GB6	1543136
50 Amp H D & 60 Amp	5412-GA6	1543137
60 Amp	A0012002-AA	1550006

① - Replaces B8C-10002-B May also be marked B9FA-10300-A
② - Identification Nos C1TF-10300-D, E, G, H
③ - Identification Nos COTF-10300-E, C1TF-10300-C,K
④ - Identification Nos C1TF-10300-F, J, M
⑤ - Also 50 Amp H D
⑥ - May also be marked B9FA-10300-B
⑦ - External Rectifier No C0011068-CA (Rambler No 3149242)

►CHANGES, CAUTIONS, CORRECTIONS

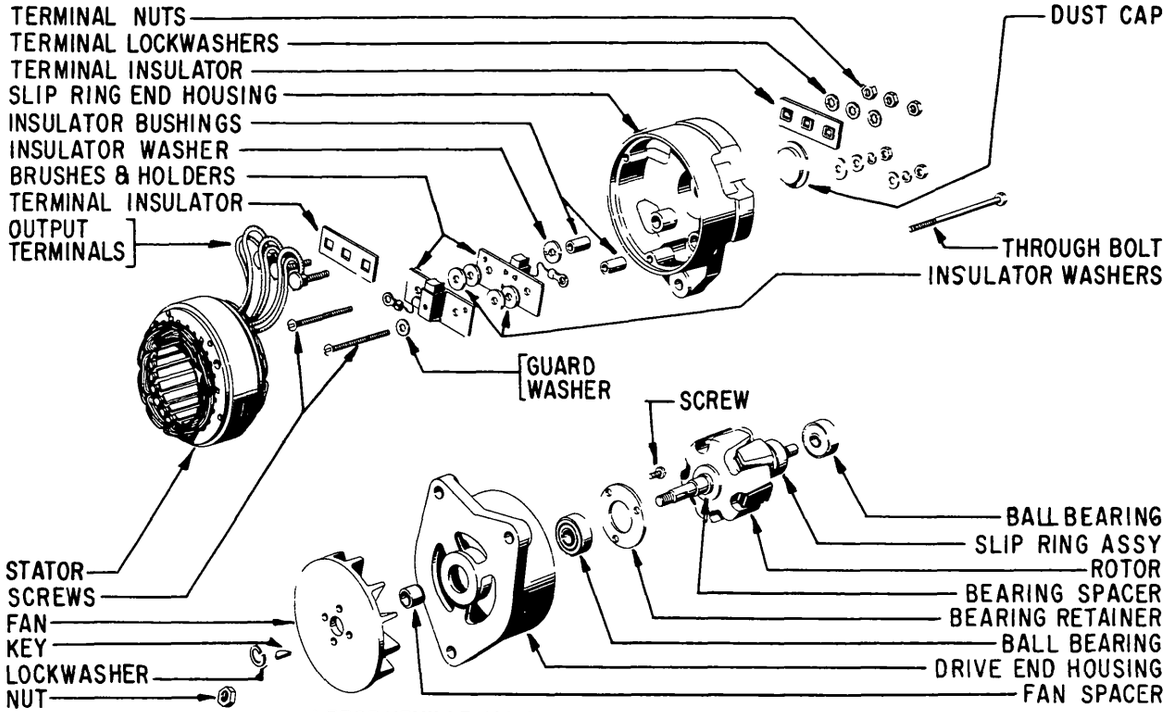
►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION Reversed polarity or excessive voltage will result in extensive damage to alternator system NOTE THE FOLLOWING TO PREVENT DAMAGE*

Battery Installation - Alternator polarity determines which battery terminal is grounded For negative polarity alternators, **negative** battery terminal must be grounded *DO NOT REVERSE BATTERY LEADS or rectifiers will be damaged*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery *DO NOT use a "Fast Charger" to provide starting voltag*

Booster Battery (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery *DO NOT REVERSE BATTERY LEADS*

DESCRIPTION: Main alternator components are the stator, rotor, brushes, slip rings, slip ring end housing and drive end housing Rectifiers consist of an externally mounted dry plate type on some models or are incorporated in slip ring end housing on other models Alternator voltage and output is controlled by a voltage regulator unit (see "Voltage Regulator" below for further description)



LEECE-NEVILLE ALTERNATOR ASSEMBLY (TYPICAL)

Stator - Consists of an iron core with three phase windings electrically 120° apart wound in slots around inside circumference Stator leads are connected to terminal posts in slip ring end housing These leads are connected to the external rectifier assembly or to internal rectifiers by additional leads

Rotor - Consists of a single field coil encased between two six-fingered overlapping iron sections assembled on a shaft The two ends of field coil are connected to two slip rings insulated from each other and the shaft Battery is connected to field coil through brushes and the slip rings

Slip Ring End Housing - Supports rectifier heat sink (if equipped), rotor shaft rear ball bearing, brush holders and brushes, and all terminals for lead connections

Drive End Housing - Supports rotor shaft front ball bearing, pulley fan, and pulley Through bolts hold entire assembly together

Rectifier (External Type) - Assembly is a dry plate, three phase full wave bridge type, selenium rectifier mounted separately from alternator and connected to it by three leads from stator phase windings Two output terminals are mounted on rectifier to connect to car wiring

Rectifier (Internal Type) - Six silicone diode rectifiers are screwed into a metal heat sink mounted in slip ring end housing and insulated from it Three rectifiers have negative polarity and are connected to ground through negative output terminal The other three rectifiers have positive polarity and are connected to alternator positive output terminal

►*CHARGE INDICATOR LIGHT RECTIFIER NOTE* On some Ford Light Duty trucks a modification to accommodate the charge indicator light consists in operating the load relay of the voltage regulator from a pair of rectifiers connected across one phase of the stator winding

SPECIFICATIONS

Performance Data

Alternator	Amperes	Volts	Alt RPM
30 Amp (Ford)	30 min	14 0	①
50 Amp (Ford)	50 min	14 0	① 2040
50 Amp (Rambler)③	50	14 0	② 2050
60 Amp (Ford)	60 min	14 0	① 3400
60 Amp (Rambler)④	60	14 0	⑤ 4400
100 Amp (Ford)	100 min	14 0	①

① - 1600 Engine RPM ② - 880 Engine RPM
③ - Alternator No A0015428-GA
④ - Alternator No A0012036-AA ⑤ - 1800 Engine RPM

Rotation - Clockwise at drive end
Rated Output - See Application Table above
Field Coil Draw - 2 4-3 0 amps (Ford), 2 5-3 0 amps (Rambler) at 12 0 volts

TESTING

►*CAUTION 1) Do not ground field circuit between alternator and voltage regulator as regulator will be damaged 2) Do not ground alternator output terminal or alternator and circuit will be damaged 3) Do not operate alternator on open circuit with field winding energized*

CONTINUED ON NEXT PAGE

LEECE-NEVILLE ALTERNATOR & REGULATOR (Cont.)

4) Do not polarize alternator as it is not required and doing so will damage entire system.
5) Before making test connections, ignition switch must must be off.

ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

Current Output: Disconnect alternator "F" and "G" leads from regulator and connect leads together. Connect an ammeter positive lead to these two leads, start engine and connect ammeter negative lead to battery positive terminal. Operate engine at proper speed *(see "Performance Data" above)* and note ammeter reading. Current output should reach or exceed specifications *(see "Performance Data" above)*.

►*ALTERNATOR TESTER NOTE:* When using an Alternator Tester for an output test, the maximum voltage variation between phases should not exceed 1.5 volts (no load), .3 volt (load).

Field Coil Draw: Disconnect "F" lead from alternator and connect an ammeter negative lead to "F" terminal and positive ammeter lead to battery positive terminal. Current draw should be as in specifications. If current draw is low or zero, field has high resistance or is open. If current draw is high field is shorted or open.

ALTERNATOR OFF CAR: Stator Test - *NOTE - This test may be made on alternators with external rectifier with alternator in car if stator leads to rectifier assembly are disconnected. On internal rectifier alternators, remove stator from slip ring end housing.* Use a 110 or 220-volt test lamp and test probes. With one test probe on alternator end housing or stator core, touch other probe to each phase terminal in turn. If lamp lights, stator is grounded. Check stator windings for continuity with an ohmmeter and test probes at two of the winding leads in turn. Each phase should show a low resistance. If resistance is high, stator windings are open or shorted.

Rotor Test: Test rotor with a 110-volt test lamp. There should be no ground between either slip ring or shaft. There should be no ground between rotor core and slip rings.

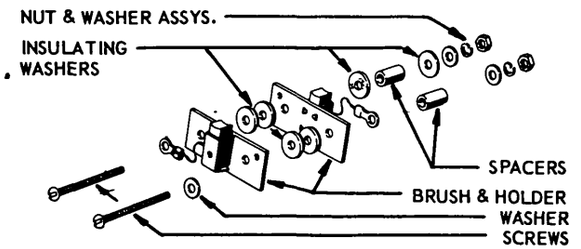
Rectifier (External Type) Service: Clean rectifier assembly frequently by blowing compressed air through plates to remove dirt. With rectifier removed, use a bottle brush or rag between plates. *CAUTION - DO NOT force brush or rag between plates. DO NOT use solvent. Clean rectifier DRY.* To test rectifier, connect a 25 ampere load across output terminals with an ammeter in circuit. Touch test probes from a 12-volt battery to two of the three terminals in turn. Ammeter readings should be equal for all three checks. A different reading in any one test indicates a faulty rectifier. *CAUTION - DO NOT apply voltage to direct current output terminals of rectifier.*

Rectifier (Internal Type) Test: *NOTE - Resistance of silicon rectifiers will vary due to temperature, type of ohmmeter, battery voltage used in test equipment, and other factors.* Remove slip ring end housing from stator assembly. Proceed as follows:

Method 1 - Connect ohmmeter leads to the two alternator output terminals. Reverse the leads. Resistance should be 3.3-20 ohms in one direction and infinite in the other direction.

Method 2 - With positive probe of ohmmeter on alternator negative output terminal, touch each of stator winding terminals with other probe. Resistance should be 5-45 ohms. Reverse the probes. Resistance should be infinite. Now place negative probe on alternator positive output terminal and touch each of stator winding terminals with other probe. Resistance should be 5-45 ohms. Reverse the probes. Resistance should be infinite.

Rectifier Mount Ground Test (Internal Type Rectifiers): Use a 110-volt test lamp and check from each output terminal screw to ground. If ground exists, check top, center, and bottom rectifier assembly-to-housing mounts, and both output terminals.



BRUSH & HOLDER ASSEMBLY (EXPLODED)

OVERHAUL

►*OVERHAUL NOTE: Alternator need be disassembled only so far as necessary for testing or needed repairs. Bearings need be removed only if loose or if lubricant lost. On 100 Amp. alternator, repair rotor assembly (except for slip rings, bearing, or coil) only if proper machining and balancing equipment available.*

DISASSEMBLY: 30, 50, 60 Ampere Alternators - Remove fan and pulley assembly with a gear puller. Remove key and fan spacer. Remove splash shields and pry out bearing dust cap. Insert a brush clip on brush holders to retract brushes. Remove nuts, washers and insulator from the three stator phase terminals. Remove through bolts and pull slip ring end housing from rotor shaft with a gear puller. Remove stator from housing (tap with soft hammer if necessary to loosen). Remove rectifier assembly mounting screws and remove assembly from housing. With arbor press or gear puller, press rotor from drive end housing. Tap or press bearings out of each housing. Remove brush holder assemblies.

Slip Ring Replacement - While removing old slip rings, place new slip rings in a warm area to prevent cracking when installing. Unsolder coil wires from slip rings. Pull rings from shaft with gear puller or use arbor press. Press new slip ring assembly on shaft with slots in line with hole in shaft for coil wires and until outer face of outer slip ring is 9/16" from end of shaft. Concentricity of slip ring faces with bearing surface of shaft must be within .002". Cut rings on a lathe to correct.

Rectifier Cell Replacement (Internal Type) - *CAUTION - Disturb as few connections as possible. Metal-to-metal surface of cell and terminal connections have a special treatment to prevent corrosion and electrolysis. Same treatment must be applied to any worn or replacement cell.* Unsolder cell lead, bend down lock tab on inner bracket and remove cell with a wrench. *CAUTION - If spacer between inner and outer rectifier mounting bracket comes out, it must be clean and on both sides before re-installation.* Install new cell. Tighten to 20-25 inch-lbs., bend lock tab up. Solder lead to cell. *DO NOT OVERHEAT OR CELL WILL BE DAMAGED.*

100 Amper Alternator: 1) Remove pulley, both brush holder assemblies from brush end housing and nuts, washers and insulators from stator winding terminals. Remove brush end housing dust cap, housing bolts and alternator top support. Loosen brush end housing with a soft hammer and remove housing and stator assembly from shaft (use gear puller if bearing is tight). Remove stator from housing. Pull drive end housing from shaft with a gear puller. Remove retainer and bearing from drive end housing.

2) Unsolder both field leads from slip rings and press off slip rings with parallel bars. *CAUTION - Use care not to crack slip rings during removal. If cracked, they must be replaced.* Remove bearing and bearing retainer from slip ring end of shaft (save wood wedge from lead slot under bearing). Remove drive end shaft nut and tap off drive end rotor half with a soft hammer. Remove key. Press other half of rotor from shaft with an arbor press (use a brass rod on end of shaft to protect and lengthen it). Remove rotor coil from hub. *CAUTION - Keep rotor halves together to maintain proper balance.*

REASSEMBLY: 30, 50. 60 Amper Alternators - Press bearings into slip ring and drive end housings (apply pressure to outer race only). Press drive end housing and bearing assembly on rotor shaft with shaft on flat plate of arbor press (use pipe so pressure exerted on bearing inner race only). Install brush holder assemblies as shown in illustration. Install a holder clip to retract brushes. Install stator over rotor and insert through bolts through drive end housing and stator. Install rectifier assembly in slip ring end housing. Install slip ring housing and rectifier assembly over stator and rotor assembly and press on slip ring end housing with an arbor press. Tighten through bolts. Install stator terminal insulator, washers, and nuts. Remove brush retainer clip. There should be 1/16" clearance between alternator fan fins and drive end housing. Install pulley and tighten to 40 ft. lbs. Test assembly for free turning.

100 Ampere Alternator: 1) Press slip ring rotor half (with wire clip) on shaft as far as snap ring and press hub on shaft. Install coil with leads under wire clip. Install key, press drive end rotor half on shaft and install and tighten locknut. Paint rotor with red oxide or red Glyptol varnish to secure coil. Place coil leads in slot in shaft, press slip ring bearing on shaft (press on inner race only), place wood wedge in slot and install snap ring and insulating washer. Press slip rings on shaft one at a time with tapered side toward bearing and wire cutout aligned with slot in shaft. Solder coil leads to slip rings.

2) Press drive end bearing into housing (press on outer race only) and install bearing retainer. With slip ring end of shaft on press plate, press drive end housing assembly on shaft (use pipe so pressure exerted on bearing inner race only). Install stator over rotor and drive end housing so dowel pin in housing mates with stator hole. Install insulator over stator leads and press slip ring end housing on shaft (mate dowel pin in housing with hole in stator). Install alternator top support. Install insulator, bushings, washers and terminal nuts on terminals. Install brush holder assemblies.

CONTINUED ON NEXT PAGE

LEECE-NEVILLE ALTERNATOR & REGULATOR (C nt.)

Clearance between alternator fan fins and housing should be 1/16". Torque pulley nut to 40 ft. lbs.

VOLTAGE REGULATOR

FORD CARS & TRUCKS

Regulator - Ford Nos. -	Alternator
B8C-10505-A	B8TZ-10346-A, E
B8Q-10505-A	B8TZ-10346-G, F
PB8M-10316-A	C1TF-10346-B,C,D
B8C-10505-B	①B8TZ-10346-C,D

RAMBLER

Regulator - Lec-Neville Nos. -	Alternator
R0013456-RA②	A0015428-GA
R0013533-RA③⑩	A0012036-AA

① - When used as 50 Amp. use Regulator No. B8Q-10505-A.
② - Rambler No. 3156485. ③ - Rambler No. 3159383.
⑩ - Two Unit type.

DESCRIPTION: Two and three unit types used (see above). Three unit type has load relay, voltage regulator and current regulator. Two unit type used on some alternators with internal rectifiers has load relay and voltage regulator only. Data and specifications below apply to both types except for current regulator data which is not applicable to two unit type. Voltage regulator is a double contact type of conventional design. Current regulator is also of conventional design. Both units perform the same functions as on a DC current generator-regulator system. Load relay has a single core winding and a single set of contacts. Relay is controlled by ignition switch (except Ford Trucks, see below) which, by energizing core winding, closes relay contacts, energizes alternator field circuit, and connects the "G" and "B" terminals of regulator together (completes alternator charging circuits to battery).

►*FORD LIGHT DUTY TRUCK NOTE:* On trucks with charge indicator light, load relay is operated through a pair of rectifiers connected across one phase of stator windings instead of through ignition switch.

SPECIFICATIONS

Load Relay

Closing Voltage - 5.6-6.4 volts (Ford), 6.0-6.4 volts (Rambler).
Contact Gap - .018-.020" with contacts open.
Air Gap - .018-.020" with contacts closed.
Hinge Gap - .005-.007" with contacts closed.

Voltage Regulator

Voltage Setting (Method 1) - 13.5-14.3 volts.
Voltage Setting (Method 2) - 13.6-13.8 volts (upper contacts); 13.7-13.9 volts (lower contacts); 14.0-14.2 volts (transfer voltage).
Contact Gap - .018-.020" with lower contacts closed.
Air Gap - .035-.043" with lower contacts closed.
Hinge Gap - .018-.020" with lower contacts closed.

Current Regulator

Setting - 28-32 amps. (30 Amp.), 48-52 amps. (50 Amp.), 58-62 amps. (60 Amp.), 98-102 amps. (100 Amp.).
Contact Gap - .018-.020" with contacts open.
Air Gap - .032-.038" with contacts open.
Hinge Gap - .005-.007" with contacts open.

ADJUSTMENT

CHECKING & ADJUSTING (ON CAR): *NOTE - Regulator is "Temperature Compensated" type. Make following checks and adjustments after regulator heated and stabilized (after 30 minutes operation with 10 ampere load).*

Load Relay: Connect a 250 ohm, 25 watt rheostat from battery positive post to "IGN" terminal of regulator, and a voltmeter positive lead to regulator "IGN" terminal with negative lead grounded. Turn full resistance into circuit and slowly decrease resistance until relay points close. Closing voltage should be as specified. To adjust, bend armature spring lower hanger down to increase voltage, up to decrease voltage.

Voltage Regulator: Method No. 1 (Fixed Resistance Method) - Connect voltmeter positive lead to regulator "G" terminal and negative lead to battery negative post. Connect ammeter positive lead to "B" terminal of regulator (disconnect battery lead from regulator) and negative lead to battery negative post with 1½ ohm resistor in line between battery and ammeter. Start engine and slowly increase speed to 1600 RPM. Steady voltmeter reading should be as specified. Retest by stopping engine, momentarily turning off ignition and restarting engine. To adjust, bend armature spring lower hanger down to increase setting, up to decrease setting.

Method No. 2 - *CAUTION - Before setting each voltage in following test sequence, alternator must be stopped and ignition switch turned off.* Connect an ammeter in series with battery lead to regulator and a voltmeter between "B" and "G" regulator terminals. Connect a set of earphones (not less than 1000 ohms resistance) to "F" and "G" regulator terminals. Proceed as follows:

1) Start engine and slowly increase speed. Listen (with earphones) for start of vibration of regulator contacts and note voltage reading. Regulator is operating on upper contacts. If voltage not as specified, bend armature spring lower hanger down to increase, up to decrease.
2) Slowly increase speed past vibration on upper contacts and note voltage when vibration stops. Vibration stops immediately before regulator operates on lower contacts. This maximum voltage is "Transfer Voltage" and must be as specified. Adjust as in 1) above.
3) Increase speed slowly past "transfer voltage" point and note start of vibration on lower contacts. If not as specified, adjust air gap by loosening contact block lock screw and turning carrier block cam adjusting screw.

Current Regulator: Method 1 - With test leads connected as in "Voltage Regulator Method No. 1 (Fixed Resistance)" test above, connect a carbon pile rheostat across the 1½ ohm fixed resistor. With engine at 1600 RPM slowly decrease resistance of carbon pile rheostat until voltmeter reads 12 volts. Ammeter will now indicate specified setting for current regulator. To adjust, bend armature spring lower hanger down to increase setting, up to decrease setting. Retest voltage regulator setting with all test equipment removed except the voltmeter and with battery in circuit.

Method 2 - Connect a battery starter variable resistance load tester across battery. With alternator turning at 2000 RPM increase resistance. Current regulator should vibrate and hold line current to specifications. To adjust, bend armature spring lower hanger up or down as necessary. Retest voltage regulator setting (upper contacts) with only voltmeter connected and battery in circuit.

ADJUSTMENT (OFF CAR): The following adjustments are made on load relay, voltage regulator, and current regulator in the same manner.

Hinge Gap: Set gap between yoke and armature lower hinge spring by loosening and tightening armature lock screw. *See Specifications.*

Air Gap: Gap between armature or armature stop and core is set by holding armature towards core and adjusting stationary contact adjusting screw. *See Specifications.*

Contact Gap: Set gap by adjusting contact carrier or armature stop. *See Specifications.*

Armature Travel: Adjust armature to float within travel limits by bending armature hinge springs (armature spring removed). *NOTE* - On load relay, be sure to solder jumper wire to contact plate.

CHRYSLER CORP. STARTERS

Car Model	Chrysler Part No.
Chrysler & DeSoto (1960-61)	1889200
Dodge & Plymouth 361" Eng. (1961)	1889200
Dodge & Plymouth 318" Eng. (1961)	1889100

DESCRIPTION: 12 volt, four-pole type with solenoid pinion shift (overrunning clutch). Brushes and springs are mounted in a separate removable brush holder plate assembly.

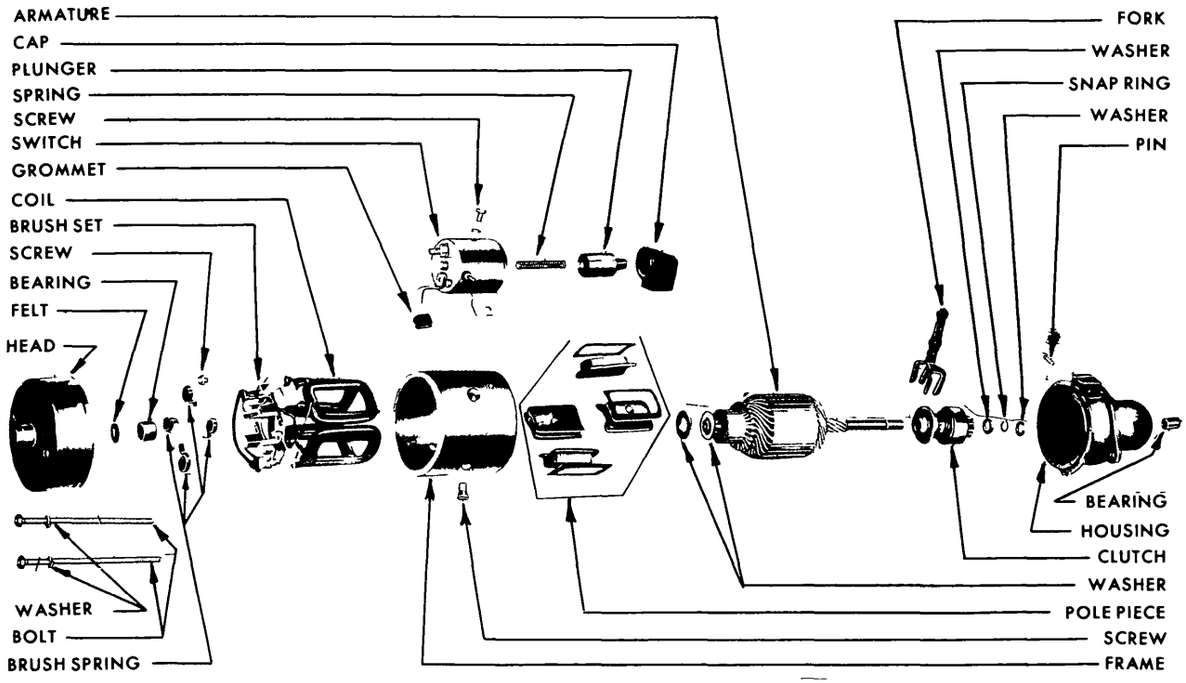
SPECIFICATIONS: **Rotation** - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.
Drive Endplay - .005" minimum.
Pinion to Housing Clearance - 1/8"±1/32" measured between pinion and pinion stop (with armature endplay removed).
Performance Data: *See Car Model pages.*

REPLACEMENT: Brushes & Springs - *NOTE - Brushes that are worn to ¼" or less or are oil soaked, should be replaced.* With commutator end head, brushes and brush holder removed, unsolder the two leads at ground brush terminal and the two insulated brush leads at field coil terminal (adjacent to hole in front face of field frame which is used in locating brush holder ring assembly). *CAUTION - Use care in removing and installing ground brushes so that shunt wire is not broken.* To remove brush springs, spread retainer tabs apart slightly on brush holder ring. If new springs are installed pinch the retainer tabs together, if necessary, to hold springs securely. Measure brush spring tension with starting motor completely assembled except for end head. Measure spring tension with spring scale hooked under spring near the end. Pull scale straight back while holding brush against commutator. Take a reading just as spring end loses contact with the brush. Spring tension should be 32-48 ounces.

►*TESTING & OVERHAUL NOTE: All testing and service procedures are the same as for conventional starters except as noted below.*

TESTING: Field Coils - With commutator end head, brushes and brush holder ring removed, disconnect field lead wires at solenoid connector and separate field leads to make sure they do not touch solenoid connector. Remove wire attaching ground terminal to field frame and pull brush leads, shunt wire and terminal assembly aside so there will be no contact.
1) Touch one prod of test lamp to series field coil lead, and the other prod to field frame. Lamp should **not** light.
2) Touch one prod to shunt field coil lead and other prod to field frame. If lamp lights in either of the two above tests, field coils are grounded and each coil should be tested separately after unsoldering the connecting wires.
3) Test two insulated brush holders for proper insulation from ring assembly by touching one test light prod to brush holder and the other to the ring. The lamp should not light. If lamp lights, the insulated brush holders are grounded and the brush ring assembly must be replaced.

OVERHAUL: Disassembly - Remove through bolts at commutator end and pull head from frame. Remove thrust washers from armature shaft, then lift brush holder spring and remove brushes. Remove brush holder plate. Disconnect field coil leads at solenoid connector, then remove solenoid attaching screws and remove solenoid and boot assembly. Drive out overrunning clutch shift fork pivot pin at upper side of pinion housing, then remove drive end pinion housing and spacer washer. Note position of shifter fork on starter drive and remove shifter fork. Slide overrunning clutch pinion gear toward commutator end of armature. Drive stop retainer toward pinion gear to expose snap ring and remove snap ring. Remove overrunning clutch drive from armature shaft. *NOTE - If it is necessary to remove field coils, remove ground brush terminal attaching screw and raise brushes with terminal and shunt wires up and away from field frame.* Remove pole shoe screws with special impact screwdriver, Tool C-3475.



CHRYSLER CORP. STARTER MOTOR (EXPLODED)

Cleaning: Wipe field frame, coil assembly and armature with a clean cloth only. To clean drive unit, use a brush moistened in solvent. DO NOT immerse starter parts in cleaning solvent.

Reassembly: Lubricate armature shaft and splines with SAE 10-W oil or 30-W rust preventive oil, then install starter drive, stop collar (retainer), lock ring and spacer washer. *NOTE - Small diameter end of spacer washer should be in contact with lock ring inside collar.* Install shifting fork over starter drive spring retainer washer with narrow leg of fork toward commutator. *CAUTION - If fork is not properly positioned, it will restrict starter gear travel, causing a lockup in the clutch.* Install drive end pinion housing on armature shaft, indexing shifter fork with slot in housing, then install shifter fork pivot pin. Install solenoid and boot assembly on field frame and tighten screws to 60-70 inch pounds. Install pinion housing and armature assembly into field frame so slot in housing indexes with locating tab projecting from solenoid base. *NOTE - Make sure shifting fork lever is inserted in solenoid plunger link.* Connect field coil leads at solenoid connector, then connect ground brushes and shunt wire terminal to field frame. Install brush holder ring assembly, indexing tang on ring in hole in field frame. Install brushes in brush holders. *CAUTION - Make sure field coil lead wires are properly enclosed behind brush holder ring and do not interfere with brush operation.* Position thrust washer on end of armature shaft and install commutator end head. Install through bolts and tighten to 40-50 inch pounds.

ADJUSTMENT: Starter Drive Gear - Place starter assembly in a vise with soft jaws, then push in on forward end of solenoid plunger link (not shifting fork lever) until plunger bottoms. Measure clearance between end of pinion and pinion stop with plunger seated and pinion pushed toward commutator end. Clearance should be 1/8"±1/32". Adjust for proper clearance by loosening solenoid attaching screws and moving solenoid in slotted holes in base. *NOTE - In some cases it may be necessary to remove starter end head and bend the end of the solenoid connector slightly to obtain proper adjustment.*

SOLENOID SWITCH: Test Specifications -
Pull-In Coil - 20.0-22.2 Amps. at 6.0 Volts at 70°F.
Hold-In Coil - 11.2-12.4 Amps. at 6.0 Volts at 70°F.

FORD MOTOR CO. GENERATORS

DESCRIPTION: Two pole, two brush, shunt generators of conventional design. Generators are force-draft air cooled by a fan built into drive pulley which rotates with armature shaft. Generators are of "B" circuit type with generator field grounded internally in the generator. *See illustration.*

LUBRICATION: Oiler for commutator endplate bronze bushing should be filled with a few drops of light oil every 5000 miles. Ball bearings are permanently lubricated.

►*GROUND POLARITY NOTE: Test connections given below are for negative grounded systems. If system is positive grounded, reverse test lead connections.*

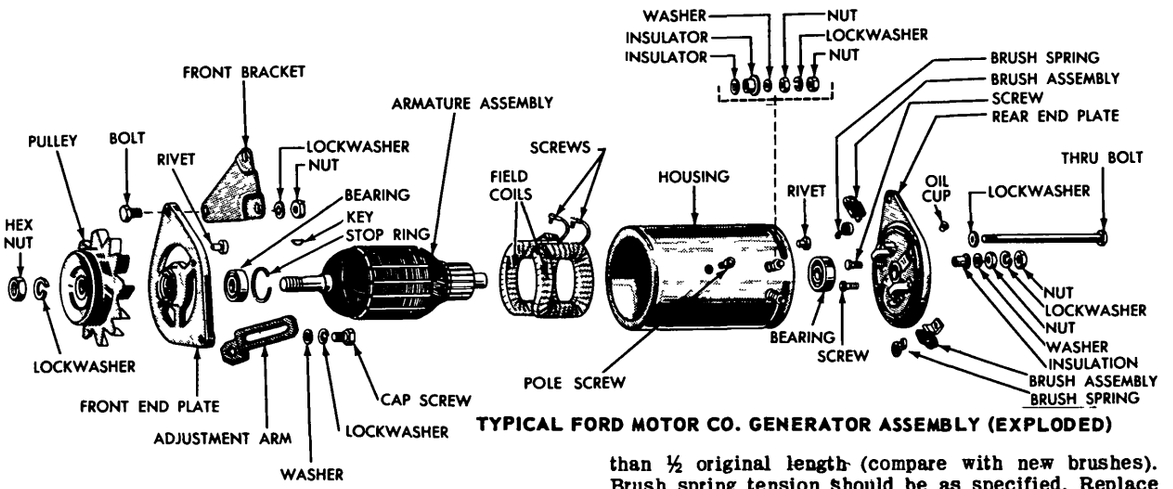
►*CHARGING CIRCUIT FUSE CAUTION:* Some regulators may have a charging circuit fuse clipped to "BAT" terminal of starter relay (fuse may be bypassed on some cars). Check for blown fuse and cause of fuse failure when diagnosing generator, regulator, or battery failure. When making test connections for current output test, bypass fuse by disconnecting lead to fuse and attaching lead directly to circuit breaker at starter relay.

TESTING: Current Output - Connect an ammeter in series with regulator "BAT" terminal and lead to "BAT" terminal. Connect a voltmeter from regulator "ARM" terminal to ground. With engine idling, connect generator "FLD" and "ARM" terminals together with a jumper wire. Slowly increase generator speed to indicated RPM and note voltmeter and ammeter readings. *See Car Model pages for specifications.* Generator should reach or exceed maximum output.

Charging Circuit Resistance: Connect an ammeter between regulator "BAT" terminal and lead to "BAT" terminal. Connect voltmeter positive lead to "ARM" terminal of generator and voltmeter negative lead to battery positive post (or "BAT" terminal of starter relay). Connect generator "ARM" and "FLD" terminals with a jumper wire. Start engine, turn on light and accessories, and adjust engine RPM to give ammeter reading of 20 amperes. Maximum voltage drop should not exceed .8 volt.

Ground Circuit Resistance: Leave ammeter and jumper wire connected as in "Charging Circuit Resistance" test above. Connect voltmeter positive lead to starter motor rear endplate capscrew, and negative lead to generator frame. Start engine, turn on lights and accessories, and adjust engine RPM to give ammeter reading of 20 amperes. Maximum voltage drop should not exceed .1 volt.

OVERHAUL: Disassembly - Remove through bolts and remove commutator endplate. *NOTE - Hook brushes away from commutator to prevent damage and loss of parts.* Remove armature and drive endplate assembly from frame. Remove pulley, drive endplate, and key from armature shaft. Pull or press commutator end ball bearing from armature shaft. *NOTE - Remove bearing only if necessary as bearing will be distorted when removed from shaft and must be replaced.* On drive endplate, remove snap ring and press bearing from endplate.



TYPICAL FORD MOTOR CO. GENERATOR ASSEMBLY (EXPLODED)

Inspection - Wash all parts except armature, field coils, and bearings in solvent and wipe other parts with a clean cloth. Inspect parts for wear, roughness, scoring, worn insulation, evidence of burning, etc. Replace parts as necessary.

Armature: Check armature shaft for wear or scoring and replace armature if necessary. Check armature windings for short on a growler. With a test lamp, check armature for short circuit to shaft and for open circuit between segments. If commutator rough, scored, or out-of-round, reface as required, removing no more than 3/64" maximum from diameter of commutator. Undercut mica and polish commutator with No. 00 sandpaper.

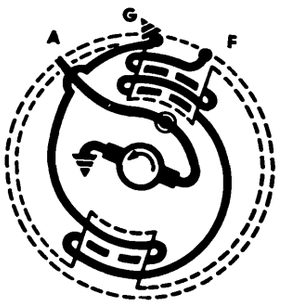
Field Windings: Let field coil ground wire hang freely (disconnect from frame) and check field windings with a test lamp for open circuit from ground wire to "FLD" terminal. Test field for ground with frame with a test lamp. Test field current draw as follows: Connect an ammeter from "FLD" terminal to battery positive post. Connect battery negative (ground) post to generator frame. Field current draw should be as specified. *See Car Model pages for specifications. NOTE - If field current draw checked with generator in vehicle, disconnect "FLD" lead at generator or regulator and do not use a jumper from battery to generator frame.* Check "FLD" terminal for ground with frame. When replacing field coils, Pole Screw Remover and Installer, No. 10044, with generator clamped in a vise or arbor press, is recommended to prevent damage and to assure proper fit of parts.

Brushes: Brushes must be free in holders and free from excess dirt and oil. Replace brushes if worn to less than ½ original length (compare with new brushes). Brush spring tension should be as specified. Replace brush springs if not within limits. *See Car Model pages for specifications.* Check insulated brush holder for ground with endplate. If ground exists, replace endplate.

Bearings: If commutator endplate bronze bushing is worn or scored, replace bushing or endplate as required. Replace ball bearings if worn, scored, loose, or if lubricant lost. *NOTE - Commutator end ball bearing will be distorted if removed from shaft and must be replaced. Drive rear bearing on shaft with a fibre mallet with socket or spacer against inner race of bearing.*

Reassembly: Reverse disassembly procedures, assembling all parts in proper order (see illustration). Make sure drive end bearing snap ring is in position against bearing in drive endplate.

POLARIZING GENERATOR: *Before operating, generator must be polarized as follows:* Disconnect field lead form "FLD" terminal of regulator and MOMENTARILY touch this disconnected wire to "BAT" terminal of regulator. *Do not use a jumper wire or regulator points will be burned instantly.*



FORD MOTOR CO. GENERATOR INTERNAL WIRING

AUTOLITE 6 & 12-VOLT "A" CIRCUIT REGULATORS

►CAUTIONS

►*GENERATOR REPOLARIZING:* Whenever regulator or generator leads are disconnected for ANY reason, the generator must be repolarized as follows: After generator and regulator leads are reconnected, connect jumper wire between "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator windings. This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of contact relay points).

►*NORMALIZING THE REGULATOR:* Before checking regulator, bring it up to normal operating temperature as follows: Operate generator at speed of 1500 RPM, adjust charging rate to 10 amperes (connect .25 ohm resistor in charging line or use variable resistance connected across battery). Continue operation for 15 minutes to "normalize" the regulator or bring it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from cover).

DESCRIPTION: These regulators are similar in design to previous types with two resistors.

CHECKING & ADJUSTING: *See "Autolite 12-Volt Regulators" in 1956 Annual Data or "Autolite 6 & 12-Volt Regulators" in latest Manual edition.*

Voltage Setting: After regulator normalized (see above), and with generator charging at 10 amps., note voltmeter reading and regulator temperature. If voltage setting not within range shown in Voltage Regulator Setting specifications below, adjust regulator.

Adjustment - Decrease generator speed to slow idle, remove regulator cover, adjust voltage regulator by bending armature spring lower hanger down (increase spring tension) to increase voltage setting, or up (decrease tension) to lower voltage setting. After each adjustment, check setting by first cycling regulator (decrease speed until cutout relay contacts open), then rechecking voltmeter reading and temperature with 10 ampere charging rate.

VOLTAGE REGULATOR SETTINGS

Model	Voltage Setting Table
VBO-4201E-4A	No. 1
VBO-4202A	No. 1
VBO-4601C	No. 3

VBO Voltage Regulator Settings

Table No. 1

Temp.	① Volts
50°F	14.7
80°F	14.5
110°F	14.3
140°F	14.1

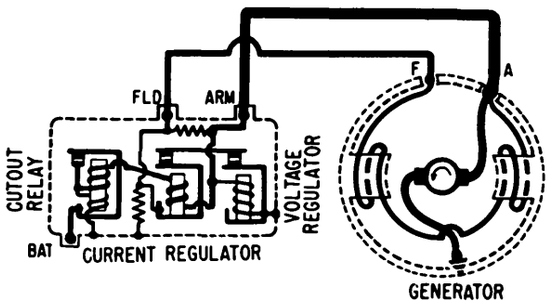
Table No. 3

Temp.	②Volts
50°F	7.3
80°F	7.2
110°F	7.1
140°F	7.0

① - Plus or minus .3 volt. ② - Plus or minus .2 volt.

Current Setting: Normalize regulator (see above). Current regulator setting should then agree with "Test A" specifications in Current Regulator Setting table below. For "Test B", operate generator at 2000 RPM, and add sufficient load to cause current regulator to operate (turn on lights and accessories, add additional load such as a lamp bank or carbon pile, or use a variable resistance across battery) with voltage of 6.7-6.9 volts (6 volt types), 13.6-13.8 volts (12 volt types). Continue to operate the generator for 15 minutes to normalize the current regulator by bringing it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from regulator cover). At end of the total 30 minute operation, current setting should agree with "Test B" specifications in Current Regulator Setting table below. If charging rate not within range shown in "Test B" column, adjust current regulator.

Adjustment - When amperage not within limits, adjust by removing regulator cover and bending armature spring lower hanger down (increase spring tension) to increase amperage setting, or up (decrease tension) to lower amperage setting. After each adjustment, stop and restart engine, then bring engine up to speed and take reading with cover on regulator.



VBO-4200 & 4600 REGULATORS

Current Regulator Setting

Model	Regulator Nominal Setting	Setting
VBO-4201E-4A		35 Amps.
VBO-4202A		40 Amps.
VBO-4601C		45 Amps.

(35 amps. Nominal Setting)

Temp. (°F)	Test "A" - Amps - Test "B"
50°	46 max.	35-39
70°	44 max.	33-37
90°	42 max.	31-35
110°	40 max.	29-33
130°	38 max.	27-31

(40 Amps. Nominal Setting)

Temp. (°F)	Test "A" - Amps - Test "B"
50°	51 max.	40-44
70°	49 max.	38-42
90°	47 max.	36-40
110°	45 max.	34-38
130°	43 max.	32-36

45 Amps. Nominal Setting

Temp. (°F)	Test "A" - Amps - Test "B"
50°	56 max.	45-49
70°	54 max.	43-47
90°	52 max.	41-45
110°	50 max.	39-43
130°	48 max.	37-41

REGULATOR RESISTORS: Resistors should be checked for correct resistance with an ohmmeter.

Regulator Resistors

Model	Mark "R1" Ohms		Mark "R2" Ohms	
VBO-4201E-4A	40	36-44	60	57-70
VBO-4202A	40	36-44	100	95-115
VBO-4601C	15	14-17	40	36-44

AUTOLITE 6 & 12-VOLT "B" CIRCUIT REGULATORS

► CAUTIONS

►*GENERATOR POLARIZING CAUTION* When regulator or generator leads are disconnected for any reason, then generator must be repolarized as follows With all wiring properly attached to both regulator and generator, disconnect generator field lead from its terminal on the regulator and momentarily touch it to the BAT terminal on regulator Re-attach field lead to field terminal on regulator This procedure will establish the correct polarity and prevent damage to the equipment

►*NORMALIZING THE REGULATOR* Before checking regulator, bring it to normal operating temperature as follows Operate generator at a speed of 1500 RPM, adjust charging rate to 10 amperes (6 volt), 7 amperes (12 volt) by connecting a 25 ohm resistor in charging line or by using a variable resistance connected across battery Continue operation for 15 minutes to "normalize" the regulator or bring it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from cover)

DESCRIPTION: "Temperature Compensated" three unit type regulator assembly The charging system is a "B" circuit in which the generator field is grounded at generator ground brush and insulated in the voltage regulator from ground Field control resistors are inserted between field and armature circuits to control generator output *CAUTION - This type regulator must be used only with generators having internally grounded fields*

CHECKING & ADJUSTING: *See "Autolite 12-Volt Regulators" in 1956 Annual Data or "Autolite 6 & 12-Volt Regulators" in latest Manual edition.*

Voltage Setting: After regulator normalized (see above), and with generator charging at 10 amps (6 Volt), 7 amps (12 Volt), or with a 25 ohm resistor between regulator and battery, note voltmeter reading and regulator temperature If voltage not within range shown in Voltage Regulator Setting specifications below, adjust regulator *See "Autolite 12-Volt Regulators" in 1956 Annual Data or "Autolite 6 & 12-Volt Regulators" in latest Manual edition.*

6-Volt Voltage Regulator Setting

Model	Voltage Setting
VBO-6601A, 1A-1, 1AT, 1AT-1	7 2-7 5 volts at 70°F

12-Volt Voltage Regulator Setting

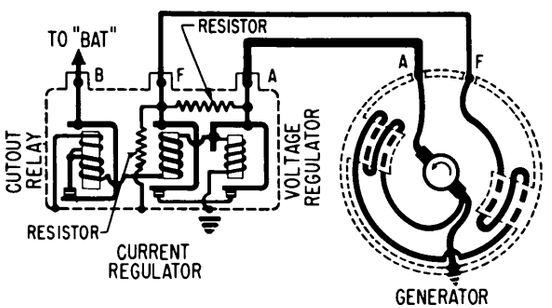
Model	Voltage Setting Table
VBO-6201A, 1A-1, 1A-2 (12 Volt)	No 2
VBO-6201B, 1B-1, 1B-2 (12 Volt)	No 2
VBO-6201C, 1C-1 (12 Volt)	No 2
VBO-6201D, 1D-1 (12 Volt)	No 2
VBO-6201E, 1E-1 (12 Volt)	No 2
VBO-6201F, 1F-1 (12 Volt)	No 2

Voltage Setting Specifications Table No. 2

Temp.	②Volts
50°F	14 7
80°F	14 5
110°F	14 3
140°F	14 1

② - Plus or minus 3 volt

Current Setting (Temperature Compensated Types): Normalize regulator *(see "Normalizing the Regulator" above)* Current setting should then agree with "Test A" specifications in Current Regulator Setting table below For "Test B", operate generator at 2000 RPM, and add sufficient load to cause current regulator to operate (turn on lights and accessories, add additional load such as lamp bank or carbon pile, or use a variable resistance across battery), with voltage of 6 7-6 9 volts (6 Volt Regulator), 13 6-13 8 volts 12 Volt Regulator) Continue operation for 15 minutes to normalize the current regulator by bringing it up to operating temperature (Temperature can be checked by placing an accurate thermometer 2" from regulator cover) At the end of a total of 30 minutes operation, current setting should agree with "Test B" specifications in Current Regulator Setting table below If charging rate not within range shown in "Test B" column, adjust current regulator *See "Auto-Lite 12-Volt Regulators" in 1956 Annual Data or "Autolite 6 & 12-Volt Regulators" in latest Manual edition.*



"B" CIRCUIT WIRING DIAGRAM

Current Regulator Nominal Setting

Model	Operating Amperes
VBO-6601A, 1A-1, 1AT, 1AT-1	ℂ45
VBO-6201A, 1A-1, 1AT, 1AT-1	ℂ35
VBO-6201B, 1B-1, 1B-2	ℂ30
VBO-6201C, 1C-1	ℂ25
VBO-6201D, 1D-1	9-11
VBO-6201E, 1E-1, 1F, 1F-1	14-16

ℂ - Temperature Compensated See Setting specifications below

Current Regulator Setting (VBO-6601A, 1A-1, 1AT, 1AT-1)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	56 Max 45-49
70°	54 Max 43-47
90°	52 Max 41-45
110°	50 Max 39-43
140°	48 Max 37-41

(VBO-6201C, 1C-1)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	34 Max 25-29
70°	32 Max 23-27
90°	30 Max 21-25
110°	28 Max 19-23
130°	26 Max 17-21

(VBO-6201B, 1B-1, 1B-2)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	39 Max 30-34
70°	37 Max. 28-32
90°	35 Max 26-30
110°	33 Max 24-28
130°	31 Max 22-26

(VBO-6201A, 1A-1, 1A-2)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	46 Max 35-39
70°	44 Max 33-37
90°	42 Max 31-35
110°	40 Max 29-33
130°	38 Max 27-31

REGULATOR RESISTORS: Resistors should be checked for correct resistance with an Ohmmeter

Regulator Resistors

Model	"R1" Mark	"R1" Ohms	"R2" Mark	"R2" Ohms
VBO-6601A, 1A-1, 1AT, 1AT-1	15	14-17	40	36-44
VBO-6201A, 1A-1, 1AT, 1AT-1	40	36-44	40	36-44
VBO-6201B 1B-1, 1B-2	40	36-44	40	36-44
VBO-6201C, 1C-1	40	36-44	40	36-44
VBO-6201D, 1D-1	60	57-70	40	36-44
VBO-6201E, 1E-1	40	36-44	40	36-44
VBO-6201F, 1F-1	60	57-70	40	36-44

DELCO-REMY 6 & 12-VOLT "SINGLE CONTACT" REGULATORS

►*1972000 REGULATOR NOTE:* These regulators checked and adjusted the same as 1119000 Series regulators. Specifications are listed below.

DESCRIPTION: "Single Contact" type similar in design to previous models. Air gap adjustment on some regulators is made by turning a nylon nut located at top of regulator unit. Point contact gap setting is made in same manner as for previous models. All voltage regulators and some current regulators are "temperature compensated" as indicated below.

CHECKING & ADJUSTMENT: Make all checks and adjustments in following sequence Voltage Regulation, Cutout Relay Operation, and Current Regulation AFTER regulator has been brought up to normal operating temperature as directed below. Generator must be repolarized each time leads are reconnected and before operating

►*GENERATOR REPOLARIZING* After generator and regulator leads reconnected, connect jumper lead between regulator "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator winding This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of relay contact points)

VOLTAGE REGULATOR

►*NORMALIZING THE REGULATOR* Before checking voltage setting, bring regulator to operating temperature as follows Connect 1/4 ohm resistance in series with battery, see that regulator cover in place, operate regulator for 15 minutes continuously with no other load than ignition (*NOTE*–If variable resistor used in place of fixed 1/4 ohm resistor, set resistor for 1-10 ampere charging rate)

Air Gap: 075" (except 1119004), 063" (1119004) with contacts just touching Adjust by loosening upper contact mounting screws and raising or lowering contact bracket (models without nylon adjusting nut), by turning nylon adjusting nut (models with nylon nut) *NOTE - On models without nylon adjusting nut, align contacts and tighten bracket mounting screws.*

Voltage Setting: With regulator "Normalized" (see above), setting can be checked using either "Fixed Resistance" or "Variable Resistance" method as indicated below.

Fixed 1/4 Ohm Resistance Method

1) Connect 1/4 ohm fixed resistor (not less than 25 watts) in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal and ground

2) Cycle the generator using either of the following methods **(A)** Move voltmeter lead from regulator "BAT" terminal to "GEN" terminal Reduce generator speed until voltmeter reading is 4 volts, then move voltmeter lead back to "BAT" terminal **(B)** Connect variable resistance in field circuit(in line between generator and regulator "F" terminals), turn out all resistance, operate generator at 3500 RPM and turn in resistance until generator voltage reduced to 12 volts then turn out all resistance and remove variable resistor

3)–Operate generator at 3500 RPM (cars & trucks), note voltmeter reading with regulator cover in place This is the voltage setting (see data below). Adjust by turning adjusting screw at voltage regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Variable Resistance Method

1)–Connect variable resistance (not less than 25 watts) and ammeter in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal & ground

2)–Cycle the generator (use either method outlined in step 2 of Fixed 1/4 Ohm Resistance Method above).

3)–Check and adjust voltage setting as outlined in step 3 of Fixed 1/4 Ohm Resistance Method above

Voltage Regulator Setting

Regulator	Voltage Range or Table No.
1119000,1,2,3	No. 3
1119004	13 6-14.3
1119122,23,35	No. 3
1119139	① No. 1
1119148	13.8-14.8
1119150,51,52,53,55,56,62,65,68	No 3
1119161	② No 3
1119173,76	No. 4
1119174,80,81	No. 3
1119182	7.4-7.9
1119187	No. 4
1119190,92	No. 3
1119200,5,7,9	No. 3
1119210,17,22	No. 4
1119212	② No. 3
1119215	No. 3
1119220,24,26	No. 1
1119232	No. 4
1119234,35,38,39,41,42,43,44,45,47,50	No. 3
1119236	③ No. 3
1119246	④ No. 1
1119251	No. 4
1119252,53,55,57,58	No. 3
1119259	No. 4
1119260,61,63,64,66,67,69,70,71	No 3
1119272	No. 4
1119274,75,77,78,79,80	No. 3
1119281	6.9-7.4
1972029	No 3
1972030	13.8-14.8
1972031,32,33,41	No. 4
1972059	6.9-7 4
1972060,61	No. 3
1972062,63,65	No 4
1972064	6.9-7 4
1972066	No 3
1972067, 70	13.8-14.8
1972157, 60	13 8-14 8
1972159	No. 3
1972201	No. 3

① - With no load on BAT terminal, add 5 amp. load at P-terminal. Voltage regulator to operate 2-3 volts lower. Check operating voltage with no current flow at P-terminal of regulator.

② - With ¼ ohm resistance in series with battery, add 5 amp. load at P-terminal Voltage regulator to operate 1-2 volts lower. Check operating voltage with no current flow at P-terminal of regulator.

③ - Paralleling voltage regulator setting must drop 4- 6 volts per 30 ampere battery load

④ - With no load on BAT terminal, add 5 amp. load at P-terminal Voltage regulator to operate 2-3 volts lower.

Voltage Setting Specifications

Setting - As indicated in table below with regulator at a specific ambient temperature When a voltage range only is given, set regulator within that range at 125°F ambient temperature Regulator settings can be "tailored" to keep battery in satisfactory state under particular operating conditions as directed below

►*AMBIENT TEMPERATURE NOTE:* "Ambient Temperature" is the temperature of the air surrounding the regulator approximately 1/4" from regulator cover when regulator is at operating temperature ("Normalizing" procedure given above will result in an approximate ambient temperature of 125°F) and can be measured by placing a thermometer 1/4" from regulator cover See table below for specific regulator settings at various ambient temperatures.

Ambient Temperature Voltage Tables (Volts)

Ambient Temp.	Table No. 1	Table No. 3	Table No. 4
165°F	13.1-13.9	13.1-13.9	6.5-6.9
145°F	13.5-14.3	13.5-14.3	6.7-7.1
125°F	13.9-14.7	13.8-14.7	6.9-7.3
105°F	14.2-15.0	14.0-14.9	7.0-7.5
85° F	14.4-15.4	14.2-15.2	7.1-7.6
65° F	14.7-15.7	14.4-15.4	7.2-7.7

"Tailoring" Voltage Regulator Setting

If battery is consistently undercharged or overcharged (using too much water), adjust voltage regulator within range specified for the ambient temperature in which the regulator is operating, as directed above. ***CAUTION - Regulator setting above 14.8 volts (at 125°F) may cause damage to lights and other voltage sensitive equipment and should be avoided.***

1)–Battery uses too much water. If voltage regulator setting **above** normal range listed above, reduce setting to within upper portion of normal range and check battery condition over a period of time. If voltage regulator setting **within** normal range listed above, reduce voltage setting 0.1 or 0.2 volts and check battery condition over period of time. This should be continued until battery remains charged with minimum use of water.

2)–Battery is consistently undercharged–If voltage regulator setting is **below** normal range listed above, increase setting to within lower portion of normal range and check battery condition over a period of time. If voltage regulator setting is **within** normal range listed above, increase voltage setting 0.1 volt and check battery condition over period of time. This should be continued until battery remains charged with minimum use of water.

CUTOUT RELAY

►*ADJUSTMENT CAUTION Disconnect battery lead before making Air Gap and Contact Gap adjustments.*

CONTINUED ON NEXT PAGE

DELCO-REMY 6 & 12-VOLT "SINGLE CONTACT" REGULATORS (C ntinued)

Air Gap: 020" (Exc 1119261), 023" (1119261), with contacts just touching To check, press down on armature until points just close (use finger pressure on armature directly above contacts), measure gap between armature and center of core. To adjust, loosen two screws at armature hinge on back of relay, raise or lower armature as necessary. *CAUTION - On relays with two sets f contacts, make sure both sets close simultaneously.*

C ntact Gap. .020" with armature up against upper stop *(CAUTION*–Gap must be same for both sets of contacts to insure simultaneous closing). Use feeler gauge to check gap. To adjust, bend upper armature stop up or down as necessary.

Cut-in (Cl sing) V ltag : 6-Volt 5 9-6.7 volts (except 1119281), 5 9-6 5 volts (1119281), **12-Volt** 11.8-13.5 volts (except 1119004), 11 5-13.0 volts (1119004). To check with regulator properly connected to generator and battery, connect voltmeter between regulator "GEN" terminal and ground Use either of the following methods to check cut-in voltage

1) Slowly increase generator speed and note voltmeter reading at instant contacts close, then decrease generator speed and make certain that relay contacts open See item (3) for adjustment

2) Connect a variable resistor in the field circuit between regulator "F" terminal and generator "F" terminal (use 25 ohm-25 watt resistor) Operate generator at medium speed with all resistance turned in, slowly turn out resistance and note voltmeter reading at instant relay contacts close Slowly turn in resistance and make certain that relay contacts open Adjust as follows

3)–Turn adjusting screw under armature spring (adjacent to contacts) in or clockwise to increase cut-in voltage, out or counter-clockwise to decrease cut-in voltage

Cut-Out (Op ning) Amp rage: (1119261) Relay opens at 1-4 amperes, reverse current at 12.5 volts.

CURRENT REGULATOR

►*CHECKING & ADJUSTMENT CAUTION* Temperature Compensated Current Regulators should be checked by the "Load Method" which provides for bringing the regulator up to operating temperature Regulators which are not temperature compensated can be checked by the "Jumper Lead" Method

Air Gap 075" with contacts just touching Check and adjust air gap in same manner as Voltage Regulator (above)

Curr nt S tting Use correct method for each type as listed below *CAUTION–Do not attempt to short out voltage r gulator by inserting screwdriver through hol in base (will short out both voltage and curr nt regulators and cause generator to operate without control).*

Load M th d
(F r T mperature Compensat d R gulat rs)

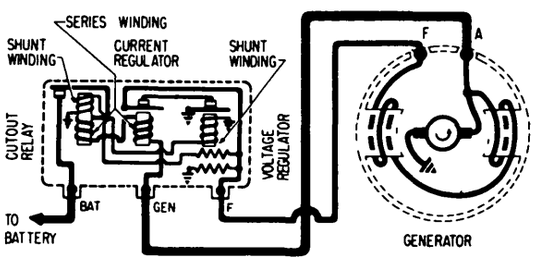
1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery)

2)–Turn on all accessory load (lights, radio, etc.) and connect additional load (carbon pile rheostat or bank of lights) to reduce voltage to approximately 1.0 volt below voltage regulator setting.

3)–Operate generator at 3500 RPM (cars & trucks) for 15 minutes with regulator cover in place. This will bring regulator up to operating temperature.

4)–Cycle the generator by using either of the following methods **(A)** Connect voltmeter between regulator "GEN" terminal and ground, reduce generator speed until voltmeter reading is 2 volts (6 volt systems), 4 volts (12 volt systems), then increase generator speed to 3500 RPM **(B)** Connect variable resistance in field circuit (in line between regulator and generator "F" terminals), operate generator at 3500 RPM with all resistance turned out, turn in resistance until generator voltage reduced to 6 volts (6 volt systems), 12 volts (12 volt systems), then turn out all resistance.

5)–Operate generator at 3500 RPM and note ammeter reading which is the current setting. Adjust by turning the adjusting screw at the current regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.



DELCO-REMY 12-VOLT REGULATORS
WIRING DIAGRAM

Jumper Lead Method
(For Non-Temperature Compensated Regulators)

1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery).

2)–Connect short jumper lead across voltage regulator points (from upper contact bracket to armature).

3)–Turn on all lights and accessories or connect additional load (see step 3 under Load Method above) to cause current regulator to operate.

4)–Operate generator at 3500 RPM (cars & trucks) and note ammeter reading which is the current setting. Adjust as directed in step (5) under Load Method above.

Ambient Temp.	Spec. No. 6	Spec. No. 7	Spec. No. 8
65°F	30.0-35.0		25.0-30.0
85°F	29.0-34.0	53 5-59 5	24.5-29.0
105°F	28.0-32.5	51.0-57.0	23.5-28.0
125°F	27.0-31.0	49.0-54.5	23.0-27.0
145°F	25.0-30 0	46.5-52.5	21.5-25.5
165°F	24.5-28.5		20.5-24.5
185°F	23 0-27 0		19.5-23.5

©Current Regulat r Setting

Mod l	Setting	M del	Setting
1119000	No. 8	1119243	13-15
1119001	No. 6	1119244	No. 6
1119002	No. 10	1119245	No 9
1119003	No. 6	1119246	48-52
1119004	②37-42	1119247	22-26
1119122	No. 8	1119250	No. 9
1119123	No. 6	1119251	17.5-20.5
1119135	18.5-21.5	1119252	14.5-17.5
1119139	18 5-21 5	1119253	No. 10
1119148	9-11	1119255	8-9
1119150	②31-35.5	1119257	15.5-18.5
1119151	②31-35.5	1119258	15.5-18.5
1119152	15.5-18.5	1119259	16.5-19.5
1119153	15.5-18.5	1119260	No. 6
1119155	②23-27	1119261	No. 6
1119156	48-52	1119263	No. 6
1119161	27-33	1119264	No. 10
1119162	②31-35.5	1119266	38-42
1119165	13-15	1119267	18.5-21.5
1119168	No. 10	1119269	53-57
1119173	No. 11	1119270	No. 8
1119174	No. 6	1119271	53-57
1119176	28-32	1119272	38-42
1119180	13-15	1119274	No. 9
1119181	22-26	1119275	38-42
1119182	48-52	1119277	No. 10
1119187	13.5-16.5	1119278	No. 10
1119190	38-42	1119279	No. 8
1119192	No. 6	1119280	No. 10
1119200	48-52	1119281	48-52
1119205	No .6	1972029	No. 6
1119207	13-15	1972030	28-32
1119209	13-15	1972031	33-37
1119210	16.5-19.5	1972032	33-37
1119212	No. 8	1972033	No. 12
1119215	14-16	1972041	44-49
1119217	23-27	1972059	38-42
1119220	33-37	1972060	No. 8
1119222	43-47	1972061	No. 10
1119224	48-52	1972062	33-37
1119226	18.5-21 5	1972063	No. 11
1119232	28-32	1972064	48-52
1119234	No. 6	1972065	No. 7
1119235	No. 10	1972066	No. 6
1119236	53-57	1972067	38-42
1119238	22-26	1972070	No. 10
1119239	22-26	1972157	23-27
1119241	18.5-21.5	1972159	No. 6
1119242	No. 10	1973160	No. 8
		1972201	No. 12

© - Ampere Range for "Non-Temperature Compensated" types. Specification Table number (see below) for "Temperature Compensated" types.

② - Check at operating temperature established after 15 minutes continuous current regulator operation.

Spec. No. 9	Spec. No. 10	Spec. No. 11	Spec. No. 12
20.0-24.0	35.0-40.0	45.5-50.5	40.5-45.5
19.5-23.0	34.0-38.5	44.0-48.5	39.0-43.5
18.5-22.0	32.5-37.0	42.5-47.0	37.5-42.0
17 5-20.8	31.0-35.5	41.0-45.5	36.0-40.5
16.5-19.5	29.5-33.5	39.5-43.5	34.5-38.5
15.5-18.5			
14.5-17.5			

DELCO-REMY "1119600 SERIES" "DOUBLE CONTACT" REGULATORS

►*DOUBLE CONTACT REGULATOR CAUTION: These r gulators do not operate in same manner as previous double contact regulators (1119100 Series).*

►*REGULATOR TESTING & SERVICE CAUTION: When t sting generator and this type regulator, observe the following precautions:*

1 - DO NOT GROUND GENERATOR FIELD WITH REGULATOR CONNECTED TO GENERATOR - This will cause **upper set** of contacts in Voltage Regulatorto burn up immediately.

2 - DO NOT FILE REGULATOR CONTACTS - All contacts of the Double Contact Voltage Regulator are soft alloy and should be cleaned with crocus cloth or other fine abrasive and washed with carbon tetrachloride.

DESCRIPTION: These regulators differ from previous "Double Contact" Voltage Regulator units in that operation of the "upper" and "lower" contacts on the voltage regulator have been reversed and additional resistance is included for better regulation.

OPERATION: The Voltage Regulator has an additional set of "Upper Contacts" connected directly across the generator field (which shorts out generator field circuit). The "Lower Contacts" are connected in series with the generator field. The Voltage Regulator operates either on "Upper Contacts" or "Lower Contacts" (both sets are never in operation at the same time), depending on load and battery requirements, as follows:

Lower Contact Operation (Low Speed & High Load-

Voltage Regulator Setting

Regulator	Table No.
1119600,1,2,3,4/5,6,7,8,9,10,11,12	No. 1
1119613,14,15,17,19,21,23,24,25,27,28	No. 1
1119629,30	No. 1
1119631	ℂ No. 1B
1119632,33	No. 1
1119634	No. 1C
1119635	No. 1
1119636,37,38,39,40,41,42,43,44,45,46	ℂ No. 1B
1119647	ℂ No. 1B
1119648,49,50,51	No. 1
1119652	ℂ No. 1B
1119654,55,57,58,59	No. 1
1119660,61	ℂ No. 1B
1119663,64	No. 1

ℂ - Make adjustment with external adjustment screw at "0".

Voltage Setting - Ambient Temperature

Temp. ℂ	℗ Table No. 1	℗ Table No. 1B	℗ Table No. 1C
65°		13.9-15.0	
85°	14.1-14.9	13.8-14.8	13.4-14.2
105°	14.0-14.8	13.7-14.6	13.3-14.1
125°	13.8-14.6	13.5-14.4	13.1-13.9
145°	13.7-14.5	13.4-14.2	13.0-13.8
165°	13.5-14.4	13.2-14.0	12.8-13.7
185°	13.4-14.2	13.1-13.9	12.7-13.5
205°	13.3-14.1		12.6-13.4

℃ - Ambient temperature taken within ¼" of cover.

℗ - Operating voltage will be .1-.3 volts l wer on lower contacts.

High G n rator Fi ld R quir m nt) - Regulator armature travel opens and closes lower contacts (vibrating action) cutting regulator resistance in and out of field circuit. This operation is same as on regulators with a single set of contacts.

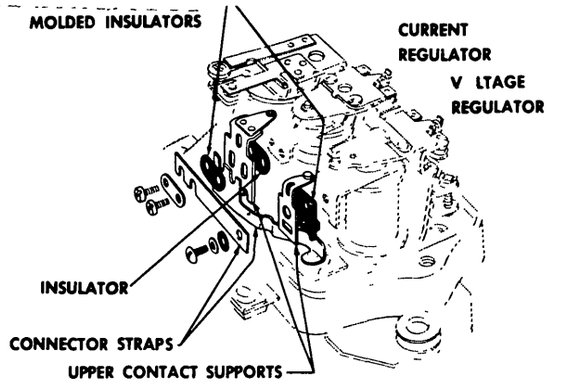
Upper Contact Operation (High Speed & Low Load - Low Generator Field Requirement) - Under these conditions, upper contact operation is not sufficient to control generator voltage. Regulator armature travel opens and closes upper contacts (vibrating action), shorting the field out (contacts closed) or cutting the regulator resistance in the field circuit (contacts open). This action provides additional regulation.

CHECKING & ADJUSTING: *See Regulator Cautions above.* Cutout Relay and Current Regulator are checked in same manner as for other 1119000 Series 12-Volt Regulators. *See "Delco-Remy 1119000 Series Regulators".*

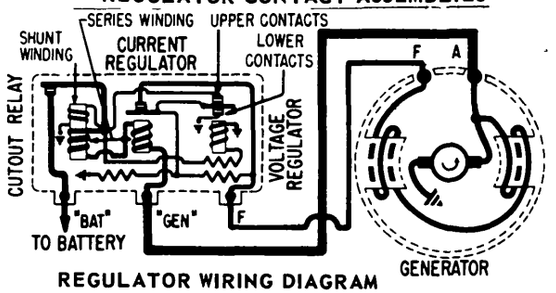
►*CHECKING & ADJUSTING CAUTION: "Temperature Compensated" Current Regulators used on some units (see table below). It is necessary that these regulators be adjusted to the setting specified for the "ambient temperature" of the unit. See table below.*

Voltage Regulator (Double Contact Type): Battery should be fully charged so that charging rate limited to 1-10 amperes (if charging rate above 10 amperes, connect ¼ ohm resistor in series with battery). Connect voltmeter from regulator "BAT" terminal to ground. Connect a 25 ohm (25 Watt) variable resistance in generator field circuit (between regulator "F" terminal and field lead normally connected to this terminal). *CAUTION* - Resistor should have an "open" position at the full resistance end to assist in cycling the generator.

Operation on Upper Contacts - With variable resistance turned out (minimum resistance), operate generator at medium speed, or a higher speed, so voltage regulator is operating on upper set of contacts. *Continue to operate 15 minutes to establish operating temperature* (with regulator cover in place). Cycle generator by turning variable resistance to "open" position momenttarily, then slowly decrease (turn out all) resistance. Regulator should again be operating on upper set of contacts. Note voltmeter reading and the ambient temperature (temperature of air surrounding regulator ¼" from its cover). Operating voltage should be as indicated in ambient temperature table (13.8-14.6 volts at 125°F).



REGULATOR CONTACT ASSEMBLIES



REGULATOR WIRING DIAGRAM

Operation on Lower Contacts - Increase resistance slowly until voltage regulator begins to operate on lower contacts. Lower set of contacts should operate .1-.3 volts lower than upper contacts.

Adjustment of Voltage Setting - (Upp r set of Contacts) - Turn adjusting screw clockwise to increase voltage and counterclockwise to decrease voltage. *CAUTION* - If adjusting screw is turned down beyond range, spring support may not return when screw is backed off. In this case, turn screw counterclockwise until there is

CONTINUED ON NEXT PAGE

ℂ Current Regulator Setting

Regulator	Setting
1119600	No. 2
1119601	No. 3
1119602	No. 4
1119603	43-47
1119604	No. 5
1119605	53-57
1119606, 07	48-52
1119608	No. 6
1119609	43-47
1119610	No. 7
1119611, 12	33-37
1119613	53-57
1119614	9-11
1119615	58-62
1119617	No. 3
1119619	No. 8
1119621	27-33
1119623	No. 2
1119624	No. 7
1119625	22-26
1119627	38-42
1119628	58-62
1119629	No. 9
1119630	No. 7
1119631	48-52
1119632	No. 8
1119633	No. 9
1119634	23-27
1119635	No. 10
1119636	53-57
1119637	48-52
1119638	38-42
1119639	No. 7
1119640	38-42
1119641	No. 5
1119642	33-37
1119643,44	No. 11
1119645	23-27
1119646, 47	19-21
1119648	No. 6
1119649	No. 5
1119650, 51	53-57
1119652	No. 8
1119654	No. 7
1119655	38-42
1119657	23-27
1119658	48-52
1119659	No. 3
1119660, 61	48-52
1119663	27-33
1119664	9-11

ℂ - Ampere Range for "Non-Temperature Compensated" types. Specification Table number (see below) for "Temperature Compensated" types.

DELCO-REMY "1119600 SERIES" "DOUBLE CONTACT" REGULATORS (C ntinu d)

ample clearance between screw head and spring support Then bend spring support up carefully until it touches screw head. Final setting of unit should be made by increasing spring tension. If setting is too high, adjust unit below required value, then raise to exact value by increasing spring tension. After each adjustment, replace regulator cover, recycle generator

L w r S t of Contacts - Adjust for difference in voltage (.1-.3 volts lower) between operation of upper set of contacts and the lower set by increasing or decreasing air gap between armature and center of core. Increase voltage by increasing air gap or decrease voltage by decreasing air gap. Loosen armature screw slightly, than insert screw-driver in slot of bracket and move armature up or down as necessary. Lower points should just be touching when air gap is checked. Recheck voltage setting for both sets of contacts.

Air Gap - 067" **Contact Gap** - 016"

Cutout R lay: Closing Voltag - 11 8-13 0 volts

Current Regulator Setting: *NOTE* - Current regulator must be brought up to normal operating temperature before checking current setting. On "Temperature Compensated" current regulators (see table below), the "ambient temperature" must be determined and the regulator set to the current value indicated in "Current Setting - Ambient Temperature" table *See "Delco-Remy 1119000 Series Regulators"*

CURRENT SETTING - AMBIENT TEMPERATURE

Ambient Temp.	Spec. No. 2	Spec. No. 3	Spec. No. 4	Spec. No. 5	Spec. No. 6	Spec. No. 7	Spec. No. 8	Spec. No. 9	Spec. No. 10	Spec. No. 11	Ambi nt Temp.
65°F				35.0-40.0	45.5-50.5	40.5-45.5	50 0-55 0	50.7-59.6	32 4-37.3	30.0-35.0	65°F
85°F	43.0-51.5	44.5-49 0	- 43.0-48.5	34.0-38.5	44.0-48.5	39.0-43.5	49 0-53 5	48.0-56.4	31.0-35.7	29 0-34.0	85°F
105°F	.40.5-48 0.	43.5-48.0	40.0-45.5 -	32.5-37.0	42.5-47.0	37.5-42.0	42 5-52 0	45 3-53.2	29.4-34.0	28 0-32.5	105°F
125°F	38.0-45.0	42.5-47.0	37.5-42.0	31.0-35.5	41.0-45.5	36.0-40.5	46 0-50 5	42.8-50.0	27.8-32 4	27.0-31.0	125°F
145°F	35.0-42.0	41.5-46.0	34.5-39.0	29.5-33.5	39 5-43 5	34.5-38.5	44 5-48 5	40.1-46 7	26 3-30 7	25.0-30.0	145°F
165°F	32.5-38.5	40.5-45.0	32.0-36.0				43 0-47 0	37 6-43.6	24 7-29.0	24 5-28.5	165°F
185°F	30.0-36.0	39.5-44.0	29.0-33.0				41 5-45 5	35.0-41.0	23.2-27.3	23.0-27.0	185°F
205°F	27.5-34.5	38.5-42.5	26.0-30.0								205°F

LINCOLN CONTINENTAL "DOUBLE CONTACT" REGULATORS

►*REGULATOR TESTING & SERVICING CAUTION:* To test a Ford double-contact regulator, remove field wire from regulator and connect to armature terminal either directly or through jumper wire connection from test equipment (in use) to save irreparable damage to regulator

►*REGULATOR SERVICING NOTE:* Disconnect battery ground from battery before connecting or disconnecting regulator wiring harness or attaching instrument test leads, as accidental flashing of harness across terminals of regulator will damage regulator.

DESCRIPTION: Three-unit regulator with cut-out relay, current and voltage regulator, similar to previous three-unit type regulators except for voltage regulation control

OPERATION: Voltage Regulator has an additional set of "upper contacts" connected directly across generator field (which shorts out generator field current). "Lower contacts" are connected in series with generator field.

Lower Contact Operati n (Low Speed & High Load - High Generator Fi ld Requirement) - Regulator armature travel opens and closes lower contacts (vibrating action) cutting regulator resistance in and out of field circuit. This operation is same as on regulators with single set of contacts

Upper Contact Operati n (High Speed & Low Load - Low Generator Fi ld Requirement) - Under these conditions, upper contact operation is not sufficient to control generator voltage. Regulator armature travel opens and closes upper contacts (vibrating action), shorting the field out (contacts closed) or cutting the regulator resistance in the field (contacts open). This action provides additional regulation.

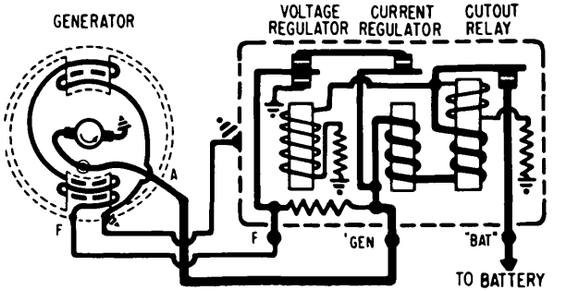
DIAGNOSIS & TESTS: *See Regulator Cautions above. NOTE - Make "Generator Output", "Charging Circuit" & "Ground Circuit" resistance tests, before making alternations to voltage regulator settings.*

Generator Output Test: *NOTE* - With Volt-Ampere Tester, turn control knob to "Direct" position. With Volt-Ampere Model VAT-6 Tester, turn control knob to No. 1 position. Proceed as follows·

1) Turn voltmeter selector switch to 16 VOLTS, and disconnect BAT wire from generator regulator terminal and connect negative ammeter test lead to generator regulator BAT wire.

2) Connect positive ammeter test lead to generator regulator BAT terminal, and disconnect generator field wire from regulator FIELD terminal and connect it to regulator ARM terminal. **Turn off all lights & equipment.**

3) Connect positive voltmeter test lead to ARM terminal of regulator and negative lead to ground. Start engine and gradually increase speed. *CAUTION - DO NOT exceed 1500 RPM, as high voltage will damag ignition system.*



GENERATOR & REGULATOR WIRING DIAGRAM

4) Read both ammeter and voltmeter for maximum output. When reading less than 40 amperes or erratic, check for slipping belt drive, low brush spring tension, broken field or armature wires or dirty commutator.

5) When ammeter does not show a reading but voltmeter indicates a reading above 16 volts, the cutout relay is not closing or wire leading from armature to regulator is open.

6) When both ammeter and voltmeter show a low or no reading, polarize generator and repeat test. If both meters still show a low or no reading, generator is defective.

Charging Circuit Resistance Test: Measure amount of resistance between armature terminal of generator and positive battery terminal, as follows:

1) Set tester knob as in "Output Test" above.
2) Turn voltmeter selector switch to 4 VOLTS, and adjust corrector so pointer reads Zero on left side of scale.

3) Disconnect BAT wire at regulator and connect negative ammeter test lead to BAT wire. Disconnect generator field wire at regulator FIELD terminal and connect to ARM terminal.

4) Connect positive ammeter test lead to generator regulator BAT terminal, and connect positive voltmeter lead to ARM terminal of generator and negative

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL "DOUBLE CONTACT" REGULATORS (Continued)

voltmeter test lead to starter relay battery terminal 5) Adjust engine RPM so ammeter reads exactly 20 amperes Voltmeter should read not more than 8 volt

6) Excessive reading indicates high current resistance Check all wiring and connections from generator armature terminal to positive battery terminal and inspect cutout relay points

Generator Ground Circuit Test: Make tester connections the same as Steps 1 through 3 in "Charging Circuit Resistance Test" above, and proceed as follows

1) Connect positive ammeter test lead to regulator BAT terminal, and positive voltmeter test lead to starting motor rear end plate capscrew Connect negative voltmeter test lead to generator frame

2) Adjust engine RPM until ammeter reads exactly 20 amperes Read voltmeter A reading of more than 1 volt indicates excessive circuit resistance Inspect ground cable and connections between battery and engine and inspect grounding of generator *NOTE* - Loose mounting bolts or painted or rusted surfaces between generator and engine, cause high resistance

Regulator Ground Circuit Test: Proceed as follows 1) With Volt-Ampere Tester, turn control knob to "Direct" position With Volt-Ampere Model VAT-6 Tester, turn control knob to No 2 position.

2) Turn voltmeter selector switch to 4 VOLTS position, and disconnect BAT wire from regulator and connect negative ammeter test lead to BAT wire

3) Connect positive ammeter test lead to regulator BAT terminal, and connect negative voltmeter test lead to generator frame and positive voltmeter lead to regulator base **Turn off all lights and equipment.**

4) Watch voltmeter while slowly increasing engine RPM from idle to 1500 RPM Voltmeter should not read in excess of 1 volt, and should preferably stay at ZERO Poor generator and regulator ground contact is indicated when reading exceeds 1 volt Check ground wire between generator and regulator and engine to body ground strap

Regulator Cutout Relay Test: *NOTE* - Battery must be in good condition and charging circuit resistance within specifications With Volt-Ampere Tester, turn control knob to "Direct" position With Volt-Ampere Model VAT-6 Tester, turn control knob to No 2 Position Proceed as follows

1) Turn voltmeter selector switch to 16 VOLTS position, and disconnect generator field wire from regulator FIELD terminal and connect it to regulator ARM terminal

2) Disconnect BAT wire from regulator and connect negative ammeter test lead to regulator BAT wire Connect positive ammeter test lead to regulator BAT terminal

3) Connect positive voltmeter test lead to ARM terminal of regulator and negative voltmeter test lead to regulator base

4) Slowly increase engine RPM and note voltage at which cutout relay points close Closing voltage is indicated by a slight dropping of the needle, at the same time, deflection of test ammeter needle will be noticed Closing voltage must be 12 3-13 0 volts Repeat operation to be sure cutout relay operates each time

5) Test amount of current necessary to open cutout relay points by increasing engine RPM until generator charges approximately 10 amperes, then slowly decrease engine RPM and observe ammeter reading *NOTE - It may be necessary to reduce engine idle speed to allow relay points to open* Cutout relay points must open at 8 amperes reverse current (discharge direction). When Cutout relay does not open or close at specified settings, remove regulator cover and inspect and adjust, see below

Regulator Voltage Regulation Test: With Volt-Ampere Model VAT-6 Tester, turn control knob to No 3 (1/ ohm) position, and proceed as follows

1) Turn voltmeter selector switch to 16 VOLTS position and connect positive voltmeter test lead to ARM terminal of regulator and negative voltmeter test lead to regulator base

2) Attach regulator temperature gauge to regulator cover, then run engine at fast idle for 15-20 minutes (if cold) or until regulator temperature gauge reading is steady for 5 minutes

3) Accelerate engine to 2000 RPM Voltage regulator should be operating on lower set of contacts Record voltmeter reading

4) Reduce engine s peed gradually until voltmeter needle jumps up or down the scale Regulator should now be operating on upper set of contacts - maintain this speed and record voltmeter reading If second reading is 14 7-15 3 volts at 75°F and the difference between the two readings is not more than 3 volt limiter is adjusted correctly If difference between readings is more than 3 volt, adjust voltage regulation If second reading is not within specifications, bend spring hanger to increase or decrease spring tension as required and repeat test procedure *NOTE* - Voltmeter may not jump up or down scale when operation is transferred from lower to upper contacts This is a satisfactory condition, provided unit is operating within specifications

Regulator Current Regulation Test: *NOTE* - This test can only be made with load placed on generator causing current regulator to operate

1) With Volt-Ampere Tester, turn control knob to "Fixed Load" (1½ ohm) position With Volt-Ampere Model VAT-6 Tester, turn control knob to No 3 (¼ ohm) position.

2) Disconnect BAT terminal wire from regulator and connect positive ammeter test lead to regulator BAT terminal Connect negative ammeter test lead to regulator base

3) Start engine and increase speed to 2000 RPM Turn control knob slowly toward the "Variable" position until highest possible ammeter reading is obtained If setting is not within 38-42 Amperes at 75°F, regulator cover must be removed and spring tension of current regulator adjusted to obtain the specified setting

ADJUSTMENTS: Cutout Relay - Bend spring support upward to cause cutout relay to close at higher voltage or downward for lower voltage *CAUTION - DO NOT BEND ARMATURE STOP or otherwise change point gap*

Current Regulation - Bend spring support upward to increase current output, downward to decrease output *DO NOT BEND ARMATURE STOP or oth rwise change point gap*

Voltage Regulation - Bend spring hanger up or down to increase or decrease operating voltage of voltage regulator If further adjustment is necessary proceed as follows.

1) Disconnect negative (ground) terminal from battery and remove regulator from car and remove regulator cover

2) Place a 040" feeler gauge between armature core and armature, and turn upper contact screw in or out to obtain 040" air gap

3) Place 037" feeler gauge between armature core and armature, and turn lower contact screw in or out to obtain a 037" air gap between armature core and the armature Hold contact points together by pressing downward on screwdriver while making this adjustment

FORD MOTOR CO. "SINGLE CONTACT" 12-VOLT REGULATORS

►CAUTIONS

►*GENERATOR POLARIZING: (NOTE* - Polarization is not necessary except when generator has been rebuilt or if new pole shoes have been installed). To polarize a generator on the car, disconnect the field wire and the battery wire from the regulator and momentarily connect the two wires together (engine not running). *CAUTION - Do not polarize generator by any method that applies battery voltage to field terminal of regulator.*

►*NORMALIZING THE REGULATOR:* **On the Car**–Clip special thermometer T56L-10505-A on regulator cover (see Note below). Operate engine with generator charging at 10 ampere rate for 30 minutes or until regulator temperature is stabilized

On the Bench–Procedure is same as on the car except that a small fan should be mounted 12-15" from the regulator so as to circulate air over the regulator cover while it is being warmed up.

Thermometer T56L-10505-A Note–This thermometer is calibrated in 10°F. increments and has additional Voltage scales indicating the correct voltage regulator setting for each temperature reading (both 6 volt and 12 volt scales provided).

►*AMBIENT TEMPERATURE NOTE:* Ambient temperature is the temperature taken adjacent to the regulator, using Thermometer T56L-10505-A.

DESCRIPTION: These 12 volt regulators are the same design as previous 12 volt units.

CHECKING & ADJUSTMENT: *CAUTION*–Regulators are temperature-compensated and must be brought up to normal operating temperature before checks are made. This normal temperature is that existing adjacent to the regulator cover after 1/2 hour of operation in the car or after the regulator has been heated until the temperature is stabilized (standard normal temperature is 70-80°F.

►*TEST METER CONNECTIONS:* If special Test Sets used, make all connections in accordance with manufacturer's instructions. If individual meters used, make connections as follows: Connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal, from regulator terminal to ground (Ford). *CAUTION - Disconnect battery cable.* On other cars, connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal in series with battery. Connect voltmeter between regulator "ARM" terminal and ground (regulator base or battery grounded terminal). Connect a 50 ohm variable field rheostat (2 amp. rating) in generator field circuit (disconnect field lead at regulator "FIELD" terminal, connect rheostat between this lead and regulator "FIELD" terminal).

CUTOUT RELAY

Cut-In (Closing) Voltage: After regulator normalized and with test meters connected (see above), check cut-in voltage as follows:

Comet, Falcon, Ford - With field resistance completely turned in the field circuit, operate engine at 1500 RPM, slowly turn resistance out of field circuit and note voltmeter reading when relay contacts close (pointer will drop back slightly). Repeat this check several times by turning resistance in and out of field circuit.

Mercury - With all the resistance turned out of the field circuit, slowly increase generator speed and note voltmeter reading at instant relay contacts close (pointer will drop back slightly). Repeat this check several times by decreasing generator speed until contacts open and then increasing speed until contacts close. If closing voltage not correct as shown in setting table below, adjustment is required.

Adjustment - Bend adjusting arm under armature spring (to left of relay contacts) upward to increase cut-in voltage, or downward to decrease cut-in voltage. Replace regulator cover and recheck the setting.

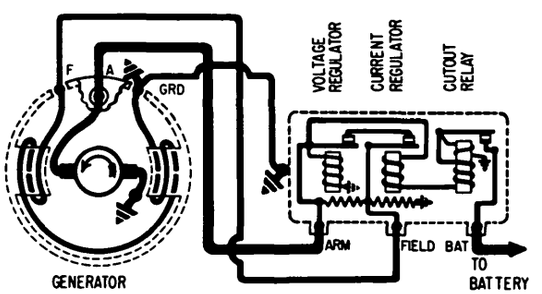
Cut-In (Closing) Voltage Setting

12.0-2.8 volts (25 & 30 Amp.), 12.4-13.2 volts (35 & 40 Amp.).

Cut-out (Opening) Discharge Current: This can be checked after checking cut-in voltage by increasing generator speed (or turning out field resistance) until charging current is approximately 10 amperes, then slowly decrease generator speed (or turn in field resistance) until maximum **discharge** current indicated on ammeter (ammeter will return to zero as contacts open).

Cut-Out (Opening) Discharge Current

6-9 amps. (25 & 30 Amp.), 8 amps. (35 & 40 Amp.), reverse current.



12-VOLT REGULATOR WIRING DIAGRAM

VOLTAGE REGULATOR

Voltage Setting: After Cutout Relay checked (above), cycle regulator by decreasing generator speed until cutout relay contacts open and then increase speed to 1500 RPM. Clip special thermometer on regulator cover to establish regulator ambient temperature and corresponding voltage setting (see Voltage Regulator Settings for various ambient temperatures below). Turn resistance completely out of field circuit (charging rate should be approximately 10 amperes). Note voltmeter reading. This is the voltage setting and should agree with setting listed below.

Final Test (Ford) - Remove all test leads except voltmeter leads and install "BAT" and "F" wires on regulator. Run engine at 1500 RPM (under battery load) and note voltmeter reading (voltage will rise to regulated value after a few moments operation).

Adjustment–Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase voltage setting, or downward to decrease voltage setting. Replace regulator cover and recheck the setting after each adjustment.

Voltage Setting

14.6-15.4 volts, with ambient air temperature of 75°F, *See table below.*

Ford Voltage Regulator Settings (Ambient Temperature Correction)

Ambient Temp. (°F)	All Exc. Auto-Lite 40 Amp. (Volts)	Aut-Lit 40 Amp. (Volts)
25°	15.1-15.9	14.3-15.2
35°	15.0-15.8	14.3-15.2
45°	14.9-15.7	14.3-15.1
55°	14.8-15.6	14.3-15.0
65°	14.7-15.5	14.3-14.9
75°	14.6-15.4	14.2-14.9
85°	14.5-15.3	14.1-14.8
95°	14.3-15.1	14.1-14.7
105°	14.2-15.0	14.0-14.7
115°	14.1-14.9	14.0-14.6
125°	13.9-14.7	13.9-14.5
135°	13.8-14.6	13.8-14.4
145°	13.6-14.4	13.8-14.4

CURRENT REGULATOR

Current Setting: This check requires that a load be added, or that the generator voltage be dropped to approximately 13 volts, to cause current regulator to operate. It is recommended that a heavy duty variable resistance (carbon pile) be connected across the 1-1/2 ohm fixed resistor in the charging line (connect resistance from ammeter lead terminal of fixed resistor to ground–see Test Meter Connections above). After Voltage Regulator checked (above), and with all resistance turned out of the field circuit, operate generator at 1500 RPM (Comet, Falcon, Ford), 2000 RPM (Mercury), **decrease the resistance until voltage drops to approximately 13 volts and ammeter reading is at maximum. This ammeter reading is the current setting. If not correct (see table below), adjust as follows:**

Adjustment–Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase current setting, or downward to decrease current setting. Replace regulator cover and recheck setting.

Current Setting

25 Amp. Regulator - 23-27 amperes (all models).
30 Amp. Regulator - 28-32 amperes (all models).
35 Amp. Regulator - 33-37 amperes (all models).
40 Amp. Regulator - 38-42 amperes (all models).

BENDIX POWER BRAKE UNIT "HYDRAULIC (DISC) REACTION"

Cadillac, All Series (1961) ①
Chevrolet Pass. Cars (1961) ①
Ford Pass. Cars (1961) ②
Lancer (1961)
Lincoln Continental (1961)
Mercury (1961) ②
Oldsmobile (Except F-85) (1961) ①
Pontiac (Except Tempest) (1961) ①
Studebaker (Except Hawk) (1961) ③
Thunderbird (1961) ②
Valiant (1961)

① - "Moraine Power Unit (Hydraulic Diaphragm Reaction Type)" also used.
② - Early Cars. Later Cars use "Midland-Ross Diaphragm Type".
③ - "Hydrovac Piston Type" also used.

DESCRIPTION: Similar in design to units used on previous models. A plastic type piston plate is used on some models. Service procedures for this type plate are different than for die-cast plate.

OPERATION: *See "Bendix Power Brake Unit Hydraulic (Disc) Reaction Type" in 1959 Final Data or later Manual edition.*

REMOVAL & INSTALLATION: *See "Bendix Power Brake Unit Hydraulic (Disc) Reaction Type" in 1959 Final Data or later Manual edition and note the following:*

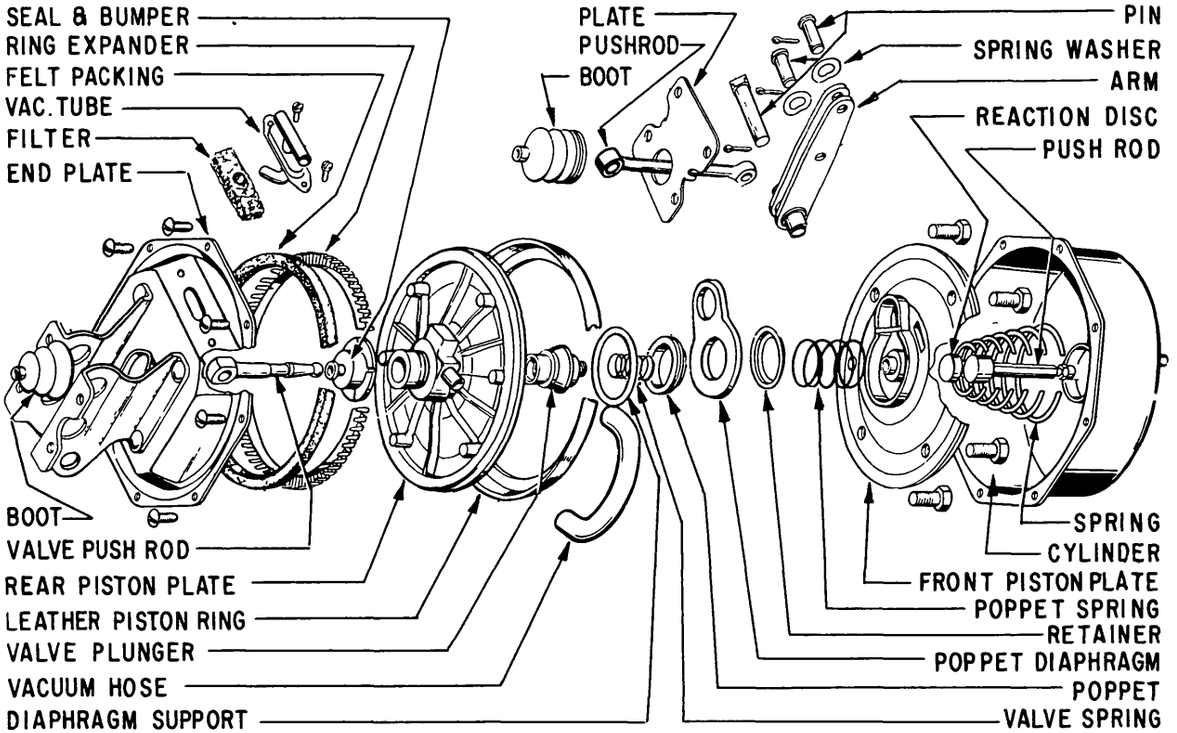
Master Cylinder: *NOTE - Master cylinder can be removed from all cars without removing power brake assembly from car.* Disconnect hydraulic brake line from master cylinder and remove nuts and bolts securing master cylinder to power brake unit. *CAUTION - Keep area around pushrod clean.*

OVERHAUL: *See "Bendix Power Brake Unit Hydraulic (Disc) Reaction Type" in 1959 Final Data or later Manual edition and note the following:*

Vacuum Power Piston (Plastic Type): Disassembly - Remove piston felt and expander ring from piston assembly, then lift rod seal and bumper boot from rear piston plate and slide off eye end of operating rod. Remove capscrews from front piston plate, separate front and rear piston plates, and remove leather packing. Remove poppet spring, valve, return spring retainer, poppet diaphragms, poppet, poppet spacer, and plunger and rod assembly. *NOTE - Do not separate valve operating rod from valve plunger unless replacement of valve rod or plunger is necessary.* If valve rod or plunger must be replaced, hold assembly with valve plunger down and inject alcohol into cavity around valve rod to wet rubber lock in valve plunger, then drive or pry valve plunger off valve rod. Use care not to damage plunger if it is to be reused. Remove rubber reaction disc from front piston plate if necessary.

CAUTION - When cleaning, use only alcohol on parts containing rubber or plastic.

Reassembly - Position plunger and rod assembly into rear piston plate, and install rod seal and bumper boot. Position spacer washer into cavity inside rear piston plate, then assemble poppet through poppet diaphragm, and install poppet spring retainer on end of poppet. Position leather packing on rear piston plate, then install poppet spring and valve return spring on plunger and poppet reaction plate. Position and align front piston plate against rear piston plate, and secure in position with capscrews. Soak piston felt in shock absorber fluid, then insert felt in expander ring, and position expander and felt in groove around rear piston plate with expander teeth up.

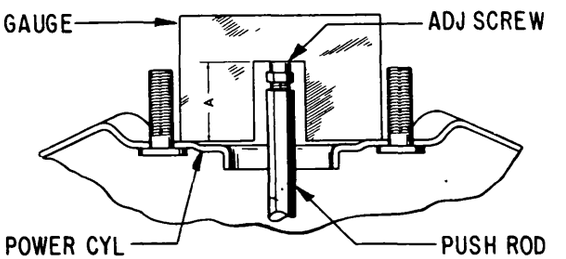


BENDIX "HYDRAULIC (DISC) REACTION" POWER BRAKE UNIT

Pushrod Adjustment (All Cars): *NOTE - The self-locking screw on end of pushrod is set to correct height on original assembly and adjustment is not required unless hydraulic pushrod has been replaced, or if adjustment has been changed. If necessary, adjust as follows:* With piston assembly free in cylinder and firmly seated in a released position, hold pushrod seated against reaction disc and centered in spring of master cylinder. Use Gauge indicated in table below or measure distance from mounting face of power cylinder to end of pushrod adjustment screw (see table for correct dimension). Rotate adjusting screw as necessary to obtain correct adjustment.

Pushrod Adjustment

Car Model	Gaug N.	Dimensi n
Cadillac	J-7723	1.195-1.200"
Chevrolet	J-7723	1.195-1.200"
Ford & Thunderbird		.962-.967"
Lancer	C-3815	1.195-1.200"
Lincoln Continental		1.175-1.180"
Mercury		.990-.995"
Oldsmobile	J-7723	1.195-1.200"
Pontiac	J-7723	1.195-1.200"
Studebaker		1.195-1.200"
Valiant	C-3815	1.195-1.200"



PUSHROD ADJUSTMENT

MIDLAND-ROSS DIAPHRAGM TYPE POWER BRAKE UNIT

F rd Pass. Cars (1961) ©
M rcury (1961) ©
Thunderbird (1961) ©

© - Later Cars For Early Cars, see *"Bendix Power Brake Unit (Hydraulic Disc Reaction Type)" in this section*

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 VACUUM LEAK AT VACUUM INLET FITTING CORRECTION* To correct, use an additional gasket under fitting mounting bolt and torque bolt to 8-10 inch lbs *CAUTION - DO NOT exceed this torque or manifold will break*

DESCRIPTION: Self-contained vacuum actuated, diaphragm type power booster mounted on firewall Booster diaphragm is vacuum balanced (equal vacuum on both sides of diaphragm when in released position) Actuating control piston is mechanically linked to brake pedal linkage by an actuating rod, and conventional type hydraulic master cylinder is mounted on forward end of booster unit

LUBRICATION: At 4000 mile intervals lubricate mechanical linkage lightly with SAE 10W engine oil

TROUBLE SHOOTING: *NOTE - Following data is for troubles originating in booster assembly only For other troubles, see "Hydraulic Brake Trouble Shooting" in Brak Section of Manual*

Brak s Drag: Valve plunger stuck

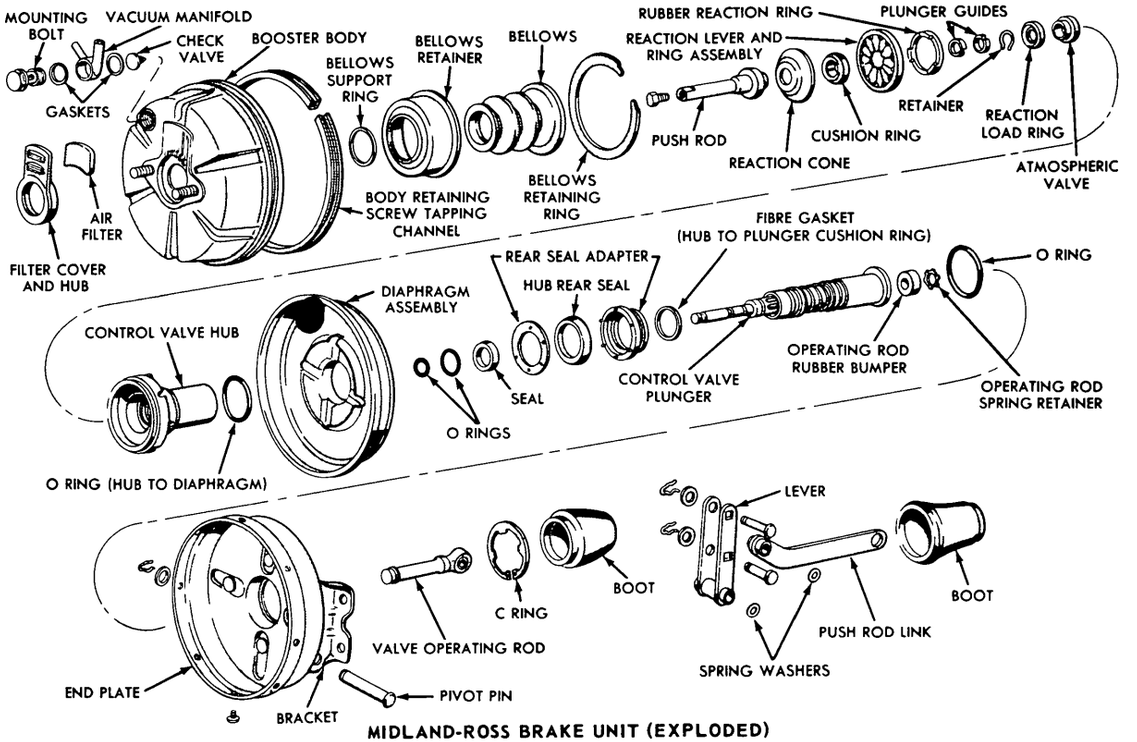
Brakes Grab: Sticking actuating valve assembly

Brakes S lf-Apply Wh n Engine Started: Leak in rear housing Diaphragm out of locating radii in housings, allowing atmospheric pressure into rear chamber Atmospheric valve unseated or stuck

Hard Pedal· Pedal linkage sticking Vacuum check valve faulty or stuck in closed position Vacuum hose collapsed or leaking Vacuum fitting plugged Vacuum chamber or bellows assembly leaking Diaphragm assembly out of place in housing locating radii Automatic transmission throttle valve vacuum line connection or fitting leaking

REMOVAL & INSTALLATION: On inside of car, remove pushrod link-to-brake pedal pivot retaining pin retainer clip, then disconnect link from pedal Disconnect stop light switch wires and hydraulic pipe from master cylinder *NOTE - To avoid bleeding brake system at installation, master cylinder may be disconnected from booster unit at this time without removing hydraulic line* Disconnect manifold and transmission vacuum throttle valve vacuum hoses from booster unit Remove booster bracket-to-dash panel retaining nuts, then pull booster and bracket off studs while sliding pushrod link out of dash panel hole To install, reverse removal procedure and bleed brake system if hydraulic line was disconnected

DISASSEMBLY· **Rem val of External Parts** - Remove master cylinder, air filter cover and hub, and air filter from booster body Remove vacuum manifold, gaskets, and vacuum check valve from booster body Disconnect valve operating rod from lever (remove retaining clip and pivot pin). Remove the brackets from end plate, and rubber boot from valve operating rod



MIDLAND-ROSS BRAKE UNIT (EXPLODED)

Removal of Bellows, Control Valve & Diaphragm Assemblies: Remove "C" ring holding rear seal adapter assembly to end plate Scribe mark booster body and end plate for reassembly, then remove retaining screws, rap end plate with a soft hammer, and separate end plate and booster body Push lip of bellows into vacuum chamber, then remove bellows, control valve, and diaphragm as an assembly Remove outer "O" ring from control valve hub

Disassembly of Bellows, Pushrod, & Control Valve Assemblies: Remove large bellows retaining ring, bellows, bellows retainer, and support ring from diaphragm and and valve assembly Remove retainer and support ring from bellows Remove pushrod assembly, reaction lever and ring assembly, and rubber reaction ring from control valve hub Remove both plastic plunger guides from control valve plunger, then remove retainer holding reaction load ring and atmospheric valve on control valve hub Slide reaction load ring and atmospheric valve from control valve hub Slide plunger and rear seal adapter from rear of control valve hub, then remove hub outer "O" ring from front side of diaphragm

Disassembly of Control Valve Plunger: Remove hub rear seal adapter from valve plunger and remove seal from adapter Remove "O" rings, seal, and fibre gaskets from plunger Pull valve operating rod from valve plunger assembly *CAUTION - Do not r move op rating rod from plunger unless valve or plunger is to be replaced If parts are separat d, new rubber bumper and spring washer must be installed on operating rod to retain it properly in the valve*

CLEANING & INSPECTION· Clean all metal parts in solvent Clean rubber parts in alcohol only Just before reassembly, re-wash all metal parts coming in contact with hydraulic brake fluid in clean alcohol Blow dirt and cleaning solvent from recesses and passages with compressed air Use all parts furnished in repair kit and discard all old rubber parts Replace any parts that are worn or damaged If inside of booster body is rusted or corroded, polish with steel wool or emery cloth If booster body scored, it should be replaced

REASSEMBLY: Assembly of Control Valve Plunger - If operating rod and plunger were separated, install new rubber bumper and spring retainer on rod, then push rod firmly into plunger until rod bottoms Install fibre gaskets, plunger seal and "O" rings on plunger assembly Install valve hub rear seal in adapter with sealing lip of seal toward rear of valve Slide adapter assembly onto plunger with small diameter end of hub to rear

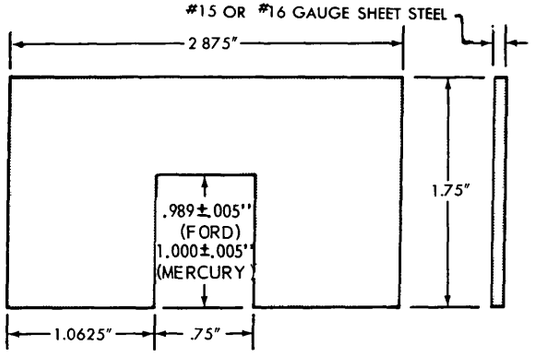
Assembly of Control Valve, Pushrod, & Bellows Assemblies: Install control valve hub outer "O" ring, then install plunger and seal adapter and hub on diaphragm (hold hub on front side of diaphragm, insert plunger assembly into hub from rear side of diaphragm) Install atmospheric valve, and reaction load ring on plunger and hub, compress valve spring, and install load ring retainer in groove of plunger Install both plastic plunger guides in plunger grooves Install rubber reaction ring in valve hub so ring locating knob indexes in notch in hub with ring tips toward front

CONTINUED ON NEXT PAGE

MIDLAND-ROSS DIAPHRAGM TYPE POWER BRAKE UNIT (C nt.)

Assemble reaction lever and ring and install assembly in valve hub. Install reaction cone and cushion ring on pushrod and install pushrod assembly on valve hub so plunger indexes in rod. Assemble bellows, retainer, and support ring (ring should be on middle fold of bellows). Place bellows assembly on diaphragm and secure with retaining ring (ring must be fully seated).

Installation of Bellows, Control Valve & Diaphragm Assemblies: Move booster body retaining screw tapping channel just enough for a new surface for self-tapping attaching screws. Install diaphragm, control valve parts, and bellows as an assembly in booster body. *CAUTION - Lip of diaphragm must be evenly positioned on retaining radius of booster body.* Pull front lip of bellows through body and place it around outer groove of body. Install "O" ring in front of end plate and install plate on body.



PUSH ROD GAUGE TOOL

Align scribe marks, compress assemblies, and install self-tapping attaching screws. Install large "C" ring on rear seal adapter at rear of end plate. *NOTE - Perform pushrod adjustment (see below) before completing reassembly.*

Installing External Parts: Install valve operating rod rubber boot. Install mounting brackets on end plate. Connect lever to mounting bracket, then connect valve operating rod and pushrod link to lever. Install vacuum check valve, vacuum manifold, both gaskets, and tighten mounting bolt to 8-10 inch lbs. Install air filter, filter cover and hub, and master cylinder on booster body. Torque master cylinder attaching bolts to 10-13 ft. lbs.

PUSHROD ADJUSTMENT: Place a gauge made to the dimensions shown in illustration against master cylinder mounting surface of booster body. Pushrod adjusting screw should just touch inner edge of slot in gauge. If gauge not used, distance from master cylinder mounting surface on booster body to end of pushrod adjusting screw should be 1.000"±.005" (Ford & T-Bird), .989" ±.005" (Mercury).

MORAINE POWER BRAKE UNIT "HYDRAULIC (DIAPHRAGM) REACTION" TYPE

Buick (Except Special) (1961)
Cadillac, All Series (1961) ℂ
Chevrolet Pass. Cars, All Series (1961) ℂ
Oldsmobile (Except F-85) (1961) ℂ
Pontiac (Except Tempest) (1961) ℂ
Rambler, All Series (1961)

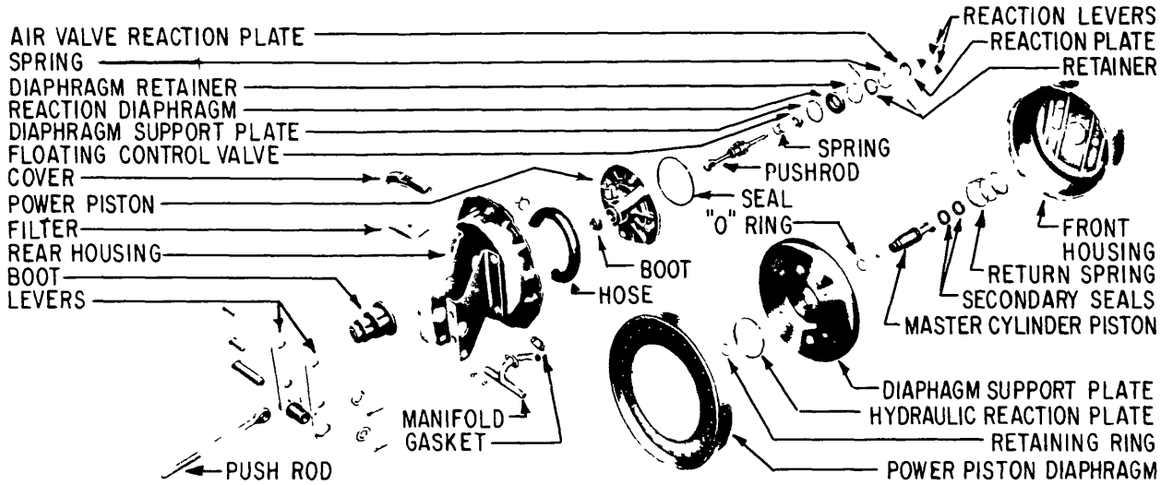
ℂ - "Bendix Power Unit Hydraulic (Disc) Reaction Type" also used.

DESCRIPTION: Design is similar to previous models except for the use of selective shims between power cylinder and brake master cylinder. On Buick models, an additional reaction disc is used between master cylinder piston reaction plate and reaction levers.

OPERATION: As brake pedal is depressed, the operating rod moves air valve forward until its seat contacts floating control valve, sealing off atmospheric pressure. Further movement carries floating valve away from seat on power piston and opens the area forward of diaphragm to vacuum source while air valve remains closed. As air is exhausted forward of diaphragm, atmospheric pressure on opposite side moves diaphragm and piston assembly forward. As diaphragm and piston assembly moves forward, the master cylinder piston is depressed into master cylinder. As pressure builds up in master cylinder, the hydraulic piston reaction plate moves away from its stop and presses against the reaction levers. These levers in turn swing around their pivots and push the valve reaction plate back against the floating control valve snubbers. In this manner, approximately 40% of the load on master cylinder piston is transferred through air valve and operating rod to the brake pedal.

REMOVAL: Power Brake & Master Cylinder - Disconnect hydraulic line from master cylinder and vacuum line from power unit, then disconnect pushrod from brake pedal. Remove nuts attaching power unit to firewall and remove unit.

Master Cylinder: *NOTE - Master cylinder can be removed from power unit without removing power unit from car.* Remove hydraulic connection from master cylinder (cover opening and pipe to prevent dirt entering). Remove master cylinder attaching nuts and remove master cylinder from vacuum unit. *NOTE - Master cylinder piston assembly will remain attached to vacuum unit. If necessary to replace piston, it will be necessary to disassemble vacuum unit.*



MORAINE BRAKE POWER UNIT ASSEMBLY

►*DISASSEMBLY & OVERHAUL CAUTION: Use care to prevent damage to parts. Do not allow oil or grease to come in contact with diaphragm or other rubber parts.*

OVERHAUL: *See "Moraine Power Brake (Hydraulic Diaphragm Reaction) Type" in 1959 Final Data or later Manual edition and note the following:*

Disassembly: If necessary to remove power cylinder from master cylinder be careful not to damage selective shims found between these two parts. If shims are damaged, replace with new shims of the same thickness.

Gauging Master Cylinder Piston: *NOTE - It is necessary to gauge piston if front or rear housing, power piston assembly, master cylinder piston, or master cylinder assembly is replaced with a new part.* To check master cylinder piston, remove front housing from master cylinder (DO NOT remove selective shims from studs). *CAUTION - Be sure parts are not displaced from bore of master cylinder.* Place Gauge J-8531 so that it stands perpendicular to front housing next to two lower studs, and bridges over end of master cylinder piston. Piston should be flush with gauge plus or minus .010". If there is excess clearance under legs of gauge, add shims (gasket material) over front housing studs as required to take up clearance. If there is excessive clearance at center of gauge, remove shims. When all shims are removed, and piston end is still lower than gauge, check for deformed parts and replace as required. Install front housing on master cylinder and tighten nuts to 20 ft. lbs. *NOTE - The dimension of Gauge J-8531 provides a measurement of 1.833-1.844" from end of master cylinder piston to master cylinder surface on power cylinder.* If more than five .010" shims are required for correct adjustment, recheck assembly of vacuum piston.

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "OVAL PISTON" TYPE

Chrysler & Imperial (1961)
DeSoto (1961)
Dodge & Dodge Dart (1961)
Plymouth (1961)

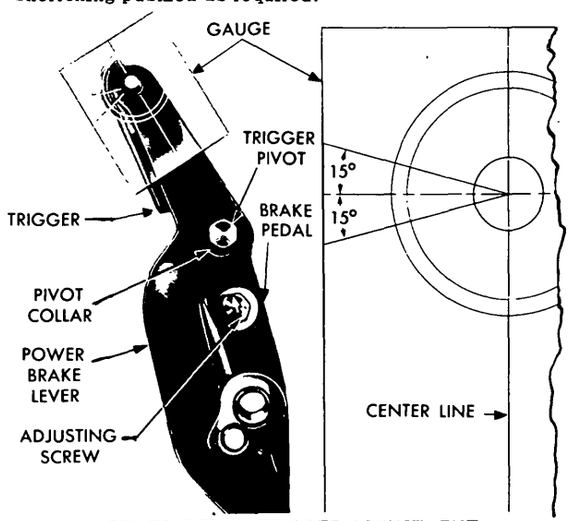
►*NOTE: "Bellows Type" Power Unit also used.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1960-61 LACK OF ASSIST ON INITIAL STOP DURING COLD WEATHER CORRECTION:* May be caused by rubber seal in check valve in vacuum hose sticking, or by kinked or collapsed vacuum hose. To correct, replace vacuum hose if necessary, and install improved type Check Valve, Part No. 1944089 (color coded Red and White). *CAUTION - Use only check valves with this color code.* Make sure brake pedal and linkage adjustments are correct.

DESCRIPTION: Oval air-vacuum unit of same design used previously.

ADJUSTMENTS: Pedal Freeplay Adjustment - Remove vacuum hose and depress brake pedal several times to release all vacuum. Insert blade of screwdriver between rubber collar of power brake trigger pivot and rear side of elongated hole in power brake lever, forcing them apart. *NOTE - If brake pedal and lever not wedged apart, a false freeplay setting (which includes booster valv travel) will be measured at pad end of pedal.* Check freeplay with linkage in this position by pushing lightly at pedal pad. Freeplay travel should be 1/16-1/8". If not within limits, adjust by lengthening or shortening pushrod as required.



BRAKE PEDAL TRIGGER ADJUSTMENT

Freeplay Measurement (Alternate Method) - Remove master cylinder pushrod end pin. With light finger pressure, move pushrod forward until contact made with master cylinder piston. Attempt to insert pushrod end through power lever and pushrod end hole. If pushrod must be pulled back to allow passage of pin, freeplay is present. If pushrod must be pushed further into master cylinder to allow passage of pin, no freeplay is present and adjustment must be made at pushrod.

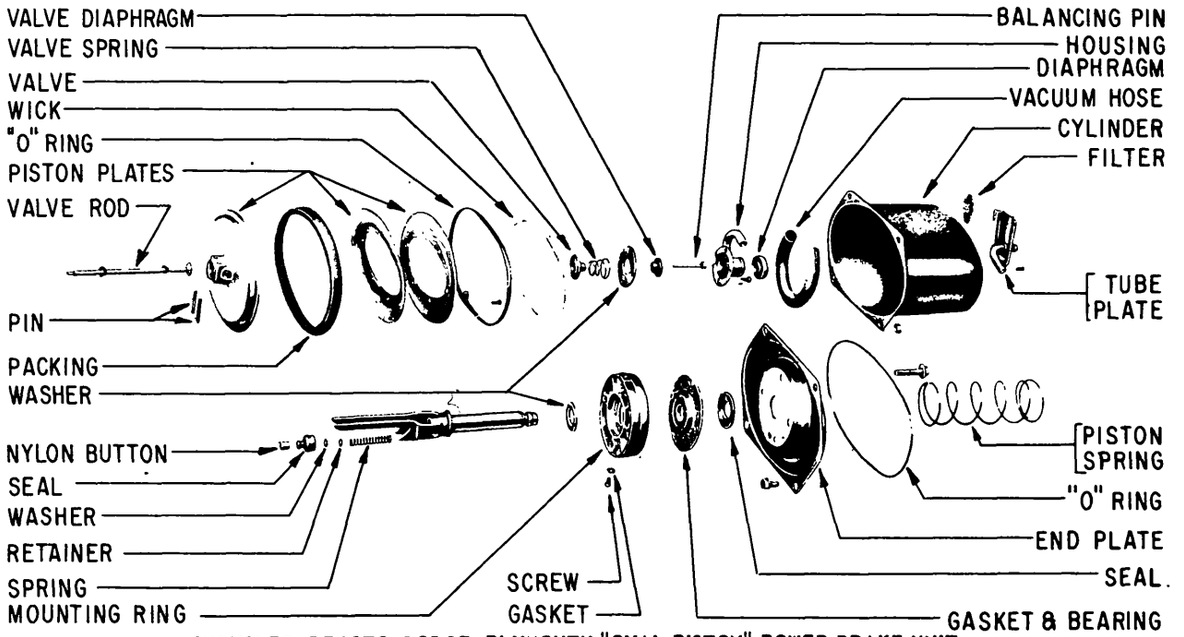
Pedal Linkage Adjustment - If pedal pressure releases slowly, adjust by rotating adjusting screw on trigger (accessible through slot in left side of brake pedal bracket) **counterclockwise.** A time delay (noted during a fast brake application) can usually be corrected by turning screw **clockwise.** *NOTE - Rotation of adjustment screw should be limited to 90° on either side of vertical position (arrow up).*

LUBRICATION: Periodically place a few drops of SAE 10W engine oil on brake lever pin bushings. No other lubrication required.

TROUBLE SHOOTING: *See "Chrysler, Dodge (Oval Piston) Type Power Unit" in 1959 Final Data or later Manual edition.*

TESTING: *See "Chrysler, Dodge (Oval Piston) Type Power Unit" in 1959 Final Data or later Manual edition.*

REMOVAL & INSTALLATION: *See "Chrysler, Dodge (Oval Piston) Type Power Unit" in 1959 Final Data or later Manual edition and note the followina:*



CHRYSLER, DESOTO, DODGE, PLYMOUTH "OVAL PISTON" POWER BRAKE UNIT

Pedal Trigger Adjustment - *NOTE - This bench adjustment must be made before reinstallation of linkage on car.* With adjusting screw in position, wedge brake pedal pivot to rear side of hole in power brake lever until adjusting screw collar is compressed and metal-to-metal contact exists. With Gauge Tool C-3508 over brake lever pin, align centerline of gauge with the centerline of the pedal. Turn the adjusting screw so the outer curved surface of trigger arm coincides with inner circle on gauge within the 15° arc lines. Distance from center of brake lever pin to inner circle must be .640"±.005". Remove wedge between power brake lever and brake pedal and press pedal so outer curved surface of trigger arm coincides with outer circle of gauge within the 15° arc lines. Radius of circle should be .730". If trigger arm curvature does not fall within the two circles, bend trigger arm as necessary or install new pedal and trigger and adjust as described.

OVERHAUL: *See "Chrysler, Dodge (Oval Piston) Type Power Unit" in 1959 Final Data or later Manual edition.*

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "BELLOWS" TYPE

Chrysler & Imperial (1961)
DeSoto (1961)
Dodge & Dodge Dart (1961)
Plymouth (1961)

►*NOTE: "Chrysler, DeSoto, Dodge, Plymouth (Oval Piston) Type" Power Unit also used.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1960-61 LACK OF ASSIST ON INITIAL STOP DURING COLD WEATHER CORRECTION:* May be caused by rubber seal in check valve in vacuum hose sticking, or kinked or collapsed vacuum hose. To correct, replace vacuum hose if necessary, and install improved type Check Valve, Part No. 1944089 (color coded Red and White). *CAUTION - Use only check valves with this color code.* Make sure brake pedal and linkage adjustments are correct.

DESCRIPTION: Same design as used on previous models.

ADJUSTMENT: *See "Chrysler, DeSoto, Plymouth (Bellows Type) Power Unit" in 1959 Final Data or later Manual edition and note the following:*

Pedal Freeplay Adjustment: Pedal freeplay should be 1/16-1/8". Adjustment procedure remains unchanged.

REMOVAL, OVERHAUL, & INSTALLATION: *See "Chrysler, DeSoto, Plymouth (Bellows Type) Power Unit" in 1959 Final Data or later Manual edition.*

BENDIX HYDRAULIC SINGLE ANCHOR

Buick (1961)
Buick Special (1961)
Lancer (1961)
Oldsmobile (1961)
Oldsmobile F-85 (1961)
Pontiac (1961)
Pontiac Tempest (1961)
Rambler American, Series 6101 (1961) ①
Rambler V8, Series 6120, 6180 (1961) ①
Valiant (1961)
Willys FC-170 (1961) ②

① - For models with Automatic Brake Adjusters, *see "Bendix Automatic Adjuster Hydraulic Brakes" in this section.* ② - With Dual Rear Wheels

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 BUICK BRAKE DRUM REPLACEMENT NOTE* Replacement brake drums have a blue lacquer coating for protection Remove coating with methyl chloroform before installing new drums

DESCRIPTION: Single anchor, without eccentric, hydraulic type of same design used previously Fixed anchor pins are used on all models except Pontiac Front Wheels Fixed anchor pins are not adjustable and "Major Brake Adjustment" is not required

ADJUSTMENTS: Before attempting any adjustments, car should be placed on stands with all wheels free Brake pedal should operate freely and there should be no bind in brake lever or cables

Brake Pedal Adjustment: This adjustment should conform with recommendations before any other adjustment is made

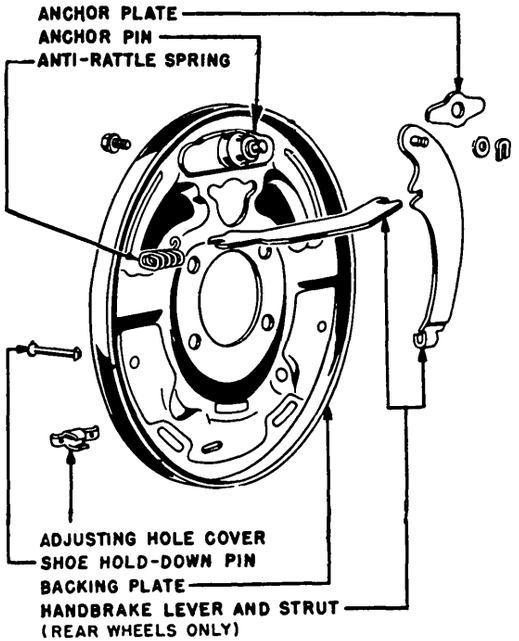
Buick & Buick Special - *NOTE - Brake pedal height cannot be adjusted on either manual or power brake cars* A non-adjustable pushrod connects directly to brake pedal External brake pedal return spring is not used and pedal return depends entirely on a spring within the cylinder Make sure pedal returns completely when released slowly If pedal does not return freely, check all pivot points for binding or lack of lubrication

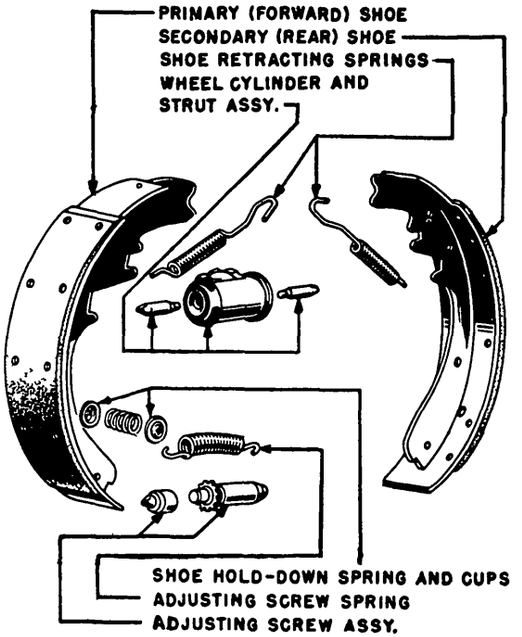
Lancer - No adjustment provided Freeplay controlled by stop built into master cylinder

Oldsmobile - Two adjustments required **Pedal Height** - Measurement should be as listed below To adjust, loosen locknut and adjust stopscrew located on underside of brake pedal support **Pedal Freeplay** - Push master cylinder pushrod until it contacts hydraulic piston, then turn pushrod until clevis pin can freely be installed into brake pedal Shorten pushrod one full turn for proper freeplay Tighten locknut and connect pushrod to brake pedal *NOTE - If pedal height is changed, adjust stop light switch*

Pedal Height - 8"±1/8" from top of brake pedal pad to floor pan (carpet turned back)

Oldsmobile F-85 - Two adjustments required **Pedal Height** - This measurement should be 6½"±1/8" from top of brake pedal pad to floor pan (carpet turned back) To adjust, loosen locknut and adjust stop bracket on underside of brake pedal bracket **Pedal Freeplay** - Freeplay should be 3/16" To adjust, *see "Oldsmobile" above*





BENDIX HYDRAULIC SINGLE ANCHOR BRAKE ASSEMBLY

Pontiac & Pontiac Tempest - Adjust pedal stop bracket to provide 6-6¼" (Pontiac), 4½" (Tempest) pedal pad to floor mat When pedal height changed, adjust stop light switch *CAUTION* - Do not lower pedal more than specifications

Rambler - Pedal freeplay should be ¼-½" Adjust by rotating pushrod eccentric bolt *NOTE - Compensating port in master cylinder should be wid open when brake pedal is in fully released position*

Valiant - No adjustment provided Freeplay controlled by stop built into master cylinder

Willys - Pedal freeplay should be at least ½" Adjust by rotating pushrod eccentric bolt *CAUTION - Compensating port in master cylinder should b wide open when pedal is in fully released position*

Minor Wear Adjustment: Check and adjust brake pedal clearance (see Brake Pedal Adjustment), release hand brake lever, and see that cables are free and are not holding brake shoes against drum At each wheel, expand brake shoes by turning adjusting screw up until wheel can just be turned by hand, adjust hand brake (cars where hand brake adjusted with shoes "expanded", see Hand Brake Adjustment), then back off adjusting screw the number of notches or "clicks" as shown in table below Check wheel for freedom of drag If drag noted, tap backing plate to assist centralization of shoes, then recheck If drag still exists, anchor pin adjustment may be in order See Major adjustment

1961 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Buick	① 12"	① 12"	1 1/8"	1"	1"	56	44
Buick Special	② 9 1/2"	② 9 1/2"	1"	7/8"	1"	57	43
Lancer	9"	9"	1"	13/16"	1"	60	40
Oldsmobile	11"	11"	1 1/8"	1"	1"	56	44
Oldsmobile F-85	9 1/2"	9 1/2"	1"	7/8"	1"	57	43
Pontiac	11"	11"	1 3/16"	1"	1"	58 5	41 5
Pontiac Tempest	9"	9"	1"	1"	1"	56 3	43 7
Rambler 01	9"	9"	1"	13/16"	1"	60	40
Rambler 20 & 80	10"	10"	1 1/8"	7/8"	1"	62 4	37 6
Valiant	9"	9"	1"	13/16"	1"	60	40
Willys	12"	13"	1 1/8"	1 1/4"	1 1/8"	50	50

① - 11 997-12 007" Maximum rebore limit 12 080" ② - 9 495-9 505" Maximum rebore limit 9 565"

CONTINUED ON NEXT PAGE

BENDIX HYDRAULIC (Cont.)

Adjusting Screw Setting

Car Model	Setting
Buick & Buick Special	15 Notches
Lancer	10-12 Notches
Oldsmobile	16 Notches
Oldsmobile F-85	15 Notches
Pontiac	12 Notches
PontiacTempest	10 Notches (Front), 12 Notches (Rear)
Rambler	ℂ 8 Notches
Valiant	10-12 Notches
Willys	Until Free

ℂ - 10 notches with new lining

Major Adjustment (Cars with Adjustable Type Anchor Pins): *NOTE - Major adjustment not required on cars with fixed anchor pins.* Make this adjustment when new or relined shoes are installed or when minor adjustment is not satisfactory. Jack up all four wheels, loosen or disconnect parking brake cables at equalizer or intermediate lever, then remove adjusting hole covers on backing plate and inspection hole covers on drum (remove wheels for access). Check pedal clearance (see Brake Pedal Adjustment). Adjust each wheel brake as specified by car manufacturer (see below). *NOTE - If hand brake cables not disconnected or loosened, shoes may be held in on position by cable.*

Pontiac (Front Wheels) - *NOTE - Pontiac rear wheels do not require a major adjustment as the anchors are "fixed" to backing plate.* Insert a .015" feeler gauge between lining and drum 1½" from adjusting screw end of secondary (rear) lining and expand shoes with adjusting screw until feeler gauge cannot be withdrawn. Back off adjusting screw until only a slight drag is felt on feeler gauge. *NOTE - This insures that shoes are against anchor pin and primary shoe is against drum.* Withdraw feeler gauge and insert it between lining and drum about 1½" from anchor pin end of secondary lining. This should give a slightly heavier drag (than near the adjustment screw). Adjust anchor pin to provide adjustment. Tighten anchor pin locknut to 60-90 ft. lbs. Complete adjustment as shown in minor adjustment above, and hand brake adjustment below.

Hand (Parking) Brake Adjustment: *CAUTION - Brake shoes must be expanded on some cars when adjusting hand brake cables.* Adjust each car as follows:

Buick – *NOTE – Make Parking Brake Adjustment when rear cables disconnected, or if cables are stretched, or whenever service brake pedal has good reserve but parking brake pedal depresses more than 8 ratchet clicks.* Make Minor Adjustment (see above). With parking brake assembly fully released, there should be 3/8" distance from rear face of parking brake idler lever to end of its slot in the frame. Adjust front cable clevis to correct. Depress parking brake pedal **exactly 2 ratchet clicks.** Tighten rear cable adjusting nut to obtain a heavy two-hand drag at rear wheels. Release parking brake lever and check rear wheels for free rotation in either direction.

Buick Special - Make "Minor Wear Adjustment" above. Pull out parking brake lever exactly 8 ratchet clicks. Hold threaded end of intermediate parking brake cable (to prevent twisting of cable) and tighten adjusting nut until left rear wheel can just be turned backward using both hands. Release parking brake lever and pull out exactly 3 ratchet clicks. Both rear wheels must turn freely in either direction.

Lancer - Make "Minor Wear Adjustment" above. Release parking brake foot lever completely. Loosen cable adjusting and lock nuts and adjust length of front cable so front cable has approximately 1/8" free-play. Tighten adjusting and lock nuts and check brake pedal and release handle for free operation.

Oldsmobile (1961) - Release parking brake and make "Minor Wear Adjustment" above if brake pedal-to-floor board clearance is less than 1¾" (Power Brakes), 4" (Standard Brakes). Adjust rear cables by first tightening equalizer adjusting nut until a heavy drag is felt at rear brakes, then loosen equalizer adjusting nut 10 turns and tighten locknut.

Oldsmobile F-85 - Make "Minor Wear Adjustment" above if total service brake pedal travel exceeds 4". Adjust rear cables by first tightening equalizer adjusting nut until a heavy drag is felt at rear brakes, then loosen equalizer adjusting nut 9 turns and tighten locknut.

Pontiac - Apply hand brake at first notch and check equalization. Loosen adjusting screw of tightest brake if not equal. If more than a few notches are required, loosen clamp screws on spreader and pull downward on the tight side of cable. This should equalize cable. Tighten spreader clamp screws while parking brake lever is still in applied position. When lever fully released wheels should turn freely with cable pulled down by gripping cable midway between conduit and and guide on frame. When adjusting rear end of front cable for close adjustment for tension, be sure to turn clevis on or off cable end but do not twist cable. Coarse adjustment is secured by selecting the correct hole in spreader.

Pontiac Tempest - Make "Minor Wear Adjustment" above. Loosen locknut (front nut) on rear cable equalizer and turn adjusting nut (rear nut) for proper tension on rear cables. *CAUTION - Do not twist cable.* Tighten locknut to 60-120 inch-lbs. torque. Release parking brake fully and make sure there is no drag on rear wheels.

Rambler (Hand Operated Type) - Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied. Release brake and check for drag.

Rambler (Foot Operated Type) - With lever in fully released position adjust rear cable at equalizer so wheels will turn without drag.

Valiant (1961) - Make "Minor Wear Adjustment" above. Release brake foot lever completely. Loosen cable adjusting and locknuts and adjust length of front cable so front cable has approximately 1/8" freeplay. Tighten adjusting and locknuts and check brake pedal and release handle for free operation.

Willys (Transmission Mounted Type) - Release fully the parking brake handle. Make sure cable and linkage do not bind. Rotate drum so a pair of access holes in drum expose shoe adjusting screw wheels in brake. Rotate adjusting wheels until shoes are snug against drum then back off each wheel 7 notches for proper clearance.

MASTER CYLINDER REMOVAL & FILLING: *NOTE - Procedures below apply for standard brakes. For removal with Power Unit, see Power Brake Unit pages in this section.*

Buick - Remove connector from stop light switch and disconnect brake pipe from master cylinder. Remove locknut, shoulder bolt, and spring washer connecting brake pedal to master cylinder pushrod. Remove master cylinder-to-dash panel bolts and remove master cylinder.

Filling - Fluid should be ½-1" below lip of filler opening.

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TRANS. MOUNTED PARKING BRAKE

Car	Drum Diam.	Length - Lining - Width	Thickness
Willys	8"	8 1/8"ℂ	1 3/4" 211"

ℂ - Each Shoe

1961 HYDRAULIC BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickness Front	Thickness Rear
Buick	2 1/4"	2"	10.040"	12.979"	10.040"	12.959"	.265"	.220"
Buick Special	2"	1 3/4"	7.523"	9.793"	7.523"	9.793"	.196"	.196"
Lancer	ℂ	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
Oldsmobile	2 1/2"	2"	9 3/8"	12 1/32"	9 3/8"	12 1/32"	7/32"	7/32"
Oldsmobile F-85	2"	1 3/4"	7.523"	9.793"	7.523"	9.793"	9/32"	9/32"
Pontiac	2 1/2"	2"	9.29"	11.94"	9.29"	11.94"	.220"	.220"
Pontiac Tempest	1 3/4"	1 3/4"	7.15"	9.31"	7.15"	9.31"	.222"	.222"
Rambler 01	2"	2"	7.62"	9.82"	7.62"	9.82"	3/16"	3/16"
Rambler 20 & 80	2 1/2"	1 3/4"	8.90"	11.06"	8.46"	10.88"	3/16"	3/16"
Valiant	ℂ	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
Willys	2"	2 1/2"	11.50"	13"	12.67"	13.94"	.238"	.238"

ℂ - Primary 2 1/4", Secondary 2 1/2"

BENDIX HYDRAULIC (Cont.)

Buick Special - Remove stop light switch connector and disconnect brake pipe from master cylinder. Remove retainer pin, washer, and clevis pin holding brake pedal to master cylinder pushrod. Remove master cylinder-to-dash panel bolts and remove master cylinder.
Filling - Fluid should be ½-1" below lip of filler opening.

Lancer - Remove brake pedal return spring and disconnect pushrod from brake pedal. Disconnect brake pipe and stop light switch leads from master cylinder. Remove master cylinder-to-dash panel attaching bolts and slide master cylinder straight out from dash panel.
Filling - Fluid should be even with top edge of master cylinder.

Oldsmobile - Disconnect brake pipe from master cylinder. On Synchro-mesh cars, install gauge pin in frame side rail holes to hold clutch linkage in position and disconnect clutch linkage from clutch pedal bellcrank and remove bellcrank. Remove master cylinder attaching nuts and remove cylinder.
Filling - Fluid should be ½" below bottom of filler opening.

Oldsmobile F-85 - Disconnect brake pipe from master cylinder, remove attaching nuts and remove cylinder. *NOTE* - Unnecessary to disconnect pushrod and clevis.
Filling - Fluid should be ½" below filler cap.

Pontiac & Pontiac Tempest - Disconnect brake pedal return spring. Disconnect master cylinder pushrod from brake pedal by removing cotter pin and clevis pin from clevis. Disconnect brake pipe from master cylinder, remove master cylinder-to-cowl attaching bolts and remove cylinder.
Filling - Fluid should be 1" below top of filler opening.

Rambler – Disconnect pipe from master cylinder, remove attaching bolts, and remove master cylinder.
Filling – Maintain fluid to within ½" of top of filler opening.

Valiant - Remove brake pedal return spring and disconnect pushrod from brake pedal. Disconnect brake pipe and stop light switch leads from master cylinder. Remove master cylinder-to-dash panel attaching bolts and slide master cylinder straight out from dash panel.
Filling - Fluid should be even with top edge of master cylinder.

Willys - Master Cylinder location under instrument panel in front of steering column. Access hold for filling provided on instrument panel to right of speedometer.
Filling - Fluid should be ½" below top of filler hole.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brak Section of Manual.*

BENDIX AUTOMATIC ADJUSTER HYDRAULIC BRAKES

Ford Pass. Cars (1961)
Lincoln Continental (1961)
Mercury (1961)
Rambler American, Series 6101 (1961) ①
Rambler V8, Series 6120, 6180 (1961) ①
Thunderbird (1961)
① – "Bendix Hydraulic Single Anchor (Without Eccentric)" also used.

► *EXCESSIVE REVERSE "CLUNK" OR BRAKE CHATTER CORRECTION:* Make sure brake backing plate attaching bolts are tightened to correct specifications. Front Brake: 80–100 ft. lbs. (Upper) 20–30 ft. lbs. (Lower). Rear Brake: 30–35 ft. lbs.

► *1961 FORD & MERCURY BRAKE NOISE OR SQUEAL CORRECTION & PRODUCTION CHANGE:* On early cars (before Sept. 16, 1960 for Mercury; before Dec. 19, 1960 for Ford) install higher tension brake shoe lower hold–down springs. Springs, Part No. TDAA–2068–A, identified by black paint, are used on later production cars.

► *1960–61 MERCURY PREMATURE BRAKE BACKING PLATE WEAR CORRECTION:* Remove any sharp or rough edge on brake shoe rim.

► *1961 THUNDERBIRD BRAKE PEDAL PIVOT PIN RATTLE CORRECTION:* Install split nylon bushings, Part No. C1VV–2461–B, preloaded with a Lubriplate coated wave washer, Part No. 356468–S13W.

► *1961 THUNDERBIRD FRONT BRAKE "HONK" CORRECTION:* Condition may occur just before car comes to a full stop. Correct by installing new front brake carrier assemblies, Part No. C1SS–2010–H (Right), No. C1SS–2011–H (Left).

DESCRIPTION: Similar in design to previous Bendix Single Anchor (Without Eccentric) brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of rear (secondary) shoe during a reverse brake application to turn brake adjusting screw a small amount after a predetermined amount of wear on front and rear linings. The adjuster consists of a steel cable with a hook and anchor fitting permanently attached, a cable guide, adjusting lever, adjusting screw, pivot nut, socket and spring.

OPERATION: When lining has worn enough to require adjustment (approximately .0005" on each shoe), secondary shoe on which adjuster is mounted moves far enough from shoe anchor during a **revers** application to cause cable to lift adjuster lever into engagement with the next tooth in the adjusting screw. When brake is released, secondary shoe returns to the anchor. Movement of the adjusting screw is 1/24th of a revolution each time it is moved by the adjuster. In forward braking, adjusting parts move with secondary shoe as a unit, and there is no lifting of the lever to engage a new tooth in adjusting screw.

ADJUSTMENTS: Make adjustments with drums cool and contracted. If car raised on frame hoist, disconnect parking brake cables. *NOTE – Anchor pins ar fix d in backing plate and no major adjustm nt is required.*

Pedal Freeplay: Ford, Lincoln, M rcury, Thund rbird – Pedal freeplay is not adjustable.
Rambler – Rotate brake pedal–to–pushrod eccentric bolt to obtain ¼–½" pedal freeplay. Adjust for maximum pedal height on power brake equipped cars.

Initial Adjustment After Ov rhaul: F rd, Linc ln, Mercury, Thunderbird – Raise car and disconnect parking brake cables. Remove access hole cover plate from backing plate and turn adjusting screw upward with Tool 2018 or screwdriver to expand shoes against drum until a slight drag is felt. Remove brake drum. Hold adjusting lever away from adjusting screw and back off adjusting screw ¾–turn with fingers. *NOTE–*

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1961 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Ford	11"	11"	1 3/32"	15/16"	1"		
Lincoln	11.062"	11.062"	1 3/32"	15/16"	7/8"		
Mercury	11.030"	11.030"	1 1/8"	15/16"	1"		
Rambler Amer.	9.0"	9.0"	1"	13/16"	1"	60.2	39.8
Rambler V8	10"	10"	1 1/8"	7/8"	1"	62.4	37.6
Thunderbird	11.030"	11.030"	1 3/32"	15/16"	1"		

1961 BRAKE LINING SPECIFICATIONS

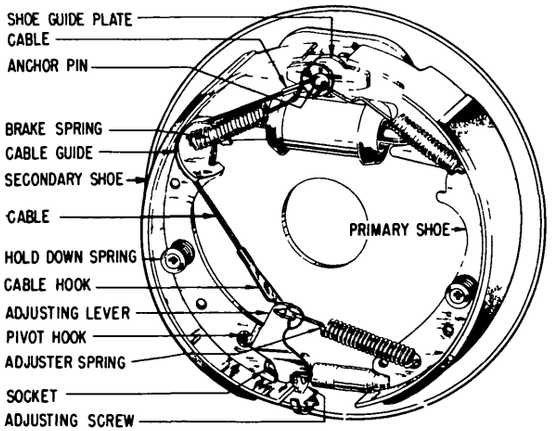
Car Model	Width Front	Width Rear	Length Front Primary	Length Front Secondary	Length Rear Primary	Length Rear Secondary	Thickness Front	Thickness Rear
Ford	2½"Ⓒ	2½"	9.28"	11.93"	9.28"	11.93"		
Lincoln	3"	3"	9.39"	12.21"	9.39"	12.21"	②	②
Mercury	2½"Ⓒ	2½"	9.30"	11.95"	9.30"	11.95"	.195"	.195"
Rambler Amer.	2"	2"	7.62"	9.82"	7.62"	9.82"	.1875"	.1875"
Rambler V8	2½"	1¾"	8.90"	11.06"	8.46"	10.88"	.1875"	.1875"
Thunderbird	③	③	9.030"	11.095"	9.03"	11.095"		

Ⓒ - 3" on Sta. Wgn., Taxi & Police. ② - .225" primary, .287" secondary. ③ - Primary 3", Secondary 2½".

BENDIX AUTOMATIC ADJUSTER HYDRAULIC BRAKES (C nt.)

If scr w cannot b turned with fingers, screw must be freed or adjusting l v r will not turn screw. If brake drum cannot be removed, hold adjusting lever away from adjusting screw while backing adjusting screw off until wheel turns freely, then back off one more stroke.

Rambl r – Lengthen adjusting screw to expose 3/8" of adjusting screw threads, then install drum. Drive car cautiously in reverse, making 7 or 8 brake applications before road testing.

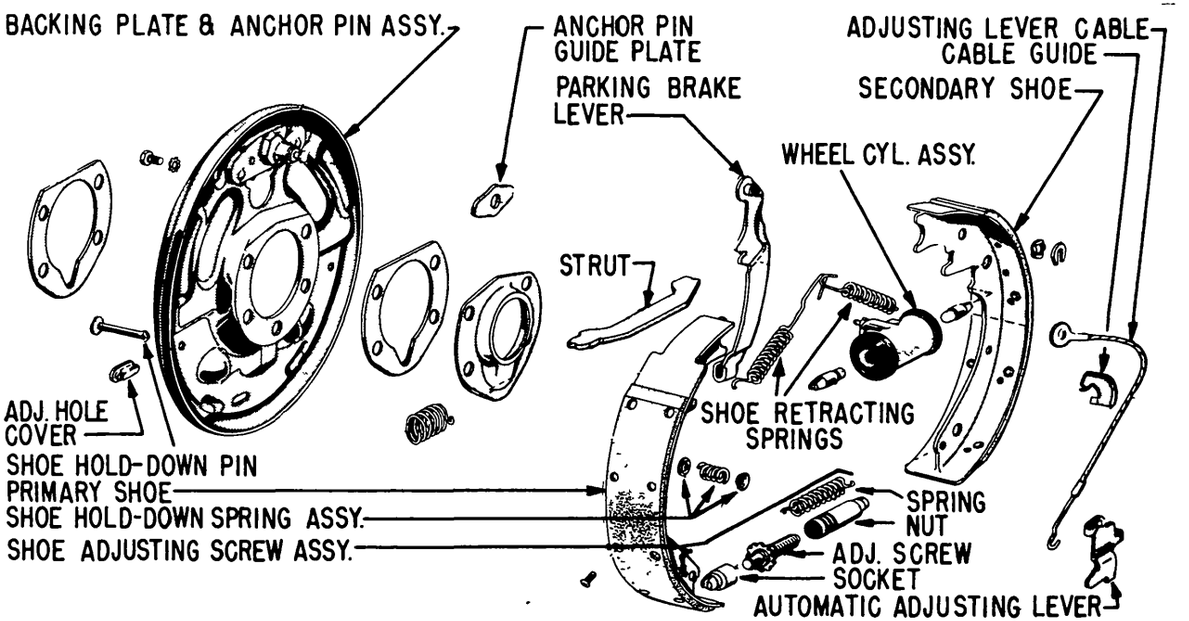


BENDIX AUTOMATIC ADJUSTER ASSEMBLY

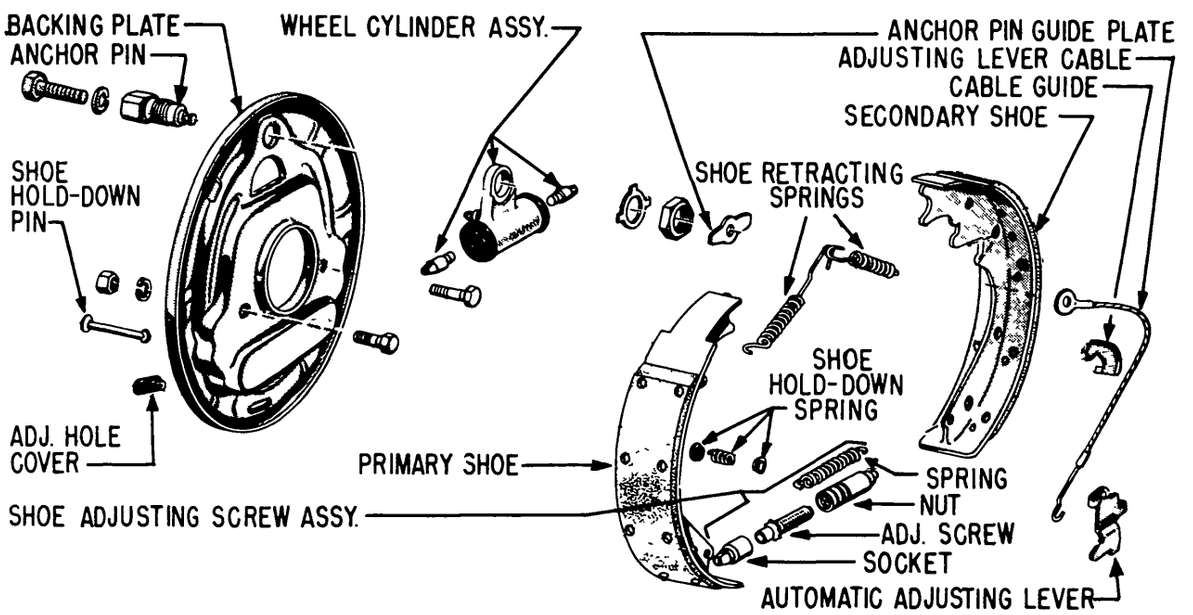
Parking Brak Adjustm nt: Ford & Thunderbird - With parking brake cables fully released, loosen locknut on equalizer rod and turn adjusting nut several turns forward. Turn locknut forward against equalizer until cables are just tight enough to remove slack. *CAUTION Excessive tight ning of cables may pull brake shoes off anchors.* Tighten both nuts against equalizer. Remove all slack from cable between parking brake pedal and equalizer lever without moving equalizer lever.

Linc ln – Fully release parking brake and raise car. Loosen cable at equalizer lever, then depress parking brake pedal 1¾" from normal released position. Adjust cable until there is a slight drag at rear wheels. Tighten equalizer rod locknut. Release brake and make sure brake shoes return to fully released position. Depress parking brake pedal 2". Car should be held satisfactorily under normal conditions.

Mercury – Release parking brake pedal, raise car, then loosen parking brake cable at equalizer lever. Depress parking brake pedal 1¾" from fully released position. Adjust front and rear cables until a slight drag is felt when turning rear wheels. *NOTE – The adjustment should be evenly divided between the two cables to maintain proper equalizer lever action.* Equalizer lever will be properly positioned when distance from rear cable clevis pin on equalizer bar to rear face of crossmember (to which parking brake bracket is attached) is 5½", with parking brake pedal fully released. Tighten locknut on equalizer rod, then release parking brake and check to make sure that shoes return to fully released position. Depress parking brake pedal 2". Under normal conditions, this should hold car satisfactorily.



FORD, LINCOLN & MERCURY REAR BRAKE ASSEMBLY



FORD & MERCURY FRONT BRAKE ASSEMBLY (LINCOLN SIMILAR)

Rambl r (Hand Op rat d Typ) - Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied.

Rambl r (F t Op rated Typ) - With lever in fully re-

CONTINUED ON NEXT PAGE

BENDIX AUTOMATIC ADJUSTER HYDRAULIC BRAKES (C nt.)

leased position adjust rear cable at equalizer so wheels will turn without drag.

Automatic Adjuster: Removal - Disengage adjusting lever from adjusting screw by pulling backward on lever. Move outboard side of adjusting screw upward and back up pivot nut as far as possible. Pull adjusting lever, cable and adjusting spring down toward rear to unhook pivot hook from large hole in secondary shoe. *CAUTION - DO NOT pry pivot hook out of hole.* Remove anchor springs and unhook cable anchor. Remove shoe guide plate. Remove cable guide from secondary shoe and remove shoe hold-down springs, shoes, adjusting screws, pivot nut and socket.

Installation - Install brake shoes on backing plate with hold-down spring pin, springs and cups. Install parking brake link and spring. Connect parking brake cable. Install shoe guide plate on anchor pin. Place cable anchor over anchor pin with crimped side toward backing plate. Install primary and secondary shoe to anchor springs. *CAUTION - Be sure that cable end is not cocked or binding on anchor pin.* Install cable guide on secondary shoe web with flanged hole fitted in hole in web. Thread cable through guide groove, not between guide and shoe web. Turn adjusting screw in to limit of threads then back off ½ turn. *CAUTION - Place left hand screw on right side of car, right hand screw on left side of car.* Install adjusting socket on screw, place assembly between shoe ends with adjusting screw nearest secondary shoe. Hook cable hook into hole in adjusting lever from backing plate side. Place pivot hook into large hole in secondary shoe web. Place hooked end of adjuster spring into large hole in primary shoe web and loop end of spring to adjuster lever. Check action of adjuster by pulling cable toward secondary shoe to lift lever past tooth. Spring will pull lever to original position (when cable released) advancing screw one tooth (1/24 revolution). Lever should contact adjusting wheel 3/16±1/32" above centerline of screw. Cable length should be 11 1/8±1/64". Cable guide groove should be parallel with shoe web and body of guide should be flat against web. Pivot hook surfaces should be square with body of lever. Adjusting screw must be seated properly in shoe web. Replace damaged or incorrect parts. Follow adjustment procedures given above.

MASTER CYLINDER: Removal (F rd, Linc ln, M rcury, Thunderbird) – Disconnect speed control linkage at exterior arm (remove cotter pin). Disconnect rubber boot, brake line, and stop light switch wires from master cylinder and stop light switch. Remove master cylinder attaching bolts and remove master cylinder.

Filling – Maintain fluid to within 3/8" (Ford & Thunderbird), ¼" (Lincoln & Mercury) of top of master cylinder.

Removal (Rambler) – Disconnect pipe from master cylinder, remove attaching bolts, and remove master cylinder.

Filling – Maintain fluid to within ½" of top of filler opening.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brak Trouble Shooting" in Brake Section of Manual.*

Willys, All Models (1961) ①

① – For FC–170 with Dual Rear Wheels, *see "Bendix Hydraulic Single Anchor (Without Eccentric)" brakes.*

►*WILLYS FORWARD CONTROL MASTER CYLINDER NOTE:* Master cylinder mounted on inside front panel of cab, just underneath instrument panel. Access to filler plug is through hole cover on panel to right of speedometer.

DESCRIPTION: "Self-Centering" hydraulic type with non-adjustable anchor ramps for each shoe. An eccentric adjusting cam is used for brake shoe adjustment.

ADJUSTMENT: Before making adjustments, jack up all four wheels, check brake pedal clearance or free travel (see below), fully release hand brake and make certain that rear wheels are free, then adjust each wheel as follows:

Brake Shoe Adjustment (For Wear or New Linings):

►*CAUTION: Brake shoes must be "centralized" by several hard brake applications before adjusting.*

Eccentric Adjustment - Adjust eccentric for each brake shoe by turning eccentric up and out until brake shoe firmly applied and wheel is locked, then back eccentric off until wheel just rotates freely without drag. Shoe clearance will then be approximately .010".

Anchor Lip Adjustment - Pressure required to pull shoe outward from support plate should be 15 lbs. Measure with spring scale hooked in end of shoe. Adjust by bending anchor lip slightly toward brake support plate to obtain this 15 lb. coil spring pressure to hold shoes on support plate ledges.

Hand Brake Adjustment: Remove all slack from rear wheel brake cables as follows:

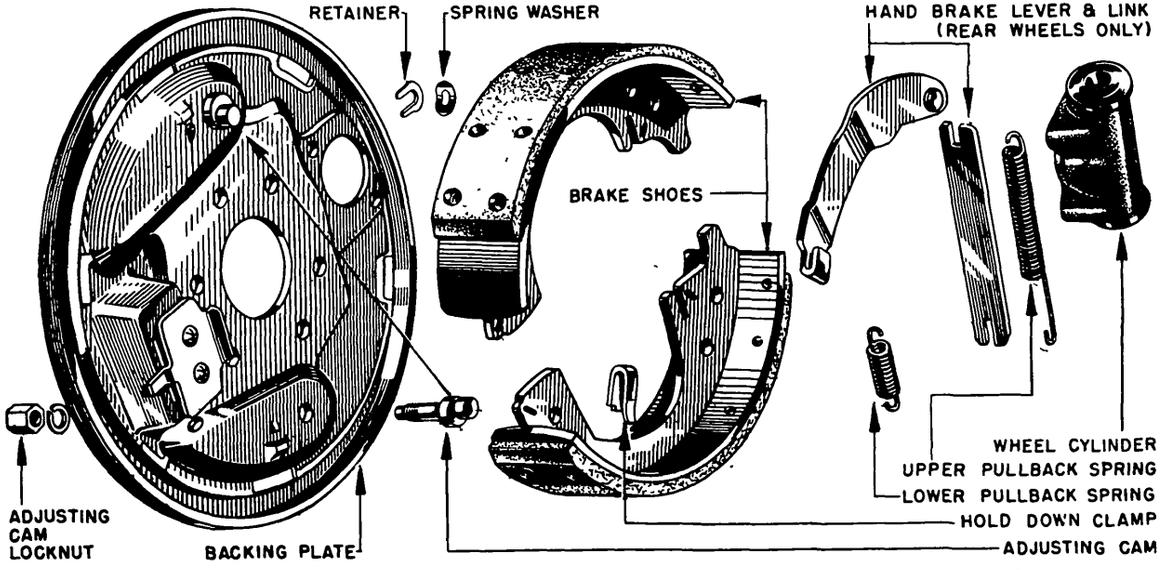
Willys (Vehicles with cabl c nnect d t rear wh l service brakes) -Pull hand lever "on" three notches, loosen front nut on connecting link between intermediate lever on frame crossmember and rear cable equalizer, tighten rear nut on link until slight drag noted at each rear wheel, then tighten front nut to lock adjustment. Release hand lever and check for freedom of drag.

Willys (Vehicles using propeller shaft mounted parking brakes). Fully release hand brake lever, check linkage for freedom from bind. Rotate brake drum so one pair of three sets of holes are over adjusting screws. Use tool or screwdriver to rotate each adjusting screw away from drive shaft until shoes are snug against drum, then back off each screw 7 notches for running clearance.

Willys (Vehicles with Operator Adjustabl Hand Brak Lever – 1) Adjusting knob on hand brake lever handle compensates for lining wear or for unusual holding conditions. With lever in "off" position, turn adjusting knob clockwise while applying and releasing handle every ¼–turn of knob until definite "snap over center" action takes place. *CAUTION – Over adjustm nt causes hard hand lever action but d s n t incr ase brake efficiency. For major adjustm nt pr c d as follows:*

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BENDIX (LOCKHEED) SELF-CENTERING



BENDIX (LOCKHEED) SELF-CENTERING REAR BRAKE (FRONT SIMILAR EXCEPT HAND BRAKE PARTS OMITTED)

BENDIX (LOCKHEED) SELF-CENTERING (Cont.)

2) With adjusting knob turned fully counterclockwise, place handle in "on" position. Tighten parking brake cables at equalizer adjusting nut until slight drag is felt at rear wheels. Tighten locknut. Release control handle. Rear wheels should be free. Turn adjusting knob clockwise for desired tension.

Brake Pedal Adjustment: Adjust master cylinder pushrod by loosening locknut and turning rod for following pedal travel with master cylinder piston and pushrod back against stop:

Brake Pedal Free Play – ½" (All Models).

MASTER CYLINDER: Fluid Level – Maintain fluid level to ½" below top of filler opening.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

1961 HYDRAULIC BRAKE SPECIFICATIONS

Willys Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
DJ-3A & FJ-3	9"	9"	1.125"	.812"	1"	65	35
CJ-3B, 5 & 6	9"	9"	1.000"	.750"	1"	65	35
Utility & Truck	11"	11"	1.125"	1.000"	1"	57	43
FC-150 & 170	11"	11"	1.125"	① .875"	1"	57	43

① - FC-170 is 1.000".

1961 BRAKE LINING SPECIFICATIONS

Willys Model	Width Front	Width Rear	Front - Length - Primary	Front - Length - Secondary	Rear - Length - Primary	Rear - Length - Secondary	Thickness Front	Thickness Rear
DJ-3A & FJ-3	① 2"	① 2"	9.875"	7.688"	9.875"	7.688"	.214"	.214"
CJ-3B, 5 & 6	1¾"	1¾"	10.219"	6.609"	10.219"	6.609"	.211"	.211"
Utility & Truck	2"	2"	12.250"	10.03"	12.250"	10.030"	.212"	.212"
FC-150 & 170	2"	2"	12.250"	10.03"	12.250"	10.030"	.212"	.212"

① - Primary. Secondary 1¾".

WAGNER (LOCKHEED) SELF-CENTERING

Checker Superba (1961)
Rambler 6 Cyl., Series 6110 (1961) ①
Studebaker, All Models (1961)
① – For cars with automatic brake adjusters, see *"Wagner Automatic Adjuster Hydraulic Brakes" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 STUDEBAKER EXCESSIVE BRAKE PEDAL SHAFT ENDPLAY CORRECTION & PRODUCTION CHANGE (Auto. Trans. Cars):* On cars before Serial No. 61S–24202 and 61V–19554, install plain washer, Part No. 532035, between bracket bushing and hairpin lock on end of shaft not having a washer. Cars after above serial numbers have this washer.

DESCRIPTION: Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies.

Self-centering Device - The upper anchor pin end of each brake shoe rests against a wedge-shaped anchor block which is mounted on fixed brake anchor pin (shoes do not contact anchor pin directly) so that the shoes are free to move radially. The wide edge of the anchor block is toward the top. When the brakes are applied, the lining surface pressure tends to force the shoe to adjust its position on the block and center itself in the drum. This centering action takes place on light, or heavy brake application and is continuous with drum expansion. The anchor plate aids in keeping the shoes properly aligned at the self-centering block.

ADJUSTMENTS: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid level is ½" below top of cylinder. Place parking brake handle in fully released position. Adjust as follows:

Rambler Brake Pedal Free Travel Adjustment: Adjust the brake pedal play ¼" to ½" by rotating the master cylinder piston pushrod to brake pedal attaching eccentric bolt.

Studebaker Brake Pedal Free Travel Adjustment: Turn adjustable pedal stop on pedal bracket to obtain ¼–3/8" pedal free travel (measured from brake pedal pad) before pressure stroke starts.

Brake Shoe Adjustment: Remove adjusting hole cover from backing plate, insert screwdriver or special adjusting tool through adjusting hole and turn adjusting screw to expand shoes until drum is just locked (pivot tool on edge of slot, move handle upward to expand shoes). Then back off the adjusting screw 8 notches (used lining), 10 notches (new lining), or more if necessary until drum is free of any drag. Replace adjusting hole cover, adjust parking brake.

PARKING BRAKE ADJUSTMENT: Rambler (Hand Operated Type) - Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied.

Rambler (Foot Operated Type) - With lever in fully released position, adjust rear cable at equalizer so wheels will turn without drag.

Studebaker - Set control handle four notches from fully released position. Adjust rear wheel cables at equalizer on frame side rail by backing off front nut until all slack is removed from cables and a heavy drag noted when rotating rear wheels by hand. Tighten front adjusting nut. Release control handle fully and see that wheels are free of any drag.

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1961 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Checker	11"	11"	1"	7/8"	1"		
Rambler	9"	9"	1"	13/16"	1"	60	40
Studebaker 6	10"	9"	1"	13/16"	1"	62	38
Studebaker V8	11"	10"	1 1/16"	7/8"	1"	62	38
Studebaker Taxi	11"	10"	1 1/16"	7/8"	1"	62	38

1961 BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Front - Length - Primary	Front - Length - Secondary	Rear - Length - Primary	Rear - Length - Secondary	Thickness Front	Thickness Rear
Checker	2 1/4"	2 1/4"	9 5/16"	12"	9 5/16"	12"	7/32"	7/8"
Rambler	① 2 1/4"	2"	7 5/8"	9 53/64"	7 5/8"	9 31/32"	3/16"	3/16"
Studebaker 6	2"	2"	8 15/32"	10 53/64"	7 9/16"	9 3/4"	② 3/16"	3/16"
Studebaker V8	2 1/4"	2"	9 21/64"	11 57/64"	8 15/32"	10 27/32"	③ 3/16"	3/16"
Studebaker Taxi	2 1/4"	2"	11 1/2"	11 1/2"	10 7/16"	10 7/16"	7/32"	3/16"

① - 2 1/2" Secondary. ② - 1/4" Secondary. ③ - 7/32" Secondary.

WAGNER (LOCKHEED) SELF-CENTERING BRAKES (C ntinued)

BRAKE SHOE REMOVAL & INSTALLATION:

R moval: Install wheel cylinder clamp to prevent hydraulic system leakage. Unhook the two shoe return springs at anchor. On rear brakes, swing the hand brake lever on the secondary shoe toward the axle to slacken cable. Lift cable from lever slot. Compress and remove hold-down spring clip on each shoe. Spread shoes and lift off brake support plate. On rear brakes, remove parking brake link and anti-rattle spring. Separate shoes by removing star wheel adjusting assembly and spring. On rear brakes, pull clip from parking brake lever mounted on secondary shoe and remove lever from shoe. Anchor plate and anchor block may now be lifted from anchor pin.

Installation: Reverse removal procedure. *NOTE* - On Studebaker Taxi and all 8 cylinder models, the parking brake lever is mounted on inner side of rear shoe. On Studebaker 6 cylinder models and all Rambler models, the parking brake lever is mounted on outside of shoe.

WHEEL CYLINDER: Removal & Disassembly - Disconnect flexible hose from cylinder. Remove screws attaching cylinder to backing plate. Remove cylinder.

Assembly & Installation: Assemble cylinders as shown in illustrations. Reverse removal procedure to install.

MASTER CYLINDER: Removal (Rambler) – Disconnect pipe from master cylinder, remove attaching bolts, and remove master cylinder.

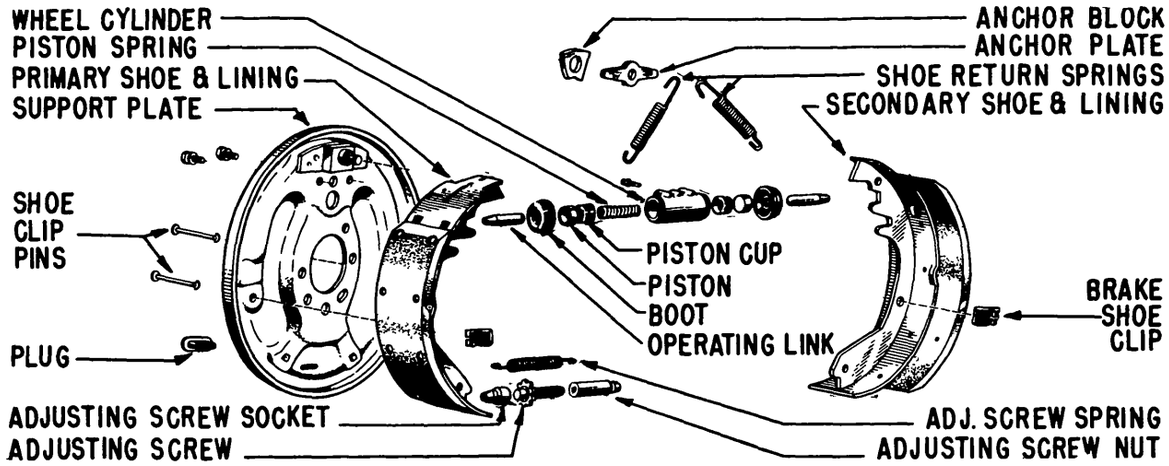
Filling – Maintain fluid to within ½" of top of filler opening.

Removal (Studebaker) – Disconnect pushrod from brake pedal, remove shoulder bolt from pushrod, and nylon bushings from pushrod. Disconnect stop light switch wire and hydraulic line. Remove attaching bolts and remove master cylinder.

Filling – Maintain fluid to within ½" of top of cylinder.

BLEEDING BRAKE SYSTEM & OVERHAULING OF MASTER CYLINDER & WHEEL CYLINDERS: *See "Hydraulic Brake Servicing" in Brake Section of Manual and note the following:* CAUTION - To bleed power brakes, engine must be stopped and no vacuum in power brake system. *NOTE* - On Studebaker equipped with power brake and/or hill holder, these units must be bled before the rest of the system.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*



WAGNER (LOCKHEED) SELF-CENTERING FRONT BRAKE ASSEMBLY

WAGNER AUTOMATIC ADJUSTER HYDRAULIC BRAKES

Rambler 6 Cyl., Series 6110 (1961)

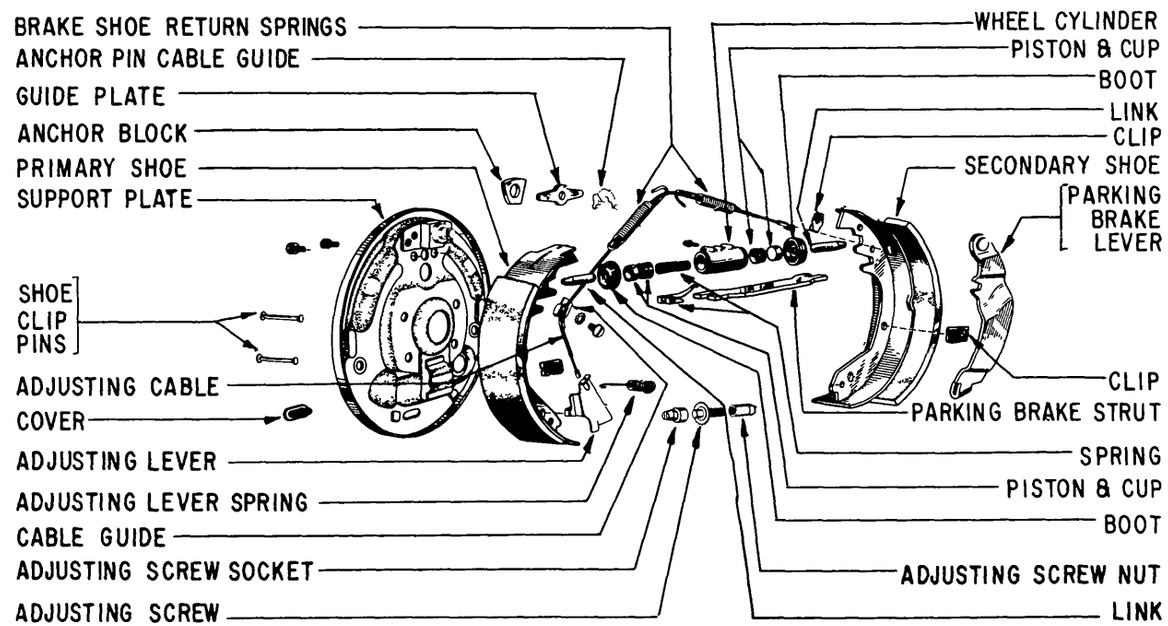
DESCRIPTION: Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies similar in design to Wagner (Lockheed) Self-Centering Brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of the front (primary) shoe during brake applications to turn brake adjusting star wheel a small amount as determined by lining wear. The adjuster consists of an adjusting lever, cable guide and an adjusting cable.

OPERATION: After lining wears enough to require adjustment, the adjusting cable will lift adjusting lever into position to engage with next tooth of star wheel when the brakes are applied. When brake is released, shoes return to the brake shoe anchor. This action will repeat on subsequent brake applications, if necessary, until shoe-to-lining clearance is reduced to a point where shoe movement is not enough to cause cable to lift lever to next tooth. The automatic adjuster is located on the front shoe (primary), and the adjusting action, when required, occurs when applying brakes in either forward or reverse motion.

ADJUSTMENT: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid is ½" below top of cylinder. Place parking brake handle in fully released position, then adjust as follows:

Brake Pedal Free Travel Adjustment: ¼" to ½" free travel required. To adjust, rotate master cylinder pushrod-to-brake pedal attaching eccentric bolt.

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WAGNER AUTOMATIC ADJUSTER BRAKE ASSEMBLY (REAR SHOWN - FRONT SIMILAR)

WAGNER AUTOMATIC ADJUSTER HYDRAULIC BRAKES (C nt.)

Brake Sh Adjustment: Adjustment not normally required, however, if a manual adjustment is necessary (after installation of new lining or shoes), proceed as follows Remove access hole cover and use a screwdriver to rotate star wheel. To tighten, rotate backing plate side of star wheel toward axle. To back off star wheel, it may be necessary to insert a second tool, past the star wheel, to force automatic adjusting lever off of star wheel. Back off star wheel to eliminate drag.

Parking Brake (Foot Operated Lever): With lever in fully released position, adjust rear cable at equalizer so wheels will turn without drag

BRAKE SHOE REPLACEMENT: *See "Wagner (Lockheed) Self–C ntering" and note the following:*

Automatic Adjuster Installation: With shoes installed on backing plate, install anchor block on anchor pin with convex side facing primary shoe (arrow on block should point in direction of forward drum rotation), then install shoe guide plate. Install **red** secondary shoe return spring with long hook end flat against shoe guide plate. Install **blue** primary spring **last** with short hook end flat against shoe table when hooked on tab of primary shoe. Slip anchor pin cable guide down in slot on anchor pin and install adjuster guide on primary shoe (do not tighten guide screw). Install adjuster lever into larger hole near end of primary shoe and connect adjuster lever spring between small hole in secondary shoe and slot in lever. Thread adjusting cable through shoe hold–down springs and over cable guide on anchor pin, hooking eye end of cable over secondary shoe return spring hook. Route cable around cable guide and swivel lever upward and engage barrel fitting end of cable in lever slide. With brake released, push primary shoe cable guide out to pull cable taut until bottom edge of adjusting lever is engaging star wheel tooth and parallel to star wheel shank. Tighten cable guide screw and test action by pulling cable.

1961 RAMBLER BRAKE SPECIFICATIONS

Drum Diameter	9" Front & Rear
Wheel Cylinder Diameter	1" Front, 13/16" Rear
Master Cylinder Diameter	1"
% Braking Power	60% Front, 40% Rear

1961 RAMBLER BRAKE LINING SPECIFICATIONS

Lining Width	2 1/4" Front ℂ, 2" Rear
Lining Length (Primary)	7 5/8" Front & Rear
Lining Length (Secondary)	9 53/64" Front, 9 31/32" Rear
Lining Thickness	3/16" Front & Rear

ℂ - Primary Shoe 2½" Secondary Shoe

MASTER CYLINDER: Removal – Disconnect pipe from master cylinder, remove attaching bolts, and remove master cylinder.

Filling – Maintain fluid to within ½" of top of filler opening.

BLEEDING BRAKE SYSTEM & OVERHAULING OF MASTER CYLINDER & WHEEL CYLINDERS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CADILLAC (BENDIX-MORAINE) AUTOMATIC ADJUSTER BRAKES

Cadillac, All Series (1961)

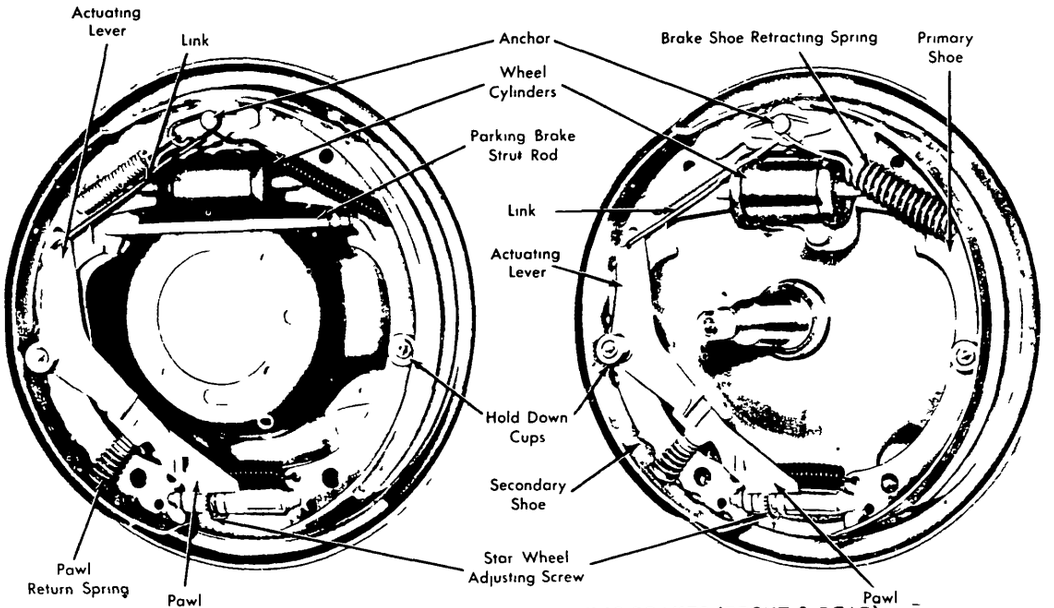
►CHANGES, CAUTIONS, CORRECTIONS

► *1961 CADILLAC BRAKE PEDAL INCOMPLETE RETURN CORRECTION:* On some cars before Engine No. 036024, condition may be caused by Cruise Control cut–off switch arm contacting its mounting bracket. If switch is properly adjusted and interference still exists, grind off edge of switch mounting bracket so there is at least 1/16" clearance between edge of switch arm and mounting bracket when brake pedal is fully raised (including slack and freeplay from pedal weight and linkage).

► *1961 CADILLAC FRONT BRAKE BACKING PLATE BOLT TORQUE & CAUTION:* Steering knuckle and arm–to–backing plate bolt and nut should be tightened to 60 ft. lbs. If necessary to re–torque, back off nut, then tighten to 60 ft. lbs. DO NOT overtighten as stripped threads will result. DO NOT use a standard bolt and nut in place of these special parts.

DESCRIPTION: Hydraulic single anchor type brake (without eccentric) with Bendix type shoes. Brake shoe anchor pins are fixed in backing plate and require no adjustment. Moraine automatic adjusting mechanism consists of a link, actuating lever, pawl, and pawl return spring.

OPERATION (AUTOMATIC ADJUSTER): The adjusters operate only when brakes are applied as car is moving in reverse As the brake drums move rearward, the wrap around action of the brake shoes forces upper end of primary shoe against anchor pin and the secondary shoe away from anchor pin The link which holds top of actuating lever stationary, forces actuating lever to pivot on secondary shoe This pivoting action forces pawl downward against end of a tooth on the star wheel adjusting screw. If lining-to-drum clearances are correct, the downward movement will stop before star wheel is turned If clearances are too wide, the secondary shoe will move outward and the pawl will move downward far enough to turn star wheel one notch and take up the adjustment



CADILLAC AUTOMATIC ADJUSTER HYDRAULIC BRAKES (FRONT & REAR)

ADJUSTMENTS: Brake Shoe Adjustment – *NOTE – Adjustment should be required only after shoe relining or replacement, or when length of star wheel has been changed.* Remove adjusting hole cover in drum and rotate star wheel to expand shoes until drum can just be rotated forward with a two–foot bar between the wheel mounting studs. Reach through adjusting hole and disengage adjuster pawl from star wheel (use a hooked tool) and back off star wheel **exactly 40 n tches.** *CAUTION – This 40 notch adjustment must be maintained.* Drive car forward and reverse and apply brakes moderately 5 or 6 times in each direction for final adjustment.

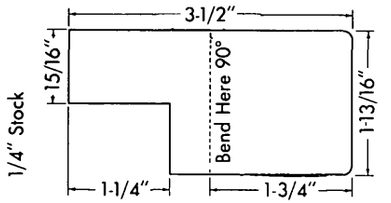
Parking Brake: *TOOL NOTE – Make a gauge tool from ¼" flat steel stock as shown in illustration.* With service brakes properly adjusted, lubricate parking brake linkage and check for free movement of cables in con-

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CADILLAC "AUTOMATIC ADJUSTER" BRAKES (C ntinu d)

duit and equalizer. Check rear relay lever spring and replace if necessary. With parking brake mechanism in fully released position, insert 15/16" part of gauge tool in gap between relay lever and end of slot in frame. Adjust intermediate cable at front clevis until gauge is a slip fit. *NOTE – On cars with Engine Nos. 010963 to 014241 with reworked intermediate cable, end of gauge should be aligned with scribe mark on frame and this dimension should be used instead of rear end of frame slot.* Back off equalizer nut so relay lever can be moved forward to insert 1 13/16" end of gauge into frame slot. *NOTE – There must be slack in rear cables when 1 13/16" end of gauge is in place.* Tighten equalizer nut to obtain a near lock–up drag on rear wheels when wheels turned by hand in forward direction. Remove gauge. Parking brake pedal should now travel 2–2½" with approximately 50 lbs. pressure on pedal.

BRAKE SHOE REPLACEMENT: Removal – *CAUTION– Note position and color of brake assembly springs for reinstallation in exactly the same locations.* Disconnect parking brake cables at rear wheels. Disconnect primary and secondary brake shoe retracting springs, and remove shoe hold–down cups. springs, pins, and sleeve. Remove pawl return spring, pawl and actuating lever. Disengage shoes from wheel cylinder and rotate shoes until link disengages from shoe plate (front), or anchor (rear).



GAUGE TOOL

Installation: Tighten front backing plate bolt to 60 ft. lbs. *(see "Front Backing Plate Bolt Torque & Caution" above).* Tighten rear backing plate bolts to 35–45 ft. lbs. (Series 60, 62, 75), 65–75 ft. lbs. (Series CC). Position shoes and hook connecting spring between primary and secondary shoes. Install star wheel between shoes so star wheel will engage pawl. *CAUTION* – Star wheel with 1 groove on O.D. (left hand threads) must be on right side of car; wheel with 2 grooves (right hand threads) must be on left side of car. Small diameter thin thrust washer must be between the end socket of star wheel and the large diameter spring washer. Install actuating lever, pawl spring, and pawl. Install shoe hold–down pins, cups, and springs, then install retracting springs. Loosen star wheel enough to install drums. Make wheel bearing, service, and parking brake adjustments.

1961 HYDRAULIC BRAKE SPECIFICATIONS

Cadillac Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Mast r Cyl. Diameter	% Braking P w r Front	% Braking P w r Rear
60, 62	12"	12"	1 1/8"	15/16"	1"	59	41
75	12"	12"	1 1/8"	15/16"	1"	59	41
Commercial	12"	12"	1 1/8"	1 1/16"	1"	52.8	47.2

1961 BRAKE LINING SPECIFICATIONS

Cadillac Model	Width Front	Width Rear	Front - Length - Primary	Front - Length - Secondary	Rear - Length - Primary	Rear - Length - Secondary	Thickness Front	Thickness Rear
60, 62	2½"	2½"	10.05"	12.98"	10.05"	12.98"	¼"	¼"
75	2½"	2½"	12.98"	12.98"	12.98"	12.98"	¼"	¼"
Commercial	2½"	2½"	12.98"	12.98"	12.98"	12.98"	¼"	¼"

PARKING BRAKE ASSEMBLY REPLACEMENT: Disconnect parking brake cable at bellcrank under car, then remove cable from clevis on assembly. Disconnect vacuum hose and remove assembly–to–instrument panel bolts. Remove assembly–to–cowl mounting bolts and remove assembly. To install, reverse removal procedure.

Vacuum Unit Replacement: With parking brake assembly removed (see above), drill out diaphragm retaining rivets (Series 60, 62), straighten diaphragm retaining tangs (Series 75, CC). Disconnect link from manual release lever (retained by rivet on Series 60, 62), and remove diaphragm. When installing, secure diaphragm to parking brake assembly, then connect link and manual release lever.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "THREE PLATFORM" TOTAL CONTACT BRAKES

Chrysler & Imperial (1961)
DeSoto (1961)
Dodge &Dodge Dart (1961)
Plymouth (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1959–61 BRAKE DRAG, PULL OR TOO FREQUENT BRAKE ADJUSTMENT CORRECTION:* This condition may result from burrs or sharp edges on brake shoe table loops and/or dust shield platforms. To correct, remove drums and brake shoe assemblies and remove any burrs or paint build-up on dust shield platforms. Lubricate all platforms with a thin film of MoPar "door ease" or Lubriplate. Carefully remove all sharp edges on shoe loop with a file or scraper. *CAUTION - Remove sufficient material to smooth loop edges only.* Reinstall brakes, retainers and return springs. Check brake shoe return spring tension by attaching a spring scale at toe of shoe and pull shoe away from wheel cylinder. Shoe should begin to move away from wheel cylinder pushrod at 45-55 lbs. If more than 55 lbs. is required to move shoe check for cause of drag. If less than 45 lbs. is required to move shoe, replace with new heavier load return springs, Part No. 2266881. *CAUTION– If th se h avi r springs used, th y must b installed on both right and left sid s of car at ith r front or r ar brak s, or on all four wh ls.*

►*HEAVY DUTY LINING NOTE:* Heavy duty lining is available for use on Police, Ambulance, High Performance, and other heavy duty vehicles for increased lining life and to prevent brake fade.

►*MASTER CYLINDER PUSHROD PRODUCTION CHANGE & REPLACEMENT NOTE:* 1/8" longer master cylinder pushrod used on later production cars with manual brakes. This pushrod will raise brake pedal height about 1". Only this pushrod will be furnished for replacement.

►*BRAKE LINING REPLACEMENT CAUTION:* Use only a lining set with same color identification as used on opposite wheel.

►*REAR WHEEL REMOVAL CAUTION:* **Do not apply service brakes to hold shoes against drum while using wheel puller.** To hold hub and drum from turning while using wheel puller, back off brake shoes from drum with adjusting cams. Apply hand brake and allow one rear wheel to remain on floor, or block wheel in suitable manner.

DESCRIPTION: These hydraulic brakes have three raised platforms (for each shoe) pressed into dust shield and three contact loops on each brake shoe so that shoe will ride on the platforms. An additional loop in brake shoe is for the attachment of return spring. The platforms act as guides to maintain proper shoe alignment and to reduce vibration and noise. Return spring is hooked in center of brake shoe eliminating need for flat guide springs. On front wheel brakes, two single piston cylinders (single action) are attached to support plate assembly, the upper cylinder actuating the front shoe and the lower cylinder actuating the rear shoe. On rear wheel brakes one double piston cylinder (double action) is attached to top of support plate assembly and actuates both brake shoes. An anchor pin in support plate assembly holds spring link in fixed position at one end. The other end of link is positioned by brake shoe adjusting cam, providing constant-loaded spring length. Side rattle and twisting of shoe is controlled by shoe retainer spring which maintains a constant pressure against platforms.

ADJUSTMENTS: Place car on stands, so that all four wheels are free. Check master cylinder and see that fluid level is not over ½" below top of cylinder. Place parking brake lever in fully released position.

Brake P dal Adjustm nt: *NOTE – Pedal freeplay adjustment not required on cars with manual brakes. The master cylinder has a fluted dust boot and retainer*

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH "THREE PLATFORM" TOTAL CONTACT BRAKES (Con..)

and th retainer acts as a master cylinder piston stop. There is no pedal stop and no pedal mounted pedal r turn spring. How ver, on later 1961 cars, a pedal r turn spring has been incorporated over master cylinder pushrod boot and held in place by a retainer ring in a groove in master cylinder pushrod. This pedal return spring and retainer may be installed on earlier cars if desir d.

P w r Brak s – *For complete pedal freeplay and linkage adjustm nt, see Chrysler Corp. Oval Piston Type or Bellows Type Pow r Brake Units in this section.*

Front Wheel Adjustm nt: Turn each adjusting cam on both front shoes in the direction of FORWARD wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

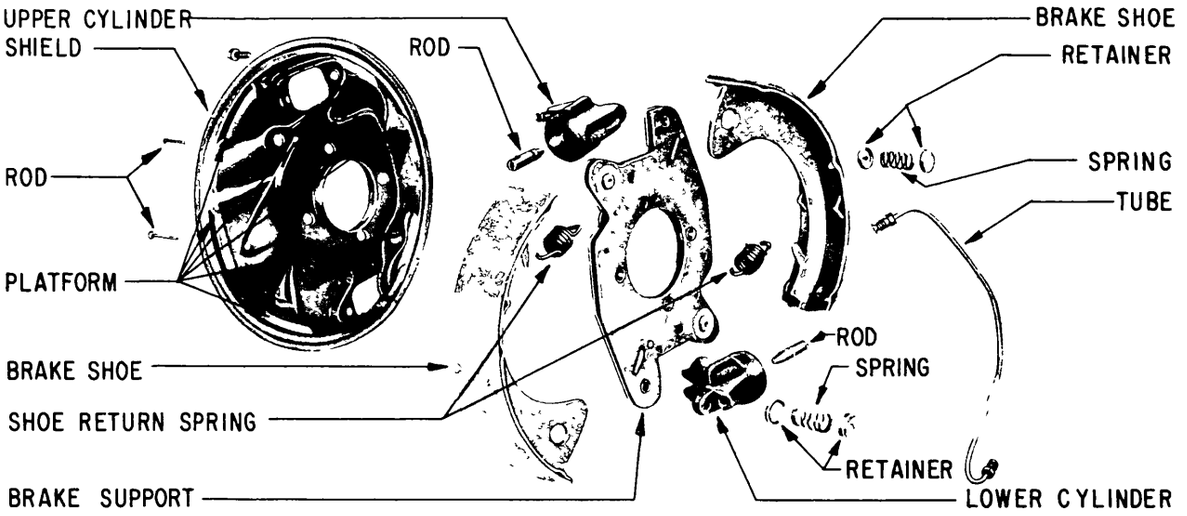
Rear Wh el Adjustment: Turn front shoe adjusting cam in direction of **f rward** wheel rotation and rear shoe adjusting cam in direction of **reverse** wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

►*RELINED OR NEW SHOE ADJUSTMENT NOTE:* Apply brake pedal prior to adjusting brakes to properly center shoes in brake drum and to assist in adjustment.

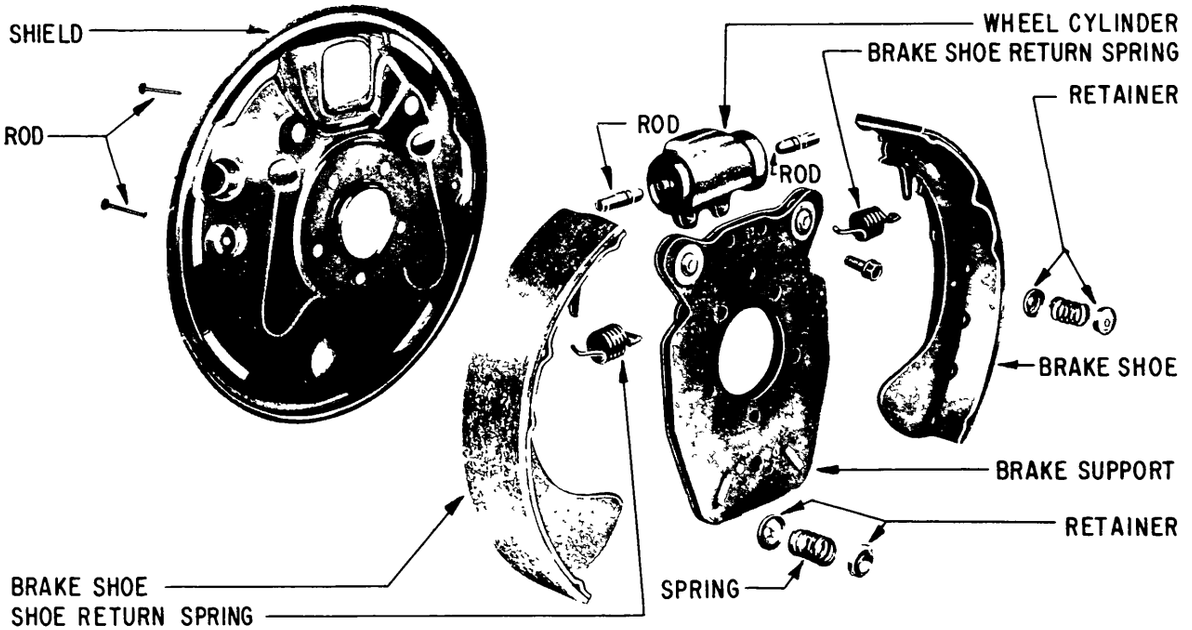
Hand Brake Adjustm nt (External Type): Disconnect control cable at brake operating lever. With a feeler gauge between brake lining and brake drum at brake band anchor, adjust anchor screw to obtain .015–.020" clearance between lining and drum. Install lock wire through head of anchor screw and anchor bracket. Adjust lower half of band by tightening guide bolt until there is a slight drag, then release bolt until drum can be rotated freely by hand. Tighten guide bolt lock nut. Tighten adjusting bolt nut until there is a slight drag on drum, then back off until drum rotates freely. Tighten adjusting lock nut. Connect operating cable to lever. Pull cable through firewall and tighten "V" nut at parking brake pedal assembly until nut is finger tight, then tighten nut 3 additional turns. Parking brake should be free of any drag. If brake pedal depresses more than 3½" from fully released position, readjust the brake.

Hand Brake Adjustment (Internal Type): With adjusting screw cover plate removed, turn adjusting nut until slight drag is felt on drum, then back off adjusting nut at least one full notch or until drum is free. *NOTE – Two raised shoulders on adjusting nut must be seated in grooves on adjusting sleeve.* Tighten cable adjusting "V" nut at parking brake pedal assembly finger tight, then an additional 3 complete turns. Parking brake should be free of any drag. If brake pedal depresses more than 3½" from fully released position, readjust the brake.

BLEEDING BRAKE SYSTEM: Use compressed air refiller, Tool C-3496 attached to master cylinder to keep master cylinder filled. Back off adjusting cams all the way, then starting with right rear wheel cylinder, attach bleeder hose, Tool C-650 to valve, with other end in jar partially filled with brake fluid. Bleed intermittently, opening and closing valve (at wheel cylinder) until fluid runs out of bleeder hose in a solid stream without bubbles. Repeat this operation on left rear wheel, right front wheel and finally left front wheel. At front wheels (with two cylinders), bleed lower cylinder first to force air out of connecting line to upper cylinder, then bleed upper cylinder. Repeat bleeding operation if brake action indicates air still in lines. Readjust cams after completing bleeding operation.



THREE-PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - FRONT WHEELS



THREE PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - REAR WHEELS

BRAKE SHOE REPLACEMENT: Removal - 1) Remove wheel, hub and drum assembly using puller C-845 to remove drum assembly.

2) Insert wrench C-3462, in the inner support plate hole, with tool cam slot engaging the spring hook. Turn tool handle to disengage spring from spring link, and turn handle in opposite direction to release the spring. Remove both springs in this manner. *CAUTION* - Do

CONTINUED ON NEXT PAGE

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "THREE PLATFORM" TOTAL CONTACT BRAKES (Cont.)

not use brake spring pliers or damage to lining will result

3) Turn brake shoe guide spring retainer 1/4 turn and remove (the lip on end of spring is for correct positioning on outer support assembly) Slide shoes from support assembly

Installation: 1) Position brake shoe in support plate, (make sure that wheel cylinder pushrods properly engage toe end of shoes and that shoes are in alignment),

2) Check tension of springs by hooking a spring scale at toe end of shoe and pulling shoe away from wheel cylinder. Scale should read 45-55 lbs. to move shoe off wheel cylinder. If more than 55 lbs. is required to move shoe, check for cause of drag. If less than 45 lbs. is required to move shoe, replace with new return springs (*see "Brake Drag, Pull or Too Frequent Brake Adjustment" above*).

1961 BRAKE SIZE APPLICATION

Car Model	Brake Size
Chrysler Newport & Windsor (Exc. Station Wagon)	11"
Chrysler Newport & Windsor Station Wagon	12"
Chrysler New Yorker, 300G, & Imperial	12"
DeSoto & Dodge (Polara)	11"
Dodge Dart & Plymouth (Std. Cars)	11"
Dodge Dart & Plymouth (High Perf. Cars) Std.	11"
Dodge Dart & Plymouth (High Perf Cars) Optl.	12"
Dodge, Dodge Dart, & Plymouth (Police Cars)	12"

1961 PARKING BRAKE SPECIFICATIONS

Drum Diameter	Width	Lining Length	Thickness
6" ①	2"	16 68"	5/32"
7" ②	2"	③ 6.53"	5/32"

① - External Contracting type.
② - Internal Expanding type. ③ - Each shoe.

LINING REPLACEMENT: Drum diameter should not exceed 004" out of round at any point Grind lining to specified clearance of 010"- 024" below drum diameter

►*BRAKE BACKING PLATE & BRAKE SHOE LOOP NOTE* Platforms for each shoe must be uniform in height and flatness (use surface gauge to check) and mating loops on brake shoes must be uniform and smooth Replace backing plate when platform heights vary more than 010"

WHEEL CYLINDER & SUPPORT PLATE: Removal & Disassembly - 1) Disconnect flexible brake hose at wheel cylinder (upper cylinder on front), and remove wheel cylinder mounting screws and lockwashers at rear of brake shield

2) Remove support plate mounting bolts and remove support plate with wheel cylinders and connector tube attached

3) With assembly on bench, remove cylinder connector tube and wheel cylinders

Assembly & Installation: 1) Assemble wheel cylinders on support plate (Install connector tube on front assembly)

2) Position support plate on brake shield and install cylinder mounting screws and lockwashers, but do not tighten

3) Install support plate bolts, lockwashers and nuts Tighten to 35 ft lbs and cylinder mounting screws to 20 ft lbs

WHEEL CYLINDER OVERHAUL: Wheel cylinder pistons that are badly scored or corroded should be replaced Use new piston cups when reconditioning cylinders Cylinder walls that have light scratches, or show signs of corrosion, can usually be cleaned up with crocus cloth Cylinders that have deep scratches or scoring, may be honed using Tool C-3080 Diameter of cylinder bore should not be increased more than 002" If a cylinder does not clean up at 002" it should be replaced (*NOTE* - Black stains on cylinder walls are caused by piston cups and will do no harm)

MASTER CYLINDER: Removal – Remove pushrod clevis pin and disconnect pushrod from pedal. Disconnect brake pipe and stop light switch wires. Remove attaching bolts and remove master cylinder.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Manual*

1961 HYDRAULIC BRAKE SPECIFICATIONS

Brake Size	Drum Diameter	Wheel Cyl. Diam.	Master Cyl. Diam.	% Braking Power
11"	11"	1 1/8"	1 1/8"	60% Front
12"	12"	1 1/8"	1 1/8"	60% Front

1961 BRAKE LINING SPECIFICATIONS

Brake Size	Lining Width Front	Lining Width Rear	Lining Length All Shoes	Lining Thickness
11" (Chrysler, DeSoto, Dodge Polara)	2 5"	2.5"	11 5"	11/64"
11" (Dart & Plymouth Exc. Station Wagon)	2"	2"	11 5"	11/64"
11" (Dart & Plymouth Station Wagon)	2 5"	2"	11 5"	11/64"
12" (All Cars)	2.5"	2 5"	12 6"	11/64"

CHEVROLET-BENDIX HYDRAULIC

Chevrolet Pass. Cars (1961)
Chevrolet Corvair Cars & Trucks (1961)
Chevrolet Corvette (1961)
Chevrolet Truck, Series 10, 20, 30 (1961) Front & Rear
Chevrolet Truck, Series 40, 50, 60 (1961) Front Only ①
① — For Rear Brakes, *see "Chevrolet Truck Twinplex" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*PASS. CAR & HALF-TON BRAKE SHOE GRINDING CAUTION:* If bench grinder used, grind shoes to .057-.087" smaller than drum size. If spindle grinder used, grind shoe to drum diameter.

►*BRAKE DRUM REPLACEMENT CAUTION:* Use suitable volatile non-toxic greaseless type solvent to clean oil from braking surface of drum before drum is installed.

►*METALLIC BRAKE LINING CAUTION:* This special purpose optional type lining may be used with the old standard drums provided surface of drum is smooth. Service adjustments are the same as for standard brakes except as noted in data below.

►*BRAKE SHOE ANCHOR PIN INSTALLATION CAUTION:* Tighten brake shoe anchor pins to torque indicated in table below.

Anchor Pin Tightening Torque

Car Model	Ft. Lbs.
Pass. Car (Except Corvair)	65
Corvair (Front)	60—85
Corvair (Rear)①	100—125
Truck, Series 10 (Front & Rear)	100—125
Truck, Series 20, 30 (Front & Rear)	150—175
Truck, Series 40, 50, 60 (Front)	150—175

①—Anchor pin is fixed on Corvair Truck Rear Brake.

DESCRIPTION: Duo-Servo, single anchor, hydraulic type without eccentric adjustment.

►*METALLIC LINING SERVICE NOTES:* When servicing the special purpose optional type lining it is important that the items below are followed:

Pull Back Spring Installation - Heat resistant type springs used as follows; PINK pull back springs must be used with front primary shoes and both rear shoes. YELLOW pull back springs must be used with front secondary shoes. Use GREEN hold down springs on all eight shoes. Paint on the springs will become blistered and burnt in operation but does **not** indicate that springs have been excessively hot.

Hold Down Spring Cup Installation - Install large hold down spring cup against web and small cup at outer end of hold down spring.

Drum Replacement - Blue heat discoloration is normal and drum should not be replaced if surface of drum is smooth.

ADJUSTMENT: Adjustments are made differently for wear (Minor Adjustment) and for new lining or shoe assemblies (Major Adjustment).

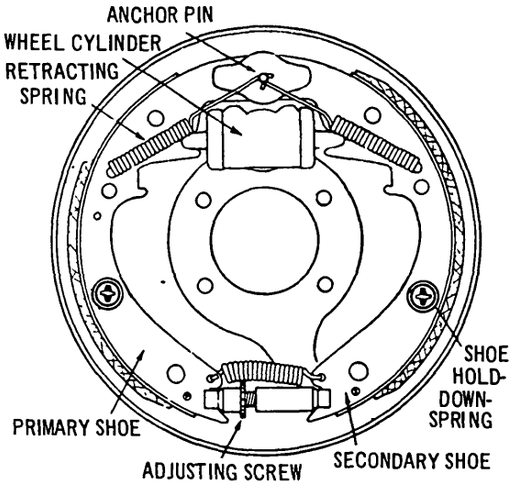
Brake Pedal Adjustment: Before adjustments made, make sure pedal returns to fully released position freely, with no binding, and that pedal retracting spring has not lost its tension.

Passenger Cars - 1/8"-3/8" pedal movement before contact of pushrod and main cylinder piston. To adjust, loosen check nut on clevis. Turn pushrod in proper direction to secure adjustment. Tighten check nut.

Corvair Trucks – With projection on head of pushrod pivot bolt toward front of truck, rotate bolt in either direction until 1/8" brake lever freeplay is obtained. Measure freeplay at bottom of pedal post underneath truck.

Trucks (With Eccentric Bolt Type Adjustment) - Rotate eccentric bolt (located at point master cylinder pushrod connects to brake pedal) to obtain a free pedal travel of 1/8" measured at center of pedal pad. *NOTE - Stop light switch should be adjusted to make electrical contact at approximately 13/16" pedal travel.*

Trucks (With Threaded Rod Type Adjustment) - Adjust pushrod so that pedal free travel measured at center of pedal pad is 1/8". *NOTE - Stop light switch should be adjusted to make electrical contact at approximately 13/16" pedal travel.*



FRONT BRAKE ASSEMBLY

Minor Adjustment (For Wear): Jack all wheels clear of floor. On passenger cars, loosen check nut at brake cable equalizer to remove tension from brake cable. On trucks, disassemble clevis of parking brake pull rod. On all cars and trucks, remove adjusting hole covers from flange plates. Expand brake shoes by turning adjusting screw with Tool J-4707 until a light uniform drag is felt on brake drum (move outer end of tool toward center of wheel to expand shoes). Now turn adjusting screw in opposite direction specified number of notches as listed in table below to relieve brake drag. Replace adjusting hole covers, reconnect and adjust parking brake.

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1961 HYDRAULIC BRAKE SPECIFICATIONS

Chevrolet Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Pass. Cars	11"	11"	1.1875"	1"	1"	58.5	41.5
Corvette	11"	11"	1.1875"	1"	1"	58.5	41.5
Corvair Cars	9"	9"	.875"	.9375"	1"	46.0	54.0
Corvair Trucks	10.995"	10.995"	1.125"	1"	1"	56.0	44.0
Truck Series 10	10.995"	11"	1.125"	1.125"	1.125"	56.0	44.0
Truck Series 20	① 11.105"	① 11.152"	1.125"	1.125"	1.125"	②	②
Truck Series 30	① 11.105"	③ 12.958"	1.125"	⑨ 1.125"	1.125"	⑤ 48.0	⑤ 52.0
Truck Series 40	11.105"		1"		1.125"	29.0	71.0
Truck Series 50, 60	13.955"		.875"		1.125"	30.0	70.0

① - 11.955" on P Series. ② - 49% Front, 51% Rear on C Series; 50% Front on P Series.
③ - 12.955" on P Series. ⑨ - 1.25" on P Series. ⑤ - 41% Front, 59% Rear on C Series.

1961 BRAKE LINING SPECIFICATIONS

Chevrolet Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickness
Pass. Cars	2.75"	2"	9.30"	11.70"	9.30"	11.70"	.175"
Corvette①	2"	1.75"	9.29"	11.69"	9.29"	11.69"	.168"
Corvette②	⑬	⑬	⑨ 2"				⑤
Corvair Cars	1.75"	1.75"	7.85"	9.42"	7.85"	9.42"	.160"
Corvair Trucks	2"	2"	9.30"	11.70"	9.30"	11.70"	⑥
Truck Series 10	2"	2"					.165"
Truck Series 20	⑦ 2"	⑦ 2"					.249"
Truck Series 30	⑦ 2"	2.5"					⑧
Truck Series 40	2.75"						.249"
Truck Series 50,60	2.50"						.250"

① - Conventional lining. ② - Optional sintered iron lining. ③ - 1" Primary, .875" Secondary.
⑨ - Each segment - 6 segments on primary, 10 segments on secondary.
⑤ - .175" front wheel; .295" rear wheel. ⑥ - .168" primary; .164" secondary.
⑦ - 2.75" on C Series. ⑧ - .249" front wheel; .252" rear wheel.

CHEVROLET-BENDIX HYDRAULIC (C nt.)

Brak Sh Adjustm nt Sp cifications

Car Model	Notches
Pass. Cars (Except Corvair)	12
Corvair Cars & Sta. Wagon (Front & Rear)	12
Corvair Trucks	12 (Front), 15 (Rear)
½—Ton Truck	12
Other Trucks	7

►*MAJOR ADJUSTMENT NOTE: All brakes have "fixed" anchor pins and major brake adjustments are not required.*

HAND (PARKING) BRAKE: Passenger Cars and ½ & ¾ Ton Trucks adjusted differently. 1, 1½, 2 and some ¾ Ton Trucks have propeller shaft mounted parking brakes. *CAUTION* - Service brakes must be properly adjusted before making parking brake adjustment.

Adjustment (Chevrolet Pass. Cars): *NOTE - A spring loaded pedal return and a ratcheting mechanism to p rmit a second stroke of pedal, if necessary, is used. Parking brake application is assured even if rear service brakes are out of adjustment. Pedal returns to normal position after each stroke and will not indicate brake application. When parking brake is applied, the release handle will "pop out" about 2", indicating that brakes are applied. If more than two strokes are r quired to set brakes, check both service and parking brake adjustment.* Raise rear wheels and check location of idler lever with respect to swivel rod bracket on frame for correct front cable adjustment. To adjust front cable, disconnect equalizer and adjust check nuts on forward cable for correct clearance (clearance will be correct even after long periods of service). Depress parking brake pedal 6 notches from fully released position (release lever fully out) and adjust equalizer adjusting nuts for slight drag on both rear wheels. Tighten check nuts and release parking brake. No drag should be felt.

Adjustm nt (Corvair): Raise rear of car and pull parking brake lever up 4 notches from fully released position. Loosen forward check nut on equalizer and tighten the rear one until a heavy drag is felt at rear wheels. Tighten check nuts securely. Fully release parking brake and rotate rear wheels; no drag should be felt.

Adjustment (Corvette): Pull hand brake out 7 clicks of pawl (not notches). Loosen check nuts on cable ends, then turn forward check nuts against clevis plates until a moderate drag is felt when rotating brake drums. Tighten check nuts and set parking brake lever to 2 notches from full released position. No drag should be felt.

Adjustment (Trucks Without Propeller Shaft Parking Brake): With service brakes properly adjusted, raise rear wheels and apply parking brake lever 4 notches from a fully released position. Loosen jam nut on threaded rod at end of forward cable. *NOTE - If threaded rod length is insufficient to obtain adjustment, move primary lever to next supplemental adjusting hole toward rear of truck.* Tighten rear nut on threaded rod until a light drag is felt at rear wheels, then tighten jam nut and lower truck to floor. Test parking brake.

Adjustment (¾ & 1 Ton Trucks using propeller shaft mounted parking brakes): Adjust clevis on brake pull rod so distance from end of rod to center line of clevis pin hole is 1 7/16". Place the hand brake lever in fully released notch of ratchet sector. Loosen locknut on brake pull rod. Remove cotter pin from clevis pin holding brake rod to brake cam (leave loose). Set brake cam rest flat on upper brake band bracket. Back off adjusting nuts (at lower end of spring) and adjusting nut at top of adjusting bolt (bolt joins lower part of band to bracket). *(CAUTION* - Do not remove nuts, loosen only). Remove lock wire from anchor screw. Adjust anchor screw until there is .010-.015" clearance between lining and drum at anchor screw. Tighten adjusting bolt (bolt without spring) until there is .020" clearance between drum and lower end of brake band. Tighten locknut. Tighten adjusting nut at lower end of spring until there is .020" clearance between drum and upper end of brake band. Tighten locknut. Adjust brake pull rod so clevis pin can be installed while brake cam rests flat on upper brake band bracket. Install cotter pin in clevis pin of brake pull rod and tighten locknut on brake pull rod. Install lock wire on anchor screw. Recheck all points of facing for correct clearances.

Adjustment (1½ & 2 Ton Trucks): Propeller shaft mounted, shoe type. *See "Chevrolet Twinplex" for data.*

MASTER CYLINDER: Removal (Pass. Cars & C rvair Cars) – Disconnect hydraulic line from master cylinder. On Chrevolet, disconnect brake pedal arm from pushrod. On Corvair, remove pedal return spring. Remove master cylinder attaching bolts and remove master cylinder. *CORVAIR CAUTION – Use extreme care to prevent brake fluid contamination of interior of car.*

Removal (Corvair Trucks) – Disconnect hydraulic line from master cylinder and remove master cylinder from beneath truck.

Removal (Chevrolet Trucks) – Disconnect clutch and brake pedal return springs. Remove pushrod boots and brake pipes from master cylinder. Remove attaching bolts and remove master cylinder.

Filling (All Models) – Maintain fluid to within ½" below reservoir filler opening.

BLEEDING BRAKE SYSTEM: *S "Hydraulic Brak Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brak Trouble Shooting" in Brake Section of Manual.*

CHEVROLET TRUCK TWINPLEX

Chevrolet Trucks, Series 40, 50 60 (1961) Rear Only Ⓒ
Ⓒ – For Front Brakes, see *"Chevrolet-Bendix Hydraulic" in this section.*

DESCRIPTION: Two cylinder, four anchor type (each shoe anchored at each end and linked to wheel cylinder at each end). Brakes are radially self-centering.

ADJUSTMENT: Each shoe has one adjustment (adjusting screw at adjustable anchor end). Adjustment is same for both wear and for new or relined shoe clearance.

Brake Pedal Adjustment: *See "Chevrolet-Bendix Hydraulic" for data.*

Brake Shoe Adjustment: Jack up both rear wheels, remove adjusting hole covers from backing plates (two holes at each wheel–one for each shoe). Use tool J-4707 or screwdriver inserted through rear (lower shoe) adjusting hole and turn adjusting screw up (move outer end of tool toward center of wheel) until light brake drag is felt on wheel, then back off adjusting screw 3 notches for correct running clearance. Adjust upper shoe similarly by inserting tool through front adjusting hole.

Parking (Hand Brake) Adjustment: Parking brake is independent type mounted on propeller shaft at rear of transmission.

1½ & 2 Ton–Fully release brake lever. Loosen locknut on outer shoe adjusting screw then tighten to secure a clearance of .010" to .015" measured at point directly above screw. Tighten locknut. Loosen locknut on link between hand brake lever and shoe actuating lever. Tighten adjusting nut on link to secure a clearance of .010" to .015" between inner shoe and drum. Tighten locknut.

Tilt Cab Over–Center Lever Adjustment – With lever fully released, turn adjusting knob until cable link pivot is at bottom of guide slot. *Adjust parking brake as detailed above.* Turn lever adjusting knob as required to obtain over–center locking position.

MASTER CYLINDER: Removal & Filling – *See "Chevrolet-Bendix Hydraulic" in this section.*

BLEEDING BRAKE SYSTEM: Pressure or manual methods can be used.

Pressure Bleeding: 1) Back off adjusting screw all the way on upper shoes of both rear wheels. Fill master cylinder reservoir to top of filler plug opening. Connect pressure bleeder to master cylinder and open valve in bleeder tank line. *(NOTE*–Bleeder tank should be charged with 25-35 lbs. air pressure and kept at approximately this pressure during bleeding operation. End of bleeder tube must be in a bleeder jar or bottle and covered with fluid while performing bleeding operations). 2) Connect bleeder tube to bleeder valves in following sequence, open bleeder valve and bleed until all air bubbles disappear, then close bleeder valve. Sequence as follows:

a) Hydrovac slave cylinder (bleeder valve on end cap). *NOTE* - Will take approximately ½ pint of fluid.
b) Hydrovac valve (bleeder valve on top of control valve).
c) Right front wheel.
d) Left front wheel.
e) Right rear wheel, front cylinder.
f) Left rear wheel, front cylinder.

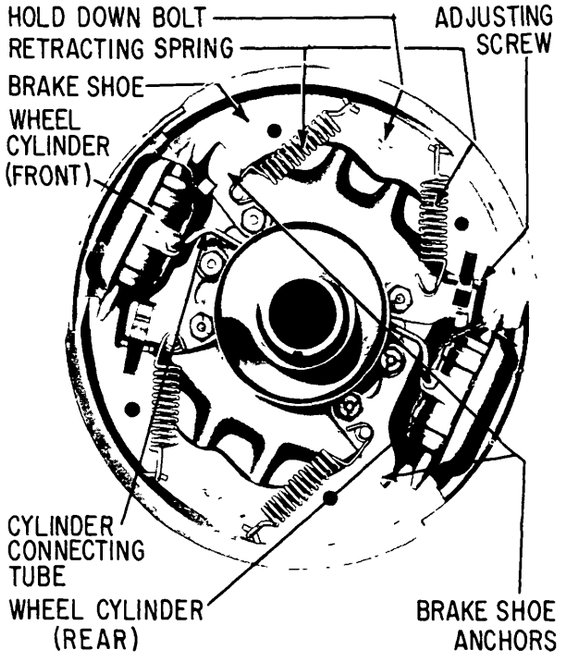
3) Adjust upper shoe on each rear wheel with pressure tank still connected. Push down hard on brake pedal several times to centralize shoes. Disconnect pressure tank and readjust all brake shoes..

4) Apply approximately 75 lbs. pressure on brake pedal and check pedal clearance from toe board to forward edge of pedal pad. Clearance should be a minimum of 5" with floor mat removed. If reserve less than 5", rebleed Hydrovac and rear brakes in sequence outlined above.

Manual Bleeding: 1) Install adapter and automatic filler J-713. Connect bleeder tube to Hydrovac bleeder valve (on end cap). Place end of tube in container having sufficient fluid to cover end of tube.

2) Open bleeder valve approximately ¾ of a turn, depress brake pedal a full stroke and allow it to return slowly, making sure end of tube is under surface of liquid in container. Continue operating pedal, refilling jar at master cylinder when necessary, until liquid emerging from bleeder tube is air bubble free. Close bleeder valve. Proceed to bleed system as outlined in steps 2) b) through f), 3) and 4) under "Pressure Bleeding" above, using automatic filler in place of pressure tank.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Manual.*



CHEVROLET TWINPLEX BRAKE ASSEMBLY

1961 HYDRAULIC BRAKE & LINING SPECIFICATIONS

Rear Drum Diameter	Wheel Cyl. Diameter	Master Cyl. Diameter	Lining Thickness	Lining Width	% Braking Power Front	% Braking Power Rear
14.955"	1.5"	1.125"	.375"	4"	Ⓒ30	Ⓒ 70

Ⓒ - C-40 - 29% Front, 71% Rear.

FORD BENDIX HYDRAULIC

Comet, All Models (1961)
Falcon, All Models (1961)
Econoline Trucks, All Models (1961)
Ford Trucks, F-100 (1961) Front & Rear
Ford Trucks, F-350, P-400 (1961) Rear Only ①
①—"Ford Truck Bendix Uni-Servo" type used on Front.

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 COMET & FALCON BRAKE PRODUCTION CHANGE & SERVICE NOTE:* Approximately February 8, 1961 the following changes in brake design were made:
Brake Shoes – Brake shoe web thickness increased from 3/16" to 7/32". Other corresponding parts of the brake have been changed to accommodate the thicker shoe web. *NOTE* –To prevent interference with rear wheel brake drum in some cases, grind 1/16" from end of brake retracting spring where loop is inserted in brake shoe.
Front Wheel Cylinders –Orificed metal baffle installed in cylinder with piston return spring between baffle and primary piston (no spring between baffle and secondary piston). Piston return spring is shorter. *CAUTION* - Do not hone this type cylinder. Also, use care when bleeding system so no air is trapped by orificed baffle.

►*1960-61 COMET & FALCON BRAKE SQUEAL CORRECTION:* On cars **without** brakes with thicker shoe webs *(see "Production Change" above)*, convert early type brakes to later type by installing thicker web shoes and new brake adjusting screw and socket assembly having wider notches to accommodate thicker web shoes. To correct squeal on all cars, there should be 2 insulators, No. C2DZ-2A482-A, installed inside socket at end of adjusting screw. Ribbed type socket with a flat base to the bore **must** be used. There must be 1/16"-1/8" clearance maintained between end of socket and near edge of adjusting screw star wheel when assembly installed in the brake (add or remove 1 insulator as necessary). *Apply lubriplate to adjusting screw threads only. DO NOT lubricate socket.*

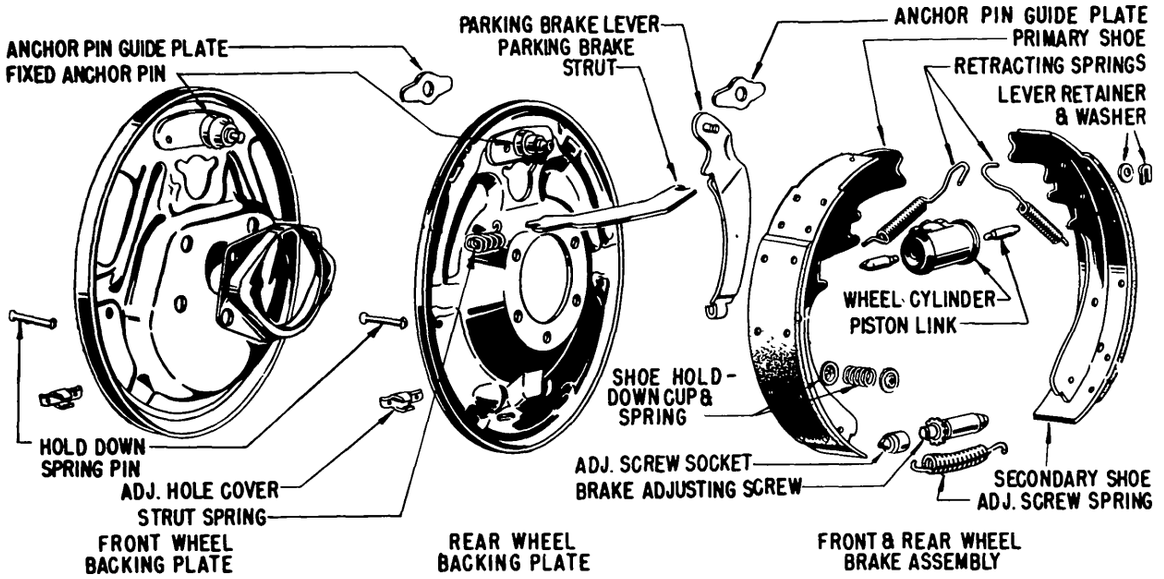
DESCRIPTION: Duo-Servo, single anchor, hydraulic type without eccentric. Anchor pins are fixed and are not adjustable.

ADJUSTMENTS: Before making any adjustments, jack up all four wheels, check brake pedal clearance (see below), fully release hand brake lever and make certain that all wheels turn freely. Parking brake cables should be disconnected when car raised on frame hoist.

Brake Pedal Adjustment: Adjust as follows:
Comet, Falcon, Econoline – 1/4–7/16" (Falcon & Econoline), 5/16–7/16" (Comet) pedal freeplay. Loosen master cylinder pushrod–to–brake pedal eccentric bolt locknut and rotate bolt until freeplay is within specifications.
Ford Trucks – 3/16–3/8" pedal freeplay. On F Series, loosen locknut on eccentric bolt connecting master cylinder pushrod to brake pedal and rotate bolt as necessary. On P Series, turn hex head on master cylinder pushrod to obtain proper adjustment. Tighten locknut to 30–35 ft. lbs.

Parking Brake Adjustment: With service brakes properly adjusted, adjust parking brake as follows:
Comet & Falcon – Pull release handle 3 notches from fully released position. Turn front nut on equalizer several turns forward, then turn rear nut forward until cables prevent forward rotation of rear wheels. Tighten front nut against equalizer. Release the handle.
Econoline – Pull release handle 1 notch from fully released position. Turn front nut on equalizer forward several turns, then turn rear nut forward until there is a medium drag at rear wheels. Tighten front nut against equalizer. Release the handle.
Ford Trucks - With parking brake handle fully released, turn nut on front of equalizer several turns forward. Turn rear nut forward until cables are just tight enough to remove all slack. Tighten front nut against equalizer. *NOTE – For propeller shaft mounted parking brakes, see "Ford Truck Self-Centering" brakes in this section.*

Minor (Wear) Adjustment: Comet & Falcon – Remove adjusting hole cover and turn adjusting screw until there is a slight drag on the drum, then back off adjusting screw until wheel turns freely.
Econoline – Remove adjusting hole cover and turn adjusting screw until there is a moderate drag on the drum, then back off adjusting screw 10 notches to allow wheel to turn freely.
Ford Trucks – Remove adjusting hole cover and turn adjusting screw until the shoes drag against the brake drum, then back off adjusting screw 10–12 notches so wheel turns freely.



FORD TRUCK FRONT AND REAR BRAKE

MASTER CYLINDER: Removal (Comet & Falcon) – Disconnect rubber boot, brake lines, and stop light switch wires from master cylinder. Remove attaching bolts and remove master cylinder.

Filling – Maintain fluid to within 3/8" (Falcon), 1/4" (Comet) from top of reservoir.

Removal (Econoline) – Remove forward splash shield and disconnect brake pedal return spring. Remove pushrod eccentric bolt. Remove snap ring from brake pedal pivot pin. Remove brake pipe outlet fitting bolt and washers (outlet fitting will be disconnected from master cylinder). Remove mounting bolts and remove master cylinder (swing down and remove from brake pedal pivot pin).
Filling–Maintain fluid to within ½" of top of reservoir.

Removal (Ford Trucks) – *See "Ford Bendix Uni-Servo" brakes in this section.*
Filling – Maintain fluid to within ½" of top of filler neck.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

BLEEDING BRAKE SYSTEM & OVERHAUL OF BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

1961 COMET, FALCON & ECONOLINE HYDRAULIC BRAKE & LINING SPECIFICATIONS
►*FOR FORD TRUCK LINING SPECIFICATIONS, SEE "FORD TRUCK SELF-CENTERING" DATA.*

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diameter Front	Wheel Cyl. Diameter Rear	Master Cyl. Diameter	Lining Width Front	Lining Width Rear	Lining Thickness
Falcon	9"	9"	1.062"	.8125"	1"	2.25"	1.50"	
Comet	9"	9"	1.062"	.8125"	1"	2.25"	1.50"	
Econoline	10"	10"	1.125"	.8125"	1"	2.50"	1.75"	

① - .875" on Sta. Wgn. ② - 2.25" on Sta. Wgn.

FORD TRUCK SELF-CENTERING

F rd Trucks, F–500, 600; B–500, 600; P–500; C–550, 600 (1961) R ar Only ①

① – "Ford Bendix Uni–Servo" used on Front.

DESCRIPTION: Two cylinder, two shoe, four anchor type hydraulic brakes. Each shoe is anchored at each end and linked to wheel cylinder at each end so that all shoes are self–energizing for both forward and reverse motion. All shoes are radially self–centering.

ADJUSTMENT: W ar Adjustment – With wheels raised, remove adjusting slot covers. Turn rear (secondary shoe) adjusting screw until brake shoe drags against drum. Back off adjusting screw so drum rotates freely. Depress brake pedal to center the shoes, then back off adjusting screw one additional notch. Repeat procedure for primary shoe.

Brak P dal Adjustm nt: 3/16–3/8" pedal freeplay. On F, B & C Series, loosen locknut on eccentric bolt connecting master cylinder pushrod to brake pedal and rotate bolt as necessary. On P Series, turn hex head on master cylinder pushrod to obtain proper adjustment. Tighten locknut to 30–35 ft. lbs.

Parking Brak Adjustm nt: External Band Type – On cable controlled type, move parking brake lever to fully released position. On rod type linkage, set lever at first notch. Flat part of adjusting rod cam must rest on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, then adjust clevis rod as necessary. Install clevis pin and cotter pin. Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise to obtain .010" clearance between brake lining and brake drum at anchor bracket. Loosen locknut on adjusting screw for lower half of brake band, adjust screw to obtain .010" clearance between lining and drum at lower half of band. Tighten locknut. Turn upper band adjusting nut for same .010" clearance. Be sure to install lock wire in anchor adjusting screw.

Int rnal Sh (9" Diam t r) Type – With parking brake lever fully released, remove linkage adjusting clevis pin. Lengthen adjusting link by turning clevis until shoes seat against drum with clevis pin installed. Remove clevis pin and shorten linkage to obtain .010" clearance between shoes and drum measured at all points around drum with clevis pin installed. Install clevis retaining cotter pin.

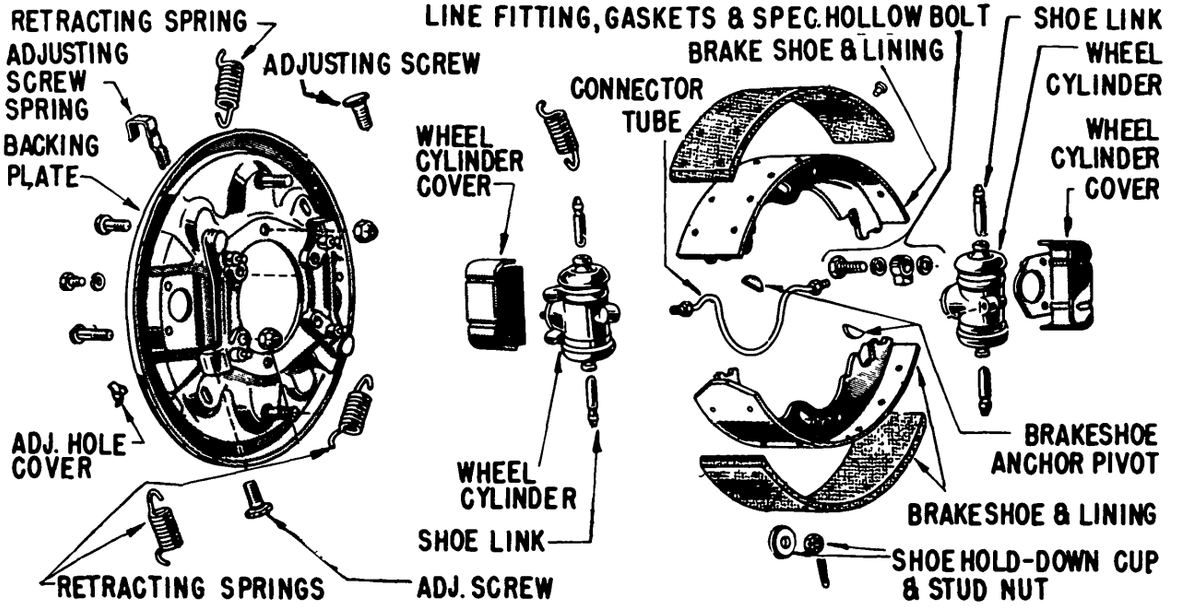
Internal Sh (12" Diameter) Type – Remove pin from adjusting rod clevis, loosen nuts on adjusting rod, and turn clevis so there is 1/4–3/8" free play on brake operating lever. Tighten clevis nuts and install clevis pin.

DISASSEMBLY: Make sure there is no vacuum or air pressure in system. Remove wheel and drum or hub and drum assembly. Proceed as follows:

1) Un qual Length Retracting Springs – Clamp boots against cylinder, note location of retracting springs and remove with Tool 2035–N. Remove brake shoe guide bolt lock wire, nut, washer, and bolt from both shoes, then remove shoes from carrier plate.

2) Equal Length Retracting Springs – Clamp boots against cylinder and remove retracting springs with Tool 2035–N. Remove brake shoe guide bolt cotter pin, nut, washer, and bolt from both shoes, then remove shoes from carrier plate.

CONTINUED ON NEXT PAGE



FORD TRUCK SELF-CENTERING BRAKE ASSEMBLY

FORD TRUCK BRAKE SPECIFICATIONS

Truck Model		Brake Drum Diameter (Inches)		Brake Lining Dimensions (Inches)						Cylinder Bore Diameter (Inches)	Master Cylinder Piston Diameter (Inches)
				Length		Width		Thickness			
		Normal	Maximum Oversize	Primary	Secondary	Primary	Secondary	Primary	Secondary		
F 100	Front	11	11 060	10 65	11 91	2	2	0 187	0 250	1 1/16	1 1/16
	Rear	11	11 060	10 65	11 91	1¾	1¾	0 187	0 250	⅞	
F-250	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	
F-350	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
P 350 (Spicer 60)	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	
P 350 (Timken B 140 rear axle), P 400	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
F-500, B-500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	15/16	1¼
	Rear	15	15 060	15 31	15 31	4	4	0 375	0 375	1½	
P-500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	15/16	1¼
	Rear	14⅛	14 185	14 42	14 42	3½	3½	0 375	0 375	1½	
F , B 600 (max)	Front	14	14 060	13 66	15 03	2½	2½	0 250	0 250	1	1¼
	Rear	15	15 090	15 31	15 31	4½	4½	0 500	0 500	1½	
C 600 (7000 lb front axle)	Front	16	16 060	16 75	16 75	2½	2½	0 250	0 250	1¼	1¼
	Rear	15	15 090	15 31	15 31	4	4	0 375	0 375	1½	

FORD TRUCK SELF-CENTERING (C ntinued)

REASSEMBLY: 1) Unequal Length Retracting Springs – Position adjusting wheel, slide adjusting screw through anchor pin support and index adjusting wheel tab in slot on adjusting screw. Install and tighten adjusting wheel lock. Place brake shoes in anchor pin slot on support bracket and engage other end of shoe in cylinder link. Install shoe guide bolt, washer, and nut. Tighten nut finger tight, then back off 1 full turn and install lock wire. Install retracting springs with Tool 2035–N, making sure springs are installed in original locations.

2) Equal Length Retracting Springs – Thread adjusting screw and wheel into anchor pin support and install adjusting wheel lock. Thread adjusting wheel into support so shoe will rest against wheel end. Install brake shoe over both retracting spring anchor pins, insert ends in cylinder links and install shoe guide bolt, washer and nut. Tighten nut finger tight, then back off 1 full turn and install cotter pin. Install retracting springs with Tool 2035–N.

MASTER CYLINDER: R m val & Filling – *S "Ford Truck B ndix Uni–S rvo" brak s in this s ction.*

BLEEDING BRAKE SYSTEM: Bleed t p wheel cylinder **first,** then lower. If power unit used, unit must be bled before wheel cylinders, with engine off and no vacuum in power unit system. *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "H, draulic Brake Trouble Shooting" in Brake Section of Manual.*

FORD TRUCK BENDIX UNI-SERVO

Ford Trucks, F–250, P–350 (1961) Front & Rear
Ford Trucks, F–350, P–400 (1961) Front Only ①
Ford Trucks, F–500, 600; B–500, 600; P–500; C–550, 600 (1961) Front Only ②

①–"Ford Bendix Hydraulic" type used on Rear.
②–"Ford Truck Self–Centering" type used on Rear.

DESCRIPTION: Bendix "Uni-Servo" single anchor, hydraulic type with single-acting wheel cylinder mounted on the backing plate and actuating the primary shoe through a strut (no direct connection to secondary shoe). Brake shoes are conventional Bendix type.

ADJUSTMENTS: Make adjustments with brake drums at normal temperature and with wheels either jacked up or contacting road (if wheels on road so they cannot be checked for drag, make this check by striking drum with a hammer–sound will be deadened if shoes contacting drum).

Minor Adjustment: Remove adjustment hole cover from brake carrier plate. Rotate adjusting screw, with a suitable tool, until shoe begins to drag, then back off shoe 10-12 notches until drum can be turned without drag.

Major Adjustment: Rotate drum until feeler slot is at lower end of Secondary (rear) shoe, then insert a 010" thick feeler gauge between brake shoe and drum Rotate drum and feeler gauge up along secondary shoe until feeler is wedged between secondary shoe and drum Turn adjusting screw (star wheel) to expand shoes until a heavy drag is felt against drum, then back off adjusting screw just enough to give clearance of 010" between shoe and drum at a point 1½" from each end of secondary shoe *NOTE - This clearance will give operating clearance for both primary and secondary shoes* When this clearance cannot be obtained, anchor pin must be adjusted

Anchor Pin Adjustment - Loosen anchor pin nut just enough so anchor pin can be moved up or down (by tapping with soft hammer) centering shoes in drum and providing the 010" operating clearance at above positions Tighten anchor pin nut to 80–100 ft lbs Check other brake assembly

Brake Pedal Adjustment: Brake pedal free travel should not be less than 3/16" nor more than 3/8" before push-rod touches master cylinder piston. Adjustable at master cylinder pushrod.

Parking Brake Adjustment (Rear Wheel): *See "Ford Bendix Hydraulic" in this section.*
Parking Brake Adjustment (Propeller Shaft): *See "Ford Truck Self–Centering" in this section.*

MASTER CYLINDER: Removal (F & B Series) – With all air pressure or vacuum removed from system, disconnect stop light switch wires and brake line from master cylinder. Force as much fluid as possible from master cylinder, then disconnect rubber boot from end of master cylinder, remove attaching bolts, and remove master cylinder.

Removal (C Series) – Procedure is same as for F & B Series with access to master cylinder under floor plate.

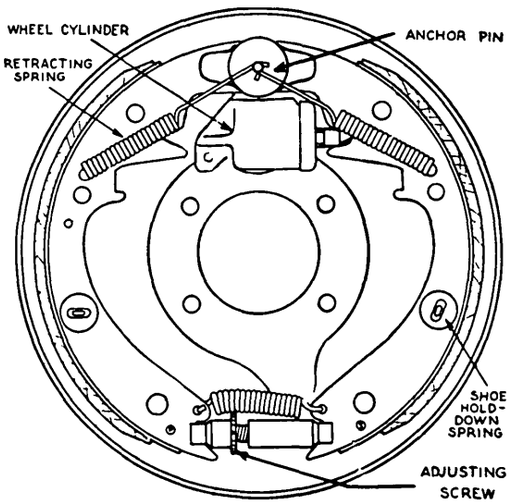
Removal (P Series) – Procedure is same as for F & B Series after turning front wheels all the way to the left and removing fender apron for access to master cylinder.

Filling (All Series) – Maintain fluid to within ½" of top of filler neck.

BRAKE SPECIFICATIONS: *Se "Brake Specification Table" in "Ford Truck Self–C ntering" data in this section.*

BLEEDING BRAKE SYSTEM & OVERHAUL OF BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brak Tr ubl Shooting" in Brake Section f Manual.*



BENDIX UNI-SERVO BRAKE ASSEMBLY

AUBURN

Car Model	Clutch No.
Dodge Dart & Plymouth, 6 Cyl.	100131-1
Willys 4 & 6 Cyl.	Ⓒ

Ⓒ - Two types used (heavier spring used on 6 Cyl. 2-wheel drive models). *NOTE* - Rockford clutches also used on these models.

DESCRIPTION: Single plate, dry disc type of same design as used on corresponding previous models.

►*WILLYS 4-CYLINDER 9¼" CLUTCH PRODUCTION CHANGE & CAUTION:* Clutch Pressure Plate No. 907821 (replaced No. 922071) with Engine Serial No. 3J-170142, 1T-89315 and 4J-284064. DO NOT use this assembly on any 9¼" assembly designed for L6-226 4x2 vehicles as interference between pressure plate assembly and clutch housing will result.

►*WILLYS L6-226 4x2 CLUTCH DISC PRODUCTION CHANGE & VIBRATION CORRECTION:* New Clutch Driven Plate No. 926917 used in production starting with Engine Serial No. S-16923 to reduce clutch vibration. Install this driven plate for replacement and vibration correction.

PEDAL ADJUSTMENT

Dodge Dart & Plymouth 6 Cyl.: Freeplay Adjustment - Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod pin. This will provide correct 1-1¼" pedal freeplay.

Over-Center Spring Adjustment - Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off over-center spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 3 turns tighter with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort required to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort required too high, tighten adjusting nut; if too low, loosen nut. Initial effort required to start pedal movement should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Willys Freeplay Adjustment: 4 Cyl. (Jeep & Jeep Dispatcher) - 1½" pedal freeplay. To adjust freeplay, loosen yoke locknut on cable between throwout lever and cross shaft lever and turn yoke as required.

4 Cyl. (Trks. and Sta. Wgn. Exc. FC-150) - 1" pedal freeplay. To adjust, loosen control rod locknut and screw adjusting nut (on threaded connection between clutch control lever and control tube lever) in or out. Retighten locknut.

6-226 Models (Exc. FC-170) - 1" pedal freeplay. To adjust, loosen locknuts on pedal adjusting rod. Turn nuts forward to increase or backward to decrease freeplay. Tighten both locknuts against trunnion (without changing adjustment).

FC-150 & FC-170 Models - ½" pedal freeplay. To adjust, change cable length so pedal has ½" free movement from fully engaged position before resistance is felt.

REMOVAL

Dodge Dart & Plymouth 6 Cyl.: Remove transmission. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to release spring tension. Remove clutch assembly.

Willys: Jeep & Jeep Dispatcher - Remove transmission or transmission and transfer case. Remove engine from chassis (labor will be saved if engine is removed without bell housing). Mark pressure plate and flywheel for reinstallation of clutch. Remove clutch cover screws (turn all screws out evenly to reduce spring pressure) and remove cover assembly and clutch disc from flywheel.

Forward Control Mdls - Remove transmission or transmission and transfer case. On FC-150 models, remove bell housing from engine. On FC-170 models, remove flywheel housing pan from bottom of housing. On all models, mark pressure plate and flywheel for reinstallation. Loosen attaching screws evenly (to release spring pressure and prevent distortion of bracket), then remove clutch assembly from flywheel.

Utility Models - On 6-226 models (with split bell housing), disconnect both front and rear propeller shafts and pull transmission to rear sufficiently to clear transmission main driveshaft from clutch, then remove bottom pan from bell housing. Mark both pressure plate and flywheel for reassembly. Loosen pressure plate to flywheel screws evenly in sequence a little at a time to prevent distortion of clutch bracket. Remove assembly from vehicle.

OVERHAUL: *See "Auburn Clutches" in 1959 Annual Data or later Manual edition and note the following:*

►*OVERHAUL TOOL NOTE: Use Tool C-585A (Dodge Dart & Plymouth, 6 Cyl.), C-585-C (Willys).*

Clutch Springs: Use correct springs (see table below). Replace all springs that are burned or do not meet specifications.

Clutch Spring Specifications

Model	No. & Color	Lbs. Pressure
Dodge Dart 6	3 Dark Blue	254-280 at 1 13/16"
Plymouth 6	3 Dark Blue	254-280 at 1 13/16"
Willys 4 Cyl. Std.	3	220-230 at 1 9/16"
Willys 4 Cyl. Optl.	3	160-176 at 1 13/16"
Willys 6 Cyl. 2WD	3	239-264 at 1 13/16"

Release Lever Setting Spacer

Model	Spacer No.
Dodge Dart & Plymouth 6	19
Willys	17

BORG & BECK

CHECKER SUPERBA	Model	Assy. No.
A10 & A4, 5, 6, 7, 8, 9	10A7	361538
CHEVROLET PASS. CARS		
Corvette	10A8W	361468
CHEVROLET TRUCK		
6 Cyl. 261" Engine	11A9	361483
V8 283" Engine	11A9	361483
CHRYSLER		
Newport & Windsor	10.5A8WW	361506
DESOTO		
All Models	10.5A8WW	361506
DODGE, DART & LANCER		
Dart 6 Cyl. 225"	9A7	361551
170"	10A5	361525
Taxi	10A5	361525
Lancer Std.	9A7	361521
Taxi	10A5	361545
H.D.	9A7	361551
H.D.	10A5	361525
Dart V8 318"	10¼A8WW	361505
361, 383"	11A8WW	361527
H.D.	11A8WW	361527
H.D.	10.5A8WW	361506
Polara Std.	10.5A8WW	361506
4-Bbl. Carb.	11A8WW	361527

PLYMOUTH		
6 Cyl. 225"	9A7	361551
6 Cyl. 170"	10A5	361525
6 Cyl. H.D.	10A5	361525
6 Cyl. Taxi	10A5	361525
V8	10¼A8WW	361505
361, 383"	11A8WW	361527
V8 High Perf.	11A8WW	361527
V8 H.D.	11A8WW	361527
PONTIAC		
V8 Std.	10.5A9W	361543
V8 H.D.	10.5A9WW	361565
Tempest	9A7	361581
RAMBLER		
American Std.	8A7	361531
American Fleet	8.5A6	361360
Classic 6 Std. & O.D.	8.5A7	361530
Classic H.D.	8.5A7	361416
Classic Fleet	9A7	361494
Classic V8 Std.	10A7	361436
Classic V8 H.D.	10A7	361407
Amb. V8 Std.	10.5A6	361442
Amb. V8 H.D.	10.5A6	361449

STUDEBAKER		
Lark 6 Std. & O.D.	9A7	361547
Lark 6 H.D.	9A7	926
Lark 6 Taxi	10.5A8	361559
Lark 6 & V8 3-Speed Trans.	10A7	361555
Hawk 4-Speed Trans.	10¼A8WW	361558
Hawk Pol & Taxi	10.5A8	361560
VALIANT		
V100, 200	9A7	361527

Clutch Disc

CHECKER SUPERBA	Disc. No.
A10	382903
A4, 5, 6, 7, 8, 9	381900
CHEVROLET PASS. CARS	
Corvette	382855
CHEVROLET TRUCKS	
6 Cyl. 261" Engine	382860
V8 283" Engine	382860
CHRYSLER	
Newport & Windsor	383043
DESOTO	
All Models	383043

CONTINUED ON NEXT PAGE

BORG & BECK (C nt.)

DODGE

Dart 6 Cyl. 225" Engine	383081
Dart 6 Cyl. 170" Engine	383082
Dart 6 Cyl. Taxi	383082
Lancer Std.	383045
Lancer Taxi	383082
Lancer H.D. 9A7 Cover Assy.	383081
Lancer H.D. 10A5 Cover Assy.	383082
Dart V8 318" Engine	383044
Dart V8 361, 383" Engine	383046
Dart H.D. 11A8WW Cover Assy.	383046
Dart H.D. 10.5A8WW Cover Assy.	383040
Polara Std.	383043
Polara 4-Bbl. Carb.	383046

PLYMOUTH

6 Cyl. 225" Engine	383081
6 Cyl. 170" Engine	383082
6 Cyl. Taxi & H.D.	383082
V8 10¼A8WW Cover Assy.	383044
V8 361, 383", High Perf., H.D.	383046

PONTIAC & TEMPEST

V8	383109
Tempest	383206

RAMBLER

American Std.	382347
American Fleet	382248
American Fleet O.D.	382490
Classic 6 Cyl. Std.	382394
Classic 6 Cyl. O.D.	382490
Classic 6 Cyl. H.D. Std.	382394
Classic 6 Cyl. H.D. O.D.	382490
Classic 6 Cyl. Fleet H.D.	383828
Classic V8 Std.	CD752
Classic V8 H.D.	381806
Amb. V8 Std. & H.D.	383036

STUDEBAKER

Lark 6 Cyl. Std.	383120
Lark 6 Cyl. O.D.	383215
Lark 6 Cyl. H.D.	383183
Lark Taxi	383182
Lark 6 & V8 3-Speed Trans.	382650
Hawk 4-Speed Trans.	383181
Hawk Pol. & Taxi	383182

VALIANT

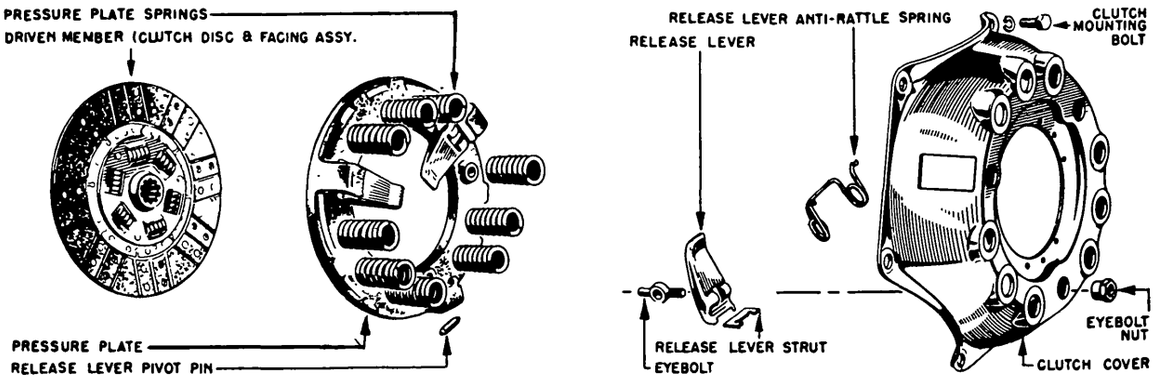
V100, 200	383045

DESCRIPTION: Single plate, dry disc type. Three release levers, mounted on bolts piloted in pressure plate and retained in clutch cover, actuate clutch struts which provide "knife-edge" action.

Semi-centrifugal Clutch Note - These clutches have three roller assemblies in grooves in pressure plate directly under the clutch cover. Centrifugal action on these rollers increases the pressure plate load as the engine speed increases.

►CHANGES, CAUTIONS, CORRECTIONS

►*STUDEBAKER 6 CYL. CLUTCH RELEASE SHAFT PRODUCTION CHANGE & CAUTION:* Longer release shaft Part No. 1553490 used in production with engine S-185257 or approximately Serial No. 61S-13563 for positive clutch operating shaft-to-ball stud engagement without use of ¼" spacer. Use Release Shaft 535692 on Models previous to this Serial No. and 1553490 after this Serial No.



BORG & BECK CLUTCH ASSEMBLY (TYPICAL)

►*STUDEBAKER LARK MODELS CLUTCH LINKAGE INTERFERENCE & ALIGNMENT CORRECTION:* Caused by interference between clutch pedal-to-bellcrank rod and edge of clearance hole in firewall. To correct, remove rod and lengthen rod and clevis assembly to 10¼" from center of clevis hole to pin hole in forward end of rod. Reinstall rod and adjust bellcrank-to-operating shaft rod to obtain free travel of ½-1" at pedal pad. Bend bellcrank as required for clearance.

►*STUDEBAKER LARK 6 MODELS INSUFFICIENT ENGAGEMENT OF CLUTCH OPERATING SHAFT & FLEXIBLE SUPPORT BRACKET BALL STUD CORRECTION:* A ¼" spacer Part No. 1693451 added between operating shaft bracket and frame bracket at Serial No. 61S-2281, for more positive shaft-to-ball stud engagement. To install spacer on earlier cars, remove flexible support bracket and ball stud assembly from bracket (discard bolts). Install a ¼" thick spacer between flexible bracket and frame with longer bolts G-181315 (¼"-28-1).

►*PONTIAC TEMPEST CLUTCH PILOT BEARING OIL SEAL NOTE:* New oil seal and felt used in later production with a crankshaft Part No. 542234 that has a deeper bore. When seal or felt replaced on later cars, bore of crankshaft should be 1/3 full of molybdenum disulphide grease, prior to installation of felt and seal. DO NOT use this seal and/or felt on earlier cars.

►*PONTIAC CLUTCH RELEASE FORK ASSY. PRODUCTION CHANGE:* New assembly with redesigned ball retainer spring used on later cars to improve clutch release operation.

►*PONTIAC TEMPEST CLUTCH PILOT BEARING RETAINER PACKAGE & CLUTCH RELEASE BEARING PACKAGE NOTE:* Retainer Pkg. Part No. 541359 & Bearing Pkg. Part No. 541939 released for correction of noise in clutch pedal bearing or release bearing areas.

►*PONTIAC TEMPEST "GRATING", "STICKY ACTION" OR "GRINDING" NOISE CORRECTION:* When this condition exists upon clutch release or engagement, correct by applying a light coat of high temperature grease (such as wheel bearing grease) to release fingers and contact surface of release bearing and area where fingers contact clutch cover.

REMOVAL: Chevrolet Truck - Remove transmission, see Transmission Section, then disconnect slave cylinder at clutch fork and remove bearing from fork. Press fork away from ball mounting (use screwdriver) or remove ball stud from rear of clutch housing. *NOTE - Pry retainer out of fork with small screwdriver.* Install Tool J-5824 to support assembly, loosen clutch attaching bolts gradually to release spring tension then remove tool and remove clutch assembly. *NOTE* - Mark clutch cover, flywheel and one pressure plate lug before removing clutch from flywheel.

Chrysler, DeSoto, Dodge & Lancer, Plymouth & Valiant - Remove transmission, see Transmission Section, then remove clutch housing pan and dust seal. Disconnect release fork rod at fork. Remove fork pull-back spring and detach fork from its pivot and remove fork, dust seal, seal and bearing. Mark flywheel, clutch cover and one pressure plate lug for reassembly and installation. Back off attaching bolts one turn at a time to release spring tension and remove assembly. *NOTE* - Keep disc facings free of grease, oil or dirt.

Pontiac - Disconnect starter lead at battery and remove propeller shaft and transmission; see Transmission Section. *CAUTION - DO NOT DAMAGE release bearing support.* Remove release bearing and fork pushrod. Remove pin and washer from clutch pedal pushrod at countershaft and disengage rod from shaft. Rotate shaft assembly to remove overcenter spring. Remove left hand pivot pin (threaded into countershaft) from shaft and move left end of shaft rearward withdrawing right end of shaft from bushing in flywheel housing. Remove starter and front flywheel housing shield. Remove flywheel housing bolts and pull housing off dowels then remove housing. Mark clutch cover and flywheel for reassembly, then loosen cover bolts gradually to release tension and remove all but top bolt. Move bottom of assembly out from flywheel and remove driven plate, then remove top bolt and clutch cover assembly.

Rambler - Remove transmission, see Transmission Section, then disconnect linkage and remove clutch housing and pan. Punch mark flywheel, clutch cover and pressure plate assembly (reassemble to same marks) and take out clutch fork. Remove clutch cover mounting screws uniformly to relieve spring tension and remove clutch assembly.

CONTINUED ON NEXT PAGE

BORG & BECK (C nt.)

Studebaker - Disconnect battery. On 6 Cyl. remove dipstick and tube and starter mounting capscrews (do not disconnect cables) and tie starter out of way. On V8 remove starter. On all models, remove clutch operating shaft. Remove transmission, see Transmission Section. Disconnect engine rear support from crossmember. Raise engine at oil pan and remove crossmember. On V8 remove clutch housing cover plate. Remove clutch housing.

NOTE - On 6 Cyl. remove dowel bolts first. Remove cover screws evenly to relieve pressure and remove clutch assembly and driven plate.

T mp st - Raise car and disconnect stabilizer bar at body frame rail. Disconnect exhaust pipe and front of torque tube from clutch housing. Support torque tube at front after lowering it enough to permit access to clutch assembly. Disconnect clutch rod from fork and accelerator linkage at pedal. Disconnect clutch linkage link from clutch housing stud. Remove clutch housing assembly with components intact. Remove clutch pressure plate and cover assembly and driven plate.

Valiant - Raise car and remove transmission, see Transmission Section. Remove clutch housing pan and disconnect clutch linkage and retracting spring at clutch fork. Remove clutch fork and release sleeve and bearing assembly. Mark cover and flywheel for reassembly and remove six cover attaching bolts. Remove cover and clutch plate.

ADJUSTMENTS: Ch vrolet Trucks - Two adjustments as follows:

Pedal T tal Trav l - *NOTE - Fill master cylinder to ½" below top of res rvoir.* Locate clutch pedal bumper to bring clutch pedal 5/8" higher (Model 60), even with brake pedal (Other models). Disconnect return spring, bottom cylinder pushrod and piston (push pushrod forward as far as possible). Pull clutch fork to rear until bearing touches levers and turn adjusting nut (behind pushrod fulcrum) until clearance between fulcrum pivot and clutch fork is 5/32" (use 5/32" diameter drill).

P dal Free Trav l Adjustment - Adjust pushrod eccentric bolt and adjustable pushrod so as to obtain free travel between master cylinder pushrod and piston. This will amount to 1/8" free travel measured at center line of pedal pad, just before pushrod contacts piston. *NOTE* - This adjustment insures piston uncovering port in reservoir.

Chrysler, D soto, D dg & Lancer, Plymouth & Valiant - Two adjustments as follows: *NOTE - Lancer & Valiant have non-adjustabl ov r-center spring.*

Pedal Freeplay Adjustment - Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This will provide correct 1-1¼" pedal freeplay.

Ov r-Cent r spring Adjustment - Release clutch pedal rod from clutch pedal and depress clutch pedal to floor. Back off over-center spring adjusting nut until free of "C" link and then tighten nut until it just contacts "C" link. Turn nut 3 turns tighter (9¼" clutch), 5 turns tighter (10", 10½", 11" clutch) with pedal still depressed. Reconnect clutch pedal to pedal rod and check pedal effort. There should be 25 lbs. effort to produce a 5" pedal stroke (1-1¼" from floor) and 10-12 lbs. on return stroke. If effort too high, tighten adjusting nut; if too low, loosen nut. Initial effort to start pedal moving should be 5-7 lbs. If more than 7 lbs., screw in over-center spring stopscrew and rubber bumper (below and at right angle to "C" link and spring). If pedal hangs up at about 1" of travel, screw bumper out. Tighten locknut.

Pontiac - Pedal Freeplay - To adjust, loosen adjusting nut locknut on clutch fork rod at clutch fork then turn adjusting nut to remove all freeplay (release bearing contacting the clutch pressure plate levers), then back off adjusting nut 3½ turns (5 turns with new driven plate) to provide correct free travel. Tighten locknut to 60-120 ft. lbs. and check pedal height.

Pedal Height Adjustment - Distance from under surface of pedal pad to floor mat should be 6-6¼". To adjust loosen pedal rod upper trunnion jam nuts and adjust.

Rambler - Pedal Freeplay Adjustment - Adjust at connecting link between throwout lever and release idler shaft assembly to obtain freeplay of ½-¾".

Studebaker - Pedal Freeplay Adjustment - Free travel ½-1". To adjust, loosen locknut on rod connecting clutch release shaft lever to clutch operating shaft lever. Turn opposite nut in or out as required. Tighten locknut.

►*HILL HOLDER NOTE:* Check setting whenever clutch pedal adjusted and adjust operating rod so Hill Holder releases at same time clutch is engaged.

Tempest - Pedal Freeplay Adjustment - Adjust self-locking nut on fork rod to provide 5/32" free movement at fork-to-pushrod connecting pin. This adjustment will provide necessary 1" free travel at pedal.

►*PONTIAC CLUTCH OVERHAUL NOTE:* Parts are not furnished and these clutches are serviced by replacement.

OVERHAUL: Mark all parts before dismantling clutch and reassemble in same position (necessary to maintain balance). Replace grooved, checked or warped pressure plates. Replace springs when pressure plate discolored from heat.

Disassembly: Place clutch on fixture or arbor press (support pressure plate under release levers), place block across cover resting on spring bosses, compress cover slightly, remove metal staking in adjusting nuts by running hacksaw blade through slot, remove nuts. Release pressure slowly, remove cover and springs. Remove release levers by grasping lever and eyebolt between thumb and forefinger, so that inner end of lever and upper end of eyebolt are pressed together, lift strut over ridge in end of lever (press lower end back against lug), lift lever and eyebolt out.

Reassembly: Place pressure plate on fixture or arbor press supporting plate under release lever lugs. Install lever, eyebolt and strut assemblies by reversing removal procedure. On semi-centrifugal models, install roller assemblies in pressure plate grooves. Install clutch springs on pressure plate. Install anti-rattle springs on release levers in cover. Place cover on pressure plate. Make certain that springs are seated in cover recesses and anti-rattle springs in place on release levers. Compress cover slowly and guide eyebolts through holes in cover. If assembly made in fixture, use clamps to clamp cover flange to plate at mounting holes. Install eyebolt nuts and turn nuts down flush with head of bolt. Compress and release clutch several times to seat all working parts. Then adjust release lever heights.

Clutch Springs: Note spring color and install in same relative position (groups of two different springs used on some clutch models). Springs should check with table below. Replace springs if weak or burned or if clutch has been subjected to excessive heat.

Clutch Spring Specifications

Assy. No.	Springs - No. & Color	Lbs. Pressure
926	9-Lavender	① 150 at 1 1/2"
361360	9-Lavender	① 150 at 1 1/2"
361407	3-Lt. Green	① 175 at 1 11/16"
	6-Dk. Blue	③ 190 at 1 11/16"
361416	6-White	② 245 at 1 1/2"
361436	6-Lt. Blue	① 165 at 1 11/16"
	3-Lt.Green	① 175 at 1 11/16"
361442	6-Lt. Green	① 175 at 1 11/16"
	6-No Color	① 155 at 1 11/16"
361449	3-Dk. Blue	③ 190 at 1 11/16"
	9-Lt. Green	① 175 at 1 11/16"
361468	3-Orange	① 170 at 1 1/2"
	6-Red or No Color	② 195 at 1 1/2"
361483	6-Tan	① 160 at 1 1/2"
	6-Red or No Color	② 195 at 1 1/2"
361494	6-White	② 245 at 1 1/2"
361505	9-Red or No Color	② 195 at 1 1/2"
361506	3-White	① 245 at 1 1/2"
	6-Red or No Color	② 195 at 1 1/2"
361521	3-Black	③ 230 at 1 1/2"
	3-Red or No Color	② 195 at 1 1/2"
361525	9-Red or No Color	② 195 at 1 1/2"
361527	6-Red or No Color	② 195 at 1 1/2"
	6-Orange	① 170 at 1 1/2"
361530	6-Black	③ 230 at 1 1/2"
361531	6-Red or No Color	② 195 at 1 1/2"
361538	3-Dk. Blue	③ 190 at 1 11/16"
361543	3-Yellow	① 140 at 1 1/2"
	9-Red or No Color	② 195 at 1 1/2"
361545	2-Tan	① 160 at 1 1/2"
	6-Lavender	① 150 at 1 1/2"
361547	3-Orange	① 170 at 1 1/2"
	3-Red or No Color	② 195 at 1 1/2"
361551	9-Orange	① 170 at 1 1/2"
361555	3-No Color	① 155 at 1 11/16"
	6-Pink	④ 217 at 1 11/16"
361559	6-Red or no Color	② 195 at 1 1/2"
361560	3-Lavender	① 150 at 1 1/2"
	6-Red or No Color	② 195 at 1 1/2"
361565	6-Orange	① 170 at 1 1/2"
	6-Black	③ 230 at 1 1/2"
361581	3-Tan	① 160 at 1 1/2"
	6-Red or No Color	② 195 at 1 1/2"

① - Plus or minus 5 lbs. ② - Plus or minus 6 lbs.
③ - Plus or minus 7 lbs. ④ - Plus or minus 8 lbs.

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BORG & BECK (Cont.)

Release Lever Adjustment (With Borg-Warner Universal Fixtures UF-300, 400): Special lands must be installed on fixture under pressure plate lever lugs. Set adjusting arm on adjusting sleeve so that height of lower side arm above bottom of sleeve is correct for each model (see table below). Install indicating plate on levers. Adjust each lever so that it just contacts indicating plate or adjusting arm, lock lever adjusting nuts by peening nut against notches in eyebolt.

Release Lever Setting (Borg-Warner Fixtures UF-300 & UF-400)

Clutch Assembly No.	①Lever Height
926	2 3/16"
361360	2 1/4"
361407, 416, 436, 442, 449	2 5/32"
361468	2 5/16"
361483	2 9/32"
361494	2 9/16"
361505	2 3/16"

① - Using three 3J Lands and 3X Indicating Plate.

Release Lever Adjustment (Using Gauge Plate): Install clutch on flywheel in car, or on dummy flywheel on bench, with Borg & Beck Gauge Plate installed in place of regular driven member (*CAUTION* - Machined lands on gauge plate should be directly under release levers). Depress each lever several times to seat all parts, then place straightedge or sheet metal height gauge on gauge plate boss directly above release lever and adjust lever height until lever tip contacts lower edge of height gauge ("Flush" setting). *NOTE* - For "Lower" settings, gauge should have a cutout at the center equal to the setting so that lower edge of gauge will be below the top of the gauge plate boss.

(Using Borg & Beck Gauge Plate)

Clutch Model	Lever Height
8A7, & 5A7	3/16" Lower
9A7	1/16" Lower
10A7	Flush
10.5A8 (Exc. 1451)	Flush
11A9	5/32" Lower

CHEVROLET (OWN)

Model	Cover Assembly No.	Cover Assembly Size	Clutch Disc No.	Clutch Disc Size	Clutch Disc Hub Color
Corvair (Exc. Fwd. Cont.)	6257953	9"	①②3784300	8"	None
Corvair (Exc. Fwd. Cont.)	3777875	9"	①3779872	9"	None
Chev. 6 Cyl. Pass. (Exc. H.D.)	3752850	10"	①3769723	9½"	D. Green
Chev. 6 Cyl. Pass. (Exc. H.D.)	3752850	10"	②3769724	9½"	Black
Chev. 6 Cyl. Pass. (H.D.)	3751041	11"	②3777088	11"	None
Chev. V8 283" Pass. (Exc. 4-Bbl., O.D.)	3785260	10"	②3779757	10"	None
Chev. V8 283" Pass. 2-Bbl. (Exc. H.D., O.D.)	3772926	10"	②3779757	10"	None
Chev. V8 283" Pass. 4-Bbl.	3742866	11"	②3754610	10"	L. Green
Chev. 6 Cyl. & 283" Pass. (with O.D.)	3744199	11"	②3754610	10"	L. Green
Chev. V8, 348" Pass.	3758517	10½"	②3758499	10½"	None
Chev. 6 Cyl. Trk. (Ser. 10-60, Exc. H.D.)	3752850	10"	①3836097	10"	Orange
Chev. 6 Cyl. Trk. (Ser. 10-60, Exc. H.D.)	3752850	10"	②3836119	10"	Red
Chev. 6 Cyl. Trk. (Fwd. Cont.)	3751041	11"	①3836097	10"	Orange
Chev. 6 Cyl. Trk. (Fwd. Cont.)	3751041	11"	②3836119	10"	Red

① - Molded ② - Woven ③ - Replaces 3779872 (Early Cars).

DESCRIPTION: Single plate dry disc type with a diaphragm spring (replacing conventional clutch release springs and release levers). Diaphragm is shaped like a dished washer, with inner rim slotted to form 18 release fingers and is pivoted on inner and outer pivot rings mounted on 9 bolts in clutch cover. *NOTE* - Clutches used on 235" engine, 283" engine with 2-Bbl. Carb., and Corvair engine all have straight-finger clutches. All other models using this type clutch, have six of the fingers (18 total) bent upward with weights at outer ends to provide centrifugal action for increased clutch pressure at higher clutch speeds.

Pedal Adjustment (Std. Travel): Pass. Car - 1) Remove clip retaining swivel to clutch lever and shaft.
2) Adjust swivel to line up with dimple located on clutch lever and shaft assembly while holding fork pushrod rearward to remove all lash between release bearing and clutch diaphragm spring. Reinstall swivel. Pedal free travel will range from 1 1/4" to 1 5/8".
►*NOTE:* If pedal does not return to bumper stop or hangs up on floor pan, measure distance between lower edge of overcenter lever and flange of instrument panel brace. If this distance less than 1" ±1/8" for 235" & 283" engines or 1 1/4" ±1/8" for 348" engine, replace pedal assembly or overcenter lever.

Corvair Pass. Car - 1) Attach return spring to clutch lever control cable cross-shaft outboard lever lower hole. *NOTE* - Clutch fork pull rod must be disconnected from cross-shaft lever.
2) Adjust clevis swivel until outboard lever on clutch lever control cable cross shaft has a clearance of 1/8" to 3/4".
3) Hold pull rod to remove all slack at bearing and align swivel with upper hole of outboard lever, then back off swivel 3 complete turns and assemble swivel to lever and install clip.

Corvair Truck & Greenbrier - *NOTE* - Pedal should have at least 3/4" travel before release bearing engages diaphragm.
1) Disconnect rear clutch return spring. *CAUTION* - Front spring must be in operation to hold pedal bumper in contact with toe-board.
2) Remove retainer clip, clevis pin and washer from clutch control idler lever and remove rear cable clevis.
3) Let idler lever hang free to furnish guide for correct line of action of cable clevis.
4) Pull cable clevis rearward to remove all slack forward of this point, then pull clutch fork pull rod until all slack is taken up at clutch fork.
5) With cable clevis and pull rod in this position, adjust pull rod clevis to align holes in both clevises.
6) With pull rod clevis position established, unscrew clevis 3½ turns (lengthen rod 5/32"). Tighten jam nut.
7) Line up holes in cable clevis, pull rod clevis, and clutch fork pull rod idler lever and insert clevis pin and retainer clip. Install return spring.

Trucks - Adjust pushrod so as to obtain free travel between master cylinder pushrod and piston. This will amount to 1/8" free travel measured at center line of pedal pad, just before pushrod contacts piston. *NOTE* - This insures piston uncovering port in reservoir.

Pedal Adjustment (Total Trav l): Trucks - 1) Adjust clutch pedal bumper so clutch pedal pad (fully released) is even with brake pedal, then disconnect return spring.
2) Push slave cylinder pushrod forward as far as possible and pull clutch fork rearward until all slack is removed at throwout bearing, then turn adjusting nut behind slave cylinder pushrod fulcrum ("V" block) to obtain 5/32" clearance between fulcrum pivot and clutch fork (use shank of 5/32" drill).

Removal: Pass. Cars - Remove transmission. Remove clutch throwout bearing from fork, then remove clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one at a time until tension of spring is released. Remove tool, then remove clutch assembly from vehicle. When installing clutch, align "X" mark on cover and flywheel.

Corvair - *See "Engine" in Corvair Special Data.*

Trucks - Remove transmission, then disconnect slave cylinder at clutch fork and remove bearing from fork. Press fork away from ball mounting (use screwdriver), or remove ball stud from rear of clutch housing. *NOTE - Pry retainer out of fork with small screwdriver.* Install Tool J-5824 to support assembly. Loosen clutch attaching bolts gradually to release spring tension then remove tool and remove clutch assembly.

Bleeding System: (Trucks) - Same as for brake system. Bleed clutch hydraulic line at clutch slave cylinder bleed holes.

OVERHAUL: 1) Remove three drive strap-to-pressure plate bolts and retracting springs, then remove pressure plate from cover. *NOTE* - When disassembling, note position of grooves on edge of pressure plate and cover for reassembly to maintain balance.
2) Inspect spring, rings and cover for excessive wear or damage. If defect found, replace assembly.

LONG MODEL 8½

Clutch Cover Assy.

Model	Long No.	Ford No.
Comet & Falcon Std.	260013	CODD-7563-B
Comet & Falcon H.D.	260138	C1UU-7563-A
Econoline	260138	C1UU-7563-A

Clutch Disc

Model	Long No.	Ford No.
Comet & Falcon Std.	280122	C1DD-7550-E
Comet & Falcon H.D.	280124	C1DD-7550-C
Econoline	280124	C1UU-7550-A

►*COMET CLUTCH EQUALIZER BUSHING PRODUCTION CHANGE & SERVICE NOTE:* Later production uses one-piece plastic bushing, in place of two-piece bronze bushing, in equalizer bar. At time of initial installation of plastic bushing, the pivots and inside surfaces of bar at bushing contacts must be lubricated with a light coat of chassis lubricant. No lubrication fitting used with plastic bushings.

►*STORED CAR CLUTCH CAUTION:* Prop clutch pedal in depressed position to prevent clutch disc sticking to flywheel during prolonged storage.

►*FAULTY CLUTCH OPERATION DUE TO EXTRA FLOOR MAT:* Extra thickness of mats require the readjustment of both "Pedal Freeplay" and "Total Travel" to maintain proper clutch linkage travel, freeplay, and operation.

DESCRIPTION: Single plate, dry disc type. Three flat release levers extend through slots in cover and engage slots in pressure plate bosses. Pressure plate springs are installed between pressure plate and cover between the release levers.

PEDAL ADJUSTMENT

Comet & Falcon: Assist Spring Adjustment - Adjust retainer in link so distance from inside radius of spring hook to front face of link is 1 3/16"

Total Travel Adjustment - Move bumper and bracket as required to secure 6-6½" of travel. Make this adjustment prior to making Freeplay Adjustment.

Freeplay Adjustment - Loosen pedal-to-equalizer rod nuts and move equalizer bar as required to obtain 7/8-1 1/8" movement of pedal from fully released position until release fingers contact release bearing, then tighten nuts against trunnion without altering adjustment.

Econoline: Freeplay Adjustment - Loosen nut on turnbuckle on release rod and rotate turnbuckle to obtain freeplay or travel of 7/8-1 1/8 movement, measured from fully released position, until release fingers contact release bearing. Tighten nut. *NOTE* - When freeplay is correct, total travel will be correct.

OVERHAUL: *CAUTION - Parts are not furnished and manufacturer recommends that clutch not be disassembled.* Replace pressure plate and cover assembly if release levers do not operate freely or if lever heights are not equal. *See Release Lever Checking below.*

Release Lever Checking: Assemble pressure plate and cover assembly on flywheel with a .250" shim installed in place of regular driven member. Use depth gauge or dial indicator to measure height of inner end of each release lever. All levers must be equal within .031". If lever variation greater than .031" replace pressure plate and cover assembly.

LONG "CF" & "NC"

CLUTCH COVER ASSY.

BUICK	Long Model	Long Assy. No.
Special	9½CF	260154
OLDSMOBILE		
F-85	9½CF	260154
88, S88	11CF	L5167
88, S88, 98 H.D.	11CF	262832

FORD PASS. CARS	Long Model & Assy	Ford No.
223" Early	9½CF 268594	1A 7563-A
223" Later		C1AA 7563-A
292"	10CF 267346	C1AA 7563-B
292"	10½CF 260108	COAA 7563-A
223" H.D. Early	11NC 266978	B7A 7563-C
223" H.D. Later		C1AA 7563-A
292" H.D.	11CF 267350	B8A 7563-B
332", 352" Early	11CF 267350	B8A 7563-B
352" Later		C1AA 7563-E
352", 390" Spec. Early ℂ	11CF 267350	COAA 7563-B
352", 390" Spec. Later ℂ		C1AA 7563-C

FORD TRUCKS		
6 Cyl.	10CF L5222	② B4A 7563-B
6 Cyl.		③ B6A 7563-B
6 & V8	10½CF 267371	B6A 7563-A
6 & V8	11CF 260162	COTT 7563-A
6 & V8	11½CF 260093	C1TT 7563-B

MERCURY		
223"	9½CF 268594	1A 7563-A
223" 11"		B7A 7563-C
292" 10"		B7A 7563-A
292", 352"	11CF 267350	B8A 7563-B

ℂ - 4-Bbl. Carb. Models.
② - Blue & White mark on cover plate.
③ - Yellow mark on cover plate.

►CHANGES, CAUTIONS, CORRECTIONS

►*BUICK "SPECIAL" CLUTCH LINKAGE BIND CORRECTION:* Lubricate all pivot points, then realign linkage as necessary to eliminate bind at any pivot point. Adjust equalizer perpendicular to engine to eliminate bind at equalizer levers.

►*352" MERCURY CLUTCH PEDAL-TO-IDLER ROD LENGTH CAUTION:* Use later type rod, 15.25", to insure adequate threads for jam nut on end of rod. Early rods were 14.56".

►*MERCURY CLUTCH SQUEAK CORRECTION:* When noise occurs only when depressing clutch pedal while engine running replace throw-out bearing. If noise occurs without engine running, lubricate driving lugs and edges of pressure plate with "Lithium" base grease. DO NOT over-lubricate.

DESCRIPTION: Single plate, dry disc type.

REMOVAL OF CLUTCH: Buick - Remove transmission, see Transmission Section, and remove throw-out bearing. Disconnect release rod from fork by removing clevis pin and unhooking fork boot from housing. Push inward on release fork to free it from ball stud in flywheel housing and remove fork. Mark clutch cover and flywheel so cover can be installed in original position

CLUTCH DISC

BUICK	Long No.
Special	280152
OLDSMOBILE	
F-85	280266
88, S88	282687
88, S88, 98 H.D.	282687

FORD PASS. CARS	Long No.	Ford No.
223" Early	288849	B8A 7550-A
223" Later		B8A 7550-A
292" 10	288852	B8A 7550-C
292" 10½"		COAA 7550-A
223" H.D. Early	288851	B8A 7550-B
223" H.D. Later		B8A 7550-B
292" H.D.	288351	B8A 7550-F
332", 352" Early		B8A 7550-F
352" Later		B8A 7550-F
352", 390" Spec. Early ℂ	288351	COAA 7550-B
352", 390" Spec. Later ℂ		COAA 7550-B

FORD TRUCKS		
6 Cyl. All	CD850	B7C 7550-A
6 & V8	CD607	B7C 7550-B
6 & V8	287335	C1TT 7550-F
6 & V8	CD607	COTT 7550-B
6 & V8	280135	C1TT 7550-E

MERCURY		
223" 10"	280287	B8A 7550-A
223" 11"		B8A 7550-B
292" 10"		B8A 7550-C
292" 11"	280267	B8A 7550-F
352" 11"		② B8A 7550-F
352" 11"		③ C1MM 7550-A

ℂ - 4-Bbl. Carb. Models.
② - Models 58A & 64A. ③ - Except Models 58A & 64A.

(for engine balance). Loosen each cover bolt a turn at a time to relieve clutch spring pressure. *NOTE - Spacers (¼" nuts) placed between levers and inner edge of cover will aid in removal and installation.* Support pressure plate and cover assembly while removing last bolts, then remove cover assembly and driven plate.

Ford Pass. - Remove transmission or slide back far enough to clear in-put shaft, see Transmission Section, then remove flywheel housing cover and release lever retracting spring. Slide release bearing and hub off release lever. Mark clutch cover and flywheel for reinstallation. Loosen six cover bolts uniformly to release spring tension. Remove cover and pressure plate through opening in flywheel housing.

Ford Truck - Remove retracting spring and pushrod at release lever. Remove slave cylinder attaching bolts. Remove transmission, see Transmission Section. Remove dust cover from clutch housing and remove release bearing and hub from lever. Mark pressure plate and cover assembly and flywheel for reinstallation in same position. Loosen cover bolts uniformly to release spring tension, then remove pressure plate and cover assembly and clutch disc through opening in bottom of clutch housing.

CONTINUED ON NEXT PAGE

LONG "CF" & "NC" (C nt.)

Oldsmobile - Remove transmission, see Transmission Section, then remove lower flywheel housing and release bearing. Mark flywheel and clutch cover for reinstallation. Loosen cover bolts uniformly two turns at a time to release spring tension and remove clutch cover assembly and driven disc.

PEDAL ADJUSTMENT: Buick - Release clevis pin from rear end of clutch release rod and rotate rod as required to obtain 3/16" movement at outer end of fork before throw-out bearing contacts release levers. This will give 7/8"-1" free play at pedal pad.

Ford & Mercury . If total pedal travel is less than 6 5/8" or more than 6 7/8", reposition pedal bumper and bracket until travel is within these limits. Adjust spring link to give assist spring length of 10" (between spring eye centers), with pedal fully released against bumpers. With engine idling, depress pedal to take up free travel and note reading from released position. Free travel should be 1 1/4-1 3/8" (Ford), 3/4-1" (Mercury). To adjust, turn adjusting nut on equalizer rod. Tighten locknut securely. Operate engine at 3000 RPM. Free travel should not be less than ½". Readjust equalizer rod if necessary. *Free travel must be set exactly.*

Oldsmobile - Disconnect lower clutch control rod from equalizer by removing wire clip. Adjust control rod in or out of trunnion nut to obtain 7/8"-1" free travel at clutch pedal. Check free travel at clutch pedal pad with lower clutch control rod connected to release yoke.

OVERHAUL: *NOTE - Car manufacturers (Buick, Ford, Mercury & Oldsmobile) do not recommend Clutch Cover & Pressure Plate Assembly overhaul. On these models, if lever height does not meet specifications shown in "Release Lever Setting" table or if levers do not operate freely without bind, replace the assembly.* Mark all parts for disassembly and reassemble in same relative positions.

Clutch Fixture Note: Manufacturer recommends use of Borg-Warner Universal Clutch Fixture UF-300 or UF-400 for all servicing and rebuilding operations.

Disassembly: Place clutch on fixture (supporting pressure plate on special lands under lugs) or arbor press. Compress cover plate slightly, take out assembly screws (lever yoke mounting screws) on cover, release pressure on cover plate slowly, lift off plate. Note whether washers used on yokes under assembly screws (these washers must be reinstalled if old pressure plate used again). See special directions below on removing and reinstalling release levers.

Clutch Springs: Pressure springs should check with table below.

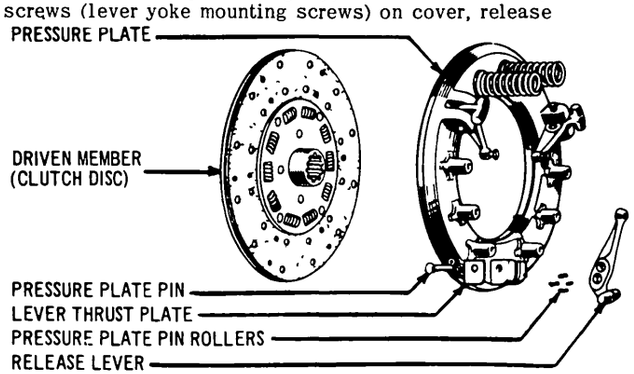
Clutch Spring Specifications

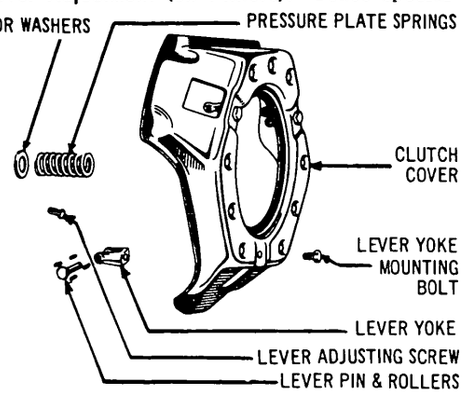
Cover Assembly	Spring Color & No.	Lbs. Pressure
L-5167	9-Tan	158-165 at 1 9/16"
L-5222	9-Buff (Bronze)	137-147 at 1.747"
260093	12-Purple	140-150 at 1.672"
260108	9-Buff (Bronze)	137-147 at 1.747"
260154	6-Aluminum	200-210 at 1.751"
260162	9-Pea Green	170-180 at 1.762"
262832	9-Orange	170-180 at 1 9/16"
266978	3-Pea Green	170-180 at 1.762"
	6-Brown & White	154-164 at 1.736"
267346	9-Buff (Bronze)	137-147 at 1.747"
267350	9-Pea Green	170-180 at 1.762"
267371	9-Buff (Bronze)	137-147 at 1.747"
268594	6-Aluminum	200-210 at 1.751"

Release Lever Assembly: Mount lever yoke on release lever, fasten by inserting flat-sided lever pin (flat side out or toward cover) and roller (place roller on flat side of pin). Insert lever in pressure plate lug, use roller pin sawed off to length of lever width as a guide and insert needle bearings, insert roller pin, pushing guide pin out, lock both lever pins with cotter pins. Thread release lever adjusting screws in ends of levers, turning screws down completely.

Assembly: Place pressure plate on fixture or arbor press. Assemble pressure springs, locator washers or insulator washers on plate, place washers on lever yokes (if washers used previously and old pressure plate being used). Place cover plate in position (lining up marks made before dismantling), compress cover slowly guiding lever weights through holes in cover and lining up yokes under cover plate holes. See that pressure springs are seated, insert cover screws in yokes, using lockwasher under screw head, tighten screws securely. Compress and release clutch several times (using weight on release levers) to seat all parts. Then adjust release lever heights.

Release Lever Adjustment (on Fixture): Place special lands on fixture under pressure plate lugs, assemble lever adjusting arm and sleeve setting bottom of adjusting arm correct distance as shown in table (all figures plus or minus 1/32") above bottom of sleeve and lock the adjusting arm with the thumbscrew. Swing arm over each release lever in turn, back off adjusting screw on top of lever until rounded screw head just contacts arm, lock screws by inverting clutch so that screw head is supported and stake or peen lever into adjusting screw slot. Do not disturb lever yoke screws when making this adjustment.





L NG CLUTCH ASSEMBLY (TYPICAL)

Release Lever Setting
(Borg-Warner Fixtur s UF-300 & UF-400)

Clutch Assembly	Lever H ight
L-5167	① 1 7/8"
L-5222	③
260093	⑤
260108	③
260154	
260162	⑤
262832	① 1 7/8"
266978	②③
267346	⑤
267350	②⑤
267371	④ 2 1/4"
268594	③⑥ 1 13/16"

① - With three 3J Lands and three 3D Rings.
② - No lever adjustment. Use new pressure plate to restore settings. Set levers parallel by tapping assembly screw on top cover.
③ - See "Ford" under Release Lever Checking & Adjustment (without Fixture) data below.
④ - With three 3J Lands, six 3K4 Height Sleeves, one 3X Indicating Plate and three bars (½" x ½" steel) bridging slots.
⑤ - Maximum Variation of Finger Height .031"
⑥ - With three 3J Lands and one 3D Ring.

Release Lever Checking & Adjustm nt (Without Fixtur): Check lever heights as follows (adjustment not recommended on Ford clutches).

Ford - Mount clutch assembly on spare flywheel with three .250" thick spacers (drill rod or precision washers may be used) in place of regular driven member (*NOTE* - Place spacer under each release lever). Use dial indicator to measure lever heights. All levers must be equal within .031". Replace pressure plate and cover assemoly if greater variation noted.

Oldsmobile (Exc. F-85) - Install special lever setting Gauge J-1084 on flywheel in place of driven member. Mount pressure plate assembly on flywheel tightening screws one or two turns at a time (to prevent distortion of cover). Lay short straightedge across center boss of the gauge as a guide for positioning levers. Bearing surfaces of all lever adjusting screws should be from .000-.062" below level of gauge center boss, and each lever should be within .015" of the other two levers. *NOTE* - If levers are not more than .025" out of plane, lightly tap release yoke mounting screw heads with 8 ounce hammer to bend pressure plate cover to bring levers within .015" of same plane. When levers are more than .031" out of plane, or do not lie within .000-.062" below center boss, adjust levers as directed under "Release Lever Adjustment (On Fixture)" above.

BUICK HYPOID

Series 44, 46, 47, 4800 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE HOUSING CAUTION:* When housing replaced, readjust pinion nose angle, see *Propeller Shaft Alignment in this section.*

►*AXLE SHAFT INSTALLATION CAUTION:* Coat axle shaft lightly with rear axle lubricant (see "Rear Axle Lubrication Note") from sealing surface to six inches inboard before installation to prevent damage to lip of wheel seal. USE ONLY POSITIVE TRACTION LUBRICANT with a Positive Traction Differential.

►*REAR AXLE LUBRICANT NOTE:* Flushing and seasonal changes not recommended for either type axle. Maintain level at filler opening to ¼" below. Use Factory Hypoid Gear Lubricant in standard axle. Use Buick Special Lubricant No. 723-TL-1000 in Positive Traction axle.

DESCRIPTION: Hypoid gear, semi-floating type with drive from axle housing through one upper and two lower control arms. Power-Lock Differential (Plate Clutch Type) Optional.

►*AXLE IDENTIFICATION NOTE:* Ratio stamped on bottom of axle housing. An "X" inside a circle next to number indicates "Positive Traction" type differential. This type also identified by lubrication tag next to filler plug.

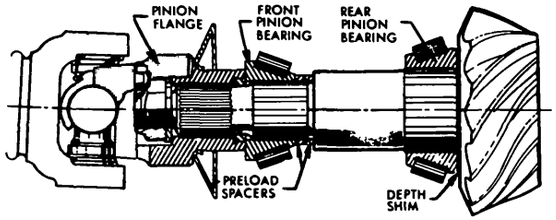
	Axl Ratios	
Mod l	Domestic	Export
4400 (Std.) Ⓒ.....	.....3.07 (14-43)	3.36 (14-47)
All Others	3.23 (13-42).....	3.36 (14-47)

Ⓒ - 3.23 (13-42) with Power Pack.

Axl Shaft R moval: Place stands under rear axle so wheels clear floor, then remove wheel and drum. Remove wheel bearing retainer plate-to-backing plate nuts (leave bolts in place to support backing plate). *NOTE - L ft sid wh l bolts hav left hand threads.* Use Puller J-6176 with Slide Hammer to pull axle assembly. Replace two backing plate nuts finger tight to hold plate in place.

Carri r Ass mbly R moval: Place jacks under rear axle housing and raise car. Mark rear universal joint for proper alignment for reassembly, then disconnect rear joint "U" bolts. Push rear propeller shaft forward and wire it to upper control arm bracket out of way. Remove axle shafts, see above, then back off two opposite carrier to axle housing nuts to last few threads and remove all other nuts. Place drain pan under carrier and pull carrier forward to drain lubricant. Place transmission jack under carrier and remove from housing.

Wheel Bearing Adjustment: None required.



BUICK HYPOID PINION ASSEMBLY

OVERHAUL: *See "Buick Hypoid" Rear Axle in 1956 Annual Data or later Manual edition and note the following:*

Differential Bearing Support Removal (With Tool J-6553): This tool should be used to pull bearing supports on 1960-61 models as follows: Retract pins in tool by turning expander screw in puller body counterclockwise, then insert puller body into bearing support until reference line on tool is flush with end of support and punch mark on tool is in general direction of hole in support. Expand tool a slight amount by turning expander screw clockwise until a slight drag on pins is felt, then move tool as required to engage pins with holes in support. Fully expand pins. Place tool sleeve over tool and install draw bolt, thrust washer, thrust bearing, and small washer, then thread draw bolt in tapped hole in puller body. Apply a reasonable amount of torque to draw bolt, then strike carrier pedestal with a solid hammer blow.

Wheel Bearing & Seal Replacement: Notch wheel bearing retaining rings in 3 or 4 places with a chisel to expand ring and slide ring off shaft. Press wheel bearing off with Remover J-6525 either in a press or with use of Ram and Yoke Assembly J-6180 and Adapter J-6258. Install new retainer plate. Press new bearing against shoulder with Installer J-6257 either in press or by using Ram and Yoke Assembly J-6180 and Holder J-6407 with Ring J-6407-2. Press new retaining ring against bearing in same manner. Remove old seal by inserting Puller J-6199 through seal and expanding it so it can be removed with a slide hammer. Coat outside diameter of seal with sealer, position seal over Installer J-9194 and drive seal straight into housing until installer bottoms against wheel bearing shoulder.

Drive Pinion & Bearing Removal: Install Holder J-8614-01 on pinion flange with two 5/16" - 18 x 2" bolts with flat washers. Remove pinion nut and washer. Use Puller J-8614-02 in Holder J-8614-01 to pull pinion flange. *NOTE - Hold pinion while flange is being removed to prevent falling out of carrier.* Remove pinion carefully to prevent damage to bearing races.

Pinion Bearing Preload Adjustment: Place original shim pack against head of pinion, and use bearing Replacer J-6377 and Holder J-6407 with Ring J-6407-2 in press to install bearing on pinion shaft. *NOTE - Original shims used only as a starting adjustment.* For starting pinion preload bearing adjustment, use original preload spacers. Place spacers on pinion, and hold pinion in carrier. Oil front bearing and place in position on pinion. Hold pinion in position and use Installer J-8913 to drive bearing into fully seated position. Install new "O" ring seal with sealing compound using Installer J-8913. Fill space between lips of oil seal with wheel bearing grease and apply thin coat of same grease to seal surface of pinion flange. Install pinion flange sufficiently to add washer and start nut. Hold flange with Holder J-8614-01 and torque nut to 80 ft. lbs. with wrench J-1313 on outer end of Handle J-6246 (this amounts to 250 ft. lbs. torque at nut). Rotate pinion 3-4 times to seat bearings. Preload should be 15-35 inch-lbs. including drag on new seal. When preload too low, reduce total spacer thickness .001" for each added 10 inch-lbs. preload needed; if too high, increase total pinion spacer thickness .001" for each 10 inch-lbs. to be subtracted. Spacers are furnished in pairs to supply thickness range from .400" to .470" by thousandths.

BUICK SPECIAL & OLDSMOBILE F-85 HYPOID

Buick Special Series 4000, 4100 (1961)
Oldsmobile F-85 (1961)

DESCRIPTION: Hypoid gear, semi-floating type, with drive from axle housing through two upper and two lower control arms. "Positive Traction" Differential Optional on Buick Special. *See "Power-Lock Differential ("Belleville" & Plate Clutch Type)".*

Axle Ratios

Model	Axle Ratios
Buick Special	3.08 (40-13); 3.36 (37-11)
Oldsmobile	3.08 (40-13); 3.23 (42-13); 3.36 (37-11)

Axle Shaft Removal: Remove wheel and brake drum. *NOTE - Left hand wheel bolts have left hand threads and nuts are marked "LF".* Remove four axle bearing retainer nuts. Attach Puller J-2619 and Adapter J-8617 and pull axle from housing. *CAUTION* - Support axle shaft carefully while pulling axle shaft out to prevent cutting seal lip. Left shaft is shorter than right shaft.

Wheel Bearing Adjustment: None.

OVERHAUL

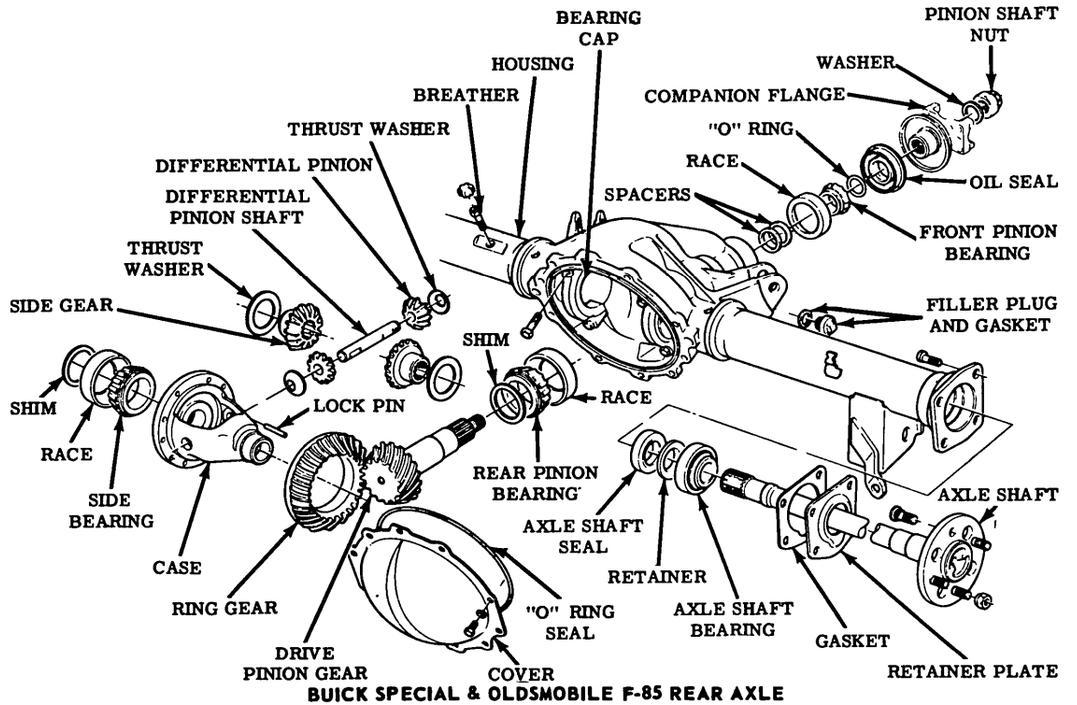
Differential Case Assembly: Removal - Back out cover bolts and pry bottom of cover loose to drain lubricant and remove cover. Check and record ring gear to pinion gear backlash, see below, for reassembly to same clearance. Remove bearing cap bolts marked "R Top" and "L Top" for reassembly. Install four safety bolts 7/16"-14 x 4 1/4" through caps finger tight. Use two pry bars to pry out differential case, to rest on safety bolts. Support assembly with one hand and remove safety bolts. Keep right and left bearing outer races and shims in sets with marked caps.

Disassembly - Pull side bearings with Support J-8615 in center hole and Puller J-2241-A or hydraulic Puller J-9005. Remove ring gear from case. Use soft hammer if necessary but DO NOT pry ring gear from case. Drive spring pin from differential pinion axle and drive and drive axle from case and remove pinions, side gears and thrust washers.

Pinion Assembly: Removal - Check "Pinion Bearing Preload", and "Pinion Depth Setting", *see below,* to check for previous setting error or for reinstallation. Use Holder J-8614-01 and remove pinion nut and washer. Use Puller J-8614-02 and Holder J-8614-01 to pull pinion flange. Remove pinion assembly, tapping with soft hammer while guiding pinion by hand to prevent damage to outer bearing races.

Disassembly - When pinion bearing is to be replaced or pinion depth setting is to be changed, remove bearing with Remover J-8612 and Holder J-6407. Pry seal from carrier and remove front bearing. Drive out outer races (front and rear) if bearings are to be replaced.

Differential Case Assembly: Reassembly - Examine all wearing surfaces of parts for scoring or unusual wear. Clean all parts thoroughly and lubricate each part before assembly. Place side gear thrust washers over gear hubs and install gears in case in original positions. Add pinion (less washer) between side gears and rotate gears until pinion is directly opposite loading pening in case. Place other pinion between side gears so that axle holes are in line, then rotate gears to make sure holes in pinions will line up with holes



BUICK SPECIAL & OLDSMOBILE F-85 REAR AXLE

in case. When holes line up, rotate pinions back toward loading opening and slide thrust washers into place. Install pinion axle and drive spring pin through hole until flush with case. Check ring gear for nicks, burrs or scoring. New gear set will have matched numbers. With mating surfaces of case and ring gear clean and free of burrs, thread two 3/8"-24 x 2" studs in opposite holes and install gear on case. Torque bolts alternately in progressive steps to 60 ft. lbs. Install side bearing with Installer J-8606 and Drive Handle J-8092.

Side Bearing Preload Adjustment - *NOTE - Adjusting shims furnished in thicknesses ranging from .040" to .082" in two thousandths graduations.* Place differential case and bearing assembly in carrier. When new side bearings used, use original adjusting shims. When old bearings are used, select new right and left adjusting shims each .002" thicker than original shim. Slip right shim into position then drive left shim into position carefully and install bearing caps with four 7/16"-14 x 4 1/4" cyl. head bolts. Rotate differential case several turns to seat bearings. Check preload with inch pound torque wrench connected at ring gear attaching bolt. With wrench projecting straight out, preload should read 20-30 inch lbs. with new bearings, or 10-20 inch lbs. with used bearings. When preload is not within specifications, increase shim thickness .002" each side for 10 in. lbs. preload desired or decrease shim thickness same amount for each 10 inch pounds to be subtracted. When preload adjustment correct, pry out differential assembly, remove bearing caps and place out of way. *NOTE* - Keep outer races and adjusting shims with their respective caps for reinstallation.

Pinion Assembly: Reassembly - When rear bearing is replaced always replace outer race with Installer J-8608 and Driver Handle J-8092. When front bearing is replaced always replace front outer race using Installer J-8611 and Driver Handle J-8092. Place original shim on pinion as starting adjustment and install rear pinion bearing with Installer J-8609, in press.

Preload Adjustment - When new bearings are installed use original preload spacers. When old bearings are to be used, select a pair of preload spacers .002" less than original spacers. Install spacers on pinion, place pinion assembly in carrier. *NOTE - Spacers are furnished in thickness ranges from .400" to .470" by thousandths.* Oil front bearing, and place in position. Hold pinion fully forward and drive front bearing over pinion until seated using Installer J-8613. Install new "O" ring seal. Coat OD of new pinion oil seal with sealer and install seal with Installer J-8613. Coat lips of oil seal and seal surface of pinion flange with gear lube. Install flange with soft hammer until a few threads appear, then install washer and nut. Hold the flange with Holder J-8614-01 and torque nut to 200 ft. lbs. Rotate pinion to seat bearings. Check bearing preload using an inch pound torque wrench connected at pinion nut. Preload reading (including drag of new seal) should be 25-35 inch. lbs. with new bearings, 15-25 inch lbs. with reused bearings. When preload not within specifications, reduce total pinion spacer thickness .001" for each added 10 in. lbs. preload desired or increase total pinion spacer thickness .001" for each 10 in. lbs. preload to be subtracted.

Depth Adjustment - Pinions are marked on small end

CONTINUED ON NEXT PAGE

BUICK SPECIAL & OLDSMOBILE F-85 HYPOID (C ntinued)

of pinion tooth indicating in thousandths the amount pinion varies from a nominal setting. A plus (+) marking, indicates that rear face of pinion when pressed into carrier must be nominal distance from centerline of the side bearing pedestals plus the amount indicated on pinion tooth. A minus (—) marked pinion indicates, nominal setting minus amount indicated on pinion tooth. *CAUTION* - Preload must be correct before making depth adjustment.

Pinion Setting Gaug J-8619 - Consists of a master gauge and an indicator gauge upon which a dial indicator is mounted. Master gauge is used to "Zero" indicator gauge. *CAUTION - Gauge parts must be clean, parti cularly the center and discs of indicator gauge and centering hole and disc pads on master gauge.* Place large discs on indicator gauge and place contact button on stem of dial indicator, then mount dial indicator on indicator gauge. Place indicator gauge on master gauge so that spring loaded center is engaged in centering hole. Center indicator contact button on contact pad and lock thumb screw. Hold yoke down firmly, with both discs contacting horizontal and vertical pads on master gauge then set dial indicator at zero. *NOTE - Be sure bearing support bores are free of burrs and center of pinion is clean.* Rotate pinion to bring blank tooth between matching number and the pinion setting mark slightly counterclockwise to top center (at about 11 o'clock). This is the gauging tooth used in production, and should be used in service. Place indicator gauge in carrier and turn pinion so that indicator contact button has a good contact with gauging tooth of pinion. Press gauge yoke down firmly toward pinion and read indicator noting whether it is plus (+) or minus (—) as indicated by arrows on surface of yoke. This indicates the variation from nominal setting of the gauging face of this pinion. Recheck zero setting to be sure it was not changed in handling.

NOTE - When old set reused, maintain original setting. When new set used, dial indicator reading should be within .0015" of pinion setting marked on pinion. When pinion setting is not as specified proceed as follows: *NOTE : Pinion depth shims furnished in thicknesses ranging from .040" to .070" by thousandths.*

Remove pinion assembly and press off bearing, see disassembly. Remove shim from pinion, wipe dry and measure its thickness, with micrometer. Service shims are marked in thousandths but should be rechecked with with micrometer. Increase or decrease thickness of shim as required to obtain proper pinion setting. For example - If pinion marked "+8" and gauge reading is "+6", decrease thickness of shims by .002". If gauge reading is "+10", increase thickness by .002". *CAUTION - Check depth setting on any new pinion even if pinion has same setting as old pinion.* Whenever a depth setting is changed, change preload setting the same amount by changing spacer thickness. (If depth setting decreased .002", decrease preload spacer thickness .002"). Reinstall rear pinion bearing with new thickness shim, reinstall pinion and bearing assembly in carrier with new thickness preload spacers. Install pinion flange and nut and tighten to 200 ft. lbs. Recheck pinion setting with gauge. Pinion setting must be within .0015" of setting marked on NEW pinion or within .0015" of original setting, USED pinion (as checked before disassembly). Recheck pinion bearing preload. Preload must not exceed 35 inch lbs. including drag on lubricated new seal.

Differential Assembly: Backlash Adjustment - Install differential case and bearing assembly. Slip right shim into position at right bearing and drive left shim into position with soft hammer. Rotate differential assembly to seat bearings then mount dial indicator on housing with contact button on back face of ring gear tooth as near in line with ring gear rotation as possible. Lock pinion to carrier and check backlash, at three or four points around ring gear. Lash must not vary over .001" around ring gear. If variation in excess of .001" check for burrs or uneven bolting condition or distorted flange and correct as necessary. Gear lash at point of minimum lash should be .007" to .009" for NEW gears, adjust to .008". On original gear set, original gear lash must be maintained within ±.001". When backlash not within specifications, increase thickness of one shim and decrease thickness of other shim for same amount. Shift a .002" shim thickness for each .001" change in backlash desired. If backlash is .001" too much, decrease thickness of right shim .002" and increase left shim thickness by .002". If backlash .002" too little, increase thickness of right shim .004" and decrease thickness of left shim .004". When backlash correct, install bearing caps according to markings and torque cap bolts to 75 ft. lbs. Install new cover seal with heavy grease to retain it in groove, install cover and tighten bolts to 25 ft. lbs.

CHEVROLET HYPOID (PASS. CAR & ½-TON TRUCK)

Chev. Pass. Cars (1961)
Ch vrolet Corv tte (1961)
Chevrol t ½-Ton Truck (1961)

DESCRIPTION: Semi-floating, hypoid type with separate carrier and Hotchkiss drive. Power-Lock Differential optional.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Bearing preload must be adjusted whenever companion flange nut is loosened.

►*AXLE IDENTIFICATION NOTE:* Conventional axles have serial number on right front side of differential. Positraction axle is identified by serial number and letter "P" on front side of carrier and lubrication tag on filler plug.

Axle Shaft Rem val: Raise car and place jack stands under axle housing. Remove tire, wheel and brake drum assembly. Remove four nuts and lockwashers from bearing retainer bolts (on inside of axle flange). Attach Axle Puller J-5748, with slide hammer, to flange and remove axle shaft and bearing assembly. Be careful not to disturb backing plate. *NOTE* - If bearing retainer and parking brake strut interfere, raise strut slightly with screwdriver to obtain clearance.

Carrier Removal: Remove rear wheels, brake drums and gasket. Remove bearing retainer bolts (on inside of axle flange) and use Tool J-5748 to remove axle shaft and bearing assembly so that axle clears differential side gears. Separate rear universal joint, lower propeller shaft, then drain rear axle lubricant and remove differential carrier nuts and lift out carrier assembly.

OVERHAUL: *See "Chevrolet Hypoid (Hotchkiss Drive)" in 1956 Annual Data or later manual edition and note the following:*

Rear Wheel Bearing Removal & Installation: Install Tool J-5741 between axle flange and bearing with land of plates against bearing and inside the retainer. Install bolts in plates. *NOTE - It will be necessary to remove retainer plate attaching bolts to allow installation of tool between retainer and bearing.* Press bearing from shaft with press plate parting line resting on press bed. *NOTE - This operation may damage bearing retainer so that it may not be replaced.* Install new bearing with Tool J-6661, pressing it on until bearing bottoms on shaft against shoulder. *NOTE - New bearing retainer must be on shaft before bearing is installed.* Install new axle shaft bearing retainer ring on shaft and use Tool J-6661 in arbor press to seat ring against bearing.

Axle Ratios: As follows:

Model	Axle Ratios ① Gear Rati
283" 3-Speed Trans.	3.36-1
Overdrive	3.70-1
Powerglide	3.08-1
Turboglide	3.36-1
Corvette 3-Speed Trans.	② 3.36-1
4-Speed Trans.	③ 3.70-1
Auto. Trans.	⑨ 3.55-1
348" 3,4-Speed Trans. (340,350 HP)	3.70-1
3-Speed (Others)	3.36-1
4-Speed Trans. (250 HP)	3.08-1
4-Speed Trans. (280,305 HP)	3.36-1
Powerglide (305 HP)	3.55-1
Powerglide (Others)	3.08-1
Turboglide (283")	3.36-1
Turboglide (348")	3.08-1

① - Positraction available on 283" & 348" in 3.08, 3.36, 3.55 & 3.70-1 ratios.
② - Positraction available in 3.36, 4.11 & 4.56-1 ratios.
③ - Positraction available 3.70, 4.11 & 4.56-1 ratios.
⑨ - Positraction not available with Auto. Trans.

CADILLAC HYPOID

Cadillac (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE SERVICE CAUTION:* Manufacturer recommends that all service on Standard or Controlled Differential Assembly other than oil seal or universal joint yoke replacement (and necessary pinion bearing preload adjustment) be handled by replacement of complete assembly. *No disassembly or adjustment of these units should be attempted in the field.*

►*REAR AXLE IDENTIFICATION MARKS:* Gear ratio of axle is indicated by a letter stamped on bottom side of carrier on flange adjacent to rear axle housing. A Controlled Differential is identified by letter "G" following axle ratio Code Letter. *See Axle Ratios.*

►*PINION BEARING ADJUSTMENT CAUTION:* Pinion bearing adjustment (preload) controlled by rear universal yoke nut which compresses spacer or sleeve between pinion bearings.

►*CAUTION:* Loosening or removal of the pinion shaft nut (for oil seal or yoke replacement) will disturb pinion bearing preload so that the detailed procedure, given below, must be followed to avoid overloading bearings or collapsing bearing spacers.

DESCRIPTION: Hypoid gear with torque arm drive (coil spring rear suspension, except commercial) of same design used on previous models.

Axle Ratios

Model	Ratio	©Code Letter
60,62 Series (Less AC)	2.94-1	T
60, 62 Series (AC)	3.21-1	W
75 Series	3.36-1	X
Comm.	3.77-1	Y

© - Letter "G" following Code letter indicates Controlled Differential.

Axle Shaft & Bearing (Exc. Comm. Chassis): Removal - Raise car and remove wheel and brake drum. Remove four bearing retainer and backing plate nuts and use Puller J-8131 and Slide Hammer J-2619 to pull axle shaft. Groove spacer with chisel and hammer, but do not split spacer. Drive chisel into spacer until spacer can be slipped off shaft. Assemble rear axle shaft and bearing assembly to "U" shaped piece of Bearing Plate and Pin Assembly J-2986-1 and place on press. Assemble Bearing Holding Tool J-2986-3 around bearing and dowels (to keep bearing from exploding while under arbor press load) and press shaft through bearing. **Reassembly** - Install new bearing on shaft so bearing seal is toward flange end of axle shaft. Place assembly through ring of Installer Tool J-6257 and position in press. Press bearing up to but not quite touching shoulder. Remove shaft from tool and assemble new spacer on shaft and reinstall assembly on tool. Press shaft through spacer until spacer just touches bearing. Install oil ring seal on bearing.

Installation - Lubricate wheel bearing bore in housing. Place new "O" ring seal on wheel bearing and install axle shaft (shorter shaft on left side), but do not damage seal. Install backing plate and bearing retainer, retainer nuts, brake drum and wheel.

Rear Axle Oil Seal (Comm. Chassis): Replacement - New oil seal must be installed whenever old seal removed. Fashion a plate with oblong center hole so it fits behind seal and remove seal with slide hammer. Coat surface of sealing lip with lubricant and outside diameter of seal with non-hardening gasket sealer before installation. Press seal squarely into its bore and onto its seat.

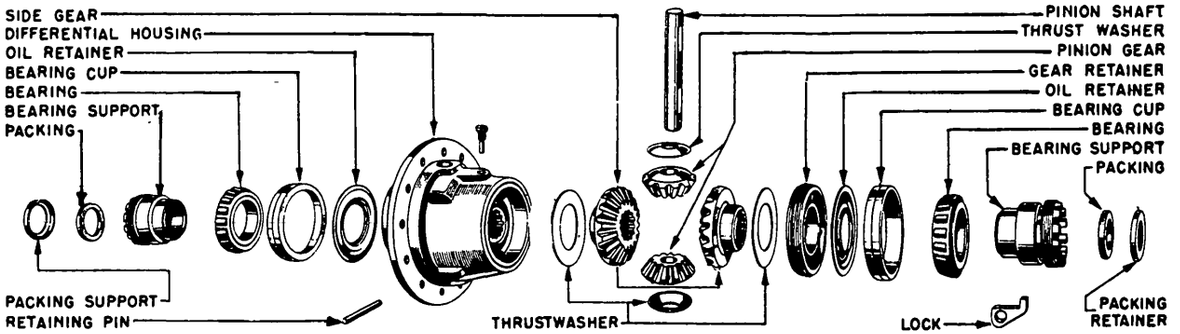
Differential Carrier: Removal - Disconnect rear universal joint at pinion yoke. Remove rear axle lubricant with suction gun. Remove axle shafts, see above, and remove carrier to axle housing nuts and washers. Remove entire assembly with gasket.

Installation - *NOTE* - If carrier was removed because of failure, inspect axle housing and rear wheel bearings for metal chips and thoroughly clean as required. Reverse removal procedure and note the following: On Controlled Differential carrier be sure internal splines of differential side gears are aligned by inserting axle shaft splines in each side approximately 4" until they bottom on differential pinion shaft.

Pinion Oil Seal & Yoke: Removal - Raise rear of car and remove both rear wheels and brake drums to eliminate drag when measuring torque readings. Use suction gun to remove approximately 1½ pints of lubricant. Disconnect rear universal joint from pinion yoke. Use a 50 inch pound torque wrench and Socket J-2571-1 with Adapter J-2571-2 to measure inch pounds required to rotate shaft (2 full turns). Record torque reading. Mark pinion shaft and yoke with punch mark for reinstallation. Install Holding Tool J-6544 on yoke, and install Socket J-2571-1 on pinion nut through hole in holding tool and remove nut using 3/4" drive socket wrench. Remove yoke from pinion shaft with Tool J-6295-01. Pry out old seal and remove staking marks on shaft threads.

Installation - Coat outer edge of seal with non-hardening gasket sealer and lubricate sealing lip with rear axle lubricant. Position seal in carrier and place Seal Installer J-8436 against seal and secure with pinion nut and washer. Install Socket J-2571-1 on pinion nut and press seal into carrier by tightening nut with socket wrench. Remove socket tool, pinion nut and washer, and seal installer. Install yoke on pinion shaft splines with punch marks up. Install pinion nut, holding flange of yoke with Pinion Yoke Holding Tool J-6544. Tighten pinion nut until proper preload is attained. Preload is attained when inch pounds torque required to rotate pinion shaft is 2 to 5 lbs. greater than the torque required to rotate shaft prior to seal and yoke removal above. *NOTE - It is necessary to remove Yoke Holding Tool J-6544 to install 50 inch pound torque wrench.* Tighten nut approximately ½ turn and check torque. Repeat this operation until proper torque is obtained but do not overtighten or back off nut to reduce preload. Maximum allowable torque on an assembly with over 1,000 miles is 15 inch lbs. (used seal) or 20 inch lbs. (new seal). The torque of a new assembly is 50 inch lbs.

Rear Axle Backlash: To measure rear axle assembly backlash, raise car on hoist and fasten one end of piece of bar stock to yoke on pinion shaft and the other end to frame side rail by means of a "C" clamp, to prevent rotation of drive shaft. Apply brake cable at one wheel to hold wheel stationary, and measure movement of outer circumference of opposite tire tread. A stiff wire pointer fastened to fender of car will aid in this measurement. Maximum backlash at tire tread should not exceed ½".



CADILLAC REAR AXLE ASSEMBLY

CHEVROLET TRUCK HYPOID

Chevrolet Truck ¾-Ton (1961)①
Chevrolet Truck 1, 1½, 2-Ton (1961)②

① - Torque-arm drive. ② - Hotchkiss drive.

DESCRIPTION: Full-floating, hypoid gear type, with "straddle" mounted pinion shaft (rear end of pinion shaft is supported in carrier housing on a roller bearing). ¾-ton, 1-ton, 1½-ton & Std. Duty 2-ton trucks have double row ball bearing on pinion shaft assembly. Heavy Duty 2-ton trucks have two tapered roller bearings (one-piece outer race) on pinion shaft. The ring gear thrust pad has been eliminated from the ¾ & 1-ton trucks. ¾ & 1-ton trucks have flange type axle shafts bolted to wheel hub. Other trucks have a splined type axle shaft with splines fitted into splines in wheel hub.

Axle Ratio Identification ①

Ratio	Identification
4.57 (32-7) Std.	MH (C20), MK(K20)
4.57 (32-7) Optl. (H.D.,3,4-Speed)	MJ(C20)
5.14 (36-7) Std.	ML(P20),PA(C30),PC(P30)
5.14 (36-7) Optl.(H.M.,H.D. 3,4-Speed)	MN(P20)
5.14 (36-7) Optl.②	PB(C3602,03,09,12),PK(P30)
6.17 (37-7) Std.	PD(C40),PE(C,L,S50;S62,64)
7.20 (36-5) Std.	PF(C,L60;S67)
7.20 (36-5) Optl.	PF(S62,64);PH(C.L.,S60)

① - Stamped as prefix to Unit No. on Carrier Housing.
② - Dual Wheels.

Axle Shaft Removal (Series 20,30): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Use new gasket when installing shaft.*

►*CAUTION:* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft. *Grease at this point will cause loosening of axle shaft flange capscrews.*

►*AXLE SHAFT NOTE:* Shafts unequal length (right shaft longer than left). Install in correct position.

Axle Shaft Removal (Series 40,50,60): Remove hubcap, then thread Tool J-1436-1 into hole in axle shaft and use slide hammer to remove shaft.

NOTE - When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►*AXLE SHAFT NOTE:* Some models have different length axle shafts. Install longer shaft on right side.

Wheel Bearing Adjustment: Remove wheels and axle shafts see above, bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten inner adjusting nut to 50-65 ft. lbs. (Series 20 & 30), 75-100 ft. lbs. (Series 40,50,60), with special wrench J-2222 (Series 20 & 30), J-870 (Series 40), J-5670(Series 50 & 60) while turning hub, then back off nut 1/8 turn. Check hub for free turning, install adjusting nut lock with tangs aligned with adjusting nut slots, bend tang into adjusting nut slot. Install outer locknut and tighten securely, then bend lock tang down into notch in locknut.

DIFFERENTIAL CARRIER: Removal - Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal above. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier on floor jack and roll from under car.

OVERHAUL: *See "Chevrolet Truck Hypoid" in 1960 Annual Data or later Manual edition and note the following.* **On ¾-Ton & 1-Ton,** the bearing spacer has been eliminated and a double row ball bearing used in place of tapered rollers. Same tool used to remove bearing. Replace double row bearing with a press and 2" pipe of suitable length, pressing against inner race. **On 1½-ton & 2-ton,** press oil seal into retainer with seal lip toward pinion bearing, until it is a minimum of .12" below top of seal bore. This compresses and spreads felt packing to assure proper sealing around pinion drive flange.

LANCER & VALIANT HYPOID

Dodge Lancer (1961)
Valiant (1961)

DESCRIPTION: Semi-floating, hypoid gear type with differential carrier integral with rear axle housing.

Axle Ratios

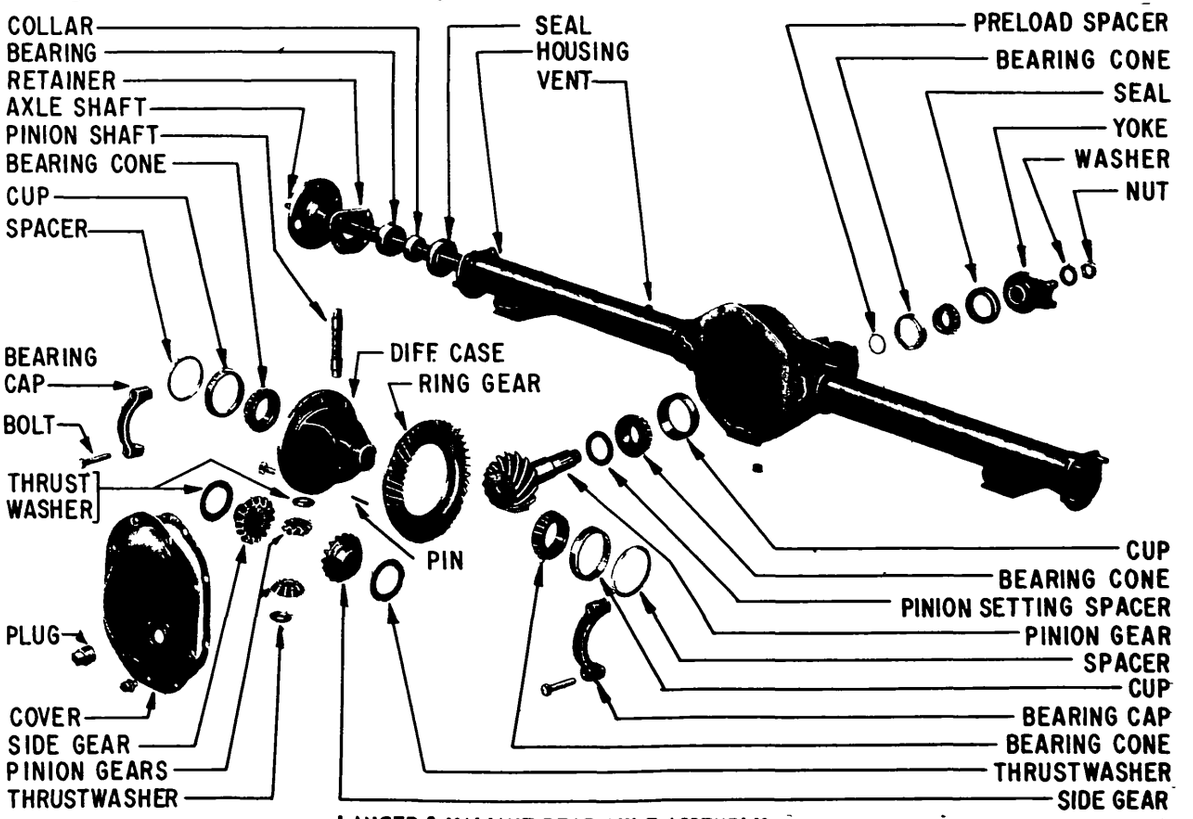
Trans.	Standard Ratio	Optional Ratio
Synchro-mesh	3.55-1 (39-11)	3.23-1 (42-13)
TorqueFlite	3.23-1 (42-13)	3.55-1 (39-11)

Axle Shaft Removal: Remove wheel and drum. Disconnect brake line at wheel cylinder. Work through axle shaft flange to remove retainer nuts and use Puller C-3725 to pull axle shaft and rear brake assembly. Carefully remove brake assembly from axle shaft without damaging seal contact area. Remove seal from housing. Use same tool to remove bearing from axle shaft (when necessary to replace bearing). Removal damages bearing.

Rear Axle Assembly Removal: Raise car and support body at front of rear wheels. Block brake pedal up. Remove rear wheels and disconnect hydraulic flex line. Disconnect parking brake cable at transmission and propeller shaft at yoke. Remove spring clips (U bolts) and shock absorbers. Remove assembly from beneath car.

OVERHAUL: *See "Valiant Hypoid" in 1960 Annual Data, Page 356, or later Manual edition.*

Pinion Bearing Preload: Service procedure remains the same with change in specification only. *NOTE* - Wrench should be moving with nose of carrier up to obtain accurate reading of 15-25 inch pounds (New bearings), 0-13 inch pounds (used bearings) without seal.



LANCER & VALIANT REAR AXLE ASSEMBLY

CHRYSLER CORP. HYPOID

Chrysler, Imperial, DeSoto, Dodge, Plymouth (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*CHRYSLER BEARING NOISE (37-65 MPH) CAUTION:* DO NOT disassemble rear axle carrier, for humming or whining noise, until after checking the following items for source of noise. 1) Side grille bar whistle. 2) Tire tread noise. 3) Front wheel bearings. 4) Propeller shaft center bearing. 5) Axle shaft endplay or noisy bearings.

►*REAR AXLE HOUSING PRODUCTION & DRAIN PROCEDURE CHANGE:* Drain plug eliminated on later cars. Use suction gun and hose to remove lubricant.

►*CHRYSLER REAR AXLE LUBRICANT LEVEL CHECKING CAUTION:* Accurate level of lubricant can only be determined when weight of car is on wheels (on floor or on wheel type hoist).

►*REAR SPRING "U" BOLT TORQUE SPECIFICATION CHANGE:* Torque specification reduced to 50 lbs., superseding all previous specifications, to reduce possibility of damage to axle shaft bearings.

DESCRIPTION: Design is same as used on previous models. "Sure-Grip" Diff. optional. *See "Power-Lock Diff. ("Belleville" & Plate Clutch Type)".*

►*DIFFERENTIAL TYPE & RATIO IDENTIFICATION:* Ratio stamped on identification pad on carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad or by a metal tag marked "Use Sure-Grip Lube", attached to carrier housing bolt.

Axle Ratios: Used as follows: *NOTE* - Both conventional and "Sure-Grip" differentials used with same ratio.

Dodge, Dart & Plymouth Ratios

Model ①	Standard Ratio	Optional Ratio
6 Cyl. SM	3.54-1 (39-11)	②3.90-1 (39-10)
6 Cyl. TF6	3.31-1 (43-13)	3.54-1 & 3.90-1
318" SM	3.58-1 (43-12)	3.91-1(43-11)
318" PF	3.31-1 (43-13)	3.58-1 (43-12)
318" TF	2.93-1 (41-14)	3.31-1 & 3-58-1
361" 2-Bbl., SM	3.23-1 (42-13)	③
361" 2-Bbl. TF	2.93-1 (41-14)	3.23-1 (42-13)
361" Dart D-500	3.31-1 (43-13)	
361", 383" All Trans.		③

① - SM-Synchro-mesh; TF6 - TorqueFlite Six; PF-PowerFlite; TF - TorqueFlite.

② - 3.31-1 (43-13) Std. on Plymouth Taxi & H.D. Package.

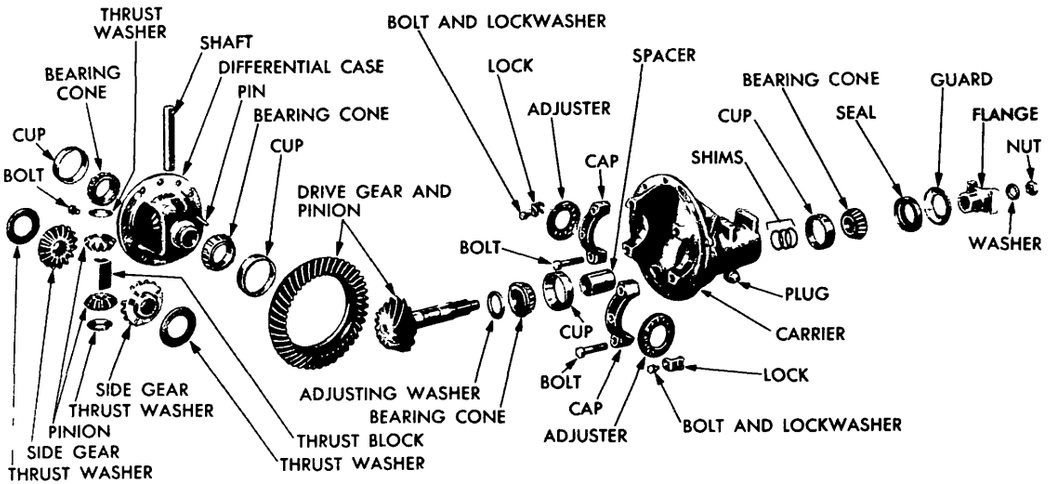
③ - 2.93 (41-14), 3.15 (41-13), 3.23 (42-13), 3.31-1 (43-13), 3.58-1 (43-12), 3.91-1 (43-11), 4.1-1 (41-10), 4.56-1 (41-9), 4.89-1 (44-9).

Chrysldr, Imperial, DeSoto Ratios

Model	Standard Ratio	Optional Ratio
361", 383" SM	3.23-1 (42-13)	
361", 383" Auto. Trans.	2.93-1(41-14)	3.23-1 (42-13)
413" N.Y. & Imp.	2.93-1 (41-14)	① 3.23-1 (42-13)
413" 300 G SM		②
413" 300G Auto. Trans.	3.23-1 (42-13)	

① - New Yorker only.

② - 3.15 (41-13), 3.23 (42-13), 2,93 (41-14), 3.58 (43-12), 3.73 (41-14).



CHRYSLER CORP. HYPOID REAR AXLE ASSEMBLY

AXLE SHAFT REPLACEMENT & ENDPLAY ADJUSTMENT: Loosen brake shoe cams and remove rear hub and drum assemblies with Puller, Tool C-845. *(NOTE - Do not attempt to remove brake drums by hammering on end of axle drive shaft as damage to bearings and thrust block will result).* Disconnect brake line at each cylinder and remove brake support plates and dust shields as assemblies. Remove axle shaft keys and install Tool C-745 to protect outer axle seal. Remove shim pack between brake backing plate and axle housing flange. Pull axle shaft with Puller C-499. Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637, and brake dust shield outer seal with Driver C-3565. Clean all parts and inspect for wear or distortion. To install, reverse removal procedure, then adjust axle shaft endplay (see below).

Endplay Adjustment: Install shims totaling .040" at one end of axle housing (shims are available in .005", .010", .0125", .015", .030" thicknesses). Lubricate bearing and install the axle shaft, bearing and cup, then using Tool C-413, drive bearing cup into axle housing until tool bottoms tightly against the shims. Remove tool and install dust shield, lockwashers and nuts. Tighten nuts to 30-35 ft. lbs. Working from opposite side of axle housing, install other axle shaft with bearing until inner end of shaft contacts the axle shaft thrust block. Lightly tap end of axle shaft with a fibre mallet to insure shaft is contacting the thrust block (opposite shaft will be forced away from thrust block to its full travel). Install bearing carefully until no axle shaft endplay exists without preloading the bearing (rotate shaft during bearing installation to check against preload). At this point the bearing cup will protrude beyond face of axle housing flange. Hold Tool C-413 firmly against bearing cup and measure the distance between end of tool and flange with a feeler gauge. To obtain the correct endplay of .013-.018", add .013" shims to the above measurement *(NOTE* - If this gives a total thickness of shims that cannot be built up from the existing shims, use the next larger shim combination). Remove tool and install total shim pack and brake dust shield. Tighten nuts to 30-35 ft. lbs.

DIFFERENTIAL CARRIER ASSEMBLY REMOVAL & INSTALLATION: Raise car and block brake pedal so it cannot be depressed. Drain differential housing, then back off brake shoes with Tool C-845. Remove axle shafts (see above). *(NOTE - Retain shims found at each end of rear axle housing and mark them for reassembly in the sam location).* Disconnect rear universal joint and drop the propeller shaft. Remove bolts attaching carrier to housing and remove the carrier assembly. To install, reverse removal procedure.

OVERHAUL: *See "Chrysler, DeSoto, Dodge, Plymouth Hypoid" in 1957 Annual Data or lat r manual edition and note the following.*

Drive Gear Backlash - .006-.009".

Pinion Rear Bearing Rem val - To remove rear pinion bearing, use Tool C-293 and four No. 37 Adapters (Pinions without spacers), four No. 36 Adapters (Pinions with spacers except Imperial), four No. 26 Adapters (Imperial).

Pinion Bearing Preload - (All Mod ls) - Preload should be 29-30 inch lbs. (New bearings), 0-15 inch lbs. (Used bearings).

Pini n Setting & B aring Preload Adjustm nt (Cars With ut Spac r n Pini n Shaft): Adjustment procedures for this type rear axle assembly are the same as for Chrysler New Yorker and Imperial as indicated in 1957 Annual Data or later Manual edition.

FORD & MERCURY "DEEP-OFFSET" HYPOID

Ford Pass. Cars (1961)
Ford Thunderbird (1961)
Ford F–100 Trucks (1961)①
Mercury (1961)

①—Spicer Model 44 used with Power–Lock Differentials.

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 MERCURY REAR AXLE LUBRICANT NOTE:* Use Lubricant C1AZ–19580–B (SAE 90), Ford Specification No. M2C49B and C1AZ–19580–A (SAE 80) Ford Specification No. M2C49A (Exc. cars with 390" Eng.) C1AZ–19580–E, Ford Specification M2C50B (Cars with 390" Eng.), when adding or replacing lubricant.

►*1961 MERCURY DIFFERENTIAL ASSEMBLY PRODUCTION CHANGE & PARTS USAGE CAUTION:* Parts for early and late type differential assemblies are not interchangeable except as indicated below. Late type have thicker side gears with distance between base of gear teeth and flange thrust face increased. Pinion gears to match side gears changed accordingly. Thrust surfaces in case (for thicker gears) moved outward .032". New type assembly identified by yellow paint mark. Always use two thrust washers (each side) when installing older type side gears in new type case to insure proper gear meshing.

►*1961 MERCURY 3.00–1 RATIO INSTALLATION NOTE:* This is a "Non–hunting" type gear tooth design with reference mark painted on a pinion tooth and a mating tooth of ring gear. Mate marks when assembling to maintain quiet operation.

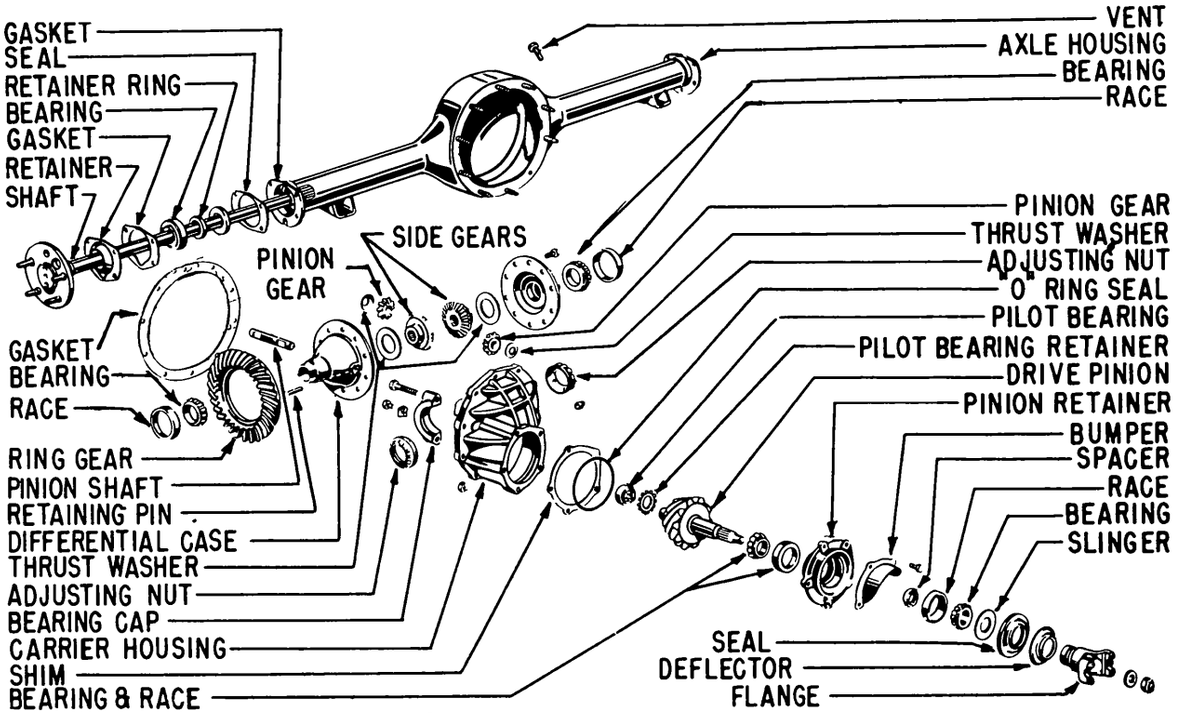
►*1961 MERCURY REAR AXLE SHAFT BEARING NOTE:* Lubricate bearing bores in housing with Lubricant C1AZ–19590–A (ball joint grease), at any time axle shafts are removed to prevent corrosion.

DESCRIPTION: Banjo type housing, semi–floating type with "deep–offset" straddle mounted drive pinion. A separate differential assembly is used which can be removed for overhaul without removing rear axle assembly from car.

Axle Ratio & Identification Note: Ratio Code stamped under **Axle** on Patent Plate on left front body pillar. Axle ratios stamped on tag located under carrier to housing nut.

Axle Ratio	Standard – Code –	Power–Lock
2.91	8	H
3.00	6	F
3.10	3	C
3.20	5	
3.50	J	
3.56	1	A
3.89 Pass	2	B
4.00	4	
3.22	10	
3.70	11	
3.89 Truck	12	
4.11	13	

Axle Shaft Replacement: Remove wheel and tire from brake drum, then remove drum from flange. Work through hole in flange to remove wheel bearing retainer nuts and pull axle shaft with Tool 4235–N (Ford), 4235–C (Mercury) and T50T–100–A. Install one backing plate nut to hold plate in place.



FORD & MERCURY REAR AXLE ASSEMBLY

Axle Seal & Bearing Replacement: Nick bearing retainer with chisel to loosen it so it can be removed from shaft. Remove bearing with Tool T60K–1225–A (Ford Pass. & Truck), OCT–951 (T'Bird), 1225–D (Mercury). Install new bearing with same tools used to remove bearing (Ford Pass. & Truck, T'Bird), 4234–4 (Mercury). Use same tools to install retainer as used to install bearing. Remove seal with 1175–AE or 1175W (Ford Pass., T'Bird, & Mercury), 1175–AB (Truck), and install new seal with 1177 or 1177N (Ford Pass., Truck, T'Bird), 4245–B (Mercury).

OVERHAUL: *See "Ford & Mercury (Deep Offset) Hypoid" in 1957 Annual Data or later Manual edition and "Edsel & Ford Equa–Lock Differential" in 1959 Annual Data or later Manual editions and note the following:*

Four Pinion Differential: Disassembly – Same as for two pinion differential except as follows After removing differential assembly from carrier, drive out three differential pinion shaft retainers with drift and separate. Drive out long pinion shaft from end opposite retainer hole. Remove two short pinion shafts, driving each from center outward. Lift out center block and remove gears and thrust washers.

Reassembly – Place a thrust washer and side gear in differential case bore. Install four thrust washers and place pinion gears on side gear. Align washers and pinion gears with pinion shaft holes in case. Install center block so its four small diameter holes are aligned with holes in pinion gears and case. Use brass drift to drive in two short pinion shafts from outside of case. *NOTE – Align shaft retainer holes as each shaft is driven in place.* Drive long pinion shaft into place from retainer hole end of case (align shaft retainer hole with that in case). Place second side gear and thrust washer on top of four pinion gears, then install differential case cover so that the three shaft retainer holes in cover align with their corresponding holes in case. Install the three shaft retainer pins with a drift. A pinion or axle shaft can be inserted in the side gear spline to check free movement of gears.

►*SPECIAL TOOL NOTE:* Tools listed below supplement tools listed in "OVERHAUL" data.

Differential Side Bearing: Remover – T57L–4220–A (Ford), 4221–AE (Mercury).
Installer – T57L–4221–A (Ford), 4222–K (Mercury).

Pinion Pilot Bearing: Remover – T57L–4625–A and T53L–200–A (Ford), T4225–L (Mercury).
Installer – Same as remover (Ford), T46L–25 KA and T4625–K (Mercury).

Pinion Preload Indicator: Use inch–pound torque wrench.

Pinion Oil Seal: Remover – 1175AE or W (All).
Installer – T58L–4676–A (Ford), 4676–F (Mercury).

Pinion Front Bearing Cone: Remover – T57L–4614–A (Ford), Arbor Press and Plates (Mercury).
Installer – T57L–4621–B and T57L–4614–A (Ford).

Pinion Bearing Rear Cone: Remover – CJ–950 or OTC–951 (Ford), 4621–K (Mercury).
Installer – T57L–4614–A & T57L–4621–B (Ford), 4621–L (Mercury).

Pinion Front Bearing Cup: Remover – T57L–4614–A (Ford), 4615–D–1 & 1202–D (Mercury).
Installer – T57L–4614–A & T57L–4616–A (Ford), 4615–E (Mercury).

FORD ECONOLINE TRUCKS, COMET & FALCON HYPOID

Comet (1961)
Falcon (1961)
Econoline Trucks (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*PARTS REPLACEMENT CAUTION: When replacing rear axle assembly parts, make sure part being installed is same as the part that was removed. Rear axle assemblies are different for the various car models and all parts are not interchangeable.*

►*RING GEAR & PINION INSTALLATION CAUTION (3.50–1 & 4.00–1 RATIOS):* These ring gear and pinion assemblies are the "non–hunting" type (pinion gear teeth mesh with same ring gear teeth) and it is important that marked tooth on pinion gear be meshed with marked tooth on ring gear.

►*AXLE SHAFT REMOVAL NOTE:* To prevent corrosion due to moisture in rear axle housing wheel bearing bores, it is recommended that bearing bores be lightly coated with ball joint lubricant, Part No. C1AZ–19590 –A, any time rear axles are removed.

►*PINION BEARING PRELOAD CAUTION: Rear universal joint companion flange nut controls pinion bearing preload. If this nut is loosened, pinion bearing preload must be adjusted.*

DESCRIPTION: Semi–floating, hypoid gear type with an integral type housing and Hotchkiss drive. Design is same as used on previous models.

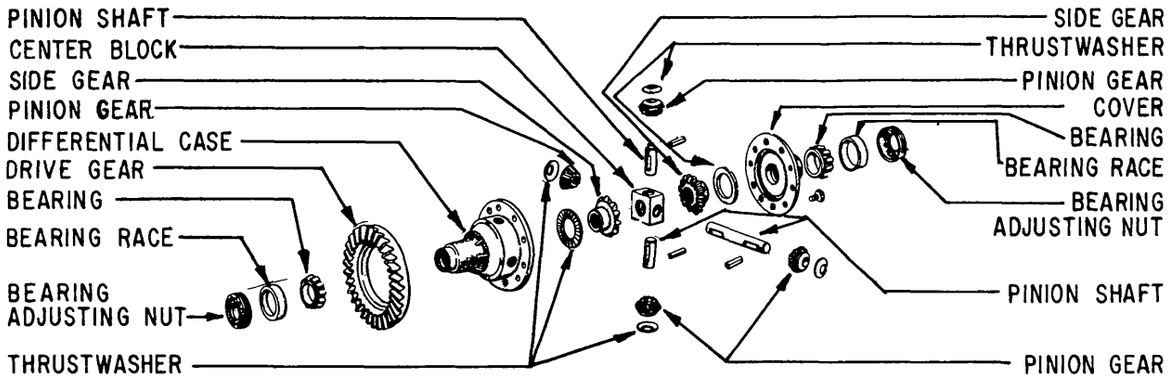
►*AXLE IDENTIFICATION & RATIO NOTE:* Ratio code is stamped under "Axle" on Patent Plate located on rear face of left front door inner panel.

Axle Ratio Code

Code	Axle Ratio
3 (Comet & Falcon)	3.10–1
4 (Comet & Falcon)	4.00–1
5 (Comet & Falcon)	3.20–1
J (Comet & Falcon)	3.50–1
01 (Econoline Truck)	3.50–1
02 (Econoline Truck)	4.00–1

AXLE HOUSING ASSEMBLY: Removal – Raise vehicle and support it on the underbody, then loosen carrier rear cover and drain lubricant. Disconnect drive shaft at pinion flange and shock absorbers at axle housing. Remove both axle shafts (see below). Remove hydraulic brake "T" connection from axle housing (do not open hydraulic brake system line), then remove brake line from retainer clip on housing. Remove both brake backing plates from housing and support them out of way with wire. *CAUTION – Be careful not to damage brake lines or cables.* Support axle housing on a jack, then remove spring plates and "U" bolts. Remove axle assembly from under car.

Installation: Reverse removal procedure and tighten spring "U" bolt nuts to 13–20 ft. lbs.



FORD ECONOLINE TRUCK DIFFERENTIAL CASE

AXLE SHAFT: Removal – Remove wheel assembly from brake drum, then back off rear brake shoe adjustments. Remove brake drum–to–axle shaft flange nuts and remove. Working through hole in axle shaft flange, remove nuts securing wheel bearing retainer, then remove axle shaft from axle housing using a suitable "sliding hammer" type puller. *CAUTION – Do not dislodge brake backing plate. Use a single nut to hold plate in position after removal of axle shaft.*

Bearing & Seal Replacement – Remove seal from axle housing with a suitable puller. To remove bearing from shaft, nick bearing retainer deeply with a chisel, using care not to damage shaft, and remove retainer. Press bearing from axle shaft using an arbor press and a suitable tool to hold and support bearing. When installing seal in axle housing, coat outside edges of new seal with sealing compound, then install seal in housing with Tool 1177–B (Comet), T61E–1190–B1 (Falcon & Econoline Truck) making sure sealing lips point inward and that seal is seated against shoulder in housing. Install outer bearing race on shaft, then press new bearing on shaft, seating it firmly against shoulder. Press a new bearing inner retainer onto shaft, seating it firmly against bearing. *CAUTION – Do not attempt to press bearing and inner retainer on shaft at the same time.*

Installation: Reverse removal procedure and tighten bearing retainer mounting nuts to 30–35 ft. lbs.

OVERHAUL: *See 1960 Annual Data, Page 352, or later Manual edition and note the following:*

Differential Case (Two–Piece Type): Disassembly – Use a suitable puller and remove differential side bearings, then remove bolts attaching drive gear to differential case. Press drive gear from case or tap it off with a hammer. On passenger cars, drive out the single pinion shaft retainer and separate two–piece differential case. Drive out pinion shaft with a brass drift and remove gears and thrust washers. On Trucks, drive out the three pinion shaft retainers and separate differential case. With a brass drift, drive out long pinion shaft (drive from end opposite retainer hole), then remove two short pinion shafts (use a brass drift and drive from center outward). Lift out center block, then remove gears and thrust washers.

Reassembly – Place a thrust washer and side gear in differential case bore. *NOTE – Lubricate all parts with rear axle lubricant as they are assembled.* On passenger cars, drive pinion shaft into case with a soft hammer far enough to support a pinion thrust washer and pinion gear, then install thrust washer and slide pinion gear onto shaft and mesh with side gear. Place second pinion gear and thrust washer in position, and drive pinion shaft all the way into position. *NOTE – Be sure to align shaft retainer holes as shaft is being driven in.* Place second side gear on top of two pinion gears, then position thrust washer and install differential cover so shaft retainer hole in cover is aligned with hole in case. On truck models, install four pinion thrust washers, and place pinion gears on side cover, then align washers and pinion gears with pinion shaft holes in case. Install center block so that its four small diameter holes are aligned with holes in pinion gears and with holes in case. Use a brass drift and drive the two short pinion shafts into center block, being sure to align shaft retainer holes as each shaft is driven into place. Drive long pinion shaft into place from retainer hole end of case, being sure to align retainer hole with hole in case. Place second side gear and thrust washer on top of the four pinion gears and install differential case cover so that the three shaft retainer holes are aligned with holes in case. On all models, install shaft retainer pins with a drift (one on passenger cars and three on truck models). *NOTE – A pinion or axle shaft spline can be inserted in side gear splines to check for free rotation of differential gears.* Place drive gear on differential case and tighten bolts to 40–50 ft. lbs.

FORD TRUCK "BANJO HOUSING" HYPOID

F-350, P-400 (1961) Ⓒ
B,C,F,P-500 & 600 (1961) Std.

Ⓒ - "Single Casting" type carrier assembly.

►*DIFFERENTIAL SIDE BEARING NOTE: Right hand bearing and adjusting nut is larger than left hand bearing and adjusting nut. The larger right hand bearing cone has 19 rollers and the smaller left hand bearing cone has 22 rollers.*

►*1961 FORD REAR AXLE LUBRICANT NOTE:* Rear axle lubricant should be changed after first 8,000 miles (on or off highway) and at each 32,000 mile interval thereafter.

DESCRIPTION: Full floating, hypoid gear type with Hotchkiss drive.

►*REAR AXLE NOTE: Different model axle assemblies are used for the different model trucks. Assemblies used on F-350 & P-400 Series trucks have a single casting type diff rential carrier (other series trucks have a multiple casting carrier). Service procedure applies to all assemblies unless otherwise specified.*

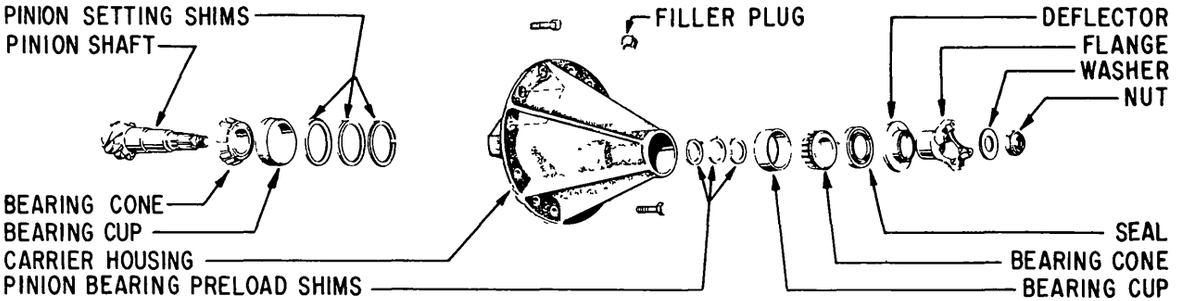
►*AXLE IDENTIFICATION CODE & RATIO NOTE:* Code (type of axle used) is located on Rating Plate on left front cab pillar or glove box door, see table below. Axle ratio tag located at various places by axle type as follows: **Timken** - On Rockwell Std. Serial No. Plate on right rear face of axle housing above brake line. **Eaton** - Stamped on carrier housing.

Truck Model	Axle Model	Code	Ratio
F-P-350,400	Timken B 140	25	4.86
F-B-P-500	Timken C 100	32	6.20
		34	6.80
F-B-P-500;C-550	Timken D 100	41	5.83
		42	6.20
		44	6.80
C-600	Timken F 104	52	6.20
		54	6.80
F-B-C-600	Timken F-106	62	6.20
		64	6.80
		66	7.20
F-B-C-600	Eaton 1614-15	53	6.50 or 7.17

Axl Shaft R plac ment: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

Axl Ass mbly R m val (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking brake cable (if equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring U-bolts, remove axle assembly.

Carri r R m val (Banj H using): Remove axle shafts (see above), disconnect drive shaft at rear joint flange.



FORD TRUCK (BANJO HOUSING) HYPOID "SINGLE CASTING" CARRIER ASSEMBLY

Support carrier assembly and remove carrier attaching bolts. Tighten puller screws (if provided) to loosen carrier from housing. Remove carrier.

Wheel Bearing Adjustment: Remove axle shafts (see above), use special bearing adjusting wrench and remove bearing locknut (outer nut), and lockwasher. Adjust bearings by turning bearing adjusting nut (inner nut) until tight, then back off 3/8 turn. Install bearing lockwasher. *NOTE - If adjusting nut equipped with dowel, make sure lockwasher fits over dowel.* Install bearing locknut and tighten. If flange type lockwasher is used, bend one flange over adjusting nut and one flange over locknut. Install axle shafts.

OVERHAUL: *See "Ford Truck 'Banjo Housing Type Rear Axle" in 1956 Annual Data or later Manual edition and note the following:*

►*OVERHAUL PROCEDURE NOTE (MODELS WITH "SINGLE CASTING" TYPE CARRIER ASSEMBLY):* Except as noted below, overhaul procedures for rear axle assemblies with this type carrier are the same as for "multiple casting" type carrier.

Disassembly: Pinion Shaft - With differential case assembly removed from rear axle housing, press pinion shaft out of flange, and out of pinion front bearing cone. Remove pinion bearing preload shims from pinion shaft (or from front bearing cone). Remove pinion flange oil seal with Tool T58L-101-A and T50T-100-A, then remove pinion rear bearing cup with Tool OTC-943 and 630-11. *NOTE - Use a micrometer and measure shim or shims which were installed under pinion bearing cup.* If pinion front bearing cup is to be removed, use a drift and drive it out of housing. Press pinion rear bearing cone from shaft using Tool T58L-101-A and T50T-100-A.

Pinion Setting: Pinion depth is adjusted by removing or installing shims located behind pinion rear bearing cup (between cup and carrier). **Increasing** the shim pack **decreases** pinion and drive gear assembled dimension. **Decreasing** the shim pack **increases** pinion and drive. gear assembled dimension. When a new pinion and ring gear are installed, check the markings on both old and new pinion and adjust pinion locating shim pack accordingly. A plus (+) marked pinion requires removal of shims in amount of the marking. A minus (−) marked pinion requires additional shims in amount of the marking. *;NOTE - B fore pini n is install d, check f r a backlash marking which may be tch d on pinion splin .*

Pinion Installation & Bearing Preload Adjustment: 1) Place pinion rear bearing cup shim pack in bore in carrier housing and press cup into case with Tool T53T-44807-B and arbor press. Check installation of cup by trying to insert a .0015" feeler gauge under cup. If pinion front bearing cup removed, install cup with Tool T53T-44807-B. If the new pinion being installed, add or subtract from original pinion bearing preload shim pack, then same amount in thousandths of an inch that was added or subtracted from shim pack behind pinion rear bearing cup.

2) Place Tool T53T-44807-B on press bed with open end upward, then place pinion front bearing cone on tool with tapered rollers pointing upward. Center bearing on tool. Place carrier housing with front end down, on pinion front bearing cone (carrier housing is now resting on pinion front bearing cones and rollers). Hold housing in this position and start pinion shaft (with rear bearing cone and preload shims in place) into pinion front bearing cone. Lower ram of press and press pinion shaft into front bearing cone. As pinion shaft is pressed into position, rotate carrier housing in both directions so bearing rollers seat properly. Gradually increase ram pressure with case still rotating and "feel" for preload on bearings.

3) As soon as slight preload is felt, install a bolt in differential bearing support pedestal which is nearest to pinion gear, then; using a pound pull scale hooked to pedestal bolt, rotate case by pulling on scale. Keep scale at right angles to a line through center of pedestal bolt and through center of pinion gear. Note reading on scale while carrier is steadily rotated (disregard pull required to start carrier rotating). *NOTE - Th distance from center of pedestal bolt to center of pinion gear is approximately 2½". The scale reading in pounds, multiplied by 2½" (radius) is the actual pinion bearing preload.* Specified pinion bearing preload is 5 to 15 inch pounds with 5000 lbs. pressure applied (minimum scale reading should be 2 lbs., and maximum scale reading should be 6 lbs.). To **increas** preload, decrease the preload shim pack thickness. To **decrease** preload, increase shim pack thickness.

4) Adjust shim pack thickness as required, then press a new pinion flange seal into carrier housing with Tool T56T-4676-A. Support pinion gear on press bed and press pinion shaft flange into position with Tool T53T-4851-B. Remove carrier assembly from press and mount it in an overhaul stand, then install flat washer and nut on pinion shaft. Hold pinion flange and tighten shaft nut to 200-275 ft. lbs.

FORD TRUCK "INTEGRAL HOUSING" HYPOID

Ford F-250, 350 & P-350, 400 Trucks (1961)

DESCRIPTION: Spicer Models 60 & 70. Full-floating, hypoid gear with Hotchkiss drive. This axle does not have a separate carrier assembly. "Power-Lock" Differential Optional on F-250.

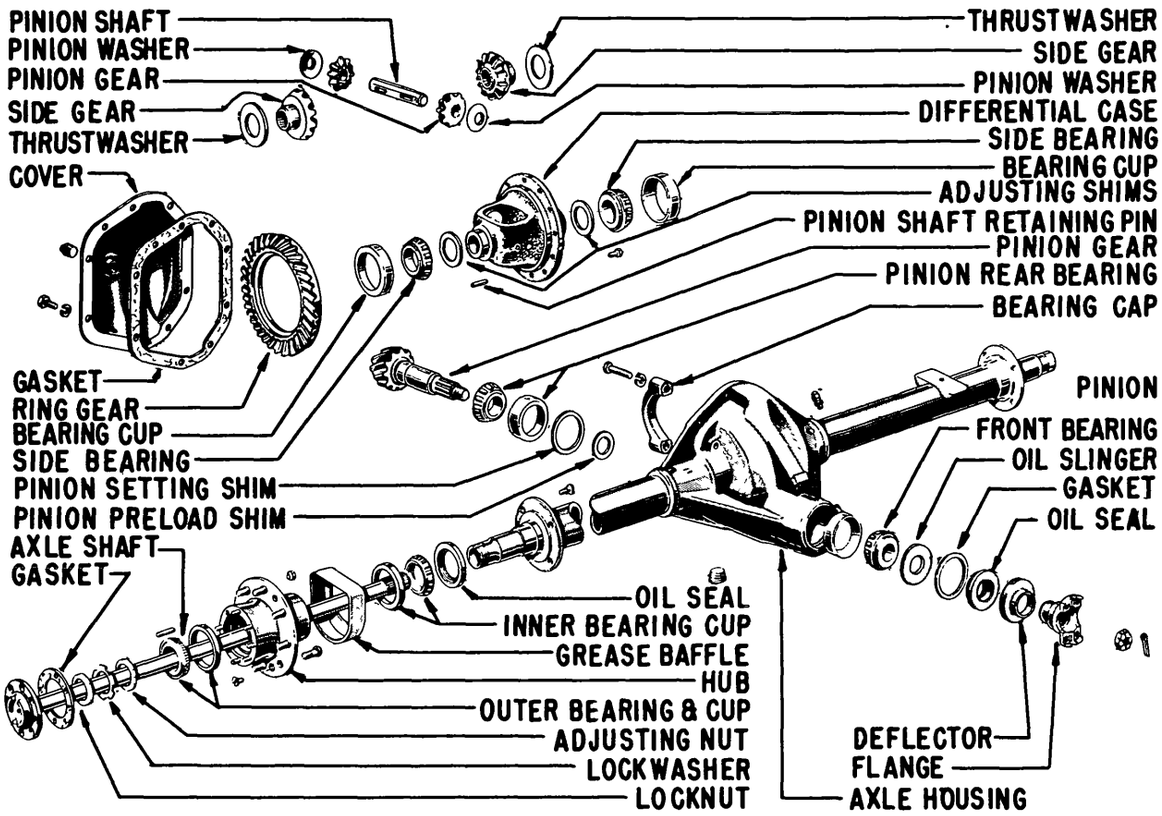
►*AXLE IDENTIFICATION CODE & RATIO NOTE:* Code (type of axle used) is located on Rating Plate on left front cab pillar or glove box door, see table below. Axle ratio tag on differential housing cover.

Truck Model	Axle Model	Code	Ratio
F-250	Spicer 60	B4②	4.56
F-250	Spicer 60	B6②	4.88
F-250	Spicer 60	24①	4.56
F-250	Spicer 60	26①	4.88
F-350,P-350,400	Spicer 70	22①	4.88
F-350,P-350,400	Spicer 70	23①	5.13
F-350,P-350,400	Spicer 70	29①	5.87

① – Regular. ② – Locking type.

AXLE SHAFT & WHEEL BEARING REPLACEMENT: Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing. Remove axle shaft stud nuts. Loosen dowels by striking drift at center of flange and remove dowels and axle shaft. Remove seal assembly from studs and wiper from housing tube (if so equipped). Remove locknut, lock washer and adjusting nut. Place wheel type jack under wheels and relieve load on bearings. Remove outer bearing cone and pull wheel off axle. Use hard wood block to drive outer bearing cone and inner seal out of hub. If bearing cups to be replaced, drive them out with a drift. Use Tool T53T-1239-A and Detail 17 to replace cups. *NOTE – Pack bearing grease on both sides of each cup.* Place each bearing cone and roller assembly into wheel hub then install new inner seal with Tool T53T-1175-D (F-250, P-350), T53T-1175-B (F-350). Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal. Install outer bearing cone and adjusting nut. Torque adjusting nut to 50-80 ft. lbs. while rotating wheel in both directions, then back off nut 3/8 turn and install lockwasher. *NOTE – When adjusting nut has locking dowel, dowel must enter lock washer hole closest to dowel. When equipped with tabs, run locknut against lockwasher and bend tab of nut.* Torque locknut to 100-150 ft. lbs. Wheel will rotate freely with .001-.010" endplay. Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets removed). Install axle shaft.

REMOVAL OF REAR AXLE ASSEMBLY: Loosen wheel stud nuts and axle shaft nuts. Disconnect rear shock absorbers from spring seat caps. Raise rear end of vehicle frame to remove weight from springs and place stands under frame. Disconnect hydraulic line at frame, parking brake cable (if so equipped) at equalizer and remove cables from support brackets. Disconnect drive shaft at universal joint and remove nuts from "U" bolts and remove spring seat caps. Roll axle from truck and drain lubricant.



FORD F-250 & P-350 TRUCK REAR AXLE

OVERHAUL: *See Ford Truck Hypoid in 1957 Annual Data or later Manual edition and note the following:*

Pinion Depth Setting Note: After pinion is installed in housing and preload is within limits, check depth setting (actual assembly dimension) with Depth Gauge using the large discs. Place dial indicator on high step. Nominal setting is 3.125".

Pinion Bearing Preload Shim Pack: When original shim pack is lost or questionable, use a .065" shim pack for trial build up.

1961 Spicer Pinion & Differential T ls

Tool	Numb r
Housing Spreader	4000-A (Altered)
Diff. Brg. Remover	T56L-400-A
Diff. Brg. Replacer	T53T-4221-C
Pinion Flange Remover	T56L-4851-C
Pinion Brg. Seal & Outer Cone Rem.	T58L-1001-A & T50T-100-A
Pinion Inner Cone Remover	①T56T-4630-C ②T56T-4630-A
Pinion Inner Cone Replacer	T53T-4621-C
Pinion Brg. Cup Remover	OTC-960
Pinion Brg. Cup Repl.	T53T-1239-A & T56T-4616-A & Details 1 & 2
Pinion & Flange Instl.	T53T-4851-B-2 & T56T-4851-A
Pinion Depth Gauge	T56T-4020-A
Pinion Flange Seal Repl.	T56T-4676-A

① – 4.55-1 ratio. ② – 4.88-1 ratio

FORD TRUCK TWO-SPEED REAR AXLE

F, B, P–500 & 600; C–550, 600 (1961)

DESCRIPTION: Two–speed planetary differential assembly with either a spiral bevel or hypoid ring gear and pinion. Spiral bevel pinion shaft is piloted at rear by a roller bearing. Shift control is electrically operated.

►*AXLE IDENTIFICATION CODE & RATIO NOTE:* Code (type of axle used) is located on Rating Plate on left front cab pillar or glove door, see table below. Axle ratio stamped on top of carrier housing below carrier assembly number.

Truck Mdl	Axl Mdel	Code	Ratio
P,B,C–500	Eaton 1350	D1	5.83/8.11
C–600	Eaton 13800	E1	5.83/8.11
	Eaton 13800	E2	6.33/8.81
F,B,C–600	Eaton 13802	F1	5.83/8.11
	Eaton 13802	F2	6.33/8.81
F,B,C–600	Eaton 16802,03	G3	6.50/9.04

AXLE SHAFT & WHEEL BEARING REPLACEMENT: Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing. Remove axle shaft stud nuts. Loosen dowels by striking drift at center of flange and remove dowels and axle shaft. Remove seal assembly from studs and wiper from housing (if so equipped). Remove locknut, lock washer and adjusting nut. Plate wheel type jack under wheels and relieve load on bearings. Remove outer bearing cone and pull wheel off axle. Use hard wood block to drive outer bearing cone and inner seal out of hub. If bearing cups are to be replaced, drive them out with a drift. Use Tool T53T–1239–A and Detail 17 to replace cups. *NOTE – Pack bearing grease on both sides of each cup.* Place each bearing and roller assembly into wheel hub, then install new inner seal with Tool T54T –1175–E(F,B,C–600). Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal. Install outer bearing cone and adjusting nut. Torque adjusting nut to 50–80 ft. lbs. while rotating wheel in both directions, then back off nut 3/8 turn and install lockwasher. *NOTE – When adjusting nut has locking dowel, dowel must enter lock washer hole closest to dowel. When equipped with tabs, run locknut against lockwasher and bend tab of nut.* Torque locknut to 100–150 ft. lbs. Wheel will rotate freely with .001–.010" endplay. Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets removed). Install axle shaft.

Axle Assembly Removal (Integral Housing): Loosen wheel and axle shaft stud nuts, disconnect shock absorbers, raise rear of frame until weight is off springs. Disconnect flexible hydraulic line at frame, parking brake cable (if so equipped) at equalizer, remove cables at brackets. Disconnect rear universal joint at flange, remove spring "U" bolts, remove axle assembly.

Carrier Removal (Banjo Housing): Shift axle into low ratio. Drain lubricant and remove axle shafts, see above. Remove electric shift unit from carrier housing. Disconnect drive shaft at rear universal joint flange. Support carrier on roller jack, then remove carrier to housing bolts and lockwashers (or stud nuts). Remove carrier from housing.

OVERHAUL: *See 1955 Annual Data Pg. 347 or later Manual edition.*

LINCOLN CONTINENTAL HYPOID

Lincoln Continental (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE "CHUCKLE" NOISE CORRECTION:* Caused by excessive differential side gear clearance. Before replacing side gears, road test car to be sure noise is not caused by shock absorbers, "U" joints or other components. To install new side gears, raise body, drain lubricant, remove axle shafts and differential cover. DO NOT DISTURB PINION SHAFT ASSEMBLY. Drive out small roll pin, push binion shaft partially out then rotate differential assembly 180° and pull pinion shaft, pinions side gears and washers from case. Examine side gear bores in case for wear, galling or scoring. If worn excessively replace case. If case OK, install NEW OVERSIZE side gears Part No. C1VV–4236–A which have .002" larger chrome plated hubs, and NEW Thrust Washers Part No. C1VY–4236–A, which are hardened. *NOTE* – When installing new case, be sure to measure side gear bore. There must be .002" clearance for lubrication and maximum clearance should not exceed .0035".

DESCRIPTION: Semi–floating hypoid gear type with integral carrier housing and Hotchkiss drive. Two types of "Directed Power" differentials (Cone Clutch & Plate Clutch) Optional. *NOTE* – 1961 rear axle models have a pinion nose bumper to control upward movement of pinion nose during acceleration, larger wheel bearings, and both axle shafts are the same length and interchangeable.

REAR WHEEL BEARING & SEAL REPLACEMENT: *Same as previous models except for Tool No. Changes. See 1961 Tools below.*

DRIVE PINION SEAL & COMPANION FLANGE REPLACEMENT: *Same as for previous models except for Tool No. Changes. See 1961 Tools below.*

REMOVAL: Raise car and place jacks at rear of spring hangers. Drain lubricant by loosening cover bolts. Mark drive shaft, universal joints, slip yoke and companion flange for reinstallation in original position to maintain drive line balance. Remove two "U" bolts at rear universal joint and slide drive shaft forward to remove shaft. Cover output shaft with Tool 7657–J to stop oil leakage from transmission. Remove wheels, brake drums, wheel bearing retainer nuts and pull axle shafts and bearings. Disconnect rear shock absorbers, then remove brake line to axle clips and bolt holding junction block to axle housing. Remove parking brake cable retainers from "U" bolts then remove backing plates and brake lines (wire them to body). Remove axle "U" bolt nuts, bolts and spring insulator retainers. Remove axle housing assembly.

►*AXLE IDENTIFICATION CODE & RATIO NOTE:* Code Number or Letter stamped on Patent plate under Axle located at front body pillar between hinges. Number 7 indicates std. axle, Letter "G", indicates a locking differential. Axle ratio is 2.89–1. Directed Power differential assemblies have an additional metal tag attached to cover bolts.

OVERHAUL: *See "Lincoln & Continental Hypoid" in 1959 Annual Data or later Manual edition and not the following Tool Numbers:*

1961 Lincoln Continental Tool Numbers

Item	Number
Grease & Oil Seal Remover	1175–AE
Axle Shaft Brg. Remover	1225–DA
Diff. Housing Spreader	4000–C
Pinion Depth Gauge	4020–B
Pinion Depth Gauge Block	4020–BA
Pinion Shaft Drive Nut	4201
Blacklash & Runout Gauge	4201–C
Diff. Assy. Bench Mount	4205–B
Axle Hsg. (Dummy) Bearings	4205–C
Pinion Tension Scale	4209–C
Diff. Side Brg. Remover	4221–C
Diff. Brg. Cones Remover	4222–H
Axle Shaft & Brg. Assy. Remover	4235–C
Wheel Brg. Seal Installer	4245–B
Pinion Front Brg. Cup Installer	4616
Pinion Brg. Installer	4621–A
Pinion Rear Brg. Remover	4621–BA
Pinion Rear Brg. Cup Installer	4628
Pinion Front Brg. Cup Remover	4628–B
Pinion Rear Brg. Cup Remover	4628–D
Pinion Shaft Oil Seal Installer	4676
Companion Flange Holder	4851–K
Companion Flange & Pinion Brg. Installer	4858–B
Companion Flange Remover	4858–D
Pinion Flange Nut Wrench	4858–G
Companion Flange Dust Shield Installer	4859

POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE)

Buick (1961) ⑤
Cadillac (1961)
Chevrolet Pass. Cars (1961) ①⑤
Chrysler & Imperial (1961) ⑥
DeSoto (1961) ⑥
Dodge (1961) ⑥
Ford F-100 & F-250 Trucks (1961) ②⑤
Lincoln (1961) ④⑥
Oldsmobile (1961) ⑤
Plymouth (1961) ⑥
Pontiac (1961) ⑤
Rambler V8 (1961) ③⑦
Studebaker (1961) ⑦
Willys (1961) ⑤

① - For Chevrolet ½-Ton Truck, see "Eaton Positraction Differential"
② - For Ford Pass Cars, see "Ford Equa-Lock Differential"
③ - For Rambler 6 Cyl Cars, see "Twin Grip Differential"
④ - For Early 1961 Lincoln Cars, see "Power-Lock Differential (Cone Clutch Type)"
⑤ - "Belleville" Type Assy
⑥ - Plate Type Assy (Early), "Belleville" Type Assy (Later)
⑦ - Plate Type Assy

►CHANGES, CAUTIONS, CORRECTIONS

►*1958-61 CHRYSLER & DODGE "SURE-GRIP" DIFFERENTIAL PLATE PRODUCTION CHANGE TO ELIMINATE "CHATTER" OR "CLUTCH SLIPPAGE":* Use service package Part No 2070845 consisting of two Belleville type clutch plates and two Belleville type clutch discs on each left and right side of unit The parts in each clutch assembly starting at side gear ring will be a flat coated plate No 2070825, a Belleville disc No 2070826 (coned side away from center of differential) a Belleville coated plate No 2070827 (convex side the same as No 2070826), a flat disc No 2070828, and a flat coated plate No. 2070829.

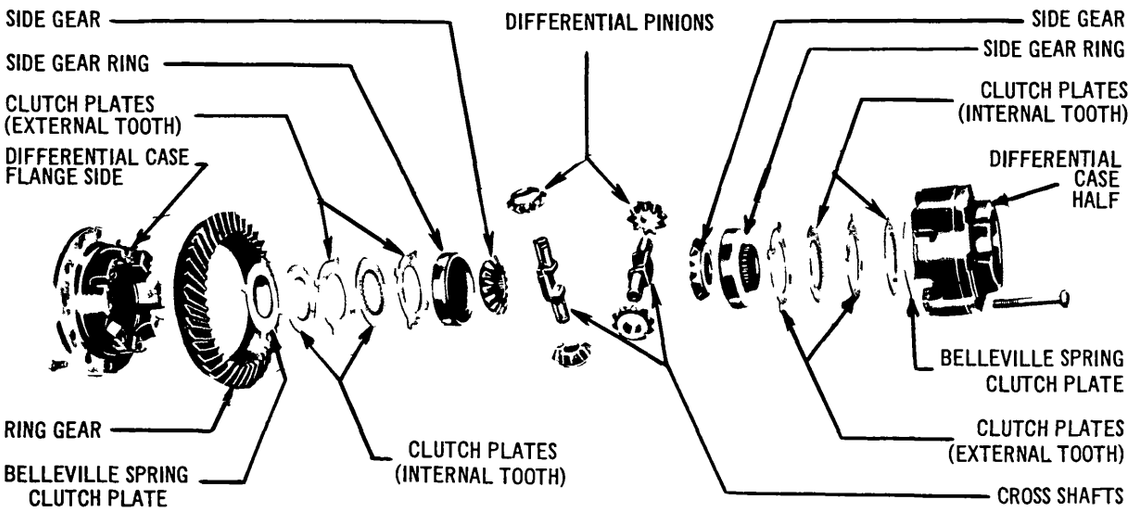
DESCRIPTION: Design is similar to that used on previous models The addition of "Belleville" type plates in differential clutch pack, on some models, has changed the checking and adjusting procedure for those models, as indicated in "Overhaul" below.

REAR AXLE ASSEMBLY REMOVAL: *See Car Model Rear Axle Data.*

AXLE SHAFT REMOVAL: *See Car Model Rear Axle Data. NOTE* - When making conversion from one model axle to another, use axle shafts with same splines as as differential side gears.

DIFFERENTIAL ASSEMBLY REMOVAL AND INSTALLATION: *See Car Model Rear Axle Data*

OVERHAUL: *See "Power-Lock Differential (Plate Clutch Type)" in 1959 Annual Data, or later Manual edition, and note the following.*



POWER-LOCK DIFFERENTIAL (WITH "BELLEVILLE" TYPE PLATES)

►*DISASSEMBLY CAUTION* Before removing Power-Lock Differential from rear axle housing for "CHATTER" correction, suck out all old lubricant from housing and install correct amount of Car Manufacturer's Specified Lubricant

►*DIFFERENTIAL CLUTCH PACK ASSEMBLY CAUTION:* When removing clutch plates and discs, note the exact sequence and position of each type plate or disc for reassembly in identical arrangement "Belleville" type plate and/or disc must have the convex side away from center of differential

►*"V" RAMP CLEARANCE NOTE* Use of "Belleville Type" plates and/or discs eliminates need for checking ramp clearance If clearance at "V" ramp exists when this type clutch pack assembled, look for worn clutch parts Lincoln permits a slight clearance provided the clearance at all four shaft ends is uniform

LUBRICATION: Car manufacturers recommendations for Power-Lock Type Differentials are as follows
Buick - Part No 531536
Cadillac - M-P Gear Lub SAE-90 to Zero, SAE 80, below.
Chevrolet Pass - GM 3758790 or 791
Chrysler Corp - M-P Gear Lub
Lincoln - Part No COLY-19A508-B
Oldsmobile & Pontiac - M-P Gear Lub
Rambler - Rambler Approved Lub
Studebaker - S-P Twin-Traction Lub
Willys - Part No 94557

POWER-LOCK DIFFERENTIAL (CONE CLUTCH TYPE)

Lincoln Continental (Early 1961)

DESCRIPTION: Same design unit as used on previous models

REAR AXLE ASSEMBLY REMOVAL: *See Lincoln Continental Hypoid*

AXLE SHAFT REMOVAL: *See Lincoln Continental Hypoid*

DIFFERENTIAL ASSEMBLY REMOVAL & INSTALLATION: *See Lincoln Continental Hypoid*

OVERHAUL: *See "Power-Lock Differential (Cone Clutch Type)" in 1959 Annual Data or later Manual edition, and note the following*

Disassembly: With case assembly on bench (ring gear removed from case), check clearance between cross pins and ramps by manually raising a cross pin up one side of the ramp and inserting feeler gauges *NOTE - If clearance at this point is less than .045" it is not necessary to disassemble differential cas If clearance is greater than .045', proceed as follows* Remove case capscrews, then remove cover, clutch rings, side gears, cross pins, and pinion gears *NOTE - Identify each part and place on a clean cloth so that it may be reinstalled in the same relative location*

SPICER HYPOID

CHECKER SUPERBA	Spicer Model No.
A10	44
FORD	
F100 Truck (With Power-Lock Diff.)	44
STUDEBAKER	
Lark 6 & V8 (Exc. below)	27
Lark Taxi & V8 Sta. Wgn	44
Hawk	44
WILLYS (REAR)	
CJ-3B, CJ-5, CJ-6	44
DJ-3A	27
F4-134, 4 x 4, 4 x 2	44
F4-134 4WD (4500 GVW)	53-2
F4-134 4WD (5000 GVW)	53
L6-226, 4 x 4, 4 x 2	44
L6-226 4WD	53
FC-150	44-1
FC-170 (Std.)	53
FC-170 (Dual Wheel)	70
FJ-3	27

DESCRIPTION: Hypoid gear type with semi-floating axles (Exc. Model 70 rear axles and axles used with front wheel drive units). Full-floating axles (Model 70 and models with front wheel drive units). Rear wheel bearings are "roller type" on all semi-floating axles. Model 70 axle differential case is "split type" and has four differential pinions. Power-Lock Differential is Optional on all models except Willys DJ-3A.

►*AXLE IDENTIFICATION & RATIO NOTE:* Power-Lock Differential identified by letter "T" and words "USE LIMITED SLIP DIFF. LUBE ONLY" on tag attached to differential cover. On Ford F100, Axle Code shown on patent plate on left front body pillar. On all models, axle ratio shown on metal tag attached to differential cover.

AXLE RATIOS: As follows:

Checker Superba

Trans.	Standard	Optional
Synchro-mesh	3.73-1 (41-11)	4.09-1; 4.55-1
Overdrive	4.09-1 (45-11)	3.73-1
Automatic	3.31-1 (43-13)	3.54-1

Ford F100

Cod	Ratio
A1	3.73-1
A2	3.92-1

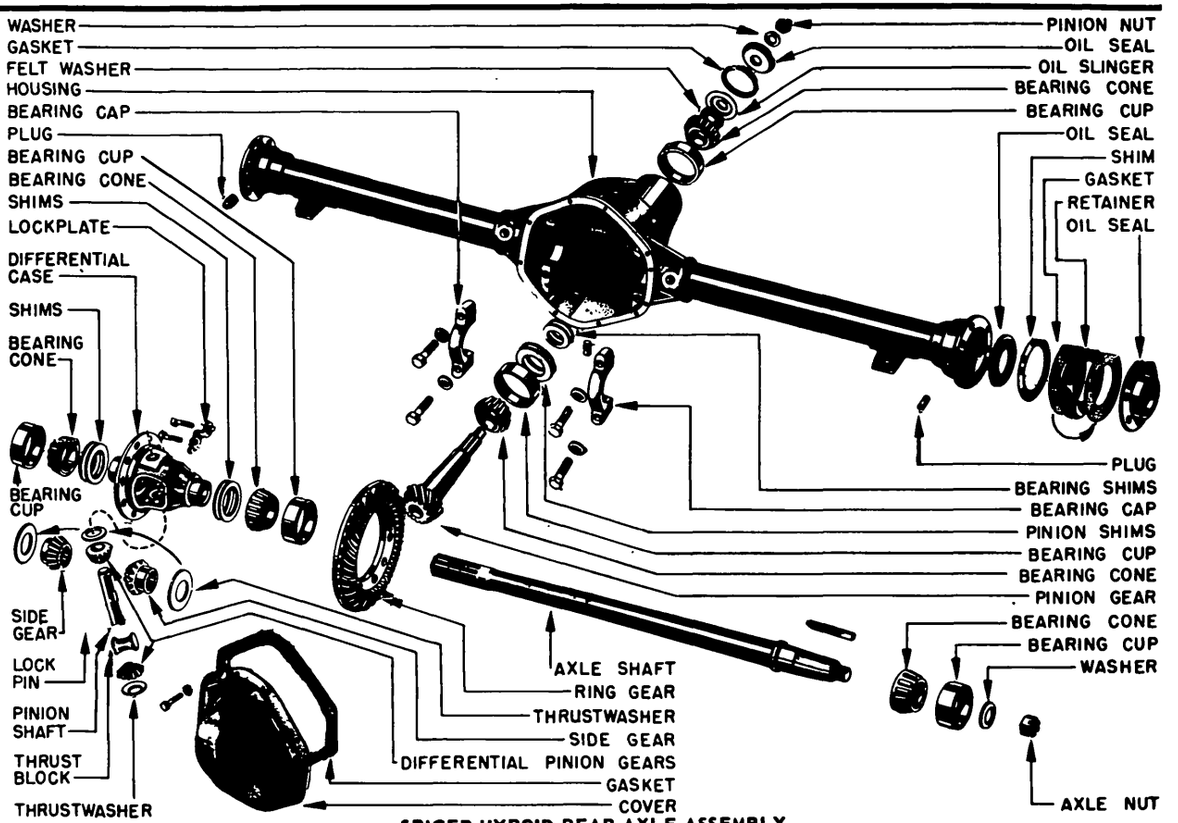
Studebaker 6 Cyl. Models

Std. Axle Ratios

Model	S.M. Trans.	Overdrive
W, F, J	3.73-1	4.10-1
D, P, C, L	4.10-1	4.56-1
Y	4.09-1	
		Flightomatic
All Models		3.73-1

Optional Axle Ratios

Model	S.M. Trans.	Overdrive
W, F, J	3.54-1, 4.10-1, 4.56-1	3.73-1, 4.56-1
D, P, C, L	3.73-1, 4.56-1	3.73-1, 4.10-1
Y	4.55-1	
		Flight matic
All (Exc. Y)		3.54-1, 4.10-1
Y		3.54-1



SPICER HYPOID REAR AXLE ASSEMBLY

Studebaker V8 Models

Std. Axle Ratios

Model	S.M. Trans.	Overdrive
W, F, J, L	3.07-1	3.54-1
D, P, C, Y6	3.31-1	3.54-1
Y1	3.31-1	
		Flightomatic
Y1		3.31-1
Others		3.07-1

Optional Axle Ratios

Model	S.M. Trans.	Overdrive
W, F, J, L	3.31-1, 3.54-1	3.07-1, 3.31-1, 3.73-1
D, P, C, Y6	3.07-1, 3, 54-1	3.07-1, 3.31-1, 3.73-1
Y1	3.54-1	
		Flightomatic
Y1		3.54-1
Others		3.31-1, 3.54-1

AXLE ASSEMBLY REMOVAL: Ford F-100 - Loosen wheel stud nuts and axle shaft nuts. Disconnect shock absorbers from spring seat caps and raise rear of truck to relieve weight from springs. Place safety jacks under frame. Disconnect hydraulic line at frame and parking brake cable (if so equipped) at equalizer, then remove cables from support brackets. Disconnect drive shaft at rear "U" joint flange and remove nuts from spring clips U bolts and remove spring seat caps. Roll axle from truck and drain lubricant.

Willys (Rear Axle)

Model	Ratio
CJ-3B, 5, 6	5.38-1 (8-43)
DJ-3A, 6A	4.56-1 (8-43)
F4-134 4 x 4, 4WD	5.38-1 (8-43)
F4-134 4 x 2	①4.89-1 (9-44)
L6-226 4 x 2, 4 x 4	②4.27-1 (11-47)
L6-226 4WD	③4.88-1 (8-39)
FC-150	④5.38-1 (9-41)
FC-170 Std.	③4.88-1 (8-39)
FC-170 H.D. Modification	⑤4.88-1 (8-39)

① - 5.38-1 (8-43) Optl.
② - 4.89-1 (9-44) or 5.38-1 (8-43) Optl.
③ - 5.38-1 (8-43) or 4.27-1 (11-47) Optl.
④ - 5.89-1 (9-53) Optl.
⑤ - 5.87-1 (8-47) Optl.

Studebaker (All Models) - Remove the hub caps, loosen wheel nuts and remove axle shaft nut. Raise rear of car and support on stands under frame just ahead of rear springs. Remove wheels, hubs, and drums. Disconnect brake line at each rear wheel cylinder, remove brake pipe clamps and free brake line from rear axle housing. Take out backing plate bolts, pull backing plate out over end of axle shaft and tie up out of way. Remove adjusting shims located beneath backing plate. *(CAUTION – Save for reinstallation).* Disconnect propeller shaft by removing rear universal joint U-bolts

CONTINUED ON NEXT PAGE

SPICER HYPOID (C ntinued)

and nuts (wire caps together). Remove rear spring U-bolts from axle housing, disconnect rear shock absorbers. Remove rear axle assembly from beneath car.
Willys - Raise rear end of vehicle with hoist and support frame ahead of rear springs. Remove wheels and disconnect propeller shaft at rear universal joint companion flange. Disconnect brake hydraulic hoses, remove spring to axle "U" bolt clips and slide assembly from under vehicle.

AXLE SHAFT REMOVAL: Ford F-100 - Loosen wheel and axle shaft stud nuts, raise car and remove stud nuts and lockwashers. Strike center of axle shaft flange to loosen dowels and remove dowels (tapered). Remove axle shaft from housing.
Studebaker (All Models) - Remove wheel and hub using Puller J-1644-A. Remove backing plate retaining bolts and remove outer washer, retainer, reinforcing plate and felt washer (discard this washer). Free, hand brake cable from equalizer and frame guides and disconnect hydraulic brake line at wheel cylinder. Pull backing plate out over end of axle shaft and tie it up out of way. Remove endplay adjusting shims *(CAUTION - Sav for reinstallation).* Use Puller J-7935 with Hammer J-2619 to remove axle shaft.
Willys - Jack up wheel and remove hub cap, axle shaft nut. Use Puller C-319 to remove wheel hub. Remove screws attaching brake dust shield, grease and bearing retainers and brake assembly. Remove wheel shield and retainer. Pull axle shaft out but DO NOT lose adjusting shims.

1961 Ford F-100 Tools

	Tool No.
Housing Spreader	4000-A
Diff. Brg. Remover	OTC-1001 With 1001-1B 1011 7 Adp.
Diff. Brg. Replacer	T57L-4221-A2
Pinion Flange Remover	T56L-4851-C
Pinion Brg. Seal & Outer Cone Remover	T58L-1001-A with T50T-100A
Pinion Inner Cone Remover	OTC-951
Pinion Inner Cone Replacer	T53T-4621-B
Pinion Brg. Cup Remover	OTC-960
Pinion Brg. Cup Replacer	T53T-1239-A & Adp. T56T-4616-A2
Pinion & Flange Installation	4858-B
Pinion Depth Gauge	T56T-4020-A
Pinion Flange Seal Repl.	T55P-4676-A

AXLE SHAFT ENDPLAY ADJUSTMENT, WHEEL BEARING & SEAL REPLACEMENT: *See "Spic r Hypoid" in 1959 Annual Data or later Manual edition.*
OVERHAUL: *See "Spicer Hypoid" in 1959 Annual Data or later Manual edition and not the following.*
Pinion Depth Setting Not : "Zero Pinion Depth" for Ford F-100 Axle is 2.625", for Studebaker Model 27 Axle is 2.094" ± .0015".

1961 Studebaker Model 27 Axl To ls

Rear Pinion Replacer	J-8671
Diff. Side Brg. Replacer	J-8668
Front Pinion Brg. Replacer	J-8672
Rear Pinion Brg. Puller	J-8669
Diff. Side Brg. Puller	J-8670
Adapter Used With J-8670	J-8670-2

1961 Willys FJ-3 Model 27 To ls

Axle Shaft Oil Seal Driver	W-263
Pinion Front Bearing Driver	W-264
Pinion Rear Brg. Sleeve Installer	W-262
Pinion Setting Block/Gauge WW-99-B	"H" or W-101-24
Diff. Case Brg. Cone Driver	C-3716

►*MODEL 70 GAUGE BLOCK NOTE:* Use bottom surface of gauge block "G".

RAMBLER HYPOID

Rambler, All Series (1961)
►*DIFFERENTIAL THRUST BLOCK PRODUCTION CHANGE & LOW SPEED "CLICK" CORRECTION:* Later cars have a thrust block with increased outside diameter to reduce operating clearances.
DESCRIPTION: Own. Hypoid gear type. Semi-floating with Hotchkiss drive (American Models), Torque Tube Drive Classic & Ambassador Models. "Twin-Grip" limited slip differential Optional.

Axle Ratios

American	Classic 6	Classic V8	Amb. V8
2.87 (15-43)	3.31 (13-43)	3.15 (13-41)	2.87 (15-43)
3.31 (13-43)	3.78 (9-34)	3.55 (11-39)	3.15 (15-43)
3.78 (9-34)	4.11 (9-37)	4.10 (10-41)	3.54 (11-39)
4.11 (9-37)	4.38 (8-35)	4.44 (9-40)	4.10 (10-41)

REAR AXLE ASSEMBLY REMOVAL: American - Drain lubricant, raise car and support rear of body. Remove wheels then remove hubs. Disconnect hand brake cables at brakes. Use wrench J-4486 to remove propeller shaft coupling nut. Disconnect rear shock absorbers, rear brake line at bracket on floor pan and rear springs from body. Remove axle and springs as an assembly and remove springs.
Classic 6, V8 & Amb. V8 - Remove cover and drain lubricant. Raise car and support it at rear of body. Disconnect parking brake at equalizer and housing at torque tube bracket. Disconnect torque tube from transmission, brake hose at bracket on body pan, shock absorbers at brackets, stabilizer bar at axle tube.

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly whenever hub removed.* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable. Remove brake support plate by sliding plate, oil seal, and shims off axle shaft. Use special Puller J-2498-B to remove shaft from housing.
Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations. Tighten axle shaft nut to 250 ft. lbs. torque.
►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in hub when it is assembled on axle shaft. New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft (serrations will not match). Tighten axle shaft nut to 250 ft. lbs. torque and check distance from outside face of hub to end of taper on shaft (hub overhzng on threaded portion of shaft). This distance must be 3/16". Punch mark new hub in line with mark on shaft. *NOTE - Rear springs held in position in seats by car weight and shock absorber travel limits.* Roll axle from chassis and disconnect truss rods, torque tube, and propeller shaft from axle. "Slip" or "Union" type couplings used which can be slipped off pinion shaft.
OVERHAUL: *See "Rambler Hypoid" in 1958 Annual Data or later Manual edition and note the tools used and shims available for these models.*

1961 T ls

Item	To IN.
Rear Hub Puller	J-736-B or J-1644-B
Rear Pinion Bearing Remover ①	J-7828
Rear Pinion Bearing Remover ②	J-2245-A
Front Pinion Brg. Cup Inst. ①	J-7818
Front Pinion Brg. Cup Inst. ②	J-2531
Rear Pinion Brg. Cup Inst. ①	J-7818
Rear Pinion Brg. Cup Inst. ②	J-2533
Rear Pinion Brg. Inst. ①	J-2995
Pinion Setting Gauge Discs ①	J-6318-2
Pinion Setting Gauge Discs ②	J-2499-2
Pinion Setting Gauge Discs ②	J-5223-5
Diff. Side Brg. Puller	J-2497
Pinion Preload Checking & Holding Tool	J-8715
Diff. Side Brg. Inst. ①	J-2100 or J-5364 & J-8092
Diff. Side Brg. Inst. ②	J-2104 or J-2646
Pinion Setting Gauge Arbor ①	③ J-5223-4
Pinion Setting Gauge Arbor ②	④ J-6482-1
Pinion Setting Gauge Arbor ②	⑤ J-5223-4
Gauge Block	J-5223-20

① - American & Series 10. ② - Series 20 & 80.
③ - With Discs J-6381-2. ④ - With Discs J-2499-2.
⑤ - With Discs J-5223-5.

►*DIFFERENTIAL SIDE BEARING & PINION PRELOAD SHIM NOTE:* Differential Side Bearing Shims are available from .142" to .176" in .002" variation. Pinion bearing preload shims are available in .170", .002", .003", .005", .010" as complete sets.

OLDSMOBILE HYPOID

Oldsmobile (1961)

DESCRIPTION: Rear axle design is same as used on previous models. Anti-Spin Differential Optional. *See "Power-Lock Diff. ("Belleville" & Plate Clutch Type)".*

►*REAR AXLE IDENTIFICATION CODE AND RATIO NOTE:* Rear axle ratio code and Anti-Spin Differential Identification letter stamped on rear flange of carrier assembly, Letter "L" following ratio code indicates Anti-Spin Differential. *See Code Table below.*

Rear Axle Code & Ratio Table

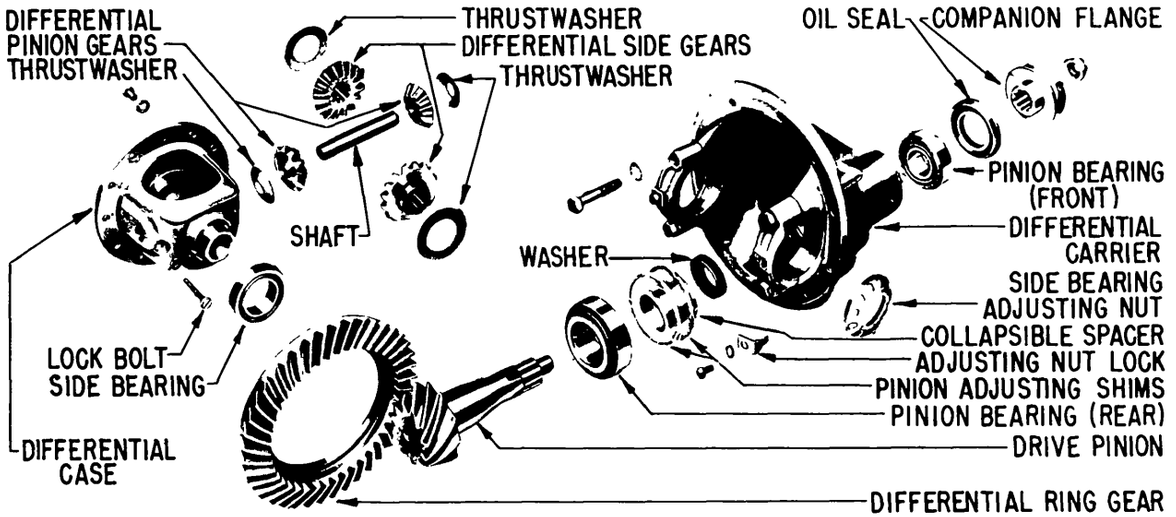
Code	Ratio
2	43:16 (2.69-1)
7	43:15 (2.87-1)
8	41:12 (3.42-1)
9	42:13 (3.23-1)
0	40:13 (3.08-1)

AXLE SHAFT: Removal - Remove wheel (left wheel has left hand threads) remove drum by removing two Tinnerman nuts from wheel studs. If nuts removed by turning off threads, they can be reused. If nuts damaged, new nuts must be used. Loosen backing plate nuts and loosen bearing retainer (do not move backing plate or brake line may be damaged). Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal). Replace one nut to hold backing plate in position.

WHEEL BEARING & OIL SEAL REPLACEMENT: *(NOTE* - Wheel bearings have .012-.015" endplay between balls and the races. Do not reject bearing unless endplay is greater than .020" or if there is definite roughness between ball and race). With axle shaft removed, remove bearing retainer collar after splitting with a cold chisel. *(CAUTION* - Do not damage axle when removing collar). Using Tool J-947-2 and J-947-1, press off bearing in an arbor press. To install bearing, use Tool J-947-3 and Plate J-947-1 with an arbor press and press bearing over axle shaft, being sure that pressure is being applied to inner race of bearing. After bearing has been pressed firmly against axle shaft shoulder, press new bearing retainer collar on shoulder of shaft against bearing. Be careful not to damage shaft surface on which oil seal runs.

Oil Seal: With axle shaft removed, remove seal. Before installing a new seal, apply sealer around its outside diameter then install seal in housing with Tool J-5818. *CAUTION* - When installing axle shaft, be careful not to damage seal.

PINION SHAFT OIL SEAL REPLACEMENT: Mark pinion shaft nut before loosening so that it may be retightened to the exact same location. This will avoid necessity of resetting pinion bearing preload. Remove companion flange nut and washer, then remove companion flange with Tool 6295-01. Remove seal by driving it out of housing with a blunt chisel. Lubricate new seal and coat outer diameter with sealing compound. Tap seal into place using Tool J-5395. Apply seal lubricant, Part No. 567196 to outer diameter of flange and to lip of new seal. Install flange and tighten nut to marked position, then tighten nut 1/16" beyond alignment mark.



OLDSMOBILE & PONTIAC REAR AXLE ASSEMBLY (TYPICAL)

OVERHAUL: *See "Oldsmobile Hypoid" in 1957 Annual Data or later Manual edition and note the following:*

Ring Gear Backlash & Differential Side Bearing Adjustment: If backlash is not within limits of .005" minimum, .009" maximum, adjust backlash to .007" to .008" (preferred setting).

Pinion Gear Setting Shims: Pinion shims are furnished in the following sizes and are identified (other than by thickness) as follows: .004" (no notch), .005" (1 notch), .006" (2 notches), .007" (no notch), .010" (no notch), .013" (1 notch), .014" (2 notches), .015" (no notch), .016" (1 notch), .017" (2 notches).

PONTIAC HYPOID

Pontiac (1961)

DESCRIPTION: Rear axle design is same as used on previous models, except as indicated below. Safe-T-Track Differential Optional. *See "Power-Lock Diff. ("Belleville" & Plate Clutch Type)".*

Axle Ratios & Identification

Axle Ratio	①Code	②③Color
2.56-1 (41-16)	3	Gray
2.69-1 (43-16)	2	Red
2.87-1 (43-15)	7	Orange
3.08-1 (40-13)	0	Yellow
3.23-1 (42-13)	9	Brown
3.42-1 (41-12)	8	White
3.64-1 (40-11)	6	Blue
3.90-1 (39-10)	4	No Color

① - Stamped on lower right side of differential carrier attaching flange. ② - Color mark on end of axle shaft. ③ - Safe-T-Track Differentials also have color Green and lubrication tag next to oil filler plug.

AXLE SHAFT REMOVAL: Raise body to provide clearance and remove wheel. Clean dirt from end of housing to protect wheel bearing and remove brake drum. Remove bearing outer retainer bolt nuts. Use Puller J-942-1, if necessary, to remove axle shaft. *CAUTION - DO NOT dislodg backing plate or brake pip may be damaged.*

►*AXLE SHAFT CAUTION:* Axle shaft with left thread on wheel bolts must be installed on left side of car.

PINION SHAFT OIL SEAL REPLACEMENT: Mark position on companion flange, pinion nut, and pinion shaft to insure reassembly in the same location. *(NOTE* - If companion flange is to be replaced, it will not be necessary to mark the above parts as pinion bearing preload will have to be readjusted). Remove drive pinion nut and washer using Holding Tool J-6289, then remove companion flange with Puller J-6295. Remove oil seal by prying it out of carrier with a blunt tool. Oil lip of new seal and coat outer diameter with Permatex No. 3. Install seal by tapping into place with Tool J-5395. Install companion flange, then install washer and nut. Tighten nut until it and the companion flange are in the same position as marked at disassembly. *(NOTE* - Pinion nut will turn relatively easy until original position is approached and bearings begin to preload. Stop turning nut at this point and check position).

OVERHAUL: *See "Pontiac Hypoid" in 1957 Annual Data or later Manual edition and note the following.*

Wheel Bearing & Oil Seal Replacement: With axle shaft removed, remove oil seal from axle housing with Tool J-943. To remove bearing from shaft, install axle shaft in Tool J-947-P so tool engages outer race of bearing and ring enclosing bearing, then press bearing

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PONTIAC HYPOID (C ntinued)

and retainer from shaft with an arbor press. To install bearing, install outer bearing retainer on shaft (if removed), then install bearing on shaft with Tool J–947–P (tool should bear only on inner race), pressing it into position with an arbor press. Press a new bearing inner retainer ring in place against bearing with Tool J–947–P. *CAUTION – Do not press bearing and inner retainer on in one operation as edge radius of retainer will climb over corner of bearing inner race and force grease seals into balls.* To install seal in housing, coat new seal lip with oil and coat outside of seal retainer with Permatex No. 3 or similar compound, then install seal with Tool J–5818. Install axle shaft. *NOTE* – If both axle shafts removed, shaft with left hand threads on wheel bolts must be on left side of car. Install bearing outer retainer and gasket and tighten self-locking retainer nuts to 30–45 ft. lbs.

Ring Gear Backlash & Differential Side Bearing Adjustment: Backlash should be between .005"-.009". Tighten bearing cap bolts to 65–85 ft. lbs.

Carrier Oil Gallery Plug Replacement: *NOTE - This plug is located at forward end of differential carrier housing lower reinforcing web.* Mark position of companion flange, pinion nut and pinion shaft so all parts may be installed in exactly the same positions to maintain proper pinion bearing preload. Remove companion flange from pinion shaft, then thread a ½" bottom tap into plug until plug starts to turn. Remove plug by turning tap and pulling at the same time. To install plug, apply a light coat of permatex No. 3 to hole in carrier and to plug, then install plug, making sure that it does not enter drain hole. *CAUTION - Do not attempt to drill a hole in plug for removal as shavings will fall into drain hole.*

1961 4-WHEEL DRIVE FRONT AXLES

CHEVROLET TRUCK (4-WHEEL DRIVE)

Chevrolet ½, ¾-Ton Trucks (1961)

DESCRIPTION: Spicer Model 44-5F. Full-floating, integral housing, hypoid gear type with yoke and trunnion type axle shaft universal joints. Differential assembly is similar to differential assembly used in Spicer 44 rear axle.

Axle Ratio & Identification Note: Axle model stamped on front left face of center section, ratio tag attached to cover bolt.

Model	Ratio
½-Ton	3.91-1 (47-12)
¾-Ton	4.55-1 (50-11)

AXLE ASSEMBLY REMOVAL: Disassemble propeller shaft from front axle differential. Raise front end of truck to remove weight from springs and support truck on stands placed behind front springs. Disconnect connecting rod from steering arm and brake hoses from frame fittings, shock absorbers from axle brackets and disconnect U-bolts from axle and roll front axle from under truck.

AXLE SHAFT REMOVAL: Support vehicle with front wheel free. Place drain pan under wheel and remove hub grease cap. Remove axle shaft snap ring and remove drive shaft as follows: On K14 models, pull splined drive flange from shaft and hub and remove spacer from hub. On K25 models, remove stud nuts and washers, remove drive flange and gasket. On all models, remove bearing lock nut and lock ring and remove adjusting nut. Remove wheel, hub and drum as an assembly. Remove bolts and lock washers holding brake flange plate and spindle to steering knuckle. Remove flange plate from steering knuckle and support the plate so brake hose will not be damaged. Slide spindle from shaft and remove axle shaft and joint assembly.

WHEEL BEARING ADJUSTMENT: Adjust bearings by tightening nut using "T" handle wrench (12" long on each side). Rotate drum and tighten snugly. Loosen nut 45° and assemble lock washer by loosening nut to nearest hole then assemble outer nut. Tighten nut to 40 ft. lbs.

DIFFERENTIAL OVERHAUL: *See Spicer Hypoid & Power-Lock (Plate Clutch Type) Differential in 1959 Annual Data or Later Manual edition.*

FORD TRUCK (4-WHEEL DRIVE)

Ford, 4-Wheel Drive F-100 & F-250 Trucks (1961)

DESCRIPTION: Spicer Model 44-6F. Full-floating, hypoid gear type with Spicer "Cross Type" universal joints. Differential assembly is similar to differential assembly used in Spicer Model 44 rear axle.

Axle Ratio & Identification Note: Ratio Code stamped under AXLE on Patent Plate on left front body pillar. Axle ratios stamped on tag on differential housing cover.

Model	Ratio	ℂ Code
F-100	3.92	A
F-250 Std.	4.56	B
F-250 H.D.	4.56	D

ℂ - Standard or Locking type.

Axle Shaft: Removal - Remove hub grease cap, hub retaining snap ring, slide driving hub from between axle shaft and wheel hub and remove driving hub spacer. Remove locknut, washer and wheel bearing adjusting nut from spindle and remove wheel, hub and drum assembly (outer bearing will also come out). Remove inner bearing. Remove oil baffle from brake carrier plate. Remove brake carrier plate and spindle from spindle arm (unnecessary to disconnect brake line). Support carrier plate. Remove axle shaft assembly.

Installation & Wheel Bearing Adjustment - Install axle shaft assembly. Install spindle and brake carrier plate on spindle arm, tighten retaining screws and install oil baffle. Install wheel inner bearing on spindle, driving hub spacer, and wheel outer bearing and adjusting nut. While rotating wheel forward and rearward, tighten bearing adjusting nut with Tool T59T-1197-A until bearings are firmly seated and then back off adjusting nut 1/8 turn (45°). Install lockwasher on spindle (locking dowel on adjusting nut must enter lockwasher hole most closely aligned with dowel). Torque locknut to 40 ft. lbs. Install driving hub, snap ring and grease cup. Fill spindle arm with proper lubricant.

Spindle Arm: Removal - With axle shaft removed (see above), disconnect steering drag link from spindle arm and spindle connecting rod at both spindle arms. Remove 2-piece seal retainer from spindle arm, felt, rubber and steel rings from spindle arm (place on axle housing). Remove upper and lower spindle arm bearing caps and shims and remove spindle arm. Remove upper and lower spindle bearings with Tool T58L-101-A inserted in bearing and Puller Tool T50T-100-A.

Installation - Make sure felt and rubber seals and steel retainer are placed on axle housing in same order as removed (felt seal toward center of truck, then rubber seal and steel retainer). Install upper and lower spindle bearing cups in axle housing with Handle T53L-200-A and Driver T57P-4625-A and place bearings in cups (retain lower bearing with wheel bearing grease). Install spindle arm on axle housing and install upper and lower bearing caps (use old shims for a trial pack). Torque bearing cap bolts and stud nuts to 25 ft. lbs. Check bearing preload by rotating spindle arm with an **inch-pound** torque wrench installed on one of the bearing cap bolt heads. Turning torque should be 50-70 inch-pounds. Adjust shim pack at bearing caps to obtain correct preload. Install steel retainer, rubber and felt seals and 2-piece retainer. Connect spindle connecting rod and drag link. Install axle shaft assembly and adjust wheel bearing (see above).

Axle Housing Removal: Raise truck so front axle hangs freely. Remove axles and spindle arms (see above). Disconnect shock absorbers at lower end and front drive shaft at pinion flange. Support axle and remove spring clip (U-bolt) nuts and spring seats. Remove axle housing assembly.

DIFFERENTIAL ASSEMBLY OVERHAUL: *See "Spicer Hypoid" rear axl in 1959 Annual Data or later Manual edition.*

WILLYS JEEP, UTILITY, & FORWARD CONTROL (4-WHEEL DRIVE) FRONT AXLE

Willys CJ-3B, 5, 6 (1961) ①
Willys FC-150, 170 (1961) ①
Willys L6-226 (1961) ①
Willys F4-134 (1961) ①
① – For Rear Axle see Spicer Hypoid.

DESCRIPTION: Spicer Models 25, 27F, 27AF, 44 & 44F. Full-floating, integral housing, hypoid gear type with Spicer "Cardan Cross", "Bendix" or "Rzeppa" Constant Velocity universal joints. Differential assembly is similar to differential assembly used in rear axle. Power-Lock (Plate Clutch Type) differential optional.

►*AXLE IDENTIFICATION & RATIO NOTE:* Spicer Model stamped in center section of housing, ratio tag attached by cover cap screw, Power-Lock Differential identified by letter "T" or brass tag attached to cover screw that reads "USE LIMITED SLIP DIFFERENTIAL LUBE ONLY".

Mod l	Ratio
CJ-3B, 5, 6	5.38–1(8–43)
F4-134, 4 x 4, 4WD	5.38–1(8–43)
L6-226 4 x 4	①4.27–1(11–47)
L6-226 4WD	②4.88–1(8–39)
FC-150	5.38–1(8–43)
FC-170 Std	③4.89–1(9–44)
FC-170 H.D. Modification	④4.89–1(9–44)

①–4.88–1(8–39 or 5.38–1(8–43) Optl.
②–5.38–1(8–43), or 4.27–1(11–47) Optl.
③–4.27–1(11–47) or 5.38–1(8–43) Optl.
④–5.89–1(9–53) Optl.

R m val: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axle Shaft & Universal Joint Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller. Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly. *(CAUTION*–Use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION:* Adjust front wheel bearings and bleed brakes after installation completed.

Steering Knuckle Bearings: Steering knuckle assembly is mounted on two "stub" kingpins with taper roller bearings seated in ball end of axle housing at inner end of each kingpin. Upper bearing cap has shim pack for bearing adjustment. Disassemble bearings as follows:

Disassembly – First remove hub and brake drum assembly, wheel bearings, axle shaft and universal joint assembly, wheel spindle, and steering tie rod socket. Remove screws holding oil seal retainer halves, remove screws retaining upper and lower bearing caps. Withdraw bearing cap and stub shaft assemblies. *(CAUTION – Do not lose bearing adjusting shims under top bearing cap).* Lift steering knuckle off axle housing. If necessary to remove bearing cups from axle housing, use special driver, Tool W–138. Wash all parts in cleaning solution and inspect bearings and races for wear, scores, or cracks.

Reassembly & Bearing Adjustment – Reverse disassembly procedure and note the following: Install one each .003", .005", .010", .030" shims at the top only. *NOTE – A shim pack of .058" thickness is added at bottom face of kingpin boss on steering knuckles at production. Maintain this shim pack at bottom and mak adjustments at the top only.* Install bearing caps, lockwashers, and screws and tighten securely. Check preload on bearings by hooking a spring scale in hole in knuckle arm for tie rod socket. Take a reading when knuckle has just started its sweep. King pin bearing preload should be 12–16 lbs. with seal and axle shaft removed. Remove or add shims to secure this preload. A washer may be added between end of cap and bearing when removal of all shims does not correct preload, then reinstall and adjust shims.

Oil Seal Assembly – Before installing oil seal felt, make a diagonal cut across top side of felt so it may be slipped over axle. Install assembly as follows: Split oil seal, backing ring assembly, oil seal felt and the two seal retainer plate halves. Install eight retaining screws.

Wheel Bearing Adjustment: Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back off nut 1/6 turn and install locking washer and nut. Tighten locknut securely and bend lockwasher over the locknut.

DIFFERENTIAL OVERHAUL: *See Spicer Hypoid & Power–Lock (Plate Clutch Type) Differential in 1959 Annual Data or later Manual edition.*

CONSTANT VELOCITY UNIVERSAL JOINTS

Buick (1961)
Buick Special (1961)
Linc ln (1961)
Oldsmobil F-85 (1961)

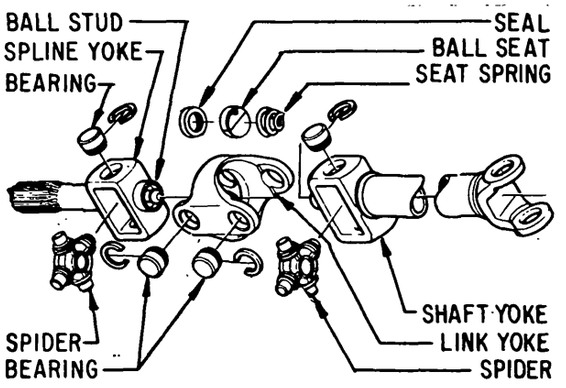
►*PROPELLER SHAFT HANDLING CAUTION: To prevent damage to constant velocity universal joint center metal ball when removing shaft assembly from car or when handling the assembly after removal, care must be taken to support shafts at both sides of constant velocity joint if shaft is moved horizontally. Do not allow one end of shaft to hang free or allow universal joint to bend at a sharp angle. Shaft assembly may be carried in a vertical position without damage to constant velocity joint.*

DESCRIPTION: Constant velocity type universal joint consists of two single joints connected with a special link yoke with a center ball and socket between joints to maintain relative position of the two units. This center ball causes each of the two joints to operate through exactly one half of the complete angle between front and rear propeller shafts, resulting in both shafts turning at a constant velocity.

LUBRICATION: Buick - *NOTE - Universal joints are lubricated for life and require no additional lubrication except as follows:* Center metal ball must be lubricated every 5000 miles with Multi-purpose Grease E.P. No.1. Fitting in universal joint is accessible through rear hole of frame tunnel (rotate drive line to line up fitting with hole). A special fitting, Alemite Part No. 326635 or equivalent is required to apply lubricant to fitting.

Lincoln: Lubricate three fittings on universal joint with chassis lubricant every 6000 miles.

Oldsmobile: Every 20,000 miles, disassemble and clean universal joint, then repack with sodium soap, fine fibre grease (Marfak Heavy Duty or equivalent).



CONSTANT VELOCITY UNIVERSAL JOINT

BUICK, CADILLAC, OLDSMOBILE PROPELLER SHAFT ALIGNMENT

Buick (1961)
Buick Special (1961)
Cadillac (1961)
Oldsmobile (1961)
Oldsmobile F-85 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*BUICK & BUICK SPECIAL PROPELLER SHAFT BALANCE CAUTION:* Paint mark on propeller shaft and "X" mark on pinion shaft (Buick Std.) or companion flange (Buick Special) must be opposite each other (180° apart) when assembled in order to maintain drive line balance. When paint and/or "X" mark not visible, scribe propeller shaft and pinion or companion flange for reassembly in original position.

►*OLDSMOBILE F-85 DRIVE LINE SHUDDER WHEN STARTING CORRECTION:* Caused by too high nose angle setting. Check nose angle and reset to specifications.

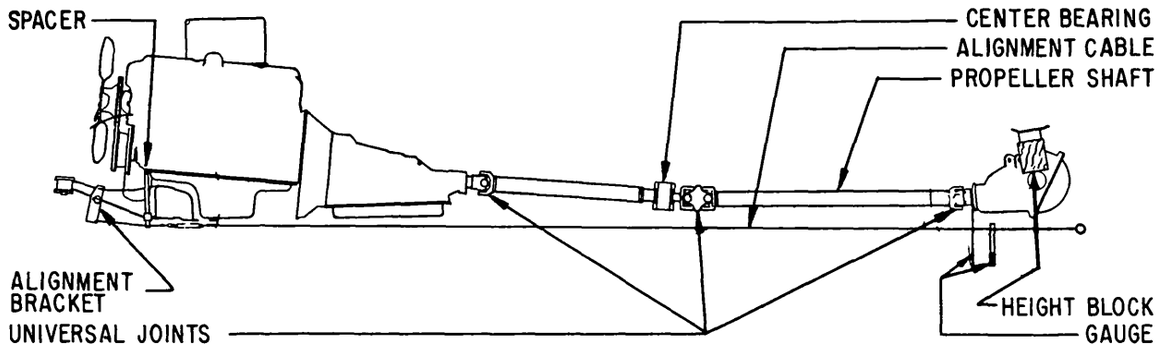
►*F-85 TOOL KIT BT-30-2 CHECKING GAUGE MODIFICATION NOTE:* Remove Plastic handle. Cut two new 1/8" notches (opposite sides) exactly 3 31/64" (Station Wagon), 3 27/64" (Sedan) from center of notch to end of tool from which you removed handle. Reinstall handle on opposite end and scribe the words "Station Wagon" and "Sedan" on respective side of tool.

►*PROPELLER SHAFT HANDLING CAUTIONS: To prevent damage to constant velocity universal joint center metal ball when removing shaft assembly from car or when handling the assembly after it is removed, care must be used to support shaft on both sides of constant velocity joint if shaft is moved horizontally. Do not allow one end of shaft to hang free or allow universal joint to bend at a sharp angle. Shaft assembly may be carried in a vertical position without damage to constant velocity universal joint.*

►*1961 BUICK (EXC. BUICK SPECIAL) PROPELLER SHAFT PRODUCTION CHANGE: Later shaft assemblies have been changed to eliminate the rear slinger on front propeller shaft. Locknut has been increased in thickness to compensate for removal of slinger.*

DESCRIPTION: Measurement of rear universal joint angle (for correct propeller shaft alignment) is accomplished by the use of a spring loaded steel cable stretched between front of chassis and rear axle carrier, on centerline of propeller shaft. When rear universal joint angle is adjusted correctly, the steel cable will clear underside of pinion flange by a definite amount.

CHECKING & ADJUSTING PROPELLER SHAFT ALIGNMENT: Buick (Exc. Buick Special) - Use Alignment Set, J-8973 as follows: Raise rear of car body and install Rear Tubular Spacers, J-8973-19 with upper end over head of rear compression bumper mounting bolt (at each side of car) and with lower ends of spacers resting on axle housing, then lower car body onto spacers. Remove nut from differential carrier mounting stud on each side of lowest stud. Thread Extensions, J-8973-17 on these two studs and attach Bracket J-8973-16 with bent lip toward rear, using original stud nuts. Attach hook of Bracket J-8973-15 over center of front frame crossmember, then with shallow slot of



PROPELLER SHAFT ALIGNMENT GAUGE TOOL INSTALLATION

Engine Height Plate J-8973-14 down, place wide upper end against flange of engine oil pan being certain plate rests on **flat** portion of pan flange. With cable in notch in spacer, pull clamp tight and hook it through a slot in rear bracket so one of the stops is to rear of bracket. Measure distance from centerline of cable to machined surface immediately in front of slinger on pinion flange. Distance should be 3 3/8"±1/16". If measurement is not within specifications, remove adjusting bolt (through two holes) and loosen two clamping bolts (through hole and slotted hole) and adjust arm until universal joint angle is correct. Install adjusting bolt through set of holes that most nearly coincide. Tighten bolts to 60 ft. lbs. Recheck measurement.

Buick Special: Use Alignment Set, J-8973 as follows: Raise rear of car body and install spacer blocks J-8973-20 (Station Wagons), J-8973-21 (Sedans) so slots straddle rubber bumpers. Hold spacer block up against bumper mounting straps and allow car to settle until axle housing contacts blocks. Remove differential cover bolt on each side of lowest cover bolt, then using these two bolts, attach Rear Bracket J-8973-16 so slotted portion of bracket is vertical. Tighten bolts securely. Engage Front Attaching Bracket J-8973-13 in front crossmember assembly using hole immediately to rear of front mount. Hook slot of bracket into rear of hole. Place Engine Height Rod J-8973-3 (notched end down) through round hole in front crossmember assembly so upper end of pin bears against engine oil pan between front oil pan bolts. Place cable in notch of height rod, pull cable tight and hook into rear bracket so one of stops on cable is to rear of bracket slot. Measure perpendicular distance from cable to machined surface immediately in front of slinger on rear flange. This distance should be 3¼"±1/16". If measurement is not within specifications, shims must be added or subtracted between lower control arm forward mounting brackets and underbody side rail. *Add or remove shims in equal amounts on both sides of car.*

Cadillac Vertical Alignment: Use Propeller Shaft Alignment Gauge Set J-8905 as follows: Place car on a level surface or on a suitable hoist. *NOTE - Gasoline tank must be full.* Remove two bolts from bottom front face of flywheel cover and install Bracket J-8905-20, securing it in place with the two bolts removed from cover. Remove two nuts and washers from two lower studs on front face of differential carrier assembly and install Rear Bracket J-8905-7, securing it in place with nuts. Measure and record standing height (direct vertical distance between top of rear axle housing and frame). *NOTE - Use average of right and left hand measurements.* Install Spacer Rods, J-8905-16, between top of rear axle housing and lowest underside surface of frame on both sides, then load down or raise car to hold spacers securely. Install spring end of Alignment Cable, J-8905-2 in slot in Front Bracket and other end of cable in Rear Bracket. *CAUTION - Propeller shaft must be checked at rear, center, and front before any adjustment is made. When checking, make certain that gauges are held as vertically as possible, and all gauge readings should be taken with marked side of gauges facing front of car.* Check propeller shaft height at rear by placing end of Gauge J-8905-21, on bottom of propeller shaft, ½" forward of weld at rear yoke. Note propeller shaft height by checking relation of gauge notch "R" to cable. Check propeller shaft height at center by inserting end of Gauge J-8905-21, in hole in bottom of frame tunnel until gauge rests against bottom of propeller shaft. Note propeller shaft height by checking relation of gauge notch "C" to cable. Check propeller shaft height at front by placing end of Gauge J-8905-6 against machined surface of transmission slip yoke (rounded surface of shaft that enters transmission extension). Note propeller shaft height by checking relation of notch in gauge arm to cable. If propeller shaft was not within specifications as indicated by gauges and cable, adjust as indicated in table below.

Propeller Shaft Adjustment

Checking Location	Shaft Too High ①	Shaft Too Low ①	Adjusting Location
Rear	Add	Remove	②
Center	Remove	Add	③
Front	Remove	Add	④

① - Add or remove shims.
② - Rear Lower Control Link. See adjusting procedure below.
③ - Propeller shaft center mount. See adjusting procedure below.
④ - Engine rear mount. See adjusting procedure below.

Adjustment (Rear Lower Control Link) - Add or remove shims between front mounting brackets for lower control arm links and the No. 4 outriggers. Shims are available in thicknesses of 1/32" and 1/16". *CAUTION - Shims*

CONTINUED ON NEXT PAGE

BUICK, CADILLAC, OLDSMOBILE PROPELLER SHAFT ALIGNMENT (C ntinued)

of equal thickness must be added or removed from right and left control links.

Pr p ller Shaft C nter Mount - Add or remove shims between bottom of center bearing support bracket and frame tunnel. Shims are available in thicknesses of 1/8" and 1/16".

Engine R ar Mount - Add or remove washers between engine rear mount and engine rear support crossmember. Washers of equal thickness must be added or removed at both legs of mount.

►*CADILLAC ADDITIONAL ADJUSTMENT TO COMPENSATE FOR INCORRECT STANDING HEIGHT:* In the event standing height at rear of car was not within specifications of 5¾"-6" as measured and recorded before checking propeller shaft alignment (see above), variations must be made in propeller shaft alignment as follows If standing height was 5½-5¾", add 1/16" shim at center mount. If standing height was 6-6¼", remove 1/16" shim at center mount *NOTE - If there are no shims at center mount, remove 1/16" shim from both lower control link brackets, and add 1/64" washers to both engine rear mount legs.* If standing height was 6¼-6½", remove 3/32" shim thickness from both lower control link brackets and remove 1/16" shim from center mount. *NOTE - If there are no shims at center mount, remove 1/8" shim thickness from both lower control link brackets, and add 5/32" washer to both engine rear mount legs.*

Cadillac H riz ntal Adjustment: After checking vertical alignment, proceed as follows· Hang plumb bobs, J-8905-14 over both front and rear of propeller shaft so they hang free and clear any obstruction, then hang Alignment Gauge, J-8905-17, on cable at rear of propeller shaft between plumb bob lines. Move cable in slot in rear bracket until extended arm of gauge (upper part) is centered between plumb bob lines Hang Horizontal Alignment Gauge, J-8905-17 on cable at front of propeller shaft between plumb bob lines Move cable in slot in front bracket until arm of gauge (lower part) is centered between plumb bob lines. *NOTE - If it was necessary to align cable at either end, recheck cable alignment at opposite end.* Hang gauge on cable (using proper slot) with printed side of gauge facing front of car Position gauge just under center bearing support mounting bolts. Check alignment of bolt head centers in relation to marks on gauge. Bolt heads should align with marks on gauge within 1/16" If shaft is out of horizontal alignment, it will be necessary to move center bearing support either to right or left as required *NOTE - In some cases, bolt mounting holes may hav to be slotted with a rat-tail file Slide front of propeller shaft toward rear of car to provide clearance for filing bolt holes.*

Oldsmobil (Std.): Use Tool BT-30-1 and BT-30-2. Connect cable at front frame crossmember, see diagram. Install rear bracket on the two lower right studs on differential carrier Hook cable in upper hole on rear bracket, then install spacer between cable and bottom of front engine mount. Install hold down clamps around axle housing (lower hook end should point toward front end of car). Install upper hook into 3/4" hole in frame immediately above axle housing. Adjust turn buckles on clamps until wooden blocks fit snugly between axle housing and rubber bumpers. *NOTE - It may be necessary to lift car to install wooden blocks.* Position gauge, see diagram, and check differential nose angle alignment. If cable is not within limits of gauge notch, the nose angle can be corrected by lengthening or shortening the lower suspension arm.

Oldsmobile F-85: Use alignment tool BT-30-2 and install on car in the same manner as for Buick Special (above), including special spacer block between axle housing and rubber bumpers. With indicator of Tool Set BT-30-2 placed against differential pinion companion flange cable must be in correct notch, see Tool Modification below. If necessary to adjust, remove shims from front of rear lower suspension arm (cable below notch); add shims (cable above notch). *NOTE* - The same amount of shims must be added or removed from both sides of car. 1/8" shim will raise or lower nose angle of differential assembly approximately 1/16".

CHEVROLET (PASS. CAR PROPELLER SHAFT ALIGNMENT

Chevrolet Pass. Cars (1961)

►*PROPELLER SHAFT SHUDDER CORRECTION:* Correct propeller shaft angle as indicated below.

PROPELLER SHAFT ANGLE CHECK & ALIGNMENT: Front shaft angle "A", rear shaft angle "B", pinion shaft angle "C" and frame riding height "D" must be within limits as shown in table below. *NOTE* - When vehicle driven continuously at maximum load conditions, angle "B" may be increased approximately ¼-½° (in negative direction).

Angle "A" - Is relation of engine angle to front propeller shaft angle. Place protractor on rocker arm cover for engine angle, up against front propeller shaft for front shaft angle. *NOTE* - DO NOT lean on front fender when taking engine angle.

Angle "B" - Is relation of front and rear propeller shaft angles. To determine rear propeller shaft angle, place protractor up against rear propeller shaft.

Angle "C" - Is relation of rear propeller shaft angle to pinion shaft angle. To determine pinion shaft angle, rotate rear universal joint to bring machined surface down parallel with floor and place protractor on this surface.

Riding Height "D" - Is distance from top of axle housing to frame kick-up. This measurement must be equal within ¼" on each side.

NOTE - Support car on tires, ramp or twin post hoist (not on frame hoist) when making angle checks.

Determining Angles - Angles "A", "B", "C" are the result of subtracting rearmost of the two angles from preceding one (example - Engine angle minus front propeller shaft angle), except when second angle is "up at rear" (Higher at rear of protractor than at front), the second angle should be added to first one.

Correcting Angles - Std. Procedure - 1) When angle "A" is not correct, change number of shims under transmission support. Adding shims reduces angle, reducing shims increases angle.

2) When angle "C" is incorrect, change number of shims at upper arm attaching point. Adding shims reduces angle, reducing shims increases angle.

NOTE - Correcting angles "A" and "C" should automatically correct angle "B". See Optional Procedure below for correcting angles "A" and "C".

Optional Procedure - For correcting angles "A" and "C", loosen or remove frame center bearing support bolts (under center section) and insert transmission shims between frame section and the support inside driveshaft tunnel. *CAUTION* - Always recheck angles "A" and "B".

Vibration Note - If objectional vibration exists when joint angles are within specifications, readjust angle toward opposite limit (high toward low or low toward high limit).

Angles & Height Specifications

Angle "A"	Angle "B"	Angle "C"	Height "D"
Pos. 2½-3°①	Neg. 1-1½°②	Pos. 2¾-3¼°③	Pos. 6¼ ± 3/8"

① - Pos. 2¾° desired. ② - Neg. 1¼° desired.
③ - Pos. 3° desired.

CHRYSLER CORP. PROPELLER SHAFT ALIGNMENT

Chrysler (1961)
Imperial (1961)
DeSoto (1961)
Dodge & Dart (1961)
Lancer (1961)
Plymouth (1961)
Valiant (1961)

EXCEPT IMPERIAL

REAR UNIVERSAL JOINT OPERATING ANGLE: Check and adjust as follows·

►*CHECKING CAUTION:* Car weight must be on wheels (use drive-on type hoist or platform) and there must be no extra weight in trunk.

Checking R ar Universal J int Angle: 1) Remove rebound plate and bumper from top of differential carrier housing Place spirit level protractor on machined surfaces of rebound plate bosses Level bubble and note reading. *NOTE - Carrier housing should incline downward slightly. To adjust, install a tapered shim between rear spring and seat on axle housing with thick end toward rear of car.* Recheck angle.

2) Place protractor on underside of propeller shaft near rear universal joint. Note reading. Add this reading and pinion angle reading (above). Total should be 2°. Add or remove shims as above to obtain 2° total angle. Tighten rebound plate assembly bolts to 200 inch-lbs. and rear spring U-bolt nuts to 70 ft. lbs.

IMPERIAL

PROPELLER SHAFT: Removal - Remove front universal joint clamps from transmission yoke (unnecessary to remove bushings if retainer strap used). Remove rear universal joint clamp in same manner. Remove center bearing housing bolts and shims from under housing Remove front and rear propeller shaft and center bearing as an assembly.

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CHRYSLER CORP. PROPELLER SHAFT (C ntinu d)

Installation: Insert front propeller shaft over body crossmember and tighten front universal joint-to-transmission yoke bolts to 170 inch-lbs. Connect rear universal joint to rear axle pinion yoke and tighten bolts to 170 inch-lbs. Place same number of shims as removed under center bearing housing, install housing and tighten bolts to 30 ft. lbs.

CENTER BEARING: Disassembly - After propeller shaft assembly removed, clean bearing housing and note the index marks on rear of front shaft and shoulder of sliding yoke. Straighten tab of star washer and unscrew cap from front shaft. Slide star washer and slinger from center bearing housing. Pull sliding yoke, cap, and seal from front shaft. Remove bearing housing from front shaft and press bearing from housing.

►*BEARING SERVICE NOTE:* Bearing is permanently sealed and no lubrication or service required except replacement.

Reassembly: Repack internal splines of front shaft with multi-purpose grease and install slinger on shaft. Press bearing into housing and install on front shaft. Install slinger and star retaining washer. Lubricate inside of seal and install cap and seal on sliding yoke using care not to damage seal on splines of yoke. Align index marks of front shaft and yoke and install yoke. Tighten retaining cap enough to compress seal firmly on shaft of yoke but free enough to permit free back and forth movement of yoke in front shaft. Lock retaining cap by bending tab of washer into notch in cap.

PROPELLER SHAFT ALIGNMENT: *NOTE - Make sure fuel tank is full and check shaft indexing by unscrewing cap seal retainer. "O" mark on splined yoke should line up with keyway in shaft.* With car level and weight of car on the wheels, remove differential carrier rebound bumper plate. Remove shims from both rear axle control strut frame brackets. Place Aligning Gauge J-6845 on machined pads of differential carrier and center the bubble. *NOTE - Level of gauge must be on same side of propeller shaft each time gauge is used.* Place gauge on rear propeller shaft near rear universal joint. Entire bubble should be within three graduations from center of gauge. If edge of bubble is ahead of the third graduation, change rear axle pinion angle as follows: Install 2° tapered shims between both rear springs and axle housing pads with thick edge of shim toward **front** of car. Tighten spring U-bolt nuts and install shims behind control strut brackets so space is filled. Tighten brackets. Install differential carrier rebound bumper plate.

CENTER BEARING HEIGHT ADJUSTMENT: Install Gauge Adapter part of Tool J-6845 on front propeller shaft near front universal joint. Place gauge of tool on rear propeller shaft at rear universal joint and adjust gauge to center bubble. Attach gauge to pins on adapter. For each graduation leading edge of bubble is **forward** of center, **add** one shim under center bearing housing bracket. For each graduation trailing edge of bubble is to **rear** of center, **remove** one shim from under center bearing housing bracket.

LINCOLN CONTINENTAL PROPELLER SHAFT ALIGNMENT

Lincoln Continental (1961)

PROPELLER SHAFT ANGLE: *NOTE* - Vibration or "shudder" upon fast acceleration, or when coasting using engine as a brake, may be caused by either rear axle being loose in springs or by excessive propeller shaft angle. Propeller shaft angle is the result of Pinion Nose Angle in relation to Riding Height with "U" bolt nuts tight.

Pinion Nose Angle - Place vehicle on known level surface that will allow access to rear axle pinion nose. Drill a small hole in common protractor at exact center of base (0°) line, and insert a line through hole with a light weight attached for bob. Place base of protractor vertically against front face of pinion housing and read where lines crosses scale.

Riding Heights - Place vehicle on smooth level floor. Inflate tires to 24 lbs. with full fuel tank and all loading removed from passenger and luggage compartment. Push rear bumper down (at center) 1" and release slowly. Measure distance from top center of axle housing to top of frame kick-up at rear of bumper bracket. Raise center of bumper 1" and release slowly and again measure distance. Average of two readings is true riding height. Riding height should be 7.2-8.5" with 8" normal.

Riding Height	℄ Pinion Nose Angle
6 inches	4° Down
7 inches	3½° Down
8 inches	3° Down
9 inches	2½° Down

℄ - Tolerance ±¼°.

Check Pinion Nose Angle with Riding Height as shown in table above. When Nose Angle does not correspond with Riding Height, remove rear axle "U" bolt nuts and install appropriate wedges (½, 1, & 1½°), between each spring insulator upper retainer and axle housing mounting pad, with no more than one wedge to be used on a side. Install "U" bolts and torque to 50-60 ft. lbs. *NOTE - Be sure lower insulator retainer contacts upper retainer.*

STUDEBAKER PROPELLER SHAFT

Studebaker Six & V8 (1961)

DRIVE LINE ALIGNMENT: Raise rear wheels off floor and put transmission in neutral. Clean shaft with sandpaper. With dial indicator measure runout of propellor shaft at front center and rear, while turning shaft slowly by hand. *NOTE – Make nd measurements about 1½" back from weld joint.* Maximum runout should be .010" at front or rear and .015" at center. If not within limits check flanges of transmission and differential. Measure shaft runout and end nearest flange and mark flange at highest runout. Disconnect universal joint, rotate flange 180° and reassemble. Check runout again. If high side of runout is still on same side, flange is at fault. If rotating flanges does not correct runout, replace shaft and/or flanges.

DRIVE LINE ANGLE CHECKING & ADJUSTMENT: Check angles with level gauge or protractor. *NOTE – Manufacturer recommends use of Special Protractor Gauge J–7181 for best results.* Raise car on drive—on hoist with weight on wheels and frame level. Bounce body up and down several times to normalize spring position and DO NOT DISTURB this position when taking angle checks.

Front Universal Joint Angle: Place gauge against clean surface of propeller shaft near front universal joint, so pendulum or pointer is free to swing. Move protractor scale so pointer is set at 90° mark. Remove gauge (do not disturb setting) and place it on clean bottom surface of starter housing. When pointer comes to rest, read degrees indicated from 90° mark. This reading represents front universal joint angle. Angle should be 4–5°.

Rear Universal Joint Angle: Proceed as for Front Universal Joint Angle Check except in second operation, place adjusted gauge vertically against forward edge of differential housing in back of universal joint. *NOTE – Gauge must not contact pinion bearing oil seal.* When pointer comes to rest, read degrees indicated from the 180° mark. This reading represents rear universal joint angle. Angle should read 4½–5½°.

CAUTION – For best results there should be approximately ½° greater angle at rear than at front.

ADJUSTMENTS: To change **front** universal joint angle, add or remove shims or spacer washers at engine rear support insulators. To change **rear** universal joint angle, add or remove wedge type caster shims at axle pad and rear springs.

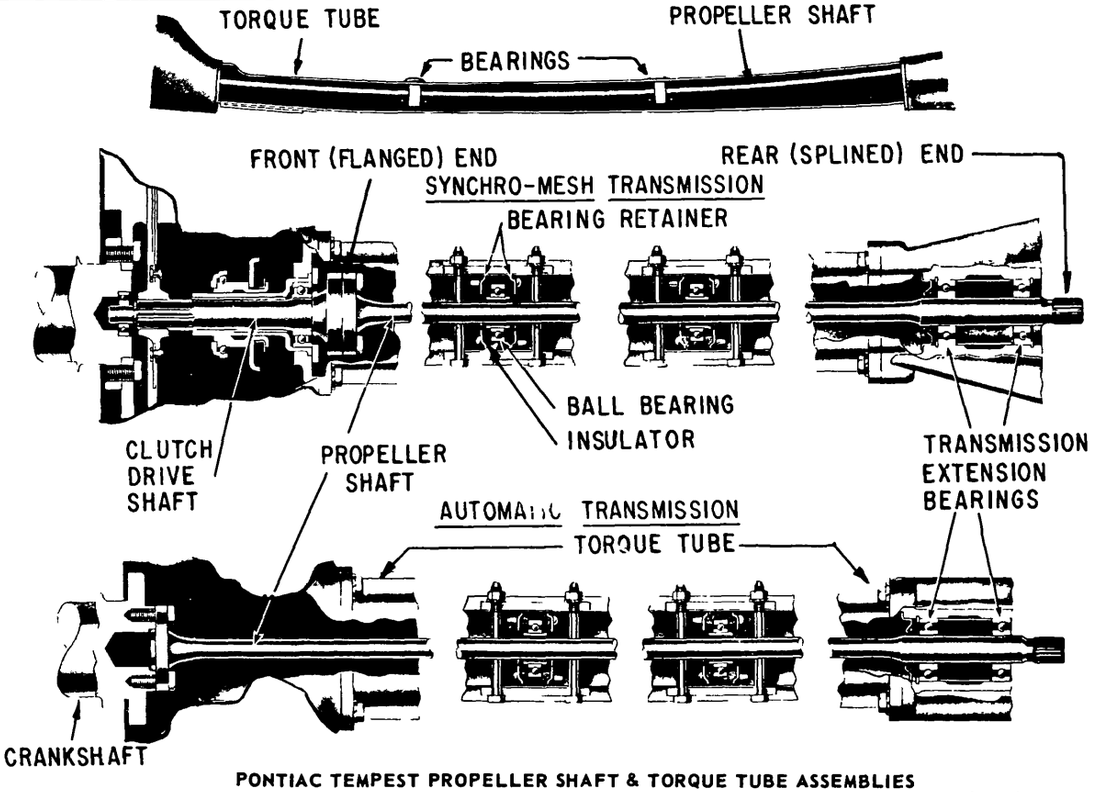
1961 PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE

P ntiac Tempest (1961)

DESCRIPTION: This new flexible propeller shaft which is supported on two rubber insulated, sealed ball bearing assemblies secured in a "hat" section, curved, torque tube is constructed of a triple alloy forged steel that is heat treated, shot-peened, and coated. The propeller shaft flange is splined at the rear to transmission shaft and is flanged at the front for connection to engine flywheel (automatic transmission); clutch drive shaft (synchro-mesh transmission). The curved "hat" section type torque tube in which propeller shaft and bearing assemblies are enclosed, is bolted to engine housing and transmission housing, rigidly joining the two together.

REMOVAL: Synchro-m sh Transmission Cars - Remove bolts retaining propeller shaft damper bearings, then remove parking brake cable from torque tube. On V8 engine cars, remove exhaust crossover pipe. On all models, disconnect transmission control rod from transmission, then remove gearshift housing and control rod. Remove flywheel housing bottom cover and support rear of engine with a jack stand. Remove torque tube access hole cover and remove six bolts from propeller shaft flange. Place a rag between propeller shaft and torque tube to prevent damage to coating on shaft, then remove bolts connecting torque tube to flywheel housing. Support torque tube, then remove the bolts securing torque tube to housing and pry torque tube and propeller shaft away and down from flywheel housing. Place a block of wood (approximately 3" square) between transmission extension and floor of car to position transmission for reassembly. Support torque tube with a stand. Remove bolts securing torque tube to transmission. *CAUTION - Torque tube and propeller shaft ar now h ld in place only by bearings in transmission extension and must be supported to prev nt bearing or shaft damag .* Remove propeller shaft and torque tube as an assembly by pulling on propeller shaft flange. *CAUTION - Pull propeller shaft straight out of transmission so that shaft will not bind in transmission or transmission extension.* Place torque tube and shaft assembly on a bench and pull propeller shaft out of torque tube. *CAUTION - When removing shaft from torqu tub , forc should not be necessary. If necessary, us a flat drift through bearing retainer bolt hole to spr ad torqu tube away from bearing retainer. B v ry car ful n t to damage coating on prop ller shaft.*

Automatic Transmission Cars: *NOTE - Due to design change on later mod ls only, disconnect exhaust pipe and lower rear stabilizer bar.* Remove bolts retaining propeller shaft damper bearings, then remove parking brake cable and vacuum line from torque tube and throttle valve linkage from transmission. On V8 engine cars, remove exhaust crossover pipe. Remove flywheel bottom cover, then support engine with a jack stand. Remove bolts connecting propeller shaft flange to flywheel and back out (about half way) bolts connecting torque tube to flywheel housing. Place a rag or cloth between propeller shaft and torque tube to prevent damage to coating on shaft, then use a screwdriver to pry propeller shaft flange (while holding with hand) rearward far enough to clear recess in flywheel. Remove bolts connecting torque tube to flywheel housing and pull torque tube and propeller shaft down and away from flywheel housing. Complete removal in same manner as for synchro-mesh transmission cars (above).



PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE ASSEMBLIES

BEARING INSULATOR & RETAINER: Removal - With propeller shaft removed from torque tube, remove screws from bearing insulator retainer, then remove insulator from each bearing. *CAUTION - Do not attempt removal of bearing from shaft as these parts are serviced only as an assembly.*

Installation: Install rubber insulator on each bearing, starting with bearing toward flange first, then place insulator retainers in position and secure with two self tapping screws. *CAUTION - Be very careful not to scratch or nick propeller shaft when installing insulator or retainer.*

INSTALLATION: Synchro-mesh Transmission Cars - Assemble propeller shaft in torque tube and place a cloth or rag between front of propeller shaft and torque tube so that coating on propeller shaft will not be damaged. *CAUTION - Propeller shaft should be replaced in torque tube without using force. If necessary, use a flat drift through bearing bolt holes to spread torque tube away from bearing retainer.* Install propeller shaft in transmission being careful to engage spline of propeller shaft into transmission and journal diameter into transmission extension bearings so as not to damage journal surface. *CAUTION - Ch ck splin alignment into transmission extension, and if absolut ly necessary, tap front flange lightly with a soft rubber hammer. Be sure splines are completely engaged in transmission.* Install bolts connecting torque tube to transmission extension and tighten to 30-45 ft. lbs., then remove block of wood between transmission and floor. Insert propeller shaft in place on clutch drive shaft and tighten bolts finger tight. Remove rag or cloth from inside torque tube, then install and tighten torque tube to flywheel housing bolts finger tight. Tighten propeller shaft flange to clutch drive shaft bolts to 40-80 ft. lbs. and torque tube to flywheel housing bolts to 40-80 ft. lbs. Install torque tube access cover screws to 40-80 inch pounds, then install and adjust gearshift housing and transmission control rod. Start and idle engine for approximately one minute, then install and tighten damper bearing retainer bolts and tighten to 8-12 ft. lbs.

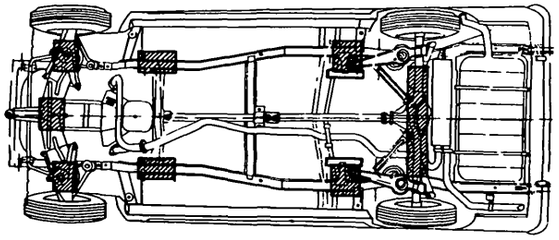
Automatic Transmission Cars: Install propeller shaft and torque tube in same manner as for synchro-mesh transmission cars (above) and note the following: Tighten bolts securing propeller shaft flange and torque tube to flywheel and flywheel housing to 30-45 ft. lbs., then install flywheel housing bottom cover. Install throttle valve linkage and adjust *(see "Carburetor" on Car Model page).* Remove support from engine. On V8 models, install exhaust crossover pipe. Start and idle engine for approximately one minute, then install and tighten bearing retainer bolts to 8-12 ft. lbs. Install parking brake cable and vacuum line.

BUICK & BUICK SPECIAL

Jacking & Hoisting: All Cars - *CAUTION - When lifting at lower control arm, lifting pad must not contact st ering arm or linkage or damage will result.*

Buick Special - Jack or lift car at points shown in illustration.

Buick - Jack car at spring seat on front lower control arms or center of front crossmember (front), and along entire length of rear axle housing (rear). Lift car at front frame side rails just forward of body floor pan (front), and rear of frame side rails at lower control arm front pivot (rear).



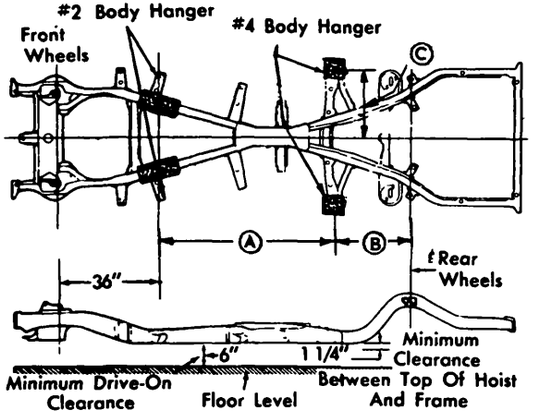
BUICK SPECIAL HOISTING POINTS

CADILLAC

H isting: Hoisting equipment that engages suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipe and mufflers. When using a frame contact type hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration. Take care to prevent hoist adapters contacting any part of the No. 2 body hanger. Hoist contact at rear should be at outer ends of No. 4 body mounting brackets. In no case should rear contacts be less than 32½" apart. *CAUTION - Hoist should not contact rear lower control link front mounting bracket. DO NOT lift Series 75 or Commercial Chassis cars on frame contact hoist as severe stress and misalignment will result due to length of frame and car.*

Cadillac Frame Dimensions

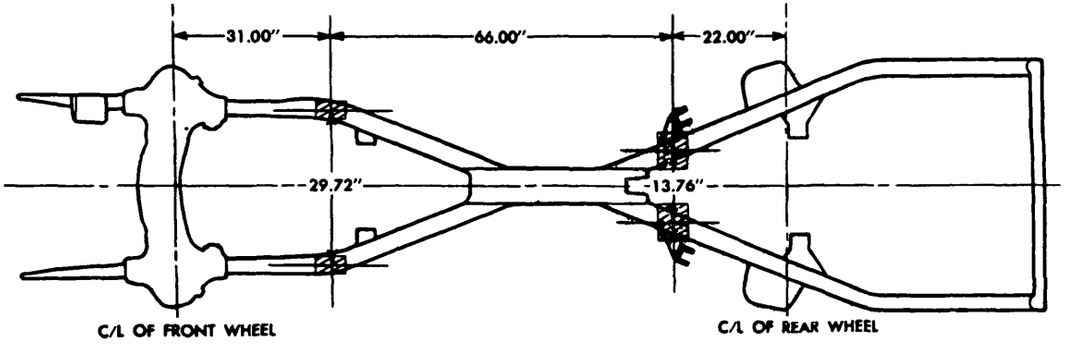
Series	Dimension A	Dimension B	Dimension C
60 & 62	64.50"	29.50"	16.25"
75	84.30"	29.50"	16.25"
CC	93.25"	26.75"	20.00"



CADILLAC FRAME CONTACT POINTS

CHEVROLET CARS & CORVETTE

H isting: Equipment engaging suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipes and mufflers. When using a frame contact hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration.



CHEVROLET FRAME CONTACT POINTS

CHEVROLET TRUCKS

Jacking: Following list of jacking points will assist wheel and tire assembly changes with vertical type emergency jacks supplied with trucks.

Front

10, 20, 30 Models - Lower arm pivot or torsion bar socket.

40 Models - Frame side rail ahead of steering gear or idler support.

50, 60 Models - Frame side rail behind front crossmember. Use hardwood block between front crossmember and upper control arm to reduce jack travel.

Rear

10, 20, 30 Models - Axle housing.

40 Models - Spring, ahead or behind axle.

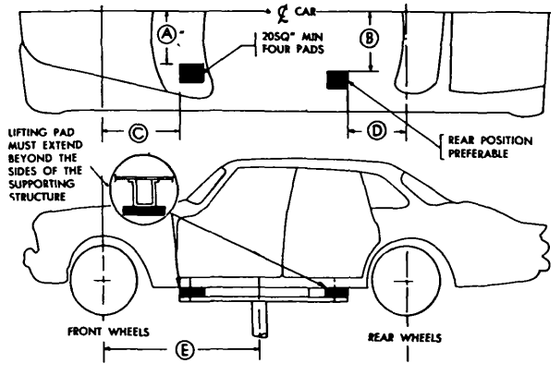
50, 60 Models - Spring, in front of axle housing.

CHRYSLER, DE SOTO, DODGE & DART LANCER, PLYMOUTH, VALIANT

Jacking: Locate jack **only** under rear axle housing or under front suspension lower control arms. *CAUTION - Jack must not contact any part of und rbody.*

Hoisting (Frame Contact Hoist): This type hoist must be equipped with proper adapters so car will be supported in correct places as shown in illustration, and to specifications listed below.

	A	B	C	D	E
Chrysler RC1, 2	16.50"	17.25"	24"	22"	54"
Chrysler RC3, 4	16.50"	17.25"	28"	22"	59"
DeSoto			24"	22"	54"
Lancer	14.2"	16.2"	20.3"	23.7"	48"
Plymouth	16.50"	17.25"	24"	18"	54"
Valiant	14.2"	16.2"	20.3"	23.7"	48"



CHRYSLER, DE SOTO, DODGE, LANCER, PLYMOUTH, VALIANT FRAME CONTACT POINTS

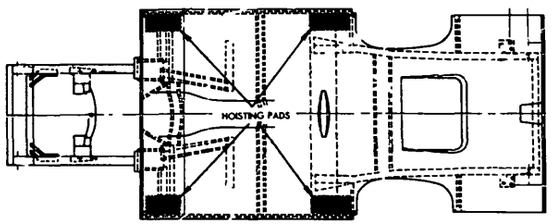
COMET, FALCON, THUNDERBIRD

Jacking: Either side of car may be raised at front by jack contact at lower arm strut connection. Either side of front end may be raised by jack pressure on front crossmember or crossmember to which stabilizer is connected. Either side of rear end may be raised by jack contact on rear crossmember. *Do not put pressure on fu l tank.*

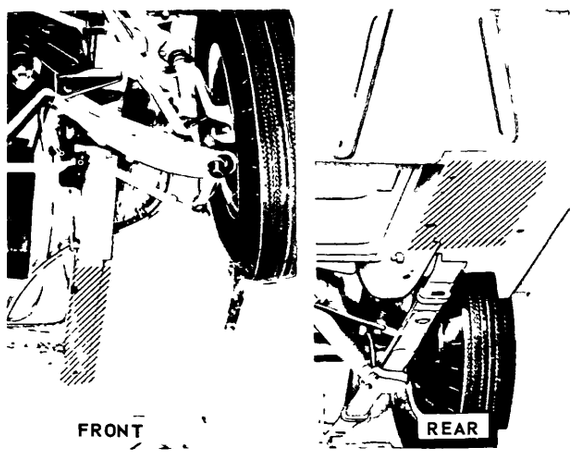
H isting: Check all drive-on type hoists for possible interference with car underbody. Modify hoist and approach ramps as necessary to provide clearance.

Rail & F rk Lift (Twin Post) Hoists - Front adapters or hoist plates must be carefully positioned to contact lower suspension arms and must be large enough to cover entire spring seat area. Rear adapters or forks must be positioned under rear axle (forks must not contact axle at points more than 1" outboard from circumference welds near differential housing). *CAUTION* - Raise car slowly and make certain that rear shock absorbers are not damaged.

Fram C ntact Hoist - Frame contact hoist adapters are necessary to lift car. Hoist adapter pads should cover at least 12 square inches (Falcon), or 24 square inches (T-Bird) of underbody areas shown in illustrations.



THUNDERBIRD FRAME CONTACT POINTS



FALCON FRAME CONTACT POINTS

CORVAIR CARS & TRUCKS

SEDANS, STATION WAGONS, GREENBRIER, TRUCKS

Jacking: Sedans & Station Wagons - Jack at lifting areas shown in illustration. *CAUTION* - Jack tab must catch outer body flange to prevent jack sliding too far under car.

Greenbrier & Trucks - Use jack pads between front and rear wheels as shown in illustration. Pin on load rest of jack must engage in hole in jack pad.

Hoisting (Frame Contact Hoist): All Models - Hoist must contact shaded lifting areas shown in illustrations.

OLDSMOBILE

Jacking: Support car at suspension points only. Do not support car at extreme ends of frame or at center of frame side rails.

Hoisting (Frame Contact Hoist): Lift car at shaded areas shown in illustration.

OLDSMOBILE F-85

Hoisting (Frame Contact Hoist): Place contact pads of hoist at circled lifting points shown in illustration. Lift arms must not interfere with hand brake intermediate lever.

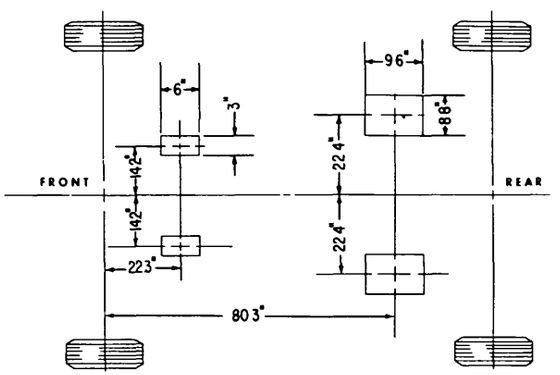
PONTIAC

Hoisting (Frame Contact Hoist): Lifting pads must be positioned at shaded areas shown in illustration to prevent damage to other parts. Ground clearance is 7½" front, 6" rear.

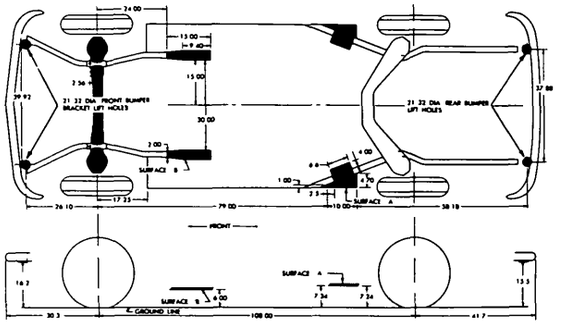
PONTIAC TEMPEST

Lifting: Lift car at any accessible point on frame side rail, at front crossmember, or front or rear lower control arms. *CAUTION* - 1) Avoid rear shock absorber brackets. 2) DO NOT lift at bumpers, torque tube, axle shafts, transaxle or engine. 3) Torque tube and exhaust system are lower than frame side rails and adapters must be used to provide clearance.

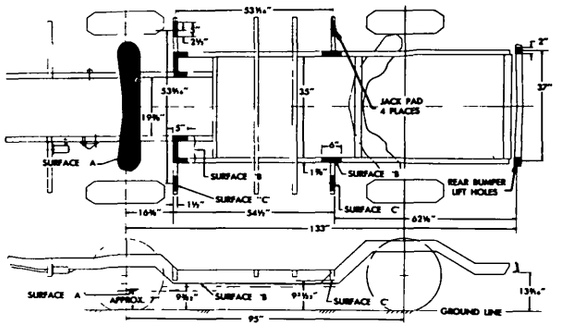
Towing: Tow **only** at front or rear crossmembers. DO NOT tow by bumpers, axle shafts, or steering linkage.



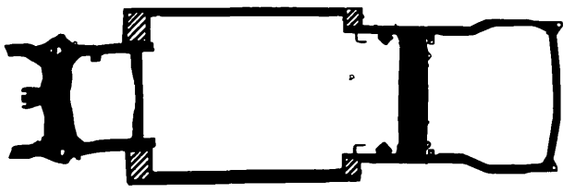
COMET FRAME LIFT DIMENSIONS



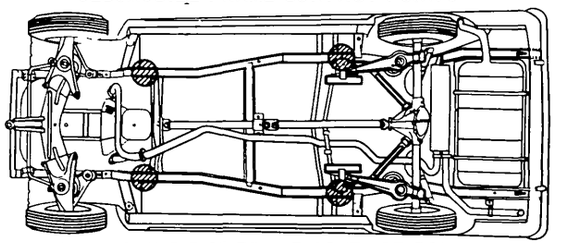
CORVAIR (SEDANS & STATION WAGONS)



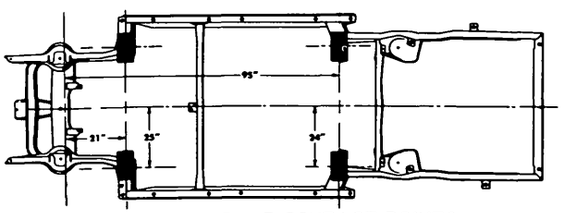
CORVAIR (GREENBRIER & TRUCKS)



OLDSMOBILE FRAME CONTACT POINTS



OLDSMOBILE F-85 FRAME CONTACT POINTS



PONTIAC FRAME CONTACT POINTS

BUICK FRONT SUSPENSION (EXCEPT BUICK SPECIAL)

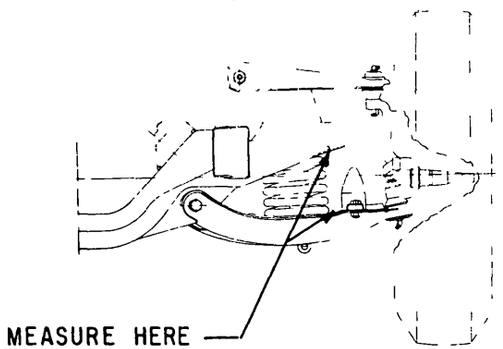
Buick Series 4400, 4600, 4700, 4800 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*BRAKE REACTION ROD TIGHTENING SPECIFICATION & ATTACHING BOLT, WASHER & NUT PRODUCTION CHANGE:* On later cars, longer bolt, Part No. 186626, two hardened steel washers, Part No. 1348315, and nut, Part No. 9413997 are used to attach reaction rod to lower control arm. With new bolts, washers must be installed under bolt head and under nut. Tighten to 60-65 ft. lbs. Earlier cars with shorter bolts and single washer must be tightened to 65-70 ft. lbs. Tighten nuts on forward end of reaction rod-to-bracket to 60-80 ft. lbs.

DESCRIPTION: New design ball joint type front suspension assembly with lower control arms pivoted to frame members by rubber bushings. Lower control arms are maintained in position by brake reaction rods mounted between lower control arms and frame members. Upper control arms are pivoted on a shaft attached to a bracket on frame member.

ADJUSTMENT: *CASTER & CAMBER ADJUSTMENT CAUTION* - Alignment Set Height Tool J-8973-23 must be installed between lower control arm and frame front crossmember at a point just inboard of the rubber rebound bumper on each side of car. Install Rear Spacers J-8973-19 between frame and axle housing with top of spacer positioned over bolt at rear of bumper. It is not necessary to use additional weight to hold car on spacer blocks or height tools as they are designed to raise car slightly. *Correct alignment height must be maintained when making caster and camber adjustments.*



RIDING HEIGHT MEASUREMENT

Kingpin Inclination: 9°52' at 0°50' camber. Not adjustable.

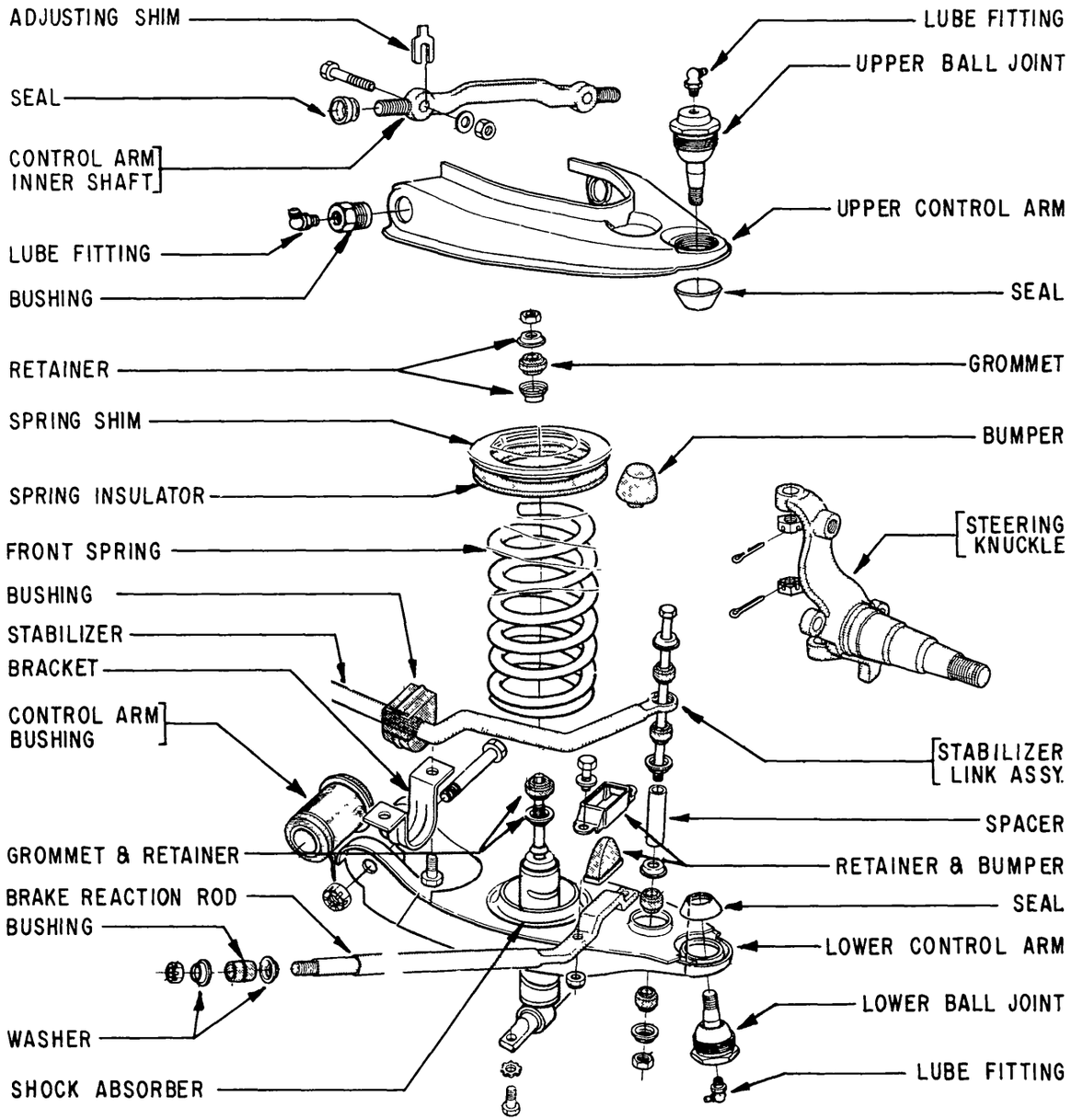
Caster: Neg. 1 1/3°±1°. Both sides equal within ¾°.

Camber: Pos. 1° to Neg. ½° (Pos. 1/3° desired). Both sides equal within ¾°.

Toe-In: 3/16-9/32".

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 22½°.

►*CASTER & CAMBER SHIMMING NOTE: Adjustment is made by shimming at upper control arm shaft. Maximum shim pack at either location must not exceed .500" with no more than five shims.*



1961 BUICK (EXC. SPECIAL) FRONT SUSPENSION ASSEMBLY

Front Riding Height: 6.06"(All models), measured between upper surface of lower crossmember and spring housing on crossmember. See illustration. To correct add 1/8" shim between top of spring and housing. If more than three shims are required, replace spring.

Front Wheel Bearing: Tighten adjusting nut to 15 ft. lbs. while rotating wheel, then back off nut and re-torque to 10 ft. lbs. If a spindle hole lines up with one of the six nut slots, back off nut 1/12 turn and install cotter pin. If neither spindle hole lines up with nut slot, back off nut a maximum of 1/6 turn and install cotter pin.

CONTINUED ON NEXT PAGE

BUICK (EXCEPT BUICK SPECIAL) FRONT SUSPENSION (Cont.)

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove upper mounting stem nut, grommet retainer, and grommet, then remove two lower mounting bracket-to-lower control arm bolts and lower shock through lower control arm.

Installation: Install lower grommet retainer and grommet (small end up) on shock stem and install shock through lower control arm. Install shock bracket to lower control arm bolts and tighten to 15-25 ft. lbs. Assemble top grommet (small end down), grommet retainer, and nut on stem and tighten to 5-10 ft. lbs.

UPPER BALL JOINT: Removal - Raise and support car under frame, then remove wheel and tire. Loosen but do not remove nut on ball joint tapered stud, then rap steering knuckle sharply in area of stud to disengage stud. With another jack, support car weight under lower control arm and remove nut from ball joint stud. Lower jack under lower control arm slightly, being careful not to damage brake hose. Raise upper control arm and remove rubber bumper under upper control arm. Use a 1 7/8" socket and unscrew ball joint from control arm.

Installation: Install replacement ball joint and carefully pick up original threads on upper control arm and seat ball joint securely against control arm. Turn grease fitting toward rear of car. Turn ball joint stud so cotter pin hole is fore and aft and assemble dust shield over stud. Move knuckle up by jacking under outer edge of lower control arm. Clean stud and tapered hole in knuckle, then install stud in knuckle and tighten nut to 30-40 ft. lbs. and install cotter pin. Reinstall rubber bumper, wheel and tire assembly.

LOWER BALL JOINT: Removal - Raise car and support under frame side rails, then remove wheel and tire. Remove wheel hub, then remove brake backing plate and place above upper control arm on frame spring seat. *NOTE - It is not necessary to remove brake hose from wheel cylinder.* Place a floor jack under lower control arm as far outboard on arm as possible, leaving approximately ½" clearance between jack and control arm. Loosen but do not remove nut on ball joint stud. *CAUTION - Do not loosen nut more than 1/8".* Rap knuckle in area of stud to disengage stud from knuckle, then raise jack against lower control arm. Remove nut and raise knuckle off ball joint stud. Use a 2 1/8" socket and unscrew ball joint from lower control arm.

Installation: Install a new ball joint into threads of lower control arm and seat ball joint firmly against control arm. Point grease fitting toward centerline of car, then install grease shield. Install knuckle over ball joint stud and rap with a hammer to seat stud in knuckle. Install nut and tighten to 60-70 ft. lbs. and install cotter pin. Install a new "O" ring seal over spindle and install backing plate and hub assembly. Tighten the ¾" bolt and nut to 60-75 ft. lbs.; 11/16" bolt and nut to 40-60 ft. lbs.; and the brake anchor bolt to 130-150 ft. lbs. Install wheel bearings and adjust (see above), then install wheel and tire.

STEERING KNUCKLE: Removal - Remove upper and lower ball joint studs from steering knuckle (see above) and remove knuckle.

Installation: Reverse removal procedure.

UPPER CONTROL ARM: Removal - Remove upper control arm ball joint from steering knuckle (see "Upper Ball Joint" above), then remove control arm shaft-to-frame bracket nuts, carefully noting location and thickness of adjusting shims between shaft and frame bracket. Remove control arm assembly. *NOTE - If right hand upper control arm is being removed, it will be necessary to remove generator.*

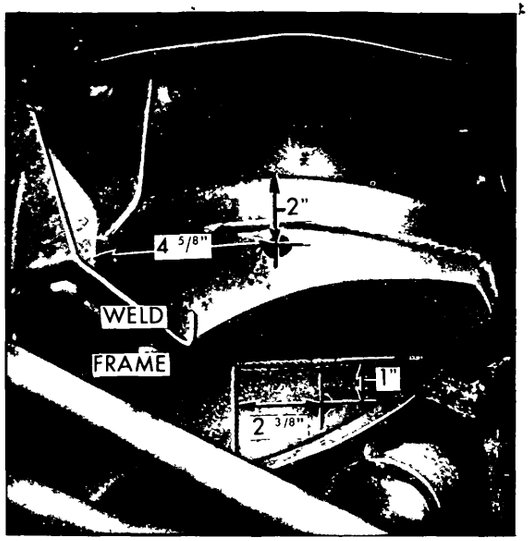
Disassembly: Clamp arm assembly in a vise and remove bushings and shaft. If necessary, remove ball joint assembly (see "Upper Ball Joint" above).

Reassembly: Assemble new grease seals on shaft and position shaft in arm. Start new bushing in original threads of arm and thread shaft into bushing to aid in alignment. Tighten bushing to 70 ft. lbs. Start second bushing into original threads of arm with shaft threaded into opposite bushing. After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing. Tighten bushing to 70 ft. lbs. *NOTE - Shaft should be free to turn by hand.* Install grease fittings and lubricate bushings. Rotate shaft to center shaft in arm so there is an equal distance between bolt holes in shaft and arm at both sides.

Installation: Reverse removal procedure, being careful to locate the steel washers under heads of shaft-to-frame bracket bolts. Install original shim packs in their proper locations between shaft and frame bracket. Tighten shaft-to-frame bracket bolts to 80-120 ft. lbs. Install upper ball joint (see "Upper Ball Joint" above), then check and adjust front end alignment.

COIL SPRING: Removal - Raise car and support under frame side rails. *NOTE - Raise car sufficiently high to allow lower control arm to be positioned nearly straight down with a jack placed beneath ball stud end of control arm.* Remove wheel, brake drum, and bearings, then remove steering arm-to-knuckle bolts and nuts. Remove brake anchor pin-to-knuckle bolt and slide backing plate assembly off spindle and place out of way. Remove brake reaction rod-to-lower control arm bolts, nuts and special flat washers, then remove control arm-to-frame compression bumper. Remove stabilizer link, spacer, grommet and retainers. Remove stabilizer bar bracket and shock absorber. Place a floor jack under lower control arm as far outboard as possible without damage to ball joint grease fitting or remove grease fitting and place jack under ball joint. *NOTE - Floor jack must be placed parallel with lower control arm with handle of jack toward opposite side of car to allow lower control arm to travel through its normal arc without bending arm or deforming inner bushing. Control arm must be lowered nearly straight down to remove spring.* Disconnect lower ball joint from knuckle (see "Lower Ball Joint" above), then lower jack to allow control arm to swing completely down and relax spring. Use a long pry bar to release spring from spring seat. *CAUTION - Spring, insulator, and shim (if used) will pop out on floor. Stand clear of spring to avoid injury.*

►*COIL SPRING REPLACEMENT TOOL NOTE:* Examine frame in area of upper spring seat for two 5/8" holes (see illustration) which must be used with Tool J-9195. If holes are not present, locate and drill as indicated in illustration.



DRILLING LOCATIONS

Installation: Tape insulator and shim (if used) to top of spring, then assemble Tool J-9195-3 (plate) and J-9195-4 (retainer) between spring coils approximately two coils up from lower end of spring. Position assembly up against spring seat and assemble tool draw bars, bearings, and nuts to frame and plate, inserting bent ends of draw bars in 5/8" holes in frame. Rotate spring so when control arm is raised, lower end of spring will be located in depression in lower control arm. Tighten draw bar nuts alternately and evenly to compress spring until lower end of spring is approximately even with lower (outboard) edge of spring seat in lower control arm. Push lower control arm down and force the lower end of spring into spring seat. Remove rebound bumper under upper control arm, then raise lower control arm with floor jack placed as far out on arm as possible. With lower control arm safely supported, make sure rubber seal is in place on ball stud, then position cotter pin hole in ball stud fore and aft and position knuckle on tapered stud. Install stud nut tighten to 60-70 ft. lbs. and install cotter pin. *NOTE - It may be necessary to add weight to front of car in order to compress spring sufficiently to allow installation of ball joint stud nut.* Remove spring installer, Tool J-9195.

Installation: Remove and replace old rubber bushing if worn, then install larger diameter washer on brake reaction rod first, with concave side away from nut. Install rod through bushing in frame bracket and install washer with smaller diameter, and nut. Do not tighten. Install frame compression bumper over brake reaction rod, then install two bolts and washers and tighten to 60-65 ft. lbs. (cars with hardened steel washer under attaching nuts); 65-70 ft. lbs. (cars without hardened steel washers under attaching nuts). *CAUTION - These bolt nuts must be tightened to the exact specifications as indicated above.* Tighten nut at front end of reaction rod to 60-80 ft. lbs. and install cotter pin. Check and adjust caster and camber.

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove bolt and nut at inner end of lower control arm and remove arm. Remove bushing by pushing or driving from frame using a suitable tool.

CONTINUED ON NEXT PAGE

BUICK (EXCEPT BUICK SPECIAL) FRONT SUSPENSION (Cont.)

Installation: Drive a new lower control arm bushing into frame until it bottoms. Slip lower control arm over bushing and install bolt and nut. Tighten nut to 80-120 ft. lbs. and install a cotter pin. DO NOT back off nut to align hole in bolt for cotter pin installation. Bend tabs of cotter pin. Reinstall coil spring (see above).

NOTE - Retainer-to-plate nut tool is accessible through spring seat hole in lower control arm. Reinstall brake backing plate, steering arm and attaching bolts. Tighten front steering arm bolt nut to 40-50 ft. lbs., rear bolt nut to 60-75 ft. lbs. and anchor bolt to 130-150 ft. lbs. Reinstall brake reaction rod and compression bumper and tighten nuts to 60-70 ft. lbs. *CAUTION - If there is any question of serviceability of brake reaction rod-to-lower control arm bolts, nuts and washers, see "Brake Reaction Rod" below for special parts required. DO NOT use standard bolts, nuts, or washers at this location.* Install stabilizer bar and shock absorber. Install wheel, hub, and brake drum assembly and adjust wheel bearings (see "Front Wheel Bearings" above).

BRAKE REACTION ROD: *CAUTION - Whenever it is necessary to replace brake reaction rod-to-lower control arm attaching bolts, nuts, and washers, use the special parts furnished in Service Package, Part No. 1389760 only. DO NOT USE standard bolts, nuts, and washers.*

Removal: Raise front of car and remove nut from front end of brake reaction rod. Remove control arm-to-frame compression bumper, then remove brake reaction rod by sliding it out of its rubber bushing on frame front crossmember.

BUICK (EXCEPT BUICK SPECIAL) REAR SUSPENSION

Buick Series 4400, 4600, 4700, 4800 (1961)

DESCRIPTION: Coil spring, three link type rear suspension having two lower control arms connected between rear axle housing outer ends and frame side rails. These two control arms take all driving and braking forces. A single upper control arm connected to right side of rear axle housing and to right frame side rail prevents axle housing from rotating during braking and acceleration. This upper control arm is a two piece design having vernier-spaced holes and two slotted holes for adjustment of rear universal joint angle (differential housing "nose" angle).

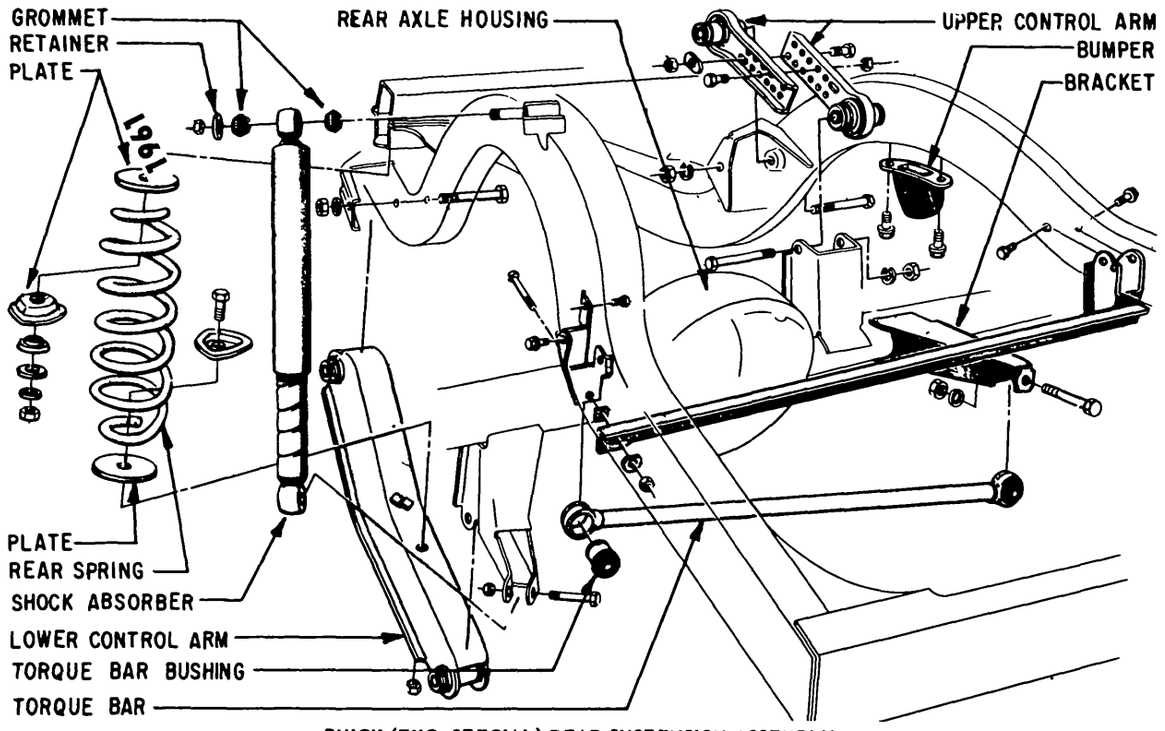
REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Raise rear of car and remove shock absorber lower mounting bolt and rubber bushings. Remove upper shock absorber mounting stem nut, upper grommet retainer and grommets, then remove shock absorber.

Installation: Inspect all rubber bushings and grommets and replace if necessary. Assemble grommets in upper shock absorber eye, then install shock with grommets over stud in frame and install washer and nut. Tighten nut to 35-45 ft. lbs. Install lower end of shock absorber and grommets in bracket, then install pivot bolt (do not tighten). Lower rear of car and tighten lower shock absorber pivot bolt to 35 ft. lbs. min. *CAUTION - Car weight must be on rear wheels when tightening shock absorber lower end.*

COIL SPRING: Removal - Raise rear of car and support on frame stands, then mark universal joint and pinion flange for correct reinstallation. Disconnect universal joint U-bolt clamps at pinion flange and slide propeller shaft forward on slip spline far enough to clear rear companion flange. Wire propeller shaft up out of way. *CAUTION - Do not allow constant-velocity universal joint to bend to end of its travel.* To provide slack in brake line, disconnect brake line bracket at rear suspension crossmember. Position floor jack under control arm below axle housing and raise tension slightly to relieve tension on shock absorber, then disconnect shock absorber at axle bracket. Remove nut from lower spring clamp bolt and carefully lower jack to fully extend spring and remove bolt and spring clamp from lower control arm. Remove upper spring clamp and remove spring. *CAUTION - Do not completely lower floor jack as this will cause strain on brake hose.*

Installation: Assemble upper insulators on stud between frame and top of spring, then position top of spring up against insulator and assemble spring clamp, clamp insulator, flat washer and lockwasher and nut on stud. DO NOT tighten at this time. Place short piece of 2 x 4 between lower end of spring and axle housing (this will hold spring forward on lower control arm to aid in attaching spring to arm). Raise control arm to contact spring and slip spring seat between spring and control arm. Insert a long tapered punch through control arm bolt hole from bottom to maintain alignment of control arm and spring seat hole. Slip spring clamp over punch and position straight side of clamp along straight end of spring. Rotate spring if necessary to locate spring end at top as follows: On left side, top spring end should be toward rear of car. On right side, top spring end should be toward front of car. Tighten upper clamp nut to 15-20 ft. lbs. Raise control arm until lower spring clamp bolt can be installed, then tighten nut to 20-30 ft. lbs. Install lower control arm to bracket on rear axle and tighten attaching bolt nut to 100-140 ft. lbs. Attach shock absorber to axle bracket and remove wood block, then tighten shock absorber nut to 35 ft. lbs. Attach propeller shaft to rear companion flange. Reinstall brake bracket



BUICK (EXC. SPECIAL) REAR SUSPENSION ASSEMBLY

LOWER CONTROL ARM: Removal - Disconnect rear spring at lower end (see above), then with bottom of spring positioned off of lower control arm and towards differential carrier, raise rear axle assembly and re-

CONTINUED ON NEXT PAGE

BUICK (EXCEPT BUICK SPECIAL) REAR SUSPENSION (C ntinu d)

connect rear shock absorber. With axle housing supported remove lower control arm rear bracket bolt (if necessary, reposition jack further forward under nose of carrier and slowly raise to relieve bind at control arm bushing). Remove lower control arm front bracket nut and bolt, driving bolt out with a brass drift, then remove control arm.

Installati n: *NOTE - B fore installing control arm, check front edges of control arm brackets and remove burrs.* Position control arm in front bracket and install bolt, washer and nut, but do not tighten. Slowly raise rear axle assembly until control arm rear bushing is aligned with bracket bolt hole (line up with a tapered punch), then install bolt, washer and nut, but do not tighten. Disconnect shock absorber at lower end, then lower rear axle assembly and position coil spring on its seat (place a short wooden block between lower end of spring and axle housing). Insert spring seat between spring and control arm, then insert a long tapered punch through control arm bolt hole from bottom to maintain alignment of control arm and spring seat hole. Slip a clamp over punch and position straight side of clamp along straight edge of spring. *NOTE - On left spring, top spring end should be toward rear of car. On right spring, top spring end should be toward front of car. If springs are not positioned as above, loosen top spring clamp bolts and position as necessary, then tighten clamp bolts to 15-20 ft. lbs.* Hold spring in position, and with lower spring clamp plate correctly positioned, install bolt with nut on bottom and tighten to 20-30 ft. lbs. Raise rear axle assembly and install lower end of shock absorber, then remove wood block. Tighten shock absorber bolt to 35 ft. lbs. minimum, and control arm bushing bolts to 90-110 ft. lbs. *NOTE - Car should be in normal load position when tightening shock absorber and lower control arm bolts.* Connect propeller shaft (see "Coil Spring" above) and install brake line bracket to rear suspension crossmember.

TRACK BAR: Removal - Raise car and support so weight of car is on rear springs, then remove pivot bolt and and nut attaching track bar to bracket on axle housing and to track bar bracket on left side of car. Remove track bar.

Installati n: If bar is bent, install a new one. DO NOT try to straighten. If necessary to replace bushings, press old bushings out from side which has no flange. Install new bushing by pressing on flanged side of bushing until flange is in contact with eye of bar. Reverse removal procedure and tighten bolts to 40-50 ft. lbs. (at frame side rail); 110-140 ft. lbs. (at axle housing). *CAUTION - Car must be at normal trim h ight when tight ning track bar bolts.*

UPPER CONTROL ARM: Replacement - *NOTE - Upper control arm bushings not available separately. If necessary to replace, install new arm assembly.* Upper control arm can be removed by disconnecting bolts at both ends. When installing, tighten bolts to 100 ft. lbs. *CAUTION* - This arm controls rear universal joint angle. If necessary to replace arm or if arm adjustment is disturbed, rear universal angle must be adjusted. *See "Propeller Shaft" in Rear Axle section.*

BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION

Buick Special (1961)
Oldsmobile F-85 (1961)

DESCRIPTION: Independent suspension with ball joints connecting steering knuckle to upper and lower control arms. The entire front suspension system is mounted on front suspension crossmember which is attached to car underbody by three isolation mounts. The complete suspension unit can be removed from car as a single unit.

ADJUSTMENT: *BUICK ADJUSTMENT CAUTION: Front 'Alignment Height Tool J-8973-22 and Rear 'Alignment Height Tool J-8973-21 (Rear Height Alignment Tool J-8973-20 for Station Wagons) must be installed when checking and setting caster and camber.*

Steering Axis Inclination: Buick Special - 7½° (Camber within specified limits). Not adjustable.
Oldsmobile F-85 - 7°30' at 0° Camber.

Caster: Buick Special - Neg. 2¾°±½° (Cars before Serial No. 1H1504352 Flint and 1H2502044 South Gate). Neg. 2°±½° (Cars after the above serial numbers). Both sides equal within ¾°.
Oldsmobile F-85 - Neg. ¾° to Pos. 1¾°. Both sides equal within ¾°.

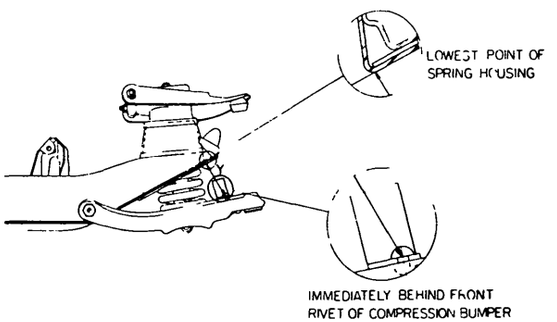
Camber: Buick Special - Neg. ¼° to Neg. 1°. Both sides equal within ¾°.
Oldsmobile F-85 - Neg. 3/8° to Pos. 3/8°. Both sides equal within ¾°.

►*CASTER & CAMBER SHIMMING NOTE: 'Adjustment is made by adding or removing shims between upper control arm shaft and bracket on front crossmember. Maximum shim pack at either location must not exceed .380". Tighten control arm shaft bolts to 60-85 ft.*

Toe-In: Buick Special - 1/16-1/8" (Cars before Serial No. 1H1504352 Flint and No. 1H2502044 South Gate). 1/8-3/16" (Cars after above serial numbers).
Oldsmobile F-85 - 0-1/8".

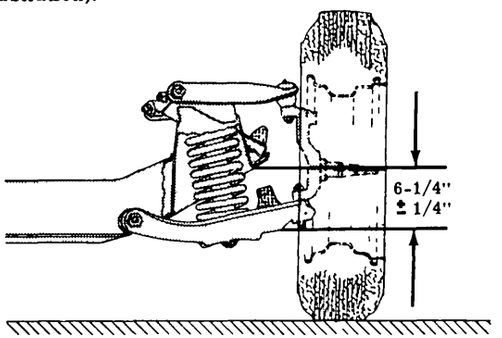
Toe-Out on Turns: With outer wheel turned 20°, inner wheel should be 23°40' (Buick Special); 23° (Oldsmobile F-85). Not adjustable.

Front Riding Height: Buick Special - 4.40" (All models at curb weight) measured from a point immediately behind front rivet of compression bumper on lower control arm to lowest point of spring housing (see illustration). *NOTE - Spring shims are not available for adjusting riding height.*



BUICK SPECIAL RIDING HEIGHT

Oldsmobile F-85 - 6¼±¼" (All Models at curb weight) measured from lower side of gauge hole in lower control arm to metal surface of spring upper housing (see illustration).



OLDSMOBILE F-85 RIDING HEIGHT

Front Wheel Bearings: Buick Special - Tighten adjusting nut to 15 ft. lbs. while rotating wheel, then back off nut and re-torque to 10 ft. lbs. If a spindle hole lines up with one of the six nut slots, back off nut 1/6 turn and install cotter pin. If neither spindle hole lines up with nut slot, back off nut a maximum of 3/12 turn and install cotter pin.
Oldsmobile F-85 - Tighten adjusting nut to 10-15 ft. lbs., then back off nut 1/6 to 1/4 turn and install cotter pin.

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove two upper and two lower shock absorber attaching bolts, then raise car (support on wheels) and remove shock absorber through lower control arm.

Installation: Reverse removal procedure and tighten attaching bolts to 15-25 ft. lbs.

LOWER BALL JOINT: Removal - Raise and support car at front crossmember, then place a jack ¼" below coil spring under lower control arm. Loosen ball joint nut (do not remove), then rap steering knuckle at ball joint stud with a brass drift or hammer to loosen stud. Remove nut and unscrew ball joint.

Installation: Lubricate with aluminum soap grease, then tighten ball joint in control arm until hex starts to shave metal from arm. Raise stud into knuckle and install nut, then tighten to 35-60 ft. lbs. and install cotter pin.

UPPER BALL JOINT: Removal - Raise and support car at front crossmember, then remove wheel and tire. Loosen ball joint nut (do not remove), then rap steering knuckle at ball joint stud with a brass drift or hammer to loosen stud. Support brake assembly, raise arm and unscrew ball joint from upper control arm.

Installation: Lubricate with aluminum soap grease, then tighten ball joint in control arm until hex starts to shave metal from arm. Insert stud in knuckle and install nut, then tighten to 35-60 ft. lbs. and install cotter pin. Install wheel and tire.

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BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION (C ntinu d)

STEERING KNUCKLE: Removal - Raise and support car at front crossmember, then remove wheel, hub and drum assembly. Remove backing plate without disconnecting brakehose (leave steering arm connected to tie rod end). *NOTE - Support backing plate out of the way.* Disconnect ball joints from steering knuckle (see above).

Installation: Reverse removal procedure and tighten ball joint stud nuts to 35-60 ft. lbs. and backing plate to steering knuckle bolts to 55-80 ft. lbs.

COIL SPRING: Removal - Raise front of car and support at underbody with floor stands. Remove wheel assembly and disconnect stabilizer link from lower control arm, then remove s. ck absorber. Position a floor jack to support lower control arm ball, between spring seat and ball joint. Disconnect lower control arm ball joint from steering knuckle (see "Lower Ball Joint" above). Slowly lower floor jack until spring is fully extended and remove spring.

Installation: *NOTE - Top of spring is identified by a flat coil.* While holding spring against pilot in front crossmember, tilt spring so it will pilot in lower control arm, then rotate spring so end of bottom coil will index with edge of hole in control arm spring seat. *NOTE - Coil should not cover any portion of hole.* Position floor jack between spring seat and ball joint, then raise control arm until ball joint is tight in steering knuckle. Tighten ball joint nut to 35-60 ft. lbs. Install shock absorber and connect stabilizer to lower control arm and tighten nut to 13-17 ft. lbs.

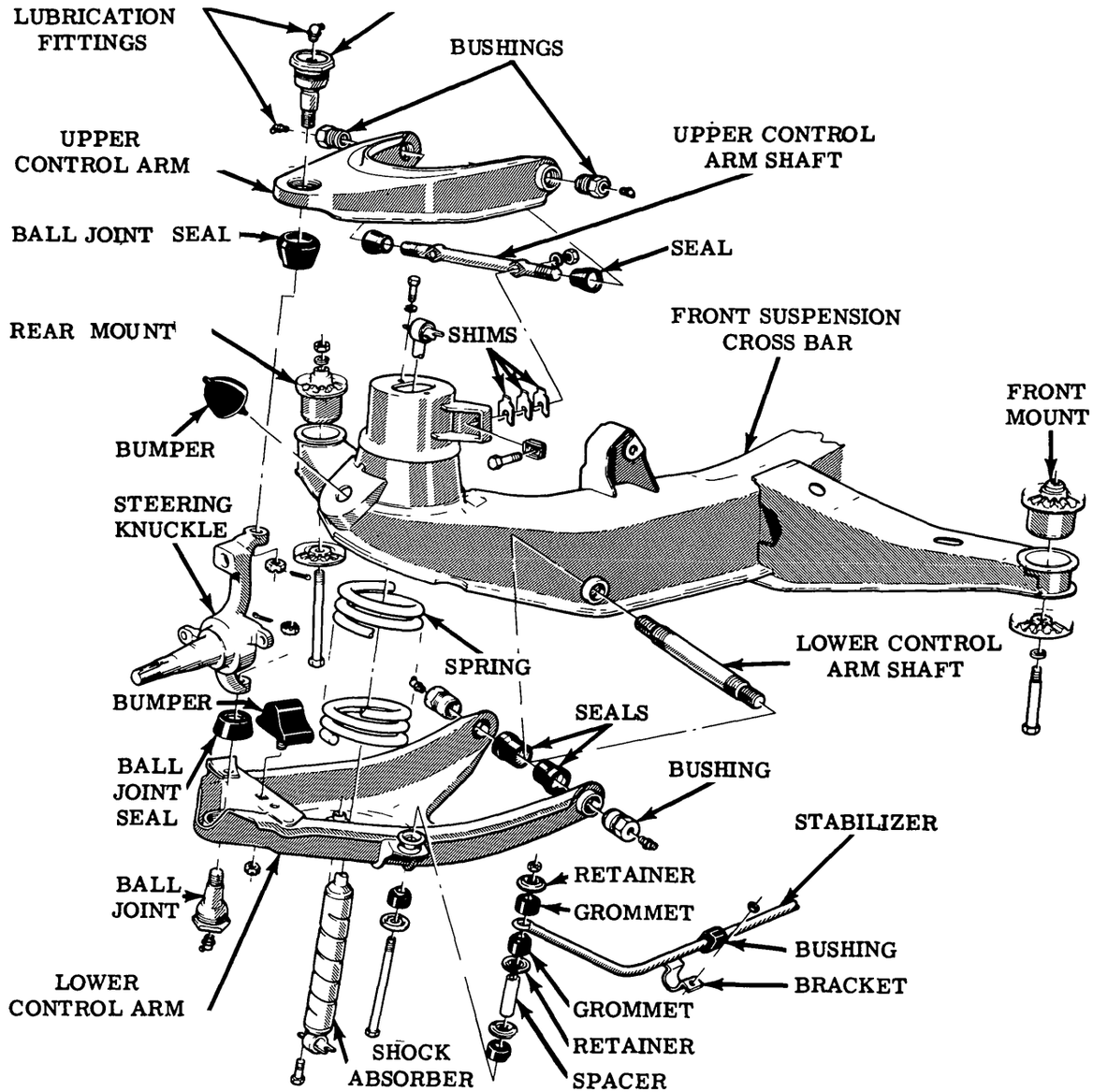
LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove pivot shaft bushings from control arm assembly and remove control arm.

Installation: Lightly coat threads of shaft with chassis lubricant and start bushing onto threads of shaft. Place Spacer Tool J-8808 on shaft between control arm and crossmember, then with spacer against front crossmember and control arm against spacer, tighten bushing until hex of bushing seats firmly into arm. Remove spacer and install bushing at opposite end of shaft.

LOWER CONTROL ARM SHAFT: Removal - Remove lower control arm, then thread Installer & Remover J-8907 or J-8907-1 on rear of lower control arm shaft approximately 7/8" and tighten lock bolt of tc old tool to shaft. *NOTE - Do not thread tool tightly on shaft.* Turn Tool J-8907 clockwise to remove shaft through front of crossmember. Remove tool, then remove shaft. *NOTE - Threads on rear of shaft are smaller than threads at front of shaft.*

Installation: Position shaft through front of crossmember with "F" on shaft toward front. Install same tool used for removal, then coat threads of shaft with Lubriplate and thread shaft into crossmember until shaft extends an equal distance from front and rear of crossmember (approximately 1 11/16"). *CAUTION - Measure and make sure shaft extends an equal distance from front and rear of crossmember.* Install lower control arm

UPPER CONTROL ARM: Removal - Raise car and support under lower control arm, then remove wheel. Disconnect upper ball joint from knuckle (see "Upper Ball Joint" above). Support hub assembly, then remove inner control arm shaft bolts and remove arm. Note location of shims between shaft and crossmember bracket,



BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION

Disassembly: Clamp arm assembly in a vise and remove old bushings and shaft.

Reassembly: Assemble new grease seals on shaft, then apply a light coating of Lubriplate to shaft threads and position shaft in arm. Start new bushing in original threads of arm and thread shaft into bushing to aid in alignment. Tighten bushing until hex section of bushing seats firmly into arm. Start second bushing into original threads of arm with shaft threaded into opposite bushing. After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing. Tighten bushing until hex section seats firmly into arm. *NOTE - Shaft should be free to turn by hand.* Install grease fittings and lubricate bushing. Rotate shaft so distance between shaft bolt holes and arm are equal at both sides.

Installation: Assemble upper control arm and shaft assembly to bracket and install original shim packs in their proper location. Tighten shaft-to-bracket bolts to 60-85 ft. lbs. Reinstall upper ball joint on knuckle,

BUICK SPECIAL & OLDSMOBILE F-85 REAR SUSPENSION

Buick Special (1961)
Oldsmobile F-85 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 OLDSMOBILE F-85 REAR COIL SPRING RATTLE CORRECTION:* This condition may be diagnosed as a body rattle and can be corrected as follows: Remove rear coil spring, then grind a flat surface on top side of lowest coil. Starting from top of end of lowest coil grind down 1/8" and taper back approximately 3". Cut one Spring Insulator, Part No. 578828 in half, and force one section between the two top coils of each spring to prevent these coils from making contact. Position original insulator on spring 180° from original location, then reinstall spring.

DESCRIPTION: Coil spring, four link type suspension having two lower control arms mounted between outer ends of rear axle housing and car underbody. Two upper control arms are mounted angularly between rear axle differential housing and car underbody.

ADJUSTMENT: *NOTE - Rear universal joint angle must be checked and adjusted whenever rear lower control arms are replaced. See "Propeller Shafts" in Rear Axle Section.*

REAR RIDING HEIGHT: Buick Special - 6.65"±3/8" (Exc. Station Wagon); 5.94"±3/8" (Station Wagon) measured from top of rear axle tube of axle housing to base of rebound bumper on car underbody.

Oldsmobile F-85: 6¼-6¾" (Exc. Station Wagons); 5 7/8-6 3/8" (Station wagons)measured from top of rear axle tube of axle housing to base of rebound bumper on car underbody.

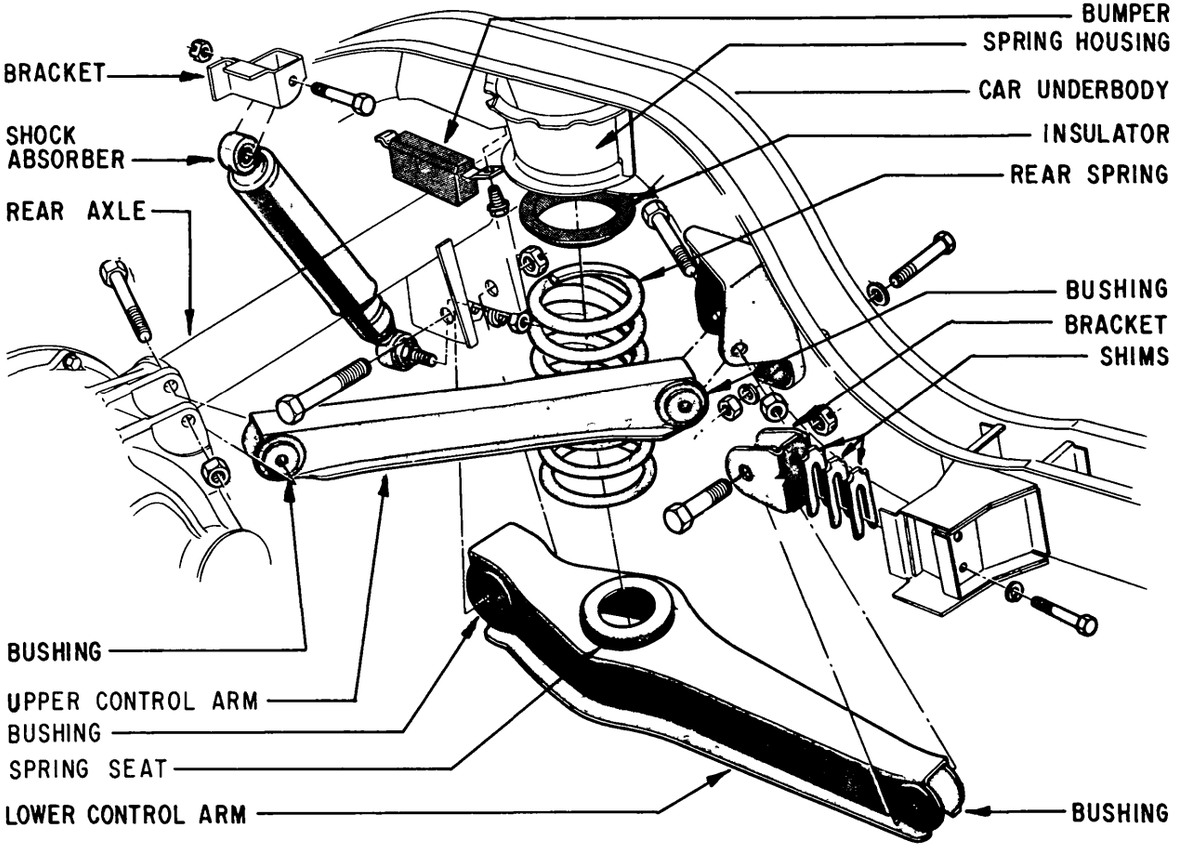
REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Raise and support rear axle, then disconnect shock absorber at upper and lower brackets and remove.

Installation: Loosely attach shock absorber to both brackets, then tighten lower stud nut to 30-45 ft. lbs. and upper nut to 45-60 ft. lbs.

REAR COIL SPRINGS: Removal - Raise and support rear of car, then slightly raise and support rear axle assembly with a floor jack. Provide slack in parking brake cables by disconnecting at cable hanger. Disconnect shock absorber from bracket on axle housing, then lower rear axle assembly fully and remove coil spring and insulator.

Installation: Position coil spring with ground (flat) end of spring and insulator at top and tang at lower end located in notch of lower control arm. Raise rear axle assembly and connect shock absorber to bracket on axle housing and tighten nut to 30-45 ft. lbs. Connect parking brake cable at hanger.



BUICK SPECIAL & OLDSMOBILE F-85 REAR SUSPENSION

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then disconnect lower control arm at bracket on axle housing. Disconnect front bracket from underbody and remove lower control arm and bracket. *CAUTION - Note number and thickness of shims found between underbody and bracket.*

Installation: *NOTE - Inspect rubber bushings and replace as required (bushings are replaced through one side of arm only). If control arm is bent or damaged it must be replaced.* Assemble front bracket on control arm and tighten nut to 85-110 ft. lbs. *NOTE - When bracket is in normal position, the arms of bracket will be angled downward.* Bolt front bracket to underbody with original number of shims in place and tighten bolts to 45-60 ft. lbs., making sure that lockwashers are in place at heads of bolts. Connect control arm to bracket on axle housing and tighten bolt to 85-110 ft. lbs., then install rear coil spring. Check rear universal joint angle and adjust as necessary. *See "Propeller Shaft" in Rear Axle Section.*

UPPER CONTROL ARM: Removal - Raise rear of car and support rear axle assembly, then disconnect upper control arm at carrier housing by removing arm bolt and locknut. Disconnect control arm at front bracket and remove control arm.

Installation: *NOTE - Inspect rubber bushings and replace as necessary (bushings are replaced through one side of arm only). If control arm is bent or damaged, it must be replaced.* Position control arm with flange on bushings facing forward and open side of control arm down. *NOTE - Right and left upper control arms are interchangeable.* Install control arm bolts and locknuts at front and rear and tighten to 85-110 ft. lbs. *NOTE - It may be necessary to rotate axle housing slightly for alignment of bolt holes.*

CADILLAC FRONT SUSPENSION

Cadillac (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 CADILLAC "CREAKING" NOISE CORRECTION:* In addition to the "creaking" noise, a wheel "thump" may also be noted. Remove rubber bushing assemblies at frame end of tie-strut and examine spacers and washers for damage. Replace if necessary. Make sure that machine threads on tie struts are not excessively rough which would cause the "stover" nuts to lose locking effect. Install new "stover" nuts and tighten to 30-40 ft. lbs. *CAUTION - Always use new "stover" nuts whenever tie-strut is disassembled at this point.*

►*1961 CADILLAC UPPER CONTROL ARM SHAFT PRODUCTION CHANGE & INSTALLATION NOTE:* Upper control arm shaft diameter has been changed in production beginning with Eng. No. 053805. A new tool, Bushing Installer Set, J-8999-15 must be used for installation of the new bushings. The above tool may also be used on all previous 1961 models.

►*1961 CADILLAC LOWER CONTROL ARM BALL JOINT SQUEAK CORRECTION:* If this condition is caused by water leaking into lower ball joint and it is necessary to repack the joint, a new kit, Part No. 3631822 consisting of clamps, fasteners, and plug is available for replacement. Beginning with Eng. No. 082672, the lower ball joint seal is cemented at the lower lip to prevent water leakage. When installing the new seal, force out any water trapped in joint by applying lubricant. Install clamp so it is facing squarely forward, parallel to car centerline. When properly installed, upper half of garter spring should be exposed at top edge of clamp.

DESCRIPTION: New design "ball-joint" type with upper and lower control arms connected to frame members by rubber bushings. A new "tie strut" is connected between outer end of lower control arm and front crossmember to carry fore and aft load of front wheels. Caster adjustments are made by adjusting nuts on threaded end of struts. The new upper control arm ball joints connects upper control arm to steering knuckle through a camber adjustment eccentric. Camber adjustments are made by turning this eccentric to reposition upper ball joint stud.

ADJUSTMENT

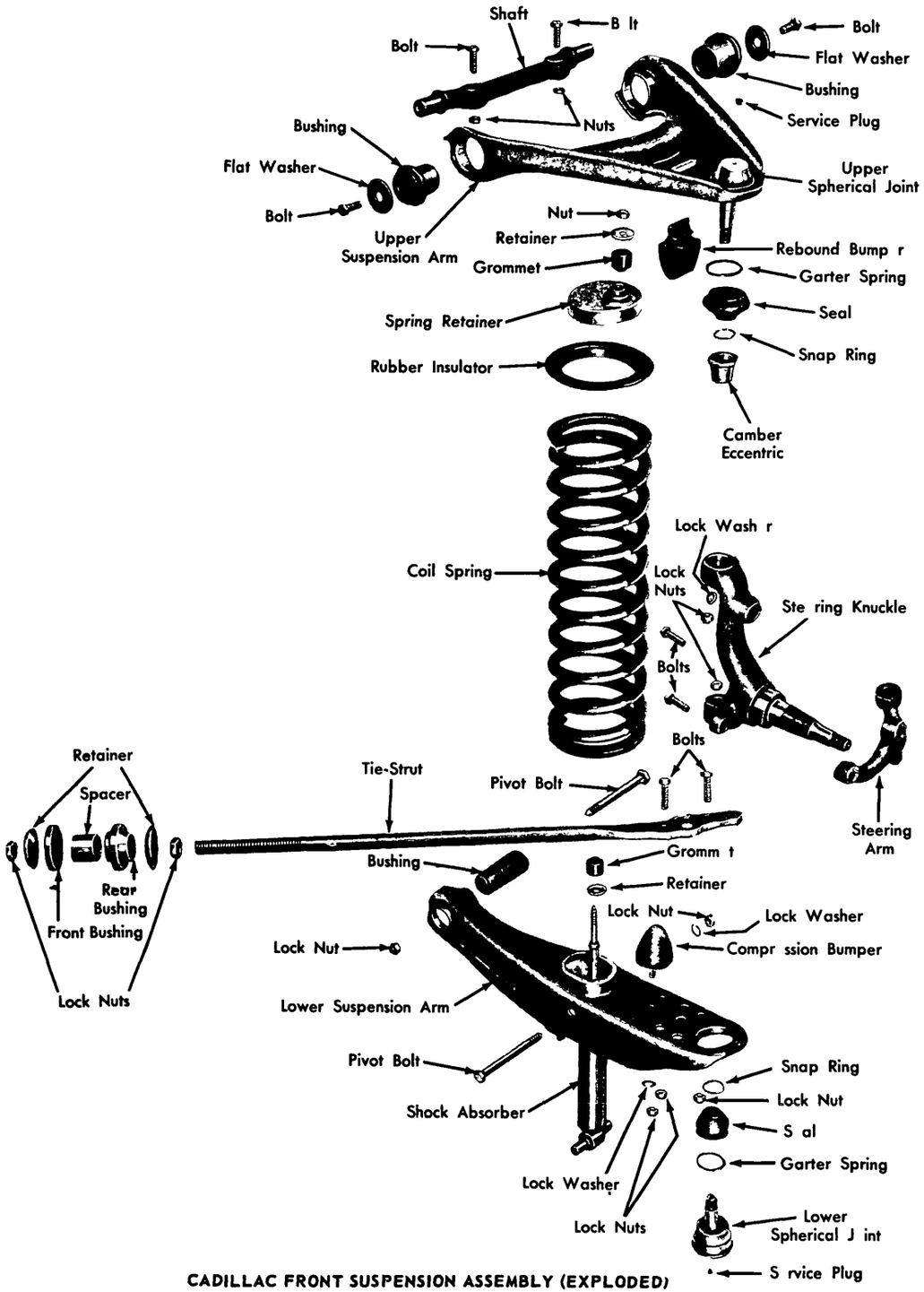
CHECKING & ADJUSTING: Before checking and adjusting front wheel alignment, check and correct any looseness in spherical "ball joints", steering gear, and connections. Check and correct standing height (*see "Trim Dimensions" below*). Inflate tires to correct pressure and check for runout. Make sure car is at curb weight.

Tire Inflation: Series 60 & 62 - 24 lbs. (front & rear). **Series 75** - 28 lbs. (front & rear). **Commercial Chassis** - 24 lbs. (front); 30 lbs. (rear).

Steering Axis Inclination: 6° at 0° camber. Not adjustable.

Camber: Left Wheel - Pos. 3/8° to Neg. 1/8°(0° preferred). **Right Wheel** - Pos. 1/8° to Neg. 3/8° (Neg. ¼° preferred). Left wheel must have ¼° to ½° more positive camber than right wheel.

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CADILLAC FRONT SUSPENSION ASSEMBLY (EXPLODED)

CADILLAC FRONT SUSPENSION (C ntinu d)

Adjustm nt - Loosen ball joint stud nut one turn and tap bottom to loosen camber eccentric in knuckle support, then use Camber Adjusting Wrench, J-9231 and turn camber eccentric until proper adjustment is obtained. *NOTE - Final position of joint stud should be in rear portion of camber eccentric to retain steering arm angl in correct position.* Tighten stud nut to 50-65 ft. lbs.

►*CAMBER ADJUSTMENT NOTE:* If difficulty is encountered loosening camber eccentric from steering knuckle, cut a piece of 7/16" diameter steel rod to a length of 20", chamfering it on one end and rounding it off on the other. Back off self-locking nut on ball joint stud **on turn,** and thread a standard nut halfway on stud. Insert round end of steel rod inside nut and against bottom of stud, then pound on end of tool with a heavy hammer to break camber eccentric loose.

Cast r: Neg. ½° to Neg. 1½°. Adjustment must be within ½° or less on both sides.
Adjustm nt - Remove splash shield over threaded end of lower control arm "tie strut", then rotate retaining nuts on forward ends of "tie strut" as necessary to obtain proper caster adjustment. After adjustment is made, hold rear nut with a wrench and tighten front nut to 55-70 ft. lbs.

T e-In: 3/16" to 1/4".

T -Out n Turns: With outer wheel at 20°, inner wheel should be 22°11'. Not adjustable.

Trim Dim nsi ns: Before checking trim height, make sure that trunk is empty and fuel tank is full. Normalize position of springs by working bumper up and down and release slowly, permitting car to assume normal position. At the front, measure distance from top of rear flange on lower control arm to center of forward lower rivet on frame side rail. *NOTE - The above mentioned rivet is nearly on centerline of front coil soring. When measuring, hold rule vertical, seating it on lowest part of support arm flange, directly below rivet.* Standing trim height should be equal on both sides of car within 3/8" (see table below for specifications). To adjust, at rear of car, measure distance between top of rear axle housing to lower underside surface of frame. Rear standing trim height should be equal within ½" on both sides of car (see table below for specifications).

Trim Heights

Body Cod ©	Front Height	Rear Height
"A"	7 1/2"	6"
"B" & "L"	7 7/16"	6"
"C" & "K"	7 5/8"	6"
"E" & "F"	7 7/16"	5 7/8"
"G"	7 15/16"	6"
"J"	7 9/16"	5 7/8"
"M"	7 3/8"	5 13/16"
"R" & "S"	8"	6 13/16"
"Z"	8 1/2"	4"

© - Part of Engine Serial Number. *See "Model Identification" on Cadillac Car Model Page.*

REMOVAL & INSTALLATION

SHOCK ABSORBER: R moval - Remove upper retaining nut, retainer, and grommet at upper suspension arm frame mounting bracket, then remove bolt holding lower end of shock to lower suspension arm. Remove shock.

Installati n: Reverse removal procedure and tighten bolt at lower end to 90-110 ft. lbs.

FRONT STABILIZER: R m val - Disconnect stabilizer at lower control arm, then remove brackets and stabilizer from frame.

Installation: Reverse removal procedure and tighten bracket-to-frame bolts to 18-25 ft. lbs.

LOWER CONTROL ARM TIE-STRUT: Removal - Raise front of car and place jack stands under frame side rails, then remove splash shield covering inner ends of tie strut. Disconnect stabilizer link from lower arm. Remove nut and retainer from threaded end of strut at front frame crossmember, and back off rear nut. Disconnect strut from lower control arm and remove rear bushing retainer and nut from strut. Remove bushings and bushing spacer from frame.

Installation: Insert bushing in rear spacer and install assembly in frame through rear side of crossmember. Install nut on tie strut and run to bottom of thread, then install rear bushing retainer with concave side toward nut. Install tie strut through rear bushing in front crossmember and install front bushing on end of tie strut, sliding it into position in frame crossmember (front bushing should lock in rear bushing). Install bushing retainer with flat side against bushing and install nut (do not tighten). Attach end of tie strut to lower control arm and tighten nuts to 30-40 ft. lbs. Connect stabilizer link to lower control arm, then lower car to floor and tighten front nut on tie strut to 30-40 ft. lbs. *NOTE - This setting supersedes previous setting of 55-70 ft. lbs.* Tighten rear nut, compressing bushing until retainer bottoms on metal spacer in bushing. Adjust caster (see above), then install splash shield.

UPPER CONTROL ARM BALL JOINT SEAL: Removal - Raise front of car and place jack stands under lower control arms, then remove lock nut and special flat washer from ball joint stud. Scribe a mark on camber eccentric and steering knuckle (for alignment at installation), then strike ball joint stud with a soft mallet to free it from steering knuckle. Raise up on upper control arm and remove ball joint from knuckle. Using Puller, J-8990, remove camber eccentric from ball joint stud. Wipe seal surface clean, then remove garter spring and seal. Clean joint pivot with solvent and inspect for looseness or binding. Replace joint if necessary.

►*BALL JOINT STUD REMOVAL NOTE:* If difficulty is encountered loosening stud from knuckle, see "Upper Control Arm Removal" below for new method of loosening ball joint stud and eccentric.

Installation: Using a new seal, turn seal inside out, then place snap ring inside seal, just over bottom hole, pressing in on bottom of seal until snap ring seats itself in groove around hole. Apply a small amount of lubricant around hole in seal and install seal on ball joint stud. Unroll seal until lip engages in recess around joint housing. Allow air to enter seal by momentarily prying lip of seal away from joint housing with a small screwdriver. Squeeze seal, sliding snap ring end up on stud, then install new garter spring with Tool J-9148. *CAUTION - Mak sur spring s cur s lip of seal in r c ss all around joint housing.* Install camber eccentric and align marks on eccentric and steering knuckle. Install a standard nut on ball joint stud and tighten until eccentric locks in knuckle, then remove standard nut, and install special flat washer and locking nut. Tighten to 50-65 ft. lbs. Pry out service plug from ball joint cover and discard plug. Use Repacking Gun, J-9280 and repack joint through plug hole with special lubricant. *CAUTION - Fill joint with lubricant, but do not allow seal to "balloon".* Install new service plug in ball joint cover. Check camber and adjust if necessary.

LOWER CONTROL ARM BALL JOINT SEAL: Removal - Remove lower control arm and coil spring (see below), then secure control arm in a vise and remove ball joint seal in same manner as for upper control arm ball joint seal. *NOTE - Seal can be replaced on lower control arm ball joint without removing control arm from car as follows:* Break ball joint loose from steering knuckle, then loosen anchor bolt and brake backing plate-to-steering knuckle bolts for clearance and disengage ball joint stud from knuckle. Move knuckle out of way and remove ball joint seal in same manner as for upper control arm ball joint.

Installation: Reverse removal procedure.

►*UPPER CONTROL ARM BALL JOINT REPLACEMENT NOTE: Do not attempt to remove ball joint assembly from upper control arm. Upper control arm and ball joint are serviced as a complete assembly.*

LOWER CONTROL ARM BALL JOINT: Removal - Remove lower control arm and coil spring (see below), then remove garter spring and seal from joint. Position Tool J-8999-7 on arbor press anvil and place lower control arm on tool with ball joint cover resting on tool. Position Ball Joint Remover, Tool J-8999-9 over joint stud until it seats on joint housing, and press ball joint out of arm.

Installation: Position support, Tool J-8999-7 on arbor press anvil and place lower control arm on support, so that ball joint mounting hole is encompassed by support. Insert new ball joint in arm, stud end first, then position Ball Joint Installer, J-8999-5 on flanged portion of joint housing and press joint into arm until joint flange bottoms on mounting hole flange. Install lower control arm and coil spring.

UPPER CONTROL ARM: Removal - Raise and support front of car with jack stands under lower control arms. Remove wheel, then remove locking nut and special flat washer from ball joint stud. *NOTE - If difficulty is encountered in freeing stud from knuckle, see n te below.* Strike bottom of stud with a soft hammer to free it from knuckle support. Remove shaft mounting bolts at frame tower and remove control arm and shaft assembly. *NOTE - For access to shaft mounting bolt nut (on early cars with bolt head upward) use a ¾" offset wr nch through openings in tower.* If necessary, remove camber eccentric with Puller J-8990. *CAUTION - Ball joint and upper control arm are serviced as a complete assembly. Do not attempt to remove joint from arm.*

►*BALL JOINT STUD REMOVAL NOTE:* If difficulty is encountered loosening stud from knuckle, cut a piece of 7/16" diameter steel rod and cut to a length of 20", then proceed as follows: Remove stud nut and special flat washer, then install a standard nut about halfway up stud. Insert round end of steel rod inside nut and against bottom of stud, then pound on end of tool with a heavy hammer to break it free.

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CADILLAC FRONT SUSPENSION (C ntinu d)

Installation: Position upper arm assembly on frame tower and install mounting bolts and lock nuts. Tighten nuts to 70 ft. lbs. *NOTE - This supersedes previous specification of 110-130 ft. lbs.* Install camber eccentric on ball joint stud if previously removed, then install ball joint stud and camber eccentric into knuckle and install a standard nut on end of ball joint stud. Tighten nut until camber eccentric locks in knuckle support, then remove standard nut and install special flat washer and locking nut and tighten to 50-65 ft. lbs. Install wheel and check front end alignment. *CAUTION - If necessary to replace bolt, nut or washer attaching control arm inner shaft to frame use only bolt, Part No. 427569; washer, Part No. 1477585; nut, Part No. 9411971.*

UPPER CONTROL ARM SHAFT & BUSHINGS: Removal - With upper control arm removed from car, remove bolt and washer from each end of shaft. Position support, Tool J-8999-2 on arbor press anvil and place one end of control arm on support with outer end of bushing resting in support. Install Spacer, Tool J-8999-1 around shaft between arm ends, then insert Driver, Tool J-8999-6 through bushing in opposite arm and thread driver into end of shaft. Use arbor press and press driver downward until there is sufficient clearance between flange on upper shaft and upper bushing to install Tool J-8999-4. Remove arm assembly from arbor press and remove driver and spacer tools. Install "C" Washer, Tool J-8999-4 between shaft flange and bushing and place this end of arm on Support, Tool J-8999-2, with outer end of bushing resting in support. Reinstall Spacer, Tool J-8999-1 between arm ends and insert Driver, Tool J-8999-6 through upper bushing, then thread driver into end of shaft. Press shaft downward until bushing is removed. Repeat the above procedure for bushing on opposite side of control arm.

►*1961 CADILLAC UPPER CONTROL ARM SHAFT PRODUCTION CHANGE & INSTALLATION NOTE:* Upper control arm shaft diameter has been changed in production beginning with Eng. No. 053805. A new tool, Bushing Installer Set, J-8999-15 must be used for installation of the new bushings. This tool may also be used for bushing installation on earlier cars.

Installation: Position Bushing Installer, Tool J-8999-16 (part of Tool J-8999-15) on arbor press anvil, then insert bushing in one end of arm and place arm and bushing on installer, with outer end of bushing seated in installer tool. Place shaft between arm ends, aligning end of shaft with bushing inner sleeve. Position bushing on opposite end of shaft and place second Bushing Installer J-8999-16, on top of bushing. Hold assembly in place by exerting slight pressure on arbor press. Check alignment of bushing, arm ends and shaft, then install Spacer, J-8999-1 around shaft between arm ends to prevent arms from collapsing when bushings are installed. Press bushing onto shaft until both bushing flanges bottom on arms. *NOTE - If bushings do not butt flush against shoulder of shaft, attaching bolts, when installed, will seat them in position.* Remove tools from arm assembly, then install flat washer, lockwasher, and screw on each end of shaft. *CAUTION - Do not tighten screws until control arm is installed on car and car weight is on wheels, then tighten screws to 60 ft. lbs.*

LOWER CONTROL ARM & COIL SPRING: Removal - Disconnect shock absorber at its upper mount, then raise front of car support with jack stands under frame side rails. Disconnect stabilizer link and tie strut at lower control arm, then remove shock absorber. Remove wheel assembly and brake drum and loosen the two bolts securing brake backing plate to steering knuckle. Remove nut from pivot bolt in lower control arm at frame mount. Position jack under outer end of lower control arm so jack is not supporting control arm, then remove locking nut from lower ball joint stud and install a standard nut on stud, running it to within two threads of knuckle support (this will prevent control arm from dropping when ball joint is broken free of knuckle support). Strike knuckle support with a hammer in area of ball joint stud to break it loose. *NOTE - Raise opposite rear corner of car to increase spring load on lower control arm and aid in breaking joint loose.* Raise jack under lower control arm sufficiently to remove spring load, then remove nut from ball joint stud. Tilt brake backing plate outward from bottom and slowly lower jack, then remove spring and insulator. Remove pivot bolt from lower control arm at frame mount and remove control arm.

Installation: Place end of lower control arm in frame mount and install pivot bolt (do not install nut), then tape rubber insulator to top of spring (shim and insulator on top of right hand spring on all air conditioned cars except Series 75). *NOTE - Either end of spring may be used at top. Both ends are the same.* Install top of spring in upper seat of spring tower and rotate spring so that bottom tang end fits between raised edge on top of lower control arm and centerline of shock absorber. *NOTE - Raised edge of lower control arm faces front of car on right side and rear of car on left side.* With a hydraulic jack placed under outer end of lower control arm, tilt brake backing plate outward from bottom, and raise arm into position. Guide spring into position with tang end between raised edge on top of lower control arm and centerline of shock absorber. *NOTE - When control arm is raised, shock may have a tendency to rotate, mispositioning tang end. End of tang must be between raised edge of arm and centerline of shock after spring is installed.* Guide ball joint stud into knuckle support, then install a standard nut on joint stud and tighten nut until stud seats in knuckle support. Remove standard nut and install special locking nut on stud, tightening it to 60-75 ft. lbs. Install nut on lower control arm pivot bolt but do not tighten until car is resting on all four wheels. Tighten anchor bolt on brake backing plate to 90-110 ft. lbs. and bend locking tang over one flat of bolt head. Install shock absorber (see above) but do not tighten lower nut until car is resting on all four wheels. Install tie strut on lower control arm and tighten nuts to 30-40 ft. lbs., then install stabilizer link. Install brake drum and wheel assembly and lower front end of car. Connect shock absorber at upper end and tighten nut on lower end to 90-110 ft. lbs. Tighten nut on lower control arm pivot bolt to 55-70 ft. lbs. Check wheel alignment and adjust if necessary.

LOWER CONTROL ARM BUSHING: R m val - With lower control arm removed, position Support, Tool J-8999-2 on arbor press anvil and insert larger diameter end of bushing in support. Place Spacer, Tool J-8999-8 around bushing sleeve between flanged sides of arm, then position Bushing Remover, Tool J-8999-10 on bushing sleeve and press bushing out of arm.

Installation: Position Support, Tool J-8999-2 on arbor press anvil and insert smaller diameter flanged end of bushing mount in support. Install new bushing in arm, smaller diameter end of bushing first, until bushing pilots itself in opposite flanged end. Place Spacer, Tool J-8999-8 around sleeve of bushing between flanged sides of arm, then position bushing Installer, Tool J-8999-9 over end of bushing and press bushing into arm until installer tool bottoms on flanged bushing mount. Install lower control arm and coil spring.

STEERING KNUCKLE: Removal - Raise front of car and place jack stands under frame side rails, then remove wheel assemblies and brake drum. Straighten locking plate on anchor bolt and remove anchor bolt, locking plate, and two bolts securing brake backing plate to steering knuckle. Position steering arm out of way and remove support plate, grease guard, and brake backing plate from knuckle. Wire backing plate to a convenient location to prevent damage to brake hose. Place a jack under lower control arm, then remove stud nut and break ball joint loose from control arm. Break joint loose from upper control arm and remove stud from upper knuckle support. Remove steering knuckle from lower ball joint stud.

Installation: Reverse removal procedure, tightening brake backing plate attaching bolts to 60 ft. lbs. and anchor bolt to 90-110 ft. lbs.

CADILLAC REAR SUSPENSION

Cadillac, Exc. Commercial (1961)

DESCRIPTION: Four link, coil spring type similar to design used on previous models.

REMOVAL & INSTALLATION

REAR SPRING: Removal - Raise and support rear of car under frame side rails, then remove wheel on side spring is being removed. Disconnect parking brake line clamp from control link, then place a jack under control arm at rear of front pivot to relieve tension on pivot bolt. *CAUTION - Insert a drift punch through hole in bottom of control arm to prevent jack from slipping.* Remove control arm pivot bolt at front and slowly lower control arm, then remove coil spring.

Installation: Tape upper rubber insulator to top of spring and place spring in upper seat of frame tower. Seat bottom of spring on control arm spring seat, then with jack placed under control arm, raise front end of arm into position. *NOTE - Place a jack under front end of differential housing to assist in aligning bolt holes.* Install front pivot bolt but do not tighten nut. Install brake line bracket on control arm, then lower car to floor. With car weight on wheels and car at normal standing height, tighten control arm pivot bolts to 85-95 ft. lbs.

REAR TRIM HEIGHT: With car trunk empty (except spare tire), and with a full tank of gas, normalize position of springs by working bumper up and down, then release bumper and allow car to assume its normal position. Measure distance from top of rear axle housing straight up to lower underside surface of frame. This distance should be as indicated in table below. *NOTE - Rear standing height should be equal within ½" on both sides of car.*

Rear Trim Dimensions

Series & Model	①Height
60 Special	5 13/16"
62 Exc. Convertible	6"
62 Convertible	5 7/8"
63 Sedan DeVille	6"
63 Coupe DeVille	5 7/8"
63 Eldorado Biarritz	5 7/8"
67 Seventy-Five Sedan & Limosine	6 13/16"
68 Commercial	②4"

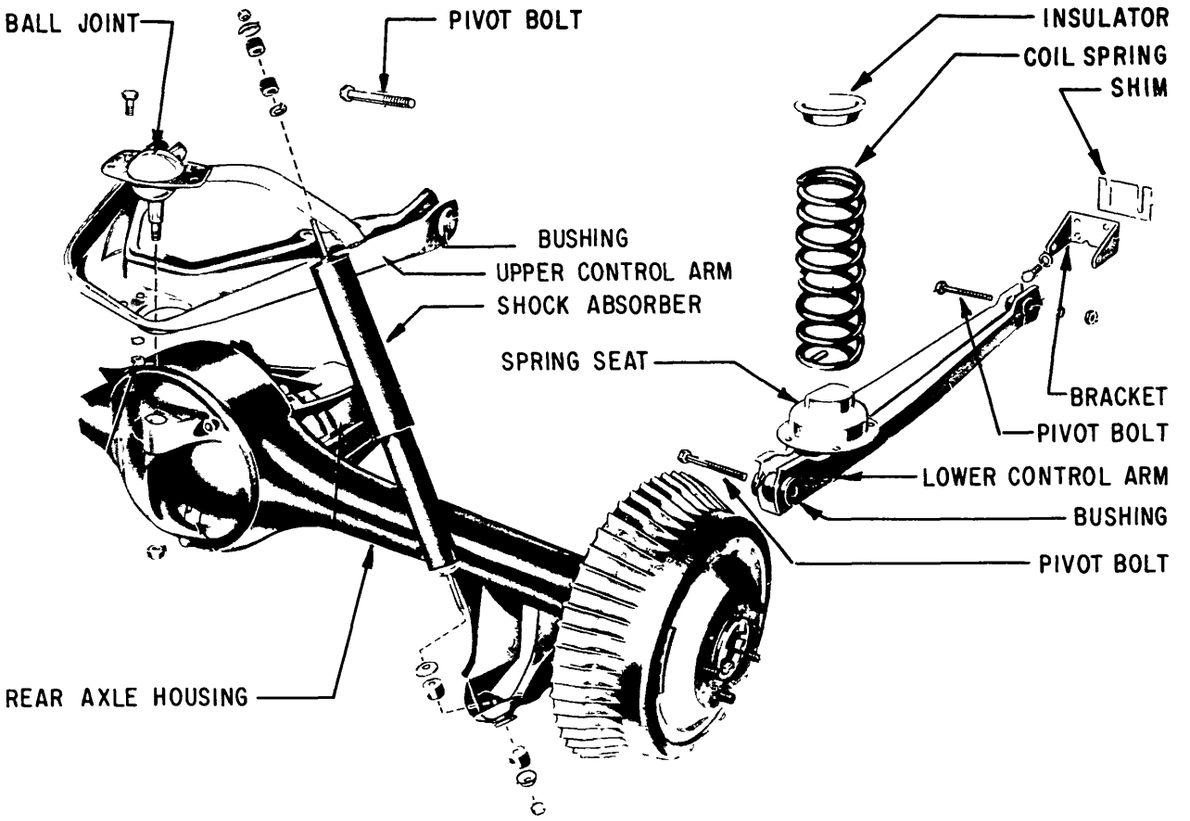
① - Plus or minus 3/8". ② - Semi-elliptical spring.

UPPER CONTROL ARM BALL JOINT: Removal - Raise car and support under front and rear frame side rails, then place a jack under forward end of differential housing and raise slightly to relieve tension on drive line. Remove nut from ball joint and strike mounting base with a hammer in area of ball stud to break joint loose. Grind off rivet heads and punch out all four mounting rivets, being careful not to damage rivet holes, then remove ball joint.

Installation: Install ball joint on upper control arm and secure in place with four bolts, nuts, and lockwashers provided in service replacement kit. Tighten nuts to 35-40 ft. lbs. *NOTE - Bolts must be installed with heads up.* Adjust jack at front of differential housing until ball joint stud will go into mounting hole, then install nut and tighten to 50-65 ft. lbs.

UPPER CONTROL ARM: Removal - Raise car and support under front and rear frame side rails, then place a jack under forward end of differential housing and raise slightly to relieve tension on drive line. Disconnect ball joint stud from control arm, then remove two pivot bolts securing front arms to frame crossmember. *NOTE - Bushings in control arms can be removed and replaced using an arbor press.*

Installation: Reverse removal procedure and tighten pivot bolt nuts to 110-130 ft. lbs. Tighten ball joint stud nut to 50-65 ft. lbs.



CADILLAC REAR SUSPENSION

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then disconnect rear end of control arm from mounting bracket on axle housing. *NOTE - Bushings in control arm can be removed and replaced using an arbor press.*

Installation: Reverse removal procedure and tighten front and rear control arm bolts to 85-95 ft. lbs. after car is lowered to floor and is at normal riding height.

CHEVROLET PASS. CAR FRONT SUSPENSION

Chevrolet Pass. Cars (1961)

DESCRIPTION: Ball joint type with coil springs and direct acting shock absorbers mounted between spring seats on lower control arms and spring pockets in front crossmember.

ADJUSTMENT: Before adjusting front end alignment, check the following: Loose or improperly adjusted steering gear, play or excessive wear in ball joints, loose tie rods or steering connections, improper front spring height (see "Riding Height" below), tire pressure, wheel bearings, and shock absorbers. Make adjustments at curb weight.

Steering Axis Inclination: 7°11'. Not adjustable.

Caster: 0°±½°. To adjust, add or remove shims at either front or rear upper control arm inner shaft attaching bolt as necessary.

Camber: Pos. ½°±½°. To adjust, add or remove shims at both front and rear upper control arm inner shaft attaching bolts as necessary.

Toe-In: 1/8-1/4".

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be 17°54'. Not adjustable.

Riding Height: With car on a level floor, bounce car, then allow to settle to normal height. Measure distance from floor to center of front inner pivot of lower control arm, then record this measurement. Measure distance from floor to lower face of lower steering knuckle ball joint boss (on the same side of car) and record this

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CHEVROLET PASS. CAR FRONT SUSPENSION (C ntinu d)

measurement. The difference between the above two measurements should be as indicated in table below. If not within limits, replace spring. *NOTE - Spring nds are not flat and shims should not be used.*

Riding Height

Model	Height
6 Cyl. 2 & 4-Dr. Sed. Ⓒ	3"±1/4"
V8 2 & 4-Dr. Sed. Ⓒ	3 5/16"±1/4"
6 Cyl. & V8 2 & 4-Dr. Sport Sed. Ⓒ	3 5/8"±1/4"
Convertible (All)	3 1/2"±1/4"
Station Wagon (All)	4 1/8"±1/4"

Ⓒ - If these models are equipped with 8.00 x 14 tires, add 19/64" to above measurements.

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Hold upper stem of shock absorber from turning (¼" wrench), then remove retaining nut and lockwasher. Remove bolts retaining lower shock absorber pivot to lower control arm and pull shock absorber assembly and mounting out at bottom of spring housing.

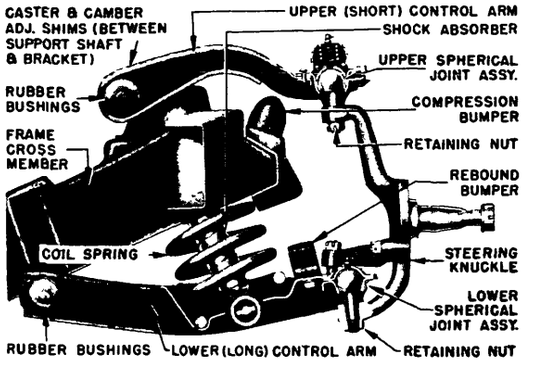
Installation: Reverse removal procedure and tighten upper retaining nut to 15-25 ft. lbs.

COIL SPRING: Removal - Raise and support car at frame side rails so control arms swing free, then remove wheel, stabilizer bar (if so equipped), and shock absorber. Loosen lower ball joint-to-steering knuckle nut and the two lower control arm cross shaft bushing bolts. Place Tool J-6874-1 across top of sixth coil, then loosely secure Tool J-6874-2 to upper shoe of tool, using attaching capscrews and washers. *NOTE - "V" notch in upper shoe of tool and raised notch in lower shoe should contact spring.* Insert Tool J-6874 up through center of spring and attach to upper and lower shoe assembly with bolt and nut. Position spacer under shock absorber mounting hole and against bottom of lower control arm. Install special bearing washer and Tool J-6874-5. Locate bearing against spacer and large washer against bearing, then insert screw, Tool J-6874-5 up through large washer bearing and spacer and thread into Tool J-6874 and tighten snugly. Center shoe assembly on spring and tighten screw until a very slight amount of compression is placed on spring, then firmly tighten down the two capscrews securing upper and lower shoes to lock these shoes to spring. Turn head of screw until spring is compressed just enough to clear spring tower, then remove lower ball joint-to-steering knuckle nut. *NOTE - If may be necessary to assist spring out of tower with a pry bar.* Disconnect lower ball joint from steering knuckle and lower control arm and spring. Immediately release compression on spring. *CAUTION - Be very careful when lowering control arm to prevent injury or damage by spring.*

Installation: *NOTE - If a new spring is being installed, remove spring compressing tool assembly from old spring and install on new spring in same manner. Place spring in its seat on lower control arm and install remaining parts of tool and compress spring.* With spring compressed sufficiently to clear spring tower, immediately install lower ball joint into steering knuckle and secure in place with nut. Release compression on spring and at the same time use a drift to guide spring into its proper seat. Tighten lower ball joint-to-steering knuckle nut to a minimum 50 ft. lbs. and install cotter pin. Install shock absorber, stabilizer bar and wheel and drum assembly, then remove car from support. Tighten two lower control arm cross shaft bushing bolts to 45-55 ft. lbs.

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove control arm cross shaft-to-frame attaching bolts and remove control arm.

Disassembly: If necessary to remove ball joint (see "Ball Joint" below). Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" - 20 capscrew (furnished with Tool J-5888) to bottom of threads in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, making sure that bushing flange does not contact support, then press on capscrew until bushing is free of control arm. Remove bushing from opposite end of cross shaft in same manner.



CHEVROLET FRONT SUSPENSION

Reassembly: With cross shaft in position in control arm and control arm supported on Tool J-7052-1 & J-5888-3, start bushing into control arm and over end of cross shaft. *NOTE - End of cross shaft with two bolt holes must be toward front of control arm.* Install Tool J-7052-5 over bushing, being sure that three piece spacer is not overlapping bushing holes in control arm. Press bushing into control arm until flange contacts control arm. Install bushing in opposite arm in same manner. After complete installation, cross shaft should be free enough to be rotated by hand. Install collar, lockwasher, and capscrew in each end of cross shaft but DO NOT TIGHTEN.

Installation: With control arm in position, attach with three lockwashers and special washers under rear bolt; front bolts and anchor nuts. After coil spring is installed, and car is on floor with weight on wheels, tighten cross shaft bushing bolts to 45-55 ft. lbs.

UPPER CONTROL ARM: Removal - Raise and support car at outer end of lower control arm, then remove wheel. Remove ball joint stud from steering knuckle with Tool J-6627 (Pitman Arm Puller). Disconnect upper control arm inner shaft from crossmember, noting number and thickness of shims at each bolt location. *NOTE - Bolts attaching control arm to fram memb r must be cut off or removed to allow proper cl aranc for control removal.* Remove upper control arm from car.

Disassembly: If necessary to remove ball joint (see "Ball Joint" below). Remove capscrews, lockwashers, and collars from both ends of cross shaft, then install 3/8" - 24 capscrew (furnished with Tool J-5888) in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, making sure that bushing flange does not contact support, then press out bushing. Remove bushing from opposite side of arm in same manner.

Reassembly: Install arm in arbor press with Tool J-7052-2 in place and press in one bushing while supported on Tool J-5888-3. Install cross shaft in arm, then invert in press and press in second bushing, using the same tools. *Cross shaft should be able to be turned by hand.* Install collar, lockwasher and capscrew in ends of shaft, but DO NOT TIGHTEN.

Installation: Install upper control arm in car and make sure attaching studs are in position. Install two nuts and bolts retaining upper control arm shaft to crossmember, then install same thickness of shims as removed at each bolt location. Install new rubber seal on ball joint stud, then install ball stud through knuckle and tighten securely. Install wheel and lower car to floor. Bounce front end of car to centralize bushings, then tighten bushing collar bolts to 35-40 ft. lbs.

BALL JOINT (UPPER & LOWER): Testing - *NOTE - If excessive wear is indicat d in upp r ball joints, both upper and lower ball joints sh uld b replaced.* To check upper ball joint, raise and support car under outer end of lower control arm. then remove wheel assembly. Remove ball joint stud from steering knuckle with Tool J-6627 (pitman arm puller). Install a stud nut on ball stud and measure torque required to turn the ball joint assembly with a torque wrench. This torque should be 2 ft. lbs. minimum or 15 lbs. maximum.

Removal: With car supported as above and joint disconnected from steering knuckle (support knuckle assembly to avoid damage to brake hose), center punch rivets, then drill them out, being careful not to enlarge holes in control arm.

Installation: On upper control arms, ream rivet holes out to 21/64" diameter. *NOTE - Upp r and low r ball joint replacement parts are in thre pi c s. M tal inn r seal is to be carefully pressed in plac on joint h using, and the rubber outer seal sh uld th n b placed ver inner seal.* Install new joint against underside (lower arm), top side (upper arm) and retain in place with special bolts and nuts supplied with new joints. Tighten to 20-25 ft. lbs. *NOTE - Tight n nut on ball j int forging to 35-45 ft. lbs.*

CHEVROLET PASS. CAR REAR SUSPENSION

Chevrolet Pass. Cars (Exc. Corvette) (1961)

DESCRIPTION: Rear suspension is similar in design to previous models except that lower control arm bushings are a new design and the upper control arm is now connected to rear axle housing at right hand side on top of axle tubes and to bracket on frame right side rail. A tie rod is attached to frame left side rail and to right hand side of rear axle housing.

REMOVAL & INSTALLATION: *See 1958 Annual Data, Page 343, or later Manual edition and note the following:*

Upper Control Arm & Bushings: Removal - Raise car on a hoist that will support rear axle housing or wheels, then remove rear pivot bushing bolt at rear axle housing. *NOTE - Rear axle must be supported in such a way as to prevent axle housing from rotating about the lower control arm rear pivot, and to also relieve load on pivot bushings.* Remove bolts, lockwashers, and nuts securing upper control arm bracket to frame bracket or crossmember. *CAUTION - NOTE number of shims removed at this control driveline angles.* Remove arm from car. Remove bolt, nut and washer attaching upper control arm to bracket and separate control arm from bracket. With control arm bushing centered over Tool J-7574-4 and Tool J-7574-3 in place and with arm resting horizontally by supporting at opposite end, press or tap bushing from arm using Tool J-7574-1 and Tool J-7079-2 (Driver Handle). Repeat procedure for opposite end of control arm.

Installation - Turn arm to opposite side (bushing can only be installed from one direction), center bushing hole over support Tool J-7574-4 and install Tool J-7574-3 between flanges at hole location. *NOTE - Tool J-7574-3 will prevent overcompression of arm during overtravel.* Fix Tool J-7574-2 on driver handle, then start bushing into hole and press or tap in place. Check to see that no interference or cocking takes place. Flange of bushing must be seated against arm. Repeat procedure for opposite end of arm. Tap front of upper control arm into control arm bracket, then install bolt, lockwasher and nut but do not tighten. Set control arm (with front bracket installed) on axle housing bracket and tap into place. Install bolt (head of bolt must be toward outboard side), lockwasher and locknut but do not tighten. Align forward end of upper control arm bracket with frame bracket or crossmember, then install two lower bolts through control arm bracket and frame bracket or crossmember. *CAUTION - Make sure shims removed at disassembly are reinstalled in original locations.* Install both nuts and lockwashers. Install upper bolt and flat washer from front of bracket, then install lockwasher and nut. Tighten the three bracket bolt nuts to 60-80 ft. lbs. *NOTE - If a new control arm was installed, check driveline angles (see Chevrolet Special Data).* Lower car to floor, then bounce rear of car several times to settle bushings. Tighten upper control arm nuts to 80-90 ft. lbs.

Lower Control Arm Bushing Replacement: Removal (Front Bushing) - With control arm and bushing centered over Tool J-7574-4 and with Tool J-7574-3 in place, and with arm resting horizontally by supporting at opposite end, press or tap bushing from arm using Tool J-7574-5 and driver handle. *NOTE - Be sure to place the remover on end of bushing with the flange.* **(Rear Bushing)** - Repeat above operations for opposite end using Tool J-7574-1 in place of Tool J-7574-5.

Installation (Front Bushing) - Fix Tool J-7574-6 onto driver handle, then start bushing into hole and press or tap in place. Check to see that there is no interference or cocking. Flange of bushing must seat against arm. **(Rear Bushing)** - Repeat above operation for rear bushing using Tool J-7574-2 in place of Tool J-7574-6.

Rear Suspension Tie Rod: Removal - Remove nut, washer and bolt from left hand side and nut and washer from stud on right side that secures tie rod to brackets. Remove tie rod.

Bushing Replacement - With tie rod centered over Tool J-7877-2 and with tie rod supported horizontally, press or drive bushing from rod, using Tool J-7877-1 and J-7079-2. With tie rod centered over Tool J-7877-2 and rod supported horizontally, press or drive bushing into arm using Tools J-7877-3 and J-7079-2. *NOTE - Tool J-7877-2 should bottom on rod when bushing is fully seated.*

Installation - Mount tie rod to right hand stud, then install nut and special washer but do not tighten. Install bolt, lockwasher and nut to left hand bracket but do not tighten. Lower car to floor and bounce rear end several times, then tighten nuts to 55-70 ft. lbs.

Rear Standing Height Measurement ℄

Model	6 Cyl.	8 Cyl.
2 & 4 Dr. Sed. (Exc. Spt. Sed.) ..	5 43/64"	5 59/64"
2 & 4 Dr. Spt. Sed.	5 43/64"	5 43/64"
Convertible	5 9/16"	5 9/16"
Station Wagon	6 11/64"	6 11/64"

℄ - Measurements are plus or minus ¼".

Corvair, All Models (1961)

DESCRIPTION: Ball joint type suspension with ball and socket joint connecting upper and lower control arms to steering knuckles. Coil springs are mounted between lower control arm and tower in front crossmember. Shock absorbers are mounted within coil springs on lower control arm and connected at top to tower in front crossmember. On 500, 700, and 900 Series, a strut rod is connected between outer ends of lower control arms and brackets that trail back from front crossmember. On these models, caster adjustment is made with this strut rod. On 1200 Series (including Greenbriar), the lower control arm is of different design, having front and rear legs, similar to upper control arm. A strut rod is not used on these models and caster adjustment is obtained by shimming at upper control arm.

TIRE INFLATION: Maintain tire pressure as indicated in following table.

Tire Pressure

Model	Hot	Cold
500, 700, 900 Series (Front)	18 lbs.	15 lbs.
500, 700, 900 Series (Rear)	30 lbs.	26 lbs.
1200 Series, 4-Ply (Front)	28 lbs.	24 lbs.
1200 Series, 4-Ply (Rear)	28 lbs.	24 lbs.
1200 Series, 6-Ply (Front)	32 lbs.	28 lbs.
1200 Series, 6-Ply (Rear)	32 lbs.	28 lbs.

ADJUSTMENT: Adjust front wheel alignment using following sequence:

CORVAIR FRONT SUSPENSION

Camber: Pos. ½° ±½° (Series 500, 700, 900); Pos. ¾° ± ¼° (Series 1200). Camber must be equal on both sides of car within ¼° (Series 500, 700, 900); ½° (Series 1200). To adjust, loosen upper support shaft-to-crossmember bolts and add or remove shims as necessary. *NOTE - Shims must be added or removed equally at both front and rear bolts.*

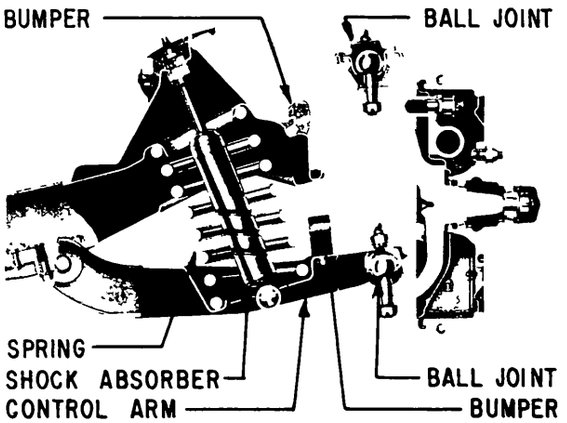
Caster: Pos. 1½° - 2° (Series 500, 700, 900); Pos. 2½° ±¼° (Series 1200). Caster must be equal on both sides of car within ¼° (Series 500, 700, 900); ½° (Series 1200).

Series 500, 700, 900 - Adjust caster by turning nuts at rear of strut rod. Lengthening this rod by turning nuts increases caster. Shortening rod by turning nuts, decreases caster. *NOTE - Because of manufacturing tolerances, it is possible to run out of threads on strut rod or cause front spring to be cocked in its seat and rub spring tower. Only when this happens is it permissible to shim unevenly at upper control arm. If shims are changed, check camber.*

Series 1200 - To adjust, loosen upper support shaft-to-crossmember bolts and add or remove shims at either front or rear bolt to obtain correct caster adjustment.

Toe-In: 1/4" to 3/8" (Series 500, 700, 900); 1/16" to 3/16" (Series 1200). Loosen clamp bolts at each end of each tie rod and turn each tie rod as necessary to obtain proper toe-in with steering gear on "high point" for straight ahead travel.

►*TOE-IN NOTE (REAR WHEELS): A rear wheel toe-in adjustment is necessary on all models. See "Corvair Rear Suspension".*



CORVAIR SERIES 1200 FRONT SUSPENSION ASSEMBLY

Toe-Out on Turns: Series 500, 700, 900 - With inner wheel at 20°, outer wheel should be 18°. Not adjustable.

Series 1200 - With outer wheel at 20°, inner wheel should be 23°. Not adjustable.

Steering Axis Inclination: 7° ±½° (Series 500, 700, 900); 7¼° ±½° (Series 1200). Not adjustable.

Riding Height: With car at curb weight (full tank of gas and spare tire), position car on a level floor, then

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CORVAIR FRONT SUSPENSION (Continued)

bounce and rock car several times and allow to settle. **Series 500, 700, 900** - Measure distance from floor to bottom of rocker panel 27" back from centerline of front wheel. This measurement should be 9 3/8"+1/2". Measure opposite side of car in same manner. Difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - These springs do not have flat ends and shims must not be used.*

Series 1200 - Measure distance from center of lower control arm pivot bolt to floor. This distance should be 11 7/8". Measure opposite side in same manner. Difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - These springs do not have flat ends and shims must not be used.*

REMOVAL & INSTALLATION

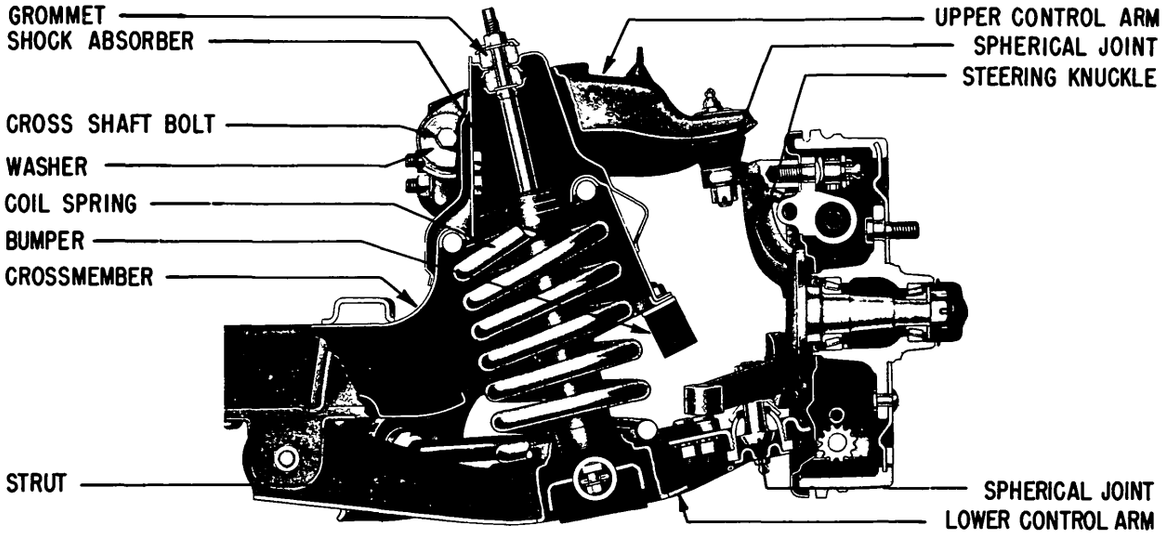
See 1960 Annual Data, Page 376, or later Manual edition and note the following:

COIL SPRING (SERIES 1200): Removal - Pry out upper rebound bumper, then raise car and support on jack stands so front control arm hangs free. *NOTE - Position stands so control arms may be raised or lowered with a floor jack.* Remove shock absorber, then position a piece of 2" x 4" lumber, 16¼" long between top of upper control arm and behind reinforcing channel above wheel. Make sure upper corner of this wood support is placed behind reinforcing channel toward inside of car. Place a floor jack under lower control arm and raise until wood support is forced firmly against channel. Disconnect lower control arm ball joint stud from steering knuckle, then raise lower control arm and free stud from knuckle boss. Swing wheel out far enough to clear lower arm, and block or wire in this position. Carefully lower jack supporting control arm until spring is decompressed and remove spring.

Installation: Seat spring in tower with end of spring coil in contact with step in spring seat, then swing lower control arm up as far as possible and seat spring in control arm. Place floor jack under lower control arm and raise until ball joint stud may be placed into steering knuckle boss (make sure dust cap is in position on ball stud). When stud will enter hole in knuckle, lower jack and install stud nut. Tighten to 60-94 ft. lbs. and continue to tighten until cotter pin holes are lined up and install cotter pin. Raise lower control arm and install upper rebound bumper in proper hole, then to seat it in position, slowly lower the control arm until upper arm presses point of bumper through hole in spring tower.

LOWER CONTROL ARM (1200 SERIES): Removal - Remove coil spring (see above), then disconnect lower control arm inner shaft from crossmember.

Disassembly: Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" - 20 capscrew (furnished with Tool J-5888) to bottom of threads in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, being careful not to allow bushing flange to contact support, then press



CORVAIR SERIES 500, 700, 900 FRONT SUSPENSION ASSEMBLY

on capscrew until bushing is free of control arm. Repeat this operation to remove bushing from opposite end of shaft.

Reassembly: Install cross shaft in control arm and position Tool J-7052-1, then support control arm with Tool J-5888-3 and hand start bushing into control arm and over end of cross shaft. *NOTE - End of cross shaft with two bolt holes must be toward front of control arm.* Install Tool J-7052-5 so three piece spacer does not overlap bushing holes in control arm, then press bushing into control arm until flange concontacts arm. Repeat procedure for bushing at opposite end of cross shaft. Install collar, lockwasher and capscrew in each end of shaft but DO NOT TIGHTEN.

Installation: Install control arm on crossmember and attach with lockwashers, bolts and anchor nuts. Install coil spring, then with car weight on wheels, tighten cross shaft bushing bolts to 45-55 ft. lbs.

UPPER CONTROL ARM (1200 SERIES): Removal - Raise and support car under outer end of lower control arm, then remove wheel assembly. Disconnect and remove ball joint stud from steering knuckle with Tool J-6627 (pitman arm puller), then wire hub, drum and steering knuckle in position to prevent damage to brake hose. Remove nuts retaining upper control arm to crossmember, noting number and thickness of shims found at each bolt, and remove control arm.

Disassembly: Remove capscrews, lockwashers and collars from both ends of cross shaft, then install a 3/8" - 24 capscrew (furnished with Tool J-5888) in one end of shaft. Support control arm in an arbor press on Tool J-5888-3, being sure that flange of bushing does not contact support, then press bushing out of arm, repeat this procedure for opposite bushing.

Reassembly: Install control arm in press with Tool J-7052-2 in place between legs of control arm and press in bushing. Install cross shaft in arms and invert assembly in press, and press in second bushing. *NOTE - Cross shaft should be free enough to turn by hand.* Install collar, lockwasher and capscrew in each end of cross shaft, but DO NOT TIGHTEN.

Installation: Reverse removal procedure and lower car to floor. Bounce front end to centralize bushings, then with weight of car of wheels, tighten bushing capscrews to 35-40 ft. lbs.

BALL JOINTS (UPPER & LOWER): Removal - With coil spring removed and control arms hanging free, remove lube fitting from joint, then mark center of rivet heads with a center punch and drill through head with a ¼" drill. Cut off heads with a chisel and remove balance of rivets with a punch. Remove ball joint.

Installation: On upper control arms, ream rivet holes out to 21/64". Position new ball joint assembly on control arm and install special bolts through mounting holes and tighten nuts securely. *CAUTION - Use only the bolts (specially hardened) furnished with ball joint assembly.* Complete installation by reversing removal procedure.

FRONT SUSPENSION CROSSMEMBER: Removal - Remove steering relay rod from car, then remove bolts retaining idler arm to frame. Disconnect brake main cylinder line and rear brake feed line from junction block at top center of cross member. Use a suitable jack under crossmember and remove the four bolts holding crossmember to underbody, then remove crossmember.

Installation: Reverse removal procedure and note the following: Tighten crossmember mounting bolts to 100-110 ft. lbs. and idler arm-to-frame nuts to 13-22 ft. lbs.

CHEVROLET TRUCK FRONT SUSPENSION

Chevrolet Trucks (Exc. Fwd. Cont. & 4-Whl. Dr.) (1961)

►*NOTE: See "Truck "I" Beam Suspension" for Fwd. Cont. & 4-Whl. Dr.*

DESCRIPTION: Same design as used on corresponding previous models.

ADJUSTMENT: *NOTE - Truck curb height must be checked and corrected before making camber and caster adjustment.*

Truck Curb Height: 10, 20, 30, 40 Series - 4½" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. Adjust torsion bar rear anchor to obtain correct height.

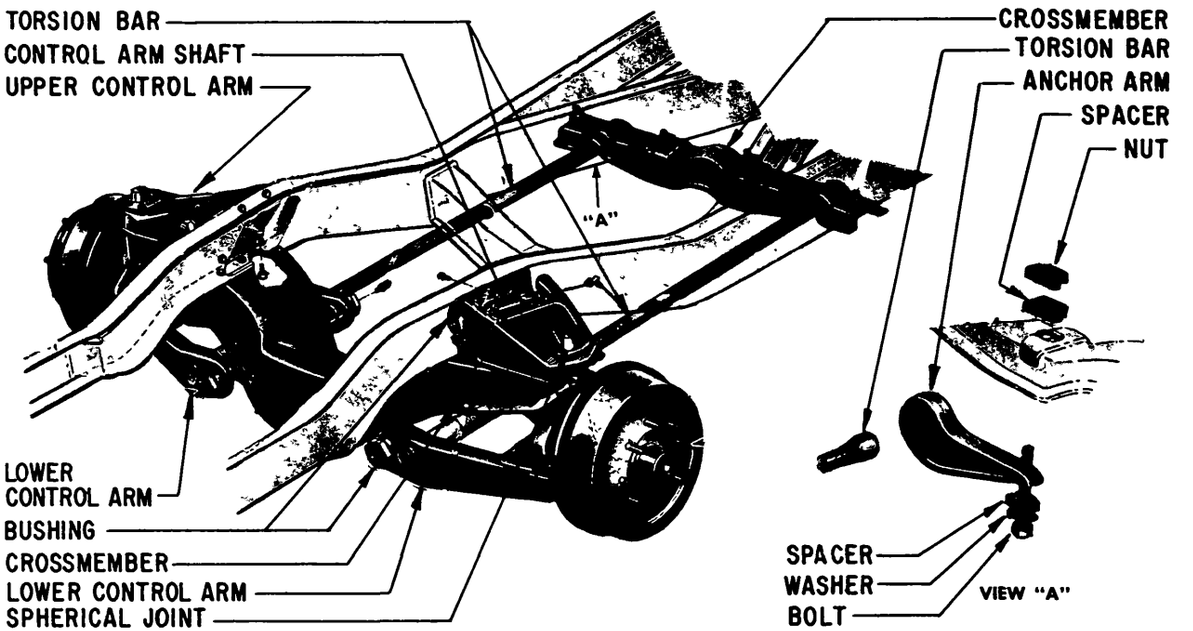
50, 60 Series - 5 1/16" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. No adjustment provided. If dimension not correct, replace torsion bars.

Caster (10, 20, 30, 40 Series): Pos. 1°±½°. *NOTE - Change shims between upper control arm spacer and bracket at either front or rear bolt.* One .0299" shim added to rear bolt changes caster a **minus** 24' and camber a **minus** 1'. One .0299" shim removed from rear bolt changes caster a **plus** 24' and camber a **minus** 2'. *NOTE - .0598" and .1196" shims are available to reduce the number of shims.* The shim pack at each bolt location should not exceed 5/8" (twenty-one .0229" shims). The total difference in shims between front and rear bolts should not exceed .33" (eleven .0299" shims).

Caster (50, 60 Series): Neg. 1° to 0° (Left Hand Side); 0° to Pos. 1° (Right Hand Side). Preferred setting is Neg. ½° (Left Hand Side); Pos. ½° (Right Hand Side). *NOTE - If there is insufficient adjustment to obtain Neg. ½ caster on left hand side, set left side as close as possible to this desired negative angle. Caster on right side should then be set 1° greater than caster at left side, without exceeding right caster limits. In any event, right wheel caster should be at least ½° more positive than left wheel caster.* Caster adjustments are made by changing locations of lower control arm shafts with reference to notched plates welded to crossmember. Check caster to determine amount of change required to obtain proper caster, then mark location of control arm shaft with reference to notched attaching plate. Loosen four shaft-to-crossmember bolts to free shaft from notches in attaching plates, then move shaft rearward to decrease caster or forward to increase caster. *NOTE - Moving shaft a distance of one notch changes caster approximately ½°. Tighten bolts and recheck adjustment.*

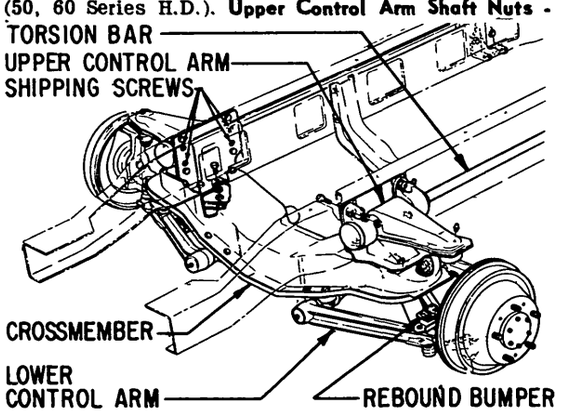
Camber (10, 20, 30, 40 Series): Pos. ½°±½°. *NOTE - Changing shims between upper control arm spacer and bracket at both front and rear bolts equally.* One .0299" shim added or removed from both bolts changes camber 10'38". Removing shims decreases camber. Adding shims increases camber. *See "Caster" above for available shim thickness and total thickness of shim packs.*

Camber (50, 60 Series): 0° ± 1/3°. *NOTE - Changing shims between upper control bracket and support at both front and rear bolts equally.* One .0299" shim added or removed changes camber approximately ½°. Adding shims increases camber. Removing shims decreases camber. *CAUTION - Make sure that the Phillips type screws (installed during manufacture) located in upper control arm brackets have been removed and discarded. These screws are needed during plant assembly only.* Remove two upper nuts and bolts attaching control arm bracket to frame and loosen two lower nuts. Lift truck at front crossmember until control arm bracket can be pried away from support. Insert or remove shims as required.



CHEVROLET TRUCK FRONT SUSPENSION (10, 20, 30, 40 SERIES)

►*UPPER & LOWER CONTROL ARM SHAFT & BRACKET NUT TIGHTENING SPECIFICATION CAUTION:* These nuts must be tightened to the following specifications: **Lower Control Arm Shaft Nuts** - 90-115 ft. lbs. (10, 20 Series); 100-135 ft. lbs. (30, 40 Series); 180-240 ft. lbs. (50, 60 Series Exc. H.D.); 315-420 ft. lbs. (50, 60 Series H.D.). **Upper Control Arm Shaft Nuts** - 60-75 ft. lbs. (10 Series); 85-110 ft. lbs. (20 Series); 120-155 ft. lbs. (30, 40 Series). **Upper Control Arm Bracket Nuts** - 125-165 ft. lbs. (50, 60 Series).



CHEVROLET TRUCK FRONT SUSPENSION (50, 60 SERIES)

Toe-In (10, 20, 30, 40 Series): 3/16-1/4" (both wheels). Loosen clamp bolts at ends of each tie rod and turn tie rod until proper toe-in is secured and steering gear is on "high point" for straight ahead travel.

Toe-In (50, 60 Series): *NOTE - Toe-In (Toe-Out) varies in relation to trim height of vehicle. See table below for correct toe-out specification at indicated trim height.*

Toe-In Specifications

Trim Height ①	②Toe-Out
6½-7½"	1/4"
5½-6½"	3/16"
3-5½"	1/16"
3" or Less	Overloaded

① - See "Truck Curb Height" above for measurement procedure.

② - Plus or minus 1/16". The above specifications are for both wheels, total.

Steering Axis Inclination: 8½°±½° (Series 10, 20, 30, 40); 7°±½° (Series 50, 60).

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 21¾° (Series 10, 20, 30, 40); 23° (Series 50, 60).

REMOVAL & INSTALLATION: *See 1960 Annual Data, Page 369, or later Manual edition and note the following:*

Torsion Bar Anchor Bolt: A new lower spacer having a locating lug is used in production. *CAUTION - This spacer must be installed so lug is positioned inboard or convex surface on spacer will not seat in mating curvature of torsion bar control arm.*

CORVAIR & PONTIAC TEMPEST REAR SUSPENSION

Corvair, All Models (1961)
Pontiac Tempest (1961)

►*1961 PONTIAC TEMPEST REAR SPRING NOISE CORRECTION (EARLY CARS):* This condition may be caused by brake hose support contacting spring coils. To correct, remove bracket and grind away sufficient material to provide spring clearance. Later cars have the bracket changed in production.

DESCRIPTION: Independently sprung with individual single control arm on each side of car. Coil type rear springs are mounted between control arm and frame crossmember. Shock absorbers are mounted within coil springs.

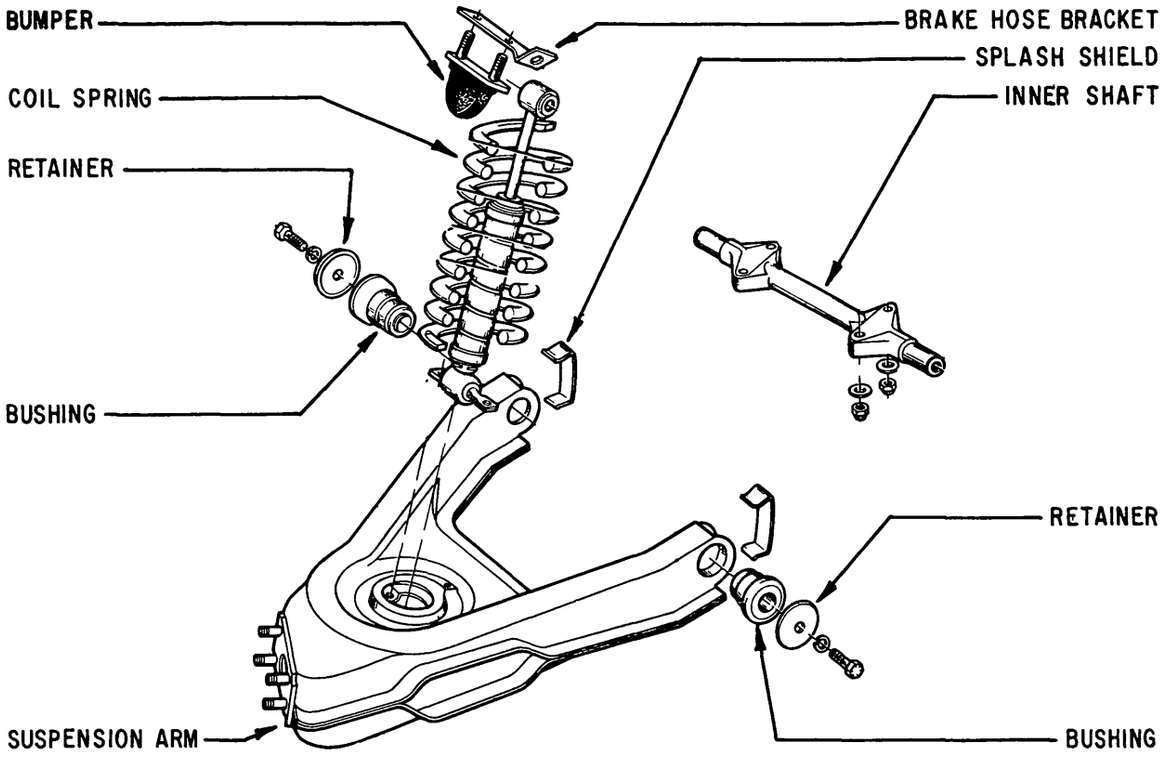
ADJUSTMENT: Toe-In - 0-1/8" (Corvair Series 500, 700 900 & Pontiac Tempest); ¼-½" (Corvair Series 1200). *NOTE - If drive-on type equipment is used, reverse car and back into position. Toe-In (overall) will be read as toe-out (readings taken from rear of tires rather than front).* To adjust, add or remove shims equally at each side of front edge of transmission case, with engine rear support loosened (All Corvair models); at front edge of differential (Pontiac Tempest). *CAUTION - Shims must be added or removed equally from each side.* DO NOT attempt to adjust one wheel at a time. A shim added to each side will decrease toe-in. Removal of shim from each side will increase toe-in. *NOTE - Because of manufacturing tolerance and parts "stack-up" it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust the wheel with toe-out as close as possible to specifications, but not letting opposite wheel go out of specification. If for example, one wheel toes-out by ¼", then opposite wheel must toe-in enough to give overall specified toe-in.*

Camber: 1½°±½° (Corvair Series 500, 700, 900); ¾°±½° (Corvair Series 1200). Not adjustable. If camber is not within limits, either the crossmember is out of alignment with body or it has become distorted due to collision.

Rear Riding Height: With car at curb weight (full tank of gas and spare tire), position car on a smooth level floor, then bounce rear end several times and allow to settle to its normal height.

Corvair Series 500, 700, 900 - Measure distance from floor to bottom of rocker panel 29" ahead of centerline of rear wheel. This measurement should be 9"±½". Measure opposite side of car in same manner. The difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - These springs do not have flat ends and shims must not be used.*

Corvair Series 1200 - Measure distance from center of rear suspension control arm pivot bolt to floor. This measurement should be 14 5/16"±1/2". Measure opposite side of car in same manner. The difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - These springs do not have flat ends and shims must not be used.*



CORVAIR & PONTIAC TEMPEST REAR SUSPENSION ASSEMBLY

Pontiac Tempest - 3 7/8", measured directly behind rear spring between control arm upper bumper bolt and top of upper control arm. To correct riding height, replace springs.

REMOVAL & INSTALLATION: *See 1960 Annual Data, Page 377, or later Manual edition and note the following:*

Rear Suspension Crossmember (Pontiac Tempest): Remove transmission and differential assembly (see "Pontiac Tempest Transaxle"), then remove both shock absorbers and coil springs (support control arms with a jack). Disconnect parking brake cables at rear equalizer, then remove fuel line and brake line from clip on top of crossmember. Disconnect brake lines at junction block and remove two bolts at each side connecting crossmember to body, then lower crossmember from car. *CAUTION - Be sure that crossmember is properly supported before lowering from car.*

Installation: Place crossmember in position and install four attaching bolts, tightening them to 60-80 ft. lbs. Complete installation by reversing removal procedure.

CORVETTE FRONT SUSPENSION

Chevrolet Corvette (1961)

DESCRIPTION: Independent linked parallelogram type with direct acting shock absorbers and coil spring. "Threaded Bushing" pivot points used on upper and lower control arms for connection to steering knuckle.

ADJUSTMENT & PARTS REPLACEMENT: *See "Suspension & Wheel Alignment" in Manual and note the following:*

Tire Inflation: 24 lbs. (Normal driving), 36 lbs. (Sustained high speed).

Kingpin Inclination: 4°±3/8°. Not adjustable.

Caster: 2°±½°. Loosen clamp bolt in upper end of knuckle support, remove lubricant fitting at outer end of upper control arm, then insert an Allen wrench through hole and turn pivot until correct caster setting is secured. *NOTE - Pivot pin must be turned in full turns only for caster setting, otherwise camber will be changed.*

Camber: 0°±½°. After adjusting caster (above), rotate pivot bolt not more than ½ turn in either direction to secure correct camber. Entire range of adjustment is obtained in ½ turn of pivot bolt.

Toe-In: 1/8"-3/8". Loosen clamp bolts at left hand tie rod and turn rod (right hand tie rod is one-piece non-adjustable type), tighten clamp bolt to 8-12 ft. lbs.

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be 17°. Not adjustable.

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "TORSION-AIRE"

Chrysler, D S to, D dg , Plymouth (1961)

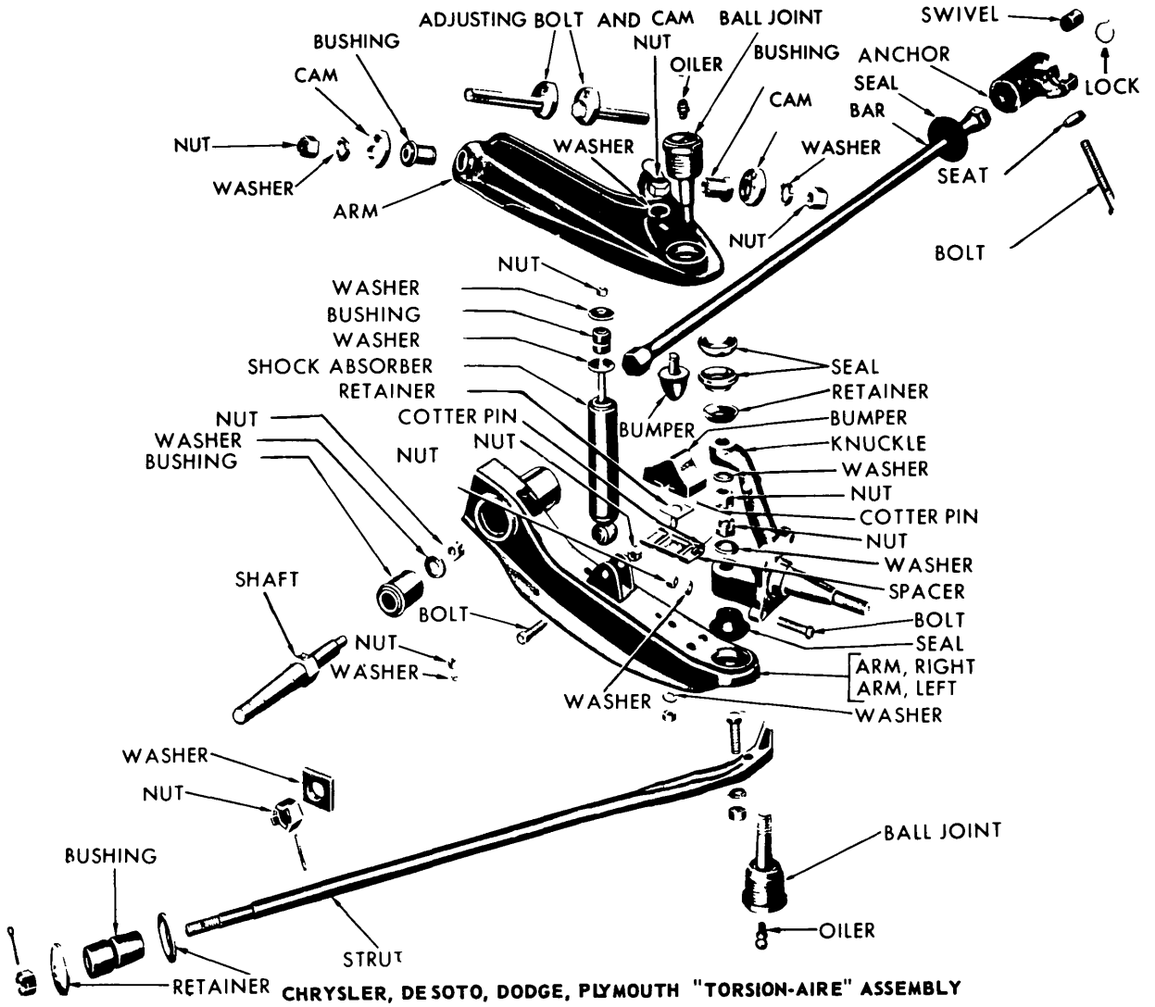
DESCRIPTION: Front suspension assembly design is similar to preceding models with eccentric type bolts at inner ends of upper control arm for adjusting camber and caster. Upper control arms attach to brackets welded to the frame by the use of special bolts having an integral cam at the head of the bolt. A matching removable cam is installed at threaded end of bolt. The brackets are provided with slotted holes and each bracket has cam retainers welded to its front and rear faces to engage cams on upper control arm attaching bolts. Rotating the head of cam bolts causes the upper control arm to move horizontally in slots provided in bracket. Turning one bolt will move the upper control arm ball joint fore or aft to affect caster (more than camber). Turning both bolts on one side an equal amount in same direction will move the upper ball joint in or out to affect camber.

ADJUSTMENT: Front suspension height must be correct before measuring caster and camber and the car must be kept at the same level when measurements are made. To properly position car for measurements, bounce car, front end first, then rear, several times by grasping center of bumpers. Release bumpers on the down stroke each time after same number of bounces.

Fr nt Susp nsi n H ight: Checking - Make sure car is on a level floor, tires inflated to recommended pressure, and car at curb weight (full gas tank, no passengers or load). Measure from lowest point of lower support arm ball joint to floor and from underside of lower control arm bushing (at center line of bushing housing). *NOTE - Under car weight, the bushing housing will always be higher than the ball joint housing.* The difference between these two figures should be as specified in table below. If the difference in measurements between the two sides of the car are less than 1/8" of each other and are within limits specified, suspension height is correct. If these measurements differ more than 1/8" or if one or both of them are outside specified limits, the torsion bars must be adjusted.

► *TORSION BAR ADJUSTMENT NOTE: Torsion bar adjusting bolt should only be loosened or tightened with a torque wrench, with car supported to relieve load on torsion bars. If more than 200 ft. lbs. is required to turn adjusting bolt, then bolt and swivel must be replaced.*

Adjustm nt - Tighten or loosen adjusting bolt at rear end of each torsion bar until measurement differences are as specified. *NOTE - Jounce car at front and rear after making adjustment prior to height check. Also when torsion bar spring adjustment is made, check alignment of front whe ls and headlight aiming.*



CHRYSLER, DE SOTO, DODGE, PLYMOUTH "TORSION-AIRE" ASSEMBLY

Front Suspension Height Limits

Model	Height Difference
All Models (Exc. Sta. Wgn.	2"±1/8"
Stn. Wgn. & Cars with H.D. Springs	2 3/8"±1/8"

Caster: Neg. ½° ± ½° (Manual Steering); Pos. ¾° ± ½° (Power Steering). Adjust caster by turning **one** eccentric bolt at a time as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in opposite directions affects caster with a minimum amount of change in camber.*

Camber: Right Wheel - Pos. ¼°±¼° (¼° preferred). **Left Wheel** - Pos. ½°±¼° (½° preferred). Adjust camber by turning **both** eccentric bolts equally in same direction as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts equally in same direction affects camber with a minimum amount of change in caster.*

Steering Axis Inclination: 5½° to 7½°. No adjustment provided.

Toe-In: 3/32-5/32" (1/8" preferred).

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 21½° ± 1°.

REMOVAL & INSTALLATION: *See 1957 Annual Data , Page 341, or later Manual editions.*

COMET & FALCON FRONT SUSPENSION

Comet (1961)
Falcon (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 UPPER & LOWER CONTROL ARM BALL JOINT SEAL REPLACEMENT NOTE (EARLY CARS):* A new boot-type upper and lower ball joint seal, Part No. C1DD-3A105-A, is being used in later production and can be installed on all previous models. *NOTE - If replacement ball joints have been installed with hex-head bolts, these bolts must be removed and replaced with round-head bolts, Part No. C2DA-3A486-A.* Thoroughly clean ball joint studs, sockets and area surrounding the sockets before installing boots.

►*1960-61 UPPER & LOWER BALL JOINT SERVICE REPLACEMENT TIGHTENING SPECIFICATION CHANGE:* Upper and lower ball joint attaching bolts should be tightened to 12-15 ft. lbs. This supersedes previous specifications of 28-45 ft. lbs.

DESCRIPTION: "Ball-Joint" type suspension with front coil spring and shock absorber mounted between upper control arm and tower in wheel housing. Lower control arm is connected to underbody with a mounting bolt. A strut connected between outer end of lower strut and bracket at forward end of underbody prevents horizontal movement of lower control arm. Shims located between upper control arm inner shaft and mounting bracket control camber and caster adjustments.

CHECKING & ADJUSTING: Before adjusting front end alignment, inflate tires to specified pressure (see below). Raise front of car and check front suspension ball joints for looseness, wear, or damage. *CAUTION – Do not raise car with jack under lower suspension arms.* Check steering gear mountings and all linkage for looseness. Adjust front wheel bearings. Check tracking of front and rear wheels.

►*ADJUSTMENT NOTE: Previous adjustment specifications are superseded by the following:*

Tire Inflation: Falcon - (Sedan) 24 lbs. front & rear. (Station Wagon) 22 lbs. front, 30 lbs. rear. (Ranchero) 24 lbs. front, 30 lbs. rear.
Comet - 22 lbs. front, 26 lbs. rear.

Caster: 0° to Pos. 1°. Preferred setting is ½° (Comet), 0° (Falcon). *NOTE - Maximum variation from side to side should not exceed ½° (¼° preferred).*

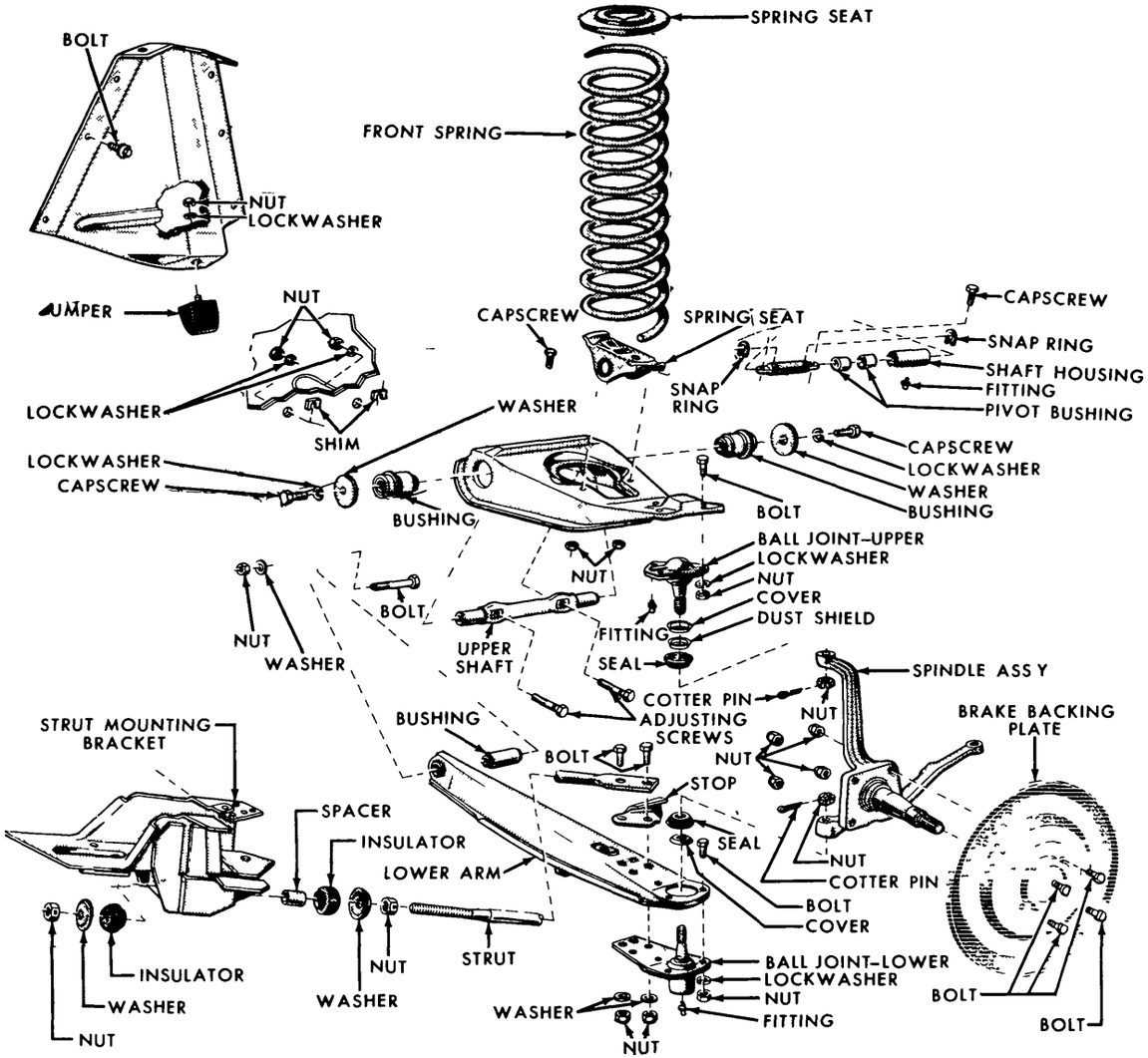
Camber: 0° to Pos. 1° (½° preferred). *NOTE - Maximum variation from side to side should not exceed ½° (¼° preferred).*

Toe-In: 9/32"±1/32".

Toe-Out on Turns: With outer wheel turned 20°, inner wheel should be 20¾°.

Front Riding Height (Comet): Synchro-mesh Trans. - 4 3/16" (2-Dr. Sedan); 4¼" (4-Dr. Sedan & 2-Dr. Sta. Wgn.); 4 1/16" (4-Dr. Sta. Wgn.), all plus or minus 3/8". **Automatic Trans.** - 4 7/16" (2-Dr. Sedan); 4 3/8" (4-Dr. Sedan); 3 15/16" (2-Dr. Sta. Wgn.); 4 5/16" (4-Dr. Sta. Wgn.), all plus or minus 3/8".

►*FRONT RIDING HEIGHT MEASUREMENT NOTE (COMET):* With car at curb weight on a level surface, measure the distance between center of lower control arm-to-frame attaching bolt and surface of floor, then measure distance between lower surface of lower control arm ball joint and floor. The difference between these two measurements is the front riding height. See above.



COMET AND FALCON FRONT SUSPENSION ASSEMBLY

Shimming Procedure: Camber and caster adjustments are made by adding or removing shims between upper control arm inner shaft and mounting pad. To change caster, remove or add shims at one of the mounting bolts. The removal of shims at front bolt or installation of shims at rear bolt will cause ball joint on upper control arm to move forward. Reversing this procedure will cause joint to move to rear. A 1/32" change of shim thickness at either bolt will change caster angle ½°. *NOTE – The difference between shim thicknesses at the two bolts should not exceed 1/16" and the maximum thickness of shim stack at each bolt must not exceed 9/16".* To adjust camber, remove or install equal shim thicknesses at both bolts. Removal of shims at both bolts will move upper ball joint inward, and installation of shims will move upper ball joint outward. A 1/16" change in shim thickness at both bolts will change camber angle 1/3°.

Lower Control Arm Strut Adjustment: Adjust length of strut by turning front and rear nuts securing strut rod to bracket on frame member to a length of 17 5/8" measured from back face of rear insulator washer to center strut-to-lower control arm attaching bolt. The correct distance between insulator washers (measured from outer surfaces) should be 1.27"±1/32" when strut rod nuts are tightened to 40-55 ft. lbs.

►*LOWER CONTROL ARM STRUT INSULATOR REPLACEMENT CAUTION:* DO NOT interchange 1960 and 1961 parts. Use only Kit, Part No. C1DZ-3468-A for replacement on 1961 models.

REMOVAL & INSTALLATION: *See 1960 Annual Data, Page 374, Later Manual Edition.*

THUNDERBIRD FRONT SUSPENSION

Ford Thund rbird (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 UPPER CONTROL ARM BALL JOINT NOISE CORRECTION:* Drill out rivets securing ball joint assembly to upper control arm, then remove ball joint assembly from car. Replace ball joint bearing with Part No. C1SS-3394-E. Install ball joint, using a new "O" ring coated with head gasket sealer installed between ball joint flange and underside of upper control arm. Secure assembly in place with hardened, fine thread bolts and lockwashers. *NOTE - The above parts ar furnished in Kit, Part No. C1SZ-3349-A.*

►*1961 FRONT COIL SPRING "CLICKING" NOISE CORRECTION:* This noise may be caused by adjacent coils at top or bottom of spring contacting each other. To correct, rework a spring insulator, Part No. C1VV-5A321-B by cutting a V-slot out of raised portion where spring "pigtail" would normally fit. Thread insulator between first and second coils (at both upper and lower end of spring). Retain in place with plastic electricians tape.

►*1961 FRONT SHOCK ABSORBER NOISE CORRECTION (EARLY CARS):* Install new upper bushings and washers from Kit, Part No. C1SZ-18198-B. Tighten stud nut to 15 ft. lbs.

►*1961 SPINDLE CONNECTING ROD SLEEVE INTERFERENCE CORRECTION:* Rotate adjusting sleeve so that bolts are at bottom of sleeve and are not binding connecting rod ends.

DESCRIPTION: New design "ball-joint" type front suspension system with coil spring mounted between top of upper control arm and bracket attached to car underbody. Upper and lower control arms are pivoted on shafts attached to brackets on underbody with the lower control arms additionally supported by strut rods connecting outer end of lower control arm to forward end of underbody. Camber adjustments are made by adding or removing shims from between lower control arm pivot shaft bracket and car underbody. Caster adjustments are made by repositioning strut on outer end of lower control arm. Front shock absorbers are mounted within front coil springs.

ADJUSTMENT: With tires properly inflated and car at normal curb weight, check and adjust in the following sequence.

Tir Inflati n: 24 lbs. (front & rear).

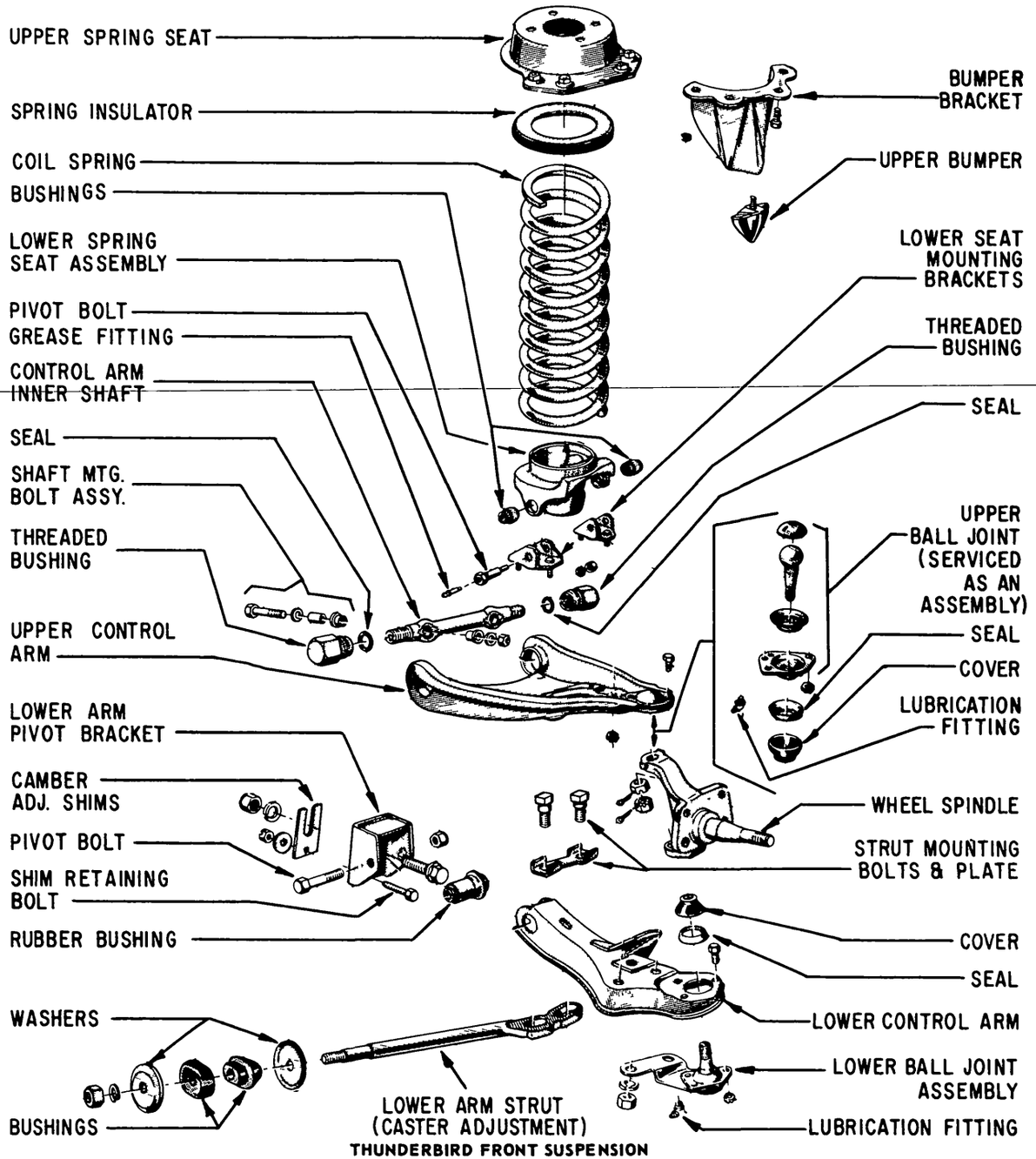
Cast r: Neg. ¼° to Neg. 1¼°. Maximum difference between front wheels should not exceed ½° (¼° preferred).

Adjustm nt - Loosen bolts attaching strut to lower control arm, then raise strut so it is free of serrations on arm. Lengthen distance between strut forward mount and edge of control arm to decrease caster and shorten distance to increase caster.

Camber: 0° to Pos. 1°. Maximum difference between front wheels should not exceed ½° (¼° preferred).

Adjustment - Remove or install shims between lower control arm pivot bracket on car underbody. Shims are available in thicknesses of .023-.027" and .113-.127". A 1/16" change of shim thickness will change camber angle 1/3°. *NOTE - Shim pack thickn ss must not x- c d 11/16".*

Toe-In: 1/16-1/8". Turn sleeve on each tie rod equally in opposite directions as required.



THUNDERBIRD FRONT SUSPENSION

Toe-Out On Turns: With outer wheel turned 20°, inner wheel should be turned 20½°. Not adjustable.

CONTINUED ON NEXT PAGE

THUNDERBIRD FRONT SUSPENSION (C ntinued)

REMOVAL & INSTALLATION

WHEEL SPINDLE: Removal - Raise front of car and support under chassis, then remove wheel, hub, and drum. Remove brake backing plate from spindle and wire up put of way. Disconnect tie rod end from spindle, then loosen both upper and lower ball joint stud nuts, but do not remove. Position a box wrench over lower end of Tool T57P-3006-A and position tool so each end contacts a ball joint stud. *CAUTION - Tool should seat firmly against ends of both studs, not against stud nut.* Turn wrench until tool places studs under tension, then loosen studs in spindle by tapping spindle near studs with a hammer. DO NOT loosen studs in spindle with tool pressure alone. Remove stud nuts and spindle from both studs.

Installation: Position on upper and lower ball joints and install stud nuts and tighten to 60-80 ft. lbs. Continue to tighten nuts until cotter pin holes line up with slots, then install cotter pins. Complete installation by reversing removal procedures.

SHOCK ABSORBER: Removal - Raise car and support under lower control arm, then lower car slightly. Disconnect lower end of shock absorber from spring lower seat, then open hood and remove shock absorber upper mounting plate bolts and bolts attaching mounting plate-to-dash panel brace at dash panel. Remove shock absorber, mounting pad and brace.

Installation: Assemble shock absorber mounting stud to plate with washer and insulator and tighten retaining nut. Position shock absorber and mounting plate assembly in place and install and tighten attaching bolts. Lower car slightly with safety stands under lower control arm and insert shock absorber stud through hole at bottom of spring lower seat. Install insulator, washer, and retaining nut on shock stud and tighten to 15-25 ft. lbs.

FRONT SPRING: Removal - Raise front of car and place a safety stand under lower control arm, then lower car slightly. Remove shock absorber (see above), then remove wheel, hub, and drum assembly. Remove upper suspension arm bumper and raise car slightly off safety stand to lower upper control arm. Insert the lock bar of Tool T61B-5310-A through top of spring and position bar on seventh coil from bottom. Slide tool bearing over tool shaft against the integral nut. Insert shaft through shock absorber mounting hole in lower spring seat so that end of shaft will thread into lock bar. Compress spring by turning shaft into lock bar until top coils are drawn out of spring upper seat. Remove bolts retaining spring seat to upper control arm and remove spring and seat as an assembly. Place spring in a vise and turn tool shaft out of lock bar to release spring, then remove bar and shaft.

Installation: Tape rubber insulator to upper end of spring in three places, then place spring in a vise and place spring lower seat against lower end of spring. Slide bearing of Tool T61B-5310-A over tool shaft against integral nut, then insert shaft through shock absorber mounting hole in spring lower seat. Insert lock bar of Tool T61-5310-A on seventh coil from spring lower end. With spring seat positioned, compress spring completely between seventh and first coil, then remove spring from vise. Position spring assembly on upper arm and align with spring upper seat. Install lower seat mounting bolts and nuts. Turn tool shaft out of tool lock bar, releasing spring into upper seat. Install shock absorber and mounting assembly, then lower car slightly with safety stand under lower control arm, raising upper arm enough to position shock absorber stud through lower spring seat. Install insulator, washer and retaining nut and tighten to 15-25 ft. lbs. Install upper arm bumper, wheel, hub, and drum assembly, then check front end alignment.

UPPER CONTROL ARM: Removal - Raise front of car and support under lower control arm, then remove front spring (see above). Remove upper ball joint (see "Wheel Spindle" above). Remove upper control arm inner shaft retaining nuts and washers, then remove upper control arm.

Disassembly: Remove nuts securing lower spring seat mounting brackets to control arm, then remove grease fittings from spring seat pivot bolts and remove spring seat assembly. Position upper arm inner shaft in a vise and unscrew bushings from shaft and arm. Remove assembly from vise and separate inner shaft from arm.

Reassembly: *NOTE - If either bushing is worn or damaged, replace both bushings. When replacing inner shaft, use only new bushings.* Position shaft in arm and install new bushings on shaft and arm. *NOTE - Turn bushings so shaft is centered in control arm (centerline of shaft attaching bolts holes should be 1.85±.02" from side of arm).* Tighten bushings to 15-25 ft. lbs.

Installation: Reverse removal procedure and adjust front end alignment.

LOWER CONTROL ARM: Removal - Raise and support car under chassis, then remove wheel, hub, and drum assembly. Remove brake backing plate and wire up out of way. Disconnect stabilizer and strut from lower control arm, then disconnect lower ball joint from spindle (see "Wheel Spindle" above). Remove lower control arm pivot bracket retaining nut and the shim retaining nut, then remove lower control arm. Place lower control arm assembly in a vise and remove pivot bolt, then separate pivot bracket from lower arm.

Installation: Assemble pivot bracket to lower control arm and install pivot bolt. Tighten pivot bolt nut snug, but do not tighten until control arm is installed on car. Complete installation by reversing removal procedure, then adjust front end alignment.

UPPER & LOWER BALL JOINTS: *NOTE - Upp r ball joint can be replaced with upper control arm in car after removing wheel, hub, and drum assembly and disconnecting upper ball joint stud from spindle. Procedures are the same as for replac ment with control arm removed from car.*

Removal: With control arm removed from car, drill a 1/8" pilot hole completely through rivet, then drill off rivet head with a 3/8" drill. Drive all rivets out of holes, and remove ball joint assembly.

Installation: *NOTE - Upper control arm ball joint is furnished in a kit and is assembled at installation. Lower ball joint is serviced only as an ass mbly. Both upper and lower ball joints are furnish d with hardened steel bolts that must b used f r attaching to control arm. DO NOT ATTEMPT to riv t replacement ball joints to control arms.* Clean end of arm and remove any burrs from edges of holes. On lower control arm, install ball joint and install and tighten special bolts furnished with ball joint assembly. On upper ball joint, assemble ball joint and install bearing in upper control arm. Coat the "O" ring found in kit with head gasket sealer and install between ball joint flange and underside of upper control arm. Install ball joint assembly and secure in position with special bolts furnished with ball joint package. Complete installation by reversing removal procedure.

FORD & MERCURY FRONT SUSPENSION

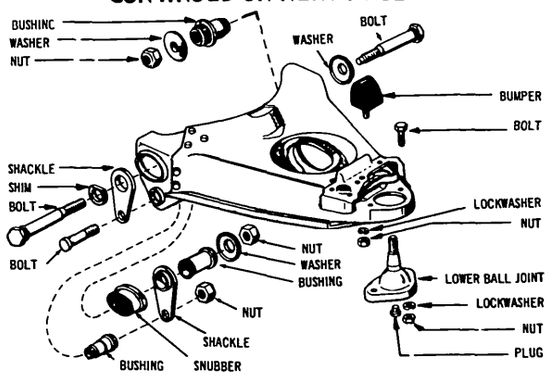
Ford Pass. Cars (1961)
Mercury (1961)

DESCRIPTION: Ball joint type suspension similar to design used on previous models except that lower control arms used on Mercury 800 & Monterey are connected at the front to frame crossmember through a shackle and rubber bushing. On all models, threaded steel bushings are used on upper control arm inner shaft pivots. Camber and caster adjustments on all models are controlled by shims located between upper control arm inner shaft and bracket on frame crossmember.

ADJUSTMENT: Before adjusting front end alignment, inflate tires to correct pressure, then raise front of car and check front suspension ball joints for looseness, wear or damage. *NOTE - Lower ball joint is not spring loaded and a slight normal looseness will be found when car is raised and wheel is hanging free.* Check steering gear mounting and all linkage for looseness. Adjust front wheel bearings. Check tracking of front and rear wheels.

Kingpin Inclination: 7° at Pos. ¾° camber. Not adjustable.

CONTINUED ON NEXT PAGE



MERCURY 800 & MONTEREY
LOWER CONTROL ARM

FORD & MERCURY FRONT SUSPENSION (C nt)

Caster: Neg. ½° to Pos. ½°. *NOTE - Maximum caster variation between wheels must be less than ½°, with ¼ pref rred.*

Camber: Pos. ¼° to Pos. 1¾°. *NOTE - Maximum camber variation b tween wheels must be less than ¼°.*

Toe-In: 1/8-1/4".

T e-Out n Turns: With outer wheels turned 20°, inner wheels should be 24¼°.

►*CAMBER & CASTER ADJUSTMENT NOTE: Camber and Cast r adjustments are made by adding or removing shims from between upper control arm shaft and bracket on cr ssm mber.*

OVERHAUL: *See 1957 Annual Data, Page 344, or later Manual edition and note th following:*

UPPER CONTROL ARM INNER PIVOT SHAFT BUSHING: Rem val & Installation - With upper control arm shaft removed from car, hold shaft in a vise and turn bushing off shaft and out of control arm. Install a new "O" ring seal in each bushing, then coat inside of each bushing with a small amount of multi-purpose lubricant (coat outer threads also). *CAUTION - An excessive amount of lubricant inside bushing will force the "O" ring out of place when bushing is installed.* Insert inner shaft in upper control arm, making sure that "bow" in shaft is upward, then install Tool T58P-3044A (Ford); Tool 3082-A (Mercury). With tool inserted between arms of upper control arm to properly locate arms the correct distance apart, place tool in a vise and thread bushing on each end of shaft, then turn bushings in until hex heads bottom on upper arm. *NOTE - New upper arms are not threaded. Bushings are self-tapping type.* Tighten bushing to 160-190 ft. lbs. Remove assembly from vise and remove tool, then check to see that shaft rotates with moderate effort. If shaft binds, check for misalignment

LOWER CONTROL ARM (MERCURY 800 & MONTEREY): Removal - Remove in same manner as for conventional lower control arm assembly.

Disassembly: *NOTE - Do not wash ball joint assembly with solvent.* Remove shackle nut, then tap the two horseshoe-shaped spacers of Tool 3079-M7 between shackle plates and ends of large elliptical bushing. Using an arbor press, support arm and shackle assembly with support cup, Tool 3069-M1 (small end) against inner shackle plate. Insert remover, Tool 3069-M2 into upper inner bushing and press bushing through both shackle plates and into support cup. Remove inner shackle plate and the outer plate and bolt assembly. Press lower bushing from arm using support cup, Tool 3069-M1 (small end) and remover, Tool 3069-M4. Press upper outer bushing from arm using support cup. Tool 3069-M1 (large end) and remover, Tool 3060-M6. Remove lower arm rear bushing using support cup, Tool 3069-M1 (small end) and remover, Tool 3069-J.

Reassembly: *NOTE - Clean bushing bores in arm. Use silicone or liquid soap as lubricant during reassembly.* Install rear bushing using replacer, Tool 3069-M5, support cup, Tool 3069-M1 (small end), and a piece of flat stock across large end of support cup. Press bushing into place until points of ribs on bushing sleeve bottom on arm. Start upper outer bushing squarely into arm by lightly tapping it into position. Use a piece of flat stock on bed of press to support upper outer bushing and press bushing into place using support cup, Tool 3069-M1 (large end) and Tool 3069-M6 over small end of support cup. Press bushing into place until shoulder of bushing sleeve bottoms on arm. Press lower bushing into arm using replacer, Tool 3069-M3, support cup, Tool 3069-M1 (small end), and a piece of flat stock across large end of support cup. Insert bolt of shackle plate and bolt assembly through lower bushing with threaded end of bolt toward inside of arm. Add inner shackle plate, then install and snugly tighten nut. Position the two horseshoe-shaped spacers, Tool 3069-M7 between shackle plates and upper outer bushing, then center shackle plates. Support the assembly and, using replacer, Tool 3069-M5, lightly tap upper inner bushing to start it squarely into position in inner shackle plate. Press upper inner bushing through shackle plates using replacer, Tool 3069-M5, support cup, Tool 3069-M1 (small end), and a piece of flat stock over large end of support cup. Remove spacers and tighten nut. *NOTE - If ball joint was removed, install new joint using parts supplied in ball joint kit. Tighten nuts to 28-35 ft. lbs. Make sur ball joint is completely filled with specified lubricant.*

Installation: Reverse removal procedure.

LANCER & VALIANT "TORSION-AIRE" FRONT SUSPENSION

Lancer (1961)
Valiant (1961)

DESCRIPTION: Independent type with torsion bars instead of conventional type coil springs. Upper control arms are attached to brackets which are welded to shock absorber tower and to body horizontals (side rails). Lower control arms are attached to the "K" type front suspension crossmember which is connected to body horizontals (side rails). Ball joints are used to attach both upper and lower control arms to steering knuckles. Torsion bars are anchored at rear to engine rear support member in the body and at the front to lower control arm. Eccentric bolt assemblies at upper control arms control camber and caster adjustments. Car riding height is controlled by a lever assembly at front end of each torsion bar.

TIRE INFLATION: Tir s Cold - 24 lbs. (Front, All Models); 24 lbs. (Rear, Sedan & 2-Seat Sta. Wgn.); 28 lbs. (Rear, 2 & 3-Seat Sta. Wgns. With Captive Air Tires). *NOTE - Captive Air Tires are standard on 3-S at and optional on 2-Seat Station Wagons.*

ADJUSTMENT: With car at curb weight (fuel tank full but with no luggage or passenger load), tires at recommemded pressure (see above) and with front suspension and steering linkage in good condition, make adjustments in the following order:

►*NOTE: Jounce car up and down several times at center of bumpers (rear bumper first) prior to taking each measurement. Car should be jounced the same number of times and the bumper should be released at the same point in cycle each time.*

Front Riding Height: Jounce car and measure from lower ball joint to floor and from control arm torsion bar spring anchor housing to floor. Subtract first measurement from second measurement. The difference should be 1¾" ± 1/8". The difference from one side of car to the other should not exceed 1/8". To adjust, turn nut on lower side (inner end) of lower control arm clockwise to increase height and counterclockwise to decrease height. After adjusting, jounce car and recheck height.

Caster: Neg. ½° ±½° (Manual Steering). Pos. ¾° ±½° (Power Steering). Adjust caster by turning **one** eccentric bolt at a time as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in opposit directions affects caster with a minimum amount of change in camber.*

Camber: Right Wheel - Pos. ¼°±¼° (Pos. ¼° preferred); **Left Wheel** - Pos. ½°±¼° (Pos. ½° preferred). Adjust camber by turning **both** eccentric bolts equally in same direction as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in same direction affects camber with a minimum amount of change in caster.*

Toe-In: 1/8" ± 1/32". Turn both tie rod adjusting tubes equally with steering wheel centered and steering gear on "high point" for straight ahead travel. *NOTE* - Before tightening clamps, turn tie rod assembly so sockets are either against front or back sides of studs. Tighten bolts to 15 ft. lbs.

Steering Axis Inclination: 6½° to 8½°. Not adjustable.

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be at 17° 40' ± 1°.

REMOVAL & INSTALLATION: *See 1960 Annual Data, Page 384, or later Manual edition.*

LINCOLN CONTINENTAL FRONT SUSPENSION

Lincoln Continental (1961)

►*1961 LINCOLN CAMBER & CASTER ADJUSTMENT*

NOTE; If difficulty is encountered in moving upper control arms shaft bolts for camber and caster adjustments, after bolts have been loosened, it may be due to undersized nuts wedging in the channel. Remove bolts and drive nuts out of channel in crossmember bracket using a blunt punch. Replace undersize nuts with Part No. 374381-S1.

DESCRIPTION: New design ball joint type suspension system with the following features. Upper control arm shaft is mounted in slotted holes in crossmember bracket and caster and camber adjustments are made by moving serrated upper arm. Lower control arm is connected to chassis at the inner end by a single rubber cored bushing. Fore and aft movement of wheel is controlled by a drag strut connected to lower control arm and to a point forward on number one crossmember.

ADJUSTMENT: Before adjusting alignment, check tires for proper inflation, wheel bearing adjustment, and for looseness or wear in front suspension.

Kingpin Inclination: 7° at ¾° camber. Not adjustable.

Caster: 0° to Neg. 1½° (¼° preferred). Both sides equal within ½°. Caster is controlled by movement of serrated upper control arm shaft on frame member. A 3/32" movement of either end of upper control arm shaft will change caster ½°. Tighten shaft attaching bolts to 100-125 ft. lbs.

Camber: 0° to Pos. ¾° (¼° preferred). Both sides equal within ½°. Camber is controlled by movement of serrated upper control arm shaft on frame member. A 3/64" movement of entire shaft will change camber ¼°. Tighten shaft attaching bolts to 100-125 ft. lbs.

Toe-In: 1/16-3/16".

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be 17°48'. Not adjustable.

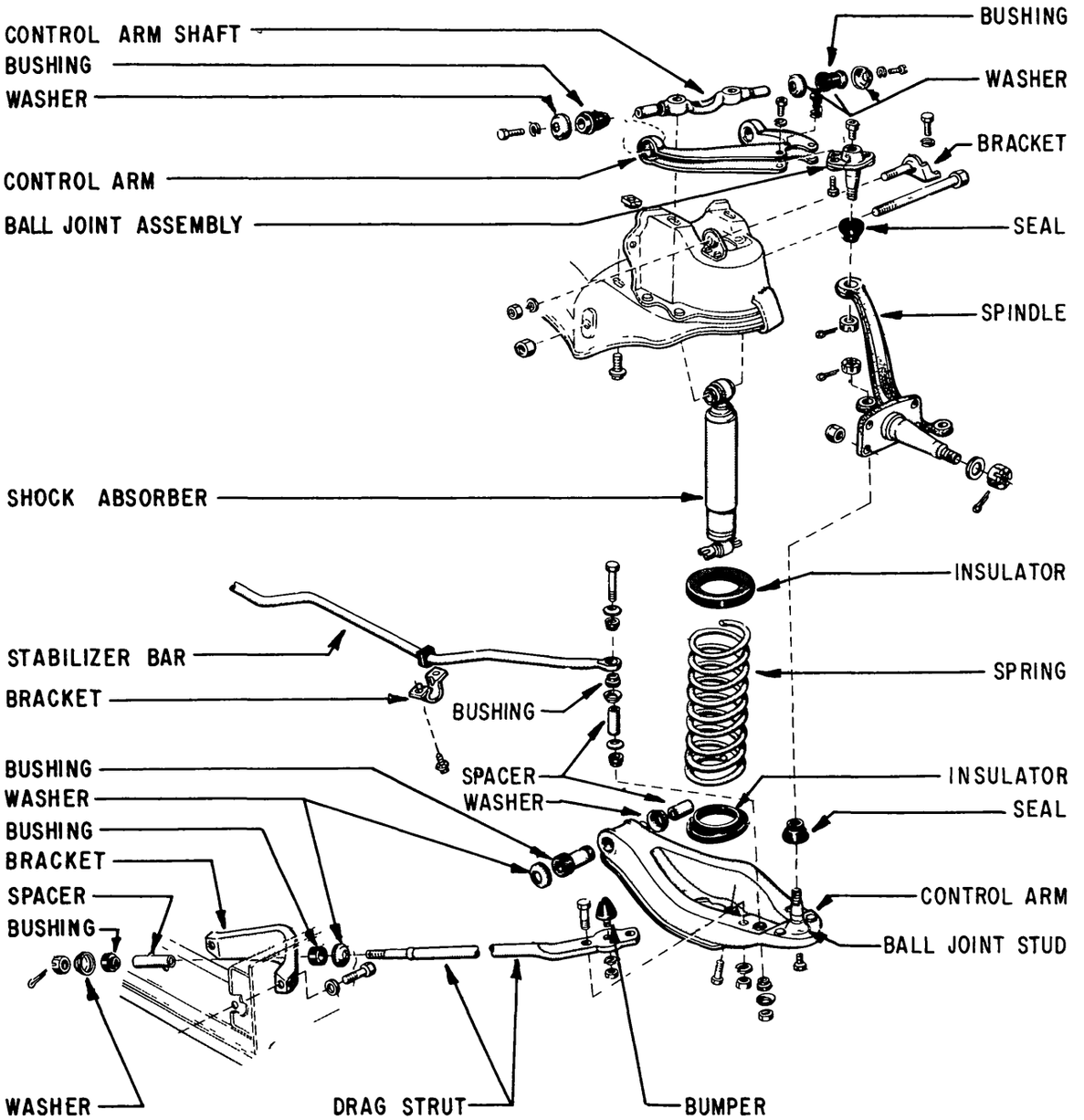
Riding Height: 5 3/16" to 6 1/8" (5¾" preferred). With car on a level floor and tires properly inflated, gas tank full and luggage compartment empty, push front bumper down about an inch, then release very slowly. Measure distance between top of drag strut and the ledge on inside of number two crossmember pocket just forward of bumper striking pad. The drag strut measuring point is midway between front attaching bolt and rubber bumper pad. Riding height difference between both sides of car should not exceed ½".

REMOVAL & INSTALLATION

LOWER BALL JOINT: Removal - Raise car and place support under each side rail to rear of lower control arm in area of lifting pad. Remove wheel, hub and drum, then remove brake backing plate and wire up out of way. Loosen lower ball joint stud nut two turns, then use a brass hammer and tap spindle until ball joint stud pops loose against nut. Place a jack under spring pocket in lower control arm, and raise arm slightly. Place a support stand under lower arm for safety. Remove nut from ball joint stud and raise upper arm and spindle until spindle clears ball stud. Prop upper arm in raised position. Remove ball joint rivet heads with a chisel and punch remaining part of rivets from holes and remove joint.

Installation: Install new joint using parts supplied in kit, and tighten bolts to 22-28 ft. lbs. *NOTE - Make sur joint is compl tely packed with specified lubricant.* Complete installation by reversing removal procedure, noting the following points: Tighten ball joint stud nut to 70-90 ft. lbs., then continue to tighten until cotter pin holes line up. Tighten backing plate attaching bolts to 75-85 ft. lbs.

UPPER BALL JOINT: Removal - Place a jack under outer end of lower control arm and raise arm, then place a support stand under side rail in lifting pad area. Remove wheel and tire and loosen upper ball joint stud



LINCOLN CONTINENTAL FRONT SUSPENSION ASSEMBLY

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL FRONT SUSPENSION (Cont)

nut two turns. Pry arm upward and tap spindle at stud boss with a brass hammer until ball stud loosens against nut. Remove nut and raise upper control arm, freeing ball joint stud from spindle. Wire upper end of spindle to underbody to prevent damage to brake hose. Remove ball joint retaining nuts and bolts and remove joint.

Installation: Install new joint using parts supplied in kit. Tighten nuts to 22-28 ft. lbs. *NOTE - Make sure ball joint is completely filled with specified lubricant.* Complete installation by reversing removal procedure, noting the following points: Tighten ball joint stud nut to 60-80 ft. lbs., then continue to tighten until cotter pin holes line up.

SHOCK ABSORBER: Removal - Remove upper eye stud nut of shock absorber, then remove upper eye stud bracket-to-crossmember retaining bolt and remove stud bracket. Remove bolts retaining shock absorber to lower control arm and remove shock absorber.

Installation: Reverse removal procedure and note the following: Tighten lower retaining nuts to 22-28 ft. lbs. Tighten upper eye bracket nut to 40-55 ft. lbs. Tighten stud bracket-to-crossmember bolt to 22-28 ft. lbs. **after upper eye stud is tightened.**

COIL SPRING: Removal - Raise car and support under each body side rail to rear of lower control arm in area of lifting pad, then remove wheel, hub and drum. Loosen backing plate for clearance. Remove shock absorber, and disconnect drag strut from lower arm. Disconnect stabilizer bar from suspension arm, then loosen (do not remove) lower ball joint from spindle (see "Lower Ball Joint" above). Place a jack under outer end of lower ball joint and raise arm several inches, then remove ball joint nut. Lower jack until spindle and spring are free, and remove spring and insulators.

Installation: Place a jack under outer end of lower control arm, then tape upper and lower spring insulators to spring. Compress coil spring with Tool 5310-A, and place spring and insulators in position, making sure that both ends of spring are properly seated. Raise lower control arm and guide lower ball joint into spindle boss. Install ball joint stud nut and tighten to 70-90 ft. lbs. Continue to tighten until cotter pin holes line up and install cotter pin. Connect stabilizer bar to lower arm and tighten nut to 22-28 ft. lbs. Connect drag strut to lower arm and tighten nuts to 70-90 ft. lbs. Install shock absorber, then tighten brake backing plate retaining nuts to 75-85 ft. lbs. If lower control arm removed, see "Lower Control Arm" below.

UPPER CONTROL ARM: Removal - Place a jack under outer end of lower control arm and raise arm, then remove wheel and tire. Disconnect upper ball joint from spindle (see "Upper Ball Joint" above). Mark position of upper control arm inner shaft on underbody to aid in making camber and caster adjustments after installation, then remove upper control arm-to-underbody retaining bolts and remove control arm.

Disassembly: *CAUTION - Do not wash ball joint with solvent.* Remove bolts, lockwashers, and cup washers from ends of control arm shaft, then assemble remover, Tool 3044-LA, to shaft at front bushing. Press bushing out of arm using support cup, Tool 3069-H, and remover, Tool 3044-AB3. Remove shaft and rear bushing inner cup washer. Remove rear bushing using support cup, Tool 3069-H, and remover, Tool 3069-L.

Reassembly: *NOTE - Both control arm bushings are pressed into arm from outside toward inside of arm. Use silicone or liquid soap as a lubricant when assembling shaft and bushings.* Press control arm rear bushing into arm using support cup, Tool 3069-H, and replacer, Tool 3068. Press bushing in until shoulder stop is reached. With rear bushing cup washer on shaft, insert end of shaft into rear bushing, then press front bushing onto shaft and into arm using replacer, Tool 3068. Bottom bushing against flange in arm. Install cup washers, lockwashers and bolts at end of upper control arm shaft. *CAUTION - Do not tighten these bolts at this time. Tighten only after control arm is installed on car and weight of car is on wheels. DO NOT SUBSTITUTE bolts at this point. Use only specified bolt if replacement is required.*

Installation: Position upper control arm shaft on underbody member and line up marks made before removal of arm. Install retaining bolts and tighten to 100-125 ft. lbs. Guide ball joint stud into spindle, then install ball stud nut and tighten to 60-80 ft. lbs. Continue tightening nut until cotter pin holes line up and install cotter pin. Install wheel and tire, then with weight of car on wheels, tighten bolts at ends of upper control arm shaft to 70-90 ft. lbs. Check front wheel alignment.

LOWER CONTROL ARM: Removal - Remove coil spring assembly (see "Coil Spring" above), then remove lower control arm-to-crossmember nut, bolt, washers, and spacer, then remove arm.

Disassembly: *CAUTION - Do not wash ball joint with solvent.* To remove ball joint, remove rivet heads with a chisel and drive remaining portion of rivets from holes. Press bushings out of inner end of control arm with Tools 3069-H, AA1 and AA2.

Reassembly: *NOTE - Apply silicone or liquid soap to shell of new bushing before installation.* Place bushing in arm with flange end of bushing at front of arm, then press bushing into arm until shoulder on bushing seats against arm. In addition to tools used for removal, use Tool 3069-M5 for bushing installation. If ball joint was removed, see "Lower Ball Joint" above, for installation.

Installation: Connect inner end of lower control arm to underbody crossmember, but do not tighten. Install coil spring assembly, then with car weight on wheels, tighten lower control arm-to-crossmember bolt retaining nut to 110-140 ft. lbs.

WHEEL SPINDLE: Removal - Raise car and support under each side rail to rear of lower control arm in area of lifting pad, then remove wheel, hub, drum, and brake backing plate. Disconnect steering connecting rod from spindle arm, then remove upper and lower ball joint studs from spindle (see "Upper and Lower Ball Joints" above).

Installation: Reverse removal procedure and tighten steering connecting rod ball stud nut to 40-55 ft. lbs. Continue to tighten nut until cotter pin holes line up, then install cotter pin.

CHEVROLET, FORD, WILLYS RIGID TYPE FRONT AXLE

Chevrolet, Fwd. Control (1961)
Chevrolet 4-Wheel Drive (1961)
Ford, All Models (1961)
Willys, All Models (1961)

DESCRIPTION: Rigid type front axle assemblies with either a single "I" beam axle (2-Wheel Drive Trucks) or with a front axle housing assembly (4-Wheel Drive Trucks).

ADJUSTMENT: Specifications are as follows:

Kingpin Inclination

Model	Inclination
Chevrolet Fwd. Control	7½° ±½°
Chevrolet 4-Wheel Drive	7½° ±½°
Ford Econoline	7½°
Ford (Exc. 4-Whl. Drive)	4°
Ford 4-Wheel Drive	7½°
Willys, All Models	7½°

Caster

Model	Caster
Chevrolet Fwd. Control	Pos. 2° ±½°
Chevrolet 4-Wheel Drive	Pos. 3° ±½°
Ford Econoline	Pos. 3½° ±¾°
Ford F-100, F-250, P-400	Pos. 3°
Ford F-350, P-350	Pos. 4°
Ford F-500, F-600, B-500, B-600	Pos. 4°
Ford P-500 (137" WB)	Pos. 3°
Ford P-500 (154" WB)	Pos. 3½°
Ford 4-Wheel Drive	Pos. 3¼°
Willys, All Models	Pos. 3°

Camber

Model	Camber
Chevrolet Fwd. Control	Pos. 1½° ±½°
Chevrolet 4-Wheel Drive	Pos. 1½° ±½°
Ford Econoline	Pos. 3/8° ±¾°
Ford (Exc. 4-Wheel Drive)	Pos. 1°
Ford 4-Wheel Drive	Pos. 1½°
Willys 2-Wheel Drive	Pos. 1°
Willys 4-Wheel Drive	Pos. 1½°

Toe-In (Both Wheels)

Model	Toe-In
Chevrolet Fwd. Control	1/4-5/16"
Chevrolet 4-Wheel Drive	1/8-3/8"
Ford Econoline	3/32±1/32"
Ford (Exc. Econoline)	1/16"
Willys, All Models	3/64-3/32"

Toe-Out on Turns

Model	① Toe-Out
Chevrolet Fwd. Control	23½°
Chevrolet 4-Wheel Drive	21¾°
Ford Econoline	21½°
Willys 2-Wheel Drive	21°45'
Willys 4-Wheel Drive	20°

① - With outer wheel turned 20°, inner wheel should be as indicated in table.

OLDSMOBILE (EXCEPT F-85) FRONT SUSPENSION

Oldsmobile, Exc. F-85 (1961)

DESCRIPTION: "Ball-Joint" type with shock absorbers mounted with front coil springs. Design is similar to that used on previous models except that upper and lower control arm inner pivot shaft bushings are not replaceable. Control arm, shaft and bushing assembly is furnished only as a complete unit.

ADJUSTMENT: Tire Inflation - Front - 24 lbs. (Series 88 & S-88 with 8.00 x 14 tires. Series 98 with 8.50 x 14 tires and Air Conditioning). 22 lbs. (Series 88, S-88 & 98). **Rear** - 22 lbs. (All Models except Fiesta); 24 lbs. (Fiesta).

Steering Axis Inclination: 11° at 0° camber. Not adjustable.

Caster: 0° to Neg. 1°.

Camber: Neg. ¼° to Pos. ½°. Variation between sides of car should not exceed ½°.

►*CASTER & CAMBER ADJUSTMENT NOTE:* Add or remove shims between upper control arm inner pivot shaft and bracket on crossmember.

Toe-In: 0-1/16". To adjust, loosen clamp bolts at each end of steering tie rod adjustable sleeves. With steering wheel set in straight ahead position, rotate sleeves as necessary to obtain correct toe-in. Position tie rod to relay rod ball studs to bottom of slot in relay. Position inner clamps so edge of clamp is not adjacent to slot in adjusting sleeve.

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 23° (Manual Steering); 24° (Power Steering). Both specifications are plus or minus ½°. Not adjustable.

Riding Height: 11 3/8" to 12 1/16" measured from underside of front spring lower seat to underside of upper seat. To measure, insert a 1/8" welding rod in drain hole of lower spring seat (inboard side of spring) and push it up to contact underside of upper spring seat. Mark rod, then remove and measure distance rod was inserted. To adjust, replace spring.

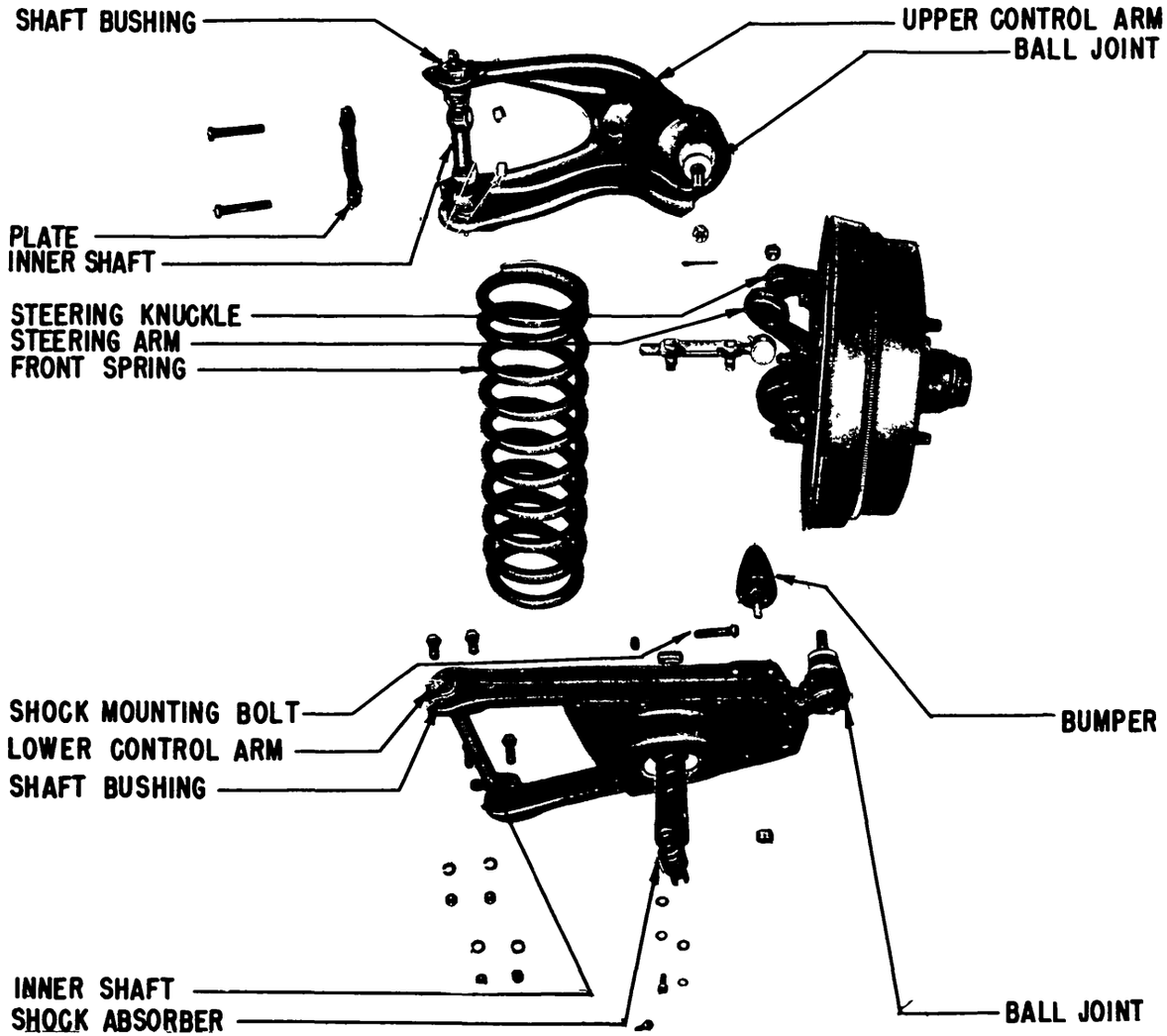
REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove upper pivot bolt from shock absorber, then remove screws and lockwashers attaching shock absorber to lower control arm and remove shock absorber.

Installation: Reverse removal procedure and tighten upper pivot nut to 65-75 ft. lbs. Tighten lower capscrews to 15-25 ft. lbs.

UPPER CONTROL ARM: Removal - Raise front of car and place jack stands under lower control arm (between spring seats and ball joints). Remove wheel, then loosen upper ball joint stud nut and install Tool J-8806. *NOTE - Tool should be positioned so loosened upper ball joint stud nut holds tool in place.* Expand tool and break stud loose from knuckle, then remove tool and pull stud free from knuckle. Disconnect ground strap from control arm. Support hub and drum to prevent brake hose damage, then remove pivot shaft to frame attaching nuts from under fender and remove wheel alignment shims, control arm and pivot shaft assembly from car. *NOTE - Keep each shim pack separat f r installati n in riginal position.*

Installation: Reverse removal procedure and tighten control arm pivot shaft nuts to 85-110 ft. lbs. Tighten ball joint stud nut to a minimum of 40 ft. lbs. (tighten nut as necessary to install cotter pin).



OLDSMOBILE (EXCEPT F-85) FRONT SUSPENSION

LOWER CONTROL ARM & COIL SPRING: Removal - Raise front of car and support with jack stands placed under frame side rails. Remove wheel assembly and disconnect stabilizer link from lower control arm, then remove shock absorber. Position a floor jack under lower control arm between spring seat and ball joint and raise floor jack until it supports lower control arm. Disconnect lower ball joint from steering knuckle with Tool J-8806 (use same procedure as for upper ball joint). Slowly lower jack to floor until spring is fully extended and remove spring. *NOTE - Right and left springs on cars with ut air conditi ning should not be interchanged. Coil spring part number is stamped on outer sid of nd coil.* To remove lower control arm, remove pivot shaft to crossmember attaching bolts.

Installation: Reverse removal procedure and note the following: Tighten control arm pivot shaft bolt nuts to 75-95 ft. lbs. To install spring, tape insulator to top of spring in at least six places (top of spring is identified by a flat coil). While holding spring and insulator against pilot on frame crossmember, tilt spring so it will pilot in lower control arm, then rotate spring so end of bottom coil will index with edge of hole in control arm spring seat (coil should not cover any part of hole). Position floor jack between spring seat and ball joint and chain upper control arm to base of jack, then raise control arm until ball joint is tight in knuckle. Tighten

CONTINUED ON NEXT PAGE

OLDSMOBILE FRONT SUSPENSION (C ntinu d)

ball joint stud nut to 40 ft. lbs. minimum (tighten nut as necessary to install cotter pin).

►*UPPER & LOWER CONTROL ARM INNER SHAFT BUSHING NOTE:* Control arm bushings are not replaceable. Control arm and bushing assemblies are furnished only as a complete unit, including control arm pivot shaft. If necessary, tighten upper control arm shaft to bushing screws to 35-45 ft. lbs. and lower control arm shaft to bushing screws to 50-60 ft. lbs.

STEERING KNUCKLE: Rem val - Raise and support front of car with floor stands placed under lower control arm between spring seat and ball stud. Remove wheel and brake drum, then remove brake backing plate (without disconnecting brake line). Leave steering arm connected to rod end. Disconnect control arm ball joints from steering knuckle (see "Upper & Lower Control Arms" above), and remove knuckle.

Installation: Reverse removal procedure and tighten brake backing plate anchor bolt to 85-110 ft. lbs. Tighten steering arm-to-knuckle-to-backing plate nuts to 80-130 ft. lbs. Check wheel alignment.

LOWER CONTROL ARM BALL JOINT REPLACEMENT: Raise front of car and support outer end of lower control arm, then remove wheel assembly. Disconnect lower ball joint from steering knuckle with Tool J-8806. Block steering knuckle, backing plate and drum assembly away from lower control arm. Drill a 5/16" hole 1¼" deep in rivet (through head), then use a 7/8" drill and drill deep enough to remove rivet head. Drive rivet out of control arm and ball joint. Repeat this procedure with other rivet. Install new ball joint using special bolts furnished. *NOTE - If rivets cannot be driven out, then the bottom heads must be drilled out. Be very careful not to elongate holes in lower control arm when drilling rivets.*

OLDSMOBILE (EXCEPT F-85) REAR SUSPENSION

Oldsm bil (Exc. F-85) (1961)

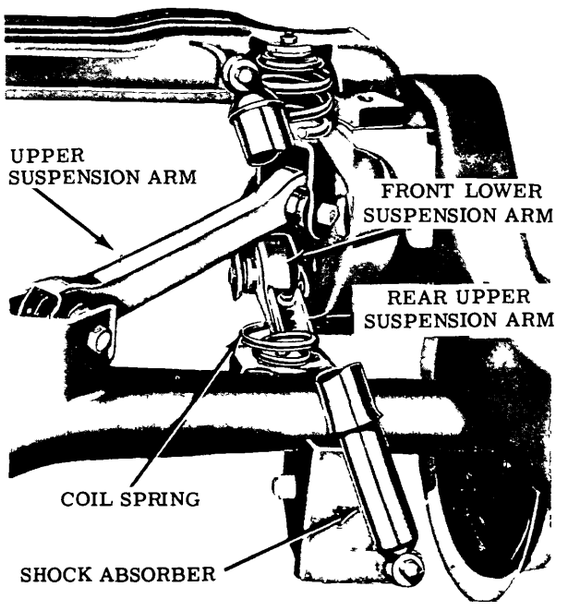
►*1961 OLDSMOBILE (EXC. F-85) REAR COIL SPRING RATTLE CORRECTION:* If this condition is noticeable on rough roads, full throttle acceleration, light braking or cornering, it may be caused by rear springs contacting frame side rail or crossmember and can be corrected as follows: Rotate spring so that upper spring end (pigtail) is 45° to right on both springs, from straight forward position. Rotate both spring clamps clockwise until they are tightly seated in both upper and lower spring ends.

DESCRIPTION: Coil spring type with two upper and two lower control arms. Upper control arms are connected to rear axle housing adjacent to differential carrier and to bracket on frame side rail. Lower control arms are connected between outer ends of rear axle housing and bracket on frame side rail. Lower control arms are adjustable for length and control the differential nose angle.

RIDING HEIGHT: 5 13/16-6 9/16" (Exc. Sta. Wgn.); 5 3/8-6 1/8" (Sta. Wgn.) measured from top of axle housing to frame.

►*SHOCK ABSORBER INSTALLATION NOTE:* Tighten upper pivot bolt and nut to 75-95 ft. lbs., and lower stud nut to 30-46 ft. lbs.

COIL SPRING: Rem val - Raise rear of car and disconnect shock absorber from axle housing, then disconnect parking brake cable clamp at frame and loosen suspension arms at frame and axle. Support frame, then remove upper and lower spring mounting bolts, washers, insulators and clamps. Remove coil spring and two remaining insulators.



OLDSMOBILE (EXCEPT F-85) REAR SUSPENSION

Installation: Reverse removal procedure and note the following: Tape upper and lower insulator to coil spring without obstructing bolt hole. Before tightening bolts, make sure that clamp stop is against end of coil spring. Tighten upper and lower spring attaching bolts to 45-65 ft. lbs. *CAUTION - Do not connect shock absorbers or tighten arm assembly bolts until weight of car is resting on rear springs.*

CONTROL ARMS: Removal - *NOTE - Upper and lower control arm bushings cannot be replaced in service. Bushings and control arms are available only in complete assemblies.* Raise and support rear axle housing, then support frame at side rails. Disconnect support arms at rear axle housing and frame side rails and remove control arms.

Installation: *CAUTION - When installing a new lower control arm, the same corresponding holes should b aligned as on the original arm.* Install upper arm and the lower arm front section with open side of channel facing downward. Lower control arms are stamped "Front" and "Rear" for proper installation. DO NOT tighten attaching bolts until car is at normal height on floor, then tighten attaching bolts to 65-75 ft. lbs.

PONTIAC (EXCEPT TEMPEST) FRONT SUSPENSION

Pontiac, Exc. Tempest (1961)

DESCRIPTION: Front suspension is same design as used on previous models.

ADJUSTMENT: *NOTE - Before checking or adjusting, inflate tires to correct pressure, check adjustment of front wheel bearings and check steering gear and linkage for excessive looseness. Check and adjust camber and caster with car at normal curb height, see "Riding Height" below.*

Tire Inflation: Inflate tires to following pressures with tires cold.

Tire Size	Pressure Front	Rear
8.00-14 (Exc. Air Cond.)	22 lbs.	22 lbs.
8.00-14 (Air Cond.)	24 lbs.	22 lbs.
8.50-14 (Exc. Safari & Air Cond.)	20 lbs.	20 lbs.
8.50-14 (Air Cond. Exc. Safari)	22 lbs.	20 lbs.
8.50-14 (Safari)	22 lbs.	24 lbs.

Steering Axis Inclination: 4°50' at 0° camber. Not adjustable.

Caster: Neg. 1½°±½°. *See "Shimming Procedure" below.*

Camber: Pos. ¼°±½°. *See "Shimming Procedure" below.*

Toe-In: 0-1/8" with trammel 9" from floor.

Toe-Out on Turns: With inner wheel turned 20°, outer wheel should be turned 19°. Not adjustable.

SHIMMING PROCEDURE: Adjustments for camber and caster are made by placing shims between upper control arm pivot shaft and frame. Caster and camber adjustments can be made at the same time. To decrease positive caster, add shims at front bolt. To increase positive caster, remove shims from front bolt. To increase camber, add shims to both front and rear bolts.

Riding Height: 3¾-4" (3 15/16"), measured from top of lower control arm to underside of frame directly behind centerline of spring. *NOTE - For camber and caster adjustment, a spacer (steel bar stock ½" x ½" square) cut to a length of 3 15/16" may be installed between lower control arm and crossmember at centerline of spring to position car for correct riding height.*

REMOVAL & INSTALLATION

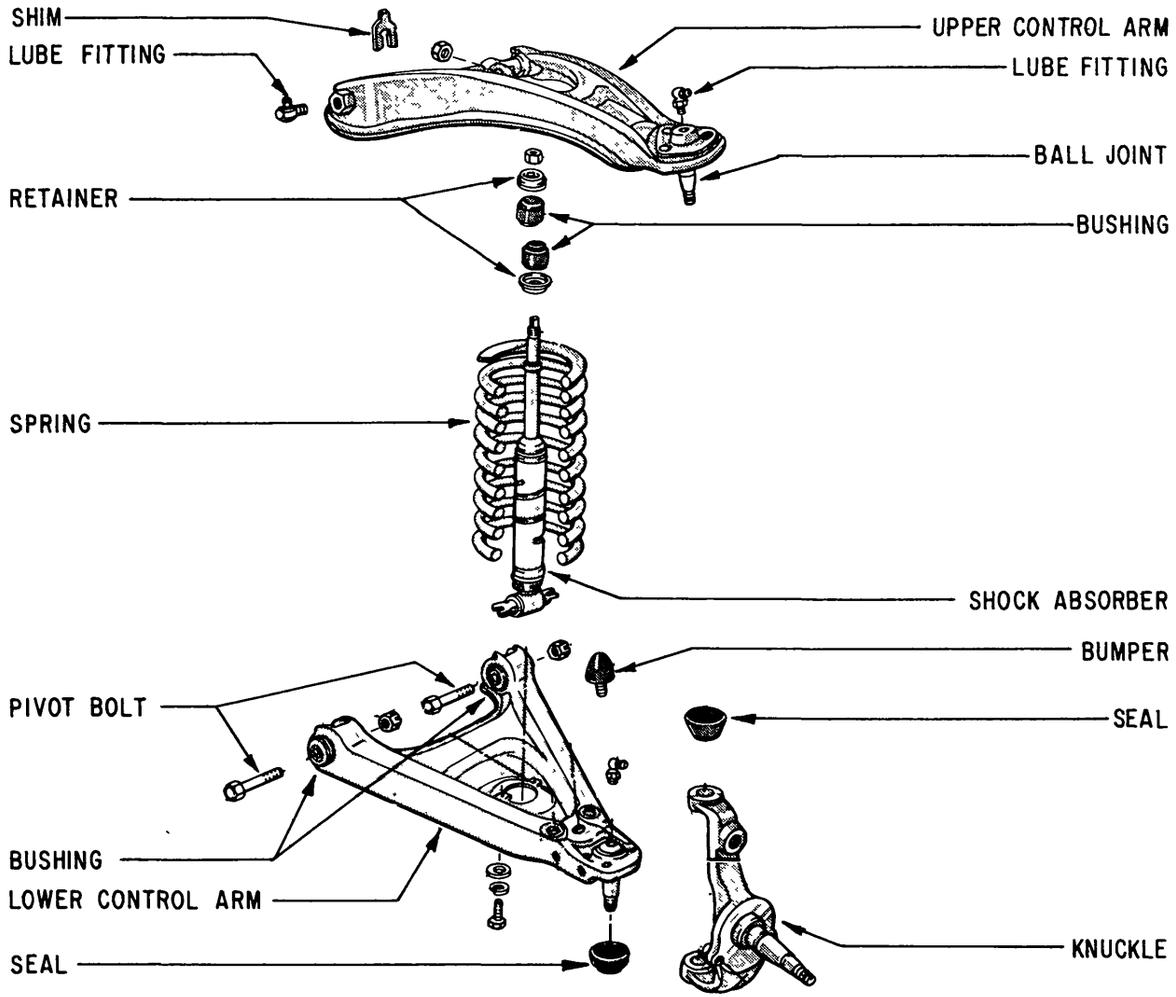
SHOCK ABSORBER: Removal - Raise and support car so weight is off front wheels, then remove nut, retainer and grommet attaching upper end of shock to frame. *NOTE - Do not turn piston rod while loosening nut.* Remove lower bolts and remove shock absorber through lower control arm.

Installation: Reverse removal procedure and note the following: Tighten upper nut to 60-120 inch pounds, and lower bolts to 15-25 ft. lbs.

COIL SPRING: Removal - Raise and support front of car with a jack placed under front crossmember, then remove wheel, shock absorber, and disconnect lower end of stabilizer link from lower control arm. Disconnect steering linkage from knuckle. Install spring compressor, Tool J-7592 as follows: Locate one compressor plate in one of the upper coils of spring so that ramp faces down against coil, then locate other plate in one of the lower coils with ramp facing up. *NOTE - Plates must parall l centerlin f spring with hol s in plate prop rly aligned.* Place retainer, J-7592-6, cup side up, over threaded end of rod, J-7592-5, followed by bearing, then start long nut, J-7592-3 on rod. Insert rod, hex end first, up through both plates, then slide retainer, J-7592-4, cut side down, over end of hex rod and secure with "C" clip, seating clip down in retainer. While holding upper end of rod, turn nut at lower end and compress spring. Disconnect inner end of lower control arm from frame crossmember, then swing inner end of arm down and remove spring. *NOTE - If desired, spring can be removed by disconnecting ball joint stud from knuckle and swinging outer end of arm down.*

Installation: Reverse removal procedure and tighten lower control arm attaching bolts at inner end to 150-175 ft. lbs. Tighten steering arm-to-knuckle nut to 60-95 ft. lbs.

LOWER CONTROL ARM: Removal - Remove front spring, then disconnect and remove ball joint stud from steering knuckle with Tool J-6627.



PONTIAC (EXC. TEMPEST) FRONT SUSPENSION ASSEMBLY

Bushing Replacement: With lower control arm removed, use an arbor press and support arm on remover, J-7022-1, then place spacer, J-7022-7 around bushing. With sleeve, J-7022-3 between control arm and arbor, press bushing from arm. Remove other bushing from opposite leg of arm in same manner. Press new bushings into arm by supporting arm on remover, J-7022-1, in an arbor press. Install spacer, J-7022-7 between sides of control arm leg and use sleeve, J-7022-3 between arbor and bushing to press bushing into position. Repeat with other bushing on opposite leg.

Installation: Reverse removal procedure and tighten control arm-to-frame bolts to 150-175 ft. lbs. Tighten ball joint stud nut to 80-95 ft. lbs.

UPPER CONTROL ARM: Removal - Place a jack under lower control arm, then raise and remove wheel. Remove

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PONTIAC FRONT SUSPENSION (C ntinu d)

ball joint stud from steering knuckle with J-6627. Disconnect control arm shaft from frame and remove shaft and arm assembly.

Disass mbly: Remove front and rear threaded bushings from control arm assembly and remove control arm shaft.

R assembly: Place tool, J-7167 in position and expand until distance between inner faces of arms is 8 31/32", then place pivot shaft with new rubber seals in position on control arm. Lubricate pivot shaft threads with graphite grease, then start bushing on pivot shaft and into arm at the same time. Tighten so head of bushing is firmly seated against control arm (150-175 ft. lbs.), Center pivot shaft in control arm and install other bushing, being sure threads index so there is no bind. Tighten so head of bushing is tightly against control arm (150-175 ft. lbs.), and remove spreader tool. Check to see that distance between inner faces of shaft ends of control arms is correct. Turn shaft in arm to centralize so distance between bolt hole to arm is equal at both ends. *NOTE - Frictional drag of shaft in bushings should not exceed 50 inch pounds.*

Installation: Position upper control arm and shaft on frame member and install bolts and self-locking nuts. Tighten to 80-95 ft. lbs. Assemble control arm to upper ball stud and tighten nut to 80-95 ft. lbs. Lubricate control arm shaft and ball studs, replace wheel and check wheel alignment.

BALL JOINT REPLACEMENT (UPPER & LOWER): With control arm removed, chisel or drill heads of rivets retaining ball joint to control arm and drive out rivets, then remove ball joint assembly. Install a new joint, retaining with special bolts, nuts and washers supplied with new joints. *CAUTION - Use only special alloy bolts supplied with stud package for this operation.* Tighten nuts to 10-12 ft. lbs.

PONTIAC (EXCEPT TEMPEST) REAR SUSPENSION

P ntiac, Except T mp st (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 REAR SPRING INTERFERENCE WITH SHOCK ABSORBER CORRECTION:* Loosen spring clamp bolts and shift spring forward at bottom to provide normal operating clearance. If necessary to rotate spring for maximum clearance, pigtail end of spring must be at forward side and parallel to front edge of spring seat on axle.

DESCRIPTION: Coil spring type suspension consisting of a lower control arm at each side connected between outer end of axle housing and frame member. An upper control arm on each side is connected to rear axle housing adjacent to differential carrier and to outboard end of frame crossmember. Upper and lower control arms are not adjustable.

COIL SPRING: R m val - Raise car with a chain fall until rear wheels are approximately 8" off floor, then support frame at both sides. Remove wheel assembly, brake bracket tube and line from crossmember. Disconnect shock absorbers from axle housing brackets, then remove pivot bolt from rear end of lower control arm. Raise car as necessary and carefully lower rear axle assembly to allow spring to expand. Remove upper spring retainer nut, bolt, lock washer, flat washer, rubber insulator and spring clamp with insulator. Remove spring clamp at bottom of spring, and remove spring.

Instdlati n: Place upper spring clamp in each end of new spring to determine at which end spring clamp fits best. After selecting best end for upper clamp, scribe a mark on spring and also on spring clamp (when spring and upper clamp are installed, alignment of marks will insure proper mating of parts and seating of upper clamp on spring). Position upper clamp on spring, aligning marks on spring and clamp, then thread lockwasher, flat washer and rubber insulator onto bolt. Insert bolt through upper clamp, aligning marks on upper clamp and spring. Holding assembly in this position, place fabric upper insulator over end of bolt. Install upper bolt and clamp as an assembly in position on spring. Turn spring, maintaining alignment, to give maximum clearance between front of spring and frame. Tighten upper clamp bolt to 45-55 ft. lbs. Install lower clamp on spring and insert bolt, lockwasher, flat washer and tighten bolt to 45-55 ft. lbs. Raise axle assembly and tighten shock absorber attaching nuts to 45-60 ft. lbs. Attach brake tube bracket and line to crossmember and install wheel assembly.

UPPER CONTROL ARM: Removal - *CAUTION - Replace n c ntrol arm assembly at a tim to prev nt axl rolling or slipping sideways.* Place car on a hoist and raise rear end, then remove bolt at rear axle housing and lift upper control arm to clear axle housing mounting bracket. Disconnect upper control arm at frame and remove control arm assembly.

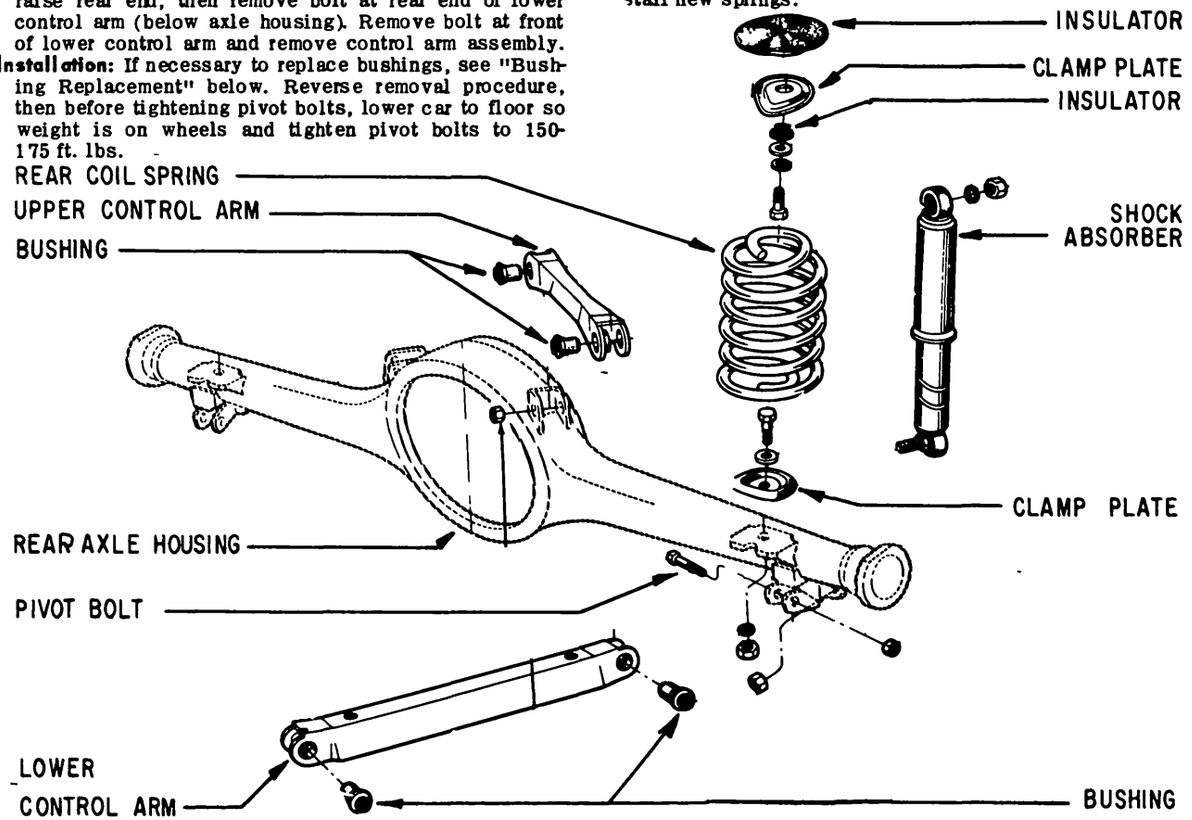
Installation: If necessary to replace bushings, see "Bushing Replacement" below. Reverse removal procedures and tighten pivot bolts to 150-175 ft. lbs.

LOWER CONTROL ARM: Removal - *CAUTION - Replace one control arm assembly at a time to prevent axle rolling or slipping sideways.* Place car on a hoist and raise rear end, then remove bolt at rear end of lower control arm (below axle housing). Remove bolt at front of lower control arm and remove control arm assembly.

Installation: If necessary to replace bushings, see "Bushing Replacement" below. Reverse removal procedure, then before tightening pivot bolts, lower car to floor so weight is on wheels and tighten pivot bolts to 150-175 ft. lbs.

BUSHING REPLACEMENT (UPPER & LOWER CONTROL ARMS): With control arm removed from car, support bushing end of control arm on Tool J-8481-2 and install spacer, Tool J-8481-5 around bushing. Use an arbor press and Tool J-8481-4 to press old bushing from arm. Repeat at opposite end for other bushing. To install bushing, use same tools, except that Tool J-8481-1 must be used to press new bushing into position.

RIDING HEIGHT: 6-6½" (6 5/16") measured from top of axle housing to frame at a point approximately 1½" outward from rubber bumper on frame. To correct, install new springs.



PONTIAC (EXC. TEMPEST) REAR SUSPENSION ASSEMBLY

PONTIAC TEMPEST FRONT SUSPENSION

Pontiac Tempest (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 PONTIAC TEMPEST FRONT SPRING SQUEAK CORRECTION:* Improper seating of upper end of coil spring may cause this condition. To correct, remove coil spring and grind off pigtail end of spring so it is in line with other spring coils.

DESCRIPTION: Independent wheel suspension with an "A" frame type upper control arm and a cantilever type lower control arm combined with a compression strut mounted between outer end of lower control arm and front crossmember side rail. Rear end of strut rod is threaded and mounted in a rubber bushing. Front end is bolted to lower control arm. The front suspension unit is constructed so it is integral with front crossmember and can be removed as a complete assembly (after removal of coil springs).

ADJUSTMENT

Tire Inflation: 22 lbs. with tires cold (front & rear). *NOTE - 6.50x15 Station Wagon rear tires should be inflated to 24 lbs.*

Steering Axis Inclination: 6½° at 0°camber. Not adjustable.

Caster: Neg. 1°40'±30'. To adjust, add or remove shims between upper control arm inner shaft and front crossmember side rail. *NOTE - If proper adjustment cannot be obtained by shimming, adjust length of strut rod. Caster is increased by lengthening rod and decreased by shortening rod. After adjustment of strut rod, tighten nut to 70-85 ft. lbs. and bend overlocking tab on two sides of nut.*

Camber: Pos. 0° 8' ±30'. Set camber on left side 0° 15' greater than on right side of car. Add or remove shims at both front and rear of upper control arm inner shaft as necessary to obtain correct camber.

Toe-In: 0-1/8".

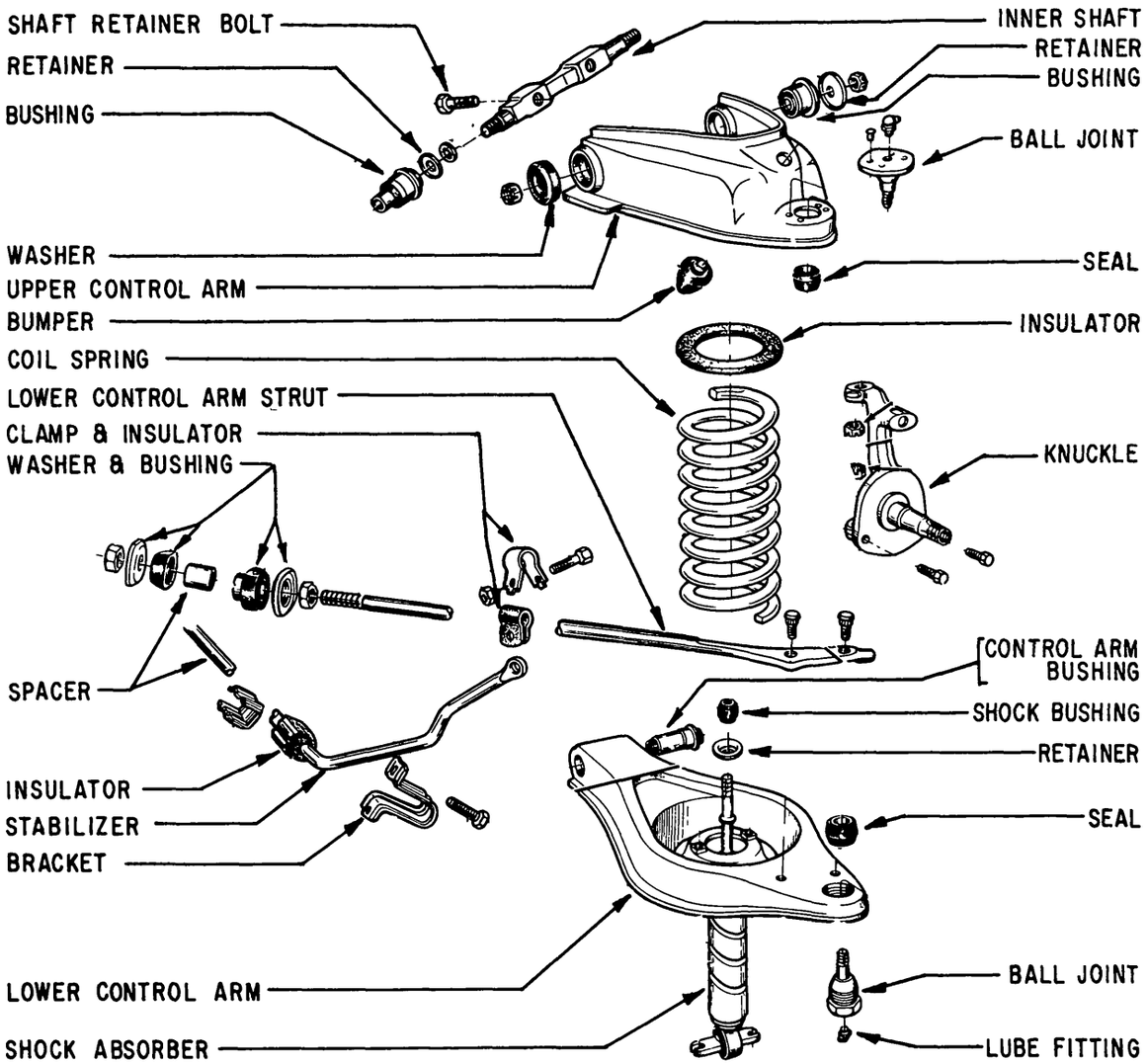
Toe-Out on Turns: With inner wheel turned 20°, outer wheel should be 18-19°.

Riding Height: Front - 4 1/3"-4 1/2" measured between top of strut rod (front end) and lower control arm bumper bolt, directly in front of spring. **Rear** - 3 7/8" measured at a point directly behind spring between top of control arm and bumper attaching bolt.

REMOVAL & INSTALLATION

SHOCK ABSORBER REPLACEMENT: Support car on side rails so front suspension hangs freely and so that clearance is sufficient on front lower control arms to allow removal of shock absorber. Hold flat part of shock upper stud and remove nut, cup washer and grommet, then remove lower attaching bolts. Withdraw shock absorber and remove cup washer and grommet. To install, reverse removal procedures and tighten lower attaching bolts to 15-25 ft. lbs. Tighten upper nut to 5-10 ft. lbs. *NOTE - Upper nut must be bottom dat nd of thr ads.*

FRONT COIL SPRING REPLACEMENT: Remove shock absorber (see above), then remove strut rod-to-control arms nuts and lockwashers. *NOTE - Studs ar pr ss d into strut and strut is und r slight t nsi n fr m rubb r grommet on opposite end.* Place a jack stand under control arm and take up slightly on spring tension. Remove lower ball stud from steering knuckle with Tool J-6627, then raise hoist until spring is free and withdraw spring. *NOTE - A bar placed through control arm and into spring tower will retain spring and keep it from slipping free.* To replace, set rubber insulator in place in crossmember spring tower and place spring on control arm. Use a jack stand under outer end of control arm, then raise arm by lowering hoist. Install ball stud in steering knuckle and tighten nut to 55-70 ft. lbs. *CAUTION - D not back off nut wh n aligning hol s t install c tt r pin.* Attach strut rod to control arm and tighten nuts to 40-55 ft. lbs. *NOTE - D not chang positi n f large nuts at gromm t nd of strut as caster adjustment will b chang d.* Install shock absorber (see above).



PONTIAC TEMPEST FRONT SUSPENSION ASSEMBLY

LOWER CONTROL ARM REPLACEMENT: Remove shock absorber and coil spring, then remove control arm inner pivot nut, flat washer and bolt and remove control arm. To install, set control arm in position and install bolt washer and nut but do not tighten until coil spring and shock absorber have been installed and lowered to floor, then bounce car several times and tighten control arm pivot bolt to 75-90 ft. lbs.

UPPER CONTROL ARM REPLACEMENT: Support car at outer end of lower control arm, then remove wheel and tire assembly. Remove upper stud from knuckle with

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PONTIAC TEMPEST FRONT SUSPENSION (Continu d)

Tool J-6627. Remove two nuts retaining upper control arm shaft to front crossmember, noting the number of shims at each bolt. Remove sheet metal access hole plugs opposite control arm retaining bolts and remove bolts through access holes. To install control arm, reverse removal procedures and note the following: Install same number of shims as removed, between crossmember and pivot shaft at each bolt location, then tighten bolts to 55-70 ft. lbs. Install a new rubber seal on ball joint stud and tighten nut to 55-70 ft. lbs.

BALL JOINT REPLACEMENT: Lower Control Arm - With lower control arm in a vise, remove self-tapping joint from control arm with 1 9/16" socket. To install, start ball joint into control arm, then secure in place with a 1 9/16" socket. Install lube fitting and lubricate with chassis lubricant. Install a rubber cap over stud.

Upper Control Arm: Prick punch center of the four rivets and drill through the heads. Use a sharp chisel and cut off rivets, being careful not to enlarge holes in control arm. Tap rivets out with a punch and remove ball joint. To install, place a new joint against upper side of control arm and secure joint to arm with four special nuts and bolts furnished with replacement part. Tighten nuts to 10-12 ft. lbs. *CAUTION - Use only alloy bolts furnished for this op ration.*

STRUT ROD REPLACEMENT: Remove nuts securing rod to lower control arm, then remove nut, lock tab, washer and grommet from rear end of rod. Remove rod from crossmember bracket and remove rubber grommet, spacer, washer, lock tab and nut. Studs in end of rod are pressed in and can be removed by driving them out. To install, install forward nut on rear end of shaft and position it about 1" from end of threads. Install lock tab, washer, spacer and grommet. Place rod in position in crossmember bracket and install remaining grommet, washer, lock tab and nut, then snug up rear nut. Install rod on lower control arm and tighten nuts to 40-55 ft. lbs. Lower car to floor and adjust caster. Tighten nut at rear of rod to 70-85 ft. lbs. and bend over lock tabs on front and rear nuts.

FRONT SUSP ENSION CROSSM EMBER: Removal - *NOTE - Front crossm mb r can be removed as a complete unit including whe ls and brake assemblies, or after all compon nts hav b n r moved. It is suggested that front springs b r moved before disconnecting crossmember from car.* Raise car and install jack stands under crossmember assembly so as to support crossmember when disconnected from car, then install a suitable engine support. Remove wheels and disconnect steering linkage at toe rod ends. Disconnect engine mounts at crossmember and remove ground straps from crossmember on both sides. Disconnect brake lines at junction block on crossmember and fuel line from crossmember clip. Remove three crossmember retaining bolts, washers, and nuts at each side of crossmember, then raise car and remove crossmember.

Installati n: Reverse removal procedures and note the following: Tighten crossmember attaching bolts to 70-85 ft. lbs., engine mount bolts to 30-45 ft. lbs. and tie rod end nuts to 55-70 ft. lbs. *NOTE - Do not back off nuts when aligning holes to install cotter pins.*

RAMBLER FRONT SUSPENSION

Rambler Am rican, S ri s 6101 (1961)
Rambler Classic 6 & V8, Series 6110 & 6120 (1961)
Rambler Ambassador, Series 6180 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*LOWER CONTROL ARM THROUGH BOLT TIGHTENING CAUTION:* The lower control arm through bolt which also acts as the front shock absorber lower anchor (on all models) is specially heat treated and must be properly tightened to 110-125 ft. lbs *DO NOT REPLACE THIS BOLT WITH ONE THAT IS NOT HEAT TREATED.*

►*TOE-IN ADJUSTMENT NOTE (Cars with Power Steering):* Operate engine to permit steering pump oil pressure to center valve spool in control valve assembly before checking or adjusting toe-in.

►*CAR LEVELING NOTE (EXCEPT AMERICAN):* On 1956-61 cars, an aluminum alloy front spring spacer (¼" thick), Part No. 3202359, is available to assist in leveling a car that leans at right or left front corner. Install spacer on spring seat with spring cushion and spring resting on spacer. *CAUTION - If two spacers are used, install one spacer on upper spring seat and one on lower spring seat.* The addition of one spacer will raise affected corner approximately ½".

DESCRIPTION: Basic design is similar to that used on previous models Upper control arms are connected to steering knuckles by trunnion assemblies. On Rambler American, the upper trunnion assembly is integral with front spring lower support. On other models, coil spring lower support is threaded on upper trunnion.

CHECKING & ADJUSTING: *CAMBER & CASTER ADJUSTMENT NOTE - Eccentric bolts at inner end of lower control arms (series 10, 20 & 80), shims between lower control arm shaft and frame (American), control camber and caster adjustments.*

Tire Inflation: 24 lbs. Front & Rear (Exc. 6180), 22 lbs. (6180 Front), 20 lbs. (6180 Rear). Cold.

►*CAPTIVE AIR TIRE PRESSURE NOTE:* 29 lbs. (Inner Chamber), 24 lbs. (Outer Chamber). All models.

Steering Axis Inclination: 8° (American), 6½° (Others).

Cast r (Series 10, 20 80): Except Power St ring - 0° to Pos. ½° (Pos. ½° preferred). **Power Steering** - Pos. ½° to Pos. 1° (Pos. 1° preferred).

Caster (American Series 01): Except Power Steering - 0° to Pos. ½° (Pos. ½° preferred). **Power Steering** - Pos. 1½° to Pos. 2° (Pos. 2° preferred).

Camber: Neg. ¼° to Pos. ¼° (0° preferred). *See "Camber & Caster Adjustment" below.*

►*CAMBER & CASTER ADJUSTMENT (SERIES 10, 20 & 80):* Lower control arm attaching bolts are provided with eccentric washers, one being attached to the bolt and the other keyed to threaded end of bolt. Loosening attaching bolt nut will permit turning the bolt and eccentrics for adjustment of camber and caster. Adjust caster first, using one bolt as necessary, then adjust camber, turning both bolts equally as required.

►*CAMBER & CASTER ADJUSTMENT (RAMBLER AMERICAN):* "U" type spacers are installed between lower control arm pivot bar and mounting surface. Increasing number or thickness of spacers at either front or rear mounting bolt permits adjusting caster angle. Increasing or decreasing equally at both front and rear bolts will change camber angle. *NOTE - Lower control arm pivot bar brace must be loosened before making camber or caster adjustments. When reinstalling brace, tighten attaching bolts to 90-95 ft. lbs.*

Toe-In: 1/16-3/16" (Exc. Series 20 & 80); 3/16" (Series 20 & 80). On all models (Exc. Series 20), loosen clamps and rotate adjusting tube on each front wheel tie rod equally in opposite directions. On Series 20, loosen clamps and rotate adjusting tube on steering drag link adjacent to right side idler lever. Adjust steering wheel for correct spoke position by rotating adjusting tubes equally in same direction (Exc. Series 20), by rotating adjusting tube on pitman arm-to-steering arm link (Series 20).

►*TOE-IN ADJUSTING TUBE CLAMP POSITIONING FOR MAXIMUM CLEARANCE:* Open end of clamp should be toward REAR (Exc. Series 20); toward FRONT (Series 20) when clamp bolt is tightened.

Toe-Out on Turns: With inner wheel at 25°, outer wheel should be 21½° (American), 22° (Others).

REMOVAL & INSTALLATION: *See 1958 Annual Data, Page 355, or later Manual editions.*

RAMBLER (EXCEPT AMERICAN) REAR SUSPENSION

Rambler, All Series Exc. American (1961)

DESCRIPTION: Rear springs are mounted between seats on rear axle housing and seats on car underbody and are held in position by weight of car on springs and by extended limits or shock absorbers A rear stabilizer bar connected between car underbody on right side and a bracket on left side of rear axle housing prevents prevents lateral movement of rear axle assembly. Shock absorbers are mounted adjacent to rear springs on forward side of rear axle housing and are connected to a bracket on rear axle housing and to car underbody assembly. Rear wheel driving force is transmitted to car body by a torque tube between rear axle housing and transmission.

SHOCK ABSORBERS: Removal - Disconnect shocks from car underbody and from bracket on rear axle housing and remove shock.

Installation: Reverse removal procedure.

REAR COIL SPRINGS: Removal - Raise and support rear of car with a jack stand placed under car underbody, then raise rear axle assembly to approximately normal ride position. Disconnect shock absorbers at bracket on rear axle, then lower rear axle sufficiently to free springs from seats. Springs can then be lifted out. *CAUTION* - When lowering rear axle assembly be careful not to lower it to the point where a strain will be placed on torque tube connection at transmission.

Installati n: Reverse removal procedure.

STUDEBAKER FRONT SUSPENSION

Studebaker (1961)

►*1961 LARK (EXC. POWER STEERING) TOE-IN SPECIFICATION CHANGE:* Toe-In should be set to 3/16-1/4". This setting supersedes previous setting of 1/16-1/8".

DESCRIPTION: Front suspension design is the same as used on previous models.

ADJUSTMENT: Before checking or adjusting front wheel, alignment, inflate tires to correct pressure, check adjustment of front wheel bearings and check steering gear and linkage for excessive looseness. Make the necessary corrections.

Tire Inflation: Front – 24 lbs. (Exc. Sta. Wgn.); 26 lbs. (Sta. Wgn.); **Rear (5.90 x 15)** – 20 lbs. (Exc. Sta. Wgn.); 26 lbs. (Sta. Wgn.). **Rear (6.40–15)** – 20 lbs. (Exc. Sta. Wgn. & Taxi); 24 lbs. (Sta. Wgn.); 22 lbs. (Taxi).

Rear (6.70 x 15) – 20 lbs. (Exc. Sta. Wgn.); 24 lbs. (Sta. Wgn.).

►*CAPTIVE AIR TIRE NOTE:* **Front** – 24 lbs. **Rear** – 22 lbs. (Sta. Wgn. with "Hide-A-Way" third seat.)

Kingpin Inclination: 6° at 0° Camber. Not adjustable.

Caster: Pos. ¼° to Neg. 1¼° (Lark); Neg. 1½° to Neg. 3° (Hawk), with not more than ½° variation between wheels. *NOTE - Adjust caster before making camber adjustment.* To adjust caster, loosen kingpin clamp bolt, then remove lubrication fitting from rear bushing at upper control arm outer pin. Insert an Allen wrench into pin and turn it until proper caster is obtained (a full turn will change caster ½°).

Camber: 0° to Pos. 1° (½° greater camber is desired on left side). To adjust camber (after caster adjustment completed), turn outer pivot pin using an Allen Wrench to obtain desired setting. *NOTE – ½ turn of the pin covers entire range of camber adjustment.*

Toe-In: 3/16-1/4" (Lark, except Power Steering); 1/16-1/8" (Hawk, all models & Lark with Power Steering). Adjust as follows: With steering gear cam lever shaft on high point of cam (steering wheel spoke straight across) and left wheel in straight ahead position (adjust left hand tie rod to bring wheel into straight ahead position if necessary). Adjust **right hand** tie rod to obtain desired setting.

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 23½° to 24½°. Not adjustable.

REMOVAL & INSTALLATION: *See 1957 Annual Data, Page 351, or later Manual editions.*

1961 FRONT WHEEL BEARING ADJUSTMENT

BUICK & BUICK SPECIAL

Tighten spindle nut to 15 ft. lbs. while turning wheel, then back off nut and retighten to 10 ft. lbs. If cotter pin holes do not line up, back off nut 1/6 turn (Buick Special); 1/12 turn (Exc. Buick Special). Do not back nut off more than 3/12 turn (Buick Special); 1/6 turn (Exc. Buick Special). Install cotter pin.

CADILLAC

Rotate wheel and tighten adjusting nut to 30 ft. lbs., then back off nut ¼ turn and install cotter pin. *NOTE - If cotter pin cannot be installed in either of the two spindle holes, loosen adjusting nut and back off as necessary.*

CHEVROLET PASS. CARS & CORVAIR

While rotating wheel, tighten spindle nut to 20 ft. lbs. (Chevrolet Pass. Cars); 80 inch lbs. (Corvair, all models), then back off adjusting nut one flat (Exc. Corvair 1200 Series); one half flat or less (Corvair 1200 Series). Install cotter pin.

CHEVROLET TRUCKS

While rotating hub, tighten spindle nut to 33 ft. lbs. (Series 10-40); 40 ft. lbs. (Series 50-60), then back off adjusting nut to nearest hole in spindle (ball bearings); 1/6 turn (taper roller bearings). Install cotter pin.

CHRYSLER, DESOTO, DODGE, PLYMOUTH, LANCER & VALIANT

Tighten wheel bearing adjusting nut to 90 inch lbs. (Chrysler & DeSoto); 180 inch lbs. (All others) and position locknut on nut with one pair of slots in line with cotter pin hole, then back off lock and adjusting nut to next slot (Chrysler & DeSoto); 1½ slots (All others). On Chrysler & DeSoto, install cotter pin. On all others, remove nut lock and reposition it on adjusting nut so cotter pin can be installed, then install cotter pin.

COMET, FORD (EXC. THUNDERBIRD), FALCON, MERCURY & ECONOLINE TRUCKS

Rotate front wheel hub and tighten adjusting nut to 11½-12½ ft, lbs. (Ford, Falcon, & Econoline Trucks); 11-14 ft. lbs. (Comet & Mercury), then back off adjusting nut at least one castellation, but not more than two. Line up nearest slot in nut with cotter pin hole and install cotter pin.

FORD TRUCKS (EXC. ECONOLINE)

With front wheel rotating, tighten adjusting nut until a noticeable drag is felt, then back off adjusting nut at least one but not more than two castellations. Lock adjusting nut in this position with cotter pin.

LINCOLN

With adjusting nut lock removed, tighten adjusting nut to 15-20 ft. lbs., then position nut lock on adjusting nut so that a set of slots in nut lock are in line with cotter pin holes in spindle. Back off nut lock and adjusting nut together until next set of slots line up with cotter pin, then install cotter pin.

THUNDERBIRD

With adjusting nut retainer removed, tighten adjusting nut to 11½-12½ ft. lbs. with wheel rotating, then back off adjusting nut so that endplay clearance is .001-.007". Position nut retainer on nut and align set of slots with cotter pin hole. *NOTE - Do not rotate adjusting nut when installing nut retainer.*

OLDSMOBILE SERIES 88, S88 & 98

Tighten adjusting nut to 17 ft. lbs., then back off nut and retighten to 4 ft. lbs. If necessary, back off adjusting nut to nearest cotter pin slot and hole for installation of cotter pin..

OLDSMOBILE F-85

With wheel rotating, tighten adjusting nut to 10-15 ft. lbs., then back off 1/6 to 1/4 turn maximum and install cotter pin.

PONTIAC (EXC. TEMPEST)

Tighten adjusting nut to 27 ft. lbs., then back nut off to "finger loose" and retighten to 25-35 inch lbs. If slot in nut does not line up with hole in spindle, tighten nut only enough for installation of cotter pin in first hole. *CAUTION - Do not exceed 110 inch lbs.*

PONTIAC TEMPEST

While rotating drum, tighten adjusting nut to 10-12 ft. lbs., then back nut off one flat. If cotter pin holes do not line up, continue to back off adjusting nut to near-hole. *NOTE - Final adjustment should be 1 - 1½ flats backed off from initial tightened position.*

RAMBLER

Rotate wheel and tighten adjusting nut until it is firmly seated and causes a drag on wheel. Back off adjusting nut to first castellation or until cotter pin hole is aligned, then install cotter pin. *NOTE - Wheel must be free to rotate without play in hub and bearings.*

WILLYS 2-WHEEL DRIVE

Rotate wheel and tighten adjusting nut until wheel binds, then back off adjusting nut 1/6 turn. If necessary, back nut off further for installation of cotter pin.

STEERING LINKAGE

►*POWER STEERING LINKAGE NOTE:* Linkage on these cars is essentially the same as linkage for manual steering cars.

AMERICAN MOTORS

Rambler (All Series): Linkage – Except on Series 20, relay rod is connected between pitman arm and steering idler arm with tie rod on left side connected between pitman arm and steering arm. On right side, tie rod is connected between idler arm and steering arm. On Series 20, relay rod is connected between idler arm at each frame side rail and steering arm at right and left sides of car. A tie rod at forward side of suspension crossmember connects pitman arm to steering arm. Ball and socket joints are adjustable on Series 01, 10, & 80 and are not adjustable on Series 20.

Ball & Socket Joint Adjustment – Tighten adjusting plug until solid contact is made, then back off plug to first cotter pin hole, not to exceed ¼ turn or less than 1/8 turn. *NOTE – On Series 10 pitman arm side, tighten and plug solid, then back off 1½–2 turns.*

CHRYSLER CORP.

Chrysler, Imperial, DeSoto, Dodge, Dart, Lancer, Plymouth, Valiant: Linkage – Consists of idler arm bracketed to right frame side member and connected to right end of drag link. Pitman arm is connected to left end of drag link. Individual tie rods, connected to drag link near its center, have sleeve adjustment for toe–in.

Idler Arm Bushing Replacement – Idler arm with bushing is serviced only as an assembly. When bushing worn, replace assembly. Opening in idler arm bracket between idler arm bushing positions or contact points should be 2¼". Bend bracket to correct.

FORD MOTOR CO.

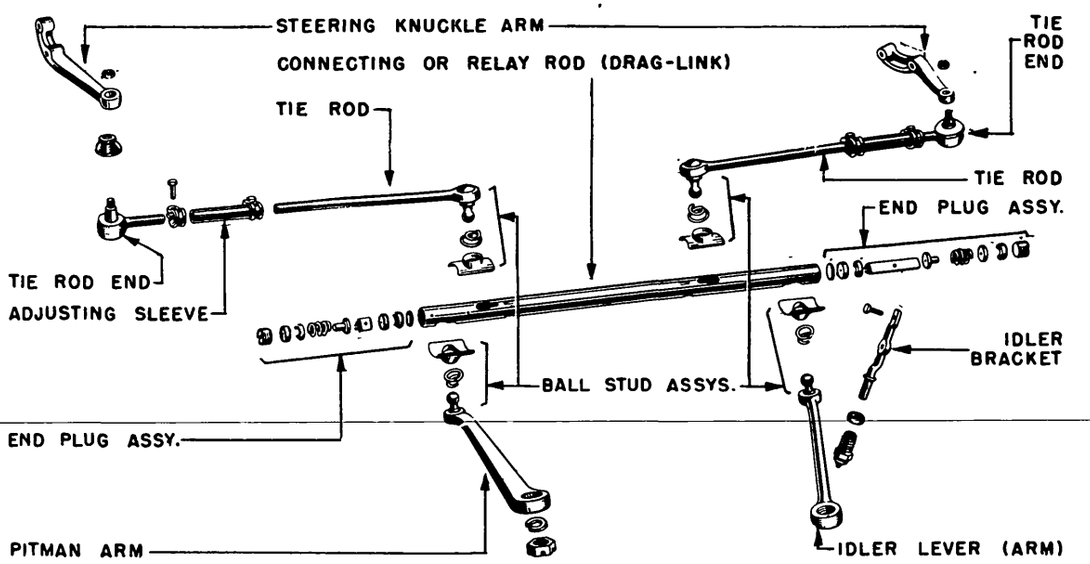
Comet, Falcon, Ford Pass. Cars, Lincoln, Mercury, Thunderbird: Linkage – Consists of steering (pitman) arm–to–idler arm rod which transmits motion from steering gear through steering arm which is attached to left end of steering arm–to–idler arm rod, then to front wheels through the tie rods. Tie rods have adjustable sleeves on outer ends for toe–in adjustment. An idler arm is attached to right side of underbody.

Tie Rod End Replacement – *NOTE – Idler (intermediate) rod ends are not replaceable. Complete rod assembly should be replaced when rod ends are worn.* Remove nut from ball end stud, then place a support behind arm near stud and tap with a soft hammer to drive it out of arm. *CAUTION – DO NOT use a wedge type ball stud separator because of special design of ball studs.*

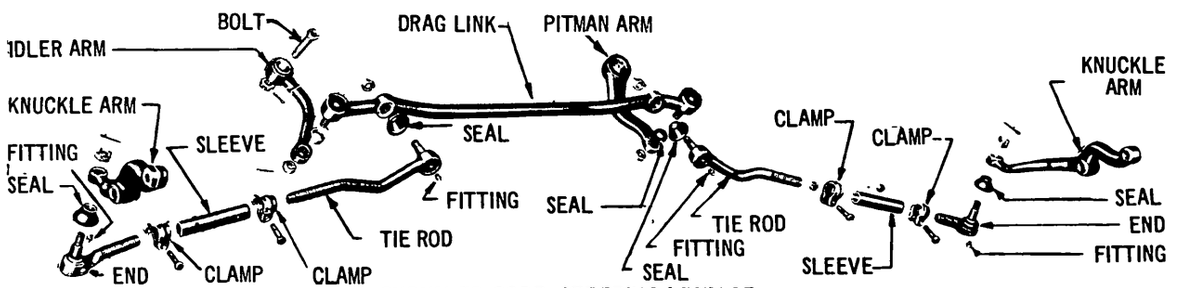
Idler Arm & Bushing Replacement – Idler arm and bushing are replaced as an assembly. Bushing is not replaceable separately. *NOTE – Replace idler arm bracket if threads are worn or bracket is bent. DO NOT attempt to straighten a bent idler arm bracket.*

Ford Trucks: Linkage – Consists of a connecting rod between front wheels. Rod has adjustable features at both ends. Spindle arm, attached to connecting rod at left end, is in turn attached to a one–piece drag link with manual adjustment features at both ends. Rear of drag link is attached to sector shaft arm.

Drag Link Adjustment – Remove cotter pins from each end of drag link. Tighten each drag link plug until drag link ball springs are fully compressed. Back off each plug to first cotter pin hole, then install new cotter pins.



GENERAL MOTORS STEERING LINKAGE (TYPICAL)



CHRYSLER CORP. STEERING LINKAGE

GENERAL MOTORS

Buick (Except Special): Linkage – Parallelogram type linkage consisting of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each front wheel. Adjustable sleeves at end of each tie rod for toe–in adjustment. Intermediate rod end plug adjustment provided at pitman arm end of intermediate rod on manual steering cars only.

Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 2 15/16–3 1/16".

Intermediate Rod End Plug Adjustment (Pitman Arm End On Manual Steering Cars) – With socket bearings properly seated around pitman arm socket, tighten end plug tight, then back out 4±1/8 turns and install cotter pin. *CAUTION – If end plug is tight before head is flush with end of rod, check for improper positioning of bearings around ball stud.*

Buick Special: Linkage – Parallelogram type linkage consisting of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each front wheel. Adjustable sleeves at end of each tie rod for toe–in adjustment. Intermediate rod end plug adjustment provided at both pitman arm and idler lever ends of intermediate rod on both manual and power steering cars.

Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is ½".

Intermediate Rod End Plug Adjustment – Adjust plugs on both pitman arm and idler lever ends of intermediate rod as follows: Turn end plug up tight, then back off plug ¼–¾ turn (½ turn preferred) and install cotter pin.

Cadillac: Linkage – Consists of a drag link between steering gear pitman arm and idler arm mounted on right frame side rail, and individual tie rods between drag link and each wheel. Adjustable sleeves at outside ends of tie rods for toe–in adjustment. No. ad-

CONTINUED ON NEXT PAGE

STEERING LINKAGE (C nt.)

justment plugs are provided at drag link ends as drag link is attached to idler and pitman arms by spherical pivots.

Drag Link Height Adjustment – Place a straight bar across two adjustable jacks directly below drag link. Adjust height of jacks so distance from top of bar to centerline of lower control arm pivot bolts is equal on both sides (adjust jacks so distance is an even number of inches). Measure distance from top of bar to lower edge of drag link on both sides using a combination square and level with bubble centered in level. *CAUTION – Do not reposition bar or move car.* Difference in measurement between 1st measurement (top of bar to centerline of lower control arm pivot bolts) and 2nd measurement (top of bar to lower edge of drag link) should be 2 15/16"±1/16" and equal at both inner pivot points within 1/16". If idler arm end of drag link not within limits, loosen idler arm support mounting screws and move support. If proper adjustment still not obtainable, remove and bend idler arm slightly. If pitman arm end of drag link not within limits, loosen steering gear mounting bolts and move gear. If proper adjustment still not obtainable, remove and bend pitman arm slightly. *CAUTION – Bend pitman and idler arms off the car and cold.*

Chevrolet Pass. Cars: Linkage – Consists of steering relay rod between pitman arm and idler arm. Pitman arm connected to relay rod by an adjustable ball and socket joint. Individual adjustable tie rods are installed between relay rod and each front wheel.

Relay Rod Ball Joint Adjustment – Remove cotter pin from end of relay rod and tighten end plug until springs are compressed and plug bottoms. Back off end plug ¾ turn plus amount necessary to insert cotter pin, then insert pin.

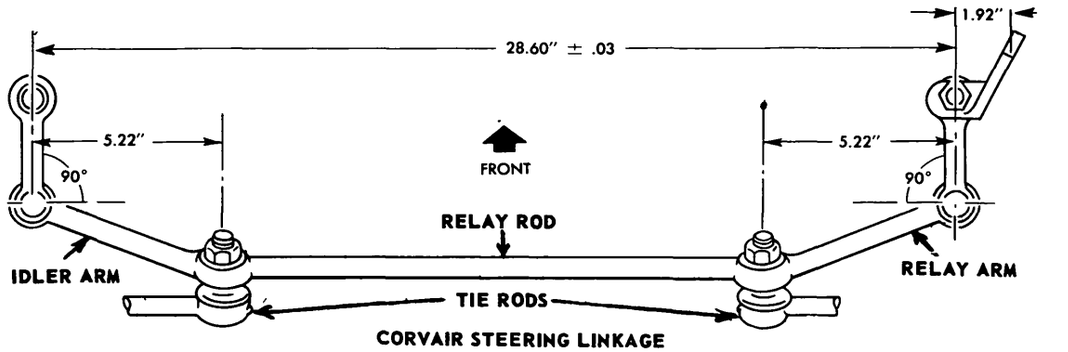
Idler Arm Inspection – Remove idler arm from bracket and remove relay rod from idler arm. Remove idler arm stud seals and all grease, then inspect idler arm for damage or wear. Place idler arm in vise, turn nut on stud until nut bottoms on threads. Torque to turn stud should be not less than 1 ft. lb., nor more than 10 ft. lbs. Replace idler arm when turning torque not within limits.

Chevrolet Trucks: Linkage – Consists of two tie rod assemblies connected between pitman arm and wheel on left hand side and between idler arm and wheel on right hand side. A relay rod is connected between pitman arm and idler arm.

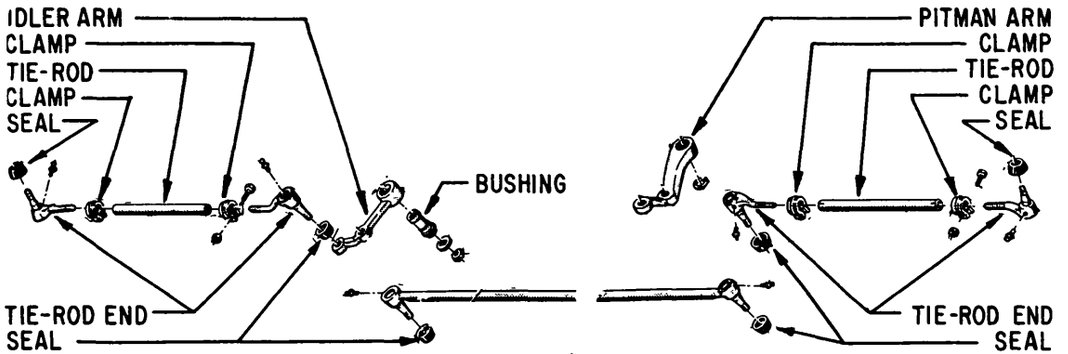
Idler Arm Inspection–*See "Chevrolet Pass. Cars" above.*

Idler Arm Bushing Replacement – *NOTE – On Series 10 through 40, idler arm bushing is not replaceable.* On Series 50 & 60, remove idler arm, then press bushing out with Tool J–1614. *NOTE – When pressing bushing from housing, pressing tool must thread down through one bushing and onto top of lower bushing. After pressing this bushing out, turn support housing over and press second bushing out. Always press from inner rim of bushing toward outside of housing.* Press new bushing into place with Tool J–7079–2 and J–8522. Bushings will be properly located in bore when pressed in until tool contacts housing.

Corvair: Linkage – Consists of a relay rod connected between pitman arm and steering idler arm located on right hand side of frame. Tie–rods are connected between relay rod and each front wheel. Bushing on pitman arm end of relay rod is replaceable.



CORVAIR STEERING LINKAGE



COMET & FALCON STEERING LINKAGE (OTHER FORD MOTOR SIMILAR)

Relay Rod Bushing Replacement – With relay rod removed from car, drive bolt out of bushing, then use a suitable size socket to press bushing sleeve and rubber out of relay rod. Press a new bushing into place with Tool J–8357. *CAUTION – When installing relay rod in car, idler arm and pitman arm must be in proper alignment (see illustration). Be sure to hold hex head of bushing bolts so bushing will not be twisted.*

Oldsmobile (Except F–85): Linkage – Consists of steering relay rod between pitman arm and idler arm, bracketed to right frame side rail. Individual adjustable tie rods are attached to center portion of steering relay rod and are provided with adjustable sleeves for toe–in adjustment. Toe–in adjustment is the only adjustment necessary for steering linkage.

Oldsmobile F–85: Linkage – Consists of steering relay rod between pitman arm and idler arm which is bracketed to right frame side rail. Individual adjustable tie rods are attached to relay rod and are provided with adjustable sleeves for toe–in adjustment.

Relay Rod End Plug Adjustment – Thread plugs into relay rod until tight, then back off ¼–¾ turn and install cotter pin with head to front of car.

Idler Arm & Support Adjustment – Thread idler arm support with seal into bushing until distance from upper face of idler arm to shoulder of support is ½". *NOTE – Idler arm must be able to rotate 90° in each direction from straight ahead position.*

Pontiac & Pontiac Tempest: Linkage – Consists of steering connecting rod between pitman arm and idler arm, bracketed on right frame side rail, and individual adjustable tie rods between steering connecting rod and each front wheel. Tie rods have adjusting sleeves at outer ends for toe–in adjustment.

Idler Lever & Support Adjustment – With lever and support off car, thread idler support into bushing until distance between upper face of idler arm and shoulder at thread end of idler support is 11/16".

STUDEBAKER-PACKARD

Studebaker Lark & Hawk: Linkage – Consists of two adjustable tie rods attached to bellcrank mounted at center of frame crossmember. Bellcrank is attached to steering gear pitman arm by a reach rod (drag link).

Bellcrank Bearing Adjustment – Insert shims between lower thrust washer and shaft until there is no end-play. Shaft should turn freely in bearings. Lock nut securely with cotter pin.

WILLYS MOTORS

Willys (All Models): Linkage – Bellcrank on frame crossmember linked to each front wheel by adjustable tie rods and to steering gear pitman arm by a steering connecting rod (drag link).

Connecting Rod End Plug Adjustment – On idler arm end of connecting rod, screw plug in firmly against ball, then back off ½ turn (except FC–150), 1/8–1/4 turn (FC–150), and install cotter pin. On pitman arm end, screw plug in firmly against ball, then back off 1 full turn (except FC–150), 1/8–1/4 turn (FC–150) and install cotter pin.

SAGINAW WORM & NUT
(Continued)

Chevrolet Trucks 1961:
Steering Wheel Removal - Remove horn button and steering shaft nut and washer. Install a puller (J-2927) into threaded holes in steering wheel hub. Remove steering wheel.

Corvair Cars & Trucks 1961:
Steering Wheel Removal - Pry out horn button, then remove screws holding receiver cup and bushing spacer to steering wheel and remove flat bellville spring. Remove nut and washer from steering shaft and insert a puller (J-2927) into threaded holes in steering wheel hub. Remove steering wheel. *CAUTION - Do not lose spring or seat on shaft under steering wheel.*

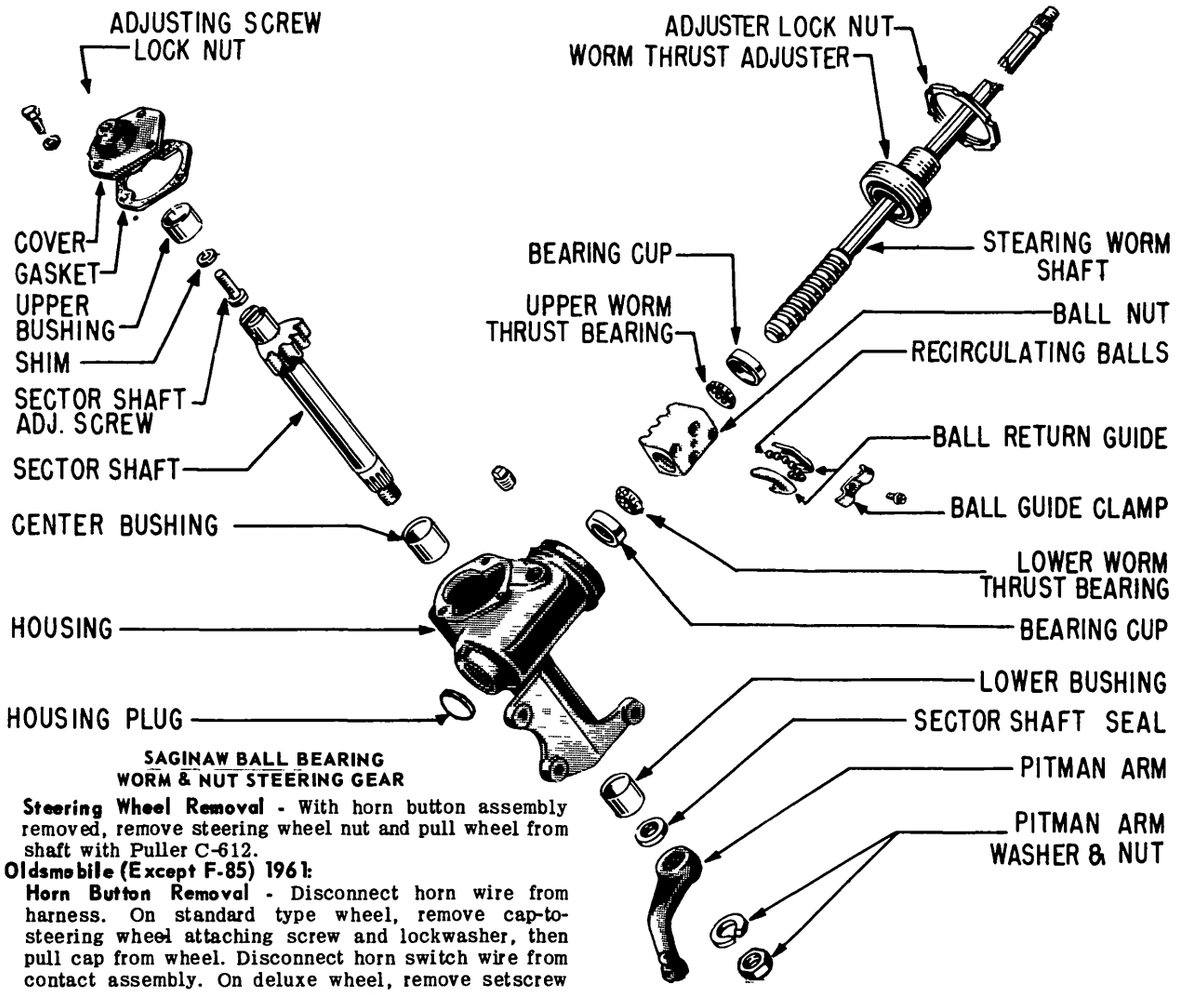
Comet & Falcon 1961:
Horn Button Removal - Disconnect horn wire under instrument panel at left side of steering column, then press down on horn button or ring and turn counterclockwise until it lifts out of steering wheel. Remove horn button and spring, then remove steering wheel (see below). Remove turn indicator lever and indicator mechanism retaining screws, and lift mechanism to one side. Remove screws retaining horn button contact and pull wire and contact from steering column.
Steering Wheel Removal - Remove horn button or ring (see above), then remove steering wheel nut and pull wheel from shaft with Puller 3600-AA or 3826 (Comet), 3600-N (Falcon).

Ford Pass. Cars 1961:
Horn Button Removal - Disconnect horn wire at bullet connector under instrument panel, then push down on horn ring assembly and turn counterclockwise until it lifts out. Remove horn ring spring and horn ring contact brush, then remove steering wheel (see below). Remove wire cover on left side of steering column, then remove two contact retaining screws and remove contact and wire assembly.
Steering Wheel Removal - With horn ring, spring and horn contact brush removed (see above), remove steering wheel with Puller 3600-AA.

Ford Trucks 1961:
Steering Wheel Removal - Disconnect horn wire at instrument panel or at horn relay. Press down on horn button or ring and turn counterclockwise until it lifts out, then remove horn button and spring. Remove steering wheel nut and remove steering wheel with Puller 3600-N (Econoline), 3600-AA (Others).

Mercury 1961:
Horn Button Removal - Remove horn ring or steering wheel hub cap by pressing down and turning counterclockwise. Remove steering wheel (see below), then remove horn contact plate and brush assembly.
Steering Wheel Removal - With horn ring and related parts removed, remove nut from steering shaft and remove steering wheel Puller 3600-AA or 3826.

Lancer & Valiant 1961:
Horn Button Removal - Disconnect negative ground cable from battery, then rotate horn button ¼ turn counterclockwise and remove button. Remove three screws and bushings from horn button base and remove horn ring. Disconnect wire from horn switch and remove base or switch.



SAGINAW BALL BEARING WORM & NUT STEERING GEAR

Steering Wheel Removal - With horn button assembly removed, remove steering wheel nut and pull wheel from shaft with Puller C-612.

Oldsmobile (Except F-85) 1961:
Horn Button Removal - Disconnect horn wire from harness. On standard type wheel, remove cap-to-steering wheel attaching screw and lockwasher, then pull cap from wheel. Disconnect horn switch wire from contact assembly. On deluxe wheel, remove setscrew if present, then pry cap and emblem assembly from shroud. On all models, remove steering wheel (see below). On deluxe wheel, disconnect horn switch wires from contact assembly lead, then remove the four shroud attaching screws and shroud. Remove staking from wheel hub and remove contact assembly from steering wheel.
Steering Wheel Removal - With cap and emblem removed (see above), remove steering wheel nut, then pull wheel with Puller BT-61-9.

Oldsmobile F-85 1961:
Steering Wheel Removal - On standard wheel, remove cap by loosening attaching screw with a Phillips screwdriver inserted into access hole in side of cap, then slide cap off wheel. On deluxe wheel, pry cap from wheel. Disconnect horn wire and remove nut and washer from steering shaft. Pull steering wheel from shaft with Puller BT-61-9.

Pontiac (Except Temp st) 1961:
Steering Wheel Removal (Std. Wh l) - Pry horn button out, remove horn button retainer, contact ring, pivot contact, spring and insulator. Remove steering shaft nut and washer and contact plate. Remove steering wheel with Puller J-3044. Remove coil spring and seat from shaft.
Steering Wheel Removal (Deluxe Wheel) - Twist and lift out steering wheel ornament. Remove lock nut, retaining nut, and washer from steering shaft, then pull horn ring and contact assembly from shaft. Remove contact assembly from horn ring. Remove pivot contact, spring and insulator from steering wheel hub, then pull steering wheel with Puller J-3044. Remove coil spring and seat from shaft.

Pontiac Temp st 1961:
Steering Wheel Removal - Lift ornament out and remove both nuts and washer from steering shaft. Remove

CONTINUED ON NEXT PAGE

SAGINAW WORM & NUT (C ntinu d)

horn ring or receiver cup, then remove pivot ring and bellville spring. Remove contact assembly. Pull steering wheel with Puller J-3044-01.

Rambler 1961:

Steering Wheel Removal - Remove horn ring or button and pull steering wheel from steering shaft with Puller J-5290.

Studebaker 1961:

Ste ring Wh l R m val - Pry out steering wheel cap, then remove horn ring retaining screws and remove ring and insulators. Remove steering wheel retaining nut and lock plate. Pull steering wheel from shaft with an adapter and Puller J-5473.

Valiant 1961: *See "Lancer & Valiant 1961" above.*

STEERING GEAR REMOVAL & INSTALLATION

►*STEERING GEAR INSTALLATION NOTE: To install steering g ar assembly, reverse removal procedures.*

Buick (Except Special) 1961: Removal - Disconnect flexible coupling from steering shaft flange. Remove pitman arm. Remove left fender skirt baffle. Remove steering gear. *NOTE - Som cars have .030" spacers under steering gear attaching bolts which must be replaced when steering gear installed.*

Buick Special 1961: Removal - *NOTE - Pitman arm cannot be r moved or installed with steering gear installed on crossmember. If pitman arm is to be removed from gear, loosen pitman arm nut before disconnecting gear from crossmember. When installing gear, do not tighten pitman nut until after steering gear is installed on crossmemb r.* Remove lower coupling clamp bolt and nut, then loosen clamp retaining mast jacket to toe pan cover and "U" bolt retaining jacket to instrument panel. Pull mast jacket assembly up far enough so lower coupling can be removed from worm shaft. Raise car and disconnect pitman arm from intermediate rod, then loosen pitman arm nut with Tool J-8987. Remove steering gear-to-crossmember attaching bolts and remove gear assembly. *NOTE - Do not remove pitman arm from shaft unl ss pitman shaft assembly or seal is to be r moved.*

Ch vrolet Pass. Cars 1961: Removal - Remove pitman arm (Tool J-6632 or J-5504). Remove splash pan, then remove steering gear-to-frame bolts and shims. Remove coupling clamp bolts and remove steering gear and shaft from under car.

►*CHEVROLET LOWER COUPLING REPLACEMENT NOTE:* If lower coupling is to be removed, it will be necessary either to lower the steering gear from its original position, or the mast jacket, upper steering gear shaft, coupling and intermediate shaft must be loosened and pulled up far enough to permit coupling to be removed from worm shaft.

Chevrolet Trucks 1961: Removal - Loosen bolt attaching lower end of intermediate shaft to steering gear, then disconnect pitman arm from steering shaft, using Puller J-6632. Remove all steering gear-to-frame attaching bolts and remove steering gear.

C rvair Pass. Cars 1961: R m val - Remove pitman arm with Tool J-6627, then disconnect coupling, remove gear attaching bolts, and remove gear by sliding it forward and down.

C rvair Trucks 1961: R moval - Remove bumper and left front outer extension panel. Remove steering connecting rod from pitman arm. Remove steering wheel (see above). Remove direction signal assembly and mast jacket-to-dash clamp. Remove steering gear attaching bolts and remove steering gear.

Comet & Falcon 1961: Removal - Raise front of car and place on stands, then remove pitman arm from sector shaft. Remove steering gear bolts from underbody and disconnect transmission shift rods at shift levers. Pull rubber seal up on steering column and fold floor mat aside. Move dash panel insulation out of way, then remove retaining screws from steering column weather seal on dash panel and remove column cover plates and gasket. Disconnect horn and direction signal wires under instrument panel. Also disconnect neutral switch wires. Remove steering wheel (see above). Remove upper bearing sleeve and spring, then remove turn indicator lever. Remove steering column clamp-to-instrument panel bolts and remove clamp (upper and lower halves) and remove insulator. Slide steering column tube assembly from steering shaft, guiding shift levers up through rubber seal at dash panel. Remove steering gear and shaft assembly out toward front through engine compartment.

Ford Pass. Cars 1961: Removal (Without Flexible Coupling) - Remove pitman arm from sector shaft and disconnect muffler inlet pipe if necessary. Remove steering gear attaching bolts. Disconnect neutral switch wires at switch and loosen steering column lower clamp. Disconnect shift levers from gearshift connecting rods. Remove steering wheel (see above) and disconnect horn and direction signal wires. Remove steering shaft upper bearing sleeve and spring. Disconnect steering column-to-instrument panel bracket and remove selector dial indicator cover and control selector indicator. Remove steering column weather seal screws and place both halves of steering column opening cover plate out of way. Remove steering column tube assembly, then remove steering gear and shaft through passenger compartment.

Removal (With Flexible Coupling) - Remove pitman arm from sector shaft and disconnect muffler inlet pipe if necessary. Remove steering gear attaching bolts and flexible coupling clamp bolt. Remove steering gear.

Ford F-100 & F-250 Trucks 1961: Removal - Disconnect horn wire from bullet connector below instrument panel, loosen steering column lower clamp and slide clamp down. Disconnect remote control shift control rods at shift levers. Remove steering wheel (see above). Remove steering column upper bushing spring and bushing. Disconnect direction signal wires and remove from retaining clip. Remove steering column bracket clamps and rubber sleeve. On floor mounted gearshift lever models, pull steering column tube off shaft. On remove control shift models, remove steering column shields from floor pan. Remove engine oil filter on V8 trucks. Remove exhaust pipe from exhaust manifold if necessary on 6 Cyl. trucks. Disconnect clutch retracting spring and remove clutch equalizer shaft outer bearing bracket and shaft (do not loosen the four split bearings). Remove inner bearing bracket. Remove pitman arm from sector shaft and wedge sector shaft opening in arm if necessary. Remove steering gear attaching bolts and remove gear from under truck (floor mounted gear shift lever), through passenger compartment (remote control shift lever). Loosen steering column tube lower clamp and remove tube.

F rd Ec n lin Trucks 1961: Rem val - Disconnect horn and direction signal wires under instrument panel and free them from retaining clip. Fold floor mat out of way, pull up rubber seal, and remove steering column floor pan cover. Remove steering column-to-instrument panel clamp, disconnect transmission shift rods from shift tube arms. Remove steering gear attaching bolts, and pitman arm attaching bolt and nut. Spread pitman arm and partially remove it from sector shaft, then remore steering gear from pitman arm. Lift steering column, shift tube, and steering gear assembly out through passenger compartment.

Mercury 1961: Removal (Without Flexible Coupling) - *See "Ford Pass. Cars 1961" above.*

Removal (With Flexible Coupling) - *See "Ford Pass. Cars 1961" above.*

Lancer & Valiant 1961: Removal - Raise car and remove pitman arm, then remove bolts attaching steering gear to frame. Remove bolt from coupling clamp at upper end of steering worm shaft, then support steering gear and tap coupling assembly upward with a mallet until it is free from shaft splines. Remove steering gear.

Oldsmobile (Except F-85) 1961: Removal - Remove steering wheel (see above), upper bearing spring and seat, then remove mast jacket cover plate from toe pan. Disconnect horn, direction signal, and neutral switch wires from switches and connector. Remove cap from upper mast jacket bracket and disconnect upper clamp. Disconnect shift linkage and battery cable sleeve from lower end of mast jacket. Loosen lower clamp and remove mast jacket from gear and worm shaft. Remove pitman arm from pitman shaft. Remove steering gear attaching bolts and remove steering gear.

Oldsmobile F-85 1961: Removal (Manual Steering) - Remove coupling clamp bolt and slide clamp off coupling onto steering gear worm shaft. Disconnect horn wire at harness and remove horn shroud from center of steering wheel. Remove steering wheel (see above). Pull horn contact plate out of recess in actuator assembly and remove upper bearing-to-actuator assembly retaining clip. Pull steering shaft up out of steering column about 2" and block in position. Pull relay rod off pitman arm. Remove steering gear attaching bolts and remove steering gear.

Removal (Power Steering) - Remove coupling flange attaching nuts and lockwashers, and ground wire from flange attaching bolt. Disconnect hoses from pump and gear. Raise steering shaft about 2" as detailed for manual steering gear above. Disconnect pitman arm from relay rod, remove steering gear attaching bolts and remove steering gear.

Pontiac (Except Tempest) 1961: Removal - Remove pitman arm from pitman shaft, scribe mark worm shaft flange and steering shaft, and disconnect lower flange from steering shaft. Remove steering gear attaching bolts and remove steering gear.

Pontiac Tempest 1961: Removal - Remove steering wheel (see above). Remove steering gear attaching bolts and remove steering gear and shaft assembly.

Rambl r 1961: Removal (Series 10 & 20) - Disconnect battery, remove steering wheel (see above) and jacket tube support plate screws. Loosen jacket tube bracket-to-instrument panel mounting bolts. Remove pitman

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SAGINAW WORM & NUT (C ntinu d)

arm. Support front of engine and remove engine front support crossmember. Mark location of turning radius stop plate, then remove plate. Remove steering gear attaching bolts and remove steering gear.

Removal (Series 80) - Disconnect battery, remove steering wheel (see above) and jacket tube support plate screws. Loosen jacket tube bracket-to-instrument panel mounting bolts. Remove left front wheel. Mark location of turning radius stop plate, then remove plate. Loosen steering gear attaching bolts, then remove pitman arm. Remove left exhaust manifold. Remove power steering hose bracket from engine left front support, support engine and remove engine left front support mounting bracket. Remove front crossmember (leave stabilizer bar attached). Remove steering gear.

Studebaker 1961: Removal - Remove battery, disconnect horn switch wire at connector, and battery cable at starter switch. On Hawk, remove battery box. Remove steering wheel and steering post jacket assembly. *NOTE - On V8 models (except Hawk), remove distributor cap, disconnect left front engine support and raise l ft front corner of engine about 1½".* Remove reach rod from pitman arm. Remove steering gear attaching bolts, turn gear upside down, lift and remove through engine com partment.

Valiant (1961): Removal - *See "Lancer & Valiant 1961" above.*

OVERHAUL

DISASSEMBLY: Remove pitman arm from sector shaft if arm still attached. Loosen sector shaft adjusting screw locknut, back out adjusting screw, then remove housing side cover with sector shaft attached. Remove gasket. Separate sector shaft from side cover by unscrewing adjusting screw. *Do not lose shim.* Loosen worm thrust bearing adjuster locknut and back out adjuster several turns, then remove housing end cover and gasket. Remove lower thrust bearing, worm shaft, and upper bearing from housing. *CAUTION - Do not allow ball nut to run down to either end of worm or damage to ends of ball guides will result.* If ball nut is to be disassembled, remove ball return guide clamps and guides from ball nut, turn ball nut over to remove balls. *CAUTION - Hold shaft and ball nut assembly over a wide pan while disassembling to retain all balls. It is very important that balls be counted and the same number of balls reinstalled when gear is assembled. Remove ball nut from worm shaft.*

REASSEMBLY: 1) Use suitable tools to remove and install bushings, bearings, bearing cups, and seals as necessary. On some models, sector shaft bearings are needle bearing type; other models use bushings. New bushings do not require reaming.

2) Place worm shaft flat on bench and slip nut over worm with ball guide holes up and shallow end of rack teeth to left of steering wheel position. Align grooves in worm and nut by sighting through guide holes. Count out one-half the number of balls removed at disassembly and drop them into one of the guide holes while turning the worm gradually away from the hole until guide hole is full from bottom of one guide hole to the bottom of the other. *NOTE - In cases where balls are stopped by end of worm, hold down the balls already dropped into hole and rotate worm back and forth.* Lay one-half of guide, groove up, on bench and place remaining balls in it. These remaining balls should fill guide. Close this half of guide with other half and hold both halves of guide together and plug each end with vaseline to hold balls in place. Push guide into holes of nut to complete one circuit. Repeat same operation with other circuit. Reassemble ball guide clamp to nut with lockwashers under clamp screws and tighten screws securely.

3) Place worm shaft and nut assembly into housing and place upper roller bearing over worm shaft. Place new housing end cover gasket over end of worm shaft, then slide housing end cover over worm shaft and assemble it to housing. Install lower roller bearing. Install worm bearing adjuster and locknut. *NOTE - W rm b aring preload adjusting may be mad at this time, or mad when steering gear is assembled.* Assemble sector shaft adjuster and shim in slot in end of sector shaft. Insert a feeler gauge between head of adjuster screw and bottom of slot. Adjuster screw must be free to turn and endplay must not exceed .002". Change adjuster shim as necessary (shims furnished .063", .065", .067", .069" thick). Start sector shaft pilot into bushing or bearing in side cover, then using a screwdriver through hole in cover, turn lash adjuster in counterclockwise direction to pull sector shaft pilot into its bushing as far as it will go. Rotate worm shaft by hand until ball nut is at center of travel. Place a new gasket on side cover, then push side cover assembly including sector shaft into place. After making sure there is some play between rack and sector teeth, assemble and tighten side cover bolts. Perform worm bearing preload adjustment (if not already adjusted), then adjust pitman shaft endplay (gear mesh). S *"Adjustments" abov .* Fill steering gear with proper lubricant.

GEMMER WORM & ROLLER

Checker (1961)
Chrysler (1961)
DeSoto (1961)
Dodge & Dodge Dart (1961)
Ford Trucks (Except F-100 & F-250) (1961) ①
Plymouth (1961)
Rambler American (1961)

① – Series F-100 & F-250 use Saginaw Ball Bearing Worm & Nut type.

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 RAMBLER AMERICAN EXCESSIVE STEERING EFFORT CORRECTION:* On early cars, if condition not corrected after the usual steering linkage and gear checks and adjustments, there may be insufficient clearance between nylon bushing at bottom of steering jacket tube and steering shaft. To correct, install new type yellow bushing with larger inside diameter, Part No. 3203276. Install bushing with Power Steering Pump Seal Installer J-5441 using generous amount of lubriplate on both bushing and contact area of steering shaft. Drill a small hole in metal retainer and bushing and install a self-tapping screw to hold bushing in place. *CAUTION – DO NOT l t scr w c ntact st ering shaft.* New type bushing used on later cars.

DESCRIPTION: Similar in design to units used on previous models. Roller shaft adjusting screw is secured in end of roller shaft with a snap ring on some models. Chrysler Corp. cars have flexible coupling between steering gear worm shaft and steering tube.

ADJUSTMENT: *NOTE – Adjustments must be made in the following sequence.*

Worm Bearing: All Except Ford Trucks – Turn steering wheel about one turn from straight ahead position and secure wheel to prevent any movement. Determine endplay by shaking front wheels sideways noting any movement that may be felt between steering wheel hub and steering jacket tube. If endplay is present, adjust worm bearing by loosening the four bottom cover bolts about 1/8", then separate top shim with a knife blade and remove. *CAUTION – Do not mutilate remaining shims or gasket.* Tighten cover and recheck for endplay. *NOTE – Remove only one shim at a time to prevent obtaining too tight an adjustment.*

F rd Trucks (F, B, P S ri s) – Disconnect pitman arm from drag link (or from control valve ball stud on power steering models). Turn steering wheel two complete turns from straight ahead position, then install an inch-pound torque wrench on steering wheel nut and measure torque required to keep wheel moving at a constant rate for at least one complete turn. If torque or preload is not within specifications in table, adjust as indicated below.

Adjustment – Disconnect horn wire at bullet connector just below steering column housing. Remove bolts attaching endplate to steering gear housing, then remove or install one gasket at a time to obtain proper preload. Gaskets are available in thicknesses of .002", .005", .010". *NOTE – R moval of gask t will increase preload and installation of gask t will decrease preload.* To remove a gasket, separate outer gasket from pack by passing a knife blade all around inner face of gasket being careful not to cut or tear remaining gaskets in pack. Install endplate and recheck preload. *NOTE – On P S ri s, st ring g ar and column must be loosen d b for ndplat can b removed for installation of gasket.*

F rd Trucks (C Seri s) – Disconnect pitman arm from drag link (or from control valve ball stud on power steering models). Remove lower universal joint re-

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GEMMER WORM & ROLLER (Continued)

taining bolt and nut and raise steering shaft assembly off steering gear, then install a 4" block of wood between steering wheel and upper steering column tube flange. Bend a piece of light strap iron (10" long) so a 1" section is at right angles to longer section, then use a heater hose clamp and fasten strap iron to worm shaft so longer section of iron forms a lever. Turn worm shaft two complete turns from straight ahead position and measure pull required to keep worm shaft moving at a constant rate for at least one complete turn, using a spring scale hooked to lever at a point 8½" from outer diameter of steering shaft. If pull required to turn shaft not within specifications in table, adjust as indicated below.

Adjustment – *Same as for F, B, P Series above.*

Ford Truck Worm Bearing Preload

Truck Model	Worm Preload
F, B, P Series ①	②4½–9 lbs.
F & B–600 Series ③	②4½–11¼ lbs.
C Series	④9–13½ lbs.

① – Except F & B–600 With 6000 Lb. Front Axle.
② – Inch–lbs. With inch–pound torque wrench on steering wheel nut.
③ – With 6000 Lb. Front Axle.
④ – Pounds pull. With spring scale installed on steering wheel at right angle to spoke.

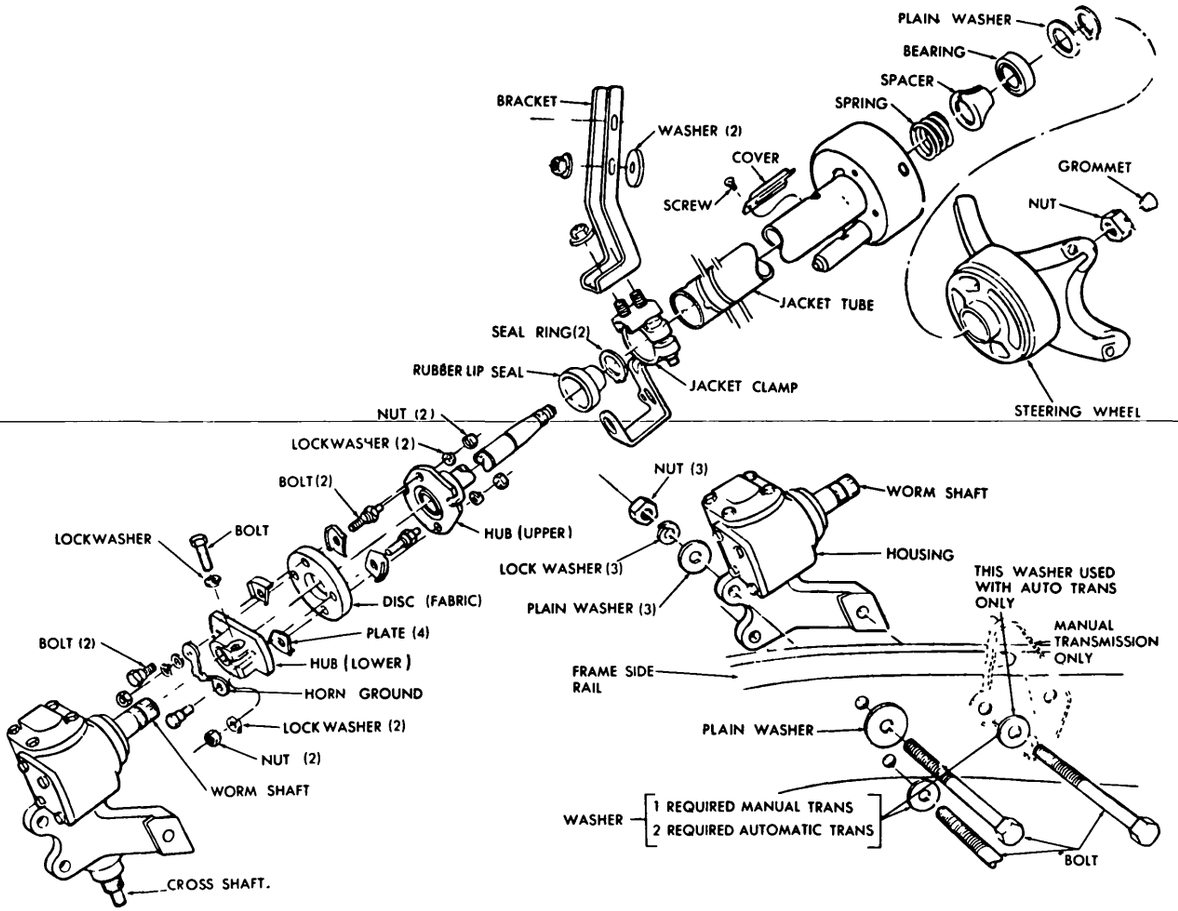
Cross Shaft Rear & Worm Mesh: Chrysler, DeSoto, Dodge, Dart, Plymouth – Disconnect pitman arm at link, then rotate steering wheel to mid–position and check for backlash by moving pitman arm back and forth. If backlash exists, loosen roller shaft adjustment screw locknut and tighten adjusting screw enough to eliminate freeplay. Rotate steering wheel to one end of its travel and apply a spring scale at rim of steering wheel. A pull of 1–2 lbs. should be required to turn wheel. Tighten adjusting screw locknut while holding adjusting screw from turning.

Ford Trucks (F, B, P Series) – Disconnect drag link from pitman arm, install an inch–pound torque wrench on steering wheel nut and measure torque required to turn wheel through straight ahead (high point) position. If torque not within limits in specification table, adjust as indicated below.

Adjustment – Loosen adjusting screw locknut at engine side of steering gear housing and adjust by turning screw inward (clockwise) to tighten mesh, outward (counterclockwise) to loosen mesh. Hold adjusting screw stationary and tighten locknut.

Ford Trucks (C Series) – Disconnect pitman arm from drag link. Remove lower universal joint retaining bolt and nut and raise steering shaft assembly off steering gear, then install a 4" block of wood between steering wheel and upper steering column tube flange. Bend a piece of light strap iron (10" long) so a 1" section is at right angles to longer section, then use a heater hose clamp and fasten strap iron to worm shaft so longer section of iron forms a lever. Turn worm shaft so it is at straight ahead position and measure pull required to turn worm shaft through straight ahead (high point) position, using a spring scale hooked to lever at a point 8½" from outer diameter of steering shaft. If pull not within limits in specification table, adjust as indicated below.

Adjustment – *Same as for F, B, P Series above.*



CHRYSLER CORP. STEERING COLUMN ASSEMBLY

Ford Truck Worm & Mesh Setting

Truck Model	Worm & Roller Mesh
F, B, P Series ①	②13½–22 lbs.
F & B–600 Series ③	②15¾–24¼ lbs.
C Series	④18½–29¾ lbs.

① – Except F & B–600 With 6000 Lb. Front Axle.
② – Inch–lbs. With inch–pound torque wrench on steering wheel nut.
③ – With 6000 Lb. Front Axle.
④ – Pounds pull. With spring scale installed on steering wheel at right angle to spoke.

Rambler American – With pitman arm disconnected and steering wheel at mid position of turning limits, shake pitman arm sideways to determine worm and cross shaft roller clearance; or hook spring scale to rim of steering wheel and note pull required to pull wheel through center of travel. Pitman arm movement should not exceed 1/32", and pull on steering wheel should be 7/8–1½ lbs. To adjust, loosen locknut on adjusting screw and tighten screw as necessary. DO NOT OVERTIGHTEN.

STEERING WHEEL & HORN BUTTON REMOVAL:

Chrysler & DeSoto: Disconnect battery, then press down on center steering wheel ornament and turn ¼ turn to remove. Disconnect horn wire and remove three screws, bushing, horn blowing ring, rubber insulator, and horn terminal plate. Loosen steering wheel nut three turns and use Puller, C–3428, to loosen steering wheel. Remove tool, wheel nut, and wheel.

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GEMMER WORM & ROLLER (C ntinu d)

Dodg , Dart, & Plym uth: Disconnect battery ground cable, then remove steering wheel ornament by removing screws from underside of wheel. Remove stationary plate, bushings, horn ring and attaching screws. Disconnect horn wire at stationary plate, then loosen steering wheel nut three turns and use Puller, C–3428, to loosen wheel. Remove tool, steering wheel nut, steering wheel, retainer, and spring.

F rd Trucks: Disconnect horn wire at bullet connector under instrument panel. Remove horn button or ring by pressing down and turning counterclockwise. Remove steering wheel nut. Install a steering wheel puller such as 3600–AA, and remove steering wheel.

Rambler American: Remove horn button or ring and pull steering wheel with Tool J–5290. To replace steering wheel, turn steering shaft until mark on shaft is at top center, then place wheel on shaft with steering wheel spokes equal distance from center.

STEERING GEAR REMOVAL, INSTALLATION & ALIGNMENT: Note the special alignment procedures outlined below.

Chrysler, DeSoto, Dodge, Dart, Plymouth: Removal – Remove pitman arm from sector shaft with Tool C–3646, then remove flexible coupling to steering gear worm shaft attaching bolt and washer. Remove steering gear to frame side rail attaching bolts and slide gear assembly forward to disengage flexible coupling from worm shaft. Raise gear and remove through engine compartment.

Installation – Place steering gear worm shaft on exact center of travel (high point). Mark master spline in outer row of serrations on worm shaft, then install gear in engine compartment. Align index mark on outside of flexible coupling hub with master spline on worm shaft. Slide coupling on worm shaft and install gear housing–to–frame attaching bolts and tighten bolts evenly to 50 ft. lbs. Position flexible coupling bolt hole in line with groove on worm shaft and install bolt and lockwasher and tighten to 30–35 ft. lbs. Install pitman arm and tighten nut to 125 ft. lbs.

Alignment – Check steering tube for alignment in steering column seal. If tube is not centered, proceed as follows: *NOTE – Steering tub must b c nt red in st ering column s al, also lip of s al which contacts tub must be w ll lubricat d with wh l b aring lubricant.* Loosen steering column clamp bolts at instrument panel, then loosen lower column clamp bolt and support bracket at both firewall and at column clamp. Hold steering column so it is centered on tube while aligning column support bracket to firewall and lower column clamp. When properly located, tighten support bracket stud nuts at firewall and at column clamp to 100 inch–pounds. Tighten steering column–to–instrument panel clamp bolts to 15 ft. lbs., then tighten lower steering column clamp bolt to **200 inch–pounds.**

Ford Trucks (F & B Series): Disconnect battery ground cable, then disconnect horn wire from bullet connector below steering gear housing and remove wire from clips on frame and fender apron. Loosen steering column lower clamp and slide clamp down. Disconnect transmission shift control rod or rods at shift levers. Remove steering wheel (see above), then remove steering column upper bushing spring and bushing. Disconnect turn signal wires, and remove from retaining clip at instrument panel bracket. Remove steering column bracket clamps and rubber sleeve. If truck has a floor mounted gear shift lever, pull steering column tube off shaft. On a truck with automatic transmission or a remote type gearshift lever, remove steering column shields from floor pan. If truck has a V8 engine, remove engine oil filter. On a clutch equipped truck, disconnect clutch retracting spring and remove clutch equalizer shaft outer bearing bracket and shaft (do not loosen split bearings). On F–350 with remote type shift, remove inner bearing bracket. Remove pitman arm. Disconnect steering gear from frame side rail. On a model with floor mounted gearshift, remove steering gear assembly from under truck. On models with automatic transmission or a remote type gearshift, remove assembly through passenger compartment. If steering column tube has not been removed, loosen lower clamp and remove tube. To install, reverse removal procedure.

Ford Trucks (C Series): Remove horn wire brush from steering column just below instrument panel bracket. Remove universal joint upper retaining nut and bolt, then turn wheels to right and remove pitman arm. Remove steering gear housing–to–frame bolts and remove steering gear with universal joint attached. Install by reversing removal procedure.

F rd Trucks (P S ri s): Remove steering wheel (see above), then remove steering column bracket bolts from instrument panel. Raise front of truck, install stands, then remove pitman arm. Loosen steering column lower clamp, and disconnect horn wire. Move steering gear to left and remove from beneath truck.

Rambler American: Removal – Remove steering wheel (see above), and pitman arm. Loosen steering jacket tube assembly at support plate and at instrument panel mounting bracket. Remove steering gear attaching bolts and remove gear from beneath car.

Installation – Reverse removal procedure.

Alignment – Loosen housing mounting bolts and align housing at angle determined by height setting of jacket tube bracket. Use shims between housing and mounting surface as necessary. Tighten mounting bolts. Loosen jacket tube bracket and let it match gear column position, then tighten.

OVERHAUL (STEERING GEAR ASSEMBLY): Disassembly – Remove seal from pitman arm end of sector shaft with a suitable puller. Loosen sector shaft adjusting screw locknut, remove sector shaft cover, adjusting screw and sector shaft as an assembly. Remove housing lower cover plate, shims, spring, seal, washer, and lower bearing. Remove worm shaft and upper bearing from housing. Drive sector shaft bushings or bearing from housing with suitable removing tools.

Reassembly: *NOTE – DO NOT lubricat any parts until unit is reassembled.* Install lower sector shaft bushing to within 1/16" of end of counterbore in housing, and upper bushing flush with housing bore face, using suitable tools. Install worm and shaft in housing with both upper and lower bearings properly seated. Install housing lower cover and shims, making sure no bind exists in worm shaft. Check worm bearing preload as follows: *See above for Ford Trucks.* For other cars, temporarily install steering wheel on worm shaft and tighten cover screws so endplay disappears with 3/8 to 3/4 pound pull required to rotate shaft. Remove or install shims between cover and housing as necessary. Install worm shaft upper seal using a protector over shaft spline to prevent seal damage. Install sector shaft and cover with adjusting screw turned all the way out. Make worm and roller mesh adjustment as detailed above. Fill housing with steering gear lubricant and check for leaks.

CHRYSLER CORP. "CONSTANT CONTROL" POWER STEERING

Chrysler & Imperial (1961)
DeSoto (1961)
Dodge & Dodge Dart (1961)
Lancer (1961)
Plymouth (1961)
Valiant (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 CROSS SHAFT OIL SEAL RETAINING RING PRODUCTION CHANGE & REPLACEMENT NOTE:* Later gears with change letter "X" (except Imperial), change letter "C" (Imperial), have a new Tru Arc snap ring, Part No. 2127049, identified by "W-168" stamped on sharp edged side. New snap ring should be installed at time of overhaul on any steering gear which has the old type snap ring. Snap ring must be installed with sharp edge facing outward toward pitman arm end of housing.

►*1961 POWER STEERING OIL LEAK CORRECTION & "O" RING AND SEAL REPLACEMENT CAUTIONS:* Power steering unit ordinarily needs overhaul only at extreme high mileage. Most leaks can be corrected by replacing external seals or "O" rings. Manufacturer recommends that Seal Kits, No. 2279985 (Valve Package), No. 2279986 (Cross Cover Seal Package); and Cross Shaft Outer Oil Seal, No. 1730985 (Except Lancer & Valiant), No. 2027039 (Lancer & Valiant) be installed to correct leaks.

DESCRIPTION & OPERATION: Similar in design and operation to previous 1959-60 models.

ADJUSTMENTS: *See "Chrysler, DeSoto, Dodge, Plymouth Constant Control Power Steering" in 1958 Final Data or later Manual editions and note the following:*

Pump Belt Adjustment (Pumps With Load Reaction Belt Tensioner): Loosen adjusting bracket bolts and install Adapter C-3832 over edge of mounting bracket as close as possible to outer edge of bracket. Insert torque wrench into adapter and tighten belt until torque wrench reads 45 ft. lbs. Hold tension with wrench, and tighten mounting bracket bolts to 30 ft. lbs. torque.

Pump Belt Adjustment (Pumps Without Load Reaction Belt Tensioner): Torque Method - With a torque wrench in pump mounting bracket, tighten belt to 100 ft. lbs. (new belt), 60 ft. lbs. (used belt).

Deflection Method - There should be 1/16" (new belt), 1/8" (used belt) deflection midway between pulleys under a 5 lb. load.

LUBRICATION: Check fluid level in reservoir every 2000 miles. Fluid level should be at bottom of filler neck when fluid is cold, and should be about half-way up filler neck when fluid is hot. **Use only MoPar Power Steering Fluid, Part No. 2084329.** DO NOT OVERFILL.

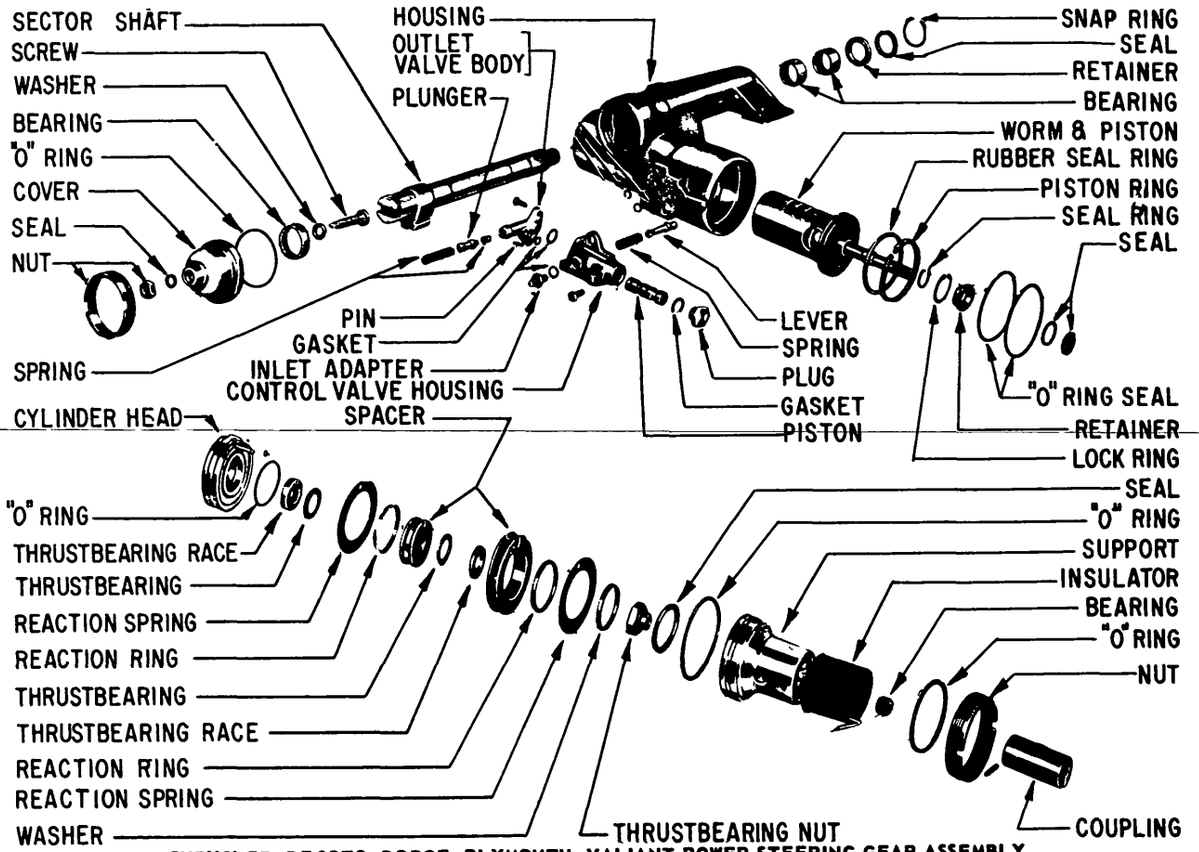
BLEEDING SYSTEM: All air can be expelled from unit by turning steering wheel several times from full right to full left and back again.

HYDRAULIC PRESSURE TEST: Disconnect pump-to-steering gear pressure hose at steering pump and connect test hose C-3388 with proper adapters between pump and gauge C-3309-B with shut-off valve between gauge and steering gear. With engine idling at 500 RPM and oil at normal operating temperature (150°-170°F., checked with thermometer in reservoir), pressure should be 55-80 lbs. (Except Lancer & Valiant), 35-80 lbs. (Lancer & Valiant). Increase engine speed to 1000 RPM and slowly close shut-off valve. Pump pressure should be as indicated in table below. *CAUTION - Do not hold valve closed for more than a few seconds.* If pressure is in excess of maximum, check for faulty relief valve. If pressure is less than minimum, power steering pump is defective.

Power Steering Pump Pressure

Car Model	Lbs. Pressure
Imperial	1150-1300 lbs.
Chrysler & DeSoto	1000-1100 lbs.
Dodge V8	1000-1100 lbs.
Dart & Plymouth 6 Cyl.	850-950 lbs.
Dart & Plymouth 318" V8①	850-950 lbs.
Dart & Plymouth 318" V8②	1000-1100 lbs.
Dart & Plymouth 361", 383", 413" V8	1000-1100 lbs.
Lancer & Valiant	850-950 lbs.

① - Without Load Reaction Belt Tensioner.
② - With Load Reaction Belt Tensioner.



CHRYSLER, DESOTO, DODGE, PLYMOUTH, VALIANT POWER STEERING GEAR ASSEMBLY

TROUBLE SHOOTING: *See "Chrysler, DeSoto, Dodge, Plymouth Constant Control Power Steering" in 1958 Final Data or later Manual editions.*

REMOVAL & INSTALLATION: Steering Wheel & Horn Button (Chrysler, Imperial, DeSoto, Dodge, Dart, Plymouth) - *See "Gemmer Worm & Roller" in this section.*

Steering Wheel & Horn Button (Lancer & Valiant): *See "Saginaw Ball Bearing Worm & Nut" in this section.*

Steering Gear Removal (Except Lancer & Valiant): Remove steering wheel and turn signal cancelling mechanism then remove retainer snap rings from groove in steering tube at top of bearing with Tool C-3229. Remove jacket tube shield to allow access to column tube clamp and remove screws attaching steering jacket tube clamp at instrument panel and remove clamp. Raise carpet and move rubber grommet up on jacket column, then remove screws attaching rubber dust boot to firewall. On Imperial models, remove floor inspection panel. Loosen jacket tube clamp at steering gear housing. Remove cotter key and nut at drag link and disconnect link from steering arm, then remove steering arm nut and washer at steering gear shaft. Slide Tool C-3646 up on steering arm and place shoe of puller behind steering arm and pull steering arm from

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CHRYSLER CORP.
"CONSTANT CONTROL"
POWER STEERING (Cont.)

gear shaft. *CAUTION - Do not remove steering arm by prying with a lever or striking with a hammer.* Disconnect hydraulic brake line at master cylinder and brake tee and remove line, then disconnect pressure and return hoses at steering gear (fasten ends of hoses above reservoir oil level and cap all openings). Slide jacket tube up and off steering gear through drivers compartment, then remove jacket tube upper spring and retainer. Remove steering tube coupling pin, two plastic inserts, horn ground strap, rubber insulator and upper steering tube. Remove gear housing to frame bolts, washers and alignment wedge. Slide steering gear upwards and toward rear of car and at the same time raise lower end of gear and remove gear from engine compartment. *NOTE - On cars with Ram Jet Manifolds, to remove gear, raise lower end of housing in a clockwise motion towards panel until gearshaft end of housing and shaft will clear "A" frame of front suspension, then tilt entire gear assembly towards engine slightly to allow swinging steering gear assembly downward through opening at fender side panel (fender side panel removed). Gearshaft end of housing should go through opening first and the housing should be rolled through opening end-over-end.*

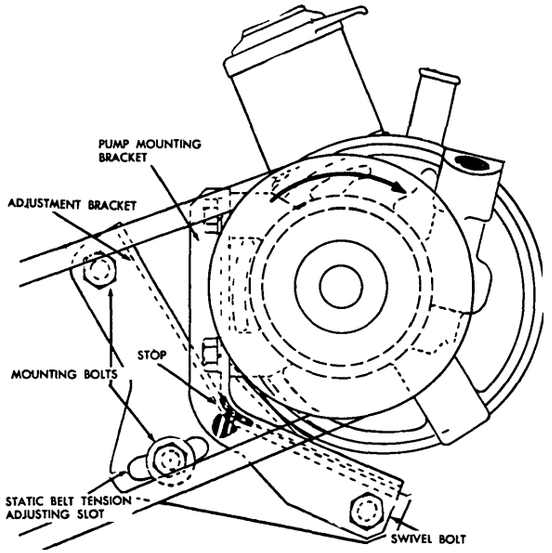
Installation - Reverse removal procedures and note the following: Make sure there is at least 1/16" clearance between bottom face of jacket tube clamp and column support spanner nut. With steering gear completely installed (gear assembly-to-frame bolts not tightened), tighten front upper and lower gear housing to frame attaching bolts to 20 ft. lbs. Install wedge over rear bolt between housing and frame so that tapered surfaces match, tapping it lightly into place, then tighten all three attaching bolts to 50 ft. lbs.

Lancer & Valiant - Remove steering arm from steering gear shaft with Tool C-3646, then disconnect hydraulic lines from steering gear. Remove bolts attaching steering gear to frame and remove bolt from coupling clamp at upper end of steering gear worm shaft. While supporting steering gear, tap coupling upward with a mallet until it is free from worm shaft splines, then lift out steering gear.

Installation - Reverse removal procedures and note the following: Tighten steering gear-to-frame attaching bolts to 75 ft. lbs. and steering arm nut to 85 ft. lbs.

OVERHAUL: *See "Chrysler, DeSoto, Dodge, Plymouth Constant Control Power Steering" in 1958 Final Data or later Manual editions and note the following:*

Power Train Reassembly: With Tool C-3676 held securely in vise, place piston and ring assembly in tool with lower part of piston and ring resting in tool land. Pressing down on piston will cause piston ring to bottom in its groove, forcing open ends of ring upwards for ease of locking the piston ring (ring should be positioned with ring hooks in line with ball guide hole). *NOTE - Positioning hooks in this manner will control internal leakage through the ring.* Wire brush knurled area of worm shaft to remove staking deposits. Lubricate each part with Automatic Transmission Fluid, then place piston on bench in a vertical position (worm shaft up).



LOAD REACTION BELT TENSIONER

Install cylinder head assembly on worm shaft making sure that gap on worm shaft seal is closed to avoid damaging the ring when cylinder head is bottomed against piston top flange. Install lower reaction plate over ferrule on cylinder head, then install lower reaction ring on pressure plate with flange up so that ring protrudes through pressure plate. Lubricate following parts with Automatic Transmission Fluid and slide them over shaft in the following order: Lower (thick) thrust bearing race, lower thrust bearing, center bearing race, upper thrust bearing and upper (thin) thrust bearing race. Install a new worm shaft thrust bearing nut and tighten nut as follows: Grip piston assembly in a soft jawed vise, then turn worm shaft counterclockwise one-half turn and while holding worm shaft in this position, tighten worm shaft nut to 50 ft. lbs. to preset the bearings. *CAUTION - If worm shaft is turned more than one-half turn, the cylinder head sleeve will clear the oil seal ring on worm shaft. Always position worm shaft oil seal ring before bottoming the cylinder head against piston top flange to avoid damaging oil seal ring.* Loosen the adjusting nut and place several rounds of cord around center bearing race, then make a loop in one end of cord and hook the loop of a distributor breaker arm spring scale (Tool MTU-36) in the cord loop. Pulling cord will cause bearing race to rotate. Retighten worm bearing adjusting nut while pulling on the cord with the scale. If adjusting nut is tightened properly, reading on scale should be 8-16 ounces (12 inch ounces preferred) while bearing race is turning. *CAUTION - Place a support under the adjusting nut during the staking operation to avoid brinnelling piston and worm bearings.* Stake the upper part of worm shaft adjusting nut into knurled area of shaft as follows: Hold a ¼" flat end punch on centerline of worm shaft and perpendicular to worm shaft at a slight angle to nut flange. Strike the punch a sharp blow with a hammer and recheck preload. If adjusting nut moved during the staking operation, it can be corrected by striking the nut a glancing blow in direction required to regain proper preload. After proper preload, stake the nut at three more locations 90° apart around upper part of nut. To test staking, torque nut to 20 ft. lbs. in either direction. If nut does not move, the staking operation is satisfactory. Recheck adjustment. Install center bearing spacer assembly over center bearing race and engage dowel pin of spacer in slot of race and slot of spacer entered over cylinder head ferrule. *NOTE - This will align valve lever hole in center bearing race with valve lever hole in center bearing spacer assembly.* Place reaction ring (outer) with flange, down against center bearing spacer. Place reaction ring (inner), without flange, inside of the outer reaction ring, with flange, and install upper reaction pressure plate over both reaction rings and over cylinder head ferrule and "O" ring making sure reaction rings enter circular groove in jacket support. *CAUTION - Form a .0015" feeler into a coil and insert with jacket support to protect seal lip when installing over worm-shaft serrations.* Align parts on power train so that valve lever hole in center bearing spacer assembly is 90° counterclockwise from piston rack teeth and lock all parts in worm shaft by entering a drill rod or suitable drift through jacket support holes and groove in worm shaft. Complete reassembly of steering gear as outlined in 1958 Annual Data or later Manual edition.

Cross Shaft Adjustment (On B nch): With hydraulic power to unit and with gear shaft on center plus or minus 2°, readjust gear shaft backlash. This will require loosening the adjusting screw until backlash is evident. Retighten adjusting screw until backlash just disappears, then continue to tighten for 3/8 or 1/2 turn from this position and tighten locknut to 50 ft. lbs. to maintain this setting. Starting from a point at least one full turn either side of center, the torque at gear shaft required to turn unit through center at 2 RPM in each direction shall not exceed 20 ft. lbs. or vary more than 5 ft. lbs. from left to right. Position steering valve to obtain equal torque and tighten valve body attaching screws to 15 ft. lbs. With unit at or near full turn in either direction, attempt to return the unit to center by applying a torque wrench at steering gear cross shaft. Hold worm shaft until cross shaft torque builds up to 50 ft. lbs. Release worm shaft and maintain a constant steady pull on cross shaft (turning cross shaft slowly). If cross shaft torque does not drop to 25 ft. lbs. maximum as the piston passes through center, check for too much interior drag; binding valve lever, binding valve spool, or cross shaft adjustment is too tight. With unit under power, but with no load, the torque required to rotate the worm shaft through an inclined angle of 180° (90° either side of center) shall be 6-9 inch lbs. Disconnect test equipment and mounting fixture and install unit in car.

POWER STEERING PUMP: *See "Chrysler, D Soto, Dodg , Plymouth, Valiant Slipper Typ Pump" in 1960 Final Data or lat r Manual dition.*

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING

Lincoln Continental (1961)
Thund rbird (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 LINCOLN CONTINENTAL NOISE IN POWER STEERING CORRECTIONS:* **1)** If caused by upper part of flexible coupling loose on steering shaft, loosen setscrew and pry **slightly** up on upper part of coupling and tighten setscrew to 18—22 ft. lbs. *CAUTION – Do not put exc ssiv pr load on steering shaft upper bearing and on fl xible part of coupling.*

2) Reduce sector adjusting screw—to—sector clearance to minimum. Adjust worm bearing preload to high limit of specification, and adjust sector mesh load to 7—10 inch—lbs. greater than worm bearing preload reading. Adjust valve spool centering. Check that power piston backlash does not exceed .0015".

DESCRIPTION: Piston type hydraulic assist power unit having a torsion bar operated control valve combined with a ball nut and worm steering gear enclosed in a single housing. Hydraulic fluid under pressure is supplied to steering gear by a positive displacement type pump. Design and operation are similar to that used on previous models.

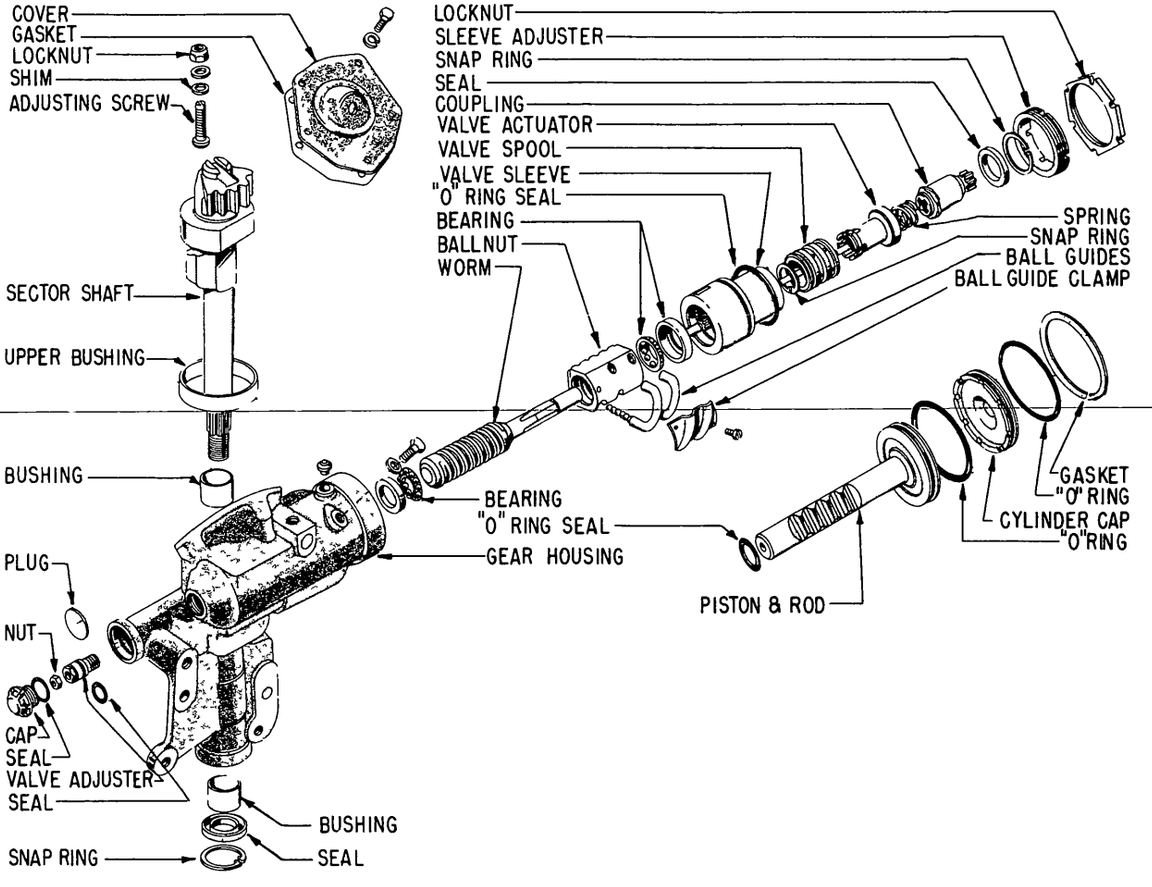
PUMP BELT ADJUSTMENT: Lincoln Continental – No adjustment. Pump is mounted on engine front cover and driven by engine crankshaft.

Thund rbird – Adjust pump mounting bracket so pulley slips against belt friction at 19—22 ft. lbs. torque. On new belt, operate engine for 15—30 minutes and recheck tension.

LUBRICATION: Check fluid level in reservoir every 4000 miles (Thunderbird), 6000 miles (Lincoln Continental). Fluid should be at "F" mark on dipstick. Use only Automatic Transmission Fluid Type "A", Suffix "A", or Ford Lubricant C1AZ—19582—A.

BLEEDING SYSTEM: If air is in system due to low oil level in pump reservoir, or to disassembly of gear, fill pump reservoir to proper level, start engine, turn on windshield wipers on Lincoln Continental, and turn steering wheel through its entire travel three or four times to allow air to escape. Recheck fluid level and add fluid as required. *CAUTION – Do not hold wheels against th ir stops when bleeding system.*

HYDRAULIC PRESSURE TEST: Connect a pressure gauge with a hand shut—off valve in pressure line between pump and steering gear (pressure gauge must be between pump and shut—off valve). With shut—off valve on gauge fully open, allow steering fluid to come to operating temperature (cycle gear from stop to stop), then note gauge readings with wheels at full left and full right positions. Pressure should be 700—850 lbs. (Thunderbird), 1120—1250 lbs. (Lincoln Continental). If pressure less than minimum, close gauge valve and note reading. *CAUTION – Do not l av valv clos d for mor than 15 s conds.* If pressure still less than minimum, pump is faulty. If pressure increases, steering gear is at fault.



"TORSION BAR" POWER STEERING ASSEMBLY

ADJUSTMENTS (LINCOLN CONTINENTAL)

Worm Bearing Preload & Sector Mesh Adjustments: 1) Disconnect pitman arm from sector shaft and drain fluid from steering gear housing and from reservoir. *NOTE – Fluid in system will cause incorrect readings.* Remove steering wheel and horn ring. *NOTE – Correct readings cannot be obtained with steering wheel and horn ring installed as segment type horn ring causes assembly to be unbalanced.* Lock two nuts on steering shaft and attach an inch—pound torque wrench to upper nut. Turn shaft to either stop, back off ¼ turn, and measure torque required to keep shaft turning at a constant rate for one complete turn. This is worm bearing preload and should be 3—6 inch—lbs. To adjust, loosen worm bearing adjuster locknut and turn adjuster as necessary. *NOTE – Always make final adjustm nt in tight ning dir ction.*

2) Turn steering shaft so ball nut and sector are centered (approximately two turns from either stop), then note torque required to turn shaft through center position. Torque should be 7—10 inch—lbs. greater than for worm bearing preload (above). To adjust, loosen sector shaft adjusting screw locknut and turn adjusting screw as necessary.

Valve Spool Centering: 1) Place steering gear on a bench near fender and insert a 3/8" drive, 3" extension into flexible coupling and retain extension with setscrew. Remove adjuster cap and install a 7/16" midget socket and a 9/16" offset box end wrench on adjuster. Connect a pressure gauge between pressure line from pump and inlet port (upper hole) of steering gear. Disconnect return line from windshield wiper control valve lower connection and attach line to outlet port of steering gear. Make sure shut—off valve on gauge is fully open.

2) Start engine and bring gear housing to operating temperature (cycle from stop to stop), check and add fluid if necessary. Turn gear coupling to left turn position, attach an inch—pound torque wrench to extension in coupling, then turn torque wrench so pressure gauge reads 300 lbs. Note torque wrench reading. Repeat for right turn position. Torque reading for both posi-

CONTINUED ON NEXT PAGE

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING (Continued)

tions should be equal within 3 inch–lbs. To adjust, loosen adjuster locknut and turn adjuster in direction of low reading. For example, if reading low in left turn position, turn adjuster toward left turn position. *NOTE – Only slight movement of adjuster is necessary to change valve spool position.* Tighten locknut and recheck.

(THUNDERBIRD)

Valv Spool Centering: Install an inch–pound torque wrench on steering shaft (unnecessary to remove steering wheel), bring power steering fluid to normal operating temperature (cycle from stop to stop), and have engine idling. With front wheels straight ahead, measure torque necessary to make a right turn and a left turn. Difference in readings between turns should not be more than 3 inch–lbs. If difference more, remove adjuster cap, loosen locknut and turn adjuster in direction of low reading. For example, if reading low in left turn position, turn adjuster toward left turn position. Tighten locknut and recheck adjustment.

W rm Bearing Preload & Sector Mesh Adjustments: 1) Disconnect pitman arm from steering arm–to–idler arm rod. Loosen sector shaft adjusting screw locknut and back out sector shaft adjusting screw. With an inch–pound torque wrench on steering shaft (unnecessary to remove steering wheel), note torque required to rotate wheel **very slowly** through one complete turn from center position. This is worm bearing preload and should be 2–6 inch–lbs. To adjust, loosen bearing adjuster locknut and turn adjuster as necessary. Tighten locknut and recheck.
2) Center steering wheel and turn sector shaft adjusting screw in until 6–14 inch–lbs. torque is required to turn steering wheel through center position. Turn wheel slowly, no backlash allowed at 30° on either side of center. *NOTE – When adjusting, always turn adjusting screw in one direction to reach adjustment. If screw turned too far, back out one full turn and readjust.*

TROUBLE SHOOTING

S "Edsel & Lincoln (Torsion Bar) Power Steering" in 1958 Final Data or later Manual editions.

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

Linc ln Continental: To remove cap from steering wheel hub, press down on cap and turn counterclockwise. Remove steering shaft nut, attach a suitable puller to steering wheel, and remove wheel and horn ring assembly. To install, align mark on wheel hub with mark on shaft. Install wheel and horn ring and torque steering shaft nut to 25–35 ft. lbs. Stake the nut.

Thund rbird: Unsnap hub cap from horn ring, remove steering wheel nut, and pull steering wheel and horn ring with a suitable puller. To install, reverse removal procedure, torque not to 25–35 ft. lbs., and stake the nut.

STEERING GEAR REMOVAL & INSTALLATION

Lincoln Continental: Disconnect hoses from steering gear and tie hoses higher than reservoir. Raise car and remove transmission linkage splash shield. Remove left exhaust manifold–to–resonator pipe. Remove pitman arm from sector shaft. Remove transmission linkage rods from equalizer shaft and force shaft outward. Loosen setscrew locking flexible coupling to steering shaft. Remove steering gear attaching bolts and remove steering gear. To install, reverse removal procedure and make sure sector shaft is centered in gear. Torque steering gear attaching bolts to 35–50 ft. lbs., and pitman arm attaching nut to 100–130 ft. lbs.

Thunderbird: Fixed Steering Column – Disconnect fluid lines from steering gear, plug gear openings and cap lines. Drive out tapered pin holding flexible joint flange to steering shaft. Disconnect pitman arm from sector shaft. Remove steering gear housing mounting bolts and remove housing. To install, reverse removal procedure. Torque gear mounting bolts to 28–43 ft. lbs., and pitman arm attaching bolt to 110–150 ft. lbs.

Moveable Column – Disconnect fluid lines from steering gear, plug gear openings and cap lines. Remove pivot bracket clamp bolts, bracket upper mounting nut and flat washer, then remove pivot bracket. Remove cotter pin and steering shaft retainer pin. Disconnect pitman arm from sector shaft. Remove steering gear housing mounting bolts and remove housing. To install, reverse removal procedure. Torque gear mounting bolts to 28–43 ft. lbs., pitman arm attaching bolt to 110–150 ft. lbs., pivot bracket clamp bolts to 19–23 ft. lbs., and pivot bracket stud nut to 9–12 ft. lbs.

OVERHAUL

See "Edsel & Lincoln (Torsion Bar) Power Steering" in 1958 Final Data or later Manual editions and note the following:
1) When installing torsion bar sleeve bearing in sleeve, bearing must be pressed in so there is .095–.105" clearance between upper surface of bearing and seal seat surface of sleeve.
2) During and after reassembly, check worm bearing preload and sector mesh adjustments, and valve spool centering according to "Adjustments" above.

HYDRAULIC PUMP

Lincoln Continental: *See "Eaton Roller (Crankshaft Mounted) Type Pump" in 1960 Final Data or later Manual edition and note the following:*
Pump Pressure – 1120–1250 lbs.
Bleeding System – Turn on windshield wipers in addition to the procedure listed.
Thund rbird: *S e "Eaton Roll r Typ Pump" in 1958 Final Data or lat r Manual editions.*

THUNDERBIRD MOVABLE STEERING GEAR

DESCRIPTION: Consists of a lateral movement mechanism at instrument panel with a flexible steering shaft coupled to steering gear torsion bar. Steering column tube lower end pivots on a bracket fastened to steering gear housing.

OPERATION: With steering column in straight ahead position and transmission selector lever in any position other than "P", column is locked to brake pedal support assembly by a pawl–type lever controlled by selector tube. Two coil springs assist pressure from selector tube and provide positive engagement of pawl in lock plate. When selector lever moved to "P" position, latch type bracket fastened to selector tube disengages pawl from locking plate. Steering column assembly can now be moved about 10" to right. When column is moved over, transmission cannot be shifted. When column moved back to straight ahead position, pawl engages locking plate. Transmission can now be shifted.

ADJUSTMENTS: Track–To–Column Bracket – Track notched edge must be centered under bracket notch for full distance of track travel. To adjust, loosen track–to–pedal support bolts.

Slide Tension: Adjust friction between track and steering column bracket by loosening or tightening nuts on cam type friction adjustment bolts. *Both bolts must b adjusted equally.*

Lock Plate: Adjust engagement of lock pawl in lock plate, by loosening lock plate mountings and adjust cam bolt and screws so lock pin clears bottom of lock plate by no more than 1/32" for the full travel. Pawl must be fully engaged in lock plate when column is locked.

Stops: With selector lever out of "P" position and nylon button of detent spring in its track center notch, position stop bracket against bumper. Pawl pin must engage fully and also clear corner of notch as pin enters or leaves. There should be no lateral movement of column as pawl pin engages or disengages. *NOTE – On air conditioned cars, spring projects to left of its attaching bolt and left notch in track is us d. If right shroud hits air conditioning unit, adjust right stop as necessary.*

TROUBLE SHOOTING: Binding, R ugh, r Rasping Column Movement: Track–to–column bracket misaligned; Lock plate rubbing pawl; Shroud interferes with instrument panel.

Hard Column Movement: Slide tension out of adjustment; Track–to–column bracket misaligned; Lock plate rubbing pawl.

Transmission Shift Into Reverse With C lumn At Extr m Right: Lock plate out of adjustment.

Poor Shift Into or Out of Park: Left stop out of adjustment; Lock pawl arm binding in pivot bushing.

Lateral Looseness In Column Wh n L ck d: Lock pawl arm loose in pivot bushing; Pivot bracket loose at steering gear.

Vertical Looseness In Column Wh n L ck d: Loose track or braces; Pivot bracket loose at steering gear; Slide tension out of adjustment.

Right Shr ud Hits Air C nditi ning Unit: Right stop bolt on track out of adjustment.

SAGINAW ROTARY VALVE POWER STEERING

Buick (1961)
Buick Special (1961)
Cadillac (1961)
Chevrolet Truck (1961)
Oldsmobile (1961)
Oldsmobile F-85 (1961)
Pontiac (Exc. Tempest) (1961)

►CHANGES & CORRECTIONS

►*1961 BUICK (EXC. SPECIAL) POWER STEERING GEAR PRODUCTION CHANGE:* A new snap ring, Part No. 5689364 and a new end plug, Part No. 5689363 is used in later production power steering gears to reduce stress on steering linkage by reducing rack-piston travel. The new snap ring is installed into upper end of housing and decreases piston travel in that direction. It is recommended that these two parts be installed on early type units when piston is removed. Later units identified by letter "S" stamped in center of end plug have the parts installed in production. To install snap ring in early units, compress ring and start in piston bore, then tap into place in upper end of housing. *DO NOT remove snap ring from gear housing when servicing steering gear.*

►*1961 CADILLAC STEERING GEAR BINDING OR POOR RETURN CORRECTION:* This condition may be caused by inner and outer tie rod ball pivots not being centered in their respective housings. Check tie rod by grasping center of rod and rotate it fore and aft. The movement should be equal in both directions. If not, pivot studs are not properly positioned.

DESCRIPTION: All Models Except Chevrolet Truck – Similar to design used on previous models with the following features.

Coupling Flange Assembly (Exc. Oldsmobile) - Coupling flange assembly is positioned on the stub shaft by a new method that eliminates necessity of scribing marks on these two parts during removal.

Adjuster Plug Assembly - Stub shaft seal back-up washer has been replaced by a combination washer and dust seal.

Rack-Piston Nut - A back-up "O" ring seal is used in addition to piston ring in rack-piston nut assembly.

Chevrolet Truck: The control valve assembly of this linkage type power steering unit is located directly on the steering gear and is similar to the control valve assembly used on cars with "integral" type power steering. Service procedures are different. For steering gear overhaul procedures, see *"Saginaw Ball Bearing Worm & Nut".*

HYDRAULIC PUMP BELT ADJUSTMENT: *See 1959 Annual Data, Page 379, or later Manual edition and note the following:*

Buick Special – Loosen power steering pump mounting bolts and rotate pump assembly to tighten belt until torque required to slip pulley on belt with a torque wrench applied to pulley nut is 40–45 ft. lbs.

Cadillac – Place a variable reading strand type gauge on drive belt midway between pulleys. Proper belt tension is 45–60 lbs. (used belt); 90 lbs. (new belt). To adjust, loosen bolts securing pump to mounting bracket, then move pump outward by hand to obtain correct gauge reading. *CAUTION – Do not use a pry bar to move pump. Tighten pump mounting bolts to 25–30 ft. lbs.*

Oldsmobile (All Models) – Position Gauge 33–70 on pump belt, then loosen pump attaching bolts and adjust belt tension by moving pump away from engine until pointer on gauge indexes with groove in gauge plunger. Tighten attaching bolts to 20–28 ft. lbs. and recheck adjustment.

Pontiac – Loosen pump mounting bolts, then move pump until belt has ¼" deflection with a 5–6 lbs. load applied midway between fan and steering pump pulleys, or a 70–75 lb. load as indicated on a Burroughs gauge. Tighten mounting bolts to 25–35 ft. lbs.

LUBRICATION: Check fluid level in power steering pump reservoir every 1000 miles (Buick & Chevrolet Truck), 2000 miles (all others) with steering gear and fluid at normal operating temperature. If necessary, add automatic transmission fluid to bring level to mark on reservoir filler neck. If steering gear and fluid are cold, bring fluid level to lower end of filler neck. *NOTE - On Chevrolet Trucks, check lubricant level in gear box and add "Multi-Purpose" lubricant as necessary.*

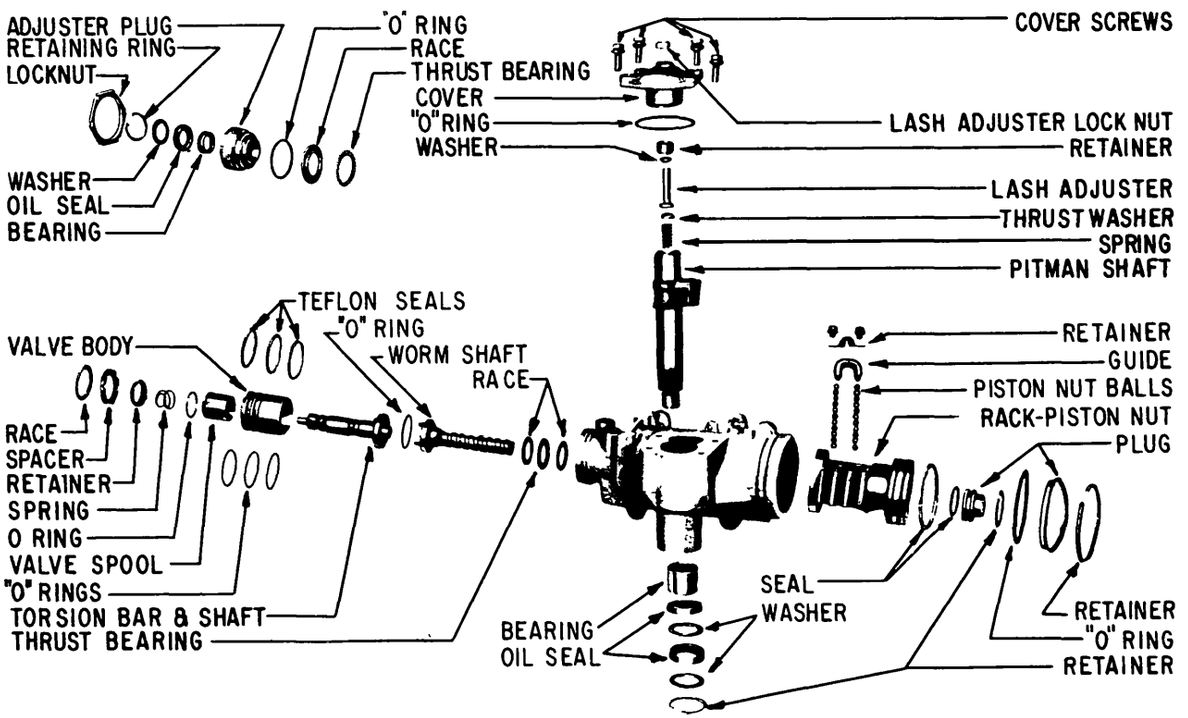
CHECKING & ADJUSTMENT (ON CAR): Disconnect pitman arm at intermediate arm or drag link (Buick Special, Cadillac, Oldsmobile F-85 & Pontiac). Remove pitman arm from shaft (Buick, Exc. Special & Oldsmobile, Exc. F-85), then proceed as follows:

Buick & Buick Special: Remove horn emblem from steering wheel hub, then turn steering wheel to extreme right or left position and attach a 0–25 inch pound torque wrench to wheel retaining nut and check torque required to turn wheel steadily for 1/8 turn from extreme position (this is where lash exists). Reading on torque wrench should be 1–11 inch pounds. Turn steering wheel ½–¾ turn off "high point" center position and check torque required to turn wheel. The reading should be 1–5 inch pounds (Exc. Buick Special); 2–5 inch pounds (Buick Special) higher than reading taken at extreme right or left position. Check torque required to turn gear through gear "high point". This reading should be 4–8 inch pounds higher than reading taken at ½–¾ turn off "high point". To adjust for proper overcenter torque, loosen lash adjuster locknut and use an Allen wrench to turn lash adjuster.

►*BUICK & BUICK SPECIAL ADJUSTMENT NOTE: Thrust bearing preload and ball nut preload can only be adjusted with steering gear out of car.*

Cadillac: Attach Distributor Point Checking Scale at rim of steering wheel so scale can be pulled at right angle to wheel, then adjust pitman shaft adjuster screw until pull "through center" on steering wheel is 12–16 ounces greater than pull at ½-turn "off center". To check rack piston and nut preload, use scale as for above check and measure pull on steering wheel through an arc not exceeding 1" with gear ½-turn "off center". The reading should be 2–8 ounces in excess of the 2 turns "off center" pull. *NOTE – If "off center" pull is not within specifications, gear*

CONTINUED ON NEXT PAGE



SAGINAW (ROTARY VALVE) POWER STEERING GEAR ASSEMBLY

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

must b r moved fr m car t check rack piston and nut preload and ball nut–to–worm shaft fit. To check thrust bearing preload, turn steering wheel 2 complete turns "off center" and measure the pull on steering wheel through an arc not exceeding 1". The reading should be between 8 and 15 ounces. If not within specifications, loosen adjuster plug locknut and back off adjuster nut 1/8 turn, using spanner wrench J-7624. *NOTE – If position of holes in adjuster plug is such that there is insufficient clearance to install spanner, install a ¾" long No. 10 bolt, in one of the adjuster plug holes and rotate flexible coupling until lower flange contacts bolt, then back out adjuster plug 1/8 turn.* Measure steering wheel pull at 2 turns "off center" to determine total drag of gear, then adjust preload by tightening adjuster plug to obtain 4–6 ounces in excess of total drag. Tighten adjuster plug and recheck preload.

Chevrolet Truck: There are no "On Car" adjustments.

Oldsmobile & Oldsmobile F–85: *NOTE – The over–center adjustment is the only power steering gear adjustment which can be made on the car; however, in order to make this adjustment, it is also necessary to check combined ball and thrust bearing preload.* On Oldsmobile, remove pitman arm from pitman shaft. On Oldsmobile F–85, disconnect pitman arm from relay rod. Loosen pitman shaft adjusting screw locknut and thread adjusting screw out to limit of its travel. Disconnect horn wire at relay, then remove horn button or ornament from steering wheel. Turn steering wheel through its full travel, then locate wheel at its center of travel. Check combined ball and thrust bearing preload with an inch pound torque wrench on steering wheel nut by rotating through center of travel (approximately ¼–turn in each direction) and note the highest reading. Tighten pitman shaft adjusting screw until torque wrench reads 4–8 inch pounds (Oldsmobile), 3–6 inch pounds (Oldsmobile F–85), higher than previous reading. *NOTE – Total preload must not exceed 16 inch pounds (Oldsmobile); 14 inch pounds (Oldsmobile F–85).* Tighten locknut and recheck. Install horn button, horn wire, and reconnect pitman arm.

P ntiac: Remove horn button or ring and install an inch pound torque wrench on steering wheel nut. *NOTE – When taking torque readings, take reading when pulling torque wrench to left and to right, then total both readings and average them out.* To check adjuster plug preload, turn steering wheel one full turn off center "high point" and check torque required to turn wheel. This should not exceed 10 inch pounds. *NOTE – If reading is below 3 inch pounds, there may be some lash in thrust bearing.* To adjust (with unit in car), loosen plug locknut using a drift punch, then move flexible coupling as necessary to install Tool J-7624 (spanner wrench) on plug. Tighten plug as necessary to obtain a bearing preload of 3–5 inch pounds, then tighten adjuster plug locknut. *NOTE – Bearing preload must be measured with spanner removed and locknut tightened.* To check worm preload, turn steering wheel one–half turn off center "high point". This reading should be 0.5–5.0 inch pounds higher than previous reading. *NOTE – Worm pr l ad is controlled by fit f rack–piston balls.* To adjust pitman shaft lash, take reading while turning wheel through center "high point". This reading should be 4–8 inch pounds higher than worm preload reading. If not within specifications, loosen pitman shaft adjuster nut and adjust lash with a 7/32" Allen wrench. Tighten locknut to 25–35 ft. lbs. Reassemble steering wheel and connect pitman arm.

STEERING WHEEL & HORN BUTTON: *See "Saginaw Ball Bearing Worm & Nut" (Manual Type Steering Gear) in this section,* and note the following:

Cadillac: Removal (Horn Button) – Pry cap off steering wheel hub, then remove two screws from underside of wheel rim (one at outer end of each spoke). Remove two Allen head screws retaining hub to steering wheel and remove hub and upper half of spoke with horn bars. Horn switches may be removed from lower section of spoke by removing one screw retaining each switch in spoke.

Installation (Horn Button) – Install horn switch in each spoke and retain with screw. Arrange horn wires so they will not become pinched between upper and lower halves of spoke, and install hub with horn bars. Secure in place with Allen screws. Install a screw in outer end of each spoke on underside of wheel, then install cap over hub.

Removal (Steering Wheel) – Pry cap off steering wheel hub, then disconnect horn wire from steering shaft. Remove upper steering shaft nut and remove two screws securing hub to steering wheel. Scribe an alignment mark on hub and on end of steering shaft for use at reassembly. Install a suitable puller or use puller J–1859–02 to remove wheel from shaft.

Installation: Reverse removal procedure and tighten shaft nut to 45–50 ft. lbs. *NOTE – Make sure marks made at removal are properly lined up when wheel is installed.*

TROUBLE SHOOTING: *See 1959 Annual Data, Page 379, or later Manual edition.*

REMOVAL & INSTALLATION: Buick (Exc. Special) – Removal – Disconnect pressure and return lines at steering gear and elevate ends higher than pump. Disconnect two upper–to–lower flange bolts, then raise car and remove pitman arm with Puller J–5504. *NOTE – On Dual exhaust cars, disconnect left front exhaust pipe at manifold.*

Installation: Reverse removal procedure and note the following: Tighten flange bolts to 15–20 ft. lbs. Tighten pitman arm nut to 90–110 ft. lbs. and gear housing to frame bolts to 60–75 ft. lbs. When installing steering gear, riveted pins on lower flange and flexible coupling must be installed in center of their correct slots in upper flange (small pin in small slot and large pin in large slot). Clip on loose end of horn wire (ground) must be installed on flange bolt between flexible coupling and upper flange.

Buick Special: Removal – *NOTE – Pitman arm cannot be removed or installed with steering gear installed on crossmember. If pitman arm is to be removed from gear, loosen pitman arm nut before disconnecting gear from crossmember. When installing gear, do not tighten pitman nut until after steering gear is installed on crossmember.* Remove lower coupling clamp bolt, then loosen clamp retaining mast jacket to toe pan cover and "U" bolt retaining jacket to instrument panel. Pull mast jacket assembly up far enough so lower coupling can be removed from worm shaft. Raise car and disconnect pitman arm from intermediate rod, then loosen pitman arm nut with tool, J–8987. Remove steering gear–to–crossmember attaching bolts and remove gear assembly. *NOTE – Do not r mov pitman arm from shaft unless pitman shaft ass mbly or s al is to be replaced.*

Installation: Reverse removal procedure and note the following: Tighten gear–to–crossmember attaching bolts to 55 ft. lbs. and pitman arm nut to 95 ft. lbs. Make sure that tang of mast jacket saddle engages slot in jacket and that steering shaft is centered in end of jacket assembly. Align coupling and clamp with groove on worm shaft and install clamp bolt and nut.

Cadillac: Removal – Syphon fluid from reservoir, then disconnect hoses at rear of pump. Raise front of car and support on jack stands near outer ends of lower control arms. Disconnect pitman arm from shaft using puller, J–9172, then remove screw holding flexible coupling to upper steering shaft. Remove screws holding gear to frame side rail and remove gear.

Installation– Reverse removal procedure and note the following: Tighten gear–to–frame attaching bolts to 40–45 ft. lbs. and upper steering shaft retaining screw to 25–30 ft. lbs. Tighten pitman arm nut to 100–125 ft. lbs. *CAUTION – Make sur that upp r steering shaft and steering gear are properly aligned.*

Chevrolet Truck: Removal – Disconnect steering shaft from lower coupling, then remove hoses from valve. Remove pitman arm nut, lockwasher and pitman arm. Remove mounting bolts and steering gear.

Installation – Reverse removal procedure.

Oldsmobile (Exc. F–85): Rem val – Scribe alignment marks on steering shaft flange and coupling flange, remove coupling flange attaching nuts and ground wire from attaching bolts. Disconnect hoses from pump, then raise car on a hoist. Remove pitman arm from shaft using puller J–5504, then remove gear to frame attaching bolts and remove gear.

Installation – Reverse removal procedure and note the following: Apply a soap fine fibre grease to gear mounting pads. Make sure alignment pin on gear housing enters proper hole in frame side rail, and that gear is properly aligned with steering shaft. Tighten gear–to–frame bolts to 60–80 ft. lbs. and pitman shaft nut to 90–120 ft. lbs.

Oldsmobile F–85: Removal – Remove coupling flange attaching nuts and ground wire, then disconnect hose from power steering pump. Remove steering shaft coupling clamp bolt and slide clamp off coupling housing onto steering gear worm shaft. Mark steering shaft in line with slot at coupling clamp surface. Disconnect horn wire from harness and horn shroud from center of steering wheel. Remove steering wheel (see above), then pull horn contact plate up out of recess in actuator assembly for necessary clearance to allow removal of upper bearing–to–actuator assembly retainer clip. Use a small screwdriver and pry upper bearing-to-actuator assembly retaining clip out of actuator housing. Pull steering shaft up out of steering column and block shaft up approximately 2". Raise car and remove pitman arm from relay rod. Disconnect steering gear from crossmember and remove from car.

CONTINUED ON NEXT PAGE

SAGINAW ROTARY VALVE POWER STEERING (Cont.)

Installation – Reverse removal procedure and note the following: Tighten pitman nut to 150–180 ft. lbs. and steering gear–to–crossmember bolts to 45–60 ft. lbs.

Pontiac: Removal – Disconnect pressure and return hoses from housing, then disconnect pitman arm from shaft using puller J–5504. Scribe mark on steering shaft worm and worm shaft flange and disconnect gear lower flange from steering shaft. Remove gear housing–to–frame bolts noting number and location of frame shims (if any), and remove steering gear.

Installation – Reverse removal procedure and note the following: Locate any shims that were removed in their original position between housing and frame. Tighten housing–to–frame bolts to 80–90 ft. lbs., pitman arm nut to 100–125 ft. lbs. and flange attaching nuts to 10–20 ft. lbs.

OVERHAUL: *See "Saginaw Rotary Valve Power Steering" in 1959 Annual Data and note the following:*

Adapter Plug: Removal - On Oldsmobile and Chevrolet Trucks, scribe marks on stub shaft and coupling flange to make sure they are assembled in same position. *NOTE - This is not necessary on other models.* On Oldsmobile and Chevrolet Truck, remove stub shaft to flange retaining screw and remove flange assembly. On other models, remove lower flange pinch bolt and remove flange from shaft. Loosen and remove adjuster plug locknut and remove adjuster plug with Tool J-7624.

Disassembly - Remove thrust bearing retainer with a screwdriver, being careful not to score needle bearing bore. Discard retainer. Remove thrust bearing spacer, thrust bearing, and thrust bearing races. Remove adjuster plug "O" ring and discard, then remove stub shaft seal retaining snap ring. On Chevrolet Truck, remove seal back-up washer. On other cars, remove and discard dust shield. On all models, remove stub shaft seal by prying out with a screwdriver and discard. Inspect needle bearing in adjuster plug, and if rollers are broken or pitted, remove needle bearing from adjuster plug by pressing from thrust bearing end using Bearing & Seal Remover, Tool J-6221 (Buick & Cadillac), J-5254 (Oldsmobile), J-5188 (Pontiac), J-8524-2 & J-7079-2 (Chevrolet Truck), Discard the bearing.

Inspection - Inspect thrust bearing spacer for cracks, then inspect thrust bearing rollers for wear, pitting, scoring or cracking. If any of these conditions are found, replace both thrust bearing races and check thrust bearing spacer. Inspect thrust bearing races for wear, pitting, scoring, cracking, or brinelling. Replace if necessary. Check thrust bearing and thrust bearing spacer.

Reassembly - Install needle bearing by pressing from thrust end of adjuster plug against identification end of bearing using the same tool used for removal. *NOTE - End of bearing must be flush with bottom surface of stub shaft seal bore.* Lubricate stub shaft seal with automatic transmission fluid, then, on Chevrolet Trucks, install seal and back-up washer. On other models, install seal with spring in seal toward adjuster plug. *NOTE - Use Tool J-8524-1 (Chev. Truck), J-5188 (Buick, Cadillac, Pontiac), J-5254 (Oldsmobile) to install seal far enough in plug to provide clearance for retaining ring (Chev. Truck), dust seal and retaining ring (Other Models).* On Chev. Truck, install retaining ring. On other models, install dust shield with lip up in plug, then install retaining ring. Lubricate "O" ring seal with petroleum jelly and install on adjuster plug. Assemble large diameter thrust bearing race, thrust bearing, small thrust bearing race, and thrust bearing spacer on adjusting plug. Press bearing retainer into needle bearing bore with a brass or wooden dowel. *NOTE - Radial position of dimples is not important.*

Installation - Install adjuster plug in end of housing just enough to make certain that all parts are properly seated in gear housing. Back adjuster plug off 1/8 turn and measure valve assembly drag, using a torque wrench. Use a spanner wrench and adjust thrust bearings so that preload of 1–3 inch–pounds in excess of valve assembly drag is obtained. Total thrust bearing preload and valve drag should not exceed 8 inch–pounds (Cadillac, Oldsmobile & Chevrolet Truck); 11 inch–pounds (Buick & Buick Special); 10 inch–pounds (Pontiac). Hold adjuster plug in position and install and tighten locknut. Install coupling shaft assembly on stub shaft (align marks made at disassembly on Oldsmobile & Chevrolet Truck). On all models except Oldsmobile & Chevrolet Truck, align groove in lower flange with pin extending from stub shaft and install flange. On Oldsmobile and Chevrolet Truck, install coupling flange bolt and tighten to 20–25 ft. lbs. On other models, install lower flange pinch bolt and tighten to 30 ft. lbs.

►*VALVE ASSEMBLY NOTE (CHEVROLET TRUCKS):* Overhaul procedures are the same as for other models with power steering except that free length of valve spool spring is 760-.790".

Control Valve Housing Removal & Steering Gear Overhaul (Chevrolet Trucks): *See "Saginaw Ball Bearing Worm & Nut" manual steering gear in this section.*

HYDRAULIC PUMP: All Models – *See "Saginaw Vane Type (Integral Reservoir)" in this section.*

POWER CYLINDER

CHEVROLET TRUCK

POWER CYLINDER: Disassembly - *NOTE - The only repair to make in the field on the power cylinder is to replace piston rod seals.* Before removing piston rod seal parts from rod end of power cylinder, clean the exposed portion of seal cavity with clean solvent, brush and compressed air. Remove snap ring. To dislodge scraper, washer, dust seal, seal back-up washer and "U" cup seal, use air hose and apply pressure to cylinder port (right hand port looking down), and seal the left hand port. Remove seal parts from rod.

Cleaning & Inspection: Clean all parts in solvent and dry with compressed air. *CAUTION - Do not use wast to wipe off spool or inside bore of valve housing.* Protect spool edges and bore of valve housing from damage during disassembly and reassembly. Inspect parts for nicks and burrs and excessive wear. Check cylinder scraper washer for fit on piston rod, which should be .001-.0035". Replace if worn.

Reassembly: Assemble open side of "U" cup seal over the rod and into bearing cavity, seal back-up washer, dust seal (with open side away from seal cavity), and scraper washer. Slide parts in place on rod and lock in place with snap ring.

1961 POWER STEERING PUMPS

SAGINAW VANE TYPE (INTEGRAL RESERVOIR)

Buick & Buick Special (1961)
Cadillac (1961)
Chevrolet Pass. Cars (1961)
Chevrolet Trucks (1961)
Oldsmobile & Oldsmobile F–85 (1961)
Pontiac & Pontiac Tempest (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 BUICK SPECIAL POWER STEERING PUMP PRODUCTION CHANGE & PARTS NON–INTERCHANGEABILITY CAUTION:* Early type pumps have oil return line attached to reservoir filler neck. Later type pumps have return line attached to rear of reservoir. Endplate, pressure plate, and dowel pins are different for each type pump and must not be interchanged between pumps. If early type reservoir is to be replaced, complete Kit, Part No. 5689717, must be installed. *NOTE – Kit converts early type pump to later type. Installation of late type reservoir only on early type pump will cause pump failure.*

►*1961 PONTIAC TEMPEST POWER STEERING NOISE CORRECTION (EARLY CARS):* If noise occurs with wheels against their stops, trouble may be in pump flow control valve. To correct, replace valve.

DESCRIPTION: Vane type pump with integral reservoir and pressure regulator valve. On some pumps, oil return line is in reservoir filler neck. On others, return line is at rear of reservoir. An oil filter for returned fluid is incorporated on some models. Pump is mounted at front of engine and is belt driven by engine crankshaft.

LUBRICATION: Checking Fluid Level – With steering system at normal operating temperature, maintain fluid level at indicated height on reservoir or dipstick. Use only Automatic Transmission Fluid Type "A", Suffix "A".

Bleeding Hydraulic System: Fill reservoir to proper level and let oil remain undisturbed for at least two minutes. Start engine and run at idle speed for a very short time and add necessary oil to maintain fluid at proper level. Raise front wheels off floor, increase engine speed to approximately 1500 RPM and turn wheels full right and left, contacting stops **lightly.** Lower car and turn wheels right and left on the floor. Check oil level and refill as necessary Continue this process as long as necessary to bleed all air from system.

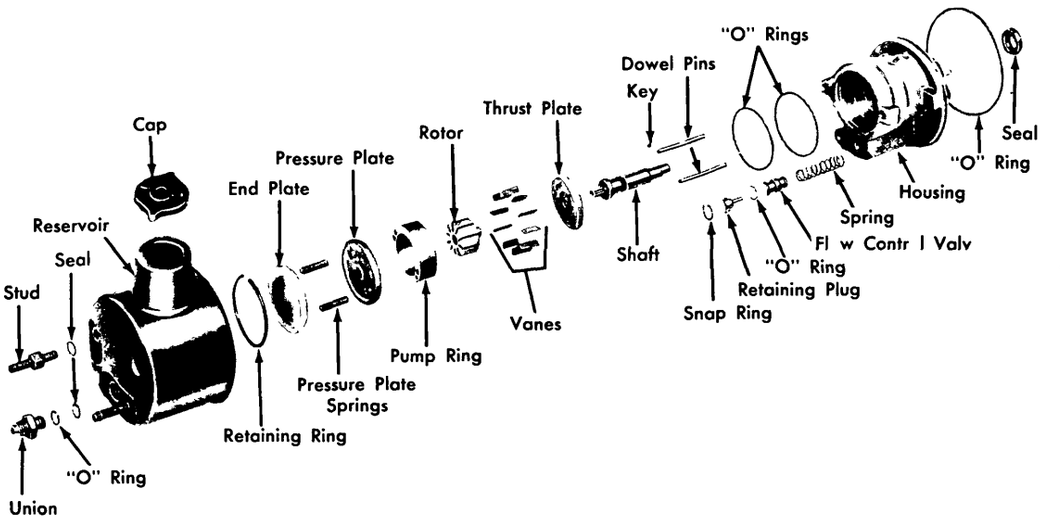
REMOVAL & INSTALLATION: Remove pulley nut, belt, and pulley. Disconnect and cover hoses. Remove pump-to-bracket attaching bolts, then remove pump. *NOTE– On some cars it may be necessary to remove pump rear bracket with pump; or bracket attaching bolts must be loosened for pump removal. Do not loosen bracket attaching bolts too much as they extend into engine water jacket.* To install, reverse removal procedure.

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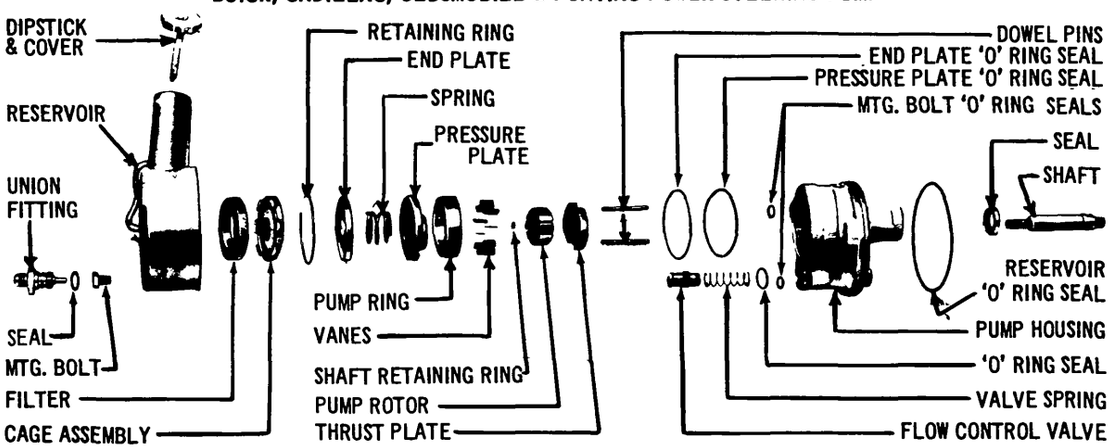
SAGINAW VANE TYPE
(INTEGRAL RESERVOIR) (C nt.)

DISASSEMBLY: *CAUTION – When clamping pump in vise, be careful not to exert excessive force on front hub of pump as bushing may be distorted.* Remove union and seal, then remove pump rear mounting bolts. Remove reservoir from housing by turning reservoir counterclockwise or by rocking housing back and forth until reservoir can be lifted freely from housing. Remove filter and filter cage if equipped. Remove endplate retaining ring (depress ring using 1/8" diameter hole in pump housing, then pry out). Remove spring loaded endplate (rock slightly if stuck), then remove pressure plate spring or springs. Remove pump from vise and invert it, allowing flow control valve and spring to drop out. Remove endplate "O" ring, then with pump housing turned over, tap housing on a wooden block until pressure plate drops out. Remove pressure plate, pump rings and vanes, being careful not to drop these parts. Install housing in a vise and use a suitable tool to remove snap ring on end of drive shaft. Remove rotor and thrust plates, then remove shaft through front of housing.

REASSEMBLY: Clean all parts in clean solvent, except "O" ring seals and drive shaft seal. *NOTE – Install new "O" ring seals at all necessary points.* Insert shaft at hub end of housing (spline end entering mounting face side). Install thrust plate on dowel pins with ported face at rear of pump housing, then install rotor, which must be free on splines, on pump shaft over splined end. *NOTE – Assembly rotor with countersunk side toward shaft.* Use a suitable tool and install shaft retaining ring. Install pump ring on dowel pins with direction of rotation arrow to rear of pump housing (rotation is clockwise). Install vanes in rotor slots with radius edge towards outside, then lubricate outside diameter and chamfer of pressure plate with vaseline and install on dowel pins with ported face toward pump ring. Use a 2¾" diameter tube to apply pressure to outer edge only and seat pressure plate by pressure on sleeve (use an arbor press). *CAUTION – Do not press or hammer on center of pressure plate as this will cause permanent distortion.* On pumps with single pressure plate spring, install spring in center groove of pressure plate. On pumps with two pressure plate springs, install a spring over each of the two dowels. Install endplate "O" ring, then lubricate outside diameter and chamfer of endplate with vaseline and install in housing, using an arbor press. While pump is in arbor press, install endplate retaining ring, making sure it is properly seated in groove of housing. Install flow control spring and plunger. *NOTE – End of plunger with hex head screws goes into bore first.* Install filter cage and filter if equipped. Position reservoir so filler tube is 30° counterclockwise of normal position, then drop into place and rotate clockwise to normal position, pressing down until reservoir seats on housing. Install studs, stud seals, union, union seal, and drive shaft key. Support shaft on opposite side of key when installing key.



BUICK, CADILLAC, OLDSMOBILE & PONTIAC POWER STEERING PUMP



BUICK SPECIAL, CHEVROLET, OLDSMOBILE F-85 & PONTIAC TEMPEST POWER STEERING PUMP

PRESSURE TEST: Install pressure gauge J–5176 or equivalent between pump and pressure line at pump. *NOTE – Adapter J–5900 or J–7786 or equivalent may be necessary to install pressure gauge to pump.* With gauge valve open and engine at idle speed, turn wheels against stops a few times to bring power steering fluid to 150–170°F. With wheels against stops, pressure should not be less than specified in table below. If pressure less, slowly close valve and check for pressure increase. Pressure will increase if pump in good condition. If pressure does not increase with valve closed, pump is faulty. *CAUTION – Do not hold gauge valve closed more than 15 seconds.* After removing gauge, bleed hydraulic system (see above).

Pump Pressur Sp cificati ns

Car Model	①Pump Pr ssur
Buick (Except Special)	1000 lbs.
Buick Special	750 lbs.
Cadillac (Before Engine No. 040000)	1150–1250 lbs.
Cadillac (After Engine No. 040000)	1100–1200 lbs.
Chevrolet Pass. Cars	850 lbs.
Chevrolet Trucks	900 lbs.
Oldsmobile (Except F–85)	1100 lbs.
Oldsmobile F–85	800 lbs.
Pontiac (Except Tempest)	925 lbs.
Pontiac Tempest	775 lbs.

①–At engine idle speed and steering oil at 150–170°F.

BENDIX LINKAGE TYPE POWER STEERING

Ch cker (1961)
F rd Pass. Cars, Exc. Thunderbird (1961)
Mercury (1961)
Stud baker (1961)

►CHANGES & CORRECTIONS

►*1961 STUDEBAKER PARTS REPLACEMENT CAUTION:* Do not interchange control valve centering springs or control valves between Lark and Hawk models. Control valve springs and control valve used on Lark models are identified by yellow paint. On Hawk models they are identified by red paint.

►*1961 MERCURY "KNOCKING" NOISE IN STEERING GEAR CORRECTION:* This condition is caused by insufficient lubricant in power steering unit and may be due to a false fluid level indicated on dipstick. Make sure that any air trapped in system is bled out, then bring fluid level to proper mark on dipstick.

DESCRIPTION: Linkage type similar to previous models. Main control valves on Ford & Mercury have a "Reaction Limiting Valve" which limits amount of effort required to turn wheel when parking or making sharp turns at low speed.

ADJUSTMENT: Pump Drive Belt – *CAUTION – Do not pry or lift against r s rvoir to raise pump assembly.*

F rd (6 Cyl. Eng.): Loosen top pivot bolt on pump adjusting bracket and adjust bolt to obt ain ½" belt deflection.

F rd (292" V8 Eng.): Place a heavy duty "C" clamp on adjusting bracket, then loosen pump adjusting bracket pump support bolts, and pump–to–exhaust manifold so "C" clamp can be tightened. Tighten "C" clamp to obtain 25 ft. lbs. slip torque on belt (torque wrench applied to pump pulley nut). Tighten all bolts to 20–25 ft. lbs.

F rd (V8 Exc. 292" Eng.): Loosen bracket adjusting bolt and move pump until pulley slips against belt friction at 25 ft. lbs. Tighten all bolts to 20–25 ft. lbs.

M rcury (All M d ls): Loosen pump pivot and adjusting bolts, then install Tool BT–33–37F (Borroughs Belt Adjusting Gauge) and move pump as required to obtain a reading of 90–120 lbs. on gauge (used belt); 120–150 lbs. (new belt). *NOTE – A new belt is one that has b n us d l ss than 10 minutes.* Tighten bolts to 20–25 ft. lbs.

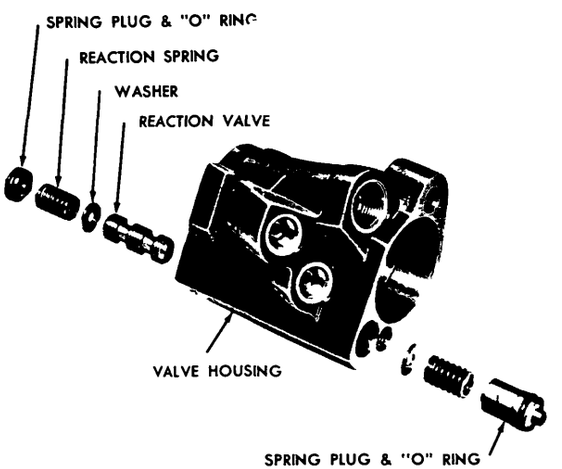
Studebaker: Belt deflection should be ¼–3/8" with 4 lbs. pull midway between pulleys. To adjust, loosen bracket mounting screws and shift pump body to secure proper belt tension.

LUBRICATION: Check fluid level every 4000 miles (Ford & Mercury), 5000 miles (Checker & Studebaker). Start engine and turn steering wheel right and left a few times, then shut off engine. Add Automatic Transmission Fluid to bring level up to following specifications:

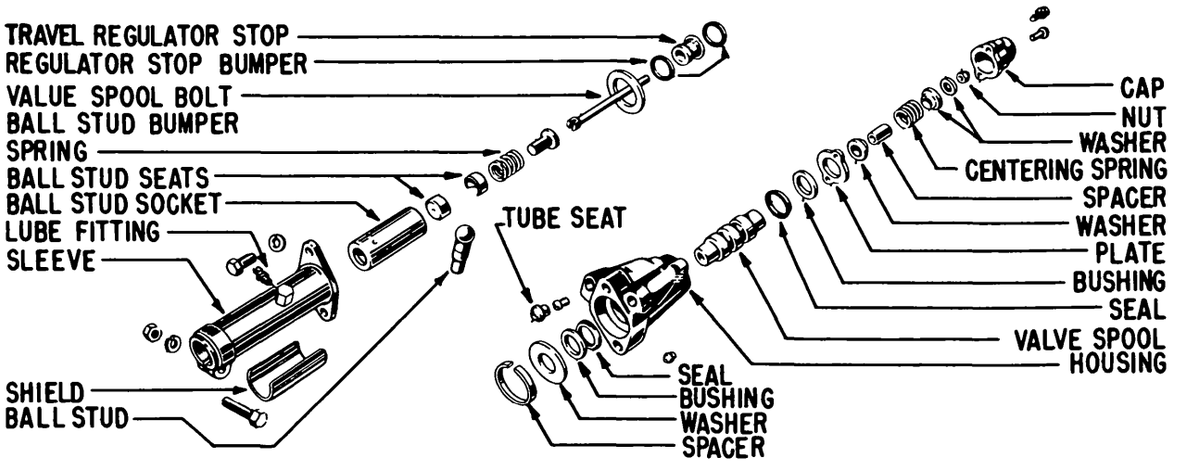
Check r – Bring level to within 1" of top.
Ford & M rcury – Bring level up to "F" mark on dipstick.
Stud baker – Level should be up to filler opening.

TESTING: Turning Eff rt – With wheels properly aligned and tire pressure correct, place car on dry concrete, set parking brake, then proceed as follows: With engine running at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to steering wheel rim and measure pull required to turn wheel at least one full turn in both directions. The pull should be about equal in both directions as follows: 12 lbs. max. (Ford & Mercury), 11 lbs. max. (Studebaker).

Pump Pressure: Install a suitable pressure gauge between pump hose and pump outlet with pressure gauge between pump and shutoff valve of pressure gauge. Run engine at idle speed (with shutoff valve open) for two minutes to normalize oil temperature. Turn wheels all the way to right and left, noting fluid pressure reading on gauge when wheels are against stop. *CAUTION – Do not hold wheel against stop for more than 30 seconds.* Fluid pressure with wheels against stop should be 950–1100 lbs. (Ford & Mercury); 850 lbs. (Studebaker); 700–900 lbs. (Checker). Close gauge valve and check pressure. If pressure is less than minimum, pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and steering gear does not function properly, trouble is in control valve or power cylinder.



REACTION LIMITING VALVE



EDSEL, FORD & MERCURY POWER STEERING CONTROL VALVE ASSEMBLY

OVERHAUL & TROUBLE SHOOTING: *See 1957 Annual Data, Page 364, or later Manual edition and note the following:*

Control Valve Removal (Studebaker): Disconnect hoses at pump body, pump reservoir, and power cylinder. Drain fluid from hoses, then remove hose retaining clips. Disconnect reach rod from steering bellcrank, then remove pitman arm from steering gear shaft with Puller J-5664. Remove control valve, reach rod, and hoses from car as an assembly. *NOTE - Before removing valve assembly from reach rod, clean assembly to remove dirt and grease from valve body, then loosen clamp on actuator sleeve and screw valve assembly off reach rod, counting the number of turns required to unscrew valve from reach rod. Record the number of turns for use at installation to maintain proper reach rod length.*

Valve Sleeve Mounting Bolt Tightening Torque: Tighten the two bolts to 15–20 ft. lbs. (Ford & Mercury), 140–170 inch pounds (Studebaker).

Control Valve Installation Measurement

Car	①Dimensi n
Ford & Mercury	11 15/16"
Studebaker	See Note Below

℄ - This measurement is the distance between center of pitman arm ball stud and tie rod ball stud.

►*STUDEBAKER INSTALLATION NOTE:* With control valve reinstalled and control valve assembly screwed into reach rod the same number of turns (recorded at time of removal), set wheels in straight ahead position and center wheel in the high spot. Slip pitman arm on steering gear shaft, aligning marks on arm and shaft, then check distance between center of pitman arm ball

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BENDIX LINKAGE TYPE POWER STEERING (Cont.)

and reach rod ball by holding end of reach rod in position at bellcrank. Adjust length of reach rod so that reach rod ball stud will slip into bellcrank without moving front wheels from straight ahead position. *NOTE - It is necessary to remove unit from car to make adjustments.*

Reaction Limiting Valve (Ford & Mercury): Disassembly – After disassembly of control valve, remove aluminum plug and "O" ring assembly from each end of control valve body, then remove springs, washers, and reaction valve.

Reassembly – Insert washer, spring, and longest plug and "O" ring assembly into valve housing from sleeve end. Carefully insert reaction valve into bore of valve housing from spring cap end, then insert washer, spring and short plug into housing.

Cylinder Rod Tightening Torque: With outer insulator, washer and nut installed on piston rod, tighten nut to 18—24 ft.lbs. (Ford & Mercury); 45—50 ft.lbs. (Studebaker).

POWER STEERING PUMP: Eaton Roll er Type. *See 1958 Annual Data, Page 398, or later Manual edition.*

FORD TRUCK LINKAGE TYPE POWER STEERING

Ford Trucks, Except Tilt Cab Models (1961) ①
Ford Trucks, Tilt Cab Models (1961) ②

① – Power cylinder used.
② – Booster (rack & piston) cylinder used.

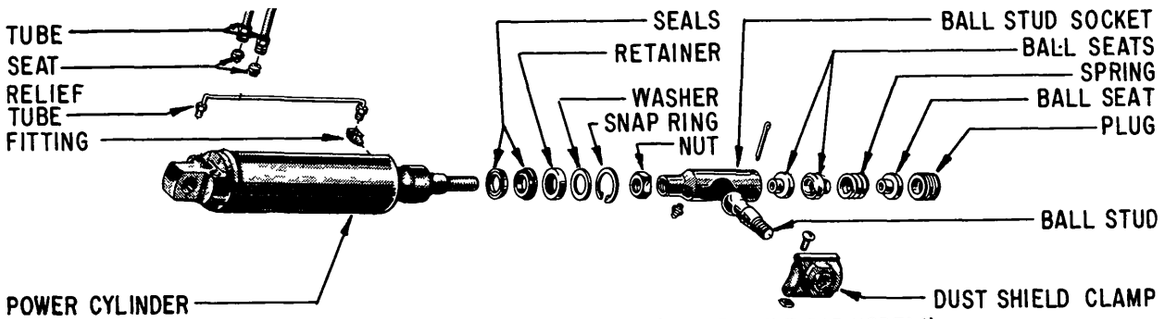
DESCRIPTION: Linkage type with control valve assembly connected directly to steering gear pitman arm. On Tilt Cab Models, the operating cylinder is a "rack & piston" booster type cylinder connected between pitman arm and wheel spindle. On other models, the hydraulic power cylinder is anchored to left side of front axle with the piston rod connected to center of spindle connecting rod. The only basic differences between the two units is in the construction of the operating cylinders.

LUBRICATION: Check fluid level in reservoir every 4000 miles (On Highway), 500 miles (Off Highway). Fluid should be at "F" mark on dipstick or within 1" of top of reservoir. Check fluid at normal operating temperature. Use only Automatic Transmission Fluid Type "A", Suffix "A"; or Ford Lubricant C1AZ-19582-A.

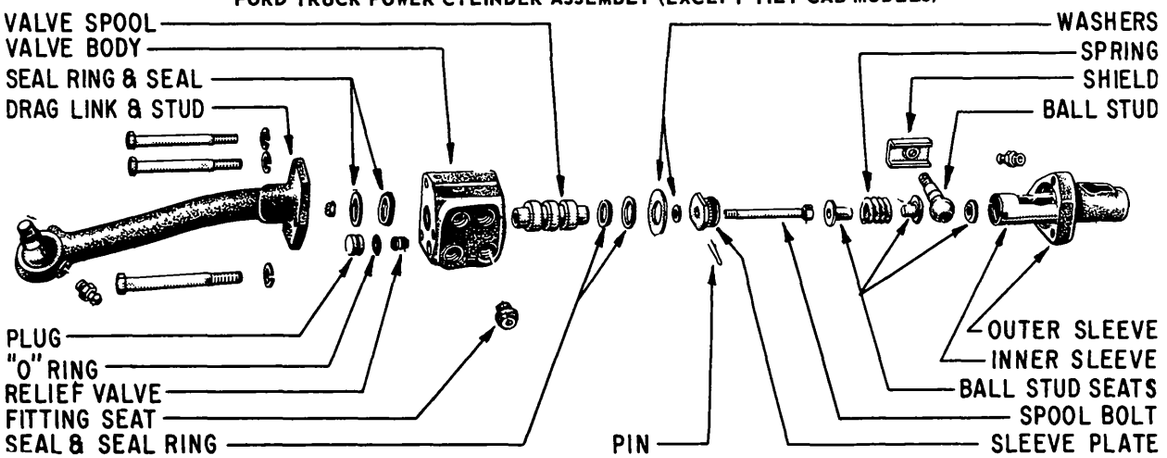
ADJUSTMENT: Pump Drive Belt – ¼" belt deflection midway between pulleys. Tighten belt adjusting bolt to 30—35 ft. lbs.

TESTING: Turning Effort – With front wheels properly aligned and tire pressure correct, place car on dry concrete, set brakes, then proceed as follows: With engine at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to rim of steering wheel and measure pull required to turn wheel at least one complete turn in both directions. Pull should be 35—65 lbs., and about equal in both directions.

Pump Pressure: Install pressure gauge, Tool T56L—33610—D, between pump hose and pump outlet with pressure gauge between pump and shut—off valve of tool. Run engine at idle speed (with shut—off valve open) for two minutes to normalize oil temperature. With wheels in straight ahead position, pressure should be no higher than 700 lbs. with engine at 900 RPM. If pressure higher, check for faulty pump or control valve. Increase engine speed to 3000 RPM and slowly close shut—off valve of gauge. Pressure should be about 1150 lbs. when shut—off valve fully closed. *CAUTION—Do not leave shut—off valve closed for more than 15 seconds.* If the pressure is less, then the pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and power steering is not satisfactory, trouble is in control valve or power cylinder.



FORD TRUCK POWER CYLINDER ASSEMBLY (EXCEPT TILT CAB MODELS)



FORD TRUCK POWER STEERING CONTROL VALVE ASSEMBLY (TILT CAB MODELS)

TROUBLE SHOOTING: *See "Ford Truck Linkage Type Power Steering" in 1959 Final Data or later Manual edition.*

REMOVAL & INSTALLATION: Power Steering Pump – Remove as much fluid as possible through reservoir filler opening. Disconnect pressure hose from pump and return line from cooler, and tie hoses to prevent fluid loss. *NOTE – It is easier on Tilt Cab Models to disconnect hoses after pump mover from mounting bracket.* Loosen adjusting bracket bolt and pivot bolt and remove pump belt. Remove pump attaching bolts and remove pump and reservoir as an assembly. To install, reverse removal procedure.

Control Valve (Except Tilt Cab): Drain reservoir, disconnect hoses from control valve, then disconnect ball studs and piston mounting bolts. Remove control valve. To install, reverse removal procedure.

Control Valve (Tilt Cab): Remove hoses from valve, then disconnect studs from idler arm and sector shaft arm. Remove control valve and drag link. To install, reverse removal procedure.

OVERHAUL: *See "Ford Truck Linkage Type Power Steering" in 1959 Final Data or later Manual edition.*

POWER STEERING PUMP: *See "Eaton Roller Type" in 1958 Final Data or later Manual editions.*

CHEVROLET & PONTIAC TEMPEST LINKAGE TYPE

Chevrolet Passenger Cars (1961)
Pontiac Tempest (1961)

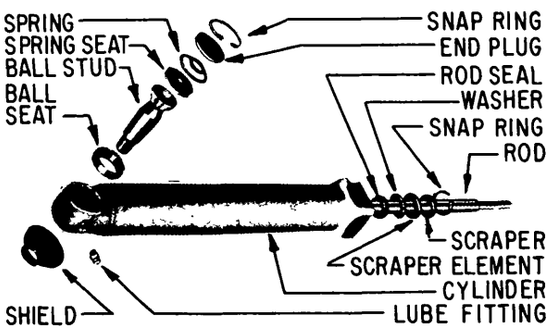
►CHANGES, CAUTIONS, CORRECTIONS

►*1961 TEMPEST POWER STEERING NOISE CORRECTION (EARLY CARS):* A noise heard when steering wheel is turned full right or full left so wheels are against stops can be eliminated by installing a new flow control valve.

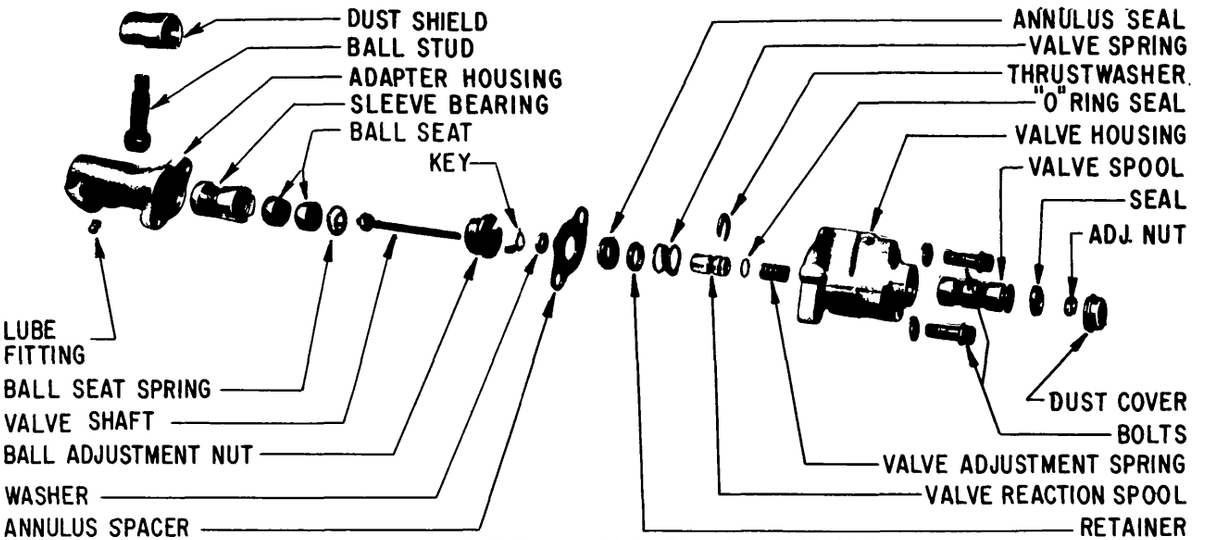
DESCRIPTION: Linkage type with power cylinder mounted between steering relay rod and bracket on frame side rail. Control valve assembly is mounted on left side relay rod and is operated by pitman arm acting on spool valve assembly. The new control valve assembly is adjustable to provide greater uniformity of operation and faster response. The new power steering pump is mounted on engine and is driven by a belt from crankshaft pulley.

ADJUSTMENT: Power Steering Pump Belt - Loosen power steering pump-to-bracket attaching bolts and move pump, with belt in place, until belt is tensioned so that a 15 lbs. force applied at midpoint between fan pulley and pump pulley will cause a ½" to ¾" belt deflection, then tighten mounting bolts.

Control Valve Balancing: *NOTE - If a hard steering effort is required (in one direction), balance control valve as follows:* With car on a hoist, engine running, and power cylinder rod disconnected from frame bracket, piston rod will be fully retracted or fully extended (if valve is out of balance). If piston rod remains retracted, turn adjusting nut clockwise until rod begins to move out, then turn nut counterclockwise until rod begins to move in. Now turn nut clockwise to exactly one-half the rotation needed to change direction of shaft movement. If rod remains extended, move nut counterclockwise until rod begins to retract, then clockwise until rod begins to move out. Now position nut to exactly one-half the rotation needed to change direction of shaft movement. *CAUTION - Do not turn nut back and forth more than is absolutely necessary to balance valve.* With valve properly balanced, it should be possible to move rod in and out manually. Stop engine and connect cylinder rod to frame bracket, then restart engine. If front wheels (still on hoist) do not turn in either direction from center the valve is properly balanced. With valve properly adjusted, install dust cap.



POWER CYLINDER ASSEMBLY



CHEVROLET POWER STEERING CONTROL VALVE ASSEMBLY

Pontiac Tempest – Loosen pump mounting bolts and tighten belt so a 5–6 lb. force applied midway between pulleys will deflect belt ¼". *NOTE – If a Borroughs Gauge is used, a reading of 70–75 lbs. should be obtained.*

LUBRICATION: Checking Fluid Level – With oil at normal operating temperature, check fluid level on dipstick. Fill to indicated level with Automatic Transmission Fluid.

Bleeding Hydraulic System: Fill reservoir to proper level and let oil remain undisturbed for at least two minutes, then start engine and run at idle speed for two minutes. Add oil if necessary, then raise front of car so wheels are off ground. Increase engine speed to 1500 RPM (Chevrolet), 1000 RPM (Pontiac), and turn wheels from full right to full left, contacting stops lightly. Lower car and turn wheels right and left on ground. Check oil level and refill as necessary. Continue this process as long as required to bleed all air from system.

REMOVAL, INSTALLATION & OVERHAUL: *See 1960 Annual Data, Page 398, or later Manual edition.*

POWER STEERING PUMP: *See "Saginaw Vane Type (Integral Reservoir)" in this section.*

MONROE LINKAGE TYPE

Rambler, All Models (1961)

►*1961 SERIES 6180 WATER ENTERING POWER STEERING CYLINDER CORRECTION:* On early cars before Car Code No. W–132800, clean and apply a heavy coat of Pliobond around lower section of pressure and return line fittings on power cylinder section of unit. Later cars have been coated with Pliobond in production.

DESCRIPTION: Linkage type of same design used on previous models.

ADJUSTMENT, TROUBLE SHOOTING, OVERHAUL: *See 1959 Annual Data, Page 390, or later Manual edition.*

POWER STEERING PUMP: Series 6120, 6180 – Eaton Roller Type. *See 1959 Annual Data, Page 398, or later Manual edition.*

Series 6101, 6110: Rambler Slipper Type. *See 1960 Annual Data, Page 403, or later Manual edition.*

PRESSURE TEST: With fluid level in reservoir correct, install oil pressure gauge J–5548–A in main oil line at control valve assembly, then start engine and bring oil to normal operating temperature. Turn wheels against curbing or other obstacle and hold tension on wheel. Oil pressure should be 800–900 lbs. (Roller Type Pump); 850–950 lbs. (Slipper Type Pump). Turn wheel in opposite direction and note pressure. If there is a variation between right and left turn, internal leakage is indicated. If pressure is low, stop engine and disconnect gauge from cylinder and valve assembly and cap pressure line. Restart engine and note pressure. If pressure is within specifications, pump is operating properly. If pressure is low (belt tension correct), trouble exists in pump. *CAUTION – Do not hold wheels at maximum pressure longer than is necessary to obtain a steady pressure reading.*

BUICK & OLDSMOBILE F-85 3-SPEED SYNCHRO-MESH

Buick Special (1961)
Oldsmobile F-85 (1961)

DESCRIPTION: Three speed, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse), all helical gear type.

REMOVAL OF TRANSMISSION: Mark front universal and companion flange for installation at same location, then disconnect joint and slide propeller shaft to rear. Disconnect shift linkage from transmission (disengage spring from equalizer, slide equalizer to left and disengage from second–third shift lever, then slide equalizer to right off support pin). Remove first–reverse shift lever from transmission shift shaft, then disconnect speedometer cable. On Buick, loosen all three exhaust pipe ball joints, then remove bolts attaching transmission mounting pad to transmission support. On all models, support rear of engine with a jack and raise engine slightly, then remove transmission support and lower engine for clearance. Remove upper transmission attaching bolts and install suitable guide pins. Remove remaining attaching bolts and slide transmission straight back until input shaft clears clutch assembly and remove from car.

DISASSEMBLY: **1)** Remove top cover and gasket, then remove speedometer driven gear from rear bearing retainer, Remove companion flange using Tool J–8614–1–2 if necessary. Remove rear bearing retainer (extension housing) and front bearing retainer. Drive countershaft and reverse idler gear shaft lock plate out of shaft grooves with a punch.

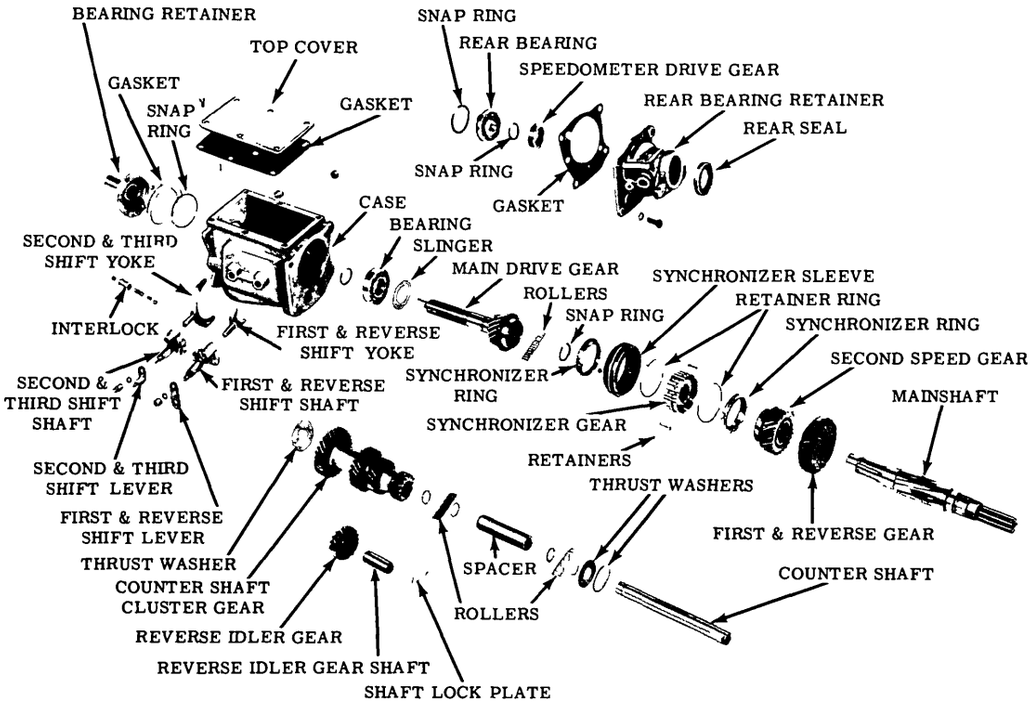
2) Use Tool J–8965 (Loading Tool) and drive countershaft out rear of transmission case. *CAUTION–Countershaft must be driven out rear of case as rear of shaft is a larger diameter.* During countershaft removal, hold loading tool in close contact with countershaft to prevent any thrust washers from falling out of position and drive loading tool only until countergear will drop into bottom of case with tool in position.

3) Pull main drive gear and bearing out front of case. *NOTE – Use a brass drift if necessary to tap gear out.* Pull mainshaft rearward enough to move rear bearing out of case, allowing shaft assembly to be tipped away from second and third shifting yoke, then remove second and third shifting yoke.

4) Remove synchronizer assembly–to–mainshaft retainer ring and remove synchronizer assembly and second speed gear together to prevent synchronizer coming apart. Remove first and reverse shifter yoke, then remove mainshaft from case.

5) Remove first and reverse gear from inside case, then use a long brass drift and drive reverse idler gear shaft out rear of transmission case and remove reverse idler gear. Lift countergear and loading tool out of case, noting position of thrust washers.

6) Remove the two shift lever shaft retaining pins by driving them out of case with a drift. *NOTE – These pins are tapered and will come out from the top only.* Pull shift lever shafts toward outside of case to allow interlock balls to fall into bottom of case, then remove outer shift levers, and remove shaft assemblies from case. Remove shift lever interlock sleeve, spring and pin.



BUICK & OLDSMOBILE F-85 3-SPEED SYNCHRO-MESH TRANSMISSION (EXPLODED)

7) Remove countergear bearing rollers (22 at each end), bearing retainer washers (2 at each end), and spacer from gear. Remove brass synchronizer rings from each end of synchronizer assembly. *NOTE – One of the rings may have to remain on main drive gear cone.*

8) Remove snap ring retainers from each end of synchronizer gear noting their position. Slide synchronizer sleeve off from synchronizer gear and remove the three synchronizer retaining plates.

INSPECTION: Wash all parts in clean solvent and inspect for damage and abnormal wear. If thrust washers are worn or scored, install new washers.

REASSEMBLY: **1)** Install interlock pin and spring in bore of interlock sleeve and install sleeve in case. Install first and reverse shift lever and shaft assembly in case. *NOTE – Notches are far apart.* Install second and third shift lever and shaft assembly in case, then install two interlock balls in interlock sleeve and retain with shift levers. With one lever in neutral detent, and the other in a gear detent, hold interlock sleeve against one lever. Clearance between sleeve and other shaft must be .001 – .007". *NOTE – Selective fit sleeves are available.* Install shift lever retaining pins.

2) Center countershaft bearing spacer in bore of countergear, then place one bearing retaining washer against each end of tubular spacer. Insert Tool J–8965 (loading tool) in bore of countergear and spacer. Load 22 bearing rollers in each end of countershaft using synthetic seal lubricant on bearings. Install the two outer bearing roller retainer washers.

3) Lubricate smaller bronze faced steel thrust washer with petroleum jelly and position on small end of countergear with tangs in slots of gear. Place small steel thrust washer on bronze faced washer with sufficient lubricant to hold in position, tang up. Coat larger bronze face thrust washer with petroleum jelly and place in position on large end of countergear with bronze face toward rear. Tang must be up to align with recess in case.

4) Position two pieces of wire (14 gauge electrical) in bottom of case for use later to lift countergear assembly into position for installation of countershaft. Hold tool in countergear flush with washers at each end, and lower assembly (large end to front) into case. *NOTE – Tangs of thrust washers must be in their proper positions in case.*

5) Position reverse idler gear in case with relieved end of gear teeth toward front of transmission. Install reverse idler gear shaft into case, then use the lock plate as a guide to position slot in shaft towards countershaft hole in case. Drive shaft in until inner edge of slot is nearly flush with case.

6) Install first and reverse gear shift yoke in first and reverse gear shift lever. Place three synchronizer retaining plates on synchronizer and install in sleeve, then install wire retaining rings. Place mainshaft and bearing assembly into case, then place first and reverse gear (yoke groove toward front), on shaft and engage gear with yoke. Place second speed gear on shaft, then install synchronizer assembly and rear synchronizer ring (yoke groove in synchronizer toward rear) and install snap ring retainer on mainshaft.

7) Position mainshaft and bearing assembly in case so

CONTINUED ON NEXT PAGE

BUICK & OLDSMOBILE F-85 3-SPEED SYNCHRO-MESH (Cont.)

both shifting yokes are engaged with grooves in low and reverse gear and in synchronizer, then place front synchronizer ring in synchronizer, aligning notches with three retainer plates. Install 14 roller bearings in main drive gear and retain in position with petroleum jelly, then install main drive gear into front of case. *CAUTION – Mak sure brass synchronizer ring is prop rly ngag d in synchronizer, and that main driv gear snap ring is tight against case.*

8) Install main drive gear bearing retainer and gasket and seal retaining bolts with Permatex No. 2 to prevent leakage. Tighten bolts to 17–20 ft. lbs. With synchronizer hub and second gear pressed forward against snap ring, clearance between second speed gear and front facing of first–reverse gear splines should be .003 – .016".

9) Use previously positioned wires and carefully raise countergear assembly so countershaft can be installed. Install countershaft through rear of case with lockplate groove to rear and turned so groove is toward reverse idler gear shaft. Hold countershaft and loading tool tightly together while tapping countershaft into case until lockplate groove is just short of being flush with case. Position lockplate into shaft grooves and tap into place, then tap shafts into case until lockplate is tight against case.

10) Remove wire used to raise countergear, then install rear bearing retainer and gasket and tighten bolts to 28–33 ft. lbs. Install shift lever shaft seals, outer shift levers, washers, and attaching nuts, then check shift levers for correct operation. Install speedometer gear, companion flange, top cover and gasket. Tighten top cover bolts to 10–12 ft. lbs.

MAIN DRIVE GEAR BEARING REPLACEMENT: With main drive gear removed from transmission, remove snap ring from shaft, then jar bearing off shaft, using a brass drift if necessary. To install bearing, install oil slinger on shaft next to gear, then install bearing and drive into position with Tool J–6133. Install bearing outer snap ring and thickest shaft snap ring that will fit in snap ring groove. *NOTE – Snap ring is available in three thicknesses.*

MAINSHAFT BEARING REPLACEMENT: With mainshaft assembly removed from transmission, remove bearing snap ring, then with first–reverse gear on shaft, bounce shaft on a wooden block and drive bearing off shaft. Press new bearing on shaft with Tool J–6133–A or equivalent and install snap ring.

REAR OIL SEAL REPLACEMENT: Disconnect propeller shaft and remove companion flange, then use an awl and pry seal out of housing. Coat a new seal with Permatex No. 2 or equivalent and drive seal into bore with Tool J–8864 (Buick), J–5154 (Oldsmobile). Install companion flange and tighten bolt to 30–45 ft. lbs., then connect propeller shaft and tighten "U" bolt nuts to 14–18 ft. lbs.

SHIFT LEVER SHAFT SEAL REPLACEMENT: Disconnect linkage from lever, then remove lever. Puncture metal edge of seal with a prick punch and pry seal out of case. Coat outer diameter of new seal with Permatex No. 2 or equivalent, and inner lip of seal with a synthetic seal lubricant. Drive seal into place with an 11/16" socket.

TRANSMISSION CONTROL ADJUSTMENT: Buick – Place both shift levers on transmission in neutral position, then loosen shift rod adjusting clamps at lower end of steering column and place both levers in a horizontal position. *NOTE – Levers must be exactly parallel.* Tighten second–third shift rod adjusting clamp, then lift selector lever toward steering wheel into first–reverse range several times to align first–reverse lower control shaft lever, and tighten first–reverse rod adjusting clamp. Check for smooth and easy operation.

Oldsmobile: Loosen trunnion nuts at bottom of steering column–to–equalizer and shift lever rods, then place selector lever in neutral position. Install Tool J–8992 on lower end of steering column and place both shift levers (at lower end of column) in a horizontal position, and in alignment, then tighten trunnion nuts.

CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH

Ch vr l t Pass. Cars (1961)
Ch vr l t Trucks, ½ & ¾–Ton (1961) Light Duty
P ntiac (1961)

DESCRIPTION: Same design used on previous models.

TRANSMISSION REMOVAL: Drain transmission and remove propeller shaft. *NOTE – On Pontiac and Ch vrol t Trucks, disconnect rear universal and slide shaft to r ar. On Ch vrolet Pass. Cars, remove bolts attaching cent r support to frame, then disconnect rear prop ll r shaft and slide shaft assembly to rear to dis ngag from transmission.* Disconnect speedometer at transmission and shifter rods at transmission levers. Support rear of engine (Chev. Pass. Cars & Pontiac) with a floor jack, then remove transmission support crossmember (Chev. Pass. Cars); disconnect at transmission bracket (Pontiac). *NOTE – On Chev. Pass. Cars, r tain shims found between transmission mounting block and support for installation in same location.* Remove upper transmission attaching bolts and install guide pins, J–1126, then remove lower attaching bolts. *NOTE – If vehicle is equipped with overdriv , disconn ct overdrive wires and controls.* Slide transmission straight back on guide pins (on Pontiac, tilt rear of extension upward to disengage bracket studs from crossmember support) until transmission shaft clears clutch assembly, and remove from vehicle.

OVERHAUL: *See 1955 Annual Data, Pag 376, or later Manual editions and note the following:*

Side Cover Disassembly & Reassembly: Remove side cover from transmission case, then remove outer shift lever clamp bolts and pull levers from shafts. Remove nuts and locks and remove shifter interlock retainer. This will allow removal of shifter shaft and fork assembly and cam assembly, or interlock from cover. To reassemble, install shifter interlock retainer, then install outer shift levers on shafts and install clamp bolts. With transmission gears in neutral, and shifter forks in neutral, install cover on transmission, using a new gasket. Tighten retaining screws tightly. *NOTE – Hump on first and reverse shifter fork must be toward rear of transmission.* Attach control rods to shift levers, then refill transmission.

TRANSMISSION CONTROL ADJUSTMENT: Chevrolet Pass. Cars – With transmission control rods disconnected at lower end of steering column, move both transmission levers to neutral position. Move transmission selector lever to neutral position and engage second–third shift lever at lower end of steering column with relay lever. Center levers in mast jacket by measuring from edge of slot in jacket to edge of slot in spacer at each side of lever, then adjust swivel of second–third shift rod for free entry in hole in lever and install retainer. Move first–reverse lever on tube until lug on lever lines up with slot in relay lever (pull relay lever to make sure lug mates with slot), then adjust swivel of first–reverse shift control rod for free entry into hole in lever and install retainer. Check shifts in all positions for smooth action and for overtravel.

Chevrolet Truck: Check clearance between lower edge of gearshift lever and upper edge of support. If clearance not 3/32" to 1/8", remove upper control shaft assembly from steering column and screw upper support up or down as necessary for proper clearance, then replace upper control shaft assembly. Measure clearance between end of gearshift lever and underside of steering wheel rim which should be 3¾" ± 1/8". If not within limits, loosen gearshift control shaft and housing assembly clamp bolts and move housing assembly (with upper and lower control shafts and gearshift lever) as necessary for proper clearance, then tighten clamp bolts. Loosen second–third speed control rod swivel clamp at housing outer lever and adjust swivel so gearshift lever is in horizontal plane. Remove housing cover to make sure shift gates in inner levers are aligned. If necessary to adjust, loosen first–reverse control rod swivel clamp at housing and adjust swivel until shifter gates are aligned.

Pontiac: Position selector lever in neutral, then disconnect shift rods at transmission. Line up shift levers at lower end of steering column so they move freely back and forth (neutral position with slots lined up). With shift levers on transmission in neutral detent, adjust trunnion at idler lever (second–third), and at shift lever (first–reverse) for free entry into shift levers, then tighten trunnion locknuts to 5–10 ft. lbs. Move selector lever into first gear and check key at first–reverse shift lever at lower end of steering column. Key should just clear lower side of opening in steering column. Shift selector lever to third gear and check key at second–third shift lever. Key should again just clear lower side of opening. Lubricate linkage joints and check shift pattern.

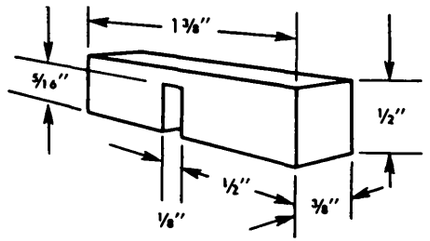
CHEVROLET, CORVETTE, PONTIAC & STUDEBAKER 4-SPEED

Chevrolet Pass. Cars (1961)
Chevrolet Corvette (1961)
Pontiac (1961)
Studebaker (1961)

DESCRIPTION: 4-speed "close ratio" helical gear type (except reverse), with constant mesh, synchro-mesh in all forward speeds. Sliding gear (reverse). Transmission is same design as used previously.

TRANSMISSION REMOVAL: Chevrolet & Corvette: Disconnect speedometer cable at transmission, then disconnect shift rods at shift levers and remove shift assembly. On all models except Corvette, remove bolts attaching center support to frame member, then remove "U" clamps on rear universal joint and remove propeller shaft and bearing assembly by moving it rearward and to the left under axle housing. On Corvette, disconnect propeller shaft at rear universal and remove it from transmission splines. Support rear of engine and remove transmission support crossmember. Remove two top transmission attaching screws and insert guide pins, J–1126, then remove lower attaching screws and slide transmission straight back on pins until shaft is clear of clutch assembly and remove transmission.

Pontiac: Remove gearshift lever boot, then drain transmission. Disconnect speedometer cable and back–up light leads at transmission. Disconnect shift rods from transmission levers and remove manual shift lever and bracket. Disconnect propeller shaft and slide the assembly to rear to disengage from transmission. Support rear of engine and remove transmission extension bracket–to–crossmember retaining nuts, then remove two top transmission attaching bolts and insert guide studs in these holes. Remove lower attaching bolts and tilt extension upward to disengage bracket studs from support, then remove transmission. *NOTE– On long wheelbase models, remove crossmember support before removing transmission.*



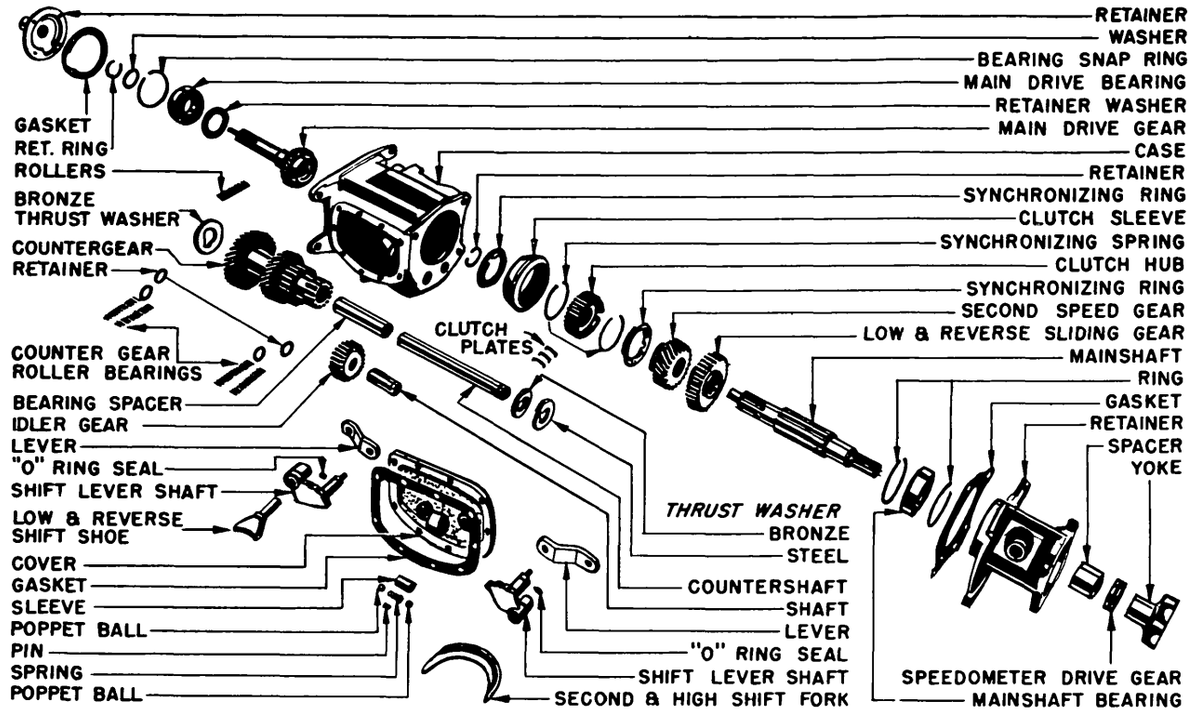
SHIFT LINKAGE GAUGE BLOCK

Studebaker: Drain transmission, then disconnect and remove shifting assembly. Disconnect crossmember under transmission and slide it to rear along exhaust pipes for clearance. Disconnect propeller shaft at rear universal and remove from transmission. Remove speedometer and drive pinion from case, then remove transmission attaching capscrews. Pull transmission to rear until shaft clears clutch assembly, and remove unit from car.

SHIFT LINKAGE ADJUSTMENT: *NOTE - The gauge block illustrated below will facilitate adjustment, however, the adjustments can be made by having an assistant hold manual shift lever in neutral position.* Remove transmission gearshift lever seal from floor pan, then place transmission in neutral and install gauge block (see illustration). Remove cotter pin, anti-rattle washer and clevis pin at each shift lever. On each shift rod, adjust threaded clevis to permit free entry of clevis pin into hole in transmission shift lever. Reconnect clevises to shift levers, then remove gauge block and check shifts. If any roughness still exists, determine rod and clevis requiring adjustment by sighting along the slot where gauge block was used.

TRANSMISSION OVERHAUL: *See 1957 Annual Data, Page 373, or later Manual editions and note the following:*

►*COUNTERGEAR NEEDLE BEARING SPACERS:* Countergear bearing assembly consists of six .050" spacers, 80 roller bearings, and a roller bearing spacer.



CHEVROLET & PONTIAC 3-SPEED (HEAVY DUTY) SYNCHRO-MESH TRANSMISSION

CHEVROLET TRUCK & PONTIAC 3-SPEED HEAVY DUTY

Chevrolet Trucks, ½, ¾, 1–Ton (1961) Heavy Duty
Pontiac Taxi, Police & Heavy Duty (1961)

DESCRIPTION: Same design as used on previous models.

REMOVAL OF TRANSMISSION: *See "Chevrolet & Pontiac 3–Speed Transmission" in this section.*

OVERHAUL: *See 1958 Annual Data, Page 406, or later Manual editions.*

CHEVROLET TRUCK 4-SPEED SYNCHRO-MESH

Chevrolet Trucks ½, ¾, 1, 1½–Ton (1961)

DESCRIPTION: Four speed, constant mesh, synchro–mesh (second, third & fourth), sliding gear (low reverse), of same design as used on previous models.

REMOVAL OF TRANSMISSION: Drain lubricant, then remove parking brake lever. *NOTE – Not necessary to remove parking brake lever on Series 10 Trucks.* Remove propeller shaft. Slide open end of Tool J–8109 over shift lever and engage lugs of tool in open slot of retainer, then press down on tool and turn it to left to disengage lugs on retainer and remove shift lever. Remove screws and slide steering column jacket grommet up jacket, then remove accelerator pedal and floor mat. Remove transmission cover. On Forward Control models, remove front and rear floor pans. On all models, remove speedometer cable at transmission. Remove two upper transmission attaching bolts and install guide pins, J–1126, then remove flywheel lower pan and lower transmission attaching bolts. Slide transstraight back on guide pins until clear of clutch assembly and remove transmission.

OVERHAUL: *See "Chevrolet Truck 4–Speed Transmission" in Transmission Section of Manual.*

CHEVROLET TRANSFER CASE

Ch vrolet ½ & ¾-T n 4-Whe l Driv Trucks (1961)

DESCRIPTION: Manual shift two-speed transfer case used on Four-Wheel Drive models to transmit power from engine to rear and front axle assemblies through a four speed transmission. A single control lever is used to shift transfer case from direct drive to low (four-wheel drive) at a ratio of 1.94-1.

DISASSEMBLY: Shift R ds - Remove transfer case cover and slide out interlock pin. Remove shift rod poppet balls and springs, then cut lock wires and remove shift fork setscrews from fork. Pull shift rods from case and remove forks from inside as rods removed.

Prop ll r Shaft Y ke and Deflector: Remove cotter pin, nut and washer at each of the three universal joints and remove yokes using a suitable puller.

Idler Shaft: Remove front and rear idler shaft bearing caps and adjusting shims. *NOTE - Tie shims to cap for use at r ass mbly.* Press or drive idler shaft out of case, then remove input shaft constant mesh gear, spacer, and low speed gear from case. If inspection indicates wear, remove bearing cone from shaft and bearing cup from case.

Front Output Shaft: Remove front bearing cap and gasket from case, then pull front output shaft and bearing assembly from case. If necessary, remove bearing from shaft. Remove front sliding gear from case. Remove rear bearing cap and gasket from case, then remove snap ring from front output gear and slide spacer from gear. Drive gear inward out of bearing and remove from case, then remove bearing from case.

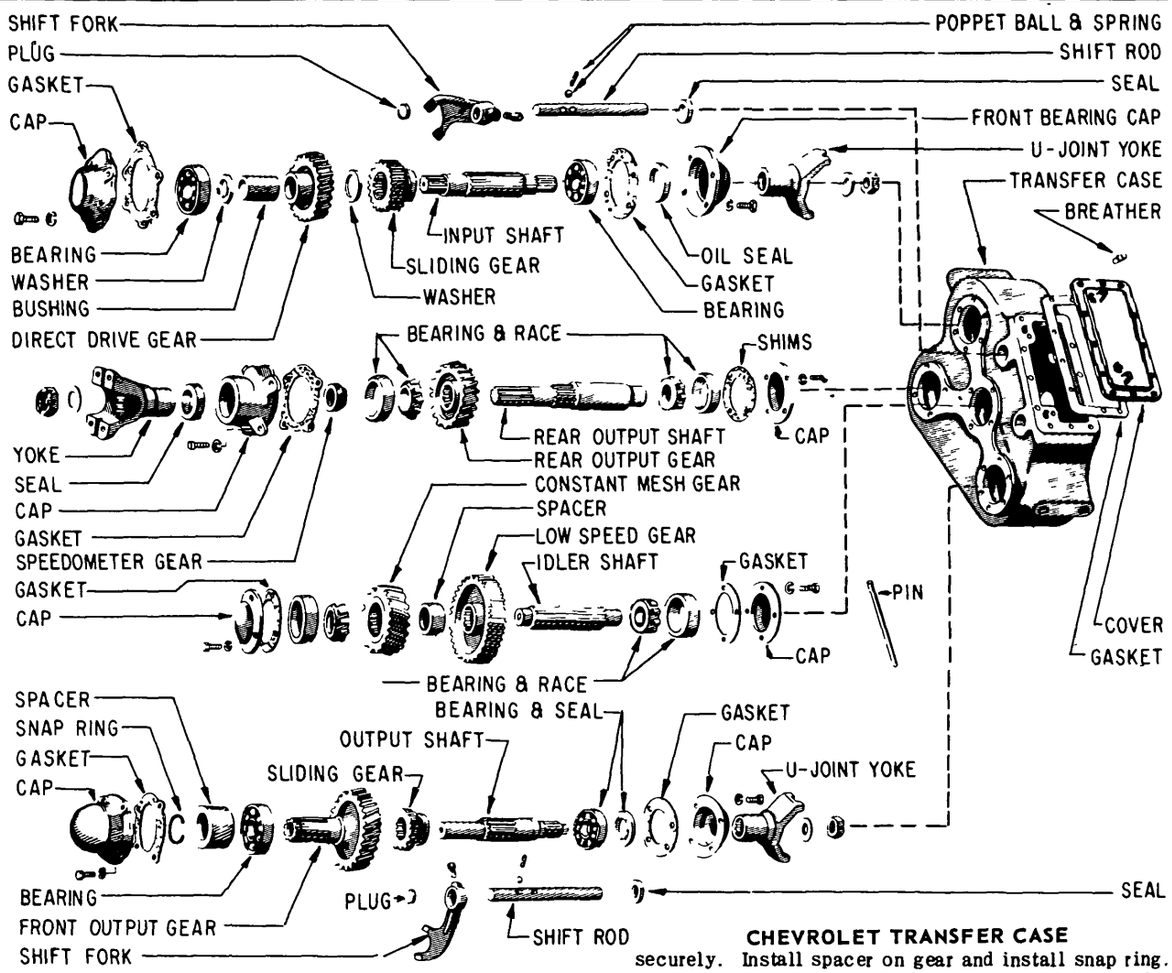
R ar Output Shaft: Remove front and rear bearing caps, gaskets and shims. *NOTE - Tag shims under front cap for use at reass mbly.* Press or drive output shaft toward front of case until shaft and bearing are removed, then remove shaft gear and bearing from case. If necessary, remove bearing cone and cup from shaft or case.

Input Shaft: Remove front bearing cap, then remove assembly and shims. *NOTE - Tag shims for use at reassembly.* Remove rear bearing cap and gasket, then press or drive shaft toward front of case until removed. Remove direct drive gear, sliding gear, and thrust washer from inside case. Remove bearing and washer.

INSPECTION: Wash all parts thoroughly in solvent and blow dry with air. Inspect all bearings for chips, cracks or worn spots. Replace bearings if damaged. Inspect splines and gears for chips or excessive wear and replace as necessary.

REASSEMBLY: *NOTE - Make sure all parts are clean, then lubricate with proper transmission fluid before reassembly. Use new gaskets and lockwashers.*

Input Shaft: Press front bearing onto shaft with shielded side of bearing toward shoulder on shaft, then insert shaft through opening in front of case. As shaft is being moved into position, install sliding gear, washer, direct drive gear and washer. Install rear bearing on shaft with shielded side toward inside, then install rear bearing cap and gasket and tighten attaching bolts securely. Install front bearing cap using same shims as removed at disassembly. Check shaft endplay with a dial indicator. In endplay exceeds .015", change shim pack as necessary to obtain proper endplay. Install universal joint yoke, washer and nut, then tighten nut securely and install cotter pin.



Rear Output Shaft: If removed, press bearing cone onto rear output shaft. Locate rear output shaft gear inside case as shaft is installed through front of case and pressed into gear. Press or drive front bearing cup into case, then install bearing cap with adjusting shims. Install cap bolts and lockwasher and tighten securely. At rear of shaft, press bearing cone onto shaft, and bearing cup into case, then install speedometer drive gear. Install oil seal and bearing cap assembly and tighten capscrews securely. Install universal joint yoke, washer and nut and tighten nut securely. Check endplay of shaft with a dial indicator and remove or add adjusting shims at front bearing cap until endplay is as near "zero" as possible

Front Output Shaft: Locate front output gear inside case, then install bearing over gear hub and into position in case. If removed, press bearing onto output shaft. Output shaft is installed through opening in front of case and sliding gear must be located on shaft as shaft is pushed in to proper location. Install oil seal and bearing cap at front of case and tighten bolts

securely. Install spacer on gear and install snap ring. Install rear bearing cap and gasket and tighten bolts

Idler Shaft: If removed, press bearing cone on front end of idler shaft. Start shaft into front side of case and install constant mesh gear, spacer, and low speed gear as shaft is pushed into position. Press front and rear bearing cups into case and over bearing cones. Install rear bearing cap and gasket and tighten bolts securely. Install front bearing cap and adjusting shims and tighten bolts securely. Check shaft endplay with a dial indicator, then add or remove shims as necessary until endplay is as near "zero" as possible.

Propeller Shaft Yoke & Deflector: Install yoke on shaft, then install washer and nut and tighten securely.

Shift Rods: If removed, install shift rod oil seals in case, then push rods into case being careful not to damage seals. Install shift forks on rods, then install and tighten setscrews. Thread a lock wire through setscrews to prevent loosening. Install poppet balls and spring into holes in case, then slide interlock pin into bosses on inner surface of cover and install cover and gasket. Tighten screws securely.

CHRYSLER CORP. HEAVY DUTY

Chrysler (1961) Std.
Dodge (1961) Std.
Dodge & Plymouth (1961) Hvy. Duty

► *TRANSMISSION LUBRICATION NOTE: SAE 80 Multi-Purpose Gear Lubricant or Automatic Transmission Fluid Type "A" (Suffix "A") may be used.*

DESCRIPTION: Own. Three speed, constant mesh, Synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type.

► *TRANSMISSION IDENTIFICATION NOTE (DODGE & PLYMOUTH):* This heavy duty transmission is identified by the breather at top of transmission case where extension housing bolts to case, and by a raised hump at front of transmission cover.

GEARSHIFT LINKAGE ADJUSTMENT (ALL MODELS): *See "Dodge, Plymouth, Lancer, Valiant Synchro-mesh Transmission".*

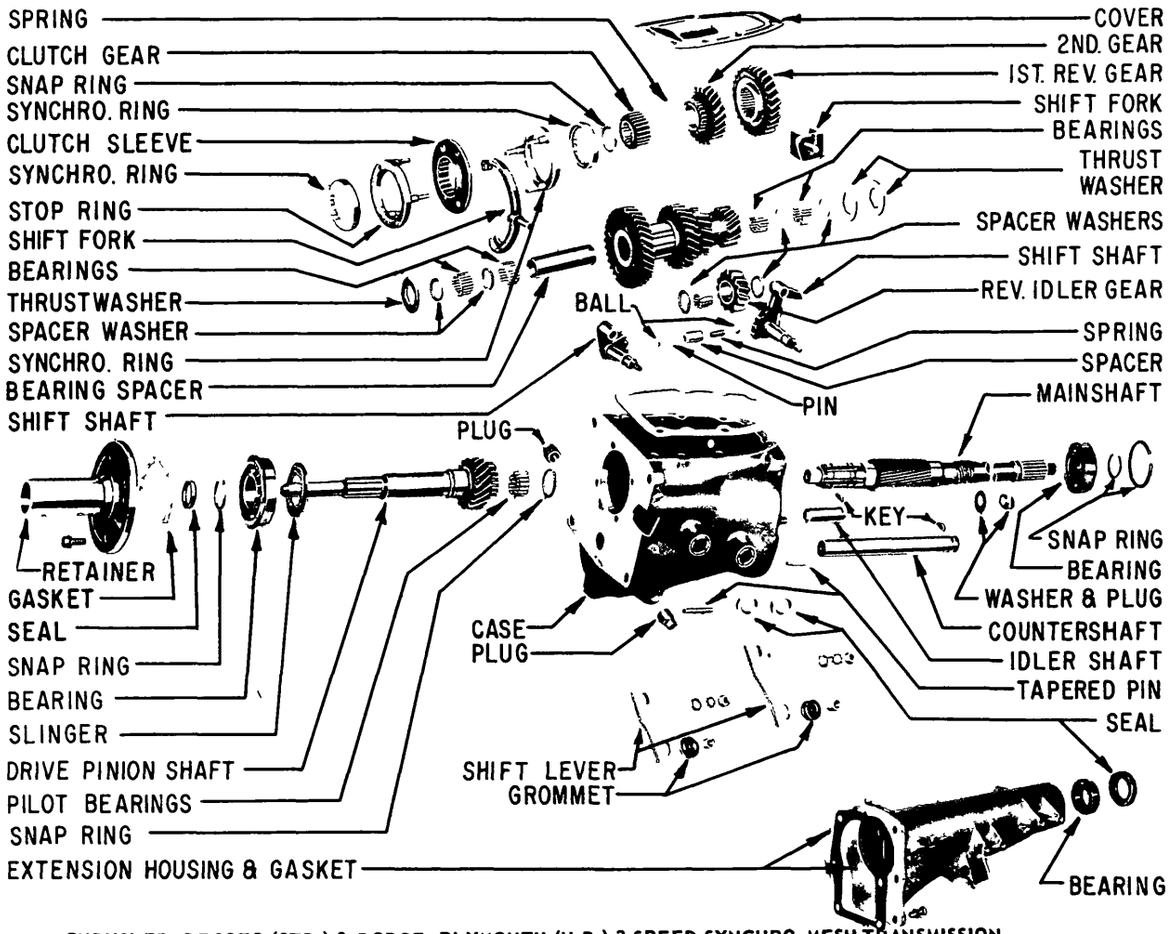
REMOVAL OF TRANSMISSION: Drain lubricant, then remove propeller shaft. Disconnect speedometer cable, pinion assembly sleeve, shift rods, and parking brake cable from transmission. On Dodge & Plymouth, support engine with a suitable fixture and remove engine rear mount bolts. On all models, remove transmission attaching bolts and pull transmission back until input shaft clears clutch assembly, then remove from car.

DISASSEMBLY: Extension Housing – Use flange holding tool C-3281 and remove companion flange nut and washer, then attach Puller C-452 and remove drum and flange assembly. Remove parking brake assembly, then remove five bolts and one nut and remove extension housing. Remove seal from rear of extension housing with Tool C-748 and remove mainshaft rear bearing (if it did not remain on mainshaft).

Drive Pinion: Remove transmission case cover and drive pinion bearing retainer. Remove drive pinion through front of case, sliding synchronizer front inner stop ring from short splines on pinion while the assembly is being removed. Remove snap ring locking main drive pinion bearing on shaft, then press bearing off pinion shaft and remove oil slinger. Remove pilot bearing snap ring from cavity in end of drive pinion gear and remove 15 roller bearings. Remove seal from drive pinion bearing retainer.

Mainshaft: Remove mainshaft rear bearing snap ring from groove in case, then slide mainshaft and rear bearing assembly to rear until rear bearing is out of case. Remove synchronizer assembly and second-third speed shift fork. Remove synchronizer clutch rear snap ring with Tool C-484 and remove synchronizer clutch gear, second speed gear and first-reverse gear from mainshaft. *NOTE – If synchronizer clutch gear cannot be removed easily, position low-reverse fork and sliding gear to rear of case and gently tap mainshaft back out of clutch gear with a plastic hammer.* Remove mainshaft and bearing through rear of case, then remove synchronizer clutch gear, second speed gear, low-reverse sliding gear, and low-reverse shift fork from case.

Countershaft: *CAUTION – Do not drive countershaft toward front of case.* Use countershaft bearing arbor, Tool C-3834 and drive countershaft toward rear of case until small key can be removed from countershaft, then drive countershaft completely out of case, keeping arbor tight against end of countershaft to prevent loss of roller bearings. Remove cluster gear, thrust washers and arbor from case and remove 88 rollers, spacer rings, and center spacer from cluster gear.



CHRYSLER, DESOTO (STD.) & DODGE, PLYMOUTH (H.D.) 3-SPEED SYNCHRO-MESH TRANSMISSION

Reverse Idler Gear: Use a blunt drift and drive reverse idler shaft toward rear of case until key can be removed, then completely drive idler shaft out of case and remove reverse idler gear. Remove thrust washers and 22 needle bearings.

Gearshift Assemblies: Use a small punch and drive tapered lock pins in both shift shafts toward top of case, then remove shafts from case, being careful not to lose spring-loaded detent balls. Remove interlock sleeve, spring, pin and detent balls. Remove both lever shaft seals and discard.

INSPECTION: Wash all parts in clean solvent and blow dry with air. Check all parts for proper fit in their respective bores, and inspect for chipped gear teeth, cracks, excessive wear or damage. Replace all necessary parts.

REASSEMBLY: Countershaft & Cluster Gear – Place bearing spacer in center of bore in cluster gear, then insert arbor, Tool C-3834 into cluster gear through spacer. Install a row of 22 needle bearings next to one end of spacer, using heavy grease to retain them in position. Place a bearing spacer ring next to needle bearings and install another row of 22 needle bearings next to spacer ring. Repeat this procedure at opposite end of cluster gear, then install one bearing spacer ring next to outside end of second row of needle bearings at each end of cluster gear. Use a small amount of grease to hold it in place and install front thrust washer on arbor at front of cluster gear, with tabs outward. Install tabbed rear thrust washer on arbor against rear of cluster gear with tabs positioned in grooves provided in gear. Install remaining rear thrust washer plate on rear of gear and arbor with step in washer facing upward as viewed from rear. *CAUTION – Rear thrust washer must be installed with step on outer diameter facing clockwise as viewed from rear in order to engage lug on inside of case, thus preventing rotation of the thrust washer.* Align tabs of front thrust washer vertically to index with notches in transmission

CONTINUED ON NEXT PAGE

CHRYSLER CORP. HEAVY DUTY SYNCHRO-MESH (C nt.)

case, and with step in rear thrust washer positioned upward. Position cluster gear and arbor assembly in transmission case, making sure thrust washers are not dislodged, and engage thrust washer tabs in case grooves. Insert countershaft into rear bore of case and drive arbor forward out of cluster gear and case. Before driving countershaft all the way into case, be sure keyway is positioned in line with key recess in case, then insert key and drive countershaft all the way into case until key is bottomed in recess.

R v rs Idl r Gear: Insert arbor, Tool C–464, in reverse idler gear and install 22 needle bearings using heavy grease to hold them in position. Place front and rear thrust washers at each end of reverse idler gear and position the assembly in transmission case with chamfered end of gear teeth toward front Insert reverse idler shaft into bore at rear of case with keyway toward rear, pushing arbor toward front of case. Align keyway in shaft with recess in case, then install key and drive shaft in until key is bottomed in recess.

G arshift Ass mbli s: Install two new shift shaft seals in transmission case with Tool C–3650, then install second–third speed shift lever shaft in transmission bore and install tapered shaft retaining pin from top of boss on case. *NOTE – Drive pin in firmly to prevent it working out of hol .* Place interlock parts in position in following order: Ball, sleeve, spring, pin, and ball, then enter low–reverse shift shaft in case bore while using detent ball installer, Tool C–3765 to depress detent ball against spring tension and push shift shaft into position so it prevents detent ball from coming out. Install low–reverse shift shaft tapered pin in case, driving it down firmly from top of boss. Place low–reverse fork in lever shaft with offset toward rear of transmission.

Mainshaft: While holding low–reverse sliding gear in position in fork, with hub extension to rear, insert mainshaft with rear bearing through rear of case and into sliding gear. Place synchronizer stop ring spring and rear stop ring on synchronizer splines of second speed gear on mainshaft, then install synchronizer clutch gear on mainshaft with shoulder to front. Select thickest synchronizer clutch gear snap ring that can be used, and install it in mainshaft groove, making sure it is bottomed all the way around groove. *NOTE– Snap rings are available in four thicknesses.* Check clearance between clutch gear and second speed gear which should be .004" – .011". Hold synchronizer clutch gear sleeve and two outer rings together with pins properly entered in holes in clutch gear sleeve and with clutch gear sleeve engaged in groove of second–third speed shift fork, and position fork in second–third speed shift shaft. While holding synchronizer parts and fork in position, slide mainshaft forward, entering synchronizer clutch gear into clutch gear sleeve and at same time entering mainshaft bearing in case. *CAUTION – If synchronizer parts not properly positioned during installation, it will not be possible to place them in position after mainshaft is is fully in position.* While continuing to hold synchronizer parts in position, tap mainshaft forward until rear bearing bottoms in case. Install rear bearing snap ring in groove in case bore.

Drive Pinion: Place oil slinger on drive pinion with offset outer portion next to drive pinion teeth, then place bearing on shaft with outer snap ring away from gear. Press bearing into position so it is seated firmly against oil slinger and pinion gear. Install bearing snap ring on shaft, making sure it is seated in groove. Coat pilot rollers (15) with heavy grease and install them in cavity of drive gear, then install snap ring. Install a new seal in drive pinion bearing retainer with Tool C–3789 until it bottoms on seat of counterbore, then place synchronizer front inner ring in position in front outer ring, and enter drive pinion through case. Engage splines on rear of pinion with inner stop ring and tap drive pinion into transmission case until outer snap ring on pinion bearing is against transmission case. *NOTE – If synchronizer front inner ring is n t positioned as indicated above, it will not clear count r-shaft drive gear teeth.* Place drive pinion bearing retainer (without gasket) over pinion shaft and against transmission case. While holding retainer with hand pressure against case, measure clearance between retainer and case with a feeler gauge. Select a gasket .003" – .005" thicker than the clearance at this point. Install proper gasket and retainer and tighten bolts to 200 inch pounds.

Extension Housing: Install a new seal in housing with Tool C–3837, then install extension housing and tighten mounting bolts and nuts to 50 ft. lbs. Install parking brake assembly, then install parking brake drum and flange assembly and tighten nut to 175 ft. lbs. Install gearshift operating levers and tighten nuts to 180 inch pounds. Install plug or back–up light switch and tighten securely. Install speedometer cable and drive pinion gear.

CHRYSLER CORP. 6 & V8 STD. SYNCHRO-MESH

D dge & Plym uth 6 & V8 (1961)
Lanc r & Valiant (1961)

►*TRANSMISSION LUBRICATION NOTE:* SAE 80 Multi–Purpose Gear Lubricant or Automatic Transmission Fluid Type "A" (Suffix "A") may be used.

REMOVAL OF TRANSMISSION: Drain lubricant, disconnect propeller shaft, speedometer housing and cable, then disconnect parking brake cable and back–up light switch wires. Install a suitable engine support and raise engine slightly, then disconnect rear support. On 6 Cyl. models, remove crossmember. On all cars, support transmission and remove transmission attaching bolts. Slide transmission to rear until input shaft clears clutch assembly and remove transmission *NOTE – Crossmember is removed with transmission on V8 mod ls.*

DESCRIPTION: Own. Three speed, constant mesh, synchro–mesh (second & high), sliding gear (low & reverse). All helical gear type.

►*OPTIONAL SYNCHRO–MESH TRANSMISSION NOTE:* An optional heavy duty transmission identified by the breather being located at top of transmission case where extension housing bolts to case, and by a raised hump at front of cover, is used on some models. *See "Chrysler & DeSoto (Standard) & Dodge & Plymouth (H avy Duty) Transmission".*

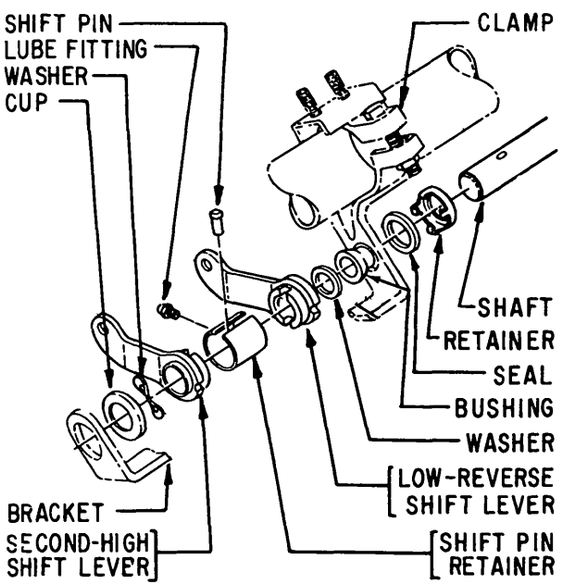
GEARSHIFT LINKAGE ADJUSTMENT: Lancer & Valiant – *See "Valiant Transmission Control Adjustment" in 1960 Annual Data, Pag 409, or lat r Manual ditions.*

Chrysl r, D S t , D dg & Plym uth: 1) Place transmission in neutral, then remove gearshift control rod swivels from both steering column shift levers (at lower end of steering column) by removing retainer clips.

2) Loosen clamp bolts securing shift lever assembly to lower end of steering column. Loosen nuts securing support bracket to firewall and nuts attaching support bracket to steering column clamp. Rotate clamp at lower end of steering column as required until support bracket–to–steering column clamp bolts are at twelve o'clock position, then tighten bolts securing clamp to steering column to 200 inch pounds.

3) Hold steering column housing so it is centered on steering column tube while aligning column support bracket to firewall and to lower column clamp. Tighten stud nuts attaching bracket to firewall and to steering column clamp. *CAUTION – When properly adjusted and tightened, this bracket must hold column centered on steering tube.*

4) Remove lube fitting located between shift levers at end of steering column and rotate retainer sleeve slot to 12 o'clock position exposing cross–over pin and slots in shift levers. Place gearshift selector lever in in neutral position. *NOTE – On cars with heavy duty transmission, a special "interlock pin" attached t steering column clamp engages hole in low–revers shift lever. Mak sur interl ck pin engag s lever on* cars with heavy duty transmission. On other cars, insert a ¼" rod through holes of support bracket and low–reverse shift lever.



1961 DODGE, LANCER, VALIANT SHIFT LEVER ASSEMBLY

CONTINUED ON NEXT PAGE

CHRYSLER CORP. 6 & V8 STD. SYNCHRO-MESH (C nt.)

5) Note position of cross–over pin in slot of retainer between shift levers and align second–high shift lever hub slot with slot in low–reverse shift lever. Move selector lever up and down and make sure cross–over pin moves full length of hub slots. If not, loosen support bracket stud nuts at clamp and one of the column clamp bolts and tap clamp up or down on column as necessary to obtain full travel of pin in hub slots, then tighten clamp and bracket.

6) Locate inter–lock pin (heavy duty transmission), or ¼" rod (standard transmission) so pin or rod is located at center of hole in low–reverse lever, then hold low–reverse lever at this position and adjust control rod swivel until swivel stud enters hole in low–reverse lever. Make sure there is no interference between transmission–to–shift lever low–reverse control rod and clutch linkage, then tighten swivel adjusting nuts (or lock stud as used on some models). Install swivel in low–reverse lever and secure in position with clip.

7) Raise selector lever in neutral position to full upward travel and hold there, then align second–high shift lever hub slot with low–reverse hub slot. While holding second–high lever at neutral position, adjust control rod swivel as required until swivel stud enters hole in second–high shift lever, then install retaining clip.

8) On standard transmission cars, remove ¼" rod from support bracket and low–reverse lever. Start engine and check operation of shift linkage through all gears. Make sure cross–over from low to second is smooth. Rotate retainer sleeve between levers so slot is over lube fitting hole and install lube fitting. Lubricate with chassis lubricant.

OVERHAUL: *See 1960 Annual Data, Page 449, or later Manual edition and note the following:*
Second Speed Gear Endplay – .002 – .011"

COMET & FALCON SYNCHRO-MESH

Comet (1961)
Falcon (1961)

►*1961 TRANSMISSION GRINDING NOISE CORRECTION (EARLY CARS):* This noise which occurs in high gear may be caused by, interference between second and high synchronizer hub and the large gear on forward end of cluster gear. If the noise is aggravated by downward pressure on gearshift lever and disappears with upward pressure, replace second and high shift cam and shaft assembly, Part No. CODR–7280–A, with later type, Part No. C1DR–7280–B. The new cam and shaft assembly has a stop that prevents shifter fork from moving synchronizer hub forward into contact with cluster gear.

DESCRIPTION: Three speed, constant mesh, synchro–mesh (second & high), sliding gear (low & reverse). All helical gear type of same design used on previous models.

REMOVAL OF TRANSMISSION: Remove propeller shaft, then disconnect speedometer cable and gearshift rods at transmission. Remove extension housing to support bolt (on Falcon Station Wagon, remove nuts from insulator retaining bolts and remove brake cable support). Place a jack under flywheel housing and raise rear of engine slightly. *NOTE – On Falcon Station Wagon, loosen two engine rear support bolts on right side and remove bolts from left side.* Remove transmission mounting bolts and install two guide pins in lower holes, then move transmission to rear to clear input shaft and guide pins and remove from car. *NOTE – To prevent oil leakage after propeller shaft removal, install Tool T60K–7657–A (Falcon), 7657–G (Comet). Tool must be removed before transmission can be removed from car.*

OVERHAUL: *See 1960 Annual Data, Page 406, or later Manual edition.*

FORD & MERCURY SYNCHRO-MESH

Ford Pass. Cars (1961)
Mercury (1961)

►*1961 MERCURY TRANSMISSION LOW & REVERSE INTERLOCK LINKAGE PRODUCTION CHANGE:* This new linkage which prevents partial low and reverse gear engagement is installed between clutch release rod and the external low and reverse shift lever on transmission. With the new linkage, it is necessary to fully depress clutch pedal before any movement of low and reverse lever is possible. To adjust linkage, disconnect interlock shift rod at interlock shift lever on transmission, then adjust clutch pedal total travel and freeplay. *CAUTION – Clutch total travel and freeplay must be within specifications before making any interlock adjustments.* With transmission selector lever in neutral position, loosen two bolts attaching interlock wedge to lever, then position wedge so that it freely enters notch of low and reverse shift lever and tighten attaching bolts. Attach interlock shiftrod to shift lever. Make sure clutch pedal is fully released (clutch engaged), and tighten interlock shift rod adjusting nut at interlock shift lever.

►*1961 TRANSMISSION "CLICKING" NOISE CORRECTION:* A clicking noise which centers in area of shift tube may be caused by burrs in low & reverse gear shift fork groove. To correct, file burrs from groove.

►*1961 MERCURY DRIVELINE "THUMP" CORRECTION:* Use a special purpose molybdenum base lubricant on transmission output shaft and driveline splines.

REMOVAL OF TRANSMISSION: Drain transmission and disconnect propeller shaft at rear universal, then slide propeller shaft to rear and remove. Disconnect speedometer cable, and shift rods at transmission. On cars with overdrive, disconnect overdrive wires and control cable. Disconnect parking brake cable and support engine with a jack, then remove engine rear support and crossmember as a unit. Remove transmission–to–flywheel housing attaching bolts and install two guide pins in lower bolt holes. Move transmission to rear until it clears clutch assembly and remove from car.

OVERHAUL: *See 1960 Annual Data, Page 410, or later Manual edition and note the following:*

Bolt Torque Specifications: As follows:

Location	Ft. Lbs. Torque Ford	Mercury
Extension Housing–to–Case	37–42	42–50
Shift Cover–to–Case	12–15	14–19
Shift Lever–to–Shaft	12–15	14–19
Front Bearing Retainer	12–15	19–25

TRANSMISSION CONTROL ADJUSTMENT: With selector lever in neutral and transmission shift levers in neutral detent, disconnect shift control rods at lower end of steering column. Center both shift levers at lower end of steering column in steering column tube slot, then rotate each shift rod clevis as necessary for clevis pin to freely enter holes in their respective shift levers. Install shift rod clevis on shift lever. When properly adjusted, transmission selector lever should move freely forward and backward in neutral without binding. Tighten locknut on shift rod ends.

FORD TRUCK 3-SPEED SYNCHRO-MESH

Ford Trucks (1961)

DESCRIPTION: Same design as used on previous models.

REMOVAL OF TRANSMISSION: Drain lubricant, disconnect speedometer cable, propeller shaft, and gearshift linkage at transmission. On propeller shaft type parking brake, disconnect cable clevis at cam and remove cable conduit clamp. On models with overdrive transmission, disconnect wires and control cable at transmission. On 4–Wheel Drive models, remove transfer case shift lever bracket from transmission. On all models, remove transmission attaching bolts and install guide studs, then pull transmission rearward until input shaft clears clutch assembly and remove transmission.

OVERHAUL: *See "Ford Truck 3–Speed Light & Medium Duty" or "Ford Truck 3–Speed Heavy–Duty" in Transmission Section of Manual.*

FORD TRUCK 4-SPEED SYNCHRO-MESH

Ford Trucks (1961)

DESCRIPTION: Same design as used on previous models.

REMOVAL OF TRANSMISSION: On all models except Tilt–Cab, remove floor mat and accelerator pedal, then remove transmission cover plate. Disconnect parking brake and remove gearshift housing. On Tilt–Cab models, disconnect parking brake rod at transmission and remove rear cross–shaft housing. On all models, disconnect drive shaft and speedometer cable, then remove two upper transmission attaching bolts and secure jack to transmission. Remove remaining transmission attaching bolts and slide transmission rearward to clear clutch assembly and remove from truck.

OVERHAUL: *See "Ford Truck 4–Speed (Synchro–mesh)" in Transmission Section of Manual.*

FORD ECONOLINE TRUCK 3-SPEED SYNCHRO-MESH

F rd Ec n lin Trucks (1961)

DESCRIPTION: Three speed, constant mesh, synchro–mesh (second & high), sliding gear (low & reverse), all helical gear type. Transmission gearshift levers and assemblies are integral with transmission side cover.

REMOVAL OF TRANSMISSION: Drain transmission and remove propeller shaft, then disconnect speedometer cable and shift rods at transmission. Support engine with a jack and remove rear support anchor bolt and nut, then lower engine to clear support. Remove transmission attaching bolts and move transmission to rear to clear clutch assembly and remove from truck.

DISASSEMBLY: 1) Mount transmission in a holding fixture and drain lubricant, then remove gearshift housing and gasket from transmission. Remove shift forks from collars on gears.

2) Remove extension housing retaining bolts, then remove input shaft bearing retainer from front of case. Slide input shaft assembly slightly forward to disengage shaft assembly fron synchronizer, then slide synchronizer and intermediate gear forward on output shaft sufficiently to disengage intermediate gear from cluster gear. Remove extension housing and output shaft as an assembly from case.

3) Remove synchronizer hub snap ring from output shaft, then remove synchronizer assembly, intermediate gear, and low–reverse sliding gear from output shaft. Remove output shaft bearing snap ring from extension housing and remove housing from output shaft.

4) Remove speedometer gear snap ring, speedometer drive gear, and speedometer drive gear ball from output shaft. Use a brass drift and drive reverse idler shaft and roll pin out of transmission case, then remove reverse idler gear.

5) Drive countershaft rearward out of cluster gear and transmission case with Tool T55P–7111–A. *NOTE – Ke p tool in contact with countershaft during removal op ration to pr v nt roller bearings and washers falling out of plac .* Allow cluster gear and countershaft removing tool to drop to bottom of transmission case.

6) Remove input shaft, bearing and drive gear from transmission case, then remove cluster gear and tool assembly from bottom of case. Remove washers, rollers, spacer and tool from cluster gear.

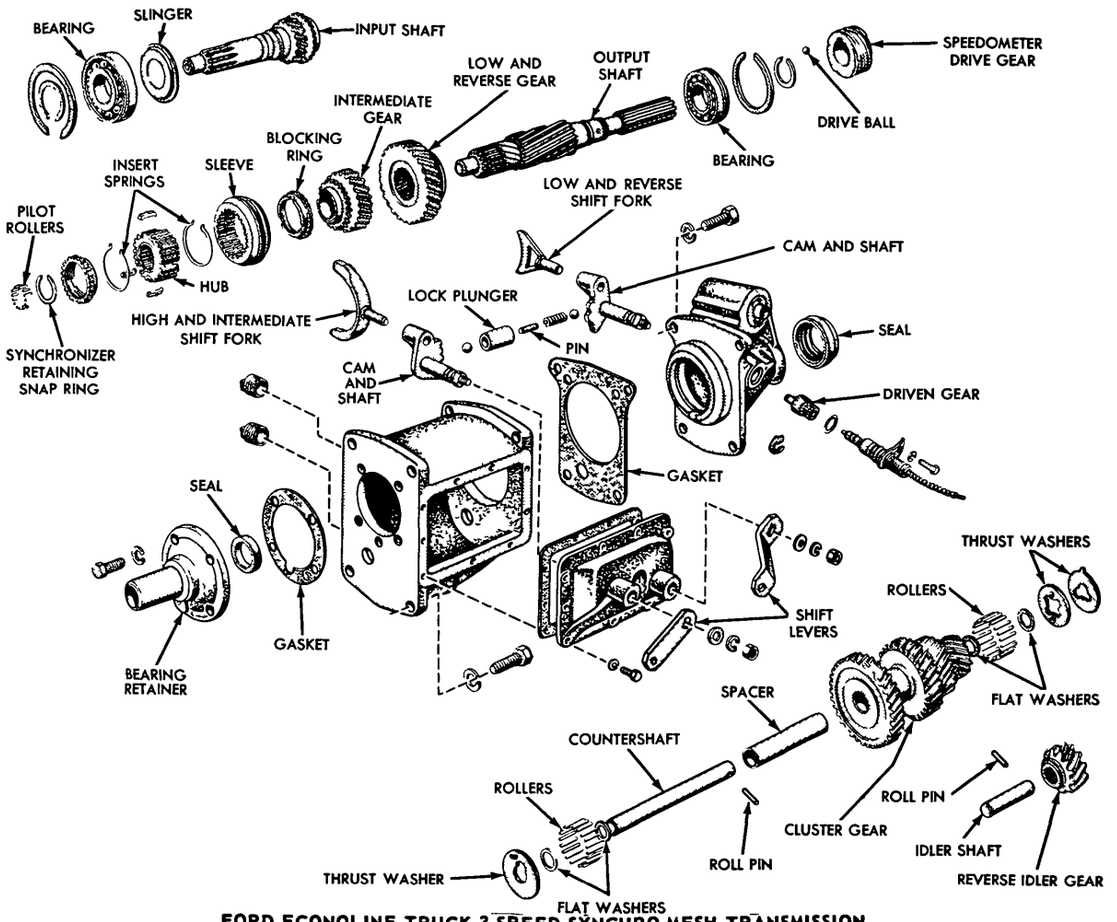
INSPECTION: Wash all parts, except ball bearings in solvent and blow dry with air. Use clean solvent and clean all lubricant from ball bearings, then hold bearing from rotating and blow dry with air. Lubricate bearings with transmission lubricant and cover with a clean cloth until ready for installation. Inspect all parts for damage or wear and replace as necessary. Inspect reverse idler bushing for wear. If bushing is worn, a new reverse idler gear must be installed. Check fit of low–reverse sliding gear on splines of output shaft and replace either or both parts if wear is excessive. Check endplay between cluster gear and thrust washers of transmission case and replace thrust washers if clearance is not within limits of .0045–.0185".

Input Shaft B aring R plac m nt: Remove inner snap ring retaining bearing to input shaft and outer snap ring retaining bearing to case, then position input shaft and bearing assembly on an arbor press and press shaft from oil slinger and bearing. To install, position new bearing and oil slinger on input shaft (snap ring groove in outer bearing race toward front end of shaft), then place Tool T53T–4621–B on input shaft and install the assembly in an arbor press and press shaft into bearing and slinger. *NOTE – Use a block between press ram and synchronizing cone of input shaft to prevent damage to shaft.* Install inner retaining snap ring on shaft, then transfer bearing–to–case snap ring to new input shaft bearing.

Output Shaft Bearing Replacement: Remove bearing retainer snap ring, then install Tool T57L–4621–A over large diameter end of shaft against bearing. Install shaft assembly in an arbor press (with large diameter of shaft downward) and press shaft through bearing. To install, position new bearing on shaft, then install Tool T53T–4621–B against bearing and position the assembly in an arbor press (with small diameter of shaft downward) and press shaft into bearing. Install bearing retaining snap ring.

Oil Seal R plac ment: Input Shaft – Remove seal with Puller T58L–101–A and a slide hammer, then install seal with Tool T60K–77047–A and an arbor press.

Output Shaft – Remove oil seal from extension housing with Puller 1175AE and a slide hammer, then install new seal with Tool 61L–7657–C.



FORD ECONOLINE TRUCK 3-SPEED SYNCHRO-MESH TRANSMISSION

TRANSMISSION REASSEMBLY: 1) Insert spacer and Tool T55P–7111–A into cluster gear assembly, then position one flat washer at each end of spacer. Apply grease to needle bearings, and assembly fifteen needle bearings against flat washer and around Tool T55P–7111–A at each end of cluster gear. Grease the other two flat washers and the three flat washers. Assemble a flat washer against outer end of needle bearings at each end of cluster gear, then assemble front thrust washer and inner rear thrust washer at front and rear ends of cluster gear. *CAUTION – Note positi n of tangs on thrust washers.*

2) Position cluster gear and countershaft tool assembly in bottom of case, then install outer rear thrust washer. Assemble thirteen needle bearings in input shaft assembly and retain in place with grease, then install front synchronizer blocking ring on input shaft and install shaft in front of case.

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ECONOLINE TRUCK 3-SPEED SYNCHRO-MESH (Cont.)

3) Slightly raise cluster gear assembly so that countershaft tool will be in alignment with countershaft holes in case, position countershaft against tool in cluster gear and drive countershaft forward into cluster gear and case. *CAUTION – As countershaft is being driven in, make sure roll pin in shaft is aligned with retaining slot in case.*

4) Position and hold reverse idler gear in case, and insert idler shaft through rear of case and reverse idler gear bore. Drive shaft into position, making sure that roll pin is aligned with retaining slot in case. Place speedometer gear retaining ball in detent in output shaft, and install speedometer drive gear and retaining snap ring.

5) Position output shaft and bearing assembly in extension housing, and install output shaft bearing–to–extension housing snap ring. Assemble low–reverse sliding gear and intermediate gear on output shaft. Assemble the three inserts in synchronizer hub and secure them in place with the two insert springs, then slide hub assembly into intermediate and high sleeve. Install one synchronizer blocking ring into rear side of hub assembly (rear side of hub assembly has shortest length of hub protruding).

6) Place sleeve and hub assembly on output shaft with blocking ring end of assembly butted against intermediate gear. Install snap ring that retains synchronizer hub to output shaft.

7) Coat a new extension housing gasket with sealer and install on extension housing. Position forward end of output shaft into opening of input shaft and tap end of shafts slightly to seat them in place. *CAUTION – Be careful not to dislodge any of the roller bearings in end of input shaft.* Install extension housing bolts (coat lower left hand bolt threads with sealer), then tighten to 37–42 ft. lbs. (7/16" – 14), 28–38 ft. lbs. (3/8" – 16).

8) Install input shaft bearing retainer and tighten bolts to 12–15 ft. lbs. Place low–reverse shift fork in collar of low–reverse sliding gear, making sure that offset of shaft is positioned toward front of transmission, then place first–intermediate shift fork in collar of intermediate and high sleeve.

9) Fill transmission, then coat gearshift housing gasket with sealer and install on shift housing. Install shift housing and make sure that shift forks index with shift shaft assemblies. Tighten housing–to–case bolts to 10–13 ft. lbs.

GEAR SHIFT HOUSING: Disassembly – Remove shift levers from shaft assemblies, then pull shifter fork and shafts out of gear shift housing. As shafts are removed, interlock balls, retainer, and spring will fall out of housing.

Reassembly: Install new seal rings in grooves in shift shafts, then lubricate shaft bores in housing, install one shaft assembly. Assemble interlock spring and one ball in interlock and install interlock assembly in gear shift housing. Install other ball in position, then install other shift shaft in housing. Place a new gasket on transmission case and retain in place with sealing compound. Shift high–intermediate sleeve and low–reverse gear to neutral positions, then place shifting forks in neutral position. Install gear shift housing on transmission and tighten bolts to 10–13 ft. lbs.

TRANSMISSION CONTROL: Adjustment – Loosen trunnion nuts at transmission shift levers enough to allow rods to slide in trunnions. Insert a ¼" drill rod through pilot hole in shift tube floor mounted bracket until it enters adjustment hole of both upper and lower shift lever, then place transmission shift levers in neutral position and tighten trunnion nuts. Remove ¼" rod and check operation in all shift positions.

WARNER SYNCHRO-MESH TRANSMISSIONS

Car & Model	Transmission Model
Checker Superba	T–90
Rambler 6 Cyl.(Series 6101 & Std.6110)	T–96
Rambler 6 Cyl.(Series 6110 Hvy. Duty)	T–86
Rambler V8 (Series 6120)	T–86
Rambler V8 (Series 6180)	T–89
Studebaker 6 Cyl. (Exc. Taxi)	T–96
Studebaker 6 Cyl. (Taxi)	T–90
Studebaker V8 (Exc. Taxi)	T–86
Studebaker V8 (Taxi)	T–89
Willys 4–Wheel Drive	T–90
Willys 4 Cyl. 2–Wheel Drive	T–96
Willys 6 Cyl. 2–Wheel Drive	T–86

► *NOTE: Transmission model number is cast in side of transmission case.*

► *1961 RAMBLER GEARSHIFT LEVER BIND CORRECTION (DOUGLAS TYPE LINKAGE):* If this condition occurs when shifting from low to second gear, adjust shift linkage *(see "Rambler Transmission Control" in 1960 Annual Data or later Manual edition).* If the binding condition still exists, proceed as follows Remove pivot pin from gearshift lever and remove lever, then enlarge pivot pin holes in gearshift housing to .201" (No. 7 drill). *NOTE – Pivot pin should rotate in housing and be tight in shift lever.*

► *1961 RAMBLER "T–96" TRANSMISSION PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Later transmissions have been changed in some details. Do not install a later type mainshaft (output shaft) in an early transmission. Later shafts are identified by a 1/32" groove at front spline of shaft, approximately ½" to rear of synchro–clutch snap ring groove. This groove is visible after synchro–clutch removed.

► *1961 STUDEBAKER SYNCHRO–MESH TRANSMISSION (EXC. V8 TAXI & OVERDRIVE) REAR BEARING RETAINER SNAP RING PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION.* A new tubular steel snap ring retainer, Part No. 1554136(T–96 Trans.), No. 1554137 (T–86 & T–90 Trans.) is used in production and should be installed on all previous 1958–61 transmissions to prevent snap rings from coming out of grooves. When installing a tubular snap ring retainer, install new snap rings behind rear bearing and in front of speedometer gear. The rear bearing snap ring is a selective fit and the thickest snap ring that will seat in groove must be used (do not over expand or distort ring). On T–86 and T–90 transmissions a spacer washer, Part No. 1554138 must be installed in front side of extension housing adapter plate. Install tubular snap ring retainer over rear bearing snap ring and speedometer gear front snap ring, then install speedometer drive gear ball and drive gear and complete reassembly of transmission.

DESCRIPTION: Same design as used on previous models.

TRANSMISSION REMOVAL: Rambler – On Rambler American, disconnect rear spring front brackets from floor pan, brake hose bracket, and brake cable at equalizer. On other models, disconnect brake tube bracket from floor pan, parking brake cable at equalizer, and cable housing at torque tube bracket, then disconnect torque tube from transmission. On all models, disconnect shock absorber at lower mounting and move rear axle assembly to rear, disengaging drive line from transmission. Disconnect shift levers, speedometer cable (and overdrive cable and wires if so equipped). Remove transmission attaching bolts and install two guide pins, Tool J–1434, in upper bolt holes, then slide transmission back to clear clutch assembly

Studebaker: Disconnect propeller shaft at rear joint flange and slide it out of transmission housing. Disconnect rods at transmission levers, and speedometer cable at transmission housing, then remove speedometer pinion. Remove clutch operating shaft, bracket, and bearing at transmission, then support transmission and remove attaching bolts. Move transmission back to clear clutch assembly and remove from car.

Willys (2–Wheel Drive): Disconnect shift rods at transmission levers, and speedometer cable at transmission (and overdrive cable and wires if so equipped). Disconnect propeller shaft at front universal. Remove support at rear of overdrive and take out overdrive governor. Position jack under engine for support and remove frame crossmember with insulators attached. Back out transmission attaching screws as far as possible yet support transmission, then pull transmission back to provide an opening between it and bell housing. Insert a long screwdriver through opening in side of bell housing and pry clutch release fork from engagement with release bearing carrier. Remove transmission attaching screws and pull transmission back to clear bell housing, then remove from car.

Willys (4–Wheel Drive): Drain transmission and transfer cases, then remove access cover from floor pan and remove gearshift housing (Exc. models with remote control). On Remote control models, disconnect shift linkage at transmission. On all models, remove transfer case shift lever pivot pin, shift levers and springs. *NOTE – If equipped with power take–off, remove shift lever plate and lever.* Disconnect propeller shafts at transfer case (disconnect end of power take–off shaft at transfer case if so equipped). Disconnect speedometer cable at case, then disconnect hand brake cable. On Forward Control models, disconnect clutch release cable at bellcrank. On all models, place jacks under transmission and engine and remove nuts attaching rear mounting to frame crossmember, then remove transfer case snubbing rubber bolt at crossmember. Remove engine rear support crossmember, then remove transmission attaching bolts. Force transmission to right side to disengage clutch control lever tube ball joint, then lower jacks under engine and transmission and slide transmission and transfer case toward rear until clutch shaft clears bell housing.

OVERHAUL: *See 1959 Annual Data, Page 398, or later Manual editions and note the following*

Rambler Series 6110 Heavy Duty (Warner T–86): Overhaul procedures same for Model T–86 trans on Series 6120

BUICK SPECIAL AUTOMATIC TRANSMISSION

Buick Special, Series 4000 & 4100 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: The engine cannot be started by pushing (or pulling) car. If necessary, a "booster" battery must be used.*

►*TOWING BUICK AUTOMATIC TRANSMISSION CARS:* Cars may be towed (or pushed) for short distances with transmission in "N" (Neutral) and at a speed not to exceed 25 MPH. If cars are to be moved any extended distance, rear wheels should be raised off ground or the drive line should be disconnected at the rear. *CAUTION - When drive line is disconnected, it must be suitably supported to prevent damage to center universal joint.*

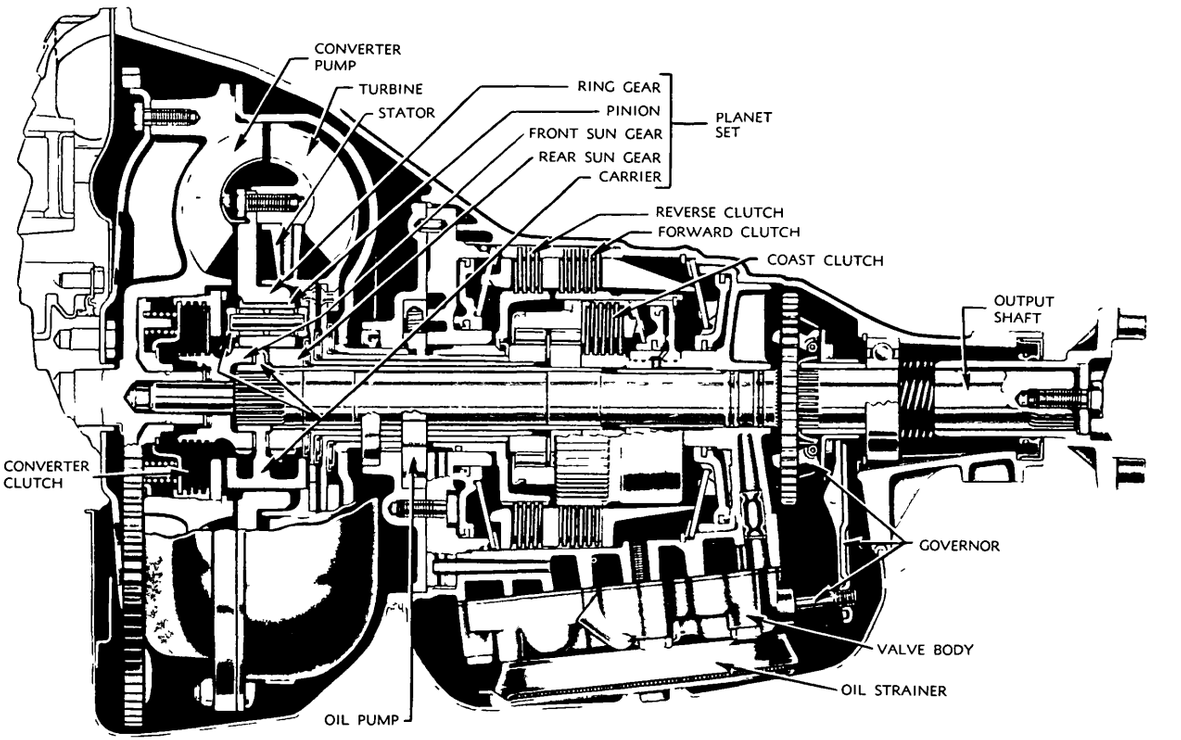
►*1961 BUICK SPECIAL TRANSMISSION OUTPUT SHAFT CHANGE (To Prevent Torque Converter Slipping Out of Transmission During Handling):* A groove has been added to output shaft for a retaining ring which will prevent torque converter slipping out of transmission. When changing an early transmission output shaft to a later type shaft, the Front Sun Gear must also be changed.

►*1961 BUICK SPECIAL TRANSMISSION COMPANION FLANGE REMOVAL OR SEAL REPLACEMENT NOTE:* When companion flange is removed or companion flange seal is installed, fill space between lips of seal with a good grade wheel bearing grease to prevent entrance of moisture.

►*1961 BUICK SPECIAL AUTOMATIC TRANSMISSION VENT PRODUCTION CHANGE & SERVICE REPLACEMENT ON EARLIER CARS NOTE:* Beginning with approximately Nov. 15, 1960 production, a new vent, Part No. 1389690, consisting of a pipe and captive nylon float was installed. The new vent prevents entry of water into transmission should car be driven through water. The new type vent can be installed on earlier cars by removing early vent and pressing new vent into place and installing retainer clip under filler pipe retaining bolt.

►*1961 BUICK SPECIAL COMPANION FLANGE & SPEEDOMETER DRIVE GEAR PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Starting with Transmission Code No. C-074, a shorter companion flange, Part No. 5676065 (2.48" from inner end to flange shoulder) and a longer speedometer drive gear, Part No. 1349889 (.800" overall length) were used in production replacing the former companion flange (2.60" from inner end to flange shoulder) and speedometer drive gear (.675" overall length). As the early type parts will not be furnished for service replacement, it will be necessary to install both the later type companion flange and speedometer drive gear if it is necessary to install either of these parts on early cars.

►*1961 BUICK SPECIAL REVERSE CLUTCH PISTON HOUSING PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A new reverse clutch piston housing, Part No. 1348645 is being used in production beginning with Transmission Code No. C-177. When installing this new assembly, the new larger assembly ring, Part No. 1348648 must also be installed. DO NOT use the earlier (smaller) assembly ring with the new housing.



BUICK SPECIAL AUTOMATIC TRANSMISSION SECTIONAL VIEW

►*1961 BUICK SPECIAL AUTOMATIC TRANSMISSION PRODUCTION CHANGES & SERVICE REPLACEMENT CAUTIONS:* Starting with Transmission Code No. C-091, one or more of the following changes will be made during production.

Production Change No. 1 (Converter Pump & Attaching Bolts) - A new Converter Pump, Part No. 1388552 which provides more space between front sun gear and converter pump center stool will be used in production and for service replacement on earlier models. The new converter pump requires the use of an extra one or two select fit bearing races forward of the needle bearing to obtain .010" loose to .005" tight fit required (see "Converter Clearance Check" below). 1¼" long flywheel-to-converter pump attaching bolts are used with the new converter pump. *CAUTION - Do not use earlier (¾" long) bolts with later type converter pump or use later (1¼" long) bolts with early converter pump.*

Production Change No. 2 (Front Sun Gear) - A new Front Sun Gear, Part No. 1348813, having a larger inside diameter counterbore will be used in production and for service replacement on earlier models. This later sun gear will accommodate either needle thrust bearing (see "Production Change No. 3" below) and adjustment for converter pump-to-sun gear clearance is made by using one or two extra races as noted in "Production Change No. 1" above. *NOTE - For identification, early sun gear has a "stepped" inside diameter while the later sun gear is counterbored to its full depth.* If a later type converter pump is being installed in an early transmission (before C-091), then front sun gear may be changed to the later type and thus permit installation of a heavier needle thrust bearing (see "Production Change No. 3" below).

Production Change No. 3 (Needle Thrust Bearing) - A new Needle Thrust Bearing, Part No. 1348816 will be used between later type converter pump and later type sun gear (see "Production Changes No. 1 & 2" above). This later thrust bearing has a larger outer diameter and is thicker than the early type and will require use of only one select fit bearing race forward of the bearing. *(NOTE - A .032" thick race is always used to rear (sun gear side) of new thrust bearing). INSTALLATION NOTE - To permit installation of this new larger needle thrust bearing, front sun gear must be the later type having the larger counterbore.*

►*SERVICE REPLACEMENT CONVERTER PUMP BALANCING NOTE:* These units are balanced, however, when installed, unbalance in pump housing may cause vibration. If vibration is objectionable, see "Balancing" below.

DESCRIPTION: Two-speed hydraulically controlled transmission and air cooled torque converter assembly which provides automatic upshifting and downshifting

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BUICK SPECIAL AUTOMATIC TRANSMISSION (C nt.)

between "low" and "direct" when transmission selector lever is in "D" (Drive) range. The torque converter assembly is integral with the transmission, and contains, in addition to a converter pump, turbine, and stator, a planetary gear set and a converte r clutch. Other transmission components are as follows:

C nverter Clutch: Multiple disc type housed in the center of converter pump assembly, and when engaged, couples engine driven converter pump to front sun gear (part of engine torque is transmitted directly to planetary gear set, bypassing the torque converter). Engagement of converter clutch is controlled by car speed and throttle opening. During light throttle acceleration, converter clutch will engage at approximately 16 MPH and under full throttle at approximately 64 MPH.

F rward Clutch: Multiple disc type. When engaged ("D" and "L" ranges) locks cam of stator and sun gear overrunning clutches to transmission case. During operation in "L" range, the forward and coast clutches are engaged, coupling rear sun gear through coast clutch housing to the forward clutch and transmission case.

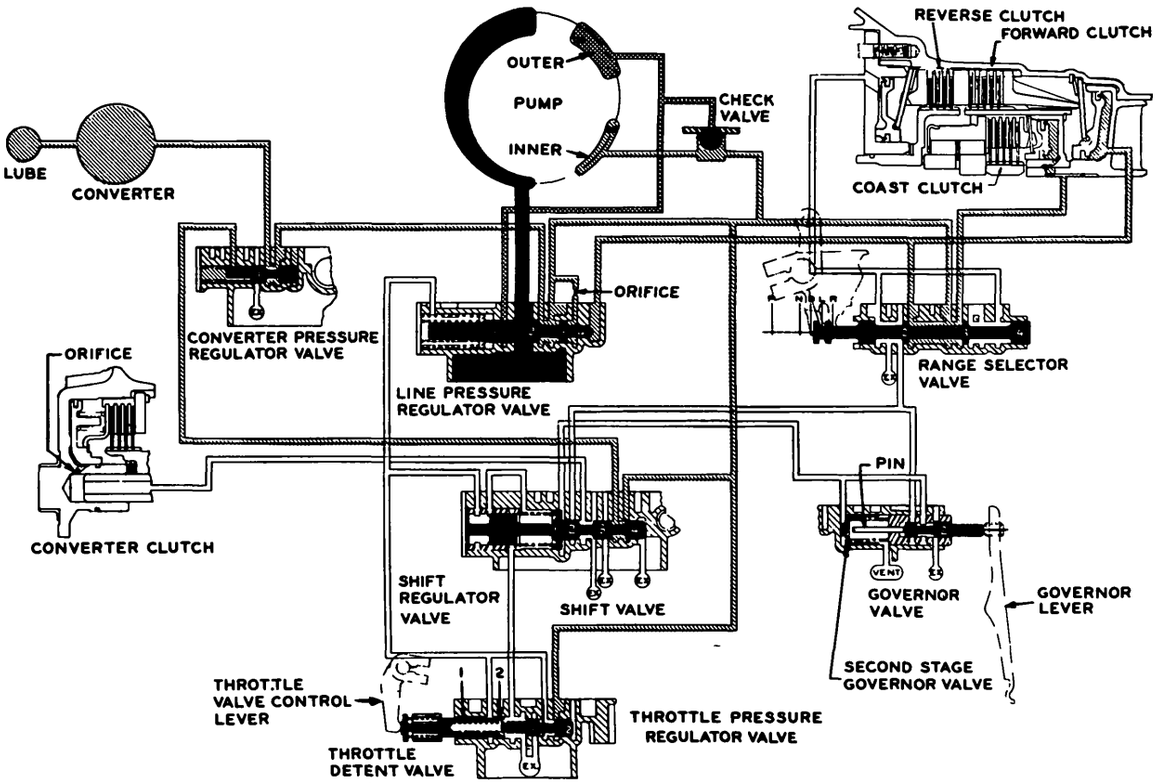
Coast Clutch: Multiple disc type. When engaged, the clutch couples rear sun gear to overrunning clutch cam. The externally splined clutch plates in the clutch pack are splined to coast clutch housing which also engages the internally splined plates of forward clutch pack. Coast clutch is engaged in all operating ranges except "D" (Drive).

R verse Clutch: Multiple disc type. When engaged, the clutch couples converter turbine and planet set ring gear to transmission case. Reverse clutch is engaged in "R" (Reverse) range only.

Overrunning Clutches: Stator and sun gear are connected by coaxial shafts to overrunning clutches that allow rotation of these parts in relation to the clutch cam in one direction only (with the engine). The overrunning clutch cam is attached to forward clutch internally splined and the coast clutch externally splined plates so the cam may be locked to transmission case (in "D" or "L" range) or coupled to rear sun gear shaft through the coast clutch (all ranges except "D").

OPERATION: Drive Range - With engine idling, the forward clutch is engaged and all other clutches are disengaged. As throttle is opened and car speed increases, governor increases pressure in hydraulic circuit and and tends to engage converter clutch. A counter hydraulic circuit controlled by throttle opening also affects engagement of converter clutch (light throttle allows converter clutch to engage at low speeds while heavy throttle delays engagement until higher speeds are reached). With converter clutch engaged, converter pump hub is connected to front sun gear and approximately 36% of engine torque is transmitted mechanically to the gear set through front sun gear, while converter turbine continues to transmit torque to gear set through the ring gear.

Revers Range: With engine running, the reverse and coast clutches are engaged and all other clutches are disengaged. Engagement of reverse clutch locks turbine to transmission case, while coast clutch engagement couples overrunning clutch cam to rear sun gear.



BUICK SPECIAL AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

As engine speed is increased, converter oil passes through turbine and is discharged at its center, spinning opposite engine rotation. The oil then strikes the stator blades and causes the stator to turn opposite engine rotation. The stator overrunning clutch transmits torque to overrunning clutch cam and coast clutch; and from coast clutch to rear sun gear through rear sun gear shaft. Rotation of rear sun gear shaft opposite engine rotation causes planet pinions to rotate around ring gear and transmit torque to planet carrier which is splined to output shaft.

Low Range: With engine idling, forward and coast clutches are engaged; reverse and converter clutches are disengaged. Engine torque is transmitted to output shaft through the gear set in same manner as in "D" range before engagement. In "L" range, however, converter clutch remains disengaged regardless of throttle opening or car speed. Also, the rear sun gear is prevented from free wheeling even on deceleration (allowing the use of "L" range to slow the car as when decending steep grades).

N utral & Park Ranges: Coast clutch is engaged and all other clutches ar e disengaged. In "P" range, the parking lock pawl is engaged with ratchet wheel on output shaft. Engagement of coast clutch couples rear sun gear to overrunning clutch cam, preventing relative motion between sun gear and clutch cam. With ring gear turning with engine and rear sun gear turning opposite engine rotation, planet pinions are turning at relatively high speed (no engine torque is transmitted to planet carrier and output shaft).

LUBRICATION

LUBRICATION: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level: Check level with transmission at normal operating temperature. With engine idling and transmission selector lever in "P" (Park) position, transmission oil level should be at "Full" mark on dipstick (dipstick located under right side of hood in engine compartment). If oil level is below "Add" mark, add sufficient Automatic Transmission Fluid Type "A" (Suffix "A") to bring level to "Full" mark. *CAUTION - Do not fill transmission abov "Full" mark.*

Draining & Refilling: *CAUTION - Accurate foot pound and inch pound reading torque wr nch s must be us d.* Remove single bolt and seal attaching oil pan to transmission case and drain transmission, then remove oil pan and seal. Remove two oil strainer strap bolts and remove strainer and "O" ring seal. Install a new strainer and "O" ring seal and tighten strainer strap bolts to

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100 inch p unds xactly. DO NOT OVERTIGHTEN. Clean oil pan and install a new seal on oil pan being careful not to stretch seal, then install oil pan and seal, oil pan bolt and seal, and tighten oil pan to case bolt to 15-20 ft. lbs. DO NOT OVERTIGHTEN. Add 5 pints of oil to transmission, then start engine and allow to idle in neutral. Immediately add oil to bring level up to ½" below full mark. With engine at normal operating temperature, add oil to bring level up to full mark on dipstick.

Capacity - Approximately 6 qts.

LINKAGE ADJUSTMENT

ADJUSTMENTS: Thr ttl Linkage - *See CARBURETOR on Car Mod l pag .*

Manual Linkage: Loosen adjusting swivel on selector lever bellcrank and place transmission selector lever in neutral detent. Move shift lever against neutral stop and tighten adjusting swivel clamp nut.

TESTING

TESTING: R ad T st - With throttle and manual linkage properly adjusted and engine at normal operating temperature, accelerate from a stop with accelerator pressed just to detent. Upshift should occur smoothly at 40-45 MPH. If upshift occurs at speeds other than those specified, see "Trouble Shooting & Diagnosis" below.

TROUBLE SHOOTING & DIAGNOSIS

TROUBLE SHOOTING & DIAGNOSIS: Upshift At Too Low Sp d - Governor valve not adjusted properly or is sticking. Shift valve or shift valve regulator sticking. Throttle valve pressure too low (worn or broken spring or valve sticking).

Upshift At T High Sp ed: Governor valve not adjusted properly or is sticking. Shift valve or shift valve regulator sticking. Throttle valve pressure too high (valve sticking).

Sl w Engag m nt f C nv rter Clutch: Converter pressure regulator valve sticking (lowering converter pressure too slowly).

Fast Engag m nt f Conv rt r Clutch: Converter charging pressure too low. Converter pressure regulator valve sticking.

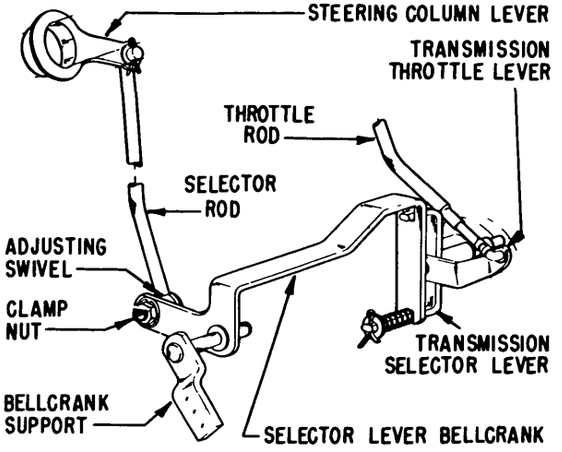
REMOVAL & INSTALLATION

►*1961 BUICK SPECIAL TRANSMISSION SUPPORT PRODUCTION CHANGE & SERVICE INSTALLATION NOTE:* In later production cars, .060" shims, Part No. 1349321 are being installed between right end of support and side rail to fill a gap and prevent misalignment of engine front mounts. When installing a transmission support, if a gap exists between right end of support and side rail, fill space with the above shims.

R m val: 1) Raise car and support front and rear, then disconnect exhaust crossover pipe at both ends and at transmission, then remove pipe.

2) Remove universal joint "U" bolts and slide front propeller shaft rearward to separate universal joint at transmission. Support weight of propeller shaft.

3) Place a jack under transmission and fasten securely to transmission, then remove transmission mounting pad to crossmember bolts. Remove transmission support crossmember to frame rail bolts and remove crossmember.



MANUAL SELECTOR LINKAGE

4) Disconnect speedometer cable, then remove shift linkage equalizer from transmission range selector outer lever. Remove transmission filler pipe, then support engine at oil pan and remove transmission converter housing cover.

5) Mark flywheel and converter for reassembly in same position, and remove three converter pump to flywheel bolts. Remove transmission case to engine block bolts.

6) Move transmission to rear for clearance between converter pump and engine crankshaft, then lower transmission out of car. *CAUTION - Wire converter assembly to transmission case to prevent it falling out if transmission is tilted forward (early cars). See "Output Shaft Change" above.*

Installation: *CAUTION - Before installing transmission assembly in car, wire converter assembly to transmission case to prevent it falling out if transmission is tilted forward (early cars). See "Output Shaft Change" above.*

1) Install transmission on a suitable jack and raise transmission into position for installation on engine block. Remove wire holding converter to transmission, then rotate converter to align it with marks made on flywheel and converter when removed.

2) Install transmission case to engine block bolts and tighten to 30-35 ft. lbs. *CAUTION - Do not overtighten.* Install flywheel to converter pump bolts and tighten to 18-25 ft. lbs.

3) Install transmission support crossmember and install transmission to mounting pad bolts, then remove transmission jack and engine support. Install transmission converter housing cover.

4) Install filler pipe and clamp using a new "O" ring seal. Reconnect speedometer cable, then connect front propeller shaft to transmission companion flange and install "U" bolts. Reinstall exhaust crossover pipe and refill transmission. *See "Draining & Refilling" above.*

TORQUE CONVERTER & GEAR SET REMOVAL & INSTALLATION

REMOVAL & DISASSEMBLY: 1) Assemble transmission to a suitable holding fixture, then remove converter pump to housing bolts and nuts. Raise transmission horizontal position (catch oil as it drains out), then pry converter pump away from housing using a screwdriver in slots provided.

2) Remove converter pump and converter clutch assembly and allow to drain. Remove front sun gear, needle thrust bearing, and two select fit needle bearing races. Slide planet carrier out of ring gear and set on a clean working surface.

3) Separate front and rear tanged thrust washers from planet carrier assembly and examine washers for scoring or wear. Check planet pinions for scoring, imbedded metal or looseness on shaft. *NOTE - If pinions are loose, replace carrier assembly. Pick out imbedded metal with a small screwdriver.*

4) With transmission vertical, remove rear sun gear and needle thrust bearing. Check gear for scoring or imbedded metal (pick out imbedded metal with a small screwdriver). Check babbitted inner surfaces of gear shaft for chipping or flaking. If either of these conditions exist, rear sun gear must be replaced. Check needle thrust bearing for looseness and wear.

5) Lift turbine and stator assembly and turbine needle thrust bearing out of housing, then lift converter pump housing out of transmission and set housing hub through hole in bench.

6) *NOTE - For convenience, it is advisable to set turbine and stator assembly in pump housing before proceeding with further disassembly.* Use a ½" socket wrench to remove three bolts attaching ring gear to turbine, then lift out ring gear and examine for wear, scoring, or imbedded metal (pick out imbedded metal with a small screwdriver).

7) Lift stator and needle bearing out of turbine and check for chipped, cracked, or broken vanes. Check babbitted inner surface of stator shaft. If babbitt is scored or flaked, stator must be replaced. Check needle thrust bearing for wear or looseness.

8) Lift turbine and needle thrust bearing out of converter pump cover and examine turbine for chipped, cracked, or broken vanes. Examine babbitted inner surfaces of turbine shaft. If babbitt is chipped or flaked, the turbine must be replaced. Examine converter pump hub for scoring, burrs or roughness that might damage pump seal or pump bushing when reinstalled.

9) Pry converter clutch housing retaining ring out of groove in converter pump, then lift converter clutch housing out of pump. Examine clutch plate contact surface for wear or scoring. Remove converter clutch pack and examine for scoring warping or excessive wear.

10) Remove converter clutch piston and apply plate with a pair of pliers. Examine plate for scoring or excessive wear. Check piston bore in converter pump for pitting or scoring. Check inner bore of piston for wear or scoring. *NOTE - Piston and apply plate are serviced as an assembly only.*

11) Unhook, expand and remove converter clutch piston inner ring and examine it for wear or scoring. Remove

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BUICK SPECIAL AUTOMATIC TRANSMISSION (C nt.)

and examine converter clutch outer piston rings for cracks or excessive wear.

CONVERTER CLEARANCE CHECK: 1) Set converter pump housing hub throug hole in bench, then place turbine and needle thrust bearing that will be used at final assembly in pump housing. Set stator and needle thrust bearing that will be used at final assembly in turbine.

2) Set ring gear in place on turbine. *NOTE - Bolt holes are spaced unevenly so gear can be installed in one position only.* Install and tighten bolts to 25-30 ft. lbs. Install sun gear and needle thrust bearing that will be used at final assembly, then install tanged thrust washers in front and rear planet carrier (tangs on washers must engage drilled holes in carrier). Set carrier assembly with tanged thrust washers in place on rear sun gear hub. *NOTE - Deep side of carrier as s mbly toward rear sun gear.*

3) Examine front sun gear for wear, scoring or imbedded metal (pick out imbedded metal with a small screwdriver). Make sure tanged thrust washer is in place on forward side of planet carrier, then set front sun gear in place on planet carrier. Set needle thrust bearing that will be used at final assembly and two select fit needle thrust bearing races in place on top of front sun gear.

4) Set converter clearance gauge J-9157 on pump housing with **longer legs down** on housing. Loosen thumb screw and push plunger down to bear on needle thrust bearing and races, then tighten thumb screw.

5) Turn gauge J-9157 over **(short legs down)** and set in place on converter pump. Assemble dial indicator to post with indicator bearing on plunger, then "zero" the indicator. Loosen plunger thumb screw and note indicator reading. *NOTE - If when gauge is set in place n converter pump, the plunger holds the gauge up so legs do not rest on pump rim, indicator reading when thumb screw is released will be in compression, not cl arance. If plunger drops when thumb screw is re l ased, indicator reading will be in clearance, not compression.* Select needle thrust bearing races to provide .010" clearance to .005" compression. *NOTE - Disassemble converter pump housing after checking clearance. It is not necessary to remove planet ring g ar assembly from turbine. For reassembly and installation of torque converter, see below.*

TRANSMISSION OVERHAUL
REMOVAL & DISASSEMBLY OF COMPONENTS

►*NOTE: To disassemble transmission, remove all components in the following order.*

PUMP UNIT: Removal - Remove attaching bolts and sealing type lockwashers, then grasp pump body with pliers and hand and lift assembly clear of case. *NOTE - R verse clutch hub will usually be removed with pump. A tanged thrust washer which may remain on top of stator overrunning clutch race should be placed in r ar f reverse clutch hub.*

Disassembly: Use air pressure to remove reverse clutch piston from reverse clutch housing (cover the assembly to prevent oil splashing). Examine reverse clutch piston inner and outer seals for nicks, cuts or wear. If necessary to replace, remove seals from piston. Remove and discard oil pump body to case seal, then remove reverse clutch piston housing to pump body bolts. Lift reverse clutch piston housing off pump (lift straight up to avoid damage to dowel pins). *NOTE - Slipper sealing pins may stick to reverse clutch piston housing and be removed with housing.* Mount a dial indicator on base and "zero" indicator on pump body. Move indicator plunger to bear on oil pump slippers one at a time. Slippers should be from .001" to .0028" below surface of pump body. Move indicator plunger to rest on rotor (checking it in several places). Rotor should be .001" to .0028" below pump body. Examine bushing; if worn or scored, remove rotor, slippers, springs, and pins and drive out bushing and seal with remover J-9154.

Reassembly: Install new bushing with installer J-9155, then apply Permatex to outer diameter of new seal and install seal with installer J-9152. Examine pump parts for wear, scoring or pitting and replace as necessary. Install rotor with driving tangs up, then install slippers and springs. Install sealing pins and lubricate assembly with automatic transmission fluid. Set reverse clutch piston housing squarely in place on pump body (dowel pins are unevenly placed so assembly can be made only in one position). Install reverse clutch piston housing to pump body bolts and tighten to 15-20 ft. lbs. Install a new oil pump body to transmission case sealing ring, then install reverse clutch piston inner and outer seals with lip of seals toward front of piston. Lubricate seals and install piston housing using a loop of smooth wire to start lips of seals into bore (a satisfactory tool can be made by crimping a loop of .020" music wire in a short length of copper tubing). *NOTE - Inner seal lip should be started first.*

REVERSE CLUTCH: Removal - Remove lever assembly ring and apply levers, then check levers for wear or bending. Lift out reverse clutch hub, select fit thrust washer on front side and tanged thrust washer on the rear. *NOTE - Reverse clutch hub and thrust washers may have been removed with pump.* Unhook and expand clutch hub oil ring and remove from hub (examine ring for wear). Remove select fit thrust washer and examine hub and washer for indications of wear or scoring. Remove tanged thrust washer at rear of clutch hub and check for wear. Remove Belleville reverse clutch release spring and check spring for cracks or wear. Remove reverse clutch pressure plate and examine for wear, then remove reverse clutch pack. Check plates for wear, flaking, burring or scoring. Measure reverse clutch friction plates. *NOTE - New plates should measure .079-.084". Plates worn thinner than .074" should be replaced.*

►*REASSEMBLY NOTE: See "Transmission Reassembly" below.*

COAST CLUTCH, OVERRUNNING CLUTCH & FORWARD CLUTCH: Removal - 1) Remove forward and reverse clutch anchor, then rotate forward and reverse clutch backing plate to disengage lugs from slots in case. Remove backing plate and examine for wear or scoring.

2) Grasp overrunning clutch cam and roller retainer and lift complete coast clutch, overrunning clutch and forward clutch pack out of transmission. *NOTE - R ar xternally splined clutch plate will remain in transmission on forward clutch pr ssur plat . R mov remaining plat and plac with forward clutch pack.* Lift forward clutch pack off coast clutch housing and examine plates for wear, scoring, flaking or warping.

3) Measure forward clutch friction plates. *NOTE - New plates should measure .079-.084". Plat s worn thinner than .074" should be r plac d.* Remove forward clutch pressure plate and check for cracks or for worn spots where levers contact plate. Pry forward clutch release spring retaining ring out of groove in case and remove retaining ring. Remove Belleville forward clutch release spring and check for cracks or wear. Remove forward clutch apply levers and check for wear or bending.

Disassembly: Coast & Overrunning Clutch s - 1) Assemble coast and overrunning clutch assembly in Tool J-2590 and provide support so assembly rests on lower edge of coast clutch housing. Tighten wing nut to relieve pressure on coast clutch cylinder-to-housing retaining ring, then pry ring out of groove in housing. Remove wing nut and spacer, then lift coast clutch piston and cylinder out of housing. Use pliers to remove piston from cylinder and check cylinder for dirt or scoring. Check piston inner and outer seals for nicks, wear or cuts (remove if damaged).

2) Remove coast clutch hub-to-coast clutch support thrust washer and check washer for wear or scoring. Remove coast clutch apply levers and check for wear or bending, then remove coast clutch release spring and check spring for wear or cracks. Remove coast clutch pressure plate and check for wear or scoring.

3) Tip coast clutch housing to remove clutch pack and hub. Examine hub for chips or scoring and clutch plates for wear, scoring, burning, flaking or warping, then measure friction plates. *NOTE - N w plat s should measure .079-.084". Plat s w rn thinn r than .074" should be replaced.*

4) Pry retaining ring out of groove in backing plate, then tilt coast clutch housing to remove coast clutch backing plate and overrunning clutch assembly. Check backing plate for wear or scoring.

5) Pull rear sun gear race out of cam assembly (rollers and spring will fall out). Check race for wear, scoring, denting or damage to splines and rollers for wear or scoring. Remove roller thrust washer and check for wear or scoring. Pull stator race out of cam (rollers and springs will fall out). Examine race for wear, scoring, denting or damage to splines and rollers for wear or scoring. Check cam for wear, scoring, or denting. *NOTE - If cam must be replaced, driv off roll r r tainer and stake in place on a new cam.*

Reassembly: Coast & Overrunning Clutch s - 1) Lubricate and install thrust washer on stator race, then set rear sun gear in place on thrust washer and assemble rollers and springs (place rollers at narrow end and springs at wide end of roller cam slots in race assembly). Install cam and race assembly in coast clutch housing, rotating cam assembly so lugs on cam engage notches in coast clutch housing.

2) Place assembly on block or otherwise support on lower edge of coast clutch housing, then install coast clutch backing plate on cam and race assembly. With assembly still resting on lower edge of coast clutch housing, install retaining ring solidly in groove in coast clutch housing above backing plate. Set coast clutch hub in place on rear sun gear face.

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BUICK SPECIAL AUTOMATIC TRANSMISSION (C nt.)

3) Lubricate a coast clutch friction plate with automatic transmission fluid and install on backing plate with splines engaged with coast clutch splines. Check a separator plate for "dish" by holding a straightedge firmly against plate, then install separator plate (all separator plates must be installed with "dish" in same direction). Continue alternately installing a lubricated friction plate and a separator plate until five friction plates and four separator plates have been installed.

4) Install pressure plate on top of last friction plate and engage lugs in notches of coast clutch housing. Install Belleville clutch release spring pressure plate with inner edge of spring upward. Install apply levers (concave edge in) between lugs of pressure plate and flat on release spring. Apply a daub of chassis lubricant on each lever to hold it in place.

5) Place thrust washer on top of coast clutch hub, then install piston inner seal and outer seal with lip of seals toward rear of piston. Lubricate seals and install piston in bore of coast clutch cylinder by using a loop of smooth wire to start lips of seals into bore. *NOTE - Start inner seal first.*

6) Make sure thrust washer and all apply levers are in place, then install cylinder and piston assembly squarely in bore of coast clutch housing. Assemble tool J-2590 to clutch assembly, then tighten wing nut until clearance is provided for installation of retaining ring above piston cylinder. Make sure ring is installed solidly in groove, then remove tool.

7) Insert rear sun gear in sun gear race. *NOTE - Turn gear in race and ch ck for drag on coast clutch. Excessive drag indicat s clutch separator plates are not all dished the same way, or foreign material is present. Sun gear ov rrunning clutch should permit rotation in only one direction.*

OIL PAN & VALVE BODY: Removal - Remove oil pan and seal, then remove oil strainer strap bolts, strap, strainer and strainer "O" ring (discard "O" ring). Use needle nose pliers to remove parking lock pawl disengaging spring. Remove remaining valve body attaching bolts and remove valve body assembly. *NOTE - Be careful when removing valve body as some of the valves may fall ut.*

Disassembly: 1) Remove range selector and governor valve, then tilt valve body to remove governor valve pin. Remove throttle detent valve and throttle pressure regulator valve spring. Remove two screws attaching valve body plate and gaskets to valve body (detent poppet may slide out when screws are removed). Remove plate and gasket and check for evidence of leakage or improper installation.

2) Remove selector lever detent poppet and spring, then remove check ball. Remove pressure regulator valve stop, then tilt valve body and remove throttle pressure regulator valve. Press in on governor valve sleeve to release spring pressure on retainer and invert valve body to allow removal of retainer. Remove sleeve, second stage governor valve spring, and governor valve.

3) Remove two screws attaching oil gauge rod guide to valve body and remove guide, then firmly hold valve retaining plate and remove two screws attaching plate to valve body. Release plate carefully against pressure of three springs behind plate.

4) Tilt valve body and remove valves, sleeves and springs. Wash all parts in solvent and inspect for wear or damage. *NOTE - Make sure small holes in converter pressure regulator, governor and throttle pressure regulator valves are clear. The small .032" hole in valve body must also be clear.* Dry all parts with air, then check each valve in its bore. All valves must move freely of their own weight.

Reassembly: 1) Install pressure regulator, shift, and main line pressure regulator valves, sleeves, and springs. Use new valve retaining plate-to-valve body gasket, then install plate and oil gauge rod guide and tighten screws. Install throttle pressure regulator valve, then, with valve at bottom of its bore, install throttle pressure regulator valve stop, making sure it is in the correct opening.

2) Install second stage governor valve, spring, sleeve, and retainer. *NOTE - Press in on sleeve against spring pressure and install retainer through valve body in wide spot of sleeve.* Install check ball, then install detent poppet and spring. Use a new gasket on each side of valve body plate and position plate and gaskets on valve body. *NOTE - Service type inner and outer plate gaskets are the same (production type gaskets are not).*

3) Make sure detent poppet is properly placed, then install and tighten screws. *CAUTION - Do not overtighten.* Install throttle detent valve and throttle pressure regulator valve spring. Install range selector valve, governor valve and pin. *NOTE - It may be necessary to shake valve body to start governor valve pin through hole in second stage governor valve.*

COMPANION FLANGE & SEAL: *NOTE - This operation may b p rform d with transmission in th car.*

Removal: Engage parking lock pawl and remove companion flange attaching bolt and tap flange off output shaft, then pry seal out of transmission case.

Installati n: Install a new seal with tool J-8864. Engage parking pawl, then lubricate companion flange and install on shaft. Tighten bolt to 45-55 ft. lbs.

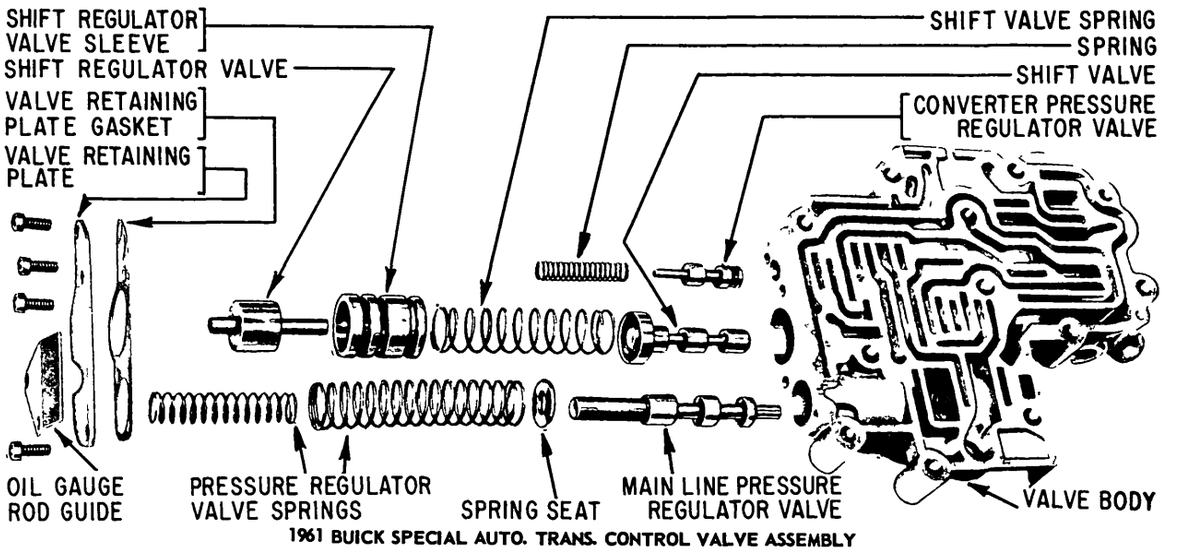
OUTPUT SHAFT, COAST CLUTCH SUPPORT, FORWARD CLUTCH PISTON, PARKING LOCK RATCHET WHEEL & GOVERNOR ASSEMBLY: Removal - 1) Remove companion flange, then use tool J-6586 to pull three adapter sleeves and retainer out of transmission case and coast clutch support. Examine "O" rings for nicks and cuts.

2) Pull output shaft forward to remove shaft, coast clutch support, parking lock ratchet wheel and governor as an assembly. *NOTE - Speedometer gear will b pulled off shaft and can be removed through compani n flange seal.*

Disassembly: Slide governor lever actuating sleeve, needle thrust bearing, thrust bearing race and parking lock ratchet wheel spacer off rear of output shaft. Check needle thrust bearing, race and sleeve for wear or scoring. Slide governor weight and retainer assembly off rear of output shaft and check roll pins for looseness in weights. Slide coast clutch support and forward clutch piston assembly off forward end of output shaft. Examine two hooked oil rings on output shaft (just forward of parking lock ratchet wheel). If worn or scored, unhook, expand and remove rings. If parking If parking lock ratchet wheel is worn or broken, expand and remove retaining ring on output shaft forward of wheel. Slide parking lock ratchet wheel off forward end of output shaft. Check output shaft for damaged splines, scored bearings, broken ring lands and other damage. To assemble parking lock ratchet wheel and output shaft, install parking lock ratchet wheel with spline chamfer toward rear of output shaft, then position ratchet wheel on output shaft splines. Expand and install retaining ring solidly in groove of output shaft. Expand and install two hooked oil rings in grooves of output shaft.

Disass mbly (Coast Clutch Supp rt & F rward Clutch Pist n): Cover assembly with a cloth and direct air

CONTINUED ON NEXT PAGE



1961 BUICK SPECIAL AUTO. TRANS. CONTROL VALVE ASSEMBLY

BUICK SPECIAL AUTOMATIC TRANSMISSION (C nt.)

pressure into center oil transfer sleeve hole to remove forward clutch piston from coast clutch support. Examine two hooked oil rings on coast clutch support. If worn or scored, unhook, expand, and remove rings. Check inner bore of support (where output shaft oil rings contact support) for wear or scoring. Check forward clutch inner and outer seal. If nicked, worn or torn, remove seal.

R assembly (Coast Clutch Support & Forward Clutch Piston): Install and hook rings on coast clutch support, then install forward clutch piston outer seal and inner seal on piston. *NOTE - Lips of seals must be toward rear of piston.* Lubricate seals and install forward clutch piston in coast clutch support using a loop of smooth wire to start seal lip into piston bore. *NOTE - Start inner seal lip first.*

R assembly: Lubricate oil rings and slide coast clutch support and forward clutch piston assembly on output shaft. Slide governor weight retainer and governor weight assembly on rear of output shaft. *NOTE - Inner tangs of retainer must be inside openings of parking lock ratchet wheel and forward end of weights must also b inside openings of wheel.* Lubricate needle thrust bearings and slide spacer, sleeve, needle thrust bearing and race on rear of output shaft. Position against governor weights.

GOVERNOR LEVER & PIN: Replacement - If lever is damaged or pin hole is badly worn, remove pin retaining plug in side of transmission case. Slide pin out of case and lever. Replace parts as necessary, then install pin through case and lever and install plug.

TRANSMISSION REAR BEARING: Removal - Remove governor lever and pin. If bearing is defective, pry bearing lock out of groove in case. Drive bearing out of case with a drift inserted from rear.

Installation: Drive new bearing squarely into case with Installer J-9164. Start one end of bearing lock into groove above bearing, then form a ramp with a screwdriver inserted between case and lock. Push lock down ramp with a second screwdriver until it is properly seated.

RANGE SELECTOR LEVERS & SHAFT, THROTTLE VALVE CONTROL LEVERS & SHAFT, & PARKING LOCK ACTUATOR: Removal - Use a "clutch head" screwdriver (Tool 10-167-3) and a wrench to remove inner throttle valve control lever attaching screw and nut, then slide inner lever off shaft and remove. Slide outer lever and shaft out of range selector shaft. If "O" ring is worn or torn, remove "O" ring. Use the same screwdriver and wrench to remove range selector inner lever to shaft attaching screw and nut, then slide inner lever off shaft. Remove inner lever and parking lock actuator assembly. *NOTE - If actuator or inner l ver requires replacement, snap off actuator retainer and assemble new parts as necessary.* Check shaft "O" ring and remove if worn, nicked, or cut.

Installation: Install and lubricate "O" ring, then slide range selector shaft through case and carefully align splines on shaft with splines in inner lever. Hold outer lever and shaft "in" against case and push inner lever completely on shaft. Install and tighten screw and nut. Assemble special washer and "O" ring on throttle control lever shaft, then lubricate "O" ring and slide shaft into range selector shaft. Engage splines on shaft with splines in inner lever and press lever on shaft completely. Install and tighten screw and nut.

TRANSMISSION REASSEMBLY & INSTALLATION OF COMPONENTS

OUTPUT SHAFT, COAST CLUTCH SUPPORT, FORWARD CLUTCH PISTON, PARKING LOCK RATCHET WHEEL & GOVERNOR ASSEMBLY: Installation - Lubricate coast clutch support outer diameter and position support so oil transfer holes are upward. Hold governor assembly in position against parking lock wheel and start rear of shaft through bearing. Ease assembly into position. If parking lock pawl is installed, hold it up out of way to allow assembly to move fully into case. *NOTE - When correctly positioned in case, coast clutch support oil transfer holes will line up with oil transfer holes in case. If necessary to rotate support, insert smooth punch through oil transfer holes in case to rotate support. Be careful not to nick or dent either support or case.* With oil holes in case and support lined up, lubricate and install oil transfer sleeves and "O" rings, and retainers. *NOTE - Retainers should be positioned flat against sleeves.* Lubricate liberally with chassis lubricant to avoid damage to seal, and install speedometer driving gear on output shaft, then install companion flange.

COAST & OVERRUNNING CLUTCH, FORWARD CLUTCH PACK, RELEASE SPRING & APPLY LEVERS: Installation - 1) With transmission case in a vertical position, install forward clutch levers, then install forward clutch release spring flat on levers with inner edge of spring down. Install release spring retainer solidly in groove of case. *NOTE - Release spring may move to one side and prevent easy installation of retaining ring. Center spring as necessary to install ring fully into groove. Make sure ring is in groove all the way around.*

2) Set forward clutch pressure plate in place on apply levers, positioning it so wide space between lugs is toward top of case (for installation of anchor). Set coast and overrunning clutch assembly in place on coast clutch support.

3) Check a separator plate (no notches on lugs) for "dish" by holding a straightedge firmly against plate, then install plate on forward clutch pressure plate with wide space between lugs toward top of case (all separator plates must be installed with "dish" in same direction). Lubricate a forward clutch friction plate with automatic transmission fluid, then install over coast clutch housing by engaging splines of plate with splines on housing. Continue alternately installing a separator plate and a lubricated friction plate until five separator plates (all "dished" same way and with wide space between lugs toward top of case), and five friction plates have been installed.

4) Install forward and reverse clutch backing plate on top of forward clutch pack, then rotate backing plate so lugs on backing plate engage lugs in case. *NOTE - Backing plate should require no force to install if forward clutch pack is installed correctly.* Install forward and reverse clutch anchor in slot at top of case.

►*FORWARD & REVERSE CLUTCH ANCHOR INSTALLATION CAUTION: B v l d edg_ of anchor must be installed toward outside f transmission. If anch r is installed t ward insid f transmission, it will b very difficult to r mov for installation in correct mann r.*

REVERSE CLUTCH COMPONENTS & OIL PUMP: Installati n - 1) Position reverse clutch hub on overrunning clutch assembly. *NOTE - Be sure tanged thrust washer is in place at rear of reverse clutch hub.* Lubricate and install a friction plate on forward and reverse clutch backing plate by engaging splines on hub with splines on plate. Check a reverse clutch separator plate (notch in tangs) for "dish" and install separator plate above friction plate (all separator plates must be installed with "dish" in same direction and with wide space between lugs toward top of transmission to clear anchor). Continue clutch pack build-up by alternately installing a lubricated friction plate and a separator plate until four friction plates and three separator plates have been installed.

2) *NOTE - Reverse clutch pressure plates are supplied in three thicknesses. If a new pressure plate is being installed, measure old plate in an unworm area nedr end of a lug. The new plate to be installed must be same thickness as old plate or reverse clutch pack clearance will be affected.* Install pressure plate over top friction plate with wide space between lugs toward top of transmission to clear anchor. Install release spring and assembling ring over pressure plate. *NOTE - Center edge of release spring upward.*

3) Lubricate thrust washer and oil pump body-to-case seal, then line up bolt holes with guide pins and lower pump into position. Install and tighten at least three oil pump body-to-case bolts. Insert a .020" feeler gauge through case between a reverse clutch friction plate and a separator plate. A .029" feeler should GO and a ,051" feeler should NOT GO. If pack clearance is less than .030" it may be due to incorrect pressure plate, separator plates not all "dished" in same direction, or apply levers incorrectly installed and binding on piston. If pack clearance is more than .050" it may be due to incorrect pressure plate, or excessively worn friction or separator plates.

4) If reverse clutch pack clearance is within specifications, remove guide pins, install remaining special bolts and captive sealing lock washers and tighten to 20-24 ft. lbs.

VALVE BODY: Installation - With surfaces of case and valve body clean, set valve body assembly in position and engage pin of range selector inner lever with groove of selector valve, then install parking lock pawl disengaging spring. Install valve body attaching bolts and tighten to 100 inch pounds in sequence indicated in illustration. Insert a .025" feeler (tool J-9153) between forward edge of rear land of governor valve and valve sleeve. Hold governor lever rearward and valve forward against feeler. Adjust screw so screw just touches end of valve with valve held inward against feeler, then remove feeler. Install a new "O" ring on oil strainer and place strainer in position on valve body, then install strainer strap and bolts and tighten to 100 inch pounds in sequence indicated in illustration.

PARKING LOCK PAWL: Replac m nt - *NOTE - This operation can be performed with transmission in the car.* Remove oil pan and seal, then remove parking pawl disengaging spring. Remove parking lock bracket-to-case bolts and remove bracket. Use a small punch or drift to drive parking lock pawl shaft pin out of case, then pull parking lock shaft and "O" ring out of case. Remove parking pawl. *NOTE - It may b n c ssary to*

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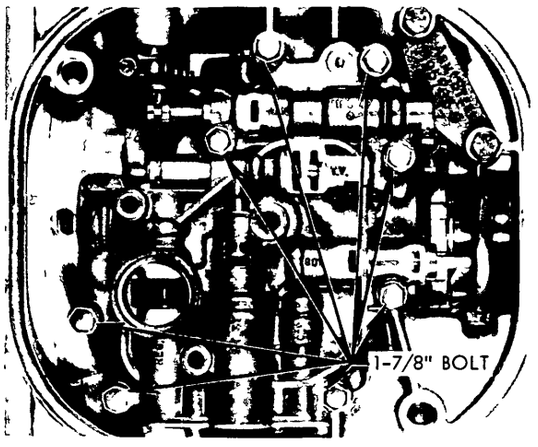
BUICK SPECIAL AUTOMATIC TRANSMISSION (Cont.)

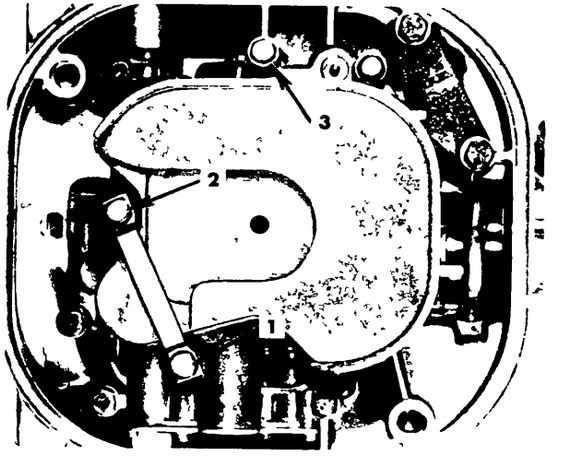
start shaft out of cas using needle nose pliers to grip shaft insid cas . To install, place a lubricated "O" ring on lock pawl shaft and align pawl with shaft, then install shaft with slot lined up with hole in case and install roll pin. Install parking lock bracket but do not tighten bolts. Shift transmission to park position, then turn output shaft so pawl engages wheel and tighten bracket bolts. Move selector to neutral and back to park position. Check for freedom of movement between park and neutral ranges. If bind exists, use a .001" shim stock under one or both bracket bolts. Tighten bolts to 15-20 ft. lbs., then install parking lock pawl disengaging spring.

OIL PAN & SEAL: Installation - Install new seal in position and set oil pan in place. *NOTE - Use car to avoid stretching s al wh n installing it on oil pan. If d sir d, plac s al in position in case groove around valv body and set pan on seal. Rap pan sharply with palm f hand to install s al on pan.* Install a new seal on bolt and install bolt and tighten to 15-20 ft. lbs.

ENGINE BALANCING

AUTOMATIC TRANSMISSION BALANCING: *NOTE - Servic replacement converter pumps and converter pumps and conv rter pump housings are balanced s parat ly and not as an assembly.* If an unbalanced condition exists after installation of either or both of these units, proceed as follows: Connect a tachometer to engine, then raise car enough to allow lower flywheel housing to be removed. Screw largest of three trial weights, Tool J-9367 on portion of converter pump-to-housing bolt extending through nut (use any of the 18 bolts as a starting point), then mark the location with crayon or chalk for later reference. Start engine, then place transmission in "P" (Park) position and run at exactly 1500 RPM. Note the amount of vibration, then remove trial weight from starting point and reinstall it directly across (180°) from starting point and again note amount of vibration. Move trial weight to third position (halfway between first and second positions) and note amount of vibration. Move trial weight to fourth position (directly across from third position) and again note amount of vibration. At the point in the above trials where greatest improvement was noted, use a smaller trial weight or combination of weights in the adjacent area to reduce vibration the greatest amount. After determining the weight or weights that provide greatest improvement, move weight or weights to right or left to determine if vibration can be further reduced. When location is found that provides greatest improvement, remove trial weights and install permanent weights in their place, using attaching bolt, Part No. 1195069 in place of standard converter pump-to-housing attaching bolt to retain weight, Part No. 1195094 in place (standard production bolt is used to retain weight, Part No. 1195092). Permanent weights are furnished .135" thick (Part No. 1195094); .0345" (Part No. 1195092). *NOTE - Permanent weights are quival nt to trial weights as follows: Two Part No. 1195094 (on larg trial w ight); One Part No. 1195094 (one m dium trial w ight; One Part No. 1195092 (one small trial w ight). Wh n two w ights ar r quired at sam location, install on adjac nt b lts.*





VALVE BODY BOLT TIGHTENING SEQUENCE

TORQUE CONVERTER & GEAR SET REASSEMBLY & INSTALLATION

REASSEMBLY & INSTALLATION: 1) Examine converter pump for chipped, cracked or broken vanes and check for damaged or loose pump ring, then expand and install converter clutch inner piston ring and hook the ends. Position converter clutch outer piston ring squarely in lower part of bore (about ¼" from bottom) and check ring gap with a feeler gauge. Gap should be .002" to .007". *NOTE - If gap is less than .002", file end of ring. If gap is greater than .007", install a new ring.*

2) Install outer piston ring on converter clutch piston and apply plate assembly, then lubricate liberally and push piston and apply plate assembly into bore of converter pump. *NOTE - A chamfer in bore serves to compress outer piston ring; however, if difficulty is encountered, a thin feeler gauge may be used to start ring ends over the chamfer.*

3) Examine converter clutch friction plates for excessive wear, burning or flaking, and measure any questionable plate. Plates worn thinner than .074" should be replaced. *NOTE - New plates are .079-.084" thick.* Lubricate a friction plate and install in converter clutch housing. Check a separator plate for "dish" by holding a straightedge firmly against plate, then install separator plate (all separator plates must be installed with "dish" in same direction). Continue alternately installing a lubricated friction plate and a separator plate until four friction plates and three separator plates have been installed.

4) Rotate piston apply plate so tangs of apply plate are centered in openings, then lower converter clutch housing and clutch pack assembly into converter pump. Retain clutch plates with fingers until assembly is properly aligned. *NOTE - Long tangs of housing must engage openings in converter pump.*

5) Install housing retainer ring over converter clutch housing in groove of converter pump and tap ring solidly into groove with drift.

6) Place converter pump housing assembly tool J-9199 over output shaft (to center converter pump housing so housing hub does not damage seal during installation), then lubricate hub of pump housing and install converter on output shaft. Remove tool J-9199.

7) Install caged needle thrust bearing on rear of turbine and retain in place with chassis lubricant. *NOTE - Oil exit holes in bearing should be placed toward rear.* Set stator and turbine assembly into pump housing carefully to avoid damage to splines, then rotate turbine to engage splines (stator and turbine will drop into place when splines are lined up).

8) Assemble caged needle thrust bearing to rear of sun gear (oil exit holes to rear), then lubricate sun gear shaft inside and out and slide it carefully into place. *NOTE - Two sets of splines must be engaged (Sun gear race and coast clutch hub). Do not force gear as spline damage may result.*

9) Place planet carrier over rear sun gear with tanged thrust washers in place at front and rear. *NOTE - Deeper pocket of carrier "down" toward rear sun gear and splined portion "up".* Assemble new converter pump oil seal to pump (do not twist square seal). Lubricate and install needle thrust bearing and two select fit bearing races into front sun gear. Retain in place with chassis lube.

10) Engage splines on sun gear hub with splines of converter clutch friction plates, then rotate gear while pressing down very lightly until all splines are engaged. Hold front sun gear with long screwdriver while positioning converter pump against pump housing, then remove screwdriver. Rotate assembly very slightly to mesh front sun gear with planet pinions. With gears in mesh, push converter pump into converter housing and pull housing toward pump.

11) Before installing pump housing to converter pump bolts, check locating hole through housing and matching hole part way through converter pump flange. *CAUTION - These holes must line up to retain balanc of conv rt r ass mbly.* With transmission in a vertical position, install and tighten special nuts and bolts alternately and evenly to 15-20 ft. lbs. *CAUTION - B sur and wir conv rt r ass mbly to transmission cas bef re r moving transmissi n from h lding fixture.*

BUICK TWIN TURBINE DYNAFLOW

Buick L Sabr , Invicta, El ctra (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 TWIN TURBINE TRANSMISSION CODE NUMBER NOTE:* A code number consisting of a letter followed by a number is stamped on lower edge of reaction shaft flange directly to rear of high (left) accumulator. This number should be used as identification when ordering parts or for service procedure changes.

DESCRIPTION: Twin turbine torque converter and transmission of same design used on previous models.

LUBRICATION

Check oil level at 1000 miles intervals and add oil as required. Drain and refill at 25,000 mile intervals.

►*CAUTION: Oil must be warm and engine must be idling wh n checking oil level. Warm up engine before draining.*

Checking Oil Level: With oil warm and engine idling with control lever in "P" (Parking), position. check oil level as indicated on dipstick in filler tube in engine compartment (on right side between battery and engine). If level is more than 1" below FULL mark on rod, add recommended oil to bring level up to FULL mark *(CAUTION - Do not fill above FULL mark).* Distance between ADD OIL and FULL marks on dipstick is equal to approximately 1 pint of oil.

►*CAUTION: If oil level is consistently low when checkd (indicating loss of 1 pint or more per 1000 miles), ch ck transmission thoroughly for oil leaks.*

Draining & Refilling: With oil warm, drain transmission case by removing drain plug in oil pan, drain torque converter, after removing bellhousing cover for access to drain plug, by loosening one plug and turning converter until second plug is downward, and removing this plug. Re-install and tighten all drain plugs. Install three quarts of recommended oil through filler opening in case. Start engine and allow it to idle with control lever in "P" (Parking) position, add additional oil to bring level up to FULL mark on dipstick. Recheck oil level after transmission warmed up. Oil level should be at FULL mark on dipstick.

►*CAUTION: DO NOT FLUSH transmission when changing oil.*

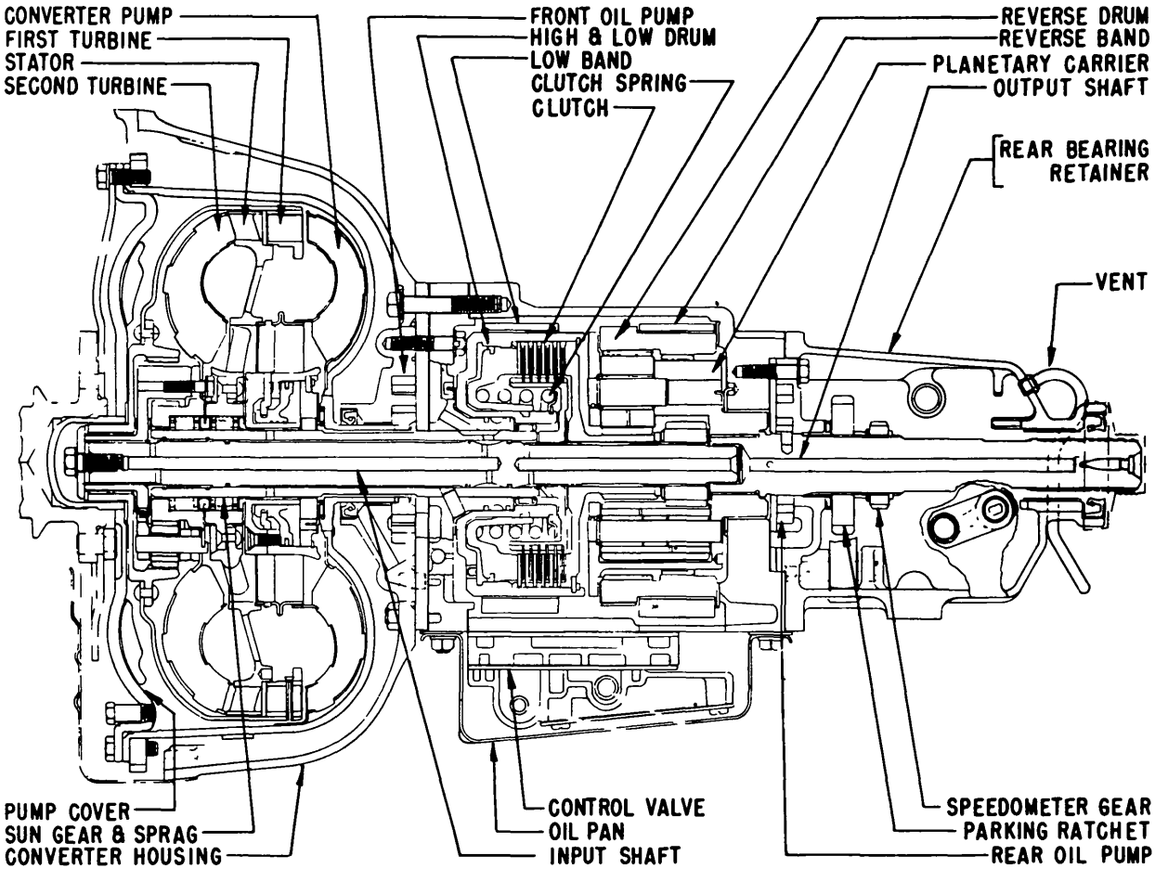
Capacity - Approximately 12 qts. (refilling after draining). Install an additional 1¾ qts. (after overhaul).

R commended Oil - Use only "Special Buick Oil for Dynaflow Drive" or Automatic Transmission Fluid, Type "A", with AQ-ATF number embossed on can.

LINKAGE ADJUSTMENT

Thr ttle Linkage & Stator Control Linkage Adjustment: *Se CARBURETOR on Car Model pages.*

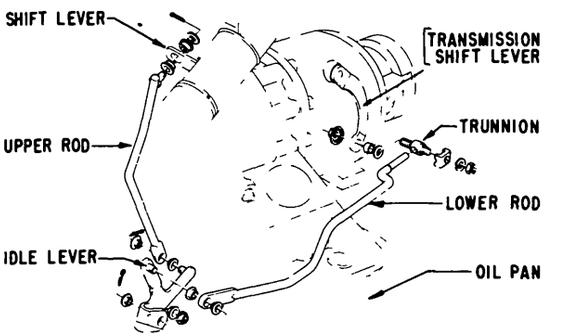
Manual Shift Control Linkage Adjustment: With manual control lever in "P" (Park) position, raise car, then loosen clamp nut at rear of lower rod and move lever several times to make sure it is in "P" (Park) detent. *NOTE - If necessary, adjust positive park stop so no more than 1/8" overtravel of lever beyond park detent is possible.* Gently pull lower shift rod toward rear of car to take up slack in linkage, then tighten clamp nut to 10-15 ft. lbs. Check the adjustment (distance from drive detent to drive stop should be approximately equal to distance from low stop to low detent). With transmission at normal operating temperature, idle engine at 600 RPM, then slowly move selector lever from "N" (Neutral) to "D" (Drive) position. Clutch should engage, as indicated by an immediate decrease in engine speed when center of dial sight ring is midway between "N" and "D" on speed ratio dial. Slowly move indicator lever from "D" (Drive) to "N" (Neutral) position. Clutch should disengage, as indicated by an immediate increase in engine speed, when center of speed ratio pointer is midway between "D" and "N" on dial.



BUICK AUTOMATIC TRANSMISSION (TWIN TURBINE)

Control Dial Pointer Position Adjustment: Shift manual control to "D" (Drive), then loosen cross recess screw attaching indicator to shift lever housing and move indicator to center "D" in sight ring. Tighten screw.

Neutral Safety Switch Adjustm nt: Check and adjust shift control linkage. Place shift control lever in "N" (Neutral) position. Insert a 3/32" drill through gauging hole in operating lever and through gauging hole in switch body *(CAUTION - B careful not to move shift control lever out of neutral position).* If gauging drill is now parallel with centerline of steering column jacket,



BUICK LINKAGE

CONTINUED ON NEXT PAGE

TWIN TURBINE DYNAFLOW (C nt.)

switch timing is correct. If gauging drill will not go through holes or is not parallel, loosen two switch mounting screws and move switch sideways until gauge is parallel. Tighten screws. To check adjustment, turn on ignition switch, place shift control lever in "R" (Reverse) position, and make sure back-up lights are lit. Then set parking brake, place shift lever in "N" (Neutral) and make sure engine will start.

BAND ADJUSTMENT

►*BAND ADJUSTMENT NOTE: Bands cannot be adjusted with transmission installed in car. Adjustment is ordinarily requir d only at time of overhaul.*

L w & R v rs Band Adjustment: Remove band adjusting cover, then loosen locknut and turn adjusting screw clockwise until considerable resistance is felt indicating that band is in full contact with drum (low) or ring gear (reverse). Back off screw until just a trace of play can be felt by prying up on locknut with a screwdriver. From that point, back off screw **6 complete turns** and tighten locknut finger tight. Note position of adjusting screw slot, then tighten locknut to 20-25 ft. lbs. Remove torque wrench and check to make sure that adjusting screw did not turn. Install band adjusting cover with a new gasket.

TESTING

If performance not satisfactory, make following tests **with transmissi n thor ughly warmed up and at operating t mp ratur :**

Oil Level: Check oil level, add fluid as necessary to bring level up to FULL mark on dipstick, recheck performance with correct oil level. If car has been losing oil at rate of 1 pint or more each 1000 miles, make thorough check for oil leaks.

Manual C ntr l Linkag : Check and adjust manual control linkage. See Linkage Adjustment.

Hydraulic C ntrol Syst m Pressures: Use Transmission Oil Pressure Gauge J-2575. Support rear end of car solidly with wheels off floor so that transmission can be operated. Remove transmission cover in floor pan for access to pressure take-off points.

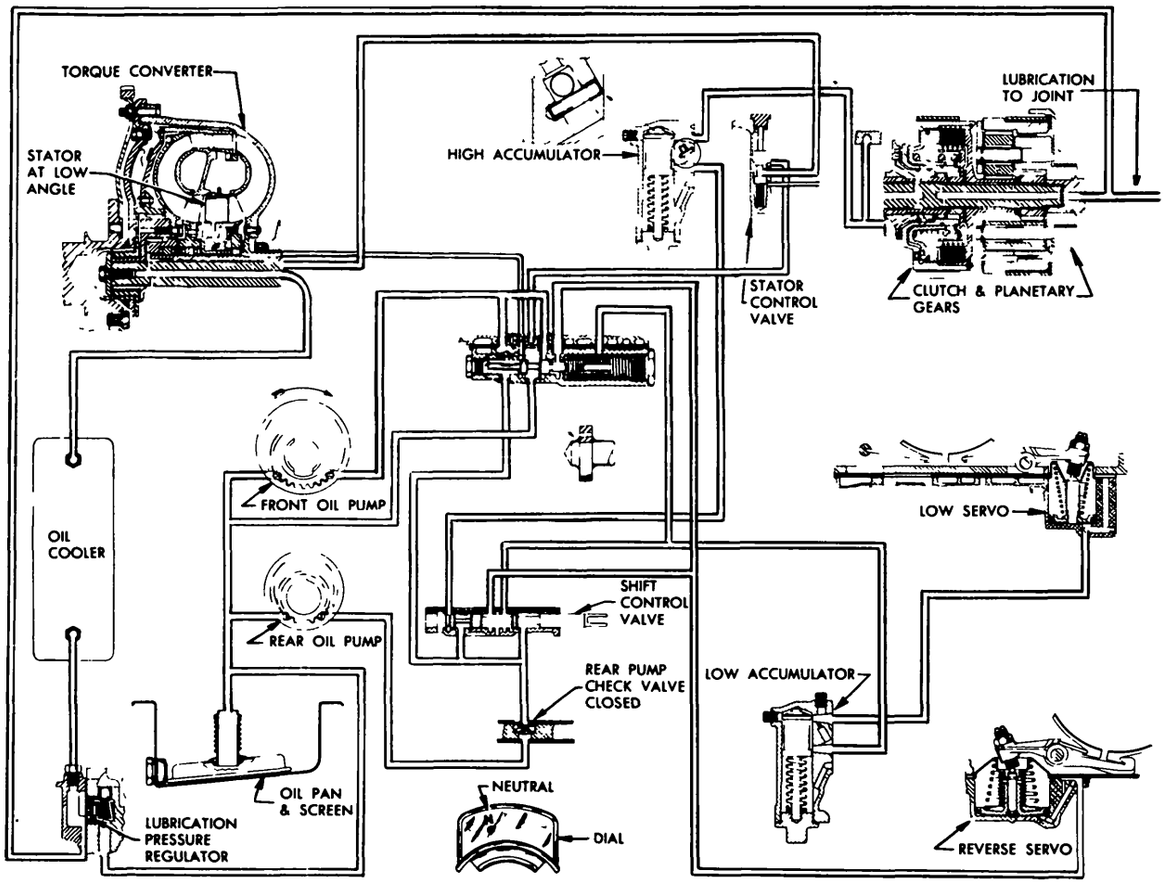
Connect gauge and make tests as follows:

Fr nt Oil Pump - Connect pressure gauge at pipe plug opening on left side of transmission case. Run engine at 500 RPM, check pressure with selector lever in **Low, Driv , and R vers rang s.** Repeat tests at 1000 RPM, and at 1800 RPM **in L w and Reverse only.** See table below for correct pressures. Low or erratic pump pressures indicate air leaks in suction lines, improper pressure regulator valve action. or excessive pump clearances.

Fr nt Oil Pump Pressures

Sel ct r L v r–	Low	Drive	Reverse
500 RPM	120 lbs.	90 lbs.	120 lbs.
1000 RPM	180 lbs.	90 lbs.	
1800 RPM	180 lbs.	90 lbs.	

High & L w Accumulat r - Connect pressure gauge at pipe plug opening on top of accumulator body (**High**–left side of car); (**Low**–right side of car). Place selector lever in **Driv Rang** (High Accumulator Test); **L w Range** (Low Accumulator Test). Run engine and check pressures at speeds indicated in tables below. Low accumulator pressure may be caused by leakage past accumulator body gasket. If accumulator pressure more than 10 lbs. lower than front pump pressure, check for leakage between accumulator and multiple disc clutch and for restricted or plugged metering orifice in accumulator dump valve.



TWIN TURBINE DYNAFLOW HYDRAULIC CIRCUITS

Accumulator Pressures

Selector Lever–	Low	Drive
500 RPM	115 lbs.	80 lbs.
1000 RPM	175 lbs.	85 lbs.
1800 RPM	175 lbs.	85 lbs.

Stator - Connect pressure gauge at pipe plug opening on left end of reaction shaft flange. Test pressure in **Drive Range** at 500 RPM, 1000 RPM, and 1800 RPM.

Stator Pressures

Sel ct r L v r	Driv
500 RPM	10 lbs.
1000 RPM	65 lbs.
1800 RPM	75 lbs.

TROUBLE SHOOTING & DIAGNOSIS

►*EXCESSIVE DYNAFLOW WHINE CORRECTION: (This condition is usually the result of excessive cl arance between input shaft and bearing in the reaction shaft).* If transmission is to be disassembled to correct whine, perform the following:

1) Remove converter cover, twin turbine assembly, and sun gear, then mount dial indicator on end of input shaft with indicator button contacting reaction shaft. Position indicator button 90° to left of top center (facing end of shaft) then move input shaft away from and toward indicator while noting the gauge reading. Repeat this check at 45° to left of top center. If dial reading exceeds .005", excessive clearance exists between input shaft and bearing in reaction flange.

2) Before replacing bearing, remove reaction flange assembly and input shaft and observe the following: (a) Inspect bearing surface on input shaft. If surface appears abnormally rough or scored, replace input shaft; if not, polish journal area with crocus

CONTINUED ON NEXT PAGE

TWIN TURBINE DYNAFLOW (C nt.)

cloth. (b) Inspect the two oil seal rings toward rear of input shaft and the mating surface in the reaction shaft for scoring or other damage. If reaction shaft or input shaft shows evidence of scoring or other damage, replace worn or damaged parts.

3) If inspection reveals that condition of reaction shaft and input shaft are satisfactory, replace only the input shaft bearing (see Overhaul data).

4) If input shaft, reaction flange, or the bearing requires replacement, it will be necessary to replace the converter sun gear and planet pinions. *NOTE* - When installing reaction flange service bushing, be sure the assembly is supported on rear end of reaction shaft to prevent distortion of aluminum reaction flange.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With selector in any Range (rear wheels free). If car will not move for 1-8 minutes after standing over night - Check front pump oil pressure (see Testing) after allowing car to stand for several hours. If zero pressure noted, check pump for excessive clearances allowing pump to lose its prime. Check alignment of of bell housing and converter primary pump hub.

►*CAUTION: If this condition found, inspect Clutch and Bands for excessive wear due to slippage caused by low oil pressure.*

If car will not move after extended operation in Reverse - Check for air leaks in pump suction line (at rear oil pump gaskets), or excessive clearance in front pump (at pump gears and covers). Check alignment of bell housing and converter primary pump hub.

2) With selector in any Range (rear wheels locked). Parking lock engaged. Broken parts in transmission or rear axle. Parking brake applied.

3) With selector in Drive Range. Check front oil pump pressure and High Accumulator pressure. If OK, check for sticking Low Band Anchor Piston, remove and inspect Clutch for worn or sticking clutch plates, leaking clutch seal rings. If High Accumulator pressure pressure low, also check rear pump Check Valve for correct installation and proper seating, check for leaks at accumulator body gasket, reaction flange gasket, clutch piston outer seal and clutch ball check valve, and leaks at sealing rings on reaction shaft flange and low drum.

4) With selector in Reverse Range. Check reverse band for displaced operating strut caused by too loose adjustment, improper installation, or broken band anchor (indicated by free up and down movement of band operating lever). If band assembly OK (no free movement of lever), check servo operation by running engine and shifting into Reverse. Remove Valve & Servo Body and check for reverse servo piston seal leaks.

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, or poor acceleration).

1) In all Speed Ranges. Low oil level. Incorrect manual control linkage adjustment. Air leak in oil pump suction pipe at oil screen sealing ring. Low front oil pump pressure caused by wear or excessive clearances in in pump. Leaks at front pump cover or reaction shaft flange, pressure regulator valve. Valve & Servo Body gasket. Pressure regulator valve defective.

2) In Driv Rang . Incorrect manual control linkage adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, check for leaking clutch sealing rings, sticking clutch piston, worn or sticking clutch plates.

3) In L w Rang . Incorrect manual control linkage adjustment. Incorrect low band adjustment. Low band and drum worn or scored. If Low Accumulator pressure If Low Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, remove Valve & Servo Body and check for gasket leaks or leaks at low servo piston seal.

4) In Reverse Range. Incorrect manual control linkage adjustment. Reverse band out of adjustment, strut out of place, or anchor broken. If front oil pump pressure low, remove Valve & Servo Body and check for gasket leaks and leaking reverse servo piston seal.

CAR CREEPS (Forward or Backward).

1) Creeps forward with selector in Neutral. Incorrect manual control linkage adjustment. Sticking low servo piston (check by removing low band adjustment cover), Sticking clutch caused by warped, binding, or incorrectly assembled clutch plates (not stacked properly with "dish" in same direction).

If Car Creeps only when engine accelerated to 2500 RPM - Check clutch vent ball checks in clutch piston and reaction shaft flange.

2) Creeps forward with selector in Reverse or backward with selector in Low. Incorrect manual control linkage adjustment.

SHIFTS ARE ROUGH

1) Low-to-Drive Shift. Incorrect Low Band adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket and for dump valve or accumulator piston sticking down (top land of piston should be visible through top port in body). Sticking low band anchor piston (remove Valve & Servo Body to check), or incorrect piston location (see piston shimming data in Valve & Servo Body Reassembly). Valve & Servo Body gasket leaks. Clutch plates worn or binding.

EXCESSIVE CHATTER OR CLUNK ON STARTING

►*CAUTION: Slight "clunk" when shifting into Low or Reverse is normal, and slight chatter when car starting to move in reverse (disappearing as soon as car in motion) is also normal.*

1) In Low & Reverse Range. Incorrect Low or Reverse Band adjustment. Engine and transmission mountings loose or incorrectly adjusted, thrust pad at transmission mounting broken (see Engine Mountings in Buick Special Data). Clutch plates warped, sticking, or incorrectly assembled (not stacked properly with "dish" in same direction). Reverse ring gear bushing worn. Planet pinion needle bearing rough.

NOISE IN TRANSMISSION.

►*CAUTION: Hum or low whine in Neutral or Parking is normal (due to free rotation of all planetary gears) and slight hum in Low and Reverse may be expected.*

1) Buzzing Noise. Low oil level. Front pump check valve hanging up on edge of gasket between valve and servo bodies. If noise noticed in Parking or Neutral, pressure regulator valve clearance in body may be excessive or orifice in valve land oversize (correct by replacing valve and body).

2) Clicking N is . If noticed in all ranges, may be caused by foreign material in converter. If noticed only when car in motion, may be caused by parking lock pawl contacting ratchet wheel due to incorrect manual control linkage adjustment.

3) Abn rmal Hum r Whin (see Caution above). If noted in all ranges, may be caused by worn parts or excessive front pump clearances (front pump noise will increase in Low and decrease at car speeds above 45 MPH. in Direct Drive). Check front pump for excessive clearances by testing for low pump pressure. If noise noted in all ranges except Direct Drive, may be caused by trouble in planetary gears (gears locked out in Direct Drive).

4) Squealing or Screeching f ll wing installation of of Front Oil Pump. Pump driving gear installed backward.

►*CAUTION: Above condition must be corrected WITHOUT FURTHER OPERATION OF TRANSMISSION or sever damage will result.*

REMOVAL & INSTALLATION

Transmission Assembly: Removal - **1)** Raise car and place on jack stands, then disconnect exhaust pipes. Remove converter housing cover and drain converter, then remove oil filler pipe and drain transmission. Disconnect cooler lines. *NOTE - If transmission is being removed to correct clutch or band troubles, cool r and lines must be flushed with air and oil to remove residue.*

2) Remove flywheel-to-converter bolts and disconnect speedometer cable, stator control rod (at accumulator), and lower shift rod at lever. Disconnect propeller shaft at rear companion flange. *NOTE - Mark shaft and flange so parts can be reassembled in sam position. Support shaft up out of way to prevent damag to center joint caused by weight of shaft.*

3) Place transmission jack or hoist in position and adjust it to securely support transmission, then remove center bearing support bolts and slide propeller shaft rearward and disengage it from transmission. Remove bolts attaching rear mounting pad to rear bearing retainer, then raise engine and transmission assembly just enough to take load off transmission support (crossmember) and remove support. *CAUTION - If shims are used between support and frame side rails, note number of shims and location, so they may be reinstalled in same position.*

4) Place a jack under rear of engine lower crankcase and lower transmission just enough so converter housing bolts can be reached, then with engine and transmission supported by separate jacks, disconnect converter housing from engine. Move transmission rearward and disengage hub of converter pump cover from crankshaft and remove transmission from under car.

Installation: Reverse removal procedure and note the following: Turn flywheel so one converter attaching bolt hole is straight up, then install transmission, aligning converter bolt holes with holes in flywheel. Install and tighten all converter housing-to-engine bolts to 45-55 ft. lbs. Tighten flywheel-to-ring gear bolts to 30 ft. lbs. Tighten rear bearing-to-mounting pad bolts to 50-60 ft. lbs.

OVERHAUL

OVERHAUL: *See "Buick Twin Turbin Dynaflow Drive" in 1960 Annual Data or Later Manual edition and not the following*

Reaction Shaft Flange, Oil Pump, Accumulat rs & Clutch: Removal - Compress low band with Tool J-9478 to remove band from case.

R ar B aring R tainer, Rear Bushing, Parking L ck, and Speed meter Driv G ar: R m val - *NOTE - Th se units can b removed with transmission in car by re-*

CONTINUED ON NEXT PAGE

TWIN TURBINE DYNAFLOW (C nt.)

moving oil pan and disconnecting propeller shaft. Disconnect valve operating rod from upper operating rod (if not previously done), then remove retainer-to-case bolts, retainer and gasket. Remove speedometer gear and ratchet wheel retaining ring with snap ring pliers and remove speedometer drive gear, shims and spacer.

Disassembly - Remove spring from detent roller lever and support, then remove nut at adjusting lever. Pull roller lever and support assembly into bearing retainer and remove. *NOTE - Inspect "0" ring on support shaft and replace it damaged.* Remove cotter pin and clip from valve operating rod. *NOTE - If valve operating rod does not have a hole for installation of cotter pin, install later type valve operating rod and parking lock operating rod.* Thread parking lock operating rod ball stud out of lever. Thread a ¼" - 20 bolt into pawl shaft and withdraw shaft from retainer. Pull lever shaft from retainer in same manner, then remove parking lock pawl and lever assembly from retainer. Drive roll pin out of cross shaft and remove cross shaft and lever assembly and cross sleeve and lever. *NOTE - Inspect cross shaft s al and lever and replace if seal is worn or damaged. If bearing is worn so excessive freeplay xists between it and cross shaft, mark position of bearing in retainer and drive out bearing with a drift. Press a new bearing into place to same position as original bearing. Inspect output shaft bushing and if necessary, drive it out with Tools J-7273-7 and J-7013-1.*

R ass mbly - If new output shaft bushing is to be installed, drive bushing into position (flush with counterbore) with Tools J-7273-7 and J-7013-1. Coat outer diameter of new seal with Permatex and install with Tool J-8864. Lubricate cross shaft seal and position it in recess over cross shaft bearing with lip inward. Hold valve operating lever and shaft in position inside retainer and slide cross shaft through bushing and seal inside valve operating lever and sleeve. Line up holes and install roll pin. Install detent roller lever and support, then assemble linkage adjusting lever on support shaft and install nut and lockwasher. Install detent spring, then assemble parking lock operating rod to operating lever assembly using a lockwasher under ball end hex. *NOTE - Full pivoting ball end of rod must be assembled to operating lever.* Position pawl levers and rod assembly in retainer and slide pawl and lever shafts into place making sure that tapped holes are outward. Attach parking lock operating ball end to upper lever using a lockwasher under ball end hex. Assemble valve operating rod to valve operating lever with a clip and cotter pin. *NOTE - If rod does not have a cotter pin hol , replace rod with later type.*

Rear Oil Pump & Lubrication Oil Pr ssur R gulator Valv : R m val - Do not remove lube oil pressure regulator valve. Use compressed air and solvent to clean valve.

Valve & Servo Bodies: Disassembly (Valve Body) - Remove lower valve operating lever and linkage adjusting lever-to-upper lever shaft and remove levers. Remove safety nuts and washers from studs and lift valve body and gasket from servo body, then remove shift control valve from valve body. Remove rear pump delivery check valve and spring from servo body. Cover large pressure regulator valve plug with a wadded cloth and pull plug retaining pin out of valve body. *CAUTION - Use care when removing retaining pin as there is heavy spring pressure behind plug.* Remove two springs and spring seat. Remove small plug retaining pin, then thread a ¼" - 20 capscrew into plug and remove plug from valve body. Remove pressure regulator valve. Remove valve body plate and gasket, then remove front pump delivery check valve and spring.

Reassembly (Valve Body) - Place front pump delivery check valve spring in body with large end down and place check valve on spring with ridged side up. Install valve body plate and a new gasket, making sure that check valve is seated against plate and not caught under gasket. Check oil orifice in pressure regulator valve and land to make sure it is clear, then install valve with land outward. Assemble "0" ring on small plug and install plug with tapped hole outward and install short retaining pin with shoulder of pin toward valve body plate side of body. Assemble spring seat on inner spring and install springs and seat into valve body through large plug opening. Clamp a drift or dowel in a vise and position a 1" inside diameter pipe nipple over the dowel. Position plug and "0" ring over spring ends and against dowel. Slide pipe nipple over plug so that when pressure is exerted to compress springs into valve body, plug will not slip off dowel. Push valve body toward dowel to push plug into valve body. Install long retaining pin with shoulder toward valve body plate side of valve. Install shift control valve with slotted end on same end of valve as large pressure regulator plug. Install rear pump delivery check valve in its seat in servo body, ridged face inward, and place valve spring on valve with large end up. Install a new gasket and the valve body on servo body, using care to keep pump delivery check valve spring below gasket, then install lock washers and safety nuts on two studs adjacent to control valve and tighten nuts evenly to 11-15 ft. lbs. Insert valve operating upper lever shaft through bearing in servo body, then with upper lever pointing toward reverse servo, place lower lever with linkage adjusting lever on shaft so that forked end of lower lever engages shift valve pin, then install lockwasher and nut.

Planetary Gear Set: Installation - Install reverse ring gear thrust washer and planet carrier rear thrust washer in case, then compress ends of reverse band with band installing clip, Tool J-2595, and install in case. *NOTE - When installing band, make sure that h avy side of band is in correct position so that it will attach to reverse anchor and not to strut.* Remove clip, then rotate servo band toward servo opening. Insert anchor through opening and engage with hooked end of band, then rotate band and anchor back to normal position. Hold band operating lever (with offset end) in place with strut shoulder toward inside of case and insert anchor shaft through case, anchor, and lever. *NOTE - Tapped end of shaft must be outward. If adjustment screw is not centered in servo opening, th low band operating lever has been installed by mistake.* Install reverse ring gear slipper in case, then install assembled planetary gearset.

Low Band, Clutch & Input Shaft: Installation - To install low band, compress ends with Tool J-9478.

Reaction Shaft Flange, Front Oil Pump & Accumulator: Installation - To check endplay, assemble a suitable dial indicator support to transmission case. *NOTE - A 3/8" - 16 bolt with a .312" rod welded to head mak s good arrangement.* Assemble dial indicator so plunger bears on end of output shaft. Push shaft forward with some force and rotate a few turns to squeeze grease from thrust surfaces. Set dial indicator at zero, then pull output shaft rearward and check indicator reading. If reading is more than .040", select a thicker washer for installation forward of needle thrust bearing and recheck endplay. If reading is less than .020", select a thinner washer and recheck. Endplay should be between .020" and .040".

Valve & Servo Body Assembly & Oil Pan: Installati n - To adjust control valve, check position of groove in first land of valve which should be flush with boss of valve body. If edge of groove is not flush, loosen bolt and nut on adjustment lever and move to position valve correctly, then tighten nut and recheck valve position.

Speedometer Driven Gear & Positive Park Stop: Installation - Check "0" ring seal on speedometer driven gear and replace if necessary. Lubricate "0" ring and gear and install in case, then install driven gear retainer and lever stop *(see "Manual Linkage Adjustment" above). NOTE - If transmission not originally equipped with lever stop to prevent over travel in "P" (Park) position, install a new stop.*

CHEVROLET POWERGLIDE

Chevrolet Pass. Cars (1961)
Chevrolet Corvett (1961)
Chevrolet Trucks, Series C10 & C20 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR (Pushing recommended rather than towing)*· Place selector lever in Neutral "N" position. When car reaches speed of approximately 16 MPH. (20 MPH if road wet or icy with resultant poor traction), move selector lever to Low "L" position to crank engine. After engine is started, move lever to "N" for engine warm-up.

►*TORQUE CONVERTER NOTE*· *Both "Welded" and "Bolted" type converters are used in production "Welded" type converters cannot be disassembled for overhaul*

DESCRIPTION

DESCRIPTION: Design is the same as for previous models except for the following changes:

High Clutch Drive Plates: Clutch drive (faced) plates are waved and the reaction plates (steel) are flat.

Clutch Hub Thrust Washer: A new thrust washer, Part No. 3783286, is used to provide a more positive locating pilot. This new thrust washer has an extruded center section which projects into a counterbored low sun gear.

Low Sun Gear & Clutch Flange Assembly: This new unit is counterbored for use with the new clutch hub thrust washer.

LUBRICATION

Checking Fluid Level: Check every 1000 miles *NOTE - No periodic draining of transmission is required, see "Draining & Refilling" below*

Recommended Fluid - Use only Automatic Transmission Fluid Type "A" (Suffix "A"), as furnished in containers bearing "AG-ATF" number

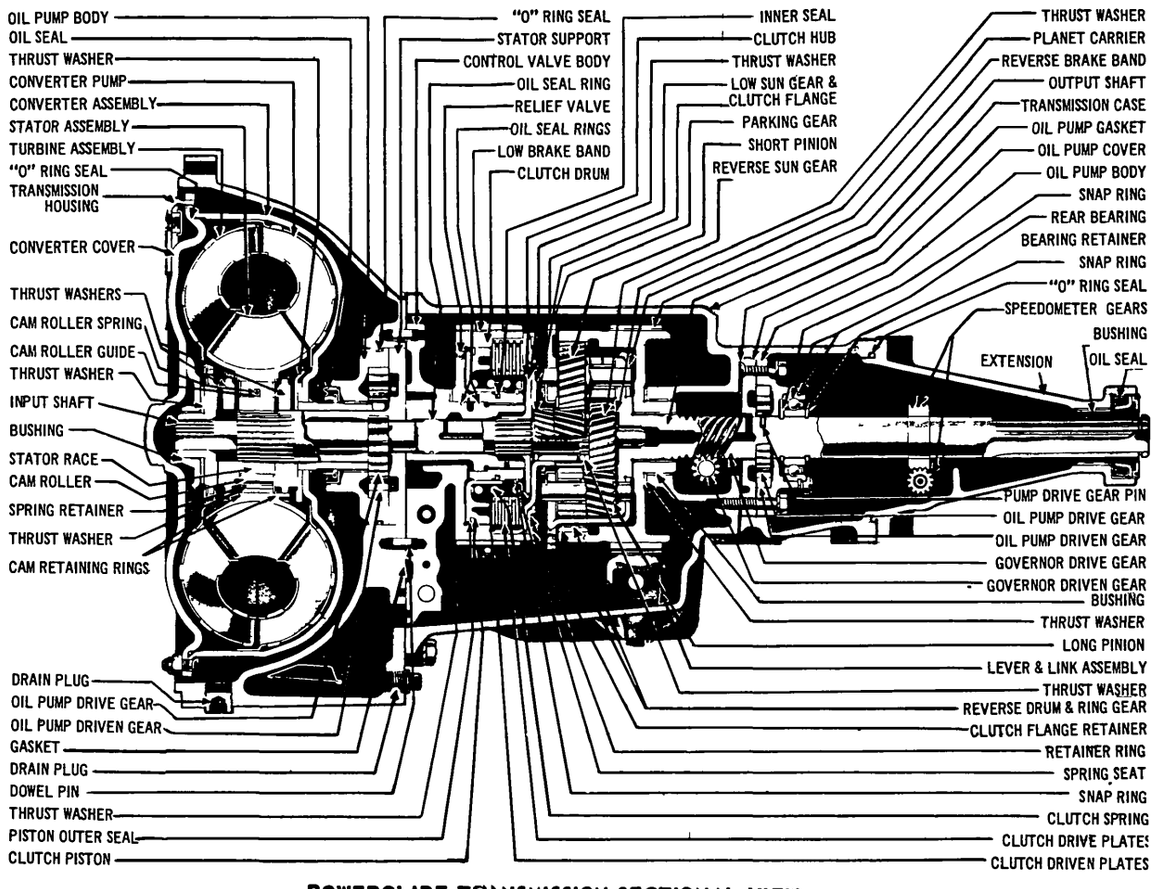
Capacity - Approximately 4½ qts (refill after transmission case drained) 10½ qts (Pass Cars), 10 qts (Trucks) after overhaul with transmission and converter dry

Draining & Refilling: *NOTE - Draining & refilling of transmission is not recommended other than for transmission repairs* Remove transmission oil pan drain plug (no drain plug on converter) To refill transmission, install drain plug and install 3½ quarts of Automatic Transmission Fluid Type "A" Operate engine with transmission in "N" (Neutral) until oil warms up, then add oil to raise fluid level to FULL mark on dipstick DO NOT OVERFILL *If converter was emptied, follow procedure above and add approximately 7½ qts of fluid after transmission fluid is warm*

LINKAGE ADJUSTMENT

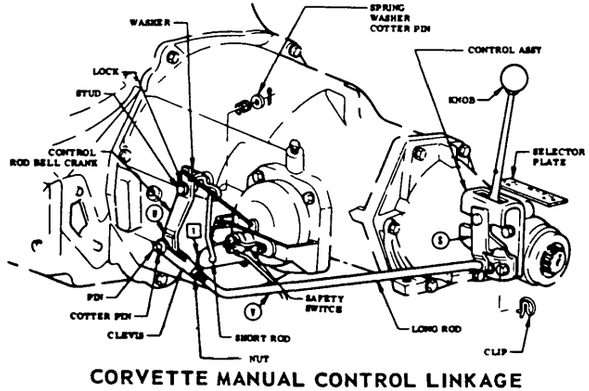
►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on car model pages.*

Manual Control Linkage (Except Corvette): Place gearshift control lever in "D" (Drive) position, then loosen clamp nut on shift control rod at its attachment to shift control lever on mast jacket. Place transmission shift lever in "D" (Drive), then adjust position of clamp on shift control rod for free entry into shift lever on mast jacket. Secure clamp nut attachment to mast jacket shift lever, then test transmission shifts in all ranges.



POWERGLIDE TRANSMISSION SECTIONAL VIEW

Manual Control Linkage (Corvette): Place control rod bellcrank (U) in "Park" position, then set control shaft lever (S) in "Park" position With both bellcrank and lever held in "Park" position, assemble control rod (V) to lever (S), then adjust clevis on rod (V) for easy entry into lever (U)



CORVETTE MANUAL CONTROL LINKAGE

Neutral Safety Switch (Exc pt C rv tt): Located on steering column mast jacket under instrument panel Place selector lever in "N" (Neutral) position and loosen two screws securing neutral safety switch retainer While holding ignition switch in "Start", adjust position of neutral switch until engine starts cranking Hold switch in this position and tighten retaining screws Check adjustment by testing for cranking with selector lever in "N" and in "P" positions

Neutral Safety Switch (Corvett): Located on left side of transmission case and linked to transmission manual control lever Adjust switch so engine will start only with transmission selector lever in "N" or "P"

BAND ADJUSTMENT

►*BAND ADJUSTING NOTE Band adjustm nt not ordinarily required in service (bands adjusted when reassembling transmission). Rev rse band adjustment requires r moval of Servo Cov r Assembly (see Disassembly data).*

C NTINUED ON NEXT PAGE

POWERGLIDE (C ntinued)

L w Serv Band: Adjusting screw located on left side of transmission under adjusting screw cover To adjust band, remove adjusting screw cover and tighten low servo adjusting screw to 5-7 ft lbs , using a torque wrench, Tool J-5853. *NOTE - Rotate input and output shafts simultaneously to properly center low band on clutch drum* Back adjusting screw off **4 turns,** then tighten locknut securely and install adjusting screw cover *CAUTION - The amount the adjusting screw should b backed off after torqueing to 5-7 ft lbs is not an approximate figure, it MUST be exactly as specified*

Rev rs S rv Band (R verse Piston Linkage): *CAUTION - Band adjustment must be verified by actual measur m nt of reverse piston travel* Rotate reverse drum to center it in reverse band, then using Tool J-4277, tighten adjusting screw to 5-7 ft lbs torque, **th n back screw off 2½ turns.** Check for proper adjustment as follows Measure distance from face of re-erse piston outward to side of case with the piston in its retracted (inboard) position with a small scale, then record this dimension Pull reverse piston outward its full travel by grasping its hub with a pair of pliers, then again measure the distance from face of piston to outboard side of case The difference between the two measurements should be 3/32-5/32" If travel is too great, tighten adjusting screw If too little, loosen adjusting screw Recheck piston travel after adjustment Tighten adjusting screw locknut to 20-25 ft lbs

TR UBLE SHOOTING

CLOSE THROTTLE DOWNSHIFT "CLUNK": May be caused by: High engine idle speed. Faulty downshift timing valve (replace valve). High mainline pressure caused by Vacuum Hose to modulator leaking or disconnected. Modulator diaphragm ruptured. Sticking valve (pressure regulator booster valve, pressure regulator valve, or modulator valve).

MOMENTARY RUN AWAY IN LOW UP TO 30 MPH (WIDE OPEN THROTTLE ACCELERATION): May be caused by a broken forced throttle cushion valve spring retainer. Check mainline pressure which will be lower just prior to shift, and the stall pressure will be low if the faulty transmission operation is caused by a broken retainer. *See "Closed & Forced Throttl Valve Spring R tainer Production Change" ab v .*

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, poor acceleration, or engine runs away on turns).

1) In all Spe d Rang s - Low oil level. Incorrect control linkage adjustment Air leak in oil pump suction pipe. Low front oil pump pressure.

2) In Driv Rang - Incorrect control linkage adjustment. Damaged or leaking clutch piston seal (worn or burned clutch plates resulting from partially engaged clutch).

3) In L w Rang - Incorrect control linkage adjustment. Low Band out of adjustment. Sticking accumulator valve, modulator lever, or modulator valve. Damaged or worn Low Servo Piston Ring resulting in poor band application or excessive oil leakage into clutch apply circuit causing partial clutch application and possibly burned clutch plates (check by connecting pressure gauges to Low Servo Apply and to High Clutch test points - there should be no pressure indicated at High Clutch point with selector lever in "L").

CAR CREEPS (Forward or Backward):

1) With Control Lever in Neutral - Incorrect control linkage adjustment. Clutch piston vent valve stuck closed. Clutch plates sticking or incorrectly assembled (not "stacked" in correct order).

2) Creeps forward with Control Lever in Reverse or backward with Lever in Low - Incorrect control linkage adjustment.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With Control Lever in any range (rear wheels free). If this occurs at other times than after reversing car, see causes listed under EXCESSIVE SLIPPAGE above. If this occurs only after reversing car (indicating loss of front pump pressure) check: Rear pump air leakage into front pump suction line (causing front pump to lose its prime). Rear pump gasket leakage. Front pump clearance excessive.

2) With Control Lever in any range (rear wheels locked). Parking pawl lock engaged. Broken parts in transmission- Parking brake applied.

3) With Control Lever in Drive Range (rear wheels free). If engine runs away and transmission is hot, check for: Low radiator water level, clogged oil cooler, sticking thermostatic valve, or dragging Low Range Band (causing over-expansion of clutch parts due to excessive heat).

SHIFTS ARE ROUGH:

1) Low-to-Drive Shift (car in motion). Incorrect Low Band adjustment. Clutch plates worn or binding. Modulator control lever or piston sticking (will cause excessive pressures). Accumulator dump valve orifice plugged.

If engine speeds up during this shift.- Check for incorrect low band adjustment and worn or binding clutch plates.

2) Drive-to-Low Shift. Incorrect Low Band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

3) Neutral-to-Reverse. Incorrect reverse band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

CHATTERS WHEN STARTING:

1) In Low Range. Incorrect Low Band adjustment Worn or rough band, scored drum. Clutch not disengaging properly due to distorted or binding plates, sticking clutch piston, sticking piston vent valve, or damaged or worn Low Servo Piston Ring allowing oil leakage into clutch apply circuit and causing partial clutch application (see tests for Excessive Slippage in Low Range above).

2) In Drive Range. Incorrect Low Band or Reverse Band Adjustment. Bands worn or rough, drums scored.

3) In Reverse Range. Incorrect Reverse Band adjustment. Worn or rough band, scored drum. Reverse ring gear and drum bushing worn or damaged.

REVERSE OPERATION JERKY OR DRAGGING.

1) Clutch plates are incorrectly assembled (not "stacked" properly) or sticking. Clutch piston vent valve stuck closed.

REVERSE CANNOT BE ENGAGED WITH ENGINE RUNNING: If reverse can only be engaged when engine not running, check for accumulator snap ring being out of place (allowing accumulator valve and body to be forced against clamp nut on parking lock lever shaft and apply spring assembly, blocking shift into reverse). *NOTE* - Above condition will not prevent shift into Low Range).

DRIVE-TO-LOW or LOW-TO-DRIVE SHIFT DIFFICULT: May be caused by improperly drilled high clutch feed orifice in valve body resulting in slow clutch application in Drive Range and slow clutch release when shifting from Drive to Low (restricted orifice will cause slow oil flow). Check by connecting pressure gauges to Low Servo Apply and to High Clutch (low servo release side) and noting pressures as follows:

1) Move selector from Neutral to Drive with engine idling. If pressure builds up much more rapidly on Low Servo Apply gauge than on High Clutch gauge, a restriction in the passage (undersized orifice) is indicated.

2) Move selector from Drive to Low. Pressure in High Clutch gauge drops slowly,oil drainage from clutch is restricted. *NOTE* - This will result in slow Low Band application and clutch drag (may cause burned clutch plates).

HIGH CLUTCH PLATES BURNED OR CLUTCH FAILURE:

►*CAUTION: When High Clutch failure noted, following tests should be made before transmission removed, and transmission should also be carefully examined after removal and disassembly.*

1) Connect pressure gauges to Low Servo Apply, High High Clutch (low servo release side), and to Reverse Servo points. Operate engine to supply oil pressure.

2) Place selector lever in Drive position and note pressure build-up in High Clutch gauge. Slow build-up indicates restriction in high clutch apply orifice resulting in clutch slippage and burned plates.

3) Place selector lever in Low position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage past Low Servo Piston Ring resulting in partial clutch application and burned clutch plates.

4) Place selector lever in Reverse position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage between the converter "out" and low servo "release" channels in valve body or damaged Housing-to-Valve Body gasket. This condition will cause partial clutch application and burned clutch plates.

NOISE IN TRANSMISSION:

1) Buzzing Noise (All Ranges). Low oil level. Pump gear interference with crescent in pump. Pump check valve not seating.

2) Ringing Noise in Converter. Low oil level. Air leak in pump suction line (pump not seated properly) resulting in low oil level in converter. Pressure regulator valve stuck (closing converter inlet port). Leakage in oil line between front pump and regulator valve.

3) Clicking Noise. Incorrect manual linkage adjustment (causing interference between parking lock pawl and gear).

CONTINUED ON NEXT PA E

POWERGLIDE (C ntinu d)

4) Whining N is . Transmission gear teeth worn. Pump gear clearance excessive or pump gear bushings worn.

FUEL CONSUMPTION EXCESSIVE:

1) Transmission Causes. Converter stator freewheeling cams and roller incorrectly assembled. Clutch piston vent valve stuck open.

TRANSMISSION OIL BEING FORCED OUT OF FILLER PIPE: Caused by aeration and foaming of the oil due to ne or more of the following:

NOTE - This condition may also cause Loss of Power and Lower Stall Speed (due to converter turbulence and lower pressures in control circuits).

1) Oil level too high allowing planet carrier to revolve in oil and aerate it. Correct by lowering oil level to correct point (see LUBRICATION) and driving car for 5 miles to work out air bubbles.

2) Oil suction pipe split, seal damaged, bore for suction pipe in housing too deep, or suction pipe retainer ears bent (preventing proper compression of the seal) resulting in air leaks in oil suction line.

3) Sand hole in suction bore of transmission case or housing or in suction cavity in valve body resulting in air leaks in oil suction.

TESTING

►*TESTING CAUTION*—Transmission oil level must be checked and corrected (see LUBRICATION) and *transmission must be warmed up before tests made.*

Warming Transmission: Transmission must be warmed by road driving or in the shop as follows before checking for oil leakage or other trouble

Road Warm-Up - Drive car for approximately 5 minutes with frequent stops and starts (to approximate heavy-traffic conditions)

Shop Warm-Up - Set hand brake tightly, place selector lever in "D" (Drive) range, start engine and run for 2 minutes at 750 RPM

►*CAUTION Recheck oil level after warm-up and before making following tests*

ROAD TEST: Road test car to determine transmission shift points as indicated in table

TRANSMISSION SHIFT POINTS (PASS. CARS)

Selector in "D" (Drive)

6 Cyl. Engine

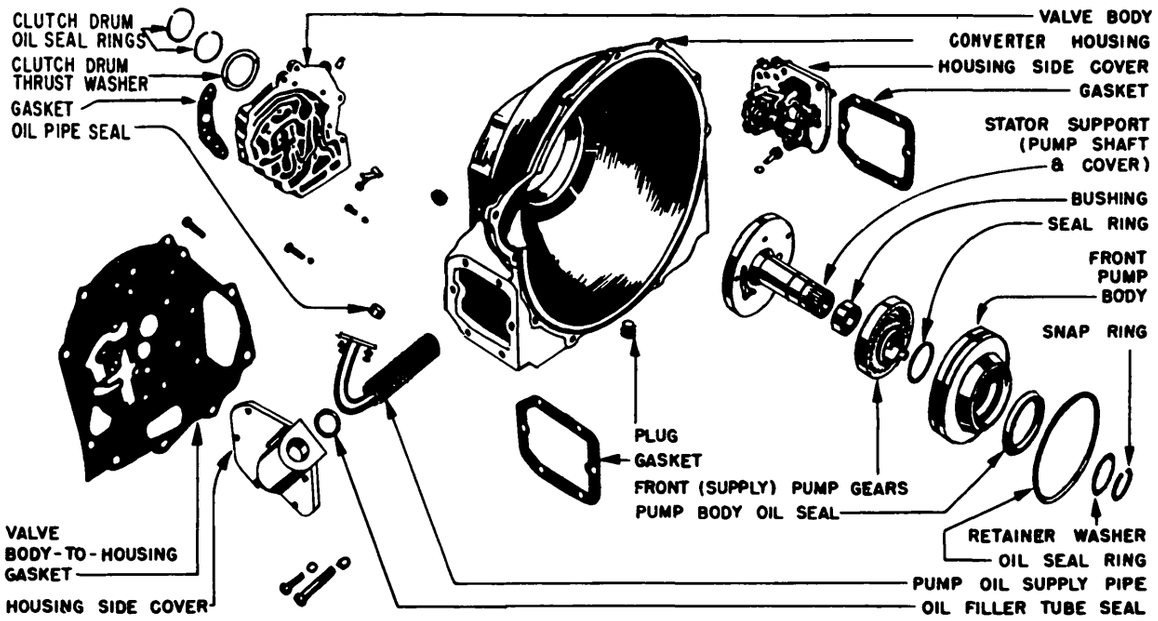
Throttle Position	Upshift	Downshift
Light Throttle	12-15 MPH	10-13 MPH
To Detent	27-44 MPH	13-17 MPH
Through Detent	44-49 MPH	41-48 MPH

283" V8 Engine (Air Cond.) ①

Throttle Position	Upshift	Downshift
Light Throttle	12-15 MPH	10-13 MPH
To Detent	37-50 MPH	13-17 MPH
Through Detent	50-56 MPH	47-53 MPH

C rvette

Thr ttle P siti n	Upshift	D wnshift
Light Throttle	12-15 MPH	10-14 MPH
To Detent .	36-52 MPH	13-17 MPH
Through Detent	54-60 MPH	50-58 MPH



POWERGLIDE TURBINE HOUSING & FRONT OIL PUMP

283" & 348" V8 Engine ②

Throttle Position	Upshift	Downshift
Light Throttle	13-16 MPH	11-14 MPH
To Detent	40-55 MPH	14-19 MPH
Through Detent	55-61 MPH	51-58 MPH

348" V8 Police Engine

Throttle Position	Upshift	Downshift
Light Throttle	14-18 MPH	12-15 MPH
To Detent	44-60 MPH	15-20 MPH
Through Detent	60-66 MPH	56-63 MPH

① - 3 36-1 axle ratio ② 3 08-1 axle ratio

TRANSMISSION SHIFT POINTS ① (TRUCKS)

½-Ton, 6 Cyl. ③

Throttle Position	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	25-40 MPH	12-16 MPH
Through Detent	40-45 MPH	38-44 MPH

½-Ton V8 ③

Throttle Position	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	34-44 MPH	12 16 MPH
Through Detent	46-52 MPH	43 49 MPH

¾-Ton 6 Cyl ④

Throttle Position	Upshift	Downshift
Light Throttle ②	11 14 MPH	9 12 MPH
To Detent	25-40 MPH	12 15 MPH
Through Detent	40 45 MPH	37-44 MPH

¾-T n V8 ④

Thr ttl Positi n	Upshift	D wnshift
Light Throttle ②	11 14 MPH	9-12 MPH
To Detent	34-44 MPH	12-15 MPH
Through Detent	46-51 MPH	43-48 MPH

① - Shift speeds given in table will vary slightly for tire sizes other than indicated

② - Closed throttle position for "downshift" speeds

③ 6 70-15 tires ④ - 7 00-17 & 7 50-17 tires

►*STALL TEST NOTE Stall testing of transmission is not recommended*

PRESSUR E TESTS: Install pressure gauge hose connections at low servo apply (main line), clutch (release side of low servo), throttle valve, governor test points on transmission (see illustration) Gauge lines should be run into driving compartment by pushing aside steering column mast jacket seal, and connected to Gauge Set J-4872-A

Wide Open Throttle Upshift Pr ssur : This shift should occur at 82-90 lbs pressure (V8 Eng), 68-74 lbs pressure (6 Cyl Eng) as indicated on low servo (main line) gauge After shift is completed, pressures on both low servo apply and high clutch gauges should indicate similar readings If pressures are correct and clutch slippage is felt, mechanical trouble in clutch is indicated If high clutch pressure is more than 5 lbs lower, check for leak in high pressure line between low and drive valve body and high clutch

Idle Pressure in "Drive" Rang : *NOTE - In addition to oil pressure gauges, a vacuum gaug is r quired for this test* With parking brake applied and shift selector lever in "D" (Drive) range, adjust engine speed until a steady 16" of vacuum is indicated on vacuum gauge Low servo apply (Main line) pressure should be 60-70 lbs (V8 Eng), or 55-65 lbs (6 Cyl Eng) If pressures not within this range, check the following Pressure regulator valve, Vacuum modulator valve, or Booster valve stuck Leak at low servo piston ring (between

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POWERGLIDE (C ntinued)

ring and bore) or at low servo piston rod (between rod and bore). Leakage at valve body-to-cas gasket. L ak between valve body and housing. Front pump clearances not correct. Leak at low drive valve body (check gasket and shifter valve). Check passages in transmission housing for porosity. Loose suction screen connection.

Manual L w Rang Pr ssur : Connect a tachometer, place s lector lever in "L" (Low) range, and adjust engine speed to 1000 RPM with car stationary. Low servo apply (main line) pressure should be 114-127 lbs. (V8 Eng.), 70-80 lbs. (6 Cyl. Eng.). Pressures not within this range indicate the following possibilities: Partially plugged oil suction screen. Broken or damaged ring in low servo. Pressure regulator valve stuck. Leak at valve body-to-case gasket. Leak between valve body and housing. Leak at servo center. Front pump clearances not correct

Drive Rang Overrun (C ast) Pressure: With car coasting in "D" (Drive) range at 20-25 MPH and engine vacuum at approximately 20", low servo (main line) pressure should be 47-53 lbs. (V8 & 6 Cyl. Engs.).

Throttl Valv Pr ssur : Pressures will range from 0-63 lbs. (V8 Eng.), 0-50 lbs. (6 Cyl. Eng.), depending on accelerator positi n. Improper throttle valve pressure is usually the result of trouble in low and drive valve body providing throttle valve linkage is properly adjusted.

Gov rnor Pressure: Governor pressure is relative to transmission output shaft speed and can be checked in terms of MPH by referring to following table.

G v rn r Pressure ℂ

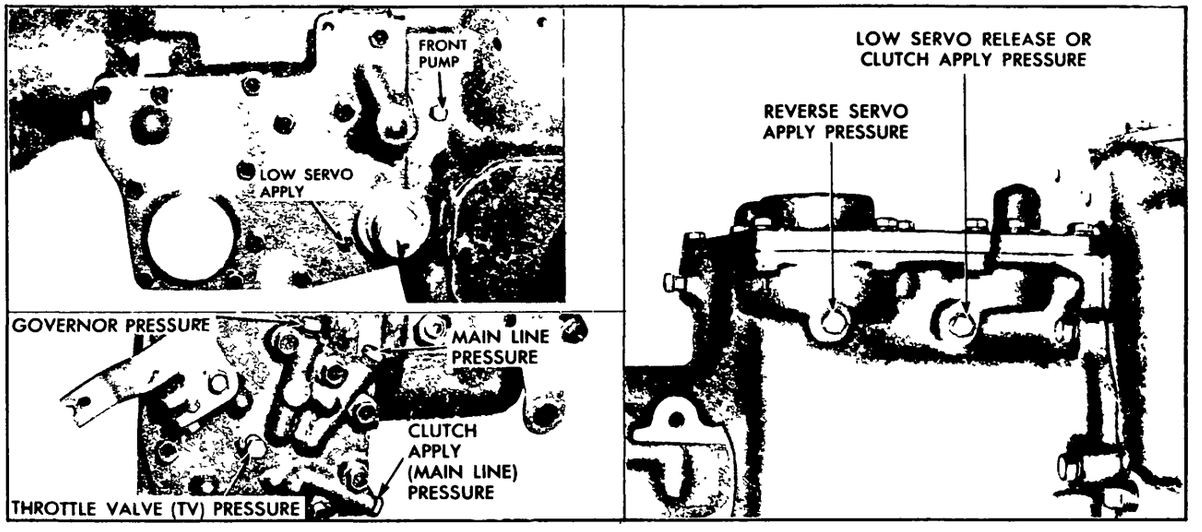
Car Sp d (MPH)	Pr ssur	Car Speed (MPH)	Pressure
5	2-4 lbs.	35	47½-53½ lbs.
10	8½-13 lbs.	40	55-62 lbs.
15	21-27½ lbs.	45	63½-71½ lbs.
20	31½-34½ lbs.	50	73½-82 lbs.
25	35½-40 lbs.	55	84-93½ lbs.
30	41-46 lbs.	60	95½-106 lbs.

ℂ - *NOTE* - Governor pressures for cars with 3.08-1 rear axle ratio will be approximately 2 lbs. lower than specified in table.

R v rs Pr ssur : With parking brake applied, place selector lever in "R" (Reverse) position. With engine at idle speed, pressure reading on reverse servo should be 80-115 lbs. (6 Cyl. & V8). With engine running at 1250 RPM, pressure reading should be 240-260 lbs. (V8), 170-190 lbs. (6 Cyl.), with vacuum modulator hose disconnected. If pressures are within limits but operation is faulty, reverse band requires either adjustment or replacement. If pressure is below limits, the following should be checked: Partially plugged oil suction screen. Broken or damaged reverse servo piston ring. Pressure regulator valve or booster valve is stuck. Leak at valve body-to-case gasket. Leak between valve body and housing. Front pump clearances not correct. Leak between piston rod and bore.

REMOVAL FROM CAR (EXCEPT CORVETTE)

Transmission & Torque Converter are removed as an assembly. *CAUTION—Torque converter is not retained in housing as on previous transmission and special holding tool must be used to prevent converter falling out when transmission assembly removed.*



POWERGLIDE PRESSURE TEST POINTS

TRANSMISSION ASSEMBLY REMOVAL: Raise car on hoist (see "Jacking & Hoisting" in Suspension & Wheel Alignment Section), then proceed as follows:

1) Drain transmission case, then remove transmission filler pipe. Disconnect oil cooler lines, vacuum modulator hose. and speedometer drive cable fitting at transmission. Disconnect body ground strap.

2) Disconnect manual and throttle valve control lever rods from transmission, then disconnect propeller shaft at transmission. Install suitable transmission lift to jack or other lifting device and attach to transmission.

3) Disconnect engine rear mount on transmission extension, then remove transmission support crossmember. *CAUTION - Use care to remove any shims which may be installed between extension mounting boss and crossmember. The same number of shims must be installed as these affect drive line angle.*

4) Remove flywheel cover, then using a jumper to turn the engine, remove flywheel-to-converter attaching bolts. Lower rear of ttansmission slightly so that the three upper transmission housing-to-engine attaching bolts can be reached (use a universal socket and approximately a 39" extension). Remove upper bolts. *CAUTION - Rear of transmission must not be lowered too far as distributor housing on engine may be forced against dash board.*

5) Support engine at oil pan rail with a jack, then remove remainder of transmission housing-to-engine attaching bolts. Remove transmission by moving slightly to the rear and downward. Install converter housing holding tool, J-5384, then remove transmission from beneath car. *CAUTION - Do n t tilt front f transmission downward prior t installing Tool J-5384, as converter may fall out f transmissi n.*

OVERHAUL

OVERHAUL: *See "Chevrolet Powerglide Transmission" in 1958 Annual Data or later Manual edition and n t the following:*

►*1961 POWERGLIDE DISASSEMBLY CAUTION:* To prevent bending manual valve and manual valve inner lever, the manual valve should be moved into the position that places it as far as possible into its bore. Before separating the two case sections, place manual valve selector lever in "L" (Low). *NOTE - Previous model transmissions required that the valve b positioned in "R" (Reverse).*

►*1961 POWERGLIDE DISASSEMBLY & REASSEMBLY CAUTION:* Before removing converter assembly from flywheel, scribe a mark on both units so they may be installed in the same position. All flywheels are marked with a stripe of white paint to indicate "heavy" side of engine and all transmission have a stripe of blue paint across ends of both converter cover and housing to indicate "light" side. These paint markings must be aligned as closely as possible during assembly to obtain best balance conditions. Flywheel assemblies used with automatic transmissions have six transmissions attaching holes instead of three. The additional holes are used to permit more accurate indexing of converter to flywheel. Only three of the bolt holes will be used for actual attachment.

Sun Gear Thrust Washer Installation: *Procedures for installation of this washer are different than for former models.* Install input shaft to clutch unit, then install low sun gear bushing on input shaft spline, bottoming bushing against shoulder on shaft. *NOTE - Wire typ snap ring formerly used on output shaft with former splined thrust washer, is not used with this design.* Assemble low sun gear thrust washer into planet carrier by tilting washer slightly to permit flange to enter behind the short planet pinions, then hold in position with

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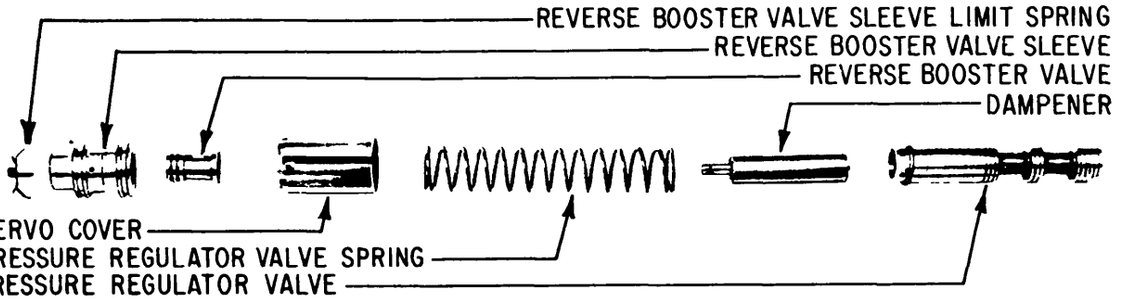
POWERGLIDE (C ntinu d)

petroleum jelly Install clutch and input shaft assembly into case, aligning thrust washer on input shaft and indexing low sun gear with pinions in planet carrier

R verse Booster Valve Positioning: *CAUTION - To prevent excessively high oil pressure, reverse booster valve must be assembled into servo cover, and servo cover installed on case as follows* Place new limit spring in servo cover bore with wide tabs seating on bottom of bore Install "O" rings on booster valve sleeve and push into bore so that end of sleeve is 13/32" (40625") below face of servo cover (19/32" on transmissions with a pressure regulator dampener) Install reverse booster valve, then install servo cover locating sleeve in bore of cover until it just contacts booster valve sleeve *CAUTION - Do not exert any downward force on reverse booster valve sleeve* Install pressure regulator valve, damper valve assembly and spring, then install reverse servo spring. Use guide pins to assemble servo cover to transmission case. *CAUTION - Make sure locating sleeve is in alignment with pressure regulator valve bore.* Check alignment of vacuum modulator hole in servo cover with hole in case.

Pressure Regulator Damper: When removing the pressure regulator valve, note a small damper in inner end of valve. When assembling, this damper must be placed so that plunger stem is outside the valve.

Clutch Drum Thrust Washer Selection: *NOTE - To use the later gauging procedure it will be necessary to rework Tool J-4260 as follows: Press low sun gear pilot pins from the tool bar, then remove spring and spring retainer from gauge rod. Install a steel ball (similar to Rochester Carburetor pump outlet check ball) under end of gauge rod setscrew in tool bar Slide gauge collar (Tool J-4260-15) onto gauge rod, between tool bar and knurled end of rod.* To gauge correct thickness of selective washer, proceed as follows Hold tool bar solidly across face of transmission case and push gauge rod into firm contact with front face of input sun gear Tighten setscrew in tool bar to lock gauge rod. Slide gauging collar down rod until it seats on tool bar, then securely tighten collar thumb screw against rod. Remove tool with setting retained. *NOTE - The above tool setting was obtained without low sun gear thrust washer positioned against input sun gear.* Place transmission main valve body assembly on a sheet of glass or a smooth table top, then install a clutch drum thrust washer on valve body and lower clutch assembly onto the stack Center low sun gear thrust washer on top of low sun gear. *NOTE - If sun gear thrust washer is flanged type, insert flanged washer on top of low sun gear.* Use Tool J-4260, pre-set at dimension obtained earlier and place tool on top of low sun gear thrust washer, with gauge rod down through center of clutch and valve body so rod rests on glass or table top Loosen setscrew in tool bar and allow bar to drop onto low sun gear thrust washer Use a feeler gauge and measure clearance between top side of bar and bottom face of gauging collar. This dimension represents clearance in transmission, and should be between .025-.050". If clearance is not within this limit, substitute a thicker or thinner clutch drum thrust washer to bring clearance within limits



PRESSURE REGULATOR VALVE ASSEMBLY

Low Servo Piston: Place low servo piston in an arbor press and support notched end of piston rod on a wood block. Use Tool J-3377 and compress piston spring and remove rod retainer. *CAUTION - This spring is under 150 lbs. pressure.* Remove piston spring and washer from piston rod. Remove piston ring from piston and install in low piston bore. Check ring gap which should be .005-.010". Assemble piston ring to piston and insert feeler gauge between side of ring and one wall of ring groove. Ring clearance should be .0005-.005". Assemble washer, spring and piston on piston rod Place assembly in an arbor press and compress spring with Tool J-3377. Install retainer, making sure it is properly seated in piston rod groove.

INSTALLATION IN CAR (EXCEPT CORVETTE)

TRANSMISSION ASSEMBLY INSTALLATION: Mount transmission on lifting device, then remove Converter Holding Tool J-5384 Proceed as follows

1) Raise transmission into place and install transmission case-to-engine upper mounting bolts, then install lower and side bolts *CAUTION - Be careful that converter does not move forward causing disengagement of pump hub drive slots from lugs of front pump drive gear*

2) Remove support from beneath engine, then raise transmission to final position Connect body ground strap With flywheel cover removed, align flywheel bolt holes on converter and install converter-to-flywheel attaching bolts using a jumper to turn engine

3) Reinstall transmission support crossmember *NOTE - Two sets of holes are provided for attachment of crossmember to frame as follows Lower holes ar to be used with Powerglide, Upper holes used with Turboglide* Be sure to reinstall exactly the same number (and thickness) of shims between extension mounting boss and crossmember as were removed *NOTE - These shims maintain correct drive line angle*

4) Remove transmission lift equipment and support, then connect propeller shaft to transmission Connect manual and throttle valve control linkage to transmission Connect oil cooler lines, vacuum modulator hose, speedometer drive cable to transmission Reinstall transmission oil filler tube and fill transmission *See LUBRICATION above*

5) Adjust all transmission linkage *See LINKAGE ADJUSTMENT above*

CHEVROLET TURBOGLIDE TRANSMISSION

Chevrolet (1961)

►CHANGES, CAUTIONS, CORRECTIONS

1961 TURBOGLIDE REVERSE CLUTCH PLATE REPLACEMENT CAUTION: It is important that when a reverse clutch plate is installed, a new reverse clutch piston return spring be installed at the same time. *NOTE - Th ld spring may appear to be normal but will be "dish d" in the opposite direction to a new spring. This conditi n will result in clutch failures.*

►*STARTING ENGINE BY PUSHING CAR:* Place control lever in "N" (Neutral) range until car reaches 25-30 MPH. Turn key on and move control lever to "GR" (Grade Retarder) position. After engine starts, move control lever to "N" (Neutral) for engine warm-up. Towing is not recommended to start car.

►*TOWING TURBOGLIDE CARS:* Cars must not be towed with rear wheels on ground except with transmission in "N" (Neutral) position and must not be towed in excess of 30 MPH. If car is to be towed a long distance, drive shaft should be removed. *NOTE* - If car has been damaged and transmission cannot be placed in "N" with selector lever, disconnect long rod from idler lever on left side below mast jacket, then pull lever on transmission toward front of car as far as it will go. Move lever toward rear of car from the forward position to the third detent which is "N" (Neutral) position.

DESCRIPTION: Design is similar to previous transmissions having the following features:

Vacuum Accumulat r (In Hydraulic Modulator Valve Body): Vacuum accumulator piston, spring, retainer and rings have been eliminated.

First Turbin Hub Bearing: The former needle bearings and races have been replaced by a solid bearing.

Clutch s: Multiple plate type clutches have replaced the former "cone" type clutches at the forward and reverse clutch locations.

Sec nd Turbine: A five spoke second turbine is being used. The second turbine shaft is heavier and a bushing has been added to prevent interference between second turbine shaft and the stator shaft bore.

Main Valv B dy: Valve body reinforcing strap, accumulator passage plug, and the two check valves in modulated oil circuit have been eliminated. A second spring and a spring cap between the pressure regulator valve and the hydraulic modulator valve have been added.

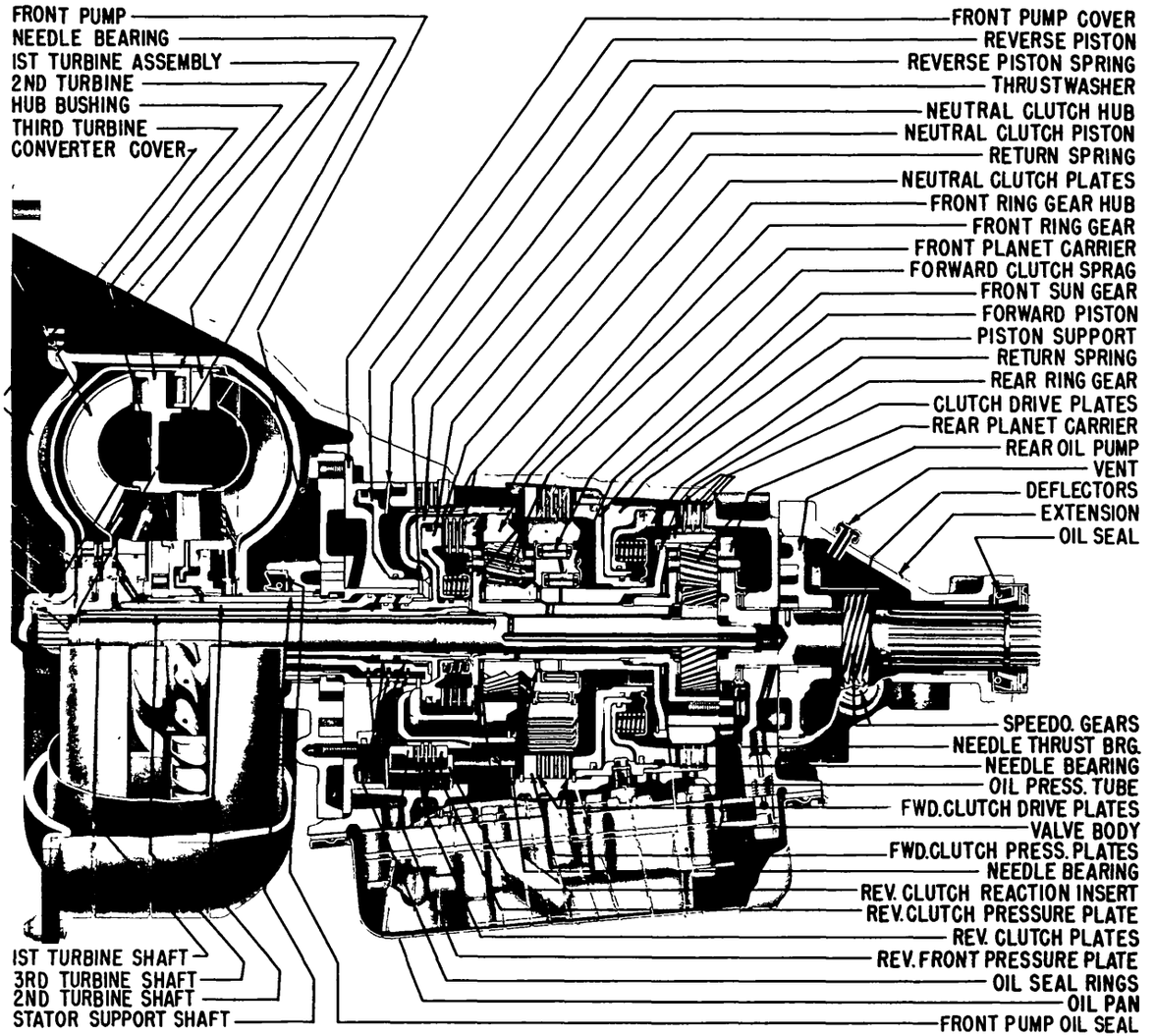
Fr nt Planetary G ars t: Six planet gears replace the three formerly used. *NOTE - Because of pinion alignment, th front planetary set is serviced only as a unit. DO NOT attempt disass mbly.*

LUBRICATION

Check oil level every 1000 miles. *NOTE - Draining and refilling f transmission is not recommended other than f r transmission r pairs.*

Capacity - 2 qts. (refill), 9½ qts. (after overhaul).

Rec mmended Oil - Use Automatic Transmission Fluid Type "A" (Suffix "A"). If this type fluid not available, use Automatic Transmission Fluid Type "A".



CHEVROLET TURBOGLIDE TRANSMISSION (SECTIONAL VIEW)

Checking Fluid Level: With transmission at normal operating temperature, transmission selector lever in "N" (neutral) and engine running at 800-1000 RPM, check fluid level on dipstick located in engine compartment.

Draining & Refilling: *NOTE - Draining & refilling of transmission is not recommended other than for transmission repairs.* To drain transmission, remove filler tube. To refill, run engine at 800-1000 RPM and install 2 qts. of recommended fluid, then bring transmission to normal operating temperature and recheck oil level. If necessary, add fluid to bring level up to "Full" mark on dipstick. *NOTE - Approximately 9½ qts. of fluid will b r quired if both transmission and torqu conv rt r hav been drained.*

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on car model pages.*

Manual Control Linkage: Place selector lever in "D" (Drive) position, then disconnect swivel on shift control rod at its attachment to shift control lever on mast jacket in engine compartment. Position shift lever on transmission in "D" (Drive) position (first detent forward from full rear position). Adjust swivel on shift control rod for free entry into shift lever on on mast jacket. Secure swivel nut attachment to mast jacket shift lever, then test transmission in all shift ranges.

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CHEVROLET TURBOGLIDE (C nt.)

N utral Safety Switch: Place selector lever in "N" (Neutral) and loosen screws attaching neutral safety switch retainer. While holding ignition switch in "START" position, adjust position of switch until engine turns over. Hold switch in this position and tighten retainer screws. Check adjustment by testing for cranking in both "N" (Neutral) and "P" (Park).

TROUBLE SHOOTING

DRIVE POOR AT LOW SPEEDS (NO REVERSE, GRADE RETARD NORMAL): Inner overrun clutch assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD: Both overrun clutches assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD AND REVERSE: Outer overrun clutch assembled backwards. Forward and neutral clutch not applied due to severe leakage in forward clutch hydraulic circuit.

CAR DRIVES VERY SLIGHTLY IN NEUTRAL (REVERSE NORMAL): Neutral clutch not released.

CAR DRIVES NORMAL IN NEUTRAL AND DRIVE AT LOW SPEEDS (NO REVERSE): Forward clutch not released.

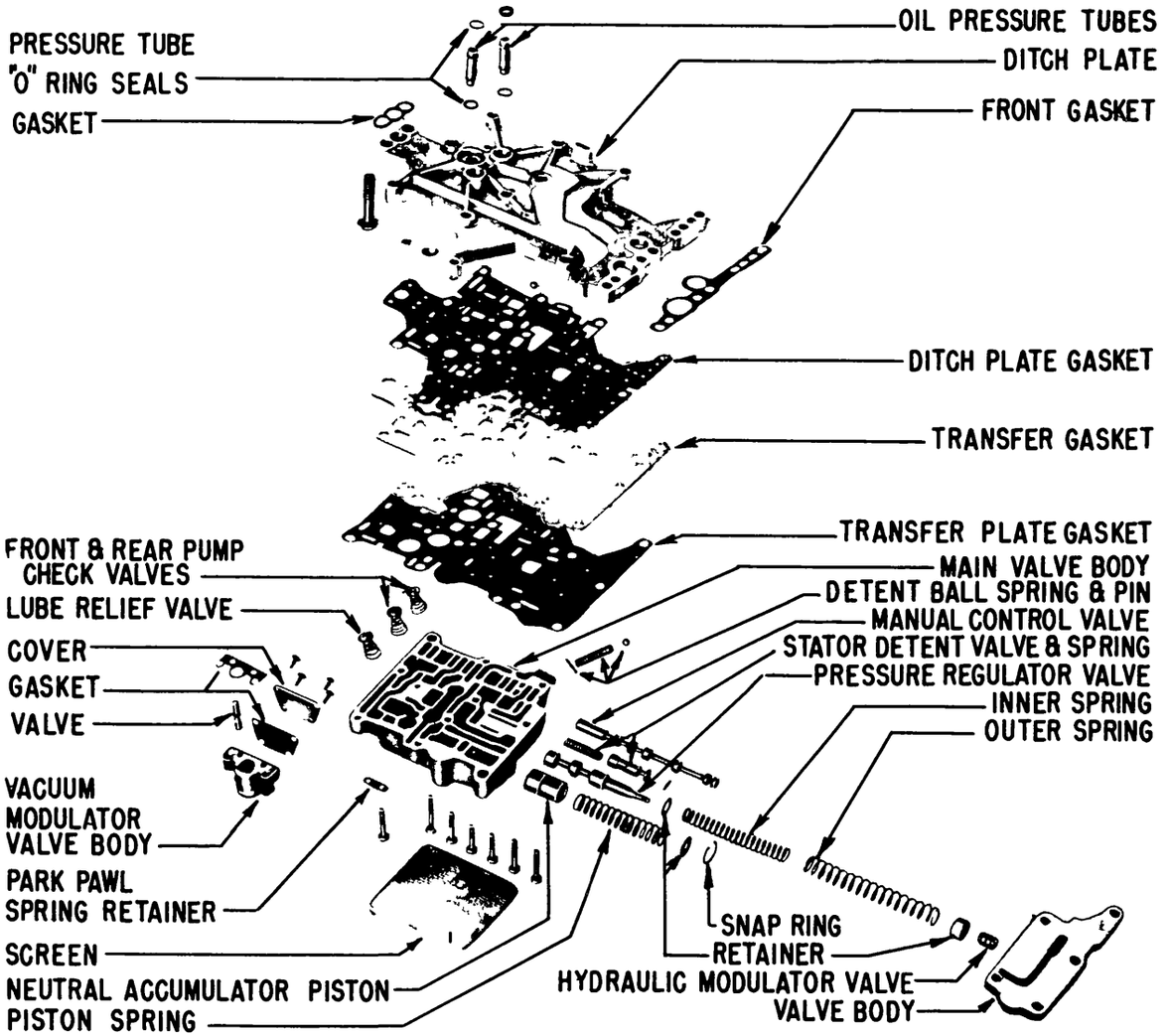
TRANSMISSION WILL NOT SHIFT TO HIGH STATOR ANGLE: Stator control linkage out of adjustment. Converter charging pressure low for one of the following reasons: (a) Leakage which will reduce line pressure enough to cause pressure regulator valve to shut off converter in line. (b) Leakage in converter circuit. (c) Stator control pressure leaking to converter out across front oil seal ring or second oil seal ring on second turbine shaft.

UNABLE TO PUSH START: Rear oil pump drive pin broken or missing.

CLUTCH SLIPPAGE ON WIDE OPEN THROTTLE STARTS: Low oil pressure due to leakage (especially check forward pressure tube "O" ring). Mechanical interference which will prevent forward or neutral piston to fully apply. Neutral or forward clutch facing bond failure.

SECOND TURBINE SEAL RING LANDS INTERFERING WITH I.D. OF STATOR SHAFT: Case locating dowels, on engine or dowel holes in case misaligned. Check by indicating front pump bore in case from crankshaft.

GRADE RETARD SLOW TO APPLY. Control linkage out of adjustment, preventing manual valve getting into grade retard position. Leakage to grade retard clutch (check pressure tube "O" ring seal and other sources). Mechanical interference in grade retard piston. Glazed grade retard plates (check neutral clutch for release).



1961 TURBOGLIDE CONTROL VALVE ASSEMBLY

If neutral clutch does not release during grade retard, grade retard plates can be damaged.

NO DRIVE, REVERSE NORMAL, NO GRADE RETARD: Reverse clutch not disengaged.

GRADE RETARD BRAKES VIOLENTLY, STATOR PRESSURE READS HIGH ON CHECKING: Vacuum hose disconnected.

SHIFTS FROM STANDSTILL VERY SLOW: Check linkage to ascertain that shift lever is positioned by transmission detents. Accumulator control valve stuck closed. Leakage in hydraulic system (Check pressure tube "O" rings and other seals and gaskets).

SHIFTS FROM STANDSTILL VERY FAST AND HARSH: Accumulator control valve spring too strong or valve stuck open.

TESTING

►TESTING CAUTION: Before t sting transmission, ch ck oil level and bring it to the "FULL" mark on dipstick (See LUBRICATION above). Warm transmission t normal operating temperatur us utlined below. Adjust engine idle speed to 425 RPM with transmissi n se- l ctor l v r in "D" (Drive) rang . Adjust throttl link- ag (s e CARBURETOR n car m d l pages).

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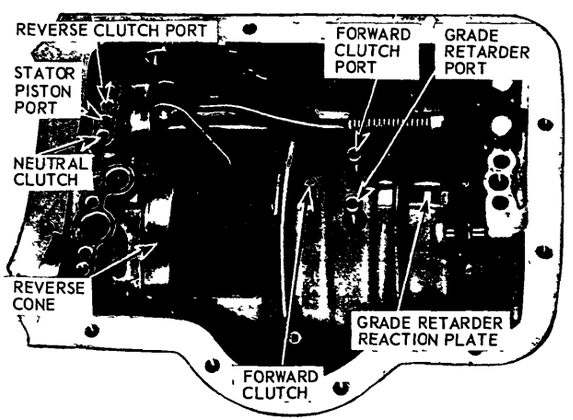
CHEVROLET TURBOGLIDE (C nt.)

►*TESTING CAUTION: Do not stall-test Turboglide Transmission.*

TRANSMISSION WARM-UP: (In Shop) – Connect tachometer to engine, set parking brake and start engine. Place selector lever in "D" (Drive) range and adjust carburetor idle speed to approximately 750 RPM. Operate engine at this speed for 15 minutes, then readjust engine idle speed to 425 RPM with transmission selector lever in "D" (Drive) range.

On Road – Drive car for approximately 5 minutes with frequent starts and stops. Make sure engine idle speed is 425 RPM with transmission selector lever in "D" (Drive) range. Check fluid level (see LUBRICATION above). *CAUTION* – If fluid level too high, lower the level to "FULL" mark, then drive car five minutes to work bubbles out of fluid.

PRESSURE TEST: Road - Connect pressure gauge to test point on left side of transmission case and connect a tachometer and a vacuum gauge to engine. With engine and transmission at normal operating temperature and oil level in transmission at "FULL" mark, proceed as follows: Place selector lever in "D" (Drive) position and bring car speed to approximately 30 MPH. Push accelerator to wide open position. Engine speed should increase to 700-900 RPM if stator is functioning and the pressure should rise to 190-210 lbs. at 3" manifold pressure. *NOTE - At any car speed, with foot off throttle, pressure gauge should read 80-90 lbs. with 18-25" of engine vacuum (pressures in "R", reverse, should be the same as in "D", drive).* With selector lever in "D" (Drive) and at a road speed of 45 MPH, foot off throttle, pressure gauge should read 80-90 lbs. Place selector lever in "GR" (Grade Retarder) range at 45 MPH, and pressure should drop to zero. *NOTE - Engine speed may drop momentarily (during manual shift from "D" to "GR") and then the Grade Retarder clutch will apply and the engine speed will increase.*



TRANSMISSION AIR TEST POINTS

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Drain oil from transmission and remove converter cover pan, transmission oil pan, and main valve body. Install oil pressure tubes in Forward Clutch and Grade Retarder apply ports (see illustration). Use Tool J-4353-1 and an air source of 100 lbs. pressure. Proceed as follows for the five air pressure checks:

Reverse Clutch: Apply pressure to reverse clutch port (see illustration) and visually check that reverse cone moves rearward. Listen for air leaks. If reverse cone does not move, determine whether front pump-to-transmission case gasket is incorrectly installed and blocking oil passages, or if reverse piston is cocked or bound. If air leaks are heard, check for damaged front pump-to-transmission case gasket or for damaged seals in reverse piston.

Stator Piston: Apply air to stator piston port (see illustration), and listen for air leaks. If air leaks are detected, check for a mispositioned or damaged front pump-to-transmission case gasket, broken or warped seal rings on second turbine shaft, defective stator piston seal, or damaged or worn brass seal in the inside diameter of stator support. Should it be determined that stator support brass seal is at fault, the stator support must be replaced as brass seal cannot be replaced separately.

Neutral Clutch: With air applied to neutral clutch port (see illustration), listen for application of clutch and air leaks. If no clutch application is heard, determine if the front pump-to-transmission case gasket is incorrectly positioned and blocking oil passages; otherwise disassemble neutral clutch and check for a locked-up or binding condition. If air leaks are heard, possible causes are a torn or distorted front pump-to-transmission case gasket, warped or broken oil seal rings on second or third turbine shafts, defective brass seal in the inside diameter of second turbine shaft. If brass seal is faulty, replace front ring gear hub and shaft assembly.

Forward Clutch: With oil transfer tube installed, apply air pressure to tube and observe that forward clutch applies. Listen for air leaks. Failure of clutch to apply can be the result of a wedged forward piston or Grade Retarder piston, probably caused by cocked piston "O" rings. A blockage of oil feed orifice in forward and brake piston support could also prevent clutch application. The first place to check if air leaks are found is the "O" ring seals on oil pressure tube in forward clutch port; otherwise, check forward piston-to-support seals.

Grade Retarder Piston: Apply air to grade retarder piston port with oil pressure tube installed (see illustration). Check Grade Retarder application by watching for movement of grade retarder reaction plate which will occur as the brake plates are forced against it by piston moving backward. If grade retarder piston does not move, check for cocked "O" ring seals in both the grade retarder and forward pistons or check for blocked orifice in piston support. Leakage could only occur at either the oil pressure tube "O" ring seal or brake piston "O" ring seal.

REMOVAL & INSTALLATION

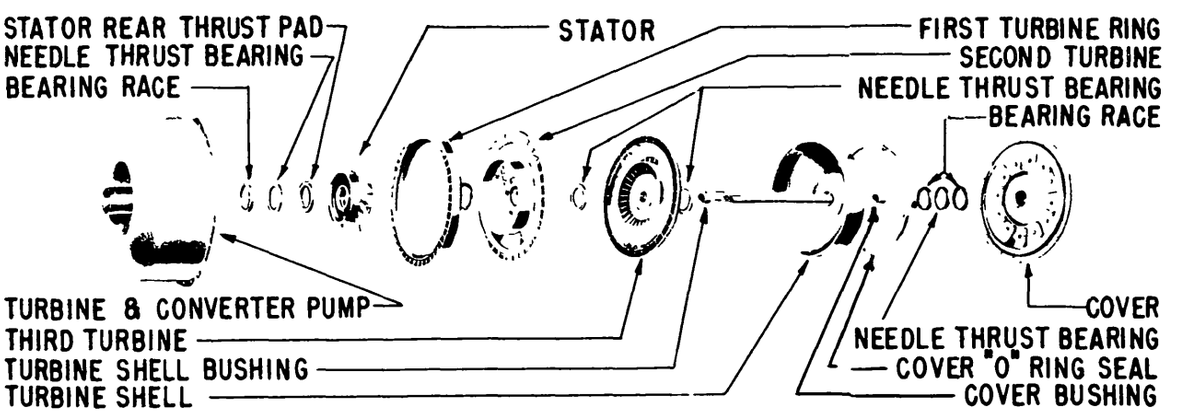
See "Chevrolet Turboglide Transmission" in 1959 Annual Data or later Manual edition.

OVERHAUL

See "Chevrolet Turboglide Transmission" in 1959 Annual Data or later Manual edition and note the following:

►*THRUST BEARING NOTE:* Torrington thrust washers are no longer used between stator and third turbine; third turbine and second turbine. The Torrington bearing and race at forward end of sprag and at rear end of sprag; and the Torrington bearing and two races forward of rear planetary gear set have also been eliminated.

First Turbine Hub Bushing Replacement: Remove solid bearing, then remove byshing with a sharp cape chisel, being careful not to damage turbine hub. Use Tool J-6561 and pilot the bushing on end of tool, then press into hub of first turbine. *NOTE* - Bushing is precision type and reaming is not required. Install a new bearing with Tool J-6561 (end opposite that used for bushing). *CAUTION - Do not cock bearing during installation.*



TURBOGLIDE TORQUE CONVERTER ASSEMBLY

CORVAIR TRANSAXLE

Corvair (1961)
Corvair 1200 Series Trucks (1961)

►*PUSHING CAR TO START ENGINE (AUTOMATIC TRANS.):* Place transmission selector lever in "N" (Neutral) until car reaches 25 MPH, then move selector lever to "L" (Low) until engine starts.

►*TOWING AUTOMATIC TRANSMISSION CARS:* With transmission selector lever in "N" (Neutral), car may be towed at speeds not to exceed 30 MPH.

DESCRIPTION: The Transaxle consists of either an integral differential (rear axle) assembly and synchro-mesh transmission; or a differential (rear axle) assembly and a Powerglide transmission as follows:

Differential (Rear Axle) Assembly: Straddle mounted hypoid gear type of new design with transmission input & output shafts running axially through differential pinion shaft. This unit which is contained in a separate carrier housing is located between transmission (either Synchro-mesh or Powerglide) and the engine assembly.

Ratios - 3.27-1, 3.55-1 & 3.89-1. *NOTE - 3.27-1 ratio not used on models with Super Turbo-Air engine. 3.89-1 ratio is standard on 1200 Series (3-Spd. & Powerglide); 3.27-1 (4-Speed).*

Synchro-mesh Transmission: Three-speed and Four-speed Synchro-mesh types integral with rear axle differential carrier. Because of attachment to differential carrier, a hollow mainshaft is used to permit passage of the clutch shaft to front of transmission for engagement of clutch gear with countergear. *NOTE - On three-speed transmission, all transmission gears are interchangeable with conventional Chevrolet 3-Speed Synchro-mesh, except for clutch gear and countergear.*

Transmission Ratios (3-Speed) - 3.50-1 (1st Speed), 1.99-1 (2nd Speed), 1.0-1 (3rd Speed), 3.97-1 (Reverse).

Transmission Ratios (4-Speed, Exc. 1200 Series) - 3.65-1 (1st Speed), 2.35-1 (2nd Speed), 1.44-1 (3rd Speed), 1.0-1 (4th Speed), 3.66-1 (Reverse).

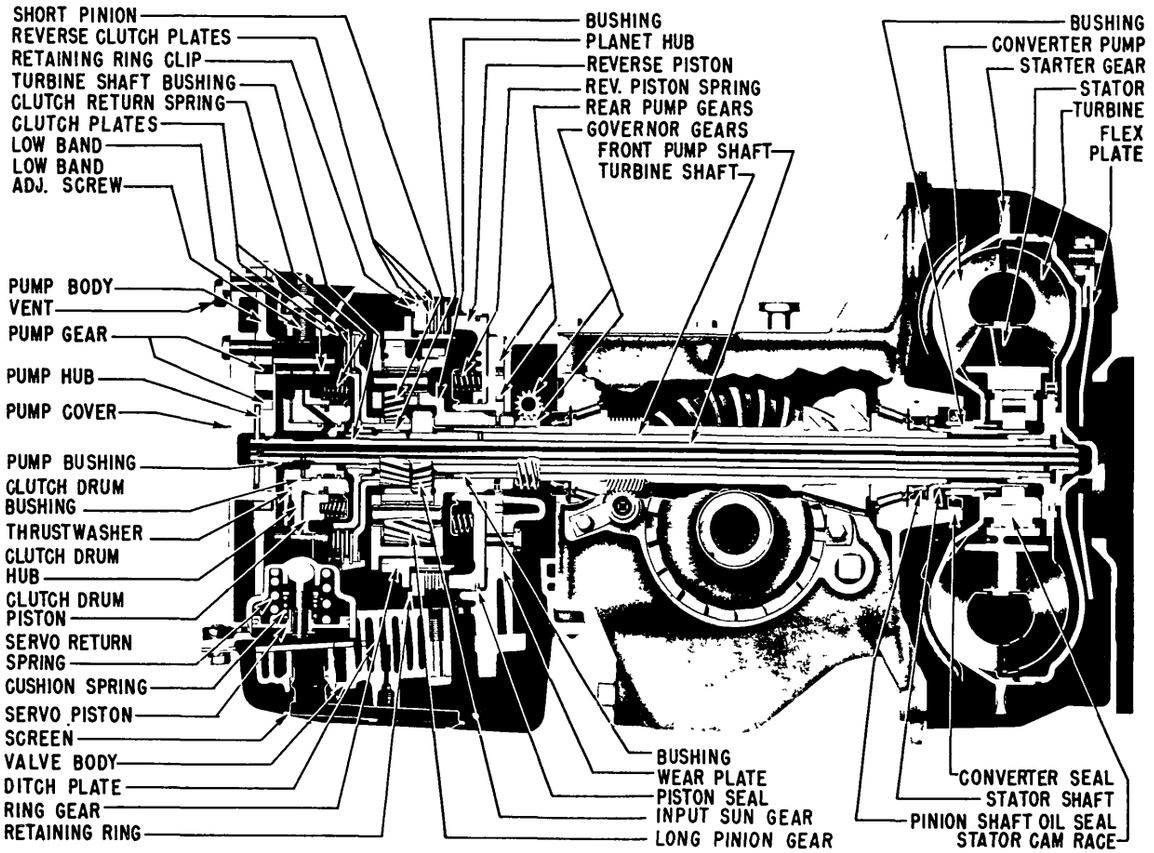
Transmission Ratios (4-Speed, 1200 Series) - 4.26-1 (1st Speed), 2.55-1 (2nd Speed), 1.68-1 (3rd Speed), 1.0-1 (4th Speed), 4.27-1 (Reverse).

Powerglide Transmission: Three element torque converter and a hydraulically operated two-speed type automatic shift transmission integral with rear axle differential carrier. Converter torque from the welded type torque converter assembly located between differential carrier and engine is transmitted to transmission through two hollow shafts running through the hollow differential pinion shaft. One shaft runs from converter cover hub to transmission front pump and the other from the turbine to transmission input sun gear.

LUBRICATION

Check fluid level in all units every 1000 miles. Drain and refill every 10,000 miles (Rear Axle & Synchro-mesh Trans.). *NOTE - Draining and refilling of Powerglide Trans. not recommended except at time of overhaul.*

Recommended Oil (Rear Axle & Synchro-mesh Transmission) - SAE 80 "Multi-Purpose" gear lubricant or SAE 80-90 Multi-Viscosity "Multi-Purpose" gear lubricant. *CAUTION - SAE 90 Viscosity lubricants are not recommended. DO NOT use "Mineral Oil" gear lubricants or any "active sulphur soap" lubricants.* Differential carrier and transmission are connected by internal passages.



CORVAIR POWERGLIDE TRANSMISSION SECTIONAL VIEW

Powerglide Trans. - Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic transmission is sealed off from differential carrier.*

Checking Fluid Level: Rear Axle & Synchro-mesh Trans. - With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential carrier, also check level in transmission. *NOTE - Fluid should be level with bottom of filler plug hole under operating condition.*

Powerglide Transmission - With transmission at normal operating temperature and transmission selector lever in "N" position, engine idling, check fluid level on dipstick in filler tube at right side of engine near firewall. Add fluid as necessary to bring level to "Full" mark on dipstick, using recommended fluid.

Draining & Refilling: Rear Axle - Drain carrier housing and replace drain plug. Refill housing with 3.1 pints of recommended fluid.

Rear Axle & Synchro-mesh Trans. - Remove drain plug in transmission housing and in differential carrier housing. *NOTE - Transmission drain plug is on left side adjacent to idler arm on side of transmission case.* Refill by adding lubricant to both units (5 pints total).

Powerglide Trans. - *NOTE - Not required except at time of transmission overhaul.* Drain oil by loosening filler tube attaching nut in oil pan. Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel J-4264. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark. Capacity is 6 pints (approximately) for normal refill. 13 pints (approximately) with transmission and torque converter dry.

ADJUSTMENT

Transmission Shift Linkage (Synchro-mesh Trans.): Loosen universal joint clamp nut at transmission end of shift shaft, then move manual shift shaft on transmission so transmission is in first speed position. Hold selector lever and tighten universal joint clamp bolt.

Clutch Linkage (Synchro-mesh Trans.): *See "Borg & Beck Clutch" in Clutch Section.*

Transmission Throttle Linkage (Powerglide Trans.): *See "Accelerator Control Linkage Adjustment" under CARBURETOR on car model page.*

Manual Linkage (Powerglide Trans.): Drain transmission oil and remove oil pan. Place transmission selector

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CORVAIR TRANSAXLE (Cont.)

lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body. With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so Tool J-8365 is held in a horizontal position. Recheck adjustment. Install oil pan and fill transmission with fluid.

Neutral Start Switch Adjustment (Powerglide Trans.): Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to "Start" position, then move Neutral Switch fore and aft until engine cranking begins. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral).

Low Band: Remove parcel shelf behind rear seat and remove plug covering access hole in floor. Loosen locknut and tighten the square head adjusting screw to 40±5 inch pounds, **then back off adjusting screw 4 full turns exactly.** Hold adjusting screw stationary and tighten locknut.

►*ADJUSTING TOOL NOTE:* A wrench for turning the adjusting screw locknut can be made by welding two ¾" tubular steel spark plug wrenches together (end-to-end) so wrench can be installed over adjusting screw locknut. A square socket wrench can be inserted through this tool to engage adjusting screw.

TROUBLE SHOOTING (AUTOMATIC TRANSMISSION)

NO DRIVE IN ANY SELECTOR LEVER POSITION (CANNOT LOAD ENGINE): Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming ball not seating.

ENGINE SPEED FLARES ON STANDSTILL STARTS BUT ACCELERATION LAGS: Low band only partially applied caused by one or more of the following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief ball not seating. Vacuum modulator hose collapsed.

TRANSMISSION WILL NOT UPSHIFT: Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.

HARSH UPSHIFT: Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE HARSH DOWNSHIFT: Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body.

CAR CREEPS EXCESSIVELY IN DRIVE: Idle speed too high.

CAR CREEPS IN NEUTRAL: Incorrect manual valve lever adjustment. High clutch or low band not released.

NO DRIVE IN REVERSE: Manual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

IMPROPER SHIFT POINTS (see "Shift Speed" table below): Incorrect accelerator control linkage adjustment. Throttle valve incorrectly adjusted. Governor defective. Rear pump priming ball stuck.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Oil pickup pipe split or not sealed causing air entrainment.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.

TESTING

►*TESTING NOTE: Transmission must be at normal operating temperature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.*

ROAD TEST: Road test car to determine transmission shift points as indicated in table below.

Transmission Shift Speeds

	MPH
UPSHIFTS:	
Minimum Throttle	10–12½
Full Throttle	41–47
Part Throttle (Detent Touch)	34–41
DOWNSHIFTS:	**MPH**
Closed Throttle	8–12
Full Throttle	38–44
Part Throttle (Detent Touch)	23–30
Manual Low (Inhibited)	41–46

PRESSURE TESTS: *NOTE – Pressure tests can be made by raising rear wheels 3–5" off floor on jack stands.*

Front Pump: Remove plug located at "6 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. With engine at idle speed (approx. 16" of vacuum), pressures should be as follows with selector lever in the indicated range: 81–98 lbs. (Reverse); 47–57 lbs. (Neutral & Drive); 71–82 lbs. (Low). Disconnect vacuum hose at balance tube, then with engine at idle speed, check pressure which should be: 140–157 lbs. (Reverse); 71–82 lbs. (Neutral, Drive & Low). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft, or missing plug from front end of front pump shaft. Moderately low front pump pressures in all ranges indicate a restricted front pump inlet. Failure of pressure to raise when vacuum hose disconnected (or high pressures with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.

Rear Pump: With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D" (Drive) and accelerate engine. Front pump pressure should drop to approximately 0–5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged or rear pump check ball is not seating.

Throttle Valve: Remove plug located at "8 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. Disconnect throttle valve rod at carburetor and vacuum hose at balance tube, then with engine at idle speed, depress accelerator to wide open position. *NOTE – By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressures should be as follows with selector lever in the indicated range: 0 lbs. (Reverse & Neutral); 52–54 lbs. (Drive); 66–77 lbs. (Low). If pressures not as specified, they can be corrected by adjusting the position of the jam nut located on end of detent valve assembly (part of throttle valve assembly inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut as necessary. To raise pressure, back off jam nut (one full turn is equal to 3 psi). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

POWER TRAIN (ENGINE, TRANSMISSION & REAR AXLE): This complete assembly must be removed as a unit. *See "Engine" in Corvair Special Data.*

SYNCHRO-MESH TRANSMISSION: Removal - With "Power Train" removed from car, support Transaxle assembly with a chain fall or suitable lift and sling, then drain transmission and differential carrier. Remove starter and the two screws securing clutch pull rod dust seal assembly, then remove pin attaching pull rod to clutch fork. Separate Transaxle from engine by removing attaching bolts securing differential carrier to clutch housing. Pull Transaxle away horizontally to prevent damage to clutch fork. Remove clutch shaft (transmission input shaft). Remove clutch fork and clutch release bearing from differential carrier. *NOTE - Fork is attached to carrier by a ball and socket and spring retainer.* Separate three-speed transmission from differential carrier by removing the four attaching bolts and disengaging transmission output shaft from splines in differential carrier.

Installation: Use a new gasket (hold in place with petrolatum), then couple transmission to differential carrier, being sure to engage splines of transmission mainshaft to internal splines of pinion in differential carrier. Secure transmission to carrier with four bolts (install two bolts on right side from transmission end and the two on left side from carrier end). Tighten bolts to 24-32 ft. lbs. Install clutch release bearing and clutch fork on differential carrier. *NOTE - Clutch release bearing slips over shaft and the fork has a spring retainer and socket which attaches to ball stud on carrier.* Install clutch shaft in Transaxle, then check distance from end of clutch release bearing shaft to end of clutch shaft. If fully engaged, the dimension should be 2 9/16"±1/32". Support Transaxle with a chain fall or other suitable lift and sling, then align attaching bolt holes in carrier and clutch housing. Pilot clutch shaft splines into clutch, then install attaching bolts and tighten securely. Connect clutch pushrod to clutch fork with pin, then position and secure clutch pushrod dust seal assembly. Install starter and fill transmission and differential carrier.

POWERGLIDE TRANSMISSION: Removal - With "Power Train" removed from car, drain transmission, then disconnect hose connecting modulator tube to carburetor

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CORVAIR TRANSAXLE (Cont.)

balance tube. Remove engine front shield and remove starter. Disconnect converter from engine flex plate by removing the three attaching bolts through the access hole (at 12 o'clock position) in converter housing. Support Transaxle with a chain fall or suitable lift and sling, then remove attaching bolts and lockwashers securing differential carrier to converter housing. Pull Transaxle away from engine and remove converter assembly. Pull turbine shaft out of Transaxle assembly. Place Transaxle on a flat surface and remove screws securing governor assembly and remove governor. Remove three bolts securing transmission to carrier, then carefully pull transmission straight away from carrier to prevent pump shaft from damaging bushings in transmission and pinion shaft. Remove gasket from carrier, then remove governor gear and selective spacers from pinion shaft of carrier.

Installation: *CAUTION - Before connecting Powerglide transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper size thrust washer, install a new gasket to either carrier or rear face of transmission (hold in place with petrolatum). Align carrier and transmission on a flat surface and carefully guide the pump shaft through differential carrier so as not to damage bushing in pinion, then engage splines of pinion shaft with planet carrier internal splines in transmission. Install governor, then secure the transmission-to-carrier with four bolts. Drive the two bolts from carrier side first (to minimize chance of cocking mating surfaces), then tighten bolts to 24-32 ft. lbs. Install turbine shaft, being careful not to damage its bushings as it is inserted over pump shaft splines. *NOTE - Be sure to engage the two sets of splines (forward splines engage clutch drum and the rear set engage into sun gear in planet gearset).* DO NOT tip rear of Transaxle downward after installation unless converter holding plates are used. Position Transaxle adjacent to engine on a chain fall or similar lift, then remove converter holding plates if installed. Align converter with flex plate, then pilot converter hub onto crankshaft. Align mounting holes in differential carrier and converter housing, then secure top left bolt (11 o'clock position). Install flex plate to converter bolt accessible at the "1 o'clock" position to prevent accidental turning of converter or flex plate and loss of attaching hole alignment. Drive remaining converter housing-to-differential carrier mounting bolts, then install starter. Drive the two remaining converter-to-flex plate bolts through the access hole in converter housing. Install engine front shield, then reinsert filler tube through front shield and connect it to oil pan. Connect vacuum modulator to carburetor balance tube with a short length of hose. Refill transmission. *(See "Draining & Refilling" above).*

Rear Selective Thrust Washer: *CAUTION - Any time repairs are made that require the separation of Powerglide transmission and differential carrier, the proper thickness of thrust washer that must be used at front face of governor gear must be determined as follows:* Install dial indicator on Support J-8364 and install a 3" indicator extension. Without gasket, place support on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator tip rests on planet carrier hub. Adjust indicator as required to permit maximum indicator travel, then set dial to zero. *NOTE - Transmission must face downward when indicator is zeroed.* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero position. *NOTE - If indicator is properly positioned on support, indicator should not deflect more than .050" (one-half turn) when removed; otherwise raise or lower dial indicator on support post as required and again "zero" gauge.* Place support and dial indicator on governor gear on differential carrier pinion shaft (support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator can be counted. *NOTE - Measurement starts once the indicator needle reaches "zero".* Fully depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear.

►*NOTE: After selected spacers are installed on governor gear, recheck measurement. If spacer stack is correct, indicator reading will now be between .025-.045". If not add or remove spacers until reading is within this range.*

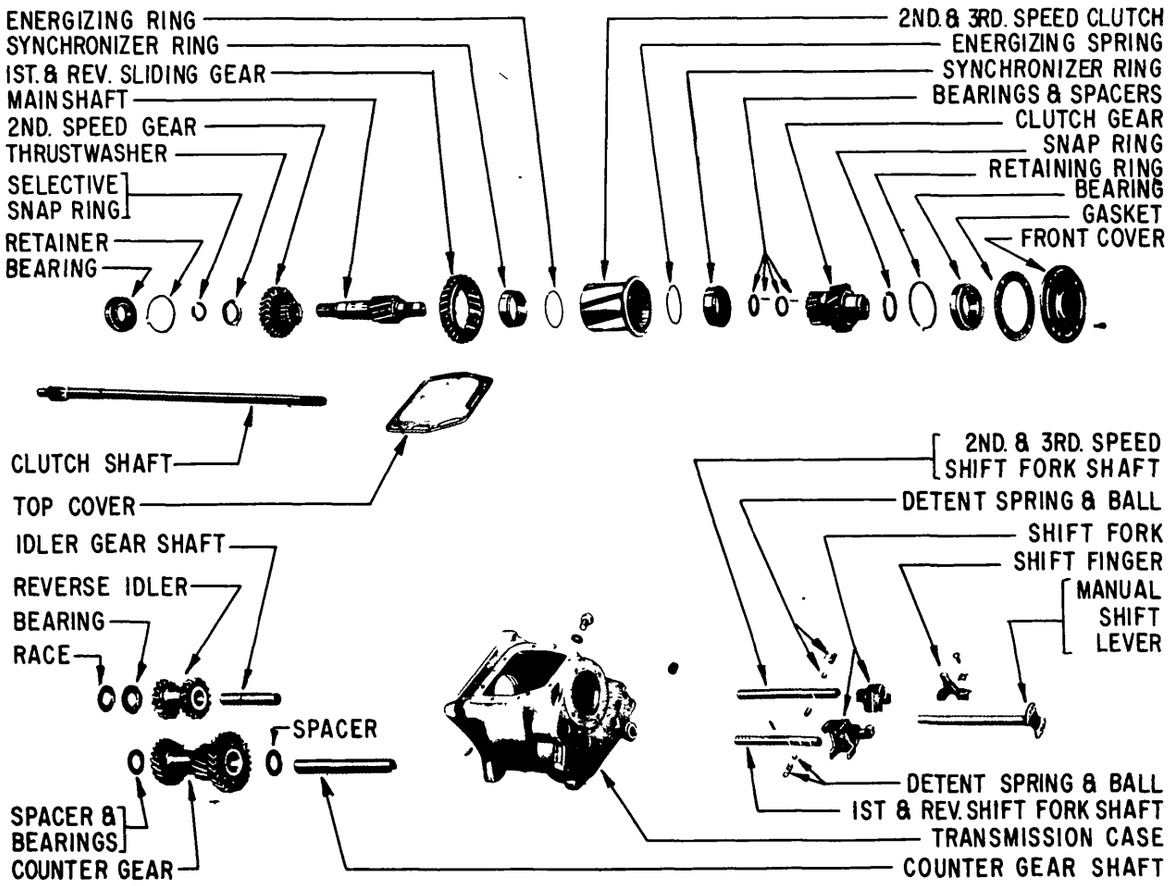
Thrust Spacer Chart

Indicator Reading	No. Required	② Spacer Thickness
.025-.046" ①	None	
.047-.062"	1	.016" ± .001"
.063-.078"	2	.032" ± .002"
.079-.094"	3	.048" ± .003"
.095-.110"	4	.064" ± .004"
.111-.126"	5	.080" ± .005"
.127-.142"	6	.096" ± .006"
.143-.155"	7	.112" ± .007"

① - If initial indicator reading is below .025", replace thrust washer at clutch hub (front pump) with a .050" thrust washer, then repeat entire rear thrust spacer selection procedure.

② - Spacer, Part No. 6256827 (.016" thick) furnished. Use number indicated.

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CORVAIR SYNCHRO-MESH TRANSMISSION (EXPLODED)

CORVAIR TRANSAXLE (C ntinu d)

OVERHAUL

OVERHAUL: *See "Corvair Transaxle" in 1960 Annual Data or Lat r Manual edition and note the following:*

DIFFERENTIAL CARRIER

Differential case has been redesigned to accommodate side gears of equal length. Because of this change, universal joint trunnions are unequal in length and the differential pinion shaft has flats on both sides to clear longer universal joint trunnions. A new "pressed on" speedometer gear replaces the former integral gear.

Diff r ntial Sid B aring Installation - Use Tool J-8359 to install side bearings on differential case and cover.

►*DRIVE PINION DEPTH SETTING NOTE (When Installing Service Replacement Drive Pinion):* Ring gear and drive pinion sets manufactured after February 1, 1961 and date coded 2-61 and later will not be marked for pinion mounting distance. On these later service replacement units, select shims using pinion code "14" as indicated in "Pinion Setting Shim Chart" under "Corvair Transaxle" in 1960 Annual Data or later Manual edition.

3-SPEED SYNCHRO-MESH TRANS.

Transmission case has been redesigned to provide piloting on differential carrier pinion front adjusting sleeve. In addition, a cast iron transmission case is used and the transmission mainshaft has been lengthened at output end.

POWERGLIDE TRANSMISSION

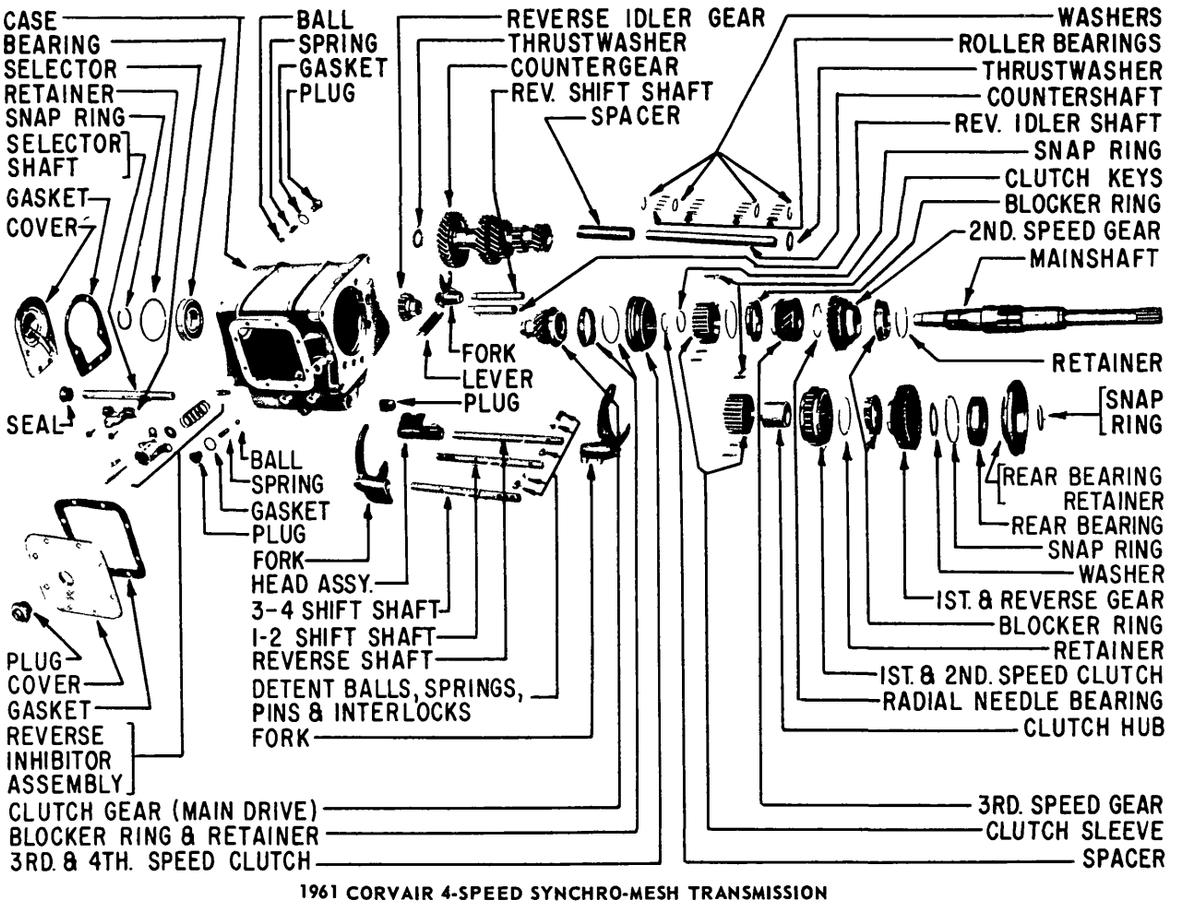
Line pressure limiting valve has been eliminated and facing material is no longer used on reverse clutch thick reaction ring. On 1200 Series Trucks, transmission oil is cooled by circulating it through a cooler located in left wheel house compartment. On these models, a bypass valve located in front pump body allows oil to circulate within the transmission case in the event of any restriction creating a pressure build-up of more than 15 lbs.

4-SPEED SYNCHRO-MESH TRANS.

DISASSEMBLY: Transmission Case - 1) Remove front bearing retainer and side cover, then remove plug, detent spring and ball from 3-4 detent channel at left rear of case. Place 3-4 shift fork into fourth gear (fully forward), then drive roll pin from shift fork with a pin punch. Remove 3-4 shift shaft with a drift and remove fork. *NOTE - Shaft can be driven out of case in either direction.*

2) Remove plug, spring and detent ball from 1-2 detent channel at front of case, then place shift fork in second gear (fully forward). Remove pin, fork and shaft in same manner as for 3-4 shift fork assembly.

3) Remove snap rings located in clutch gear bore (between clutch gear and bearing, and between clutch gear bearing and case). Install clutch bearing puller J-8880 as follows: Assemble puller plates J-8880-1 onto clutch gear bearing by inserting plates into bearing groove, then secure puller plates together with two screws. Insert adapter plug J-8880-2 into bore of clutch gear, then attach body J-8111-3 to puller plates with two ½"-13 x 2½" screws and two flat washers. Remove clutch gear bearing.



1961 CORVAIR 4-SPEED SYNCHRO-MESH TRANSMISSION

4) Remove mainshaft with assembled gears and rear bearing retainer through rear of case. *NOTE - It may necessary to jiggle output shaft, making sure that clutch gear does not separate from mainshaft.* After removal of mainshaft assembly from transmission, shift synchronizer sleeves to neutral.

5) Drive roll pin from reverse shifter head with a pin punch, then remove shifter head and shaft from case by tapping shaft out in either direction. Drive out reverse idler gear and reverse shifter fork shafts from case by driving rearward with a drift (do not lose woodruff key used in reverse idler gear shaft). Remove idler gear and reverse shifter fork from case. Lift reverse shifter lever off its pin in case.

6) To remove countergear, improvise a dummy shaft by cutting a piece of 5/8" diameter roll stock 7" long. then drive countershaft rearward, using the dummy shaft, until countershaft is removed and dummy shaft is within countergear. Remove countergear and dummy shaft from case being careful not to allow dummy shaft to slip out of gear. Remove countergear thrust washers from case.

7) Remove two interlocks, ball and spring from 3-4 detent channel (use a magnet or tip case). Remove shift finger from selector shaft by first flattening lock tabs securing retainer screws, then remove shifter shaft plug in rear of case. Tap shaft rearward out through case. Remove screws securing reverse inhibitor to case and remove inhibitor.

Mainshaft: Place clutch gear downward against bench top, then lift mainshaft out of clutch gear to prevent disturbing clutch gear roller bearings. Remove special snap ring from front of mainshaft, then slide 3-4 synchronizer unit with blocker rings, third speed gear, radial needle bearing and second speed gear from mainshaft. Remove rear bearing selective snap ring and remove rear bearing and retainer as an assembly. Remove first speed gear thrust washer, first speed gear, and 1-2 blocker rings. Press mainshaft out of 1-2 synchronizer unit and first speed gear sleeve. *CAUTION - Clutch hubs and sliding synchronizer sleeves are a matched assembly and must be kept together.*

INSPECTION: Wash all parts in solvent and blow dry with air. Inspect transmission case for cracks and check for burrs on rear face of case. If necessary dress off any burrs on machined surfaces with a flat file. Check condition of shifter shaft oil seal and re-

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CORVAIR TRANSAXLE (Continu d)

place if necessary. Make sure all bearings are clean, then lubricate with light engine oil and check for roughness. Replace all worn clutch gear and countergear bearings and spacers. Replace any gears or thrust washers that are worn or damaged.

►*SYNCHRONIZER CLUTCH SLEEVE & HUB KEY & SPRING REPLACEMENT:* If necessary to replace keys and springs, push hub from sliding sleeves and remove springs. To install, place two springs in position (one on each side of hub), so a tanged end of each spring falls into same keyway in hub. Hold keys in position and align etched marks in sleeve and hub, then slide hub into sleeve (be sure etched marks are aligned after assembly).

►*REAR BEARING RACE REPLACEMENT:* If necessary to replace rear bearing, place bearing and retainer in a press, then expand retainer ring and press out bearing. Reverse procedure to install bearing.

REASSEMBLY: Mainshaft - Install 1-2 synchronizer hub onto mainshaft with shift fork groove of hub downward, then place first gear sleeve on mainshaft. Press both first gear sleeve and synchronizer hub onto mainshaft until they bottom, using Tool J-5590 or other suitable tool. Install blocker ring in rear of 1-2 synchronizer, being sure that notches in blocker ring engage keys in synchronizer unit. *NOTE - Blocker rings used in 1-2 synchronizer have slightly longer hubs than those used in 3-4 synchronizer.* Slide first speed gear and its thrust washer onto mainshaft, then install rear bearing retainer assembly onto mainshaft and secure with selective fit snap ring. *CAUTION* - With proper snap ring installed (available in three sizes), maximum play between rear face of rear bearing and snap ring will be .005". Invert mainshaft, then install second blocker ring (long hub) in front side of 1-2 synchronizer, being sure that blocker ring notches are engaged with keys in synchronizer unit. Install second gear speed gear with clutch teeth toward 1-2 synchronizer, and place radial needle bearing on second speed gear. Install third speed gear, clutch teeth upward, onto mainshaft and seat it against radial needle bearing. Place 3-4 blocker ring on cone surface of third speed gear, then slide 3-4 synchronizer unit onto blocker ring, being sure that notches in blocker ring engage clutch keys in synchronizer unit. Install second blocker ring onto 3-4 synchronizer unit. *NOTE - If clutch gear roller bearings have been displaced, load 33 bearings into innermost diameter and 37 needle bearings into outermost diameter, using a generous amount of petroleum jelly to prevent rollers dropping out.* Carefully slide clutch gear onto mainshaft, then set the assembly aside for later installation.

Transmission: 1) Position reverse inhibitor body in transmission case on its dowel pin and secure with screws and lockwashers. *NOTE - Be sure to install plunger in inhibitor body.* Coat selector shaft with grease, then insert through seal from inside case. *CAUTION - Do not install shaft from front of case as notches in shaft will damage seal.* Attach shift finger to selector shaft with bolts and lock tabs. Bend tabs onto bolt heads after tightening bolts, then install plug at rear of shaft. Install countergear thrust washers in case and retain in place with petroleum jelly, making sure that thrust washer tabs engage grooves in case.

2) Insert countergear with its roller bearings and dummy shaft into case through rear bearing hole, then lift countergear into alignment with countershaft holes and tap countershaft into gear from rear of case. *CAUTION - Be careful to keep dummy shaft tightly against countershaft during installation to prevent roller bearing dropping out of place.* Tap countershaft in until it is flush with rear face of case. *NOTE - Countershaft is a slight press fit at front of case.*

3) Place reverse shifter lever on pin in case with tapered end away from reverse inhibitor. Place reverse idler gear shift fork in case with its pin toward the front and engage fork pin with reverse shift lever, then insert shift fork shaft.

4) With reverse idler gear shift fork fully rearward, engage reverse idler gear to shift fork, then align woodruff key groove in idler gear shaft with keyway in rear face of case and slide shaft almost fully into case. Install woodruff key in shaft and fully bottom shaft in case. Tap both reverse idler and shift fork shaft to insure full seating, then stake each shaft bore in two places below rear face of case adjacent to shaft chamfer. *CAUTION - Be sure stakes do not protrude above rear face as this will disrupt mating surface for axle.*

5) Insert a detent spring and ball in 3-4 detent channel, checking to make sure spring goes fully to bottom of channel and that detent ball does not roll out the reverse shifter head shaft hole in detent channel.

►*SHIFTER SHAFT IDENTIFICATION NOTE:* With interlock notches aligned (lay shafts out in this manner) shafts can be identified as follows:

Reverse Shifter Head Shaft - 8 3/32" overall length, and roll pin hole is approximately centered on shaft.

1-2 Shift Fork Shaft - 7 19/32" overall length, with two interlock notches in shaft and these notches are connected by a drilled hole which houses interlock pin.

3-4 Shift Fork Shaft - 7 19/32" overall length, and roll pin hole is closest to end of shaft opposite detent notched end.

6) Depress detent ball and spring in 3-4 detent channel slightly with a small drift and insert reverse shifter head shaft partially into case to compress detent, then engage pin of reverse shifter head with yoke of reverse shift lever. Check that shaft pin hole is aligned with pin hole in shifter head and push shaft through until pin holes in head and shaft align. Secure shifter head to shaft with a roll pin.

7) To install assembled mainshaft in case, shift synchronizers into second and fourth simultaneously (both forward fully) to provide clearance to pass the countergear. Insert mainshaft through rear bearing bore into case. Align rear bearing retainer portion of clearance hole with portion of clearance hole located at 2 o'clock position on rear face of case, then tap rear bearing retainer into case until flush with rear face. With large snap ring installed in outer diameter of front bearing, tap bearing into front of case and over clutch hub until large snap ring seats against front face of case. Install proper snap ring to retain clutch gear in bearing so that maximum clearance between snap ring and bearing is .005", then install small snap ring in inner diameter of clutch gear (this snap ring acts as a bottoming stop for clutch shaft).

8) Before installation of 1-2 shift fork shaft, shift the 1-2 synchronizer and the 3-4 synchronizer to neutral, then install one interlock in 3-4 detent channel. With interlock pin in hole in interlock notch end, push 1-2 shift fork shaft partially into case. *NOTE - The interlock end (two opposite notches) of the shaft goes to rear of case.* Engage 1-2 shift fork (identified by through gate at shift location) with 1-2 synchronizer. Align pin holes in shaft and fork, then tap shaft rearward until it engages interlock, and secure fork to shaft with a roll pin. Install detent ball, spring, gasket and cap in 1-2 detent channel. *NOTE - Cap used at this location has the longer shank.*

9) Drop remaining interlock into 3-4 detent channel, then push 3-4 shift fork shaft partially through hole in front of case. Engage 3-4 shift fork in 3-4 synchronizer, align pin hole in shift fork and shaft, then push shaft fully into rear of case until it engages interlock. Secure shift fork shaft with a roll pin. Install remaining detent ball, spring, nylon washer, and cap in 3-4 detent channel at left rear of case.

10) Before installing front bearing retainer and side cover, test operation of shift forks by actuating shift selector lever with a small pin punch inserted in hole in shifter shaft. If transmission shifts satisfactorily, install front bearing retainer using a new gasket. Install bolts and tighten to 15-20 ft. lbs. Install side cover and tighten bolts to 3-4 ft. lbs.

CHRYSLER CORP. TORQUEFLITE SIX

Dodge Dart 6 Cyl. (1961)
Lancer (1961)
Plymouth 6 Cyl. (1961)
Valiant (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960-61 TORQUEFLITE SIX "NO DRIVE" CORRECTION NOTE:* If this condition occurs after making the first stop when car is cold, the cause may be that front pump has lost its prime due to low oil level. If oil level is found to be low and is corrected, recheck operation before making any additional corrections.

►*1961 TORQUEFLITE SIX FRONT PUMP HOUSING SEAL PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Beginning with Transmission, Serial No. 278039, a new Front Pump Housing, Part No. 2204712, having a .125" deep seal groove, and a new Front Pump Housing Seal, Part No. 2204709, with a rectangular cross section (approx. 1/8" x 3/32"), entered production. Later type parts cannot be intermixed with the former Front Pump Housing, Part No. 1942381 (.075" deep seal groove), and Front Pump Housing Seal, Part No. 1942384 (3/32" square seal). If a new front pump housing is to be installed, use later type seal and housing. If only the seal is to be installed on early transmissions, make sure early type (3/32" square) seal is used.

DESCRIPTION: Transmission design is same as used on corresponding previous models.

LUBRICATION

Checking Fluid Level: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to "N" (Neutral) after button is pushed in. Oil level should be between "Full" mark and "Add 1 Pint" mark. *NOTE - If transmission is cold, fluid level should be at "Add 1 Pint" mark.* Add or remove transmission fluid as necessary.

Recommended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

►*CHECKING FLUID LEVEL NOTE:* The above specifications are new and supersede previous specifications.

Draining & Refilling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and add ten pints (5 qts.) of Automatic Transmission Fluid Type "A" (Suffix "A") through transmission oil filler tube. Start engine and add approximately three more pints with engine idling. Allow engine to idle for two minutes, then operate all pushbuttons, pausing momentarily in each position, and ending with the "N" (Neutral) button pushed in. Check fluid level and add sufficient fluid to bring level to "F" mark on dipstick.

Fluid Capacity: Approximately 14 pints (all models).

►*TRANSMISSION MAINTENANCE NOTE: It is recommended that when transmission is drained, oil pan should be removed and cleaned, oil screen cleaned, and transmission bands and linkage be adjusted.*

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See "Carburetor" on car model pages.*

Manual Control Cable Adjustment: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse) pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lockscrew at left side of transmission case.

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only three or four threads are showing behind wheel on the guide. *CAUTION – Check wheel for free turning on guide and remove any burrs in threads that might interfere. Lubricate threads with a few drops of transmission fluid.*

3) Hold cable guide centered in hole in transmission case and apply only enough inward pressure to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 30–50 inch pounds.

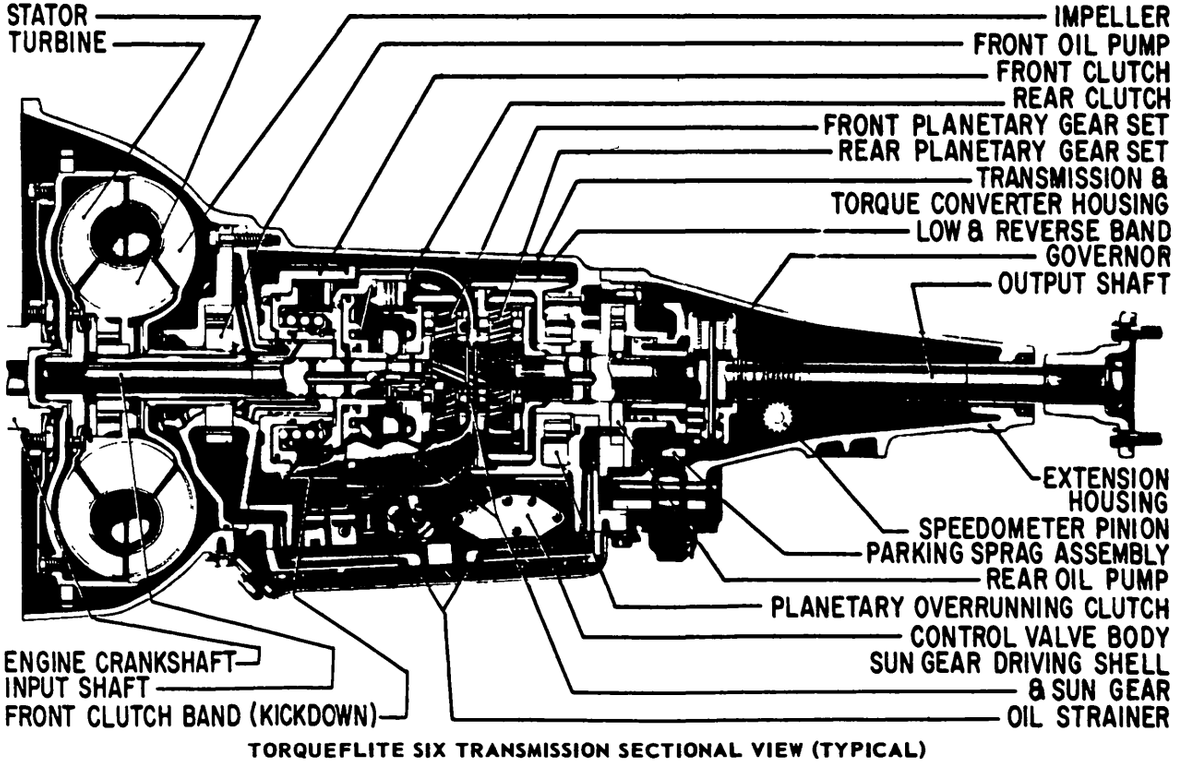
Neutral Safety Switch Adjustment: Raise car and drain approximately two quarts of fluid from transmission, then unscrew neutral safety switch and check to see that switch operating lever is aligned with center of switch opening in case. Place cupped washer and "O" ring over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and the other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3–½ turn. *NOTE* – Switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust the switch. Remove test lamp and connect wire to switch. Add fluid to transmission to bring up to proper level.

BAND ADJUSTMENT

Kickdown (Front) Band: Kickdown band adjusting screw is located on left side of transmission case near throttle shaft lever. Loosen locknut and back off approximately five turns. Check adjusting screw for freeness in transmission case, then tighten adjusting screw to a reading of **47–50 inch pounds** using Tool C–3380 with Adaptor Tool C–3790. Using a reference mark of chalk or colored pencil on corner of adjusting screw square and transmission case, back the adjusting screw out **exactly 2 1/8 turns (Dodge & Plymouth), 2 5/8 turns (Lancer & Valiant). While holding adjusting screw stationary, tighten locknut to 20-25 ft. lbs.**

Low-Reverse Band: Drain transmission and remove oil pan, then loosen the adjusting screw locknut and back locknut off approximately five turns. *NOTE – Adjusting screw is located in low-reverse band lever.* Check adjusting screw for free turning in lever, then tighten adjusting screw to a reading of **47–50 inch pounds** using Tool C–3380 and Adaptor Tool C–3790. Back off adjusting screw exactly 5¼ turns (all models) and tighten locknut to 20–25 ft. lbs. *NOTE – Hold adjusting screw from turning while tightening locknut.*

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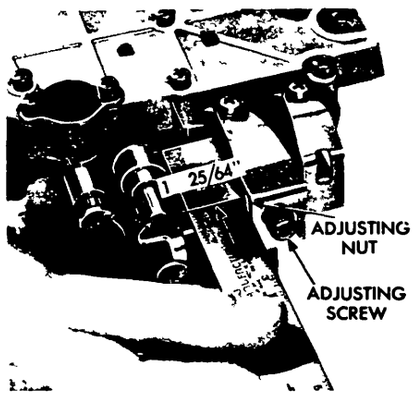
TORQUEFLITE SIX TRANSMISSION SECTIONAL VIEW (TYPICAL)

TORQUEFLITE SIX (C ntinu d)

TESTING

HYDRAULIC CONTROL PRESSURE TESTS: All of the following pressure tests must be made with the transmission at normal operating temperature.

Line Pressure & Front Servo Release Pressure: Install a tachometer on engine, then raise car and position the tachometer so it can be read under the car. Connect two 0—100 psi pressure gauges, Tool C—3292, to pressure takeoff points at top of accumulator and at front servo release (see illustration). With transmission selector lever in "D" (Drive) position, and wheels free to turn, speed up engine slightly until transmission shifts into direct drive. Reduce engine speed slowly to 800 RPM. Line pressure at this time must be 52—60 lbs., and front servo release pressure should be 45 lbs. or higher. Disconnect throttle linkage at transmission lever and hold transmission throttle lever at detent position. Increase engine speed to 3500 RPM with transmission in direct drive. At this point, line pressure should be 90—96 lbs. and front servo release pressure should be 80 lbs. or greater. *NOTE — Open transmission throttle lever when operating engine at speeds in excess of 1500 RPM.* If line pressure is not 52—60 lbs. at 800 RPM, adjust pressure (see below). *CAUTION — Do not adjust line pressure to correct reading at 3500 RPM.*



LINE PRESSURE ADJUSTMENT

Line Pressure Adjustment: Remove valve body assembly from transmission and adjust the "Allen" type screw in end of pressure regulator spring bracket so the measurement between valve body and inner edge of adjusting nut on end of spring is 1 25/64" (see illustration). *NOTE — The above adjustment can be varied to obtain specified line pressure. Turning screw counterclockwise increases pressure.*

Lubrication Pressure: Install a "tee" fitting between cooler return line fitting and fitting hole in transmission case at rear left side of transmission case. Connect a 0—100 psi pressure gauge, Tool C—3292, to "tee" fitting. At 800 RPM, with throttle lever in closed position and transmission in direct drive, pressure should be 5—25 lbs.

R ar Serv Apply Pr ssur : Connect a 0—300 psi pressure gauge, Tool C-3293, to apply pressure takeoff point at rear servo, then with transmission selector lever in "R" (Reverse) and engine speed at 1600 RPM, the reverse servo pressure should be 230—280 lbs. Not adjustable.

Govern r Pressure: Connect a pressure gauge (Tool C-3292 or equivalent) to governor pressure takeoff point located on lower left side of extension housing just back of extension housing mounting flange. Governor pressure should be within limits indicated in table below. If pressure not correct, governor valve or weights are sticking.

Governor Pressure (Dodge & Plymouth)
(3.31-1 Axle Ratio)

Governor Pressure	Car Speed 750x14 Tires	800x14 Tires
15 Lbs.	17-18 MPH	17-19 MPH
45 Lbs.	28-37 MPH	29-37 MPH
60 Lbs.	58-66 MPH	59-68 MPH

Governor Pressure (Lancer & Valiant)

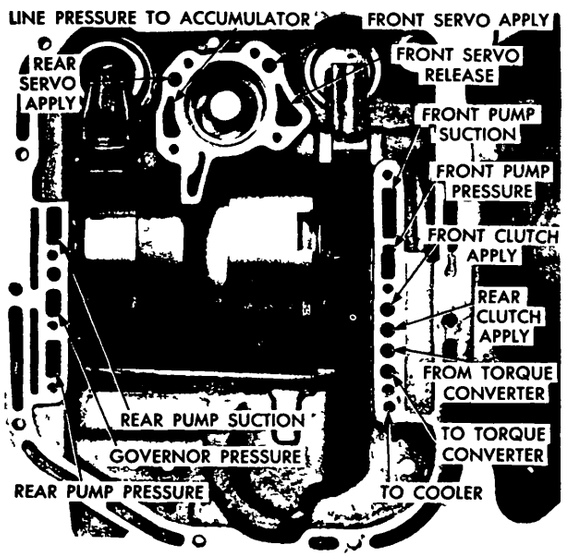
Governor Pressure	Car Speed 3.23-1 Ratio	3.55-1 Ratio
15 Lbs.	16-17 MPH	14-15 MPH
45 Lbs.	29-39 MPH	27-35 MPH
60 Lbs.	59-66 MPH	54-60 MPH

Dodge & Plymouth
Transmission Shift Speed (MPH)
(3.31-1 Axle Ratio & 750x14 Tires)

Throttle Position	1-2 Upshift	2-3 Upshift	Downshift
Closed	7-12	11-15	5-11
Wide Open	27-38	57-69	
3-2 Kickdown			45-61
3-1 Kickdown			26-32

Throttle Pressure: *NOTE — No provision is made to check throttle pressure. However, if pressure adjustment is made correctly, as indicated below, pressure is assumed to be correct.*

Throttle Pressure Adjustment — Remove valve body assembly from transmission, then loosen throttle lever stop screw locknut and back off screw approximately five turns. Insert gauge pin of Tool C—3763 between throttle lever cam and kickdown valve. By pushing in on tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body. As force is being exerted to compress the spring, tighten throttle lever stop screw finger tight against throttle lever tang with throttle lever cam touching the tool and throttle valve bottomed. *CAUTION — Be sure the adjustm nt is mad with spring fully compressed and valv b ttom d in valv body.* Remove tool and tighten stop screw locknut securely.



AIR PRESSURE CHECKS

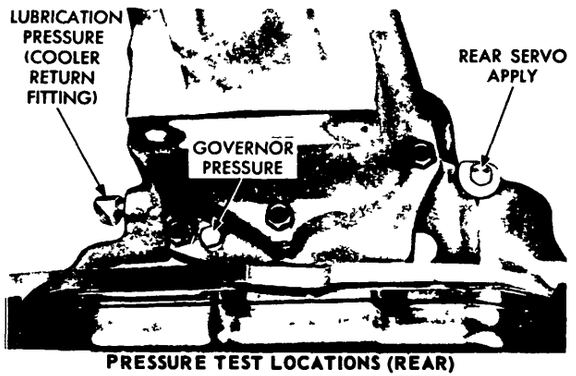
AIR PRESSURE TESTS: Front clutch, rear clutch, kickdown servo, and low-reverse servo may be checked by applying air pressure to their respective passages after valve body assembly is removed. See illustration for location of passages.

Front Clutch: Apply air pressure to front clutch passage and listen for a dull "thud" indicating that front clutch is operating. Hold air pressure on for a few seconds and check system for excessive oil leakage.

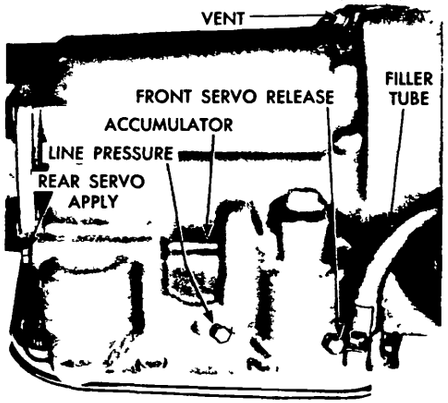
Rear Clutch: Apply air pressure to rear clutch passage and listen for dull "thud" indicating that rear clutch is operating. Hold pressure on for a few seconds and check system for excessive oil leakage.

►*NOTE: If a dull "thud" cannot b h ard in th clutches, place finger tips on clutch housing and again apply air pressure. Piston movement can be f lt as clutch is appli d.*

Kickdown Serv : Direct air pressure into kickdown servo "apply" passage. Operation of servo is indicated by a tightening of front band. Spring tension on servo piston should release the band.



PRESSURE TEST LOCATIONS (REAR)



PRESSURE TEST LOCATIONS (RIGHT SIDE)

CONTINUED ON NEXT PAGE

TORQUEFLITE SIX (C ntinued)

L w-R v rs S rv : Direct air pressure into low-reverse servo "apply" passage. Operation of servo is indicated by a tightening of rear band. Spring tension on servo piston should release band.

►*AIR PRESSURE TEST NOTE: If all the above units op rate prop rly, "n driv ", "erratic" and "no upshift" conditions are caus d by trouble in the control valve ass mbly.*

Dodg & Plymouth
Transmission Shift Speed (MPH)
(3.31-1 Axl Ratio & 800x14 Tires)

Throttl Positi n	1-2 Upshift	2-3 Upshift	Downshift
Closed	7-12	11-16	5-11
Wide Open	28-38	58-70	
3-2 Kickdown			46-63
3-1 Kickdown			26-33

Lanc r & Valiant
Transmission Shift Speed (MPH)
(3.23-1 Axle Ratio)

Throttl P siti n	1-2 Upshift	2-3 Upshift	Downshift
Closed	6-11	10-14	4-10
Wide Open	25-41	58-69	
3-2 Kickdown			46-62
3-1 Kickdown			24-35

Lancer & Valiant
Transmissi n Shift Speed (MPH)
(3.55-1 Axle Ratio)

Thr ttl P siti n	1-2 Upshift	2-3 Upshift	Downshift
Closed	6-10	9-13	4-9
Wide Open	23-36	52-63	
3-2 Kickdown			42-56
3-1 Kickdown			22-32

GEARSHIFT CONTROL UNIT

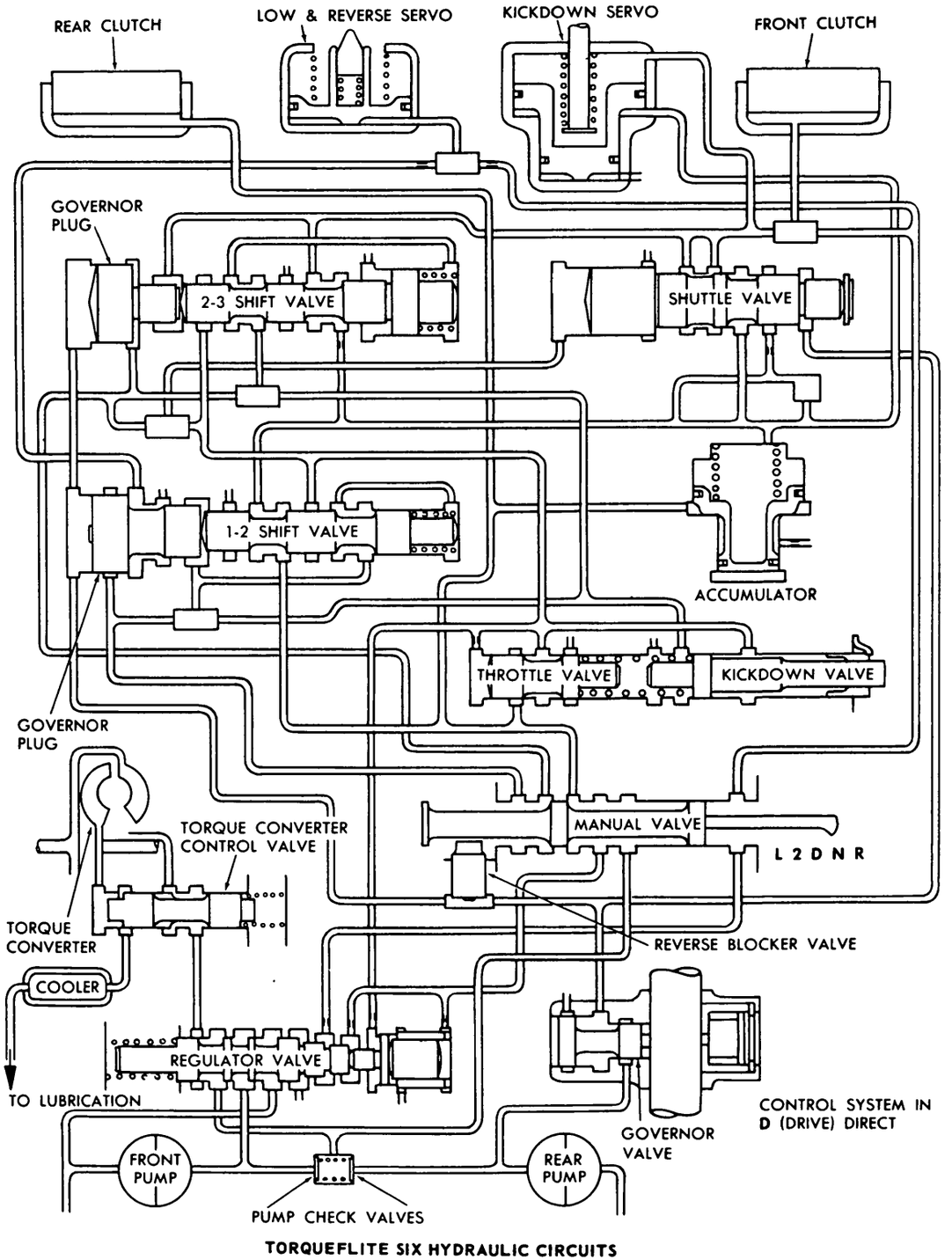
PUSH BUTTON CONTROL UNIT: Removal - Procedures are different for the various models as indicated below.

Dodg Dart & Plym uth (6 Cyl.): Disconnect one battery cable, then disconnect back-up light switch and illuminating lamp leads at rear of instrument panel. Remove screws of push button face plate and remove push buttons by pulling them off slides. Remove lamp bulb, then remove control housing stud nuts that are accessible. Remove control cable from rear of instrument panel, then remove hairpin clip securing cable to actuator and screws holding bracket to control housing.

Valiant: Disconnect negative (ground) cable from battery, then disconnect back-up lamp switch wire at push button control. Remove two screws from face plate and remove face plate and gasket. Remove parking brake handle from lever, then remove three screws securing control assembly to instrument cluster. Carefully work assembly rearward out of cluster. Remove push buttons by pulling them off slides, then remove mounting bracket from assembly. Remove hairpin lock securing control cable to actuator and screws holding cable bracket to control. Remove control cable, then disconnect parking brake cable and remove parking brake arm from control unit.

Installati n: Reverse removal procedures and adjust cable.

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TORQUEFLITE SIX HYDRAULIC CIRCUITS

TORQUEFLITE SIX (C ntinued)

MANUAL CONTROL CABLE: R m val - Drain 2 quarts f fluid from transmission, then depress "L" (Low) push button. Remove neutral starting switch and remove control cable-to-adjusting wheel lock screw. Insert screwdriver through neutral starting switch opening, then push screwdriver gently against upper projecting portion of cable lock spring and pull outward on cable to remove cable from adapter and transmission case.

Installation: Have an assistant hold the "R" (Reverse) button fully depressed, then back adjusting wheel off until two or three threads are showing behind wheel on guide. Lubricate cable guide with transmission lubricant, insert cable in transmission case, push inward on cable making sure lock-spring engages cable. Adjust control cable *(see "Adjustment" above)*, then fill transmission with recommended fluid.

LAMP BULB REPLACEMENT: Dodge Dart & Plymouth - Remove push button face plate and remove one or more of the center push buttons.

Valiant: Lamp is located between speedometer and control unit and can be replaced by pulling it out of socket from rear of speedometer housing.

BACK-UP LIGHT SWITCH REPLACEMENT: All Models - Remove push button control housing assembly, then straighten tabs securing switch to housing. Install switch and bend tabs to retain it in place. Install housing and connect switch and lamp wires.

TORQUE CONVERTER

►*TORQUE CONVERTER NOTE: This is a sealed unit and cannot be disassembled for overhaul. In the event of parts failure in transmission, the torque converter should be flushed as described below*

FLUSHING TORQUE CONVERTER: With torque converter assembly removed from engine, place it in an upright position and pour two quarts of clean solvent or kerosene into converter through impeller hub. Turn and shake converter so as to swirl solvent through internal parts. *NOTE - Turning turbine and stator with transmission input and reaction shafts will help to dislodge foreign material.* Position converter in its normal operating position with drain plug at lowest point, then drain solvent. Rotate turbine and stator, and shake converter while draining. Repeat the above operation at least once, or as many times as required until solvent is drained out clean. After flushing, shake and rotate converter several times with drain plug out to remove all solvent and dirt. Reinstall drain plug and tighten to 20 ft. lbs.

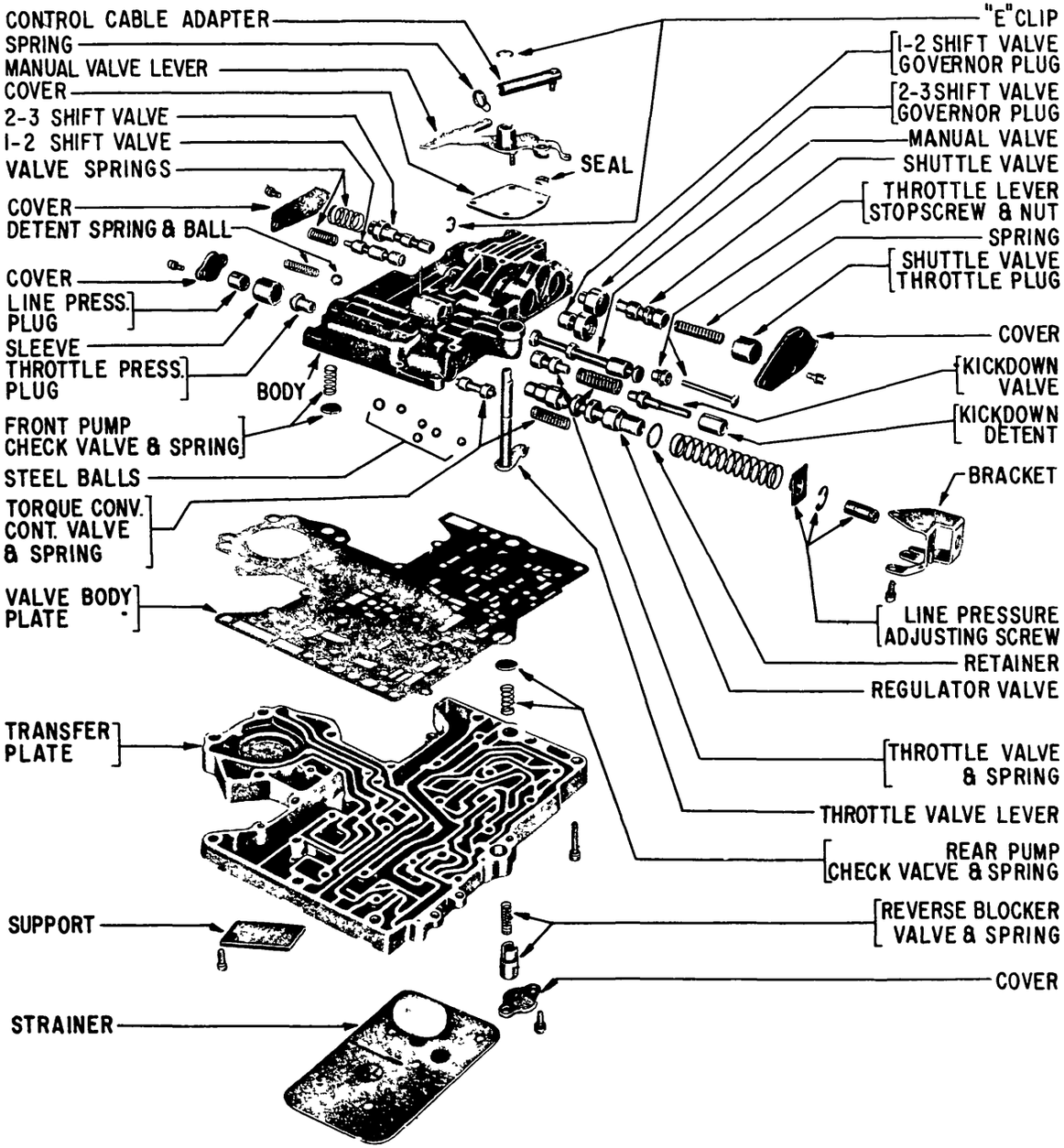
TRANSMISSION
REMOVAL & INSTALLATION

►*TRANSMISSION & TORQUE CONVEF.TER REMOVAL CAUTION:* Transmission and torque converter must be removed and installed as an assembly to prevent damage to converter drive plate, front pump bushing, and oil seal. *DO NOT allow weight of transmission to rest on plate during removal or installation.*

REMOVAL: 1) Connect a suitable Remote Control Starter Switch (Tool C-763 or equivalent) so engine can be rotated from under car, then disconnect high tension lead from distributor. Raise car on a hoist or support on stands and drain converter and transmission.

2) Mark converter and drive plate for use at reassembly. *NOTE - Crankshaft flang bolt circl , inn r and uter circle of holes in drive plate, and the four tapped h l s in front face of converter all hav n hol offs t so th s parts will be install d in riginal position.*

3) Rotate engine to locate two converter-to-drive plate bolts at "4" and "7" o'clock positions and remove bolts, then rotate engine and remove remaining two bolts.



TORQUEFLITE SIX VALVE BODY ASSEMBLY

CAUTION - Do not rotate converter r drive plate by prying with a screwdriver r other tool. DO NOT ngag starter if drive plate is not attached t converter with at least on bolt r if transmissi n case-to- ngin bolts have been loosened.

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TORQUEFLITE SIX (Continu d)

4) Position control cable for removal by depressing "1" (Low) pushbutton, then disconnect negative cable from battery. Remove starter motor assembly, then remove starter neutral safety switch from transmission case. Remove pushbutton control cable-to-transmission adjusting wheel lockscrew and insert a screwdriver through neutral starter switch opening and push gently against upper projecting portion of cable lock-spring, then pull outward on cable to remove it from adaptor and transmission case.

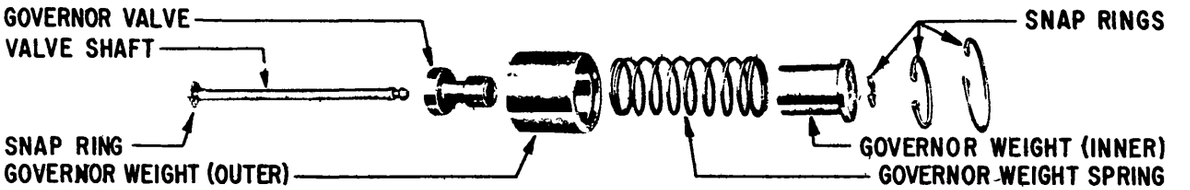
5) Remove throttle link and lever assembly from transmission throttle shaft, then disconnect oil cooler lines at transmission and remove oil filler tube. Remove speedometer pinion and sleeve assembly. On Lancer and Valiant, loosen transmission parking brake cable clamp where cable enters cover, then remove housing cover lower plug. Insert a screwdriver through hole, then gently exert pressure against projecting portion of cable lock-spring and withdraw brake cable.

6) On Dodge and Plymouth, remove parking brake adjusting nut cover plate and loosen cable clamp bolt on brake support. Disengage ball end of cable from operating lever and remove cable from brake support. On all models, disconnect propeller shaft at front universal and secure shaft out of way.

7) Remove nut and washers securing transmission extension housing insulator to crossmember, then install support fixture C-3806 and raise engine slightly. Remove crossmember, then place a transmission jack under transmission to support the assembly. Attach a small "C" clamp to edge of bell housing to hold converter in place during removal.

8) Remove bell housing retaining bolts, then carefully work transmission and converter assembly toward rear off engine block dowels and disengage converter hub from end of crankshaft. Remove transmission and converter from under car. To remove converter assembly, remove "C" clamp from edge of bell housing, then carefully slide converter assembly out of transmission.

INSTALLATION: Reverse removal procedure and note the following: To install converter on transmission, rotate front pump rotors with Tool C-3756 until two small h les in tool handle are vertical, then carefully slide converter assembly over input shaft and reaction shaft, making sure that converter impeller shaft slots are also vertical and engage front pump inner rotor lugs. *CAUTION - Check for full engagement by placing a straightedge across fac of case. Surface of converter front cover lug sh uld be at least ½" to rear of straightedge when converter is pushed all the way into transmissi n.* Attach a "C" clamp in same manner as for removal. After transmission is installed on engine, install bell housing bolts and tighten to 25-30 ft. lbs. Install and tighten converter-to-drive plate bolts to 200 inch pounds. Tighten crossmember-to-frame nuts to 20-35 ft. lbs. To install control cable, have an assistant engage "R" (Reverse) button and hold it firmly depressed, then insert pushbutton control cable in transmission case and push inward on cable, making sure lock-spring engages cable. Install adjusting wheel retaining screw.



TORQUEFLITE SIX GOVERNOR VALVE ASSEMBLY

OVERHAUL

See "Torqueflite Six" in 1960 Annual Data or later Manual edition and note the following:

Front Pump & Torque Converter: Driving lugs on front pump inner rotor are located in center of inner rotor and both faces of lugs are square. The diameter which pilots rotor on converter impeller hub is also located at center of rotor. Converter impeller has two slots to drive rotor instead of two tangs used on previous models. There is no difference between front and rear side of rotor, however, marks (made at time of disassembly) must be aligned when reassembled.

Reaction Shaft Support-to-Front Clutch Thrust Washer: A fibre thrust washer has been added between reaction shaft support and front clutch assembly. This washer is .043-.045" thick and should be replaced if worn or damaged.

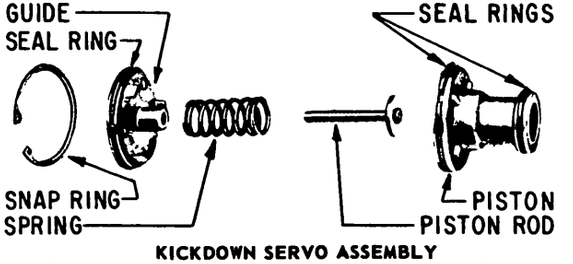
Checking Transmission Alignment: 1) Remove transmission and torque converter, then remove flexible drive plate. Check dowels in rear face of cylinder block and make sure they extend at least 5/16" out of block. *CAUTION - Drive plate will be damaged if one or both dowels are missing or if they are not positioned properly.*

2) Slide converter assembly out of transmission, then tighten front kickdown band adjusting screw to 47-50 inch pounds (see "Band Adjustment" above) to prevent front and rear clutch retainers from moving forward during removal of front pump. Remove front pump, then install a dial indicator on crankshaft (use a 5½" long rod, having 7/16"-20 threads cut in one end, screwed into crankshaft flange bolt hole to mount dial indicator).

3) Clean cylinder block face and transmission flange face, then bolt transmission to engine being careful not to strike indicator when raising transmission into place. Tighten attaching bolts to 25-30 ft. lbs. Position dial indicator plunger against bore diameter which pilots front pump (do not allow plunger to rest on chamfered edge of bore). Reach into case from below and adjust dial and plunger so plunger can travel in each direction.

4) Rotate crankshaft with a wrench on bolt in front end of crankshaft. *NOTE - If bolt not on crankshaft, install bolt, Part No. 2128569.* Measure bore runout by rotating crankshaft slowly, recording readings every 45° of rotation. Also record points of maximum and minimum readings. *NOTE - Use a mirror, if necessary, to see dial as it is being rotated.* Total runout of bore should not exceed .015".

Transmission Alignment: If runout is excessive, reduce within limits by using offset dowels which are available in .007", .014" and .021" offsets. After determining amount and direction of transmission case bore runout, select a pair of offset dowels with the offset nearest to one-half the amount of runout. Drive original dowels from engine block and install offset dowels with slots parallel and the offset in direction of runout. *NOTE - Upper dowel must be installed with slotted end into block flange (toward front of engine). Install lower dowel with slotted end toward rear of engine. Install both dowels up to shoulder of offset.* Reinstall transmission case and tighten attaching bolts to 25-30 ft. lbs. *CAUTION - Do not force bolts as case might be binding on dowels.* Recheck bore runout, then make small corrections with a screwdriver bit and a wrench by loosening case bolt slightly (support transmission) and turn dowels to obtain as near zero runout as possible. *NOTE - Dowel slots must be kept as near parallel as possible to maintain proper distance between dowels.* When transmission is properly aligned, remove assembly without disturbing dowels, then install front pump and reaction shaft support assembly. Back off adjusting screw 2 1/8 turns (Dodge & Plymouth), 2 5/8 turns (Lancer & Valiant), then tighten locknut to 20-25 inch pounds.



KICKDOWN SERVO ASSEMBLY

Checking Converter Hub Runout: *NOTE - If flexible drive plate is cracked or broken, install a new plate. Do not use lockwashers on retaining bolts.* Install converter on drive plate and tighten bolts to 270 inch pounds (do not install lockwashers on bolts). Attach a dial indicator to engine block flange so dial plunger rests on converter hub (just ahead of pump drive slots), then rotate crankshaft with a wrench on bolt at front of crankshaft and check converter hub runout. *CAUTION - Do not rotate converter by hand or with a turning tool as flexing of plate will give a false reading.* Total runout of hub should not exceed .015". Runout less than .050" may be corrected by attaching a large "C" clamp in front of engine block flange and behind starter ring gear on converter. Draw ring gear adjacent to low runout point of converter hub toward the engine. Release clamp and recheck runout. *CAUTION - DO NOT pry converter away from engine and be careful to avoid over-correction.* If necessary to correct crankshaft runout, flange runout should not exceed .002".

CHRYSLER CORP. TORQUEFLITE EIGHT

Chrysler, Imperial, DeSoto, Dodge, Plymouth (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: (Towing car to start is not recommended because of sudden surge of power when engine starts).* Turn ignition switch on, then push the "1" (Low) button in and depress accelerator pedal slightly. After car attains a speed of 15 MPH, the transmission will start engine.

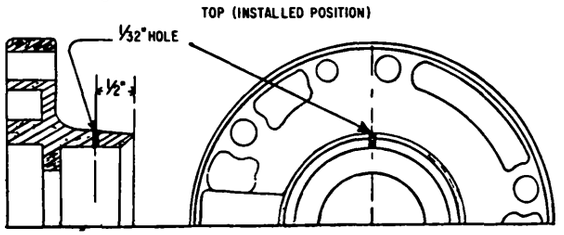
►*TOWING TORQUE-FLITE CARS: Following procedure is recommended:*

Transmission Operating Properly—Car may be towed safely in "N" (Neutral) position at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be disconnected.

Transmission Inoperative—Tow car with rear end raised or remove the propeller shaft.

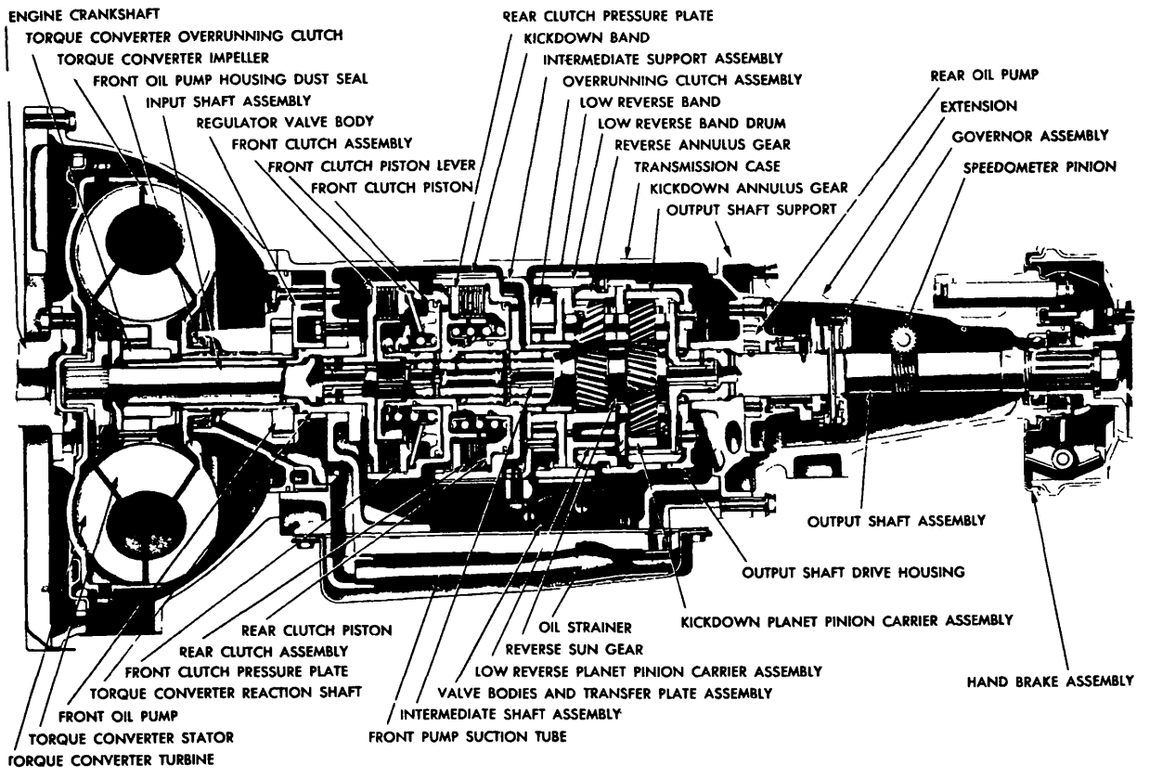
►*1961 TORQUEFLITE 8 TRANSMISSION HARSH 1-2 UPSHIFT ON LIGHT THROTTLE CORRECTION:* **With transmission at normal operating temperature, fluid level at proper height and engine at proper idle speed, adjust throttle valve linkage (see "CARBURETOR" on Car Model pages). Road test car and if condition still exists, proceed as follows: Adjust kickdown band (see below) as outlined. If harsh upshift still exists and transmission serial number is between 1,765,601 and 1,780,390, change throttle valve adjustment by shortening carburetor-to-bellcrank rod 1/8-1/4". *CAUTION - Do not shorten rod in excess of 1/4" as this may cause excessive delay in shift pattern.***

►*1961 TORQUEFLITE 8 TRANSMISSION GOVERNOR BUZZ CORRECTION (Transmissions up to Trans-Serial No. 1730284):* **Make sure buzz is not caused by incorrect fluid level (either overfilled or insufficient fluid), or missing oil inlet strainer seals. If buzzing exists after making necessary corrections, proceed as follows: Remove transmission extension housing, governor and rear oil pump housing, then drill a 1/32" hole in top of pump housing (see illustration). Thoroughly clean housing and reassemble transmission. When installing governor and governor support, be sure sealing ring gaps are 180° apart. *NOTE - "Buzzing" may also be corrected by installing a new front and rear pump check valve (see "Production Change" following).***



PUMP HOUSING

►*1961 TORQUEFLITE 8 TRANSMISSION FRONT & REAR PUMP CHECK VALVE PRODUCTION CHANGE:* **A new check valve assembly, Part No. 2204843 is being used in production beginning with Transmission Serial No. 1730284 to keep rear pump filled at all times and prevent air getting into governor hydraulic circuit. This new valve assembly may be installed on earlier cars to prevent governor "buzz". *NOTE - When installing valve, make sure drilled hole is toward outside of regulator body.***



TORQUEFLITE TRANSMISSION SECTIONAL VIEW

►*1960-61 TORQUEFLITE 8 TRANSMISSION "NO REVERSE" CONDITION CORRECTION & CONTROL VALVE BODY PRODUCTION CHANGE:* **Beginning with Transmission Serial No. 1821718, a new lip type seal has been added to bottom of blocker valve and a new transfer plate (with a smaller opening into the bore for governor pressure) has been incorporated in production to prevent reverse blocker valve from sticking. Later transmission with the above changes are identified by a "W" stamped on transmission case rail. On earlier transmissions, a sticking reverse blocker valve can be corrected by installing Blocker Valve Spring & Seal Package, Part No. 2275523 as follows: Remove valve body, then remove reverse blocker end plate, valve and spring from transfer plate. Separate valve body and steel plate from transfer plate. *NOTE - Unl ss oil is v ry dirty, it is not n c ssary t remov ther valves from valv body.* Clean reverse blocker valve bore with crocus cloth, then allow parts to soak in a suitable solvent for a few minutes. Wash all parts and blow dry with air. Assemble valve body using parts in the above service package and install valve assembly in transmission. Adjust transmission as necessary and check operation.**

►*TORQUEFLITE BAND ADJUSTMENT NOTE:* **Kickdown band adjusting screw back-off specifications will be stamped on right side pan rail of transmission between transmission serial number and transmission part number (forward end of case). Reverse band adjustment is 2½ turns. Adjustment procedures remain the same as previous models.**

DESCRIPTION: **Design is same as used on previous models except that rear clutch piston retainer and pressure plate have been modified by decreasing the clearance between pressure plate drive lugs and grooves in piston retainer. The new pressure plate is also used in front clutch assembly.**

LUBRICATION

Checking Fluid Level: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. Fluid level should be at "F" (Full) mark or slightly below (never above "F" mark). Add or remove transmission fluid as necessary.

R c mm nd d Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

►*NOTE: If fluid is check d with transmissi n c ld, fluid l v l should be at "L" (L w) mark r slightly below.*

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TORQUEFLITE EIGHT (C nt.)

℄T rqueFlite Fluid Capacity

Engin	Capacity
318"	18 pts.
All Others	21 pts.

℄ - Approximate capacity. Total fluid required should be determined by measuring with dipstick. See *"Checking Fluid Level" above.*

Draining & R filling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and aud 5 qts. of Automatic Transmission Fluid Type "A" (Suffix "A") through transmission oil filler tube. Start engine and run at idle speed for two minutes (depress each button for at least two seconds while engine is idling), then add three quarts of fluid. Check fluid level and add necessary fluid to bring level to within ¼" of "Add One Pint" mark but never above the mark.

►*TRANSMISSION MAINTENANCE NOTE:* It is recommend d that when transmission is drained, oil pan should be r moved and cleaned, oil screen cleaned, and transmission bands and linkage adjusted.

►*CONVERTER FLUSHING NOTE:* Converter assembly can be flushed as follows: With transmission removed (converter attached to engine), drain converter and install drain plug. Reach through starter hub with a screwdriver and lift on side of hub spline to turn starter counterclockwise. Sight through opening and make sure rectangular slots on rear face of starter are aligned vertically. Use a container with a long spout and slowly pour two quarts of clean kerosene into converter. Tape hub opening, then disconnect coil wire and rotate engine with starter for approximately 10 seconds. Drain converter and repeat the flushing procedure as necessary. To completely drain converter, remove drain plugs and use starter to rotate converter until all kerosene is thrown out of openings.

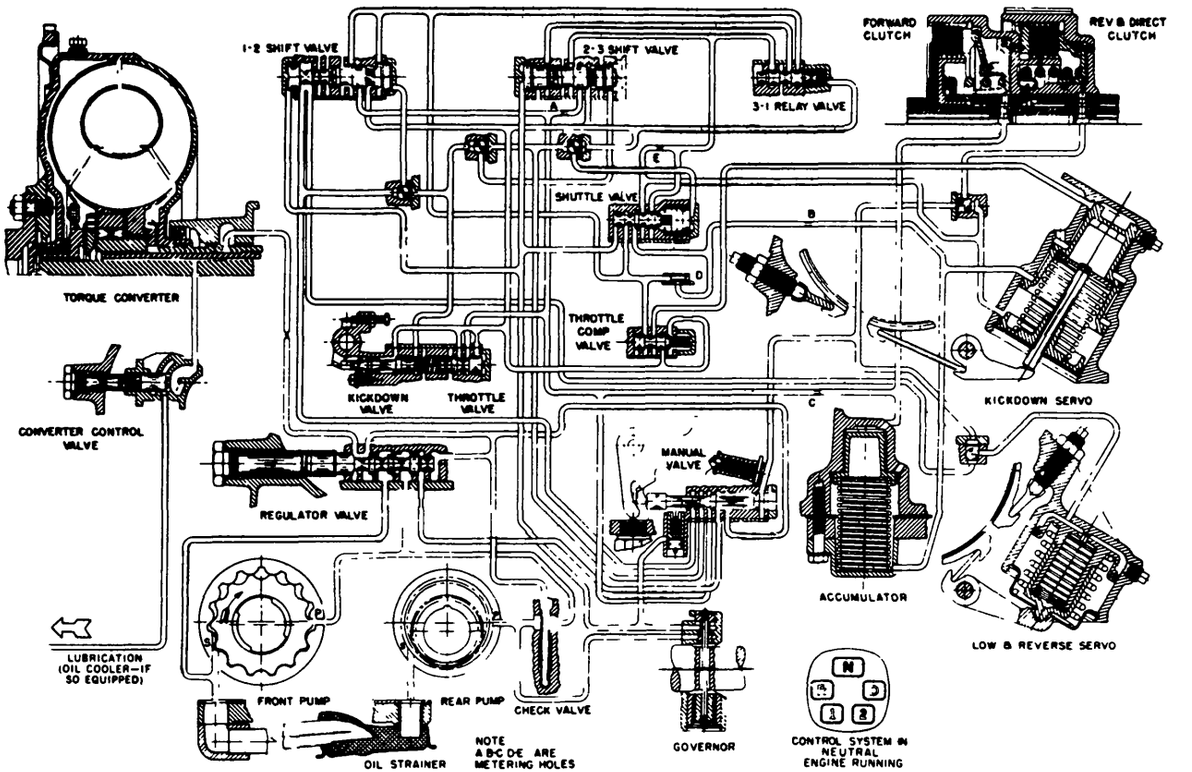
LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See "Carbur tor" on car model pages.*

Manual C ntr l Cable Adjustment: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse) pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lock screw at left side of transmission case.

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only two or three threads are showing behind the wheel on the guide. *CAUTION - Ch ck wheel for fr turning on guide and remove any burrs in thr ads that might interfere. Lubricate threads with a f w dr ps of transmission fluid.*

3) Hold cable guide center in hole of transmission case and apply only enough inward force to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.



TORQUEFLITE TRANSMISSION HYDRAULIC CIRCUITS

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 30-50 inch pounds.

Neutral Safety Switch Adjustment: With concave spring (cupped) washer installed on neutral safety switch with cupped side of washer toward transmission case, install "O" ring seal up against the washer. Install switch into case until spring washer contacts case, then tighten **one-third of a turn.** Refill transmission to proper level and check operation of switch. Engine should start only when "N" (Neutral) pushbutton is in depressed position.

BAND ADJUSTMENT

►*KICKDOWN BAND ADJUSTMENT NOTE:* Kickdown band adjusting screw back-off specifications will be stamped on right side pan rail of transmission between transmission serial number and transmission part number (forward end of case). Reverse band adjustment is 2½ turns.

Kickdown (Front) Band: Kickdown band adjusting screw is located on left side of transmission case. With a ¾" wrench, back off locknut approximately 5 turns. Check freeness of adjusting screw in transmission case, then tighten adjusting screw to **70-75 inch p unds** using torque wrench (Tool C-3380). *NOTE - If Adapt r,* C-3583 or C-3705 (depending on accessibility) is used with torque wrench, tighten until reading on torque wrench is 47-50 inch pounds. Adapter Tool C-3583 or C-3705 must be used if band is adjusted with transmission in car. Using a reference mark of chalk or colored pencil on corner of adjusting screw and transmission case, **back the adjusting screw out exactly th number of turns indicated in table below.** While holding adjusting screw stationary, tighten locknut to 35-40 ft lbs.

Kickdown Band Adjustment

Car Model	Adjustment
Chrysler & DeSoto (All Models)	2½ turns
Dodge & Plymouth (318" Engine)	2½ turns
Dodge & Plymouth (361", 383", 413" Engs.)	2 turns

Low-Reverse (Rear) Band: Low-reverse band adjusting screw is located on right side of transmission case. With a ¾" wrench, back off locknut approximately 5 turns. Check freeness of adjusting screw in transmission case, then tighten adjusting screw to **70-75 inch pounds** using torque wrench (Tool C-3380). *NOTE - If Adapter, C-3583 is us d with t rqu wr nch, tight n until reading on torque wrench is 47-50 inch p unds. Adapter, Tool C-3583, must be used if band is adjusted with transmissi n in car.* Use a reference mark of chalk

CONTINUED ON NEXT PAGE

SHIFT PATTERN TABLE (MPH)

SHIFT CONDITION	PLYMOUTH					DODGE				
	Std. Eng.		Hi-Perf. Eng.		Ram Manifold	Dart		Polara		Ram Manifold
	2.93-1 Axle	3.31-1 Axle	2.93-1 Axle	3.31-1 Axle		Std. Eng.	Hi-Perf.	Std.	Hi-Perf.	
Closed Throttle 1-2 Upshift	8-14	7-13	8-13	9-15	10-14	8-14	7-13	8-15	7-13	10-15
Closed Throttle 2-3 Upshift	12-18	11-16	11-16	12-18	14-19	12-18	12-18	13-18	12-18	14-19
Wide Open Throttle 1-2 Updhift	30-45	27-40	39-48	44-54	36-42	30-45	30-45	31-46	31-46	37-42
Wide Open Throttle 2-3 Upshift	65-81	58-72	65-78	73-88	59-72	65-81	66-81	66-83	67-83	60-74
3-2 Kickdown Limit	62-79	55-70	63-76	71-86	55-64	62-79	62-78	63-80	63-80	37-65
3-1 Kickdown Limit	30-43	27-38	32-46	36-42	35-41	30-43	29-42	30-43	30-43	36-42
Closed Throttle Downshift	6-13	5-12	6-11	7-12	7-12	6-13	6-13	6-13	6-13	8-13

TORQUEFLITE EIGHT (Cont.)

or colored pencil on corner of adjusting screw square and transmission case, then **back adjusting screw out exactly 2½ turns** (all models) While holding adjusting screw stationary, tighten locknut to 35-40 ft lbs

TESTING

ROAD TESTING TRANSMISSION: *NOTE - Before road testing, engine must be properly tuned and idle speed set to correct specifications* With engine at normal operating temperature and fluid at proper level, all shifts and kickdowns should occur within the speed ranges given in "Shift Pattern" tables below

►*ROAD TESTING NOTE- All shift speeds may vary somewhat due to production tolerances, type of engine, rear axle ratios and tire sizes All shifts, however, should be smooth, responsive and without noticeable engine runaway*

HYDRAULIC CONTROL PRESSURE TESTS: *NOTE-Use Pressure Gauge C-3293 (300#) for all the following tests.*

Line Pressure: Remove the 1/8" pipe plug from line pressure take-off hole located on left side of transmission case (lower plug forward of control lever and cable connection) Install pressure gauge at this point and make the following tests.

Line Pressure Tests (Cars Without Ram Manifold)

Pushbutton Depressed	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	200-240
N		1200	85-95
D	Free	1200	89-91
2	Free	1200	85-95
1	Free	1200	85-95
D	Free	3500	95-100

SHIFT PATTERN TABLE (MPH)

SHIFT CONDITION	CHRYSLER					DESOTO	
	Newport	Windsor	New Yorker	Imperial	300-G ①	2.93-1 ② Axle	3.31-1 ③ Axl
Closed Throttle 1-2 Upshift	8-15	8-15	9-15	9-16	11-15	9-15	8-13
Closed 2-3 Upshift	12-18	12-19	12-19	13-20	13-20	11-18	10-16
Wide Open Throttle 1-2 Upshift	31-46	31-47	32-48	33-49	38-44	33-46	29-41
Wide Open Throttle 2-3 Upshift	67-83	68-84	69-86	72-90	61-75	60-84	61-74
3-2 Kickdown Limit	63-80	64-82	66-83	69-87	58-67	65-81	58-71
3-1 Kickdown Limit	30-43	31-44	32-45	33-47	37-43	32-44	28-39
Closed Throttle Downshift	6-13	6-13	6-13	7-14	8-13	7-12	6-11

① - Ram Manifold. ② - Standard. ③ - Optional.

Line Pressure Tests (Cars with Ram Manifold)

Pushbutton Depressed	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs)
R	Free	1600	235-275
N		1200	100-110
D	Free	1200	104-106
2	Free	1200	100-110
1	Free	1200	100-110
D	Free	3500	108-115

Line Pressure Adjustment: With transmission in "D" (Drive) range and engine operating at 1200 RPM, turn adjusting screw in regulator valve spring retainer (on right side of transmission directly below torque converter control valve) clockwise to increase pressure and counterclockwise to decrease pressure, until pressure is within specified limits as indicated in tables

CONTINUED ON NEXT PAGE

TORQUEFLITE EIGHT (C nt.)

G v rn r Pr ssur : Remove 1/8" pipe plug from governor pressure take-off hole located on lower left side of transmission case (at rear of case in output shaft support) Install pressure gauge at this point and make the following tests:

(Chrysler)

Pushbutton Depr ssed	Car Speed Newp rt	Windsor	Governor Pressure
2	18-22 MPH	18-22 MPH	15 psi
D	41-50 MPH	43-51 MPH	50 psi
D	69-77 MPH	72-80 MPH	75 psi

Pushbutton Depr ssed	Car Speed N w York r	Imperial	Governor Pressure
2	18-23 MPH	19-24 MPH	15 psi
D	43-51 MPH	45-54 MPH	50 psi
D	72-80 MPH	75-83 MPH	75 psi

Pushbutton Depr ssed	Car Speed 300 G	Governor Pressure
D	21-24 MPH	15 psi
D	36-43 MPH	50 psi
D	55-62 MPH	75 psi

℄ --Tests are made with rear wheels free to turn.

Govern r Pressure Tests ℄
D Soto (2.93-1 Axle Ratio)

Pushbutton Depressed	Car Speed All Models	Governor Pressure
2	15-20 MPH	15 psi
D	37-44 MPH	50 psi
D	61-68 MPH	75 psi

℄ - Tests are made with wheels free to turn.

G v rn r Pr ssure Tests ℄
(Dodg & Plymouth)
(Cars With ut Ram Manifold)

Pushbutt n D pr ss d	Std. G v rn r	Hi-Perf. Governor	Governor Pressure
2	690-790 ②	690-790 ②	15 psi
D	1250-1510 ②	1680-1860 ②	45 psi
D	2560-2790 ②	2850-3070 ②	75 psi

℄ - Tests are made with rear wheels free to turn.
② - Engine RPM

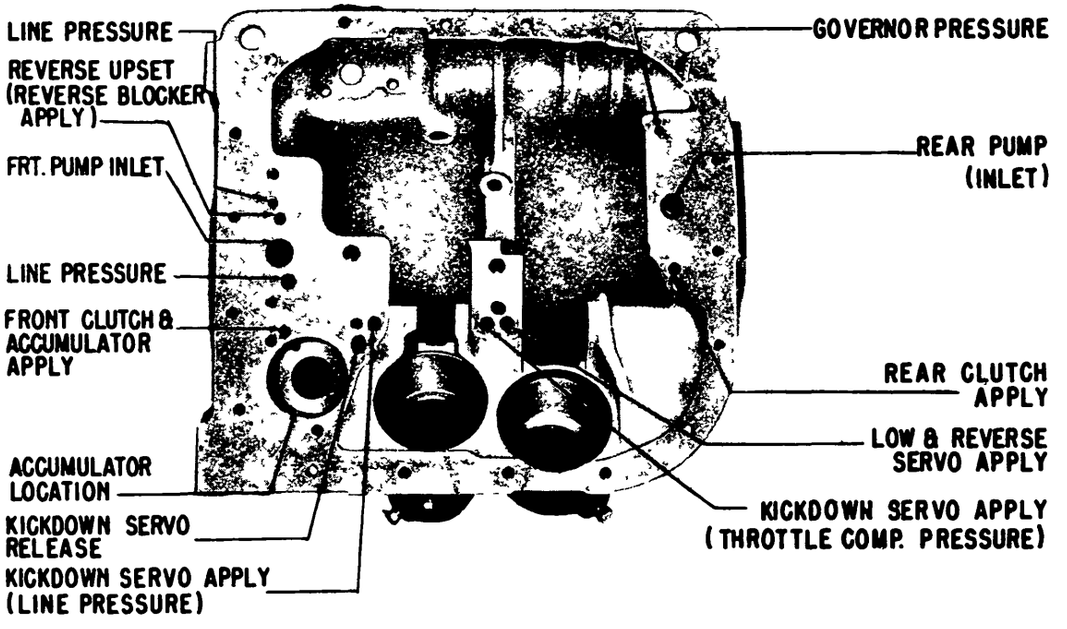
G v rn r Pr ssure Tests ℄
(D dg & Plymouth)
(Cars With Ram Manifold)

Pushbutton D pr ss d	Engine RPM	Governor Pressure
2	860-970	15 psi
D	1830-2100	65 psi
D	2550-2800	85 psi

℄ - Tests are made with rear wheels free to turn.

►*NOTE: If governor pressure is not correct and does not correspond to engine RPM or car speed (see tables above), refer to "Trouble Shooting & Diagnosis".*

Lubricati n Pressur : Remove 1/8" pipe plug from pressure take-off hole located on left side of transmission case (middle plug forward of control cable and lever connection) Install pressure gauge at this point and proceed as follows: With engine running at 800 RPM in neutral, lubrication pressure should be approximately 10-30 lbs If pressure is incorrect, check line pressure and see "Trouble Shooting & Diagnosis" below. If pressure is extremely high, it is an indication of a restriction due to dirt or foreign matter in lubrication passages.



TORQUEFLITE OIL PASSAGES IN TRANSMISSION CASE

Throttle Pressure: With car off floor and wheels free to turn, install a 100 lb. pressure gauge (Tool C-3292) at throttle pressure take-off plug at top of kickdown servo on right side of transmission. Disconnect bellcrank-to-throttle linkage at transmission, then start engine and place transmission in "2" (second) position. While holding transmission throttle lever **toward closed throttle position** (against internal stop), increase engine speed slowly (using accelerator or suitable throttle control fixture) to approximately 850 RPM to obtain upshift into second speed. After shift takes place, compensated throttle pressure should read 10-16 lbs. As throttle lever at transmission is advanced toward full throttle, compensated throttle pressure should begin to rise after approximately 5° of movement. If compensated throttle pressure rises immediately when lever is moved or if pressure is incorrect or fails to rise after approximately 5° movement, adjust throttle valve pressure (see below) Before stopping engine, advance throttle control lever at transmission slowly, then return to closed position. Pressure should rise to 80-90 lbs., then fall smoothly without hesitation and return to consistent reading at closed throttle. If necessary, clean valve body assembly and repeat tests.

Throttle Valve Pressure Adjustment: Adjust throttle valve link at slotted end to obtain correct throttle valve pressure *NOTE - To aid in future adjustments, it is recommended that the throttle valve stopscrew inside transmission be correctly set as follows: Push in "N" (Neutral) button, then block carburetor choke valve in wide open position Drain transmission fluid and remove oil pan Adjust transmission throttle valve stopscrew so that end of stopscrew just contacts throttle lever with the accelerator pedal released, then tighten stopscrew lockout. Install transmission oil pan and refill transmission.*

AIR PRESSURE TESTS: The front clutch, rear clutch, kickdown servo, and low and reverse servo may be checked by applying air pressure to their respective passages when valve body is removed *(CAUTION – Air supply must be free of all dirt and moisture).* Refer to "Oil Passages in Transmission Case" illustration for location of air passages.

1) Raise car on hoist, drain transmission fluid and remove transmission oil pan.

2) **Front Clutch**–Remove accumulator cover. Apply pressure to front clutch passage. Listen for a dull thud which indicates that front clutch is operating. Hold air pressure on for a few seconds and check for excessive oil leaks in system.

3) **Rear Clutch**–Remove valve body assembly and apply air pressure to rear clutch passage. Listen for a dull thud which indicates that rear clutch is operating. Check for excessive oil leaks.

4) **Kickdown Servo**–Apply air pressure to kickdown "apply" (line)) pressure passage. Observe operation of kickdown servo, lever and band when air pressure is applied. Apply air pressure to "apply" (compensated throttle) pressure passage and observe operation of kickdown servo.

5) **Low & Reverse Servo**–Apply air pressure to low & reverse servo passage and observe operation of servo, lever, and band.

►*AIR PRESSURE TEST NOTE: If all the above units operate properly, "no drive" "erratic" and "no up-*

CONTINUED ON NEXT PAGE

TORQUEFLITE EIGHT (C nt.)

shift" conditions are caused by trouble in the control valve assembly.

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Except where noted, the following operations can be performed without removing the transmission from the car.*

LINE PRESSURE INCORRECT: Oil level incorrect. Check for stuck or scratched regulator valve or buckled spring. Check kickdown servo for broken seal rings, stuck piston or broken linkage. Check low & reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Check for possible leak at front pump suction tube, tube elbow or rear pump suction tube. Check for loose bolts, burrs or scratches on mating surfaces of valve body. Clean valve assembly and check for stuck valves, dirt, scratched valve or body, and burrs on valves. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Check regulator valve body for scratches and scoring on valve bores and face which bears against front pump housing. Examine regulator valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

GOVERNOR PRESSURE INCORRECT (Does not correspond to car speeds): Clean governor assembly, and check weight assembly and valve for burrs, scratches or sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. Clean and inspect rear pump assembly for side or diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring.

LUBRICATION PRESSURE INCORRECT: Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter control valve or buckled spring. *Transmission must be removed for the following.* Clean and inspect front pump and drive sleeve for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings Flush out converter and check converter-to-housing runout.

HARSH NEUTRAL-TO-DRIVE OR NEUTRAL-TO-REVERSE SHIFT: Check hydraulic control pressures. Adjust low and reverse band Adjust engine idle speed. Check Low & Reverse servo for torn seal, stuck piston sleeve, broken band or broken linkage. Check accumulator cover screw torque and piston for broken rings. *Transmission must be removed for the following:* Clean and inspect front clutch discs, plates, drive hub, return spring and piston. Check front clutch circuit for leakage Clean and inspect rear discs, plates, return spring and piston Check rear clutch circuit for leakage

DELAYED NEUTRAL-TO-DRIVE SHIFT: Check transmission oil level. Check hydraulic control pressures. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure (see above). *Transmission must be removed for the following.* Clean and inspect front pump and drive sleeve assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect front clutch discs, plates, drive hub, return spring and piston. Check front clutch circuit for leakage.

RUNAWAY ON UPSHIFT & 3-2 KICKDOWN: Check transmission oil level. Adjust throttle linkage *(see "Carburetor" on car model pages).* Check hydraulic control pressures. Adjust kickdown band. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure (see above). *Transmission must be removed for the following* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage

HARSH UPSHIFT & 3-2 KICKDOWN: Adjust throttle linkage *(see "Carburetor" on car model pages).* Check hydraulic control pressures. Adjust kickdown band. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. *Transmission must be removed for the following* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage.

NO UPSHIFT: Proceed as for "Runaway on Upshift & 3-2 Kickdown" above, and clean governor assembly and check weight assembly and valves for burrs, scratches and sticky operation Examine governor valve shaft, shaft snap rings and seal rings

NO KICKDOWN OR NORMAL DOWNSHIFT: Proceed as for "Runaway on Upshift & 3-2 Kickdown" above Check control cable adjustment Adjust low and reverse band *Transmission must be removed for the following* Clean and inspect overrunning clutch assembly for brinnelled rollers and cam, and improperly assembled rollers and springs

SHIFTS ERRATICALLY: Check transmission oil level Adjust throttle linkage *(see "Carburetor" on car model pages).* Check control cable adjustment Check hydraulic control pressures Check for stuck or scratched regulator valve or buckled spring Check output shaft rear bearing for roughness or an unseated snap ring Check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube Check control valve body for loose bolts, burrs or scratches on mating surfaces Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Test transmission units with air pressure (see above) Clean governor assembly and check weight assembly and valve for burrs, scratches and sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. *Transmission must be removed for the following* Clean and inspect front pump and drive sleeve assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings.

SLIPS IN FORWARD DRIVE POSITIONS: Check transmission oil level. Check hydraulic control pressures. Check control valve body for loose bolts, burrs or scratches on mating surfaces Check for stuck valves, dirt, scratched valves or body, and burrs on valves Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings Test transmission units with air pressure. *Transmission must be removed for the following* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston Check rear clutch circuit for leakage. Clean and inspect the overrunning clutch assembly for brinnelled rollers or cam, and improperly assembled rollers and springs.

SLIPS IN LOW-REVERSE ONLY: Check hydraulic control pressures Adjust low-reverse band. Check low-reverse servo for torn oil seal, stuck piston sleeve, broken band or linkage. Check control valve body for loose bolts, burrs, scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves Tighten valve body bolts to correct specifications Test transmission units with air pressure. *Transmission must be removed for the following:* Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump Examine valve body to determine if the secondary reaction orifice is free of dirt. Check gasket for uniform compression by valve body

SLIPS IN ALL POSITIONS: Check transmission oil level. Check hydraulic control pressures Check for a stuck or scratched regulator valve or buckled valve spring. Check control valve body for loose bolts, burrs or scratches on mating surfaces Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Test transmission units with air pressure (see above). *Transmission must be removed for the following* Clean and inspect front pump and drive sleeve assembly for side and diametral clearance Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump Examine valve body to determine if the secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body

NO DRIVE IN ANY POSITION: Proceed as for "Slips in all Positions" above, and in addition, check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube

NO DRIVE IN FORWARD RANGES: Check hydraulic control pressures Adjust kickdown band Check kickdown servo for broken seal rings, stuck servo piston or broken linkage Check control valve body for loose

CONTINUED ON NEXT PAGE

TORQUEFLITE EIGHT (C nt.)

bolts, burrs or scratches on mating surfaces Check for stuck valves, dirt, scratched valves or body, and burrs on valves Tighten valve body bolts to correct specifications Check accumulator cover screw torque and piston for broken rings Test transmission units with air pressure (see above) *Transmission must be r moved for the following* Clean and inspect front clutch discs, plates, drive hub, return spring and piston Check front clutch circuit for leakage. Clean and inspect rear clutch discs, plates, drive hub, return spring and piston Check rear clutch circuit for leakage Clean and inspect overrunning clutch assembly for brinnelled rollers or cam, and improperly assembled rollers and springs

NO DRIVE IN REVERSE: Check hydraulic control pressures. Adjust low-reverse band. Check low-reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect rear clutch disc, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage.

DRIVES IN NEUTRAL: Adjust gearshift control cable. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications *Transmission must Le removed for the following:* Clean and inspect front clutch disc, plates, drive hub, return spring and piston. Check front clutch circuits for leakage.

DRAGS OR LOCKS: Adjust kickdown band and the low-reverse band. Check handbrake for excessive drag. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check low-reverse servo for torn oil seal, stuck piston sleeve, broken band or linkage. *Transmission must be removed for the following* Clean and inspect discs, plates, drive hub, return spring and piston of both front and rear clutches. Check front and rear clutch circuits for leakage. Clean and inspect planetary gear set for worn thrust washers, nicked or rough gear teeth, and excessive pinion clearance. Clean and inspect overrunning clutch assembly for brinnelled rollers and cam and improperly assembled rollers and spring

GRATING & SCRAPING NOISES: Check handbrake for excessive drag. Check output shaft rear bearing for roughness or an unseated snap ring. Clean governor assembly, and check weight assembly and valves for burrs, scratches, or sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. Clean and inspect rear pump assembly for side or diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support for scoring. *Transmission must be removed for the following* Clean and inspect front pump assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect front and rear clutch discs, plate, drive hubs, return spring and pistons. Check front and rear clutch circuits for leakage. Clean and inspect planetary gear set for worn thrust washers, nicked or rough gear teeth, and excessive pinion clearance.

BUZZING NOISES: Check transmission oil level. Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter valve or buckled spring. *Transmission must be removed for the following:* Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump housing. Examine valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

TRANSMISSION HARD TO FILL (Oil blow out filler tube): Check transmission oil level. Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter valve or buckled spring. Check to determine whether tube is free of dirt. Check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube. *Transmission must be removed for the following:* Clean and inspect front pump assembly for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against front pump housing. Examine valve body to determine if secondary reaction orifice if free of dirt. Check gasket for uniformness of compression by valve body.

TRANSMISSION OVERHEATS: Check transmission oil level. Adjust kickdown band and low-reverse band. Check handbrake for excessive drag. Check regulator and converter valves for stuck or scratched valves or buckled springs. Check for mud, dirt, or other foreign material on screens or torque converter cooling fins. Clean and inspect rear pump assembly for side and diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve assembly for side and diametral appearance. Examine oil pump inner and outer rotor for scoring. Check drive sleeve seal rings. Check and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump housing. Examine the valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body. Clean and inspect front and rear clutch discs, plate, drive hubs, return spring and piston. Check front and rear clutch circuits for leakage.

IMPOSSIBLE TO PUSH CAR: Check hydraulic control pressures. Adjust low-reverse band. Check low-reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Check valve body for loose bolts, burrs or scratches on mating surfaces. Clean valve body assembly, check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Clean and inspect rear pump assembly for side and diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring.

STARTER WILL NOT ENERGIZE: Adjust gearshift control cable. Adjust engine idle speed.

GEARSHIFT CONTROL UNIT

PUSH BUTTON CONTROL UNIT: R m val (All Mod ls) - Disconnect battery cable, then disconnect back-up light switch wire at push button control and illuminating lamp leads at rear of instrument panel *NOTE - On Imperial, remove speedometer for access to rear of control unit* Remove screws of push button face plate and remove push buttons by pulling them off button slide Remove lamp bulb Remove control housing stud nuts and remove control and cable from rear of instrument panel Remove clip attaching control cable to actuator and the screws holding cable bracket to control housing

Installation: Insert end of cable on actuator and install clip, then place cable bracket on control unit and install screws securely Carefully guide unit from rear of instrument panel and install nuts Install lamp bulb and pushbuttons Replace front plate, then connect back-up switch wires and illuminating lamp wires Connect battery cable On Imperial models, reinstall speedometer

MANUAL CONTROL CABLE: Removal - Drain approximately 2 quarts of fluid from transmission, then engage the "1" (first) push button Remove control cable adjustment wheel lockscrew, then remove neutral starter switch, cupped washer and seal With a screwdriver inserted through neutral starter switch opening, push gently against upward projecting portion of control cable adapter spring and pull outward on cable and remove the assembly from case

Installation: Have an assistant hold "R" (Reverse) button firmly depressed, then back adjusting wheel off on cable guide until two or three threads are showing behind wheel on guide Lubricate cable guide threads and "O" ring with a few drops of transmission oil Insert cable end in adapter, and slide cable assembly into case until manual lever assembly bottoms on reverse detent At this point, cable will lock to the adapter Pull out on cable assembly to make sure that adapter spring has engaged cable end Adjust cable, see "Linkage Adjustment" above Reinstall neutral starter switch and refill transmission to proper level

GEARSHIFT UNIT LAMP BULB REPLACEMENT: Remove gearshift housing and plate (see above) Remove one or more push buttons for clearance Replace defective or burned out bulb Replace control housing and plate assembly Test operation of unit

BACK-UP LIGHT SWITCH REPLACEMENT: Remove gearshift control housing and plate (see above) Back-up light switch is fastened to control unit by four tabs Remove lead wires, then straighten tabs to remove switch. To install, position switch and bend tabs to secure switch to housing Reconnect lead wires Check reverse slide action (slide should freely return for full travel) Install gearshift control housing

GEARSHIFT CONTROL UNIT TROUBLE SHOOTING & DIAGNOSIS

LOW & REVERSE BUTTONS REQUIRE HEAVY PRESSURE TO LOCK: Adjust manual control cable. S *"Manual Control Cable Adjustment" abov* .

CONTINUED ON NEXT PAGE

TORQUEFLITE EIGHT (C nt.)

"CLUNKING" NOISE WHEN BUTTON RETURNS: Remove control unit and replace rubber bumper if missing or damaged.

PUSH BUTTON WILL NOT RETURN: Remove control unit and replace broken or defective return spring.

PUSH BUTTON WILL NOT LOCK: Replace operating slide.

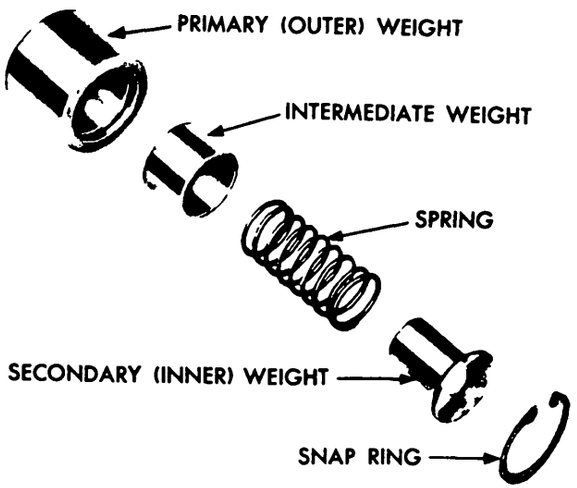
PUSH BUTTON BINDS: Replace operating slides if warped. Align bezel so push buttons are centered. Position light lead wire as outlined under "Gearshift Control Unit Installation" above. Carefully relieve area where push button contacts felt. This can be done by inserting a .005" feeler gauge between push button cover and the felt mask. Gently moving the gauge in and out in this area will usually relieve the binding condition. Should it become necessary to replace or reglue the mask, use a suitable adhesive and place glue in an area where it will not interfere with operation of the push buttons.

LOOSE PUSH BUTTON COVER: Remove bezel to expose push button. Using a small screwdriver, exert sufficient pressure to force tang into plastic recess on push button.

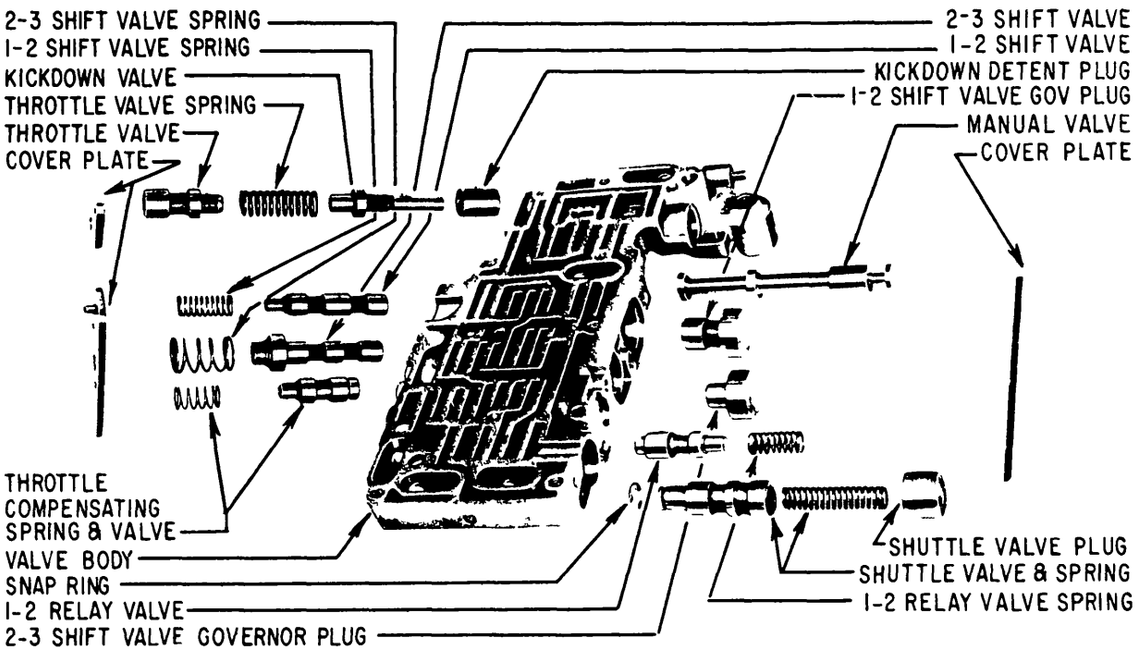
TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

Procedures are the same as for previous models except as indicated *See "TorqueFlite Transmission" in 1958 Annual Data or later Manual edition and note the following*

VALVE BODY & TRANSFER PLATE: Removal - *NOTE - It is not necessary to disconnect control cable at transmission to permit removal of valve body with transmission in car* Drain transmission and remove oil pan, then engage the "R" (Reverse) push button Disconnect throttle linkage and remove throttle valve lever and washer Remove manual control lever-to-control cable adapter stud nut and remove oil strainer transfer plate bolts and lower valve body and transfer plate assembly



TORQUEFLITE GOVERNOR ASSEMBLY



TORQUEFLITE CONTROL VALVE ASSEMBLY

Installation: Clean mating surfaces and check for burrs on transmission case and valve body transfer plate. Place manual lever in reverse position (all the way in), then install accumulator piston spring into recess in top of transfer plate and carefully guide the spring up into accumulator piston as transfer plate and valve body are placed up against transmission case. At the same time, index cable adapter stud into manual control lever. Install transfer plate bolts and washers (leave four holes open to attach oil strainer) and draw down evenly and tighten to 14-16 ft. lbs. Install oil strainer and tighten the four bolts in the same manner. Install cable adapter stud nut securely and tighten, then install throttle valve lever and washer and reconnect throttle linkage. Install oil pan and fill transmission with recommended lubricant. See "Draining & Refilling" above.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: 1) Disconnect battery, then push in the "R" (Reverse) button on control panel and raise car on a hoist Drain transmission and torque converter After draining, replace converter drain plug and tighten

2) Disconnect front universal joint and secure propeller shaft out of way Remove brake adjusting screw cover plate and loosen cable clamp bolt on parking brake support Disengage ball end of cable from operating lever and remove cable from brake support

3) Disconnect speedometer cable and housing at transmission, then disconnect neutral switch wire and throttle control linkage from throttle lever Remove push button control cable adjustment wheel locking screw and neutral starting switch

4) Insert a screwdriver through neutral starting switch hole, contact top end of cable-to-adapter locking spring and while releasing the lock, pull out cable Disconnect oil cooling lines from transmission

5) Install engine support, Tool C-3487 *NOTE - On some models it may be necessary to remove starter to provide clearance for fixture* Adjust tool to support engine, then raise engine slightly and remove crossmember to torsion bar bracket bolts *CAUTION - When using Tool C-3487, do not lower engine more than three inches from floor pan*

6) *NOTE - Rear motor support and bracket may be left on transmission extension during repairs* Remove the two transmission case to torque converter housing screws and lockwashers from right side and install guide studs, Tool C-3276 With transmission supported, remove two transmission to torque converter housing screws and lockwashers from left side Slide transmission straight back to avoid damage to front oil pump driving sleeve, then lower to floor

INSTALLATION: 1) Install guide studs, Tool C-3276, in two transmission mounting holes in right side of torque converter housing, then with front oil pump drive sleeve lubricated, install it making sure the driving lugs are properly engaged with oil pump pinion *NOTE - Main portion of drive sleeve will be flush with front of pump housing when properly installed*

2) Note position of driving lugs inside torque converter hub, then position front pump drive sleeve on transmission accordingly to aid in proper engagement when

CONTINUED ON NEXT PAGE

TORQUEFLITE EIGHT (C nt.)

transmission installed Slide transmission over guide studs and into position against converter housing Make sure driving lugs on front oil pump drive sleeve properly engage torque converter *CAUTION - To avoid damage to front oil pump, do not use transmission-to-torque converter housing screws to force transmission and housing togeth r*

3) Install two transmission-to-torque converter housing screws on left side but do not tighten Remove guide studs and install the other two bolts on right side Tighten all four bolts evenly to 40 ft lbs

4) Place crossmember in position and tighten crossmember-to-torsion bar bracket bolts securely Lower the engine and at the same time align mounting bolts in insulator bracket with holes in rear spring mount plate Install nuts and tighten to 35 ft lbs then remove Tool C-3276

5) Install oil cooling lines and connect neutral starting switch wire Install oil pan filler tube nut and tighten to 40 ft lbs Connect speedometer cable, then engage ball end of parking brake cable in operating lever and tighten cable clamp bolt Install brake adjusting screw cover plate on parking brake support Connect front universal and tighten nuts to 37 ft lbs Install starter (if removed)

6) Connect throttle control linkage to throttle lever on transmission, then install push button control cable in adapter, making sure spring lock engages cable Adjust manual control cable (see above) Connect battery, refill transmission with fluid (see above), then adjust throttle linkage

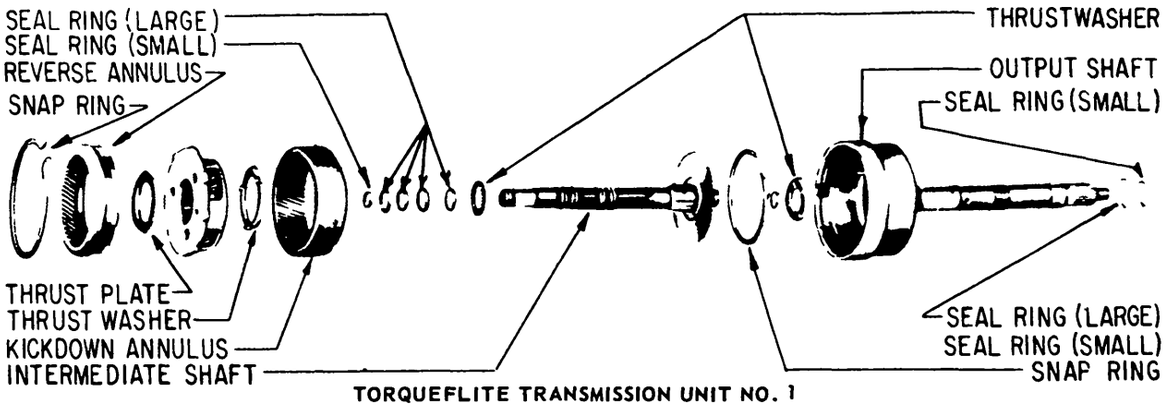
OVERHAUL

See "Torqu Flite Transmission" in 1957 Annual Data r lat r Manual diti n and note the following:

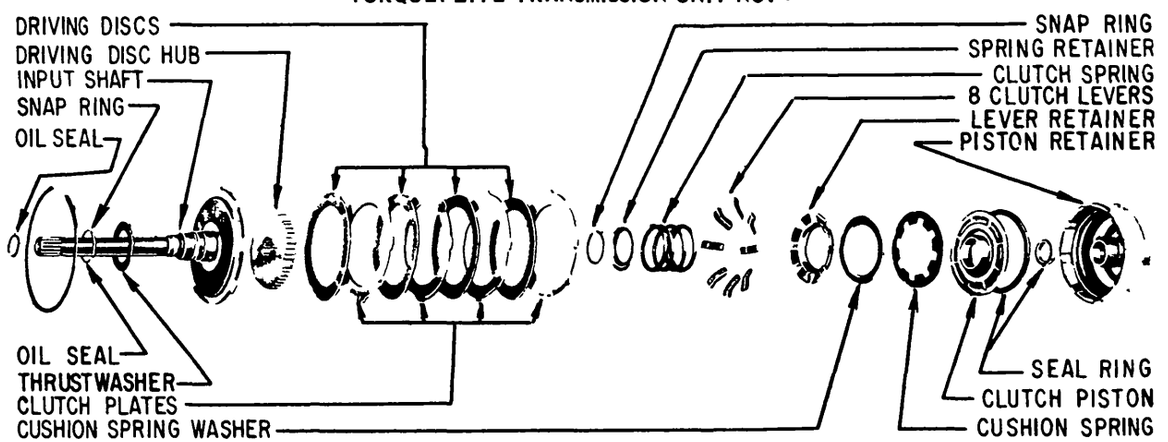
FRONT & REAR CLUTCH ASSEMBLIES: The number of clutch plates and discs in each unit is dependent on car model. Reinstall the same number of plates and discs as removed from clutch assembly.

VALVE BODY & TRANSFER PLATE (ONE-PIECE TYPE): Disass mbly - 1) Place valve body and transfer plate assembly in stand, Tool C-3528, with operating lever shafts downward. *CAUTION - Do not clamp any porti n f valv body assembly in a vise or use f rc wh n r moving r installing valves andplugs.*

2) Remove reverse blocker valve retainer plate, blocker valve and spring, then remove cross recess screws holding valve body, valve body steel plate, and transfer plate together. *NOTE - Whil removing, h ld valv body to prev nt l ss f any f th six ball checks. Not the l cati n f thes balls for proper installation. All ch ck valv balls ar th sam size.*



TORQUEFLITE TRANSMISSION UNIT NO. 1



TORQUEFLITE TRANSMISSION UNIT NO. 3

3) Remove shuttle valve and governor plug cover plate, then remove shuttle valve plug and spring. Remove 1-2 relay valve spring, valve and governor plug. Remove 2-3 shift valve governor plug, then remove manual valve and shuttle valve.

4) On opposite side of valve body, remove shift valve cover plate, then remove 1-2 shift valve spring, 2-3 shift valve spring, 1-2 shift valve, and 2-3 shift valve Remove throttle compensating valve spring and valve Remove throttle valve cover plate, throttle valve and spring Remove kickdown valve and detent plug.

Reassembly: Reassemble valve body by reversing disassembly procedure (see above), then set valve body steel plate and transfer plate over stand pilots, Tool C-3528 With all ball checks in place, position valve body up against transfer plate and valve body steel plate, then install attaching recess screws and washers Tighten all screws evenly to 25-30 inch pounds. *CAUTION - If this plate is incorrectly positioned, gov rnor pressure leakage willr sult. When correctly install d th edge of plate will align flush with edge of valv body transfer plat , compl tely covering blocker valv b re and governor pressure passag in transfer plate*

FRONT CLUTCH (8 LEVER): Disassembly - With front clutch assembly removed from transmission, remove input shaft fibre thrust washer and snap ring, then remove input shaft from piston retainer Invert retainer and remove driving discs, plates, pressure plate and hub Install spring compressor, Tool C-3533 and compress spring retainer Use snap ring pliers and remove spring retainer snap ring Remove compressor tool, then remove spring retainer, spring, levers, lever retainer, cushion spring washer, and cushion spring from retainer With a twisting motion, remove piston from retainer Remove outer seal ring from piston, then remove inner rubber seal ring from hub of retainer

Reassembly: Lubricate and install inner rubber seal ring on hub of retainer, making sure lip of seal is facing rear of retainer and seal is seated in groove Lubricate and install seal ring on piston with lip of seal towards rear of piston Place piston assembly in retainer using a twisting motion to seat piston in bottom of retainer Install cushion spring with dished (concave) side facing piston, then place cushion spring washer with chamfer towards front of retainer Place lever re-

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TORQUEFLITE EIGHT (C nt.)

tainer over hub of piston and install levers. Install return spring over hub of retainer and position spring retainer and snap ring on spring. Use compressor, Tool C-3533 and compress spring sufficiently to seat snap ring with snap ring pliers. Remove compressor tool and install pressure plate (smooth side up) in retainer. Install discs and plates by first placing one of the discs in piston retainer followed by a steel plate. Repeat this procedure until all plates and discs have been installed. Check and adjust clutch clearance *(see "Front Clutch Pr ssure Plate Travel Check & Adjustment" below).* Install driving disc hub, then install input shaft by placing input shaft and retainer assemblies in an arbor press with the rear of piston retainer resting on a suitable support. Make sure ball check at rear of retainer does not contact support during pressing operation. Press input shaft into retainer until snap ring can be installed. Remove assembly from arbor press and place thrust washer over input shaft and against thrust surface on input shaft flange.

Front Clutch Pressure Plate Travel Check & Adjustment: To check front clutch clearance, install Rear Clutch Pressure Plate Part No. 1732114 (Used in transmission prior to early 1957), or Rear Clutch Pressure Plate, Part No. 1824319 (Used in Dodge Trucks). *CAUTION– Front Clutch Pressure Plate, Part No. 1736408 (also used in Rear Clutch Assemblies after Late 1957) cannot be used to check front clutch clearance.* Hold this plate firmly in position and insert a feeler gauge between plate and top disc in the assembly. Total clearance should be .020–.040". If measured clearance is not within these limits, the clutch discs should be replaced with any combination of new discs which are furnished in thicknesses of .060–.063", .073–.076", .087–.090" to provide for proper clearance. Remove rear clutch plate (used for checking) and install front clutch hub. Complete assembly as indicated above.

EXTENSION HOUSING BUSHING: R m val - Remove bushing in same manner as for bearing used on previous models. *See "TorqueFlite Transmission" in 1957 Annual Data or later Manual edition.*

Installation: *CAUTION - When positioning bushing in extension housing, make sure lubrication hole in bushing will index with lubrication hole in housing wh n bushing has been driven into position. Pulling the tool out of the bushing seats bushing prop rly and removes any slight irregularities. Do not ream bushing after installation.* Place a new bushing on Tool C-3692, and install in extension housing. Use driver, Tool C-3691, and install oil seal with metal portion of seal facing in, until driver bottoms on extension. Install brake support grease shield with indent on shield matching groove in extension.

CHRYSLER CORP. POWERFLITE AUTOMATIC TRANSMISSION

Dodge V8 & Plymouth V8 (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*PUSHING CAR TO START ENGINE:* Pushing is recommended rather than towing. With the "N" (Neutral) button pushed in, turn the key to "ON" position. When car reaches a speed of approximately 25 MPH, push in the "L" (Low) button. This will allow the transmission to crank the engine.

►*TOWING POWERFLITE CARS:* Following procedure recommended.

Transmission Inoperative – Disconnect propeller shaft or tow car with rear end raised.

Transmission Operating – The car may be safely towed at moderate speeds with the "N" (Neutral) button pushed in. For long distance towing (over 100 miles), the propeller shaft should be removed.

DESCRIPTION: Same design as used on previous models. Transmission consists of a torque converter and two speed hydraulically operated planetary transmission.

LUBRICATION

Ch cking Fluid Level: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. Fluid level should be at "F" mark or slightly below (never above "F" mark). Add or remove transmission fluid as necessary.

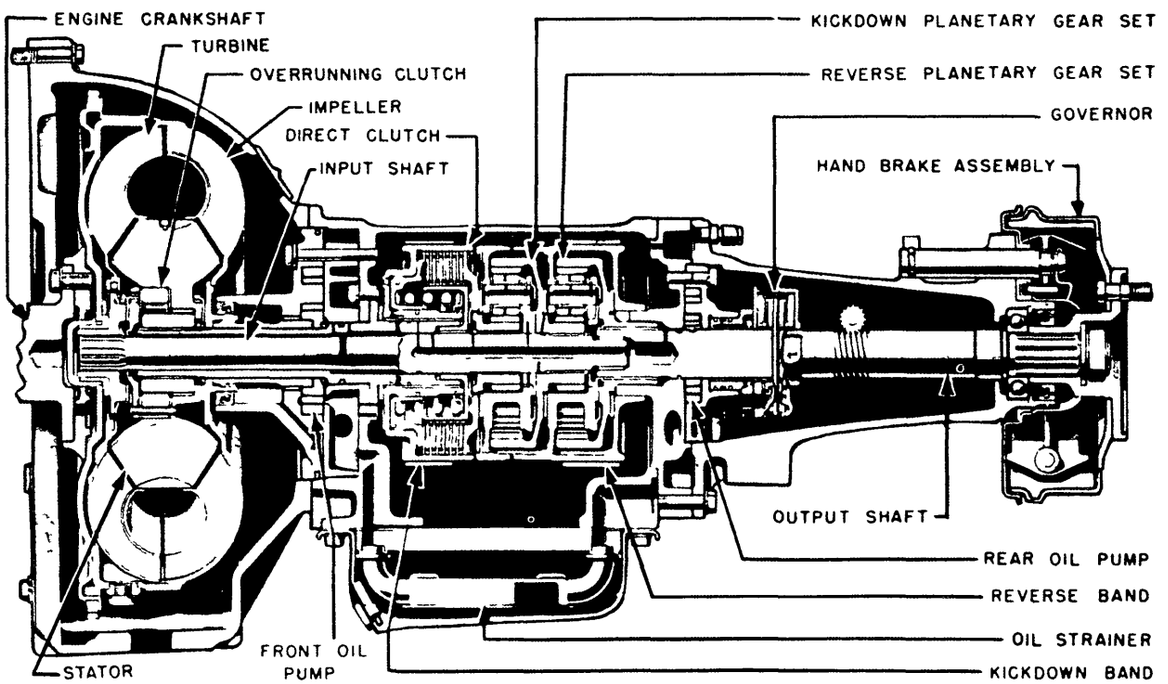
R commended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

►*NOTE: If fluid is checked with transmission cold, fluid l vel should be at "L" (Low) mark or slightly below.*

Capacities - 20 pts. (Dodge Dart & Plymouth); 22 pts. (DeSoto); 23 pts. (Dodge).

►*NOTE: Th above ar appr ximat capaciti s. T tal fluid r quir d should be d t rmined by measuring with dipstick. S e "Ch cking Fluid L v l" abov .*

Draining & R filling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel



POWERFLITE TRANSMISSION SECTIONAL VIEW

cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and add 5 qts. of Automatic Transmission Fluid Type "A" (Suffix "A") through transmission oil filler tube. Start engine and add approximately 3 qts. while engine is idling. Allow engine to idle for two minutes, then operate all pushbuttons, pausing momentarily at each position, and ending with the "N" (Neutral) button pushed in. Check fluid level and add sufficient fluid to bring level to "L" (Low) mark on dipstick.

►*TRANSMISSION MAINTAINANCE NOTE: It is r commended that when transmission is drain d, oil pan should be removed and clean d, oil scr n cl an d, and transmission bands and linkag adjust d.*

►*CONVERTER FLUSHING NOTE:* Converter assembly can be flushed as follows: With transmission removed (converter attached to engine), drain converter and in-

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POWERFLITE (C nt.)

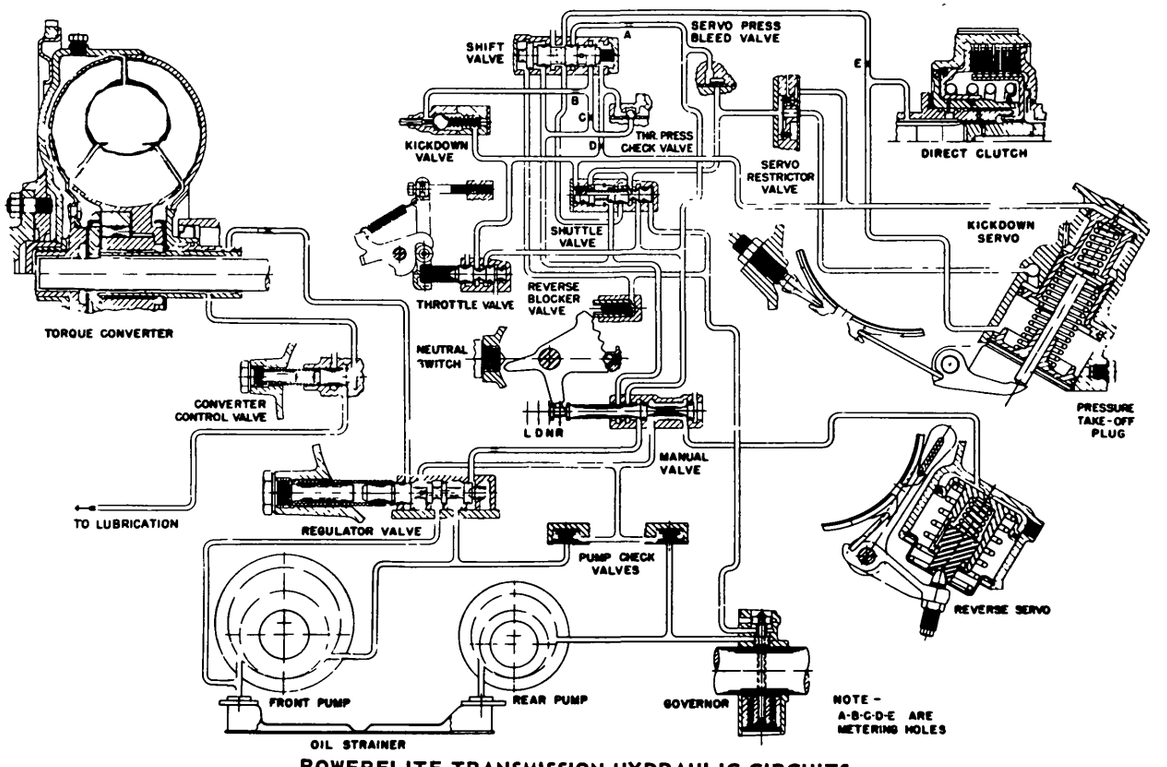
stall drain plug. Reach through starter hub with a screwdriver and lift on side of hub spline to turn starter counterclockwise. Sight through opening and make sure rectangular oil slots on rear face of starter are aligned vertically. Use a container with a long spout and slowly pour two quarts of clean kerosene into converter. Tape hub opening, then disconnect coil wire and rotate engine with starter for approximately 10 seconds. Drain converter and repeat the flushing procedure as necessary. To completely drain converter, remove drain plugs and use starter to rotate converter until all kerosene is thrown out of openings.

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See "Carburetor" on car mod l pages.*

Manual C ntrol Cabl Adjustment: Remove neutral safety starting switch from side of transmission. Loosen adjustable mounting bracket capscrew and move cable and bracket assembly (manually) as required, to position the manual valve lever in neutral position. Hold the "N" (Neutral) button tightly in at full travel (the neutral starting switch cam should then be practically centered in neutral starting switch mounting hole). Use a free fitting flat-faced shaft inserted through the neutral mounting switch hole, and apply very light pressure against the manual valve lever to maintain the neutral detent position of lever. *(NOTE* - If tool is not available, lever may be held by finger pressure). Carefully move cable assembly "in" and "out" **without moving** the manual lever, to determine total free-play travel of cable. Locate the cable midway in the free-play range, release pressure against the manual lever and tighten mounting bracket securely. *Do not allow cable t mov wh n tight ning the bracket.* Install neutral starting switch and check transmission fluid level.

Thr ttl Pr ssur Adjustment: With throttle linkage properly adjusted and tachometer attached, start engine and adjust idle speed to 475-500 RPM (with transmission in neutral and hand brake set). Stop engine and raise car on a hoist, then remove throttle pressure take-off plug located between reverse and kickdown servos on right side of transmission case. Connect gauge, Tool C-3292, then start engine and push in the "D" (Drive) button on instrument panel. Engine speed will drop 50 RPM and pressure reading on gauge should be 13-15 lbs. If pressure not within specifications, remove throttle valve adjusting screw access hole plug (approximately 1 quart of fluid will drain out) and insert Adjusting Screw Wrench, Tool C-3279A. Adjust pressure as necessary. *NOTE - Turn screw OUT to increase pressure and IN to decr ase pressure.* Replace throttle valve adjusting screw access hole plug and tighten to 25 ft. lbs. Recheck throttle pressure. Move accelerator pedal very slowly. If throttle pressure and linkage properly adjusted, pressure will rise 6-8 lbs. the instant engine RPM is increased. *NOTE - D not us throttl rod when making this ch ck. Instead, use accelerator pedal lev r located on und rsid of floor pan.* Stop engine and remove oil pressure gauge, then install plug. Tighten to 10-12 ft. lbs. If necessary, replace fluid that drained out.



POWERFLITE TRANSMISSION HYDRAULIC CIRCUITS

Neutral Starter Switch Adjustment: Install mounting washer on switch so that concave side is away from switch, then place rubber "O" ring on switch and install switch in transmission case. Turn switch in until washer contacts case, then tighten switch an extra 1/3 to 1/2 turn. Connect wire and recheck switch operation.

BAND ADJUSTMENT

BAND ADJUSTMENT: *Kickdown (front) band can be adjusted externally. Reverse (rear) band adjustment requires removal of transmission case oil pan.*

Kickdown (Front) Band: Working from beneath car, loosen kickdown band adjusting screw locknut (located on left side of transmission case). Check freeness of adjusting screw in transmission case. If free, use inch-pound torque wrench, Tool C-3380 and tighten adjusting screw to 72 inch-pounds *(NOTE - If Extension, Tool C-3583, is used with torque wrench, tighten adjusting screw to 40-43 inch-pounds).* Use a reference mark of chalk or colored pencil on a corner of adjusting screw square and the transmission case. Using extreme care, back adjusting screw out exactly 2¾ turns. Hold adjusting screw with wrench and tighten locknut.

R v rs (R ar) Band: Drain transmission and remove oil pan. Loosen band adjusting screw locknut and tighten adjusting screw to 20-25 inch pounds. Mark a reference point and back off adjusting screw **12 turns.** Hold adjusting screw and tighten locknut to 30-35 ft. lbs. Replace oil pan and refill transmission.

TESTING

Transmission Shift Speeds (MPH)
(All Models)

Throttle Position	Upshift	Downshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-47

ROAD TESTING TRANSMISSION: *NOTE - Before road testing, engine must be properly tuned and idle speed set to correct specifications.* With engine at normal operating temperature and fluid at proper level, all shifts and kickdowns should occur within the speed ranges given in "Transmission Shift Speeds" table above.

►*ROAD TESTING NOTE: All shift speeds may vary somewhat due to production tolerances, type of engin , rear axle ratios and tire sizes. All shifts, however, should be smooth, responsive and without noticeabl engine runaway.*

STALL TEST: Use an accurate tachometer to check engine speed. With engine idling, push in the "D" (Drive) selector button and note smoothness of shift. Set hand brake firmly and apply foot brakes to hold car. Accelerate engine to wide open throttle and check engine speed which should be 1400-1500 RPM (All models). If speed is in excess of maximum RPM, bands may be

CONTINUED ON NEXT PAGE

POWERFLITE (C nt.)

slipping *CAUTION - D not hold ngine at wide pen throttle more than a few seconds*

► *CAUTION – When making stall test, do not hold throttle wid open for more than a few seconds.* If engine speed excessive and is not corrected by band adjustment, make additional checks as follows: Check for incorrect manual control cable adjustment, leakage at valve body mating surfaces, defective throttle valve, defective shuttle valve or valve body and cover plug, defective kickdown servo parts.

HYDRAULIC PRESSURE TESTS: *CAUTION* - Pressure differences from 15 lbs. to 250 lbs. will be found in making following tests and correct pressure gauge must be used.

Gauge No. C-3292 (100 lbs.) – Use for throttle pressure, governor pressure, and lubrication pressure checks.

Gauge No. C-3293 (300 lbs.) – Use for line pressure check.

Line Pressure: Remove 1/8" pipe plug from line pressure take-off hole (front left side of transmission case), install C-3293 (300 lb.) pressure gauge at this point. Check reverse oil pressure first (brakes off), then apply brakes to hold car and check the other points. Run engine at speed indicated in table below, check line pressure for each selector button position

Line Pressure

Selector Button Engaged	Eng. RPM	Pressure
"R"	1400	225-275 lbs.
"N"	800	85-95 lbs.
"D"	800	85-95 lbs

► *NOTE:* If line pressure not correct, check for Low oil level or clogged strainer, defective regulator valve and spring, manual valve and lever, throttle valve, cam and spring, oil leakage at valve body, or regulator body mating surfaces, defective kickdown piston and related parts, worn front pump or defective front pump drive sleeve or pinion.

Throttle Pressure: Remove 1/8" pipe plug from throttle pressure take-off hole (right center of transmission case between the servos), install C-3292 (100 lb. gauge at this point. Apply brakes to hold car, push in the "D" (Drive) selector button, run engine at speed indicated in table.below and note throttle pressure at each speed.

Throttle Pressure

Throttle Opening	Eng. RPM	Pressure
Closed	Idle	13-15 lbs
Wide Open	1400-1500	80-90 lbs

► *CAUTION: When making the above test, do not hold throttle wide open for more than a few seconds If ngine speed exceeds maximum RPM, check the cause in same manner as for "Stall Test" above*

► *NOTE* If throttle pressure not correct, check line pressure (above) and also check the following points Incorrect throttle linkage adjustment, leakage at valve body mating surfaces, defective throttle valve, cam & spring, defective throttle pressure check ball or kickdown valve ball and rod, defective kickdown piston or related parts.

Governor Pressure Remove 1/8" pipe plug from governor pressure take-off hole on lower left side of output shaft support (plate between transmission case and extension housing), install C-3292 (100 lb.) gauge at this point. Support car securely with rear wheels off floor so that they are free to turn, push in the 'D' (Drive) selector button and run engine at speed indicated (as noted on speedometer). Note governor pressure in each speed range.

Governor Pressure ℂ

Axle Ratio	15 Lbs.	45 Lbs.	60 Lbs.
2 93-1	13-17 MPH	24-36 MPH	57-69 MPH
3 31-1	12-16 MPH	23-34 MPH	54-65 MPH
3 58-1	10-15 MPH	20-30 MPH	48-58 MPH
3 91-1	10-14 MPH	19-29 MPH	46-56 MPH

ℂ - Governor Pressure at indicated speed

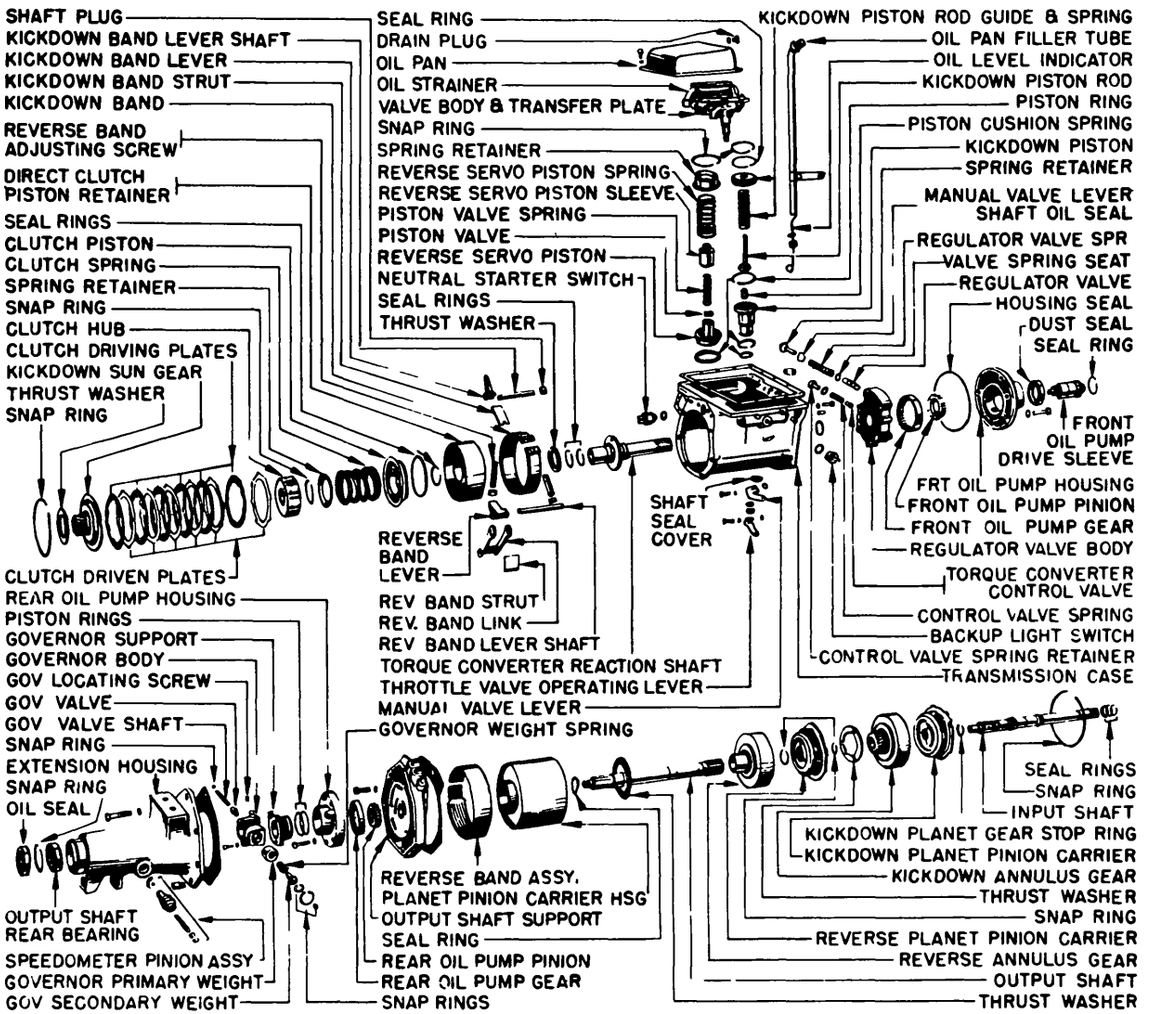
► *NOTE* If governor pressure not correct, check for leakat valve body mating surfaces or output shaft support gaskets, defective governor assembly, or defective rear pump.

Lubricati n Pr ssure: Check only when there is reason to believe that it is incorrect Remove pipe plug at upper left side of output shaft support and install 1/8' flared tube connector Connect Gauge C-3292 With engine running at 800 RPM in 'N' (Neutral) position lubrication pressure should not be less than 10 lbs

► *NOTE* If lubrication pressure is not correct, check for leakage at regulator body mating surfaces or at output shaft support gasket, defective converter control valve, defective front pump drive sleeve, defective reaction shaft bore, defective input shaft seal rings, plugged lubrication holes.

Clutch Pr ssure Remove the 1/8' pipe plug fitting from pressure take-off hole tapped in kickdown servo (clutch pressure take-off plug on forward right hand side of transmission case) and install gauge C-3292 With rear wheels free to turn, accelerate the engine slowly until

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POWERFLITE TRANSMISSION EXPLODED VIEW

POWERFLITE (Cont.)

an upshift occurs. During the upshift, the pressure gauge attached to the kickdown servo should show a very rapid rise from 0 to final clutch or line pressure (see "Line Pressure Table" above). This rise should not take more than 1½-2 seconds. With engine speed not less than 650 RPM (trans. upshifted), the direct clutch pressure should not read lower than 10 lbs. below line pressure. Should a slow rise in clutch pressure be observed or a clutch pressure of more than 10 lbs. lower than line pressure be obtained, it is an indication of abnormal leakage.

► *NOTE* – If clutch pressure not correct, check oil level; throttle linkage adjustment; converter control valve; valve body mating surfaces; throttle valve, cam and spring; kickdown piston and guide; regulator valve body mating surfaces; front pump drive sleeve, clutch retainer bushing and reaction shaft seal rings, clutch discs and plates; clutch piston, seal rings and check valve ball.

TROUBLE SHOOTING & DIAGNOSIS

EXCESSIVE SLIPPAGE:

All Ranges—Inspect oil level. Adjust gearshift linkage Check oil pressure; if low, inspect regulator valve and torque converter control valve for sticking Inspect valve body in transmission case mating surfaces for evidence of oil leakage

Kickdown—Readjust throttle linkage and kickdown band Inspect valve body to transmission case mating surfaces for evidence of oil leakage Check operation of throttle valve and note wear of valve bore and cam Check spring Check valve body end cover for oil leakage Check shuttle valve for free movement Inspect kickdown piston and guide for binding Inspect spring Inspect band lining for wear and band lever for free movement

Kickdown (Over 25 MPH)—Inspect valve body end cover for oil leakage Inspect shuttle valve and plug for free movement Inspect spring

Direct—Inspect valve body to transmission case mating surfaces for evidence of oil pressure leakage Check kickdown piston for binding Check shaft seal rings and clutch retainer bushing for wear Check clutch discs, piston and clutch check valve

Reverse—Check reverse band adjustment Inspect transmission case to valve body mating surfaces for evidence of oil pressure leakage Inspect reverse servo assembly for wear or binding Inspect reverse lever and linkage for free movement

Hill Climbing—Insufficient oil will result in low pressures to kickdown servo or direct clutch if oil level is low

SHIFT PATTERN:

No Upshift—Check oil level and gearshift linkage adjustment Check governor and throttle pressure If there is no pressure rise when accelerating engine in direct drive, governor valve may be stuck closed Check valve body to transmission case for parallelism Check manual valve and lever for correct detent engagement Check shift valve for free operation and shift valve spring for breakage Check kickdown piston assembly Check rear pump drive pinion Drive pinion ball may be cracked or broken, permitting pinion gear to slip Inspect clutch ball check for proper operation Ball check valve must operate freely and seat properly.

No Shift in "D" (Drive) Range and an Upshift In Low Range—The cause is the governor valve sticking open. This can be verified by checking governor pressure (see "Governor Pressure Test" above) If governor pressure exceeds the pressures indicated in table, governor valve is possibly stuck and in most cases can be corrected in the following manner Clean off area around governor pressure take-off plug and remove plug. Cover oil filler tube with a cloth or plug and hold firmly to prevent air from forcing transmission oil out through filler tube. Screw a piece of ⅛" pipe into hole to help direct air into unit Apply clean filtered air to pipe in short blasts, tapping parking brake drum at same time with a rubber hammer just enough to jar governor After applying air pressure, recheck governor pressure and see if valve has been freed up. In cases where governor pressure is still to high, it will be necessary to remove transmission extension case for further inspection

Low Upshift Pattern—Readjust throttle linkage Check governor pressure Governor valve may be binding or sticking Inspect the rear pump assembly Check valve body to transmission case for parallelism Check operation of throttle valve and inspect cam and spring Check shift valve for free operation and spring for breakage

Low Upshift Pattern at Heavy Throttle—Inspect regulator valve, throttle valve, and governor for burrs or dirt which may cause binding or sticking. Inspect the regulator spring

High Upshift Pattern—Readjust throttle linkage and check both throttle and governor pressures. Adjust throttle pressure if necessary. If throttle pressure does not rise according to speeds on chart (see "Throttle Pressure" above), throttle valve may be sticking Inspect for dirt or burrs. Inspect throttle cam for wear Check valve body to transmission case for parallelism Check shift valve spring If governor pressure does not correspond to pressures indicated in "Governor Pressure" table above, remove governor and inspect valve for sticking Check rear pump gears for wear, broken teeth or excessive clearance. Inspect pump drive pinion ball.

All Upshifts Below 14 MPH—Inspect throttle valve, cam and spring Check throttle pressure check ball Check governor valve for sticking

Erratic Shifting—Check oil level. Inspect valve body to transmission case for parallelism Check action of shift valve Inspect governor support gaskets for oil leakage

No Downshift—Check governor pressure. High initial pressure indicates valve is stuck open. Remove governor and inspect Inspect shift valve action, check spring.

Low Downshift Speed—Governor valve is stuck open Remove and clean and check for burrs and dirt

High Downshift Speed—Readjust gearshift linkage Inspect valve body to transmission case for parallelism Inspect manual valve and lever. Inspect kickdown valve and ball

No Kickdown—Adjust throttle linkage Inspect valve body to transmission case for parallelism Inspect throttle valve, cam and spring. Also inspect kickdown valve and shift valve components.

Low Kickdown Limit—Check governor pressure Governor valve may be sticking due to dirt Inspect regulator valve and spring for proper operation. Inspect rear pump gears and drive pinion ball. Check valve body cover plate for parallelism.

SHIFT QUALITY:

Harsh Shift from Neutral to Reverse—Adjust engine idle speed. Readjust rear band. Inspect condition of the reverse band, strut and linkage. Inspect the reverse servo piston, spring valve and rings.

Harsh Shift from Neutral to Drive—Adjust engine idle speed. Adjust throttle linkage. Inspect kickdown servo pistons, springs, guide, rod and piston rings

Delayed Shift from Neutral to Drive—Adjust kickdown band Inspect condition of band, strut, lever and lever shaft

Excessive Engine Speed Increase on Upshifts—Check oil level and adjust throttle linkage. Inspect regulator valve and spring and check operation of valve in regulator body. Check valve body mating surface for parallelism. Inspect throttle valve, cam and spring Check operation of valve in valve body. Inspect kickdown piston components. Check mating surfaces of regulator valve body and transmission for parallelism. Inspect reaction shaft seal ring for deterioration. Inspect input shaft oil seal rings for wear or breakage and condition of reaction shaft bore Inspect clutch retainer bronze bushing If worn below bronze surface, replace retainer. Inspect condition of reaction shaft oil seal rings for wear or broken ends Inspect condition of clutch plate and condition of friction material on seal ring. Check clutch check valve ball.

Excessive Engine Speed Increase on Upshifts at Light Throttle—Check line pressure. Inspect front oil pump gears for wear and excessive clearance.

Harsh Upshift—Adjust throttle linkage Inspect regulator valve and spring Check for sticking shuttle valve. Check valve body mating surfaces for parallelism Inspect throttle valve, cam and spring. Inspect kickdown piston components. Check regulator valve body mating surfaces for parallelism. Inspect direct clutch spring, spring retainer, and snap ring.

Harsh Lift Foot Shift—Adjust throttle linkage. Check valve body mating surface Check operation of throttle valve Inspect valve, valve bore, cam and spring. Inspect servo pressure bleed valve for dirt Check operation of shuttle valve. Inspect shuttle valve, plug, inner and outer springs, and guide pin.

Excessive Engine Speed Increase on Downshift at Part Throttle—Check oil level and adjust throttle and gearshift linkage. Check valve body mating surface Check operation of manual valve and valve lever Inspect servo restrictor valve and operating plug Check plug for free operation. Check valve spring for distortion or looseness

Harsh Downshift—Adjust engine idle speed and throttle linkage Inspect valve body mating surface Inspect throttle valve, cam and spring for proper operation Inspect for dirt, burrs or wear, or breakage. Inspect servo restrictor valve for proper operation Inspect clutch plates and disc friction material Inspect the piston for wear or scoring Check seal for wear or deterioration which would result in leakage Inspect thrust washers for excessive wear

Excessive Increase in Engine Speed on Kickdown—Readjust kickdown band. Check regulator valve

CONTINUED ON NEXT PAGE

POWERFLITE (C nt.)

and spring for proper operation Inspect for dirt, wear, or breakage. Check valve body mating surface for nicks, burrs and trueness, which would cause leakage. Check operation of servo restrictor valve and shuttle valve Inspect valve and plug for dirt, burrs or wear Inspect all parts of kickdown piston assembly. Inspect piston rings for excessive wear or broken ends Check governor valve for wear, dirt, binding or sticking. Inspect rear pump gears for excessive wear or broken teeth Check pump clearance, drive pinion gear and pinion ball

Harsh Kickdown—Adjust kickdown band. Inspect regulator valve and spring. Inspect for dirt, burrs or breakage Inspect servo pressure bleed valve for dirt. Check operation of shuttle valve. Check valve and plug for burrs, dirt or excessive wear. Inspect all parts of kickdown piston assembly Inspect piston rings for scoring, wear or broken ends. Inspect regulator valve body mating surface for nicks, burrs and trueness which would cause leakage. Inspect reaction shaft neoprene seal for deterioration. Inspect governor valve for free operation. Check for dirt which would cause sticking. Inspect rear pump gears for excessive clearance, worn or chipped teeth Inspect drive pinion gear and drive pinion ball. Inspect the input shaft seal rings for excessive wear or broken ends, and reaction shaft bore for scoring. Inspect all parts of the direct clutch assembly.

OIL PRESSURE:

No Governor Pressure—Governor valve may be stuck in closed position due to dirt. To free valve, apply a short spurt of high air pressure (90 lbs.) to governor pressure take-off hole and at same time tap transmission extension housing with a rubber mallet. Before applying air pressure, cover filler tube with a cloth. In addition, drain two or three quarts of oil from transmission oil pan. After air is applied, reinstall governor pressure take-off plug and run transmission in Reverse a few seconds. Recheck governor pressure. This corrective procedure may not be permanent. If valve becomes stuck again, remove governor for servicing. If pressures do not correspond to those indicated in "Governor Pressure" table above, the governor may need service. However, before servicing governor, check the other points in the transmission that could cause low pressure as follows: Check the valve body mating surface for trueness, nicks or burrs. These could cause oil leakage. Check both output shaft support gaskets for evidence of internal leakage. Check operation of governor valve and inspect for foreign matter. Check the rear pump gears for broken teeth, wear, and excessive clearance. Check the mating surface of output shaft for trueness, burrs or nicks.

High Initial Governor Pressure—High governor pressure at low engine speeds is due to the governor valve being stuck in the open position, usually caused by dirt *(see "No Governor Pressure" above)*, for clearing with air pressure.

Line Pressure—If line pressure does not correspond to pressures indicated in "Line Pressure" table above, it will be necessary to investigate and make the following adjustments or corrections: Check transmission oil level. Inspect regulator valve for free operation, dirt or burrs, and condition of valve spring. Check valve body mating surface for trueness, nicks or burrs. Check operation of manual valve and lever. Inspect front pump gears for worn or chipped gears. Check clearance between gears and face of housing.

Throttle Pressure—If throttle pressures do not correspond to pressures indicated in "Throttle Pressure" table above, check line pressure and make the following adjustments and corrections: Adjust throttle linkage. Inspect operation and condition of regulator valve and spring. Check valve body mating surfaces for nicks, burrs and trueness. Check operation and condition of throttle valve, cam and spring. Check throttle pressure check valve ball for nicks and dirt. Inspect condition of kickdown rod and ball.

Direct Clutch Pressure—Direct clutch pressure should be approximately 10 lbs. lower than line pressure with transmission upshifted and engine speed not lower than 650 RPM. If not, refer to "Excessive Engine Speed on Upshifts" above A pressure drop between line pressure and direct clutch pressure as high as 25 lbs. may be due to broken or damaged seal rings in the direct clutch circuit These are: three interlocking type input shaft seal rings; the direct clutch piston retainer seal ring, direct clutch piston neoprene seal ring, the neoprene reaction shaft seal ring, and the two interlocking type reaction shaft seal rings.

Lubrication Pressure—Lubrication pressure is checked at the upper left side of the output shaft support, Remove the ⅛" pipe plug and use 100 lbs., pressure gauge C-3292 to check pressure. Lubrication pressure should be 35 to 50 lbs. pressure with transmission in neutral and engine speed at fast idle. If pressure readings are incorrect, check line pressure and inspect torque converter control valve. Low pressures may be due to internal oil leakage at the following points: drive sleeve seal ring, regulator valve body mating surface, reaction shaft seal ring, output shaft support gaskets, input shaft seal rings, and reaction shaft bore. Low oil pressure may also be caused by plugged lubrication lines.

IMPROPER RESPONSE TO GEARSHIFT SELECTOR LEVER POSITIONS:

Moves Forward in "N" (Neutral)—Adjust gearshift linkage. Adjust kickdown band. Inspect manual valve lever assembly. Check valve body mating surface for nicks, burrs and trueness which would cause leakage Check operation of manual valve. Inspect all parts of kickdown piston. Check regulator body mating surface for nicks, burrs and trueness. Check clutch discs and plates for warpage which would cause dragging. Inspect clutch ball check.

Car Moves Forward in "N" (Neutral) at High Engine Speed—Clutch check valve ball bleed hole may be plugged causing centrifugal oil pressure to partially engage the direct clutch. A slight surge which is not continuous is normal.

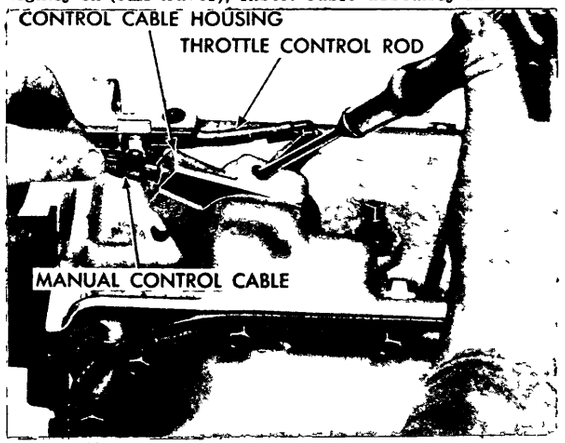
Car Moves Backward in "N" (Neutral)—Readjust gearshift linkage and inspect manual valve and valve lever for proper engagement. Adjust reverse band, levers, strut, and shaft. Check for binding, dirt, excessive wear.

GEARSHIFT CONTROL UNIT REMOVAL & INSTALLATION

MANUAL CABLE ADJUSTMENT: *See "Manual Cable Adjustment" above.*

CABLE ASSEMBLY: Removal (Transmission End) - Push in "R" (Reverse) button, then remove neutral safety starter switch from transmission case. *NOTE - Approximately one quart of oil will drain out* Loosen cable-to-transmission adjustable mounting bracket screw, then place a screwdriver through neutral starting switch hole and push against cable lock spring. Withdraw cable assembly from case. Check cable ferrule "O" ring for roughness, shredding or deterioration and replace if necessary Make sure slot in bracket fits just freely into ferrule groove to full depth of slot.

Installation: Push in "L" (Low) pushbutton and then place transmission manual valve lever in reverse detent by moving neutral switch contact part of lever full travel toward rear using a screwdriver inserted in neutral starting switch hole. With "L" (Low) button held tightly in (full travel), insert cable assembly into case



TRANSMISSION GEARSHIFT CONTROL (CABLE RELEASING PROCEDURE)

engaging cable ferrule groove with lock spring in cable adapter. Make sure groove in cable properly engages lock spring. Replace adjustable mounting bracket and tighten capscrew finger tight. Refill transmission and adjust manual cable (see above).

PUSHBUTTON CONTROL UNIT: Removal (All Models) - Disconnect battery cable, then disconnect back-up light switch wire at pushbutton control and illuminating lamp leads at rear of instrument panel. Remove screws of pushbutton face plate and remove pushbuttons by pulling them off button slides. Remove lamp bulb. Remove control housing stud nuts and remove control and cable from rear of instrument panel Remove clip attaching control cable to actuator and the screw holding cable bracket to control housing.

Installation: Insert end of cable on actuator and install clip, then place cable bracket on control unit and install screws securely. Carefully guide unit from rear of instrument panel and install nuts. Install lamp bulb and pushbuttons. Replace front plate, then connect back-up switch wires and illuminating lamp wires. Connect battery cable.

OVERHAUL

OVERHAUL: Service procedures are the same as for previous models. *See "Powerflit Transmission" in 1956 Annual Data or later Manual editions.*

FORD MOTOR 2-SPEED AUTOMATIC TRANSMISSION

COMET DRIVE
Comet, All Models (1961)
FORDOMATIC
Falcon, All Models (1961)
Ford Pass. Cars, Exc. 390" Eng. (1961)
MERC-O-MATIC
All Models, Exc. 390" Eng. (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE:* A number of different transmissions are used on the various models as indicated in following table. For identification, refer to service identification tag attached to oil pan flange or to rear servo cover lower rear mounting bolt. This tag will be stamped with transmission serial number prefix and suffix and will include a figure indicating service identification code number. *NOTE - On later transmissions the service identification tag includes transmission serial number and engine displacement.*

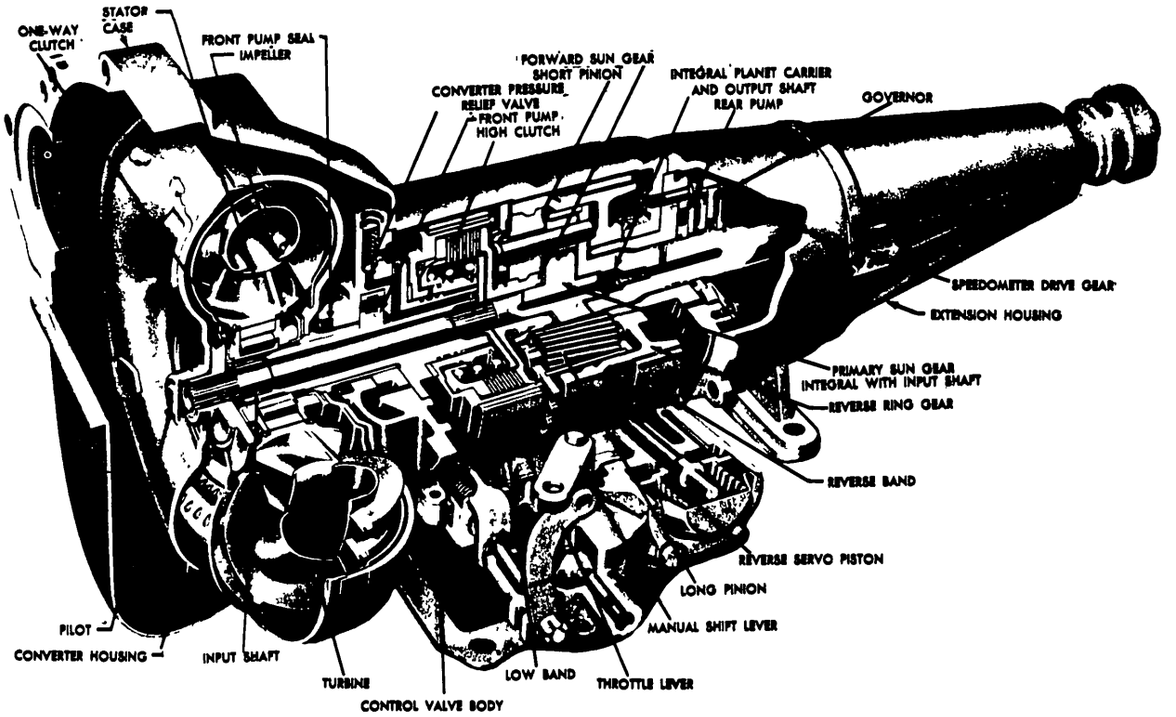
Transmission Identification

Car Model	Engine	Serial Prefix
Comet (Exc. Sta. Wgn.)③	144"	①PBZ-K
Comet (Exc. Sta. Wgn.)③	170"	①PCF-C
Comet (Exc. Sta. Wgn.)④	144"	②PCL-C
Comet (Exc. Sta. Wgn.)④	170"	②PCM-C
Comet (Sta. Wgn.)③	144"	①PBZ-H
Comet (Sta. Wgn.)③	170"	①PCF-A
Comet (Sta. Wgn.)④	144"	②PCL-A
Comet (Sta. Wgn.)④	170"	②PCM-A
Falcon (Exc. Ranchero & Sta. Wgn.)③	144"	①PBZ-H
Falcon (Exc. Ranchero & Sta. Wgn.)③	170"	①PCF-A
Falcon (Ranchero & Sta. Wgn.)③	144"	①PBZ-J
Falcon (Ranchero & Sta. Wgn.)③	170"	①PCF-B
Falcon (All Models)④	144"	②PCL-A
Falcon (All Models)④	170"	②PCM-A
Ford & Mercury (All Models)③	223"	①PBP-C
Ford & Mercury (All Models)③	292"	①PBR-C
Ford & Mercury (All Models)③	352"	①PBS-E
Ford & Mercury (All Models)④	223"	②PCH-A
Ford & Mercury (All Models)④	292"	②PCJ-A
Ford & Mercury (All Models)④	352"	②PCK-A

① - Manual throttle control.
② - Vacuum throttle control.
③ - Early cars.
④ - Later cars.

►*1961 2-SPD. AUTO. TRANS. PRODUCTION CHANGE:* Later transmissions have been changed to provide automatic control of transmission throttle valve, eliminating the necessity of external linkage for throttle valve control. Engine vacuum, operating a diaphragm assembly located at rear of transmission case, controls transmission throttle valve movement. A separate downshift rod, connected to accelerator pedal linkage allows transmission to be shifted into "kickdown" by depressing accelerator pedal fully. *See "Description" below for detail changes in later transmission.*

►*1961 TRANSMISSION NOT DRIVING IN "DR" RANGE CORRECTION:* If this condition exists in "Dr" range but car will drive in manual "L" or "R" ranges, it may be due to ball check valve in low servo piston not seating properly. If pressure and stall tests along with linkage adjustment check do not indicate any change from specifications, the low servo piston should be removed and, if ball check valve is not operating properly, replace low servo piston.



2-SPEED TRANSMISSION SECTIONAL VIEW
(MANUAL THROTTLE CONTROL TRANSMISSION)

►*TOWING CAR CAUTIONS: If transmission in working condition, car may be towed for a distance not to exceed 15 miles and at a speed not greater than 30 MPH with transmission selector lever in "N" (Neutral). If transmission inoperative, disconnect and remove propeller shaft or tow with rear wheels off ground.*

DESCRIPTION

DESCRIPTION: Two-speed hydraulically controlled planetary transmission and torque converter similar to design used on previous models. Transmission fluid in all transmissions except those used with 144" (Comet & Falcon) engines is circulated through a cooler in car radiator lower tank. *NOTE - On 144" engines, the transmission has an external bypass for recirculation of transmission fluid.* The torque converter assembly on 144" and 170" engines is air cooled. Transmission throttle and control pressures are controlled manually by linkage on early models and by engine vacuum on later models. *See "1961 Transmission Production Changes" for differences between early and later transmissions.*

►*1961 TRANSMISSION PRODUCTION CHANGES:* Beginning approximately March 20, 1961, transmission employing engine manifold vacuum instead of mechanical linkage to control transmission throttle and operating pressures entered production. Differences between early and later transmissions are as follows:

Transmission Case - On later type case, low servo apply orifice is incorporated into main control assembly (located in transmission case on early transmissions). Addition of diaphragm assembly threaded into left rear of case. Filler tube threaded directly into transmission case without use of a separate adaptor. Early and later cases are not interchangeable.

External Kickdown Lever - Replaces throttle control lever used on early transmissions. This lever is not interchangeable with previous throttle control lever.

Throttle Control Valve Rod - Incorporated between vacuum diaphragm and throttle control valve.

Main Control Valve Assembly - In later type control valves, a compensator valve spacer replaces former compensator throttle actuated valve sleeve. Compensator valve bore is also changed. A throttle boost valve has been added and the vacuum throttle valve is revised dimensionally and is relocated in valve body. An "L" shaped retainer for throttle pressure boost valve plug is bolted to lower valve body (holds boost valve plug, valve and spring in bore). *NOTE -- This retainer cannot be used on early transmissions.* An upper valve body reinforcement (left rear) is used to minimize leakage and to retain throttle valve within its bore.

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2-SPEED AUTOMATIC TRANSMISSION (Continued)

Front Servo Release Spring - Later type front servo piston return springs are different than springs used on early units.

Governor Assembly - A new shorter governor valve (1" long) is used on later transmissions and is not interchangeable with early transmission governor valve.

LUBRICATION

Check fluid lever every 1000 miles (Comet), every 4000 miles (Falcon, Ford, Mercury). *CAUTION - Make sure dipstick is locked in position.*

Recommended Fluid - Ford & Mercury Part No. C1AZ-19582 or Automatic Transmission Fluid Type "A" (Suffix "A").

Checking Fluid Level: With parking brake applied, engine at normal operating temperature, and car standing on a level floor, shift selector lever through all positions, then place selector lever in "P" (Park) position. Check fluid level on dipstick. Add sufficient fluid through filler tube to bring level to "F" (Full) mark on dipstick. *CAUTION - Do not overfill transmission.*

Capacity - 6¼ qts. (Comet & Falcon), 9 qts. (Ford & Mercury 223" & 292" Engs.), 10 qts. (Ford & Mercury 352" Eng.).

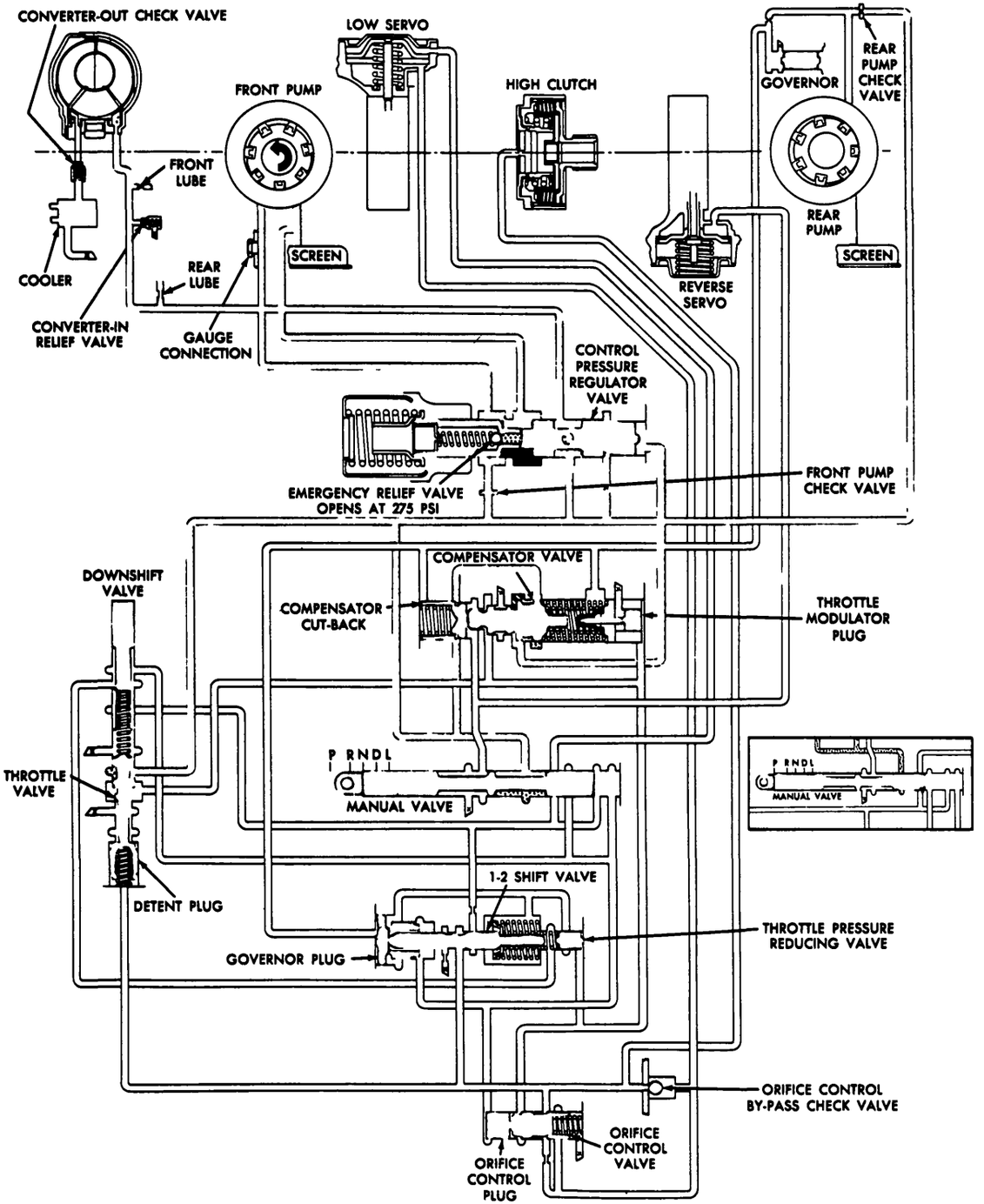
Draining & Refilling: *NOTE - Periodic draining and refilling not required.* To drain and refill for service operations, proceed as follows: Remove cover from lower front side of converter housing and remove one converter drain plug. Rotate converter 180° and remove other plug, then remove drain plug from oil pan. *NOTE - If oil pan not equipped with oil plug, start at either corner of oil pan and alternately remove bolts so oil pan can tilt down at one corner.* After draining is completed, remove and clean oil pan and screen. Reinstall oil pan and screen using a new gasket and tighten oil pan bolts to 10-13 ft. lbs. Tighten oil drain plug to 10-15 ft. lbs. Install drain plugs in converter and tighten to 15-28 ft. lbs., then install converter cover. Add 4 qts. of recommended fluid (see above) and run engine at idle speed for about 2 minutes, then add 2 qts. (Comet & Falcon); 3 qts. (Ford & Mercury 223" & 292" Engs.) 4 qts. (Ford & Mercury 352" Eng.) more fluid. Run engine at fast idle until normal operating temperature is obtained. Shift selector lever through all positions, then place in "P" (Park) position and check fluid level on dipstick. Add sufficient fluid to bring fluid level to "F" (Full) mark on dipstick. *CAUTION - Do not overfill transmission.*

ADJUSTMENT

LINKAGE ADJUSTMENT: Throttle Linkage Adjustment - *See CARBURETOR on car model pages.*

Manual Linkage: With engine stopped, loosen shift lever clamp at lower end of steering column so that shift rod is free to slide in clamp. Position selector lever so pointer lines up over "D" (Drive). *NOTE - Lever must be held against quadrant stop (between "D" & "L") during linkage adjustment.* Position transmission detent lever on transmission into "D" (Drive) detent position (second from rear), then tighten clamp on shift rod.

CONTINUED ON NEXT PAGE



2-SPEED AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS (MANUAL THROTTLE CONTROL TRANSMISSION)

2-SPEED AUTOMATIC TRANSMISSION (Continued)

Check pointer alignment for all selector lever detent positions.

FORD PASS. CARS

NEUTRAL SAFETY SWITCH ADJUSTMENT: Check starter circuit in all selector lever positions. The circuit must be open in all positions except "N" (Neutral) & "P" (Park). To adjust, loosen switch-to-steering column attaching screws, then shift selector lever to "N". Rotate switch as far as it will go in either direction, then insert a .060" pin through switch housing at gauge pin hole. *NOTE - This hole will be located at nd of switch housing or on the upper side of housing d pending upon typ of switch used.* Hold pressure against gauge pin and rotate switch in the free rotation direction until pin engages hole in plate. With gauge pin through housing and into plate, tighten attaching screws and remove gauge pin. Check starter circuit in all selector lever positions. Starter must operate with selector lever in "N" (Neutral) or "P" (Park).

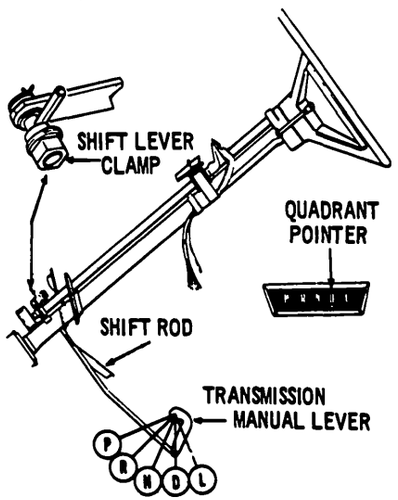
COMET, FALCON & MERCURY

NEUTRAL SAFETY SWITCH ADJUSTMENT: Check starter circuit in all selector lever positions. The circuit must be open in all positions except "N" (Neutral) and "P" (Park). To adjust, loosen screws securing switch to mounting bracket on lower end of steering column and rotate switch as required to obtain starter operation in "N" or "P" positions. Tighten screws.

ALL CARS

BAND ADJUSTMENT: Periodic band adjustment not required. Check band adjustment each time oil pan is removed and adjust as necessary.

Front Band (L w Rang): Loosen locknut on adjusting screw on left front side of transmission case, then tighten adjusting screw with Tool T59P-77370-A (Falcon & Ford) or Tool 7345 (Comet & Mercury) until tool handle snaps (breaks) over center. *NOTE - Th s tools ar pre-set torque wrench s which ov rrun wh n torqu on scr w r ach s 10 ft. lbs.* Back off adjusting screw **exactly two turns**. Hold adjusting screw at this point and tighten locknut to 35-40 ft. lbs.



MANUAL LINKAGE ADJUSTMENT (TYPICAL)

Rear Band (Reverse Range): Drain transmission and remove oil pan and screen. Loosen rear servo piston rod locknut and adjusting nut, then install tool as follows: If Falcon and Ford Tool T59P-77409-A is used, place tool on rear servo rod so two forks straddle band apply lever. *NOTE - Inner fork must engage flat on servo piston rod. The outer fork is a ¼" spacer and must be inserted between piston rod seat and adjusting nut.* If Comet & Mercury Tool 7355-A is used, insert tool between adjusting nut and piston rod-to-actuating lever seat, with opposite end of tool resting on raised boss on control valve assembly. With wrench T59P-77423-A (Falcon & Ford), or No. 7355-B (Comet & Mercury), tighten nut until wrench handle snaps (breaks) over center. *NOTE - These tools are pre-set torque wrenches which overrun when torque on screw reaches 45-50 in. lbs.* Back off adjusting screw **exactly two turns**. Hold adjusting screw at this point and tighten locknut to 15-18 ft. lbs. Remove tools from servo piston rod. Install oil pan and screen using a new gasket. Refill transmission with recommended fluid *see "Draining & Refilling" above.*

TESTING

►*TRANSMISSION TESTING NOTE: Testing procedures for early transmissions (manual throttle control) are different than procedures for late transmissions (vacuum throttle control) as indicated below. Before proceeding with tests, check fluid level and bring transmission to normal operating temperature, then connect a suitable pressure gauge to pressure take-off hole on left side of transmission case (Falcon & Ford), to pressure checking tube at rear of engine on firewall (Comet & Mercury). Install a tachometer on engine, and on models with vacuum throttle control, install a manifold vacuum gauge. Adjust engine to correct idle speed.*

LINE PRESSURE: Manual Throttle Control Transmissions - With engine at correct idle speed, move selector lever through all detents and check pressure which should be 40-48 lbs. (144" Eng.); 46-56 lbs. (all others). *NOTE - As selector lever is moved to each detent position, check alignment of pointer in relation to quadrant and transmission detent positions. If manual linkage not properly set, see "Manual Linkage Adjustment" above.* With parking brake and foot brake set firmly, place selector lever in "D" (Drive) position and increase engine speed to 1000 RPM (Ford & Mercury); 1200 RPM (Comet & Falcon). Line pressure should be 53-57 lbs. (144" Eng.); 78-82 lbs. (170" Eng.); 77-84 lbs. (223", 292" & 352" Engs.). If line pressure not within specifications, adjust throttle valve rod (see "Throttle Valve Adjustment" on car model pages), to correct line pressure readings.

Vacuum Throttle Control Transmissions: With engine at normal idle speed (engine vacuum 15" Hg. or higher), move transmission selector lever through all detents. Reading on pressure gauge should be 40-48 lbs. (144" & 170" Engs.); 46-60 lbs. (223", 292" & 352" Engs.). Position selector lever in "D" (Drive), then open throttle gradually and watch pressure gauge. Operating pressure should remain within limits indicated for idle speed (above) until vacuum drops between 15" and 12.5"Hg., then it should start to rise. *NOTE - With selector lever in "L" (Lo) or "R" (Reverse), pressure should start to rise at same point as with selector lever in "D" (Drive).*

STALL TEST: Manual Throttle Control Transmissions - *NOTE - Make separate stall test in "D" (Drive), "L" (Lo), and in "R" (Reverse).* With parking and service brakes applied and selector lever in "D", "L", or "R", open throttle through detent and note engine speed and line pressure. Engine speed should be as indicated in table below, and line pressure should be 135-155 lbs. (144" Eng.); 170-192 lbs. (170", 223", 292" & 352" Engs.). *CAUTION - Do not stall test for more than 5 seconds. Between tests, run engine for at least 2 minutes at 1200 RPM with selector lever in "N" (Neutral) to prevent transmission overheating.* If engine runs away on a stall test in "D" or "L", but is held within limits in "R", the low band is slipping. If engine runs away in "R" during a stall test, but is held within limits in "D" or "L", the reverse band is slipping. *NOTE* - Transmission "high" clutch cannot be stall tested since the clutch applies only at road speeds above 15 MPH.

Vacuum Throttle Control Transmissions: *NOTE - Mak separate stall test in "D" (Drive), "L" (Lo), and in "R" (Reverse).* With parking and service brakes applied and selector lever in "D", "L", or "R", open throttle through detent and note pressure and vacuum gauge readings and engine RPM. Vacuum should drop below 1.5" Hg. and the pressure should reach maximum limits of 145-170 lbs. (144" & 170" Engs.); 175-200 lbs. (223" & 292" Engs.); 200-215 lbs. (352" Eng.). Engine speed at stall should be as indicated in table below. *CAUTION - Do not stall test for more than 5 seconds. Between tests, run engine for at least 2 minutes at 1000 RPM with selector lever in "N" (Neutral) to prevent transmission overheating.* If engine runs away on a stall test in "D" or "L", but is held within limits in "R", the low band is slipping. If engine runs away in "R" during a stall test, but is held within limits in "D" or "L", the reverse band is slipping. *NOTE* - Transmission "high" clutch cannot be stall tested since the clutch applies only at road speeds above 15 MPH.

ENGINE STALL SPEEDS

Engine	Low Limit - RPM	High Limit
144" (Manual Throttle)	1645	1845
144" (Vacuum Throttle)	1600	1800
170" (Manual Throttle)	1840	2040
170" (Vacuum Throttle)	1750	1950
223" (All Models)	1300	1500
292" & 352" (All Models)	1550	1750

AIR PRESSURE TESTS (With Transmission in Car): Raise car on hoist, then remove transmission oil pan and control valve assembly. Proceed as follows:

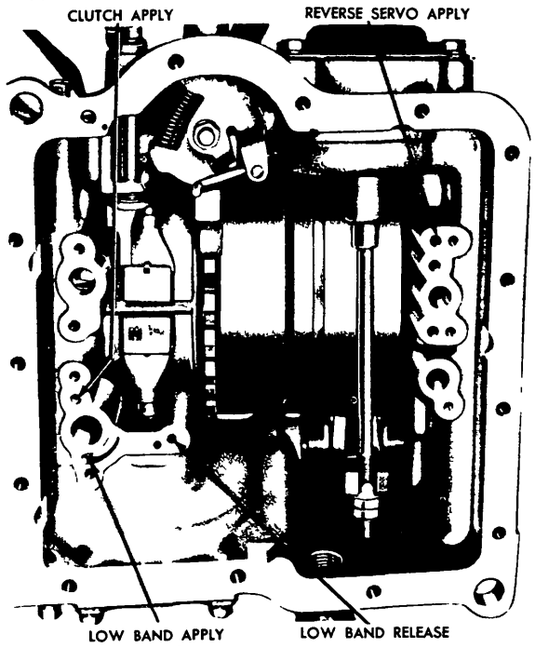
Clutch Apply: Apply pressure to front clutch passage (see illustration). A dull thud indicates that clutch is operating. Retain air pressure in passage for several seconds to check for leakage.

CONTINUED ON NEXT PAGE

2-SPEED AUTOMATIC TRANSMISSION (C ntinu d)

Low & Reverse Servos: Apply pressure to "Low Band Apply" and "Reverse Band Apply" holes in case (see illustration). Band operation can be observed.

SHIFT TEST: Shift points and low gear operation should be as indicated in table below. *NOTE - These speeds are approximate.*



AIR PRESSURE TEST POINTS

CONTROL PRESSURE RISE TEST: Manual Control Throttle Valve Transmissions - *NOTE - If control pressure rises with transmission selector lever in "D", "L", r "R" as determined in "Line Pressure (Manual Control Throttle Transmissions)" above, is normal in any one position, throttle linkage, throttle and compensator pressures, and pump capacity are probably normal. The probable cause of no pressure rise in the other selector lever positions is leakage in hydraulic system upstream from manual valve.* To check operation of throttle linkage, disconnect transmission throttle rod from accelerator shaft and lever, then place selector lever in "P" (Park) position. Adjust engine speed to 1000 RPM (Ford & Mercury), 1200 RPM (Comet & Falcon), then push downward (Ford & Mercury), pull upward (Comet & Falcon) on throttle control rod and check pressure gauge. Control pressure should rise to 170-192 lbs. (170", 223", 292" & 352" Engs.); 135-155 lbs. (144" Eng.). If pressure rises to this range, pump capacity, main system leakage, throttle and compensator pressures are normal. Trouble is probably due to leakage in low servo apply line.

GOVERNOR PRESSURE TEST: ttach Pressure Gauge T57L-77820-A at connection on left side of transmission case, then place gauge so it can be read inside the car. Check gauge reading at stall (see table for pressure limits). Check control pressure on the road at speeds indicated in table, **at full throttle.** *NOTE - Hold car to the exact speed indicated by applying service brakes.* Allow sufficient time between tests for transmission, engine, and brakes to cool. If gauge readings do not drop with road speed, the governor or compensator valve may not be operating properly. *NOTE - If readings were normal (car standing) at idle and stall, the compensator valve is operating properly and the trouble is indicated to be lack of governor pressure at compensator valve.*

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Same for "Manual Throttle Control Transmission" and for "Vacuum Throttle Control Transmission" except where noted.*

HARD SHIFTING (VACUUM THROTTLE CONTROL TRANSMISSIONS): Vacuum supply tube disconnected. Throttle valve sticking. Vacuum diaphragm not operating properly. Vacuum diaphragm loose in transmission case. Engine idle speed too high. Engine operation faulty, resulting in loss of vacuum.

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GOVERNOR PRESSURE SPECIFICATIONS

CAR & ENGINE	AXLE RATIO	Govern r (Control) Pressure (At Wide Op n Throttl) 10 MPH	20 MPH ℂ	30 MPH
Comet & Falcon 144"	All	110 lbs.	80 lbs.	75 lbs.
Comet & Falcon 170"	All	150 lbs.	120 lbs.	75 lbs.
Ford & Mercury 223"	All	157 lbs.	97 lbs.	67 lbs.
Ford & Mercury 292"	All	163 lbs.	117 lbs.	67 lbs.
Ford & Mercury 352"	All	165 lbs.	124 lbs.	72 lbs.

℃ - At 15 MPH on Comet & Falcon.

SHIFT SPEED SPECIFICATIONS

SHIFT THROTTLE	AXLE RATIO	SHIFT SPEED (MPH) 1-2 Minimum	1-2 Thru Detent	2-1 Minimum	2-1 Thru Detent
Comet 144" & 170" Engs. ℃	All	10-15	40-50	40-50	5-15
Falcon 144" Eng. ②	3.10-1	12-18	48-55	46-54	8-14
144" Eng. ②	3.50-1	11-16	43-49	41-48	7-12
144" Eng. ②	3.89-1	10-14	40-44	38-43	7-11
144" Eng. ③	3.50-1	13-15	44-50	42-48	6-13
144" Eng. ③	4.00-1	12-14	40-44	38-42	5-12
170" Eng. ②	3.10-1	13-18	47-55	46-54	6-15
170" Eng. ②	3.50-1	12-16	42-49	41-47	6-13
170" Eng. ②	3.89-1	11-15	38-44	37-43	5-12
170" Eng. ③	3.50-1	13-15	45-49	43-47	6-12
Ford 223" Eng. ②	3.56-1	13-16	48-52	42-47	5-11
292" Eng. ②	3.56-1	13-16	48-52	42-47	5-11
292" Eng. ②	3.10-1	15-18	55-60	48-54	6-13
352" Eng. ②	2.91-1	16-18	53-58	51-57	6-14
352" Eng. ②	3.10-1	15-17	50-55	46-53	6-13
223" Eng. ③	3.56-1	14-17	43-53	41-51	6-14
292" Eng. ③	3.00-1	16-21	55-64	53-62	8-16
352" Eng. ③	3.00-1	16-19	51-60	49-59	8-16
Mercury 223" Eng. ④	3.56-1	13-16	48-52	42-47	5-11
292" Eng. ④	3.56-1	13-16	48-52	42-47	5-11
292" Eng. ④	3.10-1	15-18	55-60	48-54	6-13
352" Eng. ④	2.91-1	16-18	53-58	51-57	6-14
352" Eng. ④	3.10-1	15-17	50-55	48-53	6-13

℃ - Approximate car speeds. ② - Manual throttle control transmissions.

③ - Vacuum throttle control transmissions. ④ - All transmissions.

Form 15-A

2-SPEED AUTOMATIC TRANSMISSION (C ntinued)

ENGINE OVERSPEEDS DURING 1-2 UPSHIFT (VACUUM THROTTLE CONTROL TRANSMISSIONS): Vacuum diaphragm throttle valve rod bent or missing. Throttle valve sticking. Vacuum diaphragm connected to constant vacuum source (power brake or windshield wiper lines).

HARSH INITIAL ENGAGEMENT IN "D", "L", OR "R": Check engine idle and fluid level.

SLIPS OR CHATTERS IN "D" OR "L": Check fluid level, throttle linkage, control pressure, low band adjustment. Make an air pressure check. Inspect for loose or worn engine or transmission mounts. Check operation of low servo and band. Check for leakage in low servo apply circuit.

SLIPS OR CHATTERS IN "R": Check fluid level, throttle linkage, control pressure, reverse band adjustment. Make an air pressure check. Inspect for worn or loose engine mounts. Check operation of reverse servo. Check for leakage in reverse servo apply circuit.

CREEPS EXCESSIVELY IN "D": Engine idle speed too fast.

ENGINE OVERSPEEDS DURING 1-2 SHIFT: Check fluid level. Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment, control pressure, low band adjustment. Make an air pressure check. Check control valve body for malfunction. Check for leakage in clutch apply or low servo release circuit. Check planetary gears.

MOMENTARY LOCKUP DURING 1-2 SHIFT: Check fluid level, throttle linkage, control pressure and low band adjustment. Low servo and band not operating properly. Check high clutch for malfunction. Check for possible broken low servo return spring.

SEVERE 2-1 SHIFT DURING COAST-DOWN: Check engine idle speed and throttle linkage. Check control valve body for malfunction. Make a control pressure check.

NO 1-2 SHIFT IN "D": Check fluid level. Check fluid odor for possibly burned clutch plates. Check manual linkage adjustment. Check for improperly operating governor. Check for leakage in control pressure main circuit. Check high clutch and low servo and band for improper operation.

DELAYED 1-2 UPSHIFT: Check throttle linkage. Check for improperly operating governor. Check for leakage in control pressure main circuit.

SLIPS CONTINUOUSLY AFTER 1-2 SHIFT: Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment and fluid level. Make a control pressure check and an air pressure check. Check high clutch for improper operation and for leakage in clutch apply or low servo release circuit.

NO 2-1 FORCED DOWNSHIFT (KICKDOWN): Check throttle linkage adjustment. Check control valve body for malfunction. Check for leakage in control pressure main circuit.

NO 2-1 SHIFT DURING COAST-DOWN: Check for malfunction in control valve body or governor.

FLUID FORCED OUT FILLER TUBE OR VENT: Check fluid for contamination by engine coolant. Transmission external vent plugged. Check fluid for aeration.

TRANSMISSION OVERHEATS: Check control pressure. Check oil cooler flow.

ACCELERATION NORMAL (MAXIMUM SPEED APPROXIMATELY 45 MPH): Converter one-way clutch not operating properly.

ACCELERATION VERY POOR (OPERATION ABOVE 30 MPH AT STEADY THROTTLE IS NORMAL): Converter one-way clutch not operating properly.

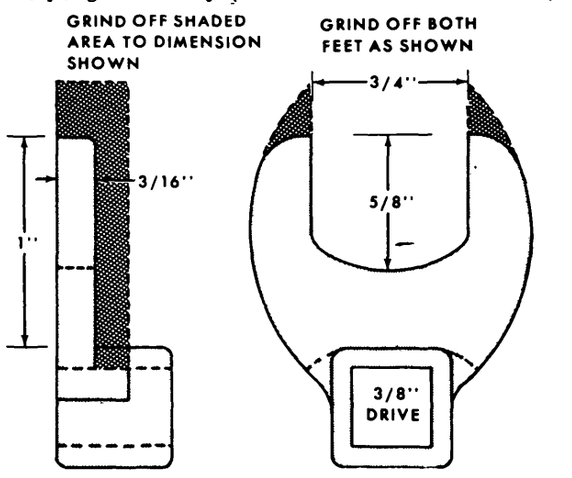
ENGINE DOES NOT START BY PUSHING CAR: Check fluid level and manual linkage adjustment. Check for malfunction in control valve body. Rear pump not operating properly. Check for leakage in control pressure main circuit.

PARKING LOCK DOES NOT HOLD OR BINDS: Check manual linkage adjustment. Check parking linkage.

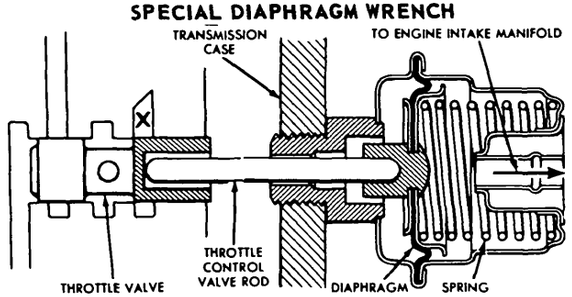
MINOR REPAIRS (TRANSMISSION IN CAR)

Vacuum Diaphragm: Removal - To remove diaphragm assembly without removing oil pan and throttle valve body, modify a ¾" "Crow-foot" wrench as illustrated below and use it on "hex" portion of diaphragm to turn diaphragm assembly out of transmission case. The diaphragm assembly can also be removed by removing oil pan, throttle valve assembly, and throttle control valve rod, then insert a 3/16" Allen wrench into end of diaphragm assembly (from inside transmission case) and turn diaphragm assembly out of case. *CAUTION - Do not apply any pressur to diaphragm housing.*

Installati n - Reverse removal procedure and tighten diaphragm assembly to 15-18 ft. lbs.



SPECIAL DIAPHRAGM WRENCH



THROTTLE CONTROL VACUUM DIAPHRAGM

Control Valve Body: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove six bolts attaching control valve body to transmission case, then lower control valve body and work the manual shift valve link out of manual valve.

Installation - Position control valve assembly in transmission case, then connect manual valve shift link to manual valve, and position the throttle valve lever between downshift valve and the stop plate on upper valve body. Install control valve attaching screws and tighten to 8-10 ft. lbs. Install fluid screen and oil pan, using a new gasket. Tighten attaching bolts to 10-13 ft. lbs. Install drain plug and tighten to 10-13 ft. lbs. Refill transmission with recommended fluid and adjust throttle linkage and manual linkage.

Front Servo Piston Assembly: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove main control valve assembly (see above), and disconnect fluid filler tube from transmission case. Remove two opposing bolts from front servo cover, then install two longer bolts (5/16" - 18 x 2") and nuts to hold cover in position against servo spring tension while removing remaining servo cover bolts. Remove servo cover by slowly unscrewing nuts on long bolts until all servo spring tension is released from cover. Remove the long bolts, nuts and servo cover. *NOTE - Before removing servo cover, note position of front band actuation struts. This will aid in reassembly in case struts are dislodged.* Remove servo piston assembly and servo spring from transmission case and remove servo piston seal ring from piston.

Installation - Inspect front servo piston for nicks, burrs and a warped or bent condition. Inspect servo piston bore for burrs, wear, and scoring. Install new seal ring on servo piston and install servo piston spring and piston assembly in servo bore with air bleed hole toward top of case. Clean servo cover and mounting face and position new "O" ring seal on cover, then place servo cover on servo piston. Retain servo cover in place with the two long bolts used at disassembly (5/16" - 18 x 2"), and nuts. Pull servo cover partially into position by turn the nuts on long bolts to compress servo spring. Install regular cover attaching bolts in the open threaded holes. Remove both long bolts and nuts and install remaining two cover attaching bolts. *NOTE - Check position of front band actuating strut while tightening servo cover bolts to assure that servo piston rod enters actuating strut properly. If struts have been dislodged, loosen front servo band adjusting screw and position them correctly.* Tighten servo cover attaching bolts evenly to avoid distorting cover, then when cover is firmly seated, tighten bolts to 12-15 ft. lbs. *CAUTION - Use care when positioning "O" ring seal and servo cover to prevent futur leakage.* Install main control valve assembly, then connect manual shift valve link to manual valve and position throttle lever

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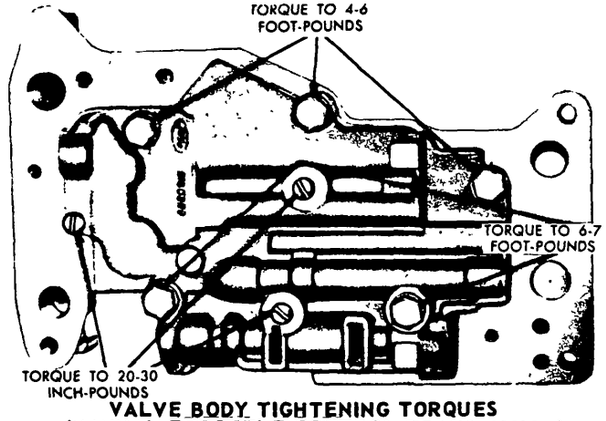
2-SPEED AUTOMATIC TRANSMISSION (Continued)

between downshift valve and stop plate on upper valve body. Tighten control valve attaching bolts to 8-10 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install fluid screen and transmission oil pan and refill transmission. Adjust Linkage.

►*FRONT SERVO COVER GASKET REPLACEMENT:* Remove low band adjusting screw locknut and tighten adjusting screw with wrench, Tool T59P-77370-A (Ford), Tool 7345 (Edsel) until wrench overruns. Loosen cover capscrews approximately two turns each, then tighten band adjusting screw until wrench overruns. Repeat this procedure until servo cap is removed (low band strut will be seated against bottom of servo casting and will be held in place). To install cover, use two 5/16" - 18 x 1¼" hex head bolts in place of the regular bolts, then place servo cover over piston and start the two bolts. Tighten bolts snugly to bring cover into contact with piston and to position piston stem in band strut (piston stem will be back in position in cup face of band strut). Loosen band adjusting screw two turns, then tighten servo cover capscrews approximately two turns or until they are snug (band will again be tight against drum). Repeat this procedure until cover is drawn close enough so that regular cover capscrews can be installed in rest of cover holes, then remove the two temporary bolts and replace them with regular bolts. Continue to repeat the above procedure until cover is fully installed. Install low band adjusting screw locknut and adjust the band.

Rear Servo Piston Assembly: Removal - Disconnect accelerator pedal connecting rod, then raise car and remove transmission oil pan, fluid screen and main control valve. Remove four bolts and remove rear servo cover, "O" ring seal, and servo piston spring. *CAUTION - Servo cover is spring loaded.* Remove locknut, adjusting nut, and half-ball rod seal from rear servo piston rod. Remove rear engine mount from under transmission housing, then lower extension onto frame crossmember. Remove piston rod from transmission case. Remove servo piston and seal ring from piston bore. *NOTE - Push outward on piston stem from inside transmission case or apply air pressure to reverse servo apply passage in transmission case to remove piston.* Remove seal ring from piston.

Installation - Inspect piston, stem and rod for nicks or burrs. Check rod for wear or for a bent or warped condition. Inspect piston bore, for burrs, wear and scoring. Install new seal on piston, then install piston assembly into bore in case. Push piston to bottom of bore. Install piston rod through piston, then position band operating lever and install the half-ball rod seal, adjusting nut, and locknut loosely. Raise transmission from frame crossmember and install rear engine mount. Install new "O" ring seal on servo cover, then install servo cover, maintaining pressure against cover while tightening the attaching bolts. Tighten bolts slowly and evenly until cover is firmly seated, then tighten bolts to 12-15 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install main control valve assembly, fluid screen, transmission oil pan, and drain plug. Refill transmission (see "Draining & Refilling" above). Connect accelerator rod and adjust pedal to 3½" above floor. Adjust throttle and manual linkage.



VALVE BODY TIGHTENING TORQUES (MANUAL THROTTLE CONTROL TRANSMISSION)

EXTENSION HOUSING & GOVERNOR: Removal - Raise car and drain fluid from transmission, then disconnect driveshaft at rear universal and remove driveshaft. Remove bolts attaching rear engine support to transmission, then use a transmission jack and raise transmission until extension housing clears rear engine support and frame crossmember. Remove extension housing from transmission case. To remove governor, remove snap ring from output shaft and remove governor and governor drive ball. *NOTE - Replace output shaft seal if worn or damaged.*

Installation - Reverse removal procedure.

Extension Housing Bushing and/or Seal Replacement: With drive shaft and universal joint assembly removed from transmission, proceed as follows: Remove bushing and seal together with Tool 7000-AF (Comet); T60K-7691-A (Falcon); T52L-7000-GAE (Ford); 7000-G (Edsel). *CAUTION - Do not damage spline seal when tool is installed.* Install new bushing with Tool 7657-F (Comet); T60K-7697-G (Falcon); T52L-7000-HAE (Ford); 7000-HF (Edsel). To remove seal only, use seal puller 1175-AE or W (All models). To install seal, use Tool 7657-G (Comet); T60K-7657-A (Falcon); T57P-7657-A (Ford); 7657-F (Edsel). Coat outer diameter of seal with a non-hardening sealing compound.

TRANSMISSION OVERHAUL

See "Ford & Edsel 2-Speed Automatic Transmission" in 1959 Annual Data.

REMOVAL & INSTALLATION

COMET & FALCON

REMOVAL: Transmission and converter are removed as an assembly.

1) Place car on a hoist (do not raise), then pull back floor mat and remove the two upper converter housing-to-engine attaching bolts. From under the hood, remove bolts attaching throttle linkage bracket to converter housing, then remove starter.

2) Raise car and drain converter and transmission. *CAUTION - Do not attempt to turn flywheel with a wrench on converter-to-flywheel stud nuts.* Disconnect driven shaft at rear axle pinion flange and remove drive shaft. Install extension housing seal replacer in extension housing *(see "Extension Housing Bushing and/or Seal Replacement" above for tool number).*

3) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable at extension housing. Disconnect oil filler tube (on Comet, disconnect pressure checking tube at transmission).

4) Remove two lower stud nuts attaching rear support insulators to support crossmember, then disconnect parking brake cable rod at equalizer lever. Position a transmission jack under transmission and raise it slightly to take weight off support member, then remove support member.

5) Lower transmission and support rear end of engine, then remove converter-to-flywheel stud nuts and move converter away from flywheel as far as it will go. Remove the two lower converter housing-to-engine block bolts and work converter housing off engine block dowel pins, then work converter pilot out of engine crankshaft. Secure converter to converter housing and lower transmission from car.

INSTALLATION: *See "Ford & Mercury below".*

FORD & MERCURY

REMOVAL: Transmission and converter are removed as an assembly.

1) Raise car and drain transmission and converter, then disconnect drive shaft at pinion flange and remove shaft. Install extension housing seal replacer in extension housing seal *(see "Extension Housing Bushing and/or Seal Replacement" above for tool number).*

2) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable from extension housing. Disconnect oil cooler lines at transmission, then remove lines from clamp at engine block. Disconnect oil filler tube at transmission case. On Edsel, disconnect pressure checking tube at transmission.

3) Remove starter from converter housing and disconnect parking brake cables at the equalizer. Remove two engine rear support bolts from extension housing and remove support clamp.

4) Position a transmission jack under transmission and raise it slightly to take weight off crossmember. Support rear of engine in this position with an engine support bar or stand, then remove crossmember.

5) Remove bolts attaching converter-to-flywheel and remove converter housing-to-engine block bolts. Secure converter to transmission so it will not fall out when transmission is separated from engine, then work transmission off engine block dowel pins and toward rear until converter pilot clears crankshaft. Lower transmission and remove it from car.

INSTALLATION: Reverse removal procedure and note the following: Tighten insulator-to-crossmember bolts to 23-29 ft. lbs. Tighten converter-to-flywheel stud nuts to 23-28 ft. lbs. With transmission completely installed, and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least 10 times to fill low servo release cavity with fluid. Adjust manual and throttle linkage.

FORD MOTOR SINGLE & DUAL RANGE

FORDOMATIC
F rd Trucks, F-100
CRUISE-O-MATIC
F rd V8 Pass. Cars (1961)
Thund rbird (1961)
F rd Truck, F-250, 350, P-350, 400, 500 (1961)
MERC-O-MATIC SINGLE RANGE
M rcury 292" & 352" Engs. (1961)
MERC-O-MATIC DUAL RANGE
M rcury 292", 352" & 390" Engs. (1961)

►*SINGLE RANGE & TWIN RANGE TRANSMISSION NOTE: F rd matic and Merc-O-Matic Single Range transmissions ar "Single-Range" type with five sel ctor l v r positi ns. Cruise-O-Matic and Merc-O-Matic Dual Rang transmissions are "Twin-Range" typ with six sel ctor lever positions.*

►*TRANSMISSION IDENTIFICATION NOTE: A number f diff r nt transmission models are used on the various car models as indicat d in following table. For identification, refer t id ntification plate located on left sid f case, r to th additional identification tag fast n d n bott m f il pan by one of the oil pan attaching bolts. On the identification plate, the prefix l tters t th Transmission Serial number indicate transmissi n m d l (Example: "PCD-A" followed by serial numb r). Thes same letters are used on identification tag to indicat transmission model. An additional figur on th identification tag indicates detail changes mad to transmission and should be referred to for s rvice.*

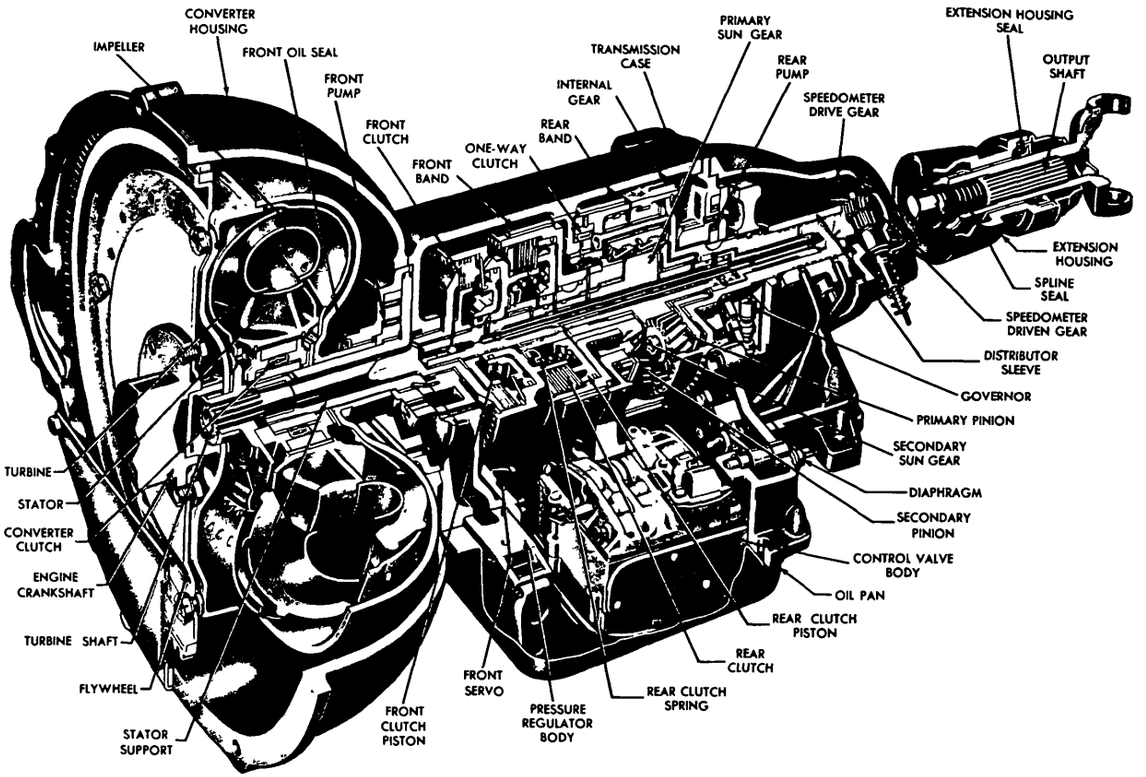
Transmissi n Identification

Car	Engine	Serial Prefix
Ford Pass	292"	①PCC-A,B,or C
Ford Pass	352"	①PCD-A,C,or D
Ford Pass	390"	①PCE-B,E,or G
Thunderbird	390"	①PCE-A,D,or F
Police Interceptor	390"	①PCE-C,F,or H
Ford Truck F-100	223"	②PBC-N
Ford Truck F-250	223"	①PBC-M
Ford Truck P-350, P-400, P-500	223"	①PAU-M
Ford Truck F-350	223"	①PAU-L
Ford Truck F-100	292"	②PBW-J
Ford Truck F-250	292"	①PBW-K
Ford Truck F-350 P-400, P-500	292"	①PBY-H
Ford Truck F-350	292"	②PBY-G
Mercury	292"	②PAZ
Mercury	352"	②PBM
Mercury	292"	①PCC-A,B,or C
Mercury	352"	①PCD-A,C,or D
Mercury	390"	①PCE-B,E,or G
Mercury Police Interceptor	390"	①PCE-C,F,or H

① – "Twin-Range" transmission
② – "Single-Range" transmission

►CHANGES, CAUTIONS, CORRECTIONS

►*FAST IDLE OPERATION (FOR SUSTAINED PERIOD) CAUTION:* To prevent transmission overheating, do not operate car with transmission in Neutral or Park for periods longer than 10 minutes unless fluid level, manual and throttle linkage, and parking brake adjustments are within specifications. It is suggested that the car be raised and properly supported, and operated in gear if long periods of operation at fast idle are required.



FORD & MERCURY 3-SPEED (TWIN RANGE) AUTOMATIC TRANSMISSION

►*1961 TRANSMISSION EXTENSION HOUSING SQUEAL CORRECTION:* Apply a light coat of Lubricant, Part No. B8A-19589-A, on front driveshaft yoke.

►*1961 "PCE" (390" ENG.) TRANSMISSION REAR BAND ACTUATING LEVER PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* If actuating lever breakage occurs, replace broken lever with Part No. C1SP-7A169-A. This new lever entered production at Transmission Serial No. PCE-B-26650.

►*1961 "DUAL-RANGE" TRANSMISSION DIPSTICK IDENTIFICATION:* Dipstick cap is copper plated and distance from lower end of dipstick to upper end (point where it is riveted to handle) should be 16.74". *CAUTION* – The use of the longer 2-Speed Transmission dipstick will result in lower than indicated oil level.

►*1961 "DUAL-RANGE" TRANSMISSION NOT DOWNSHIFTING OR UPSHIFTING CORRECTION:* This condition may be caused by throttle and kickdown linkage binding. To correct, free up all linkage and lubricate all pivot points.

►*1961 "DUAL-RANGE" TRANSMISSION FRONT CLUTCH PISTON PRODUCTION CHANGE:* To reduce possibility of front clutch failure under server "rocking" conditions, front clutch piston assemblies have been revised to incorporate a centrifugally operated ball check bleed valve in place of the former mechanically operated valve. Later type front clutch pistons may be used on previous "Dual-Range" transmissions.

►*STARTING ENGINE BY TOWING OR PUSHING CAR:* Pushing is recommended. Place selector lever in Neutral "N" position. When car reaches 20 MPH speed, turn on ignition, move selector lever to "LO", depress accelerator pedal to half throttle position until engine begins to run. *NOTE-On ice or snow where traction not good, move selector lever to "DR" position to crank engine.*

►*TOWING CAR CAUTIONS: Do not tow at speed great r than 40 MPH and observe following precautions:*
If Transmission Operating Properly-Place selector lever in Neutral "N" position. Car can be towed normally for distances not to exceed 12 miles. **F r gr at r distanc s, us same proc dur as for in p rativ transmissi n.**

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

If Transmission Inoperative—Tow car with rear wheels lifted off road, or disconnect and remove propeller shaft and protect rear end of transmission from entry of dirt (U-joint Knuckle, Part No. 1M-4841 can be installed and wired in place for this purpose).

DESCRIPTION

DESCRIPTION: Single—Range and Dual—Range transmissions are similar in design to previous transmissions except that dual—range transmissions used on passenger cars have a vacuum controlled throttle valve. The spring loaded vacuum diaphragm unit mounted on rear of transmission case is actuated by engine vacuum against spring pressure. At high vacuum, diaphragm moves against spring pressure to move pushrod away from throttle valve, cutting off throttle pressure. As vacuum drops, spring loaded diaphragm moves pushrod to open throttle valve and increase throttle pressure. A transmission oil cooler is provided on all models.

OPERATION

OPERATION: *See Fordomatic, Merc-O-Matic & Turbo-Drive Transmissions" in 1957 Annual Data or later Manual edition and note the following:* On twin-range type transmissions, with selector lever in "Dr. 1" range, the car starts in first gear and upshifts to 2nd, then to 3rd gear. With selector lever in "Dr. 2" range, the car starts in 2nd gear (same as single range transmission) and upshifts to 3rd gear. Power flow through the twin range type transmission is the same as for single range type transmissions except that with selector lever in "Dr 1" range, the pinion carrier is held against rotation by the one-way sprag clutch instead of by the rear band. First gear in "Dr 1" range is the only gear that uses the one-way sprag clutch

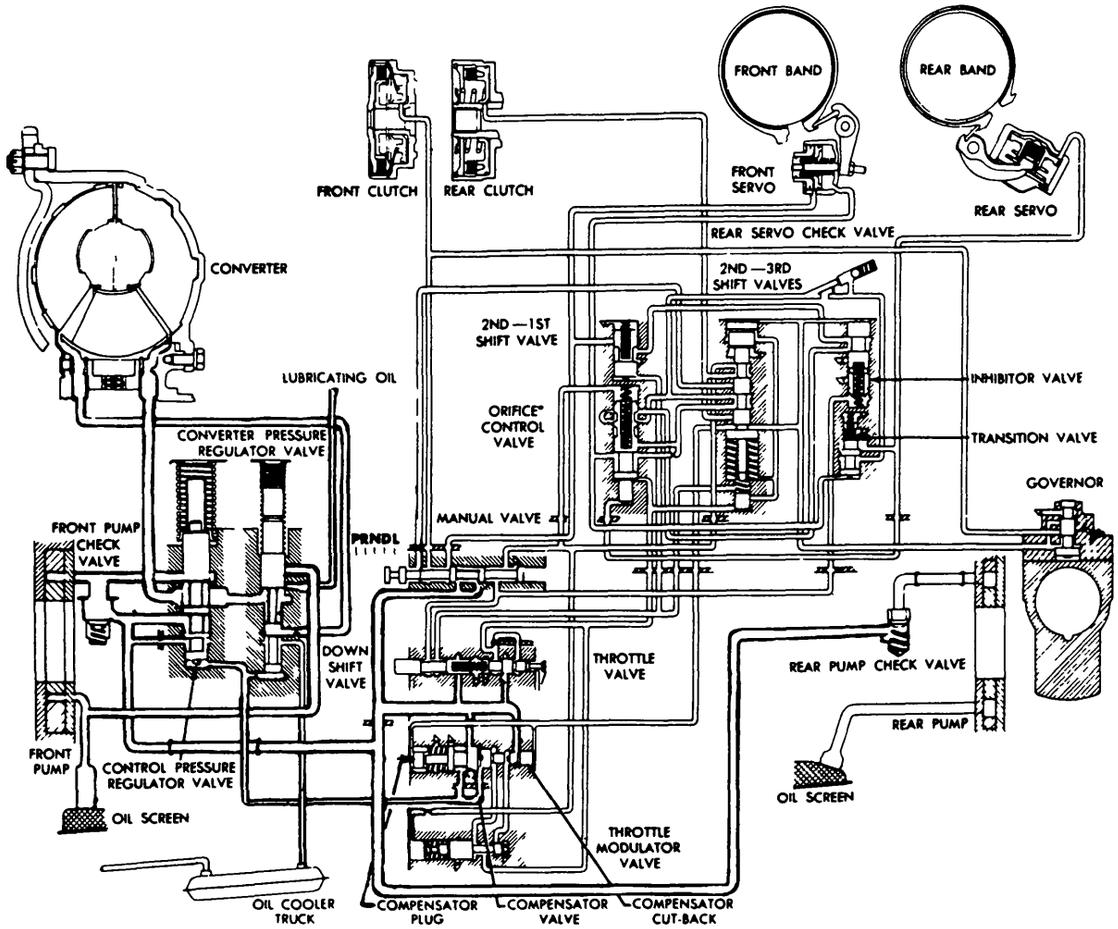
LUBRICATION

Checking Fluid Level: Check fluid level every 4000 miles (Ford, Thunderbird, Mercury); 1000 miles (Ford Truck—On highway operation; Daily (Ford Truck—Off highway operation). Apply hand brake, place selector lever in "N" position, then run engine at fast idle speed to bring transmission to normal operating temperature. Move selector lever through all positions in turn, then move selector lever to "P" (Park) position. Check fluid level and add recommended transmission fluid as required to bring level to "F" (Full) mark on dipstick. **Recommended Fluid** – Automatic Transmission Fluid Type "A" (Suffix "A").

► *TRANSMISSION DRAINING & REFILLING NOTE: Periodic draining and refilling is not recommended, except at time of overhaul.*

Capacity (All Models) – 10 qts. (drain & refill); 11½ qts. (transmission dry).

Draining & Refilling: *NOTE – Not recommended except at time of transmission overhaul.* Remove converter housing lower cover and drain converter by removing one drain plug, then rotate engine 180 and remove second drain plug. Disconnect oil filler tube from transmission oil pan to drain fluid from transmission. Tighten converter drain plugs to 15—28 ft. lbs., then install transmission filler tube. Install 5 qts. of recommended fluid, then start engine and allow to run 2—4 minutes at idle speed. Add remaining amount of fluid (see above) and bring engine and transmission to normal operating temperature. Place transmission in "P" (Park) position and check fluid level. Add fluid to bring level up to "F" (Full) mark on dipstick. *CAUTION – Correct fluid level should be determined by dipstick reading rather than actual quantity of fluid installed.*



"SINGLE-RANGE" TRANSMISSION HYDRAULIC CIRCUITS

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on car model pages.*

FORD PASS. CARS & MERCURY (EXC. THUNDERBIRD)

Manual Linkage Adjustment: With engine stopped, loosen clamp at shift lever on lower end of steering column so shift rod is free to slide in clamp. Position selector lever in "D1" position, then shift manual lever on transmission to "D1" position (second from rear). Tighten clamp on shift rod, then check pointer alignment for all selector lever detent positions.

THUNDERBIRD

Manual Linkage Adjustment: With engine stopped, loosen nut at lower end of manual shift rod on transmission shift lever. Position manual selector lever so pointer is against steering column stop in "D1" position (large green dot is "D1" position). Move shift lever on transmission to "D1" detent position (second from bottom), then tighten nut on shift rod and shift lever. Check pointer alignment for all positions of selector lever and reset if necessary.

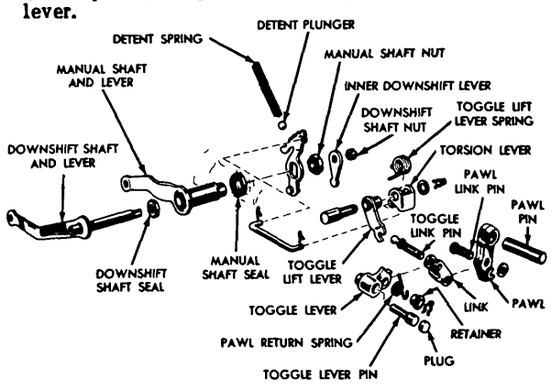
FORD TRUCK

Manual Linkage Adjustment: With engine stopped, disconnect upper end of manual shift rod from selector lever, then position lever so pointer is down against steering column stop in "Dr" position (Fordomatic); "D1" position (Cruise-O-Matic). Shift manual lever on transmission to second detent position from bottom. Rotate adjusting sleeve on manual shift rod until pin can easily be inserted in lever, then lengthen rod by turning adjusting sleev tw full turns. Lock adjusting

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (Cont.)

sleeve in position and connect rod to selector lever. Check pointer alignment for all positions of selector lever.



FORD & MERCURY 3-SPEED AUTOMATIC TRANSMISSION MANUAL & KICKDOWN LINKAGE

NEUTRAL SAFETY SWITCH ADJUSTMENT

Ford Pass. Cars & Mercury (Exc. Thunderbird & Mercury Series 800 & Monterey): Loosen neutral switch-to-steering column attaching screws at lower end of steering column, then shift selector lever to "N" (Neutral) position. Move switch in elongated mounting holes until a .060" gauge pin can be inserted through hole in switch housing and into switch plate. With gauge pin in place, tighten attaching screws, then remove gauge pin. Check starter circuit in all lever positions. The circuit should be open in all positions except "N" or "P".

Thunderbird & Mercury (Series 800 & Monterey): Switch is located on lower side (Thunderbird), upper side (Mercury) of steering column (inside passenger compartment). To adjust, loosen steering column-to-switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws. *NOTE - Starter circuit must be open in all positions except "N" or "P".*

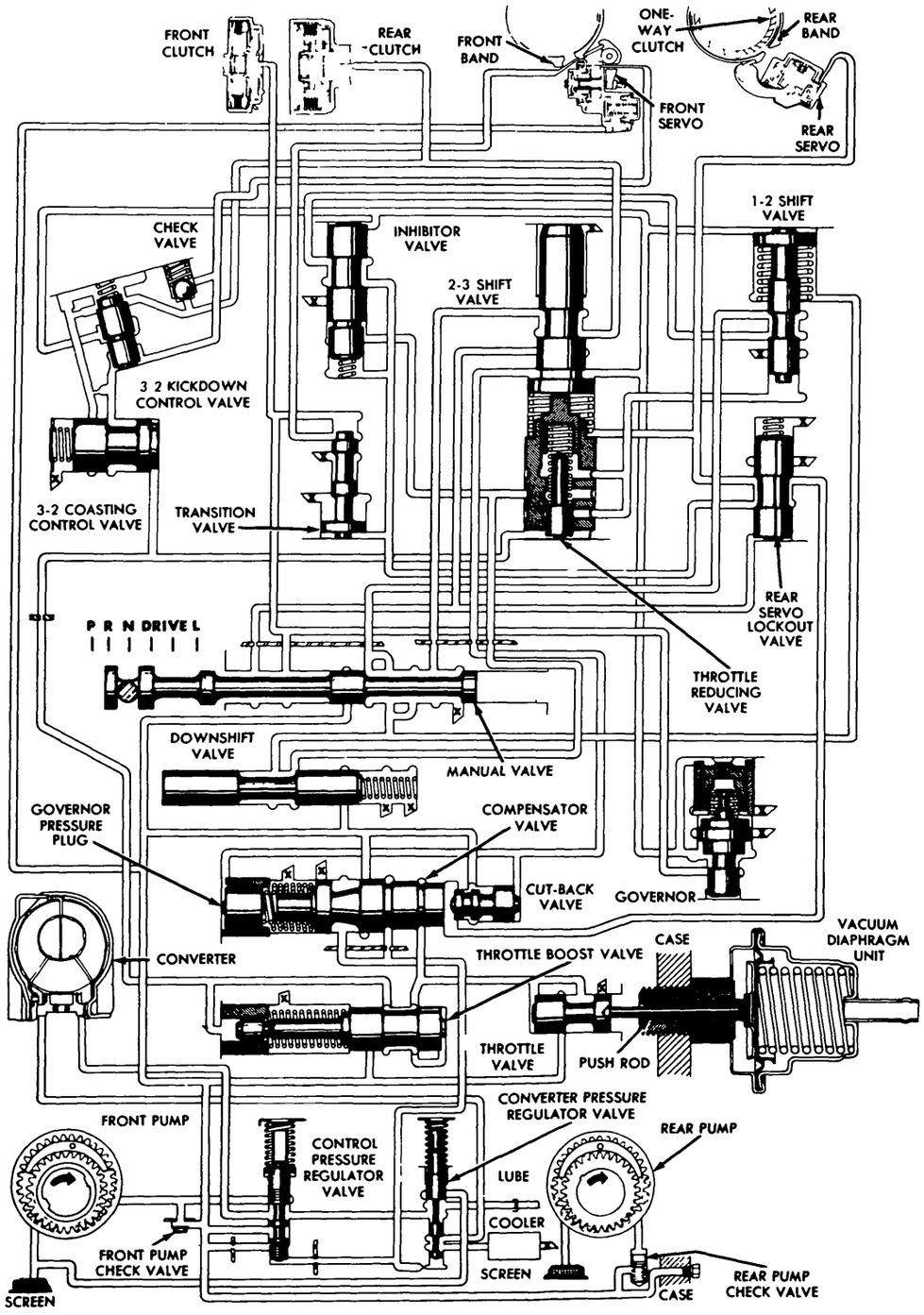
Ford Trucks: Loosen screws attaching switch to bracket on steering column, then position switch so that starter circuit is closed when selector lever is at "N" or "P". *NOTE - Circuits must be open in all other positions.* Tighten attaching screws and check operation in all lever positions.

BAND ADJUSTMENT

►*BAND ADJUSTMENT NOTE: Adjust bands every 12,000 miles under normal operation. For severe operation, adjust bands more frequently as required.*

FRONT BAND ADJUSTMENT (Except Mercury): Drain fluid from oil pan and remove pan and oil screen. Loosen front servo adjusting screw locknut two full turns and check adjusting screw for free rotation in actuating lever. Pull adjusting screw end of actuating lever away from servo body and insert adjusting tool gauge block (part of Tool T58L-7195-A) between servo piston stem

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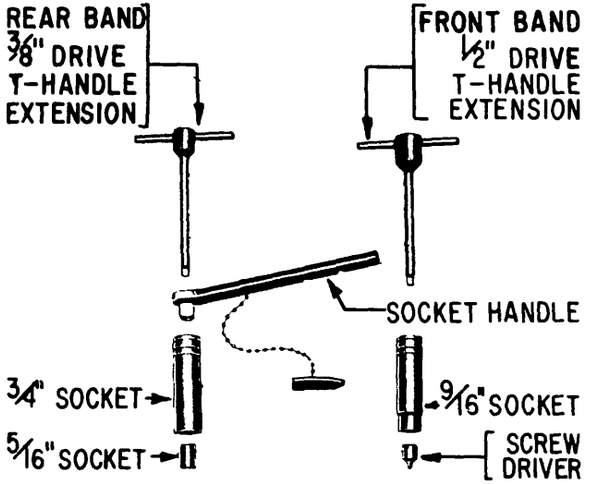
FORD & MERCURY 3-SPEED (TWIN RANGE) AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

FORD MOTOR SINGLE & DUAL RANGE (Cont.)

and adjusting screw. *NOTE – See illustration for details of Tool T58L–7195–A and other tools required for front band adjustment.* Install special ½" drive socket handle on 9/16" deep socket, then insert special T–handle extension through socket handle and socket, and install screwdriver socket on end of T–handle extension. Place assembled tools on adjusting screw so screwdriver socket engages adjusting screw and 9/16" socket engages adjusting screw locknut. With a torque wrench on T–handle extension, tighten adjusting screw to 10 inch pounds, then **back off screw exactly one full turn.** *CAUTION – Damage will result if transmission if adjusting screw is not backed off exactly one full turn.* Hold adjusting screw stationary and tighten locknut to 20–25 ft. lbs. Remove gauge block, install screen and oil pan and refill transmission with fluid.

Mercury: Drain transmission and remove oil pan and screen, then loosen front servo adjusting screw locknut two full turns. Pull back on actuating rod and insert Gauge Block, Tool 7225–C13–B (part of Tool T–7225–C) between front servo piston stem and adjusting screw. Tighten adjusting screw until wrench overruns, **then back off adjusting screw exactly one complete turn,** hold adjusting screw and tighten locknut to 20–25 ft. lbs. *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly one full turn.* Install screen and oil pan and refill transmission with fluid.

REAR BAND ADJUSTMENT (Except Mercury): On all models except Thunderbird, fold back floor mat at right side of floor pan and remove access hole cover. On Thunderbird, remove console and right side heater duct floor director, then remove access hole cover. On all models, place socket handle (part of Tool T58L–7195–A) on ¾" deep socket. *NOTE – See illustration for details of Tool T58L–7195–A and other tools required for rear band adjustment.* Insert special 3/8" drive T–handle extension through handle and socket, then install 5/16" 8–point socket on extension. Insert assembled tools in access hole so that adjusting screw and locknut are engaged. Loosen adjusting screw locknut and tighten adjusting screw to 10 ft. lbs. Remove torque wrench from T–handle extension and **back off adjusting screw exactly 1½ turns.** *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly 1½ turns.* Hold adjusting screw stationary and tighten locknut to 35–40 ft. lbs.



TOOL T58L-7195-A

FORD AUTOMATIC TRANSMISSION BAND ADJUSTING TOOL

Mercury: Fold back floor mat on right side and remove access hole cover. Loosen band adjusting screw locknut with Tool 7195–C, then use T–handle portion of tool to tighten adjusting screw until wrench overruns. *CATUION – If screw is found to be tighter than wrench capacity (10 ft. lbs.), loosen screw and retighten until wrench overruns.* **Back off adjusting screw 1½ turns,** then tighten locknut to 35–40 ft. lbs. while holding adjusting screw stationary. *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly 1½ turns.*

TESTING

► *TRANSMISSION STALL TEST NOTE: Stall test procedures are the same for "Single–Range" and "Twin–Range" transmissions. When making the stall test, never hold throttle open longer than 5 seconds.*

STALL TEST: With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kickdown position), and note engine speed (see Stall Speed Table below). *CAUTION – If engine speed exceeds maximum limits in table, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows: **"D1"** – Front clutch and one–way clutch engaged at all accelerator pedal positions. **"D2"** – Front clutch and front band applied at all accelerator pedal positions. **"L"** – Front clutch and rear band applied. **"R"** – Rear clutch and rear band applied. *NOTE – Engine over–speeding is an indication of clutch or band slippage.*

ENGINE STALL SPEEDS

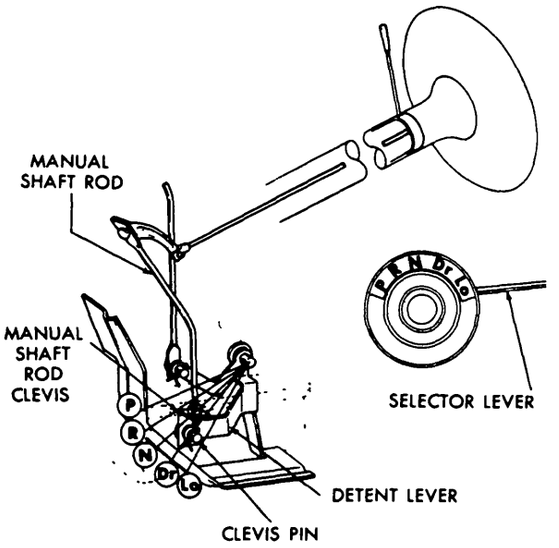
Engine	Engine RPM
Pass. Car 292" Eng	1500–1700
Pass. Car 352" Eng	1600–1800
Pass. Car 390" Eng (Std.)	1800–2000
Pass. Car 390" Eng (Police)	1850–2050
Truck 223" Eng	1400–1600
Truck 292" Eng	1520–1720

SHIFT TESTS (Single Range Transmission): Select a smooth road for tests. Make test as outlined below and see "Shift Point Table" for correct speed where shift should occur.

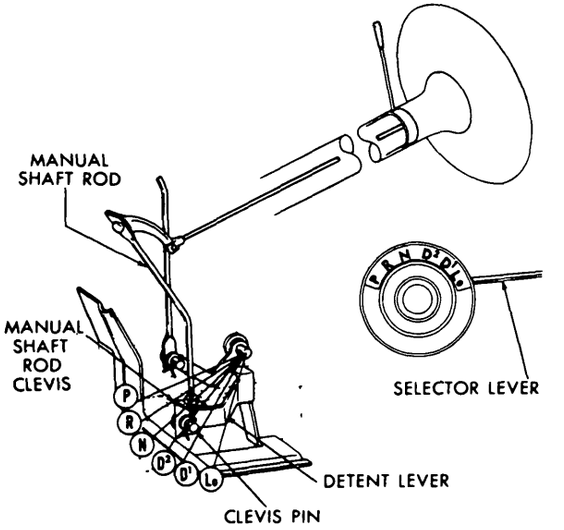
2–3 Upshift (Minimum Throttle): Place selector lever in "DR" range, and starting from a standstill, apply accelerator lightly but steadily.

3–2 Downshift (Minimum Throttle): Permit car to decelerate (from speed attained in above test) until downshift occurs from high to intermediate.

3–2 Downshift (Forced): Reduce car speed below 45 MPH then press accelerator pedal to floor (through detent).



"SINGLE-RANGE" TRANSMISSION LINKAGE



"TWIN-RANGE" TRANSMISSION LINKAGE

Transmission should shift from high to intermediate. This shift should occur only with transmission in high gear.

2–1 Downshift (Forced): With selector lever in "DR" range and car speed below 18 MPH, quickly press accelerator fully to the floor. This action shifts transmission from intermediate to low.

2–3 Upshift (Maximum Throttl): Place selector lever in "DR" range, and starting from a standstill, press accelerator to the floor. Full throttle upshift should occur as indicated

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (Cont.)

1-2 Upshift (Maximum Throttle): With accelerator fully pressed to floor for above test (2-1 Downshift, Forced), transmission should upshift from low to intermediate when car speed indicated in table is reached. The 2-3 Upshift will occur at same speed as for 2-3 Upshift (Maximum Throttle).

"DR" to "LO" Manual Shift: With car speed between 40–45 MPH, manually shift selector lever from "DR" to "LO". Instead of shifting to low gear, the transmission should shift from high to intermediate. When car speed is reduced within the range indicated in table, transmission should shift into low range.

"R" Shift: Bring car to a stop and place selector lever in "R" range. The car should move in reverse direction smoothly, upon light throttle application.

SHIFT TESTS (Twin-Range Transmissions With Vacuum Thr ttl C ntrol):

1–2, 2–3 Upshift (Minimum Throttle): Place selector lever in "D1" range. Starting from a standstill, transmission should start in first gear and shift to second, then at a higher speed, shift to third.

3–2, 2–1 Downshift (F rced): With transmission in third gear, depress accelerator pedal to floor (through detent). Transmission should shift from third to second, or from third to first, depending on car speed.

3–1 Downshift (Minimum Throttle): Coasting down from approximately 30 MPH in third gear, transmission should downshift from third to first. *NOTE – A 3–2–1 downshift may b xperienced under the above c nditions.*

3–2, 2–1 Downshift (Partial Throttle): With transmission selector lever in "D1" position and car speed at approximately 30 MPH, depress and hold accelerator at half throttle position and at the same time apply service brakes to a point where road speed is slowly decreased. The 3–2 and 2–1 shifts should occur as road speed decreases.

CONTROL PRESSURE TESTS (PASS. CARS): Attach tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet at rear of transmission case. Apply parking brake and adjust idle speed to 450–475 RPM with transmission selector lever in "D1" or "D2" position. *NOTE – If idle speed cannot be brought within limits by adjusting carburetor throttl st pscr w, ch ck throttle and downshift linkage for binding and check for vacuum leakage at transmission diaphragm unit.* With engine at indicated idle speed and engine vacuum at 18.0"Hg(minimum) and with transmission in either "D1", "D2" or "N", pressure should be 57–69 lbs. (Exc. Police Interceptor); 70–95 lbs. (Police Interceptor). With transmission selector lever in either "P", "R" or "L", pressure should be 57–213 lbs. (Exc. Police Interceptor); 70–228 lbs. (Police Interceptor). If control pressures are within limits, apply service brakes and advance throttle until engine vacuum reading falls below 16–13.7" Hg. As vacuum reading passes through this range (16–13.7"), transmission control pressure should start to rise and continue to rise with throttle opening, reaching a maximum pressure of 145–170 lbs. on all models except Police Interceptor, 170–200 lbs. on Police Interceptor (with transmission selector lever in "D1" or "D2"). With transmission selector lever in "L" or "R", maximum pressure should be 201–213 lbs. (Exc. Police Interceptor); 212–228 lbs. (Police Interceptor). At maximum pressure, vacuum reading should be 1.5" Hg or less on all models. *NOTE – With selector lever in "P", "L" or "R", control pressure rise is not dependent on diaphragm unit. When selector lever is shifted into any of these positions and engine RPM is increased, control pressure should rise immediately and reach its maximum before engine speed reaches stall RPM.* If control pressures are not correct, erratic, or fail to rise with increased engine speed, see "Trouble Shooting & Diagnosis".

CONTROL PRESSURE TESTS (Single–Range & Truck Twin–Range Transmissions): Install a pressure gauge in pressure take–off hole located either near throttle lever or at rear of transmission case, then install a tachometer on engine and bring engine to normal operating temperature. Adjust engine to correct idle speed and set hand brake, then place transmission selector lever in "DR", "D1" or "D2" and check idle pressure which should be within specifications (see tables below). Increase engine speed and note control pressure indicated on gauge. If pressure is not within limits (see tables below) adjust throttle control rod to obtain required pressure, then recheck idle pressure. With selector lever in one of the above positions, increase engine speed to stall condition and note pressure and engine RPM which should be within specifications (see tables below).

► *CONTROL PRESSURE DIAGNOSIS NOTE: If contr l pr ssur s ar n t within sp cificati ns as indicated in "Line Pressure Range" tables, perform "Shift T st" and "Stall Test".*

SINGLE RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)						MANUAL SHIFT
SHIFT		2-3		3-2		1-2	2-1	
THROTTLE		MIN.	MAX.	MIN.	FORCED	MAX.	FORCED	
Ford Truck F-100	All	8–17	43–60	5-8	40–56	39	8-19	11–21
Mercury 312" Eng.	All	10-29	54-68	6-9	50-64	34-45	11-21	14-24
Mercury 383" & 430" Engs.	All	11-23	59-78	6-11	55-74	37-52	12-24	15-17

TWIN RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)								MAN. SHIFT
RANGE		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	L
THROTTLE		Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	
SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1	3-2	2-1
Ford Pass. Cars	3.56-1	6-8	31-38	12-20	50-59	6-7	47-55	22-30	6-9	16-22
Ford Pass. Cars	3.10-1	7-9	35-44	14-23	58-69	6-8	54-64	26-36	6-10	18-26
Ford Pass. Cars	2.91-1	8-10	38-48	15-25	62-74	7-9	58-69	27-38	7-11	19-27
Thunderbird	All	7-9	37-44	14-23	60-69	6-8	56-64	27-36	6-10	18-26
Ford Truck F-250	All	6-11	25-40	8-20	40-62	3-8	36-58	16-27	3-8	12-22
Ford Truck (Exc. F-250)	All	5-10	22-38	7-19	35-58	3-7	31-54	14-26	3-7	10-20
Mercury (Exc. Pol. Inteptr)	All	6-10	31-48	12-25	50-73	6-9	47-69	22-38	6-11	16-27
Mercury (Police Inteptr.)	All	6-11	47-56	14-27	79-90	6-8	73-81	37-46	4-11	21-31

LINE PRESSURE RANGE TABLE

Ford Trucks (Single–Range Transmission)

Engine Speed	Lever Position	Pressur
Idle	All	56–67 lbs.
1000 RPM	Dr	80–85 lbs.
Stall	Dr or Lo	153–170 lbs.
Stall	R	203–214 lbs.

Ford Trucks (Twin–Range Transmission)

Engine Speed	Lever Position	Pressur
Idle	All	56–67 lbs.
1000 RPM	D1 or D2	80–85 lbs.
Stall	D1 or D2	153–170 lbs.
Stall	R or Lo	203–214 lbs.

Mercury (Single Range Transmission)

Engine Speed	Lever Position	Pressure
Idle	All	56-72 lbs.
1000 RPM	D	80-85 lbs.
Stall	D or L	150-170 lbs
Stall	R	196-216 lbs.

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan, and control valve assembly. Proceed as follows:

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

Fr nt Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of system.

Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

Rear Clutch: Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating Check for leaks in same manner as for front clutch (above).

Rear Band & Servo: Apply pressure to rear servo oil passage (see illustration), and observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If servos, bands, clutches, and governor operate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" in OVERHAUL BELOW.*

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Make corrections in sequence shown, testing operation of transmission after each correction.* For inspection of fluid distributor sleeve, see "Overhaul" below.

CONTROL PRESSURE LOW: If pressure is low at idle speed in all selector lever positions, check for excessive leakage in front oil pump, case, and control valve body. *NOTE – Control pressure in "P", "L" & "R" is regulated entirely by control pressure regulator valve and its spring.*

CONTROL PRESSURE HIGH: If pressure is high at idle speed with transmission selector lever in "N", "D1" & "D2", trouble may be in diaphragm unit or its connecting tubes and hoses. Check engine manifold vacuum. Check diaphragm pushrod for bends and for corrosion. Install diaphragm unit with pushrod removed and recheck control pressure in "N", "D1" or "D2". If control pressure is still too high, trouble is in transmission control system. If pressure is within limits, diaphragm unit is not operating properly.

CONTROL PRESSURE DOES NOT RISE WITH THROTTLE OPENING: If control pressure does not rise in "D1" or "D2" as engine vacuum falls below 16–13.7" Hg, check transmission pressure rise capacity by shifting to "R" or "L". In these positions, maximum control pressure should be obtained at not more than engine stall RPM. If pressure rise is normal in "R" or "L", remove hose from diaphragm unit and check hose and tube. *NOTE – To check, hold thumb over end of hose and check for vacuum. If engine speeds up when hose is disconnected and slows down as thumb is held against end of hose, vacuum source is satisfactory.* If vacuum reading at end of hose is 18" Hg or greater, change diaphragm unit and recheck pressure rise with throttle opening in "D1" and "D2". If control pressure does not rise now, trouble is in transmission. Check for internal leakage in components that have pressure in them in "D1" and "D2" but do not have pressure in them in "R" and "L".

CONTROL PRESSURE IS EXTREMELY ERRATIC: If control pressure is erratic in "N", "D1" and "D2", check diaphragm unit tubes, hoses and diaphragm pushrod (see "Control Pressure High" above). If vacuum is satisfactory, replace diaphragm unit and retest control pressure. If no improvement noted, clean and inspect control valve body and pressure regulator.

SEVERE ENGAGEMENT ("Lo", "Dr", or "R" Ranges): Check engine idle speed and throttle linkage adjustments. Adjust rear band. Perform a control pressure test. Remove and clean main control valve assembly and pressure regulator valve.

1-2, 2-3 SHIFT POINTS LOW, HIGH, OR ERRATIC: Check fluid level. Adjust throttle and manual linkage. Check governor operation. Perform a pressure control test. Remove and clean main control valve assembly and pressure regulator valve.

SEVERE 2-3 SHIFT: Adjust throttle linkage. Adjust front band. Remove and clean main control valve assembly and pressure regulator valve. Remove and inspect front servo.

ENGINE OVERSPEEDS (2-3 SHIFT): Adjust front band. Remove and clean main control valve assembly.

NO 1-2 OR 2-3 SHIFTS: Remove and inspect governor. Remove and clean valve assembly. Rear clutch slippage. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

NO FORCED DOWNSHIFTS: Adjust throttle linkage. Perform control pressure check. Remove and clean main control valve assembly. Check operation of inner and outer throttle levers.

SEVERE 3-2 OR 3-1 SHIFTS (CLOSED THROTTLE): Check engine idle speed and throttle linkage. Remove and clean main control valve assembly.

SLIPPAGE OR CHATTER IN 2ND SPEED: Check fluid level. Adjust throttle linkage. Adjust front band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front servo not performing properly. Front clutch slipping. Leakage in hydraulic system.

SLIPPAGE OR CHATTER IN 1ST SPEED: Check fluid level. Adjust throttle linkage. Adjust rear band. Clean main control valve and pressure regulator assemblies Check inner and outer throttle levers. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

SLIPPAGE OR CHATTER IN REVERSE: Check fluid level. Adjust throttle linkage. Adjust rear band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty

NO DRIVE IN "DR" OR "D2" RANGE: Adjust front band. Clean main control valve assembly. Make an air pressure check. Front clutch slipping. Leakage in hydraulic system. Fluid distributor in output shaft faulty.

NO DRIVE IN "D1" RANGE: Adjust manual linkage. Rear pump not operating properly. Planetary one-way clutch not operating properly.

NO DRIVE IN "R" RANGE: Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Make an air pressure check. Rear clutch not operating. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "LO" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN ANY RANGE: Check fluid level. Adjust manual linkage. Check control pressure. Clean main control valve and pressure regulator assemblies. Make an air pressure check. Leakage in hydraulic system.

LOCKUP IN "DR" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "R" RANGE: Adjust front band. Front servo not operating properly. Front clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "LO" RANGE: Adjust front band. Front servo not operating properly. Clean main control valve assembly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

PARKING LOCK BINDS OR WILL NOT HOLD: Adjust manual linkage. Check parking linkage.

UNABLE TO START ENGINE BY PUSHING: Check fluid level. Adjust manual linkage. Clean main control and pressure regulator valve assemblies. Rear pump not operating. Leakage in hydraulic system.

TRANSMISSION OVERHEATING: Converter cooling air passages blocked. Oil cooler and connections faulty. Clean pressure regulator assembly. Converter one-way clutch slipping or faulty.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Adjust front band. Clean main control valve and regulator valve assembly. Front servo not operating properly. Leakage in hydraulic system.

MAXIMUM SPEED BELOW NORMAL (POOR ACCELERATION): Converter one-way clutch not operating properly.

NO 2-1 DOWNSHIFT: Adjust throttle linkage. Clean main control valve assembly. Rear servo not operating properly.

NO 3-1 DOWNSHIFT: Adjust engine idle speed and throttle linkage. Remove and clean main control valve assembly.

NOISE IN NEUTRAL: Clean and inspect pressure regulator. Engine rear oil seal faulty. Front clutch not releasing properly. Front pump faulty.

NOISE IN 1ST, 2ND OR REVERSE SPEEDS: Clean and inspect pressure regulator. Fault in planetary assembly. Front or rear clutch faulty. Front pump faulty.

NOISE IN PARK RANGE: Clean and inspect pressure regulator. Front pump faulty.

NOISE WHEN COASTING IN NEUTRAL (20-30 MPH) WITH ENGINE OFF: Rear pump faulty.

MINOR REPAIRS (TRANSMISSION IN CAR)

Se 1958 Annual Data, Pag 466, r lat r Manual ditions.

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

TRANSMISSION & CONVERTER REMOVAL

FORD PASS. CARS (EXC. THUNDERBIRD)

1) Place car on hoist but do not raise. Pull back floor mat and remove converter access hole covers, then remove two upper bolts attaching converter housing to engine.

2) Raise car, and remove cover from lower front side of converter housing, then drain converter and transmission *(see "Draining & Refilling" above).* Remove vacuum hose from vacuum diaphragm unit.

3) Remove flywheel to converter bolts. *NOTE – On "Dual-Range" typ transmissions, install converter housing front plate to hold converter in place when transmission is removed.*

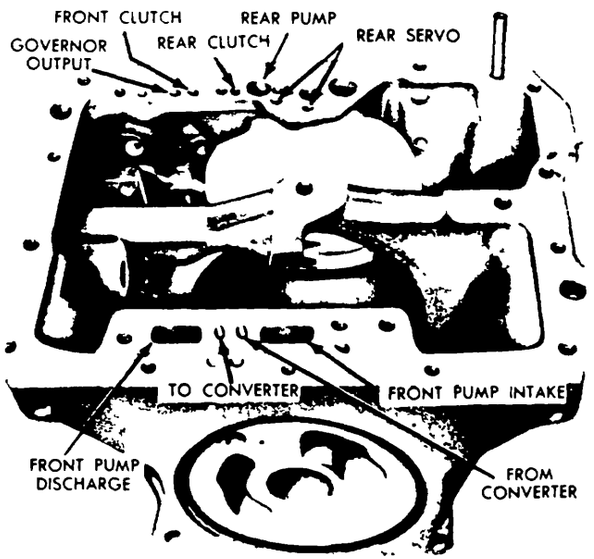
4) Disconnect battery cable at starter, and transmission to body ground cable from transmission, then remove starter.

5) Disconnect oil cooler lines from transmission, then disconnect manual and throttle linkage from transmission levers.

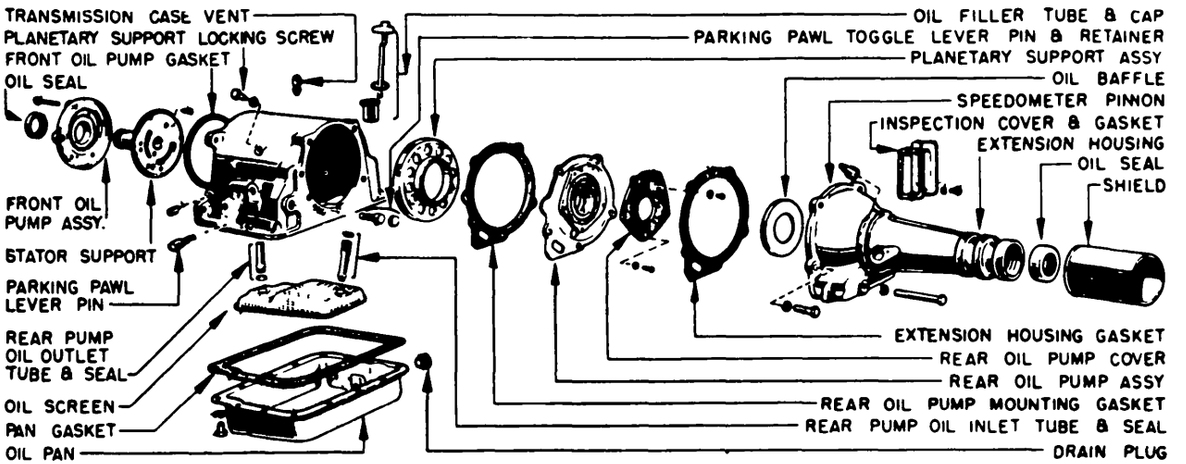
6) Disconnect speedometer cable from extension housing, and remove drive shaft. Remove remaining converter housing-to-engine attaching bolts. Remove two engine rear support-to-transmission bolts, and raise transmission slightly to take weight off crossmember, then remove crossmember.

7) On V8 models with single exhaust, loosen and drop exhaust system to allow converter to clear muffler inlet pipe.

8) If clearance needed to remove transmission and converter assembly from car, tilt rear of assembly upward slightly and to rear of car (enough to allow removal of flywheel-to-crankshaft bolts). Move assembly to rear and remove it. *NOTE - If there is enough clearance, remove flywheel-to-converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft.*



TRANSMISSION TEST POINTS



TRANSMISSION CASE & EXTENSION HOUSING ASSEMBLY

9) To install transmission and converter assembly, reverse removal procedures and note the following. Tighten flywheel housing-to-engine block bolts to 45-50 ft. lbs. Tighten flywheel-to-crankshaft bolts to 75-85 ft. lbs.

Torque Converter Removal (From Transmission): See *"Torque Converter Overhaul" below.*

THUNDERBIRD

►*NOTE: Transmission and torque converter must be removed as separate assemblies. See "Transmission Removal (Without Converter)" below.*

FORD TRUCKS

1) Place truck on hoist, but do not raise. Remove converter access hole convers in floor pan and remove two upper converter housing-to-engine bolts. Raise truck on hoist and remove cover from lower front side of converter housing. Drain transmission and converter, *(see "Draining & Refilling" below).*

2) Remove flywheel-to-converter bolts. On V8 models, install converter housing front plate to hold converter in place during transmission removal. On 6 cyl. models, wedge converter in place.

3) Disconnect starter cable at starter, then disconnect body ground cable at transmission. Remove starter. On 6 cyl. models, remove linkage splash shield. On trucks with oil cooler, disconnect water hoses at cooler.

4) Disconnect manual and throttle linkage from transmission levers, then disconnect speedometer cable from extension housing. Remove drive shaft.

5) Remove both engine rear support bolts, then raise engine and transmission high enough to remove engine rear supports. Lower engine against floor stand or engine support bar so converter housing is clear of crossmember when all weight is off transmission jack. Remove remaining converter housing-to-engine attaching bolts.

6) On V8 models with single exhaust system, loosen and drop exhaust system, to allow converter to clear muffler inlet pipe.

7) If clearance is needed to remove assembly, tilt rear of assembly upward slightly and to the rear (enough to allow removal of the six flywheel-to-crankshaft bolts). Move assembly to the rear. *NOTE. If there is enough clearance, remove flywheel-to-converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft.*

8) To install transmission and torque converter assembly, reverse removal procedures and note the following: Tighten converter housing-to-engine bolts to 45-50 ft. lbs. Tighten converter-to-flywheel bolts to 25-28 ft. lbs.

Torque Converter Removal (From Transmission): See *"Torque Converter Overhaul" below.*

MERCURY

1) Connect a starter remote control to starter solenoid, then remove three converter housing–to–engine attaching bolts and the starter motor upper bolt at right side of engine.

2) Raise car and remove converter housing lower plate and drain oil from converter assembly. *NOTE – Use starter remote control to rotate converter.* Disconnect selector rod and downshift control rod at transmission, then disconnect speedometer cable and vacuum diaphragm engine vacuum tube.

3) Drain transmission and remove filler tube from transmission. Disconnect oil cooler lines at transmission, then disconnect parking brake cables at equalizer. Disconnect drive shaft at rear universal and remove driveshaft.

4) Remove converter–to–flywheel retaining nuts. *NOTE – Use starter remote control to turn flywheel.* Remove starter cable at starter and remove starter. Position a

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

transmission jack under transmission and slightly raise transmission.

5) Remove engine rear support insulator bolts and engine rear support crossmember bolts and remove crossmember. *NOTE – If car is equipped with dual exhaust system, it may be necessary to disconnect exhaust pipes at exhaust manifolds and lower pipes to obtain clearance for removal of crossmember.*

6) Remove converter housing–to–engine lower retaining bolts, then remove transmission and converter assembly from under car.

7) To install converter and transmission assembly, reverse removal procedures and note the following Tighten rear support insulator bolts and converter housing lower bolts to 40–45 ft. lbs. Tighten converter–to–flywheel retaining nuts to 20–25 ft. lbs.

Torque Converter Removal (From Transmission): See *"Torque Converter Overhaul" below.*

TRANSMISSION REMOVAL (WITHOUT CONVERTER)

FORD PASS. CARS & FORD TRUCKS

►*NOTE: Transmission and torque converter must be removed as an assembly on Sunliner models.*

1) Raise car or truck on a hoist and drain transmission and torque converter, then disconnect oil cooler lines. On truck models, disconnect water hoses from oil cooler. On Pass. Cars, disconnect vacuum tube from vacuum diaphragm unit.

2) Remove linkage splash shield then disconnect manual and throttle linkage from transmission levers Disconnect speedometer cable from extension housing

3) On passenger cars remove engine rear support to transmission bolts On all cars and trucks position a transmission jack under transmission On passenger cars raise jack slightly to take weight off crossmember then remove crossmember On all models with transmission jack in position remove four transmission to converter housing bolts

4) Tilt rear of transmission assembly slightly upward and with a jack move assembly toward rear of car until input shaft is clear then lower assembly and remove

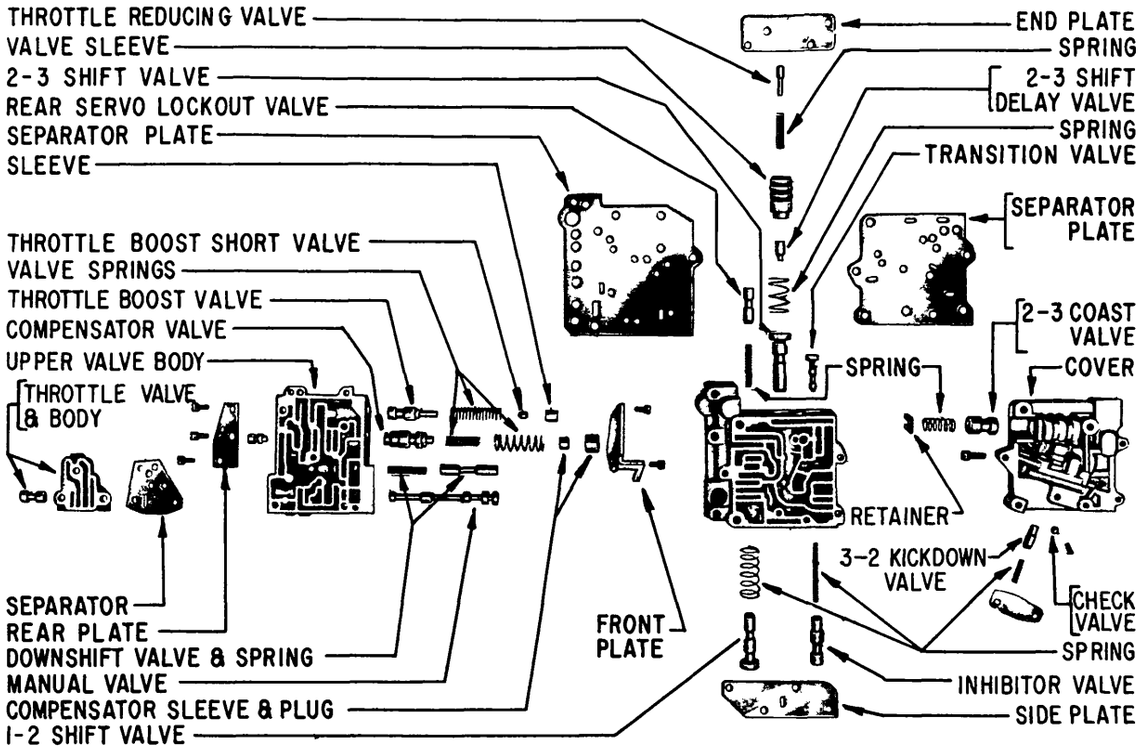
5) To install, reverse removal procedures and tighten transmission to converter housing bolts to 40-45 ft lbs. *NOTE - Two guide pins installed in the top transmission to converter housing bolt holes will aid in installation*

THUNDERBIRD

1) Raise car on a hoist and drain transmission and converter *(see "Draining & Refilling" above).* Disconnect drive shaft at pinion flange and remove drive shaft. *NOTE* – Install seal replacer, Tool T57L–7657–A in extension housing seal.

2) Disconnect pitman arm–to–idler arm rod at pitman arm end. Remove one bolt on each muffler inlet pipe–to–chassis bracket (toward rear of chassis), then disconnect muffler inlet pipes from exhaust manifold.

3) Disconnect oil cooler lines and manual and downshift control rods at transmission. Remove diaphragm unit tube from clip on oil pan and from diaphragm unit. Disconnect speedometer cable at extension housing.



FORD & MERCURY AUTOMATIC TRANSMISSION (TWIN RANGE) CONTROL VALVE

4) Remove engine rear support bolts, then place a transmission jack under transmission and raise it slightly to take weight off crossmember. Remove transmission rear support bracket–to–chassis bracket bolts. Remove support and hand brake cables from equalizer and allow support and equalizer to hang down from front brake cable.

5) With transmission jack in position, remove four transmission–to–converter housing bolts. Tilt rear of transmission assembly slightly upward, and with jack move the assembly toward rear until clear of converter housing. Lower transmission and remove from car.

6) To install, reverse removal procedure and note the following Tighten transmission–to–converter housing bolts to 40–45 ft. lbs.

MERCURY

►*NOTE – Transmission and torque converter must be removed as an assembly on convertible models.*

1) Raise car on hoist and disconnect vacuum tube from vacuum diaphragm, then drain fluid from transmission *(see "Draining & Refilling" above).*

2) Disconnect selector rod and downshift control rod at transmission. Disconnect speedometer cable at extension housing and oil cooler lines at transmission. Disconnect parking brake cables at equalizer, then disconnect drive shaft at rear universal joint and remove driveshaft.

3) Remove engine rear support insulator bolts, then position a transmission jack under transmission and slightly raise transmission. Remove crossmember bolts and crossmember. *NOTE – If car is quipped with dual exhaust system, it may b n c ssary to disconn ct exhaust pipes at exhaust manifolds and low r pip s to obtain clearance for removal of crossmemb r.*

4) With transmission jack in position, remove transmission–to–converter housing bolts, then support engine and move transmission toward rear until clear of turbine shaft. *NOTE – Tilt rear of transmission up slightly for necessary clearanc .*

TORQUE CONVERTER OVERHAUL

TORQUE CONVERTER OVERHAUL *Se "Edsel, Ford, Lincoln, Mercury Automatic Transmission" in 1958 Annual Data or later Manual edition and note the following*

►*NOTE Converter assembly on all models, exc pt Ford 6 Cyl Trucks, is of welded construction and cannot be disassembled for service The only service required is the inspection of one-way clutch and converter end play check (converter thrust wash r insp ction) as noted below*

►*DISASSEMBLY & REASSEMBLY CAUTION Cl anliness is extremely important wh n opening up transmission Thoroughly clean utside of cas first, and clean each part as removed*

ALL MODELS

TORQUE CONVERTER REMOVAL (Fr m Engin): Remove transmission (see above), then remove stud nuts attaching converter to flywheel Replace converter

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

housing lower front cover to prevent converter from falling when housing is removed. *NOTE – On Ford 6 Cyl. Trucks, w dg c nverter in place to prevent it falling out f housing.* Remove starter motor, then remove converter housing–to–engine bolts. Work converter off engine dowel pins and remove housing and converter.

TORQUE CONVERTER INSTALLATION (On Engine): Place converter in housing and retain it there by installing lower front cover. *NOTE – On Ford 6 Cyl. Trucks, w dg conv rt r in place.* Raise housing and converter into position and start housing on engine dowel pins. Start converter housing–to–engine bolts. Remove converter housing front cover (or wedge) and position converter on flywheel. Install converter–to–flywheel stud nuts and tighten to 20–25 ft. lbs. Tighten converter housing–to–engine bolts to 40–45 ft. lbs., then install converter front cover. Install transmission.

FORD 6 CYL. TRUCKS

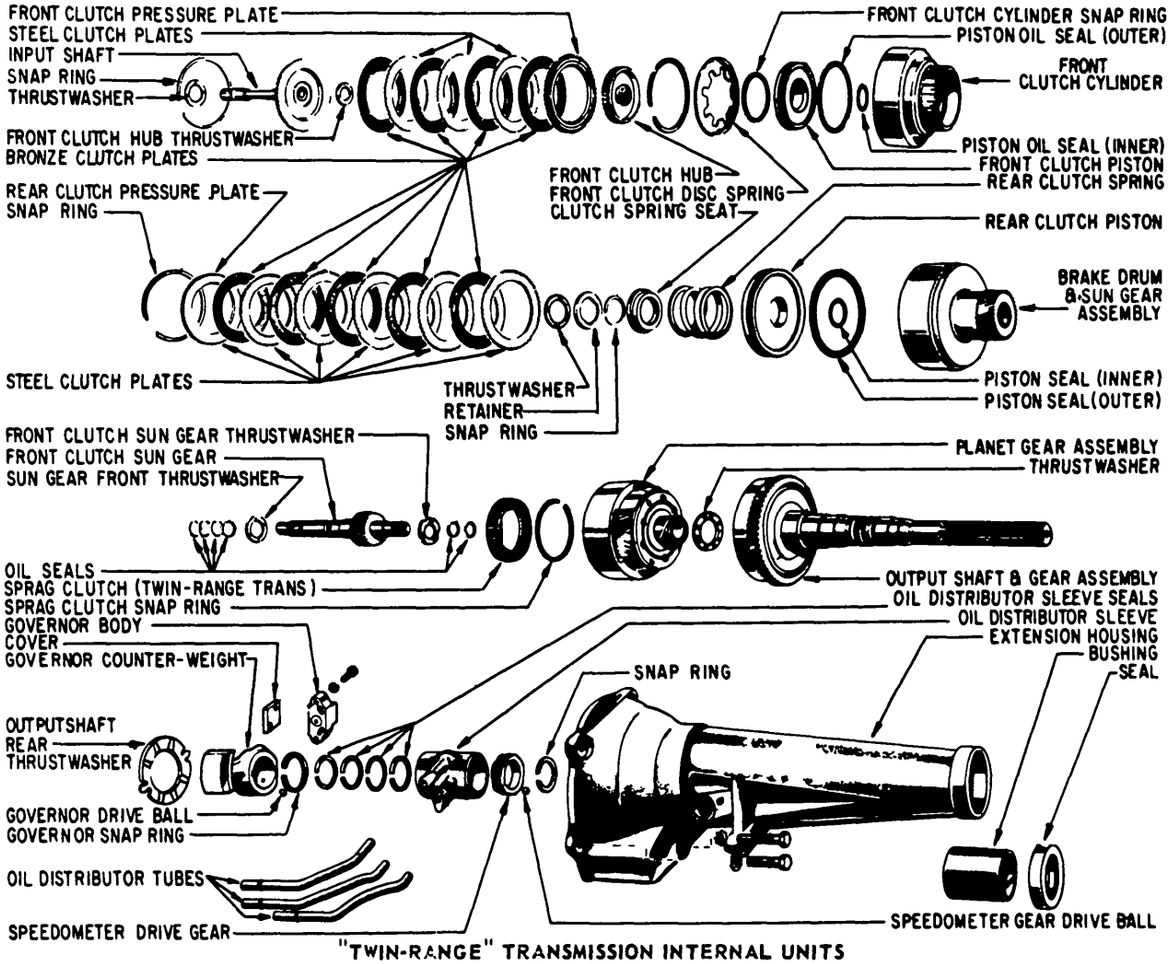
TORQUE CONVERTER REMOVAL (From Transmission): Grasp converter cover with both hands and pull straight out (*CAUTION*–To prevent damage to front seals, do not rock assembly from side to side) Remove converter housing attaching bolts and remove housing from transmission

DISASSEMBLY: Remove converter cover attaching bolts and nuts Remove cover and "O" ring seal Remove bronze thrust washer from turbine and remove turbine. Remove stator from pump housing *(CAUTION–Check and locate the balancing marks on cover and stator so they may be replaced in the exact same position)* Remove thrust washer from pump hub and from turbine hub. Remove sprag clutch inner race and remove snap ring retaining outer hub to stator *(CAUTION–Do not burr snap ring groov).* Remove outer hub, sprag assembly, outer race and inner hub as an assembly Separate hubs and sprag assembly from outer race Remove snap ring retaining inner hub to stator

INSPECTION: Inspect converter blades for looseness, and check thrust surfaces for scores and splines for burrs and wear Inspect seal surfaces and front pump driving lugs for wear Inspect sprag assembly for worn or broken sprags or broken or distorted spring. Inspect bushings for wear or scoring (if bushings worn, polish bearing surface of journal with crocus cloth to eliminate possibility of wear having been caused by rough bearing surface)

REASSEMBLY; Install stator inner hub and snap ring Turn assembly over, install outer race in stator Install sprag assembly in outer race making sure that sprags are pointed in the right direction Install outer hub and outer hub snap ring Insert Tool No 7946, tapered side first, into sprag assembly while rotating tool counter-clockwise to position sprags Install inner race with spline section up Guide tool No. 7946 with hand while pushing inner race into position. Check stator for clockwise rotation while holding the inner race Install new seal in pump hub and install hub in pump Tighten hub capscrews to 8-10 ft lbs Install thrust washer into hub of converter pump and install stator with the word "front" (stamped into face of stator) upward Install thrust washer in hub of turbine and install turbine Install bronze thrust washer on turbine hub. Position converter cover on pump housing with new "O" ring seal and properly align balance marks on cover and housing *(CAUTION–Cover and housing must be installed in the same position noted when these parts disassembled).* Install all converter bolts and tighten to 25-28 ft. lbs. in the sequence indicated below. Install converter housing on transmission case and tighten attaching bolts to 40-45 ft. lbs Install converter assembly and press it firmly into position on turbine shaft *(CAUTION–Do not "rock" converter assembly while installing it on shaft (will damage oil seals)*

►*COVER BOLT TIGHTENING SEQUENCE (To prevent leaks):* Tighten two nuts directly opposite each other just snug, tighten two nuts 90° from first two similarly, tighten two nuts 45° from first four nuts similarly, Continue this sequence until all nuts have been tightened just snug, then torque all nuts in same sequence to 25-28 ft lbs torque



"TWIN-RANGE" TRANSMISSION INTERNAL UNITS

FORD V8 CARS & TRUCKS MERCURY

TORQUE CONVERTER REMOVAL (From Transmissi n): Same as for Ford 6 cyl models (above)

CONVERTER ONE-WAY CLUTCH INSPECTION: Ford V8 Cars & Trucks - Install stator outer race holding tool in one of the four holes provided in stator, then install Tool T58L-7902-A in converter pump drive hub (As tool enters converter, Allen screw heads will enter stator clutch inner race splines) Place a torque wrench on tool Tool (and stator inner race) should turn freely **clockwise** (from pump drive hub side of converter) It should lock up and hold a 10 ft lb pull when wrench is turned counterclockwise Try clutch for lockup and hold in at leas five different locations around converter If clutch fails to lockup and hold 10 lb torque, replace converter unit

CONTINUED ON NEXT PAGE

FORD MOTOR SINGLE & DUAL RANGE (C nt.)

Mercury – Install Tool 7946–A in converter hub, then install torque wrench on tool. Rotate torque wrench in a clockwise direction (viewed from rear). Tool should rotate freely. If tool cannot be rotated, overrunning clutch is binding and converter clutch must be replaced. Swing tool so steel rod positions against opposite pump drive lug. Apply 10 ft. lbs. torque while attempting to rotate counterclockwise (converter viewed from rear). Rotate tool clockwise and attempt to turn converter counterclockwise at least five times. If tool fails to hold on any attempt to turn converter counterclockwise, the one–way clutch is slipping and converter must be replaced. *NOTE – One–way clutch inspection can be performed with converter installed on ngine (with transmission removed).*

CONVERTER ENDPLAY CHECK: Ford V8 Cars & Trucks - Install Tool T58L-7902-A into converter pump drive hub until it bottoms then install guide over converter pump drive hub Expand split fiber bushing in turbine spline by tightening adjusting nut until tool is securely locked in spline Attach a dial indicator to tool and position indicator button on converter pump drive hub lug, then set dial indicator to zero Lift tool upward as far as it will go and note indicator reading If total endplay exceeds 060", replace converter unit

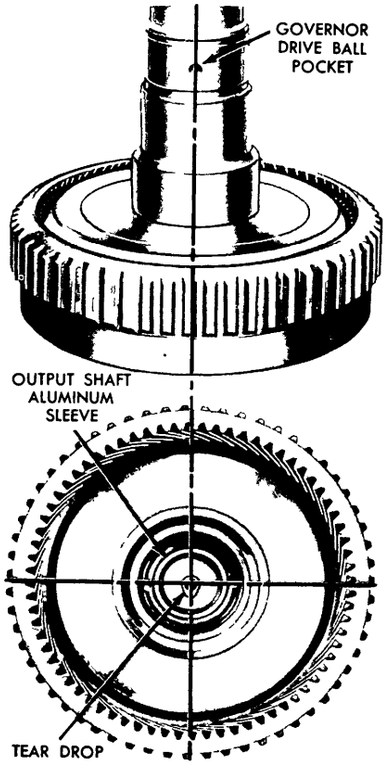
Mercury – Install Thrust Washer Check Tool 7937–A (Endplay Checking Tool), into converter pump drive hub. Tap lightly on end of tool to drive it forward to eliminate end thrust movement. Install dial indicator on rod so indicator lever rests against outside surface of converter. Pull tool toward rear of converter and note movement on dial indicator. If movement exceeds .060", replace converter assembly. *NOTE – Converter ndplay can be checked with converter installed on ngine (with transmission removed).*

TRANSMISSION OVERHAUL

See 1958 Annual Data, Page 466, or later Manual editions.

OUTPUT SHAFT (ALUMINUM SLEEVE) & DISTRIBUTOR SLEEVE INSPECTION: Inspect for scores, broken teeth, and burrs. Inspect output shaft aluminum sleeve for alignment with governor drive ball (see illustration). *NOTE – Aluminum sleeve must be in proper alignment with passages in shaft to provide unrestricted flow of transmission fluid.* Make sure distributor sleeve passages are open and that fluid tubes fit properly in sleeve.

MAIN CONTROL VALVE (TWIN–RANGE TRANS.): Installation – Before installing valve body, check for bent manual valve by rolling valve on a flat surface. Align front servo tubes with holes in valve body, then shift manual valve lever to "L" detent and place inner downshift lever between downshift lever stop and downshift valve. *NOTE – Manual valve must engage actuating pin in manual d tent l ver.* Install but do not tighten control valve body attaching bolts. Install two tubes to pressure regulator and control valve body, then move control valve body toward center of case as far as attaching bolts will permit. Tighten valve body attaching bolts to 8–10 ft. lbs. Turn manual valve one full turn in each manual lever detent position. If manual valve binds against actuating pin in any detent position, loosen valve body attaching bolts and move body away from center of case. *CAUTION – Move body only enough to relieve binding.* Retighten attaching bolts and check manual valve operation.



OUTPUT SHAFT SLEEVE ALIGNMENT

VACUUM DIAPHRAGM UNIT (TWIN–RANGE TRANS.): Installation – Position pushrod in bore of diaphragm unit, then using diaphragm unit as a guide, insert pushrod into threaded opening of case. Tighten diaphragm unit to 18–27 ft. lbs. and connect vacuum hose.

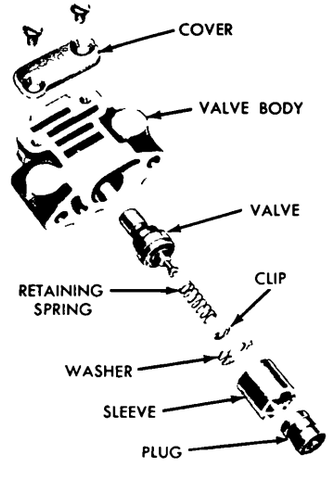
MAIN CONTROL VALVE (SINGLE–RANGE TRANS.): Installation – Install control valve assembly, aligning servo tubes with control valve. Align inner throttle lever between throttle lever stop and downshift valve, and at same time push throttle valve in to clear transmission case. Align manual valve with actuating pin in manual detent lever, then install attaching bolts but do not tighten. Install large control pressure tube in valve body and regulator, then install small control pressure compensator tube in valve body and regulator. Install lubrication tube in rear pump and regulator body. Tighten control valve body attaching bolts to 8–10 ft. lbs. If manual valve binds in any detent position, loosen main control valve attaching bolts and move control valve away from center of case. *CAUTION– M v b dy nly enough t r li v binding.* Retighten attaching bolts and check manual valve operation.

GOVERNOR: Removal - Remove inspection cover from extension housing, then remove two screws retaining governor body to counterweight and remove governor assembly through inspection opening.

Disassembly: *NOTE - Some early production governors, identified by a daub of blue paint, were built with th governor sleeve staked into governor body Units of this type cannot be disassembled for complet inspection, however, they may be cleaned by removing cov r and plug and washing passages and bor s with solvent.* To disassemble units that are not staked, remove governor plug, sleeve, slotted washer, valve and spring assembly from body. Remove spring retaining clip from valve. *CAUTION - Do not distort or str tch spring* Remove spring from valve, then remove valve body cover from governor. Inspect all parts for burrs and scores and inspect valve and governor plug for free movement in their respective bores.

Reassembly: Install cover on body and tighten screws to 20-30 inch pounds, then place spring on valve stem and install retaining clip. Lubricate all parts with transmission fluid and install valve in valve body. Install slotted washer, then install governor sleeve so that legs on sleeve enter slots in washer and seat against body. *NOTE - When properly install d, legs on xpos d end of sleeve will be below gov rnor body-to-count r-weight mating surface* Install governor plug in sleeve.

Installation: Position governor assembly on counterweight with cover toward rear of car (opposite to previous models), then install attaching screws and tighten evenly to 50-60 inch pounds Install inspection cover and gasket and tighten screws to 50-60 inch pounds.



GOVERNOR VALVE ASSEMBLY

LINCOLN AUTOMATIC TRANSMISSION

Lincoln Contin ntal (1961)

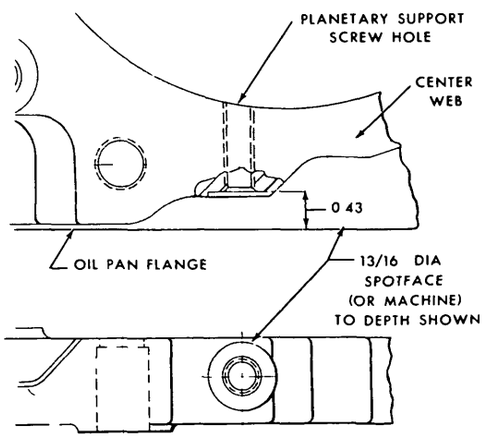
►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE: An identification tag fastened to oil pan attaching bolt is stamped with Transmission Model letters "PCA–B" which may be followed by an additional figure indicating changes in transmission construction.*

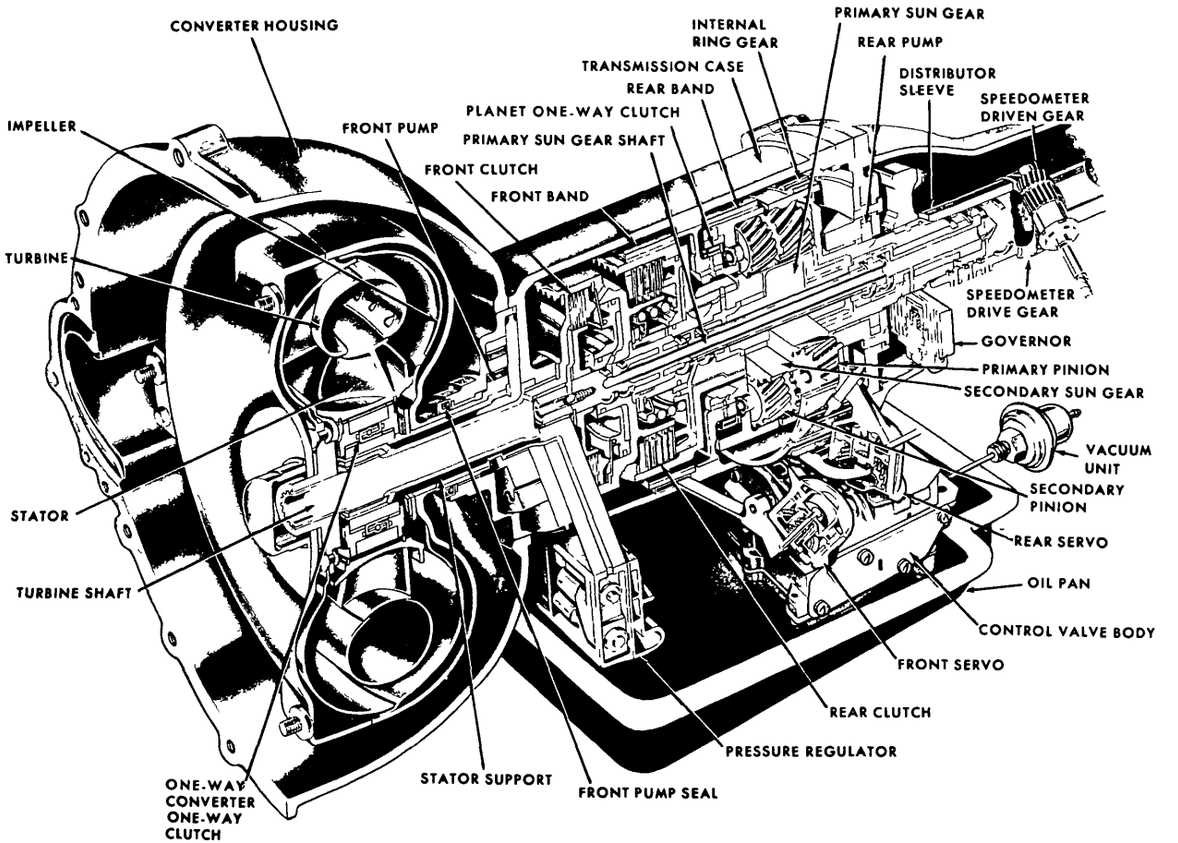
►*1961 TRANSMISSION CASE & CENTER SUPPORT BOLT PRODUCTION CHANGE & CORRECTION TO PREVENT INTERFERENCE BETWEEN SUPPORT SCREW AND FRONT CLUTCH DRUM:* A new transmission case, Part No. C1VP–7005–N having a spot faced center support screw hole, and using a shorter center support screw, Part No. C1VP–7A291–B, is used in production after Transmission Serial No. PCA–B–10083. Later type transmissions are also identified by the number "1" added as a suffix to identification tag (PCA–B–1). Earlier transmission cases can be reworked to eliminate interference between support screw and front clutch drum by spot facing an area 13/16" in diameter to a depth of .430" measured from machined surface of transmission oil pan flange to bottom of spot faced counterbore *(see illustration).* A shorter center support screw, Part No. C1VP–7A291–B, must be used when center support is spot faced.

►*1961 TRANSMISSION OIL FILTER & OIL SCREEN PRODUCTION CHANGE:* Later transmissions identified by "PCA–B–2" (or later) on transmission identification tag have a new internal oil screen covered with a dacron material replacing the earlier wire mesh oil screen and external filter. *NOTE – The external filter is not used when the internal dacron type filter is used. Lat r type dacron filter is not interchangeable on earlier models except by replacement of all related parts individually designed for use with the new filter.*

►*1961 TRANSMISSION FRONT CLUTCH PISTON PRODUCTION CHANGE:* To reduce possibility of front clutch failure under severe "rocking" conditions, front clutch piston assemblies have been revised to incorporate a centrifugally operated ball check bleed valve in place of the former mechanically operated valve. Later type front clutch pistons may be used on earlier transmissions.



LINCOLN AUTOMATIC TRANSMISSION CASE REWORK



LINCOLN AUTOMATIC TRANSMISSION.

►*1961 TRANSMISSION OIL COOLER & EXTERNAL FILTER CONNECTION LEAKAGE CAUTION:* Due to critical fluid level tolerance of ONE PINT in this transmission, a slight leak may cause extensive transmission damage if not corrected immediately. To prevent leakage at external connections, note the following: Use only hose material, Part No. C1VV–7B093–B for replacement. Use either a No. 10 Corbin clamp or a suitable screw–type hose clamp. *NOTE – Do not use a hose material that is not impervious to automatic transmission fluid.*

►*1961 EARLY PRODUCTION TRANSMISSION OIL FILTER HOSE CAUTION:* Inspect the short (3") hose connector at oil filter to make sure it is fabric covered. If exterior of hose is smooth rubber, discard and replace with approved fabric covered hose, Part No. C1VV–7B093–B.

►*1961 EARLY PRODUCTION TRANSMISSION PRESSURE REGULATOR ASSEMBLY SERVICE REPLACEMENT CAUTION:* When replacing pressure regulator assembly on early transmission (with metal oil pan screen) use Pressure Regulator, Part No. C1VP–7A139–F and rework as follows: Remove pressure regulator cover from old assembly and install on the new pressure regulator. *NOTE – This is necessary because of difference in oil pickup tube bore size.*

►*1961 TRANSMISSION OIL PAN INSTALLATION & BOLT TIGHTENING CAUTION:* A new oil pan gasket material is being used which has a tendency to "flow" from under oil pan bolts after they are initially tightened and may result in bolt torque being slightly less than specified 10–13 ft. lbs. when rechecked after use. DO NOT overtighten at any time to compensate for "flow" of oil pan gasket material. Whenever oil pan is removed, inspect flange around bolt holes for distortion. Flatten if necessary to provide a smooth mating surface for gasket.

►*1961 EARLY TRANSMISSION "MOAN" OR "WHINE" (AT 700–1000 RPM) CORRECTION:* On early cars with external transmission oil filter, this noise may occur at 700–1000 RPM with transmission in "D" range and is caused by a restriction in the filter. To correct, remove external oil filter and connect oil cooler line directly to oil cooler.

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LINCOLN AUTOMATIC TRANSMISSION (Cont.)

► *1961 TRANSMISSION FLUID LOSS CORRECTION:* A fluid loss through transmission vent may be caused by improperly installed transmission fluid dipstick. Correct by installing and locking the dipstick.

► *TOWING CAR CAUTIONS: Do not tow car at speed greater than 40 MPH and observe following precautions:*

Transmission Operating Properly – Place transmission in "N" (Neutral) position. Car can be towed normally for distances not to exceed 12 miles. **For great distances, use same procedure as for inoperative transmission.**

Transmission Inoperative – Tow car with rear wheels lifted off ground or disconnect and remove propeller shaft. *NOTE – Be sure and protect rear end of transmission from entry of dirt.*

DESCRIPTION

DESCRIPTION: Three speed hydraulically controlled planetary transmission and torque converter which provides automatic shifting between low, intermediate and high (selector lever in "D1"), and between intermediate and high (selector lever in "D2"). "Lo", "R", & "P" are controlled manually. Transmission throttle valve is controlled by engine vacuum operating a diaphragm assembly at rear of transmission, eliminating throttle control linkage. A downshift lever actuated by accelerator pedal allows transmission to be downshifted by depressing accelerator pedal past the full throttle detent position. Front and rear servos are machined into transmission and external front and rear band adjusting screws have been provided. Transmission fluid is filtered through an external filter (early cars); internal filter (later cars), and is cooled in an oil cooler located in car radiator.

LUBRICATION

► *TRANSMISSION FLUID LEVEL CAUTION: Transmission fluid level must not be allowed to drop more than ONE PINT below normal FULL level.*

Checking Fluid Level: Check fluid level every 6000 miles. With engine and transmission at normal operating temperature, shift transmission through all ranges, then place selector lever in "P" (Park) position. Check fluid level on dipstick and add sufficient recommended fluid to bring level up to FULL mark on dipstick. *CAUTION – Do not overfill.*

Draining & Refilling: Periodic fluid changes not recommended except at time of transmission overhaul.

Capacity: 23 pints (transmission and torque converter dry).

Recommended Fluid: Lincoln Part No. C1AZ–19582 or Automatic Transmission Fluid Type "A" (Suffix "A").

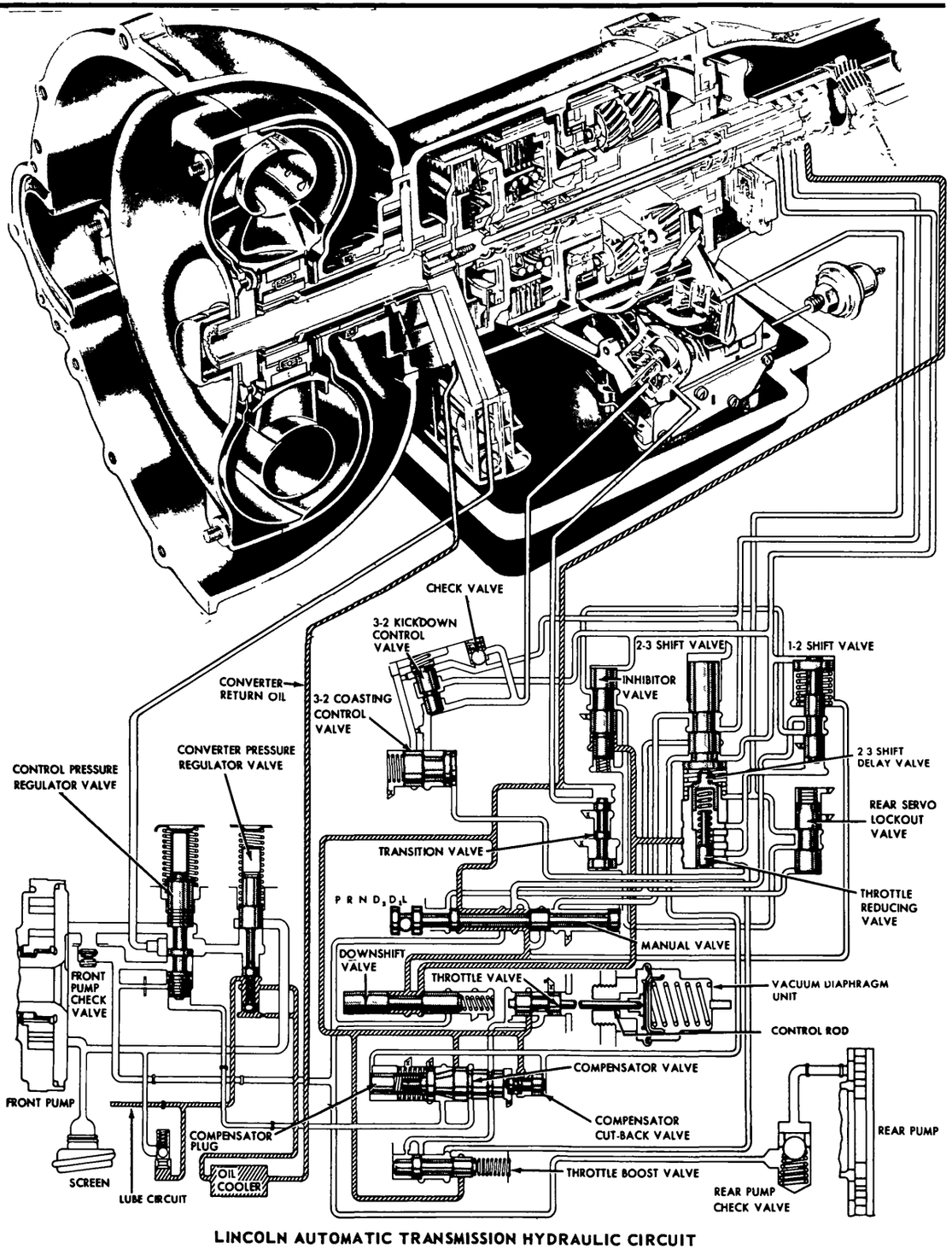
Transmission Fluid Filter: External Type Filter (Early Cars) – Replace filter every 12,000 miles.

Internal Type Dacron Filter (Later Cars) – Not necessary to change periodically. If necessary to change because of transmission failure and filter contamination, replace filter assembly. *DO NOT attempt to clean old filter.*

LINKAGE ADJUSTMENT

Throttl Linkag Adjustm nt: *See CARBURETOR on car model pages.*

CONTINUED ON NEXT PAGE



LINCOLN AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

LINCOLN AUTOMATIC TRANSMISSION (C ntinued)

Manual Linkage Adjustm nt: With engine off and transmission selector lever in "D1" position against stop, raise car and remove splash shield. Disconnect adjustable link from transmission manual shift lever on transmission and make sure shift lever is fully engaged in second detent from bottom. Loosen locknut on adjustable link, then pull downward on link to hold selector lever against stop. Adjust rod length as necessary until hole in link aligns with stud on transmission manual lever, then lengthen link one–half turn additional and connect to transmission shift lever. Check selector lever through all positions. *CAUTION – Do not make compensating adjustments in manual control linkage to overcome misalignment of selector lever indicator or starter n utral switch.*

NEUTRAL SAFETY SWITCH ADJUSTMENT

Linc ln (1961): Remove lower radio speaker and grille, then remove hood release handle from instrument panel. On convertible models, remove top control switch from instrument panel. On all models, remove lower left instrument panel cover and lower section of left vent. Remove wire connector from neutral safety switch, then position transmission selector lever in "D1" or "D2" range and loosen screws attaching neutral switch to steering column. Connect a self–powered test lamp to lower two terminals (back–up lamp) on neutral safety switch. Position selector lever in "R" position and pull switch to its farthest downward position. Slowly move switch upward until test lamp goes on. Tighten one switch mounting screw and move selector lever up and down without moving it out of "R" position. Test lamp should remain on. Attach test lamp lead to upper two terminals on switch and shift selector lever to "P" or "N" position. Test lamp should light. Apply a slight up and down pressure on selector lever while in "P" and "N" positions. Test lamp should not go out. Tighten switch attaching screws and connect wire connector to switch, then install vent extension, lower instrument panel cover, hood release handle, and lower radio speaker and grille.

BAND ADJUSTMENT

► *BAND ADJUSTMENT NOTE: Adjust bands every 12,000 miles und r normal operation. For severe operation, adjust bands v ry 6,000 miles.*

FRONT BAND ADJUSTMENT: *NOTE – Front band adjusting screw is locat d on left side of transmission case (above plug for line pressure check). It is not n c ssary to remove oil pan for front band adjustment.* Raise car and remove transmission linkage splash shield, then remove all dirt from adjusting screw threads and oil threads. Loosen adjusting screw locknut, then install Tool 7345 and tighten adjusting screw until handle "breaks" over center. *CAUTION – If adjusting screw is tighten than wrench capacity (10 ft. lbs.), loosen adjusting screw and readjust.* **Back off adjusting scr w xactly thr full turns.** Hold adjust-screw stationary and tighten locknut to 35–40 ft. lbs. *CAUTION – Damag may r sult to transmission if adjusting scr w is not back d off xactly thr e full turns.*

TRANSMISSION SHIFT POINTS

RANGE THROTTLE SHIFT	AXLE RATIO	SHIFT SPEEDS (RPM)								MANUAL SHIFT
		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	Lo
		Min. 1-2	Max. 1-2	Min. 2-3	Max. 2-3	Min. 3-1	Max. 3-2	Max. 2-1	Min. 3-2	2-1
Continental	2 89-1	8-11	40-50	11-25	65-77	7-9	62-72	21-32	7-11	19-28

► *FRONT BAND ADJUSTING TOOL NOTE·* Tool 7345 consists of two parts, adjusting screw locknut wrench (Tool 7345–L) and adjusting screw ratchet wrench (Tool 7345). Adjusting screw wrench is designed to be inserted through locknut wrench.

REAR BAND ADJUSTMENT: *NOTE – Rear band adjusting screw is located on right side of transmission and is accessible through a hole in floor pan.* Fold back floor mat on right side and remove cover from access hole in floor pan. Remove dirt from adjusting screw and oil the threads, then loosen adjusting screw locknut with Tool 7195–C. Use T–handle of tool and tighten adjusting screw until wrench overruns. *CAUTION – If adjusting screw is tighter than wrench capacity (10 ft. lbs.), loosen adjusting screw and readjust.* **Back off adjusting screw exactly 1½ turns** and tighten locknut to 35–40 ft. lbs. *CAUTION – Damage may result to transmission if adjusting screw is not backed off exactly 1½ turns.*

TESTING

► *TRANSMISSION STALL TEST NOTE: When making stall test, never hold throttle open longer than 5 seconds.*

STALL TEST: With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kick-down position), and note engine speed which should be 1600–1800 RPM *CAUTION – If engine speed exceeds maximum limits, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows **"D1"** – Front clutch and one–way clutch engaged at all accelerator pedal positions. **"D2"** – Front clutch and front band applied at all accelerator pedal positions. **"L"** – Front clutch and rear band applied. **"R"** – Rear clutch and rear band applied. *NOTE – Engine overspeeding is an indication of clutch or band slippage.*

SHIFT TESTS: Select a smooth road for tests. Make tests as outlined below and refer to "Shift Speed Table" for correct speed where shift should occur.

1–2, 2–3 Upshift (Minimum Throttle): Place selector lever in "D1" range, and starting from a standstill, transmission should start in first gear and upshift to second, then at a higher speed, upshift to third.

2–3 Upshift (Minimum Throttle): Place selector lever in "D2" range, and starting from a standstill, transmission should start in second gear and upshift to third gear.

1–2, 2–3 Upshift (Maximum Throttle, Through Detent): Place selector lever in "D1" range, then depress accelerator through detent and hold there. Transmission should upshift at speeds indicated. *NOTE – 2–3 Upshift with s l ctor l v r in "D2" rang will ccur at sam sp d as for "D1" rang .*

3–2, 2–1 Downshift (Forced): With transmission in third gear, depress accelerator pedal to floor (through detent). Transmission should shift from third to second, or from third to first, depending on car speed.

3–1 Downshift (Minimum Throttle): Coasting down from approximately 30 MPH in third gear, transmission should downshift from third to first. *NOTE – A 3–2–1 downshift may be experienced under the above conditions.*

"DR" to "LO" (Manual Shift): With car speed approximately at 50 MPH, shift selector lever from "D1" or "D2" to "Lo". Transmission should shift from high to second. When car speed is reduced within range indicated in table, transmission should shift to low gear.

CONTROL PRESSURE TESTS: Attach a tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet on side of transmission (directly below front band adjusting screw on left side of case). Apply parking brake and adjust idle speed to 450–475 RPM with transmission selector lever in "D2" position. With engine at indicated idle speed and engine vacuum above 16" Hg, and with transmission in either "D1", "D2" or "Lo", pressure should be 57–69 lbs. In "P", "N" or "R", pressure should be 57–213 lbs. If control pressures are within limits, apply service brakes and place transmission selector lever in "D1" or "D2", then increase engine speed slowly until line pressure starts to rise. At this point, manifold vacuum should be 16.0" to 13.7" Hg. As vacuum reading passes through this range, transmission control pressure should start to rise and continue to rise with throttle opening, reaching a maximum pressure of 145–170 lbs. At maximum pressure, vacuum reading should be 1.5" Hg. *CAUTION – Do not hold transmission under stall condition for more than five seconds.* If control pressures are not correct, erratic, or fail to rise with increased engine speed, *see "Trouble Shooting & Diagnosis".*

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan and control valve assembly, then proceed as follows.

Front Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for a dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leakage in this part of system.

Governor Valve: Remove governor inspection cover, then apply air pressure to same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

Rear Clutch: Apply air pressure to rear clutch oil passage (see illustration) and listen for a dull thud to indicate clutch is operating. Check for leakage in same manner as for front clutch (above).

CONTINUED ON NEXT PAGE

LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

Rear Band & Servo: Apply pressure to rear servo oil passage (see illustration) and check band application.
Front Band & Servo: Apply pressure to front servo apply hole and check band application.

TROUBLE SHOOTING & DIAGNOSIS

CONTROL PRESSURE LOW: If pressure is low at idle speed in all selector lever positions, check for excessive leakage in front oil pump, case, and control valve body. *NOTE – Control pressure in "P", "L", & "R" is regulated entirely by control pressure regulator valve and its spring.*

CONTROL PRESSURE HIGH: If control pressure is high at idle speed with transmission selector lever in "N", "D1" & "D2", trouble may be in diaphragm unit or its connecting tubes or hoses. Check engine manifold vacuum. Check diaphragm pushrod for bends and for corrosion. Install diaphragm unit with pushrod removed and recheck control pressure in "N", "D1" or "D2". If control pressure is still too high, trouble is in transmission control system. If pressure is within limits, diaphragm unit is not operating properly.

CONTROL PRESSURE DOES NOT RISE WITH THROTTLE OPENING: If control pressure does not rise in "D1" or "D2" as engine vacuum falls below 16–13.7" Hg, check transmission pressure rise capacity by shifting to "L" or "R". In these positions, maximum control pressure should be obtained at not more than engine stall RPM. If pressure rise is normal in "R" & "L", remove hose from diaphragm unit and check hose and tube. *NOTE – To ch ck, hold thumb over end of hose and check for vacuum. If engine speeds up when hose is disconnected and slows down as thumb is held against end of hose, vacuum source is satisfactory.* If vacuum reading at end of hose is 18" Hg or greater, change diaphragm unit and recheck pressure rise with throttle opening in "D1" or "D2". If control pressure does not rise now, trouble is in transmission. Check for internal leakage in components that have pressure in them in "D1" and "D2" but do not have pressure in them in "R" or "L".

CONTROL PRESSURE IS EXTREMELY ERRATIC: If control pressure is erratic in "N", "D1" and "D2", check diaphragm unit tubes, hoses and diaphragm pushrod (see "Control Pressure High" above). If vacuum is satisfactory, replace diaphragm unit and retest control pressure. If no improvement noted, clean and inspect control valve body and pressure regulator.

ROUGH INITIAL ENGAGEMENT: Adjust engine idle speed. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check control pressure. Adjust front and rear bands.

SHIFT POINTS INCORRECT OR NO SHIFT POINTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check for sticking governor valve or plug. Check control pressure. Check position of valves in control valve body (Check control pressure at each detent position during road test).

ROUGH SHIFT POINTS: Check engine idle speed, throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check for sticking governor valve or plug. Check control valve body. Adjust front band. Check rear servo accumulator.

SLIPPAGE DURING SHIFTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check for sticking governor valve or plug. Check control valve assembly. Adjust front band. Check front servo circuit (air pressure check). Check rear clutch and circuit (air pressure check).

SLIPS (INITIAL ENGAGEMENT "D2", "D1" & "L": Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check front clutch and circuit (air pressure check).

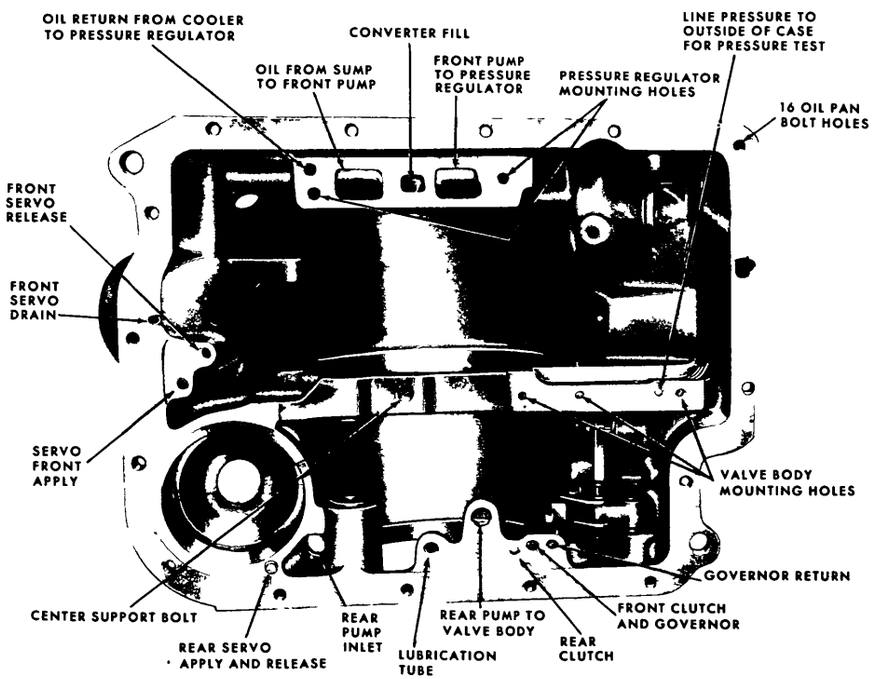
SLIPS (REVERSE ONLY – OR NO REVERSE): Check control pressure. Adjust rear band. Check rear servo circuit (air pressure check). Check control valve body. Check rear clutch and circuit (air pressure check). Check for turned oil distributor sleeve in output shaft.

SLIPS ("D1" LOW GEAR ONLY – OR NO DRIVE IN "D1"): Check operation of planet carrier one–way clutch. Check adjustment of manual and transmission linkage.

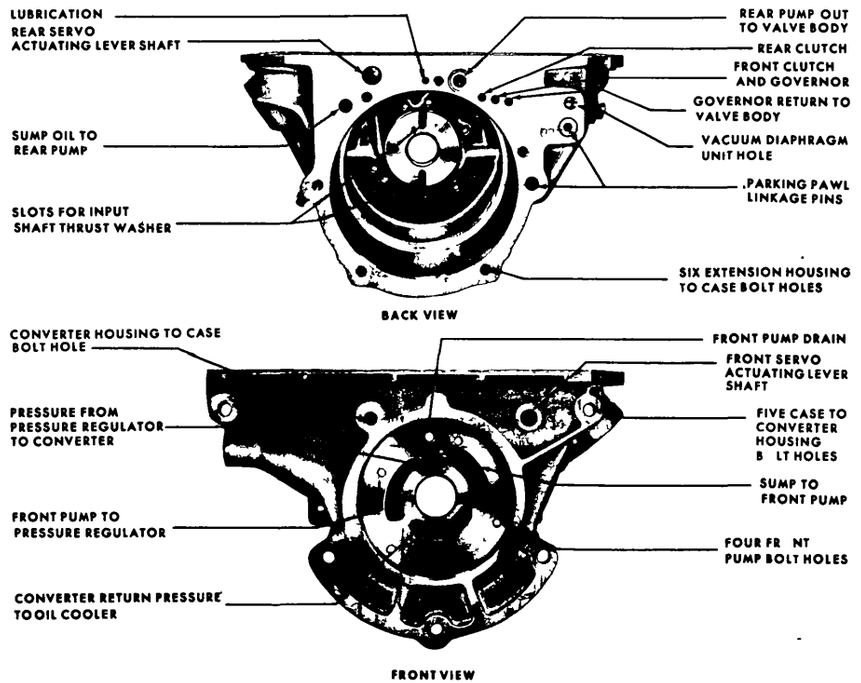
LOSS OF INTERMEDIATE GEAR IN "D1" & "D2": Check front band adjustment. Check front servo circuit (air pressure check). Check control valve body.

SLIPS IN REVERSE (OR IN HIGH GEAR IN "D1" & "D2"): Check rear clutch and circuit (air pressure check). Check control valve body. Check control pres-

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LINCOLN AUTOMATIC TRANSMISSION CASE PASSAGES



LINCOLN AUTOMATIC TRANSMISSION PASSAGE IDENTIFICATION

LINCOLN AUTOMATIC TRANSMISSION (C ntinued)

sure. Check for turned oil distributor sleeve in output shaft.

NO CLOSED THROTTLE DOWNSHIFTS: Check for sticking governor valve or plug. Check control pressure. Check control valve body.

NO FORCED DOWNSHIFT: Check for correct accelerator pedal height. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control valve body.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Check control pressure. Check control valve body. Check front servo circuit (air pressure check). Adjust front band. Check operation of planet carrier one–way clutch.

CAR CREEPS EXCESSIVELY (SELECTOR LEVER IN ANY DRIVING RANGE): Excessive engine idle speed.

CAR MOVES FORWARD IN NEUTRAL: Check manual and transmission linkage adjustment. Check front clutch and circuit (air pressure check).

NO DRIVE IN ANY RANGE: Check transmission fluid level. Check manual and transmission linkage adjustment. Check control pressure. Check for broken converter lugs or input shaft.

COMPLETE LOCK–UP IN ANY RANGE: Check for wrong clutch and/or band application. Check control valve body. Check operation of planet carrier one–way clutch. Check for turned oil distributor sleeve in output shaft. Check front clutch and circuit (air pressure check). Check rear clutch and circuit (air pressure check). Check for release of parking linkage.

UNABLE TO START BY PUSHING: Check transmission fluid level. Check rear pump assembly. Check for broken converter lugs or input shaft. Check front clutch and circuit (air pressure check).

PARK LINKAGE WILL NOT HOLD: Check manual and transmission linkage adjustment. Check parking linkage.

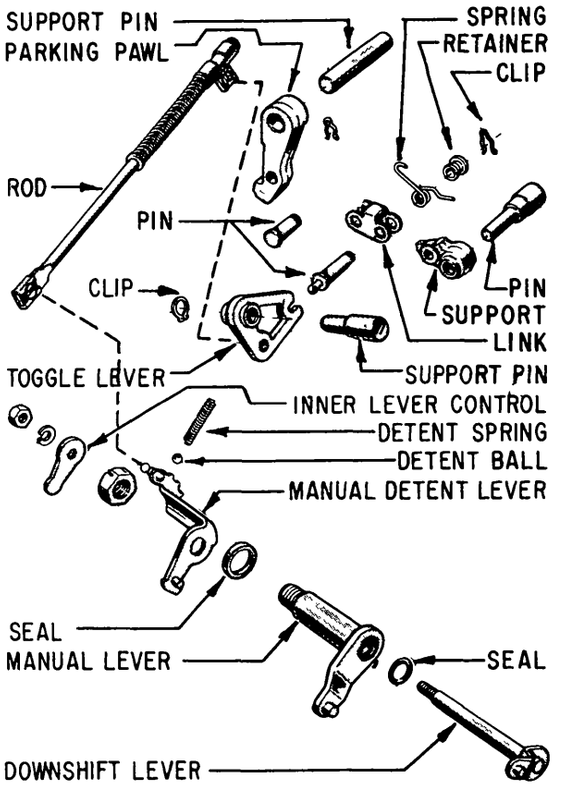
TRANSMISSION OVERHEATS: Check transmission fluid level. Check control pressure. Check for restricted or leaking oil cooler and lines. Check converter one–way clutch operation. Check front band adjustment. Check rear band adjustment.

POOR ACCELERATION (MAXIMUM SPEED TOO LOW): Check transmission fluid level. Check operation of converter one–way clutch. Check engine performance.

TRANSMISSION NOISY ON COASTING 40–20 MPH: Check rear pump assembly.

MINOR REPAIRS (TRANSMISSION IN CAR)

PARKING PAWL REPLACEMENT: Loosen locknut on rear band adjusting screw and tighten adjusting screw with Tool 7195–C until wrench overruns. *NOTE – This holds plan t carri r, front and rear clutch assemblies in plac during parking pawl replacement.* Raise car on a hoist and support front of transmission with a jack stand and wooden block, then drain transmission oil pan. Mark drive shaft and rear companion flange (for reassembly at same location), then remove drive shaft. Remove oil pan and screen. Remove three short tubes from main control valve that directs rear clutch, front clutch and governor return pressure to case. Remove cross member at extension housing and remove extension housing. Remove distributor sleeve snap ring and move distributor back until rear clutch, front



LINCOLN AUTO. TRANS. INTERNAL LINKAGE

clutch and governor return tubes are removed from case. Remove output shaft and rear pump, then remove toggle return spring from lever pin, and remove .328" diameter washer and pin. Remove parking pawl support pin with a magnet and remove parking pawl parts. To reassemble, reverse disassembly procedure using new gaskets. Adjust rear band and fill transmission case with fluid.

GOVERNOR REPLACEMENT: Raise car and remove inspection cover from extension housing. Rotate drive shaft until governor is in line with inspection hole in housing, then remove two governor valve body retaining bolts and governor from counterweight. *CAUTION– Do not drop any parts into extension housing.* Make sure all parts are thoroughly cleaned and that governor valve moves freely in valve body before valve body assembly is assembled to counterweight. Install governor valve assembly to counterweight so that valve body cover is faced toward rear of car, then tighten attaching bolts to 50–60 inch pounds. Install a new gasket on inspection cover and install cover.

TRANSMISSION & CONVERTER REMOVAL & INSTALLATION

REMOVAL: *NOTE – Transmission and c nv rt r must be r moved as an ass mbly. On additi nal convert r housing–to–transmission cas bolt is l cated behind conv rter ass mbly wh r it is not acc ssibl until aft r converter is r mov d.*

1) Remove upper converter housing–to–engine bolts (from under hood), then install starter remote control so engine can be rotated from under car. Place transmission selector lever in "N" (Neutral), then raise car and drain transmission oil pan.

2) Remove converter access cover from front of converter housing and remove transmission linkage splash shield. Mark drive shaft and rear companion flange for installation in same position and remove drive shaft.

3) Remove parking brake equalizer bar retracting spring and disconnect parking brake cables and equalizer assembly. Disconnect transmission downshift rod and manual linkage parts at transmission levers, then disconnect vacuum line hose at vacuum diaphragm and speedometer cable at transmission.

4) Remove engine stabilizer bar from converter housing and converter–to–flywheel retaining nuts. *NOTE– As converter is rotated, remove converter drain plugs and drain converter.* Turn front wheels fully to right and remove starter motor, then disconnect oil cooler lines at transmission and remove transmission filler tube and underbody reinforcement plate.

5) Position transmission jack, with Adapter Kit 7000–EG and Bracket Kit 7000–LC, under transmission and raise transmission slightly. Remove rear support crossmember and brackets from extension housing and car underbody.

6) Detach vacuum line at converter housing, then remove manual linkage equalizer assembly mounted between transmission and underbody. Remove remaining converter housing–to–engine retaining bolts and move transmission and converter toward rear and from under car.

INSTALLATION: Reverse removal procedure and note the following: Tighten crossmember–to–underbody bolts to 13–18 ft. lbs. and body bracket–to–body bolts to 20–30 lt. lbs. Tighten rear universal joint bolts to 15–20 ft. lbs. Tighten converter housing retaining bolts and underbody reinforcement plate bolts to 40–50 ft. lbs. Tighten converter housing–to–flywheel retainbolts to 20–25 ft. lbs.

CONVERTER & HOUSING: Removal – With transmission removed from car, hold converter assembly with both hands and pull converter directly forward. *CAUTION – To prevent damage to front pump seal, do not rock converter assembly from side to side.* Remove one bolt from inside converter housing (holding converter housing to transmission case). Remove remaining five bolts holding converter housing to transmission case and remove housing.

Installation: Position converter housing on case and install five bolts and washers from outside converter housing and one self–locking bolt from inside housing. Install converter so drive lugs on converter are between lugs on front pump drive gear. *CAUTION – Do not move converter from side to side or up and down when it is being assembled.*

TRANSMISSION DISASSEMBLY

DISASSEMBLY (Removal of Components): 1) Place transmission in a suitable holding fixture, then remove oil pan, gasket and oil screen. Remove all oil passage tubes. *CAUTION – Avoid bending or damaging il tub s during removal.* Remove throttle valve vacuum diaphragm assembly and throttle control valve rod, then remove main control valve body assembly from

CONTINUED ON NEXT PAGE

LINCOLN AUTOMATIC TRANSMISSION (Continued)

mounting pad on case. *CAUTION – Hold manual valve in place as assembly is removed.*

2) Remove pressure regulator spring retainer and springs and remove pressure regulator assembly, then loosen front and rear band screws several turns.

3) *CHECK TRANSMISSION ENDPLAY BEFORE PROCEEDING WITH DISASSEMBLY.* Remove one front pump attaching bolt and mount Dial Indicator Support Tool 77067 in this bolt hole so Dial Indicator 4201-C can be installed on support tool in a position to allow contact button to rest on end of turbine shaft. Pry front clutch cylinder toward rear of transmission, then set dial indicator to zero while maintaining a slight pressure on clutch cylinder. Remove tool used for prying clutch cylinder toward rear and insert it between large internal gear and case and pry units toward front of case. Record indicator reading for use at reassembly. This endplay should be .010–.029". Remove dial indicator and support.

4) Remove front pump attaching bolts and remove front pump from case. Remove extension housing seal with Tool 1175–AE, then remove extension housing from transmission. Remove distributor sleeve retaining snap ring and remove distributor sleeve and tubes from output shaft by tapping with a soft hammer on sleeve. *CAUTION – Do not bend or distort tubes.* Remove all four rings and spacer washer from output shaft. Remove governor snap ring and slide governor off shaft, then remove governor drive ball.

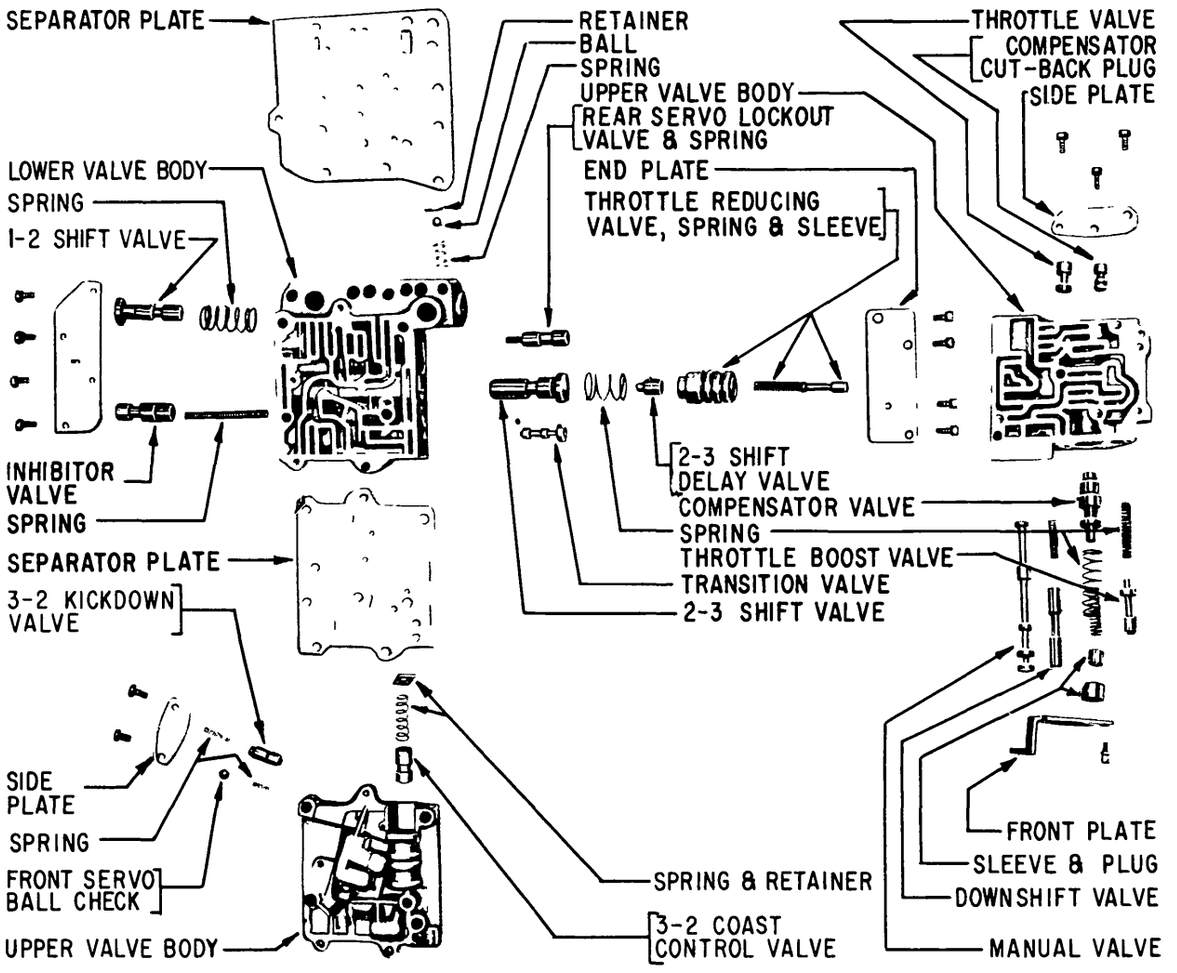
5) Remove rear pump from transmission case, then remove discharge port "O" ring seal. Remove output shaft rear thrust washer from pump, and remove output shaft front thrust washer (selective). Remove two oil seal rings from front clutch sun gear shaft, then use a brass drift and tap rear band actuating lever shaft out through rear of case. Remove rear band actuating lever, strut and rear band anchor strut. Remove center support bolts.

6) Expand rear band with snap ring pliers and use actuating lever strut as a spacer to hold rear band in a spread position. Slide clutch assemblies, center support and planet carrier out rear of case. Remove rear band through bottom of case, then remove front band, anchor strut and actuating lever strut from case. *NOTE – For disassembly and reassembly of Power Train (clutch assemblies, center support and planet carrier), see "Power Train" below.*

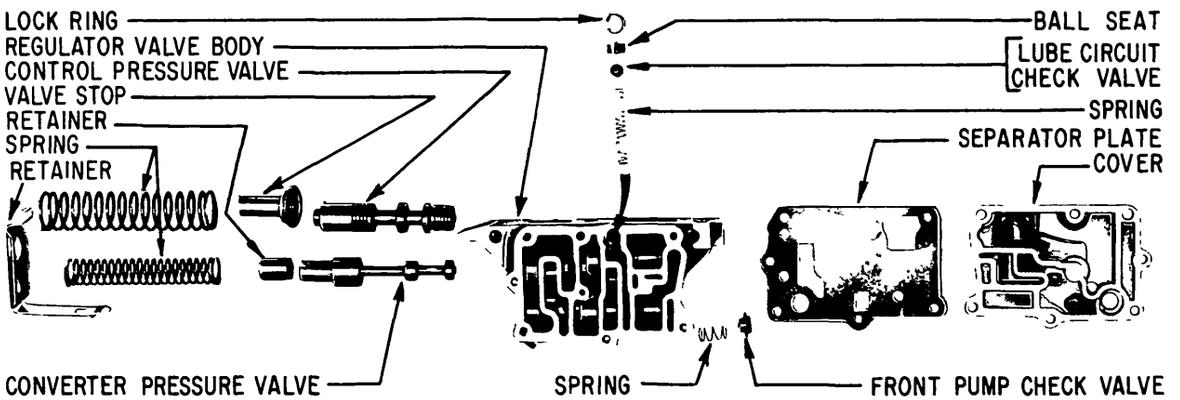
7) To remove rear servo assembly, hold and compress spring retainer with a large "C" clamp or a valve spring compressing tool. After removal of snap ring, release pressure slowly on tool so that compressed return spring does not release too quickly. Remove rear servo spring retainer, spring, and piston from case. Remove accumulator piston, check valve, spring and "O" ring.

8) Remove front servo cover with a screwdriver and remove front servo retainer snap ring. Remove front servo piston assembly and return spring. Drive out front band actuating lever shaft access hole plug on front face of case (near front pump) and remove front band actuating lever retaining clip, then remove actuating lever shaft through hole in front face of case. Remove front servo actuating lever.

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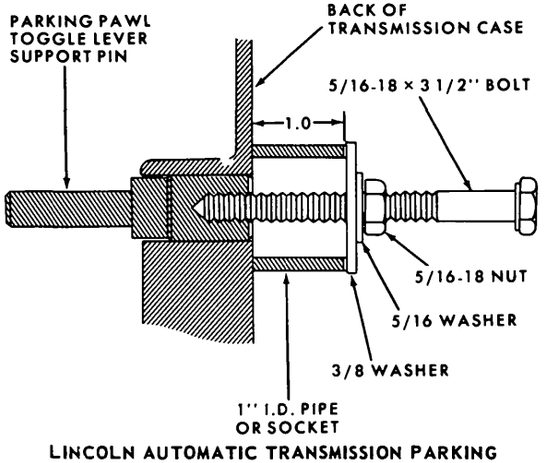
LINCOLN AUTOMATIC TRANSMISSION CONTROL VALVE



LINCOLN AUTOMATIC TRANSMISSION PRESSURE REGULATOR

LINCOLN AUTOMATIC TRANSMISSION (C ntinued)

9) If necessary to remove manual and parking pawl linkage, proceed as follows: Detach parking pawl toggle operating rod from manual detent lever and parking pawl toggle operating lever assembly. Remove throttle control inner lever nut, detent lever, ball, spring and outer lever from case. To remove parking pawl toggle lever support pin from back face of case, use special tool (see illustration). Remove parking pawl support pin and parking pawl assembly from case. Remove parking pawl operating lever retaining clip from support pin, then remove lever. Tap out toggle operating lever support pin using a brass drift to drive pin into case. Remove manual lever oil seal from case. To install manual and parking pawl linkage, reverse removal procedure. Make sure that parking pawl toggle lever support pin is installed so it is flush with back face of case. *NOTE – If pin is pressed in too far, parking pawl lever will bind and not release.*



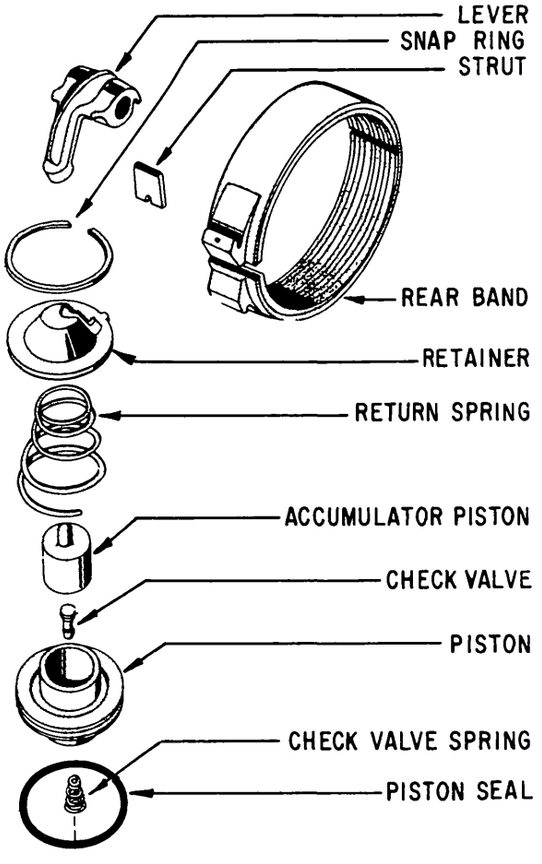
LINCOLN AUTOMATIC TRANSMISSION PARKING TOGGLE SUPPORT REMOVAL TOOL

INSPECTION: Wash all parts and blow dry with air, then inspect for damage. Lubricate all mating surfaces with automatic transmission fluid before reassembly.

REASSEMBLY: 1) Assemble front servo, using new oil rings, then install servo release spring and piston assembly in front servo bore in case, compressing piston ring while installing the assembly. Depress piston retainer and install snap ring. Install seal on front servo cover and press cover into its bore in case being careful not to damage rubber seal.

2) Assemble rear servo piston, using new oil rings, then install servo assembly in its bore in case. Position spring on piston and retainer on spring, then compress retainer and install snap ring. Install front and rear bands in case and expand rear band, using actuating lever strut as a spacer.

3) Install input shaft thrust washer in case. *CAUTION – Make sure tangs on washer hold it in place as gear train is assembled.* Install complete gear train (clutches, center support, planet carrier and output shaft) into case. *NOTE – Center support can be positioned only one way to line up bolt holes.* Install center support bolts and washers and tighten bolts to 28–33 ft. lbs.



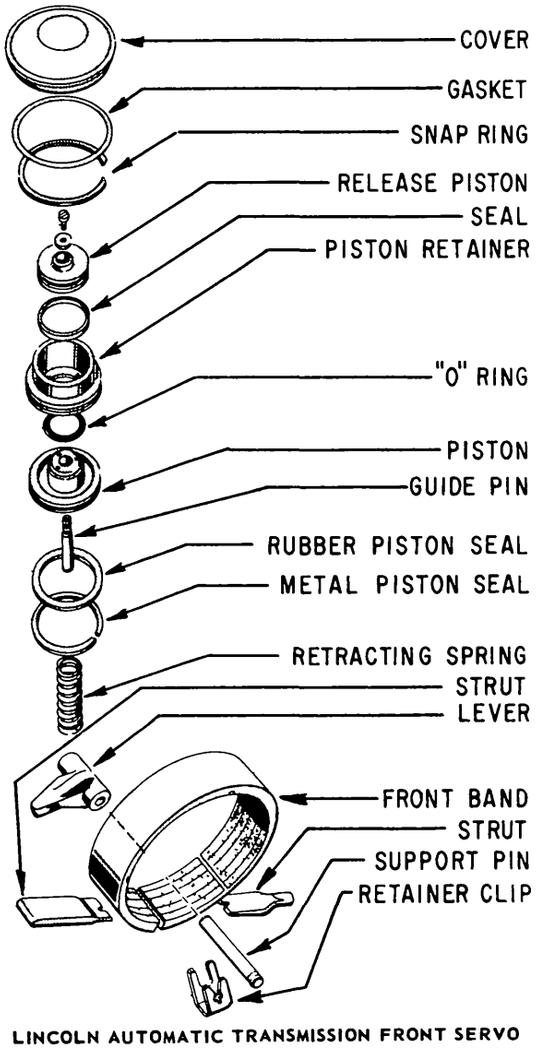
LINCOLN AUTOMATIC TRANSMISSION REAR SERVO

4) Remove spacer from rear band, then install rear band anchor strut and position band on strut. *NOTE – Make sure slot in strut and pin in band are in alignment.* Position rear band actuating lever and strut in case and install rear band actuating lever shaft.

5) Install front band actuating lever, pin and retaining clips, then install metal plug in case at lever pin hole. Install front band actuating and anchor struts.

6) Make sure rear pump drive key is in output shaft, then install rear pump discharge port "O" ring seal in case. Position selective fit output shaft rear thrust washer on rear pump. *NOTE – This washer controls transmission endplay.* With tangs of thrust washer in holes in pump, install gasket on pump, then install pump on output shaft with keyway of pump and key in shaft in alignment. Install governor drive ball, governor and snap rings on output shaft.

7) Install rear pump–to–extension housing gasket on rear pump and install distributor sleeve (with tubes assembled) on output shaft, with inside diameter chamfer toward front of transmission. Guide distributor tubes into transmission case as distributor is moved forward, over the oil rings and against spacer washer. Install distributor sleeve retainer snap ring, then install extension housing and tighten bolts to 28–33 ft. lbs. Install front pump and gasket and tighten bolts to 17–22 ft. lbs.



LINCOLN AUTOMATIC TRANSMISSION FRONT SERVO

8) Recheck transmission endplay and correct, if necessary, by replacing selective fit output shaft thrust washer. Adjust front & rear bands *(see "Band Adjustment" above).* Install pressure regulator assembly springs, spacers and retainer and tighten bolts to 17–22 ft. lbs. Install main control valve assembly, spacing it so that maximum contact is obtained between manual lever and detent lever when it is placed in each detent position. *CAUTION – Manual valve should not bind in casting as detent lever is moved to each detent position.*

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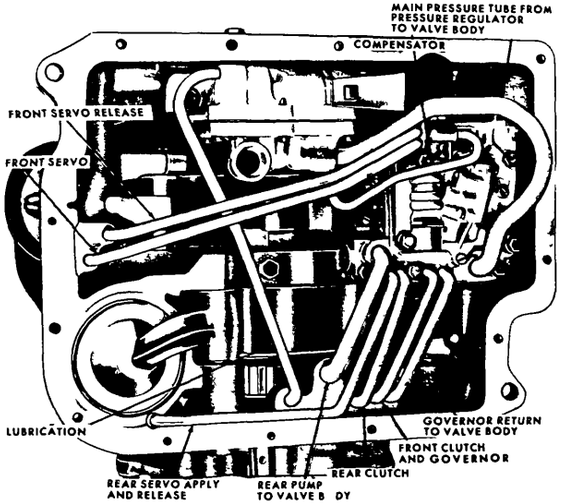
LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

9) Install hydraulic pressure tubes in following order, making sure tubes are set firmly in place to eliminate any leakage. *NOTE – Refer to "Hydraulic Pressure Tube" illustration.* (a) Lubricating Pressure Tube. (b) Rear Clutch, Front Clutch & Governor Return Tube. (c) Rear Servo Apply & Release Tube. (d) Rear Pump Pressure Tube. (e) Compensator Tube. (f) Main Pressure Tube. (g) Front Servo Apply & Release Tube.

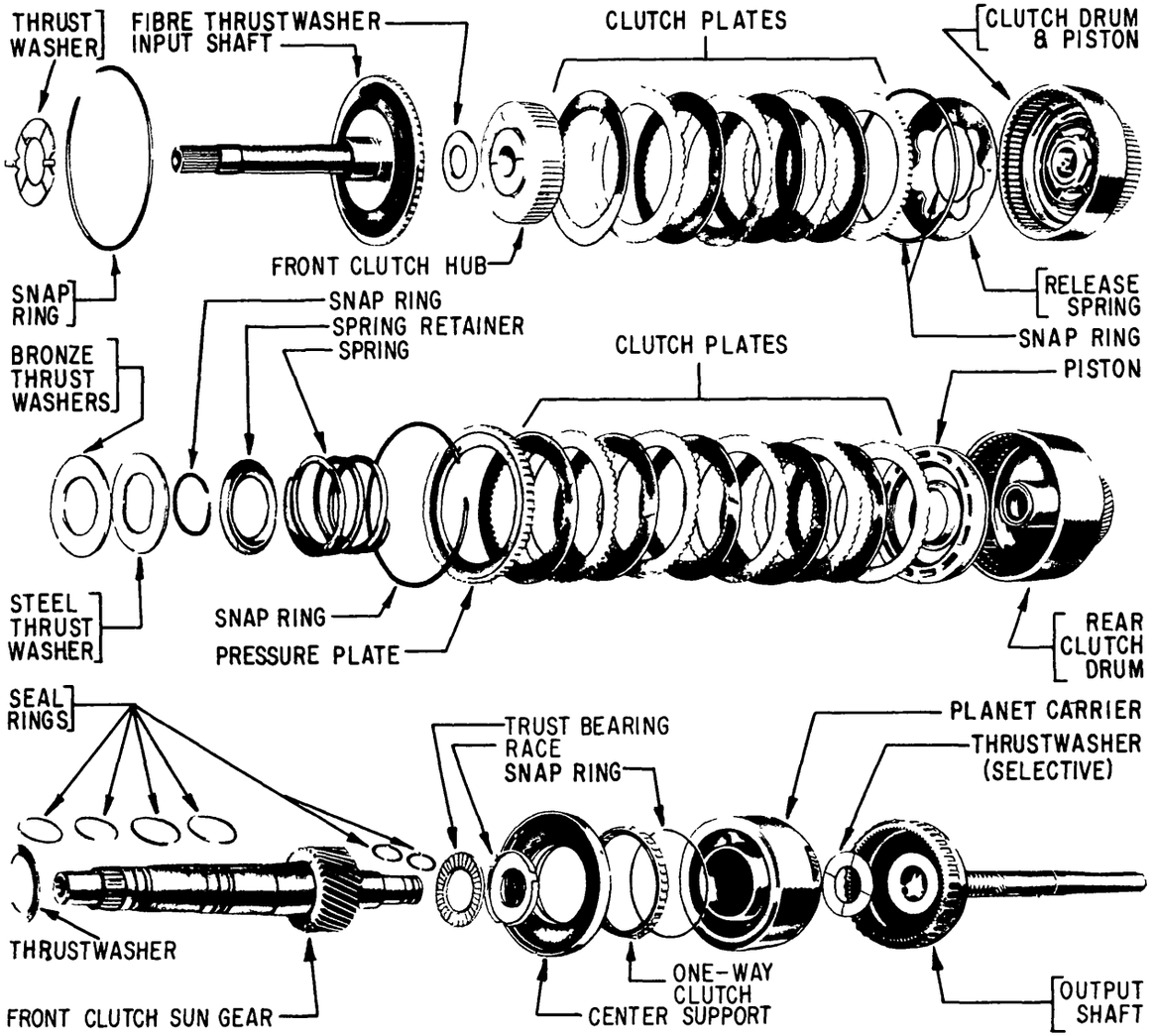
10) Install seal on front pump inlet tube on screen and install screen. Install oil pan gasket, pan and service identification tag.

POWER TRAIN: Disassembly - Place power train (clutch) assemblies, center support, and planet carrier) in a suitable holding fixture (Tool 77530–A), then remove bronze and steel thrust washers from clutch assembly. Remove oil seal rings from primary sun gear shaft, and remove rear clutch from sun gear shaft. Remove rear clutch seal rings from sun gear shaft and the thrust washer between rear clutch and primary sun gear. Remove front clutch snap ring which holds turbine shaft to front clutch hub, then remove turbine shaft. Remove front clutch plates and internal hub, then using an arbor press and Tool 77565, remove Belleville spring. Use air pressure and Tool 7000DE (or other suitable nozzle) and force piston out of drum. Remove rear clutch pressure plate snap ring and rear clutch plates, then compress rear clutch spring with an arbor press and Tool 77515–A and remove snap ring, spring retainer and release spring. Remove piston in same manner as for front piston (above).

R assembly – Reverse disassembly procedure, making sure that one–way clutch is assembled with drag strips toward front of center support, and that thrust washers between clutch assemblies are properly positioned.



LINCOLN AUTOMATIC TRANSMISSION HYDRAULIC PRESSURE TUBES



LINCOLN AUTOMATIC TRANSMISSION POWER TRAIN

TORQUE CONVERTER

Needle thrust washer and race must be positioned between planet assembly and front clutch sun gear.

TORQUE CONVERTER: Torque converter is a welded unit and cannot be disassembled for repair. Check converter operation as follows and replace complete assembly if not within specifications.

Stator One–Way Clutch: Install Tool 7946–A into stator hub from rear of converter, then install a suitable torque wrench on tool. Rotate torque wrench handle in a clockwise direction (viewed from rear of converter). If tool does not rotate freely, overrunning clutch is binding or is installed backwards and must be replaced. Swing tool so steel rod (part of tool) positions against opposite pump drive lug, then apply 10 ft. lbs. torque while attempting to rotate tool counterclockwise (converter viewed from rear). Rotate tool clockwise and attempt to turn converter counterclockwise at least five times. If tool fails to hold on any attempt to turn converter counterclockwise, then one–way clutch is slipping and the converter must be replaced.

End Play Check: Install Tool 7937–A into stator hub, then tap lightly on tool to drive it forward, eliminating forward end thrust movement. Install a dial indicator on rod so indicator contact button rests against outside surface of converter, then pull tool toward rear of converter. *CAUTION – Do not rock or tip tool sideways.* Movement indicated on dial indicator should not exceed .060". If endplay is greater, thrust washers are worn and converter must be replaced.

DUAL-COUPLING HYDRA-MATIC TRANSMISSION

Cadillac (1961)
Pontiac (1961)

►*TRANSMISSION IDENTIFICATION NOTE: A serial number prefix stamped on the serial number plate located at lower left hand corner on rear face of transmission case identifies the various transmissions as indicated in table below.*

Car Model	Serial Number Prefix
Cadillac Series 60 & 62	"C"
Cadillac Series 75	"CA"
Pontiac, 2-Bbl. Carb	PS-61
Pontiac, Triple Carburetors	PAS-61
Pontiac, 4-Bbl. Carb.	PBS-61
Pontiac, Economy Eng.	PES-61

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR NOTE: Due to the elimination of the rear pump in this transmission, it is not possible to start the engine by pushing, towing, or coasting the car.*

►*TOWING HYDRA-MATIC DRIVE CARS: Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with the transmission. When towing at speeds above 30 MPH or if transmission known to be out of order, disconnect propeller shaft from transmission. CAUTION - After towing, check fluid level and if necessary, bring to proper level.*

►*1961 CADILLAC HYDRA-MATIC REAR UNIT GEAR NOISE NOTE:* Rear unit gear noise developing after transmission has been overhauled or disassembled and reassembled may be caused by rear unit sun gear and rear unit internal gear being installed improperly. Both of these gears have a definite front and rear side. Rear unit sun gear has a drilled spot to indicate **rear face** of gear. The internal gear has a 15° chamfer machined on **front** outside diameter of drive lugs.

DESCRIPTION: Four-speed hydraulically controlled planetary type transmission of same design used on previous models.

LUBRICATION

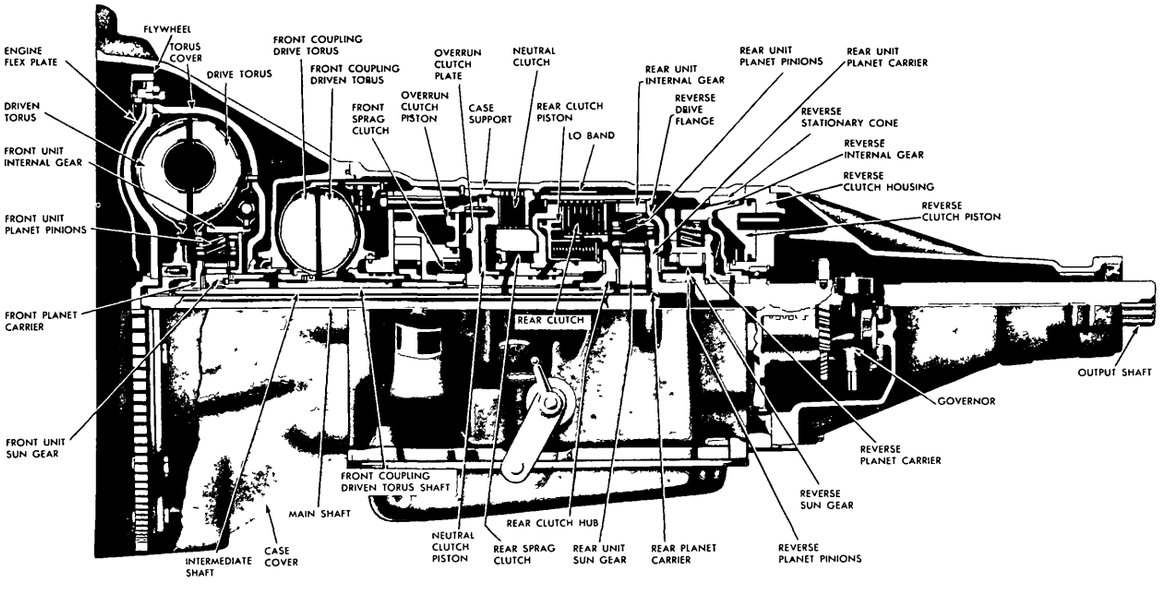
LUBRICATION: Check fluid level each time engine oil is changed (Cadillac); at every 2000 mile chassis lubrication (Pontiac). Drain and refill every 16,000 miles (Cadillac), every 25,000 miles (Pontiac). *CADILLAC NOTE: Original factory fill should be changed at 30,000 miles or one year, whichever occurs first.*

►*1961 PONTIAC TRANSMISSION DIPSTICK NOTE: Dipstick must be inserted in filler tube and rotated 1/8 turn to lock it in position. When checking fluid level, make sure dipstick is in locked position*

►*FLUID LEVEL CAUTION: Due to the smaller size of this transmission, it is extremely important that the proper fluid level be maintained. DO NOT check or change the fluid level when transmission is extremely hot or cold because of fluid expansion and contraction.*

Recommended Lubricant: Use Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - On Pontiac, Automatic Transmission Type "A" may be used.*

CHECKING FLUID LEVEL: With transmission selector lever in "N" or "P" position and transmission at normal operating temperature (engine at idle speed), check fluid level on dipstick. Add oil with engine running to bring level up to "Full" mark on dipstick. *NOTE - It requires approximately 1 pint of fluid to bring level from "Low" to "Full". DO NOT OVERFILL TRANSMISSION.*



DUAL-COUPLING HYDRA-MATIC SECTIONAL VIEW

Capacity: Refill - 9 qts. (Cadillac & Pontiac).
After Overhaul - 10 qts. (Cadillac), 10½ qts. (Pontiac). *CAUTION - The transmission fluid capacities indicated above are approximate, follow procedure outlined above (see "Checking Fluid Level").*

►*CADILLAC TRANSMISSION OIL FILTER: A paper element type oil strainer on oil intake pipe (in oil pan) should be replaced every 30,000 miles or when any major transmission failure has occurred.*

LINKAGE ADJUSTMENT

►*THROTTLE VALVE LINKAGE ADJUSTMENT NOTE: See "Carburetor" on individual car model pages for throttle valve linkage adjustment.*

CADILLAC

MANUAL LEVER LINKAGE ADJUSTMENT: Remove slush deflector, then remove clevis from manual lever on transmission. Loosen adjusting nuts on transmission manual rod and place manual lever in DR-4 position. Place selector lever on steering column in DR-4 position, then adjust length of manual rod until hole in manual lever lines up with hole in clevis. Increase length of rod **one turn.** Install clevis and tighten adjusting nuts. Check operation of selector lever. It should be free to enter "P" (Park) position and DR-4 stop in steering column should correspond to DR-4 detent position in transmission. Readjust if necessary.

Neutral Safety Switch Adjustment (Combination Neutral Safety Switch, Back-up Light Switch): Located on steering column forward of instrument panel. Loosen attaching screw on switch and position it on jacket so starter is not operative in any position except "N" (Neutral) or "P" (Park).

PONTIAC

MANUAL LEVER LINKAGE ADJUSTMENT: Place selector lever and transmission manual lever in "P" (Park) position; and with outer transmission shift lever trunnion nuts backed off clear of trunnion, pull shift rod down toward transmission as far as possible. While holding in this position, run the upper trunnion nut down to just contact trunnion, then run lower nut up to contact trunnion and lock nuts securely.

Neutral Safety Switch Adjustment: Located at lower end of steering column in engine compartment. Place selector lever in "N" (Neutral) position, then loosen switch mounting screws. Adjust switch to index with

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC TRANSMISSION (Cont.)

selector lever. *NOTE - Starter must not operate when ignition key is turned to start position with selector lever in "D" (Drive) position.* Test to see that engine starts when selector lever is in "P" (Park) or "N" (Neutral) position. Tighten switch mounting screws securely.

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *See "Dual-Coupling Hydra-Matic" Shift Point Table for correct shift speeds.*

OIL PRESSURE TEST: Connect oil pressure gauge, Tool J-2540-A (Cadillac), J-5907 (Pontiac) to take-off hole at bottom of reverse clutch housing using a hose and fitting. Drive car until normal operating temperis reached, then test as follows:

Zero Throttle Pressure (Pontiac): Check pressure in all ranges. Pressure should be 50 lbs. minimum in all ranges with a maximum variation of 10 lbs. (may be higher in reverse).

Drive "Right" Pressure (Pontiac): With transmission selector lever in Drive "Right" position and car speed at approximately 25 MPH, pressure should be 90-100 lbs. *NOTE - Pressure at any speed is constant regardless of throttle pressure as throttle valve pressure is not used to modulate line pressure.*

Drive "Left" Pressure (Pontiac): While driving at 25 MPH, move selector lever to Drive "Left" position so that transmission will shift into 4th Speed. Oil pressure should drop to 60-70 lbs. in 4th.

Full Throttle Pressure Test (Cadillac): In any drive range, pressure should be at least 30 lbs. higher than zero throttle pressure test reading (see above).

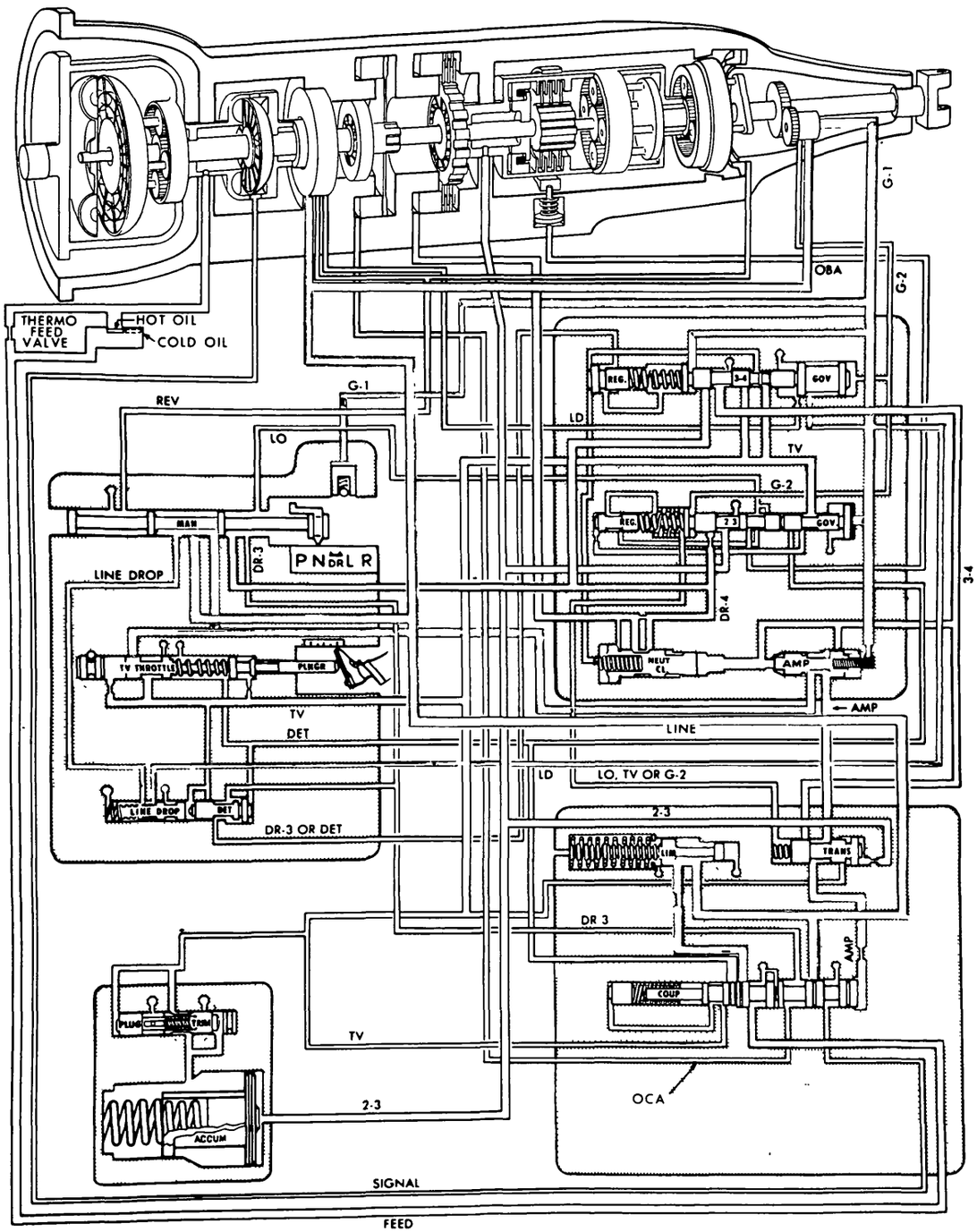
Reverse Pressure Test (Cadillac): Place selector in "R" (Reverse) position and apply foot brake. Increase engine speed to half throttle. Pressure range under these conditions should be 150-200 lbs.

CADILLAC (ALL SERIES)

	(Engine Speed - RPM)		
UPSHIFTS:	**1-2**	**2-3**	**3-4**
"Dr4" (Min. Throttle)	850	1380	1270
(Full Throttle)	2810	3850	4170
"Dr3" (Min. Throttle)	850	1380	4170
(Full Throttle)	2810	3850	4170
"Lo" (Min. Throttle)	850	4590	4170
(Full Throttle)	2810	4590	4170

DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr4" (Min. Throttle)	630	540	470
(Full Throttle)	2485	1590	1000
"Dr3" (Min. Throttle)	2485	540	470
(Full Throttle)	2485	1590	1000
"Lo" (Min. Throttle)	2485	2560	470
(Full Throttle)	2485	2560	1000

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DUAL-COUPLING HYDRAULIC CIRCUITS

DUAL-COUPLING HYDRA-MATIC TRANSMISSION (Cont.)

PONTIAC (ALL MODELS)

		(Car Speed - MPH) 1-2	2-3	3-4
UPSHIFTS:				
"Dr Left"	(Min. Throttle)	5-9	11-15	21-25
	(Full Throttle)	11-15	39-43	65-75
"Dr Right"	(Min. Throttle)	5-9	11-15	
	(Full Throttle)	11-15	39-43	74-80
"Lo"	(Min. Throttle)	4-9		
	(Full Throttle)	11-15	47-54	74-80
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr Left"	(Closed Throttle)	Ⓒ 18-15	Ⓒ 10-6	Ⓒ 8-3
	(Full Throttle)	② 70-33	25-14	12-3
"Dr Right"	(Closed Throttle)	74-68	10-6	8-3
	(Full Throttle)	② 74-28	25-14	12-3
"Lo"	(Closed Throttle)	70-60	48-44	8-3
	(Full Throttle)	② 70-28	48-44	12-3

Ⓒ - When this shift occurs, transmission will freewheel and it is not possible to observe shift with throttle closed. To check for shift, decelerate, with throttle closed, to specified speed, then accelerate to determine which speed transmission is in.
② - Forced.

TROUBLE SHOOTING & DIAGNOSIS

NO UPSHIFTS OR ERRATIC: Governor valves stuck. Broken governor rings. Sticking valves or dirt in valve body. G-2 bushing turned. Front unit internal gear bushing seized on shaft.

MISSES 2ND SPEED: Governor boost valve stuck. Transition valve stuck away from plate. Sticking valves or dirt in valve body. Governor sticking.

MISSES 3RD, OR 2-4-3: Transition valve sticking. Sticking valves or dirt in valve body. Throttle valve adjustment too long. Rear clutch or transition valve spring faulty.

LOCKS UP IN 2ND AND 4TH: Front sprag clutch broken. Overrun clutch applied or sticking.

LOCKS UP IN 3RD OR 4TH: Rear sprag clutch broken. Low band not releasing.

ROUGH 2-3 SHIFT: Accumulator valve stuck or accumulator piston stuck. Accumulator gasket broken or leaking. Restricted or leaking oil passages. Broken accumulator spring. Broken or leaking piston oil seal rings. Control valve faulty or throttle valve adjusted improperly. Rear clutch pack faulty. Case passages restricted or leaking.

UPSHIFTS ROUGH: Throttle linkage adjusted short. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking or restricted main line feed to governor.

UPSHIFTS LOW: Throttle linkage adjusted long. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking throttle valve oil.

NO REVERSE, SLIPS OR LOCKS UP: Manual linkage incorrectly adjusted. Manual valve not engaged with drive pin. Reverse piston apply restricted or leaking. Low oil pressure. Overrun clutch apply leaking. Pressure regulator faulty. Neutral clutch not released. Flash restricting neutral clutch exhaust port or manual body.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Governor valves sticking or broken governor rings. Reverse blocker piston stuck. Manual linkage interference.

REVERSE DRIVE IN NEUTRAL: Reverse stationary cone sticking.

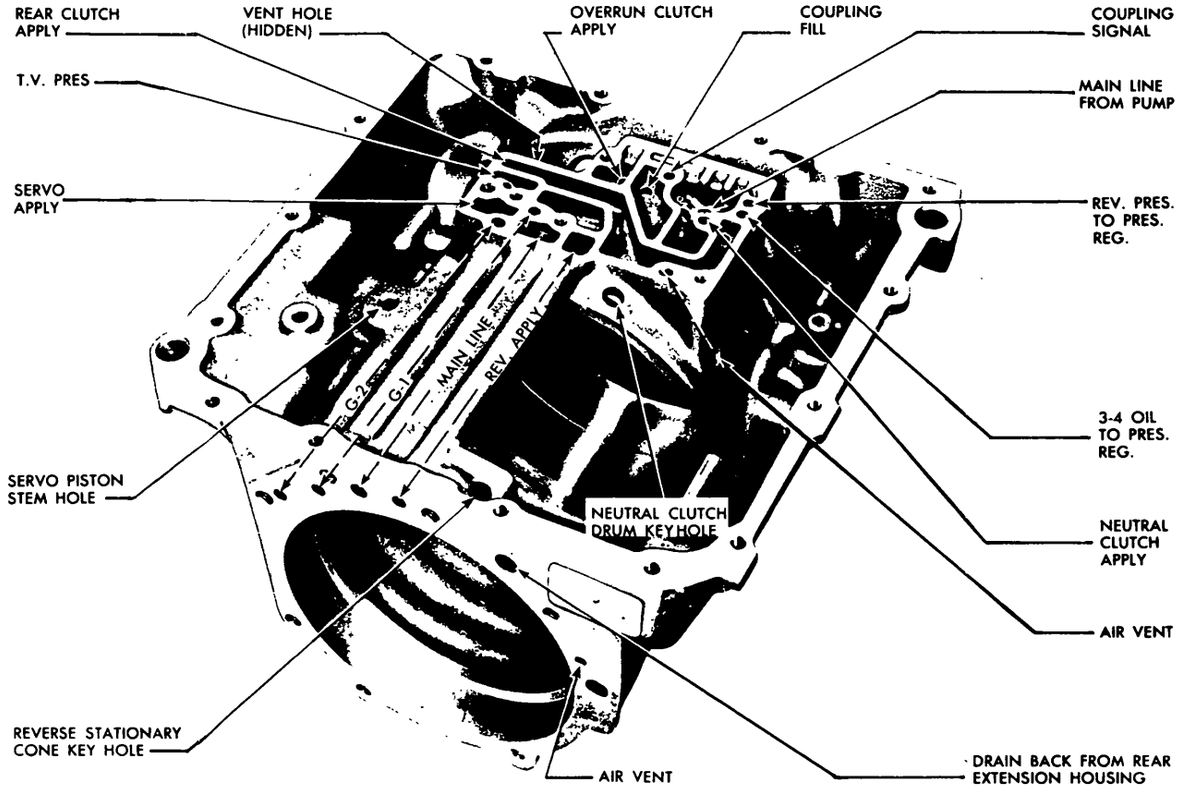
DELAYED 1-2 SHIFT: Coupling valve sticking. Governor boost valve sticking. G-1 valve sticking. Wrong spring on coupler valve.

SLIPS IN 1ST AND 3RD: Front sprag clutch slipping. Front sprag clutch broken.

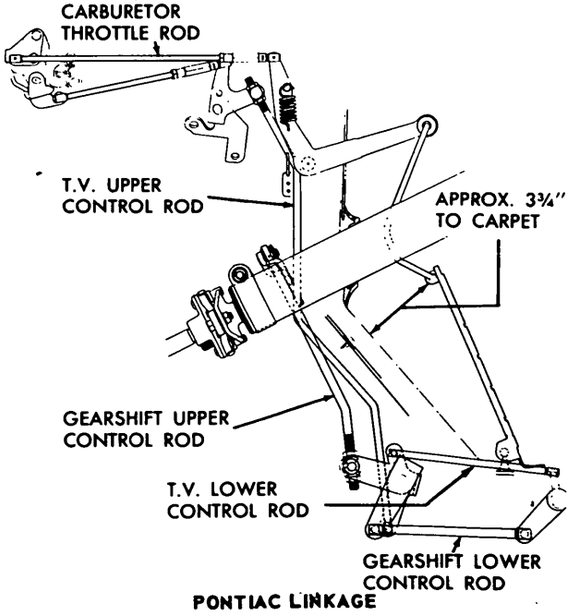
SLIPS IN OR MISSES 2ND AND 4TH: Front unit torus cover seals leaking. Front unit torus cover exhaust valves sticking or missing. Front unit torus cover feed restriction or leak. Front unit torus cover signal restriction or leak. Low oil pressure. Coupling valve sticking. Sticking valves or dirt in valve body. Coupling snap ring improperly installed, or missing. Limit valve faulty. Coupling passage restricted or leaking. Front unit torus vanes damaged.

SLIPS IN ALL DR RANGES: Manual linkage improperly adjusted. Neutral clutch clipping or burned. Neutral clutch apply restricted or leaking (case support or valve body). Incorrect number of neutral clutch plates. Low oil pressure. Control valve faulty. Torus members (check valve) faulty. Intake pipe "O" ring damaged or

CONTINUED ON NEXT PAGE



DUAL-COUPLING HYDRA-MATIC OIL PASSAGES



PONTIAC LINKAGE

DUAL-COUPLING HYDRA-MATIC TRANSMISSION (C nt.)

missing. Pressure regulator valve stuck in pump. Pump slide stuck.

SLIPS IN 1ST OR 3RD (DR RANGE): Rear sprag clutch slipping or improperly assembled. Rear sprag clutch broken. Neutral clutch burned, restricted or the piston is sticking.

SLIPS IN 3RD OR 4TH: Rear unit clutch slipping or burned. Rear unit clutch apply restricted or leaking. Incorrect number of clutch plates (rear). Accumulator faulty. Center support leakage at 2-3 passage. Low oil pressure. Accumulator valve stuck (3rd only).

SLIPS IN 3RD IN DR RIGHT ON COAST: Overrun clutch slipping or burned. Overrun clutch apply restricted or leaking. Sticking valves or dirt in valve body. Overrun clutch passages restricted or leaking.

SLIPS IN 1ST AND 2ND LO RANGE ON COAST: Low servo apply restricted or leaking. Low band not anchored to case or broken. Low servo piston and rod binding in case or servo and accumulator body. Band facing worn or loose. Anchor dowel pin loose or missing in case.

NO DRIVE IN DR RANGE: Manual linkage incorrectly adjusted or manual valve not engaged with drive pin. Low oil pressure (pressure regulator stuck). Front pump intake pipe improperly installed. Front sprag broken (front pump bushing or front unit drive torus shaft). Front and/or rear sprag not properly installed. Rear sprag broken. Front sprag inner race broken. Rear sprag outer race broken. Neutral clutch plates burned. Neutral clutch piston, control valve or front pump not operating properly.

DRIVE IN LO RANGE ONLY: Rear sprag broken. Neutral clutch not applying.

NO FORCED DOWNSHIFTS (4-3 OR 3-2): Control valve faulty or linkage not properly adjusted.

2-3 RUNAWAY OR 2-1-3 SHIFT: 2-3 passage in center bearing support restricted or leaking. Plug out of accumulator. Rear clutch burned. Valve body faulty (transition valve or case passages in the 2-3 circuit).

WILL NOT GO INTO PARK: Parking links broken. Mechanical interference. Manual linkage or parking pawl faulty.

STARTS IN 2ND SPEED: Valves sticking. Governor sticking or governor boost valve stuck.

DRIVES FORWARD IN REVERSE AND NEUTRAL: Neutral clutch piston stuck in applied position.

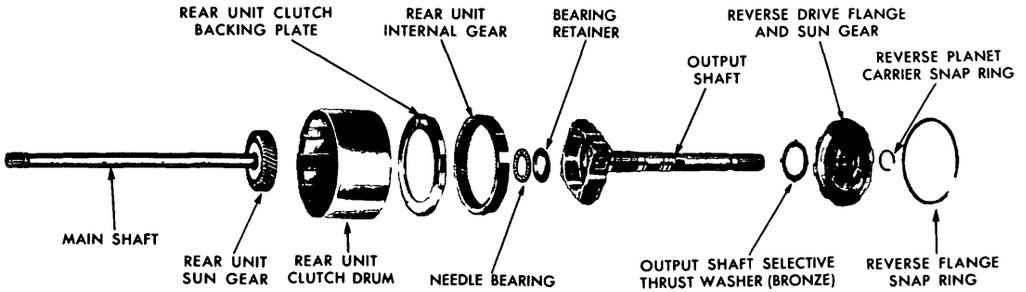
LUNGES FORWARD BEFORE BACK-UP WHEN PLACING SELECTOR IN REVERSE: G-2 plunger stuck in outward position. Restricted neutral clutch release oil supply.

REMOVAL & INSTALLATION

CADILLAC

REMOVAL: 1) Place car on a hoist or on jack stands and disconnect battery. Remove starter motor and slush deflector and lower flywheel cover front cover.

2) Drain transmission at oil pan and flywheel, then remove transmission filler pipe bracket bolt from right cylinder head. Clean dirt from pipe flange and slide filler pipe out of sleeve in transmission case.



1961 DUAL-COUPLING HYDRA-MATIC CASE CENTER SUPPORT, NEUTRAL & REAR UNIT CLUTCH

3) Disconnect brake cables from parking brake relay lever, then remove retracting spring and remove relay from frame. Remove propeller shaft assembly and remove intermediate frame crossmember below flywheel housing. Disconnect speedometer cable from extension housing. Remove throttle valve and manual levers from shafts.

4) Remove four nuts from flywheel-to-drive plate screws, then place a jack under rear of engine oil pan (use a wood block to prevent damage to plan). Place transmission jack under transmission and raise it just enough to take strain off rear engine support. Disconnect engine rear support at transmission extension housing and remove crossmember that carries support.

5) Disconnect oil cooler pipes from adapter on transmission case and cap the lines to prevent leakage.

6) Remove six screws holding flywheel housing to engine then remove transmission and flywheel housing as a unit by moving assembly toward rear of car, disengaging flywheel housing from locating dowels on engine, and then tilting front unit downward to lower it from car. Remove washer from pilot hole in crankshaft.

INSTALLATION: 1) Install spacer in pilot hole in crankshaft, then raise transmission into position carefully with transmission jack and align drive plate with torus cover screws and drive dowel holes in flywheel housing with dowels on engine. Install flywheel housing-to-crankcase screws, making sure that flywheel is as far forward as possible. Connect oil cooler lines and tighten securely.

2) Lift engine and transmission to about one inch above its normal height and install engine rear support bracket on frame. Tighten three bracket bolts on one side only. Install three bracket bolts on other side loosely. Lower transmission carefully and install two support screws. Remove block from engine pan and remove transmission jack.

3) Install four nuts attaching drive plate to flywheel and tighten to 15-20 ft. lbs. *CAUTION - Make sure drain plugs in flywheel and oil pan are tight.* Install flywheel housing front cover making sure to attach the two exhaust braces. Install starter motor.

4) Install filler tube in transmission with support bracket properly positioned on cylinder head. Install manual and throttle valve levers on transmission shaft, making sure that serrations on levers are lined up with serrations on their respective shafts and tighten securely. Install speedometer cable, and install slush deflector.

5) Wedge screwdriver in between frame and end of rear support bracket which was left loose, to spring frame slightly. Install frame crossmember below flywheel housing with six bolts. Remove screwdriver and tighten bolts. Tighten three remaining bolts on engine rear support bracket.

6) Install propeller shaft assembly, then install parking brake relay lever and retracting spring in position on frame. Connect brake cables to lever and adjust cable. Lower car to floor and connect battery.

7) Install filler pipe bracket to cylinder head screw, then fill transmission with fluid (*see "Draining & Refilling" above*). Adjust manual and throttle valve linkage. *See "Linkage Adjustments" abov* .

PONTIAC

REMOVAL: 1) Remove one battery cable and release the parking brake, then raise car and drain transmission (see "Draining & Refilling" above). Disconnect oil cooler lines by either removing clamps and pulling hoses or by cutting the hoses. Disconnect drive line from transmission output shaft, then remove complete drive line assembly.

2) Disconnect speedometer cable from drive gear and remove gearshift lower control rod. Remove cross shaft bracket, cross shaft lever and bushing from transmission. Remove lower end of throttle valve upper control rod (engine-to-transmission idler lever), then remove throttle valve lever control rod and throttle idler lever.

3) Remove both starter cables and remove starter and splash shield. Remove flywheel bottom cover and remove flywheel-to-flex plate attaching bolts. Position automatic transmission jack under transmission and and remove two rear support-to-frame crossmember bolts. Disconnect crossmember at each frame side rail and raise transmission so rear mount supports are clear of cross member, then rotate crossmember slightly in frame and remove parking brake return spring and cable guide rod from crossmember.

4) Remove crossmember, then lower transmission enough to remove flywheel housing-to-engine bolts. Work transmission rearward to disengage dowels from front flywheel housing and remove transmission from car.

INSTALLATION: Reverse removal procedure and note the following: With transmission in position engaging dowels into engine and torus cover bolts into flex plate, install and tighten two flywheel housing attaching screws. *NOTE - If pilot on flywheel has entered*

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DUAL-COUPLING HYDRA-MATIC TRANSMISSION (Cont.)

end of crankshaft properly, flywheel and torus cover should move back and forth slightly. Rotate flywheel to bring one flex plate mounting pad down to lowest position, then push flywheel forward slightly to seat it against crankshaft. Measure clearance between pad on flex plate and flywheel with a feeler gauge. Minimum clearance should be .015". If less, move transmission away from engine and install special spacer over flywheel pilot. Move transmission back into position and install two flywheel housing-to-engine bolts. When installing flex plate-to-flywheel attaching nuts, tighten nuts to 15 ft. lbs. using a torque wrench with extension, Tool No. J-6498.

OVERHAUL

►*LATE 1960-61 CADILLAC 2-3 SHIFT VALVE ASSEMBLY NOTE:* Beginning with Late 1960 production an additional spacer is used between end of 2-3 Shift Valve and 2-3 Shift Valve Spring. When installing, the spacer fits on end of 2-3 Shift Valve with rim of spacer against large land on valve.

►*LATE 1960 & EARLY 1961 CADILLAC HYDRA-MATIC TRANSMISSIONS REMAINING IN 3RD GEAR WHEN CAR IS STOPPED CORRECTION:* On 1961 cars before Engine No. 024382 or on late 1960 cars using a spacer in 2-3 Shift Valve bore (see above), install 2-3 Shift Valve Spring, Part No. 8620807. This new spring with redesigned end coils eliminates possibility of spring hanging up on a step in valve bore.

►*1960-61 CADILLAC SERVO ACCUMULATOR ASSEMBLY NOTE:* When reassembling this unit, the accumulator is properly positioned when top of piston stem is below face of accumulator body. The relation of top of piston to face of accumulator body does not indicate seating of the stem.

►*CADILLAC TRANSMISSION REAR CLUTCH HUB-TO-REAR CLUTCH UNIT THRUST WASHER INSTALLATION NOTE:* Beginning with Late 1960 production, a steel backing washer has been added between rear clutch hub and rear clutch cover to reduce galling of bronze thrust washer and reduce wear on the clutch cover. When installing, the bronze thrust washer is positioned next to rear clutch hub and the steel backing washer is positioned between bronze washer and rear unit clutch cover with flange on backing washer toward clutch cover. These washers, included in Service Package, Part No. 8619969, will replace and be interchangeable with single type bronze washer, and may be used on all 1956-61 transmissions.

OVERHAUL: *See "Dual Coupling Hydra-Matic Transmission" in 1960 Annual Data or later Manual edition and note the following:*

Rear Clutch Hub-to-Rear Clutch Unit Thrust Washer: Position bronze thrust washer next to rear clutch hub, then position steel backing washer between bronze thrust washer and rear unit clutch cover with flange on backing washer toward clutch cover.

3-SPEED HYDRA-MATIC TRANSMISSION

Oldsmobile 88, Super 88, 98 (1961)
P ntiac Catalina & Ventura (1961)

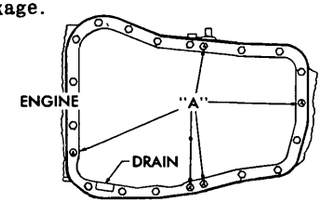
►CHANGES, CAUTIONS, CORRECTIONS

►*1961 TRANSMISSION REAR CARRIER WEAR CORRECTION:* Thin thrust washers (.025" thick), Part No. 8621901 will eliminate further carrier wear and may be used to compensate for wear that has occurred. Replace present thick thrust washers (.050" thick) with two thin washers. A maximum of two additional thin washers may be added to side of pinion where carrier has worn so that total pinion-to-thrust washer endplay is .005-.029". *NOTE - Remove burrs and sharp edge at pinion pin hole before checking endplay. See "Overhaul" below for rear carrier pinion gear removal and installation procedure.*

►*1961 FLYWHEEL DAMPER RATTLE NOTE :* Oil or grease on friction lining material of damper will destroy frictional characteristics of material and may cause damper rattle. Damper hub splines and transmission input shaft should be kept free of oil or grease that could be thrown onto damper linings.

►*1961 TRANSMISSION OIL SEAL REPLACEMENT CAUTION:* New "tumbled" (smoothed) oil seal rings, Part Nos. 8620809 (Case Cover Oil Ring); 8620812 (Governor Oil Ring); 8620813 (Multiplier Oil Ring) should be installed when transmission disassembled for any reason.

►*1961 TRANSMISSION OIL PAN ATTACHING BOLT NOTE:* Later transmissions will have five attaching bolts (with copper sealing washers), Part No. 8620721 installed as indicated in illustration. These bolts may be used on earlier transmission to eliminate possibility of leakage.

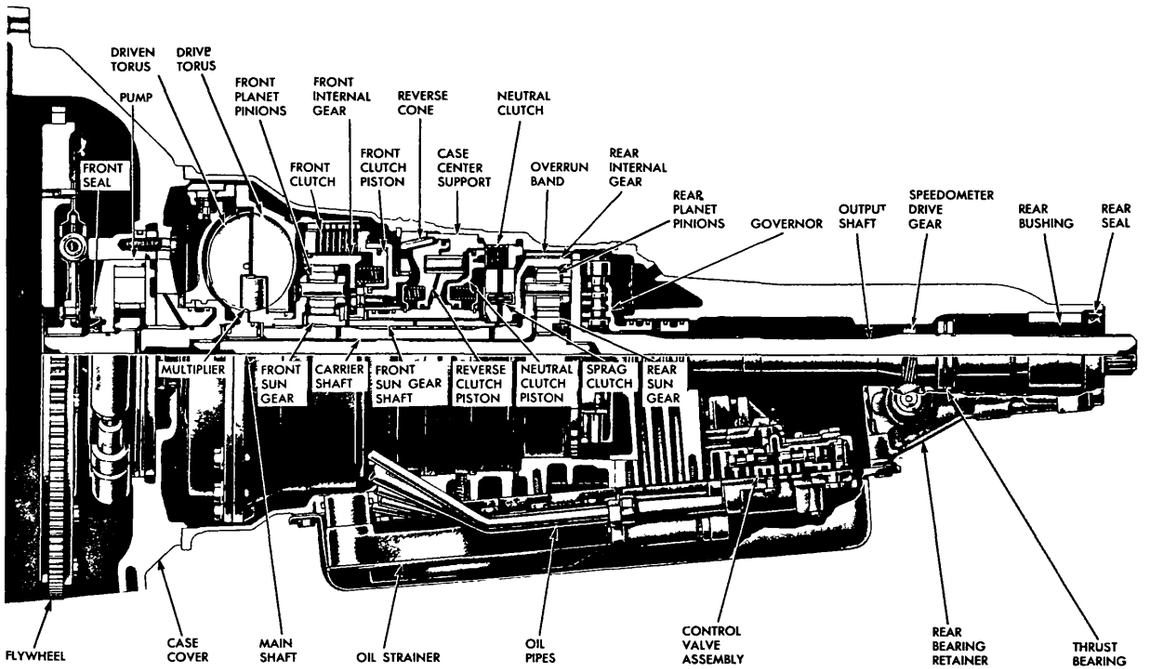


OIL PAN ATTACHING BOLTS

►*1961 PONTIAC SERVICE CHANGE TO DECREASE 1-2 SHIFT POINT:* 1-2 shift point may be lower 1 to 2 MPH and provide a lower engine RPM during shift by removing 1-2 Shift Valve Spring (See Control Valve illustration). With spring removed, adjust engine idle speed to 500-510 RPM.

►*1961 PONTIAC HIGH SHIFT POINT CORRECTION:* Excessively high 1-2 shift point speed may be caused by interference between upper throttle valve control rod and hex shoulder on idler control lever shaft at transmission. To correct, rotate idler lever shaft so that flat side is parallel to throttle valve upper rod. *NOTE - In severe cases it may be necessary to remove throttle valve rod and bend lowest section of rod at idler lever shaft so it has approximately ¼" deflection from center. R install rod and adjust linkage.*

►*1961 PONTIAC SERVO PISTON PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Beginning with Transmission Serial No. P-76880, PE-18336, PA-2188 & PB-3345, a new servo piston and inner and outer springs are being used in production. A Service Package, Part No. 8620995, containing a new servo piston, outer spring and snap ring is furnished for service replacement on both early and later models.



3-SPEED HYDRA-MATIC DRIVE TRANSMISSION SECTIONAL VIEW

►*1961 PONTIAC FRONT CLUTCH PISTON ASSEMBLY CHANGE (To Prevent Centrifugal Apply of Front Clutch at High Speed With Selector Lever in Neutral):* Front Clutch Piston Assembly, Part No. 8620792, which includes a small one-way ball check is available for installation on "PA" transmissions used with 425A Engine, Triple Carburetor Engine, and Special Police Engine.

►*1961 PONTIAC COOLER CONTROL VALVE PRODUCTION CHANGE (To Permit Increased Cooling Under Heavy Duty Operation):* Cooler control valve has been eliminated on later cars. On early cars having the cooler control valve, additional cooling may be obtained for heavy duty operation by removing cooler control valve body, depressing plunger slightly, and removing snap ring which retains plunger in body. Remove plunger and its spring, then remove thermostatic element from body and reinstall body and gasket in case cover. Installation of body and gasket prevents oil flow through screw holes into case rather than into cooler.

►*1961 PONTIAC CASE COVER PLUG LEAK CORRECTION:* Pry out old plug, then remove old stake marks from cover with a file so they will not tear new seal. Coat sealing surface of new cover plug, Part No. 8620423 with non-hardening sealer and tap plug into case until edge is flush with cover. Use a flat tipped punch against edge of plug and tap plug until it is seated 1/16" below face of cover, then stake at four points to retain.

►*1961 PONTIAC TRANSMISSION CONTROL VALVE ASSEMBLY PRODUCTION CHANGE (For Improved Shift Pattern):* All Transmissions between Serial Nos. P-76001 & P-77000 and those above No. P-82314 incorporate a new control valve assembly, Part No. 8621906, identified by "P-2" stamped on valve body. With the new control valve, transmission shift pattern has been changed as follows: A closed throttle 3-2 downshift occurs at approximately 17 MPH in place of former 3-1 downshift at 14 MPH. The minimum throttle 1-2 upshift is lowered to 13 MPH and the 2-3 shift is raised to approximately 21 MPH.

►*1961 PONTIAC TRANSMISSION OIL SCREEN PRODUCTION CHANGE:* A Strainer Screen, Part No. 8620852 is being installed in governor feed line beginning with Transmission Serial Nos. P-82160, PE-19720, PA-2188 and PB-3345. The new screen cannot be installed in earlier models.

DESCRIPTION: New "split torque" type hydraulically controlled automatic planetary gear transmission and torque converter (fluid coupling and torque multiplier). Engine torque is transmitted completely by hydraulic action in first speed, and completely by mechanical action in second speed. In third speed, the torque is "split", causing the torque converter to carry only 40% of engine torque with the remaining 60% being transmitted mechanically.

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3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

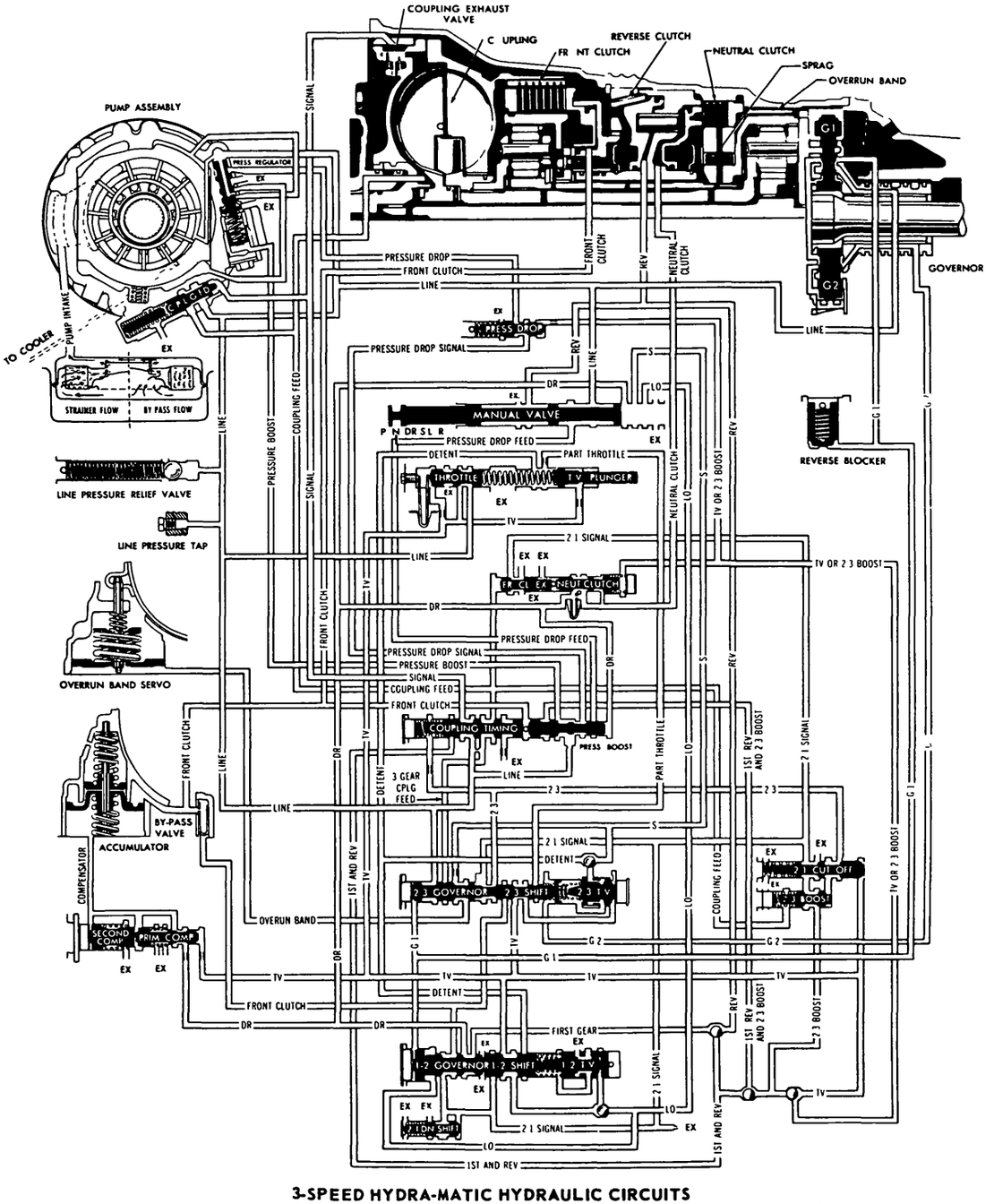
OPERATION: N utral Range - Engine torque is transmitted through torus cover to drive torus member causing it to rotate driven torus and turn main shaft and rear unit sun gear in direction of engine rotation. The neutral clutch being disengaged, prevents sprag assembly from holding rear unit internal gear against turning opposite engine rotation. Therefore, as rear unit sun gear turns in direction of engine rotation, rear unit pinions turn opposite engine rotation driving rear internal gear opposite engine rotation. The front unit sun gear being mechanically connected to rear internal gear, causes front unit pinions to rotate in direction of engine rotation, driving front internal gear in same direction. With both rear unit internal gear and front unit internal gear spinning freely, there is no transmission of torque from front or rear units to carriers or output shaft.

First Sp ed - Driv Rang : Engine torque is transmitted through torus cover to torus drive member then through oil to torus driven member which redirects it through the stator (multiplier) and back to the driven member. This action multiplies the engine torque and applies it to mainshaft and rear unit sun gear. With neutral clutch applied, locking sprag outer race to case, the rear unit internal gear is held stationary. The rear sun gear, turning in direction of engine rotation attempts to drive pinions and internal gear opposite engine rotation; however, because sprag assembly holds internal gear stationary, the output shaft through the pinions is compelled to rotate in direction of engine rotation within the internal gear at a reduced speed and with increased torque. As the rear carrier and output shaft rotate in this manner, the front carrier which is mechanically connected to rear carrier, also rotates in same direction at reduced speed. Because the sprag assembly is holding front unit sun gear from turning opposite engine rotation, carriers and pinions rotate the front unit internal gear in direction of engine rotation at approximately one-half engine speed.

Sec nd Sp d - Driv Rang : Engine torque is transmitted through torus cover to torus drive member. The front clutch is applied and coupling is empty so engine torque is mechanically applied to front unit internal gear. Front unit sun gear assembly is splined to sprag inner race and is prevented from turning opposite engine rotation by sprag when neutral clutch is applied. Engine torque at front internal gear is applied to pinions, and because sun gears cannot rotate opposite engine rotation, the planet pinions and carrier are forced to rotate in direction of engine rotation around sun gear in reduction. Front carrier is splined to rear unit carrier and shaft assembly which in turn is bolted directly to output shaft.

Third Speed - Driv Range: Engine torque is transmitted through torus cover and is applied through front clutch to front unit internal gear. Front unit internal gear, through pinions, tends to turn front sun gear against the sprag, causing front unit to run in direction of engine rotation, in reduction. With rear carrier rotating in same direction at the same reduction, and rear internal gear tending to be stationary against the sprag, rear unit pinions attempt to rotate opposite engine rotation on their pins, thus driving rear unit sun gear and driven torus in direction of engine rotation faster than engine speed. However, because coupling is filled, coupling driven member and rear unit sun gear cannot revolve faster than drive torus which turns at engine speed. Therefore, rear sun gear speed is slowed down to approximately engine speed. As a result, rear unit pinions are also slowed down. The carrier and pinions change direction of load against internal gear causing it to overrun the sprag and revolve with carrier and sun gear at same speed. With output shaft and carriers connected to converter stator (multiplier), the

CONTINUED ON NEXT PAGE



3-SPEED HYDRA-MATIC HYDRAULIC CIRCUITS

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

stator is also turning at same speed as drive and driven members so that it has no effect in multiplying torque in the torque converter. As a result, the entire drive train must revolve as one common unit in direct drive.

R verse Range: Engine torque is applied to mainshaft in same manner as in "First Speed - Drive Range" above. Rear unit sun gear then drives rear unit pinions as idlers which in turn drive rear unit internal gear in a direction opposite engine rotation (neutral clutch is released making sprag clutch ineffective for holding internal gear) With rear unit internal gear turning opposite engine rotation, front unit sun gear is turning in same direction. The reverse cone which is applied holds front unit internal gear stationary so that front unit pinions and carrier are forced to walk around front internal gear in a direction opposite to engine rotation, and in reduction. The output shaft being connected to front and rear unit carrier is also turning in a direction opposite to engine rotation, and in reduction.

LUBRICATION

LUBRICATION INTERVALS: Check fluid level every 2000 miles. Drain and refill every 25,000 miles.

R commended Lubricant: Use only Automatic Transmission Fluid Type "A" (Suffix "A").

►*1961 OLDSMOBILE OIL SPLASH OUT OF FILLER TUBE CORRECTION:* Metal washers holding dipstick seal in position may not be properly staked allowing seal to move and permitting oil to pass Correct by installing a new dipstick

►*1961 FLUID LEVEL DIPSTICK CAUTION:* Dipstick must be fully inserted into filler tube and rotated 1/8 turn to right to properly lock it into position to prevent oil leakage from filler tube and to properly position dipstick when checking fluid level

CHECKING FLUID LEVEL: With car on a level floor, transmission at operating temperature, engine idling, and selector lever in "P" (Park) position, check fluid level on dipstick located at right rear side of engine. Add recommended fluid as necessary to bring level to FULL mark on dipstick. *NOTE - 1 pint of fluid is required to bring level from ADD mark to FULL mark. With transmission cold, oil level should be at ADD mark. DO NOT OVERFILL.*

DRAINING & REFILLING: With transmission at normal operating temperature, disconnect filler pipe from right side of oil pan and drain transmission. *NOTE - Flushing transmission is not recommended.* Remove oil pan and strainer and clean oil pan, then install strainer using a new pump intake pipe "O" ring if necessary Use a new gasket and install oil pan and tighten screws securely, then connect oil filler pipe. If only oil pan has been removed, pour 4 qts. of fluid into transmission (if valve body has been removed, pour in 5 qts. or after overhaul use 8 qts.). Start engine and let idle at slow idle speed (off fast idle cam), then place selector lever in "P" (Park) position and check level on dipstick. Add sufficient fluid to bring level to FULL mark on dipstick. *CAUTION - D not ov rfill.*

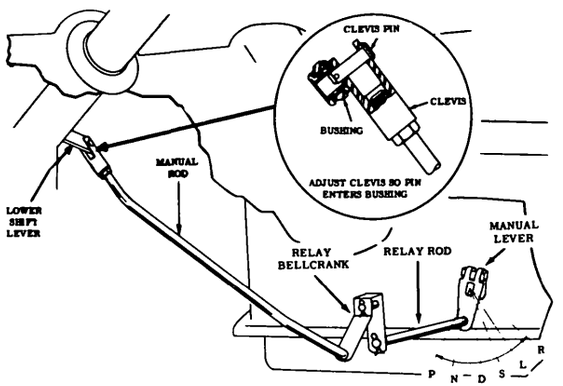
Capacity: Approximately 4¼ qts. (after drain), 5¾ qts. (after removing valve body), 8½ qts. (after overhaul).

ADJUSTMENT

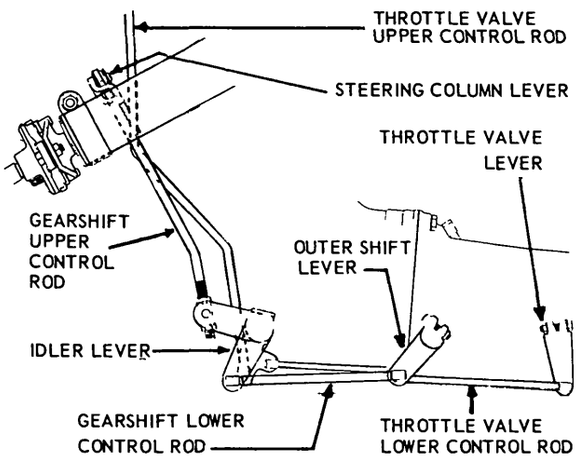
►*THROTTLE VALVE LINKAGE ADJUSTMENT S "Carbur t r" on individual car mod l pag s.*

►*1961 OLDSMOBILE SHIFT RELAY BELLCRANK CHECKING NOTE* Whenever linkage is disconnected from transmission, clearance between end of manual shift rod and lower auxiliary throttle valve rod should be checked to make sure there is a minimum clearance of 1/8" when throttle valve rod is pushed all the way forward To adjust clearance, bend **outer** leg of shift relay bellcrank **outward** so there is 1/8" to 5/16" clearance between cotter pin on shift rod and throttle valve rod Be sure cotter pin is correctly installed and wrapped around rod

MANUAL LEVER LINKAGE ADJUSTMENT: With transmission outer shift lever trunnion nuts backed clear of trunnion, place selector lever in "P" (Park) position and transmission lever in "P" (Park) position. Pull shift rod down toward transmission as far as possible, then while holding rod in this position, run trunnion upper nut down to just contact trunnion. Run lower nut up to contact trunnion, then tighten nuts securely.



OLDSMOBILE MANUAL SELECTOR LINKAGE



PONTIAC MANUAL SELECTOR LINKAGE

After making adjustments, check transmission parking lock with car on an incline

SELECTOR LEVER INDICATOR: Pontiac - With manual linkage adjustments completed, place selector lever in Drive Right position and check indicator pointer index. If necessary to adjust, loosen check nut above ball stud, then adjust index by rotating rod. Tighten check nut securely.

NEUTRAL SAFETY SWITCH: Place selector lever in "N" (Neutral) position, then loosen switch mounting screw on steering column jacket below instrument panel Adjust switch to index with selector lever. Starter must operate when transmission selector lever in either "P" (Park) or "N" (Neutral) position and must not operate in any other position. Tighten switch mounting screw securely

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *NOTE - Make sure engine is operating at peak performance.* See "Shift Speed Tables" below for correct shift speeds under different operating conditions.

►*CAUTION Do not stall test transmission under any conditions.*

OIL PRESSURE TEST: With oil pressure gauge connected to the upper of the two test holes on left-hand side of rear bearing retainer, check the oil pressure while on road test with selector lever in Drive Right position and with transmission in second speed at approximately 25 MPH. Minimum pressure should be 98.6 lbs. Maximum pressure should be 111.4 lbs. If not within specifications, check the following.

Low Oil Pressure: Oil level is low Booster plug is the wrong one or is stuck. Pressure regulator valve is not operating properly. Strainer and "O" ring are leaking Manual valve is misaligned with quadrant Fluid is foaming or cavitation is occurring Internal leakage. Stuck valve in control valve assembly. Front pump slide is stuck causing low output.

High Oil Pressure: Pressure regulator valve is stuck. Booster plug is the wrong one or is stuck. Manual valve is misaligned with quadrant. Stuck valve in control valve assembly. Front pump stuck causing high output

SHIFT SPEED TABLES

►*1961 PONTIAC SHIFT SPEED CHANGE NOTE (Later Cars With New Type Control Valve Assembly) See "1961 Pontiac Transmission Control Valve Assembly Production Change" above*

		1-2	2-3
UPSHIFTS			
"Dr. Left"	(Min. Throttle)	14-18	18-23
	(Full Throttle)	33-40	76-89
"Dr. Right"	(Min Throttle)	14-18	
	(Full Throttle)	33-40	76-89
"Lo"	(Min Throttle)		
	(Full Throttle)		76-89
DOWNSHIFTS		**3-2**	**2-1**
"Dr. Left"	(Closed Throttle)	20-15	16-13
	(Full Throttle)	84-68	29-25
"Dr. Right"	(Closed Throttle)	84-72	16-13
	(Full Throttle)	84-72	29-25
"Lo"	(Closed Throttle)	84-72	52-46
	(Forced)	84-72	52-46

►*NOTE·* Minimum throttle denotes a fixed throttle opening only sufficient to provide acceleration enough to accomplish each of the shifts.

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

TROUBLE SHOOTING

NO UPSHIFT: "G-1" valve in governor is sticking closed or the 1-2 shift valve train in control valve assembly is sticking *(NOTE - To determine if "G-1" valve is sticking, drive car between speed of 15-20 MPH, then very carefully attempt to momentarily engage the reverse position to see if reverse blocker piston is working. If selector lever can be moved beyond "LO" range position, reverse blocker is not operating properly, due in most cases to a stuck "G-1" valve. If a thorough rinsing of governor in clean solvent does not free "G-1" valve, replace governor assembly). CAUTION - When making test, DO NOT fully engage selector lever in Reverse position or leave lever in partial Reverse position.*

NO DRIVE IN DRIVE RANGE: Check Neutral Clutch, Sprag assembly (or Race), Fluid Coupling, Oil Level & Pressure, Manual Linkage, Control Valve Assembly, Sticking Reverse Cone, and for Restricted Passages.

DRIVE IN NEUTRAL: Check operation of Neutral Clutch for Manual Linkage Adjustment.

NO REVERSE: Check Manual Linkage Adjustment, Low Pressure, Restricted Passages, and check operation of Reverse Cone Clutch and Neutral Clutch.

DRIVE IN "RIGHT DRIVE" OR LOW RANGE ONLY: Check operation of Sprag Assembly and Neutral Clutch.

FORWARD DRIVE IN REVERSE: Check Manual Linkage and operation of Neutral Clutch.

REVERSE DRIVE IN NEUTRAL: Check operation of Reverse Cone Clutch.

DRIVE IN SECOND & THIRD ONLY: Check for malfunction in Control Valve Assembly.

DRIVE IN FIRST & THIRD ONLY: *NOTE - This condition may be r port d as a "1-2 Slippage".* Check for malfunction in Control Valve Assembly or Fluid Coupling.

DRIVE IN FIRST & SECOND ONLY: Check operation of Governor and for malfunction in Control Valve Assembly.

SLIPPAGE 1-2 SHIFT: *NOTE - This condition may be reported as "Driv in First & Third Only".* Check operation of front clutch, or Accumulator, and for malfunction in Control Valve Assembly. Accumulator Body Assembly not operating properly. Check Throttle Valve Linkage adjustment and for Low Oil Pressure. Check for restricted 1-2 Oil Passages.

SLIPPING 2-3 SHIFT: Check for malfunction in Fluid Coupling and in Control Valve Assembly. Front Clutch not operating properly.

SLIPPING IN ALL RANGES: Low oil pressure.

ROUGH 1-2 SHIFT: Accumulator, Compensator Body Assembly, or Front Clutch not operating properly. Malfunction in Control Valve Assembly or in Fluid Coupling. Throttle Valve Linkage not adjusted properly. Front Clutch Passage restricted.

ERRATIC SHIFTS: Governor Assembly or Control Valve Assembly not functioning correctly.

HIGH OR LOW UPSHIFTS: Throttle Valve Linkage not properly adjusted (if too short, upshifts will be high, if too long, upshifts will be low). Control Valve Assembly or Governor malfunctioning. Throttle Valve Lever bent. Governor Oil Passage restricted. Throttle Valve or Line Pressure not correct.

NO ENGINE BRAKING (INTERMEDIATE OR LOW RANGE): Overrun Band or Servo not operating.

NO PART THROTTLE OR DETENT DOWNSHIFT: Check Throttle Valve Linkage Adjustment and Accelerator Travel. Malfunction in Control Valve Assembly or Governor.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Check Manual Linkage Adjustment, operation of Governor, and Reverse Blocker Valve.

SELECTOR LEVER WILL NOT GO INTO PARK: Check Parking Linkage and Adjustment of Manual Linkage.

REMOVAL & INSTALLATION

OLDSMOBILE

REMOVAL: Disconnect transmission vent pipe from rear of right hand exhaust manifold, then raise car on hoist and remove transmission filler pipe and drain fluid. Disconnect speedometer cable and transmission control levers at transmission, then remove propeller shaft. Disconnect exhaust pipe bracket from transmission rear housing. Install engine support bar, Tool BT 30-16, then support transmission with a suitable transmission lift. Raise engine enough to relieve weight from rear engine mounts, then remove engine mount-to-crossmember attaching bolts and lower transmission lift until it is free of transmission oil pan. Lower engine (using engine support bar attaching screws), NOT TO EXCEED 1½" to permit removal of upper transmission-to-flywheel housing bolts. Disconnect cooler lines from fittings and cap all openings. Pry bent pipe from top of transmission, then raise transmission lift until it supports transmission and remove remaining transmission-to-flywheel housing bolts. Position exhaust pipe bracket to clear transmission output shaft, then move transmission rearward to disengage input shaft hub from damper hub. Lower transmission from car.

INSTALLATION: Reverse removal procedure and note the following: Lubricate input shaft splines with a small amount of wheel bearing grease. Refill transmission with fluid. See *"Lubrication" above.*

PONTIAC

REMOVAL: Remove either battery cable from battery, then raise car on a hoist and drain transmission. Remove propeller shaft and disconnect speedometer cable from driven gear. Remove selector lever lower rod and remove lower end of selector upper rod by removing "E" ring. Remove two cross shaft bracket-to-frame bolts, then remove bracket cross shaft lever and bushings. Remove lower end of throttle control transmission rod (engine-to-transmission idler lever). and remove idler lever-to-outer transmission throttle valve lever control rod, remove throttle control idler lever. Remove parking brake return spring and brake cable guide hook from frame, then remove oil cooler lines. Loosen exhaust manifold bolts about ¼", and remove both starter cables. Remove starter and splash shield. Remove bottom cover from bottom of case cover and remove bolts holding flywheel from cover plate to transmission case cover. Support transmission with a transmission jack, then remove two rear mount support-to-frame crossmember nuts and raise transmission so studs clear transmission and remove crossmember. Lower transmission until jack is barely supporting it, then remove breather pipe. Use a long extension and a "U" joint and remove remaining transmission case cover to engine attaching bolts. Raise transmission to its normal position and slide it rearward from engine and flywheel and remove it from car. Remove rear mount support from rear mount and remove rear mount from rear bearing retainer.

INSTALLATION: Reverse removal procedures and note the following: Tighten transmission case cover to engine attaching bolts to 50-70 ft. lbs. Refill transmission and adjust throttle and manual linkage.

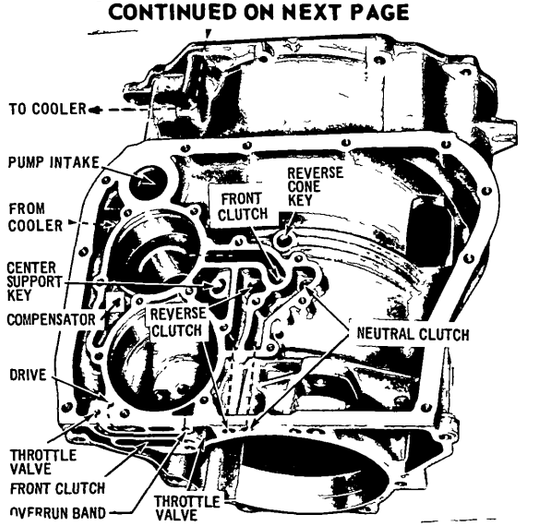
TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

PRESSURE REGULATOR VALVE: Removal - Remove left hand inspection cover on case cover, then remove regulator valve, plug, stop, spring, and valve from pump body.

Installation: Replace "O" ring on plug, then place valve plug in a ¾" socket (with speed handle). Place line boost plug in valve plug (hollow end facing out), then set valve stop on top of plug. With the spring attached to regulator valve, place spring through plug stop and into plug. Feed entire assembly through inspection hole and into pump. *NOTE - It may take some manipulati n to get valve and plug stop properly into their b re.* Tighten plug to 15-20 ft. lbs. and replace cover.

►*LINE BOOST PLUG NOTE:* This plug, in pressure regulator valve assembly, is furnished in three sizes for different line boost pressures. Plain plug is for normal pressure. The plug with a ring on side of cap is for lower pressure, and the plug with a groove on side of cap provides lowest pressufe. To check line boost pressure, proceed as follows: Disconnect control rod to throttle valve rod outer lever and secure throttle valve lever in full throttle valve position with a length of wire. Install oil pressure gauge in upper of two holes in rear bearing retainer, then start engine and operate at 1500 RPM. On transmissions with serial number before P61-26932; PE61-7521 & PB61-20106, place transmission selector lever in "D" (Drive) position. *CAUTION - Make sure parking brakes and servic brakes are applied so car does not move.* On all other transmissions, place transmission selector lever in "N" (Neutral) or "P" (Park) position. Pressure on gauge should be 176-183 lbs. Change line boost plug to obtain correct pressure.

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3-SPEED HYDRA-MATIC TRANSMISSION CASE PASSAGES

3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

COUPLING FEED LIMIT VALVE: Removal - Remove inspection plate on right side of case cover and remove coupling feed valve plug from lower portion of pump. *NOTE - After removal of plug and pin, remove valve and spring from pump body with long nose pliers.*

Installation: Carefully insert spring and valve together, into pump body, using long nose pliers. Replace "O" ring on plug, then place plug in socket wrench and place pin in plug. Insert plug and pin through inspection hole (with pin in center of spring) and screw plug into pump. Tighten to 15-20 ft. lbs. Replace inspection plate.

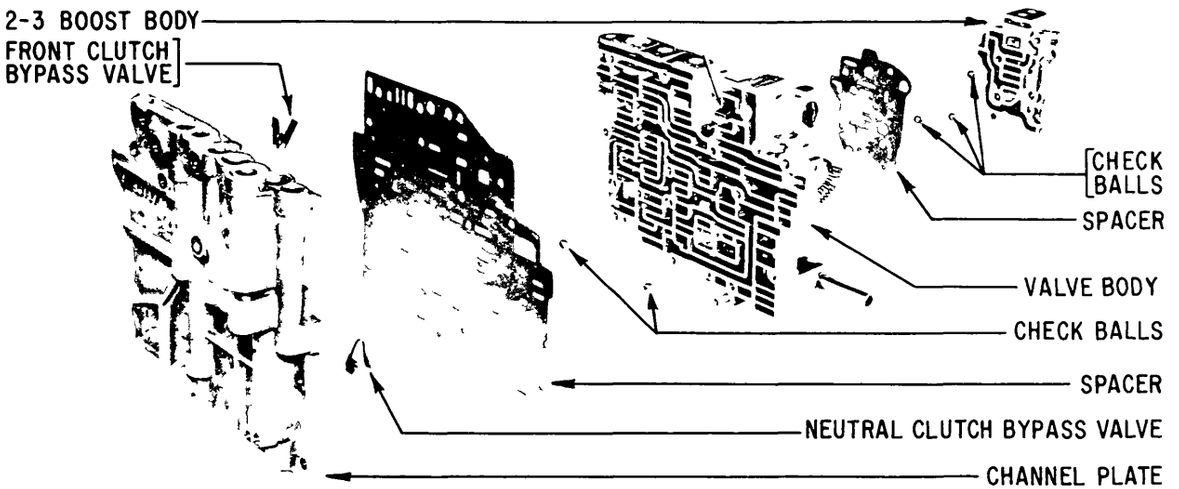
REAR SEAL & REAR BUSHING: Rear Seal Replacement - Remove propeller shaft, then remove seal with a screwdriver. To install seal, coat outer casing with sealing compound and drive it into rear bearing retainer with Tool J-5154.

Rear Bushing & Seal Replacement: Remove bushing retaining bolt from left side of rear bearing retainer and remove propeller shaft. Fit bushing remover, Tool J-8845 and slide hammer, Tool J-2619 into bushing and tighten, then remove bushing and seal. To replace bushing, install (chamfered end first) into rear bearing retainer, aligning retainer bolt slot with bolt hole, then drive into place with a slide hammer and drift. To install seal, see above.

CONTROL VALVE BODY: Removal - Drain transmission and remove outer throttle lever from shaft, then remove throttle lever seal with a small screwdriver placed behind flange. Remove oil pan and gasket and remove five valve body-to-rear bearing retainer attaching bolts. Slide valve body off pipe assembly and remove from transmission. *CAUTION - Do not let manual valve drop out of valve body during removal.*

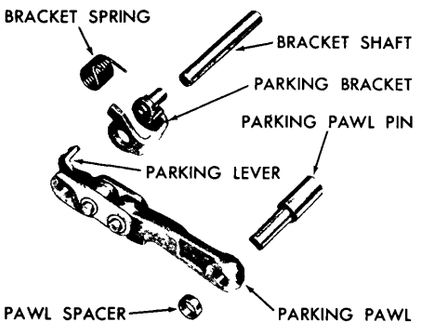
Installation: Install manual valve in valve body, then apply petrolatum to all valve body pipe ports. Install valve body in rear bearing retainer by guiding throttle shaft through its opening and then positioning manual valve on pick-up pin (detent lever). Guide valve body over pipe assembly and slide forward to seat seals, then install five attaching bolts and tighten to 6-8 ft. lbs. Install throttle shaft seal over throttle shaft and into case. Install oil pan and gasket and tighten screws to 12-15 ft. lbs. Install oil filler pipe and refill transmission.

GOVERNOR: Removal - Drain transmission and remove oil pan, then remove throttle valve lower control rod from throttle valve outer lever, and gearshift control lower rod from outside shift lever. Remove speedometer cable and remove hand brake cable guide rod and return spring from frame crossmember. Remove propeller shaft from transmission, then place a support under front of transmission. Remove rear mount support-to-crossmember nuts, crossmember attaching bolts, and retaining clamp from rubber insulator. Raise transmission from rear mount support to clear crossmember and remove crossmember. Remove control valve assembly (see above), then lower transmission sufficiently to remove breather pipe from its bore. Reach into rear bearing retainer and remove four governor and output shaft attaching bolts (hold outside manual lever forward to engage parking brake when loosening bolts). Mark edge of output shaft flange and a corresponding spot on inside of case with a grease pencil (to match output shaft with planet carrier when reassembling). *CAUTION - These parts will fit together in one position only and it is important that the carrier not be rotated after removing output shaft, otherwise the guide marks will be of no value.* Remove rear bearing retainer-to-case attaching bolts (two bolts are inside retainer) and slide retainer rearward away from transmission. Remove rear bearing retainer cover and reach through access hole with 90° snap ring pliers and unseat snap ring from output shaft. Remove output shaft from front of retainer. *CAUTION - Do not strike inner sleeve of rear bearing retainer with speedometer drive gear when removing shaft.* Press speedometer drive gear off of shaft using suitable press plates and holder, then remove governor.



3-SPEED HYDRA-MATIC CONTROL VALVE ASSEMBLY

Installation: Place governor and gasket on output shaft, then drive speedometer drive gear onto shaft with Tool J-6133-A. *NOTE - Rear side of drive gear should be 6 9/32" from end of shaft.* Place snap ring through hole in bearing retainer and slide over end of output shaft as shaft is carefully installed into retainer. Seat snap ring in grooves against thrust bearing race, then install bearing retainer cover and gasket. Position retainer-to-case gasket on retainer (hold in place with petrolatum), making sure that manual shaft retainer is installed. Align guide marks on output shaft flange and case and place unit in position on case, being sure that parking linkage is aligned with manual lever. Install bearing retainer-to-case attaching bolts, using a short bolt in center hole on each side, and one inside rear bearing retainer. Install breather pipe and clip. Install governor attaching bolts, rotating shaft as necessary. *NOTE - Hold manual valve lever forward while tightening governor attaching bolts to 19-23 ft. lbs.* Raise transmission and install frame crossmember (brake cables go above crossmember), then lower transmission so rear mount support studs engage crossmember bracket. Install insulator retainers and crossmember attaching bolts, then install rear mount support stud nuts. Complete installation by reversing removal procedures *(see "Control Valve Body Installation" above).*



PARKING BRAKE LINKAGE

PARKING LINKAGE: Removal - Remove rear bearing retainer from transmission case and remove access hole cover *(see "Governor" above),* then push parking pawl pin from case with a small rod and remove pin and pawl pin spacer from transmission case. Balance of linkage can be removed as a unit from rear of case.

Installation: Reverse removal procedures.

SERVO & ACCUMULATOR: Removal - Drain transmission, then remove oil pan and strainer. Remove compensator valve body (three screws and one bolt), then remove remaining servo and accumulator cover attaching bolts and remove cover. *CAUTION - Servo release spring pushes servo piston against cover. Be careful not to drop piston when cover is removed.* Accumulator lower spring and possibly the case center support springs will be removed with cover. Use accumulator pin to remove both accumulator pistons and remaining spring. Remove case center support seal springs and seal if they did not previously fall free.

Installation: *NOTE - Cut a rectangular piece of stiff sheet metal so it will hold servo piston in its bore when*

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

bolted to right rear oil pan bolt hole. Place upper accumulator piston on piston pin and place tapered spring over pin with large end of spring against piston and piston seal facing away from spring. Install tapered spring, pin and upper piston into case with small end of spring upward. Hold these parts in case and install lower accumulator piston, pocket side down. Screw ends of case center support seal springs into seal far enough so they will not fall off easily and install seals into case so spring are suspended below them (petrolatum may be used to hold seals and springs into place). Place servo return spring over servo pin and install assembly into case. Retain it in place using the previously mentioned tool bolted to an oil pan hole. Place remaining accumulator spring in position over accumulator pin and hold in place while installing servo and accumulator cover. Attach cover with three bolts and leave just loose enough to remove servo retaining tool. *CAUTION - Make sure three seal springs enter case straight.* Remove retaining tool and install remaining cover bolts except the strainer attaching bolt and tighten all screws to 6-8 ft lbs. Install compensator, oil strainer, and oil pan, then install filler tube and refill transmission.

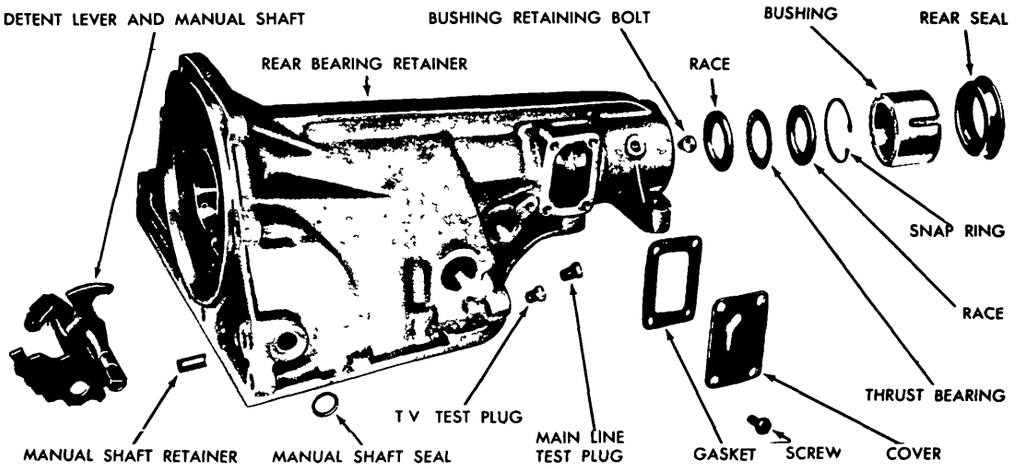
TRANSMISSION DISASSEMBLY

►*TRANSMISSION DISASSEMBLY NOTE: Instructions below cover removal of sub-assemblies in their proper order from transmission case. See "OVERHAUL OF UNITS" for Disassembly, Inspection, and Reassembly.*

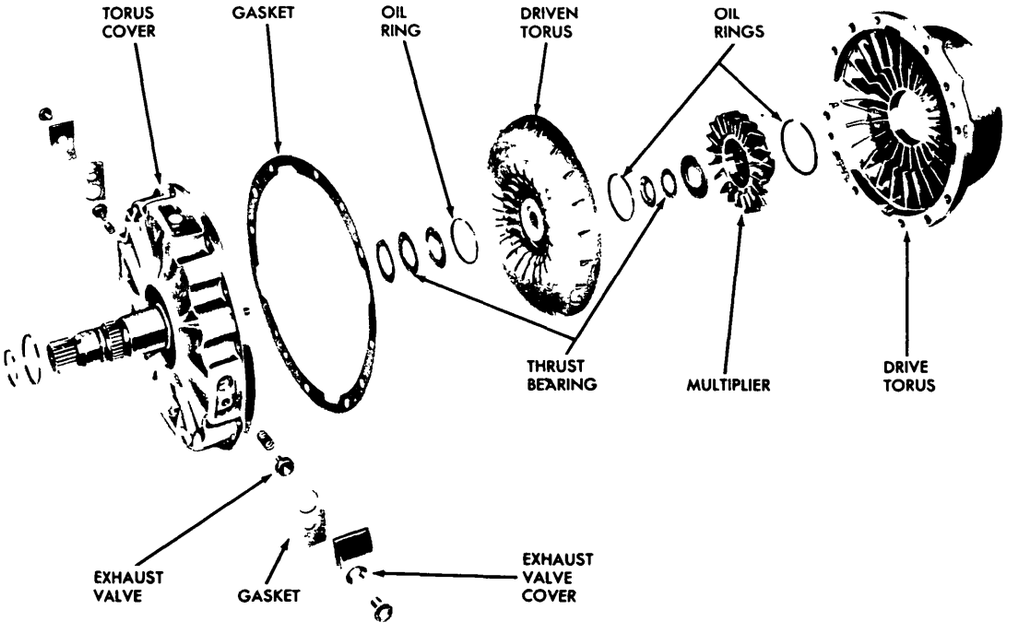
CONTROL VALVE, SERVO & ACCUMULATOR: With transmission installed in a suitable transmission holding fixture, remove outer shift lever and throttle valve lever, then turn transmission so oil pan is upward. Remove oil pan and oil strainer from transmission. If necessary to remove oil strainer to case "O" ring, pry it out with a small screwdriver. Pry throttle shaft seal from side of rear bearing retainer with a small screwdriver. Remove control valve assembly attaching bolts and remove valve assembly from pipe assembly and rear bearing retainer, being careful not to drop manual valve, then remove manual valve from control valve assembly. Remove compensator valve body from servo and accumulator cover, then remove servo and accumulator cover. Remove three case center support springs and seals (seals may have remained in transmission case). Remove servo piston from bore in case, then remove servo release spring, lower accumulator spring and lower accumulator piston. Remove lower accumulator piston pin, and using the stem of pin as a tool, remove upper accumulator piston, then remove spring. Remove ring and seal from lower and upper accumulator pistons. Remove pipe assembly attaching bolt and seal from front side of transmission case cover and withdraw pipe assembly and seals from transmission. *NOTE - Multipl seals may have remained in transmission.*

FRONT UNIT ENDPLAY CHECK: *NOTE - Before proceeding with furth r transmission disassembly, check front unit ndplay as follows:* Remove one case cover-to-case attaching bolt and install a suitable dial indicator support, then assemble endplay adapter, Tool J-8865 on input shaft of torus cover. Clamp a dial indicator on bolt, then position a screwdriver through case, on front side of flange on output shaft, and gently pry rearward on output shaft to position units to rear of case. Index indicator with end of Tool J-8865, then position screwdriver behind flange on output shaft and gently pry forward to position units toward front of case. Record amount of endplay indicated on dial indicator. Endplay should be .004-.022". If not within specifications, carefully inspect thrust bearings, thrust washers, and races when removing units from case to determine source of endplay.

REAR BEARING RETAINER: Remove bushing and sleeve assembly and rear seal only if replacement is necessary (*see "Transmission Unit Rem val - Transmission in Car" above*). Rotate transmission to a vertical position with output shaft up, then remove speedometer driven gear. Remove eight rear bearing retainer-to-case attaching screws (six on outside and two on inside of bearing retainer). Remove retainer cover, then reach through retainer access hole and unseat rear output shaft snap ring with snap ring pliers. Move snap ring upward on shaft a short distance. Carefully remove bearing retainer and gasket upward over output shaft (this will slide rear output shaft snap ring from output shaft). *CAUTION - B car ful not to allow manual shaft r tainer from falling out of front fac of bearing r tainer.*



REAR BEARING RETAINER



TORUS & MULTIPLIER (EXPLODED)

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

When lifting retainer over output shaft, do not strike r tainer sleeve with speedometer drive gear on output shaft. Remove dislodged snap ring from retainer, then remove remaining snap ring from output shaft. Remove governor attaching bolts and raise governor high enough to mark one dowel pin and nearest tooth on output shaft flange with grease pencil for ease in reassembly. Remove output shaft assembly from transmission by lifting straight up. Remove speedometer drive gear from output shaft by installing it in suitable press plates and pressing gear off shaft, then remove governor assembly and gasket over output shaft.

CASE COVER, PUMP & TORUS COVER: With transmission in a vertical position, input shaft upward, remove five large and three small case cover-to-case attaching bolts (two small bolts are on case side of cover). Remove case cover and pump assembly by lifting straight up (slight tapping with a plastic hammer may be necessary), then remove thrust bearing race from torus cover if it did not remain with case cover. Remove case cover gasket and discard. If necessary to replace seal, bend entire outer edge of seal in toward center with a punch or screwdriver, then remove with pliers or pry out with a long screwdriver. Remove torus cover attaching screws and then remove cover by lifting input shaft straight up. *NOTE - Some effort may be required for this operation.* Remove torus cover-to-drive member steel gasket (gasket cannot be reused), then remove race, thrust bearing, and race from either torus cover or torus member.

TORUS, FRONT UNIT & REAR UNIT: With transmission in a horizontal position, bottom up, remove driven torus member-to-mainshaft spiral snap ring with a small pointed tool, then push mainshaft through driven torus member and remove driven torus member. Remove race, thrust bearing and race from drive torus member (some of these parts may have remained with driven torus member). Remove mainshaft and sun gear from rear of transmission, then remove bearing and race from rear carrier (these parts may have remained with mainshaft). Remove sun gear from mainshaft by pushing toward splined end of shaft. From front of transmission, remove drive torus member and torque multiplier (stator) as a unit. Remove torque multiplier by pushing from rear of drive torus member. If necessary, remove oil seal rings from driven torus member and torque multiplier (three rings). Remove front carrier-to-carrier shaft snap ring and remove front unit carrier assembly. Remove race, thrust bearing and race (some of these parts may have remained with carrier). Remove rear carrier and shaft assembly from rear of transmission. Remove roller thrust bearing and race from rear unit carrier assembly (these parts may have remained with rear unit internal gear). From rear of transmission, remove rear internal gear- to-front sun gear shaft snap ring, then remove rear unit internal gear and sprag assembly, including retainer. Make sure parking pawl is disengaged. Rotate transmission to vertical position, front end upward. *CAUTION - Transmission parts ar loos and will drop out if transmissi n is n t rotat d prop rly.* Remove front unit sun gear assembly, race, roller thrust bearing and race, then remove front unit internal gear and clutch assembly from front of transmission. Remove bronze thrust washer from front unit clutch drum (bronze thrust washer may have remained on case center support).

►*DRIVE TORUS BUSHING WEAR NOTE:* Drive torus bushing may show wear caused by oil ring on torque multiplier. This ring groove will not create noise or affect transmission operation and it is not necessary to replace drive torus assembly.

REVERSE CLUTCH & CASE CENTER SUPPORT: Remove reverse stationary cone-to-case snap ring, then use puller, Tool J-8768 to remove reverse cone and reverse stationary cone. *NOTE - Position tool under lugs of reverse cone and pull upward.* Remove reverse stationary cone key from case, then remove reverse and neutral piston and support assembly (if tight in case, tap gently with a soft hammer from the rear). Remove case center support key from transmission case and remove neutral clutch plates (four drive and four driven plates). Rotate transmission to a vertical position with rear end upward, then remove band assembly by unhooking from anchor and lifting upward.

PARKING LINKAGE: *See "Transmission Unit Removal - Transmission in Car" above.*

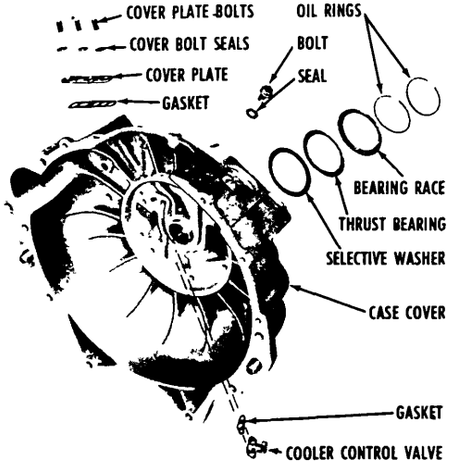
OVERHAUL OF UNITS

►*1961 PONTIAC CASE CENTER SUPPORT KEY PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* On later transmissions, case center support key slot and retaining key have been made narrower. When necessary to install either a new key or center support on earlier transmissions, install Service Package, Part No. 8620970 which contains a later type support and key. Later type key, Part No. 8620755 is available separately but must be used only with a narrow slot.

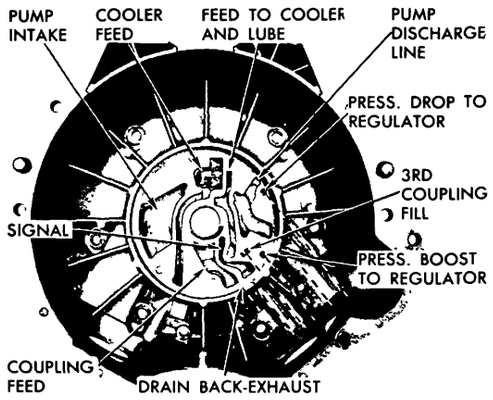
►*OVERHAUL NOTE:* Clean all parts thoroughly and blow out case passages with air. Inspect bolt threads for cross threading and transmission case for leaks or interconnected passages. Examine case for "hairline" cracks. Inspect case-to-strainer neck "O" ring seal for cuts, hardness or pinched seal. If parking linkage was not removed, inspect pawl pin and parking brake links for wear or bind. Inspect case support-to-case seals for hardness or cracks. Inspect seal springs for collapsed coils and for fit of seals on spring ends.

CASE COVER: Disassembly - Loosen cover-to-pump attaching bolts about four turns, then support cover so pump is off bench and gently tap loosened bolts to remove pump from case cover. Remove attaching bolts and pump. Remove two hook type oil seal rings from case cover, then remove race, thrust bearing and selective washer (race may have been removed previously). Remove two case cover-to-cooler control valve assembly screws and remove cooler control valve assembly and gasket. *NOTE - Do not disassemble cooler control valve assembly.* Remove case cover plate and gasket, then remove remaining bolts and seal in case cover.

Inspection: Clean thoroughly and inspect all passages for interconnection or restriction using an air gun or smoke. Inspect bushing for tight fit or excessive wear and inspect case cover for cracks or porosity. Inspect rings and ring grooves for nicks or burrs and case cover plate bolts for leaks or cross threads. Inspect cooler passage connection threads in case cover for cross threads. *NOTE - Worn threads may be repair d with on of th commercial thr ad repair kits.* Inspect case cover-to-coupling cover thrust bearing and the two bearing races.



CASE COVER



CASE COVER OIL PASSAGES

Reassembly: Install case cover plate and a new gasket and tighten bolts (with seal washers) to 18-20 ft. lbs. Install remaining bolt and seal washer in case cover and tighten to 18-20 ft. lbs. Attach cooler control valve assembly and a new gasket and tighten bolts to 2.5-3.5 ft. lbs. Install selective washer over tower of case cover, then install thrust bearing and cupped race (cup side over bearing on case cover). Install two hook type oil rings on tower. To install pump assembly, position cover on bench with open side up, then lay pump in its recess with coupling feed limit plug and pressure regulator plug facing their access holes. Align top structual web of pump exactly with top web in case cover. Start one attaching bolt from under side of cover to assure alignment before pushing pump to bottom of its recess in cover. Install pump attaching bolts from rear side of case cover and tighten to 15-18 ft. lbs.

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

PUMP: Disassembly - Inspect, and if necessary, remove pump-to-cover seal, then remove pump cover-to-body attaching screw and remove cover from pump over roll pin (do not pry to remove). Remove top vane guide ring, rotor, 11 vanes and bottom vane guide ring. Remove pump slide by compressing slide against priming springs and lift up on opp osite end. Remove inner and outer priming springs, then remove coupling feed limit plug and "O" ring. Remove coupling limit spring, guide pin and valve. Remove pressure regulator plug assembly and "O" ring, then remove line boost plug from pressure regulator plug. Remove line boost plug stop from pump. Remove pressure regulator valve spring and valve by inserting snap ring pliers into spring. If necessary, remove rubber cushion from pressure regulator valve.

Insp ction: Inspect oil passages in pump body and cover for dirt or restrictions using a tag wire and compressed air. Check for free movement of slide in pump body. Inspect pump vanes for excessive wear at guide ring contact point. *NOTE - Bright spots at the two wear points is normal unl ss deeply scored.* Check rotor for scoring and rotor splines for nicks or burrs. Inspect pressure regulator valve for nicks, scoring or burrs. Make sure valve moves freely in bore. Inspect coupling feed limit valve for nicks and burrs and make sure valve moves freely in bore. Inspect pressure regulator valve spring, inner and outer primary springs, and coupling feed limit valve spring for distortion or collapsed coils. Replace pump-to-case cover "O" ring. Inspect coupling feed limit valve plug for cross thread, and check valve plug "O" ring seal for cuts or damage.

R ass mbly: Install new cushion on pressure regulator valve if previously removed, and install spring on valve, then install valve and spring in bore of pump. Install pressure regulator stop into pump over spring. Install new "O" ring on pressure regulator plug if necessary. Install line boost plug into pressure regulator plug (cup side out), then install plug assembly into pump and tighten to 15-20 ft. lbs. Install coupling limit valve, spring and pin into pump. If necessary, install a new "O" ring on coupling feed limit valve plug, then install plug into pump and tighten to 15-20 ft. lbs. Install inner and outer pump priming springs into bottom cavity of pump, then assemble slide into pump body by compressing slide against priming springs at lower end until slide can be fully installed into pump. Install bottom guide ring into pump cavity and install pump rotor (shoulder side down) in pump pocket over guide ring. Install 11 vanes into rotor with ring wear pattern on edge of vane against guide ring, then install top guide ring on rotor. Install pump cover over roll pin and secure with retaining screw. Tighten screw to 6-8 ft. lbs. If removed, install pump to-cover "O" ring on pump. *NOTE - For installation of pump in cover, see "Case Cov r R ass mbly" ab ve.*

TORUS COVER: Disassembly - Inspect and remove, if necessary, two hook type oil rings from input shaft, then remove torus exhaust valve cover screw with a clutch head socket. Remove exhaust valve cover, steel gasket, valve and spring (discard steel gasket as it cannot be reused). Repeat operation for second exhaust valve.

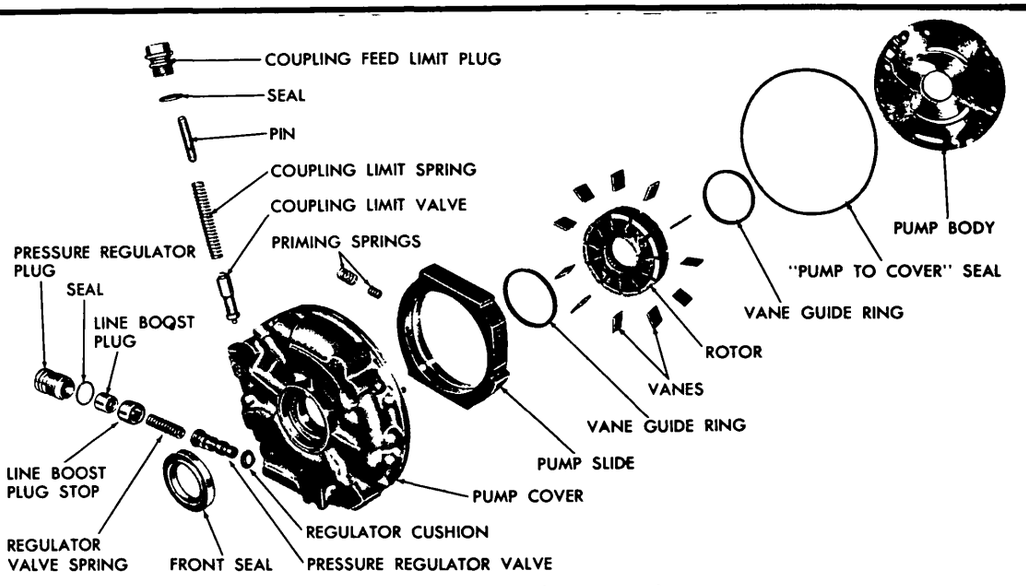
Inspection: Inspect splines and snap ring grooves for nicks and burrs. Check for broken rings. Check coupling signal passage for restriction, using a fine wire. Inspect coupling cover exhaust valves for nicks and burrs, making sure valves move freely in bore. Check exhaust valve spring for distortion or collapsed coil. Replace coupling exhaust valve cover gasket and inspect cover for cracks or porosity. Inspect coupling cover-to-driven torus thrust bearing and race. Inspect mainshaft pi lot bushing for excessive wear and tight fit.

Reassembly: Install exhaust valve spring and valve, then install retaining tool J-6122. Install cover and new torus cover exhaust valve gasket and retaining screw, using a clutch head socket. Tighten to 19-23 ft. lbs. Repeat above operation for second exhaust valve. Install two hook type oil rings on input shaft.

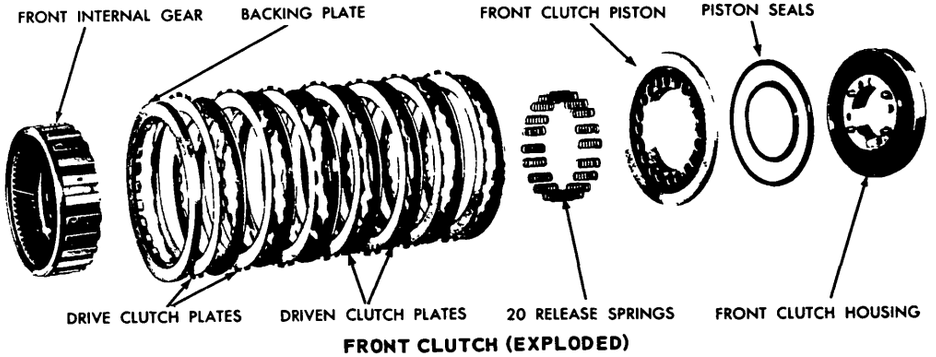
FRONT CLUTCH; Disassembly - Remove bronze thrust washer from front clutch assembly (if not previously removed), then install entire assembly in a soft jawed vise with internal gear upward and vise engaging large teeth on opposite side of assembly. Remove internal gear-to-front clutch housing attaching bolts and gently tap a dowel pin with a drift to remove front internal gear from front clutch housing. *CAUTION - Housing is spring loaded.* Remove front internal gear, then remove front clutch backing plate. Remove 7 drive and 7 driven front unit clutch plates and the 20 front clutch release springs. Remove front clutch piston from front clutch housing, then remove front clutch piston outer seal from piston and inner piston seal from housing. Discard seals.

Inspection: Inspect front unit internal gear for tooth damage, nicks, and burrs. Check internal gear bushing for wear, nicks, and burrs and make sure bushing is not loose. Inspect clutch plate splines on internal gear for free clutch plate movement. Check lubrication ports for restrictions. Inspect clutch backing plate for nicks, burrs or foreign material. Inspect drive and driven clutch plates for foreign particles imbedded in plates and for wear such as metal spots appearing through face material on drive plates or deep cuts on driven plates. *NOTE - St l driv n plat s ar wav d and a w ar patt rn will app ar at high p ints f wave (this is a normal c nditi n). Disc l ration of driv plates is*

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PUMP ASSEMBLY (EXPLODED)



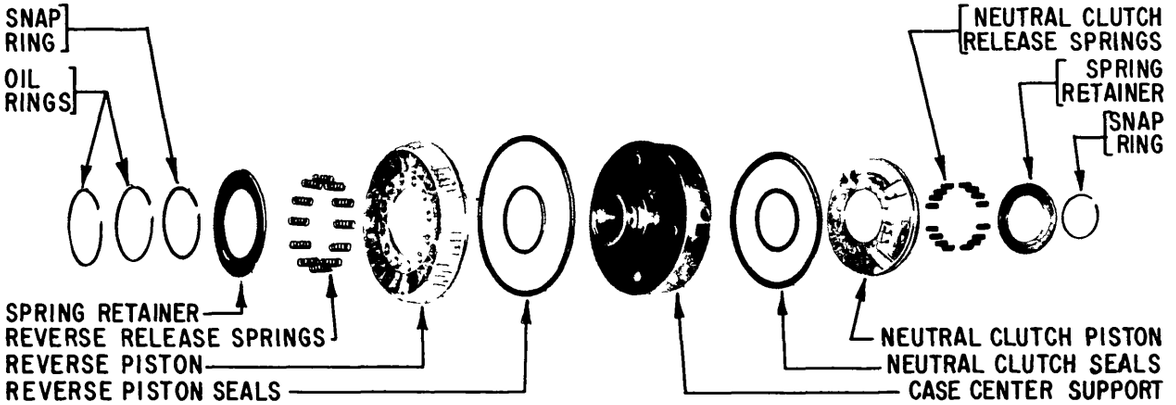
FRONT CLUTCH (EXPLODED)

3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

a normal condition. Inspect front clutch apply piston for scores, nicks, and burrs, and check for cracks in casting. Replace inner and outer clutch piston rubber lip type seals (make sure seal is not pinched or nicked during installation). *NOTE - Inner seal should be installed first, using clutch piston without outer seal to seat inner seal snug in ring groove by clockwise and and counterclockwise piston movement.* Inspect the front clutch housing for foreign material and clutch apply oil passages for restrictions or "off location" oil passages. Inspect bolt threads for cross threading or crossed threads. Inspect internal gear-to-center support thrust washer for excessive wear, nicks, burrs, or foreign particles imbedded in thrust face.

R assembly: Install new inner piston seal on front clutch housing with lip of seal facing down, then install new outer piston seal on clutch piston with lip facing away from spring pockets. Install clutch piston in clutch housing, carefully rotating assembly while depressing lip of piston seal with small blade screwdriver. Install piston release springs (20 springs) in to spring pockets in piston. Install front clutch backing plate on front internal gear with undercut facing flange on internal gear. Install 7 composition drive and 7 steel driven plates alternately over front internal gear starting with a composition clutch plate. *NOTE - Steel clutch plates must be installed in an un-nested position as follows: Place a composition plate and first steel plate over internal gear noticing location of slight "half moon" notch in edge of steel plate. Install another composition plate and then the second steel plate so that the "half moon" notch is located two drive lugs on internal gear away from notch in first steel plate. Continue to alternately install composition and steel plates so that notches in the odd numbered steel plates are one above the other and the notches in the even numbered steel plates are one above the other.* Hold the assembly together and position front unit internal gear, with plates, on clutch release springs aligning dowels. Place entire assembly in a soft jawed vise with vise engaging large teeth on clutch housing. Install four front unit internal gear-to-front clutch housing bolts and alternately tighten bolts to properly seat front internal gear on dowels. Check bottom steel clutch plate for freedom after tightening bolts to 22-27 ft. lbs. Install bronze thrust washer into recessed inner diameter of front clutch housing bore, using petrolatum to retain it in position.

CASE CENTER SUPPORT: Disassembly - Remove two oil delivery sleeve hook type oil seal rings from case center support. Use Clutch Spring Compressor, Tools J-4670-C and J-6129; and Reverse-Neutral Clutch Piston Adapter, Tool J-8765, remove reverse release spring retainer snap ring. *NOTE - Center tool and position ring gap between legs of tool.* Remove tools from reverse and neutral clutch assembly, then remove reverse release spring retainer. Remove 12 reverse piston release springs and reverse clutch piston. *NOTE- It may be necessary to tap housing gently.* Remove inner and outer reverse piston seal rings and discard. Reinstall the same tools as above and remove neutral clutch release spring retainer snap ring in the same manner as for reverse release spring retainer snap ring, then remove tools. Remove neutral clutch release spring retainer and 16 release springs. *CAUTION - Do not mix neutral clutch springs with reverse springs.* Remove neutral clutch piston, tapping housing gently if necessary, then remove inner and outer neutral clutch seal rings and discard.



CASE CENTER SUPPORT (EXPLODED)

Inspection: Inspect center support for nicks, burrs, damage or excessive wear on bushing. Check bushing for looseness. Check reverse apply, front clutch apply, and neutral apply passages for restrictions or interconnected passages using a fine wire and compressed air. Check two hook type oil seal rings on oil delivery sleeve for wear or damage. Inspect neutral clutch piston and reverse piston for excessive wear, burrs, cracks, or distortion. Inspect all clutch release springs for distortion or collapsed coils. Replace neutral clutch piston inner and outer seals, then inspect neutral clutch release spring retainer and snap ring groove. Inspect reverse piston spring retainer and snap ring groove.

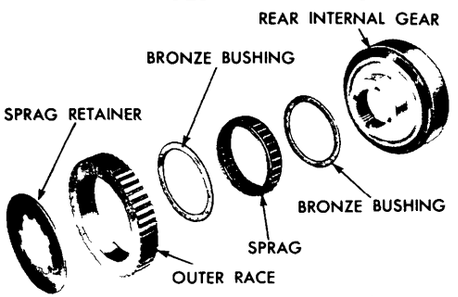
Reassembly: Install new inner and outer clutch seals with lip of seal facing away from spring pockets, then install Tool J-8766 over neutral clutch inner hub. Install neutral clutch piston using a small screwdriver to depress lip of outer seal into case center support, then remove Tool J-8766. Install 16 release springs into spring pockets of neutral clutch piston, then install spring retainer over release springs. Use same tools used for disassembly and install retainer snap ring, then remove tools. Install Tool J-8766 over oil delivery sleeve and Tool J-8767 into case center support (oil inside of tool), then install new inner and outer reverse piston seal rings on reverse piston with lip of seals facing dowel pin holes in piston. Install reverse piston, aligning piston to index with dowels, then remove tools. Install 12 reverse piston release springs into spring pockets and install reverse piston spring retainer. Lay snap ring on top of tower, then install same tools used at disassembly and compress release springs. Install piston spring snap ring and remove tools. Check all springs for proper position in pockets, then install two hook type oil seal rings on oil delivery sleeve .

REAR UNIT PINION THRUST WASHER REPLACEMENT: With output shaft and carrier assembly removed from transmission, place carrier portion of assembly in a vise being careful not to damage ground surface, then drive pinion out with a flat punch. *NOTE - Staking on shaft side of pin will be sh ared during r moval.* Be careful when removing pin and pinion gear to prevent loss of pinion needle bearings. To install pinion gears and washers, position carrier shaft in a vise with carrier side up (do not clamp vise on ground surface of shaft), then install needle bearings in pinion gear, retaining them in place with a small amount of petrolatum. Position pinion gear, with proper number of thrust washers to provide endplay of .005-.029" *(see "1961 Transmission Carrier Wear Correction" above)* in carrier and install a 3/8" drill shank up through carrier and pinion. Install a new pinion gear pin from output shaft side and allow loading tool to back out while driving pin into position. *NOTE - Loading must remain tight against pin to prevent pinion gear bearings being dislodged.* After all pinions are installed, clamp a drift in a vise and position gear pin head on end of drift, then peen opposite end of pin with a ball peen hammer. *CAUTION - Head of pinion pin must be below carrier face.* Repeat operation for remaining pins.

REAR INTERNAL GEAR & SPRAG: Disassembly - Remove sprag retainer, then remove sprag outer race from sprag assembly and rear internal gear. Remove sprag and bushing assembly from internal gear. *NOTE - Sprag assembly consists of sprag ass mbly and two bronze bushings.*

Inspection: Inspect rear internal gear for tooth damage and gear bushing for excessive wear, nicks, or burrs. Inspect splines on inner diameter of inner sprag race for burrs or broken splines, and check both inner and

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SPRAG ASSEMBLY (EXPLODED)

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

outer sprag races for scoring. Inspect outer sprag race for nicks, burrs or damaged splines, then test onedrive plate for free up and down movement on splines. Inspect sprag assembly for score marks, damaged spring retainer or damaged shoulder. Test sprag action with sprag installed in outer race over the inner sprag race (shoulder of sprag should face up or toward sprag retainer). Inspect sprag retainer for bent tangs or distortion.

R ass mbly: Place one bronze bushing over inner race of intern al gear with cup side facing upward, then place sprag assembly into sprag outer race. With shoulder side of sprag up, start sprag and outer race over internal gear. slide sprag and outer race down against internal gear, then install second bronze bushing with cup side down, against sprag assembly. Apply petrolatum on sprag retainer and install retainer on internal gear, aligning tangs with internal gear slots. *NOTE - Check to mak sure sprag ass mbly is properly installed by rotating out r rac count rclockwise. Outer race should not turn clockwis .*

GOVERNOR: Disassembly - Compress finger of G-2 plug retainer and remove, then remove G-2 plug and G-2 valve If necessary, remove four governor oil hook type oil seal rings from governor tower.

Insp cti n: Inspect rings and ring grooves (rings should fit freely in grooves). Check G-1 and G-2 line pressure oil passages for restrictions using a fine wire. Inspect governor bushing for scores, nicks, or burrs. Check G-1 and G-2 valves for free movement. Make sure entire governor casting is free from all dirt and small chips.

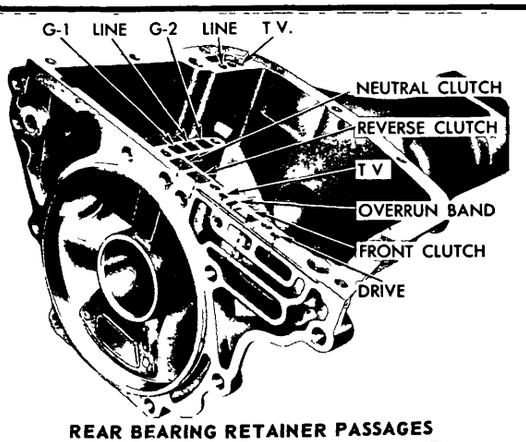
R ass mbly: If removed, install hook type oil seal rings on governor tower, then install G-2 valve (small land first) into governor. Install plug with flat side out, then install retainer with finger side out. *CAUTION - Use car to pr v nt G-2 valv from dropping out of governor body.*

PARKING LINKAGE: Disassembly - Install assembly in a vise using a soft jaw vise on dowel pin, then lift hook end of bracket spring off parking lever and disassemble parts.

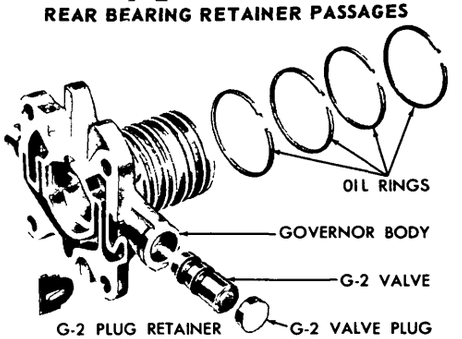
Inspecti n: Check all pins for excessive wear or binding in their bores and check bracket spring for breaks or collapsed coil.

R ass mbly: Clamp dowel pin of parking bracket in soft jawed vise, then place bracket spring in bracket with straight leg of spring in narrow slot between the sides of bracket and the hook end of spring near fixed end of dowel pin. Place bracket shaft approximately half way through bracket and spring and then slide pawl and lever assembly onto shaft. Use long nose pliers and hook bracket spring over parking lever.

REAR BEARING RETAINER: Disassembly - Remove inside detent lever and shaft assembly by removing manual shaft retaining pin from case side of retai ner. *CAUTION - This is not a screw.* Rotate lever and shaft assembly to remove from rear bearing retainer. If necessary, remove manual shaft seal from bore in retainer. Remove rear thrust bearing race-to-rear bearing retainer snap ring through access hole in retainer. Remove rear race, bearing and front race from rear bearing retainer.



REAR BEARING RETAINER PASSAGES

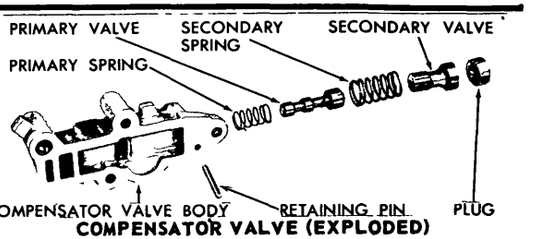


GOVERNOR (EXPLODED)

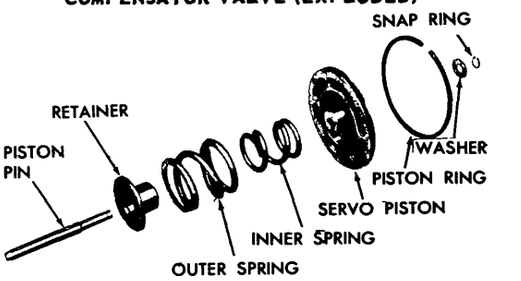
Inspection: Inspect rear bearing retainer for "hair line" cracks or leaks and check for inter-connected passages (using air gun or smoke). Inspect rear bearing and race. Check bolt hole threads for cross threading or stripping. Check air vent passage for restriction and anti-siphoning valve for proper movement. Inspect detent lever for nicks, and burrs, and replace detent lever shaft "O" ring seal. Clean thoroughly with compressed air.

Reassembly: Install race, thrust bearing, and race into rear bearing retainer. Install snap ring (concave side toward rear and with identification side away from race), then align ear on snap ring with top slot in retainer. If removed, install bushing and sleeve assembly in rear end of rear bearing retainer, chamfered end first. Align short slot in bushing with retaining bolt hole in rear bearing retainer, then install with soft hammer and drift. Install bushing retainer bolt and tighten to 12-15 ft. lbs. Install inside detent lever and shaft assembly into rear bearing retainer, then install detent shaft retainer into hole in rear bearing retainer, aligning key with annular groove in detent shaft. If removed, install new manual shaft seal (grooved side toward retainer) over detent shaft.

SERVO PISTON & ACCUMULATOR PISTONS: Disassembly - Place a 7/16" deep socket over long end of servo piston pin, then position a "U" shaped spacer against piston end of piston assembly and place the socket, piston assembly and "U" shaped spacer between jaws of a bench vise. Slowly tighten vise sufficiently to remove the snap ring, then remove servo piston-to-piston pin snap ring and washer being careful



COMPENSATOR VALVE (EXPLODED)



SERVO PISTON

not to spread snap ring more than necessary as it can be easily distorted. Remove piston assembly from vise, then remove servo piston, springs, and retainer. From upper accumulator piston, remove and discard lip s al.

Inspection: Inspect servo piston ring and ring groove for broken ring and ring groove for nicks or burrs. Check release spring for collapsed coils or broken spring. Check piston stem for scoring. Use a fine wire and check oil passages in piston. Inspect lower accumulator piston ring and ring groove for broken ring and ring grooves for nicks or burrs. Replace rubber lip type seal on upper accumulator piston. Inspect accumulator release springs for collapsed coils or broken spring. Inspect accumulator piston pin for scoring.

Reassembly: Install a new piston seal on upper accumulator piston with lip facing flat side of piston, then install spring retainer, springs and servo piston ver servo piston pin. Install assembly is vise in same manner used at disassembly, then align pin carefully and compress the assembly to allow flat washer and snap ring to be installed. Remove servo piston assembly and tools from vise.

►*CONTROL VALVE INSPECTION NOTE:* **Inspect each valve for free movement in valve body bore. If necessary, stone the valve lands slightly to remove small burrs. DO NOT remove square edges of valve lands. Inspect springs for distortion or collapsed coils. Make sure ball seats are not pitted or chipped. Inspect spacer plates for restrictions, dents or distortion.**

COMPENSATOR VALVE BODY: Disassembly - Compress compensator plug and remove retaining pin, then remove plug. Remove secondary and primary valves and springs.

Reassembly: Install spring on primary compensator valve and install spring and valve (small end first) into body. Install spring on secondary compensator valve and install spring and valve into body (spring end first). Install plug with threaded side out, then compress plug and install retaining pin.

2-3 BOOST BODY: Disassembly - Remove boost body from main valve body (one attaching scr ew is located on

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

channel plate side of body). *NOTE - B car ful not t lose the three loose check balls in boost body.* Remove three check balls and spacer plate from valve body, then remove retainer from 2-3 boost body (retainer is under spring pressure). Remove 2-1 cut-off valve spring and valve, 2-3 boost plug, spring and valve.

R assembly: Install 2-3 boost valve (long stem out), spring and plug into bore of boost body nearest the cored face. Compress 2-3 boost plug against spring tension and partly install 2-3 boost body retainer. Install 2-1 cut-off valve (stem out), and spring in remaining bore of boost body, then compress 2-1 cut-off valve spring and slide 2-3 boost body retainer over spring. *NOTE - See "Assembly of Complete Control Valve" below for installation of 2-3 Boost Body.*

►*1961 VALVE BODY TOOL NOTE:* To aid in removing and replacing valves in control valve assembly, make tools illustrated below. Tool No. 1 is made from 1/8" diameter soft metal rod and is used to remove stuck valves. Tool Nos. 2 & 3 are made from 3/8" & 5/16" diameter copper tubing and are used to compress and hold valve spring while spring retaining pin is being removed or replaced.

►*CONTROL VALVE DISASSEMBLY & REASSEMBLY NOTE: Carefully identify all valve assembly parts so they may be returned to same location in valve body at reassembly. See "Changes, Cautions, Corrections" above for differences in control valve assemblies.*

CONTROL VALVE BODY: Disassembly - 1) Remove channel plate from valve body assembly (two screws on valve body side and thirteen screws on channel plate side), then remove neutral clutch bypass valve from cored side of channel plate. Remove front clutch bypass valve.

2) If necessary to remove pressure relief ball and spring, proceed as follows: Turn channel plate over to casting side and remove retaining pin. *CAUTION - Pin is under xtreme pressure.* Remove pressure relief spring and ball. After cleaning and inspection, reassemble channel plate by installing pressure relief ball, spring and retainer, neutral clutch bypass and front clutch bypass valve, then set channel plate aside and continue with disassembly.

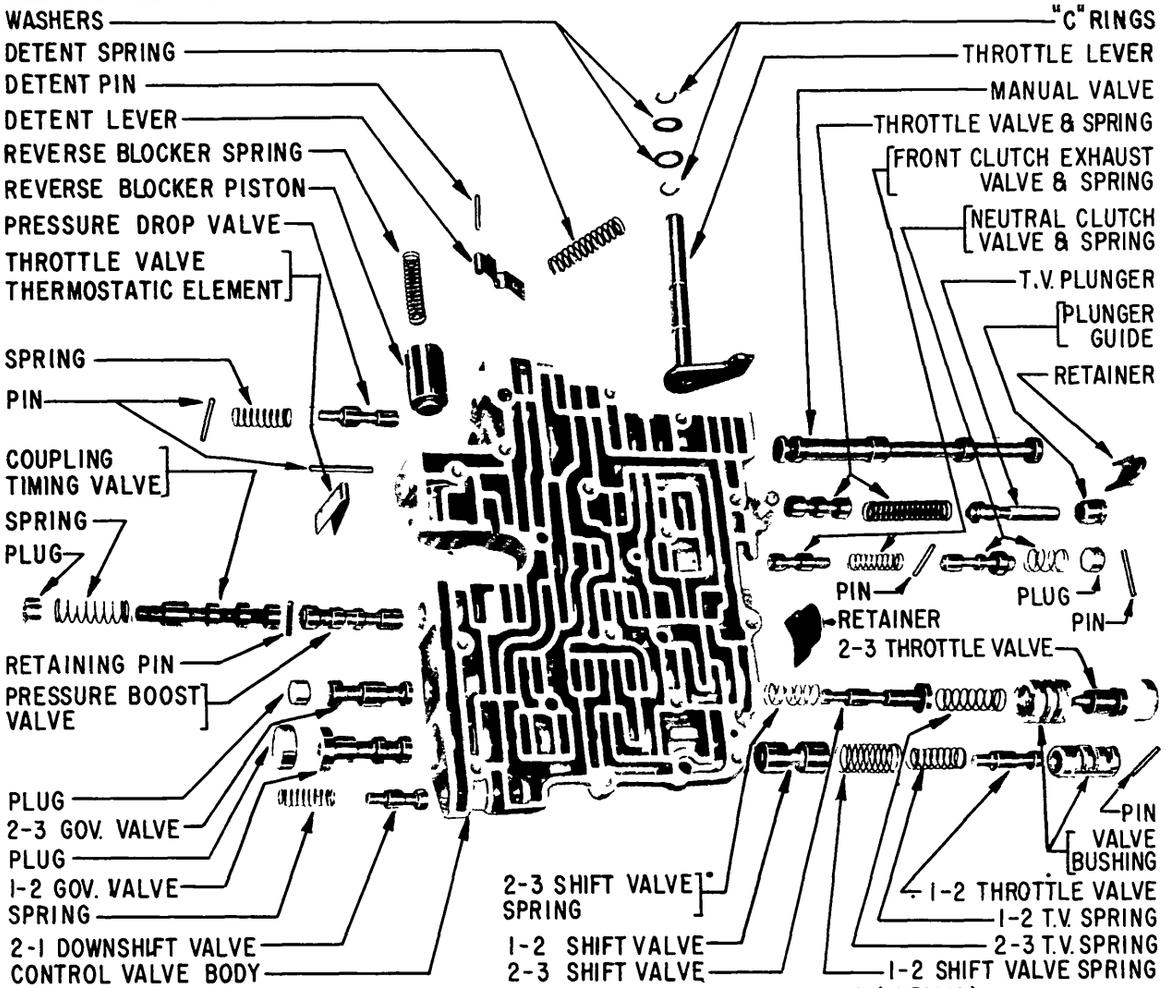
3) Remove channel plate-to-valve body spacer and place on channel plate and check alignment of bypass valves. Remove two check balls and throttle valve thermostatic element. Remove throttle valve plunger guide retainer located in cored passage near throttle valve adjusting screw. Position control valve assembly with cored side up and throttle valve lever positioned on top right hand side.

►*DISASSEMBLY NOTE: Refer to valve body illustration and proceed as follows:*

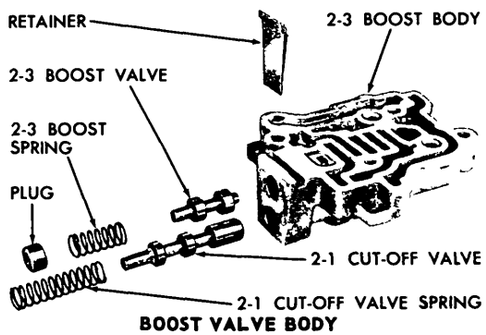
4) Remove multiple valve plug retainer (plugs are under spring tension), then remove 1-2 downshift valve and spring.

►*VALVE PLUG REMOVAL NOTE: All valve plugs are threaded so that a valve body attaching screw can be threaded into plug for removal and installation.*

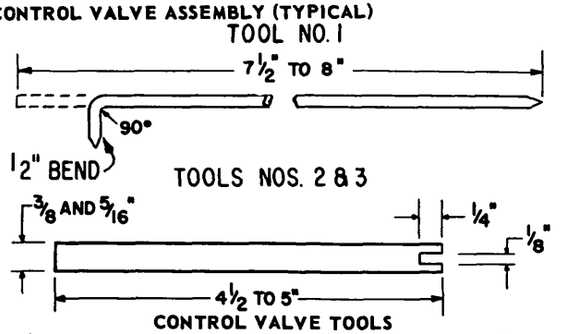
5) Remove plug from 1-2 governor valve bore and remove valve and spring, then remove 2-3 governor valve plug and 2-3 governor valve. Remove plug from coupling timing valve bore and remove spring and coupling timing



3-SPEED HYDRA-MATIC TRANSMISSION CONTROL VALVE ASSEMBLY (TYPICAL)



BOOST VALVE BODY



CONTROL VALVE TOOLS

valve. Remove pressure boost valve retaining pin from center of cored side of valve body (in coupling timing valve bore). *NOTE - On arly transmissi n, cover nd of bore with finger to prevent loss of pressure boost plug which is und r spring pr ssur .* Remove pressure boost plug and spring.

6) From opposite side of valve body, remove pin retain-

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

ing 1-2 throttle valve bushing and remove bushing and 1-2 throttle valve. From the same bore, remove shift valve springs and 1-2 shift valve.

7) From the next bore, remove valve bore plug retainer and plug (plug is under spring tension), then remove 2-3 throttle valve, spring and bushing, and 2-3 shift valve and spring.

8) Remove retaining pin from neutral clutch valve bore, then remove plug, neutral clutch valve and spring. From the same bore, remove front clutch exhaust valve retaining pin on cored side of valve body (use a small screwdriver to relieve spring pressure on pin for removal),then remove front clutch exhaust valve spring and valve.

9) Mark throttle valve adjustment screw and **loosen xactly 5 turns.** Turn valve body over and remove throttle lever by removing outside "C" ring and washer, positioning shaft so that lever will clear throttle valve adjustment screw, then remove washer. Remove throttle valve plunger, sleeve, spring and valve.

10) Remove pressure drop valve retaining spring, pressure drop valve and spring. If necessary, remove reverse blocker piston retaining pin, spring and reverse blocker piston.

11) Remove detent spring. *NOTE - Do not remove detent l v r unless n c ssary to replace.* If necessary, drive pin out with a small punch.

R ass mbly: *NOTE - All attaching screws must be tightened to 2.5-3.5 ft. lbs. and all attaching bolts to 6-8 ft. lbs.*

1) Install manual detent lever and retaining pin, then install detent spring. Install reverse blocker piston, spring and pin. Install pressure drop valve (stem end of valve last) spring and retaining pin in top bore adjacent to detent spring.

2) Install throttle valve (round end first), spring, plunger and sleeve in throttle valve bore adjacent to manual valve bore. Place washer against "C" ring on throttle valve lever shaft, then install shaft through hole in valve body so throttle valve lever will index between plunger and throttle adjusting screw. Install washer and "C" ring securing lever assembly to valve body. Turn throttle valve adjusting screw back to original position (**xactly 5 turns**). Install throttle valve plunger guide retainer through cored side of valve body into annular groove in throttle valve plunger.

3) Install front clutch exhaust valve (land end first) and front clutch exhaust valve spring in bore adjacent to throttle valve bore. Install short retaining pin through cored side of valve body while compressing exhaust valve spring, then install neutral clutch valve and spring in same bore. Compress valve spring and install valve bore plug (threaded end out) and retaining pin.

4) Place 2-3 shift valve spring on 2-3 shift valve, then install assembly in bore next to neutral clutch valve. Install 2-3 throttle valve spring into spring pocket in 2-3 shift valve, then install 2-3 throttle valve into 2-3 regulator bushing so valve will completely enter bore of bushing. Install 2-3 throttle valve and bushing into 2-3 bore in valve body (small end of throttle valve first) and install valve bore plug (threaded end out) and retainer.

5) Install 1-2 shift valve in bore next to 2-3 shift valve, then install 1-2 shift valve spring and 1-2 throttle valve spring. Install 1-2 throttle valve into bushing (stem end out)and install this assembly into bore (valve end first). Depress bushing and install short retaining pin from cored side of valve body.

6) In bore adjacent to "U" shaped cutout of valve body, install pressure boost valve (use brass rod to guide valve into bore, long end first). Install retaining pin through same bore, then install coupling timing valve (land end first). Install line boost plug into line boost valve spring (retain with petrolatum). Use a 5/16" copper tube (5" long) and load line boost plug and spring into end of copper tube, then place tube into bore against line boost valve, spring end first. Use 1/8" brass rod (8" long) and insert it through tube, pushing line boost plug and spring into line boost valve. While holding line boost plug and spring compressed with brass rod, withdraw copper tube far enough to insert retaining pin. Then gently remove brass rod to allow pin to be installed. Install coupling timing valve (land end first), then install coupling timing valve spring over stem of coupling timing valve. Install valve bore plug and partially install multiple plug retainer in such a manner that only one corner of plug is retained, permitting installation of remaining plugs and valves.

7) Install 2-3 governor valve (small land first),then install bore plug against governor valve, compressing plug against spring tension into bore and position multiple retainer again so edge of plug is secured and adjacent bore is not obstructed. Install 1-2 governor valve in bore next to 2-3 governor valve and install plug, compressing valve against spring pressure. Again reposition multiple retainer to secure plug. Install 2-1 downshift valve (land end first) into remaining bore, then place 2-1 downshift valve spring over 2-1 downshift valve, compressing the spring, and secure with multiple retainer.

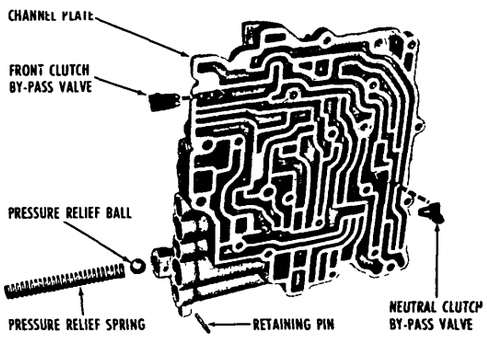
ASSEMBLY OF COMPLETE CONTROL VALVE: 1) Install throttle valve thermostatic element (open end down) in cavity behind throttle valve in control valve body, then position spacer plate over cored side of control valve body.

2) Install two small check balls into pocket on cored side of valve body, then position channel plate on valve body and attach with thirteen screws (leave loose for final adjustment). Turn control valve body over and install three ball check valves into pockets.

3) Place 2-3 boost valve body spacer on valve body, then place 2-3 boost valve body on spacer plate and install three attaching screws (do not tighten screws). Install loosely two screws attaching valve body to channel plate. Turn control valve assembly over and install remaining 2-3 boost valve body-to-control valve body assembly long attaching screw. Tighten all attaching screws to 2.5-3.5 ft. lbs.

TRANSMISSION DISASSEMBLY

NEUTRAL CLUTCH, CASE CENTER SUPPORT & REVERSE CLUTCH: Place transmission in holding fixture with front end up, then install neutral clutch backing plate (flat side up). Install four drive and four driven plates as follows: Install a composition drive plate above clutch backing plate and then a steel driven plate with notched lug of plate in a slot adjacent to one of the wide lugs in case. Install a second composition plate



CHANNEL PLATE (EXPLODED)

and then another steel plate with its notched lug on opposite side of wide case lug from the first steel plate. *NOTE - Steel plates must be installed in this arrangement to properly "un-nest" the clutch pack.* Alternately install composition and steel plates so that notches on first and third steel plates are on one side of case lug and the second and fourth steel plates are on opposite side. With plates properly installed, install long case center support key with long lip toward front of case (hold it in place with petrolatum). Mark the case to indicate sides of key to assist in alignment for installation of case center support. Install neutral andreverse clutch assembly (case center support) into case, aligning center support key with keyway. *NOTE - If n cessary, tap into place and make sure oil rings do not come unhooked during installation.* Install reverse stationary cone key into case (rounded side toward front of case). Install reverse cone (steel) into case cover reverse piston, then install reverse stationary cone (plastic) in case, aligning reverse stationary cone key with keyway in cone (lightly tap into place if necessary). Install large reverse cone snap ring into snap ring groove in case with flat ends of snap ring up, and ring gap at open segment of ring groove in case. Reposition transmission with rear end upward, and install overrun clutch band over anchor in case. *NOTE - If overrun clutch is excessively worn, lining cracked or distorted, install a new clutch band.* Install rear unit internal gear, sprag assembly and sprag retainer into case, aligning neutral clutch plates with sprag outer race. *CAUTION - B sure sprag retainer bottoms against case center support to insure engagement of all plates.*

►*NEUTRAL & REVERSE CLUTCH ASSEMBLIES CHECKING NOTE:* At this point in reassembly, apply air pressure to Neutral Clutch passage and to Reverse Clutch passage (see "Transmission Case Passages" illustration). A destinctive "clunk" will be heard when pressure is released if clutch is operating properly.

FRONT UNIT & REAR UNIT: *NOTE - Before installation of front unit carrier assembly, inspect plan t pinions for damage and for free movement of gears n pins. Make sure pinion pins are well staked. Check splines on carrier hub. Inspect front sun gear-to carrier thrust washer for excessive wear, nicks, burrs or for ign mat rial imbedd d in thrust race.* Position transmission with bottom upward, then install front clutch assembly into front of transmission engaging

CONTINUED ON NEXT PAGE

3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

teeth in front clutch hub with reverse cone. *NOTE-Make sure bronze washer is positioned in counterbore of front unit clutch drum.* Install thick bearing race, thrust bearing, thin cupped bearing race on front sun gear and shaft assembly. Install front sun gear and shaft assembly through case center support, aligning splines of sun gear shaft with rear internal gear and cutaway splines with sprag retainer. *CAUTION - Be sure to hold rear unit internal gear forward during this operation.* Install front sun gear shaft-to-rear unit internal gear snap ring, then install bearing race (flange up) and bearing on rear planet carrier (retain in place with petrolatum). Install rear planet carrier through front unit sun gear shaft from rear of transmission, then install front carrier thrust bearing race onto rear carrier shaft (inner flange out) and install front carrier thrust bearing into race. Install thrust bearing race over front thrust bearing (outer flange inward). Hold rear planet carrier forward and install front unit carrier. Install front unit carrier-to-rear planet carrier snap ring while holding rear carrier forward.

PARKING LINKAGE: Position transmission with rear end upward, then install pawl spacer in case. Install parking assembly (parking pawl first) through hole in rear of case so that pawl tooth faces inside of case. Install pawl pin into case, through pawl and spacer. Push parking bracket shaft to bottom of its bore and move pawl to its disengaged position.

OUTPUT SHAFT & GOVERNOR: *NOTE - Before installing output shaft, inspect splines for nicks and burrs. Make sure snap ring groove is free of dirt and chips. Inspect mainshaft pilot bushing for excessive wear and tight fit. Inspect parking sprocket lugs for burred edges and speedometer gear for misalignment and tight fit on shaft.* Install rear unit sun gear-to-rear carrier bearing race into rear carrier with flange up and retain in place with petrolatum. Install rear unit sun gear-to-rear carrier thrust bearing into bearing race, then assemble rear unit sun gear to mainshaft, if removed, and install through rear carrier. Install governor gasket and governor on output shaft and install speedometer drive gear with Tool J-6133. Position speedometer gear so rear side of gear is 2 3/64" (Oldsmobile); 9/16" (Pontiac) from forward edge of nearest snap ring groove. Install output shaft to rear carrier assembly, using aligning marks, then engage parking pawl. Install governor attaching bolts and tighten to 19-23 ft. lbs., then install snap ring on front output shaft groove.

REAR BEARING RETAINER: Install gasket on rear bearing retainer and retain with petrolatum, then start rear bearing retainer down over output shaft and install rear output shaft snap ring through access hole and over end of output shaft while retainer is being lowered over governor assembly. Carefully align parking linkage pin and manual detent lever as rear bearing retainer is aligned with dowel pin and case. *NOTE - If necessary, seat rear bearing snap ring with Tool J-6133. Install* two short retainer-to-case attaching bolts at center location on each side, then install remaining short bolt inside rear bearing retainer. Install five remaining long retainer bolts and tighten all bolts to 20-25 ft. lbs. If rear seal was removed, install new seal with Tool J-5154. Install retainer cover plate and gasket.

TORUS: *NOTE - Before installing torus, inspect driven torus member for bent or damaged vanes and hub splines for nicks and burrs. Check oil rings for damage and grooves for nicks and burrs. When locked, rings should turn freely in groove. Inspect balance weight (if present) for good weld. Inspect driven coupling to stator thrust bearing race for distorted bearing surface or excessive wear on thrust race (a slight distortion or bend could cause a side loading effect and cause part of the rollers to dislodge from cage).* Install front unit drive torus, aligning front unit clutch plates with drive slots in drive torus (make sure clutch plates are engaged by looking through vent port in bottom of case). Install hook type oil ring on stator hub (torque multiplier), if removed, then install hook type oil ring on front and rear hubs of driven torus member. Install stator (torque multiplier) into drive torus, aligning splines, then position stator so that inner diameter of hub of stator is flush with planet carrier shaft (a light tap with a plastic hammer may be required). Install driven torus -to-stator rear bearing race into stator, then install flanged race (flange up) into driven torus. Install bearing into flanged race and retainer with petrolatum. Install driven torus member over main shaft. Position transmission so bottom is upward. *CAUTION - Do not position more than 90° or parts will fall out.* While moving mainshaft forward (with small tool inserted in hole of mainshaft) install driven torus-to-mainshaft spiral retaining ring. Position transmission with front end upward, then install new drive torus-to-torus cover metal gasket on torus drive member and retain in place with petrolatum. Install flat bearing race into torus cover, then install bearing into flanged race and install bearing and flanged race assembly into torus cover (flanged down). Install torus cover to drive torus member, aligning the dowel pins. *NOTE - Guide Pins, Tool J-8938 may be used.* Install box wrench on case as a tool to hold torus cover, then install torus cover-to-drive torus attaching bolts and cross-tighten the bolts to 17-20 ft. lbs. Remove box wrench.

CASE COVER: Install gasket on case cover and retain in place with petrolatum, then install case cover and pump assembly on transmission. Install five of the six large case cover-to-case attaching bolts (leaving one hole in which to install dial indicator support) and tighten to 30-35 ft. lbs. Install the three smaller attaching bolts two shorter bolts from rear of case cover), and tighten to 15-18 ft. lbs. After front unit endplay is checked and adjusted (see below), install front seal, rubber lip down with Tool J-8761 and Seal Protector J-8828.

►*1961 FRONT PUMP SEAL INSTALLATION CAUTION:* When replacing seal, Front Seal Installer Tool J-8761 and Seal Protector Tool J-8828 must be used. Make sure that seal is properly seated and that small "grater" spring is not dislodged or hanging up on spline of input shaft. Apply seal lubricant, Part No. 567196 to sealing lip and a light coat of suitable sealer to outer diameter of seal before positioning into pump. When seal is properly seated, seal cage might project past pump body. This is normal and should not be used as a location point for depth.

FRONT UNIT ENDPLAY CHECK: See "Front Unit Endplay Check" above. If endplay is not within limits of .004-.022", remove case cover and install proper thrust washer or combination of thrust washers between case cover and torus cover to obtain proper endplay. See table below for selective thrust washer sizes and identification.

Endplay Selective Thrust Washers

Part No.	Thickness	Color
8620697	.027-.029"	Bright
8620698	.036-.038"	Copper
8620699	.045-.047"	Black
8620700	.054-.056"	Bright & Notched

SERVO & ACCUMULATOR: Install accumulator pin in case, then install upper accumulator spring (small end first). Install new upper accumulator seal (lip of seal facing flat side of piston) and upper accumulator piston (lip of seal facing away from tapered spring). Install lower accumulator piston ring on piston and install piston over pin with spring pocket facing out. Install lower accumulator into spring pocket. Install servo release spring into case bore and install servo piston assembly (stem first), then install three case center support-to-case seals and springs (seals down). Install gasket on servo and accumulator cover and install cover. Install four bolts and align center support to case seal springs and accumulator spring, then with cover properly aligned, install all bolts loosely (except the one attaching compensator valve body) and tighten to 6-8 ft. lbs. Install compensator valve body on cover and tighten the three attaching screws to 2.3-3.5 ft. lbs. and the one attaching bolt to 6-8 ft. lbs. Install seals on both ends of pipe assembly and install pipe assembly (fixed end first) into case cover through opening in case. Install seal and washer on pipe assembly attaching bolt, and install bolt to pipe assembly from front side of case cover.

CONTROL VALVE BODY & OIL PAN: Install manual valve in valve body, then apply petrolatum to valve body ports and install valve body assembly, to rear bearing retainer, guiding throttle valve shaft through opening in rear retainer and position manual valve on pickup pin. Position pipe assembly to index with pipe ports in valve body and move forward to seat pipe seals. Secure valve body assembly with five attaching bolts and tighten to 6-8 ft. lbs. *NOTE - If it is difficult to index pipe with valve body ports, loosen pipe assembly to case cover bolt one-half turn. Be sure and retighten after control valve is installed.* Install throttle shaft seal over shaft into case, using care not to fold lip under. Install a case to strainer neck "O" ring in case bore, then install strainer assembly and secure in position with one servo and accumulator cover bolt. Tighten to 6-8 ft. lbs. Install new oil pan gasket and oil pan and tighten bolts to 12-15 ft. lbs. Install outer shift lever and throttle valve lever, then install speedometer driven gear assembly.

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION

Oldsmobile F-85 (1.61)

►CHANGES, CAUTIONS, CORRECTIONS

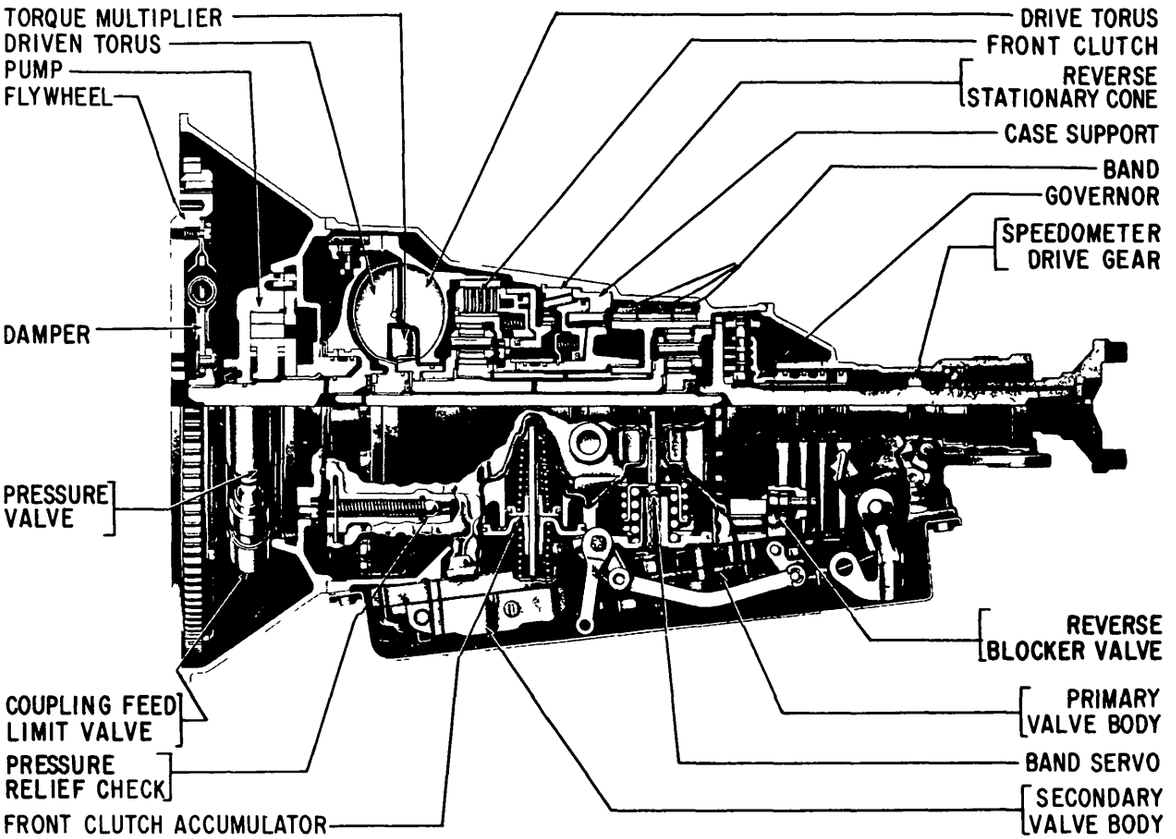
►*1961 OLDSMOBILE F-85 TRANSMISSION PRODUCTION CHANGE (Pressur Compensated Shift Pattern):* Beginning with Transmission Serial No. 0561-49150 (2-Bbl. Carbs.) and OD561-012353 (4-Bbl. Carbs.), control valve assembly and separator plate were changed to provide a "Pressure Compensated Shift Pattern". Later type control valve assemblies are stamped "0-3" or "OD-2" on throttle lever side of valve bodies and channel plate. Later type control valve assemblies, Part No. 8620999 ("0" Model Trans.); No. 8621900 ("OD" Model Trans.) must be used on all transmissions after the above serial numbers. *DO NOT USE on earlier transmissions.* Later type separator plates must be us d with later type control valve assembly and may be used with early control valve assemblies. *DO NOT USE early type separator plate with later type control valve assembly.*

►*1961 OLDSMOBILE F-85 TRANSMISSION "BUZZ" CORRECTION:* Before disassembling any part of transmission, check installed height of filler tube on transmission which should measure 15 13/16" from top of tube to its entry point in transmission case. If less than the above dimension, raise to correct height and bend filler tube attaching bracket as necessary to hold it in position. Fill transmission to proper level with recommended fluid (see "Lubrication" above). If "buzz" is eliminated (because of low oil level), further correction is unnecessary.

►*1961 OLDSMOBILE F-85 TRANSMISSION ENGINE "REV-UP" DURING 1-2 SHIFT (OIL HOT OR COLD) CORRECTION:* This condition may be caused by front clutch piston bottoming in clutch housing, blocking off oil pressure to clutch piston. To correct, file four grooves ¼" wide 1/16" deep and 90° apart on raised inner rim of housing side of clutch piston. Remove any sharp edges or burrs caused by filing. When assembling, align one of the grooves with a clutch piston oil feed passage.

►*1961 OLDSMOBILE F-85 TRANSMISSION SLIP OR ENGINE "REV-UP" DURING 1-2 SHIFT (WITH COLD OIL) CORRECTION: NOTE - This slippage may only occur on first few shifts and may not occur if engine is run for a few minutes before placing selector lever in "Drive" range.* On transmissions before Transmission Serial No. 0561-26287 contents of Parts Pkg. No. 8620976 should be installed in secondary valve body. This parts package contains one each of the following parts: Coupling Signal Valve, Coupling Signal Valve Spring, Coupling Valve Bore Plug and Coupling Valve Bore Plug Retainer. Complete valve body assembly must be removed from transmission, then secondary valve body can be removed from complete assembly for installation of the above parts. Transmissions having serial numbers higher than 0561-26287 have these parts installed in production.

DESCRIPTION: "Split-Torque" type hydraulically controlled automatic planetary transmission and torque converter (fluid coupling and torque multiplier). Engine torque is transmitted completely by hydraulic action in first speed and completely by mechanical action in second speed. In third speed, the torque is "split", causing the torque converter to carry only 40% of engine torque with remaining 60% being transmitted mechanically.



OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION SECTIONAL VIEW

OPERATION: Neutral Range - Engine torque is transmitted through torus cover to drive torus member causing it to rotate driven torus and turn mainshaft and rear unit sun gear in direction of engine rotation. In neutral, the band is released and allows rear unit internal gear to turn. As rear unit sun gear turns in direction of engine rotation, rear unit pinions turn in opposite direction, driving rear internal gear opposite engine rotation. The front unit sun gear being mechanically connected to rear internal gear is also turning opposite engine rotation causing front unit pinions to turn in direction of engine rotation, driving front internal gear in same direction. With both rear unit internal gear and front unit internal gear spinning freely, there is no transfer of torque from front or rear units to carriers or output shaft.

First Speed: Engine torque is transmitted through torus cover to torus drive member then through oil to torus driven member which redirects it through the stator (torque multiplier) and back to driven member. This action multiplies the engine torque and applies to mainshaft and rear unit sun gear. The band is applied locking rear unit internal gear stationary causing output shaft to rotate in direction of engine rotation within the internal gear at a reduced speed and with increased torque. As rear carrier and output shaft rotate clockwise at reduced speed the front carrier, which is mechanically connected to rear carrier, also rotates in direction of engine rotation at a reduced speed. As the band is holding front unit sun gear stationary, the carrier and pinions rotate front unit internal gear in direction of engine rotation at approximately one-half engine speed.

Second Speed: Engine torque is transmitted through torus cover to torus drive member. The front clutch is applied and coupling is empty so engine torque is mechanically applied to front unit internal gear. Front unit sun gear is splined to rear unit internal gear and is prevented from turning opposite engine rotation when band is applied. Engine torque at front internal gear is then applied to pinions, and because sun gear cannot rotate opposite engine rotation then planet pinions and carrier are compelled to revolve in direction of engine rotation around the sun gear in reduction. Front carrier is splined to rear unit carrier and shaft assembly which in turn is bolted directly to output shaft.

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

Third Speed: Engine torque is transmitted through torus cover and is applied through front clutch to front unit internal gear. Front unit internal gear, through pinions, tends to turn front sun gear opposite engine rotation. This would cause front carrier to run in direction of engine rotation, in reduction. The rear carrier, then must also attempt to rotate in direction of engine rotation, in reduction. With rear carrier rotating opposite engine rotation in reduction, and rear unit internal gear tending to turn in opposite direction, the rear unit pinions attempt to rotate in direction of engine rotation on their pins, thus driving rear unit sun gear and driven torus in direction of engine rotation faster than engine speed. As the fluid coupling is filled, coupling driven member and rear unit sun gear cannot revolve faster than drive torus which turns at engine speed. Therefore rear unit sun gear is slowed down to approximately engine speed. In so doing, rear unit pinions are slowed down in their rotation on pinion pins. Carriers and pinions then change direction of load against internal gear causing it to revolve in direction of engine rotation with carrier and sun gear at the same speed. Because output shaft and carriers are connected to the stator (torque multiplier) in the coupling, the torque multiplier is also turning at same speed as drive and driven members so that it has no effect in multiplying torque in coupling, causing the entire train to rotate as one common unit.

Reverse: Engine torque is applied to mainshaft in same manner as in "First Speed" above. Rear unit sun gear then drives rear unit pinions as idlers which in turn drive rear unit internal gear in a direction opposite to engine rotation. With rear unit internal gear turning opposite engine rotation, front unit sun gear is turning in same direction. The reverse cone which is applied holds front unit internal gear stationary so that front unit pinions and carriers are compelled to walk around front internal gear in a direction opposite to engine rotation, and in reduction. The output shaft being connected to front and rear unit carrier is also turning in a direction opposite engine rotation, and in reduction.

LUBRICATION

LUBRICATION INTERVALS: Check fluid level every 2000 miles. Drain and refill every 26,000 miles.

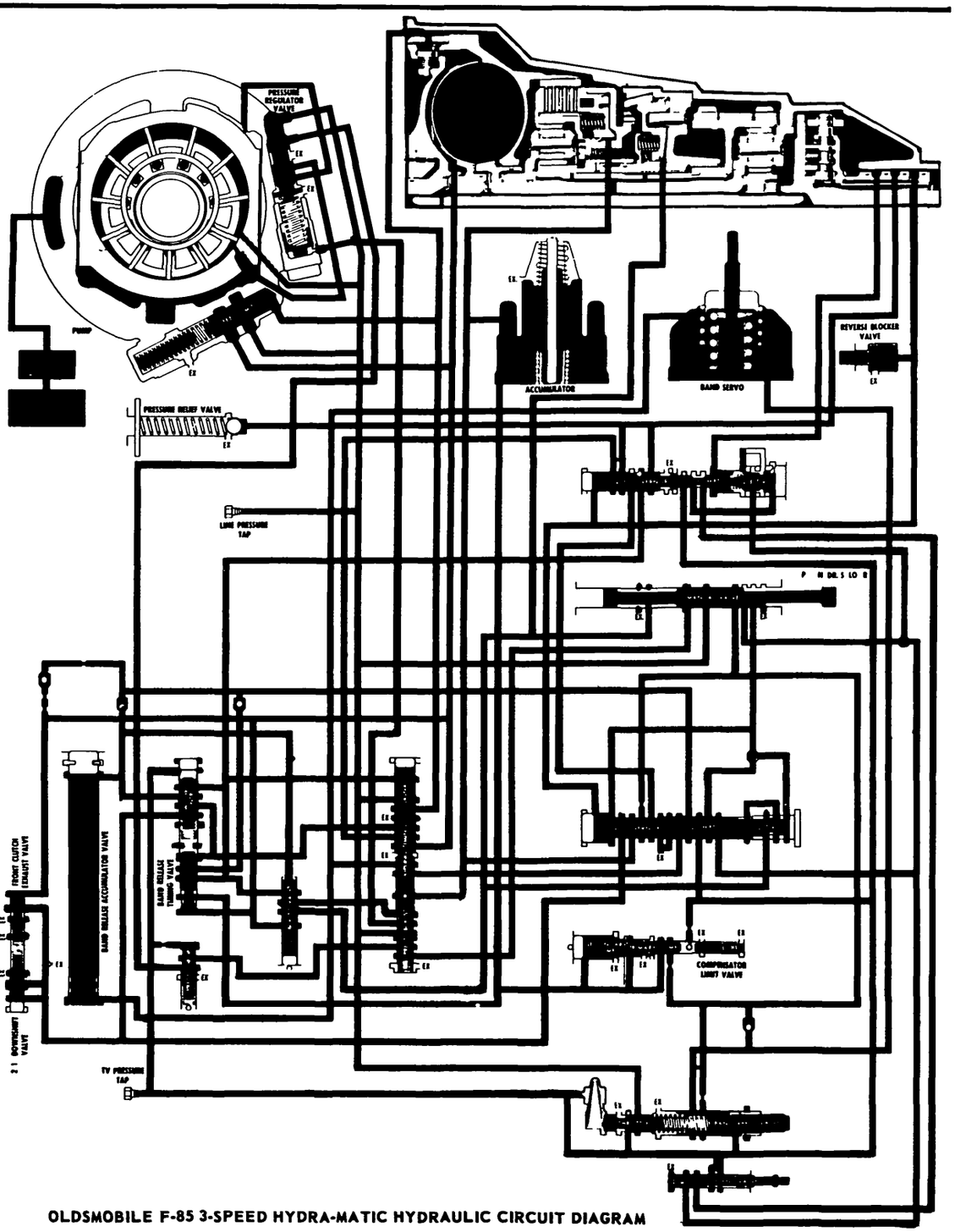
Recommended Lubricant: Use only Automatic Transmission Fluid Type "A" (Suffix "A").

CHECKING FLUID LEVEL: With car on a level floor, transmission at normal operating temperature and selector lever in "P" (Park) position, check fluid level on dipstick. Add recommended fluid as necessary to bring level to FULL mark on dipstick. *NOTE - 1 pint of fluid is required to bring level from ADD mark to FULL mark. DO NOT OVERFILL.*

DRAINING & REFILLING: Remove drain plug from transmission oil pan and drain fluid, then replace plug. Remove dipstick and add 3½ qts. of recommended fluid, then with selector lever in "P" (Park) position and car on a level floor, start engine. With engine running, add sufficient fluid to bring level to FULL mark on dipstick. *CAUTION - D n t ov rfill.*

Capacity: Approximately 4 qts. (after drain); 5 qts. (after removal of pan); 7 qts. (after overhaul).

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC HYDRAULIC CIRCUIT DIAGRAM

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

LINKAGE ADJUSTMENT

THROTTLE LINKAGE ADJUSTMENT: *See "Carburetor" on car mod l pag .*

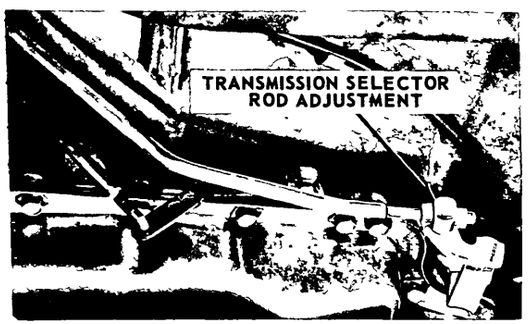
THROTTLE VALVE LEVER (ON TRANSMISSION) ADJUSTMENT: Remove lower throttle valve rod from throttle valve lever and place pin of Throttle Valve Lever Gauge, BT-33-2 in threaded hole in case (located in boss on left side of transmission case at forward end). If hole in lever does not align WITHIN the hole in gauge, bend throttle valve lever as necessary with Bending Tool, BT-33-7 to align center of hole WITHIN gauge hole.

MANUAL LINKAGE ADJUSTMENT: Place selector lever in "N" (Neutral) position, then loosen front and rear locknuts at manual lever on transmission. Hold manual rod and shift lever upward so selector lever is positioned against neutral stop. Tighten rear locknut until it just contacts swivel, **then tighten it two additional turns.** Tighten front locknut.

BAND ADJUSTMENT: Adjust every 26,000 miles. Remove oil pan and cleaner and loosen adjusting screw locknut. Use an inch pound torque wrench and Tool J-8591 and tighten adjusting screw to 20 inch pounds. **L sen screw tw c mpl te turns** and hold while tightening locknut. Tighten locknut to 18-20 ft. lbs.

ACCELERATOR PEDAL HEIGHT: Place Tool BT-33-2 in position (with hole nearest the pin) over the throttle valve bellcrank pin. Swing gauge in an arc and adjust length of accelerator lever rod until end of gauge just contacts closest surface of cowl.

THROTTLE STOPSCREW ADJUSTMENT: *NOTE - This adjustment is requir d whenever channel body and thr ttl body have been separated or either has been replaced.* Disconnect throttle valve rod from outer throttle valve lever on transmission, then insert Tool BT-33-6 between throttle valve plunger and throttle valve lever by pushing plunger into its bore and holding the lever rearward. Adjust stopscrew against lever until throttle valve plunger bottoms in its bore, **then back st pscr w ut nly nough to permit removal of gauge.**



MANUAL SELECTOR LINKAGE

NEUTRAL SAFETY SWITCH ADJUSTMENT: Loosen switch attaching screws on mast jacket, then with selector lever in "N" (Neutral), position switch so that a .090" pin can be inserted through hole in switch arm and into hole in face of switch. Tighten switch attaching screws and remove pin. Check to make sure starter is not operative in any selector lever position except "N" (Neutral) and "P" (Park).

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. See "Shift Speed Tables" below for correct shift speeds under different operating conditions.

►*CAUTION: Do not stall test transmission under any conditions.*

OIL PRESSURE TEST: Main Line Pressure - Connect a 300 lbs. pressure gauge to main line passage in case (remove plug in side of case just forward of outer throttle valve lever). With engine at normal operating temperature, engine idling at 500 RPM and parking brake applied, pressure should be 60-125 lbs. in all transmission ranges. Pressure should not vary more than 10 lbs. between ranges. With pressure gauge connected, operate car on road. Pressures should be as indicated in table below.

Operating Pressure Test

Selector Lever Position	Shift	ℂ Pressure
Dr., S., L., Rev.	1st	118-175 lbs.
S (30 MPH)	2nd	98-111 lbs.
Dr. (Zero Throttle, 30 MPH)	3rd	68-78 lbs.

℄ - A drop in pressure of approximately 10 lbs. as each shift is made is normal, but gauge reading should stabilize after each shift is made.

SHIFT SPEED TABLES

UPSHIFTS

Drive Range	1-2 CAR SPEED	2-3
Min. Throttle	12-15 MPH	17-24 MPH
Max. Throttle	24-30 MPH	58-65 MPH
Super Range		
Min. Throttle	12-15 MPH	60-68 MPH
Max. Throttle	24-30 MPH	60-68 MPH
Lo Range		
Min. Throttle	ℂ	ℂ
Max. Throttle	60-68 MPH	60-68 MPH

DOWNSHIFTS

Drive Range	3-2 CAR SPEED	2-1
Medium Throttle	30-16 MPH	12-8 MPH
Part Throttle	30-16 MPH	None
Detent	58-50 MPH	22-8 MPH
Super Range		
Medium Throttle	58-50 MPH	12-8 MPH
Part Throttle	58-50 MPH	None
Detent	58-50 MPH	22-8 MPH
Lo Range		
Medium Throttle	58-50 MPH	28-22 MPH
Part Throttle	58-50 MPH	28-22 MPH
Detent	58-50 MPH	28-22 MPH

℄ - Not possible.

TROUBLE SHOOTING & DIAGNOSIS

NO DRIVE IN DRIVE RANGE: Check for low oil level or low pressure. Manual linkage out of adjustment. Sticking valve in control valve assembly. Band not applying. Check for internal leakage. Check for restricted passage with air pressure. Coupling not filling.

MISSING ALL SHIFTS: Sticking governor valve. Sticking valve in control valve assembly. Clutch not applying.

DRIVE IN SECOND & THIRD ONLY: Sticking valve in control valve assembly. Clutch is locked (too many plates).

DRIVE IN FIRST & THIRD ONLY (This may be reported as a 1-2 Slip): Sticking valve in control valve assembly. Coupling not emptying.

DRIVE IN FIRST & SECOND ONLY: Governor "G-2" valve sticking. Sticking valve in control valve assembly.

DRIVE IN THIRD ONLY: Sticking valve in control valv assembly. Band not applying. Sticking governor valves.

DRIVE IN NEUTRAL (REVERSE OR FORWARD): Internal manual linkage engaging. Neutral clutch mispositioned. Reverse cone clutch not applying.

NO REVERSE: Internal manual linkage mispositioned. Low oil pressure. Reverse cone clutch not engaging. Restricted passage. Band not releasing.

ROUGH 1-2 UPSHIFT: Throttle valve linkage not adjusted properly. Sticking valves in control valve assembly. Sticking parts in accumulator. Coupling not emptying fast enough. Front clutch slipping. 1-2 oil passage resticted.

ROUGH 2-3 UPSHIFT: Band not releasing quickly. Sticking parts in servo.

SLIPPING IN ALL RANGES: Low oil pressure.

SLIPPING 1-2 UPSHIFT: Throttle valve linkage too long. Low oil pressure. Check for restrictions or sticking parts in accumulator. Sticking valves in control valve assembly. Band slipping. Check number of plates in front clutch. 1-2 oil passage restricted.

SLIPPING 2-3 UPSHIFT: Sticking valves in control valve assembly. Coupling not filling fast enough. Front clutch slipping.

NO ENGINE BRAKING IN INTERMEDIATE OR LOW RANGE: Sticking valves in control valve assembly. Band slipping or servo not applying.

NO PART THROTTLE OR DETENT DOWNSHIFT: Throttle valve linkage too long. Sticking valves in control valve assembly. Accelerator travel too short. Governor valves sticking.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Internal manual linkage mispositioned. Reverse blocker valve stuck open. Governor "G-2" valve stuck open.

SELECTOR LEVER WILL NOT GO INTO PARK: Parking linkage broken, improperly assembled or distorted. Manual linkage not properly adjusted.

FORWARD DRIVE IN REVERSE: Internal manual linkage improperly assembled or distorted.

HIGH UPSHIFTS: Throttle valve linkage too short. Sticking valve in control valve assembly or in governor. Throttle valve lever bent. Throttle valve pressure too high. Line pressure too high. Governor oil passage restricted.

LOW UPSHIFTS: Throttle valve linkage too long. Control valve assembly or governor valves sticking. Throttle lever bent. Throttle valve or line pressure too low. Governor passages restricted.

HANGING IN SECOND OR ENGINE STALLS UPON STOP: Control valve assembly or governor valves sticking. Throttle valve linkage too short. Clutch not releasing.

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

REMOVAL & INSTALLATION

REMOVAL: Install Engine Support Tool J-8974, then remove oil filler tube and breather tube. Disconnect propeller shaft, shift and throttle linkage, cooler lines and speedometer cable. Remove exhaust pipe and transmission rear support bar, then place transmission lift in position and remove transmission to engine bolts.

Installation: Reverse removal procedures and note the following: Lubricate threads of transmission-to-engine block bolts with Lubricant, Part No. 980131 and tighten to 30-35 ft. lbs.

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

►*NOTE: The following transmission components can be removed without removing transmission assembly from car. See "Transmission Disassembly" and "Transmission Reassembly" below.*

Without Removing Oil Pan Extension Housing: Limit Valve. Pressure Regulator Valve. Companion Flange. Rear Oil Seal. Oil Filler Pipe. Oil Pan. Rear Bearing Retainer.

After Removing Oil Pan: Control Valve Assembly. Parking Linkage. Channel Plate. Band Adjusting Screw & Nut. Accumulator-Servo. Throttle and Manual Control Levers, Shafts and Seals. Oil Cleaner, Oil Pump Intake Pipe and "O" Rings.

After Removing Extension Housing: Speedometer Drive Gear. Governor. Reverse Blocker Valve. Rear Bearing.

TRANSMISSION DISASSEMBLY

►*TRANSMISSION DISASSEMBLY NOTE: Instructions below cover removal of sub-assemblies in their proper order from transmission case. See "OVERHAUL OF UNITS" for disassembly, inspection, and reassembly.*

1) Remove filler pipe "O" ring from side of transmission case, then install transmission in a suitable holding fixture with bottom side upward. Remove oil pan and discard gasket, then remove oil cleaner assembly. Discard "O" ring seal in case if damaged.

►*TRANSMISSION FRONT UNIT ENDPLAY CHECK NOTE:* If transmission is to be completely disassembled check front unit endplay as follows: Remove one case cover-to-case bolt and install a suitable dial indicator support, then assemble Endplay Adapter, Tool J-6135 on input shaft of torus cover. Clamp a dial indicator on support so contact of indicator is against front edge of adapter and in line with adapter bolt. Gently pry on output shaft to position units forward (insert screwdriver through case, behind flange on output shaft), being careful not to pry on governor weights. At the same time move input shaft in or out and record endplay which should be .006-.018". Remove tools.

2) Remove inside throttle valve link from rear throttle valve lever by removing "E" retaining ring. *CAUTION - Do not lose spacer from end of detent valve.* Remove outer throttle valve lever, "O" ring and spacer, then remove lever and linkage assembly. Disengage linkage by removing "E" ring retaining from throttle valve lever to inside throttle valve link.

3) Loosen inside manual and detent lever lock screw and remove "E" ring from end of manual shaft, then slide manual shaft out of retainer to remove valve link. Remove manual and detent lever assembly from rear bearing retainer, and remove manual shaft "O" ring.

4) Remove control valve assembly from transmission case, being carefull not to lose detent valve spacer, then remove servo and accumulator pistons, springs and pin. Unhook parking pawl spring from parking lever, then remove band adjusting screw and nut. *NOTE - Band anchor pin is located under adjusting screw and will fall out when transmission is turned over.*

5) Remove two case center support seal spring retainers, springs and seals. *CAUTION - Retainer is under spring pressure.* Remove rear bearing retainer cover attaching bolts, then engage parking pawl to hold output shaft and remove companion flange attaching bolt and companion flange. Use Tool J-8614 to pull flange from shaft. If replacement of rear seal is necessary, remove it by driving around outer edge with a sharp punch and prying the seal out of the retainer. Remove three internal and five external rear bearing retainer-to-case bolts, breather pipe clip, then remove retainer assembly with bearing and gasket. Remove rear bearing to output shaft snap ring, and with parking pawl engaged, remove speedometer drive gear with Tool J-8760 and J-6123. Remove governor.

6) Scribe mark on dowel of carrier and lug of output shaft for alignment at reassembly, then remove output shaft and parking pawl assembly. If necessary to remove pump seal, crimp seal with pliers and remove.

7) Rotate transmission so pan is downward to allow band anchor pin to fall free from case, then turn transmission front end upward. Remove eight remaining case cover-to-case attaching bolts. *NOTE - If pump seal was not removed, install seal protector, Tool J-8828 over input shaft.* Remove case cover, gasket, and pump assembly by lifting straight up. Remove seal protector, then remove twelve torus cover attaching bolts and remove torus cover assembly by lifting straight up on input shaft. Remove and discard metal torus cover-to-drive torus gasket, then remove torus cover-to-driven member race, thrust bearing and race.

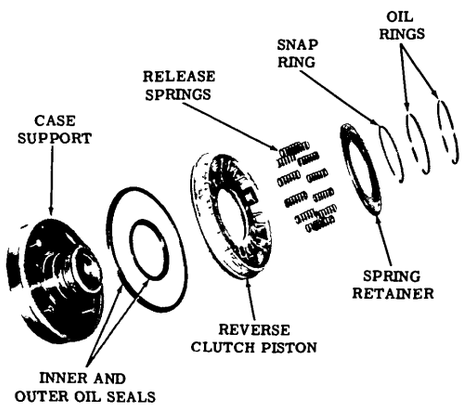
8) Rotate transmission so oil pan side is up and remove mainshaft retaining ring (spirlox) with an awl or pointed tool, then push mainshaft through driven torus and remove torus. Remove driven torus to torque multiplier race, thrust bearing and second race from multiplier. Inspect and remove if necessary, two lock type oil rings from driven torus.

9) Remove mainshaft sun gear and thrust washer from rear of transmission and remove rear sun gear from mainshaft. Remove drive torus and torque multiplier as a unit. Inspect and remove if damaged, lock type oil ring from torque multiplier.

10) Remove front carrier-to-rear carrier shaft snap ring, then remove front planet carrier assembly, bronze thrust washer, and front unit sun gear. Remove rear unit carrier assembly and internal gear bronze thrust washer from rear of transmission. Remove rear internal gear and turn transmission so front end is up.

11) Remove front sun gear and front internal gear backing washers and bronze thrust washer, then remove front unit internal gear and clutch housing assembly by lifting straight up. Remove front internal gear-to-case center support bronze thrust washer.

12) Remove stationary cone-to-case snapring and remove



REVERSE CLUTCH ASSEMBLY

reverse cone and stationary cone, using Tool J-8768 and slide hammer (if reverse cone sticks). Remove reverse stationary cone key from transmission case by pressing from bottom of case. Remove case center support assembly. *NOTE - If unit does not remove easily, tap on back of support with a brass drift.* Remove center support key from transmission case, then lift band and band anchor out of case.

OVERHAUL OF UNITS

►*OVERHAUL NOTE:* Clean all parts thoroughly and blow out case passages with air. Inspect bolt threads for cross threading and transmission leaks for leaks or interconnected passages. Examine case for "hairpin" cracks. Inspect case-to-strainer neck "O" ring seal for cuts, hardness or pinched seal. If parking linkage was not removed, inspect pawl pin and parking brake links for wear or bind. Inspect case support-to-case seals for hardness or cracks. Inspect seal springs for collapsed coils and for fit of seals on spring ends.

TRANSMISSION CASE: Disassembly - If necessary to replace pressure relief ball or spring, pull tapered pin, then remove spring and ball check valve. *CAUTION - spring is under considerable tension. Use extreme care during disassembly.* Remove two pressure take-off plugs from case.

Reassembly: Install two pressure take-off pipe plugs, then install ball check valve, spring, and a new tapered pin (use a new pin at each reassembly). *CAUTION - Use extreme care when compressing spring and installing pin.*

CASE SUPPORT: Disassembly - Remove two lock type oil rings from case support, then use Clutch Spring Compressor, Tools J-4670-B and J-6129; and Reverse-Neutral Clutch Piston Adapter, Tool J-8765, and remove case support snap ring. Remove tools, then remove spring retainer, 12 reverse clutch release springs and reverse clutch piston. Remove inner and outer reverse piston seals and discard.

Reassembly: Install new inner and outer reverse piston seals so that lip of seals will face case support. Install reverse piston inner seal protector. Tool J-8843 over oil delivery sleeve of case center support, then install reverse piston into case center support, guiding outer

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

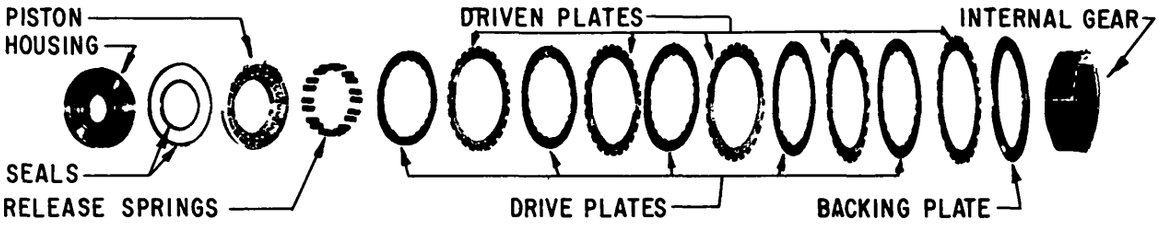
piston seal into support with a small screwdriver. *NOTE - Piston will go on only two ways because of offset dowels.* Remove seal protector and install twelve reverse clutch release springs and spring retainer. *CAUTION - Mak sur all release springs are properly s ated in th ir pockets.* Place snap ring on case support and attach spring compressing tools used at disassembly. Install case support spring retainer snap ring and remove tools. Install two new lock type oil rings.

FRONT INTERNAL GEAR AND CLUTCH HOUSING: Disass mbly - Install Tool J-8938 (two studs) in dowel pin holes in clutch housing assembly and secure in a vise. Remove four front internal gear-to-clutch housing attaching bolts, then remove assembly from dowel pins and place on bench. Separate internal gear and clutch drum by tapping on assembly to free internal gear from dowel pins. Remove front unit internal gear, backing plate and disc. Remove twenty clutch release springs, clutch piston and outer piston seal (discard seal), then remove inner clutch seal from clutch housing (discard seal).

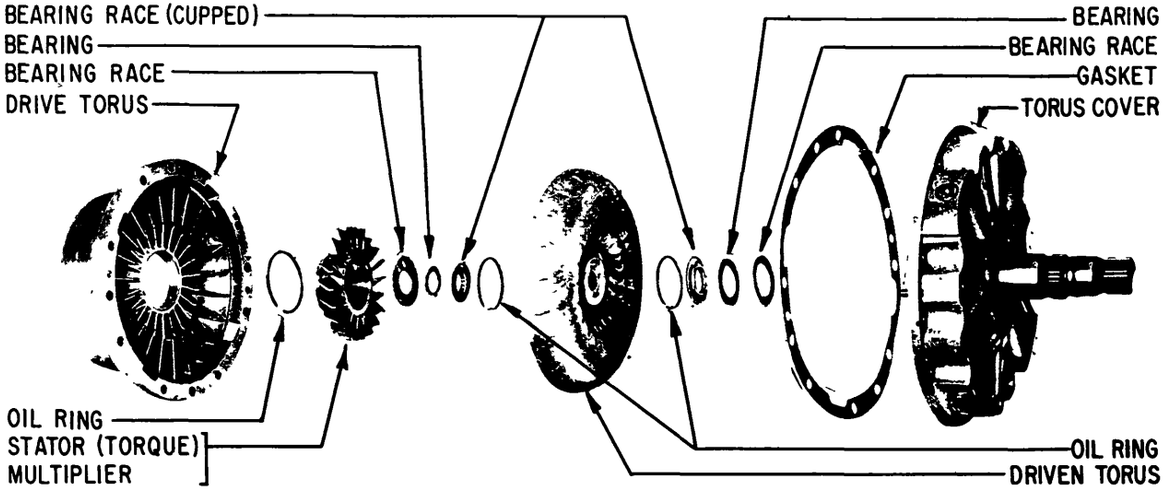
R assembly: Install a new inner piston seal on clutch housing, with lip of seal facing down. Install new outer piston seal on clutch piston with lip of seal facing flat side of piston (lubricate with No. 567196 lubricant). Install piston into clutch housing using small screwdriver to guide outer seal into bore, then install twenty clutch release springs into pockets in clutch piston. Install front clutch backing plate over front internal gear with counterbore facing tooth flange on front internal gear. Install five composition drive and five steel driven front clutch plates alternately, nesting them as follows: Position a composition plate over front unit internal gear, then place a steel plate over internal gear and notice position of slight half moon notch in edge of steel plate. Continue to install composition and steel plates alternately so that all steel plates have their notches one above the other. With all plates installed, carefully place front unit internal gear backing plate and clutch plates over front clutch housing, aligning dowel pins and holes. Install four front in-internal gear-to-clutch housing bolts and tighten lightly and evenly, using caution so as not to pinch bottom steel plate between internal gear and clutch piston. Install Tool J-8938 (two studs) in dowel pin holes in clutch housing assembly and secure in vise. Tighten internal gear-to-clutch housing bolts to 22-27 ft. lbs.

TORUS COVER: Disass mbly - Install Tools J-6122-01 (exhaust Valve Retainers), then remove exhaust valve covers by using Tool J-8874 to remove attaching screws. Remove and discard exhaust valve cover gaskets, then remove both exhaust valves and springs. Inspect and remove, if necessary, two lock type oil rings from input shaft.

R ass mbly: Install two new lock type oil rings on input shaft, if removed, then install exhaust valve springs and valves (retain valves with Tool J-6122-01). Replace torus cover exhaust valve covers and new gaskets with attaching screw and Tool J-8874. Tighten to 20-25 ft. lbs. and remove Tool J-6122-01.



OLDSMOBILE F-85 3-SPEED HYDRA-MATIC FRONT UNIT CLUTCH



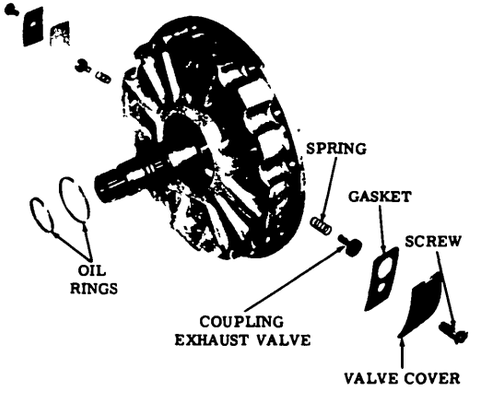
OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TORQUE CONVERTER

REAR BEARING RETAINER: Disassembly - Remove reverse blocker valve and spring by removing "E" ring, then remove detent plunger and spring by holding plunger against spring tension while removing retainer. Remove rear bearing snap ring and bearing. If necessary to remove parking pawl bracket shaft, remove two bracket shaft "E" rings.

Reassembly: Install rear bearing and snap ring, then install detent plunger and spring and compress to install retainer. Install reverse blocker valve and spring into rear bearing retainer and secure with "E" ring. Apply a coating of Permatex No. 2 to outer diameter of rear oil seal and install with Tool J-5154. Install parking pawl bracket, shaft and spring into bearing retainer and install two "E" rings on shaft.

GOVERNOR: Disassembly - Inspect and remove, if necessary, 4 lock type oil rings. Remove G-2 valve retainer, plug and valve.

R assembly: Install G-2 valve (stem end out), then install plug (cupped end first). Install G-2 valve plug retainer and four new lock type oil rings (if removed).



TORUS COVER ASSEMBLY

SERVO PISTON: Disassembly - Place Tool J-8760 against servo piston, then clamp in vise and remove retaining ring and washer. Slowly open vise and release spring pressure, then remove assembly from vise and

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

remove servo piston, spring and retainer. Inspect servo piston oil ring and replace if necessary.

R assembly: Install spring retainer, spring and servo piston pin. Place assembled components into vise using Tool J-8760 and carefully compress the assembly to allow the flat washer and retaining ring to be installed. Remove from vise and install new oil ring (if removed).

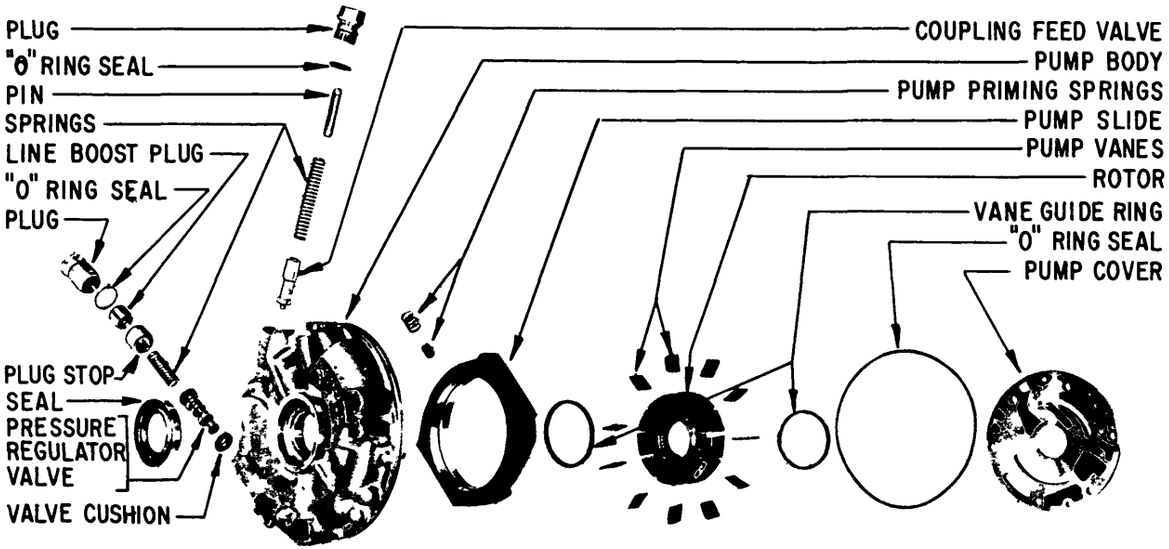
ACCUMULATOR PISTON: Disassembly - Remove and discard lip seal from upper accumulator piston (if necessary). Inspect seal ring on lower accumulator piston and replace if necessary.

R assembly: Install new piston seal on upper accumulator piston with lip facing flat side of piston. Install new ring on lower piston (if removed).

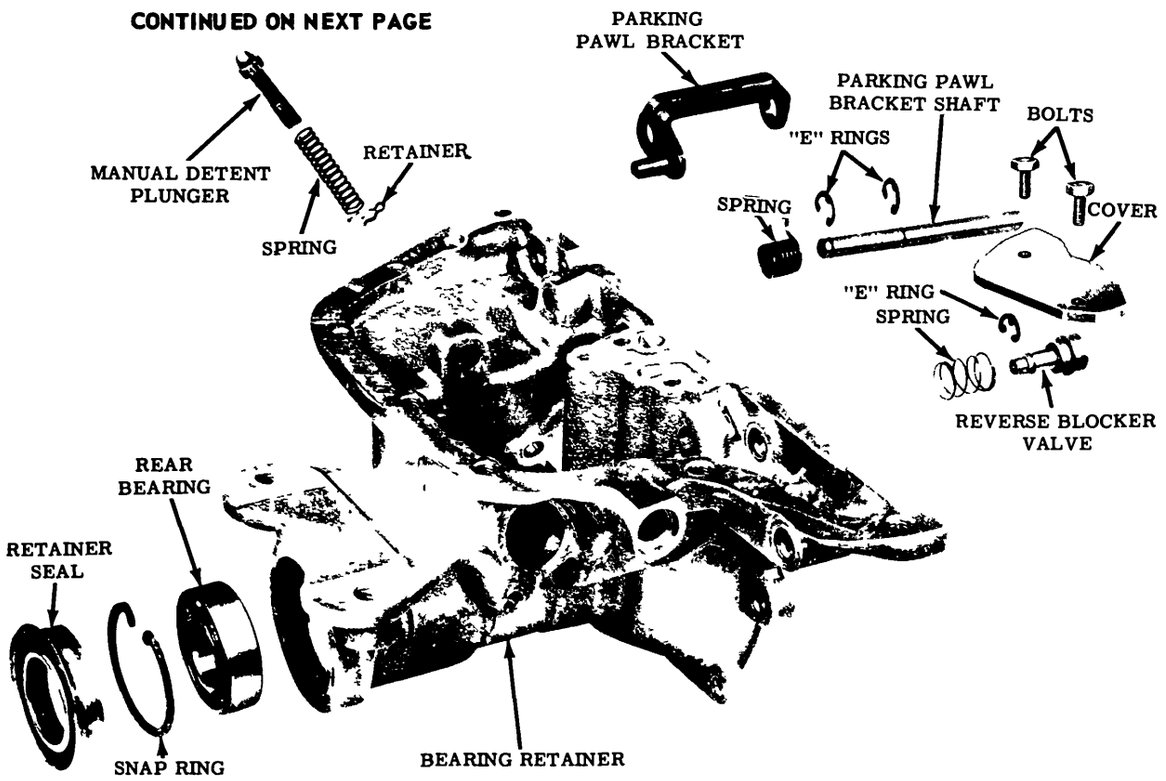
PUMP: Removal (From Case Cover) - Loosen six case cover-to-pump attaching bolts approximately four turns each, then carefully tap on bolt heads to free pump and "O" ring seal from case cover assembly. Remove attaching bolts and remove pump.

Disassembly: Inspect and if necessary, remove and dispump-to-case cover "O" ring seal, then remove pump cover. Remove upper vane ring, rotor, eleven vanes and

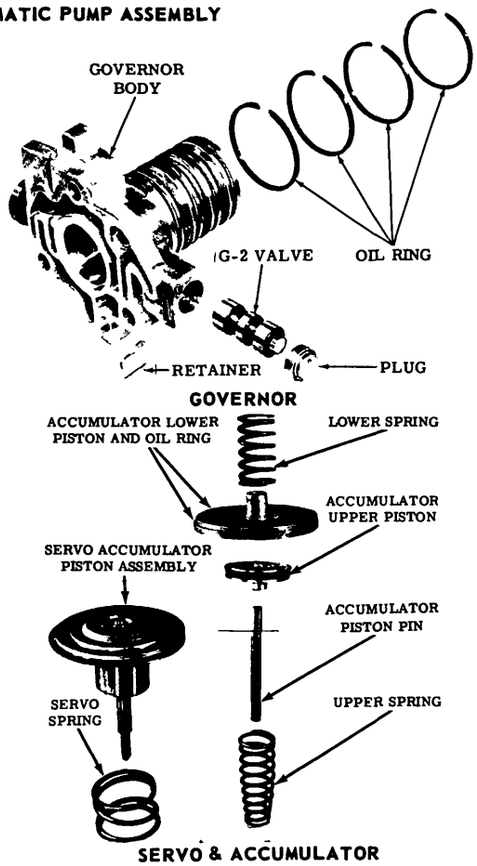
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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC PUMP ASSEMBLY



REAR BEARING RETAINER



SERVO & ACCUMULATOR

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

bottom vane ring. Remove pump slide and inner and outer priming springs. Remove coupling feed limit valve plug and "O" ring. Remove "O" ring from plug if necessary. Remove coupling feed limit valve spring, valve and pin. Remove pressure regulator plug, "O" ring seal and line boost plug (line boost plug is in the pressure regulator plug). Inspect and remove "O" ring, if necessary. Remove pressure regulator spring, valve and line boost plug stop. *NOTE - DO NOT remove pressure regulator valv cushion unl ss replacement is necessary.*

R ass mbly: Install a new pressure regulator valve cushion (if removed), then install pressure regulator valve, spring, plug stop, boost plug, "O" ring and plug. Tighten plug to 15-20 ft. lbs. Install coupling feed valve limit spring, pin, "O" ring and plug. Tighten to 15-20 ft. lbs. Install inner and outer priming springs and slide. *NOTE - Slide will fit one way only.* Install lower vane guide ring into pump body, then install pump rotor so shoulder on rotor seats over raised center portion of pump body. Install eleven vanes so vane ring wear pattern on edge of vanes faces towards vane rings, then install upper vane guide ring. Install pump cover by locating on pin and secure with one attaching screw. Tighten to 6-8 ft. lbs. Install pump body to case cover "O" ring seal (if removed).

Installati n (On Cas Cov r): Support pump assembly on a convenient support to raise pump above work bench enough to allow case cover to fit against pump. Align case cover-to-pump bolt holes and position case cover on pump. *NOTE - Hol s will only align in one position.* Install six case cover-to-pump attaching bolts, drawing bolts up evenly to properly seat "O" ring seal in case cover. Tighten to 20-25 ft. lbs.

CONTROL VALVE: Disassembly (Complete Control Valv) -Place control valve assembly on a clean surface with channel plate-to-case spacer down, and the rear throttle valve lever located in lower left hand corner. Remove the one retaining screw from each valve body, then turn control valve assembly over so rear throttle valve lever is located in upper left hand corner. Remove three screws retaining channel plate-to-case spacer plate, and remove plate. Remove three ball checks from channel plate, and three channel plate-to-valve body attaching screws. Remove manual valve from primary valve body, then remove channel plate and rear throttle valve lever from valve bodies. Remove sleeve, detent valve and spring from primary valve body. Remove the three exposed ball checks, then the channel plate-to-valve body spacer. *NOTE - To remove throttle valv lever from channel plate, remove the "E" ring.*

Primary Valv Body: Disassembly - 1) Remove band apply valve bushing retainer from cored face of primary body, then remove band apply valve and bushing from throttle valve bore. Remove band apply valve spring, throttle valve spring and valve.

2) Remove retaining pin from cored face of 1-2 valve bore while holding 1-2 throttle valve bushing. Remove 1-2 throttle valve bushing, 1-2 throttle valve, valve spring, and 1-2 shift valve spring and valve.

3) Remove 2-3 bore plug retainer and plug. *NOTE - M st of th valv bore plugs ar tapp d to all w an attaching screw to be threaded in for disassembly purpose.* Remove 2-3 throttle valve and throttle valve bushing, then remove valve from bushing. Remove 2-3 Throttle valve spring.

4) Remove 2-3 shift valve and spring, then remove bore plug retainer and bore plug from other end of 2-3 shift valve bore. Remove 2-3 governor valve. Remove bore plug retainer and bore plug from 1-2 valve bore and remove the 1-2 governor valve.

5) Remove bore plug retaining pin from cored face of compensator bore while holding bore plug, then remove compensator bore plug and secondary compensator valve and spring. Remove primary compensator valve and spring. Remove compensator limit valve retainer pin by compressing limit valve spring with a brass rod, and remove compensator limit valve and spring. *CAUTION - DO NOT disturb thermostatic throttle valve element adjusting screw.*

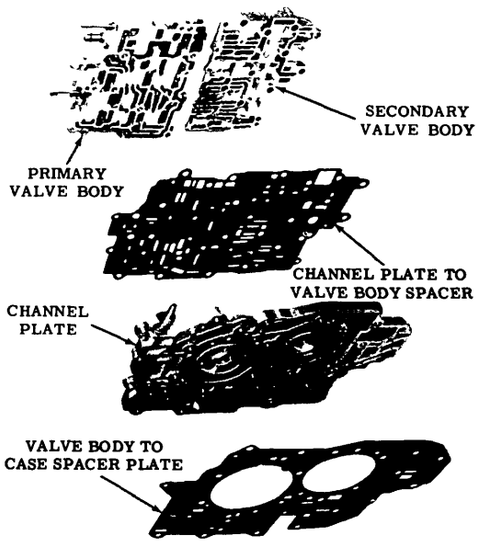
Reassembly - 1) Install compensator limit valve spring and valve, then install retaining pin by compressing limit valve spring with a brass rod. Install primary compensator valve spring and valve (small land first), then install secondary compensator valve spring and valve (small land first). Install bore plug (tapped hole out) and retaining pin.

2) Install 1-2 governor valve and bore plug (large end first) into 1-2 valve bore, and install bore plug retainer. Install 2-3 governor valve and bore plug (large end first) into 2-3 valve bore, and install retaining pin.

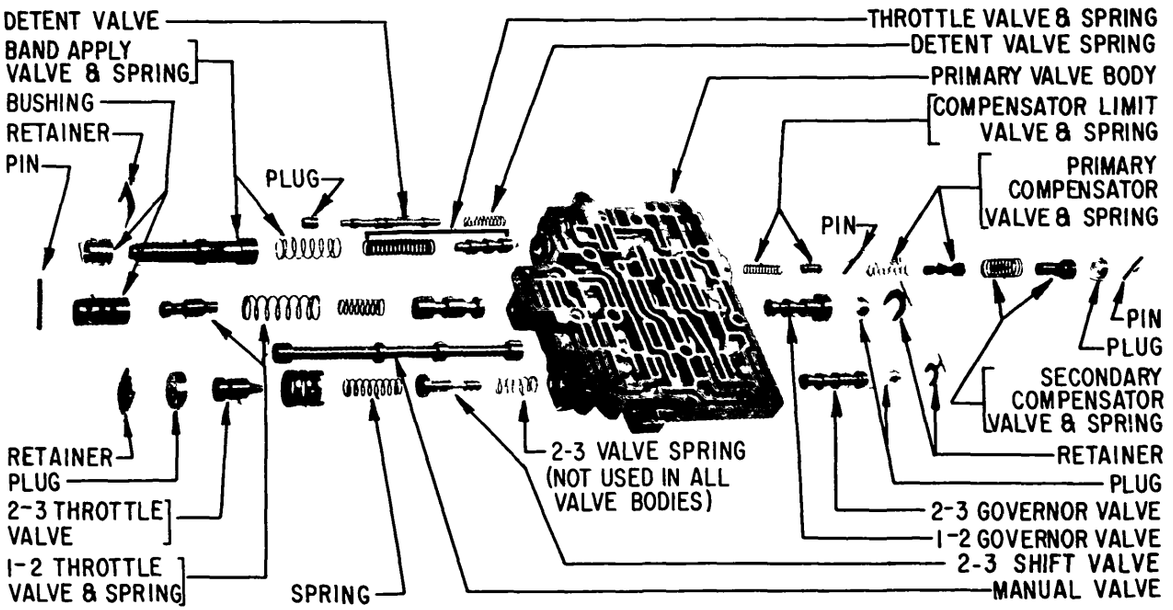
3) Install 2-3 shift valve spring on 2-3 shift valve and install valve and spring (small land first) into other end of 2-3 valve bore. Install 2-3 throttle valve spring in spring pocket of shift valve, then install 2-3 throttle valve in the 2-3 throttle valve bushing so it completely enters the bushing. Install 2-3 valve and bushing (tapered end first) and install retainer (flat side out).

►*NOTE: Install all flanged bore plug retainers with flat side out.*

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CONTROL VALVE ASSEMBLY



PRIMARY VALVE BODY ASSEMBLY

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (Cont.)

4) Install 1-2 shift valve in 1-2 bore (small land first), then install 1-2 shift valve spring and 1-2 throttle valve spring. Install 1-2 throttle valve into 1-2 throttle valve bushing (land end first), and install 1-2 throttle valve and bushing. Install retaining pin while holding springs compressed. Install throttle valve in throttle valve bore (stem end out).

5) Install band apply valve spring and the throttle valve spring, then install band apply valve (spring pocket first). Install band apply valve bushing on band apply valve and install band apply valve retainer while holding valve and bushing compressed. *DO NOT install manual valve and detent valve train at this time.*

Secondary Valve Body: Disassembly - 1) Remove band release accumulator bore plug retainer from cored face, then remove bore plug from accumulator bore (large bore). Remove band release accumulator valve.

2) Remove low throttle control valve bore plug retainer from next bore, then remove plug, low throttle control valve and spring.

3) Remove band release timing valve plug, spring, and valve. From the next bore, remove coupling signal valve bore plug retainer, plug, spring, coupling signal valve, and coupling timing valve.

4) Remove pressure boost valve retaining pin from cored face while compressing valve with a brass rod, then remove valve and spring. Remove 2-3 boost valve retaining pin from cored face while compressing bore plug, then remove 2-3 boost valve spring and valve.

5) Remove pressure drop valve retaining pin while holding drop valve spring compressed, then remove pressure drop valve and spring. Remove 2-1 downshift valve bore plug retainer and plug, then remove valve and spring. Remove front clutch exhaust valve retaining pin from cored face while holding spring compressed and remove spring and valve.

Reassembly - *NOTE - All attaching screws must be tightened to 2.5-3.5 ft. lbs.*

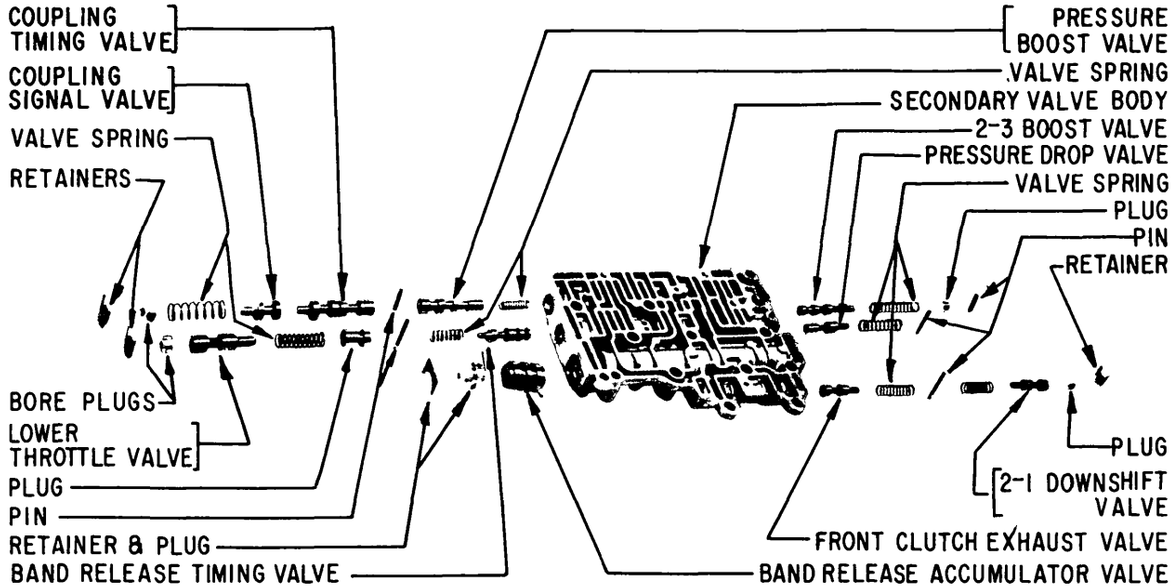
1) Install front clutch exhaust valve (stem out), and valve spring, then compress spring and install retaining pin. Install 2-1 downshift valve spring and valve (stem first) and install bore plug and retainer.

2) Install pressure drop valve (stem last), and valve spring, then compress spring and install retaining pin. Install 2-3 boost valve (stem last) and valve spring, then install bore plug and short retaining pin.

3) Install pressure valve spring and valve (hollow end first), then install retaining pin by compressing valve with a brass rod. Install coupling timing valve (stem end last), coupling signal valve (stem end last), coupling signal valve spring and bore plug, then compress the spring and install retaining clip.

4) Install band release timing valve (stem end last) into next bore, and install spring and plug (short land of plug first). Compress spring and install retaining pin. Install low throttle control valve spring, valve (stem end first), bore plug and retainer. Install band release accumulator valve, bore plug and retaining clip.

Reassembly (Complete Control Valve): Install two medium and one large ball checks into ball check seats in channel plate (see illustration for location), then install channel plate-to-valve body spacer over channel plate. Install detent spring and valve (long stem first) into primary valve assembly, then install throttle valve sleeve on detent valve. Install primary valve assembly on spacer plate while compressing throttle valve sleeve and band apply valve. Install one attaching screw loosely. Install secondary valve assembly on spacer plate and install one attaching screw loosely. Turn assembly over and install one small and two large check balls into their pockets in channel plate (see illustration). Install manual valve (land with hole out), then install channel plate-to-case spacer plate and install all attaching screws loosely. Install ¼" drill in an attaching bolt hole to align primary valve assembly with channel plate, then tighten the countersunk flat head screw to 2.5-3.5 ft. lbs. Install secondary valve body-to-case attaching screws for guides and tighten all valve body attaching screws to 2.5-3.5 ft. lbs. Remove case attaching screws and ¼" drill.



SECONDARY VALVE BODY ASSEMBLY

TRANSMISSION REASSEMBLY

1) Install transmission into a suitable holding fixture with front end upward, then install band with a single ear facing servo side of case. Install band anchor link between band and case with cupped end of link against band adjusting stop pin hole.

2) Install case center support with bevel upward and install center support assembly, aligning keyway in support with key. Install reverse stationary cone key into case, then install the reverse cone over reverse piston. Install reverse stationary cone, aligning key with key slot. Install reverse stationary cone retaining snap ring with ring gap at open section of ring groove.

3) Install case center support-to-front internal gear bronze thrust washer into front clutch housing and retain in place with petrolatum. Install front internal gear and clutch assembly over splines of reverse cone.

4) Rotate transmission bottom side upward. *CAUTION - Do not rotate over ¼ turn or clutch assembly will fall out.* Install rear internal gear into rear of transmission case. Install steel backing washer, bronze thrust washer, steel backing washer and sun gear on front sun gear shaft. Install rear carrier-to-rear internal gear bronze thrust washer over carrier shaft, then install rear carrier from rear of transmission.

5) Install front sun gear-to-front carrier bronze thrust washer over carrier shaft and retain with petrolatum. Install front carrier assembly and retain with snap ring.

6) Rotate transmission so rear end is upward, then install rear sun gear on mainshaft. Install rear carrier-to-sun gear bronze thrust washer into rear carrier and install mainshaft. Install output shaft on rear carrier using the marks made at disassembly for proper alignment.

7) Install parking pawl spacer into counterbore in case, then install parking pawl and linkage against the spacer so that tooth of pawl faces flange on output shaft. Install parking pawl pivot shaft and engage pawl with output shaft. Install governor assembly with three attaching bolts and tighten to 22-27 ft. lbs.

8) Install speedometer drive gear ¼" past snap ring groove using Tools J-8760 and J-6133-A. Install rear bearing-to-output shaft snap ring. Retain a new gasket on rear bearing retainer with petrolatum, then install bearing retainer over output shaft, guiding parking pawl shaft into parking pawl assembly. *CAUTION - Use care when guiding retainer over governor rings.* Install one long rear retainer attaching bolt in lower left hand corner of retainer, then install breather pipe clip over upper right bolt. Install seven remaining rear bearing retainer attaching bolts and tighten to 20-25 ft. lbs.

9) Rotate transmission so front end is upward, then install drive torus over front unit clutch. *CAUTION - Be sure all clutch plates are engaged by observing that drive torus rests against front carrier.* Install lock type

CONTINUED ON NEXT PAGE

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION (C nt.)

oil ring on torque multiplier (if removed), then install torque multiplier.

10) If removed, install two lock type oil rings on driven torus. Install flat bearing race into torque multiplier, then install cupped race and bearing into driven torus (bearing out), and retain in place with petrolatum. Install driven torus on mainshaft and install a new driven torus-to-mainshaft retaining ring. *NOTE - It may be n c ssary to lift up on mainshaft to install retaining ring.* Install flat bearing race, bearing and cupped race (cup facing torus cover) into torus cover, retaining in place with petrolatum.

11) Install a new gasket on torus cover, aligning dowel pin holes, and retain with petrolatum. Install twelve torus cover attaching bolts and cross-tighten to 10-12 ft. lbs. Install gasket on case cover and retain with petrolatum, then install case cover and pump assembly while aligning attaching bolt holes. *NOTE - Install Tool J-8828 on shaft before installing case cover if s al was not r moved.* Install nine case cover-to-case attaching bolts and tighten to 20-25 ft. lbs. *NOTE - Of th nin bolts, on is long r.*

12) Install new seal by placing front seal protector, Tool J-8828 over input shaft, install seal and drive into pump with Tool J-8761. Remove tools and rotate transmission so oil pan is upward.

13) Check front unit endplay *(see "Transmission Front Unit Endplay Check" under "Transmission Disassembly" above).*

14) Hook curved end of parking pawl spring into notch in parking lever, then install rear bearing retainer cover and tighten bolts to 20-25 ft. lbs.

15) Install upper accumulator spring, pin, upper piston, lower piston, and spring into case, then install servo spring and piston assembly. Install two case support-to-case seals on springs, then install into case and push retainers into place. Place control valve assembly over servo and accumulator pistons and install attaching bolts. Tighten to 6-8 ft. lbs.

16) Install band anchor stop pin into hole in case, then install band adjusting screw and locknut (leave locknut loose). Use Tool J-8591 and an inch-pound torque wrench and tighten adjusting screw to 20 inch-pounds, **then back scr w ff tw turns.** Tighten locknut to 18-20 ft. lbs.

17) Install an "O" ring seal on manual lever shaft and install shaft. *NOTE - Depress detent plunger to allow manual and detent assembly to slide by.* Install "E" ring on manual shaft, then install manual valve link in detent lever and manual valve. Position detent and manual lever over detent plunger. Tighten manual shaft lockscrew, indexing lockscrew with groove in manual shaft. Tighten to 6-8 ft. lbs.

18) If removed, install inside throttle valve link to front throttle valve lever assembly and retain with "E" ring. Install spacer on outer throttle valve lever through case and into front throttle valve lever, then align lockscrew with hole in shaft and tighten lockscrew to 6-8 ft. lbs. Install inside throttle valve link over rear throttle valve lever shaft and retain with "E" ring.

19) Install filler pipe "O" ring seal into bore inside of case (if removed), then install cleaner "O" ring into bore in case. Install cleaner and clip into valve body. Install a new oil pan gasket and oil pan and tighten attaching bolts to 12-15 ft. lbs. Engage parking pawl in "Park" position and install companion flange assembly, using Tool J-6505. Install attaching bolt and tighten to 30-40 ft. lbs.

PONTIAC TEMPEST TRANSAXLE

Pontiac Tempest (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 TEMPEST AUTOMATIC TRANSMISSION SHUDDER CORRECTION (EARLY MODELS WITH 4-BBL. CARBS):* This condition which occurs on minimum throttle upshifts after transmission is warm, may be caused by lack of proper orifice in transmission-to-carburetor vacuum line. *NOTE - Later carburetors with vacuum take-off located between idle mixture screws on carburetor do not require an orifice.* To correct, pull hose and vacuum pipe from modulator valve at transmission, then remove rubber hose from pipe. Drill out end of vacuum pipe with a No. 32 (.116") drill. Remove hose from front end of pipe and blow out any chips from drilling. Install an Orifice, Part No. 540933, small end first and tap into vacuum pipe, making sure orifice is not loose in pipe (pinch pipe around orifice). Slip rubber hose over vacuum pipe and reinstall vacuum pipe to modulator valve.

►*1961 TEMPEST V8 AUTOMATIC TRANSMISSION PRODUCTION CHANGE & SERVICE REPLACEMENT (To Correct Engine Idle Speed Increase on a Low Speed Forced Downshift):* A new Downshift Timing Valve, Part No. 3751214 is being used in production and may be used for service replacement on earlier cars to correct the above condition. To install, remove transmission oil pan and control valve body assembly. Downshift Timing Valve is located adjacent to servo piston in a bore in transmission case.

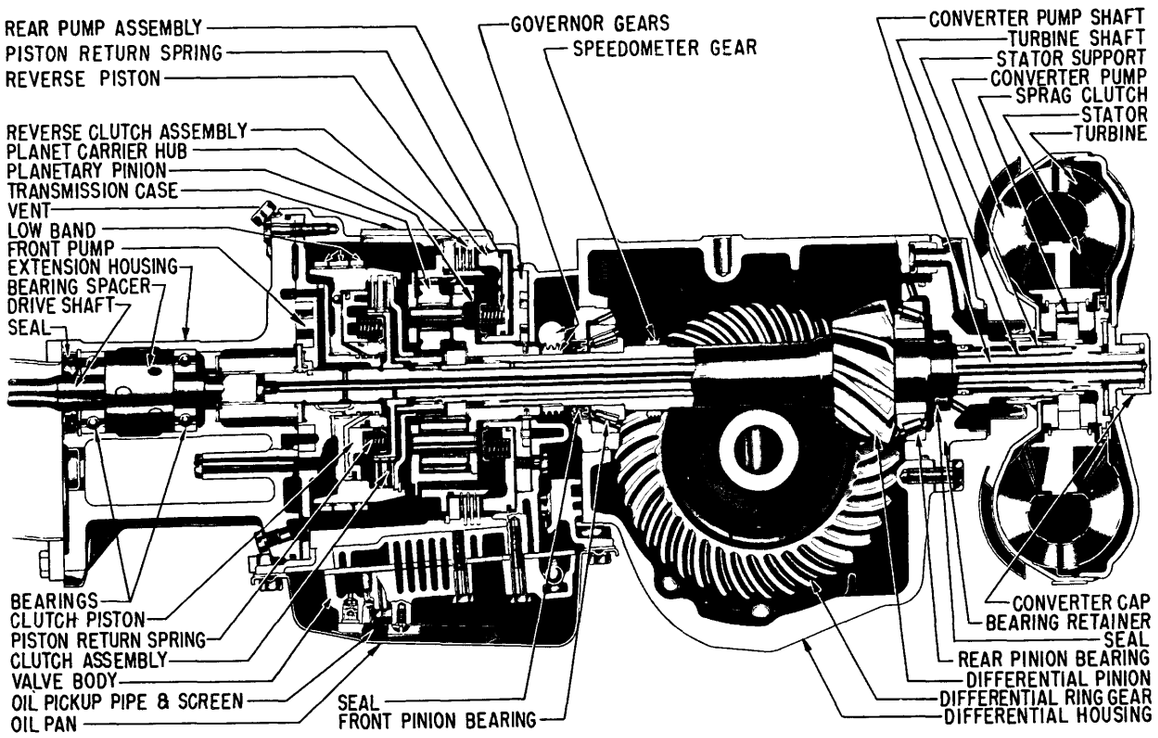
►*1961 TEMPEST SYNCHRO-MESH TRANSMISSION CASE OIL PLUG PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To Provide More Positive Differential Drive Pinion Bearing Lubrication):* A new transmission case oil plug, Part No. 541774 is being installed in production and should be installed on earlier cars whenever transmission or differential carrier assembly is removed from car. The new plug restricts flow of lubricant between transmission and differential carrier housing.

DESCRIPTION: The Transaxle assembly consists of either an integral differential (rear axle) unit and synchro-mesh transmission; or a differential (rear axle) unit and an automatic type transmission as follows:

Differential (Rear Axle) Assembly: Straddle mounted hypoid gear design which is contained in a separate housing attached directly to transmission case. On cars with automatic transmission, the torque converter is located to rear of differential housing with transmission input and output shafts running axially through differential pinion shaft. Each axle shaft is independently suspended and is free to move in a vertical plane in an arc. Axle shafts are attached to universal joints which are splined into differential side gears.

Axle Ratios - *NOTE - Axle ratio stamped on right side of carrier housing on flat surface next to side cover.* 3.08-1 (37-12), 3.31-1 (43-13), 3.55-1 (39-11), 3.73-1 (41-11), 3.90-1 (39-10). *NOTE - 3.08-1 not available on Station Wagons. 3.90-1 not availabl on Automatic Transmission cars.*

Synchr -m sh Transmissi n: Three-speed synchro-mesh type integral with rear axle differential carrier.



PONTIAC TEMPEST TRANSAXLE (WITH AUTOMATIC TRANSMISSION)

Transmission Ratios - 2.94-1 (1st Speed), 1.68-1 (2nd Speed), 1.00-1 (3rd Speed). 3.32-1 (Reverse).

Automatic Transmission: Three element torque converter and a hydraulically operated two-speed type automatic shift transmission which is integral with rear axle differential carrier. Engine torque is transmitted through converter pump shaft (located within hollow turbine shaft) to torque converter turbine, then back to transmission through the hollow turbine shaft (located within hollow differential driven pinion shaft). Transmission output shaft is splined directly to differential drive pinion shaft.

LUBRICATION

Check fluid level in all units every 2000 miles.

►*AUTOMATIC TRANSMISSION NOTE:* Draining and refilling of automatic transmission is not recommended except at time of overhaul.

Recommended Oil (Rear Axle & Synchro-mesh Trans.) - SAE 80 or SAE 90 "Multi-Purpose" gear lubricant. *CAUTION - Do not use straight mineral oil gear lubricants or lubricants containing active sulphur soap.* Differential carrier and synchro-mesh transmission are connected by internal passages.

Aut matic Transmission - Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic Transmission is s al d off from differ ntial carri r.*

Ch cking Fluid Level: Rear Axle & Synchro-mesh Transmissi n - With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential case, also check level in transmission housing. *NOTE - With unit at operating temperature, fluid should b l v l with bottom of filler plug hole.*

Automatic Transmission - With transmission at normal operating temperature and transmission selector lever in "N" (Neutral) position, engine idling, check fluid level on dipstick in filler tube located under a plate in right-front of luggage compartment. Add recommended fluid as necessary to bring level to "Full" mark on dipstick. Approximately one pint of oil is required to raise level from "Add" to "Full".

Draining & Refilling: Rear Axl & Synchr -m sh Transmission - *NOTE - Not rec mm nded exc pt at time f overhaul or repair.*

Capacity - 2.8 pints (Transmission); 3 pints (Differential).

Automatic Transmission - *NOTE - N t recomm nd d except at time of transmission overhaul.* Drain oil by loosening filler tube attaching nut in oil pan. To refill, tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark.

Capacity - 6 pts. (after draining). 12 pts. (after overhaul).

CONTINUED ON NEXT PAGE

PONTIAC TEMPEST TRANSAXLE (Continued)

ADJUSTMENT

Transmission Throttle Linkage (Automatic Trans.): See *CARBURETOR in Car Model page.*

Manual Linkage (Automatic Trans.): Drain transmission oil and remove oil pan. Place selector lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body. With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so Tool J-8365 is held in a horizontal position. Recheck adjustment. Install oil pan and fill transmission with fluid.

Neutral Starter Switch Adjustment (Automatic Trans.): Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to start position, then move neutral switch fore and aft until engine cranking begins. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral). *NOTE - Neutral switch is located on rear of gearshift control and indicator assembly.*

Low Band: *NOTE - Periodic adjustment is not recommended, however, if necessary, proceed as follows:* Lower transmission for access to adjusting screw, then loosen locknut and tighten screw to 40±5 inch lbs. torque, **then back off four full turns exactly.** Hold adjusting screw stationary and tighten locknut.

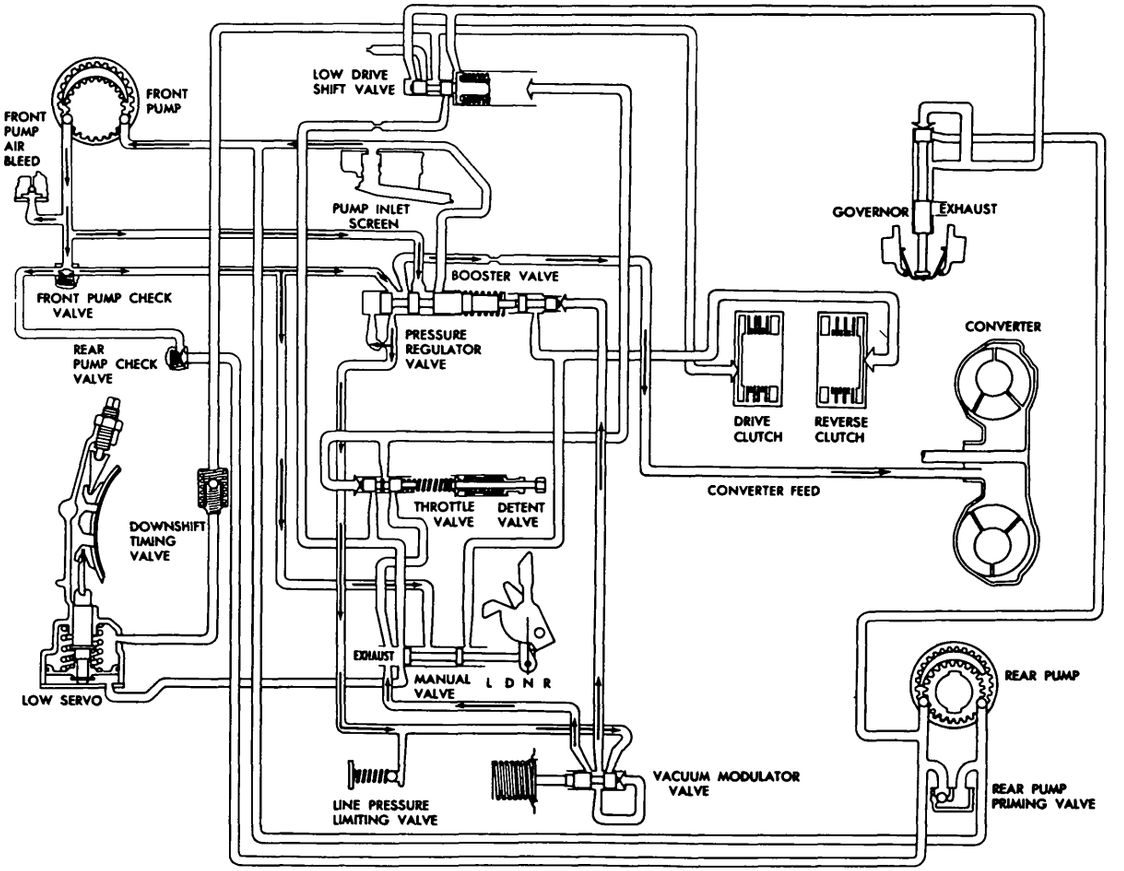
TROUBLE SHOOTING (AUTOMATIC TRANSMISSION)

NO DRIVE IN ANY SELECTOR LEVER POSITION (CANNOT LOAD ENGINE): Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming ball not seating.

ENGINE SPEED FLARES ON STANDSTILL STARTS BUT ACCELERATION LAGS: Low band only partially applied caused by one or more of the following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief ball not seating. Vacuum modulator hose collapsed.

TRANSMISSION WILL NOT UPSHIFT: Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.



PONTIAC TEMPEST AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

HARSH UPSHIFT: Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE HARSH DOWNSHIFT: Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body.

CAR CREEPS EXCESSIVELY IN DRIVE: Idle speed too high.

CAR CREEPS IN NEUTRAL: Incorrect manual valve lever adjustment. High clutch or low band not released.

NO DRIVE IN REVERSE: Manual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

IMPROPER SHIFT POINTS (see "Shift Speed" table below): Incorrect accelerator control linkage adjustment. Throttle valve incorrectly adjusted. Governor defective. Rear pump priming ball stuck.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Oil pickup pipe split or not sealed causing air entrainment.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.

TESTING (AUTOMATIC TRANSMISSION)

►*TESTING NOTE: Transmission must be at normal operating temperature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.*

ROAD TEST: Road test car to determine transmission shift points as indicated in table below.

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PONTIAC TEMPEST TRANSAXLE (Continued)

Transmission Shift Speeds

UPSHIFTS	©MPH
Minimum Throttle	12-15
Full Throttle	43-50
Part Throttle (Detent Touch)	35-45
DOWNSHIFTS	**©MPH**
Closed Throttle	9-15
Full Throttle	39-46
Part Throttle (Detent Touch)	21-33

© - With 3.55-1 ratio rear axle.

PRESSURE TESTS: *NOTE - Pressure tests can be made by raising rear wheels 3-5" off floor on jack stands.*

Front Pump: Remove pipe plug located at "6 o'clock" position in front face of transmission extension housing and connect pressure gauge. With engine at idle speed (approximately 16" of vacuum), pressures should be as follows with selector lever in indicated range: 106-130 lbs. (Reverse); 55-67 lbs. (Neutral & Drive); 124-137 lbs. (Low). Disconnect vacuum hose at vacuum modulator, then with engine at idle speed, check pressure which should be 198-222 lbs. (Reverse); 101-114 lbs. (Neutral & Drive); 124-137 lbs. (Low). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft or missing plug from front end of converter pump shaft. Moderately low front pump pressures in all ranges indicate a restricted front pump inlet. Failure of pressure to rise when vacuum hose disconnected (or high pressures with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.

Rear Pump: With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D" (Drive) and accelerate engine. Front pump pressure should drop to approximately 0-5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged or rear pump check ball is not seating.

Throttle Valve: Remove plug located at "8 o'clock" position in front face of transmission extension housing and connect pressure gauge. Disconnect throttle valve rod at carburetor and vacuum hose at vacuum modulator, then with engine at idle speed, depress accelerator to wide open position. *NOTE - By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressure should be as follows with selector lever in indicated range: 0 lbs. (Reverse & Neutral); 50-52 lbs. (Drive); 119-132 lbs. (Low). If pressures not as specified, they can be corrected by adjusting position of jam nut located on end of detent valve assembly (part of throttle valve assembly inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut (one full turn is equal to 3 psi). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

►*AXLE FLANGE RUNOUT NOTE: Flange runout should not exceed .010" when checked just outside wheel bolts.*

AXLE SHAFT: Removal - Remove wheel and brake drum, then remove axle bearing retainer-to-brake backing plate attaching nuts (accessible through hole in axle shaft flange) and pull backing plate out slightly. Push backing plate back on control arm studs to break plate away from bearing retainer. Remove universal joint-to-rear axle flange U-bolts and pull axle shaft to separate flange from U-bolts. Remove axle shaft with Tool J-8614 and pull axle shaft from lower control arm.

Installation: Insert axle shaft through lower control arm and install flange on axle splines. *NOTE - It may be necessary to lightly tap flange onto splines.* Install and securely tighten axle shaft-to-flange bolt. Attach universal joint to flange on axle shaft with U-bolts and tighten nuts to 14-20 ft. lbs. With bearing retainer and brake backing plate holes aligned with control arm studs, insert universal joint splined yoke through seal at side bearing and index with splines of side gears. *NOTE - Coat lip of seal and splines with hypoid lubricant to prevent damage to seal.* Install nuts securing bearing retainer to backing plate (through access hole in axle flange) and tighten to 30-45 ft. lbs. Install wheel and drums and tighten mounting nuts to 70-85 ft. lbs.

TRANSAXLE (TRANSMISSION & DIFFERENTIAL CARRIER): Removal - Raise car and support transaxle assembly and rear of engine, then drain lubricant from transmission and differential carrier housing (see *"Draining & Refilling"*). Remove axle bearing retainer-to-brake backing plate attaching nuts and pull axle shafts out far enough to remove universal joints from differential assembly (cover universal joint splines). Remove propeller shaft damper bearing retainer bolts at both bearings, then remove speedometer driven gear from differential assembly. Disconnect transmission control rods and cables from transmission and remove cables and lines from torque tube. On synchro-mesh cars, remove gearshift lever housing. On cars with V8 engine, remove exhaust crossover pipe. On all cars, remove flywheel cover and torque tube access hole cover, then disconnect propeller shaft from flywheel or clutch drive extension. *CAUTION - Place a rag between shaft and torque tube to protect propeller shaft coating.* Disconnect torque tube from flywheel housing, then disconnect transaxle from rear crossmember (remove two bolts through access hole in trunk or from under car). Remove transaxle, propeller shaft, and torque tube as an assembly.

Installation: With torque tube and propeller shaft installed on transaxle, position the assembly in car and install two bolts securing transaxle assembly to rear crossmember (through access holes in trunk) and tighten to 65-85 ft. lbs. Install propeller shaft on flywheel and secure front flange to flywheel, tightening bolts finger tight. Remove protecting rag or cloth from propeller shaft and secure torque tube to flywheel housing, tightening bolts finger tight. Tighten propeller shaft flange-to-flywheel or clutch drive shaft to 30-35 ft. lbs., then tighten torque tube-to-flywheel housing bolts to 30-45 ft. lbs. Install axle shaft universal joint splines in differential carrier assembly. *NOTE - Coat lip of seal and splines with hypoid lubricant to prevent damage to seal.* Install rear axle bearing retainer in position on brake backing plate and tighten attaching nuts to 30-45 ft. lbs. Tighten universal joint U-bolts 14-20 ft. lbs. *CAUTION - Make sure universal joint snap rings are properly installed.* Install wheel and brake drum assemblies, flywheel cover and torque tube access cover plate. On V8 models, install exhaust crossover pipe. Remove support from transaxle and engine, then install transmission control rods and cables. Install parking brake cable on torque tube and adjust. Install speedometer cable in differential carrier assembly and fill transmission and differential housing with proper lubricant (see *"Lubrication" above*). Idle engine approximately one minute, then tighten propeller shaft bearing bolts to 8-12 ft. lbs.

SYNCHRO-MESH TRANSMISSION: Removal - With transaxle assembly removed from car (see above), remove bolts attaching torque tube to transmission, then remove propeller shaft and torque tube as a unit by pulling on propeller shaft flange. Remove transmission-to-differential carrier attaching bolts and separate transmission from differential carrier.

Installation: Install transmission on differential carrier and tighten attaching bolts. Install propeller shaft and torque tube being careful to engage spline of propeller shaft into transmission and journal diameter into transmission extension bearings so journal surfaces are not damaged. *CAUTION - Check alignment of propeller shaft into transmission extension and, if absolutely necessary tap front flange of propeller shaft lightly with a soft rubber hammer. Be sure splines are completely engaged in transmission.* To complete installation in car, see "Transaxle" above.

AUTOMATIC TRANSMISSION: Removal - With transaxle removed from car, remove converter cover cap using Tool J-9183 or other suitable "strap wrench" to hold converter. Remove converter retaining ring and converter. *NOTE - Reinstall cap on converter after removal and place cap side down to retain oil.* Remove bolts attaching torque tube to transmission, then remove propeller shaft and torque tube as a unit by pulling on propeller shaft flange. Remove speedometer driven gear, governor assembly and "O" ring, then pull turbine drive shaft out of transmission. Remove screws retaining transmission to differential carrier and separate transmission from differential carrier.

Installation: *CAUTION - Before connecting Automatic Transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper thickness thrust washer, install a new gasket to either carrier or rear face of transmission. Align carrier and transmission on a flat surface and carefully guide pump shaft through differential carrier so as not to damage bushing in differential pinion, then engage splines of pinion shaft with planet internal splines in transmission. Install governor and "O" ring seal and secure transmission to carrier with four screws. *NOTE - Drive two screws from carrier side first to minimize chance of cocking mating surface of transmission and carrier.* Tighten screws to 30-35 ft. lbs. Install turbine shaft into converter, then install converter and turbine shaft into transmission, being careful not to damage turbine shaft bushings when sliding over converter pump shaft. *CAUTION - Do not use force when engaging splines in converter and at end of turbine shaft. Engagement will occur easily if splines are correctly aligned.* Retain converter with retaining ring, then install converter cap and seal assembly. Tighten to 60-70 ft.

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PONTIAC TEMPEST TRANSAXLE (C ntinu d)

lbs. *NOTE - If not previously installed, install modulator valve and vacuum modulator assembly.*

R ar Selectiv Thrust Washer: Any time repairs are made that require separation of automatic transmission and differential carrier, the proper thickness of thrust washer to be used at front face of governor gear must be determined as follows: Install dial indicator on Support J-8364 and install a 3" indicator extension. Without gasket, place support J-8364 on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator extension tip rests on planet carrier hub. Adjust indicator as required to permit maximum indicator travel, then set dial to zero. *NOTE - Transmission must face downward when indicator is zeroed.* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero Position. *NOTE - If indicator is properly positioned on support, indicator should not d flect more than .050" (one-half turn) when removed; otherwise raise or lower dial indicator on support as required and again "zero" indicator.* Place support and dial indicator on governor gear on differential carrier pinion shaft (Support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator needle can be counted. *NOTE - Measurement starts onc th n dl reaches "zero".* Finally depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear.

►*NOTE: After s lected spacers are installed on governor gear, r ch ck m asurement. If spacer stack is corr ct, indicator reading will now be between .025-.038". If n t, add or r move spacers until reading is within this range.*

Thrust Spacer Chart

Indicat r R ading	N .Reqd.	©Spacer Thickness
.025-.046"	None	
.047-.062"	1	.016"±.001"
.063-.078"	2	.032"±.002"
.079-.094"	3	.048"±.003"
.095-.110"	4	.064"±.004"
.111-.126"	5	.080"±.005"
.127-.142"	6	.096"±.006"
.143-.155"	7	.112"±.007"

© - Spacer, Part No. 6256827 (.016") furnished. Use number indicated in table.

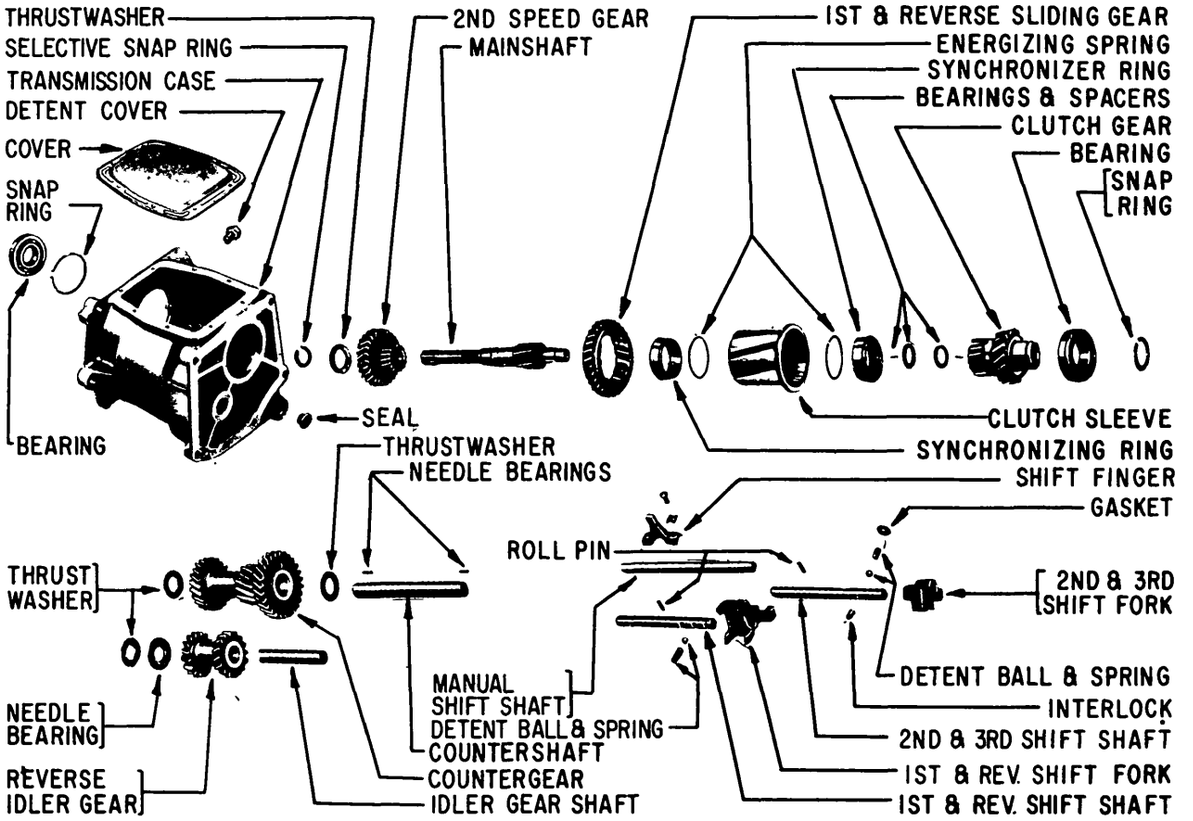
DIFFERENTIAL CARRIER: Removal & Installation - *See instructi ns abov for "Synchro-mesh" or "Automatic" Transmissions.*

SYNCHRO-MESH TRANSMISSION OVERHAUL

DISASSEMBLY: With transmission removed from differential carrier, proceed as follows:

1) Mount transmission on fixture J-7896-01 and remove extension assembly, being careful not to dent or damage mounting surface. Remove filler plug, case top cover and gasket.

2) Remove snap ring from mainshaft groove at rear of case (snap ring is immediately behind mainshaft bearing).



1961 PONTIAC TEMPEST SYNCHRO-MESH TRANSMISSION

Drive out clutch gear bearing and clutch gear by driving on mainshaft, then continue to drive or press mainshaft out of transmission and remove thrust washer. *CAUTION - Be sure synchronizer ring tangs are lined up with mainshaft splines before driving out mainshaft.*

3) Remove second speed gear, first and reverse sliding gear, and second and third speed clutch sleeve from case by lifting out through top cover hole, then remove second speed gear from clutch sleeve. To remove mainshaft bearing from case, fully expand retaining ring and start bearing out by tapping on outer race, then drive bearing out of case.

4) Remove detent cover plug and remove second and third gear detent spring and ball. Use a suitable punch and drive out roll pin securing second and third speed shift fork to shaft, then tap shaft toward front of case with a drift and remove fork, shaft and roll pin. Remove interlock from detent cavity, then remove first and reverse shift fork and shaft in same manner. Remove first and reverse gear detent ball and spring.

5) Remove two capscrews and lock tabs securing shift finger to manual shift shaft and pull shaft from case. Remove manual shift shaft seal.

6) Remove countergear and thrust washers by driving countergear shaft out from front of case using Tool J-5777. *CAUTION - H ld tool in c ntact with count r-g ar t prev nt n edl b arings from dropping out.* If necessary to remove reverse idler gear, drive reverse idler lock pin into shaft, then drive reverse idler shaft out of case. Remove caged needle bearing and thrust washer at rear of reverse idler gear. Remove mainshaft bearing retainer ring from case.

Clutch Sleeves & Synchronizer Rings (Disassembly & Reassembly): Remove first and reverse sliding gear, then turn synchronizer ring in clutch sleeve until ends or ring retainer can be seen through slots in clutch sleeve. Use Tool J-932 and expand retainer into counterbore in clutch sleeve, then slip synchronizer ring out of sleeve. *NOTE - If cones are damaged it will be necessary to replace clutch sleeve assembly and both synchronizer rings. Replace clutch sleeve if there is more than .030" endplay between cone and snap ring.* Inspect rings for smoothness, then place rings in synchronizer cones and check with thumbs to see that rings do not rock. Install synchronizer ring retainers in counterbores in end of clutch sleeve, then use Tool J-932 in slot in clutch sleeve and expand each retainer in counterbore. Lubricate each synchronizer ring with light oil and install in clutch sleeve. *CAUTION - Mak sure retainers seat in gro v all th way around rings s rings will turn fre ly.* Install first and reverse sliding gear on clutch sleeve.

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PONTIAC TEMPEST TRANSAXLE (C ntinu d)

INSPECTION: Wash all parts in clean solvent and blow dry with air. Check bearings for roughness and replace if necessary. Inspect case for cracks and inspect machined surfaces for burrs. Dress burrs off with a flat file. Inspect all gears and replace any that are worn or damaged. Make sure first and reverse sliding gear slides freely on clutch sleeve and that clutch sleeve slides freely on mainshaft. *NOTE - If reverse idler gear bushings are worn or damaged, replace entire assembly. Gear and bushing are not serviced separately.* Proper clearance between idler gear bushing and shaft is .002-.004".

►*SYNCHRONIZER ENERGIZING SPRING CAUTION:* If these springs have been removed, new springs must be installed. Assemble each spring in its groove in clutch gear and second speed gear with offset or locking end of spring between the third and fourth teeth of either of the two banks of teeth on these gears, thus keeping spring from turning in its groove. *CAUTION - Spring must be carefully installed so as not to expand it greater than the diameter of the gear teeth as spring will take a "set".*

REASSEMBLY: **1)** Install manual shaft seal. Place thrust washer (with tab facing out) on large gear end of countergear assembly, then place countergear and thrust washer in bottom of transmission case. Insert countershaft at rear of case and drive out Tool J-5777 with countergear shaft (notched end facing rear of case). *CAUTION - Hold Tool J-5777 against countergear while driving out to prevent displacement of needle bearings.*

2) If reverse idler gear was removed, coat needle thrust bearing and thrust washers with grease and position them on reverse idler gear in that order (needle bearing must be against end of gear having the chamfer). Coat bushings with transmission lubricant, then place reverse idler gear assembly in position in case so thrust bearing is toward rear of case.

3) Install reverse idler shaft from rear, making sure lock pin hole in shaft lines up with hole in case and at the same angle. Use a new shaft lock pin and drive it in approximately 1/16" below surface of case. Lubricate manual shift shaft with oil, then insert through seal into case. Position actuating finger and secure to shaft with two lock tabs and capscrews. Tighten screws to 5-7 ft. lbs. and bend lock tabs onto heads of screws. Install detent spring and ball in detent cavity, tapping it into place to make sure spring is on bottom of cavity.

4) Start roll pin into first and reverse fork, then start first and reverse shaft (shorter than second and third shaft) through lower hole at front of case with three detents facing detent ball, and slip yoke on shaft. While depressing detent ball, press shaft over ball to center detent position. Secure fork to shaft with a roll pin.

5) Coat interlock with oil and install in detent cavity. *NOTE - Before installing second and third shift fork, mak sure first and revers shift fork is engaged with manual shift l v r shift finger.* Start roll pin into fork, then insert second and third fork shaft through front of case with three detents facing away from interlock, and slip fork onto shaft. Secure fork to shaft with a roll pin. Insert detent ball and spring for second and third shaft fork and install detent cover and gasket. Tighten cover to 25-35 ft. lbs. *NOTE - Check for fre movement of manual shift shaft in all positions after installing detent plug.*

6) Check synchronizer rings for freeness, then index second speed gear properly with synchronizer ring tangs and install in clutch sleeve. Place assembled clutch sleeve, first and reverse sliding, and second speed gear in case (with second speed gear at rear of case). *NOTE* - Make sure first and reverse sliding gear and shoulder on clutch sleeve are in proper forks.

7) Place mainshaft in clutch gear, then from front of case, insert mainshaft through bores of clutch sleeve and second speed gear. *CAUTION - Make sure that tangs of synchronizer ring are aligned with mainshaft splines before installing mainshaft and that clutch gear slots are properly aligned with larger tangs on synchronizer ring.*

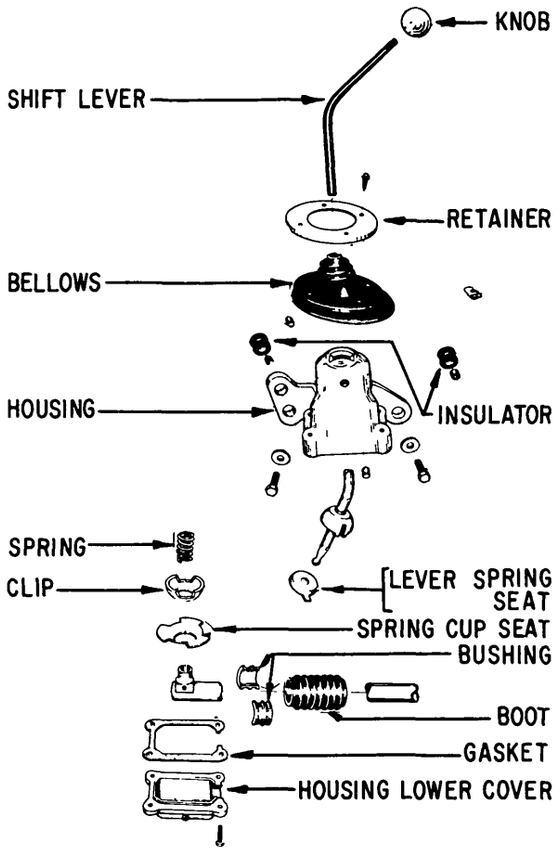
8) Drive clutch bearing into place, then install thrust washer on mainshaft with its oil grooves toward second speed gear and install mainshaft bearing retainer ring. Install mainshaft bearing with ring groove toward case and, with retainer ring expanded, drive bearing onto mainshaft with Tool J-6133. Install a ½" deep socket in clutch gear and continue to drive mainshaft bearing until snap ring groove on mainshaft is accessible, then remove socket.

9) Install snap ring, then check endplay of mainshaft by inserting feeler gauge between snap ring and bearing inner race. Endplay should not exceed .004". If necessary, install a snap ring of proper thickness to bring endplay within limits. Selective snap rings are furnished in four sizes from .086" to .097". After checking endplay, drive mainshaft forward into case until snap ring contacts bearing inner race.

10) Check for free movement of manual shift shaft and be sure movement into each gear position is free, then install top cover and gasket. Tighten cover bolts to 3-4 ft. lbs. Install filler plug and tighten to 25-35 ft. lbs., then install extension assembly and tighten bolts to 35-40 ft. lbs.

GEARSHIFT LEVER ASSEMBLY: **Disassembly** - Remove housing lower cover, then remove "half bushings" and transmission control rod (use a wire to support control rod at front). Remove control lever ball and remove shift control assembly from torque tube. Mount shift control in a vise (lever downward), then depress spring cup and rotate spring cup seat to disengage it from housing. Remove spring cup seat, spring cup, and spring. Remove control lever and control lever spring seat.

Reassembly: Lightly coat all bearing surfaces with wheel bearing lubricant, then install control lever spring seat in control lever. *NOTE - Spring seat must be installed with tab on correct side so spring tension will position lever towards second and high position.* Install control lever in housing, then install spring and spring cup, lining up notches in cup with lever. Install spring cup seat with seat detent aligned to engage notch in housing. Depress spring cup and rotate spring cup seat until three seat extensions fully engage three housing shoulders. *CAUTION - S at must be fully engaged or control lever will not operate properly.* Install shift control assembly on torque tube, then install control rod and bushings. *NOTE - Plac wh l bearing lubricant into control rod socket before connecting control rod to control lever ball.* Install housing lower cover gasket and cover and tighten bolts to 40-60 inch pounds. Install gearshift lever knob.



1961 PONTIAC TEMPEST SYNCHRO-MESH TRANSMISSION GEARSHIFT ASSEMBLY

EXTENSION HOUSING: **Disass mbly** - Remove seal, then remove bearing retaining ring and install Tool J-8918. Use a slide hammer to remove front and rear bearings and spacer as an assembly. If rear retainer ring must be removed for any reason, extension housing must be separated from transmission.

Reassembly: Install rear bearing using a suitable socket that rides on outer race to drive it into position. Install spacer, then install front bearing in same manner as for rear bearing. Install retainer ring and a new seal.

AUTOMATIC TRANSMISSION

►*1961 TEMPEST AUTOMATIC TRANSMISSION SUN GEAR THRUST WASHER PRODUCTION CHANGE & SERVICE INSTALLATION CAUTION:* Transmissions having a Date Code of "2-03" or later (see "Transmission Date Code Identification Note" below) have a Torrington Needle Thrust Bearing replacing the earlier thrust washer in planet carrier assembly. In conjunction with this change, clutch flange, low sun gear as-

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PONTIAC TEMPEST TRANSAXLE (C ntinu d)

sembly, and turbine shaft assembly were also changed. On earlier transmissions (with bronze thrust washer), if any of the above components require replacement, it will be necessary to install Low Sun Gear Thrust Washer Repair Package, Part No. 539588 which includes a Planet Carrier Assembly (with later type needle thrust bearing), Turbine Shaft Assembly, and Low Sun Gear Flange Assembly. Transmission having the later type parts installed in production may be identified by a daub of blue paint on transmission case in area of date code stamp.

►*1961 TEMPEST AUTOMATIC TRANSMISSION FRONT PUMP BUSHING PRODUCTION CHANGE & FRONT PUMP DRIVE PLATE THRUST WASHER CHANGE:* A non-replaceable bushing is used in front pump between inside diameter of pump internal gear and body on later cars. Use Thrust Washer, Part No. 3796016 (.088-.092" thick) with later type unit. On earlier units, use Thrust Washer, Part No. 3784643 (.058-.062" thick).

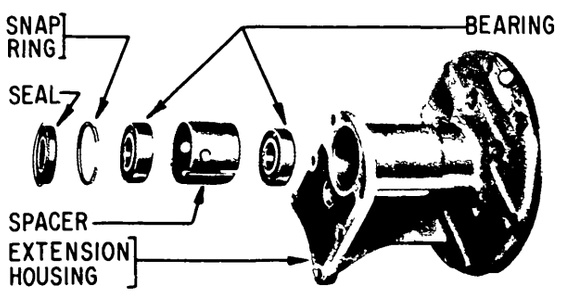
►*1961 TEMPEST AUTOMATIC TRANSMISSION NOT SHIFTING TO HIGH RANGE (After Selector Lever M v d From Low to Driv):* If transmission will shift to high when lever is moved from Neutral to Drive, throttle valve retaining ring has broken or fallen out of valve body. To correct, install a reinforced retaining ring, Part No. 9416713.

►*1961 TEMPEST AUTOMATIC TRANSMISSION DATE CODE IDENTIFICATION: Date code is hand stamped on right hand sid of transmission case above oil pan flang . As an example, "B 2 03" would indicate manufacturing plant (B); month of February (2) third day of month (03).*

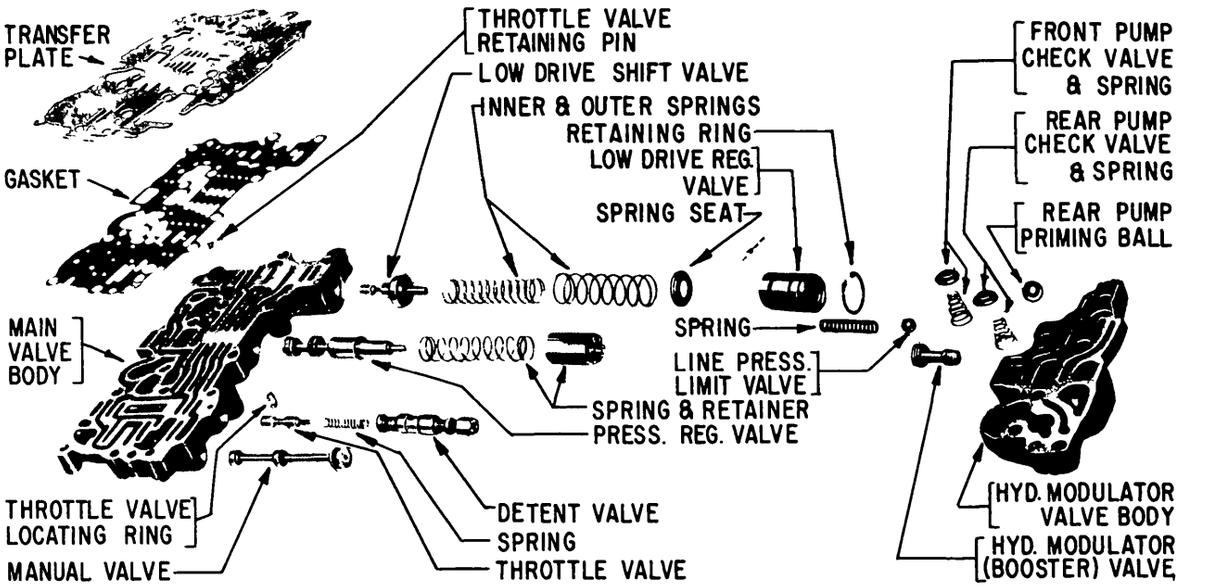
TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

EXTENSION HOUSING OIL SEAL REPLACEMENT: Remove torque tube and propeller shaft *(see "Pontiac T mpest Prop ll r Shaft & Torque Tube")*, then pry out old seal. Tap a new seal into position and install propeller shaft and torque tube.

EXTENSION HOUSING BEARINGS REPLACEMENT: Remove oil seal (see above), then remove bearing retainer ring with Truarc pliers. Insert Tool J-8918 into extension housing so that it picks up inner race of rear bearing. Install slide hammer on tool and tap out front bearing, spacer, and rear bearing as an assembly. To install, use a suitable socket (large enough to contact outer race of bearing) and tap rear bearing into position. Install spacer, then tap new front bearing into position. Install retainer ring, oil seal, torque tube and propeller shaft.



1961 PONTIAC TEMPEST EXTENSION HOUSING



1961 PONTIAC TEMPEST CONTROL VALVE ASSEMBLY

VACUUM MODULATOR: Removal - Remove vacuum hose at modulator, then unscrew modulator from transmission using channel lock pliers or a thin 1" wrench. Remove modulator valve from bore.

Inspection: Check valve for nicks and burrs. If light stoning will not eliminate nicks and burrs, replace modulator.

Installation: Install modulator valve in transmission bore, then place a new gasket on vacuum modulator and hold gasket centered with petroleum jelly. *CAUTION - Gasket must be held in a centered position during installation to prevent external oil leaks.* Install modulator and tighten securely, then install vacuum hose.

GOVERNOR: Removal - *NOTE - Governor is located on left side of transmission case and is accessible from below car.* Unscrew lock screw securing governor tab to case and pull governor from transmission.

Driven Gear Installation: *NOTE - This is the only replaceable part on governor.* To remove, drive out roll pin with a punch and pull out old gear. Drill a new hole in governor 90° from original hole, then insert driven gear and install roll pin.

Installation: Install new "0" ring on governor and install governor into transmission with a slight twist to engage gear teeth. Secure in place with lock bolt.

VALVE BODY & LOW SERVO: Removal - Drain transmission and remove oil filler pipe and oil pan, then remove transmission throttle rod from lever on transmission. Remove retainer screw, oil screen and "0" ring seal. Improvise a sheet metal strap to fit across corner of transmission case in area of low servo and secure loosely in position with an oil pan screw. Remove screws securing valve body to transmission case and tap body lightly with a soft hammer to loosen it from dowels in case. Carefully lower valve body about 1/16", then rotate improvised strap into position so it spans the servo piston hub and tighten strap retaining screw securely. *NOTE - This will eliminate possibility of piston slipping down out of its bore and the loss of low band engagement with its apply components.* Remove control valve body. If necessary to replace downshift valve, remove it from bore in case (adjacent to low servo piston). If low servo is to be removed, tighten low band adjusting screw fully, then remove retainer and pull downward on piston shaft with a screwdriver. *CAUTION - Do not remove low servo piston (with transmission in car) without fully tightening low band adjusting screw.* If front pump air bleed ball is to be replaced, remove retainer with needle nose pliers.

Disassembly, Inspection & Reassembly: *See "Valv Body" and "Low Servo" under "Overhaul" below.*

Installation: If downshift valve or front pump air bleed ball was removed, replace these parts and install retainer. Install low servo piston and return spring in bore and engage notch in piston shaft with low band apply strut, loosening low band adjusting screw slightly to permit piston ring to seat in case bore. Install retainer to hold piston in bore. Position new gasket on valve body, then position valve body on transmission case, indexing on dowels, and remove piston retainer. *CAUTION - Be sure manual valve indexes properly with pin on inner shaft lever.* Install valve body screws and tighten to 9-11 ft. lbs. Install oil pick-up screen and "0" ring in valve body and secure with screw. Position manual lever in full reverse position so it is held securely by wedging devise in transfer plate, then engage control cable and secure. Install oil pan

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PONTIAC TEMPEST TRANSAXLE (Continu d)

and new gasket and tighten attaching screws to 3-4 ft. lbs. Tighten filler tube attaching nut and refill transmission with fluid *(see "Draining & Refilling" above).*

OVERHAUL

(TRANSMISSION OUT OF CAR)

DISASSEMBLY

►*NOTE: Instructions below cover removal of sub-assemblies from transmission case. See "OVERHAUL OF UNITS" for disassembly, inspection and reassembly of these units.*

1) With transmission removed from differential carrier, remove modulator and modulator valve, then mount transmission in Holding Fixture, J-7896-01. Loosen low band adjusting screw locknut and fully tighten low band adjusting screw.

2) Remove extension housing attaching screws and tap housing off transmission with a soft hammer. Remove thrust washer and coupling and remove converter pump drive shaft. *NOTE - It is not necessary to remove drive key unless it is to be replaced.* Remove second thrust washer from pump body and remove pump gears. Stack gears so they may be reassembled with same face upward.

3) Remove pump body and gasket, then remove pump body-to-clutch drum thrust washer. Loosen low band adjusting screw and remove low band, apply strut and reaction strut. Remove clutch drum assembly. On early cars not having a needle bearing type sun gear thrust washer, remove thrust washer. *NOTE - Later cars have a Torrington Needle Thrust Bearing which cannot be removed from carrier assembly. See "Automatic Transmission Sun Gear Thrust Washer Production Change & Service Installation Caution" above.* Remove planet carrier assembly from ring gear, then remove ring gear from engagement with reverse clutch plates.

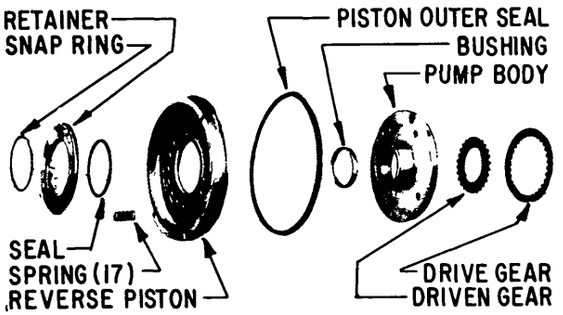
4) Remove clip mounted on thick reverse reaction plate between ends of reverse clutch plate snap ring and remove snap ring. Remove thick reaction plate, three drive plates (faced) and three reaction plates (steel).

5) Place transmission in a horizontal position and remove rear pump and reverse piston mounting bolts at rear of case, then remove rear pump and reverse piston assembly. Remove rear pump wear plate.

TRANSMISSION UNIT OVERHAUL

REAR PUMP & REVERSE PISTON: Disassembly - Remove drive and driven gears from pump body and stack so they may be reassembled with same face upward. Compress spring retainer with Tool J-6129, J-4670-C and J-8765. With spring retainer compressed until springs bottom, remove snap ring, then carefully release pressure and remove spring retainer and return springs. To remove reverse piston, fill snap ring groove in hub of rear pump body with string, a small rubber band, or a similar size "O" ring. Once groove is filled, rear pump body can be pushed out of reverse piston bore. Remove square cut piston inner seal and piston outer seal. *NOTE - Discard seals and install new seals at reassembly.*

Inspection: Wash all parts in solvent and blow dry with air, then check pump clearances which should be as follows: .0025-.005" between outer diameter of driven gear and body. .003-.009" between driven gear and crescent. .0005-.0015" between top of pump housing and top of both pump gears, measured with a straightedge and feeler gauge. Inspect pump body for leaks and scoring and hub of pump body for smoothness. Check for broken piston return spring and make a comparative check of spring heights by standing all springs in a row. If there is any appreciable difference in height, replace springs. If rear pump body bushing is scored or worn, replace.



1961 PONTIAC TEMPEST REAR PUMP & REVERSE PISTON

Reassembly: Install piston inner seal in reverse piston, then install piston outer seal in piston with lip of seal toward pump body (opposite from spring seats in piston). Install on pump body. *NOTE - It is not necessary to fill snap ring groove on pump body for installation of piston.* Position return springs in their seats on reverse piston, then place spring retainer on springs. Compress spring in same manner as for disassembly and install snap ring in groove in rear pump body. Complete assembly by installing drive and driven gears in pump body. *NOTE - Apply a small amount of petroleum jelly to gears to prevent their being dropped out.*

CLUTCH DRUM: Disassembly - Remove retainer ring securing low sun gear and clutch flange assembly to drum, then remove low sun gear clutch flange and hub-to-flange thrust washer. Lift out clutch hub, then remove nested drive and reaction plates and hub thrust washer. To remove spring retainer, compress springs in same manner as for reverse piston (above), then remove snap ring and carefully release pressure. Remove retainer and return springs. To remove clutch piston, pull upward with a twisting motion on center, and remove piston seal. Remove piston inner seal from hub of clutch drum.

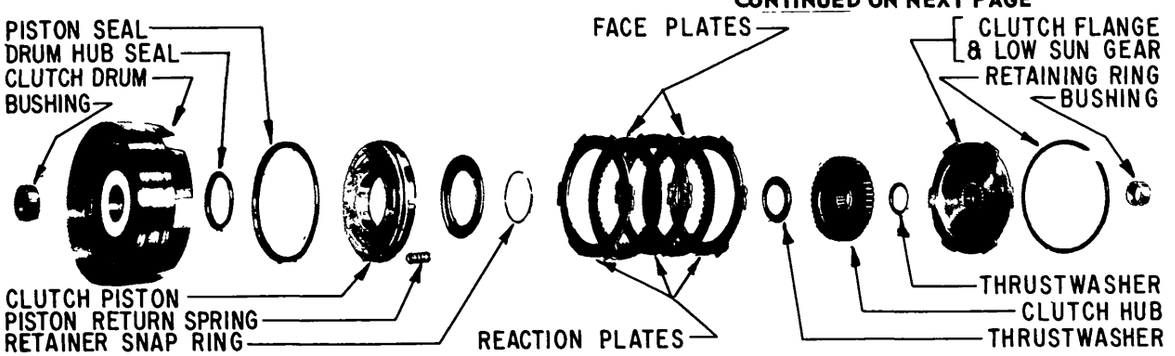
Inspection: Wash all parts in solvent and blow dry with air. *CAUTION - Do not use rags to dry parts.* Inspect brake drum band surface for scoring or burning and check drum bushing for scoring or excessive wear. Check steel ball in clutch drum that acts as a relief valve. Be sure that it is free to move in hole and that orifice leading to front of drum is open. *NOTE - If relief ball is loose enough to fall out or not loose enough to rattle, replace clutch drum as an assembly. DO NOT attempt to replace or restake ball.* Check fit of clutch flange in drum slots. There should be no appreciable play between these two parts. Check low sun gear for nicks or burrs and bushing for wear. Check clutch plates for burring, pitting or metal pick-up. Check to see that plates (faced) are a free fit over clutch hub and that steel plates are a free fit in clutch flange. Check for excessive wear on friction facing or drive plate teeth. Check condition of clutch hub splines and mating splines on faced plates.

Clutch Drum Bushing Replacement: Remove old bushing with chisel, Tool J-8400-1 being careful not to damage bushing bore. Install new bushing with Tool J-9211.

Low Sun Gear Bushing Replacement: Remove old bushing with a chisel or other suitable tool being careful not to damage bushing bore. Install new bushing with Tool J-8360-3.

Reassembly: Install piston inner seal in hub of clutch drum. *NOTE - Make sure seal lips are downward or toward front of transmission.* Install new piston seal in clutch piston (seal lips toward clutch drum when installed). Lubricate both seals, then install clutch piston in clutch drum with a twisting motion. Place 15 return springs in position on clutch piston, then place spring retainer on springs. Compress springs with same tools used at disassembly (see above), then install snap ring in groove on clutch drum with Truarc pliers. Install hub front thrust washer with its lip toward clutch drum, then install clutch hub. Install steel reaction plate, faced drive plate, two steel plates, faced plate, then steel plate. Install hub rear thrust washer with its flange toward sun gear, then low sun gear and clutch flange assembly and secure in place with retainer ring. *NOTE - Finally installed, openings of retainer ring should be adjacent to one of the lands*

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1961 PONTIAC TEMPEST CLUTCH DRUM ASSEMBLY

PONTIAC TEMPEST TRANSAXLE (Continued)

of clutch drum. Check assembly by turning clutch hub to be sure it is free to rotate.

FRONT PUMP & EXTENSION HOUSING: Disassembly - *NOTE - Front pump body was removed from extension housing when transmission case was disassembled.* Pry seal out of extension housing and remove bearing retainer ring with Truarc pliers. Invert extension housing and drive out front bearing, spacer, and rear bearing using a suitable socket as a driver.

Insp ction: Wash all parts in solvent and blow dry with air. *CAUTION - Do not use rags to dry parts.* Inspect pump gears for nicks or damage. Inspect pump cover (face of extension housing) and pump body for nicks or scoring. Check oil control rings on pump body. Check condition of bushing in front pump body. On early cars, if bushing is damaged, replace bushing. On later cars, a non-replaceable bushing is used. *See "Tempest Automatic Transmission Front Pump Bushing Production Change & Front Pump Drive Plate Thrust Washer Change" above.* Install pump gears and check following clearances: Between outer diameter of driven gear and the body (should be .0025-.005"); between the driven gear and crescent (should be .003-.009"). Use a scale and a feeler gauge and check gear end clearance which should be .0005-.0015". Inspect front and rear extension housing bearings for damage.

Front Pump B dy Bushing Replacement (Early Cars): *See "Tempest Automatic Transmission Front Pump Bushing Production Change & Front Pump Drive Plate Thrust Washer Change" above.* Press out old bushing with Tool J-8885 and an arbor press. Install new bushing with Tool J-8884 and an arbor press.

Reassembly: Install rear bearing in extension housing using a suitable socket as an installer (do not drive on inner race), then install spacer and front bearing. Install retainer ring with Truarc pliers. Use a soft hammer and drive in new oil seal. Install a new square cut oil ring on outer diameter of oil pump cover (extension housing). *NOTE - Further assembly will be completed when transmission is reassembled.*

PLANET CARRIER: Service by replacing as a complete unit.

TURBINE SHAFT: Insp cti n - Check shaft for nicks and cracks and check splined area for wear. Check to make sure that the two lubrication holes are open. Inspect bushing, and if necessary, replace.

Bushing Replacem nt: *NOTE - Both shaft bushings are identical, however, the rear bushing is installed deeper than the front.* To remove old bushing, cut out with chisel, Tool J-8400-1 being careful not to damage bore. Install new bushings with Tool J-8886-1 (front), J-8886-2 (rear).

PUMP SHAFT: Insp cti n - Inspect splines for wear or damage and drive lugs for wear or peened edges.

CONVERTER: *NOTE* - Internal repairs cannot be made. If seams are cracked or broken, either weld or replace unit. Check converter hub bushing for wear or damage.

C nvert r Bushing Replac ment: Chisel out old bushing with Tool J-8400-1. Install bushing with Tool J-9229 and arbor press.

REASSEMBLY

1) With transmission installed in holding fixture, install two guide pins, Tool No. 3387-2 in rear pump bolt holes, then install rear pump wear plate on pins, using a small amount of petroleum jelly to hold plate in position. Insert rear pump and reverse piston with guide pins into case, then insert a length (½" to ¾" wide) of .010-.015" thick shim stock between piston outer seal and case. With rear of case downward, running the shim stock around entire diameter of seal will seat seal quickly. Remove guide pins and install rear pump mounting bolts and tighten to 9-11 ft. lbs.

2) Install reverse clutch drive and reaction plates alternately starting with a reaction plate (steel) and finishing with a drive plate (faced). *NOTE - Notched lug in each steel reaction plate is installed so it is at TOP of the groove at the "4 o'clock" position in case.* Then install thick reaction plate retainer ring in such a manner so that open ends of ring are at the "12 o'clock" position. Install retainer ring clip on thick reaction plate between ends of snap ring.

3) With rear of transmission case downward, align internal lands and grooves of reverse face plates. Engage ring gear to reverse drive plates. *NOTE - Engagement must be made by "feel" while jiggling drive plates laterally.*

4) Install planetary unit with a slight twist to engage planet gears with ring gear. Be sure to engage the two rear pump drive lugs on planet hub with grooves in rear pump drive gear.

5) On early transmissions without later type needle thrust bearing in planet carrier assembly *(See "Tempest Automatic Transmission Sun Gear Thrust Washer Production Change & Service Installation Caution" above),* install thrust washer on captive input sun gear in planetary gear set with flange of thrust washer toward front of transmission. *NOTE - If necessary, use a small amount of petroleum jelly to keep thrust washer centered.* Install clutch drum assembly, using a slight twist to engage low sun gear to planetary gears.

6) Turn transmission to a horizontal position, then install low band, apply strut and reaction strut. When low band linkage is completely installed, tighten low band adjusting screw to prevent struts from falling out of place. Shake clutch drum slightly to center band and linkage. Replace original thrust washer (selective) or a new washer of same size if original is damaged. *NOTE - Final endplay adjustment will be made later in reassembly.*

7) Install front pump body and gasket, being careful not to damage cast iron oil rings on pump body hub when they are indexed to clutch drum. Install inner and outer pump gears with drive notches on inner gear facing up, and outer gear with same face upward as removed. Install thrust washer in pump body. *CAUTION - Make sure correct thrust washer is installed. See "Tempest Automatic Transmission Front Pump Bushing Production Change & Front Pump Drive Plate Thrust Washer Change" above.*

8) Install converter pump drive shaft, being careful when inserting shaft not to damage bushing of transmission components already installed. Position coupling on end of pump drive shaft, then position coupling thrust washer in extension housing (light press fit).

9) Install a new square cut seal ring in extension housing, then position extension housing on transmission case. Dip mounting bolt heads in sealing compound and install mounting bolts loosely. Tighten outer bolts in a criss-cross pattern to 15-20 ft. lbs., then tighten five inner bolts to same torque. Check pump for freeness.

10) Adjust low band by first tightening adjusting screw to 40±5 inch pounds, **then back off four full turns exactly.** Hold adjusting screw and tighten locknut. To install governor assembly, vacuum modulator, control valve, servo, pick-up pipe, screen and oil pan, *see "Transmission Unit Removal & Installation - Transmission in Car" above.*

DIFFERENTIAL CARRIER

►*FRONT PINION BEARING ADJUSTING NUT SEAL INSTALLATION CAUTION:* Tool J-8340-01 must be used when installing seal to properly position it in nut. If seal is installed too deep it will strike end of bearing rollers.

►*DIFFERENTIAL CARRIER COMPONENT SERVICING NOTE: The following differential carrier components can be removed with the carrier in its installed position in car.*

AXLE SHAFT: Removal & Installation - *See "Removal & Installation" above.*

Axle Shaft Bearing Replacement: Place axle shaft in a press with Tool J-9816-1 puller plate **below** the puller ring, then remove oil deflector, bearing and puller ring. To install a new bearing assembly, place a new puller ring, bearing assembly and oil deflector on axle shaft. *NOTE - To prevent damaging bearing assembly during installation, place the old puller ring with flat side against bearing inner race.* Press new puller ring and bearing assembly onto axle shaft using Tool J-8916-2 and an arbor press. Remove old puller ring and install oil deflector with closed side of deflector toward bearing.

SIDE BEARING ADJUSTING SLEEVE OIL SEAL REPLACEMENT: With axle shaft pulled outward far enough to remove universal joint from differential carrier, pry side bearing oil seals out with a screwdriver. Apply a bead of sealing compound to new seal, then install seal with Tool J-8889. Coat lip of seal with hypoid lubricant, then install axle shaft.

OVERHAUL

DIFFERENTIAL CARRIER: Disassembly - With differential carrier assembly separated from transmission, drain lubricant from carrier housing, then mount differential carrier in Fixture J-7896-01. On automatic transmission cars, pull governor drive gear and spacers from pinion shaft. On all models, pry differential side bearing oil seals from side cover and housing, then remove differential carrier side cover (bearing retainer) from carrier. *CAUTION - Differential case and ring gear assembly are held in position by side cover and will be free when side cover removed.* Remove differential case and ring gear assembly, then remove pinion rear bearing retainer and shim pack. On automatic transmission cars, remove rubber oil passage sleeve. *NOTE - If necessary, rear bearing retainer can be tapped out from front of case.* Remove front pinion bearing adjusting locknut, then remove adjusting nut with Tool J-8890. Remove pinion and shaft assembly from carrier. Remove left hand side bearing adjusting

CONTINUED ON NEXT PAGE

PONTIAC TEMPEST TRANSAXLE (Continued)

nut and lockscrew, then remove side bearing race from carrier. *NOTE - If necessary, adjusting nut can be screwed in until race is pushed from carrier.* Remove adjusting screw, lockscrew, bearing race and "O" ring seal from side cover.

DIFFERENTIAL CASE & RING GEAR: Disassembly - *NOTE* - If side bearing or differential case is to be replaced, remove bearings with Tools J-8900 and J-8614. Place differential case in soft jawed vise and remove ring gear attaching bolts, then install two ring gear attaching bolts partially into ring gear and tap ring gear off differential case. Separate cover from differential case (noting the scribed mark across parting line of case and cover). Remove side gear and thrust washer from cover half, then drive out roll pin retaining cross shaft in case and drive out cross shaft. Remove pinions, thrust washers, and side gear from case.

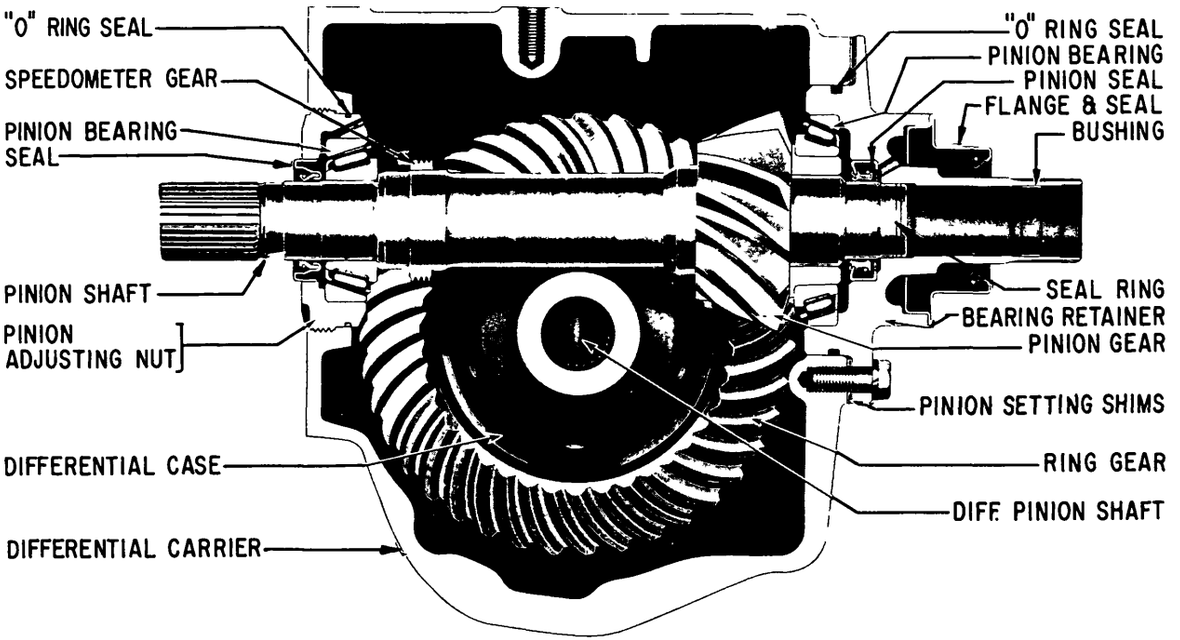
Inspection: Clean all parts in solvent, then inspect all castings for cracks or other damage. Inspect bearings for loose rollers, flaked or pitted rollers, and locking of bearings. Inspect gears for nicks and scoring. Replace all excessively worn or damaged parts.

Reassembly: Install side gear and thrust washer in case, then install two pinion gears and thrust washers in case. Drive cross shaft into case, being sure to align holes for pin, then install roll pin through cross shaft. Install side gear and thrust washer in cover, then install cover on differential case being sure to align scribe marks across parting line. Position ring gear on differential case and install ring gear attaching bolts. Tighten bolts to 55-65 ft. lbs. Press side bearings on differential case and cover using Tools J-8901, J-8092 and an arbor press.

PINION GEAR & SHAFT: Disassembly - On automatic transmission cars, remove oil ring from pinion shaft, On all cars, press off front pinion bearing using Tool J-8891 in Holder Tool J-6407, and Handle, J-8092. *CAUTION - Be sure speedometer drive gear is clear of yoke of press.* Press off speedometer gear with same tools used to press off bearings. Press off rear pinion bearing using Tool J-8893 in Holder, Tool J-6407. *NOTE - When pressing off rear pinion bearing, place Tool J-8901 (Synchro-mesh Trans.); J-8901 and J-8980 (Automatic Trans.) on end of pinion shaft and press against tool with arbor press. This will prevent damage to end of shaft with arbor press.*

Reassembly: Press on rear pinion bearing using Tool J-8894 and J-8092, then press on speedometer drive gear with Tools J-8980, J-8892 and J-6407. *NOTE - On Automatic transmission cars, use Tool J-8887 installed on end of pinion shaft in addition to the above tools.* Press on front pinion bearing with Tools J-8892, J-6407 and J-8092. On Automatic transmission cars, install oil ring on shaft.

REAR PINION BEARING RETAINER (SYNCHRO-MESH TRANS.): Disassembly - Remove "O" ring seal from retainer, then remove rear pinion bearing outer race with Tool J-8855 and Tool J-8855-4.



1961 PONTIAC TEMPEST DIFFERENTIAL CARRIER

Reassembly: Install rear pinion bearing outer race with Tool J-8898 and Tool J-8092, then install a new "O" ring seal.

REAR PINION BEARING RETAINER (Automatic Trans.): Disassembly - Remove "O" ring seal from retainer, then secure retainer in a soft jawed vise being careful not to damage splined shaft. *CAUTION - Clamp vise on outer diameter of retainer or on flange that supports stator oil seal. Do not clamp on splined stem that supports turbine.* Remove rear oil seal using a small chisel or other suitable tool, then remove bearing outer race with Tools J-8855 and J-8855-4. Pry off rear flange and stator oil seal with a screwdriver. Remove stator shaft bushing using Tool J-8400-1 or a suitable chisel.

Reassembly: Install new bushing with Tool J-8888 and Tool J-7079, then apply a uniform bead of sealing compound and install new rear flange and oil seal with Tool J-8899. Install new inner seal with Tool J-7137 and Tool J-8092 (lip of seal toward pinion gear). Install pinion bearing race with Tool J-8898 and Tool J-8092, then install new "O" ring seal on bearing retainer.

FRONT PINION BEARING ADJUSTING NUT: Disassembly - On automatic transmission cars remove "O" ring seal from nut and remove oil seal by tapping out from rear of nut. To remove bearing race, place nut in a soft jawed vise and drive race out of nut with a drift. On Standard transmission cars support nut on Tool J-7576, then press race out with Tool J-8897 and Tool J-8092.

Reassembly: On all models, install front bearing race in nut with Tool J-7137 and Tool J-8092. On automatic transmission cars, apply a uniform bead of sealing compound and install front oil seal with Tool J-8340-01, then install new "O" ring seal.

PINION DEPTH SETTING: *NOTE - If rear bearing race is to be replaced, install in rear bearing retainer before checking pinion depth setting.* Place rear pinion bearing in rear bearing retainer, then install Tool J-8919 over bearing. Measure distance between rear bearing retainer flange & lower side of Tool J-8919 with a feeler gauge, then refer to "Shim Chart" for correct thickness of shims required between differential carrier & rear bearing retainer flange. *NOTE* - If pinion shaft is marked with a "plus" (+) or "minus" (—) sign and a single digit (1 through 4), refer to "Pinion Correction Chart" for adjustments to be made to shim pack thickness. As an example: If feeler gauge thickness was .029" and carrier assembly was marked "—3" *(see "Differential Carrier Marking Note" below for location of marks on carrier)*, reference to the table would indicate that a shim pack .021" thick would be required (with an unmarked pinion shaft). If pinion shaft is marked "—3" (for example), reference to "Pinion Correction Chart" would indicate that shim must be increased .003". As a result, total shim pack required between differential carrier and rear bearing retainer would be .024" (.021" plus .003").

►*DIFFERENTIAL CARRIER MARKING NOTE:* Carrier housing is marked with a "plus" or "minus" sign and a single digit (1 through 3) on machined surface of cover side of carrier housing for use in adjusting pinion depth.

CONTINUED ON NEXT PAGE

PONTIAC TEMPEST TRANSAXLE (C ntinu d)

PINION CORRECTION CHART

Pini n Mark	Shim Pack Correction
–4	Add .004"
–3	Add .003"
–2	Add .002"
–1	Add .001"
No Mark	No Change
+1	Subtract .001"
+2	Subtract .002"
+3	Subtract .003"
+4	Subtract .004"

DIFFERENTIAL CARRIER: Reassembly - Install side bearing races in carrier and in side cover, then install adjusting nuts. *NOTE - Do not exceed four turns of adjusting nut in carrier housing.* Position ring gear and differential assembly in carrier, then place side cover, without oil seal, on case and retain with four bolts. *NOTE - Be sur the two aligning bolts are installd in correct hols.* Tighten adjusting nut in cover finger tight, then install Tool J-8903 in end of differential case splined bore through side cover. Adjust side bearing preload to 10-20 inch pounds by turning adjusting nut with Tool J-8902. Check preload with a torque wrench installed on end of Tool J-8903. When preload is correct, install adjusting nut lock screws and washers in side cover, then remove side cover from differential carrier. Remove differential case and ring gear assembly. Install original shim pack (or shim pack thickness determined when pinion depth setting checked) on rear bearing retainer. On automatic transmission cars, install a new rubber oil passage seal. On all models install a new "0" ring seal on bearing retainer, then install retainer on carrier and tighten bolts to 20-35 ft. lbs. Invert carrier and position pinion shaft assembly in carrier, being careful not to damage oil ring on shaft or seal on automatic transmission models. Install pinion adjusting nut assembly (and "0" ring seal on automatic transmission models), then tighten adjusting nut until all play in pinion shaft is eliminated, using Tool J-8890. Install Tool J-8362 inside pinion shaft and tighten nut on tool (used to rotate pinion shaft). Adjust pinion bearing preload to 10-16 inch pounds by turning adjusting nut. Position ring gear and differential assembly in carrier, then install cover, without "0" ring seal, and retain with four bolts. Remove side bearing adjusting screw locknuts and install Tool J-8903 in end of differential case splined bore through side cover. Set up a dial indicator (J-8001) on support, Tool J-3387-3 and secure in cover bolt hole so that indicator button contacts handle of Tool J-8903 squarely on line scribed on handle of tool. Insert a large screwdriver in opposite differential case splined bore to rotate differential assembly, then adjust ring gear backlash to .004-.009" by loosening one adjusting nut and tightening the other one notch at a time. Move ring toward pinion to decrease backlash and away from pinion to increase backlash. *CAUTION - Do not rotate pinion while checking backlash.* Remove dial indicator and support. Install side bearing adjusting nut lockscrews and tighten to 10-20 inch pounds. *NOTE - At this point check ring gear and pinion tooth contact pattern with red lead and make necessary adjustments to obtain correct pattern.* Remove side cover and install a new "0" ring seal, then install cover and tighten attaching bolts to 10-20 inch pounds. Apply a bead of sealing compound and install new differential side bearing oil seals with Tool J-8889. Install drain and filler plug. On automatic transmission models, install governor drive gear and spacers.

Demension Determined With Feeler Gauge	MARK ON CARRIER						
	4.583	4.582	4.581	4.580	4.579	4.578	4.577
	-3	-2	-1	NO MARK	+1	+2	+3
.038	.030	.031	.032	.033	.034	.035	.036
.037	.029	.030	.031	.032	.033	.034	.035
.036	.028	.029	.030	.031	.032	.033	.034
.035	.027	.028	.029	.030	.031	.032	.033
.034	.026	.027	.028	.029	.030	.031	.032
.033	.025	.026	.027	.028	.029	.030	.031
.032	.024	.025	.026	.027	.028	.029	.030
.031	.023	.024	.025	.026	.027	.028	.029
.030	.022	.023	.024	.025	.026	.027	.028
.029	.021	.022	.023	.024	.025	.026	.027
.028	.020	.021	.022	.023	.024	.025	.026
.027	.019	.020	.021	.022	.023	.024	.025
.026	.018	.019	.020	.021	.022	.023	.024
.025	.017	.018	.019	.020	.021	.022	.023
.024	.016	.017	.018	.019	.020	.021	.022
.023	.015	.016	.017	.018	.019	.020	.021
.022	.014	.015	.016	.017	.018	.019	.020
.021	.013	.014	.015	.016	.017	.018	.019
.020	.012	.013	.014	.015	.016	.017	.018

PINION SHIM CHART

RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION

DRIV-ER-MATIC & DUAL-RANGE
Checker Superba (1961)
FLASH-O-MATIC
Rambler American 6101 Series (1961)
Rambler 6110, 6120, 6180 Series (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING THE ENGINE BY PUSHING CAR: NOTE -* Pushing rather than towing is recommended (to avoid possibility of car ramming towing vehicle). Place selector lever in Neutral "N" position. When speed of 15-20 MPH is reached, turn ignition "on" and move selector lever to "D-1" or "D-2" position.

►*TOWING THE CAR:* If transmission inoperative, always tow car with rear wheels raised or with propeller shaft disconnected. If transmission operating properly car can be towed for **short distance** with selector lever in Neutral "N". Prolonged towing may cause damage to transmission.

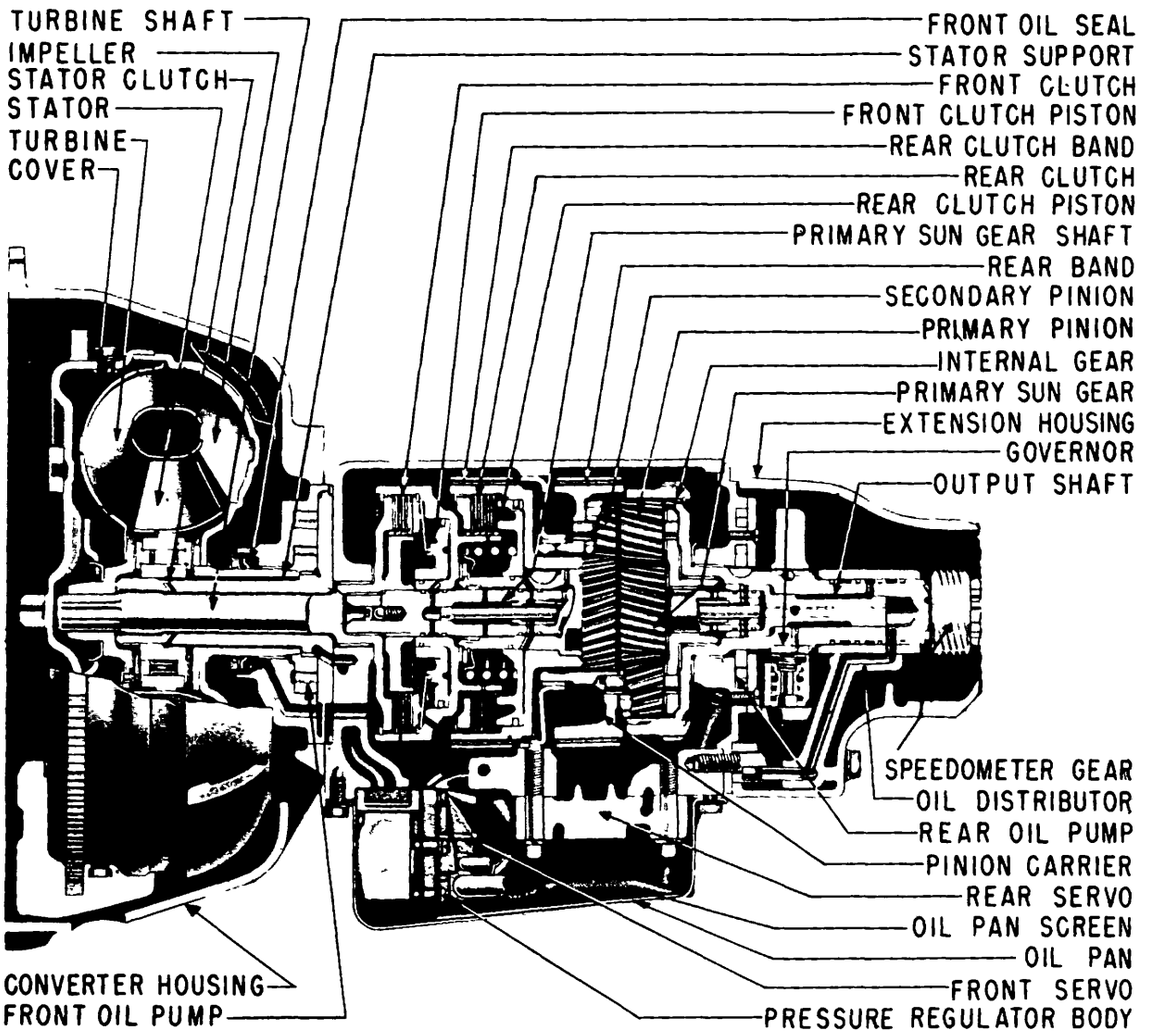
►*1961 RAMBLER AMERICAN ("L" HEAD ENGINE) AUTOMATIC TRANSMISSION VACUUM & OIL PRESSURE SPECIFICATION CHANGE:* The new specification is 110 lbs.±3 lbs. at 10.5" of vacuum (same as for Rambler American models with OHV. Engine). This new specification supersedes previous specification of 85 lbs. ±3 lbs. at 8.6" vacuum. *See "CONTROL UNIT ADJUSTMENT" below.*

►*1961 RAMBLER AMERICAN ("L" HEAD ENGINE) AUTOMATIC TRANSMISSION "HUNTING" BETWEEN SECOND & THIRD SPEED GEARS:* This condition occurs under normal throttle pressure between 30 and 50 MPH and can be corrected by adjusting vacuum and oil pressures to later specifications (see "Specification Change" above). If "hunting" continues to exist with vacuum and pressure at specified limits, reduce pressure 5 to 10 lbs. by resetting vacuum and solenoid unit approximately ½ turn out from case. *CAUTION- Do not exceed 1 full turn from specified setting.* If the above changes do not correct the condition, replace throttle valve spring between throttle valve and kickdown valve with Part No. 3151124, then readjust oil pressure to 110 lbs. ±3 lbs. at 10.5" of vacuum.

DESCRIPTION

RAMBLER

Flash-O-Matic transmission consists of a hydraulic torque converter and a hydraulically controlled automatic 3-speed planetary transmission which provides automatic operation in "D1" & "D2" ranges. Additional "L" (Low), "R" (Reverse), and "P" (Park) ranges are controlled manually. In "D1" range, the car starts in low and upshifts to intermediate and then to direct. In "D2", the car starts in intermediate, then shifts to direct. Downshifts follow the same pattern (in reverse) in relation to car speed and throttle position. On Series 10, 20, & 80, throttle valve pressure is controlled by a vacuum and solenoid unit located at left rear of transmission. This unit operated by a vacuum line from intake manifold. A forced downshift (kickdown) from direct to intermediate can be made by fully depressing the accelerator pedal. On Rambler American, a transmission range selector lever located on steering column and connected to transmission manual lever by linkage positions manual valve in transmission. A neutral safety switch, operated by shift levers at lower end of steering column permits starting engine when selector lever is in either "P" (Park) or "N" (Neutral) position. On other series, a push button transmission range selector control located at left of instrument panel consists of five buttons operating a cable connected to manual lever on transmission. A "Park" lever mounted directly below push buttons operates amechanical parking pawl which engages external teeth on rear internal gear. When "Park" lever is pushed in, all buttons except "N" (Neutral) are locked and cannot be operated. With either of the forward or reverse buttons pushed in, "Park" lever is locked and cannot be operated. A back-up light switch operated by the "R" (Reverse) button and a starter switch, operated by the "N" (Neutral) button, are also located on the push button gear selector control assembly. Planetary transmissions on all models are similar except for the pinion carrier assembly used in transmissions on Series 10, 20 & 80. The pinion carrier assembly on these models incorporates a sprag type free wheel clutch that performs the function of rear band while in "D-1" range. A transmission oil cooler is incorporated in lower tank of radiator on Rambler Series 20 & 80, and Checker Superba.



FLASH-O-MATIC TRANSMISSION SECTIONAL VIEW

CHECKER SUPERBA

Design of the "Driv-er-matic" & "Dual-Range" automatic transmissions used on these models is the same

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RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (Cont.)

as used on Rambler American (see above), except that the "Driv-er-matic" transmission is a single range type and does not have a "P" (Park) position.

LUBRICATION

►*CAUTION: Ch ck fluid at 1000 mile intervals. Drain and r fill at 15,000 mil intervals, using Automatic Transmissi n Fluid Typ "A" (Suffix "A"). The dipstick is l cat d on right rear of engine under hood.*

Capacity - (Drain & R fill) Approximately 8½ qts. (Rambler), 10 qts. (Checker Superba).

►*NOTE: Aft r ov rhaul, 10 qts. (Rambler, except Series 80), 11 qts. (Rambl r Series 80), will be required to fill transmission.*

Ch cking Fluid L v l - With engine and transmission at normal operating temperature and running at idle speed, operate transmission through all ranges. Place transmission in "N" (Neutral), then check fluid level on dipstick and add fluid as required to bring level to "F" (Full) mark. *NOTE - Approximately 1½ pints of fluid are r quired to rais fluid level from "L" to "F" mark.*

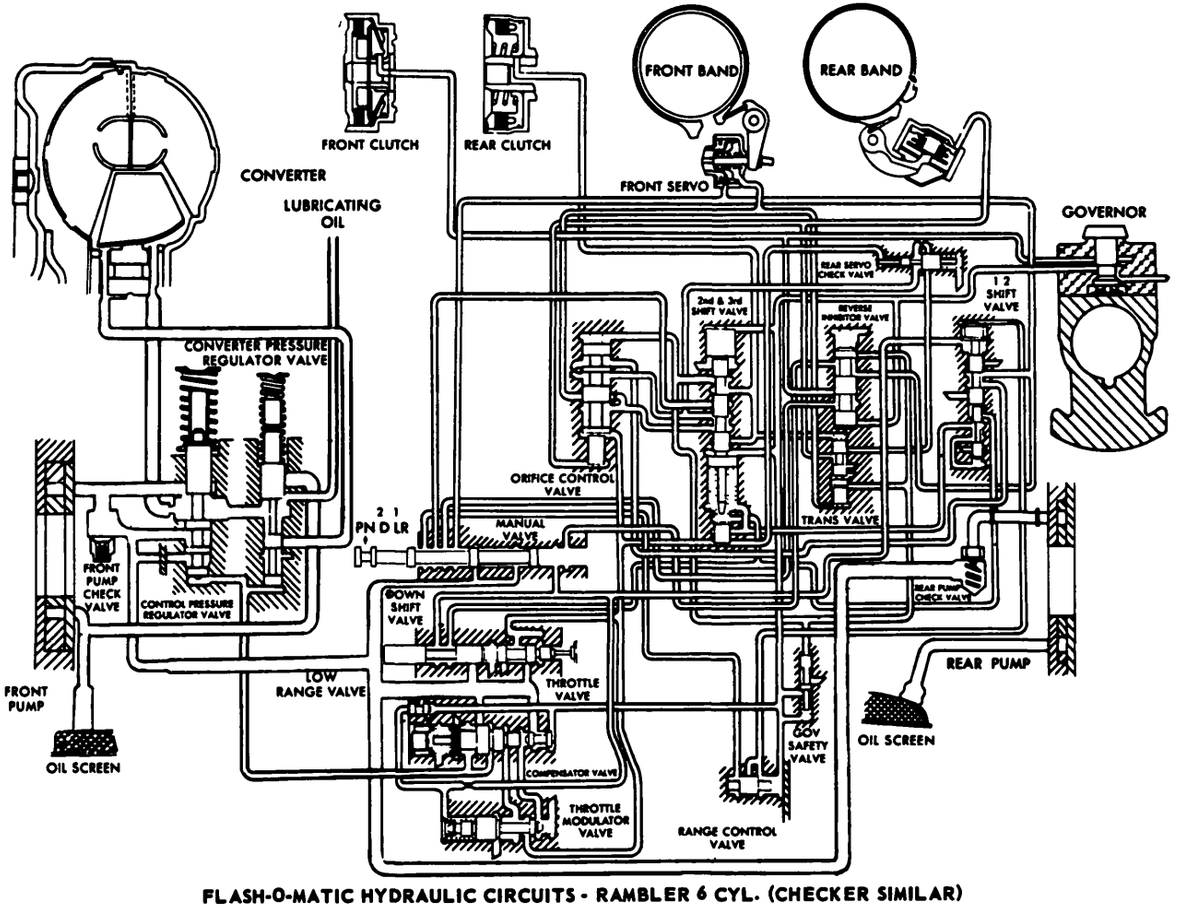
Draining & R filling - With transmission at normal operating temperature, rotate converter until one of the drain plugs is visible through square opening in converter bell housing. Remove plug and then turn converter 180° and remove second drain plug. Remove drain plug at rear of transmission oil pan. After draining, replace the drain plugs and tighten converter plugs to 7-10 ft. lbs. Install 5 qts. (Exc. Rambler Series 80), 6 qts. (Rambler Series 80), of Automatic Transmission Fluid Type "A" (Suffix "A"). Set hand brake and run engine with transmission selector lever in "N" position. Add 3½ qts. (Rambler Models), 4 qts. (Checker Superba) of fluid and move selector lever through all ranges. Check oil level, and if necessary, add sufficient fluid to bring level to "F" mark on dipstick. *CAUTION - D n t ov rfill transmission as this will cause foaming when transmission is warm.*

LINKAGE ADJUSTMENT

RAMBLER AMERICAN

Manual Linkage Adjustment (Rambler American): Disconnect gearshift rod at transmission lever and place transmission lever in third detent from top (D-1 position). Place gearshift selector lever (on steering column) in "D-1" position. *NOTE - Make sure selector operating shaft lev r at lower end of steering column strik s against stop gate located on bearing housing.* Adjust trunnion on gearshift rod to enter hole in lever on transmission freely, then remove trunnion from lever and l ngthen n turn. Install trunnion in hole and install washer and cotter pin. If selector lever pointer does not line up with "1" on gear selector dial, use an Allen wrench and adjust pointer as necessary. Check lever pointer in all positions.

N utral Saf ty Switch Adjustm nt: Place selector lever in "N" (Neutral) and set parking brake. Loosen nuts on operating lever-to-switch rod (at lower end of steering column) and adjust switch contact arm to a point where switch contact is made when ignition switch is turned to start position. Engine should start. Locate selector lever in "D-2" position. Engine should not start. Tighten adjusting nuts.



FLASH-O-MATIC HYDRAULIC CIRCUITS - RAMBLER 6 CYL. (CHECKER SIMILAR)

CHECKER SUPERBA

Manual Linkage Adjustment: Disconnect manual shift rod from selector lever on steering column and from lever on transmission. Position transmission selector lever so indicator is down against stop in "D" (Drive) position. Place transmission manual lever in the "D" (Drive) detent (second from top of transmission), then adjust length of manual shift rod so it fits into ball joint on steering column and into shift lever on transmission without changing position of selector lever or transmission shift lever. Tighten ball joint nut at steering column and install washer and cotter pin at transmission lever. Move selector lever through all positions and check operation.

Neutral Saf ty Switch Adjustm nt: Starter circuit must be open in all positions except "N" (Neutral). To adjust, loosen neutral switch-to-steering column screws and position switch so starter circuit is closed when selector lever is at "N" (Neutral).

Kickd wn Switch Adjustment: Loosen the two nuts on kickdown switch (one above and the other below toeboard) and rotate the upper nut to obtain a clearance of ¼" between switch and accelerator pedal when carburetor throttle valves are in a wide open position.

PUSHBUTTON CONTROL
RAMBLER SERIES 10, 20 & 80

Gear Selector Pushbutton Control Adjustment: Disconnect cable at transmission lever, then push "L" (Low) button in and move selector lever on transmission all the way to rear. Adjust cable linkage at clevis to align holes in clevis and lever. Install clevis pin and washer and tighten clevis securely. Check adjustment in all five positions.

Parking Lever Adjustment: Pull "Park" lever handle out and disconnect cable at transmission (transmission outer lever will be in its off position and inner lever will lay against toggle lever pin). Adjust clevis on cable to index perfectly with hole in lever. Install clevis, pin and washer and tighten.

Gear S lector Ass mbly Removal: Disconnect battery, then disconnect back-up light wire at connector and

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RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (Cont.)

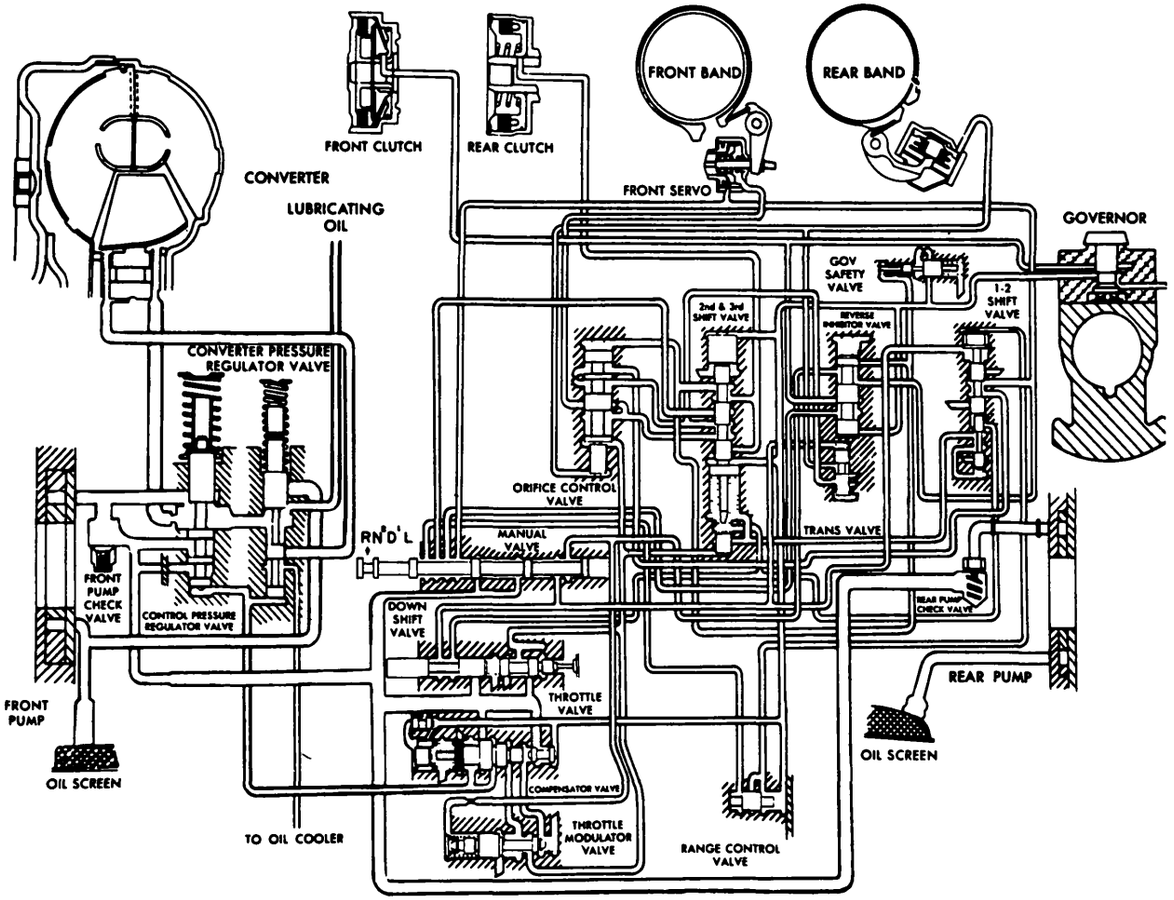
from junction block at firewall. Disconnect control light bulb from connector under instrument panel, then disconnect neutral safety switch wire from junction block and relay at left wheelhouse panel and pull wires through wall. Remove gear selector escutcheon from instrument panel, then remove the three screws retaining gear selector control and move the unit forward to clear pushbuttons from instrument panel. Lower unit and move it toward rear and remove retainer nuts from both cable attaching pins. Pry cable outer looms from brackets of control unit. *NOTE - If safety switch or back-up light switch require replacing, bend prongs of switch up with a screwdriver. When installing switch, bend prongs down carefully.* To install the assembly, reverse removal procedures.

CONTROL UNIT ADJUSTMENT
RAMBLER

Adjustment: *NOTE - The following instructions supers de all previous testing procedures.* Remove pressure test plug at left front side of transmission and install the 1/8" pipe plug extension provided with Tool J-8773 (Vacuum & Solenoid Control Adjusting Kit), then connect an oil pressure gauge to the extension. Disconnect vacuum line at vacuum and solenoid unit and attach vacuum gauge to "T" fitting on test line. Start engine and bring to normal operating temperature with transmission in neutral. At engine idle speed of 475 RPM, transmission in neutral, turn needle valve on test line to lower vacuum reading on gauge to obtain a vacuum reading as follows: 10.5" Hg (American and Series 10); 12.1" Hg (Series 20); 13.8 Hg (Series 80). With correct vacuum reading, oil pressure reading should be as follows: 110 lbs. (American). *NOTE - S e "Rambler American ("L" Head Engine) Vacuum & Oil Pressure Specification Change" above.* 100 lbs. (Series 10); 85 lbs. (Series 20 & 80). *NOTE - Oil pressures are plus or minus 3 lbs.* If oil pressure readings are not correct, loosen vacuum and solenoid unit locknut and turn unit in toward case if pressure is too low; away from case if pressure is too high. After correcting adjustment, cover the bleed holes provided in needle valve to stop atmospheric pressure entering test line. This will bring vacuum reading on test gauge to highest engine vacuum and oil pressure gauge should then read 55-65 lbs. With rear wheels raised off floor, place transmission in "D-2" position, then cover bleed hole in needle valve. Accelerate engine until transmission shifts into direct drive. Pressure gauge should read 25-35 lbs.

SUPERBA

Adjustment: *NOTE - After unit is installed on transmission case, it should be initially adjusted by screwing it in or out so the distance between front edge of unit and transmission case is 3/8".* Remove 1/8" pipe plug from lower left corner of transmission case and install a 300 lb. pressure gauge. Remove fitting at rear of vacuum solenoid unit and install a vacuum gauge using a "T" fitting. Install vacuum line so unit will operate and vacuum gauge will register. Connect a tachometer to engine, then start engine and run several minutes to bring to normal operating temperature.



FLASH-O-MATIC HYDRAULIC CIRCUITS - RAMBLER V8

Place selector lever in "D1" ("D" on Superba A1OL)and apply parking and service brakes. Accelerate engine until a reading of 10.5" HG is obtained on vacuum gauge. Reading on pressure gauge should be 90-105 lbs. If pressure is below specifications, turn vacuum and solenoid unit inward to increase pressure;outward to decrease pressure. When correct pressure has been obtained, tighten locknut. *NOTE - It is recommended that vacuum and solenoid unit not be turned more than 1/2 turn either way from initial setting of 3/8".*

►*CAUTION: When making the above tests, do not operate engine for more than 10 seconds at any one interval.*

BAND ADJUSTMENT

►*TORQUE WRENCH DIAL READING NOTE:* To obtain correct dial reading on wrench, compensate for the additional length of adapter Tool J-7847 as follows: Multiply "9" (torque required on adjusting nut) by lever length of wrench (middle of handle to center of wrench socket drive). Record the product of this multiplication. Add length of torque wrench to length of adapter, Tool J-7847 (6"). Record sum of this addition. Divide product of the multiplication by the sum of the addition. The quotient of this division will be the reading on torque wrench dial which will be required to obtain 9 ft. lbs. on rear band adjusting nut.

Front Band: Remove transmission oil pan, gasket, and screen. Use Tool J-5880 (Rambler), Tool No. 7195 (Checker Superba) and loosen adjusting screw, then insert gauge block (part of tool) between end of adjusting screw and servo piston rod. Turn screw in until it overruns and remove gauge block. *NOTE* - It may be necessary to back adjusting screw off slightly to remove gauge block. If so be sure to tighten screw the same amount after block is removed. Tighten locknut to 20-25 ft. lbs. and install screen, gasket, and transmission oil pan. Refill transmission.

Rear Band: Rambler - Loosen locknut on adjusting screw located on left side of transmission case and install Tool J-7847 on adjusting screw. Tighten screw with torque wrench to 9ft. lbs. *(s "Torqu Wr nch Dial R ading Not " abov).* Mark adjusting screw with a reference point and **back ff adjusting scr w 1½ turns.** Tighten locknut securely.

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RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (C nt.)

Ch ck r Sup rba - Remove cover plate from floor pan and position Tool No 7225 on adjusting screw and loosen locknut Using "T" handle of tool, tighten adjusting screw until wrench overruns (10 ft lbs), then **back ff adjusting screw 1½ turns.** Hold adjusting screw stationary and tighten locknut to 35-40 ft lbs

TESTING

STALL TEST: Connect tachometer to engine and place it where it can be easily read from driver's seat Set hand brake and start engine Place selector lever in "D1" position, apply service brakes and operate engine at full throttle. Note tachometer reading. *(CAUTION - Do not operate ngine at high speed while selector lever is in one of the driving ranges, with rear wheels held stationary, for mor than 10 seconds at a time to pr v nt ov rheating transmission)* Normal stall speeds are as indicated in table below If stall speed is greater than normal, slippage in transmission is indicated If stall speed is below normal, poor engine performance is indicated

Stall Speeds

M d l	Engine RPM
merican	1400
Series 10	1400
Series 20	1575
Series 80	1600

SHIFT SPEEDS

(Rambl r American)

Upshift	Light Thr ttl	Full Throttle	Kickdown
1-2	10-14 MPH	25-29 MPH	36-40 MPH
2-3	15-19 MPH	45-49 MPH	56-60 MPH
D wnshift	**Cl sed Thr ttle**	**Full Throttle**	**Kickdown**
3-2	12 MPH	23 MPH(Max)	53 MPH(Max)
2-1	8 MPH		19 MPH(Max)

(S ries 10)

Upshift	Light Thr ttl	Full Throttle	Kickdown
1-2	10-14 MPH	26-30 MPH	41-45 MPH
2-3	18-22 MPH	49-53 MPH	65-69 MPH
D wnshift	**Cl s d Thr ttle**	**Full Throttle**	**Kickdown**
3-2	9-13 MPH	23-27 MPH	59-63 MPH
2-1	5-9 MPH		22-26 MPH

(S ries 20)

Upshift	Light Thr ttl	Full Throttle	Kickdown
1-2	6-10 MPH	21-25 MPH	32-36 MPH
2-3	24-26 MPH	47-51 MPH	62-66 MPH
D wnshift	**Cl s d Thr ttle**	**Full Throttle**	**Kickdown**
3-2	10-14 MPH	26-30 MPH	54-58 MPH
2-1	5-9 MPH		17-21 MPH

(S ries 80)

Upshift	Light Thr ttl	Full Throttle	Kickdown
1-2	10-14 MPH	26-30 MPH	37-41MPH
2-3	21-25 MPH	46-50 MPH	64-68 MPH
D wnshift	**Cl s d Thr ttl**	**Full Thr ttl**	**Kickd wn**
3-2	16-20 MPH	28-32 MPH	58-62 MPH
2-1	6-10 MPH		25-29 MPH

(Ch ck r Sup rba)

Upshift	Light Thr ttl	Full Thr ttl	Kickd wn
1-2	5-8 MPH	22-30 MPH	
2-3	10-13 MPH	41-50 MPH	
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	7-11 MPH		35-49 MPH
2-1	3-7 MPH		

AIR PRESSURE TEST (Transmission in Car): Raise car on hoist and remove transmission oil pan and control valve assembly The front servo tubes should remain in front servo and the servo attaching screw must be tight *NOTE - When making air pressure tests, hold a clean towel over transmission opening to prevent excessive oil spray*

Front Clutch· Apply air pressure to front clutch passage (on transmission case rear flange). Listen for a dull thud indicating clutch is operating. Retain air pressure in this passage for several seconds to check for leaks in this circuit

Governor Valve Remove governor inspection hole cover and apply air pressure to front clutch passage (see above). Listen for a click and watch valve snap inward. Replace inspection hole cover.

Rear Clutch· Apply air pressure to rear clutch passage (on transmission case rear flange). Listen for a dull thud indicating clutch is operating. Retain air pressure in this passage for several seconds to check for leaks in this circuit.

Front Band & Servo: Apply air pressure to front servo apply tube (rear tube) and observe band application.

Rear Band & Servo: Apply pressure to rear clutch oil passage (transmission case rear flange), and observe band application.

► *TESTING NOTE If servos, bands, clutches, and governor operate with air pressure, then the no-drive problems, erratic shift, or no-upshift conditions indicate that the control valve assembly and pressure regulator valve assembly is the cause of the trouble See "Control Valve" and "Pressure Regulator Valve" below*

TROUBLE SHOOTING & DIAGNOSIS

INITIAL ENGAGEMENT TOO ROUGH: Idle speed may be too high. Control pressure may be too high caused by improper adjustment of throttle control vacuum unit. Regulator control valve may be dirty

INITIAL ENGAGEMENT DELAYED: Check fluid level On Series 10 or Rambler American, adjust rear band as it may be loose Control pressure may be too low at idle speed Clean control valve assembly and pressure regulator assembly Check front pump for wear Check fluid circuits for leaks and correct as necessary

INOPERATIVE IN ALL RANGES· Check fluid level. Manual linkage may be disconnected. No control pressure, which may be caused by trouble at front pump. Check rear band adjustment Check rear servo action with air pressure Inspect and clean control valve assembly Check engine stall speed, as converter may not be operating properly

NO DRIVE IN "D" OR "L" POSITION: Check fluid level Manual linkage not properly adjusted Control pressure may be low Adjust vacuum control unit Clean control valve and pressure regulator valve assemblies Check front clutch action with air pressure. On Series 10 and Rambler American, check rear servo and band with air pressure Check transition valve in control valve assembly as it may be stuck

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be too low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly.

LOCKS UP IN "D" POSITION: Rear clutch or front band may be applied. Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failure.

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo or "one-way" clutch for mechanical failure Check rear clutch Clean control valve assembly assembly

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band, or "one-way" clutch may be applied Clean control valve assembly

LOCKS UP IN "R" POSITION: Check front clutch and band and front servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited, check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Control pressure may be too high. Check and correct vacuum and solenoid adjustment. Check and adjust bands. Clean governor valve assembly.

1-2 UPSHIFT SLIPPAGE (LIGHT THROTTLE): This condition may be caused by an unbalanced vacuum condition due to clogged vacuum ports or vacuum leakage at carburetor *(See "Carter (AS) Carburetor" in Carburetor Section)* Check adjustment of Vacuum & Solenoid Control Unit on transmission *(See "Throttl Control Adjustment" above)*

1-2 UPSHIFT SLIPS: Adjust vacuum and solenoid unit. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.

NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check for stuck governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Adjust vacuum solenoid unit.

2-3 UPSHIFT ROUGH: Control pressure may be too high, adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for stuck governor valve.

CONTINUED ON NEXT PAGE

RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (C nt.)

2-3 UPSHIFT "PILE-UP" (LIGHT THROTTLE): *See "1-2 Upshift Slippage (Light Throttle)" above.*

2-3 UPSHIFT SLIPS: Control pressure may be too low; adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for internal leaks and stuck governor valve.

NO 2-3 UPSHIFT: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit. Adjust vacuum solenoid unit.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Orifice control valve may be stuck.

3-2 KICKDOWN (EARLY): Check for stuck governor valve.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Rear servo check valve may be stuck.

WILL NOT START BY PUSHING: Rear pump not operating. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust vacuum solenoid unit. Check for damaged internal linkage or pawl.

TRANSMISSION REMOVAL & INSTALLATION

RAMBLER (EXCEPT RAMBLER AMERICAN CONVERTIBLE)

►*RAMBLER SERIES 20 & 80 (WITH SINGLE EXHAUST) TRANSMISSION REMOVAL NOTE: Disconnect crossover (right) exhaust pipe at manifold flange and "U" clamp connection at left exhaust pipe.*

REMOVAL: Disconnect battery cable, then raise car on a hoist and place jack stands under rear of car at body sills. Disconnect oil filler tube at oil pan and drain transmission. On Series 20 & 80, disconnect oil cooler lines at transmission. On all models, disconnect vacuum line and wire terminal at vacuum unit located at rear of transmission. Disconnect speedometer cable at transmission and rear brake hose bracket from floor panel. Disconnect manual shift linkage or cables from levers at transmission, then disconnect rear shock absorbers from rear axle. On Rambler American, disconnect rear spring front brackets from body floor pan, then slide rear axle to rear to disengage front universal joint from transmission shaft. On other models, disconnect torque tube, propeller shaft, and parking brake cable, then lower rear axle and move rearward to separate torque tube and propeller shaft from transmission. On all models, place a hydraulic hoist with a suitable cradle in position under transmission oil pan, then remove transmission case-to-converter housing upper capscrews. On all cars except Rambler American, remove shift cable bracket. On all cars, install two guide pins, Tool J-1434 into capscrew holes, then remove lower capscrews and lockwashers. With hydraulic hoist and cradle adjusted so transmission is in alignment with converter housing, pull transmission to rear to disengage it from housing and converter assembly. Lower assembly and remove from car.

►*TRANSMISSION, BELL HOUSING & CONVERTER ASSEMBLY REMOVAL NOTE:* These parts may be removed as an assembly as follows: In addition to transmission removal procedure (see above), remove the starter attaching bolts and remove starter. Support transmission and remove crossmember at side sill bolts. Lower engine and block engine on both sides from the top ledges of oil pan to side sill crossmember (these blocks should be 5" long and 2" square). Remove bell housing-to-engine bolts and bell housing lower mud pan. Remove six capscrews attaching torque converter to drive plate. Complete removal as outlined above.

INSTALLATION: Reverse the removal procedure and note the following: If transmission removed separately, position front pump drive tangs on converter in a horizontal position and position the front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 40-45 ft. lbs. If converter has been removed, converter-to-drive plate attaching capscrews must be tightened to 23-28 ft. lbs.

(RAMBLER AMERICAN CONVERTIBLE)

►***TRANSMISSION REMOVAL NOTE:* Transmission and converter cannot be removed as an assembly. Transmission must be removed separately, then the converter and bell housing can be removed.**

►***1961 (EARLY MODEL) TRANSMISSION REMOVAL NOTE: On some early models, it is necessary to remove transmission oil pan before transmission can be removed from car. On later cars, modifications were made in auxiliary crossmember to allow removal of transmission without removing oil pan.***

REMOVAL: Disconnect vacuum line and remove solenoid vacuum unit, then disconnect shift rod from transmission. Disconnect parking brake at front end of adjusting rod and push rod through hole in crossmember (toward rear). Disconnect parking brake bellcrank and bracket from crossmember. Disconnect and remove speedometer cable, then remove cable and gear from transmission extension housing. Disconnect brake tube and gas line brackets from under floor pan to permit moving axle toward rear, then disconnect rear brake cables from brackets at side sills and disconnect rear shock absorbers at rear axle. Place stands under rear of body and lower rear axle far enough to relieve tension on rear springs. Disconnect and remove rear axle "U" bolt brackets. Raise rear axle to clear spring center bolts and slide rear axle on rear springs to remove universal joint from transmission output shaft. Remove four capscrews retaining transmission to bell housing, then place transmission jack (having a tilting attachment) under transmission oil pan and secure transmission to jack. Move transmission to rear far enough to clear input shaft from bell housing. Lower front of transmission and tilt transmission to right side. Keep lowering front end and tilting to right side until transmission input shaft clears bell housing and rear of case clears slot in crossmember.

INSTALLATION: Reverse removal procedure and note the following: Position front pump drive tangs on converter in a horizontal position and position front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 40-45 ft. lbs.

CHECKER SUPERBA

REMOVAL: Raise car and drain transmission fluid, then loosen tube clip capscrew at extension on starter motor and rotate filler tube out of the way. Disconnect vacuum line at vacuum unit (rear of transmission), then disconnect hand brake cable at drive shaft if chassis is so equipped. Disconnect manual shift linkage at shift lever on transmission, then disconnect the two oil cooler lines on right side of transmission (if so equipped). Disconnect propeller shaft at transmission companion flange and wire propeller shaft out of the way. Place a hydraulic hoist with a suitable transmission lift cable in position under transmission oil pan and adjust hoist to align cradle with oil pan flange, then hoist enough to support transmission. Remove transmission case to converter housing upper capscrews and lockwashers and install two pilot studs into screw holes. Remove lower transmission case to converter housing capscrews. Pull transmission straight toward rear of car to disengage it from converter housing and converter assembly.

INSTALLATION: Reverse removal procedure, being careful to align turbine shaft splines with turbine hub splines and the converter impeller lugs with slots in front pump drive gear.

TRANSMISSION OVERHAUL

►*CONVERTER OVERHAUL NOTE:* Torque converter is a sealed assembly (case is welded together during manufacture) and cannot be disassembled for service.

TRANSMISSION OVERHAUL: *See "Warner Automatic Transmission" in 1960 Annual Data or later Manual edition.*

STUDEBAKER FLIGHTOMATIC

Studebak r, All Models (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Move selector lever to "N" (Neutral) position. When car speed reaches 20 MPH, turn the ignition switch on and move transmission selector lever to the "L" (Low) position. It is recommended that the car be pushed to start it rather than be towed.

►*TOWING CAR CAUTION:* Car can be towed for very short distances with the transmission selector lever in the "N" position. Prolonged towing will result in damage to the transmission unless the drive shaft is disconnected or the rear wheels are off the ground.

►*1961 STUDEBAKER SIX TRANSMISSION SLOW ENGAGEMENT OR "BUMP" CORRECTION & PRODUCTION CHANGE:* On transmissions after Serial No. 19163 (Exc. Taxi); 10500 (Taxi), slow engagement or "bump" when shifting into "D" or "L" can be corrected as follows: Replace the three front clutch discs with three new discs, Part No. 1554230, (four on Taxi and Heavy Duty transmission). On standard transmissions (except Taxi and heavy Duty), install Pressure Plate, Part No. 1554179. On all transmissions, drill out front clutch inlet hole located in front clutch cylinder (this hole is located in mainshaft bore of clutch hub) to a 5/32" diameter hole (present hole is .075-.081"). Transmissions built after the above serial numbers have these corrections made in production. *NOTE - It is suggested that whenever it is necessary to replace front clutch parts in these transmissions, the above parts should be installed plus a new Front Clutch Cylinder, Part No. 1554227.*

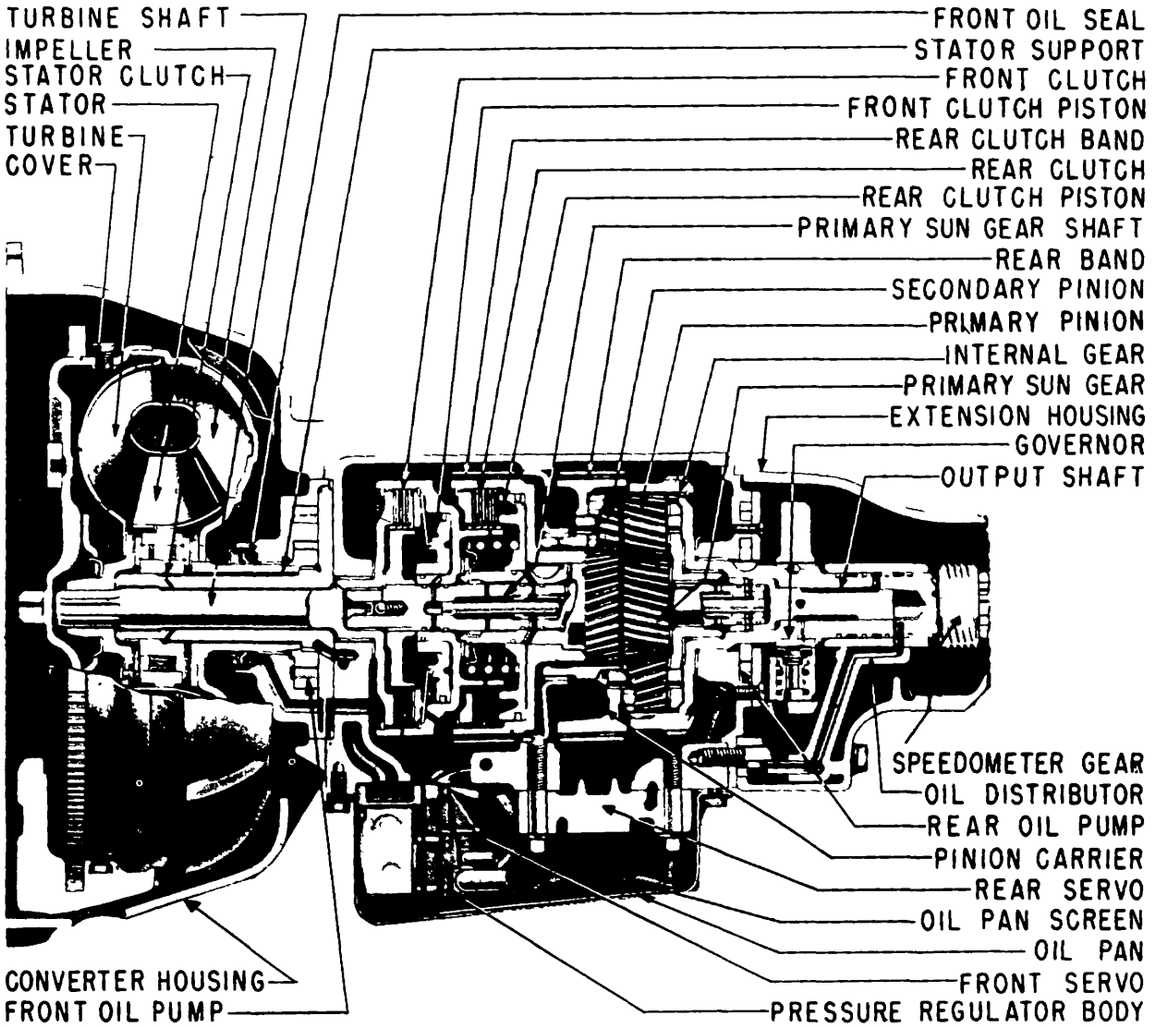
►*1961 STUDEBAKER SIX (EXCEPT TAXI) HEAVY DUTY TRANSMISSION NOTE:* This transmission is identical to transmission used on taxicab models except that a different governor assembly and speedometer drive gear is used. The shift points of this transmission are similar to transmissions used on standard models. A plain aluminum identification plate on transmission case identifies this transmission.

►*1961 TRANSMISSION FRONT PUMP PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new helical gear front pump, Part No. 1552576 is used in production on later cars and may be used for service replacement on early models. The later pump cover and stator hub, Part No. 1552577, may be used for service replacement on the earlier spur gear type pump.

►*1961 TRANSMISSION DIPSTICK TUBE BRACKET PRODUCTION CHANGE & SERVICE INSTALLATION NOTE:* A new dipstick tube positioning bracket, Part No. 1553453 is being used in production to insure proper positioning of dipstick tube. It is suggested that whenever oil pan is removed on early transmissions without the bracket, that the service bracket, Part No. 1553453, be installed. Attach to second oil pan capscrew from rear on right side of transmission.

DESCRIPTION

DESCRIPTION: Transmissions used on all models except with 170" Over-Head-Valve engine are similar to transmissions used on previous models. Heavy duty and Taxicab transmissions are water cooled by circulating transmission fluid through an oil cooler located in car radiator. The transmission used on 170" Over-Head-Valve engines is similar to the other transmissions except that a one-way (sprag) clutch is used in the planetary gear train to eliminate application of rear band when transmission is operating in "D" (Drive) range. *NOTE - Rear band is applied only when selector lever is in "L" (Low) or "R" (Reverse).* In conjunction with the addition of a sprag clutch, the control valve assembly was also changed to eliminate the rear servo check valve and spring.



STUDEBAKER FLIGHTOMATIC TRANSMISSION SECTIONAL VIEW

LUBRICATION

►*CAUTION: Check fluid l vel at 1000 mil intervals. Drain and r fill at 15,000 mil int rvals, using Automatic Transmissi n Fluid Typ "A" (Suffix "A").*

Capacity - 9 qts. (Exc. Taxicab & Heavy Duty Trans.). 9½ qts. (Taxicab & Heavy Duty Trans.).

Checking Fluid Level—Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission have reached normal operating temperature. Roll up the floor mat from right side until oil level inspection hole cover in floor pan is accessible, and remove cover. Clean all dirt and foreign material from around transmission fluid dipstick. Apply the parking brake and foot brake and move selector lever slowly from "P" position to "R" position and then back to "D" position. Remove dipstick and wipe clean, then install it in transmission and turn clockwise to the lock position. Remove dipstick and check fluid level. Add fluid through dipstick hole to raise level to the "F" mark on dipstick. *NOTE*—The amount of fluid re-

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STUDEBAKER FLIGHTOMATIC (C ntinu d)

quired to raise the level from "L" mark on dipstick to "F" mark is approximately 1½ pints.

Draining & Refilling—Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission are at normal operating temperature. Stop engine and raise car on hoist. Remove transmission dipstick (*see "Checking Fluid Level" above*). Remove transmission drain plug. Rotate the converter until one of the drain plugs is visible through hole in converter housing, remove drain plug and quickly rotate converter 180°, and remove the other converter drain plug. After fluid has drained from transmission and converter, install transmission drain plug using a new gasket, and the two converter drain plugs. Lower the car to floor and install three quarts of Automatic Transmission Fluid Type "A" (Suffix "A") through dipstick hole. Apply parking brake and foot brake, then start engine and operate it with selector lever in "N" (Neutral) position. Slowly pour four quarts of fluid into transmission. Move selector lever through all ranges. Check oil level on dipstick (see "Checking Fluid Level" above). Add sufficient oil to bring level up to "F" mark on dipstick.

LINKAGE ADJUSTMENT

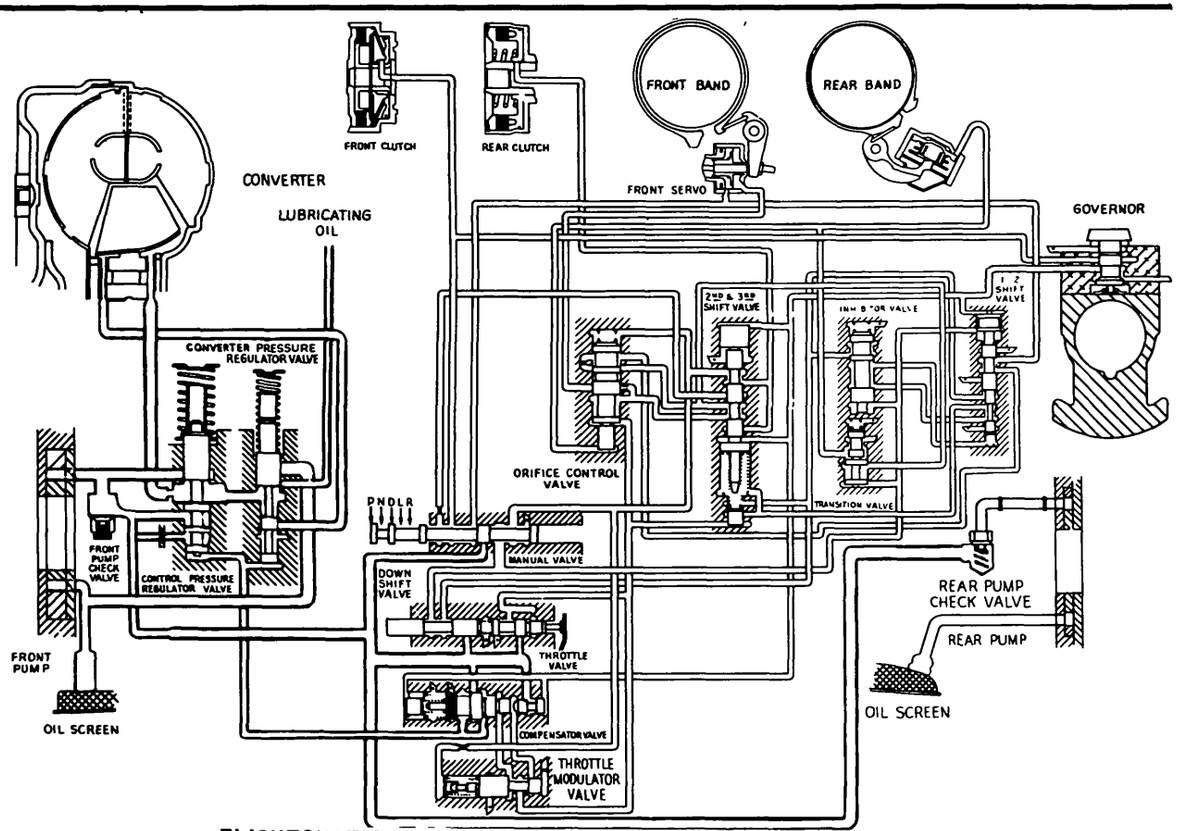
Thr ttle Linkage Adjustment: *See CARBURETOR on Car Model Pages.*

Manual Linkage Adjustment: Disconnect shift lever-to-transmission manual valve lever rod at transmission manual valve lever by removing the ball joint assembly. Place selector lever in "D" (Drive) position and place the manual lever on transmission in the "D" (Drive) position (this is center of manual valve lever travel). Adjust the shift lever-to-manual valve lever rod until the ball joint stud will slip freely through the hole in the manual valve lever. Install ball joint stud locknut and lock to rod.

N utral Safety Switch Adjustment: Place transmission selector lever in "N" (Neutral), then loosen switch bracket on steering column jacket. Align pin hole in switch lever with corresponding hole in switch body and install pin to maintain alignment. Tighten bracket attaching screws. Test operation of switch. Engine should start only with selector lever in "P" (Park) or "N" (Neutral) position.

BAND ADJUSTMENT

Fr nt Band: Remove transmission oil pan, gasket and screen. Loosen the front servo adjusting screw locknut two full turns with a 9/16" wrench. Check the adjusting nut for free rotation in the actuating lever and free the adjusting screw if necessary. Install the gauge block of the adjusting tool (J-5880) between the servo piston rod and the adjusting screw. Place the Front Band Adjusting Tool J-5880, on the adjusting screw and tighten until the tool overruns. **Back ff th adjusting scr w ne full turn,** and tighten locknut to 20-25 ft. lbs. Place the screen over the rear pump inlet first then over the front pump inlet, and install the screen retaining clip. Position a new oil pan gasket on transmission oil pan flange and hold it in place with petroleum jelly. Align oil pan on transmission flange and install capscrews and lockwashers. Tighten to 10-13 ft. lbs. Install drain plug and fill transmission *(see "Lubrication" above).*



FLIGHTOMATIC TRANSMISSION HYDRAULIC CIRCUITS (6 CYL. MODELS)

Rear Band: Remove inspection cover in center of front compartment floor and clean all dirt and foreign material from around rear band adjusting screw and locknut. Oil adjusting screw threads, then using Tool J-5883, tighten screw until tool overruns. **Back off adjusting screw 1½ turns** and tighten locknut to approximately 35-40 ft. lbs. *CAUTION - It is very important that the adjusting screw be backed off 1½ turns to avoid damage to band and servo.*

THROTTLE VALVE STOP ADJUSTMENT

Throttle Valve Stop: Remove oil pan and screen, then remove compensator tube and bellcrank-to-throttle valve lever rod from throttle valve lever. Hold throttle valve lever against throttle valve stop and measure distance from center of hole in throttle valve lever to machined surface on rear of transmission case. This distance should be a minimum of 4 7/32" and not to exceed 4 5/8". If not within specifications, bend throttle valve stop as necessary. To bend the stop, remove compensating pressure tube from pressure regulator valve assembly and control valve assembly and bend stop with Tool J-5887.

TESTING

STALL TEST: Connect tachometer to the engine and place it where it can be easily read from the drivers seat. Set the hand brake and start the engine. Place selector lever in "D" (Drive) position, apply service brakes and operate the engine at full throttle. Note tachometer reading. Repeat this procedure with selector lever in "L" and "R" positions. *(CAUTION—Do not operate the engine at high spe d whil th s l ctor lever is in one of the driving rang s, with the r ar wheels held stationary, for mor than 10 sec nds at a time or for a total time greater than n minut in any half-hour period).* Normal stall speeds are 1450-1550 RPM (6 Cyl.), 1550-1650 RPM (259" V8 Eng.), 1750-1850 RPM (289" V8 Eng.). If stall speed is greater than normal, slippage in transmission is indicated. If stall speed is between 900-1000 RPM (if engine is normal), slippage is indicated in torque converter stator freewheel unit.

ROAD TEST: A thorough test must be made to determine the shift speed and transmission performance. The initial application of the various bands and clutches should be checked in all driving ranges by stopping the car and moving the selector lever to "D", "Lo", & "R"

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC (C ntinued)

ranges. A driving test should be made in the "D" range to check the shift speeds. *See "Shift Speeds" below.*

FLUID PRESSURE TESTS: Fluid pressure tests should be made to ascertain whether or not the pressure regulator system is functioning correctly and to determine if there is fluid leakage in the clutch circuits. Remove the 1/8" pipe plug located near throttle lever and manual lever, and install pressure gauge hose (pressure gauge should be in drivers compartment). Connect a tachometer to engine and position it so it can be read from driver's compartment Make the following tests·

►*FLUID PRESSURE TEST CAUTION (CARS WITH CLOSED CRANKCASE VENTILATION):* Disconnect airflow valve from carburetor or manifold, and temporarily plug carburetor or manifold vacuum port during pressure tests or adjustments.

1) Idle Pressure T st - With engine and transmission at normal operating temperature, and with engine at normal idle speed, move selector lever to "D", "L" & "R" positions. The pressure reading should be approximately 50-60 lbs. (6 Cyl), 50-80 lbs. (V8, Exc Taxicab), 59-95 lbs. (V8 Taxicab), in all ranges If pressure is low in any one range, a fluid leak in that circuit is indicated. If pressure is high, the throttle linkage should be checked and adjusted. *See CARBURETOR on Car Model pag s.*

2) Pressur R gulati n Test - Move selector lever to "D" (Drive) range and firmly set hand brake and foot brake. Run engine at 1000 RPM and check pressure gauge. Pressure should be approximately 70-75 lbs. (6 Cyl.); 80-85 lbs. (V8, Exc. Taxicab), 95-100 lbs. (V8 Taxicab). If pressure is less, it indicates the throttle linkage is too long and must be adjusted. If pressure is greater, it indicates throttle linkage is too short.

3) Stall Pressur T st - Firmly set hand and foot brakes and operate engine at full kickdown position. Move selector lever to "D", "L", "R" ranges and check pressure gauge. Pressure in "D" & "L" should be 100-130 lbs. (6 Cyl.), 130-175 lbs. (V8, Exc. Taxicab), 132-184 lbs. (V8 Taxicab). In "R" range, the pressure should be 160 lbs. minimum (6 Cyl.); 170-190 lbs. (V8, Exc. Taxicab), 184-203 lbs. (V8 Taxicab). If pressure is not within limits, control valve assembly and pressure regulator valve assembly must be removed and cleaned.

FLIGHTOMATIC SHIFT SPEEDS

Minimum Throttle Upshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
1-2	7-9 MPH	6-8 MPH	
2-3	16-19 MPH	14-17 MPH	12-18 MPH

Maximum Throttle Upshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
1-2	35-38 MPH	28-32 MPH	34-42 MPH
3-2	59-64 MPH	41-46 MPH	63-73 MPH

Maximum Kickdown

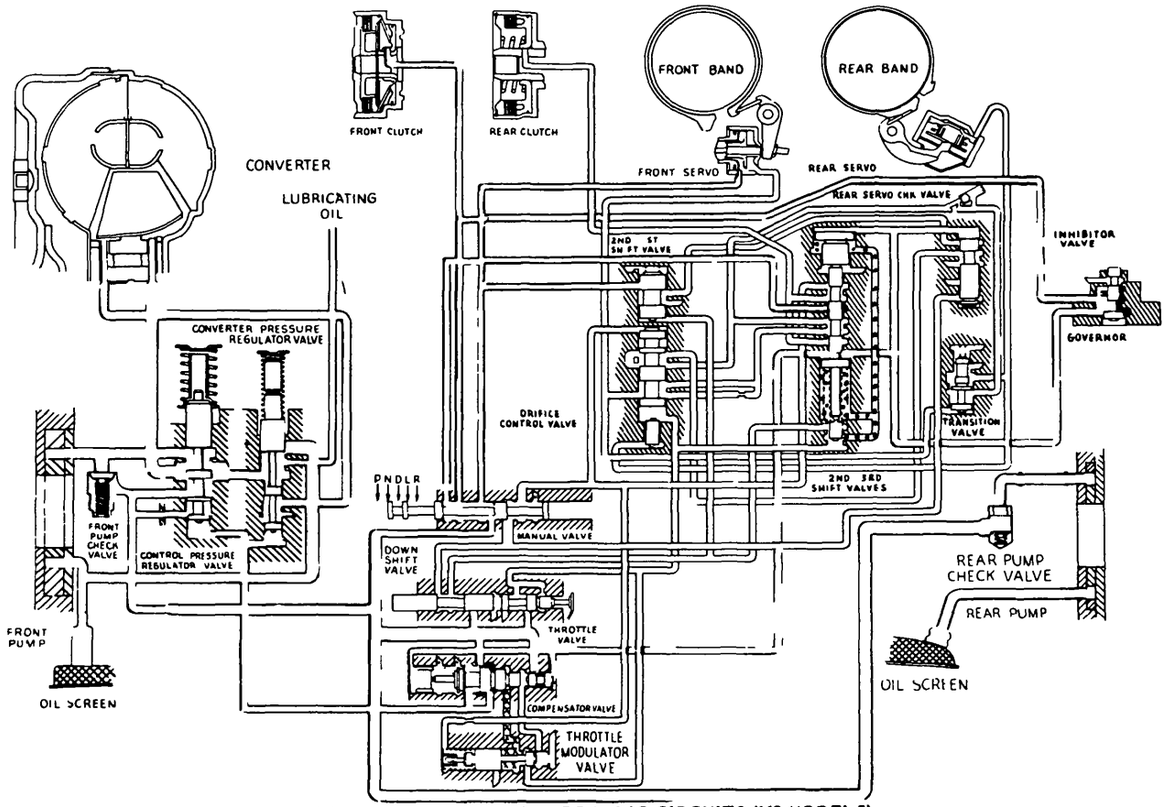
Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
3-2	50-55 MPH	34-39 MPH	60-70 MPH
3-1	15-19 MPH	10-14 MPH	20-26 MPH
2-1	10-14 MPH	6-10 MPH	12-18 MPH

Cl s d Throttle Downshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
3-2	7-11 MPH	6-10 MPH	3-8 MPH

Inhibited D wnshift (Selector Lever in "L")

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
2-1	15-22 MPH	14-18 MPH	15-21 MPH



FLIGHTOMATIC TRANSMISSION HYDRAULIC CIRCUITS (V8 MODELS)

AIR PRESSURE TEST (With Transmission in Car): Raise car on hoist and remove transmission oil pan and control valve assembly. Proceed as follows

Front Clutch: Apply pressure to front clutch and governor input passage (case rear flange). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of the system.

Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

R ar Clutch; Apply air pressure to rear clutch oil passage (case rear flange). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).

Rear Band & Serv : Apply pressure to rear servo oil passage (case rear flange), observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If servos, bands, clutches and governor operate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" below.*

TROUBLE SHOOTING

►***DIAGNOSIS OF TRANSMISSION SLOW ENGAGEMENT OF FRONT & REAR CLUTCHES: This condition noted*** at times when manual selector lever is shifted to a position that requires application of either front or rear clutch with car standing still, and at idle (transmission at normal operating temperature) Check as indicated below.

1) Perform "Initial Engagement Delay" below

2) Check control pressure at 1000 RPM and at idle during time complaint condition is noticeable Make comparative readings in all ranges.

3) Isolate rear clutch or rear band areas by adjusting rear band so it mechanically locks rear drum If trouble is corrected, leakage within rear band servo is indicated If complaint remains, it indicates that problem is in rear clutch circuit

4) If the above procedures do not correct the complaint,

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC (Continued)

but indicate a pressure leak in either front or rear clutch circuits, remove and disassemble transmission, then inspect all parts for nicks, scores and wear Check all seal rings and grooves Check all valves and valve bores

►*CONTROL VALVE BUZZ (PARK & REVERSE RANGES) CORRECTION* This condition may be due to highly aerated oil in the transmission which could be caused by a leak in the transmission When abnormally severe valve buzz is encountered, remove the dipstick and check for indications of air bubbles in the oil If air is present, check and correct as follows

1) Sand holes or porosity in transmission case

2) Leakage between pressure regulator valve assembly and the machined surface of case This condition can be due to nicks or other damage on either of the mating surfaces, or by improper torqueing of the capscrews

3) Leakage between front pump and transmission case due to damaged gasket or improper torqueing of capscrews

4) Incorrect control pressures or sticking valves

INITIAL ENGAGEMENT TOO ROUGH: Idle speed may be too high. Control pressure may be too high caused by improper throttle valve linkage or dirt in control valve assembly or regulator valve assembly. Check throttle valve stop and reset if necessary.

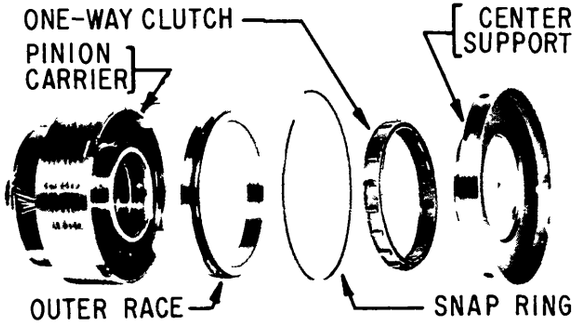
INITIAL ENGAGEMENT DELAYED: Check fluid level Adjust rear band as it may be loose. Control pressure may be too low at idle speed. Clean control valve assembly and pressure regulator assembly. Check front pump for wear. Check fluid circuits for leaks and correct as necessary.

INOPERATIVE IN ALL RANGES: Check fluid level. Manual linkage may be disconnected. No control pressure which may be caused by trouble at front pump. Check rear band adjustment. Check rear servo action with air pressure. Inspect and clean control valve assembly. Check engine stall speed, as converter may not be operating properly.

NO DRIVE IN "D" OR "L" POSITION: Check fluid level. Manual linkage may be disconnected. Control pressure may be low. Adjust throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Check front clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly as it may be stuck.

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be low. Check and adjust throttle valve linkage, and clean control valve and regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo action with air pressure. Check transition valve in control valve assembly.

LOCKS UP IN "D" POSITION: Rear clutch or front band may be applied. Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failures.



1961 STUDEBAKER 6 CYL. AUTOMATIC TRANSMISSION ONE-WAY CLUTCH

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo, and rear clutch for mechanical failure.

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band may be applied. Check bands and servo for mechanical failure. Clean control valve assembly.

LOCKS UP IN "R" POSITION: Check front clutch and band and front band servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Check throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited, check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.

SLIPS IN "R" POSITION: Check fluid level. Check and adjust throttle control linkage. Clean control valve and regulator valve assemblies. Check rear servo for limited travel. Check front clutch for mechanical failure as it may be slipping. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Check and correct throttle control linkage as control pressure may be too high. Clean and adjust bands. Governor valve may be stuck.

1-2 UPSHIFT SLIPS: Check and adjust throttle control as control pressure may be too high. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.

NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check for stuck governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Check and adjust throttle control linkage. Clean control valve assembly.

2-3 UPSHIFT ROUGH: Control pressure may be too high, adjust throttle control linkage and clean control valve assembly. Adjust front band. Check for stuck governor valve.

2-3 UPSHIFT SLIPS: Control pressure may be too low, adjust throttle control linkage and clean control valve assembly Adjust front band. Check for internal leaks and for stuck governor valve.

NO UPSHIFT 2-3: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit. Adjust throttle control linkage.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Orifice control valve stuck

3-2 KICKDOWN (EARLY): Adjust throttle control linkage.

NO KICKDOWN: Adjust throttle control linkage.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Rear servo check valve may be stuck.

WILL NOT START BY PUSHING: Rear pump not operating. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust throttle control linkage. Check for damaged internal linkage or pawl.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: Raise car on hoist, and remove transmission drain plug and converter drain plug. On coupe and hardtop models, remove body front pillar support crossmember. On cars with dual exhaust system, remove the left hand exhaust system. Remove complete propeller shaft assembly. Disconnect shift lever-to-transmission manual valve lever rod from manual valve lever. Disconnect bellcrank-to-throttle valve lever rod at throttle valve lever. Remove speedometer cable retaining screw and remove pinion and cable. Place transmission lift with the saddle as far forward in the tracks as possible, in position on transmission oil pan flange and align saddle on oil pan flange. Remove the four transmission-to-converter bell housing capscrews. Install transmission-to-converter housing guide pins, Tool J-4284, into upper capscrew holes. Remove transmission assembly by sliding it rearward on saddle out of converter bell housing and converter.

INSTALLATION: Position front pump drive tangs on converter hub in horizontal position. Using a thin screwdriver, position the front pump external tooth gear drive lugs in vertical position. Install transmission-to-converter housing guide pins, Tool J-4284 (if they were removed). Raise transmission to proper height and angle and carefully slide transmission assembly into torque converter and bell housing, using the pilot studs as guides Do not force transmission into converter by using transmission retaining screws to draw transmission into position, as this may damage converter or front pump. Make sure transmission fits snugly against converter bell housing. When transmission is in contact with bell housing, install the two lower transmission-to-bell housing retainer capscrew and lockwashers. Remove guide pins and install remaining capscrews and lockwashers. Tighten capscrews to 40-45 ft. lbs. Remove transmission hoist and saddle. Install speedometer pinion and cable and install retaining screw. Install shift lever-to-transmission manual valve lever rod. Install bellcrank-to-transmission throttle valve lever rod. On coupes and hardtops, install the body front pillar support cross-member. On cars with dual exhaust, install left exhaust pipe. Install propeller shaft assembly. Fill transmission to proper level (see "Draining & Refilling" above).

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC (C ntinued)

TORQUE CONVERTER REMOVAL & INSTALLATION

REMOVAL: Remove transmission (see above), and starter. Disconnect tail pipe support and remove the "U" bolt from exhaust pipe support at converter housing. Disconnect rear exhaust pipe from front exhaust pipe and pull muffler and pipe assembly rearward. Move assembly to one side out of the way. Using a suitable support for engine (support must be shaped to support weight of engine at oil pan flanges and not under oil pan) and a hydraulic jack, remove rear insulator studs and raise engine just enough to have a separation between insulators and crossmember. Remove rear engine support crossmember. Remove converter bell housing-to-engine capscrews and remove bell housing, being careful not to damage dowels or distort converter blower. Lower rear of engine, being careful not to pull off water outlet hose (if additional clearance is required) drain cooling system and disconnect water outlet hose). Remove capscrews and washer holding converter assembly to the crankshaft-to-converter drive plate, and remove converter assembly.

INSTALLATION: Install converter assembly on the crankshaft-to-converter drive plate and loosely install retaining screws and lockwashers. Clean engine rear plate and mating surface on bell housing and install bell housing, taking care not to damage dowels or converter blower. Be sure bell housing is installed on dowels. Install bell housing retaining capscrews and tighten to 23-28 ft. lbs. If engine has been lowered, raise it to normal position. Position converter aligning tool, J-6310, into bore of bell housing and over pump drive fingers on torque converter assembly. Install the two upper transmission capscrews to hold aligning flange in position, and rotate converter assembly through two complete revolutions to center the torque converter assembly. Tighten converter-to-drive plate capscrews to 23-28 ft. lbs. Remove aligning tool. Install rear engine support crossmember. Install exhaust pipe, muffler and tail pipe assembly, making sure that proper alignment exists between assembly and the supports. Install transmission (see above), and starter.

TRANSMISSION OVERHAUL

CONVERTER OVERHAUL: Converter assembly is welded together and cannot be disassembled for servicing or overhaul.

TRANSMISSION OVERHAUL: *Se "Warner Automatic Transmission" in 1960 Final Data or later Manual edition and note the following:*

Control Valve Assembly (6 Cyl. Models): Lower Valv Body Cover - Rear Servo Check Valve and Spring not used. The only valve at this location is the 1-2 shift valve and spring.

Pinion Carrier & One-Way (Sprag) Clutch: Disassembly - *NOTE - Pinion Carrier cannot be disassembled except as follows:* The one-way clutch may be removed by slipping it out of outer race, then the outer race can be remove by removing the snap ring. *NOTE - Do not r - move outer race unless replacement is necessary.*

Reassembly - Install one-way clutch outer race and secure in position with snap ring. Install one-way clutch into pinion carrier and outer race assembly with flanged end of one-way clutch towards pinion carrier. Properly assembled, the brass drag strips attached to inner cage of one-way clutch will be located away from pinion carrier

G.M. 4-WAY SEAT CONTROL

Buick (1961)
Oldsmobile (1961)

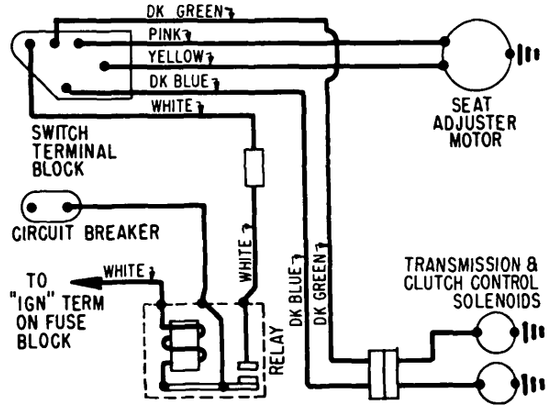
DESCRIPTION & OPERATION: Similar in design and operation to previous models. Either shunt-wound or series-wound motor used. Ignition switch must be on for seat operation with series-wound motor. *See wiring diagrams for circuits with each type motor.*

TROUBLE SHOOTING & DIAGNOSIS: *See "G.M. 4-Way Seat Control" in 1960 Final Data or later Manual edition.*

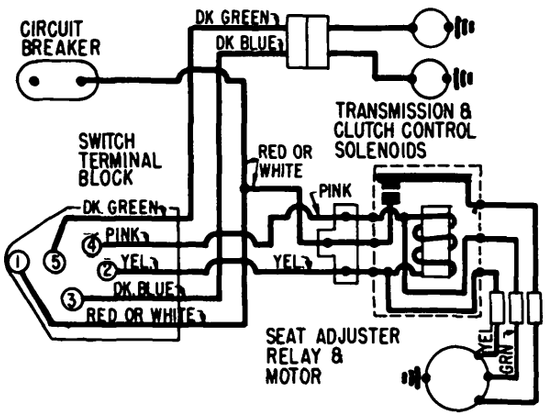
TESTING: *See "G.M. 4-Way Seat Control" in 1960 Final Data or later Manual edition and note the following:*

Checking Relay Assembly (Series-Wound Motor Type): Check for current at circuit breaker side of relay with a test light. If test light does not light, short or open circuit exists between circuit breaker and relay. With ignition switch turned on, check for current at control switch side of relay with a test light. If test light does not light, relay is faulty or short or open circuit exists between ignition switch and relay.

REMOVAL & INSTALLATION: *See "G.M. 4-Way Seat Control" in 1960 Final Data or later Manual edition.*



G-M 4-WAY SEAT (SERIES MOTOR)



G-M 4-WAY SEAT (SHUNT MOTOR)

G.M. 6-WAY SEAT CONTROL

Buick (1961)
Cadillac (1961)
Chevrolet (1961)
Oldsmobile (1961)
Pontiac (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 LEFT FRONT VERTICAL CABLE WHIPPING CORRECTION:* Whipping is indicated by cable hitting rubber coupler of motor at any time during operation. To correct, form a wire hook from stiff wire and hook over cable about 3" from cable transmission and into a slot in seat frame.

DESCRIPTION & OPERATION: Similar in design and operation to previous models except as noted below:

Cadillac - When seat control switch is mounted in door arm rest, pink wire at No. 3 position controls seat forward and up cycle, and yellow wire at No. 6 position controls seat rearward and down cycle as shown in wiring diagram. When seat control switch is mounted in seat side panel, No. 3 and No. 6 switch position operations are reversed so that No. 3 position controls seat rearward and down cycle and No. 6 position controls seat forward and up cycle. This change is accomplished by reversing green and yellow leads from relay to seat motor.

Oldsmobile - Switch control circuit is from ignition switch through control relay to control switch, and power circuit is through seat circuit breaker and control relay to seat relay and motor. Ignition switch must be on for both motor and switch operation.

TROUBLE SHOOTING & DIAGNOSIS: *See G.M. 6-Way Seat Control (One Motor Type)" in 1960 Final Data or later Manual edition.*

TESTING: *See "G.M. 6-Way Seat Control (One Motor Type)" in 1960 Final Data or later Manual edition and note the following:*

►*OLDSMOBILE NOTE:* Ignition switch must be on before making any electrical tests.

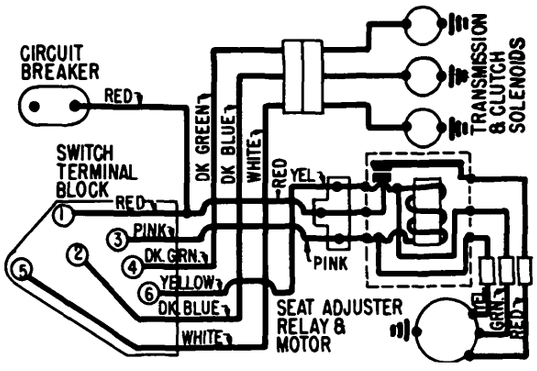
Checking Seat Control Switch: Substitute known good switch or use a 3-way jumper wire and connect to switch block as listed below.

Three-Way Jumper Wire - Join two pieces of 12 gauge wire together at one end and insert joined end into feed location (No. 1 on diagram) in switch block. Insert other ends of wires into a field and a solenoid location (Nos. 2 through 6 on diagram) in switch block.

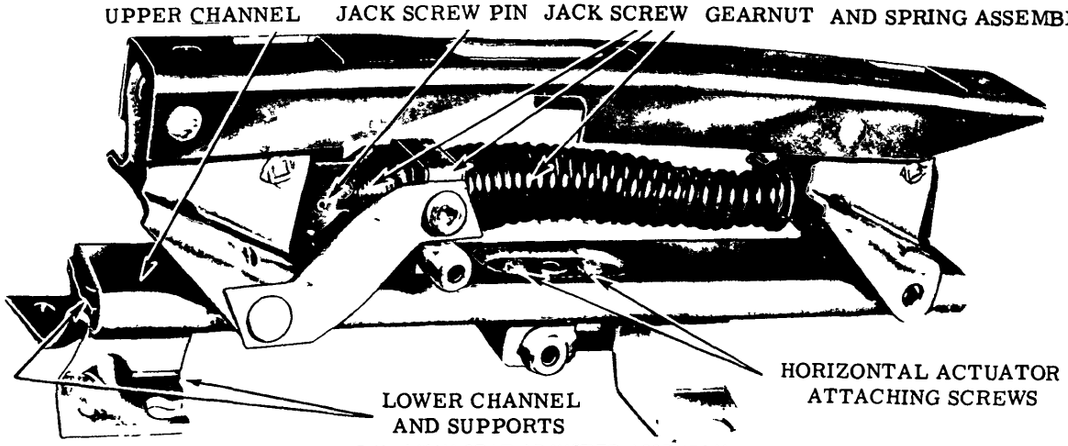
With Switch In Seat Side Panel -
1) To raise front edge, jumper in 6 & 5.
2) To lower front edge, jumper in 3 & 5.
3) To raise rear edge; jumper in 6 & 4.
4) To lower rear edge, jumper in 3 & 4.
5) To move seat forward, jumper in 6 & 2.
6) To move seat rearward, jumper in 3 & 2.

With Switch In Door Arm Rest -
1) To raise front edge, jumper in 3 & 5.
2) To lower front edge, jumper in 6 & 5.
3) To raise rear edge, jumper in 3 & 4.
4) To lower rear edge, jumper in 6 & 4.
5) To move seat forward, jumper in 3 & 2.
6) To move seat rearward, jumper in 6 & 2.

REMOVAL & INSTALLATION: *See "G.M., 6-Way Seat Control (One Motor Type)" in 1960 Final Data or later Manual edition.*



6-WAY SEAT CONTROL WIRING DIAGRAM



G.M. 4-WAY SEAT ADJUSTER ASSEMBLY

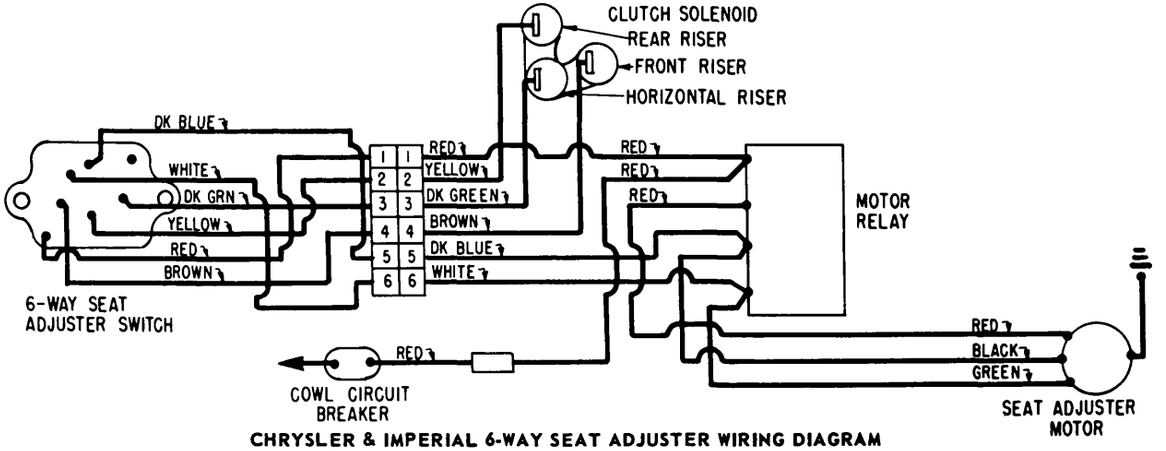
CHRYSLER CORP. 6-WAY SEAT CONTROL

Chrysler, Imperial, D Soto (1961)
Dodge & Dodge Dart (1961)
Plymouth (1961)

DESCRIPTION: 6-Way Power Seat operated by a single reversible electric motor located under the front seat. The motor drives a gear assembly which transmits power to slave units located in the seat tracks. Solenoid clutches in the gear assembly, when energized by actuation of the control switches on left side of front seat, engage the flexible drive cables with the gear assembly to operate the seat horizontally, up and down, and tilt it.

FRONT SEAT ASSEMBLY: Removal - Disconnect battery and remove front seat assembly *(NOTE* - On hardtop models, remove front seat and cushion as an assembly). Disconnect control wires at switch and disconnect seat adjuster battery wire at circuit breaker in cowl. Remove seat guide attaching stud nuts and remove adjuster. *CAUTION - Do not damage flexible tubing during removal.*

Installation: Install adjuster and stud nuts. Connect seat adjuster battery wire to circuit breaker on cowl. Form a loop in the wires from relay to clip on floor for horizontal travel. Install front seat assembly. Connect control wires to switch and install front seat cushion of four-door models. Connect battery.



CHRYSLER & IMPERIAL 6-WAY SEAT ADJUSTER WIRING DIAGRAM

FORD THUNDERBIRD 4-WAY SEAT CONTROL

Ford Thunderbird (1961)

DESCRIPTION & OPERATION: Four-way power seat mechanism consisting of a reversible electric motor, control switch, motor control relay, gear housing and screw shaft, four limit switches, and two solenoid actuated nuts. Two duplicate assemblies are used, one for each front seat. Gear housing and screw shaft has a driving worn gear connected to motor by a rubber coupling and a driven gear which rotates screw shaft. horizontal and vertical nut and solenoid assemblies are meshed to screw shaft and connected to seat track. When solenoid is energized, internally threaded nut is locked by solenoid pawl (ball), engaging a notch on nut. When screw shaft is rotated through locked nut, nut and solenoid move along shaft and move seat track. When seat reaches any extreme position, limit switch disengages operating nut and solenoid assembly from screw shaft.

TROUBLE SHOOTING & DIAGNOSIS: Seat Will Not Operate - Check for properly grounded system at main (black) ground wire. Check for voltage to circuit breaker, at circuit breaker, and to main junction block at console panel. Check for voltage from junction block to control to control relay. Check for voltage from relay to control switch, and at each terminal of control switch. Check relay, motor, and wiring for voltage.

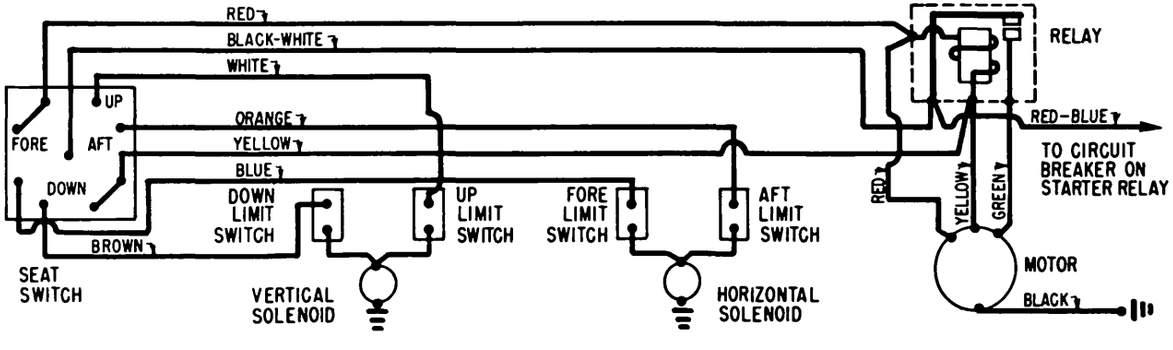
Motor Runs But Seat Does Not Move: Check for loose or broken motor coupling; faulty seat regulator worm, gear, or screw shaft; faulty wiring from control switch to solenoid; faulty solenoid and nut assembly; open limit switch.

Seat Moves In One Plane Only: If no voltage present at any switch terminal, switch is faulty. Check for inoperative solenoid or limit switches.

Seat Ratchets At End Of Travel: Faulty solenoid and nut assembly; faulty limit switch.

REMOVAL & INSTALLATION: Seat Mechanism - Remove seat track retaining nuts and washers and disconnect wiring to junction block. Remove seat assembly from car. Remove seat track-to-seat assembly retaining bolts, disconnect wiring at control switch, and remove seat track mechanism. To install, reverse removal procedure.

Seat Motor: Remove motor-to-drive assembly retaining nuts and washers and remove motor. Remove rubber coupling from motor shaft, and wiring from motor. To install, reverse removal procedure.



THUNDERBIRD 4-WAY SEAT CONTROL WIRING DIAGRAM

CADILLAC VACUUM DOOR LOCK

Cadillac (1961)

DESCRIPTION & OPERATION: Consists of vacuum storage tank, vacuum lock remote control valve assembly, selector valve, and actuator assemblies.

Vacuum Tank - Attached to front of power brake mounting support on left side of body. Connect by hose to engine manifold with check valve in the line. A minimum of three complete cycles of operation (lock and unlock) is available immediately after engine has been shut off.

Remote Control Valve - Attached with screws below right hand defroster duct. Supplies vacuum from tank to lock actuators when selector valve is actuated.

Selector Valve - Located on each front door trim assembly.

Actuator Assemblies - Located in each door are double acting vacuum diaphragms with vacuum supplied to each side. Diaphragm moves a linkage or bell crank connected to locking lever of lock.

►*NOTE:* All vacuum hoses and corresponding actuator ports are color coded, see diagram.

TROUBLE SHOOTING: Condition and cause as follows:

System Inoperative - Hoses crossed at vacuum supply tank, vacuum supply hose pinched at remote control valve, door valve supply hose pinched at remote control valve, vacuum supply hose disconnected at tank, remote valve or engine, remote valve diaphragm leaking.

All Doors Can Be Locked But Not Unlocked - Main supply hose crossed with lock supply hose at remote control valve, unlock selector hose or supply hose disconnected at remote valve.

All Doors Can Be Unlocked But Not Locked - Main supply hose crossed with unlock hose on remote control valve, lock selector hose or supply hose disconnected at remote valve.

Moving Either Door Valve to Unlock or Lock Produces the Opposite Action of All Locks - Door lock selector valve hoses (small) crossed at remote control valve, actuator supply hoses (large) crossed at remote valve.

Moving One of Door Valves to Lock or Unlock Produces the Opposite Action of the Lock-Valve selector hoses crossed at one door valve, door selector valve reversed in trim assembly

System Will Not Lock From Door Valve or System Will Not Unlock From One Door Valve - Lock or unlock selector valve hose pinched or disconnected from affected door valve.

Lock Movement on Any Door Not Synchronized with Other Doors - Hoses crossed at affected door lock actuator.

One Door Lock Lags Behind Others When Locked or Unlocked - Lock or linkage binding.

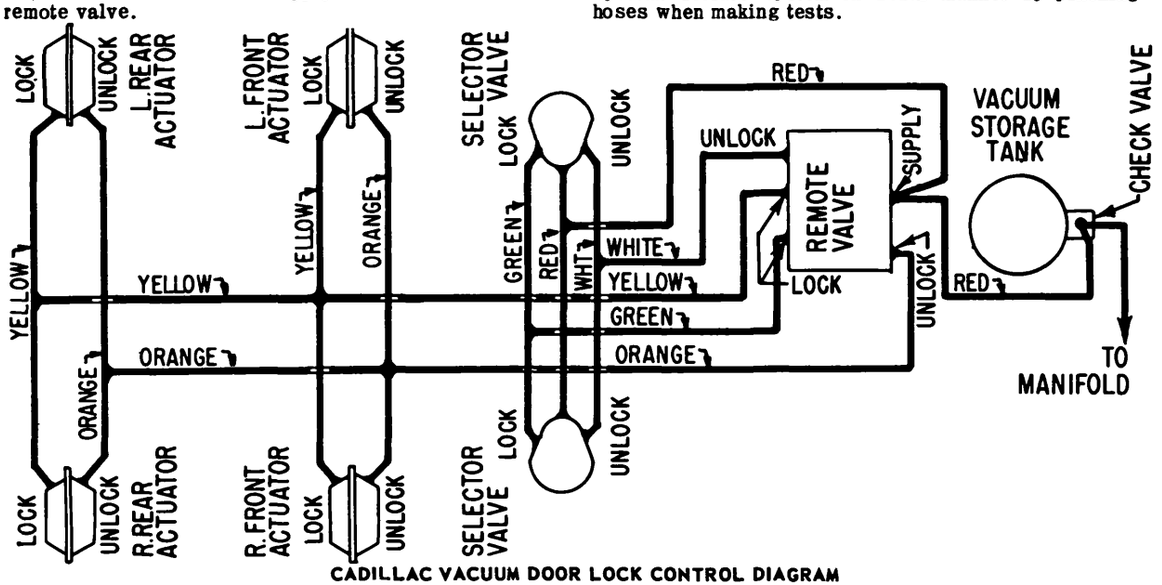
System Inoperative from One Door Valve - Vacuum supply hose pinched or disconnected at affected door valve.

One Door Lock Will Not Lock or Unlock - Actuator hoses pinched or disconnected.

System Will Not Hold Vacuum for 48 Hours - Leak at remote control valve, any two door locks, storage tank and check valve, any part of harness connections.

Locks Inoperative with Front Door Closed, But Operative with Door Open - Door valve vacuum supply hose pinched at front body hinge pillar on side affected.

TESTING: For leaks not severe enough to be heard, use a suitable water testing device made from a quart jar and flexible tubing. I.D. of tube connected to remote control valve should be 7/32", and I.D. of tube connected to storage tank should be 5/32", Install tester hose not protruding into the water on bottom of check valve on tank. Install hose with end in the water to hose leading to remove control valve. After pressures in system normalized, a bubble will appear in water every 15 seconds or faster if there is an appreciable leak in system. Isolate system in usual manner by pinching hoses when making tests.



CADILLAC VACUUM DOOR LOCK CONTROL DIAGRAM

CADILLAC TRUNK LID LOCK

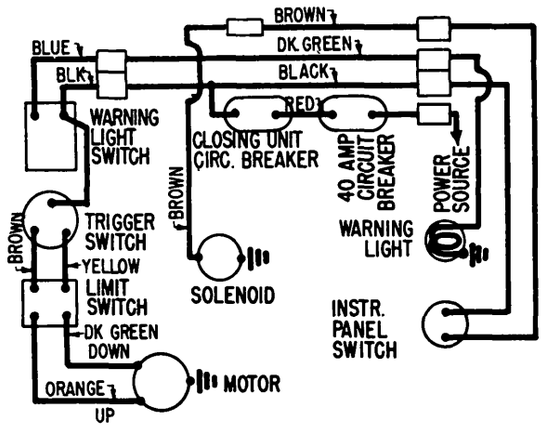
Cadillac, All Series (1961)

DESCRIPTION: Unit consists of a power closing unit located in rear end panel and a solenoid operated lid lock on trunk lid with a control switch in glove box which enables trunk lid to be opened from inside car. Trunk can be opened also with a key in the usual manner.

REMOVAL & INSTALLATION: Closing Unit - Remove unit guard and disconnect wiring harness plug. Mark position of closing unit on support and remove unit. To install, reverse removal procedure.

Lock Assembly - Remove trunk lid inner panel access hole cover plate. Disconnect lock solenoid wire at connector, then remove attaching screws and remove power lock assembly from lid. To install, reverse removal procedure.

CHECKING & ADJUSTMENTS: *See "Cadillac Electric Trunk Lid Lock" in 1959 Final Data or later Manual edition.*



CADILLAC TRUNK LOCK DIAGRAM

BUICK TRUNK LID LOCK

Buick (1961)

DESCRIPTION & OPERATION: Vacuum operated trunk unlocking device consists of control lever in glove box, vacuum reserve tank on left inner fender skirt, and vacuum power unit in trunk lock mechanism. Vacuum reserve tank vacuum supply line located in "T" fitting in distributor vacuum advance line near carburetor. A check valve in tank prevents vacuum loss when intake manifold vacuum drops. If vacuum unit fails, trunk can be unlocked in the usual manner.

►*TRUNK LOCK & DISTRIBUTOR CAUTION:* To restore vacuum to supply tank, engine must be run above idle speed as there is no distributor vacuum advance at idle speed. Also, make sure that vacuum line from "T" fitting to reserve tank is in good condition and that there are no leaks at fittings or distributor vacuum advance will fail to operate.

LINCOLN CONTINENTAL DOOR LOCKS

Lincoln Continental (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 DOOR LOCK WARNING LAMP NOTE:* Either Bulb No. 257 (flashing type) or Bulb No. 1445 (non-flashing type) may be used.

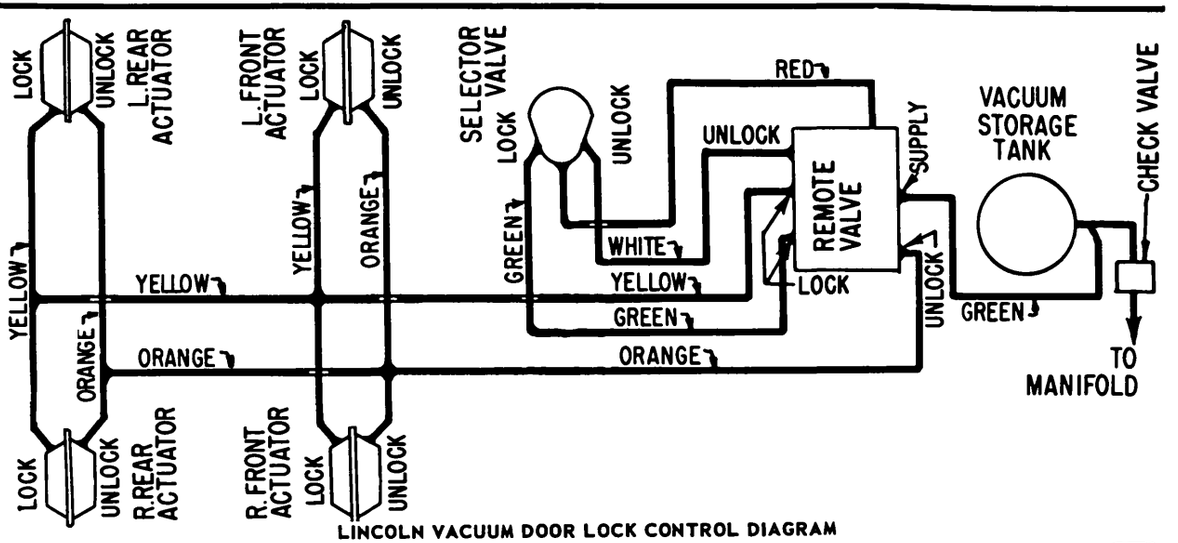
►*1961 INSTRUMENT PANEL SWITCH BREAKING CORRECTION & BEZEL REWORK NOTE (Cars Before F bruary 1, 1961):* Toggle shaft breakage may be caused by pressure exerted by plastic control bezel. When installing a new switch or replacing control bezel, grind 1/16" off back side of bezel.

►*1961 DOOR LOCK SYSTEM INOPERATIVE CORRECTION:* If caused by vacuum hose at vacuum reserve tank being broken or pinched, make sure hose is routed under wide rubber seal between fender and fender apron with hose length as short as possible.

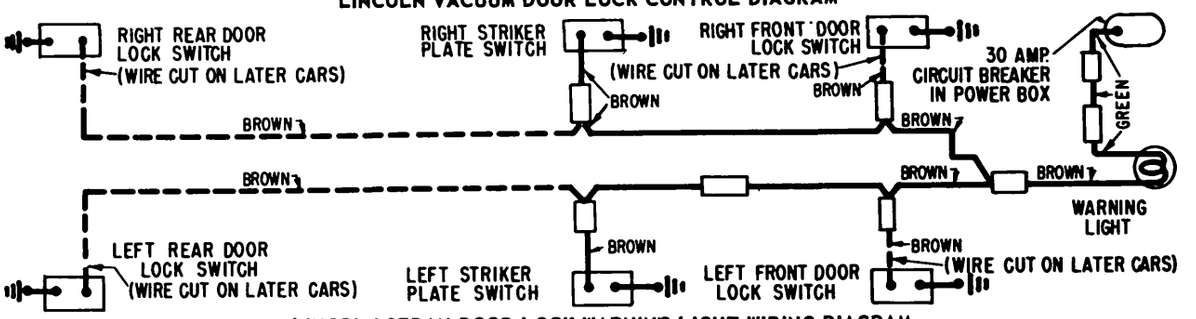
►*1961 INSUFFICIENT VACUUM RESERVE CORRECTION:* Make sure black (heater) and green (door lock) hoses are not reversed at vacuum reserve tank (heater vacuum chamber is smaller than door lock chamber). Green door lock hose must be on outboard nipple of tank.

►*1961 WARNING LAMP CIRCUIT PRODUCTION CHANGE:* On cars after April 28, 1961, the brown wires connecting the door lock and door open warning lamp circuit to the door lock actuators in each door have been disconnected. The warning lamp will now flash or glow only when a rear door is open or not completely closed. The door lock warning lamp part of circuit is thus inoperative. *See wiring diagram for details.*

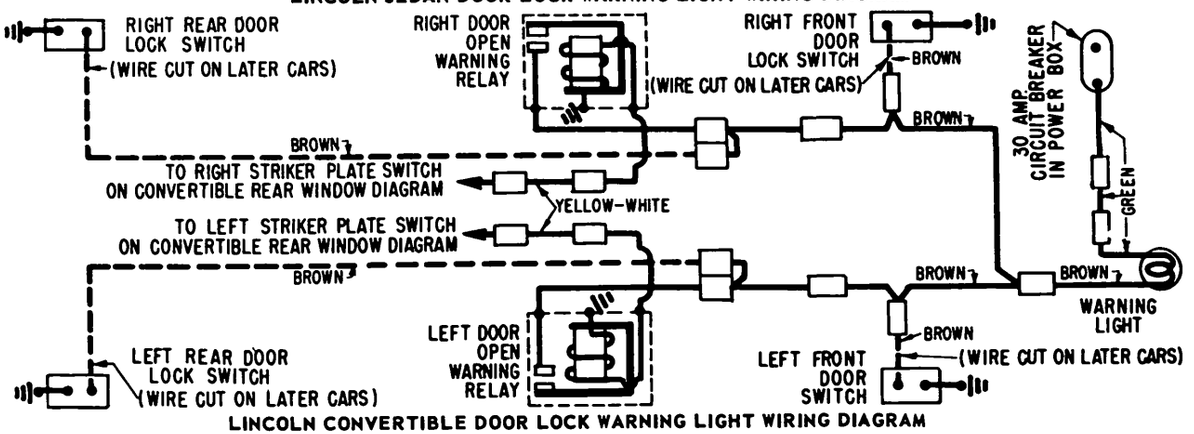
DESCRIPTION: Consists of a vacuum storage tank, vacuum control valve, selector valve on instrument panel, and actuator assemblies in each door. Selector valve switch on instrument panel allows all four doors to be locked or unlocked at one time by the driver. Any individual door may be locked or unlocked at any time in the usual manner because of a "Bleed-through" feature of selector valve which neutralizes the vacuum after doors are locked. A warning lamp on instrument panel will flash or glow depending on type bulb used *(see "Warning Lamp N t " above)* when a rear door is open or not completely closed, or when all doors are not locked. The door lock warning lamp switches are part of the vacuum actuator assemblies in each door. *NOTE - Door l ck warning lamp feature not used on later cars, see "Circuit Production Change" above.* The door open warning lamp switches are mounted on rear door side of center pillar (sedans), part of the rear door striker plate switch (convertible). *NOTE - On convertibles, strik r plate switch is also part of the automatic window circuit, and to isolate door open warning light circuit operation (accomplished by closing th ground circuit), and still maintain the hot feed for automatic window circuit, a door op n warning r lay is included in ach striker plate switch circuit.*



LINCOLN VACUUM DOOR LOCK CONTROL DIAGRAM



LINCOLN SEDAN DOOR LOCK WARNING LIGHT WIRING DIAGRAM



LINCOLN CONVERTIBLE DOOR LOCK WARNING LIGHT WIRING DIAGRAM

REMOVAL & INSTALLATION: Vacuum Control Valve - For access, remove glove compartment.

S lector Valv Switch - Disconnect battery. Remove lower radio speaker and grille, and hood release handle and bracket from dash panel. Remove top control switch from dash panel. Remove lower left instrument panel cover, and the lower section of left fresh air vent. Remove door lock switch knob, bezel nut and both bezels. Remove hoses from switch and remove switch. Plug vacuum hoses to prevent dirt entry.

TESTING & TROUBLE SHOOTING: *CAUTION - DO NOT apply air pressur to system r actuator diaphragms will be damag d. P rform all t sts with engine running.*

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL DOOR LOCK (Continued)

Entire System Inoperative: Check for vacuum at manifold, check valve, and storage tank (attach a vacuum gauge to each component). Locks will be actuated at 6-8" of vacuum. Check vacuum to control valve by removing green supply hose. If no vacuum present, hose is damaged, restricted or improperly installed.

All Doors Will Not Lock: Unlock doors and disconnect red and green hoses from control valve. If no vacuum at red nozzle on control valve, control valve is faulty. If vacuum present, connect red and green nozzles of valve with a jumper hose. If doors lock, selector valve or hoses to valve are faulty. Remove green and yellow hoses from control valve and connect yellow hoses to green hose with jumper hose. If doors lock, control valve is faulty.

All Doors Will Not Unlock: With all doors locked, remove red and white hoses from control valve. If no vacuum present, control valve is faulty. If vacuum is present, connect red and white nozzles of valve with a jumper hose. If doors unlock, selector valve or red and white hoses to valve are faulty. Remove green and orange hoses from control valve and connect orange hoses to green hose with a jumper hose. If doors unlock, control valve is faulty.

One or More Locks Inoperative: 1) Remove cowl trim panel, disconnect yellow (locking) or orange (unlocking) hose from tee. If no vacuum at hoses connected to control valve when selector valve actuated, control valve or hoses from valve are faulty.

2) **Front Doors** - Remove door trim panel and access cover and disconnect yellow or orange hose from actuator. If vacuum is present at hoses when selector valve operated, actuator or mechanical linkage is faulty.

3) **Rear Doors** - Remove rear seat cushion and back and disconnect yellow or orange hose at nipple in quarter panel. If no vacuum present at hoses when selector valve operated, hose from tee behind cowl panel or tee is faulty. If vacuum is present, disconnect yellow or orange hose from actuator in door. If vacuum is present at hoses when selector valve operated, actuator or mechanical linkage is faulty.

CHRYSLER CORP. ELECTRIC WINDOWS

Chrysler & Imperial (1961)
DeSoto (1961)
Dodge & Dodge Dart (1961)
Lancer (1961) Ⓒ
Plymouth (1961)
Valiant (1961) Ⓒ
Ⓒ - Suburban tailgate window only.

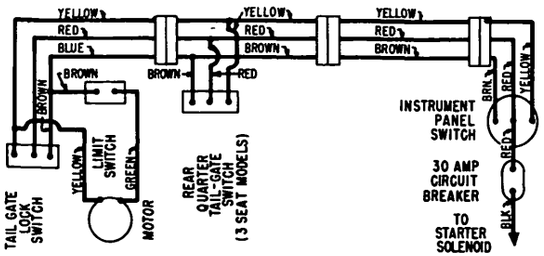
►CHANGES, CAUTIONS, CORRECTIONS

►*1961 TAILGATE WINDOW BINDING IN UP POSITION CORRECTION & PRODUCTION CHANGE:* Install a rubber hose, Part No. 2254553 (framed windows), No. 2254554 (unframed windows), between inner and outer lips of upper glass run to reduce upward travel limit of window. This change made on later cars.

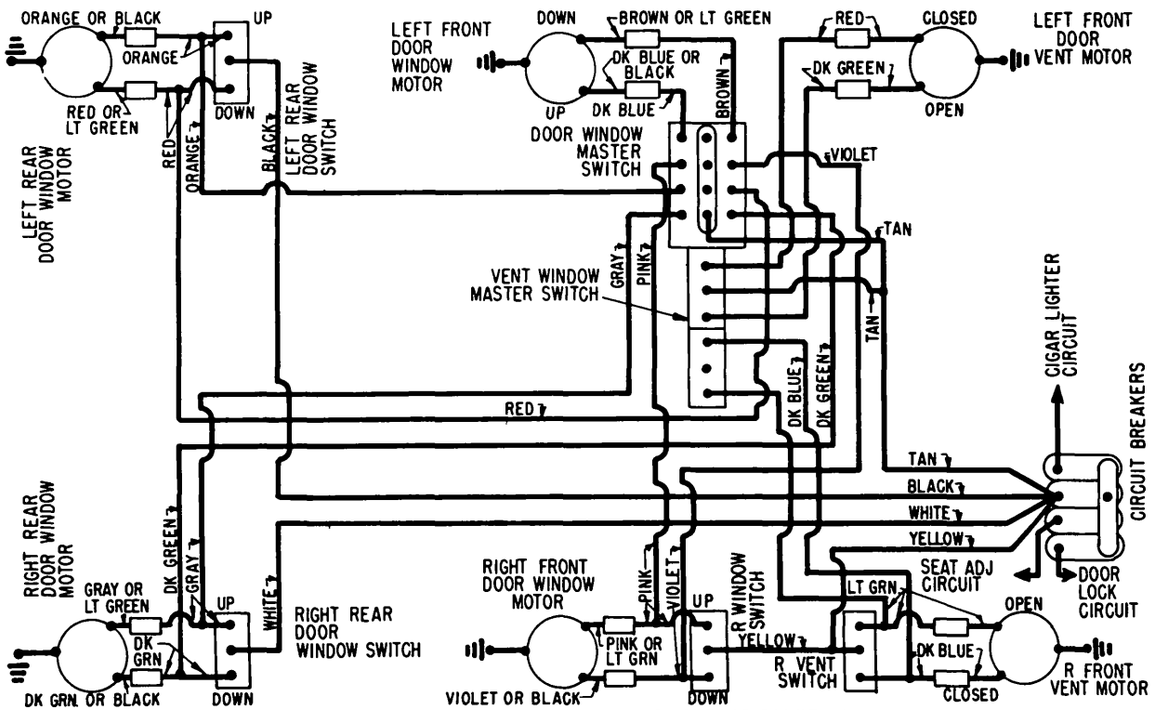
DESCRIPTION: Door Windows - Similar in design and operation to previous models.

Tailgate Window - Electrically operated window controlled by a key operated switch in exterior locking handle, and by a switch on instrument panel. On 3-seat suburbans, an additional roof rail switch provided for passenger control of window. Optional "Child Guard" control for 3-seat suburbans consists of an up relay, a down relay, and a vacuum switch in one of the rear doors. Vacuum switch controls roof rail switch. When rear door is locked, vacuum switch is open, roof switch is not grounded, and is inoperative. However, window can be controlled from lock or instrument panel switches in usual manner.

WINDOW LIFT REPLACEMENT: Removal - Disconnect battery and remove garnish molding, then remove door trim panel and disconnect wires from switch. Remove clips from regulator pins holding lower glass channel.



SUBURBAN TAIL GATE WIRING (TYPICAL)



CHRYSLER CORP. ELECTRIC WINDOW WIRING DIAGRAM

Raise glass manually, then remove regulator attaching screws, pivot guide retaining pin and remove motor and regulator through opening in door. If necessary to replace gear box, first remove regulator counter-balance spring. *NOTE - The gear box is replaced only as a complete assembly and is permanently lubricated.*

Installation: Place regulator and motor through door opening and insert pivot arm pin into guide. Install regulator screws finger tight. DO NOT TIGHTEN at this time. Remove window prop and lower glass, then insert control arms into glass channel, using a leather washer on each side of channel and secure with a clip. Connect wires to motor and connect battery, then operate window several times and stop glass halfway. Tighten regulator screws. Check operation as follows: Connect an ammeter into circuit and operate window. Ammeter reading should be constant at approximately 14 amps. (all models except rear doors of 4-Door Hardtop models), 20 amps. (4-Door Hardtop models). If ammeter reading fluctuates, there is a bind in glass or linkage. Adjust glass down stop so window is flush with garnish molding. Install trim panel, garnish molding, and other parts.

FORD MOTOR CO. ELECTRIC TYPE

Ford Pass. Cars (1961)
Mercury (1961)
Thunderbird (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*WINDOW SWITCH FAILURE PREVENTION:* If a switch has failed because of water entering switch, seal replacement switch with waterproof tape before installing.

DESCRIPTION: Electrically controlled windows operated a reversible type motor combined with each individual window regulator assembly. Individual switches located near each window for separate control, and a master control switch on left front door to control all windows. A lock-out switch on master control switch enables windows to be operated only by the driver of the car. A safety relay on right side of cowl prevents window operation except when ignition switch in ON or ACC positions. *NOTE - For electrically operated station wagon tailgat window, see "Ford Motor Co. Tailgate Window" in this section.*

TROUBLE SHOOTING & DIAGNOSIS: All Windows Will Not Operate In Either Direction - Trouble will be in main feed circuit breaker, safety relay, ignition switch, or lock-out switch; or any of appropriate control wiring. with a voltmeter or jumper wire, test for current at various parts of control circuit.

On Window Will Not Operate In Either Direction Through Either Switch Circuit: If motor runs freely, it is loose and pulled away from coupling. Check for defective motor circuit breaker, faulty wiring from switches to motor (or faulty switch feed wire), motor armature or field windings faulty.

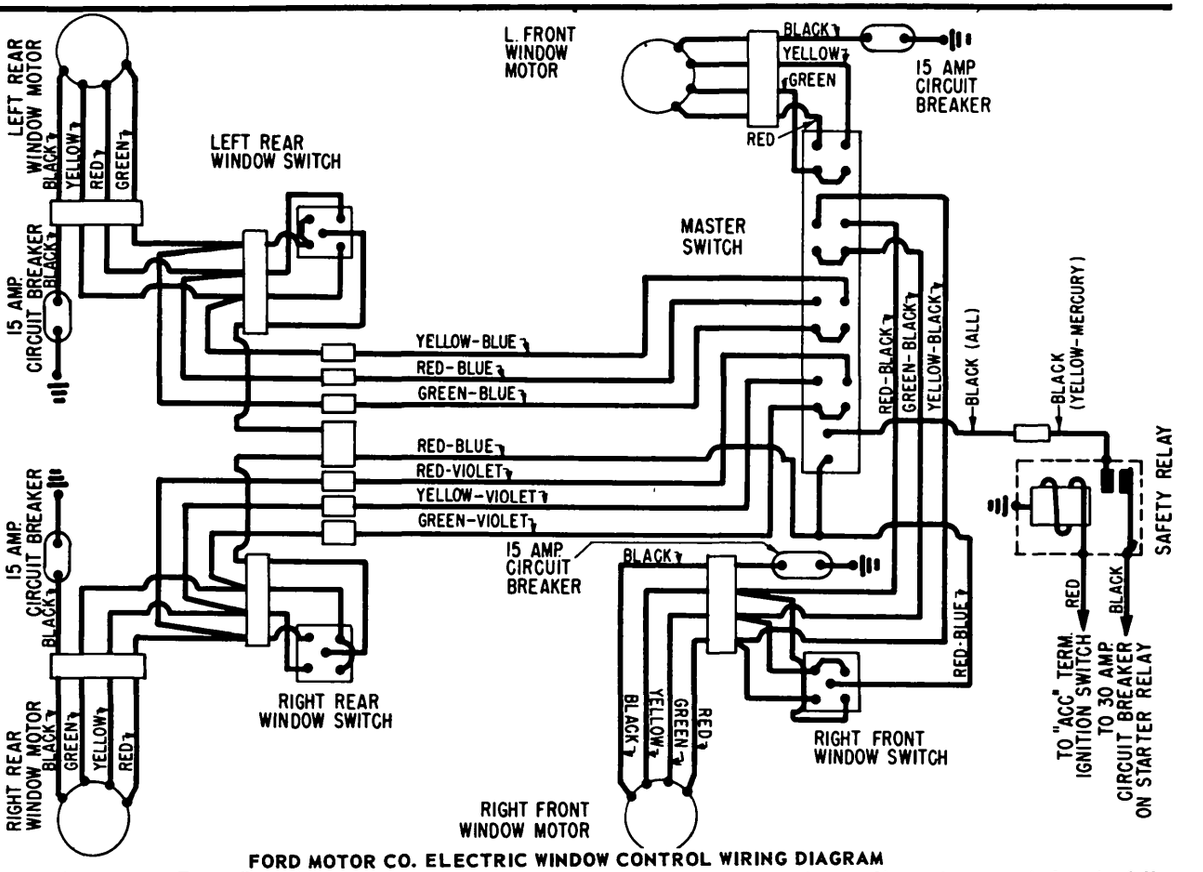
On Window Operates In One Direction Through Either Switch: Check for faulty switch or faulty wiring between switch and motor. Check for faulty motor field coil.

Window Operates In Both Directions Through One Switch Only: Check for defective switch or faulty wiring between switch and motor.

Window Operates Opposite To Switch: Check for improperly mounted switch.

Window Operates Sluggishly: Check regulator and window runs for binding. Check for frayed insulation on wires which may cause partial ground. Check that paint does not insulate ground wires or ground circuit breakers. Check for loose connections or corrosion causing high resistance. Check motor current draw with an ammeter. Normal current draw during operation should not exceed 20 amperes. Current draw with mechanism against a stop should be 30-50 amperes. If current draw excessive, replace motor. Motor no-load current draw should not exceed 14 amperes at 12 volts.

REMOVAL & INSTALLATION: Motor (Ford & Thunderbird) - Remove door trim panel, disconnect wires, remove motor mounting nuts and motor brace. Pull motor free of rubber coupling and remove motor.



FORD MOTOR CO. ELECTRIC WINDOW CONTROL WIRING DIAGRAM

Motor (Mercury - Front Doors): Disconnect battery, remove door trim panel and trim water shield. Disconnect motor wires, and remove motor bracket attaching screw. Disconnect motor and coupling from regulator assembly, then remove motor.

Motor (Mercury - Rear Doors or Quarter): *Motor removed with regulator as an assembly. See "Regulator Removal" below.*

►*REGULATOR ARM TENSION SPRING REPLACEMENT NOTE:* Spring can be replaced after regulator removed. Regulator arm must be at point of maximum upward travel to reduce amount of spring tension to overcome.

Front Door Regulator: Ford - Remove door trim panel and loosen water shield. On 2-door and 4-door hardtop models, disconnect regulator at arm and plate. On other 4-door models, disconnect regulator from glass channel roller. Secure glass by hand in raised position. On 4-Door models (except hardtop), disconnect front run bracket from inner panel to provide access. On all models, remove regulator retaining screws and remove regulator. To install, reverse removal procedure.

Mercury - *NOTE - Procedure is for removal of regulator and motor as an assembly.* Disconnect battery, remove door trim panel and trim water shield. Remove window lower stop. Disconnect motor wires. With wire hook, remove retainers from window rollers and separate regulator arm pivots from rollers. Secure window in fully raised position. Remove regulator assembly attaching screws and remove regulator and motor assembly.

Thunderbird - Remove door trim panel and loosen water shield. Block window in fully raised position, and remove regulator arm from plate assembly. *NOTE - If arm and plate assembly are to be removed, lower window and disconnect arms from the two glass roller assemblies, then remove arm and plate assembly.* Remove regulator assembly retaining screws and remove regulator. To install, reverse removal procedure.

Rear Door Regulator: Ford - Remove door trim panel and loosen water shield. Lower glass about halfway and disconnect regulator arms, then support glass in fully raised position. Remove regulator retaining screws, slide equalizer arm out of bracket or guide, then remove regulator. To install, reverse removal procedure.

Mercury - With window fully raised, disconnect battery, remove door trim panel and trim water shield. On 4-door hardtop, remove window upper stop. On all models, disconnect motor wires, and remove retainers from window rollers with a wire hook. Separate regulator arms from rollers and prop window up. On 4-door hardtop, remove center guide assembly. On all models, remove regulator and motor bracket mounting screws.

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FORD MOTOR CO.
ELECTRIC TYPE (C ntinued)

Slide equalizer arm out of bracket and remove regulator and motor as an assembly. To install, reverse removal procedure.

Rear Quarter Regulator: Ford - Remove rear seat cushion and back, remove trim panel and pull water shield away from access holes. Lower window, disconnect regulator from glass channel rollers, and support window in fully raised position. Remove regulator retaining screws, slide regulator arm out of equalizer bracket, and remove regulator. To install, reverse removal procedure.

Mercury - Remove rear seat cushion, back and trim panel. Lower window, remove retainer clips from window rollers, separate regulator arms from rollers, then remove rollers. Secure window in fully raised position. Remove motor from regulator. Disconnect regulator from quarter panel, slide equalizer arm out of equalizer arm bracket and remove regulator assembly. To install, reverse removal procedure.

Thunderbird - Remove quarter trim panel and water shield. Remove window upper stop. Disconnect regulator arms from glass channel. Lower glass, lift glass from front guide, then remove glass assembly. Remove regulator retaining bolts, slide regulator equalizer arm roller out of bracket, and remove regulator. To install, reverse removal procedure.

FORD MOTOR CO. TAIL GATE WINDOW

Comet, Station Wagon (1961)
Falcon, Station Wagon (1961)
Ford, Station Wagon (1961)
Mercury, Station Wagon (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*WINDOW REGULATOR REPLACEMENT NOTE:* Manual type only furnished for replacement and must be reworked for electric type installation.

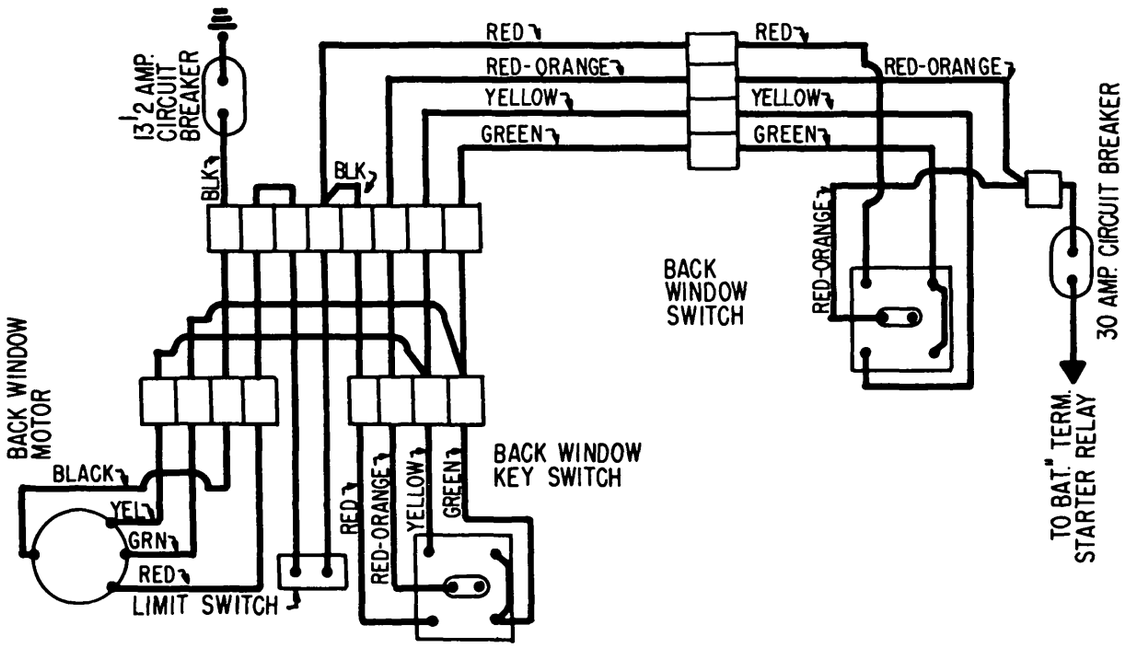
DESCRIPTION: Electrically controlled station wagon tailgate window operated by a reversible electric motor and a window regulator mechanism in tailgate. Control is through a key operated lock switch on upper center of tailgate outer panel, and a toggle switch on left front door for driver control. A limit switch located at right side of tailgate pillar post prevents operation of window when tailgate is open.

EMERGENCY MANUAL OPENING: Opening Tailgate If Window Is Fully Raised - Remove trim panel retaining screws, trip lock handle to relieve pressure, then remove trim panel by pulling up and forward to slide it out of lower retainer. Remove water shield and access hole cover from inner panel. Remove regulator arm roller retaining pins and disengage rollers from regulator arms. Push window into full down position and open tailgate.

Opening Tailgate If Window Is Partially Raised: Remove quarter window rear garnish moldings, and quarter window outside rear moldings. Remove tailgate window glass upper side run retaining screws. Open tailgate and window as an assembly by removing upper runs simultaneously.

TROUBLE SHOOTING & DIAGNOSIS: *CAUTION - When testing circuits with tailgate lowered and limit switch held closed, operate circuit only momentarily. Continuous operation of window in horizontal position will damage motor,*

Window Will Not Operate Through Either Switch Circuit: Check control circuit for continuity. Check feed and ground circuit breakers. Check all wiring for continuity. Motor armature or field coil windings may be faulty. Limit switch or wiring may be defective (down cycle).



FORD MOTOR CO. STATION WAGON TAILGATE WIRING DIAGRAM

Window Operates Through One Switch Only: The other switch is defective. Wiring from other switch faulty.

REMOVAL & INSTALLATION: Window - Lower tailgate, disconnect hinge supports at tailgate, remove trim panel and trim panel water shield. Remove retainers from window channel rollers and disconnect regulator arms from rollers. Remove window.

Motor: Remove window (see above), disconnect wiring from motor, and remove motor-to-regulator attaching nuts .Remove motor.

Regulator: *NOTE - Motor and regulator may be remov d as an assembly if desired.* Remove window (see above), disconnect motor wiring at motor, and remove regulator attaching nuts. Remove regulator and motor assembly.

Limit Switch: Lower tailgate. If switch not visible, remove access cover behind tail light or trim panel and water shield as necessary. Remove limit switch attaching screws and remove switch.

Lock Switch: Switch can be removed after window, motor, and regulator are removed.

LINCOLN CONTINENTAL ELECTRIC TYPE

Lincoln C ntin ntal (1961)

DESCRIPTION: Two kinds of system used as follows: **C nventi nal Typ** - Single reversible electric motor in each door to operate each door window (front door vent windows not electrically operated). A single-pole, double-acting switch is installed on each door arm rest for individual window control, and a master control switch is installed on left front door arm rest for driver operation of all windows. Master switch also contains a lock-out switch so all windows can be operated from master control switch only.

Automatic Typ - This system used on Convertible rear door windows, and is built around conventional system. Consists of additional switches and relays which automatically lower rear door window approximately 5" when door is opened, hold window in position, then return window to fully raised position when door is closed. Window can be operated in the usual manner from either switch except that it cannot be raised manually after it has lowered automatically, see *"Manual Operation Note" under OPERATION below.*

OPERATION (AUTOMATIC TYPE): Window operation is divided into down and up cycles as follows:

Window D wn Cycl : 1) When door inside handle or outside pushbutton is moved to open door, cam on lock assembly actuates door handle switch to close switch contacts. Current flows through door handle switch, window stop switch, down relay coil and stop relay contacts. Down relay is now energized and down relay contacts are closed. When door handle or pushbutton released, down relay is kept energized by a "lock-in" circuit with current sipplied and recirculated from down relay contacts. Current flows through the same components except that door handle switch is not in the circuit.

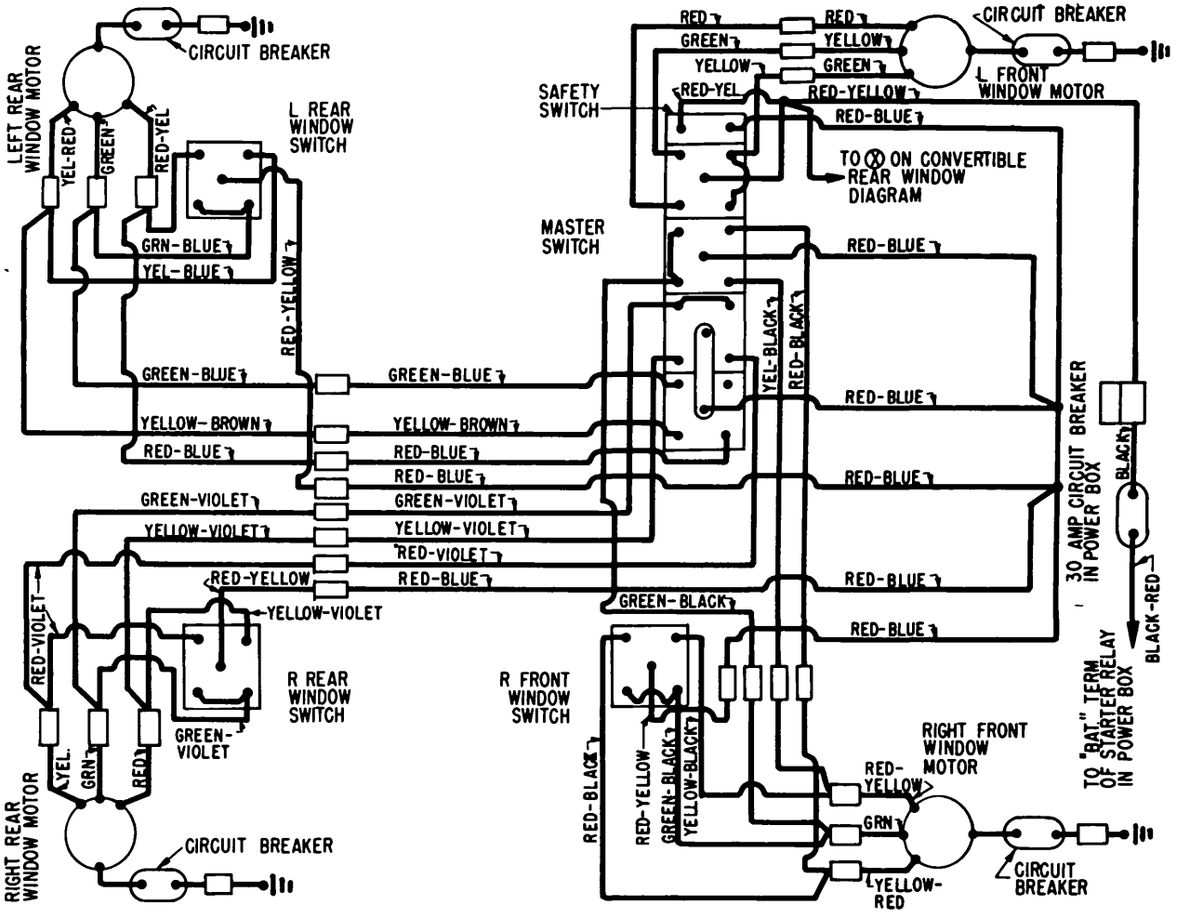
2) When down relay contacts are closed, current flows through down relay contacts, to motor down field, to armature relay coil, and stop relay coil to ground. Energizing armature relay coil closes armature relay contacts and current flows from battery, through armature relay, motor armature, and stop relay coil to ground. Motor is then energized and window begins to lower.

3) When window is 4-6" down, window down stop switch will be opened to open down relay and motor down field circuits to stop motor.

4) No. 1 contacts of door striker plate switch are closed when door is open. Current now flows through door striker plate switch No. 1 contacts, window cut-off switch, up relay coil, stop relay contacts and coil, and bypass switch to ground. Up relay is now energized but window will not raise until striker plate switch is depressed when door closed to close motor up field circuit. As soon as up relay coil is energized a "lock-in" circuit is completed through the up relay contacts to keep the circuit functioning until door is closed.

Window Up Cycl : 1) When door is closed, striker plate switch is depressed to close striker plate switch No. 2 contacts. Current now flows through up relay contacts, striker plate switch No. 2contacts, motor up field, armature relay coil, stop relay coil, and bypass switch to ground. Energizing armature relay coil closes armature relay contacts and current flows from battery, through armature relay, to motor armature, and stop relay coil to ground. Motor is then energized and window begins to rise.

2) About ¼" before window reaches closed position, window actuates bypass switch to open switch contacts. Current now flows only through stop relay coil to ground. Stop relay coil now carries full motor current (becomes an overload cutout). When window is fully closed, motor stalls and draws maximum current. This current energizes stop relay coil to open stop relay contacts which open complete window up circuit and deactivate the system.



LINCOLN CONTINENTAL CONVENTIONAL WINDOW WIRING DIAGRAM

►*MANUAL OPERATION & CUT-OFF SWITCH FUNCTION NOTE:* 1) If window has been lowered more than 6" before door is opened, cut-off switch is actuated (contacts open) and relay circuit is disconnected so no automatic window operation will take place.

2) When window has been lowered automatically and door is open, motor up field can be completed only through No. 2 contacts of door striker plate switch when door is closed. Therefore window cannot be raised manually.

3) With door open and window lowered automatically, either switch can be operated to lower window completely. However cut-off switch contacts will be opened and window will not raise automatically when door is closed. Window must be raised manually after door is closed to reset circuit for automatic operation.

EL ECTRICAL COMPONENTS & LOCATIONS (AUTOMATIC WINDOWS): Following list of electrical components and their locations will aid in testing and in trouble shooting.

30 Ampere Circuit Breaker: Main power window feed. In power box.

10 Ampere Circuit Breaker: Protects relay and motor field circuits. On relay panel behind rear seat.

Motor: In lower inner door panel.

Window Stop Switch: On plate inside door panel above door lock.

Window Cut-Off Switch: On plate inside door panel above door lock.

D r Handle Switch: On door lock assembly inside door panel.

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LINCOLN CONTINENTAL ELECTRIC TYPE (Continued)

D r Striker Plate Switch: In door latch striker plate.
Window Bypass Switch: Inside door panel at top of door on window rear up-stop bracket.
Armature Relay: Relay panel behind rear seat.
Stop Relay: Relay panel behind rear seat.
Up Field Relay: Relay panel behind rear seat.
D wn Field Relay: Relay panel behind rear seat.

TROUBLE SHOOTING & DIAGNOSIS (CONVENTIONAL WINDOWS): Bypass switches and relays as necessary when making tests. Use a continuity light for checking circuits.

On Window Operates In One Direction Only Through Either Switch: Motor field or field circuit wiring open or shorted

Window Operates In Both Directions Through One Switch Only: Switch defective or open wiring.

On Window Totally Inoperative: Motor armature and/or field windings, or circuit wiring open or shorted. Motor circuit breaker improperly grounded or faulty.

All Windows Totally Inoperative: 30 ampere main feed circuit breaker or main feed wiring defective.

TROUBLE SHOOTING & DIAGNOSIS (AUTOMATIC WINDOWS): *NOTE - Since automatic window circuit is built around conventional electric window system, check that conventional part of system is in proper operating condition before checking automatic window circuits. Use the following guide for automatic window checks.*

Window Will Not Lower Automatically: Check 10 ampere circuit breaker, motor down relay, door handle switch, window stop switch.

Window Lowers Completely: Check stop switch actuator lever spring, window stop switch, motor down relay.

Window Will Not Raise: Check 10 ampere circuit breaker, motor up relay, window cut-off switch, door striker plate switch.

Window Closes But Motor Does Not Stop: Check window stop relay and window bypass switch.

SWITCH ADJUSTMENTS (AUTOMATIC WINDOWS): Door Handle Switch - Open rear door, raise window (depress striker plate switch), and disconnect battery. Remove trim panel, disconnect door handle switch wires, and remove door lock assembly. Engage door lock locking pawl and loosen switch adjusting screws. Hold locking lever tightly against locking pawl and adjust door handle switch so switch roller just touches switch actuating cam. Tighten adjusting screws. *NOTE - Make sure switch cannot be actuated when door lock is in l ck position. Lower window before closing door.*

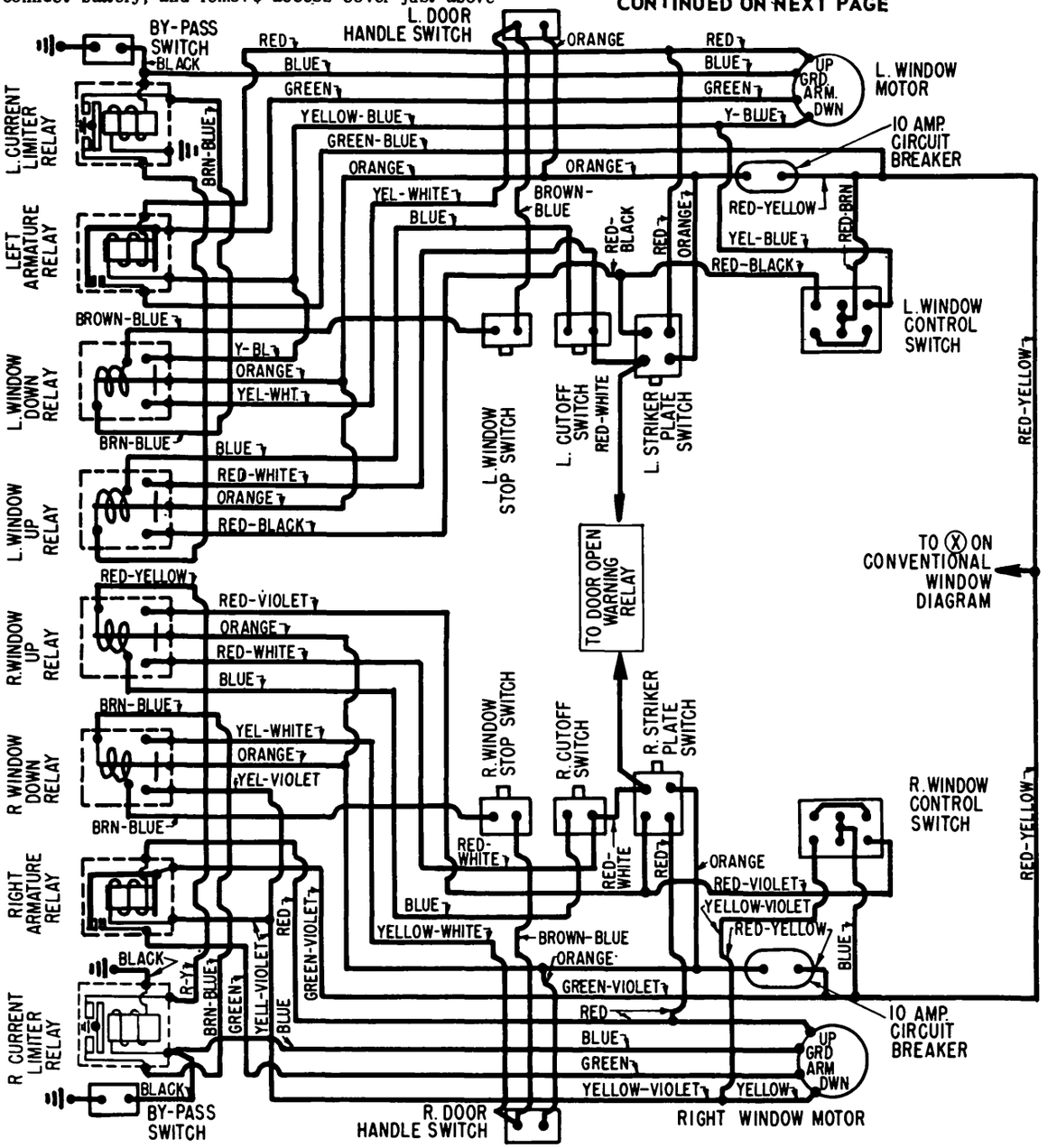
Bypass Switch: Open door, remove trim panel, disconnect battery and switch leads. Mark window up stop position and remove stop and bypass switch as an assembly. Adjust switch so threaded part of switch is flush with lower surface of window stop bracket. *NOTE - Threaded part must not protrude beyond bracket.* Reinstall switch and window stop.

Striker Plate Switch: Open door, remove center pillar trim, disconnect battery and switch leads. Mark striker plate position and remove striker plate and switch assembly. Adjust switch so threaded part of switch is flush with inner surface of striker plate. *NOTE - Threaded part must not protrude into l ck throat of strik r plate.* Install striker plate and switch assembly.

Window Cut-Off & Stop Switches: *NOTE - Both switches mounted on a singl mounting plate and two types of mounting plat have b n used. Type 1 us s hairline method for cut-off switch adjustment. Type 2 uses gauge pin hole method for cut-off switch adjustment.* Adjust switches as follows: Open door, lower window, disconnect battery, and remove access cover just above door lock. Remove outer switch plate mounting screws, pull on switch plate, and remove inner screw and switch plate together (prevents dropping inner screw inside door). Disconnect switch leads and remove assembly.

Cut-Off Switch Type 1 - Loosen cut-off switch (switch

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CONVERTIBLE AUTOMATIC REAR WINDOW WIRING DIAGRAM

LINCOLN CONTINENTAL
ELECTRIC TYPE (Continued)

without roller) on mounting plate and align switch actuator lever surface contacting switch with vertical hairline scribed on switch. Move switch toward actuator until contacts click, then tighten switch retaining screws. Check adjustment by moving actuator arm against switch. Click should occur when actuator is in line with hairline.

Cut-Off Switch Typ 2 - Insert 1/8" diameter pin into aligning hole in switch mounting plate and swing switch actuator against pin. Hold actuator lever against pin and move switch toward actuator until contacts click. Tighten switch mounting screws. Check adjustment by moving actuator arm against switch. Click should occur just as actuator contacts gauge pin.

Stop Switch - Loosen switch retaining screws and place actuator arm so it just touches cut-off switch blade. Hold actuator in this position and adjust switch tightly against actuator until no free travel is present, then tighten switch retaining screws. When installing assembly in door, position actuator lever on top of window mechanism actuating pin.

REMOVAL & INSTALLATION: Motor - Remove door trim panel, access cover, and rear guide on rear doors. With window in fully raised position, remove motor-to-regulator attaching nuts, disconnect wiring, and remove motor. To install, reverse removal procedure.

Window Cut-Off & Stop Switches - *See "Switch Adjustments" above for removal.*

Door Handle Switch - Remove trim panel and door access cover plate. Raise window completely, disconnect switch wiring, remove retaining screw and remove switch.

Bypass Switch - *See "Switch Adjustments" above for removal.*

Striker Plate Switch - *See "Switch Adjustments" abov for removal.*

RAMBLER

Rambl r (Except Am rican) (1961)

DESCRIPTION: Window regulators are individually powered by electric motor in each door. Motors are controlled by individual switches on each door panel and a master switch mounted on the left front door panel. All switches are retained to trim panel by spring type retaining clips at top and bottom sides of switch. A 30 ampere circuit breaker mounted under instrument panel protects wiring harness and a 15 ampere circuit breaker is used to protect motor.

REMOVAL & INSTALLATION OF REGULATOR ASSEMBLY: *NOTE* - Regulator and motor must be removed as an assembly.

Fr nt Do r Wind w R gulator: *Ignition key must be in off position.* Remove window control switch assembly and door trim panel. Disconnect regulator arm from cross arm assembly by removing key slotted retainer from grooved stud riveted to cross arm assembly. Move glass to fully raised position and remove circuit breaker to inner panel screw. Disconnect motor to switch wires and remove mounting stud at lower end of center division bar. Remove regulator to door screws, hold division bar toward inner door panel (for clearance), and remove regulator and motor assembly through large opening in inner door panel. To install, reverse removal procedure.

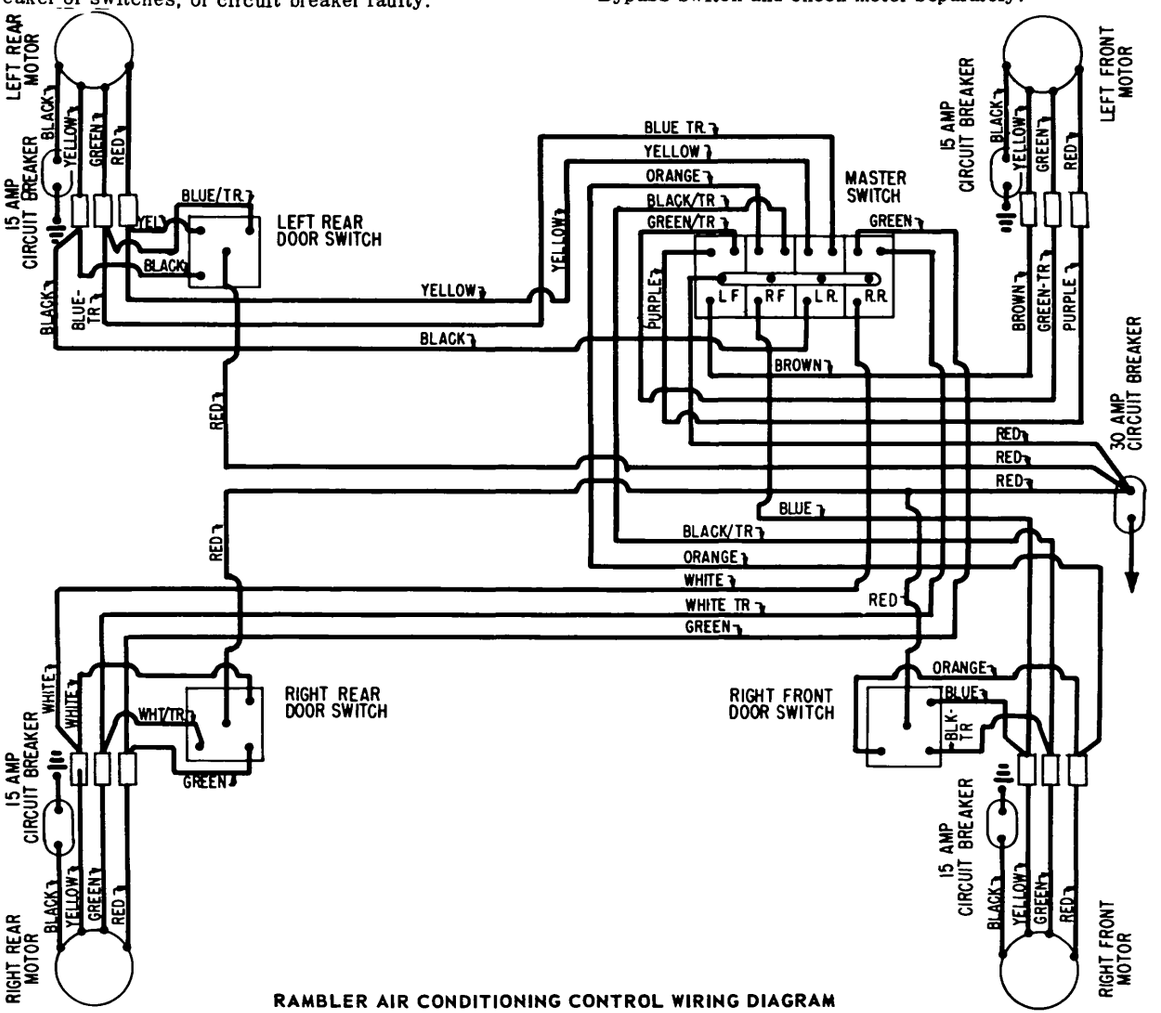
R ar D r Wind w R gulator: *Ignition key must be in off position.* Remove window control switch and door trim panel. Disconnect regulator arms from glass bottom channel by removing retainers and raise glass to fully raised position. Move regulator arms to horizontal position. Disconnect motor wires at connectors and remove circuit breaker from inner door panel. Remove regulator mounting screws and remove regulator and motor assembly through lower rear corner of cutout keeping regulator arms together. Use slight pressure if necessary.

Mast r Switch: *Ignition switch must be in off position.* Insert putty knife or similar tool at top of switch between switch housing and mounting plate and depress retaining spring by pushing downward on both springs top and bottom. Tilt switch away from panel at top of switch and insert putty knife at retainer locations. When removing switch, tag each wire and mark terminal for proper reassembly.

TROUBLE SHOOTING: All Wind ws Fail T Operat In Eith r Directi n r Op rat Sl wly - Battery low or dead, circuit breaker faulty. Battery ground loose, or terminal in control circuit loose or corroded.

Windows Operate Intermittently - Loose wires on circuit breaker or switches, or circuit breaker faulty.

One Window Fails To Operate - Loose or broken connections at dash circuit breaker and switch in door. Bypass switch and check motor separately.



RAMBLER AIR CONDITIONING CONTROL WIRING DIAGRAM

G.M. ELECTRIC TYPE

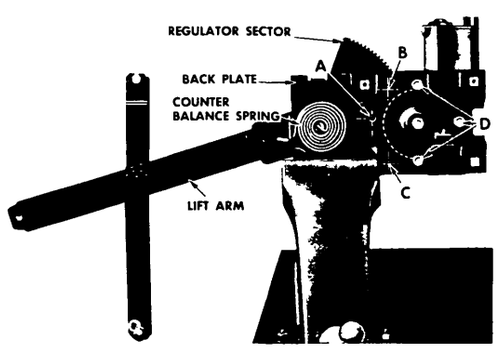
Buick & Buick Special (1961)
Cadillac (1961)
Chevrolet Pass. Cars (1961)
Oldsmobile & Oldsmobile F-85 (1961)
Pontiac & Pontiac Tempest (1961)

►*1961 TAILGATE WINDOW SHORTING CORRECTION:* May be caused by contacts on contact switch plate on rear door pillar post and on tailgate side rail being bent out of shape or pivoting and causing circuit to ground to body. To correct, curl contact prongs back to original positions, or pivot prongs back into alignment and cement with a drop of clear lacquer.

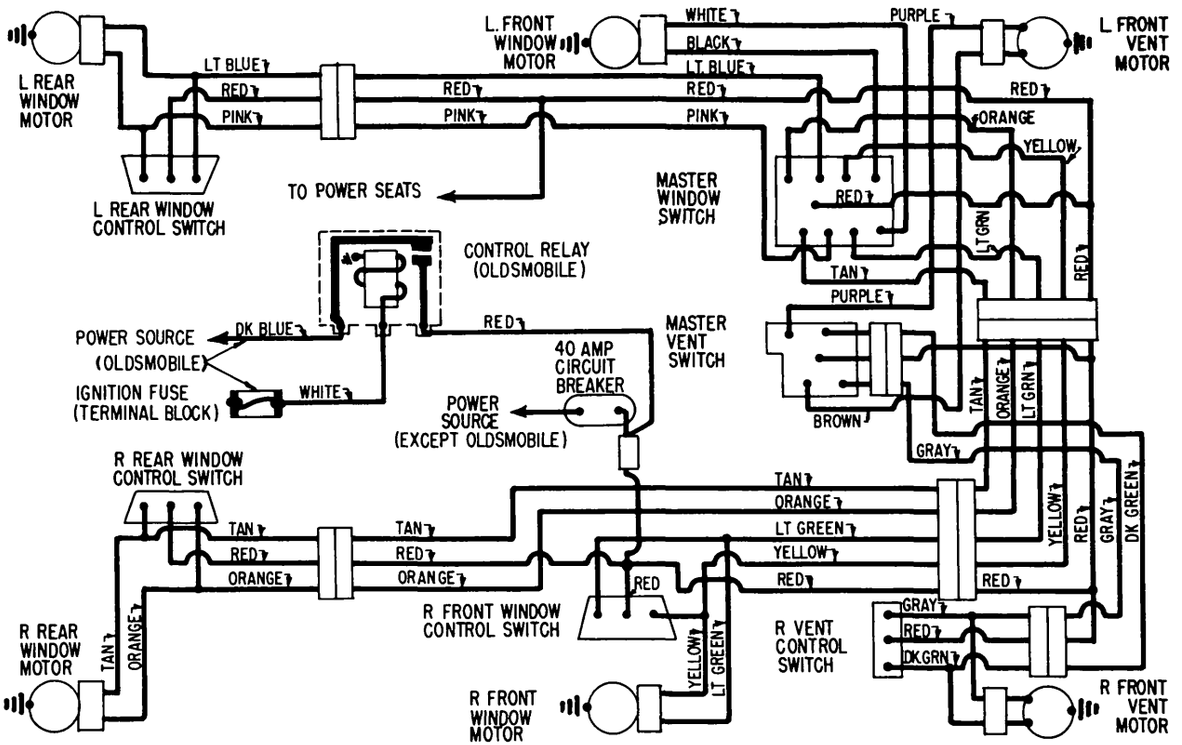
DESCRIPTION: Door Windows - Window regulators individually powered by reversible electric motors in each door which are geared directly to regulator assembly. On Cadillac, vent windows in both front and rear doors are also power operated. On Buick and Oldsmobile, front door vent windows are also power operated. Two-way switches on each door and a master control switch on left front door control window operation. On Oldsmobile, a control relay wired to power source and to ignition switch prevents window operation until ignition switch is in ON or ACC positions. **Tailgate Window** - Dropping type window in tailgate operated by a reversible electric motor in tailgate. Control is by a switch on instrument panel. Tailgates which are hinged at the bottom have a lock switch in center of tailgate outer panel. Three-seat station wagons have additional passenger control switch at rear of rear quarter inner panel trim.

EMERGENCY OPENING OF TAILGATE: On tailgates hinged at bottom, safety switch may fail and prevent window being lowered to open tailgate. Proceed as follows: Remove spare tire cover and all accessible screws from tailgate inner panel. Pull panel forward, cut water deflector over right hand access hole, remove access cover upper screws, and remove cover. Reach into bottom of tailgate and remove green wire from retaining clip and pull up far enough to pierce wire with pick or knife. Ground pick and lower window by means of control switch.

TROUBLE SHOOTING & DIAGNOSIS (DOOR WINDOWS): **All Windows Inoperative** - Power feed circuit faulty. Check feed wires, feed circuit breaker, and control relay (where equipped).



FRONT DOOR REGULATOR ASSEMBLY



G.M. (EXC. CADILLAC) WINDOW CONTROL WIRING DIAGRAM

One Window Inoperative From Both Switches: Faulty circuit wiring; both switches faulty; motor defective; mechanical bind or failute in linkage.

One Window Inoperative From One Switch Only: The other switch or wiring from that switch is defective.

TROUBLE SHOOTING & DIAGNOSIS (TAILGATE WINDOW): *NOTE - On Oldsmobile, instrument panel and third seat control switches are wired through window control relay. Rear window can be operated through these switches only if ignition switch is in ON or ACC positions.*

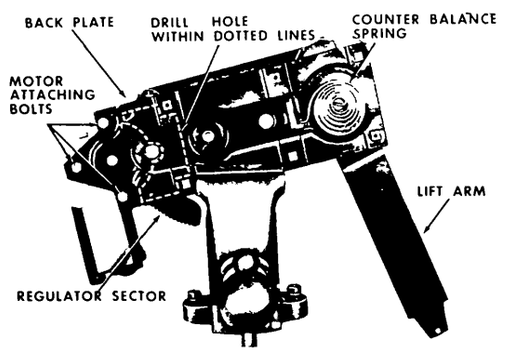
Window Inoperative From All Switches: Power feed circuit or control relay defective. Safety switch faulty or motor not grounded. Motor faulty. Mechanical bind or failure in linkage.

Window Inoperative From On Switch Only: Circuits to or from affected switch are defective. Affected switch is faulty. If both instrument panel and rear quarter switches are inoperative, check for faulty control relay.

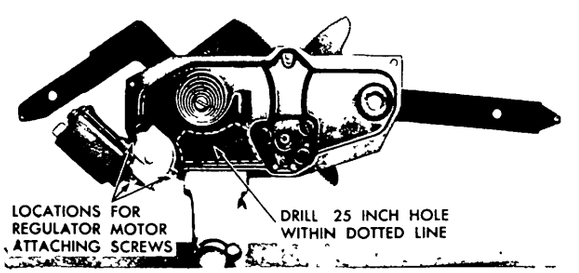
Window Cannot Be Raised From Any Switch: Up cycle feed wire defective. Motor defective.

REGULATOR ASSEMBLY REMOVAL & INSTALLATION: *CAUTION - Do not operate regulator motor after window assembly is disengaged from regulator. Operation with load removed will damage motor.*

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REAR DOOR AND QUARTER WINDOW REGULATOR ASSEMBLY



TAIL GATE REGULATOR ASSEMBLY

G.M. ELECTRIC TYPE (C ntinu d)

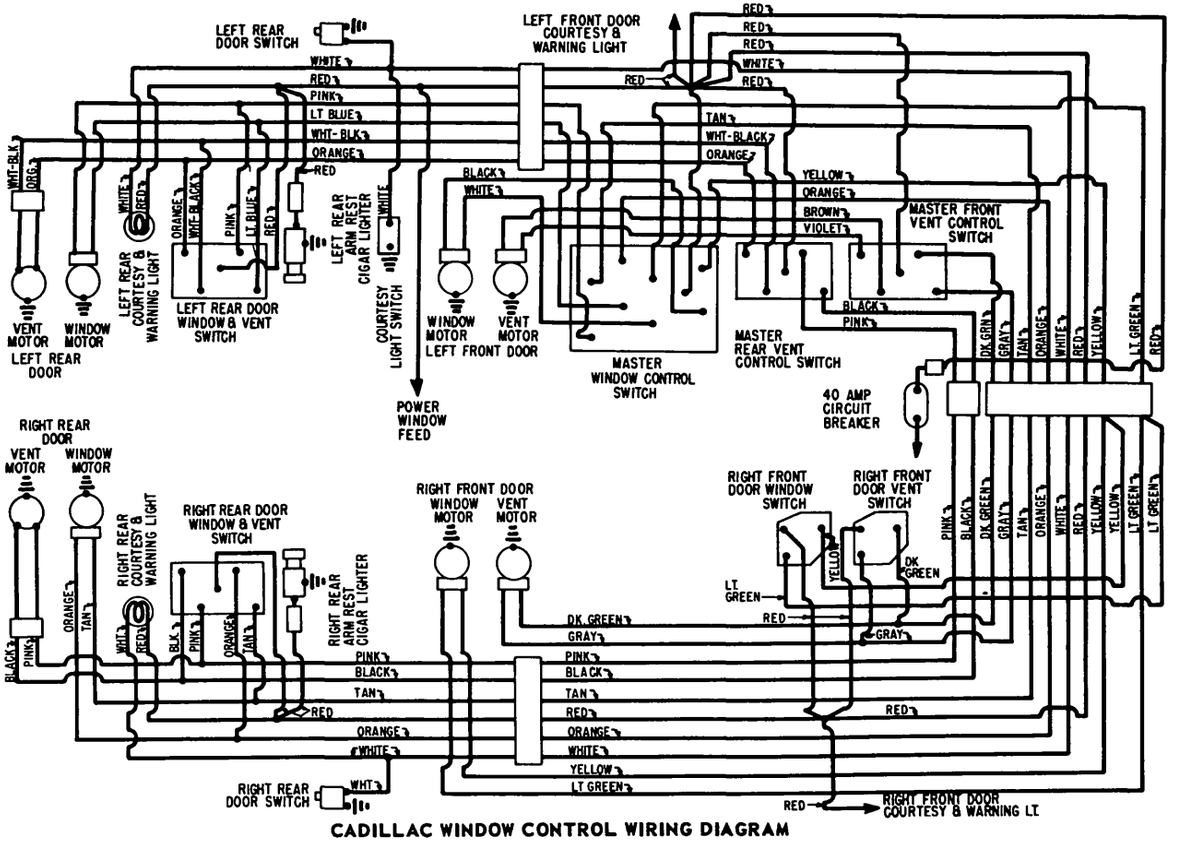
Front D rs (All M d ls): Lower door window, then remove door trim panel assembly and detach inner panel water deflector. Disconnect wiring harness feed wires from regulator motor at connector. Remove ventilator division channel lower adjusting stud and nut, then remove window lower sash channel cam attaching screws. Disengage window assembly from lower sash channel cam, then raise window and prop in "up" position. Remove inner panel cam attaching screws (where present). Detach cam from regulator arm and remove from door. Remove window regulator attaching screws, then carefully work regulator assembly through rear access hole and remove from door. To install, reverse removal procedure.

R ar Doors (All M dels): Lower door window, then remove door trim panel assembly and detach inner panel water deflector. Disconnect wiring harness feed wires from regulator motor at connector. Remove door window lower sash channel cam attaching screws, then carefully detach cam from regulator lift arm and remove through access hole. Lift window assembly and prop in "up" position. On some models (where present), remove inner panel cam attaching screws, then detach cam from regulator balance arm and remove through access hole. Remove regulator attaching screws and remove regulator assembly through access hole. To install, reverse removal procedure.

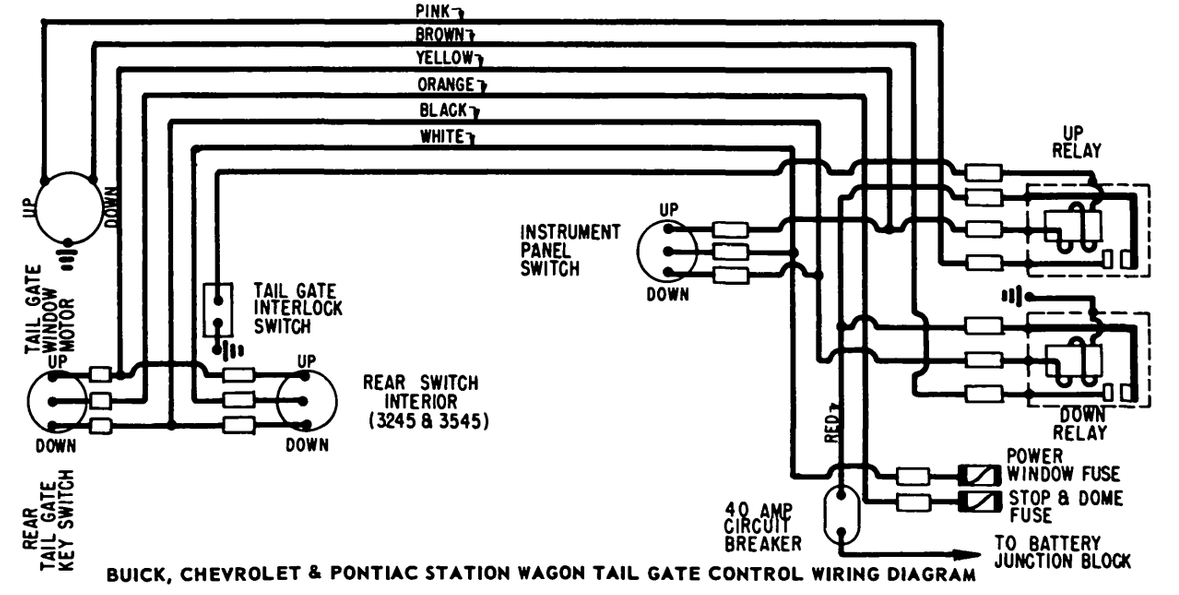
R ar Quart r Wind w (2-Do r Sedan): Lower rear quarter window and remove rear seat cushion and back, then remove rear quarter window garnish molding, rear quarter arm rest and rear quarter trim assemblies. Detach inner panel water deflector sufficiently to gain access to window lower sash channel cam attaching screws and window regulator attaching screws. Remove arm rest support, then disconnect feed wire plug from motor. Remove window lower sash channel cam attaching screws, then detach cam from roller on regulator lift arm and remove cam. Lift window to "up" position and prop in place. Remove front guide attaching screws and move guide rearward to allow upper end of guide to be started out through access hole, then remove guide assembly. Remove window regulator attaching screws and remove regulator assembly through large access hole. To install, reverse removal procedure.

2-Do r Hardt p - Lower rear quarter window, then remove rear seat cushion and back assemblies and rear quarter arm rest and trim assemblies. Remove rear quarter inner panel access hole cover and disconnect the feed wire plug from the motor, then remove the window lower sash channel cam attaching screws. Detach cam from roller on regulator lift arm and remove cam. Lift window and prop in the "up" position. Remove rear quarter window regulator attaching screws, then lower and rotate regulator assembly to maneuver lift arm around front guide assembly. Remove assembly through access hole. To install, reverse removal procedure.

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CADILLAC WINDOW CONTROL WIRING DIAGRAM



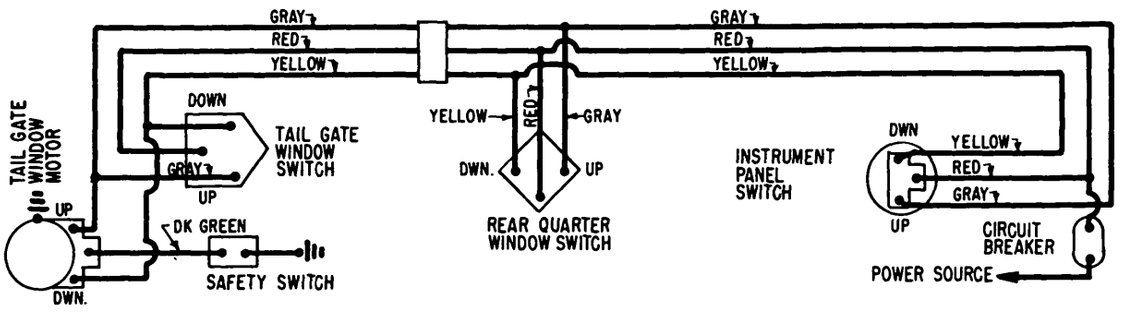
BUICK, CHEVROLET & PONTIAC STATION WAGON TAIL GATE CONTROL WIRING DIAGRAM

G.M. ELECTRIC TYPE (Continued)

Convertible - Remove rear seat cushion and back, top compartment side trim panel and rear quarter trim assembly. Remove inner panel access hole cover, then operate window to full "up" position and prop in place. Disconnect feed wire plug from motor, then remove regulator attaching screws. Disengage regulator lift arm roller from lower sash channel cam and remove regulator assembly through access hole.

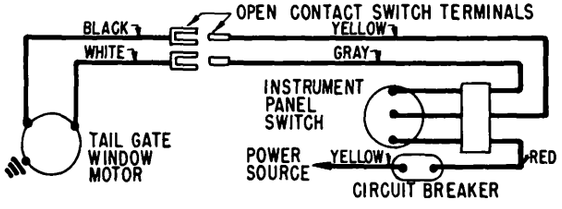
Door Ventilators: Raise the door window, then remove the door trim assembly and detach inner panel water deflector to gain access to regulator attaching screws. Disconnect regulator motor feed wires at connector, then remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage ventilator regulator shaft from ventilator tee shaft and remove regulator and motor assembly from door through front access hole. To install, reverse removal procedure.

Tail Gate Window (Station Wagons): Remove inner cover panel lower retainer and inner cover panel, then remove tail gate skid strips, tail gate inner cover panel finishing moldings and tail gate inner cover panel. Detach or cut gate inner panel water deflector sufficiently to gain access to lower sash channel cam attaching bolts. Remove tail gate inner panel access hole cover. Carefully operate window upward until window sash channel right and left cam attaching bolts are accessible through access holes. Remove sash channel cam attaching bolts, then disengage cams from sash channel and carefully pull window out of gate. Detach tail gate lock remote control right connecting rod from remote control (work through a hole near center of tail gate adjacent to large access hole), then disconnect harness connector from motor. Remove regulator attaching screws and remove regulator through large access hole. To install, reverse removal procedure.



OLDSMOBILE STATION WAGON TAIL GATE CONTROL WIRING DIAGRAM

REGULATOR MOTOR REMOVAL (WITH REGULATOR ASSEMBLY REMOVED FROM CAR): Clamp regulator and motor assembly securely in a vise, then drill a ¼" hole through back plate at the location indicated in illustrations. *NOTE - Drill the ¼" hole in front door window regulators at either "A", "B" or "C" (see illustration), depending on position of lift arm. On other regulator assemblies, drill the hole within the area outlined by dotted lines in illustration. Do not locate hole less than ½" from edge of back plate or sector.* Insert a 3/16" bolt through hole in back plate and sector and install a nut but do not tighten. Remove motor attaching bolts and remove motor assembly from regulator. Clean all chips from regulator and motor pinion gear after drilling. To install, reverse removal procedure. *CAUTION - Be sure to remove temporary nut and bolt from regulator befor installing in car.*



BUICK SPECIAL, OLDSMOBILE F-85 & PONTIAC TEMPEST TAIL GATE WINDOW CONTROL WIRING DIAGRAM

1961 POWER TOP CONTROLS

HYDRAULIC-ELECTRIC TYPE

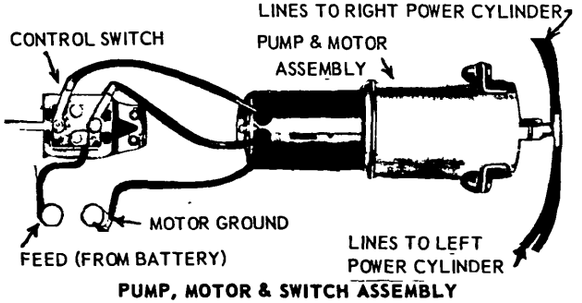
Buick (1961)
Cadillac (1961)
Chevrolet Pass. Cars (1961)
Chrysler & Imperial (1961)
Dodge & Dodge Dart (1961)
Ford Pass. Cars (1961)
Mercury (1961)
Oldsmobile (1961)
Plymouth (1961)
Pontiac (1961)
Rambler American (1961)
Studebaker (1961)

DESCRIPTION: Similar in design and operation to models previously used. System is a sealed unit and is not vented to the atmosphere, making it unnecessary to replace hydraulic fluid periodically. System is "self-air bleeding".

CHECKING FLUID LEVEL: With top in raised position, disconnect positive or negative battery cable. Remove pump and motor shield, in rear compartment, and place absorbent material below reservoir. Remove filler plug from reservoir. On motor and pump assemblies installed horizontally, fluid should be at lower edge of filler cap hole. If fluid low, add hydraulic fluid Delco No. 11 (GM Hydraulic Brake Fluid Super No. 11).

REPLACING FLUID (After Repairs): Cylinders and hydraulic system contains more fluid than one filling of reservoir will supply. Check reservoir frequently during refilling of system. Air in system will automatically bleed out with a few operations of top.

CHECKING HYDRAULIC PRESSURES: Remove motor and pump assembly. Install plug in one port and pressure gauge in port to be checked. Actuate motor with an applied terminal voltage of 9.5-11.0 volts. Gauge should show a pressure as specified below. Check pressure in other port. *NOTE* - A difference in pressure readings may exist between pressure port for top of cylinders and port for bottom of cylinders. This condition is acceptable if both readings are within limits specified. If pressure not within specified limits, unit is defective and should be repaired or replaced.
Hydraulic Pressure - 240-280 PSI (General Motors Cars, Rambler, Studebaker).



PUMP, MOTOR & SWITCH ASSEMBLY

CHECKING OPERATION OF LIFT CYLINDERS: Remove rear seat cushion and folding top compartment side panel assembly. Operate folding top control switch and observe lift cylinders during up and down cycles for these conditions:
1) If movement of cylinder rods is not coordinated or sluggish when motor is actuated, check hydraulic hoses from the motor and pump to cylinders for kinks.
2) If one cylinder rod moves slower than other, cylinder with slow moving rod is defective and should be replaced.
3) If both cylinder rods move slowly, or do not move at all, check pressure of pump. See "Checking Hydraulic Pressure" above.

MOTOR & PUMP ASSEMBLY: *See "Power Operated Top Motor & Pump (Rotor Type)" in Miscellaneous Section of Manual.*

LINCOLN CONTINENTAL TOP CONTROL

Linc In Continental (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 DECK OPEN LIMIT SWITCH NO. 1 MALFUNCTION CORRECTION:* On cars before March 1, 1961, if Deck Open Limit Switch No. 1 fails, trouble may be due to switch wiring being pinched between lower back panel flange and trunk lid. To correct, route switch wiring through the left hand clip holding rear lamp wiring.

►*1961 SWITCH, CIRCUIT, WIRING & TOP OPERATION PRODUCTION CHANGES:* Four changes made in production as follows: *NOTE - See wiring diagram for change details.*

1) Cars Between Serial Nos. 400024 and 403100 & All Cars After January 10, 1961 - A Top Lock Cut-Off Switch added to top erect cycle for better sealing of No. 1 bow to windshield header and for better cycle continuity. Switch is attached to back panel left hand hinge. Switch holds top lock motor energized until back panel is folded under deck lid. *NOTE - Back Panel Erect Limit Switch changed from 6-terminal to 4-terminal switch when Top Lock Cut-Off Switch added.*

2) Cars B ginning December 5, 1960 - On top erect cycle, the top up relay and motor energized through Top Up Limit Switch instead of through Top Lock Limit Switch as on previous cars. Wiring for operation through Top Lock Limit Switch is similar to that for operation through Top Up Limit Switch *See text below for sequence of operation.*

3) Cars Aft r December 21, 1960 - Yellow & White wires attached to lower contacts of Deck Lock Limit Switch are removed from switch and taped to the harness. Hydraulic pressure in the top cylinders is no longer relieved when top is raised and locked and provides for greater rigidity and better back panel fit.

4) Cars After June 6, 1961 - A new Top Up Limit Switch installed on main pivot casting of top linkage to permit top motor to operate until rear edge of top and finish panel are properly seated. Control of top up motor circuit is through this new switch. The existing Top Up Limit Switch in right side of No. 1 bow will control top lock motor circuit only, and this switch has been renamed Top Lock Limit Switch No. 1.

DESCRIPTION: Completely automatic convertible power top mechanism which unlocks and opens the trunk deck lid, raises the top and locks it to the windshield header, then closes and locks the deck lid. The cycle is reversed for lowering the top. The system consists of an electric-hydraulic system for raising and lowering the top and deck lid, and three electric systems with drive cables, locking rods, and transmission for locking and unlocking deck lid, locking and unlocking top to windshield header, and for folding and unfolding upper back panel. All basic systems have appropriate switches, relays, and solenoids for electrical and mechanical continuity.

OPERATION: Top operation is divided into retract and erect cycles as follows: *CAUTION - Before operating the top, engine must be running, transmission in "N" or "P", and all windows lowered.*

C ntrol Circuit: *NOTE - Control circuit to top control switch is the same for both retract and erect cycles.* With ignition switch in ACC or ON positions, and transmission selector lever in N or P (neutral safety switch contacts closed), current flows from ignition switch, through top control neutral relay, neutral safety switch, and starter motor relay to ground. Top control neutral relay is energized (relay contacts closed), and current flows from 10 ampere circuit breaker through top control neutral relay, to top control switch.

Top Retract Cycle: Following operatings take place with top erected and locked to windshield header and deck lid closed and locked.

Deck Lid Unlocking - Current flows from control switch through lower contacts of back panel retract limit switch, and upper contacts of deck open limit switch No. 1, to deck unlock relay which energizes deck lock motor. Deck lock motor unlocks deck lid through two flexible drive cables.

Deck Lid Opening - When deck lid unlocks, deck lock limit switch is released to complete deck lid open circuit. Current flows through lower contacts of back panel retract limit switch, upper contacts of deck open limit switch No. 1, center contacts of deck lock limit switch to deck open relay which energizes top and deck motor and deck lid solenoid. When deck lid solenoid valve opens, hydraulic pressure flowing to both deck lid hydraulic cylinders raises deck lid.

Back P nel Unfolding - When deck lid is fully raised, bracket on deck lid left hydraulic linkage depresses deck open limit switch No. 1 to open deck lid unlock and opening circuits and at same time complete back panel unfolding circuit. Current now flows through lower contacts of deck open limit switch No. 1, and upper contacts of back panel erect limit switch, to back panel erect relay which starts back panel motor to unfold back panel.

Top Unlocking - When back panel is completely unfolded, bracket on back panel hinge mounting plate depresses back panel erect limit switch to open back panel motor circuit and at same time close top unlock motor circuit. Current now flows through upper contacts of top unlock limit switch, and lower contacts of back panel erect limit switch, to top unlock relay which energizes top lock motor to unlock top from windshield header through two rods.

Top Retracting - When left top lock rod unlocks top, the rod depresses top unlock limit switch to open top unlock motor circuit and at same time close top retract circuit. Top lock limit switch is released at same time. Current now flows through lower contacts of top unlock limit switch, and upper contacts of top down limit switch, to top down relay which energizes top and deck motor and both top solenoids. Top solenoid valves open, and hydraulic pressure to both top hydraulic cylinders lowers the top.

Deck Lid Closing & Locking - When top is fully lowered, right rear side rail depresses top down limit switch which opens top retract circuit and closes deck lid close and lock circuits. Current now flows through center contacts of top down limit switch, to deck lock relay which starts deck lock motor. Current also flows through upper contacts of deck lock limit switch to deck close relay which causes top and deck motor to continue operation and also energizes deck lid solenoid. When deck lid solenoid valve opens, hydraulic pressure to both deck lid hydraulic cylinders closes deck lid. When deck lid is closed, deck lid lock limit switch is depressed and opens deck lid close circuit. Deck lock motor (which was started when deck lid began to lower) locks deck lid. After deck lid locked, deck lock circuit is opened by releasing top control switch on instrument panel.

Top Erect Cycle: Following operations take place with top stacked in luggage compartment and deck lid closed and locked.

Deck Lid Unlocking - Current flows from top control switch through lower contacts of top down limit switch, and upper contacts of deck open limit switch No. 2 to deck unlock relay which energizes deck lock motor. Motor unlocks deck lid through flexible cables. *NOTE - On Cars before December 21, 1960 (see "Production Changes" above), the following also happens:* Current flows through lower contacts of deck lock limit switch to both top solenoid valves which open to relieve hydraulic pressure and remove tension in top stack linkage.

Deck Lid Opening - When deck lid unlocks, deck lock limit switch is released and completes the deck opening circuit. *NOTE - At same time circuit to both top solenoids is opened to close solenoid valves on early cars (see "Deck Lid Unlocking" and "Production Changes" above)* Current now flows through lower contacts of top down limit switch, upper contacts of deck open limit switch No. 2, and center contacts of deck lock limit switch to deck open relay which energizes top and deck motor and deck lid solenoid. Deck lid solenoid valve opens and hydraulic pressure to both deck lid hydraulic cylinders raises deck lid. *NOTE - Deck lock motor continues to operate as circuit is still closed.*

Top Erecting - When deck lid is raised, deck open limit switch No. 2 is depressed by bracket on deck lid right hydraulic linkage, and deck lid unlocking and opening circuits are opened, while at the same time the top erect circuit is closed. Current now flows through upper contacts of top lock limit switch (early cars), upper contacts of top up limit switch (later cars - *see "Production Changes" above),* and through lower contacts of deck open limit switch No. 2 to top up relay which energizes top and deck motor and both top solenoids. Top solenoid valves open and hydraulic pressure to both top hydraulic cylinders raises the top.

Top Locking (Early Cars - Before June 6, 1961) - When No. 1 bow contacts windshield header, nylon lever arm in bow depresses top up limit switch to complete top lock circuit. *NOTE - On cars after December 5, 1960, top motor circuit is opened when top up limit switch is depressed.* Current flows through lower contacts of top up limit switch, and center contacts of back panel erect limit switch, or through top lock cut-off switch *(see "Production Changes" above, and wiring diagram),* to top lock relay which energizes top lock motor and locks top to windshield. *NOTE - On cars before December 5, 1960, as top begins to lock, lock rod in No. 1 bow depresses top lock limit switch to open top motor circuit.*

T p L cking (Later Cars - Aft r Jun 6, 1961) - When No. 1 bow contacts windshield header, nylon lever arm in bow depresses top lock limit switch No. 1 *(formerly*

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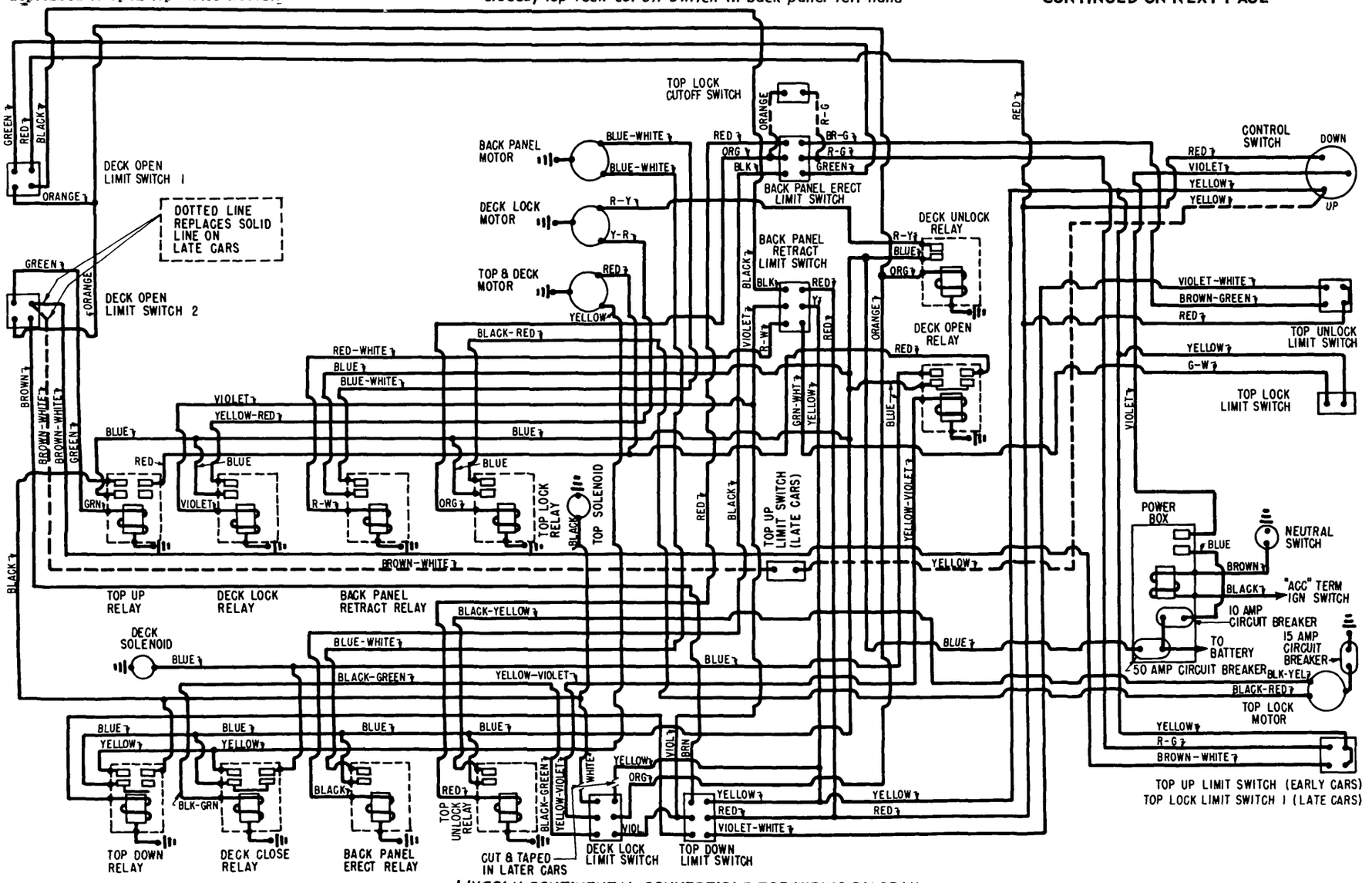
LINCOLN CONTINENTAL TOP CONTROL (C ntinu d)

Top Up Limit Switch - See "Production Changes" above) to complete top lock circuit. Current flows through top lock limit switch No. 1 and top lock cut-off switch, to top lock relay which energizes top lock motor and locks top to windshield. While top is locking and after rear edge of top and finish panel are properly seated, top up limit switch in main pivot casting of linkage is depressed to open top motor circuit.

Back Pan l Cl sing - *NOTE - See "Production Changes" abov for cars with and without Top Lock Cut-Off Switch.* When lock rod in No. 1 bow depresses top lock limit switch, back panel closing circuit is completed. *NOTE - On cars without top lock cut-off switch, top locking circuit is opened at the same time.* Current now flows through lower contacts of top lock limit switch, and upper contacts of back panel retract limit switch, to back panel retract relay which energizes back panel motor and closes back panel. *NOTE - On cars with top lock cut-off switch, when back panel is closed, top lock cut-off switch in back panel left hand hinge is depressed and top lock motor circuit is opened.*

D ck Lid Cl sing & Locking - When back panel has folded, back panel retract limit switch is depressed to open back panel motor circuit and to complete deck lid close and lock circuits. Current flows through center contacts of back panel retract limit switch, and upper contacts of deck lock limit switch, to deck close relay which energizes top and deck motor and deck lid solenoid. When deck lid solenoid valve opens, hydraulic pressure to both deck lid hydraulic cylinders closes deck lid. At same time deck close circuit is completed,

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LINCOLN CONTINENTAL CONVERTIBLE TOP WIRING DIAGRAM

LINCOLN CONTINENTAL TOP CONTROL (C ntinu d)

current also flows from center contacts of back panel retract limit switch to deck lock relay which energizes deck lock motor. When deck lid is closed, deck lock motor locks deck lid. Also, then deck lid is closed, deck lock limit switch is depressed to open deck lid closing circuit. *NOTE - On cars after December 21, 1960 (see "Production Changes" above), depressing deck lock limit switch also completes circuit to both top sol noids so hydraulic pressure is relieved and top is permitted to settle.* Releasing top control switch opens deck lock circuit and cycle is completed.

EMERGENCY MANUAL OPERATION: Manually Unlocking Top - Remove No. 1 bow access cover and turn motor coupling manually to unlock top.

Manually Unlocking D ck Lid - Raise car and remove each deck lid lock nut attaching screw from underside of each wheelhouse. Remove rear seat cushion and disconnect deck unlock relay to prevent damage to lock nut assembly. Lift forward edge of deck lid about 1", then actuate top control switch to open deck lid.

Manually Opening Deck Lid - Unlock deck lid manually (see above), or with control switch. Remove deck lid hydraulic cylinder attaching screws from under rear crossmember. Lift deck lid manually. *NOTE - If deck lock nuts have be n released from wheel housings, nut and housing part of locks will remain attached to deck lid lock scr ws.*

EL ECTRICAL COMPONENTS & LOCATIONS: Following list of electrical components and their locations will aid in testing and trouble shooting.

50 Amper Circuit Br aker: Motor relay feed (power circuit). On right hand dash trough on instrument panel above power box.

10 Amper Circuit Breaker: For control feed circuit. In power box.

15 Amp r Circuit Br aker: Top lock motor ground. In right quarter panel.

15 Amp r Circuit Breaker: Back panel motor ground. At center of deck lid.

15 Amp r Circuit Break r: Deck lock motor ground. At center of deck lid.

Top Control N utral R lay: In power box.

Deck L ck Motor: At center of deck lid.

T p & D ck M tor & Pump: In right quarter panel.

Upper Back Panel M tor: Forward left side of deck lid.

T p L ck M tor: No. 1 bow, right center.

T p L ck Limit Switch: No. 1 bow, left side (inboard switch).

T p L ck Cut-Off Switch: Upper back panel left hinge mounting plate (inboard).

T p Unlock Limit Switch: No. 1 bow, left side (outboard switch).

T p Up Limit Switch/T p Lock Limit Switch No. 1: *See "Production Chang s" above for switch designation Change.* No. 1 bow, right side.

Top Up Limit Switch (Cars After June 6, 1961): *See "Production Chang s" above.* On main pivot casting of top linkage.

Back Panel Erect Limit Switch: Back panel left hinge mounting plate.

Back Pan l Retract Limit Switch: Back panel right hinge mounting plate.

D ck Op n Limit Switch N . 1: Deck lid actuator, left side.

Deck Open Limit Switch N . 2: Deck lid actuator, right side.

Deck Lock Limit Switch: Deck lock nut assembly, right side.

Deck Open Relay: Rear seat-back support, right side outboard.

Deck Unlock Relay: Rear seat-back support, right side inboard.

►*OTHER RELAYS:* Following relays are located in a panel on right quarter panel: Top Up Relay, Top Down Relay, Deck Close Relay, Deck Lock Relay, Top Lock Relay, Top Unlock Relay, Back Panel Erect Relay, Back Panel Retract Relay. *See wiring diagram for correct locations.*

Top Down Limit Switch: On right main pivot bracket.

Deck Lid Solenoid Valve: On right quarter panel to rear of top and deck motor and pump.

Top Solenoid Valves: On right quarter panel forward of top and deck motor and pump.

TESTING & TROUBLE SHOOTING: Operate any of the twelve circuits by energizing the applicable relay by a jumper wire from hot or common relay terminal to relay actuating terminal (bypasses all appropriate limit switches and operates motor directly). Check for a motor stalled against a jammed deck lid lock screw or running freely due to broken drive cable. Check locking mechanism in No. 1 bow for proper operation. If a motor continues to run after its circuit is opened, a power relay is faulty. If a motor operates when control circuit bypassed, check control circuit continuity. *NOTE - Be sure to test main circuit breaker, top control neutral relay, and top control switch.* If there is no current at top control neutral relay, check control circuit 10 ampere circuit breaker and neutral safety switch. Make a continuity test of switches and make sure switches are properly adjusted.

►*TROUBLE SHOOTING NOTE:* Following are probable causes of top malfunction for retract and erect cycles.

Retract Cycle: Deck Lid Will Not Unlock - Deck unlock relay; Back panel retract limit switch; Deck open limit switch No. 1; Deck lock motor or circuit breaker.

Deck Lid Will Not Open - Deck open relay; Deck lock limit switch; Deck solenoid; Top and deck motor.

Deck Lid Will Not Close - Top down limit switch; Deck lock limit switch; Deck close relay; Deck solenoid; Top and deck motor.

Deck Lid Will Not Lock - Deck lock relay; Deck lock motor or circuit breaker.

Back Panel Will Not Unfold - Deck open limit switch No. 1; Back panel erect limit switch; Back panel erect relay; Back panel motor or circuit breaker.

Top Will Not Unlock - Top unlock limit switch; Back panel erect limit switch; Top unlock relay; Top lock motor or circuit breaker.

Top Will Not Retract - Top unlock limit switch; Top down limit switch; Top down relay; Top solenoids; Top and deck motor.

Erect Cycle: Deck Lid Will Not Unlock - Deck lid; Top down limit switch; Deck open limit switch No. 2; Deck unlock relay; Deck lock motor or circuit breaker.

Deck Lid Will Not Open - Deck lock limit switch; Deck open relay; Deck solenoid; Top and deck motor.

D ck Lid Will Not Clos - Back panel retract limit switch; Deck lock limit switch; Deck close relay; Deck solenoid: Top and deck motor.

Deck Lid Will Not L ck - Deck lock relay; Deck lock motor or circuit breaker.

T p Will N t Erect - Top lock limit switch or top up limit switch; Deck open limit switch No. 2; Top up relay; Top solenoids; Top and deck motor.

Top Will Not "Settle" Into Position - Top solenoids; Top up limit switch; Deck lock limit switch.

Top Will Not Lock - Top up limit switch or top lock limit switch No. 1; Top lock cut-off switch; Back panel erect limit switch; Top lock relay; Top lock motor or circuit breaker.

Back Panel Will Not Fold - Top lock limit switch; Back panel retract limit switch; Back panel retract relay; Back panel motor or circuit breaker.

SWITCH ADJUSTMENTS: Deck Lock Limit Switch - With a test lamp attached to the two top terminals of switch, adjust switch so test lamp is lighted when deck lock screws contact deck lock nuts but goes out after lock screws engage lock nuts by one or two threads.

Top Down Limit Switch: With top fully retracted and a test light attached to upper terminals of switch, loosen switch so plunger is not depressed by top side rail. Then adjust switch against side rail until plunger is depressed and light goes out. Move switch upward an additional 1/16" and tighten mounting screws.

Back Panel Erect Limit Switch: With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully open. With test light attached to two upper terminals of switch and back panel fully open, move switch against actuator until plunger is depressed and test light goes out. Tighten mounting screws.

Back P nel Retract Limit Switch: With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully folded. Attach test light to top terminals of switch. Fold back panel until rubber pads underside of deck lid are compressed and back panel motor stalls. Move switch against actuator until plunger is depressed and test light goes out, then move switch an additional 1/16" against actuator and tighten mounting screws.

Top Lock Limit Switch: With top erected, but unlocked, remove access cover in No. 1 bow and move switch so plunger will not be compressed when top is locked. Operate top motor until top locks and motor stalls, then release control switch. With a test light attached to two inboard (rear) terminals of switch, adjust switch plunger against actuator until test light goes out, then move switch an additional 1/16" against actuator and tighten mounting screws.

Top Unlock Limit Switch: With top erected and No. 1 bow access cover removed, raise deck lid and back panel until top just starts to unlock. Loosen switch so plunger will not be depressed when top is unlocked. Insert a 1/8" shim between left hand end of lock linkage and linkage stop, then unlock top fully. Shim should be held in place by lock linkage. With a test light attached to two outboard (rear) terminals of switch, adjust switch plunger against actuator until light goes out. Tighten mounting screws. *CAUTION - Lock linkage stop must b adjusted so switch actuator will n t hit switch body.*

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LINCOLN CONTINENTAL TOP CONTROL (Continued)

Top Up Limit Switch/Top Lock Limit Switch No. 1: With top erected and locked, No. 1 bow access cover removed, and switch loosened, attach a test light to switch terminals and adjust switch plunger against nylon actuator until light goes out, then move switch an additional 1/16" and tighten mounting screws.

T p Up Limit Switch (In Main Pivot Casting): With deck lid opened, slide switch down so plunger will not be depressed when top fully erected. Raise top until No. 1 bow almost contacts windshield header. Disconnect double connector from switch, attach a test light to switch terminals, and slowly raise top until No. 1 bow contacts windshield header and package tray reaches proper position. *NOTE - Make sure best weather seal at package tray and rear side rail weatherstrips is is obtained.* Move switch against top linkage until test light just goes out, then tighten switch mounting screws.

Deck Open Limit Switches No. 1 & 2: With deck lid partially opened, move switches so they will not be activated when deck lid fully open. Insert a 1/8" shim between both deck lid hinges and their opening stops, then open deck lid. Shims should be held **in place by deck lid hinges.** With a test light attached to rear two terminals of either switch, adjust switch plunger against actuator until test light goes on. Tighten switch mounting screws. Repeat for other switch.

Top Lock Cut-Off Switch: With deck lid fully raised and back panel completely folded under so it contacts rubber pads, loosen switch adjusting screws and move switch against actuator until switch fully depressed. Tighten adjusting screws.

HYDRAULIC FLUID LEVEL CHECK: Loosen filler plug in end of reservoir. Start engine and run at fast idle while cycling top three times to bleed air from system. With top erected and deck lid open, remove filler plug. If fluid does not run out of opening, add heavy duty brake fluid so fluid is level with edge of filler plug hole. Install filler plug.

FORD THUNDERBIRD TOP CONTROL

Ford Thunderbird (1961)

DESCRIPTION & OPERATION: *See "Ford Thunderbird Top Control" in 1960 Final Data or later Manual dition and note the following:*

Relays - Deck solenoid power relay and top solenoid power relay have been eliminated. *See 1961 Wiring Diagram for details.*

EMERGENCY MANUAL OPERATION: Unlocking Deck Lid - If deck lock motor fails to operate, manually unlock deck lid to gain access to deck lock motor as follows: Place floor jack under frame rear crossmember and raise car approximately 10". Remove each deck lid lock retaining screw (underside of each wheelhouse). Lift front edge of deck lid about 1 inch and operate top control switch to complete opening of deck lid.

Opening Deck Lid - Unlock deck lid by operating top control switch or by using the above procedure. Loosen the two straps supporting the fuel tank and lower tank approximately 1 inch. DO NOT remove straps or tank. From beneath lower back panel, remove both deck cylinder retaining screws from each side. Complete opening of deck lid. If deck lid locks have been released from wheelhousings the nut and housing portion of locks will remain attached to deck lid.

Erecting Top - *NOTE* - It may be necessary to erect top manually if: Electric-hydraulic motor fails; there is an open circuit in motor feed; the top solenoid valves fail; there is an open circuit in the feed line; a top cylinder or linkage fails. Unlock and open deck lid. Energize both top solenoid valves using suitable jumper wires and 12 volt source. If either valve is inoperative, disconnect the hydraulic lines connected to the valves so that there will be no hydraulic block in top cylinders , then manually erect top.

TROUBLE SHOOTING & DIAGNOSIS

►*TESTING NOTE:* Usual cause of top malfunction is a defective or improperly adjusted switch. Make switch checks before making further tests.

SUPPLY CIRCUIT TESTING: Use a continuity light between ground and various points in supply circuit. With ignition switch in ON or ACC position and selector lever in N or P, check the following in sequence: Circuit breakers, neutral switch relay, actuator switch, and relay power bus bar.

SWITCH CIRCUIT TESTING: Check switch for improper adjustment by depressing switch stem. Check for electrical failure by bypassing switch with jumper wire directly at switch contact terminals or wire connectors. *NOTE - Continuity light cannot be used to test switch circuits as current draw required by light will not allow relay coils to energize.* To bypass switch circuit, connect jumper wire between relay bus bar and relay coil terminal. If motor or solenoid operates, check switch circuit for defects. If audible "click" of relay is heard, switch circuit troubles are indicated. If motor or solenoid fails to operate and relay operates, check for defective motor, solenoid, or respective circuits.

MOTOR & SOLENOID TESTING: Use a 12-volt power source and jumper wire directly to motor or solenoid, or bypass motor ground circuit breaker to isolate trouble.

UNIT & OPERATION TESTING: Use a 100 Ampere scale ammeter between main feed 50 ampere circuit breaker on starter relay and motor supply lead (black wire) supplying control relay bus bars. If a switch is improperly adjusted so it closes the relay circuit for any cycle but still does not open the cycle just finishing; or if switch is faulty, ammeter reading will indicate the trouble. *See "Electrical Test Specifications" below.*

ELECTRICAL TEST SPECIFICATIONS

Operation	Maximum Amperage Draw ① Amperes
Deck Lid Unlock	30
Deck Lid Open	90
Package Tray Extend	35
Package Tray Fold	30
Top Erect or Retract	75
Deck Lid Close	70
Deck Lid Lock	25

① - Battery must be 11.5-12.5 volts for these tests.

Unit	Electrical Unit Current Draw ② Amperes
Pump Motor (Normal)	32-48
(Bypassing)	58
Tray Motor (Normal)	30-35
(No Load)	18-21
(Stalled)	100
Lock Motor (Normal)	18-22
(No Load)	15-18
(Stalled)	50
Solenoids (Each)	10

② - With 100 ampere scale ammeter between 50 amp. circuit breaker and relay feed wire.

HYDRAULIC CHECKS

►*NOTE:* Faulty hydraulic system operation can be caused by lack of fluid, leaks, air in system, obstructions or kinks in hoses, or faulty operation of cylinder or pump.

Fluid Level: Retract top, remove filler plug and check fluid level (bottom edge of filler hole). If low, check for leaks, adding heavy duty brake fluid as necessary.

Lift Cylinder Operation: Operate top control switch and observe operation of lift cylinders. If movement of piston rods is sluggish or uneven, check hoses from pump to cylinders for kinks. If one piston rod moves more slowly than the other, the cylinder with the slower rod is defective and should be replaced. If both rods move slowly or not at all, disassemble and repair pump.

ADJUSTMENT

Top Down Switch: Lower top to full down position, place a .060" shim between end of switch shaft and roof hinge arm. Adjust switch firmly to the end of its travel against shim. Tighten mounting screws and remove shim.

Deck Closed Switch Adjustment: Use Tool T57P-15780-A. Pull apart the switch quick disconnect and attach a continuity test light to wires that go to bottom set of contact terminals. Press tool firmly into the lock nut and adjust switch upward until the test light attached to the bottom set of contacts just goes on, then tighten switch mounting screws and remove tool.

Deck Closed Switch Actuator Adjustm nt: Use Tool T57-15780-A. Position tool over lock screw, press tool firmly against lock screw shoulder. Pivot tool to line up with switch actuator. Bend actuator until it touches raised portion of tool.

Deck Closed Switch Actuator Adjustm nt: If operation of deck lid discloses that deck lid pops up when opening, the switch actuator may be bent very slightly away from deck lid.

Top Up Switch: Raise top to full up position. Place .060" shim between end of switch shaft and roof hinge arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shim.

Tray Erect Switch: Extend package tray on the deck lid to end of its travel. Place .060" shim between end of switch shaft and switch actuator on the tray support arm. Adjust switch firmly to the end of its travel against the shim. Tighten switch mounting screws and remove shim.

Tray R tract Switch: Retract the package tray on the deck lid to the end of its design travel. Place .060" shim between end of switch shaft and the switch actuator on tray support arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shims.

CONTINUED ON NEXT PAGE

FORD THUNDERBIRD TOP CONTROL (Continued)

Deck Open Switches: Both right and left deck open switches are adjusted in same manner. Raise deck lid to full open position, place .060" shim between end of switch shaft and actuator. Adjust actuator so that the switch shaft is fully depressed. Tighten actuator mounting screws and remove shim.

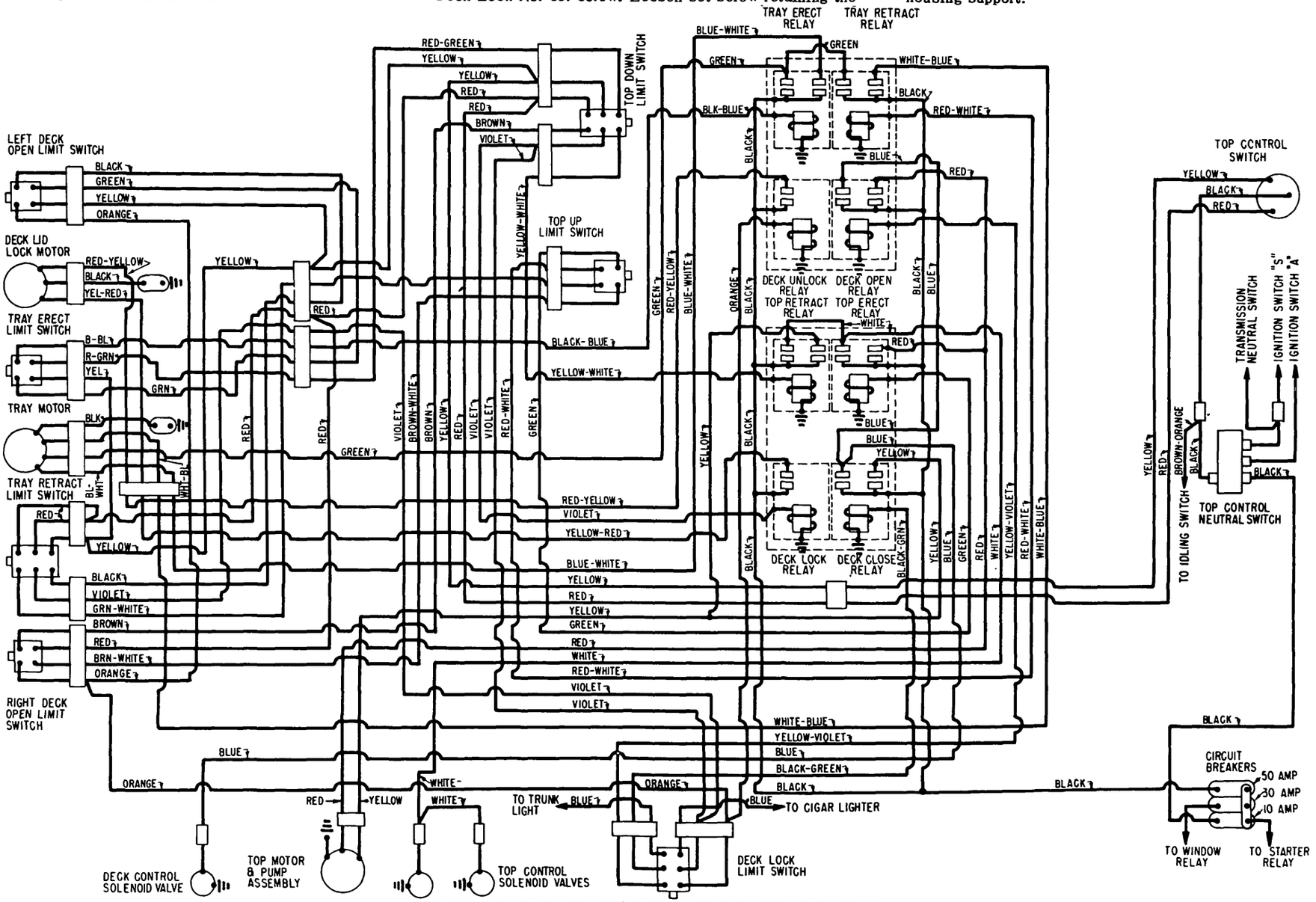
DECK LOCK ADJUSTMENT: *NOTE* - For adequate seal, deck lock screw assembly must be adjusted to engage properly with the lock nut assembly.

Deck Lock Screw Assembly: Loosen two nuts retaining lock screw assembly to deck lid and adjust the assembly fore and aft to align with lock nut assembly.

Deck Lock Nut Housing Support: Loosen two screws retaining lock nut housing support to quarter panel and adjust support side to side to align with lock screw.

Deck Lock Nut Set Screw: Loosen set screw retaining the locknut in housing assembly and turn lock nut in or out to the required position. The Tool T57P-53510-A may be used to turn lock nut as necessary. *CAUTION* - DO NOT attempt any trial locking of deck unless set screw is properly tightened.

Deck Lock Nut Housing Height: The foot of the lock nut housing assembly may be adjusted up or down from the wheelhouse to insure the correct positioning of the "O" ring. The "O" ring should be centrally located in housing support.



THUNDERBIRD CONVERTIBLE TOP CONTROL WIRING DIAGRAM

AIR CONDITIONING SERVICE CAUTIONS

HANDLING FREON: Though considered the safest and best refrigerant for use in Air Conditioning systems, the following precautions must be observed to avoid serious accidents or damage to the system

Drum: 1) Do not leave drum uncapped (metal cap furnished with drum is for protection of valve and safety plug) It should be replaced after each use of drum

2) Do not carry drum in passenger compartment of car Place drum in luggage compartment or, if in an open truck, cover drum to protect it from radiant sun heat If precaution not taken, resultant increase in pressure may cause safety plug to release or drum to burst

3) When charging system, do not subject drum to high heat Use water no warmer than 125°F (Hot rags will suffice) *Never place drum on radiator, stove, or use torches for heating during charging.* Keep drums upright

4) Never permit a drum to be dropped or strike another drum violently

5) Do not fill drum completely (when filling one drum from another) Leave space above liquid for expansion

Personal: 1) Do not discharge Freon into room with exposed flame because concentrations of this gas in contact with open flame will produce a toxic gas

2) Do not expose eyes to liquid *USE GLASSES OR GOGGLES. Liquid Freon will freeze anything with which it comes in contact* If Freon should strike eyeballs, splash water to area of eye to gradually get temperature above freezing point, apply a few drops of sterile mineral oil to eyes as an irrigator If irritation continues, wash eyes with a weak solution of boric acid *DO NOT RUB EYES See an eye specialist at once*

3) Do not inhale large quantities of Freon vapor as it will act an an anesthetic

4) If Freon comes in contact with skin, injury should be treated for frostbite

HANDLING REFRIGERANT LINES: 1) Keep refrigerant lines dry and clean. Whenever a connection or joint is broken, clean all dirt from joint or connection

2) Parts from stock are capped and dehydrated Caps should only be removed just prior to installation Lines removed from system to be used again, should be capped immediately, to prevent dirt and moisture from entering lines

3) Lines should be free of kinks, and should be carefully stored to avoid crushing or bending

4) Proper size wrenches should be used when tightening fittings Always use two wrenches to prevent twisting copper tubing

5) Tubing that is left free to vibrate will harden and crystallize the area of the tubing at flare sections so that it may become brittle and break

6) When using paint drying lamps, ovens, steam cleaners, or other heat producing devices, avoid heating any part of system If sufficient heat applied, pressure will increase to a point where some part of system will rupture

7) When undercoating, use care to see that undercoating does not plug evaporator drain Do not coat air conditioning joints and connections

8) Keep gauge set and lines free of moisture

9) Compressor lubricant container must not be left open longer than necessary as the special oil is moisture free and will absorb moisture from air if left uncapped

AIR CONDITIONING LEAK TESTS

LEAK TESTING CONFINED AREAS. For leak testing confined areas, such as sections of evaporator and condenser a torch or flame type detector must be used Two types are available One type uses anhydrous methyl alcohol under pressure for producing the testing flame The cylinder is refillable and must be preheated to pressurize cylinder The other type uses propane gas under pressure, to produce the testing flame The cylinder is replaceable and comes already pressurized making it unnecessary to pre-heat cylinder in order to produce testing flame Instructions for use of the detectors are furnished with the detector

Leak Testing: With flame adjusted, explore for leaks by moving end of hose or sampling tube around all points where a leak may be Especially check around bottom of connections, since Freon is heavier than air and will be more apparent at bottom of fitting Color of flame will turn to a yellow-green when a small leak is detected Large leaks will be indicated by a change in color to bright or brilliant blue or purple When hose or tube is moved away from leak flame will clear to an almost colorless pale-blue or green *CAUTION*–Do not use lighted detector in any place where combustible or explosive gases dust or vapors may be present Do not breathe fumes and black smoke that are produced if leak is a big one Before leak testing be sure car is thoroughly aired (particularly if Freon tank used or if system opened for any reason) and moved to a Freon-free area in order that false readings may be prevented

PIN-POINTING LEAKS: There are a number of fittings and places throughout the air conditioning unit where a leak detector solution or detergent may be used to pin-point leaks Apply solution to suspected area with swab that is attached to bottle cap Bubbles will form, within seconds if there is a leak

AIR CONDITIONING TROUBLE SHOOTING

►*CAUTION Do not disconnect refrigerant lines, replace parts, or attempt adjustments without complete instructions See "Air Conditioning Service Cautions"*

POOR COOLING: 1) Blowers Not Operating–Fuse blown or faulty circuit breaker, switch in "Off" position, defective switch, switch resistors or blower rheostats inoperative, broken wire or loose connections, blower motor defective, blower fans or motor improperly installed

2) Restricted Air Flow–Filters clogged, dirt or other obstructions in air ducts, evaporator fins or coils clogged or restricted with frost or ice

3) Refrigerant Flow to Cooling Coils or Fins Incorrect–Expansion valve improperly adjusted or defective, power element or temperature bulb does not contact pressure line properly, restriction in liquid line between receiver and cooling coils or fins, power element or temperature bulb discharged, insufficient refrigerant, by-pass valve, thermostatic switch or solenoid (if so equipped) not properly set or inoperative, modulator valve (if so equipped) defective, break in any part of closed refrigeration system

4) Refrigerant Not Condensing Properly–Air flow through condenser, restricted, high engine operating temperatures, air or excess refrigerant in system, restriction in high pressure side of compressor and condenser

5) Clutch (If So Equipped) Does Not Engage–Defective coil or relay, clutch plate lining worn or saturated with oil causing slippage, air conditioning "On" switch defective, thermostat inoperative, clutch adjustment incorrect

6) Compressor–Belts not adjusted properly worn or broken, operating above normal pressures, disconnect pulley bolts not in place, valves faulty, service valves not fully open

7) Electrical–Loose connections or broken wires between electrical units blown fuses or faulty circuit breakers

TOO COLD: 1) Clutch (If So Equipped) Does Not Disengage–Thermostat inoperative, relay stuck closed, air conditioning "On" switch inoperative

2) Blower Speed Cannot be Reduced–Defective blower switch

VIBRATION–NOISE: 1) Blowers–Loose on shaft, striking housing, foreign material, motor bearings or mounts loose or worn

2) Compressor–Mounting brackets loose, loose internal parts, insufficient oil, too much refrigerant

3) Air Flow–Foreign material in air system, small slits or openings in ducts

INCORRECT OPERATING PRESSURE: 1) Excessive Pressure on High Pressure Side–Air or excess refrigerant in system, air flow through condenser core restricted, kinks or restrictions in line on high pressure side, high engine temperature, shut-off valve on high pressure side of compressor not fully open, insufficient air flow through cooling coil, defective expansion valve or incorrect adjustment

2) Insufficient Pressure on High Pressure Side–Shortage of refrigerant, defective expansion valve or incorrect adjustment, leaky or broken compressor valves

3) Excessive Pressure on Low Pressure Side–Power element or temperature bulb not making correct contact with pressure line, expansion valve needle stuck open or leaking

4) Insufficient Pressure on Low Pressure Side–Restriction in lines shortage of refrigerant, expansion valve needle stuck shut, expansion valve not open far enough plugged or defective, dehydrator-filter (strainer-drier) plugged, power element or temperature bulb charge lost or line plugged, compressor valves faulty, blower fans inoperative, temperature control thermostat does not cut out, moisture or freeze-up

GENERAL MOTORS CARS

Buick & Buick Special (1961)
Cadillac (1961)
Chevrolet Pass. Cars (1961)
Corvair (1961)
Oldsmobile & Oldsm bile F-85 (1961)
Pontiac & Pontiac Temp st (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 BUICK COMPRESSOR NOISE AT LOW SPEED CORRECTION:* Install new compressor rear mounting bracket package, Part No. 1389756, which includes rubber insulators between compressor and bracket.

►*1961 BUICK SPECIAL AIR CONDITIONER PRODUCTION CHANGE NOTE:* On units produced after March 1, 1961 hot gas bypass valve control system is replaced by a clutch cycling temperature control system. Hot gas bypass valve, control wire, and pipes are eliminated and a "cold sensitive" temperature control switch is located in evaporator case. Other parts of system are basically unchanged. See *wiring diagram*

►*SHUT-OFF VALVE NOTE:* Hand operated or Schrader type valves used in intake and discharge lines. *CAUTION – Schrader type valves are opened by special adapters on charging hoses and hoses must be properly connected to th gauge set, and set manifold valves must be completely clos d before making connections to valves.*

►*SERVICE CAUTION: Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing & Troubl Shooting" at beginning of Air Conditioning Section.*

►*1961 BUICK SPECIAL AIR CONDITIONER BUZZING NOISE CORRECTION:* May be caused by low pressure line behind windshield wiper motor contacting motor. Minimum clearance between hose and motor should be¼".

DESCRIPTION: Similar in design and operation to previous systems. All units are located in engine compartment or on front of dash. Cadillac Series 75 has an additional evaporator and blower assembly in trunk.

ADJUSTMENT

COMPRESSOR BELT: Adjust belt as follows:
Buick (Except Special): Adjust belt so strand tension gauge J-7316 reads 90.
Buick Special: Adjust belt so strand tension gauge J-7316 reads 72.
Cadillac: Adjust belt so strand tension gauge reads 90 (new belt), 45–60 (used belt).
Chevrol t & Corvair: ½–¾" deflection with 15 lbs. load applied midway between crankshaft and compressor pulleys.
Oldsmobile & Oldsm bile F-85: With Tension Gauge BT-33-70 installed on belt, adjust tension until pointers on gauge are even with line on gauge plunger.
P ntiac & Pontiac Tempest: Adjust belt with Burroughs Belt Tension Gauge to obtain 100–105 lbs. belt tension.

MAGNETIC CLUTCH: Energize clutch coil from a 12 volt source and check clearance between coil housing outer rim and face of **rotor plate** at three different locations. Clearance should be .025–.035". If not correct, remove pulley and rotor plate and adjust number of shims and spacers as necessary. Shims furnished in .010", .012", .015", .018", .020", .022", .025" thicknesses; and spacers furnished in .070", .093", .108" thicknesses.

EXPANSION VALVE: No adjustment. Valve is preset at the factory.

HOT GAS BYPASS VALVE: Adjust valve for each model as follows:

Buick (Except Special) 1961: Remove control valve lever, counterbalance spring and spacer. Connect service gauges to compressor, then close gauge set valves and open compressor valves to gauge position. Set engine speed to 1600 RPM, then turn unit on and allow for stabilization. Turn adjusting screw in or out with Tool J-7727 or a reworked screwdriver (1/8" wide notch 1/8" deep in center of blade) to adjust suction pressure to obtain a reading of 25–27 lbs. at 90–100°F ambient temperature. *NOTE – If valve has been rebuilt, it may be necessary to add or remove plunger shims to obtain proper adjustment.*

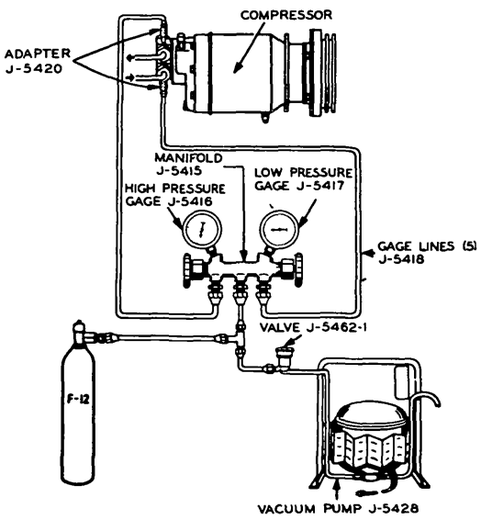
Buick Special 1961: Remove control valve lever, counterbalance spring and spacer. Connect high pressure gauge line to compressor outlet and low pressure gauge line to evaporator. Set engine speed to 1600 RPM, then turn unit on and allow for stabilization. Turn adjusting screw in or out with Tool J-7727 or a reworked screwdriver (1/8" wide notch 1/8" deep in center of blade) to adjust suction pressure to obtain a reading of 26–40 lbs. at 90°F ambient temperature. *NOTE – If valve has been rebuilt, it may be necessary to add or remove plunger shims to obtain proper adjustment.*

Cadillac 1961: Install high and low pressure gauges to compressor and purge gauge lines. Start engine and run at 2000 RPM. Move "Temp" levers to coldest setting and fan switch to "Low". Run system for approximately 5 minutes, then bring the high pressure to 200 lbs. by blocking air flow through radiator and condenser or by placing a fan in front of condenser. When high pressure is at 200 lbs., low pressure should be at 30 lbs. If not correct, remove diaphragm on front of bypass valve and use Adjuster Tool J-6389 to turn adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. *NOTE – Turn adjusting screw ¼ turn and allow time for gauge to settle. Repeat if necessary. This is important as gauge does not immediately indicate actual reading.* Install diaphragm.

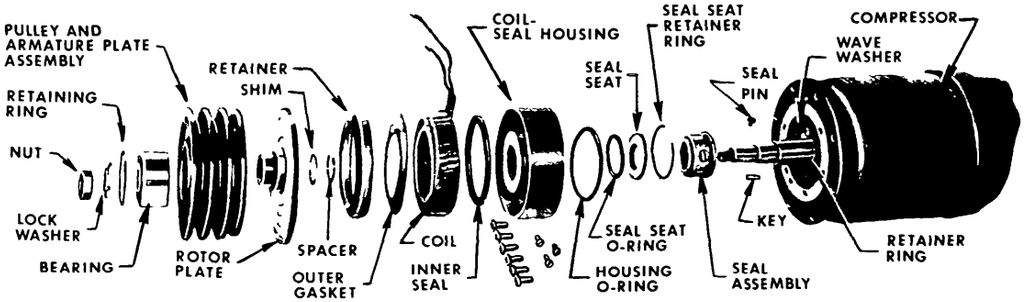
Chevrolet 1959–61: Connect gauge set to compressor, then turn compressor hand shut-off valves partially clockwise. Purge gauge lines by opening gauge set valves for a few seconds, then start engine and operate at 1500 RPM. Set controls for full inside air, maximum cooling, and high blower speed. Stabilize system by operating for about 10 minutes. When compressor head pressure reaches 130–225 lbs., reading on low pressure gauge should be 27 lbs. (1959–60), 26 lbs. (1961) if valve properly set. If pressure reading incorrect, disconnect return spring and cable from valve, and remove clip and pin, lever arm and nylon spacer from valve. Use Tool J-6389 or J-7727 and slowly adjust valve until low pressure reading is correct. Replace lever and other valve parts and adjust valve operating cable.

Oldsmobile & Oldsmobile F-85 1961: Remove cap from gauge fitting on low pressure line near evaporator assembly. Install Adapter J-5420 on low pressure gauge line and connect adapter to gauge fitting on low pressure line. Purge gauge and hose by opening low pressure gauge valve for a few seconds. Start engine and allow to run at 2000 RPM. Move temperature control lever to extreme right position, turn blower speed on "low" and engage "Recirculation" button (if equipped). Place paper in front of condenser to obtain a head pressure of 200 lbs. Check pressure on low pressure gauge and adjust only if pressure is not 23.5–24.5 lbs. (F-85), 29–30 lbs. (Others). To adjust, remove control cable,

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GAUGE SET INSTALLATION

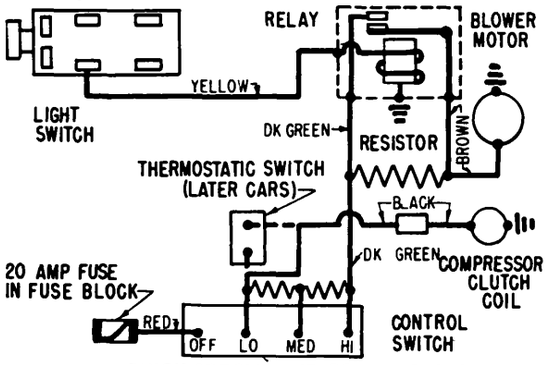


AIR CONDITIONING COMPRESSOR (TYPICAL)

GENERAL MOTORS CARS (Continued)

lever and cam, then insert Tool J–6389 or J–7727 into valve. Adjust pressure to 24 lbs. (F–85), 29.5 lbs. (Others) by turning screw clockwise to increase pressure, counterclockwise to decrease pressure. Turn engine off, remove gauge hose from pressure fitting and replace cap. Reinstall cable and control lever assembly, then adjust control cable (See below).

Pontiac (Except Tempest) 1961: Connect gauge set to compressor, then push temperature control lever full down for maximum cooling (valve lever cam should just contact nylon plunger). Depress "Inside" button and position blower to "Hi". Close doors and windows, then start engine and run at 2900 RPM for 3 minutes. Reading on low pressure gauge should be 19–22 lbs. at 70–90°F ambient temperature. If not within this range, remove valve lever and nylon plunger and adjust valve with Tool J–6389. Turn screw clockwise to increase pressure and counterclockwise to decrease pressure. *NOTE – Make adjustments in small increments and allow time for pressure to stabilize.* Install and adjust control cable.



BUICK SPECIAL AIR CONDITIONING CONTROL DIAGRAM

Control Cable Adjustment (Hot Gas Bypass Valve): Adjust for each car model as follows:

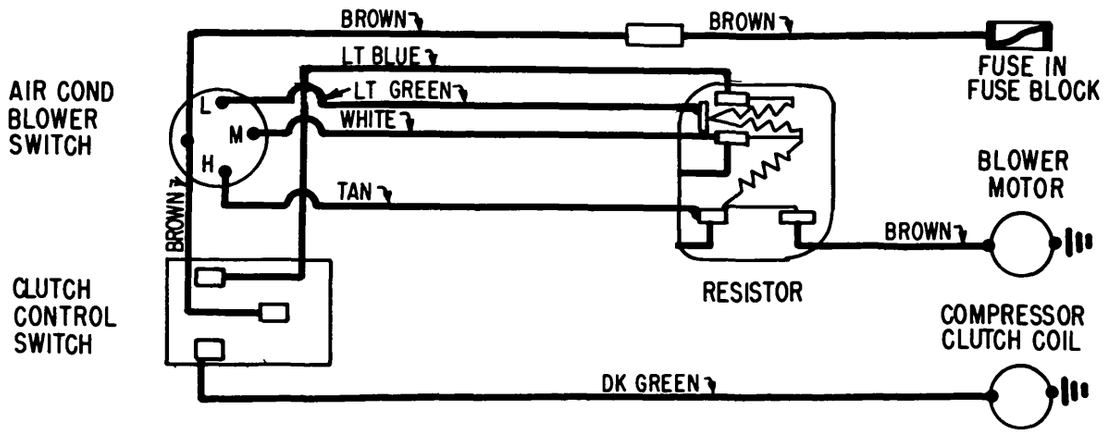
Buick (Except Special) 1961 – Set "Cool" lever for maximum cooling (down position), and loosen control wire cable clamp at hot gas bypass valve. Push valve lever to extreme rearward position (toward instrument panel) and clamp control wire cable.

Buick Special 1961 – Set "Temp" lever for maximum cooling (extreme right), and loosen control wire sheath clamp at valve. Push valve lever forward beyond normal travel and release slowly. Valve lever will return to maximum cold position. Clamp control wire sheath.

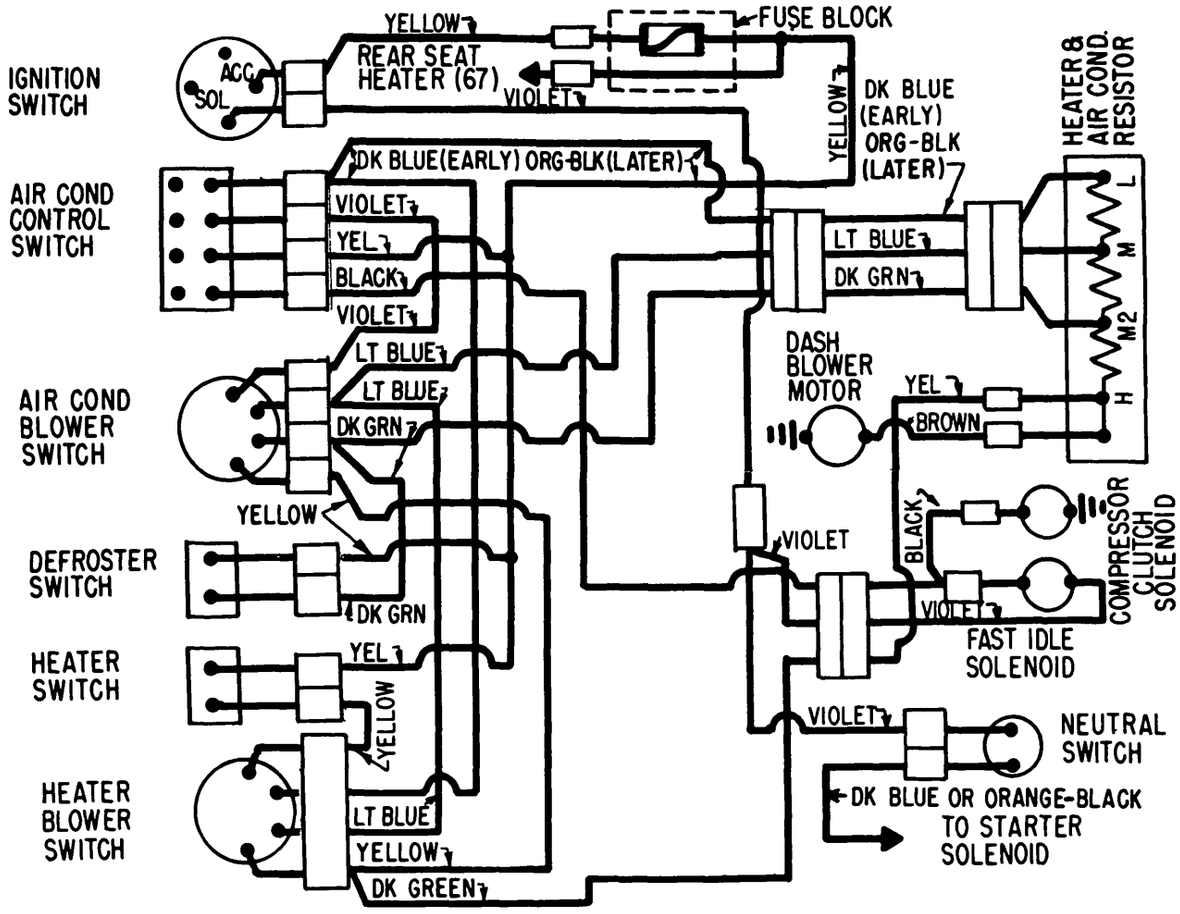
Cadillac 1961 – No adjustment. Valve operation controlled by vacuum diaphragm on valve and vacuum modulator at air conditioner control panel.

Chevrolet 1961 – Make sure cable operates freely, then disconnect return spring. Move COLD lever on dash control to extreme right for maximum cold position. Remove bowden wire loop from lever arm, then move lever arm toward front of car to end of its free travel. Loosen clamp holding bowden wire sheath and move

CONTINUED ON NEXT PAGE



BUICK (EXC. SPECIAL) AIR CONDITIONING CONTROL WIRING DIAGRAM



CADILLAC AIR CONDITIONING CONTROL WIRING DIAGRAM

GENERAL MOTORS CARS (Continued)

sheath until wire loop matches position of lever arm pin when pin is held ¼" to rear of maximum cooling position. Tighten clamp and reinstall wire on lever.

Oldsmobile & Oldsmobile F-85 1961 – Make sure cable is not kinked, then disconnect return spring. Place control lever in extreme right position. Disconnect control cable from lever and loosen cable clamp on bypass valve bracket. Loosen lockscrew on lever assembly. With lever against stop, position cam so that it just touches nylon plunger, then tighten lockscrew. With bypass lever held against its stop, install control wire coil over lever pin, tighten cable clamp and install return spring. Move control lever to extreme left and back to extreme right position. There should now be 1/16" spring-back of lever. Check to make sure cam is just touching nylon plunger.

Pontiac (Except Tempest) 1961 – Disconnect bowden cable loop from valve cam lever and disconnect spring, then pull loop as far forward (toward front of car) as possible. Move lever on valve forward and return it slowly until lever just contacts nylon plunger. Hold lever in this position. *NOTE – If cable loop does not extend 1/8" ahead of valve lever pin, loosen bowden cable clamp at valve and slide cable housing as required.* Tighten cable housing locknuts. Install bowden cable loop on valve lever and connect spring.

THERMOSTATIC SWITCH: Adjust switch for each model as follows:

Buick Special 1961: Pull evaporator face plate out of evaporator case, and remove cardboard cover from right end of thermostatic switch. Attach gauge set to compressor and evaporator. Set engine speed at 1600 RPM, open doors and hood, set "Cool" lever for maximum cooling (extreme right), turn blower on high speed, and make sure heater levers are off. Turn switch adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure to obtain a low pressure reading of 20–31 lbs. at 90°F ambient temperature with compressor head pressure not to exceed 245 lbs.

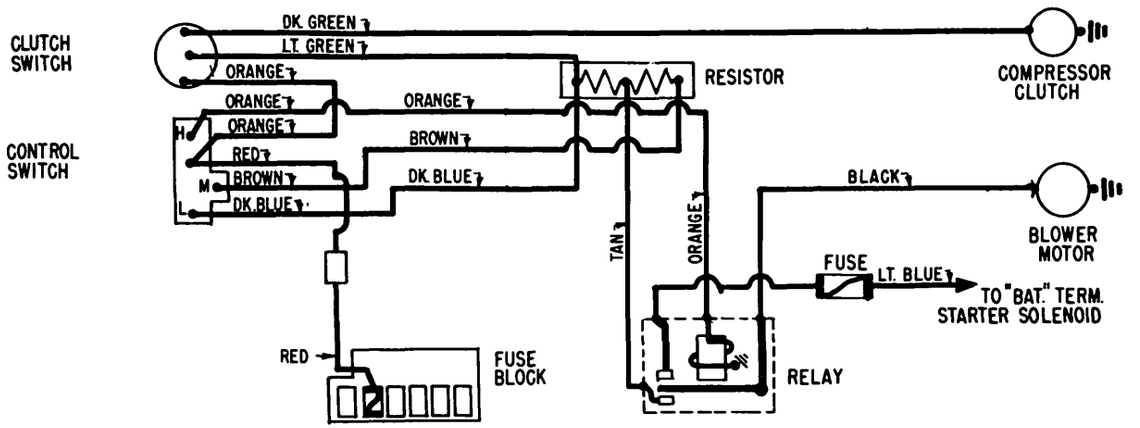
Chevrolet & Corvair 1961: Connect gauge set to compressor, then turn compressor hand shut-off valves partially clockwise. Purge gauge lines by opening gauge set valves for a few seconds, then start engine and operate at 1500 RPM. Set controls for full inside air, maximum cooling, and high blower speed. Stabilize system by operating for about 10 minutes. When compressor head pressure reaches 130–140 lbs. at 70°F ambient temperature, reading on low pressure gauge should be 14 lbs. If pressure reading incorrect, expose switch by removing evaporator face plate and cardboard switch cover, and turn switch adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure in one-turn increments until proper pressure is reached.

Pontiac & Tempest 1961: 1) Remove switch from evaporator and turn knob fully clockwise (full cold position). Determine local barometric pressure (call airport or radio station). Refer to tables below for "make" and "break" temperatures for barometric pressure just obtained.

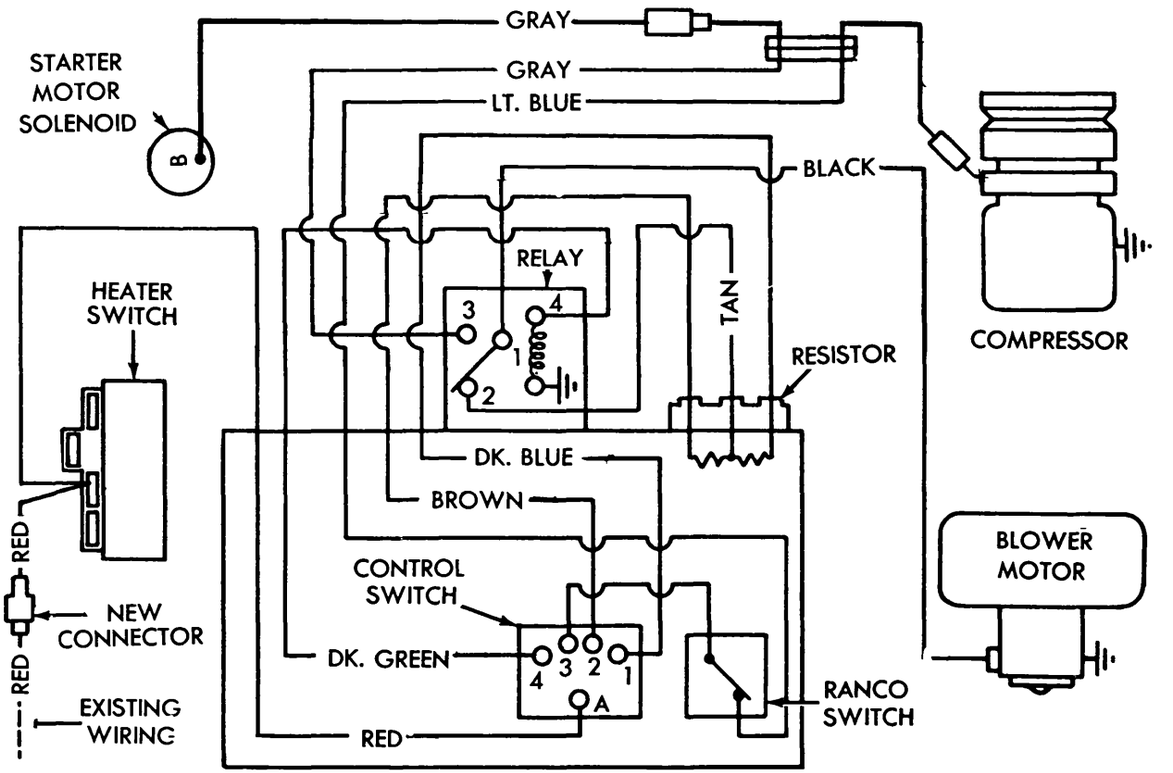
2) Cool some water to 1°F below minimum temperature on chart and immerse capillary part of switch in the water. *NOTE – Do not let any ice in the water touch capillary as a false reading will result.* If switch contacts do not open, adjust as indicated below. If switch contacts do open, raise water temperature about 1°F and immerse capillary. Repeat until contacts do not open. Highest temperature at which contacts open is "break" temperature and should be within limits in table. If not within limits, adjust switch.

3) Reimmerse capillary in water, open points by rotating switch knob to warmer position, then return knob immediately to maximum cold position. Gradually add warm water until contacts close. This "make" temperature should not be higher than 3–4°F than "break" temperature.

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CHEVROLET "ALL WEATHER" AIR CONDITIONING CONTROL WIRING DIAGRAM



CHEVROLET "COOL PACK" AIR CONDITIONING CONTROL WIRING DIAGRAM

GENERAL MOTORS CARS (Continued)

Adjustment – Remove switch fiber cover and turn adjusting screw counterclockwise to lower "break" temperature, and clockwise to raise "break" temperature. One turn of screw will change "break" temperature about 4°F.

Pontiac & Tempest Thermostatic Switch Specifications

Barometric Pressure	Pontiac ①Break Limits	Tempest ①Break Limits
25	32–35°F	33–37°F
26	33–36°F	33½–37½°F
27	33–37°F	34½–38½°F
28	34–37°F	35–39°F
29	34–38°F	36–40°F
30	35–39°F	36–41°F

① – Highest temperature at which contact points open.

Make Limits – Minimum temperature at which contact points close should be 3–4°F higher than break limits temperature.

COMPRESSOR CLUTCH SWITCH: Buick (Except Special) 1961 – Bend switch operating tab on lever to which "Cool" control wire is attached so switch is in extreme off position when "Cool" lever is in the off position.

Chevrolet 1961: With "Outlet" knob fully out, secure cable to door control rod with rod placed at end of travel furthest from driver's side of car.

Oldsmobile (Except F–85) 1961: Bend switch bracket as necessary so switch will close when sliding lever in control assembly is moved ¼" from extreme left position.

Pontiac (Except Tempest) 1961: Adjust switch position so switch closes when control lever is moved downward ¼" from full up position.

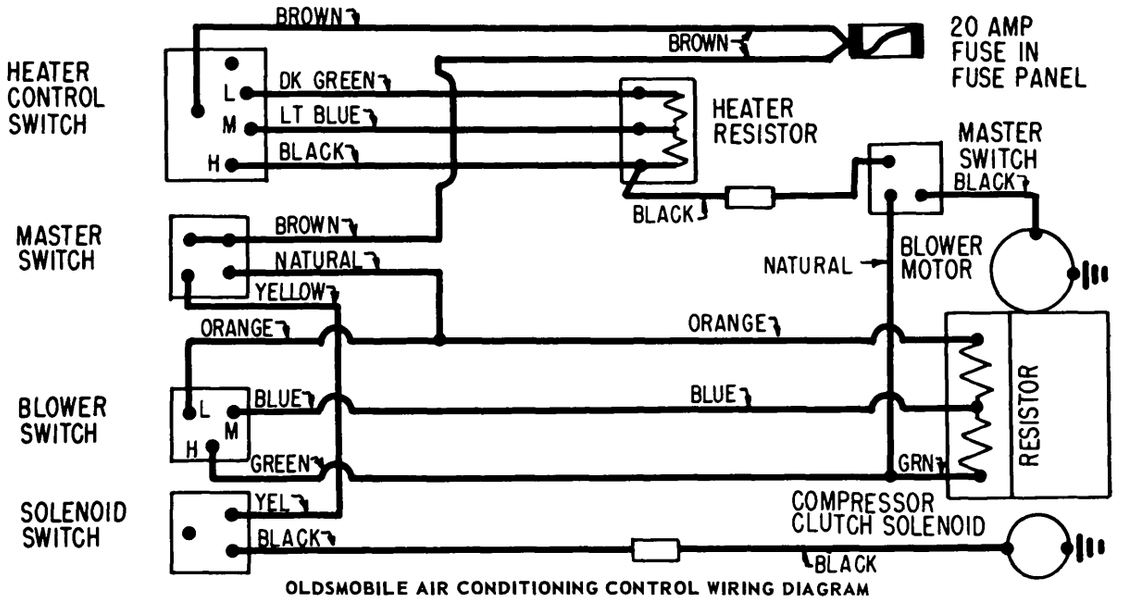
FAST IDLE ADJUSTMENT: Chevrolet – Adjust hand throttle wire guide stop to limit engine speed to 900 RPM with control lever pulled out and transmission in neutral. Check to see that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not operating.

SERVICING

GAUGE SET INSTALLATION: Connect gauge set into system (see illustration and "System Gauge Connection Note" below). *NOTE – For purging or adding oil to system, Freon tank and Vacuum Pump are not connected to center connection on manifold.* Make sure that shut–off valves on gauge set are fully closed and that shut–off valves on compressor head (cars with this type valve) are turned fully COUNTERCLOCKWISE (back seated).

► *SYSTEM GAUGE CONNECTION NOTE* Usual location for gauge set connections is at the compressor. However, the low pressure line valve may be located at the hot gas bypass valve. On some cars, high pressure valve is located at the compressor muffler on the left wheelhouse panel with the low pressure valve at the air intake pipe near the dash panel, also on left wheelhouse panel. Some cars have an additional low pressure line valve at the evaporator case inside passenger compartment. *This valve must be used for low pressur gauge connection when adjusting hot gas bypass valve. See individual hot gas bypass valve adjustment procedures above for particular car application.*

► *SCHRADER TYPE VALVE CONNECTION CAUTION: On cars using this type valve in place of hand operated shut–off valves in refrigerant lines at compressor head, it is necessary to connect Adapters J–5420 to gauge connecting lines and to make sure that both valves on gauge set are completely closed before connecting adapters to Schrader type valves as the adapters will automatically open these valves.*



OLDSMOBILE AIR CONDITIONING CONTROL WIRING DIAGRAM

► *HAND OPERATED SHUT–OFF VALVE NOTE.* These are two–way valves. When turned COUNTERCLOCKWISE (back seated), compressor is connected to refrigerant lines and line to gauge fitting is closed. This is the normal operating position. When turned CLOCKWISE (front seated), compressor is closed off from refrigerant lines and open to gauge fitting. When valves are turned to middle position, compressor is open to both refrigerant lines and to gauge fitting. In this position, gauge readings can be taken with system in operation.

► *HIGH PRESSURE GAUGE CAUTION· Due to high operating capacity of compressor, a 600 lb. gauge must be used.*

ALL MODELS (EXCEPT CADILLAC, CHEVROLET & CORVAIR)

PURGING SYSTEM: Connect gauge set (see above), and turn hand shut–off valves (where equipped) partially clockwise. Open high pressure gauge valve so refrigerant escapes through gauge set and out the center fitting and hose. *CAUTION – DO NOT open gauge valve too much as oil and liquid refrigerant will escape. Refrigerant should escape in vapor form only.* When hissing ceases, all refrigerant has been discharged from system. Close gauge high pressure valve. Leave gauge set connected in preparation for evacuating and charging.

CADILLAC

PURGING SYSTEM: Install Adapters J–5420 on high and low pressure valve fittings. Tighten adapters to depress valve cores until a **slight** hissing sound is heard. When hissing stops, system is discharged. *CAUTION – DO NOT overtighten adapters or oil and liquid refrigerant will escape. Refrig rant should escape in vapor form only.* Remove adapters as soon as system is purged.

CHEVROLET & CORVAIR

PURGING SYSTEM: Connect gauge set (see above).Open both compressor hand shut–off valves ¼–turn clockwise from fully counterclockwise position. *NOTE – Corvair has Schrader type valves and this step is unnecessary.* Remove cap from gauge center connection and open high pressure gauge valve, being careful not to open it too far, and slowly discharge **vap r** through center connection. *CAUTION – Opening valve too far will cause compressor oil to be discharged with the refrigerant.* When pressure is reduced below 100 lbs. on high pressure gauge, open low pressure gauge valve and continue discharging until all refrigerant has been released or pressure does not exceed 5 lbs. Close both gauge valves, and compressor hand shut–off valves. Leave gauge set connected in preparation for evacuating and charging.

ALL MODELS

EVACUATING SYSTEM (WITHOUT VACUUM PUMP): Connect gauges as indicated in illustration, but substitute a bottle or other suitable container in place of vacuum pump (container will catch the evacuated oil so it may be measured and a like amount of clean oil replaced). *CAUTION – Be sure the fitting on discharge valve is open to compressor with no restriction from valve closure, caps, or plugs in attached line before starting engine.* Turn both high and low pressure valves on compressor clockwise to gauge position. Leave low pressure gauge valve tightly closed, carefully open high pressure gauge valve and hand shut–off valve (vacuum line valve), being careful to avoid any accidental discharge of liquid refrigerant. Discharge refrigerant, air, and any oil into bottle.

CONTINUED ON NEXT PAGE

GENERAL MOTORS CARS (Continued)

Start engine and set at low idle speed and turn air conditioner to maximum cooling position. *Maintain engine speed at slow idle at all times during evacuation.* Turn high pressure service valve to shut–off position. Operate system at low idle for five minutes, then turn off engine and air conditioner and close hand shut–off valve immediately. If system holds 26–28" of vacuum *(see "Vacuum Note" below)* for 10 minutes, system is not leaking. If not, locate and correct leak. Close high pressure gauge valve, open low pressure gauge valve and charge system with refrigerant at cylinder pressure, then repeat evacuation as indicated above. Again close high pressure gauge valve and open low pressure gauge valve and then complete charging with correct amount of refrigerant *(see "Charging System" below).*

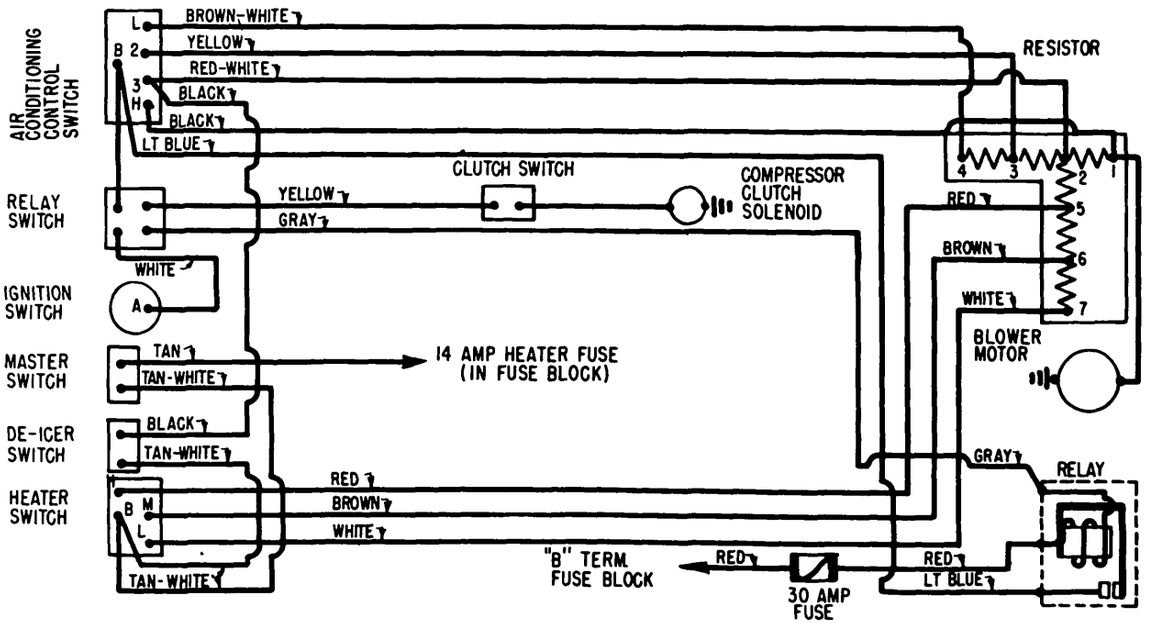
EVACUATING SYSTEM (WITH VACUUM PUMP): Connect gauge set, vacuum pump, and container of refrigerant as shown in illustration. Check fluid level in vacuum pump and add correct oil if necessary. Make sure dust cap on discharge side of vacuum pump has been removed. Open high and low pressure valves on gauge set. *CAUTION – Shut–off valve on vacuum pump must be closed.* Start vacuum pump and SLOWLY open shut–off valve at pump. *NOTE – If oil is blown from pump, oil must be replaced.* Operate pump to obtain approximately 28" of vacuum *(see "Vacuum Note" below)* for 10 minutes. If vacuum of 28" cannot be obtained, close valve at pump and note low pressure gauge to see if vacuum in system holds. If vacuum holds, pump or gauge may be at fault. If vacuum will not hold, charge system with refrigerant, check for leaks, and repair as necessary, then purge system. Repeat evacuation procedure and when vacuum of 28" has been obtained for 10 minutes, close valve at pump, stop pump and check vacuum to see that it will hold. If vacuum holds and no leaks are apparent, open refrigerant container valve to charge system to cylinder pressure, then close valve. Evacuate system again and close gauge valves. The system is now ready for a complete charge.

►*VACUUM NOTE:* Vacuum specification of 28" is for sea level. For each additional 1000 feet of elevation above sea level, lower vacuum specification by 1".

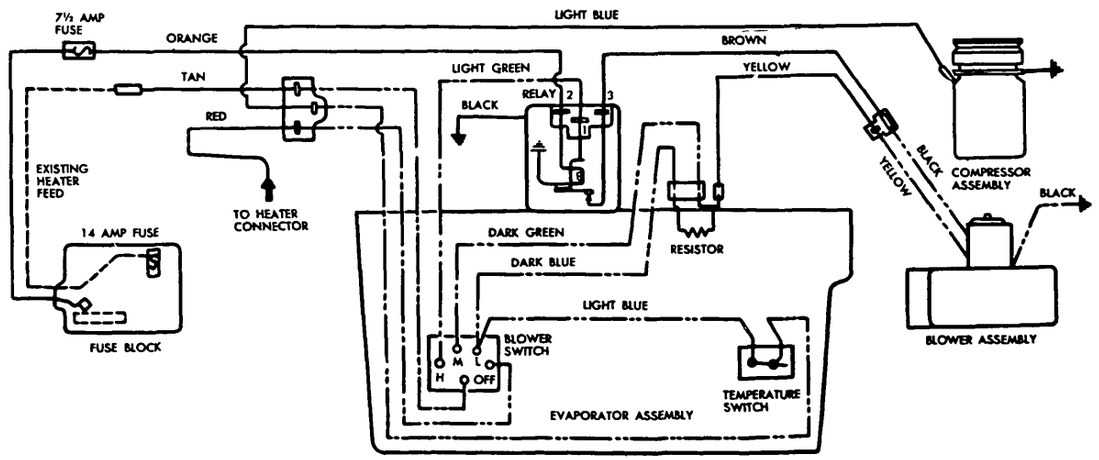
ALL MODELS

CHARGING SYSTEM: With system completely evacuated (gauge set and refrigerant tank connected), place refrigerant cylinder in a bucket of hot water (not to exceed 125°F). *CAUTION – Do not heat refrigerant cylinder above 125°F because fusible plug in cylinder valve melts at 157°F and softens at a slightly lower temperature.* Place cylinder and bucket on a suitable scale and record total weight. Open low pressure valve on gauge set (high pressure valve on gauge set closed). Set both high and low pressure service valves on compressor in gauge position. Wearing goggles to protect eyes, fully open refrigerant cylinder valve and allow refrigerant vapor to flow into system. Operate engine at slow idle speed until the correct amount of refrigerant has been charged into the system (see "Refrigerant Capacity Table" below). *NOTE – It may be necessary to refresh water in bucket to maintain required pressure.* Close both valves on gauge set, close valve on cylinder and remove cylinder from bucket. Operate compressor with engine running at 1600 R.P.M. and check removal performance of air conditioner. If performance satisfactory, stop engine, then firmly backseat both high and low pressure service valves on compressor. Remove gauge lines and replace protective caps over gauge connections and shut–off valves. Check oil level in compressor (see below).

CONTINUED ON NEXT PAGE



PONTIAC "CIRC-L-AIRE" AIR CONDITIONING CONTROL WIRING DIAGRAM



PONTIAC "COOL PACK" AIR CONDITIONING CONTROL DIAGRAM (TYPICAL OF TEMPEST)

GENERAL MOTORS CARS (C ntinued)

Refrigerant Capacity Table

Car Model	Capacity
Buick (Except Special)	4½ lbs.
Buick Special	2½ lbs.
Cadillac (Except Series 75)	4½ lbs.
Cadillac, Series 75	6 lbs.
Chevrolet Cars (All Weather System)	3 lbs., 12 ozs.
Chevrolet Cars (Cool Pack System)	3 lbs.
Corvair	5 lbs.
Oldsmobile (Except F–85)	5 lbs., 3 ozs.
Oldsmobile F–85	2 lbs., 8 ozs.
Pontiac (Circ–L–Aire System)	5 lbs.
Pontiac (Cool Pack System)	3.25 lbs.
Pontiac Tempest	3 lbs.

ALL MODELS (EXCEPT CADILLAC)

CHECKING & ADDING OIL TO COMPRESSOR: Checking – Operate engine at slow idle for 5 to 7 minutes with system operating, then stop engine. Loosen screw in oil test fitting on side or bottom of compressor and allow a slight seepage of oil. Retighten screw for a moment and then "crack" open slightly again. If a steady flow of oil is evident, the oil level is either at a safe minimum level of 4 ounces or above it. When oil test screw is cracked open a second time and no oil escapes, or there is a hissing sound, the oil is below a safe minimum and oil should be added.

Adding Oil (Buick & Buick Special): Purge system and remove compressor. Drain oil from compressor. If oil is dirty, flush compressor and condenser with liquid refrigerant. Pour 13 ozs. of new 1000 viscosity oil to compressor through oil check fitting. Install compressor, evacuate and charge the system.

Adding Oil (Chevrolet & Corvair – Off Car): Purge system and remove compressor. Drain and measure oil from compressor. If oil is dirty, flush system with liquid refrigerant. If system was flushed, add 13 ozs. of new 1000 viscosity oil to compressor. If system was not flushed, add new oil in the amount drained from compressor. Install compressor, evacuate and charge the system.

Adding Oil (Chevrolet & Corvair – On Car): *NOTE – Manufacturer recommends following method as the only method for adding a partial charge of oil.* Attach gauge set to compressor, fill Oil Injector Tool J–7605 with 2 ozs. of 1000 viscosity oil and install tool on low pressure side of gauge set with valve at bottom of tool turned fully clockwise. Turn compressor hand shut–off valves fully counterclockwise and purge air and moisture from gauge lines. Operate engine at fast idle and set air conditioner controls for maximum output. Open both gauge valves fully and compressor hand shut–off valves 2 turns clockwise. Open valve on oil injector tool slowly and allow engine to run until all oil is drained from tool. Close gauge valves and recheck oil level. Repeat process if necessary. *CAUTION – Do not add mor than 4 ozs. of oil b for r ch cking oil l vel.*

Adding Oil (Oldsm bil & Oldsm bile F–85 – Off Car): Turn compressor hand shut–off valves fully clockwise and remove shut–off valves (Oldsmobile), pipe adapter plate (F–85) from compressor. Remove compressor, drain and measure oil from compressor. Flush compressor and condenser with liquid refrigerant if oil dirty or contaminated. Pour 9 ozs. (Oldsmobile), 13 ozs. (F–85) new 1000 viscosity oil into compressor and tighten oil drain screw. Install compressor, evacuate and charge the system.

Adding Oil (Oldsmobile & Oldsmobile F–85 – On Car): *NOTE – For procedure for F–85 with low pressure hand shut–off valve at right angle to evaporator low pressure pipe, see special Oldsmobile F–85 note below.* Install gauge set and purge high and low pressure lines. High pressure hand shut–off valve on compressor should be turned 2 turns clockwise. Compressor low pressure hand shut–off valve should be fully clockwise. Install oil charging line to center connection on gauge set and purge line. While vapor is escaping from oil line, insert oil line to the bottom of a 1000 viscosity oil bottle and allow vapor to bubble through the oil. Close high pressure valve on gauge set. With temperature control set for maximum cooling and "Normal" button pushed in, let engine run at slow idle to obtain about 10" of vacuum. If vacuum on low pressure gauge holds, open gauge set low pressure valve and allow 2 ozs. of oil to be drawn into system. Close gauge set low pressure valve, remove oil line from bottle, and cap gauge set center connection. Open gauge set high pressure valve, then open gauge set low pressure valve slowly so high pressure forces remaining oil into compressor. Close gauge set valves and turn compressor low pressure valve fully counterclockwise. Operate engine at 1600 RPM for 5 minutes and stop engine. Check oil level and add 2 more ozs. of oil if necessary.

►*OLDSMOBILE F–85 ADDING OIL NOTE (Units With Low Pressure Hand Shut–Off Valve At Right Angle To Evaporator Low Pressure Pipe):* Turn compressor hand shut–off valve fully clockwise (closed position), then purge compressor through high pressure valve. Disconnect low pressure hose and valve and pour 2 ozs. of 1000 viscosity oil into hose. Install a new "O" ring on hose and connect to hand shut–off valve. Remove cap from gauge outlet on high pressure hand shut–off valve, start engine and run at slow idle for about 5 minutes with air conditioning "On" to evacuate compressor and hoses, then install cap and stop engine. Open low pressure hand shut–off valve fully (loosen high pressure protective cap and allow a small amount of refrigerant to escape to remove any air in hose). Tighten cap and open high pressure valve fully. Operate engine at 1600 RPM for 5 minutes with air conditioner at maximum cooling and "Low" button depressed. Check oil level and repeat process as necessary.

Adding Oil (Pontiac & Pontiac Tempest): *See "Adding Oil (Chevrolet & Corvair – On Car)" above.*

Compressor Oil Capacity

Car Model	①Capacity
All (Except Pontiac & Tempest Cool Pack)	13 ozs.
Pontiac & Tempest Cool Pack System	11 ozs.

① – Fluid measure.

CADILLAC

CHECKING & ADDING OIL TO COMPRESSOR: Checking – Operate engine at 1000 RPM for about 5 minutes with air conditioner set for maximum output. Turn off engine and disconnect generator cooling tube at generator, then adjust compressor to center of its swing on mounting bracket. Wait a few minutes and open oil test screw slightly (screw is at bottom of compressor at forward end). If no oil escapes or if only hissing or vapor is evident, oil should be added (see below). If oil escapes, allow oil to drain until hissing or vapor is evident, then close test screw. Repeat the procedure, then add 2 ozs. of oil (see below).

Adding Oil (On Bench): Remove compressor, then remove oil test screw. Drain and measure oil from the compressor. Flush compressor if oil dirty. Add same amount of 1000 viscosity oil to the compressor as was removed. *NOTE – Do not add less than 6 ozs. of oil even if less than 6 ozs. was drained. Do not add oil at relief valv opening.* Install test screw, then install compressor.

Adding Oil (On Car): *Add oil, 2 ozs. at a time, using gauge set and Oil Injector Tool J–7605 as described under "Adding Oil (Chevrolet & Corvair–On Car)" abov .*

►*CADILLAC OIL CAPACITY NOTE·* When replacing any air conditioning component, add oil to component to insure correct amount of oil in the system. It is unnecessary to add oil when replacing valves or hoses.

Component	Added Oil
Evaporator	3 ozs.
Condenser	1 oz.
Receiver	2 ozs.
Receiver & Condenser	3 ozs.

COMPRESSOR REMOVAL & INSTALLATION

►*CAUTION: To prevent dirt and moisture nt ring air conditioning system, it is very important to cap all openings and to complete work on syst m as soon as possible.*

BUICK (Except Special): Purge system, then remove valve retaining plate from rear of compressor. Cover openings in lines and compressor. Disconnect clutch coil wire, loosen belts, and remove compressor from mounting bracket. To install, reverse removal procedure.

BUICK SPECIAL: Purge system and disconnect high and low pressure hoses at Schrader valves. Pull clutch coil wire from connector at wheelhouse. Remove front stabilizer bar assembly. Remove compressor front brace and front bracket attaching bolts. Loosen bolt holding rear brace to engine mount, then remove bolt and nut holding rear brace and adapter to cylinder block. Loosen front brace–to–timing chain cover bolt and push brace as far out as possible. Remove belt, then lower compressor out from under car. *NOTE – It may be necessary to remov ngin left side fill r plate for sufficient clearanc .* To install, reverse removal procedure.

CADILLAC: Purge system, remove high and low pressure line fitting from compressor. Disconnect clutch coil wires and drive belt. Remove compressor mounting screws and remove compressor. To install, reverse removal procedure.

CONTINUED ON NEXT PAGE

GENERAL MOTORS CARS (Continued)

CHEVROLET (Except Corvair): Remove air cleaner, purge system, remove connectors, and disconnect clutch coil wire. Loosen brace and bracket pivot bolts and remove belt. Remove compressor attaching screws and remove compressor. To install, reverse removal procedure.

CORVAIR: Removal – Purge system, remove fittings block, and cap openings. Remove nut from compressor mounting bracket pivot bolt and remove compressor–to–adjusting bracket attaching parts. Remove belt. Disconnect electrical wires from compressor. Remove bolts attaching triangular bracket to front of compressor. Work long pivot bolt forward until threaded end is moved out of compressor rear mounting boss. Remove compressor.

Installation – Support compressor on mounting bracket and work mounting bracket pivot bolt rearward through compressor rear mounting boss. Loosely install pivot bolt nut and washer. Attach triangular bracket to compressor. Connect wiring, install drive belt, and compressor–to–adjusting bracket attaching parts. Adjust belt tension (see above), then tighten pivot bolt nut to apply light pressure on rubber mounting.

OLDSMOBILE & OLDSMOBILE F–85: Remove power steering pump on F–85. Purge system, then remove valve manifold from compressor and cap lines and openings. Disconnect clutch coil wire. Energize clutch coil from a 12–volt source so pulley nut can be loosened, then remove pulley nut and locking washer. Rebelts. Remove compressor attaching bolts and remove compressor. To install, reverse removal procedure.

PONTIAC & PONTIAC TEMPEST: *NOTE – Compressor can be positioned on fender for access to engine without disconnecting refrigerant lines or purging system.* Purge system. Disconnect clutch coil wire. Slowly remove manifold fittings assembly from compressor and cap lines and openings. Remove compressor attaching bolts, then remove compressor belt. Remove compressor.

►*OVERHAUL NOTE: Compressor clutch, clutch coil, shaft seal, and compressor oil pump are the only parts that are recommended for service replacement. The compressor main body assembly should be replaced as a unit if faulty.*

COMPRESSOR OVERHAUL

COMPRESSOR CLUTCH ASSEMBLY: Removal – With compressor on bench, bend tangs on shaft lockwasher so pulley nut can be removed. Remove capscrews holding pulley hub and armature assembly to pulley. *CAUTION – These screws must be removed to prevent damage to rotor plate during pulley hub and arma-assembly removal.* Use Puller J–8433 and remove pulley hub and armature plate assembly. Remove rotor plate with Remover J–6322. *NOTE – Scoring of these parts is normal and they should not be replaced for this reason.* Remove woodruff key, shims, and spacers from shaft. Remove coil retaining groove pins or screws, remove wire clamp from compressor, then remove coil retainer, outer gasket, coil, and inner seal. Remove pulley bearing retaining ring with Truarc pliers, then press bearing out of pulley.

Installation – Reverse removal procedure and note the following: When installing pulley bearing, press on outer race of bearing only, and be sure that beveled side of snap ring is away from bearing. After rotor installed, check clutch air gap as described under "Adjustments" above. Tighten pulley hug–to–pulley capscrews to 4 ft. lbs. torque; and compressor shaft nut to 6 ft. lbs. torque.

COMPRESSOR SHAFT SEAL & OIL PUMP: Removal – With clutch assembly removed (see above), drain oil from compressor on units having an oil pump (Cadillac, Oldsmobile & F–85). Remove coil housing attaching screws and remove coil housing and wave washer. Remove snap ring, seal seat and "O" rings, then remove shaft seal assembly. Remove shaft seal drive pin and retainer ring; remove oil pump cover and oil pump gears.

Installation – *NOTE – Oil pump gears must be replaced as a matched set.* Install parts in reverse order of removal and note the following: **1)** DO NOT score polished surfaces of shaft seal and seal seat. **2)** Use lint–free tissues (furnished in seal kit) for cleaning parts, and coat all parts with clean 1000 viscosity refrigeration oil. **3)** Seal pin must be properly installed in shaft (seal will not go on pin unless pin is correctly aligned with groove in seal). **4)** Use Seal Protector J–6320 with tapered end to front of shaft to prevent damage to "O" ring inside of seal. **5)** Torque coil seal housing screws to 15 ft. lbs. **6)** After seal housing installed, leak test seal with liquid refrigerant.

STUDEBAKER

Studebaker (1961)

►CHANGES & CORRECTIONS

►*1961 LARK WATER SPLASH FROM EVAPORATOR DRAIN PAN CORRECTION:* Condition may occur on extreme right or left turns. To correct, install Auxiliary Drain Pan Kit, Part No. 1555524.

►*1959-61 LARK COMPRESSOR SUCTION VALVE INTERFERENCE WITH HOOD CORRECTION:* If interference not corrected by shifting valve downward, install new valve, Part No. 1546049 (1961), No. 1546054 (1959-60).

DESCRIPTION: Air conditioning system design is the same as used on previous models.

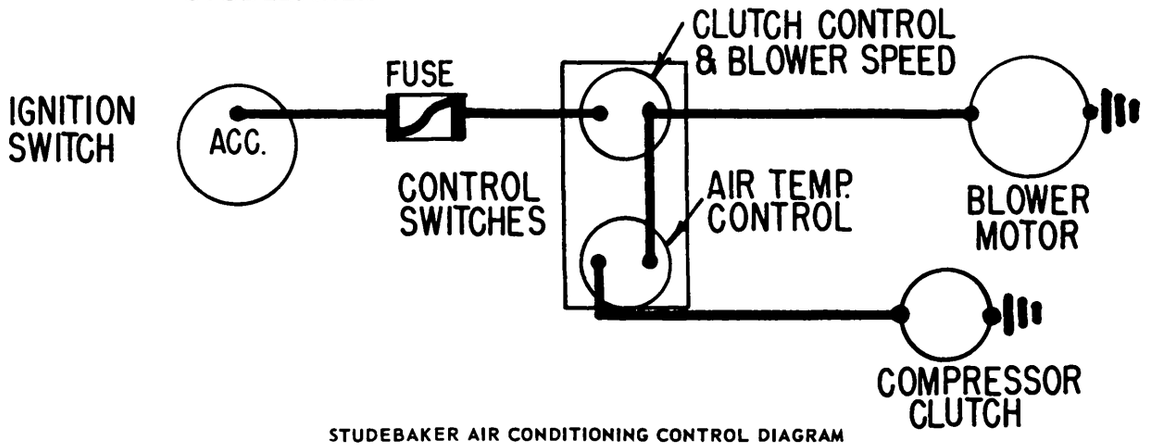
►*SERVICE CAUTION: Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

ADJUSTMENT

COMPRESSOR DRIVE BELT: Loosen idler pulley retaining nut and move pulley as required to tighten belt so a pull of 20 lbs. will deflect belt ½" with spring scale located midway between compressor pulley and idler pulley (6 cyl. models), between compressor pulley and fan pulley (V8 models).

SERVICING

AIR CONDITIONER SERVICE NOTE: All service operations except for removal and installation of compressor for engine repairs should be performed by a competent refrigerant service man.



STUDEBAKER AIR CONDITIONING CONTROL DIAGRAM

►*COMPRESSOR REMOVAL NOTE:* For access to engine on Silver Hawk models, the compressor hoses can be released from clamps on body and fender and the compressor can be moved out of the way. On other models, if necessary to remove compressor from its mounting, see *"Compressor Removal"* below.

COMPRESSOR REMOVAL (When Necessary to Disconnect Hoses): Remove caps and close the upper and lower service valves on compressor, then remove capscrews securing the two valves to compressor. Place tape over openings in compressor and valves. Remove compressor from engine compartment *CAUTION* - Keep compressor in its horizontal position.

Installation: Reverse removal procedure and install new valve-to-compressor gasket. Secure both valves in positions before opening valves. *NOTE -Before installing compressor belt, turn compressor over a few times by hand to discharge any oil that may have collected on top of piston.*

FORD MOTOR CO. CARS

Ford Pass. Cars (1961)
Lincoln Continental (1961)
Mercury (1961)
Thunderbird (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961 LINCOLN CONTINENTAL AIR CONDITIONER BLOWER INTERMITTENT OR NO OPERATION CORRECTION:* May be caused by water entry into vacuum operated blower lock-out switch and corrosion of switch contacts. To correct, wrap replacement switch in a plastic bag and install switch with plastic between mounting bracket and switch bracket.

DESCRIPTION: Similar in design and operation to previous models. Both Eaton and Warner magnetic clutches used.

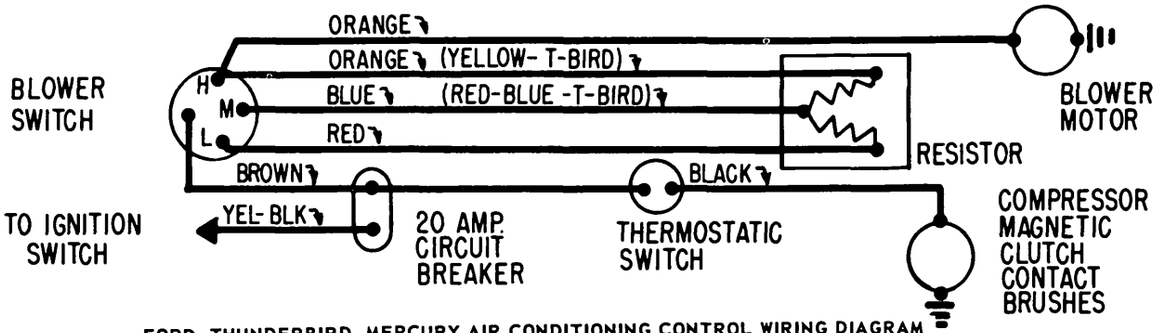
ADJUSTMENT

Compressor Belt: Ford - ½" deflection midway hetween compressor and water pump pulleys.
Lincoln, Mercury, T-Bird - Use Tension Gauge BT33-73F. Tension should be 120-150 lbs. (new belt), 90-120 lbs. (used belt).

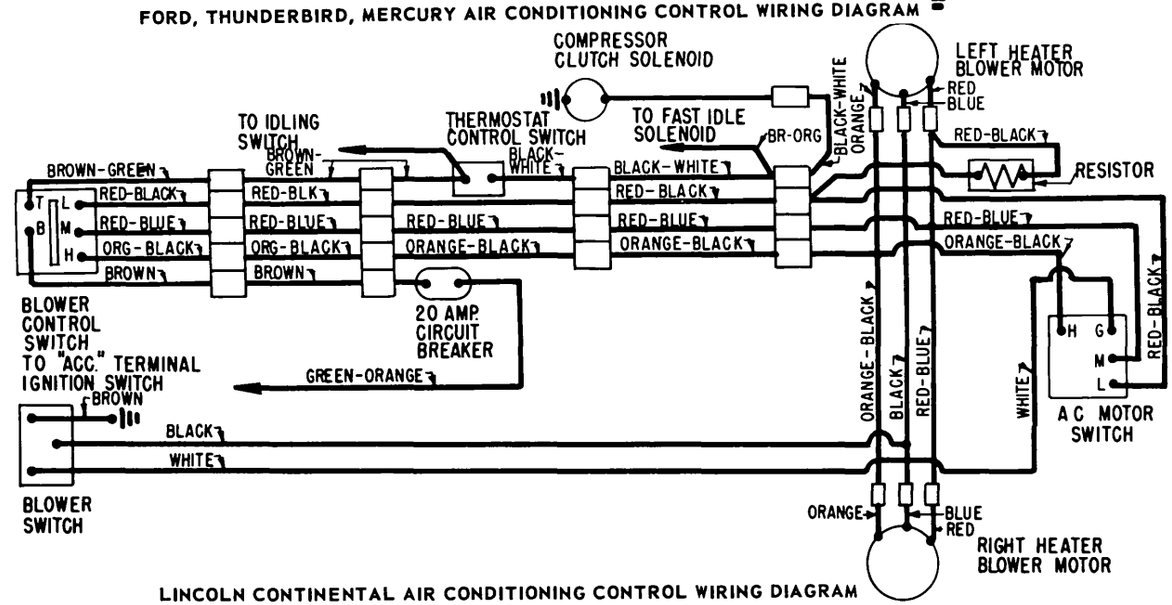
SERVICING

MAGNETIC CLUTCH (Warner): Two-piece design with field coils attached to front seal plate of compressor.
Removal - Same as previous (Eaton) type.
Disassembly - Field coils can be removed by removing three attaching bolts after compressor service valves have been front seated and refrigerant charge relieved.
Installation - To install field coils, first insert centering pilot over compressor shaft and insert three attaching bolts. Torque bolts to 10-13 ft. lbs.
Clutch Bearing Removal & Installation - Remove clutch from compressor and snap ring retaining clutch hub in bearing. Press clutch hub out of pulley bearing (support pulley in belt sheave). Remove snap ring retaining bearing in pulley and press pulley bearing from pulley. *NOTE* - Press from front of clutch towards rear. To reassemble, reverse removal procedure.

►*OTHER DATA: See "Edsel, Ford, Lincoln, Mercury Air Conditioning" in 1958 Final Data or later Manual edition and note the following:*
Freon Capacity - 2½ lbs. (Ford, Lincoln, Mercury), 2¾ lbs. (Thunderbird).
Compressor Oil Level - *NOTE - Height on dip rod inserted in oil filler hole.* ¾" (Ford, Mercury,, Thunderbird); 1¼-1½" (Lincoln).



FORD, THUNDERBIRD, MERCURY AIR CONDITIONING CONTROL WIRING DIAGRAM



LINCOLN CONTINENTAL AIR CONDITIONING CONTROL WIRING DIAGRAM

RAMBLER

Rambler, All Series (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS: Before disconnecting any part of the air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

►*1961 AMERICAN (L-HEAD ENGINE) VIBRATION DURING OPERATION CORRECTION:* Install an Idler Pulley Assembly, Kit No. 3203205. Pulley will also remove slack in belt and prevent belt vibration.

►*1961 CLASSIC SIX (ALUMINUM ENGINE) IDLER PULLEY MISALIGNMENT, NOISE, AND BELT SQUEAL CORRECTION:* Install Idler Pulley Assembly Kit, No. 3203277.

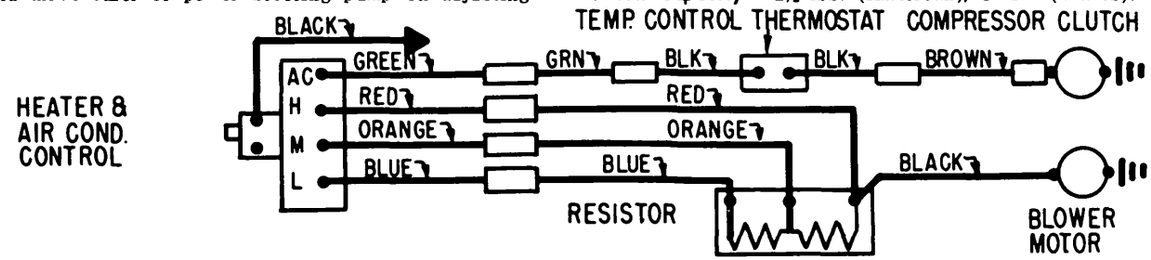
DESCRIPTION: Similar in design and operation to previous models.

LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing & Troubl Shooting" at beginning of Air Conditioning Section.*

SERVICING

COMPRESSOR BELT: Use fan belt strand tension gauge. Place gauge between longest span between pulleys and move idler or power steering pump on adjusting bracket to obtain a reading of 70-80 lbs. (used belt), 110-120 lbs. (new belt).

►*OTHER DATA: See "Rambler Air Conditioning" in 1960 Final Data or later Manual edition and note the following:*
Freon Capacity - 2½ lbs. (American), 3 lbs. (Others).



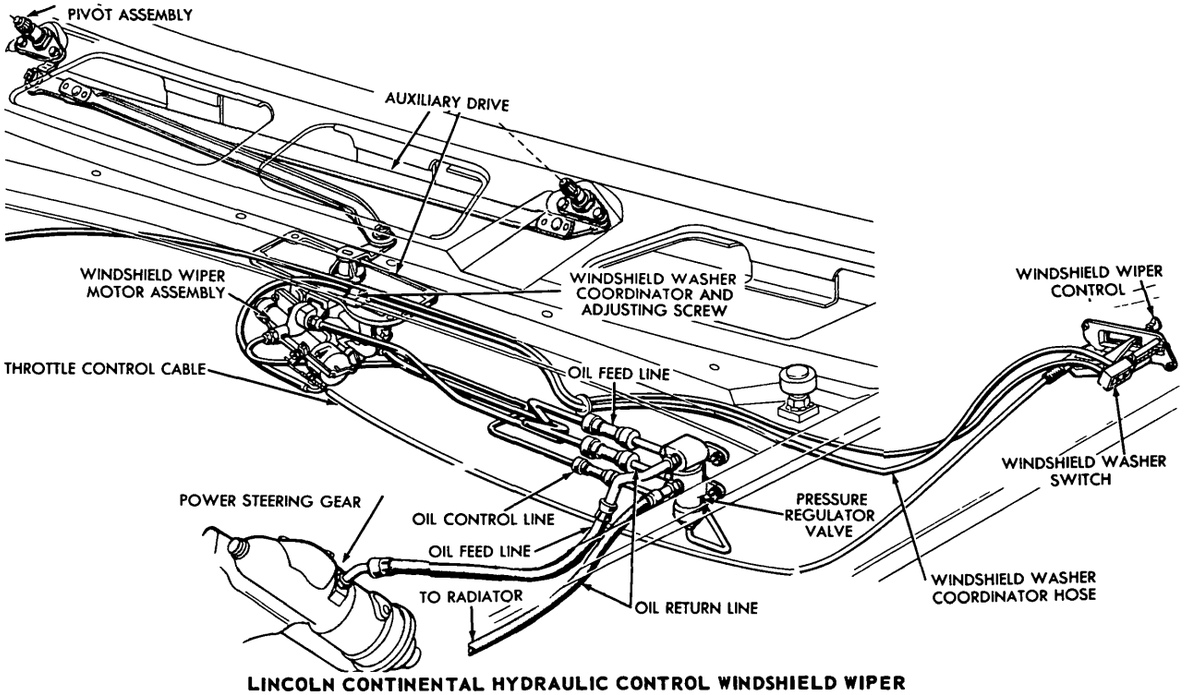
RAMBLER AIR CONDITIONER CONTROL WIRING DIAGRAM

LINCOLN HYDRAULIC WINDSHIELD WIPER

Lincoln Continental (1961)

DESCRIPTION: Wipers - Windshield wiper motor hydraulically operated by power steering return line fluid. A pressure regulator valve connects wiper motor and power steering in series during windshield wiper operation. Wiper arms are link driven in tandem from an auxiliary drive assembly above wiper motor through a pivot assembly for each wiper arm and blade assembly. **Washer** - An electric pump with a reservoir is mounted on right fender apron and controlled by washer switch mounted on windshield wiper control on instrument panel.

OPERATION: Wipers - When not in operation some hydraulic fluid is directed to wiper motor to be available to operate hydrostatic coupler in regulator valve when wipers turned on. Rest of fluid bypasses wiper motor and returns to power steering pump reservoir through cooling coils in radiator. When wipers turned on, control cable from instrument panel control opens throttle valve in wiper motor allowing control fluid to operate hydrostatic coupler in pressure regulator valve. Coupler decreases bypass port opening in regulator valve and allows greater fluid pressure to flow to wiper motor. Wiper motor then drives wiper arms. The construction of the regulator valve allows throttle valve to control wiper motor speed. **Washers** - When washer button is pressed, electric pump is energized and pumps fluid from reservoir through the pump to the washer nozzles and against windshield. At the same time washer button is pressed, engine vacuum through washer switch actuates wiper motor throttle valve to start wiper operation. Pump will continue to pump fluid against windshield until washer button released. After washer button released, windshield wipers will continue to operate at medium speed for eight cycles until vacuum is bled from wiper vacuum control line at washer control valve. An adjusting screw at washer control valve regulates number of cycles wiper will operate after washer button released.



LINCOLN CONTINENTAL HYDRAULIC CONTROL WINDSHIELD WIPER

REMOVAL & INSTALLATION: Pivot Shaft & Housing - Remove wiper arms and blades and cowl top ventilation grille and screen. On right side, disconnect drive arm from pivot shaft. On left side, disconnect drive arm from pivot shaft and from auxiliary drive. Remove pivot shaft retaining screws and nuts and remove pivot shaft and housing. To install, reverse removal procedure.

Wiper Motor: Remove washer coordinator hose, and oil return, feed, and control lines from motor. Disconnect and control cable at motor. Disconnect motor from auxiliary drive and remove motor. To install reverse removal procedure *and bleed power steering lines.*

Auxiliary Drive: Remove wiper arms and blades, ventilation grille and screen, and both washer nozzles. Disconnect pivot shaft drive arm from auxiliary drive. Remove attaching screws and remove auxiliary drive assembly. To install, reverse removal procedure.

Pressure Regulator Valve: Disconnect fluid lines at valve and remove valve attaching screws. Remove valve. To install reverse removal procedure *and bleed power steering lines.*

G.M. ONE-SPEED ELECTRIC WINDSHIELD WIPER & WASHER

Buick & Buick Special (1961)
Chevrolet Pass. Cars (1961)
Chevrolet Trucks (1961)
Corvair (1961)
Oldsmobile & Oldsmobile F-85 (1961)
Pontiac & Pontiac Tempest (1961)

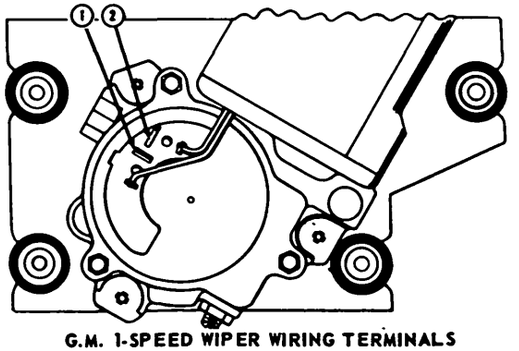
►*NOTE:* 2-Speed type also used.

DESCRIPTION: Single speed rectangular shaped shunt type 12-volt motor similar in design to previous models. Washer (optional) mounts on gear housing section of wiper and is driven by wiper motor.

ADJUSTMENTS, TROUBLE SHOOTING & OVERHAUL:
Washer - *See "G.M. Two-Speed Electric Windshield Wiper & Washer" in 1960 Final Data or later Manual edition.*

Wiper - *See "G.M. One-Speed Electric Windshield Wiper" in 1959 Final Data or later Manual edition and note the following:*

Gearbox Disassembly & Reassembly - Remove crank arm retaining nut, crank arm, steel cap, retaining ring and endplay washers. Remove gear box cover or washer pump and pull gear and shaft out of gear box. Remove terminal board assembly and unsolder motor leads as required.



G.M. 1-SPEED WIPER WIRING TERMINALS

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►IMP RTANT FACT RY PRODUCTION & RECOMMENDED CHANGES (Se N xt Pag)

IMPORTANT FACTORY PRODUCTION & RECOMMENDED CHANGES

FOR PREVIOUS MODELS & 1962 MODELS

AMERICAN MOTORS

►*1962 RAMBLER V8 ENGINE HYDRAULIC VALVE LIFTER STICKING CORRECTION (EARLY CARS):* .0005" undersize hydraulic valve lifters, Part No. 3240106, are available for installation in place of a standard lifter to correct a sticking condition. *See "Valve Syst m" in Rambl r Special Data.* Later engines, after Code No. 40123 should not require the undersize lifter.

►*RAMBLER VOLTAGE REGULATOR ADJUSTMENT NOTE:* For adjustment and specifications of "Rambler Brand" voltage regulators, *see "Rambler Replacem nt R gulators" in El ctrical Section.*

►*1961-62 AMERICAN (L-HEAD ENGINE) WITH AIR CONDITIONING VIBRATION CORRECTION:* On cars without power steering, an engine vibration, during air conditioning operation, can be corrected by installing a Belt Idler Pulley Assembly, Kit Part No. 3203205, to relieve a slack condition on drive side of compressor pulley.

CHRYSLER CORPORATION

►*1960-62 170" & 225" ENGINE CHAMPION SPARK PLUG INSTALLATION CAUTION:* Whenever a Champion spark plug is installed on these engines, always include a gasket with each plug to prevent oil leakage into spark plug tubes.

►*1960-62 TORQUEFLITE SIX TRANSMISSION FRONT PUMP HOUSING BUSHING REPLACEMENT NOTE: S "Torqu Flit Six Automatic Transmission" in Transmission Section.*

►*1960-62 LANCER, DODGE, PLYMOUTH & VALIANT 6 CYL. ENGINE OIL PRESSURE INDICATOR LIGHT NOTE:* If the time required for oil pressure indicator light to go out, after starting a cold engine, exceeds approximately five seconds, install Oil Filter Stand Pipe, Part No. 2402607. If an excessive amount of time is still required after installation of stand pipe, install Mopar Filter, Part No . 1851658. If the above condition occurs on a car with replaceable element type filter, install Mopar Oil Filter Assembly, Part No. 2128548.

►*1962 TORQUEFLITE EIGHT HIGH FREQUENCY "CLICK" CORRECTION:* This condition which occurs at 2-3 upshift and is most noticeable in direct gear around 24-40 MPH may be caused by kickdown band rattling against its anchor. Check kickdown band adjustment and reset to **tw turns** if necessary. If noise is not corrected, remove transmission oil pan and valve body and back off adjusting screw to completely unload kickdown band. If free gap is less than 11/16" between band ends, replace band with one that has and end gap of at least 11/16". In addition, replace original band anchor with Part No. 1942120 (copper plated). If band gap is more than 11/16", remove band anchor only and replace with Part No. 1942120.

►*1960-62 CHRYSLER CORP. CARS (WITH ALTERNATOR) NOTE:* During cold weather operation the ammeter or charge indicator may not show a charging condition for a few seconds after engine is started, or until voltage regulator warms up. This condition is normal and no harm to regulator or alternator occurs. Even at sub-zero temperatures, this condition should not last for more than one mile of driving.

►*1962 & EARLIER CHRYSLER CORP. CARS (WITH POWER STEERING) PUMP FITTING LEAKAGE CORRECTION:* If proper tightening of high pressure hose tube nut to 24 ft. lbs. does not correct the leakage, replace the Outlet Ball Seat Fitting in the pump as follows: With pump assembly removed from car, clamp pump in a vise so that discharge opening is in a downward position. Use a No. 4 E-Z Out and remove ferrule, being careful not to damage threads on housing. Clean bore in housing, then install a new ferrule, Part No. 1738683, centering it in bore with tapered end of ferrule upward. Press ferrule into position by reinstalling high pressure hose and tightening flare nut to 24 ft. lbs.

►*1961 LANCER & 1960-61 VALIANT DIFFERENTIAL SIDE BEARING PRELOAD SPECIFICATION CHANGE:* The method for checking and determining spacer thickness for proper side bearing preload remains the same. However, the .003" to .006" addition to zero endplay spacer pack should be changed to .010". *See "Lancer & Valiant Hypoid" in Rear Axle Section.*

►*1961 LANCER & 1960-61 VALIANT REAR AXLE SHAFT BEARING REPLACEMENT:* Use procedures for 1962 models. *See "Lancer & Valiant Hypoid" in Rear Axle Section.*

FORD MOTOR CO.

►*1960-62 COMET, FALCON, FAIRLANE & METEOR (144" & 170" ENGINES) IMPROVED PERFORMANCE & FUEL ECONOMY CORRECTION (CARS WITHOUT HEATER):* Connect water-heated carburetor spacer (spacer is installed on engine during production) to engine cooling system. To connect spacer, drain cooling system and remove air cleaner. Remove pipe plugs from water pump and cylinder head. Install inlet and outlet nipples, then install hoses. Fasten hoses securely with clamps. Check for leaks. *CAUTION - Do not allow hose to rest on exhaust manifold.*

►*1961-62 LINCOLN ENGINE FAILURE TO OPERATE AT HIGH SPEED CORRECTION:* This condition which is similar to those resulting from vapor lock, may be caused by wear at end of fuel pump pushrod. To correct, replace pushrod.

►*1960-62 COMET, FALCON, FAIRLANE & METEOR (144" & 170" ENGINES) THERMOSTAT REPLACEMENT NOTE:* Use Thermostat, Part No. C2DZ-8575-A (190°F Thermostat) on cars using permanent type anti-freeze.

►*1961-62 AUTOMATIC TRANSMISSION (ALL MODELS EXC. LINCOLN) LOW LINE PRESSURE CORRECTION:* Inspect throttle control valve rod for wear at throttle valve end if transmission shifts are early and soft. If control valve rod is worn, replace rod.

►*1961-62 FORD & MERCURY (EXC. COMET, FALCON, FAIRLANE & METEOR) SYNCHRO-MESH HIGH SHIFT EFFORT & GEAR CLASH IN 2ND GEAR CORRECTION:* Install a new heavier synchronizer retainer spring, Part No. C2AZ-7109-A (yellow color).

►*1960-61 IGNITION TIMING RECOMMENDED CHANGE (ALL MODELS):* Initial ignition timing should be set to specifications indicated for comparable 1962 models. *S e individual 1962 car mod l pages.*

►*1961-62 MERCURY & FORD 292" ENGINE RUNAWAY DURING 1-2 UPSHIFT CORRECTION: See "Ford M tor 2-Speed Automatic Transmission" in Transmissi n Section.* If the procedures indicated under "Changes, Cautions, Corrections" do not correct engine "runaway", it is recommended that a softer front servo spring, Part No. C1DP-7A003-A be installed in front servo. This spring has a free length of 3.17", 9¾ coils, and a wire diameter of .207".

►*1962 FORD FAIRLANE & MERCURY METEOR (221" & 260" ENGS.) AUTOMATIC TRANSMISSION 1-2 UPSHIFT SLIPPAGE CORRECTION: See "Ford M t r 2-Speed Automatic Transmission" in Transmissi n Section and check transmission for proper fluid level, line pressure and vacuum.* Make sure that all air has been bled from front servo. If the condition continues to exist after the above checks and tests have been found to be within specifications, replace front servo return spring with Spring, Part No. B9AZ-7A003-A. If replacement of servo spring does not correct the condition, disassemble transmission and check for worn, damaged, or incorrect parts. Pay particular attention to items which may cause leakage in clutch circuit.

►*1960-EARLY 1962 COMET & FALCON FRONT BRAKE SQUEAL CORRECTION:* A new "O" ring type front wheel brake cylinder piston, Part No. C2DZ-2196-A can be installed on these models to reduce brake squeal. The new piston, which has an "O" ring installed in an annular groove, is used in production beginning March 7, 1962.

►*1962 MERCURY METEOR WITH 221" ENGINE & SYNCHRO-MESH TRANSMISSION SUB-STANDARD PERFORMANCE NOTE:* Replace original 1¾" diameter exhaust system with the 2" diameter exhaust system used on cars with automatic transmission.

GENERAL MOTORS CORP.

►*1961 BUICK SPECIAL CLUTCH PEDAL LASH NOTE & RATTLE CORRECTION:* Install spring, Part No. 1352190 (Clutch Equalizer Spring used on 1962 models) as follows: Drill a ¼" hole 1 5/16" from bottom of equalizer lower arm, then remove former coil spring from clutch release fork and install the new spring between hole in equalizer lower arm and clutch release fork.

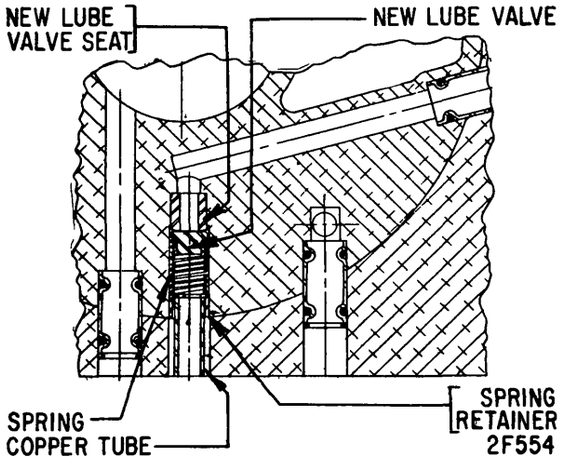
►*1961 BUICK SPECIAL (WITH 4-BARREL CARB.) HESITATION CORRECTION:* If carburetor accelerating pump system is not defective, trouble may be due to incorrect pump stroke setting which depends on average daytime temperature. *See "Rochester 4G & 4GC 4-Barrel Carburetors" in Carburetion Section.*

►*1959 & EARLIER BUICK TRIPLE TURBINE AUTOMATIC TRANSMISSION "BUZZ" CORRECTION:* Install Lube Valve Kit, Part No. 1389297 as follows: Remove oil pan and valve body, then drill out lube exhaust hole in transmission case to a depth of 5/8"

CONTINUED ON NEXT PAGE

GENERAL MOTORS CORP. (Cont.)

using a 7/16" drill. Remove lube valve spring retainer from hole (spring and ball will fall out). Tap center hole of valve seat with a ¼"-20 tap to secure two or three effective threads. Remove tap and install a ¼"-20 X 2¼" bolt into tapped hole of valve seat, placing a suitable wood spacer between head of bolt and transmission case. Withdraw valve seat by turning bolt into threads (shimming between head of bolt and wood block as necessary). Disconnect cooler line and flush passage with kerosene and blow dry with air. Install a new valve seat with lead chamfer upward. *NOTE - Use a brass rod to tap valve seat into position, then install a new valve and spring and spring retainer.* Make up a piece of 5/16" copper tubing 53/64" long and install in hole so end of tube is seated in lower end of spring retainer. Install valve body and check all adjustments. Install oil pan and refill transmission.



BUICK TRIPLE TURBINE LUBE VALVE

►*1962 BUICK SPECIAL AUTOMATIC TRANSMISSION COAST CLUTCH PRODUCTION CHANGE TO PREVENT STICKING OF PISTON IN CYLINDER:* Beginning with transmission code number E145, a new coast clutch piston, Part No. 1356770, incorporating a counterbore on its inner diameter is being used in production to prevent sticking if piston should be tilted slightly. It is recommended that the new piston be installed in earlier transmissions whenever transmission is disassembled for any reason.

►*1961 BUICK (EXC. SPECIAL) CONSTANT VELOCITY UNIVERSAL JOINT LUBRICATION NOTE:* If a frame contact hoist is used when lubricating the center universal joint, it will be necessary to either raise the rear axle assembly to its correct running position or disconnect propeller shaft at rear companion flange and raise propeller shaft for access to grease fitting. Make sure rear companion flange and propeller shaft are reassembled in the original position.

►*1961 BUICK (EXC. SPECIAL) REAR AXLE "CLICKING" NOISE CORRECTION:* This noise which occurs when shifting from Drive to Reverse can be corrected as follows: Disconnect propeller shaft and remove pinion nut and flat washer, then install copper washer, Part No. 1353954 over pinion shaft until it contacts companion flange (lubricate washer with rear axle lubricant before installation). Use a flat end punch and gently tap outer diameter of washer so it starts into splines, then reinstall flat washer on pinion shaft. Install nut and tighten to 350 ft. lbs. Reinstall propeller shaft.

►*1962 & EARLIER BUICK TWIN TURBINE AUTOMATIC TRANSMISSION "WHINE" CORRECTION & REACTION SHAFT BUSHING CLEARANCE CHECK:* With reaction shaft and input shaft assembled in transmission, mount a dial indicator on input shaft so movement of shaft can be measured. Move input shaft up and down, then rotate shaft and move side to side. If total indicator reading is more than .006" in each direction, replace reaction shaft bushing. Excessive wear on this bushing has some effect on turbine gear whine.

►*1959-61 BUICK LESABRE HARD STARTING (HOT) CORRECTION:* This condition is caused by dry starter bearings and can be corrected by installing a later type starter armature, Part No. 1958023 which has a grease groove at each end of starter shaft. Make sure bearings are in good condition and are properly lubricated with Buick 4X (silicone lubricant) Compound.

►*1961-EARLY 1962 CADILLAC HYDRA-MATIC TRANSMISSION GEAR WHINE CORRECTION:* The whine, which is heard when decelerating from approximately 15 MPH to stop may be caused by governor drive gear snap ring. *See "Dual-Coupling (4-Speed) Hydra-Matic Transmission" in Transmission Section.*

►*1961 CADILLAC FRONT SUSPENSION UPPER CONTROL ARM REMOVAL PROCEDURE CHANGE: See "1962 Cadillac Front Suspension" in Suspension & Wheel Alignment Section.*

►*1959 & LATER CADILLAC HYDRA-MATIC GOVERNOR DRIVE GEAR REPLACEMENT CAUTION:* Governor drive gear and locating snap rings should always be installed with governor and driven gear removed. Then install governor, carefully meshing the gears. This procedure assures proper gear alignment and prevents gear damage.

►*1961 CHEVROLET 409" ENGINE NOTE: This engine which was released in mid-1961 is the same as the 1962 409" engine. See "1962 Chevrolet V8 & Corvette" car pages.*

►*1955-62 CHEVROLET PASS. CARS & 1961-62 CORVAIR "95" TRUCKS UPPER BALL JOINT STUD REPLACEMENT NOTE:* If upper control arm ball stud replacement unit, Part No. 3813205 has ¼" attaching holes in flange, drill holes to 5/16" diameter. Special 5/16" diameter bolts furnished in unit **must** be used to attach ball stud assembly.

►*1958 CHEVROLET V8 (CARB. NO. 7012452) STUMBLE DURING ENGINE WARM-UP CORRECTION:* Install Pump Modification Kit, Part No. 7019742. Carburetors having the brass identification tag stamped "D" or later have the above changes made in production.

►*1960-62 SERIES 10-40 TRUCK LOSS OF FRONT SUSPENSION CASTER-CAMBER SHIMS CORRECTION:* To prevent loss of shims after front end alignment, pivot shaft attaching bolts must be tightened properly and aligned in frame bracket hole as follows: Raise front of truck so wheels hang free, then tighten nut on pivot bolts to 30-40 ft. lbs. Rap front and rear flange of upper control arm, near pivot shaft, using a one pound hammer. When bolts are properly seated, increase torque on nut to proper specification.

►*1961 OLDSMOBILE F-85 SYNCHRO-MESH TRANSMISSION LONG SHIFT LEVER TRAVEL FROM FIRST TO SECOND GEAR CORRECTION:* Install a 1962 Shift Equalizer Lever, Part No. 1350390. Adjust linkage as outlined in 1961 Final Data, Page 395.

►*1961-62 OLDSMOBILE (EXC. F-85) PROCEDURE FOR REPLACING LOWER CONTROL ARM BUSHINGS:* Replacement bushing kits are now available for installation. *For procedure, see "Oldsmobile Front Suspension" in Suspension & Wheel Alignment Section.*

►*1961-62 PONTIAC TEMPEST (SINGLE BARREL CARBURETOR) THROTTLE RETURN CHECK (ANTI-STALL DIAPHRAGM) NOTE:* This unit is eliminated from production on automatic transmission cars (except with air conditioning).

►*1961 PONTIAC TEMPEST UPPER & LOWER FRONT SUSPENSION BALL JOINT REPLACEMENT: For new procedures, see "1962 Pontiac Tempest Front Suspension" in Suspension & Wheel Alignment Section.*

STUDEBAKER CORP.

►*1962 STUDEBAKER 6 CYL. ENGINE MAIN BEARING REPLACEMENT CAUTION:* Engines equipped with "Full-Flow" oil filter system require different main bearings (except rear main bearing) than those used on engines without "Full-Flow" oil filter. *DO NOT USE bearings designed for engines with out "Full-Flow" oil filter on engines with "Full-Flow" filter.*

►*1961-62 STUDEBAKER 4-SPEED SYNCHRO-MESH TRANSMISSION PARTS REPLACEMENT CAUTION:* Two different drive pinions are used. To assure installation of correct drive pinion and matching cluster gear, count the number of teeth in pinion (either 25 or 27). This can be done by removing side cover of main case.

WILLYS MOTORS

►*1962 & EARLIER WILLYS L6-226 ENGINE CRANKSHAFT REAR OIL SEAL LEAKAGE CORRECTION:* Install Crankshaft Rear Oil Seal Kit, Part No. 925958 which contains a new molded victoprene crankshaft oil seal to replace the previous rope type. Installation instructions are provided with each kit.

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SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Note the following

1) Do not drop or slide machined surfaces on bench or floor.

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation)

3) Lubricate all bolts or screws entering an aluminum part See "Bolt Thread Lubrication Note" below.

4) Tighten bolts and nuts to the specified torque. DO NOT overtighten. Torque valves are for clean lubricated threads.

►*BOLT THREAD LUBRICATION NOTE:* Use engine oil or special thread lubricant on all threads entering an aluminum part.

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole. This brings hole back to original thread size See following table for inserts and tools required.

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

ENGINE

6 CYL. ENGINE

ENGINE REMOVAL: **1)** Remove hood assembly, drain cooling system and engine oil Remove air cleaner, starter and radiator core Disconnect exhaust pipe at manifold and remove flywheel housing screws and flywheel mud pan

2) Disconnect thrust rod assembly from bracket on lower left side of block (Classic 6 Auto. Trans.). Then drain torque converter and transmission and remove flywheel drive plate-to-converter assembly screws on Auto. Trans. Cars (All models).

3) Remove front engine support upper nuts. Disconnect all wiring, lines, and hoses from engine and power steering assembly Remove Air Conditioning compressor and bracket assembly *NOTE* - DO NOT DISCHARGE system

4) Attach lifting hook, lift engine upward and forward to clear clutch shaft pilot bushing

V8 ENGINE

ENGINE REMOVAL: **1)** Remove battery and hood assembly Drain oil and cooling system On Auto Trans Cars, drain transmission and disconnect cooler lines at radiator and straps on engine oil pan. On Air Conditioned Cars, remove air compressor and mounting bracket from engine and move compressor and hoses to one side

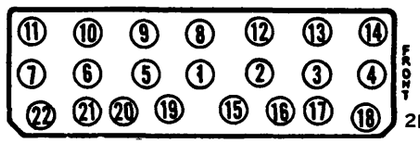
2) Remove water pump upper and lower hoses and hoses at fuel pump, heater control valve and cylinder head Remove radiator core and loosen exhaust pipes at mufflers. Remove exhaust manifolds from cylinder heads and push them outward towards wheelhouse panels.

3) Disconnect all wiring and hose connections from engine, coil primary, heat sending unit, oil sending unit, vacuum safety switch, generator, etc

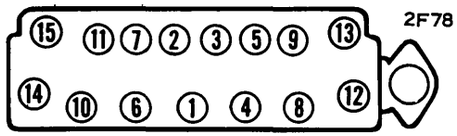
4) Remove starter Loosen flywheel housing and remove flywheel mud pan

5) On Auto. Trans. Cars, drain torque converter and loosen flywheel drive plate from converter.

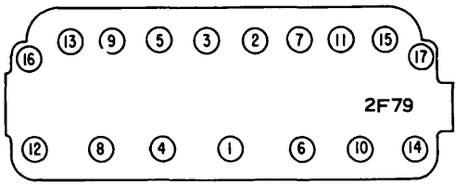
6) Attach lifting fixture to engine, loosen rear engine support cushions at rear crossmember Support transmission and torque tube and remove rear crossmember. Loosen front engine support cushions, raise engine upward and forward through hood opening.



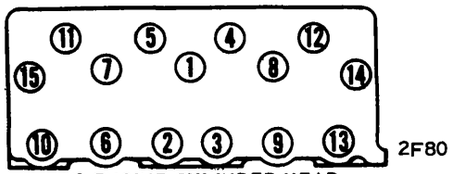
6 CYL. "L-HEAD" CYLINDER HEAD



6 CYL. (CAST IRON) CYLINDER HEAD



6 CYL. (ALUMINUM) CYLINDER HEAD



V8 ENGINE CYLINDER HEAD

CYLINDER HEAD & MANIFOLD

6 CYL. ENGINE (CAST IRON)

CYLINDER HEAT INSTALLATION: Use torque indicating wrench to tighten cylinder head studs in sequence shown in cylinder head diagram. Torque specifications are for engine operating temperature.

Cylinder Head Gasket - Always use new gasket. Coat gasket with non-hardening gasket paste to insure tight seal between cylinder head and block.

6 CYL. ENGINE (ALUMINUM)

CYLINDER HEAD INSTALLATION: Hollow guide pins are located at right front and rear corners of block. Guide pin at right front corner also serves as oil delivery tube to rocker arm shaft assembly. *Two neoprene "O" rings form a seal between guide pin, cylind r block and cylinder head. R plac "O" rings ach tim cylinder r m ved. See R plac m nt Proc dure b low.* After "O" rings replaced, apply "Perfect Seal" or equivalent to both sides of cylinder head gasket. Place

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head on block and tighten capscrews in approximately 20 lb. increments to 50-53 ft. lbs., following sequence in diagram. Retorque cylinder head bolts after engine reaches normal operating temperature.

Neoprene "O" Rings Replacement Procedure: Remove delivery tube carefully by grasping with pliers and turning in each direction while pulling upward. Install "O" rings on tube and apply engine oil to assembly. Tap tube lightly into cylinder block bore half its own length. Then install cylinder head as outlined above.

V8 ENGINE

CYLINDER HEAD INSTALLATION: Cylinder block has two sleeve locating dowels to assist in lining up cylinder head and gasket during installation. Coat gasket with non-hardening gasket paste, install gasket with marks AM and TOP upward. Install cylinder head, pushrods, and rocker arm assembly *(CAUTION - Special drilled capscrew must be installed in rear rocker arm support bracket to provide lubrication for rocker arms).* Tighten head bolts in sequence shown in diagram to correct torque.

PISTON PINS

ALL ENGINES

PISTON PIN: Pin is press fit in connecting rod and no clamp bolt or locking rings are used to retain pin. Piston pin must be removed and installed as detailed below to prevent distortion or damage to piston.

Removal - Remove pins with special Piston Pin Remover J-6360 and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver.

Installation - Place piston pin pilot in support, insert piston and connecting rod. This aligns piston and connecting rod piston pin bores. Press piston pin into connecting rod and piston assembly until lower pilot bottoms in support which will properly center rod on pin.

►*CAUTION:* Pin must be tight press fit in connecting rod.

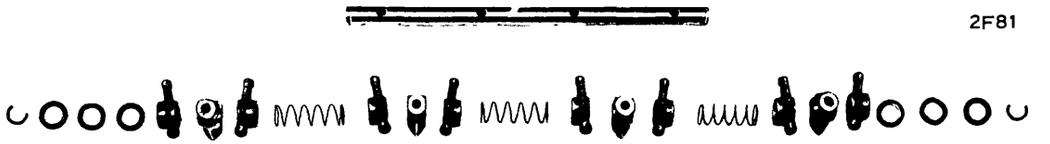
CRANKSHAFT & MAIN BEARINGS

6 CYL. ENGINE

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Packing in groove in block and cap behind oil slinger on crankshaft. Cap sealed with rubber plugs in groove on each side where cap fitted in recess in block. Use Tool J-1610 to install packing in groove in block and cap. Place packing in groove (with bearing shell removed), place small diameter of tool over packing, hit end of tool with lead hammer to seat packing, cut ends of packing flush with bearing cap seat, remove tool. Repeat operation for groove in block. Install rubber seal plugs on each side of bearing cap (where angle seal used, make certain that seal also seated in horizontal groove in block). *NOTE* - Side seals may leak for short duration during engine warm-up. However, they will swell as they absorb engine oil.

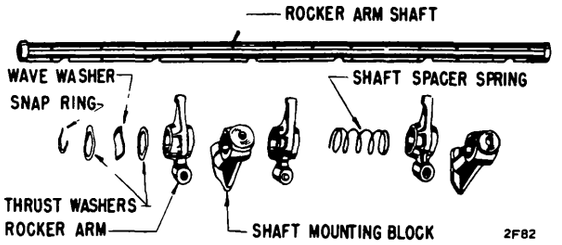
V8 ENGINE

CRANKSHAFT REAR MAIN BEARING OIL SEAL: Install hemp packing in block and in bearing cap using tool J-3048-A to seat packing in groove. Trim excess packing off flush with face of cap. Rubber type seals are installed in side grooves of bearing cap. *NOTE* - Side seals may leak for short while during initial engine warm-up. They will swell as they absorb engine oil.



2F81

V8 ENGINE ROCKER ARM ASSEMBLY



6 CYL. ROCKER ARM ASSEMBLY

ENGINE FRONT COVER

V8 ENGINE

REMOVAL: Remove water pump, fuel pump assembly and vibration damper. Remove cover-to-cylinder block screws and remove cover.

INSTALLATION: Locate dowels in cylinder block and leave cover screws loose until vibration damper is partially installed. This prevents damage to oil seal and aligns cover properly. Tighten cover screws and install fuel and water pumps.

CAMSHAFT & BEARINGS

V8 ENGINE

CAMSHAFT REMOVAL: Remove rocker arm covers, spark plug wires, rocker arm assemblies, intake manifold and carburetor. Remove upper oil breather and lifter assembly cover. Remove spring and lower oil baffle and pushrods. Keep pushrods in order for correct reinstallation. Remove hydraulic lifters, keeping in order for reinstallation. Remove fuel pump, vibration damper, and engine front cover. Remove water pump and cylinder head water distributing manifold. Crank engine to bring timing marks adjacent and in line across shaft centers and remove fuel pump eccentric, crankshaft and camshaft sprockets and timing chain assembly. Remove camshaft thrust retainer plate and withdraw camshaft.

6 CYL. "L" HEAD ENGINE

CAMSHAFT LOBE LIFT: With cylinder head removed and all valve lash adjusted to zero, rotate engine until cam lobe to be checked has the basic circle (opposite nose of cam) under valve tappet. Install a dial indicator so arm rests on head of valve, and adjust dial indicator to zero. Rotate engine to point where maximum upward movement of valve occurs. This reading should be .340' ±.006" for all cam lobes (Intake & Exhaust).

OHV 6 & V8 ENGINES

CAMSHAFT LOBE LIFT: Drain radiator and remove rocker arm assembly. Install dial indicator on end of pushrod (rubber tubing may be installed to secure indicator plunger to pushrod). Rotate engine until cam lobe basic circle (opposite nose of cam) is under the valve tappet. Set dial indicator to zero, then rotate engine to a point where maximum upward movement of pushrod occurs. See table below for correct dial reading (±.006").

Cam Lob Lift	
6 Cyl. (Cast Iron) Intake	.262"
6 Cyl. (Cast Iron) Exhaust	.263"
6 Cyl. (Aluminum) All Valves	.254"
V8 (All Valves)	.254"

VALVE SYSTEM

ROCKER ARMS

6 CYLINDER ENGINES

ROCKER ARM ASSEMBLY: Rocker arm shaft is one piece type and entire rocker arm assembly can be removed after taking out mounting bolts in shaft brackets.

Disassembly & Inspection: Remove snap ring on end of shaft. Slide thrust washers, wave washer, rocker arms, mounting brackets and springs off shaft. Inspect all parts for wear. See that plugs are tight in shaft.

Reassembly & Installation: Install all parts in same relative positions. *CAUTION* - Rocker arms are "Right" and "Left" and must not be interchanged. On aluminum engines the support blocks must be installed with "Front" facing forward. Install assembly with rocker arm lubricating holes in shaft down or toward cylinder head. Oil is supplied through front rocker arm shaft support block.

V8 ENGINE

ROCKER ARM ASSEMBLY: Complete assembly mounted on cylinder head by four long cylinder head retaining capscrews *(CAUTION* - Rear bolt is special hollow type for rocker arm lubrication). Assembly can be removed by taking out the retaining screws.

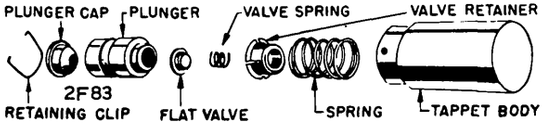
Disassembly & Inspection: Remove snap ring on end of shaft and slide all parts off shaft. Keep all parts in order for correct reassembly. Clean and inspect all parts for wear. Inspect rocker arm radius at valve stem end for wear and replace worn rocker arms. Plugs must be tight in ends of shaft.

HYDRAULIC LIFTERS

V8 ENGINE

►*V8 ENGINE VALVE LIFTER CLEARANCE CAUTION:* Clearance must be .0005-.002". Tight fit of lifter in bore may cause damage to valve train and engine parts, excessive clearance will cause low oil pressure at low engine speeds. If lifter is tight, check lifter

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V8 HYDRAULIC VALVE LIFTERS

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bore for burrs and lifter for scuffing or galling. Check clearance as directed below. If correct clearance cannot be secured with standard lifter, undersize lifter may be installed as listed below. Use of undersize lifters should not be necessary on engines after No. 40123.

Ch cking Lift r Clearanc - Insert lifter approximately one-half of total length in lifter bore. Lifter should fall into position of its own weight. Do not force lifters into place.

R placement Lift rs - Standard (Part No. 3160304), .0005" Undersize (Part No. 3204106). Undersize lifter is identified by small "V" groove on top of lifter body.

HYDRAULIC VALVE LIFTERS: Removal - Remove rocker arm covers, spark plug wires, rocker arm assemblies, intake manifold and carburetor. Remove upper oil breather and lifter assembly cover. Remove spring and lower baffle and pushrods. Keep pushrods in order for installation in original positions. Remove hydraulic lifters, keeping them in order for reinstallation.

Disassembly: Press down on valve pushrod socket and use needle nose pliers to remove the lock ring. Remove pushrod socket, plunger, and plunger spring. Remove check valve assembly from plunger, being careful not to lose the small flat valve and coil spring. *CAUTION - Disassemble one lifter at a time to prevent mixing plungers and bodies. These parts are selectively fit and must not be interchanged.* Wash all parts in clean solvent, removing all varnish and gum deposits.

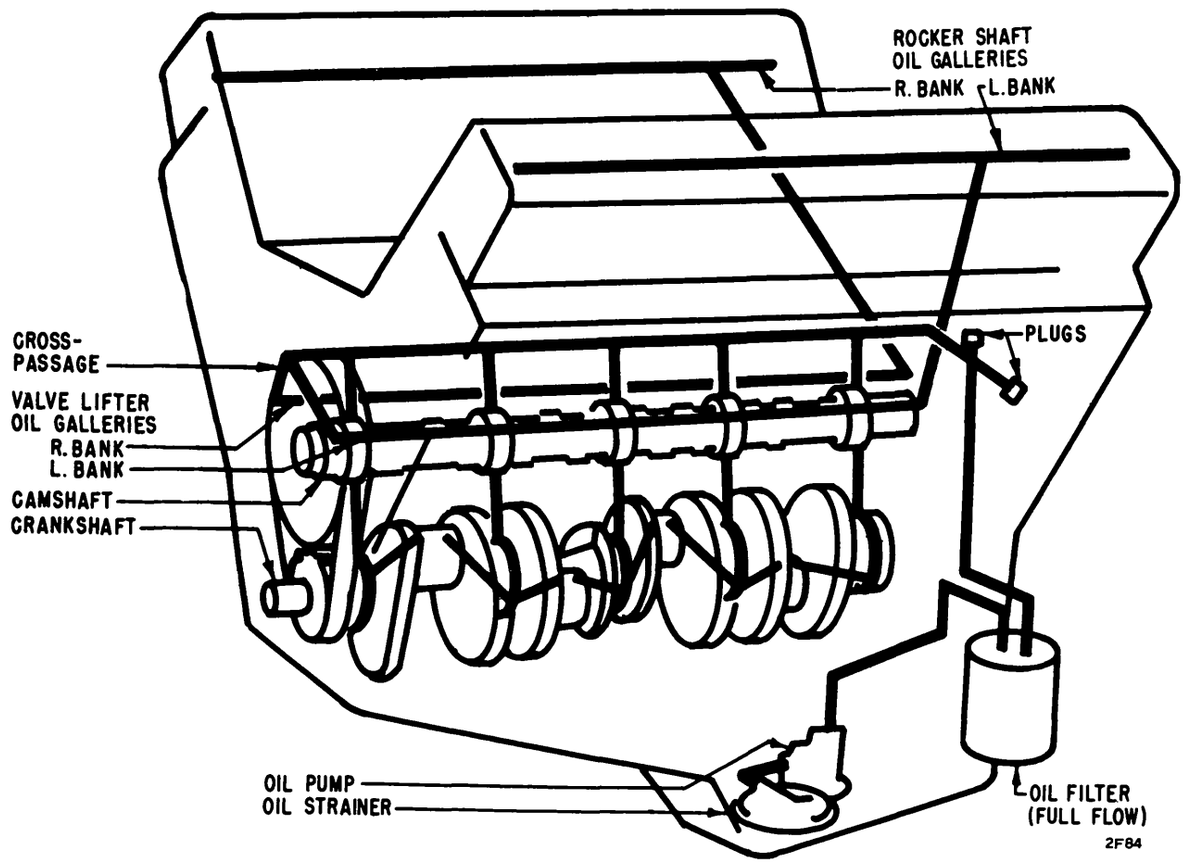
Inspection: Inspect the plunger and wall of body for scratches (if either scratched, replace entire unit). Try plunger for fit in body. If check valve removed from plunger inspect flat disc valve, spring and seat.

Reassembly: Reverse disassembly procedure. *See illustration for correct sequence.*

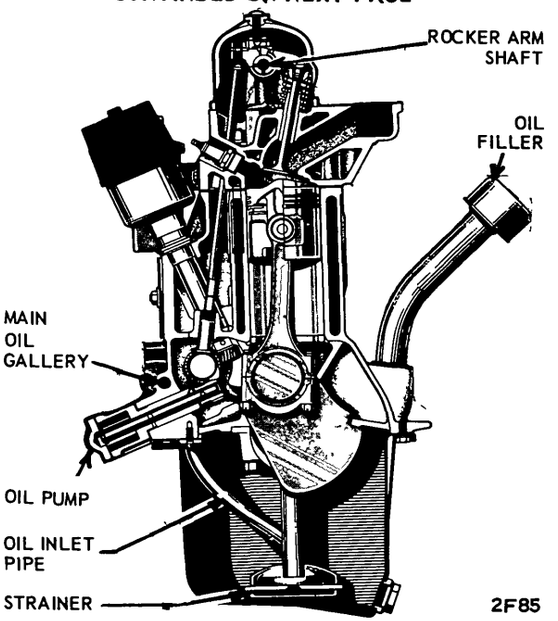
Testing: Fill body with kerosene and install plunger return spring, plunger assembly, and pushrod socket (do not install snap ring). Place lifter between jaws of Checking Tool J-5790 and check leakdown by depressing tool. A decided resistance should be felt. If lifter leaks down rapidly, or collapses immediately, recheck and replace lifter assembly if necessary. Normal lifter should require 10-45 seconds to leak down when filled with kerosene (.125" travel with 50 lb. load).

Installati n: Lifters should be prelubricated and installed in engine WITHOUT being filled with oil. They will normally charge themselves in 3-8 minutes of engine operation.

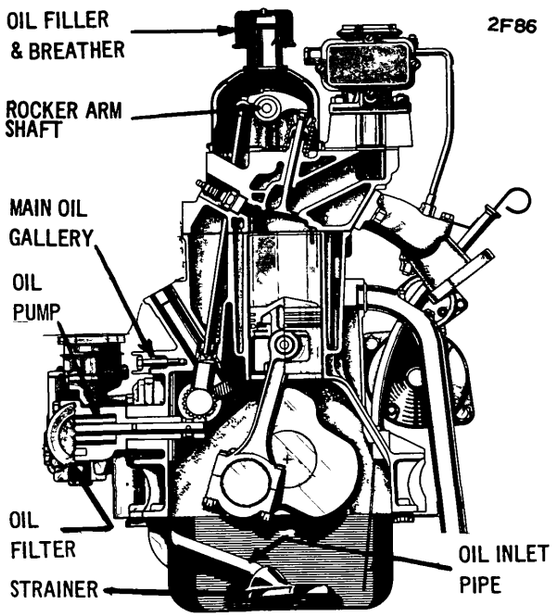
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RAMBLER V8 ENGINE OILING SYSTEM



6 CYL. CAST IRON ENGINE OILING SYSTEM



6 CYL. ALUMINUM ENGINE OILING SYSTEM

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OILING SYSTEM
ENGINE LUBRICATION
6 CYLINDER ENGINES (CAST IRON)

►*OVERHEAD VALVE & "L" HEAD ENGINE NOTE:* Oiling systems for both engines are similar except for cylinder head rocker arm and valve lubrication used on Overhead Valve Engines only.

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve mechanism on cylinder head (Overhead Valve Engines only). All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage around pump body hub to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve (under plug on right side of crankcase) regulates pressure by bypassing oil from main oil gallery back into oil pan. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects lower part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Valve Lifters, Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings.

Rocker Arms, Pushrods & Valve Stems (Overhead Valve Engine) - Oil tube connected to main oil gallery (at front of engine) and to fitting on side of cylinder head (at forward end directly above No. 1 spark plug) supplies oil to passage in cylinder head and through front rocker arm shaft support block to hollow rocker shaft. Rocker shafts have drilled oil holes at each rocker arm. Rocker arms are drilled (upper hole in arm allows oil to run down flat machined surface to each end of arm for pushrod and valve stem lubrication).

OIL FILTER: Partial flow type mounted on bracket on engine. Intake pipe is connected to main oil gallery and return pipe is connected to fitting on crankcase.

6 CYL. ENGINES (ALUMINUM)

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters, and valve mechanism on cylinder head. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage in pump body to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve in pump cover regulates pressure by bypassing oil back into oil intake passage. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects upper part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings.

Rocker Arms, Pushrods, & Valve Stems - An oil gallery (vertical) located in right front corner of cylinder block distributes oil from main longitudinal oil gallery, through the hollow locator pin into the cylinder head where a pair of drilled passages connect into the front valve rocker arm support block and into the hollow rocker arm shaft. Each rocker arm is drilled to direct oil to flat machined surface of top, then to each pushrod, valve stem and spring. Holes on top of cylinder head drain oil back into oil pan.

Valve Lifters - Ports in main oil gallery supply lubrication to valve lifters.

OIL FILTER: Externally mounted, full flow type located on adapter on oil pump body.

V8 ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arm and valve mechanism on cylinder head. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed strainer and intake pipe assembly mounted on pump cover. Oil pressure regulator is located in pump body with oil pipe through which oil is bypassed back into oil pan. Pump delivers oil through passage in bearing cap and block to full flow type oil filter mounted externally on left side of engine block. From the filter, oil flows through transverse and vertical passages in block to main oil gallery extending full length of block directly above camshaft. Main gallery feeds two lifter galleries (on either side of main gallery and extending full length of block) through grooved channel in rear face of camshaft thrust plate which serves as a cover for the galleries on front face of engine block. Oil is distributed through these galleries as follows:

Crankshaft & Camshaft Bearings - Oil passage in each crankcase web connects main oil gallery with camshaft bearing and corresponding main bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from grooved passage in bearing cap of rod for opposite bank of cylinders (groove in rod must be upward or toward center of engine for this cross-lubrication).

Timing Chain & Sprockets - Lubricated through drilled passage in camshaft front bearing journal. This oil is metered by camshaft bearing.

Valve Lifters - Lifter oil galleries intersect lifter bores for direct oil supply to the hydraulic lifters.

Rocker Arms, Pushrods & Valve Stems - Oil passage in block at rear end of each lifter oil gallery connects with rear cylinder head and rocker shaft bracket bolt hole in block. Special drilled bolts used in these holes which permit oil to flow upward, through and around undercut bolt stem, and through bracket to hollow rocker arm shaft. Shaft is drilled at each rocker arm. Rocker arms have drilled oil hole on upper side which permits oil to flow over top of arm for pushrod and valve stem lubrication. Drain holes in lower corners of cylinder head provide a return passage to oil pan.

OIL FILTER: Full flow type mounted on pad on left side of engine block. Bypass valve located in filter adapter mounted on filter pad (bypass valve allows oil to flow directly to outlet passage).

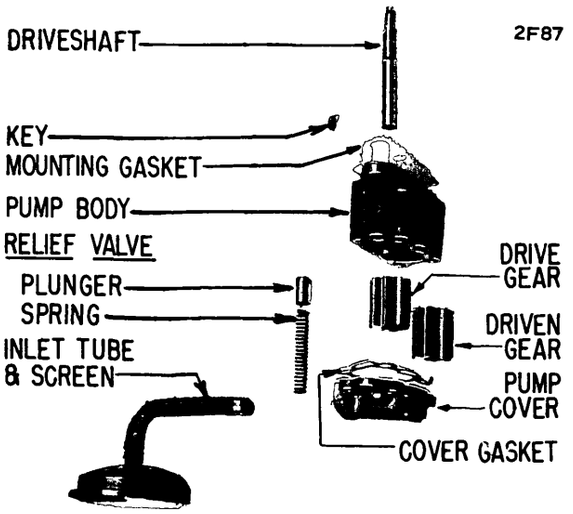
OIL PUMP
V8 ENGINE

OIL PUMP: Removal - Remove oil pan and screws retaining oil pump to rear main bearing cap, remove oil pump. *NOTE* - Oil pump is driven by distributor drive shaft so removal of oil pump does not affect ignition timing.

Disassembly: Remove inlet tube and screen assembly from pump cover. Remove cover retaining screws, cover, pump gears, relief valve spring and plunger.

Inspection: Check gear to cover clearance by placing straight edge across pump body with gears in operational cavity. Clearance should not exceed .004". A clearance of .008" maximum should exist between gears and

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V8 ENGINE OIL PUMP

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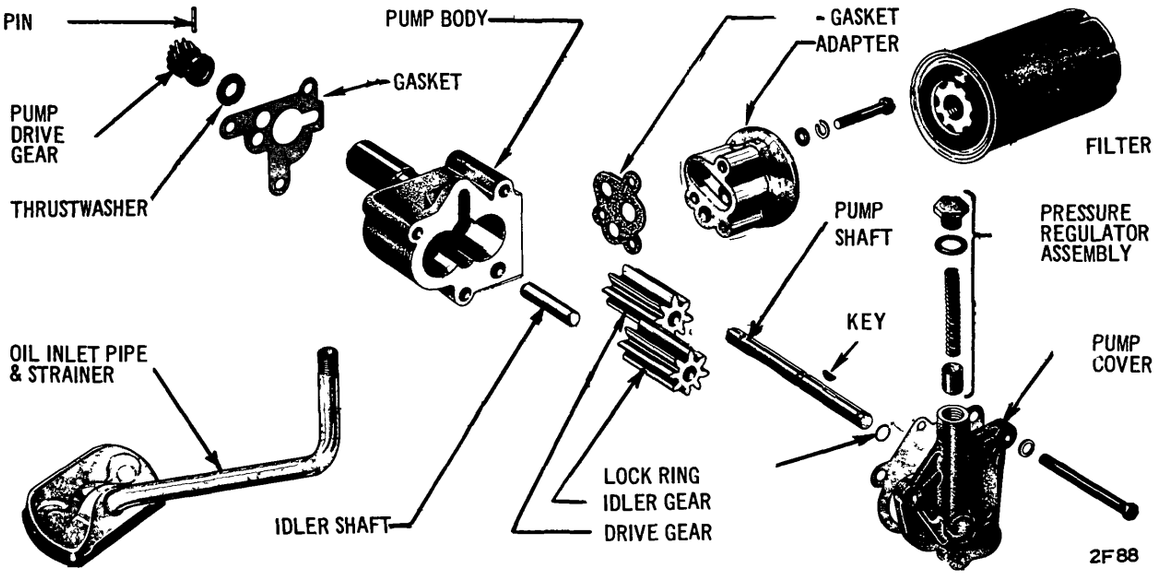
walls of gear cavity opposite point of gear mesh.

Reassembly & Installation: Reverse disassembly procedure. Install cover with pump out of engine, and check pump for free operation before installation.

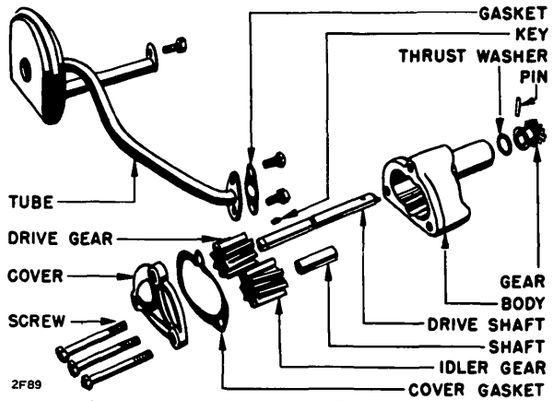
6 CYLINDER ENGINE

OIL PUMP: Removal - Pump mounted externally on right side of engine. Remove pump by taking out three capscrews in pump cover.

►*OIL PUMP REMOVAL (CARS EQUIPPED WITH "E-STICK" AUTO. CLUTCH) NOTE:* If wheelhouse inner panel interferes with valve body (oil pump cover) removal, proceed as follows: Remove both lower capscrews and loosen top capscrew. Pull valve body (oil pump cover) away from engine about ¼" and rotate clockwise (to front of car) until capscrew and valve body can be removed. Then remove pump. When installing valve body, torque capscrews to 13-15 ft. lbs. DO NOT OVERTIGHTEN.



6 CYL. ALUMINUM ENGINE OIL PUMP



6 CYL. CAST IRON ENGINE OIL PUMP

►*"E-STICK" AUTO. CLUTCH VALVE BODY SERVICE NOTE: See "E-Stick Automatic Clutch" in Clutch Section.*

Oil Pump Overhaul: Remove pump cover and gasket. Lift out pump drive gear, idler gear, and idler gear shaft. Remove key from keyway in shaft. Remove shaft and driving gear assembly through upper end of pump body. *NOTE - Driving pin is held on shaft by a pin.* Remove thrust washer from shaft. Reassemble pump by reversing removal procedure.

MODEL IDENTIFICATION

Model	Model Identification Deluxe	Custom
2-Door Club Sedan	6206	6206-2
2-Door Coupe Ⓒ	6202	
2-Door Sta. Wgn.	6204	6204-2
4-Door Sedan	6205	6205-2
4-Door Sta. Wgn.	6208	6208-2

Ⓒ - Fleet sales only.

►*MODEL IDENTIFICATION NOTE: See "Car Code Number" below.*

SERIAL NUMBER: Stamped to plate attached to right hand wheelhouse panel under hood.

Car Code Number: Number plate located on left front door hinge pillar post. Number includes model, body, trim, paint code and car built sequence numbers. Not used for licensing.

Engine Code Number: Located at upper front corner on left side of cylinder block. Indicates date of manufacture, not used for licensing.

ENGINE NUMBER LETTERS: Located below engine code number (see above). First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. minimum at cranking speed with throttle wide open. Maximum variation between cylinders 10 lbs.

VALVE TAPPET CLEARANCE: .016" Intake, .018" Exhaust. Set cold.

MANIFOLD HEAT CONTROL: None used.

CRANKCASE VENTILATION VALVE: Check at regular intervals (at least every 10,000 miles) and check operation before performing a "Tune-Up" for ignition and and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.037".

Spark Plugs - Champion H10 or H18Y. 14mm. Torque to 30 ft. lbs.

COIL: Prestolite (Autolite) 200562 or 200613.

Ignition Current - 3 amperes (stopped).

Resistor - None used.

DISTRIBUTOR: Prestolite (Autolite) IAT-4407. Pivoted breaker plate type.

Condenser - Autolite No. IBB-2042SS-1.

Capacity - .18-.23 mfd.

Contact Point Set - Autolite No. IBP-2040L.

Breaker Gap - .018-.022". *NOTE* - Set gap with engine stopped and use a feeler gauge. DO NOT BEND breaker arm. To adjust, bend stationary contact support.

Cam Angle - 36-42°.

Breaker Arm Spring Tension - 17-22 ozs.

Rotation - Counterclockwise at commutator end.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	420	0	840
1	540	2	1080
2.5	700	5	1400
6	1700	12	3400
7	2000	14	4000

Vacuum Spark Control: Autolite No. IAT-2023LL. Integral type.

Vacuum Advanc

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5
1	2	5 7/8
2	4	6 3/4
4	8	9
5.5	11	11

IGNITION TIMING

Setting - 3° BTDC (Reg. fuel), 6° BTDC (Prem. fuel).

Timing Mark - Vibration damper pulley has five notches (TDC,3°,5°,8°,10° BTDC). Align correct notch with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF single barrel used on all models.*

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): Throttle valve pressure controlled by cable connected to carburetor throttle lever on carburetor throttle shaft. To adjust, perform following: **1)** With carburetor throttle valve in hot idle position (off fast idle cam) and engine not running, disconnect throttle cable at lever on carburetor throttle control shaft. **2)** Pull throttle cable toward carburetor and adjust clevis to obtain "free" pin in throttle shaft lever hole. *NOTE - If, after this adjustment, transmission does not shift properly, see "Rambler Six Automatic Transmission" in Transmission Section.*

THROTTLE LINKAGE ANTI-STALL DASHPOT ADJUSTMENT ("E-STICK" AUTO. CLUTCH): Turn idle speed screw out to allow throttle valve to close tightly in bore. Depress dashpot diaphragm stem fully. Adjust by turning dashpot in or out to obtain 1/8" clearance between dashpot stem and throttle lever. Tighten locknut, then reset idle speed.

CARTER YF CARBURETOR

Carter YF, No. 2014S (Without "E" Stick), 3331S (With "E" Stick Clutch).

Idle Setting - ½-1½ turns out. Turn screw out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 500 RPM (Flash-O-Matic in "N"), 500 RPM (Air Cond. Cars "ON").

Float Level - ½" (Gauge T109-83 or J-818-1) from top of float at free end to bowl cover (gasket removed) with air horn and float assembly inverted so that float hangs freely. Adjust by bending lip that contacts needle valve (do not bend float arm). *CAUTION - On carburetors with resilient type needle valve seat, DO NOT allow float arm to contact inlet needle when bending lip to adjust float level as seat can be compressed enough to cause a false setting.*

Accelerating Pump - No seasonal adjustment.

Fast Idle: .054" throttle valve opening (Gauge J-5660) with choke valve tightly closed. Adjust by bending fast idle connector link at lower angle.

Automatic Choke Setting: One notch lean.

►*OTHER DATA: See "Carter YF Carburetors" in Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter MODF-3184SA. Fuel & Vacuum, diaphragm type.

Pressur - 4-5½ lbs. maximum, measured 16" above pump outlet with engine running at 1800 RPM.

Gas lin Gauge: King-Seeley Electric Contact Voltage ("CV") type with Gauge Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57592.

Tank Unit - King-Seeley No. 59230.

Radio Suppression Chok Filt r - Located on feed terminal of Gauge Voltage Regulator.

Air Cleaner: Dry filter element (Std.) or Oil Bath (Optl.) types used. Dry filter element should be removed and cleaned every 4000 miles and replaced every 25,000 miles. Check oil bath type every 4000 miles, drain and refill sump every 12,000 miles and wash filter in kerosene (drain dry).

►*AIR CLEANER PAPER ELEMENT CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash in any liquid or use compressed air. DO NOT LUBRICATE.

BATTERY

Globe-Union or Prestolite (Aut lit). As follows:

Car Use	ⓒGlobe-Union N .	Plat s	②Hr. Capacity
All(less A.C.)	2SM-40	42	40 Amp.
All(with A.C.)	2SMH-60	66	60 Amp.
Heavy Duty	2SH-70	66	70 Amp.

ⓒ - Autolite No. 11HS70 (70 Amp. hr. capacity at 20 hr. rate) used only as heavy duty.

② - 20 hour rate.

Battery Ground - Negative to cylinder head.

Engine Ground - Transmission case to rear engine crossmember.

STARTER

Prestolite (Autolite) MEC-6002. Armatur N . 16-77.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 42-53 ozs.

Shunt Field Current Draw - 4.4-5.1 amps. at 10 volts.

Performanc Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	48
6.5 ft. lbs.	Lock	4.0	285

Neutral Safety Switch ("E-Stick" Automatic Clutch): Engine can be started in neutral only. *For all data see Rambler "E-Stick" Aut matic Clutch in Clutch Section.*

GENERATOR

Prestolite (Autolite) GJO-7402A (Std. & Air C nd.).

►*GENERATOR NOTE: "A" Circuit typ us d on all models.*

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amperes at 10 volts.

Performance Data - C ld (70°F)

Amperes	Volts	RPM
13.0	15.0	1750
25.0	15.0	2300
30.0	15.0	2700

Belt Adjustment: 110-120 lbs. (new belt), 70-80 lbs. (used belt) strand tension using belt tension gauge. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

GENERATOR REGULATOR

Prestolite (Autolite) VBO-4223H-1 (With ut Air C nd.), VBO-4223G-1 (With Air C nd.).

►*REGULATOR NOTE: "A" Circuit typ used on all mod ls.*

CONTINUED ON NEXT PAGE

S e INDEXES on Pgs. 4 to 9 for compl te CARBURETION, ELECTRICAL, MECHANICAL data.

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Cut ut R lay

Cuts In - 12.4-13.3 volts.
Cuts Out - 3-5 amps. discharge current after a charge of 7 amps.
Contact Gap - .015".
Air Gap - .024-.027".

V ltag Regulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes, or with .25 ohm resistor in series with regulator and battery.
Air Gap - .048-.052" (check at brass armature stop pin).

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" typ . S t t foll wing sp cifications at 70°F.*

Regulator	Test A - Operating Amperes	Test B
VBO-4223H-1	32 Max.	25(23-27)
VBO-4223G-1	37 Max.	30(28-32)

T st A - After 15 minutes operation charging at 7 amps.
T st B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

►*OTHER DATA: S "Pr stolite (Autolite) "A" Circuit R gulators" in El ctrical Section.*

R plac ment R gulat r: Rambler No. 3203659.

Cutout Relay

Cuts In - 12.6-13.4 volts.
C ntact Gap - .011-.014".
Air Gap - .025-.030".

V ltag Regulator

Setting - 14.6-15.4 volts at 70°F ambient temperature.
Air Gap - .030-.033" with armature pressed down to point where contacts just close.

Curr nt R gulator

►*SETTING CAUTION: "T mp rature Compensated" type. S t to following sp cificati ns at 75°F.*
Setting - 28-32 amperes.
Air Gap - .035-.045" with armature pressed down to point where contacts just touch.

►*OTHER DATA: Se "Rambl r Regulators" in Electrical S ction.*

ALTERNATOR & REGULATOR

►*Se RAMBLER AMBASSADOR Car Model Pages.*

MISC. ELECTRICAL

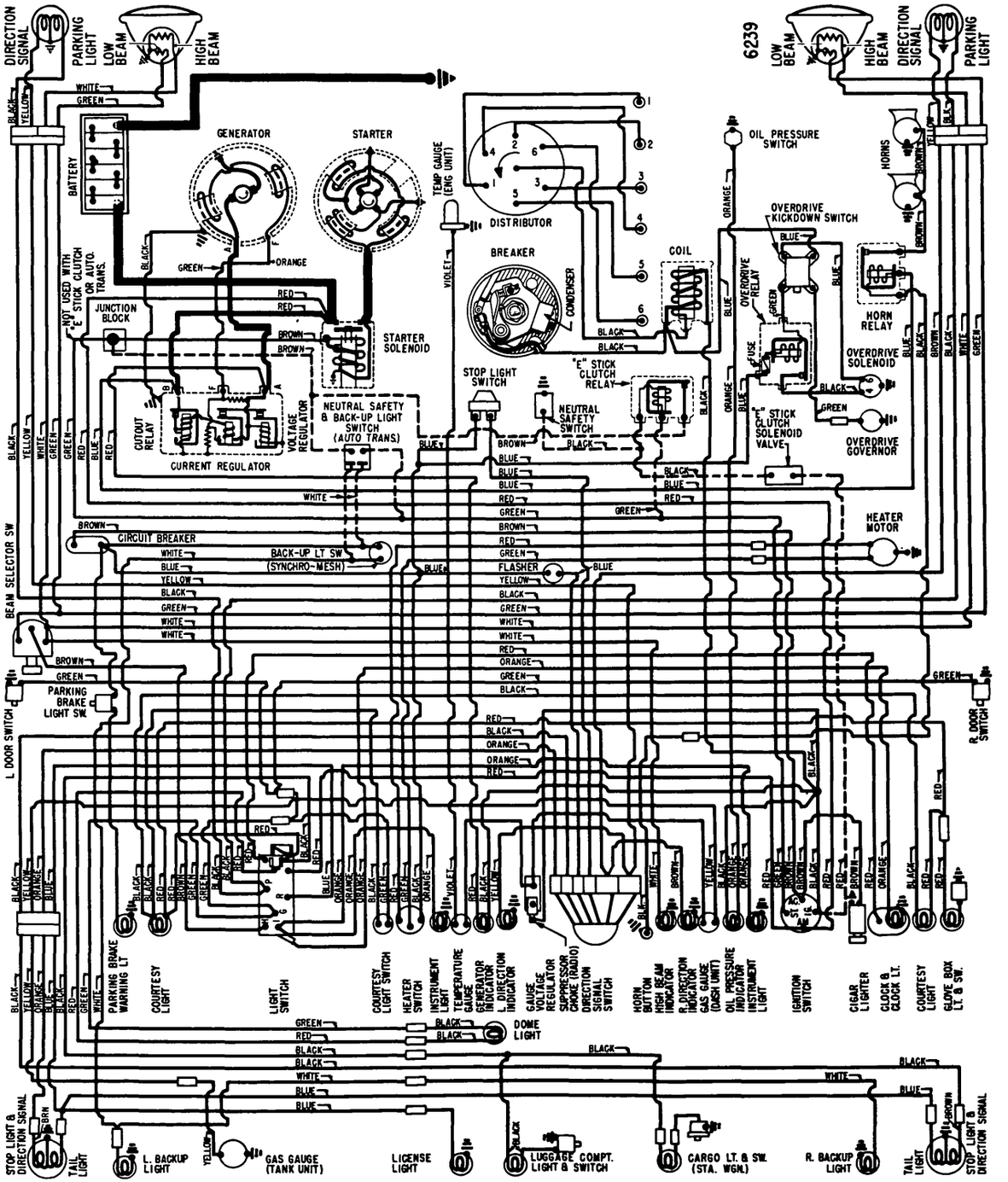
►*ERRATIC DIRECTION SIGNAL OR TAIL LIGHT OPERATION CORRECTION:* May be caused by poor ground between tail lamp socket and base. To insure a good ground at this point, remove tail lamp lens and and bulbs, centerpunch the flange of lamp socket to its base in about six places.

Light Switch R m val: Disconnect battery, place switch in full OFF position and press button (top of switch) to release shaft and knob assembly, then remove french nut. Remove switch and disconnect wires.

St p Light Switch: Located at front end of master cylinder. Use thread sealer when installing new switch.

CIRCUIT BREAKERS: 30 Amper - Back-up Light, Direction Indicator, Stop Light. Located on cowl ceiling under dash.

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18 Ampere - Headlight, Headlight Beam Indicator. Located in headlight switch.
12 Ampere - Parking Light, Tail Light, Instrument Light, License Plate Light, Trunk or Cargo Light. Located in headlight switch.

FUSES: 3AG 7½ Ampere - Dome Light, Clock Light, Glove Compartment Light, Instrument Panel Courtesy Lights. Located on light switch assembly.
AGA-5 Ampere - Radio. Located in line.
AGC-15 Ampere - Overdrive Relay. Located in relay.

ENGINE

ENGINE SPECIFICATIONS: Own. Cast Iron, 6 Cylinder "L" head.

Bore	Stroke	Displacement
3 1/8"	4 1/4"	195.6 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
8.0-1	23.4	90 at 3800 RPM

OIL PAN REMOVAL: Remove steering linkage cross tie rod before removing oil pan.

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, tin plated type with flat top.
Original Bore & Piston Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification, above.*
Clearance - .0006"-.0012" at bottom of skirt.
Removal - Pistons and rods removed from above.
Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top), .0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry.
Replacement Pistons: Std., .002", .005", .010", and .020" Oversize. Furnished with fitted pins.
Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.
Diameter - .8595-.8598". **Length** - 2.75".
Clearance in Piston - Palm press fit in piston at room temperature.
Pin Removal & Installation - *See "Piston Pins" in Rambler Special Data.*
Replacement Pins: Furnished Std. and .001", .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0930-.0935"	.010-.020"	.003-.005"
Compr.(2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3)①	.0245"	.015-.055"	.0008-.004".

① - Three-piece steel rail.

Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

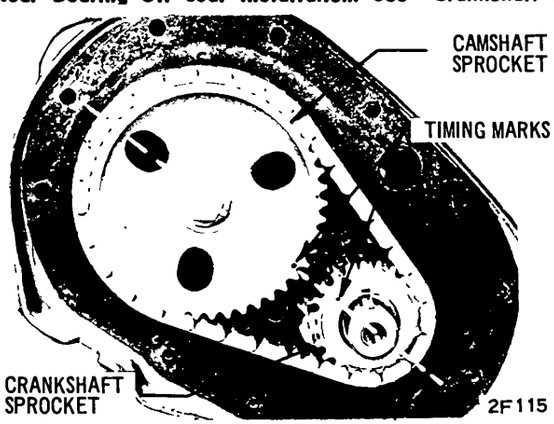
►*CONNECTING ROD & BEARING PRODUCTION CHANGE:* Connecting rod on later cars has one oil squirt hole only on camshaft side of engine (second squirt hole on opposite side of rod eliminated). Bearing upper half also has only one oil hole (indexing with squirt hole in rod). Both types of bearing inserts can be used with later type rod (second oil hole will be blanked off by rod) or, if desired, second oil hole in rod (opposite camshaft side) can be closed by light peening. *CAUTION - Oil squirt hole on camshaft side of rod must be open and bearing insert must have oil hole indexing with oil hole in rod.*

Length - 6.625" center-to-center. **Weight** - 23 ozs.
Crankpin Journal Diameter - 2.0948-2.0955".
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identification above.*
Bearings - Steel-backed babbitt. No shims.
Clearance - .001-.0015". **Side Play** - .005-.015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.
Installing Rods: Identification marks (raised surface on center of rod and cap) and notch in top of piston toward front of engine. On rods with single squirt hole *(see Production Change Note above)*, oil squirt hole must be on camshaft side of engine.

CRANKSHAFT

Journal Diameter - 2.4793-2.4798". Four Bearings.
Original Bearing Sizes - *See ENGINE NUMBER LETTERS under Model Identification above.*
Bearings - Steel-backed babbitt. No shims.
Clearance - .001-.0015".
Replacement Bearings: Std. & .001", .002", .010", .012" Undersize.
End Thrust: Taken by flanged front main bearing.
Endplay - .003-.008".
Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*



VALVE TIMING MARKS

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.*

Bearings - Steel-backed babbitt bushings.
Clearance - .001-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.
Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. **Width** 1", **Pitch** 3/8", **Length** 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Engine Front Cover Oil Seal (Crankshaft Front Seal): Cover oil seal can be replaced without removing cover by using Remover Tool J-9256 and Installer J-9163.

VALVES

Tappet Clearance: .016" Intake, .018" Exhaust.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.469"	.3407-.3412"	4.781"
Exhaust	1.281"	.3407-.3412"	4.7835"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°①	.340"	.002-.0035"
Exhaust	45°①	.340"	.002-.0035"

① - Valve Face angle 44°.

Valve Seat Width - 5/64-3/32".
Valve Stem Oil Seal - None used.

Valve Springs: Single spring used on each valve. Specifications as follows:

Valve	Lbs. Pressur	Length
Open	75-82	1 7/16"
Closed	37-41	1 3/4"

Valve Guides: Use Tool J-1429-1 to remove and replace guides. Guides should be flush with guide bore opening in block. Finish ream all guides after installation.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.
Intake Valves - Open 10° BTDC, Close 58° ALDC.
Exhaust Valves - Open 49° BLDC, Close 19° ATDC.
Valve Timing Check - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration dampener as intake valve opens after DC as engine is rocked back and forth over DC.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 12 lbs. minimum at 600 RPM, 50 lbs. at 3000 RPM.

Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block just ahead of oil pump.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4±1 lbs. Oil pressure indicator switch located on right side of block to rear of fuel pump.

Oil Pump: Gear type. Mounted on right side of engine. *See OILING SYSTEM in Rambler Special Data.*

►*OIL PUMP REMOVAL CAUTION FOR CARS EQUIPPED WITH "E-STICK" AUTO. CLUTCH: See ENGINE OILING SYSTEM in Rambler Special Data.*

Oil Filter: Partial flow type. Replace element every 4000 miles or sooner if needed.

Replacement Filter Element - Rambler No. 8990508.

Crankcase Ventilation: Standard Cars - Filter in crankcase filler cap and breather tube in valve chamber front side plate.

Positive Crankcase Ventilation Cars - Usual breather tube in valve chamber front side plate replaced by vacuum line to manifold, with valve in line to vary the air flow through crankcase to meet changing conditions at all engine speeds and loads. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. Add 1 qt. for heater.

Pressure Valve: 12-15 lb. radiator filler cap, Rambler No. 3165718.

Thermostat: Rambler No. 3203274 (Dole - 192-197°).

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Service as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57596.

Engine Unit - King-Seeley No. 44275.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

RAMBLER AMERICAN

Model	Deluxe	Custom	400
2 Door Club Sedan	6206	6206-2	6206-5
2-Door Coupe ©	6202		
2-Door Convertible			6207-5
2-Door Sta. Wgn.	6204	6204-2	
4-Door Sedan	6205	6205-2	6205-5
4-Door Sta. Wgn.	6208	6208-2	6208-5

© - Fleet sales only.

RAMBLER CLASSIC SIX

Model	Deluxe	Custom	400
2-Door Club Sedan	6216	6216-2	6216-5
4-Door Sedan	6215	6215-2	6215-5
4-Door Sta. Wgn.	6218	6218-2	6218-5
4-Door 3-Seat Sta. Wgn.		6218-4	

►*MODEL IDENTIFICATION NOTE: See "Car Code Number" below.*

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood.

Car Code Number: Number plate located on left front door hinge pillar post. Number includes model, body, trim, paint code and car built sequence numbers. Not used for licensing.

Engine Code Number: Located at upper front corner of left side of cylinder block. "C" prefix on Cast Iron Engines, and "B" prefix on Aluminum Engines. Indicates date of manufacture. Not used for licensing.

ENGINE NUMBER LETTERS: Located below engine code number on Cast Iron Engines, and at left rear corner of cylinder block on Aluminum Engines. First letter is size of bore, second letter is size of main bearings, third letter is size of connecting rod bearings. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 145 lbs. minimum at cranking speed with throttle wide open.

VALVE TAPPET CLEARANCE: Cast Iron Block - .012" Intake, .016" Exhaust, Hot.

Aluminum Block - "O" lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: None used.

CRANKCASE VENTILATION VALVE: Check at regular intervals (at least every 10,000 miles) and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.037".

Spark Plugs - Champion H-10 or H18Y. 14 mm. Torque to 30 ft. lbs.

COIL: Delco-Remy No. 1115066.

Ignition Current - 1.7 amps. idling, 3.75 amps. stopped.

Resistor - None used.

DISTRIBUTOR: Delco-Remy No. 1112435.

Condenser - Delco-Remy No. 1928111.

Capacity - .18-.23 mfd.

Contact Point Set - Delco-Remy No. 1924571 or 1944375 (pre-assembled).

Breaker Gap - .016".

Cam Angle - 28-35°.

Breaker Arm Spring Tension - 17-21 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	600	1-5	1200
5-7	900	10-14	1800
7.5-9.5	1500	15-19	3000
10-12	2100	20-24	4200

Vacuum Spark Control: Delco-Remy No. 1116174.

Vacuum Advance

Distr. Degrees	Engine Degrees	Vacuum ("of Hg)
1	2	5-7
11	22	16-17

IGNITION TIMING

Model	Ignition Setting Regular - Fuel - Premium
American (S.M. Trans.)	8° BTDC — 12° BTDC
American (Auto. Trans.)	10° BTDC — 14° BTDC
Classic (S.M. Trans.)	TDC — 3° BTDC
Classic (Auto. Trans.)	5° BTDC — 8° BTDC

Timing Mark - Vibration damper pulley has five notches (TDC, 3°, 5°, 8°, 10° BTDC). Align correct notch with pointer on timing chain cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter & Holley Single & Dual Carburetors used as follows:*

Car Model	Carburetor
American (exc. "E-Stick")	Holley 1908FC(2381-1)
American ("E-Stick")	Holley 1908FC(2446)
Classic (S.M. & O.D. Trans.)	Holley 1908FC(2138-1)
Classic (Auto. Trans.)	Carter AS 3206S
Classic (Opt. All Trans.)	Carter WCD 3322S

THROTTLE LINKAGE ADJUSTMENT (FLASH-O-MATIC CARS): Throttle valve pressure controlled by cable connected to carburetor throttle lever on carburetor throttle shaft. To adjust, perform following: 1) With carburetor throttle valve in hot idle position (off fast idle cam) and engine not running, disconnect throttle cable at lever on carburetor throttle control shaft. 2) Pull throttle cable toward carburetor and adjust clevis to obtain "free" pin in throttle shaft lever hole. Unscrew clevis ONE FULL TURN, then install clevis pin and retain with cotter pin. *NOTE - If, after this adjustment, transmission does not shift properly, see Rambler Six Flash-O-Matic Transmission in Transmission Section.*

THROTTLE LINKAGE ANTI-STALL DASHPOT ADJUSTMENT ("E-STICK" AUTO. CLUTCH): 1) Turn idle speed screw out to allow throttle valve to close tightly in bore. 2) Depress dashpot diaphragm stem fully. 3) Adjust by turning dashpot in or out to obtain 9/64" clearance between dashpot stem and throttle lever. Tighten locknut, then reset idle.

CARTER AS

Carter AS 3206S. Single barrel downdraft type.

Idle Setting - ¼-1¼ turns open. Turn screw out for richer mixture.

Idle Speed - 500 RPM. If equipped, Air Conditioning unit "ON". Flash-O-Matic transmission in neutral.

Float Level - 3/32" (Gauge T109-50) for carburetors with resilient inlet needle seat (5/32" - Gauge T109-148 for carburetors with solid inlet needle seat), Check and adjust float level exactly as follows: Remove gasket and invert bowl assembly while holding float pin retainer in place so that float hangs freely with float weight only on inlet needle. Use gauge to check distance from top of float at free end to gasket surface on bowl. To adjust, remove float lever pin retainer, install float holding tool, T109-389, and bend float lip as necessary *(CAUTION - Holding tool prevents float and needle pressing against resilient needle valve seat which might be compressed and cause false setting).* After adjustment, remove tool, install lever pin retainer, recheck float setting.

Accelerating Pump - No seasonal adjustment.

Fast Idle: .033-.037" (Gauge J-5496) opening between edge of throttle plate and carburetor bore (side opposite idle port). Adjust by bending connector link at lower angle

Automatic Choke Setting: Center on index.

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

HOLLEY SINGLE BARREL

Holley Model 1908FC. Single barrel downdraft type similar in design to Holley Visiflo. Used as follows:

Car Model	Holley Carb. No.
American (Without "E" Stick)	R-2381-1
American (With "E" Stick Clutch)	R-2446
Classic 6	R-2138-1

Idle Setting - 1 turn open approximately. Turn screw out for richer mixture.

Idle Speed - 550 RPM in neutral. 500 RPM on cars equipped with Air Conditioning and unit turned "ON".

Fuel Level - With engine running, measure through economizer diaphragm hole. With depth gauge placed on machined surface of opening, distance should be 3/4" (R-2446 & R-2381-1), 11/16" (R-2138-1).

Accelerating Pump - No seasonal adjustment.

Fast Idle: Integral type operated by choke valve. No adjustment required.

Automatic Choke Setting: Center on index.

►*OTHER DATA: See "Holley Visi-Flo Carburetors" in Carburetion Section.*

CARTER WCD

Carter WCD 3322S. 2-Barrel, downdraft type.

Idle Setting - ½-1½ turns open. Turn screws out for richer mixture.

Idle Speed - 550 RPM (S.M. & O.D. Trans. in neutral), 500 RPM (Auto. Trans. in neutral, Air Cond. Cars with unit "ON").

Float Level - Two separate adjustments must be made, lateral & vertical. For LATERAL adjustment, invert bowl cover assembly (gasket removed), then place float gauge J-4773 directly under floats with notches of gauge fitted over edges of casting. Sides of floats should just touch vertical uprights of gauge. To adjust, bend float arms. For VERTICAL adjustment, with float gauge in same position, floats should just clear horizontal portion of gauge. Vertical distance between top of float and machined casting surface must be 5/32" (Gauge T109-196) for carburetors with solid inlet needle seat, 1/8" (Gauge T109-36) for carburetors with resilient inlet needle seat. *CAUTION - On carburetors with resilient inlet needle seat, check float level with float hanging freely so that only weight of float is on inlet needle and be careful not to allow float lever to press on inlet needle when adjusting float level (seat can be compressed enough to cause false setting).*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Acc l rating Pump - No seasonal adjustment.

Fast Idl : .010" (Gauge J-5640) clearance between lip of fast idle cam and boss on body with choke valve closed (loosen clampscrew and adjust lever on choke shaft, then hold in place and tighten clampscrew). Then check for .020" clearance (Gauge J-1388) between throttle valve and bore of carburetor (side opposite idle port), with idle adjusting screw on high step of fast idle cam. Adjust by turning fast idle screw.

Automatic Ch k Setting: Centered on index.

►*OTHER DATA: S "Carter WCD Carburetors" in Carburetion S ction.*

CARB. EQUIPMENT

Fuel Pump: American - Carter MDOF-3184SA. Fuel & Vacuum, diaphragm type.

Classic - Carter No. MPF-3025SA. Fuel & Vacuum, with piston type vacuum pump.

Pr ssur - 4-5½ lbs. minimum at 16" above inlet at 1800 RPM (American), 4-5½ lbs. maximum, using 6" hose and "T" fitting 6" above carb. inlet (Classic).

Gasoline Gaug : King-Seeley Electric Constant Voltage ("CV") type with Voltage Regulator, King-Seeley No. 57603.

Dash Unit - King-Seeley No. 57592 (American), No. 58852 (Classic).

Tank Unit - King-Seeley No. 59230 (American), No. 59225 (Classic).

Radi Suppr ssi n Ch k Filter - Located on feed terminal of Gauge Voltage Regulator.

Air Cl an r: Dry filter element type Std. Filter element should be cleaned every 4000 miles and replace every 25,000 miles.

►*AIR CLEANER PAPER ELEMENT CLEANING CAUTION:* Clean paper filter element by tapping and shaking to remove dirt particles. DO NOT wash in any liquid or use compressed air. DO NOT LUBRICATE.

BATTERY

Gl be-Uni n r Pr st lit (Autolite). As follows:

Car Us	①Glob -Uni n No.	Plates	②Hr. Capacity
All (Less A.C.)	2SM-45	42	45 Amp.
All (With A.C.)	2SMH-60	66	60 Amp.
Heavy Duty	2SH-70	66	70 Amp.

① - Also Autolite No. 11HS-70 (70 Amp. hour capacity - 20 hr. rate) used only for heavy duty.

② - 20 hr. rate.

Batt ry Gr und - Negative to cylinder head.

Engin Ground - Transmission case to rear engine crossmember.

STARTER

D lc -Remy N . 1107201.

Driv - Overrunning clutch (solenoid pinion shift).

R tation - Counterclockwise at commutator end.

Brush Spring T nsi n - 35 ozs. minimum.

Performance Data

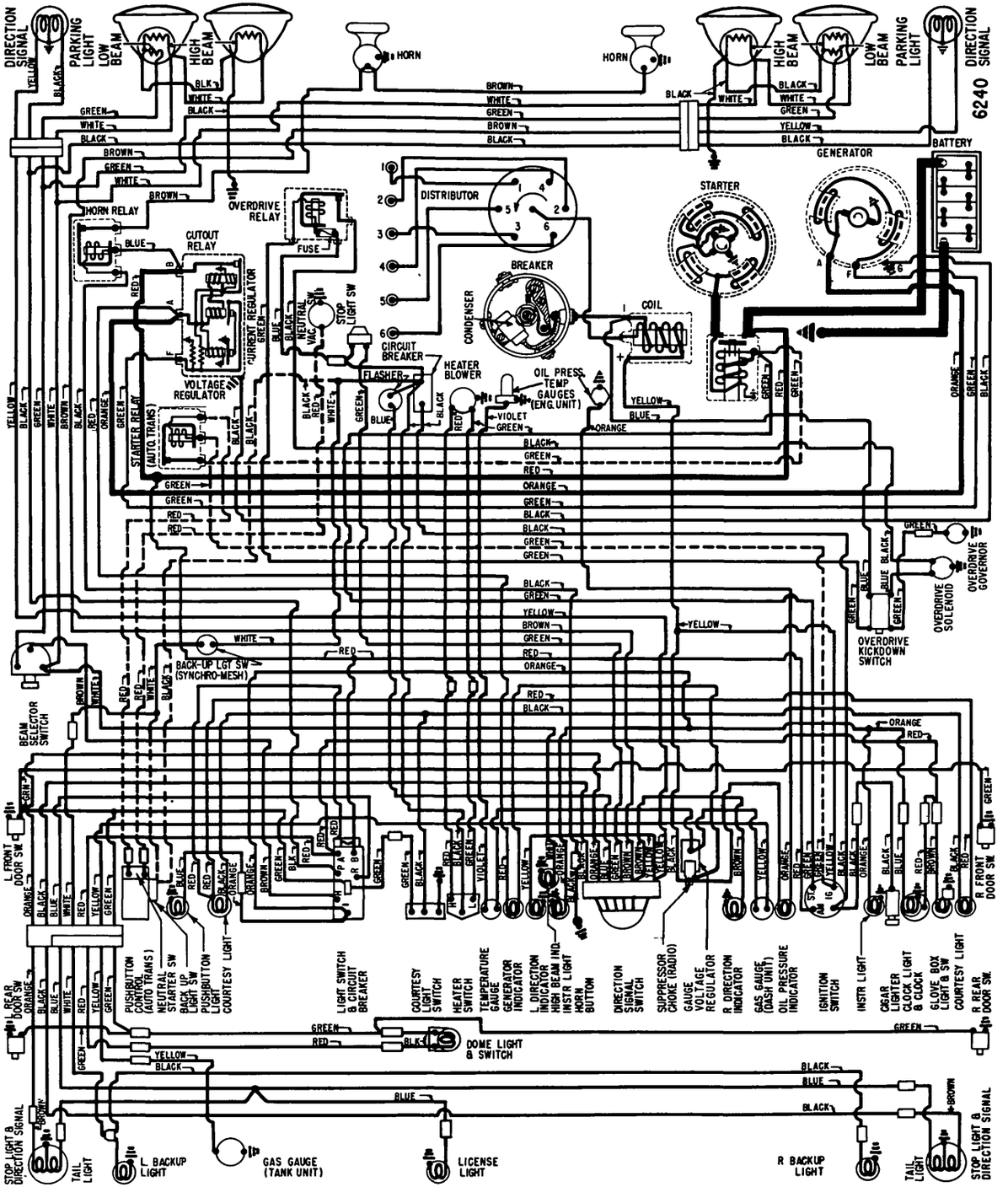
Torque	RPM	Volts	①Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

① - Includes solenoid.

Start r Switch: Delco-Remy Solenoid No. 1119798 mounted on starter and controlled by Ignition & Starter Switch Rambler No. 3158414 for key starting (synchro-mesh). Automatic Transmission Cars controlled as follows:

American - Same as synchro-mesh above with Neutral

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Safety & Back-Up Light Switch Rambler No. 3203293. *S NOTE b l w.*

Classic - Neutral Safety Switch Rambler No. 3157963 and Relay No. 3156115 with Push Button Control Switch mounted on gearshift control and operated by pushing in "Neutral" button with ignition switch turned ON. Vacuum switch prevents starter operation with engine running.

►*"E-STICK" AUTO. CLUTCH EQUIPPED CARS STARTER RELAY NOTE:* Two types used. Rambler No. 3156115 (Relay has 3 screw type terminals), No. 3165763 (Relay has 2 screw type terminals and 1 male arcless type).

►*VACUUM NEUTRAL STARTER SWITCH CAUTION:* DO NOT apply a hot lead direct to switch for test purpose as it will overheat loading spring and/or burn contacts. Disconnect lead to switch and ground lead to engine. If engine will start, switch is defective. Switch opens at 11-14" of vacuum. Starter gear clash that occurs when engine started cold and on low fast idle setting with choke fully closed is the result of low engine vacuum and is normal.

Neutral Safety Switch Adjustment (American) - *See "Rambler Automatic Transmission" in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows.

Model	Generator No.
All Without Air Conditioning	1100416
All With Air Conditioning	1102299
Heavy Duty	1102123

►*AUTOLITE HEAVY DUTY GENERATOR NOTE: See Rambler Ambassador Car Model Pages.*

Performance Data

Generator	Amperes	Volts	RPM
1100416	25	14.0	2710
1102299	30	14.0	2240
1102123	45	14.0	2520

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.5-1.62 amps. (1100416), 1.69-1.79 amps. (1102299), 2.66-2.86 amps. (1102123), at 12 volts and 80°F.

Belt Adjustment: 110-120 lbs. (New), 70-80 lbs. (Used) tension, using a belt tension gauge at center of longest span between pulleys. Move generator in its mounting bracket to adjust. *NOTE* - When using gauge on notched belt, finger of gauge should be in notch.

GENERATOR REGULATOR

Delco-Remy. Used as follows:

Model	Regulator	Generator
Standard	1119122, E	1100416
Air Cond.	1119003, E	1102299
Heavy Duty	1119600	1102123

►*REGULATOR NOTE: All regulators are "A" Circuit.*

►*AUTOLITE HEAVY DUTY REGULATOR NOTE: See Rambler Ambassador Car Model Pages.*

►*DOUBLE CONTACT REGULATOR NOTE:* Regulator 1119600 has double contacts for voltage regulation. *NOTE - Sp cificati ns below ar "N rmal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119003, 122), 11.8-13.0 volts (1119600).

C ntact Gap - .020".

Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119003, 122) - 13.8-14.7 volts at 125°F.

Setting (1119600) - 13.8-14.6 volts operating on upper contacts, .1-.3 volt lower on lower contacts. At ambient temperature of 125°F.

Contact Gap - (1119600) .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (1119122 & 1119003), .060" (1119122E & 1119003E), .067" (1119600) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119122) - 23-27 amperes (hot).

Setting (1119003) - 27-33 amperes (hot).

Setting (1119600) - 38-45 amperes (hot).

Air Gap - .075" with armature pressed down to point where contacts just touch.

Replacement Regulator (30 Ampere): Rambler No.3203659.

►*OTHER DATA: See "Rambler Replacement Regulator" under GENERATOR REGULATOR in Rambler American (L-Head Engine) Car Model Pages.*

ALTERNATOR & REGULATOR

►*See RAMBLER AMBASSADOR Car Model Pages.*

MISC. ELECTRICAL

►*ERRATIC DIRECTION SIGNAL OR TAIL LAMP OPERATION CORRECTION:* May be caused by poor ground between tail lamp socket and base. To insure a good ground at this point, remove tail lamp lens and bulbs. Centerpunch the flange of the lamp socket to the base in about six places.

Light Switch Removal: Disconnect battery, place switch in full OFF position and press button (top of switch) to release shaft and knob assembly, then remove french nut. Remove switch and disconnect wires.

Stop Light Switch: Located on fitting at front end of master cylinder (American), in fitting on front face of firewall (classic). Use thread sealer when installing new switch.

CIRCUIT BREAKERS: 30 Ampere - Back-up Light, Direction Indicator, Stop Light, Power Windows. Located on cowl ceiling under dash.

18 Ampere - Headlights, Headlight Beam Indicator. Located in headlight switch.

15 Ampere - Protects Power Windows. Mounted near each motor.

12 Ampere - Parking, Tail, Instrument, License Plate, Instrument Panel Courtesy Lights. Located on light switch assembly.

FUSES: 3AG 7½ Ampere - Dome, Clock, Glove Compartment, and Instrument Panel Courtesy Lights. Locate on light switch assembly.

AGC - 15 Ampere - Overdrive Relay. Located in relay.

AGA-5 Ampere - Radio. Located in line.

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl. valve-in-head.

►*ENGINE NOTE: B th Cast Ir n and Aluminum Engines in producti n. Sp cificati ns listed b low apply to both ngines, exc pt wh r noted.*

B r	Strok	Displac ment
3.125"Ⓒ	4.25"	195.6 cu. ins.

Ⓒ - For .010" Oversize bore, *se ENGINE NUMBER LETTERS above.*

Compr. Ratio	Rat d HP	D v lop d HP
8.7-1	23.44	Ⓒ127 at 4200 RPM

Ⓒ - 1-Bbl. Carb. 138 at 4500 RPM with 2-Bbl. Carb.

►*ENGINE THRUST ROD ASSEMBLY (Seri s 6210 with Auto. Trans.):* Limits forward movement of engine. Attached by bracket to lower left side of block and to front suspension crossmember at rear.

►*ALUMINUM ENGINE SERVICE NOTE: See Rambler Special Data for special precautions in handling parts.*

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tight ning Sp cifications" in Rambler Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylind r Head & Manifold" in Rambler Special Data.*

PISTONS

Aluminum alloy, solid skirt, steel strut, tin plated type with contoured top.

Original Bore & Pistons - *S "ENGINE NUMBER LETTER" under Model Id ntificati n above.*

Clearance - .0006-.0012" at bottom of skirt.

Weight (Piston only) - 14.7 ozs.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Piston to bore clearance .0006-.0017" (Skirt Top)..0006-.0012" (Skirt Bottom). Piston properly fitted should support its own weight with piston and bore dry

Replacement Pistons: Std., .002", .005", .010" and .020" Oversize. Furnished with fitted pins.

Installing Pistons: Notch in perimeter must be to front of engine.

PISTON PIN

Press fit in connecting rod. No locking device.

Diameter - .8595-.8598". **Length** - 2.75".

Clearance in Piston - Palm press fit in piston at room temperature.

Pin Removal & Installati n - *See "Pist n Pins" in Rambler Special Data.*

Replacement Pins: Furnished Std. and .001", .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring per piston.

Ring	Width	End Gap	Sid Cl aranc
Compr. (1)	.0930-.0935"	.010-.020"	.003-.005"
Compr. (2)	.0925-.0935"	.010-.020"	.003-.005"
Oil (3)①	.0245"	.015-.055"	.0001-.0084".

① - Three-piece steel rail.

Installing Rings: *NOTE* - Top compression ring outer edges beveled. Install both compression rings with inner notched edge up.

Replacement Rings: Sets of Standard and .020" Oversize.

CONNECTING ROD

►*CONNECTING ROD & BEARING PRODUCTION CHANGE:* Connecting rod on later cars has one oil squirt hole only on camshaft side of engine (second

CONTINUED ON NEXT PAGE

S INDEXES on Pgs. 4 to 9 for complet CARBURETION, ELECTRICAL, MECHANICAL data.

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squirt hole on opposite side of rod eliminated). Bearing upper half also has only one oil hole (indexing with squirt hole in rod). Both types of bearing inserts can be used with later type rod (second oil hole will be blanked off by rod) or, if desired, second oil hole in rod (opposite camshaft side) can be closed by light peening. *CAUTION - Oil squirt hole on camshaft side of rod must be open and bearing insert must have oil hole indexing with oil hole in rod.*

Length - 6.625" center-to-center. Weight - 23 ozs.

Crankpin Journal Diam ter - 2.0948-2.0955".

Original Bearing Sizes - See *"ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-Backed "Micro-Babbitt" (Cast Iron Eng.), "Sintered Copper-Lead" (Aluminum Eng.). No shims.

Clearance - .001-.0015". Sideplay - .005-.015".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Installing Rods: Install rods in respective cylinders with cylinder numbers on rods and caps toward camshaft side of engine and notch in top of piston to front of engine. On rods with single oil squirt hole *(see Production Changes above)*, oil squirt hole must be on camshaft side of engine.

CRANKSHAFT

Journal Diameter - 2.4793-2.4798". Four bearings.

Original Bearing Size - See *"ENGINE NUMBER LETTERS" under Model Identification above.*

Bearings - Steel-Backed "Micro-Babbitt" (Cast Iron Eng.). "Sintered Copper-Lead" (Aluminum Eng.). No shims.

Clearance - .001-.0015".

End Thrust: Taken by flanged front main bearing.

Endplay - .003-.008".

Replacement Bearings: Furnished Std. and .001", .002", .010", .012" Undersize.

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Rambler Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Rambler Special Data.*

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* **When improper valve operation is indicated, check lift of each cam. *See "Camshaft & Bearings" in Rambler Special Data.***

Bearings - Steel-backed babbitt bushings.

Clearance - .001-.003".

End Thrust: Thrust plate on front face of engine between No. 1 bearing and camshaft sprocket.

Endplay - .004-.008".

Timing Chain: Morse non-adjustable type. Width 1", Pitch 3/8", Length 22½" or 60 links.

Camshaft Setting: Install chain with punch mark on camshaft sprocket and mark on crankshaft sprocket adjacent and in line with each other across centerline of sprockets.

Engine Front Cover Removal: *See "Engine Front Cover" in Rambler Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): Cover oil seal can be replaced without removing cover by using Remover J-9256 and Installer J-9163.

VALVES

Tappet Clearance: (Cast Iron Engine) - .012" Intake, .016" Exhaust, with engine hot and running.
(Aluminum Engine) - "0" lash, hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.594"	.341-.342"	4.791"
Exhaust	③	④ .3405-.3415"	②

Valve	Seat Angle	Lift	Stem Clearance
Intake	① 45°	⑤	.0015-.0035"
Exhaust	⑥ 45°	⑦	.0025-.004"

① - Valve face angle 44°.
② - 4.791" (Cast Iron Eng.), 4.808" (Aluminum Eng.).
③ - 1.343" (Cast Iron Eng.), 1.250" (Aluminum Eng.).
④ - .3407-.3412" (Cast Iron Engine).
⑤ - .371" (Cast Iron Eng.), .406" (Aluminum Eng.).
⑥ - 44½° face angle (Aluminum Eng.), 44° face angle (Cast Iron Eng.).
⑦ - .369" (Cast Iron Eng.), .406" (Aluminum Eng.)..

Valve Seat Width - .078-.093".

Valve Stem Oil Seals - Rubber deflectors mounted on all valve stems at upper end of guide.

Valve Springs: Single spring used on each valve. Specifications as follows:

Cast Iron Engine

Valve	Lbs. Pressure	Length
Open	115-125	1 7/16"
Closed	65-70	1 13/16"

Aluminum Engine

Valve	Lbs. Pressure	Length
Open	155-165	1 7/16"
Closed	75-85	1 13/16"

Valve Guides: Use Tool J-1429-B to remove and install all guides. Install guide so it extends 23/32" above surface of cylinder head. Finish ream all guides after installation.

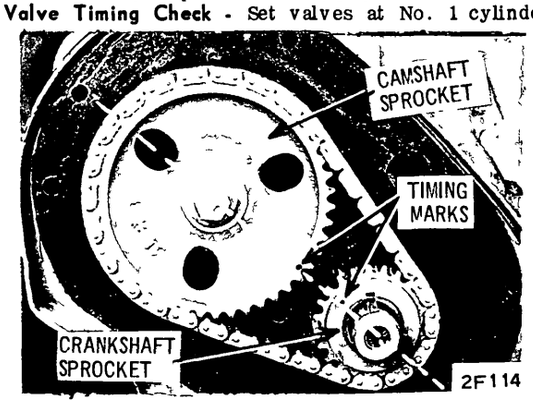
Rocker Arm Assembly: *See VALVE SYSTEM in Rambler Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 12°30' BTDC. Close 51°30'ALDC.
Exhaust Valves - Open 53°30' BLDC. Close 10°30'ATDC.
Valve Timing Check - Set valves at No. 1 cylinder at .003" lash. With No. 6 piston at TDC in firing position, timing will be correct if exhaust valve opens the same amount before DC on vibration damper as intake valve opens after DC as engine is rocked back and forth over DC.



VALVE TIMING MARKS

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Rambler Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.
Normal Oil Pressure (Cast Iron Engine) - 12 lbs. at 600 RPM, 50 lbs. at 3000 RPM.
Normal Oil Pressure (Aluminum Engine) - 15 lbs. at 600 RPM, 55 lbs. at 3000 RPM.
Pressure Regulator Valve - Non-adjustable spring loaded valve located in cylinder block (Cast Iron Engine), in oil pump cover (Aluminum Engine).

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on right side of engine block.

Oil Pump: Gear type, mounted on right side of engine. *See "Oiling System" in Rambler Special Data.*

►*OIL PUMP REMOVAL CAUTION (CARS EQUIPPED WITH "E-STICK" AUTO. CLUTCH): See ENGINE OILING SYSTEM in Rambler Special Data.*

Oil Filter: Partial flow type Std. (Cast Iron Engine), full flow type Std. (Aluminum Engine). Replace element and gasket at 4000 mile intervals.

►*OIL FILTER INSTALLATION CAUTION:* Apply thin coat of oil to new gasket. Install filter by hand until gasket contacts mounting bracket seat. Then tighten ½ additional turn. DO NOT OVERTIGHTEN.

Replacement Filter Element - Rambler No. 8990508 (Cast Iron Eng.), No. 8991072 (Aluminum Eng.).

Crankcase Ventilation: Standard Cars - Filter in crankcase filler cap and breather tube in valve tappet cover.
Positive Crankcase Ventilation Cars - Usual breather tube in valve chamber front side plate replaced by vacuum line to manifold with valve in line to vary the air flow through crankcase to meet changing conditions at all engine speeds and loads. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 10 qts. Add 1 qt. for heater.
Pressure Valve: 12-15 lb. radiator filler cap, Rambler No. 3165718.
Thermostat: 192-197°F Dole. Rambler No. 3203274 (American), No. 3203275 (Classic).
Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Service as an assembly.
Temperature Gauge: King-Seeley.
Dash Unit - King-Seeley No. 57596 (American), No. 58855 (Classic).
Tank Unit - King-Seeley No. 44275 (All).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

Model	Model Identification Deluxe	Custom	400
4-Door Sedan	6285 Ⓒ	6285-2	6285-5
Station Wagon (2 Seat)		6288-2	6288-5
Station Wagon (3 Seat)			6288-6

Ⓒ - Fleet Sales only.

SERIAL NUMBER: Stamped on plate attached to right hand wheelhouse panel under hood.

Car Code Number: Stamped on bottom of body and number plate located on left front door hinge pillar. Number is not used for licensing.

Engine Code Number: Stamped on tag attached to generator mounting bracket. Number is not used for licensing.

►*ENGINE NUMBER LETTERS (Adjacent To Engine Code Number):* First letter is size of bore, second letter is size of main bearings, and third letter is size of connecting rod bearings. Engines not marked are standard in all respects. "A" - Standard. "B" - .010" Undersize. "C" - .010" Oversize.

TUNE-UP

COMPRESSION PRESSURE: 145 lbs. minimum at cranking speed. Cylinders must be equal within 10 lbs.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type. Located between right bank exhaust manifold and exhaust crossover pipe (exhaust gases diverted through heat passages in manifold when valve closed).

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.037".

Spark Plugs - Champion H-10 or H-18Y. 14 mm. Torque to 25-30 ft. lbs.

COIL: Prestolite (Autolite) No. 200571.

Ignition Current - 3 amps. at 12.5 volts with resistor in circuit.

Resistor - Autolite No. PU-5003 connected in circuit between positive terminal of coil and ignition switch. *Resistor must be in circuit when testing coil output.*

DISTRIBUTOR: Prestolite (Autolite) IBP-4109.

Condenser - Autolite No. IBB-2042SS-1.

Capacity - .18-.23 mfd.

Contact Point Set - Autolite No. IBP-2040L.

Breaker Gap - .018-.022". **Cam Angle** - 28-32°.

Breaker Arm Spring Tension - 17-22 ozs.

Rotation - Counterclockwise at commutator end.

Automatic Advance - IBP-4109

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250-350	0	500-700
7.5-9.4	750	15-18.8	1500
17-19	1900	34-38	3800

Vacuum Spark Control: Autolite No. IBP-2023LC. Integral type.

Vacuum Advance - IBP-2023LC

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
8.2-11	16.4-22	15

IGNITION TIMING

Carb. & Trans.	Ignition Setting Regular - Fuel - Premium
2-Bbl. Carb. Synchro-mesh & O.D.	TDC ..... 3° BTDC
2-Bbl. Carb. Auto. Trans.	5° BTDC ..... 8° BTDC
4-Bbl. Carb. Auto. Trans.	5° BTDC

►*TIMING SETTING NOTE:* Set timing with vacuum line disconnected and distributor opening taped closed, and with engine at idle speed.

Timing Mark - Timing pointer on engine front cover and milled notches on vibration damper. Notches indicate TDC, 3° BTDC, 5° BTDC, and 8° BTDC. Align correct notch with pointer.

CARBURETOR

►*CARBURETOR APPLICATION: Holley 2-Barrel carburetor Standard; Holley 4-Barrel carburetor Optional.*

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS. CARS): None required. Transmission shift points controlled by vacuum & solenoid unit at rear of transmission.

Anti-Stall Dashpot Adjustment: With dashpot plunger fully depressed, turn dashpot in or out to obtain 3/32" (2-Bbl.), 7/64" (4-Bbl.) between dashpot plunger and throttle lever.

HOLLEY 2 & 4-BARREL

2-BARREL CARBURETOR	Holley No.
Synchro-mesh & O.D.	Model 2300, No. 2442
Auto. Trans.	Model 2300, No. 2463
4-BARREL CARBURETOR	
Synchro-mesh & O.D.	Model 4150, No. 1957-1
Auto. Trans.	Model 4150, No. 2464

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - Initial setting 1 turn open. Turn screws out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh & O.D.), 475 RPM (Auto. Trans. in "N"), 500 RPM (Air Conditioning "ON").

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. MPF-3158-S. Fuel & Vacuum, with piston type vacuum pump.

Pressure - 4-5½ lbs. maximum using 6" hose and "T".

Gasoline Gauge: King-Seeley Electric Constant Voltage ("CV") type with Gauge Voltage Regulator King-Seeley No. 57603.

Dash Unit - King-Seeley No. 58852.

Tank Unit - King-Seeley No. 59225 (Exc. 9-Pass. Sta. Wgn.), No. 59230 (9-Pass. Sta. Wgn.).

Radio Suppression Choke Filter - Located on feed terminal of Gauge Voltage Regulator.

Air Cleaner: Replaceable element (dry type) used for all models. Clean element every 4000 miles, replace every 25,000 miles.

►*AIR CLEANER CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT WASH in any liquid or use compressed air. DO NOT OIL.

BATTERY

Globe-Union 2SMH-60 & 2SH70, Prestolite (Autolite) 11HS70. 12 volt, 11 plate, 60 ampere hour capacity (2SMH-60), 70 ampere hour capacity (2SH70 & 11HS70) at 20 hour rate.

Battery Ground - Negative to cylinder block.

Engine Ground - Transmission to rear crossmember.

STARTER

Prestolite (Autolite) MDY-6009. Armature No. 16-77.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 42-53 ozs.

Performance Data - MDY-6009

Torque	RPM	Volts	Amperes
0 ft. lbs.	4200	10.0	60
9 ft. lbs.	Lock	4.0	405

Starter Switch: Autolite Solenoid No. SAJ-4004 mounted on starter and controlled by Ignition & Starter Switch Rambler No. 3158414 (Synchro-mesh). On Auto. Trans. Cars, solenoid controlled by Ignition Switch Rambler No. 3158613, a Neutral Safety Switch No. 3157963, and a Relay No. 3156115 with Push Button Control. Neutral Safety Switch is mounted on gear shift control and operated by pushing in Neutral Button with ignition switch ON. Vacuum Switch prevents starter operation with engine running.

►*VACUUM NEUTRAL STARTER SWITCH CAUTION:* DO NOT apply a hot lead direct to switch for test purpose as it will overheat loading spring and/or burn contacts. Disconnect lead to switch and ground lead to engine. If engine will start, switch is defective. Switch opens at 11-14" of vacuum. Starter gear clash that occurs when engine started Cold and on low fast idle setting with choke fully closed is the result of low engine vacuum and is normal.

GENERATOR

Prestolite (Autolite) GJP-7405A & S (Std.), GJP-7104A (Heavy Duty).

Armature - Autolite No. 10-53 (GJP-7104A Gen.).

►*CHARGING CIRCUIT CAUTION:* Generator GJP-7405A is "A" circuit type with generator field grounded in generator regulator. Generator GJP-7104A is "B" circuit type with generator field grounded in the generator.

►*OPTIONAL DELCO-REMY "HEAVY-DUTY" GENERATOR NOTE: See Rambler American & Classic 6 data pages.*

Performance Data - GJP (Cold - 70°F)

Amperes	Volts	RPM
16 min	15.0	1750
30	15.0	2390
35	15.0	2600

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amperes at 10.0 volts.

Motoring Current - 3.1-3.5 amperes at 10.0 volts.

Belt Adjustment: Use a Belt Tension Gauge on longest accessible belt span. Gauge should read 70-80 lbs. (Used Belt), 110-120 lbs. (New Belt). Adjust by moving generator on its mounting bracket. *NOTE* - When using gauge on a notched belt, finger of gauge should be in belt notch.

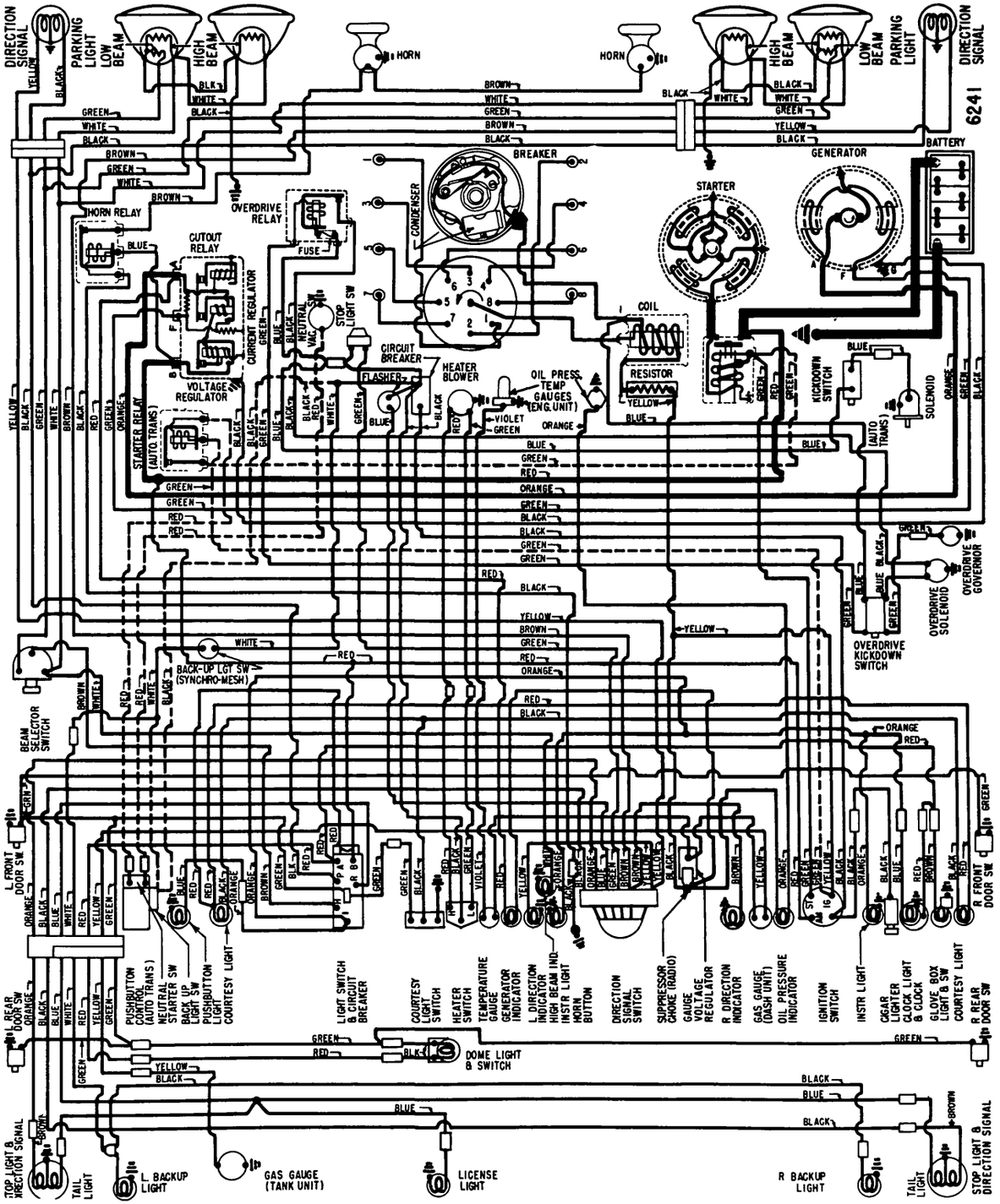
GENERATOR REGULATOR

Prestolite (Autolite) VBO-4223F-1 ("A" Circuit), VBO-6201A ("B" Circuit). Used as follows:

►*OPTIONAL DELCO-REMY "HEAVY DUTY" GENERATOR REGULATOR NOTE: See Rambler American & Classic 6 data pages.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.



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Cutout Relay

Cuts In - 12.5-13.5 volts.
Cuts Out - 3-5 amps. discharge current after a charge of 7 amperes.
Contact Gap - .015". **Air Gap** - .025-.027".

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F charging at 7 amperes or with a .25 ohm resistor in series with regulator and battery.
Air Gap - .048-.052" (check at brass armature stop pin).

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A - Operating Amperes -	Test B
44 max.	35 (33-37)

Test A - After 15 minutes operation charging at 7 amperes.
Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).
►*OTHER DATA: See "Prestolite (Autolite) "A" Circuit Regulators" and "Prestolite (Autolite) "B" Circuit Regulators" in Electrical Section.*

ALTERNATOR

LEECE-NEVILLE: A00122116-AA or A0012074AB. Three phase type with internal rectifiers.

A00122116-AA Specifications

Rated Output - 50 amperes at 12.0 volts and 1950 RPM.
Field Coil Resistance - 3.8-4.2 ohms at 12.0 volts.
►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

PRESTOLITE (AUTOLITE): No. ALD-5005. Three-phase type with internal rectifiers.

Rotation - Clockwise at drive end.
Rated Output - 38 amps. minimum at 14.2 volts and 4200 alternator RPM (1750 engine RPM).
Field Current - 2.34-2.42 amps. at 10.0 volts and 70°F.
►*OTHER DATA: See "Prestolite (Autolite) Alternator & Regulator" in Electrical Section.*

DELCO-REMY: No. 1117070. Three-phase type with internal rectifiers.

Rotation - Clockwise at drive end.
Brush Spring Tension - 10 ozs.
Field Current Draw - 6-6.6 amps. at 12 volts and 80°F.
►*OTHER DATA: See "Delco-Remy Delcotron Alternators (Internal Rectifier)" in Electrical Section.*

ALTERNATOR REGULATOR

LEECE-NEVILLE: No. R-0013533-RA. Consists of a Voltage Regulator and a Load (Field) Relay. Voltage Regulator is "Double Contact" type.

Load Relay

Closing Voltage - 6.0-6.4 volts.
Contact Gap - .018-.020" with contacts open.
Air Gap - .018-.020" with contacts closed.
Hinge Gap - .005-.007" with contacts closed.

Voltage Regulator

Voltag Setting - 13.6-13.8 volts (upper contacts); 13.7-13.9 volts (lower contacts); 14.0-14.2 volts (transfer voltage).
C ntact Gap - .018-.020" with lower contacts closed.

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Air Gap - .035-.043" with lower contacts closed.
Hing Gap - .018-.020" with lower contacts closed.
►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

PRESTOLITE (AUTOLITE): No. VBS-6201A-1 (Early), VBV-6221A-1 (Later). Consists of a "Double Contact" type Voltage Regulator and an Indicator Light Relay (VBS), Circuit Breaker (VBV). *NOTE* - VBV type has no 'L" terminal and Indicator Light lead connected to Regulator "A" terminal.

Indicator Light Relay (VBS)

C ntacts Close - 1.5 amperes maximum.
C ntacts Open - 2.0-2.5 amperes.

Circuit Breaker (VBV)

C ntacts Close - 8.0-9.0 volts.
C ntacts Open - 13.0-13.5 volts.
C ntact Gap - .017-.022".
Air Gap - .025-.027".

Voltage Regulator

Setting (VBS-6201A) - 13.9-14.3 volts at 80°F operating on upper contacts. Voltage spread between upper and lower contacts .1-.3 volts.
S tting (VBV-6221A-1) - 14.0-14.4 volts at 70°F operating on upper contacts. Voltage spread between upper and lower contacts .2-.5 volts.
C ntact Gap - .010-.012" (lower contacts with upper contacts closed).
Air Gap - .034-.038" (VBS-6201A), .034-.037" (VBV-6221A-1), with lower contacts just touching.
►*OTHER DATA: See "Prestolite (Autolite) Alternator & Regulator" in Electrical Section.*

DELCO-REMY: No. 9000552. Consists of a Voltage Regulator and a Field Relay (integral).

Field Relay

Cl sing Voltage - 5.0-9.5 volts.
Air Gap - .014" with points just touching.
Contact Gap - .027".

Voltage Regulator

S tting - 13.0-13.6 volts (adjust to 13.4 volts).
Air Gap - .075".
►*OTHER DATA: See "Delco-Remy Delcotron Alternator (Internal Rectifier) & Transistorized Regulator" in El ctrical Section.*

MISC. ELECTRICAL

►*ERRATIC DIRECTION SIGNAL OR TAIL LIGHT OPERATION CORRECTION:* May be caused by poor ground between tail light socket and base. To insure a good ground at this point, remove tail lamp lens and bulbs. Centerpunch the flange of lamp socket.

Light Switch Removal: Disconnect battery, place switch in full OFF position and press button (top of switch) to release switch shaft and knob assembly, then remove French nut. Remove switch and disconnect wires.

Stop Light Switch: Located in fitting on front face of firewall. Use thread sealer when installing new switch.

CIRCUIT BREAKERS: 18 Ampere - Headlights and High Beam Indicator. In light switch.
12 Ampere - Parking, Tail, License, Instrument, & Trunk lights. In light switch.
30 Ampere - Stop lights, Direction Signals, Back-up lights. On ceiling of cowl beneath dash panel.

FUSES: AGC 15 Amper - Overdrive circuit. Clipped to "B" terminal of overdrive relay.
3AG 7½ Ampere - Courtesy, Dome, & Glove Box lights.
AGA 5 Amper - Radio. In feed wire.

ENGINE

ENGINE SPECIFI CATIONS: Own. V8, valve-in-head of same design used previously.

Bore	Stroke	Displacement	Rated HP
4"	3¼"	327 cu. ins.	51.2

Model	Compr. Ratio	Developed HP
Std. 2-Bbl.Carb.	8.7-1	250 at 4700 RPM
Optl. 4-Bbl. Carb.	9.7-1	270 at 4700 RPM

Compression Reading - *See TUNE-UP.*

►*CRANKSHAFT OIL SHEDDER AND ENGINE FRONT COVER PRODUCTION CHANGE:* Oil Shedder, No. 3165660, installed on crankshaft beginning Engine Code No. 30920. Revised Engine Front Cover, No. 3203682, also installed to accommodate oil shedder. Oil shedder can be used only with new type cover.

OIL PAN REMOVAL: Remove right shock absorber upper retaining nut and remove right front coil spring. Loosen strut rod nuts at right front lower control arm ball joint. Remove stabilizer bar. Disconnect engine support tubes from crossmember. Remove power steering cylinder piston rod nut and grommet or idler arm. Disconnect right side of crossmember, pull crossmember down, and install a 6¼" wood block between crossmember and underbody to hold crossmember down. Remove flywheel dust cover. Drain crankcase, then remove oil pan by tilting forward, down, and to the right to clear crossmember.

CYLINDER HEAD INSTALLATION: *See "Cylinder Head & Manifolds" in Rambler Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Rambler Special Data.*

ENGINE REMOVAL: *See "ENGINE" in Rambler Special Data.*

PISTONS

Aluminum alloy, slipper type, tapered skirt, cam ground with steel reinforcement. Piston pin offset to thrust side of piston.
Original Bore & Piston Sizes - *See "ENGINE NUMBER LETTER" under Model Identification, above.*

►*LOW COMPRESSION (8.7-1) PISTON IDENTIFICATION:* This piston has two notches in piston head.
Weight - 23.45 ozs.
Removal - Pistons & rods removed from above.
Clearance - .0009-.0015" (bottom of skirt).

Installing Pistons: Install with "F" cast in piston strut and notches (or notch) in piston head toward front of engine. *See Rod Installation.*

Replacement Pistons: Std. & .002", .005", .010", .020", .030" oversize. Use .030" oversize on 4-Bbl. cars only.

PISTON PIN

Press fit in connecting rod. No locking device.
Diameter - .9307". **Length** 3.1870".
Pin Fit in Piston - Palm press fit at room temperature.
Pin Fit in Connecting Rod - Tight press fit, no locking device used.
Pist n Pin Rem val & Installati n - Tool Set 6360 should be used to prevent damage to piston. *S "Piston Pins" in Rambler Sp cial Data.*
Replac ment Pins: Std. and .003", .005" Oversize.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Cl aranc
Compr.(1&2)	.0775-.0780"	.010-.020"	.002-.006"
Oil (3)	.0245"	℄ .015-.055"	.0001-.0079"

℄ - Each rail.
Installing Rings - Install upper compression ring (both outside edges beveled), and lower compression ring (outside edges not beveled) with beveled inner edges on inside diameter up.
Replacement Rings: Sets of Std. & .020", .030" Oversize.

CONNECTING ROD

Length - 6.3750" center-to-center. **Weight** - 27.6 ozs.
Crankpin Journal Diameter - 2.2483-2.2490".
Original Bearing Sizes - *See "ENGINE NUMBER LETTERS" under Model Identificati n ab v .*
Lower Bearing - Steel-backed, sintered copper lead alloy precision type.
Clearance - .0007-.0028". **Side Cl aranc** - .004-.012"
Replacement Bearings: Std. and .001", .002", .010", .012" Undersize.
Installing Rods: Assemble connecting rod to piston with notch in piston to front of engine. Cylinder numbers on connecting rod and cap should be toward outside bank in which they are installed.

CRANKSHAFT

Journal Diameter - 2.4983-2.4995".
Original Bearing Sizes - *Se ENGINE NUMBER LETTERS under Model Identificati n ab v .*
Bearings - Steel-backed, micro-babbitt alloy, precision type.
Clearance - .0006-.003".
Replacement Bearings: Std. & .001", .002", .010" Undersize.
End Thrust: Taken by No. 1 flanged bearing.
Endplay - .003-.007".
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Rambler Sp cial Data.*
Crankshaft Front Oil Seal: *See "Engin Fr nt Cov r" in Rambler Special Data.*

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each cam. *Se "Camshaft & Bearings" in Rambl r Special Data.*
Bearings - Steel-backed babbitt lined bushings.
Clearance - .001-.003".
End Thrust: Taken by thrust plate behind camshaft sprocket.
Endplay - .003-.006".
Timing Chain: Non-adjustable side guide type. **Width** .875". **Pitch** .375". **Length** 23¼" or 62 links.
Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line with straight edge across shaft centers. To check assembly, rotate crankshaft until timing mark on camshaft sprocket is on horizontal line at either 3 or 9 o'clock position. There should be 10 links or 20 pins between timing marks.
Camshaft Removal & Installati n: *Se "Camshaft & Bearings" in Rambler Special Data.*
Engine Front Cover Removal: *S "Engin Front Cover" in Rambler Special Data.*
Engine Front Cover Oil Seal (Crankshaft Fr nt Seal): Cover oil seal can be replaced without removing cover by using Remover J-9256 and Installer J-9163.

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S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

VALVES

Tapp t Cl arance: Zero lash, hydraulic lifters.

Valv	H ad Diam.	Stem Diam.	Length
Intake	1.787"	.3715-.3725"	4.859"
Exhaust	1.406"	.3715-.3725"	4.859"

Valv	Seat Angl	Lift	Stem Clearance
Intake	30°①	.375"	.0015-.0025"
Exhaust	45°②	.375"	.0015-.0025"

① - Valve face angle 29°. ② - Valve face angle 44°.

Valv S at Width - .078-.093" (Int.), .093-.140" (Exh.).

Valv St m Seals - Rubber deflector installed on valve stem and over top of valve guide on all valves.

Valv Springs: Install springs with closed coil end against cylinder head. **Fr e Length** - 2.20".

Valve Spring Specifications

Valves	Spring Pressure	Spring Length
Closed	85-91 lbs.	1 13/16"
Open	150-160 lbs.	1 7/16"

Valv Guides: Drive old guides out, drive new guides in to a height of 3/4"±1/64" above cylinder head (measured from top of guide to flat machined surface for lower spring retainer on head). Finish ream all guides after installation.

Valv Lift rs: Hydraulic Type.

Clearanc - .0005-.002".

►*LIFTER CLEARANCE CAUTION:* Tight fit may cause damage to valve and engine parts, loose fit will cause reduced engine oil pressure at low speed. *For selective fit of und rsiz lift rs to control clearance, see "Valve Syst m" in Rambl r Sp cial Data.*

Lift r R m val. Ov rhaul & Testing - *See "Valve Syst m" in Rambler Sp cial Data.*

R ck r Arm Assembly: *S "Valve System" in Rambler Sp cial Data.*

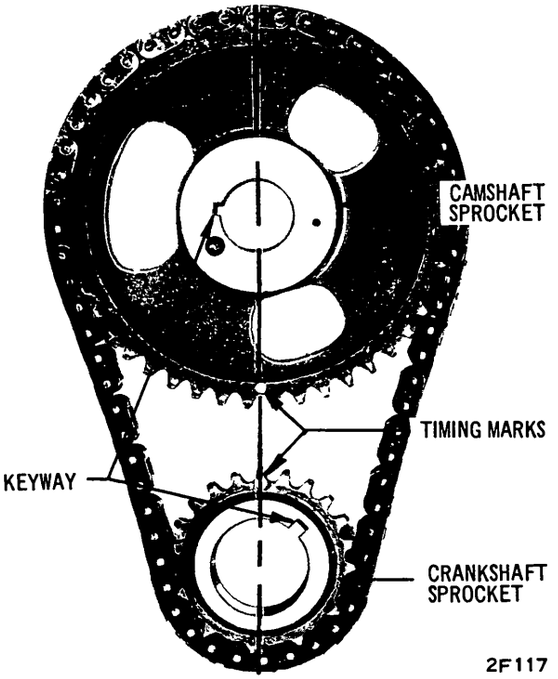
VALVE TIMING

S "Camshaft S tting" under CAMSHAFT above.

Intak Valve - Open 12°30'BTDC. Close 51°30' ALDC.

Exhaust Valves - Open 53°30'BLDC. Close 10°30'ATDC.

Valv Timing Ch ck: Remove rocker arm cover and spark plugs. Turn crankshaft to bring No. 6 piston to TDC of compression stroke (No. 1 will be on exhaust stroke in overlap position). Rotate crankshaft 90° **counter-clockwise.** Install dial indicator on No. 1 intake rocker arm pushrod end. Crank engine in a **clockwise** direction until dial indicator indicates pushrod movement (hydraulic lifter should be fully charged for this check). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. *NOTE* - **If more than ½" variation in either direction, remove timing chain cover and inspect timing chain for stretch. Chain deflection should not exceed ½". Replace as necessary.**



VALVE TIMING MARKS

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engin Lubrication" und r OILING SYSTEM in Rambl r Sp cial Data.*

Crankcas Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure - 10 lbs. at 600 RPM, 55 lbs. at 3000 RPM.

Pressure Regulator - In oil pump. Opens at 55-60 lbs.

Oil Pressure Indicator: Light on instrument panel comes on when ignition switch turned on, goes out after engine starts and oil pressure reaches 4-6 lbs. Oil pressure indicator switch located on engine block.

Oil Pump: Gear type. Mounted on rear main bearing cap and driven by distributor drive shaft.

Oil Pump Removal, Overhaul & Installation: *See "Oiling System" in Rambler Special Data.*

Oil Filter: Full-flow, disposable type

►*FULL-FLOW OIL FILTER BYPASS VALVE NOTE & FILTER CHANGE CAUTION:* When making filter change, check to be sure that bypass valve is properly secured in retainer.

Replacement Filter - Rambler No. 8991072.

Crankcase Ventilation: Standard Cars - Filter element in oil filler cap and breather pipe attached to valve lifter cover.

Positive Crankcase Ventilation Cars - Usual breather tube normally at rear of engine is replaced by vacuum line to carburetor base insulator with valve in line to vary air flow through crankcase to meet changing conditions at all engine speeds and loads. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 18 qts., add 1 qt. for heater.

Pressure Valve: 13 lb. radiator filler cap.

Water Pump: Centrifugal, double row ball bearing type. Requires no lubrication. Service as an assembly.

Temperature Gauge: King-Seeley "CV" electric type with Gauge Voltage Regulator No. 57603.

Dash Unit - King-Seeley No. 58855.

Engine Unit - King-Seeley No. 44275.

"Power-Saver" Fan (Air Cond. Cars): Fan operates normally up to 2600 RPM±100 RPM and then the viscous fluid clutch will slip to maintain speed of 2600 RPM. Service as an assembly.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

6 CYLINDER ENGINE

	Inch Lbs.	Ft. Lbs.
Cylinder Head		65
Exh. Manifold		10
Intake-to-Exhaust Manifold	200	
Oil Pan	200	
Main Bearing Cap		ℂ
Rear Main Bearing Seal Retainer		30
Con Rod Cap		45
Camshaft Sprocket		35
Rocker Shaft Support Bracket		30
Rocker Arm Cover	40	
Engine Front Cover	200	
Water Pump		30
Oil Pump	200	
Oil Filter Stud		30
Engine Front Mount-to-Frame		85
Engine Front Mount-to-Block		45
Engine Rear Mount		35

ℂ - 85 ft. lbs. (Cast Iron Block), 50 ft. lbs. (Aluminum block)

V8 ENGINES

	Ft. Lbs. 318"	Ft. Lbs. 361",383",413"
Cylinder Head	ℂ85	ℂ70
Intake Manifold	30	50
Exhaust Manifold	30	30
Oil Pan	15	15
Main Bearing Cap	85	85
Rear Bearing Seal Retainer		30
Pulley-to-Vibration Damper	200 In. Lbs.	15
Pulley or Vibration Damper	135	135
Con Rod Cap	②	②
Camshaft Sprocket	35	35
Camshaft Thrust Plate	210 In. Lbs.	
Rocker Shaft Support Bracket		30
Rocker Arm Cover	36 In. Lbs.	40 In. Lbs.
Engine Front Cover	35	15
Water Pump	30	30
Oil Pump	35	35
Oil Filter	30	

ℂ - Tighten all bolts twice in sequence when installing cylinder head.
② - 45 ft. lbs. plain; 40 ft. lbs. treated (CST Black).

ALUMINUM ENGINE SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Note the following:

1) Do not drop or slide machined surfaces on bench or floor.
2) Do not use gasket cement (Except as indicated under Cylinder Head Installation).
3) Lubricate all bolts or screws entering an aluminum part. See "Bolt-Thread Lubrication Note" below.
4) Tighten bolts and nuts to the specified torque. DO NOT overtighten. Torque valves are for clean lubricated threads.

BOLT THREAD LUBRICATION NOTE: Use engine oil or special thread lubricant on all threads entering an aluminum part.

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum. The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole. This brings hole back to original thread size. See following table for inserts and tools required.

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	.266"	4 CPB	528-4N
5/16"-18	1185-5	.332"	5 CPB	528-5N
3/8-16	1185-6	.397"	6 CPB	528-6N
7/16"-14	1185-7	.453"	7 CPB	528-7N
1/2"-13	1185-8	.516"	8 CPB	528-8N
Spark Plug -				
14 MM Short	.512		137-11	542
14 MM Long	.513		137-11	542

ENGINE

6 CYLINDER ENGINE

REMOVAL: Remove hood, drain cooling system, remove battery and air cleaner. Remove radiator (plug transmission oil cooler lines). Remove crankcase vent pipe and disconnect all lines, wires, cables and linkage from engine. Disconnect exhaust pipe from manifold. Remove clutch torque shaft, brake cables and rods, speedometer cable, gear shift rods, transmission oil cooler lines and filler tube (drain transmission and torque converter), and push button cable. Support rear of engine (Support Tool C-3806). Remove transmission. Attach Lifting Fixture C-3804 to cylinder head and disconnect engine front mounts. Remove engine.

V8 ENGINES

REMOVAL: Remove hood, drain cooling system, remove battery, fan shroud, and radiator (plug transmission oil cooler lines). Disconnect all lines, wires, cables and linkage from engine. Remove carburetor. Attach Lifting Fixture C-3466 to carburetor flange studs and disconnect engine front mounts. Remove No. 6 spark plug. Disconnect exhaust pipes from manifolds. Support rear of engine with Tool C-3487 and remove engine rear crossmember. Remove transmission. Remove engine.

CYLINDER HEAD & MANIFOLD

6 CYLINDER ENGINE

CYLINDER HEAD: Removal - Drain cooling system, disconnect all lines and wires on cylinder head *(CAUTION - Disconnect spark plug cables by pulling straight out in line with plug).* Remove carburetor air cleaner, disconnect exhaust pipe at exhaust manifold flange, remove carburetor as a unit with intake and exhaust manifolds. Remove rocker arm cover. Remove rocker arm assembly by taking out bolts in rocker shaft support pedestals. Remove pushrods *(CAUTION - Keep pushrods in order and reinstall in same positions).* Take out bolts and remove cylinder head.

Installation: Coat new head gasket with suitable sealer, install gasket and head over dowels in block *(CAUTION - Rocker arm oil feed hole at right rear corner of head must register with oil hole in block).* Tighten all cylinder head bolts in sequence shown in diagram to 65 ft. lbs., then retighten all bolts in same sequence to 65 ft. lbs. *NOTE* - Use Sealing Compound Part No. 1057794 on both sides and place copper side of gasket toward cylinder block.

MANIFOLD ASSEMBLY: Installation - *CAUTION Loosen 3 intake manifold-to-exhaust manifold bolts before installing assembly (necessary to maintain correct alignment) and also note "Manifold Stud Replacement" note below.* Install manifold and carburetor assembly on cylinder head with cup side of conical bolt washers against manifold. Tighten nuts to 15 ft. lbs., then tighten intake manifold-to-exhaust manifold bolts to 15 ft. lbs.

318" ENGINE

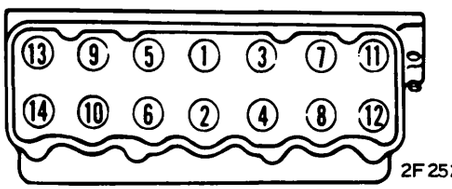
CYLINDER HEAD INSTALLATION: Coat new gasket with sealer and install on block. Assemble rocker arm shaft assembly in cylinder head struts *(see "Valve System" below).* Install cylinder head on block and tighten attaching bolts to specified torque in sequence shown in diagram. **Retighten in same sequence to same torque.** Install pushrods with small ends in lifters (use Valve Spring Compressor Tool C-3695 to position large end of pushrod under rocker arm and make sure low point of camshaft lobe is under lifter). Complete reassembly procedure.

361", 383" & 413" ENGINES

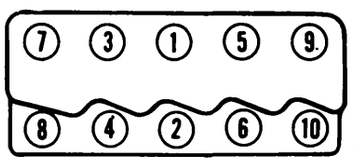
CYLINDER HEAD: *REMOVAL NOTE* - On air conditioned cars, No. 8 cylinder exhaust valve must be open to provide removal clearance between rocker arm cover and heater housing.

Installation: Coat new head gasket with Mopar Sealer No. 1122893. Install cylinder head and tighten bolts to correct torque in sequence shown in diagram. **Retighten in same sequence to same torque.** Complete reassembly procedure.

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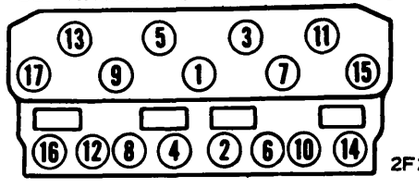


6 CYL. CYLINDER HEAD



V8 318" ENGINE CYLINDER HEAD

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V8 361", 383", & 413" ENGINE CYLINDER HEAD

PISTON PINS

6 CYL. ENGINES & V8 361", 383" & 413" ENGINES

PISTON PIN REMOVAL: Use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration to remove pin from piston and rod. *CAUTION* - When pin falls freeof rod, stop press to prevent damage to anvil of tool.

PISTON PIN INSTALLATION: *CAUTION - DO NOT ream pistons or connecting rods.* Lubricate pin bores in piston and rod and use Tool C-3724 (6 Cyl.), C-3684 (V8) as shown in illustration. Notch or "front" on piston must face upwards when assembled in tool and with connecting rod properly positioned (see below), press piston pin in until pin bottoms on pilot.

►*CONNECTING ROD POSITION:* **6 Cyl.** - With notch on piston to front of engine, oil hole in rod must be to left side of engine. **V8** - For right bank cylinders, large chamfer on lower end of connecting rod must be opposite to notch in piston head (rod facing downward in tool). For left bank cylinders, large chamfer on rod must be on same side as piston head notch (rod facing upward in tool).

Testing For Proper Fit - Assemble piston and rod with tool in same manner as for pin removal (see illustration). Clamp screw shaft end of tool in a vise. With torque wrench at nut (anvil end of tool), apply 15 ft. lbs. torque. If pin does not move, fit is correct. If pin moves in rod, fit is incorrect and rod should be replaced.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

►*TOOL NOTE:* Use Seal Installer C-3743 for 6 Cyl., C-3511 for 318" engine, C-3625 for 361", 383" & 413" engines. *NOTE* - On 6 Cyl., 361", 383" & 413" engines, use bridge of tool over seal retainer when installing seal, but do not use bridge when installing seal into block.

REAR MAIN BEARING OIL SEAL: Install new seal in block and cut off ends of seal flush with block. Install new seal in cap or seal retainer in same manner and cut off ends of seal flush with cap or retainer. Install side seals in cap or retainer. *NOTE - On 318" engine, short cap seal must be on doweled side of cap.*

ENGINE FRONT COVER

6 CYLINDER ENGINE

ENGINE FRONT COVER: Removal - Drain cooling system and remove radiator and fan. Remove vibration damper (Puller Tool C-3732). Loosen oil pan attaching bolts to provide clearance. Remove engine front cover.

Installation: Reverse removal procedure and make sure mating surfaces of cover and block are free of burrs.

FRONT OIL SEAL: Removal - Use Tool C-3506. With inside of cover up, put puller screw through seal and position puller blocks directly opposite each other under flange of seal retainer. With washer and nut on puller screw tighten nut so puller blocks distort seal retainer lip. Place sleeve over retainer and place removing and installing plate into sleeve. Place flat washer and nut on puller screw, hold center screw and tighten nut to remove seal.

Installation: Insert puller screw through removing and installing plate so thin shoulder faces up. Insert assembly through seal opening in front cover (inside of cover up), and place seal in opening with neoprene part of seal down. Place seal installing plate into seal with protective recess toward lip of seal retainer. With flat washer and nut on puller screw, hold screw and tighten nut until neoprene is tight against face of front cover. If a .0015" feeler gauge **cannot** be inserted between neoprene and cover, seal is installed correctly.

V8 ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system and remove radiator and water pump assembly. Remove crankshaft damper bolt, then remove two of the pulley bolts and install Tool C-3688 to pull damper off end of crankshaft. Remove cover-to-cylinder block bolts and remove cover.

Installation: Reverse removal procedure and tighten bolts to specified torque. Use extreme care not to damage oil pan gasket.

FRONT OIL SEAL: Removal - *See 6 Cyl. above.*

Installation: *See 6 Cyl. above.*

CAMSHAFT & BEARINGS

6 CYLINDER ENGINE

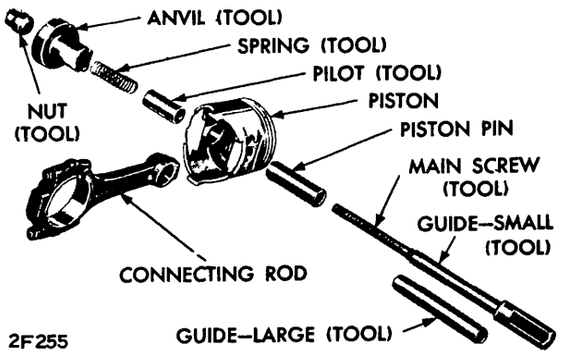
►*ALUMINUM ENGINE CAMSHAFT REAR PLUG REMOVAL NOTE:* To prevent damage to aluminum block, punch a hole in center of plug with 1/8" sharp punch (do not drill hole), then tap hole for threads with 10-24 tap. Use a steel bar 1/4"x1"x6" with 1/4" hole drilled in center, across supports to plug pull with a 10-24 x 1 1/8" long screw placed in hole in bar. Remove all foreign material from block before inserting new plug.

CAMSHAFT REMOVAL: Remove engine. Remove valve lifters with Lifter Removing Tool C-3661 (after removing rocker arm shaft assembly and pushrods). Remove engine front cover, timing sprockets, distributor, oil pump, and fuel pump. Remove camshaft carefully.

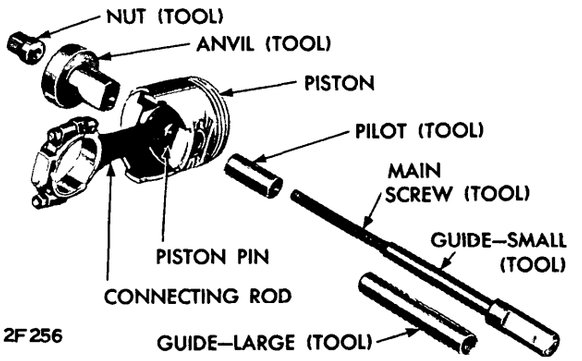
Bearing Installation: Use Tool C-3132A to install bearings. No. 1 bearing must be installed 3/32" in from front face of cylinder block. Make sure oil holes in bearings index with oil holes in block. Use Tool C-897 to install rear welch plug.

318" ENGINE

CAMSHAFT: Removal - Remove engine. Back off valve lash adjusting screws, slide rocker arms to one side and remove pushrods. Remove valve lifters (accessible after intake manifold removed). Remove timing sprockets, distributor, and distributor-oil pump drive gear. Remove camshaft.



PISTON PIN INSTALLATION



PISTON PIN REMOVAL

Installation: Lubricate cam lobes and bearing journals and install camshaft. When shaft within 1¾-1½" of final position, install Camshaft Holding Tool C-3509 to prevent disturbing welch plug at rear of block and causing oil leak as follows: Install tool in place of distributor drive gear and against rear side of cam gear, and attach with distributor retainer plate bolt. Now push camshaft in to final position and leave tool in place until sprockets and timing chain are installed.

361", 383" & 413" ENGINES

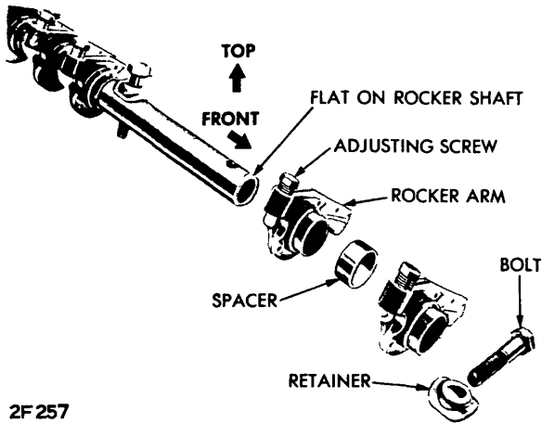
CAMSHAFT: Removal - Remove engine. Remove lifters (see below). Remove timing sprockets, distributor, oil pump-distributor drive shaft, and fuel pump. Remove camshaft.

Installation: Modify Tool C-3509 by grinding off index lug holding upper arm on tool and rotate arm 180°. Sliding bar will now extend outward in direction opposite to fixed tongue. Proceed as for 318" engine above.

►*BEARING INSTALLATION NOTE:* No. 1 bearing must be 1/32" in from front face of cylinder block.

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6 CYL. ROCKER ARM ASSEMBLY

VALVE SYSTEM

318" ENGINE

►*VALVE SERVICE NOTE:* For access to valve assemblies or for pushrod removal without removing rocker arm shaft assembly or cylinder head, back off valve lash adjusting screw and slide rocker arm to one side.

VALVE TAPPET ADJUSTMENT
413" SUPER HI-PERF. ENGINE

VALVE TAPPET ADJUSTMENT: Adjustment must be made with lifter on lowest point of cam base circle. Use indicator light in ignition primary circuit to determine crankshaft position and made adjustments as detailed below. Set tappet clearance at .028" Intake, .032" Exhaust as follows:

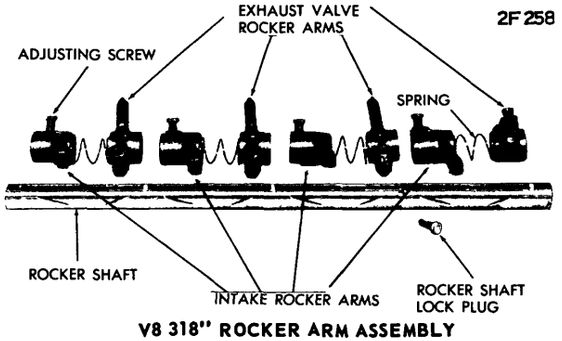
1) Adjust ignition timing to TDC.
2) Chalk mark TDC and 180° opposite TDC on crankshaft damper.
3) With crankshaft at TDC on No. 1 Cylinder (Compression stroke, Points opening), adjust No. 2 & 7 Int.; 4 & 8 Exh.
4) Rotate crankshaft 180° (until points open on No. 4 Cylinder) and adjust No. 1 & 8 Int.; 3 & 6 Exh.
5) Rotate crankshaft an additional 180° (until points open No. 6 Cylinder) and adjust No. 3 & 4 Int.; No. 5 & 7 Exh.
6) Rotate crankshaft an additional 180° (until points open on No. 7 Cylinder) then adjust No. 5 & 6 Int.; No. 1 & 2 Exh.
7) Reset ignition timing to operating specifications.

ROCKER ARMS
6 CYLINDER ENGINE

ROCKER ARM SHAFT ASSEMBLY: Installation - Install assembly with flat on end of rocker shaft upward and toward front of engine. *CAUTION - This is necessary to provide correct lubrication of rocker arms.* Make certain that shaft retainers are seated on shaft between extended bushings of adjacent rocker arms. Long rocker shaft retainer goes in center position and long rocker shaft bolt goes at *rear of engine. Tighten bolts to* specifications.

318" ENGINE

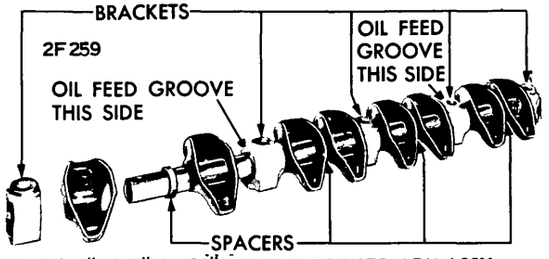
ROCKER ARM SHAFT ASSEMBLY: Installation - Slide rocker arm shaft into bore of strut, engage intake rocker arm. Install spring and engage exhaust rocker arm. Repeat this procedure until all intake and exhaust rocker arms are installed. Make sure that rocker shaft bolt grooves align with head bolt holes in rocker shaft struts. *NOTE* - The plug hole in strut must align with hole in rocker shaft. Install new rocker shaft plug.



V8 318" ROCKER ARM ASSEMBLY

361", 383" & 413" ENGINES

ROCKER ARM SHAFT ASSEMBLY: Installation - Install rocker shafts so that the 3/16" lubrication holes point downward into rocker arms and 15° angle of holes points outward toward valve end of rocker arm. Disregard arrows stamped on shafts when determining shaft position. This procedure supersedes all previous data on installation.



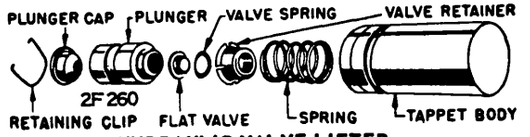
V8 361", 383" & 413" ENGINE ROCKER ARM ASSY.

HYDRAULIC LIFTERS
361", 383" & 413" ENGINES

Removal: *NOTE - Unnecessary to remove cylinder heads or intake manifold if following procedure observed:* Remove rocker arm shaft assembly and pushrods. Slide Puller C-3661 through pushrod hole in cylinder head and seat firmly in lifter. Remove lifter with a twisting motion. *Keep lifters and pushrods together and reinstall in bores from which removed.*

Disassembly: *CAUTION - Disassemble one lifter at a time to avoid intermixing parts (parts not interchangeable between lifters).* Pry out plunger retainer spring clip. Invert body and remove plunger cap, plunger, check valve, check valve spring, check valve retainer, and plunger spring. Separate plunger, check valve retainer, and check valve spring.

Inspection: Clean all parts in solvent and check for any nicks, scratches or wear. Replace entire lifter if any parts damaged.



HYDRAULIC VALVE LIFTER

Reassembly: Reverse disassembly procedure making sure lifter is assembled as shown in illustration.

Testing: With cap removed from plunger, submerge upright lifter completely in a pan of clean kerosene and allow to fill. Replace cap. Place lifter upright in Lifter Testing Pliers C-3160 and check leakdown. If lifter collapses immediately, disassemble, clean and test again. If leakdown persists, replace lifter.

Installation: Lubricate lifters and reverse removal procedure.

OILING SYSTEM
ENGINE LUBRICATION
6 CYLINDER ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied to all crankshaft, connecting rod, and camshaft bearings, and to valve mechanism on cylinder head (metered by rear camshaft bearing). All other points are lubricated by spray or oil mist in crankcase.

OPERATION: Rotor type oil pump mounted externally on right side of crankcase (assembly consists of oil pump, oil filter, and oil pressure regulator). Pump draws oil from oil pan through fixed strainer and intake pipe screwed into crankcase wall at pump mounting pad. Pump delivers oil directly into main oil gallery extending along right side of crankcase (slot in gallery registers with pump outlet port when pump installed). Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil channel in each crankcase web furnishes oil from main oil gallery to each crankshaft and camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provides continuous flow of oil to crankshaft passages.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on left (upper) side of connecting rod when this hole registers with oil passage in connecting rod journal.

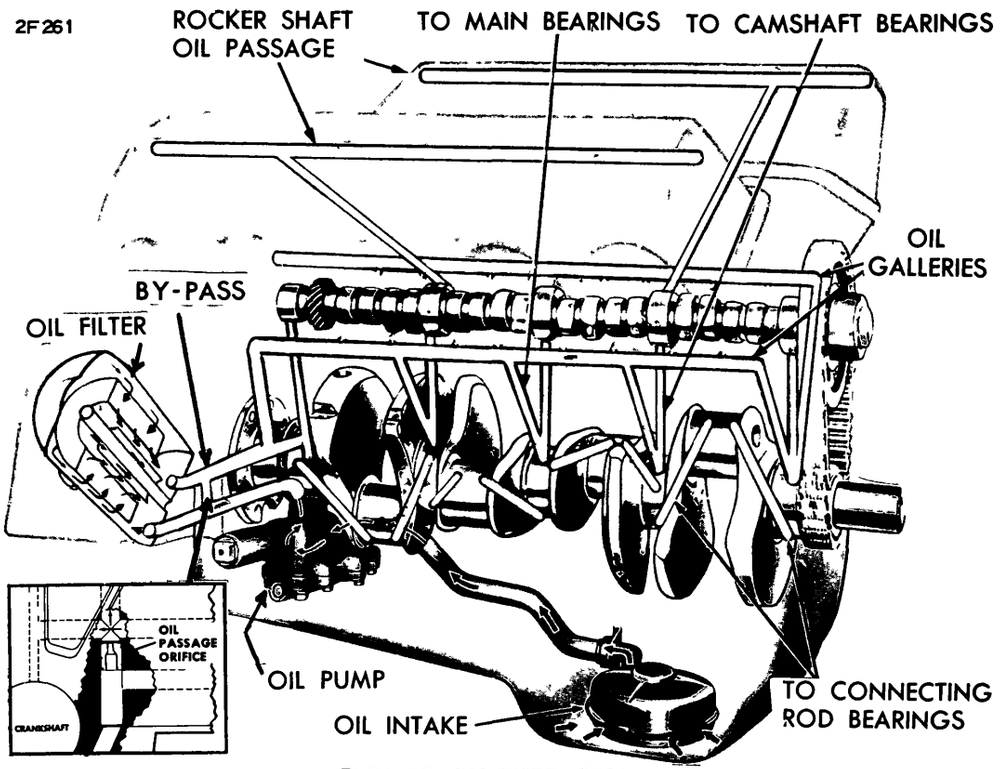
Timing Chain & Sprockets - Lubricated by oil from front main bearing (bearing is chamfered to provide this oil spray).

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows up through vertical channel in block and head, and through rear rocker shaft bracket to hollow rocker shaft. Rocker arms are lubricated through oil hole in shaft and each rocker arm has trough on upper surface (for adjusting screw and pushrod lubrication) and oil hole (for valve tip lubrication). Excess oil drains down through pushrod chamber to valve lifters and returns to crankcase.

Valve Lifters - Lubricated by connecting rod oil spray and oil drainage from rocker arm chamber on head.

OIL FILTER: Full flow type mounted on oil pump body. Integral relief valve permits oil to bypass filter if element is clogged.

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ENGINE OILING SYSTEM (318" ENGINE)

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V8 ENGINE (318")

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted on rear main bearing cap, draws oil through floating oil strainer and intake pipe mounted on pump cover and delivers oil through a channel in pump body and rear main bearing cap to oil filter intake port (filter is mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross channel and vertical channel connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward end of this gallery, a "V" channel connects to the front main bearing and the forward end of the left main oil gallery which extends back the full length of the engine. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical channel connecting to an extension of the horizontal cross channel leading from the oil filter outlet port (see above). Other crankshaft and camshaft bearings are lubricated by a "V" shaped oil channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (an additional channel at the front crankshaft bearing supplies oil to the left main oil gallery).

Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod bearing is lubricated by passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of rod bearing cap of the rod for opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication)

Valve Lifters - Right and left main oil galleries intersect lifter bores so that separate oil passage to each lifter is not required.

Rocker Arms, Pushrods, & Valves - On these engines oil channel from No. 4 camshaft bearing (for left bank), No. 2 camshaft bearing (for right bank) connect with cylinder head bolt holes in block (Nos. 3 & 5 bolts as shown in Cylinder Head Diagram). These bolt holes in block and head are oversize so that oil passes up around bolts to angle passage in shaft bracket and through this drilled hole into the hollow rocker arm shaft *(NOTE - A screw in the shaft bracket positions shaft and aligns these oil holes).* All rocker arms have drilled passage to pushrod socket end. Intake arms have drilled passage terminating at end of arm directly above valve stem contact point. Exhaust arms have drilled hole from rocker arm bushing to upper surface of arm and valve stems are lubricated by gravity flow of oil from this oil hole.

OIL FILTER: Shunt type used. Filter mounted on pad at right rear corner of engine crankcase. Bypass passage in block has restriction or metering orifice which controls oil flow directly into engine or through oil filter.

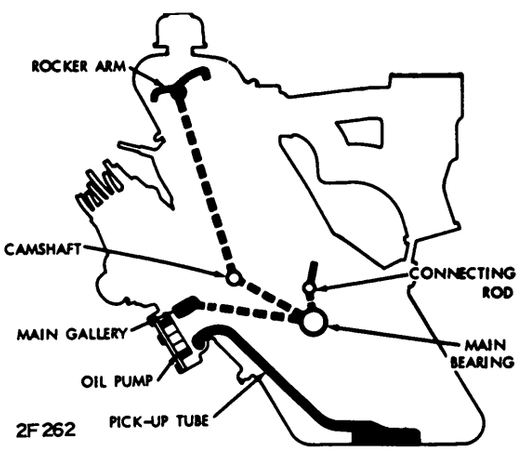
V8 ENGINES (361", 383" & 413")

►*ENGINE IDENTIFICATION:* These engines may be identified by distributor mounting (at front of engine) and oil pump and filter assembly mounted externally at left front corner of engine block.

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic lifters. Oil metered by camshaft bearing supplies other valve parts (rocker arms, pushrods, valve stems). All other parts are lubricated by oil spray.

OPERATION: Rotor type oil pump mounted externally on left front corner of block draws oil through fixed oil strainer and intake pipe in crankcase. From the pump, oil flows through filter (Filter, bypass valve, and oil pressure regulator valve are located in pump body) and then through transverse channels in front end of block to the right main oil gallery extending the full length of engine block just below right bank valve lifters. At rear end of right main oil gallery, two angled transverse channels connect the right and left main oil galleries. Left main oil gallery extends full length of engine block just below left bank valve lifters. Oil is distributed from these main oil galleries as follows:

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ENGINE OILING SYSTEM (6 CYLINDER ENGINE)

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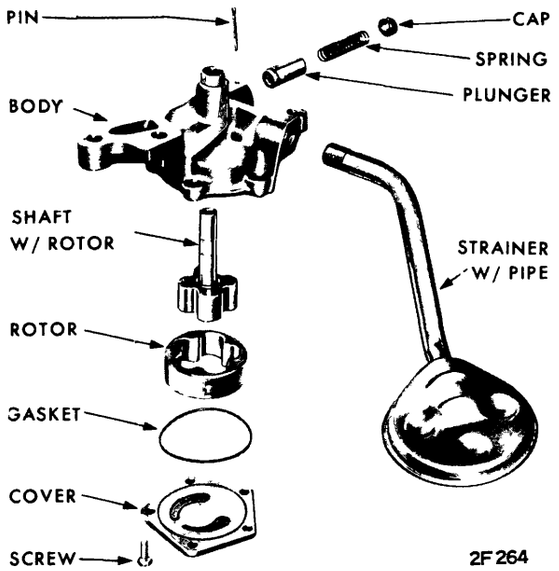
Crankshaft & Camshaft Bearings - Fr nt crankshaft and camshaft bearings are lubricated by a vertical channel intersecting the transverse channel in the front of the block (feed to right main oil gallery). Other crankshaft and camshaft bearings are lubricated by a "V" shaped channel in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the corresponding camshaft bearing.

Connecting Rod Bearings - Crankshaft is drilled. Each connecting rod is lubricated by passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap for rod of opposite bank of cylinders (slot in rod must be upward or toward center of engine to provide this cross-lubrication).

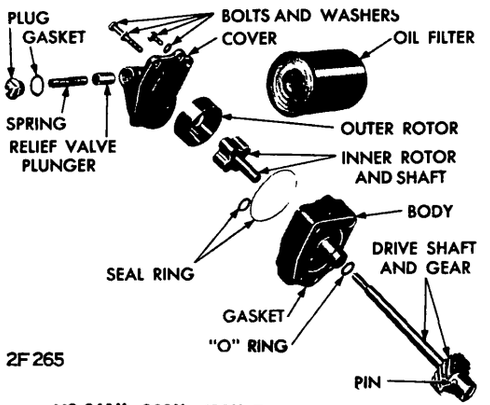
Valve Lifters - Right and left main oil galleries intersect lifter bores for direct oil supply to lifters.

Rocker Arms, Pushrods, & Valves - Hollow rocker arm shaft on each head is supplied with oil through channel in block leading from No. 4 camshaft bearing (both banks - camshaft journal is drilled and registers with each channel in turn as camshaft rotates). Channel in block registers with drilled hole in head which terminates at rocker shaft support bracket pad on head



V8 318" ENGINE OIL PUMP

(oil holes provided at Nos. 2 and 4 brackets - one hole and oil lead in head will register with channel in block when head installed). Nos. 2 and 4 (wider) rocker shaft support brackets have oil passage connecting oil lead in head with rocker arm shaft (*CAUTION* - These brackets must be installed with oil passage toward center of engine to align with oil hole in head). Rocker arms are stamped steel with channel section which forms oil reservoir. Oil flows from valve tip end of arm to lubricate valve stem and through hole at pushrod end of arm to lubricate pushrod seat.



V8 361", 383", 413" ENGINE OIL PUMP

OIL FILTER: Full flow and shunt types used. Filter has bypass valve (full flow type), bypass passage (shunt type), which ensures engine lubrication if filter element is clogged.

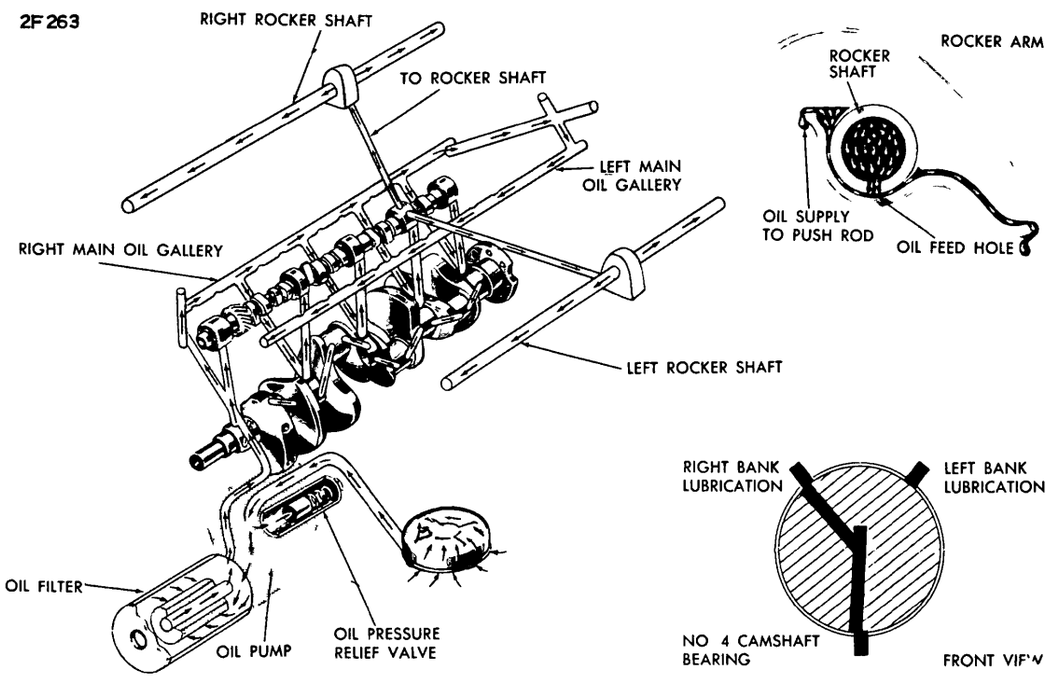
OIL PUMP

OIL PUMP: Removal (6 Cyl. Eng.) - Disconnect battery cable and remove air cleaner and horns with brackets. Attach lifting plate Tool C-3804 and fixture Tool C-3809 and raise car on hoist (Two post) and remove lower engine mount insulator to frame stud nut (right & left side) then lower car. Raise engine by tightening fixture nut until mount insulator stud clears pad and remove left mount and bracket from block. Raise car again and remove right mount and bracket from block. Disconnect front shock absorbers from lower arms and place stands under frame crossmember or "K" member. Lower front post of hoist until suspension is in full rebound under no load. Loosen torsion bar tension adjusting bolts. Use Tool C-3728 to remove torsion bars then raise front post of hoist. Remove "K" member bolts allowing "K" member to drip when hoist is lowered. Remove oil filter assembly and disconnect sending unit wire. Remove oil pump attaching bolts and remove pump.

Removal (318" Eng.) - Remove oil pan, (see car Model Pages), and remove pump from rear main bearing cap.

Removal (361", 383", 413" Eng.) - Remove attaching bolts and remove oil pump and filter assembly from bottom side of engine.

Disassembly (All Engines): Remove cover. On 6 Cyl., press off drive gear (support gear to keep load off aluminum housing). Remove inner rotor and shaft and outer rotor. Remove pressure relief valve plug and and valve assembly.



ENGINE OILING SYSTEM (361", 383", 413" ENGINES)

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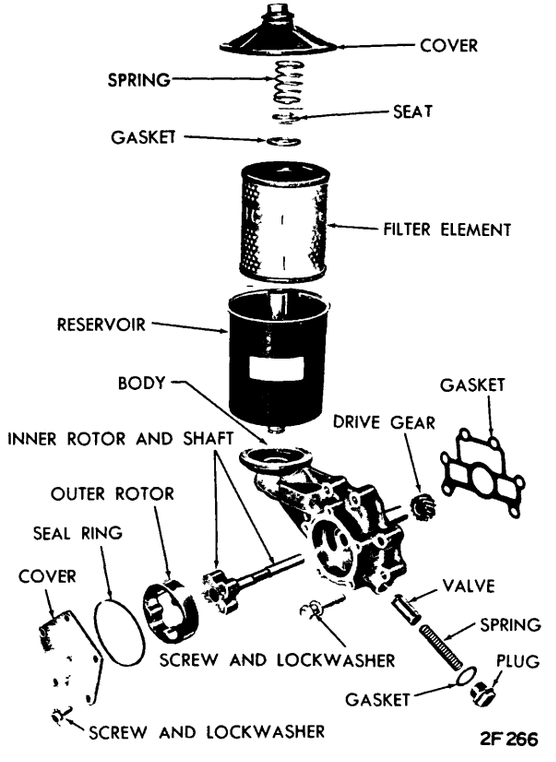
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Inspection (All Engines): Clean all parts. Replace cover if mating surface scratched or grooved. Lay a straightedge across cover. If .0015" feeler gauge can be inserted between cover and straightedge, replace cover. Measure thickness of inner and outer rotors, and diameter of outer rotor. *NOTE - Minimum dimensions listed in table below. Replace rotors if measurements below these specifications.* With inner and outer rotors assembled in pump body, place a straightedge across surface of body and rotors. If a .004" feeler gauge can be inserted under straightedge, replace pump body. Remove inner rotor and press outer rotor against pump body. If clearance between outer rotor and body is more than .012", replace body. If clearance between inner and outer rotors is more than .010", replace both rotors. Test pressure relief valve spring (see below), and replace spring (if necessary) with same type previously used.

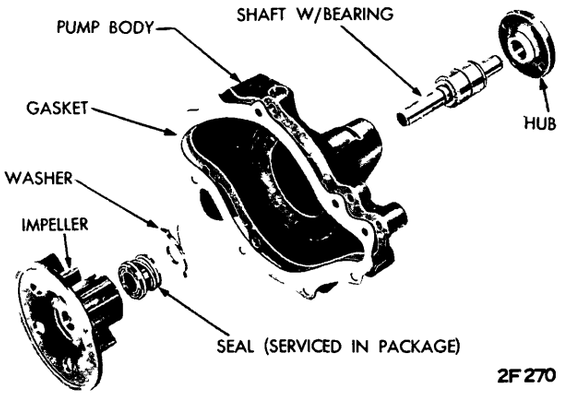
Oil Pump Rotor Specifications

Engine	Rotor Thickness	Outer Rotor Diameter
6 Cyl.	.649"	2.469"
318"	.998"	2.244"
361", 383" & 413"	.943"	2.469"

Reassembly (All Engines): Reverse disassembly procedure. On 6 Cyl., press drive gear on shaft until it is flush with end of shaft. Tighten cover screws to 130 inch-lbs. (6 Cyl.), 10 ft. lbs. (V8).



6 CYL. OIL PUMP



V8 318" ENGINE WATER PUMP

Installation (All Engines): Reverse removal procedure.

ALL ENGINES

OIL PRESSURE RELIEF VALVE: Three types of springs are available. Replace with correct type as follows:

Relief Valve Spring Specifications
(6 Cyl., 361", 383" & 413" Engines)

Color	Free Length	Load Length
Gray (Light)	2 3/16"	1 39/64" at 11.85-12.85 lbs.
Red (Std.)	2 19/64"	1 39/64" at 14.85-15.85 lbs.
Brown (Heavy)	2 25/64"	1 39/64" at 17.90-18.90 lbs.

(318" Engine)

Color	Free Length	Load Length
Gray (Light)	3 1/32"	2 1/16" at 16.1-17.1 lbs.
Red (Std.)	2 27/32"	2 1/16" at 19.5-20.5 lbs.
Brown (Heavy)	2 31/32"	2 1/16" at 22.9-23.9 lbs.

COOLING SYSTEM
WATER PUMP

6 CYLINDER ENGINE

Disassembly: Support pump on hub end of shaft and Break plastic impeller from metal insert then remove support plate and gaskets. Place a ¼" ball bearing against a groove on outer diameter of insert, then place insert and ball bearing in vise to split insert. Remove rubber portion of seal with spring. *NOTE* - DO NOT pry retainer portion out of pump body. Use Tool C-3753 to remove retainer portion of seal then remove thrower from shaft. Use Tool C-412 to remove hub. Support pump body on front face (fan hub end) and press on rear end of shaft to remove shaft and bearing assembly out front of pump. *CAUTION* - Always use a new shaft and bearing assembly.

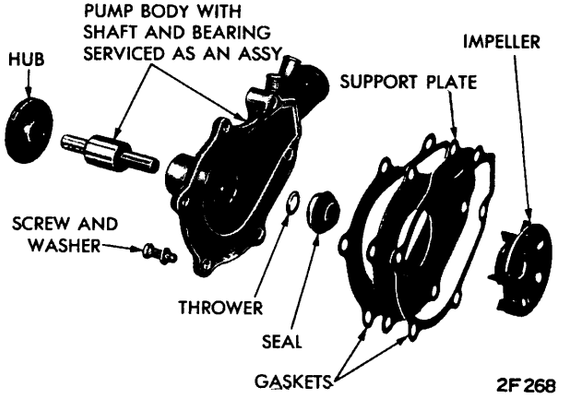
Reassembly: Support pump housing at hub end and use a 1¼" (12 point) socket against outer lip of seal retainer to press seal assembly into pump body, until lip is against body. Place thrower ring in position on long end of shaft (1/8" from bearing assembly), then start shaft and bearing assembly into pump body bore. Use same socket and support body at seal end and use Tool C-3468 (against outer bearing race only) to press shaft and bearing in flush with body hub end. Support pump on propeller end of shaft and press hub (flat surface out) onto shaft so shaft extends 13/32" beyond fan hub. Place new gaskets on each side of separator plate and place plate on pump body. Clean seal face and impeller hub seal surface. Support pump on hub end of shaft and press impeller on shaft (blade portion down) until it is flush with end of shaft. *NOTE* - Pump bearing outer case must be flush with front end of pump body and impeller flush with shaft end to provide correct clearance between impeller blades and separator plate.

V8 ENGINES

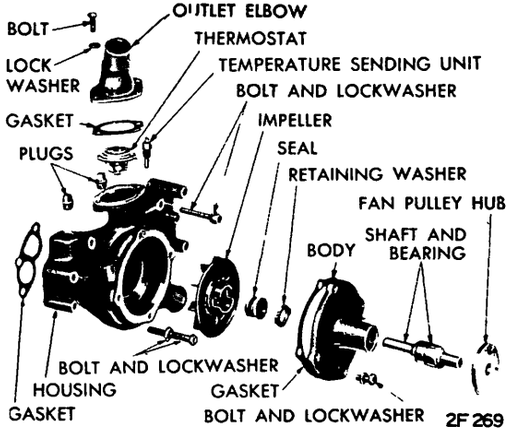
Disassembly: Remove fan hub with Puller C-412. Support hub end of pump and remove impeller by breaking it away from metal insert. Remove seal by sliding over shaft and insert. With Splitter C-3476, split metal insert and remove from shaft. Support hub end of pump body and press shaft and bearing through front of pump.

Reassembly: With pump body supported as close to center bore of pump as possible, press shaft and bearing assembly into body with Sleeve C-3468 and a press. Distance from shoulder of seal retainer to front face f

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6 CYL. WATER PUMP



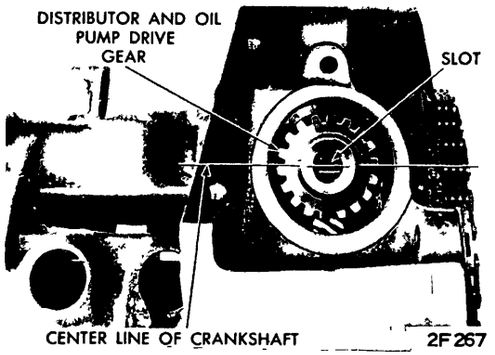
361", 383", 413" ENGINE WATER PUMP

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pump body must be .090". Reface pump seal seat of housing (see below). Install new seal into impeller with ears on retaining washer engaged in slots in impeller. Support shaft at hub end and press impeller on shaft until it is flush with end of shaft. Support impeller end of shaft and press hub on shaft until shaft projects .330" beyond front face of hub.

Refacing Seal Seat - Place Tool C-551 over pump shaft. Turn tool in an even continuous clockwise motion until smooth surface is obtained. Remove tool and install abrasive disc SP-1527 over end of tool and down against cutters. Polish seat surface to a high polish. **Turn by hand in a clockwise direction. Do not use motor.** Blow out with compressed air.

Installation· Reverse removal procedure.



V8 ENGINE DISTRIBUTOR DRIVE SHAFT

IGNITION NOTES

V8 ENGINES

DISTRIBUTOR-OIL PUMP DRIVE SHAFT BUSHING:
Removal - Thread Tool C-3052 into bushing, hold puller screw and tighten puller nut to remove bushing.
Installation: Slide new bushing over burnishing end of Tool C-3053. Insert tool and bushing into bore of block. Drive bushing and tool down into position using a soft hammer. As the burnisheris pulled through the bushing by pressure applied to puller nut, tool will wedge bushing tight in its bore and will burnish bore to correct size. *DO NOT REAM THE BUSHING.*

DISTRIBUTOR BASIC TIMING: Before installing distributor, time the engine as follows: Place No. 1 piston at TDC of firing stroke. Mark on vibration damper should be under DC mark on timing pointer. Coat shaft and drive gear with engine oil. Install shaft so that, after gear spirals into place indexing with oil pump shaft, slot in top of drive gear will point to first intake manifold bolt on left side of engine (318"), will be parallel to centerline of crankshaft (361", 383" & 413").

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Model	Model Designation
Chrysler Newport	SC1-L
Chrysler New Yorker	SC3-H
Chrysler 300 & 300H	SC2-M
Imperial Custom	SY1-L
Imperial Crown	SY1-M
Imperial LeBaron	SY1-H

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (Example below) includes identification data.

① ② ③ ④ 5
8 3 2 3 100001

① - Car Make. **8** Chrysler, **9** Imperial.
② - Model Series. **1** Chrysler Newport or Imperial Custom. **2** Chrysler 300, or Imperial Crown. **3** Chrysler New Yorker or Imperial LeBaron. **4** Chrysler 300-H. **5** Chrysler Newport Town & Country. **7** Chrysler New Yorker Town & Country. **8** Taxi, **9** Police. **0** Fleet.
③ - Year **2** 1962.
④ - Assembly Plant. **3** Jefferson (Detroit), **4** Imperial (Detroit), **5** Los Angeles, **6** Newark (Del.), **7** St. Louis.
⑤ - Beginning vehicle number.

ENGINE NUMBER: Stamped on boss on top right side of cylinder block just behind water pump. Number (example below) includes identification data.

① ② ③ ④ ⑤
S 38 ... 8 4

① - Year. **S** 1962.
② - Displacement. **36** 361 cu. in., **38** 383 cu. in., **41** 413 cu. ins. **42** 426 cu. ins.
③ - If this space blank, engine is standard. *For identifying marks see below.*
④ - Month Assembled. **8** August, etc.
⑤ - Day Assembled. **4** 4th day, etc.

►*ENGINE NUMBER MARKS: Identified as follows:*
"**A**" - All cylinder bores .020" oversize.
"**Malt s Cross**" - One or more bearing journals .001" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"**X**" & "**Malt s Cross**" - One or more bearing journals .010" undersize. *See "Connecting Rods" & "Crankshaft" below.*
"♦" - One or more valve lifters .008" oversize.
"**H.P.**" - High Performance Engine.

TUNE-UP

COMPRESSION PRESSURE: 125-155 lbs. at 120 RPM (361" Eng.); 130-165 lbs. at 100 RPM (383" & 413" Eng.). Engine must be warm, spark plugs removed, and throttle wide open. Maximum variation between cylinders should not exceed 20 lbs. (361" Eng.), 25 lbs. (383" & 413" Eng.).
VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: SC1, SC2-300, SC3, SY1 - Hydraulic, Zero-lash.
SC2-300 Hi-Perf. & SC2-300H - .015" Intake, .024" Exhaust, Hot.
Hi-Perf. Engines (Optl. Camshafts) - .016" Intake, .022" Exhaust, Cold.
All Other Models. Zero lash, hydraulic lifters.
MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with special lubricant, Part No. 1879318). Coil spring should have approximately ¾ turn wrap with manifold heat control valve closed. Counterweight should respond by moving clockwise approximately ½" when engine accelerated and released quickly.
CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".

Spark Plugs - 14 mm. Torque to 30 ft. lbs.

Model	Autolite No.	Champion No.
SC1, SC3, SY1	A-42	J-12Y
SC2-300 & SC2-300 Pwr. Pack	A-42	J-12Y
SC2-300 Hi-Perf. & SC2-300H	A-32	J-9Y

COIL: Autolite No. 200567 or Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501, 0.5-0.6 ohms. connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler (Own) or Autolite as follows:

Model	Chrysler	Autolite
SC1, SC2-300 ①	2095969	
SC1, SC2-300 ②	2095836	IBP-4005S
SC1, SC2-300 Police	2095832	⑤ IBS-4006G
SC2-300 Pwr. Pack ③	2095987	
SC2-300 Hi-Perf. & SC2-300H ④	⑥	⑤ IBS-4011A
SC3, SY1 ③	2095987	

① - One 2-Bbl. Carburetor. ② - Partial Production.
③ - One 4-Bbl. Carburetor. ④ - Two 4-Bbl. Carbs.
⑤ - Double breaker type distributor.
⑥ - 2095841 (No Tach.), 2098313 (With Tachometer).

Condenser - Autolite 2-32. **Capacity** .25-.285 mfd.
Contact Point Set - Chrysler No. 2098244 (2095836, 2095987).
Breaker Gap - .014-.019".
Cam Angle (Single Breaker) - 27-32° with vacuum line disconnected.
Cam Angle (Double Breaker) - 27-32° (Single set of points), 38-40° (both sets operating together).
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance - 2095832 & IBS-4006G

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	225-425	0	250-450
0-1½	425	0-3	450
3½-4½	775	7-9	1550
5½-6½	2050	11-13	2100

Automatic Advance - 2095836 & IBP-4005S

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	250-450	0	500-900
0-2	450	0-4	900
2.5-4.5	700	5-9	1400
10.5-12.5	2150	21-25	4300

Automatic Advance - 2095841, 2098313, IBS-4011A

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	325-475	0	650-950
0-4	475	0-8	950
4.5-6.5	640	9-13	1280
9-11	2400	18-22	4800

Automatic Advance - 2095987

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	310-490	0	620-980
0-2	490	0-4	980
3.5-5.5	800	7-11	1600
8.5-10.5	2300	17-21	4600

Vacuum Spark Control: Integral type.

Vacuum Advance - 2095832 & IBS-4006G

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-8.0
3.0-4.5	6-9	12
5.75-7.25	11.5-14.5	16.5

Vacuum Advance - 2095836 & IBP-4005S

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-8.0
6.0-9.0	12-18	12
11.5-14.5	23-29	16.5

Vacuum Advance - 2095841, 2098313, IBS-4011A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7.2-8.9
4.5-7.5	9-15	12
7.5-10.5	15-21	14.5

Vacuum Advance - 2095987

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-9
4.5-7.5	9-15	12
8.3-11.0	16.6-22	15

Distributor Basic Timing & Drive Shaft Bushing Replacement: *See "Ignition Notes" in Chrysler Corp. Special Data.*

IGNITION TIMING

Setting - 10° BTDC at 475-500 RPM with vacuum line disconnected.
Timing Mark - Mark on vibration damper and indicator on chain case cover. Align vibration damper mark with correct mark on indicator.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

CARBURETOR

►*CARBURETOR APPLICATION:* As follows:

Engine	Carburetor
361" SC1 (Std.)	One Carter or Stromberg 2-Bbl.
383" SC1 (Police)	One Carter 4-Bbl.
383" SC2 (Std.)	One Carter 2-Bbl.
413" SC2 Pwr. Pack	One Carter 4-Bbl.
413" SC2 Hi-Perf. & 300H	Two Carter 4-Bbl.
413" SC3, SY1	One Carter 4-Bbl.
413" & 426" Hi-Perf.	Two Carter 4-Bbl. (Ram)

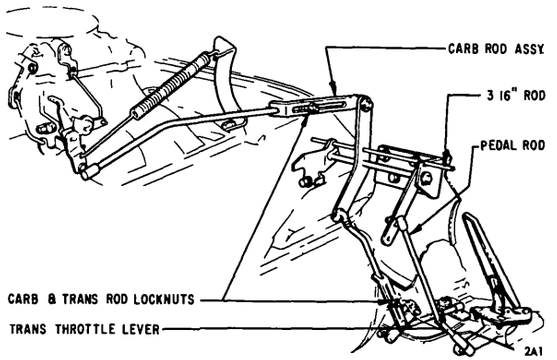
►*IDLING SETTING CAUTIONS:* When making Idle Speed and Mixture adjustments, observe the following: **1)** Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). **2)** On automatic transmission cars (exc. High Perf. & 300H), loosen nut on sliding link of carburetor-to-bellcrank rod so transmission internal stop will not interfere with carburetor lever. When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut.

THROTTLE LINKAGE ADJUSTMENT (Chrysler & Imperial): **1)** With throttle linkage in place, disconnect or block choke valve in wide open position and place throttle at slow idle.
2) Loosen nuts on carburetor and transmission rods and insert a 3/16" rod (10" long) through holes in bellcrank bracket and lever assembly.
3) Hold transmission lever forward against stop and tighten transmission rod locknut.
4) Disconnect one end of accelerator pedal rod (at transmission and dash bracket levers) and adjust rod length to obtain a pedal angle of 113-115° from horizontal and reinstall rod.
5) Remove the 3/16" rod and move link of carburetor rod assembly rearward until transmission lever is against stop. Tighten carburetor rod locknut and remove choke block.

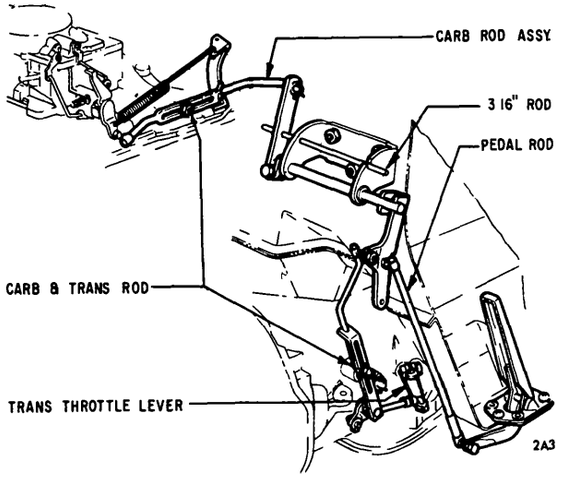
THROTTLE LINKAGE ADJUSTMENT (Hi-Perf. & C-300H): **1)** With throttle linkage in place, block choke in open position and place rear throttle at slow idle.
2) Loosen nuts on carburetor and transmission connector rods and insert a 3/16" (10" long) rod through bellcrank bracket and lever assembly.
3) Move transmission lever forward against its stop and tighten transmission rod locknut.
4) Disconnect end of accelerator rod and adjust length to give pedal angle of 113-115° from horizontal, then remove the 3/16" rod.
5) Move carburetor rod assembly rearward against transmission stop and tighten carburetor rod locknut.
6) Hold rear carburetor at wide open position and adjust length of connector rod so that front carburetor is also at wide open throttle position, then tighten locknut and remove choke block.

STROMBERG WWC 2-BARREL
361" Engine (Less C.C.V.)

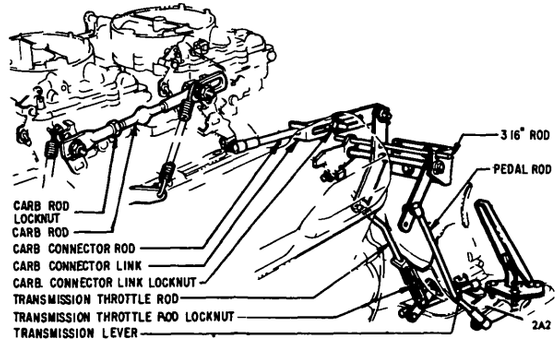
Stromberg WWC, Code 3201 (All Trans.). Downdraft type with automatic choke. *NOTE* - Cars with Closed Crankcase Ventilation use Carter BBD, see below.



CHRYSLER AUTO. TRANS. THROTTLE LINKAGE



IMPERIAL AUTO. TRANS. THROTTLE LINKAGE



CHRYSLER AUTO. TRANS. TWO CARB. THROTTLE LINKAGE

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*
Idle Setting - 1-1½ turns open. Adjust both screws alike. Turn screws out for richer mixture.
Idle Speed - 500 RPM (500 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N", headlights on High Beam, and carburetor throttle rod locknut loosened. See *"Cautions"* above.

Float Level - With body inverted and float hanging free (Off car), or with sufficient fuel in bowl so only pressure of buoyant float holds lip firmly against inlet needle (On Car), distance from bowl surface (gasket removed) to top of float at center should be 1/8" or use Gauge 73725. To adjust, hold floats on bottom of bowl and bend lip. *CAUTION* - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.
Accelerating Pump - Pump connector rod in center hole in pump lever (normal setting).

Fast Idle Speed: 1400 RPM with fast idle adjusting screw centered on index mark on top step of fast idle cam. To adjust screw position, bend tang on choke shaft lever with Tool T109-22.
Automatic Choke: "Cross-Over" type. Set 1 notch rich.
Throttle Linkage Adjustment: See *CARBURETOR* above.
►*OTHER DATA: See "Stromberg WWC Carburetors" in Carburetion Section.*

CARTER BBD 2-BARREL
361" & 383" Engines

Carter BBD No. 3244S (383" Std.), 3245S (361" & 383" with Closed Crankcase Ventilation).
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - 500 RPM (500 RPM on Air Cond. cars with Air Cond. "ON"), with automatic transmission in "N", headlights on High Beam, and carburetor throttle rod locknut loosened. See *"Cautions"* above.

Float Level - With main body inverted and float hanging free (Off car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet (On Car) distance from bowl surface to top of float at center should be 9/32" measured with Gauge T109-239. To adjust, hold floats on bottom of bowl and bend float lip. *CAUTION* - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.

Accelerating Pump - Install connector rod in center hole (medium stroke) of throttle lever.
Fast Idle Speed: 1400 RPM with fast idle adjusting screw centered on index mark on top step of fast idle cam. To adjust screw position, bend tang on choke shaft lever with Tool T109-22.

Automatic Choke: "Cross-Over" type. Set at index.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter BBD Carburetors" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARTER AFB 4-BARREL

383", 413" & 426" Engin (1-Carb.)

Applicati n	Carter Carb. No.
383" Engine (Police)	3375S(CCV), 3374S
413" Engine (Std.)	3256S(CCV), 3251S
413", 426" Eng. (Hi-Perf. - Large Bore)	3387S

CCV - Closed Crankcase Ventilation.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barr ls feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idl Spe d - 500 RPM (with Air Cond. "On" on Air Cond. Cars), 700-800 RPM (Hi-Perf. Engines). *Headlights must be on High Beam and carburetor throttle rod locknut lo sen d. See CAUTIONS above.*

Throttle Linkage Adjustm nt: *See CARBURETOR above.*

►*OTHER DATA: S "Carter AFB 4-Barrel Carburetors" in Carbur tion Section.*

CARTER AFB 4-BARREL

413" & 426" Engine

Hi-Perf. With Ram Manifold

Cart r AFB-3084S. Two carburetors, one for each bank.

►*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor fe ds l ft bank cylinders, LEFT carburetor feeds right bank cylinders.*

Idl Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (Idle Air) screw settings. *S "Carter AFB 4-Barrel Carburetors" in Carbureti n Secti n.*

Throttle Linkage & Interconnecting Linkage Adjustments: *S e CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carbur ti n Section.*

CARTER AFB 4-BARREL

413" Engin (2-Carbs. - Runner)

Carter AFB-3258S (Front), 3259S (Rear) Hi-Perf. & 300H.

Idl Speed & Mixture Adjustment - Turn idle mixture screws 1-2 turns open. Set idle air bypass screws (between mixture screws) 1 turn open and adjust idle speed to 650 RPM by opening or closing bypass screws (keep them equal). Adjust idle mixture screws on front carburetor for maximum RPM. Repeat on rear carburetor and readjust front carburetor if necessary. *NOTE* - If mixture adjustment increases idle speed to more than 675 RPM, readjust idle bypass screw to obtain 650 RPM.

Interconn cting Linkag Adjustment - Both front and rear carburetor levers sh uld operate freely and in same plane. Correct either bent or damaged levers. *NOTE* - Install interconnecting rod with slotted end connected to l wer h l in fr nt carburetor throttle lever, and end connected at top h le of rear carburetor throttle lever. Hold rear carburetor throttle wide open (choke in full open position) and adjust slotted end of rod so fr nt carburetor throttle valves will also be in wide open position. Tighten locknut and check operation. Interconnecting rod must rotate slightly on pivots without bind in any position.

►*IDLE SPEED ADJUSTMENT NOTE: Idl Air Bypass screw n throttl body used to adjust idle speed. Throttl valv s are normally closed on sl w idl .*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. M2769S.
Fuel Pump Pressure - 3½-5 lbs.

Fuel Filter: Disposable type located in carburetor inlet line. Replace every 16,000 miles or if clogged. DO NOT attempt to clean.

Gasoline Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial).
Dash Unit - Part No. 2258137 (Chrysler), No. 2197225 (Imperial).
Tank Unit - Chrysler No. 2240547.

Air Cleaner: Paper element type. Clean every 8,000 miles, replace element every 32,000 miles or sooner if needed.

►*CLEANING CAUTION:* Clean filter element by blowing out with compressed air from inside surface of element. Hold air nozzle 2" from element to avoid damage. DO NOT oil, lubricate or wash element.

BATTERY

SC1 & SC2 300. Autolite 11-HS-59B, Willard MB-24-59 or Gould 11B-OE-59. 12 volt, 11 plate, 59 ampere hour capacity (20 hr. rate).
SC2-300H, SC3, SY1. Autolite 12-HB-70B or Willard MB-27-70. 12 volt, 13 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Left front engine.

STARTER

Chrysler Own No. 1889200 Manual Trans. Std. Eng. Autolite MDT-6002 Manual Trans. Hi Perf. Eng.; Chrysler Own No. 2095150 (gear reduction type) Auto. Trans.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.

Performance Data - 1889200

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800 Min.	11.0	78 Max.
8.5 ft. lbs.	Lock	4.0	350

Performance Data - 2095150

Torque	RPM	Volts	Amperes
0 ft. lbs.	1980	11.0	85 Max.
24.0	Lock	4.0	475

Performance Data - MDT-6002

Torque	RPM	Volts	Amperes
0 ft. lbs.	3600	10.0	56 Max.
8.5 ft. lbs.	Lock	4.0	350

Starter Switch: Solenoid, Chrysler No. 1889146 (S.M. Trans.), No. 2275554 (Auto. Trans.) on starter and controlled by Ignition & Starter Switch Chrysler No. 2097628. Neutral Safety Switch Chrysler No. 1704283, mounted on transmission on automatic transmission cars.
Neutral Safety Switch Adjustment - *S "Torqu Flit V8" in Transmission Section.*

ALTERNATOR

Chrysler Own. Three-phase A.C. unit with full-wave rectifier. Used as follows:

Model	Chrysler N .
Standard	2098265
Air Cond. & H.D.	2098320

Rotation - Clockwise at drive end.
Rated Output - 35 amperes (2098265), 40 amperes (2098320).
Field Coil Draw - 2.30-2.70 amps. at 12 volts (alternator turned by hand); 3.00-3.50 amps. at 15 volts, 70°F and 750 Alternator RPM.

►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

Belt Adjustment: Use Torque or Deflection method as follows:

Belt Torque Specifications - Ft. Lbs.

Model	New	Used
Alternator (No Air Cond.) SC1, SC2	60 ©	40 ©
Alternator (No Air Cond.) SC3, SY1	40 ©	30 ©
Alternator (With Air Cond.) All	60	40
Fan Idler	50	35

© - Torque wrench assumes a different position according to model, when adjusting belt tension.

Belt Deflection Method

Model	New	Used
Alternator (No Air Cond.)	1/8"	1/4"
Alternator (With Air Cond.)	1/4"	3/8"
Fan Idler	1/16"	1/8"

REGULATOR

Chrysler Own. No. 2098300 (All Models). Field control type. No Cutout Relay or Current Regulator.
Air Gap - .048-.052". Point Gap - .014-.016".
Voltage Setting - 13.7-14.3 volts at 70°F.

►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

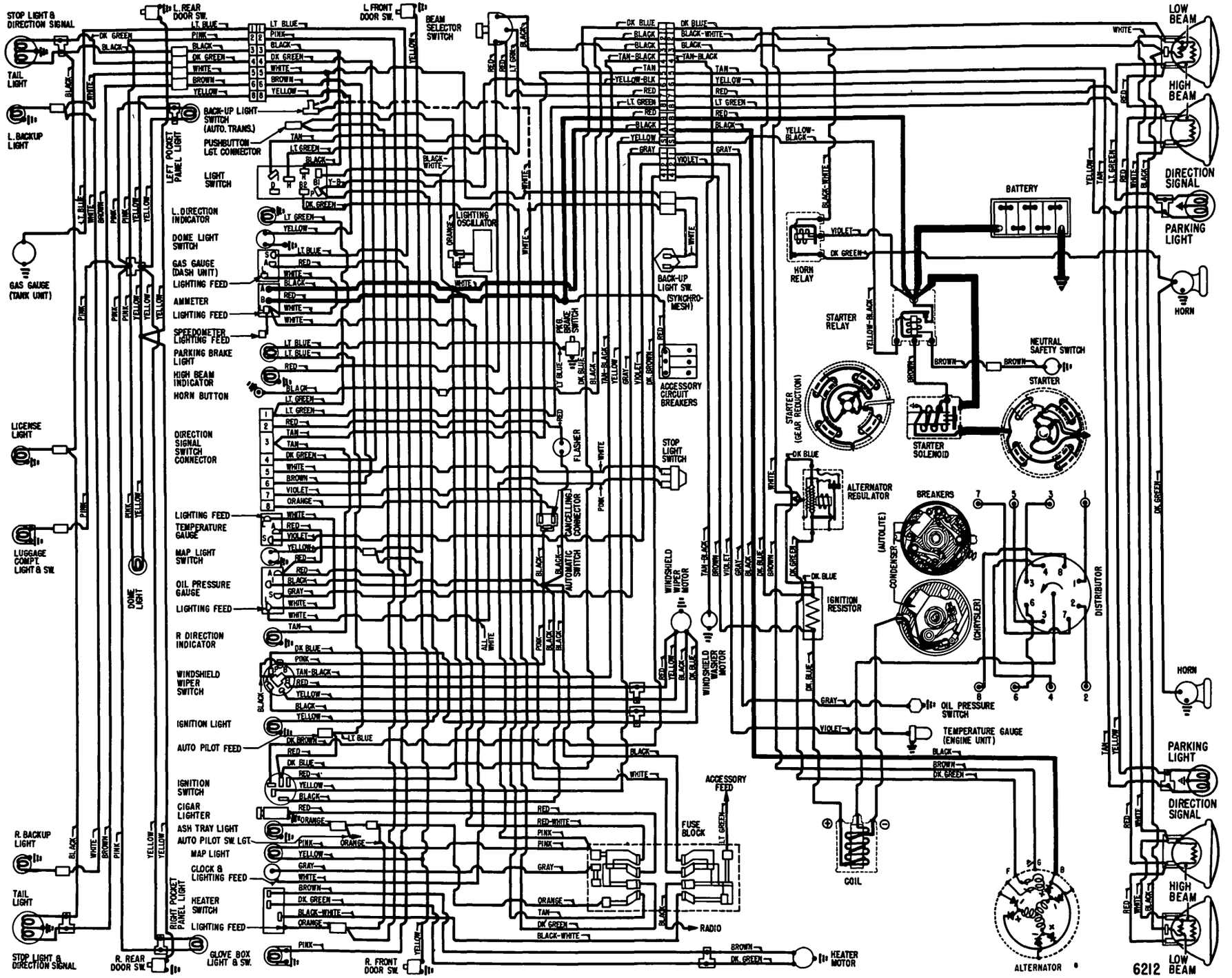
MISC. ELECTRICAL

Automatic Beam Changer: *See Electrical Section.*
Electronic Rear View Mirror: *See Electrical Section.*
Instrument Panel Lighting: *See "Chrysler & Imperial Panelescent Lighting" in Electrical Section.*
Stop Light Switch Location: Mechanical type on brake pedal lever bracket.
Adjustment - Adjust position of switch so stoplight pedal goes ON in the first 1/8" of pedal pushrod travel.

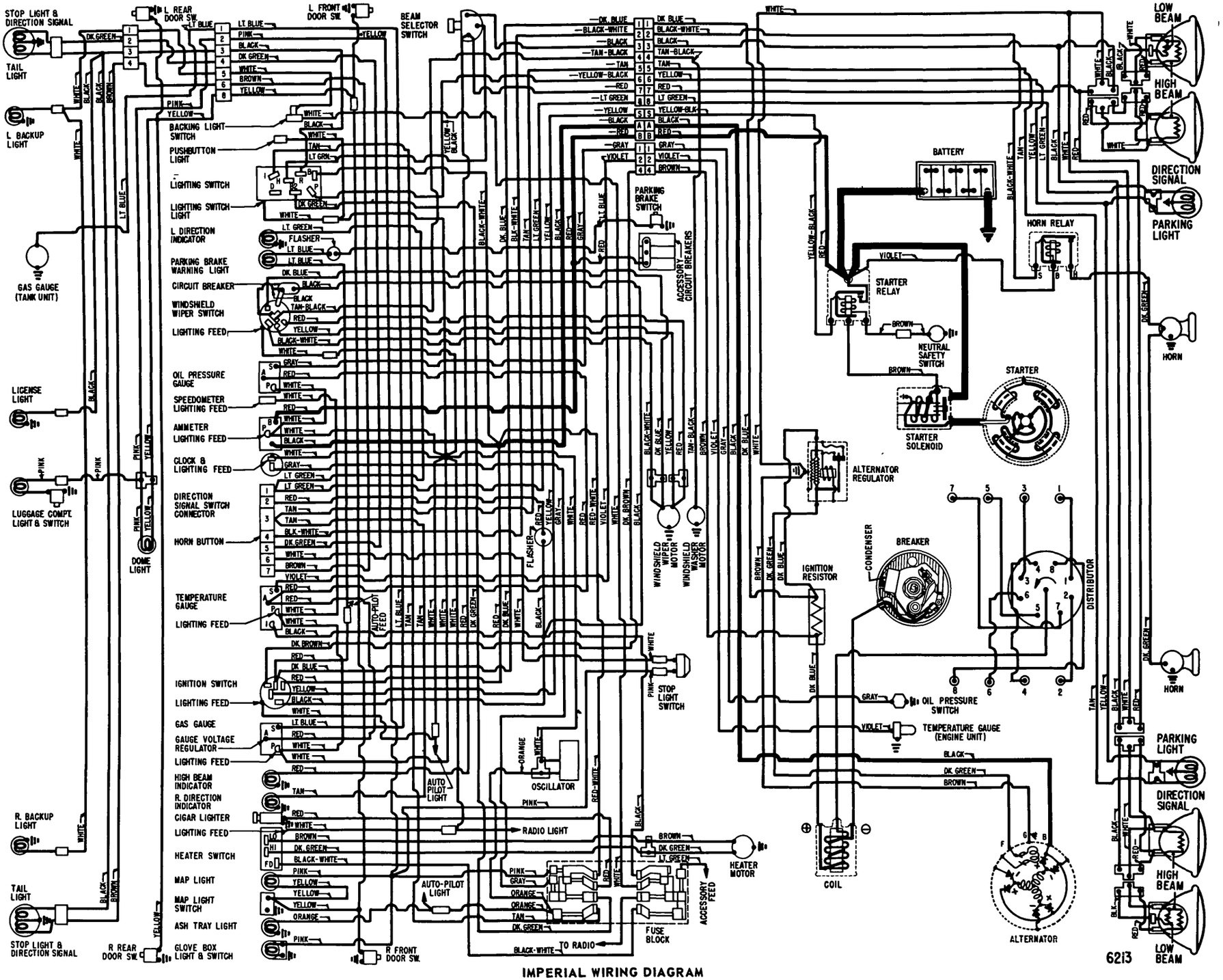
Instrument Cluster & Speedometer (Chrysler): Removal - 1) Disconnect battery ground cable. Remove steering wheel and steering jacket tube cover and disconnect all wires at terminals and the instrument ground wire. 2) Remove instrument cluster bezel and disconnect speedometer cable. Remove steering tube collar and remove two screws and spacers that attach dome and cluster assembly to support. 3) Remove plastic dome to instrument panel screws and carefully release base of dome from supports (use pointed instrument), and move dome away from panel opening. Tip cluster outward to reach parking brake warning lamp socket. *NOTE* - If dome fits tightly into support it may be necessary to remove cluster-to-dome screws and push cluster up into dome so dome can be

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.



CHRYSLER (EXC. IMPERIAL) WIRING DIAGRAM



IMPERIAL WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

compressed to clear supports.
4) Snap out lamp socket and bulb and remove dome and cluster assembly.
5) Remove speedometer head assembly.
Installation - Reverse removal procedure.

Instrument Cluster & Speedometer (Imperial): Removal - 1) Disconnect battery ground cable. *NOTE - When equipped with Heater and/or Air Cond., remove defroster and spot cooler hoses.*
2) Disconnect speedometer cable at head and odometer reset cable at instrument panel cluster. *NOTE - Mask steering jacket tube.*
3) Remove instrument cluster-to-panel screws and remove cluster by tilting lower end outward.
4) Disconnect all electrical connections and disengage wire harness loom from clips and remove cluster. *NOTE* - For speedometer service do not remove head from cluster.
Installation - Reverse removal procedure.

CIRCUIT BREAKERS: 22.5 Ampere - Headlights, High Beam Indicator, Ignition switch.
6 Ampere - Windshield wiper. Between switch & motor.
8 Ampere - Rear Cigar Lighter & Power Antenna.
5 Ampere - Windshield Wiper. Wiper switch.

FUSES: Located in fuse block behind instrument panel to left of steering column.
9 Ampere - Parking, Tail, License Plate, Lights.
9 Ampere - Stop, Dome, Glove Compartment, Map, Trunk and Spot lights.
2 Ampere - Instrument, Ignition, Clock Lights & Clock.
10 Ampere - Rear Defroster & Air Cond. Blower.
6 Ampere - Back-Up Lamp.
14 Ampere - Front Cigar Lighter.

ENGINE

ENGINE SPECIFICATIONS: Own. 90°V8, valve-in-head. Different engines used as follows:

Engine	Bore	Stroke	Displacement
361"	4.125"	2.375"	361 cu. in.
383"	4.250"	3.375"	383 cu. in.
413"	4.190"	3.750"	413 cu. in.
426"	4.250"	3.750"	426 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
361"	9.1-1	54.3	265 at 4000 RPM
383"	10.1-1	57.8	305 at 4600 RPM
413" ①	10.1-1	55.9	340 at 4600 RPM
413" ②	10.1-1	55.9	365 at 4800 RPM
413" ③	10.1-1	55.9	380 at 5200 RPM
413" ④	11.0-1	55.9	405 at 5400 RPM
426" ②	11.0-1	57.8	373 at 4800 RPM
426" ②	12.0-1	57.8	385 at 4800 RPM
426" ④	11.0-1	57.8	413 at 5400 RPM
426" ④	12.0-1	57.8	421 at 5400 RPM

① - SC3 New Yorker; SY1 Imperial.
② - SC2-300 Hi-Perf. Large Bore Carb.
③ - SC2-300H & SC2-300 HI Perf. with 2 4-Bbl. Carbs.
④ - SC2-300 & 300H Hi-Perf. with 2 4-Bbl. Ram Induction.

Compression & Vacuum Reading: *See TUNE-UP.*
ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*
CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifolds" in Chrysler Corp. Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL: 1) Disconnect battery, raise car on hoist and disconnect steering linkage from idler and pitman arms.
2) Remove outlet vent pipe and disconnect exhaust pipe branches from right and left manifolds. Remove exhaust pipe.
3) Drain oil and remove converter dust shield. Remove oil pan bolts. Turn flywheel until counterweight and connecting rods at front of crankshaft are at highest position to provide clearance and lower oil pan. *NOTE* - Turn oil pan counterclockwise to clear oil screen and suction pipe as it is lowered.

PISTONS

Cast Aluminum alloy, eliptically turned, tin-plated thermally controlled by steel strut (Std.) Forged Aluminum alloy, domed, trunk-type, eliptically turned (Optl. on Hi-Perf. Engines).
Removal - Pistons and rods removed from above.
Fitting New Pistons: Clearance should be .0003-.0013" between piston and cylinder wall, measured at top of skirt on piston, and halfway down cylinder wall crosswise to engine.
►*CYLINDER BORE OVERSIZE CAUTION:* Letter "A" within engine number indicates that cylinder bores are .020" Oversize.
Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders 1-3-5-7), with notch on side opposite to large chamfer at lower end of connecting rod (right bank cylinders 2-4-6-8), *see Rod Installation.*
Replacement Pistons: Furnished Std., .005", .020", & .040" Oversize with fitted pins.

PISTON PIN

Pin is press fit in connecting rod and special removal and installation procedures required.
Diameter - 1.0935-1.0937". **Length** - 3.555-3.575".
Clearance in Piston: .00045-.00075".
Clearance in Rod: .0007-.0012".
Piston Pin Removal & Installation: *See "Piston Pins" in Chrysler Corp. Special Data.*
Replacement Pins: Furnished standard size only with new pistons.

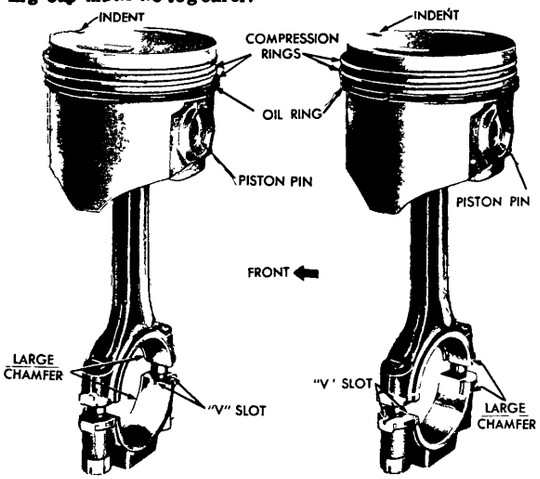
PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	.013-.025"	.0015-.003"
Oil (3)	.1860-.1865"	.013-.025"	.001-.009"

Installing Rings: Install compression rings with "Top" mark toward top of piston.
Replacement Rings: Furnished for oversize ranges of Std. to .009", .020" to .029", .040" to .049".

CONNECTING ROD

Length (Center-to-Center) - 6.36" (361" & 383"), 6.77" (413" & 426").
Crankpin Journal Diameter: 2.374-2.375".
►*JOURNAL DIAMETER CAUTION (ONE OR MORE JOURNALS MACHINED UNDERSIZE):* See CRANKSHAFT below.
Clearance - .0005-.0015". Wear limit .0025".
Sideplay - .009-.017". Total both rods.
Installing Rods: With piston correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.



PISTON & ROD ASSEMBLY

CRANKSHAFT

Journal Diameter: (361" & 383") 2.6245-2.6255". (413") 2.7495-2.7505".
►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:* **.001" UNDERSIZE** - Indicated by "Maltese Cross" within engine number. **.010" UNDERSIZE** - Indicated by "X" and "Maltese Cross" within engine number. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The number following letter "R" or "M" indicates journal number.
Clearance - .0005-.0015". Wear limit .0025".
Endplay - .002-.007".
End Thrust - Taken by No. 3 (Center) main bearing.
Replacement Bearings: Std. & .001", .002", .003", .010" & .012" oversize.

CAMSHAFT

►*HI-PERF. OPTIONAL CAMSHAFTS NOTE: For identification, these camshafts will be designated as camshaft Option 284°, 292°, & 308°. See Valve Lift, Valve Springs & Valve Timing, below.*

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983". (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.748-1.749".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.750-1.751".
Bearings - Removable, lead base babbitt on steel.
Clearance - .001-.003". Wear limit .005".
End Thrust: Controlled by camshaft sprocket hub riding against front face of cylinder block.
Timing Chain: Width .88". **Pitch** .50". **Length** 50 links.
Camshaft Setting: Marks on both sprockets adjacent and in line with straightedge across shaft centers.
Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Chrysler Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Special Data.*

VALVES

Tappet Clearance: SC2-300 & 300H Hi-Perf. - Intake .015", Exhaust .024". Hot. **Hi-Perf. Optional Camshafts** - Intake .016", Exhaust .022". Cold.

►*OVERSIZE VALVE STEM NOTE:* Engines with .005" oversize valve stems will be marked with an "E" (Exh.) or an "I" (Int.) on end of cylinder head on untapped boss.

Valve	Head Diam.	Stem Diam.	Length
Intake	2.08"	.372-.373"	4.87"
Exhaust	1.60" ①	.371-.372"	4.87"

Valve	Seat Angl	Lift	Stem Clearance
Intake	45°	②	③.001-.003"
Exhaust	45°	②	④.002-.004"

① - Hi-Perf. Optl. 1.74".
② - **SC1, SC2 300, SC2 300 Pwr. Pack, SC3, SY1** - Int. & Exh. .390".
SC2-300 Hi-Perf., SC2-300H - Int. .444". Exh. .456".
SC2 Hi-Perf. Optl. Camshafts - 284° Int. .449", Exh. .454"; 292° All .490"; 308° All .520".
③ - Wear limit .004". ④ - Wear limit .006".

Valve Seat Width - 1/16-3/32" Intake, 3/64-1/16" Exhaust.
Valve Stem Oil Seal - Cup type seals used on all valve stems.

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylinder gauge), grind tip down to approach, but do not go below minimum height (slotted area on gauge).

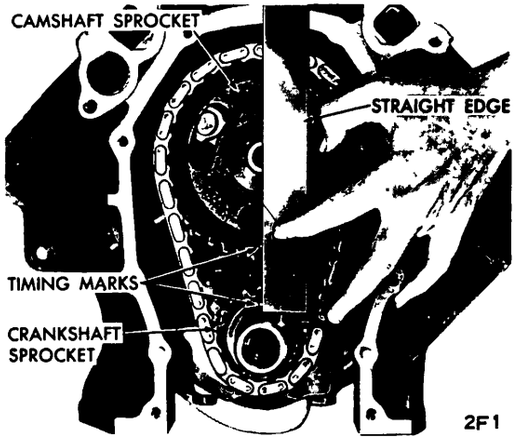
Valve Springs: Damper springs used on SC2-300 Hi-Perf., SC2-300H, SY1, & 284° & 292° Optl. SC2 Hi-Perf. camshaft engines. Inner springs used with 308" SC2 Hi-Perf. camshaft engine.

Spring Specifications
(SC1, SC2-300, SC2-300 Pwr. Pack, SC3, SY1)

Valve	Pressure	Length
Closed	100 lbs.	1.86"
Open	195 lbs.	1.47"

(SC2-300H, SC2-300 Hi-Perf. & SC2 Hi-Perf. 284° Optl. Camshaft)

Valve	Pressure	Length
Closed	90 lbs.	1.86"
Open	226 lbs.	1.43"



CHRYSLER & IMPERIAL VALVE TIMING MARKS

(SC2 Hi-Perf. Optl. 292° Camshaft)

Valve	Pressure	Length
Closed	122 lbs.	1.86"
Open	284 lbs.	1.47"

(SC2 Hi-Perf. Optl. 308° Camshaft) ①

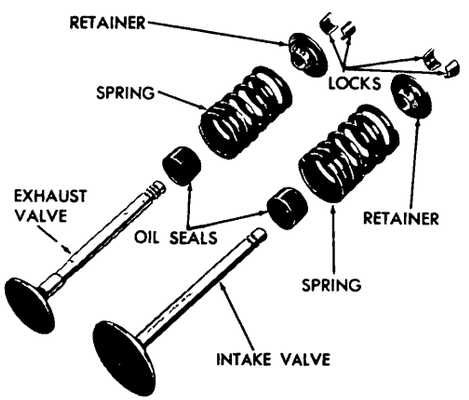
Valve	Pressure-Inner-Length	Pressure-Outer-Length
Closed	30 lbs. 1.562"	95 lbs. 1.86"
Open	77 lbs. 1.132"	261" lbs. 1.36"

① - Includes damper.

Free Length - 2.38" SC2-300H; 2.34" SC1, SC2-300, SC2 Pwr. Pack, SC2 Hi-Perf. (Std. Camshaft), SC2 Police, SC3, & SY1.

►*VALVE SPRING HEIGHT CAUTION:* If valves or seats are ground, check installed height of spring (from counterbore in head to lower surface of spring retainer). If height exceeds 1 57/64", install a 1.16" spacer under spring to bring height within limits of 1 53/64-1 57/64".

►*CAUTION:* Spring ends must be square within 1/16".



CHRYSLER & IMPERIAL VALVE ASSEMBLY

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005"), C-3430 (.015"), and C-3427 (.030") to ream guides in progressive steps of .005", .015" & .030".

►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

VALVE LIFTERS

Mechanical lifters used in SC2-300 Hi-Perf., SC2-300H and SC2 Hi-Perf. Optl. camshafts. Hydraulic lifters used in all other models.

►*OVERSIZE LIFTER NOTE.* A "♦" on engine serial number pad indicates that lifters are .008" oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top top surface of body.

Diameter - .9040-.9045". **Clearance** - .0005-.0018".
Replacement Lifters: Furnished Std. & .001", .008", .030" oversize.
Hydraulic Lifter Overhaul & Testing: *See "Valve System" in Chrysler Corp. Special Data.*
Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

①Valve Timing Specifications
(SC1, SC2-300, SC2-300 Pwr. Pack, SC3, SY1)
Intake Valves - Open 13°BTDC. Close 59°ALDC.
Exhaust Valves - Open 59°BLDC. Close 13°ATDC.
(SC2-300 Hi-Perf., SC2-300H)
Intake Valves - Open 22°BTDC. Close 66°ALDC.
Exhaust Valves - Open 62°BLDC. Close 28°ATDC.
(SC2 Optl. 284° Camshaft)
Intake Valves - Open 25°BTDC. Close 79°ALDC.
Exhaust Valves - Open 74°BLDC. Close 30°ATDC.
(SC2 Optl. 292° Camshaft)
Intake Valves - Open 31°BTDC. Close 81°ALDC.
Exhaust Valves - Open 76°BLDC. Close 36°ATDC.
(SC2 Optl. 308° Camshaft)
Intake Valves - Open 43°BTDC. Close 85°ALDC.
Exhaust Valves - Open 83°BLDC. Close 45°ATDC.
① - With valve train solid (Hydraulic Lifters).

VALVE TIMING CHECK (Exc. SC2 Hi-Perf. & 300H): Rotate crankshaft until No. 6 exhaust valve closes (No. 6 intake opens). Insert a ¼" spacer between rocker arm pad and stem tip of No. 1 intake valve (second valve on left bank). Install dial indicator so plunger contacts valve spring retainer as nearly perpendicular as possible. Allow spring load to bleed lifter down to provide a solid lifter. Zero indicator. Turn crankshaft in normal running direction until valve has lifted .017". Timing indicator should read 10° BTDC to 2° ATDC.

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INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CAUTION - Remove spacer before turning crankshaft any further in normal direction.

VALVE TIMING CHECK (SC2 Hi-Perf. & 300H): With No. 6 exhaust valve is closing and the No. 6 intake is opening. Turn rocker arm adjusting screw down to zero clearance plus 1/2 turn. Install dial indicator so that indicator plunger contacts retainer as near to 90° angle as possible. Adjust dial indicator to zero. Turn crankshaft clockwise (Normal running direction) until valve has lifted .069". The timing pointer should read 5° BTDC to 7° ATDC. Remove dial indicator, back off adjusting screw; with engine running at hot idle, adjust valve clearance to specifications.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-65 lbs. at 2000 RPM.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, see *"Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Gauge: Constant Voltage type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial).

Dash Unit - Chrysler No. 2291302 (Chrysler), No. 2197222 (Imperial).

Engine Unit - Chrysler No. 1972241.

Oil Pump: Rotor type mounted on cylinder block at lower left front side of engine.

Pump Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow disposable type. Replace filter every 4000 miles to coincide with engine oil change.

►*OIL FILTER INSTALLATION CAUTION:* Before installing, make sure that drain-back valve is free by unseating valve with blunt instrument inserted in four holes in oil filter base. Screw new filter on base until gasket contacts base. **Tighten ½ turn additional by hand.** DO NOT overtighten.

Crankcase Ventilation: Standard Cars - Filter element in crankcase filler cap and breather tube in right valve rocker cover. Clean filter in filler cap at every oil change or sooner under heavy dust conditions.

Positive Crankcase Ventilation Cars - A vacuum tube is connected to air outlet vent cap on right valve rocker and to lower part of carburetor throttle body. A ventilation valve is installed in outlet cap to regulate crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 16 qts. Add 1 qt. for heater.

►*AIR CONDITIONING OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F for summer operation.

Pressure Valve: 14 lb. (Std.), 16 lb. (Air Cond.) radiator filler cap used on all models.

Thermostat: Pellet type. Located in water outlet housing. Chrysler No. 1735011 (180°F).

Water Pump: Sealed ball bearing type. No. lubrication.

Water Pump Removal - Drain cooling system. On Air Cond. cars remove upper half of fan shroud. Loosen all belts. Remove fan, spacer and pulley (Exc. Air Cond. Cars), remove pulley from fan hub and then remove fan drive (Air Cond. Cars). Remove pump.

Water Pump Overhaul - *See "Cooling System" in Chrysler Corp. Special Data.*

Fluid Fan Drive: Used on Air Cond. cars and Std. on all SC2-300 Hi-Perf. & 300H.

Temperature Gauge: Constant Voltage Type with voltage regulator inside oil pressure gauge (Chrysler), inside temperature gauge (Imperial).

Dash Unit - Chrysler No. 2257660 (Chrysler), 2291553 (Imperial).

Engine Unit - Chrysler No. 2240744 (King-Seeley or Autolite), No. 2256302 (Stewart Warner).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

DODGE DART

Model Identification

Model	Std. Series	330 Series	440 Series
2-Door Sedan	SD1-L-21	SD1-M-21	
2-Door Hardtop		SD1-M-23	SD1-H-23
4-Door Sedan	SD1-L-41	SD1-M-41	SD1-H-41
Station Wagon	SD1-L-45	SD1-M-45	

PLYMOUTH

Model	Savoy	Belvedere	Fury
2-Door Sedan	SP1-L-21	SP1-M-21	
2-Door Hardtop		SP1-M-23	SP1-H-23
4-Door Sedan	SP1-L-41	SP1-M-41	SP1-H-41
Station Wagon	SP1-L-45	SP1-M-45	

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 1 2 1 100001

① - Car make. 2 Plymouth. 4 Dart.
② - Model series. 1 2 & 4-Door Sedan (Std. & Savoy), 2 2 & 4-Door Sedan and Hardtop (330 & Belvedere), 3 2-Door Hardtop & 4-Door Sedan (440 & Fury), 5 Station Wagon (Std. & Savoy), 6 Station Wagon (330 & Belvedere), 8 Taxi, 9 Special.
③ - Model year. 2 1962.
④ - Assembly plant. 1 or 2 Detroit (Plymouth). 2 or 3 Detroit (Dodge). 5 Los Angeles. 6 Newark. 7 St. Louis (Dodge), Valley Park (Plymouth).
⑤ - Beginning vehicle number at each assembly plant.

ENGINE NUMBER: Stamped on right side of cylinder block below cylinder head opposite No. 1 cylinder. Number (example below) includes identification data.

① ② ③ ④
S 17 8 4

① - Year. S 1962. AS denotes aluminum engine.
② - Displacement. 17 170 cu. ins. 22 225 cu. ins.
③ - Month assembled. 8 August, etc.
④ - Day assembled. 4 4th day, etc.

►*ENGINE NUMBER MARKS:* Identified as follows: "A" on Model Pad indicates .020" oversize cylinder bore.
"♦" on Model Pad indicates .008" oversize tappets.
"Main Cross" on Model Pad indicates .001" undersize bearing shells. Location of undersize journals identified by letter "M" (Main Journal), letter, "R" (Connecting Rod Journal) on crankshaft counterweight. *NOTE* - Number following letters, indicate which journals are undersize.
"X" on Model Pad indicates .010" undersize crankshaft. Crankshaft counterweight will be stamped "M-10" or "R-10" to indicate all main and/or connecting rod journals are .010" undersize.

TUNE-UP

►*CARTER BBS CARB. EQUIPPED CARS HARD COLD START (NECESSITATES PUMPING ACCELERATOR) & SLOW WARM-UP CORRECTION:* Condition may be caused by incorrect "R" Series (1961) choke rod which is shorter than the correct "S" Series (1962) choke rod. Be sure "S" Series choke assembly is on vehicle. Shorter choke rod prevents choke valve from closing when starting engine.

COMPRESSION PRESSURE: 110-140 lbs. at 130 RPM (plugs removed). Maximum variation between cylinders 20 lbs.

VACUUM READING: 19.5" at idle speed.

VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust, Hot.

►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal operating temperature, remove cylinder head cover and operate engine for additional 5 minutes at 550 RPM. Make adjustments.

MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stop stud.

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .035".

Spark Plugs - Champion N12Y or Autolite AG52. "Long Reach" type. 14mm. Torque to 30 ft. lbs..

►*CARBON AND/OR OIL FOULED SPARK PLUGS CORRECTION:* If carburetor and automatic choke operate properly, replace ONLY affected plug with MoPar Spark Plug No. 2098374 (Champion UN12Y auxiliary gap type). *CAUTION - DO NOT use any other type spark plug.*

►*SPARK PLUG GASKET NOTE:* A gasket must be used along with aluminum sleeve on each plug to insure against oil leakage into spark plug sleeves.

COIL: Chrysler Nos. 1688212 or 2095223. Autolite No. 200567. Essex No. 62-160-2.

Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.

Resistor - Chrysler No. 2095501 (0.5-0.6 ohms) connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler No. 2095974 (170" Eng.), No. 2095976 (225" Eng.).

Condenser - Chrysler 2098058. **Capacity** .25-.285 mfd.
Contact Point Set - Chrysler No. 2098244.
Breaker Gap - .017-.023".
Cam Angle - 40-45°.
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 2095974

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325-475	0	650-950
0-2.5	475	0-5	950
8-10	925	16-20	1850
12.5-14.5	2200	25-29	4400

Automatic Advance - 2095976

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325-475	0	650-950
0-2	475	0-4	950
7-9	1000	14-18	2000
10.5-12.5	2300	21-25	4600

Vacuum Spark Control: Integral type.

Vacuum Advance - 2095974

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg)
Start	0	5.0-7.1
5	10	8-9.5
9.5-12.5	19	12.5

Vacuum Advance - 2095976

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg)
Start	0	4.9-7.1
3-5	6-10	10.5
5.25-7.5	10.5-15.0	13

IGNITION TIMING

Setting - 2½° BTDC (range 2½° ATDC to 7½° BTDC). *NOTE* - Set timing with distributor vacuum line disconnected and engine idling at 500 RPM in Neutral.

Timing Mark - Timing tab on chain case cover marked "0" and "10" with 5° marks before and after "10". Align timing mark on vibration damper with correct mark on tab.

CARBURETOR

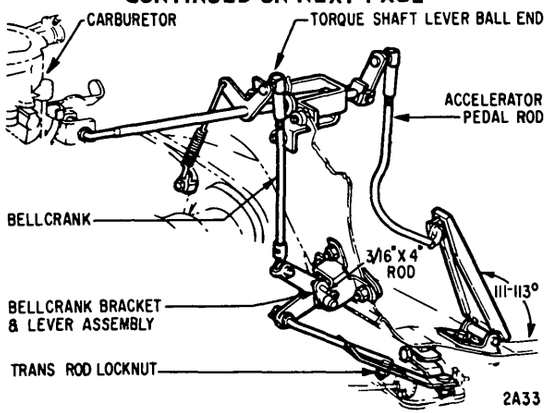
►*THROTTLE LINKAGE STICKING CORRECTION:* Check accelerator shaft and bracket assembly for proper (.030-.070") endplay. Pry accelerator end of shaft with screwdriver to relieve shaft binding.

►*CARBURETOR APPLICATION: One Carter BBS single barrel carburetor used on all cars with Closed Crankcase Ventilation. One Holley Model 1920 single barrel carburetor optional for all transmissions.*

►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to high beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank so transmission interval stop will not interfere with carburetor throttle lever. When adjustments completed, screw ball joint up or down until ball on bellcrank will mate exactly with socket.

THROTTLE LINKAGE ADJUSTMENT: 1) Disconnect upper end of bellcrank-to-torque shaft rod ball joint. 2) Disconnect choke at carburetor or block choke in full open position. Open throttle slightly to release

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AUTO. TRANS. THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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fast idle cam, then return throttle to curb idle. 3) With locknut loose in transmission rod, insert a 3/16" rod (4" long) through holes in bellcrank bracket and lever assembly. 4) Move transmission lever forward against stop and tighten transmission locknut. 5) Disconnect top end of pedal rod, then adjust to provide 111-113° pedal angle (see illustration). Reinstall top end of pedal rod. 6) Remove 3/16" rod from bellcrank bracket and lever assembly. Adjust length of transmission bellcrank-to-torque shaft rod by means of adjustment screw. The correct rod length allows the ball socket to line up with the ball end when rod is held upward against transmission stop. 7) Install ball socket on torque shaft lever ball end, connect choke rod.

CARTER BBS

Carter BBS-3231S (Synchro-mesh), BBS-3232S (Auto. Trans.), BBS-3233S (All Taxi), BBS-3235S (All Closed Crankcase Ventilation Cars).

Idle Setting - ½-1½ turns open. With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn screw in until speed starts to drop. Turn screw out just enough to recover lost engine speed. Readjust idle speed screw for correct engine idle speed.

Idle Speed - 550 RPM with headlights on high beam and accelerator shaft rod ball joint unsnapped. See *"Idle Setting Caution" above.*

Float Level - With main body inverted and float hanging free (off car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (on car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 7/32" measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accelerating Pump - Install throttle connector rod in center hole of throttle lever.

Fast Idle: 170" Engine - 1300 RPM (Auto. Trans. without Closed Crankcase Ventilation), 1400 RPM (Others). **225" Engine** - 1300 RPM (Synchro-mesh Trans.), 1400 RPM (Auto. Trans.).

Automatic Choke: "Cross-Over" type. 2 notches rich.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Carter BBS Carburetors" in Carburetion Section.*

HOLLEY MODEL 1920

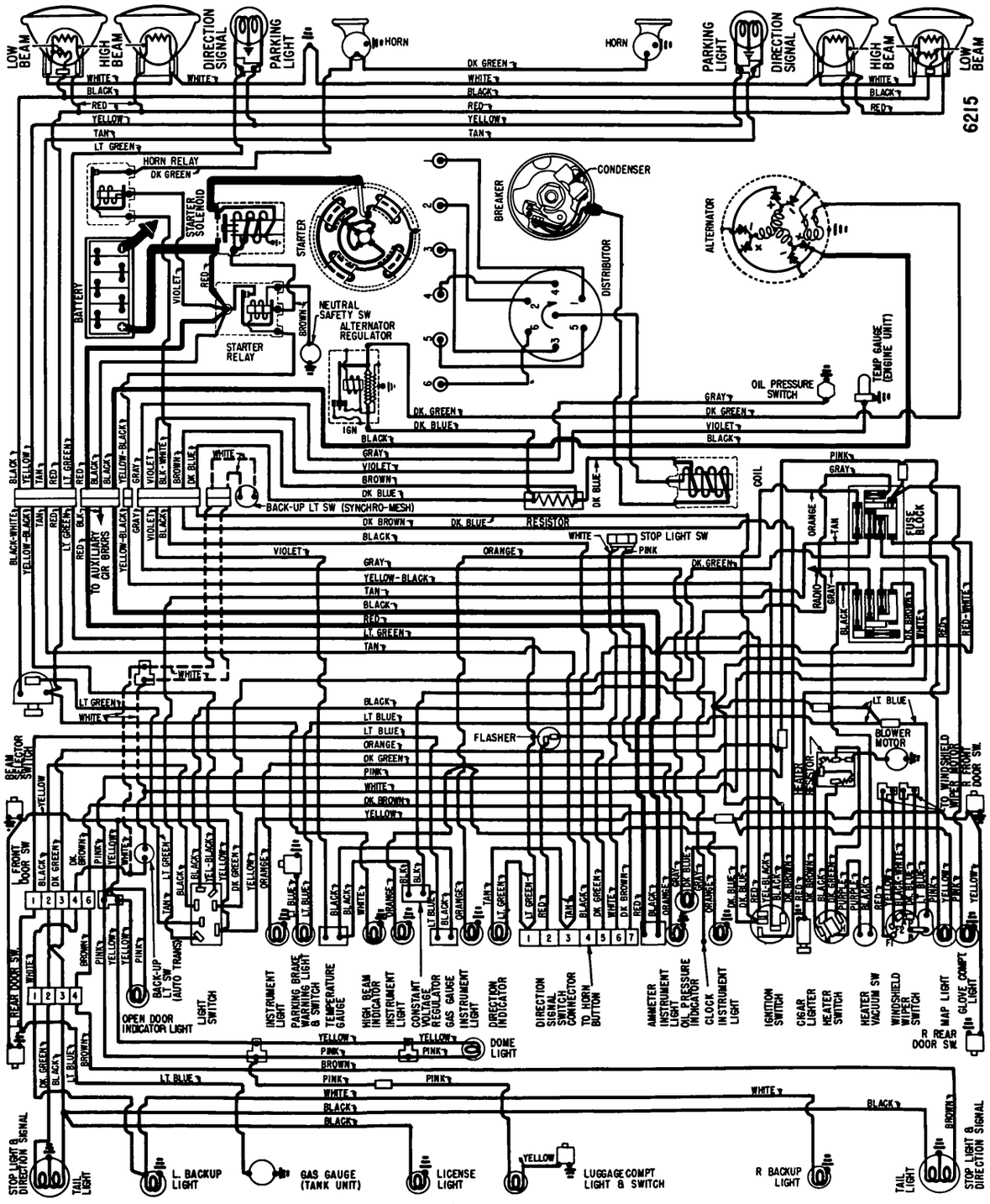
Holley No. 1920 R-2418A (Synchro-mesh), R-2419A (Auto. Trans.).

Idle Setting - ½-1½ turns open. With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn screw in until speed starts to drop. Turn screw out just enough to recover lost engine speed. Readjust idle speed screw for correct engine idle.

Idle Speed - 550 RPM with headlights on high beam and accelerator shaft rod ball joint unsnapped. See *"Idle Setting Caution" above.*

Fuel Level: 11/16" below machined mounting surface of power valve (economizer) with engine running and car on level floor. Remove power valve assembly and use scale to measure fuel level. *See "Holley Single Barrel Model 1920 Carburetor" in Carburetion Section for adjustment procedure.*

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DODGE DART 6 CYL. WIRING DIAGRAM

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Accelerating Pump - Install throttle connector rod in center hole of throttle lever.
Fast Idle: 170" Engine - 1500 RPM (Synchro-mesh), 1800 RPM (Auto. Trans.).
225" Engine - 1500 RPM (Synchro-mesh), 1700 RPM (Auto. Trans.).
Automatic Choke: "Cross-Over" type. Set at Index.
Throttle Linkage Adjustment: See *CARBURETOR* above.
►*OTHER DATA:* See *"Holley Model 1920 Carburetors"* in Carburetion Section.

CARB. EQUIPMENT

Fuel Pump: Carter M2996S. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.
Fuel Filter: Disposable paper type, located in fuel line between pump and carburetor. Replace element every 16,000 miles.
Gasoline Gauge: Constant voltage type with separate voltage regulator Chrysler Corp. No. 2209216 (Dodge), No. 2258413 (Plymouth) mounted on back of instrument panel.
Dash Unit - Chrysler Corp. No. 2258240 (Dodge), 2257205 (Plymouth).
Tank Unit - Chrysler Corp. No. 2275589 (Exc. Sub.), No. 2275588 (Suburban).
Air Cleaner: Paper element type. Clean every 8,000 miles or more often as required. Replace every 32,000 miles.
►*CLEANING CAUTION:* Remove cleaner from carburetor and remove cover and element. Clean inside cover with compressed air and gently clean element by holding air nozzle at least two inches from inside screen. Discard element if it has been punctured. Check soft plastic sealer on both sides of element for smoothness.

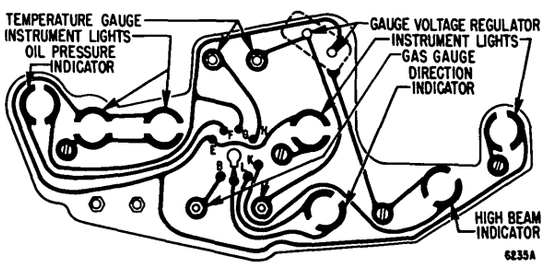
BATTERY

170" Engines - Autolite 9-HS-38, Willard HB-42-38, Gould-National 9B-OE-38. 12 volt, 7 plate, 38 ampere hour capacity (20 hr. rate).
225" Engines - Autolite 11-HS-48B, Willard MB-24-48, Gould-National 11B-OE-50. 12 volt, 9 plate, 48 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.

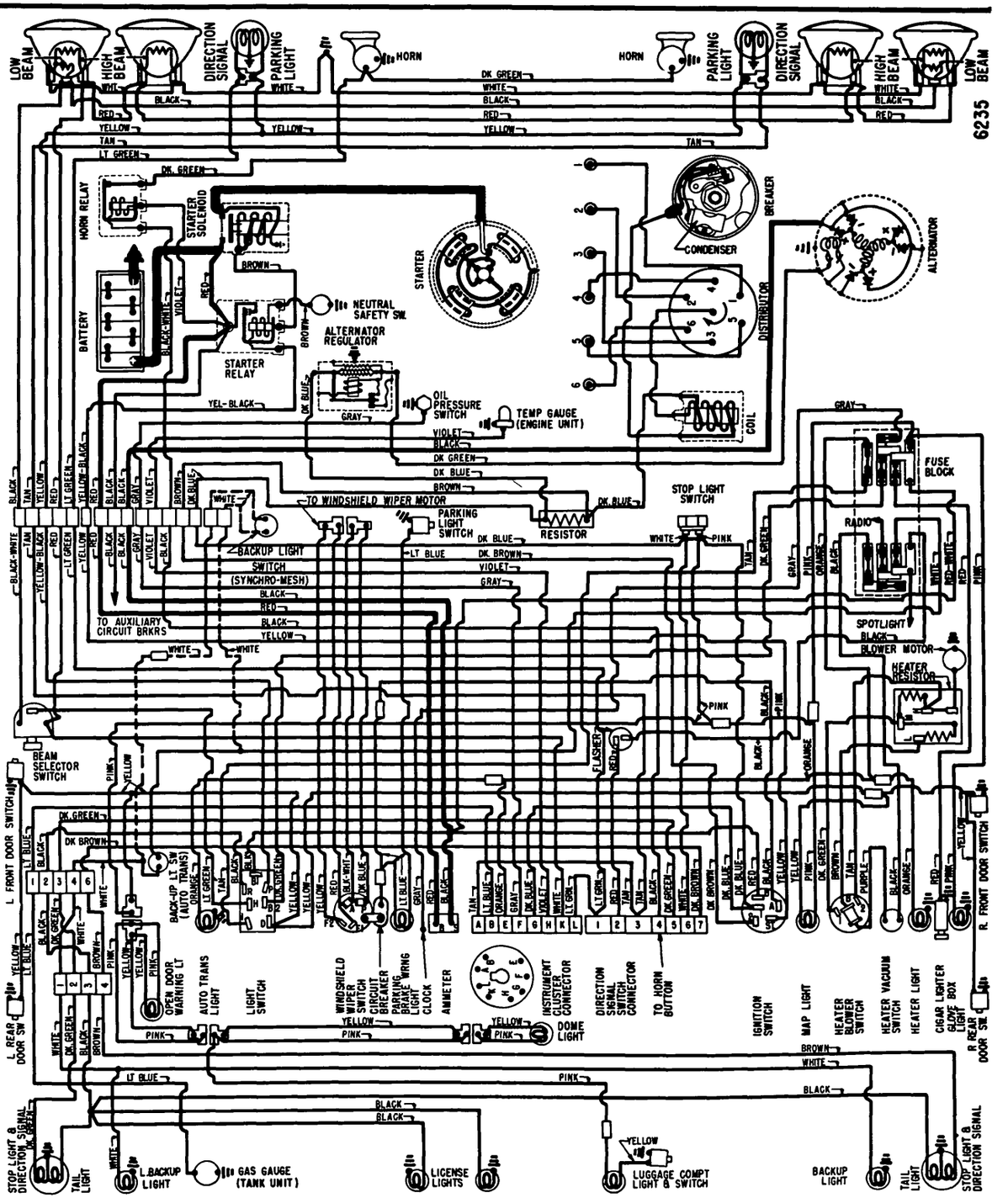
STARTER

Chrysler No. 2095150. Armature - Chrysler 2095094.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.

CONTINUED ON NEXT PAGE



PLYMOUTH 6 CYL. PRINTED CIRCUIT



PLYMOUTH 6 CYL. WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	1950	11.0	85
24.0	Lock	4.0	475

Starting Switch: Solenoid Switch No. 1889146 on starter and controlled by combination Starter & Ignition Switch No. 2097628 and Neutral Safety Switch No. 1704283 mounted on automatic transmission.

Neutral Safety Switch Adjustment - *See "TorqueFlite Six" in Transmission Section.*

ALTERNATOR

Chrysler No. 2098275 (Lancer & Valiant), No. 2098265 (Dart & Plymouth), No. 2098320 (Heavy Duty).

Rotation - Clockwise at drive end.

Rated Output - 26 amperes (2098275), 34.5 amperes (2098265), 39 amperes (2098320).

Field Coil Draw - 2.3-2.7 amperes at 12 volts (alternator turned by hand), 3.00-3.50 amperes at 15 volts and 70°F & 750 alternator RPM.

►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

Belt Adjustment: Use Torque or Deflection methods as follows:

Eng.	Belt Torque (Ft. Lbs.) New	Belt Torque (Ft. Lbs.) ©Used	Belt Deflection New	Belt Deflection ©Used
170"	20	15	5/32"	1/4"
225"	20	15	1/8"	1/4"

© - Belt used ½ hour or more.

REGULATOR

Chrysler No. 2098300. Field control type. No cutout relay or current regulator.

Air Gap - .048-.052". **Point Gap** - .014-.016".

Voltage Setting - 13.7-14.3 volts at 75°F.

►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Lighting Switch Removal (Dodge): Part of Instrument Cluster. *See "Instrument Cluster Removal" below.*

Lighting Switch Removal (Plymouth): Disconnect battery. Pull switch knob out and rotate it until flat on shaft is down. Push knob in all the way. Disconnect wires, press spring loaded release button on top center of switch, and pull shaft and knob out of switch. Remove switch mounting bezel on instrument panel and remove switch.

Stop Light Switch Location: Mechanical type, mounted on brake pedal lever bracket.

Adjustment - Adjust position of switch so stoplight goes on in first 1/8" of pedal pushrod travel.

Cluster Removal (Dodge): *NOTE - Removal of cluster is necessary to service instruments.* 1) Disconnect negative battery terminal at battery and remove steering wheel. Mask steering jacket tube area and disconnect speedometer cable at speedometer.

2) Slide wiper switch knob off stem and remove headlight switch control knob by pressing knob stem release button on under side of instrument panel (pull button must be in full ON position). Release spring and pull out knob and stem.

3) Remove heater control knob and remove sleeve on heater control lever and four clutch trip plate-to-clutch base screws and remove trip plate.

4) Remove four cluster panel to instrument cluster mounting panel screws and pull cluster forward out of mounting panel, then tilt top of panel downward and roll it over to expose harness, sockets and connectors.

5) Disconnect wire connectors, snap out light sockets and remove cluster assembly.

Installation: Reverse removal procedure.

Cluster Removal (Plymouth): *NOTE - Removal of cluster necessary to service instruments.* 1) Remove negative battery cable at battery. Mask steering jacket tube area and remove heater switch and temperature control knob.

2) Disconnect speedometer cable at speedometer and remove four cluster bezel screws. Pull cluster forward and tilt it downward to expose harness connectors and printed circuit.

3) Disconnect wire connectors, snap out lamp sockets and lead wires to clock and ammeter and remove cluster. Instruments are secured to cluster base by nuts and screws.

Installation: Reverse removal procedure.

CIRCUIT BREAKERS: 30 Ampere - Tailgate Lift, located behind left front kick panel.

22½ Ampere - Headlights, integral with lighting switch.

20 Ampere - Window Lifts, located behind left front kick panel.

6 Ampere - Variable Speed Windshield Wiper, back of wiper switch.

5 Ampere - Single Speed Windshield Wiper, back of wiper switch.

FUSES: 20 Ampere - Heater.

14 Ampere - Cigar Lighter.

9 Ampere - Tail Lights, Parking Lights, Glove Compartment & Trunk Lights, Dome Light & Stop Lights.

7½ Ampere - Radio.

6 Ampere - Back-Up Lights & Rear Window Defroster.

2 Ampere - Instrument Panel Lights & Clock.

NOTE - Fuse block located at bottom edge of instrument panel.

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head, inclined 30° to right, of same design used previously.

►*PLYMOUTH TAXI NOTE:* 170" Engine optional on this model. Specifications below apply to both engines (225" & 170").

Engine	Bore	Stroke	Displacement
225"	3.41"	4.125"	225 cu. ins.
170"	3.41"	3.125"	170 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
225"	8.2-1	27.7	145 at 4000 RPM
170"	8.2-1	27.7	101 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Using tie rod end puller Tool J-3742, remove steering and idler ball joints from steering linkage center link. Remove dust shield. Remove oil pan attaching bolts, then rotate engine crankshaft to clear the counterweights, then remove oil pan.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, slipper type skirt. Thermally controlled by steel strut.

Weight - 16 ozs.

►*OVERSIZE CYLINDER BORE CAUTION:* Letter "A" incorporated in engine number indicates .020" oversize bore.

Removal - Pistons and rods removed from above.

Clearance - .0005-.0015" at top of skirt.

Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure piston at top of skirt at right angles to pin hole, measure cylinder bore halfway down and at right angles to crankshaft.

Installing Pistons - Notch in piston head must be toward front of engine. *See Rod Installation.*

Replacement Pistons: Furnished with pins in Std. size and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

PISTON PIN

Press fit in connecting rod.

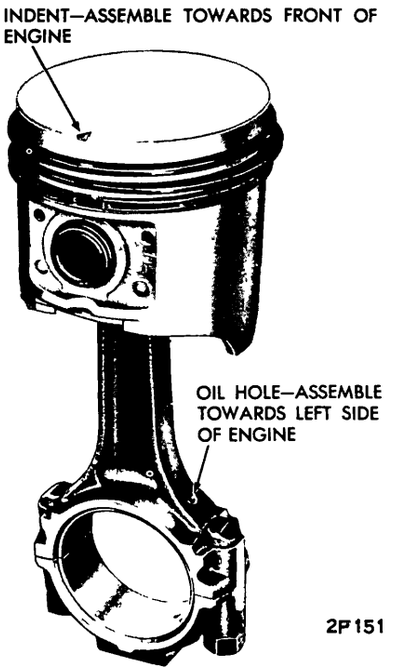
Diameter - .9007-.9009". **Length** - 2.955-2.975".

Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

Pin Fit in Rod - .0007-.0012" Interference fit. Special procedure and tools used for removal & installation. *See "Piston Pins" in Chrysler Corp. Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

CONTINUED ON NEXT PAGE



PISTON ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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PISTON RINGS

Compression rings are cast iron. No. 1 is taper twist, tin plated, No. 2 is reverse twist, taper face, lubrite coated, Oil ring is Cast Iron single piece (170"), 3-piece, two chrome plated rails with stainless steel expander-spacer (225").

Ring	Width	End Gap	Side Clearance
Compr.(1&2)..	.0775-.0780"..	.010-.020"....	.0005-.0040"
Oil (3).....	.1860-.1865"..	.015-.062"....	.0090" Max.

Installing Rings - Mark "Top" on compression rings must be toward top of engine.

Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020-.029", .040-.049".

CONNECTING ROD

Length (Center-to-Center) - 5.707" (170"), 6.699" (225").

Weight - 25.7 ozs. (170"), 27.3 ozs. (225").

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE): See CRANKSHAFT below.*

Piston Pin Bore in Rod - .8995-.9000".

Clearance - .0005-.0015". Wear limit .0025".

Side Clearance - .006-.012".

Bearing Adjustment - None, replace bearings.

Installing Rods - Notch in head of piston must be to front of engine, oil squirt hole in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010", Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505". Taper and out-of-round limit .001".

Bearing Type - Removable, precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-based babbitt on steel.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize crankshaft journals identified as follows:

"MALTESE CROSS" - On Model pad, indicates .001" undersize journals. Location of the undersize journals is indicated by letter "M" (Main journal), or "R" (Connecting Rod Journal) on crankshaft counterweight. *NOTE* - Numbers following letter "M" or "R" indicate which journals undersize.

"X" - On Model Pad indicate .010" undersize crankshaft and crankshaft counterweight will be stamped "M-10" or "R-10" indicating all main or all connecting rod journals .010" undersize.

►*MAIN BEARINB INTERCHANGEABILITY CAUTION:* Upper halves have oil holes, are grooved and are not interchangeable with lower halves. No. 3 bearings are flanged for crankshaft end thrust control. No. 1 upper is chamfered for timing chain lubrication and is marked "Red" on edge. No. 2 & 4 uppers are interchangeable. No. 1, 2 & 4 lowers are interchangeable.

Clearance - .0005-.0015".

End Thrust - Taken by No. 3 (rear intermediate) flanged bearing.

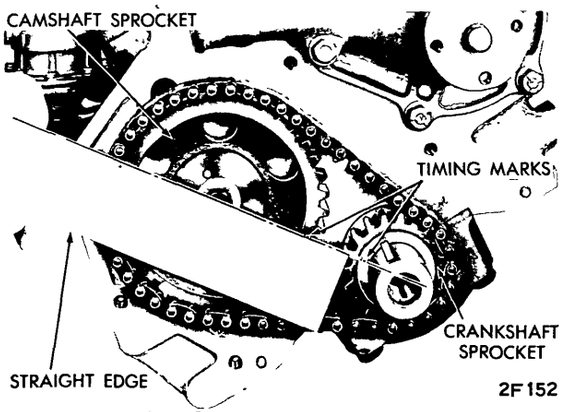
Endplay - .002-.007".

Replacement Bearings: Std. and .001", .002", .010" undersize.

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*



ENGINE VALVE TIMING MARKS

CAMSHAFT

Journal Diameter - (1) 1.998-1.999", (2) 1.982-1.983", (3) 1.967-1.968", (4) 1.951-1.952".

Bearings - Lead based babbitt on steel.

Clearance - .001-.003". Wear Limit - .005".

End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.

Timing Chain: Side guide type. **Width** - .88". **Pitch** - .50". **Length** - 50 links. Replace chain when slack exceeds 11/64". Measure slack by holding crankshaft gear stationary and rotating camshaft in both directions, (use torque wrench on camshaft sprocket bolt). Apply 30 ft. lbs. (with head installed), 15 ft. lbs. (with head removed) turning torque.

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*

Tappet Clearance: .010" intake, .020" exhaust. Hot.

►*OVERSIZE TAPPET NOTE:* A "♦" on Model Pad indicates .008" oversize tappets.

Camshaft Setting: Marks on sprockets must be adjacent and in line across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

Valve	Head Diam.	①Stem Diam.	Length
Intake	1.615-1.625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

Valve	Seat Angle ④	Lift	Stem Clearance
Intake	45°	.375"	②.001-.003"
Exhaust	45°	.360"	③.002-.004"

① - Std. Also furnished .005", .015", .030" Oversize.
② - Wear Limit .004". ③ - Wear Limit .006".
④ - Valve face angle 45° (Int.), 47° (Exh.).

Valve Seat Width: 5/64-3/32" Int., 3/64-1/16" Exh.

Valve Stem Oil Seals: Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valve Springs: Free Length 2".

Valve Spring Specifications

Valve	Pressure	Length
Closed	83 lbs.	1 11/16"
Open	177 lbs.	1 5/16"

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of spring seat in cylinder head to lower face of spring retainer). If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16".

Valve Lifters: Barrel type, removed from above.

Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

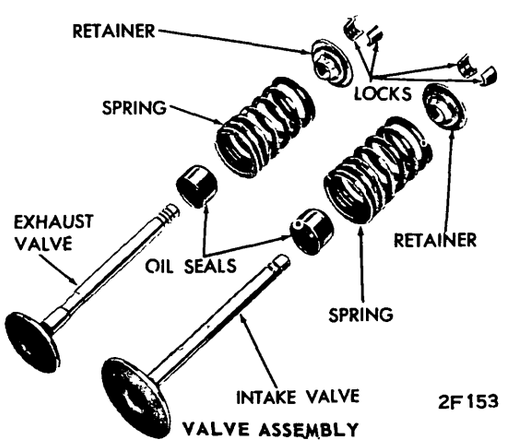
VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 8° BTDC. Close 44° ALDC.
Exhaust Valves - Open 48° BLDC. Close at TDC.

CONTINUED ON NEXT PAGE



VALVE ASSEMBLY

Se INDEXES on Pgs. 4 to 9 for complet CARBURETION, ELECTRICAL, MECHANICAL data.

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Valv Timing Check - Turn crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Install dial indicator so pointer contacts No. 1 intake valve spring retainer parallel to axis of valve stem. Turn No. 1 intake valve adjusting screw one full turn to remove all lash, zero dial indicator and rotate crankshaft clockwise (normal running direction) until valve has lifted .018". Timing on timing tab should read from 12° BTDC to TDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

N rmal Oil Pressure: 45-60 lbs. at 40-50 MPH.

Oil Pressure Relief Valve - Located in pump body.

►*RELIEF VALVE SPRING NOTE:* Three types of springs available. Replace with same color spring, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Indicator light on Instrument panel operated by Oil Pressure Switch Chrysler Corp. No. 2256800. On oil pump on right side of block.

Oil Pump: Rotor type. On right side of crankcase.

Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow type. Replace filter element every 4,000 miles, to correspond with oil changes.

Crankcase Ventilation: (Standard Cars) - Filter in filler cap (air intake) and outlet vent tube extending from rocker arm cover to right rear of engine. Wash filler cap in kerosene and re-oil with SAE No. 30 engine oil every 8,000 miles or more often in dusty areas.

Positive Crankcase Ventilation Cars: Vacuum tube connects outlet breather cap with lower part of throttle body. A ventilation valve is located in outlet vent cap and regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. (170"), 12 qts. (225") Std. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) both summer and winter.

Pr ssur Valv : 14 lb. Std., 16 lb. Air Cond. Cars, pressure radiator filler cap.

Thermostat: Pellet type. In water outlet connection on cylinder head (160°F) No. 2129206, (180°F) 2129205.

Water Pump: Sealed ball bearing, packless type. No lubrication required.

See "Cooling System" in Chrysler Corp. Sp cial Data.

Pump Removal - Drain cooling system and remove fan shroud if equipped with Air Cond. Loosen alternator mounting bracket (to loosen fan belt) and swing alternator in towards water pump. On Air Cond. Cars, loosen idler pulley. Remove pump.

Temperature Gauge: Constant Voltage Type with separate voltage regulator Chrysler Corp. No. 2209216 (Dodge), No. 2258413 (Plymouth) mounted on back of instrument panel.

Dash Unit - Chrysler Corp. No. 2258241 (Dodge), 2257213 (Plymouth).

Engine Unit - Chrysler Corp. No. 2240744 (King-Seeley & Autolite), No. 2256302 (Stewart Warner).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

DODGE DART

Body Styl	Standard	330	440
2-Door Sedan	SD2-L-21	SD2-M-21	
2-Door Hardtop		SD2-M-23	SD2-H-23
Conv. Coupe			SD2-H-27
4-Door Sedan	SD2-L-41	SD2-M-41	SD2-H-41
4-Door Hardtop			SD2-H-43
Sta. Wgn. ①	SD-L-45	SD2-M-45	SD2-H-45
Sta. Wgn. ②		SD2-M-45	SD2-H-45

DODGE POLARA 500		DODGE CUSTOM 880	
2-Door Hardtop	SD2-P-23	2-Door Hardtop	SD3-L-23
Conv. Coupe	SD2-P-27	Conv. Coupe	SD3-L-27
4-Door Hardtop	SD2-P-43	4-Door Sedan	SD3-L-41
		4-Door Hardtop	SD3-L-43
		Sta. Wgn. ①	SD3-L-46
		Sta. Wgn. ②	SD3-L-46

PLYMOUTH (Exc. Sp. Fury)

Body Styl	Savoy	Belvedere	Fury
2-Door Sedan	SP2-L-21	SP2-M-21	SP2-H-21
2-Door Hardtop		SP2-M-23	SP2-H-23
Conv. Coupe			SP2-H-27
4-Door Sedan	SP2-L-41	SP2-M-41	SP2-H-41
4-Door Hardtop			SP2-H-43
Sta. Wgn. ①	SP2-L-45	SP2-M-45	SP2-H-45
Sta. Wgn. ②		SP2-M-45	SP2-H-45

PLYMOUTH (Sport Fury)

Body Styl	
2-Door Hardtop	SP2-P-23
Conv. Coupe	SP2-P-27

① - Six Passenger. ② - Nine Passenger.

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
5 3 2 6 100001

① - 5 Dodge, 3 Plymouth.
② - Car Model. See below.
③ - 2 Year 1962.
④ - Assembly Plant. See below.
⑤ - Starting Serial Number each plant.

Car Model

1 - Std. Dart or Savoy. 2 - Dart 330 or Belvedere.
3 - Dart 440 or Fury. 4 - Polara or Sport Fury.
5 - 6 Pass. Sta. Wgn. Std. Dart or Savoy.
6 - All Sta. Wgn. Dart 330 or Belvedere.
7 - All Sta. Wgn. Dart 440 or Fury.
8 - Police. 9 - Special.

Assembly Plant

1 - Plymouth (Detroit). 2 - Dodge (Detroit). 3 - Jefferson (Detroit). 5 - Los Angeles. 6 - Delaware. 7 - St. Louis.

ENGINE NUMBER: (361") Stamped on right side of block below distributor. Number (example below) includes identification data.

① ② ③ ④
S 36 8 1

① - Year S 1962.
② - 36 First two numbers of cu. in. displacement
③ & ④ - Month and Year built

318" Engine. Stamped on left front of block under cylinder head. Number (example below) includes identification data.

① ② ③
S 318 1001

① - Year S 1962.
② - Displacement 318" 318 cu. in.
③ - Beginning sequence number.

►*ENGINE NUMBER MARKS:* Stamped on Engine No. pad unless specified otherwise. Identified as follows: "A" All cylinder bores .020" oversize.

"Maltese Cross" One or more bearing journals .001" undersize.

361" Engine. "Maltese Cross" & Letter "X" indicates .010" undersize bearings.

318" Engine. Letter "B" following engine number indicates .010" undersize bearings.

318" Engine. Letters "HD" under serial number indicates 10½" clutch.

318" Engine. A "♦" following serial number indicates .008" oversize lifters.

Letters "LC", "HP" or "SP" stamped on Model pad indicate Low Compression, High Performance or Special police engines.

►*OVERSIZE VALVE NOTE:* Letter "E" (Exhaust), "I" (Intake) marked on upper side of exhaust manifold (318" Eng.), on untapped boss on end of cylinder head (361" Eng.) indicates .005" oversize valves.

TUNE-UP

COMPRESSION PRESSURE: 120-125 lbs. (318"), 125-155 lbs. (361") at cranking speed (120 RPM) with engine warm, spark plugs removed and wide open throttle. Maximum variation between cylinders 20 lbs.

VACUUM READING: 19.5" at idling speed.

VALVE TAPPET CLEARANCE: As follows:

Standard Engine

318" Eng. - .013" Int. .020" Exh. Hot. ①
361" Eng. (SD2, SD3) - Hydraulic, Zero lash.

361", 383", 413" Hi-Perf. Engines (One 4-Bbl. or Two 4-Bbl. Runner Carb.)

268° Camshaft - Hydraulic, zero lash.
268° & 276° Camshaft - .016" Int., .028" Exh. Cold.

413 Hi-Perf. Engine (Two 4-Bbl. Carbs. Ram Induction)

284° Camshaft - .016" Int., .028" Exh. Cold.
292° Camshaft - .016" Int., .018" Exh. Cold.
308° Camshaft - .022" Int., .026" Exh. Cold.

413" Super Hi-Perf. Eng.

.028" Int., .032" Exh. Cold.

① - *Supersedes previous specifications.*

►*413" SUPER HI-PERF. ENGINE VALVE TAPPET ADJUSTMENT CAUTION:* Procedure for adjusting tappet clearance on Standard 413" Engine does not apply to this engine. *See 413" Super Hi-Perf. Eng. Tappet Adjustment under VALVE SYSTEM in Chrysler Corp. Special Data.*

MANIFOLD HEAT CONTROL: Thermostatically controlled valve located at exhaust manifold outlet on right side of engine. Valve must operate freely (lubricate with special lubricant Part No. 1879318). Coil spring should have approximately 3/4 turn wrap with manifold heat control in closed position.

CRANKCASE VENTILATION VALVE: Service at 10,000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035" All Normal Driving, .025" Acceleration Trials.
Spark Plugs - **(318")** Autolite A42 or Champion J-12Y. **(361")** Autolite A-42 or Champion J-9Y (Std.). Champion J-12Y (Custom 880). **(383" & 413" Hi Perf.)** Champion J-9Y (Std.), J-7Y (Optl.). **(413" Super Hi-Perf. Eng.)** J-9Y (Std. Driving), J-2Y (Acceleration Trials).

COIL: Autolite No. 200567 or Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling. 3.0 amps. stopped.
Resistor - Chrysler No. 2095501. 0.6 ohms. Connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.

DISTRIBUTOR: Chrysler & Autolite. As follows:

Engine	Distributor No.
318" Synchro-mesh	Chrysler 2095983
318" Auto. Trans.	Chrysler 2095979
318" Pwr. Pack	Chrysler 2095981
361" (Dodge Cust. 880)	Chrysler 2095836
361" (Dodge Polara 500)	Autolite IBS-4006G
361" & 383" Hi Perf.	Autolite IBS-4006G
413" Hi. Perf-	Autolite IBS-4011-A
413" Super Hi-Perf. Eng.	Autolite IBB-4202

NOTE - "IBB" & "IBS" Distributors are double break type.

Condenser - Chrysler No. 2098058 (Chrysler Distr.), No. 1818757 (Autolite Distr.), **Capacity** .25-.285" mfd.
Contact Point Set - Chrysler No. 2098244 (Chrysler Distr.), No. 2299322 (Autolite Distr.).
Breaker Gap - .014-.019".
Cam Angle (Single Breaker) - 27-32° with vacuum line disconnected.
Cam Angle (Double Breaker) - 27-32° (Single set of points), 34-40° (both sets operating together).
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise (318"), Counterclockwise (361") viewed from above.

Automatic Advance - 2095836

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		250-450	0		500-900
0-2		450	0-4		900
2.5-4.5		700	5-9		1400
10.5-12.5		2150	21-25		4300

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Aut matic Advance - 2095983

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		270-430	0		540-860
0-2		430	0-4		860
4.5-6.5		800	9-13		1600
10.5-12.5		2300	21-25		4600

Automatic Advance - 2095979

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		330-570	0		660-1140
0-2		570	0-4		1140
2-4		800	4-8		1600
8-10		2300	18-20		4600

Automatic Advance - 2095981

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		275-425	0		550-850
0-2.5		425	0-5		850
3.5-5.5		625	7-11		1250
7.5-9.5		2200	15-19		4400

Automatic Advance - IBS-4006G

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		275-425	0		550-850
0-3		425	0-6		850
7-9		775	14-18		1550
11-13		2050	22-26		4100

Automatic Advance - IBS-4011-A

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		325-475	0		650-950
0-4		475	0-8		950
4.5-6.5		640	9-13		1280
9-11		2400	18-22		4800

Automatic Advance - IBB-4202

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		500	0		1000
6		750	12		1500
12		1000	24		2000

Vacuum Spark Control: Integral type.

Vacuum Advance - 2095836

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-8.5
6-9	12-18	12
11.5-14.5	23-29	16.5

Vacuum Advance - 2095983

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
5-8	10-16	13
11.5	23	14.7
8.5-11.5	17-23	15.5

Vacuum Advance - 2095979

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
5-8	10-16	13
12-15	24-30	18

Vacuum Advance - 2095981

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4.5-6.2
4-7	8-14	9.5
8.5-11.5	17-23	13.2

Vacuum Advanc - IBS-4006G

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7.5-9.2
4.5-7.5	9-15	12
9.5-12.5	19-25	16

Vacuum Advance - IBS-4011-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7.2-8.9
4.5-9.5	9-15	12
7.5-10.5	15-21	14.5

Distributor Basic Timing & Drive Shaft Bushing: *See "Ignition Notes" in Chrysler Corp. Special Data.*

IGNITION TIMING

Engine	Ignition Setting
318" Synchro-mesh	① 5° BTDC (Range 0-10° BTDC)
318" Auto. Trans.	① 10° BTDC (Range 5-15° BTDC)
318" Pwr. Pack	① 10° BTDC (Range 5-15° BTDC)
361"	① 10° BTDC (Range 5-15° BTDC)
361" & 383" Hi. Perf.	① 10° BTDC
413" (IBS-4011-A Distr.)	① 10° BTDC
413" (IBB-4202 Distr.)	② 10° BTDC

① - At 500 RPM with vacuum line disconnected.
② - At 800 RPM or 34° at 3000 RPM.

Timing Mark (318") - Graduation marks on crankshaft pulley and pointer on chain case cover. Align proper mark on pulley with pointer.

Timing Mark (361", 383", 413") - Mark on vibration damper and graduations on indicator on timing chain cover. Align vibration damper mark with proper mark on indicator.

CARBURETOR

►*CARBURETOR APPLICATION: Carter & Stromberg carburetors used as follows:*

Engine	Carburetor
318" Std.	Carter BBD or Stromberg WW 2-Bbl.
318" Optl.	One Carter AFB 4-Bbl.
361" (Polara)	One Carter AFB 4-Bbl.
361" (Custom 880)	Stromberg WWC 2-Bbl.
383", 413" Hi-Perf	One Carter AFB 4-Bbl.
361", 383", 413"	① Two Carter AFB 4-Bbl.
413"	② Two Carter AFB 4-Bbl.

① - Runner. ② - Ram Induction.

►*ACCELERATOR SHAFT BIND CORRECTION:* Check accelerator shaft and bracket assembly for proper end-play of .030-.070". Correct by bending assembly using a screwdriver as a pry bar.

►*CARBURETOR SAG, STUMBLE, OR SURGE CORRECTION (318" DART or 361" DODGE CUSTOM 880):* When engine Tune-Up does not correct these conditions, *see "Carter BBD" and "Stromberg WW & WWC" Carburetors in Carburetion Section for recommended changes.*

►*ERRATIC CHOKE OPERATION (361" ENGINES WITH 4-BARREL CARBURETOR):* Poor starting, stalling, erratic fast idle speed, and richness or leanness, may be caused by choke connector rod binding in choke housing. Check by disconnecting rod from choke valve lever with engine warmed up. If resistance felt when rod tilted for removal from lever, correct as follows: Remove choke assembly from engine and allow to cool off. Note position of choke coil hooked end, number and location of washers on rod and spring coil, and position of bracket through which rod is fastened. Remove two pin springs and washers, remove thermostat spring and bracket, lift rod out. Use a square and pliers to correct bend in lower end of rod to exactly 90°. Reassemble choke and install on engine. Recheck rod for freedom from bind.

►*IDLE SETTING CAUTIONS:* When making Idle Speed & Mixture adjustments, observe the following: **1)** Turn headlights on to High Beam to compensate for alternator load (alternator charges battery at idle speed). **2)** On automatic transmission cars loosen nut on sliding link of carburetor-to-bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut.

THROTTLE LINKAGE ADJUSTMENT (All Carb.): With all throttle linkage connected except transmission rod ball socket-to-ball end at upper end of rod, disconnect choke at carburetor or block choke valve in full open position and open throttle slightly to release the fast idle cam, then return carburetor to curb idle. With transmission lever against its stop, adjust length of transmission rod (at upper end) so ball socket lines up with ball end without exerting any force on rod. *NOTE - Socket and Rod must be at sam h ight wh n ch cking rod length.* When adjustment correct, assemble ball socket to ball end. The transmission lever will be in its extreme forward position with carburetor at curb idle. When throttle opened transmission lever will also start its travel with no vertical movement of lever or vertical movement of rod in lever. Assemble remainder of throttle linkage with cable clamp loose, and insert a 3/16" rod, 4" long in holes in dash bellcrank and lever assembly. Adjust position of cable housing ferrule in clamp so that all slack is removed from cable with carburetor at curb idle. To remove slack, move cable in clamp in direction away from carburetor lever. Tighten clamp nut, remove 3/16" rod and connect choke rod or remove choke block.

CARTER BBD

Engine	Cart r Carb. N .
318" Synchro-mesh	BBD 3240S
318" Auto. Trans.	BBD 3241S
361"	BBD 3245S

►*MANIFOLD FUEL DISTRIBUTION: Carbur tor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel 1-4-6-7.*
Idle Setting - 1 turn open. Turn idle speed screw in or out to obtain 500 RPM. *NOTE - Chok valve must b wide open and fast idle screw off fast idl cam.* Turn each mixture screw to obtain highest RPM. Readjust to 500 RPM with Idle Speed Screw. Turn each mixture screw clockwise (leaner) until slight drop in RPM, then turn each mixture screw counterclockwise (richer) just enough to regain lost RPM. Readjust idle speed to

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S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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500 RPM. Repeat above procedure if necessary. Move sliding link to rear against stop and tighten nut. **Idl Sp d** - 500 RPM Std. & Air Cond. See *"Idle Setting Cautions" above.*

Float L v l - *NOTE* - Carburetors equipped with synthetic rubber tipped fuel inlet needle and require accurate float adjustment to give best performance and fuel economy. To adjust, proceed as follows: Invert main body so weight of floats **only** is forcing needle against its seat. Fulcrum pin must be fully seated. Use Tool T109-230 or "T" scale placed across inverted bowl at center of floats. Distance from surface of fuel bowl to crown of each float at center should be 9/32". To adjust, hold floats against bottom of bowl and bend float lip toward or away from needle. *CAUTION DO NOT allow lip of float to push against needle while making adjustment. Keep float lip perpendicular to the needle or slanted not more than 10° away from needle when float is set correctly.*

Accel rating Pump - Install connector rod in inner hole of rocker arm and center hole of throttle lever. If connector rod moved to other holes, bowl vent clip must be moved correspondingly.

Fast Idl : 1400 RPM. Turn fast idle adjusting screw. *NOTE* - To align screw with index mark on fast idle cam, bend tang on choke shaft.

Automatic Choke: "Cross-Over" type. Set at Index.

Throttle Linkag Adjustment: *See CARBURETOR above.*

►*OTHER DATA: S "Carter BBD Carburetors" in Carbur tion S ction.*

STROMBERG WW & WWC 2-BARREL

Engin	Stromberg Code No.
318" Synchro-mesh	WW 3-198
318" Auto. Transmission	WW 3-199
318" All Trans. Ⓒ	WW 3-200
361" Dodge Custom 880	WWC 3-201

Ⓒ - Closed Crankcase Ventilation.

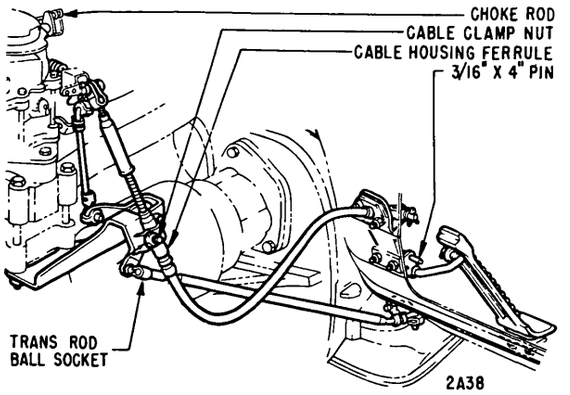
►*STUMBLE ON ACCELERATION OR ENGINE STALL DURING WARM-UP CORRECTION:* Caused by bent pump rocker arm. At normal idle speed (not Fast Idle), vent should be open 1/16" with pump vent clip in middle stroke position. Straighten arm as necessary.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

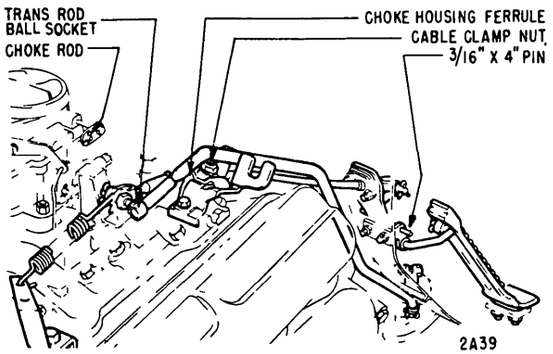
Idl Setting - 1½ turns open. Turn idle speed screw in or out to obtain 500 RPM. *NOTE - Choke valve must be wide open and fast idle screw off fast idle cam.* Turn each mixture screw to obtain highest RPM. Readjust to 500 RPM with Idle Speed Screw. Turn each mixture screw clockwise (leaner) until slight drop in RPM, then turn each mixture screw counterclockwise (richer) just enough to regain lost RPM. Readjust idle speed to 500 RPM. Repeat above procedure if necessary. Move sliding link to rear against stop and tighten nut.

Idle Speed - 500 RPM Std. & Air Cond. *See "Idle Setting Cautions" above.*

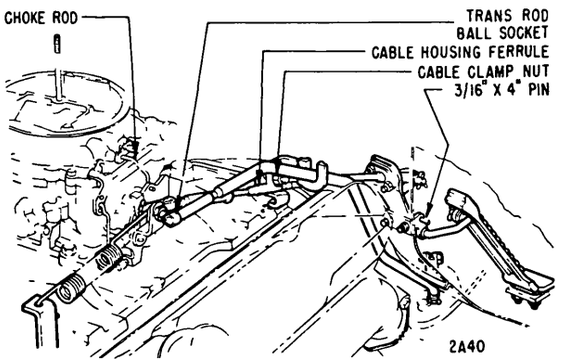
Float Lev l - *NOTE* - Carburetors equipped with synthetic rubber tipped fuel needle and require accurate float adjustment to give best performance and fuel economy. To adjust proceed as follows: Invert main body so weight of floats **nly** is forcing needle against its seat. Fulcrum pin must be fully seated. Use Tool 73725 or "T" scale, place across inverted bowl at center of floats. Distance from surface of fuel bowl (gasket removed) and top of float at center should be 7/32" (except Custom 880), 1/8" (Dodge Custom 880). To adjust, hold the floats against bottom of bowl and bend float lip (Tool 73605) toward or away from needle. *CAUTION - DO NOT allow float to push against needl while making adjustment. K p float lip perpendicular to the needle or slanted not more than 10° away from needle when float is set correctly.*



AUTO. TRANS. THROTTLE LINKAGE ADJUSTMENT (BBD CARB.)



AUTO. TRANS. THROTTLE LINKAGE ADJUSTMENT (WW CARBS.)



AUTO. TRANS. THROTTLE LINKAGE ADJUSTMENT (AFB CARBS.)

Accelerating Pump - Install connector rod in center (medium stroke) of throttle lever. If connector rod moved to other holes, bowl vent clip must be changed correspondingly.

Fast Idle: 1250 RPM (exc. Custom 880), 1400 RPM (Custom 880) with fast idle adjusting screw on top step of fast idle cam.

Automatic Choke: "Cross-Over" type. **All (exc. Cust m 880)** - Centered on Index. **Custom 880** - 2 Points lean (supersedes previous Index setting).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Stromberg WW Carburetors" or "Stromberg WWC Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Engine	Carter Carb. N .
318" Auto. Trans. STD	3247S
318" Auto. Trans. C.C.V. Ⓒ	3249S
361" Synchro-mesh Std.	3252S
361" Auto. Trans. Std.	3253S
361" All Trans. C.C.V. Ⓒ	3257S
383" Hi-Perf.	3437S Ⓒ, 3438S
413" Hi-Perf.	3251S
383" & 413" Hi-Perf. (Large bore)	3397S

Ⓒ - Closed Crankcase Ventilation.

►*EXCESSIVE EARLY WARM-UP RICHNESS OR SMOKING CORRECTION: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

Idle Setting - 1½ turns open. Turn idle speed screw in or out to obtain 500 RPM. *NOTE-Choke valve must b wide open and fast idle screw off fast idle cam.* Turn each mixture screw to obtain highest RPM. Readjust to 500 RPM with Idle Speed Screw. Turn each mixture screw clockwise (leaner) until slight drop in RPM, then turn each mixture screw counterclockwise (richer) just enough to regain lost RPM. Readjust idle speed to 500 RPM. Repeat above procedure if necessary. Move sliding link to rear against stop and tighten nut.

Idle Speed - 500 RPM Std. & Air Cond.; 700-800 RPM Hi-Perf. *See "Idle Setting Cautions" above.*

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Runner - Front & Rear Carburetors)
361", 383", 413" Hi-Perf. Carter No. 2790S or 3258S Front, Carter No. 2791S or 3259S Rear.

Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane. Correct either bent or damaged levers. *NOTE* - Install interconnecting rod with slotted end connected to **lower hole** in **front** carburetor throttle lever, and end connected at **t p h le** of **rear** carburetor throttle lever. Hold **rear** carburetor throttle wide open (choke in

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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full open position) and adjust slotted end of rod so front carburetor throttle valves will also be in wide open position. Tighten locknut and check operation. Interconnecting rod must rotate slightly on pivots without bind in any position.

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting. See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Ram Induction with Two Carburetors)

413" Hi-Perf. & Super Hi-Perf. Two Carter No. 2903S or 3447S. Two used (one on each side of engine).

►*MANIFOLD FUEL DISTRIBUTION: RIGHT carburetor feeds left bank cylinders. LEFT carburetor feeds right bank cylinders.*

►*IDLE SPEED ADJUSTMENT NOTE: Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed on slow idle.*

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw setting. See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage & Carburetor Interconnecting Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter. Used as follows:

Engine	Carter No.	Lbs. Pressure
318" Std.	M-2608S	5-7
318" Air Cond.	M-2611S	5-7
361" Std.	M-2769S	3½-5
361", 383", 413" Hi-Perf.	M-2769S	5-7
413" Super Hi-Perf. Eng.	M-3446S	

Fuel Filter: Paper element type unit located between fuel pump and carburetor. Replace element every 16,000 miles.

Gasoline Gauge: Constant voltage type with separate voltage regulator Chrysler Corp. No. 2209216 (Dodge), No. 2258413 (Plymouth) mounted on back of instrument panel.

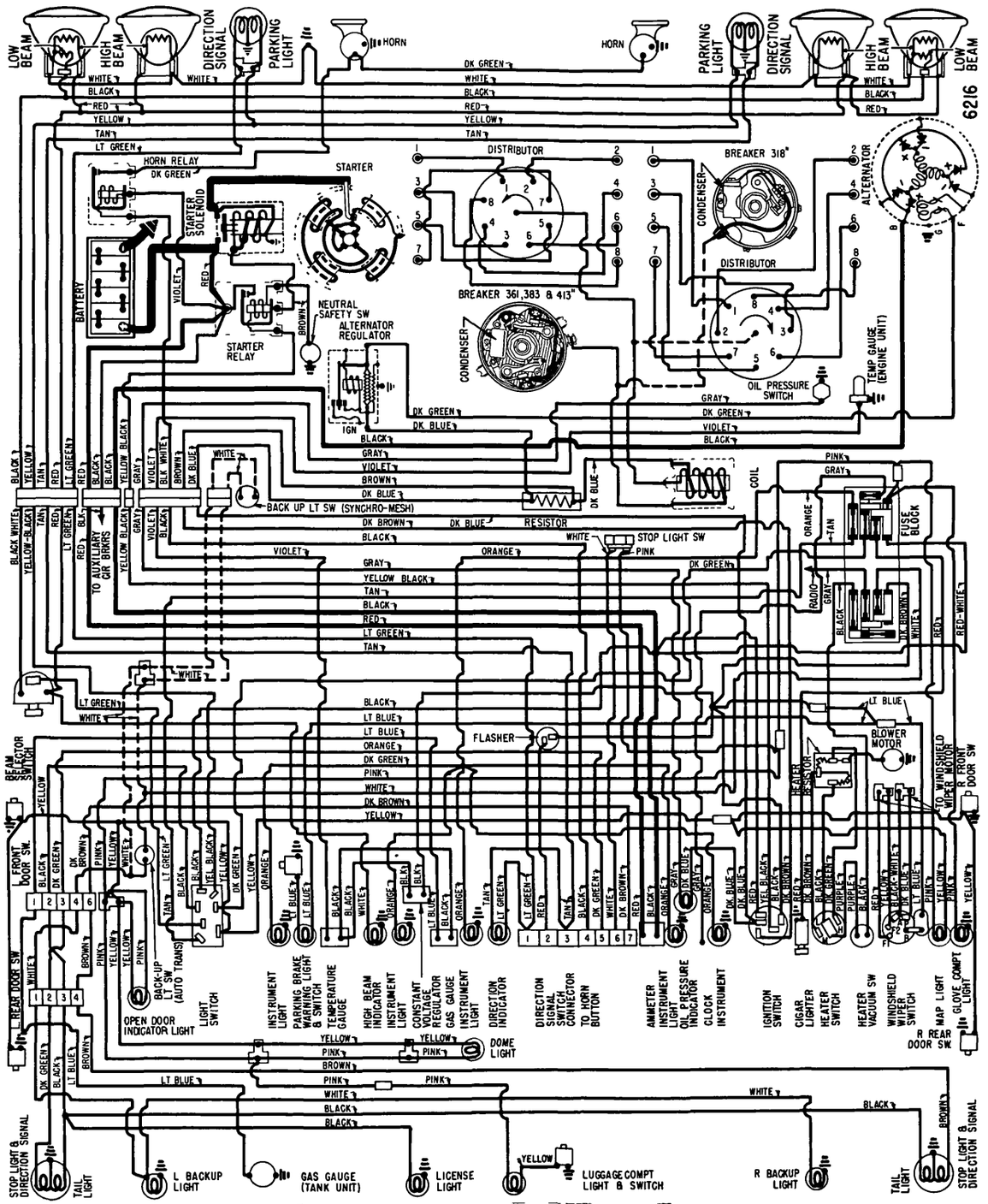
Dash Unit - Chrysler Corp. No. 2258240 (Dodge), No. 2257205 (Plymouth).

Tank Unit - Chrysler Corp. No. 2275589 (Exc. Sub.), No. 2275588 (Suburban).

Air Cleaner: Paper element type. Element should be cleaned as often as necessary not to exceed 8,000 mile intervals. Replace element at 32,000 mile intervals.

►*CLEANING CAUTION:* Clean filter element by blowing out with compressed air from inside surface of element. Hold nozzle 2" away from element to avoid damage. DO NOT oil, lubricate or wash element.

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DODGE (EXC. CUSTOM 880) WIRING DIAGRAM

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BATTERY

318". Autolit 11-HS-48B, Willard MB-24-48, Gould 11B-OE-50. 12 volt, 9 plate, 48 ampere hour capacity (20 hr. rate).
361". Autolite 11-HS-59B, Willard MB-24-49, Gould 11B-OE-59. 12 volt, 11 plate, 59 ampere hour capacity
Battery Ground - Negative.

STARTER

Chrysler Own. No. 1889200 (Custom 880 Synchro-mesh), No. 2095150 (Exc. Custom 880 Synchro-mesh), gear reduction type.

►*DAMAGE TO STARTER CABLE CORRECTION:* Bend battery to starter cable retaining clip up 90° (perpendicular to side rail reinforcement), so cable clears reinforcement.

Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 32-48 ozs.

Performance Data - 1889200

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800	11.0	78
8.5 ft. lbs.	Lock	4.0	350

Performance Data - 2095150

Torque	RPM	Volts	Amperes
0 ft. lbs.	1950	11.0	85
24 ft. lbs.	Lock	4.0	475

Starting Switch: Solenoid Switch No. 1889146 mounted on starter and controlled by combination Starter and Ignition Switch No. 2097628 and Neutral Safety Switch No. 1704283 mounted on automatic transmission.
Neutral Safety Switch Adjustment - *See "TorqueFlite Eight" in Transmission Section.*

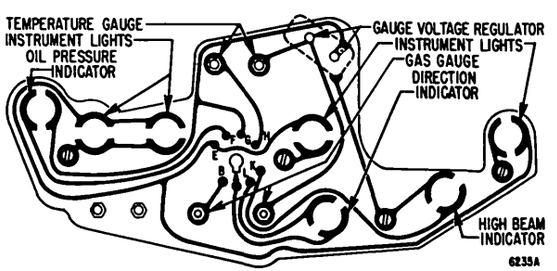
ALTERNATOR

Chrysler Own. Three-phase A.C. unit with full-wave rectifier. Used as follows:

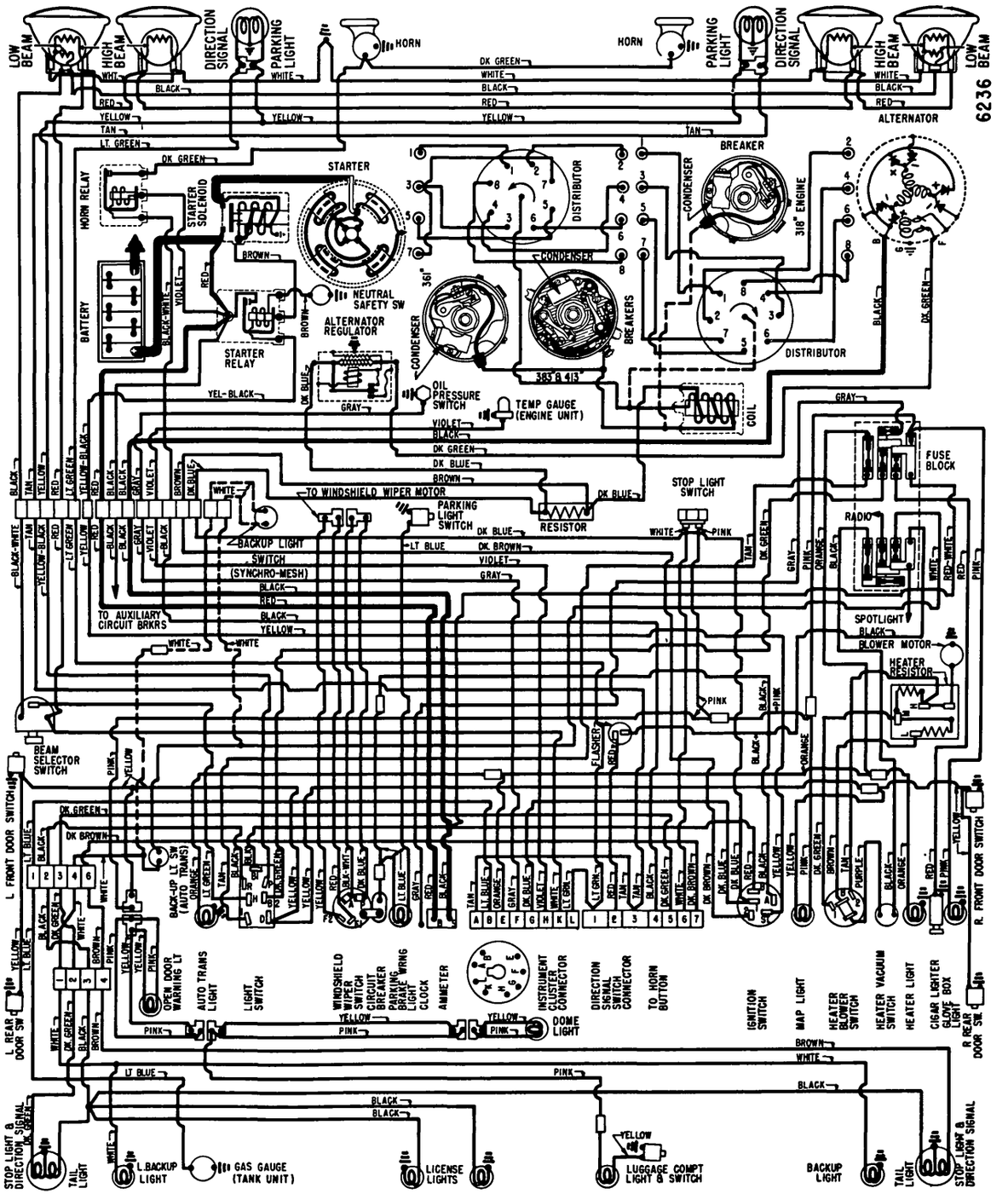
Model	Chrysler No.
All Engines, Std.	2098265
All Engines Air Cond. & Hvy. Duty	2098320

Rotation - Clockwise at drive end.
Rated Output - 35 amperes (2098265), 40 amperes (2098320).
Field Coil Draw - 2.30-2.70 amps. at 12 volts (alternator turned by hand); 3.00-3.50 amps. at 15 volts, 70°F and 750 Alternator RPM.
►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

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PLYMOUTH PRINTED CIRCUIT



PLYMOUTH WIRING DIAGRAM

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Belt Adjustment. Use torque or deflection methods

Belt Torque Specifications

Model	New	③Used
Alternator (318")	50	30
Idler Bracket (318")	75	55
Alternator (361") With Air Cond.	60	40
Alternator (361") Less Air Cond.	60	40
Fan Idler (361")	50	35

Deflection Method ℄

Model	New	③Used
Less Air Cond.	1/8"	1/4"
With Air Cond.	②	1/4"
Fan Idler	1/16"	1/8"

℄ - With 5 lb. load at midpoint of belt.
② - 1/8" (318"), 1/4" (361"). ③ - In use 1/2 hour.

REGULATOR

Chrysler Own. No. 2098300 (All Models). Field control type. No cutout Relay or Current Regulator.
Air Gap - .048-.052". Point Gap - .014-.016".
Voltage Setting - 13.7-14.3 volts at 70°F.

►*OTHER DATA: See "Chrysler Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

Lighting Switch Removal (Dodge): Part of Instrument Cluster. *See "Instrument Cluster Removal" below.*

Lighting Switch Removal (Plymouth): Disconnect battery. Pull switch knob out and rotate until flat on shaft is down. Push knob in all the way. Disconnect wires, press spring loaded release button on top center of switch, and pull shaft and knob out of switch. Remove switch mounting bezel on instrument panel and remove switch.

Stop Light Switch Location: Mechanical type, mounted on brake pedal lever bracket.

Adjustment - Adjust position of switch so stop light goes ON in the first 1/8" of pedal pushrod travel.

Cluster Removal (Dodge): *NOTE - Removal of cluster necessary to service instruments.* 1) Disconnect negative battery terminal at battery, and remove steering wheel. Mask steering jacket tube area and disconnect speedometer cable at speedometer.

2) Slide wiper switch knob off stem and remove headlight switch control knob by pressing knob stem release button on under side of instrument panel (pull button must be in full ON position), release spring and pull out knob and stem.

3) Remove heater control knob and remove sleeve on heater control lever and four clutch trip plate-to-clutch base screws and remove trip plate.

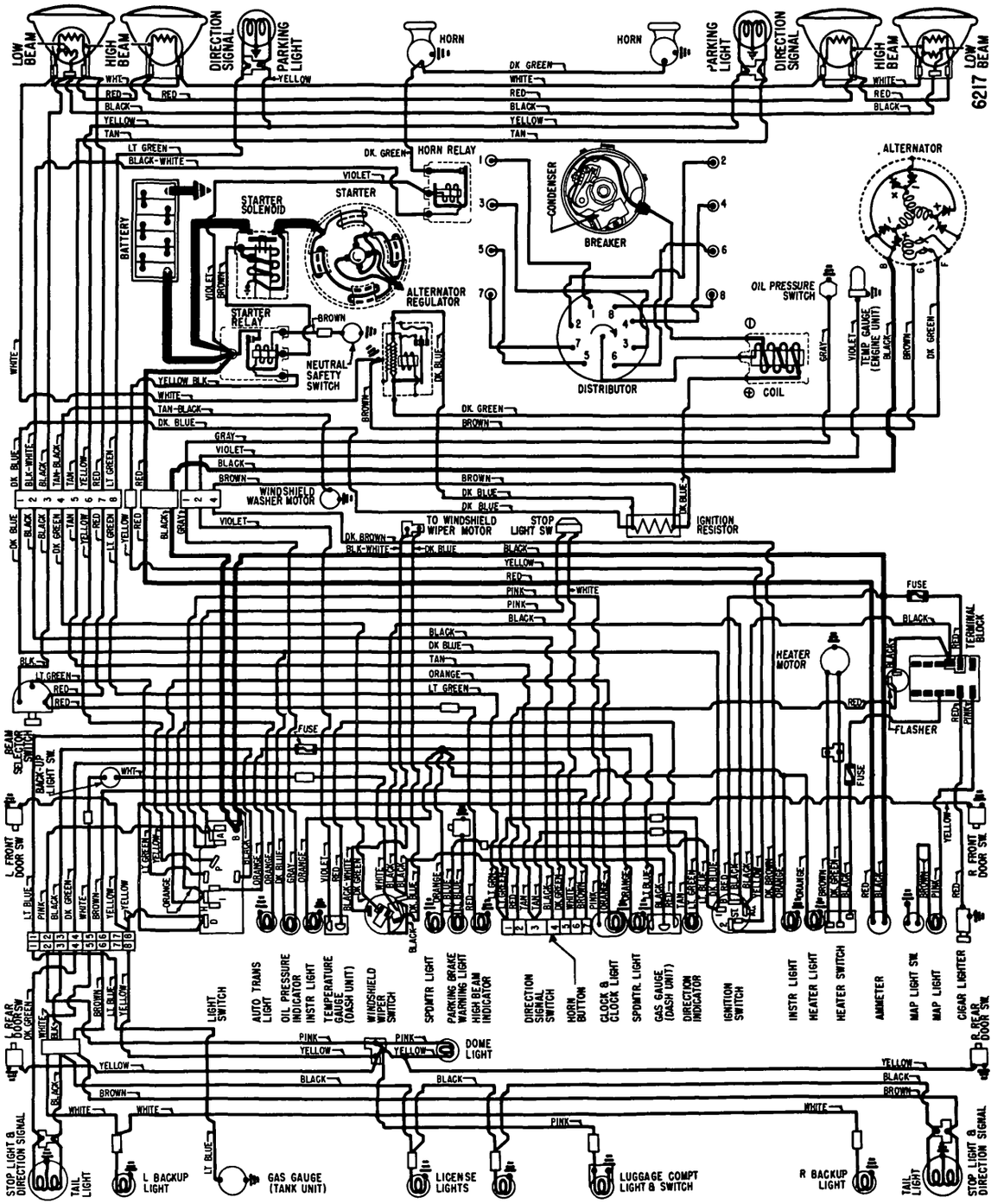
4) Remove four cluster panel-to-instrument cluster mounting panel screws and pull cluster forward out of mounting panel, then tilt top of panel downward and roll it over to expose harness, sockets and connectors.

5) Disconnect wire connectors, snap out light sockets and remove cluster assembly.

Installation - Reverse removal procedure.

Speedometer Removal (Dodge): See Cluster Removal above, then remove speedometer attaching screws at rear of base.

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DODGE CUSTOM 880 WIRING DIAGRAM

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Installation - Reverse removal procedure.

Clust r R moval (Plym uth): *NOTE - R moval f clust r n c ssary t s rvic instruments.* 1) Remove negative battery cable at battery. Mask steering jacket tube area and remove heater blower switch and temperature control knobs.

2) Disconnect speedometer cable at speedometer and remove four cluster bezel screws. Pull cluster forward and tilt it downward to expose harness, connectors and printed circuit.

3) Disconnect wire connectors, snap out lamp sockets and lead wires to clock and ammeter, then remove cluster. Instruments are secured to cluster base by nuts or screws.

Installati n - Reverse removal procedure.

CIRCUIT BREAKERS: 22.5 Ampere. In headlight switch, protects headlamps & High Beam Indicator.

6 Amper . Variable Speed Windshield wiper, **5 Ampere** Single Speed Wiper. On back of wiper switch.

FUSES: *NOTE* - Fuse block located at left of Glove Compartment and secured to under side of instrument panel.

9 Amp r . Parking, Tail, License Plate, Stop, Dome & Glove Compartment lights.

2 Amp r . Instrument, Clock, Parking Brake lights and Clock.

6 Amp r . Back-Up Lights.

20 Amp r . Heater.

14 Ampere. Cigar Lighter.

ENGINE

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head 318", 361", 383" & 413" engines of same design used previously.

Engin	B r	Stroke	Displacement
318"	3.910"	3.3 10"	318 cu. in.
361"	4.125"	3.375"	361 cu. in.
383"	4.250"	3.375"	383 cu. in.
413"	4.190"	3.750"	413 cu. in.

Engin	Compr. Rati	Rated HP	Developed HP
318" ①	9.0-1	48.9	230 at 4400 RPM
318" ②	9.0-1	48.9	260 at 4400 RPM
361" ③	9.0-1	54.3	305 at 4800 RPM
361" ④	9.0-1	54.3	265 at 4400 RPM
361" ⑥	9.0-1	54.3	310 at 5200 RPM
383" ⑤	10.0-1	57.8	330 at 4600 RPM
383" ⑥	10.0-1	57.8	335 at 5200 RPM
413" ⑤	11.0-1 ⑧	55.9	365 at 4600 RPM
413" ⑥	11.0-1 ⑧	55.9	385 at 5200 RPM
413" ⑦	11.0-1 ⑧	55.9	410 at 5400 RPM

① - 2-Bbl. Std. Dodge Dart, Dart 300 & 400; Plymouth Savoy, Belvedere & Fury.

② - One 4-Bbl. Pwr. Pkg. Dodge Dart, Dart 300 & 400; Plymouth Savoy, Belvedere & Fury.

③ - One 4-Bbl. Dodge Polara 500, Plymouth Sport Fury; & D-500 & Plymouth Golden Commando Engines.

④ - One 2-Bbl. Dodge Custom 880.

⑤ - Hi-Perf. Optl. Engine (One 4-Bbl. Carb.).

⑥ - Hi-Perf. Optl. Engine (Two 4-Bbl. Carb. Runner).

⑦ - Hi-Perf. Optl. Engine (Two 4-Bbl. Carb. Ram).

⑧ - Optl. Compression Ratio 13.5-1.

C mpr ssion & Vacuum R ading - See *TUNE-UP.*

►*361" & 383" ENGINE VIBRATION CORRECTION (AIR COND. CARS):* Install a brace (fabricated from 1" x 1" angle iron or ½" x ½" bar stock) from right hand compressor head to rear of ignition coil mounting pad. It may be necessary to fabricate a triangle plate to mount ignition coil after brace installed.

►*30-35 & 55-65 MPH NOISE CORRECTION (318" Eng. with Auto. Trans.):* When noise is similar to rear axle gear, torque converter, air cleaner or wind noise at crankshaft torsional period, install parts as follows:

Item	Less Air Cond.	With Air Cond.
Damper	2402090	
Pulley	1821411	1855152
Indicator	1947236	
Bolt (5/16"x18x3/4)	Six 180077	
Lockwasher	Six 120214	
Screw	One 1821414	

►*ROUGH IDLE CORRECTION (318" Eng.):* When abnormal roughness occurs after engine tuned to specifications, perform the following service operations: 1) Tighten intake manifold bolts to 35 ft. lbs. 2) Check complete intake system for air leaks. 3) Set tappets to .013" intake, .021" exhaust (at operating temperature). 4) Adjust engine idle speed to 550 RPM in neutral with transmission rod disconnected. 5) Adjust mixture screws to obtain maximum smoothness in neutral. 6) Adjust transmission rod.

►*ENGINE OIL LEVEL CHECK (Early 318" Eng.):* When 4-quart refill (5-quart with filter), brings oil level on dipstick (engines prior to No. S318-55281) above "Full Mark", dipstick should be reworked for correct position for both "Full" and "Add Oil" marks or dipstick replaced with Part No. 2202921.

►*ENGINE OIL LEVEL CHECK (361" Eng.):* When 4-quart refill (5-quart with filter change) brings oil level on dipstick above "Full" mark, dipstick should be reworked for correct position for both "Full" and "Add Oil" marks or dipstick replaced with Part No. 2402227.

►*EXHAUST OIL SMOKE ON STARTING OR AFTER EXTENDED IDLING (1961-62 318" V8 ENGINES BEFORE NO. S318-45889):* Caused by oil entering combustion chamber through exhaust valve guides. Can be corrected by installing special flat type seals, Part No. 2402178, on exhaust valve stems above valve guide. Seals can be installed without removing cylinder head by using compressed air to hold valves up with springs removed. *NOTE* - Regular cup type seals (as used on intake valves and all valves on later engines) cannot be installed on these engines as guide bosses are not machined to take these seals. *See Cylinder Head Production Change Note following.*

►*318" V8 ENGINE CYLINDER HEAD PRODUCTION CHANGE:* Beginning with Engine No. S318-45889, a new cylinder head with machined exhaust valve guide bosses for the installation of "cupped" type valve stem seals was used in production. This cylinder head, No. 2402116, must be used with head gasket, No. 2268376, and cup type valve stem seals are used on all valve stems. Seals are Part No. 2128977. *NOTE* - Flat type exhaust valve stem seals can be used on this engine (see Exhaust Oil Smoke Correction above), but these cup type seals cannot be used on earlier engines.

►*413" SUPER HI-PERF. ENGINE INTAKE MANIFOLD BOLT IDENTIFICATION:* Length of the bolt (tip to under head) for each attaching bolt is indicated by a number located on intake manifold near each access hole to aid in proper installation.

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL (318"): Disconnect battery ground at battery and remove dipstick. Raise car, drain oil and remove engine to torque converter housing brace. Remove exhaust cross-over pipe from exhaust manifolds and leave it hang from muffler (unnecessary with dual exhaust). Remove steering and idler arm ball joints from steering linkage center link, then remove oil pan bolts and oil pan.

OIL PAN REMOVAL (361"): Disconnect battery ground at battery and remove dipstick. Raise car on hoist and drain oil. Remove steering and idler arm ball joints from steering linkage center link, then remove oil pan bolts and oil pan.

PISTONS

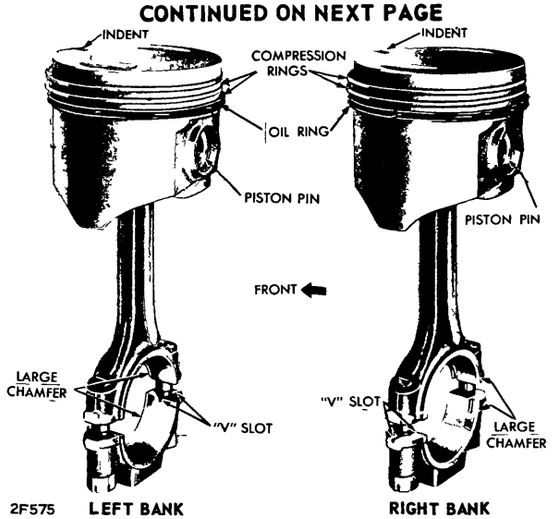
Cast Aluminum alloy, elliptically turned, tin-plated thermally controlled by steel strut (Std.), Forged Aluminum alloy, domed, trunk-type, elliptically turned (Optional on 413" Hi-Perf. Engine).

►*CYLINDER BORE OVERSIZE NOTE:* Letter "A" within engine number indicates all cylinder bores are .020" oversize.

Removal - Pistons & rods removed from above.

Fitting New Pistons: (318") - Clearance should be .0005-.0015" on thrust side at top of skirt. With .0015" x ½" feeler inserted between cylinder wall and piston at

CONTINUED ON NEXT PAGE



PISTON & ROD ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

thrust face, pull required to withdraw feeler should be 5-10 lbs.

(361", 383", 413") - Clearance should be .0003-.0013" between thrust face of piston and cylinder wall, measured at top of skirt on piston and halfway down cylinder wall crosswise of engine.

Installing Pistons: Notch in piston head must be toward front of engine. Assemble piston to rod with notch on same side as large chamfer on lower end of connecting rod (left bank cylinders 1-3-5-7), with notch on side opposite to large chamfer at lower end on connecting rod (right bank cylinders 2-4-6-8). *See Rod Installation.*

PISTON PIN

318" Engine - Floating type with lock ring at each end.
361", 383", 413" Engines - Pin is press fit in connecting rod and special removal and installation procedure required.

Diameter - .9842" (318"), 1.094" (361", 383", 413").
Clearance in Piston: .0001-.0004" (318"), .00035-.00075" (361", 383", 413"). Thumb press fit at 70°F.
Clearance in Rod: .0001-.0004" (318"), thumb press fit in rod at 70°F. .0007-.0012" (361", 383", 413") interference fit.
Piston Pin Removal & Installation (361", 383", 413"): *See "Piston Pins" in Chrysler Corp. Special Data.*
Replacement Pins: Std. and .003", .008" Oversize (318"), Furnished only with new pistons (361", 383", 413").

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.078"	Ⓒ	.015-.0030"
Oil (3)	.186"	Ⓒ	.0010-.009"

Ⓒ - .010-.020" (318"), .013-.025" (361", 383", 413").

Installing Rings: Install compression rings with "Top" mark toward top of piston.
Replacement Rings: Furnished in oversize sets with ranges of Std. to .009", .020-.029", & .040-.049".

CONNECTING ROD

Length (Center-to-Center) - 6.123" (318"), 6.36" (361" & 383"), 6.77" (413").
Weight - 25.6 ozs. (318"), 28.6 ozs. (361" & 383"), 29.8 ozs. (413").
Crankpin Journal Diameter - 2.124-2.125" (318"), 2.374-2.375" (361", 383" & 413").
►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals Machined UNDERSIZE):* See CRANKSHAFT below.
Lower Bearing - Removable precision type. Bi-metal Grid (318"), Lead base babbitt on steel (361", 383" & 413").

Clearance - .0005-.0015". Wear limit .0025". All Engines.
Sideplay - .006-.014" (318"), .009-.017" (361", 383" & 413"). Total for both rods.

Installing Rods: With pistons correctly installed on connecting rod (see PISTONS above), larger chamfer on lower end of rod should be installed toward nearest crankshaft journal fillet. Oil grooves in rod and bearing cap must be together.
Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

CRANKSHAFT

Journal Diameter: (318") 2.4995-2.5005". (361") 2.6245-2.6225", (413") 2.7490-2.7500.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION: Engines with undersize journals identified as follows:*
.001" UNDERSIZE - Indicated by "Maltese Cross" on engine number pad. Position of undersize Main Journals is stamped on No. 2 counterweight, and position of undersize Connecting Rod Journals is stamped on No. 3 counterweight. Connecting rod journals will be identified by letter "R" and main journals by letter "M". The numbers following letter "R" and "M" indicate journal number.

Bearings - Removable precision type. Tin based babbitt on steel (No. 3 thrust bearing), lead based babbitt on steel (Others). *NOTE* - Copper-lead babbitt bearings optional on Hi-Perf. engines.
Clearance - .0005-.0015" Std. bearings, .010-.025" optional Hi-Perf. engine bearings.
Replacement Bearings: Std. & .001", .002", .003", .010", .012" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Upper and lower halves of any bearing are not interchangeable. No. 3 bearing is not interchangeable with other bearings. On 318" engine, No. 5 is not interchangeable with other bearings.

End Thrust: Taken by flanged No. 3 (center) main bearing.
Endplay - .002-.007".
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

CAMSHAFT

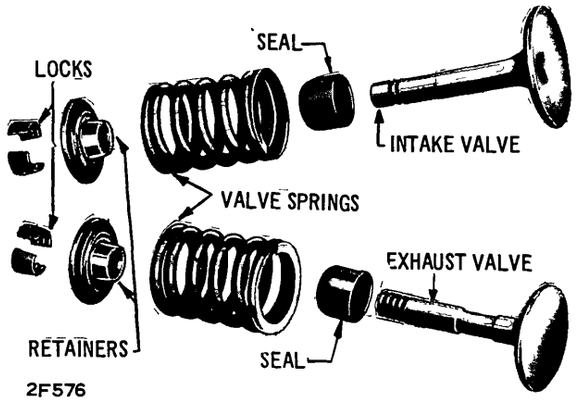
►*CAMSHAFT USAGE NOTE:* Various camshafts used. For identification, standard camshafts will show model application, optional camshafts (Hi-Perf. Engines) will be designated as Camshaft Options 268°, 284°, 292°, 308° and qualified by carburetion used. *See Valve Lift, Valve Springs & Valve Timing below.*
►*CAMSHAFT PRODUCTION CHANGE (318" Eng.):* Camshafts Part Nos. 2268990 (Std.), 2268991 (Pwr. Pack) used in production with engine Nos. S318-83038 (Std.), S318-89994 (Pwr. Pack) have eliminated need for use of spacer No. 1618717. Use these camshafts for replacements, discarding old spacer.

Journal Diameter: (1) 1.998-1.999". (2) 1.982-1.983", (3) 1.967-1.968". (4) 1.951-1.952". (5) 1.5605-1.5615" (318"), 1.748-1.749" (361", 383", & 413").
Bearing Diameter: (1) 2.000-2.001". (2) 1.984-1.985". (3) 1.969-1.970". (4) 1.953-1.954". (5) 1.5625-1.5635" (318"), 1.750-1.751" (361", 383" & 413").
Bearings - Removable, lead base babbitt on steel.
Clearance - .001-.003". Wear limit .005".
End Thrust (318"): Taken by thrust plate behind camshaft sprocket hub. **Endplay** - .002-.006". Wear limit .010".
End Thrust (361", 383" & 413"): Controlled by camshaft sprocket hub riding against front face of cylinder block.

Timing Chain (318"): Width 1.02". Pitch .375". Length 68 links.
Timing Chain (361", 383" & 413"): Width .88". Pitch .50" Length 50 links.
Camshaft Setting: Marks on sprockets adjacent and in line with straightedge across shaft centers.
Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

►*OVERSIZE VALVE STEM NOTE:* Letter "E" (Exhaust), "I" (Intake) marked on upper side of exhaust manifold (318" Eng.) on untapped boss on end of cylinder head (361" Eng.) indicates .005" oversize valves.



VALVE ASSEMBLY

318" Engin

Valve	Head Diameter	Stem Diam ter	⑥L ngth
Intake	1.844"	.372-.373"	4.51"
Exhaust	1.563"	.371-.372"	4.45"

Valve	Seat Angle	Lift	St m Cl arance
Intake	45°	Ⓒ	③.001-.003"
Exhaust	45°	②	④.002-.004"

361", 383" & 413" Engines

Valve	Head Diameter	St m Diameter	⑥L ngth
Intake	2.08"	.372-.373"	4.79"
Exhaust	Ⓒ	.371-.372"	4.79"

Valve	Seat Angle	Lift	St m Clearanc
Intake	45°	⑤	③.001-.003"
Exhaust	45°	⑤	④.002-.004"

Ⓒ - .380" (2-Bbl. Carb.), .400" (Pwr. Pkg.).
② - .386" (2-Bbl. Carb.), .406" (Pwr. Pkg.).
③ - Wear limit .004". ④ - Wear limit .006".
⑤ - 361" Eng. .390" Int. & Exh. 268° .449" Int. .456" Exh.
276° .450" Int. .455" Exh. 284° .449" Int., .454" Exh.
292° .490" Int. & Exh. 308° .520" Int. & Exh.

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413" Super Hi-Perf. Engine - .507" Intake & Exhaust (Zero Lash).
℄ - To center of valve face.
℃ - 1.60" Std., 1.74" or 1.88" Optl.
Valve Seat Width - 1/16"-3/32" Int., 3/64"-1/16" Exh.
Valve Stem Oil Seals - Cup type used on all valves except early production 318" Exh. *See "318" Cylinder Head Production Change" above.*

►*VALVE GRINDING CAUTION:* Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylinder gauge), grind tip down to approach, but do not go below, minimum height (slotted area on gauge).

Valve Springs: Damper used with single spring all engines
►*VALVE SPRING SPECIFICATION NOTE (318" Eng.):* Early valve spring (.192" wire) and later spring (.182" wire) are completely interchangeable in sets or intermixed.

318" Engine (Early)

Valve	Pressure	Length
Closed	83 lbs.	1.69"
Open	177 lbs.	1.31"

318" Engine (Later)

Valve	Pressure	Length
Closed	53 lbs.	1.69"
Open	143.5 lbs.	1.31"

361 Engine Std.

Valve	Pressure	Length
Closed	100 lbs.	1.86"
Open	195 lbs.	1.47"

361", 383", 413" Engines (4-Bbl. & Two 4-Bbl. Carburetors)
(Hyd. Lifters & 268° & 276° Camshafts & 413" Two 4-Bbl. Ram 284° Camshaft)

Valve	Pressure	Length
Closed	100 lbs.	1.86"
Open	195 lbs.	1.47"

Optional

Valve	Pressure	Length
Closed	90 lbs.	1.86"
Open	226 lbs.	1.43"

413" Engine (Two 4-Bbl. Ram Manifold) (292° & 308° Camshafts)

Valve	Pressure	Length
Closed	90 lbs.	1.86"
Open	226 lbs.	1.43"

Optional No. 1

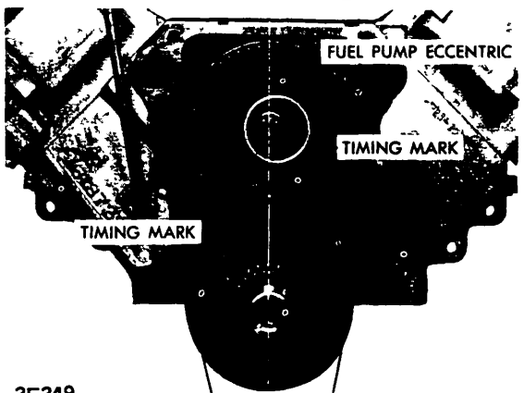
Valve	Pressure-Outer-Length	Pressure-Inner-Length
Closed	95 lbs. 1.86"	30 lbs. 1.56"
Open	261 lbs. 1.36"	77 lbs. 1.13"

Option No. 2

Valve	Pressure	Length
Closed	120 lbs.	1.86"
Open	305 lbs.	1.39"

Spring Free Length - 2.38" (361"), 2.34" (383" & 413").
Spring Installation (361", 383", 413") - Install all springs with closed coil end toward cylinder head.

Valve Guides: Guides are cast integral with cylinder head. When clearance is excessive, ream guides and install valves with oversize stems. Valves furnished with .005", .015" & .030" oversize stems. Use Tool C-3433 (.005" OS), C-3430 (.015" OS), C-3427 (.030" OS) to ream guides in progressive steps.
►*OVERSIZE VALVE STEM IDENTIFICATION NOTE (318" Eng.):* "I" or "E" on boss above nearest appropriate valve guide indicates that valve is .005" Oversize.
►*PUSHROD INSTALLATION CAUTION:* Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.
Hydraulic Valve Lifters: Used on D-500, Polara 500, Custom 880, Golden Commando & 361", 383", 413" engines with 4-Bbl. and two 4-Bbl. Runner Carburetors. Mechanical lifters used with optional camshafts on 361", 383" & 413" engines.
►*OVERSIZE LIFTER NOTE:* A "♦" on engine serial number pad indicates that lifters are .008" oversize. If only certain lifters are oversize, the diamond will be placed on lifter boss facing engine centerline. These oversize lifters will also have notches on top surface of lifter body.
Diameter - .9040-.9045". **Clearance** - .0005-.0018".
Replacement Lifters: Furnished Std. & .001", .008", .030" oversize.
Lifter Overhaul & Testing: *See "Valve System" in Chrysler Corp. Special Data.*
Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*



318" ENGINE VALVE TIMING MARKS

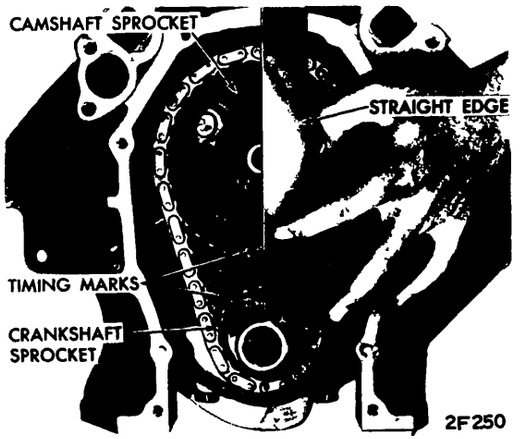
VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

℄ Valve Timing Specifications

(318" Standard)
Intake Valves - Open 19° BTDC. Close 45° ALDC.
Exhaust Valves - Open 57° BLDC. Close 1° ATDC.

(318" Pwr. Pack)
Intake Valves - Open 13° BTDC. Close 55° ALDC.
Exhaust Valves - Open 51° BLDC. Close 17° ATDC.



361", 383" & 413" ENGINES VALVE TIMING MARK

(361" Polara, Custom 880, D-500 & Golden Command)
Intake Valves - Open 13° BTDC. Close 59° ALDC.
Exhaust Valves - Open 59° BLDC. Close 13° ATDC.

361", 383", 413" Hi-Perf. Engines (4-Bbl. & Two 4-Bbl. Runner)
(Hydraulic & Mechanical Lifters 268° Camshaft)
Intake Valves - Open 22° BTDC. Close 66° ALDC.
Exhaust Valves - Open 62° BLDC. Close 26° ATDC.

(Mechanical Lifters 276° Optl. Camshaft)
Intake Valves - Open 24° BTDC. Close 72° ALDC.
Exhaust Valves - Open 62° BLDC. Close 34° ATDC.

413" Engine (Two 4-Bbl. Ram Manifold) (284° Optl. Camshaft)
Intake Valves - Open 25° BTDC. Close 79° ALDC.
Exhaust Valves - Open 74° BLDC. Close 30° ATDC.

(292° Optl. Camshaft)
Intake Valves - Open 31° BTDC. Close 81° ALDC.
Exhaust Valves - Open 76° BLDC. Close 36° ATDC.

(308° Optl. Camshaft)
Intake Valves - Open 43° BTDC. Close 85° ALDC.
Exhaust Valves - Open 83° BLDC. Close 45° ATDC.

℃ - With valve train solid (Hydraulic Lifters).

VALVE TIMING CHECK (318"): Rotate crankshaft until No. 6 exhaust valve is closing and the No. 6 intake valve is opening. Install a dial indicator on No. 1 intake valve so indicator plunger contacts spring retainer as nearly perpendicular as possible. Turn No. 1 intake valve adjusting screw in one full turn. Adjust indicator to zero. Turn crankshaft clockwise until valve has lifted as shown in table below. Timing on indicator should read from 10° BTDC to 2° ATDC.

(361") - Rotate crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Insert a 1/4" spacer between rocker arm pad and stem of No. 1 intake valve (second valve on left bank). Install dial indicator so plunger contacts valve spring retainer as nearly perpendicular as possible. Allow spring load

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S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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to bleed down lifter to provide a solid lifter. Turn crankshaft in normal running direction until valve has lifted as shown in table below. Timing on timing indicator should read from 10° BTDC to 2° ATDC. *CAUTION* - Remove spacer before turning crankshaft any further in normal direction.

Valve Timing Check Specifications

Engine	Valve Lift
318" Standard	.033"
318" Pwr. Pack	.024"
361"	.034"

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

Crankcase Capacity: 4 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 45-65 lbs. at 2000 RPM.

Oil Pressure Relief Valve - Mounted in oil pump. For various springs used, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Warning light on instrument panel operated by Oil Pressure Switch Part No. 1818830.

Oil Pump (318"): Mounted on rear main bearing cap. Rotor type with strainer mounted on pump body. Strainer must be installed parallel with bottom of cylinder block.

Oil Pump (361",383",413"): Rotor type mounted on cylinder block at lower left front side of engine. **Pump Overhaul (All Pumps):** *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter (318"): Partial flow type. Replace filter element every 4000 miles to coincide with engine oil change.

Oil Filter (361",383",413"): Full-flow disposable type. Replace filter element every 4000 miles to coincide with engine oil change.

►*OIL FILTER REPLACEMENT CAUTION (361", 383", 413"):* Use only Filter Element Part No. 1851658 for service replacement. Before installing, make sure that drain-back valve is free by unseating valve with a blunt instrument inserted in four holes in oil filter base.

►*OIL FILTER INSTALLATION CAUTION (361", 383", 413"):* Screw new filter on base until gasket contacts base. Tighten ½-turn additional by hand. DO NOT overtighten.

Crankcase Ventilation (Standard Cars): Filter element in crankcase filler cap and breather tube in right valve rocker arm cover. Clean filter in filler cap every 5000 miles or sooner under heavy dust conditions.

Positive Crankcase Ventilation Cars - Breather tube replaced by tube connecting breather tube with lower part of carburetor throttle body. Ventilation valve located in outlet vent cap regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 20 qts. (318"), 16 qts. (361", 383" & 413"). Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of plus 15°F both summer and winter.

Pressure Valve: 14 lb. radiator cap (Std.), 16 lb. (Air Cond.).

Thermostat: Pellet type. In water outlet connection on cylinder head. Opens at 180°F.

Water Pump: Sealed ball bearing type. No lubrication required.
See "Cooling System" in Chrysler Corp. Special Data.

Pump Removal - Drain system, remove shroud (Air Cond. Cars), then loosen fan belt on Air Cond. Cars loosen idler pulley. Remove fan, spacer and pulley. Remove pump to housing retainer bolts and remove pump.

Fluid Fan Drive: Used on Air Conditioned Cars.

Temperature Gauge: Constant voltage type with voltage regulator Chrysler Corp. No. 2209216 (Dodge), No. 2258413 (Plymouth) mounted on back of instrument panel.

Dash Unit - Chrysler Corp. No. 2258241 (Dodge) No. 2258413 (Plymouth).

Engine Unit - Chrysler Corp. No. 2240744 (King-Seeley & Autolite), No. 2256302 (Stewart Warner).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

DODGE LANCER

Body Style	Series 170	Series 770	Series GT
2-Door Sedan	SL1-L-21	SL1-H-21	
2-Door Hardtop			SL1-P-23
4-Door Sedan	SL1-L-41	SL1-H-41	
4-Door Sta. Wgn.	SL1-L-45	SL1-H-45	

VALIANT

Body Style	Series V100	Series V200	Signet 200
2-Door Sedan	SV1-L-21	SV1-H-21	
2-Door Hardtop			SV1-P-23
4-Door Sedan	SV1-L-41	SV1-H-41	
4-Door Sta. Wgn.	SV1-L-45	SV1-H-45	

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
1 3 2 1 100001

① - Car Make 1 Valiant. 7 Lancer.
② - Model Series. 1 2 & 4-Door Sedan (Series 170 & V100). 2 2 & 4-Door Sedan (Series 770 & V200). 4 2-Door Hardtop (Series GT & Signet 200). 5 4-Door Sta. Wgn. (Series 170 & V100).. 7 4-Door Sta. Wgn. (Series 770 & V200).
③ - Model year. 2 1962.
④ - Assembly Plant. 1 or 2 (Valiant) Detroit. 2 or 3 (Lancer) Detroit. 5 Los Angeles. 6 Newark. 7 (Valiant) Valley Park. 7 (Lancer) St. Louis.
⑤ - Beginning serial number at each plant.

ENGINE NUMBER: Stamped on right side of cylinder block below cylinder head opposite No. 1 cylinder. Number (example below) includes identification data.

① ② ③ ④
S 17 8 4

① - Year. S 1962. AS denotes aluminum engine.
② - Displacement. 17 170 cu. ins. 22 225 cu. ins.
③ - Month assembled. 8 August, etc.
④ - Day assembled. 4 4th day, etc.

►*ENGINE NUMBER MARKS:* Identified as follows: "A" on Model Pad indicates .020" oversize cylinder bore.
"♦" on Model Pad indicates .008" oversize tappets.
"Maltese Cross" on Model Pad indicates .001" undersize bearing shells. Location of undersize journals identified by Letter "M" (Main Journal), letter "R" (Connecting Rod Journal) on crankshaft counterweight. *NOTE* - Numbers following letters indicate which journals are undersize.
"X" on Model Pad indicates .010" undersize crankshaft and crankshaft counterweight will be stamped "M-10" or "R-10" to indicate all main and/or connecting rod journals are .010" undersize.

TUNE-UP

►*CARTER CARB. CARS HARD COLD START (NECESSITATES PUMPING ACCELERATOR) & SLOW WARM-UP CORRECTION: See "Carter BBS Carburetor" below.*
►*HOLLEY CARB. CARS IMPROVED PERFORMANCE & FUEL ECONOMY SPECIFICATION CHANGE: See "Holley Carburetors" below for new fl at l v l specifications.*

COMPRESSION PRESSURE: 110-140 lbs. at 130 RPM (plugs removed). Maximum variation between cylinders 20 lbs.
VACUUM READING: 19.5" at idle speed.
VALVE TAPPET CLEARANCE: .010" Intake, .020" Exhaust. Hot.
►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal operating temperature, remove cylinder head cover and operate engine for additional 5 minutes at 550 RPM. Make adjustments.
MANIFOLD HEAT CONTROL: Thermostatic coil spring type. Valve must operate freely. When installing, coil spring should be installed so that about one full turn (355° wrap) is required to hook outer end around stud.
CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing a "Tune-Up" for ignition or carburetor troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.
SPARK PLUG GAP: .035".
Spark Plugs - Champion N12Y or Autolite AG52. "Long Reach" type. 14mm. Torque to 30 ft. lbs..
►*6 CYL. ENG. SPARK PLUG CARBON AND/OR OIL FOULED CONDITION CORRECTION:* If carburetor and automatic choke operate properly, replace ONLY affected plug with MoPar Spark Plug No. 2098374 (Champion UN12Y auxiliary gap type). *CAUTION* - DO NOT install hotter heat range nor any other type spark plug.
►*SPARK PLUG GASKET NOTE:* A gasket must be used along with aluminum sleeve on each plug to insure against oil leakage into spark plug sleeves.
COIL: Chrysler Nos. 1688212 or 2095223. Autolite No. 200567. Essex No. 62-160-2.
Ignition Current - 1.9 amps. idling, 3.0 amps. stopped.
Resistor - Chrysler No. 2095501 (0,5.0.6 ohms) connected in lead between ignition switch and coil. Bypassed during cranking by second lead from ignition switch.
DISTRIBUTOR: Chrysler No. 2095976 (225" Eng.), 2095974 (170" Eng. exc. Late model with Auto. Trans.), 2098524 (Late 170" Eng. with Auto. Trans.).
►*170" ENG. (WITH AUTO. TRANS.) DISTRIBUTOR CHANGE NOTE:* New distributor No. 2098524 installed on cars in production beginning Eng. No. S-17-3-8. New distributor may be installed on early 170" Eng. with Auto. Trans. to improve low speed performance, especially at high altitudes during wide open throttle operation on steep grades.

Condenser - Chrysler 2098058. **Capacity** .25-.285 mfd.
Contact Point Set - Chrysler No. 2098244.
Breaker Gap - .017-.023".
Cam Angle - 40-45°.
Breaker Arm Spring Tension - 17-21.5 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 2095974

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	325-475	0	650-950
0-2.5	475	0-5	950
8-10	925	16-20	1850
12.5-14.5	2200	25-29	4400

Automatic Advance - 2095976

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	325-475	0	650-950
0-2	475	0-4	950
7-9	1000	14-18	2000
10.5-12.5	2300	21-25	4600

Vacuum Spark Control: Integral type.

Automatic Advance - 2098524

Degrees	Distr. RPM	Degrees	Eng. RPM
Start	320-480	0	640-960
0-8.5	480	0-17	960
7-9	610	14-18	1220
12.5-14.5	2200	25-29	4400

Vacuum Advance - 2095974 & 2098524

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg)
Start	0	5.0-7.1
5	10	8-9.5
9.5-12.5	19	12.5

Vacuum Advance - 2095976

Distr. Degrees	Eng. Degrees	Vacuum ("of Hg)
Start	0	4.9-7.1
3-5	6-10	10.5
5.25-7.5	10.5-15.0	13

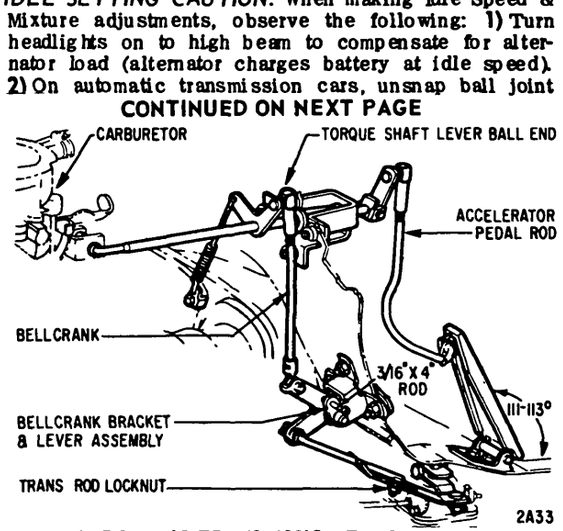
IGNITION TIMING

Setting - 2½° BTDC (range 2½° ATDC to 7½° BTDC). *NOTE* - Set timing with distributor vacuum line disconnected and engine idling at 500 RPM in Neutral.
Timing Mark - Timing tab on chain case cover marked "0" and "10" with 5° marks before and after "10". Align timing mark on vibration damper with correct mark on tab.

CARBURETOR

►*CARBURETOR APPLICATION: One Carter BBS single barrel carburetor used on all cars with Closed Crankcase Ventilation. One Holley Model 1920 single barrel carburetor optional for all transmissions.*
►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, observe the following: 1) Turn headlights on to high beam to compensate for alternator load (alternator charges battery at idle speed). 2) On automatic transmission cars, unsnap ball joint

CONTINUED ON NEXT PAGE



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

connection at accelerator shaft bellcrank so transmission interval stop will not interfere with carburetor throttle lever. When adjustments completed, screw ball joint up or down until ball on bellcrank will mate exactly with socket.

THROTTLE LINKAGE ADJUSTMENT: 1) Disconnect upper end of bellcrank-to-torque shaft rod ball joint. 2) Disconnect choke at carburetor or block choke in full open position. Open throttle slightly to release fast idle cam, then return throttle to curb idle. 3) With locknut loose in transmission rod, insert a 3/16" rod (4" long) through holes in bellcrank bracket and lever assembly. 4) Move transmission lever forward against stop and tighten transmission locknut. 5) Disconnect top end of pedal rod, then adjust to provide 111-113° pedal angle (see illustration). Reinstall top end of pedal rod. 6) Remove 3/16" rod from bellcrank bracket and lever assembly. Adjust length of transmission bellcrank-to-torque shaft rod by means of adjustment screw. The correct rod length allows the ball socket to line up with the ball end when rod is held upward against transmission stop. 7) Install ball socket on torque shaft lever ball end, connect choke rod.

CARTER BBS

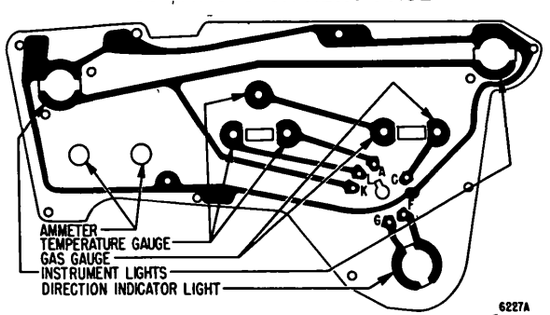
►*HARD COLD START (NECESSITATES PUMPING ACCELERATOR) & SLOW WARM-UP CORRECTION:* Condition may be caused by "R" Series (1961) choke coil housing which has a shorter choke rod than the correct "S" Series (1962) model, preventing choke valve from closing enough for starting engine.

Carter BBS. Used as follows:

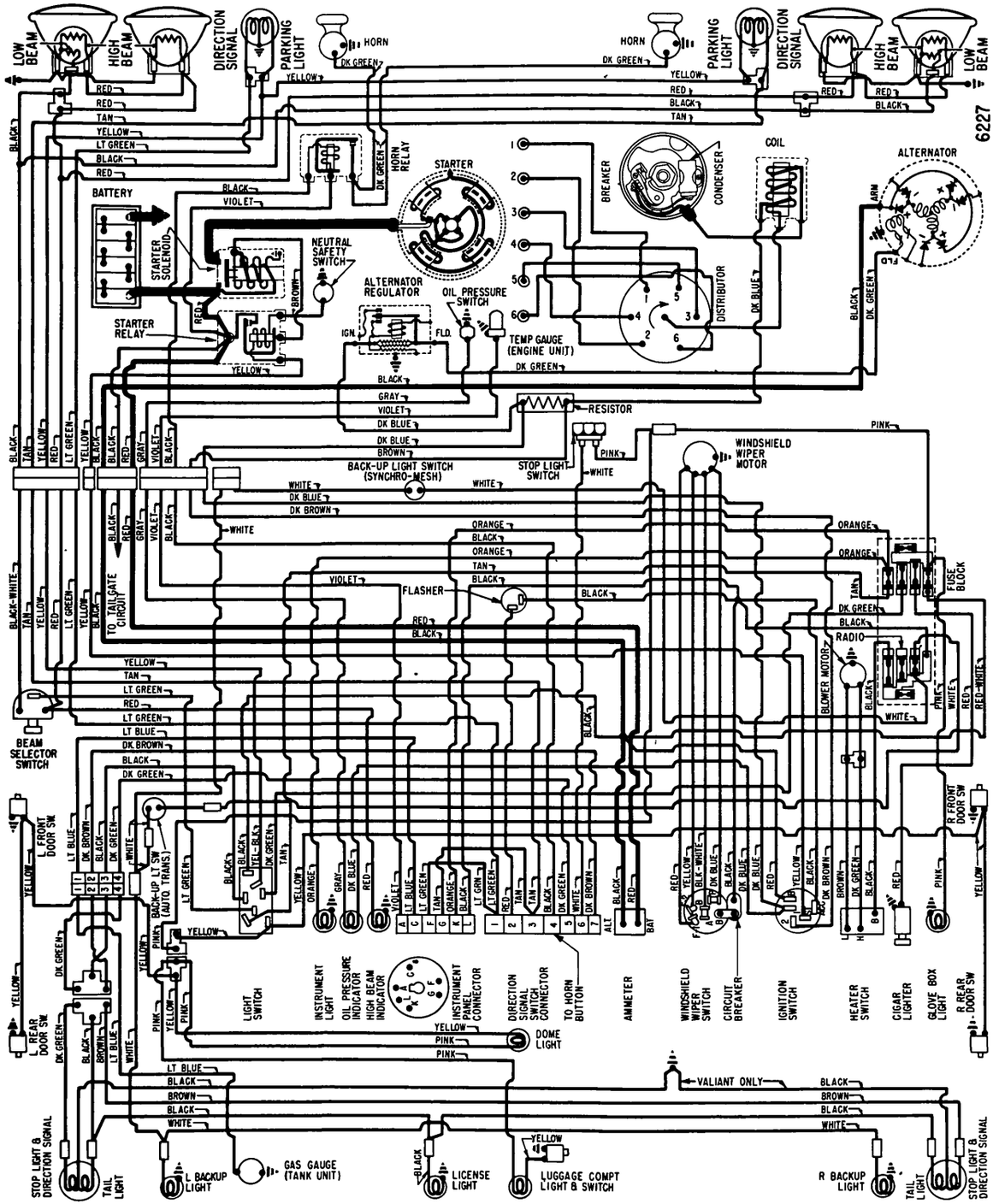
Model	Carburetor No.
170" Synchro-mesh Trans.	3229S
170" Auto. Trans.	3230S
170" Closed Crankcase Ventilation (All Trans.)	3234S
170" Taxi (All Trans.)	3286S
170" Taxi (With Closed Crankcase Ventilation)	3287S
225" Synchro-mesh Trans.	3237S
225" Auto. Trans.	3238S
225" With Closed Crankcase Ventilation (All)	3239S

Idle Setting - ½-1½ turns open. With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn screw in until speed starts to drop. Turn screw out just enough to recover lost engine speed. Readjust idle speed screw for correct engine idle speed.

CONTINUED ON NEXT PAGE



LANCER & VALIANT PRINTED CIRCUIT



LANCER & VALIANT WIRING DIAGRAM

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Idle Speed - 550 RPM with headlights on high beam and accelerator shaft rod ball joint unsnapped. See *"Idle Setting Caution"* above.

Float Level - With main body inverted and float hanging free (off car), or with sufficient fuel in bowl so only pressure of buoyant float holds float lip firmly against fuel inlet needle (on car), float fulcrum pin seated against fulcrum pin retainer, distance from bowl surface (gasket removed) to crown of floats at center should be 7/32" measured with Gauge T109-239. To adjust, bend float lip. *CAUTION - DO NOT compress rubber tip of fuel inlet needle as incorrect float level setting will result.*

Accel Pump - Install throttle connector rod in center hole of throttle lever.

Fast Idle: 170" Engine - 1300 RPM (Auto. Trans. without Closed Crankcase Ventilation), 1400 RPM (Others).
225" Engine - 1300 RPM (Synchro-mesh Trans.), 1400 RPM (Auto. Trans.).

Automatic Choke: "Cross-Over" type. 2 notches rich.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Carter BBS Carburetors" in Carburetion Section.*

HOLLEY MODEL 1920

Model	Carburetor No.
170" (Synchro-mesh Trans.)	R-2136A
170" (Auto. Trans.)	R-2416A
225" (Synchro-mesh Trans.)	R-2303A
225" (Auto. Trans.)	R-2417A

Idle Setting - ½-1½ turns open. With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn screw in until speed starts to drop. Turn screw out just enough to recover lost engine speed. Readjust idle speed screw for correct engine idle.

Idle Speed - 550 RPM with headlights on high beam and accelerator shaft rod ball joint unsnapped. See *"Idle Setting Caution"* above.

Fuel Level: 11/16" below machined mounting surface of power valve (economizer) with engine running and car on level floor. Remove power valve assembly and use scale to measure fuel level. *See "Holley Single Barrel Model 1920 Carburetor" in Carburetion Section for adjustment procedure.*

Accel Pump - Install throttle connector rod in center hole of throttle lever.

Fast Idle: 170" Engine - 1500 RPM (Synchro-mesh), 1800 RPM (Auto. Trans.).
225" Engine - 1500 RPM (Synchro-mesh), 1700 RPM (Auto. Trans.).

Automatic Choke: "Cross-Over" type. Set at Index.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Holley Model 1920 Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter M2996S. Mechanical type.
Pressure - 3½-5 lbs. at 500 RPM.

Fuel Filter: Disposable paper type, located in fuel line between pump and carburetor. Replace element every 16,000 miles.

Gasoline Gauge: Constant voltage type with voltage regulator inside Temperature Gauge.
Dash Unit - Chrysler No. 2257926 (Lancer), No. 2256348 (Valiant).
Tank Unit - Chrysler No. 2209296.

Air Cleaner: Paper element type. Clean every 8,000 miles or more often as required. Replace every 32,000 miles.

►*CLEANING CAUTION:* Remove cleaner from carburetor and remove cover from element. Clean inside cover with compressed air and gently clean element by holding air nozzle at least two inches from inside of screen. Discard element if it has been punctured. Check soft plastic sealer on both sides of element for smoothness.

ELECTRICAL

►*ELECTRICAL NOTE: For BATTERY, STARTER, ALTERNATOR & ALTERNATOR REGULATOR, see "Dodge Dart Six & Plymouth Six" Car Model Pages.*

MISC. ELECTRICAL

Lighting Switch Removal: Remove Instrument Cluster Bezel, see below, then remove nut securing switch to cluster base and remove switch from back of base.

Stop Light Switch Location: Mechanical type, mounted on brake pedal lever bracket.
Adjustment - Adjust position of switch so stop light goes on in first 1/8" of pedal pushrod travel.

Instrument Cluster Removal: Remove battery ground cable and cover jacket tube area with masking tape. Remove headlight and wiper switch knobs by inserting screwdriver in slot of knob to depress retaining spring while pulling knob outward. Remove four cluster bezel screws and pull bezel towards driver's seat and tilt it out at top edge. Remove printed circuit and instrument assembly attaching screws (eight) and carefully lift assembly upward towards driver's seat. Remove multi-connector from printed circuit pins (pull on connector while pushing against master locator). DO NOT DAMAGE Gauge Hands and Dials. Disconnect leads to ammeter, then remove cluster.

Speedometer Removal: Remove instrument cluster bezel, see Instrument Cluster Removal above, removing speedometer cable and remove three screws securing speedometer to bezel base.

Instrument Lights: All instrument light bulbs can be replaced (except right hand printed circuit bulb) by reaching up behind panel. Right hand printed circuit bulb requires the removal of either the printed circuit or the radio speaker grille and speaker.

CIRCUIT BREAKERS & FUSES: *See "Dodge Dart Six & Plymouth Six" Car Model Pages.*

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head, inclined 30° to right, of same design used previously.

►*ALUMINUM ENGINE NOTE (225" Optl.): Specifications are the same as for Cast Iron Engine except where noted. See "Aluminum Engine Service Cautions" in Chrysler Corp. Special Data.*

Engine	Bore	Stroke	Displacement
225"	3.41"	4.125"	225 cu. ins.
170"	3.41"	3.125"	170 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
225"	8.2-1	27.7	145 at 4000 RPM
170"	8.2-1	27.7	101 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chrysler Corp. Special Data.*

CYLINDER HEAD: Cast Iron Engine - Either the Std. cast iron head or the "Special" cast iron head (Aluminum block) may be used.
Aluminum Engine - Cast iron head with word "Special" cast between lifting pads on left side of head. Use only this head on Aluminum block.
See "Cylinder Head & Manifold" in Chrysler Corp. Special Data.

TIGHTENING TORQUES: *See "Tightening Specifications" in Chrysler Corp. Special Data.*

OIL PAN REMOVAL: Using tie rod end puller Tool C-3742, remove steering and idler arm ball joints from steering linkage center link. Remove dust shield and motor stud nuts. Remove horns and mounting brackets, then disconnect battery negative ground cable. Install engine lifter plate Tool C-3804 and Fixture C-3809. Raise engine 1½-2". Raise car on hoist, then remove oil pan.

PISTONS

Horizontal slot, steel band, elliptically turned, tin-plated.

►*CYLINDER BORE OVERSIZE CAUTION:* Letter "A" on engine number pad indicates .020" oversize cylinder bore.

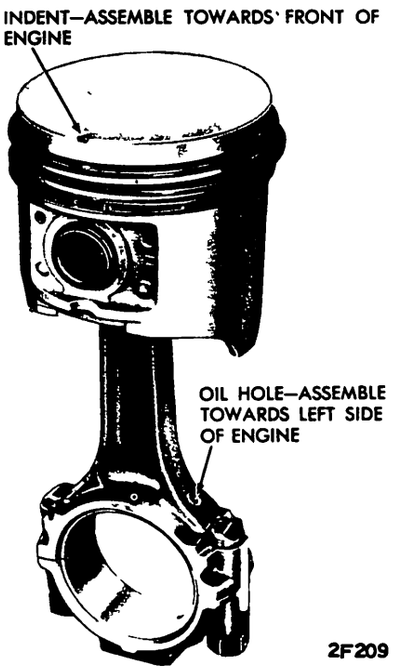
Weight - 16.0 ozs.

Removal - Pistons and rods removed from above.

Clearance - .0005-.0015" at top of skirt.

Fitting New Pistons - Use micrometers with piston and cylinder bore clean and dry and at 70°F. Measure

CONTINUED ON NEXT PAGE



PISTON & ROD ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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cylinder bore halfway down and at right angles to crankshaft.

Installing Pistons - Notch in piston head must be toward front of engine.

Replacement Pistons: Furnished with pins in Std. and .005", .020", .040" Oversize. *NOTE* - All pistons are machined to same weight.

PISTON PIN

Press fit in connecting rod.

Diameter - .9007-.9008". **Length** - 2.995-2.975".

Pin Fit in Piston - .00045-.00075" clearance. Pin should be sliding fit in piston at 70°F.

Pin Fit in Rod - .0007-.0012" interference fit. Special procedure and tools used for removal and installation. *See "Piston Pins" in Chrysler Corp. Special Data.*

Replacement Pins: Std. size only. Furnished as an assembly with new pistons.

PISTON RINGS

(170" Engine) - Compression ring cast iron, low taper and twist, tin plated. Oil ring single piece cast iron.

(225" Engine) - No. 1 compression ring taper twist, tin plated, No. 2 compression ring reverse twist, taper face, Lubrite coated. Oil ring, three-piece with two chrome plated rails and stainless steelexpander (spacer).

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0775-.0780"	.010-.020"	.0015-.0040"
Oil (3)	.1860-.1865"	.015-.062"	.0090" Max.

Installing Rings - Mark "Top" on compression rings must be toward top of engine.

Replacement Rings: Furnished in sets for oversize ranges as follows: Std. to .009", .020-.029", .040-.049".

CONNECTING ROD

Length (Center-to-Center) - **(170")** 5.707", **(225")** 6.999".

Weight - (170") 25.68 ozs. **(225")** 27.3 ozs.

Journal Diameter - 2.187". Out of round limits .001".

►*JOURNAL DIAMETER CAUTION (ONE OR MORE Journals machined UNDERSIZE): See CRANKSHAFT below.*

Clearance - .0005-.0015".

Side Clearance - .006-.012"

Bearing Adjustment - None, replace bearings.

Installing Rods: Notch in head of piston must be toward front of engine and oil squirt holes in lower end of rod must be toward left side of engine.

Replacement Bearings: Std. and .001", .002", .010" Undersize.

CRANKSHAFT

Journal Diameter - 2.7495-2.7505".

Bearing Type - Removable precision type, lead-base babbitt on steel, exc. thrust bearing which is tin-base babbitt on steel.

►*ALUMINUM ENGINE MAIN BEARING NOTE:* Same as for cast iron engine except that oil feed holes in bearings are in a different location and require special inserts. *CAUTION* - DO NOT use cast iron block original main bearing inserts in aluminum block. Upper and lower bearing caps are cast iron and are line bored in complete sets. If replacement is required, all four upper and lower main bearing caps must be replaced with a matched set for proper alignment. Identification numbers are stamped on upper caps and cast into lower caps. When upper and lower caps are installed, bearing tab slots should be on left side of engine.

►*CRANKSHAFT JOURNAL UNDERSIZE CAUTION:* Engines with undersize crankshaft journals identified as follows:

"MALTESE CROSS" - On Model Pad, indicates .001" undersize journals. Location of the undersize journals is indicated by letter "M" (Main Journal), "R" (Connecting Rod Journal) on crankshaft counterweight. *NOTE* - Numbers following letter "M" or "R" indicate which journal or journals undersize.

"X" - On Model Pad indicate .010" undersize crankshaft and crankshaft counterweight will be stamped "M-10" or "R-10" indicating all main or all connecting rod journals .010" undersize.

►*MAIN BEARING INTERCHANGEABILITY CAUTION:* Upper halves have oil holes, are grooved and are not interchangeable with lower halves. No. 3 bearings are flanged for crankshaft end thrust control. No. 1 upper is chamfered for timing chain lubrication and is marked "Red" on edge. No. 2 & 4 uppers are interchangeable. No. 1, 2 & 4 lowers are interchangeable.

Clearance - .0005-.0015". Wear limit .0025".

Endplay - .0035-.0085".

End Thrust - Taken by No. 3 (rear intermediate) main bearing.

Replacement Bearings: Std. and .001", .002", .010" Undersize.

►*MAIN BEARING SERVICING NOTE:* Bearing caps are numbered and must be installed in correct position (not interchangeable).

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chrysler Corp. Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

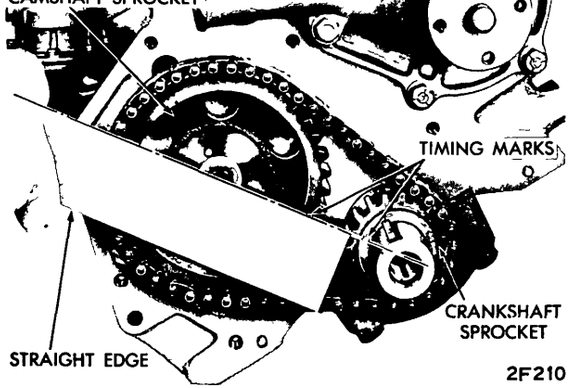
CAMSHAFT

Journal Diameter - **(1)** 1.998-1.999", **(2)** 1.982-1.983", **(3)** 1.967-1.968", **(4)** 1.951-1.952".

Bearings (Cast Iron Eng.) - Lead-based babbitt on steel.

Bearings (Aluminum Eng.) - Bearing inserts not used. Camshaft bearing journals run directly in finished bores in block.

Clearance - .001-.003". Wear limit .005".



ENGINE VALVE TIMING MARKS

End Thrust: Taken by rear face of sprocket hub on front face of block. No thrust plate used.

Timing Chain: Side guide type. **Width** .88". **Pitch** .50", **Length** 50 links. Replace chain when slack as measured on rim of camshaft sprocket exceeds 11/64" (hold crankshaft sprocket stationary, use torque wrench to turn camshaft in both directions applying 30 ft. lbs. turning torque (if cylinder head installed), 15 ft. lbs. turning torque (if head off).

Camshaft Removal: *See "Camshaft & Bearings" in Chrysler Corp. Special Data.*

Camshaft Setting: Marks on sprockets must be adjacent and in line across shaft centers.

Engine Front Cover Installation: *See "Engine Front Cover" in Chrysler Corp. Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chrysler Corp. Special Data.*

VALVES

Tappet Clearance: (Cast Iron Eng.) - .010" Intake, .020" Exhaust. Hot.

►*OVERSIZE TAPPET NOTE:* A "♦" on Model Pad indicates .008" oversize tappets.

(Aluminum Eng.) - Same as for Cast Iron Eng. *See below.*

►*ALUMINUM ENGINE NOTE:* When setting tappet clearance, after engine reaches normal temperature, remove rocker arm cover and operate engine for an additional 5 minutes at 550 RPM before making adjustments.

Valve	Head Diam.	① Stem Diam.	Length
Intake	1.615-1.625"	.372-.373"	4.774"
Exhaust	1.355-1.365"	.371-.372"	4.797"

Valve	Seat Angle ②	Lift	Stem Clearance
Intake	45°	.375"	③ .001-.003"
Exhaust	45°	.360"	④ .002-.004"

① - Std. Also furnished .005", .015", .030" Oversize.
② - Valve face angle 45° Intake, 47° Exhaust.
③ - Wear limit .004". ④ - Wear limit .006".

Valve Seat Width - .070-.090" Intake, .040-.060" Exhaust.
Valve Stem Oil Seals - Cup type seals used on all valve stems (long seal on intake, short seal on exhaust).

Valve Guides: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves with oversize stems furnished .005", .015", .030" Oversize. Use Reamer Tool No. C-3433 (.005" O.S.), C-3430 (.015" O.S.), C-3427 (.030" O.S.) in sequence.

Valve Springs: Free length 2". *NOTE* - Damper spring used inside valve spring on Hyper Pack engine.

Valve Spring Specifications

Valve	Pressure	Length
Closed	83 lbs.	1 11/16"
Open	177 lbs	1 5/16"

Valve Spring Installation - Valve spring ends must be square within 1/16". Check installed height of spring which must not exceed 1 11/16" (measure from face of

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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spring seat in cylinder head to lower face of spring retainer). If height greater, install 1/16" spacer in head counterbore to bring spring height within limits of 1 5/8" to 1 11/16".

Valve Lifters: Mechanical type on all engines.

Rocker Arm Assembly: *See "Valve System" in Chrysler Corp. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications
(All 170" & 225" Std. Engines)

Intake Valves - Open 8° BTDC. Close 44° ALDC.
Exhaust Valves - Open 48° BLDC. Close at TDC.

Valve Timing Check - Turn crankshaft until No. 6 exhaust valve is closing and No. 6 intake valve is opening. Install dial indicator so pointer contacts No. 1 intake valve spring retainer parallel to axis of valve stem. Turn No. 1 intake valve adjusting screw one full turn to remove all lash, zero dial indicator and rotate crankshaft clockwise (normal running direction) until valve has lifted .018". Timing on timing tab should read from 12° BTDC to TDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under "OILING SYSTEM" in Chrysler Corp. Special Data.*

►*ALUMINUM ENGINE OILING SYSTEM NOTE:* Same as for Cast Iron Eng. except that oil to main bearings passes through upper main bearing caps, then to bearings.

Crankcase Capacity: 4 qts. refill. Add 1 qt. for filter change.

Normal Oil Pressure: 45-60 lbs. at 40-50 MPH.

►*RELIEF VALVE SPRING NOTE:* Three types of springs available. Replace with same color spring, *see "Oiling System" in Chrysler Corp. Special Data.*

Oil Pressure Indicator: Indicator light on Instrument Panel operated by Oil Pressure Switch, Chrysler Corp. No. 2256800. On oil pump on right side of block.

Oil Pump: Rotor type. On right side of crankcase.
Overhaul - *See "Oiling System" in Chrysler Corp. Special Data.*

Oil Filter: Full-flow type. Replace filter element every 4,000 miles, to correspond with oil changes.

Crankcase Ventilation: (Standard Cars) - Filter in filler cap (air intake) and outlet vent tube extending from rocker arm cover to right rear of engine. Wash filler cap in kerosene and re-oil with SAE 30 engine oil every 8,000 miles or more often in dusty areas.

Positive Crankcase Ventilation Cars: Vacuum tube connects outlet breather cap with lower part of throttle body. A ventilation valve is located in outlet vent cap and regulates crankcase ventilation. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. (170"), 12 qts. (225") Std. Add 1 qt. for heater.

►*AIR CONDITIONER OPERATION CAUTION:* Engine cooling system must be protected to a temperature of 15°F (above zero) both summer and winter.

Pressure Valve: 14 lb. std., 16 lb. Air Cond. Cars, pressure radiator filler cap.

Thermostat: Pellet type. In water outlet connection on cylinder head (160°F) No. 2129206 (180°F) No. 2129205.

Water Pump: Sealed ball bearing, packless type. No lubrication required.
See "Cooling System" in Chrysler Corp. Special Data.

Pump Removal - Drain cooling system and remove fan shroud if equipped with Air Cond. Loosen alternator mounting bracket (to loosen fan belt) and swing alternator in towards water pump. On Air Cond. Cars, loosen idler puller. Remove pump.

Temperature Gauge: Constant Voltage Type with voltage regulator inside gauge.
Dash Unit - Chrysler Corp. No. 2256351.
Engine Unit - Chrysler Corp. No. 2240744 (King-Seeley & Autolite), No. 2256302 (Stewart Warner).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

Engine	Fo t- P unds T rque 144" & 170"	223" & 262"	221" & 260"	292"	352", 390" & 406"	430"
Cylinder Head	①	①	①	①	①	①
Intake Manifold		23-28	12-15	23-28	32-35 ②	25-28
Exhaust Manifold	13-18	23-28	13-18	23-28	23-28	15-21
Oil Pan	7-9	9-13	9-11	9-13	9-13	4-6
Main Bearing Caps	60-70	95-105	60-70	80-90	95-105	95-105
Flywheel	75-85	75-85	75-85	75-85	75-85	75-85
Vibration Damper or Pulley	45-55	⑧	70-90	70-90	70-90	75-90
Connecting Rod Caps	19-24	40-45	19-24	40-45	40-45	40-45
Camshaft Sprocket	35-45	35-45	35-45	35-45	35-45	12-15
Camshaft Thrust Plate	12-15	12-15	6-9	12-15		
Rocker Arm Cover	3-5	4-7	3-5	2-2½	4-7	2½-4
Rocker Shaft Support Bracket	30-35	45-55	30-35	12-15	40-45	45-50
Pushrod Chamber Cover		2-2½		2-2½		3½-5
Engine Front Cover	7-9	6-9	12-15	③	12-15	10-13
Water Outlet Housing	12-15	23-28	12-15	12-15	12-15	⑩ 8-13
Water Pump	12-15	23-28	12-15	12-15	23-28	23-28
Oil Pump	12-15	⑤	23-28	12-15	⑥	23-28
Oil Filter Adapter	50-60	50-60	60-100	50-60	12-15	10-13
Oil Filter Center Bolt		20-25	20-25	20-25		
Flywheel Housing	40-50	40-50	37-42	40-50	40-50	40-50
Transmission Mounting	32-36	37-42 ⑦	37-42	37-42 ⑦	37-42	37-42

① - See "Cylinder Head Installation" below for tightening procedure Three different applications must be made
② - Cast Iron Manifold 12-15 ft lbs for Aluminum type
③ - 12-15 ft lbs (5/16" bolts) 23-28 ft lbs (3/8" bolts)
⑩ - Radiator Supply Tank-to-Intake Manifold
⑤ - 30-35 ft lbs (223' Eng) 12-15 ft lbs (262" Eng)
⑥ - 23-28 ft lbs (352" Eng), 12-15 ft lbs (390 ' Eng)
⑦ - Passenger Cars Trucks as follows **Bolts** 7/16' - 30-38 ft lbs , 9/16' - 70-90 ft lbs ,5/8' - 96-120 ft lbs **Nuts** 7/16 ' - 35-45 ft lbs 9/16 - 81-102 ft lbs , 5/8 - 115-140 ft lbs
⑧ - 70-90 ft lbs (223"), 140-150 ft lbs (262")

ENGINE

COMET & FALCON

ENGINE REMOVAL: *NOTE* - Engine only is removed Do not remove transmission Proceed as follows

1) Remove hood, drain cooling system and crankcase remove air cleaner and disconnect battery ground cable Remove radiator drive belt fan and pulley Disconnect heater hoses at water pump and at carburetor heater spacer outlet generator and starter wires at units accelerator rod and choke control cable at carburetor

2) Disconnect windshield wiper hose at vacuum pump Remove fuel pump bowl and disconnect flexible fuel line from tank line (plug tank line) Disconnect primary wire at coil and oil and temperature sending unit wires at units Remove starter and dust seal

3) Disconnect clutch retracting spring and remove equalizer shaft and arm bracket from underbody rail Remove flywheel or converter upper retaining bolts (accessible through floor pan) and disconnect exhaust pipe from manifold Disconnect engine mounts and remove flywheel or converter housing cover Remove flywheel housing lower bolts (synchro-mesh), disconnect converter from flywheel and remove converter housing lower bolts (auto trans)

4) Support transmission and flywheel or converter attach lifting hooks under exhaust manifold remove engine

FORD 6 CYLINDER CARS

ENGINE REMOVAL: *NOTE - Unnecessary to remove transmission Procedure below is for r moval of engine only* Drain cooling system and crankcase Disconnect all wires, cables, and hoses from engine units (also disconnect and plug automatic transmission oil cooler lines at radiator) Remove radiator and air cleaner Disconnect accelerator and throttle linkage (tie accelerator bracket to dash) Disconnect exhaust manifold, remove starter and automatic transmission filler tube bracket Remove engine rear plate upper right bolt and disconnect clutch linkage (remove bracket from rear of engine) Remove flywheel or converter housing cover Remove flywheel-to-converter nuts and hold converter in housing Disconnect flywheel or converter housing from engine, support transmission and remove rest of engine rear plate bolts Disconnect engine front mounts and remove engine (Lifting Hook, T52L-6000-C, may be used)

MERCURY 6 CYLINDER CARS

ENGINE REMOVAL· *NOTE - Procedure below is for removal of engine only* **1)** Remove hood Drain cooling system and crankcase Disconnect all wires, cables, and hoses from engine units (also disconnect and plug automatic transmission oil cooler lines at radiator) Remove radiator and fan guard assembly, and air cleaner Disconnect accelerator and throttle linkage from carburetor and engine Disconnect power steering pump from water pump and position out of way so oil will not drain out (unnecessary to disconnect hoses) Remove starter and dust seal and crankcase ventilation tube Disconnect exhaust pipe from exhaust manifold Disconnect engine front mounts at frame

2) Synchr -m sh Cars - Disconnect clutch linkage from flywheel housing Remove propeller shaft Disconnect shift rods, wires, and cables from transmission Support rear of engine and disconnect engine rear mount from transmission Remove flywheel housing lower cover Disconnect transmission from flywheel housing and slide transmission rearward so input shaft clears housing Disconnect engine front mount brackets from engine and remove engine *NOTE* - Lifting Bracket 6000-AB may be attached to cylinder head bolts (after valve rocker cover removed) to aid in lifting engine

3) Automatic Transmission Cars - Remove converter housing bolts Support transmission, remove converter housing lower cover, and disconnect converter from flywheel Secure converter in housing Attach Lifting Bracket 6000-AB to cylinder head bolts (remove valve rocker cover), and remove engine

FORD V8 CARS & THUNDERBIRD

ENGINE REMOVAL: *NOTE - Procedure below is for removal of engine only* Drain crankcase and cooling system Remove hood and air cleaner Disconnect all wires, hoses, cables, lines, and brackets from engine (do not disturb radiator supply tank, remove with engine) Remove dipstick Disconnect accelerator and throttle linkage from carburetor and engine (remove accelerator cross shaft bracket) Remove power steering pump from engine and position to prevent loss of oil (unnecessary to disconnect hoses) Isolate air conditioning compressor and disconnect hoses *S e "Ford Motor Co Air Conditioning ' in Miscellaneous Section* Swing coil out of way (292"), remove coil (352",390",406") Place distributor cap near center of engine (292") Remove flywheel or converter housing-to-engine upper bolts Remove starter, dust seal, and automatic transmission filler tube bracket Remove oil filter (292") Disconnect muffler inlet pipes from exhaust manifolds and engine support insulators from frame Remove flywheel housing lower cover, disconnect clutch linkage (remove bracket from engine), disconnect converter from flywheel (secure converter in housing), and remove remaining flywheel or converter-to-engine bolts Support transmission, attach lifting hooks, Tool T53L-6000-B (292"), T58P-6000 A (352",390",406"), and sling T53-L-300-A, and remove engine

MERCURY V8 CARS

ENGINE REMOVAL: *NOTE - Procedure below is for removal of engine only* **1)** Remove hood, battery, and battery carrier Drain cooling system and crankcase Remove radiator Remove fan, spacer, and pulley assembly from water pump Remove oil filter (292") Remove coil (352",390",406") Remove engine and automatic transmission dipstick Isolate air conditioning compressor and disconnect hoses *See "Ford Motor Co Air Conditioning" in Miscellaneous Section* Remove power steering pump from engine and position to prevent loss of oil (unnecessary to disconnect hoses) Place distributor cap near center of engine (292") Disconnect all wires, hoses, cables, lines, and brackets from engine Disconnect accelerator and throttle linkage from carburetor and engine (remove accelerator cross shaft bracket) Disconnect exhaust pipes from exhaust manifolds Disconnect engine front mounts from engine

2) Synchr -m sh Cars - Remove flywheel housing lower cover Disconnect clutch linkage from flywheel housing

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Disconnect shift rods and speedometer cable from transmission. Remove propeller shaft. Disconnect engine rear mount from transmission and disconnect transmission from flywheel housing. Slide transmission rearward until input shaft clears flywheel housing. With Lifting Hooks, 6000-E (292"), 6000-BD (352",390",406"), and Lifting Sling, 6000-BA, remove engine.

3) Aut matic Transmissi n Cars - Remove converter housing lower cover and disconnect converter from flywheel. Secure converter in housing. Disconnect converter housing from engine (support transmission and converter, and rear of engine). With Lifting Hooks, 6000-E (292"), 6000-BD (352", 390", 406"), and Lifting Sling, 6000-BA, remove engine.

LINCOLN CONTINENTAL

ENGINE REMOVAL: *NOTE - Following procedure is for r moval of ngin only.* Remove hood. Drain cooling system and crankcase. Remove air cleaner and air inintake duct assembly. Remove speed control unit. Remove battery. Disconnect all wires, lines, hoses, cables, and brackets from engine (disconnect and plug transmission oil cooler line at radiator). Remove transmission fluid filter. Remove fuel pump heat shield and fan shield. Remove fan, fluid fan drive and pulley as an assembly. Remove radiator. Isolate air conditioning compressor and disconnect hoses. *See "Ford Motor Co. Air Conditioning" in Miscellaneous Section.* Remove compressor and mounting bracket. Disconnect accelerator and throttle linkage from carburetor and engine (tie linkage to dash for clearance). Remove converter housing access cover and underbody splash shield from lower front of transmission. Disconnect exhaust pipes from exhaust manifolds. Disconnect power steering pump outlet line from pump. Remove oil filter. Disconnect engine front mounts from engine. Remove starter and dust seal, and generator splash shield. Disconnect converter from flywheel, engine lateral restrictor from converter housing, and remove converter housing lower retaining bolts. Support transmission and remove converter housing-to-engine upper bolts. Secure converter in housing. Install lifting eyes in each cylinder head lower front mounting bolt hole, and in rear of each exhaust manifold. With suitable lifting chains and hooks, remove engine from car.

ECONOLINE TRUCKS

ENGINE REMOVAL: *NOTE - Following procedure is for r moval of ngin and transmission assembly.* Drain cooling system and crankcase, and remove air cleaner. Disconnect all wires, hoses, cables, and lines from engine. Raise and support truck. Remove propeller shaft. Disconnect transmission shift rods from transmission. Disconnect clutch linkage from flywheel housing and underbody. Remove exhaust pipe, muffler, and tail pipe assembly. Lower truck after half-way for safety. Use Transmission Jack KRW-7020 and Engine Adapter T61E-6000-A or other suitable equipment and support engine and transmission assembly after securing engine to adapter. Disconnect engine right and left front mounts from engine, and remove right and left support members from underbody. Disconnect transmission extension from hanger bracket. Lower jack and raise truck to remove engine assembly from beneath truck.

FORD 6 CYLINDER TRUCKS

ENGINE REMOVAL (F & B SERIES): Procedure is same as for Ford 6 Cyl. Cars after removing hood, fan, spacer, and pulley.

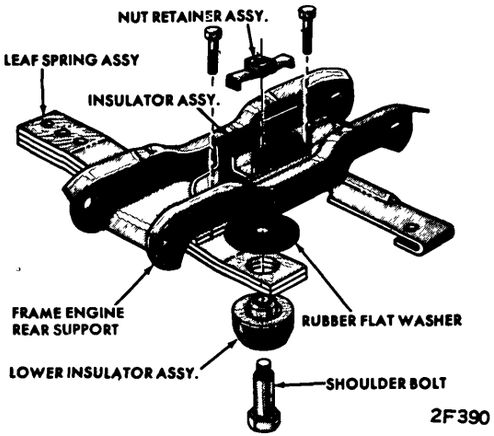
ENGINE REMOVAL (P SERIES): *NOTE - Procedure below is for removal of engine only.* Drain cooling system and crankcase. Remove driver's seat assembly, master cylinder inspection cover, and steering column cover plates. Disconnect accelerator linkage from pedal and all wires from headlight dimmer switch. Remove left wheelhouse panel and center floor plate, disconnect right side of engine rear cover panel from right wheelhouse panel, and rear flange of engine rear cover from frame crossmember and center floor plate front bracket. Remove air cleaner tube (leave air cleaner attached to engine cover). Remove engine rear cover plate (wedge frame gussets open so rear flange will clear slots). Remove accelerator bracket assembly and carburetor. Disconnect throttle control rod. Disconnect exhaust manifold from muffler inlet pipe. Disconnect all wires, cables, lines, and hoses from engine. Remove starter, radiator and fan. Disconnect engine from front mounts. Remove flywheel or converter housing cover and disconnect housing from engine. Disconnect converter from flywheel. Remove crankcase ventilation tube. Remove automatic transmission filler tube and drain transmission. Loosen engine rear support screws, raise transmission, remove engine (swing 30° to right and lift rear to clear compartment).

FORD V8 TRUCKS

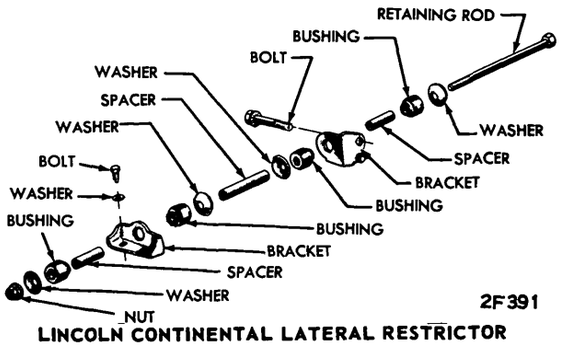
ENGINE REMOVAL (F & B SERIES): Procedure is the same as for Ford V8 Cars except the following: Remove radiator and shroud assembly, fan, spacer, and belt. Disconnect power steering hoses and let system drain (unnecessary to remove pump). *NOTE* - Access cover provided in floor pan to remove converter housing bolts, accelerator assembly, and other parts.

ENGINE REMOVAL (C SERIES): Tilt the cab and drain cooling system and crankcase. Remove radiator and shroud assembly, fan, and air cleaner. Remove all wires, cables, clips, lines, and hoses from engine. Remove clutch release lever retracting spring and starter. Disconnect exhaust pipes from manifolds. Remove flywheel housing inspection cover and disconnect engine from flywheel and front mounts (support transmission). With lifting hooks (Tool T53L-6000-B) and sling (Tool T53L-300-A) remove engine.

ENGINE REMOVAL (P SERIES): *NOTE - Procedure below is for removal of engine and transmission as an assembly.* Drain cooling system and crankcase. Remove driver's seat, master cylinder inspection cover, steering column cover plate, left wheelhouse panel, and center floor plate. Disconnect accelerator linkage at pedal and all wires from headlight dimmer switch. Disconnect right side of engine rear cover from right wheelhouse panel, rear flange of engine rear cover from crossmember and center floor plate front bracket. Remove engine rear cover plate (wedge frame gussets open so plate will clear slots). Remove crossmember and air cleaner. Disconnect all wires, cables, lines, and hoses from engine and transmission (remove radiator hoses, hand brake cable and bracket). Disconnect engine from front mounts and exhaust pipes from manifolds. Remove air cleaner stud. Disconnect engine rear support, front universal joint, transmission shift rods, and clutch slave cylinder hose. With lifting hooks (Tool T53L-6000-B), sling (Tool T53L-300-A), and floor crane, remove engine and transmission assembly.



CANTILEVER SPRING ENGINE REAR MOUNT ASSEMBLY



LINCOLN CONTINENTAL LATERAL RESTRICTOR

ENGINE MOUNTINGS

METEOR 170" & 221" ENGINE

ENGINE REAR MOUNTING BRACKET ADJUSTMENT: Loosen bracket side rail attaching bolts and raise or lower bracket (with a jack) to obtain specifications shown in table below. Measure from rib on floor pan to flat surface on top of bracket.

Model	Left Side	Right Sid
170" Std. Trans.	1 1/2"±1/16"	1 1/16"±1/16"
170" Auto. Trans.	2 1/4"±1/16"	1 5/16"±1/16"
221" All Trans.	2 1/4"±1/16"	1 5/16"±1/16"

COMET & FALCON

ENGINE REAR MOUNT (CANTILEVER SPRING TYPE): Consists of a leaf type spring mounted on rear support and extending to front of car. Spring is bolted to transmission extension. Spring is insulated from support by two rubber insulators and a rubber flat washer. Spring-to-support attaching bolt is a shoulder type bolt.

***Installation** - CAUTION - To prevent high frequency high speed vibrati n caused by transmissi n extension contact with rear mount, ¼" minimum clearanc must be maintained b tween rear mount upper insulator and*

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transmission extension. Tighten spring-to-support attaching shoulder bolt until bolt bottoms (22-32 ft. lbs. torque). *CAUTION - Do not add washers between lower insulator and spring as noise and vibration would result.* Tighten other bolts to specified torque *(see "Engine Mounting Tightening Table" below).*

ENGINE MOUNT TORQUE SPECIFICATIONS: As follows:

COMET & FALCON	Ft. Lbs.
Front Support Insulator to Engine	18-24
Front Support Insulator to Bracket Nut	11-15
Rear Support Bracket to Crossmember	11-15
Rear Support to Cantilever Spring	22-32
Cantilever Spring to Trans. Ext.	18-28

FAIRLANE & METEOR 6 CYL.	Ft. Lbs.
Front Support Brkt to Engine	18-24
Front Insulator Assy. to Support Brkt.	15-21
Front Bracket to Underbody	26-34
Rear Support Insulator to Ext. Hsg.	32-42
Rear Insulator to Rear Support	10-15
Rear Support to Mounting Bracket	41-53
Rear Mounting Bracket to Underbody	41-53

GALAXIE & MONTEREY 6 CYL.	Ft. Lbs.
Front Bracket to Insulator	40-45
Front Bracket to Engine	35-40
Front Insulator to Frame	35-40
Rear Support Retainer to Ext. Housing	40-45
Rear Support to Frame	12-15

FAIRLANE & METEOR V8	Ft. Lbs.
Front Support Brkt, to Engine	29-39
Front Insulator Assy.to Support Brkt.	15-21
Front Support Brkt. to Body Bracket	41-53
Front Mounting Bracket to Underbody	26-34
Rear Support Insulator to Ext. Hsg.	32-42
Rear Insulator to Rear Support	10-15
Rear Support to Mounting Bracket	41-53
Rear Mounting Bracket to Underbody	41-53

GALAXIE & MONTEREY V8	Ft. Lbs.
Front Bracket to Crossmember	45-50
Front Insulator to Frame	35-40
Front Insulator to Engine	35-40
Rear Support Retainer to Ext. Hsg.	40-45
Rear Support to Frame	12-15

THUNDERBIRD	Ft. Lbs.
Front Insulator to Engine	35-40
Front Insulator to Intermediate Bracket	30-42
Front Intermediate Brkt. to Crossmember	30-42
Rear Support Retainer to Ext. Hsg.	25-30
Rear Support to End Bracket	30-42

LINCOLN	Ft. Lbs.
Front Insulator to Frame	45-60
Front Insulator to Engine	50-65
Rear Crossmember Brkts. to Body	20-30
Rear Support Crossmember to Support Brkt.	13-18
Rear Support Insulators to Support Member	20-30
Rear Support Insulator to Ext. Hsg.	20-30

ECONOLINE TRUCK	Ft. Lbs.
Front Insulator Assembly to Frame	11-15
Front Insulator Assembly to Engine	23-28
Rear Insulator Assembly to Engine	23-29

FORD TRUCKS	Ft. Lbs.
Front Insulator to Engine Mount (½x20)	35-45
Front Insulator to Engine Mount (7/16x20)	45-55
Rear Insulator to Engine Mount	70-90

LINCOLN CONTINENTAL

ENGINE LATERAL RESTRICTOR: Consists of rubber bushed rods and spacers mounted on brackets from converter housing to underbody side rail to restrict engine side movement.

Removal - Remove outer bracket from underbody side rail. Remove inner bracket from converter housing. Remove lateral restrictor assembly.

Disassembly - Remove restrictor rod retaining nut and disassemble unit. Clean all parts in solvent and replace worn or damaged parts.

Reassembly - With head of large restrictor rod in a vise, assemble all parts in same order as removed (see illustration). *NOTE - Lips of rubber bushings must be seated properly in bores of inner and outer brackets.* Torque retaining nut to 13-18 ft. lbs.

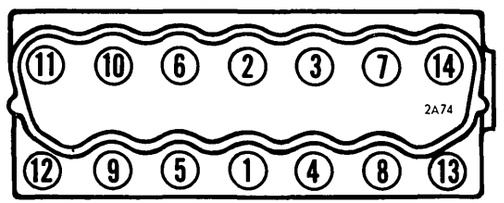
Installation - Position unit on car with outer bracket resting on underbody side rail. Insert inner bracket dowel pin into converter housing, install inner bracket retaining bolt and torque to 40-50 ft. lbs. Torque outer bracket retaining bolts to 13-18 ft. lbs.

CYLINDER HEAD & MANIFOLD

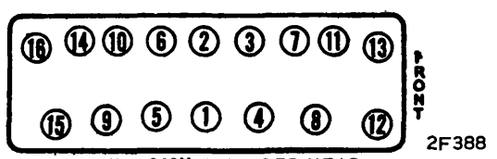
6 CYLINDER ENGINES

►*223" & 262" ENGINES CYLINDER HEAD BOLT NOTE:* All 262" and later production 223" engines have cylinder heads with 1/2" bolts. Previous bolt size was 7/16". Bolt torque specifications for each size bolt are different. *See below.*

CYLINDER HEAD: Removal - When removing head, install guide studs in front and rear cylinder head bolt holes on manifold side of head. Make guide studs from 7/16" - 14 x 6" or 1/2" - 13 x 6" bolts, depending on cylinder head bolt size, by cutting off bolt head, tapering end, and slotting for screwdriver engagement.



144" & 170" CYLINDER HEAD



223" & 262" CYLINDER HEAD

Installation - Coat both sides of new gasket with head gasket sealer. *CAUTION - "Sandwich" type gasket (steel core bonded between rubber-asbestos sheets) used on 223" and all 262" engines. DO NOT use sealer on this gasket.* On 144" & 170" engines, coat right side front and rear head bolts with sealer. On 223" & 262" engines, coat all left side bolts with sealer. Install head over guide studs (see "Removal" above), install two end bolts finger tight to hold head, then install remaining bolts. Tighten bolts in sequence shown in diagrams in three steps to torque limits shown in table below. **Do not disturb bolts after final step completed.**

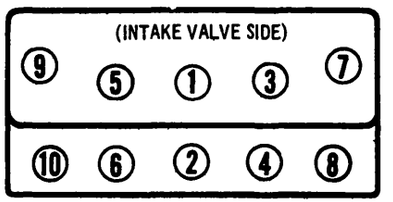
V8 ENGINES

CYLINDER HEAD: Removal - *NOTE* - On 221" & 260" engines, loosen rocker arm stud nuts and pivot rocker arms to one side so pushrods can be removed. On 352",390" & 406" engines, observe rocker arm shaft removal procedure below.

Installation - On 221" & 260" engines, coat head bolts with water resistant sealer. Coat new gasket on both sides with gasket sealer. Gaskets must be installed with word "Front" to front of engine, and word "Top" facing upwards. On 292" engine, install long cylinder head bolts at the dowel locations. On all engines, tighten bolts in sequence shown in diagrams in three steps to torque limits shown in table below. Do not disturb bolts after final step completed.

Head Bolt Specifications (Ft. Lbs.)

Engine	Step 1	Step 2	Step 3
144" & 170"	55	65	75
223" & 262"	95	105	115
221" & 260"	55	65	70
292" Pass. & MD Trks.	55	65	75
292" HD Trks	65	70	85
352",390" & 406"	70	80	90
430"	85	95	105



V8 ENGINES CYLINDER HEAD

V8 ENGINES

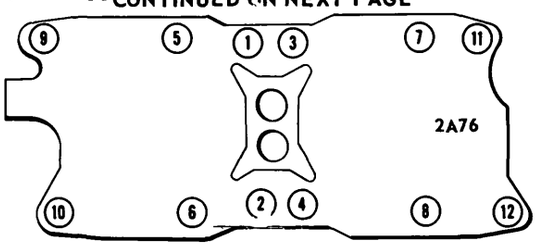
INTAKE MANIFOLD: Removal (352" & 390") - *Observe rocker arm shaft removal procedure detailed below.*

Installation (292") - Make sure gaskets are in place and tighten manifold attaching bolts to correct torque, starting from the center bolts.

Installation (221" & 260") - Coat cylinder block seal seal surfaces with oil resistant sealer. Install new seals and gaskets. **Gaskets must be interlocked with seal tabs.** Tighten manifold attaching bolts in sequence shown in diagram in three steps to following torques: **Step 1** - All bolts to 8-10 ft. lbs.; **Step 2** - All bolts to 12-15 ft. lbs. **Step 3** - Bolts 1,2,3 & 4 to 12-15 ft. lbs.

Installation (352", 390", 406") - Coat mating surfaces of manifold and cylinder heads with oil resistant sealer. Make sure front and rear manifold seals do not slip out of place when installing manifold. Tighten manifold attaching bolts to correct torque, starting from the center bolts.

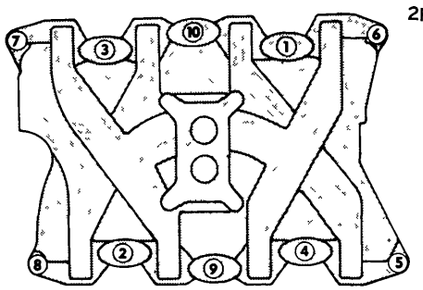
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V8 221" & 260" INTAKE MANIFOLD TIGHTENING SEQUENCE

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Installation (430") - Manifold gaskets must be installed with "Front" to front of engine. Tighten attaching bolts to correct torque, and in correct sequence (see diagram).



430" ENGINE INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS

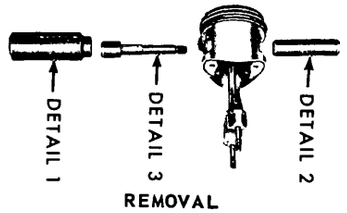
FITTING PISTONS: To check piston fit in cylinder and to determine clearance between piston and cylinder walls, position a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *NOTE - Feeler must extend entire length of piston.* Pull feeler from cylinder with a spring scale and note reading. Specifications should agree with table below.

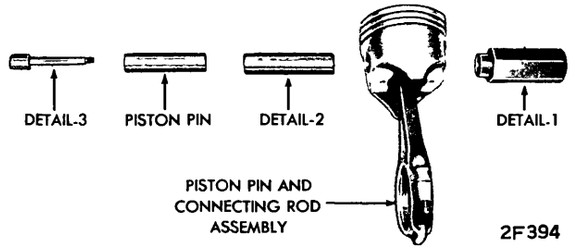
PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0.0007	7	0.0025	7	0.0049
6	0.0004	6	0.0010	6	0.0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0.0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065

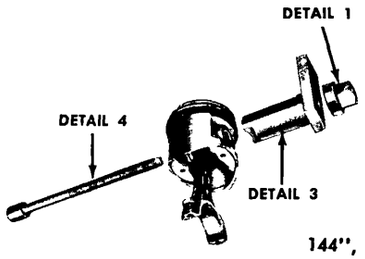
PISTON PINS
144", 170", 221" & 260" ENGINES

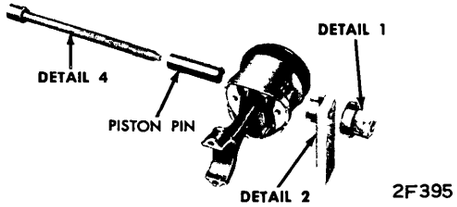
►*TOOL T60K-6135-A MODIFICATION NOTE:* If tool not previously modified to prevent damage to piston, make following modification so piston will not be damaged when Detail 2 of tool seats against piston pin boss: Grind a 1/16" - 45° chamfer around outer edge of Detail 2.



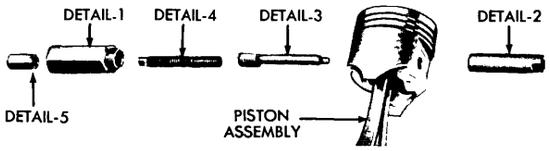


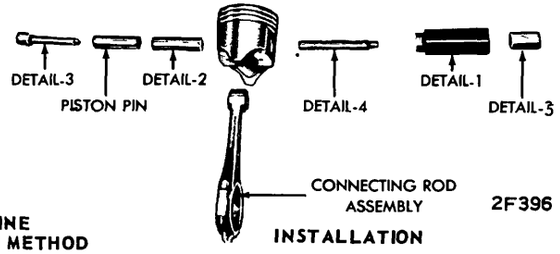
ARBOR PRESS METHOD





144", 170", 221" & 260" ENGINES





430" ENGINE
VISE & WRENCH METHOD

REMOVAL: Press pin out of piston and connecting rod using Tool T60K-6135-A and vise and wrench, or Tool 6135-J and arbor press, as shown in illustrations.

INSTALLATION: Lightly coat all parts with engine oil, assemble piston and connecting rod correctly and press pin into piston and connecting rod as follows: **1)** With Tool T60K-6135-A and vise and wrench, draw pin into assembly until pin seats in Detail 2. **2)** With Tool 6135-J and arbor press, press pin into assembly until Detail 2 is seated firmly in Detail 1. See *illustrations.*

430" ENGINE

REMOVAL: Press or pull pin out of piston and connecting rod assembly with Piston Pin Remover and Replacer Set, Tool 6135-F, using an arbor press or vise and wrench as shown in illustrations.

INSTALLATION: Press or pull pin into piston and connecting rod with Tool 6135-F and an arbor press or vise and wrench as shown in illustrations. Pin must be ¼" beyond face of piston boss. To check pin fit install all parts of Tool 6135-F for vise installation and place in a vise. Turn nut with torque wrench until pilot (Part No. 2 of tool) bottoms in anvil (Part No. 1 of tool). Minimum torque required to seat pilot is 20 ft. lbs. If less torque required replace connecting rod.

CRANKSHAFT & MAIN BEARINGS
ALL ENGINES

►*MAIN BEARING CAP INSTALLATION NOTE:* Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine.

CRANKSHAFT THRUST BEARING ALIGNMENT: Install all bearing caps except thrust bearing cap and torque to specifications. Install thrust bearing cap with bolts finger tight. Pry crankshaft forward against upper half of bearings, then pry bearing cap to rear to align thrust surfaces of both bearing halves. While holding crankshaft forward, tighten thrust bearing cap bolts to specifications. Move crankshaft to rear of engine and check crankshaft endplay.

REAR MAIN BEARING OIL SEAL: *NOTE - On 292" engine, coat entire mating surface of seal retainer with oil resistant sealer before installation. On other engines, coat only rear mating surface of cap with sealer - do not use sealer forward of side seal groove. Use of sealer prevents oil leaks.*

►*OVERSIZE REAR MAIN BEARING SEAL NOTE:* When main bearing cap side seal does not compress firmly when forced into cap (cause of oil leak), an oversize seal is available for installation. DO NOT use oversize seal unless inspection shows that standard seal does not function properly.

Upper & Lower Seal Installation: *CAUTION - Use Installing & Forming Tool as listed below and follow procedure listed exactly to prevent seal shift and oil leaks.* Preform seal by hand and install into block or

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cap (or retainer) with thumbs, seating seal at center and then working from the ends toward the center. Now place installing tool properly in block or cap as follows: Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap or retainer for lower seal. Tool flanges must bottom on seal groove rear flange and bearing saddle (insert removed). Hold tool firmly and strike top of tool sharply. Cut seal ends flush with block or cap (or retainer). Trim frayed ends. Install cap or retainer and tighten bolts to specifications.

Side Seal Installation: Dip side seals in light engine oil and install **immediately** into grooves. *CAUTION - DO NOT use sealer. Seals expand with oil.* Tap seals firmly into position. Do not trim ends.

Testing Seal Installation - Squirt a few drops of oil into parting lines between cap and cylinder block from the outside. Blow compressed air against seals from the inside of block. If air bubbles appear in oil, it is an indication of oil leakage.

Crankshaft Rear Seal Installing Tool

Engine	Tool No.
144",170",221" & 260"	T60K-6701 or 6701-D
223", 262" & 292"	T52L-6701-AGD or 6701-A
352", 390" & 406"	T59P-6701-A or 6701-C
430"	6701-B

ENGINE FRONT COVER

6 CYLINDER ENGINES (EXCEPT TRUCKS)

ENGINE FRONT COVER: Removal - Drain crankcase and cooling system. Remove radiator, fan, belt, pulley, and damper. Remove water pump. Remove oil pan *(see individual Car Model Pages).* Remove front cover.

Installation - Use Pilot, T61K-6019-A or 6059-E (144" & 170"), T 52L-6059-AEE or 6059-B (223") to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete installation.

221" & 260" ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system and crankcase. Remove hoses from water outlet housing and water pump, then slide by-pass hose clamp toward pump. Remove air cleaner and disconnect battery ground cable. Loosen generator mounting bolts at generator and support bolt at water pump. Remove fan, spacer, pulley and drive belt. Remove Power Steering belt and compressor belt. Remove crankshaft pulley from adapter, remove crankshaft screw and washer and remove adapter. Disconnect fuel pump outlet line at pump and remove fuel pump bolts and lay pump to one side with flexible line attached. Remove oil dipstick and disconnect dipstick tube bracket and oil filler tube bracket at generator mounting bracket. Remove oil pan-to-front cover bolts, then remove front cover and water pump as an assembly.

Installation - Use Pilot T61P-6019-A to center cover on block. Use water resistant sealer on all screws and press in on tool while tightening screws to specifications. Reverse removal procedure to complete installation.

292" V8 ENGINE (EXCEPT TRUCKS)

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator, fan, belt, pulley, spacer, power steering pump pulley, and pull crankshaft damper. Remove oil pan *(see Car Model Pages),* and fuel pump. Disconnect hoses from water pump. Disconnect power steering pump from water pump (place so oil will not drain). Move generator support bracket and adjusting arm out of way. Remove front cover and water pump assembly. *NOTE* - Air conditioner compressor brackets are attached by front cover screws.

Installation - Place large diameter end of Cover Aligning Tool T52L-6059-AEE or 6059-B in bore of cover and place cover on block. Push in on tool and tighten cover bolts to specifications. Complete installation by reversing removal procedure.

352", 390" & 406" ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system, remove radiator. Remove belts. Remove water pump, fan, pulley, and generator adjusting arm as an assembly. Remove power steering pump pulley. Pull crankshaft damper. Remove oil pan *(see Car Model Pages).* Remove fuel pump (unnecessary to disconnect flexible line). Remove stepped-down crankshaft sleeve with a three-jawed puller. Remove non-stepped-down sleeve with Puller, Tool T56P-6362-A. Remove front cover. *NOTE* - Air conditioner compressor brackets are attached by front cover bolts.

Installation - Use Pilot, Tool T61P-6019-B or 6059-F to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete installation.

430" ENGINE

ENGINE FRONT COVER: Removal - Drain cooling system and disconnect battery. Remove radiator supply tank, fan shield, drive belts, fluid fan and pulley assembly. Remove water pump (loosen power steering reservoir bracket mounting bolts for clearance). Remove crankshaft damper. Remove power steering pump (disconnect and plug lines). Remove fuel pump heat shield and fuel pump. Remove cup type plug from top of front cover and then remove fuel pump pushrod. Remove engine front cover.

Installation - Reverse removal procedure and note the following: 1) Power steering pump rubber insulators must be properly installed. 2) Lips of front cover seal must maintain proper contact with power steering pump.

6 CYL. & V8 TRUCK ENGINES

ENGINE FRONT COVER: Removal - Drain cooling system and crankcase. On P Series, remove hood, then remove grille, headlights, parking lights, wind deflector and hood lower weatherstrip as an assembly. Remove accelerator cross shaft. On all trucks, remove radiator, fan shroud, fan, spacer, brackets, pulleys, and damper. On V8 trucks, remove fuel pump, disconnect engine front mounts and raise engine slightly. On all trucks, remove oil pan and flywheel housing inspection cover. Remove engine front cover.

Installation - *See 292" V8 Engine above for aligning tool and procedure.* Reverse removal procedure to complete installation.

ALL ENGINES

FRONT COVER OIL SEAL REPLACEMENT: *NOTE - On 430" engine, seal must be seated in cover. No special tools required. For other engines, proceed as follows:* Remove old seal with punch and clean recess in cover. Drive new seal in cover with proper tool (see below) until seal is fully seated and make sure spring is positioned properly in seal.

Front Cover Seal Installing Tool

Engine	Tool No.
144" & 170"	T60K-6700-A or 6700-C
221" & 260"	T58P-6700-B
223", 262", 292"	T52L-6700-BEE or 6700-B
352", 390" & 406"	T59P-6700-B or 6700-B

CAMSHAFT & BEARINGS

►*CAMSHAFT REMOVAL PROCEDURE NOTE: See other sections of this Special Data for removal of Cylinder Head, Engine Front Cover, Intake Manifold, Rocker Arm Shaft Assembly, and Oil Pump. See individual Car Model pages for Oil Pan removal.*

144" & 170" ENGINES

CAMSHAFT REMOVAL: On Econoline, remove front passenger seat and engine cover. On Comet & Falcon, remove grille. On all models, remove radiator, engine front cover, oil pan and oil pump, sprockets and timing chain, distributor, fuel pump, oil filter, rocker arm shaft assembly, pushrods, cylinder head, lifters, and camshaft thrust plate. Remove camshaft.

223" & 262" ENGINES

CAMSHAFT REMOVAL: Remove headlight trim rings and grille, radiator, engine front cover, oil pan, dampers and pulleys, rocker arm shaft assembly, pushrods, distributor, fuel pump, oil filter, pushrod chamber cover, sprockets (or gears) and timing chain, and camshaft thrust plate and spacer. Raise and hold lifters clear of camshaft. On F Series Truck, disconnect engine front mounts and raise engine so camshaft can be removed through grille opening. On all models, remove camshaft.

221" & 260" ENGINES

CAMSHAFT REMOVAL: Remove engine front cover (see above), then crank engine until timing marks on sprockets are adjacent and in line between shaft centers and remove camshaft sprocket screw, washers, and fuel pump eccentric. Slide both sprockets and timing chain forward and remove as an assembly. Disconnect spark plug wires at plugs and remove from bracket on rocker cover. Disconnect coil high tension lead at coil and remove distributor cap and plug wires as an assembly. Remove coil and disconnect vacuum line at carburetor, then remove distributor. Remove carburetor to filter fuel line and disconnect heat tube at carburetor and heater hose from carburetor spacer. On Auto. Trans. Cars, disconnect throttle valve vacuum line at intake manifold and oil cooler lines at radiator. Remove radiator. Disconnect accelerator rod at carburetor and remove retracting spring, bellcrank assembly and position out of way. Disconnect temperature unit wire and engine ground strap and bellcrank assembly and position out of way. Remove intake manifold and carburetor as an assembly. Remove rocker arm covers, loosen arm stud nuts and rotate arms to one side. Remove pushrods (Keep in sequence for reinstallation). Remove valve lifters, camshaft thrust plate, and pull camshaft toward front of engine. *NOTE - Avoid damaging camshaft bearings.*

292" V8 ENGINES

CAMSHAFT REMOVAL: Remove grille, radiator, engine front cover and water pump, intake manifold, oil pan,

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rocker arm shaft assemblies, pushrods, pushrod chamber cover, distributor, sprockets and timing chain, camshaft thrust plate and spacer. Raise and hold lifters clear of camshaft. Remove camshaft.

352", 390" & 406" ENGINES

CAMSHAFT REMOVAL: Remove grille (unnecessary on T-Bird), radiator, engine front cover, sprockets and timing chain, distributor, rocker arm shaft assemblies, pushrods, intake manifold, lifters, and oil pan and screen. Remove camshaft.

430" ENGINE

CAMSHAFT REMOVAL: Remove hood, air conditioning condenser (unnecessary to disconnect lines), radiator, lower center grille, engine front cover, sprockets and timing chain, rocker arm shaft assemblies, pushrods, and lifters. Remove chamshaft.

ALL ENGINES

►*CAMSHAFT BEARING INSTALLATION CAUTION:* When installing bearings, special care must be taken to align oil holes in bearings with drilled oil passages in cylinder block bearing bore. Also, bearings with 2 holes provide lubrication to valve system and extensive engine damage would result if these holes were blocked. *DO NOT install any bearing with 1 hole in a 2 hole bearing position.*

CAMSHAFT BEARING REPLACEMENT: 144" & 170" - Use Tool 6261-M & Adapter Set 6261-AB. No. 1 & No. 4 bearings are not interchangeable with any other bearing. No. 1 bearing must be installed to .100-.140" below front face of bearing bore in block. No. 4 bear- No. 4 bearing has two oil holes and must be installed so forward edge of bearing is 24 3/4"±1/64" from thrust plate mounting surface of block.

223" & 262": Use Tool T52L-6261-CEE & Adapter Set T54L-6250-B or Tool 6261-C. No. 1 bearing is not interchangeable with other bearings. No. 1 bearing must be installed to .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes.

221" & 260": Place bearings in bores and press into position with Tool T62F-6250-A and Details 1,2 & 3. Be sure oil holes in bearings are in line with holes in cylinder block. *NOTE* - Front bearing must be installed .005-.020" below front face of cylinder block. Coat new rear plug with water resistant sealer and install with flange facing out and slightly below chamfer in bore.

292": Use Tool T52L-6261-CEE or 6261-C & Adapter Set T54L-6250-B or 6261-E. No. 1 & No. 3 bearings are not interchangeable with other bearings. No. 1 bearing must be installed to .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes.

352" & 390": Use Tool T52L-6261-CEE or 6261-F & Adapter Set T54L-6250-B or 6261-E. None of the bearings are interchangeable. No. 1 bearing must be installed to .005-.020" below front face of cylinder block.

430": Use Tool 6261-F & Adapter Set 6261-AC. *NOTE - Camshaft bearing journals and I.D. of bearings ar st pp d (largest journal and smallest b aring at front). DO NOT int rchange bearings. Position numb r of bearing is stamped on ach b aring.* No. 1 bearing must be installed with notch on bearing to front of engine and facing down toward bottom of block; and bearing must be .005-.020" below front face edge of cylinder block bearing bore. On other bearings, split in bearing must be up toward top of cylinder block.

VALVE SYSTEM

ALL ENGINES

►*1962 METEOR V8 221" & 260" ENG. EXCESSIVE VALVE PUSHROD GUIDE WEAR CORRECTION & PRODUCTION CHANGE NOTE:* A new valve pushrod Part No. C20Z-6565-B, was incorporated in production approximately February 5, 1962 to minimize excessive wear in cylinder head pushrod guide area. When valve rocker arm cover removed, visually inspect this area for wear (maximum allowable wear of pushrod guide is .005"). Replace cylinder head and all pushrods with new polished type rods, if wear limit exceeded. If wear limit not exceeded, but wear is evident, replace affected pushrod with new type. *NOTE* - To measure pushrod guide wear in cylinder head, move rocker arm in such a position that the pushrod rests in worn slot of guide (this verifies that rocker arm pad is in full contact with entire top surface of valve stem). Measure by using a straight edge across affected guide and measuring with .005" wire gauge.

ROTATABLE VALVES: Valves operate directly in valve guide holes in cylinder head. Remove and install as follows:

Valve Removal: Use Tool 6513-EE to compress valve springs. Remove all parts of assembly.

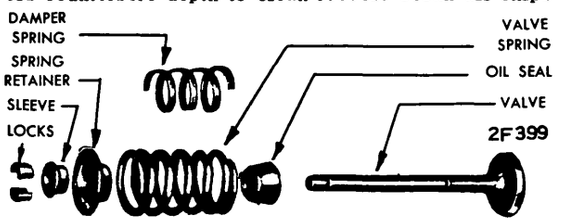
Valve Installation: Lubricate valve guides and stems with engine oil. Apply Lubriplate to valve stem tip. Install all parts in same order as removed, making sure closed coil end of valve spring is toward cylinder head and damper spring, if used, is not caught in valve spring.

262" & 292" HD TRUCK ENGINES

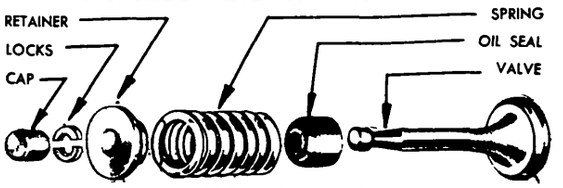
EXHAUST VALVES

FREE TURNING VALVE CAP CLEARANCE CHECK: Clearance between end of valve stem and inside surface of cap with valve locks and spring retainer installed should be .0002-.004" measured with Tool 6513-CE-2. Lap open end of cap if clearance more than .004".

EXHAUST VALVE SEAT INSERT INSTALLATION: Counterbore the recess in head about .001-.002" below old counterbore depth to clean recess. Clean all chips and oil from recess. Chill new oversize insert and tool in dry ice for ½ hour. Place insert on tool with small radius on outer edge facing outward, pilot tool in guide and drive insert into recess until fully seated. DO NOT peen around insert. Reface insert. *CAUTION - Installation must be made quickly after tool and ins rt removed from dry ice.*



ROTATABLE VALVE ASSY. (WITH DAMPER)



FREE-TURNING VALVE ASSY. 2F400

VALVE GUIDES

ALL ENGINES

VALVE GUIDE REAMING (To Install Valves With Ov r- size Stems): Reamers are furnished .003" oversize with standard diameter pilot, .015" oversize reamer with .003" oversize pilot, and .030" oversize reamer with .015" oversize pilot. Always use reamers in sequence and reface valve seat after valve guide is reamed. Use Reamer Tool as follows:

Valve Guide Reaming Tool

Engine	Tool N .
144" & 170"	T60K-6085-A or 6085-AE
223" & 262"	T52L-6085-AEE or 6085
221" & 260"	6085-AE
292" (Exc. HD Trk. Exh.)	T52L-6085-AEE or 6085
292" (HD Trk. Exh.)	T56T-6085-A
352, 390" & 406"	T58P-6085-B or 6085-H
430"	6085-H

VALVE TAPPET ADJUSTMENT & CHECKING MECHANICAL LIFTER TYPE ENGINE "CONVENTIONAL" TYPE ROCKER ARMS

INITIAL VALVE LASH ADJUSTMENT (After Overhaul): Check rocker arm adjusting screw for proper setting. Torque required to turn screw after interference noted must be 3 ft. lbs. minimum. Replace adjusting screw or rocker arm if necessary.

6 Cylinder: Adjust intake and exhaust valves of each cylinder in firing order (1-5-3-6-2-4) with each piston at TDC of compression stroke.

292" V8: 1) Place No. 1 piston at TDC of compression stroke. Adjust following valve clearances: No. 1,4,5 Exhaust; No. 1,2,7 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at TDC). Adjust following valve clearances: No. 6 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valve clearances: No. 2,3,7 Exhaust; No. 3,6,8 Intake.

390", 406" V8: 1) Place No. 1 piston at TDC of compression stroke. Adjust following valve clearances: 1,4,5 Exhaust; No. 1,,7,8 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at TDC). Adjust following valve clearances: No. 2 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valve clearances: No. 3, 7, 8 Exhaust; No. 2, 3, 6 Intake.

All Engines: Make final clearance check. *See TUNE-UP on Car or Truck Model Pages.*

"ZERO LASH" TYPE ROCKER ARM ENGINES

INITIAL VALVE LASH ADJUSTMENT (Aft r Ov rhaul): Adjust intake and exhaust valves of each cylinder in turn in firing order (1-5-3-6-2-4) with each piston at

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TDC at end of compression stroke as follows:

1) Push rocker arm eccentric in toward rocker arm until recess mark on eccentric is inboard of valve stem tip (eccentric will remain in position when released and should be near limit of its travel). Push eccentric end of rocker arm down until eccentric contacts valve stem tip and all vertical and horizontal clearance in eccentric is removed.

2) Tighten rocker arm adjusting screw to remove all lash between screw and pushrod socket. *CAUTION - Do not turn screw beyond this position or valve will be forced open.* Push outward slightly on eccentric. If all vertical clearance was not removed, eccentric will move out slightly until upper edge of eccentric bottoms in rocker arm. but recess mark must still be inboard of valve stem tip.

3) Continue to push eccentric outward and loosen rocker arm adjusting screw until recess mark in eccentric is centered directly over valve stem tip. Tighten adjusting screw locknut.

Final Adjustment - With engine idling at normal temperature, make minor adjustment with adjusting screw until eccentric recess mark is centered over valve stem tip during entire valve cycle of operation. Tighten adjusting screw locknut to 35 ft. lbs.

HYDRAULIC LIFTER TYPE ENGINE

HYDRAULIC LIFTER OPERATING RANGE CHECK: Clearance between valve stem and rocker arm should be .078-.218" with lifter fully collapsed. To check operating range of lifter, proceed as follows:

1) Place No. 1 piston at TDC of compression stroke. Following valves will be adjusted: No. 1, 3, 7, 8 Intake; No. 1, 4, 5, 8 Exhaust. Bleed lifter down with Tool T58P-6565-A or 6513-K and hold collapsed. Insert first step of gauge part of Tool T58P-6565-A or .078" feeler gauge between valve stem and rocker arm. If first step or gauge enters, use standard length pushrod. If first step or gauge does not enter, use .060" **shorter** pushrod (coded White). If second step of tool or .218" gauge can be inserted between valve stem and rocker arm, operating range is excessive (incorrect pushrod, excessive wear on pushrods, rocker arms, or valve stems). If all other parts of valve train are within limits, install .060" **longer** pushrod (coded Yellow).

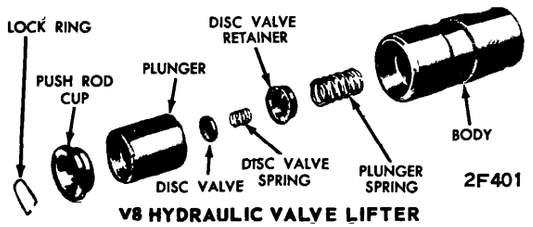
2) Repeat above procedure with No. 6 piston at TDC of compression stroke and check the following valves: No. 2, 4, 5, 6 Intake; No. 2, 3, 6, 7 Exhaust.

►*CAUTION:* To avoid damage to valve or piston when compressing spring to remove pushrod, make sure piston is below TDC.

HYDRAULIC LIFTERS
V8 ENGINES

►*CAUTION:* Observe the following cautions when servicing hydraulic lifters: **1)** Lifters must be reinstalled in bores from which removed. **2)** DO NOT intermix parts of one lifter with parts of any other lifter. **3)** Absolute cleanliness must be observed to keep lifters free of lint, dust, or other foreign material.

HYDRAULIC LIFTER OVERHAUL: Rem val - Lifters can be removed with a magnet after removal of intake manifold (352" & 390" Engines), through pushrod holes (430" Engine).



V8 HYDRAULIC VALVE LIFTER

Disassembly: Remove lock ring (depress plunger fully if necessary), pushrod cup, plunger and spring. Invert plunger and remove disc valve retainer (pry up gently with a screwdriver), disc valve and spring.

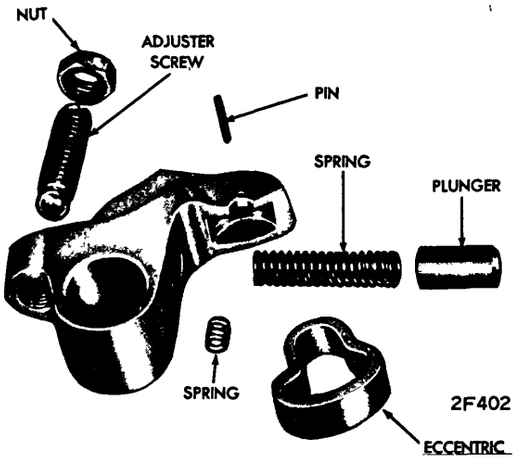
Reassembly: With plunger inverted, install disc valve, spring, and retainer. Insert plunger spring and plunger (open end up) into lifter body. Place pushrod cup on plunger and install lock ring (closed end first).

Lifter Testing: Leakdown rate should be 10-80 seconds under a 50 lb. load. Use a lifter tester according to directions of manufacturer.

ROCKER ARMS
221" & 260" ENGINES

ROCKER ARM ASSEMBLY: Removal - Remove rocker arms adjusting nuts, fulcrum seats and rocker arms.

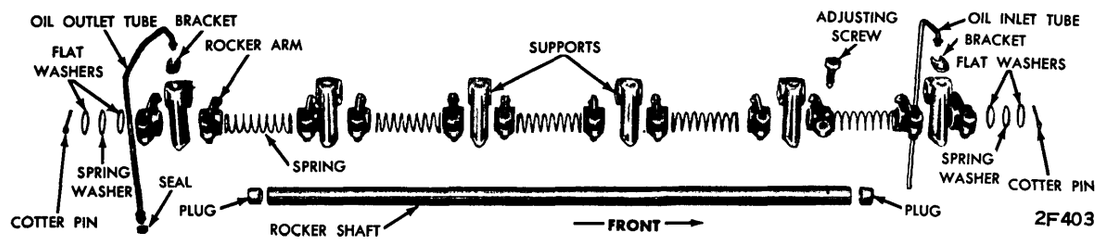
ROCKER ARM STUD REPLACEMENT: *NOTE - .003" oversize studs (not available for service) may be used in production. Oversize studs are identified as follows: Standard stud is plain; .003" OS. stud has daub of paint on threaded end and a groove at tapered end.*



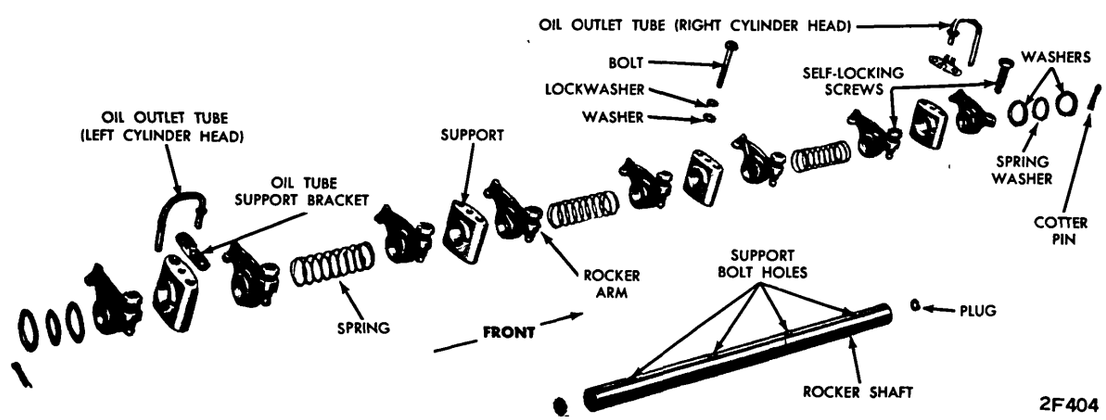
"ZERO LASH" HYDRAULIC VALVE LIFTER

.015" OS. stud has taper ab ve threaded section f r increase in diameter. To remove stud, place washer detail of Tool 6527-A over stud, thread puller detail onto stud, place sleeve detail over puller, and then nut detail onto puller. Hold puller detail stationary and turn large nut to pull stud. If stud threads are damaged, cut them off and cut notch or groove in stud so puller detail can be secured to old stud with the

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6 CYLINDER 223" & 262" ROCKER ARM ASSEMBLY



V8 292" ENGINE ROCKER ARM ASSEMBLY

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Allen set screws. *NOTE* - No reaming is required to replace a standard stud with a new standard stud. When replacing a standard stud or a .003" (Factory OS) stud with a .015" OS stud, ream stud bore with Tool 6527-B. Coat new stud with Lubriplate and drive into position with Tool 6527.

223" 6 CYL. ENGINES

"ZERO LASH" TYPE ROCKER ARMS: Conventional type aluminum rocker arm modified to hold a spring-loaded hardened eccentric cam between rocker arm and valve stem. Plunger and spring mounted on underside or rocker arm work against eccentric and hold eccentric outward during engine cycle of rocker arm movement maintaining zero clearance at valve stem tip.

Overhaul - Disassemble rocker arm and eccentric assembly by removing eccentric retaining pin. Eccentric recess depth in rocker arm should not exceed .300" measured from radius corners of front cutout (below pin hole) perpendicular to greatest depth of recess. Reassemble all parts in correct positions (see illustration). *For rocker arm shaft assembly overhaul, see "6 Cyl. & 292" V8 Engines" below.*

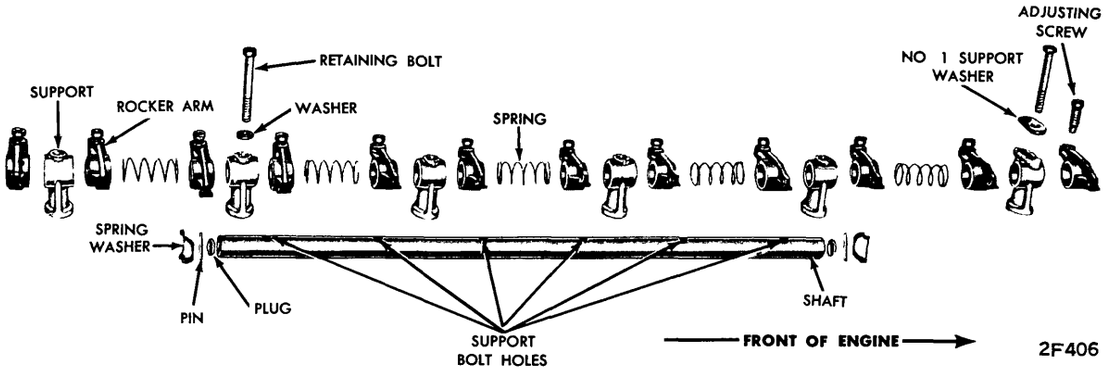
6 CYL. & 292" ENGINES

ROCKER ARM ASSEMBLY OVERHAUL: Removal - Remove oil inlet and outlet pipes. Loosen rocker arm adjusting screws to relieve spring tension. Loosen rocker arm shaft support retaining bolts evenly in turn, then remove rocker arm shaft assembly.

Disassembly: Remove cotter pins from ends of shaft and remove all parts, noting order in which assembled, To remove plugs from ends of shaft, pierce one plug and remove and push out other plug with a rod.

Reassembly: Lubricate all moving parts with engine oil and apply Lubriplate to rocker arm pads. Install shaft end plugs with cup side out. Install all parts in same order as removed, with oil holes in shaft facing downward.

Installation: Reverse removal procedure, making sure that inlet line "0" ring seals are in place, and that support end of outlet pipe enters locating hole in shaft to position shaft properly.



6 CYLINDER 144" & 170" ENGINE ROCKER ARM ASSEMBLY

352", 390" & 406" ENGINES (MECHANICAL LIFTERS)

ROCKER ARM ASSEMBLY OVERHAUL: Removal - Loosen rocker arm adjusting screws to relieve spring tension. Loosen rocker arm shaft support retaining bolts evenly in turn, then remove rocker arm shaft assembly.

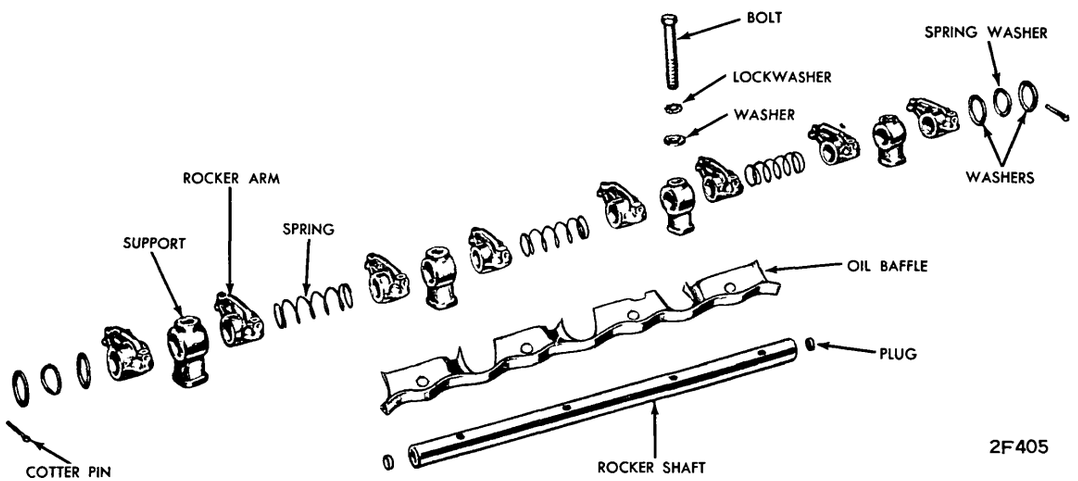
Disassembly: *See "6 Cyl. & 292" V8 Engines" above.*

Reassembly: *See "6 Cyl. & 292" V8 Engines" above.*

Installation: Reverse removal procedure.

352", 390" & 430" ENGINES (HYDRAULIC LIFTERS)

ROCKER ARM ASSEMBLY OVERHAUL: Removal - *CAUTION - Follow procedure below exactly to prevent damage to valve train parts.* Place No. 1 piston at TDC at end of compression stroke and rotate crankshaft damper an additional 45°. Loosen right bank rocker arm shaft support bolts in sequence 2 turns at a time, starting at No. 4 (rear) cylinder. When bolts are loosened, remove rocker arm shaft assembly.



V8 352", 390", 406" & 430" ROCKER ARM ASSEMBLY

Follow same procedure for right bank rocker arm shaft bolts, starting at No. 5 (front) cylinder.

Disassembly: *"6 Cyl. & 292" V8 Engines" above.*

Reassembly: *See "6 Cyl. & 292" V8 Engines" above.*

430" ENGINE NOTE - Identification notch on rocker arm shaft must be down and to rear of engine on left bank, down and to front of engine on right bank.

Installation: *CAUTION - Follow procedure below exactly to permit hydraulic lifters to leak down and to prevent damage to valve train parts.* Place No. 1 piston at TDC of compression stroke and rotate crankshaft damper an additional 45°. Tighten right bank rocker arm shaft support bolts in sequence, 2 turns at a time, starting at No. 4 (rear) cylinder, until torque specification is reached. Follow same procedure for right bank rocker arm shaft support bolts, starting at No. 5 (front) cylinder.

OILING SYSTEM
ENGINE LUBRICATION

144" & 170" ENGINES

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil under reduced pressure (metered by camshaft bearing) lubricates distributor drive gear and valve mechanism on cylinder head. All other parts are lubricated by oil spray or splash.

OPERATION: Rotor type oil pump mounted in crankcase at left front corner of engine. Pump draws oil through fixed strainer and intake pipe mounted on pump cover and delivers oil to full flow type filter mounted externally on front left side of crankcase. From the filter, oil passes through transverse passage to main oil gallery extending along full length of engine block directly above the camshaft. Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main gallery to each crankshaft bearing and then up to corresponding camshaft bearing. Distributor drive gear is lubricated from front camshaft bearing.

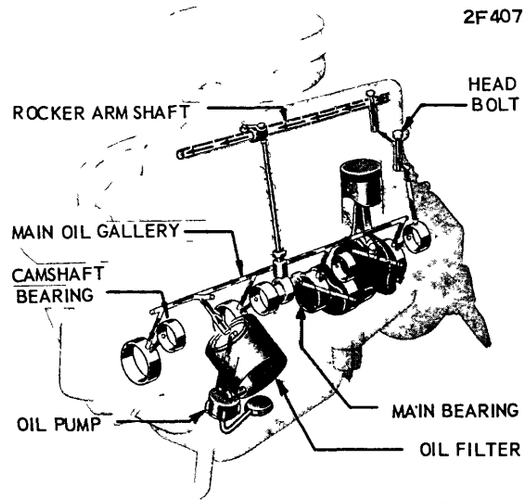
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing. Oil groove in main bearings provide continuous flow of oil to con-

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necting rod bearings.

Pist ns & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole on right side of rod when this hole registers with oil hole in connecting rod journal.



144" & 170" ENGINE OILING SYSTEM

Timing Chain & Sprockets - Lubricated by splash from oil pan.

Rocker Arms, Pushrods & Valve Stems - Oil from rear camshaft bearing flows through vertical passage in block and around left rear corner cylinder head bolt to oil port at rear rocker arm shaft bracket pad. Oil then flows around this bracket bolt to hollow rocker arm shaft, and is distributed to each rocker arm for rocker arm, pushrod, and valve tip lubrication. Excess oil is discharged from rocker arm shaft at front shaft bracket. Oil from rocker chamber runs down pushrods to lubricate pushrod seat and lifter and drains back into the oil pan through cored openings in the block.

OIL FILTER: Full flow type. Mounted externally on left front corner of engine. Filter has integral bypass valve and anti-drain back diaphragm.

223" & 262 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. Oil metered by No. 3 camshaft bearing lubricates rocker arms, pushrods, and valve stems. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Gear type oil pump mounted in crankcase on right hand side draws oil through fixed oil inlet and strainer, mounted on pump cover and delivers all oil through a passage in the pump body and crankcase wall to the oil filter intake port (filter mounted on pad on right side of crankcase). Filter outlet port on filter pad is connected to main oil gallery by a vertical passage and cross-passage in the block. Main oil gallery extends along right side of crankcase and oil is distributed from this gallery as follows:

Crankshaft & Camshaft B arings - Lubricated by drilled passages in each crankcase web through which oil is supplied from main oil gallery to each crankshaft bearing. A transverse passage connects this passage with each camshaft bearing.

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with connecting rod bearing lubricating hole.

Timing Chain & Sprockets - Lubricated through drilled passage in front end of block which directs oil from front camshaft bearing to crankshaft sprocket (camshaft journal has flat which registers with bearing supply oil hole and timing chain lubrication hole once in each revolution). Oil slinger on front end of crankshaft also throws oil onto chain.

Rocker Arms. Pushrods, & Valves - Drilled passage in No. 3 (rear intermediate) camshaft journal feeds oil at reduced pressure to drilled passage in block. A tube extending up through block and cylinder head directs this oil to the No. 6 (rear) rocker shaft bracket and into the hollow rocker arm shaft. Oil then flows through drilled passages in rocker arm to lubricate rocker arm bushing, pushrod socket and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker arm shaft flows through outlet pipe at No. 1 (front) rocker shaft bracket. This pipe terminates at drilled hole in lifter chamber directly above distributor driveshaft for distributor and drive gear lubrication (see below).

►*"ZERO LASH" ROCKER ARM NOTE:* Spring in rocker arm recess between arm and eccentric separates arm and eccentric for increased oil flow around eccentric. Rocker arm plunger and spring assembly is filled with oil to provide a cushioning effect to eccentric movement.

Valve Lifter & Fuel Pump Eccentric - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. A drilled hole in the lifter chamber floor directly above fuel pump eccentric on camshaft provides lubrication for the eccentric. A return hole at rear of lifter chamber allows oil to drain back into the crankcase.

Distributor & Drive Gear - Oil return pipe from rocker arm shaft terminates at drilled hole in lifter chamber. This hole is directly above distributor drive gear on camshaft and gears are lubricated by this return oil. A transverse passage in the block at the oil return pipe location in the lifter chamber directs drain oil to relieved section of distributor housing. Oil holes in housing direct oil to distributor lower bushing and drive gear.

OIL FILTER: Full-flow type mounted on pad on right side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when engine is started up.

221" & 260" ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod and camshaft bearings, hydraulic lifters and pilot end of distributor shaft.

OPERATION: Rotor type oil pump mounted on inside of crankcase draws oil through fixed oil screen in oil pan and delivers all oil to full-flow type filter. A spring loaded relief valve in pump limits maximum pressure in system. Filter has an internal relief valve which by-passes all oil when filter is clogged. Oil passes from filter through passages in block to No. 1 main and camshaft bearings and to main oil gallery in right bank side of block. Oil from main oil gallery is delivered as follows:

Crankshaft & Camshaft B arings - Lubricated by drilled passages from main oil gallery to No. 2,3,4 & 5 main bearings and passages from their webs to camshaft bearings.

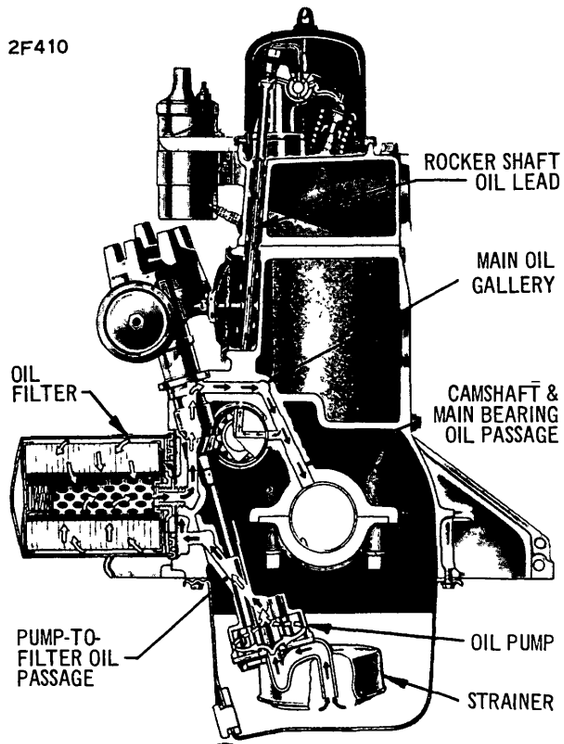
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in each connecting rod lower end when this hole lines up with oil hole in crankshaft.

Hydraulic Lifters - Oil passes from main oil gallery to passages at rear of block leading to hydraulic lifter galleries.

Rocker Arms, Pushrods & Valv s - Lubricated by oil passing through metered hole in upper end of hydraulic lifter plunger, through hollow pushrods, to friction areas of rocker arms. Oil drains back through holes in both ends of cylinder heads and the block.

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223" & 262" ENGINE OILING SYSTEM

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Distribut r - Pilot end (lower end) of shaft is lubricated through passage from No. 1 camshaft bearing bore.

Distribut r Driv & Driven Gears, Timing Chain, Sprockets and Fu l Pump Eccentric - All splash lubricated.

OIL FILTER: Full-flow type mounted on left front side of engine. Filter has integral relief valve to permit oil to by-pass filter when filter clogged.

292" V8 ENGINE

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, Oil metered by camshaft bearings lubricates rocker arms, pushrods, and valves. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted externally on left side of crankcase draws oil through fixed oil strainer in oil pan and external oil pipe (passes through or attached to side of oil pan) and delivers all oil through a port in the pump mounting base and passages in crankcase to oil filter intake port (filter mounted on pad on left side of crankcase). Filter outlet port on crankcase connects directly with main oil gallery extending along left side of crankcase. Oil is distributed from this main oil gallery as follows:

Crankshaft & Camshaft Bearings - Lubricated by drilled passage in each crankcase web through which oil is supplied from main oil gallery to intersecting passage leading to corresponding main and camshaft bearings.

C nn cting Rod B arings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in side of connecting rod lower end when this hole lines up with oil hole in crankpin.

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 3 camshaft bearing extend up through block and matching passages in cylinder heads (with offset formed by channel on lower face of head) and oil then flows up through drilled passage in No. 2 rocker shaft support bracket (Right Bank), No. 3 rocker shaft support bracket (Left Bank) to hollow rocker arm shaft. Oil holes in shaft and rocker arm provide lubrication for rocker arm bushing, pushrod ball end and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker shaft flows through outlet pipe at No. 1 rocker shaft bracket (Right Bank), No. 4 rocker shaft bracket (Left Bank) for timing chain and distributor lubrication (see below).

Valve Lifters & Pushrod Seats - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. Oil for this purpose is also supplied by rocker shaft outlet pipes which terminate in lifter chamber. Oil in lifter chamber is returned to oil pan through large opening at rear of chamber. This oil lubricates distributor drive gear.

Distributor, Intermediate Shaft & Bushing - Lubricated by oil supplied through drilled passage from No. 5 camshaft bearing (camshaft journal is drilled and oil flows through this passage from camshaft bearing oil hole to distributor oil passage). *NOTE* - Distributor drive gear is lubricated by oil return from lifter chamber to oil pan through large opening at rear of lifter chamber.

Timing Chain & Sprockets - Oil return from right bank rocker chamber (outlet pipe at No. 1 rocker shaft bracket) is channeled by trough in lifter chamber to hole in front cylinder block wall through which the oil is directed on timing chain and sprockets. Oil slinger on crankshaft also throws oil on timing chain,

OIL FILTER: Full-flow type mounted on pad on left side of crankcase. Relief valve in filter assures engine lubrication if filter element clogged. An anti-drainback diaphragm in the filter mounting recess traps oil in filter to insure quick oil circulation when the engine is started up.

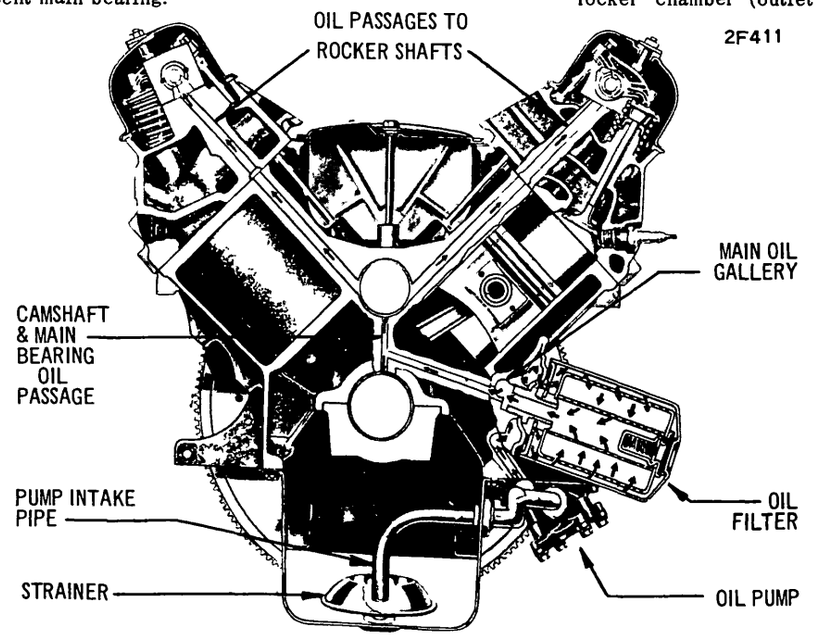
352", 390" & 406" ENGINES

►*MECHANICAL LIFTER ENGINE NOTE:* On engines with mechanical lifters, engine oiling system is changed as follows: 1) Jiggle pin in main oil gallery replaced by a cap plug. 2) Passages from main oil galleries to right and left lifter galleries are plugged.

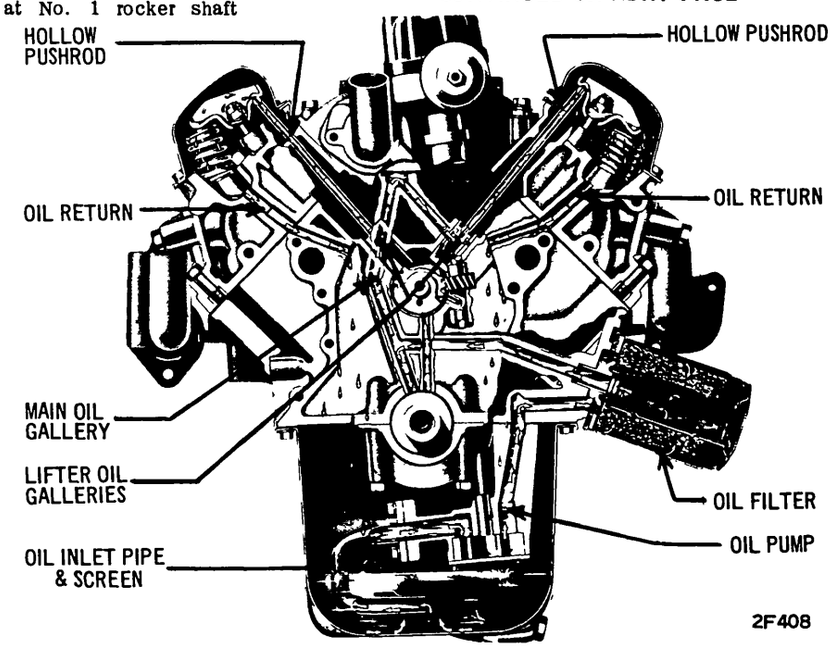
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, hydraulic valve lifters, and rocker arms. All other parts are lubricated by oil spray or directed oil return flow.

OPERATION: Rotor type oil pump mounted in crankcase draws oil through fixed intake pipe and oil strainer mounted on pump body and delivers oil through passage in crankcase to oil filter inlet port on filter mounting pad. From the filter, oil flows through transverse passages in the front wall of the cylinder block to forward end of main oil gallery which extends the entire length of the crankcase in the floor of the lifter chamber. At a point near the rear of the engine, cross-passages connect the main gallery with the right and left valve lifter galleries which extend along the length of the crankcase in line with the valve lifters. Oil is distributed through these galleries as follows:

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V8 292" ENGINE OILING SYSTEM



221" & 260" ENGINE OILING SYSTEM

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Crankshaft & Camshaft Bearings - Front camshaft and crankshaft bearings are lubricated directly from the oil filter outlet passage (vertical passage in front cylinder wall between bearings intersects the filter cross-passage). Other camshaft and crankshaft bearings are lubricated through vertical passage in crankcase web at each bearing which extends down from main oil gallery to corresponding camshaft and crankshaft bearings (camshaft bearing bore in block is grooved to permit oil flow around bearing and on to the crankshaft bearing).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall by connecting rod of the same cylinder in opposite bank. Spray hole consists of a slot in parting face of rod bearing cap through which oil is sprayed when this slot lines up with oil hole in crankpin. *NOTE - Rods must be installed with this slot upward toward camshaft to effect this cross-lubrication.*

Valve Lifters - Right and left lifter oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods & Valves - Drilled passages in block at No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank) extends up through block and matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect this bolt hole with passage in block). An angle passage in the head connects cylinder head bolt hole with rocker shaft support bolt hole (No. 2 support bracket for left bank „ No. 3 bracket for right bank). Oil then flows up around bracket bolt and through an angle passage into the hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips (baffle under rocker shaft assembly shields valve stems from oil splash). Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber is returned to oil pan through drain holes at each end of cylinder head and in lifter chamber.

Timing Chain & Sprockets - Plug at forward end of main oil gallery has vent hole and jiggle pin to vent air trapped in gallery. Oil passing through this vent lubricates timing chain and sprockets.

Distributor & Drive Gear - Lubricated through cross-passage from No. 1 camshaft bearing (see illustration).

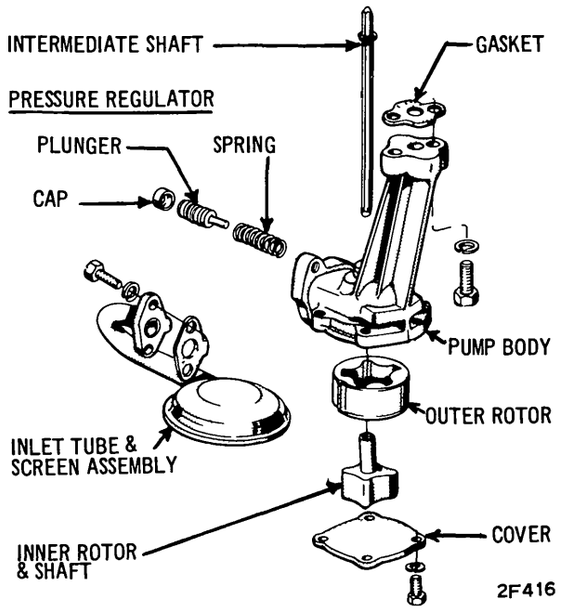
OIL FILTER: Full flow type mounted on adapter at right front of crankcase. Relief valve in filter assures engine lubrication if filter element clogged.

430" V8 ENGINE

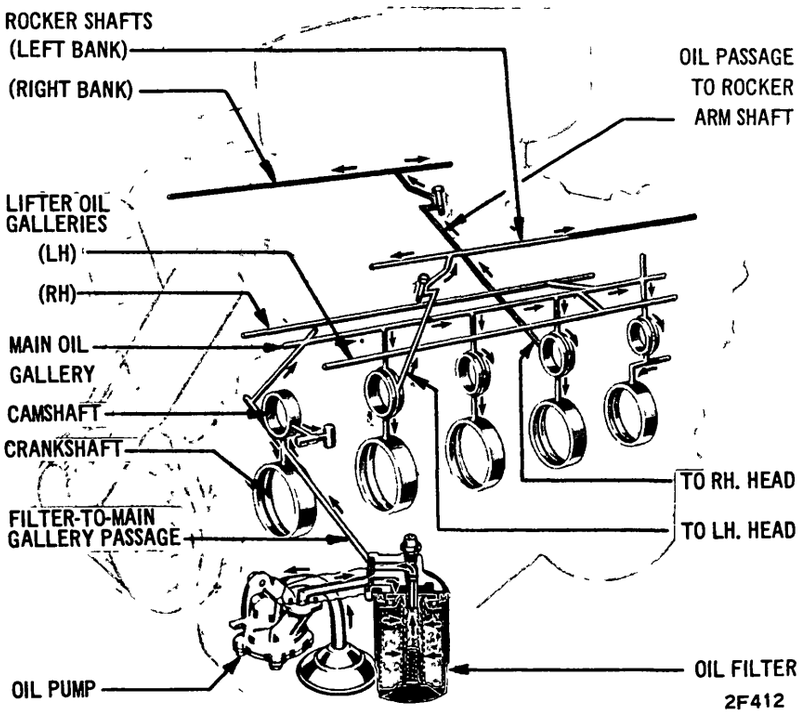
DESCRIPTION: *Oiling system for this engine is same as for 352", 390" & 406" V8 Engines (see above) except for the following details.*

Crankshaft & Camshaft Bearings - All bearings are lubricated through vertical passages from main oil gallery (oil flow from filter is direct to main oil gallery).

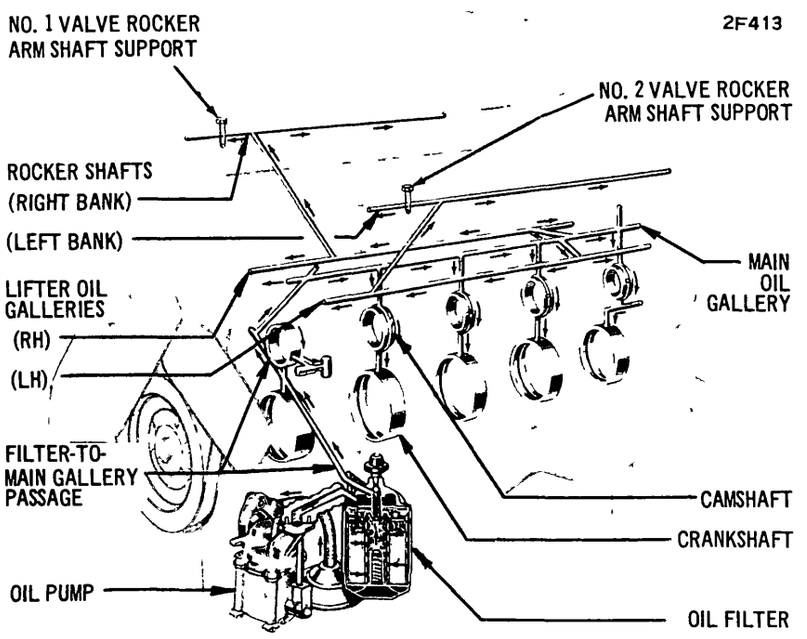
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221" & 260" ENGINES OIL PUMP



V8 352", 390" & 406" ENGINE OILING SYSTEM



V8 430" ENGINE OILING SYSTEM

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Rocker Arms, Pushrods, & Valves - Drilled passages in block lead from right and left lifter oil galleries and connect with matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect passage in block with this bolt hole). An angle passage in the head connects the cylinder head bolt with the rocker shaft support bracket hole (No. 1 support bracket for right bank, No. 2 bracket for left bank). Oil then flows up around bracket bolt and through angle passage in bracket into hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips. Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber drains back into lifter chamber through holes at front and rear lower corners of head.

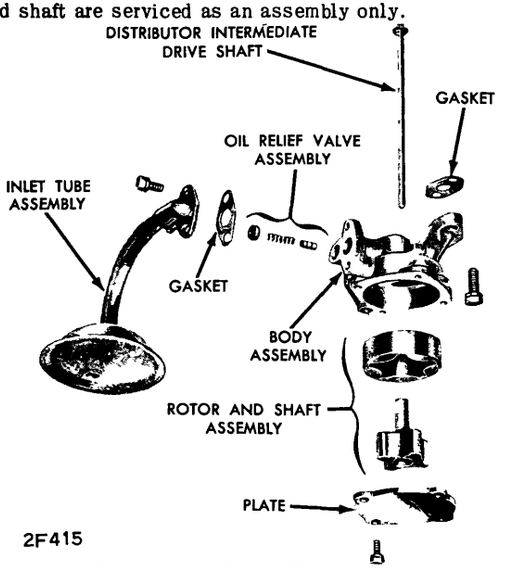
Timing Chain & Sprockets - Oil draining from front camshaft bearing flows onto thrust face of camshaft sprocket and is sprayed on timing chain and crankshaft sprocket.

OIL PUMP
ALL ENGINES

OIL PUMP: Removal - Remove oil pan. On 223" Engine, remove distributor. On all 6 Cyl. & 292" V8 Engines, remove oil pump and intermediate shaft. On 352", 390", 406" & 430" V8 Engines, remove oil pump after oil pan removed or drop oil pump into pan while removing pan.

Disassembly: Remove inlet tube and cover. Remove inner rotor and shaft, then remove outer race. Remove relief valve chamber cap with self-threading screw, then remove relief valve spring and plunger.

Inspection: Clean all parts and dry thoroughly. Check all parts for wear or damage and replace as necessary. Check clearances as given in table below. Rotor endplay is measured with straightedge across housing with pump assembled. *NOTE* - Outer race, inner rotor and shaft are serviced as an assembly only.



V8 352", 390", 406" & 430" ENGINE OIL PUMP

Oil Pump Specifications

Item	All Engines
Outer Race-To-Housing	①.006-.012"
Rotor Endplay	②.0011-.0041"
Shaft-To-Housing	③.0015-.0029"
Relief Valve-To-Bore	.0015-.0029"

① - .003-.008" (V8 Truck). ② - .0010-.0035" (V8 Truck). ③ - .0025-.0039" (223" & 262" Engines).

Relief Valve Spring Specifications

Engine	Lbs. Pressure	Length
144" & 170"	8.6-9.5	1.078"
223" & 262"	9.0-9.6	1.53"
221" & 260"	11.15-11.75	1.704"
292"	8.7-9.7	1.710"
352", 390", 406", 430"	9.0-9.6	1.530"

Reassembly: Reverse disassembly procedure. Torque cover attaching screws to 6-9 ft. lbs. (except 430" Eng.), 90-100 inch-lbs. (430" Engine).

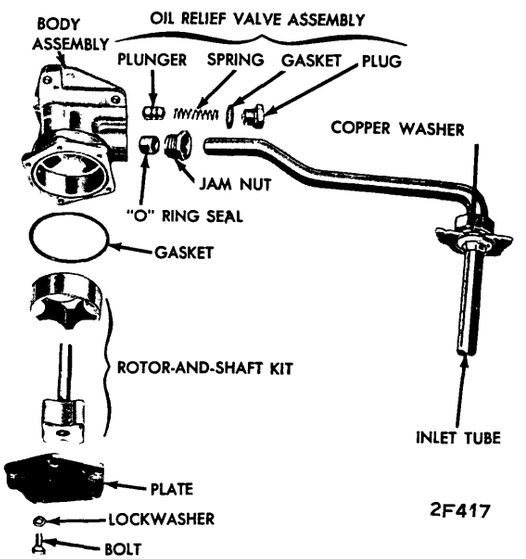
Installation: Reverse removal procedure.

ENGINE COOLING SYSTEM
WATER PUMP
ALL ENGINES

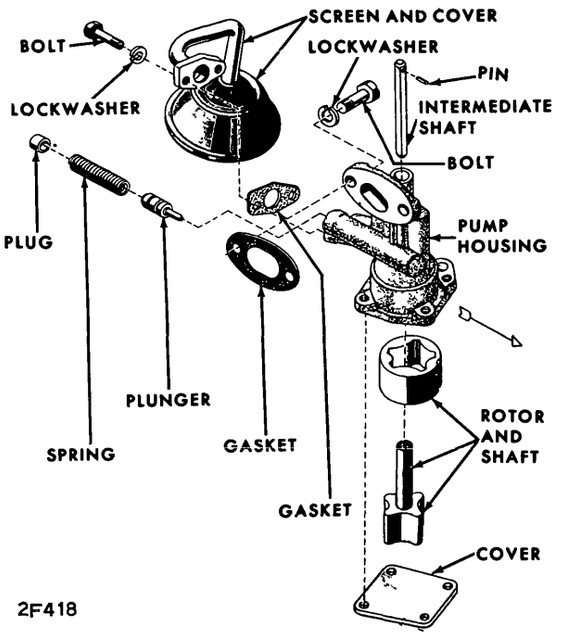
►*TOOL NOTE:* Special tool sets are available for water pump overhaul. Other suitable support plates and drivers may be used providing they support and apply pressure properly to shaft, bearing, housing, and other parts.

WATER PUMP OVERHAUL: Removal - Drain cooling system and disconnect hoses from pump. Remove belt, fan, and water pump pulley. Remove any other brackets or accessories attached to water pump (unnecessary to disconnect power steering pump hoses). Remove radiator supply tank on Continental. Remove water pump.

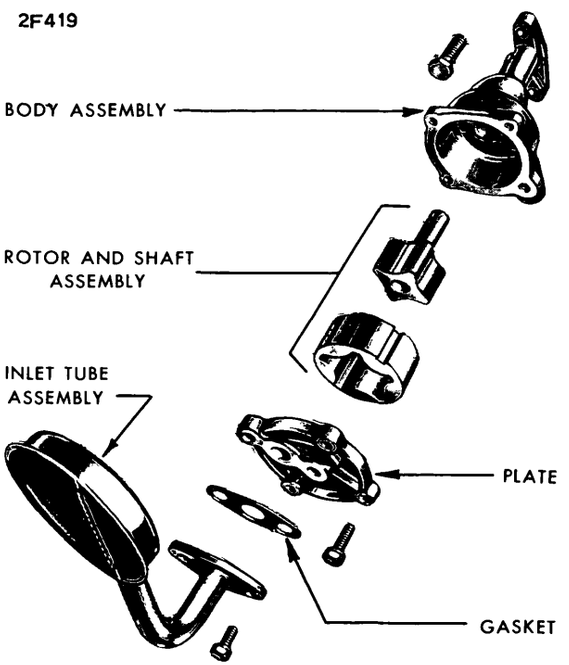
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V8 292" ENGINE OIL PUMP



223" & 262" ENGINE OIL PUMP



144" & 170" ENGINE OIL PUMP

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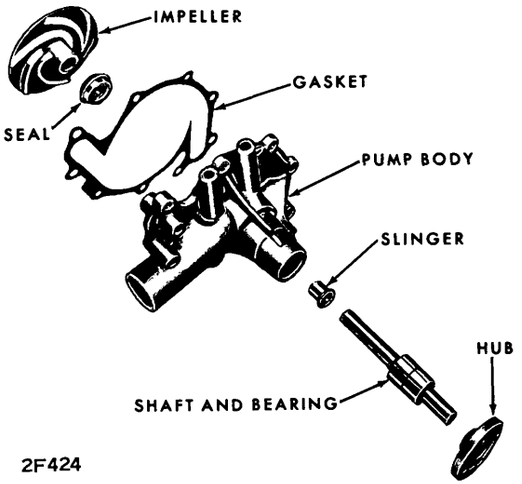
Disass mbly: Remove back plate (if equipped). Press or pull hub or pulley from shaft. Support housing and press shaft and bearing out of impeller, seal, and housing (or press shaft from housing, then press impeller from shaft). Press seal from housing. Remove slinger from shaft if slinger damaged.

R assembly: *NOTE - See table below for specifications.* Support shaft and press new slinger on shaft for specified clearance between underside of slinger flange to end of bearing race (144" & 170"), or specified distance from slinger flange to end of shaft (Others). On 144" & 170"Engines, coat shaft and bearing with a light coat of grease and press shaft into housing, with housing properly supported. On all engines, coat seal with waterproof sealer and press into housing, applying pressure to seal flange only. On all other engines, support housing and press shaft and bearing into housing until bearing is flush with hub edge of housing. On all engines, coat rubbing face of impeller with grease and press impeller on shaft with shaft properly supported until impeller-to-housing clearance is as specified. *NOTE - On pumps without back plate, impeller clearance is between front face of impeller to to rear mounting face of housing. On pumps with back plate, impeller clearance is distance rear face of impeller is below housing mounting face.* Support shaft and press hub on shaft to dimension specified from front face of hub to pump housing mounting face (front face of pulley to face of housing mounting legs on 430" Engine).

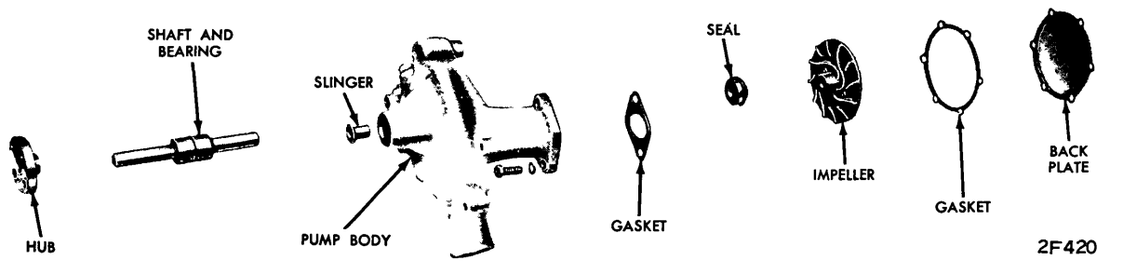
Installation: Reverse removal procedure.

Water Pump Dimensions & Clearanc s

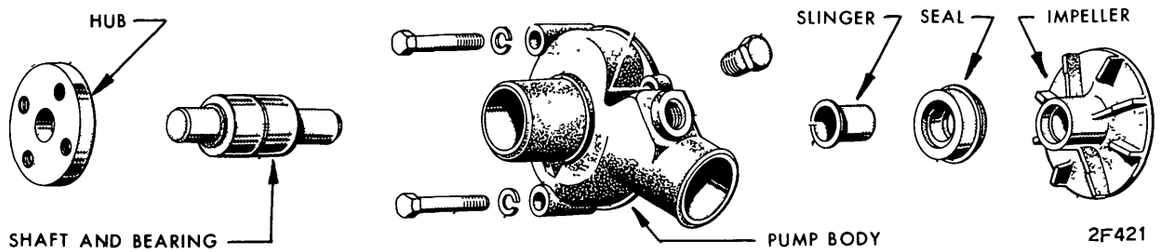
Engin	Sling r	Impell r	Hub
144" & 170"	.220"	.005-.025"	3.94"
223" Pass.	1.94"	.015-.025"	4.32"
223" Truck	1.76"	.020-.030"	4.36"
262"		.020-.030"	4.70"
221", 260"	1.875"	.040"	5.16"
292" Pass.	1.94"	.025-.035"	4.48"
292" Truck	1.94"	.030-.040"	4.48"
352" & 390"	1.94"	.070-.080"	8.65"
430"		.105-.115"	7.094"



221" & 260" ENGINE WATER PUMP



V8 352", 390", 406" & 430" ENGINE WATER PUMP



144" & 170" ENGINE WATER PUMP

POWER BOOSTER FAN

FORD & MERCURY

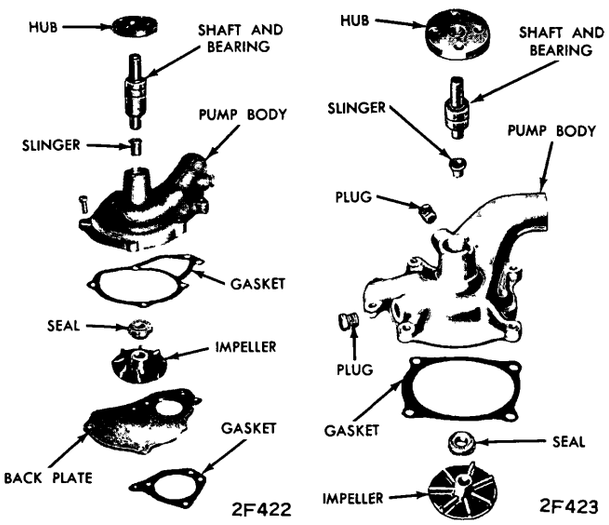
POWER BOOSTER FAN: Fluid coupling filled with silicone oil attached to water pump pulley at input side and to fan at output side. Unit is designed to provide driving force for maximum fan operation at low speeds and to limit top speeds of fan at higher engine speeds. This is accomplished by the torque carrying capacity of the fluid and also by the amount of fluid admitted to the coupling depending on various engine and ambient temperatures. A bi-metal strip on front of clutch moves out under higher temperatures and allows metal rod in center of clutch to move out. This rod actuates a valve inside clutch to control amount of fluid admitted to coupling from a reserve chamber. This action increases fan speed when air becomes hotter. Reverse action takes place under colder temperatures. Maximum fan speed is reached at approximately 3700 Engine RPM. Maximum fan speed at about 75MPH under extremely high ambient temperatures is 2700 RPM. Under low ambient temperatures, maximum fan speed is approximately 1500 RPM.

Trouble Shooting & Diagnosis: Poor cooling or noise may be caused by: Actuating rod sticking; Bi-metal strip deformed or kinked; Excessive fluid leakage from clutch unit.

Disassembly: Push bi-metal strip from retaining brackets and remove. Clean clutch unit with rag dipped in solvent. *CAUTION - DO NOT immerse clutch unit in any kind of liquid. Clean unit before removing actuating rod to prevent damage.* Remove actuating rod with fingers or needle-nose pliers.

Inspection: Replace entire clutch assembly if there is excess fluid leakage or if bi-metal strip kinked or

CONTINUED ON NEXT PAGE



223" & 262" ENGINE

V8 292" ENGINE

WATER PUMPS

CONTINUED FROM PRECEDING PAGE

bent. *NOTE - Bi-metal strips not interchangeable among units.* Clean actuating rod bore in clutch with crocus cloth. Clean rod in solvent and make sure rod moves freely in clutch bore. Replace damaged rod with replacement rod. *CAUTION - Replacement rod must be same length as old rod. Adjust Allen screw in service rod to obtain proper length.*

Reassembly: Reverse disassembly procedure.

LINCOLN CONTINENTAL

POWER BOOSTER FAN: Fluid coupling mounted between fan and water pump pulley. Unit is regulated by underhood temperatures to control fan RPM as engine cooling requirements change. Bi-metal coil spring on clutch front cover expands under higher temperatures and causes a plate inside unit to uncover opening between reserve and drive chambers and control amount of fluid in drive chamber. Reverse operation takes place under lower temperatures.

►*SAFETY CAUTION: Do not permit silicone oil to come in contact with the eyes as irritation will result.*

►*TESTING CAUTION:* Before testing, oil in unit must have minimum temperature of 65-70°F (park in heated garage overnight or operate engine at 1000 RPM for 20 minutes); and fan unit must be warm (operate for at least 5 minutes regardless of ambient air temperatures).

Testing & Troubl Shooting: *NOTE - Unit cannot be repaired and is service d as an assembly only. If unit does not operate properly under any of the following tests, it must be replaced.*

1) With engine stopped, fan should rotate under light finger pressure. If unit locked, replace it.

2) Make sure belt tension is properly adjusted and thermostatic spring is free of dirt and other foreign matter. Disengage spring from adjusting slot and rotate spring counterclockwise (toward No. 1 cylinder of engine) until internal valve is felt seating against a stop. Tape spring in this position. Unit should not provide engine torque to fan regardless of underhood temperatures.

3) Mark one fan blade with chalk, connect a tachometer to engine and a timing light to No. 1 spark plug. Start engine and hold light beam at fan. Marked blade of fan should be stopped between 1700 and 1900 engine RPM. If above or below this range, replace unit. Remove tape from spring and insert spring in proper adjustment position (see below).

Adjustment: Three adjustment slots in coil spring retaining bracket. End of spring should be positioned in proper slot depending on engine cooling requirements and ambient air temperaturds as follows:

Position A - Left hand slot when viewed from front of fan. Lowers underhood temperature requirements necessary to engage coupling to fan. Use this slot for high ambient air temperature zones and on cars with high engine operating temperatures.

Position B - Center slot. Use under normal operating conditions.

Position C- Right hand slot when viewed from front of fan. Permits higher underhood temperatures before drive torque applied to fan. Use in low ambient air temperature zones to increase engine operating temperature.

FUEL SYSTEM NOTES

430" ENGINE

CARBURETOR AIR INTAKE DUCT ASSEMBLY (WITH THERMOSTAT CONTROL): Thermostatically controlled valve in air intake duct assembly should be fully closed at temperatures below 75°F (for air intake from rear "heated" opening) and should start to open at 85°F. Valve should be wide open at 100°F (for air intake from outside through left radiator side air deflector). If valve does not operate satisfactorily, remove duct assembly and test operation as follows:

Duct Assembly Removal: Loosen clampscrew and slide flexible hose off end of duct. Remove wing nut retaining air cleaner on carburetor, remove nut and washer retaining duct assembly on bracket. Lift air cleaner and duct assembly off engine. Loosen two clampscrews and slide duct assembly from air cleaner.

Testing: Place duct assembly in pan of water at temperature below 75°F. (thermostat must be covered by water). Valve should be in closed "heat on" position. Heat the water slowly. At temperature of 85°F, valve should start to open (*NOTE* - If valve does not start to open, hold water temperature at 85°F for eight minutes before discarding thermostat as defective). Increase water temperature to 100°F. Valve should now be wide open in "heat off" position (*NOTE* - If valve not wide open, hold water temperature at 100°F for eight minutes before discarding thermostat as defective). If valve operation not satisfactory, remove thermostat and spring assembly and check valve shaft for binding. If valve moves freely, replace thermostat and duct assembly. If valve does not operate correctly, adjust thermostat rod as follows:

Adjustment: Increase rod length to move valve toward "heat off" position, decrease rod length to move valve toward "heat on" position.

►*FALCON TRUCK & ECONOLINE NOTE: See separate data pages for information on these models.*
►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

FORD FALCON MODELS

Falcon Passenger Cars	**Series 10**
2-Door Sedan	11
4-Door Sedan	12
2-Door Sedan "Futura"	17
Falcon Station Wagons	**Series 20**
2-Door Ranch Wagon	21
4-Door Ranch Wagon	22
4-Door Country Squire	26
Ranchero	27
Sedan Delivery	29

MERCURY COMET MODELS

Comet Passenger Cars	**Series 00**
2-Door Sedan	01
4-Door Sedan	02
Comet Custom Passenger Cars	**Series 10**
2-Door Sedan	11
4-Door Sedan	12
2-Door Special Sedan "S-22"	17
Comet Station Wagons	**Series 20**
Comet 2-Door	21
Comet 4-Door	22
Comet Custom 2-Door	23
Comet Custom 4-Door	24

SERIAL NUMBER: Stamped on patent plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 S 12 S 100001

① - Year Model. 2 1962.
② - Assembly Plant. *See below.*
③ - Model Series. *See above.*
④ - Engine. *See below.*
⑤ - Beginning vehicle number at each assembly plant (100001 for Falcon, 500001 for Comet).

Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - Pilot Plant
H - Lorain	**R** - San Jose	**T** - Metuchen

Engine Code Identification

Engine	Code	Engine	Code
144" 6 Cyl. Std.	S	170" 6 Cyl. Std.	U
144" 6 Cyl. Export	D	170" 6 Cyl. Export	E

Engine Production Code Numbers: Stamped on crankcase outlet ventilation pipe boss on crankcase just forward of distributor. Indicate place, day and month of engine manufacture. Not used for licensing.

Car Build Date Code: Stamped under DATE on patent plate. Number indicates day of month, letter indicates month as follows: **A** January through **M** December (I not used).

►*ENGINE DESIGNATION NOTE:* In the following data, engines will be identified as follows: **144** (144 cu. in. engine), **170** (170 cu. in. engine).

TUNE-UP

►*ENGINE FAILING TO RETURN TO NORMAL IDLE SPEED CORRECTION:* Condition may be caused by throttle linkage binding. Check, clean, and lubricate pivot points.

►*170" ENGINE CARBURETOR HIGH FREQUENCY BUZZ CORRECTION: See "Holley Single Barrel Model 1909 Carburetor" in Carburetion Section.*

►*IMPROVED PERFORMANCE & FUEL ECONOMY ON CARS WITHOUT HEATER:* Connect water-heated carburetor spacer (already installed on engine in production) to the engine cooling system. To connect spacer, drain cooling system, and remove air cleaner. Remove pipe plugs from water pump and cylinder head. Install inlet and outlet nipples, then install hoses. Fasten hoses securely with clamps. Check for leaks. *CAUTION* - Do not allow hose to rest on exhaust manifold.

COMPRESSION PRESSURE: 170 lbs. ± 20 lbs. at cranking speed. All cylinders must be equal within 10 lbs.
VACUUM READING: 18" at idle speed.
VALVE TAPPET CLEARANCE: .016", All Valves, Hot and Cold. Use step-type feeler gauge (.015" GO, .017" NO GO). If tappet clearance set with engine cold, reset clearance after operating engine for 30 minutes at 1200 RPM to stabilize temperature.
►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: "Hot Spot" in intake manifold at lower center and engine coolant heated spacer between carburetor and intake manifold (Cars with heater). *For cars without heater, see IMPROVED PERFORMANCE note above.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Autolite BF-82. 18 mm. Torque to 15-20 ft. lbs. Plugs have tapered seat, no gasket used.

COIL: Ford & Mercury No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.

DISTRIBUTOR: Ford. Used as follows:

Engine & Transmission	①Distributor No.
144 Synchro-mesh	②C2DF-12127-D
144 Auto. Trans.	③C1DF-12127-F
170 Synchro-mesh	④C1GF-12127-A or ⑤C2UF-12127-A
170 Auto. Trans.	⑥C2GF-12127-A

① - Number stamped on distributor housing for identification.
② - Part No. C2DZ-12127-B. ③ - Part No. C1DZ-12127-A.
④ - Part No. C1DZ-12127-B. ⑤ - Part No. C2UZ-12127-A.
⑥ - Part No. C2DZ-12127-C.

Condenser - Ford & Mercury No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford & Mercury No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand

①C2DF-12127-D

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.33	400
½-1½	0.78	600
3½-4½	1.30	800
10-12	3.45	1400
12½-15	5.00	1800
12¾-15½	5.35	2000
16½ max.	10.00	2000

①C1DF-12127-F

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.65	700
1½-2¼	1.27	1000
4¾-5¾	2.93	1600
5¾-7	3.94	2000
15¾ max.		

②C1GF-12127-A & C2UF-12127-A

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1½-2½	0.43	700
5¼-6¼	0.92	1000
7½-8¾	1.50	1300
10-11¼	2.40	1700
11-12¼	3.00	2000
16½ max.		2000

③C2GF-12127-A

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.35	650
¾-1¾	0.76	900
4-5	1.40	1250
8½-9¾	3.00	2000
11¾ max.	10.00	2000

① - Set test stand to 0°, 0" of Hg, and 300 RPM.
② - Set test stand to 0°, 0" of Hg, and 450 RPM.
③ - Set test stand to 0°, 0" of Hg, and 400 RPM.

IGNITION TIMING

Model	Std. Setting	All wabl Rang
Synchro-mesh	4° BTDC	4-9° BTDC
Auto. Trans.	10° BTDC	10-15° BTDC

►*SETTING NOTE:* Set timing with engine idling and distributor vacuum line disconnected.
Timing Mark - Notch in crankshaft pulley or damper and timing pointer on left side of chain case cover. Pointer marked "0", "3", "6", "10", "14", Align pulley notch with correct mark on pointer.

CARBURETOR

►*CARBURETOR APPLICATION: One Holley Model 1909 single barrel carburetor used on all models.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, hot idle speed correctly set, and anti-stall dashpot correctly adjusted (see below), stop engine and proceed as follows:

Accelerator Pedal Height Adjustment - Distance from top front corner of accelerator pedal to floor mat should be 4¼". To adjust, turn threaded trunnion on accelerator connecting link. With accelerator pedal fully depressed, make sure carburetor throttle plate is fully open. Readjust pedal height as necessary.

Downshift Rod Adjustment - Disconnect accelerator return spring at manifold, and kickdown spring at rod and "Z" bar. Pull downshift rod and "Z" bar up to full limit of travel (or hold accelerator pedal depressed and pull on downshift rod only). Slide stop bolt down against "Z" bar and tighten bolt securely. Install return springs. Check throttle and downshift linkage for full travel and see that no bind exists in linkage.

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve valve closed. Clearance between end of dashpot plunger and throttle lever with dashpot plunger fully depressed should be .120-.150". To adjust, screw dashpot in or out as required.

HOLLEY MODEL 1909

Engin & Trans.	①Carburetor No.
144" Synchro-mesh (Early)	C2DE-9510-A
144" Auto. Trans. (Early)	C2DE-9510-B
144" Synchro-mesh (Late)	C2DE-9510-L
144" Auto. Trans. (Late)	C2DE-9510-M
170" Synchro-mesh (Early)	C2DE-9510-C
170" Auto. Trans. (Early)	C2DE-9510-D
170" Synchro-mesh (Late)	C2DE-9510-N
170" Auto. Trans. (Late)	C2DE-9510-R
170" Taxi with Synchro-mesh	C2DE-9510-J
170" Taxi with Auto. Trans.	C2DE-9510-K

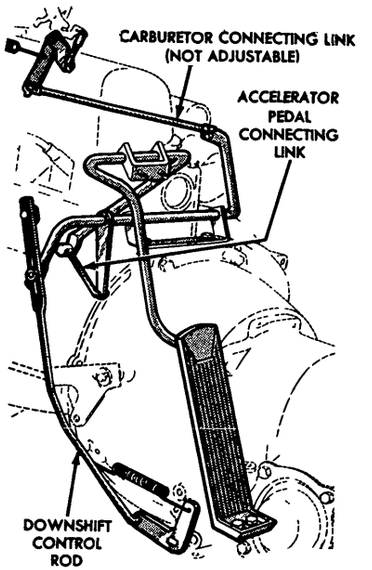
Engin & Trans. COMET	①Carburetor No.
144 Synchro-mesh (Early)	②C2GE-9510-A
144 Synchro-mesh (Later)	C2GE-9510-J
144 Synchro-mesh & Auto. Trans. (Early)	②C2GE-9510-B
144 Synchro-mesh & Auto. Trans. (Later)	C2GE-9510-K
170 Synchro-mesh (Early)	②C2GE-9510-C
170 Synchro-mesh & Auto. Trans. (Later)	C2GE-9510-L
170 Synchro-mesh (Early)	②C2GE-9510-D
170 Synchro-mesh & Auto. Trans. (Later)	C2GE-9510-M

① - Number stamped on throttle lever side of main body flange and/or on tag attached to carburetor.

② - If Carburetors A,B,C or D have an asterisk on flange, they have all modifications found in later carburetors J,K,L and M.

Idle Setting - Initial setting 1-1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll. Then turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - With engine at normal operating temperature so that throttle stopscrew is resting on low step of fast idle cam, adjust throttle stopscrew for correct engine idle speed as indicated in table below. *NOTE - On automatic transmission cars, selector lever must be in "D" (Drive) position.*



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

Car Model ①	Idle Speed Setting Synchro-mesh	② Auto. Trans.
All Models (Std.)	500-550 RPM	475-525 RPM
All Models (CCV)	550-600 RPM	525-575 RPM

① - **Std.** - Without Closed Crankcase Ventilation. **CCV** - With Closed Crankcase Ventilation.

② - With transmission in "D" (Drive) position.

Float Level - 5/16"±1/64" from top of float (¼" from free end) to gasket surface of air horn with air horn inverted and float resting freely on inlet needle valve. Use Gauge 10-238 (Falcon), 9550-MFC (Comet). Adjust by bending float tab with needle nose pliers. *CAUTION - Do not allow float to press on inlet needle valve when making adjustment (may damage Viton Tipped needle).*

Fast Idle: 1500 RPM (Synchro-mesh), 1800 RPM (Auto. Trans.). Adjust with fast idle adjusting screw on highest step of fast idle cam, then turn adjusting screw to obtain proper RPM.

Automatic Choke Setting: Centered at Index.

Accelerating Pump Setting: Connect link in outer hole of pump operating lever for average (year around) temperature. Place in inner hole for high temperature or high altitude. *NOTE* - These settings supersede previous setting.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Single Barrel Model 1909 Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Comet & Falcon No. C2DZ 9350-A (Electric Wipers), CODE 9350-J (Vacuum Wipers).

Fuel Pump Pressure - 3½-5½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator Comet & Falcon No. B9MF-10804-A.

Dash Unit - Comet No. C2GF-9280-A, Falcon No. C2DZ-9305-A.

Tank Unit - **Comet** No. COAZ-9275-C (Exc. Sta. Wgn.), No. C1AF-9275-A (Sta. Wgn.).

Falcon No. CODZ-9275-C (Exc. Sta. Wgn. & Sed. Del.), No. C1DF-9275-A (Sta. Wgn. & Sed. Del.).

Fuel Filter: Disposable type in fuel line. Replace filter every 12,000 miles (Falcon), 6,000 miles (Comet). *NOTE* - Filter must be installed with arrow on filter case pointing toward carburetor.

Air Cleaner: Dry filter element type. Clean every 6,000 miles, replace element every 30,000 miles.

►*CLEANING CAUTION:* Clean filter element by blowing compressed air from inside surface of element. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

►*INSTALLATION CAUTION:* Locating notch in carburetor and mating tab on air cleaner must be engaged and mark "FRONT" must be to front of engine.

BATTERY

Ford & Mercury Part No.	①Volts	Plates	②Capacity
CODZ-10654-A	12	9	40 Ampere Hr.
CODZ-10654-B	12	9	55 Ampere Hr.
B9A-10654-D	12	11	55 Ampere Hr.

① - Numbers are for dry type batteries for service replacement. ② - At 20 hour rate.

Battery Ground - Negative, to right front corner of cylinder head.

STARTER

Ford. "Positive Engagement" type. 4" and 4½" diameter types used. Different specifications for each size are listed below.

Drive - Ford & Mercury No. C2DZ-11350-A (4" Starter), No. C2DZ-11350-B (4½" Starter). Solenoid pinion shift with solenoid wound on one starter pole piece.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 45 ozs. minimum.

Cranking Speed - 250-290 RPM, 100-150 amperes.

Performance Data - 4" Starter

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
8 ft. lbs.		5.0	450

Performance Data - 4½" Starter

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
9.6 ft. lbs.		5.0	500

① - With starter on engine and engine idling.

Starting Switch: Magnetic type, Comet & Falcon No. B6A-11450-A, controlled by ignition switch.

Neutral Safety Switch: Comet & Falcon No. C1KF-7A217-A (With Back-up Lights), No. CODF-7A217-A (Without Back-up lights).

Adjustment - *See "Ford Motor Co. 2-Speed Automatic Transmission" in Transmission Section.*

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SEE INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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GENERATOR

Ford. 25 and 30 ampere generators used. Different specifications for each type are listed below.

►*IDENTIFICATION NOTE:* Rated output of generator is stamped, painted, or stenciled on unit.

Performance Data

Amperes	Volts	Gen. RPM
25	15.0	2610
30	15.0	2525

Brush Spring Tension - 20-26 ozs.

Field Current - 1.2-1.8 amperes at 12.0 volts (hot).

Rotation - Counterclockwise at commutator end.

B lt Adjustment: Use Belt Tension Gauge T62L-8620-A or 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Engine	①New Belt	②Used Belt
All	90-120	60-90

① - Run belt for 5 minutes and reset tension.

② - Any belt operated 10 minutes or longer.

GENERATOR REGULATOR

Ford or Bosch. 25 and 30 Ampere Regulators used with generators of same amperage rating. See *GENERATOR* above.

►*IDENTIFICATION NOTE:* Current setting of regulator is stamped on unit.

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.4-13.2 volts (25 Amp.), 12.0-12.8 volts (30 Amp.).

Cuts Out - 8 amps. (25 Amp.), 6-9 amps. (30 Amp.) reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current Regulator

Setting (25 Amp.) - 23-27 amperes.

Setting (30 Amp.) - 28-32 amperes.

►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

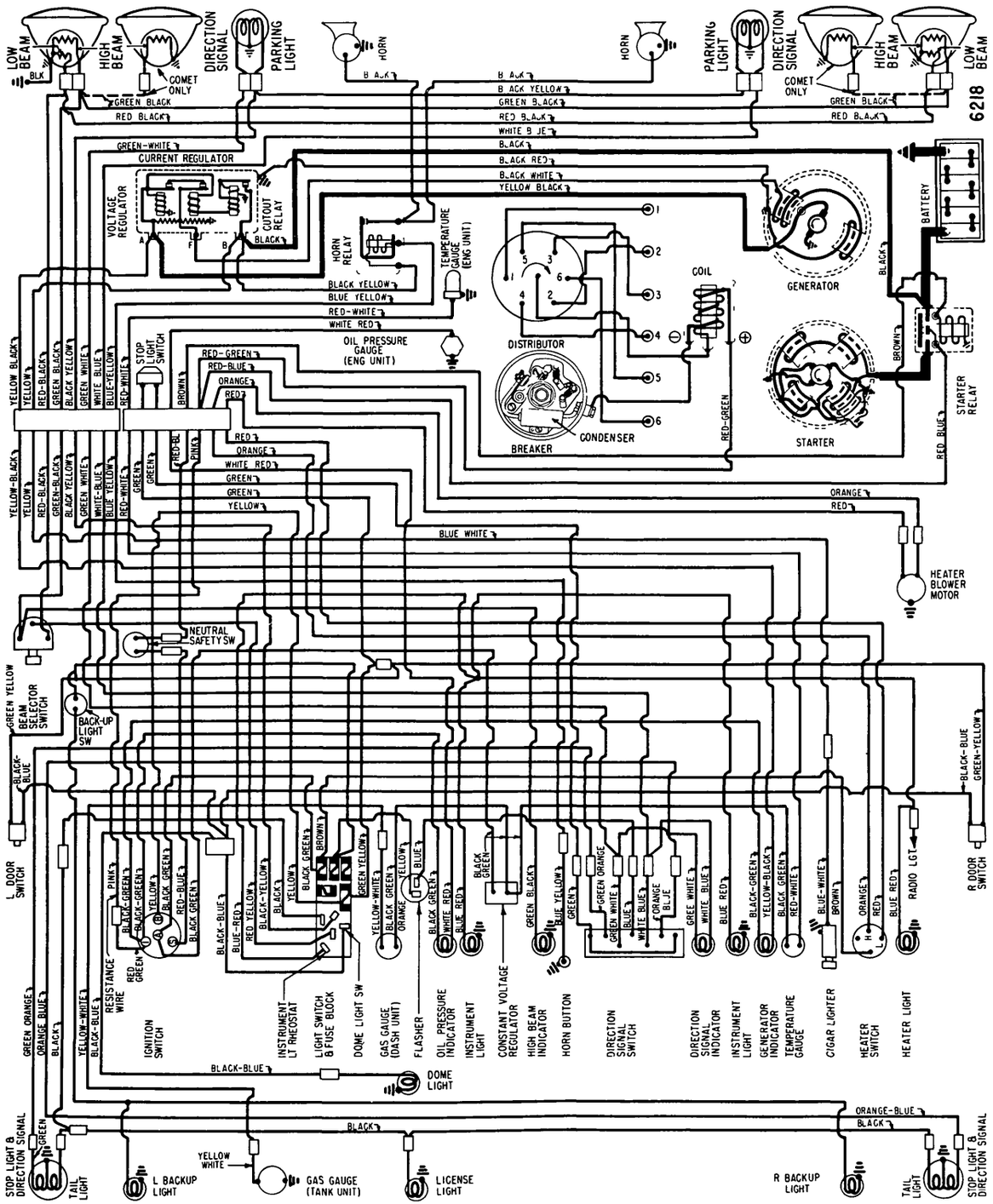
St p Light Switch Location: On forward end of brake master cylinder.

Lighting Switch: Combination lighting switch and fuse junction block.

Removal - Disconnect battery. Remove switch control knob and shaft by pressing down on release button on top of switch (switch in "OFF" position). Use Tool 17470-N-51 to remove bezel nut and remove switch. Separate switch from fuse junction block.

►*COMET DIRECTION SIGNAL INTERMITTENT OPERATION CORRECTION:* May be caused by poor ground between rear bulb socket and reflector. To correct, stake bulb socket to reflector in several places with a prick punch.

CONTINUED ON NEXT PAGE



COMET & FALCON WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Speedometer Removal: Disconnect speedometer cable at speedometer head, then remove instrument cluster bezel retaining screws and remove bezel, lens, and cluster mask plate from cluster housing. Remove speedometer retaining screws and remove speedometer.

CIRCUIT BREAKERS: 18 Ampere - Protects headlight circuit. Integral with headlight switch.
12 Ampere - Protects electric windshield wipers. On right side of instrument cluster near ignition switch.

FUSES: *Fuses are located in fuse junction block of lighting switch except as noted.*
15 Amper - Instrument Panel, Dome, and All Exterior Lights (except headlights).
14 Amper - Direction Signals & Back-up Lights.
14 Amper - Heater Blower.
7.5 Amper - Radio.
Cigar Lighter - Sulphur disc on back of lighter socket.

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head. 144" and 170" engines of same design used previously.

Engin	Bore	Stroke	Displacement
144	3.50"	2.50"	144 cu. ins.
170	3.50"	2.94"	170 cu. ins.

Engin	Compr. Rati	Rated HP	Developed HP
144	8.7-1	29.4	85 at 4200 RPM
170	8.7-1	29.4	101 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*LOSS OF ENGINE OIL PRESSURE CORRECTION:* May be caused by insufficient engagement of distributor drive shaft into oil pump intermediate drive shaft Make sure cup plug in bottom of pump drive rotor is installed 3/16-7/32" below rotor face so that there is 5/16" minimum engagement of distributor shaft into intermediate shaft. Also, make sure hexagon shape of intermediate shaft, and hexagon hole of distributor shaft are not rounded.

►*EXHAUST PIPE-TO-EXHAUST MANIFOLD STUD NUT NOTE:* These studs have interference threads and nuts will not hold torque if used more than once. Install new nuts whenever pipe disconnected from manifold and torque nuts to 40-50 ft. lbs.

►*FLYWHEEL RETAINING CAPSCREW SEALING CAUTION:* Flywheel attaching bolt holes in crankshaft flange are drilled through flange. Flywheel retaining capscrews **must** be coated with oil resistant sealer to prevent engine oil leak at this location which may be diagnosed as a rear oil seal leak.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*
ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (COMET): Drain crankcase and remove dipstick. Disconnect engine front mounts, raise engine and place 2" wood blocks between mounts and engine. Let engine rest on blocks. Remove stabilizer bar attaching nuts and pull stabilizer bar down. Remove oil pan. *NOTE* - Rotate crankshaft as necessary for clearance.

OIL PAN REMOVAL (FALCON): Drain crankcase and remove dipstick. Remove clutch retracting spring. Remove front crossmember. Remove stabilizer bar retaining nuts and pull stabilizer down. Remove oil pan. *NOTE* - Rotate crankshaft as necessary for clearance.



PISTON & ROD ASSEMBLY

PISTONS

Solid skirt type with three rings.
Removal - Pistons and rods removed from above.
Clearance - .0018-.0036" at bottom of skirt.

Checking Clearance & Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*

Replacement Pistons: Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040", .060" Oversize with fitted pins.

Installing Pistons: Notch on piston head should be to front of engine. *See Rod Installation.*

PISTON PIN

Press fit in connecting rod, no locking device used.
Diameter - .9120-.9123" (rod hole diameter .9107-.9112").
Length - 3.010-3.030".
Pin Fit in Piston - .0001-.0003". Wear limit .0008".
Pin Removal & Installation - *See "Piston Pins" in Ford Motor Co. Special Data.*
Replacement Pins: Furnished in assembly with new pistons. *See "Replacement Pistons" above.*

PISTON RINGS

Top compression ring is chrome plated, lower compression ring is phosphate coated. Oil Ring is three-piece type with chrome plated rails.

Ring	Width	Eng Gap	Side Clearance
Compr. (1)	.0774-.0781"	.010-.020"	.0019-.0036"
Compr. (2)	.0770-.0780"	.010-.020"	.0025-.0045"
Oil (3)		.015-.055"	℄

℄ - Snug (side sealing type ring).

CONNECTING ROD

Journal Diamet r: 2.1236-2.1240" (Red), 2.1232-2.1236" (Blue). Taper wear limit .001", Out-of-round wear limit .0006".
Clearance - .0008-.0023".
Sideplay - .004-.008". Wear limit .014".
Length (Center-To-Center): 4.854-4.856" **(144);** 4.714-716" **(170).** *DO NOT interchange rods between engines.*
Installing Rods: Numbers on rods and caps must be on same side and installed in same numbered cylinder. Oil squirt hole should be toward right side of engine on all rods and notch in piston head toward front of engine.
Replacement Bearings: Furnished Std. (2 sizes Red & Blue), & .002", .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

CRANKSHAFT

Journal Diameter - 2.2486-2.2490" (Code Red), 2.2482-2.2486"(Code Blue). Taper wear limit .001", Out-of-round wear limit .0006".
Bearings - Steel backed copper lead alloy.
Clearance - .0006-.0025",
Replacement Bearings: Furnished Std. (2 sizes – Red & Blue), & .002", .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by No. 3 main bearing.
Endplay - .004-.008". Wear limit .012".
Thrust Bearing Alignment - *See "Crankshaft & Bearings" in Ford Motor Co. Special Data.*
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Bearings" in Ford Motor Co. Special Data*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated in front of crankshaft sprocket to reduce oil leakage at front oil seal.

CAMSHAFT

Journal Diameter - 1.8095-1.8105".
Clearance - .001-.003". **Wear Limit** .006".
End Thrust: Taken by thrust plate and spacer behind camshaft sprocket.
Endplay - .001-.007". Wear limit .012".
Replacement Bearings: Furnished Std. & .015" Undersize. *NOTE* - No. 4 bearing has two oil holes and is **not** interchangeable with other bearings.
Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Camshaft Setting: Marks on both sprockets must be adjacent and in line with straightedge across shaft centers.
Timing Chain: Side guide type, 50 links.
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and/or sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Motor Co. Special Data.*

Tappet Clearance: .016" All Valves, Hot & Cold. *For preliminary adjustment after overhaul, see "Valve System" in 1961 Ford Motor Co. Special Data.*

Valve	Head Diameter	①Stem Diameter
Intake	②	.3100-.3107"
Exhaust	1.261-1.276"	.3090-.3097"

Valve	Seat Angle	③Lift	④Stem Clearance
Intake	45°⑤	⑥.2405"	.0008-.0025"
Exhaust	45°⑤	⑦.2395"	.0018-.0035"

① - Std. Also furnished .003", .015", .030" Oversize.
② - 1.462-1.472" (144" Eng.), 1.522-1.532" (170" Eng.).
③ - Cam Lobe Lift. Maximum allowable lift loss .005".
④ - Wear limit .0045" Intake, .0055" Exhaust.
⑤ - Valve Face Angle 44°.
⑥ - Valve Lift .361". ⑦ - Valve Lift .359".

Valve Seat Width - .070-.080", All Valves.

Valve Stem Oil Seals - Cup type seals installed on all valve stems below upper spring retainer.

Valve Springs: Free Length - 2.00" approximately.

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①47.75-56.25 lbs.	1.585"
Open	②112-122 lbs.	1.222"

① - Wear limit 40 lbs. at 1.585".
② - Wear limit 101 lbs. at 1.222".

Valve Spring Installation: Valve spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward cylinder head. Check installed height of spring from surface of cylinder head spring pad to underside of spring retainer. If height greater than 1 39/64", install .030" spacers as necessary on head under spring to bring height within limits 1 9/16"-1 39/64". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Barrel type. Remove from above after removing cylinder head.
Clearance - .0005-.0020". Wear limit .004".

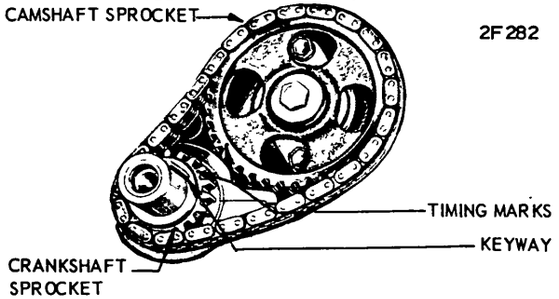
Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications

Intake Valves - Open 15°①BTDC. Close 37°②ALDC.
Exhaust Valves - Open45°①BLDC. Close 7°③ATDC.
① - Camlift .012". ② - Camlift .015". ③ - Camlift .014".



VALVE TIMING MARKS

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 3½ qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 35-55 lbs. (hot) at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel, controlled by Engine Oil Pressure Switch, Comet & Falcon No. B6A-9278-B, located on left rear side of engine to rear of coil.

Oil Pump: Rotor type, located in crankcase.
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow disposable type. Replace every 6,000 miles to coincide with engine oil change.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket face of filter with engine oil. Install filter on adapter until gasket contacts adapter face, then tighten ½ turn by hand. DO NOT overtighten.

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet (road draft) tube at left front corner of engine. Clean filter in filler cap at 6000 mile intervals.
Positive - Road draft tube replaced by an adapter tubing and hose routed to ventilation valve installed in spacer between carburetor and intake manifold. Service system at regular intervals. Check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 8.7 Qts. Add 1 Qt. for heater.
Pressure Valve - 13-15 lbs. radiator cap.

Thermostat: 160°F, Comet No. C1UE-8575-B, Falcon No. CODE-8575-A. 178°F (Early), Comet No. C1UE-8575-A, Falcon No. CODE-8575-B. 188°F (Later), Comet & Falcon No. C2DZ-8575-A, and replaces early 178°F.

Water Pump: Packless, sealed ball bearing type.
Pump Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Comet & Falcon No. B9MF-10804-A.
Dash Unit - C2GF-10883-A (Comet), C2DZ-10883-A (Falcon).
Engine Unit - CODF-10884-A (Early), C1AZ-10884-A (Later).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

FORD FAIRLANE MODELS

Fairlan	Seri s 30	Fairlane 500	Series 40
2-Door Sedan	31	2-Door Sedan	41
4-Door Sedan	32	4-Door Sedan	42

MERCURY METEOR MODELS

M teor	Seri s 30	Meteor Custom	Series 40
2-Door Sedan	31	2-Door Sedan	41
4-Door Sedan	32	4-Door Sedan	42
		2-Door Sedan (S-33)	47

SERIAL NUMBER: Stamped on patent plate attached to left front door hinge pillar. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 F 31 L 100001

① - Year Model. 2 1962.
② - Assembly Plant. A - Atlanta, F - Dearborn, K - Kansas City, R - San Jose, S - Pilot Plant.
③ - Body Series. *See table above.*
④ - Engine. *See b low.*
⑤ - Beginning vehicle number at each assembly plant (100001 for Fairlane, 500001 for Meteor).

Engine Code Designation

Engin	Code Letter
170" 6 Cyl.	U
170" 6 Cyl. (Low Comp. Export)	E
221" V8	L
221" V8 (Low Comp. Export)	C
260" V8	F

Engin Producti n C de Numbers: Indicate place, day, and month of engine manufacture. Not used for licensing. Located as follows: **6 Cyl.** - Stamped on crankcase outlet ventilation pipe boss on crankcase just forward of distributor. **V8** - Stamped on front face of cylinder block above and to left of water pump mounting.

Car Build Date C de: Stamped under DATE on patent plate. Number indicates day of month, letter indicates month as follows: A January through M December (I not used).

TUNE-UP

►*170" 6 CYL. ENGINE CARBURETOR HIGH FREQUENCY BUZZ CORRECTION: See "Holley Single Barrel Model 1909 Carburetors" in Carburetion Section.*

►*V8 ENG. CARS FUEL SYSTEM POOR PERFORMANCE AND/OR "LEANING OUT" CORRECTION:* Condition may be caused by flexible fuel line being kinked. To correct, shorten line to proper length.

►*IMPROVED PERFORMANCE & FUEL ECONOMY ON CARS WITH 170" ENGINE (WITHOUT HEATER):* Connect water-heated carburetor spacer to engine cooling system. Spacer already installed, but not connected in these cars. To connect spacer, drain cooling system, and remove air cleaner. Remove plugs from water pump and cylinder head, then install outlet and inlet nipples. Connect hoses and fasten securely with clamps. Check system for leaks. *NOTE* - Do not allow hose to rest on exhaust manifold.

►*ENGINE STALLING CORRECTION (Early Cars):* May be caused by fibreglass hood insulation being drawn into carburetor air cleaner. To correct, cut a 3" diameter hole in insulation around imprint of air cleaner horn flange.

COMPRESSION PRESSURE: 170 lbs. ± 20 lbs. (6 Cyl.), 150 lbs. ± 20 lbs. (V8) at cranking speed. All cylinders must be equal within 10 lbs.

VACUUM READING: 18" (6 Cyl. & 260" V8), 16" (221" V8) at idle speed.

VALVE TAPPET CLEARANCE: 6 Cyl. - .016", All Valves, Hot and Cold. Use step-type feeler gauge (.015" GO, .017" NO GO). If tappet clearance set with engine cold, reset clearance after operating engine for 30 minutes at 1200 RPM to stabilize temperature.
V8 - Zero lash, hydraulic lifters. *For clearance adjustment and checking, see "Valves" under ENGINE below.*

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE (6 CYL.):* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: "Hot Spot" in intake manifold at lower center and engine coolant heated spacer between carburetor and intake manifold (Cars with heaters). *For cars without heater, see IMPROVED PERFORMANCE note above.*

CRANKCASE VENTILATION VALVE: Service at 6000 mile intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

6 CYLINDER ENGINE

FIRING ORDER: 1-5-3-6-2-4.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Autolite No. BF-82. 18 mm. Torque to 15-20 ft. lbs. (20-30 ft. lbs. for new plug in new head). Plugs have tapered seat, no gasket used.
COIL; Ford & Mercury No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.
DISTRIBUTOR: Ford. Used as follows:

Application	① Distributor No.
Synchro-mesh	② C1GF-12127-A or ③ C2UF-12127-A
Auto. Trans.	④ C2GF-12127-A

① - Number stamped on distributor housing for identification,
② - Part No. C1DZ-12127-B. ③ - Part No. C2UZ-12127-A.
④ - Part No. C2DZ-12127-C.

C ndenser - Ford & Mercury No. 7RA-12300-C.
Condens r Capacity - .21-.25 mfd.
C ntact P int S t - Ford & Mercury No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand
①C1GF-12127-A & C2UF-12127-A

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1½-2½	0.43	700
5¼-6¼	0.92	1000
7½-8¾	1.50	1300
10-11¼	2.40	1700
11-12¼	3.00	2000
16½ max.	10.00	2000

②C2GF-12127-A

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.35	650
¾-1¾	0.76	900
4-5	1.40	1250
8½-9¾	3.00	2000
11¾ max.	10.00	2000

① - Set test stand to 0°, 0" of Hg, and 450 RPM.
② - Set test stand to 0°, 0" of Hg, and 400 RPM.

V8 ENGINES

FIRING ORDER: 1-5-4-2-6-3-7-8.
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Autolite No. BF-92. 18 mm. Torque to 15-20 ft. lbs. (20-30 ft. lbs. for new plug in new head). Plugs have tapered seat, no gasket used.
COIL: Ford & Mercury No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.
DISTRIBUTOR: Ford. Used as follows:

Application	① Distributor No.
221" V8 (Early)	② C20F-12127-E
221" V8 (Late)	C20F-12127-H
260" V8	③ C20F-12127-F

① - Number stamped on distributor housing
② - Part No. C20Z-12127-A. ③ - Part No. C20Z-12127-B.
Condenser - Ford & Mercury No. B9AF-12300-A.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford No. B7A-12171-A (Fairlane), Mercury No. B8Q-12171-A (Meteor).
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

①Automatic Advance - C20F-12127-E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	400	0	800
¾-1¾	525	1½-3½	1050
4-5	675	8-10	1350
6½-7½	900	13-15	1800
12-13½	2000	24-27	4000

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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② Automatic Advanc - C20F-12127-F

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	425	0	850
1-2	550	2-4	1100
4-5	800	8-10	1600
6¼-7¼	1100	12½-14½	2200
8-9¼	1500	16-18½	3000
10-11½	1950	20-23	3900

④ Automatic Advance - C20F-12127-H

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	475	0	950
½-1½	575	1-3	1150
3¾-4¾	725	7½-9½	1450
6-7	925	12-14	1850
9¾-11¼	2000	19½-22¼	2000

Ⓒ - Set test stand to 0°, 0" of Hg, and 250 RPM.
② - Set test stand to 0°, 0" of Hg, and 350 RPM.
④ - Set test stand at 0° at 350 RPM.

Vacuum Spark Control: Diaphragm type.

③ Vacuum Advance - C20F-12127-E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
1-4	2-8	7½
6-9	12-18	13
7½-10½	15-21	18
10½ max.	21 max.	20

③ Vacuum Advance - C20F-12127-F

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
1-4	2-8	9½
4-7¼	8-14½	12½
7-10	14-20	17½
7½-10½ max.	15-21 max.	20

⑤ Vacuum Advance - C20F-12127-H

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
3½-6½	7-13	8
7-10	14-20	12
9¼-12¼	18½-24½	18
12½ max.	24 max.	20

③ - Set test stand to 0°, 0" of Hg, and 1000 RPM.
⑤ - Set test stand at 0° RPM & 0" of Hg.

IGNITION TIMING

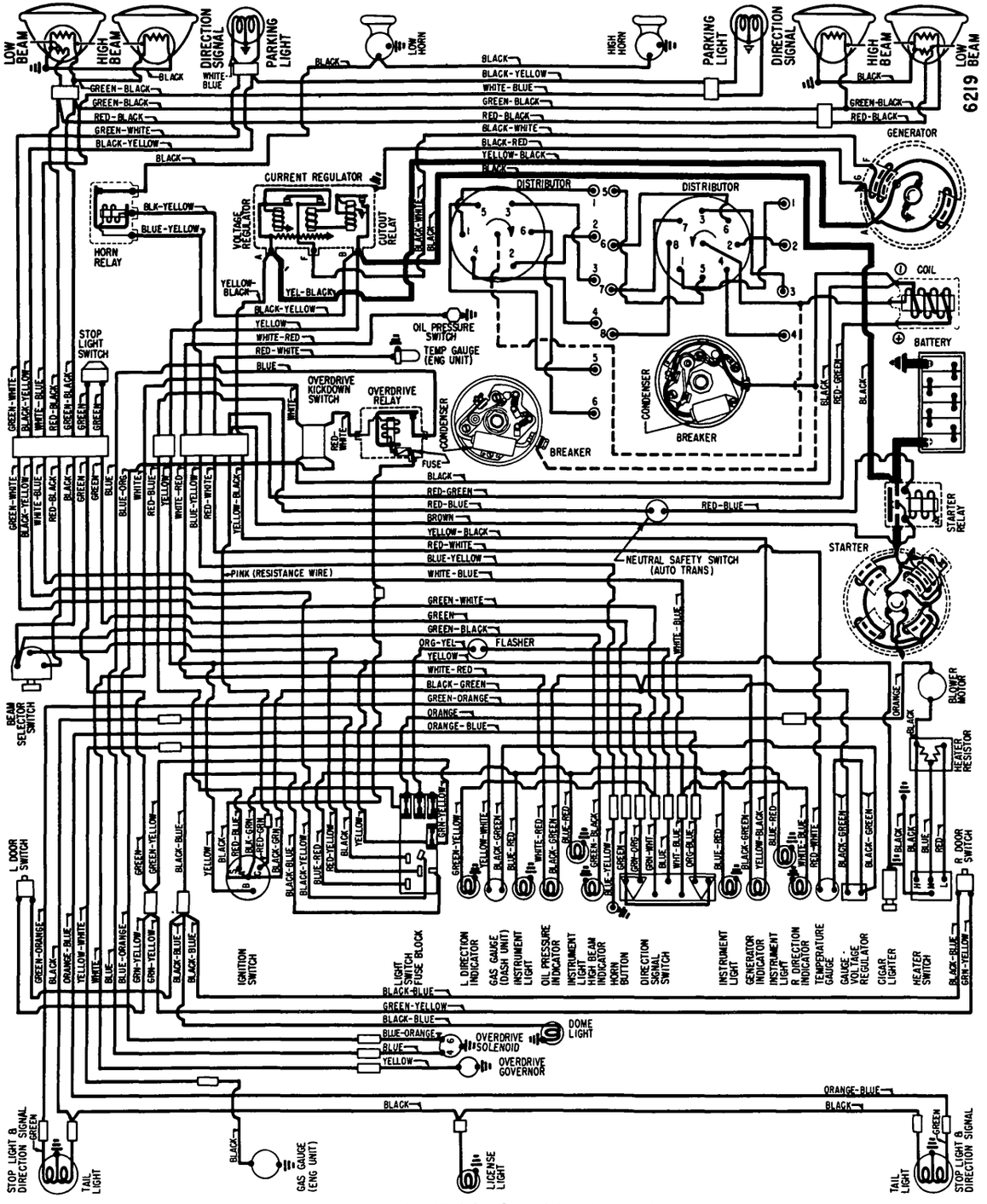
Model	Std. Setting	Allowable Range
6 Cyl. Synchro-mesh	4° BTDC	2-9° BTDC
6 Cyl. Auto. Trans.	10° BTDC	2-15° BTDC
V8 All Trans.	Ⓒ 5° BTDC	5-8° BTDC

Ⓒ - Supersedes previous 4° BTDC specification.

►*SETTING NOTE:* Set timing with engine idling and distributor vacuum line disconnected.

Timing Marks - Align pulley notch or pin with correct notch on pointer as follows: **6 Cyl.** - Notch in crankshaft pulley and timing pointer on left side of chain case cover. Pointer has 5 marks from 0 (TDC) to 14° BTDC. **V8** - Pin in crankshaft damper and timing pointer on left side of chain case cover. Pointer has 4 marks from 0 (TDC) to 10° BTDC.

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FORD FAIRLANE 6 & V8 WIRING DIAGRAM

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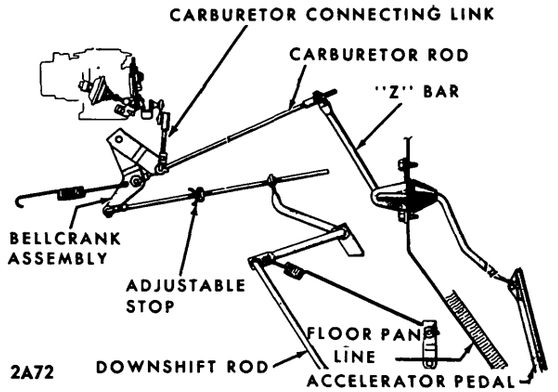
CARBURETOR

►*CARBURETOR APPLICATION: 6 Cyl. - On Holley Model 1909 single barrel carburetor used on all models. V8 - On Ford 2-Barrel carburetor used on all models.*

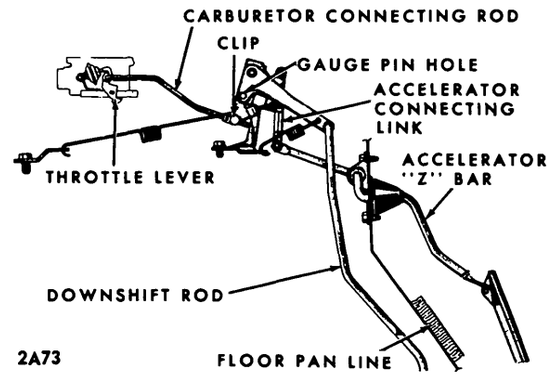
THROTTLE LINKAGE ADJUSTMENT (6 CYL. AUTO. TRANS.): With engine at normal operating temperature, and idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Stop engine and adjust accelerator connecting link for accelerator pedal height of 3 15/16" (Fairlane), 4 5/16" (Meteor) from top front corner of accelerator pedal to floor mat. Adjust Tinnerman nut on downshift adjusting rod so there is 2 5/16" (Fairlane), 2 1/8" (Meteor) between nut and "Z" bar. *NOTE- If downshift adjusting rod dimension must be reduced more than 1/4" for proper kickdown shift, check for bent linkage or incorrect accel rate pedal height.*

THROTTLE LINKAGE ADJUSTMENT (V8 AUTO. TRANS): With engine at normal operating temperature, and idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Stop engine and adjust accelerator connecting link for accelerator pedal height of 3 15/16" (Fairlane), 4 5/16" (Meteor) from top front corner of accelerator pedal to floor mat.

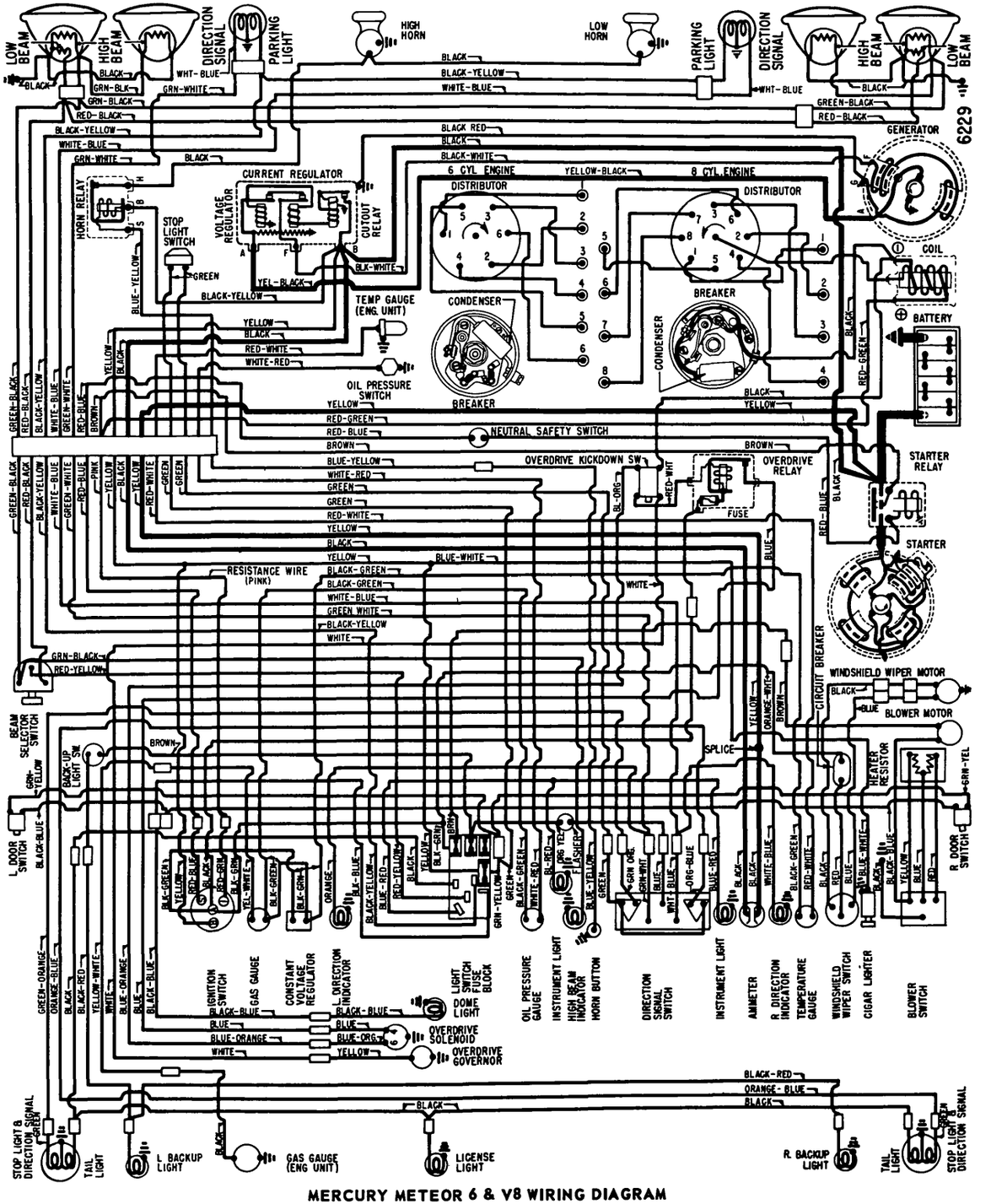
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6 CYL. AUTO. TRANS. THROTTLE LINKAGE



V8 AUTO. TRANS. THROTTLE LINKAGE



MERCURY METEOR 6 & V8 WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Disconnect carburetor connecting rod from carburetor throttle lever and insert a 1/4" gauge pin through gauge pin holes in bellcrank. Adjust length of carburetor connecting rod for free fit into throttle lever with throttle lever held against hot idle screw. Gauge pin must be a free fit in gauging holes. Connect carburetor connecting rod and remove gauge pin.

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .120-.150" (6 Cyl.), .060-.090" (V8). To adjust, screw dashpot in or out as required.

POWER STEERING IDLE SPEED-UP CONTROL: Description - Device prevents engine stalling when steering linkage stops are contacted (as in parking the car). Consists of a control valve with plunger mounted on throttle linkage bellcrank and connected by a hydraulic line to power steering pump. Power steering oil pressure actuates valve.

Adjustment - With engine at correct idle speed, turn wheels against linkage stops, loosen locknuts on control valve mounting bracket, and adjust control valve to maintain same idle speed with linkage against stops. *CAUTION - DO NOT hold wheels against stops for more than 15 seconds.*

HOLLEY MODEL 1909
FAIRLANE

Engine & Trans.	① Carb. No.
6 Cyl. Synchro-mesh (Early)	C2DE-9510-C
6 Cyl. Auto. Trans. (Early)	C2DE-9510-D
6 Cyl. Synchro-mesh (Late)	C2DE-9510-N
6 Cyl. Auto. Trans. (Late)	C2DE-9510-R
6 Cyl. Taxi (Synchro-mesh)	C2DE-9510-J
6 Cyl. Taxi (Auto. Trans.)	C2DE-9510-K

METEOR

Engine & Trans.	① Carb. No.
6 Cyl. Synchro-mesh (Early)	C2GE-9510-C
6 Cyl. Auto. Trans. (Early)	C2GE-9510-D
6 Cyl. Synchro-mesh (Late)	C2GE-9510-L
6 Cyl. Auto. Trans. (Late)	C2GE-9510-M

① - This number stamped on brass tag and on main body of carburetor.

Idle Setting - Initial setting 1-1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll. Then turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - With engine at normal operating temperature so that throttle stopscrew is resting on low step of fast idle cam, adjust throttle stopscrew for correct engine idle speed as indicated in table below. *NOTE - On automatic transmission cars, selector lever must be in "D" (Drive) position.*

Idle Speed Setting

Car Model ①	Synchro-mesh	② Auto. Trans.
All Models (Std.)	500-550 RPM	475-525 RPM
All Models (CCV)	550-600 RPM	525-575 RPM

① - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.
② - In "D" (Drive) Range.

Accelerating Pump Setting - Connect link in outer hole for average (year around) temperature and in inner hole for high temperature or high altitude. *NOTE* - These settings supersede previous setting.

Float Level - 5/16"±1/64" from top of float (¼" from free end) to gasket surface of air horn with air horn inverted and float resting freely on inlet needle valve. Use Gauge 10-238 (Fairlane), 9550-MFC (Meteor). Adjust by bending float tab with needle nose pliers. *CAUTION - Do not allow float to press on inlet needle valve when making adjustment (may damage Viton tipped needle).*

Fast Idle: 1500 RPM (Synchro-mesh), 1800 RPM (Auto. Trans.). To adjust, with fast idle adjusting screw on highest step of fast idle cam, turn adjusting screw to obtain proper RPM.

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* Operate air conditioner at least 20 minutes before setting idle speed, and set idle speed with air conditioning on.

Automatic Choke Setting: Centered on Index.
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Holley Single Barrel Model 1909 Carburetors" in Carburetion Section.*

FORD 2-BARREL CARBURETORS

Eng. & Trans. ①	Carb. No.
221" V8 Synchro-mesh (Std.)	② C20E-9510-N
221" V8 Synchro-mesh (CCV)	② C20E-9510-S
221" V8 Auto. Trans. (Std.)	② C20E-9510-R
221" V8 Auto. Trans. (CCV)	② C20E-9510-T
260" V8 Synchro-mesh (Std.)	③ C20F-9510-U,AA
260" V8 Synchro-mesh (CCV)	③ C20F-9510-Y,AC
260" V8 Auto. Trans. (Std.)	③ C20F-9510-V,AB
260" V8 Auto. Trans. (CCV)	③ C20F-9510-Z,AD

① - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.
② - This number stamped on tag attached to carburetor.
③ - Stamped on carburetor main body.

See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section for complete identification and part numbers.

►*STUMBLE OR HESITATION ON ACCELERATION CORRECTION (221" Engine):* Caused by using dry fuel level (initial setting only), with new resilient tipped fuel inlet needle. To correct, use wet fuel level setting. *See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1-1½ turns open. With engine at normal operating temperature, turn both idle adjusting screws in until engine runs roughly from lean mixture, then turn screws out until engine begins to roll. Finally, turn screws in just enough for smooth running (favor a slightly rich mixture).
Idle Speed - 500-525 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans. in "D" Range).
►*AIR CONDITIONED CAR IDLE SPEED NOTE:* Operate air conditioner at least 20 minutes before setting idle speed, and set idle speed with air conditioning on.

Throttl Linkag Adjustment: *Se CARBURETOR abov .*
►*OTHER DATA: S "Ford 2 & 4-Barr l Carbur t rs" in Carbur ti n S cti n.*

CARB. EQUIPMENT

Fuel Pump; Used as follows:

Engine	Ford & Mercury Pump No.
6 Cyl.	C20Z-9350-B
6 Cyl.	① C20Z-9350-D
221" V8	C20Z-9350-A
260" V8	C20Z-9350-C

① - Use C20Z-9350-B for replacement.

Fuel Pump Pressure - 3½-5½ lbs. (6 Cyl.), 4-6 lbs. (V8).
Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Ford & Mercury No. B9MF-10804-A.
Dash Unit - C20Z-9305-A (Fairlane), C2YY-9280-A (Meteor).
Tank Unit - C20Z-9275-A (Fairlane & Meteor).
Fuel Filter: Disposable or replaceable element type in fuel inlet line between pump and carburetor. Replace filter element every 30,000 miles or 30 months.
Air Cleaner: Dry filter element type. Clean every 6,000 miles, replace element every 30,000 miles or sooner under severe operating conditions.
►*CLEANING CAUTION:* Remove element from cleaner body and hold in a vertical position to shake dust or dirt out by tapping element lightly against horizontal surface. Tap and rotate element until outer surface has been cleaned. Direct compressed air (if used) against inside surface only. DO NOT deform element and DO NOT oil paper or screen of element.

BATTERY

Ford & Mercury Part No.	① Volts	Plates	② Capacity
CODZ-10654-A	12	9	40 Ampere Hr.
CODZ-10654-B	12	9	55 Ampere Hr.

① - Numbers are for dry type batteries for service replacement. ② - At 20 hour rate.
Battery Ground - Negative, to cylinder head.

STARTER

Ford. "Positive Engagement" type. 4" and 4½" diameter types used on 6 Cyl., 4½" diameter type used on V8. Different specifications for each size are listed below.
Drive - Ford & Mercury No. C2DZ-11350-A (6 Cyl. 4" Starter), No. C2DZ-11350-B (6 Cyl. 4½" Starter), No. C20Z-11350-A (V8 4½" Starter). Solenoid pinion shift with solenoid wound on one starter pole piece.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 45 ozs. minimum.
Cranking Speed - 250-290 RPM, 100-150 amperes.

Performance Data - 6 Cyl. 4" Starter

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
8 ft. lbs.		5.0	450

Performance Data - 6 Cyl. 4½" Starter

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
9.6 ft. lbs.		5.0	500

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S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Performance Data - V8 4½" Starter

Torque	RPM	Volts	Amperes
0 ft. lbs.	Ⓒ	12.0	70
15.5 ft. lbs.		5.0	670

Ⓒ - With starter on engine and engine idling.

Starter Switch: Magnetic type, Fairlane & Meteor No. B6A-11450-A, controlled by Ignition Switch and Neutral Safety Switch No. C20A-7A247-A.

Neutral Safety Switch: Fairlane & Meteor No. C20A-7A247-A.

Adjustment - *See "Ford Motor Co. Automatic Transmission" in Transmission Section.*

GENERATOR

Ford. 30 Ampere type used.

►*IDENTIFICATION NOTE:* Rated output of generator is stamped, painted, or stenciled on unit.

Performance Data

Amperes	Volts	Gen. RPM
30	15.0	2525

Brush Spring Tension - 20-26 ozs.

Field Current - 1.2-1.8 amperes at 12.0 volts (hot).

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Use Belt Tension Gauge T62L-8620-A or 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Engine	Ⓒ New Belt	②Used Belt
All	90-120	60-90

Ⓒ - Run belt for 5 minutes and reset tension.

② - Any belt operated 10 minutes or longer.

GENERATOR REGULATOR

Ford. 30 Ampere type for generators of same amperage rating.

►*IDENTIFICATION NOTE:* Current setting of regulator is stamped on unit.

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cut out Relay

Cuts In - 12.0-12.8 volts.

Cuts Out - 6-9 amps. reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current Regulator

Setting - 28-32 amperes.

►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators" in Electrical Section.*

MISC. ELECTRICAL

Stop Light Switch Location: On upper forward end of master cylinder.

Lighting Switch: Combination lighting switch and fuse block.

Removal - Disconnect negative battery cable, then remove switch control knob by pulling on knob and pressing on release button. Remove bezel nut and bezel, then remove switch and fuse block. Remove retaining clips and remove fuse block.

Instrument Cluster: Removal - Disconnect negative battery cable and remove wiring harness from clips at top of cluster. Remove wiring harness from clamp attached to left air vent register. Disconnect speedometer cable from speedometer. On Meteor, disconnect charge indicator wire from terminal block attached to steering column right support, then remove charge indicator wire from charge indicator loops. On all cars, cover steering column, then remove five cluster screws and pull cluster from instrument panel. Disconnect all wires and lamps from cluster and remove cluster from car.

Installation - Reverse removal procedure and check operation of all instruments and lamps.

Speedometer: Removal - On all cars, remove instrument cluster. On Meteor, remove six cluster cover screws and remove cluster cover. On Fairlane, remove bezel from instrument cluster. Remove speedometer-to-cluster or housing screws and remove speedometer.

CIRCUIT BREAKERS: 18 Ampere - Headlight circuit. Integral with headlight switch.

12 Ampere - Two-speed electric windshield wipers. On lower left side of instrument panel near ignition switch.

6 Ampere - Single speed electric windshield wipers. On lower left side of instrument panel near ignition switch.

FUSES: *Fuses are located in fuse junction block of lighting switch except as noted.*

3AG 15 Ampere - Instrument Panel, Dome, & All Exterior Lights (except Headlights).

3AG 15 Ampere - Overdrive. *On Overdrive Relay.*

3AG 15 Ampere - Air Conditioner. *In feed wire.*

SFE 14 Ampere - Direction Signals & Back-up Lights.

SFE 14 Ampere - Heater Blower.

SFE 7.5 Ampere - Radio.

SFE 7.5 Ampere - Spotlight. *In feed wire.*

Cigar Lighter - Sulphur disc or reset circuit breaker on back of lighter socket.

6 CYL. ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head. 170" engine similar in design to Falcon & Comet engines.

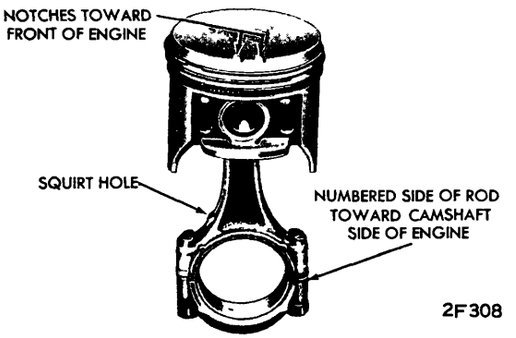
Bore	Stroke	Displacement
3.50"	2.94"	170 cu. ins.

Compr. Ratio	Rated HP	Developed HP
8.7-1	29.4	101 at 4400 RPM

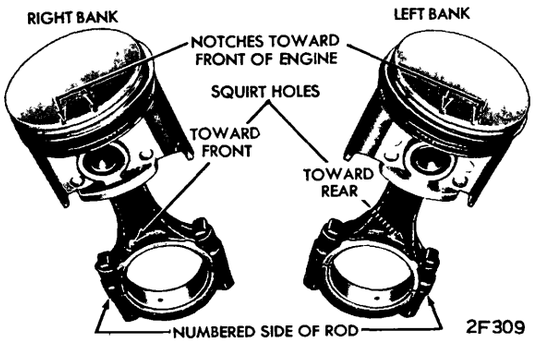
Compression & Vacuum Reading - *See TUNE-UP.*

►*EXCESSIVE RESONANCE & LOW MOAN CORRECTION:* Caused by improperly adjusted engine rear mounting brackets. *See "Engine" in Ford Motor Co. Special Data.*

►*LOSS OF ENGINE OIL PRESSURE CORRECTION:* May be caused by insufficient engagement of distributor drive shaft into oil pump intermediate drive shaft. Make sure cup plug in bottom of pump drive rotor is installed 3/16-7/32" below rotor face so that there is 5/16" minimum engagement of distributor shaft into intermediate shaft. Also, make sure hexagon shape of intermediate shaft, and hexagon hole of distributor shaft, are not rounded.



6 CYL. PISTON & ROD ASSEMBLY



V8 PISTON & ROD ASSEMBLY

►*EXHAUST PIPE-TO-EXHAUST MANIFOLD STUD NUT NOTE:* These studs have interference threads and nuts will not hold torque if used more than once. Install new nuts whenever pipe disconnected from manifold and torque nuts to 40-50 ft. lbs.

►*FLYWHEEL RETAINING CAPSCREW SEALING CAUTION:* Flywheel attaching bolt holes in crankshaft flange are drilled through flange. Flywheel retaining capscrews **must** be coated with oil resistant sealer to prevent engine oil leak at this location which may be diagnosed as a rear oil seal leak.

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL: Drain crankcase, remove dipstick, and remove clutch retracting spring. Remove front crossmember. Remove stabilizer bar retaining nuts and pull stabilizer bar down. Remove oil pan retaining bolts, crank engine for necessary clearance, and remove oil pan.

PISTONS

Slipper-skirt type with two compression rings and one oil ring.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*ORIGINAL BORE & PISTON NOTE:* Production standard bore is 3.5000-3.5024". Pistons used in this standard bore are 2 sizes, 3.4976-3.4982" (Color Coded Red), and 3.4988-3.4994" (Color Coded Blue). Production cylinder bore also may be .003" Oversize 3.5024-3.5036" with .003" oversize pistons 3.5000-3.5006".

Removal - Pistons and rods removed from above.
Clearance - .0018-.0036" selective fit. Wear limit .006".
Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*
Replacement Pistons: Furnished Std. and .020", .030", .040", .060" Oversize.
Installing Pistons: Install piston with notches in head of piston toward front of engine. *See Rod Installation.*

PISTON PIN

Press fit in connecting rod.
Diameter - .9120-.9123" (rod hole diameter .9107-.9112").
Pin Fit in Piston - .0001-.0003". Wear limit .0008".
Pin Fit in Rod - Press fit in rod. *See "Piston Pin" in Ford Motor Co. Special Data.*
Replacement Pins: Furnished Std. and .001" and .002" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0774-.0781"	.010-.020"	.0019-.0036"
Compr. (2)	.0770-.0780"	.010-.020"	.0020-.0040"
Oil (3)		.015-.055"	①

① - Snug (side sealing type ring).

Replacement Rings: Furnished Std. and .020", .030", .040" & .060" Oversize.

CONNECTING ROD

Journal Diameter: 2.1236-2.1240" (Red)' 2.1232-2.1236" (Blue). Taper wear limit .001". Out-of-round wear limit .0006".
Clearance - .0008-.0023". Wear limit .0034".
Sideplay - .004-.008". Wear limit .014".

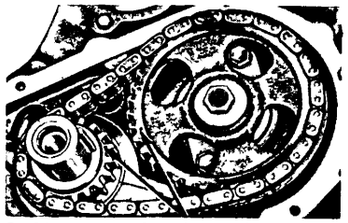
Length - 4.714-4.716" (center-to-center).
Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020" & .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

Installing Rods: Numbers on rods and caps must be on same side and installed in same numbered cylinder. Oil squirt hole should be toward right side of engine on all rods and notch in piston head toward front of engine.

CRANKSHAFT

Journal Diameter: 2.2486-2.2490" (Red), 2.2482-2.2486" (Blue). Taper wear limit .001", Out-of-round wear limit .0006".
Clearance - .0007-.0025". Wear limit .003".

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.



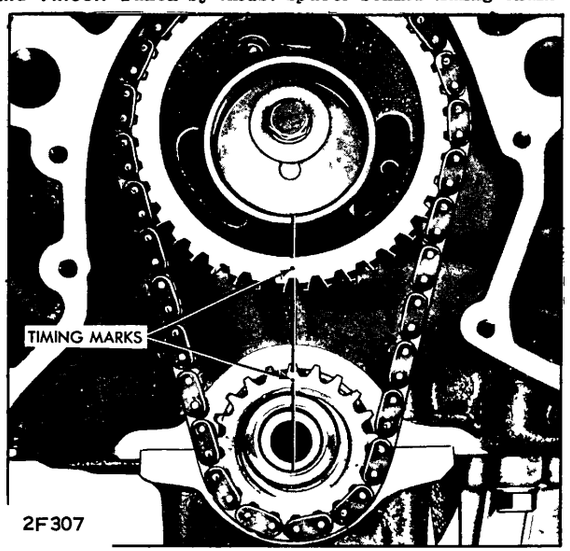
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6 CYL. VALVE TIMING MARKS

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by No. 3 (rear intermediate) main bearings.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Endplay - .004-.008". Wear limit .012".
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Journal Diameter - 1.8095-1.8105".
Bearings - Steel backed babbitt lined bushings.
Clearance - .001-.003". Wear Limit .006".
End Thrust: Taken by thrust spacer behind timing chain sprocket.
Endplay - .001-.007". Wear limit .012".
Replacement Bearings: Furnished Std. and .015" Undersize.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*
Timing Chain: Side guide type.
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.
Camshaft Setting: Timing marks on both sprockets adjacent and inline with straightedge across shaft centers.
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*



2F307

V8 VALVE TIMING MARKS

VALVES

Tappet Clearance: .016", All Valves, Hot or Cold, *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*
►*ROTATABLE VALVE NOTE:* All valves are rotatable type, *see "Valve System" in Ford Motor Co. Special Data.*

Valve	Head Diameter	①Stem Diameter
Intake	1.522-1.532"	.3100-.3107"
Exhaust	1.261-1.276"	.3090-.3097"

Valve Seat Angle	②Lift	③Stem Clearance
Intake 45° ④	.2405"	.0008-.0025"
Exhaust 45° ④	.2395"	.0018-.0035"

① - Std. Also furnished .003", .015", .030" Oversize.
② - Cam Lobe Lift. Maximum allowable lift loss .005".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.

Valve Seat Width - .070-.080", All Valves.
Valve Stem Oil Seals - Cup type seals installed on all valve stems below upper spring retainer.
Valve Springs: Free Length - 2.00" approximately.

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①47.75-56.25 lbs.	1.585"
Open	②112-122 lbs.	1.222"

① - Wear limit 43 lbs. at 1.585".
② - Wear limit 101 lbs. at 1.222".

Valve Spring Installation: Valve spring ends must be square within 1/16", Install springs with damper (closed) coil end down toward cylinder head. Check installed height of spring from surface of cylinder head spring pad to underside of spring retainer. If height greater than 1 39/64", install .030" spacers as necessary on head under spring to bring height within limits of 1 9/16-1 39/64". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above) ream guides and install valves with oversize stems. See *"Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Mechanical, barrel type. Removed from above by using magnet placed in pushrod seat, after removing rocker arm assembly and pushrods.

Diameter - .8740-.8745". **Clearance** - .0005-.0020".

Rocker Arm Assembly: See *"Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of camshaft sprockets.

Valve Timing Specifications

Intake Valves - Open 15° ①BTDC. Close 37° ②ALDC.
Exhaust Valves - Open 45° ①BLDC. Close 7° ③ATDC.
① - Camlift .012". ② - Camlift .015". ③ - Camlift .014".

V8 ENGINE

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 221" and 260" engines of conventional design. Intake manifold rests directly on cylinder block to form the pushrod chamber cover. Valve rocker arms are individually mounted on studs which are pressed into cylinder block.

Engine	Bore	Stroke	Displacement
221"	3.50"	2.87"	221 cu. ins.
260"	3.80"	2.87"	260 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
221"	8.7-1	39.2	145 at 4400 RPM
260"	8.7-1	46.2	164 at 4400 RPM

Compression & Vacuum Reading - See *TUNE-UP.*

►*EXCESSIVE RESONANCE OR MOAN CORRECTION:* Caused by improperly adjusted engine rear mounting brackets. See *"Engine" in Ford Motor Co. Special Data.*

►*FLYWHEEL RETAINING CAPSCREW SEALING CAUTION:* Flywheel attaching bolt holes in crankshaft flange are drilled through flange. Flywheel retaining capscrews **must** be coated with oil resistant sealer to prevent engine oil leak at this location which may be diagnoses as a rear oil seal leak.

CYLINDER HEAD & MANIFOLD: See *"Cylinder Head & Manifold" in Ford Motor Co. Special Data.*
TIGHTENING TORQUES: See *"Tightening Specifications" in Ford Motor Co. Special Data.*
ENGINE REMOVAL: See *"Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL: Drain crankcase and remove dipstick. Remove front crossmember. Remove oil pan retaining bolts, crank engine for necessary clearance, and remove oil pan. *NOTE - When installing pan, tabs of oil pan front and rear seals must be over oil pan gasket.*

PISTONS

Slipper-skirt type with two compression rings and one oil ring.

►*ORIGINAL BORE & PISTON NOTE:* As follows:

	221"	260"
Std. Bore	3.5000-3.5024"	3.8000-3.8024"
Red Pistons	3.4976-3.4982"	3.7976-3.7982"
Blue Pistons	3.4988-3.4994"	3.7988-3.7994"
.003" OS Bore	3.5024-3.5036"	3.8024-3.8036"
.003" OS Pistons	3.5000-3.5006"	3.8000-3.8006"

Removal - Pistons and rods removed from above.
Clearance - .0018-.0036". Wear Limit .006".
Fitting New Pistons: See *"Pistons" in Ford Motor Co. Special Data.*
Replacement Pistons: Furnished Std. (221" & 260"), and .020", .030", .040", .060" (221") Oversize.
Installing Pistons: Install piston with notches in head of piston toward front of engine. See *Rod Installation.*

PISTON PIN

Press fit in connecting rod.
Diameter - .9120-.9123" (rod hole diameter .9107-.9112").
Pin Fit in Piston - .0001-.0003". Wear limit .0008".
Pin Fit in Rod - Press fit in rod, see *"Piston Pin" in Ford Motor Co. Special Data.*
Replacement Pins: Furnished Std. and .001" and .002" Oversize.

PISTON RINGS

Top compression ring is chrome plated. Lower compression ring is phosphate coated. Oil ring has two chrome plated steel rails and a serrated spring spacer.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0774-.0781"	.010-.020"	.0019-.0036"
Compr (2)	.0770-.0780"	.010-.020"	.0020-.0040"
Oil (3)		.015-.055"	①

① - Snug (side sealing type ring).

Replacement Rings: Furnished Std. and .020", .030", .040" & .060" Oversize.

CONNECTING ROD

Journal Diameter: 2.1236-2.1240 (Red), 2.1232-2.1236" (Blue). Taper wear limit. 001", Out-of-round wear limit .0006".

Clearance - .0009-.0025". Wear limit .0035"
Sideplay - .006-.016". Wear limit .019".

Length - 5.154-5.156" (center-to-center).
Replacement Bearings: Std. (2 sizes marked Red and Blue) and .002", .010", .030" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

Installing Rods: Install rods in correct numbered cylinder with oil squirt hole to center of engine and notches in piston head to front of engine.

CRANKSHAFT

Journal Diameter: 2.2486-2.2490" (Red), 2.2482-2.2486" (Blue). Taper wear limit .001", Out-of-round wear limit .0006".
Clearance - .0006-.0026". Wear limit .0034".

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by No. 3 (rear intermediate) main bearing.
Thrust Bearing Alignment - See *"Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Crankshaft Rear Oil Seal Installation: See *"Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Crankshaft Front Oil Seal Installation: See *"Engine Front Cover" in Ford Motor Co. Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all cars to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub. To remove slinger, remove crankshaft front cover and slide slinger off crankshaft.

CAMSHAFT

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. See *"Camshaft & Bearings" in Ford Motor Co. Special Data.*

Journal Diameter: (1) 2.0805-2.0815", (2) 2.0655-2.0665", (3) 2.0505-2.0515", (4) 2.0355-2.0365", (5) 2.0205-2.0215".
Bearings - Steel backed babbitt lined bushings.
Clearance - .001-.003". Wear Limit .006".

End Thrust: Taken by thrust spacer behind timing chain sprocket.
Endplay - .001-.007". Wear limit .012".
Replacement Bearings: Furnished Std. and .015" Undersize.
Camshaft Removal & Installation: See *"Camshaft & Bearings" in Ford Motor Co. Special Data.*
Camshaft Bearing Replacement - See *"Camshaft & Bearings" in Ford Motor Co. Special Data.*
Timing Chain: Side guide type.
►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up slack on drive side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.
Camshaft Setting: Timing marks on both sprockets adjacent and in line with straightedge across shaft centers.
Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Ford Motor Co. Special Data.*
Engine Front Cover Removal: See *"Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

►*EXCESSIVE PUSHROD GUIDE WEAR CORRECTION & VALVE PUSHROD ASSEMBLY PRODUCTION CHANGE:* See *"Valve System" in Ford Motor Co. Special Data.*

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Tappet Clearance: Zero lash, hydraulic lifters. *For hydraulic lifter operating range, check, see "Valve System" in Ford Motor Co. Special Data.*

Valve	Head Diameter	①Stem Diameter
Intake	1.582-1.597"	.3100-.3107"
Exhaust	1.381-1.396"	.3090-.3097"

Valve	Seat Angle	②Lift	③Stem Clearance
Intake	45°④	.2375"	.0008-.0025"
Exhaust	45°④	.2375"	.0018-.0035"

① - Std. Also furnished .003", .015", .030" Oversize.
② - Cam Lobe Lift. Maximum allowable lift loss .005".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.

Valve Seat Width - .060-.080", All Valves.

Valve Stem Oil Seals - Cup type seals installed on all valve stems below upper spring retainer.

Valve Springs: Free Length - 2 5/32" approximately.

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①57-63 lbs.	1.770"
Open	②161-178 lbs.	1.380"

① - Wear limit 52 lbs. at 1.770".
② - Wear limit 145 lbs. at 1.380".

Valve Spring Installation: Valve spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward cylinder head. Check installed height of spring from surface of cylinder head spring pad to underside of spring retainer. If height greater than 1 25/32", install .030" spacers as necessary on head under spring to bring height within limits of 1 3/4-1 25/32". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above) ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Hydraulic. Removed from above by using magnet placed in pushrod seat after removing intake manifold and pushrods.
Diameter - .8740-.8745". **Clearance** - .0005-.0020".
Hydraulic Lifter Overhaul - *See "Valve System" in Ford Motor Co. Special Data.*
Hydraulic Lifter Operating Range - *See "Valve System" in Ford Motor Co. Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.
Rocker Arm Stud Replacement - *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valve - Opens 21° ① BTDC. Close 51° ② ALDC.
Exhaust Valve - Opens 57° ① BLDC. Close 15° ② ATDC.
① - Camlift .003". ② - Camlift .006".

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*
Crankcase Capacity: 3½ qts. (6 Cyl.), 4 qts. (V8) refill. Add 1 qt. for filter change.
Normal Oil Pressure - 35-55 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator (Ford Fairlane): Indicator light on instrument panel controlled by Engine Oil Pressure Switch No. B6A-9278-B.
Oil Pressure Gauge (Mercury Meteor): King-Seeley "CV" (Constant Voltage) type with Gauge Voltage Regulator Ford & Mercury No. B9MF-10804-A.
Dash Unit - Meteor No. C2YY-9273-A.
Engine Unit - Meteor No. B7T-9278-A.
Oil Pump: Rotor type driven by distributor shaft. Located in crankcase.
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*
Oil Filter: Full-flow, disposable type. Replace every 6,000 miles.
Filter Replacement - Coat gasket surface of filter with oil, thread filter on bracket by hand until gasket contacts adapter face, then tighten filter an additional ½ turn. Run engine and check for leaks.
CAUTION - DO NOT overtighten.
Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and ventilation (road draft) tube at front of engine (6 Cyl.), rear of engine (V8). Clean and lubricate filler cap every 6,000 miles.
Positive - Road draft tube replaced by vacuum regulator valve and necessary hoses and tubing to connect regulator valve to engine ventilation outlet and to spacer between carburetor and manifold. Service system at 6,000 mile intervals and check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 8½ qts. (6 Cyl.), 13½ qts. (V8). Add 1 qt. for heater.
Pressure Valve - 12-15 lb. radiator filler cap.
Thermostat: 160°F. Fairlane & Meteor No. C1UZ-8575-B (replaces early CODE-8575-A).
188°F. Fairlane & Meteor No. C2DZ-8575-A (replaces early 178°F CODE-8575-B. C1UZ-8575-A & C2UZ-8575-A).
Water Pump: Packless, sealed ball bearing type.
Pump Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator B9MF-10804-A.
Dash Unit - C2OZ-10883-A (Fairlane), C2YY-10883-A (Meteor).
Engine Unit - CODF-10884-A (Early), C1AZ-10884-A (Later).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

FORD GALAXIE MODELS

Galaxi	**S ri s 50**
2-Door Club Sedan	51
4-Door Town Sedan	52
Galaxi 500	**Series 60**
2-Door Club Sedan	61
4-Door Town Sedan	62
2-Door Club Victoria	63
4-Door Town Victoria	64
2-Door Convertible	65
Stati n Wagons	**Series 70**
4-Door Ranch Wagon	71
4-Door 6 Passenger Country Sedan	72
4-Door 9 Passenger Country Sedan	74
4-Door 6 Passenger Country Squire	76
4-Door 9 Passenger Country Squire	78

MERCURY MONTEREY MODELS

Monterey	**Series 50**
2-Door Sedan	51
4-Door Sedan	52
2-Door Hardtop	53
M nt r y Cust m	**Series 60**
4-Door Sedan	62
2-Door Hardtop	63
4-Door Hardtop	64
2-Door Convertible	65
Stati n Wagons	**Series 70**
4-Door Commuter (6 Pass.)	①72
4-Door Commuter (9 Pass.)	②72
4-Door Colony Park (6 Pass.)	③76
4-Door Colony Park (9 Pass.)	④76

① - Body Style 71A. ② - Body Style 71C.
③ - Body Style 71B. ④ - Body Style 71D

SERIAL NUMBER: Stamped on patent plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ③ ③ ④ ⑤
2 E 51 V 100001

① - Year Model. **2** 1962.
② - Assembly Plant. *See below.*
③ - Body Series. *See above.*
④ - Engine. **V** 223 cu. in. 6 Cyl.
⑤ - Beginning vehicle number at each assembly plant (100001 for Ford, 500001 for Mercury).

Ass mbly Plant Designation

A - Atlanta	**J** - Los Angeles	**S** -Pilot Plant
D - Dallas	**N** - Norfolk	**U** - Louisville
E - Mahwah	**P** - St. Paul	**W** - Wayne
G - Chicago	**R** - San Jose	**Z** - St. Louis

Engin Production Cod Numbers: Indicate place, day and month of engine manufacture. Not used for licensing.
Car Build Dat C d : Stamped under DATE on patent plate. Number designates day of month, letter designates month as follows: **A** January through **M** December.

TUNE-UP

►*AIR CLEANER "BUZZ" NOISE CORRECTION:* "Buzz" may occur when accelerating from fully stopped position, or when operation at fast idle. Caused by air vibrating against its lower brace. To correct, overbend brace at existing bend.
COMPRESSION PRESSURE: 150 lbs.±10 lbs. at cranking speed. Maximum variation between cylinders 10 lbs.
VACUUM READING: 18" at idle speed.
VALVE TAPPET CLEARANCE: "Zero Lash" type used. Long recess mark on lower side of rocker arm eccentric cam must be centered over valve stem when engine is idling. To make minor adjustment, turn rocker arm adjusting screw. For initial adjustment and checking, *see "Valve System" in Ford Motor Co. Special Data.*
MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight. Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾ turn windup and hooked over stop pin.
CRANKCASE VENTILATION VALVE: Service at 6000 mile intervals and check operation before performing a a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Autolite BTF-6 (Std.), BF-82 (Economy Carb.). 18 mm. Torque to 15-20 ft. lbs. (20-30 ft. lbs. for new plug in new head). Plugs have tapered seat, no gasket used.
COIL: Ford & Mercury No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from multiple connector to starter solenoid.
DISTRIBUTOR: Ford. Used as follows:

Model	① Distributor No.	Type
Synchro-mesh	② C1AF-12127-E	Loadomatic
	③ C2AF-12127-E	Loadomatic
Taxi	④ C1AE-12127-F	Loadomatic
Auto. Trans.	⑤ C2AF-12127-D	Step-Stop
	⑥ C2AF-12127-F	Step-Stop

① - Stamped on distributor housing for identification.
② - Part No. C1AZ-12127-A.
③ - Part No. C2AZ-12127-E.
④ - Part No. C2AZ-12127-C.
⑤ - Part No. C1AF-12127-D.
⑥ - Part No. C2AZ-12127-F.

Condenser - Ford & Mercury No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford & Mercury No. FAA-12171-A.
Breaker Gap - .024-.026".
Cam Angle - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand
① C1AF-12127-E

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.25	350
1-2	0.48	500
6-7	1.93	1100
10¼-11½	4.80	2000

② C1AF-12127-D

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	3½-4½	1.08	800
A	6¼-7¼	1.70	1000
B	7½-8½	2.38	1200
C	7½-8½	5.63	2000
C	9-10½	6.50	1450
D	13 max	10 min.	

A - Adjust primary spring. **B** - Adjust stop washers.
C - Adjust spring washers. **D** - Replace breaker plate assembly.
① - Set test stand to 0°, 0" of Hg, and 250 RPM.
② - Set test stand to 0°, 0" of Hg, and 400 RPM.

IGNITION TIMING

Model	Std. Setting	Allowable Rang
Synchro-mesh	6° BTDC	2-11° BTDC
Auto. Trans.	12° BTDC	2-17° BTDC

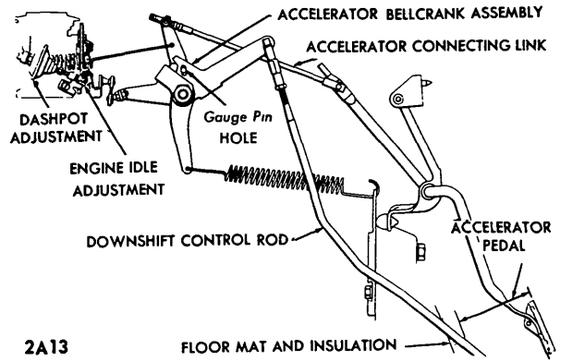
►*SETTING NOTE:* Set timing with engine idling and distributor vacuum line disconnected.
Timing Mark - Pointer on chain case cover and crankshaft damper marked with 9 timing marks from TDC to 16 (16° BTDC) in 2° increments. Align pointer with correct mark on damper.

CARBURETOR

►*CARBURETOR APPLICATION: One Holley Model 1904 or 1908 1-barrel carburetor used on all models.*

THROTTLE & DOWNSHIFT LINKAGE ADJUSTMENT: Make engine idle speed and anti-stall dashpot adjustments (see below), then proceed as follows: Stop engine and make sure carburetor throttle lever is against idle adjusting screw. Adjust accelerator connecting link for accelerator pedal height of 3 11/16" from top front corner of accelerator pedal to floor mat. Adjust downshift control rod length so a ¼" gauge pin will fit freely several times in gauge pin holes in accelerator bellcrank assembly.
Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

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AUTOMATIC TRANSMISSION THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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HOLLEY MODEL 1904 & 1908

Model ①	② Carburetor No.
Synchro-mesh (Std.)	③ C2AE-9510-A
Synchro-mesh (CCV)	③ C2AE-9510-B
Auto. Trans. (Std.)	③ C2AE-9510-E
Auto. Trans. (CCV)	③ C2AE-9510-F
Economy (Synchro-mesh)	④ C2AE-9510-C
Economy (Auto. Trans.)	④ C2AE-9510-D
Economy	④ C2AE-9510-AS

① - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.

② - Stamped on fuel inlet boss.

③ - Part No. C2AZ-9510-(with same suffix).

④ - Part No. C2AZ-9510-H.

Idle Setting - Initial setting 1-1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll. Then turn screw in until engine runs smoothly. Favor a slightly rich mixture.

Idle Speed - 500-525 RPM (Synchro-mesh), 450-475 RPM (Auto. Trans. in "D").

Fuel Level - 11/16"±1/32" below power valve mounting surface (remove power valve and use Tool T52L-9550-AGE for Ford, 9550-AE-3 for Mercury). Fuel should touch end of "low" pin, but not touch end of "high" pin.

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment (will be correct when hot or slow idle correctly set).

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA: See "Holley Single Barrel Model 1904 & 1908 Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter. Ford & Mercury Nos. C2AZ-9350-B,D.
Fuel Pump Pressure - 3½-5½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford & Mercury No. B9MF-10804-A.
Dash Unit - Ford No. C2AZ-9350-A (Galaxie), Mercury No. C2MY-9280-A (Monterey).
Tank Unit - Ford & Mercury No. COAZ-9275-C (Exc. Sta. Wgn.), C1AF-9275-A (Sta. Wgn.).

Fuel Filter: Disposable element type. Replace element every 30,000 miles.

Air Cleaner: Dry filter element type. Clean every 6,000 miles, replace element every 30,000 miles.

►*CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. If compressed air used, direct air stream from inside surface of filter element. DO NOT wash element in solvent or other liquids and DO NOT oil or lubricate.

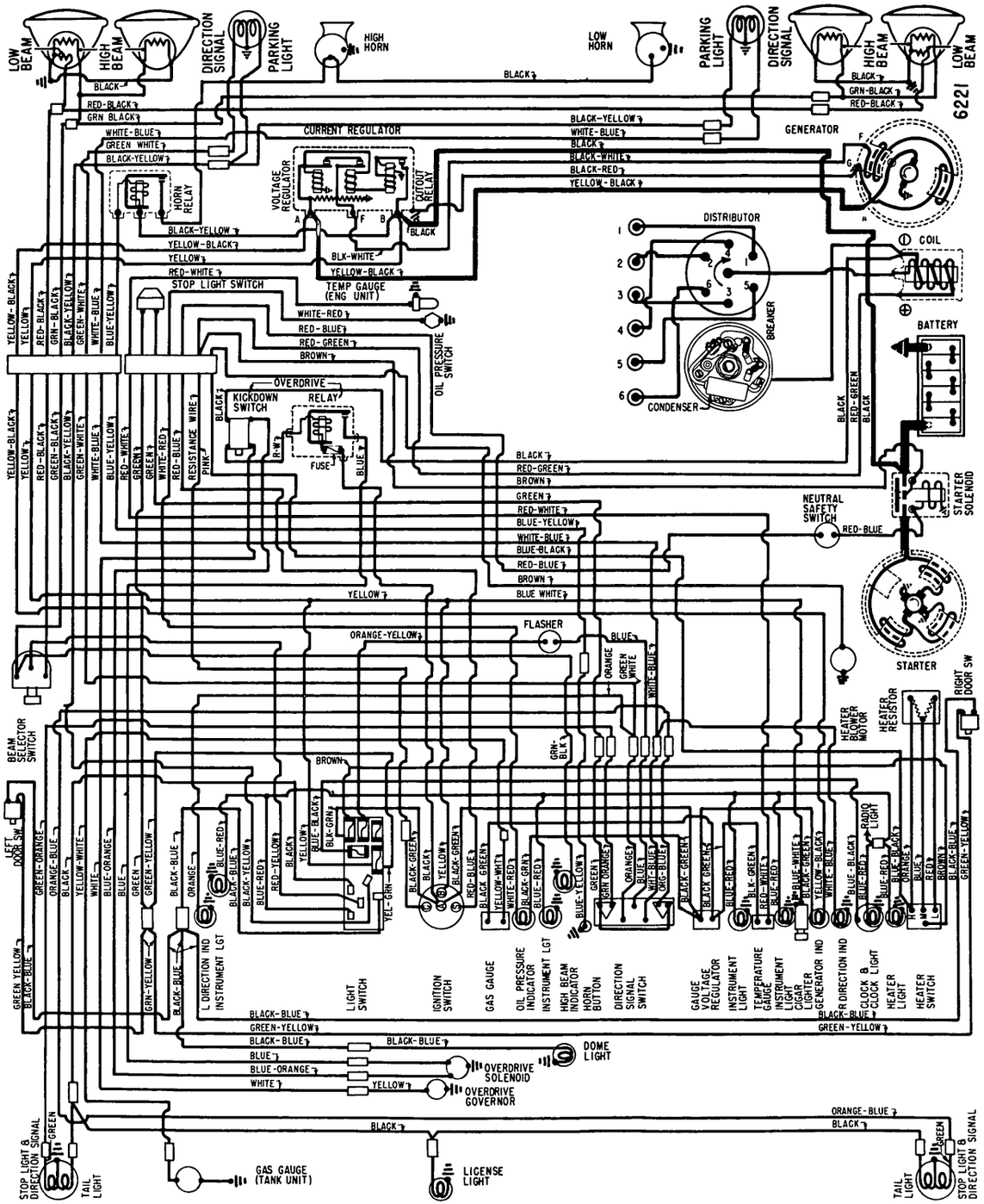
ELECTRICAL

►*SEE FORD GALAXIE & MERCURY MONTEREY V8 PAGES (FOLLOWING) FOR BATTERY, STARTER, GENERATOR, GENERATOR REGULATOR, ALTERNATOR, ALTERNATOR REGULATOR, CIRCUIT BREAKER AND FUSE DATA.*

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head. 223 cubic inch engine of same design used previously except that a vibration damper has been installed

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FORD GALAXIE 6 CYL. WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

at the upper side of the timing chain to minimize timing chain noise.

B re	Strok	Displacement
3.62"	3.60"	223 cu. ins.
Compr. Ratio	**Rat d HP**	**Developed HP**
8.4-1	31.54'	138 at 4200 RPM

Compr ssi n & Vacuum R ading - *See TUNE-UP.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *Se "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *Se "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (FORD): Drain crankcase and remove flywheel housing inspection cover and dipstick. On Station Wagons; remove stabilizer bar-to-lower control arm and frame rail retaining nuts and move stabilizer bar as far forward as possible. On All Models, remove crankcase ventilation tube assembly. Remove oil pan retaining screws, rotate crankshaft for clearance, and remove oil pan.

OIL PAN REMOVAL (MERCURY): Drain crankcase and remove dipstick. Remove stabilizer bar-to-lower control arm nuts and loosen right and left stabilizer bar-to-frame clamps. Pry stabilizer bar to right and pull arms downward for clearance. Remove oil pan.

PISTONS

Autothermic type. Solid skirts with three rings.

►*ORIGINAL BORE & PISTON NOTE:* Production standard cylinder bore range is 3.6250-3.6274". Pistons used in this standard bore are 2 sizes: 3.6236-3.6242" (color coded Red), and 3.6248-3.6254" (Color coded Blue). Production cylinder bore also may be .003" Oversize (3.6274-3.6286") with .003" Oversize pistons (3.6260-3.6266").

R m val - Pistons and rods removed from above.

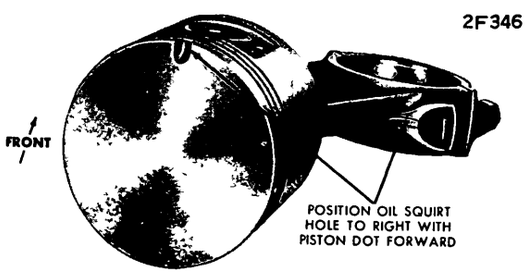
Cl arance - .0008-.0026" at bottom of skirt.

Fitting N w Pist ns: *See "Pistons" in Ford Motor Co. Sp cial Data.*

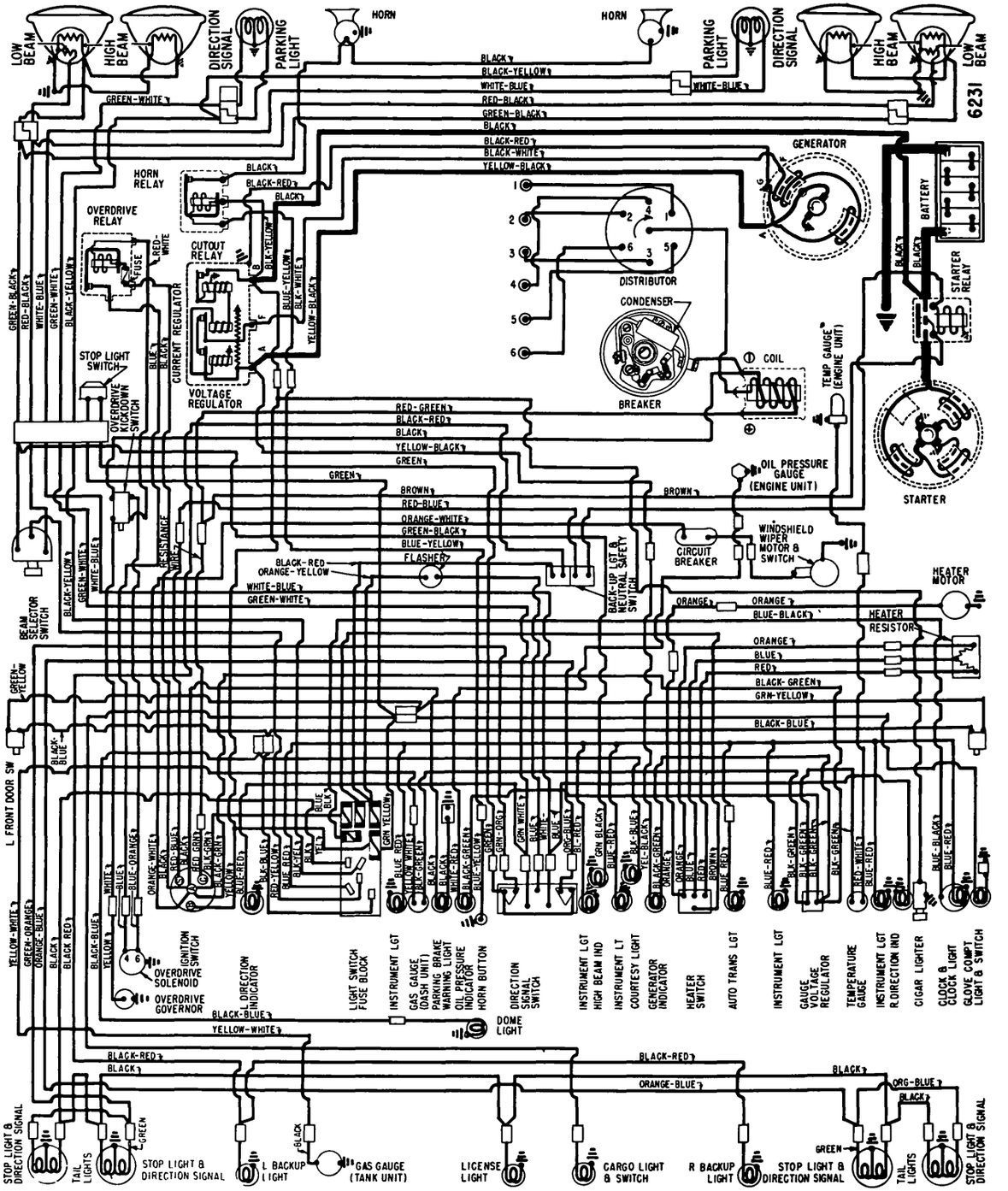
R plac m nt Pistons: F rd - Furnished Std. (1 size only), and .020", .030", .040", .060" Oversize with fitted pins. **Mercury** - Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040" Oversize with fitted pins.

Installing Pistons: Install piston with indentation in head of piston toward front of engine. *See Rod Installation.*

CONTINUED ON NEXT PAGE



PISTON & ROD ASSEMBLY



MERCURY MONTEREY 6 CYL. WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

PISTON PIN

Floating type with lock ring at each end.
Diameter - .9120-.9123". **Length** - 3.010-.3.030".
Pin Fit in Piston - .0001-.0003". Wear limit .0008".
Pin Fit in Rod Bushing - .0001-.0005". Wear limit .001".
Replacement Pins: Std. (Code Green), .001" (Code Blue), .002" (Code Yellow) Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0929-.0936"	.010-.020"	①.0019-.0036"
Compr. (2)	.0930-.0940"	.010-.020"	①.0015-.0035"
Oil (3)		.015-.055"	②

① - Wear limit .006".
② - Snug - side sealing type ring.
Replacement Rings: Std., & .020", .030", .040" Oversize. Also .060" Oversize on Ford.

CONNECTING ROD

Journal Diameter - 2.2984-2.2988" (Red), 2.2980-2.2984" (Blue).
Clearance - .0006-.0025". Wear limit. .0035".
Side Clearance - .003-.009". Wear limit .012".
Length - 6.258-6.262" center-to-center.
Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
Installing Rods: Install rod in piston so that oil squirt hole is to **right** when indentation on piston head is to front of engine. Rods and caps are numbered 1 to 6. Numbers on rods and caps must be on same side and installed in same numbered cylinders.

CRANKSHAFT

Journal Diameter - 2.4984-2.4988" (Red), 2.4980-2.4984" (Blue).
Bearings - Steel backed copper lead alloy.
Clearance - .0006-.0028". Wear limit .0038".
Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030" Undersize.
►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.
End Thrust: Taken by rear intermediate (No. 3) bearing.
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Endplay - .004-.008". Wear limit .012".
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*
Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

►*CAMSHAFT NON-INTERCHANGEABILITY CAUTION:* Different camshafts used in Adjustable and Zero Lash type engines. DO NOT interchange camshafts unless rocker arm and shaft assemblies are also changed.

Journal Diameter - 1.9255-1.9265".
Clearance - .001-.003". Wear limit .006".

End Thrust: Taken by thrust plate and spacer behind camshaft sprocket. *NOTE* - Chamfer on inside of spacer must be toward camshaft journal.
Endplay - .001-.007". Wear limit .012".
Replacement Bearings: Finished bearings furnished Std. & .015" Undersize. *CAUTION* - No. 3 bearing is **not** interchangeable with other bearings.

Camshaft Bearing Replacement - *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Timing Chain: Side guide type, 56 links. Replace chain when side deflection exceeds ½" on slack side (establish reference mark on block with sprocket turned so that all slack removed, then turn sprocket in opposite direction so that slack is present, measure deflection by pressing out on chain midway between sprockets).

TIMING CHAIN VIBRATION DAMPER: Retained by camshaft thrust plate retaining screws behind camshaft sprocket.
Removal - Remove camshaft and crankshaft sprockets and timing chain assembly. Remove damper from camshaft thrust plate.
Installation - Reverse removal procedure.
Timing Chain Damper Clearance: There should be .030-.070" clearance between snubber pad of damper and timing chain when all slack is removed from chain.
Camshaft Setting: Sprockets are marked by "0" at one tooth. Mesh chain so that there are 12 pins between "0" marks with marks on driving side of chain.

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

"Zero Lash" Type - For initial adjustment and checking, *see "Valve System" in Ford Motor Co. Special Data.* For minor operating adjustment, *see TUNE-UP above.*

Valve	Head Diameter	①Stem Diameter
Intake	1.775-1.785"	.3416-.3423"
Exhaust	1.505-1.520"	.3398-.3405"

Valve	Seat Angle	②Lift	③Stem Clearance
Intake	45°④	.260"	.0010-.0024"
Exhaust	45°④	.260"	.0028-.0042"

① - Furnished also with .003", .015", .030" Oversize
② - Cam Lobe Lift. Wear limit .005".
③ - Wear limit .0045" Intake, .0055" Exhaust.
④ - Valve Face Angle 44°.

►*ROTATABLE VALVE NOTE:* All valves are rotatable type. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Seat Width - .070-.090", all valves.
Valve Stem Oil Seals - Umbrella type seals used on all valve stems. Install with cupped side down.
Valve Springs: Free Length - 2.33".

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	①97-105 lbs.	1.780"
Open	②160-178 lbs.	1.410"

① - Wear limit 88 lbs. at 1.780".
② - Wear limit 144 lbs. at 1.410".

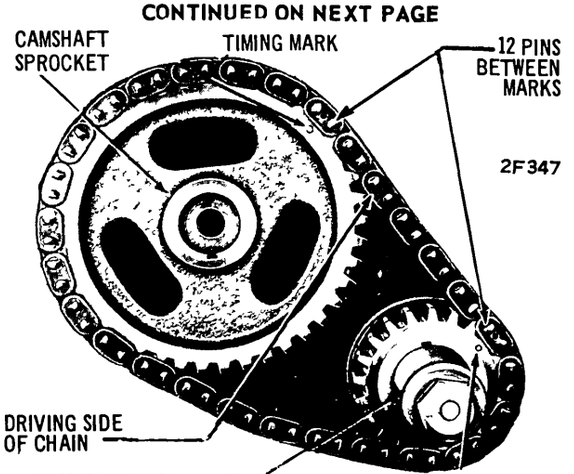
Valve Spring Installation: Spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward cylinder head. Check installed height of spring which must not exceed 1 25/32" from surface of cylinder head spring pad to underside of spring retainer. If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 3/4-1 25/32". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Mushroom type. Remove from below with camshaft out.
Clearance - .0011-.0027". Wear limit .0055".

Rocker Arm Assembly: "Zero Lash" type to provide no valve operating clearance. *See "Valve System" in Ford Motor Co. Special Data.*

CONTINUED ON NEXT PAGE



6 CYL. VALVE TIMING MARKS

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications

Intake Valves - Open 23° ① BTDC. Close 59° ② ALDC.
Exhaust Valves - Open 71° ① BLDC. Close 10° ② ATDC.
① - Camlift .002". ② - Camlift .005".

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel controlled by Oil Pressure Switch, Ford & Mercury No. B6A-9278-B (Alternate FDH or FDA-9278-A), mounted on right side of engine above starter.

Oil Pump: Gear type early, Rotor type later. Rotor type only furnished for replacement. Pump located in crankcase.
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Disposable type. Replace every 6,000 miles.

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet pipe at rear of crankcase at left side. Clean filter in filler cap everu 6,000 miles.
Positive - Outlet pipe replaced by adapter and tube into intake manifold just below carburetor. Ventilation valve located at manifold end of tube. Clean valve every 6,000 miles and check operation before performing a "Tune-Up" for ignition and carburetion troubles.
See "Closed Crankcase Ventilation Systems" in Carburetion Section.

ENGINE COOLING SYSTEM

Water Capacity: 15 qts. Add 1 qt. for heater.
Thermostat: Ford & Mercury No. COAZ-8575-A (160°), No. COAZ-8575-B or C2AZ-8575-A (178°) for use with permanent anti-freeze.
Pressure Valve: Radiator filler cap, Ford & Mercury No. B8A-8100-A. 12-15 lb. type.
Water Pump: Packless, sealed ball bearing type. *See "Cooling System" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator, Ford & Mercury No. B9MF-10804-A.
Dash Unit - C2AZ-10883-A (Ford), C2MY-10883-A (Mercury).
Engine Unit - Ford & Mercury Nos. B7A or C1AZ-10884-A.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*THUNDERBIRD JACKING & HOISTING PRECAUTIONS: Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

FORD GALAXIE MODELS

Galaxie	**Series 50**
2-Door Club Sedan	51
4-Door Town Sedan	52
Galaxie 500	**Series 60**
2-Door Club Sedan	61
4-Door Town Sedan	62
2-Door Club Victoria	63
4-Door Town Victoria	64
2-Door Convertible	65
Station Wagons	**Series 70**
4-Door Ranch Wagon	71
4-Door 6 Passenger Country Sedan	72
4-Door 9 Passenger Country Sedan	74
4-Door 6 Passenger Country Squire	76
4-Door 9 Passenger Country Squire	78

THUNDERBIRD MODELS

Thunderbird	**Series 80**
Tudor Hardtop	83
Tudor Convertible	85

MERCURY MONTEREY MODELS

Monterey	**Series 50**
2-Door Sedan	51
4-Door Sedan	52
2-Door Hardtop	53
Monterey Custom	**Series 60**
4-Door Sedan	62
2-Door	63
4-Door Hardtop	64
2-Door Convertible	65
Station Wagons	**Series 70**
4-Door Commuter (6 Pass.)	①72
4-Door Commuter (9 Pass.)	②72
4-Door Colony Park (6 Pass.)	③76
4-Door Colony Park (9 Pass.)	④76

① - Body Style 71A. ② - Body Style 71C.
③ - Body Style 71B. ④ - Body Style 71D.

SERIAL NUMBER: Stamped on patent plate attached to left front door hinge pillar post. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 E 51 W 100001

① - Year Model. 21962.
② - Assembly Plant. *See below.*
③ - Body Series. *See above.*
④ - Engine. *See below.*
⑤ - Beginning vehicle number at each assembly plant (100001 for Ford & Thunderbird, 500001 for Mercury).

Assembly Plant Designation

A - Atlanta	N - Norfolk	U - Louisville
D - Dallas	P - St. Paul	W - Wayne
E - Mahwah	R - San Jose	Y - Wixom
G - Chicago	S - Pilot Plant	Z - St. Louis
J - Los Angeles		

Engine Code Designation

Engine	Code Letter
292" Engine 2-Bbl. Carb.	W
292" Engine 2-Bbl. Carb. (Export)	T
352" Engine 2-Bbl. Carb.	X
390" Engine 4-Bbl. Carb. (Std.)	Z
390" Engine 4-Bbl. Carb. (High Perf.)	Q
390" Engine 4-Bbl. Carb. (Police Interceptor)	P
390" Engine Three Carbs. (Super High Perf.)	M
390" Engine 4-Bbl. Carb. (Export)	R
406" Engine 4-Bbl. Carb. (High Perf.)	B
406" Engine Three Carbs. (Super High Perf.)	G

Engine Production Code Numbers: Indicate plate, day and month of engine manufacture. Not used for licensing.

Car Build Date Code: Stamped under DATE on patent plate. Number designates day of month, letter designates month as follows: A January through M December (I not used).

►*ENGINE DESIGNATION NOTE:* In the following data pages, engines will be referred to by cubic inch displacement (for example, **292**), with special difference pointed out as necessary (for example, **390 Hi Perf.**).

TUNE-UP

►*390" ENGINE STALLING, ROUGH, OR EXCESSIVE SMOKING ON STARTING CORRECTION:* May be caused by too slow Fast Idle Setting or insufficient choke plate pull-down. *See "Ford 2 & 4-Barrel Carburetors" in Carburetion Section.*

COMPRESSION PRESSURE: 292 - 160±20 lbs., **352,390 & 406** - 180±20 lbs. All at cranking speed. Maximum variation between cylinders 10 lbs.

VACUUM READING: 18" at idle speed.

VALVE TAPPET CLEARANCE: 292 - .019" Cold, .018" Hot, All Valves. Adjust to .019" clearance while engine is cold, then check for .018" clearance after running engine for 30 minutes to normalize temperature. Minimum torque required to turn self-locking tappet adjusting screw must be 3 ft. lbs. minimum after interference noted.

352 & 390 Std. - Zero lash, hydraulic lifters.

390 Hi Perf. & Police - .028" Cold, .025" Hot, All Valves.

406 Hi Perf. - .025". Int. & Exh. Cold.

MANIFOLD HEAT CONTROL: 292 - Automatic thermostatically controlled valve (Spring & Counterweight) located in outlet of right exhaust manifold. When valve is closed (Heat on) right manifold exhaust gases are directed to heat riser passages and out to left exhaust manifold. When valve open (heat off) more of right manifold gases are permitted to flow directly out exhaust system.

352,390 & 406 - None used. Engine coolant heated spacer installed between carburetor and intake manifold.

CRANKCASE VENTILATION VALVE: Service at 6,000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 292 - 1-5-4-8-6-3-7-2. **352,390 & 406** - 1-5-4-2-6-3-7-8.

Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.

SPARK PLUG GAP: .032-.036" (Exc. 406 Super Hi-Perf.), .025" (406 Super Hi-Perf.).

Spark Plugs - Autolite BF-82 (292), BF-42 (352,390 Std., 406 Hi. Perf.), BF-32 (390 Hi-Perf. & Police; 406 Super Hi-Perf.). 18 mm. Torque to 15-20 ft. lbs. (20-30 ft. lbs. new plug in new head). Plugs have tapered seat and no gasket is used.

COIL: Ford & Mercury No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.

Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from multiple connector to starter solenoid.

DISTRIBUTOR: Ford. Used as follows:

Engine	Distributor No.
292	①**COAF-12127-A**
352 Synchro-mesh	①**COAF-12127-E**
352 Auto. Trans.	①**COAF-12127-D**
390 Std. Ford & Mercury	①**C2AF-12127-A**
390 Std. Thunderbird	①②**C2SF-12127-A**
390,406 All Hi-Perf.	①③**COAF-12127-K**
390 Police	①④**C2AF-12127-D**
390 Export	⑤**C1SF-12127-B**

① - Stamped on distributor housing for identification.
② - Part No. C2SZ-12127-A.
③ - Double Breaker, Centrifugal Advance Only type.
④ - Part No. C2AZ-12127-B. ⑤ - Part Number.

Condenser - Ford & Mercury No. 7RA-12300-C (COAF-12127-K), No. B9AF-12300-A (Others). **Capacity** - .21-.25 mfd.

Contact Point Set - Ford & Mercury No. FDS-12171-A (2 sets - COAF-12127-K); No. B7A-12171-A (1 set - Others).

Breaker Gap - .014-.016" (Single Breaker Type), .019-.021" (Double Breaker Type - set both sets to same gap).

Cam Angle (Single Breaker) - 26-28½°.

Cam Angle (Double Breaker) - 33° (each set), 33° (total dwell). Maximum variation between point sets 1°.

Breaker Arm Spring Tension - 17-20 ozs. (Single Breaker Type), 27-32 ozs. (Double Breaker Type).

Rotation - Counterclockwise viewed from above.

① Automatic Advance - COAF-12127-A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	500	0	1000
1¼-2¼	800	2½-4½	1600
5-6¼	1300	10-12½	2600
10¼-11¾	2000	20½-23½	4000

① Automatic Advance - COAF-12127-E

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	500	0	1000
1-2	775	2-4	1550
5-6¼	1250	10-12½	2500
11½-13	2000	23-26	4000

② Automatic Advance - COAF-12127-D

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
¾-1¾	500	1½-3½	1000
5-6¼	1100	10-12½	2200
11½-13	2000	23-26	4000

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

③ Automatic Advance - C2AF-12127-A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325	0	650
½-1¼	400	1-2½	800
3½-4½	500	7-9	1000
5-6	600	10-12	1200
10¾-12¼	2000	21½-24½	4000

③ Automatic Advance - C2SF-12127-A

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325	0	650
1¼-2¼	425	2½-4½	850
5-6	550	10-12	1100
7½-8½	700	15-17	1400
13-14½	2000	26-29	4000

③ Automatic Advance - C0AF-12127-K

Degrees Distr.	RPM	Degrees Eng.	RPM
2¼-3¼	650	4½-6½	1300
5-6½	800	10-13	1600
7¾-9	1125	15½-18	2250
11½-13	2000	23-26	4000

③ Automatic Advance - C2AF-12127-D

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	325	0	650
½-1½	400	1-3	800
4½-5½	525	9-11	1050
7-8	700	14-16	1400
15¼-16¾	2000	30½-33½	4000

① - Set test stand to 0°, 0" of Hg, and 300 RPM.
② - Set test stand to 0°, 0" of Hg, and 200 RPM.
③ - Set test stand to 0°, 0" of Hg, and 250 RPM.

Vacuum Spark Control: Diaphragm type, Mounted on distributor and linked directly to breaker plate.

⑪ Vacuum Advance - C0AF-12127-A

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	7
5-8	10-16	12½
8-11	16-22	16
9½-12½	19-25	20

⑪ Vacuum Advance - C0AF-12127-D & E

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
5-8	10-16	10
8-11	16-22	13½
9½-12½	19-25	17

⑪ Vacuum Advance - C2AF-12127-A & C2SF-12127-A

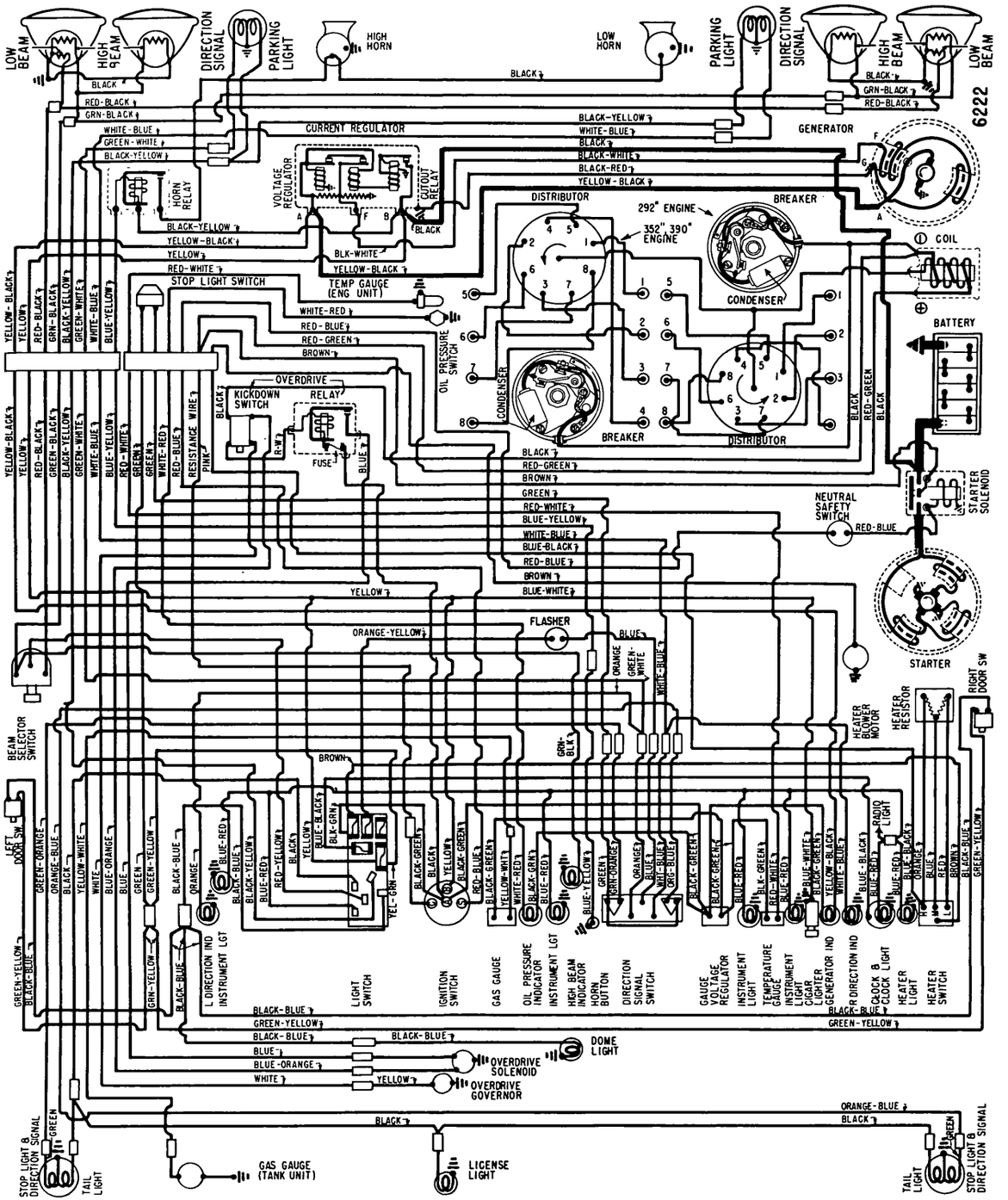
Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-2½	0-5	6
4-7	8-14	10
5½-8½	11-17	15

⑪ Vacuum Advance - C2AF-12127-D

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
1-4	2-8	7
4-7	8-14	10
5½-8½	11-17	15

⑪ - Set test stand to 0°, 0" of Hg, and 1000 RPM.

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FORD V8 (EXC. THUNDERBIRD) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

IGNITI N TIMING

Engine	Synchro-mesh	Auto. Trans.
292	①5° BTDC	②12° BTDC
352	①5° BTDC	③ 8° BTDC
390 Std.		③ 8° BTDC
390 Police	② 12° BTDC	②12° BTDC
390 All Hi Perf.	④ 14° BTDC	
406 All Hi-Perf.	⑤ 8° BTDC	

① - Allowable range 2-10° BTDC.
② - Allowable range 2-17° BTDC.
③ - Allowable range 2-13° BTDC.
④ - Allowable range 2-19° BTDC.
⑤ - Allowable range 2-8° BTDC.

►*SETTING NOTE:* Set timing with distributor vacuum line disconnected.

Timing Mark - Timing pin located in crankshaft pulley and pointer on engine front cover with 5 timing marks from 0 to 14° BTDC (292), 4 timing marks from 0 to 10° BTDC (352 & 390). Align pin with correct mark on pointer.

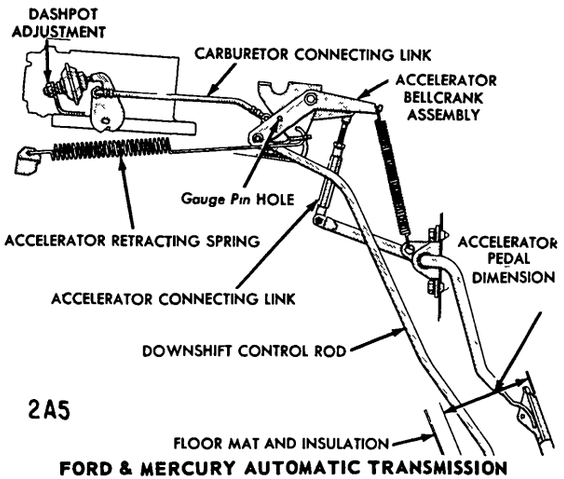
CARBURETOR

►*CARBURETOR APPLICATION: As follows:*

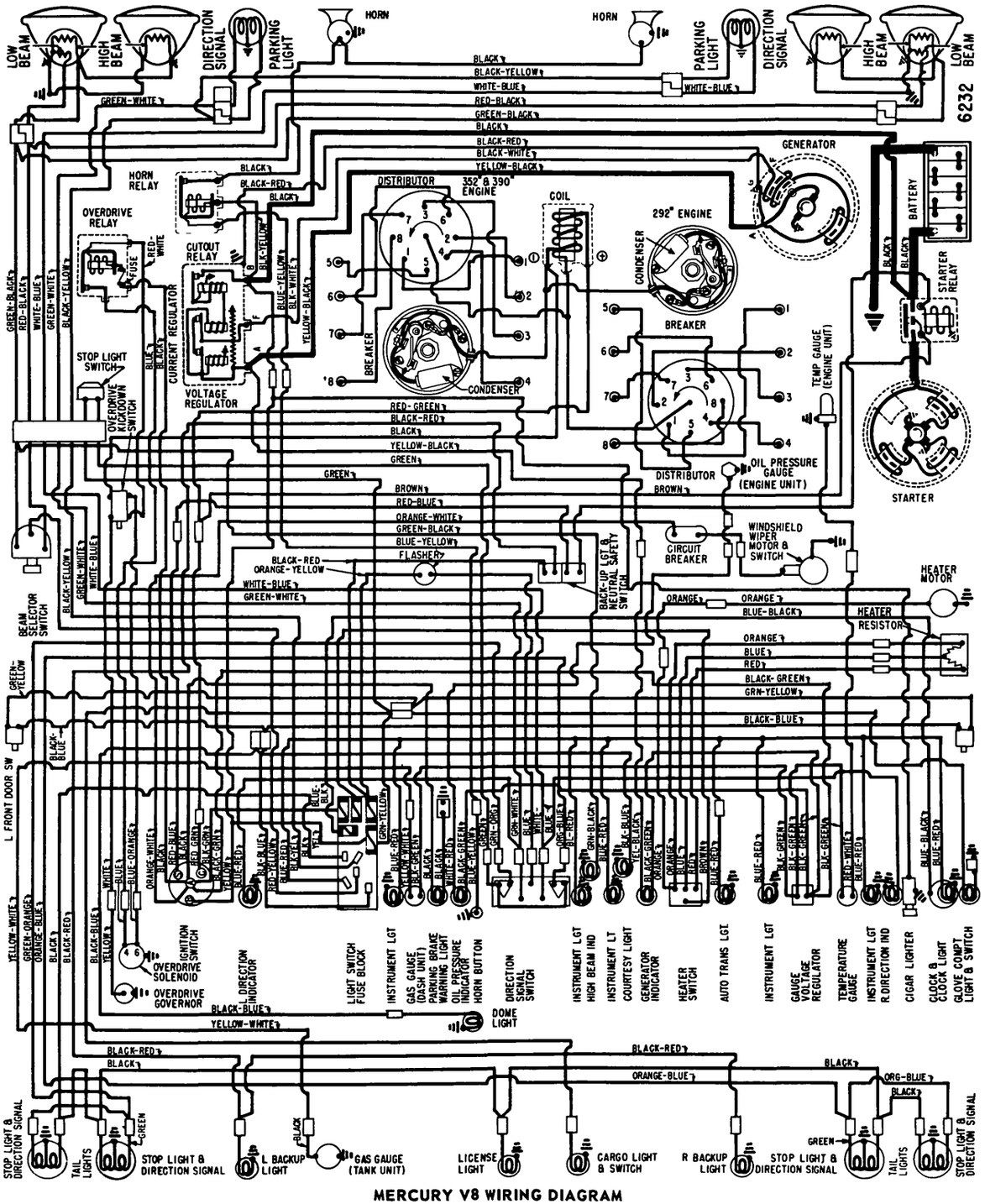
Engine	Carburetor
292	One Ford 2-Barrel
352	One Ford 2-Barrel
390 Std. & Police	One Ford 4-Barrel
390 & 406 Hi-Perf.	One Holley 4-Barrel
390 & 406 Super Hi-Perf.	Three Holley 2-Barrel

THROTTLE & DOWNSHIFT LINKAGE ADJUSTMENT (2-Speed Automatic Transmission): Make engine idle speed and anti-stall dashpot adjustments (see below), then proceed as follows: Stop engine and make sure carburetor throttle arm stopscrew is against hot idle step of carburetor fast idle cam. Adjust accelerator connecting link for accelerator pedal height of 3 11/16" (Ford), 3 1/2" (Mercury) from top front corner of accelerator pedal to floor mat. Disconnect carburetor connecting link at carburetor, insert a 1/4" gauge pin

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FORD & MERCURY AUTOMATIC TRANSMISSION THROTTLE LINKAGE



MERCURY V8 WIRING DIAGRAM

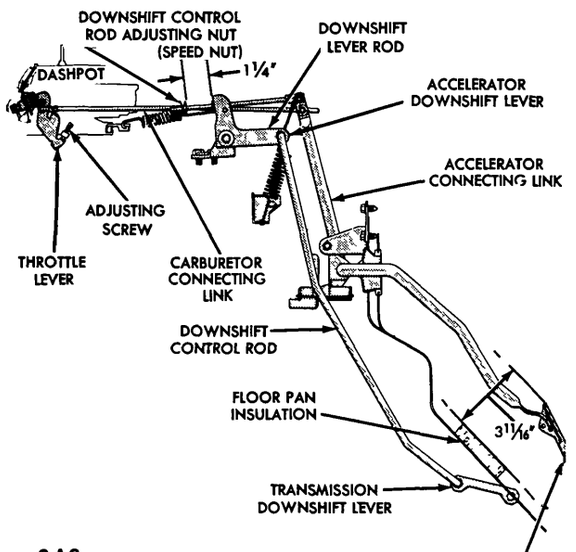
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through holes in bellcrank assembly, and adjust carburetor connecting link so gauge pin will slide in and out of holes freely several times when connecting link is connected to carburetor.

THROTTLE & DOWNSHIFT LINKAGE ADJUSTMENT (3-Speed Automatic Transmission - Ford & Mercury): Make engine idle speed and anti-stall dashpot adjustments (see below), then proceed as follows: Stop engine and make sure carburetor throttle lever is against idle adjusting screw. Disconnect carburetor connecting link from accelerator bellcrank. Insert 1/4" gauge pin through holes in bellcrank assembly. Lift connecting link to normal operating position, maintain forward pressure on link so carburetor throttle lever is firmly against idle adjusting screw, and adjust length of link so sleeve fits freely into bellcrank lever. **Rotate sleeve one full turn counterclockwise to lengthen link.** Remove gauge pin and connect link. Make sure gauge pin will still enter gauging holes freely (adjust connecting link again as necessary). Adjust accelerator connecting link so pedal height is 3 11/16" (Ford), 3 1/2" (Mercury) from top front corner of pedal to floor mat.

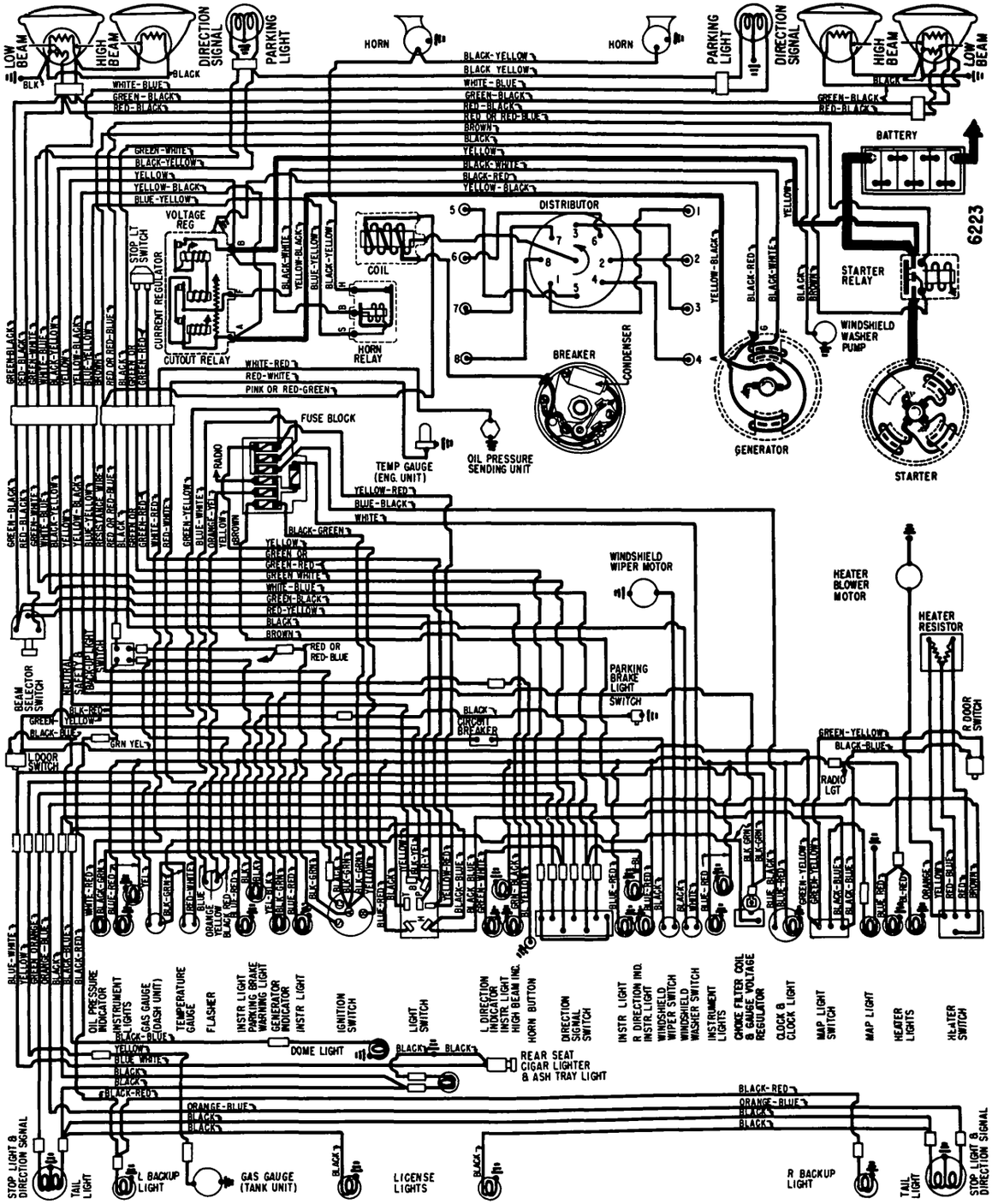
THROTTLE & DOWNSHIFT LINKAGE ADJUSTMENT (3-Speed Automatic Transmission - Thunderbird): Make engine idle speed and anti-stall dashpot adjustments (see below), then proceed as follows: Make sure carburetor throttle lever is against idle adjusting screw. Disconnect carburetor connecting link at carburetor and adjust link to obtain accelerator pedal height of 3 11/16" from top front corner of pedal to floor mat. Place speed nut on downshift lever rod 1 1/4" from for-

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2A6

THUNDERBIRD AUTOMATIC TRANSMISSION THROTTLE LINKAGE



FORD THUNDERBIRD WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

ward face of bushing in downshift lever (distance from bellcrank to nut will be 1 1/4").

Anti-Stall Dashpot Adjustment: With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

Manual Throttle Control Adjustment (Ford & Mercury Air Conditioned Cars): Attach a tachometer to engine and place transmission selector lever in "N" or "P". Turn air conditioning on and make sure magnetic clutch is engaged. Using hand throttle, bring engine speed to 750-1000 RPM and secure stop closest to throttle control handle against cable armor so engine cannot be operated higher than above range with hand throttle.

FORD 2-BARREL CARBURETORS

Engine & Transmission ①	②Carburetor No.
292 Synchro-mesh (Std.)	C2AE-9510-Y
292 Synchro-mesh (CCV)	C2AE-9510-AA
292 Auto. Trans. (Std.)	C2AE-9510-Z
292 Auto. Trans. (CCV)	C2AE-9510-AB
352 Synchro-mesh (Std.)	C2AE-9510-AC
352 Synchro-mesh (CCV)	C2AE-9510-AE
352 Auto. Trans. (Std.)	C2AE-9510-AD
352 Auto. Trans. (CCV)	C2AE-9510-AF

FORD 4-BARREL CARBURETORS

Engine & Transmission ①	②Carburetor No.
390 Std. ④ Synchro-mesh (Std.)	C2AE-9510-AG
390 Std. ④ Synchro-mesh (CCV)	C2AE-9510-AJ
390 Std. ④ Auto. Trans. (Std. & CCV)	C2AE-9510-AK
390 Police Synchro-mesh (Std.)	C2AE-9510-AL
390 Police Synchro-mesh (CCV)	C2AE-9510-AN
390 Police Auto. Trans. (Std. & CCV)	C2AE-9510-AR
390 Thunderbird (Early)	C2SE-9510-C
390 Thunderbird (Late)	⑥ C2SF-9510-B

HOLLEY TRIPLE (2-BBL.) CARBURETORS

Engine	⑤Carburetor No.
390 & 406 Pass. Cars	Center C1AE-9510-AV
390 & 406 Pass. Cars	Front & Rear C1AE-9510-AU
390 Thunderbird	Center C2SE-9510-A
390 Thunderbird	Front & Rear C2SE-9510-E

HOLLEY 4-BARREL CARBURETORS

Engine & Transmission ①	⑤ Carburetor No.
390,406 Hi-Perf. Synchro-mesh (CCV)	C1AE-9510-AM

① - **Std.** - Without closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.

② - This number stamped on tag attached to carburetor. *See "Ford 2 & 4-Barrel Carburetors" & "Holley 2 & 4-Barrel Carburetors" in Carburetion Section for complete identification data and parts numbers.*

③ - Thunderbird. ④ - Ford & Mercury.

⑤ - This number stamped on choke plate flange.

⑥ - Stamped on carburetor main body.

►*MANIFOLD FUEL DISTRIBUTION (292): Carburetor RIGHT barrels feeds Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*MANIFOLD FUEL DISTRIBUTION (352,390 & 406): Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

Idl Setting - Initial setting 1-1½ turns open (¾-1¼ turns open on Front & Rear carburetors on 3 Carb. Cars). With engine at normal operating temperature, turn both idle adjusting screws in until engine runs roughly from lean mixture, then turn screws out until engine begins to roll. Finally, turn screws in just enough for smooth running (favor a slightly rich mixture).

Idle Speed - As follows:

Engine	Idle Speed
292 & 352 Synchro-mesh	500-525 RPM
292 & 352 Auto. Trans. ①	450-475 RPM
390 Std. Auto. Trans. ①	475-500 RPM
390 Police Synchro-mesh	575-600 RPM
390 Police Auto. Trans. ①	550-575 RPM
390 All Hi Perf. Synchro-mesh	675-700 RPM
406	675-700

① - Automatic Transmission in either "Drive" position.

►*AIR CONDITIONED CAR IDLE SPEED NOTE:* Operate air conditioner at least 20 minutes before setting idle speed, and set idle speed with air conditioning on.

ACCELERATING PUMP SETTING (292,352,290,406 Eng.):

Place operating link in No. 2 hole (year around), No. 3 hole (Extremely low temperature), No. 1 hole (High Temperature or High Altitude) position of overtravel lever.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Ford 2 & 4-Barrel Carburetors" & "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Fuel only or Fuel & Vacuum as follows:

Model	Carter	AC
292,352,390,406 Std.	C2AZ-9350-C	
292,252,390,406 Air.Cond.	C2AZ-9350-A	
390 Thunderbird	C2SZ-9350-A	
390 Thunderbird 3 Carbs.	C2SZ-9350-B	
4 & 6-Bbl. Carb. Special		COAE-9350-F

Fuel Pump Pressure - 4-6 lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) with Gauge Voltage Regulator Ford & Mercury No. B9MF-10804-A.

Dash Unit - Z2AZ-9305-A (Ford), C2MY-9305-A (Mercury).

Tank Unit - COAZ-9275-C (Pass. Cars), C1AF-9275-A (Sta. Wgn.), C1SF-9275-C (Thunderbird).

Radio Suppression Choke Filter (Thunderbird) - Located in feed circuit mounted on gauge voltage regulator.

►*MERCURY MONTEREY EXCESSIVE "EMPTY" FUEL RESERVE CHANGE:* Normal reserve when gauge registers Empty is 2 gallons. If desired, this can be reduced approximately 1 gallon by bending gauge float arm down 3/10".

Fuel Filter: Disposable element type (all engines). Located integrally with fuel pump (350,390 engines with Air Cond.), in line between fuel pump and carburetor (all others). Replace filter element every 30,000 miles. *NOTE* - To reassemble integral type, tighten housing by hand until housing contacts gasket then advance 1/8 turn.

Air Cleaner: Dry filter element type. Clean every 6,000 miles, replace element every 30,000 miles.

►*CLEANING CAUTION:* Remove element from cleaner body and hold in vertical position to shake dust or dirt out by tapping element lightly against horizontal surface. Tap and rotate element until outer surface has been cleaned. Direct compressed air (if used) against inside surface only. DO NOT deform element and DO NOT oil paper or screen of element.

BATTERY

Ford Part No. ①	Volts	Plates	②Capacity
B9A-10654-D ③	12	11	55 Ampere Hr.
B9A-10654-E ④	12	13	65 Ampere Hr.
B9A-10654-F ⑤	12	11	70 Ampere Hr.

① - Numbers are for dry type batteries for service replacement. ② - At 20 hour rate.

③ - Replaces original battery with red filler caps.

④ - Replaces original battery with gray filler caps.

⑤ - Replaces original battery with yellow filler caps.

Battery Ground - Negative, to engine.

Engine Ground - Converter or flywheel housing to frame (6 Cyl.); Rear of cylinder head or intake manifold to body (V8).

STARTER

Ford & Mercury No. C2AZ-11002-A (Except T-Bird), N. C2SZ-11002-A (T-Bird).

Armature - Ford No. B6A-11005-B (Ford & T-Bird), Mercury No. C2AZ-11005-A (Mercury).

Drive - Bendix "Folo-Thru" (Rubber Type). Ford & Mercury No. C2AZ-11350-B.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 48-58 ozs.

Cranking Speed - 150-180 RPM, 155-190 amperes.

Performance Data - C2AZ-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	110
14.8 ft. lbs.		5.0	580

Performance Data - C2SZ-11002-A

Torque	RPM	Volts	Amperes
0 ft. lbs.	①	12.0	70
15.5 ft. lbs.		5.0	670

① - With starter on engine and engine idling.

Starting Switch: Magnetic type, Ford and Mercury No. B6A-11450-A, controlled by ignition and neutral safety switch (Auto. Trans.).

Neutral Safety Switch Adjustment (Aut. Trans.) - *See "Ford Motor Co. Automatic Transmissions" in Transmission Section.*

GENERATOR

Ford. Used as follows:

Car & Equipment	Generator
Ford & Mercury Std.	30 Amp.
Thunderbird Std.	35 Amp.
Ford & Mercury Air Cond.	30 or 35 Amp.
Thunderbird Air Cond.	40 Amp.

►*IDENTIFICATION NOTE:* Rated output of generator is stamped, painted, or stenciled on unit.

	Performance Data		
Generator	Amperes	Volts	Gen. RPM
6 Cyl. Std. ①	30	15.0	2525
V8 Std. ①	30	15.0	2500
Air Cond. ①	30 or 35	15.0	2670
T-Bird Std.	35	15.0	2670
T-Bird Air Cond.	40	15.0	2650

① - Ford & Mercury.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

Brush Spring Tension - 20-26 ozs.
Field Current - 1.2-1.8 amperes at 12.0 volts (hot).
Rotation - Counterclockwise at commutator end.
Belt Adjustment: Use Belt Tension Gauge T62L-8620-A or 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Engine	①New Belt	②Used Belt
223 & 292	90-120	60-90
352, 390, 406	100-130	80-110

① - Run belt for 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer.

GENERATOR REGULATOR

Ford or Basch. 30, 35, and 40 Ampere Regulators used with generators of same amperage rating. *See GENERATOR above.*
►*IDENTIFICATION NOTE:* Current setting of regulator is stamped on unit.
►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cut out Relay

Cuts In - 12.0-12.8 volts (30 Amp.); 12.2-13.0 volts (35 Amp. - Ford); 12.4-13.2 volts (35 Amp. - T-Bird & Mercury); 12.4-13.2 volts (40 Amp.).
Cuts Out - 6-9 amps. (30 Amp.); 8 amps. (35 & 40 Amp.) reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current Regulator

Setting (30 Amp.) - 28-32 amperes.
Setting (35 Amp.) - 33-37 amperes.
Setting (40 Amp.) - 38-42 amperes.
►*OTHER DATA: See "Ford Motor Co. 12-Volt Regulators" in Electrical Section.*

ALTERNATOR

Leece-Neville. 60 Ampere, three-phase type, with internal (radially mounted) rectifiers.
Rated Output - 60 amperes at 14.0 volts and 3300 RPM (Cold), 4100 RPM (Hot).
Cut-In Speed - 760 RPM.
Brush Spring Tension - 8-10 ozs.
Field Current - 2.4-3.0 amperes at 12.0 volts and 75°F.
►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

ALTERNATOR REGULATOR

Leece-Neville. 60 ampere, three-unit type, consisting of Load Relay, Voltage Regulator, and Current Regulator.

Load Relay

Closing Voltage - 5.6-6.4 volts.

Voltage Regulator

Setting - 13.5-14.3 volts (upper contacts), .1-.3 volts lower (lower contacts) at 75°F ambient temperature.

Current Regulator

Setting - 58-62 amperes.
►*OTHER DATA: See "Leece-Neville Alternator & Regulators" in Electrical Section.*

MISC. ELECTRICAL

Stop Light Switch Location: On forward end of brake master cylinder.
Lighting Switch: Combination lighting switch and fuse junction block.
Removal - Disconnect battery. Remove switch control knob and shaft by pressing spring-release button on top of switch (switch in "off" position). Unscrew retaining nut and remove switch. Remove retaining clip (Ford & Mercury) and separate switch from fuse junction block (All Cars).
Instrument Cluster Removal: Ford - Disconnect battery and remove steering column cover plate. Turn automatic transmission indicator needle down on shifting shaft. Disconnect speedometer cable and instrument cluster wiring harness from retaining clips at rear of panel. Protect steering column from scratches. Remove instrument panel retaining screws and pull cluster from panel and lay on steering column. Disconnect the wires to the gauges and instruments, remove the lights, and remove cluster assembly. *NOTE* - Individual instruments may be removed after assembly removed.
Mercury - Disconnect battery. Disconnect speedometer cable and remove wires from retaining clip on clock right hand retaining nut. Remove wires from two clips holding harness to back of instrument cluster. Protect steering column from scratches. Remove automatic transmission selector lever cover as follows: Pull trim from below selector dial, remove pointer mechanism attaching screws from bottom of steering column and remove selector cover-to-instrument panel attaching screws. Remove selector cover. *NOTE* - It may be necessary to remove screw on bottom side of steering column which attaches shroud to steering column. Remove instrument cluster-to-instrument panel retaining screws (four long screws on top, four short screws on bottom, two screws just above steering column). Pull instrument cluster forward and lay on steering column. Remove wires from gauges and lights.
Speedometer Removal (Thunderbird): Remove chrome trim ring (attached by one screw). Remove speedometer mounting screws and pull speedometer from instrument panel so speedometer cable can be disconnected and pilot lights removed. Remove speedometer. *NOTE* - When installing, pilot lights must be secured in mounting holes. Top pilot light is high beam indicator.

CIRCUIT BREAKERS: 18 Ampere - Protects headlight circuit. Integral with headlight switch.
12 Ampere - Protects 2-Speed electric windshield wipers. On instrument panel to left of steering column.
6 Ampere - Protects single speed windshield wipers. Located on instrument panel to left of steering column.

FUSES: *NOTE - On Ford & Mercury, fuses are located in fuse junction block of lighting switch. On Thunderbird, fuses are in fuse block on left hand air duct. All fuses are in above locations except as noted.*
15 Ampere - Park, Tail, Dash, Dome lights.
15 Ampere - Overdrive. On overdrive relay.
15 Ampere (T-Bird) - Cigar lighter feed circuit.
14 Ampere - Heater blower.
14 Ampere - Back-up Lights & Turn Signals.
14 Amp. - Windshield Washer Pump. In feed wire.
7.5 Amper - Spotlight. In feed wire.
7.5 Amper - Radio.
4 Amp. (T-Bird) - Instrument panel rheostat. In feed wire.
2 Amp. (Ford & Mercury) - Clock.
1 Amp. (T-Bird) - Clock.
Cigar Lighter - Sulphur disc or reset circuit breaker on back of lighter socket.

ENGINE

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head 292",352",390",406" engines of same design used previously (406" engine is similar in design to 390").

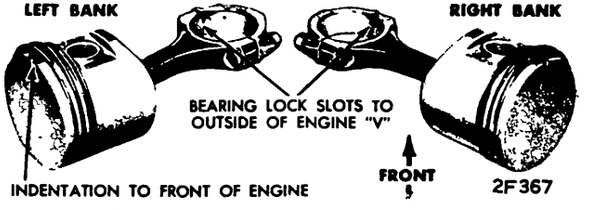
Engine	Bore	Stroke	Displacement
292	3.75"	3.30"	292 cu. ins.
352	4.00"	3.50"	352 cu. ins.
390	4.05"	3.78"	390 cu. ins.
406	4.13"	3.78"	406 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
292	8.8-1	45.00	170 at 4200 RPM
352	8.9-1	51.20	220 at 4300 RPM
390 Std.	9.6-1	52.49	300 at 4600 RPM
390 Police	9.6-1	52.49	330 at 5000 RPM
390 Hi Perf.	10.6-1	52.49	375 at 6000 RPM
390 ①	11.1-1	52.49	401 at 6000 RPM
406 Hi-Perf.	11.4-1	54.58	385 at 5800 RPM
406 ①	11.4-1	54.58	405 at 5800 RPM

① - Super Hi-Performance (3 Carburetors)
Compression & Vacuum Reading - *See TUNE-UP.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*
ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*
►*CYLINDER OVERSIZE BORE NOTE (406" ENG.):* Manufacturer recommends no oversize boring of cylinder block.
►*ENGINE COMPARTMENT RATTLING NOISE CORRECTION (292 Eng.): Caused by incorrectly anch red counterweight on exhaust manifold heat control valv. When counterweight can be rotated 360° on shaft, replace it.*
OIL PAN REMOVAL: 292 - Drain crankcase and disconnect oil pump inlet tube at pump. Remove oil pan retaining screws and remove oil pan. *NOTE* - On Mercury, remove ends of stabilizer bar from mounting studs and pull ends of bar down to provide clearance for oil pan removal.
352, 390, 406 Engines - Drain crankcase and remove dipstick. Remove flywheel housing lower cover. On Mercury, remove stabilizer bar from mounting studs and pull ends of bar down for clearance. On all cars,

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V8 ENGINE PISTON & ROD ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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remove oil pan retaining screws and let pan rest on frame crossmember. Crank engine for necessary clearance between crankshaft counterweight and rear of oil pan. Swing oil pump pick-up tube and screen out of way or let drop into oil pan. Remove oil pan by moving forward and tilting down.

390 (T-Bird) - Drain crankcase and cooling system. Disconnect radiator upper hose at supply tank. Remove oil pan retaining screws and let pan rest on underbody crossmember. Rotate crankshaft so counterweight will clear pan and move pan forward. Raise engine so there is tension on front engine mounts, disconnect mounts and raise engine so oil pump retaining bolts can be removed. Remove oil pan and pump.

PISTONS

Autothermic type. Solid skirts with three rings.

►*ORIGINAL BORE & PISTON NOTE:* Production standard cylinder bore range is .0024" for all engines except 406" engine. *Manufacturer recommends no reboring of 406" engine cylinder block.* Pistons in standard bore are 2 sizes color coded Red & Blue. *See table below for specifications:*

Engine	Production Cylinder Bore	Bore
292		3.7500-3.7504"
352		4.0000-4.0024"
390		4.0500-4.0524"
406		4.1300-4.1336"

Production Piston Size

Engine	Red	Blue
292	3.7486-3.7492"	3.7498-3.7504"
352	3.9982-3.9988"	3.9994-4.0000"
390	4.0477-4.0483"	4.0489-4.0495"
406	4.1258-4.1264"	4.1270-4.1276"

Removal - Pistons & rods removed from above.

Clearance - **292** .0008-.0026". **352** .0012-.0030". **390, 406** .0017-.0035". Wear limit .006" (All).

Checking Clearance & Fitting Pistons - *See "Pistons" in Ford Motor Co. Special Data.*

Installing Pistons - Install pistons with notch in piston head toward front of engine. *See Rod Installation.*

Replacement Pistons: Ford - Furnished Std. (one size only) All engines, and .020", .030", .040" (All Engines except 406), .060" (292, 352) oversize with fitted pins.

Mercury - Furnished Std. (2 sizes - Red & Blue), and .020", .030", .040" oversize with fitted pins.

PISTON PIN

Floating type with lock ring at each end.

Diameter - **292** .9120-.9123". **352,390,406** .9750-.9753".

Length - **292** 3.010-3.030". **352,390,406** 3.156-3.170".

Clearance In Piston - .0001-.0003". Wear limit .0008".

Clearance in Rod - .0001-.0005". Wear limit .001". Light thumb press fit at 70°F.

Replacement Pins: Std. (Green), .001" (Blue), .002" (yellow) Oversize.

PISTON RINGS

Two compression rings and one oil ring per piston. Oil ring is "side sealing" type (two steel rails with spring spacer between).

292 Engine

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.0780"	.010-.020"	Ⓒ.0020-.0035"
Compr. (2)	.0770-.0780"	.010-.020"	Ⓒ.0020-.0040"
Oil (3)		.015-.055"	②

352 & 390 Engines

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0774-.0781"	.015-.025"	Ⓒ.0024-.0041"
Compr. (2)	.0930-.0940"	.015-.025"	Ⓒ.0020-.0040"
Oil (3)		.015-.055"	②

Ⓒ - Wear limit .006".

② - Snug. Side sealing type ring.

Replacement Rings: Furnished Std. & .020", .030", .040" Oversize. Also .060" Oversize for Ford 292 & 352 engines.

CONNECTING ROD

Length (Center-to-Center) - **292** 6.320-6.324", **352** 6.538-6.542", **390 & 406** 6.486-6.490".

Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.1884-2.1888"	2.1880-2.1884"
352,390,406	2.4384-2.4388"	2.4380-2.4384"

Clearance: 292 .0005-.0024". Wear limit .0034".

352,390,406 Std. .0007-.0028". Wear limit .0038".

390 (Mechanical Lifters) - .0009-.0029". Wear limit .0038".

Sideplay - .006-.016". Wear limit .019".

Installing Rods: Install rods in correct numbered cylinder with squirt hole to center of engine, bearing lock slots to outside of engine, and notch in piston head to front of engine.

Replacement Bearings: Std. (2 sizes marked Red and Blue), and .002", .010", .020", .030", .040" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

CRANKSHAFT

Journal Diameter (Std. Size)

Engine	Red	Blue
292	2.4984-2.4988"	2.4980-2.4984"
352,390,406	2.7488-2.7492"	2.7484-2.7488"

Main Bearing Clearance

Engine	Clearance	Wear Limit
292	.0006-.0030"	.0042"
352 & 390 Std.	.0006-.0031"	.0039"
390 Ⓒ, 406	.0008-.0012" (No. 1)	.0039"
	.0010-.0031" (Others)	.0039"

Ⓒ - 390 with Mechanical lifters.

Replacement Bearings: Furnished Std. (2 sized marked Red and Blue), and .002", .010", .020", .030", .040" Undersize.

►*STANDARD SIZE NOTE:* **Red** marked bearings increase clearance, **Blue** marked bearings decrease clearance.

End Thrust: Taken by No. 3 (center) main bearing

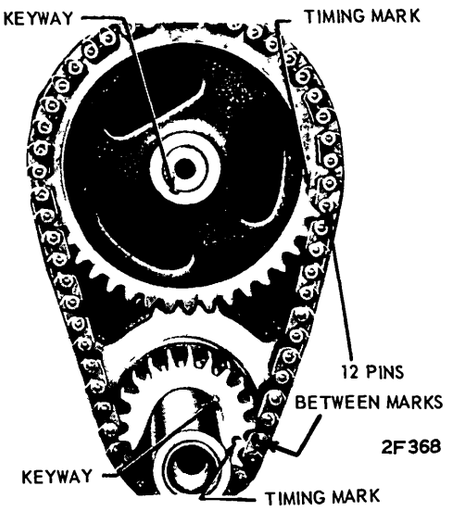
Thrust Bearing Alignment - *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Endplay - .004-.008". Wear limit .012".

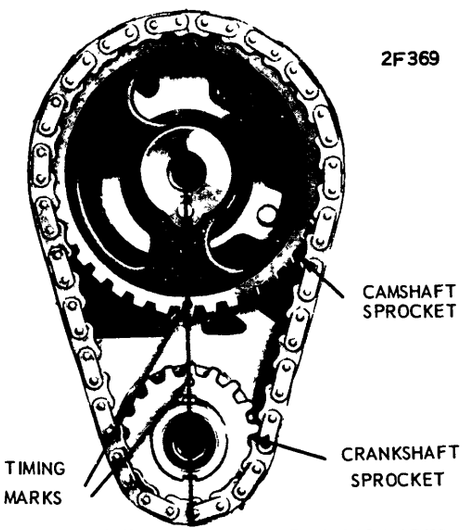
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on all car and truck engines to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub and cylinder front cover. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.



V8 292 VALVE TIMING MARKS



V8 352", 390", 406" ENGINES VALVE TIMING MARKS

CAMSHAFT

Journal Diameter - **292** 1.9255-1.9265", **352,390, 406** 2.1238-2.1248".

Bearings - Steel backed babbitt lined bushings.

Clearance - .001-.003". Wear limit .006".

End Thrust: 292 - Taken by thrust plate and spacer located between camshaft sprocket and shoulder on camshaft. **Endplay** - .001-.007". Wear limit .012". **352,390,406** - Controlled by spring-loaded thrust button on fuel pump eccentric bolt.

Replacement Bearings: Std. and .015" undersize.

Camshaft Bearing Replacement - *See "Camshaft &*

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Bearings" in Ford Motor Co. Special Data.

Camshaft Removal & Installation: See *"Camshaft & Bearings" in Ford Motor Co. Special Data.*

Timing Chain: Side guide type. **Length** - 56 links (292), 48 links (352,390,406).

►*TIMING CHAIN REPLACEMENT NOTE:* Replace chain and sprockets when deflection on slack side exceeds ½" (take up slack on driving side, measure slack on opposite side). Remove and install chain as a unit with both sprockets.

Camshaft Setting (292): Sprockets marked by round depression on one tooth. Mesh chain so that there are 12 chain link pins between timing marks on sprockets when marks are on drive side.

Camshaft Setting (352,390,406): Timing marks on both sprockets adjacent and in line across shaft centers.

Engine Front Cover Oil Seal (Crankshaft Front Seal): See *"Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal: See *"Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

Tappet Clearance: 292 - .019" Cold, .018" Hot. All valves. *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*

352 & 390 Std. - Zero lash, hydraulic lifters. *For hydraulic lifter operating range check, see "Valve System" in Ford Motor Co. Special Data.*

390 Police & Hi-Perf. - .028" Cold, .025" Hot. All valves. *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*

406 Hi-Perf. - .025" Int. & Exh. Cold. *For preliminary adjustment after overhaul, see "Valve System" in Ford Motor Co. Special Data.*

292 Engine

Valve	Head Diameter	①Stem Diameter
Intake	1.642-1.652"	.3416-.3423"
Exhaust	1.505-1.520"	.3398-.3405"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°③	.264"	④.0010-.0024"
Exhaust	45°③	.262"	⑤.0028-.0042"

352 & 390 Std. Engines (Hydraulic Lifters)

Valve	Head Diameter	①Stem Diameter
Intake	2.022-2.037"	.3711-.3718"
Exhaust	1.551-1.566"	.3693-.3700"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°③	.232"	④.0010-.0024"
Exhaust	45°③	.232"	⑤.0028-.0042"

390 Police & All Hi Perf. Engines (Mechanical Lifters)

Valve	Head Diameter	①Stem Diameter
Intake	2.022-2.037"	.3711-.3718"
Exhaust	1.551-1.566"	.3701-.3708"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°③	.2636"	④.0010-.0024"
Exhaust	45°③	.2636"	⑥.0020-.0034"

406 Hi-Perf. Engines

Valve	Head Diameter	①Stem Diameter
Intake	2.022-2.037"	.3711-.3718"
Exhaust	1.551-1.566"	.3693-.3700"

Valve	Seat Angle	②Lift	Stem Clearance
Intake	45°③	.298"	④.0010-.0024"
Exhaust	45°③	.298"	⑤.0028-.0042"

①- Furnished with .003", .015" & .030" oversize stems.
②- Cam lobe lift. Wear limit .005".
③- Valve Face Angle 44°.
④- Wear limit .0045". ⑤- Wear limit .0055".
⑥- Wear limit .0047".

Valve Seat Width - .070-.090" (All Engines).

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over valve guide.

►*ROTATABLE VALVE NOTE: All valves are rotatable type. See "Valve System" in Ford Motor Co. Special Data.*

Valve Springs: *NOTE - Valve damper spring used inside valve spring on all 390 Engines. Install damper spring inside valve spring so coil end of damper is 135° counterclockwise from coil end of valve spring.*

Spring Specifications - 292

Valve	Spring Pressure	Length
Closed	71-79 lbs. ①	1.780"
Open	161-177 lbs. ②	1.390"

Spring Specifications - 352

Valve	Spring Pressure	Length
Closed	94-104 lbs. ③	1.820"
Open	180-198 lbs. ④	1.420"

⑤Spring Specifications - 390 Std.

Valve	Spring Pressure	Length
Closed	74-84 lbs. ⑥	1.820"
Open	190-208 lbs. ⑦	1.420"

⑤Spring Specifications - 390 Police & All Hi Perf. 406 Hi-Perf. Engine

Valve	Spring Pressure	Length
Closed	80-90 lbs. ⑧	1.820"
Open	255-280 lbs. ⑨	1.320"

①- Wear limit 64 lbs. at 1.780".
②- Wear limit 145 lbs. at 1.390".
③- Wear limit 85 lbs. at 1.820".
④- Wear limit 162 lbs. at 1.420".
⑤- Spring and damper assembly together.
⑥- Wear limit 67 lbs. at 1.820".
⑦- Wear limit 171 lbs. at 1.420".
⑧- Wear limit 72 lbs. at 1.820".
⑨- Wear limit 230 lbs. at 1.320".

Spring Free Length - 292 - 2.33", 352 - 2.26", 390 Std. & 406 - 2.15", 390 Police & All Hi-Perf. - 2.06".

Valve Spring Installation: Spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward cylinder head. *NOTE - On 390 Engines, end with damper spring coil must be 135° counterclockwise from coil end of valve spring.* Check installed height of spring which must not exceed maximum (in table below) from surface of cylinder head spring pad to underside of spring retainer. If height greater, install .030" spacers as necessary on head under spring to bring height within limits listed in table below. *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Spring Height Specifications

Engine	Installed Height
292	1 3/4-1 25/32"
352 & 390 Std.	1 13/16-1 27/32"
390 Police & All Hi-Perf. & 406	1 5/16-1 21/64"

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum (see table above), ream guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: (292) Mechanical, mushroom type. Remove from below after removing camshaft.

Clearance - .0011-.0027". Wear limit .0055".

Valve Lifters (352 & 390): Hydraulic (Std. Engine). Mechanical (Hi-Perf. & Police Engines), barrel type. Can be removed through pushrod holes without disturbing chamber cover or manifold.

Clearance - .0005-.0020". Wear limit .005".

Valve Lifters (406): Mechanical type. Can be removed through pushrod holes without disturbing chamber cover or manifold.

Clearance - .0005-.0020".

Hydraulic Lifter Overhaul - *See "Valve System" in Ford Motor Co. Special Data.*

Hydraulic Lifter Operating Range - *See "Valve System" in Ford Motor Co. Special Data.*

Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT for alignment of sprocket marks, and "Lift" under VALVES for checking of camshaft lobe wear.

Valve Timing Specifications - 292

Intake Valves - Open 12°①BTDC. Close 54°②ALDC.
Exhaust Valves - Open 58°③BLDC. Close 8°④ATDC.

Valve Timing Specifications - 352

Intake Valves - Open 22°⑤BTDC. Close 68°⑥ALDC.
Exhaust Valves - Open 68°⑤BLDC. Close 22°⑥ATDC.

Valve Timing Specifications - 390 Std.

Intake Valves - Open 26°⑤BTDC. Close 64°⑦ALDC.
Exhaust Valves - Open 67°⑤BLDC. Close 23°⑦ATDC.

Valve Timing Specifications - 390 Police & All Hi. Perf.

Intake Valves - Open 28°⑧BTDC. Close 73°⑨ALDC.
Exhaust Valves - Open 76°⑧BLDC. Close 25°⑨ATDC.

①- Camlift .016". ②- Camlift .019". ③- Camlift .015".
④- Camlift .018". ⑤- Camlift .002". ⑥- Camlift .005"
⑦- Camlift .004". ⑧-Camlift .008". ⑨ -Camlift .011".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 5 qts. refill, 6 qts. with filter change.

Normal Oil Pressure - 292, 352, 390 Std., 406 35-55 lbs. at 2000 RPM. **390 Hi-Perf. & Police** 52-72 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel controlled by Engine Oil Pressure Switch, Ford & Mercury No. B6A-9278-B.

Oil Pump: Rotor type driven by distributor through intermediate drive shaft. Located outside crankcase on left side (292), inside crankcase at front (353,390 & 406).

Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow, disposable type. Replace every 6,000 miles.

Filter Replacement - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter surface, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - DO NOT overtighten.*

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and ventilation (road draft) tube at rear of engine. Clean and lubricate filler cap filter every 6,000 miles.

Positive - Road draft tube replaced by an adapter, tubing, and hose routed to ventilation valve installed in intake manifold. Service system at regular intervals and check valve operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 19 qts. Add 1 qt. for heater.

Pressure Valve: 12-15 lb. radiator filler cap.

Thermostat: Located in water outlet connector. Ford & Mercury No. COAZ-8575-A (160°), COAZ-8575-B or C2AZ-8575-A (178°) for use with permanent anti-freeze.

Water Pump: Packless, sealed ball bearing type.

Pump Overhaul - *See "Cooling System" in Ford Motor Co. Special Data.*

Fluid Fan Drive: Used on Air Conditioned Cars. *See "Cooling System" in Ford Motor Co. Special Data.*

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type used with Gauge Voltage Regulator, Ford & Mercury No. B9MF-10804-A.

Dash Unit - Ford & Mercury No. C2AZ-10883-A (Pass.), C2SZ-9307-A (Thunderbird).

Engine Unit - Ford & Mercury No. B7A-10884-A (Exc. Air Cond. Cars), C1AZ-10884-A (Air Cond. Cars).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on base of left front door pillar. Number (example below) includes identification data.

① ② ③ ④ ⑤
2 Y 86 H 400001

① - Model Year. 2 1962.
② - Assembly Plant. Y Wixom.
③ - Body Series Code. See below.
④ - Engine. H 430" Domestic. K 430" Export.
⑤ - Beginning vehicle number.

Body Series Table

Body Type	Code No.
4-Door Sedan	82
4-Door Hardtop	84
4-Door Convertible	86

VEHICLE SPECIFICATION CODE: Vehicle specification codes (on Patent Plate) contain Body Style, Color, Trim and Day and Month vehicle was assembled.

Engine Production Code Number: Stamped on cylinder block directly in front of left hand cylinder head and indicates place, year, month, day of month and plant inspector. Not used for licensing.

TUNE-UP

►*ENGINE STRAVING AT HIGH SPEEDS (CAR RESTARTS AFTER SHORT PERIOD) CORRECTION:* Check fuel pump pushrod for excessive wear (compare with new pushrod). Replace if necessary.

►*HARD COLD STARTING CORRECTION:* May be caused by gummed-up choke and/or carburetor linkage. Clean all carburetor linkage pivot points with a commercial solvent, lacquer thinner or denatured alcohol. Rinse parts with kerosene and dry with air. DO NOT OIL any pivot points. Give automatic choke a functional check to insure adjustments are correct.

►*AUTOMATIC CHOKE STICKING CORRECTION: See "Carter ABD Carburetors" in Carburetion Section.*

COMPRESSION PRESSURE: 180±20 lbs. All cylinders must be equal within 10 lbs.

VACUUM READING: Steady 17-18" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Water jacketed intake manifold with thermostat controlled circulation eliminates need of heat valve.

CARBURETOR AIR INTAKE DUCT ASSEMBLY: *See FUEL SYSTEM NOTES in Ford Motor Co. Special Data.*

CRANKCASE VENTILATION VALVE: Service at 24,000 mile intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-4-2-6-3-7-8.
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.
SPARK PLUG GAP: .032-.036".
Spark Plugs - Autolite No. BF-42. 18 mm. Torque to 15-20 ft. lbs. Plugs have tapered seats, no gasket used.

COIL: Linc In N. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - COLF-12250-A (Resistance Wire). 1.3-1.4 ohms at 75°F.

►*COIL RESISTOR NOTE:* Pink Ignition Resistor Wire Assembly is connected to a small pigtail from ignition switch and to a multiple quick disconnect at left side of dash panel. Resistor Assembly is bypassed during cranking by lead from starter solenoid to battery terminal of coil.

DISTRIBUTOR: Lincoln No. C1VF-12127-A.
Condenser - Lincoln No. B9AF-12300-A.
Capacity - .21-.25 mfd.
Contact Point Set - Lincoln No. B8Q-12171-A.
Breaker Gap - .014-.016".
Cam Angle - 26-28½°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance ①

Degrees	Distr. RPM	Degrees	Eng. RPM
0	300	0	600
1-2	550	2-4	1100
6-7¼	1100	12-14½	2200
14½-15¾	2000	29-31½	4000

① - Adjust Test Stand to 0° at 200 RPM, with vacuum diaphragm disconnected.

Vacuum Spark Control: Integral type mounted in distributor housing and linked directly to breaker plate.

Vacuum Advance ②

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg.)
½-3½	1-7	7
6-9	12-18	12
8½-11½	17-23	16
9½-12½	19-25	18

② - Adjust Test Stand to 0° at 1000 RPM and 0" of Hg.

IGNITION TIMING

Setting - 8° BTDC. *Manufacturer recommends that previous allowable range specification (2-13° BTDC) not be followed as pre-ignition may occur on some engines when set ahead as much as 5°.* Set timing with vacuum line disconnected and carburetor opening taped closed.
Timing Mark - Sawtoothed pointer marked 0°, 3°, 6°, 10° BTDC. Raised dot at TDC of crankshaft damper should align with proper sawtoothed mark of pointer on cover.

CARBURETOR

►*CARBURETOR APPLICATION: Carter ABD 2-Barrel Carburetor used on all models.*

Throttle Linkage Adjustment: Make adjustments in the following sequence.
Engine RPM Adjustment – Bring engine to normal operating temperature, connect tachometer and place selector lever in D2. Hold throttle lever against hot idle screw and adjust engine idle speed to 450-475 RPM. *NOTE* - Trip fast idle cam to be sure automatic choke has positioned the lever against hot idle screw.
Anti-Stall Dashpot Adjustment - With carburetor lever against hot idle screw and dashpot plunger fully depressed, clearance between dashpot plunger and lever should be .090-.150". To adjust, loosen locknut and turn dashpot in mounting bracket.
Down Shift Rod Adjustment - Loosen downshift rod locknut and disconnect rod from ball stud on bellcrank assembly, then slide spring clip off rod. *NOTE* - Be sure movable outer bracket of bellcrank is against stop pin on inner mounting bracket on bellcrank assembly. Hold downshift rod upward against transmission internal stop and adjust length of rod until hole in rod is aligned with ball stud on bellcrank assembly. Lengthen rod one turn and position it on ball stud. Slide spring clip over end of rod to lock rod to ball stud. Tighten locknut securely. *CAUTION* - If bellcrank outer bracket does not remain against stop pin, lengthen downshift rod an additional turn.
Accelerator Pedal Height Adjustment - *CAUTION - Make this adjustment at the accelerator connecting link only.* Stop engine and measure distance from top of accelerator pedal to carpet. **Nominal measurement should be approximately 3¼".** Depress accelerator pedal and check detent feel and kickdown action of bellcrank. Adjust height to obtain proper downshift rod operation. *NOTE* - Throttle plates in carburetor must be fully opened before making this adjustment. Road test to check kickdown operation.

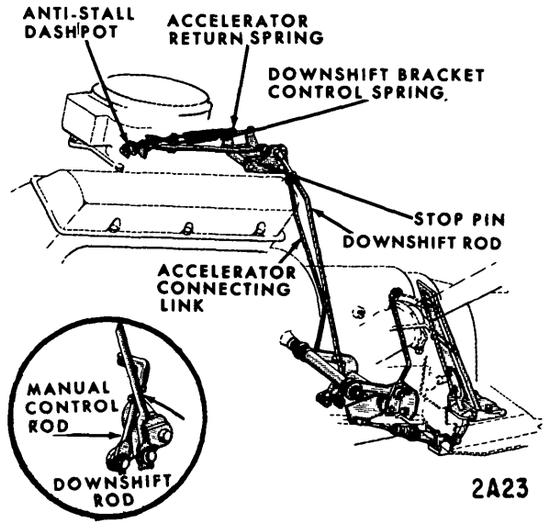
CARTER ABD 2-BARREL

Carter ABD. Used as follows:

Model	Carter No.	① Lincoln No.
Std. ②	3327S	③ C2VE-9510-B
Std. ④	3329S	③ C2VE-9510-D
Air Cond. ②	3328S	③ C2VE-9510-A
Air Cond. ④	3330S	③ C2VE-9510-E

① - Number stamped on air horn near inlet valve & seat.
② - 0-5,000 ft. Alt. ③ - Part No. C2VE-9510-C.
④ - 5,000-10,000 ft. Alt.

CONTINUED ON NEXT PAGE



LINCOLN CONTINENTAL THROTTLE LINKAGE

S INDEXES on Pgs. 4 to 9 for complet CARBURETION, ELECTRICAL, MECHANICAL data.

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►*AUTOMATIC CHOKE CAUTION:* Do not loosen center screw holding water jacket assembly to choke housing. Remove this screw only if jacket gasket is to be replaced or jacket cleaned. Slot blade of a suitable size screwdriver to remove screw. Choke is adjusted in the usual manner without loosening center screw.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Mixture & Speed Setting - Initial setting for idle mixture screws is ½-2½ turns open. Initial setting for idle air (idle speed) adjusting screw is 3½ turns open. *NOTE - Air conditioner should be "off" and air cleaner removed so hot idle compensator valve can be held closed when making adjustments.* With engine at normal operating temperature, adjust idle air screw for idle speed of 450-475 RPM in D1 or D2 position, then adjust each idle mixture screw for smoothest idle, highest vacuum reading and engine RPM. Recheck, and, if necessary, reset idle speed and readjust idle mixture setting.

Float Level - With bowl cover gasket removed, distance from top machined surface of main body to top of each float at free end with float shaft retainer pressed down and float assembly in uppermost position against inlet needle should be 5/16". Use 5/16" tab of Gauge 9550-DB (or Tool T109-280) to check level.

Accelerating Pump - With pump operating rod in hole furthest from throttle shaft (marked "W") and throttle lever in closed position, distance from top of accelerator plunger to top surface of fuel bowl cover should be 17/32". To adjust, bend pump operating rod.

Fast Idle: With fast idle adjusting screw on low step of fast idle cam, engine speed should be 600-650 RPM (Transmission selector lever in "D2" range).

Automatic Choke: Centered at index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter ABD 2-Bbl. Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

►*ENGINE STARVING AT HIGH SPEEDS (CAR RESTARTS AFTER SHORT PERIOD) CORRECTION: See TUNE-UP above.*

Fuel Pump: Lincoln No. C1VE-9350-B. Fuel only.
Pressure - 4.5-6.5 lbs. at 500 RPM.

DISPOSABLE TYPE FUEL FILTER: Lincoln No. CODE-9155-A.

Installation - To save damage to filter and possibility of leaks, proceed as follows:

1) Use only the filter hex connection adjacent to mating part for applying torque.

2) Bend filter line so that normal free floating position of the end of line is in proper alignment with filter to avoid induction stress on filter case.

3) Use second wrench on filter hex connection to avoid transferring stress through filter case and tighten fuel filter inlet to fuel pump hand tight plus 2½ turns. Tighten fuel filter outlet to fuel line to 180-200 inch lbs.

Replacement - Remove fuel filter to carburetor fuel tube, and old filter assembly. Remove brass nipple from pump outlet. Install new filter in fuel pump outlet. *CAUTION - DO NOT transfer fluid from thru gh filter case when installing filter or fuel tube.* Assemble filter to carburetor fuel tube at filter end then to carburetor. Check for leaks.

DISPOSABLE FUEL FILTER FLOW CHECKS: Check fuel flow at both inlet and outlet side of fuel filter Minimum flow required for engine operation is 1 pint within 20 seconds at 500 RPM. Static pressure will not vary because of restricted filter. Procedure for checking fuel pump pressure remains the same.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator, Lincoln No. B9MF-10804-A.

Dash Unit - Lincoln No. C1VF-9280-B.

Tank Unit - Lincoln No. C1VF-9275-F.

Air Cleaner: Dry filter element type Std. Clean element as required. Replace every 30,000 miles.

►*CLEANING CAUTION:* Tap or shake element lightly to clean. Compressed air may be used if directed against inside (opposite to air intake flow). Replace element if damaged. DO NOT WASH element in any liquid and DO NOT LUBRICATE.

Automatic Speed Control: *See "Cruise Control" in Carburetion Section.*

BATTERY

Lincoln No. C1VY-10655-A. 12 volt, 13 plate, 80 ampere hour capacity (20 hour rate).
Battery Ground - Negative, to body.
Engine Ground - Starter to body sheet metal.

STARTER

Lincoln No. C2VY-11002-A. Positive engagement type.

Armature - Lincoln No. C2OZ-11005-A.

Drive - Lincoln No. C2OZ-11350-A. Solenoid pinion shift.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 40 ozs.

Cranking Speed - 150 RPM (warm engine), 9.5 volts, 250 amps. draw.

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	9500	12.0	70

Starting Switch: Lincoln No. B6A-11450-A, magnetic type, controlled by ignition and starter switch Lincoln No. C0LF-11572-A and Neutral Safety Switch Terminal Block Lincoln No. C1VP-7B217-B.

Neutral Safety Switch Terminal Block Adjustment: *See "Lincoln Automatic Transmission" in Transmission Section.*

GENERATOR

►*GENERATOR PULLEY NOISE CORRECTION & PRODUCTION CHANGE NOTE:* Condition may be caused by armature shaft diameter stack-up and thread length differences. Replace armature assembly (if found to have a threaded length in excess of ½") with a new armature which has a shaft thread length of ½". If loose, replace pulley. The above changes were made in production beginning Dec. 1, 1961.

Lincoln No. C1VF-10002-C.
Armature - Lincoln No. C1VF-10027-A (armature & bearing).

Performance Data

Amperes	Volts	Gen. RPM
40	15.0	2650

Brush Spring Tension - 20 ozs. minimum.
Field Current - 1.5-2.0 amps. at 10.0 volts (hot).
Rotation - Counterclockwise at commutator end.

Belt Adjustment: Use Belt Tension Gauge T62L-8620-A or 33-73F or equivalent and measure belt tension as follows:

Belt Tension Specifications (Lbs.)

Belt	①New	②Used
Generator & Water Pump	110-120	90-100
Air Cond. Compressor & Water Pump	120-150	90-120

① - Run belt for 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer.

GENERATOR REGULATOR

Lincoln No. C2VY-10505-A. Double Contact type of same design used previously. Regulator terminal wire leads are sealed (see "Testing Note" below).

►*REGULATOR TESTING NOTE:* Regulator "FLD", "ARM", and "BAT" wires are sealed at the regulator. All regulator wires end in two multiple connectors which mate with generator and gauge feed wiring harnesses. When testing generator and regulator, connect all test leads at the battery and generator. DO NOT attempt to pierce sealed connection.

►*SETTING CAUTION:* "Temperature Compensated" type. Set to following specifications at 75°F ambient (engine compartment) temperature, after ½ hour operation in vehicle, or after regulator heated and stabilized.

Cutout Relay

Cuts In - 12.3-13.0 volts.
Cuts Out - 8 amperes discharge current.
Air Gap - .008-.012".

Voltage Regulator

Setting - 14.7-15.3 volts at 75°F. Variation between upper and lower contacts not to exceed .3 volt.
Air Gap - .037" (Lower Contacts Closed), .040" (Upper Contacts Closed).

Current Regulator

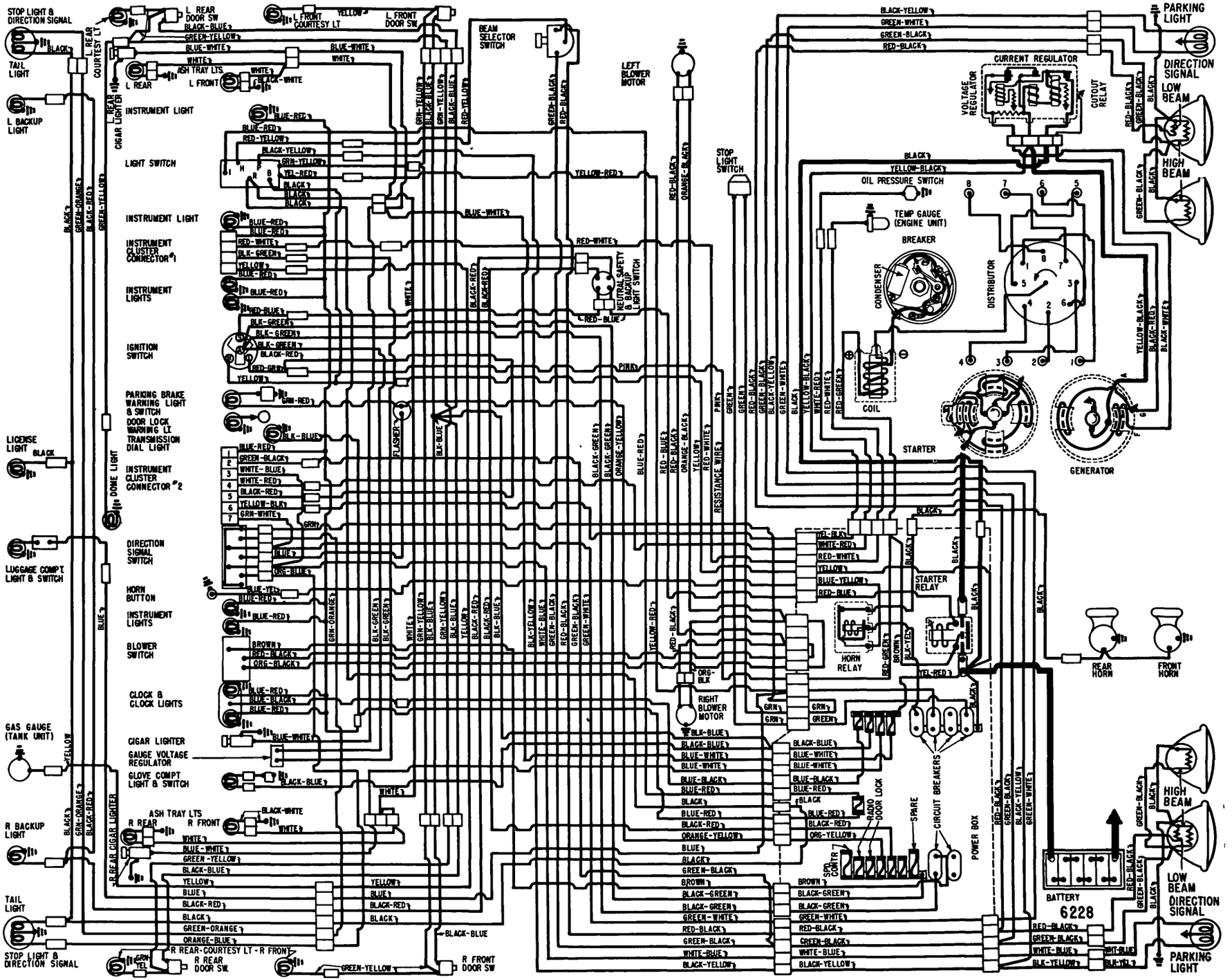
Setting - 38-42 amperes.
Air Gap - .033-.036".

►*OTHER DATA: See "Lincoln 12-Volt (Double Contact) Regulators" in Electrical Section.*

CONTINUED ON NEXT PAGE

S INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

LINCOLN CONTINENTAL 1962



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MISC. ELECTRICAL

Instrument panel has upper and lower clusters. Upper cluster (three housings) can be serviced from front. Lower cluster (controls) removable in two sections.

Speedometer Removal: Loosen screws on bottom of housing and pull bezel away. Remove light shields. Remove attaching screws and pull speedometer from housing. To install, reverse removal procedure.

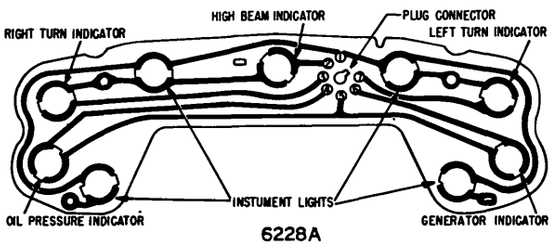
Speedometer Housing Printed Circuit Board Removal: Remove negative cable from battery. Remove clock by removing attaching screw and lifting up and away. Remove attaching wires. Remove speedometer cable from speedometer housing. Remove hood release handle from bracket and remove lower left instrument panel cover. Remove lower section of left vent from car. Remove main light switch from lower left cluster and remove ignition switch. With 5/16" socket, remove mounting plate-to-speedometer housing screws. Disconnect plug from printed circuit board then remove housing. Remove bulb sockets, then remove attaching screws. To install reverse removal procedure.

Gauge Housing Printed Circuit Board Removal: Loosen screw below gauge housing and pull bezel out. Remove plate attaching screws and pull gauges from housing. Disconnect connector from printed circuit board, then remove lamp sockets. Remove gauges from printed circuit board, then remove attaching screw. Remove printed circuit board from plate. To install, reverse removal procedure.

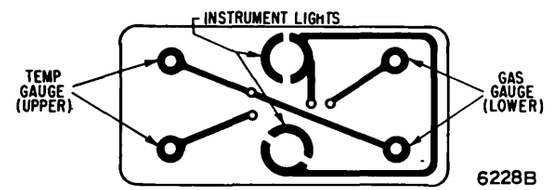
Instrument Lamp Removal: Fuel & Temperature Gauge - Loosen screw below housing and pull bezel out. Remove plate attaching screws and pull gauges from housing. Disconnect connector from printed circuit board, then remove socket and replace lamp(s).

Speedometer Housing - Loosen screws below housing and pull bezel out. Carefully replace lamp (s). *NOTE - Do not press socket out of printed circuit board.* To replace high beam or two upper background lights, remove speedometer.

Clock - Remove screw below clock and remove clock. disconnect wires, then replace bulb.



INSTR. CLUSTER PRINTED CIRCUIT (2)



INSTR. CLUSTER PRINTED CIRCUIT (1)

POWER BOX NOTE: A power box mounted on right side of dash panel in engine compartment contains fuse panel, starter and horn relays, power circuit breakers and dash panel wiring connector assemblies. Power box acts as a distribution point for all circuits. A decal inside cover gives circuit breaker and fuse application, ratings, location, and wiring color codes. Fuses may be removed by using ignition key. Heater and air conditioning circuit breakers are installed individually and can be lifted from their spring-loaded holders. Other circuit breakers are mounted on a bus bar and should be removed from holder as an assembly.

Lighting Switch Removal: Disconnect battery negative (ground) cable. Press inward on headlamp switch spring release button and carefully remove switch knob and shaft. Remove switch bezel nut and bezel. Lower switch below panel, note wire color codes and disconnect wires.

Stop Light Switch Location: On lower side of brake master cylinder. *CAUTION* - After replacing switch, depress brake pedal to check for leaks. Check brake fluid level in master cylinder.

CIRCUIT BREAKERS: 18 Ampere - Protects headlights. Integral with headlight switch.
12 Ampere - Protects Instrument Panel, Dome, Trunk, Tail, License, and Parking Lights. In Power Box.

FUSES: All fuses are in Power Box.
15 Ampere - Instrument panel and left rear door cigar lighters.
15 Ampere - Right rear door cigar lighter.
14 Ampere - Interior lights.
14 Ampere - Speed Control.
14 Ampere - Door Open Warning Light circuit feed.
10 Ampere - Electric Antenna.
7.5 Ampere - Back-up lights.
7.5 Ampere - Radio.
7.5 Ampere - Direction Signals and Stop Lights.
4 Ampere - Instrument Panel Rheostat.
2 Ampere - Clock.
Sulphur Disc or Reset Circuit Breaker - In socket of each cigar lighter.

ENGINE

ENGINE SPECIFICATIONS: Own V8, valve-in-head, of same design as previous models.

Bore	Stroke	Displacement
4.30"	3.70"	430 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
10.0-1	59.17	300 at 4100 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove dipstick, and turn crankshaft so No. 1 piston is 15° BTDC (use crankshaft timing marks). Remove generator splash shield and auto. trans. line bracket bolt. Remove engine front support insulator-to-mounting pad nut. Raise engine approximately 1" (use block of wood on jack placed under leading edge of oil pan), and insert a ¾" wood block between insulator and underbody engine support pads. Remove both stabilizer arm bolts, washers, insulators, spacers, and nuts. Lower stabilizer arms for clearance. Remove oil pan bolts and free oil pan from block. Remove oil pump pick-up tube and screen assembly bolts, and drop assembly in oil pan. Remove oil pan from under vehicle.

ENGINE LATERAL RESTRICTOR: *See "Engine Mountings" in Ford Motor Co. Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

PISTONS

Step head, slipper type, aluminum alloy with a steel strut. Piston pin is interference fit in piston. Retaining rings are not used.

Removal - Piston & Rod removed from above.

Clearance - .0011-.0029".

Fitting New Pistons: *See "Pistons" in Ford Motor Co. Special Data.*

Installing Pistons: Pistons for right and left hand cylinders are NOT interchangeable. Install piston so indentation notch on head of piston is toward front of engine. *See Rod Installation.*

Replacement Pistons: Std., .003", .020", .030", .040" Oversize.

PISTON PIN

Press fit in connecting rod, no retaining device.

Diameter - .9749-.9752". **Length** - 3.48-3.50".

Clearance in Piston - .0002-.0004". **Wear Limit** - .0008".

Piston Pin Removal & Installation: *See "Pistons Pins" in Ford Motor Co. Special Data.*

Replacement Pins: Standard size. Furnished with new pistons only.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0774-.0781"	.015-.025"	ℂ .0014-.0031"
Compr.(2)	.0930-.0940"	.015-.025"	ℂ .0010-.0030"
Oil (3)		.025-.038"	②

ℂ - Wear limit .006". ② - Snug. Side sealing type.

Installing Rings: Install second compression ring with outside counterbore down. Oil ring expander spacer gap must be opposite notch in piston head with segment gaps 1" on each side. Compression ring gaps must be 150° on each side of expander spacer gap.

Replacement Rings: Furnished Std. .020", .030", .040" Oversize.

CONNECTING ROD

Length (Center-to-Center) - 6.599-6.601".

Journal Diameter - 2.5998-2.6001" (Code Red), 2.5992-2.5995" (Code Blue).

Lower Bearing - Copper lead alloy, steel back.

Clearance - .0007-.0020". **Wear Limit** - .0038".

Side Clearance - .005-.015". **Wear Limit** - .018".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearance. If necessary, regrind journals and install undersize bearings.

Installing Rods: Install rod in correct numbered cylinder with notch on head of piston toward front of engine and oil squirt hole in rod facing inward and rod number facing outward toward outer side of cylinder block.

CRANKSHAFT

Journal Diameter - 2.9000-2.9003" (Code Red), 2.8994-2.8997" (Code Blue).
Out-of-Round Limits - .0004". **Wear Limit** - .0006".
Bearings - Copper-lead alloy, steel back.
Clearance - .0008-.0024". **Wear Limit** - .0039".

End Thrust: Taken by No. 3 (center) main bearing.
Endplay - .004-.008". **Wear Limit** - .012".

Crankshaft Thrust Bearing Alignment: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Replacement Bearings: Std. (2 sizes marked RED and BLUE for selective fit), .002", .010", .020", .030" Undersize.

►*NOTE:* Any combination of RED and BLUE standard bearing inserts may be used to obtain desired clearances. If necessary, regrind journals and install undersize bearings.

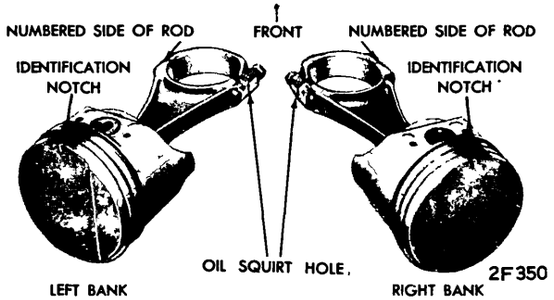
Crankshaft Rear Oil Seal Installation: *See "Crankshaft & Main Bearings" in Ford Motor Co. Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

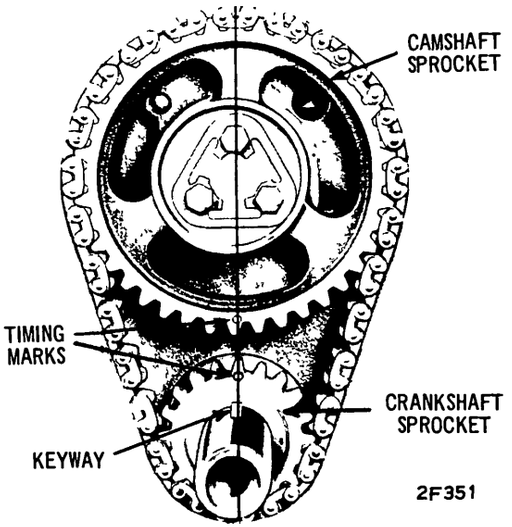
►*OIL SLINGER NOTE:* A crankshaft front oil slinger is incorporated on engine to reduce oil leakage at front oil seal. Slinger is held in place by crankshaft pulley hub. To remove slinger, remove cylinder front cover and slide slinger off crankshaft.

CAMSHAFT

Journal Diameter - (1) 2.3243-2.3248", (2) 2.3093-2.3098", (3) 2.2943-2.2948", (4) 2.2793-2.2798", (5) 2.2643-2.2648".
Out-of-Round Limits - .0005". **Wear Limit** - .001".
Bearings - Babbitt lined, steel backed.
Clearance - .0012-.0027". **Wear Limit** - .005".



PISTON & ROD ASSEMBLY



VALVE TIMING MARKS

Endplay - Thrust to rear. Taken by thrust face of camshaft sprocket riding against front surface of block.

Camshaft Bearing Service: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Replacement Bearings: Std. and .015" Undersize.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Ford Motor Co. Special Data.*

Camshaft Setting - Timing marks should be adjacent and in line with straightedge across shaft centers.

Timing Chain Deflection: Not more than ½" deflection from straight to outward deflected position.

Timing Chain Cover Seal Installation (Crankshaft Front Seal): *See "Engine Front Cover" in Ford Motor Co. Special Data.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Ford Motor Co. Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	Stem Diameter
Intake	1.955-1.970"	①
Exhaust	1.645-1.660"	②

Valve	③Seat Angle	④Lift	Stem Clearance
Intake	45°	.2316"	⑤ .0008-.0018"
Exhaust	45°	.2316"	⑥ .002-.003"

① - Std., .3712-.3717" (Code Red), .3717-.3722" (Code Green) and .003", .015", .030" Oversize.
② - Std., .3701-.3705" (Code Red), .3705-.3709" (Code Green) and .003", .015", .030" Oversize.
③ - Face angle 44° (Intake & Exhaust).
④ - Cam lobe lift. Wear loss limit .005".
⑤ - Wear limit. 0045". ⑥ - Wear limit .0055".

Valve Seat Width - .070-.090" Intake and Exhaust.

Valve Stem Oil Seals - Umbrella type seals used on all valves. Install seals with cup side down over guide.

Oversize Valve Stem Installation: *See "Valve System" in Ford Motor Co. Special Data.*

Valve Springs: Roto-Coil design valve rotators used on all exhaust valves eliminating spring retainer and sleeve. No damper springs used.

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	65-75 ①	1.640"
Open	179-199 ②	1.230"

① - Wear limit 58 lbs. at 1.640".
② - Wear limit 161 lbs. at 1.230".

Valve Spring Installation: Spring ends must be square within 3/64". Install springs with damper (closed) coil end down toward cylinder head. Check installed height of spring which must not exceed 1 21/32" from surface of cylinder head spring pad to underside of spring retainer. If height greater, install .030" spacers as necessary on head under spring to bring height within limits of 1 5/8-1 21/32". *CAUTION - Install spacers only if necessary. DO NOT use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Guides: Integral with cylinder head. When stem-to-guide clearance exceeds maximum .0045" (Intake), .0055" (Exhaust), ream valve guides and install valves with oversize stems. *See "Valve System" in Ford Motor Co. Special Data.*

Valve Lifters: Hydraulic barrel type. No adjustment.
Diameter - .8740-.8745".
Clearance in Lifter Bore - .0005-.0020".
Wear Limit - .005".
Hydraulic Lifter Operating Range Check - *See "Valve System" in Ford Motor Co. Special Data.*
Hydraulic Lifter Overhaul - *See "Valve System" in Ford Motor Co. Special Data.*

Rocker Arm Assembly: *See "Valve System" in Ford Motor Co. Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: Following valve opening and closing points are with camlift as indicated.*

Valve Timing Specifications

Intake Valves - Open 22° BTDC ①. Close 68° ALDC ②.
Exhaust Valves - Open 63° BLDC ①. Close 27° ATDC ②.

① Camlift .002". ② - Camlift .005".

Valve Timing Check: Install a quadrant on crankshaft damper. Remove right rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers cam lobe lift shown in Valve Timing Table above. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner. If reading not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 5 qts. refill. Add 1 qt. with filter change.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Light on instrument panel. Light goes on when ignition switch turned on or when oil pressure is low.

Oil Pressure Switch - Lincoln No. B6A-9278-B.

Oil Pump: Rotor type mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft.

Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow disposable type. Mounted on lower left front corner of cylinder block. Replace element every 4000 miles or 4 months. *NOTE* - Replacement filter Lincoln No. C1AZ-6731-A. Use no other filter.

Installation - Coat gasket with light film of oil. Screw filter onto adapter (by hand) until snug. Then tighten ¼ turn additional. DO NOT OVERTIGHTEN.

►*OIL FILLER CAP NOTE:* Disposable type. Replace every 12,000 miles or 12 months.

Crankcase Ventilation: Standard Cars - Filter in oil filler cap and ventilator tube at rear of engine. Replace oil filler cap every 12,000 miles or 12 months.

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Three stage engine warm-up and cooling system with temperature controlled water jacketed intake manifold. Additional thermostat installed in front face of each cylinder bank.

NOTE - Cylinder block thermostats are accessible by removing water pump.

Water Capacity: 25 qts. (with heater).

Pressure Valve: 12-15 lb. radiator filler cap, Lincoln No. B8A-8100-A.

Thermostat: 157-162°F (No. 8BE-8575-B); 178°F (No. C2VY-8575-A): Located in water outlet connection. Two 137-142°F (B9S-8575-B) thermostats located in front face of cylinder banks.

Water Pump: Packless, sealed ball bearing type. *See "Cooling System" in Ford Motor Co. Special Data.*

Temperature Gauge: King-Seeley Electric Constant Voltage ("CV") type with Gauge Voltage Regulator Lincoln No. B9MF-10804-A.

Dash Unit - Lincoln No. C1VF-10883-A.

Engine Unit - Lincoln No. C1AZ-10884-A.

Power Booster Fan: Std. on Air Cond. Cars. *See "Cooling System" in Ford Motor Co. Special Data.*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on rear face of left front door inner panel. Number (example below) includes identification data.

① ② ③ ④
E10 S H 205001

① - Series Code (letter and first two digits of series designation). See below.
② - Engine Type. See below.
③ - Assembly Plant. H Lorain
④ - Consecutive unit number starting with 205001 for August 1961 through 339999 for September 1962.

Series Code Designation

Model	Series	Code
Econoline Regular Pick-Up	E103	E10
Econoline Heavy Pick-Up	E104	E10
Falcon Station Bus	E110	E11
Falcon Club Wagon	E120	E12
Falcon Deluxe Club Wagon	E130	E13
Econoline Regular Van	E143	E14
Econoline Heavy Van	E144	E14

Engine	Engine Code Designation	Code
144" 6 Cyl.		S
144" 6 Cyl. Low Compr. Export		K
170" 6 Cyl.		T
170" 6 Cyl. Low Compr. Export		M

►*ENGINE DESIGNATION NOTE: In the following data pages, engines will be referred to as follows:* 144" 6 Cyl. as 144; 170" 6 Cyl. as 170.

►*FORD P-100 SERIES (144" ENGINE) SPECIFICATIONS NOTE: Data below applies to this model.*

TUNE-UP

COMPRESSION PRESSURE: 170 lbs.±20 lbs. at cranking speed. All cylinders must be equal within 10 lbs.

VACUUM READING: 18" at idle speed.

VALVE TAPPET CLEARANCE: .018" Intake & Exhaust, Hot & Cold. Can be set with engine cold but must be rechecked with engine at operating temperature and idling. Use feeler gauge (.017" GO, .019" NO GO).

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: "Hot Spot" in intake manifold at lower center and engine coolant heated spacer between carburetor and intake manifold.

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals (4000 mile intervals under stop and go operation), and check operation before performing a "Tune-Up" for ignition and carburetion troubles. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .032-.036".

Spark Plugs - Autolite BF-82. 18 mm. Torque to 15-20 ft. lbs. Plugs have tapered seat, no gasket used.

COIL: Ford No. B6A-12029-B.

Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.

Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) used between ignition switch and multiple connector on dash. Bypassed during cranking by lead from starter switch.

DISTRIBUTOR: Ford. "Loadomatic" type used as follows:

Engine	①Distributor No.
144	C0DF-12127-A, C2DF-12127-A,D,E
170	C1DF-12127-B, C2UF-12127-A,B

① - Stamped on distributor housing.

Condenser - Ford No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford No. FAA-12171-A.
Breaker Gap - .024-.026". **Cam Angle** - 35-38°.
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►**With Distributor On Test Stand**
①C0DF-12127-A & C2DF-12127-A ②E

Distr. Degrees	Vacuum ("of Hg)	Distr. RPM
0	0.33	400
½-1½	0.78	600
3½-4½	1.30	800
10-12	3.45	1400
12½-15	5.00	1800
12¾-15½	5.35	2000
16½ max.	10.00	2500

①C1DF-12127-B

Distr. Degrees	Vacuum ("of Hg)	Distr. RPM
1½-2½	0.43	700
5¼-6¼	0.92	1000
7½-8¾	1.50	1300
10-11¼	2.40	1700
11-12¼	3.00	2000
16½ max.	10.00	2000

① - Set test stand to 0°, 0" of Hg, and 300 RPM.
② - Set test stand to 0°, 0" of Hg, and 450 RPM.

IGNITION TIMING

Setting - 4° BTDC. Allowable range 4-9° BTDC. Set timing with engine idling and distributor vacuum line disconnected.

Timing Mark - Notch in crankshaft pulley and timing pointer on left side of chain case cover. Pointer marked "0", "3", "6", "10". Align pulley notch with correct mark on pointer.

CARBURETOR

►*CARBURETOR APPLICATION: One Holley Model 1904 or 1908 single barrel carburetor*

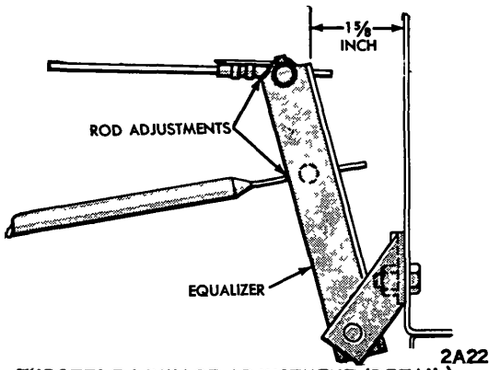
THROTTLE LINKAGE ADJUSTMENT: Depress accelerator pedal to wide open throttle position and hold in this position while making the following adjustments Adjust accelerator pedal connecting rod at equalizer on engine so there is 1 5/8" between upper end of equalizer and engine rear cover panel. Adjust carburetor-to-equalizer connecting rod at equalizer to obtain full throttle opening.

HOLLEY MODEL 1904 & 1908

Engine	①Carburetor No.
144	C2UE-9510-A
144 (P-100 Series Truck)	C2UE-9510-D
144 (CCV)②	C2UE-9510-B
170 (Early)	C1UE-9510-D
170 (Late)	C2UE-9510-C
170 (Later)	C2UE-9510-E

① - Stamped on carburetor main body.
② - With Closed Crankcase Ventilation.

Idle Setting - Initial setting 1-1½ turns open. Turn adjusting screw in until engine begins to run roughly from lean mixture, then turn screw out until engine begins to roll. Then turn screw in until engine runs smoothly. Favor a slightly rich mixture.



THROTTLE LINKAGE ADJUSTMENT (DETAIL)

Idle Speed - 525-575 RPM.

Fuel Level - 23/32"±1/32" below power valve mounting surface (remove power valve and use Tool T52L-9550-AGE). Fuel should touch end of "low" pin, but not touch end of "high" pin.

Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment (will be correct when hot or slow idle correctly set).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley Single Barrel Model 1904 & 1908 Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Fuel only. Ford No. C2DZ-9350-A.
Pressure - 3½-5½ lbs. at 500 RPM.

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator Ford No. B7A-10804-B.
Dash Unit - Ford No. C1TF-9280-A.
Tank Unit - Ford No. C0DZ-9275-A.

Fuel Filter: Disposable type in line between fuel pump and carburetor. Replace every 8,000 miles or when clogged. *NOTE* - To replace, position new filter in rubber sleeves so fuel flow arrow on filter points away from pump.

Air Cleaner: Oil Bath type. Clean every 4,000 miles and refill reservoir with engine oil (SAE 30 above 32°F, SAE 20 below 32°F)

ELECTRICAL

►*SEE FALCON CAR DATA PAGES FOR BATTERY, STARTER, GENERATOR, REGULATOR, CIRCUIT BREAKER AND FUSE DATA.*

ENGINE

ENGINE SPECIFICATIONS: Own. 6 Cyl., valve-in-head. 144" and 170" engines of same design used previously.

Engine	Bore	Stroke	Displacement
144	3.50"	2.50"	144 cu. ins.
170	3.50"	2.94"	170 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
144	8.7-1	29.4	85 at 4200 RPM
170	8.7-1	29.4	101 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Ford Motor Co. Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Ford Motor Co. Special Data.*

ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL: Raise engine compartment cover, remove dipstick, then raise and support truck. Drain crankcase. Remove oil pan retaining screws, crank engine as necessary for clearance, then remove oil pan. Remove oil pump inlet tube and screen assembly.

►*OTHER ENGINE DATA: See Falcon Car Data Pages.*

ENGINE OILING SYSTEM

ENGINE OILING SYSTEM: *See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*

Crankcase Capacity: 3½ qts. Add 1 qt. for filter.

Normal Oil Pressure: 35-55 lbs. at 2000 RPM.

Pressure Regulator Valve - In pump body, not adjustable.

Oil Pressure Indicator: Indicator light on instrument panel controlled by Engine Oil Pressure Switch, Ford No. B6A-9278-B, located on right side of engine above starter.

Oil Pump: Rotor type. Mounted in crankcase.

Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*

Oil Filter: Full-flow type. Replace every 8,000 miles or twice a year.

►*OIL FILTER INSTALLATION NOTE:* Coat gasket face of filter with engine oil. Install filter on adapter until gasket contacts adapter face, then tighten ½ turn by hand. DO NOT overtighten.

Crankcase Ventilation: Conventional - Filter in oil filler cap (inlet) and outlet pipe at rear of engine. Clean system every 4,000 miles (On Highway) 500 miles (Off Highway), or sooner under severe operating conditions.

Positive - Road draft tube replaced by an adapter, tubing, and hose routed to ventilation valve installed in intake manifold or in spacer between carburetor and intake manifold. Service system each 8,000 miles (4,000 miles or 3 months for "Stop & Go" operation), and check valve operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 9 qts. Add 1 qt. for heater.

Pressure Valve: 12-15 lb. Radiator Filler Cap, Ford No. C1UU-8100-A.

Thermostat: As follows:

Type	Early	Later
160°F	C1UE-8575-B	C1UZ-8575-B
178°F	C1UE-8575-A	C1UZ-8575-A

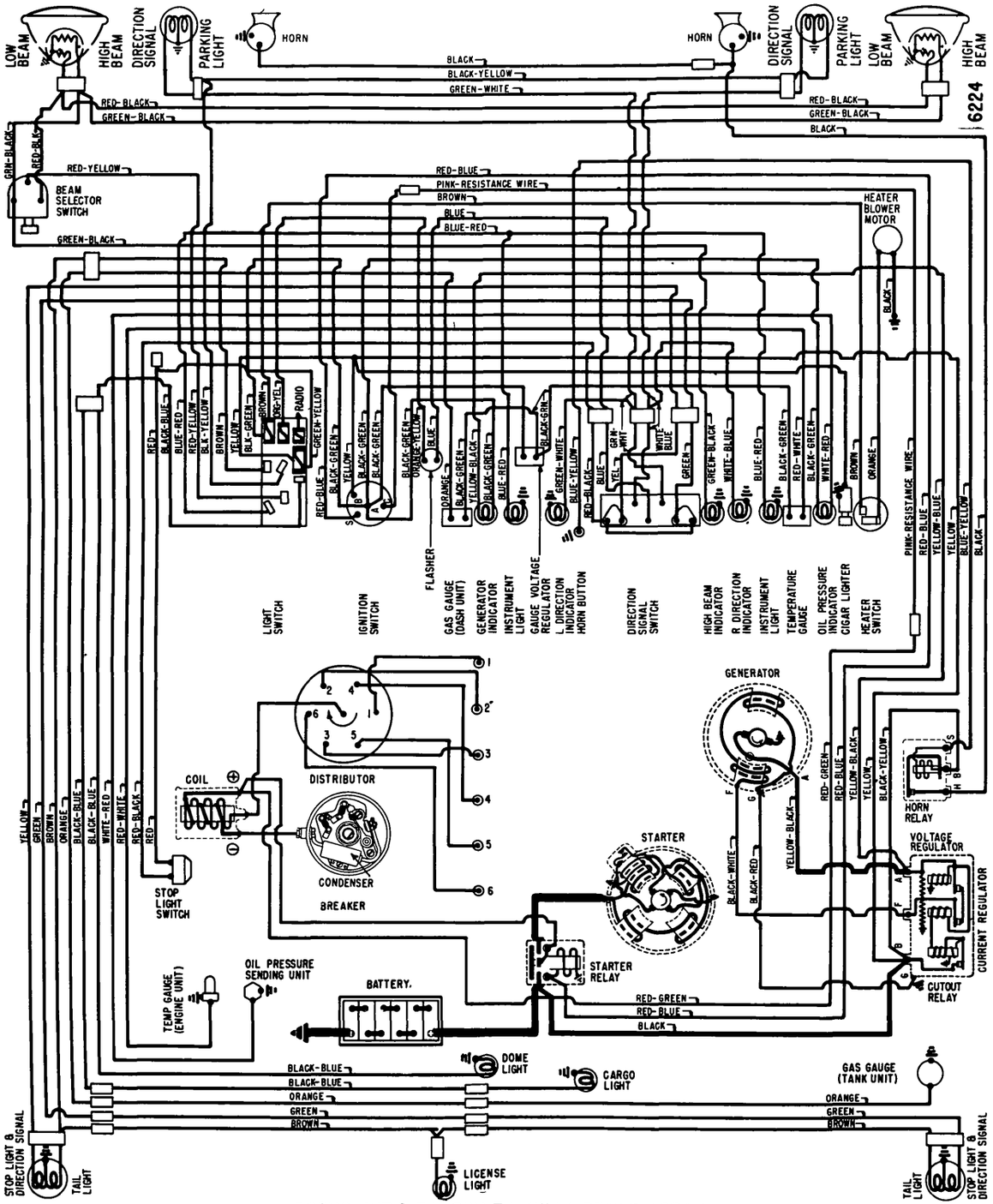
Water Pump: Packless sealed ball bearing type.

See "Cooling System" in Ford Motor Co. Special Data.

Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with a Gauge Voltage Regulator Ford No. B7A-10804-B.

Dash Unit - Ford No. C1UF-10883-A.

Engin Unit - Ford No. CODF-10884-A.



ECONOLINE & FALCON TRUCKS WIRING DIAGRAM

►*ECONOLINE & FALCON TRUCK NOTE: See separate data pages for these models.*

►*P-100 SERIES (144" ENGINE) DATA NOTE: For all data on this model, see Econoline & Falcon Truck pages.*

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on patent plate on rear face of left front door inner panel, or on left front cab pillar, or glove box door, or right hand dash panel, depending on truck model. Number (example below) includes identification data.

① ② ③ ④
F10 J U 205001

① - Series Code (letter and first two digits of series designation). *See below.*
② - Engine Type. *See below.*
③ - Assembly Plant. *See below.*
④ - Consecutive unit number starting with 205001 for August 1961 through 339999 for September 1962.

Truck Model Series

Letter	Type	Letter	Type
F	Conventional	P	Parcel Delivery
B	School Bus	C	Tilt Cab

Number	Size
100, 250, 350, 400	Light Duty
500, 550, 600	Medium Duty

Engine Type

Engine	Code Letter
223" 6 Cyl.	J
223" 6 Cyl. Export	A
262" 6 Cyl.	B
292" V8 2-Bbl. Carb. Medium Duty	C
292" V8 4-Bbl. Carb. Heavy Duty	D

Assembly Plant

A - Atlanta	H - Lorain	E - Mahwah
G - Chicago	U - Louisville	R - San Jose
D - Dallas	N - Norfolk	S - Pilot Plant
K - Kansas City	P - St. Paul	

►*ENGINE DESIGNATION NOTE: In the following data pages, engines will be referred to as follows:*

Engine	Designation
6 Cyl. 223"	223
6 Cyl. 262"	262
V8 292" 2-Bbl. Carb. Medium Duty	292MD
V8 292" 4-Bbl. Carb. Heavy Duty	292HD

TUNE-UP

COMPRESSION PRESSURE: 150 lbs. ± 20 lbs. at cranking speed. Cylinders must be equal within 10 lbs.

VACUUM READING: 18" at idle speed.

VALVE TAPPET CLEARANCE: Can be set with engine cold but must be rechecked with engine at operating temperature and idling. Use step-type feeler gauge (.001" undersize for "go"; .001" oversize for "no go"). **Cold Clearance** - .019" Intake & Exhaust, All Engines. **Hot Clearance** - **223 & 262** - .019" All Valves. **292** - .018" All Valves.

►*SELF-LOCKING TAPPET ADJUSTING SCREW NOTE:* Torque required to turn screw after interference noted must be 3 ft. lbs. minimum.

MANIFOLD HEAT CONTROL: 223 & 292MD - Automatic thermostatic type located at center of exhaust manifold (6 Cyl.), between crossover pipe and right exhaust manifold (292 MD). Valve is closed when engine is at normal temperature and running at slow idle, and opens when operating at high RPM. Spring is installed with ¾-turn windup and hooked over stop pin. Valve must operate freely. Lubricate every 4000 miles with special Exhaust Gas Control valve solvent, Ford No. COAA-19A501-A.
262 - "Hot Spot" in intake manifold at lower center and engine coolant heated spacer between carburetor and intake manifold.
292HD - None used.

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals (4000 miles on P Series), and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION
6 CYLINDER ENGINES

FIRING ORDER: 1-5-3-6-2-4
SPARK PLUG GAP: 223 - .032-.036". **262** - .028-.032".
Spark Plugs - Autolite BTF-6 (223), BTF-3 (262). 18 mm. Torque to 15-20 ft. lbs. Plugs have tapered seat, no gasket used.
COIL: Ford No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) in wiring harness between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.
DISTRIBUTOR: Ford. Used as follows:

Engine	①Distributor No.	Distributor Type
223	②C2AF-12127-E	Loadomatic
262	③C1TF-12127-D	Step-Stop

① - Stamped on distributor housing for identification.
② - Part No. C2AZ-12127-A
③ - Also daub of blue paint on distributor housing.
Condenser - Ford No. 7RA-12300-C.
Condenser Capacity - .21-.25 mfd.
Contact Point Set - Ford No. FAA-12171-A.
Cam Angle - 35-38°.
Breaker Gap - .024-.026".
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Clockwise viewed from above.

Advance Performance
►With Distributor On Test Stand
①C2AF-12127-E

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
0	0.25	350
1-2	0.38	500
6-7	1.93	1100
10¾-11½	4.80	2000

①C1TF-12127-D

Test	Distr. Degrees	Vacuum ("of Hg)	Distr. RPM
A	0-1¼	0.42	400
A	5-6	1.03	800
A	7¾-8¾	1.62	1000
B	8½-9½	2.32	1200
C	8½-9½	5.65	2000
C	10¾-12¼	7.30	1600
D	13 max.	10.00 min.	1600

① -Set test stand at 0°, 0" of Hg, and 250 RPM.
A - Adjust primary spring. B - Adjust stop washers.
C - Adjust spring washers. D - Replace breaker plate assembly.

V8 ENGINES

FIRING ORDER: 1-5-4-8-6-3-7-2
Cylinders - RIGHT BANK 1-2-3-4, LEFT BANK 5-6-7-8.
SPARK PLUG GAP: 292MD - .032-.036". **292HD** - .028-.032".
Spark Plugs - Autolite BTF-6 (292MD), BTF-3 (292HD). 18 mm. Torque to 15-20 ft. lbs. Plugs have tapered seat, no gasket used.
COIL: Ford No. B6A-12029-B.
Ignition Current - 2.5 amps. idling, 4.5 amps. stopped.
Resistor - Pink resistance wire (1.30-1.40 ohms at 75°F) in wiring harness between ignition switch and dash panel connector. Bypassed during cranking by lead from starter switch.
DISTRIBUTOR: Ford. Centrifugal & Vacuum Advance type used on 292MD. Centrifugal Advance only type used on 292HD.

Engine	①Distributor No.
292MD	COTF-12127-B
292HD	②COTF-12102-C

① - Stamped on distributor housing for identification.
② - Part No. COTZ-12127-A.
Condenser - Ford No. B9TF-12300-A (COTF-12127-B), No. B7A-12300-C (COTF-12102-C). **Capacity** - .21-.25 mfd.
Contact Point Set - Ford No. B7A-12171-A (COTF-12127-B), No. B8Q-12171-A (COTF-12102-C).
Cam Angle - 26-28½°.
Breaker Gap - .014-.016".
Breaker Arm Spring Tension - 17-20 ozs.
Rotation - Counterclockwise viewed from above.

①Automatic Advance - COTF-12127-B

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		550	0		1100
¾-1¾		700	1½-3½		1400
3¼-4¼		900	6½-8½		1800
5½-6½		1150	11-13		2300
8½-10		1600	17-20		3200
9¼-10¾		1800	18½-21½		3600

②Automatic Advance - COTF-12102-C

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0		400	0		800
½-1½		500	1-3		1000
5½-6½		900	11-13		1800
8½-9½		1250	17-19		2500
10¾-12¼		2000	21½-24½		4000

① - Set test stand at 0° and 300 RPM.
② - Set test stand at 0° and 250 RPM.
Vacuum Spark Control (292MD): Integral type.

③Vacuum Advance - COTF-12127-B

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
0-1	0-2	5
3¾-6¾	7½-13½	10
5½-8½	11-17	13

③ - Set test stand at 0°, 0" of Hg, and 1000 RPM.

IGNITION TIMING

Engine	Std. Ignition Setting
223 All Trans.	6° BTDC
262	2° BTDC
292 All Trans.	8° BTDC

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

►*TIMING RANGE NOTE:* Under special conditions, timing may be advanced 5° over recommended setting or retarded from normal setting to 2° BTDC.

►*TIMING SETTING CAUTION:* Set timing with engine idling and distributor vacuum line disconnected. Check advance operation by accelerating engine after vacuum line connected

Timing Mark (223) - Vibration damper marked by lines TDC (Long Mark) & 3°, 5°, 7°, 9° BTDC (Short Marks). Align pointer on chain case cover with correct mark (or space between marks) on pointer.

Timing Mark (262) - Vibration damper marked by lines TDC (Long Mark) & 2°, 4°, 6°, 8°, 10° BTDC (Short Marks). Align pointer on chain case cover with correct mark on pointer.

Timing Mark (292) - Notch or pin in crankshaft pulley and timing pointer on chain case cover. Pointer marked "0", "3", "6", "10". Align pulley notch or pin with correct mark on pointer.

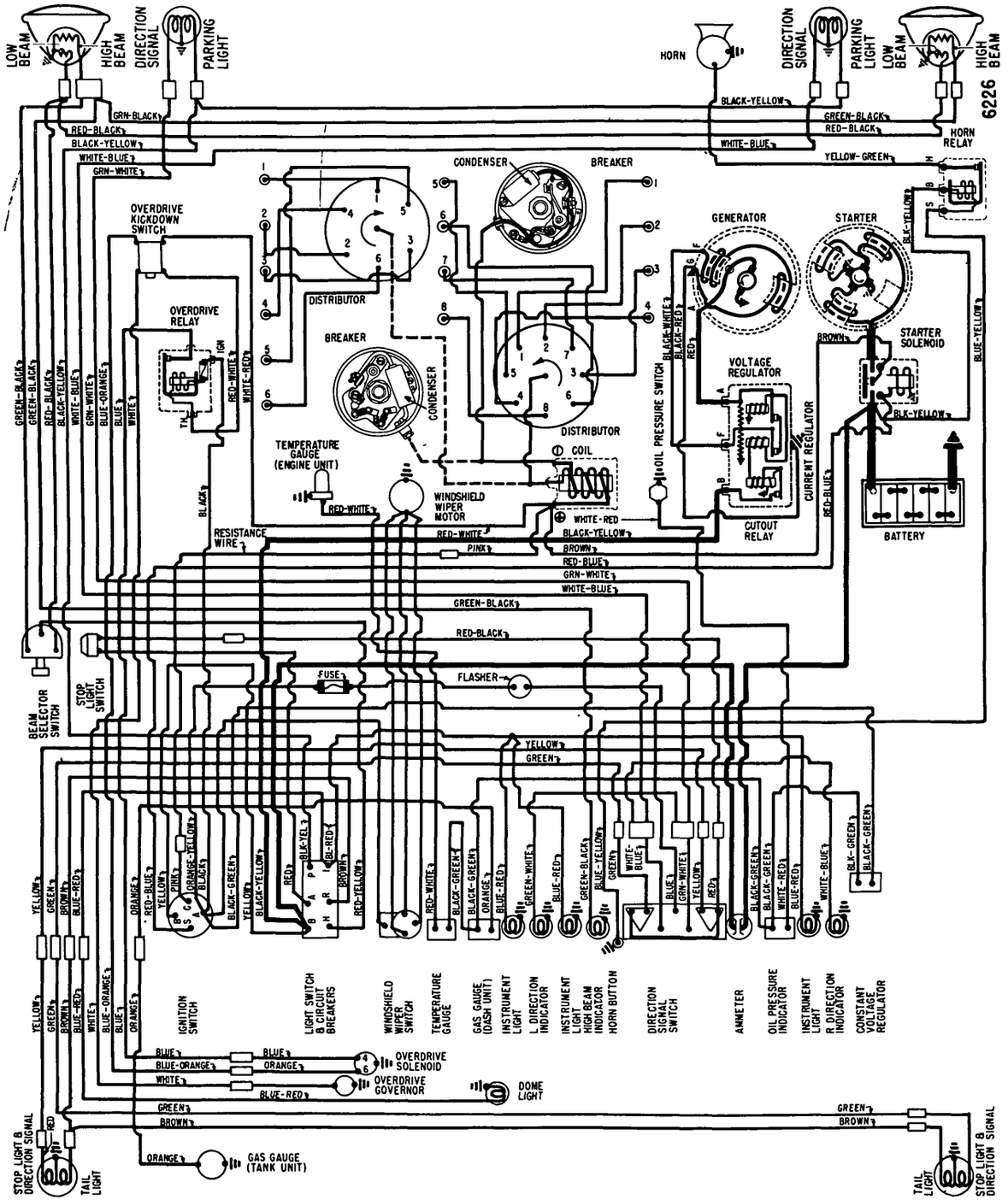
CARBURETOR

►*CARBURETOR APPLICATION: Holley Model 1904 or 1908 single barrel carburetor used on all 6 Cyl.; Holley 2-Barrel carburetor used on all 292MD; Holley 4-Barrel carburetor used on all 292HD.*

THROTTLE LINKAGE ADJUSTMENT (6 Cyl. Cruise-O-Matic): Adjust engine idle speed to 475-525 RPM in Drive and make anti-stall dashpot adjustment (see below). With engine stopped and carburetor on hot idle, remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut. Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission. Turn throttle rod clevis until pin enters hole in lever and **lengthen throttle rod 3 turns.** Connect throttle control rod, tighten locknut, install clevis lock. Measure accelerator pedal height from point where linkage connects to pedal to floor mat. Distance should be 3¾" (Except P Series). On P Series, measure distance from center of hole in cross shaft (for accelerator rod) to a line parallel to bottom line of bracket. Distance should be 1 7/8". To adjust, turn threaded adjusting sleeve on accelerator pedal adjusting link. Adjust pedal detent so it barely contacts pedal at full throttle. Make final adjustment by pressure method (see below).

THROTTLE LINKAGE ADJUSTMENT (V8 Cruise-O-Matic): Adjust idle speed to 475-525 RPM in Drive and make anti-stall dashpot adjustment (see below). Disconnect throttle control rod and carburetor connecting rod from cross shaft assembly. Insert a ¼" gauge pin through gauge holes. Hold connecting rod to normal operation position so throttle lever is solidly against idle adjusting screw. Adjust connecting rod length to fit freely into accelerator assembly lever, then turn adjusting sleeve **one full turn counterclockwise to lengthen rod.** Remove gauge pin and connect rod. Check alignment or gauge pin holes, and set throttle to hot idle position. Gauge pin must enter freely. Readjust connecting rod as necessary. Remove gauge pin, pull upward on throttle control rod, so transmission lever is against its internal stop. Rotate adjusting sleeve so rod fits freely into accelerator lever assembly. Lengthen throttle control rod (turn adjusting

CONTINUED ON NEXT PAGE



FORD TRUCK (PARCEL DELIVERY) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

sleeve counterclockwise) three turns for approximate setting. Connect control rod to accelerator assembly lever. Adjust pedal height to 3¾" measured from floor mat to point where linkage connects to pedal (except P Series), so center of hole in cross shaft lever (for pedal rod) is 9/16" above horizontal (P Series). To adjust height, turn sleeve on accelerator pedal connecting rod. Adjust pedal detent so it just contacts pedal at full throttle. Make a final adjustment of throttle linkage by pressure method (see below).

Pressure Method Final Adjustment: With carburetor or accelerator pedal linkage adjusted and transmission at normal operating temperature, apply parking brake. Stop engine, and remove threaded cap from pressure linkage tube (in engine compartment) and connect pressure gauge to tube using Adapter T60L-7000-B so pressure gauge can be read from driver's seat. Connect a tachometer to engine. Note gauge reading at 1000 RPM. If pressure below 80 lbs., lengthen throttle rod by rotating sleeve. If pressure is over 85 lbs., shorten rod. Tighten locknut to hold rod adjustment.

Anti-Stall Dashpot Adjustment: After engine idle speed has been adjusted to specifications, loosen dashpot locknut. Hold throttle in hot idle position, bottom dashpot plunger. Distance from plunger to throttle shaft lever should be .060-.090". Adjust by turning dashpot or dashpot adjusting nut.

HOLLEY MODELS 1904 & 1908

Engine & Series ①	② Carburetor No.
223 (Except P Series) Synchro-mesh Std.	C2TE-9510-E
223 (Except P Series) Synchro-mesh CCV	C2TE-9510-F
223 (Except P Series) Auto. Trans. Std.	C2TE-9510-H
223 (Except P Series) Auto. Trans. CCV	C2TE-9510-J
223 (P Series) Synchro-mesh	C2TE-9510-G
223 (P Series) Auto. Trans.	C2TE-9510-K
223 (P Series)	C2TE-9510-T
223 (P-100)	C2TE-9510-C
262 All Series	C2TE-9510-L

① - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.
② - Stamped on fuel inlet boss or main body.

Idle Setting - Initial setting 1-1½ turns open. Turn mixture screw in until engine runs roughly (lean mixture) then back out screw until engine rolls (rich mixture). Turn screw in until engine runs smoothly. Favor a rich mixture.

Idle Speed - 223 & 262 - 500-550 RPM (Synchro-mesh), 475-525 RPM in "D" (Auto. Trans.).

Fuel Level - 11/16"±1/32" (Except C2TE-9510-L), 3/4"±1/32"(C2TE-9510-L) below power valve diaphragm cover mounting surface. Use Gauge T52L-9550-AEE.

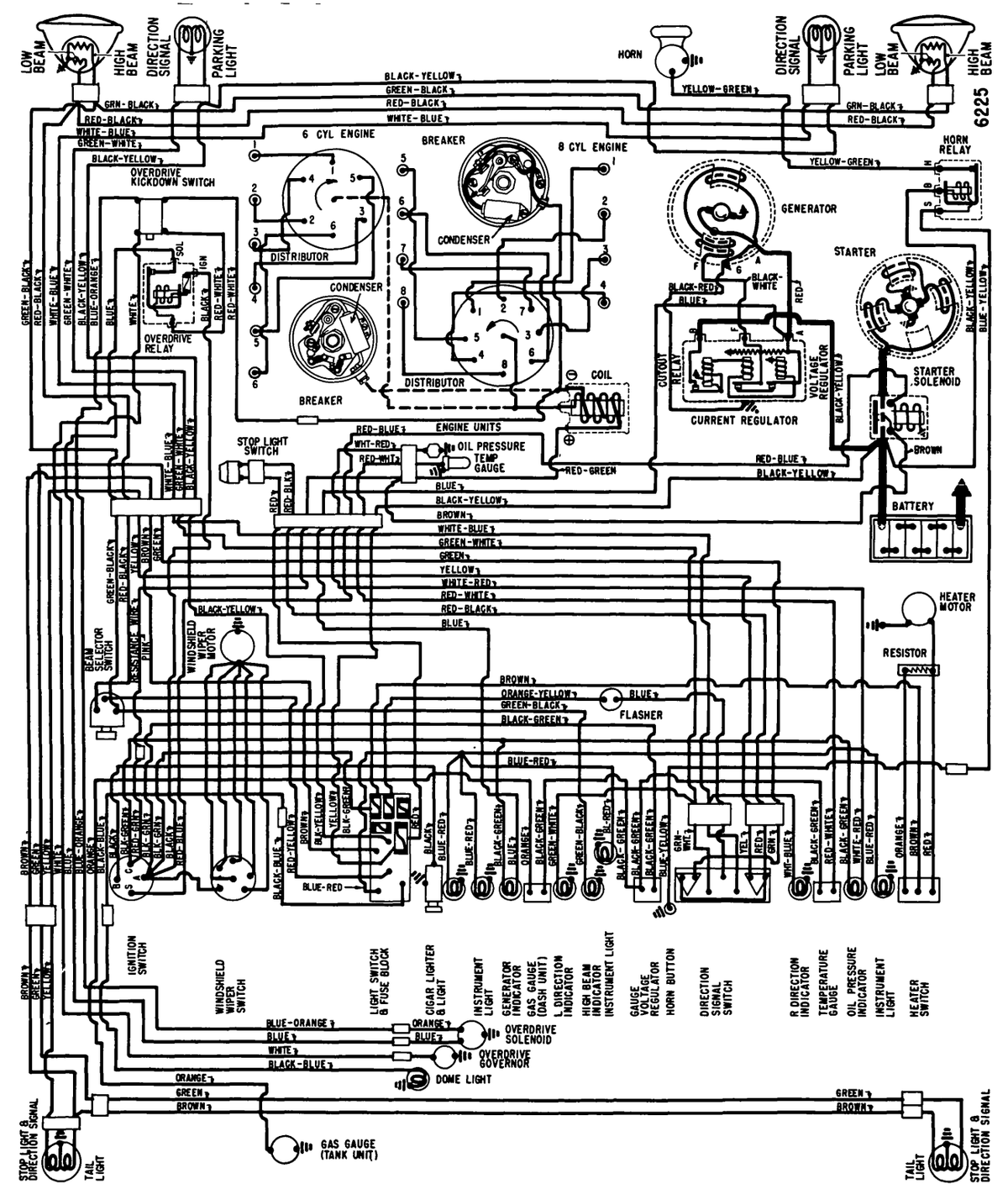
Accelerating Pump - Inner hole for average or hot weather operation, outer hole for cold weather operation.

Fast Idle: No adjustment, will be correct when hot or slow idle correctly set.

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Holley Single Barrel Models 1904 & 1908 Carburetors" in Carburetion Section.*

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FORD TRUCK (CONVENTIONAL) WIRING DIAGRAM

CONTINUED FROM PRECEDING FAGE

HOLLEY 2-BARREL CARBURETORS

Engine & Transmission ①	②Carburetor No.
292MD Synchro-mesh	③C2TE-9510-N
292MD Auto. Trans.	③C2TE-9510-M
292MD All Trans. With Hand Throttle	④C2TE-9510-R

HOLLEY 4-BARREL CARBURETORS

Engine & Transmission ②	②Carburetor No.
292HD All Trans. (Std.)	C1TE-9510-AM
292HD All Trans. (CCV)	C1TE-9510-A

① - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.
② - Number stamped on choke plate flange.
③ - Part No. C2TZ-9510-D. ④ - Part No. C2TZ-9510-E.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - *NOTE - Idle mixture adjusting needles used only on secondary side (one on each side of Fuel Metering Block).* Initial setting 1-1½ turns open. Turn mixture needles until engine runs roughly (lean mixture), then back needles out until engine begins to roll (rich mixture). Turn needles in until engine runs smoothly. Favor a rich mixture.

Idle Speed - **292MD** - 500-550 RPM (Synchro-mesh), 475-525 RPM (Auto. Trans. in "D"). **292HD** - 525-575 RPM (Synchro-mesh), 475-525 RPM (Auto. Trans. in "D").

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Holley 2 & 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: As follows:

Engine	Ford Pump No.
223	B8A-9350-E
262	C1TE-9350-A or C2TZ-9350-A
292 MD	B9TE-9350-A
292 HD	B8T-9350-B

Fuel Pump Pressure - 3.5-6.5 (292 HD) 3.3-5.5 lbs. at 500 RPM. (All Others).

Gasoline Gauge: King-Seeley Electric "CV" (Constant Voltage) type with Gauge Voltage Regulator as follows:

Series & Body Type	Ford Regulator No.
F & B Series (Cowl, No Windshield)	B7A-10804-B
F & B Series (Others)	B9MF-10804-A
P Series	B7J-10804-A
C Series	COMF-10804-A

Dash Unit - As follows:

Series & Body Type	Ford Motor Co. No.
F & B Series (Cowl, No windshield)	C1TF-9280-A
F & B Series (Others)	C1TF-9280-C
P Series	B7J-9280-A
C Series	C1TF-9280-B

Tank Unit - As follows:

Series & Body Style	Ford Motor Co. No.
F & B Series ①②	C1TF-9275-C
F-100,250,350; All P Series③④	B8C-9275-A
F-350③; F-500, 600; B-500, 600⑤	B8T-9275-A
C Series ⑤⑥	B8T-9275-A
P-350,400,500; F-500,600; B-500,600⑥	B8T-9275-A

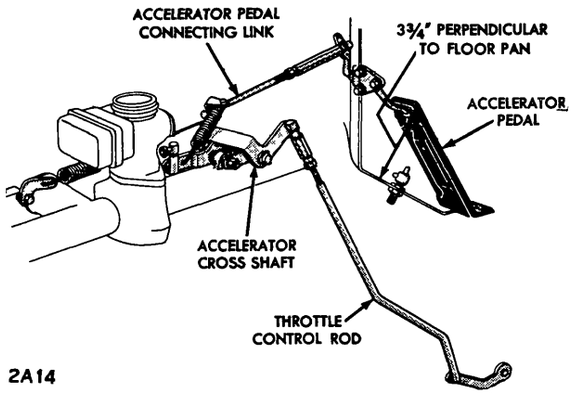
① - Conventional Closed Cab & Pickups.
② - 18 gallon "In cab" tank. ③ - Without cab.
④ - 17 gal. tank mounted inside frame.
⑤ - 18 gallon side mounted tank. ⑥ - 30 gal. tank.

Fuel Filter: Disposable or replaceable element type in fuel inlet line, or magnetic type in fuel Pump bowl, depending on truck model. Clean filter (except disposable type) every 8,000 miles (On Highway), 4,000 miles (Off Highway). Replace disposable type every 12,000 miles. Replace element type every 12,000 miles (Off Highway), 24,000 miles (On Highway).

Air Cleaner: Oil bath type. Clean at 4000 miles or 1000 miles in dusty areas (On Highway), at 500 mile intervals (Off Highway).

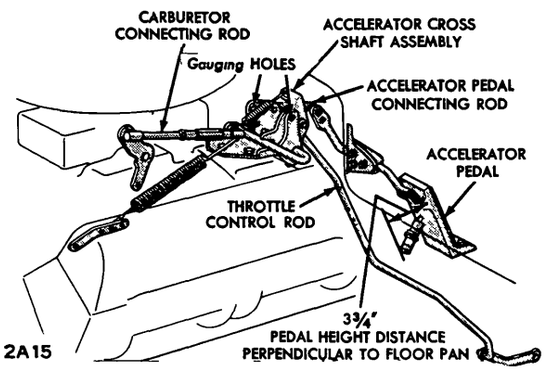
ELECTRICAL

►*SEE FORD GALAXIE & MERCURY MONTEREY V8 PAGES FOR BATTERY, STARTER, GENERATOR, GENERATOR REGULATOR, ALTERNATOR, ALTERNATOR REGULATOR, CIRCUIT BREAKER AND FUSE DATA.*



2A14

FORD TRUCK 6 CYL. AUTOMATIC TRANSMISSION THROTTLE LINKAGE



2A15

FORD TRUCK V8 AUTOMATIC TRANSMISSION THROTTLE LINKAGE

ENGINE

ENGINE SPECIFICATIONS: Own. Valve-in-head. 6 Cyl. 223" & 262", and V8 292" engines of same designs used previously.

Engine	Bore	Strok	Displacement
223	3.625"	3.60"	223 cu. ins.
262	3.718"	4.03"	262 cu. ins.
292	3.75"	3.30"	292 cu. ins.

Engine	Compr. Ratio	Rat dHP	D veloped HP
223	8.4-1	31.50	135 at 4000 RPM
223①	8.4-1	31.50	104 at 3600 RPM
262	8.0-1	33.18	152 at 4000 RPM
292MD ②	8.0-1	45.00	160 at 4000 RPM
292HD ③	8.0-1	45.00	171 at 3800 RPM

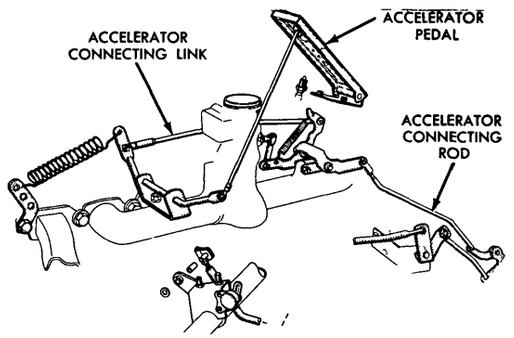
① - Export.
② - Medium Duty - With 2-Bbl. Carburetor.
③ - Heavy Duty - With 4-Bbl. Carburetor.

Compression & Vacuum Reading - *S TUNE-UP.*

CYLINDER HEAD: *See "Cylind r H ad & Manifold" in Ford Motor Co. Special Data.*

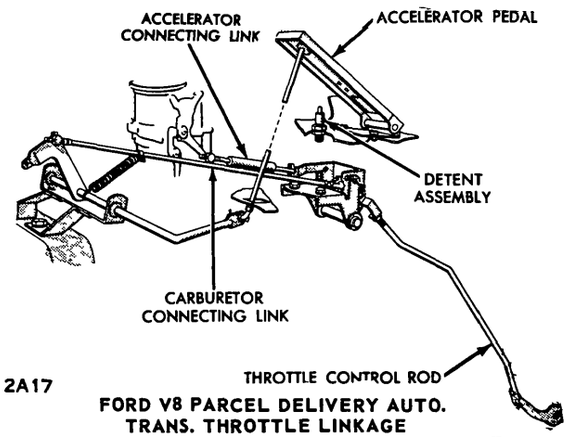
TIGHTENING TORQUES: *S "Tight ning Sp cifications" in Ford Motor Co. Sp cial Data.*

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2A16

FORD 6 CYL. PARCEL DELIVERY AUTO. TRANS. THROTTLE LINKAGE



2A17

FORD V8 PARCEL DELIVERY AUTO. TRANS. THROTTLE LINKAGE

Se INDEXES on Pgs. 4 to 9 for compl t CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE REMOVAL: *See "Engine" in Ford Motor Co. Special Data.*

OIL PAN REMOVAL (6 Cyl.): Drain crankcase and remove oil level dipstick. Remove flywheel housing inspection cover. Remove oil pan retaining screws and remove oil pan.

OIL PAN REMOVAL (V8): Drain crankcase and remove dipstick. Remove converter housing dust cover (Auto. Trans. Trucks). On C Series, position No. 1 piston at TDC. On all trucks, disconnect oil inlet tube from oil pump and remove "O" ring seal from tube. Remove oil pan retaining screws and remove oil pan.

6 CYL. ENGINES

223" 6 CYLINDER ENGINE

►*See 1962 Ford Galaxie 6 & Mercury Monterey 6 Passenger Car Pages.* Engine is similar to that used in 1962 Passenger Cars, and all car engine data applies to truck *except the following:*

Connecting Rod: Clearance - .0008-.0028". Wear limit .0035".
Side play - .005-.011". Wear limit .014".
Main Bearing: Clearance - .0009-.0033". Wear limit .0038".
Camshaft Lobe Lift: .273" All lobes.
Tappet Clearance: .019" Hot or Cold, all valves.

Valve Spring Specifications
(Free Length 2.09")

Valve	Spring Pressure	Length
Closed	① 71-79 lbs.	1.78"
Open	② 161-177 lbs.	1.39"

① - Wear limit 64 lbs. at 1.780".
② - Wear Limit 145 lbs. at 1.390".

262" 6 CYLINDER ENGINE

This 262" 6 Cylinder Engine is similar in design to 223" 6 Cylinder Engine. The camshaft is driven directly by a gear in mesh with crankshaft gear instead of by a timing chain. The exhaust valves are "free turning" type, with cap eliminated. *NOTE - All 223" Ford Galaxie 6 & Mercury 6 engine data on Car Model Pages apply to this 262" engine except as follows:*

Pistons: Clearance - .0032-.005".
Rings (Compression): Width - .0774-.0781".
Connecting Rod: Sideplay - .005-.011". Wear limit .014".
Main Bearings: Clearance - .0009-.0034".
Camshaft Setting: Mesh marked tooth of crankshaft gear with marked notch in camshaft gear, with marks in line with shaft centers.
Lobe Lift - .273". All lobes.
►*VALVE SEAT NOTE:* Valve inserts used in exhaust valve seats only.
Valve: Head Diam. - Exhaust 1.505-1.515".
Stem to Guide Clearance - Exhaust .0025-.0042".

Valve Spring Specifications
(Free Length 1.96")

Valve	Spring Pressure	Length
Closed	③ 71-79 lbs.	1.78"
Open	④ 161-177 lbs.	1.39"

③ - Wear limit 64 lbs. at 1.78".
④ - Wear limit 145 lbs. at 1.39".
Tappet Clearance: .019" Hot or Cold. All Valves.

V8 ENGINES

►*SEE 1962 FORD GALAXIE V8 & MERCURY MONTEREY V8 PAGES AND NOTE THE FOLLOWING EXCEPTIONS:*

PISTON RINGS:	Width	End Gap	Side Clearance
Compr. (1)	.0774-.0781"	.010-.025"	.0019-.0036"
Compr. (2)	.0774-.0781"	.010-.025"	.0019-.0036"
Oil (3)		.015-.062"	①

① - Snug - Side sealing-type ring.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Ford Motor Co. Special Data.*
Crankcase Capacity: 5 qts. (223 & 292), 6 qts. (262) for refill. Add 1 qt. with filter change.
Normal Oil Pressure: 25-55 lbs. at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.
Oil Pressure Indicator: (F Series) - Indicator light on instrument panel controlled by Engine Oil Pressure Switch, Ford No. B6A-9278-B.
(B,C & P Series) - King-Seeley Electric "CV" (Constant Voltage) type with gauge voltage regulator. *See "Gasoline Gauge" under CARB. EQUIPMENT above for Gauge Voltage Regulator application.*
Dash Unit - Ford No. C1TF-9273-A (B Series), No. C1TF-9273-B (C Series), No. B7J-9273-A (P Series).
Engin Unit - Ford No. B7T-9278-A (B,C & P Series). On right side of engine above starter (6 Cyl.), at rear of oil filter (V8).
Oil Pump: Rotor Type, mounted in crankcase (6 Cyl.), outside of crankcase on left side (V8).
Pump Overhaul - *See "Oiling System" in Ford Motor Co. Special Data.*
Oil Filter: Full-flow, disposable element type. Replace element every 4,000 miles.
Reinstallation - *NOTE - Be sure two elongated holes in anti-drain back diaphragm are in the "UP" position,* Install new gasket, place assembly in position, insert center bolt into adapter finger tight. Rotate assembly in each direction to seat gasket evenly and torque bolt to 20-25 ft. lbs. DO NOT OVER TORQUE BOLT.
Crankcase Ventilation: Conventional - Filter in oil filler (inlet) and outlet pipe at rear of engine. Clean system every 4000 miles (On Highway) 500 miles (Off Highway), or sooner under severe operating conditions.
Positive - Road draft tube replaced by an adapter, tubing, and hose routed to ventilation valve installed in intake manifold or in spacer between carburetor and intake manifold. Service system each 8000 miles (4000 miles or every three months in Stop and Go Service). Check valve operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: Depends on vehicle - Variable. Add 1 qt. for heater.
Pressure Valve: 7 lb. radiator filler cap Ford No. OL-8100-A.
Thermostat: 160°F. Ford No. COAZ-8575-A, 178°F. No. COAZ-9575-B.
Water Pump: Packless, sealed ball bearing type. *See "Cooling System" in Ford Motor Co. Special Data.*
Temperature Gauge: King-Seeley Electric "CV" (Constant Voltage) type with a gauge voltage regulator. *See "Gasoline Gauge" under CARB. EQUIPMENT above for Gauge Voltage Regulator applications.*
Dash Unit - Ford No. B7J-10883-A (Parcel Delivery), No. C1TF-10883-A or C (Others).
Engine Unit - Ford No. B7A-10884-A.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*NOTE:* The following data covers the Aluminum V8 (215 cu. ins.), Cast Iron V6 (198 cu. ins.) and the Cast Iron V8 (401 cu. ins.). *R f r nc will b mad to Displacement.*

TIGHTENING SPECIFICATIONS

198" & 215" ENGINES

	Ft. Lbs.
Cylinder Head	65-70
Rocker Arm Bracket	25-30 (V8), 30-35 (V6)
Rocker Arm Cover	3-5
Intake Manifold	25-30
Carb. to Intake Manifold	12-15
Water Outlet to Intake Manifold	20-25
Exhaust Manifold	10-15
Oil Pan	6-15
Engine Front Cover	20-25
Oil Pump Cover	10-15
Fuel Pump to Front Cover	20-25
Water Pump to Front Cover	6-8
Main Bearing Caps (Exc. Rear)	50-55 (V8) 100-125 (V6)
Main Bearing Cap (Rear)	65-70(V8) 100-110(V6)
Connecting Rods	30-35

401" ENGINE

Cylinder Head	65-75
Intake Manifold	25-30
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps	100-110
Flywheel	50-60
Harmonic Balancer	200-220
Con Rod Caps	40-45
Rocker Arm Support Brackets	30-35
Rocker Arm Cover	3-5
Valve Lifter Cover	3-5
Water Manifold	25-30

ALUMINUM ENGINE SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines, to prevent damage by scratching, nicking, or scoring. Note the following:

1) Do not drop or slide machined surfaces on bench or floor.

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation).

3) Lubricate bolts and screws entering any aluminum part. *See "Bolt Thread Lubrication Note" below.*

4) Tighten bolts and nuts to the specified torque. DO NOT overtighten. Torque values are for clean lubricated threads.

►*BOLT THREAD LUBRICATION NOTE:* Use "Buick Special Thread Lubricant".

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum. The repair consists of drilling out worn or damaged threads tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole. This brings hole back to original threaded size. See following table for inserts and tools required.

"Heli-Coil" Thread Inserts

Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	4 CPB	528-4N
5/16"-18	1185-5	332"	5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short	512		137-11	542
14 MM Long	513		137-11	542

ENGINE MOUNTINGS

401" ENGINE

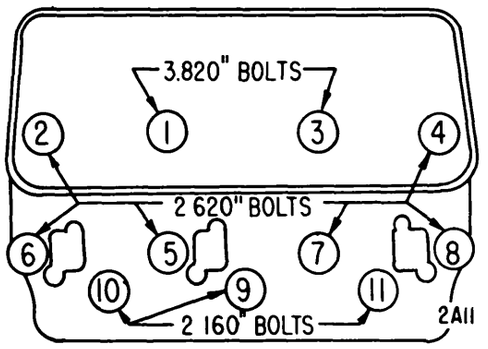
►*ENGINE MOUNTING NOTE:* When properly aligned, engine and transmission should rest in normal position without any strain on the rubber mounting pads. Engine alignment is determined by transmission support location. Before loosening or removing support, mark support and frame at each end to insure reinstallation in original position with exact number and location of shims used originally.

ENGINE MOUNTINGS: Adjustment - Disconnect exhaust pipe from exhaust manifold and loosen four engine mount-to-frame bolts. With support shims in place, support in original position (fore and aft), and transmission support-to-frame bolts tight, raise engine to allow mounts to normalize, then lower engine and tighten mount-to-frame bolts. Reassemble exhaust system making certain system is free of binding and that there is no interference between exhaust pipes and chassis members.

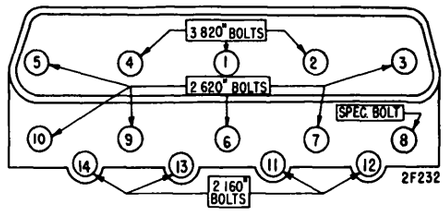
CYLINDER HEAD & MANIFOLD

198" & 215" ENGINES

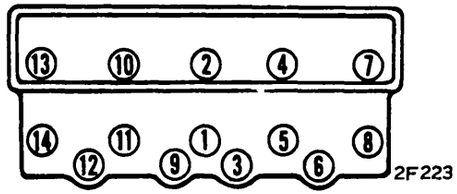
CYLINDER HEAD & GASKET INSTALLATION: Install new cylinder head gasket over dowels on block. *CAUTION - DO NOT USE sealing compound of any kind.* Install cylinder head, then coat threads of cylinder head bolts with Buick Perfect Seal. Install and tighten bolts a little at a time about three times around in sequence indicated in diagram (diagram also shows locations of different size bolts). Tighten bolts in same sequence to specifications. DO NOT OVERTIGHTEN.



198" ENGINE CYLINDER HEAD DIAGRAM



215" ENGINE CYLINDER HEAD DIAGRAM



401" ENGINE CYLINDER HEAD DIAGRAM

401" ENGINE

CYLINDER HEAD & GASKET: When handling the thin crimped steel gasket, use care not to damage lacquered surface coat or kink sealing rings stamped in gasket. *(CAUTION* - Do not coat lacquered surface of gasket with any sealing material and DO NOT RE-USE THE OLD GASKET as stamped sealing rings are flattened in a used gasket). Right and left cylinder heads are identical except that the water inlet port is open at front end and is plugged at rear end as installed on engine. After installation of cylinder head, tighten bolts a little at a time, three times around in sequence shown in diagram, then in same sequence to specifications. After engine brought to operating temperature, recheck head bolts to specifications.

►*CYLINDER HEAD REMOVAL NOTE:* All of the cylinder head bolts and pushrods cannot be removed with head in place. When removing head, pull pushrods part way out and tape in place. These same pushrods must be in head before head installation.

PISTON PINS

198" & 215" ENGINES

►*PRESS-FIT PISTON PIN REMOVAL & INSTALLATION: CAUTION - Special tools must be used to avoid damage to piston assembly parts.*

Pin Removal: Place Support J-8754-1 in press with full radial face up and install spring in support. Place piston, pin and rod in press with Driver J-8355-3 inserted in pin. Press out piston pin.

Pin Installation: Place Pilot J-8754-2 and spring in Support J-8754-1 and position Support so Pilot J-8754-2 is located in piston pin bore, then place in arbor press. Coat pin and connecting rod lightly with graphite lubricant and place Driver J-8355-3 in pin and press pin into piston and connecting rod until pin bottoms against Pilot J-8754-2.

401" ENGINE

PRESS-FIT PISTON PIN REMOVAL & INSTALLATION: *CAUTION - Special tools must be used to avoid damage to piston assembly parts.*

Pin Removal: Place piston pin Support Tool J-6047-17

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in press with radial face up. Place piston assembly on Support and press out pin with Drive Pin Tool J-6047-4. *NOTE* - Guide Pin Tool J-6047-16 used for installation.

Pin Installation: 1) Place piston Support Tool J-6047-18 in base plate of press with piston Support full radial face upward.

2) Place rod in piston with spurt notch on same side as valve depressions in piston dome. Lubriplate pin and enter into boss, forcing rod against opposite boss.

3) Place small end of Drive Pin Tool J-6047-4 in top end of pin and place assembly in press.

4) Be sure all parts are aligned correctly, then force pin through rod and piston bosses until Guide Pin Tool J-6047-18 stops downward travel.

5) Remove assembly and rotate piston on pin to check for proper fit between piston and pin.

CRANKSHAFT & MAIN BEARINGS

CRANKSHAFT REAR OIL SEAL: Braided fabric seals pressed into grooves in crankcase and rear bearing cap at rear of oil collecting groove. Neoprene seals are placed in sides of bearing cap. Crankshaft must be removed to replace braided seal in crankcase.

ALL SERIES

Installation - Place new seal in groove in cap and force down with hammer handle or smooth stick until seal projects above groove not more than 1/16". Cut ends of seal flush with surface of cap. Replace seal in crankcase in same manner. *CAUTION - Engine must be operated at slow speed after new braided seal installed.* Neoprene seals are slightly longer than grooves in bearing cap. Seals must **not** be cut to length. Lubricate seals and install in bearing cap with upper ends protruding approximately 1/16". After cap is installed, force seals up into cap with blunt instrument to provide seal at parting line between cap and case.

ENGINE FRONT COVER

198" & 215" ENGINES

TIMING CHAIN COVER: Removal - 1) Drain cooling system, disconnect hoses and remove radiator. Remove fan, pulley and belts.

2) Remove crankshaft pulley and reinforcement, and harmonic balancer.

3) On Pwr. Steering Cars, remove steering pump bracket bolts at timing cover and loosen or remove other bolts so that pump may be moved out of way.

4) Remove fuel pump and generator (not the generator brackets).

5) Remove distributor cap and pull spark plug wires off rocker arm cover brackets. Swing cap and wires out of way and disconnect distributor primary wire. Remove distributor.

6) When timing chain and sprockets are not to be disturbed, note position of distributor rotor for reinstallation in same position.

7) Loosen and slide thermostat bypass front hose clamp rearward. Remove timing cover to engine block bolts and two oil pan to timing cover bolts. Remove cover assembly and gasket.

FRONT OIL SEAL: Removal & Installation - Use a punch to drive out old seal and shedder from front toward rear of cover. To install, coil new packing around opening so ends are at top. Drive in shedder with punch. Stake shedder in place in at least three places. Use hammer handle or other smooth object to size packing until balancer hub can be inserted through opening.

401" ENGINE

TIMING CHAIN COVER: Removal - Drain cooling system, remove radiator core, shroud, fan belt, fan and pulley, vibration dampener. Remove all bolts attaching timing chain cover and water pump manifold to upper and lower crankcase and cylinder heads. *NOTE* - DO NOT REMOVE water pump from chain cover. Remove cover and manifold carefully, making sure not to damage lower crankcase gasket.

FRONT OIL SEAL: Installation - After removing braided fabric packing with a screwdriver and tapping pressed steel shedder out of timing chain cover, work the new packing into the shedder, then drive the shedder into recess in cover with Installer J-5250-1. Push Packing Expander J-5250-2 through seal to expand packing into place and size the opening for the crankshaft. Apply a light coat of vaseline to packing.

FLYWHEEL

ALL SERIES

FLYWHEEL REPLACEMENT: Flywheel or Ring Gear must be replaced as an assembly (gear is welded in place and not furnished separately).

Installation of Flywheel: Make certain that flywheel and crankshaft are clean and free from burrs which might cause run-out (remove burrs with a mill file). Install flywheel and tighten bolts evenly to specifications. Mount Dial Indicator so stem of indicator bears against float surface of flywheel at inner side of bolt holes. Hold crankshaft end thrust in one direction and turn flywheel to check runout. Runout should not exceed .015". When runout exceeds .015", tap high side of flywheel with mallet. If not corrected, remove flywheel and check for burrs between flywheel and face of crankshaft flange. If not corrected by removing burrs, check runout of flange.

Engine Vibration: When engine vibration is introduced by installation of the flywheel, proceed as for "Engine Unbalance" below.

Misaligned Flywheel: Loosen one flywheel attaching bolt and check contact between flywheel legs and converter pump cover. A .010" feeler should slip between flywheel and cover with slight drag. Pry leg away when too much contact exists, or insert ¼" diameter rod on each side of bolt and tighten bolt to spring leg to increase contact. Recheck other legs, to obtain equal contact.

ENGINE BALANCING

►*IF VIBRATION NOTED AFTER INSTALLATION OF CRANKSHAFT, FLYWHEEL, OR OTHER ROTATING PARTS, CORRECT THIS UNBALANCED CONDITION AS FOLLOWS:*

Critical Speed of Vibration - Determine speed at which vibration is most evident (use tachometer) and operate engine at this speed to check results from the following corrective procedures.

►*CAUTION:* Procedure below will correct minor unbalance caused by replacement of individually balanced parts. Extreme vibration caused by parts abnormally out of balance, or different in weight from corresponding parts, should be corrected by replacement of these parts.

1) Remove bell housing cover and install one balance weight (.060" thick) under head of two converter pump cover bolts, and tighten bolts to 25-30 ft. lbs. *(CAUTION - Do not place a weight at a flywheel-to-converter driving bolt as these bolts are not long enough for addition of weights).*

2) Run engine at critical speed and carefully compare vibration with that obtained without the weight, then stop engine. Mark location of balance weight on converter pump, remove weight and tighten bolt to 25-30 ft. lbs .Install the weight at other converter pump cover bolts and compare vibration produced at critical speed

3) At the point where balance weight produced greatest improvement in vibration. Install weights of proper thickness to eliminate objectionable vibration. Balance weights are furnished in the following thicknesses:

Balance Weight Part Nos.

Thickness	Part No.
.009"	1178106
.018"	1178107
.0345"	1178108
.060"	1178109
.120"	1178110

NOTE: When factory balancing of converter pump is changed to balance on engine, the pump cannot be used with any other engine.

VALVE SYSTEM

ROCKER ARMS

198" & 215" ENGINES

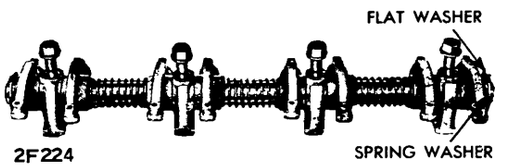
ROCKER ARM ASSEMBLY: Removal - Pull spark plug wires from brackets on rocker arm covers and swing wires and retainer out of way. On right side, remove vent pipe, then remove rocker arm cover and gasket. Remove four rocker arm shaft to cylinder head bolts and remove rocker arm and shaft assembly. *NOTE - Vent pipe oil baffle is mounted under rear bolts on right rocker arm and shaft assembly.*

Disassembly - Remove cotter pin, plain washer and spring washer from each end of shaft. Remove bracket bolts and slide rocker arm, springs and brackets off shaft.

Reassembly - Assemble springs, rocker arms and brackets as shown in diagram. *NOTE - Two types of rocker arms are used, and valve ends of rocker arms slant away from brackets.* Install spring washer, flat washer and cotter pin on each end of shaft in the order named. Install bolts with plain washers through brackets and shaft so notch in one end of shaft is up and at the front (right hand shaft), up and at the rear (left hand shaft).

NOTE - Vent pipe oil baffle is mounted under rear bolts on right rocker arm and shaft assembly.

CONTINUED ON NEXT PAGE



198" & 215" ENGINES ROCKER ARM ASSEMBLY

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401" ENGINE

ROCKER ARM ASSEMBLY: One assembly mounted on each cylinder head (see illustration).

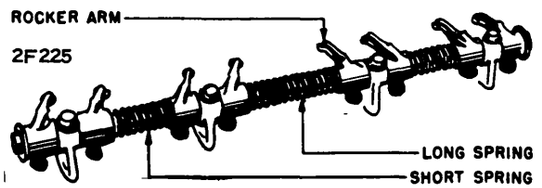
Disassembly: Remove cotter pin, flat washer, and spring washer from each end of shaft. Pull mounting bolts out of support brackets and slide rocker arms, springs and brackets off shaft.

Reassembly: See illustration for location of parts. Install longer spring at center of shaft and install rocker arms with offset (slant) toward center of shaft (two types of rocker arms used - see table below for proper location of each type). Turn shaft so that notch in one end of shaft is upward or toward top of bracket and install bolt through bracket and shaft to maintain this position (*CAUTION* - Notch must be upward to place rocker shaft oil holes in proper relationship to rocker arms).

Rocker Arms

Part No.	Location
1173808	4 Right Front & 4 Left Rear
1173809	4 Left Front & 4 Right Rear

Installation: Make certain that notch in one end of rocker arm shaft is upward, position assembly on head with dowels engaging blind holes in brackets, tighten all bracket bolts evenly to 30-35 ft. lbs.



401" ENGINE ROCKER ARM ASSEMBLY

HYDRAULIC LIFTERS

198" & 215" ENGINES

Removal: *CAUTION - Use air and clean cloths to remove all dirt from cylinder heads and adjacent parts.*

1) Drain cooling system, remove air cleaner and silencer, disconnect all pipes and hoses from carburetor. Remove coil and disconnect temperature wire at switch.

2) Disconnect accelerator and transmission linkage and throttle return spring. Slide front bypass hose clamp rearward and disconnect upper radiator hose at outlet.

3) Disconnect heater hose at thermostat control valve inlet (push hose down to drain intake manifold).

4) Remove twelve intake manifold-to-cylinder head bolts and remove intake manifold and carburetor assembly (slide rearward to disconnect bypass hose from water pump).

5) Remove intake manifold gasket (sound absorber). Remove intake manifold gasket clamps and gasket and remove rubber gasket seal.

6) Remove rocker arm covers, and rocker arm and shaft assemblies. Remove pushrods and valve lifters. *NOTE - Keep lifters separated (in order) so they will be returned to original positions in engine.*

401" ENGINES

Removal: Remove air cleaner, disconnect all pipes from carburetor and intake manifold. Disconnect wires from accelerator vacuum switch and remove throttle return spring. Remove coil and equalizer shaft bracket from intake manifold and move them out of way. Remove intake manifold and carburetor as an assembly. Thoroughly clean cylinder heads, rocker arm covers and adjacent areas to prevent dirt entering engine. Remove rocker arm cover and rocker arm assemblies, remove pushrods. Remove valve lifter cover, lift out individual valve lifters and place them in numbered compartments of a holding fixture to insure re-installation in original position in engine.

ALL SERIES

Disassembly: Use a pushrod to hold down the pushrod seat in lifter while removing plunger retainer from body with Retainer Remover J-5238. Remove pushrod seat and plunger from lifter body. Body bore above plunger may be caked with carbon and varnish. In this case, place lifter in large end of Tool J-4160 (Special), J-4160-A (Std.) with plunger inward. While holding lifter with thumb, rap open end of remover against a block of wood with just enough force to jar plunger from body.

►*IMPORTANT NOTE:* Disassemble one lifter at a time to avoid interchanging parts. Be careful not to score or nick lifter parts.

Cleaning and Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or identations. If any exist, replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: *NOTE - Current type of ball retainers eliminate need for check of ball travel unless retainer is badly worn or damaged.* It is recommended that all parts be rinsed in clean kerosene and then assembled without drying (this will eliminate all lint and dust adhering to parts). Hold plunger in vertical position with feed hole up, install check ball, ball retainer, spring, and body over plunger. Install pushrod seat and plunger retainer in end of body, use handle of Tool J-5238 to depress parts until retainer engages groove in body. Test lifter for leakdown rate, see below. Protect lifter assembly by wrapping it in clean paper until ready to test or install in engine.

Leakdown Rate - 1) Clean cup of Test Fixture J-5095 and fill it to ½" of top with "Hydraulic Lifter Test Fluid" (Kent-Moore No. J-5268).

2) Remove rubber washer (used for larger lifters) and install Gauge Sleeve J 5180-5 in cup and install Buick V8 Gauge Rod Nose J 5180-15 in ram.

3) Swing arm out of way, raise ram and place lifter (top side up) in Sleeve J-5180-5. *NOTE* - Lifter must be completely covered by fluid during test.

4) Lower ram to rest in lifter pushrod seat, then lower weight arm to rest on roller of ram.

5) Operate lifter plunger, through full travel to force all air out of lifter, until considerable resistance is built up in lifter and a definite grab point is felt at top of stroke when indicator pointer is at bottom of scale.

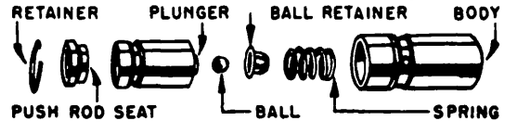
6) Finally operate lifter plunger approximately 10 additional strokes to be sure all air is out of lifter. *NOTE* - When one stroke (of last ten) has noticeable weak resistance, replace check ball and repeat above procedure.

7) Remove weight arm to allow lifter plunger to come up to its retainer, then lower arm to rest on ram roller. As pointer starts moving upward, start rotating fluid cup by turning handle one revolution every two seconds.

8) Use stop watch to check time required for pointer to move from lower to upper mark on scale (Marked Buick V8).

9) Leakdown rate (time between marks) must be between 12 and 40 seconds for satisfactory lifter operation.

►*LIFTER REPLACEMENT CAUTION:* A doubtful lifter should be checked 3-4 times before deciding to replace it.



HYDRAULIC VALVE LIFTER (ALL) 2F226

OILING SYSTEM

ENGINE LUBRICATION

198" & 215" ENGINES

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to crankshaft, connecting rod and camshaft bearings and to valve lifters. Oil is supplied under controlled pressure to rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. See *Engine Oil Flow Diagram.*

OPERATION: Gear type oil pump located in timing chain cover, draws oil through screen and pipe assembly (or over top of screen if clogged) and a drilled passage in crankcase connecting to drilled passage in timing chain cover. All oil is discharged from pump to cover assembly. Spring loaded relief valve (in cover) limits oil pressure to a maximum of 33 lbs. per square inch. A bypass valve (in cover) opens when filter becomes clogged (4½-5 lbs. pressure difference between filter inlet and outlet) to bypass unfiltered oil directly to oil galleries in engine. Oil from filter (mounted on oil pump cover) supplies oil through oil pump cover and drilled passages in crankcase to two main oil galleries that run full length of the crankcase.

Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

Connecting Rod & Pistons - Main bearings supply oil through drilled passages in crankshaft to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through small notch in connecting rod bearing parting surface that registers with hole in crankshaft every revolution. Piston pins are lubricated by splash.

Timing Chain & Sprockets - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief

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in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.

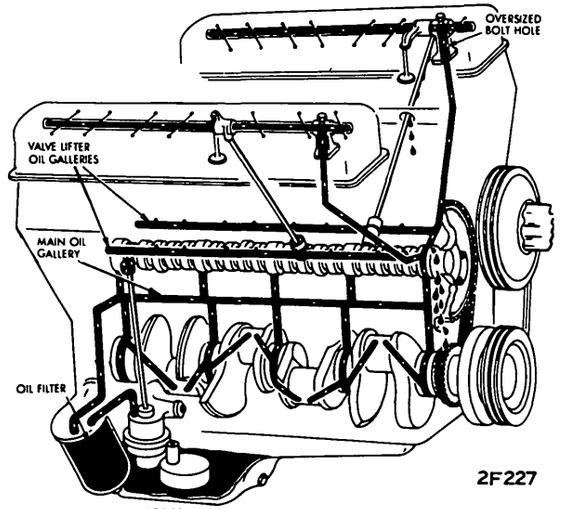
Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries.

Rocker Arms, Valves and Pushrods - These items receive oil from main oil galleries through drilled holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) to hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil through hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.

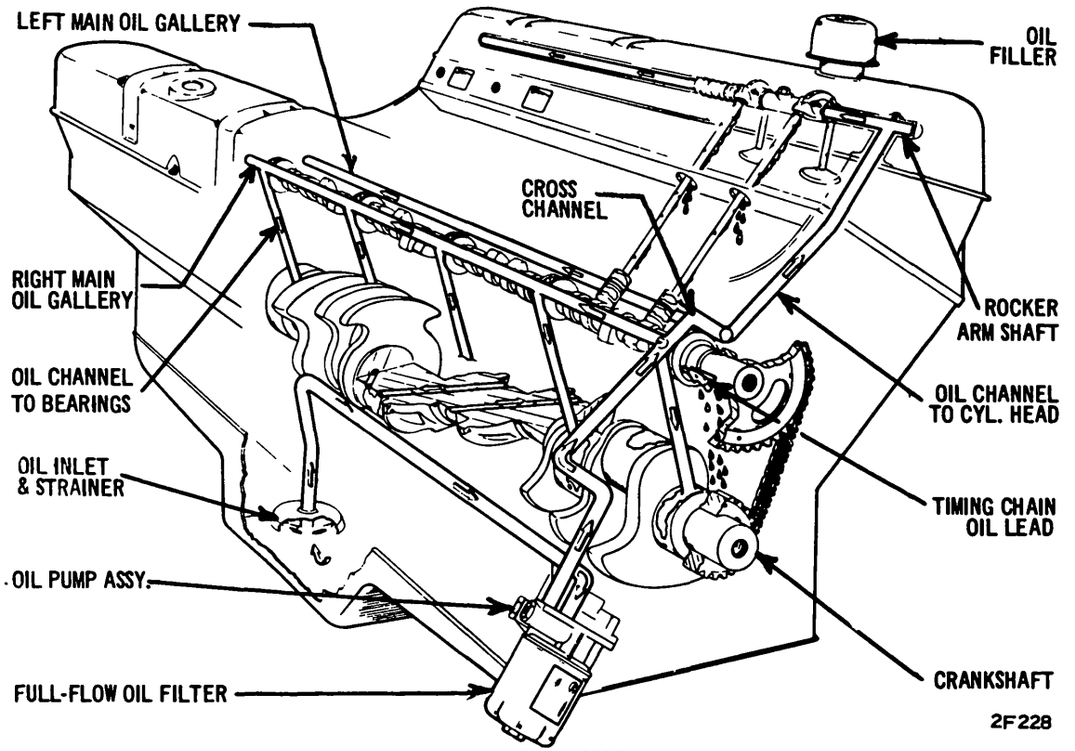
401" ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to crankshaft, connecting rods, and camshaft bearings, and under controlled volume to valve lifters, rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. *See "Engine Oil Flow" diagram.*

OPERATION: Gear type oil pump at lower side of crankcase (at rear end) draws oil from crankcase sump through screen (or over top of screen if clogged) and delivers it through oil passages in pump body and crankcase to full flow filter. By-pass ball type valve in filter base opens to by-pass filter element when clogged or when difference in oil pressure between inlet and outlet ports is 4½-5½ lbs. Oil from filter passes into main oil gallery (full length of crankcase below camshaft) and through drilled passages in crankcase at full pressure to all crankshaft and camshaft bearings, where it is distributed to all moving parts of engine.



401" ENGINE OILING SYSTEM



215" ENGINE OILING SYSTEM (198" ENGINE SIMILAR)

Crankshaft, Connecting Rods & Pistons - Holes drilled in crankshaft carry oil from main bearings to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through squirt hole in parting surface of connecting rod that registers with hole in crankshaft at each revolution of crankshaft. Pistons are lubricated by splash.

Camshaft, Sprockets, Lifters - Oil from front camshaft bearing, flows down front face of crankcase to drop on sprocket that transfers it to chain. Oil holes in crankcase and camshaft front bearing align with groove in camshaft bearing journal which meters flow of oil from main gallery to valve lifter oil galleries in each bank of cylinders. The full length of cylinder bank oil gallery cuts into lower sides of all valve lifter guide holes to supply low pressure oil to each lifter.

Rocker Arms, Valves & Pushrods - These items receive low pressure oil from valve lifter gallery through connecting passages drilled in front end of cylinder block and head. Oil passage in cylinder head ends in a counterbored recess surrounding front rocker arm shaft bracket bolt. Oversize bolt hole in bracket permits oil to flow into hollow rocker arm shaft (plugged at each end). Holes in rocker arm shaft allow oil to flow to each rocker arm. Oil is metered to pushrod ball seat and to valve stem through drilled holes in rocker arm. Excess oil drains off and returns to oil pan through pushrod opening in cylinder head and block.

OIL PUMP

198" & 215" ENGINES

►*OIL PUMP COVER SPACER INSTALLATION CAUTION (Police Cars):* Spacer must be installed between oil pump cover gasket and spacer gasket and the cover must be installed with switch away from alternator.

OIL PUMP: Removal & Disassembly - Remove oil filter and disconnect pressure switch wire at bypass valve cap. Remove oil pump cover assembly-to-timing chain cover screws, then remove cover assembly and slide out oil pump gears. Remove oil pressure relief valve cap, spring and valve. Remove oil filter bypass valve cap, spring and valve.

Inspection - Wash all parts thoroughly and inspect all parts for wear or scoring. Replace any relief valve spring that shows side wear or is questionable. Clean screen staked in bore. Valve should be an easy slip fit in bore. Check bypass valve for cracks, nicks or warping. Valve should be flat and the face free of nicks or scratches.

Assembly & Installation - Reverse removal and disassembly procedure and note the following: Lubricate relief valve before installation and tighten relief valve and bypass valve caps to 30-35 ft. lbs. *NOTE - Relief valve cap has no hole tapped for pressure switch.* Place straightedge across gears. Clearance between straightedge and gasket surface of timing chain cover should be .0018-.0058". If less, remove gears and check

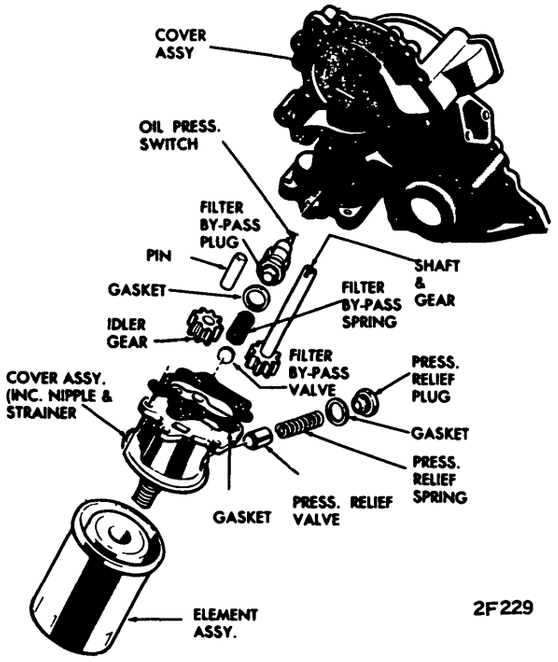
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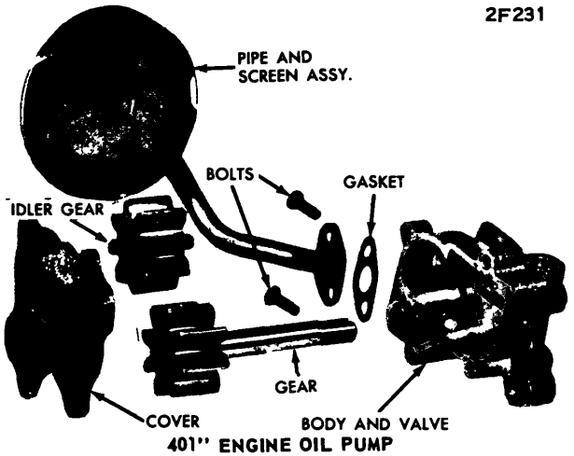
chain cover for wear. If satisfactory, remove gears, fill gear pocket full of petrolatum jelly and force gears into cavity. *CAUTION - This is important as pump will not prime itself with air in cavity.* Install gasket and tighten cover-to-timing chain cover screws alternately and evenly to 10-15 ft. lbs. Install filter and connect switch wire.

401" ENGINE

OIL PUMP: Removal & Disassembly - Remove oil pan, then remove oil pump. Remove screen and screen



198" & 215" ENGINES OIL PUMP



401" ENGINE OIL PUMP

housing, then remove gasket, pipe, and cover from pump body. Remove gears. Remove hex cap, spring and ball valve from pump body.

Cleaning & Inspection - Clean all parts in solvent and blow dry with air. Check for wear on side of spring and that it has not collapsed. Check ball for wear and that it seats properly. Inspect body, cover, gears and shaft for wear or scoring. Replace all worn or damaged parts.

Reassembly - Install gear and shaft and idler assembly in pump body with chamfered end of idler gear teeth inward away from cover. Use straightedge across pump body to check clearance of gears and cover. Clearance should not be more than .005" or less than .0005". Lubricate and assembly parts to pump body by reversing removal procedure. When completely reassembled, pump shaft should turn freely and have slight endplay (.0005-.005").

Installation - Install pump with new gasket, tightening screws while turning shaft back and forth through gear lash. *NOTE* - If pump shaft tends to bind as bolts are tightened, rap body lightly with plastic mallet to free shaft. Shaft must be free of bind when bolts are tight.

COOLING SYSTEM

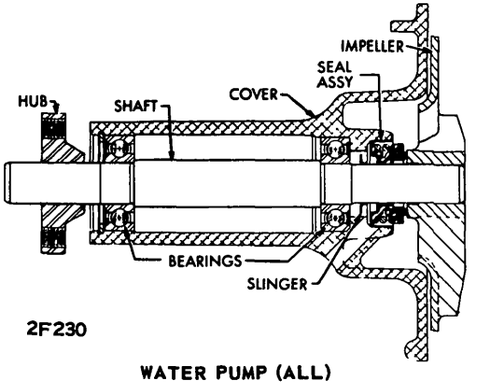
ALL SERIES

WATER PUMP: *NOTE* - Water pump cover is die cast aluminum in which pump bearings are shrunk fit. The cover, shaft, bearings, and hub are not serviceable. Seal and impeller are only serviceable parts.

Disassembly - Pull impeller from pump shaft (avoid end thrust on bearings). Remove carbon washer, rubber bellows and spring from brake sleeve. When necessary to replace sleeve, use drift through vent hole in pump body. *NOTE* - DO NOT use solvent to clean parts as it will destroy bearing lubricant.

Reassembly - Press new brass seal sleeve into body using thick walled tube. When old sleeve not removed, separate new seal sleeve from seal bellows by soaking it in hot water to soften cement. Install bellows and spring in sleeve with notches in washer engaging driving dents of sleeve. Coat face of washer and impeller hub with rust preventative and press impeller on shaft until rear face is flush with end of shaft. *CAUTION - Avoid any thrust on shaft bearings.*

Installation - Clean gasket surfaces and use new gasket. Bolts with lockwashers must be tightened uniformly.



WATER PUMP (ALL)

►*JACKING & HOISTING CAUTION: Before jacking, hoisting or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Designation
LeSabre	4400
Invicta	4600
Electra "225"	4800

ENGINE & SERIAL NUMBER: Stamped on plate attached to body at left front hinge pillar and observed through a cut-out in left hinge cover; and also stamped on top surface of crankcase forward of valve lifter cover on left side. Number (example below) includes identification data.

① ② ③ ④
4 1 1 00 1001

① - Series. 4 4400. 6 4600. 8 4800.
② - Year Model. 1 1962.
③ - Assembly Plant. 1 Flint. 2 South Gate. 3 Linden. 4 Kansas City. 5 Wilmington. 6 Atlanta. 8 Arlington.
④ - Beginning vehicle number at each assembly plant.

Engin Production Cd Number: Stamped on same surface as Engine & Serial Number, but on right side. When viewed from front of engine, number is upside down. Number is **not** used for licensing.

►*ENGINE PRODUCTION CODE NUMBER IDENTIFYING MARKS:* Used as follows:

21 - Std. engine, 2-Bbl. Carb., 10.25-1 Compr. Ratio.
L21 - Regular Gas Option engine, 2-Bbl. Carb., 9.0-1 Compr. Ratio.
41 - Std. engine, 4-Bbl. Carb., 10.25-1 Compr. Ratio.
L41 - Low Compr. Ratio Export engine, 4-Bbl. Carb., 8.75-1 Compr. Ratio.

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (For ign Travel): See Note under Engine Specifications for recommended changes.*

COMPRESSION PRESSURE: 160 lbs. minimum (8.75-1 & 9.0-1 ratios), 180 lbs. minimum (10.25-1 ratio) at cranking speed of 160 RPM. Cylinders must be equal within 15 lbs.

VACUUM READING: 14" minimum at 525 RPM.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right exhaust manifold. Valve must operate freely (lubricate shaft every 1000 miles). Check thermostat at 70°F (room temperature). There should be 180° wrap on spring.

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-2-7-8-4-5-6-3.
Cylinders - RIGHT BANK 1-3-5-7. LEFT BANK 2-4-6-8.

SPARK PLUG GAP: .035".
Spark Plugs - AC No. 44S (Std.), No. 42COM (Colder) No. 45S (Hotter). 14 mm. Torque to 25-30 ft. lbs.

COIL: Delco-Remy No. 1115100
Ignition Current - 1.7 amps. idling, 3.7 amps. stopped at 12.6 volts.
Resistor - Resistance wire (1.80±.05 ohms) connected in circuit from coil to IGN.1 terminal of ignition switch. Bypassed during cranking by lead from IGN.2 terminal of switch to coil.

►*IGNITION CIRCUIT NOTE: When ignition switch is in "Lock" position, coil resistance wire is grounded.*

DISTRIBUTOR: Delco-Remy No. 1110993 (10.25-1 ratio). No. 1110999 (9.0-1 & 8.75-1 ratios).
Condenser - Delco-Remy. **Capacity** - .18-.23 mfd.
Breaker Gap - Gap (.016") will be correct when cam angle correctly set.
Cam Angle - 29-31°. Set at 30° (will give .016" point opening).
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110993 & 999

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	450	0-4	900
3-5	950	6-10	1900
6-8	1425	12-16	2850
9-11	1900	18-22	3800

Vacuum Spark Control: Delco-Remy No. 1116163 (1110993 Distr.), No. 1116164 (1110999 Distr.).

Vacuum Advance - 1116163

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
8	16	16.25-18

Vacuum Advance - 1116164

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6.5-8.5
9-10.5	18-21	12-14

IGNITION TIMING

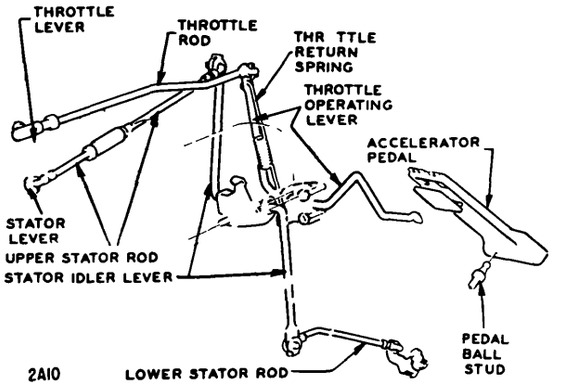
Setting - 12° BTDC at 400 RPM.
Timing Mark - Timing indicator on chain case cover marked "O" (TDC), "5" (5° BTDC), and "12" (12° BTDC). Align correct mark with yellow paint filled groove on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION: Carter and Rochester carburetors used as follows:*

Series & Compr. Ratio	Carburetor Type
4400 Std. (10.25-1)	Rochester 2GC
4400 Reg. Gas (9.0-1)	Rochester 2GC
4400 Power Pack (10.25-1)	Carter AFB or Rochester 4GC
4600 & 4800 (10.25-1)	Carter AFB or Rochester 4GC
All Series Export (8.75-1)	Carter AFB or Rochester 4GC

THROTTLE LINKAGE ADJUSTMENT: Make sure stator linkage is properly adjusted (see below), then proceed as follows: Disconnect carburetor throttle rod from throttle operating lever. Hold accelerator pedal firmly against floor mat and throttle in wide open position. Now hold throttle rod at hole in lever. **Rod must be 1/16" short of entering hole in lever.** Readjust rod as necessary. Connect rod to lever and again check for wide open throttle with accelerator against floor mat. Check and adjust choke unloader if necessary. Check for smooth operation of linkage. Desired wide open



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

throttle position should be when accelerator pedal strikes floor mat rather than stop on throttle lever striking hard against boss on throttle body.

Stator Linkage Adjustment: Move upper end of stator idler lever forward and hold against pressure of stator valve spring. Move throttle lever to wide open throttle position. Throttle lever on carburetor should contact stator lever just as throttle reaches wide open position. If clearance exists between throttle lever and stator lever, shorten upper stator rod as necessary by rotating turnbuckle. If wide open throttle causes stator idler lever upper end to bend farther forward, lengthen upper stator rod as necessary by rotating turnbuckle. Tighten turnbuckle locknut and check operation.

Anti-Stall Dashpot Adjustment: With engine at normal operating temperature, open throttle to clear fast idle cam, then rotate cam to extreme fast idle position and let throttle close against cam. Adjust dashpot so it just touches throttle lever. *This is a preliminary setting only. Now proceed as follows:* Place transmission in "Drive" with brakes applied, then jab accelerator pedal and release quickly. If engine stalls, move dashpot toward throttle lever. If too much time required for throttle to come to fully closed position, move dashpot away from throttle lever.

ROCHESTER 2GC 2-BARREL

Rochester 2GC. Two-Barrel, downdraft type as follows:

Model	Rochester No.
4400 Std., No. CCV Ⓒ	7020046
4400 Air Cond. No. CCV Ⓒ	7020047
4400 Std. CCV Ⓒ	7020048
4400 Air Cond., CCV Ⓒ	7020049
4400 Replacement	7016201

Ⓒ - Closed Crankcase Ventilation.

►*HESITATION CORRECTION & CARBURETOR PRODUCTION CHANGE (4400 WITH 2GC CARBURETOR):* Hesitation during moderate acceleration after engine thoroughly warmed up can be corrected by installing new Power Piston (Carburetors stamped "B" on metal tag have this new piston installed in production). *See "Rochester 2GC Carburetors" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1½ turns out. Turn screw out for richer mixture.

Idle Speed - Initial setting 1 turn in. Adjust screw for idle speed of 525 RPM (575 RPM on Air Cond. Cars) with transmission in "N" (Neutral) or "P" (Park).

Float Level - 23/32" (Gauge BT-214) from air horn gasket to lower (sharp) edge of float seam at outer end of float with air horn inverted. To adjust, bend float arm at rear.

Float Drop - 1 29/32" (Gauge BT-184) from air horn gasket to bottom of float with air horn upright and float hanging freely. To adjust, bend float tang.

Accelerating Pump - Install connector rod in center hole of throttle lever.

Fast Idle: No adjustment (will be correct when hot or slow idle correctly set).

Automatic Choke Setting: At index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2GC 2-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB No. 3297S. Four-Barrel downdraft type.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - Initial setting ¾ turn open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idle Speed - Initial setting ¾ turn in. Adjust screw for idle speed of 525 RPM (575 RPM on Air Cond. Cars) with transmission in "N" (Neutral) or "P" (Park).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC. Four-Barrel downdraft type as follows:

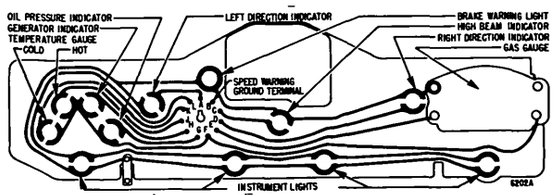
Model	Rochester No.
Standard No. CCV℄	7020040
Standard CCV℄	7020041
Replacement	7016200

℄ - Closed Crankcase Ventilation.

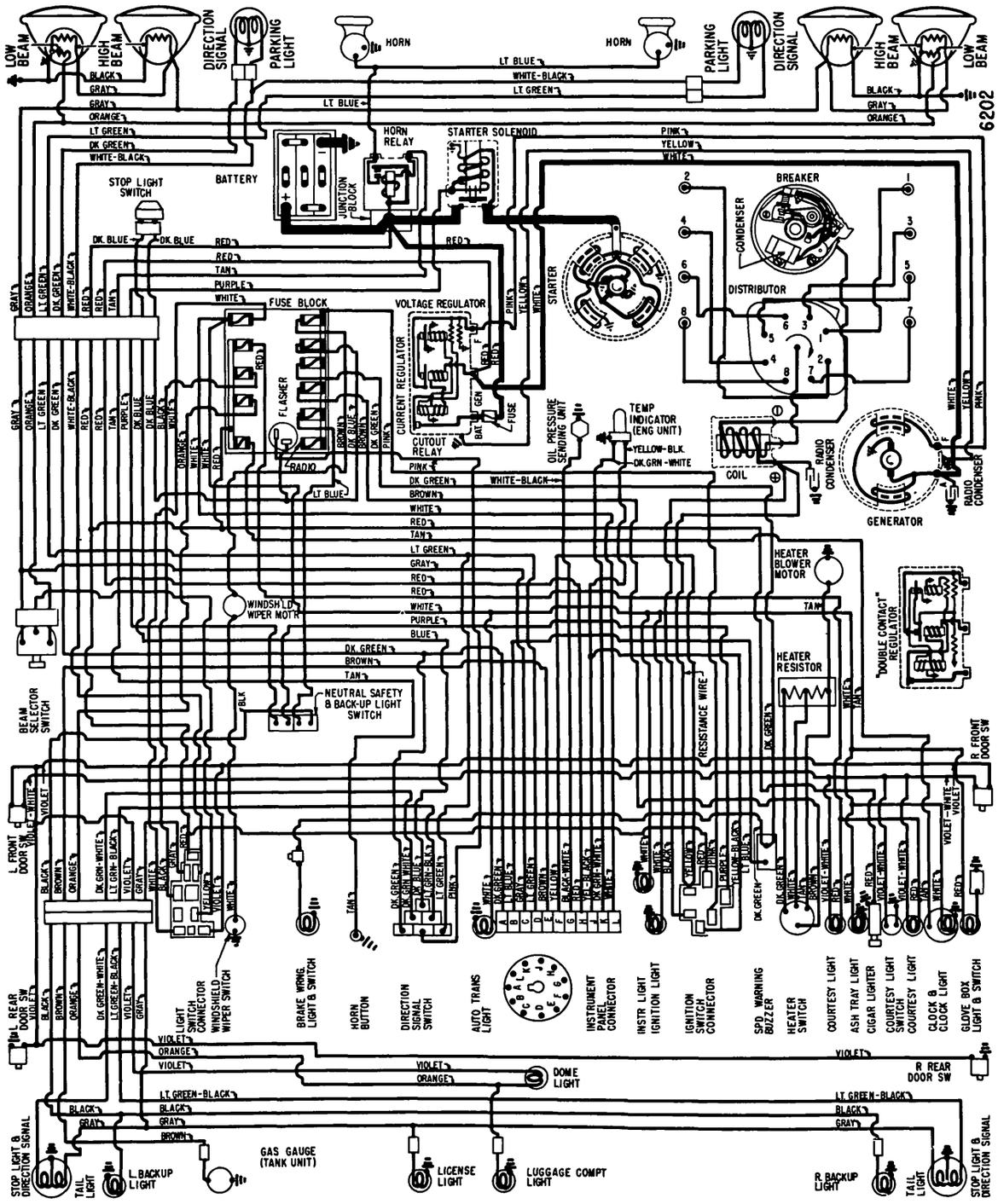
►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7, LEFT barrels feed 2-3-5-8.*

►*IDLE COMPENSATOR CAUTION:* Idle compensator

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BUICK PRINTED CIRCUIT



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(thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or suitable tool inserted in throttle bore to hold valve closed.

Idl Setting - Initial setting 1½ turns open. Adjust both screws (primary side only) alike. Turn screws out for richer mixture.

Idl Speed - Initial setting 1 turn in. Adjust screw for idle speed of 525 RPM (575 RPM on Air Cond. Cars) with transmission in "N" (Neutral) or "P" (Park).

Throttle Linkag Adjustment: *See CARBURETOR above.*

►*OTHER DATA: S "Rochester 4GC 4-Barrel Carbur tors" in Carbur tion S ction.*

CARB. EQUIPMENT

Fu l Pump: Mechanical.
Pr ssur - 4¾-6½ lbs. at idle speed at carburetor inlet.
Fu l Filt r: Glass bowl type in carburetor inlet line. Replace filter element every 12,000 miles.
Air Clean r: Oil wetted plastic foam (Polyurethane) type. Clean and reoil every 8000 miles or sooner under severe operating conditions.
►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from wire mesh support and wash in solvent. Squeeze element (do not wring) to remove all solvent and reoil with 10W-30 engine oil.

BATTERY

D lc N . 562 (Wet), No. 563 (Dry). 12-volt, 11 plate, 70 ampere hour capacity (20 hour rate).
Battery Gr und - Negative, to left front corner of engine block.
Engin Gr und - From rear of each cylinder head to dash.

STARTER

D lco-R my N . 1107221. Armature - Delco-Remy.
Driv - Overrunning clutch (solenoid pinion shift).
R tati n - Counterclockwise at commutator end.
Brush Spring T nsi n - 35 ozs. minimum.

P rformance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3800-6200	10.6	70-105
	Lock	2.0	320-360

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid No. 1114272 controlled by combination Ignition & Starter Switch (Key starting) No. 1116588.

N utral Saf ty & Back-up Light Switch (Auto. Trans.): Buick No. 1178138. Mounted on steering column under instrument panel. Connected in starter control circuit so that starter operates only when selector lever is in "N" or "P" position. *To adjust, see "Buick Twin Turbine Dynaflow" in Transmission Section.*

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION: Batt ry charging circuit prot cted by a 40 ampere, white porcelain covered, (Std. Regulator), 50 ampere, brown procelain covered, (Air Cond. Regulator) fuse clipped to "BAT" t rminal of g n rat r r gulat r. Ch ck for blown fus wh n diagnosing batt ry, g n rator, r r gulat r failur .*

D lc -R my N . 1102302 (L ss Air C nd.), 1102215 (Early Air Cond.). *NOTE - Delcotron Alternator used on late production Air Cond. Cars. See ALTERNATOR below.*

Performance Data - Cold (70°F)

Generator	Amperes	Volts	RPM
1102302	35	14.0	2730
1102215	45	14.0	2600

Field Current - 1.48-1.62 amps. (1102302), 2.66-2.86 amps. (1102215) at 12 volts and 80°F.
Brush Spring Tension - 28 ozs.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: Tension Gauge J-7316 should read "70" on Std. cars, "90" on Air Cond. cars.

GENERATOR REGULATOR

Delco-Remy No. 1119242,277,299 (Std.); No. 1119659 (Air Cond.) - *NOTE - Regulator No. 1119659 is "Double Contact" type.*
►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119242,277,299), 11.8-13.0 volts (1119659).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119242,277,299) - 13.8-14.7 volts at 125°F ambient temperature.
Setting (1119659) - 13.8-14.6 volts at 125°F ambient temperature operating on upper contacts. .1-.3 volt lower operating on lower contacts.
Contact Gap (1119659) - .016".
Air Gap - .075" (1119242,277,299), .067" (1119659) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119242,277,299) - 31.0-35.5 amps. at 125°F.
Setting (1119659) - 42.5-47.0 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy Single Contact Regulators" or "Delco-Remy Double Contact Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy Delcotron No. 1100633 (Late Air Cond. Cars), No. 1117070 (Police Cars).

►*DELCOTRON MOUNTING BRACKET PRODUCTION CHANGE & BREAKAGE CORRECTION:* When replacing first type bracket (with brace attached to Delcotron rear mounting bolt), install later type bracket, No. 1356686 and brace No. 1356688 *(CAUTION - These parts must be used together).* Later bracket has two tapped holes for brace attachment and is installed on later production cars.

R tation - Clockwise at drive end.
Rat d Output (Hot) - 52 amps. (1100633), 60 amps. (1117070).

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	RPM
1100633	5	14.0	1100
	52	14.0	6500
1117070	58	14.0	2500

Field Current - 6-6.6 amps. (1117070), 1.9-2.3 amps. (1100633) at 12 volts and 80°F.
Belt Adjustment: Tension Gauge J-7316 should read 80.
►*OTHER DATA: See "Delco-Remy Delcotron Alternators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy No. 1119506 (1100633 Gen.), No. 9000554 (1117070 Gen.). *NOTE - Regulator No. 1119506 has double contacts for Voltage Regulation.*

REGULATOR 1119506: Two-unit type containing a Double Contact Voltage Regulator and a Field Relay.

Voltage Regulator

Setting - 13.5-14.4 volts at 125°F ambient temperature operating on upper contacts. .1-.3 volt lower operating on lower contacts.
Air Gap - .060" with lower contacts just touching.
Contact Gap - .014" with lower contacts just touching.

Field Relay

Closing Voltage - 2.3-3.7 volts.
Air Gap - .015" with contacts just touching.
Contact Gap - .030".
►*OTHER DATA: See "Delco-Remy Double Contact Alternator Regulators" in Electrical Section.*

REGULATOR 9000554: Contains an Indicator Light Relay, Transistorized Voltage Regulator, with separate Field Relay, Delco-Remy No. 1116895.

Indicator Light Relay

Setting - Points should close 2 volts lower than voltage regulator setting (below).
Air Gap - .075" with armature pressed down to point where contacts just close.

Voltage Regulator

Setting - 13.0-13.6 volts, adjust to 13.4 volts at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Field Relay

Closing Voltage - 7.0-9.0 volts.
Sealing Voltage - 11 volts maximum.
Air Gap - .010" with contacts just touching.
Contact Gap - .015-.025".
►*OTHER DATA: See "Delco-Remy Transistorized Alt rnator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT CLUSTER ASSEMBLY NOTE:* It is necessary to remove Instrument Cluster Assembly to replace printed circuit and fuel gauge. Light bulb sockets are accessible by lowering either right or left lower plate and are removed by turning bulb socket counterclockwise.

Instrument Cluster Assembly: Removal - 1) Remove Instrument panel screws (4 along front edge) and position mirror in its rearmost position.
2) Lift up cover and pull it toward rear of car to remove it, then disconnect clock wiring connectors

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3) Lower left control plate and disconnect printed circuit plug. *CAUTION* - Use care to prevent damaging pins on printed circuit.

4) Remove knob and nut from end of speedometer reset shaft and unplug parking brake warning light socket (if used) from panel.

5) Remove three screws securing cluster to instrument panel and lift cluster up to disconnect speedometer cable and remove assembly.

►*PRINTED CIRCUIT REMOVAL CAUTION:* Safety Buzzer ground wire (if used) must be disconnected from pin on underside of printed circuit before removing printed circuit.

Installation - Reverse removal procedure aligning projection on disconnect plug with keyway when assembling plug on connector pins and be sure that ground clip is installed correctly.

Speedometer Removal: Speedometer can be removed from cluster assembly after assembly removed.

"Guide-Matic" Headlight Control: *See Electrical Section.*

Lighting Switch Removal: Disconnect battery ground cable. Remove light switch and vent control plate to instrument panel screws and pull plate out from instrument panel. Unplug multiple connector and pull switch out to last notch, then depress latch button on top of switch as you draw rod and knob assembly out of switch. *CAUTION - DO NOT depress latch button prior to pulling on knob and rod.* Remove switch escutcheon with wrench J-8563, then remove nut with wide blade screwdriver. Remove switch plate.

CIRCUIT BREAKERS: 15 Ampere - Headlights, High Beam Indicator, Parking Lights. In headlight switch.

Special - Cigar lighter. On back of lighter.

FUSES: *All fuses located in fuse block under left side of instrument panel.*

30 Ampere - Heater & Air Cond. Blowers & Compressor Clutch.

25 Ampere - Windshield wiper and washer.

20 Ampere - Dome & Trunk Lights, and Rear Cigar Lighter.

10 Ampere - Back-up Lights.

10 Ampere - Turn Signals & Indicator, and Stop Lights.

10 Ampere - Tail & License Lights, and Instrument Panel Lights and Rheostat feed.

7.5 Ampere - Radio (Wonder Bar).

5 Ampere - Courtesy & Glove Box Lights.

5 Ampere - Speed Warning Buzzer, Parking Brake Warning Light.

4 Ampere - Automatic Headlight Dimmer. *NOTE* - This fuse located under left front kick pad near amplifier.

3 Ampere - Instrument Panel Lights.

2.5 Ampere - Radio (Except Wonder Bar).

2 Ampere - Clock.

ENGINE

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 401" engine of same design used previously.

Bore	Stroke	Displacement	Rated HP
4.1875"	3.640"	401 cu. ins.	56.11

Series & Engine	Compr. Ratio	Developed HP
4400 Std. (2-Bbl.)	10.25-1	280 at 4400 RPM
4400 Reg. Gas (2-Bbl.)	9.0-1	265 at 4400 RPM
4400 Power Pack (4-Bbl.)	10.25-1	325 at 4400 RPM
4600 & 4800 All	10.25-1	325 at 4400 RPM
All Series Export	8.75-1	315 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel octane rating for satisfactory performance is 93 Research Method, 84 Motor Method. If satisfactory fuel cannot be secured for 8.75-1 & 9.0-1 ratio engines, install a .045" thick cylinder head gasket. To lower compression ratio of 10.25-1 ratio engines, install lower compression ratio piston and pin assembly, Part No. 1388539.

ENGINE MOUNTINGS: *See "Engine Mountings" in Buick Special Data.*

CYLINDER HEAD & GASKET: Cylinder heads are interchangeable between engines. All engines use a .015" cylinder head gasket and lower compression ratio used with Regular Gas Option, is obtained by use of lower dome height pistons. *See "Engine Operation in Low Octane Areas (Foreign Travel)" above.*

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Aluminum alloy, cam ground - transverse slot, divorced skirt.

Clearance - .001-.0016" (Top of skirt). Measure at right angle to piston pin ¼" below top of skirt.

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. and .001", .005", .010", .020" & .030" Oversize. *NOTE - Pistons furnished only with fitted pins.*

Installing Pistons: Install pistons and rods with valve depressions in head of piston on same side as oil spurt notch in lower end of rod. *See Rod Installation.*

PISTON PIN

Pin is press fit in connecting rod.

Diameter - .9994-.9997". **Length** - 3.520".

Clearance in Piston - .0001". Finger push fit.

Clearance in Rod - .0007-.0015". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.077-.078"	.015-.025"	.003-.005"
Oil (3)	.181-.187"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE:* Install rings with identification mark upwards. Top ring must be installed with inner bevel to top of piston. Second ring must be installed with inner bevel to bottom of piston.

Replacement Rings: Std. & .010", .020", .030" Oversize.

CONNECTING ROD

Length - 6.220" (center-to-center).

Crankpin Journal Diameter - 2.249-2.250". Out-of-round limit .0015".

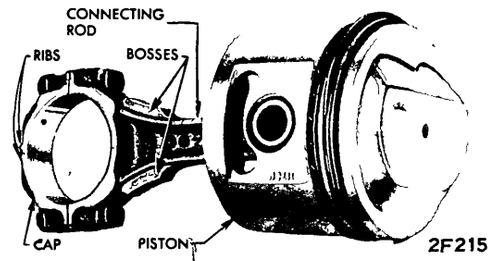
Bearings - Steel backed M400 Aluminum, full precision type. Both halves interchangeable.

Clearance - .0002-.0023". Wear limit .003".

Side play - .005-.012" (Two rods).

Replacement Bearings: Standard and .001", .002", .020" and .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with spurt notch in lower end of rod and valve depressions in pistons on the high side of cylinder bore. This will bring all spurt notches and valve depressions in piston toward camshaft. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.



PISTON & ROD ASSEMBLY

CRANKSHAFT

►*CRANKSHAFT & FLYWHEEL UNBALANCE OR VIBRATION (After replacement of parts - Synchro-mesh & Dynaflow Cars):* *See "Engine Balancing" in Buick Special Data.*

Journal Diameter - 2.498-2.499". Five bearings. Out-of-round limit .0015".

Bearings - Durex 100A (Rear Main), M400 Aluminum (All others), full precision type. Both halves interchangeable.

►*BEARING NOTE:* Bearing upper halves can be rotated out and in by using Tool KMO-734 in oil hole.

Clearance - .0005-.0021".

Replacement Bearings: Furnished Std. and .001", .002". .003" Undersize.

End Thrust: Taken by No. 3 main bearing.

Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

►*1962 CAMSHAFT & VALVE SPRING PRODUCTION CHANGE & CAUTION:* On cars beginning Engine Production Code No. 4I-28962, new camshaft, Part No. 1351515, and new outer valve springs, Part No. 1352424; were installed to improve engine performance. Early camshafts have 1 groove in land just forward of No. 3 bearing journal, and later camshafts have 2 grooves. *DO NOT use early type valve springs with later type camshaft because of lifter pump-up at high speeds. However, later type valve springs can be used with either camshaft.*

Journal Diameters - (1) 1.785-1.786", (2) 1.755-1.756", (3) 1.725-1.726", (4) 1.695-1.696", (5) 1.665-1.666".

Bearings - Steel-backed babbitt lined bushings.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*BEARING REPLACEMENT NOTE:* Camshaft bearings must be line reamed after being pressed into block. **Clearance** - .0005-.0035". Service limit .0015-.004".

End Thrust: Taken by hub of camshaft sprocket. Distributor and oil pump drive force camshaft to rear at all times.

Timing Chain: Link belt. **Width** - .864", **Pitch** - .500". **Length** - 26" or 52 links.

Camshaft Setting: "O" marks on camshaft and crankshaft sprockets in line with straightedge across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

►*1962 OUTER VALVE SPRING & CAMSHAFT PRODUCTION CHANGE & CAUTION: See CAMSHAFT above.*

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.875"	①	4.785"
Exhaust	1.500"	②	4.785"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.439"	③
Exhaust	45°	.441"	④

① - Top .373"; Bottom .3715".
② - Top .372"; Bottom .3705".
③ - Top .001-.003"; Bottom .002-.004".
④ - Top .0015-.0035"; Bottom .0025-.0045".

Valve Seat Width - 3/64-5/64" (1/16" average).

►*VALVE GRINDING CAUTION:* Normal height of valve stem above rocker arm gasket surface is 1.540". When valve facing or seat grinding raises valve stem height more than .050" above normal, grind off end of valve stem or replace valve.

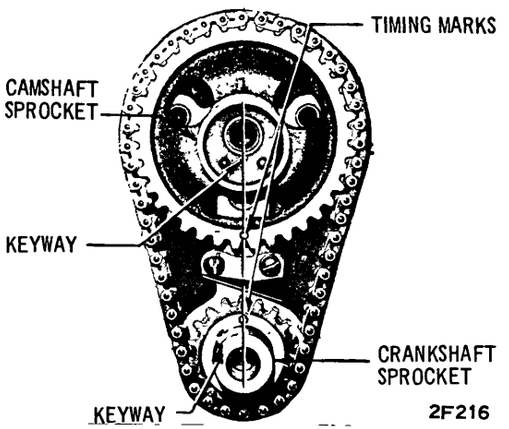
Valve Springs: Inner and outer springs used on all valves. Install with closed coils against cylinder head.

Valve	Inner Spring Lbs. Press.	Inner Spring Length	Outer Spring Lbs. Press.	Outer Spring Length
Closed	23-28	1.69"	39.5-44.5	1.60"
Open	73-79	1.25"	93-99	1.16"

Valve Guides: Drive old guides out from combustion chamber side using Driver J-269. Install new guides from top of head using Valve Guide Aligner J-5240-2 over guide hole and installer J-5240-1 to drive guide down until installer shoulder contacts top of aligner which will position guide correctly in head. Finish ream guides with Valve Guide Reamer J-129-3..

Hydraulic Valve Lifters: Barrel type.
Diameter - .8425". **Clearance in Block** - .0015-.003".
Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*



VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 28° BTDC. Close 87° ALDC.
Exhaust Valves - Open 76° BLDC. Close 46° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Buick Special Data.*

Crankcase Capacity: 4 qts. refill, 5 qts. dry engine. Add 1 qt. for filter change.

Normal Oil Pressure; 40 lbs. at 1600 RPM.
Pressure Regulator Valve - In oil pump body. Not adjustalbe.

Oil Pressure Indicator: Oil pressure warning light on instrument panel and oil pressure switch in oil gallery at right rear of engine. Lights when oil pressure below a safe level.
Engine Unit - AC No. 1508753.

Oil Pump: Spur-gear type oil pump mounted at rear end of crankcase and driven by distributor drive shaft.
Oil Pump Removal & Overhaul - *See "Oiling System" in Buick Special Data.*

Oil Filter: AC full flow type, mounted on right rear of engine. Replace every 4000 miles or sooner if needed. *NOTE* - Ball check in filter base bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

►*EXHAUST CROSSOVER PIPE INTERFERENCE WITH FILTER REMOVAL (EARLY CARS):* If clearance insufficient for filter removal, loosen exhaust system and crossover pipe at exhaust manifolds and move pipe rearward. If clearance still insufficient, install new crossover pipe. *CAUTION - Do not bend or hammer* pipe to provide more clearance.

Filter Element Replacement - AC No. PF-7.

►*OIL FILTER INSTALLATION CAUTION:* DO NOT use a wrench to tighten filter. Tighten (by hand only) until gasket contacts seal face, then tighten additional 2/3 turn. DO NOT OVERTIGHTEN.

Crankcase Ventilation: Standard Cars - Air enters through two ventilating type filter caps at top of each rocker arm cover. Air is drawn out through metal gauze filled filter located at rear end of valve lifter cover and ventilator pipe extending down from lifter cover.
Positive Crankcase Ventilation Cars - Same as for standard cars except that ventilator pipe is removed and a vent tube adapter, valve assembly and hose is connected to intake manifold adapter. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Temperature Controlled Fan Clutch (AC Cars): Air Cond. cars equipped with 20" fan have a torque sensitive fan clutch. Flow of silicone (governing fan speed) controlled by temperature sensitive coil. When air through radiator is 80°F or below, fan speed is 800-1200 RPM. At higher temperatures speed of fan into a maximum of 2100 RPM.
Fan Clutch Adjustment - Normal position is in center slot of tab. For hotter fan cut-in, place spring end in right hand slot (facing engine). For colder fan cut-in place spring end in left hand slot (facing engine). To reposition spring, bend retaining tab just enough to move spring.

Water Capacity: 17 qts. Add 1½ qts. for heater.

Pressure Valve: Radiator filler cap. 15 lb. type. *NOTE* - Use of lower test filler cap will cause engine to heat with loss of coolant.

Thermostat: Poppet type, located in water manifold above pump. Opens at 167-172°F.

Water Pump: Packless sealed ball bearing type with aluminum housing. *NOTE - Shaft seal and impeller only replaceable parts. See "Cooling System" in Buick Special Data.*
Pump Removal - Drain cooling system. loosen belts, and remove fan blade, spacer, and pulleys from water pump hub on pump shaft. Remove belts. Disconnect hose from pump inlet and heater hose from nipple. Remove bolts, then remove pump assembly and gasket from timing chain cover.

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes out when engine temperature reaches 110°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 245°F. *NOTE* - Red light circuit is connected to Oil Pressure sender line through a vacuum switch so that the light will come on when ignition switch is turned on (this checks bulb and circuit each time engine is started). As soon as engine starts and manifold vacuum builds up, vacuum switch opens this circuit and red light will go out.
Engine Unit - AC No. 1998746.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*STARTING CAR BY PUSHING NOTE (AUTOMATIC TRANSMISSION CARS):* Because of transmission design, car cannot be started by pushing.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series	Series Designation
Standard	4000
Deluxe	4100
Skylark	4300

ENGINE & SERIAL NUMBER: Stamped on plate attached to body at left front hinge pillar; and also stamped on identification pad on engine crankcase just forward of right cylinder head. Number (example below) includes identification data.

①②③ ④
1 1 1 001001

① - Series. 0 4000 (V8), 1 4100 (V8), 3 4300 (V8), A 4000 (V6), B 4100 (V6). *NOTE* - Some early V6 4000 series may have a 0.

② - Year Model. 1 1962.

③ - Assembly Plant. 1 Flint. 2 South Gate. 3 Linden. 4 Kansas City. 5 Wilmington. 6 Atlanta. 8 Arlington.

④ - Beginning vehicle number at each assembly plant.

Engine Production Code Number: V6 - Stamped on front of crankcase below left cylinder head gasket. Number is **not** used for licensing.

V8 - Stamped along side of Engine & Serial Number (see above), but is upside down when viewed from front of engine. Number is **not** used for licensing.

►*ENGINE PRODUCTION CODE NUMBER IDENTIFYING MARKS.* Used as follows:

6I - Prefix for V6 engine.

I - Prefix for Std. V8 engine (9.0-1 compr. ratio & 2-Bbl. carb.).

HI - Prefix for Power Pack V8 engine (10.25-1 compr. ratio & 4-Bbl. carb.).

LI - Prefix for Export V8 engine (7.6-1 compr. ratio & 2-Bbl. carb.).

TUNE-UP

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel): See Notes under V6 & V8 Engine Specifications for recommended changes.*

COMPRESSION PRESSURE: 160 lbs. minimum (Except V8 Power Pack), 175 lbs. minimum (V8 Power Pack) at cranking speed. Cylinders must be equal within 15 lbs.

VACUUM READING: 14" minimum at 525 RPM.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: V6 - Automatic thermostatic type located in right exhaust manifold. Valve must operate freely (lubricate shaft every 1000 miles). Check thermostat at 70°F (room temperature). There should be 180° wrap on spring.

V8 - None used. Intake manifold is heated by engine coolant.

CRANKCASE VENTILATION VALVE: Service at 8000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

►*V6 IGNITION NOTE:* Firing Intervals are 90° & 150°. Cam angle (dwell) is 30° and same for all cylinders (point open interval varies).

FIRING ORDER (V6): 1-6-5-4-3-2.

Cylinders - RIGHT BANK 2-4-6, LEFT BANK 1-3-5.

FIRING ORDER (V8): 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 44S (V6), No. 45FFS (V8 Std.), No. 44FFS (V8 Power Pack), 14 mm. Torque to 25-35 ft. lbs. (V6), 15-20 ft. lbs. lubricated (V8).

COIL: Delco-Remy No. 1115137 (V6), No. 1115136 (V8 Std.), No. 1115161 (V8 Power Pack).

Ignition Current - 1.7 amps. idling, 3.7 amps. stopped at 12.6 volts.

Resistor - Resistance wire (1.80±.05 ohms) connected in circuit from coil to IGN 1 terminal of ignition switch. Bypassed during cranking by lead from IGN 2 terminal of ignition switch to coil.

►*IGNITION CIRCUIT NOTE: When ignition switch is in "Lock" position, coil resistance wire is grounded.*

DISTRIBUTOR: Delco-Remy No. 1110286 (V6), No. 1110977 (V8). External adjustment "Window" type.

Condenser - Delco-Remy. **Capacity** - .18-.23 mfd.

Breaker Gap - Gap (.016") will be correct when cam angle correctly set.

Cam Angle - 29-31°. Set at 30° (will give .016" point opening).

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110286

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	525	1-5	1050
6-8	875	12-16	1750
9.5-11.5	1400	19-23	2800
13-15	1950	26-30	3900

Automatic Advance - 1110977

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	525	0-4	1050
6.5-8.5	1050	13-17	2100
12-14	1850	24-28	3700

Vacuum Spark Control: Delco-Remy No. 1116182.

Vacuum Advance - 1116182

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
8	16	14.50-15.75

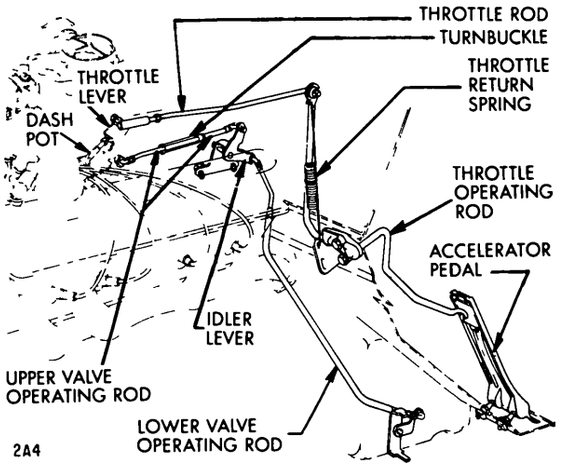
►*V6 DISTRIBUTOR INSTALLATION CAUTION:* Centerline of rotor must be aligned with notch on distributor housing. Install distributor with rotor in position to fire No. 1 cylinder (distributor cap towers are numbered and No. 1 terminal is first tower beyond window in direction of rotation).

IGNITION TIMING

Ignition Timing Specifications

Engine	At 1050 RPM	At 400 RPM
All (Except V8 Power Pack)	7½° BTDC	5° BTDC
V8 Power Pack	10 BTDC	7½° BTDC

►*TIMING SETTING NOTE:* Set timing with distributor vacuum line disconnected. Preferred method of setting. timing is with engine at **exactly** 1050 RPM. After timing set, reset engine idle speed. If impossible to use preferred method, set timing at 400 RPM so there is no centrifugal advance (second method is less accurate than preferred method).



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

Timing Mark - Timing indicator on chain case cover marked "O" (TDC), "5" (5° BTDC), "10" (10° BTDC). Align correct mark with yellow paint filled groove on harmonic balancer.

CARBURETOR

►*CARBURETOR APPLICATION: On Rochester 2GC 2-Barrel used on all engines except V8 Power Pack. One Rochester 4GC 4-Barrel used on V8 Power Pack.*

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS.): Move throttle lever to wide open position and make sure carburetor-to-transmission linkage does not prevent throttle from opening completely. *NOTE - If throttle does not open completely, adjust carburetor-to-transmission linkage (see below).* Disconnect rear end of throttle rod from throttle operating lever, then with accelerator pedal pressed firmly against floor mat, hold throttle in wide open position and hold rear end of throttle rod at hole in throttle operating lever. **Rod end must be approximately 1/16" short of entering hole in lever.** Adjust rod length as necessary, then connect rod to lever and secure with cotter pin. With accelerator pedal pressed to floor mat, recheck throttle for wide open position. Hold choke valve closed and move throttle lever to wide open position to check adjustment of choke unloader. *NOTE - Throttle should be wide open just as accelerator pedal strikes floor mat, rather than stop on throttle lever striking hard against boss on throttle body.*

Carburetor-To-Transmission Linkage - With throttle held in wide open position, check adjustment by pushing transmission linkage idler lever fully forward (through detent). *CAUTION - Transmission linkage should have all play (slack) just taken out, but should not be adjusted so short that stop in transmission prevents carburetor from reaching wide open position.* If carburetor

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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will not reach wide open position, lengthen rod as required by rotating turnbuckle. If there is any play in linkage, shorten rod as required. *CAUTION - Never driv car with transmission linkage misadjusted or disconnected as lin pr ssur will be too low and burned out clutch s will result.*

Anti-Stall Dashp t Adjustment (All Cars): Open throttle to clear fast idle, then rotate cam to extreme fast idle position, and allow throttle to close against fast idle cam. Adjust dashpot until it just touches throttle lever. *NOTE - This is a preliminary setting only.* With transmission in "D" (Auto. Trans.), Neutral (Synchro-mesh) and brakes firmly applied, jab accelerator pedal and release rapidly. Note engine operation as throttle closes. If engine stalls from too rapid closing of throttle, move dashpot towards throttle lever until its action prevents engine stalling. If excessive time is required for throttle to reach fully closed position, move dashpot away from throttle lever. If proper control cannot be obtained by adjustment, replace dashpot.

►*ANTI-STALL DASHPOT (SYNCHRO-MESH TRANS. CARS) PRODUCTION CHANGE NOTE:* Beginning approximately May 15, 1962 all cars with synchro-mesh transmissions (3 & 4-Speed) assembled without carburetor dashpots.

ROCHESTER 2GC 2-BARREL

R chester 2GC. Used as follows:

Engin Ⓒ	Rochester No.
V6 Synchro-mesh (Std.)	7020141
V6 Synchro-mesh (CCV)	7020143
V6 Auto. Trans. (Std.)	7020140
V6 Auto. Trans. (CCV)	7020142
V8 Synchro-mesh	7019093 or 7020147
V8 Auto. Trans.	7019090 or 7020146

Ⓒ - **Std.** - Without Closed Crankcase Ventilation.
CCV - With Closed Crankcase Ventilation.

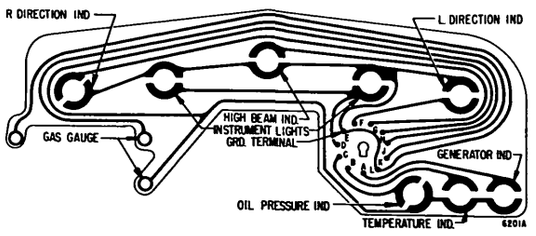
►*MANIFOLD FUEL DISTRIBUTION (V6): Carburetor RIGHT barr l f eds right bank cylinders, LEFT barrel feeds l ft bank cylind rs.*

►*MANIFOLD FUEL DISTRIBUTION (V8): Carburetor RIGHT barrel f ds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

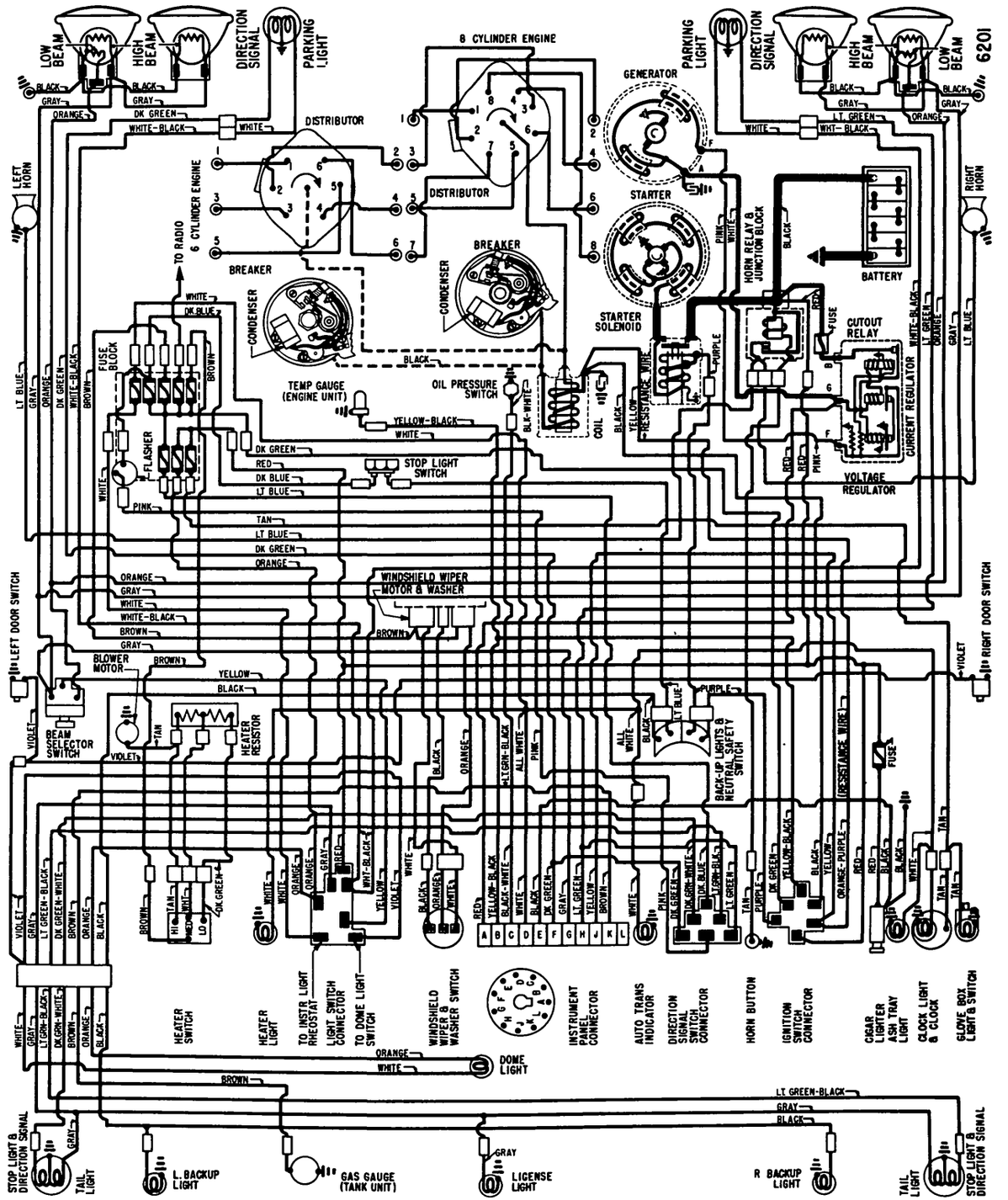
Idl Setting - Initial setting 1 turn out. Turn screw out for richer mixture.

Idl Sp d - Initial setting 1 turn in. Adjust screw for idle speed as follows: **V6** - 575 RPM (Std. & Air Cond.). **V8** - 525 RPM (Std.), 575 RPM (Air Cond.). *Automatic transmission must be in "N" (Neutral) or "P" (Park).*

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BUICK SPECIAL PRINTED CIRCUIT



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Float Level - With air horn assembly inverted, position float level gauge BT-188 over float so gauge rests against pump side of power piston shaft with outer gauge leg in line with center of float. Float level should be 1 17/64". To adjust, bend float arms.

Float Drop - Hold air horn assembly upright and measure distance from gasket to bottom of float pontoon at outer end. Distance should be 1 29/32". To adjust, bend tang on float arm.

Accelerating Pump - Install connector rod in outer hole of throttle lever.

Fast Idle: No adjustment (will be correct when hot or slow idle correctly set).

Automatic Choke Setting: 1 notch rich (V6), at Index (V8).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2GC 2-Barrel Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7020045 (Synchro-mesh), No. 7020043 (Auto. Trans.).

►*HESITATION ON ACCELERATION CORRECTION:* If carburetor accelerator pump system not defective, trouble may be due to incorrect pump stroke adjustment. Correct pump rod setting depends on average daytime temperature as indicated:

Temperature	Pump Rod Position
Below 0°F	Inner Hole (Long Stroke)
0° to 60°F	Center Hole
Above 60°F	Outer Hole (Short Stroke)

►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and use pencil or other suitable tool inserted in throttle bore to hold valve closed.

Idle Setting - 1½ turns open. Adjust both screws (primary side only) alike.

Idle Speed - 525 RPM (575 RPM on Air Cond. Cars) with selector lever in Neutral or Park Position.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC type.

Pressure - 4½-5¾ lbs. at pump outlet.

Fuel Filter: (V6 Engine) - Sintered bronze filter at carburetor inlet. To clean, soak in solvent, blow dry with air. Replace if necessary.

V8 Engine - Glass bowl located in line between pump and carburetor. Can be visually inspected.

►*FUEL BOWL FILTER NOTE:* To clean, remove and soak bowl in cleaning solvent to loosen any deposits. Replace element (AC type GF-124) every 12,000 miles or sooner if contamination has entered fuel system.

Air Cleaner: Oil-wetted plastic foam type. Clean and recoil every 8000 miles or sooner if needed.

►*AIR CLEANER INSTALLATION CAUTION:* No locating tabs used. Install air cleaner on carburetor and securely tighten wing nut **by hand.** The word "FRONT" must be located on the forward center line of engine.

►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from mesh support and wash in nonflammable solvent. Kerosene or Oleum Spirts may be used if fire hazard precautions are observed. Squeeze element (do not wring out) to remove all solvent and recoil with 10W-30 engine oil. Element should not drip oil.

BATTERY

Delco No. 454 (Wet), No. 455 (Dry). 12 volt, 9 plate, 40 ampere hour capacity (20 hour rate).

Battery Ground - Negative, to right front corner of engine block.

Engine Ground - From rear of right cylinder head to dash.

STARTER

Delco-Remy No. 1108303.

Armature - Delco-Remy No 1935829.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs min.

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Ⓒ - Includes solenoid.

Starting Switch: Delco-Remy Solenoid No. 1114266, mounted on starter and controlled by combination Ignition & Starter Switch Delco-Remy No. 1116621.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1347209 (without Back-up Lights), No. 1349888 (with Back-up Lights) mounted on steering column under cowl. Connected in starter control circuit so that starter operates only when selector lever is in "N" or "P" position.

Adjustment - *See "Buick Special Automatic Transmission" in Transmission Section.*

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit protected by a 40 ampere fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing battery, generator, or regulator failure.*

Delco-Remy No. 1102310 (V6), No. 1102307 (V8).

Performance Data - Cold (70°F)

Amperes	Volts	RPM
35	14.0	2730

Field Current - 1.48-1.62 amps. at 12 volts and 80°F.

Brush Spring Tension - 28 ozs.

Rotation - Counterclockwise at commutator end.

Belt Adjustment: Tension reading on Gauge J-7316 should be 60 lbs. (Less AC and Pwr. Strg.), 72 lbs. (With AC), 80 lbs. (Power Strg.).

GENERATOR REGULATOR

Delco-Remy No. 1119277 & 299.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*NOTE: Specifications below are "Normal" settings.*

Cut out Relay

Cuts In - 11.8-13.5 volts.

Contact Gap - .020".

Air Gap - .020" with contacts just closed

Voltage Regulator

Setting - 13.8-14.7 volts at 125°F ambient temperature.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 31.0-35.5 amps. at 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy (Single Contact) Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy No. 1117070. Three-phase type with internal rectifiers.

Ⓒ Performance Data - Cold (70°F)

Amperes	Volts	RPM
58	14.0	2500

Ⓒ - Rated output hot 60 amps.

Current Output At Idle Speed - 25 amps. (approx.) at 525 Engine RPM.

Field Current - 6-6.6 amps. at 12 volts and 80°F.

Brush Spring Tension - 13 ozs.

Rotation - Clockwise at drive end.

Belt Adjustment: Tension Gauge J-7316 should read 80.

►*OTHER DATA: See "Delco-Remy Delcotron Alternators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy No. 9000554 (Indicator Light Relay & Transistorized Voltage Regulator) with separate Field Relay, Delco-Remy No. 1116895.

Indicator Light Relay

Setting - Points should close 2 volts lower than voltage regulator setting.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Voltage Regulator

Setting - 13.0-13.6 volts, adjust to 13.4 volts at 125°F.

Air Gap - .075" with armature pressed down to point where contacts just touch.

Field Relay

Closing Voltage - 7.0-9.0 volts.

Sealing Voltage - 11 volts maximum.

Air Gap - .010" with contacts just touching.

Contact Gap - .015-.025".

►*OTHER DATA: See "Delco-Remy Transistorized Alternator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT CLUSTER ASSEMBLY NOTE:* This assembly is made of plastic and contains speedometer, indicator lights, fuel gauge, light switch, wiper & washer switch, ignition & starter switch and lighter. It is necessary to remove instrument cluster to remove printed circuit which is a part of speedometer housing. Light bulbs are accessible without removing cluster by turning sockets counterclockwise. An external ground is used for lights, switches and lighter *CAUTION* - Disconnect battery ground cable at battery before removing any instrument panel unit or wiring.

Instrument Cluster Assembly: Removal - 1) Install two

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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pieces of cloth tape 1" wide x 4" long (double thickness) over lower flange of instrument panel to prevent damage to harness.

2) Remove cluster hood, then remove two nuts from under panel that retain cluster at each side. Remove two lower edge of cluster to instrument panel tie bar screws.

3) Disconnect wiring harness connectors from headlight switch, windshield wiper switch, ignition switch and lighter. Disconnect speedometer cable and printed circuit plug.

4) Remove cluster by pulling rearward and upward.

Installati n - Reverse removal procedure being careful to line up disconnect plug with keyway in printed circuit when assembling plug on connector pins.

Sp d meter R m val: Remove Instrument Cluster Assembly, see above, then remove speedometer from cluster.

Lighting Switch Rem val: Disconnect battery ground cable, unplug multiple connector from switch. Pull switch out to last notch and depress loaded latch button on left side of switch while pulling rod and knob assembly out of switch. Remove switch escutcheon with wrench J-8563 and remove switch from instrument panel.

CIRCUIT BREAKERS: 15 Ampere - Headlights and Front Parking Lights. Integral with headlight switch.
Special - Cigar lighter. On back of lighter.

FUSES: *'All fus s located in fuse block under left side of instrument pan l.*
25 Amper - Windshield wiper and washer.
20 Amper - Heater and Air Conditioning Systems.
10 Amper - Direction Signals & Stop Lights.
9 Ampere - Back-up Lights.
9 Amp r - Tail, License, Dome, Instrument Panel Lights, and Instrument Panel Light Rheostat feed.
3 Amp r - Instrument Panel Lights & Rheostat.
2.5 Amp r - Radio.
2 Amper - Clock & Glove Box Light.

V6 ENGINES

ENGINE SPECIFICATIONS: Own. 90°V6, valve-in-head. Engine block is cast iron type.

B r	Strok	Displacement
3.625"	3.200"	198 cu. ins.

C mpressi n Rati	Rated HP	Developed HP
8.8-1	31.54	135 at 4600 RPM

Compr ssion & Vacuum R ading - *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (For ign Trav l):* Minimum fuel octane rating (research method) for satisfactory operation is 93.

OIL PAN REMOVAL: Drain oil and remove steering idler arm bracket-to-crossmember attaching bolts, then remove lower flywheel housing. Remove oil pan bolts and lower pan enough to remove oil pump pipe and screen-to-cylinder block bolts. Rotate crankshaft for maximum clearance of forward end of oil pan. Move front of pan to right and lower pan through opening between crossmember and steering intermediate shaft.

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Buick Sp cial Data.*

TIGHTENING TORQUES: *S "Tight ning Sp cifications" in Buick Sp cial Data.*

PISTONS

Aluminum alloy, full skirt, cam ground, tin plated. Three rings used.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance .0005-.0011". Use accurate micrometer and measure at right angle to piston pin ¼" below oil ring groove. Measure cylinder bore approximately 1½-2" below top of bore at right angle to pin. Block and piston must be at nearly the same temperature.

Installing Pistons: Assemble rod in piston so identification notch in piston head is to front of engine. *See Rod Installation.*

Replacement Pistons: Furnished Std. & .010" Oversize.

PISTON PIN

Pin is pressed fit in connecting rod.

Diameter - .8747-.8750". **Length** - 2.960".

Clearance in Piston - .0001". Easy finger push fit at 70°F.

Clearance in Rod - .0007-.0015". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. NOTE - Pistons may be damaged if special procedure and tools not used.*

Replacement Pins: Furnished in Std. size only.

PISTON RINGS

Compression rings are cast iron lubrited type. Oil ring consists of two uncoated steel rails separated by a spacer and backed by a hump type spring steel expander.

Ring	Width	End Gap	Side Clearance
Compr.(1& 2)	.077-.078"	.010-.020"	.003-.005"
Oil (3)	.180-.186"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE:* Install rings with inner groove or bevel downward.

Replacement Rings: Furnished Std. size only.

CONNECTING ROD

Length - 5.860" (center-to-center).

Crankpin Journal Diameter - 2.000".

Bearings - Steel backed Durex 100A. Precision type.

Clearance - .0002-.0022".

Sideplay - .006-.014" (Total both rods).

Replacement Bearings: Furnished std., .001", .002", .010", .020" & .021" Undersize.

Installing Rods: Install piston and rod assembly in engine so all spurt notches in lower ends of rods are upward, and all notches in piston heads are to front of engine. Rib on edge of rod cap should be on same side as conical boss on web of rod and both marks should face toward adjacent connecting rod on same crankpin.

CRANKSHAFT

Journal Diameter: 2.2992". Out-of-round limit .003".

Clearance - .0005-.0021". Wear limit .003".

End Thrust: Taken by No. 2 (front intermediate) main bearing.

Endplay - .004-.008".

Replacement Bearings: Furnished Std., .001", .002", .003" & .010" Undersize.

►*MAIN BEARING CAP IDENTIFICATION CAUTION:* *See V8 Engine below.*

Crankshaft R ar Main Bearing Oil S al: *S "Crankshaft & Main B arings" in Buick Sp cial Data.*

Engin Front Cov r Removal: *Se "Engin Front Cov r" in Buick Special Data.*

Crankshaft Fr nt Oil S al: *Se "Engin Fr nt Cov r" in Buick Sp cial Data.*

FLYWHEEL REPLACEMENT: *S "Flywhe l" in Buick Special Data.*

CAMSHAFT

Journal Diameters - (1) 1.755-1.756", (2) 1.725-1.726", (3) 1.695-1.696", (4) 1.665-1.666".

Bearings - Steel backed babbitt. *NOTE* - Bearings must be line reamed after installation.

Clearance - .0005-.0035". Wear limit .0015-.004".

Endplay - .004-.008".

Timing Chain: Link belt. **Width** - .875". **Pitch** - .375". **Length** - 54 links.

Camshaft Setting: "O" marks on camshaft and crankshaft sprockets adjacent and in line across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	Stem Diameter	Length
Intake	1.500"	①	4.605"
Exhaust	1.3125"	②	4.605"

Valve	Seat Angle	Lift	Stem Clearanc
Intake	45°	.385"	③
Exhaust	45°	.385"	④

① - Top .3412"; Bottom .3407".
② - Top .3407"; Bottom .3402".
③ - Top .0005-.0025"; Bottom .001-.003".
④ - Top .001-.003"; Bottom .0015-.0035".

Valve Seat Width - 1/16". Wear limit 5/64".

►*VALVE GRINDING CAUTION:* Normal height of valve stem above valve spring seat surface is 1.825". When valve facing or seat grinding raises valve stem height more than .050" above normal, grind off end of valve stem or replace valve.

Valve Springs: Single springs used on all valves. Install springs with closed coils against cylinder head.

Valve Spring Specifications

Valve	Spring Pressure	Length
Closed	64 lbs.	1.640"
Open	168 lbs.	1.260"

Valve Guides: Non-replaceable (integral with head). If valve stem has excessive clearance in its guide, ream guide .005" oversize (use Reamer Tool J-9556) and replace valve using a .005" oversize valve.

Hydraulic Valve Lifters: Barrel type.

Diameter - .8422-.8427".

Clearance in Block - .0015-.003".

Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data.*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 18° BTDC. Close 82° ALDC.
Exhaust Valves - Open 62° BLDC. Close 38° ATDC.

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V8 ENGINES

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. Aluminum block with cast iron cylinder liners of same design used previously.

Bore	Stroke	Displacement	Rated HP
3.50"	2.80"	215 cu. ins.	39.2

Engine	Compr. Ratio	Developed HP
Standard	9.0-1	155 at 4600 RPM
Power Pack	10.25-1	185 at 4800 RPM
Export	7.6-1	145 at 4600 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (Foreign Travel):* Minimum fuel rating for satisfactory performance is as follows:

9.0-1 Compr. Ratio - 93 (Research), 83 (Motor).
10.25-1 Compr. Ratio - 99 (Research), 84 (Motor).
7.6-1 Compr. Ratio - 83 (Research), 74 (Motor).

►*ALUMINUM ENGINE SERVICE CAUTION:* This aluminum engine requires special gasket and bolt lubricants, special torques and special handling precautions. *See "Aluminum Engine Service Cautions" in Buick Special Data.*

OIL PAN REMOVAL: Drain oil and remove steering idler arm bracket-to-crossmember attaching bolts, then remove lower flywheel housing. Remove oil pan bolts and lower pan enough to remove oil pump pipe and screen-to-cylinder block bolts. Rotate crankshaft for maximum clearance of forward end of oil pan. Move front of pan to right and lower pan through opening between crossmember and steering intermediate shaft.

CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Buick Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Buick Special Data.*

PISTONS

Aluminum alloy, cam ground, transverse slot, divorced skirt.

Clearance - .001-.0015" measured as follows: **On piston,** ¼" below oil ring groove at right angles to piston pin. **In bore,** at right angles to crankshaft 1½" from top of cylinder bore. Piston and bore should be at same temperature.

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. & .010" Oversize.

Installing Pistons: Pistons may be installed on rods in either direction. Piston pins are not offset and pistons are concentric. *See Rod Installation.*

PISTON PIN

Pin is pressed fit on connecting rod.

Diameter - .8747-.8750". **Length** - 2.870".
Clearance in Piston - .0001" select. At 70°F.
Clearance in Rod - .0007-.0015". Press fit.

Piston Pin Removal & Installation: *See "Piston Pins" in Buick Special Data. CAUTION - Pistons may be damaged if special procedure and tools not used.*

Replacement Pins: Furnished in Std. size only.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.077-.078"	.010-.020"	.003-.005"
Oil (3)	.181-.187"	.015-.035"	.0035-.0095"

►*COMPRESSION RING INSTALLATION NOTE: Install both rings with identification mark up.*

Replacement Rings: Furnished standard size only.

CONNECTING ROD

Length - 5.660" (Center to Center).
Crankpin Journal Diameter - 2.000".
Bearings - Steel backed Durex 100A. Precision type.
Clearance - .0002-.0022".
Side Play - .006-.014" (Total both rods).

Replacement Bearings: Furnished Std., .001", .002", .010", .020", .021" Undersize.

Installing Rods: Install piston and rod assembly in engine with boss on rod and cap **forward** (right hand cylinders), **rearward** (left hand cylinders) with oil spurt hole upward.

CRANKSHAFT

►*MAIN BEARING CAP IDENTIFICATION NOTE & INSTALLATION CAUTION:* No. 2 & 3 main bearing caps for both V6 and V8 engines are stamped with identifying numbers and must be installed in correct locations. V8 engine caps are identified by the numbers to the right of arrow on cap. V6 engine caps are identified by the numbers to the left of the arrow. Numbers are listed below.

Main Bearing Cap Identifying Numbers

Engine	No. 2 Cap	No. 3 Cap
V6	2-6 ↑ 3-8	3-6 ↑ 2-8
V8	3-6 ↑ 2-8	2-6 ↑ 3-8

Crankshaft Journal Diameter - 2.2992". Five bearings.

Bearings - Steel backed Durex 100A. Precision type. Bearing halves are not alike and not interchangeable in cap and crankcase. Front two and rear two assemblies are identical, center bearing flanged for end thrust control. *CAUTION - Ends extend slightly beyond parting surface to fit tightly and not turn. DO NOT FILE FLUSH WITH PARTING SURFACE.*

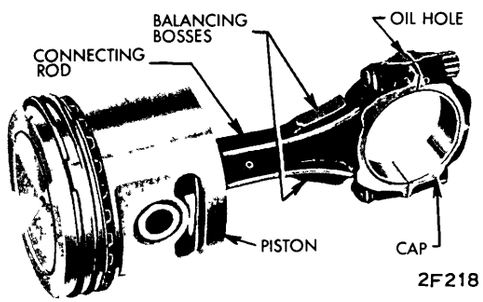
Clearance - .0005-.0021".

Replacement Bearings: Furnished Std., .001", .002", .003", .010" Undersize.

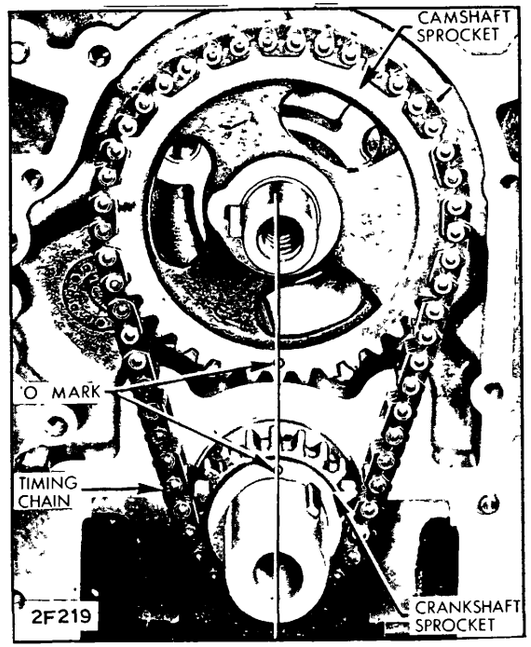
End Thrust: Taken by center No. 3 main bearing.
Endplay - .004-.008".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Buick Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Buick Special Data.*



PISTON & ROD ASSEMBLY



VALVE TIMING MARKS

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Buick Special Data.*

FLYWHEEL REPLACEMENT: *See "Flywheel" in Buick Special Data.*

CAMSHAFT

Journal Diameters - 1) 1.785-1.786". 2) 1.755-1.756". 3) 1.725-1.726". 4) 1.695-1.696". 5) 1.665-1.666".

Bearings - Steel backed babbitt. *NOTE* - Bearings must be line reamed after installation.

Clearance - .0005-.0035". Wear limit .0015-.004".

Endplay - .004-.008".

Timing Chain: Link belt. **Width** - .875". **Pitch** - .375". **Length** - 54 links.

Camshaft Setting: "O" marks on camshaft and crankshaft sprockets adjacent and in line across shaft centers.

Engine Front Cover: *See "Engine Front Cover" in Buick Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Buick Special Data.*

VALVES

Tappet Clearance: *None in service (hydraulic).*

Valve	Head Diam.	Stem Diam.	Length
Intake	1.500"	①	4.605"
Exhaust	1.3125"	③	4.605"

	Seat Angle	Lift	Stem Clearance
Intake	45°	.383"	②
Exhaust	45°	.383"	④

① - .3412" (top), .3407" (bottom).
② - .0005-.0025" (top), .0015-.0035" (bottom).
③ - .3407" (top), .3397" (bottom).
④ - .001-.003" (top), .002-.004" (bottom).

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valve Seat Width - 1/16-5/64" (all valves)

►*VALVE SEAT NOTE* - *Seats are "Sintered Iron" shrunk fit at time of assembly and are not replaceable*

►*VALVE GRINDING CAUTION* Normal height of valve stem above valve spring seat surface is 1.825". Grind off stem or replace valve when stem is raised more than .050" above normal

Valve Springs: Single valve spring used (no inner spring or damper). Install with closed coil end toward cylinder head

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	64	1.640"
Open	168	1.260"

Valve Guides: Drive out old guide from combustion chamber side with Tool J-267. Lubricate and install new guide with Tool J-8813. Tool will bottom when guide properly installed. *NOTE* - Service guides are .001" larger outside diameter for good fit in aluminum head. Ream valve guides to correct size after installation with Reamer J-8814.

Hydraulic Valve Lifters: Barrel type.

Diameter - .8422-.8427" **Clearance in Block** - .0015-.003"

Lifter Overhaul & Testing - *See "Valve System" in Buick Special Data*

Rocker Arm Assembly: *See "Valve System" in Buick Special Data*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above

Valve Timing Specifications

Intake Valves - Open 29° BTDC, Close 71° ATDC

Exhaust Valves - Open 67° BLDC, Close 33° ATDC

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM See "Engine Lubrication" under OILING SYSTEM in Buick Special Data*

Crankcase Capacity: 4 qts. (refill), 5 qts. (dry). Add 1 qt. with filter change.

Normal Oil Pressure: 33 lbs. at 2400 RPM

Pressure Regulator Valve - In oil pump cover. *NOTE* - Regulator relief valve cap not drilled for pressure indicator switch. Switch located in bypass valve cap.

Oil Pressure Indicator: Oil pressure indicator light in Instrument Cluster controlled by oil pressure switch in cap of oil bypass valve in oil pump cover. Lights when ignition turned on and goes out when oil pressure reaches a safe level.

Engine Unit - AC No. 1194214

Oil Pump: Spur gear type, mounted in engine front cover and driven by distributor drive shaft.

Oil Pump Overhaul - *See "Oiling System" in Buick Special Data*

Oil Filter: AC full-flow type, mounted on oil pump cover at right front of engine. Replace element every 4,000 miles. *NOTE* - Bypass valve in oil pump cover bypasses oil directly to engine when pressure differential between inlet and outlet ports reaches 4½-5½ lbs.

Replacement Filter Element - AC No. PF-7

►*OIL FILTER INSTALLATION CAUTION* DO NOT use a wrench to tighten filter. Tighten by hand until gasket contacts sealing face, then tighten an additional 2/3 turn. This supersedes previous instructions.

Crankcase Ventilation: Standard Cars - Air is drawn in through a ventilation cap in left rocker arm cover and drawn out through right rocker arm cover vent pipe, past a baffle that prevents oil being exhausted through vent pipe. Vent pipe extends down from lifter cover.

Positive Crankcase Ventilation Cars - Same as above, except that right rocker arm vent is connected by hose directly to plate located between carburetor and intake manifold. A spring loaded check valve is used to restrict ventilation system flow whenever intake manifold vacuum is high. *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

ENGINE COOLING SYSTEM

Water Capacity: 12 qts. (V8), 10½ qts. (V6). Add 1½ qts. for heater.

Pressure Valve: 15 lbs. radiator filler cap.

NOTE - Use of lower test filler cap will cause engine to heat with eventual loss of coolant.

Thermostat: Pellet type, located in forward (outlet) end of intake manifold. Opens at 167-172°F.

Water Pump: Packless sealed ball bearing type with aluminum housing. *NOTE* - Shaft seal and impeller are the only replaceable parts. *See "Cooling System" in Buick Special Data.*

Pump Removal - 1) Drain cooling system, loosen belts and remove fan blade and pulleys from hub on water pump shaft and remove belts.

2) Disconnect hose from water pump inlet and heater hose from nipple. Remove water pump-to-timing chain cover bolts and remove pump.

Temperature Indicator: Temperature indicator light in Instrument Cluster controlled by water temperature switch in intake manifold. Bulb will light when starter switch turned on (grounded circuit) to test bulb, and when water temperature reaches 248°F (indicating cooling system not functioning properly).

Engine Unit - AC No. 1993582

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	Ft. Lbs.
Cylinder Head	75
Intake Manifold Bolts	30
Intake Manifold Nuts	25
Exhaust Manifold to Head	60
Oil Pan Screw & Nut	12
Main Bearing Caps	95
Vibration Damper	110
Connecting Rod Caps	45
Camshaft Sprocket	20
Rocker Arm Cover ℄	
Engine Front Cover	12
Water Pump	30
Oil Pump	30
Engine Front Mount Stud	90
Engine Front Mount to Cushion	30
Engine Rear Mount Cushion Retainer	55
Eng. Rear Mount Cushion to Crossmember	55
Eng. Rear Mount Crossmember to Frame	30

℄ - Retorque after running engine.

ENGINE

ENGINE REMOVAL (WITH TRANSMISSION): *CAUTION - Use extreme care when disconnecting any part of air conditioning equipment or lines for access to engine, see "Air Conditioning Service Cautions" in Miscellaneous Section.* Proceed as follows:

1) Drain cooling system, crankcase and transmission. Remove hood top panel, disconnect battery and wires from generator. Remove upper and lower radiator hoses and remove radiator core. Remove fan and vibration dampener and loosen distributor.

2) Disconnect power steering pump to valve body hoses at pump and install caps on fittings to prevent oil leakage. Disconnect refrigerant lines, see Caution above. Disconnect all heater hoses at water pump, power brake vacuum line at intake manifold. Remove carburetor air cleaner, disconnect carburetor linkage and fittings and remove carburetor.

3) Remove transmission linkage slush deflector and disconnect throttle valve levers and speedometer cable at transmission. Disconnect flexible fuel line at steel fuel line and engine to cowl ground straps, primary wire at coil, oil pressure and cooling system temperature switch wires. Remove coil and disconnect wire to procelain resistor.

4) Remove two center-bearing-support to frame bolts (Nuts are tack welded and should remain fastened to support), "U"-bolts and locks at rear axle pinion, slide propeller shaft and front yoke off transmission mainshaft and through frame tunnel section. DO NOT nick yoke. Remove intermediate support.

5) Remove wires from starter and disconnect exhaust pipe at exhaust manifolds. Disconnect front motor support screws at frame idler arm support screws from frame and lower idler arm and steering connecting link.

6) Install rope or chain around intake manifold, attach hoist and take weight off engine supports. Disconnect and remove rear engine support bracket from frame and extension housing. Lift engine with transmission out.

CYLINDER HEAD & MANIFOLD

CYLINDER HEAD REMOVAL: There are six lengths of cylinder head screws used. Carefully note length and position of each cylinder head screw for correct reinstallation.

CYLINDER HEAD INSTALLATION: Use a Torque Wrench and tighten cylinder head capscrews starting from the center row of bolts and working outward and toward each end.

Cylinder Head Gasket - Install with side stamped "Top" UP.

Tightening Torque - See Tightening (Torque Wrench) Specifications.

ORIGINAL BORE & PISTONS

ORIGINAL PRODUCTION ENGINE BORE & PISTON SIZES: Piston and cylinder bore size indicated by a letter ("A" through "M" less "F", "G" & "I") in steps of .0002". Letter stamped on top face of block either to right or left of each cylinder bore. Sizes range from 4.0000-4.0002" to 4.0018-4.0020" (Cylinder Size), 3.9990-3.9992" to 4.008-4.0010" (Piston Size). *NOTE* - A cylinder with letters "AA" stamped on block would have a diameter of 4.0010-4.0102" and a piston diameter of 4.018-4.011".

PISTONS

FITTING NEW PISTONS: Pistons should be measured for size 1/8" below upper cross slot and 1/8" to either side of vertical slot. Cylinders should be measured 1 1/4" from top, crosswise to cylinder block.

PISTON PINS

PISTON PIN REMOVAL: Place Piston Pin Support J-8390-3 on arbor press and place piston assembly on support with "REAR" marked **upward.** Insert pilot end of Remover J-8390-1 into piston pin and press pin out of piston and connecting rod. *NOTE* - Keep pins in order for reinstallation.

PISTON PIN INSTALLATION: Lubricate piston pins and piston pin holes in piston with engine oil. Place Support J-8390-3 on press with Spring J-8390-4 and Spacer J-8390-2 in position on Support. Place connecting rod on its respective piston so that when assembly is installed in engine, side of piston marked "Rear" is toward rear of engine and number on lower end of rod is down. Nos. 1,3,5,7 (Left bank), 2,4,6,8 (Right bank). Place assembly on Support and place pin in position. Place Pin Remover & Installer J-8390-1 on piston pin and press pin in until it bottoms on spacer in Support.

VALVE SYSTEM

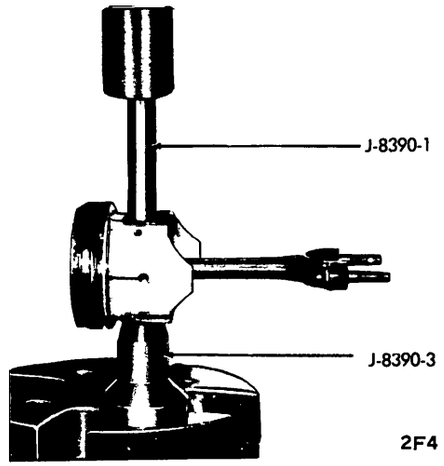
ROCKER ARMS

ROCKER ARM ASSEMBLY: Remove rocker arm covers. Remove secondary wiring and distributor cap as an assembly. Remove four cylinder head cap screws which hold rocker arm assembly to cylinder head and remove rocker arm assembly.

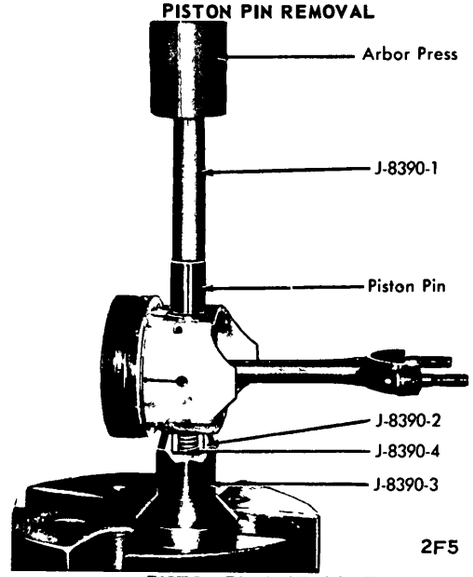
Disassembly & Reassembly: See illustration for correct order of parts. Parts can be removed from shaft by removing cotter pin at end.

Installation: Install rocker arm assembly in position on cylinder head with notches on each end of rocker shaft pointing downward and toward center of engine, and rocker arm brackets with larger machined surface next to head. Install four cylinder head screws and tighten to specifications. Install rocker arm covers and secondary wiring with distributor cap assembly. Tighten cover screws to specifications.

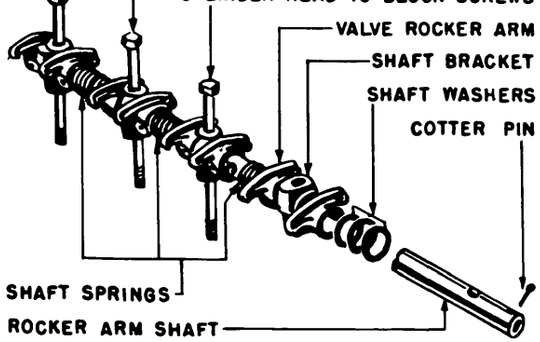
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2F4
PISTON PIN REMOVAL



2F5
PISTON PIN INSTALLATION



CADILLAC ROCKER ARM ASSEMBLY 2F6

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HYDRAULIC LIFTERS

VALVE LIFTERS: Hydraulic, Barrel Type. Consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (See illustration). Oil is introduced to this unit from main oil gallery through hole in side of lifter plunger and body.

Testing Lock Down Rate (On Engine): *NOTE - Procedure below requires use of Lifter Leak Down Rate Tester J-3074 which is designed for this purpose.* 1) On Air Cond. Cars, remove rear bracket and loosen generator. Remove resistor wire from porcelain resistor at coil. Remove distributor cap, coil, and rocker arm covers. Set timing at "C" mark and observe position of distributor rotor. Check each lifter as outlined in the following table:

With rotor at No. 1 firing position (pointing toward rear of engine), check each lifter as shown below.

No. 1 Int. & Exh.	No. 2 Int. & Ex.	No. 3 Exhaust
No. 4 Exhaust	No. 5 Intake	No. 7 Intake
No. 8 Int. & Exh.		

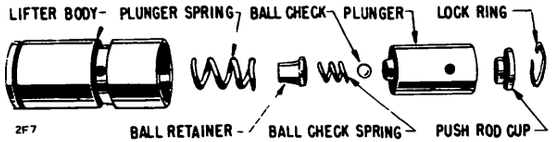
Rotate crankshaft one complete turn and with rotor at No. 6 firing position (pointing toward front of engine) check:

No. 3 Intake	No. 4 Intake	No. 5 Exhaust
No. 6 Int. & Exh.	No. 7 Exhaust	

2) Insert feeler gauge of tool between valve stem and rocker arm, at the same time compress the tool "pop-out" spring against the valve spring retainer. *NOTE* - Tool should be installed as quickly as possible to avoid any unnecessary leak down of lifter. Note the interval of time during which tool is held in place by valve spring pressure. It will be found through this test that noisy lifter or lifters will have the shortest leak down time.

Removal - Pushrod holes in cylinder block enlarged to permit removal of valve lifters without removing intake manifold. Remove rocker arm assembly and pushrods, then remove lifters with mechanical finger or magnet attached to long rod.

Disassembly: Press down on center of valve lifter pushrod cup, and with pointed tool remove lock wire from groove. Invert lifter and slide out pushrod cup, plunger, ball, snap spring, ball retainer and spring. *NOTE* - If plunger is stuck in body, place lifter, pushrod end down, in Valve Plunger Remover Tool J-4160. Holding tool firmly in hand with thumb over lifter body, strike tool sharply on block of wood until plunger falls out of body.



HYDRAULIC VALVE LIFTER

Cleaning & Inspection: Wash all parts in a suitable carbon solvent and remove all trace of carbon and varnish. Inspect plunger and lifter body for scoring or other damage that would prevent free movement. Inspect lower end of lifter body for nicks or indentations. If any exist replace complete lifter assembly. Dry lifter parts with air, then install plunger in lifter body without other parts and check for free movement. Plunger should drop of own weight into body bore.

Reassembly: Place ball on its seat in lower end of plunger while holding plunger upside down. Place small spring on ball. Position ball retainer over ball and end of plunger. Move retainer up and down to be sure spring is in working order. Place spring over ball retainer. Lower lifter body over plunger assembly on an angle to seat spring. If necessary probe with a small wire through oil hole to allow assembly to be seated. Turn assembly right side up and fill plunger with clean engine oil. Jiggle ball with a small piece of wire until oil drains out of plunger into body and trapped air is released from body. Refill plunger with oil and place pushrod cup on plunger. Position lock wire over cup. Using Valve Lifter Lock Wire Installer J-2730, press lock wire into groove.

CRANKSHAFT & MAIN BEARINGS

CRANKSHAFT REMOVAL (Engine in Car): Place stands under car at all four wheels. Remove timing chain and sprockets. Remove transmission and flywheel flex plate. Remove steering gear idler arm from right frame side bar and lower steering linkage to floor. Remove oil pan, oil pan baffle and oil pump. Remove spark plugs, disconnect connecting rods and push piston assemblies up into cylinder bores. Remove front and rear main bearing caps support crankshaft at front and rear and remove three remaining bearing caps. Lower crankshaft.

REAR MAIN BEARING OIL SEAL: Raise car on stands and remove oil pan, oil baffle and oil pump. Remove rear main bearing cap and discard seal. Remove and discard upper seal from cylinder block. *NOTE* - Grooves in bearing cap and cylinder block must be clean, dry and free from burrs. Upper and lower seal are identical.

Upper Half Installation - Start seal in groove in block and rotate seal into position. Press firmly on both ends so it protrudes evenly on each side.

Lower Half Installation - Install lower half in cap with lip facing forward and one end of seal over ridge and flush with split line. Hold this end from slipping and push seal into position with pressure on other end. Seal must be pressed down firmly and protrude uniformly on each side. *NOTE - DO NOT apply pressure on lip.* Coat surface of cap and block with .010" thick film of rubber cement but do not get cement on seal lip or bearing surface. Lubricate lip of seal with thin film of engine oil.

►*REAR MAIN BEARING INSTALLATION CAUTION:* For proper alignment of thrust surfaces of rear main bearing proceed as follows: Install upper and lower inserts in block and bearing cap. With rear oil seal in place and mating surfaces clean, install bearing cap and tighten screws to 1-2 ft. lbs. torque. Using a plastic hammer, drive crankshaft forward, then rearward, then forward again (*CAUTION* - Pound on counterweights, not on connecting rods). Tighten bolts evenly to specifications. Check to make sure crankshaft is not binding.

CAMSHAFT & BEARINGS

CAMSHAFT REMOVAL: Remove Air Conditioner Condenser, *see "Air Conditioning" in Miscellaneous Section.* Remove radiator, timing chain and sprockets and remove valve lifters. Remove fuel pump and fuel pump pushrod. Slide camshaft forward carefully out of engine. *CAUTION* - DO NOT scratch camshaft bearings with camshaft lobes.

Camshaft Bushing Removal & Installation: Use Bearing Remover & Installer Tool J-3063 to pull old bushings out. Install new bushings with same tool and see that oil holes in bushing line up with oil holes in block (check oil leads with piece of wire after tool removed).

Camshaft Installation: Lower camshaft into position between radiator grille and engine and guide it carefully into cylinder block. Be sure distributor is timed correctly when inserting camshaft. Reverse removal procedure.

OILING SYSTEM
ENGINE LUBRICATION

ENGINE LUBRICATION: Force feed type of lubrication with oil supplied under pressure to crankshaft, connecting rod, and camshaft bearings, valve lifters, rocker arm bearings and metered to upper rocker arms for pushrod surface and valve lubrication. Oil is supplied from rear main bearing for lubrication of oil pump drive shaft. All other moving parts of engine are lubricated by gravity flow or splash. See "Engine Oil Flow" diagram.

OPERATION: Gear type oil pump mounted on rear main bearing cap (driven by distributor drive shaft) draws oil through a screened intake floating on oil in crankcase and delivers it through full flow oil filter and to vertical oil header which feeds rear main bearing. This header delivers oil to an intersecting Right Longitudinal Header and through a connecting header, to the Left Longitudinal Header. Upper end of vertical header is plugged. Rear end of right longitudinal header supplies oil through cylinder block and head to right rocker arm shaft, left longitudinal header supplies oil at front end through cylinder block to left rocker arm shaft. Oil from cylinder heads drains back directly to crankcase through left front and both rear holes in each cylinder head. The hole in front end of right cylinder head drains oil back through head and matching hole in block to engine front cover for lubrication of timing chain and sprockets. A drilled hole at rear of valve lifter compartment returns lifter compartment excess oil to crankcase.

Crankshaft, Connecting Rods & Pistons - Vertical header at rear main bearing supplies oil to rear main bearing. The right longitudinal header supplies oil to the front and center main bearings. The left longitudinal header supplies oil to the two intermediate main bearings. Drilled passages in crankshaft supply oil from main bearing journal to connecting rod journal for connecting rod bearing lubrication. Oil is forced out groove in connecting rod bearing cap against cylinder walls for piston lubrication. Piston pins receive oil through drilled passage in piston.

Camshaft, Sprockets and Lifters - Rear camshaft bearing is supplied oil from the connecting header. All other camshaft bearings receive oil from drilled passages in block from respective main bearing. Oil pressure switch is screwed into upper end of connecting header. Drain back hole in front end of right cylinder head returns surplus oil to engine front cover for tim-

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ing chain and sprocket lubrication. Each longitudinal header supplies oil through drilled passages in block to its respective bank of valve lifters.

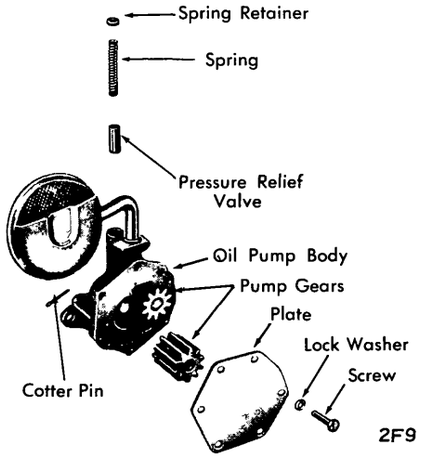
Rocker Arms, Valves & Pushrods - Oil is supplied to rocker arm shaft on right bank from rear end of right longitudinal header through a vertical branch in cylinder block and head. The left rocker arm shaft is supplied through a vertical branch in cylinder block and head at front end of left longitudinal header. Rocker arm shafts are plugged at each end. One hole in bottom of rocker arm shaft intersects a 45° groove and supplies oil evenly under loaded area of each rocker arm. The other hole is mismatched with an angular passage in the arm and meters oil to the pushrod end of the arm for lubrication of the pushrod surface in the arm. From this point oil flows down to the opposite end of the arm for valve tip lubrication.

OIL FILTER: Full Flow Type - Mounted on pad on right rear side of crankcase. Oil inlet (from pump) and outlet (to engine oiling system) channels are located in mounting pad and filter mounting bracket.

OIL PUMP

OIL PUMP REMOVAL: Remove oil pan, oil pan baffle and two nuts holding oil pump to rear main bearing cap and remove oil pump assembly. *NOTE* - Pump drive shaft is now loose and should be removed.

Disassembly: Remove cotter pin securing oil pressure regulator valve spring and spring retainer in body and remove valve and spring. *NOTE - Do not lose retainer when removing cotter pin.* Unlock and remove six cover plate-to-housing screws and remove plate. Slide idler gear off idler shaft in pump and press collar off drive shaft. Slide pump drive gear out of pump body.



OIL PUMP ASSEMBLY

Inspection: Inspect strainer screen for dirt and clean thoroughly. Inspect oil pressure regulator valve for nicks and burrs. Check free length of regulator valve spring. Inspect drive gear and idler gear for nicks and burrs.

Oil Pump Specifications - Backlash between drive gears - .008-.012". Clearance drive shaft to pump body - .0010-.0025". Wear limit .005". Endplay in pump gears - .001-.004". Wear limit .006".

Spring Free Length - 2 21/32". **Spring Pressure** - 5 1/4-5 3/4 lbs. at 1 7/16".

Assembly: Install oil pump drive gear in oil pump body. Press collar on end of drive shaft and slide idler gear into pump body, meshing gear with drive gear. Install oil pump cover plate and secure screws with new locks. Slide regulator valve, spring and retainer into pump body and install cotter pin.

Installation: Install oil pump drive shaft. Place pump assembly on studs so drive shaft does not bind against block and install two nuts and lockwashers and tighten to specifications.

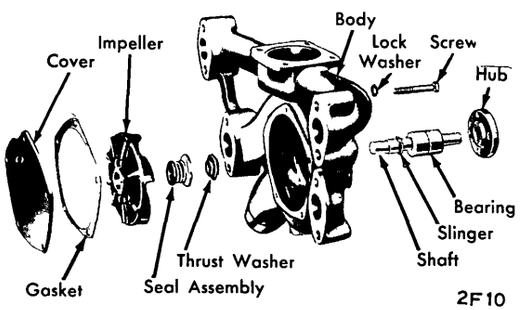
COOLING SYSTEM

WATER PUMP REMOVAL: Non-Air Conditioned Cars - Remove air cleaner, drain cooling system, and disconnect all hoses from water pump. Remove steering pump and generator belts. Disconnect throttle return spring, disconnect steering pump bracket and move pump and bracket to one side (do not disconnect hoses). Remove water pump attaching screws and remove water pump and fan.

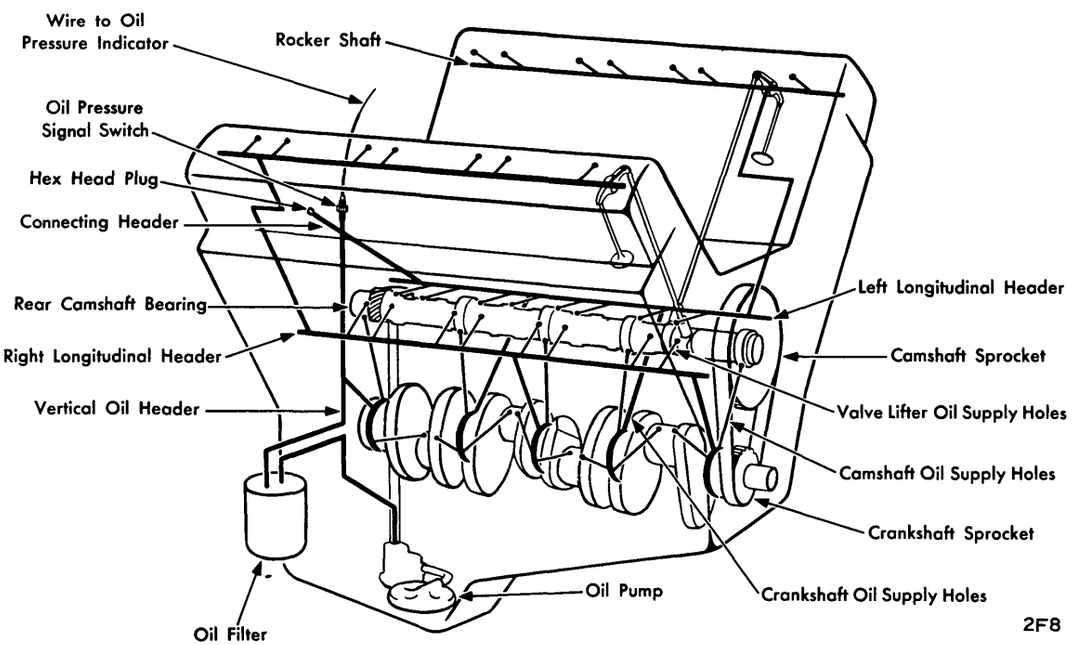
Air Conditioned Cars - Remove air cleaner, drain cooling system and disconnect all hoses from water pump. Remove all belts. Move power steering pump and bracket to one side (do not disconnect hoses). Remove fan, fan clutch, and fan pulley. Remove water pump-to-cylinder block screws which also hold Freon compressor front mounting bracket to water pump flanges. Remove compressor front mounting bracket-to-cylinder head screw. Remove compressor front mounting bracket brace-to-water pump screw. Remove water pump attaching screws and remove pump.

Disassembly: Remove thermostat housing, thermostat, fan blade assembly, cover plate and gasket. Use Impeller Puller No. J-3211 to remove impeller. Remove seal assembly and washer from body. Press shaft out through front of pump body. Discard shaft.

CONTINUED ON NEXT PAGE



WATER PUMP ASSEMBLY



CADILLAC ENGINE OILING SYSTEM

CONTINUED FROM PRECEDING PAGE

Inspection: Check impeller blades for improper clearance or excessive wear and check spring loaded seal for wear or cracks. Check shaft bearing for roughness or excessive endplay. To refinish seal surface, place Seal Seat Refinisher Fixture J-8759 in vise and place water pump housing face down on fixture. Install pilot in fixture and use flat side of fine valve grinding stone (large enough to cover surface of casting). Use short grinding intervals and follow with refinish grinding stone. *NOTE* - If grinding increases distance from gasket surface to seal surface to more than 1 7/32", replace housing.

Reassembly: Place pump on Holding Fixture J-6855-1 so that center shaft of fixture does not line up with hole in water pump housing. Install new shaft Assembly with Tool J-3249. *NOTE - DO NOT install shaft without installer J-3249 as shaft bearings will be damaged.* Turn pump over and install thrust washer and seal assembly over driving lugs of shaft space slinger. Washer should slide freely. Use arbor press to install impeller on shaft assembly, until outer face of impeller vanes is .005-.010" below back face of water pump. Position fixture on pump so center shaft touches end of pump shaft assembly. Align hub on shaft and press it on until flush with top of shaft. Hub should be positioned on shaft as follows:

On Non-Air Cond. Cars, with assembly in same position, place .080" Hub Spacer J-3249-2 on bottom of Hub Installer J-3249 then position both on hub and shaft and press until tool bottoms on shaft. **On Air Cond. Cars,** same as above except without .080" Hub Spacer J-3249-2. Rotate shaft to check for hub runout. Use gasket cement when installing cover and tighten screws to 15 ft. lbs. Rotate shaft to be sure impeller has clearance. Install pulley and fan assembly and tighten screws to 20 ft. lbs. Install thermostat in pump body, coat housing and flange with cement and tighten screws to 12 ft. lbs.

Installation: Reverse removal procedure. Run engine and check for leaks.

►*JACKING & HOISTING (ALL MODELS): Before jacking, hoisting, towing or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING: Car CANNOT be started by pushing because of transmission design.*

►*PARKING BRAKE VACUUM RELEASE CAUTION: Before working on engine with engine running and car in gear, disconnect vacuum supply hose from right hand connector of vacuum switch on neutral safety switch and tape switch opening closed.*

MODEL IDENTIFICATION

ENGINE SERIAL NUMBER: Stamped on lower left hand side of cylinder block between two welch plugs just above edge of oil pan, and on top of frame on left hand side member just behind radiator. *NOTE* - Number (example below) includes identification data as follows:

① ② ③
62 L 000001

① - Year model - 1962.
② - Body Code - *See Series Designation Table below.*
③ - Beginning Engine Serial Number.

Series Designation

Series	Body Style	Body Code
60	6039 Sedans, Sixty Special	M
62	6229 Sedan Six Window	K
62	6239 Sedan Four Window	N
62	6247 Coupe	G
62	6267 Convertible	F
62	6289 Sedan, Four Window	A
62	6329 Sedan DeVille, Six Window	L
62	6339 Sedan DeVille, Four Window	B
62	6347 Coupe DeVille	J
62	6367 Eldorado Biarritz	E
62	6389 Sedan Short Deck	D
75	6723 Sedan, Nine Pass.	R
75	6733 Limousine, Nine Pass.	S
CC	6890 Commercial Chassis	Z

Engine Unit Number: Stamped on bell housing portion of crankcase behind left hand cylinder block directly above cast rib. *NOTE* - "L.C" after unit number indicates low compression engine. Mark * following unit number indicates .010" oversize bore and pistons.

Body Style	Engine Unit Prefix
6039; 6229, 47, 67, 89; 6329, 39, 47, 67, 89 (Less AC)	26X
6039; 6229, 47, 67, 89; 6329, 39, 47, 67, 89 (With AC)	26K
6723, 33; 6890 (Less AC)	27X
6723, 33; 6890 (With AC)	27K

TUNE-UP

►*FLUTTERING OR WARBLING NOISE CORRECTION (Cars with Carter Carburetors):* This noise noted with engine idling and transmission in Drive or Neutral and can be eliminated by pumping brakes (causing large vacuum flow into brake unit). Caused by vibration of metal web of carburetor-to-intake manifold steel shim. Correct by installing new type shim, Part No. 1480387 (shim redesigned to prevent this vibration).

COMPRESSION PRESSURE: 165-185 lbs. (Cranking Speed), 212-230 lbs. (1000 RPM) with throttle wide open. Maximum variation between highest and lowest cylinders should be less than 20 lbs.

VALVE TAPPET CLEARANCE: None. Hydraulic lifters.

MANIFOLD HEAT CONTROL: Automatic thermostatic type, located between left exhaust manifold and pipe. Valve controls flow of exhaust gases from left cylinder head through ribbed passages in intake manifold with a branch passage that warms carburetor in region of primary throttle valves and idle ports.

CRANKCASE VENTILATION VALVE: Service at every engine oil change, and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs - AC No. 44. 14 mm. Torque to 25 ft. lbs.

COIL: Delco-Remy 1115134 (Service Replacement).

Ignition Current - 1.25 amperes with engine running.

Resistor - Resistance type wire (primary circuit) from switch to coil. Resistance wire by-passed by feed from starter solenoid during engine cranking period.

►*IGNITION COIL NOTE:* Identified by Brown Bakelite Insulator. DO NOT use these higher inductance coils and 1.35 ohm ignition feed harness on 1959 and earlier cars.

DISTRIBUTOR: Delco-Remy 1110988 (Early), 1111014 (Later). "Window" type.

►*DISTRIBUTOR PRODUCTION CHANGE:* Distributor No. 1111014 used in production beginning Engine No. 066509 with new centrifugal advance specifications. Vacuum Advance Specifications remain the same as for Distributor 1110988. *See Specifications below.*

Condenser - Delco-Remy 1932004. **Capacity** .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988.

Breaker Gap - Breaker gap will be correct (.016") when cam angle correctly set.

Cam Angle - 28-32°. Set to 30°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - 1110988

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1½	400	0-3	800
2½-4	600	5-8	1200
5-7	1400	10-14	2800
7-9	2000	14-18	4000

Automatic Advance - 1111014

Degrees Distr.	RPM	Degrees Eng.	RPM
0-1.5	400	0-3	800
2.25-3.75	600	4.5-7.5	1200
4.5-6.0	800	9-12	1600
6.25-8.0	1200	12.5-16.0	2400
7.75-9.75	1600	15.5-19.5	3200
8.0-10.0	2000	16.0-20.0	4000

Vacuum Spark Control: Delco-Remy 1116192.

Vacuum Advance - 1110988, 1111014

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
10½-12	21-24	13.25-15.25

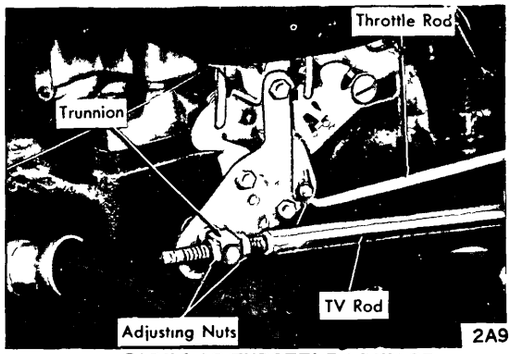
IGNITION TIMING

Setting - 5° BTDC.

►*SETTING NOTE:* When fuel of 100 octane rating or better is not available, retard setting toward "C" mark to eliminate detonation.

Timing - Disconnect vacuum line at distributor (tape pipe). Adjust timing with engine idling at 480 RPM.

Timing Marks - Timing indicator on chain case cover and harmonic balancer marked "C", "5" and "10". "5" & "10" are degrees ahead of "C" mark (TDC).



CADILLAC THROTTLE LINKAGE ADJUSTMENT POINTS

CARBURETOR

►*CARBURETOR APPLICATION: Carter and Rochester 4-Barrel carburetors used.*

►*CARTER CARBURETOR PRODUCTION CHANGE & IMPROVED LOW SPEED OPERATION & RESTARTING CHANGE:* New choke baffle which improves low traffic speed operation in cold weather and delays choke closing during brief engine shut-downs used in production beginning with Engine No. 083297 (approx.). *For installation of this choke baffle in earlier carburetors, see "Carter AFB 4-Barrel Carburetors" in in Carburetion Section.*

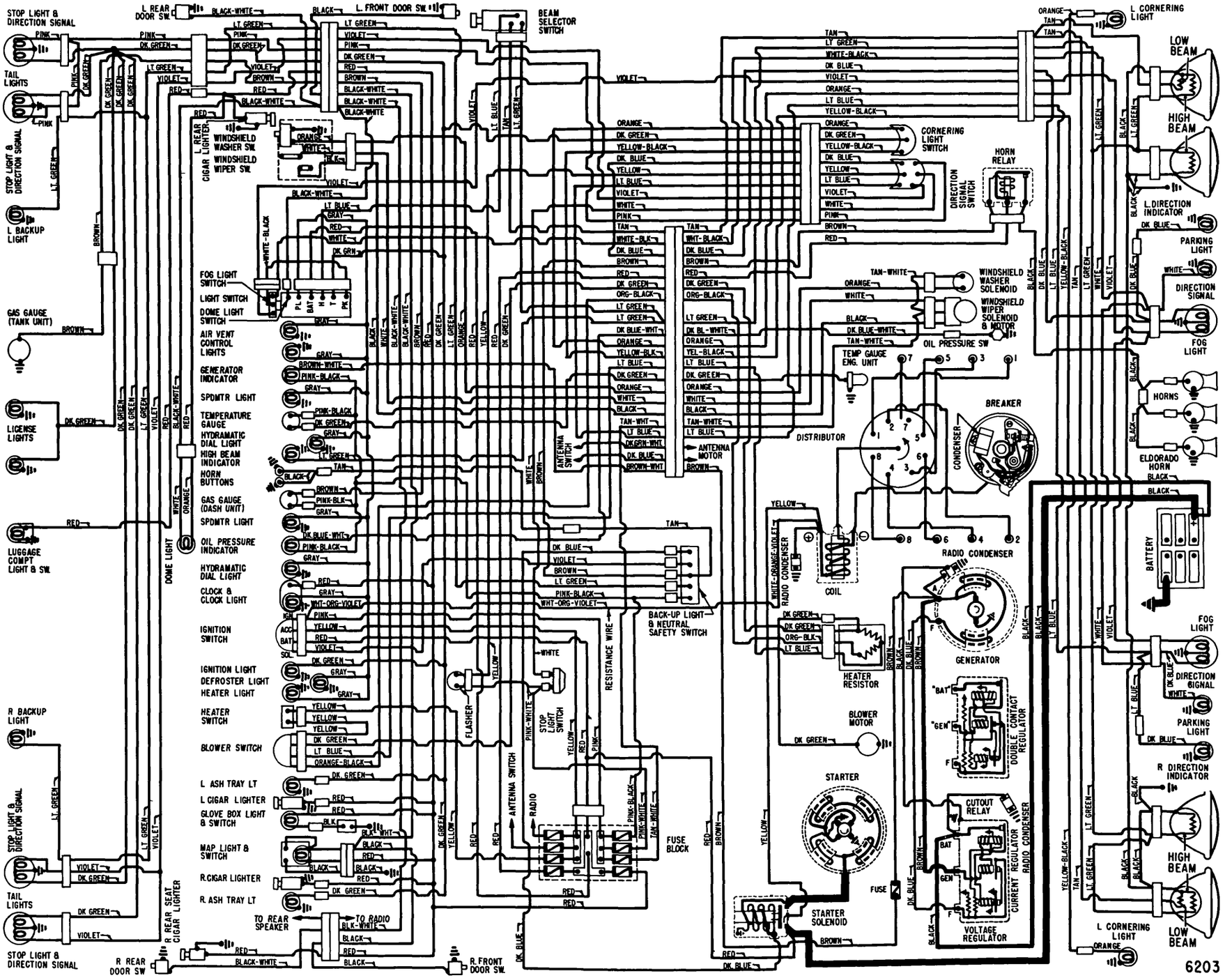
Idle Speed-Up Control Adjustment (Cars With Air Conditioning): With engine at normal operating temperature and slow idle adjustment completed, turn air conditioner "ON" and place transmission selector lever in "N" position. Adjust engine idle speed to 900-950 RPM by loosening locknut on diaphragm shaft and turning nut to obtain specified RPM. Tighten locknut.

Throttle Return Check Adjustment: Allow engine to idle and make sure that throttle check plunger is not in contact with throttle relay lever. Open throttle wide momentarily to allow engine manifold vacuum to drop and throttle check plunger to come out. Let throttle snap shut and observe delay caused by throttle check. If engine races, throttle check plunger is too long. If engine stalls, plunger is too short. Adjust plunger screw as necessary for correct operation. *NOTE* - Clearance between throttle check plunger and relay should be approximately .190" with engine running.

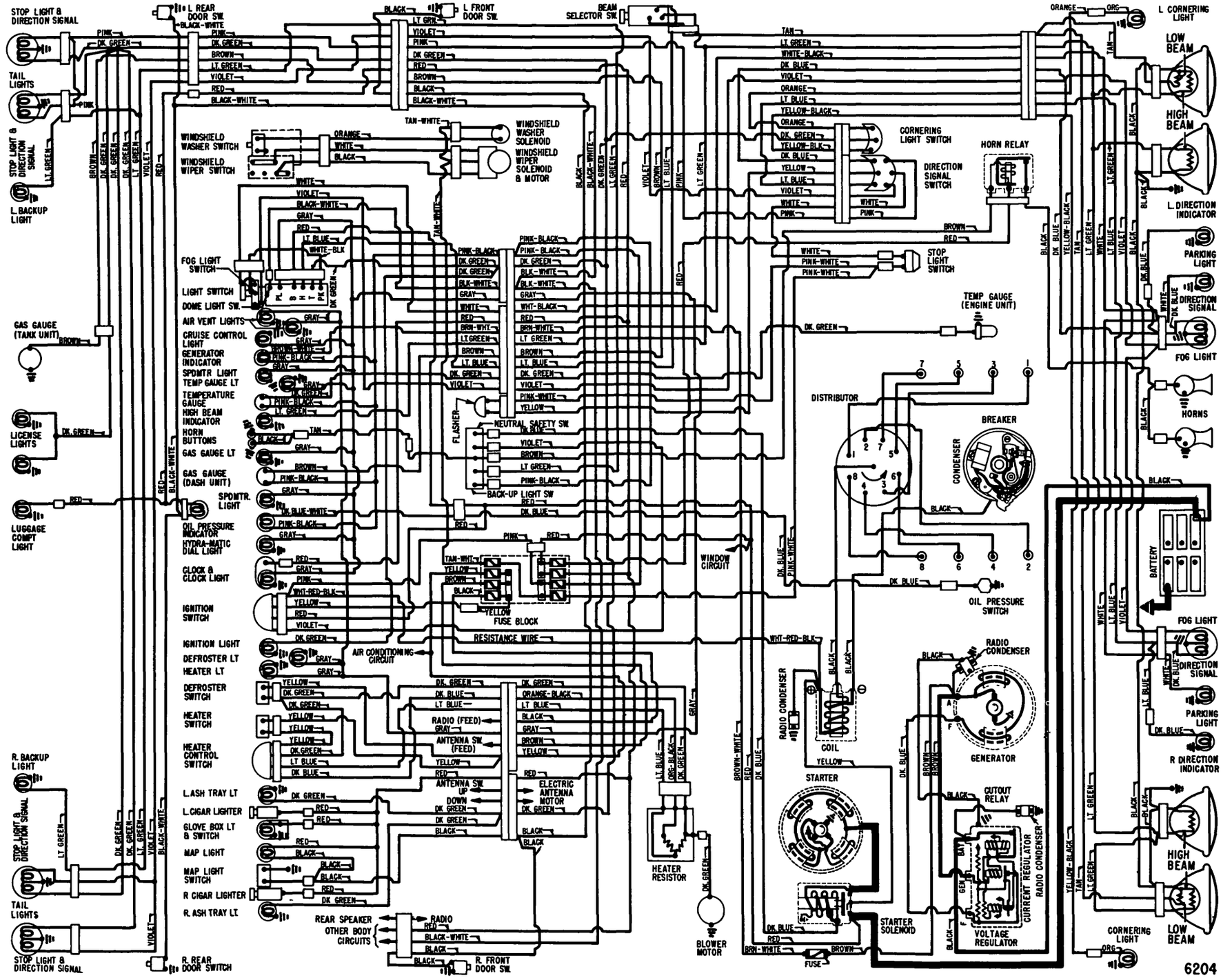
THROTTLE LINKAGE ADJUSTMENT: Remove clip from carburetor throttle rod trunnion and remove trunnion from relay bracket lever (at front of dash). Place a ¼" drill shank through gauging hole in relay lever and dash relay bracket. With engine running, set throttle lever to hot idle position (Air Conditioner turned "OFF"). Adjust carburetor throttle rod trunnion to allow free entry into dash relay lever and install trunnion and spring clip. Push end of throttle valve rod (rod from carburetor to transmission throttle lever) toward rear of car to position transmission throttle lever against its stop. Bring front jam nut on throttle valve rod against trunnion until all slack is taken up. **Then tighten nut 3 full turns.** Tighten rear jam nut. If 4-3 downshift cannot be obtained, check carburetor

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.



CADILLAC 60 & 62 SERIES WIRING DIAGRAM



CADILLAC 75 & CC SERIES WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

for wide open throttle and choke unloader with accelerator pedal fully depressed.

Accelerator Pedal Height Adjustment - Remove cotter pin from trunnion on inner side of accelerator pedal arm and remove trunnion from arm. Adjust trunnion up or down as required to obtain wide open throttle with pedal fully depressed. Assemble linkage, and install slush deflector.

ROCHESTER 4GC 4-BARREL

Rochester 4GC No. 7019030 (Std.), 7019031 (Air Cond.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*IDLE ADJUSTMENT NOTE: See "Parking Brake Vacuum Release Caution" above.* Hose must be disconnected and vacuum fitting taped.

►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed at slow idle.

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB No. 3351S (Std.), 3352S (Air Cond.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*IDLE ADJUSTMENT NOTE: See "Parking Brake Vacuum Release Caution" above.* Disconnecting hose at this location eliminates vacuum leakage at neutral switch while making idle mixture adjustment.

►*IDLE SPEED ADJUSTMENT NOTE:* Idle Air Bypass screw on throttle body used to adjust idle speed. Throttle valves are normally closed at slow idle.

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 713. Fuel only.
Pressure - 5¼-6½ lbs. at idling.

Fuel Line Filter: Located in line between fuel pump and carburetor. *NOTE* - Air Conditioned cars have special filter and orificed passages for returning fuel vapors to fuel tank.

Gasoline Gauge: AC electric type.
Dash Unit - AC No. 5643643 (Exc. Comm. Chassis), 5643115 (Comm. Chassis).
Tank Unit - AC. Used as follows:

Model	Std. Car	Air Cond. Car
All (Exc. Comm.)	5642342	5642343
Comm. Chassis	5642565	

Air Cleaner: Replaceable oil-wetted Polyurethane Foam element type. Replace element every 30,000 miles.

►*CAUTION:* Element should NOT be washed, oiled, tapped, or blown out with compressed air.

Cruise Control: Automatic speed control and warning device. *See "Speed Controls" in Carburetion Section.*

BATTERY

Delco No. 562. 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Engine to dash.

STARTER

Delco-Remy 1107799. Armature 1950563.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. min.

Performance Data

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.0	65
	Lock	3.5	300

① - Includes solenoid.

Starting Switch: Delco-Remy Solenoid Switch No. 1119910 mounted on starter and controlled by Ignition & Starter Switch Delco-Remy No. 1116618 (Ser. 75 & CC), No. 1116619 (Others).

Neutral Safety Switch: Combination Neutral Safety & Back-up Light Switch Delco-Remy No. 1993560, mounted on steering column.
Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows:

Series	Generator	Armature
All (Exc. 75,CC) Std.	1102315	1946719
All (Exc. 75,CC) Air Cond.	1102318	1939837
75, CC Std.	1102318	1939837

Performance Data

Generator	Amperes	Volts	RPM
1102315	35	14.0	2730
1102318	45	14.0	2520

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.48-1.62 amps. (1102315), 2.66-2.86 amps. (1102318) at 12 volts and 80°F.

Belt Adjustment: Adjust belt tension to 60 lbs. (used belt), 90 lbs. (new belt). *NOTE* - Use variable reading strand tension type gauge on belt midway between pulleys.

REGULATOR

Delco-Remy 1119002 or 1119168 (1102315 Gen.), 1119601 (1102318 Gen.). *NOTE - Regulator 1119601 is "Double Contact" type.*

►*NOTE: Specifications below are "Normal" Settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119002 & 1119168), 11.8-13.0 volts (1119601).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting - 1119002 & 1119168) - 13.8-14.7 volts at ambient temperature of 125°F.
Setting (1119601) - 13.8-14.6 volts at 125°F ambient temperature when operating on upper contacts. .1-.3 volts lower when operating on lower contacts.
Contact Gap (1119601) - .016".
Air Gap - .075" (1119002 & 1119168), .067" (1119601) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119002) - 32-37 amps. at 125°F.
Setting (1119601) - 42.5-47.0 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy 6 & 12 Volt Single Contact Regulators" and "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

MISC. ELECTRICAL

►*DIRECTION SIGNAL SWITCH CHANGE (To ensure switch turn-off after Right Turn completed):* New switch cam, Part No. 1479866, with new cam lobe contour used in production beginning Engine No. 075000 (approx.). If switch does not cancel after right turn completed on earlier cars, remove steering wheel and install new type cam. *For steering wheel removal, see "Saginaw Rotary Valve Power Steering" in Steering Section.*

Instrument Panel, Bezel & Cluster Removal (Ser. 60,62):
1) Disconnect battery and remove five screws retaining upper panel cover to lower panel. Raise upper panel enough to disconnect Map Light and Guide-Matic Phototube Unit 3-way connectors. Pull cover rearward to disengage hooks at front of cover from retainers on cowl and remove cover.
2) Instrument Panel Bezel - Remove instrument panel cover, see above. Remove radio manual selector and volume control knobs, springs, and speaker and tone control rings. Use Wrench J-6968 to remove selector control shaft nut. Disconnect one 6-way wire connector and one single connector from headlamp switch and fog lamp three-way connector. Disconnect light bulb socket and feed wire connector from clock. Remove bezel retaining nuts from left side of bezel and remove screw and nut from right side near clock. Remove screw holding bezel to cowl brace.
3) Instrument Cluster - Remove Instrument Panel Cover & Bezel, *see above.* Disconnect gauge wires from fuel and temperature gauges, speedometer cable at speedometer head and remove cluster bulb sockets. Disconnect odometer reset cable from lower flange of instrument panel, then remove cluster screws and cluster.
4) Fuel & Temperature Gauge - Remove upper panel cover (see above) and disconnect wires from gauge. Remove gauge-to-cluster retaining screws and remove gauge.
5) Speedometer - Remove instrument cluster, then remove eight back plate to cluster casting screws and remove back plate with speedometer head. Remove speedometer head from back plate.

Instrument Panel Cover & Cluster Removal (Series 75 & Comm.): Disconnect the battery and remove lower steering column cover and Hydra-Matic indicator pointer, Remove panel cover-to-lower instrument panel screws. Raise front edge of cover and insert wood block. *NOTE - Above procedure provides access to components.* Disconnect two harness connectors at firewall, headlight feed connector, ignition switch connector, shift indicator light, speedometer cable, and trip mileage cable. Disconnect Guide-Matic and Cruise Control. Unhook panel cover hooks from cowl retainers and remove cover.

Instrument Cluster - After cluster and panel assembly removed (see above), separate cluster from panel after marking bulbs and cluster for reassembly.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Fuel & Temperature Gaug - After cluster and panel assembly removed (see above), disconnect wires and remove gauges from cluster. If removed with cluster installed in car, raise panel cover (see above), loosen cluster harness from retaining clip for access, disconnect wires and remove gauge.

Speedometer - Separate speedometer from cluster after cluster and panel assembly have been removed (see above).

St p Light Switch Location: Mounted on flange protruding from brake pedal support bracket below instrument panel. **Adjustment** - Loosen switch mounting nut and adjust switch position so stop lights are on when brake pedal depressed ½".

CIRCUIT BREAKERS: 20 Ampere. On Headlight switch. Protects Head, Ash Tray, Fog, Instrument, Parking & Cornering lights.

40 Ampere. Horn (with Power Seats and Windows).

FUSES: In Fuse panel unless otherwise specified.

25 Ampere. Body feed (Cigar Lighters, Cloak, Courtesy lights, Glove Box, Map, and Trunk compartment lights).

25 Ampere. Windshield Wipers.

14 Ampere. Turn Signals and Stop Lights.

7½ Ampere. Radio.

9 Ampere. Indicators and Back-Up Lights.

25 Ampere. Air Cond. & Heater.

6 Ampere. Generator Tell-Tale. In right dust shield.

6 Ampere. Cruise Control. Cruise Control Brake Signal.

4 Ampere. Guide-Matic. At Amplifier Unit.

25 Ampere. Horn (without Power Seats & Windows).

ENGINE

ENGINE SPECIFICATIONS: Own. V8, valve-in-head.

Bore	Stroke	Displacement
4"	3 7/8"	390 cu. ins.
Compr. Ratio	**Rated HP**	**Developed HP**
10.5-1©	51.2	325 at 4800 RPM

© - 8.75-1 Export.

Compression Pressure - *See TUNE-UP.*

►*OVERSIZE CYLINDER BORE CAUTION:* Engines with mark * following Engine Unit No. have .010" oversize cylinder bore and pistons.

►*CYLINDER HEAD PRODUCTION CHANGE & VALVE GRINDING CAUTION:* New head, identified by code letter "Z" adjacent to center exhaust port, used in production after Engine No. 027755. This head has machining changes to prevent valve deposits and to increase valve spring pressures. *When valves ground on this cylinder head, shims must not be used under valve springs. See VALVE data below.*

ENGINE REMOVAL: *See "Engine" in Cadillac Special Data.*

OIL PAN REMOVAL: Disconnect battery ground strap and drain oil. Remove starter and heat control valve (swing exhaust pipe away). Lower idler arm support from frame side bar and remove oil pan-to-cylinder block screws and nuts and remove oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifolds" in Cadillac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Cadillac Special Data.*

PISTONS

►*ORIGINAL CYLINDER BORE CAUTION:* Engines with mark * preceding Engine Unit No. (on left rear of crankcase) have .010" oversize pistons and cylinder bore. Standard cylinder bore size 4.000-4.0020".

Original Bore & Pist ns - *See "Original B re& Pistons" in Cadillac Special Data.*

Pistons - Pistons have trough in head to provide fuel turbulance and clearance for valves at high speed.

Clearance - .0008-.0012". Measure piston with micrometer placed 1/8" below cross slot and 1/8" to either side of vertical slot, with piston at 70°F. Subtract .0001" for every 6° above 70°F.

Removal - Piston and rod assemblies removed from above. Install connecting rod Guide Studs J-3224 on connecting rod bolts to guide rod out through bore without nicking or damaging it.

Fitting New Pistons: Use micrometer or feeler gauge *See "Pistons" in Cadillac Special Data.*

Replacement Pistons: Standard (3 sizes Code K,L,M) and .010" (3 sizes Code KK, LL, MM), .020" & .030" Oversize with rings and pins.

Installing Pistons: Install in cylinder with piston pin boss marked "Rear" toward rear of engine. *See "Connecting Rods" (below) for installation on rods.*

PISTON PIN

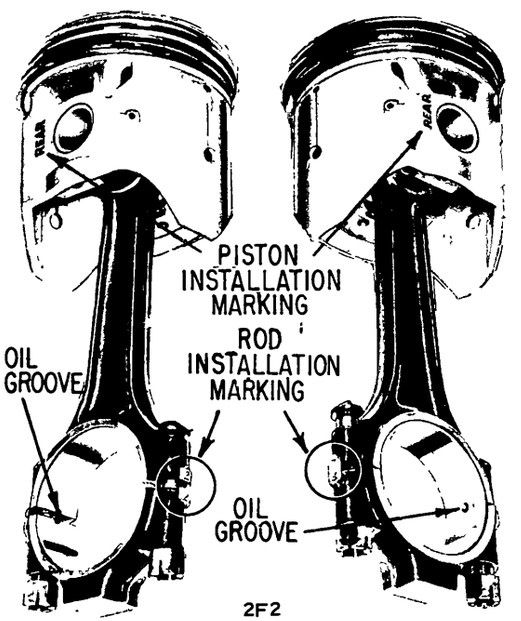
Pins are selective fit in pistons and not available separately. When high mileage wear sufficient to cause tapping or knock, replace piston and pin assembly.

Diameter - .9994-.9997". Length - 3 3/32".

Pin Fit in Piston - .00005-.0001" clearance at 70°F. Not fitted in field (replace piston & pin assembly).

Pin Fit in Rod - *(NOTE* - Special tools required). *See "Piston Pins" in Cadillac Special Data.*

Replacement Pins: Furnished with new pistons only.



RIGHT BANK LEFT BANK

CADILLAC PISTON & ROD ASSY

PISTON RINGS

Piston rings are 2-in-1 chrome set with side sealing type oil ring.

Ring	Width	End Gap	Sid Cl aranc
Compr. 1&2	5/64"	.013-.029"	.0022-.0035"
Oil	3/16"	.013-.029"	©

© - Three-piece type, side sealing.

Replacement Rings: Standard, .020" and .030" Oversize.

Installing Rings: Chamfered inner edge of both compression rings must be installed toward top of piston.

CONNECTING ROD

Length - 6.5" (center-to-center).

Crankpin Journal Diamet r - 2.2488-2.2493".

Out-of-Round Limits - .00025" maximum.

Bearings - Moraine 400. Bearing shell is steel backed aluminum. Bearing halves are interchangeable. No shims.

Clearance - .0005-.0020" (Service limit .0035").

Replacement Bearings: Furnished in standard size only.

Installing Rods: Install piston and rod in cylinder bore with REAR on piston toward rear of engine and numbers on lower end of rod down. Numbers 1, 3, 5, 7 are in left bank; 2, 4, 6, 8 are in right bank.

CRANKSHAFT

Journal Diameter - 2.625"

Out-of-Round Limits - 00025"

Bearings - Rear, Moraine Durex 100A. All other bearings are Moraine 400 Aluminum

Clearance - .0008-.0025". Wear limit .0045".

Replacement Bearings: Furnished in standard size only.

►*REAR MAIN BEARING ALIGNMENT NOTE:* For thrust bearing surface alignment *see "Crankshaft & Main Bearings" in Cadillac Special Data.*

End Thrust: Taken by flanged rear main bearing.

Endplay - .001-.007". Wear limit .010".

Crankshaft Removal: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Cadillac Special Data.*

CAMSHAFT

►*CAUTION:* Handle shaft with care to avoid damage

Removal, Alignment & Installati n - S *"Camshaft & Bearings" in Cadillac Special Data.*

Bearings - Steel backed babbitt bushings.

Clearance - .001-.0022" (service limit .004" max.).

Bearing Out-of-Round Limit - .002" max.

Timing Chain: Link-Belt side guide type. **Width** - 11/16", **Pitch** .500", **Length** 23" or 46 links.

Camshaft Setting: Both sprockets marked "0". Mesh chain with sprockets turned so that marks adjacent and in line with straightedge across shaft.

VALVES

Tappet Clearance: None in service, hydraulic.

Valve	Head Diam.	St m Diam.	L ngth
Intake	1.875"	.3415-.3425"	4.717-4.688"
Exhaust	1.500"	.3415-.3420"	4.727-4.694"

Valve	Seat Angle	Lift	Stem Cl arance
Intake	©45°	45"	②.0005-.0025"
Exhaust	©45°	45"	②.0010-.0025"

© - Valve face angle 44°.

② - New valves and guides. Wear limit .005" max.

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*NEW VALVE SEAT CAUTION: DO NOT lap or grind so that seat width is more than 1/64" (due to difference of 1° between valve seat and valve which is designed to provide "hairline" contact.*

►*VALVE GRINDING & SPRING HEIGHT CAUTION:* When valves ground on engines before Engine No. 027755, shims should be installed on cylinder head under valve springs to compensate for metal removed from valve and head and restore valve spring pressures. These shims furnished in Kit No. 3632098. *DO NOT use shims on engines after No. 027755. See Cylinder Head Production Change above.*

Valve Seat Recommendations - 3/64-1/16" (moderate speed or city driving), 1/16-3/32" (high speed driving). Cut seat so that distance from outer edge to edge of flange on valve head is no more than 1/32".

Valve Stem Oil Seal: Rubber "O" ring seal installed in lower groove on valve stem below valve keeper.

Valve Stem Oil Seal Check & Installation - Place 1" diameter suction cup on valve spring retainer. Cup will not stick to retainer when pumped up and down if seal leaks. To install new seal without removing valve, proceed as follows: Remove spark plug at affected cylinder, insert Valve Holder J-3213-1 in plug port to hold valve up and seated. Reinstall nearest rocker arm bolt and position Valve Spring Compressor J-5892-1 under bolt head and depress valve spring. Remove valve lock and seal. Release spring tension to replace spring.

Valve Guides: Pressed in cylinder head from combustion chamber side with longest chamfer end pointing toward rocker arm side of head. Use Remover Tool J-3062 to drive out old guide (toward top of head) and installer Tool J-3066 to drive new guide in (tool serves as stop for driver).

Valve Springs: Free length 2.25" approximately.

Valve Spring Specifications

	Pressure	Length
Valve Closed	60-65 lbs.	1.946"
Valve Open	155-165 lbs.	1.496"

►*SPRING INSTALLATION CAUTION:* Lower end of valve spring must be seated in cylinder head.

Valve Lifters: Hydraulic.

►*HYDRAULIC LIFTER PRODUCTION CHANGE:* Lifter with fused carbide foot used in production beginning Engine No. 048100. Improved lifter does not have joint line on body but is interchangeable with previous type (same part number).

See "Valve System" in Cadillac Special Data.

Valve Lifter Removal - *See "Valve System" in Cadillac Special Data.*

Rocker Arm Assembly: *See "Valve System" in Cadillac Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE: Specifications are "Without Ramp".*

Valve Timing Specifications

Intake Valves - Open 39° ℄BTDC. Close 105° ALDC.
Exhaust Valves - Open 85° ℄BLDC. Close 59° ATDC.
℄ - At .001" lift.

Valve Timing Check - Not practical to check in field. Manufacturer recommends removing timing chain cover and checking timing gears.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Cadillac Special Data.*

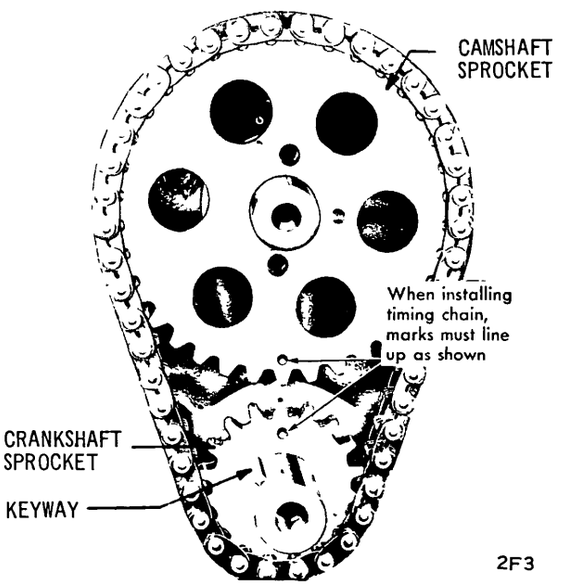
Crankcase Capacity: 4 qts. refill, 6 qts. with filter change.

Normal Oil Pressure: 30-35 lbs. min. at 30 MPH. 15 lbs. at idling speed.

Pressure Regulator Valve - On oil pump. Not adjustable.

Oil Pressure Indicator - Light on instrument panel controlled by pressure switch AC No. 1508767 mounted on engine.

Oil Pump: Helical gear, mounted on rear main bearing cap.



CADILLAC VALVE TIMING MARKS

Oil Pump Removal & Overhaul - *See "Oiling System" in Cadillac Special Data.*

Oil Filter: Full flow type, with throw-away type filter element, located on right rear side of engine block near starter. Replace filter element at 6,000 miles and then each six months or 4,000 miles thereafter.

►*OIL FILTER INSTALLATION CAUTION:* Screw new filter element onto stud by hand until gasket touches filter base, then tighten element additional 2/3 turn. DO NOT OVERTIGHTEN.

Crankcase Ventilation: Standard Cars - Air intake in oil filler cap (oil wetted type) with road draft tube from rear of valve rocker cover extending down below engine at right rear corner. Clean and re-oil breather cap at every engine oil change.

Positive Crankcase Ventilation Cars - Air intake in oil filler cap with road draft tube replaced by a hose from rear of valve rocker cover to ventilation valve mounted between carburetor and intake manifold to provide complete recirculation of engine gases. *CAUTION - On this system, filler cap air intake must be serviced at recommended interval (whenever oil filter changed - see Std. Cars above) to insure proper operation of system and to prevent other engine or carburetion troubles. Also, ventilation valve must be serviced at this time. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Four blade fan (Std.), seven blade fan with shroud and thermostatically controlled clutch (Air Cond. Cars).

Water Capacity: 18½ qts. (All) less heater; 19¼ qts. (Exc. Ser. 75); 20¾ qts. (Ser. 75) with heater.

Pressure Valve - 13½-16½ lb. radiator filler cap.

Pressure Valve: AC No. RC-15, 13½-16½ lb. Radiator filler cap. Bayonet type with safety catch. Rotate to left against stop to relieve pressure before removing cap.

Thermostat: Dole type. Cadillac No. 3136531 (165°F), No. 3150205 (175°F). In water outlet at top of pump body.

Temperature Controlled Fan Clutch (Air Cond. Cars): When temperature around thermostatically controlled clutch is above 155°F, or outside temperature is higher than 90°F, clutch is coupled, permitting maximum fan speed of 3500 RPM. When underhood temperature is below 120°F or outside air temperature is below 70°F, clutch will uncouple, limiting maximum fan speed to 2100 RPM. Unit is serviced as an assembly only.

Water Pump: Packless type, with sealed ball bearings.

Removal & Overhaul - *See "Cooling System" in Cadillac Special Data.*

Temperature Gauge: AC Electric type.

Dash Unit - AC No. 1513993 (Series 75 & CC), No. 1514468 (Others).

Engine Unit - AC No. 1513130.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

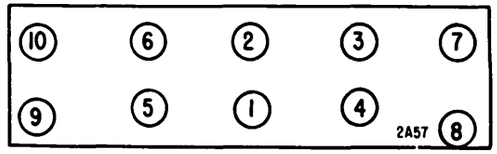
	Ft. Lbs.
Cylinder Head	90-95
Manifold (2 Center) Clamp Bolts	25-30
Manifold (Outer) Clamp Bolts	15-20
Int. Man. to Exh. Man. Nuts	15-30
Oil Pan (Size 1/4" - 20)	6 1/2 - 7 1/2
(Size 5/16" - 18)	12 1/2 - 15
Main Bearing Caps	45-55
Flywheel	50-65
Fan Blade to Hub	5-6
Crankshaft Pulley to Hub (4 Cyl.)	15-20
Connecting Rod Caps	30-35
Camshaft Thrust Plate	6-7 1/2
Rocker Arm Cover	3-4
Engine Front Cover	6 1/2-7 1/2
Water Pump	13-17
Water Outlet	18-23
Thermostat Housing to Cyl. Head	25-30
Oil Pump	9-11
Oil Pump Cover to Body	5-6
Oil Filter	Hand Tight
Clutch Housing Cover Plate	6 1/2-7 1/2
Clutch Housing to Crankcase	28-38

ENGINE

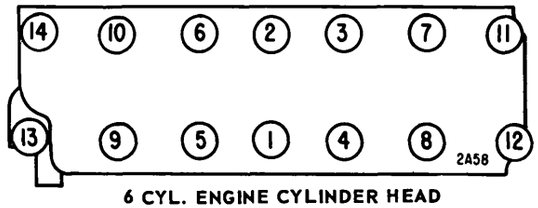
ENGINE REMOVAL: Raise car and place on jackstand. Drain cooling system and crankcase. Remove hood, disconnect radiator and heater hoses at engine. Disconnect battery. Remove radiator and shroud assembly (4 Cyl.), radiator (6 Cyl.). Remove air cleaner, disconnect all accessible wires. Disconnect fuel line at fuel pump and disconnect accelerator control linkage at firewall. On 4 Cyl., disconnect hand choke linkage. On all cars, disconnect exhaust pipe from manifold. Disconnect clutch cross shaft bracket at frame and disconnect clutch pushrod, spring and pedal linkage. On Auto. Trans. Cars, remove transmission oil filler tube and plug opening. On all cars, remove rocker arm cover and road draft tube. Install engine lifting tool in two cylinder head bolt holes. Attach to hoist and secure engine. Remove drive shaft by removing universal joint U-bolts. Plug end of transmission extension housing. Disconnect steering linkage idler arm bracket from right side rail and lower linkage for clearance. Remove engine rear mounting bolts. Disconnect speedometer cable and transmission control rod linkage lower ends. Loosen engine front mounting bolts and raise engine slightly and remove front engine mounting bolts, nuts, washers. Remove transmission crossmember and free transmission rear mounting. *CAUTION - Unless sufficient weight has been taken off crossmember, the transmission extension or crossmember may suddenly swing downward.* Remove engine and transmission as a unit from vehicle.

CYLINDER HEAD & MANIFOLD

CYLINDER HEAD INSTALLATION & REMOVAL: Removal - Drain cooling system, remove air cleaner, and disconnect all lines and hoses from carburetor. Remove intake and exhaust manifolds and carburetor as an assembly. Remove retaining clip from water outlet and disconnect wiring harness from rocker arm cover. Disconnect radiator hose and battery ground strap from cylinder head. Remove spark plugs. Remove coil on 6 Cyl. On all cars, remove rocker arm cover. Back off rocker arm adjusting nuts and pivot rocker arms to clear pushrods, then remove pushrods. Remove cylinder head.



4 CYL. ENGINE CYLINDER HEAD



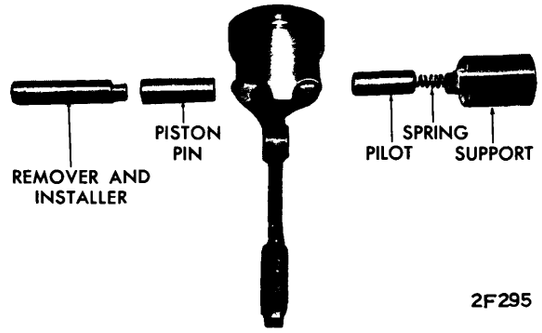
6 CYL. ENGINE CYLINDER HEAD

Installation - Reverse removal procedure. Coat cylinder head bolts with sealing compound and tighten to specifications in sequence shown in diagram.

PISTON PINS

PISTON PINS: Removal - Install pilot of Piston Pin Removing & Installing Tool J-6994 on piston pin. Install piston and rod assembly on support and place assembly in an arbor press. Press pin out of connecting rod.

Installation - Lubricate piston pin holes in pistons and connecting rods. Position rod in piston so that flange or heavy side of rod at the bearing end will be towards front of piston (cast depression in top of piston head). Install pin on installer and pilot spring and pilot in support. Install piston and rod on support (indexing pilot through piston and rod). Using an arbor press, start pin into piston and press on installer until pin pilot bottoms. Check piston pin for freedom of movement in piston bore.



PISTON PIN ASSEMBLY

CRANKSHAFT & MAIN BEARINGS

MAIN BEARING REPLACEMENT (With Engine in Car): Remove oil pan, spark plugs, cap on main bearing, and remove bearing from shell. Install main bearing shell removing and installing tool in crankshaft oil hole. *NOTE - If such tool not available, a cotter pin may be bent and used.* Rotate crankshaft clockwise to roll upper bearing shell out of engine. Oil new bearing shell and insert plain (unnotched) end of shell between crankshaft and indented or notched side. Rotate bearing into place. Install new bearing shell in bearing cap. Check bearing clearance. Install oil pan and spark plugs.

REAR MAIN BEARING OIL SEAL: Can be replaced without removing crankshaft. *NOTE - Always replace upper and lower seal as a unit.* Drain crankcase and remove oil pan. Remove oil seal from groove, prying from bottom (small screwdriver). Clean crankshaft surface and install well lubricated seal in bearing cap groove (keep oil off of parting line surface) and gradually push until seal is rolled into place (use a hammer handle). To replace upper half of seal, use a small hammer and brass pin punch to tap one end of seal until it protrudes enough to be removed with pliers. Install bearing cap and torque to specifications.

CRANKSHAFT PULLEY

4 CYLINDER ENGINE

CRANKSHAFT PULLEY: Pulley is bolted on flanged hub by three bolts (two 3/8", one 5/16") to ensure correct location of timing mark on pulley rim.

Removal - Drain radiator, disconnect hoses, remove radiator core and shroud as an assembly. Remove fan belt. Remove pulley. Install puller tool, No. J-6978, on hub using two 3/8" x 2" and one 5/16" x 2" bolts, remove hub. Do not use key in crankshaft.

Installation - Coat seal contact area on hub with engine oil, position hub on crankshaft with key aligned with keyway, use Tool J-5590 to drive hub on shaft until it bottoms against crankshaft gear *(NOTE - Crankshaft extends through hub and tool must be used to ensure seating hub properly on shaft).* Install pulley and tighten mounting bolts securely.

HARMONIC BALANCER

6 CYLINDER ENGINES

HARMONIC BALANCER: Balancer consists of an inertia weight pressed on a hub and procedure below must be used when removing and installing balancer to prevent inertia weight shifting on hub.

Removal - Drain radiator, disconnect radiator hoses, remove radiator core, remove fan belt. Install puller tool, No. J-6978, using bolts in tapped holes in face of balancer, remove balancer.

Installation - Coat seal contact area of balancer hub with engine oil, assemble special balancer installer tool, No. J-8792, on balancer *(see TOOL J-8792 NOTE below)*, position balancer on crankshaft with key aligned with keyway and drive balancer on shaft until it bottoms against crankshaft gear, remove tool.

TOOL J-8792 NOTE - This tool also used on V8 engines (different set-up) and must be assembled exactly as follows for use on 6 Cyl. Engines: Thread Driver into Clamp on deep finger side of clamp (side marked V8), insert pilot in end of driver on opposite side of clamp with smaller end in toward clamp, secure pilot with machine screw. Install tool assembly on balancer with shallow fingers of clamp engaging pulley rim on balancer.

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ENGINE FRONT COVER

FRONT OIL SEAL INSTALLATION: Remove crankshaft pulley (4 Cyl.), harmonic balancer (6 Cyl.). *See Crankshaft Pulley and Harmonic Balancer above.* Drain oil and remove oil pan. Remove timing gear cover and gasket. Pry oil seal out of cover from front with a large screwdriver. Install new seal with lip (open side of seal) toward inside of cover and drive or press seal into place with Tool J-0995 (with cover removed) or Tool J-8340 (with cover in place).

CAMSHAFT & BEARINGS

CAMSHAFT REMOVAL & INSTALLATION: Drain crankcase and radiator. Remove radiator and grille. Remove rocker arm cover and rocker arm shaft assembly. Remove coil and valve side cover, pushrods, and lifters. When removing distributor, note position of rotor. Remove vibration dampener (6 Cyl. - See above), or crankshaft pulley (4 Cyl.). On all engines remove oil pan and engine front cover (see above). Remove camshaft thrust plate screws and remove camshaft and gear. *CAUTION - Support shaft carefully to prevent bearing damag .*

Installati n: Reverse removal procedure and note the following: When installing a replacement camshaft, one 16 oz. can of "E.O.S" (Engine Oil Supplement Part No. 3755788) should be added to crankcase and, if practical, at the same time pour 2 or 3 ounces directly on the newly installed camshaft. Molybdenum disulphide ("Molykote" or equivalent) should be applied to the foot of each valve lifter. Drain out the engine oil containing "E.O.S." after engine has been driven its normal oil change period.

CAMSHAFT LOBE LIFT CHECK: Remove valve rocker covers and gaskets, remove rocker arms and balls. Attach Tool J-8520 to stud, then position clamp and indicator with ball socket adapter of Tool J-8520 to pushrod. *NOTE - Pushrod must be in lifter socket.* Rotate crankshaft slowly in direction of rotation until lifter is on heel of cam lobe. At this point, pushrod will be at lowest position. Set dial indicator to zero, then rotate crankshaft slowly, or attach an auxiliary starter switch and "bump" engine over, until pushrod is in fully raised position. *NOTE - Ground primary wire on coil when cranking ngin .* Total lift on dial indicator should be .1914". To check reading for accuracy, continue to rotate engine until dial indicator reads zero.

CAMSHAFT BEARING REPLACEMENT: Removal - With camshaft and flywheel removed, drive out expansion plug from rear cam bearing by driving from inside. Position bearing pilot in inner bearing. Install nut on puller screw far enough so puller screw can be threaded into pilot while nut extends out front of block. Install remover section onto puller screw, then install screw through cam bore and thread it into pilot. Using two wrenches, hold screw shaft and turn puller nut to remove bearing. On 6 Cyl. Eng., repeat operation on other inner bearing from rear of engine. Drive out front and rear bearings from outside to inside of block.

Installati n - Inner bearings should be installed first. Install inner bearing on pilot and position to rear of inner bearing bore and install screw shaft (with remover adapter on it) through block from front of engine into pilot. Align oil hole on bearing with oil hole from oil gallery. Snug puller nut against adapter. Using two wrenches, hold screw shaft and turn puller nut to pull bearing into place. *NOTE* - Oil hole on top side of bearing shell cannot be seen during installation, so first align bearing shell oil hole with oil hole in bore and mark opposite side of bearing and block at bore to easily index oil hole during installation. On 6 Cyl. engines, repeat operation from rear of engine to install inner bearing. Install new No. 1 bearing on pilot with drive handle attached. Align oil hole on bearing with oil hole from oil gallery and drive bearing in from front of engine. *CAUTION - The front bearing must be driven approximately 1/8" behind front of cylinder block to uncover oil hole to timing gear oil nozzle.* Repeat above procedures to drive rear bearing into position from rear of block. *NOTE* - Rear bearing installed position is flush with inner edge of rear cam bearing bore in block. Install new expansion plug at rear bearing.

VALVE SYSTEM

VALVE STEM OIL SEALS

VALVE STEM OIL SEAL INSTALLATION: Place valve in the port and place valve spring and cap in position. Place spring and rotator on valve. Then using Tool J-8062 compress the spring and install the oil seal and valve keys. See that the seal is flat (not twisted) in the lower valve stem groove and that the keys seat properly in upper valve stem groove. Install all valve stem seals in same manner.

VALVE GUIDES

VALVE GUIDE REAMING FOR OVERSIZE VALVE STEMS: Valves with oversize stems are furnished for inlet and exhaust valves in .003", .015" and .030". Use 3/8" diameter reamer sizes from Reamer Tool Set J-7049. J-7049-7 (Std.), J-7049-4 (.003"), J-7049-5 (.015"), & J-7049-6 (.030"). Ream to next oversize.

ROCKER ARMS

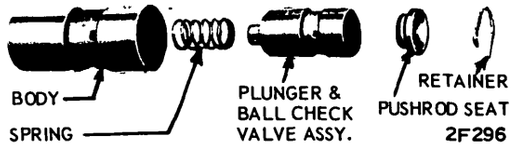
ROCKER ARM STUD REPLACEMENT: Damage rocker arm studs may be replaced with Std. size studs. Loose studs should be replaced with .003" or .013" Oversize studs after reaming rocker arm stud holes with Tool J-5715 (.003") or J-6036 (.013"). Remove old stud by placing Tool J-5802 over stud, installing nut and flat washer and removing stud by turning nut. Ream hole for oversize, if necessary, then coat press-fit area of stud with hypoid axle lubricant. Install new stud using Tool J-6880. Tool should bottom on head.

HYDRAULIC LIFTERS

HYDRAULIC VALVE LIFTERS: Barrel type consisting ing of plunger and valve assembly operating within a cylinder formed by valve lifter body (see illustration). Oil is introduced to this unit through oil gallery in block.

Removal: Remove rocker arm assemblies, pushrod cover, pushrods and valve lifters. *NOTE* - Keep valve lifters and pushrods in order so they may be reinstalled in original positions.

Disassembly: Use Tool J-4274 and hold plunger down and remove plunger and pushrod seat retainer with a small screwdriver blade. Remove pushrod seat, plunger,



HYDRAULIC VALVE LIFTER

ballcheck valve assembly, and plunger lifter spring. Clean all parts in solvent and inspect each part for nicks or burrs and wear. Replace lifter assembly if any part damaged or has excessive wear.

Reassembly: Drop lifter spring into body. Install plunger and ball check valve assembly into body, using care to align feed holes in body and plunger . Fill lifter with SAE 10 oil, insert end of Tool J-4274 into plunger, and press down solidly. Insert Pin (Part of Tool J-4274) through oil feed holes to hold plunger against spring tension and remove other part of tool. Fill lifter with SAE 10 oil and install pushrod seat and spring retainer. Remove tool pin.

OILING SYSTEM
ENGINE LUBRICATION

DESCRIPTION: Positive pressure lubrication is provided to all main, camshaft and connecting rod bearings and to all valve lifters and rocker arms. The main oil gallery at right side of block distributes all lubrication.

OPERATION: Gear type oil pump flange mounted to cylinder block (at right side) and driven by distributor drive shaft draws oil from oil pan through a floating screen and delivers it through an opening in mounting flange to cylinder block, then into the full flow oil filter. The oil pump cover is equipped with a pressure regulator valve. Bypass valve located in filter base. Oil flows from filter to main oil gallery and is then distributed as follows:

Crankshaft & Camshaft Bearings - Each main and camshaft bearing is fed oil by a passage extending through crankcase webs from main oil gallery.

Connecting Rods & Pistons - Oil is delivered from each main bearing to adjacent connecting rod bearing through drilled passages in crankshaft. A hole in connecting rod sprays oil onto cylinder walls for piston and pin lubrication, when holes in rod and journal index. Oil hole in rod is towards camshaft side of engine.

Valve Lifters - Main oil gallery intersects lifter bores and lifters are supplied with oil directly from gallery. Lifter has metering valve directly below hole in pushrod seat to permit oil to pass into hollow pushrod.

Rocker Arms & Valve Stems - Oil passes up through hollow pushrods to a hole in upper end of pushrods that matches hole in rocker arm. Oil sprayed from this hole and across rocker arm lubricates valve stem tip. Oil in rocker arm chamber drains down through pushrod holes to valve lifter chamber, then returns to crankcase through drain holes.

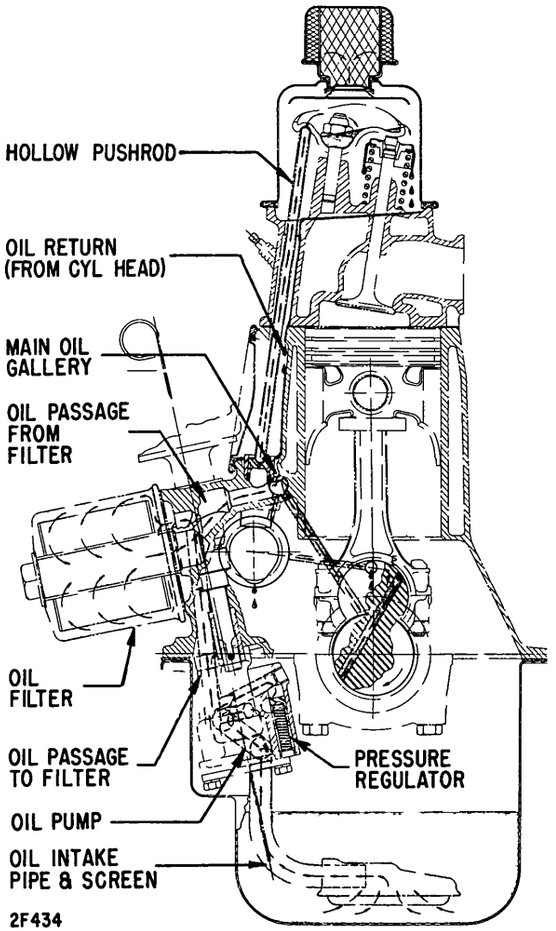
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Timing Gears - Lubricated by oil flow from nozzle pressed in front face of block above crankshaft gear. Oil is fed to nozzle through cross-passage from front camshaft bearing.

Distributor Drive Gear - Lubricated by oil drainage from valve lifter compartment (drain hole directs oil onto gears).

OIL FILTER: Full-flow type mounted on right side of engine. Bypass valve located in filter base. Receives oil from passage in crankcase and delivers it to main oil gallery. Replace filter cartridge every 4000 miles.



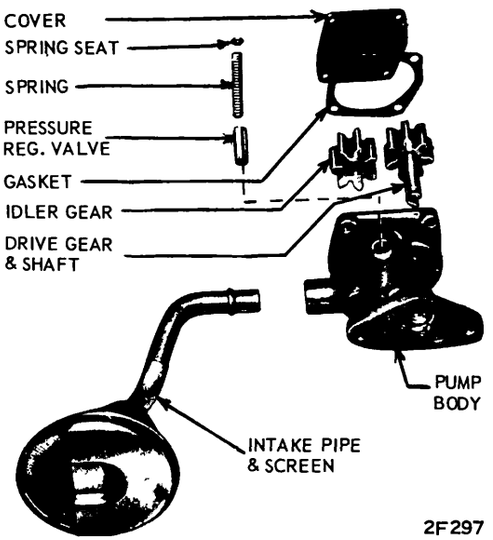
ENGINE OILING SYSTEM

OIL PUMP

OIL PUMP: Removal & Disassembly - Drain oil and remove oil pan, *see Car page*. Remove mounting bolts and remove pump and screen assembly. Remove 4 cover screws, cover, gasket, idler gear and drive gear and shaft. Remove pressure regulator valve and valve parts. If necessary, pull out oil pump suction pipe and screen. *NOTE* - DO NOT disturb oil pickup pipe on screen (pipe is located at assembly).

Inspection - Wash all parts in cleaning solvent and dry with compressed air. Replace pump assembly if any of the following conditions are found: 1) Pump body cracks or excessive wear. 2) Excessive wear or damage to gears. 3) Excessive shaft looseness in housing. 4) Excessive wear on inside of cover that would permit oil to leak past gears. 5) Damaged pickup screen or relief grommet or oil in air chamber. 6) Poor pressure regulator valve fit in cover.

Reassembly & Installation - Install drive gear and shaft in pump body, install idler gear with smooth face toward pump cover. Install suction pipe and screen assembly on cover, then install cover on pump body with new gasket, tighten cover screws to specifications. Check to see that shaft turns freely with cover tightened. Install all pressure regulator valve parts in order. Align slot in pump drive shaft with tongue on end of distributor shaft and mount pump on lower face of cylinder block (*CAUTION - Do not use a gasket on pump mounting flange*). Pump mounting flange should fit freely over end of distributor shaft lower bushing. Tighten pump mounting screws to specifications.



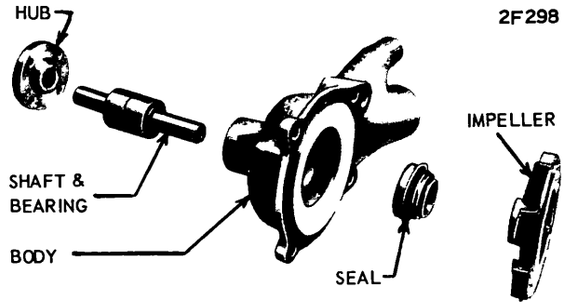
ENGINE OIL PUMP

COOLING SYSTEM

WATER PUMP

WATER PUMP REMOVAL: Drain radiator and remove water inlet hose from pump. Remove fan belt. On heater equipped cars, remove hose from pump housing. On all models, remove water pump attaching bolts, then remove pump. *CAUTION - Pull pump straight out of cylinder block to avoid damage to impeller and shaft.*

Disassembly - Remove fan and pulley. Support fan hub in an arbor press and press pump shaft out of hub. Then support pump in an arbor press and press shaft and impeller assembly out rear of pump, applying pressure on outer race of shaft bearing (use a 7/8" deep socket or a piece of tubing 1 1/8" O.D.). *CAUTION - Do not press on shaft or bearings will be damaged.* Use Tool J-5855 and a 1/2" x 2" pin in an arbor press to press shaft out of impeller (support impeller on seal surface). Discard old seal.



ENGINE WATER PUMP

Reassembly - Install pump shaft and bearing assembly into pump body bearing bore, applying pressure to outer race until it is flush with front of pump body. *CAUTION - Apply pressure to outer race only.* Lightly coat O.D. of new seal with sealing compound and press into place. Using Tool J-5590, apply pressure to seal outer flange. Seal should bottom with outer flange against body of pump. Press on fan hub and check fan hub location. Measure from pump body gasket surface to outer or front side of hub, using Tool J-9583 (installed in pump mounting hole - end of tool should contact bed plate on press ±.005"). Support pump on front or hub end of shaft and press on impeller. Press to obtain .010-.035" clearance between impeller vanes and pump body. Install pump cover and gasket (with a light coat of gasket sealer) and tighten screws diagonally. Install pump pulley and fan on pump hub and tighten securely. Install pump assembly on cylinder block and tighten bolts securely. Use a new pump-to-block gasket. Install hoses and fill radiator.

IGNITION NOTES

DISTRIBUTOR DRIVE SHAFT LOWER BUSHING: This bushing pressed in cylinder block (with or without washer at upper end of bushing bore) and serves as lower bearing for distributor shaft. Replace bushing (and washer, if used) when shaft-to-bushing clearance exceeds .0035".

Removal: Use Tool J-9534 and slide hammer to remove old bushing from lower face of cylinder block. If washer found in bushing recess in block, drive old washer out with a drift.

Installation: If washer used, drive new washer up in place in block with Tool J-9535. Position new bushing on Tool J-9535 (use driver-bolt in driver handle) and drive bushing up into position in block until tool bottoms against block, remove tool from bushing. *NOTE* - Bushing may slightly seize installer arbor during installation. If this occurs, remove tool by using slide hammer in driver bolt hole of driver handle (will not damage bushing).

►*JACKING & HOISTING CAUTION: B f r jacking, hoisting, r wo king und r car, s "Jacking & Hoisting Pr cauti ns" in Susp nsion & Wh el Alignm nt S cti n.*

►*PUSH-STARTING DELCOTRON EQUIPPED CARS:* Turn off all electrical loads except ignition to insure ample closing voltage for the field relay coil. Once engine started, electrical loads may be added.

MODEL IDENTIFICATION

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar. Number (example below) includes identification data.

① ② ③ ④
2 0211 F 100001

① - Model Year. 2 1962.
② - Body Style (preceded by "O"). *See below.*
③ - Assembly Plant. *S b low.*
④ - Beginning vehicle number at each assembly plant.

Body Styl Designation
Ch vy II 100 Standard

B dy Styl	4 Cyl.	6 Cyl.
2-Door Sedan	111	211
4-Door Sedan	169	269
4-Door Station Wagon	135	235

Ch vy II 300 Deluxe

Body Styl	4 Cyl.	6 Cyl.
2-Door Sedan	311	411
4-Door Sedan	369	469
4-Door Station Wagon	345	445

N va 400

B dy Styl	6 Cyl.
2-Door Sedan	441
2-Door Sport Coupe	437
4-Door Sedan	449
2-Door Convertible	467
4-Door Station Wagon	435

Assembly Plant Designation

A - Atlanta	J - Janesville	O - Oakland
B - Baltimore	K - Kansas City	S - St. Louis
F - Flint	L - Los Angeles	T - Tarrytown
G - Framingham	N - Norwood	W - Willow Run

ENGINE NUMBER: Stamped on pad on right side of cylinder block at rear of distributor. Number (example below) includes identification data.

① ② ③ ④
F 12 10 E

① - Engine Assembly Plant. F Flint, T Tonawanda.
② - Month of Manufacture. 12 December.
③ - Day of Manufacture. 10 Tenth.
④ - Engine Type. *S below.*

Engin C d Designation

Engin & Equipment	Code Letter
4 Cyl. Synchro-mesh	E
4 Cyl. Synchro-mesh & Heavy Duty Clutch	EB
4 Cyl. Powerglide	EG
6 Cyl. Synchro-mesh	H
6 Cyl. Synchro-mesh & Heavy Duty Clutch	HB
6 Cyl. Powerglide	HF

TUNE-UP

COMPRESSION PRESSURE: 130 lbs. at cranking speed with throttle wide open. Maximum variation between highest and lowest cylinders 20 lbs.

VACUUM READING: 17-21" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

Hydraulic Lifter Adjustment (Engine Running) - With engine at normal operating temperature and running at idle s peed, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops. This is "zero lash" position. Now turn nut an additional ½-turn and wait until engine runs smoothly. Continue to turn nut down in ½-turn increments until nut has been turned down 1 full turn from "zero lash" position. *CAUTION - Make adjustment slowly so lifter will adjust itself and prevent engine damage.*

MANIFOLD HEAT CONTROL: Automatic thermostatic type with counterweight in exhaust manifold outlet. Valve must operate freely.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

►*4 CYL. ENG. MIS-FIRE OR CUT-OUT: See "Coil Wire Caution" below.*

FIRING ORDER: 4 Cy. - 1-3-4-2. 6 Cyl. - 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.038" - Set at .035".

Spark Plugs - AC No. 46N. 14 mm. Torque to 20-25 ft. lbs.

COIL: Delco-Remy No. 1115165 (4 Cyl.), No. 1115166 (6 Cyl.).

►*4 CYL. ENG. COIL WIRE CAUTION:* Correct length of coil-to-distributor high tension wire is 13". Use of the 6 Cyl. Eng. wire (10") could result in mis-fire or engine "cut-out". Replace wire if not correct length.

Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.

Resistor - Pink resistance wire (1.8 ohms at 80°F) connected in circuit from passenger side of bulkhead connector to a splice near ignition switch. Bypassed during cranking by lead from starter solenoid.

DISTRIBUTOR: Delco-Remy No. 1110268 (4 Cyl.), No. 1110267 (6 Cyl.). Pivoted breaker plate type.

►*CAM ANGLE SETTING CAUTION:* Cam angle must be set with distributor on the engine (Can not be set accurately with distributor on bench since distributor shaft lower bushing is located in engine block).

Condenser - Delco-Remy No. 1928111.
Capacity - .18-.23 mfd.
Contact Point Set - Delco-Remy No. 1954557.

Breaker Gap - .019" (new points), .016" (used points).
Cam Angl - 31-34°.
Br aker Arm Spring Tensi n - 19-23 ozs.
R tation - Clockwise viewed from above.

Automatic Advanc - 1110267

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	375	0-4	750
5-7	700	10-14	1400
12-14	1150	24-28	2300

Automatic Advance - 1110268

Degrees Distr.	RPM	Degrees Eng.	RPM
.5-2.5	400	1-5	800
6-8	750	12-16	1500
9.5-11.5	1300	19-23	2600
13-15	1850	26-30	3700

Vacuum Spark Control: Delco-Remy No. 1116187 or 198.

Vacuum Advance - 1116187 & 198

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11-13.5	22-27	11.5

Distributor Drive Shaft Lower Bushing: For service information, *see "Ignition Notes" in Chevy II Special Data.*

IGNITION TIMING

Setting - 4 Cyl. - 4° BTDC (Range 4-10° BTDC).
6 Cyl. - 8° BTDC (Range 8-12° BTDC).

►*TIMING SETTING NOTE:* Set timing with engine running at idle speed and vacuum hose disconnected from distributor and taped closed.

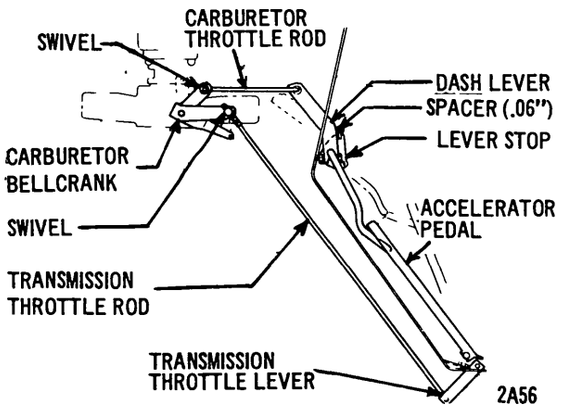
Timing Mark - Notch in pulley (4 Cyl.), vibration damper (6 Cyl.), and timing tab on engine front cover marked "O" (TDC) with 2° increment marks indicating advance. Align pulley or damper notch with correct mark on tab.

CARBURETOR

►*CARBURETOR APPLICATION: One Rochester B used on 4 Cyl. Eng., one Rochester BC used on 6 Cyl. Eng. Carter YF optional on all models.*

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): Disc nnect carburetor throttle rod at carbu-

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AUTOMATIC TRANSMISSION THROTTLE LINKAGE

S e INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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retor bellcrank and depress accelerator pedal fully so dash lever is against a .06" (1/16") spacer between dash lever and lever stop. Rotate carburetor bellcrank to wide open throttle position and adjust swivel on carburetor throttle rod so it freely enters hole in bellcrank. With accelerator pedal still depressed, disconnect transmission throttle rod from carburetor bellcrank (bellcrank still in wide open position), push downward on transmission throttle rod to reach full detent in transmission, then adjust swivel on transmission throttle rod so rod freely enters hole in carburetor bellcrank. **Lengthen rod 2 additional turns.** Remove spacer at dash lever.

ROCHESTER B & BC

Engine & Transmission	Carburetor No.
4 Cyl. Synchro-mesh (Early)	B 7020103
4 Cyl. Synchro-mesh (Late)	B 7020115
4 Cyl. Powerglide (Early)	B 7020104
4 Cyl. Powerglide (Late)	B 7020114
6 Cyl. Synchro-mesh	BC 7020105
6 Cyl. Powerglide	BC 7020108

►*BC 7020105 CARBURETOR LOAD-UP DURING WARM-UP CORRECTION & PRODUCTION CHANGE NOTE:* To minimize engine "load-up" after a cold start, change choke setting to INDEX. This change now in production.

►*4 CYL. CARBURETOR PRODUCTION CHANGE NOTE:* Carburetors Nos. 7020114 & 115 have new spring-loaded float needle valve assembly and seat unit that requires special float level adjustment, *see below.* For rework of earlier model carburetors, *see "Rochester B & BC Carburetors" in Carburetion Section.*

►*ENGINE SURGE CORRECTION:* To correct this condition on B or BC carburetors Nos. 7020103,104,105 or 108, *see "Rochester B & BC Carburetors" in Carburetion Section.*

Idle Speed - 600 RPM (4 Cyl.), 500 RPM (6 Cyl. Synchro-mesh), 600 RPM (6 Cyl. Powerglide in "D" Drive).

Float Level (Solid Float Needle) - 1 9/32" (Gauge M-250) with air horn inverted, gasket in place, and gauge tang inserted in discharge nozzle. Top of each float must just touch gauge and float must be centered between gauge legs. To adjust, bend float tang.

Float Level (Spring-Loaded Needle) - 1 9/32" (Gauge M-250) with air horn inverted, gasket in place and gauge tang inserted in discharge nozzle. While setting float level, a 1/32" shim must be inserted between head of float needle pin and float arm. Float adjustment is performed with float arm resting freely on shim. Bend float arms to adjust.

Float Drop - 1¾" (Gauge BT-93) from gasket surface to bottom of float with air horn upright and float hanging freely. To adjust, bend float tang.

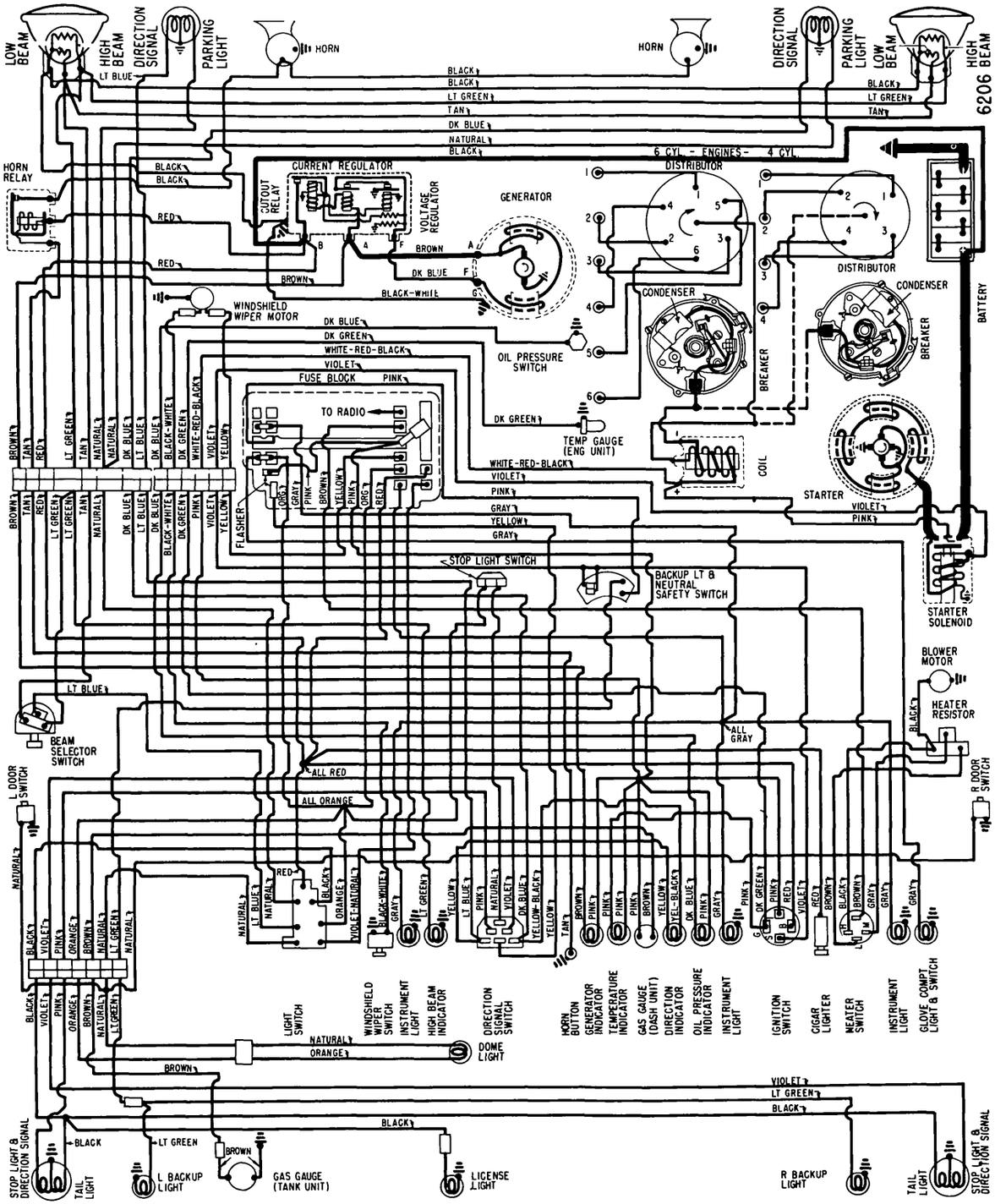
Fast Idle: No Adjustment. Will be correct when hot or slow idle correctly set.

Automatic Choke Setting: At INDEX. Supersedes previous specification for BC 7020105.

Throttl Linkag Adjustment: S e *CARBURETOR above.*

►*OTHER DATA: S "Roch ster B & BC Carburetors" in Carburetion S ction.*

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CARB. EQUIPMENT

Fuel Pump: AC No. 3540, stamped 5623540. Mechanical Pressure - 3½-4½ lbs. at 500-1000 RPM.
Gas line Gauge: AC Electric.
Dash Unit - AC No. 5643846.
Tank Unit - AC No. 5642018 (exc. 3-Seat Sta. Wgn.), No. 5642259 (3-Seat Sta. Wgn.).
Air Cleaner: Oil wetted plastic foam (Polyurethane) type. Clean and reoil every 4000 miles or sooner under severe operating conditions.
►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from wire mesh support and wash in solvent. Squeeze element (do not wring) to remove all solvent and reoil with 10W-30 engine oil.
Fuel Filter: In carburetor inlet. Clean at regular intervals (unnecessary to replace at each tune-up). *CAUTION - When installing, be sure small cone end faces outward.*

BATTERY

Delco No. 454 (Std.) - 12 volt, 9 plate, 42 ampere hour capacity (20 hour rate).
Delco No. 668 (Optl.) - 12 volt, 11 plate, 70 ampere hour capacity (20 hour rate).
Battery Ground - Negative, to cylinder head.
Engine Ground - Rear of cylinder head to firewall.

STARTER

Delco-Remy No. 1107216 & 247 (Synchro-mesh), No. 1107236 & 248 (Powerglide).
Armature - Delco-Remy.
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data (All)

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

① - Includes Solenoid.

GENERATOR

Delco-Remy No. 1100326 (4 Cyl.), 1102096 (6 Cyl.), 1102273 & 168 (Optional).
Armature - Delco-Remy No. 1928952 (1100326 Gen.), No. 1923535 (1102096 Gen.).

Performance Data - Cold (70°F)

Generator	Amperes	Volts	RPM
1100326	25	14.0	2710
1102096	30	14.0	2240
1102274	35	14.0	2630
1102168	35	14.0	2730

Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.5-1.62 amps. (1100326), 1.48-1.62 amps. (1102168), 1.69-1.79 amps. (1102096 & 274) at 12.0 volts and 80°F.
Belt Adjustment: Belt tension gauge should read 75 lbs. This supersedes previous specifications. Move generator in its mounting bracket to adjust.

GENERATOR REGULATOR

Delco-Remy. Used as follows:

Regulator No.	Generator No.
1119000	1100326
1119001	1102096
1119002	1102274
1119604	1102168

►*REGULATOR NOTE: Delco-Remy Regulator No. 1119604 has double contacts for voltage regulation.*

Cutout Relay
Cuts In - 11.8-13.0 volts (1119604), 11.8-13.5 volts (Others).
Contact Gap - .020".
Air Gap - .020" with contacts just touching.

Voltage Regulator
Setting (Exc. 1119604) - 13.8-14.7 volts at 125°F ambient temperature.
Setting (1119604) - 13.8-14.6 volts at 125°F ambient temperature. .1-.3 volt lower when operating on lower contacts.
Air Gap - .075" (Exc. 1119604), .067" (1119604) with armature pressed down to point where contacts just touch.
Contact Gap (1119604) - .016".

Current Regulator
Setting - 23.0-27.0 (1119000), 27.0-31.0 (1119001), 31.0-35.5 (1119002 & 604) amps. at 125°F ambient temperature.
Air Gap - .075" with armature pressed down to point where contacts just touch.
►*OTHER DATA: See "Delco-Remy 1119000 Series Single Contact Regulators" or "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

ALTERNATOR

Model	Delco-Remy Alternator No.
Air Conditioning	1100600 & 613
Optional	1100601
Optional Heavy Duty	1117765

Performance Data - Cold

Alternator	Amperes	RPM
1100600, 613	12	1100
	42	6500
1100601	5	1100
	52	6500
1117765	24	1100
	62	6500

Field Current - 1.9-2.3 amps. (1100600,601 & 613), 3.7-4.4 amps. (1117765) at 12 volts and 80°F.
►*OTHER DATA: See "Delco-Remy Delcotron Alternators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy. Transistorized and conventional types used as follows:

Regulator No.	Type	Alternator No.
1119502	① Conventional (3-Unit)	1100600, 601, 613
9000567 ②	③ Transistorized (2-Unit)	1117765

① - Contains a Voltage Regulator, Field Relay, and Indicator Light Relay.
② - Use with separate Indicator Light Relay, Delco-Remy No. 1115811.
③ - Contains a Voltage Regulator and Field Relay.

Field Relay
Closing Vltag - 6.5-8.5 volts (1119502), 5.0-9.5 volts (9000567).
Contact Gap - .015" (1119502), .027" (9000567).
Air Gap - .015" (1119502), .014" (9000567).

Voltage Regulator
Setting - 13.5-14.4 volts (1119502), 13.2-14.2 volts (9000567) at 125°F ambient temperature operating on upper contacts. .1-.3 volts lower operating on lower contacts.
Air Gap - .067" (1119502), .075" (9000567).

Indicator Light Relay (No. 1119502)
Closing Voltage - 3.8-5.2 volts.
Contact Gap - .010". **Air Gap** - .010".

Indicator Light Relay (No. 1115811)
Closing Voltage - 1.5-9.5 volts.
Contact Gap - .018".
Air Gap - .020" with contacts closed.
►*OTHER DATA: See "Delco-Remy Double Contact Alternator Regulators" or "Delco-Remy Transistorized Alternator Regulators ("B" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

Lighting Switch Removal: Pull control knob out to ON position. Reach under instrument panel and depress switch shaft retainer and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multiple plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.
Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.
Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.
Instrument Cluster Console & Instruments Removal: Loosen upper mast jacket retaining clamp and slide upward to free mast jacket. Loosen lower mast jacket retaining clamp and drop mast jacket and steering wheel down. Disconnect speedometer cable from speedometer and remove console-to-instrument panel attaching screws. Lean console forward onto mast jacket. Remove individual instrument as required. Remove console as a unit by unsnapping all wire connectors. To install, reverse removal procedure.
Speedometer Cluster Removal: After instrument cluster console removed (see above), remove four back panel-to-bezel attaching screw and separate parts carefully. Remove two screws attaching speedometer head to cluster back panel. To install, reverse removal procedure.
CIRCUIT BREAKERS: 15 Ampere - Headlight & Parking Light circuits. Integral with headlight switch.
FUSES: *Fuses are located in a junction block under dash panel.*
SAE 20 Ampere - Heater & Air Conditioning.
SAE 20 Ampere - Windshield Wiper Motor.
3AG/AGC 15 Ampere - Tail, Stop, Dome lights.
3AG/AGC 10 Ampere - Heater (without Air Conditioning).
3AG/AGC 10 Ampere - Back-Up & Brake Lights.
3AG/AGC 4 Ampere - Radio.
3AG/AGC 3 Amper - Instrument & Clock lights.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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ENGINE

►*OPTIONAL V8 ENGINE NOTE: 283" & 327" V8 engines are available as optional equipment. See "1962 Chevrolet V8 Cars & Corvette" data pages for all data on these engines.*

ENGINE SPECIFICATIONS: Own. 4 Cylinder or 6 Cylinder, overhead valve, cast iron block engine of conventional design. 4 Cyl. Engine has 5 main bearings, 6 Cyl. Engine has 7 main bearings. Rocker arms on all engines are individually mounted on studs installed in cylinder head.

Engine	Bore	Stroke	Displacement
4 Cyl.	3.876"	3.25"	153 cu. ins.
6 Cyl.	3.5635"	3.25"	194 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
4 Cyl.	8.5-1	24.0	90 at 4000 RPM
6 Cyl.	8.5-1	30.5	120 at 4400 RPM

Compression & Vacuum Reading - *See TUNE-UP.*

►*INACCURATE ENGINE OIL LEVEL READING CORRECTION (Early Cars):* Make sure dipstick retaining tube projects 2 5/16" (4 Cyl.), 1 13/16" (6 Cyl.) out of cylinder block.

OIL PAN REMOVAL: Drain crankcase, disconnect battery, and remove starter. Disconnect steering idler arm bracket at right frame side rail and swing steering linkage down for clearance. On 6 Cyl., remove front crossmember (let stabilizer bar hang down while removing crossmember on station wagons). On all cars, remove oil pan attaching bolts and remove oil pan. *NOTE* - When installing oil pan, install screws into timing gear cover last as they are installed at an angle and holes will line up after other pan bolts are installed.

ENGINE REMOVAL: *See "Engine" in Chevy II Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Chevy II Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevy II Special Data.*

PISTONS

Aluminum alloy, cam ground. Three rings used.

Removal - Pistons and rods removed from above.

Replacement Pistons: Furnished Std. & .001", .020", .030", .040" Oversize.

Fitting New Pistons: Clearance .0006-.0010" at bottom of skirt. Use .0015" x ½" ribbon feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder until center of piston pin is flush with top of cylinder block, with feeler 90° from piston pin hole. Pull required to withdraw feeler should be 7-18 lbs.

Installing Pist ns: Assemble piston to connecting rod so cast depression in piston head will be to front of engine. *S Rod Installation.*

PISTON PIN

Diamet r - .9270-.9273". **L ngth** - 2.990-3.010".

Clearanc In Piston: .00015-.00025". Pin should support its own weight in either pin boss when coated with light engine oil and at 60°F. *Higher or lower temper- will give false interpretations.*

Clearance In Rod: Press fit.

Piston Pin Removal & Installation: Special procedure and tools used. *See "Piston Pins" in Chevy II Special Data.*

Replacement Pins: Furnished with new pistons only. Replace piston and pin as a unit.

PISTON RINGS

Compression rings are cast alloy iron with upper ring chrome plated. Oil has two chrome plated steel rails and an expander spacer.

Ring	Width	End Gap	Side Clearance
Compr.(1)	.0775-.0780"	.010-.020"	.0020-.0035"
Compr.(2)	.0770-.0780"	.010-.020"	.0020-.0035"
Oil (3)	.184-.188"	.015-.055"	Snug

►*COMPRESSION RING INSTALLATION NOTE:* Install all rings with mark "GM" to top of piston. Inner bevel must be to top of upper ring, to bottom of lower ring.

Replacement Rings: Service type rings furnished Std. & .020", .030", .040" Oversize.

CONNECTING ROD

Length - 5.700"(center-to-center).

Crankpin Journal Diameter: 1.999-2.000". Out-of-round and taper limit .001".

Clearance - .0007-.0027".

Sideplay - .008-.014".

Installing Rods: Install pistons and rods in engine so cast depressions in piston head are to front of engine and oil hole in connecting rod is to camshaft side of engine.

Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.

CRANKSHAFT

NOTE - 4 Cyl. Eng. has 5 main bearings, 6 Cyl. Eng. has 7 main bearings.

Journal Diameter: 2.2978-2.2988". Out-of-round and taper limit .001".

Clearance - .0008-.0034".

End Thrust: Taken by rear main bearing.

Endplay - .002-.006".

Replacement Bearings: Std. & .002", .010", .020", .030" Undersize.

Bearing Installation: Not necessary to remove engine. *See "Crankshaft & Main Bearings" in Chevy II Special Data.*

Crankshaft & Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevy II Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Ch vy II Special Data.*

Vibrati n Damp n r (6 Cyl. Only): *S e "Vibration Dampner" in Ch vy II Special Data.*

CAMSHAFT

J urnal Diameter - 1.8682-1.8692". Out-of-round limit .001".

Bearings - Steel backed babbitt lined bushings.

Replacement Bearings: "Precision Type" (do not require reaming).

►*CAMSHAFT BEARING INSTALLATION CAUTION:* Outside diameter of bearings varies according to bearing number and engine listed below. Be sure bearings are installed in proper locations. No. 1 bearing must be installed to depth of 1/8" below front face of cylinder block.

Camshaft Bearing Outside Diamet r

Bearing No.	Outsid Diameter
6 Cyl. No. 1 & 4; 4 Cyl. No. 3	2.009-2.011"
6 Cyl. No. 2 & 3; 4 Cyl. No. 1 & 2	1.999-2.001"

End Thrust: Taken by thrust plate between camshaft sprocket and camshaft gear.

Endplay - .001-.005".

Camshaft Setting: Timing marks on both gears must be together.

Camshaft Removal & Installati n: *S "Camshaft & Bearings" in Chevy II Sp cial Data.*

Engine Front Cover Oil Seal (Crankshaft Fr nt S al): *See "Engine Front Cover" in Chevy II Sp cial Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters. *For op rating clearance adjustment, s "Tune-Up". F r initial adjustment after overhaul, s b low.*

Initial Valve Lash Adjustment - Use distributor rotor position for determining when lifter is on base circle of cam. With rotor pointing to No. 1 cylinder (points open), turn adjusting screw down until all lash is removed (by checking pushrod sideplay), then turn screw down an additional 1 turn and tighten locknut. Repeat on other valve for that cylinder. Continue to adjust valves for each cylinder using firing order sequence.

Valve	Head Diameter	St m Diameter	L ngth
Intake	1.715-1.725"	3410-.3417"	4.9025-4.9324"
Exhaust	1.495-1.505"	①	4.913-4.933"

Valve	Seat Angle	② Lift	St m Cl aranc
Intake	46°③	.335"	.0010-.0027"
Exhaust	46°③	.335"	④ .0015-.0032"

① - Top .3410-.3417"; Bottom .3400-.3407".
② - Cam Lobe Lift .1914".
③ - Valve Face Angle 45°
④ - At Center.

Valve Rotators - May be used.

Valve Seat Width - 1/32-1/16" Intake; 1/16-3/32" Exhaust.

Valve Springs: Single springs used on all valves. Install with closed coil end toward cylinder head.

Spring Free Length - 2.03" approximately.

Valve Spring Specificati ns

Valve	Spring Pressur	Length
Closed	84-92 lbs. ①	1.660"
Open	163-173 lbs.	1.330"

① - Wear limit 70 lbs. at 1.660".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Valv Spring Install d Height: Check installed height of valve spring from top of spring seat in cylinder head to top of valve spring shield. If height greater than 1 23/32", install 1/16" shim under spring at spring seat to bring height within limits of 1 21/32-1 23/32". *CAUTION - Installed height must not be less than 1 21/32".*

R ck r Arms: Individually mounted on studs installed in cylinder head.
R ck r Arm Stud R placement - *See "Rocker Arms" in Ch vy II Sp cial Data.*
Valve St m Oil S als (Replacement): *See "Valve System" in Chevy II Special Data.*

Valv Guid s: Integral with cylinder head. *See "Valve System" in Chevy II Special Data.*
Valv Lift rs: Hydraulic on all models. *For overhaul proc dures, see "Valv System" in Chevy II Special Data.*

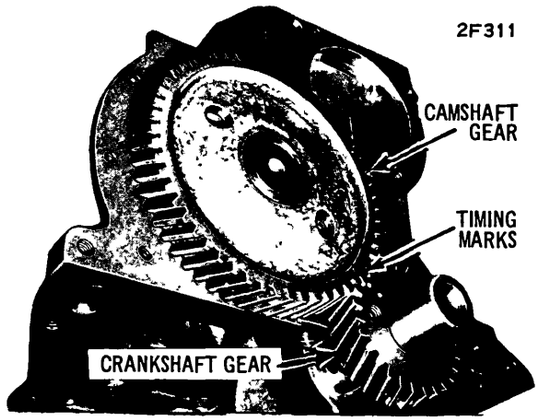
VALVE TIMING

S e *"Camshaft S tting" under CAMSHAFT above.*

Valv Timing Specifications
Intak Valv s - Open 34° BTDC. Close 86° ALDC.
Exhaust Valv s - Open 68° BLDC. Close 52° ATDC.

ENGINE OILING SYSTEM

►*OIL LEVEL DIPSTICK NOTE (EARLY CARS):* If oil level reading not accurate on these cars, check distance oil dipstick tube projects out of block. This distance should be 2 5/16"(4 Cyl.), 1 13/16"(6 Cyl.). *CAUTION - Dipstick on 4 Cyl. ngin must be pressed firmly in*



VALVE TIMING MARKS

tube so that felt seal contacts top of tube to prevent oil leakage.

►*ENGINE OILING SYST EM: See "Engine Lubrication" under OILING SYSTEM in Chevy II Special Data.*

Crankcase Capacity: 4 Cyl. - 3½ qt. refill 4 qts. with filter change.
6 Cyl. - 4 qts. refill, 5 qts. with filter change.
Normal Oil Pressure - 45 lbs. at 2000 RPM.
Pressure Relief Valve - In oil pump. Not adjustable.
Oil Pressure Indicator - Light on instrument panel controlled by pressure switch AC No. 3815936 located in main oil gallery on lower right side of engine.
Oil Filter: Full flow type for all engines. Replace cartridge every 4000 miles or sooner if needed.
Replacem nt Filter Element - AC PF-11 (6 Cyl.), PF-12 (4 Cyl.).
Oil Pump: Spur gear type. Located in crankcase, driven by distributor gear. No gasket used between pump and mounting flange.
Oil Pump Removal & Overhaul - *See "Oiling System" in Chevy II Special Data.*
Crankcase Ventilation: Standard Cars - Air intake through oil filler breather cap and outlet at crankcase ventilator pipe.

Positive Crankcase Ventilation Cars - Road draft tube replaced by adapter to which is connected a valve and hose which connect to adapter plate between carburetor and intake manifold. Disassemble and clean system every 10,000 miles or sooner if needed. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 8½ qts. (4 Cyl.), 11½ qts. (6 Cyl.), add ½ qt. for heater.
Pressure Valve: 13 lb. radiator filler cap, AC No. 850800.
Thermostat: Poppet pellet type. In intake manifold water outlet. 170°F Part No. 3138868.
Temperature Gauge: AC Electric.
Engine Unit - AC No. 6400092 (stamped AC 238-242M).
Water Pump: Centrifugal, double row ball bearing type. Permanently lubricated.
Overhaul - *See "Cooling System" in Chevy II Special Data.*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	6 Cyl. - Ft. Lbs.	V8
Cylinder Head	90-95	60-70
Intake Manifold	25-35	25-35
Exhaust Manifold	① 15-20	① 15-20
Oil Pan	② 12½-15	10-15
Main Bearing Caps	100-110	③
Flywheel	55-65	55-65
Crankshaft Pulley	15-20	15-20
Connecting Rod Caps	35-45	④
Camshaft Sprocket		15-25
Rocker Arm Support Bracket	25-30	
Rocker Arm Cover (Inch-Lbs)	20-25	20-25
Engine Front Cover	6-7½	6-8
Water Pump	25-35	25-35
Oil Pump		45-50
Oil Filter		20-30
Clutch Housing	45-55	25-30

① - Tighten two center bolts to 25-30 ft lbs
② - Corner bolts. Other screws 6-7½ ft lbs
③ - 60-70 ft. lbs. (283" & 327" Eng.), 95-105 ft. lbs. (409" Eng.).
④ - 30-35 ft. lbs. (283" & 327" Eng.), 35-45 ft. lbs. (409" Eng.).

ENGINE

PASS. CARS

ENGINE REMOVAL: Drain cooling system crankcase and transmission Remove hood radiator (on Auto Trans Cars disconnect and plug cooler lines) Remove battery and all electric equipment wires and remove air cleaner and filter Disconnect fuel and vacuum lines and remove exhaust pipe to manifold bolts Disconnect carburetor control rods at bellcrank clutch control bell crank and transmission rods (overdrive wires and cables) Remove Auto Trans filler tube and plug opening Disconnect speedometer cable propeller shaft (and remove overdrive solenoid) On V8 cars remove road draft tube exhaust crossover pipe and manifold heat control valve Install lifting hooks (Kit J 4536) Disconnect clutch idler shaft bracket raise engine slightly and remove all engine and transmission mounting bolts Remove engine and transmission

CORVETTE

ENGINE REMOVAL: Drain cooling system, drain transmission (or plug drive shaft opening when shaft removed). Disconnect battery cables, remove air cleaner and distributor shield. Disconnect all wiring, ground straps, and pipes at engine connections. On Powerglide cars, disconnect Neutral Safety Switch lead at connector on firewall. Disconnect accelerator linkage and tachometer drive cable at distributor Scribe alignment marks on hood hinges, remove hood. Disconnect radiator tank hoses and upper radiator hose at radiator Remove shroud upper half, remove generator, fan assembly, belt, and water pump pulley, then remove shroud lower half. Disconnect lower radiator hose and remove radiator. Disconnect heater hoses from engine and position hose ends between heater air duct and fender for clearance. On Fuel Injection Cars, remove Fuel Injection unit Remove rocker arm covers. Support vehicle on jack stands. Attach lift fixture to engine (at center head bolt on each bank), and support engine weight with a lift Lift off distributor cap and place it in front of distributor for clearance, cover distributor with clean cloth. Remove engine front mount bolts, disconnect exhaust pipes at manifolds, remove shift lever knob and floor cover. Remove propeller shaft and disconnect speedometer drive cable. Remove right front engine mount frame bracket or fuel pump for clearance. Support transmission weight on jack, take out transmission mount bolts, remove transmission support bracket. Lower transmission while guiding shift lever through floor opening. Lift engine and transmission out of vehicle.

6 CYL. TRUCKS

ENGINE REMOVAL: *NOTE - On Low Cab Forward Models, see "Front Sheet Metal Assembly Removal" below.* On Other Models, drain cooling system, crankcase and transmission Remove hood, radiator hoses, radiator and shroud On All Trucks, disconnect all electric equipment wires Remove coil mounting screws and lay coil and wires out of way Disconnect engine ground strap, fuel line, and remove air cleaner Disconnect control cables from carburetor and oil pressure and vacuum lines Remove exhaust pipe to-manifold bolts, accelerator rod and on ½, ¾ Ton trucks, remove control rods from bellcrank on clutch housing On Auto Trans Trucks, remove transmission throttle linkage rods at transmission On 1-Ton Trucks, remove coolant line clips from dash and frame panels On All Other Models remove floor mat and transmission floor pan cover On 1-Ton Trucks disconnect parking brake pull rod On 1½ & 2-Ton Trucks, disconnect inner and outer levers from parking brake operating lever On 1 1½, 2-Ton Trucks remove transmission cover (with parking brake and gearshift levers) *NOTE Cover opening to keep out dirt* Disconnect speedometer cable, clutch slave cylinder hydraulic line and remove propeller shaft Remove rocker arm assemblies and pushrods Install lifting Tool J 4536-A and raise engine slightly Remove engine mounts and remove engine and transmission

FRONT SHEET METAL ASSEMBLY REMOVAL (Low Cab Forward): Drain radiator and remove radiator hoses On Air Cond trucks remove compressor lines Disconnect air cleaner intake hose at fender skirt (if so equipped) wire connectors at dash and toe panel battery generator and regulator leads Disconnect Power Steering Reservoir hose at pump Remove hood assembly at hinges and remove front bumper Remove fender extension bolts (note number and location of shims for reinstallation) Remove fender upper edge to-plenum and hinge pillar bolts Work from under rear of fender to remove two bolts and spacers at fender extension mounting bracket Remove bolt locking tab, and flat washer from radiator support to crossmember Remove fender skirt mounting bolts and remove bolt, washer spacer and grommet from fender skirt bracket Remove steering joint cover bolts and cover from fender skirt and remove snap in clip from seal to skirt Spread seal from steering column and remove cover Remove sheet metal assembly with radiator battery horn and voltage regulator

ENGINE REMOVAL (Tilt Cab): Engine removal is same as for conventional trucks except for special procedures required by cab design as follows **1)** Drain radiator, disconnect gear shift cable assemblies, and parking brake cable. **2)** Disconnect slave cylinder steel line from flexible hose, then remove accelerator cable rear support and cable ball joint from relay bellcrank. **3)** Separate brake vacuum hose from carburetor, then remove check valve from cab support crossmember. Disconnect fuel inlet line at pump. **4)** Remove surge tank, radiator and heater hoses from engine. Disconnect all wiring, including ground strap, and remove cab release rod guide from side of cab support. **5)** Remove cab-control island support assembly-to-frame and radiator bolts and remove support assembly from truck. **6)** Remove engine mounting bolts, lift engine and transmission up and out of chassis as a unit.

V8 TRUCKS

ENGINE REMOVAL: Drain cooling system crankcase and transmission Remove hood, battery cables and carburetor air cleaner Remove radiator and heater hoses fan blade, spacer, pulley, fan shroud and radiator Remove power brake vacuum line, power steering return line and pump pressure line Remove all electrical equipment lines Disconnect choke and throttle cables Remove accelerator rod from carburetor and dash bellcrank Remove road draft tube and disconnect exhaust pipe at manifolds Remove transmission control rods and disconnect clutch slave cylinder hydraulic line Disconnect and plug oil cooler lines (if so equipped) Disconnect speedometer cable and propeller shaft Remove floor pan and sheet metal, *see "Front Sheet Metal Assembly Removal, Low Cab Forward" above* Remove engine front mount-to-frame crossmember bracket nut and washer, rocker arm covers Install eye bolts (Kit J 4536-A) in head bolt holes Raise engine slightly remove crossmember Remove engine and transmission as a unit

OIL PAN

6 CYL. CARS

OIL PAN REMOVAL (Cars with Powerglide Trans.): Engine must be removed from chassis for pan removal unless cylinder head removed first. With cylinder head off, remove pan as for Synchro-mesh Cars (following).

OIL PAN REMOVAL (All Synchro-mesh Cars & Powerglide Cars with Cyl. Head Removed): Drain crankcase and cooling system, raise and support car and remove radiator and cylinder head. Disconnect battery ground strap at engine, fuel pump inlet line at pump, and accelerator control rod at accelerator control rod lever. Remove overdrive solenoid. Disconnect power brake hose at check valve, and remove oil filter and support bracket assembly. Disconnect exhaust pipe from exhaust manifold, and transmission lower control rods at transmission shifter levers. Disconnect clutch fork pushrod at clutch fork and all clutch controls from engine Loosen transmission mounting bolts and disconnect engine front mounts from engine. Remove hood. Raise engine approximately 3" until valve rocker cover contacts dash upper panel. Remove flywheel underpan extension and remove oil pan. *NOTE* - Rotate crankshaft as necessary for oil pan to clear counterweights.

DROPPING OIL PAN (For Limited Work): *NOTE* - Oil pan gaskets, seals and rear main bearing oil seal can be replaced without removing oil pan completely from vehicle as follows: Raise car on hoist drain crankcase, remove rocker arm cover and disconnect exhaust pipe at manifold and the transmission shifter bellcrank

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at transmission. Loosen engine rear mount and remove through bolts at engine front mounts. Raise engine front end (use jack under pan or balancer) high enough to place a 2" spacer wood block under each engine front mount. *NOTE - Raise engine slowly to avoid damage to fan and radiator hoses.* Then place blocks under front mounts and remove jack. Remove oil pan screws and lower pan to frame. Move oil pan forward between sway bar and harmonic balancer. This will allow a 4-6" clearance for rear main bearing oil seal replacement. To remove oil pan gaskets and seals, manipulate oil pan to gain access to each piece. To install, reverse removal procedure.

V8 PASS. CARS

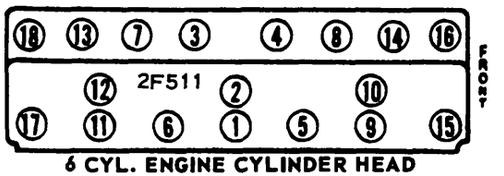
OIL PAN REMOVAL: *NOTE - On Powerglide transmission cars, r mov transmission control lever cross shaft at transmissi n shift r lev r and shaft assembly in addition to f llowing procedur .* Raise car, drain crankcase and radiator. Disconnect radiator hoses at radiator. Disconnect battery ground strap at engine. Disconnect clutch pushrod at pedal control and disconnect intermediate lever and shaft. Remove clutch pedal control intermediate lever and shaft assembly from frame mounting bracket, but leave shaft assembly attached to engine. Remove carburetor fuel feed pipe at fuel pump and remove the fuel pump. Remove accelerator control rod from its lever. On 409" engine, remove oil level gauge tube. Remove power brake vacuum hose at check valve on manifold. On other engines, remove power steering pump at generator and lay on upper control arm (unnecessary to disconnect hoses). On 409" engine, disconnect generator brace and rotate away from engine so power steering pump will clear brake master cylinder. Remove transmission lower control rods at shift levers. Disconnect exhaust pipes from manifolds and lower pipe and muffler assembly. Remove oil filter. Loosen transmission mounting bolts. Remove long bolts from each front engine mount. *NOTE - Turn crankshaft so harmonic balancer keyway slot is at bottom of engine to enabl crankshaft c unt rweights to clear oil pan baffl .* Raise engine at harmonic balancer approximately 2¾" (409" engine), 3" (Other engines) until transmission contacts underbody toe pan. *CAUTION - While raising engine watch clearance at fan blades and shroud.* Remove oil pan bolts and remove pan with a tilting motion.

CYLINDER HEAD & MANIFOLD
ALL ENGINES

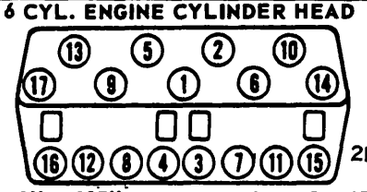
CYLINDER HEAD INSTALLATION (6 CYL. ENGINES): Use torque indicating wrench to tighten cylinder head capscrews in correct sequence as shown in diagram

CYLINDER HEAD INSTALLATION (V8 ENGINES): Coat steel head gasket with a good head gasket paste and install gaskets in position on cylinder block. Install heads over dowels in block. Coat threads of all bolts with Permatex No. 3 (head bolts protrude into water passages). Use a torque indicating wrench and tighten bolts a little at a time to 60-70 ft. lbs. in the sequence shown in diagram.

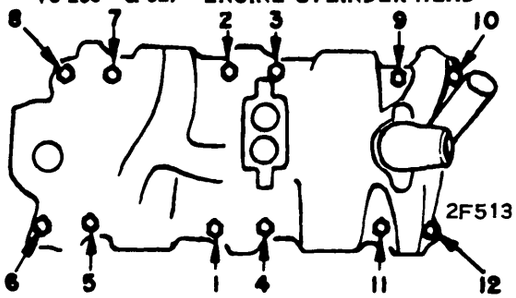
►*CYLINDER HEAD GASKET CAUTION (CORVETTE):* On 340 HP. & 360 HP. engines, TWO cylinder head gaskets are used on each head. DO NOT use gasket cement between the head gaskets.



6 CYL. ENGINE CYLINDER HEAD



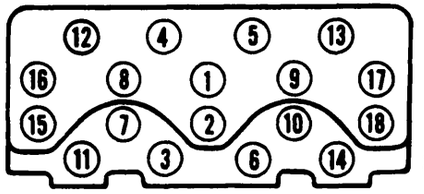
V8 283" & 327" ENGINE CYLINDER HEAD



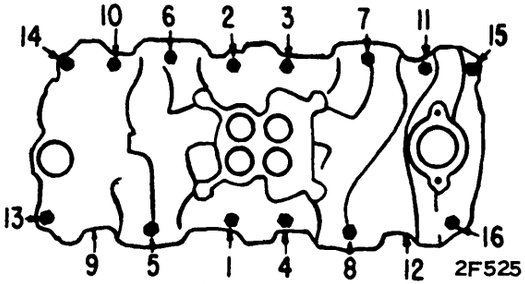
V8 283" & 327" ENGINE INTAKE MANIFOLD

►*409" ENGINE CYLINDER HEAD GASKET CAUTION:* Changes in coolant passages in 1962 engines require the use of 1962 Gasket No. 3814003 **only.** *Use of 1961 gasket will result in water pump seal failure.*

INTAKE MANIFOLD INSTALLATION (V8 ENGINES): Install manifold end gaskets on cylinder block. Coat ends of intake manifold side gaskets around water passages with a good sealing compound and install heads. Tighten bolts a little at a time to 25-35 ft. lbs. torque.



CHEVROLET V8 409" ENGINE CYLINDER HEAD



CHEVROLET V8 409" ENGINE INTAKE MANIFOLD

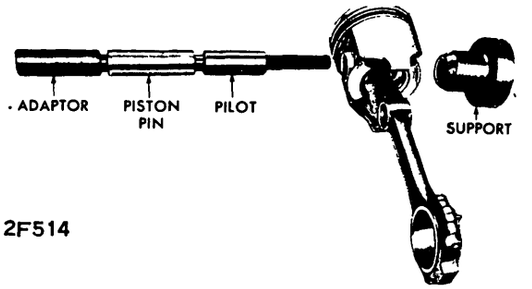
PISTON PINS
V8 ENGINES

PISTON PINS (283" & 327" Engines): Removal - Install pilot Tool J-9510 on puller screw with pilot through piston and pin. Install tool support over threaded end of puller screw with small end of support against piston. Install nut loosely on puller screw and place assembly in arbor press so that pin can be pressed out through support.

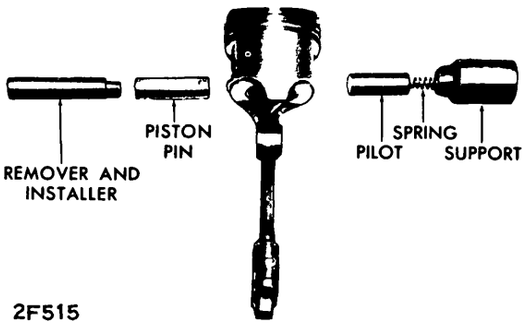
Installation: Lubricate pin holes and position connecting rod in its respective piston so that flange or heavy side of rod at bearing end will be toward **front** of piston (cast depression in head of piston and "F" marks on piston struts) on #1-#3-#5-#7 pistons and rod flange to **rear** of piston on No. 2, No. 4, No. 6, No. 8 pistons. Install piston pin on adapter and pilot on screw. Install puller screw through piston and rod, indexing pilot through piston and rod. Install support over threaded end of puller screw with small diameter toward piston. Install in arbor press and press piston pin in until pilot bottoms in support.

PISTON PINS (409" Engine): Removal - Install pilot of piston pin Tool J-6994-5 on piston pin. Place piston and rod assembly on support and place assembly in arbor press. Press pin out of connecting rod.

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PISTON PIN DISASSEMBLY



PISTON PIN ASSEMBLY

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Installation - Lubricate piston pin holes in piston and rod, position rod in respective piston, s flange or heavy side of rod (at bearing end) will be towards front of piston (cast depression in piston head and "F" mark on strut) on No. 1-3-5-7pistons,and rod flange or heavy side of rod, to rear on No. 2-4-6-8 pistons. Place piston pin on installer and pilot spring and pilot in support. Place piston and rod on support indexing pilot through piston and rod. Place support on arbor press, start pin into piston, and press pin into piston until pilot bottoms.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

6 CYLINDER & V8 MAIN BEARING REPLACEMENT:

1) Remove spark plugs and remove engine oil pan. Remove bearing cap and bearing shell.

2) Install main bearing shell removing and installing tool (or use a cotter pin bent as required). Rotate crankshaft in direction of usual rotation and roll upper bearing shell out of engine.

3) Oil new bearing shell and insert plain (un-notched) end of shell between crankshaft and block on the indented or notched side. Rotate bearing into place. Install new bearing shell in bearing cap.

REAR MAIN BEARING OIL SEAL (6 Cyl. Eng.): To replace rear bearing oil seal without removing engine proceed as follows:

1) Drop oil pan, oil pump assembly, rear main bearing cap (discard old seal). Loosen all bearing caps (to allow crankshaft to drop a slight amount). *NOTE* - Pry between crankshaft and block to force crankshaft down as necessary.

2) Use screwdriver or similar tool to force old seal out of upper bearing so it can be removed with a pair of pliers (rotate shaft to aid in removal of seal).

3) Pre-form new upper seal in cap.

4) Insert soft wire (tag wire) through new upper seal 1/4" from end and wrap wire around end of seal to keep seal from spreading. Lubricate entire surface of upper seal with lubricant and reform seal in lower cap.

5) Insert wire through seal opening in crankcase and around crankshaft. Use screwdriver or similar tool to start seal accurately, then pull seal into position (working seal into position with tool and rotating crankshaft as necessary). With seal centered, cut off ends ¼" below bearing edge.

6) Install new lower seal in bearing cap (force it into position with Tool J-5788) and cut ends off flush with surface of bearing cap. Tighten all bearing caps to specifications.

REAR MAIN BEARING OIL SEAL (V8 Eng.): To replace rear main bearing seal without removing engine, first remove oil pan (see above for Pass. Cars, or car model page for Trucks), then proceed as follows:

Cap Seal - Remove bearing cap and pry out old seal with screwdriver. Lubricate new seal (exc. parting surface) and roll seal into place without damaging bead of seal with seal tangs.

Block Seal - Use small drift to start seal out until it can be removed with pliers. Lubricate new seal (exc. parting surface) and gradually push seal in with hammer handle until seal rolls into place. DO NOT cut seal with seal retainer tang.

VIBRATION DAMPENER

6 CYL. ENGINE

VIBRATION DAMPENER (6 CYL ENGINE): Removal - Drain radiator, disconnect hoses. On Automatic Transmission models, remove oil cooler lines. Remove radiator (note number of shims). Remove fan belt. Install Tool J-6978 or J-1287 and remove vibration dampener and pulley assembly.

Installation: Remove puller and install two 3/8"-16 x 1" (16 thread) capscrews in dampener to support wheel portion during installation. Position dampener on crankshaft with key and keyway on alignment and drive dampener on shaft until it bottoms against crankshaft gear. Use a heavy hammer and bar through the grille, taking care that a straight installation is made. Remove the two capscrews previously installed.

V8 ENGINES

HARMONIC BALANCER: Balancer consists of an inertia weight pressed on a hub and procedure below must be used when removing and installing balancer to prevent inertia weight shifting on hub.

Removal: Drain radiator, disconnect radiator hoses, disconnect transmission fluid cooler lines (Auto. Trans. Cars). Remove battery, fan belt, fan, and pulley. Remove radiator and fan shroud. Remove pulley bolts from balancer and remove crankshaft pulley. Install puller tool, No. J-6978, using bolts in tapped holes in face of balancer, remove balancer.

Installation: Coat seal contact area of balancer hub with engine oil, assemble special balancer installer tool, J-8792, (see Tool Note below) on balancer with fingers hooked over balancer rim and tighten threaded driver finger tight *(CAUTION - This is necessary to prevent balancer being pulled apart).* Start balancer on crankshaft with keyway aligned with key in shaft, use soft hammer to drive balancer in place until it bottoms on shoulder on shaft (or spacer installed on shaft on 409" Engines). Remove installer tool and reassemble engine.

►*TOOL J-8792 NOTE:* This tool also used on Chevy II 6 Cyl. Engines (different set-up) and must be assembled exactly as follows for use on V8 engines: Thread driver in clamp on shallow finger side (opposite side from V8 mark on clamp), insert pilot in end of driver on opposite side of clamp with large end in toward clamp, secure pilot with machine screw. Install tool assembly on balancer with deep fingers of clamp engaging balancer rim.

►*HARMONIC BALANCER INSTALLATION CAUTION (CORVETTE 340 & 360 HP ENGINES):* A spacer is installed between balancer hub and crankshaft shoulder for belt alignment. Make certain this spacer is in place when installing balancer. On later engines, a bolt is installed in end of crankshaft and this bolt should be used to pull balancer on shaft (do not drive balancer on).

ENGINE FRONT COVER

ALL ENGINES

FRONT OIL SEAL INSTALLATION: Pry old seal out of front cover. Install new seal so that open end of seal is toward inside of cover and drive it into position with Oil Seal Driver J-995 (6 Cyl.), J-996 (V8). *CAUTION* - Support cover at sealing area while installing seal.

CAMSHAFT & BEARINGS

CAMSHAFT LOBE LIFT (All Eng.): Remove rocker arm shaft and support assembly (6 Cyl.), rocker arms and balls (V8). On 6 Cyl. Eng., install 3/8"-24-16 Stud Adapter from Tool J-8520 in rocker shaft support hole. On all engines, attach Tool J-8520 to adapter or stud and adjust dial indicator to seal in pushrod cup. *NOTE - Be sure pushrod is seated in lifter socket.* Rotate crankshaft slowly (clockwise) until lifter is on heel of cam lobe (pushrod will be in its lowest position). Set dial indicator to Zero and slowly "BUMP" engine over until pushrod is in **FULLY** raised position. Compare total lift on dial indicator with Specifications in "CAMSHAFT-WEAR LIMIT" table below. *NOTE - Continue to rotate engine until indicator reads Zero for accuracy check on dial indicator.*

Camshaft Lobe Lift & Wear Limit

	Intake Lift		Exhaust Lift	
Engine	① New	② Worn	① New	② Worn
235" Pass	.222"	.217"	.222"	.217"
235" Trk.	.210"	.203"	.225"	.218"
261" Trk.	.274"	.269"	.280"	.273"
283" ③⑤	.222"	.217"	.222"	.217"
283" ④⑤	.266"	.261"	.266"	.261"
283" ⑥	.263"	.258"	.267"	.262"
327" ⑤	.266"		.266"	
409" ⑥	.2813"		.2649"	

① - Plus or Minus .002". ② - Plus .003", Minus .002".
③ - Pass. Cars with 2-Bbl. Carb.
④ - Pass. Cars (Exc. 2-Bbl. Carb.), Corvette & Trucks.
⑤ - With Hyd. Lifters. ⑥ - With Mech. Lifters.

6 CYL. ENGINES

CAMSHAFT REMOVAL & INSTALLATION: Drain crankcase and radiator. Remove radiator and grille. Remove rocker arm cover and rocker arm shaft assembly. Remove coil and valve side cover, pushrods and lifters. Remove vibration damper (see above). Remove oil pan and engine front cover (see above). Remove camshaft thrust plate screws and remove camshaft and gear. *CAUTION - Support shaft carefully to prevent bearing damage,*

Installation: Reverse removal procedure. Note new camshaft installation caution under V8 below.

6 CYLINDER CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Install No. 1 and No. 2 bearings first, then rear two bearings. *(CAUTION* - Align holes in bearings with oil holes in block before pulling into place). Install plug flush to 1/32" deep from clutch housing face of case.

V8 ENGINES

CAMSHAFT REMOVAL & INSTALLATION: 1) Drain radiator, remove outlet and inlet hoses. On Auto. Trans. models, remove oil cooler lines from radiator and plug lines and fittings. Remove attaching bolts and lift radiator straight up to remove.

2) Remove air cleaner, disconnect throttle rod at carburetor (On Auto. Trans. models, disconnect lower transmission throttle lever rod). Disconnect fuel, vacuum, and choke lines at carburetor coil primary wires, and coil to distributor secondary wires. Remove distributor.

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3) On overdrive models, disconnect kickdown switch wires at switch

4) Remove spark plugs, water and heater hoses, and temperature indicator unit from intake manifold Remove intake manifold

5) Remove fan belt, exhaust manifold to exhaust crossover pipe stud nuts and lower crossover pipe Remove exhaust manifold heat control valve from right exhaust manifold

6) Disconnect generator wires, remove exhaust manifolds, choke heat tube and remove rocker arm covers

7) Loosen rocker arm nuts, pivot rocker arms and remove pushrods and valve lifters *NOTE* - Pushrod seats on solid lifters should remain with lifters

8) Remove fuel pump lines at fuel pump, pump mounting bolts, fuel pump, fuel pump pushrod adapter bolts adapter and pushrod

9) Remove bumper, grille-to-fender tie bar screws, grille-to-fender screw and screw and bolt at front end of grille From under fender, remove grille bracket to fender filler panel screw and fender and filler panel to grille screw

10) Remove grille filler panel-to-grille clips, hood lock plate-to-grille support assembly, and fender tie bar bolts

11) From under fender, remove tie bar-to-fender skirt bolts and front bolts at tie bar, then loosen rear bolt at each side Rack tie bar backward to clear top of grille Lift grille assembly to clear tabs at fillerpanel, unplug electrical connections and remove grille

12) Remove vibration dampener (see *"Vibration Dampner R moval"*), timing chain cover, timing chain and sprocket Install two bolts, 5/16"-18 x 4", in camshaft bolt holes and remove camshaft *NOTE* - All camshaft bearings are the same diameter Use care to avoid damage to bearings

Installati n: Reverse removal procedure. **When installing n w camshaft,** add one 16 oz. can of E.O.S. (Engine Oil Supplement Part No. 3755785) to crankcase and, if possible, pour 2 or 3 ozs. of E.O.S. directly on shaft. In addition (particularly on Hi-Perf. Engines), apply molybdenum disulphide (Molykote or equivalent) on foot of each valve lifter. Drain crankcase containing oil with E.O.S. additive at end of 1,000 miles (409" Engine), at normal oil change period (Other Engines).

V8 CAMSHAFT BEARING REPLACEMENT: Use Bearing Remover & Replacer J-6356. Remove bearing nearest center of block first, then No. 2 and No. 4 bearings, and finally front and rear bearings (with this sequence minimum number of turns are required to locate Remover & Replacer for removal of next bearing). When installing, install No. 1 or front bearing first. This bearing will act as guide for tool and center the No. 2 and No. 3 bearings being pulled into place. *(CAUTION–*Use care when installing rear bearing due to smaller size of oil pressure holes in rear bearing. When installing end plug, install flush to 1/32" deep to maintain level surface on rear of cylinder block).

TIMING GEARS

6 CYL. ENGINES

REPLACEMENT TIMING GEARS: Fibre type camshaft gear and steel crankshaft gear used on passenger cars. Aluminum camshaft gear and steel crankshaft gear used on trucks.

TIMING GEAR INSTALLATION: Gears are press fit on crankshaft and camshaft and must be removed and installed as follows

Crankshaft Gear–To remove gear, attach Puller J-8105 to the gear and turn handle When installing gear, make certain that two woodruff keys are in the crankshaft, then drive gear on shaft until it bottoms against shoulder

Camshaft Gear–To remove gear, install Gear Remover J-971 on shaft in back of gear (remover consists of support sleeve), place camshaft assembly in arbor press *(CAUTION–*Thrust plate must be positioned so that it will not be damaged by woodruff key in shaft as shaft pressed out), press shaft out of gear. To install gear, place shaft in arbor press (support shaft securely directly back of front bearing journal), install gear spacer ring and thrust plate over end of shaft, and install woodruff key in shaft keyway. Install camshaft gear and press it on shaft until it bottoms against the gear spacer ring. End clearance of thrust plate should be 001 005" Install the camshaft assembly in engine block, being careful not to damage bearings or cams. With crankshaft installed turn camshaft and crankshaft so that valve timing marks on gear teeth will line up, then push camshaft into position. Install camshaft thrust plate-to-block screws and tighten securely. Camshaft and crankshaft gear runout should not exceed .004" for camshaft and .003" for crankshaft. Backlash between timing gear teeth should not be less than .004" nor more than .006". *CAUTION–*Press on hub only when installing camshaft gear.

TIMING CHAIN

V8 ENGINE

TIMING CHAIN: Removal–Remove vibration dampener, timing chain cover, and oil slinger Rotate engine until timing marks on sprockets are in alignment and adjacent Remove three camshaft sprocket screws and remove camshaft sprocket and chain together

Installation Install chain on camshaft sprocket Hold sprocket vertical with chain hanging below, and line up 'O' timing marks on both sprockets so they are adjacent and in line with a straight edge across shaft centers Align dowel in camshaft with dowel hole in sprocket and install sprocket on camshaft Draw camshaft sprocket onto shaft using the three mounting bolts Tighten to 15-20 ft lbs *CAUTION–Do not attempt to drive sprocket onto shaft as welch plug at rear of engine can be dislodged.*

VALVE SYSTEM

VALVE STEM OIL SEALS
6 CYL. ENGINES

VALVE STEM OIL SEAL INSTALLATION: Seal consists of synthetic rubber ring installed in second groove of valve stem directly under valve locks on all valves. When assembling valves, install seal as follows Install valve spring and spring retainer on valve stem, compress spring until lower groove on valve stem is exposed, install seal in this groove *(CAUTION* - Seal must seat flat in groove and not be twisted). Install valve locks in upper groove in valve stem, relieve spring tension, check to see that seal is properly retained in spring retainer and that locks are engaged.

V8 ENGINES

VALVE STEM OIL SEAL INSTALLATION: Seal consists of "O" ring installed in second groove of valve stem directly under valve locks on all valves and cup shaped metal shield placed over outer end of valve spring under valve cap Install valve spring and damper, with close coiled end against cylinder head and place shield over spring On trucks place rotator in position (if used) Install cap compress spring and install seal in lower groove on stem *NOTE* - Be sure seal is flat and not twisted in groove Install valve locks and release spring tension

VALVE GUIDES
6 CYL. ENGINES

VALVE GUIDE INSTALLATION: Press old guide from cylinder head with an arbor press and Tool J-5600. Press new guides (short guides for exhaust, long guides for intake)into head with Tool J-5599 until top of guide is 15/16" (exhaust), 1" (intake) above head *NOTE - When using Tool J-5599, use a 1/16" shim under tool for intake guides When using Tool J-5734, use a 1/16" shim under tool for exhaust guides* Finish ream all guides with 343" hand reamer, Tool J-4822

ROCKER ARMS

►*ROCKER ARM COVER INSTALLATION CAUTION (CORVETTE)·* Covers are marked "O" on inboard side and must be installed with marks toward center of engine for rocker arm clearance. Engine ground straps are attached by rocker cover screws and must be installed when covers installed.

6 CYL. ENGINES

ROCKER ARMS (6 CYL. ENGINES): Diamond bored and "granodized" (no bushings) and fit directly on rocker arm shafts Different rocker arms used as follows and must be installed as indicated

Rocker Arm Identification

Type	Cylinder No.	©Casting No.	Part N .
L H Intake	2-4-6	3764485	3764489
L H Exhaust	1-3-5	3764487	3764481
R H Intake .	1-3-5	3764486	3764490
R H Exhaust	2-4-6	3764488	3764482

©- Last two digits (85, 87, etc) of this number stamped on rocker arm

Installation Assemble rocker arms as indicated in illustration with open end of shaft toward center, and baffle in rear shaft open end in vertical position

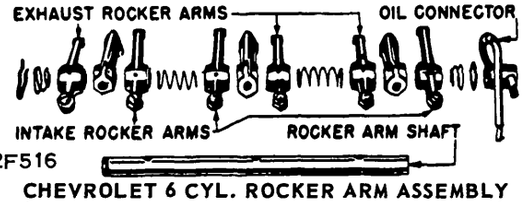
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V8 ENGINES

ROCKER ARM STUD REPLACEMENT (V8 ENGINES): Replacement studs furnished .003" & .013" Oversize. **Removal** - Remove old stud by placing Spacer J-5802 over stud, adding flat washer and nut and turning nut down to pull stud from head.

Installation - Ream stud hole for correct oversize stud using Reamer J-5715 for .003", J-6036 for .013" oversize. Coat press-fit part of stud with hypoid lubricant and use Tool J-6880 to install stud in head. Tool should bottom on head.



CHEVROLET 6 CYL. ROCKER ARM ASSEMBLY
(REAR ASSY. SHOWN - FRONT ASSY. SIMILAR)

PUSHROD IDENTIFICATION & INSTALLATION: On 409" Pass. engines, the exhaust pushrod is longer than the inlet pushrod and the pushrods have different color markings. All pushrods with a color stripe on one end **must** have that end contacting rocker arm. *See Valve Data below.*

Pushrod No. & Identification

Engine	Part No.	Valve	Paint Stripe
235", 261"	3836260	All	None
283"	3837152	All	None
327" ①	3817616	All	None
327" ②	3796234	All	Blue
409" Pass.	3795627	Intake	Black
	3795629	Exhaust	Blue

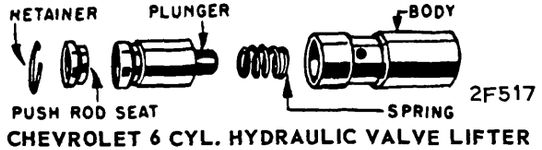
① - 250 & 300 HP Pass. & Corvette.
② - Truck; 340 & 360 HP Corvette.

HYDRAULIC LIFTERS
6 CYL. ENGINES

HYDRAULIC VALVE LIFTERS: Barrel type consisting of plunger and valve assembly operating within a cylinder formed by valve lifter tappet or body (see illustration) Oil is introduced to this unit through oil gallery in block

Removal: Remove rocker arm assemblies pushrod cover pushrods and valve lifters *NOTE* - Keep valve lifters and pushrods in order so they may be returned to original positions

Disassembly: Use Tool J-4274 and hold plunger down and remove plunger and pushrod seat retainer with a small screwdriver blade. Remove pushrod seat, plunger, ballcheck valve assembly, and plunger lifter spring. Clean all parts in solvent and inspect each part for nicks or burrs and wear. Replace lifter assembly if any part damaged or has excessive wear.



CHEVROLET 6 CYL. HYDRAULIC VALVE LIFTER

R assembly: Drop lifter spring into body. Install plunger and ball check valve assembly into body, using care to align feed holes in body and plunger. Fill lifter with SAE 10 oil, insert end of Tool J-4274 into plunger, and press down solidly. Insert pin (part of J-4274) through oil feed holes to hold plunger against spring tension and remove other part of tool. Fill lifter with SAE 10 oil and install pushrod seat and spring retainer. Remove tool pin.

V8 ENGINES

HYDRAULIC VALVE LIFTERS: Barrel type consisting of lifter body pushrod seat inertia valve check ball ball retainer pushrod seat retainer plunger and plunger spring Oil is supplied under pressure from main oil gallery line

Removal: Remove rocker arm covers intake manifold back off rocker arm nuts until arms may be pivoted away to remove pushrods Remove hydraulic lifters.

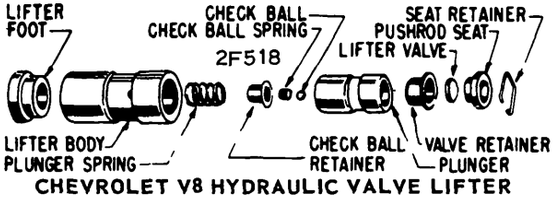
Disassembly: Hold plunger down with pushrod, then remove pushrod seat retainer, pushrod seat, inertia valve assembly, plunger and spring from lifter body Pull check valve ball retainer from plunger and remove ball and spring Clean all parts in solvent and inspect them carefully for wear or damage Replace lifter if damaged parts are found

Reassembly: Place check ball on small hole in bottom of plunger, check ball spring in ball retainer and place retainer over ball so spring rests on ball Squeeze retainer and press into position in plunger Place plunger spring over ball retainer and slide lifter body over spring and plunger Install pushrod seat and inertia valve assembly in open end of plunger, push plunger into body and install retainer Compress plunger to open holes and fill with SAE 10 oil Work plunger up and down and again refill

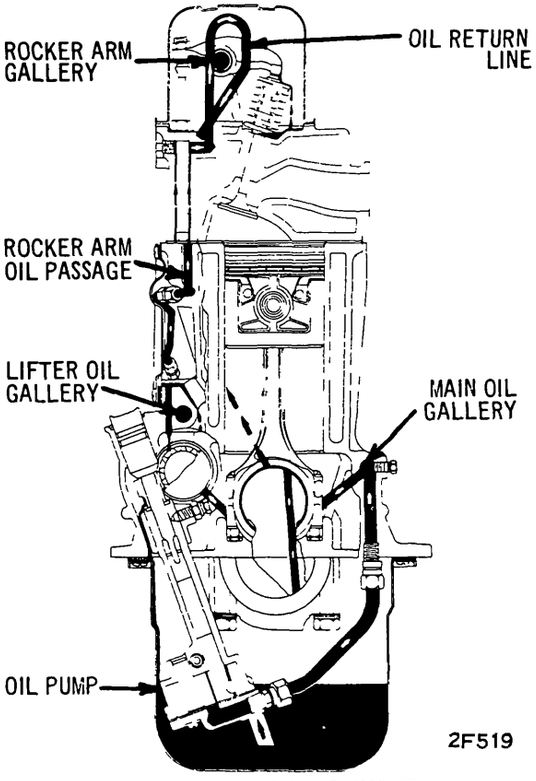
V8 ENGINES

LIFTER ADJUSTMENT: Engine Stopped - With No 1 cylinder at TDC firing position, adjust Exhaust Valves 1-3-4-8 and Intake Valves 1-2-5-7 as follows: Back off rocker arm stud adjusting nut until there is play in valve pushrod, then tighten nut until pushrod-to-rocker arm clearance is just removed. Then tighten nut an additional 1 turn. This procedure will place hydraulic lifter plunger in the center of its travel. No further adjustment is required. *NOTE - To identify lifters, see above.* Crank engine one complete revolution so No. 6 cylinder is at TDC firing position and adjust Exhaust Valves 2-5-6-7 and Intake Valves 3-4-6-8 in the same manner.

Engine Running - With engine at idle speed, back off rocker arm stud adjusting nuts one at a time until rocker arm starts to clatter. Then turn nut down until clatter just stops. Turn nut an additional 1 turn.



CHEVROLET V8 HYDRAULIC VALVE LIFTER



6 CYL. ENGINE OILING SYSTEM

OILING SYSTEM
235" & 261" ENGINE

ENGINE LUBRICATION: Force feed type with oil supplied under pressure to all crankshaft, connecting rod and camshaft bearings, lifters and rocker arms. Restricted oil pressure supplied to valve stems and pushrod sockets and timing gears All other parts oiled by spray or mist from engine crankcase

OPERATION: Gear type oil pump, mounted on crankcase (at right side) and driven by distributor drive shaft, draws oil from oil pan through a floating oil screen and delivers it by pipe to fitting on lower end of passage, leading to a horizontal oil gallery at left side of crankcase. Pressure regulator valve located in oil pump body. Oil is distributed from main oil gallery as follows:

Crankshaft & Camshaft Bearings - An oil channel from main oil gallery through each crankcase web delivers oil to each crankshaft main bearing A similar channel in opposite side of each web delivers oil from each crankshaft bearing to each camshaft bearing

Connecting Rod Bearings - Crankshaft is drilled so that each connecting rod bearing is lubricated through passages from adjacent main bearing Main bearings provide continuous flow of oil to connecting rod bearings.

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Pistons & Pins - Oil spray is thrown on cylinder walls from an oil hole on left side of connecting rod when this hole registers with hole or passage in connecting rod journal.

Timing Chain & Sprockets - Oil from front camshaft bearing passes through a milled slot in rear surface of front engine plate and is directed by a nozzle at timing gears.

Lifter Oil Gallery - A horizontal lifter oil gallery, located directly above camshaft, receives oil from rear camshaft bearing (early cars) from both front and rear camshaft bearings (later cars). This gallery lubricates both mechanical and hydraulic valve lifters.

Rocker Arms, Pushrods, and Valve Stems - Oil is delivered to the horizontal lifter gallery by the front and rear camshaft bearings. A vertical oil gallery from center of lifter gallery, with an 11/32" orifice restriction, delivers oil to a matching passage in cylinder head to fitting on cylinder head. Oil is delivered from fitting on cylinder head through a pipe to a connector between hollow rocker arm shafts, then to return passage in cylinder head and block to crankcase. Oil passes through holes in hollow rocker arm shafts to rocker arms where bleeder holes supply oil for valve stem and push-rod socket lubrication.

OIL FILTER: 235" Eng. - Optional partial flow type mounted on engine bracket.

261" Eng. - A full flow type filter mounted on the intake manifold. Receives oil directly from passage in crankcase leading to main oil gallery and delivers it to main oil gallery. *NOTE* - When filter removed, connect inlet and outlet openings in crankcase with pipe and DO NOT plug openings at any time.

283 & 327" ENGINES

DESCRIPTION: Positive pressure lubrication is provided to all main, camshaft and connecting rod bearings and to all valve lifters and rocker arms. Three horizontal oil galleries are located in "V" at center of engine and distribute oil under pressure to all parts of engine.

OPERATION: Gear type oil pump mounted on rear main bearing cap draws oil from engine oil pan sump through a meshed screen intake (with bypass valve at center of screen) and delivers it through rear main bearing cap to a vertical passage leading to main oil gallery. On 1956 and later engines, this vertical oil passage is rerouted through a full flow filter mounting pad at left side of crankcase. Bypass valve is located between filter and mounting pad. Oil distribution from main oil gallery is as follows:

Crankshaft & Camshaft Bearings - An oil passage from vertical oil passage supplies oil to rear main bearing. Oil passages from main oil gallery supply oil to each camshaft bearing and to all except the rear main bearing.

Connecting Rods & Pistons - Oil is delivered from each main bearing to adjacent connecting rod bearing through drilled passages in crankshaft. A hole in connecting rod sprays oil onto cylinder walls, for piston and piston pin lubrication, when hole in rod matches hole in connecting rod journal.

Valve Lifters - Oil passage from rear camshaft bearing supplies oil to lifter oil galleries. Both mechanical and hydraulic valve lifters intersect the gallery. A recess in mechanical lifter permits oil to pass into lower end of pushrod. A larger passage in rear camshaft bearing permits more oil pressure for lubrication of hydraulic lifters. Hydraulic lifters contain an inertia valve which opens permitting oil to pass to hollow pushrods.

Rocker Arms & Valve Stems - Oil passes up through hollow pushrods to a hole in upper end that matches hole in rocker arm. Oil sprayed out this hole and across rocker arm lubricates valve stem tip.

OIL FILTER: Full flow type mounted on left side of crankcase. Receives oil direct from oil passage from oil pump and delivers it back to vertical oil passage. Bypass valve located between filter and mounting pad.

409" ENGINE

DESCRIPTION: 409" engine lubrication system is the same as for 283" & 327" V8 Engines except for the following: The oil pump delivers oil through passage in rear main bearing cap to a filter mounting pad at left side of engine. A passage from filter pad leads to a horizontal main oil gallery running full length of engine. Oil from this main gallery is delivered through diagonal passages to vertical passages leading up to camshaft and down to crankshaft bearings.

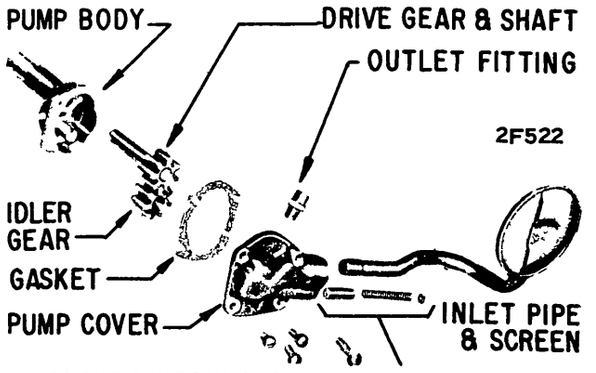
OIL FILTER: Full flow type mounted in recess on left lower side of crankcase with bypass valve located in recess. Receives oil through direct passage in bearing cap and crankcase and delivers it through passage to main oil gallery.

OIL PUMP

6 CYL. ENGINES

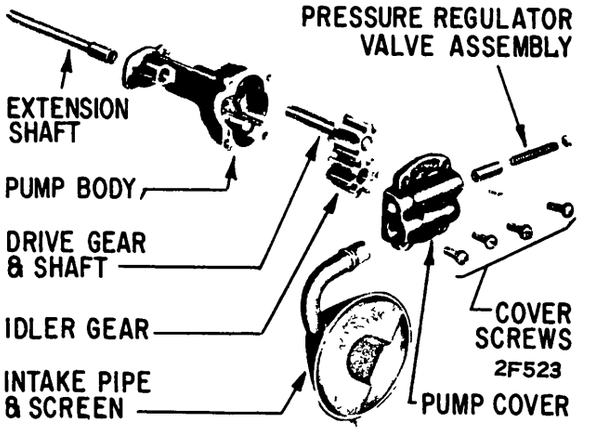
6 CYL. OIL PUMP (Removal & Disassembly): Drain oil, remove oil pan and disconnect oil pump-to-block oil line. Remove oil pump retaining sleeve lock screw and remove oil pump and oil pump-to-block oil line. Remove pressure oil line from pump and remove pump cover attaching screws, cover, gasket, idler gear and drive

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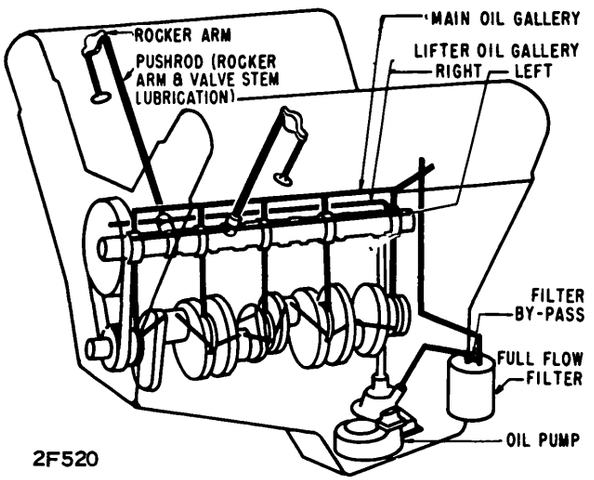


PRESSURE REGULATOR VALVE ASSY

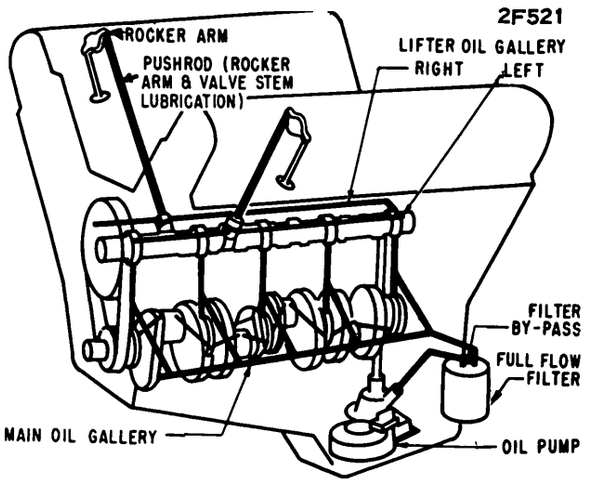
6 CYL. ENGINE OIL PUMP



CHEVROLET V8 OIL PUMP



283" & 327" ENGINE OILING SYSTEM



348" & 409" ENGINE OILING SYSTEM

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gear and shaft. Remove regulator valve pin and valve parts. Remove intake pipe and fixed screen as an assembly. Wash all parts in solvent and inspect pump body for cracks or excessive wear. Check shaft for looseness in housing and gear and cover for wear.

Assembly: Install drive gear and shaft in body. Install idler gear with smooth side toward cover. Install cover and new gasket. Tighten screws securely and check to see that shaft turns freely. Install regulator valve plunger, spring, retainer and pin. Install oil line to pump body loosely.

Installation: Install pump in block and align oil lines and install retaining sleeve lock screw and tighten securely. *(CAUTION*–Make sure tapered end of lock screw draws down into hole in oil pump body. Tighten oil pump-to-block oil line and pump-to-screen oil line connector nuts securely. Replace intake pipe and screen.

V8 ENGINE

V8 OIL PUMP (Removal & Disassembly): Drain oil, remove oil pan and pump to rear bearing cap bolt. Remove pump, extension shaft and collar. Disconnect pump shaft from extension, remove pump shaft, pump cover, idler gear, drive gear and shaft. If screen or pipe need replacing, hold cover (in soft jawed vise) and pull out pipe. Wash all parts in solvent and inspect all parts for cracks, burrs or excessive wear.

Reassembly: Assemble drive gear and shaft in body, install idler gear (with smooth side to cover). Install pickup screen and pipe on cover (if removed) but DO NOT twist or collapse suction tube. Install cover and tighten screws to 6-9 ft. lbs. (shaft must turn freely). Assemble collar end of extension shaft assembly over pump drive shaft, align tang with slot in pump drive shaft. Assemble pump and extension shaft to rear bearing cap. Align slot in extension shaft, install rear bearing cap bolt and tighten to specifications. *NOTE* - Bottom edge of screen must be parallel to oil pan rails.

COOLING SYSTEM

WATER PUMP

ALL ENGINES

WATER PUMP (All Eng.): Removal - Drain radiator, remove water inlet hose and heater hose from pump housing. Remove water pump to cylinder block bolts and remove pump from engine. *NOTE* - On 6 Cyl. engine, pull pump straight out of block to avoid damage to impeller and shaft.

►*DISASSEMBLY CAUTION: Fan hub position has been changed to provide radiator clearance and former hub setting gauges cannot be used on 1962 pumps (use former gauges to position hub when installing 1962 pump on 1961 or earlier model). Mark position of hub on shaft before disassembling pump to insure replacing hub in correct position when reassembling pump.*

Disassembly: On V8 pumps, remove back plate and gasket. On all models, support hub in press and press shaft out of hub (use 1/2" x 2" pin). Support pump in press (use blocks under pump body) and press shaft and impeller out of pump body. *(CAUTION* - Apply pressure to outer race of bearing only). Place Tool J-5855 in press, support impeller on seal surface, press shaft out of impeller (use 1/2" x 2" pin). Discard old seal.

Reassembly: 1) Install shaft and bearing assembly in pump body from front side (235", 261", 283", 327" Eng.), from rear side (348" & 409" Eng.), until bearing is flush with front of pump body. *CAUTION - Apply pressure on outer race of bearing only.*

2) Coat outer diameter of seal with sealing compound and press on outer flange with Tool J-5590 until seal bottoms with outer flange against pump body.

3) Press hub on shaft to correspond with mark on shaft made at time of disassembly.

4) Support pump on hub and install impeller. *NOTE - Clearance between vanes and pump body should be .010-.035". Bend feeler gauge to check 348" & 409".* Install cover and gasket, tightening screws diagonally. Install pulley and fan.

Installation - Reverse removal procedure using new gasket between pump and cylinder block. Adjust fan belt tension.

►*FLUID FAN NOTE:* Thermo-modulated fan is standard equipment on 327" & 409" Pass. engines and optional on all other model Pass. Engines. Silicone fluid in clutch assembly limits maximum fan speed to 3500 RPM. Temperature sensing modulating device limits fan speed to 1600 RPM until modulating device reaches 120°F, then fan speed increases to 3500 RPM as temperature increases to 150°F at thermostat.

►*JACKING & HOISTING CAUTION Before jacking, hoisting or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section*

MODEL IDENTIFICATION

Body Style	Series Designation Biscayne	Bel Air	Impala
2-Door Sedan	1111	1511	
2-Door Sport Coupe		1537	
2-Door Sport Coupe ℂ			1747
4-Door Sedan	1169	1569	1769
4-Door Sport Sedan			1739
2-Door Convertible			1767
4-Door Sta Wgn (6-Pass)	1135	1535	1735
4-Door Sta Wgn (9-Pass)		1545	1745

ℂ - Special

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post *NOTE* - Number (example below) includes identification data

ℂ ② ③ ④
2 1111 A 100001

ℂ - Year 2 1962
② - Model designation *See Series Designation above*
③ - Assembly Plant *See below*
④ - Beginning unit number at each assembly plant

Assembly Plant Designation

A - Atlanta	**J** - Janesville	**N** - Norwood
B - Baltimore	**K** - Kansas City	**O** - Oakland
F - Flint	**L** - Los Angeles	**S** - St Louis
G - Framingham	**W** - Willow Run	**T** - Tarrytown

ENGINE NUMBER: Stamped on pad on right side of engine block directly to rear of distributor *NOTE* - Number (example below) includes identification data

ℂ ② ③
F 0101 A

ℂ - Engine plant **F** - Flint **T** - Tonawanda **C** - Engines built in Canada
② - Code number indicating month and day of manufacture **0101** - January 1
③ - Engine type *See table below*

Synchro-mesh Transmission

A - Basic Engine	**AJ** - H D Clutch, AC & Pwr Strg
AE - H D Clutch	**AK** - Pwr Strg
AF - Air Cond	**AM** - H D Clutch & Pwr Strg
AG - H D Clutch & AC	**AZ** - Pwr Strg & AC

Powerglide Transmission

B - Basic Engine	**BE** - Power Steering
BG - Air Cond	**BH** - Pwr Strg & AC

TUNE-UP

COMPRESSION PRESSURE: 130 lbs minimum at cranking speed and throttle wide open 15 lbs maximum variation between cylinders

VACUUM READING: 17-20" steady, at idling speed

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters With engine at operating temperature and idling, loosen locknut and back off adjusting screw (one at a time) until rocker arm clatters, then turn adjusting screw down until clatter stops, plus 1½ turns, then tighten locknut *For Initial Valve Adjustment see VALVES below*

MANIFOLD HEAT CONTROL: Thermostatic type Check for free operation Should require ½ turn from unhooked to hooked position Replace a distorted spring

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles *See "Closed Crankcase Ventilation Systems" in Carburetion Section*

IGNITION

FIRING ORDER: 1-5-3-6-2-4

SPARK PLUG GAP: 035"

Spark Plugs - AC-46 (Std), AC-44 (colder) 14 mm Torque to 25 ft lbs

COIL: Delco-Remy No. 1115165.

Ignition Current - 1 8 amps idling, 4 0 amps stopped

Resistor - Resistance type cable (1 8 ohms) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation) Bypassed during cranking when coil energized directly from starter solenoid bypass terminal

DISTRIBUTOR: Delco-Remy No. 1112403.

Condenser - Delco-Remy **Capacity** 18-23 mfd

Contact Point Set - Delco-Remy No 1847643

Breaker Gap - 016"

Cam Angle - 28-35° with 016" gap

►*BREAKER GAP CAUTION* Manufacturer recommends final check with feeler gauge or dial indicator if dwell meter used to set points

Breaker Arm Spring Tension - 19-23 ozs

Rotation - Clockwise viewed from above

Automatic Advance

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
4-6	700	8-12	1400
9-11	1350	18-22	2700
12-14	1750	24-28	3500

Octane Selector: Adjustment on distributor provides 10° spark advance or retard from center "0" position

Vacuum Spark Control: Delco-Remy No 1116089, 140 or 143

Vacuum Advance - 1116089

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
7 5	15	7 5-10

Vacuum Advance - 1116140 & 143

Distr Degrees	Eng Degrees	Vacuum (" of Hg)
Start	0	4-6
11	22	15-16

IGNITION TIMING

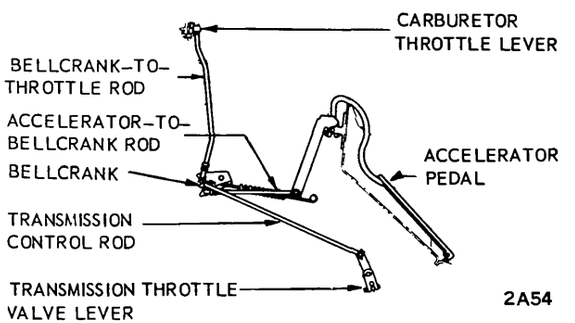
Setting - 5° BTDC at idle speed with vacuum line disconnected Allowable range 0°-8° BTDC

Timing Mark - First short vertical line on flywheel, clockwise from steel ball (TDC) insert This line should align with pointer in inspection hole in right front face of housing with octane selector set on "O"

CARBURETOR

►*CARBURETOR APPLICATION Rochester BC single barrel carburetor used on all models.*

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE CARS): 1) Disconnect control rod from throttle lever at transmission cover Remove lower bolt at rear of transmission side cover Rotate throttle valve control outer lever counterclockwise to open throttle position 2) Hold lever in this position and with throttle valve outer lever gauge J-5906 set at 7 09", measure distance from left side cover lower rear bolt to hole in throttle lever If pins of gauge will enter holes, adjustment is correct If necessary to adjust, loosen lever-to-clamp adjusting screw and adjust lever on throttle shaft as necessary Reconnect throttle rod



POWERGLIDE TRANSMISSION THROTTLE LINKAGE

3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever Disconnect accelerator-to-bellcrank rod at bellcrank

4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position

5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank

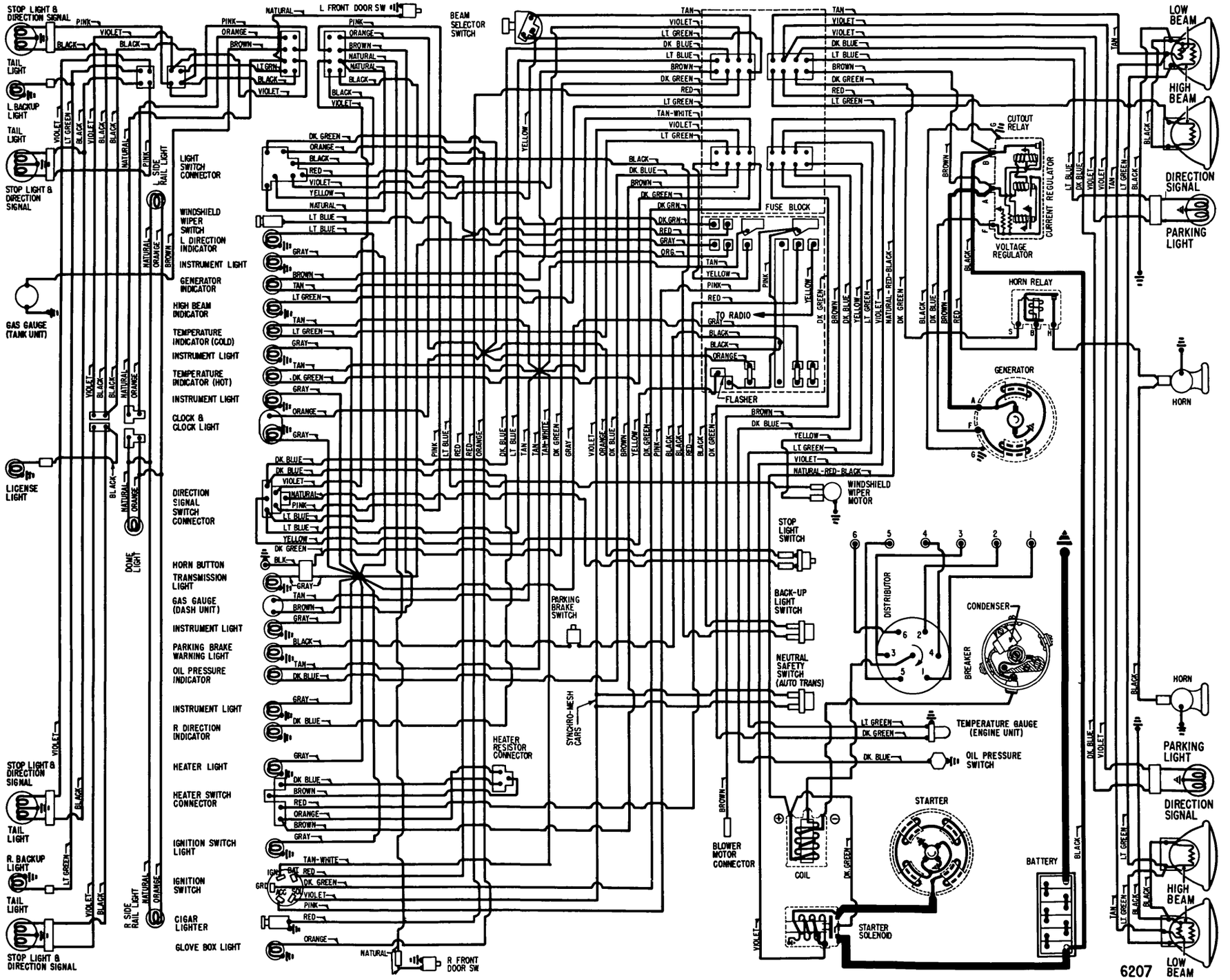
ROCHESTER BC

Rochester BC single barrel carburetor used as follows

Model	Carburetor No.
Synchro-mesh (Std)	7020003
Powerglide (Std)	7020000
Synchro-mesh (Economy)	7020107
Powerglide (Economy)	7020106
Velocity Governor	7020005

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
L. BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
GAS GAUGE (TANK UNIT)
LICENSE LIGHT
DOME LIGHT
STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
R. BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
R. SIDE RAIL LIGHT
L. SIDE RAIL LIGHT
LIGHT SWITCH CONNECTOR
WINDSHIELD WIPER SWITCH
L. DIRECTION INDICATOR
INSTRUMENT LIGHT
GENERATOR INDICATOR
HIGH BEAM INDICATOR
TEMPERATURE INDICATOR (COLD)
INSTRUMENT LIGHT
TEMPERATURE INDICATOR (HOT)
INSTRUMENT LIGHT
CLOCK & CLOCK LIGHT
DIRECTION SIGNAL SWITCH CONNECTOR
HORN BUTTON
TRANSMISSION LIGHT
GAS GAUGE (DASH UNIT)
INSTRUMENT LIGHT
PARKING BRAKE WARNING LIGHT
OIL PRESSURE INDICATOR
INSTRUMENT LIGHT
R DIRECTION INDICATOR
HEATER LIGHT
HEATER SWITCH CONNECTOR
IGNITION SWITCH LIGHT
IGNITION SWITCH
CIGAR LIGHTER
GLOVE BOX LIGHT
L. FRONT DOOR SW
R. FRONT DOOR SW
BEAM SELECTOR SWITCH
FUSE BLOCK
TO RADIO
FLASHER
PARKING BRAKE SWITCH
HEATER RESISTOR CONNECTOR
SYNCHRO-MESH CARTS
BLOWER MOTOR CONNECTOR
WINDSHIELD WIPER MOTOR
STOP LIGHT SWITCH
BACK-UP LIGHT SWITCH
NEUTRAL SAFETY SWITCH (AUTO TRANS)
CUTOUT RELAY
VOLTAGE REGULATOR
CURRENT REGULATOR
HORN RELAY
GENERATOR
DISTRIBUTOR
CONDENSER
BREAKER
COIL
STARTER
STARTER SOLENOID
BATTERY
TEMPERATURE GAUGE (ENGINE UNIT)
OIL PRESSURE SWITCH
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
HORN
6207

CONTINUED FROM PRECEDING PAGE

Idle Setting - 1½ turns open. 2½ turns open after engine temperature normal.
Idle Speed - 500 RPM (Synchro-mesh), 475 RPM (Powerglide in Drive).
Float Level - 1 9/32" (Gauge M-250). With air horn inverted and gasket in place, position gauge M-250 over floats with tang inserted in discharge nozzle. Bend float arms as necessary so that top of each float just touches gauge and float is centered between gauge legs.
Float Drop - Bend float tang as necessary to obtain a distance of 1¾" from gasket surface to bottom of float, with air horn upright and float hanging free.

Automatic Choke Setting: Set on Index (7020105), 1 Notch Lean (7020003), 1 Notch Rich (7020107), 2 Notches Rich (7020000 & 7020106). *NOTE* - Settings for 7020105 & 7020003 supersede previous specifications.

Fast Idle: With fast idle adjusting screw on second step and against high step of fast idle cam, Gauge BT-99 (.076") should just slide between lower edge of choke valve and carburetor bore. To adjust, bend connector rod.
Throttle Linkage Adjustment: See *CARBURETOR above.*
►*OTHER DATA: See "Rochester BC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type. Fuel only.
Replacement Fuel Pump - AC 4434.
Pressure - 3½-4½ lbs. at 450-1000 RPM.
Gas line Gauge: AC Electric type.

Dash Unit - AC No. 5643416.
Tank Unit - AC No. 5641248 (Except Station Wagon), No. 5642510 (Station Wagon).
Air Cleaner: Oil-wetted polyurethane element air cleaner Standard. Oil bath type Optional. Clean oil wetted polyurethane element every 4000 miles or sooner under adverse driving conditions.
►*POLYURETHANE ELEMENT CLEANING CAUTION:* Wash element in kerosene or mineral spirits (not acetone or similar solvents) and squeeze out excess solvent. DO NOT WRING. Reoil with engine oil then squeeze out excess oil. Replace air cleaner-to-air horn gasket. Be sure filter element is not folded or creased so as to cause an imperfect seal.

Fuel Filter: In fuel inlet line at carburetor. Clean with solvent and compressed air. Replace every 15,000 miles.
Cruise Control: Automatic Speed Control. *See "Cruise Control" in Carburetion Section.*

ELECTRICAL

►*SEE CHEVROLET V8 PAGES (FOLLOWING) FOR ALL BATTERY, STARTER, GENERATOR, REGULATOR & MISC. ELECTRICAL DATA.*

ENGINE

ENGINE SPECIFICATIONS: Own. 6 cyl. valve-in-head.

Bore	Stroke	Displacement
3 9/16"	3 15/16"	235.5 cu. in.
Compr. Ratio	**Rated HP**	**Developed HP**
8.25-1	30.4	135 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*
ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Chevrolet Special Data.*
CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Aluminum alloy, cam ground, tin plated, with pin offset 5/64".
Removal - Pistons and rods removed from above.
Clearance - .0005-.0011".
►*STANDARD & .001" PISTON NOTE:* Standard and .001" pistons are furnished in two sizes as follows: **Std.** - Marked **S4** (3.5625-3.5630"), **S5** (3.5630-3.5635"), **.001" Oversize** - Marked **S6** (3.5635-3.5640"), **S7** (3.5640-3.5645").
Fitting New Pistons: Use .0015" x ½" feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder to a point where center of piston pin hole is flush with to surface of block (feeler 90° from pin hole). Pull required to withdraw feeler must be 7-18 lbs.
Installing Pistons: Install piston with notch in piston and mark "Front" toward front of engine.
Replacement Pistons: Furnished Std. & .001", .020" .030", .040" Oversize.

PISTON PIN

Locked in rod. No bushing used in piston.
Diameter - .8660-.8665".
Piston Pin Fit in Piston - .00015-.00025" clearance. With both piston and pin at 70°F, and light film of oil on pin, pin should hold own weight in either piston pin boss. It should be possible to install pin in piston with thumb pressure.
Replacement Pins: Furnished Std. & .0015", .003", .005" Oversize.

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.(1&2)	.0930-.0935"	.010-.020"	.002-.004"
Oil (3)	.184-.188"	ℂ.015-.055"	ℂ.000-.008"

ℂ - On rails. ℂ - Chrome rails and spacer.
Replacement Rings: Furnished Std. & .020", .030", .040" Oversize.
►*RING INSTALLATION CAUTION:* Install compression rings with side marked "GM" upward.

CONNECTING ROD

Length - 6.81" center-to-center.
Crankpin Journal Diameter - 2.311-2.312".
Lower Bearing - Replaceable precision type.
Clearance - .001-.003" (new), .001-.004" (used).
Sideplay - .005-.012".
Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.
Installing Rods: Install rods with piston pin clamp and number on rod lower end toward camshaft.

CRANKSHAFT

Journal Diameters - (1) 2.6835-2.6845", (2) 2.7145-2.7155", (3) 2.7455-2.7465", (4) 2.7765-2.7775".
Clearance - .0008-.0024" (Nos. 1 & 2), .0010-.0026" Nos. 3 & 4).
Bearing - Thin wall babbitt with steel back.
Bearing Adjustment: Precision type. Replace bearings.
End Thrust - Taken by No. 3 (rear intermediate) main bearing.
Endplay - .0035-.0095".
Replacement Bearings: Furnished Std. & .002", .010", .020", .030" Undersize.
Bearing Installation: Can be replaced without removing engine. *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*
Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*
Vibration Dampener: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

Journal Diameters - (1) 2.1537-2.1547", (2) 2.0912-2.0922", (3) 2.0287-2.0297", (4) 1.9662-1.9672".
►*NOTE:* Journal out-of-round limits .001". Run-out limits .002".
Bearing Type - Steel backed babbitt lined bushings, no reaming required.
Clearance - .0015-.0035".

End Thrust: Controlled by spacer and thrust plate behind camshaft sprocket.
Endplay - .001-.005".

►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. *See "Camshaft & Bearings" in Chevrolet Special Data.*
Timing Gear: Fibre camshaft gear, steel crankshaft gear.
Back Lash - .003-.005".
Replacement Timing Gears & Installation: *See "Timing Gears" in Chevrolet Special Data.*
Camshaft Setting: Timing is correct when timing marks on gears are together.
Camshaft Removal & Replacement: *See "Camshaft & Bearings" in Chevrolet Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Initial Valve Adjustment: Use distributor rotor position for determining when lifter is on base circle of cam. With rotor pointing at No. 1 cylinder (points open) turn adjusting screw down until all lash is removed (check pushrod side play), then turn screw down an additional 1½ turns and tighten locknut. Repeat on other valve for that cylinder. Continue to adjust valves for each cylinder using firing order sequence.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	.3410-.3417"	6.272-6.282"
Exhaust	1.495-1.505"	Ⓒ	4.913-4.933"

Valve	Seat Angle	Lift	Stem Clearance
Intake	Ⓑ 31°	.3275"	.0010-.0027"
Exhaust	Ⓓ 46°	.3275"	.0016-.0033"

Ⓒ - .3410-.3417" (top), .3400-.3407" (bottom)..001"taper.
Ⓑ - Valve face angle 30°. Ⓓ - Valve face angle 45°.

Valve Seat Width - 1/32-1/16" (Intake), 1/16-3/32" (Exhaust).

Valve Stem Oil Seal Installation: *See "Valve System" in Chevrolet Special Data.*

Valve Guides: Precision type, pressed in head.
Valve Guide Installation - *See "Valve System" in Chevrolet Special Data.*

Valve Springs: Install springs with closed coil end down.
Free Length - 2.16".

Spring Specifications

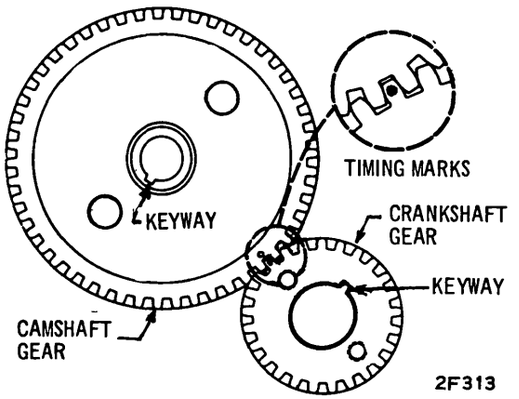
Valve	Pressure	Length
Closed	62-68 lbs.	1.858"
Open	158-168 lbs.	1.528"

►*VALVE SPRING HEIGHT CAUTION:* Check installed height of valve springs. If distance from spring seat in head to top of valve spring exceeds 1 7/8", install shims under spring to bring installed height within limits of 1 51/64-1 7/8".

Valve Lifters: Hydraulic. *See "Valve System" in Chevrolet Special Data.*

Valve Rotators: Used on all valves.

Rocker Arm Assembly: *See "Valve System" in Chevrolet Special Data.*



VALVE TIMING MARKS

►*PUSHROD IDENTIFICATION & INSTALLATION CAUTION:* For Part No. Application, Color Identification & Installation Caution, *see "Rocker Arms" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 62° BTDC. Close 94° ALDC.
Exhaust Valves - Open 92°30' BLDC. Close 63°30' ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 5 qts., add 1 qt. with filter change.

Normal Oil Pressure: 35 lbs. at 2000 RPM.
Pressure Regulator Valve - In oil pump body. Not adjustable.
Oil Pressure Indicator - Light located on left side of instrument panel, controlled by pressure switch AC No. 1508753 located in main oil gallery on left side of engine. Switch closes when pressure drops to 4-7 lbs.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Oil Filter Element: Replacement element AC No. 115. Replace every 4000 miles.

Crankcase Ventilation (Standard): Air intake through breather filter in valve rocker arm cover and outlet through crankcase breather pipe on right side of engine.
Servicing - Clean breather filter in a good solvent every 2,000 miles, then oil mesh with light engine oil.

Crankcase Ventilation (Optional): Positive Type. Two types used as follows: 1) Conventional road draft tube replaced by a crankcase outlet pipe with baffles in upper end. Ventilation valve in upper end of outlet pipe is connected to intake manifold by a hose.
2) Same as Type 1) above with additional fresh air intake from carburetor air cleaner to valve rocker cover. Oil filler breather cap is replaced by solid non-breather type. *Both types are serviced in same manner. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

►*RADIATOR REMOVAL CAUTION (POWERGLIDE CARS): Transmission oil cooler is part of radiator lower tank and must be TIGHTLY SEALED after removal or during repairs to avoid entrance of foreign material.*

Water Capacity: 17 qts. (Synchro-mesh), 16½ qts. (Powerglide) without heater. Add 1 qt. for heater.

Pressure Valve: Radiator filler cap, AC No. 850800 Type RC-6, 13 lb.

Thermostat: Pellet type. In cylinder head water outlet. 170°F Std., 160°F & 180°F Optional. Use 160°F thermostat with Methanol type anti-freeze.

Temperature Gauge: AC Electric.
Dash Unit - AC No. 1513850.
Engine Unit - AC No. 1993561.

Water Pump: Permanently lubricated, sealed ball bearing type. *See "Cooling System" in Chevrolet Special Data.*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*PUSH-STARTING DELCOTRON ALTERNATOR EQUIPPED CARS CAUTION: Turn off all electrical loads except ignition. This insures ample closing voltage for field relay coil.*

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Series Designation (Exc. Corvette)

Model	Biscayne	Bel Air	Impala
2-Dr. Sedan	1211	1611	
2-Dr. Sport Coupe	1637		1847
Convertible			1867
4-Dr. Sedan	1269	1669	1869
4-Dr. Sport Sedan			1839
Sta. Wgn. (6 Pass.)	1235	1635	1835
Sta. Wgn. (9 Pass.)		1645	1845

Model	Corvette Series Designation
2-Dr. Convertible	867

SERIAL NUMBER: Stamped on plate on left front door hinge pillar post (Exc. Corvette), under hood on upper part of steering column (Corvette). Number (example below) includes identification data.

① ② ③ ④
2 1211 F 100001

① - Model year. 2 1962.
② - Series prefix. *See Series Designation above.*
③ - Assembly plant. F Flint. *See table below.*
④ - Unit number. Continuous at each assembly plant (Pass. & Corvette separate) beginning at 100001.

Assembly Plant Designation

A - Atlanta	J - Janesville	O - Oakland
B - Baltimore	K - Kansas City	S - St. Louis
F - Flint	L - Los Angeles	T - Tarrytown
G - Framingham	N - Norwood	W - Willow Run

ENGINE NUMBER: Stamped on pad at right side of cylinder block behind distributor. Number (example below) includes identification data as indicated.

① ② ③
T 0101 C

① - Engine plant. F - Flint. T - Tonawanda. C - Engines built in Canada.
② - Code number indicates day and month of manufacture. Not individual or continuous number. 0101 is January 1 production date.
③ - Engine type. *See Engine Type table below.*

Engine Type

283" Pass. Car Engine (2-Bbl. Carb.)

Car Model	Transmission Application 3-Speed	Overdrive	Powerglide
Less Air Cond.	C & CB	CD	D
With Air Cond.	CL		DK

327" Pass. Car Engine (4-Bbl. Carb.)

Car Model	Transmission Application 3-Speed	Powerglide
Less Air Cond.	R & RB	S & SB
With Air Cond.	RA	SA

327" Corvette Engine

Carburetion	Transmission Application 3-4-Speed	Powerglide
4-Bbl. (250 HP)	RC	SC
4-Bbl. (300 HP)	RD	SD
4-Bbl. (340 HP, Mech. Lift.)	RE	
Fuel Injection	RF	

409" Pass. Car Engine

Carburetion	HP	Engine Type
One AFB 4-Bbl.	380	QA
Two AFB 4-Bbl.	409	QB

►*409" ENGINE NOTE:* Special cam, mechanical lifters, and 3 & 4-speed transmissions used.

TUNE-UP

COMPRESSION PRESSURE: 140 lbs. (283" Eng.), 160 lbs. (327" Eng.), 150 lbs. (409" Eng.) Minimum at cranking speed with throttle open. Maximum variation between cylinders 15 lbs.

VALVE TAPPET CLEARANCE: Hydraulic Lifters - With engine at operating temperature and idling, loosen locknut and back off adjusting screw (one at a time) until rocker arm clatters, then turn adjusting screw down until clatter stops, plus 1 turn and tighten locknut.

Mechanical Lifters - .008" Intake, .018" Exhaust.

MANIFOLD HEAT CONTROL: Heat control valve and thermostatic coil assembly located between right exhaust manifold and crossover pipe (single exhaust), exhaust pipe (dual exhaust). Assembly not used in Fuel Injection Cars. Make sure valve shaft is free to turn. If sticking, free up with G.M. Manifold Heat Control Solvent or equivalent.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition or carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035" (.033-.038").

Spark Plugs - AC 46 (283" Eng.), AC 44 (327" Eng.), AC 43N (409" Eng.). *Corvette plugs listed below.* All *14 mm. Torque to 20-25 ft. lbs.*

Use	Corvette Spark Plug No.	AC Number
City driving only		46
Town & country driving	45 (4-Bbl.), 44 (F.I.)	
Heavy duty and high output		C 43 COM
Extended and extreme high output		C 42-1 COM

COIL: Delco-Remy. Used as follows.

Engine	Delco-Remy No.
283"	1115115
327" (Exc. Corvette)	1115115
327" (Corvette with 4-Bbl. Carb.)	1115091
327" (Corvette with Fuel Injection)	1115107
409"	1115091

Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.
Resistor - Delco-Remy No. 1931385 (Corvette & 409" Eng.). All others use a resistance type cable (1.8 ohms) in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation). Bypassed during cranking when coil energized directly from starter solenoid bypass terminal.

DISTRIBUTOR: Delco-Remy. Used as follows:

Application	Delco-Remy No.
283" Eng.	1110947
327" Eng. (exc. Corvette)	1110987
Corvette (250 & 300 HP)	1110984
Corvette (340 HP)	1110985
Corvette (Fuel Injection)	1110990
409" Eng.	1111006 & 1110919

►*DISTRIBUTOR NOTE: Distributors used as follows:*
1110919, 985, 990 & 1111006 - Double breaker with conventional distributor cap (not window type). Vacuum spark control not used (centrifugal weight advance only).
1110947, 984, 987 - External adjustment "Window" type.
Condenser (Double Breaker Distr.) - Delco-Remy No. 1942284.
Condenser (Window Type Distr.) - Delco-Remy No. 1932004.
Capacity - .18-.25 mfd.
Contact Point Set (Double Breaker Distr.) - Delco-Remy No. 1931988.
Breaker Gap (Window) - Gap (.016") will be correct when cam angle correctly set (see below).
Cam Angle (Window) - 28-32°. Set at 30°. Gives .016" point opening.
Breaker Gap (Double Breaker) - .014-.018" (new points).
Cam Angle (Double Breaker) - Adjust each set of points to 29±1° with other set blocked open with .025" thick insulator. Cam angle for both sets of points operating together should be 34±1°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110947

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	375	0-4	750
5-7	750	10-14	1500
10-12	1450	20-24	2900
13-15	1875	26-30	3750

Automatic Advance (1110984, 85, 87, 90 & 1111006)

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	425	0-4	850
4.5-6.5	800	9-13	1600
8-10	1600	16-20	3200
11-13	2300	22-26	4600

Automatic Advance - 1110919

Degrees	Distr. RPM	Degrees	Eng. RPM
.5-2.5	400	1-5	800
6.5-8.5	775	13-17	1550
9.5-11.5	1600	19-23	3200
13-15	2500	26-30	5000

Vacuum Spark Control: Delco-Remy No. 1116148 or 201.
NOTE - Vacuum unit not used on double breaker type distributors.

Distr. Degrees	Vacuum Advance Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
8	16	15-16

IGNITION TIMING

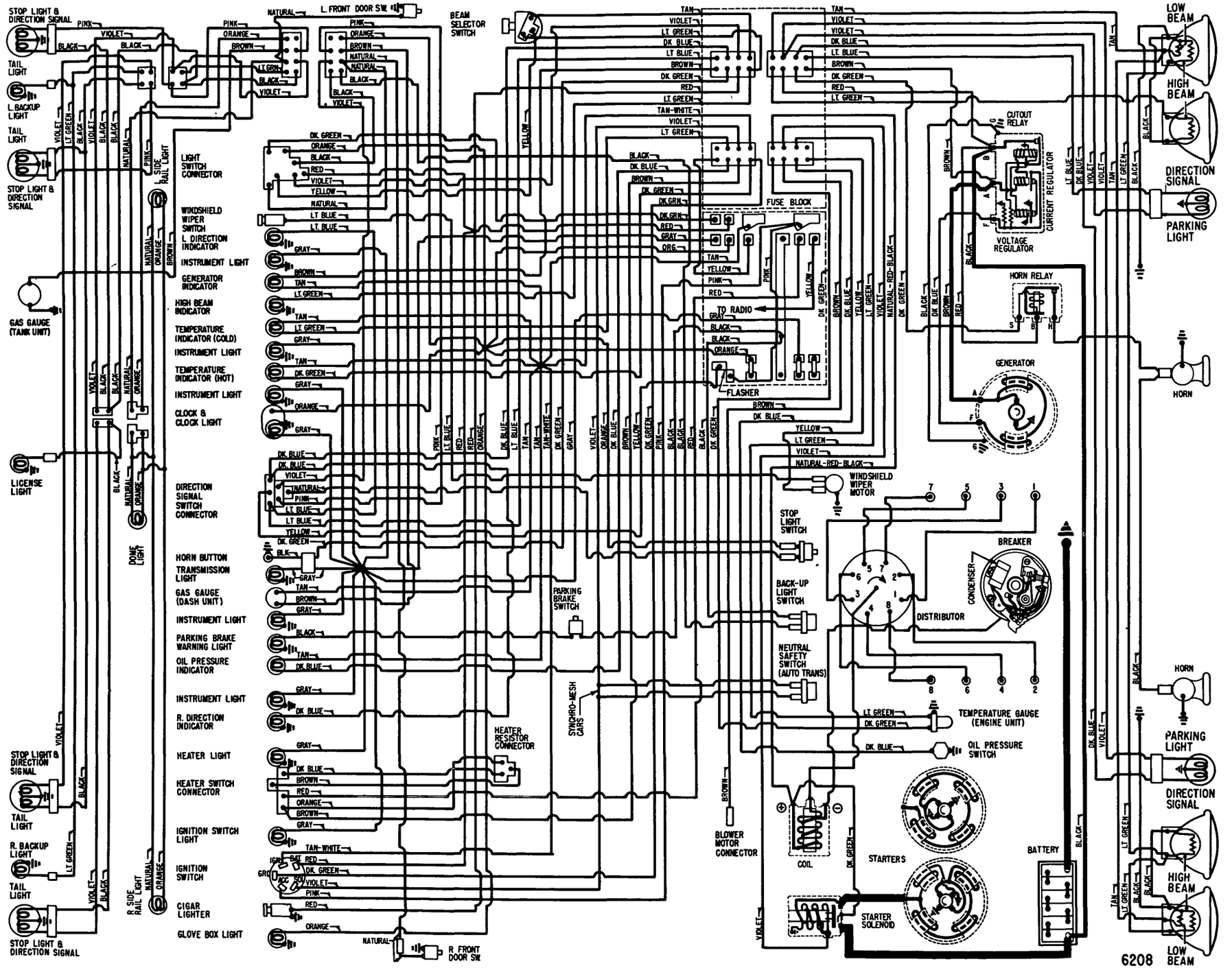
Engine	Std. Setting	Range	Idle Spd.
283"	4° BTDC	4-8° BTDC.	① 500 RPM
327" (250 HP)	4° BTDC	4-10° BTDC.	① 500 RPM
327" (300 HP)	8° BTDC	6-12° BTDC.	① 500 RPM
327" (340 & 360 HP)	10° BTDC		650 RPM
409"	12° BTDC		650-700 RPM

① - Synchro-mesh Trans. 475 RPM on Powerglide Cars with selector lever in "Drive".

►*TIMING SETTING CAUTION: Timing must be set with vacuum line disconnected and hollow stud (manifold connection) capped, and engine at idle (see above).*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.



CHEVROLET V8 (EXC. CORVETTE) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Timing Mark - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines at 2° increments with greatest number of lines on advance or BTDC side.

CARBURETOR

Engin	Carburetor Application
283"	Rochester 2GC (one)
327" (250 HP)	① Rochester 4GC or Carter WCFB (one)
327" (300 & 340 HP)	Carter AFB (one)
327" (360 HP)	Rochester Ramjet Fuel Injection
409" (380 HP)	Carter AFB (one)
409" (409 HP)	Carter AFB (two)

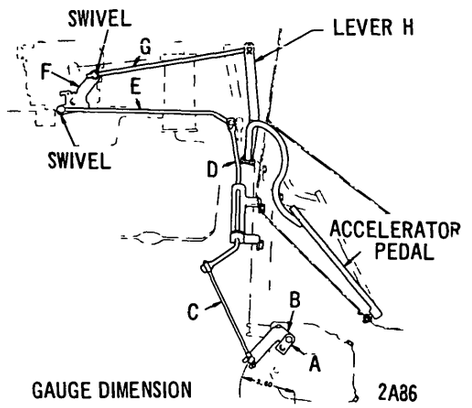
① - Rochester 4GC used on some Chev. Pass. Cars with Powerglide.

►*AIR CONDITIONING FAST IDLE CAUTION:* Adjust stop on dash Fast Idle Control Wire to provide 900 RPM engine speed when knob is pulled out. Make sure knob is pushed in when making normal fast idle adjustment and that air conditioning fast idle control linkage d es n t interfere.

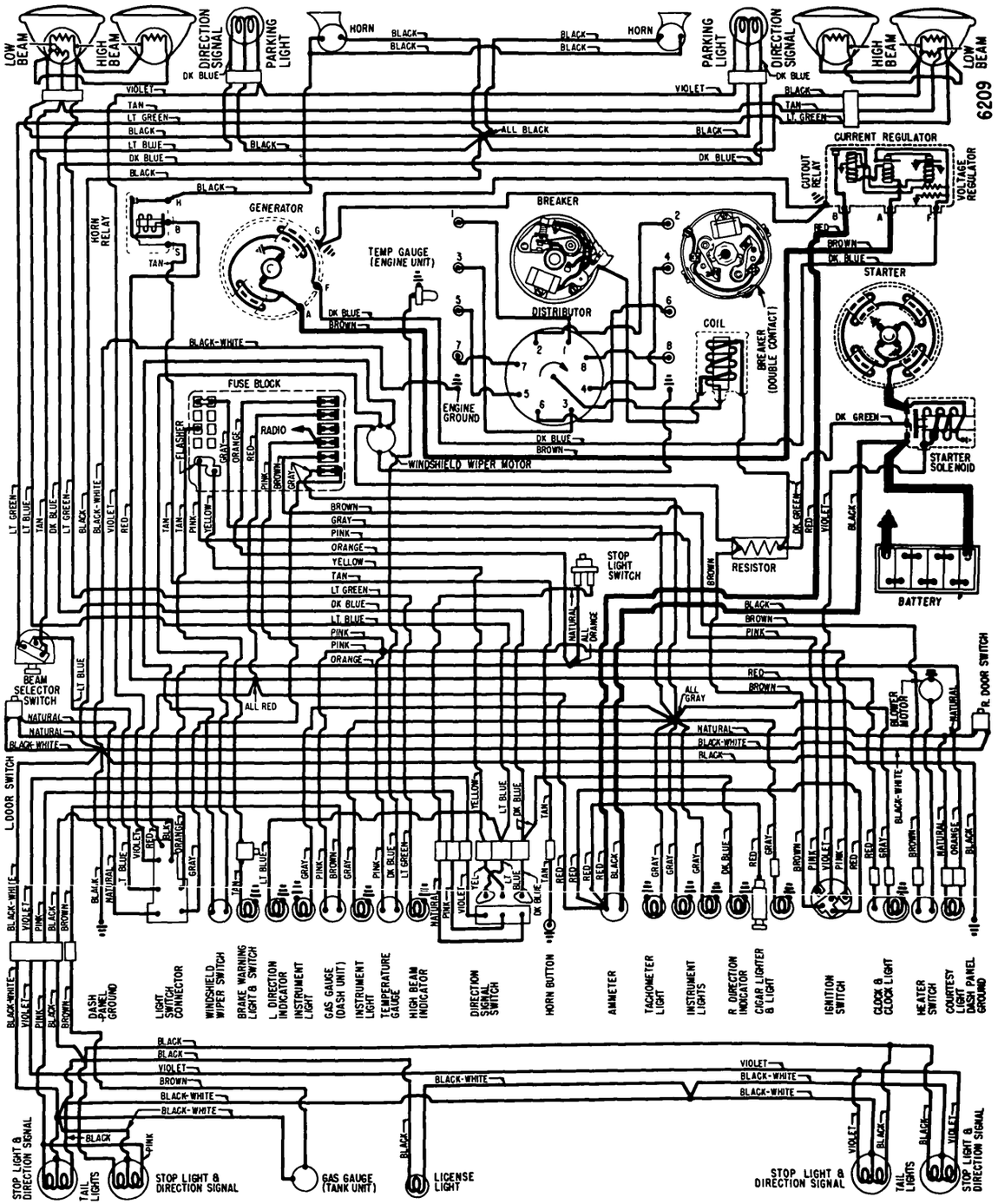
THROTTLE LINKAGE ADJUSTMENT (CAST IRON POWERGLIDE): S *illustration.* Loosely assemble lever "B" to clamp "A". Insert Tool J-5906 between transmission left side cover lower front bolt and hole in lever "B". Distance between hole center lines should be 3.60". With gauge in place and holding clamp "A" counterclockwise in full detent position, tighten lever "B" to clamp "A". *R m v gauge, then perform adjustments as outlined in "Aluminum" Powerglide Throttle Linkag Adjustment b low.*

THROTTLE LINKAGE ADJUSTMENT (ALUMINUM POWERGLIDE): S *illustration.* Install rod "C". Thread rod "E" through swivel and install in lever "F". Place lever "F" in wide open position and move cross-shaft assembly "D" forward against transmission internal stop. Adjust swivel on rod "E" until swivel freely enters cross-shaft assembly "D". Fix swivel in cross-shaft. To check adjustment, place linkage in idle position, then return to wide open by rotating lever "F". Push downward on lever "B" and note if rod "E" deflects, or if lever "F" will not reach wide open throttle position (if so, repeat adjustment). Depress ac-

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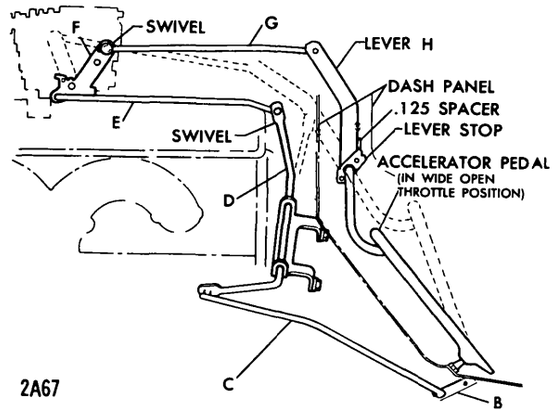
POWERGLIDE (CAST IRON) THROTTLE LINKAGE



CHEVROLET CORVETTE WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

celerator pedal until lever "H" contacts a .125" spacer (Aluminum Powerglide), 1/2" wood block under pedal rod (Cast Iron Powerglide), 1/4-3/8" distance above toe panel with carpet removed (Corvette). On all models rotate lever "F" to wide open position, then adjust swivel in rod "G" for free entry in lever "F" and install rod into lever.



POWERGLIDE (ALUMINUM) THROTTLE LINKAGE
ROCHESTER 2GC 2-BARREL
(283" Engine)

Rochester 2GC No. 7020007 (Synchro-mesh), 7020008 (Powerglide), 7020018 (Air Cond. with Powerglide). Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making idle setting and idle speed adjustments, Idle Compensator must be in closed position. Depress button on back side of float bowl.

Idle Setting - Initial setting 1½ turns open. Adjust both screws alike. After idle speed set to correct specifications *(see "Idle Speed" below)*, turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM. *NOTE* - Approximate adjustment can be obtained by setting screws lean to moderate rough idle and then backing out ¼ turn.

Idle Speed - 500 RPM (Synchro-mesh), 475 RPM (Powerglide in Drive).

Float Level - 1 23/64" (Gauge BT-152). With air horn inverted and gasket in place, position float level gauge over float, so it rests against pump side of power piston shaft, with outer gauge leg in line with center of float. Bottom of float should just touch gauge. Bend float arm to adjust.

Float Drop - Bend float tang as required to obtain a distance of 1 29/32" (Gauge BT-152) from gasket surface to bottom of float, with air horn upright and float hanging free. Use scale or scribed mark on float and pump gauge.

Automatic Choke Setting: Centered at index (Exc. 7020007), 1 notch lean (7020007).

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA:* See *"Rochester 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL
(327" 250 HP Engine)

Rochester 4GC 7020006 (Powerglide), 7020012 (Early Air Cond.), 7020022 (Late Air Cond.).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* Idle Compensator (thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and insert pencil or suitable tool in throttle bore.

Idle Setting - Initial setting 1½ turns open. After idle speed correctly set *(See "Idle Speed" below)*, turn each idle mixture screw for smoothest idle at highest vacuum reading and RPM. *NOTE* - Approximate adjustment can be obtained by setting screws lean to moderate rough idle and then backing out ¼ turn.

Idle Speed - 475 RPM (Powerglide in Drive).

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA:* See *"Rochester 4GC Carburetors" in Carburetion Section.*

CARTER WCFB 4-BARREL
(327" 250 HP Engines)

Carter WCFB 3190S (Powerglide), 3191S (Synchro-mesh). Used on 327" (250 HP) Engines, including Corvette.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Setting - ½-2 turns open. Turn both screws alike. Turn screws out for richer mixture.

Idle Speed - 500 RPM (Synchro-mesh), 475 RPM (Powerglide). Powerglide Trans. in "Drive".

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA:* See *"Carter WCFB Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL

Carter AFB 4-Barrel. Used as follows:

Engine	Carter No.
327" (300 & 340 HP) Early Ⓒ	3269S
327" (300 & 340 HP) Late Ⓒ	3310S
409" (380 HP) Early	3270S
409" (380 HP) Late	3345S,SA

Ⓒ - Includes Corvette.

Idle Setting - ½-2 turns open. Turn both screws alike. Turn out for richer mixture.

Idle Speed - (327" 300 HP Engine) - 500 RPM (Synchro-mesh), 475 RPM (Powerglide in Drive).

(327" 340 HP Engine) - 650 RPM.

(409" Engine) - 650-700 RPM.

Throttle Linkage Adjustment: See *CARBURETOR* above.

►*OTHER DATA:* See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

CARTER AFB 4-BARREL
(Two Carburetors)

Carter 3361S (Front), 3362S (Rear).

Idle Setting - Turn idle mixture screws ¾ turn open from lightly seated position. Back idle speed screws just off throttle levers and turn in 1½-2 turns.

Idle Speed - 700 RPM.

►*OTHER DATA:* See *"Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

FUEL INJECTION
Rochester Ramjet

Rochester No. 7017355 or 7017360. *NOTE - Only difference between units is in type of fuel filter used. For all data, see "Rochester Fuel Injection" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC Diaphragm type. Fuel only.

Replacement Pump - AC No. 4701 (283" Eng.), No. 4657 (Others).

Pressure - 5½-6½ lbs. at 1,000 RPM.

Gasoline Gauge: AC Electric.

Dash Unit - AC No. 5643416 (Pass.), No. 5643258 (Corvette).

Tank Unit - As follows:

Model	AC No.
Pass. (Exc. Sta. Wgn. & Dual Exh.)	5641248
Pass. Dual Exh. (Exc. Sta. Wgn.)	5641461
Sta. Wgn. (Exc. Dual Exh.)	5642510
Sta. Wgn. Dual Exhaust	5642511
Corvette	5642125

Air Cleaner: 409" Engine & Corvette - Oil wetted polyurethane element type. Clean every 4000 miles (exc. Corvette), 8000 miles (Corvette). See *CLEANING CAUTION below.*

Other Engines - Paper element type Std. Check paper element for restrictions every 5000 miles and replace if necessary.

►*POLYURETHANE ELEMENT CLEANING CAUTION:* Clean element every 4000 miles. Remove and inspect for rips or tears (replace if necessary). Wash element in kerosene or mineral spirits. *NEVER USE a hot degreaser, acetone or similar solvent.* After squeezing out (do not wring), dip element in light engine oil, then gently squeeze out excess oil. Replace air horn-to-air cleaner gasket.

Fuel Filter: In fuel inlet line at carburetor. On fuel injection equipped Corvettes, replace filter every 15,000 miles or sooner if needed. On all other cars, replace paper element at 5,000 mile intervals.

Cruise Control: Automatic speed control. See *"Cruise Control" in Carburetion Section.*

BATTERY

Delco-Remy used as follows:

Engine	Delco No.	Plates	Amp. Hr. Capacity
283" & 235"	458	9	54 (20 hr. rate)
327" & 409"	558	11	61 (20 hr. rate)

Battery Ground - Negative, to engine.

Engine Ground - Engine to cowl.

STARTER

Delco-Remy. Used as follows:

Engine	Delco-Remy No.
6 Cyl.	1107888
283" & Corvette	1107889
327" & 409" (Synchro-mesh)	1107233
327" (Powerglide)	1107242

Drive - Overunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum (1107888,889), 40 ozs. minimum (1107233,242).

Performance Data - 1107888,889

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.25	270-310

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Performance Data - 1107233,242

Torque	RPM	Volts	① Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

① - Includes solenoid.

Starting Switch: Delco-Remy Solenoid Switch No. 1119910 mounted on starter and controlled by Ignition Switch Delco-Remy No. 1116610 (Pass.), No. 1116577 (Corvette).

Neutral Safety Switch: Combination neutral safety and back-up light switch, Delco-Remy No. 1998677 (Pass.), No. 1993566 (Corvette), mounted on steering column under instrument panel.

Adjustment - *See "Powerglide Transmission" in Transmission Section.*

GENERATOR

Delco-Remy. Used as follows:

Engine	Generator	Armature
6 Cyl.	1102096	1923535
283"	1102097	1923535
327" Pass. Car	1102097	1923535
327" (250 & 300 HP Corvette)	1102174	1948005
327" (340 & 360 HP Corvette)	1102268	1940161
409"	1102268	1940161
Taxi	1105123	1945122
(Optional)	1105116	1940161

Performance Data

Generator	Amperes	Volts	RPM
1102096, 97	30	14.0	2240
1102174	35	14.0	2630
1102268	35	14.0	2630
1105116	40	14.0	1730
1105123	40	14.0	1930

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 Amps. (1102096,097,174, 268), 2.73-3.0 Amps. (1105116,123) at 12 volts and 80°F.

Belt Adjustment: 75 lbs. (new & used) using strand tension gauge Tool J-7316 midway between generator and water pump pulleys. To adjust, move generator in its mounting bracket.

GENERATOR REGULATOR

Delco-Remy. Used as follows:

Regulator	Generator
1119001E (6 Cyl.)	1102096
1119001E (283" & 327" Pass. Car)	1102097
1119002E (250 & 300 HP Corvette)	1102174
1119002E (340 & 360 HP Corvette)	1102268
1119235 (409" Eng.)	1102268

Cutout Relay

Cuts In - 11.8-13.5 volts.

Contact Gap - .020". **Air Gap** - .020".

Voltage Regulator

Setting - 13.8-14.7 volts at 125°F.

Air Gap - .060" (1119001E & 2E), .075" (1119235).

Current Regulator

Setting - 27.0-31.0 amps. (1119001E), 31.0-35.5 amps. (1119002E, 235).

Air Gap - .075" (contacts just touching).

►*OTHER DATA: See "Delco-Remy Single Contact Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy "Delcotron". Used as follows:

Model	Alternator No.
Air Conditioning (Std.)	1100600
Air Conditioning (Opt.)	1100613
Heavy Duty	1117765
Optional	1100601

Performance Data

Alternator	Amperes	RPM
1100600, 613	12	1100
	42	6500
1100601	5	1100
	52	6500
1117765	24	1100
	62	6500

Field Current - 1.9-2.3 amps. (1100600, 601 & 613), 4.1-4.5 amps. (1117765) at 12 volts and 80°F.

►*OTHER DATA: See "Delco-Remy Delcotron Alterators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy. Transistorized and conventional types used as follows:

Regulator	Type	Alternator
1119502	① 3-Unit, Conventional	1100600,01,13
9000567 ②	③ 2-Unit, Transistorized	1117765

① - Contains a Voltage Regulator, Field Relay & Indicator Light Relay.

② - Use with separate Indicator Light Relay, Delco-Remy No. 1116811.

③ - Contains a Voltage Regulator and Field Relay.

Field Relay

Closing Voltage - 6.5-8.5 volts (1119502), 5.0-9.5 volts (9000567).

Contact Gap - .015" (1119502), .014" (9000567).

Voltage Regulator

Setting - 13.5-14.3 volts (1119502), 13.3-13.9 volts (9000567) at 125°F ambient temperature operating on upper contacts. .1-.3 volt lower operating on lower contacts.

Contact Gap (1119502) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .067" (1119502), .075" (9000567).

Indicator Light Relay (1119502)

Closing Voltage - 3.8-5.2 volts.

Contact Gap - .010". **Air Gap** - .010".

Indicator Light Relay (No. 1115811)

Closing Voltage - 1.5-9.5 volts.

Contact Gap - .018".

Air Gap - .020" with contacts closed.

►*OTHER DATA: See "Delco-Remy Double Contact Alternator Regulators" or "Delco-Remy Transistorized Alternator Regulators ("B" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

Lighting Switch Removal: Pull handle out to "ON" position. Depress switch shaft retainer (under dash) and remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multi-plug connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.

Stop Light Switch Location: Mechanical type mounted under dash in contact with brake pedal.

Adjustment - Adjust position of switch so that stop light comes on when brake pedal is depressed 5/8" from fully released position.

Instrument Cluster Console Removal: Loosen and slide upwards upper mast jacket retaining clamp to release mast jacket. Loosen lower mast jacket retaining clamp and drop mast jacket and steering wheel down. Disconnect speedometer cable from speedometer. Remove console-to-instrument panel attaching screws and lean console forward onto mast jacket. Remove individual instruments as required or remove console as a unit by unsnapping all wire connectors.

Speedometer Cluster Removal: After Instrument Cluster Console removed (above), unsnap instrument light sockets from speedometer cluster, remove two attaching nuts and remove cluster.

CIRCUIT BREAKER: 30 Ampere - Headlamp circuit. Located in light control switch.

FUSES: Located in junction box beneath dash, except where noted.

20 Ampere - Air Conditioning.

15 Ampere - Spotlight.

10 Ampere - Heater, Back-up Light & Brake Signal Light.

4 Ampere - Radio.

3 Ampere - Instrument panel lights.

9 Ampere - Overdrive. Located in wiring harness on engine side of dash panel, just forward of instrument panel.

ENGINE

►*ENGINE NOTE: 409" Engine & 327" (340 & 360 HP Corvette) Engines use mechanical lifters.*

ENGINE SPECIFICATIONS: Own. V8, valve-in-head, 283", 327" (Including Corvette) and 409" displacement.

Eng.	Bore	Stroke	Rated HP	Displacement
283"	3.875"	3.00"	48	283 cu. ins.
327"	4.000"	3.25"	51.2	327 cu. ins.
409"	4.3125"	3.50"	59.5	409 cu. ins.

Engine	Compr. Ratio	Rated HP
283" Pass. Car	8.5-1	170 at 4200 RPM
327" Pass. & Corv. ①	10.5-1	250 at 4400 RPM
327" Pass. & Corv. ②	10.5-1	300 at 5000 RPM
327" Corvette ③	11.25-1	340 at 6000 RPM
327" Corvette ④	11.25-1	360 at 6000 RPM
409" ⑤	11.0-1	380 at 5800 RPM
409" ⑥	11.0-1	409 at 6000 RPM

① - One WCFB 4-Bbl. Carb. ② - One AFB 4-Bbl. Carb.

③ - One AFB 4-Bbl. Carb. with mechanical lifters.

④ - Fuel Injection (Ramjet) & mechanical lifters.

⑤ - One AFB 4-Bbl. Carb. ⑥ - Two AFB 4-Bbl. Carbs.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: *See "Oil Pan" in Chevrolet Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifolds" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

PISTONS

Cast aluminum alloy, autothermic type with piston pin offset .060" toward major thrust side.

Removal - Pistons and rods removed from above.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Clearance - As follows:

Engine	Clearance
283"	①.0006-.0010"
327" (250 & 300 HP)	②.0006-.0010"
327" (340 & 360 HP)	.0030-.0035"
409"	.0035-.0042"

① - Measured 2.44" from top of piston.
② - Measured 2.24" from top of piston.

Fitting Pistons: Use Piston Fitting Scale J-5513 and 8" x ½" x .004" feeler stock (409" & Corvette 340 & 360 HP Engs.), 8" x ½" x .0015" feeler stock (Other engines). With feeler surfaces clean and dry, insert feeler ribbon in cylinder and start inverted piston into bore (feeler adjacent to piston pin boss), keeping feeler ribbon straight in bore. Rotate piston down into cylinder until piston pin is parallel to crankshaft axis and center of pin is flush with top of cylinder bore. With a slow, steady pull on scale, reading should be 7-17 lbs. (409" Eng.), 11-18 lbs. (Corvette 340 & 360 HP Engs.), 4-6 lbs. (Other Engs.).

Replacement Pistons: (Exc. Corvette Fuel Inj. & 409" Eng.) - Furnished Std. & .001", .020", .030", .040" Oversize with fitted pins.

Corvette Fuel Inj. & 409" Eng. - Furnished Std. & .001", .030" Oversize with fitted pins.

►*STANDARD & .001" OVERSIZE PISTON NOTE:* These pistons furnished in TWO sizes and marked as follows:

Engine	Type	Mark	Size
283"	Std.	S4	3.8750-3.8755"
		S5	3.8755-3.8760"
	.001" OS	S6	3.8760-3.8765"
		S7	3.8765-3.8770"
327"	Std.	S4	4.0000-4.0005"
		S5	4.0005-4.0010"
	.001" OS	S6	4.0010-4.0015"
		S7	4.0015-4.0020"
409"	Std.	S4	4.3100-4.3105"
		S5	4.3105-4.3110"
	.001" OS	S6	4.3110-4.3115"
		S7	4.3115-4.3120"

Installing Pistons: Install pistons with cast depression in head and "F" mark cast in side of piston toward front of block. *See Rod Installation.*

PISTON PIN

Pin is press fit in connecting rod.
Diameter - .9270-.9273" (283" & 327" Engs.), .9895-.9898" (409" Eng.).
Length - 2.990-3.010" (283" & 327" Engs.), 3.250-3.270" (409" Eng.).
Pin Fit in Piston - .00015-.00025". With piston and pin at 60°F, and light film of oil on pin, pin should support own weight in either pin boss.
Pin Fit in Connecting Rod - Press fit in rod. Special procedure used for removal & installation, see *"Piston Pins" in Chevrolet Special Data.*
Replacement Pins: Furnished in assembly with new pistons. Replace with new piston and fitted pin assembly.

PISTON RINGS

Compression rings are cast alloy iron, with chrome plated upper and wear resistant coating lower. Oil ring is 3-piece type with chrome plate O.D. rails and stainless steel spacer.

283" Engine

Ring	Width	End Gap
Compr. (1 & 2)	.0775-.0780"	.013-.023"
Oil (3)	.184-.188"	.015-.055"

327" Engine

Ring	Width	End Gap
Compr. (1 & 2)	①.0770-.0775"	.013-.023"
Oil (3)	②.187-.189"	.015-.055"

① - On Corvette, upper ring .0775-.0780".
② - On Corvette, .184-.189".

409" Engine

Ring	Width	End Gap
Compr. (1 & 2)	.0770-.0780"	.015-.025"
Oil (3)	.1839-.1879"	.015-.065"

Replacement Rings: Service type rings furnished as follows:
Corvette (With Fuel Inj.) & 409" Eng. - Rings furnished Std. and .030" Oversize.
Other Engines - Rings furnished Std. & .020", .030", .040" Oversize.
Installing Rings: Install compression rings with mark "GM" upwards.

CONNECTING ROD

Length - 5.699-5.701" (283" & 327"), 6.009-6.011" (409") center-to-center.
Weight - 20.32 ozs. (283" & 327"), 27.53 ozs. (409").
Crankpin Journal Diameter - 1.999-2.000" (283" & 327"), 2.1993-2.1998" (409").
Lower Bearing - Replaceable precision type.
Clearance - .0008-.0028" (vertical on all models). On Corvette the horizontal clearance is .0017-.0038".
Sideplay - .008-.014" (283" & 327"), .015-.021" (409").
Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.
Rod Installation: Install rod in piston so that flange or heavy side of rod at bearing end will be toward FRONT of piston (marked by cast depression in head of piston and "F" mark on piston strut) on Nos. 1-3-5-7 pistons, and flange on rod to REAR of piston on Nos. 2-4-6-8 pistons. Install rod and piston assembly in cylinder with cast depression in head and "F" mark on strut toward front of cylinder block. Oil hole in connecting rod will then be toward center of engine.

CRANKSHAFT

Journal Diameter - 2.2988" (283" & 327"), 2.4977" (409")
Bearings - Replaceable precision type.
Clearance - .0008-.0034" (283" & 327"), .0006-.0032" (409").
End Thrust - Taken by rear (No. 5) main bearing.
Endplay - .002-.006" (283" & 327"), .006-.010" (409").
Replacement Bearings: Std. & .001", .002", .010", .020" Undersize.
Bearing Installation: Not necessary to remove engine from car. *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Chevrolet Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Chevrolet Special Data.*
Vibration Damper: *See "Vibration Dampener" in Chevrolet Special Data.*

CAMSHAFT

►*SPECIAL CAMSHAFT NOTE: Special camshaft and mechanical lifters used on Corvette 340 & 360 HP Engines and on 409" Engines.*

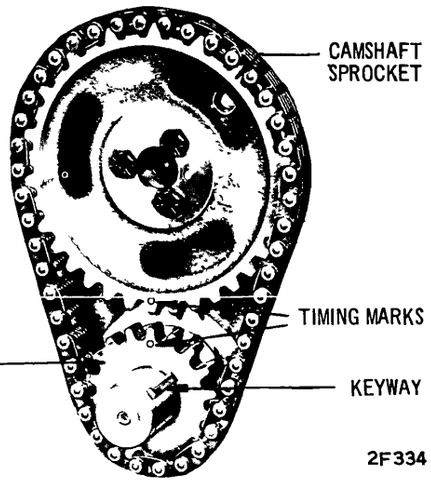
►*CAMSHAFT LOBE LIFT NOTE:* When improper valve operation is indicated, check lift of each lobe. *See "Camshaft & Bearings" in Chevrolet Special Data.*

Journal Diameter - (All) 1.8682-1.8692".
Bearings - Steel backed babbitt lined bushings.
Clearance - .0015-.0035".
Replacement Bearings: "Precision" type (do not require reaming). Use Tool J-6098 to remove and install bearings.
Camshaft Setting: Both Sprockets marked "0". Install chain with sprocket marks adjacent and in line with straightedge across shaft centers.
►*CAUTION:* When installing sprocket on camshaft, line up dowel holes in sprocket and shaft. DO NOT DRIVE SPROCKET ON SHAFT, use three mounting bolts and DRAW sprocket in place.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Chevrolet Special Data.*

Timing Chain: Link belt type. See below for specifications.

Engine	Width	Pitch	Length (Links)
283" & 327"	.875"	.500"	46
409"	.875"	.500"	48

Installation & Removal - *See "Timing Chain" in Chevrolet Special Data.*



VALVE TIMING MARKS

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Chevrolet Special Data.*

VALVES

Tappet Clearance: Mechanical Lifters - .008" Intake, .018" Exhaust.

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Hydraulic Lifters - 1 turn down from zero lash. See *"Hydraulic Lifter Ajustment" in Chevrolet Special Data.*

Valve Adjustment (Mechanical Lifters): Turn rocker arm stud nut as required for desired clearance.

Valve Adjustment (Hydraulic Lifters): See *"Hydraulic Lifter Adjustment" in Chevrolet Special Data.*

283" & 327" Engines (Exc. Corvette)

Valve	Head Diam.	Stem Diam.	Length
Intake	① 1.72"	.3410-.3417"	4.902-4.992"
Exhaust	1.495-1.505"	.3410-.3417"	4.913-4.933"
Valve	**② Seat Angl**	**Lift**	**Stem Clearance**
Intake	46°	③ .333"	.0010-.0027"
Exhaust	46°	③ .333"	.0016-.0032"

Corvette

Valve	Head Diam.	Stem Diam.	Length
Intake	④ 1 23/32"	.3410-.3417"	⑤ 4.902-4.922"
Exhaust	1 1/2"	.3410-.3417"	⑥ 4.913-4.933"
Valve	**② Seat Angl**	**Lift**	**Stem Clearance**
Intake	46°	ⓛ .3987"	.0010-.0027"
Exhaust	46°	ⓛ .3987"	.0016-.0033"

409" Engine

Valve	Head Diam.	Stem Diam.	Length
Intake	2.190"	.3715-.3722"	5.095-5.115"
Exhaust	1.715-1.725"	.3710-.3717"	5.105-5.125"
Valve	**② Seat Angl**	**Lift**	**Stem Clearance**
Intake	46°	.4922"	.0010-.0027"
Exhaust	46°	.4735"	.0025-.0042"

ⓛ - 1.94" on 300 HP engines. ② - 45° face angle
③ - .3987" on 327" Engine.
④ - 1 15/16" on 300,340 & 360 HP engines.
⑤ - 4.870-4.889" on 300, 340 & 360 HP engines.
⑥ - 4.891-4.910" on 340 & 360 HP engines.
ⓛ - .39975" on 340 & 360 HP Engs. (measured at valve stem).

Valve Seat Width - 1/32-1/16" Intake, 1/16-3/32" Exhaust (exc. Corvette); 1/16" Intake, 3/32" Exhaust (Corvette).

Valve Rotators - May be used.

Valve Stem Seal Installation: See *"Valve System" in Chevrolet Special Data.*

Valve Guids: Integral with cylinder head. Ream valve guide holes for oversize valves if valve stem clearance is excessive. Valves furnished with .003", .015" and .030" Oversize stems. Use reamer Set J-5830 or J-7049.

Valve Springs: .045" x .750" flat wound damper used on 327" (exc. Corvette) & 409" Engines. 5-10 lb. damper used on Corvette engines.

Valve Spring Specifications

283" Engine

Valve	Lbs. Pressure	Length
Closed	84-92	1.660"
Open	163-173	1.330"

327" Engin (Inc. Corvette)

Valve	Lbs. Pressure	Length
Closed	78-86	1.660"
Open	170-180	1.260"

409" Engine

Valve	Lbs. Pressure	Length
Closed	130-138	1.680"
Open	273-285	1.290"

►*VALVE ROCKER COVER ON EARLY 327" (250 & 300 HP) ENGINE INSTALLATION CAUTION:* Due to configuration of valve rocker covers, it is possible to install covers incorrectly. The cover side having the greater vertical wall height, before entering the side-to-top radius, should be installed inboard on cylinder head.

Valve Lifters: Hydraulic lifters standard except on engines with special camshaft. *See "Valve System" in Chevrolet Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Rocker Arm Stud Replacement - *See "Valve System" in Chevrolet Special Data.*

►*PUSHROD IDENTIFICATION & INSTALLATION CAUTION:* For Part No. Application, Color Identification & Installation Caution, *see "Rocker Arms" in Chevrolet Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

283" Engine

Intake Valves - Open 18° BTDC. Close 54° ALDC.
Exhaust Valves - Open 52° BLDC. Close 20° ATDC.

327" Engine (Exc. Corvette)

Intake Valves - Open 12°30' BTDC. Close 57°30' ALDC
Exhaust Valves - Open 54°30' BLDC. Close 15°30' ATDC.

Corvette (Hydraulic Lifters)

Intake Valves - Open 32°30' BTDC. Close 87°30' ALDC.
Exhaust Valves - Open 74°30' BLDC. Close 45°30' ATDC.

Corvette (Mechanical Lifters)

Intake Valves - Open 35° BTDC. Close 72° ALDC.
Exhaust Valves - Open 76° BLDC. Close 31° ATDC.

409" Engine

Intake Valves - Open 59°12' BTDC. Close 106°36' ALDC.
Exhaust Valves - Open 86°5' BLDC. Close 26°44' ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 4 qts. (Exc. Corvette & 409" Eng.), 5 qts. (Corvette & 409" Eng.). Add 1 qt. with filter change.

Normal Oil Pressure - 45 lbs. at 2000 RPM.

Pressure Relief Valve - In oil pump. Not adjustable.

Oil Pressure Indicator - Light located at left side of instrument panel, controlled by a pressure switch located in main oil gallery adjacent to distributor. Switch closes when pressure drops to 4-7 lbs.

Oil Pressure Gauge (Corvette) - AC No. 1509355.

Oil Filter: Full-flow type. Replace cartridge every 4000 miles or sooner under adverse driving conditions.

Replacement Filter Element - AC No. PF-141.

Oil Pump: Spur gear type. Located in crankcase, driven by distributor drive gear.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Crankcase Ventilation: Standard Cars - Air intake through oil filler breather cap and outlet at crankcase ventilator pipe

Positive Crankcase Ventilation Cars - Road draft tube is replaced by an adapter to which is connected the ventilation valve and a hose which runs to an adapter plate between the carburetor and intake manifold. Fresh air is drawn into engine through oil filler breather cap. *To prevent ignition or carburetion troubles and to insure proper operation of system, entire system must be disassembled and cleaned every 10,000 miles or sooner if needed. See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

►*FLUID FAN NOTE:* Viscous Coupling Fan optional on all engines with Air Conditioning.

Water Capacity: 17¼-17¾ qts. (Exc. Corvette & 409" Eng.), 15½ qts. (Corvette), 21 qts. (409" Eng.). On all cars add 1 qt. for heater.

Pressure Valve: Radiator filler cap, used as follows:

Model	AC No.	Pressure	AC Typ
Pass.	850800	13 lbs.	RC-6
Corvette	861753	13 lbs.	RC-21

Thermostat: Poppet pellet type in intake manifold water outlet. 170°F, Part No. 3138868.

Temperature Gauge: AC Electric.

Dash Unit (Pass. Cars) - Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and light goes out when temperature reaches 120°F. RED light remains off during normal engine operation, but comes on when engine temperature reaches 240°F. *NOTE* - Red light will come on when ignition key turned to "Start" position (to test bulb and circuit) but should go out when engine started.

Dash Unit (Corvette) - AC No. 1514185.

Engine Unit - AC No. 1993561 (Pass. Cars), No. 1513321 (Corvette).

Water Pump: Packless, sealed ball bearing type.

Overhaul - *See "Cooling System" in Chevrolet Special Data.*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*FOR "CORVAIR 95" TRUCKS, SEE CORVAIR DATA PAGES.*

►*JACKING & HOISTING NOTE: B for jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

Light Duty

Type & Rating	Series
½ to 1½ Ton Conventional	C10,C20,C30,C40
½ & ¾ Ton 4-Wheel Drive	K10,K20
½ to 1 Ton Forward Control	P10,P20,P30

Medium Duty

1½,2 Ton Std. & Hvy. Duty Conventional	C50,C60
1½, 2 Ton Std. & Hvy. Duty Low-Cab-Forward	L50,L60
2 Ton Std. & Hvy. Duty School Bus	S50,S60

SERIAL NUMBER: Stamped on plate on upper left hinge pillar (Exc. Flat Face Cowl), left side of dash (Flat Faced Cowl).

① ② ③ ④ ⑤
S 2 L613 T 100001

① - **S** Indicates 3/4 Ton Special or 1½ Ton Special, **H** Indicates 2 Ton Heavy Duty (not used on other models).
② - **2** Indicates year 1962.
③ - Series Designation.
④ - Assembly Plant. *See Assembly Plant Table below.*
⑤ - Serial Number Continuous starting with 100001 at each assembly plant.

Assembly Plant Table

A - Atlanta	**J** - Janesville	**O** - Oakland
B - Baltimore	**K** - Kansas City	**S** - St. Louis
F - Flint	**L** - Los Angeles	**T** - Tarrytown
G - Framingham	**N** - Norwood	**W** - Willow Run

ENGINE NUMBER: 6 Cyl. Stamped on right side of block next to distributor.
V8 Eng. Stamped on forward edge of block under right cylinder head.
NOTE - Number (example below) includes identification data as indicated.

① ② ③
F 1210 P

① - Engine Plant. **F** - Flint. **T** - Tonawanda.
② - Code number indicating month (Dec.) and day (10th) of manufacture. This is not an individual or continuous number.
③ - Engine Type. See table below.

Engine Type

J, K, L - 235" (J,JB,JC,JG,JH,JK,K,KA,L indicate clutch and transmission options).
L - 261" (LB,LD,LE,LF,LG,LJ,LK,LM,LU,L,W,LX, LY,LZ, indicate transmission, brake, steering and clutch options).
M - 283" (M,MA,MD,ME indicate transmission options).
U - 327" (U,UA,UB,UD,UE,UF,UG,UH,UJ,UK indicate transmission and brake options).

TUNE-UP

COMPRESSION PRESSURE: 235" & 261" - 130 lbs., 283" 140 lbs., 327" 150 lbs. at cranking speed with throttle open. All cylinders alike within 20 lbs.
VACUUM READING: 17-21", at idling speed.
VALVE TAPPET CLEARANCE: 235" - .006" Intake, .018" Exhaust, hot. 261" - .006" Intake, .020" Exhaust, hot. 283" & 327" - Hydraulic lifters. One turn down from "no-lash".
MANIFOLD HEAT CONTROL: Thermostatic coil spring type located between manifold and exhaust pipe. Valve must operate freely.
CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 6 Cyl. 1-5-3-6-2-4. V8 1-8-4-3-6-5-7-2.
Cylinders (V8) RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".
Spark Plugs - AC 46 (6 Cyl. 235" & 283" V8), AC-42-1 Com. (6 Cyl. 261" & 327" V8).

COIL: Delco-Remy 1115165 (6 Cyl.), 1115115 (V8).
Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.
Resistor - Resistance type cable (1.8 ohms at 80°F) used in harness between bulkhead disconnect plug and starter solenoid bypass terminal (in coil primary circuit for regular operation). Bypassed during cranking when coil energized directly from starter solenoid bypass terminal.

DISTRIBUTOR: Delco-Remy 1112403 (6 Cyl.), 1110947 (283"), 1112765 (327").

Condenser - Delco-Remy No. 1928111 (6 Cyl.), No. 1932004 (V8). **Capacity** - .18-.23 mfd.
Contact Point Set - Delco-Remy 1924571 (6 Cyl. - non-assembled), 1944375 (6 Cyl. - pre-assembled). 1931988 (V8).
Breaker Gap - .016" (6 Cyl. & V8). On V8, gap will be correct when cam angle correctly set.
Cam Angle (6 Cyl.) - 28-35°, **(V8)** 30° ±2°.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1112403

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
4-6		700	8-12		1400
9-11		1350	18-22		2700
12-14		1750	24-28		3500

Automatic Advance - 1110947

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		375	0-4		750
5-7		750	10-14		1500
10-12		1450	20-24		2900
13-15		1875	26-30		3750

Automatic Advance - 1112765

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		425	0-4		850
4.5-6.5		800	9-13		1600
8-10		1600	16-20		3200

Vacuum Spark Control: 1116143 (1112403 Distr.), 1116089 (1110947 Distr.), 1116201 (1112765 Distr.).

Vacuum Advance - 1116201

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
8	16	15-16

Vacuum Advance - 1116089

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
8	16	7.5-10

Vacuum Advance - 1116143

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
11	22	15-16

IGNITION TIMING

Setting - As follows:

Engine	Ignition Setting
235"	5° BTDC
261"	TDC
283"	①4° BTDC
327"	②8° BTDC

① - With vacuum line disconnected and opening in manifold closed.
② - This supersedes early production setting of 4° BTDC.
Timing Mark (6 Cyl.) - First vertical line on flywheel clockwise from steel ball (235"). Set at steel ball (261"). Line up line or ball with pointer in flywheel housing with Octane selector set at "0".
Timing Mark (V8) - Mark on vibration damper and timing tab attached to engine front cover. Timing tab marked "A" (Advance), "O" (TDC) and lines in 2° graduations with greatest number of lines on advance or BTDC side.

CARBURETOR

Engine	CARBURETOR APPLICATION	Carburetor
6 Cyl. (Exc. Fwd. Contr.)		Rochester B
6 Cyl. (Fwd. Contr.)		Carter BB
V8		Rochester 2G 2-Bbl.

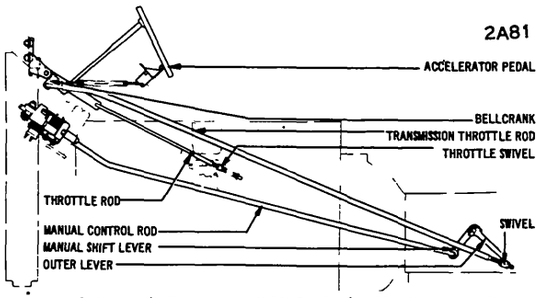
THROTTLE LINKAGE ADJUSTMENT (HYDRA-MATIC):
Forward Control Models - With engine at normal operating temperature and idle speed set at 400-450 RPM. insert 1/8" diameter pin into gauge pin hole in mounting bracket of accelerator pedal lever. Adjust length of throttle rod so that swivel just enters throttle lever. Remove swivel from outer lever and move lever back against transmission stop. Check distance from hole

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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in outer lever to rear face of transmission with Checking Gauge J-2545-C, bending lever as necessary (Tool J-5260) to allow entry of gauge into hole. *CAUTION D not apply forc against stop at either end of lever travel.* Adjust transmission throttle rod so that swivel at transmission case just enters outer lever, then **shorten** throttle rod **thr and one-half turns** of jam nut.



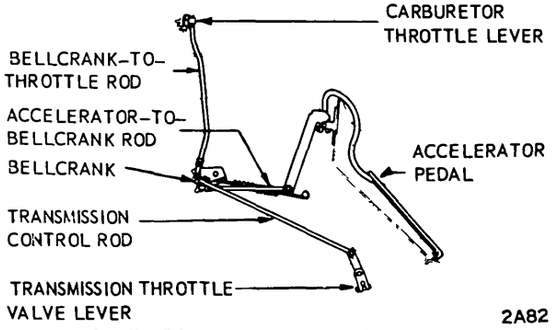
6 CYL. (FORWARD CONTROL) HYDRA-MATIC THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

6 Cyl. - 1) Disconnect control rod from throttle lever at transmission cover. Remove lower bolt at rear of transmission side cover. Rotate throttle valve control outer lever counterclockwise to open throttle position.

2) Hold lever in this position and with throttle valve outer lever Gauge J-5906 set at 7.09", measure distance from left side cover lower rear bolt to hole in throttle lever. If pins of gauge will enter holes, adjustment is correct. If necessary to adjust, loosen lever to clamp attaching screw and adjust lever on throttle shaft as necessary. Reconnect throttle rod.

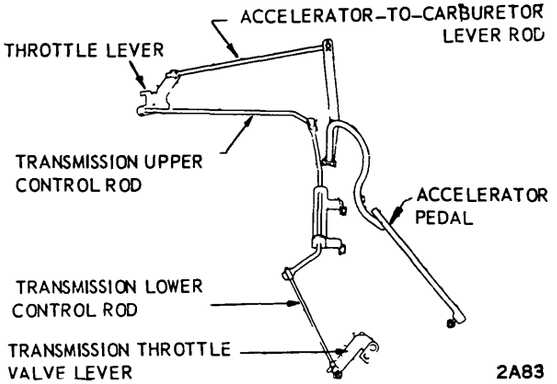
3) Disconnect bellcrank-to-transmission throttle lever rod at throttle valve lever. Disconnect accelerator-to-bellcrank rod at bellcrank.



6 CYL. POWERGLIDE THROTTLE LINKAGE

4) Force bellcrank-to-transmission throttle lever rod forward against its stop in transmission (open throttle position) and adjust bellcrank-to-carburetor throttle rod for free entry of swivel pin in throttle valve lever, with carburetor throttle valve in wide open position.

5) With carburetor throttle valve held in wide open position and accelerator fully depressed, adjust accelerator-to-bellcrank rod for free entry of swivel pin into hole in bellcrank.



V8 POWERGLIDE THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT (POWERGLIDE):

V8 - Remove lower control rod, loosen transmission throttle lever clamp screw. Insert Tool J-5906 between transmission left hand side cover lower front bolt and hole in lever. Distance should be 3.60", as indicated on gauge, from centerline of bolt to hole centerline. With gauge in place and holding lever clamp in full detent position (rotate clockwise), tighten lever to clamp and remove gauge. Install lower control rod. Disconnect upper control rod from throttle lever on carburetor. Adjust upper control rod length for free entry into throttle lever with transmission throttle lever pulled forward against transmission internal stop. Attach throttle rod to carburetor lever. Check adjustment by releasing linkage to its idle position, then hold carburetor throttle lever in wide open position and press downward on transmission outer throttle lever and check for deflection. Readjust upper throttle rod if rod deflects. Place ½" wood block under accelerator pedal rod, depress accelerator against block, and adjust swivel on accelerator-to-carburetor throttle lever rod for free entry into throttle lever when held in wide open position. Readjust length of accelerator rod when detent is not felt before reaching wide open throttle.

ROCHESTER "B" (SINGLE BARREL)

Engine	Rochester Carb. No.
235" (Std.)	7015011
235" (Economy)	7015021
261"	7015013

Idl Setting - 1½-2½ turns open. Turn screw out for richer mixture.

Idl Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto Trans. in "D").

Float Level - 1 9/32" from bottom of each float to cover gasket (do not remove gasket). Use Gauge M-250. With assembly inverted, place gauge with projection inserted in discharge nozzle. Carefully bend float lip vertically so that each float just touches top portion of gauge. Bend float arms to bring them into alignment and to center them in gauge. Tilt assembly 90° on each side and check to see that floats do not touch gauge.

Float Drop - Turn cover right side up so float drops down. Distance from gasket on cover to bottom of each float should be 1¾" on all models. Adjust by bending tang at rear of each float assembly.

►*CAUTION: Both floats must be set alike and must not be twisted out of alignment.*

Accelerating Pump - No seasonal adjustment.

Choke Adjustment: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Rochester B & BC Carburetors" in Carburetion Section.*

ROCHESTER 2G (2-BARREL)

Engine	Rochester Carb. No.
283" Std.	7015015
283" Velocity Gov	7013011
327" Std.	7020109

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyl. 2-3-5-8. LEFT barrel feeds 1-4-6-7.*

Idle Setting - Initial setting 1½ turns open. After idle speed set to correct specifications (see below), turn both idle mixture screws for smooth idle with highest vacuum reading and RPM.

Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans, in "D").

Float Level - 1 23/64" (Gauge BT-152) with air horn inverted and gauge placed over float so it rests against pump side of power piston shaft and outer gauge leg in line with center of float. Adjust by bending float arm (Tool BT-69) between pivot and float.

Float Drop - 1 29/32" (Gauge BT-152) from air horn gasket to bottom of float with air horn held upright. To adjust, bend float tang.

Choke Setting: Manual choke used.

Throttle Linkage Adjustment: *See CARBURETOR abov .*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARTER BB (UPDRAFT)

Carter (BB) 871SC (Forward Control Models). Single barrel updraft type with manual choke.
Idle Setting - ½-1½ turns open (turn screw out for richer mixture).
Idle Speed - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans. in "D").

Float Level - Top of float (not seam) 0" to 1/32" below top of bowl with needle valve seated. Use Gauge J-818-13A on top edge of bowl (gasket removed).
Accelerating Pump - Inner hole (in plunger shaft and throttle lever) Summer. Outer hole, Winter.
Throttle Linkage Adjustment: *See CARBURETOR above.*
►*OTHER DATA: See "Carter BB (Updraft) Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC used as follows:

Model	AC No.
6 Cyl. Std.	4434
6 Cyl. Fwd. Contr. & Flat Faced Cowl	4666
V8	4701

Pressure - 3½-4½ lbs. (6 Cyl.), 5½-6½ lbs. (V8) steady at 450-1000 RPM.

Gasoline Gauge: AC Electric.
Dash Unit - As follows:

Model	AC Part No.
Series 10 thru 40 (exc. below)	5643018
Series 10 Fwd. Contr. & All FFC	5643021
Fwd. Contr. (Pin Type Terminals)	5518461

Tank Unit - Various types used. Replace with same type as original equipment.

BATTERY

Delco No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).
Ground - Negative.
Engine Ground - Engine to frame (6 Cyl.), to dash (V8).

STARTER

Delco-Remy. As follows:

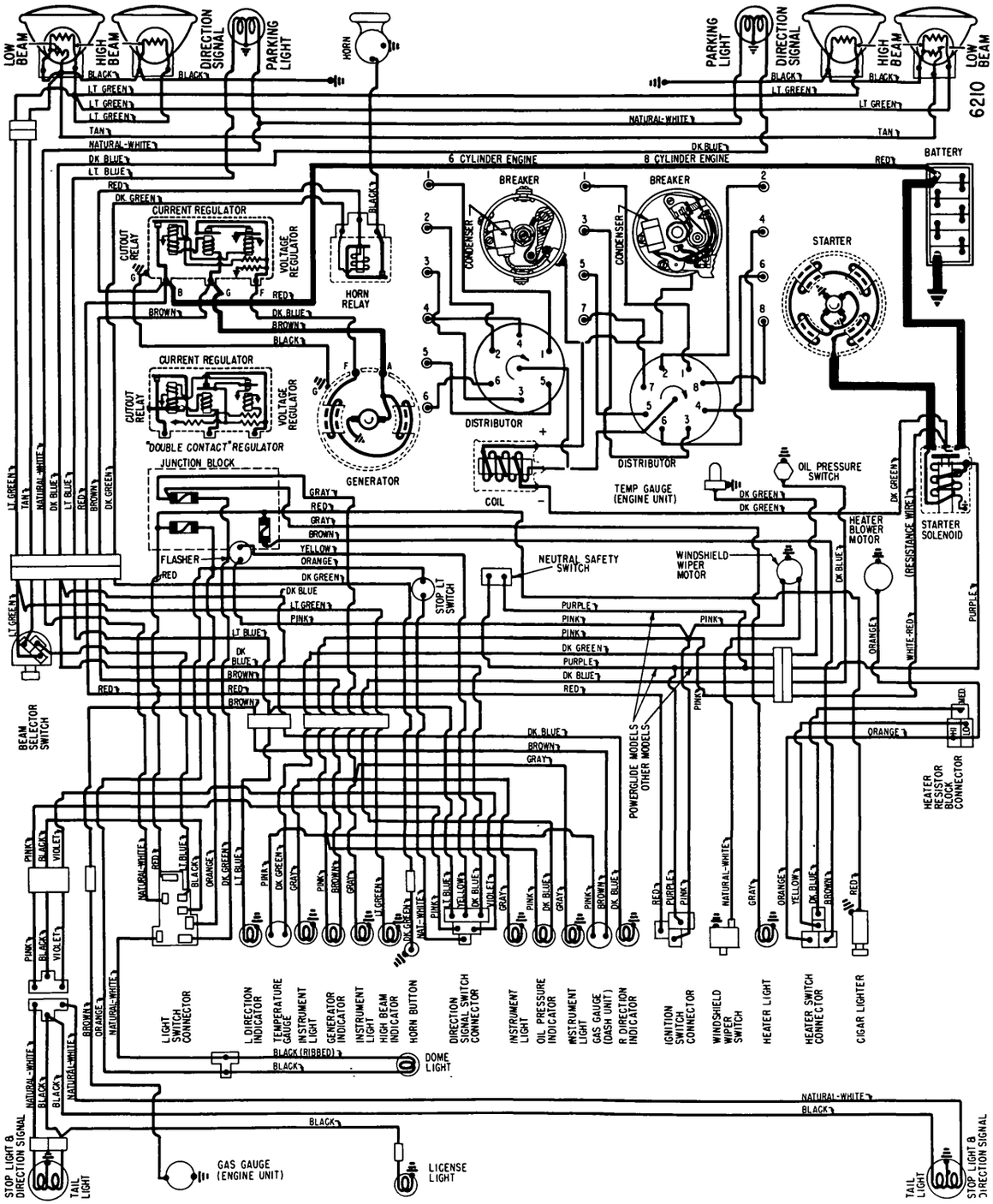
	Starter	Armature
6 Cyl. Std. Trans.	1107888	1932185
Fwd. Contr. Hydra-Matic	1107675, 1107677	1926626
283" V8	1107889	1935829
327" V8	1107233, 1107895	1935829

Drive - Overrunning clutch with solenoid pinion shift.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 40 ozs. min. (327"), 35 ozs. min. (Others).

Performance Data - 1107888, 889

Torque	RPM	Volts	Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

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CHEVROLET TRUCKS (WITH GENERATOR INDICATOR) WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

Perf rmanc Data - 1107675,677

Torque	RPM	Volts	©Amperes
0 ft. lbs.	6900	10.3	75
10.5 ft.lbs.	Lock	5.8	435

P rf rmanc Data - 1107233 & 895

Torque	RPM	Volts	©Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

© - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119910 (Synchro-mesh), No. 1119793 (Hydra-Matic), on starter and controlled by Ignition & Starter Switch. Neutral Safety Switch used on Automatic Transmission models (see below).

N utral Saf ty Switch: Delco-Remy 1993520 (Powerglide), 1998677 (Powerglide - with Back-up Light Switch), 1998110 (Hydra-Matic).

Adjustm nt - S "Ch vrolet (Cast Iron) Powerglide" or "Dual-Rang Hydra-Matic" in Transmission Section.

GENERATOR

D lc -R my. Used as follows:

M d l	Generator
All (Exc. Tilt Cab with Pwr. Strg.)	1102096
Tilt Cab with Pwr. Strg.	1102202
Optional	1105116, 123

P rf rmance Data

Generator	Amperes	Volts	RPM
1102096	30	14.0	2240
1102202	35	14.0	2630
1105116	35	14.0	1730
1105123	40	14.0	1930

R tati n - Counterclockwise at commutator end.

Brush Spring T nsi n - 28 ozs.

Fi ld Curr nt - 1.69-1.79 amps. (1102096,202), 2.73-3.0 amps. (1105116,123), at 12.0 volts.

B lt Adjustm nt: (Tensian Gauge) - 90 lbs. new, 75 lbs. used. Approx. 1,000 miles is considered used.

(Withaut T nsi n Gaug) - 1/32" deflection per inch of span between pulleys with 15 lb. push midway between pulleys.

GENERATOR REGULATOR

D lc -Remy. Used as follows:

Regulator	Generator No.
1119001 (30 Amp.)	1102096
1119002 (35 Amp.)	1102202

Cut ut Relay

Cuts In - 11.8-13.5 volts.

Contact Gap - .020". **Air Gap** - .020".

V ltage Regulator

S tting - 13.8-14.8 volts at 125°F.

Air Gap - .075".

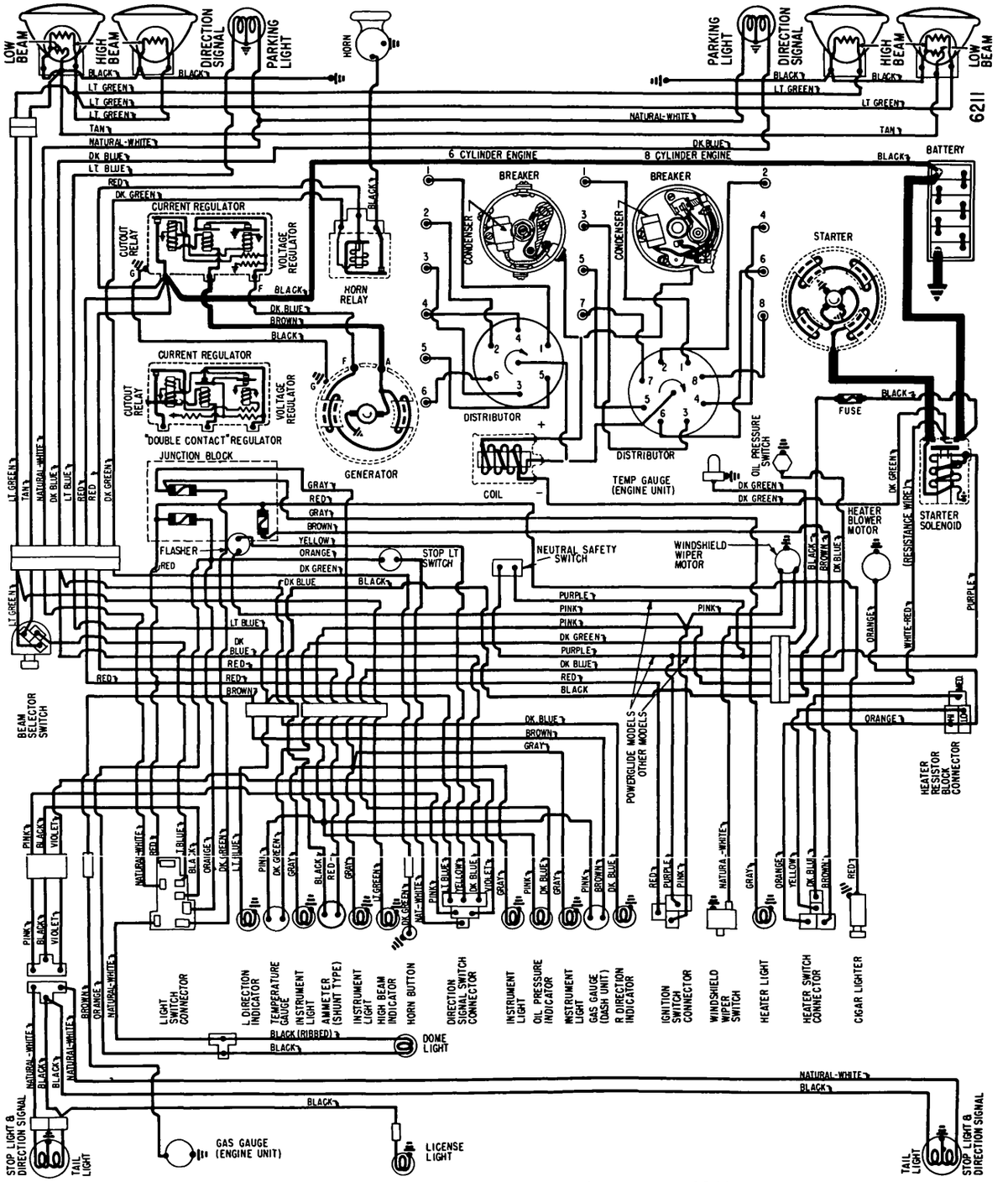
Current Regulator

Setting - 27-31 amps. (1119001), 31-35.5 amps. (1119002) at 125°F ambient tem perature.

Air Gap - .075" (With contacts just touching).

►*OTHER DATA: S "D lco-R my Singl C ntact R gulaters" in El ctrical S cti n.*

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CHEVROLET TRUCKS (WITH AMMETER) WIRING DIAGRAM

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ALTERNATOR & REGULATOR

►*SEE "CHEVROLET V8 CARS & CORVETTE" PAGES FOR ALL ALTERNATOR & REGULATOR DATA.*

MISC. ELECTRICAL

Lighting Switch Removal: Remove connector from switch. Depress switch shaft retainer (on top of switch) and remove knob and shaft. Remove retaining ferrule and switch assembly.

Stop Light Switch: Located on underside of dash panel brace. Adjust switch position to make electrical contact with 5/8" brake pedal travel.

Instrument Cluster Removal: Disconnect battery. Disconnect oil pressure line, speedometer cable, and air gauge pipe from instruments. Remove cluster-to-dash retaining screws. Remove cluster from panel, disconnect electrical leads and snap out bulb sockets. Individual instruments may be removed as required.

CIRCUIT BREAKERS: 15 Ampere. Located on light switch, protects Head & Parking lights.

FUSES: Located in fuse block on dash panel, except as noted.

10 Ampere. Back-up light, Heater & Defroster (recirculating type), Parking Brake Alarm.

20 Ampere. Cool Pack Air Conditioning.

15 Ampere. Dome light, Heater & Defroster (Deluxe type), Spot, License, Stop, & Tail lights.

3 Ampere. Instrument lamps.

4 Ampere. Radio.

9 Ampere. Underhood light.

3 Ampere. Ammeter circuit in holder at engine harness bulkhead connector.

ENGINE

ENGINE SPECIFICATIONS: 6 Cyl. & V8 Valve-in-Head.

Engine	Bore	Stroke	Displacement
235"	3 9/16"	3 15/16"	235 cu. in.
261"	3 3/4"	3 15/16"	261 cu. un.
283"	3 7/8"	3"	283 cu. in.
327"	4"	3 1/4"	327 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
235" Ⓒ	8.25-1	30.4	135 at 4000 RPM
261"	8.0-1	33.7	150 at 4000 RPM
283"	8.5-1	48.0	160 at 4200 RPM
327"	8.0-1	52.1	185 at 4400 RPM

Ⓒ - Both Updraft & Downdraft Carb. Models.

Ⓒ - Rocker arm cover name plates show cubic inch displacement.

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Engine" in Chevrolet Special Data.*

OIL PAN REMOVAL: (6 Cyl. Engines) - Raise front of vehicle and place on stands, drain lubricant and remove bolts and screws. *NOTE* - Turn crankshaft as necessary to allow clearance at front crossmember.

OIL PAN REMOVAL: (V8 Engine) - Raise front of vehicle and place on stands. Drain lubricant. Remove bolts and screws and remove oil pan.

CYLINDER HEAD & MANIFOLDS: *See "Cylinder Head & Manifold" in Chevrolet Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Chevrolet Special Data.*

►*327" ENGINE PISTON & RING INSTALLATION CAUTION:* Install compression rings with trademark or identification **UP.** DO NOT use champhered edge on ID as indicator for compression ring installation. Pistons must be installed with notch in piston head **forward** in **left bank** and to **rear** in right bank.

►*PUSHROD IDENTIFICATION & INSTALLATION CAUTION:* For Part No. Application, Color Identification & Installation, *see "Rocker Arms" in Chevrolet Special Data.*

►*VALVE SEAT INSERT NOTE: Exhaust valve seat inserts have been eliminated in 1962 engine cylinder heads.*

►*HYDRAULIC VALVE LIFTER NOTE: New and rebuilt valve lifters should be refilled with engine oil before installation by submerging them in engine oil and working lifter plunger up and down several times.*

►*ROCKER ARM SHAFT SUPPORT NOTE (261" Eng.):* New rocker arm shaft support with a 1/8" horizontal slot located in side of shaft bore towards valves is installed at front and rear positions. New support with new oil connector tube improves durability of valve train.

►*OTHER ENGINE DATA: See Chevrolet Passenger Car Pages and Note the following:*

Valve Timing Specifications

235" Engine

Intake Valves - Open 1° BTDC. Close 39° ALDC.
Exhaust Valves - Open 42° BLDC. Close 9° ATDC.

261" Engine

Intake Valves - Open 11°30' BTDC. Close 52°30' ALDC.
Exhaust Valves - Open 51° BLDC. Close 13° ATDC.
Pistons - Skirt Clearance - (235") .0006-.0010", (261") .0012-.0016",
Piston Pins - Diameter - (261") .927-.9275".
Compression Rings - Gap - (235") .007-.017", (261") .010-.025".
Valves - Length - (235" & 261") 6.364-6.394".
Head Diam. - (235" & 261") 1.875"±.005" (Intake).
Lift - Measured at valve stem. (235") Int. .3104" Exh. .3325" (261") Int. .4051 Exh. .4143".

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Intake Valves	74-82	1.858"
Exhaust Valves	186-198	1.462"

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Chevrolet Special Data.*

Crankcase Capacity: 5 qts. (235",261", & 327"), 4 qts. (283"). Add 1 or 2 qts. for filter change depending on size of filter used.

Normal Oil Pressure - 35 lbs. at 2000 RPM (6 Cyl.), 30 lbs. at 1170-1200 RPM (V8).

Pressure Regulator Valve - In oil pump body, not adjustable.

Oil Pressure Indicator (Exc. Fwd. Contr. & Flat Face Cowl): Indicator light on instrument panel. Controlled by pressure switch Part No. 3815936.

Oil Pressure Gauge (Forward Contr. & Flat Face Cowl Models): AC No. 1508246 (Fwd. Contr. except 102" wheel base), AC No. 1508014 (Ser. 10 Fwd. Control & Flat Face Cowl). Not electric.

Oil Pump: Gear type. Located in crankcase, driven by distributor gear.

►*OIL PUMP SCREEN NOTE:* Oil pickup pipe should be installed so that bottom of pickup screen is parallel with oil pan rails.

Oil Pump Overhaul - *See "Oiling System" in Chevrolet Special Data.*

Oil Filter: Replaceable element type. Replace element at 4000 mile intervals (Ser. 10), at first 1000 miles and at 2000 mile intervals thereafter (Others). Always change filter element when changing crankcase oil.

Replacement Filter Element - (235" 6 Cyl.) AC P-115 (1 qt.), AC P-117 (2 qt.) partial flow. (261", 283" & 327") AC PF-141 full-flow.

Filter Valve Replacement (283" & 327" V8) - Drain crankcase, remove filter and cartridge. Remove oil filter valve bolts, valve and seal. *NOTE - Check valve for cracks, replace if broken.* A 10 lb. valve must be used. Position valve away from engine when installing.

Crankcase Ventilation (Standard): Air intake through oil filler cap, outlet through road draft tube at rear of engine.

Servicing - Clean oil filler cap in solvent and reoil with light engine oil every 2000 miles, or more often if required by operating conditions.

Crankcase Ventilation (Optional): Positive Type (6 Cyl.). Two types used as follows: 1) Conventional road draft tube replaced by a crankcase outlet pipe with baffles in upper end. Ventilation valve at upper end of outlet pipe is connected to intake manifold by a hose.

2) Same as Type 1 above with additional fresh air intake from carburetor air cleaner to valve rocker cover. Oil filler breather cap is replaced by solid non-breather type. *Both types are serviced in same manner. See "Closed Crankcase Ventilating Systems" in Carburetion Section.*

Positive Type (V8) - Road draft tube replaced by an adapter and hose which has control valve at upper end connected to fitting in carburetor base. Valve should be serviced at each tune-up. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: Variable (depends on vehicle and type of cooling system). Add 1 qt. for heater installation.

Pressure Valve - 7 lb. radiator filler cap.

Thermostat: 167-172°F, located in cylinder head water outlet.

Temperature Indicator Gauge: AC electric type.

Dash Unit - AC No. 1513850 (Series 10 thru 40 except Fwd. Contr. & Flat Face Cowl), 1513853 (Series 10 through 40, Series 10 Fwd. Contr. & All Flat Face Cowl), 1513381 (Series 20 & 30 Fwd. Contr.).

Engine Unit - AC No. 1513321 or 6400211.

Water Pump: Packless type with sealed ball bearing.

Pump Removal & Overhaul - *See "Cooling System" in Chevrolet Special Data.*

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

►*TIGHTENING CAUTION: Due to use of aluminum crankcas , r ar h using, cylinder heads, and ther parts, bolt and stud torques must be held as close as p ssibl to sp cificati ns in table below to avoid ov rstr ss of bas metal parts and stripped threads.*

	Inch-Lbs.	Ft. Lbs.
Cylinder Head		27-33
Exhaust Manifold		12-27
Rocker Arm Stud		27-33
Rocker Arm Stud Nut	55-125	
Rocker Arm Cover	30-50	
Oil Pan	40-60	
Oil Cooler		8-12
Oil Cooler Adapter		7-13
Oil Cooler Shroud	60-80	
Oil Pump Cover	60-80	
Oil Filter & Gen. Adapter		7-13
Connecting Rod Caps		20-26
Crankcase Rear Housing		7-13
Crankcase Halves (7/16")		42-48
Crankcase Halves (5/16")		7-13
Crankcase Cover		7-13
Drive Flange or Flywheel		20-26
Flywheel Housing		20-30
Engine Rear Mount Bolt		50-60
Engine Rear Mount Bracket Nut		40-50
Engine Front Insulator-to-Frame		25-35
Engine Front Mount Bracket-to-Trans.		20-30
Engine Front Insulator-to-Bracket		60-80
Skid Plate-to-Rear Housing		20-30
Clutch Cover		15-20

POWER TRAIN

POWER TRAIN REMOVAL. *NOTE - Complete assembly (ngin , transmission, and rear axle) must be removed from car as a unit. T s parate transaxle from engine, s "C rvair Transaxl " in Transmission Section.*

PASSENGER CARS

►*TURBOCHARGED ENGINE REMOVAL NOTE:* Engine removal procedure is same as for standard passenger cars after supercharger and carburetor assembly removed Disconnect manifold pressure tube at manifold and thread through front shield as engine is raised or lowered.

1) Remove spare tire (coupe & sedan), engine access cover (station wagon). Remove carburetor air cleaners. Disconnect air heater return air hose. Remove engine-to-body front seal retainer. Disconnect left carburetor return spring and throttle rod at cross shaft. Disconnect main choke cable at firewall.

2) Make the following electrical disconnections: Battery positive terminal cable, generator ground strap and leads to voltage regulator, ignition leads from starter motor harness connector, right and left engine-to-body ground straps, coil and oil and temperature switch wires.

3) Raise car on hoist and remove battery cable and ignition leads from starter solenoid. Remove engine rear grille and skid plate, rear and side seal engine retainers. Disconnect parking brake spring from cross-member. Pull choke cable forward to clear front engine mount. Disconnect accelerator control rods at idler lever and push lever-to-carburetor rod into engine compartment. Disconnect fuel line and speedometer cable. Disconnect air heater flexible hoses from engine. Disconnect gasoline heater fuel line.

4) Remove axle shafts (see Rear Axle Section), and pull universal joints from differential carrier.

5) On Synchro-mesh cars, disconnect shift tube coupling at transmission shifter shaft, then loosen coupling clamp nut and push shift tube coupling into tube until clear of engine front mount. Disconnect clutch return spring and clutch pull rod. Remove clutch cross shaft from front mount. Unfasten clutch cable sheath clamp from engine front mount and drop clutch cable and cross shaft clear of power train. Remove back-up light switch from 4-speed transmission housing (switch is below normal oil level).

6) On Powerglide cars, disconnect transmission shift cable from transmission case. Rotate transmission throttle valve lever fully counterclockwise and remove cable from transmission case. Remove transmission filler tube (use a container to catch oil).

7) Position a hydraulic transmission jack stand under engine assembly, using Tool J-7894 (adapter), and lock tool in place with attached locking knob and additional bolt and nut. Remove cotter pins and castellated nuts from front engine mount (at transmission) and from rear engine mount. *NOTE - If front mounting bracket and shims are removed from transmission, the same amount of shims removed must be replaced. Rear "toe-in" will be affected if shims are changed.* Lower power train gradually and watch for possible interference at rear mount and left rear lower control arm. Remove exhaust pipe and muffler assembly.

TRUCKS

Procedure is same as for Passenger Car Power Train Removal except as noted below.

On Synchro-mesh trucks, disconnect clutch return spring at clutch housing and at pull rod idler lever. Remove clutch cable retainer from engine front mount, then remove pull rod clevis, idler lever and cable clevis. On Powerglide trucks, disconnect transmission oil cooler lines at transmission.

ENGINE SERVICE

►*ENGINE FRONT & REAR IDENTIFICATION: All reference to engine and components is to position installed in car. FRONT of engine is flywheel end toward front of car. REAR of engine is accessory drive end toward rear of car.*

►*CAMSHAFT REPLACEMENT NOTE:* When camshaft being replaced, manufacturer recommends that a 16 oz. can of Engine Oil Supplement, No. 3755788, be added to crankcase (pour 2 or 3 ozs. directly on camshaft if possible). Also, apply molybdenum disulphide ("Molykite" or equivalent) to foot of each valve lifter when camshaft installed (especially important on high performance engines).

►*ANTI-SEIZE COMPOUND NOTE: Permatex No. 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs and capscrews entering an aluminum part to prevent thread seizure and damage.*

►*ALUMINUM THREAD REPAIR NOTE: A thread repair kit, Part No. 3780960, is available for repairing stripped or damag d thr ads in aluminum parts.*

►*ALUMINUM PARTS CAUTION: Aluminum c mp n nts of ngin ar r lativ ly soft and asily damag d. Us xtrem care not to nick, scratch or oth rwis distort mating or bearing surfac s.*

CRANKCASE & CYLINDER HEAD STUD REPLACEMENT: Coat stud threads with anti-seize compound (see above) and install into cylinder head or crankcase with special detail of Tool J-8354 to projected length as follows: *NOTE - Measure projected length from shoulder of tool (installed on stud) to surface of crankcase or cylinder head.*

Stud	Projected Length	Tool Detail
Carb. Mounting (Outboard)	4 3/16"	2
Carb. Mounting (Inboard)	1 5/8"	2
Exhaust Manifold	31/32"	3
Cylinder (Long - Upper)	8 9/32"	1
Cylinder (Short - Lower)	7 9/16"	1
Rear Housing Mounting	4 9/16"	3
Distributor Holding	1 1/8"	

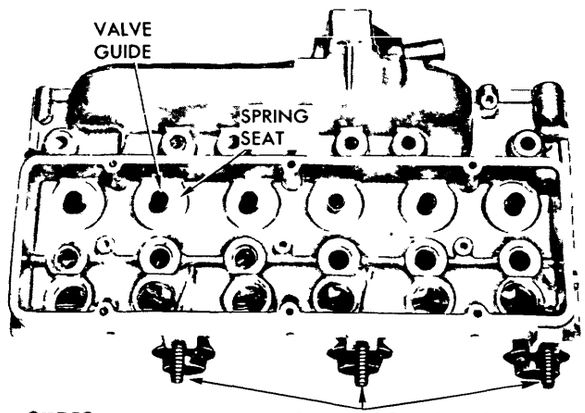
►*CYLINDER STUD TORQUE NOTE:* Maximum torque should be 30 ft. lbs., minimum torque 10 ft. lbs. If under 10 ft. lbs., install either .003" or .006" oversize studs as necessary.

EXHAUST MANIFOLD SLEEVE REPLACEMENT: *CAUTION - Remove sleeves from cylinder head only if absolutely necessary.* Remove sleeves by turning gradually with a pipe wrench. **Do not** pry or tap sleeves to remove. To install, coat new sleeves with anti-seize compound (see above). Insert sleeves into dry ice for about 10 minutes and at same time heat cylinder head to 200°F (do not use open flame). Remove sleeves from dry ice and tap into cylinder head bores making sure sleeves are true with bores. *NOTE - Replacem nt sleeves furnished Std., .002", & .010" Oversize.*

EXHAUST MANIFOLD INSTALLATION: Place manifold on sleeve gaskets, tap manifold lightly to insure alignment with gaskets, then firmly seat manifold with a soft hammer. Install manifold clamps and french locks. Torque attaching nuts to 23-27 ft. lbs., then bend tab on locks.

ENGINE MOUNTS: Front Mount Removal - Remove clutch lever control cable cross shaft ball stud at front mount bracket or Powerglide control cable. Support engine and remove insulator-to-bracket nuts. Remove shift rod coupling from transmission shift rod. Lower engine about 2" so front engine bracket clears mount stud.

CONTINUED ON NEXT PAGE



2F532 EXHAUST MANIFOLD STUDS
CORVAIR CYLINDER HEAD

CONTINUED FROM PRECEDING PAGE

Disconnect parking brake cable from mounting bracket. Remove front mount and insulator. *CAUTION - Shims between transmission and mounting bracket control rear wheel toe-in and must be replaced in original positions.*

Rear Mount Removal: Support engine and remove rear center shield. Remove bracket-to-skid plate nuts, lower engine and remove engine-to-bracket mount assembly.

CRANKCASE COVER, BLOWER & BLOWER BEARING REMOVAL: 1) Disconnect battery ground cable, accelerator and fuel lines, then remove oil level gauge and carburetor air cleaners and supports. Remove spare tire. Remove carburetor vacuum balance tube and retaining strap at engine upper shroud assembly and front shield.

2) Remove pulley belt and distributor wire harness, then remove carburetor cross shaft and choke cable assembly from carburetors. Disconnect generator brace and swivel it away from upper shroud. Remove engine upper shroud.

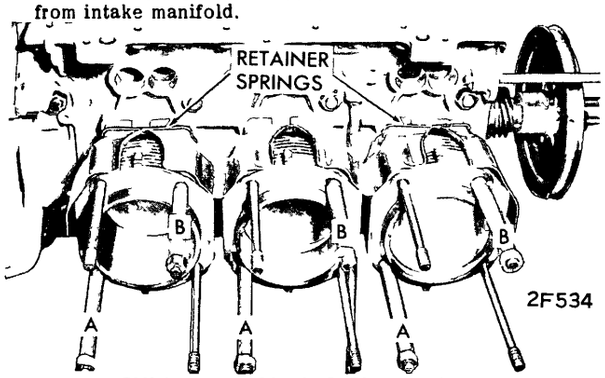
3) Remove four retaining bolts from blower pulley and remove pulley and blower from bearing hub assembly. Remove crankcase cover and blower bearing assembly as a unit. Remove crankcase-to-crankcase vent gasket and crankcase vent.

Blower Bearing Replacement: Use hypoid lubricant on bearing shaft and press bearing on crankcase cover so distance from crankcase cover gasket rail to top surface of large diameter of hub assembly is 4.520-4.530".

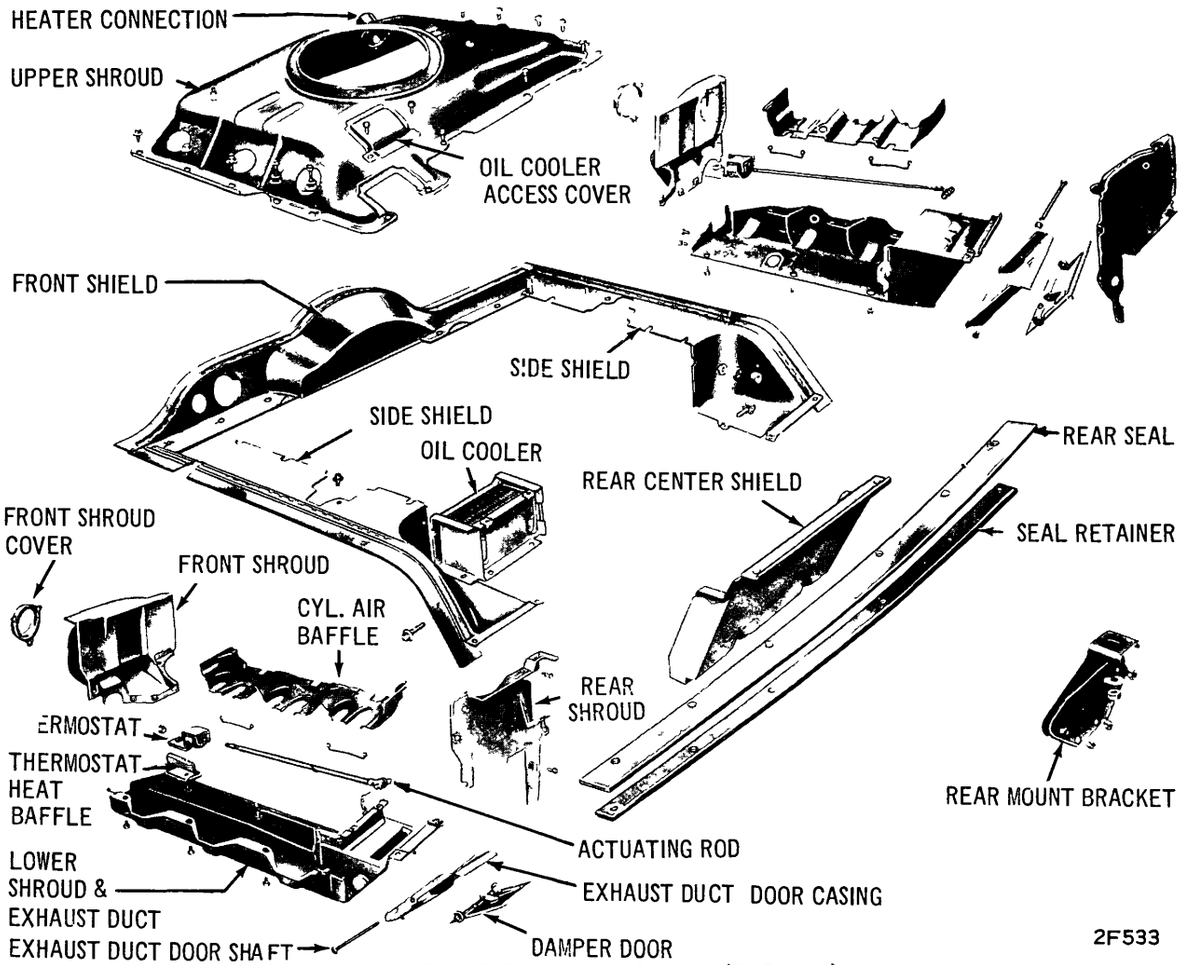
OIL COOLER REMOVAL: Remove all screws retaining cooler to engine shrouds, shields and cylinder head, then remove oil cooler access hole cover and remove long oil cooler mounting bolt. Remove oil cooler.

CYLINDER HEAD: Removal - *NOTE - When removing right hand cylinder head, disconnect coil, oil pressure and cylinder head temperature sending unit wires in addition to following procedure.*

1) Drain crankcase and disconnect battery cables from battery and generator. Disconnect radio ground strap. Remove air cleaner, accelerator return spring and air cleaner support. Disconnect accelerator rod from carburetor and remove cross shaft retainer at shaft support. Disconnect cross shaft support from carburetor. Disconnect fuel line and choke cable from carburetor. Remove carburetor and long (outboard) carburetor mounting stud from manifold. Disconnect vacuum balance tube from intake manifold.



CYLINDER HOLDING FIXTURES

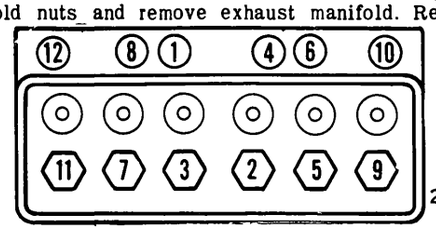


CORVAIR ENGINE SHROUDING (TYPICAL)

2) Disconnect generator mounting bracket and swivel bracket up and away from engine upper shroud. Remove spark plugs. Remove engine side shield. Remove oil cooler.

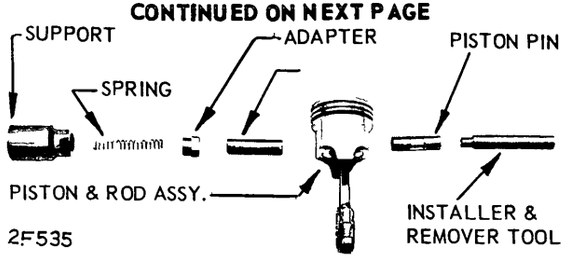
3) Raise car on a hoist and attach Tool J-7894 (adapter) to underside of engine. Remove both engine side seal retainers and rear seal retainers. Remove engine rear center shield and seal assembly. Remove lower engine shroud and exhaust duct, then remove exhaust pipe-to-manifold nuts and remove exhaust manifold. Remove engine rear mounting nut and washer from below body rear mounting bracket.

4) Remove valve rocker cover (catch oil draining from cylinder head), then remove rocker arms, pushrods, rocker arm studs and pushrod guides. Remove "O" rings from cylinder head and from bottom of pushrod drain tubes, then remove drain tubes.



CORVAIR CYLINDER HEAD TIGHTENING SEQUENCE

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CORVAIR PISTON PIN ASSEMBLY

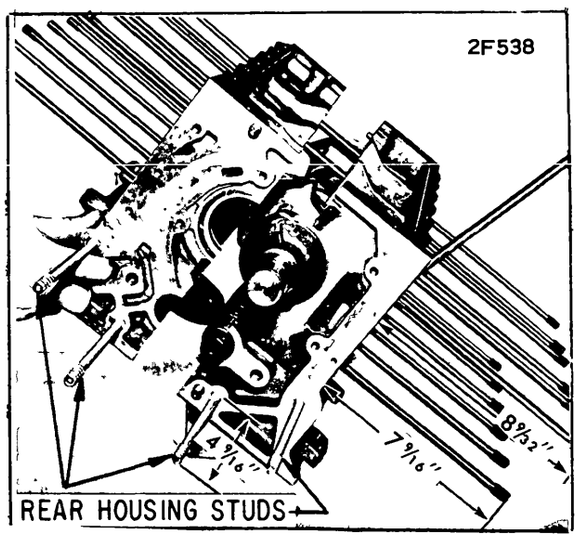
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5) Remove cylinder head nuts and flat washers, then carefully lower engine assembly approximately 3" to clear cylinder head carburetor flange. Remove cylinder head from crankcase studs.

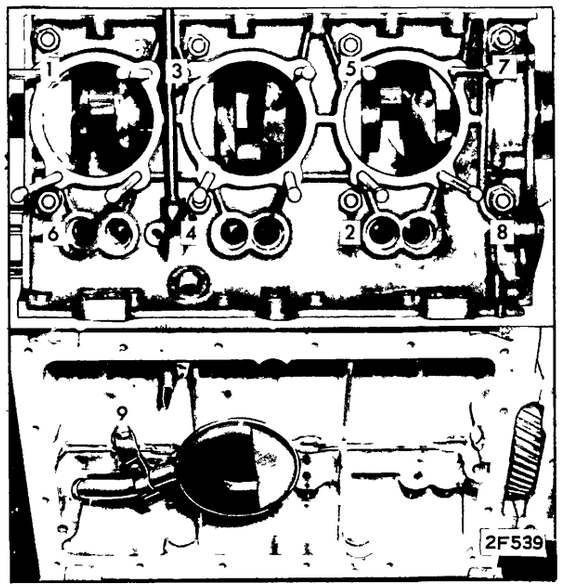
►*CAUTION: Do not rotate crankshaft with cylinder head removed unless holding fixtures are installed on studs to hold cylinder in place. ½" O.D. steel tubes 4¼" long should be installed one long stud and ½" O.D. steel tubes 3½" long should be installed on one diagonally opposite short stud of each cylinder. See Illustration.*

Installation - To install head, reverse removal procedure and note the following: Use anti-seize compound such as Permatex No. 404 or its equivalent on the threads of all bolts, studs and capscrews entering aluminum parts. Tighten cylinder head retaining nuts and rocker arm stud nuts (rocker arm studs have internal threads at lower end that thread over cylinder head studs and act as cylinder head nuts) to 27-33 ft. lbs. in the sequence shown in diagram. Install pushrods with the .050" side oil hole upward (next to rocker arm). Install rocker arms and adjust to proper position (see *"Hydraulic Lifter Adjustment" below*). Tighten rocker arm cover screws to 30-50 inch-lbs.

CYLINDER REMOVAL: *NOTE - Cylinder can be removed with engine in car.* Remove cylinder heads and install holding fixtures (see above). Remove crankcase cover and blower assembly (see above). Remove cylinder air baffles (secured by retainer spring clips at base of cylinder). Turn crankshaft and remove connecting rod caps. Remove cylinder holding fixture and remove cylinder, piston and rod as an assembly. *NOTE - If desired, cylinder can be removed without removing piston and connecting rod. In this case, use Tool J-8356 to compress piston rings when installing cylinder.* **Installation** - Install new copper gasket over cylinder pilot and install cylinder into crankcase. Reverse removal procedure.



CRANKCASE STUD DIMENSIONS



CRANKCASE TIGHTENING SEQUENCE

PISTON PIN REMOVAL & INSTALLATION: Use Tool Set J-8355 to remove and install piston pin in piston and connecting rod (see illustration). When installing, press pin in until pilot of tool bottoms on adapter and support.

CONNECTING ROD BEARING REPLACEMENT: *NOTE - Bearings can be replaced without removing engine from car.* Remove crankcase cover and blower assembly (see above). Remove spark plugs. Remove connecting rod bearing caps (turn crankshaft to position rods for access to cap bolts).

FLYWHEEL HOUSING: Crankshaft Front Oil Seal Replacement - Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-2221-A or suitable installer. *CAUTION: Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

ENGINE REAR HOUSING REPLACEMENT: Observe the following: 1) Grooved pin holding oil pump pressure regulator valve must be installed with a suitable drift. 2) Oil pump gallery plug must be flush with counterbore (use sealing compound). 3) Distributor holding stud should project 1 1/8" from distributor mounting pad on housing.

CRANKSHAFT PULLEY REMOVAL: *Following procedure supersedes previous recommendations.* Rework Crankshaft Pulley Remover J-6978-1 by drilling two 7/16" holes through puller. Place holes 180° apart on a 2¼" circle which is concentric with screw hole in center of tool. Proceed as follows:

1) Raise and support rear of car. Loosen blower belt, remove oil filter assembly, and remove engine grille. Remove engine rear sealing strip retainer and sealing strip, then remove engine rear center shield.

2) Support rear of engine, disconnect and remove rear engine mount and remove mount bracket from engine. *NOTE - On trucks, lower rear of engine to obtain sufficient clearance.* Remove pulley attaching bolt, then remove pulley using reworked Puller J-6978-1 (see above).

Crankshaft Rear Oil Seal: *See CAUTIONS below.* Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-270-6 or suitable installer. *CAUTION - Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

CRANKCASE SEPARATION: After cylinders, rear housing, and flywheel housing removed, loosen crankcase holding bolts. Tilt crankcase on right side at about 15° angle to prevent camshaft and crankshaft falling out. Remove holding bolts and remove crankcase left half.

CRANKCASE ASSEMBLY: Make sure split line surfaces are free of nicks and scratches. Install main bearing inserts in right half and install crankshaft. Install camshaft, guiding thrust washer into groove in crankcase and index timing marks on camshaft and crankshaft gears. Install main bearing inserts in left half and carefully install left half to right half. Torque holding nuts to proper specifications in sequence shown in diagram. *CAUTION - Hold bolt head and tighten nuts. DO NOT tighten at bolt head.*

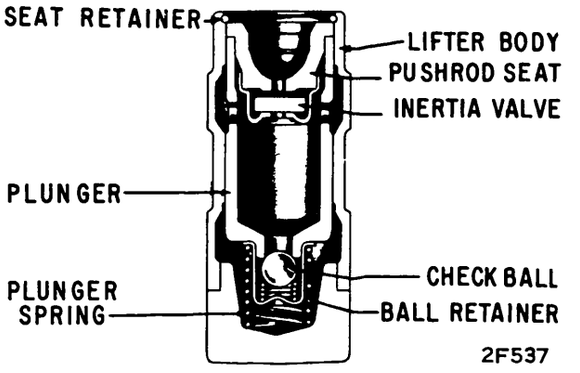
►*THRUST BEARING (NO. 1 - REAR) INSTALLATION*

CAUTION: Later engines and replacement bearings will have only one flanged bearing half. Install this flanged half in **left half of crankcase only.**

MAIN BEARING REPLACEMENT: When testing bearing clearance, crankcase must be assembled without camshaft exactly as indicated under "Crankcase Assembly" above.

CRANKSHAFT DRIVE FLANGE: Drive flange and crankshaft timing gear are a one-piece unit with a tight press fit on crankshaft. A hydraulic press is necessary to remove and install gear and flange. To remove, use Support Plate J-358-1, Adapter Rings J-7028, and a

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CORVAIR HYDRAULIC VALVE LIFTER

CONTINUED FROM PRECEDING PAGE

hydraulic press. To install, support crankshaft between front crankshaft throw and front journal (support must clear thrust face of No. 6 crankpin). Install woodruff key and install crankshaft gear. Press gear on shaft with Tool J-6175 and a hydraulic press.

►*FLYWHEEL SEALING CAUTION:* Flywheel or flex plate-to-crankshaft gear bolts must have sealing compound applied before installation to prevent oil leakage.

CAMSHAFT GEAR REMOVAL & INSTALLATION: Remove gear by supporting gear with Tool J-971 and pressing out shaft with an arbor press. To install, support camshaft at back of front journal, install thrust washer and woodruff key and press gear on shaft with an arbor press (support gear with Tool J-971) until gear bottoms on thrust washer.

PUSHROD, PUSHROD GUIDE & DRAIN TUBE INSTALLATION: Place "O" rings on each end of drain tubes and install with long end of tube toward cylinder head. Insert pushrods into drain tubes with .050" side oil hole at rocker arm end (pushrod marked with blue paint). Install pushrod guides and rocker arm studs. Install rocker arms and make valve lifter adjustment.

HYDRAULIC LIFTER ADJUSTMENT: For initial adjustment after overhaul, proceed as follows: Set distributor at No. 1 firing position and crankshaft pulley notch at 0° on timing tab. Adjust No. 1, 3, 6 Intake and No. 1, 4, 5 Exhaust valves as follows: Turn rocker arm adjusting nut down until no axial movement of pushrod is felt, then turn adjusting nut 1 turn additional. With distributor at No. 2 firing position (pulley notch at 0°), adjust No. 2, 4, 5 Intake and No. 2, 3, 6 Exhaust valves.

HYDRAULIC LIFTERS: Removal - Lifters are removed from lifter bores after pushrods and drain tubes removed by means of a magnet or wire hook and should be reinstalled in same bore from which removed.

Disassembly - Hold plunger down and remove pushrod seat retainer. Remove pushrod seat and inertia or metering valve assembly, plunger, and spring from lifter body. Remove check ball retainer, ball and spring. *NOTE* - Replace entire lifter if any part damaged.

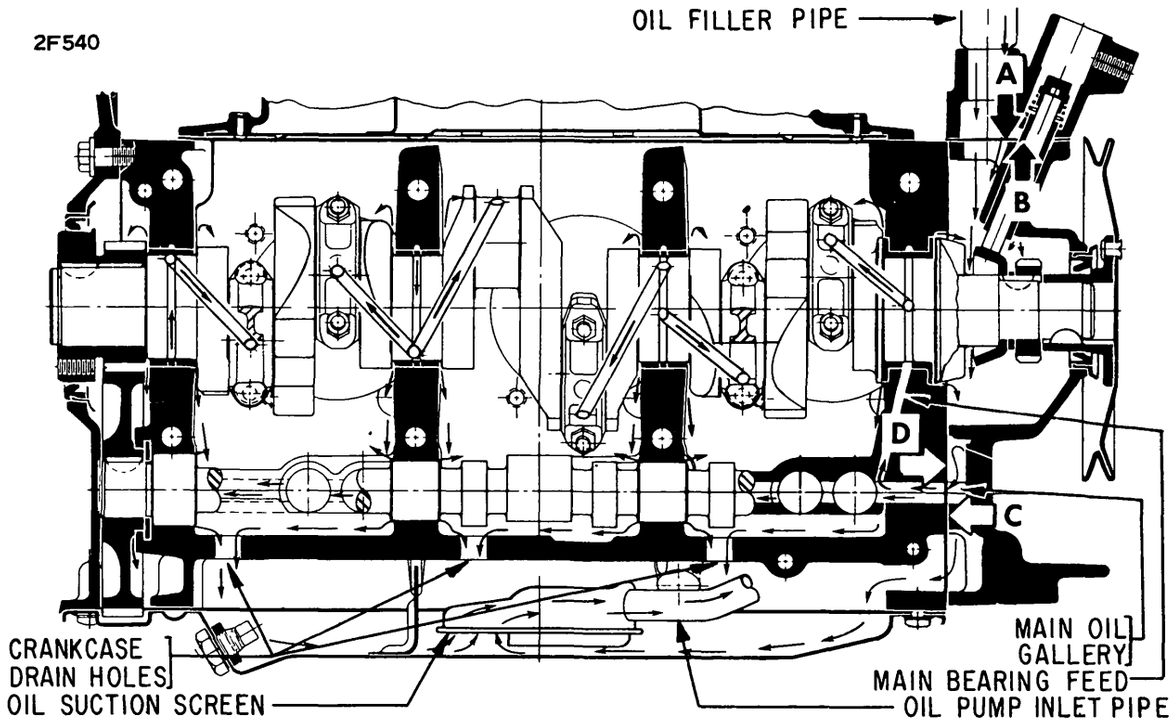
Reassembly - Insert check ball in plunger, place spring in seat in ball retainer and insert retainer on plunger. Place plunger spring over ball retainer and slide lifter body over spring and plunger. Install pushrod seat and inertia or metering valve assembly into plunger and install retainer. *NOTE - Fill lifter with SAE 10 engine oil at reassembly and before installing in engine.*

OILING SYSTEM

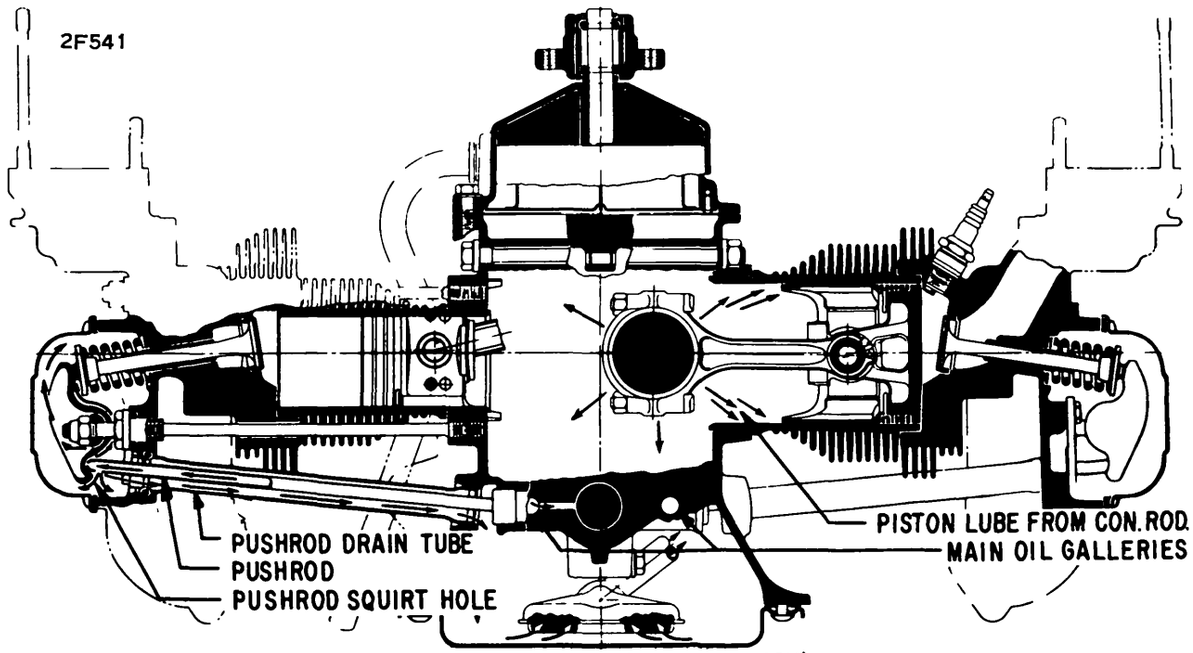
ENGINE LUBRICATION: Force feed type with oil under full pressure supplied to all crankshaft, camshaft, and connecting rod bearings, and to hydraulic valve lifters. Oil metered by lifters lubricates pushrods and rocker arms. All other parts are lubricated by oil spray.

OPERATION: Oil pump located in engine rear housing & driven by distributor shaft which is driven by crankshaft. Pump draws oil through fixed oil screen and intake pipe in crankcase and delivers oil to full-flow type filter mounted on Filter & Generator Adapter which is mounted on engine rear cover. Oil is then directed through oil cooler (mounted on side of engine

CONTINUED ON NEXT PAGE



ENGINE OILING SYSTEM (SIDE VIEW - SEE VIEWS A, B, C, D)



ENGINE OILING SYSTEM (CROSS SECTION)

CONTINUED FROM PRECEDING PAGE

rear cover) and then to the two main oil galleries (one on either side of camshaft) which extend entire length of crankcase. Oil is distributed through the main galleries as detailed below. *NOTE - See Engine Rear Cover and Filter & Generator Adapter illustrations for location of channels and passages in these parts and for location of bypass valves for oil filter and oil cooler.*

Crankshaft & Camshaft Bearings - Lubricated through passages in crankcase webs from main oil galleries. Individual bearings are lubricated from right or left main oil galleries as follows: **Crankshaft Bearings** - Nos. 1 & 3 (right gallery), Nos. 2 & 4 (left gallery). **Camshaft Bearings** - Nos. 1, 3, 4 (right gallery), No. 2 (left gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

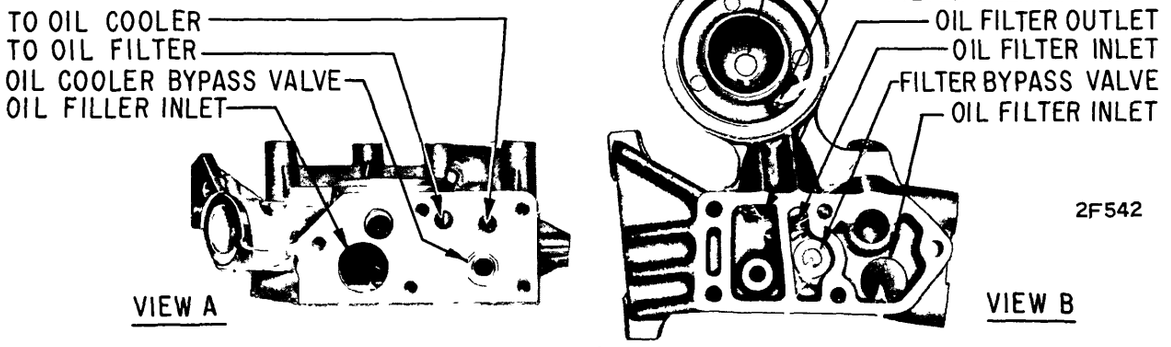
Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from ends of connecting rod bearings.

Timing Gears - Lubricated by oil spray from forward end of crankshaft and camshaft No. 1 bearings.

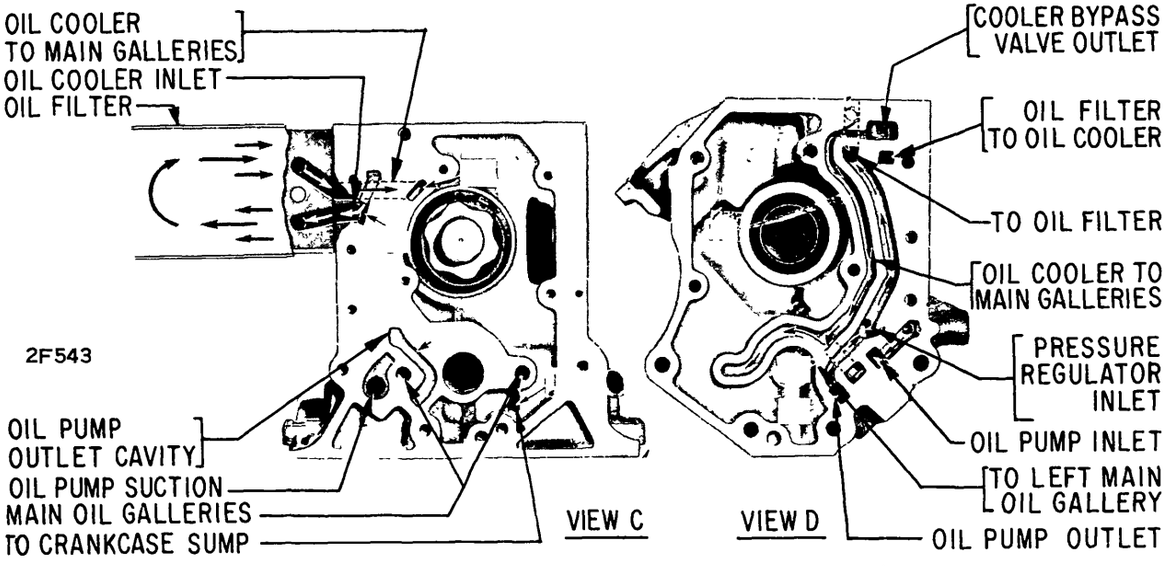
Fuel Pump Eccentric & Distributor Drive Gear - Lubricated through drilled orifice and pressed in nozzle in engine rear housing which directs oil on these parts (early cars), lubricated by overspray from No. 1 (rear) main bearing (later cars - orifice and nozzle omitted from rear housing).

Hydraulic Valve Lifters - Main oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods, & Valves - Pushrods are hollow and are supplied with oil from hydraulic lifter (inertia valve in upper end of lifter permits oil to flow through hole in end of pushrod). Upper end of pushrod has a side hole which sprays the valve chamber (lifter and pushrod rotate in operation and this oil spray is directed around valve chamber) and a through hole in the end which lubricates pushrod socket and rocker arm ball (pushrod hole registers with hole in rocker arm once during each revolution directing oil upward to the rocker arm ball). Oil in rocker arm chamber is returned to crankcase through the tubular pushrod drain tubes.



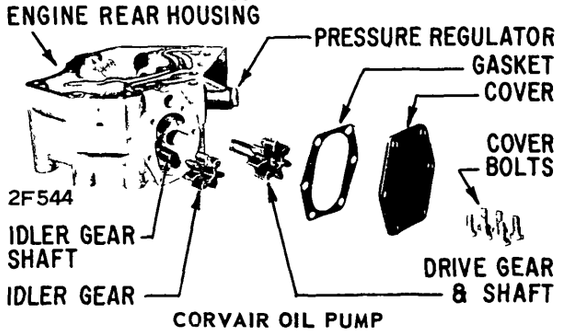
OIL FILTER-GENERATOR ADAPTER (SEE OILING SYSTEM SIDE VIEW)



ENGINE REAR HOUSING (SEE OILING SYSTEM SIDE VIEW)

OIL FILTER: Full-flow type mounted on Filter & Generator Adapter at rear of engine. Bypass valve (10 lb. type) located in adapter (see illustration) permits oil circulation through engine if filter element is clogged.

OIL COOLER: Finned cooler mounted on side of Engine Rear Housing in the engine cooling air stream. Bypass valve (10 lb. type) located in Filter & Generator Adapter (see illustration) permits oil circulation through engine if cooler is clogged.



CORVAIR OIL PUMP

OIL PUMP: Disassembly - Drain crankcase, remove rear grille, center shield and engine rear mount (support engine). Remove oil pump cover. Remove oil pump drive gear and shaft and idler gear from rear housing. Remove pressure regulator valve plug, gasket, spring,

Reassembly: Lubricate gears with engine oil. Install idler gear on idler shaft and make sure shaft is 010-.020" below housing gasket surface. Insert drive gear and shaft in housing. Clearance between gears and housing should be .002-.005". Gear backlash should be .002-.008". *NOTE - Oil pump gears should extend .0025-.0045" above housing gasket surface for oil pump prime. Gears of .001" oversize thickness are available.* Install oil pump gasket and cover and pressure regulator valve assembly.

ELECTRICAL NOTES

GENERATOR INSTALLATION: *CAUTION - If preload on generator exists, end frame will break. To prevent this condition, use following installation procedure exactly.* Tighten generator-to-adapter bolts to 15-22 ft. lbs. and loosely assemble mounting bracket-to-generator bolt and nut (at commutator end of generator). Bracket must be able to move. Tighten generator bracket-to-cylinder head bolts finger tight. Now tighten bracket bolt at commutator end of generator to 8-11 ft. lbs. Tighten front bracket-to-cylinder head bolt to 15-22 ft. lbs. and rear bolt to same torque.

STARTER REMOVAL: *Following procedure is recommended as easiest method of removal and installation.* Disconnect battery and raise and support car. Disconnect rear throttle control rod from transmission bellcrank, and from carburetor cross shaft. Disconnect starter solenoid wires (use ¼" drive midget socket set). With 3/8" drive, 9/16" shallow socket on a 9" extension with ratchet, remove upper starter mounting bolt. Then remove lower bolt. Pull starter forward and remove from engine compartment.

►*JACKING & HOISTING CAUTION: Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*ENGINE APPLICATION & IDENTIFICATION NOTE* Four engines used as follows: 1) Std. Engine, 8.0-1 compr. ratio, 80 HP, used on all models except Monza with Powerglide. 2) Std. Engine, 9.0-1 compr. ratio, 84 HP, used on all Monzas with Powerglide. 3) Super Turbo Air Engine, 9.0-1 compr. ratio, 102 HP, optional on all models. Cars with Super Turbo Air Engine may be identified by a special crossed flag emblem under car nameplate on rear deck lid. 4) Turbocharged Engine, 8.0-1 compr. ratio, 150 HP, optional on Monza 2-Door Coupe & Convertible with 4-speed synchro-mesh transmission only. These models will be designated "Monza Spyder" when equipped with this engine. *NOTE - In the following data, reference to individual engines, where necessary, will be as follows: Std. (8.0-1); Std. (9.0-1); Hi Perf.; Turbocharged.*

MODEL IDENTIFICATION

Body Style	Series Name	Series Prefix
2-Door Coupe	500 Std.	527
2-Door Coupe	700 Deluxe	727
4-Door Sedan	700 Deluxe	769
4-Door Station Wagon	700 Deluxe	735
2-Door Coupe	Ⓒ 900 Monza	927
4-Door Station Wagon	900 Monza	935
4-Door Sedan	900 Monza	969
Convertible	Ⓒ 900 Monza	967
Greenbrier	Corvair "95"	R-1206
Pickup	Corvair "95"	R124
Panel	Corvair "95"	R125

Ⓒ - When equipped with Turbocharged Engine, called "Monza Spyder".

SERIAL NUMBER: Stamped on plate attached to left front door lock pillar. Number (example below) includes identification data.

Ⓒ ② ③ ④
2 0527 F 100001

Ⓒ - Year Model. 2 1962.
② - Body Style (Series Prefix) preceded by "0" on all models except Corvair "95". *See table above.*
③ - Assembly Plant. *See below.*
④ - Beginning vehicle number at each assembly plant (separate sequence for Corvair & Corvair "95").

Assembly Plant Designation

A - Atlanta	J - Janesville	O - Oakland
B - Baltimore	K - Kansas City	S - St. Louis
F - Flint	L - Los Angeles	T - Tarrytown
G - Framingham	N - Norwood	W - Willow Run

ENGINE NUMBER: Stamped on top of cylinder block just forward of generator-oil filter adapter. Number (example below) includes identification data.

Ⓒ ② ③ ④
F 12 10 YC

Ⓒ - Engine Assembly Plant. F Flint. T Tonawanda.
② - Month of Manufacture. 12 December.
③ - Day of Manufacture. 10 Tenth.
④ - Engine Type. *See below.*

Engine Code Designation

Engine & Equipment	Code Letter
Std. (8.0-1), Synchro-mesh, No Air Cond.	YC,YH,V
Std. (8.0-1), Synchro-mesh, With Air Cond.	YL
Hi Perf., Synchro-mesh, No Air Cond.	YN,YQ
Hi Perf., Synchro-mesh, With Air Cond.	YM
Std. (8.0-1), Powerglide, No Air Cond.	Z,ZB,W
Std. (8.0-1), Powerglide, With Air Cond.	ZD
Std. (9.0-1), Powerglide, No Air Cond.	ZH. ZL
Std. (9.0-1), Powerglide, With Air Cond.	ZJ
Hi Perf., Powerglide, No Air Cond.	ZF, ZK
Hi Perf., Powerglide, With Air Cond.	ZG
Turbocharged Engine	YR

TUNE-UP

►*AIR CONDITIONED CAR ENGINE ACCESS PROCEDURE: For access to engine for tune-up and other engine service on air conditioned cars without disconnecting refrigerant line or purging system, use the following procedure:* 1) Remove compressor mounting bracket pivot bolt nut and compressor-to-adjusting bracket attaching parts. Remove compressor belt. Disconnect wiring from compressor. Remove triangular bracket from front of compressor. Work mounting bracket pivot bolt forward until threaded end of bolt is out of compressor rear mounting boss. Reposition compressor in engine compartment.
2) Remove compressor belt, then remove condenser and shroud assembly-to-bracket attaching screws. Carefully lift assembly from engine and rotate toward right rear of car as far as refrigerant lines will permit.

COMPRESSION PRESSURE: 130 lbs. at cranking speed with throttle wide open. Maximum variation between highest and lowest cylinders 20 lbs.

VACUUM READING: 14-18" at idle speed.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

Hydraulic Lifter Adjustment (Engine Running) - With engine at normal operating temperature and running at idle speed, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops. This is "zero lash" position. Now turn nut an additional ¼-turn and wait until engine runs smoothly. Continue to turn nut down in ¼-turn increments until nut has been turned down 1 full turn from "zero lash" position. *CAUTION - Make adjustment slowly so lifter will adjust itself and prevent engine damage.*

MANIFOLD HEAT CONTROL: None used.

POSITIVE CRANKCASE VENTILATION: Std. - Consists of tube and hose arrangement from crankcase ventilation outlet into right carburetor air cleaner. *No valve used in this system.* Clean hose and pipe at 10,000 mile intervals or sooner if needed, and check cleanliness of system before performing a "Tune-Up" for ignition and carburetion troubles.
Optional - Consists of a tube and hose arrangement with a metering valve from crankcase ventilator outlet to vacuum balance tube. Additional hose at inlet side of valve into air cleaner allows excessive blow-by to go directly into air cleaner. Clean valve at 5000 mile intervals or sooner if needed, and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-4-5-2-3-6.
Cylinders - RIGHT BANK 1-3-5, LEFT BANK 2-4-6. *NOTE - Right rear cylinder is No. 1 and left rear cylinder is No. 2. Engine rotation, as viewed from rear of car, is counterclockwise.*

SPARK PLUG GAP: .035".
Spark Plugs - AC No. 46FF (Std. 8.0-1), No. 44FF (Std. 9.0-1, Hi Perf. & Turbocharged). *Use No. 42FF on Turbocharged Engine when used in competition.* 14 mm. Torque to 20-25 ft. lbs.

COIL: Delco-Remy No. 1115135 (Except Turbocharged), No. 1115172 (Turbocharged).
Ignition Current - 1.8 amps. idling, 4.0 amps. stopped.
Resistor - Turbocharged - Delco-Remy No. 1931385 resistor unit mounted on engine right side shield between distributor and coil. Bypassed during cranking by lead from starter solenoid to coil.
Other Engines - Resistance wire (1.8 ohms at 80°F) connected in circuit between instrument panel disconnect plug and rear wiring harness connector. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Delco-Remy - Pivoted breaker plate type. *NOTE - On Turbocharged Engines, pressure retard unit used which replaces vacuum advance unit. Pressure retard unit retards spark when intake manifold is pressurized, thus partially opposing centrifugal advance at high engine RPM.*

Application	Distributor No.
Synchro-mesh	1110269
Powerglide (Std. 8.0-1 Engine)	1110271
Powerglide (Std. 9.0-1 Engine)	1110278
Hi Performance Engine	1110272
Turbocharged Engine	1110290

Condenser - Delco-Remy No, 1956007 (Std. 9.0-1 Engine), No. 1928111 (Other Engines). **Capacity** - .18-.25 mfd.
Contact Point Set - Delco-Remy No. 1954566 (All Engines).
Breaker Gap - .019" (new points), .016" (used points).
Cam Angle - 31-34°, 33° preferred.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Clockwise viewed from above.

Automatic Advance - 1110269

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	400	0-4	800
7-9	1050	14-18	2100
15-17	1800	30-34	3600

Automatic Advance - 1110271

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	800	0-4	1600
5-7	1270	10-14	2540
11-13	1850	22-26	3700

Automatic Advance - 1110278

Degrees	Distr. RPM	Degrees	Eng. RPM
0-2	925	0-4	1850
3-5	1300	6-10	2600
6-8	1675	12-16	3350
9-11	2050	18-22	4100

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Aut matic Advanc - 1110272

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	425	0-4	850
2-4	600	4-8	1200
6-8	1375	12-16	2750
11-13	2400	22-26	4800

Aut matic Advance - 1110290

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	1950	0	3900
6	2250	12	4500

Vacuum Spark C ntr l: Delco-Remy No. 1116198, 1116199, & 1116200.

Vacuum Advance - 1116198

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11.5	23	11-13.5

Vacuum Advance - 1116199

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
11.5	23	14-16.25

Vacuum Advance - 1116200

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
11.5	23	15-17.25

① Aut matic R tard - 1110290 Distr.

Distr. Degrees	Eng. Degrees	Pressure
Start	0	② 1 lb.
4½	9	③ 2 lbs.

① - This is a retard of the timing point.
② - At 2500 Engine RPM. ③ - At 2750 Engine RPM.

IGNITION TIMING

Engin & Trans.	Std. Setting	Allowable Range
Synchro-mesh(Exc.Hi Perf.)	4° BTDC	4-10° BTDC
Powerglide & Hi Performance	13°BTDC	13-18° BTDC
Turbocharged	24° BTDC	None

►*TIMING SETTING NOTE (EXCEPT TURBOCHARGED):* Set timing with engine running at idle speed and with distributor vacuum line disconnected.

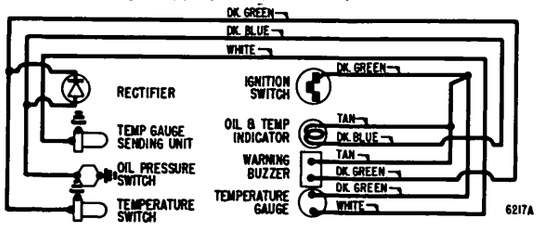
►*TIMING SETTING CAUTION (TURBOCHARGED):* Set timing with engine running at correct idle speed. Unnecessary to disconnect spark retard hose. *DO NOT s t timing mor than 24° under any circumstances or s v r ngine damage will result.*

Timing Mark - "0", "4", "8", and "16" marks on timing tab and a notch on crankshaft pulley. Align notch on pulley with correct mark on timing tab.

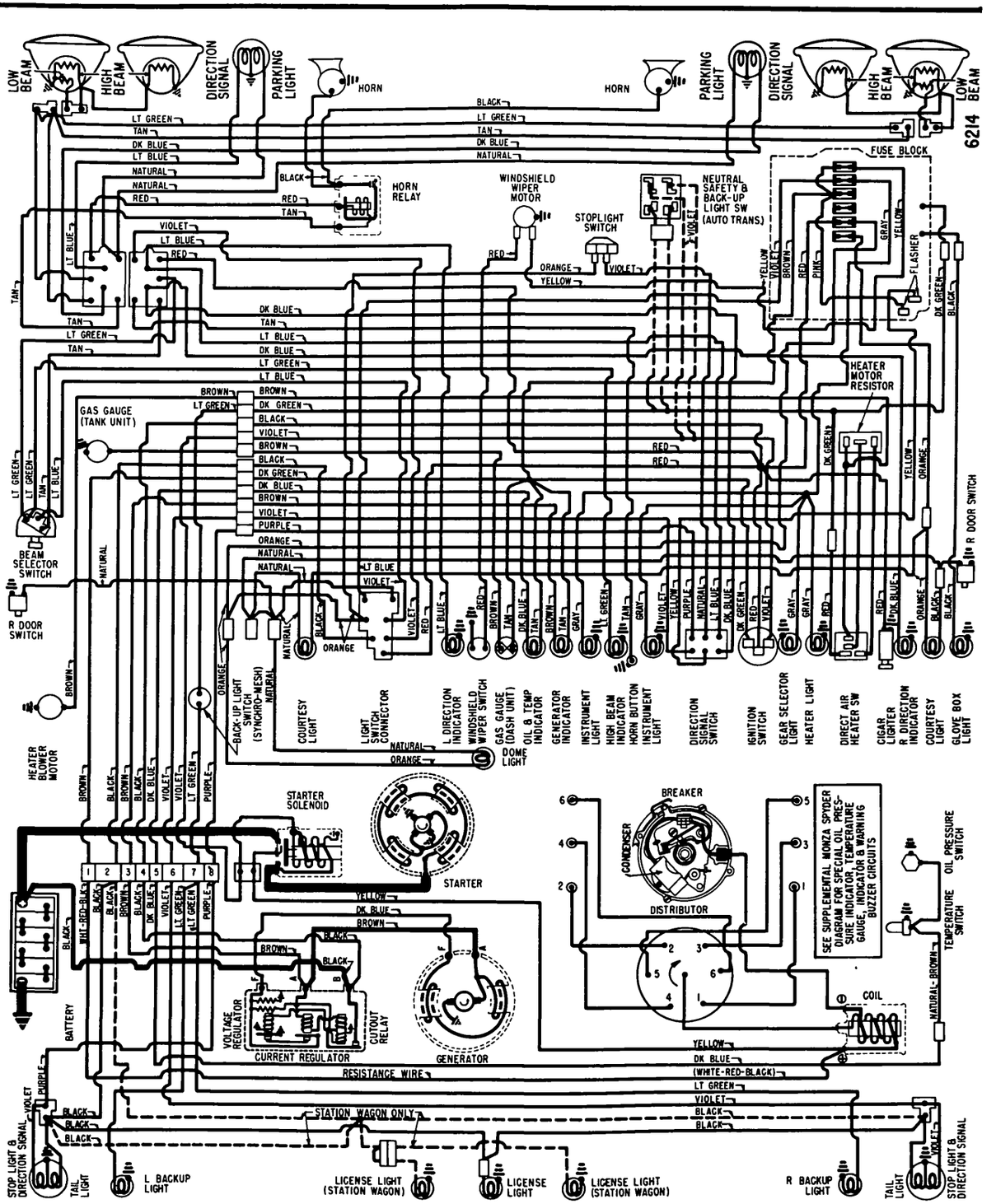
CARBURETOR

►*CARBURETOR APPLICATION: Two Rochester Model "H" singl barr l carbur tors used on all models ex- c pt Turb charged Engine. One Carter "YH" used on Turb charg d Engine.*

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MONZA SPYDER ENGINE WARNING SYSTEM



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PASSENGER CARS (EXCEPT TURBOCHARGED ENGINE)

ACCELERATOR CONTROL LINKAGE ADJUSTMENT: Remove mudguard over idler lever "A" (see illustration) on transmission, then disconnect swivel "D" from lever "A". Disconnect swivel "B" from left carburetor cross shaft lever "E". Pull rod "C" to wide open throttle (through detent for Powerglide and against stop for standard transmission) and turn lever "E" to wide open throttle position (carburetor throttle lever against the stop). Adjust swivel "B" to align with hole in lever "E", then lengthen rod "C" by backing off swivel **five full turns.** Position accelerator pedal by placing a block of wood 1" thick (Synchro-mesh), 1¼" thick (Powerglide) between pedal and floor mat. Hold lever "A" in wide open throttle position (through detent for Powerglide) and turn swivel "D" to align with hole in lever "A". Install mudguard. *NOTE - This complete procedure provides proper clearance between accelerator pedal and floor mat at wide open throttle.*

►*ADJUSTMENT NOTE: After above adjustment completed, proceed with carburetor synchronization, idle speed and mixture, and other adjustments as listed under "Rochester Model H" below.*

CORVAIR "95" TRUCKS

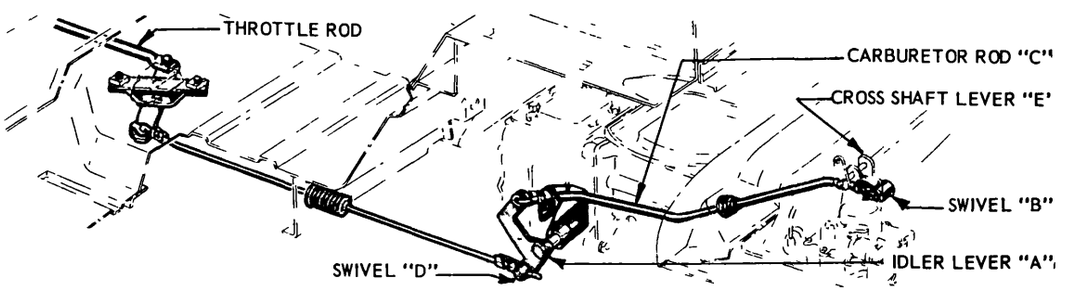
ACCELERATOR CONTROL LINKAGE ADJUSTMENT (ALL MODELS): *Make Carburetor Cross Shaft Linkage Adjustment as detailed under "Rochester Model H" b low, then proceed as follows:* Place a 3/4" spacer between floor mat and upper end of accelerator pedal and block pedal against spacer. Rotate carburetor cross shaft lever for wide open throttle position, then unsnap accelerator cable adjustment rod clip and rotate adjusting rod to remove all slack from cable. Install clip. Return accelerator pedal and carburetor cross shaft to idle position and disconnect return spring from accelerator pedal lever. Clearance between accelerator lever and cable shield with lever arm held up to remove freeplay should be 1/8". Adjust by moving shield in desired direction, then tighten mounting screws. Install pedal return spring (cable shield should now act as a pedal lever stop). *NOTE - Cable in engine compartment should now have some slack at idle to allow engine to r turn to idle speed.*

►*ADJUSTMENT NOTE: On Powerglide models, proceed with "Throttle Valve Linkage Adjustment" below. On Synchro-mesh models, proceed with idle speed and mixture and other adjustments as detailed under "Rochster Model H" below.*

THROTTLE VALVE LINKAGE ADJUSTMENT: After accelerator control linkage adjustment correctly made (see above), disconnect throttle valve rod at carburetor cross shaft lever and rotate cross shaft to wide open throttle position. Pull throttle valve rod so throttle valve is through the detent and adjust swivel on rod to just enter hole in cross shaft lever, then lengthen rod **5 full turns** and connect to lever. *Proceed with idle speed and mixture, and other adjustments as detailed under "Rochester Model H" below.*

ROCHESTER MODEL "H"

Applicati n	Carbur tor N .
Synchro-mesh	7020101
Powerglide	7020100



POWERGLIDE THROTTLE LINKAGE

Single barrel, downdraft type similar in design to previous models. Two carburetors used, one on each intake manifold. Each carburetor has an automatic choke mechanism consisting of a vacuum diaphragm (to replace conventional vacuum piston) which is attached to float bowl cover and linked to choke pivot shaft. Choke valve plate is linked to a bi-metal coil thermostat attached to a flat milled surface on bottom of each cylinder head. Vacuum for diaphragm operation is received from base of carburetor through an external rubber hose.

►*ADJUSTMENT CAUTION: Make accelerator and throttle valve linkage adjustments (see above), then make following adjustments exactly in the order listed.*

Carburetor Synchroni zation (Cross Shaft Adjustment): Make following adjustments on each carburetor in sequence with both throttle rods disconnected at cross shaft, choke control rods disconnected at choke levers, and engine off: Back off idle speed screw from throttle lever and open choke valve so throttle lever does not ride fast idle cam. Insert a .003" feeler gauge between idle speed screw and throttle lever, turn screw in until it just contacts gauge, and then 1½ additional turns to set throttle valve. Turn idle mixture screw out 1½ turns from a lightly seated position. Connect right carburetor throttle rod to cross shaft lever. On left carburetor, rotate cross shaft (with accelerator rod) so right carburetor throttle valve is completely closed. Adjust throttle rod in swivel so rod freely enters hole on cross shaft lever, **then shorten rod 1 full turn** and connect to lever. *NOTE - It may be necessary to hold choke valve open so fast idle cam is clear of throttle lever.*

Preliminary Idle Mixture & Speed Adjustment: Bring engine to normal operating temperature, make sure ignition timing is correct, connect a vacuum gauge to adapter on vacuum balance tube, and a tachometer to engine. Adjust idle speed screw on each carburetor as close to 500 RPM (Powerglide in "D"), 600 RPM (Hi Perf. Engine with Synchro-mesh) as possible. Adjust idle mixture screws for highest steady vacuum. *NOTE - On Air Conditioned Cars, set idle speed at 550 RPM with Auto. Trans. in "D" and with a compressor head pressure of 300 lbs. (air conditioning on).*

Vacuum Balance Check: Remove choke diaphragm hose from each carburetor base adapter and connect equally calibrated vacuum gauges to each adapter. *CAUTION - Do n t turn tubing in carburetor body.* With engine running at idle speed, note difference in vacuum at each carburetor. If difference 1" or less, carburetors are synchronized. If difference more than 1", adjust left carburetor throttle rod 1 turn (up to increase left carburetor vacuum down to decrease vacuum). *Adjust by disconnecting rod at cross shaft and r tating in swiv l. NOTE - Higher vacuum reading pr ferr d on right carburetor (spark advance side). CAUTION - Mov cr ss shaft by grasping accelerator r d only or g ometry and synchronization will be ups t.* Remove gauges and replace choke diaphragm hoses.

Final Idle Mixture & Speed Adjustment: *Mak sur air cleaners are installed.* Connect vacuum gauge to vacuum balance tube adapter and adjust idle speed and mixture screws on each carburetor for highest steady vacuum reading between 14-18".

Fast Idle: *Make this adjustm nt aft r idl sp d correctly set.* Stop engine and place throttle lever on second highest step of fast idle cam. Bend tang on throttle lever to obtain .078" clearance between idle speed screw and throttle lever. Recheck idle speed.

Choke Vacuum Diaphragm: With diaphragm arm squarely against diaphragm, clearance between lower edge of choke valve and wall of air horn should be .145-.170". Disconnect and bend diaphragm link to adjust. *NOTE - Throttle lever fast idle tang sh uld r st n s c nd highest step of fast idle cam. B nd ut r ch k shaft lever tang to adjust.*

Choke Rod Adjustment: Stop engine and disconnect choke control rod at choke shaft lever. With choke valve held closed, pull control rod up against stop in thermostat bracket and adjust control rod until it freely enters hole in choke shaft lever. *CAUTION - Turn rod in vertical portion only, do not crank at ffset part.* Check choke position after engine at operating temperature. Choke valve should be open and fast idle cam clear of throttle lever.

Unloader: Clearance between choke valve lower edge and wall of air horn with throttle valve in wide open position should be .250". To adjust, bend tang on throttle lever.

Float Level: 1 13/64" (Gauge BT-174 or J-9577) with air horn inverted and gasket in place. Gauge must be centered in air horn bore, front and rear upper surfaces of float must touch gauge, and floats must be parallel to air horn. To adjust, bend float tang.

Float Drop: 1¾" from gasket surface to bottom of float with air horn upright and float hanging freely. To adjust, bend float tang.

►*OTHER DATA: S "Roch st r H Corvair Carbur tors" in Carbur tion S ction.*

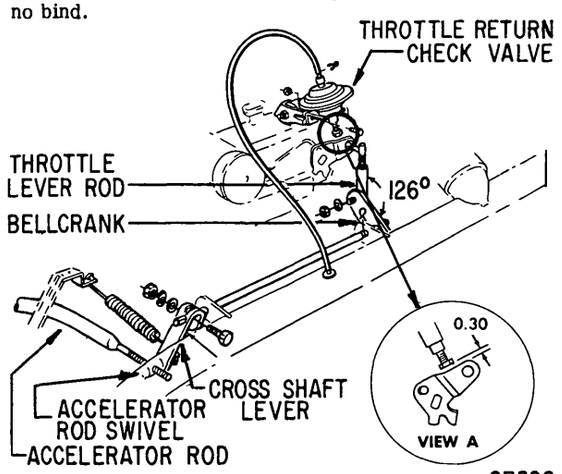
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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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TURBOCHARGED ENGINES

ACCELERATOR LINKAGE ADJUSTMENT: With engine at normal operating temperature (or with air cleaner removed to block choke valve open), proceed as follows: Disconnect accelerator rod swivel from cross shaft lever and make sure throttle lever is against idle speed screw. Angle between throttle lever rod and bellcrank should be 126°. Adjust by changing length of throttle lever rod. Pull accelerator rod rearward against bellcrank stop on transmission, then rotate cross shaft lever to full throttle position (carburetor throttle lever against stop boss on flange). Adjust accelerator rod swivel so it just enters hole in cross shaft lever, then connect swivel to lever and install retaining clips. *NOTE - Swivel pin should be just short of cross shaft lever hole rather than just past, or linkage may be bent.* Move linkage from idle to full throttle and check that carburetor throttle lever operates correctly with no bind.



MONZA SPYDER ACCELERATOR LINKAGE

CARTER YH

Carter YH, N. 3311S. Single barrel, side draft (horizontal) type used with exhaust driven supercharger. Automatic choke and throttle return check are used.

Idle Setting: Initial setting ¾-turn out from lightly seated position. With engine at normal operating temperature (tachometer and vacuum gauge connected), proceed as follows:

Idle Speed: 850 RPM with choke valve fully open and fast idle inoperative.

Idle Mixture: With engine operative at correct idle speed, adjust idle mixture screw to obtain highest vacuum. Readjust idle speed and repeat idle mixture adjustment.

Throttle Return Check: With engine at normal operating temperature and with idle mixture and speed correctly set (choke valve fully open and fast idle not operating), measure distance between throttle valve lever and return check valve bolt. Distance should be .030". To adjust, hold a wrench on flat of diaphragm stem and turn selflocking nut as necessary.

Float Level: 5/8" (Gauge J-21056). Invert bowl cover and measure distance between float at center and gasket surface of bowl cover (gasket removed). Adjust by bending float arm.

Float Drop: 2 3/8". Hold bowl cover in upright position and let float hang freely. Measure distance between gasket surface (gasket removed) and float seam at free end of float. Adjust by bending tang at hinge end of float.

Automatic Choke Setting: 1 notch rich.

Fast Idle: No adjustment on engine.

Accelerator Linkage Adjustment: *See above.*

►*OTHER DATA: See "Carter YH Carburetors" in Carburetion Section.*

SUPERCHARGER

Exhaust driven turbine and a centrifugal impeller used with a single horizontal type carburetor mounted directly on supercharger unit.

►*OTHER DATA: See "Corvair Supercharger" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4886. Fuel only.
Fuel Pump Pressure - 4-5 lbs. at idle to 1000 RPM.

Gasoline Gauge: AC Electric type.
Dash Unit - AC No. 5643032 (Pass. Except Turbocharged), No. 5644251 (Pass. Turbocharged), No. 5643525 (Trucks).
Tank Unit - AC No. 5641645 (Pass.), No. 5641632 (Trucks).

Fuel Filter: Except Turbocharged - In carburetor fuel inlet. Replace if dirty, plugged, or if carburetor floods.
Turbocharged - In carburetor inlet line mounted on air cleaner support bracket. Replace every 10,000 miles.

Air Cleaner: Oil wetted plastic foam type. Clean and reoil every 2000 miles or sooner under severe dust conditioning.

►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from wire mesh support and wash in solvent. Squeeze element (do not wring) to remove all solvent and reoil with 10W-30 engine oil.

BATTERY

Delco No. 557 (Dry Type). 12 volt, 9 plate, 42 ampere hour capacity (20 hour rate).
Battery Ground - Negative, to body and generator.
Engine Ground - Left and right sides of engine to body.

STARTER

Delco-Remy No. 1108306 (Synchro-mesh), No. 1108307 (Powerglide).
Armature - Delco-Remy No. 1946226 (All).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Ⓒ - Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119910 mounted on starter and controlled by Ignition & Starter Switch, Delco-Remy No. 1116569.

Neutral Safety Switch: Delco-Remy No. 1998717. Combination neutral safety and back-up light switch.
Adjustment - *See "Corvair Transaxle" in Transmission Section.*

Starter Removal: *See "Electrical Notes" in Corvair Special Data.*

GENERATOR

Delco-Remy. Used as follows:

Application	Generator No.	Armature No.
Coupes & Sedans	1102226	1952301
Station Wgn. & Corvair "95"	1102227	1952301
Optional	1105135	1950521
Optional	1105139	

Performance Data

Generator	Amperes	Volts	Gen. RPM
1102226 & 227	30	14.0	2240
1105135	35	14.0	1730
1105139	40	14.0	1930

Rotation - Clockwise at commutator end.
Brush Spring Tension - 28 ozs.
Field Current - 1.69-1.79 amps. (1102226 & 227), 2.73-3.0 amps. (1105135 & 139) at 12.0 volts and 80°F.

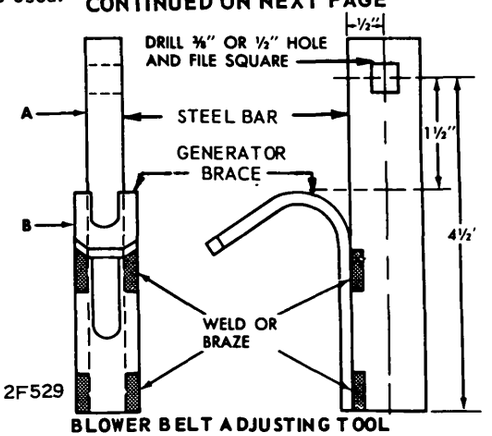
Blower Belt Adjustment: *NOTE - New belt is one installed for less than 1000 miles. Used belt is one installed for more than 1000 miles. Use either of two methods listed below for belt adjustment.*

Strand Tension Gauge Method - Use a variable reading strand tension gauge and adjust idler pulley to obtain 70 lbs. strand tension on **new** belt, or 50 lbs. strand tension on **used** belt.

Special Torque Tool Method - *Refer to "Tool Fabrication Note" and illustration below.* Place slot of hooked end of tool over reinforcing rib of pulley bracket with shank end of tool toward rear of car (relative to idler pulley installed position). Loosen idler pulley attaching bolt. Insert torque wrench into tool shank and pull wrench to rear of car to apply 20 lbs. torque for **new** belt, or 15 lbs. torque for **used** belt. Tighten the pulley attaching bolt and nut while holding tension load. *CAUTION - DO NOT allow torque to exceed specifications even momentarily. Any slight variation in tension will result in an excessively tight belt. If specifications are exceeded, complete readjustment is necessary.*

►*TOOL FABRICATION NOTE:* Make tool shown in illustration from a steel bar ¼" thick, ¾" wide, and 5" long; and the slotted end of a generator brace, Part No. 3836330 or 3739845. Hook has a developed length of 5". *CAUTION - Hold dimensions shown in illustration to plus or minus 1/16" to assure correct tension when tool is used.*

CONTINUED ON NEXT PAGE



BLOWER BELT ADJUSTING TOOL

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

►*NEW BLOWER BELT INSTALLATION NOTE:* When a new belt is installed, adjust tension as for new belt (see above), then operate engine at 1500 RPM for a minute or two to seat belt, then readjust tension (new belt specifications). *NOTE - This procedure supersedes previous recommendations.*

Air Conditioning Compressor Belt Adjustment: ½-¾" deflection midway between compressor and crankshaft pulleys under a 15 lb. load.

►*GENERATOR PULLEY INSTALLATION CAUTION:* Pulley nut has **left-hand threads.** DO NOT attempt to turn nut in opposite direction nor install a right-hand thread nut as severe damage to armature will result.

Generator Installation: *See "Electrical Notes" in Corvair Special Data.*

REGULATOR

Delco-Remy. Used as follows:

Regulator	Generator
1119001	1102226 & 227
1119604 & 635 Ⓒ	1105135
1119610 & 654 Ⓒ	1105139

Ⓒ - "Double Contact" type.

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001), 11.8-13.0 volts (1119604,610,635 & 654)

Contact Gap - .020".

Air Gap - .020" (1119604 & 610), .023" (1119635 & 654) with contacts just closed.

Voltage Regulator

Setting - 13.8-14.7 volts (1119001), 13.8-14.6 volts (1119604,610,635, & 654) at 125°F ambient temperature. *NOTE* - On "Double Contact" regulator, .1-.3 volt lower when operating on lower contacts.

Contact Gap (1119604,610,635 & 654) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .075" (1119001), .067" (1119604,610,635 & 654) with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 27.0-31.0 amps. (1119001), 31.0-35.5 amps. (1119635 & 604), 36.0-40.5 amps. (1119654 & 610) at 125°F ambient temperature.

Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy 1119000 Series (Single Contact) Regulators" and "Delco-Remy 1119600 Series (Double Contact) Regulators" in Electrical Section.*

MISC. ELECTRICAL

Headlights: 4-Headlight System.

Stop Light Switch Location: Under instrument panel.

Adjustment - Adjust switch in mounting bracket so electrical contact is made when brake pedal depressed ½-¾" from fully released position.

Lighting Switch Removal: Disconnect battery ground cable and pull switch to ON position. Depress switch shaft retaining button (top of switch under instrument panel) and remove shaft and knob. Remove switch retaining ferrule and bezel and remove switch.

Ignition Switch Removal: With negative cable disconnected at battery, position ignition switch in "Lock" and insert a wire in small hole in cylinder face. Depress plunger with wire and continue to turn key counterclockwise until cylinder can be removed. Use a spanner wrench (Tool J-7607 or J-5893, with inside of tangs filed off), and remove attaching nut, then remove switch. To remove "theft resistant" connector, use a piece of heavy wire stock and press on lock clip in slot in connector. Hold wire in place and work connector away from switch.

Instrument Cluster Removal (Pass. Cars): Disconnect battery ground cable and disconnect connectors from back of cluster. Pull wiring harness out of retaining clips on cluster. Disconnect speedometer cable. Remove lighting switch (see above). Remove cigar lighter attaching nut from behind panel and remove lighter. Lower mast jacket and steering wheel or remove steering wheel (see Steering Section). Remove instrument panel-to-cluster attaching screws and remove cluster, instrument center panel and seal by pulling straight out and turning slightly to clear transmission range selector. *NOTE - Individual bulb sockets and fuel gauge may be removed without removing cluster.*

Instrument Cluster Removal (Greenbrier & Trucks): Disconnect battery ground cable. On Powerglide trucks, remove "C" clip holding transmission cable assembly to transmission control assembly. Remove cable assembly attaching nut from control support arm. Move selector lever to "Low". On all trucks, remove speedometer cable and cluster attaching screws. Remove cluster from instrument panel, disconnect cluster wiring and remove from truck. *NOTE* - When installing, Powerglide selector lever must be in full DOWN position.

CIRCUIT BREAKER: 15 Ampere - Protects headlight circuit. Integral with lighting switch.

14 Ampere - Two-speed windshield wiper.

FUSES: *Fuses are located in junction block beneath dash panel.*

3AG/AGC 20 Ampere - Gasoline Heater.
3AG/AGC 20 Ampere - Back-up Light & Heater.
3AG/AGC 20 Ampere - Single speed Windshield Wiper.
3AG/AGC 10 Ampere - Glove Box Light & Heater Blower.
3AG/AGC 10 Ampere - Tail, Stop, Direction Signals, Dome, License lights & Cigar Lighter.
3AG/AGC 4 Ampere - Radio.
3AG/AGC 3 Ampere - Instrument Panel & Control lights.

ENGINE

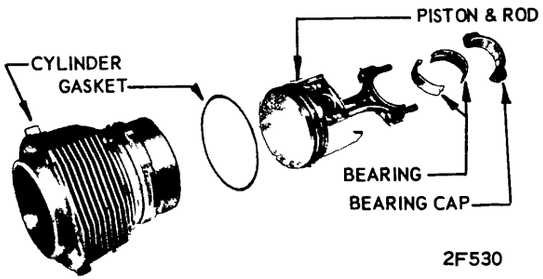
►*ALUMINUM THREAD REPAIR NOTE: A thread repair kit, Part No. 3780960, is available for repairing stripped or damaged threads in aluminum parts.*

►*ANTI-SEIZE COMPOUND NOTE: Permatex No. 404 Anti-Seize Compound (or equivalent) must be used on threads of all bolts, studs or capscrews entering an aluminum part to prevent thread seize and damage.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., horizontally opposed, overhead valve, air-cooled aluminum engine of same design used previously.

►*ENGINE APPLICATION & IDENTIFICATION: See "Engine Application & Identification Note" at beginning of Corvair Data Pages.*

►*TURBOCHARGED ENGINE NOTE & CAUTION:* This engine uses different cylinder heads and crankcase cover vent baffle plates, and heavy duty main and connecting rod bearings, connecting rods, piston rings,



CORVAIR CYLINDER ASSEMBLY

and crankshaft. *DO NOT install supercharger from this engine on any other engine.*

Bore	Stroke	Displacement	Rated HP
3.4375	2.60"	145 cu. ins.	28.4

Engine Ⓒ	Compr. Ratio	Developed HP
Std. Exc. Monza Powerglide	8.0-1	80 at 4400 RPM
Std. Monza Powerglide	9.0-1	84 at 4400 RPM
Hi Performance Engine	9.0-1	102 at 4400 RPM
Turbocharged Engine	8.0-1	150 at 4400 RPM

Ⓒ - *See "Engine Application & Identification Notes" at beginning of Corvair Data Pages.*

Compression & Vacuum Reading - *See TUNE-UP.*

ENGINE REMOVAL: *See "Power Train" in Corvair Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Corvair Special Data.*

ENGINE MOUNTS: *See "Engine Service" in Corvair Special Data.*

CRANKCASE COVER, BLOWER & BLOWER BEARING: *See "Engine Service" in Corvair Special Data.*

OIL COOLER: *See "Engine Service" in Corvair Special Data.*

CYLINDER HEAD: *See "Engine Service" in Corvair Special Data.*

EXHAUST MANIFOLD: *See "Engine Service" in Corvair Special Data.*

CRANKCASE & CYLINDER HEAD STUDS: *See "Engine Service" in Corvair Special Data.*

OIL PAN REMOVAL: Drain crankcase and remove oil pan retaining bolts. Remove pan.

CYLINDER

Individual cast iron type with integral cooling fins. Replacement cylinders are furnished only as an assembly with piston and pin.

Bore - 3.4370-3.4400". Maximum wear limit .005".

Removal - *See "Engine Service" in Corvair Special Data.*

PISTONS

Aluminum alloy, tin plated, slipper type skirt with steel strut. Piston pin is offset toward major thrust side.

Removal - Piston and rod removed as an assembly with cylinder. *See "Engine Service" in Corvair Special Data.*

Clearance - .0011-.0015" measured 2.20" from top of cylinder bores.

Installing Pistons: Install piston with notch on top of piston toward front (flywheel end) of engine on both banks.

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Replacement Pistons: Standard size only. Piston, pin, and cylinder are furnished as a complete assembly.

PISTON PIN

Pin is press fit in connecting rod.
Diameter - .7999-.8002". **Length** - 2.630-2.650".
Pin Fit In Piston - .00015-.00025". Pin should support its own weight in either pin boss when coated with light engine oil and at 60°F. *Higher or lower temperatur will give fals int rpr tations.*
Pin Fit in Connecting Rod - Press fit. *See "Engine Service" in Corvair Special Data.*

Replacement Pins: Standard size only furnished in assembly with piston and cylinder.

PISTON RINGS

Compression rings are cast alloy iron with wear resistant coating. Oil ring is a single piece, uncoated, with a slotted expander. *NOTE - Upper compression ring on Turbocharged Engine is chrome plated.*

Ring	Width	End Gap	Side Clearance
Compr. (1 & 2)	.0770-.0780"	.010-.020"	.0012-.0032"
Oil (3)	.1860-.1865"	.010-.020"	.002-.0035"

Installing Rings - Install rings with identification marks and inside bevel **away from** top of piston.
Replacement Rings: Furnished Standard size only.

CONNECTING ROD

Length - 4.719-4.721" center-to-center.
Journal Diameter - 1.799-1.800".
Lower Bearing - Replaceable precision type.
Clearance - .0007-.0027".
Sidplay - .005-.010".
Bearing Replacement: Furnished Std., .001", .002", .010", & .020" Undersize, To replace bearings, *see "Engine Service" in Corvair Special Data.*
Installing Rods: No squirt hole. Install in either direction.

CRANKCASE

Cast aluminum alloy, vertically divided into two halves held together at parting line by bolts. Studs for mounting cylinders, cylinder heads, rocker arms, and rear housing are mounted in each half and are replaceable. Crankcase must be separated for service on either crankshaft or camshaft.
Crankcase Separation: Crankcase can be separated after removal of cylinder heads, cylinders, rear housing, and clutch housing. *See "Engine Service" in Corvair Special Data.*
Stud Replacement: *See "Engine Service" in Corvair Special Data.*

CRANKSHAFT

Journal Diameter - 2.0978-2.0998" (No. 1 & 2), 2.0983-2.0993" (No. 3 & 4).
Bearings - Steel backed babbitt precision type. No adjustment.
Clearance - .0012-.0027" (No. 1 & 2), .0007-.0022" (No. 3 & 4).

Replacement Bearings: Furnished Std., .001", .002", .010", & .020" Undersize. Also No. 1 bearing furnished .003" Undersize. To replace bearings, crankcase must be separated. *See "Engine Service" in Corvair Special Data.*

►*NO. 4 MAIN BEARING NON-INTERCHANGEABILITY CAUTION:* No. 4 bearing upper half is .0015" thicker and lower half .0015" thinner than corresponding bearing halves of No. 2 & 3 bearings to lower centerline of No. 4 bearing. No. 4 bearing halves have brown dye on edges for identification. DO NOT install a No. 4 bearing in No. 2 or 3 positions, nor a No. 2 or 3 bearing in No. 4 position.

End Thrust - Taken by flanged type No. 1 (rear) main bearing (at accessory drive end of engine). *NOTE - Left half of bearing only is flanged on later cars.*

Endplay - .002-.006".

Crankshaft Front & Rear Oil Seals: *See "Engine Service" in Corvair Special Data.*
Vibration Damper: None used.

Crankshaft Drive Flange: Integral with steel timing gear. Pressed on crankshaft. *See "Engine Service" in Corvair Special Data.*

Crankshaft Pulley Removal: Unnecessary to remove power train. *See "Engine Service" in Corvair Special Data.*

CAMSHAFT

Alloy cast iron camshaft located below crankshaft on split line of engine. Camshaft journals ride directly on machined base metal of crankcase and bearing inserts are not used. Exhaust valve lobes are twice the width of intake lobes and actuate a pair of exhaust valve lifters.

►*CAMSHAFT USAGE NOTE:* Two camshafts used as follows: **No. 3777255** - Used on Monza with Powerglide and Air Conditioning, and High Performance and Turbocharged Engines. **No. 3779332** - Used on all other engines. *DO NOT interchange camshafts.*

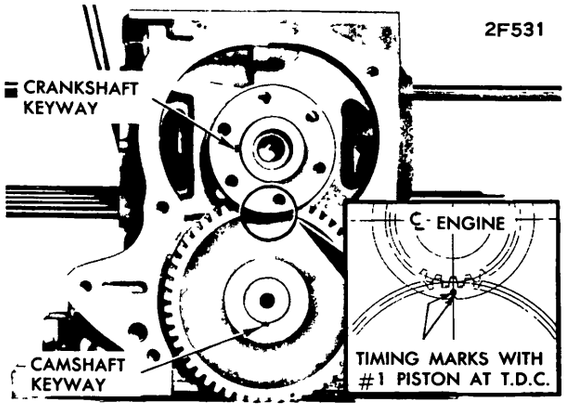
Journal Diameter - 1.4395-1.4405" (front), 1.1995-1.2005" (all others).
Clearance - .0015-.0035" (new), .002-.004" (used). *NOTE - If beyond the above limits, replace either crankcase or camshaft.*

End Thrust: Controlled by thrust washer located between camshaft gear and front bearing.
Endplay - .002-.007".

Camshaft Removal: Crankcase must be separated. *See "Engine Service" in Corvair Special Data.*

Timing Gear: Aluminum, with steel crankshaft gear, pressed on camshaft. Replace gears in matched sets only. To remove gear, remove camshaft and *see "Engine Service" in Corvair Special Data.*
Backlash - .002-.004".

Camshaft Setting: Align notch in crankshaft gear flange with mark in camshaft gear adjacent to each other across shaft centers. Notches can be aligned only when crankcase reassembled. *See "Engine Service" in Corvair Special Data.*



CORVAIR VALVE TIMING MARKS

VALVES

Valve	Head Diam.	① Stem Diam.	Length
Intake	1.335-1.345"	.3415-.3422"	4.489-4.509"
Exhaust	1.235-1.245"	② .3410-.3417"	4.494-4.514"

Valve	Seat Angle	⑦ Lift	Stem Clearance
Intake	45° ③	④ .314"	⑤ .0010-.0027"
Exhaust	45° ③	④ .344"	⑥ .0014-.0029"

① - Standard. Also furnished .003" & .010" Oversize (Intake), .003", .010", .020" Oversize (Exhaust).
② - Top of stem. .3400-.3407" at bottom of stem. *Note - Valve stems are tapered .001".*
③ - Valve Face Angle 44° (Except Turbocharged), 45° (Turbocharged).
④ - .378" Intake & Exhaust on Camshaft No. 3777255.
⑤ - Wear limit .004". ⑥ - Wear limit .006".
⑦ - Cam Lobe Lift .209" Intake, .229" Exhaust (Camshaft No. 3779332); .252" Intake & Exhaust (Camshaft No. 3777255).
Valve Seat Width - 1/32-3/32" Intake, 1/16-1/8" Exhaust.
Valve Seat Inserts: Steel, not replaceable.
Valve Guides: Pressed into cylinder head. Not replaceable. Guides may be reamed for oversize valve stems if valve clearance excessive. Intake valves furnished with .003" & .010" oversize stems; exhaust valves furnished with .003", .010" & .020" oversize stems. Use Reamer Set J-5830.
Valve Springs: Spring must be installed with a hardened shim (minimum .020" - furnished .030") under it to protect aluminum head.
Free Length - 1.74" (Std. 8.0-1), 2.08" (Std. 9.0-1, Hi Perf. & Turbocharged).

Spring Specifications - Std. (8.0-1)

Valve	Lbs. Pressure	Length
Closed	58-64	1.508"
Open	141-149	1.148"

Spring Specifications (Std. 9.0-1, Hi Perf., Turbocharged)

Valve	Lbs. Pressure	Length
Closed	69-79	1.696"
Open	159-169	1.306"

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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►*VALVE SPRING INSTALLED HEIGHT CAUTION:* Check installed height of valve spring after grinding valves by measuring distance from spring seat on cylinder head to top of valve spring. If this dimension exceeds "Preferred Height" listed in table below, install additional 1/32" shim, Part No. 6255818 (Std. 8.0-1), No. 3781876 (All Others), under valve spring to bring height within limits. *CAUTION - Do not add shims to bring height to less than "Minimum Height" below.*

Valve Spring Height Specifications

Engine	Valve	Preferred Height	Min. Height
Std. (8.0-1)	Intake	1 15/32"	1 7/16"
	Exhaust	1 1/2"	1 15/16"
All Others	Intake	1 11/16"	1 21/32"
	Exhaust	1 11/16"	1 21/32"

Pushrods: Externally mounted type between cylinder head and crankcase and enclosed in drain tubes. For servicing, see *"Engine Service" in Corvair Special Data.*

Hydraulic Lifter Adjustment - *See "Engine Service" in Corvair Special Data.*

Rocker Arms: Mounted individually on cylinder-cylinder head studs.

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications
(Camshaft No. 3779332)

Intake Valves - Open 43° BTDC. Close 93° ALDC.
Exhaust Valves - Open 87° BLDC. Close 69° ATDC.

(Camshaft No. 3777255)

Intake Valves - Open 54° BTDC. Close 118° ALDC.
Exhaust Valves - Open 95° BLDC. Close 78° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Corvair Special Data.*

Crankcase Capacity: 4 quarts refill, 4½ quarts with filter change.

Normal Oil Pressure: 35 lbs. at 2000 RPM.

Pressure Relief Valve - In engine rear housing. Not adjustable.

Oil Filter: Full flow type. Replace element every 4000 miles. Use a new seal and tighten center bolt to 20-25 ft. lbs.

Replacement Filter Element - AC No. PF-4.

►*AIR CONDITIONED CAR OIL FILTER REPLACEMENT NOTE:* To prevent oil spilling into engine compartment when changing filter, remove both filter and adapter as as a unit and separate filter from adapter at the bench.

Oil Pump: Gear type pump located in engine rear housing and driven by distributor shaft.

Pump Overhaul - *See "Oiling System" in Corvair Special Data.*

Oil Cooler: Located at rear of engine left side shield. Clean every 5000 miles by removing access cover and removing dirt, twigs, etc.

Crankcase Ventilation: Standard - Air intake through oil filler cap and outlet pipe from top of crankcase cover and down on right side of engine.

Positive - Two types used. *See "Positive Crankcase Ventilation" under TUNE-UP above.*

ENGINE COOLING SYSTEM

Air cooled by blower mounted on top of engine. Engine temperature regulated by a bellows type thermostat filled with butyl alcohol in each lower shroud exhaust duct. Each thermostat operates a damper door at rear of each lower exhaust duct. Exhaust damper doors restrict blower air exhaust until engine reaches operating temperature. *NOTE - If thermostat fails, damper doors will remain open.*

Thermostat: Chevrolet No. 3152003 (Std.), No. 3153516 (Air Cond.), No. 3156432 (Turbocharged). Standard thermostats start to open damper doors at 200-210°F and doors are fully open at 225-230°F. If thermostats fail, atmospheric pressure causes damper doors to remain open.

Exhaust Damper Door Adjustment: *Make this adjustment whenever a new thermostat is installed.* With exhaust damper door fully open, pull thermostat actuating rod out to maximum travel (thermostat against bellows stop). There should be 2 3/8" opening from top of damper door to top of opening (exhaust duct top edge). Adjust by turning swivel on actuating rod until it enters damper door, then install retaining clip.

ENGINE WARNING SYSTEM

ALL MODELS (EXCEPT TURBOCHARGED ENGINES):

Oil Pressure-Temperature Indicator - Light on instrument panel comes on when ignition switch turned on but goes off during normal engine operation. If oil pressure is low, or if cylinder head temperature reaches 450°F, light will come on. Light controlled by an oil pressure switch and a disc type temperature switch on underside of right cylinder head near No. 3 cylinder as follows:

Oil Pressure & Temperature Switches

Model	Oil Switch No.	Temperature Switch No.
Standard	3818783	1993533
Air Conditioned	3818783	1993574

►*OIL PRESSURE & TEMPERATURE SWITCHES INSTALLATION CAUTION:* Switches are grounded through threads of body. **Do not** coat threads with sealer or anti-seize compound. Torque oil pressure switch to 45-65 **inch-lbs.**, and temperature switch to 10-15 ft. lbs.

TURBOCHARGED ENGINES: Oil Pressure-Temperature Indicator - 1) Same system as for standard cars (see above) with Oil Pressure Switch No. 3818783, and Temperature Switch No. 1993599. 2) In addition to indicator light system, a temperature gauge, No. 6400538, is installed in instrument cluster and controlled by a sending unit, No. 1513431, in left cylinder head. A warning buzzer, No. 3815936, to indicate excessive engine temperature, is located under instrument panel. A silicon rectifier in wiring harness near warning buzzer allows light current to flow to ground through closed engine temperature switch (right head), but prevents oil pressure switch from completing buzzer circuit. *See "Monza Spyder Engine Warning System" supplementary wiring diagram for circuits.*

Manifold Pressure Gauge - A pressure gauge, calibrated in inches of mercury, located in instrument cluster and connected to intake manifold by a tube, indicates manifold pressure.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

88, SUPER 88 & 98

	Ft. Lbs.
Cylinder Head	60-80
Intake Manifold (Bolts & Nuts)	22-34
Exhaust Manifold (Bolts & Nuts)	19-25
Oil Pan	10-18
Main Bearing Caps (Exc. Rear)	90-120
Main Bearing Caps (Rear)	130-160
Flywheel	85-95
Crankshaft Pulley	100 min.
Con Rod Caps	34-48
Camshaft Sprocket & Pump Eccentric	14-22
Rocker Arm Support Brackets	14-22
Rocker Arm Cover	4-7
Engine Front Cover	24-40
Water Manifold	22-26
Water Pump Mounting	14-22
Oil Pump Mounting	22-26
Oil Filter to Cylinder Block	28-38
Oil Filter to Housing Base	Hand Tight
Engine Front Mount to Bracket Nuts	35-50
Engine Front Mount Bracket to Cover Bolts	28-38
Front Mount to Frame Nuts	45-50
Engine Rear Mount to Flywheel Housing	50-60
Engine Rear Mount to Crossmember	40-56
Flywheel Lower Housing Cover Bolts	4-7
Flywheel Lower Housing to Block	50-55
Transmission Mounting	50-55

F-85 MODELS

Cylinder Head	45-55
Intake Manifold	25-30
Intake Manifold Gasket Clamp Bolt (5/16)	10-15
Exhaust Manifold	18-24
Carburetor to Intake Manifold	14-17
Water Outlet to Intake Manifold	20-25
Oil Pan	6-15
Main Bearing Caps	65-70
Crankshaft Pulley (Balancer)	140-160
Connecting Rods	30-35
Rocker Arm Bracket	45-55
Rocker Arm Cover	3-5
Engine Front Cover	15-20
Filter to Front Cover	30-35
Oil Pump Cover	10-15
Oil Pump Screen to Block	10-15
Fuel Pump to Front Cover	20-25
Water Pump to Front Cover	6-8
Engine Front Mount to Block Bolts	50-55
Engine Front Mount to Crossmember	35-50
Engine Rear Mount to Transmission	30-40
Engine Rear Mount to Cross Support	20-34

ALUMINUM ENGINES SERVICE CAUTIONS

SERVICE PRECAUTIONS: *NOTE* - Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Note the following:

1) Do not drop or slide machined surfaces on bench or floor.

2) Do not use gasket cement (Except as indicated under Cylinder Head Installation).

3) Lubricate all bolts or screws entering an aluminum part. See "Bolt Thread Lubrication Note" below.

4) Tighten bolts and nuts to the specified torque. DO NOT overtighten. Torque valves are for clean lubricated threads.

►*BOLT THREAD LUBRICATION NOTE:* Use engine oil or special thread lubricant on all threads entering an aluminum part.

DAMAGED OR WORN THREAD REPAIR (ALUMINUM BLOCK): "Heli-Coils" are available locally for repairing damaged or worn threads in aluminum. The repair consists of drilling out worn or damaged threads, tapping hole with special "Heli-Coil" tap, and installing a "Heli-Coil" insert in tapped hole. This brings hole back to original thread size. See following table.

"Heli-Coil" Thread Inserts

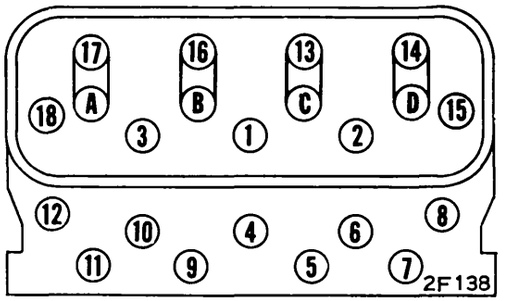
Thread Size	Insert Part No.	Drill Size	Special Tap Part No.	Inserting Tool No.
1/4"-20	1185-4	266"	.4 CPB	528-4N
5/16"-18	1185-5	332"	.5 CPB	528-5N
3/8-16	1185-6	397"	6 CPB	528-6N
7/16"-14	1185-7	453"	7 CPB	528-7N
1/2"-13	1185-8	516"	8 CPB	528-8N
Spark Plug				
14 MM Short 512			137-11	542
14 MM Long 513			137-11	542

CYLINDER HEAD & MANIFOLD

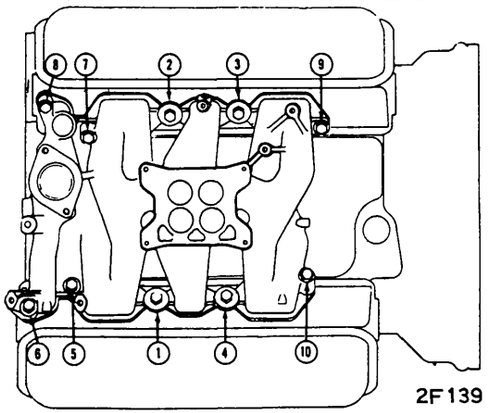
88, SUPER 88 & 98

CYLINDER HEAD: Removal - Drain cooling system, remove intake manifold and generator, then disconnect exhaust pipes. On right hand head, disconnect ventilator tube or hose from rocker arm cover. Remove cover. On Air Cond. Cars, remove compressor and generator bracket attaching bolts and tip compressor rearward to remove cover. On Power Steering Cars, remove pump mounting bracket bolts and move assembly to one side for access to left hand cover. Remove rocker arm shaft assembly. Disconnect ground strap and remove pushrods. *NOTE - Keep pushrods in order so they can be reinstalled in original positions.* Remove cylinder head bolts and remove head with exhaust manifold attached. **Installation** - Place guide studs J-3455 in bolt holes at each end of block. Apply P.O.B. No. 3 Gasket Sealer to both sides of gasket and place gasket over studs. Place cylinder head in position and apply C.P. Sealer to head bolts. Install center and lower row of bolts finger tight. Install pushrods and rocker arm shaft assemblies making sure pushrods are properly seated in rocker arms and lifters. Tighten rocker arm shaft bracket and cylinder head bolts in sequence shown in diagram to 14-22 ft. lbs. (lettered bolts), to 50-60 ft. lbs. (numbered bolts), then recheck all bolts to final specifications shown above. *NOTE - Complete installation using C.P. No. 9 Sealer on intake manifold bolts.*

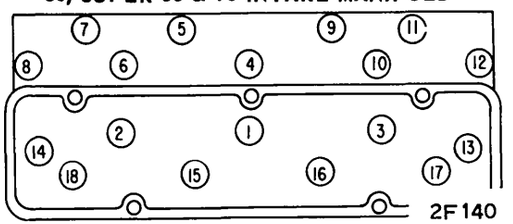
INTAKE MANIFOLD: Removal - Drain radiator, disconnect upper radiator hose from water outlet. Remove air cleaner and disconnect spark plug wires and throttle linkage. Remove fuel and vacuum lines that interfere with manifold removal and disconnect primary coil wire and remove ignition wires from resistor. On power steering cars, disconnect power steering pump and bracket as an assembly. On air conditioned cars, remove external fuel filter. Disconnect generator, then remove attaching bolts and tip compressor and bracket rearward to obtain clearance for manifold removal. Remove intake manifold with coil and carburetor attached. Clean cylinder head and manifold machined surfaces.



88, SUPER 88 & 98 CYLINDER HEAD



88, SUPER 88 & 98 INTAKE MANIFOLD



OLDSMOBILE V8 F-85 CYLINDER HEAD

Installation - Reverse removal operations using new graphite coated metal gaskets. Apply Permatex No. 3 sealer or equivalent around gasket water holes. Dip manifold bolts in C.P. No. 9 sealer, install bolts and nuts and torque to specifications. Adjust power steering belt tension, adjust throttle linkage.

F-85 MODELS

►*ALUMINUM ENGINE CAUTION: Use care in handling all aluminum parts.*

CYLINDER HEAD: Removal - Drain radiator and cylinder block. Remove intake manifold (see below), then disconnect exhaust pipe. Disconnect spark plug wires and remove valve cover.

To remove right cylinder head, remove generator rear mounting bracket bolt. Remove ground straps at front and rear of cylinder head. If equipped with heater, remove all head bolts except rear rocker arm shaft bracket bolt. Then loosen rear rocker arm shaft bracket bolt

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and raise shaft assembly from head and remove all pushrods except No. 16. Lift No. 16 to within 1" of blower case and tape to rocker shaft. Lift head, rocker shaft assembly, and exhaust manifold off dowel pins and remove as a unit by angling it forward to clear blower case.

To remove left cylinder head, remove power steering belt (if so equipped), then remove power steering pump bracket-to-cylinder head bolts. Remove rocker arm shaft assembly and push rods. Remove cylinder head bolts and cylinder head with exhaust manifold attached.

Installation - Head gaskets should be coated on both sides with POB No. 4 Sealer or equivalent. Likewise coat the cylinder head bolts and torque to specifications *(see diagram).*

F-85 MODELS

INTAKE MANIFOLD: Removal - Drain radiator and disconnect upper hose from outlet. Disconnect heater hose at rear of manifold. Disconnect spark plug wires and remove carburetor cover. Disconnect throttle linkage from accelerator bellcrank and then disconnect choke heat tube and lower throttle rod. Remove fuel and vacuum lines from carburetor. Disconnect primary wiring from coil and secondary lead. Disconnect temperature gauge wire. Slide thermostat bypass hose clamp back on hose at water pump. Remove intake manifold bolts, then remove manifold with coil and carburetor attached. Remove intake manifold gasket clamp bolts, clamps, seals, and gasket.

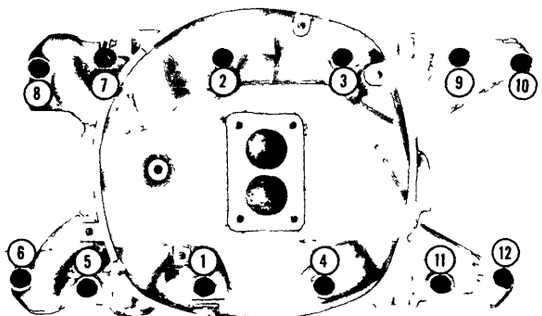
Installation - Reverse removal procedure and note the following. Coat either side of gasket with POB No. 3 and install. Install end seals and clamps then lubricate clamp bolts with engine oil and torque to 10-15 ft. lbs. *NOTE - When tightening clamp bolts, intake gasket must be positioned so manifold-to-head bolt holes will be open.* After positioning intake manifold on engine and connecting thermostatic bypass hose to water pump, coat intake manifold bolts with engine oil and install. Torque bolts alternately to specifications.

PISTON PINS

F-85 MODELS

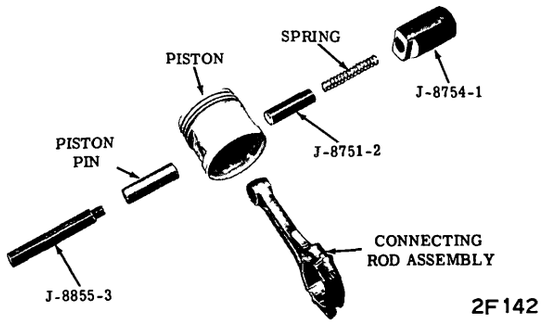
Piston Pin Removal: Place piston on Tool No. J-8754-1 with letter "F" on piston facing up. Press pin out with Tool No. J-8855-3.

Installation - Place spring and guide stop Tool No. J-8751-2 in main body of Tool No. J-8754-1. Place



2F141

F-85 INTAKE MANIFOLD



2F142

F-85 PISTON PIN ASSEMBLY

piston on this tool with Letter "F" up. Place connecting rod in piston with identification mark **up** on right hand bank cylinders, with mark **down** on left bank cylinders. Coat pin with engine oil and press into piston and rod with Tool J-8855-3 until it contacts guide stop Tool J-8751-2 in Tool J-8754-1 to automatically center pin in piston. Pin-to-connecting rod fit is .0007-.0013" tight.

CRANKSHAFT & MAIN BEARINGS

►*F-85 CRANKSHAFT ASSEMBLY REPLACEMENT PARTS CAUTION & BALANCING NOTE:* Crankshaft, balancer, and flywheel are balanced individually in production and complete assembly is then balanced by installation of unstaked pins in holes provided around rim of flywheel and balancer. *NOTE* - Flywheel is balanced individually in production by installation of **staked** pins in above holes. When replacing balancer or flywheel, maintain crankshaft assembly balance by transfering balance pins (unstaked) to new unit as follows:

Balancer - If no pins used on old balancer, install new balancer as is. If balance pins are found on old balancer, transfer these pins (unstaked) to corresponding position on new balancer.

Flywheel - If no balance pins (unstaked) found on old flywheel, install new flywheel as is. If balance pins (unstaked) found on old flywheel, transfer pins to corresponding position on new flywheel. *NOTE - If* the presence of a staked pin on new flywheel prevents transfer of balance pin, place unstaked pin in nearest corresponding hole.

88, SUPER 88 & 98

REAR MAIN BEARING OIL SEAL: Asbestos covered wiper seal installed in rear groove in bearing cap and block (oil slinger operates in front groove).

Oil Seal Installation - Crankshaft must be removed to replace upper half of seal. Place seal in groove in cap or block by hand, then drive tightly into groove by tapping Tool 23-18 with hammer. Seal is bottomed in cap or block when Tool 23-18 is seated in cap only and the undercut area of tool will pass over seal, when tool moved across cap or block. Hold Tool 23-18 tightly against seated seal and cut seal flush with parting line between upper and lower bearing. *NOTE* - Ends of seal must be cut clean (no frayed ends) and seal must entirely fill groove. After bearing cap installed, wipe DuPont Cement No. 5402 in grooves in block on both sides of bearing cap and press two cork seals into place in grooves.

F-85 MODELS

REAR MAIN BEARING OIL SEAL: Replacement - Oil pan and rear main bearing cap, insert and seals must be removed. Install seal into bearing cap, packing by hand. Using Installer Tool No. J-8807, hammer seal into place. To check if seal is fully seated, slide tool away from seal. With tool seated fully in bearing cap, slide tool against seal. If undercut area of tool slides over seal, seal is fully seated. Rotate tool before cutting off excess seal packing. Cut seal 1/16" from bearing surface. Taper end of seal into a point. With screwdriver, pack fibers toward center, away from edges. Rotate tool to cut seal between notch and handle. Install two side bearing cap seals, leaving seal extended on each side. Coat back of insert with light film of oil and install in bearing cap. Clean crankshaft bearing journal and seal contact. Install bearing cap guide pins. Install bearing cap into place by tapping with wood block. Remove guide pins. Apply lubricant Part No. 980131 to cap bolts then torque to specifications. Do not trim ends of side seals.

►*NOTE: Seal in block installed with crankshaft removed.*

ENGINE FRONT COVER

88, SUPER 88, & 98

ENGINE FRONT COVER: Removal - Drain cooling system and disconnect lower radiator hose and heater hose from front cover. Disconnect generator link at generator and remove front engine mount to crossmember nuts. Use Tool J-8568 to raise engine to clear bolts of crossmember, then insert wood block 8" x 2" x 4" between each exhaust manifold and upper control arm and allow engine to rest on 2 x 4's. Remove oil pan, radiator assembly, fan blades and pulley, then remove crankshaft pulley. Remove distributor cap and rotate engine until rotor points toward cowl, then remove fuel pump assembly. Remove front cover attaching bolts and front cover assembly.

Installation - Reverse removal procedures and tighten belts to gauge line on Tool 33-70. *NOTE* - Use a new front oil seal and coat fuel pump rocker arm pad with Special Seal Lubricant Part No. 567196. Front cover bolts should be dipped in P.O.B. No. 3 Sealer and torqued to specifications. Coat on side of fuel and vacuum pump gasket with gasket cement such as P.O.B. No. 4.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: *NOTE - Front cover oil seal can be replaced without removing radiator or crankshaft pulley key as follows:* Remove crankshaft pulley and thread Pilot Bolt J-7583-3 into crankshaft. Thread Tool J-7583-1 into oil seal and then tighten Forcing Screw J-7583-2 until seal is free from front cover. Remove seal from tool and pilot bolt from crankshaft.

Installation - *NOTE - Two types seal (½" & ¾" thick) used in production. Both seals can be installed with Seal Installer J-7584-1 and Adapter Ring J-7584-2 must be used with ¾" seal.* Coat outer diameter of seal with P.O.B. No. 3 sealer and lips of seal with Special Lubricant, Part No. 567196. Position seal in front cover. If ¾" seal used, place Adapter Ring J-7584-2 between Installer J-7584-1 and seal. Place Installer

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over seal and thread Forcing Screw J-7584-3 into crankshaft until Installer contacts front cover. Remove tools and install pulley and belts.

F-85 MODELS

ENGINE FRONT COVER: Removal - Drain cooling system disconnect heater hose, bypass hose and radiator hoses and oil pressure switch wire. Remove crankshaft balancer, fan and pulleys, distributor cap, vacuum hose, generator and mounting bracket. Remove fuel pump and two front oil pan bolts. Remove cover bolts and remove cover.

Installation - *NOTE - Whenever front cover is removed, the oil pump cover must also be removed, and Petrolatum packed around pump gears. This will prevent loss of oil pump prime.* To install front cover, apply Permatex No. 2 to new gasket and place on block. Install front cover. Apply engine oil to bolts and torque evenly to specifications. Install balancer (see above). Connect oil pressure switch. Install generator, mounting bracket, and adjusting link. Install new fuel pump gasket using Permatex No. 2. Apply special seal lubricant on fuel pump arm. Torque to specifications. Connect other parts in reverse order of removal procedure.

Engine Front Cover Oil Seal (Crankshaft Front Oil Seal) Replacement: Remove front cover *(see above)*. Lay front cover flat on bench. Remove seal retainer with drift.

Installation - Assemble seal in retainer. Support front cover on wood block. Apply POB No. 4 sealer to outside of seal retainer. Place seal and retainer in cover with seal joint towards top of cover and install with Tool No. J-8753 until seated. Stake retainer securely. Place Tool No. J-8753-2 in seal and push tool, a little at a time, from both sides until tool goes through seal.

CAMSHAFT & BEARINGS

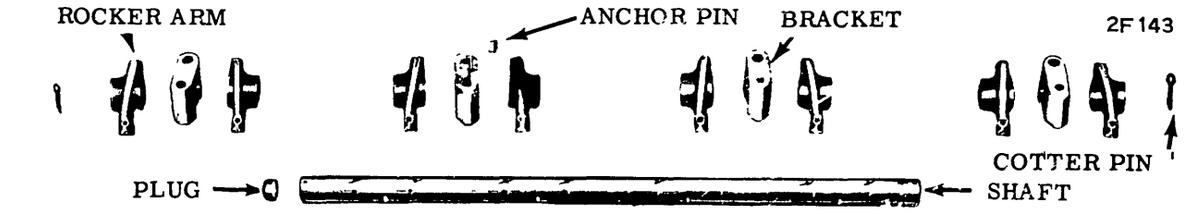
ALL MODELS

CAMSHAFT: Removal - Remove grille and radiator. Remove valve lifters as outlined in *HYDRAULIC LIFTERS* below. Remove distributor. Remove engine front cover as outlined in *ENGINE FRONT COVER* above. Remove camshaft assembly, fuel pump eccentric, camshaft sprocket and timing chain. Slide camshaft carefully out front of engine.

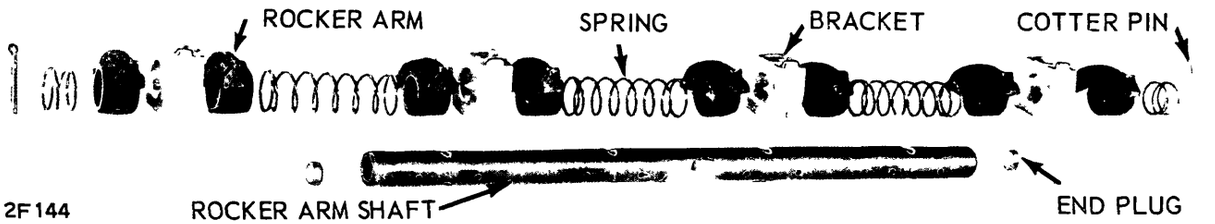
Installation - Coat camshaft liberally with engine oil mixed with GM Concentrate No. 582099. Reverse removal procedure being careful not to damage parts.

Camshaft Bearings Removal & Installation (88, SUPER 88, & 98): *NOTE - DO NOT replace bearings individually.* Use Tool Set No. J-4476 to replace bearings. DO NOT remove or disturb camshaft plug at rear of block.

Camshaft Bearings Removal & Installation (F-85): *NOTE - Bearings must be replaced in complete sets.* Remove bearings in numerical order. Drive them rearward out of their bores (exc. No. 5). To remove No. 5 bearing, drill a 3/16" hole in block (do not drill through the bearing) and with a small drift, dent the bearing enough to allow removal out front of bore. Install No. 5 bearing first (align all oil passages) then install other bearings opposite of removal sequence. Position bearings in block as follows: No. 5 bearing - 18 7/32", No. 4 - 13 13/32", No. 3 - 9 11/64", No. 2 - 4 15/16", No. 1 - 1/8", from front face of block.



88, SUPER 88 & 98 ROCKER ARM ASSEMBLY



F-85 ROCKER ARM ASSEMBLY

VALVE SYSTEM

ROCKER ARMS

ROCKER ARM SHAFT ASSEMBLY: 88, Super 88, & 98 - Removal - Remove rocker arm cover. *NOTE* - On Air Cond. Cars it will be necessary to remove compressor and generator bracket bolts and tip compressor rearward to remove R.H. cover. On Power Steering Cars, it will be necessary to remove pump mounting bracket bolts and move assembly to one side to remove L.H. cover. Remove rocker arm bracket bolts.

Disassembly - Remove cotter pins from ends of rocker shaft. Remove the brackets and the rocker arms from shaft. *NOTE* - One bracket is attached to shaft by anchor pin. When necessary to remove this bracket, insert drift through oil passage in bracket to drive out pin. If necessary to remove plug, punch hole in plug and pry plug from end of shaft.

Reassembly - Reverse disassembly procedure and note the following: Pinned bracket must have pin driven in flush with bracket. Rocker shaft plug must be driven in until outer shoulder is 9/32" into end of shaft.

ROCKER ARM SHAFT ASSEMBLY: F-85 Models - Removal - Remove carburetor cover. Disconnect heat tube from carburetor and manifold on right side. Disconnect spark plug wires and valve cover-to-cylinder head screws and rotate cover off breather pipe and remove cover. Remove rocker arm shaft bracket-to-head bolts. Remove heater blower assembly to remove right rocker arm assembly.

Disassembly - Remove cotter pins from ends of shaft. *NOTE* - Disassemble one shaft assembly at a time and mark for correct reinstallation. Remove springs, arms, and brackets from shaft. If necessary to remove shaft end plug, punch hole in plug, then pry plug from shaft.

Reassembly - If shaft plug was removed, drive new plug in shaft to clear cotter pin hole. Lubricate frictional surfaces of rocker arms and shaft with engine oil and reverse removal procedure.

Installation - Reverse removal procedure and note the following: Coat bolt threads with POB No. 4 Sealer or equivalent and torque to 45-55 ft. lbs. Engage shaft with dowel.

HYDRAULIC LIFTERS

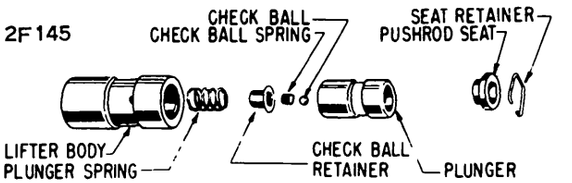
VALVE LIFTERS: Hydraulic, Barrel Type. Consists of plunger and valve assembly operating in a cylinder formed by valve lifter body (see illustration). Oil is forced into lifter from main oil gallery through hole in side of body and plunger.

Removal - *NOTE - Keep lifters in order for reinstallation in original bores in block.* Remove intake manifold, *see "Intake Manifold"*, engine top cover, valve rocker arm covers and rocker arm shaft assemblies. On varnished lifters, apply "D-Carb" solution to lifter body. Allow 5 minutes for solution to remove varnish. Use Tool BT-39 (F-85), Tool 23-13 (88, Super 88 & 98) to remove varnished lifters.

Disassembly: Use Tool BT-31 or small screwdriver to remove retainer spring. Remove pushrod seat, plunger and plunger spring. Remove ball check retainer from plunger, then remove ball and spring.

Cleaning & Inspection: Use cleaning brush J-5099 and clean solvent to remove all foreign material from all parts. Check all parts for nicks, burrs, or scoring. *NOTE* - Ball, ball check retainer, springs, pushrod seat and snap ring are interchangeable or can be replaced individually. Body and plunger are selective fit and are not interchangeable. Replace lifter when body or plunger are worn or damaged. *CAUTION - DO NOT replace lifter when a slight gap appears or lifter shows leakage where foot is welded to body unless leak-down is not within specifications.* Place straightedge across

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HYDRAULIC VALVE LIFTER (TYPICAL)

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lifter foot. If light appears under straightedge placed across foot of lifter, it indicates a flat or concave surface and lifter should be replaced and camshaft lobe checked for wear. Wear at camshaft cam center is normal, but wear across entire width of cam base circle requires replacing of camshaft.

Reassembly & Testing: Lifter must be assembled while submerged in test fluid to obtain accurate leak-down rate.

1) Install Adapter 105-2 in reservoir of Tester BT-60, then fill reservoir with Hydraulic Lifter Test Fluid BT-59 to ½" of top of reservoir.

2) Assemble ball check, spring, and retainer into plunger with flange pressed tight against bottom of recess in plunger.

3) Install spring over ball check retainer. Hold plunger with spring up and insert into lifter body (to prevent cocking spring). Place assembly in tester cup, then position pushrod seat into plunger. Position ¼" steel test ball on pushrod seat and lower tester ram until it contacts steel ball. *NOTE* - Allow ram to move downward by its own weight until air bubbles disappear.

4) Raise ram, then allow it to lower. Repeat several times or until all air is expelled from lifter. *CAUTION - DO NOT ATTEMPT TO EXPEL AIR FROM LIFTER BY PUMPING RAM.*

5) When all air is removed, allow ram to bleed down lifter to expose ring groove and install retaining ring.

6) Adjust ram screw so it contacts steel ball in pushrod seat when pointer is at start line. Raise ram and start test by resting arm on steel ball.

7) Rotate reservoir one revolution every two seconds, and time indicator from start to stop line. Allowable leak-down time is shown in table below. *NOTE* - If lifter is within specifications, it can be placed in service without removing test fluid.

Lifter Leak-down Rate

Model	Used Lifters	New Lifters
F-85	8-40 seconds	12-40 seconds
88, Super 88, 98	12-90 seconds	20-90 seconds

Lifter Identification (Exc. F-85)

Identification Note - Production engines used Standard, .001", or .010" oversize lifters. Use correct size when replacing lifters. All lifters have identification numeral (Except Standard) on lifter body. Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover. When no mark appears, lifters are standard.

Lifter Identification (F-85)

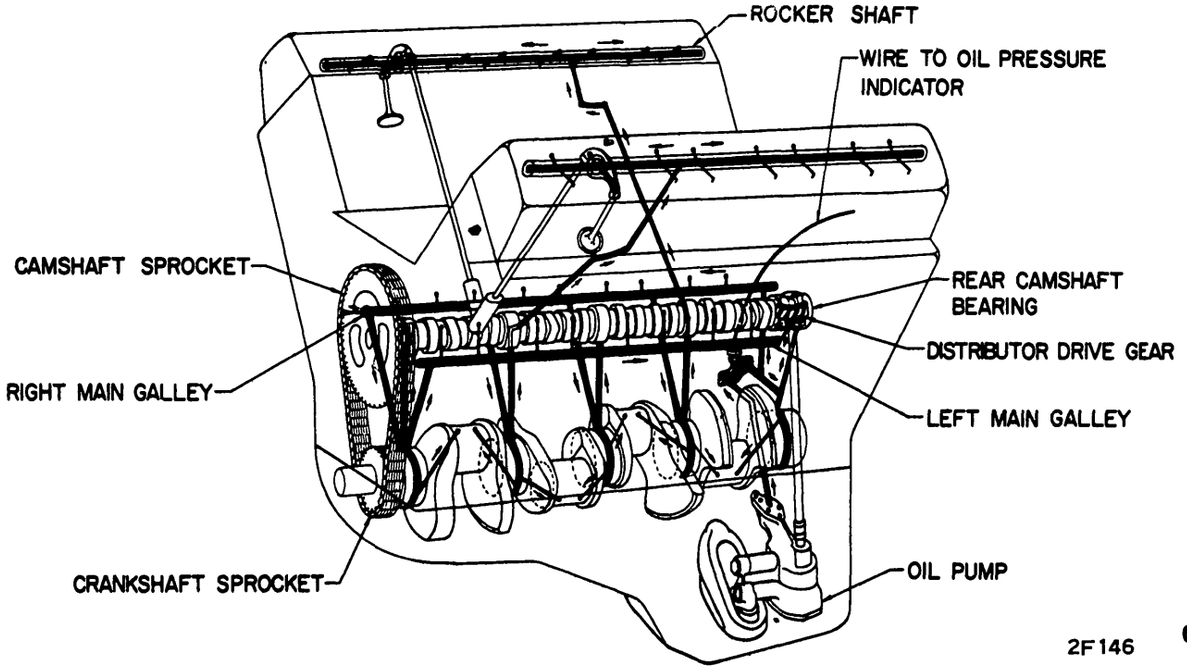
Standard size only (Heavy Duty lifters are mechanical type).

OILING SYSTEM

ENGINE LUBRICATION

88, SUPER 88, & 98

ENGINE LUBRICATION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, camshaft bearings, and to hydraulic valve lifters, fuel pump eccentric and lever, and distributor drive gear. Oil metered by camshaft bearings lubricates other valve parts (rocker arms, pushrods, and valve stems). Other parts are lubricated by oil spray.



88, SUPER 88 & 98 ENGINE OILING SYSTEM

OPERATION: Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through fixed oil strainer and intake pipe mounted on pump cover and delivers oil through a passage in the pump body, rear main bearing cap, and crankcase to the oil filter intake port (filter mounted on pad at right rear corner of crankcase). From the filter outlet port on the pad, a horizontal cross passage and vertical passage connect with the right main oil gallery extending the full length of the engine just below the right bank valve lifters. At the forward end of this gallery, a "V" passage connects to front main bearing and to the forward end of the left main oil gallery extending back along the engine just below the left bank valve lifters. Oil is distributed from these main oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical passage intersecting the horizontal cross passage from the oil filter (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil passage in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (additional passage at front crankshaft bearing supplies oil to left main oil gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod is lubricated through passage from adjacent main bearing (separate oil lead to each rod on each crankshaft throw).

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from slot in side of bearing cap of rod for opposite bank of cylinders (slot in rod cap must be upward or toward center of engine to provide this cross-lubrication).

Valve Lifters - Each lifter supplied with oil through short passage leading upward from main gallery at point directly below lifter.

Rocker Arms, Pushrods & Valves - Hollow rocker arm shafts are supplied with oil through passage in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank), and connecting passage in head which registers with drilled oil passage in rocker shaft bracket (see Note below). Rocker arm is drilled to provide lubrication for pushrod socket and valve tip. Oil return holes are provided on lower side of heads.

ROCKER SHAFT BRACKET NOTE - Rocker shaft bracket with drilled oil lead has anchor pin which locates shaft properly so that oil hole in bracket and shaft line up (pin is driven in flush with top of bracket). This bracket is No. 2 or 3 (left bank), No. 4 or 3 (right bank) depending on whether end brackets are used (discontinued during 1960 production).

Distributor Drive Gear - Lubricated from drilled hole in plug at rear end of left main oil gallery.

Timing Chain & Sprockets, Fuel Pump Lever & Eccentric - Lubricated from drilled hole in hexagonal headed plug which closes front end of right main oil gallery.

OIL FILTER: Full flow type mounted on pad on right rear of crankcase. Filter has bypass valve to ensure engine lubrication if filter element clogged.

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►*CAUTION:* **On cars where filter not used, a cover with a channel oil passage connecting the inlet and outlet ports is installed on filter pad to provide oil circulation. If cover removed, install with new gasket (coat both sides of gasket with POB No. 5 sealer), and torque cover bolts to 35-40 ft. lbs.**

F-85 MODELS

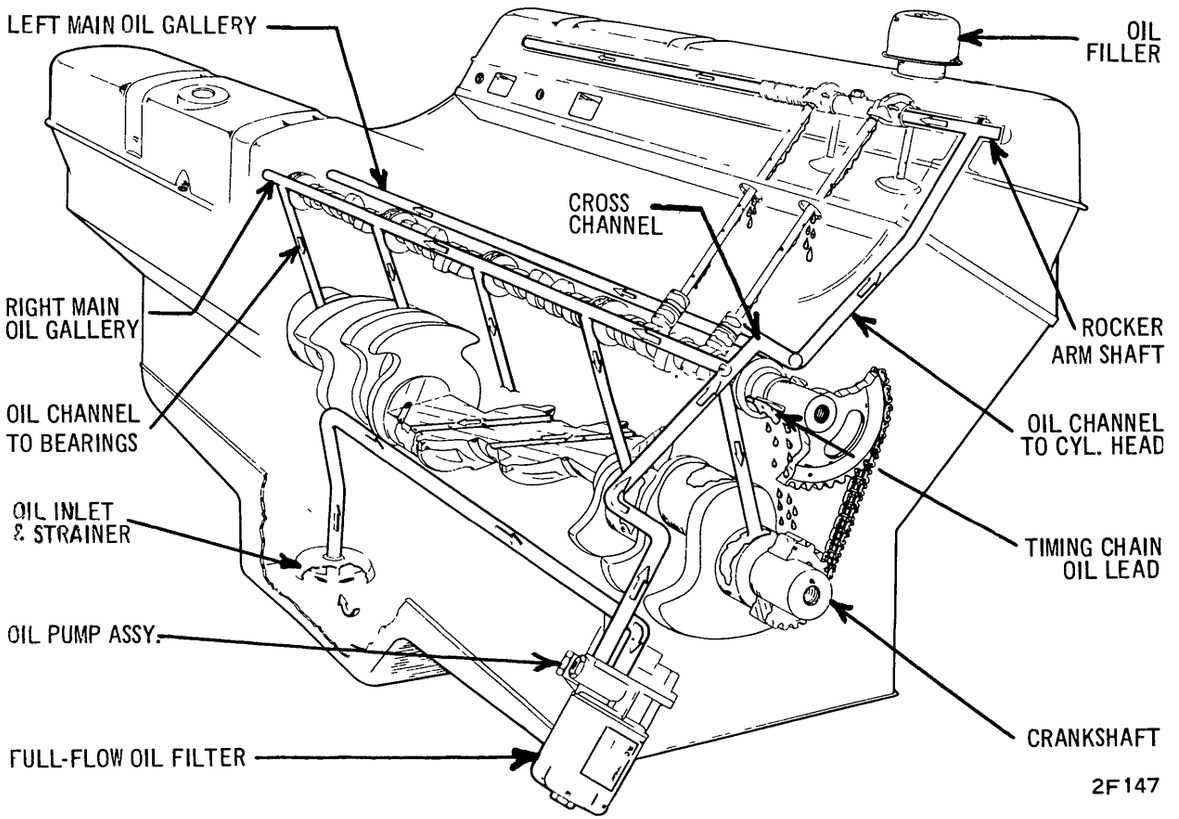
ENGINE LUBRICATION: Force feed type with oil supplied under pressure to crankshaft, connecting rod and camshaft bearings and to valve lifters. Oil is supplied under controlled pressure to rocker arm bearings and pushrods. All other moving parts are lubricated by gravity flow or splash. See *Engine Oil Flow Diagram.*

OPERATION: Gear type oil pump located in timing chain cover, draws oil through screen and pipe assembly (or over top of screen if clogged) and a drilled passage in crankcase connecting, to drilled passage in timing chain cover. All oil is discharged from pump to cover assembly. Spring loaded relief valve (in cover) limits oil pressure to a maximum of 33 lbs. per square inch. A bypass valve (in cover) opens when filter becomes clogged (4½-5 lbs. pressure difference between filter inlet and outlet) to bypass unfiltered oil directly to oil galleries in engine. Oil from filter (mounted on oil pump cover) supplies oil through oil pump cover and drilled passages in crankcase to two main oil galleries that run full length of the crankcase.

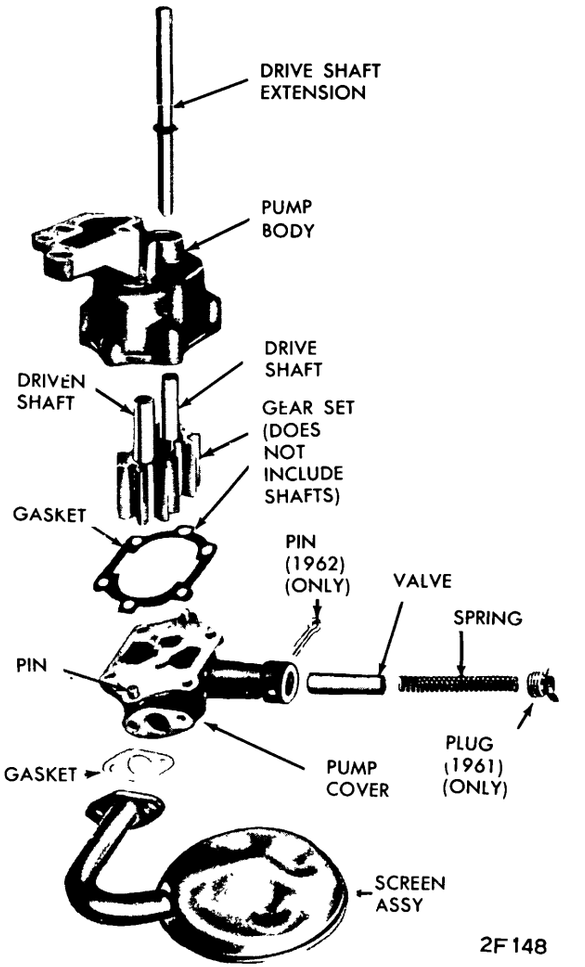
Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

Connecting Rod & Pistons - Main bearings supply oil through drilled passages in crankshaft to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through small notch in connecting rod bearing parting surface that registers with hole in crankshaft every revolution. Piston pins are lubricated by splash.

Timing Chain & Sprockets - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.



F-85 ENGINE OILING SYSTEM



88, SUPER 88 & 98 OIL PUMP

Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries

Rocker Arms, Valves and Pushrods - These items receive oil from main oil galleries through drilled holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) to hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil trhough hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.

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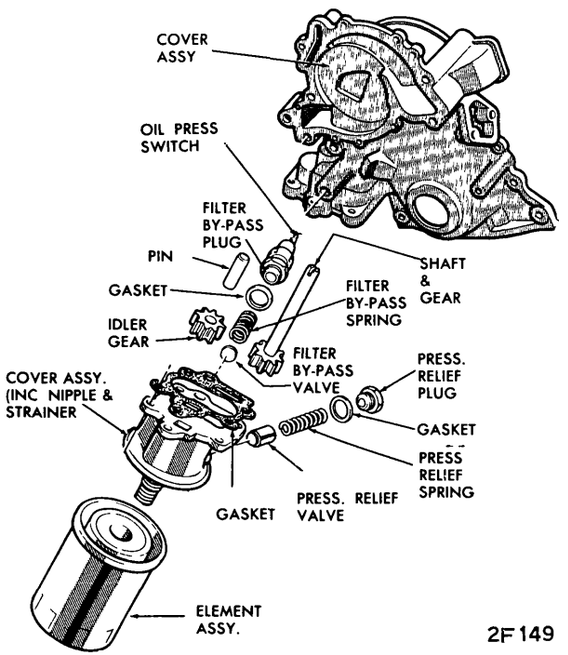
OIL PUMP
88, SUPER 88 & 98

OIL PUMP: Removal & Disassembly - Remove oil pan, oil pump to rear main bearing cap, screws and remove oil pump and drive shaft extension. Remove drive shaft extension. *CAUTION - DO NOT remove special washers from drive shaft extension.* Remove intake pipe and screen, pressure regulator nut, spring and valve. Remove cover screws and cover. Remove drive gear and idler gear from body.

Cleaning & Inspection: Wash all parts in solvent and blow out passages with compressed air. Inspect all parts for scores. Use fine hone to clean up small imperfections. Relief valve clearance should be .0025-.005". End clearance of gears should not exceed .0025-.008".

Reassembly - Reverse disassembly procedure, tightening cover screws to 5-8 ft. lbs. and pressure regulator nut to 30-40 ft. lbs. Install intake pipe and screen assembly with screen facing away from pump mounting pad and tighten screws to 4-7 ft. lbs.

Installation: Assemble drive shaft extension to drive shaft so that end nearest special washers is inserted into oil pump drive shaft. Insert other end of drive shaft extension through opening in block until shaft mates with distributor drive gear. Position pump on bearing cap and tighten bolts to specifications.



F-85 OIL PUMP

F-85 MODELS

OIL PUMP: Removal & Disassembly - Disconnect pressure switch wire. Remove all dirt from connections and joints. Remove oil filter and pump cover-to-front cover attaching screws. Remove cover carefully, then slide idler and oil pump drive gears out. Remove oil filter bypass valve cap, spring and valve. Remove oil pressure valve cap and spring. Remove pressure regulator valve by tapping housing in palm of hand.

Cleaning & Inspection: Wash all parts in solvent and blow dry with air. Inspect all parts for scoring, cracks, nicks, or warping. Check pressure relief valve clearance in bore. Clearance should be .0015-.0035". Gear end clearance should be .0015-.0075".

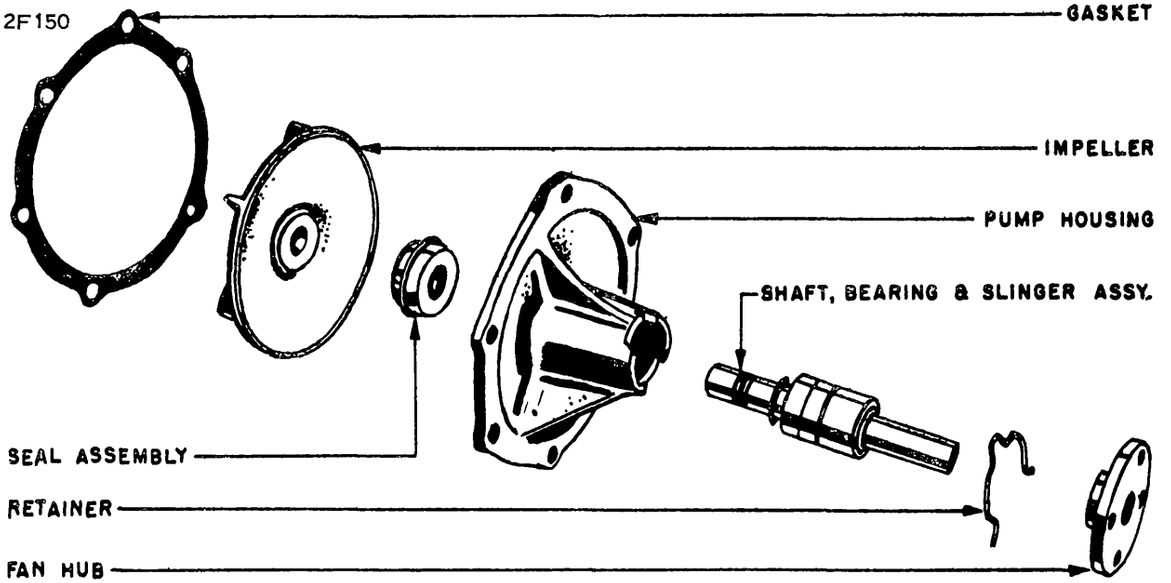
Reassembly - Install filter bypass valve into output passage bore (inside diameter ribs) seating valve squarely in bottom of passage. Install spring (light weight), gasket and cap. Replace gasket if damaged. Install pressure regulator valve (flat end first),pressure regulator spring, gasket and cap. Torque caps to 30-35 ft. lbs. Install pump drive gear and idler gear. Install new pump gasket. Fill gear pocket with petrolatum and force into every cavity and between gear teeth. *NOTE - Packed petrolatum helps in priming pump.*

ENGINE COOLING SYSTEM
WATER PUMP
88, SUPER 88, & 98

WATER PUMP: Disassembly - Remove bearing retainer wire from front of housing. Support outside surface of pump housing in press and press shaft through impeller and housing pressing impeller end of shaft toward front of housing. Remove seal assembly from rear of housing by driving against face of seal with drift. Support hub and press shaft through hub to remove hub.

Reassembly - Place Gauge 33-68 in impeller side of housing, use driver, Tool 5175, to press shaft and bearing assembly into housing from opposite side until shaft bottoms on gauge. Install retainer wire. Support inner end of shaft on press and use Tool BT-16 to press hub on shaft. Coat outer diameter of new seal with C.P. No. 9 Sealer and use Tool 23-17 to press it into place. Clean mating surface of impeller of any foreign particles and use Tool BT-15 to support impeller while pressing shaft through impeller until bottom edges of vanes are 13/16" from machined face at edge of housing.

Installation - Use gasket cement on pump housing to retain gasket on housing, then install pump assembly in front cover and tighten 5/16" bolt to 14-22 ft. lbs., 7/16" bolts to 24-40 ft. lbs. Install fan pulley, spacer and fan. Tighten fan to hub bolts to 10-15 ft. lbs. Install pulley belts and adjust belt tension.



88, SUPER 88 & 98 WATER PUMP

►*JACKING & HOISTING CAUTION: Before jacking or hoisting, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING CAUTION: Hydra-Matic cars cannot be started by pushing because of transmission design.*

MODEL IDENTIFICATION

Series	① Designation	Engine
Dynamic 88	32	394"
Super 88	35	394"
Starfire	36	394"
98	38	394"

① - First two digits of series and body style designation following "62" year number under STYLE on Body Identification Plate.

SERIAL NUMBER: Stamped on plate on left front door pillar. Number (example below) includes identification data.

① ② ③ ④
62 2 M 01001

① - Year. 62 (1962).
② - Series Designation. 2 - Dynamic 88. 5 - Super 88. 6 - Starfire. 8 - 98.
③ - Assembly Plant. M - Lansing. A - Atlanta, K - Kansas City, L - Linden, C - South Gate, W - Wilmington, T - Arlington.
④ - Beginning Vehicle Number.

Engine Unit Number: Stamped on pad located above center exhaust port of left cylinder head.

Starting Unit Number - 300,001 with prefix and suffix letters as follows:

Model	Prefix	Suffix	Carb.	Compr. Ratio
88	F		2-Bbl.	① 10.25-1
88 (Opti.)	F	L	2-Bbl.	① 8.75-1
88 (Opti.)	G		4-Bbl.	① 10.25-1
88 Exp.	F	E	2-Bbl.	② 8.3-1
S88, 98	G		4-Bbl.	① 10.25-1
Starfire	G	S	4-Bbl.	② 10.50-1
S88, 98, Starfire, Exp.	G	E	4-Bbl.	② 8.3-1

① - Head gasket thickness .025".
② - Head gasket thickness .040".

►*STARFIRE DATA NOTE:* Starfire data is same as Super 88 & 98 unless otherwise specified.

TUNE-UP

►*ENGINE STARVES OUT AT HIGHWAY SPEEDS CORRECTION:* Caused by: 1) Fuel hose pinched in clip on frame near pump or bend in hose too short. To correct, reposition hose in large opening in clip or open clip to relieve pressure. Reroute hose to eliminate kink. 2) Incorrect fuel filter installed in tank (A.C. Cars with 2GC Carburetor with fuel return line). Replace short filter with long filter, No. 584183.

COMPRESSION PRESSURE: 100 lbs. minimum at cranking speed with throttle and choke open and spark plugs removed. Reading on low cylinder must not be less than 80% of high cylinder.

VALVE TAPPET CLEARANCE: Zero lash (hydraulic).

MANIFOLD HEAT CONTROL: Thermostatic coil type, located on left side between exhaust manifold and exhaust pipe.

CRANKCASE VENTILATION VALVE: Service at 10,000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *see "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-7-3-6-5-4-2.

Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .030".

Spark Plugs - AC No. 45 (Low Compr. engine), 44 (High Compr. Engine), 42 or 43 (Heavy Duty), 46 (Export). Torque to 18-34 ft. lbs.

COIL: Delco-Remy 1115112 (Std.), No. 1115159 (88 Heavy Duty).

Ignition Current - 2.0 amps. idling, 4.0 amps. stopped.

Resistor - (1115112) In wiring harness, not serviced separately. Bypassed during cranking by second lead from switch. **Capacity** - 1.75-1.85 ohms.

Resistor - (1931385) 88 Heavy Duty.

DISTRIBUTOR: Delco-Remy 1111004 (88 Low Compr. Eng.), 1110989 (All High Compr. Engs.). Window type with external adjustments.

Heavy Duty - Delco-Remy 1110978 or 1110991. Double breaker type with conventional distributor cap (not window type). Vacuum spark control not used (centrifugal weight advance only).

Condenser - Delco-Remy 1932004 (1111004 & 1110989 Distr.).

Capacity - .18-.23 mfd.

Contact Point Set - Delco-Remy 1931988 (1111004 & 1110989 Distr.).

Breaker Gap - .016" (1111004 & 1110989 Distr.), .014-.018" (1110978 & 1110991 Distr.). Will be correct when cam angle correctly set.

Cam Angle (1111004 & 1110989) - 28-32° (Set to 30°).

Cam Angle (1110978 & 1110991) - 29°±1° (each set), 34°±1° (both sets operating together).

►*HEAVY DUTY DISTRIBUTOR NOTE:* After adjusting each breaker individually, cam angle with both breakers operating must be 34°±1°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance (1111004 & 1110989)

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
9-11	1200	18-22	2400
12-14	2000	24-28	4000

Automatic Advance - 1110978,991

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	400	0-4	800
6.5-8.5	975	13-17	1950
8-10	1200	16-20	2400
11-13	2200	22-26	4400

Vacuum Spark Control: Delco-Remy No. 1116204 (1111004 Distr.), No. 1116203 (1110989 Distr.).

Vacuum Advance (1116203)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
13.5	27	15.25-18.25

Vacuum Advance (1116204)

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7-9
13	26	16.75-19.25

►*VACUUM ADVANCE OPERATIONAL CHECK:* Vacuum advance operation should be checked whenever ignition timing is set. After setting ignition timing (with vacuum advance cut off by disconnecting vacuum line), reconnect vacuum line and check ignition timing. If vacuum advance operating correctly, engine RPM should increase and timing should advance; if not, vacuum unit is defective.

IGNITION TIMING

Setting - 5° BTDC (10.25-1 Compr. Ratio), 2½° BTDC (8.75-1 Ratio). With low octane fuel or carbon build-up, retard setting 2½°. Set timing with engine idling at 850 RPM, vacuum line disconnected and vacuum line fitting taped closed. After setting timing, reconnect vacuum line and check vacuum unit operation. See above.

►*HIGH OCTANE FUEL NOTE:* When using extra high octane fuel, timing may be advanced providing spark knock is not encountered.

Timing Mark - Three slots in rim of crankshaft balancer and pointer on upper left side of front cover. Slots indicate 0°, 5°, and 10° BTDC.

CARBURETOR

►*CARBURETOR APPLICATION:* Rochester carburetors are used. Rochester 2GC carburetor used on Dynamic 88 (Std. or Opt. W4 and Export.). Rochester 4GC carburetors used on Dynamic 88 Opt. W3 and all Super 88 and 98 (Domestic & Export).

Throttle Return Check Adjustment: With transmission in "N" (Neutral) and engine at normal operating temperature, set carburetor on fast idle and adjust to 1600 RPM (4-Bbl.), 1900 RPM (2-Bbl.). Turn off engine. Rotate fast idle cam so fast idle screw rests on highest step of fast idle cam. Clearance between contact screw and contact on throttle lever should be .020" (4-Bbl.), .050" (2-Bbl.). To adjust, turn contact screw using two wrenches so that diaphragm is not permitted to turn.

THROTTLE LINKAGE ADJUSTMENT: Transmission Throttle Lever Adjustment - Raise car and remove lower throttle valve relay rod from lever at side of transmission. Place short end of Gauge BT-33-1 into manual lever shaft. Hold throttle lever to end of its rearward travel and adjust lever (by bending as required) so that hole in throttle valve lever is visible within hole in gauge (not necessarily centered). Lower car and make the next three adjustments with carburetor throttle valves in closed position. To completely close throttle valves, start engine, remove air cleaner and block intermediate choke lever (at climatic control housing) to release fast idle cam. Use Tool J-6342-01 to hold plunger away from throttle lever. Stop engine, BACK OUT SLOW IDLE ADJUSTING SCREW UNTIL CARBURETOR THROTTLE VALVES ARE COMPLETELY CLOSED. There should now be clearance at end of fast idle screw, slow idle screw, and throttle return check plunger.

Lower Throttle Valve Rod Adjustment: Loosen jam nut on lower throttle valve rod and remove both rods from bellcrank. Hold throttle valve bellcrank and lower throttle valve rod against their rearward stops, adjust lower throttle valve rod clevis so that pin will enter freely into holes in clevis and throttle valve bellcrank. Install cotter pin and tighten jam nut.

Carburetor Lever to Auxiliary Bellcrank Link Adjustment: Bend link as necessary to obtain .020-.040" clearance as shown in diagram.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Upper Throttle Valve Rod Adjustment: Adjust length by rotating rod until bellcrank is .002-.005" off its stop with throttle valves closed. *NOTE - Do not apply pressure when making this adjustment.* Tighten jam nut.

Idle Speed Adjustment: Make this adjustment as shown below, then make Throttle Downshift Stop Screw Adjustment and Accelerator Pedal Alignment & Height Adjustment with choke completely off, fast idle off, and carburetor throttle valves in slow idle position.

Throttle Downshift Stopscrew Adjustment: Loosen jam nut and back out stopscrew (located in auxiliary bellcrank adjacent to carburetor throttle lever) several turns Hold throttle lever so that throttle valves are in wide open position, and rotate throttle valve bellcrank counterclockwise to point of maximum transmission lever travel. *NOTE - Do not bend or stretch linkage.* Hold linkage in this position and adjust stopscrew to just touch tang on downshift lever. Allow throttle valves to close, then turn screw in 1½-2 turns and tighten jam nut.

Accelerator Pedal Alignment & Height Adjustment: Bend left ball stud (located behind lower end of accelerator pedal) up or down as required to correct pedal alignment. Adjust accelerator rod to position rod to bellcrank bushing so that Gauge BT-33-1 just touches dash (see diagram). Lubricate linkage pivot points

ROCHESTER 2GC 2-BARREL

Model	Rochester No.
88 (No C.C.V.) Std. Ⓒ	7020052
88 (No C.C.V.) Air Cond. Ⓒ	7020058
88 (With C.C.V.) Std. Ⓒ	7020954
88 (With C.C.V.) Air Cond. Ⓒ	7020956

C.C.V. - Closed crankcase ventilation.

Ⓒ - All transmissions.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel Cyls. 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making idle Setting and Idle Speed Adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or suitable tool in throttle bore). If engine speed **increases** when air cleaner installed, do not decrease speed. Readjust if engine speed **decreases.**

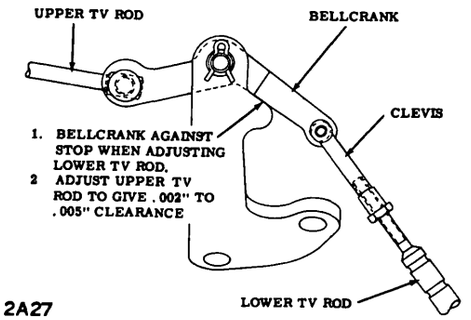
Idle Setting - After idle speed set to dorrect specifications (see Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed - 550 RPM Synchro-mesh, 500 RPM Auto. Trans. in Drive. *NOTE - On cars with Idle Compensator, air conditioning must be turned OFF. On cars without Idle Compensator, air conditioning must be ON.*

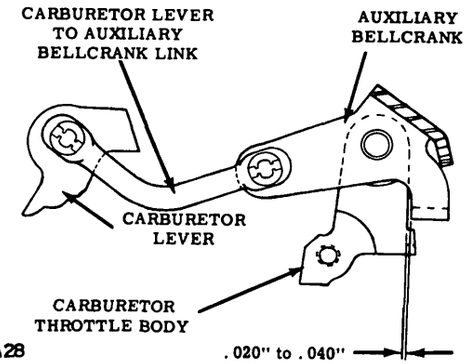
Float Level - 1/2" (Gauge BT-197) before Code Tag "B"; 13/32" (Gauge BT-212) Code Tag "B" or later. With air horn inverted and gasket in place, place edge of gauge across air horn gasket at outer end of float. Sharp (lower) edge of float seam should be even with edge of cutout in gauge. Adjust by bending float arm.

Float Drop - Bend float tang to obtain a distance of 1 3/4" from gasket surface to bottom of float with air horn upright and float hanging free. Use Gauge BT-197 or BT-212.

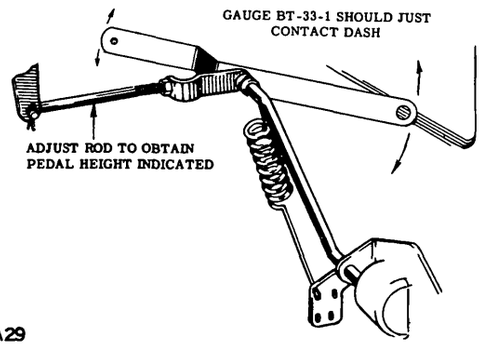
Fast Idle - Rotate fast idle cam so fast idle screw is on high step of cam. With engine running at normal operating temperature and transmission in "N" (Neutral), adjust fast idle screw to obtain an engine speed of 1900 RPM (2200 RPM for sub-zero temperatures). Readjust throttle return check.



UPPER & LOWER THROTTLE VALVE ROD



CARBURETOR LEVER-BELLCRANK LINK



ACCELERATOR PEDAL ADJUSTMENT

Throttle Linkage & Return Check Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Rochester 4GC 7020950 (Std.), 7020955 (Air Cond.), 7019059 (Heavy Duty).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* When making Idle Setting & Idle Speed Adjustments, Idle Compensator must be in closed position (remove air cleaner and insert pencil or other suitable tool in throttle bore). If engine speed **increases** when air cleaner installed, **do not** decrease speed. Readjust if engine speed **decreases.**

Idle Setting - After idle speed set to correct specifications (See Idle Speed below), turn both idle mixture screws for smoothest idle with highest vacuum reading and RPM, then turn each screw out ¼ turn.

Idle Speed - 550 RPM Synchro-mesh Trans., 500 RPM Auto. Trans. in Drive. *NOTE - On cars with Idle Compensator, air conditioning must be OFF, on cars without Idle Compensator, air conditioning must be ON.*

Automatic Choke Setting: Centered at Index.

Throttle Linkage Adjustment (Auto. Trans. Cars): See *CARBURETOR above.*

►*OTHER DATA: See "Rochester 4G & 4GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Two types used.

Replacement Pumps

Model	Oldsmobile Part No.
First Cars (1/8"-27 outlet)	5621761
Later Cars (1/4"-18 outlet)	5621827

Pressure - 5-6 lbs. at 16" above outlet at 1800 strokes (3600 engine RPM).

Gasoline Gauge: AC electric type.

Dash Unit - AC No. 5643895.

Tank Unit - AC No. 5642244 (Pass.), No. 5642245 or 5642246 AC (Sta. Wgn.).

Fuel Filter: Accreated & Saran type. Located in fuel line between fuel pump and tank. Part No. 854566 (2-Bbl. Carb.), No. 5650426 (4-Bbl. Carb.).

Air Cleaner: Aluminum mesh element type (88), Heavy duty replaceable paper element type (Super 88 & 98 - Optl. on 88). Clean aluminum mesh type every 8,000 miles. Replace heavy duty paper element type every 16,000 miles. DO NOT attempt to service paper element type.

BATTERY

Delco-Remy 462 (Series 88). 12 volt, 9 plate, 62 ampere hour capacity (20 hr. rate).

Delco-Remy 562 (Series S88 & 98). 12 volt, 11 plate, 70 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Rear of right cylinder head to fire-wall.

STARTER

Delco-Remy 1107665 (88 Std.), 1107208 (88 Heavy Duty), 1107776 (S88,98). *NOTE - 1110776 is "Two-Shunt" type.*

Armature - Delco-Remy 1932185 (1107665), 1941888 (1107776).

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107665

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Performanc Data - 1107776

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

Perf rmanc Data - 1107208

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3800-6200	10.6	70-105
	Lock	2.0	320-360

Ⓒ - Includes solenoid.

Starting Switch: Solenoid Switch, Delco-Remy No. 1119798 (1107665), No. 1114257 (1107776) on starter and controlled by combination Starter & Ignition Switch Delco-Remy No. 1116605 and Neutral Safety & Back-up Switch (see below).

Hydra-Matic Neutral Safety & Back-up Light Switch: Oldsmobile No. 579409 (Exc. Starfire), 570386 (Starfire). **Adjustm nt** - *S e "3-Speed (4 Stage) Hydra-Matic Drive Transmission" in Transmission Section.*

GENERATOR

D lc -R my No. 1102276 (Std.), 1102277 (Air Cond. xc pt Starfir), 1102279 (Air Cond. Starfire), 1102293 (P lic).

Armatur - Delco-Remy.

►*CHARGING CIRCUIT FUSE CAUTION:* Battery charging circuit is protected by a fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing generator, regulator, or battery failure.

P rformance Cold

Generator	Amperes	Volts	RPM
1102276	35	14:0	2520
1102277,279,293	45	14.0	2600

Brush Spring Tension - 28 ozs.

Fi ld Curr nt - 1.62-1.82 amps. (1102276), 2.66-2.86 amps. (1102277,279,293) at 12 volts and 80°F.

R tati n - Counterclockwise at commutator end.

B lt Adjustm nt: Place Tension Tool 33-70 on generator belt. Loosen generator adjusting link bolt. Tighten belt until index groove on tool plunger aligns with notches just above pointer (will provide recommended belt tension of 90 lbs.). Tighten adjusting link bolt.

GENERATOR REGULATOR

D lco-R my No. 1119253E (1102276 Gen.), 1119600 (1102277,279 & 293 G n.). *NOTE - Regulator 1119600 is "Double Contact" typ .*

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*REGULATOR CAUTION: Regulators must be used with g n rators as indicat d above. DO NOT interchange.*

NOTE - Sp cificati ns bel w are "Normal" settings.

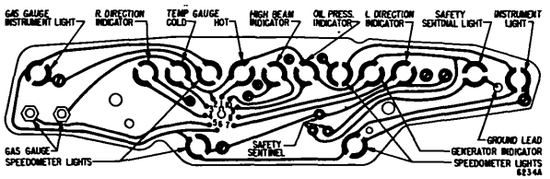
Cutout Relay

Cuts In - 11.8-13.5 volts (1119253E), 11.8-13.0 volts (1119600).

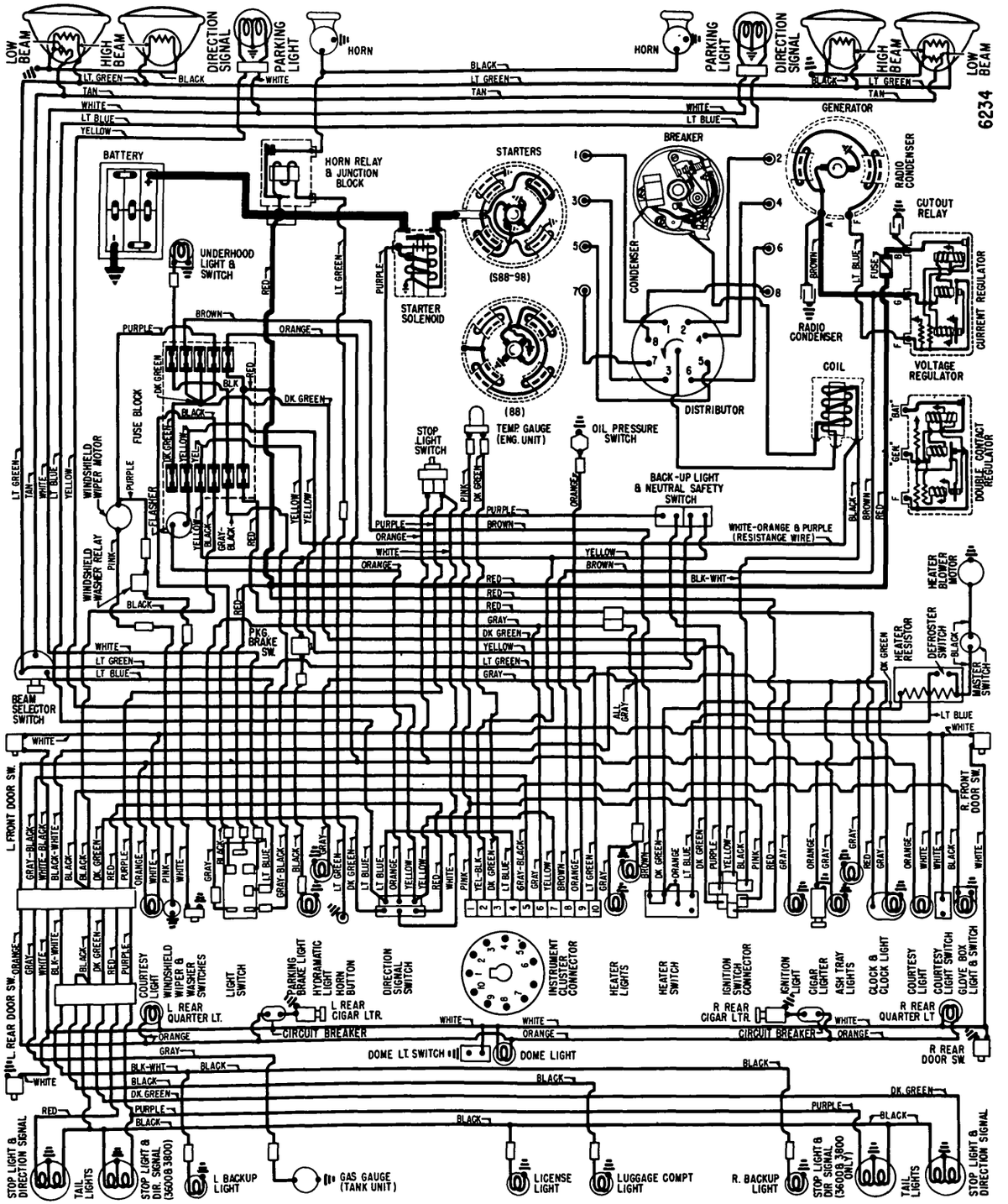
C ntact Gap - .020".

Air Gap - .020" with contacts just closed.

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OLDSMOBILE PRINTED CIRCUIT



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V-Itag Regulator

Setting (1119253E) - 13.8-14.7 volts at ambient temperature of 125°F.

Setting (1119600) - 13.8-14.6 volts operating on upper contacts, .1-.3 volts lower operating on lower contacts. At ambient temperature of 125°F.

Contact Gap (1119600) - .016" (upper contacts) with lower contacts just touching.

Air Gap - .060" (1119253E), .067" (1119600), with contacts just touching.

Current Regulator

Setting (111925E) - 31.0-35.5 amps. (Adjust to 35 amps.), at ambient temperature of 125°F.

Setting (1119600) - 38-45 amps. at 125°F ambient temperature.

Air Gap - .075" with contacts just touching.

►*OTHER DATA: See "Delco-Remy 6 & 12 Volt Single Contact Regulators" & "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy No. 1117070 or 1100601. Internal rectifier type. *NOTE - No. 1117070 is "A" circuit, No. 1100601 is "B" circuit.*

Performance Data - Cold

Alternator	Amperes	Volts	RPM
1117070	① 58	14.0	① 2500
1100601	② 52	14.0	② 6500

① - 31 amps. at 1000 RPM. ② - 5 amps. at 1100 RPM.

Rated Output - 52 amps. (1100601), 60 amps. (1117070).

Field Current - 1.9-2.3 amps. (1100601), 6.0-6.6 amps. (1117070) at 12.0 volts and 80°F.

►*OTHER DATA: See "Delco-Remy Delcotron Alternators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy No. 9000554 (1117070). No. 1119508 (1100601). *NOTE - No. 9000554 is Transistorized type, No. 1119508 is Double Contact type.*

►*OTHER DATA: See "Delco-Remy Double Contact Alternator Regulators" or "Delco-Remy Transistorized Alternator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT CLUSTER NOTE:* Cluster consists of Speedometer Head, Fuel Gauge, Safety Sentinel, Instrument Lights, and Indicators (Generator Charge, Oil Pressure, Temperature "Hot" and "Cold", High Beam, and Turn Signals).

INSTRUMENT CLUSTER: Removal 1) Remove windshield side garnish mouldings and instrument panel side panels. Disconnect steering column assembly (All Strg.), plus gear at frame (Std. Steering) and remove Console.

2) Disconnect heater and Air Cond. controls, printed circuit connector, speedometer cable, front and rear seat speaker and antenna leads, ignition and headlight switch connectors, power top, courtesy light and power antenna switch leads, instrument panel harness connector, hoses from deck lid vacuum release control, courtesy lights, and cigar lighter leads.

3) Remove cluster attaching screws and remove cluster.

Installation - Reverse removal procedure.

SPEEDOMETER CLUSTER: Removal - Disconnect printed circuit connector, speedometer cable from speedometer head and remove three cluster to instrument panel screws and remove cluster.

Installation - Reverse removal procedure.

SPEEDOMETER CABLE ASSEMBLY: Removal - Disconnect speedometer cable by reaching behind end of instrument panel and front door hinge pillar. Remove left air outlet grille and cowl trim panel. Disconnect cable from transmission and remove cable from car.

Installation - Reverse removal procedure.

PRINTED CIRCUIT: Removal - Remove speedometer cluster assembly, *see above,* then remove printed circuit screws and fuel gauge connector nuts and washers. Disconnect safety sentinel actuating wire and remove printed circuit.

Installation - Reverse removal procedure.

SPEEDOMETER HEAD: Removal - Remove instrument cluster assembly, *see above.* Remove safety sentinel control knob actuating wire and case to bezel screws. Remove speedometer head attaching screws and remove head.

Installation - Reverse removal procedure.

FUEL GAUGE: Removal - Remove instrument cluster and printed circuit. Remove fuel gauge retainer to case screws and remove gauge from cluster. Remove gauge to retainer connecting studs, flat washers and insulator and remove gauge from retainer.

Installation - Reverse removal procedure.

CIRCUIT BREAKERS: 20 Ampere, protects headlights, beam indicator and parking lights.

FUSES: All fuses located in fuse panel on firewall behind instrument panel. Color coded to simplify servicing.

9 Ampere. Tail, License Plate, Glove Compt. Under Hood and Trunk, lights.

20 Ampere. Stop (88, S88), Dome and Courtesy lights.

25 Ampere. Stop (98) lights.

9 Ampere. Direction Indicator.

3 Ampere. Instrument, Ignition, Clock and Heat Control lights.

9 Ampere. Back-up, Indicator, Parking Brake, and Fuel Gauge lights.

1 Ampere. Westclox, **2 Ampere** Borg, Clock.

2½ Ampere. Deluxe, **7.5 Ampere** Super Deluxe, Radio.

20 Ampere. Windshield Wiper, Cigar Lighter and Heater (88, S88).

25 Ampere. Heater (98).

HORN RELAY: Delco-Remy No. 1116946.

ENGINE

ENGINE SPECIFICATIONS: Own 90° V8, Valve-in-head.

Engine	Bore	Stroke	Displacement
All	4 1/8"	3 11/16"	394 cu. in.

Engine	Compr. Ratio	Rated HP	Developed HP
88 Std.	10.25-1 ①	54	280 at 4400 RPM
88 Optl.	8.75-1 ③	54	260 at 4400 RPM
88 Optl.	10.25-1 ②	54	330 at 4600 RPM
S88 & 98 Std.	10.25-1 ②	54	330 at 4600 RPM
Starfire Std.	10.50-1 ②	54	345 at 4800 RPM
88 Exp.	8.3-1 ①	54	
Other Exp.	8.3-1 ②	54	

① - 2-Bbl. Carb. & Premium Fuel. ② - 4-Bbl. Carb.
③ - 2-Bbl. Carb. & Regular Fuel.

Compression & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Drain oil and disconnect battery. Position No. 1 piston at bottom of stroke. Remove exhaust crossover pipe (if so equipped). Disconnect idler arm support from frame. Remove starter. Remove engine front mount attaching nuts and raise engine. Remove oil pan. *NOTE - Front oil pan bolts can be removed through holes in frame crossmember.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*

INTAKE MANIFOLD: *See "Cylind r Head & Manifold" in Oldsmobile Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Oldsmobile Special Data.*

PISTONS

Aluminum alloy, Auto-Thermic, Cam Ground, Tin plated, with Steel Strut.

►*PISTON IDENTIFICATION NOTE:* Pistons used in all engines are "dished" head type but amount of dish varies as follows:

88 Low Compr. Engine - Dish is approx. 5/8" deep.

All High Compr. (Except Starfire) - Dish is 1/16" deep.

Starfire Engine - Dish is 1/32" deep and piston has raised ring in center of dish.

Turbo-Rocket Engine - Pistons have heavier dome.

Weight - 26.349 ozs. **Length** - 4.050".

Removal - Pistons & Rods removed from above.

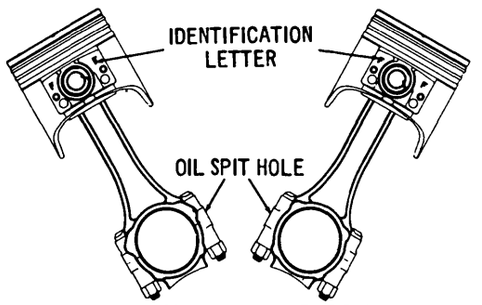
►*CAUTION:* Mark pistons and stamp rods and bearing caps with number of cylinder bore before removing to insure correct installation.

Clearance - .0075-.00125" at thrust surface (selective fit). *NOTE* - Some engines have .005" or .010" Oversize pistons.

Fitting Pistons - Use a .0015" x ½" x 12" ribbon feeler between inverted piston (pin and rings removed) and cylinder wall at right angles to piston pin position. Pull to withdraw feeler should be 3-12 lbs.

Replacement Pistons: Furnished with fitted pins in Std. Codes A,B,C,D,E,W,X,Y,Z, (Exc. Starfire), Codes A,B, C,D,E (Starfire) and .010", .020" & .030" Oversize.

Installing Pistons: Install piston on same numbered connecting rod with "F" on pin boss and notch or notches toward front of engine. *See Rod Installation.*



2F60

OLDSMOBILE PISTON & ROD ASSY.

PISTON PIN

Floating type with lock ring at each end. Pins are offset in piston .090" toward right side of engine.

►*CAUTION:* Discard old lock rings and install new service type lock rings when installing pins.

Diameter - .9803"-.9807". **Length** - 3.126".

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Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.
Pin Fit in Rod Bushing - .0003-.0005" loose.
Replacement Pins: Std., .001" & .003" Oversize.

PISTON RINGS

Two compression rings and one oil ring used.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.0775-.078"	.013-.023"	.001-.004"
Compr. (2)	.0925-.0935"	.013-.023"	.001-.004"
Oil	①	.015-.055"	.0005-.007"

① - .1831-.1889" (Perfect Circle), .1840-.1890" (Sealed Power).
Replacement Rings: Std. and .010" Oversize.
Installing Rings: Install upper "Chrome" and lower "Parco Lubrite" compression rings with side up that is marked with a dimple (Sealed Power) or word "TOP" (Perfect Circle).

CONNECTING ROD

►*CONNECTING ROD JOURNAL CAUTION:* Engines with Letter "X" 3/8" high stamped on left upper front face of block adjacent to water outlet nozzle above ground strap hole have crankshaft with connecting rod journals 2.4898-2.4893 in diameter. Use Connecting Rod Bearing Package Part No. 5458315 (Upper and lower half for each journal) for these engines.

Length - 6.996-7.000" center-to-center. **Weight** - 34.55 ozs.
Crankpin Journal Diameter - 2.4992-2.5002".
Lower Bearing - Moraine 400 steel backed aluminum with babbitt overlay.
Clearance - .0005-.0026" (vertical), .0013-.0034" (horizontal).
Sidplay - .002-.011" (total both rods).

Replacement Bearings: Std. and .002", .010", .020" Undersize.

Installing Rods: Install connecting rod in engine with oil spit hole toward center of engine. Install connecting rod caps with bearing index notches in rod and cap on same side.

►*CAUTION: Use Guide Tool BT-22 over rod bolts to prevent damaging crankpin journals when removing and installing piston and rod assemblies.*

CRANKSHAFT

Journal Diameter - 2.9990-3.000". Five bearings.
Bearings - Moraine 400 steel-backed aluminum with babbitt overlay (Nos. 1 through 4), Durex 100A steel-backed babbitt overlay (No. 5).

Clearance - .0005-.0021" (Nos. 1 & 2), .0008-.0024" (Nos. 3 & 4), .0020-.0034" (No. 5). **Wear Limit** - .0035" (Nos. 1 through 4), .0045" (No. 5).

►*MAIN BEARING DESIGN CHANGE:* 1962 Nos. 2,3 & 4 main bearings are 5/32" wider than 1961 bearings. Both upper and lower main bearing shells have center hole groove and are now interchangeable.

Main Bearing Identification
(On Shell Tang)

Thickness	No. 1 Through 4	No. 5
Standard	None	None
.0005"	B	A
.0010"	C	B
.0015"	E	C

Replacement Bearings: Furnished Std. and .0005", .001", .0015", .002", .010" .020" Undersize. See table above for identification. **Install bearings in pairs (upper and lower shells).**
End Thrust: Taken by No. 5 (flanged) bearing.
Endplay - .004-.008".
Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*

CAMSHAFT

►*IDENTIFICATION NOTE:* Camshaft used in Series 88 (Regular Fuel) is identified by step on thrust flange.
Journal Diameter - 1.9977-1.9985".
Bearings - Steel-backed babbitt.
Clearance - .001-.0033".
End Thrust: Taken by flange at front of camshaft against front camshaft bearing. Camshaft held to rear by plunger and spring at front end of camshaft.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Oldsmobile Special Data.*
Timing Chain: Single flanged side guide type. **Width** - 27/32". **Pitch** - .50". **Length** - 24" or 48 links.
Camshaft Setting: Mesh chain with sprocket marks adjacent and in line with a straightedge across shaft centers (or use Tool BT-11).
►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket with cupped side out.

►*CAMSHAFT REPLACEMENT CAUTION:* Coat camshaft liberally with engine oil mixed with G.M. Concentrate Part No. 567725 to insure proper installation and provide initial lubrication.

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: Two types used and either type can be removed and installed without removing Engine Front Cover. *See "Engine Front Cover" in Oldsmobile Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.870-1.880"	.3427-.3432"	5.093"
Exhaust	1.557-1.567"	.3940-.3945"	5.081"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	①	.0010-.0025"
Exhaust	45°	②	.0015-.0030"

① - .428" (88), .435" (S88,98).
② - .435" (88), .437" (S88,98).

Valve Seat Width - .037-.075", all valves.
Valve Stem Seals - Cup type oil seal (deflector) installed cup side down on valve stem below valve spring retainer on all valves.
Valve Springs: Outside diameter at bottom is larger than at top. No damper springs used.

Valve Spring Specifications

Valve	Pressure	Length
Open	175-189 lbs.	1.437"
Closed	85-95 lbs.	1.837"

Free Length - 2.25".

Valve Guides: To remove old guides, support head and drive guides out through top of head using Remover Tool J-3062. Install new guides as follows: Place Gauge Washer J-5158-3 on valve spring seat. Use Valve Guide Installer Tool J-5158-2 to drive new guide in head (grooved end of guide up) until tool seats against gauge washer. This will correctly position guides in head (guide should extend 25/32" above face of valve spring seat).
►*OVERSIZE VALVE GUIDE NOTE:* Valve guides with .010" oversize outside diameter may be identified by a groove on guide.
Valve Lifters: Hydraulic lifters standard on all models.
►*HYDRAULIC LIFTER INSTALLATION CAUTION:* Production engines use Standard, .001" or .010" oversize lifters. Use correct size when replacing lifters. All lifters have identification numeral (Except Standard) on lifter body. Cylinder block marked "1" or "10" for lifter size on rail under rocker arm cover. When no mark appears, lifters are standard.
Diameter - .9210-.9215" (Std.). **Length** - 2.125".
Clearance in Block - .0005-.0020" (Selective).

Replacement Lifters: Std., .001", .002", .003", .005" & .010" Oversize.
Hydraulic Lifter Removal, Overhaul & Testing - *See "Valve System" in Oldsmobile Special Data.*
Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications (88 - Reg. Fuel)
Intake Valves - Open 14° BTDC. Close 50° ALDC.
Exhaust Valves - Open 54° BLDC. Close 16° ATDC.

Valve Specifications (88, S88, 98 - Premium Fuel)
Intake Valves - Open 11° BTDC. Close 59° ALDC.
Exhaust Valves - Open 59° BLDC. Close 25° ATDC.

Valve Timing Check: Remove left hand cylinder head rocker arm assembly and rotate engine so that No. 1 piston is on top dead center (firing stroke). Install Tool No. J-5374-01 in place of rear rocker shaft bracket with step plunger over No. 7 cylinder exhaust pushrod. The pilot at bottom of tool will fit into cylinder head bolt hole. Screw main body of gauge down so step plunger contacts pushrod and small diameter of plunger is flush with top of main body. Tighten clamp bolt. Rotate engine one complete revolution so that No. 1 piston

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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is again at TDC (intake stroke). If timing chain is installed properly, third step of plunger will rise 1/32" above (8.75-1 Eng.), be nearly flush to (10.0-1 Eng.), top of main body. If plunger rises more, camshaft is advanced, and if less, camshaft is retarded.

ENGINE OILING SYSTEM

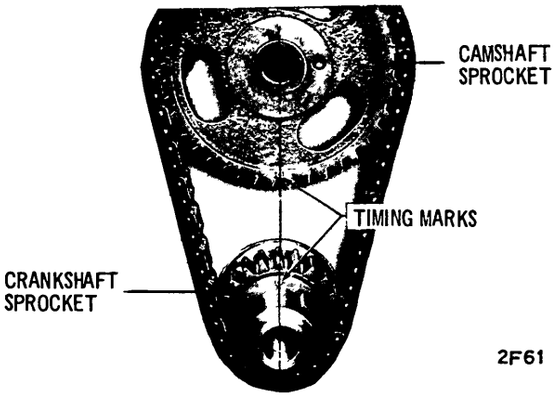
►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*

Crankcase Capacity: 4 qts. refill. 5 qts. with filter change.

Normal Oil Pressure: 35-45 lbs. at 50 MPH.
Pressure Regulator - In pump body. Not adjustable. Valve starts to open at 45 lbs. Maximum pump pressure is 45-55 lbs.
Oil Pressure Indicator - Oil pressure warning light on instrument panel and oil pressure switch in engine block or oil filter. Lights when pressure below 3 lbs.

Engine Unit - AC No. 1508668.
Oil Pump: Gear type. In crankcase at rear end.
Oil Pump Removal, Overhaul & Installation - *See "Oiling System" in Oldsmobile Special Data.*

Oil Filter: Full-flow type. Replace element every 4,000 miles or sooner if needed. Located on lower right side of crankcase.



OLDSMOBILE VALVE TIMING MARKS

Replacement Filter: Element - AC No. PF-7.

Crankcase Ventilation: Standard Cars - Air intake in oil filler cap, outlet pipe at right rear corner of engine. **Filler Cap Cleaning Note** - Clean at every oil change by washing in solvent and re-oiling with engine oil. **Positive Crankcase Ventilation Cars** - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 20¼ qts. (Std.), 22 qts. (With Air Cond.).
Pressure Valve - 15 lb. radiator filler cap.
Thermostat: Choke type, 170°F.

Water Pump: Packless, sealed ball bearing type.
See "Cooling System" in Oldsmobile Special Data.

Removal - Drain cooling system, and loosen belts. Remove fan, spacer and pulley from pump hub. Remove four pump housing to engine front cover bolts and two pump housing to block bolts, and remove pump.

Temperature Indicator: Two light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes out when engine temperature reaches 113°F±2°F. RED light remains off during normal engine operation but comes on when engine temperature reaches 243°F±2°F. *NOTE* - Red light will come on when ignition key turned to "Start" position (to test bulb and circuit) but should go out when key returned to running position.
Engine Unit - Delco-Remy No. 1998741.

Fluid Fan Drive: Std. on Air Cond. cars. Fan clutch engages when radiator air temperature reaches 160°F and fan rotates to a maximum of 2000 RPM. When air temperature drops to 135°F or below, clutch disengages which allows fan to run at maximum of 1000 RPM. Serviced as assembly.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

►*STARTING CAR BY PUSHING NOTE (AUTOMATIC TRANSMISSION CARS): Because of transmission design, car cannot be started by pushing.*

MODEL IDENTIFICATION

Series	①Series Designation
3000 (Standard)	30
3100 (Deluxe)	31

① - First two digits of series and body style designation following "62" year number under STYLE on Body Identification Plate

SERIAL NUMBER: Stamped on plate attached to left front door pillar. Number (example below) includes identification data.

① ② ③ ④
62 O M 01001

① - Year. 62 (1962).
② - Series. O - 3000. 1 - 3100.
③ - Assembly Plant. M - Lansing. C - South Gate, K - Kansas City.
④ - Beginning Vehicle Number.

ENGINE UNIT NUMBER: Stamped on front of right hand cylinder head.

Starting Unit Number - S-100001. Suffix letter indicates following: E - Low Compression Export Engine. G - 4-Bbl. Carburetor. H - Low Compression Export Engine and 4-Bbl. Carburetor. T - Turbo-Rocket Engine.

TUNE-UP

VALVE TAPPET CLEARANCE: Zero lash, hydraulic.

MANIFOLD HEAT CONTROL: None used. Intake manifold is heated by engine coolant.

CRANKCASE VENTILATION VALVE: Service at 10,000 mile intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. See *"Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.

Cylinders - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .030".

Spark Plugs - AC 46FFX (2-Bbl. Carb.), 45FF (4-Bbl. Carb. & Turbo-Rocket Eng.), 42FF or 44FF (Heavy Duty). Tighten to 12-17 ft. lbs.

COIL: Delco-Remy 1115168 (Std.), 1115160 (Heavy Duty), 1115170 (Stamped 170) Turbo-Rocket Engine.

Ignition Current - 2.0 amps. idling, 4.5 amps. stopped.

Resistor (1115168 Coil) - Resistance wire (1.75-1.85 ohms) integral part of wiring harness connected in circuit between coil and No. 1 terminal of ignition switch. Bypassed during cranking by second lead from switch.

Resistor (1115160 Coil) - Delco-Remy No. 1931385.

Resistor (1115170 Coil) - .5 ohm.

DISTRIBUTOR: Delco-Remy 1110975 (Std. Eng. Synchro-mesh). 1110992 (Std. Eng. Hydra-Matic), 1110979 (Heavy Duty), 1111021 (Turbo-Rocket Eng. Synchro-mesh), 1111013 (Turbo-Rocket Eng. Hydra-Matic).

Condenser - Delco-Remy. **Capacity** - .19-.23 mfd.

Breaker Gap - .016" (1110975 & 992), .014-.018" (1110979). Gap will be correct when cam angle correctly set.

Cam Angle (1110975 & 992) - 30° (Limits 28-32°).

Cam Angle (1110979) - 29°±1°. Set each breaker individually. Will give .014-.018" breaker gap.

►*HEAVY DUTY DISTRIBUTOR NOTE:* After adjusting each breaker individually, cam angle with both breakers operating must be 34°±1°.

Breaker Arm Spring Tension - 19-23 ozs.

Rotation - Clockwise viewed from above.

Automatic Advance - 1110975 & 992

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	500	0-4	1000
5-7	1000	10-14	2000
8-10	1550	16-20	3100
11-13	2100	22-26	4200

Automatic Advance - 1110979

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	500	0-4	1000
5-7	950	10-14	1900
10-12	1400	20-24	2800

Automatic Advance - 1111013, 1111021

Degrees Distr.	RPM	Degrees Eng.	RPM
0-2	500	0-4	1000
5-7	1000	10-14	2000

Vacuum Spark Control: Delco-Remy 1116175 (1110975 Distr.), 1116194 (1110992 Distr.).

Vacuum Advance - 1116175 & 194

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5-7
12.5	25	15.25-17.0

Vacuum Advance - 1111013 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	4-6
10.5-13	21-26	17

Vacuum Advance - 1111021 Distr.

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	9-11
10.5-13	21-26	17

IGNITION TIMING

Setting - 5° BTDC (Std. Eng. Synchro-mesh), 7½° BTDC (Std. Eng. Auto. Trans.), 10° BTDC (Turbo-Rocket Eng.), all at 850 RPM with distributor vacuum line disconnected and pipe plugged.

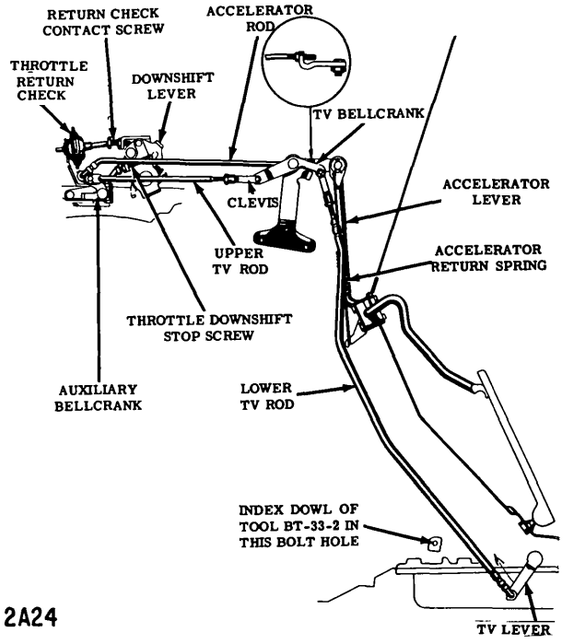
►*DETONATION NOTE:* If engine detonates with above setting due to low octane fuel or carbon build-up, timing should be retarded 2½°. If extra high octane fuel is used, timing may be advanced beyond 5° setting if no detonation occurs.

Timing Mark - Timing Indicator on chain case cover marked "O" (TDC), "5" (5° BTDC), "10" (10° BTDC). Align groove on harmonic balancer with correct mark on Indicator.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester 2-Bbl. (Std.), Rochester 4-Bbl. (Optional on Std. Eng.), Rochester RC (Turbo-Rocket Eng.).*

THROTTLE LINKAGE ADJUSTMENT (Std. Eng. - All Carbs): Raise car and disconnect lower throttle valve rod from throttle valve lever on transmission, position Gauge BT-33-2 on transmission with index dowel on gauge in bolt hole on case (in boss at lower left front corner of case). Hole in lever must be centered within hole in gauge with lever held in rearward position. Bend lever as necessary with Tool BT-33-7. Connect rod to transmission throttle lever, then disconnect



OLDSMOBILE F-85 AUTO. TRANS. THROTTLE LINKAGE (EXC. TURBO-ROCKET ENGINE)

upper end of rod from bellcrank, disconnect rear end of upper throttle valve rod from bellcrank. Hold bellcrank down at rear, press downward on lower throttle valve rod, adjust clevis at upper end of rod so that clevis pin is free fit in rod and bellcrank, connect rod. Remove air cleaner, block or move throttle return check out of the way, block choke valve open (on 4-Bbl. Carb., block intermediate choke lever) so that fast idle cam is released, back off throttle lever stopscrew so that throttle valves are completely closed. On 2-Bbl. Carbs., place Tool BT-6117 on machined surface of manifold and bend auxiliary bellcrank link as necessary so that top of accelerator rod just touches tool. On 4-Bbl. Carbs., bend auxiliary bellcrank link as necessary so that clearance between auxiliary bellcrank and gauging surface of carburetor throttle body is .020-.040". Adjust swivel on rear end of upper throttle valve rod so that rod is slightly short *(CAUTION - Swivel must turn freely on rod threads)*, connect rod to bellcrank. Hold bellcrank against stop and turn swivel to lengthen rod until swivel turns freely and feels "sloppy", continue to lengthen rod until all play has just been taken up and slight resistance is felt when turning swivel (resistance will be very slight and adjustment should be repeated until point where play has just been taken up has been determined), hold swivel from turning and tighten locknut. Loosen throttle downshift stopscrew locknut and back off stopscrew approximately six full turns. Use accelerator lever to move throttle valves to wide open position and overtravel the linkage to point of maximum transmission

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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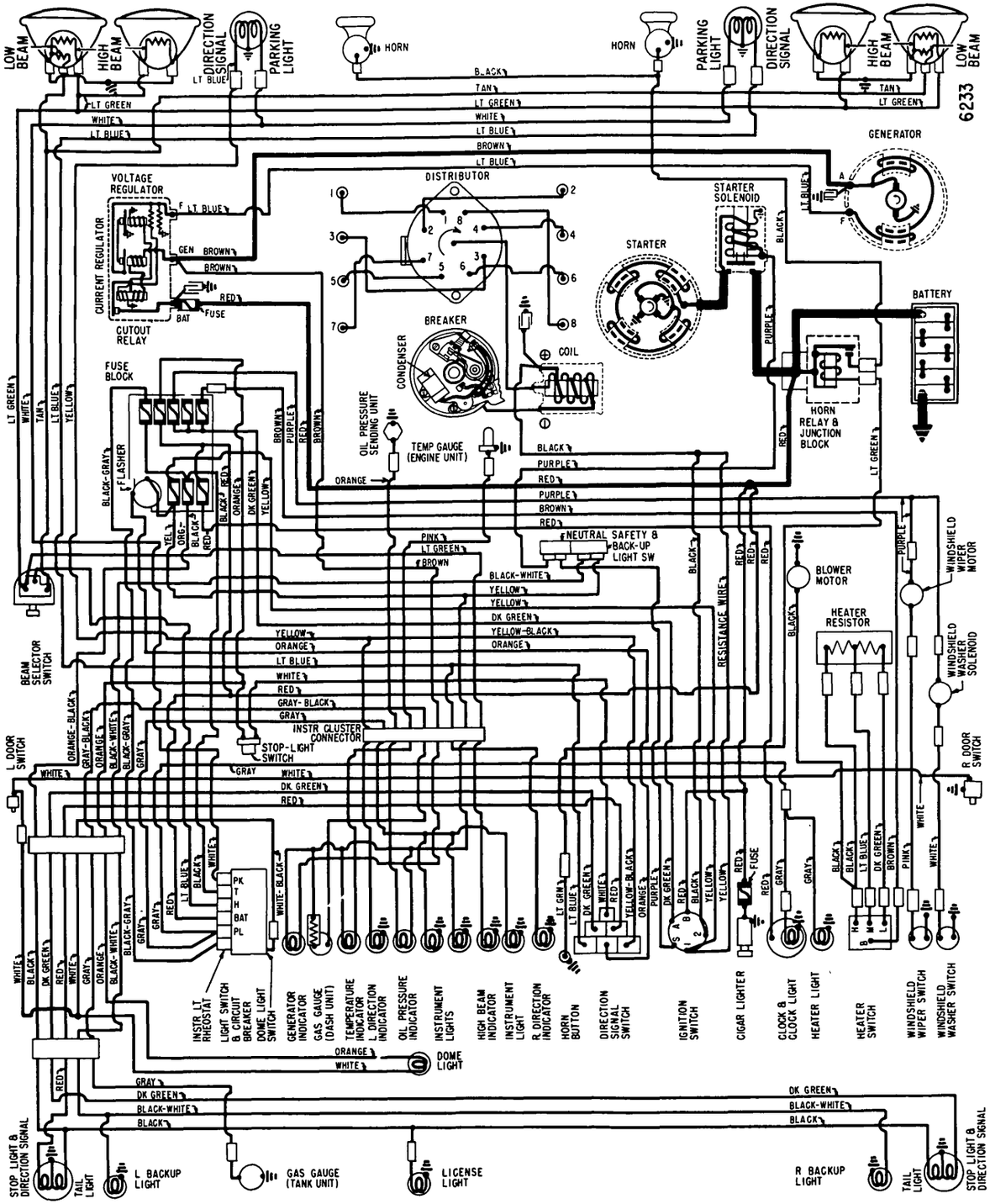
throttle valve lever travel *(CAUTION - Do not bend or str tch linkag)*, hold accelerator lever in this position and turn downshift stopscrew in until it just touches downshift lever tang, then **turn stopscrew in an additional 1½ turns (2-Bbl. Carb.), 1½-2 turns (4-Bbl. Carb.),** tighten locknut. Free choke valve. Run engine until normal operating temperature is reached, adjust slow idle speed to 500 RPM (550 RPM on Air Cond. Cars), fast idle speed to 1800 RPM (4 Bbl. Carbs. only), shut off engine. Adjust pedal height (see below) adjust throttle return check (see below).

Pedal Height Adjustment: With choke valve wide open and fast idle screw not contacting fast idle cam (4-Bbl. Carb.), position Tool BT-33-2 on rear end of accelerator rod (engage center hole of tool with clevis pin) with dowel pin end of tool extending forward. Loosen locknut and turn adjusting clevis on accelerator rod until end of gauge just touches cowl, tighten locknut.

Throttle Return Check Adjustment: With fast idle screw on high step of fast idle cam, adjust plunger screw for .020" clearance between end of screw and throttle lever.

THROTTLE LINKAGE ADJUSTMENT (Turbo-Rocket Eng.): Raise car and disconnect lower throttle valve rod from throttle valve lever on transmission, position gauge BT-33-2 on transmission with index dowel on gauge in bolt hole on case (in boss at lower left front corner of case). Hole in lever must be centered within hole in gauge with lever held in rearward position. Bend lever as necessary with Tool BT-33-7. Connect rod to throttle valve lever, then disconnect upper end of rod from bellcrank. Hold rod in downward position and bellcrank down at rear. Adjust clevis on upper end of rod as necessary so that clevis pin is free fit in bellcrank and rod clevis, connect rod. Remove air cleaner, disconnect upper end of carburetor rod from carburetor throttle lever, install Throttle Return Check Tool, J-6342-01, on return check plunger to hold plunger out of the way, back out slow idle stopscrew, make certain that fast idle screw does not contact fast idle cam (if necessary, block choke valve open with screwdriver inserted in carburetor bore). Back out auxiliary bellcrank stopscrew until bellcrank contacts the stop. Loosen locknut at lower end of carburetor rod adjusting sleeve, turn sleeve to shorten rod and connect upper end to front carburetor throttle lever, then while holding throttle valve in closed position by pressing on rear carburetor throttle lever, turn adjusting sleeve to lengthen carburetor rod until the rod links close and a slight load is felt on the sleeve threads, **then shorten rod one turn of the adjusting sleeve,** tighten the locknut. Loosen locknut at adjusting sleeve on rear end of upper throttle valve rod (at bellcrank), shorten rod slightly, then while holding bellcrank against its stop, lengthen rod until slight resistance is felt on adjusting sleeve threads, tighten locknut. Adjust engine idle speed to 550 RPM in Drive by turning throttle lever stopscrew, then adjust auxiliary bellcrank stopscrew until idle speed is affected (throttle valve begins to open), **back stopscrew out one turn.** Adjust fast idle speed to 1500 RPM with fast idle screw on second step of fast idle cam. Adjust accelerator pedal height *(s Std. Engin Adjustm nt data above)*. Adjust throttle return check *(see below)*. Loosen throttle down-

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shift stopscrew locknut (on auxiliary bellcrank) and back off stopscrew approximately six full turns. Use accelerator lever to move throttle valve to wide open position and overtravel the linkage to point of maximum transmission throttle lever travel *(CAUTION - Do not bend or stretch linkage)*, hold accelerator lever in this position and turn downshift stopscrew in until it just touches the downshift lever tang, then **turn stopscrew in an additional 1½ turns,** tighten locknut.

Throttle Return Check Adjustment: With fast idle speed correctly set, and fast idle screw on high step of fast idle cam, adjust plunger screw for .050" clearance between end of screw and lug on throttle lever.

ROCHESTER 2GC 2-BARREL

Model	Rochester Number Synchro-mesh	Auto. Trans.
No C.C.V. Early	7020053	7020051
No C.C.V. Late	7020981	7020980
With C.C.V. Early	7020959	7020957
With C.C.V. Late	7020983	7020982

C.C.V. - Closed Crankcase Ventilation.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

Idle Setting - Initial setting 1½ turns open. Turn screws out for richer mixture.

Idle Speed - 550 RPM (Synchro-mesh, & Air Cond.) 500 RPM (Auto. Trans. with Selector lever in "DR").

Float Level - 35/64" (Early Carbs.), 25/32" (Late Carbs.) with air horn inverted and gasket installed. Measure distance between lower edge (sharp edge) of float seam at outer end of float at toe and air horn gasket. To adjust, bend float arm.

Float Drop - 1 29/32" (Gauge BT-187) distance from gasket to bottom of float with air horn upright and gasket in place. To adjust, bend float tang.

Fast Idle: No adjustment. Will be correct when hot or slow idle correctly set.

Automatic Choke Setting: Centered at index.

Carb-Airator Adjustment: *NOTE - This is an external breather attached to carburetor on air conditioned cars to assist in reducing rich fuel and air mixture during hot idling.* In extreme hot temperature (95°F or over), if hot idle is rough or erratic or stalling occurs, tighten temperature screw (on side of unit) one turn and road test car. *CAUTION - Do not upset normal idle setting and do not overtight n screw.* If engine idles too fast under these extreme hot temperatures, tighten the air screw (directly below temperature screw unit).

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Model	Rochester No.
All Trans. Early, Std.	7020952
All Trans. Later, Std.	7020984
All Trans. Early Air Cond.	7020953
All Trans. Later Air Cond.	7020985
Heavy Duty	7020958

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* Idle Compensator (Thermostatically controlled idle air bypass) used on air conditioned cars and must be in closed position when making idle setting and idle speed adjustments. Remove air cleaner and insert pencil or suitable tool in throttle bore.

Idle Setting - Turn adjusting screws in or out for desired mixture.

Idle Speed - 550 RPM (Synchro-mesh & Air Cond.), 500 RPM (Auto. Trans., with selector in "DR").

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

ROCHESTER RC

For all data on this carburetor and Fluid Injection System used on supercharged Turbo-Rocket Engine, see "Oldsmobile F-85 Supercharged Jetfire Carburetor and Fluid Injection System" in Carburetion Section.

SUPERCHARGER

Turbo-supercharger used on Turbo-Rocket Engine. *See "Oldsmobile F-85 Supercharger" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC. Used as follows:

	Oldsmobile No.
Early Cars (Metal Cover)	5621774
Later Cars (Glass Bowl)	5621820

Fuel Pump Pressure - 5-6 lbs. at 1800 RPM (Std. Eng.), 6-8 lbs. at 1800 RPM (Turbo-Rocket Eng.).

Fuel Filter: Saran fuel filter on tank end of suction line and replaceable element type filter located in fuel line between fuel pump and carburetor.

Gasoline Gauge: AC Electric.

Dash Unit - AC No. 5643430.

Tank Unit - AC No. 5641870 (3-Seat Sta. Wgn.), No. 5642248 (Others).

Air Cleaner: Non-Disposable type. Service every 8,000 miles. Wash dirt from filter by plunging it up and down several times in clean kerosene and wringing dry. Oil filter element with SAE 20 oil, then squeeze out excess oil and reinstall.

Disposable Type (Heavy Duty) - Replace element every 16,000 miles or more frequently as required.

BATTERY

Delco-Remy No. 454. 12 volt, 9 plate, 40 ampere hour capacity (20 hr. rate).

Battery Ground - Negative.

Engine Ground - Rear of right hand cylinder head.

STARTER

Delco-Remy No. 1108303. Armature No. 1935829.

Drive - Overrunning clutch (solenoid pinion shift).

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 35 ozs. minimum.

Performance Data

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

℄ - Includes solenoid.

Starter Switch: Delco-Remy 1114266 (solenoid) mounted on starter and controlled by combination Ignition & Starter Switch, Delco-Remy 1116587, and Neutral Safety & Back-up Light Switch (Hydra-Matic Transmission Cars).

Hydra-Matic Neutral Safety & Back-up Light Switch: Delco-Remy 579438 (Except cars with Console), 585058 (With Console).

Adjustment - *See "Oldsmobile F-85 Hydra-Matic Transmission" in Transmission Section.*

FUEL PUMP PRESSURE: 5-6 lbs. at 1800 RPM.

GENERATOR

Delco-Remy 1102236 (Std.), 1102230 (Police).

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit is protected by a fuse to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing generator, regulator or battery failures.*

Performance Data

Model	Amperes	Volts	RPM
Std.	35	14.0	2630
Police	45	14.0	2520

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 28 ozs.

Field Current - 1.69-1.79 Amps. (Std.), 2.66-2.86 Amps. (Police), at 12 volts and 80°F.

Belt Adjustment: Place Tension Tool BT-33-70 on generator belt (from under car between generator and crankshaft pulley). Loosen generator adjusting link bolt until index groove on tool plunger aligns with notches just above pointer (will provide recommended belt tension of 90 lbs.). Tighten adjusting link bolt to 14-17 ft. lbs.

GENERATOR REGULATOR

Delco-Remy No. 1119253 (Std.), 1119600 (Police).

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*DOUBLE CONTACT REGULATOR NOTE: Regulator 1119600 has double contacts for voltage regulation. NOTE - Specifications below are for "Normal" settings.*

Cutout Relay

Cuts In - 11.8-13.5 volts (1119253), 11.8-13.0 volts (1119600).

Contact Gap - .020" (All).

Air Gap - .020" (All) with contacts just closed.

Voltage Regulator

Setting (1119253) - 13.8-14.7 volts at 125°F ambient temperature.

Setting (1119600) - 13.8-14.6 volts (upper contacts), .1-.3 volt lower (lower contacts) at 125°F ambient temperature.

Contact Gap - .016" (upper contacts) with lower contacts just touching.

Air Gap (1119253) - .075" with contacts just touching.

Air Gap (1119600) - .067" with contacts just touching.

Current Regulator

Setting (1119253) - 31.0-35.5 amps. at 125°F ambient temperature.

Setting (1119600) - 38.0-45.0 amps. at 125°F ambient temperature.

Air Gap - .075" (All) with contacts just touching.

►*OTHER DATA: See "Delco-Remy 6 & 12 Volt Single Contact Regulators" & "Delco-Remy 1119600 Series Double Contact Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy Delcotron No. 1117070. Three phase type with internal rectifiers.

℄ Performance Data - Cold (70°F)

Amperes	Volts	RPM
58	14.0	2500

℄ - Rated output hot 60 amps.

Current Output - 25 amps. (approx.) at 525 Engine RPM.

Field Current - 6-6.6 amps. at 12 volts and 80°F.

Brush Spring Tension - 13 ozs.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Rotation - Clockwise at drive end.
Belt Adjustment: Tension Gauge J-7316 should read 80.
►*OTHER DATA: See "Delco-Remy Delcotron Alternators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy 9000554 (Indicator Light Relay & Transistorized Voltage Regulator) with separate Field Relay, Delco-Remy No. 1116895.

Indicator Light Relay

Setting - Points should close 2 volts lower than voltage regulator setting.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Voltage Regulator

Setting - 13.0-13.6 volts, adjust to 13.4 volts at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Field Relay

Closing Voltage - 7.0-9.0 volts.
Sealing Voltage - 11 volts maximum.
Air Gap - .010" with contacts just touching.
Contact Gap - .015-.025".

►*OTHER DATA: See "Delco-Remy Transistorized Alternator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

►*INSTRUMENT PANEL PRINTED CIRCUIT NOTE:* Entire instrument cluster served by a printed circuit. All units in cluster are connected by a multiple contact plug which is keyed to prevent improper assembly. Service of printed circuit is by **replacement only.**

Instrument Cluster Removal: Disconnect positive cable from battery. Remove cluster cover attaching screws. Disconnect wiring harness, clock and speedometer cable at cluster. Remove cluster-to-instrument panel attaching nuts and washers from under instrument panel. To install, reverse removal procedure.

Speedometer Head Removal (Cluster Removed): Remove instrument cluster bezel-to-case attaching screws. Remove bezel and face. Remove speedometer head attaching screws from case assembly, then remove speedometer head. To install, reverse removal procedure.

Speedometer Head Printed Circuit Removal (Cluster Removed): Remove all cluster lamp sockets and circuit attaching screws. Remove hex nuts from fuel gauge mounting studs. Remove printed circuit. To install, reverse removal procedure.

Fuel Gauge Assembly Removal: Disconnect positive cable from battery. Remove cluster cover. Disconnect fuel gauge wiring connector and light socket from printed circuit. Remove attaching nuts and withdraw fuel gauge from front of cluster. To install, reverse removal procedure.

Headlight Switch Removal: Disconnect positive cable from battery. Disconnect wiring from light switch. Remove knob and rod by first pulling out to "ON" position, then depressing button on top of switch assembly and pull rod out. Remove escutcheon with Tool No. J-6592-01. Remove headlight switch from rear of instrument panel. To install, reverse removal procedure.

Stop Light Switch Location: Mechanical type mounted on bracket on pedal stop above brake pedal arm.
Adjustment - Adjust switch in its mounting bracket by loosening locknuts.

CIRCUIT BREAKERS: 20 Ampere - Headlights, High Beam Indicator, Parking & Tail Lights. In headlight switch. *NOTE - Tail lights and Instrument panel lights also protected by fuse, see below.*
FUSES: All fuses (Except as noted), located on fuse block attached to inside of cowl panel to left of steering column.
20 Ampere. Dome, Courtesy and Stop lights.
9 Ampere. Temperature Indicator, Oil Pressure Warning, Generator Warning, Back-up, License & Tail lights, Fuel Gauge, Turn Signal.
4 Ampere. Deluxe Radio.
20 Ampere. Heater and/or Air Conditioning, Electric Windshield Wipers & Washers.
3 Ampere. Instrument Cluster, Clock, Shift Indicator, Heater Ventilator & Air Cond. lights.
20 Ampere. Cigar Lighter (Instrument Panel). On back of lighter.
HORN RELAY: Delco-Remy 1116946.

ENGINE

ENGINE SPECIFICATIONS: Own V8. 90° valve-in-head aluminum block with non-replaceable cast iron cylinder liners. Cylinder heads are aluminum.

►*TURBO-ROCKET (SUPERCHARGED) ENGINE NOTE: This engine has modifications for higher power output including Pistons with heavier dome; Aluminum steel-backed bearings with heavier Main Bearing Caps; and Valves with aluminized heads. Specifications for all engines are listed below.*

Engine	Bore	Stroke	Displacement
All	3.5"	2.80"	215 cu. ins.

Engine	Compr. Ratio	Rated HP	Developed HP
Std.	8.75-1	39.2	155 at 4800 RPM
Optl. ①	10.25-1	39.2	185 at 4800 RPM
Optl. ②	10.25-1	39.2	215 at 4600 RPM

① - 4-Bbl. Carb. ② - Turbo-Rocket (Supercharged) Engine.

►*ENGINE SERVICE NOTE: For Aluminum Engine Service Cautions see "Engine" in Oldsmobile Special Data.*

►*ENGINE OPERATION IN LOW OCTANE AREAS (FOREIGN TRAVEL):* The following modifications should be made before attempting travel in low octane areas to prevent excessive detonation and resultant engine damage. Lower the compression ratio by making changes listed for fuel or octane rating listed below. *NOTE* - "Normal" octane requirements are 90 for standard engine and 99 for Power Pack Engine.

8.75-1 Compr. Ratio Engine

Octane Rating	Head	Gasket ①	Compr. Ratio	Spark Plugs
86	no change	.045" ②	8.25-1	47FF

10.25-1 Compr. Ratio Engine

88	8.75-1 Head	no change	8.5-1	47FF
85	8.75-1 Head	.045" ②	8.0-1	47FF

① - Std. Head Gasket Thickness .020".
② - Kit No. 583457 (incl. Head and Intake Manifold Gaskets).

►*MODIFIED ENGINE (FOREIGN TRAVEL) TIMING NOTE:* Ignition timing may have to be set in range of 5°BTDC to 0° TDC if detonation still occurs.

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
INTAKE MANIFOLD: *See "Cylinder Head & Manifold" in Oldsmobile Special Data.*
TIGHTENING TORQUES: *See "Tightning Specifications" in Oldsmobile Special Data.*
OIL PAN REMOVAL: Raise car and drain oil, then disconnect relay rod from steering idler arm. Remove cover on front of lower flywheel housing and remove pan bolts. *NOTE* - On some types of lifts, it may be necessary to drop oil intake pipe and screen assembly into oil pan before removing pan. Position crankshaft so counterweights do not interfere with pan removal.

PISTONS

►*PISTON IDENTIFICATION NOTE:* Standard engine piston has elongated "V" notch in head. Turbo-Rocket engine has square end "V" notch in head.
Aluminum alloy, All-Aluminum, cam ground, tin plated.
Weight - 14.78 ozs. (Std. Eng.), 14.92 ozs. (Turbo-Rocket Eng.).
Removal - Pistons & Rods removed from above.
►*CAUTION:* Mark pistons, rods, and bearing caps with number of cylinder before removing to insure correct reinstallation.
Clearance - .0005-.0011" at thrust surface.
Fitting Pistons - Use a .0015" x ½" x 12" feeler(ribbon) between inverted piston (pin and rings removed) and cylinder wall at right angles to piston pin position. Pull to withdraw feeler should be 3-8 lbs.
Replacement Pistons: Furnished with fitted pins in Std., and .010" Oversize (Std. Eng.), .030" Oversize (H.D. Eng.).
Installing Pistons - Install piston on connecting rod with "F" on piston pin web and notch in head toward front of engine. *See Rod Installation.*

PISTON PIN

Pressed in rod. Pins are offset in piston .040" to right of cylinder bore centerline.
Diameter - .8747-.8750". **Length** - 2.860-2.880".
Pin Fit in Piston - .0003-.0005" loose. Pin should not fall through piston of own weight when using the low limit (.0003"). Can be pushed into place with hand.
Pin Fit in Rod - .0009-.0014" tight. *NOTE - Special tools required. See "Piston Pins" in Oldsmobile Special Data.*
Replacement Pins: Furnished in Std. size only.

PISTON RINGS

Two compression and one oil ring used. Upper ring chrome plated, lower ring Ferrox treated. Oil ring is spring steel.

Ring	Width	End Gap	Side Clearance
Compr. (1&2)	.0780-.0785"	.010-.020"	.002-.004"
Oil (3) ①	.2184-.2319"	.015-.055"	.0005-.0055"

① - Three-piece, consisting of two rails and a spacer.
Replacement Rings: Std. & .010" oversize.

CONNECTING ROD

Length - 5.660" center-to-center.
Crankpin Journal Diameter - 1.999-2.000".
Bearings - Steel back Durex 100 with 4167M babbitt overlay (Std. Eng.), Moraine M-400 steel back aluminum (Turbo-Rocket Engine). *IDENTIFICATION NOTE:* Bearings marked on back as follows: GMMA (Std. Eng.); M-400 (Turbo-Rocket Engine).
Clearance - .0002-.0022".

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Endplay - .006-.014" (total for both rods).
Installing Rods - Install piston and rod assembly in engine with identification boss on rod and cap toward **front of engin** (Right Hand Cylinders); toward **rear of engin** (Left Hand Cylinders). Oil spurt hole in rod must be upwards.
Replac ment B arings: Std., .002", .010" & .020" Undersize.

CRANKSHAFT

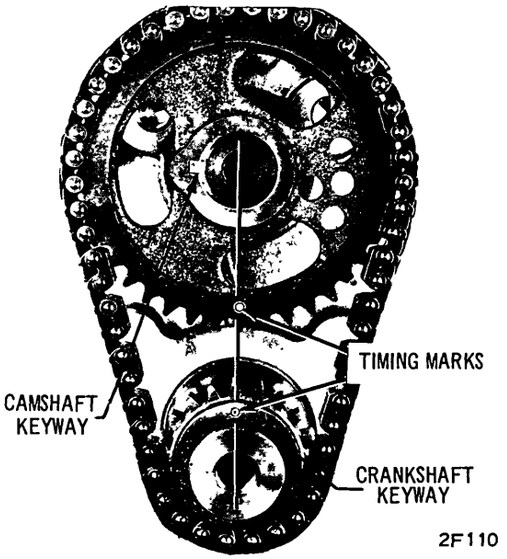
►*TURBO-ROCKET ENGINE CAUTION:* Special bearing caps and longer bolts used. Bolts can be identified by length (from end to underside of head) as follows: 3 5/32" (Std. Engine), 3 7/16" (Turbo-Rocket Engine). *See Bearing data below.*

B arings - Steel back Durex 100A with 4176M babbitt overlay (Std. Eng.), Moraine M-400 steel back aluminum (Turbo-Rocket Eng.). *IDENTIFICATION NOTE:* Bearings marked on back as follows: GMMA (Std. Eng.), M-400 (Turbo-Rocket Eng.).

Clearance - .0008-.0024". **Wear Limit** - .0035".
►*CAUTION: UPPER AND LOWER MAIN BEARING SHELLS MUST BE INSTALLED IN MATCHED PAIRS.*
Replac ment B arings - Furnished in Std., .001", .002" & .010" Undersize.
End Thrust: Taken by No. 3 (center) main bearing.
Endplay - .004-.008".
Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Oldsmobile Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Oldsmobile Special Data.*
►*BALANCER, CRANKSHAFT, FLYWHEEL REPLACEMENT CAUTION: See "Crankshaft & Bearings" in Oldsmobile Special Data.*

CAMSHAFT

►*HEAVY DUTY ENGINE NOTE:* Special camshaft No. 583043 used.
Journal Diameter - (1) 1.785-1.786", (2) 1.755-1.756", (3) 1.725-1.726", (4) 1.695-1.696", (5) 1.665-1.666".
Bearings - Five Steel Backed Babbitt.
Clearanc - .0005-.0025" (1), .0005-.0035" (Others).
Endplay - .011-.059".
Camshaft S tting - Mesh chain with sprocket marks adjacent and in line with straightedge across shaft centers.
Timing Chain: Width - .875". **Length** - 54 links. **Pitch** - .375".
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Oldsmobile Special Data.*
►*FUEL PUMP ECCENTRIC NOTE:* Fuel pump eccentric bolted to front of camshaft ahead of sprocket with cupped side out.
►*CAMSHAFT REPLACEMENT CAUTION:* Coat camshaft liberally with engine oil mixed with GM Concentrate Part No. 567725 to insure proper installation and provide initial lubrication.
Engine Front Cover Rem val & Installation: *See "Engine Front Cover" in Oldsmobile Special Data.*
Engine Fr nt C v r Oil Seal (Crankshaft Front Seal) Installation: *Se "Engine Front Cover" in Oldsmobile Special Data.*



VALVE TIMING MARKS

VALVES

►*TURBO-ROCKET ENGINE NOTE:* Valve heads and seats are Aluminized.
Tappet Clearance: None in service (hydraulic).

Valve	Head Diam.	Stem Diam.	Length
Intake	1.517-1.527"	.3427-.3432"	①
Exhaust	1.348-1.358"	②	③

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.384"	.0010-.0025"
Exhaust	45°	.384"	④

① - 4.863" (2-Bbl. Carb.), 4.943" (4-Bbl. Carb.).
② - .3427-.3422" (Top), .3417-.3412" (Bottom).
③ - 4.861" (2-Bbl. Carb.), 4.941" (4-Bbl. Carb.).
④ - .0015-.0030" (Top), .0025-.0040" (Bottom).
Valve Seat Width - .037-.075".
Valve Stem Oil Seals: Inverted cup (Oil deflector) over valve stem inside valve spring.
Valve Springs: Single spring used on all valves.

Spring Specifications

Valve	Lbs. Pressure	Length
Closed	70-80	1.750"
Open	160-175	1.350"

Free Length - 2.150".
Valve Guides: Press fit. To remove, support cylinder head and drive out valve guide with Tool No. BT-68-5A. To install, lubricate guide and bore with engine oil. Place valve guide into cylinder head with outside beveled end up. *NOTE* - Intake guides must be installed with grooved end up. Place guide installer Tool No. BT-68-5B over new guide and drive until tool makes contact with cylinder head. This positions guide.
►*OVERSIZE VALVE GUIDE NOTE:* Oversize valve guides identified by 2 grooves (.001"OS), 1 groove (.010"OS), 3 grooves (.011"OS). When replacing guides use .001" oversize guides.
Valv Lifters: Hydraulic lifters standard on all models. Mechanical lifters available with special camshaft on heavy duty engines.
Diameter - .8422-.8427". **L ngth** - 1.997-2.007".
Clearance in Block - .0008-.0023" selective.
Replacement Lifters: Standard only.
Hydraulic Lifter Removal, Overhaul & Testing: *S "Valve System" in Oldsmobile Special Data.*
Rocker Arm Assembly: *See "Valve System" in Oldsmobile Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications (Standard Engine)

Intake Valves - Open 22° BTDC. Close 58° ALDC.
Exhaust Valves - Open 60° BTDC. Close 20° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM:* *See "Engine Lubrication" under OILING SYSTEM in Oldsmobile Special Data.*
Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.
Intake Valves - Open 22° BTDC. Close 58° ALDC.
Exhaust Valves - Open 60° BLDC. Close 20° ATDC.
Normal Oil Pressure: 30 lbs. at 2400 RPM.
Pressure Regulator - In pump body. Not adjustable.
Oil Pressure Indicator - Oil pressure warning lights on instrument panel and oil pressure switch on oil pump. Lights when pressure below 3 lbs.
Engine Unit - AC No. 1508668.
Oil Pump: Gear type. Located in front engine cover.
Oil Pump Removal, Overhaul & Installation - *S e "Oiling System" in Oldsmobile Special Data.*
Oil Filter: Full-flow type with throwaway filter element. Located on oil pump cover. Replace filter every 4,000 miles or more frequently as operating conditions require.
Replacement Filter Element - AC PF-7.
Crankcase Ventilati on: Standard Cars - Air intake at oil filler and breather cap at rocker arm cover. Air outlet is connected to ventilating baffle at other rocker arm cover.
Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to intake manifold with a valve in the line. *See "Positive Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 10½ qts. (Less Air Cond. & Heater). 11 qts. (Air Cond. less Heater), add 1½ qts. for heater.
Pressure Valve - 15 lb. radiator filler cap.
Thermostat: AC No. 1199784 (170°F). Located in water outlet on intake manifold.
Water Pump: Packless, sealed ball bearing type. Serviced by replacement only.
Removal - Drain cooling system, disconnect heater and lower radiator hoses from pump. Loosen pulley belts, then remove fan and pulley from pump. Remove pump-to-front cover attaching bolts. Remove pump.
Fluid Fan Drive: Standard on all cars with Air Cond.
Temperature Indicator: Controlled by thermal switch in right front of intake manifold. A red light indicates temperature has reached 238°±2°F (Cars without A.C.).
Engin Unit - Delco-Remy 1993513.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

PONTIAC V8 & TEMPEST 4 CYLINDER

	Ft. Lbs.
Cylinder Head	85-100
Intake Manifold	30-45
Exhaust Manifold	20-35
Oil Pan	8-15
Main Bearing Cap (Rear)	110-130
Main Bearing Caps (Others)	90-110
Flywheel	85-100
Vibration Damper	130-190
Crankshaft Pulley	130-190
Con Rod Caps	40-46
Camshaft Sprocket	30-45
Rocker Arm Cover	45-80 in. lbs.
Pushrod Cover	25-70 in. lbs
Engine Front Cover (To Oil Pan)	10-20
Water Pump	10-25
Oil Pump	20-35
Oil Filter	20-35
Clutch Housing (Pontiac V8)	60-90
Clutch Housing (Tempest 4 Cyl)	40-60
Transmission to Clutch Housing (Pontiac V8)	45-60
Transmission to Clutch Housing (Tempest 4 Cyl)	35-40

ENGINE

ENGINE REMOVAL: Pontiac - *NOTE* - Engine removed with or without transmission Detail following includes transmission with engine

1) Drain water, engine and transmission oil Remove hood Disconnect all wires, pipes and throttle linkage Remove carburetor, crankcase ventilator pipe, heater hoses, cooler lines, radiator and fan, battery and cables

2) On Power Steering Cars, remove pump belt and pump from mounting bracket and secure assembly out of way

3) Disconnect exhaust pipe from crossover pipe, and disconnect gearshift linkage.

4) On synchro-mesh cars, disconnect clutch fork linkage and remove clutch countershaft bracket from flywheel housing

5) Remove propeller shaft assembly Raise engine slightly by hooking chain to intake manifold, threading chain through holes behind carburetor

6) Remove front and rear insulator mounting screws. Disconnect cooler lines at timing cover

7) On Auto-Trans cars, place transmission jack under transmission and remove frame crossmember *CAUTION - Without jack for support, transmission will swing down when crossmember removed*

8) Hoist engine and transmission out of chassis

ENGINE REMOVAL: Tempest - Remove hood, drain and remove radiator Disconnect heater hoses at engine Disconnect all accessible wires Disconnect fuel line at fuel pump, then disconnect vacuum modulator line (Auto Trans.). Disconnect battery ground strap Remove front fender cross brace, fan and pulley, and disconnect accelerator rod at engine Raise front of car Disconnect clutch and shifting linkage (Synchro-mesh). Disconnect exhaust pipe at manifold. Place wooden block at rear of engine Disconnect propeller shaft and torque tube from rear of engine Disconnect engine support at crossmember Carefully raise engine with chainfall or overhead hoist Move engine forward to clear firewall and heater. To install, reverse removal procedure.

CYLINDER HEAD & MANIFOLD

PONTIAC V8 & TEMPEST 4 CYL.

CYLINDER HEAD: Removal - Remove intake manifold, pushrod and rocker arm cover Loosen rocker arm retaining nuts and move rocker arms off pushrods. *NOTE - Remove pushrods but keep them separated for reinstallation in original position.* Remove crossover pipe to manifold attaching screws. Remove battery ground and engine ground straps on left head or engine ground strap and Hydra-Matic oil level indicator tube bracket on right head Remove head screws (head held in place by dowels) and remove head with exhaust manifold attaching Hooks J-4266 *CAUTION - Handle head carefully as rocker arm studs are hardened and may crack if struck NOTE* - Left head must be raised off dowels, moved forward and "jockeyed" to clear power steering and brake equipment

Installation - Right and left heads are the same. *NOTE - When installing new head, transfer all serviceable parts to new head Use new seals on all valve stems and new exhaust manifold gasket. Install new intake manifold mounting studs Check rocker arm position with Gauge J-6324* Reverse removal procedure and note the following Head screws are of three different lengths and will project an equal distance from head DO NOT use sealer of any kind on threads

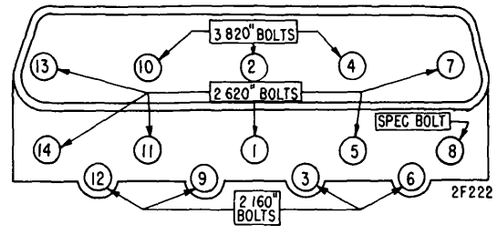
TEMPEST ALUMINUM V8

CYLINDER HEAD: Removal - Remove intake manifold. Pull spark plug wire retainer from brackets on rocker arm cover, disconnect wire at plugs, then swing wires and loom out of way. Remove rocker arm cover, gasket, vent pipe (right side of engine), 4 bracket-to-cylinder head attaching bolts, rocker arm and shaft assembly Remove pushrods. *NOTE - Keep pushrods separated for reinstallation in original positions.* Disconnect exhaust manifold at exhaust pipe, then disconnect battery ground strap at right front outer cylinder head bolt stud Remove cylinder head bolts (14) and rear generator attaching bolt. Remove cylinder head, gasket, and exhaust manifold as an assembly *CAUTION - Aluminum is easily damaged. Use care to protect gasket surfaces*

Installation - Install new gasket on block dowels. DO NOT USE SEALER Install cylinder head after coating head bolts with special non-hardening sealing compound. Tighten head bolts a little at a time until snug, then torque to 50-55 lbs using sequence in diagram. *Locations of different length bolts also illustrated in diagram.* Install pushrods in original location and position through cylinder head opening so rods are correctly positioned on lifter plungers. Notch at one end of rocker arm shaft must be upward Set rocker arm and shaft assembly in place and start several bolts into head Tilt rocker arms toward pushrods and locate top of pushrod in its rocker arm seat. Draw down rocker arm and shaft assembly by tightening 4 bracket bolts a little at a time. Torque bolts to 25-35 lbs. Install rocker arm cover and gasket. Install vent pipe, connect spark wires and battery ground strap

PISTON PINS

Removal: *NOTE Piston Pin Remover & Replacer Set, J 6901 is used Individual parts are marked with respective numbers* Place plunger of Tool J 6901 into



TEMPEST V8 ALUMINUM ENGINE
CYLINDER HEAD DIAGRAM

piston pin bore and position on arbor press Put J-6901 5 between connecting rod and piston boss Put J-6901 3 in pin and press until pin bottoms in J 6901 Remove J 6901 5 and plunger and spring from J-6901 Reposition on arbor press and press pin out of rod

Installation: Place plunger and spring in J-6901 and place plunger in piston pin bore Position on arbor press Coat pin and rod lightly with graphite lubricant Insert pin put J 6901 3 in pin and press pin in until it bottoms against plunger of J 6901 Piston must turn freely on pin *Pin must not move under 1500 lb minimum load after assembly*

Oversize Pin Installation - 001" and 003" oversize pins can be installed Connecting rod can be honed to fit **but must be 0008- 0016' smaller than th pin used**

CRANKSHAFT & MAIN BEARINGS

REAR MAIN BEARING OIL SEAL REPLACEMENT·

1) Drain oil and remove oil pan, oil pump, and oil pump drive shaft Remove oil baffle and cylinder block to oil baffle tube (lower oil level indicator tube) Remove transmission (See Synchro-mesh Transmission Removal on Car Page or Hydra-Matic Drive in Transmission Section). On 4 Cylinder cars, support engine and remove front crossmember assembly

2) Remove rear center main bearing cap and upper half of rear center main bearing shell to allow crankshaft to be lowered and to prevent damage to thrust surfaces of bearing Remove rear main bearing cap and loosen remaining bearing caps sufficiently to allow crankshaft to be lowered approximately ½" at rear

3) With crankshaft lowered to provide clearance, remove upper half of rear main bearing oil seal and bearing shell

4) Install seal in cap, compress with Tool J-7588, and trim one end flush with cap *NOTE - On engines with no cast slots in seal groove in block, rotate seal in cap and recompress slightly to eliminate bumps caused by seal retention slots in cap* Remove seal from cap and turn end-for-end and install in block by slipping up over crankshaft into seal cavity Install rear center main bearing cap and bearing shell and torque to 95 ft lbs Trim both ends of seal flush with block

5) Install a new seal in cap as above and trim flush with cap Install cap with shell and tighten to 120 ft lbs Remove rear main bearing cap again and inspect split line to be certain that none of seal material has been compressed between cap and block Make sure mating surfaces are clean

6) Next, apply a bead of sealer (Permatex No. 3) approx.

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1/16" in diameter to mating surface of cap extending from packing seal groove outward to the groove for oil pan cork rear gasket. Install rear main bearing cap and tighten to 120 ft. lbs. torque.

7) Remove rear center main bearing cap and reinstall upper half of bearing shell. Install cap and tighten to 95 ft. lbs. Tighten remaining bearing caps to 95 ft. lbs. Replace transmission, oil pump, oil pump drive shaft, oil baffle, oil pan and flywheel lower cover and shield.

►*CAUTION:* Seal must be installed exactly as detailed above to prevent oil leaks at rear bearing. Make certain that seals not cut too short and that mating surfaces of bearing cap and block are free of any packing material, dirt or oiliness (except for Permatex bead on cap) and that they are not scratched or burred.

VIBRATION DAMPENER

VIBRATION DAMPENER: Removal–Loosen generator at adjusting strap and remove fan belt from vibration dampener. On cars equipped with power steering, also remove power steering pump belt. Position fan so wide angles will be at top and bottom allowing access to dampener Remove dampener attaching screw (15/16" socket) and retaining washer, and slide dampener off shaft.

Installation: Reverse the removal procedure.

ENGINE FRONT COVER

ENGINE FRONT COVER: Removal - Drain cooling system. Remove generator adjusting strap, fan and accessory belt, and fan pulley and fan from water pump. Disconnect radiator hoses and remove fuel pump and vibration damper. On 4 cylinder cars, loosen timing cover attaching bolts and loosen timing cover-to-intake manifold draw bolt, then remove cover. On V8, remove oil pan-to-cover screws, cover-to-oil cooler line screws, and cover-to-block screws and nuts, then pull cover forward to clear studs and remove.

CRANKSHAFT FRONT OIL SEAL REPLACEMENT: After front cover removed (above), slide old seal off end of crankshaft. Coat face of new seal with graphite lubricant and install on crankshaft before installing front cover.

CAMSHAFT & BEARINGS

►*NOTE:* Camshafts on 4 cylinder cars can be removed by first removing radiator grille lower panel, grille, and hood latch as an assembly. Then remove front bumper assembly, drain radiator and remove. Engine will then be accessible for camshaft removal.

CAMSHAFT REMOVAL & INSTALLATION: Drain radiator. Remove intake manifold, crankcase ventilator outlet pipe, pushrod cover and rocker arm covers. Disconnect and move spark plug wires out of way. Loosen rocker arm ball nuts so rocker arms can be disengaged from pushrods and turned sideways. Remove pushrods and hydraulic lifters. Mark or store pushrods and lifters so they can be installed in original positions Remove radiator and timing chain cover. Remove timing chain cover seal and fuel pump eccentric. Slide timing chain and sprockets off ends of crankshaft and camshaft. Remove distributor. Remove camshaft thrust plate attaching screws and remove thrust plate. Slide camshaft out of engine carefully, making sure not to damage bearings in block. Front of engine should be raised as necessary to permit shaft to slide between grille and hood catch support plate. To install, reverse removal procedure.

TIMING CHAIN

►*1961-1962 4 CYL. TIMING CHAIN FAILURE CORRECTION, TIMING CHAIN BUMPER AND BRACKET PRODUCTION CHANGE NOTE & TIMING CHAIN WEAR CHECK:* Install new bumper spring damper Part No. 543287, new bumper bracket Part No. 543285 and new timing chain bumper spring Part No. 539298. Install these new parts whenever timing chain cover removed. Above change went into production beginning Eng. No. 116591. *NOTE - When replacing these parts, check timing chain as follows:*

1) Turn crankshaft clockwise to remove slack from timing chain tension span.

2) Place straightedge against slack span, tangent to sprockets.

3) Apply 10 lbs. minimum force against center of slack span. Slack span should not displace more than 3/8" from straight line. Replace chain if chain slack exceeds 3/8".

TIMING CHAIN TENSIONER (4 CYLINDER CARS): Removal - Right hand bumper must be removed first, because of hook in each end of spring. DO NOT attempt to remove spring by twisting or stretching spring. *To install, reverse removal procedure, and note the following:* Bumper bolts should not bottom in threads. If they do, tap deeper with bottoming tap. Check to see that two-bolt bumper bracket is wider than gap between each bolt head and block. The single bolt shoulder should bottom on block face, allowing bracket to rotate freely.

VALVE SYSTEM

CHECKING VALVE STEM LENGTH: Position rocker arm on stud and hold in place using Rocker Arm Stud Installer J-8927. Slip valve into place and hold it against valve seat. While holding rocker arm and valve in position securely, insert Valve Train Gauge J-8928 through pushrod hole and seat snugly in pushrod seat of rocker arm. With all parts seated, step end of gauge should be flush with gasket face of head *(See NOTE below),* but should not project past step on gauge. If gauge projects too far (valve stem too long), grind off tip of valve stem as necessary. *CAUTION* - When grinding end of valve stem be careful not to overheat it (may soften hardened stem).

►*NOTE:* Undercut cylinder head requires a straightedge at this point. Clamp straightedge on lower inboard side of head (flush with bottom of head). This is the reference point.

ROCKER ARMS

ROCKER ARM STUD REPLACEMENT: *NOTE - Use oversize stud (.003") only when original stud is found to be loose in cylinder head. Use standard size stud for replacement when original stud threads are damaged.*

Removal: 1) Remove cylinder head. With rocker arm removed, file two slots, 3/32"x1/8" deep, on opposite sides of rocker arm stud. Top of slots should be 1/4-3/8" below thread travel. Place washer J-8934-3 at bottom of rocker arm stud. Position rocker arm stud Remover J-8934-1 on rocker arm stud and tighten screws securely with 5/32" Allen wrench. Place spacer J-8934-2 over stud remover. Thread 7/8" standard nut on stud remover and turn nut until rocker arm stud is out of cylinder head. If oversize stud being installed, ream out stud hole with Reamer J-5715.

2) Remove plugs from ends of cylinder head oil gallery and thoroughly clean out metal deposits and foreign matter from cylinder head (head must be right side up so metal or foreign material will not lodge around studs).

Installation: 1) Position rocker arm on new rocker arm stud and place Rocker Arm Stud Installer on stud in place of rocker arm ball. Carefully press stud into head using a 2-ton press, until it is installed about half-way (7/16").

2) Position Valve Train Gauge in pushrod hole so that it seats properly in the rocker arm. With valve seated, slowly press rocker arm stud into cylinder head until gauge projects about midway between end of gauge and step with respect to gasket surface of cylinder head

►*NOTE:* It will be necessary to clamp a straightedge along edge of cylinder head (undercut head) to simulate this gasket surface.

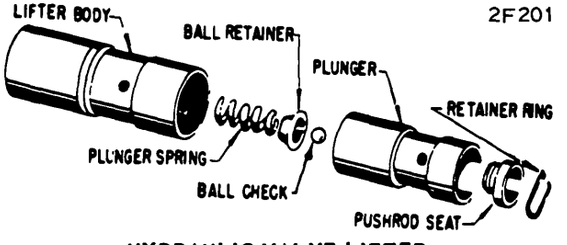
3) Remove Rocker Arm Stud Installer, rocker arm and ball. Blow air through hole in new stud to insure that passage is not restricted, and blow air through oil gallery. Replace plugs in ends of oil gallery. Check oil passages from oil gallery to all studs. Install rocker arm and ball and install nut loosely. Replace cylinder head.

HYDRAULIC LIFTERS

HYDRAULIC VALVE LIFTER OVERHAUL: Removal– Remove intake manifold, pushrod cover and rocker arm cover. Loosen rocker arm ball nut and move rocker arm off pushrod. Remove pushrods and lifters.

Disassembly: Remove pushrod seat retaining ring by holding down seat with pushrod while dislodging spring from lifter body with pointed tool (*NOTE*–it may be necessary to unseat lifter ball, using plunger unloader J-5097, before plunger can be pushed down). Invert lifter and allow plunger to slide out of body. If plunger sticks, place lifter in large end of Hydraulic Valve Lifter Plunger Remover J-4160-A, with pushrod end of lifter downward. Hold tool firmly in hand with thumb over lifter body and strike sharply against a block of wood until plunger falls out (it may be necessary to soak a lifter with a stuck plunger in cleaning solvent to loosen plunger in body). *CAUTION–If more*

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HYDRAULIC VALVE LIFTER

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than one lifter is being disassembled at a time, make very sure that parts for each individual lifter be kept together so that parts are not intermixed.

Inspection: Wash individual lifters separately, keeping parts for each lifter together. If necessary, soak lifter in suitable carbon solvent to dissolve varnish and carbon. Using a lint free cloth, clean each part with a hard wiping action. Use a bristle brush if required. Do not use a wire brush or sandpaper. Inspect lifter body for scoring, and check cam surface at end of lifter for wear. Check plunger, and using a magnifying glass, inspect check ball seat for defects, and outer surface of plunger for scratches or scores. Inspect pushrod seat for roughness and make sure hole in seat is open. Inspect lifter ball for nicks or scoring. If any part of lifter is found defective, replace entire unit.

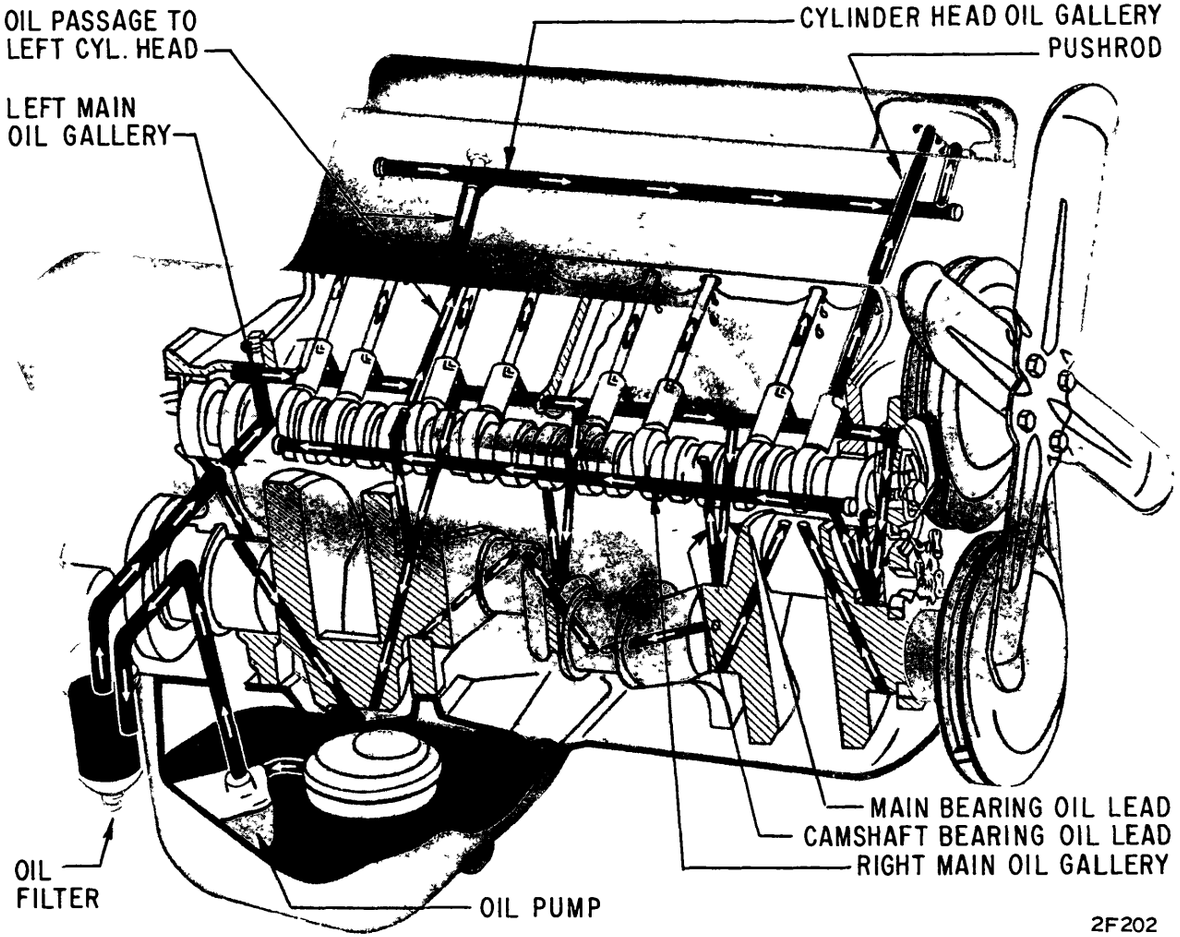
Assembly: Rinse all parts in clean kerosene before assembly and assemble without drying. Rinse plunger spring and ball retainer and position retainer in spring. Install ball in retainer. Rinse plunger and place on retainer so seat on plunger mates with ball. Invert plunger with parts assembled thus far and, after rinsing body, install body over spring and plunger. Place lifter body on clean paper; rinse and install pushrod seat and retainer ring.

Checking Leakdown Rate: Fill tester cup in Valve Lifter Leakdown Tester J-5790, to approximately 1 inch from top with special testing fluid. Swing weight arm up out of way, raise ram, and position lifter into boss in center of tester cup. Place 7/32" steel ball in pushrod seat of lifter and lower ram onto ball. Adjust ram (with weight arm clear of ram) so that pointer is positioned on set line (marked "S"). Tighten jam nut to maintain setting. Operate lifter through full travel of plunger by pumping weight arm to fill lifter with test fluid and force out air, (Lifter must be completely submerged at all times). Continue pumping for several strokes after definite resistance is felt (*NOTE*–If noticeably weak resistance is felt during any one of last few strokes (of hard pumping), replace ball in lifter and repeat test to this point. Raise weight arm to allow plunger spring to expand fully; lower arm onto ram and commence turning crank slowly (1 revolution every 2 seconds). Time indicator travel from lower line (first line above set line) to line marked .125" or 1/8", while still rotating cup with crank. **Lifter is satisfactory if rate is between 12 and 40 seconds. Check a questionable lifter 3-4 times before discarding.**

Installation: *(CAUTION–If new lifter is to be installed, remove sealer coating from new lifter, making sure that hole in pushrod seat is not plugged with sealer coating. Check leakdown rate).* **Place new lifter in lifter boss and replace pushrod exactly as removed (same end against rocker arm). Tighten rocker arm ball** retaining nuts to 15-25 lbs. Replace rocker arm cover, pushrod cover and intake manifold.

OILING SYSTEM
ENGINE LUBRICATION

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic valve lifters.



PONTIAC V8 ENGINE OILING SYSTEM (4 CYL. ENGINE SIMILAR)

Metered oil is supplied to pushrod seats, rocker arms, timing chain and sprockets, and distributor drive gear. All other parts are lubricated by oil spray.

OPERATION: Gear type oil pump mounted on lower face of block in rear of crankcase draws oil up through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in pump body and crankcase to inlet port on oil filter mounting pad on right side of crankcase. From filter outlet, oil flows through transverse passage in rear end of block to rear end of left main oil gallery which extends along entire length of engine block. At forward end of left main oil gallery a "V" passage extends down to crankshaft bearing and up to forward end of right main oil gallery which also extends along entire length of engine block. Oil is distributed through these oil galleries as follows:

Crankshaft & Camshaft Bearings - Rear bearings are lubricated through short vertical passage extending between crankshaft bearing bore and camshaft bearing bore and intersecting the oil filter outlet passage (above) from which oil is supplied to these bearings. **Other** bearings are lubricated by "V" passage in each crankcase web which extends down from left main oil gallery to crankshaft bearing bore and then up to camshaft bearing bore (additional passage at front crankshaft bearing supplies oil to right main oil gallery).

Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole from adjacent main bearing.

Pistons & Pins - Lubricated by oil jet thrown on cylinder walls through groove between rod and bearing cap of connecting rod for opposite cylinder when this groove lines up with oil hole in crankpin journal. *NOTE* - Rods must be installed with this groove upward or toward camshaft for this cross-lubrication.

Pushrods, Rocker Arms, & Valves - Pushrods are filled with oil directly through small hole in top of lifter for lubrication of upper and lower pushrod seats. Vertical passages in block at No. 2 camshaft bearing (for right bank), and No. 4 camshaft bearing (left bank) extend up

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through engine block and matching passages in head (passage in head is around one cylinder head bolt with grooved channel in lower face of head to connect with hole in block) to connect with cylinder head oil gallery which extends along entire length of each cylinder head. Oil in this system is metered by camshaft bearing and is fed intermittenly when oil holes line up. Rocker arm studs (pressed in head) extend down into this cylinder head oil gallery and have drilled oil passage with side hole at rocker arm ball seat through which oil flows to lubricate ball seat and up through grooves in ball to fill channel section of arm. This oil overflows end of rocker arm to lubricate valve tip. Excess oil in rocker chamber drains down pushrod openings into lifter chamber and oil drain holes in floor of lifter chamber (at each side of center crankcase web) return oil to the oil pan.

Valve Lifters - Hydraulic valve lifters are supplied with oil through short vertical passage extending from main oil gallery directly to lefter bore.

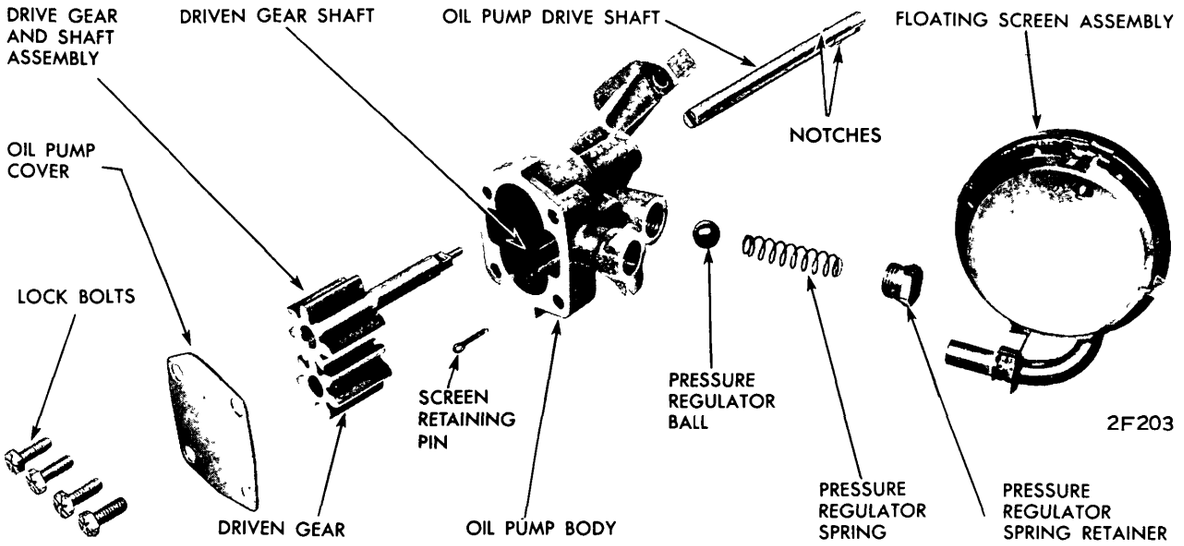
Timing Chain, Sprockets, & Fuel Pump Eccentric - Drilled holes in camshaft front journal provide a jet of oil when hole in journal lines up with oil hole in bearing. This jet strikes camshaft thrust plate and part of the oil is diverted downward through grooves in front face of engine block and thrust plate for sprocket and chain lubrication. An additional hole in the thrust plate permits an oil jet to pass through opening in camshaft sprocket and lubricate fuel pump eccentric and rocker arm.

Distributor Shaft & Bushings - Lubricated through passage in block from main oil gallery.

OIL FILTER: Full flow type mounted on base adapter bolted on right side of crankcase. Bypass valve located in filter base assures engine lubrication if filter element clogged.

4 CYLINDER ENGINE

Engine design and oiling system similar to Pontiac V8 except for absence of left bank. See above.



PONTIAC OIL PUMP (ALL MODELS)

OIL PUMP

OIL PUMP OVERHAUL: ***Removal***–Remove oil pan and remove oil pump attaching screws while holding pump in place. Carefully lower oil pump away from block with one hand while removing oil pump drive shaft with the other hand.

Disassembly: Remove cotter pin which retains floating screen to pump inlet and remove screen. Remove pressure regulator and spring retainer, spring and pressure regulator ball. Remove screws retaining cover to oil pump body and remove cover. Remove driven gear and drive gear with shaft.

Cleaning & Inspection: Clean all parts thoroughly (clean screen with Bendix Cleaner). Inspect pressure regulator spring for distortion, cracks, and wear on sides. Inspect pressure regulator ball for nicks or other damage. Inspect oil pump drive shaft (distributor to pump shaft) for wear or cracks. Inspect all other pump parts for wear. Replace parts as necessary.

Assembly: Install drive and driven gears. Install cover and turn drive shaft by hand to insure that it turns freely and has a slight amount of endplay. Install pressure regulator ball, spring and retainer using a new gasket on retainer. *(CAUTION–Do not attempt to change oil pressure by varying length of pressure regulator spring).* Install screen assembly on oil pump and install new cotter pin retainer.

Installation: To install pump, position drive shaft into position in distributor and oil pump drive gear, then position oil pump in place on block, indexing drive shaft with pump drive gear shaft. Install two attaching screws with lockwashers and tighten securely. *(NOTE–* Removal and installation of pump does not disturb distributor timing). Install oil pan.

►*JACKING & HOISTING CAUTION: B for jacking, hoisting, or working under car, s "Jacking & H isting Pr cauti ns" in Susp nsion & Wh l Alignment Section.*

►*STARTING CAR BY PUSHING CAUTION: Hydra-matic cars CANNOT be started by pushing because of transmission design.*

MODEL IDENTIFICATION

Series	①Series Designation
Catalina	23
Star Chief	26
Bonneville Safari (Station Wagon)	27
Bonneville Coupe, Sedan, Convertible	28
Grand Prix	29

①—First two digits of series and body style designation following "62" year number under STYLE on body identification plate.

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar post, on front of right bank of engine on lower outer edge near water pump outlet hose (see also engine production code number below), and on most 4—speed synchro-mesh transmission cars, on top of transmission case. Number (example below) includes identification data.

①	②	③	④
3	62	P	1001

①—Series. 3 - 23, 6 - 26, 7 - 27, 8 - 28, 9 - 29.
②—Model Year. 62 1962.
③—Assembly Plant. P Pontiac, S South Gate, W Wilmington, K Kansas City, L Linden, D Doraville, A Arlington.
④—Beginning vehicle number for each prefix combination.

Engine Production Code Number: Stamped on front face of right cylinder bank on upper edge near water pump outlet. Do not confuse this number with Serial and Engine Number.

►*ENGINE IDENTIFICATION LETTER CODE:* Thirty—five different engine combinations used. Letter code (O1A, 11B, etc.) stamped on small pad directly below Engine Production Code Number. Letter code indicates various items of equipment used in a particular engine and will be listed in following data as necessary.

TUNE-UP

►*HARD START OR LOW CRANKING RPM IN COLD WEATHER CORRECTION:* Replace battery with Heavy Duty Battery No. 775 (72 amp. hr.).

►*ENGINE MISFIRE OR IGNITION SHORT CORRECTION:* On non-air conditioned cars, rotate No. 4 spark plug wire connector beneath generator rear brace to about 7 o'clock position.

►*IGNITION SHORTING OUT CORRECTION:* If condition occurs on cars with tachometer, check for short in tachometer wiring (shorting against ignition coil) and make sure tachometer fuse is 1 ampere capacity.

COMPRESSION PRESSURE: 140-150 lbs. (8.6-1 ratio), 155-165 lbs. (10.25-1 & 10.75-1 ratios) at 155-165 RPM. Lowest cylinder must not be less than 80% of highest cylinder.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: Thermostatic coil type in right exhaust manifold outlet. Inspect at 4000 mile intervals. Valve must operate freely and anti-rattle spring must be installed in a downward position. Bend anti-rattle bracket so counterweight strikes stop before heat valve strikes inside of manifold in closed position.

CRANKCASE VENTILATION VALVE: Replace valve at 12,000 mile intervals or yearly and check operation before performing a "Tune—Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders—RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.
SPARK PLUG GAP: .035".
Spark Plugs — AC No. 45S (No. 44S on Police Cars). 14mm. Torque to 25 ft. lbs.
COIL: Delco-Remy No. 1115133.
Ignition Current — 2.1 amps. idling, 3.4 amps. stopped.
Resistor — Resistance wire (1.28-1.36 ohms at 80°F) connected in circuit between coil and IGN 1 terminal of ignition switch. Bypassed during cranking by second lead from ignition switch.
DISTRIBUTOR: Delco-Remy No. 1110997 (8.6-1 ratio), No. 1110996 (10.25-1 & 10.75-1 ratios). External adjustment ("Window") type.
Condenser-Delco-Remy 1932004. **Capacity**.18-.23 mfd.
Contact Point Set-Delco-Remy No. 1931988.
Breaker Gap - Gap (.016") will be correct when cam angle correctly set.
Cam Angle - 28-32°. Set at 30°. Will give .016" breaker gap.
Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance — 1110997

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0—2		450	0—4		900
6—8		1050	12—16		2100
9—11		1800	18—22		3600

Automatic Advance — 1110996

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0—2		400	0—4		800
4—6		750	8—12		1500
7—9		1000	14—18		2000
8—10		1450	16—20		2900

Vacuum Spark Control: Delco-Remy No. 1116172 (1110996 Distr.), No. 1116173 (1110997 Distr.).

Vacuum Advance - 1116172

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8-10
10	20	14.75-16.75

Vacuum Advance - 1116173

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
10.5	21	13-15

IGNITION TIMING

Setting — 6° BTDC with engine at normal operating temperature and operating at idle speed; and with distributor vacuum line disconnected.

►*IGNITION TIMING NOTE:* Above timing setting (6° BTDC) is for operation on regular fuels (8.6-1 ratio), and for premium fuels (10.25-1 & 10.75-1 ratios). Do not retard later than 0° for any reason.

Timing Marks — TDC and 6° BTDC marks on harmonic balancer. Align pointer on chain case cover with correct mark on balancer.

CARBURETOR

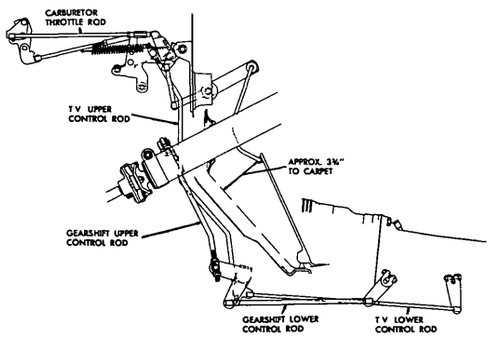
►*CARBURETOR APPLICATION: Cart r and Roch st r carburetors used as follows:*

Model	Carbur t r
Catalina & Star Chief	Rochester 2—Bbl.
Bonneville & Grand Prix	Carter AFB 4—Bbl.
All Models (Optional)	Rochester Triple 2—Bbl.

THROTTLE LINKAGE ADJUSTMENT: With engine and transmission at normal operating temperature, idle speed correctly set, proceed as follows: Loosen both nuts on transmission throttle control rod trunnion. Stop engine and install Linkage Adjusting Pin J-7687 through holes in throttle control lever and bracket. *NOTE — On cars with throttle r turn ch ck, r mov throttle return check or install Holding Tool J-6342-01 over return check.* Close throttle valves fully and loosen locknut on transmission throttle control rod. Adjust length of rod so gauge pin is a free fit in holes. Tighten locknut, but leave pin in place. Push transmission throttle control rod down until transmission throttle control outer lever reaches end of its travel. *CAUTION — Upper locknut must not touch trunni n.* Hold rod and tighten upper and lower trunnion locknuts finger tight. **Then shorten r d by backing ff l w r nut 2½ turns.** Tighten upper nut securely. Remove gauge pin. Loosen locknut on carburetor throttle rod and adjust rod so there is 4 35/64" clearance from underside of attaching boss on accelerator pedal to body toe pan (3¾" to carpet). Tighten locknut. Remove Tool J-6342-01.

THROTTLE RETURN CHECK ADJUSTMENT: Set Hot Idle Speed and Mixture Adjustment to specifications. With transmission in Neutral and engine running, disconnect vacuum hose from throttle return check and plug end of vacuum hose. Adjust contact screw of throttle return check to obtain 1050 RPM. *CAUTION - While adjusting c ntact scr w, hold adjustment screw plunger from turning to pr v nt damag to diaphragm inside return ch ck.* This procedure supersedes previous manufacturer's recommendations.

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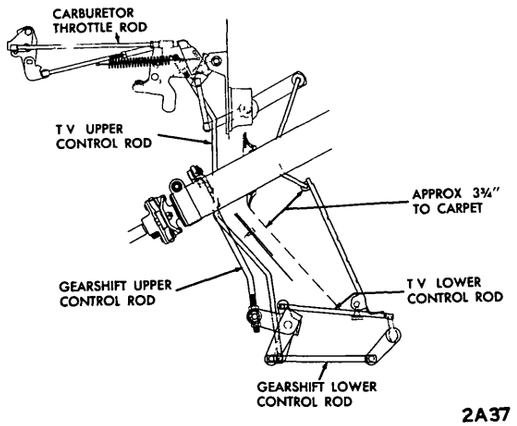


2A36

ROTO HYDRA-MATIC THROTTLE LINKAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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2A37

SUPER HYDRA-MATIC THROTTLE LINKAGE
ROCHESTER 2GC 2-BARREL

Engin & Transmissi n	Carburetor No.
Std. Engine Synchro-mesh	①7020060
Std. Eng. Super H-M No Air Cond.	②7020070
Std. Eng. Roto H-M No Air Cond.	②7020071
Std. Eng. Super H-M With Air Cond.	②7020072
Std. Eng. Roto H-M With Air Cond.	②7020073
425E Eng. Super H-M No Air Cond.	①7020074
425E Eng. Roto H-M No Air Cond.	①7020075
425E Eng. Super H-M With Air Cond.	①7020076
425E Eng. Roto H-M With Air Cond.	①7020077

① — 1 7/16" throttle bore with choke on air horn.

② — 1 11/16" throttle bore with choke on throttle body.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel f ds Cyls. 2-3-5-8, LEFT barrel feeds 1-4-6-7.*

►*IDLE COMPENSATOR CAUTION:* Idle compensator (thermostatically controlled idle air bypass) used on all cars with Air Conditioning. Compensator valve must be closed when making idle setting and idle speed adjustments. Press on spring-loaded button on rear of carburetor throttle body.

Idle S tting – Initial setting 1½ turns open. Turn screw out for richer mixture.

Idl Speed – 480-500 RPM with Hydra-Matic in "DR" (540-560 RPM with Air Cond. "Off" and Hydra-Matic in "DR").

Fl at L vel – 5/8" ± 1/16" (Std. Eng. Hydra-Matic), 11/16" ± 1/16" (Std. Eng. Synchro-mesh & 425E Eng.) between bottom of float seam at toe end and air horn gasket with air horn inverted, gasket in place and needle seated. Use Gauge BT-177 or J-8556 (5/8"), BT-176 or J-8557 (11/16"). To adjust, bend float arm.

Fl at Drop – 1¾" (Gauge BT-176, BT-177, J-8556, J-8557) from gasket surface to lowest point of float with air horn upright, gasket in place and float hanging free. To adjust, bend float tang.

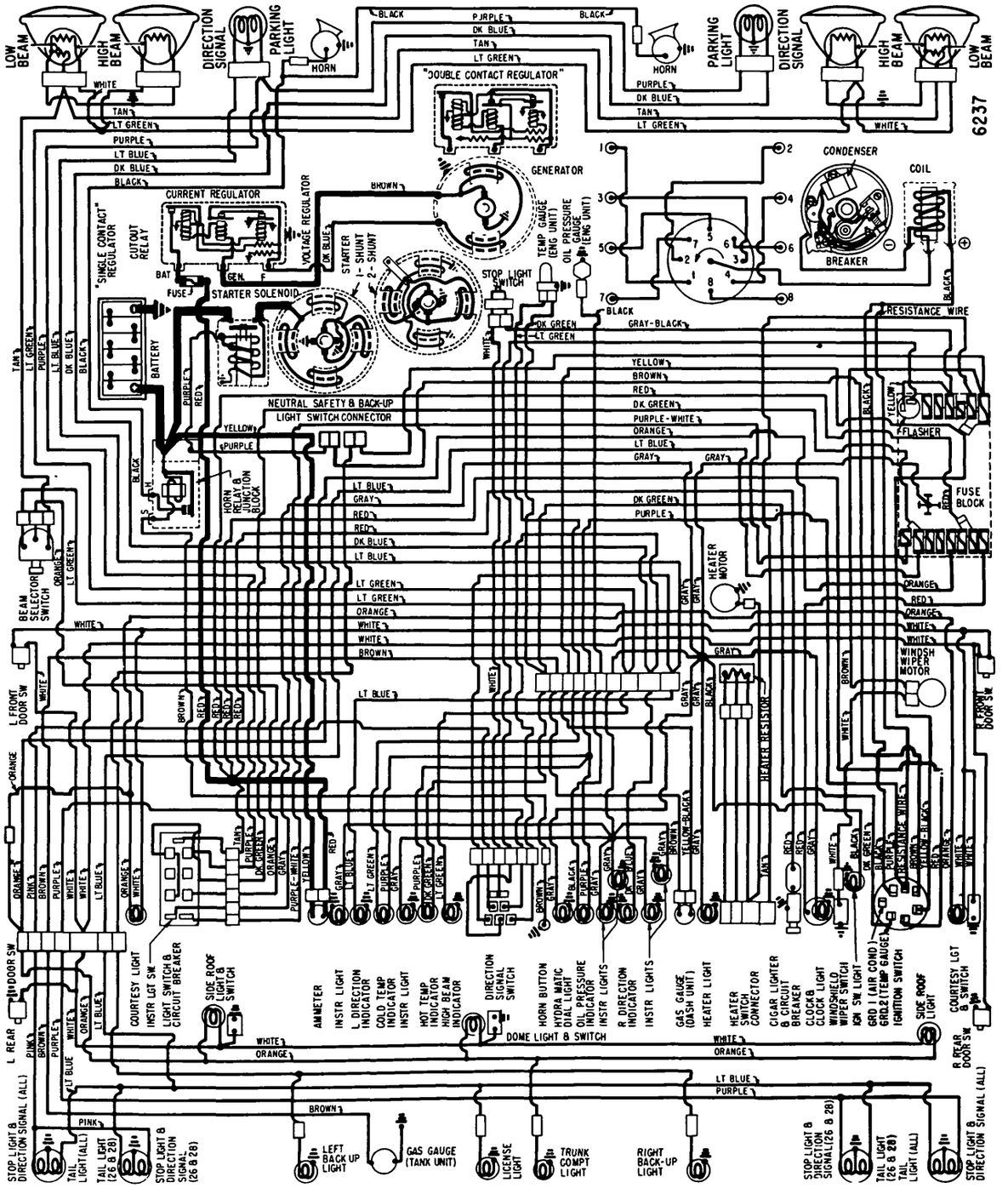
Fast Idl : No adjustment. Fast idle will be correct when hot or slow idle correctly set.

Aut matic Ch k S tting: Centered at index.

Thr ttl Linkage Adjustm nt: See *CARBURETOR abov .*

►*OTHER DATA: Se "Rochester 2GC 2-Barr l Carburetors" in Carbur tion S ction.*

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CARTER AFB 4-BARREL

►*PART THROTTLE STUMBLE OR HESITATION CORRECTION & PRODUCTION CHANGE (HYDRA-MATIC CARS) NOTE:* Later Carter Carburetors have recalibrated metering rods and vacuum step-up springs. These carburetors can be identified by letters SA following model number on carburetor tag. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Carter AFB. Standard on Bonneville and Grand Prix, *Optional on all other models as follows:*

Transmission	Carburetor No.
Synchro-mesh	①3123SA
Super Hydra-Matic (Early)	②3300S
Super Hydra-Matic (Late)	④3300SA
Roto Hydra-Matic (Early)	③3326S
Roto Hydra-Matic (Late)	④3326SA

① - With black identification tag.
② - With yellow identification tag.
③ - With red identification tag.
④ - Stamped on carburetor tag.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 2-3-5-8, LEFT barrels feed 1-4-6-7.*

Idle Mixture & Speed Setting – Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter AFB 4-Barrel Carburetors" in Carburetion Section.*

TRIPLE CARBURETORS
(Rochester 2G & 2GC)

Transmission	Front	Center	Rear
	Rochester Carburetor No.		
Synchro-mesh	7013063	7020064	7013065
Super Hydra-Matic	7013063	7020067	7013065
Roto Hydra-Matic	7013063	7020069	7013065

Idle Speed - *Same as other models (see 2GC data above).*

►*For complete adjustment data on these carburetors (including linkage adjustment to insure correct synchronization), see "Rochester Triple Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4512. Fuel only.
Pressure - 5¼-6½ lbs. at 500-1000 RPM.

Fuel Filter: AC No. GF-61P (Exc. Air Cond.), No. GF-73 (Air Cond.). Located near fuel pump in line between pump and carburetor. Replace every 12,000 miles or yearly.

Gasoline Gauge: AC electric type.
Dash Unit - AC No. 5643990 (Std.), 5643993 (Optl.).
Tank Unit - AC. Used as follows:

Model	Std. Cars	Air Cond. Cars
All (exc. Sta. Wgn.)	5641736	5641737
Station Wagon	5641570	5641571

Air Cleaner: Wire mesh, paper element or plastic foam types used.
Wire Mesh Type - Clean every 8000 miles or six months.
Paper Element Type - Clean or replace every 16,000 miles or yearly, sooner under severe dusty conditions. *NOTE* - Clean by blowing air on inner surface of filter element.
Plastic Foam Typ - Clean and reoil every 16,000 miles or yearly (sooner under severe dusty conditions).

►*POLYURETHANE ELEMENT NOTE & CLEANING CAUTION:* Plastic type. May be used to replace other elements and may be found on cars in service. Clean element by removing it from screen and washing in solvent (such as kerosene at room temperature) and squeezing dry (*CAUTION - DO NOT wring dry*). Dip element in SAE 10W-30 oil, squeeze to remove excess oil, reinstall element on screen with sealing edges evenly overlapping the screen.

BATTERY

Delco. Used as follows:
Synchro-mesh Cars - 2SMR53, No. 458. 12 volt, 9 plate, 53 ampere hour capacity (20 hr. rate).
Hydra-Matic Cars - No. 558. 12 volt, 11 plate, 63 ampere hour capacity (20 hr. rate).
Heavy Duty Battery - 3SMR72, No. 670 & 775. 12 volt, 11 plate, 72 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - At either cylinder head.

STARTER

Delco-Remy No. 1107791 (8.6-1 ratio except 425E Eng. with Air Cond.), No. 1107781 (All others). *NOTE - Starter No. 1107781 is "Two Shunt" type.*
Armature - Delco-Remy No. 1950563 (1107791 Str.), No. 1949770 (1107781 Str.).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107791

Torque	RPM	Volts	①Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Performance Data – 1107781

Torque	RPM	Volts	①Amperes
0 ft. lbs.	3900-5400	10.6	80-120
	Lock	2.0	290-370

① – Includes Solenoid.

Starting Switch: Delco-Remy Solenoid No. 1119798 (Synchro-mesh), No. 1114257 (Auto. Trans.) mounted on starter and controlled by Ignition & Starter Switch.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998705 located on steering column behind instrument panel.
Adjustment - *See "Dual-Coupling Hydra-Matic Drive" in Transmission Section.*

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION: Battery charging circuit protected by a 45 amp. fuse, No. 1945172 (Std. Reg.), 60 amp. fuse, No. 1945171 (Double Contact Reg.) clipped to "BAT" terminal of generator or regulator. Check for blown fuse when diagnosing generator, regulator, or battery failure.*

Delco-Remy. Used as follows:

Model	Generator No.
Standard (Less Heater)	1102263
Standard (With Heater) Early	1102303
Standard (With Heater) Late	1102264
Heavy Duty & Air Cond.	1102220
Heavy Duty Low Cut-in	1105143
425A Eng. with 3 2-Bbl. Carbs. (Early)	1102304
425A Eng. with 3 2-Bbl. Carbd. (Late)	1102265

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

►*1102303 & 1102304 GENERATOR CORRECTION & PRODUCTION CHANGE NOTE: See Generator Regulator below.*

Performance Data

Generator	Amperes	Volts	Gen. RPM
1102263	30	14.0	2310
1102303 & 304	35	14.0	2540
1102264 & 265	35	14.0	2730
1102220	45	14.0	2520
1105143	45	14.0	2200

Rotation - Counterclockwise at commutator end.
Field Current - 1.48-1.62 amps. (1102263,64,65), 2.66-2.86 amps. (1102220,303,304). 2.73-3.0 amps. (1105143).
Brush Spring Tension - 28 ozs.
Belt Adjustment: Borroughs Tension Gauge should read 70-75.

GENERATOR REGULATOR

►*BURNED REGULATOR CONTACTS AND/OR POINT MATERIAL BUILD-UP (CARS EQUIPPED WITH 1102303 OR 1102304 GENS.) CORRECTION AND PRODUCTION CHANGE NOTE:* Condition may be corrected by installing rectifier resistor assembly Part No. 1960461. To install, attach blue lead to generator field terminal and brown lead to generator armature terminal. Replace regulator if necessary. Above changes not necessary with later production generators (higher field resistance). Production change effective approximately March 15, 1962 with Generator Parts Nos. 1102264 (replacing 1102303), and 1102265 (replacing 1102304).

Delco-Remy. Used as follows:

Regulator No.	Generator
1119623	1102220 & 1105143
1119263	1102263
1119668	1102264,265 & 1102303,304

►*REGULATOR NOTE:* 1119623 & 1119668 regulators are "Double Contact" type.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Cutout Relay

Cuts In - 11.8-13.0 volts (1119623 & 668), 11.8-13.5 volts (1119263).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119623 & 668) - 13.8-14.6 volts at 125°F ambient temperature operating on upper contacts. .1-.3 volt lower operating on lower contacts.

Setting (1119263) - 13.8-14.7 volts at 125°F ambient temperature.

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Contact Gap - .016".
Air Gap - .067" (1119623 & 668), .075"(1119263)with armature pressed down to point where contacts just touch.

Curr nt Regul ator

S tting (1119668) - 31.0-35.5 amps. at 125°F.
S tting (1119623) - 38.0-45.0 amps. at 125°F.
S tting (1119263) - 27.0-31.0 amps. at 125°F.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: S "D lco-Remy 6 & 12-Volt Single C ntact R gulators" or "Delco-Remy Double Contact R gulators" in El ctrical Section.*

ALTERNATOR

D lco-Remy D lcotr n N . 1117070 & 1117750. Three-phase type with internal rectifiers.

©P rformanc Data - Cold (70°F)

Alt rnator	Amperes	RPM
1117070	31	1000
	58	2500
1117750	18	1100
	62	6500

© - Rated output hot 60 amps. (1117070), 62 amps. (1117750).
Current Output - 25 amps. (approx.) at 525 Engine RPM (1117070).
Fi ld Curr nt - 6-6.6 amps. (1117070), 3.7-4.4 amps. (1117750) at 12 volts and 80°F.
Brush Spring T nsion - 10 ozs.
Rotation - Clockwise at drive end.
►*OTHER DATA: Se "D lco-Remy Delcotron Alternators" in El ctrical Secti n.*

ALTERNATOR REGULATOR

D lc -R my N . 9000562. Two-unit type containing a Field Relay and a Transistorized Voltage Regulator.

V ltag Regulator

N rmal S tting – 13.9-14.6 volts. Adjust within range regardless of temperature.
Air Gap – .070" with armature pressed down to point where contacts just touch.

Fi ld Relay

Cl sing V ltag – 5.0-9.5 volts.
Air Gap – .014" with contacts just touching.
C ntact Gap – .027".
►*OTHER DATA: See "D lco-Remy Transistorized Alternator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

Dir ction Signals: Switch located on steering column behind instrument panel. To remove, remove attaching screws and washers, remove assembly and horn wire retainer from steering column housing. To install, reverse removal procedure.
►*FLASHER IDENTIFICATION NOTE:* Use flasher unit marked AP 2 (on 23 & 25 Series), AP 3 (on 26 & 28 Series). Flasher mounted on fuse block located on dash shroud above front edge of left floor mat.

Instrument Clust r R moval: Disconnect battery. Disconnect cluster wire at chassis wiring harness connection below plenum chamber. On cars with Circ-L-Aire Conditioning remove instrument cluster pad and trim plate (retained with clutch head screws). Remove radio knob and retaining nut. Push cluster toward front seat and using a sprin wrench or deep socket, remove lockwashers and nuts. Disconnect speedometer cable and remove wire connector from ammeter terminals and other electrical connections. On all cars without Circ-L-Aire Conditioning, push cluster toward front of car, turn cluster upside down and remove. To install, reverse removal procedure.
Speedometer Removal (Cluster Removed): Disconnect Safeguard control cable (if so equipped) by pulling straight out. Remove cluster face plate and lens by unsnapping face plate from housing. Remove screws on back of cluster at speedometer cable fitting area. Remove speedometer and instruments carefully. If car is equipped with Safeguard speedometer, disconnect ground wire at clip terminal and also the wire retainer clip. Carefully note routing of wires before removing ground wire. Remove screws retaining numeral plate and remove speedometer head assembly. To install, reverse removal procedure.
Lighting Switch Removal: Disconnect battery. Pull headlight switch knob "ON". Push latch button on side of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly, freeing switch from instrument panel.
Stop Light Switch Location: Mechanical type located on bracket attached to steering column behind instrument panel.
Adjustment - Loosen locknut and position switch thread 3/16" to pedal arm with brake fully released. *NOTE - Switch must not restrict pedal action.*

CIRCUIT BREAKER: 22 Ampere – Headlights, high beam indicator, parking and tail lights. In headlight switch. *NOTE – Tail lights also protected by 14 ampere fuse in fuse block.*

FUSES: *All fuses (except as noted) are in a fuse block on passenger side of dash on left side of car.*
3AG or AGC 30 Ampere – Air Conditioner system. *In line above fuse block.*
SFE 25 Ampere – Windshield wiper and washer, and back-up lights.
SFE 20 Ampere – Heater blower, Safe Guard speedometer circuit, and Low Fuel Level warning circuit.
SFE 14 Ampere – Tail and license lights.
SFE 14 Ampere – Interior (courtesy, dome, etc.) and Trunk lights.
SFE 14 Ampere – Glove Box light, and Clock.
SFE 14 Ampere – Cigar lighter light, and ash tray light.
SFE 14 Ampere – Parking brake warning light.
SFE 14 Ampere – Spotlight and underhood light.
SFE 14 Ampere – Power Antenna.
SFE 7.5 Ampere – Radio.
SFE 4 Ampere – All instrument panel, control, and indicator lights (except cigar lighter light and ash tray light).
SFE 4 Amp r – Lighting control rheostat.
SFE 1 Amp re – Tachometer. *In wiring n ar ignition coil.*
Special – Fuse or Circuit Breaker for cigar lighters located on forward end of lighter housing. Capacity depends on heat from lighter element and amperes used.

ENGINE

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. 389" engine of same design used previously. All engines are basically the same with modifications and optional equipment as indicated. *See "Engine Identification Letter Code" under MODEL IDENTIFICATION above. Reference will be made to Letter Code to indicate on which engines various items will be found.*
►*425A ENGINE NOTE:* These engines are Letter Codes 08B, 11B, 25J, 28J, 47N, 50N.
►*425E ENGINE NOTE:* These engines are Letter Codes 20L, 21L, 40R, 41R.

Engine	Bore	Stroke	Displacement	Rated HP
All	4 1/16"	3 3/4"	389 cu. ins.	52.8

Engine①	Compr. Ratio	Developed HP
Std. (2-Bbl., S-M)	8.6-1	215 at 3600 RPM
Std. (4-Bbl., S-M)	8.6-1	235 at 3600 RPM
425E(2-Bbl., All H-M)	8.6-1	230 at 4000 RPM
Optl.(2-Bbl., Roto H-M)	10.25-1	267 at 4200 RPM
Optl.(2-Bbl., All H-M)	10.25-1	287 at 4400 RPM
Optl.(4-Bbl., All Trans.②)	10.25-1	303 at 4600 RPM
Optl.(3 Carbs., All Trans.)	10.75-1	318 at 4600 RPM
425A(4-Bbl., All Trans.)	10.75-1	333 at 4800 RPM
425A(3 Carbs., All Trans.)	10.75-1	348 at 4800 RPM

① – **S-M** – Synchro-mesh (All).
Roto H-M – Roto Hydra-Matic.
② – Except Std. 3-speed synchro-mesh.
Compression Reading – *See TUNE-UP.*

►*421" ENGINE NOTE:* This high performance engine can be built from the following special parts:

Part	Part N .
Cylinder Block (4 3/32" bore x 4" stroke)	542981
Rear Main Bearing Seal Packing	1193133
Cylinder Head Gasket①	542973
Crankshaft	542990
Pistons (Standard Bore)	542983
Oil Pump & Oil Pan②	983684
Intake Manifold③	983683
Camshaft (McKellar No. 11)	542992
Crankshaft & Connecting Rod Bearings	543012
Piston Rings	543296

① – Use with Cylinder Head Package No. 989798 to replace Gasket No. 535458.
② – 60 lb. pump and 8 quart oil pan.
③ – Package consists of: Intake Manifold No. 542991; Two 4-Bbl. Carburetors No. 534628; Throttle Linkage No. 543025; Spacer No. 543294.

OIL PAN REMOVAL: Drain radiator and crankcase. Remove hood and air cleaner. Disconnect battery ground cable and radiator hoses. Move coil away from body. Disconnect exhaust manifolds from exhaust pipes. Lower idler arm and tie rod by disconnecting idler arm bracket from frame. Disconnect engine front mounts. Lower starter from clutch housing. Remove oil pan retaining bolts. Remove clutch housing lower cover. Raise engine as high as possible and remove flywheel cover. Let oil pan drop from block. Remove front main bearing cap and position crankshaft at No. 1 firing position. Hold crossover pipe and tie rod down and remove oil pan.

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Installation - Use new gaskets and cement gasket in rear main bearing cap 1-1¼" from both sides of groove. Push pan into place (hold crossover pipe and tie rod down) and install front main bearing cap. *NOTE - Place a jack stand under front frame and lower engine to torque cap bolts to 95 ft. lbs.* Reverse removal procedure to complete installation.

ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*

CYLINDER HEAD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*

TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, tin plated, with piston pin offset 1/16" to right. *See "Piston Note" below.*

►*PISTON NOTE:* Various types used as follows:

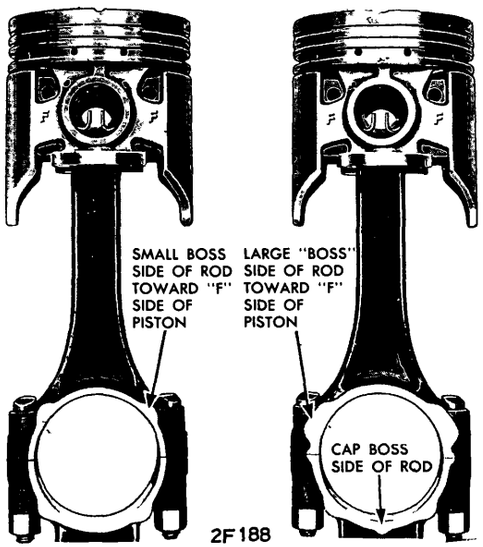
Low Compression (8.6-1 Ratio) - Pistons have recess or dish in head and are identified by TWO notches at front of piston head and mark "L" on rear piston pin boss. *These pistons must not be used in 10.25 & 10.75-1 ratio engines.*

High Compression (10.25 & 10.75-1 ratios) - "Flat Top" type. Pistons have valve clearance reliefs machined on head and are identified by ONE notch at front of piston head.

Removal - Pistons and rods removed from above.

Piston Clearance - .0007-.0013" measured 1.18" below top of skirt. Fit pistons with .0015" x ½" feeler. Pull to withdraw feeler should be 8-15 lbs. *NOTE - .0022-.0027" clearance on 425A engines, police cars, and 3 carb. synchro-mesh engines.*

Installing Pistons - Install piston with notches in piston head and "F" mark on piston boss toward front of engine. *See Rod Installation.*



PISTON & ROD ASSEMBLY

Replacement Pistons: Police, T425A & Thr 2-Bbl. Carb. - Furnished Std. (4.060", 4.061", 4.062" "Flat Top") and .005", .010", .020", .030" Oversize.

All Others - Furnished Std. (4.061", 4.062", 4.063" "Flat" or "Recessed" Top) and .005", .010", .020", .030" Oversize

PISTON PIN

Pin is press fit in rod.

Diameter - .9802". **Length** - 3.25".

Pin Fit in Piston - .0003-.0005" loose. Piston must turn freely on pin.

Pin Fit in Rod - .0008-.0016" press fit.

Piston Pin Removal & Installation - *See "Piston Pins" in Pontiac Special Data.*

Replacement Pins: Furnished Std. and .001", .003" Oversize.

PISTON RINGS

Compression rings are cast iron, taper faced. No. 1 has thick chrome, No. 2 has Lubrite finish. Oil ring is segmented spring steel with chrome face on rails.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.078"	.016-.026"	.0015-.0030"
Compr. (2)	.078"	.013-.025"	.0015-.0035"
Oil	.184"	.015-.035"	.0015-.0085"

Installing Rings - Step or chamfer on upper compression ring and letter "T", dot, or word "TOP" on lower compression ring toward the top.

Replacement Rings: Std. and .005", .010", .020", .030" Oversize.

CONNECTING ROD

Length - 6 63" (center-to-center)

Crankpin Journal Diameter - 2.2492-2.2502".

Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims.

Clearance - .0005-.0025".

Sideplay - .006-.011"

Replacement Bearings: Std., .001" and 002" Undersize

Installing Rods: Pistons have F marks and one notch (10.25-1 & 10.75-1 ratios), two notches (8.6-1 ratio) on front. Install rods so that LARGE machined boss at lower end of rod on same side as "F" mark and notch in piston (Left bank cyls. 1-3-5-7), on opposite side of piston from "F" mark and notch (Right bank cyls 2-4-6-8). Install assemblies in engine with "F" marks and notches on piston toward front of engine and oil groove in lower end of rod toward center of engine.

CRANKSHAFT

Journal Diameter - 3.000". Five bearings.

Bearings - M-400 (No. 4) Durex 100-A (Others). Steel backed inserts, precision type, no shims.

Clearance - .0005-.0025" (Front), .0005-.003" (All Others).

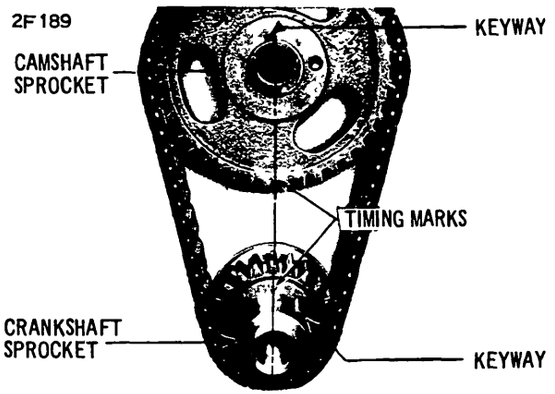
End Thrust: Taken by No. 4 (rear center) main bearing.

End Play - .0035-.0085".

Replacement Bearings: Furnished Std. and .001", .002" Undersize.

Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*



VALVE TIMING MARKS

Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

►*CAMSHAFT IDENTIFICATION & APPLICATION NOTE:* Different camshafts used in various engines identified by number stamped on end of shaft as follows: *NOTE – See "Engine Identification Letter Code" under MODEL IDENTIFICATION above for Engine Identification.*

Engine (Letter Code)	Camshaft Identification
01A, 02B, 03B, 04B	1
15H, 17H, 20L, 21L, 23H, 40R, 41R	0
05A, 06B, 10B, 16K, 16KJ, 18K, 27J, 35M, 86P, 37M	4
38P, 39N, 44M, 45P, 49N	4
08B, 11B, 25J, 28J, 47N, 50N	6

Journal Diameter - 1.8987-1.8997". Five bearings.

Clearance - .0015-.0030".

End Thrust - Taken by thrust plate behind camshaft sprocket.

Endplay - .003-.007",

Timing Chain: Length 60 links. **Width** .88" (Morse), 1" (Link Belt). **Pitch** .375".

►***TIMING CHAIN REMOVAL CAUTION:*** **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons or both will result due to piston striking valve. To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage.

Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers.

Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*

Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	Stem Diameter	Length
Intake	1.88"	.3407-.3414"	①4.85"
Exhaust	1.60"	.3402-.3409"	②4.84"

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Valve	Seat Angle	Lift	Stem Clearance
Intake	30°③	⑤	.0021-.0038"
Exhaust	45°④	⑤	.0026-.0043"

①—4.89" on 425A Engines. ②—4.87" on 425A Engines. ③—Valve Face Angle 29°. ④—Valve Face Angle 44°. ⑤—.33" (Camshaft "1"); .37" (Camshaft "0"); .40" (Camshafts "4" & "6").

Valve Seat Width — .045-.071" Intake, .048-.070" Exhaust.

Replacement Valves: Furnished Std., .001", .003", .005" Oversize stems.

Valve Stem Oil Seals: Used on all valves as follows:

Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup).

Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks).

Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data.*

Valve Springs: Single or double (inner and outer) springs used depending on camshaft used as follows:

Valve Spring Specifications

①Camshaft "1"

Valve	Spring Pressure	Length
Closed	80 lbs.	1.53"
Open	171 lbs.	1.20"

①Camshaft "0"

Valve	Inner Spring Pressure	Inner Spring Length	Outer Spring Pressure	Outer Spring Length
Closed	26 lbs.	1.48"	58 lbs.	1.53"
Open	61 lbs.	1.11"	107 lbs.	1.16"

①Camshaft "4"

Valve	Inner Spring Pressure	Inner Spring Length	Outer Spring Pressure	Outer Spring Length
Closed	26 lbs.	1.48"	60 lbs.	1.52"
Open	64 lbs.	1.08"	114 lbs.	1.12"

①Camshaft "6"

Valve	Inner Spring Pressure	Inner Spring Length	Outer Spring Pressure	Outer Spring Length
Closed	32 lbs.	1.48"	62 lbs.	1.52"
Open	96 lbs.	1.08"	131 lbs.	1.12"

① — *See "Camshaft Identification & Application Note" above.*

►*VALVE SPRING REMOVAL NOTE: To remove one or more valve springs without removing cylinder heads, see VALVES in Pontiac Special Data.*

Valve Guides: Cast integral with cylinder head.

Valve Stem Clearance in Guide: .0021-.0038" (Intake), .0026-.0043" (Exhaust). Oversize reamers ream guides to next oversize.

Hydraulic Lifters: Standard on all models.

Diameter - .8424-.8427" **Length** - 2".

Clearance in Lifter Boss - .0013-.0028".

Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data.*

Rocker Arms: Mounted individually on studs pressed into cylinder head.

Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15-25 ft. lbs. torque.

Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*

VALVE TIMING

See "Camshaft Setting" and "Camshaft Identification & Application Note" under CAMSHAFT above.

Valve Timing Specifications

Camshaft "1"

Intake Valves — Open 14° BTDC. Close 58° ALDC.
Exhaust Valves — Open 48° BLDC. Close 24° ATDC.

Camshaft "0"

Intake Valves — Open 22° BTDC. Close 67° ALDC.
Exhaust Valves — Open 63° BLDC. Close 27° ATDC.

Camshaft "4"

Intake Valves — Open 30° BTDC. Close 63° ALDC.
Exhaust Valves — Open 77° BLDC. Close 25° ATDC.

Camshaft "6"

Intake Valves — Open 29° BTDC. Close 74° ALDC.
Exhaust Valves — Open 82° BLDC. Close 31° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Pontiac Special Data.*

Crankcase Capacity: 4 qts. refill, add 1 qt. when changing filter element.

Normal Oil Pressure: 30-40 lbs. at 2600 RPM.

Pressure Regulator - In oil pump body. Not adjustable.

Oil Pump: Gear type, located on right rear bottom of cylinder crankcase and driven by distributor drive gear. Distributor timing is not affected by removal and installation of pump.

Pump Overhaul - *See "Oiling System" in Pontiac Special Data.*

Oil Filter: Full-flow type. Replace element every 15,000 miles or once a year. Use only AC No. PF-7 filter element.

Crankcase Ventilation: Standard Cars - Filter elements in oil filler caps in each rocker arm cover, and ventilator pipe at engine rear. Clean filter elements every 2,000 miles by plunging in gasoline or kerosene. Re-oil with engine oil.

Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

Oil Pressure Indicator: Warning light on instrument panel controlled by pressure switch on oil filter pad. Light goes on when ignition turned on; goes out when oil pressure reaches 5 lbs.±1.5 lbs.

►*LOW OIL PRESSURE CORRECTION:* If oil pressure indicator remains on, clean oil pump thoroughly. Dirt or chips may be lodged in oil pressure regulator ball seat.

ENGINE COOLING SYSTEM

Water Capacity: 18½ qts., add 1 qt. for heater.

Pressure Valve: Radiator filler cap. 14-17 lbs. (Std.).

Thermostat: Pellet type, in water outlet passage in intake manifold. 170°F (Pontiac No. 3148225) Std., 180°F (No. 3149016) Optl. for use with permanent anti-freeze.

Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly.

Temperature Gauge: Two-light system (Red & Green) with temperature switch in engine block. GREEN light is lighted when engine running cold and goes off when engine temperature reaches 113°±2°F, RED light remains off during normal engine operation but will come on when engine temperature reaches 238°±2°F. *NOTE* - Red light will light up when ignition switch turned to "Start" position but should go out when key returned to running position (this tests bulb and circuit each time engine is started).

Engine Unit - Delco-Remy No. 1993521 (Std.), No. 1993522 (Air Conditioning).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

►*JACKING & HOISTING CAUTION: Before jacking, hoisting, or working under car, see "Jacking & Hoisting Precautions" in Suspension & Wheel Alignment Section.*

MODEL IDENTIFICATION

SERIAL & ENGINE NUMBER: Stamped on plate on left front door hinge pillar and on pad on front face of cylinder block (4 Cyl.), on front face of right cylinder bank (V8). *See also Engine Production Code Number below.* Number (example below) includes identification data.

① ② ③ ④
1 62 P 1001

① – Series. 1 21 (All Body Styles).
② – Year. 62 1962.
③ – Assembly Plant. P Pontiac; S. South Gate; K Kansas City.
④ – Beginning vehicle number for each prefix combination.

Engine Production Code Number: Stamped on pad on front face of cylinder block (4 Cyl.), on front face of right cylinder bank (V8). *Do not confuse this number with Serial and Engine Number.* Not used for licensing.

►*ENGINE IDENTIFICATION LETTER CODE:* Twelve different engine combinations available. Letter Code (89Z, 97Y, etc.) stamped on small pad directly below Engine Production Code Number. Letter Code indicates various items of equipment used in a particular engine and will be listed in the following data where necessary.

TUNE-UP

►*1961-1962 4 CYLINDER TEMPEST DIESELING OR RUN-ON CORRECTION:* To correct, adjust idle speed and idle mixture (see below). Remove and discard throttle return check (except 4-Bbl. Carbs. or any Air Cond. Cars). Free up throttle linkage. Be sure engine returns to idle speed (increase return spring tension if necessary). Set timing 6° BTDC. Check atmospheric idle vent adjustment (4-Bbl. Carbs.). Tighten fan belt, check cooling system and free up manifold heat valve.

COMPRESSION PRESSURE: 4 Cyl. - 140-150 lbs. (8.6-1 ratio), 155-165 lbs. (10.25-1 ratio) at 155-165 RPM. Lowest cylinder must be within 80% of highest cylinder.
V8 - 160 lbs. at cranking speed. Lowest cylinder must be within 80% of highest cylinder.

VALVE TAPPET CLEARANCE: Zero lash, hydraulic lifters.

MANIFOLD HEAT CONTROL: 4 Cyl. - Thermostatic coil type in exhaust manifold outlet. Inspect at 4000 mile intervals. Valve must operate freely and anti-rattle spring must be installed in a downward position. Bend anti-rattle bracket so counterweight strikes stop before heat valve strikes inside of manifold in closed position.
V8 - None used. Intake manifold is heated by engine coolant.

CRANKCASE VENTILATION VALVE: Clean or replace valve at 12,000 mile intervals or yearly and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 4 Cyl. - 1-3-4-2. **V8** - 1-8-4-3-6-5-7-2. **Cylinders (V8)** - RIGHT BANK 2-4-6-8, LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .035".

Spark Plugs (4 Cyl.) - AC No. 45S (No. 44S for Police cars and cars pulling trailers). 14 mm. Torque to 15-25 ft. lbs.

Spark Plugs (V8) - AC No. 44FFS. 14 mm. Torque to 15-20 ft. lbs. *CAUTION - Use thread lubricant.*

COIL: Delco-Remy No. 1115169 (4 Cyl.), No. 1115136 (V8).

Ignition Current - 2.1 amps. idling, 3.7 amps. stopped (1115136).

Resistor - Resistance wire (1.80 ohms) connected in circuit between coil and IGN 1 terminal of ignition switch. Bypassed during cranking by lead from IGN 2 terminal of ignition switch.

DISTRIBUTOR: Delco-Remy. Used as follows:

Engine (Compr. Ratio)	Distributor No.
4 Cyl. (8.6-1)	1110282 (Early Ⓒ), 1110284 (Late Ⓓ)
4 Cyl. (10.25-1)	1110283 (Early Ⓒ), 1110285 (Late Ⓓ)
V8	1110983 Ⓒ

Ⓒ - External adjustment "Window" type.

Ⓓ - Pivoted Breaker Plate type. No external adjustments.

►*PIVOTED PLATE DISTRIBUTOR NOTE: For all service procedures, see "Delco-Remy Pivoted Breaker Plate Distributors" in Electrical Section.*

Condenser - Delco-Remy No. 1928111 (V8), No. 1932004 (4 Cyl.).
Capacity - .18-.23 mfd.
Contact Point Set - Delco-Remy No. 1931988.
Breaker Gap (All Models) - Gap (.016") will be correct when cam angle correctly set.
Cam Angle (1110282 & 283) - 74-76°. Set at 75°. Will give .016" breaker gap.
Cam Angle (1110284 & 285) - 31-34°. Set at 33°. Will give .016" breaker gap.
Cam Angle (1110983) - 28-32°. Set at 30°. Will give .016" breaker gap.

►*CAM ANGLE SETTING CAUTION (PIVOTED PLATE DISTRIBUTOR): Set with vacuum line disconnected.*

Breaker Arm Spring Tension - 19-23 ozs.
Rotation - Counterclockwise (4 Cyl.), Clockwise (V8) viewed from above.

Automatic Advance - 1110282 & 284

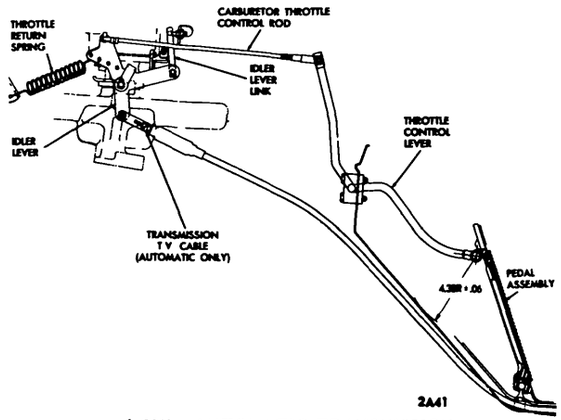
Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		625	0-4		1250
9-11		1300	18-22		2600
12-14		2200	24-28		4400

Automatic Advance - 1110283 & 285

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		400	0-4		800
7-9		1000	14-18		2000
9-11		1875	18-22		3750

Automatic Advance - 1110983

Degrees	Distr.	RPM	Degrees	Eng.	RPM
0-2		525	0-4		1050
6.5-8.5		1050	13-17		2100
12-14		1850	24-28		3700



4 CYL. AUTOMATIC TRANSMISSION THROTTLE LINKAGE (V8 SIMILAR)

Vacuum Spark Control: Delco-Remy No. 1116206 (1110282 & 283 Distr.), 1116195 (1110284 & 285 Distr.), 1116190 (1110983 Distr.).

Vacuum Advance - 1116195 & 1116206

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
10 ± .75	20 ± 1.50	13-15

Vacuum Advance - 1116190

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	6-8
8 ± .75	16 ± 1.50	14.5-15.75

IGNITION TIMING

Setting - 6° BTDC (4 Cyl.), 5° BTDC (V8) at hot idle speed with distributor vacuum line disconnected and manifold opening taped closed.
Timing Marks (4 Cyl.) - Pointer on engine front cover and TDC and 6° BTDC (top mark) on vibration damper.
Timing Marks (V8) - Mark on vibration damper to be aligned with 5° mark cast in block.

CARBURETOR

►*CARBURETOR APPLICATION: Rochester B or BC 1-Barrel Standard on 4 Cyl., Rochester 4GC 4-Barrel Optional on 4 Cyl., Standard on V8.*

►*ACCELERATOR LINKAGE BIND & FUEL LINE FAILURE CORRECTION (4 Cyl. With 4-Bbl. Carb.):* Carburetor pump arm clip may be rubbing on fuel line caused by incorrect installation of fuel filter which will misposition fuel line.

THROTTLE LINKAGE ADJUSTMENT (AUTO TRANS.): 1) Adjust threaded trunnion on carburetor throttle control rod for accelerator pedal height of 4.38" ± .06" through centerline of throttle control lever pivot at accelerator pedal to floor mat. Disconnect throttle valve cable from carburetor and depress accelerator pedal to floor. Carburetor throttle valves should be at wide open position.

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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2) With throttle valve cable disconnected at carburetor, block carburetor throttle valves in wide open position and pull throttle valve cable fully forward until throttle valve lever is against stop in transmission. *NOTE - Do not confus transmission detent feel with lever stop contact.* Adjust front connector at cable trunnion so it fits freely into carburetor adapter lever. Tighten locknuts.

3) Recheck adjustment after linkage connected. When carburetor is at wide open position, throttle valve lever must be against its stop. Road test car and if shift points do not correspond with specifications in table below, readjust cable length as necessary. *CAUTION - Do not adjust cabl mor than 2 turns from original setting. If mor turns n cessary for correct shift patt rn, oth r transmission trouble is indicated.*

Transmissi n Upshift Speeds

Thr ttl P siti n	4 Cyl. –MPH–	V8
Minimum Throttle	12-15	17-21
Full Throttle	43-50	49-55
Part Throttle (Detent)	35-45	40-49

THROTTLE RETURN CHECK ADJUSTMENT (4 Cyl.): With idle mixture and speed adjustments correctly set, engine at normal operating temperature and idling, and transmission in neutral, disconnect vacuum hose from throttle return check and plug end of vacuum hose. Adjust contact screw of throttle return check to obtain 1175 RPM (1-Bbl.), 1050 RPM (4-Bbl.). *NOTE - Hold sl v n xt to diaphragm to prevent turning while adjusting contact scr w.*

ANTI-STALL DASHPOT ADJUSTMENT (V8): With throttle linkage and idle speed correctly set, place idle speed adjusting screw on high step of fast idle cam. Adjust dashpot to obtain a clearance of .000-.010" between dashpot plunger and throttle lever.

ROCHESTER B & BC

Mdl	Rochester No.
4 Cyl. Synchro-mesh (Manual Choke)	B 7020061
4 Cyl. Auto. Trans. (Automatic Choke)	BC 7020062

Idl S tting - Initial setting 1½ turns open. Turn screw out for richer mixture.

Idl Sp ed Setting

Mdl	Idle Setting
Synchro-mesh (Air Cond. "Off")	680-700 RPM
Auto. Trans. in "D" (No Air Cond.)	580-600 RPM
Auto. Trans. in "D" (With Air Cond. "Off")	630-650 RPM

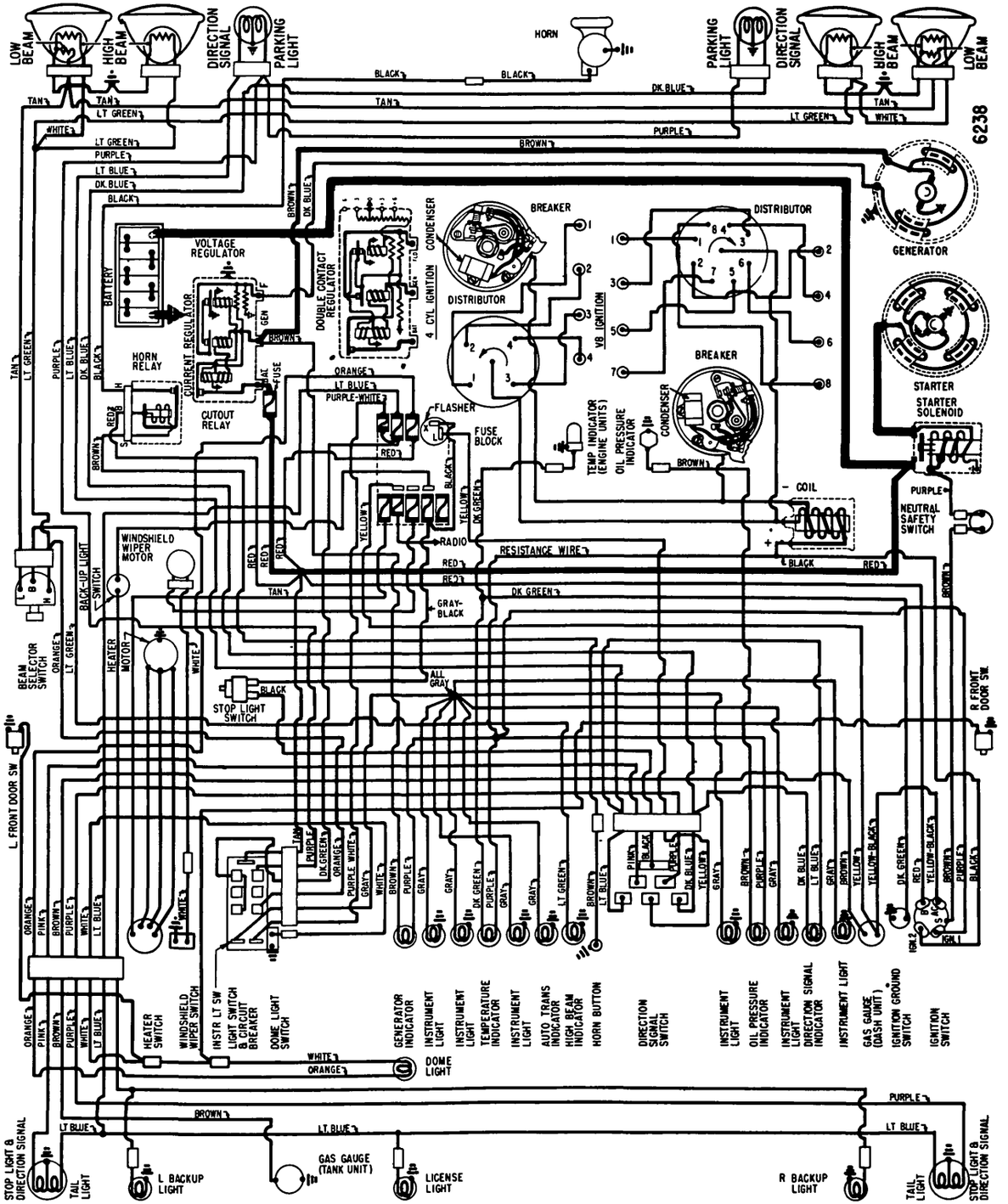
Fl at L v l - 1 9/32" (Gauge M-250). With air horn inverted and gasket in place, place gauge over floats with gauge tang inserted in discharge nozzle. Bend float arms so top of each float just touches gauge and float is centered between gauge legs.

Fl at Drop - 1 3/4" (Gauge BT-93). With air horn upright and float hanging freely, bend float tang as required for distance from gasket surface to bottom of float.

Thr ttl St p (Manual Ch ke Only) - With choke valve wide open, rotate eccentric washer to obtain .001-.006" clearance between upper end of kick lever and kick cam.

Fast Idl : No adjustment (will be correct when hot or slow idle correctly set).

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Automatic Choke Setting: Centered on Index (Supersedes previous specifications of 1 or 2 notches rich).

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Rochester B & BC Carburetors" in Carburetion Section.*

ROCHESTER 4GC 4-BARREL

Model	Rochester No.
4 Cyl. Synchro-mesh	7020079
4 Cyl. Auto. Trans.	7020066
V8 (All Trans.)	7020078

►*MANIFOLD FUEL DISTRIBUTION (4 Cyl.):* Carburetor FRONT barrels feed Cyls. 2 & 3; REAR barrels feed Cyls. 1 & 4.

►*MANIFOLD FUEL DISTRIBUTION (V8):* Carburetor RIGHT barrels feed Cyls. 2-3-5-8; LEFT barrels feed Cyls. 1-4-6-7.

Idle Mixture & Speed Setting - Special procedure required to insure correct mixture and speed (idle air) screw settings. *See "Rochester 4GC Carburetors" in Carburetion Section.*

Throttle Linkage Adjustment: See *CARBURETOR above.*

►*OTHER DATA: See "Rochester 4GC 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: AC No. 4843 (4 Cyl.), 4827 (V8). Fuel only.
Pressure - 4-5¼ lbs. at 1800 RPM.

Fuel Filter: AC No. GF-61 (Exc. V8 with Air Cond.), No. GF-67 (V8 with Air Cond.). GF-61 filter located in carburetor fuel inlet (integral), and GF-67 filter located in carburetor inlet line. Replace every 12,000 miles.

Gasoline Gauge: AC Electric.
Dash Unit - AC No. 5643990.
Tank Unit - AC No. 5641735 (Std.), No. 5641843 (V8 with Air Cond.).

Air Cleaner: Oil wetted wire mesh or oil wetted plastic foam (polyurethane) types used.
Wire Mesh Type - Clean and reoil every 8000 miles or sooner under severe dusty conditions.
Plastic Foam Type - Clean and reoil every 16,000 miles or yearly, or sooner under severe dusty conditions.

►*PLASTIC ELEMENT CLEANING CAUTION:* Remove element carefully from wire mesh support and wash in solvent. Squeeze element (do not wring) to remove all solvent and reoil with 10W-30 engine oil.

BATTERY

Delco No. 454 (30 Amp. Generator) - 12 volt, 9 plate, 42 ampere hour capacity (20 hour rate).
Delco No. 459 (35 Amp. Generator) - 12 volt, 9 plate, 53 ampere hour capacity (20 hour rate).
Delco No. 558 (Heavy Duty) - 12 volt, 11 plate, 61 ampere hour capacity (20 hour rate).
Batt ry Gr und - Negative.
Engin Gr und - To crossmember at each side of engine.

STARTER

D lc -Remy N . 1107796 (4 Cyl.), 1108303 (V8).
Armature - Delco-Remy No. 1932185 (4 Cyl.), No. 1935828 (V8).
Drive - Overrunning clutch (solenoid pinion shift).
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 35 ozs. minimum.

Performance Data - 1107796

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	4.3	300-360

Performance Data - 1108303

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

℄ - Includes solenoid.

Starting Switch: Delco-Remy No. 1116612 Ignition & Starter Switch Assembly controls Delco-Remy Solenoid No. 1119798 (4 Cyl. exc. AC), No. 1114266 (V8). Solenoid mounted on starter.

Neutral Safety & Back-up Light Switch: Delco-Remy No. 1998717. Located on steering column behind instrument panel.
Adjustment - *See "Pontiac Tempest Transaxle" in Transmission Section .*

GENERATOR

►*CHARGING CIRCUIT FUSE CAUTION: Battery Charging Circuit protected by a 45 amp. fuse, No. 1945172 clipped to "BAT" terminal of generator regulator. Check for blown fuse when diagnosing generator, regulator or battery failure.*

Delco-Remy. Used as follows:

Model	Delco-Remy No.
4 Cyl. (Synchro-mesh)	1102266
4 Cyl. (Auto. Trans.)	1102273
4 Cyl. (With Air Cond.)	1102319
V8 (Less Air Cond.)	1102267
V8 (With Air Cond.)	1102307
V8 (Heavy Duty & Taxi)	1105145

Armature - Delco-Remy No. 1946931 (1102266 & 267 Gen.), No. 1940161 (1105145 Gen.).

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Performance Data - Cold (70°F)

Generator	Amperes	Volts	Gen. RPM
1102266 & 267	30	14.0	2310
1102273	30	14:0	2150
1102307 & 319	35	14:0	2730
1105145	35	14.0	1730

Rotation - Counterclockwise at commutator end.
Field Current - 1.48-1.62 amps. (1102266,267,273,307 & 319), 2.73-3.0 amps. (1105145).
Brush Spring Tension - 28 ozs.

B lt Adjustment: Borroughs Tension Gauge should read 70-75 lbs.

GENERATOR REGULATOR

D lco-Remy. Used as follows:

Generator	Regulator N .
1102266, 267 & 273	1119263
1102307 & 319	1119264
1105145	1119641

NOTE - Regulator 1119641 is External Adjustment Double Contact type.

►*SEE CHARGING CIRCUIT FUSE CAUTION ABOVE.*

Cutout Relay
Cuts In - 11.8-13.5 volts (1119263 & 264), 11.8-13.0 volts (1119641).
Cont act Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage R gulator
Setting (1119263 & 264) - 13.8-14.7 volts at 125°F ambient temperature.
Setting (1119641) - 13.5-14.4 volts at 125°F ambient temperature operating on upper contacts with external adjustment screw set at "0". .1-.3 volts lower when operating on lower contacts.

►*EXTERNAL ADJUSTMENT NOTE:* External adjustment feature provides quick adjustment of voltage regulator setting for temporary unusual driving conditions and high or low battery temperature. Move adjustment screw as required.
Contact Gap (1119641) - .016".
Air Gap - .075" (1119263 & 264), .067" (1119641) with armature pressed down to point where contacts just touch.

Current R gulator
Setting (1119263) - 27.0-31.0 amps. at 125°F.
Setting (1119264 & 641) - 31.0-35.5 amps. at 125°F
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-R my 1119600 (Doubl Contact) Series Regulators" or "D lco-Remy 1119000 Series Regulators" in Electrical Section.*

ALTERNATOR

Delco-Remy Delcotron No. 1117070. Three-phase type with internal rectifiers.

℄ Performance Data - Cold (70°F)

Amperes	Volts	RPM
58	14.0	2500

℄ - Rated output hot 60 amps.

Current Output at Idle Sp ed - 25 amps. (approx.) at 525 engine RPM.
Field Current - 5.6-6.3 amps. at 12 volts and 80°F.
Brush Spring Tension - 13 ozs.
Rotation - Clockwise at drive end.

►*OTHER DATA: See "D lco-Remy D lcotron Alt rnators" in Electrical Section.*

ALTERNATOR REGULATOR

Delco-Remy No. 9000562. Two-unit type containing a Field Relay and a Transistorized Voltage Regulator.

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Voltage Regulator

Normal Setting - 13.9-14.6 volts. Adjust within range regardless of temperature.
Air Gap - .070" with armature pressed down to point where contacts just touch.

Field Relay

Closing Voltage - 5.0-9.5 volts.
Air Gap - .014" with contacts just touching.
Contact Gap - .027".
►*OTHER DATA: See "Delco-Remy Transistorized Alternator Regulators ("A" Circuit Type)" in Electrical Section.*

MISC. ELECTRICAL

Direction Signals: Switch located on steering column jacket behind instrument panel. To remove switch, loosen clamp screw and remove control cable assembly from switch. To install, reverse removal procedure, making sure switch and lever are in neutral position before tightening switch clamp screws.
Lighting Switch Removal: Unhook one battery cable. Pull headlight switch to "ON" position. Push latch button on bottom of switch assembly and pull out switch knob assembly. Screw bushing from switch assembly allowing switch to be removed from instrument panel.
Instrument Cluster Removal: Disconnect battery. Remove upper and lower retaining screws, and remove screws from lower steering column bezel. Remove speedometer cable. Pull cluster and housing out from instrument panel opening to gain access to wiring. Remove bulbs and wiring. Remove retaining screws (cluster-to-housing). To install, reverse removal procedure.
Speedometer Removal: Remove instrument cluster (see above) then remove all speedometer head retaining screws. Remove speedometer. To install, reverse removal procedure.
Fuel Gauge Removal: Remove instrument cluster (see above) then remove wire connector and bulb. Remove retaining screws, then remove gauge. To install, reverse removal procedure.
Stop Light Switch Location & Adjustment: Mechanical type located on bracket attached to steering column behind instrument panel. To adjust, loosen locknut and position switch thread 3/16" to pedal arm with brake released. *NOTE - Switch must not restrict pedal pedal action.*
CIRCUIT BREAKER: 22 Ampere - Headlights, Parking lights, and High Beam Indicator. In headlight switch. *NOTE - Following circuits are wired in series with headlight switch circuit breaker in addition to the individual fuse for that circuit on fuse block: Tail, Trunk, & License lights; Instrument, Clock, & Ash Tray lights; Courtesy & Dome lights.*
FUSES: *All fuses are in fuse block on passenger side of dash on left side of car.*
25 Amper - Windshield wiper and washer.
25 Amper - Back-up lights.
25 Amper - Parking Brake Warning light.
20 Amper - Direction Signals.
20 Amper - Glove box light, Lighter, Clock.
20 Amper - Heater & Air Conditioner.
9 Amper - Tail, Trunk, & License Lights.
9 Amper - Courtesy & Dome lights.
9 Amper - Stop lights.
7.5 Amper - Radio.
4 Amper - All instrument panel, control, and dial lights.

ENGINE
4 CYL. ENGINES

ENGINE SPECIFICATIONS: Own. 4 Cyl., valve-in-head, inclined 45° to right. 195" engine of same design used previously.

Bore	Stroke	Displacement	Rated HP
4 1/16"	3 3/4"	195 cu. ins.	26.4

Engine	Compr. Ratio	Developed HP
1-Bbl. Carb. Synchro-mesh	8.6-1	110 at 3800 RPM
1-Bbl. Carb. Auto. Trans.	8.6-1	115 at 4000 RPM
1-Bbl. Carb. Synchro-mesh	10.25-1	120 at 3800 RPM
1-Bbl. Carb. Auto. Trans.	10.25-1	140 at 4400 RPM
4-Bbl. Carb. Synchro-mesh	10.25-1	166 at 4800 RPM
4-Bbl. Carb. Auto. Trans.	10.25-1	166 at 4800 RPM

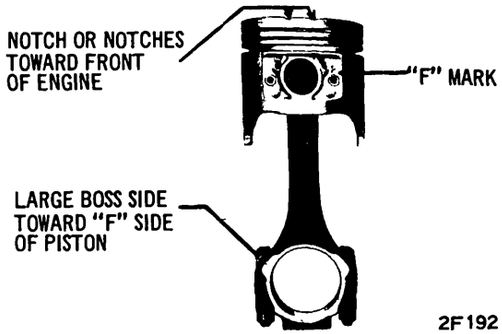
Compression Reading - *See TUNE-UP.*
►*FLYWHEEL HOUSING LOWER COVER GASKET NOTE:* Due to a design change in flywheel housing bottom cover, the lower cover gasket is not used or required on cars after Serial Nos. 162P-8032, 162S-1893, & 162K-1001.
OIL PAN REMOVAL: Drain crankcase. Remove exhaust crossover pipe, flywheel housing front shield, and lower cover. Remove front crossmember assembly as follows: *NOTE - Crossmember assembly includes entire front suspension system.* Raise car, support crossmember and install an engine support. Remove wheels. Disconnect tie rod ends, engine mounts, engine ground straps, and brake lines at crossmember. Remove fuel line from clip on crossmember. Remove retaining bolts and remove crossmember assembly. Remove attaching bolts and remove oil pan.
►*ENGINE IDENTIFICATION LETTER CODE NOTE: Located below Engine Production Code Number. See ENGINE IDENTIFICATION above.*
ENGINE REMOVAL: *See "Engine" in Pontiac Special Data.*
CYLINDER HEAD & MANIFOLD: *See "Cylinder Head & Manifold" in Pontiac Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Pontiac Special Data.*

PISTONS

Aluminum alloy, cam ground, slipper type with steel struts, tin plated. *NOTE* - 8.6-1 ratio pistons have dished head, two notches in front of piston, and "L" on rear of piston near pin boss, and must not be used in 10.25-1 ratio engines. Pistons for these engines have reliefs machined in piston head for valve clearance and have a notch in front of piston.
Fitting New Pistons - Measure piston skirt perpendicular to piston pin boss (pin removed) and 1¼" below oil ring groove. Micrometer must be in full contact. Clearance between piston and cylinder bore .0007-.0013" (actually measured).
Installing Pistons: Install pistons with notch or notches in piston head and "F" mark on piston boss toward front of engine. *See Rod Installation.*
Replacement Pistons: Furnished Std. (4.060", 4.061", 4.062", 4.063" "Flat" or "Recessed Top") and .005", .010", .020", and .030" oversizes.

PISTON PIN

Diameter - .9802". **Length** - 3.25".
Clearance in Piston - .0003-.0005" loose.
Clearance in Rod - .0008-.0016" interference fit. Pin is a press fit in rod.
Piston Pin Removal & Installation - *See "Piston Pins" in Pontiac Special Data.*



PISTON & ROD ASSEMBLY

Replacement Pins: Furnished Std. and .001", .003" oversize.

PISTON RINGS

Compression rings are cast iron, taper faced. No. 1 has thick chrome, No. 2 has Lubrite finish. Oil ring is segmented spring steel with chrome face on rails.

Ring	Width	End Gap	Side Clearance
Compr. (1)	.078"	.016-.026"	.0015-.0030"
Compr. (2)	.078"	.013-.025"	.0015-.0035"
Oil	.184"	.015-.035"	.0015-.0085"

Installing Rings - Step or chamfer on upper compression ring and letter "T", dot, or word "TOP" on lower compression ring toward the top.
Replacement Rings: Std. and .005", .010", .020", .030" Oversize.

CONNECTING ROD

Length - 6.63" (center-to-center)
Crankpin Journal Diameter - 2.2492-2.2502".
Lower Bearing - Durex 100A, steel-backed, replaceable precision type, no shims.
Clearance - .0005-.0025".
Sideplay - .0045-.0085".
Replacement Bearings: Std. and .001" & .002" undersize.
Rod Installation: Install rods in pistons so that LARGE machined boss at lower end of rod is on same side as "F" mark on piston and toward front of engine.

CRANKSHAFT

Journal Diameter - 3.000". Five bearings.
Bearings - M-400 (No. 4) Durex 100-A (Others). Steel backed inserts, precision type, no shims.
Clearance - .0005-.0025" (Front), .0005-.003" (All Others).
End Thrust: Taken by No. 4 (rear center) main bearing.
End Play - .0035-.0085".
Replacement Bearings: Furnished Std. and .001", .002" Undersize.
Crankshaft Rear Main Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Pontiac Special Data.*
Crankshaft Front Oil Seal: *See "Engine Front Cover" in Pontiac Special Data.*
Vibration Dampener Removal & Installation: *See "Vibration Dampener" in Pontiac Special Data.*

CAMSHAFT

►*CAMSHAFT APPLICATION NOTE:* Three camshafts used depending on carburetion, compression ratio and transmission application. Camshaft No. 537995 used on

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

89Z, 88Z, 86Z, 85Z & 78Y Engines. Camshaft No. 541155 used on 79Y Engine. Camshaft No. 539099 used on 87Z, 77Y & 76Y Engines. *For engine letter code, refer to Engine Identification Letter Cede under MODEL IDENTIFICATION above.*

Journal Diameter - 1.8987-1.8997". Five bearings.
Clearance - .0015-.0030".
End Thrust - Taken by thrust plate behind camshaft sprocket.
Endplay - .003-.007".
Timing Chain: Length - 60 links.
►*1961-1962 4 CYL. TIMING CHAIN FAILURE CORRECTION, TIMING CHAIN PRODUCTION CHANGE NOTE & TIMING CHAIN WEAR CHECK: See "Timing Chain" in Pontiac Special Data.*
Timing Chain Tensioner - Consists of a fixed bumper on drive side of front face and a spring loaded bumper on slack side of timing chain. *See "Timing Chain" in Pontiac Special Data.*
►*TIMING CHAIN REMOVAL CAUTION:* **Do not rotate crankshaft with timing chain out of engine.** Damage to valves, pistons or both will result due to piston striking valve. To rotate camshaft with timing chain off, crankshaft must be positioned so pistons are 45° before or after TDC, to avoid damage.
Camshaft Setting: Both sprockets marked "O". Mesh chain with sprockets turned so that marks are adjacent and in line across shaft centers.
Camshaft Removal & Installation: *See "Camshaft & Bearings" in Pontiac Special Data.*
Engine Front Cover Removal: *See "Engine Front Cover" in Pontiac Special Data.*
Engine Front Cover Oil Seal (Crankshaft Front Seal) Installation: *See "Engine Front Cover" in Pontiac Special Data.*

VALVES

Tappet Clearance: Zero lash, hydraulic lifters.

Valve	Head Diameter	Stem Diameter	Length
Intake	1.88"	.3407-.3414"	4.85"
Exhaust	1.60"	.3402-.3409"	4.84"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°①	③	.0021-.0038"
Exhaust	45°②	③	.0026-.0043"

① - Valve Face Angle 29°. ② - Valve Face Angle 44°. ③ - .40" (Engines Codes 87Z, 77Y, 76Y). .33" (Engines Coded 89Z, 88Z, 86Z, 85Z , 78Y). .34"(Eng. Coded 79Y).
Valve Seat Width - .048-.070".
Replacement Valves: Furnished Std., .001", .003", .005" Oversize stems.
Valve Stem Oil Seals: Used on all valves as follows:
Oil Shield - Inverted cup over upper end of outer valve spring (under spring retainer cup).
Oil Seal - Neoprene seal installed in second groove on valve stem (under valve locks).
Valve Stem Length Checking: *See "Valve System" in Pontiac Special Data.*
Valve Springs: Single or double (inner and outer) springs used as follows:

Valve Spring Specifications
①Engin s Cod d 89Z, 88Z, 86Z, 85Z, 78Y, 79Y

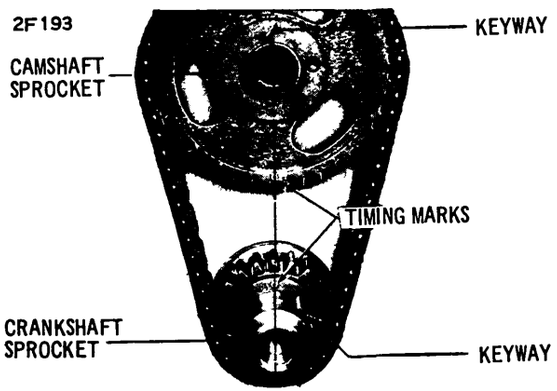
Valv	Spring Pr ssur	L ngth
Closed	80 lbs.	1.53"
Open	171 lbs.	1.20"

①Engin s C d d 87Z, 77Y, 76Y

Valv	Inn r Spring Pr ssur	Inn r Spring L ngth	Out r Spring Pr ssur	Out r Spring L ngth
Closed	26 lbs.	1.48"	60 lbs.	1.52"
Open	64 lbs.	1.08"	114 lbs.	1.12"

① - *See "Camshaft Application Note" above.*

Valve Guides: Cast integral with cylinder head. *NOTE* - Ream guides for next oversize using tools No. J-5830-1 (.003"OS), and J-6621 (.005" OS).
Hydraulic Lifters: Standard on all models.
Diameter - .8424-.8427". **Length** - 2".
Clearance in Lifter Boss - .0013-.0028".
Hydraulic Lifter Overhaul - *See "Valve System" in Pontiac Special Data.*
Rocker Arms: Mounted individually on studs pressed into cylinder head.
Installation of Rocker Arm to Stud - Tighten rocker arm stud nut to 15-25 ft. lbs. torque.
Rocker Arm Stud Replacement - *See "Valve System" in Pontiac Special Data.*



VALVE TIMING MARKS

VALVE TIMING

See "Camshaft Setting" and "Camshaft Application Note" under CAMSHAFT above.

Valve Timing Specifications
Engines Coded 89Z, 88Z, 86Z, 85Z, 78Y
Intake Valves - Open 14° BTDC. Close 58° ALDC.
Exhaust Valves - Open 48° BLDC. Close 24° ATDC.
Engines Coded 87Z, 77Y, 76Y
Intake Valves - Open 30° BTDC. Close 63° ALDC.
Exhaust Valves - Open 77° BLDC. Close 25° ATDC.
Engines Coded 79Y
Intake Valves - Open 24° BTDC. Close 60° ALDC.
Exhaust Valves - Open 66° BLDC. Close 26° ATDC.

V8 ENGINES

ENGINE SPECIFICATIONS: Own. 90° V8, valve-in-head. Aluminum block with cast iron cylinder liners of same design used previously.

Bore	Stroke	Displacement
3.50"	2.80"	215 cu. ins.

C mpressi n Rati	Rated HP	D vel ped HP
11.0-1 (4-Bbl. Carb.)	39.2	190 at 4800 RPM

C mpr ssi n R ading - *See TUNE-UP.*
►*FLYWHEEL HOUSING LOWER COVER GASKET NOTE:* Due to a design change in flywheel housing bottom cover, the lower cover gasket is not used or required on cars after Serial Nos. 162P-8032, 162S-1893, & 162K-1001.
OIL PAN REMOVAL: Raise car, drain crankcase, and remove flywheel pan. Remove oil pan attaching bolts and remove oil pick-up pipe bolts. Remove oil pan. *NOTE - Raise engine slightly if n c ssary for cl aranc .*
ENGINE REMOVAL: *See "Engine" in P ntiac Special Data.*
CYLINDER HEAD REMOVAL & INSTALLATION: *S "Engine" in Pontiac Special Data.*
►*OTHER V8 ENGINE DATA: See 1962 BUICK SPECIAL Car Model Pages.*

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: S "Engin Lubricati n" under OILING SYSTEM in P ntiac Special Data.*
Crankcase Capacity: 4 qts. refill, 5 qts. with filter change.
Normal Oil Pressure: 30-40 lbs. at 2600 RPM.
Pressure Regulator - In oil pump body, not adjustable.
►*LOW OIL PRESSURE CORRECTION:* If oil pressure indicator flickers or remains ON, dirt or chips may be lodged in oil pressure regulator ball seat. To correct, clean oil pump thoroughly.
Oil Pump: Spur gear type. 4 Cyl. pump located on right rear lower face of cylinder block and driven by distributor drive gear. V8 oil pump located in timing chain cover.
Pump Overhaul - *See "Oiling Syst m" in P ntiac Special Data.*
Oil Filter: AC No. PF-7. Full flow type. Replace element every 4000 miles or sooner if needed.
Crankcase Ventilation (Standard Cars): Filter elements located in oil filler cap on left rocker arm cover (V8), front of rocker arm cover (4 Cyl.). Oil baffles in rocker arm cover prevent oil from being exhausted with air through vent pipe. Clean filter element every 12,000 miles or sooner if needed by washing in solvent, blowing dry and re-oiling.
Positive Crankcase Ventilation Cars - Road draft tube replaced by hose to manifold with valve in line. *Se "Closed Crankcase Ventilation Syst ms" in Carburetion Section.*
Oil Pressure Indicator: Warning light on instrument panel controlled by switch in oil filter pad (4 Cyl.), in oil pump cover (V8). Light goes on when ignition turned on, goes out when oil pressure reaches 5 ±1½ lbs. *NOTE - If light remains on or flick rs, cl an il pump thoroughly. See LOW OIL PRESSURE CORRECTION above.*

ENGINE COOLING SYSTEM

Water Capacity: 11½ qts., with heater 12½ qts., with air conditioning 13 qts.
Pressure Valve: Radiator filler cap 14-17 lbs.
Thermostat: Pellet type in intake manifold water outlet passage. 180°F Std., 170°F Optl.
Water Pump: Packless, sealed double row ball bearing shaft. Serviced as an assembly.
Temperature Gauge: Warning light on instrument panel goes on when ignition turned on, goes out when engine warms. In case of cooling system malfunction, red light goes on at 248°F. Service thermal switch by replacement .
Engin Unit - Delco-Remy No. 1993518.

Se INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

	Ft. Lbs. 6 Cyl.	V8
Cylinder Head	46-50	55-65
Intake Manifold		26-30
Exhaust Manifold	25-30	25-30
Oil Pan	13-17	13-17
Main Bearing Caps	85-95	85-95
Flywheel	33-35	33-35
Vibration Damper	130-140	130-140
Connecting Rod Caps	28-32	52-54
Piston Pin Clamp Bolt	20-25	20-25
Camshaft Gear	20-22	20-25
Rocker Arm Support Bracket	13-17	13-17
Rocker Arm Cover	19-21 Inch Lbs.	
Engine Front Cover	13-17	13-17
Water Pump	13-17	13-17
Oil Pump	13-17	13-17
Oil Filter Cover	20-25	20-25
Engine Front Mount	20-25	20-25
Engine Rear Mount Bolt (S.M. & O.D.)	70-80	70-80
Engine Rear Mount Cage Bolt (S.M. & O.D.)	30-35	30-35
Engine Rear Mount Bolt (Auto. Trans.)	45-50	45-50
Engine Rear Mount Screw (Auto. Trans.)	45-50	45-50
Clutch Housing ①	28-32	28-32
Clutch Housing ②	13-15	...
Transmission Mounting	60-70	60-70

① - To Cylinder Block.
② - To Engine Plate. Plate Dowel Bolt Nut 28-32 ft. lbs.

ENGINE

►*AIR CONDITIONED CAR CAUTION:* When removing engine, air conditioning compressor must first be removed from its mounting bracket. *See "Studebaker Air Conditioning" in Miscellaneous Section.*

6 CYLINDER ENGINE

ENGINE REMOVAL: Remove hood, radiator, battery and carburetor air cleaner. Disconnect heater hoses from water pump and cylinder head. Drain crankcase. Disconnect all lines, wires, cables, and hoses from engine. Remove clevis pin connecting accelerator cross shaft and bellcrank rod. Disconnect engine front mounts and engine ground strap from right front mount. Disconnect exhaust pipe from manifold (remove "U" clamp at clutch or converter housing bracket to lower pipe). Remove starter motor. Disconnect one end of right tie-rod, remove shaft from steering bellcrank, and move bellcrank to clear oil pan. Install engine lifting eyebolts in place of Nos. 15 & 20 cylinder head bolts and raise engine so weight is off the front mounts.

On automatic transmission cars, disconnect accelerator bellcrank-to-transmission rod. Remove converter housing lower plate and disconnect torque converter from drive plate. On all cars, remove clutch or converter housing attaching bolts and drive out dowel pins. Remove engine.

V8 ENGINE

ENGINE REMOVAL: Remove hood, upper air deflector, and fan shroud. Remove battery. On Hawk, remove fan blade assembly. On other cars, remove radiator and water pump manifold. On all cars, remove generator, starter, and exhaust crossover pipe. Turn wheels to extreme right (Hawk), remove steering bellcrank shaft (Others). Remove carburetor air cleaner, fuel pump-to-carburetor pipe, spark modifier pipe, and spark plug cable support brackets from rocker arm covers. Disconnect all hoses, lines, wires, and cables from engine. On automatic transmission cars, disconnect accelerator bellcrank rod at bellcrank. On all cars, disconnect both engine front mounts and engine ground strap. With a sling under intake manifold, raise engine to take weight off front mounts. Remove clutch or converter housing cover plate. Disconnect torque converter from drive plate. Disconnect clutch or converter housing from engine. Push engine forward to disengage clutch housing dowels and until transmission splines are clear. Remove engine.

OIL PAN

ALL ENGINES

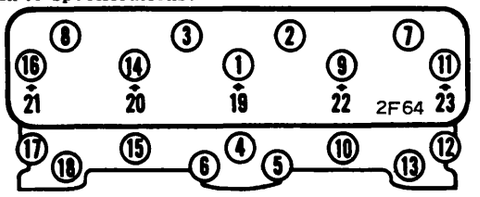
OIL PAN INSTALLATION: To install oil pan gaskets, filler block must be removed. Remove filler block attaching screws and carefully separate gasket and filler block. If gasket damaged, replace with correct portion of a new front cover gasket. Clean oil pan and mounting flanges of block and apply a sealer such as Perfect Seal to block flanges. Install oil pan gaskets. Install filler block on front cover and install one upper screw. Pry upward on filler block with a stick and install opposite upper screw. *This procedure will compress gasket ends and align filler block.* Install lower screws and tighten all screws until screw heads just engage lockwashers. Install oil pan, tighten mounting screws to specifications and then tighten filler block attaching screws securely.

CYLINDER HEAD & MANIFOLD

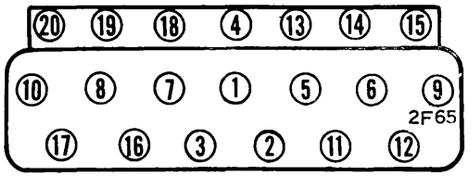
►*AIR CONDITIONED CAR CAUTION:* When removing cylinder head, air conditioning compressor must first be removed from its mounting bracket. *See "Studebaker Air Conditioning" in Miscellaneous Section.*

6 CYLINDER ENGINE

CYLINDER HEAD INSTALLATION: Insert dowel studs in capscrew holes Nos. 14, 15 & 17. Coat both sides of gasket with a thin coat of Perfect Seal, install gasket and place cylinder head over dowel studs. Coat capscrews with oil or graphite paste and install. Partially tighten all screws in sequence (see diagram), then again to specifications.



V8 ENGINE CYLINDER HEAD



6 CYLINDER ENGINE CYLINDER HEAD

V8 ENGINE

CYLINDER HEAD INSTALLATION: *CAUTION - Right and l ft cylind r h ads ar int rchang abl . Bl ck off rear water pump port on both heads with a dummy plat and gasket. Heat indicator unit is mounted in left head dummy plate.* Coat gasket with Perfect Seal and install. Coat cylinder head capscrews with oil or graphite paste and install nine short screws in outer two rows of holes in head, five medium length screws in center row and tighten finger tight. Install pushrods. Install rocker arm assembly with the four long screws and tighten finger tight. Install rocker arm support bracket screws and tighten alternately to specifications. Tighten cylinder head screws to specifications in sequence shown in diagram. Complete reassembly.

ORIGINAL BORE & PISTONS

ALL ENGINES

ORIGINAL BORE & PISTON SIZES: Standard cylinder bores may vary from 3.0000" to 3.0025" (6 Cyl.), 3.5625" to 3.5645" (V8) oversize in .0005" increments (not more than .001" variation in any one block). Bore size is stamped on top face of cylinder next to bore. *Example: "25" on cylinder indicates bore size 3.0025" (6 Cyl.), 3.5625" (V8).* Replacement pistons furnished for these oversizes under the standard size part number and size is marked on top of piston.

PISTON PINS

ALL ENGINES

PISTON PIN: Removal - Place Removing & Installing Tool J-1293-C in a vise and place piston and rod assembly through tool. *CAUTION - Do not overtight n tool retaining nut as piston pin may be expanded.* Remove locknut and washer from piston pin clampscrew and install on opposite end of screw. Tighten locknut to remove screw and then separate piston, pin, and rod.

Installation: Use Tool J-1293-C in same manner as for removal. Oil squirt hole in rod must be on solid side of piston. Clampscrew should be installed from slotted side of piston (all V8 pistons and 6 Cyl. pistons Nos. 1, 3, 5); from solid side of piston (6 Cyl. piston Nos. 2, 4, 6). Align flat surface of piston pin with flat surface of clampscrew. Tighten clampscrew locknut to specifications.

CRANKSHAFT & MAIN BEARINGS

ALL ENGINES

►*REAR MAIN BEARING OIL LEAK CORRECTI CN:* Rear main bearing has beveled pocket adjacent to parting line of the two bearing halves. The **non-bevel d** portion of the bearing parting surface must be square and sharp. If not square and sharp, a rear main bearing oil leak can result. If this condition exists, replace bearing halves.

REAR MAIN BEARING OIL SEAL INSTALLATION: Loosen intermediate bearing cap screws **2 turns only** to aid installation. Install seals as follows:

Brummer Seal - With seal grooves in block and cap clean and dry, blunt sharp edge of flange at rear of block and carefully insert seal in block so wiping lip of seal contacting crankshaft points away from flywheel. Trim ends flush with block. Install seal in bearing cap

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and align with block seal. Apply oil to wiping edge of seal and install bearing cap making sure exposed part of seal smoothly straddles rear flange of bearing cap.

Cork Seals - Drive into grooves between sides of cap and block. Do not damage or split seals. Tighten intermediate bearing caps.

►*LEAK TEST NOTE:* After new seals installed, run engine for 45 minutes before checking for leaks.

ENGINE FRONT COVER

6 CYLINDER ENGINE

ENGINE FRONT COVER: Removal - Remove radiator, vibration damper, fan pulley (Puller J-8111) and protect threaded end of crankshaft. Remove attaching bolts and remove cover.

Installation: Install cover on engine leaving attaching bolts loose so cover will center itself when fan pulley installed. Install fan pulley (Pusher Set J-4704-A). Reverse removal procedure.

FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Install new felt seal in cover using fan pulley hub to seat it properly.

V8 ENGINE

ENGINE FRONT COVER: Removal - Remove fan shroud (Hawk), radiator, all belts, fan blade assembly, water manifold fuel pump, pump-to-carburetor pipe, vibration damper, and fan pulley hub (Puller J-8111). Remove attaching screws and remove front cover.

Installation: Install front cover and leave attaching screws loose until fan pulley hub installed so seal and cover will be properly centered. Install fan pulley hub (Pusher Set J-7404). Reverse removal procedure.

FRONT COVER OIL SEAL (CRANKSHAFT FRONT SEAL) INSTALLATION: Install new felt seal in cover and wet with engine oil. Use fan pulley hub to seat seal properly.

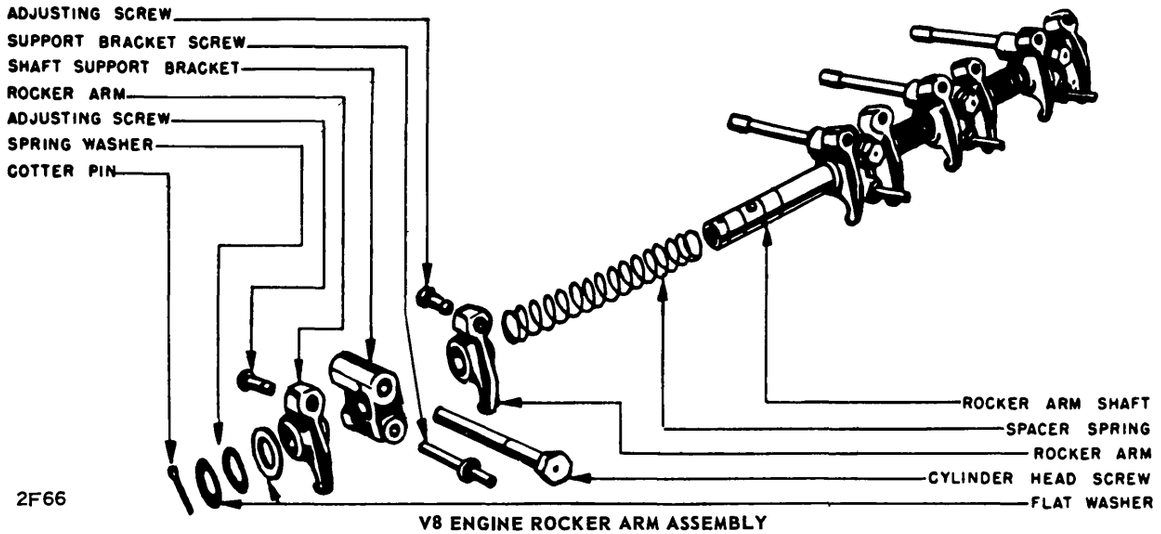
CAMSHAFT & BEARINGS

6 CYLINDER ENGINE

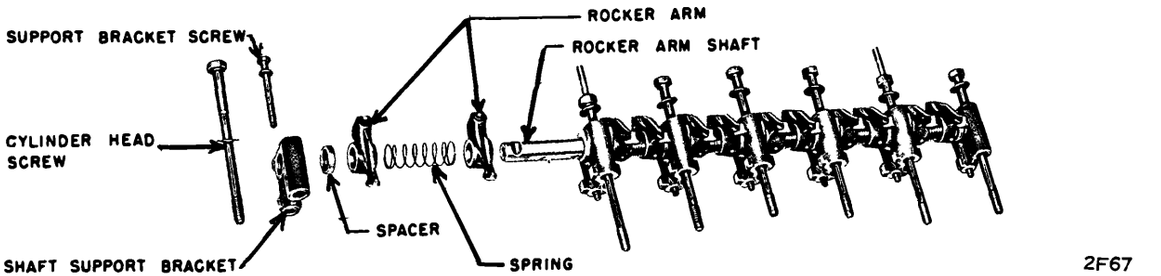
CAMSHAFT REMOVAL: *NOTE - If necessary to remove camshaft without removing engine, remove fenders, grille and radiator as an assembly. Then proceed as follows:* Remove cylinder head, manifold assembly, and valve cover plates. Remove valve assemblies and either turn engine over so lifters will fall free or block lifters up away from camshaft lobes. Remove oil pan, oil pump, and pump drive shaft. Remove timing gear cover (see above). Turn crankshaft until camshaft thrust plate screws can be seen through spokes of camshaft gear. Remove capscrews and remove camshaft and gear.

V8 ENGINE

CAMSHAFT REMOVAL: Position IGN mark on vibration damper directly under timing pointer and distributor in No. 6 firing position. Remove fan shroud (Hawk), radiator, fan blade and water manifold assemblies. Remove rocker arm assemblies and pushrods, carburetor and intake manifold assemblies, lifter cover, valve lifters, fuel pump and timing gear cover. Turn camshaft just enough so thrust plate retaining screws can be exposed and removed, then return camshaft to original position. Carefully remove camshaft and gear.



V8 ENGINE ROCKER ARM ASSEMBLY



6 CYL. ENGINE ROCKER ARM ASSEMBLY

ALL ENGINES

TIMING GEAR REMOVAL: Remove front cover (see above), camshaft gear retaining screw, lock and flat washer, and fuel pump eccentric and lock plate. Use Puller No. J-8111 to remove camshaft gear. Remove crankshaft pulley key and oil slinger and pull crankshaft gear with Tool No. J-8111.

VALVE SYSTEM

VALVE GUIDES

ALL ENGINES

VALVE GUIDE REMOVAL & INSTALLATION:- Use Tool J-4673 (V8), J-9265 (6 Cyl.) to drive guides out combustion chamber side of cylinder head. *NOTE - Intake valve guides are longer than exhaust valve guides. Do not interchange.* To install valve guides with Tool J-4673, coat outside of guide lightly with white lead and insert chamfered end of guide from combustion chamber side. Place installing plate on head with "Intake" or "Exhaust" mark up depending on guide being installed, so long side of plate is parallel to end of head and plate bore aligns with guide bore. Insert driver through plate and drive guide into head until shoulder of driver contacts bottom of counterbore in plate.

ROCKER ARMS

6 CYLINDER ENGINES

ROCKER ARM ASSEMBLY: Removal - Remove air cleaner, rocker arm retaining nuts and washers. Unscrew rocker arm bracket screws from head, then unscrew cylinder head capscrews-to-rocker arm assembly. Remove rocker arm assembly with capscrews remaining in rocker arm shaft brackets.

Disassembly: Mark rocker arm, brackets, and rocker arm shaft for easy reassembly. Press in on one end shaft bracket, then remove cylinder head capscrew. Gradually release spring and carefully remove bracket, spacer, first rocker arm, compression spring, and next rocker arm from the rocker arm shaft. Proceed to next set.

Reassembly: Clearance between rocker arm shaft and rocker arms must be .0005-.0025". Install rear rocker arm shaft support bracket and insert cylinder head capscrew through bracket to hold in place. Install spacer next to end support, then install a rocker arm on the shaft next to spacer. Bottom of rocker arm must be on oil groove side of shaft and the valve stem end of rocker arm must be on same side of shaft as cylinder

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head capscrew groove in shaft. Install spacer spring next to rocker arm then install second rocker arm and one center support bracket and secure with cylinder head capscrew. Install remainder in same manner. *NOTE* - Install spacer between end rocker arm and end bracket.

Installati n: Reverse removal procedure. Tighten cylinder head capscrews finger tight and tighten bracket screws alternately to avoid distortion. Then torque cylinder head capscrews 46-50 lbs. (refer to torque tightening sequence diagram in this section). Tighten rocker arm shaft bracket screws to a torque of 13-17 ft. lbs. Before installing rocker arm cover, check and adjust valve clearances. Install a new rocker arm cover gasket in cover flange. Torque rocker arm screws three times to 20 in. lbs., tightening rear nut last. Install air cleaner.

V8 ENGINE

ROCKER ARM ASSEMBLY: R moval - Remove air cleaner, disconnect spark plug wires, drain cooling system and remove rocker arm covers. Remove rocker arm bracket screws and the four rocker arm-cylinder head capscrews. Remove rocker arm assembly.

Disassembly: Mark rocker arms, brackets and rocker shaft for reassembly. Remove cotter pin from end of shaft and slide all parts off shaft, removing cylinder head screws when necessary.

Reassembly: Rocker arm springs should require 9½-10½ lbs. pressure to be compressed to length of 2 1/32". Replace spring if not within specifications. Clearance between rocker arm shaft and rocker arms must be .0005-.0025". Lubricate all parts with oil. Reverse removal procedure. Install parts in order shown in illustration and make sure bottom of rocker arm is on oil groove side of shaft and adjusting screw end of rocker arm is on same side of shaft as cylinder head capscrew groove in shaft. When correctly assembled, flat on end of rocker shaft will be to rear on right bank, to front on left bank.

Installation: Reverse removal procedure, tightening rocker arm bracket screws alternately to avoid distortion.

VALVE LIFTERS
ALL ENGINES

VALVE LIFTER INSTALLATION: Thoroughly clean lifter bores in cylinder block and inspect for smoothness. With lifter and bore clean and dry, check lifter fit and select correct lifter size. Lifters furnished Std., .001" and .005" oversize. *See .005" Oversize Lifter Installation below.*

Checking Lifter Fit in Bore: With proper fit, lifter should just slide into place from its own weight. If .001" oversize lifter does not restore proper clearance, bore must be reamed to .005" oversize and .005" oversize lifters installed.

►*.005" OVERSIZE LIFTER INSTALLATION:* Special reamers required for reaming lifter bore as follows: 1352-5TB (6 Cyl.), 1352-STB (V8). These reamers will provide correct lifter clearance.

OILING SYSTEM

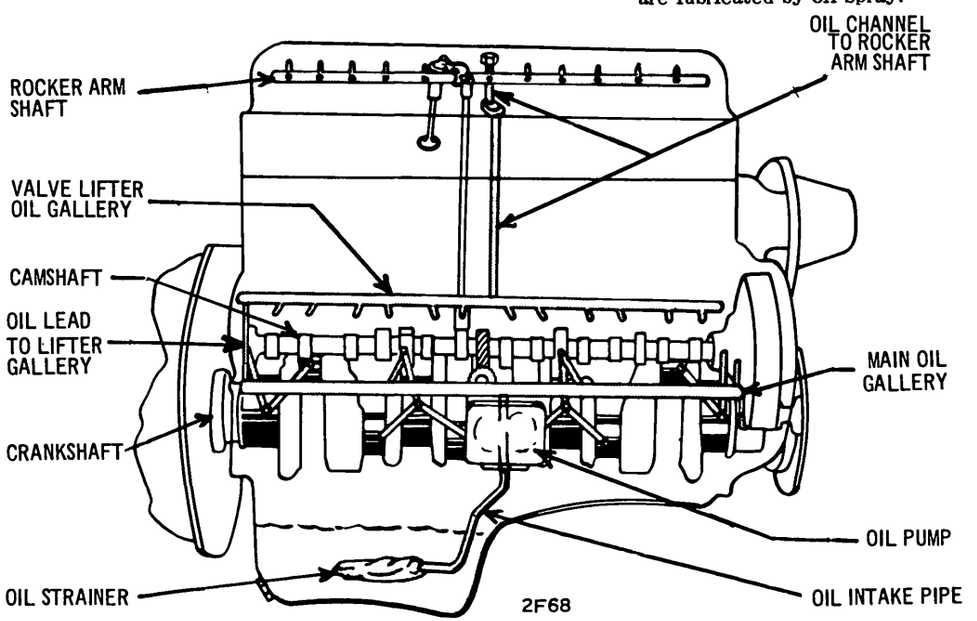
ENGINE LUBRICATION
6 CYLINDER ENGINE

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve lifters. All other parts are lubricated by oil spray.

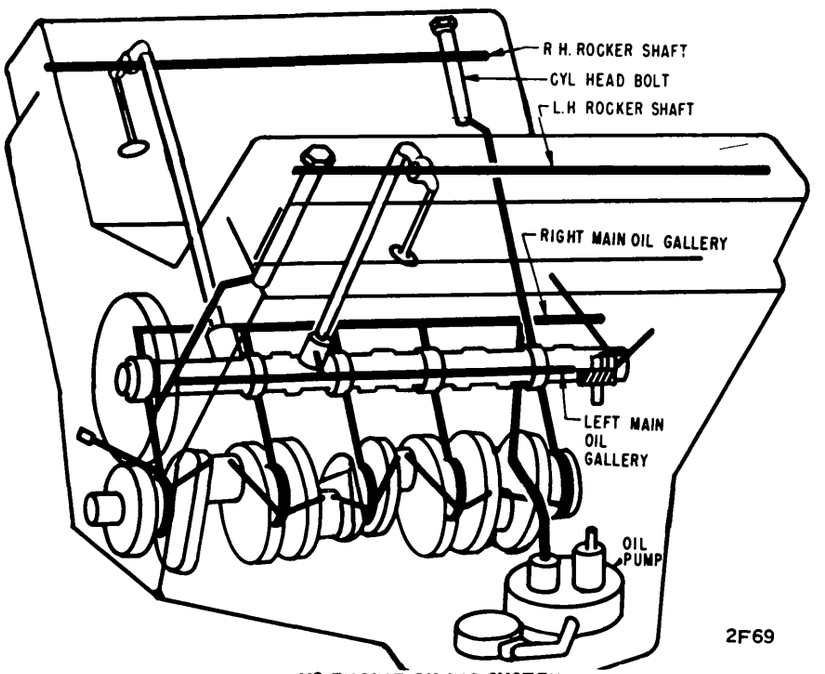
OPERATION (Early Pr ducti n Cars): Gear type oil pump mounted externally on right side of crankcase draws oil through floating oil strainer and intake pipe in crankcase which terminates at inlet port in pump mounting base. Oil from pump flows through outlet passage in pump body and mounting pad directly to main oil gallery which extends longitudinally along right side of crankcase (oil pressure regulator is located in crankcase at forward end of this oil gallery). At rear of engine, a transverse passage connects main oil gallery with lifter oil gallery which also extends entire length of engine block on inner side of lifter chamber. Oil is distributed through these oil galleries. *See below.*

OPERATION (Later Production Cars): Gear type oil pump mounted externally on right side of crankcase draws oil through floating oil strainer and intake pipe in crankcase which terminates at inlet port in pump mounting base. Oil from pump flows through outlet passage in pump body and mounting pad into drilled passage in oil filter base (full-flow oil filter used). A valve is located in filter base to by-pass oil in the event element becomes plugged. Oil then enters main oil gallery which extends longitudinally along right side of crankcase (oil pressure regulator is located in crankcase at forward end of this oil gallery). At rear of engine, a transverse passage also connects main oil gallery with lifter oil gallery which extends entire length of engine block on inner side of lifter chamber. Oil is distributed through these oil galleries as follows:

CONTINUED ON NEXT PAGE



6 CYLINDER ENGINE OILING SYSTEM
(EARLY CARS WITH PARTIAL FLOW FILTER-FULL FLOW SYSTEM SIMILAR)



V8 ENGINE OILING SYSTEM
(EARLY CARS WITH PARTIAL FLOW FILTER-FULL FLOW SYSTEM SIMILAR)

CONTINUED FROM PRECEDING PAGE

Crankshaft & Camshaft B arings - Lubricated through drilled passages in each crankcase web extending from main oil gallery to camshaft bearing bore and then down to corresponding main bearing bore (rear camshaft bearing is lubricated from passage connecting main oil gallery to lifter oil gallery).
Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.
Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in connecting rod when this hole lines up with crankpin oil hole.
Valve Lifters - Each lifter lubricated through short oil passage extending from lifter oil gallery to lifter bore.
Rocker Arms, Pushrods & Valves - A vertical oil passage in center of cylinder block connects valve lifter oil gallery with passage in cylinder head. This passage leads the oil up and around the relieved cylinder head capscrew shank to the rocker arm shaft center bracket. The bracket is drilled to connect the capscrew hole with the rocker arm shaft hole. The oil enters the shaft and flows to the rocker arms through small holes drilled in the rocker arm shaft. The rocker arms are drilled from the pushrod ends to the bore and allow the oil to flow to the pushrods. Oil from rocker arm assembly returns to the oil pan through the pushrod-passages in the cylinder head and block.
Timing Gears - Lubricated by oil return from pressure regulator valve. Valve bypass port discharges into channel formed by groove in front of block behind engine front plate through which oil is directed onto timing gears. *NOTE* - Small bleed hole in valve plunger provides lubrication for gears at low speeds when pressure regulator valve is closed.

V8 ENGINES

DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters and valve mechanism on cylinder head. All other parts are lubricated by oil spray or oil return flow.

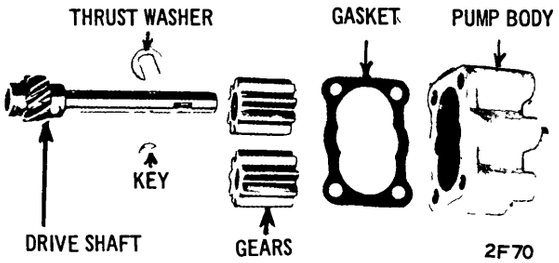
OPERATION (Early Production Cars): Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through floating oil strainer and intake pipe mounted on pump body and delivers oil through passages in rear main bearing cap and engine block to rear of right main oil gallery which extends along entire length of engine. At forward end of engine, two intersecting cross-passages connect the right main oil gallery with the left main oil gallery which also extends along entire length of engine. Oil is distributed from these oil galleries. *See below.*

OPERATION (Later Production Cars): Gear type oil pump mounted on rear main bearing cap in crankcase draws oil through floating oil strainer and intake pipe mounted on pump body and delivers oil through drilled passages in oil filter base (full-flow oil filter used). A valve is located in filter base to by-pass oil in the event oil filter element becomes clogged. Oil is then delivered to passages in rear main bearing cap and engine block to rear end of right main oil gallery which extends along entire length of engine. At forward end of engine, two intersecting cross-passages connect right main gallery with the left main oil gallery which also extends along entire length of engine. Oil is distributed from these oil galleries as follows:

Crankshaft & Camshaft B arings - Lubricated through drilled passage in each crankcase web extending from **right hand** main oil gallery to corresponding camshaft and crankshaft bearings. *NOTE* - Rear camshaft bearing is lubricated by separate cross-passage from right main oil gallery.
Connecting Rods - Crankshaft is drilled and each connecting rod bearing is lubricated through drilled hole in shaft from adjacent main bearing.
Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spray hole in lower end of connecting rod when this hole registers with oil hole in crankpin.
Valve Lifters - Lifters are lubricated through short vertical passage leading from adjacent main oil gallery.
Rocker Arms, Pushrods, & Valves - Drilled passages in block at forward end of left main oil gallery (for left bank), and at rear end of right main oil gallery (for right bank) extend up to matching passages in cylinder head and rocker shaft support brackets (front bracket on left head, rear bracket on right head). Passage in head and support bracket is around relieved shank of cylinder head bolt which passes through bracket. Oil flowing through this passage enters hollow rocker arm shaft through angle passage in bracket. Drilled holes in shaft and in rocker arm and tappet adjusting screw provide lubrication for rocker arm, pushrod socket, and valve tip. Drain hole at rear end of each cylinder head and matching passage in block drain excess oil back into lifter chamber (drain hole in head is through hollow dowel). An oil return hole in the lifter chamber permits oil to drain back into oil pan. *NOTE* -Early engines had drain hole at each end of each cylinder head.
Timing Gears - Lubricated by oil bypassed by pressure regulator valve (pressure regulator mounted on right front corner of engine block and oil return passage directs oil on timing gears). Valve plunger has small bleed hole to provide lubrication for gears at low speeds when regulator valve is closed.
Camshaft Gear Thrust Face - Groove in front camshaft bearing permits oil to flow out and through hole in camshaft thrust plate. Two grooves in front face of plate distribute oil over face of thrust plate on which camshaft gear hub rides.
Distributor Drive Shaft & Gear - Lubricated through passage from rear of rear camshaft bearing.

OIL FILTER (Early Cars): Partial flow type mounted on bracket on cylinder head. Oil inlet line is connected to drilled hole at front of left cylinder head. Filter outlet pipe returns oil to crankcase filler pipe.

OIL FILTER (Later Cars): Full-flow type located at right rear of cylinder block above engine oil pan mounting flange. Filter element is screwed into filter base and is sealed to base by a gasket. Oil lines for filtering system are drilled passages in filter base (No external oil lines). Valve located in filter base to by-pass oil to engine should filter element become clogged.



6 CYLINDER ENGINE OIL PUMP

OIL PUMP

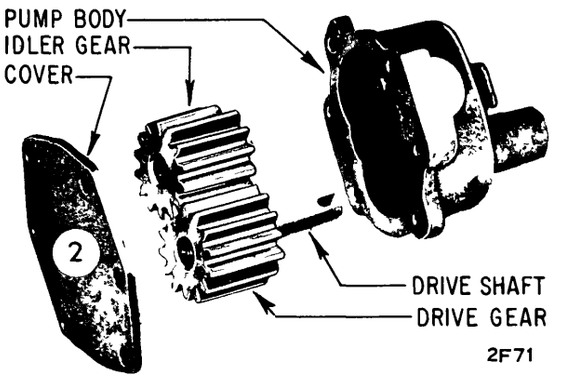
6 CYLINDER ENGINE

OIL PUMP: Removal & Disassembly - Disconnect oil pressure pipe and remove pump cover, gasket, and idler gear. Remove drive gear with Tool J-2959. Remove woodruff key and U-shaped thrust washer and remove pump body. To remove pump drive shaft and gear, remove oil pan and distributor. Push drive shaft inward and remove from inside crankcase.

Inspection: Clearance between cover plate and ends of gears should be no more than .007". Lower ends of gears should be flush with cover surface of pump body with gears resting on lower part of body. Total clearance between pump gears should be no more than .010". To check, place a .005" feeler gauge between teeth of gear and body on each side of pump. If gears rotate, replace pump body.

Installation & Reassembly: Reverse removal procedure, dipping each part in oil and using new gaskets. *CAUTION - Install oil pump driv shaft xactly as f llows to obtain correct ignition timing.* Install drive shaft and engage camshaft gear and pump drive gear in any position. Position No. 1 Piston at TDC of compression stroke and UDC 1-6 mark on vibration damper directly under pointer on front cover. Disengage pump gear from camshaft gear and turn shaft so keyway points directly to bottom of engine when gears start to engage. Mesh gears (keyway will point to rear of engine). Install distributor. When slot in distributor shaft engages tang on pump drive shaft, distributor rotor should line up with No. 1 terminal in distributor cap.

CONTINUED ON NEXT PAGE



V8 ENGINE OIL PUMP

CONTINUED FROM PRECEDING PAGE

V8 ENGINE

OIL PUMP: Removal - Remove oil pan. Remove retaining nuts and remove pump.

Disassembly: Remove oil strainer and pipe. Remove cover, idler gear, and drive gear and shaft (do not separate shaft from gear).

Inspection: Inspect cover for scratches or deep scores. Maximum clearance between ends of gears and cover plate is .007" measured with weight of gears on upper part of pump body and a straightedge across body. Total gear-to-body clearance should be not more than .010" measured with a .005" feeler between each gear and body. If gears rotate, replace pump body.

Reassembly: Reverse disassembly procedure and tighten strainer pipe to 30 ft. lbs.

Installation: Reverse removal procedure.

COOLING SYSTEM

WATER PUMP

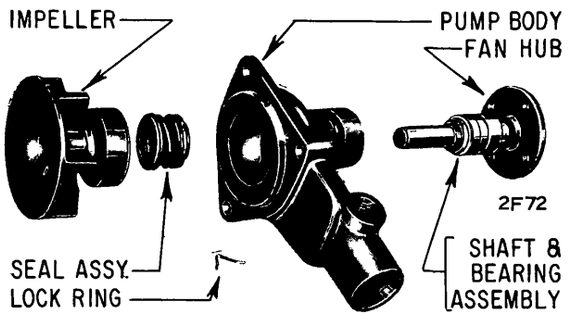
►*6 CYL. & V8 ENGINES WATER PUMP PRODUCTION CHANGE NOTE:* Beginning approximately June 25, 1962, a new water pump went into production on all cars. For disassembly and reassembly procedures on early and late water pumps, see below.

EARLY 6 CYL. ENGINE

WATER PUMP: Removal - Drain cooling system, remove fan belt, fan blades and pulley. Disconnect heater hose and generator adjusting arm. Disconnect radiator-to-pump hose. Remove water pump.

Disassembly: Remove bearing lock ring, place pump in an arbor press and press shaft, bearing and hub assembly through impeller and front of housing. Press hub from shaft.

Reassembly: Press new hub on shaft until flush with end of shaft. Install shaft and lock ring in housing. Use new seal and impeller and press impeller on shaft to obtain .015-.031" clearance between impeller and housing (rotate shaft when checking clearance).



6 CYL. ENGINE WATER PUMP

Installation: Reverse removal procedure.

EARLY V8 ENGINE

WATER PUMP: Removal - Drain cooling system, remove belt, fan and pulley. On Hawk, remove fan shroud (see below). Remove pump-to-manifold screws and remove water pump.

Disassembly: Remove bearing lock ring and press hub, shaft and bearing assembly out through front of housing. Press hub from shaft.

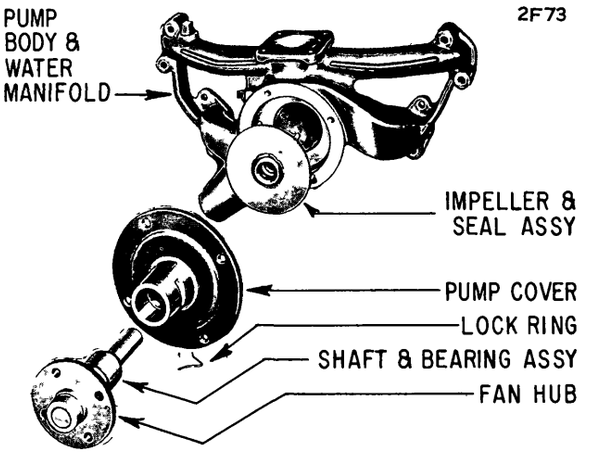
Reassembly: Use a new hub and press on shaft until flush with end of shaft. Install shaft in housing, install new seal in impeller. Press impeller on shaft until flush with end of shaft. Impeller-to-housing clearance should not exceed .090".

Installation: Reverse removal procedure.

LATE 6 CYL. & V8 ENGINES

WATER PUMP: Removal - Same procedures as used above.

Disassembly - Place assembly in an arbor press and remove shaft, bearing and hub assembly by pressing arbor through the impeller and out through the front of the housing.



V8 ENGINE WATER PUMP

Reassembly - Press shaft and bearing into housing until distance from hub end of bearing to machined flange of housing is 2.719-2.7324" (6 Cyl.), 1.625-1.640" (V8). Press fan hub (always use a new fan hub) onto shaft so distance from outside edge of hub to machined flange of housing is 4 13/32" (6 Cyl.), 2 33/64" (V8). Press impeller and seal assembly onto shaft until .015-.031" (6 Cyl.), clearance is obtained between impeller and pump body. On V8 models, there should be a distance of 15/16" between machined edge of impeller face and machined surface of housing.

HAWK MODELS

FAN SHROUD REMOVAL: Drain radiator and remove radiator inlet hose. Remove wiring from shroud and move wiring harness out of way. Remove fan blades. Remove fan shroud attaching screws and remove shroud.

MODEL IDENTIFICATION

Mod l	M del D signati n
2-Door Sedan (Deluxe)	62S-F4
2-Door Hardtop (Regal)	62S-J6
2-Door Hardtop (Daytona)	62S-J8
2-Door Convertible (Regal)	62S-L6
2-Door Convertible (Daytona)	62S-L8
2-Door Police Sedan (Deluxe)	62S-F3
2-Door Gran Turismo Hawk (Export only)	62S-K6
4-Door Sedan (Deluxe)	62S-Y4
4-Door Sedan (Regal)	62S-Y6
4-Door Police Sedan (Deluxe)	62S-Y3
4-Door Taxicab Sedan (Special)	62S-Y1
4-Door Sta. Wgn. (Deluxe)	62S-P4
4-Door Sta. Wgn. (Regal)	62S-P6
4-Door Police Sta. Wgn. (Deluxe)	62S-P3
4-Door Luxury Cruiser Sedan (Export only)	62S-Y8

SERIAL NUMBER: Stamped on plate attached to left front door hinge pillar post.

Assembly Plant	Starting Numbers
South Bend	62S-1001
Canada	62SC-1001

ENGINE NUMBER: Stamped on pad at upper left front of cylinder block.

Assembly Plant	Starting Numbers
South Bend	S-210901
Canada	SC- 24301

TUNE-UP

COMPRESSION PRESSURE: 140-160 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs.

VALVE TAPPET CLEARANCE: .025-.027" (Cold), .023-.025" (Hot), All Valves.

►*TAPPET CLEARANCE ADJUSTING SCREW CAUTION:* Screws are located on underside of rocker arm and are self-locking type. Torque required to turn screw must be 30 in. lbs. minimum.

MANIFOLD HEAT CONTROL: Automatic thermostatic type.

CRANKCASE VENTILATION VALVE: Service every 10,000 miles or sooner if needed. Under cold weather driving conditions, more frequent cleaning of tubes and valve assembly is necessary. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

►*EARLY 1962 CRANKCASE VENTILATION VALVE PRODUCTION CHANGE & LEAN CARBURETION CORRECTION:* When a flat spot or surge condition and/or excessive oil consumption is encountered on early 1962 cars, replace crankcase ventilation valve with new "Low Flow" type. Later 1962 cars are equipped with "Low Flow" Crankcase Ventilation Valve (Studebaker No. 1555578 - Type CV-587 on external label).

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .033-.038".

Spark Plugs - Champion H14Y. 14mm. Torque to 30 ft. lbs.

COIL: Autolite 200657 (exc. Taxi & Police), 200659 (Taxi & Police). Ignition Current - 4.0 amps. idling.

►*IGNITION RESISTOR NOTE:* Pink resistance wire (2.1-2.2 Ohms) from coil to ignition switch, bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Aut lit N . IAT-4403B.

C nd ns r - Autolite 2-32. **Capacity** .18-.23 mfd.

C ntact P int S t - Autolite No. 1-47.

Br ak r Gap - .017-.022".

Cam Angle - 37-41°. *Check and adjust with vacuum modifier line disconnected.*

Breaker Arm Spring Tension - 17-22 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees	Distr.	RPM	Degrees	Eng.	RPM
Start		300	0		600
2		400	4		800
4		500	8		1000
8		700	16		1400
12		900	24		1800

Vacuum Spark Control: Autolite integral type.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	7
4¼	8½	11
8	16	13

IGNITION TIMING

Setting - 2° BTDC.

Timing Mark - On vibration damper. "IGN" mark in line with pointer on left side of timing cover.

Timing - Disconnect vacuum advance pipe at carburetor. Install plug in carburetor. With engine at idling speed, timing light should show index mark nearest IGN mark directly under pointer.

CARBURETOR

►*FLAT SPOT & SURGE CONDITION (LEAN CARBURETION) CORRECTION: See Crankcase Ventilation Valve under TUNE-UP above.*

►*CARTER AS CARBURETOR PRODUCTION CHANGE & LOW SPEED STUMBLE DURING ENGINE WARM-UP (EARLY 1962 CARS) CORRECTION:* New pump plunger Studebaker No. 1557200 incorporated into production on late 1962 cars. Install new plunger on earlier cars with above condition. *See "Carter AS Carburetors" in Carburetion Section.*

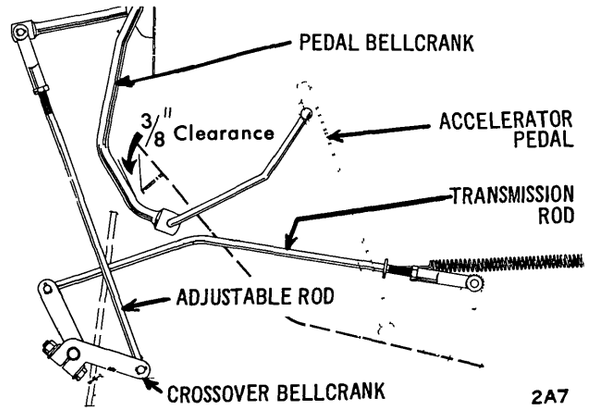
►*CARBURETOR APPLICATION: Carter AS single barrel*

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature and carburetor off fast idle, proceed as follows:

1) On right side of engine, disconnect adjustable rod from manifold bellcrank and adjust engine idle to 550 RPM with selector lever in "P" or "N" position. Hold bellcrank against stop plate (with engine idling at 550 RPM), adjust length of crossover bellcrank-to-manifold bellcrank rod to provide .005-.010" air gap between bellcrank and stop plate. *NOTE - Engine idle should not change and bellcrank should not leave its stop when rod is connected.*

2) On left side of engine, adjust length of rod between accelerator pedal bellcrank and crossover bellcrank to provide 3/8" clearance between rib on floor pan and accelerator bellcrank arm. *CAUTION - This adjustment must be accurate to prevent engine race on hard brake application or improper kickdown operation.*

3) Install pressure gauge on transmission at left front corner of case in front of selector lever. Operate engine at 1000 RPM in "D" range (brakes applied). Adjust rod connecting crossover bellcrank to transmission throttle valve control lever for pressure of 70-75 lbs. Remove gauge.



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

CARTER CARBURETORS

Model	① Carb. M d l
All Exc. Taxi (No Pos. Crankcase Vent.)	AS 3370S & 71S
All Exc. Taxi (Pos. Crankcase Vent.)	AS 3372S & 73S
Taxi	AS 3186S

① - AS-3371S & AS-3373S on cars equipped with governors.

►*CARTER AS CARBURETOR PRODUCTION CHANGE & LOW SPEED STUMBLE DURING WARM-UP (EARLY 1962 CARS) CORRECTION:* New pump plunger Studebaker No. 1557200 incorporated into production on late 1962 cars. Install new plunger on earlier cars with above condition. *See "Cart r AS Carbur tors" in Carburetion Section.*

Idle Setting - Initial setting approximately 1 turn open from a lightly seated position. Turn screw out for richer mixture.

Idle Speed - 550 RPM (All Trans.) in neutral.

Float Level - 5/16" (Gauge T109-280) Taxi; 3/16" (Gauge J-9643-2) Others. On all models, measure from top of each float at free end to top of casting with carburetor inverted. To adjust, (Taxi, with standard needle seat) bend float lip; (Others, with resilient seat) remove float pin retainer and place Float Holding Tool J-9643-1 in carburetor bowl with tang on tool engaging hole in center of float arm. Hold tool down tightly against bowl cover surface and bend upper horizontal center section of float arm with wide blade screwdriver or pliers. *CAUTION - Us care not to damage resilient type needl valve seat.*

Fast Idle: .065" clearance between throttle valve and side of body measured opposite idle ports, with fast idle link on high step of cam. To adjust, bend choke connector rod.

Automatic Choke Setting: Centered at index.

Throttle Linkage Adjustment: *S CARBURETOR abov .*

►*OTHER DATA: S "Cart r AS Carbur tors" in Carburetion S ction.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARB. EQUIPMENT

Fu l Pump: AC. Fuel only. Replacement pump 4703.
Fu l Pump Pr ssur - 3½-5 lbs.
Gas lin Gaug : Electric type.
Dash Unit - Studebaker No. 1552983 (All Lark Deluxe), No. 1555708 (All Lark Regal).
Tank Unit - Studebaker No. 1549575 (All).
Air Cl an r: Dry filter element type Std., Oil Bath type Optl. Clean dry type element every 1000 miles, replace every 10,000 miles.

►*DRY TYPE FILTER ELEMENT CLEANING CAUTION:* Clean filter element by tapping and shaking to remove dirt particles. DO NOT wash in any liquid, DO NOT use compressed air, and DO NOT oil.

ELECTRICAL

►*SEE STUDEBAKER V8 PAGES FOR BATTERY, STARTER, GENERATOR, REGULATOR & MISC. ELECTRICAL DATA.*

ENGINE

►*EXCESSIVE OIL CONSUMPTION CORRECTION: See "Crankcas Ventilation Valve Production Change Not "under TUNE-UP above.*

►*REPLACEMENT MAIN BEARING CAUTION:* Different bearings used in engines with Full-Flow oil filter (later production). *S CRANKSHAFT below.*

ENGINE SPECIFICATIONS: Own. 6 Cyl., overhead valve type. *NOTE* - Y-1 taxicab (heavy duty engine) has an aluminum camshaft timing gear, top compression ring is chrome, and heavy duty intake and exhaust valves are used.

B r	Str ke	Displacement
3"	4"	170 cu. ins.

C mpr. Rati	Rat d HP	Developed HP
8.25-1 Ⓒ	21.6	112 at 4500 RPM

Ⓒ - 8.5-1 (Police & Taxi), 7.0-1 (Export).
Compr ssi n & Vacuum Reading - *See TUNE-UP.*

OIL PAN REMOVAL: Remove oil dipstick and drain oil. On long wheel base models, move wheels to right to move steering bellcrank out of way. On other models disconnect tie rods and reach rod from steering bellcrank. Remove retaining pinch bolt and remove bellcrank from shaft. Remove oil pan screws and remove pan.

OIL PAN INSTALLATION: *See OIL PAN in Studebaker Sp cial Data.*

ENGINE REMOVAL: *S ENGINE in Studebaker Special Data.*

CYLINDER HEAD: *S CYLINDER HEAD & MANIFOLD in Stud bak r Sp cial Data.*

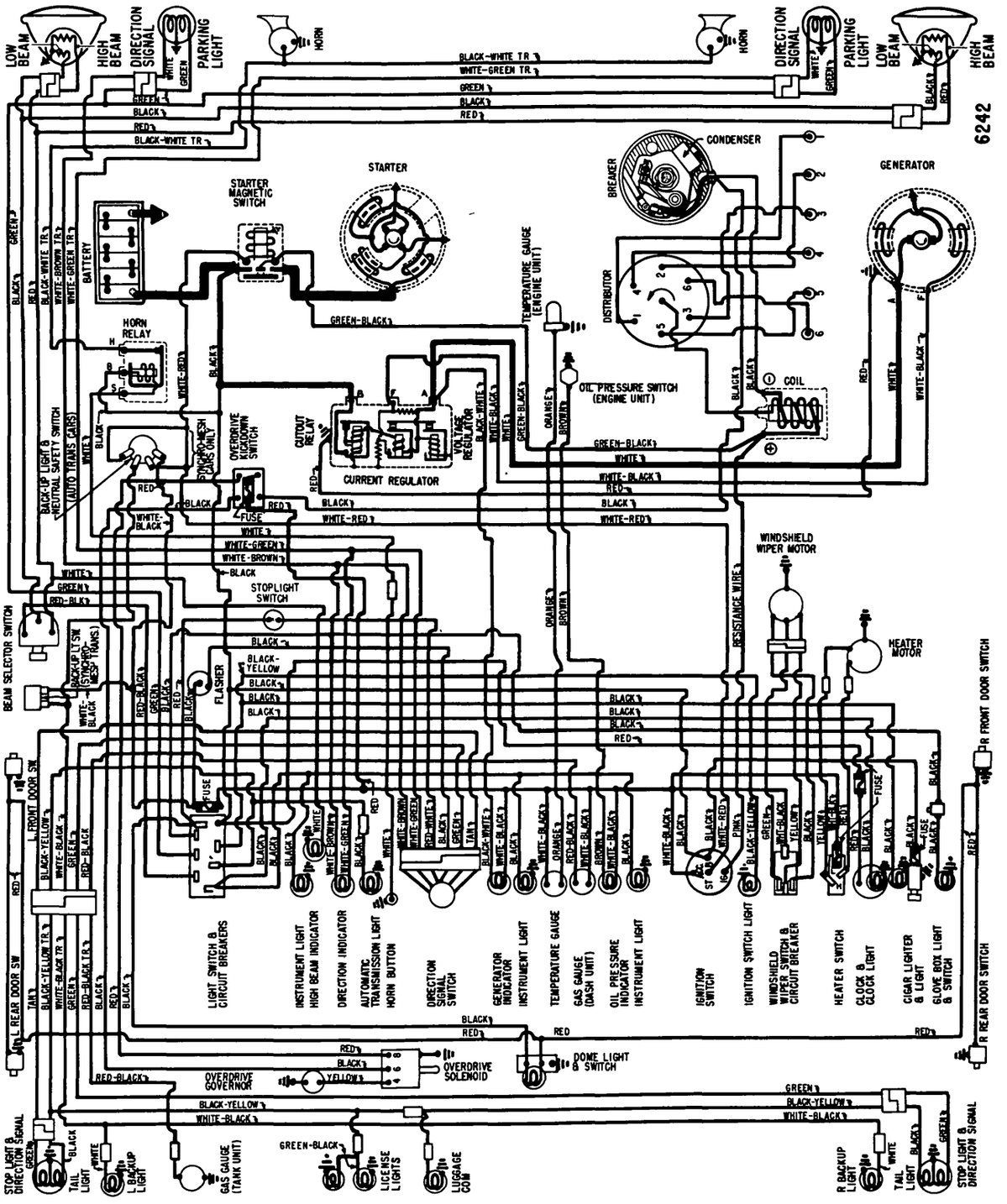
TIGHTENING TORQUES: *See TIGHTENING SPECIFICATIONS in Stud bak r Special Data.*

PISTONS

T-slotted, cam ground, tin plated aluminum alloy with one oil and two compression rings. Heat dam at top of piston controls heat at top ring. *NOTE* - 7-1 compression ratio has crater head type piston.

Fitting Pist ns - Use a .002" x 1" x 12" feeler gauge inserted on camshaft side of cylinder. Insert piston (inverted) in cylinder bore with slotted side away from

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camshaft and bottom edge of piston 1" below top edge of bore. Pull required to withdraw feeler should be 7-12 lbs.

Installing Pistons - "T" slot of piston away from camshaft side, and narrow part of rod offset to right on odd numbered rods, and to left on even numbered rods. *See Rod Installation.*

Replacement Pistons: Std. & .001", .0025", .010", .020", .030" and .040" Oversize. Pistons furnished with pins.

PISTON PIN

Pin is locked in rod by tapered pin and locknut.

Diameter - .7491-.7495". **Length** - 2.625".

Clearance in Piston - .0001-.0003" (selective fit). Light thumb push fit at 70°F.

Replacement Pins: Std. & .0025", .005" Oversize.

Piston Pin Removal & Installation - *See PISTON PINS in Studebaker Special Data.*

PISTON RINGS

Two compression rings (Cast Iron-Ferrex) and one oil ring (Cast Iron-Blued). *NOTE* - Y-1 Taxi has Chrome top (No. 1) compression ring.

Ring	Width	End Gap	Side Clearance
Compr. No. 1	3/32"	.007-.017"	.002-.005"
Compr. No. 2	1/8"	.007-.017"	.002-.005"
Oil	5/32"	.007-.017"	.0015-.004"

Replacement Rings: Std. & .020", .030", and .040" Oversize.

Installing Rings: Top compression ring has step at the inside which must be installed upward. Second compression ring has step at outside which must be installed downward. Inner and outer oil ring end gaps must not meet at the same point.

CONNECTING ROD

Length - (Center-to-center) 6 3/8". **Weight** - 19.04 ozs.

Crankpin Journal Diameter - 1.81175-1.81275".

Bearings - Steel backed, Microbabbitt lined, no shims.

►*HEAVY-DUTY ALUMINUM BEARING NOTE:* New type bearings are available for all 170 OVH 6 Cylinder Engines and went into production on 1961 S-Y1 Taxicabs beginning Engine Serial No. 61S-196221. These bearings are steel-backed, lined with aluminum alloy with a flash of babbitt over the aluminum.

Clearance - .0005-.002".

Sideplay - .005-.009".

Replacement Bearings: Std., .001", .002", .010", .020" .030" Undersize.

Installing Rods: Assemble piston on pin so "T" slot of piston on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, oil squirt hole and number will be to right on odd numbered rods, to left on even numbered rods. *CAUTION* - Odd numbered (1-3-5) and even numbered (2-4-6) rods cannot be interchanged.

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION:* If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap. Drill and file hole to correct.

Journal Diameter: 3.0623-3.0628".

Bearings - Steel-backed, micro-babbitt lined. No shims.

►*HEAVY-DUTY ALUMINUM BEARING NOTE (Nos. 2 & 3 Bearings):* Steel-backed, aluminum alloy bearings (with flash of babbitt over the aluminum) used in production on 1961 Y-1 Taxicabs beginning with Engine No. 61S-196221. *These bearings available for service.*

Clearance - .0005-.002".

Replacement Bearings: Standard & .001", .002", .010", .020", .030" Undersize.

►*REPLACEMENT MAIN BEARING CAUTION:* Bearings used in later production engines with full-flow oil filter have different oil hole locations (except rear main bearing) and previous type bearings must NOT be used in these engines. *NOTE* - These later type bearings can be used in earlier engines without full-flow filter.

►*FRONT MAIN BEARING CAP REMOVAL NOTE:* Turn crankshaft until No. 3 and No. 4 pistons are at top of their travel. Remove bearing cap bolts, then remove cap by twisting end away from camshaft toward rear of engine.

End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear, controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.

Endplay - .003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*

CAMSHAFT

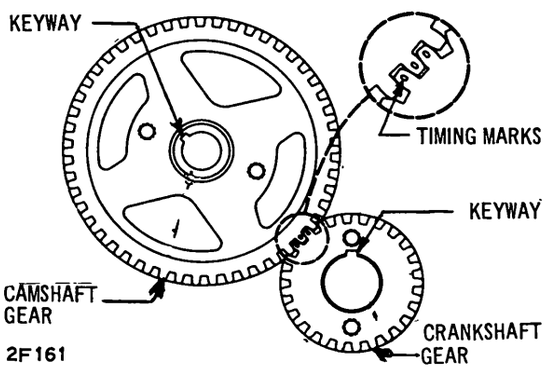
Journal Diameters - (1) 1.7475-1.7480", (2) 1.7162-1.7170", (3) 1.6857-1.6865", (4) 1.6232-1.6240".

Bearings - Steel backed babbitt lined bushings.

Clearance - No. 1-.0007-.0022", Nos. 2,3,4-.0010-.0027".

End Thrust: Taken by thrust plate assembled on front face of engine block behind camshaft gear (spacer assembled on shaft between gear hub and front bearing journal controls endplay). Adjust endplay by replacing thrust plate or spacer. When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting the plate.

Endplay - .003-.006".



VALVE TIMING MARKS

Camshaft Setting: Mesh marked tooth of camshaft gear between marked teeth of crankshaft gear.

Camshaft Removal & Installation; *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub.

Timing Gear Removal & Installation: *See "Timing Gears" in Studebaker Special Data.*

Backlash - .001-.003".

Engine Front Cover Removal: *See "Engine Front Cover" in Studebaker Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Studebaker Special Data.*

VALVES

NOTE - Y1 Taxicab engine has heavy duty intake and exhaust valves.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.593"	.3415"	5.250"
Exhaust	1.406"	.3415"	5.250"

Valve	Seat Angle	Lift	Stem Clearance
Intake	45°	.359"	.0015-.0035"
Exhaust	45°	.359"	.0015-.0035"

Valve Seat Width - 1/16-3/32".

Valve Springs: Single spring used on all valves.

►*VALVE SPRING LOCK INSTALLATION CAUTION:* When installing lock in recess of lower spring retainer, groove in lock must engage tongue in retainer.

Valve Spring Specifications

Valve	Pressure	Length
Open	105-115 lbs.	1.671"
Closed	45-55 lbs.	2.031"

Valve Guides: Use Tool No. J-9265 to drive guide out of cylinder head from combustion chamber side. Coat outside of guide with white lead, then start chamfered end into head from combustion chamber side. Drive new guide in until driver bottoms on counterbore in plate.

►*OVERSIZE VALVE GUIDE NOTE:* Engines with .010" oversize valve guides have a letter "O" stenciled in pad located at left rear of cylinder head below climatizer outlet elbow connection. All guides will be .010" oversize.

Valve Lifters: Straight Barrel Type. Interchangeable.

►*VALVE TRAIN PARTS CAUTION:* Later rocker arm and adjusting screw assemblies or interchangeable and pushrods and rocker arm shafts or **NOT** interchangeable between 6 Cyl. and V8 engines.

Valve Lifter Installation & Fitting - *See "Valve System" in Studebaker Special Data.*

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" Oversize Lifters requiring Reaming of Lifter Bore):* *See "Valve System" in Studebaker Special Data.*

Replacement Lifters - Std., .001" & .005" Oversize.

Rocker Arm Assembly: *See "Valve System" in Studebaker Special Data.*

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

Valve Timing Specifications

Intake Valves - Open 15° BTDC. Close 50°30' ALDC.

Exhaust Valves - Open 55°36' BLDC. Close 10° ATDC.

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Valve Timing Check - Adjust No. 1 intake valve at .030". Rotate engine until No. 6 piston is on the compression stroke (the IN-OP 1-6 marking on the damper should be several inches from pointer). Then, while moving pushrod up and down, continue to rotate crankshaft. Valve timing will be correct if pushrod stops moving as above marking is directly below pointer.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Studebaker Special Data.*

►*OIL FILTER PRODUCTION CHANGE:* Full-flow oil filter used in production on April 17, 1962 beginning Eng. No. S-248301. *NOTE - Correct oil filter must be used. See data below on both early and late production oil filters.*

Crankcase Capacity: 5 quarts refill, add 1 quart with filter change.

Normal Oil Pressure : 30 lbs. min. at 2000 RPM.

Pressure Regulator Valve : Opens at 50 lbs. Under plug on lower right front corner of engine. For access, remove engine front cover bolt. Replace weak spring (do not attempt to stretch spring).

Oil Pressure Indicator: Indicator light on instrument panel controlled by oil pressure switch, Studebaker No. 1539898, on left side of engine.

Oil Pump: Spur gear type, driven by gear on camshaft. **Pump Removal & Overhaul** - *See OILING SYSTEM in Studebaker Special Data.*

Oil Filter: Early Cars - Partial flow type. Replace element and housing (as a unit) every 5000-6000 miles or sooner if needed.

Later Cars - Full-flow type. Replace element every 4000 miles or sooner if needed.

Oil Filter Replacement Element - Studebaker No. 1542739 (Partial Flow - Early Cars), AC No. 3311 (Full-Flow - Later Cars).

►*EARLY CARS OIL FILTER INSTALLATION CAUTION:* Lubricate gasket with engine oil and tighten filter by hand ½-turn additional after filter gasket seats on its base. DO NOT OVERTIGHTEN.

►*LATER CARS OIL FILTER INSTALLATION & REMOVAL NOTE:* Remove filter by unscrewing element from base. If necessary use a wrench on the hexagonal boss on lower end of element. To install, lubricate gasket with light engine oil and tighten by hand only. DO NOT use a wrench or tool.

Crankcase Ventilation: Standard Cars - Filter element in oil filler cap (air intake) and in breather pipe (air outlet). Element in breather pipe replaceable (retained by cotter pin). To clean element, remove and wash in solvent, drain ,thoroughly and reoil.

Positive Crankcase Ventilation Cars - Road Draft Tube replaced by a hose to the manifold incorporating a valve in the line. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 11 qts. refill, add 1 qt. for heater.

Pressure Valve: 13 lb. radiator filler cap, Studebaker No. 1551190.

Thermostat: Choke type in water outlet on cylinder head. Studebaker No. 1550956 (170°) Std., No. 1551141 (160°) and No. 1551140 (180°) optional.

Water Pump: Packless, sealed ball bearing type.

►*WATER PUMP NOISE CORRECTION:* Add 4 ozs. water soluble oil to coolant. If noise persists, replace pump.

►*WATER PUMP PRODUCTION CHANGE:* Improved type pump used in production after approximately June 25, 1962. *See "Cooling System" in Studebaker Special Data for overhaul data on this pump.*

Pump Removal & Overhaul - *See COOLING SYSTEM in Studebaker Special Data.*

Temperature Gauge: Direct reading, electric type.

Dash Unit - Studebaker No. 1552984 (All Lark Deluxe), No. 1555709 (All Lark Regal).

Engine Unit - Studebaker No. 1549452 (Marked "362-AR" on one face of hex head).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

Model	Model Designation
2-Door Sedan (Deluxe)	62V-F4
2-Door Hardtop (Regal)	62V-J6
2-Door Hardtop (Daytona)	62V-J8
2-Door Police Sedan (Deluxe)	62V-F3
2-Door Convertible (Regal)	62V-L6
2-Door Convertible (Daytona)	62V-L8
2-Door Gran Turismo Hawk (Regal)	62V-K6
4-Door Sedan (Deluxe)	62V-Y4
4-Door Sedan (Regal)	62V-Y6
4-Door Taxicab Sedan (Special)	62V-Y1
4-Door Police Sedan (Deluxe)	62V-Y3
4-Door Luxury Cruiser Sedan	62V-Y8
4-Door Sta. Wgn. (Deluxe)	62V-P4
4-Door Sta. Wgn. (Regal)	62V-P6
4-Door Police Sta. Wgn. (Deluxe)	62V-P3

SERIAL NUMBER: Stamped on plate attached to left front hinge pillar post.

Assembly Plant	Starting Numbers
South Bend	62V-1001
Canada	62VC-1001

ENGINE NUMBER: Stamped on machined pad at upper left of cylinder block.

Assembly Plant	Starting Numbers 259" Eng.	289" Eng.
South Bend	V-534901	P-79801
Canada	VC-19601	PC-2801

TUNE-UP

►*SURGE CONDITION AT 30-50 MPH or STICKING CHOKE (Cars equipped with Stromberg 2-Bbl. Carburetors) CORRECTION: See "Stromberg WW Studebaker) Carburetors" in Carburetion Section.*

►*FLAT SPOT & SURGE OR EXCESSIVE OIL CONSUMPTION CORRECTION (Cars equipped with Positive Crankcase Ventilation): See Crankcase Ventilation Valve below.*

►*ROUGH ENGINE IDLE, STUMBLE ON ACCELERATION AT LOW SPEED, OR ENGINE DYING (Early cars with Carter WCFB Carburetors): See "Carter WCFB" under CARBURETOR below for recommended modification and Carburetor Production Changes.*

COMPRESSION PRESSURE: 140-160 lbs. at 150 RPM. Maximum variation between cylinders 10 lbs.

VALVE TAPPET CLEARANCE: .025-.027" (Cold). .023-.025" (Hot). All valves.

►*TAPPET CLEARANCE ADJUSTING SCREW CAUTION:* Screws are located on underside of rocker arm and are self-locking type. Torque required to turn screw must be 30 in. lbs. minimum.

MANIFOLD HEAT CONTROL: Automatic thermostatic type located in right bank exhaust manifold outlet.

Checking Thermostatic Coil Spring - With outer end of coil free from anchor and valve closed (counterweight forward), hooked end of coil should be 90° clockwise from anchor pin at 70°F.

CRANKCASE VENTILATION VALVE: Service every 10,000 miles or sooner if needed. Under cold weather driving conditions, more frequent cleaning of tubes and valve assembly is necessary. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

►*FLAT SPOT & SURGE OR EXCESSIVE OIL CONSUMPTION CORRECTION AND CRANKCASE VENTILATION VALVE PRODUCTION CHANGE NOTE:* When above condition encountered, replace crankcase ventilation valve with new type "Low Flow", Studebaker No. 1555578. New "Low Flow" type now in production.

IGNITION

FIRING ORDER: 1-8-4-3-6-5-7-2.
Cylinders - RIGHT BANK 2-4-6-8. LEFT BANK 1-3-5-7.

SPARK PLUG GAP: .033-.038".
Spark Plugs-Champion H14Y. 14mm. Torque to 25-30 ft. lbs.

COIL: Prestolite (Autolite) No. 200607.
Ignition Current - 3.8 amps. idling.
Resistor - Pink resistance wire (1.8 Ohms) from coil to ignition switch. Bypassed during cranking by lead from starter solenoid to coil.

DISTRIBUTOR: Prestolite (Autolite) No. 1BP-4108.
Breaker Gap - .014-.019".
Cam Angle - 27-31°. *Check and adjust with vacuum modifier line disconnected.*
Breaker Arm Spring Tension - 17-22 ozs.
Rotation - Counterclockwise viewed from above.

Automatic Advance

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
3	400	6	800
4	500	8	1000
6	650	12	1300
8	800	16	1600
11	1050	22	2100
12	1100	24	2200

Vacuum Spark Control: Autolite integral type.

Vacuum Advance

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	8
5	10	11
9	18	13

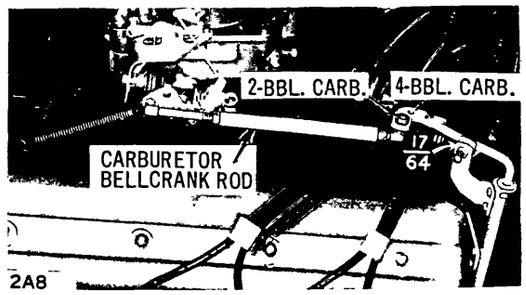
IGNITION TIMING

Setting - 4° BTDC at 550 RPM. Vacuum line to distributor disconnected and opening in carburetor plugged.
Timing Mark - "IGN" line on vibration damper aligned with pointer on timing gear cover.

CARBURETOR

►*CARBURETOR APPLICATION: Stromberg 2-Bbl. (Std.), Carter 4-Bbl. (Opt.).*

FLIGHTOMATIC THROTTLE LINKAGE ADJUSTMENT: With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows:



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

1) Adjust engine idle speed to 550 RPM with transmission selector in "N" (Neutral) position. Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position.

2) *NOTE - Make sure that carbur tor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetors and in out r hol on cars with 4-barrel carburetors. In both cases, ball joint must b on underneath side of bellcrank l v r.*

3) Adjust carburetor-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave its stop.

4) Stop engine and remove 1/8" pipe plug located near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" (Drive) position and run engine at 1000 RPM with rear wheels held stationary by foot brake. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. on Taxi). Stop engine, remove gauge and install plug.

THROTTLE RETURN CHECK ADJUSTMENT: Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on outer lever. Mark position of check assembly relative to bracket, then turn check assembly **1¼ to 2 turns toward lev r.** Tighten locknut.

STROMBERG WW

►*SURGE CONDITION AT 30-50 MPH CORRECTION: See "Strombera WW (Studebaker) Carbur tors" in Carburetion Section.*

►*STICKING CHOKE CORRECTION:* Replace choke rod with new Rod, Studebaker No. 1555388. Check all other components for correct operation. Replace as necessary.

Stromberg Series WW, Code 6-127 & 6-127A (Exc. Cl sed Crankcase Ventilation Cars), 6-128 (Cars with Closed Crankcase Ventilati n Syst m).

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrel feeds Cyls. 1-4-6-7, LEFT barrel feeds 2-3-5-8.*

Idle Setting - Initial setting 1¼ turns open, final setting approximately midway between missing and rolling points. Set both screws alike, turn screws out for richer mixture.

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.

Float Level - 3/16" from top edge of main body to top of float measured at center of float. To check, remove bowl cover and place float level gauge of Tool J-7477 across top edge of main body at center of float. Float should just touch gauge. To adjust, bend float lip.

Accelerating Pump - Center hole, normal setting. For less fuel, install rod in inner hole; for more fuel, install rod in outer hole.

Fast Idle Setting: Close choke so that fast idle screw contacts highest part of fast Idle cam. Adjust fast idle screw so a .030" wire gauge can be inserted freely between throttle valve and throttle body on the idle port side.

Automatic Choke Setting: Centered on index.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: Se "Stromb rg WW (Studebaker) Carbur tors" in Carburetion S ction.*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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CARTER WCFB 4-BARREL

►*ROUGH ENGINE IDLE, STUMBLE ON ACCELERATION AT LOW SPEED, OR ENGINE DYING CORRECTION (Cars with WCFB 2829S, 2830S, 3165S & 3166S Carburetors): See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

Carburetor Application

Transmission Type	Early Cars	Later Cars
Synchro-mesh & O.D.	2829S	3419S
Synchro-mesh & O.D. (CCV)	3165S	3422S
Flightomatic	2830S	3420S
Flightomatic (CCV)	3166S	3423S

CCV - Closed Crankcase Ventilation.

►*MANIFOLD FUEL DISTRIBUTION: Carburetor RIGHT barrels feed Cyls. 1-4-6-7. LEFT barrels feed 2-3-5-8.*

Idle Setting - Initial Setting ½-1½ turns open. Turn screws out for richer setting. *CAUTION* - Thermostatic Valve plunger (used on later and modified carburetors) must be held closed when adjusting idle speed and mixture.

Idle Speed - 550-600 RPM, with selector lever in "N" on Flightomatic cars.

Throttle Linkage Adjustment: *See CARBURETOR above.*

►*OTHER DATA: See "Carter WCFB 4-Barrel Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. 2573S. Fuel only.
Pressure - 3½-5 lbs. at 30 MPH.
Gasoline Gauge: Electric type.
Dash Unit - Studebaker No. 1555453 (Hawk), No. 1552983 (All Deluxe), No. 1555708 (All Regal).
Tank Unit - Studebaker No. 1549575 (All).
Air Cleaner: DRY TYPE (plasticized paper) Standard. Oil Bath type Optional. Clean dry type filter element. every 1000 miles, replace element every six months or 10,000 miles.

►*CLEANING CAUTION (DRY TYPE): Clean filter element by tapping lightly to remove dirt particles. DO NOT wash element in any solvent or liquids and DO NOT oil.*

BATTERY

Willard No. HO-11-50 (6 Cyl. & V8). 12 volt, 9 plate, 50 ampere hour capacity (20 hr. rate).
Battery Ground - Negative.
Engine Ground - Front engine support bracket to frame.

STARTER

Prestolite (Autolite) used as follows:

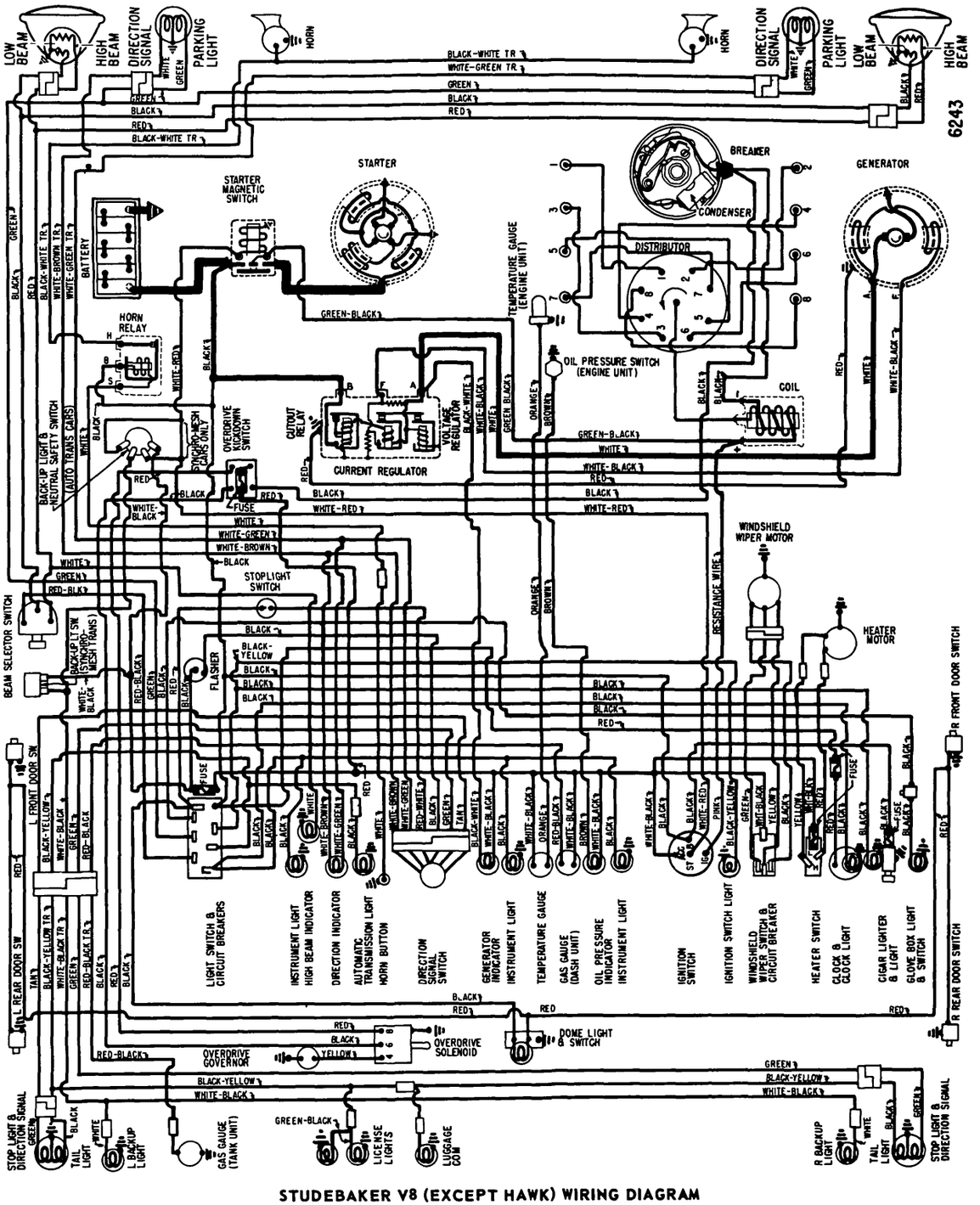
Model	Autolite No.
6 Cyl. (Exc. S.M. Y1-Taxi)	MDU-7005
6 Cyl. (S.M. Y1-Taxi)	MDU-7025
V8 Hawk	MDU-7025
V8 Lark (Exc. Auto. Trans.)	MDU-7025
V8 Lark (Auto. Trans.)	MDU-7026

Drive - Dendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 31-47 ozs. (MDU-7005), 35 ozs. minimum (MDU-7025 & 7026).

Performance Data

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50 max.
6.2 ft. lbs.	Lock	4.0	280 max.

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STUDEBAKER V8 (EXCEPT HAWK) WIRING DIAGRAM

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Starting Switch: Magnetic switch, Studebaker No. 1539716, mounted on dash and controlled by combination Ignition and Starter Switch.

Automatic Transmission Neutral Safety Switch: Studebaker No. 1552780. Located on steering column.

Adjustment - *See "Studebaker Flightomatic Transmission" in Transmission Section.*

GENERATOR

PRESTOLITE (AUTOLITE)

Prestolite (Autolite). Used as follows:

M del	Autolite Gen. No.
6 Cyl. & V8 (Std.)	GJP-7402E
6 Cyl. & V8 (Optl. Hvy. Duty)	GGA-6001-SN

►*GENERATOR NOTE: "A" Circuit Type used on all models.*

Performance Data

G nerator No.	Amps.	Volts	RPM
GJP-7402E	35	15.0	2600
GGA-6001-SN	40	14.6	1600

Armature - Autolite No. 10-24 (GGA-6001-SN).

Brush Spring Tension - 18-36 ozs. (GJP-7402E), 34-41 ozs. (GGA-6001-SN).

Field Current - 1.6-1.7 amps. (GJP-7402E), 1.1-1.3 amps. (GGA-6001-SN) at 10 volts and 70°F.

R tation - Counterclockwise at commutator end.

B lt Adjustment: 6 Cyl. - ¼" deflection with 10 lbs. pull midway between generator and fan pulleys.

V8 - ½" deflection with 14 lbs. pull midway between generator and fan pulleys.

DELCO-REMY

Heavy duty only. Used as follows:

Generator No.	Amps.	Volts	RPM
1102127	45	14.0	2520
1106679	50	13.0	1600
1106981	40	13.0	1500
1106985	50	13.0	1475

►*GENERATOR NOTE: "A" Circuit Type used on all models.*

Brush Spring Tension - 28 ozs.

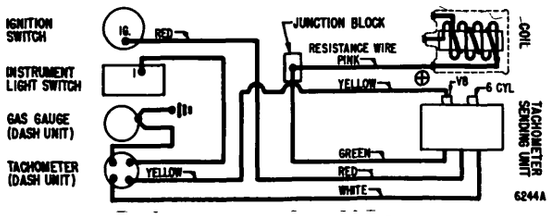
Field Current - 2.66-2.86 amps. (1102127), 2.14-2.28 amps. (1106679 & 985), 1.37-1.50 amps. (1106981) at 12 volts and 80°F.

R tation - Counterclockwise at commutator end.

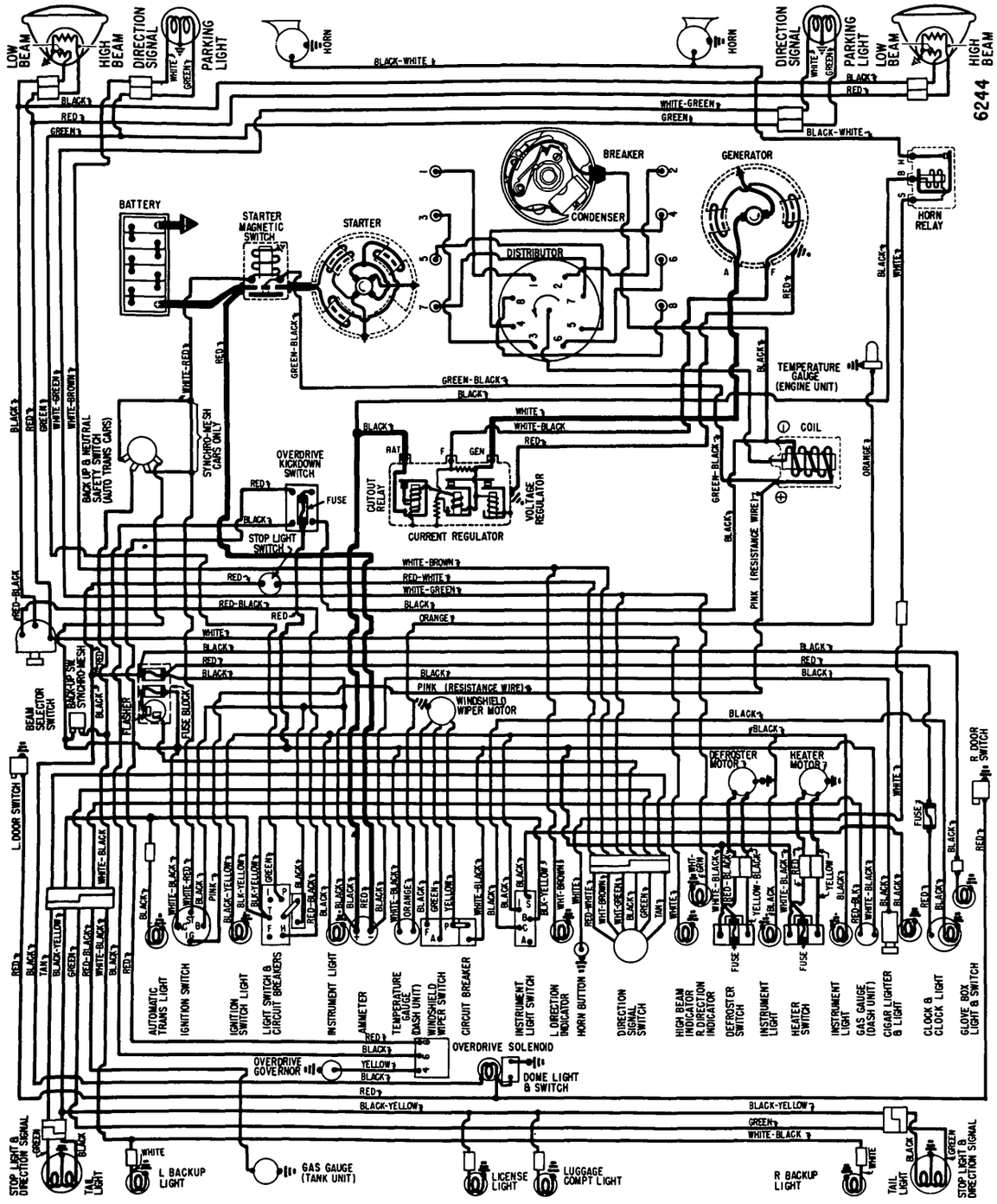
B lt Adjustment: 6 Cyl. - ¼" deflection with 10 lbs. pull midway between generator and fan pulleys.

V8 - ½" deflection with 14 lbs. pull midway between generator and fan pulleys.

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STUDEBAKER HAWK TACHOMETER WIRING DIAGRAM



STUDEBAKER HAWK WIRING DIAGRAM

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GENERATOR REGULATOR

PRESTOLITE (AUTOLITE)

Prestolite (Autolite) No. VBO-4223F1 (Std. 6 Cyl. & V8), No. VBO-4201B-1 (Heavy Duty 6 Cyl. & V8).

►*REGULATOR NOTE: "A" Circuit Type used on all models.*

►*SPECIFICATION NOTE: Specifications below are "Normal" settings.*

Cut ut Relay

Cuts In - 12.4-13.3 volts (VBO-4223F1), 12.5-13.5 volts (VBO-4201B-1) at 70°F.
Cuts Out - 3-5 amps. discharge after a charge of 7 amps.
C ntact Gap - .015" minimum.
Air Gap - .025-.027".

V ltage Regulator

Setting - 14.2-14.8 volts at 70°F, unit operating normally while charging at 7 amperes or with a .25 ohm resistance between regulator and battery.
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Curr nt Regulator

►*SETTING CAUTION: "Temperature Compensated" typ . S t to following specifications at 70°F.*

Op rating Amperes

Regulator No.	Test A	Test B
VBO-4223F1	44 amps.	35 (33-37) amps.
VBO-4201B-1	49 amps.	40 (38-42) amps.

Test A - After 15 minutes operation charging at 7 amps.
T st B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

►*OTHER DATA: S "Prestolite (Autolite) A Circuit R gulators" in El ctrical Section.*

DELCO-REMY

Used for heavy duty only.

G n rat r	Regulator
1106679	1119606
1106981	1119004
1102127	Ⓒ 1119610
1106985	Ⓒ 1119619

Ⓒ - Double Contact Regulator.

►*REGULATOR NOTE: "A" Circuit Type used on all mod ls.*

►*SPECIFICATION NOTE: Specifications below are "N rmal" s ttings.*

Cutout Relay

Cuts In - 11.5-13.0 volts (1119004), 11.8-13.0 volts (1119606, 610 & 619) at 70°F.
C ntact Gap - .020" minimum.
Air Gap - .020".

V ltage Regulator

Setting (1119004) - 13.6-14.3 volts at 125°F ambient temperature.
Setting (1119606,610 & 619) - 13.8-14.6 Volts (upper contacts), .1-.3 volts lower, operating on lower contacts at 125°F ambient temperature.
C ntact Gap (1119606,610 & 619) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .063" (1119004), .067" (1119606, 610, & 619) with armature pressed down to point where contacts just touch.

Current Regulator

Setting (1119004) - 37.0-42.0 amps. at 125°F ambient temperature.
Setting (1119606) - 48-52 amps.
Setting (1119610) - 36.0-40.5 amps. at 125°F ambient temperature.
Setting (1119619) - 46.0-50.5 amps. at 125°F ambient temperature.
Air Gap - .075" with armature pressed down to point where contacts just touch.

►*OTHER DATA: See "Delco-Remy Single Contact Regulators" or "Delco-Remy Double Contact Regulators" in Electrical Section.*

ALTERNATOR

DELCO-REMY: No. 1117070. Three-phase type with internal rectifiers.
Rated Output - 60 Amperes.

Performance Data - Cold (70°F)

Amperes	Volts	RPM
31	14.0	1000
58	14.0	2500

Rotation - Clockwise at drive end.
Field Current - 6.0-6.6 amps. at 12 volts & 80°F.
Brush Spring Tension - 10 ozs.

►*OTHER DATA: See "Delco-Remy Delcotron Alternators (1-D, 2-D, 3-D, 4-D Series)" in Electrical Section.*

LEECE-NEVILLE: No. A0012000AB or No. A0012002AA. Three-phase type with internal rectifiers.
Rated Output - 60 Amperes.

►*OTHER DATA: See "Leece-Neville Alternator & Regulator" in Electrical Section.*

ALTERNATOR REGULATOR

DELCO-REMY: No. 9000554 or No. 9000581. Transistorized type with Indicator Light Relay and Voltage Regulator.

►*NOTE: Above regulators used with separate Field Relay, No. 1116985.*

Voltage Regulator

Normal Setting - 13.0-13.6 volts (adjust to 13.4 volts) at 125°F ambient temperature.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Indicator Light Relay

Voltage Setting - Contacts should close 2 volts lower than voltage regulator setting.
Air Gap - .075" with armature pressed down to point where contacts just touch.

Field Relay
(Separate Relay No. 1116985)

Closing Voltage - 8.3-10.2 volts.
Sealing Voltage - 10.7 volts maximum.
Air Gap - .011" with contacts just touching.
Contact Gap - .025"

►*OTHER DATA: See "Delco-Remy Transistorized Alt rnator Regulators ("A" Circuit Type)" in Electrical S cti n.*

LEECE-NEVILLE: Voltage regulator unit and separate Rectifier Relay used.

►*OTHER DATA: Se "L c -N vill Alternator & Regulat r" in El ctrical S ction.*

MISC. ELECTRICAL

CIRCUIT BREAKERS: 18 Amp r (Lark 6 & V8). On Headlight switch. Protects headlights and High beam indicator. **20 Ampere (Hawk V8).** On Headlight switch. Protects headlights, high beam indicator, parking lamp, tail lamp, license plate lamp, instrument lamp, ignition lamp.
12 Ampere (Lark 6 & V8). On headlight switch. Protects parking lamp, tail lamp, stop lamp, license plate lamp, instrument lamp, ignition lamp, dome lamp, & clock lamp.
5 Ampere. Located in switch. Protects windshield wiper.

FUSES: SFE 14. Protects overdrive. In kickdown switch.
AGC 15 ampere - Climatizer & Defroster. In switch.
1AG 3 ampere - Clock. In lead behind Instr. Panel.
AGW 4 ampere - Radio (manual). In lead.
AGW 2½ ampere - Radio (Pushbutton). In lead.
SFE 9 ampere - Direction signal and Back-up lights. In fuse block behind instrument panel.
Thermal - Cigar Lighter. On back of lighter socket.

ENGINE

ENGINE SPECIFICATIONS: Own. V8, valve-in-head. Two engines used: 289" Engine used in Hawk Sports Coupe & Police Cars, 259" Engine used in all other models.

Engine	Bore	Stroke	Displac m nt
259"	3 9/16"	3 1/4"	259.2 cu. ins.
289"	3 9/16"	3 5/8"	289 cu. ins.

Engine	① Compr. Ratio	Rated HP	Develop d HP
259"(2-Bbl.)	8.25-1	40.6	180 at 4500 RPM
259"(4-Bbl.)	8.25-1	40.6	195 at 4500 RPM
289"(2-Bbl.)	8.25-1	40.6	210 at 4500 RPM
289"(4-Bbl.)	8.25-1	40.6	225 at 4500 RPM

① - 8.5-1 Optional (7.0 & 7.5-1 Export).
Compression & Vacuum Reading - *See TUNE-UP.*

►*EXCESSIVE OIL CONSUMPTION NOTE: See Crankcase Ventilation Valve under TUNE-UP above.*

►*ENGINE OIL LEAK AT FILTER (Cars with Full-Flow Filter):* Caused by interference between oil filter cartridge and underside of filter base mounting pad preventing filter seating tightly on base. To correct, remove filter, filter base, and right hand exhaust pipe. Mask surface of mounting pad with tape, carefully grind off underside of pad to provide 3/32-1/8" clearance between filter cartridge and pad when filter installed. Clean pad thoroughly, install filter base and cartridge using new gaskets. Operate engine and check for oil leaks.

OIL PAN REMOVAL: Remove dipstick and adapter tube (remove head bolt to remove tube clamp). Disconnect battery. Drain crankcase. Remove starter. On Hawk, swing wheels to right to move steering bellcrank out of way. On other models, remove steering bellcrank assembly and exhaust crossover pipe. Remove oil pan

OIL PAN INSTALLATION: *See OIL PAN in Stud baker Special Data.*

ENGINE REMOVAL: *See ENGINE in Studebaker Sp cial Data.*

CYLINDER HEAD: *S CYLINDER HEAD & MANIFOLDS in Stud baker Special Data.*

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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TIGHTENING TORQUES: *See TIGHTENING SPECIFICATIONS in Stud bak r Special Data.*

PISTONS

Aluminum alloy, cam ground, T-slot, three-ring type. *See ORIGINAL BORE & PISTONS in Studebaker Special Data.*

►*PISTON INTERCHANGEABILITY CAUTION:* Pistons for 289" engine have a dished head, and pistons for 259" engine have a flat head. DO NOT INTERCHANGE.

Weight - 16.21 ozs.

Removal - Pistons and rods removed from above.

Fitting New Pistons: Clearance determined by selective feeler fit. Use a 1" x .002" x 12" feeler inserted on camshaft side of cylinder bore. Insert inverted piston in bore with slotted side away from camshaft, and bottom edge 1" below top of cylinder bore. Pull required to remove feeler should be 7-12 lbs.

R placement Pistons: Std. & .001", .002", .010", .020", .030", .040" Oversize. Furnished with pins.

Installing Pistons: Install piston on rod so solid side of piston is on same side as oil hole in bearing bore. Install piston in cylinder with slot toward left side of engine. *See Rod Installation.*

PISTON PIN

Locked in rod by tapered pin and locknut.

Diameter - .8741-.8745". **Length** - 3 1/16".

Clearance in Piston - .0001-.0003" selective fit. Light thumb push fit at 70°F.

R placement Pins: Std. & .0025", .005" Oversize.

R moval & Installation: *See PISTON PINS in Studebaker Special Data.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr.	.077-.078"	.008-.016"	.002-.005"
Oil	.1855-.1865"	.008-.016"	.0015-.005"

Replacement Rings: Sets of Std. & .020", .030", .040" Oversize.

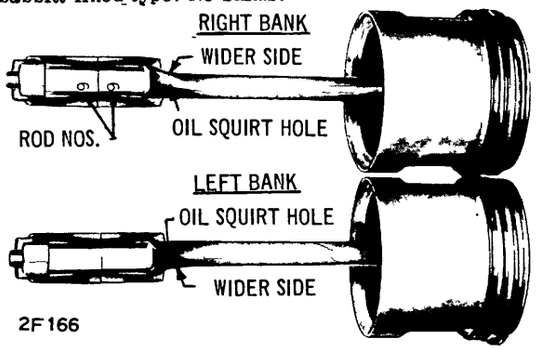
Installing Rings: Install compression rings with chamfered side of ring upward. Gaps of inner and outer oil ring must not come at same point.

CONNECTING ROD

Length - 6 5/8" center-to-center. **Weight** - 23.71 ozs.

Crankpin Journal Diameter - 1.99925-2.00025".

Lower Bearing - Interchangeable. Steel backed, micro-babbitt lined type. No shims.



PISTON & ROD ASSEMBLY

Cl aranc - .0005-.002". **Sid play** - .008-.013".

R placem nt B arings: Std., .001", .002", .010" and .020" Undersize.

Installing R ds: Number on rod and bearing cap must be on same side. Rod is installed in same numbered cylinder with numbers down toward oil pan (toward right on right bank rods, toward left on left bank rods), and oil squirt hole on all rods toward right of engine. Rods are offset with widest half of bearing toward rear on right bank, toward front on left bank.

►*CAUTION:* Install piston and pin on rod so that T-slot of piston is on side opposite oil hole in bearing bore. Insert tapered end of clamp screw so it will be toward heavy boss. Be careful to align flat surface of screw with flat on piston pin. Bearing cap must be assembled on rod with groove in cap and rod on same side.

►*REPLACEMENT ROD IDENTIFICATION NOTE:* Replacement rods are unnumbered. To identify, hold rod upright with oil hole toward you. Wide part of offset will be to right on left bank rods, to left on right bank rods.

CRANKSHAFT

►*REAR MAIN BEARING OIL LEAK CORRECTION:* **If proper installation of new rear oil seal and oil pan gaskets does not stop the leak, make sure that drain core hole in rear main bearing cap connects with groove in cap. Drill and file hole to correct.**

Journal Diameter - 2.4995-2.5000".

Bearings - Steel-backed, micro-babbitt lined. No shims.

Clearance - .0005-.0025".

Replacement Bearings: Std. & .001", .010", .020", .030" Undersize.

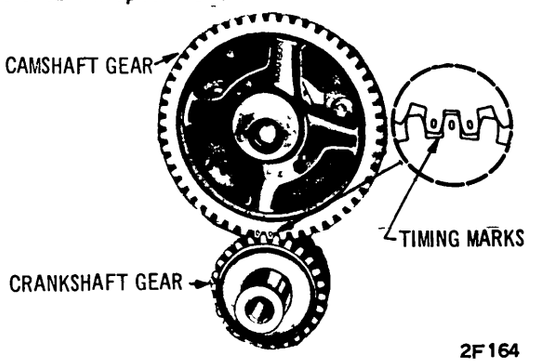
►*MAIN BEARING REPLACEMENT NOTE:* Replacement main bearings are same type on all engines (furnished in heavy duty type only). Special bearings not required on engines with full-flow oil filter.

End Thrust: Taken by thrust washer assembled between front main bearing and crankshaft gear, controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.

Endplay - .003-.006".

Crankshaft Rear Main Bearing Oil Seal: *See "Crankshaft & Main Bearings" in Studebaker Special Data.*

Crankshaft Front Oil Seal: *See "Engine Front Cover" in Studebaker Special Data.*



VALVE TIMING MARKS

CAMSHAFT

Journal Diamet rs - (1) 1.86975-1.87075", (2) 1.85375-1.85475", (3) 1.83875-1.83975", (4) 1.82275-1.82375", (5) 1.24475-1.24575".

Bearings - Precision type, steel backed babbitt lined.

Clearance - .00075-.00225" (No. 1), .001-.00275" (Others).

End Thrust: Taken by thrust plate located between front camshaft bearing and camshaft gear.

Endplay - .003-.006".

Camshaft Setting: Mesh marked tooth of camshaft gear between marked teeth of crankshaft gear.

Camshaft Removal & Installation; *See "Camshaft & Bearings" in Studebaker Special Data.*

Timing Gears: Crankshaft gear is Cast Iron, Camshaft gear is Celeron with steel hub.

Timing Gear Removal & Installati n: *See "Timing Gears" in Studebaker Special Data.*

Backlash - .001-.003".

Engine Front Cover Oil Seal (Crankshaft Fr nt Seal): *See "Engine Front Cover" in Stud baker Sp cial Data.*

VALVES

Tappet Clearance - .023-.025" (Hot), .025-.027" (Cold).

Valve	Head Diam.	Stem Diam.	L ngth
Intake	1.656"	.343"	5.156"
Exhaust	1.531"	.343"	5.156"

Valve	Seat Angle	Lift	St m Clearance
Intake	45°	.359"	.0015-.0035"
Exhaust	45°	.359"	.0015-.0035"

Valve Seat Width - 1/16-3/32".

Valve Stem Oil Seal: "Umbrella" type, rubber seals installed on all exhaust and intake valve stems (with cupped side down toward top of valve guide) within valve spring below spring retainer.

Valve Springs: Single spring used. Replace spring if 10% weaker than pressure given in specifications below. *NOTE* - Damper installed on lower (close-coiled) end of all springs.

Valve Spring Sp cificati ns

Valve	Lbs. Pressure	L ngth
Closed	45-55	2.031"
Open	105-115	1.671"

Valve Guides: Pressed in head from underside.

Guide Removal & Installation - *See "Valve System" in Studebaker Special Data.*

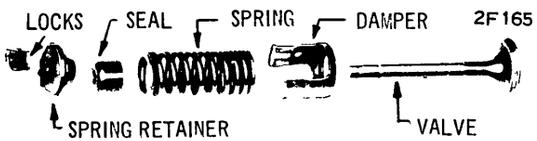
Valve Lifters: Straight barrel type. Remove from above. Not necessary to remove camshaft.

Valve Lifter Installation & Fitting - *See "Valv System" in Studebaker Special Data.*

►*OVERSIZE VALVE LIFTER INSTALLATION (.005" Oversize Lifters requiring Reaming of Lift r Bore): See "Valve System" in Studebaker Special Data.*

Replacement Lifters - Std., .001" & .005" Oversize.

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VALVE ASSEMBLY

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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Rock r Arm Ass mbly: *See "Valv Syst m" in Studebak r Sp cial Data.*

VALVE TIMING

S e "Camshaft S tting" under CAMSHAFT above.

Valve Timing Specificati ons

Intak Valv s - Open 11°BTDC. Close 54°36' ALDC.
Exhaust Valv s - Open 51°36' BLDC. Close 14° ATDC.

Valve Timing Ch ck - Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and vibration dampener mark "IN.OP.1" is approaching pointer on timing gear cover, continue to turn crankshaft slowly while working No. 1 intake rocker arm up and down to determine point at which all clearance is taken up. Dampener mark "IN.OP.1" should be directly under pointer.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" und r OILING SYSTEM in Studebaker Special Data.*

►*OIL FILTER PRODUCTION CHANGE:* A full-flow type oil filter went in production on April 17, 1962 beginning Eng. Nos. V-559387 and P-90826. *NOTE - Corr ct oil filt r must b used. See data below on both arly and lat production oil filters.*

Crankcas Capacity: 5 qts. (add one quart when filter changed).

N rmal Oil Pr ssur - 20-40 lbs. at 40 MPH.
Pr ssur R gulator Valve - Located on right side at front of engine block slightly above crankcase flange.

Oil Pr ssur Indicator (Lark): Indicator light on instrument panel controlled by oil pressure switch. Studebaker No. 1539898.
Oil Pr ssur Indicat r (Hawk): Direct reading, non-electric type gauge, Studebaker No. 1539878.
Oil Pump: Spur gear type, on rear main bearing cap in crankcase.

Removal, Overhaul & Installation - *See "Oiling System" in Studebaker Special Data.*

Oil Filter: Early Cars - Filter is partial-flow type on cars produced before Eng. Nos. V-559387 or P-90826. Replace element and housing (as a unit) every 5000-6000 miles or sooner if needed.

Later Cars - Filter is full-flow type on cars produced after Eng. Nos. V-559387 or P-90826. Filter mounted at right rear of cylinder block above engine oil pan mounting flange. Replace filter element every 4000 miles or sooner if needed.

►*EARLY CARS OIL FILTER INSTALLATION CAUTION:* Lubricate gasket with engine oil and tighten filter by hand ½-turn after gasket seats on base. *Do not cross-thread or overtighten.*

►*LATER CARS OIL FILTER REMOVAL & INSTALLATION CAUTION:* Oil filter element is removed by unscrewing element from base. To facilitate removal, a wrench may be used on hexagonal boss on lower end of element. To install, lubricate element with light engine oil and tighten it by hand. DO NOT use wrench or tool to tighten.

Oil Filter Element Replacement - Studebaker No. 1542739 Partial-Flow (Early Cars), AC No. 3311 Full-Flow (Later Cars).

Crankcas V ntilati n: Standard Cars - Filter element is located in oil filler cap (air intake). Breather pipe (air outlet) is connected at r ear of valve chamber cover plate.
Positive Crankcase Ventilation Cars - The road draft tube has been replaced by a hose to the manifold utilizing a valve in the line. *See "Closed Crankcas Ventilation Systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

►*WATER PUMP NOISE CORRECTION:* Add 4 ozs. water soluble oil to coolant. If noise persists, replace pump.
►*WATER PUMP PRODUCTION CHANGE:* Improved type water pump used in production approximately July 25, 1962. For Overhaul, *see "Cooling System" in Studebaker Special Data.*
Water Capacity: 17 qts. (less heater), add 1 qt. (Lark), 1½ qts. (Hawk) for heater.

Pressure Valve: 14 lb. radiator filler cap, Studebaker No. 1551190.

Thermostat: Choke type Studebaker No. 1550956 (170°F) Std., No. 1551141 (160°F) and No. 1551140 (180°F) Optional.

Water Pump: Packless, sealed ball bearing type.

Pump Removal & Overhaul - *See COOLING SYSTEM in Studebaker Special Data.*

Radiator & Fan Shroud Removal - *See COOLING SYSTEM in Studebaker Special Data.*

Temperature Gauge: Direct reading, electric type.
Dash Unit - Studebaker No. 1552984 (All Lark Deluxe), No. 1555709 (All Lark Regal), No. 1555456 (Hawk Hardtop), No. 1539879 (Hawk Coupe).
Engine Unit - Studebaker No. 1545220 (All).

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

TIGHTENING SPECIFICATIONS

6 CYLINDER OVERHEAD CAM ENGINE

	Ft. Lbs.
Cylinder Head	75-80
Cam Bearing Deck Stud Nuts	15-20
Exhaust Manifold	35-40
Intake Manifold	15-20
Oil Pan	12-15
Filler Block to Cylinder Block	12-15
Main Bearing Caps	85-95
Connecting Rod Caps	40-45
Vibration Damper	100-130
Water Pump to Timing Chain Cover	12-15

"F" HEAD & "L" HEAD ENGINES

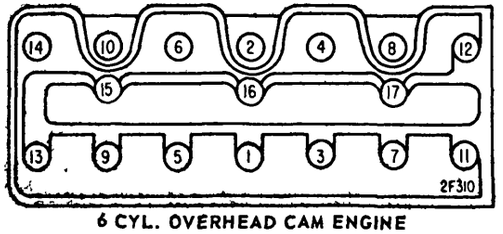
	4 Cyl.	6 Cyl.
Cylinder Head	60-70	35-45
Int. & Exh. Manifolds	29-35	30-35
Oil Pan	9-14	12-15
Main Bearing Caps	65-75	85-95
Crankshaft Counterweight Bolt	60-70	
Flywheel	35-41	35-40
Vibration Damper		100-130
Con Rod Caps (3/8")	35-45	40-45
Piston Pin Clamp Bolt	35-41	
Camshaft Sprocket	30-40	35-40
Rocker Arm Support Bracket	30-36	
Valve Chamber Cover		7-10
Engine Front Cover		12-15
Water Pump	12-17	15-20
Oil Pump		30-35

CYLINDER HEAD & MANIFOLD

OVERHEAD CAM ENGINE

CYLINDER HEAD REMOVAL (WITHOUT REMOVING TIMING CHAIN): Remove rocker arm cover, install Camshaft Sprocket Removal & Installation Tool, W-268, on rocker arm cover studs. Install hook of removal tool in camshaft sprocket, tighten nut to relieve tension on camshaft. Remove capscrew, lockwasher, flat washer, and fuel pump eccentric from camshaft sprocket, pull forward on sprocket to free it from pilot on camshaft. Release tension on removal tool by backing off tool nut and allow chain and sprocket to rest on bosses on timing chain cover. *CAUTION - DO NOT slack off on chain (which would allow it to disengage from crankshaft sprocket), DO NOT attempt to remove sprocket from chain, and DO NOT attempt to crank engine with sprocket and chain resting on timing chain cover (will cause severe damage).*

CYLINDER HEAD INSTALLATION: Install cam deck with 5/16" stud nuts (Nos. 15, 16 & 17 in illustration). Position all-metal cylinder head gasket on block so coolant and vent ports are properly aligned. *NOTE - Use no seal r or other compound on gask t.* Position cylinder head squarely on block then install cylinder head bolts. Using a torque wrench, tighten cylinder head bolts (Nos. 1 through 14), then tighten cam deck stud nuts (Nos. 15, 16 & 17) to specifications, following sequence shown in diagram.



6 CYL. OVERHEAD CAM ENGINE

CRANKSHAFT & MAIN BEARINGS

6 CYL. OVERHEAD CAM ENGINE

REAR BEARING OIL SEAL INSTALLATION: Rear end of crankcase is sealed against oil leaks by a seal consisting of the filler block guard, upper seal half, two gasket inserts, a lower seal half, a rear filler block and an oil pan seal. For detailed installation, see following:

FRONT & REAR FILLER BLOCKS: Lower filler blocks are bolted on lower face of crankcase to close oil pan opening (filler blocks must be removed to replace oil pan gasket). Rear filler block (upper filler block guard in crankcase) is grooved for seals which bear on polished surface of crankshaft. Filler blocks can be removed and replaced without disturbing crankshaft as follows:

Lower Filler Block Servicing (Front & Rear): Remove 2 socket head machining screws attaching rear filler block to cylinder block. Remove oil pan seal, filler block, gasket inserts and lower rear seal. Remove front filler block-to-cylinder block attaching bolts and remove. Discard seals and oil pan gaskets and cement. Replace front and rear bearing oil seals. Cement filler blocks for a distance of 2" from each end (also coat oil pan seals for a distance of 2" from each end) then install oil pan seals. Ends of pan seals should be 1/16" below top of filler block. Allow cement to dry before installing.

Upper Filler Block Servicing (Rear): Guard is seated in groov e in crankcase and can be rotated out without disturbing crankshaft after lower filler block removed. Remove and discard old seal, clean out seal groove, then install new seal. Do not use sealing compound in groove.

ENGINE FRONT COVER

6 CYL. OVERHEAD CAM ENGINE

FRONT COVER OIL SEAL: With timing chain cover installed, apply thin coating of sealing compound on outer edge of seal and position seal in opening so that the seal lip faces toward inside of cover. Drive seal into place using Oil Seal Installing Tool W-269.

ENGINE FRONT COVER REMOVAL: Remove hose from front cover water port. Remov e front cover-to-engine front cover plate attaching bolts, nuts and washers. Remove cover, lifting eye and gasket. Slide oil slinger and oil pump drive gear from crankshaft.

CAMSHAFT & BEARINGS

6 CYL. OVERHEAD CAM ENGINE

►*CAMSHAFT SERVICING NOTE:* Camshaft operates directly in bearing bores in Camshaft Support Deck and camshaft or support deck must be replaced if bearing clearance excessive. S *Camshaft and Support D ck data b l w.*

CAMSHAFT REMOVAL: With cylinder head removed, lift rocker arm guide off mounting studs on camshaft support deck, turn rocker arms parallel to camshaft (rotate camshaft to release tension on rocker arms, turn arms off cams as tension is relieved). Remove nuts and lockwashers attaching retainer to front of support deck, remove retainer, pull camshaft forward and out of support deck bearing bores.

CAMSHAFT SUPPORT DECK REMOVAL: After camshaft removed, remove three nuts, lockwashers, and plain washers attaching deck to cylinder head, lift support deck off head.

CAMSHAFT BEARING SERVICE: Check support deck and bearing bores for cracks, visible wear, or scoring. Check bearing bore and camshaft journal diameters with micrometers. Replace support deck or camshaft if bearing clearance more than .004". Support deck bearing bore dimensions are as follows:

Bearing	Support Deck B r	Camshaft J urnal
No. 1	1.9995-2.0005"	1.9965-1.9975"
No. 2	1.8745-1.8755"	1.8715-1.8725"
No. 3	1.7465-1.7475"	1.7495-1.7505"
No. 4	1.3715-1.3725"	1.3745-1.3755"

►*CAMSHAFT INSTALLATION CAUTION:* Some OHC Engines have a .030" thick shim installed between cam bearing deck casting and camshaft thrust plate. This shim must be reinstalled after camshaft servicing. To determine if the engine has this shim, measure between centerline of base holes to thrust plate surface. If measurement is .810", no shim required. If measurement is .780", a thrust plate shim, Willys Part No. 932076 is required.

TIMING CHAIN

OVERHEAD CAM ENGINE

TIMING CHAIN REMOVAL: Remove timing chain cover (see above). Install Camshaft, Sprocket Removal & Installer, Tool W-268, on rocker arm cover studs of cam bearing support deck. Install the hook of this tool in the sprocket and tighten the nut to relieve tension on camshaft. Remove capscrew, lockwasher and flat washer and fuel pump eccentric from sprocket. Pull forward on camshaft to remove it from pilot. Release tool hook, then slide timing chain sprocket to remove from crankshaft. Remove chain tensioner pin. Remove blade assembly and tensioner spring from lower tensioner mounting stud. Remove chain guide bracket-to-front engine plate attaching capscrews, washers and nuts. Remove chain guide bracket. To install, reverse removal procedure. *Check Valv Timing. See Car Model Pages.*

VALVE SYSTEM

ROCKER ARMS

OVERHEAD CAM ENGINE

ROCKER ARM STUD REPLACEMENT (Overh ad Cam Eng.): Position cam bearing support deck on an arbor press and position the support of Rocker Arm Stud Remover and Installer Tool W-266 under defective stud. Position tool guide on top of stud with chamfered end up. Position driver in guide so that end rests on top of stud. Press on end of driver to dislodge stud. Remove stud. Invert cam bearing support deck on arbor press and install support of tool under deck aligned with hole for stud. Position new stud in hole in bearing deck (thread end first). Position tool guide on knurled end of stud with chamfered end down. Press stud into place until it seats firmly.

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OILING SYSTEM
ENGINE LUBRICATION
OVERHEAD CAM ENGINE

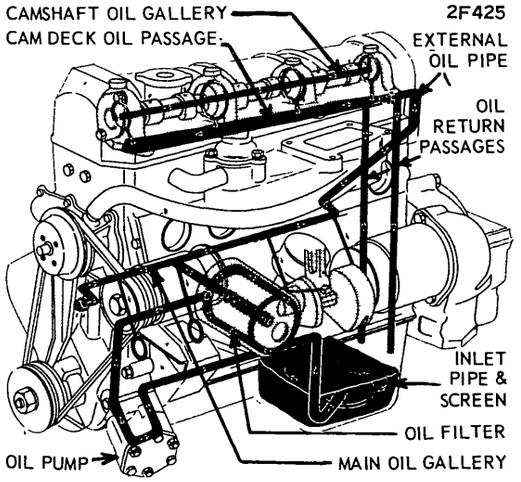
DESCRIPTION: Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. All other parts are lubricated by oil spray.

OPERATION: Double rotor type oil pump, driven by helical gear on crankshaft, draws oil through fixed intake screen, and delivers oil to full flow filter through passages in block. Oil flow from filter is through passage in block to main oil gallery which extends along left side of block. Oil is distributed from main oil gallery as follows:

Crankshaft Bearings - Each main bearing supplied with oil from main oil gallery through angle passage in crankcase web extending down from main oil gallery to main bearing bore.

Camshaft B arings - Drilled passages in support deck provide lubrication to camshaft bearings. Oil passage to rear camshaft bearing also provides oil under pressure to fill oil passages in camshaft to keep cams lubricated.

Camshaft B aring Supp rt Deck - A ¼" steel tube is inserted in this passage to conduct oil to front of support deck and to prevent oil drain back when engine is idle. Oil enters this tube via external tube at rear of block which connects oil passage in block to oil passage in cylinder head.



6 CYL. OVERHEAD CAM ENGINE OILING SYSTEM

Conn cting Rod B arings - Oil passages in crankshaft mate with oil grooves in main bearings and these passages conduct oil to the connecting rod bearings.

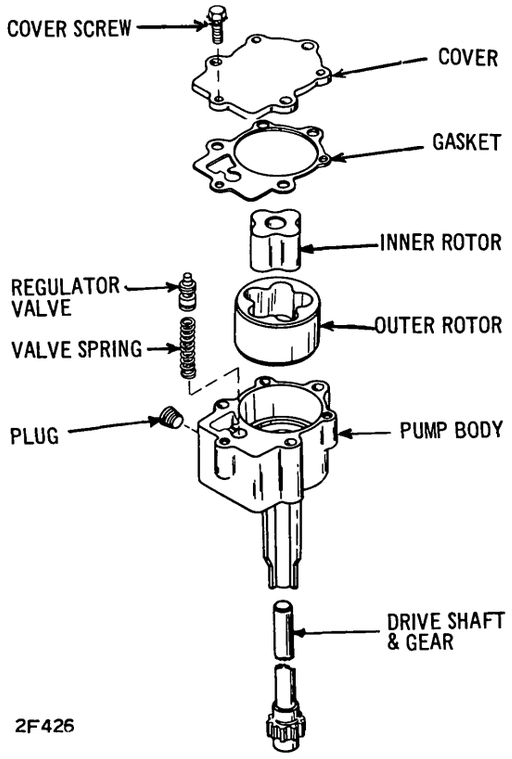
Pist ns & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lin ds up with oil hole in crankpin.

Timing Gears - A passage in block conducts oil to a fitting at front of block which provides a stream of oil to timing chain, sprocket, and oil pump drive gear at front end of crankshaft.

OIL FILTER: Full-flow type mounted externally on left side of cylinder block. All oil supplied by oil pump passes through filter, then through passage to main oil gallery in block. Relief valve located in pump body.

OIL PUMP

OIL PUMP SERVICING: Removal - Remove three nuts and lockwashers. Pull straight out to remove pump. **Inspection** - Cle an and check pump for cracks or leaks. Check drive gear for worn teeth, cracks, etc. Replace gear if damaged. Mount dial indicator on oil pump to check for endplay. Move pump shaft to its extremes and check for total endplay. If this exceeds .005", replace pump. *CAUTION* - Drive gear is press fit on oil pump shaft and must be removed and replaced with an arbor press. Correct axial positioning of the gear on shaft as follows: Outside end of gear hub must be 7 1/32" from mounting face of pump. Centerline of face of gear teeth should coincide with bottom of distributor shaft slot in end of oil pump shaft. **Installation** - Oil pump is driven from crankshaft by means of a helical gear. Distributor is driven by the oil pump by means of a tongue on end of distributor shaft engaging slot on end of oil pump shaft. Tongue and slot are machined off-center so they can be meshed in only one position. To install, rotate crankshaft until pointer on timing chain cover is aligned with "O" timing mark on vibration damper. Install oil pump mounting gasket and position oil pump on studs on timing chain cover. Do not engage distributor drive gear worm. Insert long bladed screwdriver in distributor shaft opening on opposite side of block and engage slot in oil pump shaft. Turn shaft so that slot is positioned at roughly the 4 and 10 o'clock position with narrow side of shaft up. Remove screwdriver and, looking down distributor shaft hole with a flashlight, recheck position of oil pump shaft slot. Replace screwdriver and, while turning screwdriver counterclockwise to guide oil pump shaft gear into engagement with camshaft gear, press against oil pump to force it into position. Remove screwdriver and recheck position of slot. If correctly installed, slot will be in roughly the 3 and 9 o'clock position with narrow side of shaft still on top. If slot out of position, remove pump assembly and repeat operation. Secure pump with three nuts and lockwashers.



6 CYL. OVERHEAD CAM ENGINE OIL PUMP

ELECTRICAL NOTES
DISTRIBUTOR

DISTRIBUTOR REMOVAL & INSTALLATION (Overh ad Cam Engine): To remove, disconnect and remove high tension wires from cap terminal towers (Note original position for correct reinstallation). Remove primary lead from terminal post at side of distributor. Unlatch 2 distributor cap springs and remove cap. Note position of rotor in relation to the base. Remove distributor-to-timing chain cover attaching screw and lift assembly from engine.

Installation - *See "Oil Pump Installation" under OIL PUMP in this section, and note the following:* No. 1 spark plug terminal tower is in the five o'clock position and starting with this tower, the wires are installed in a counterclockwise direction in firing order.

MODEL IDENTIFICATION

Mod l	Seri s Symbol
F4-134 4 x 2 & 4 x 4 Jeep Utility	54
L6-226 4 x 2 & 4 x 4 Jeep Utility	54
F4-134 4 x 2 Jeep Utility Sta. Wgn.	58
L6-226 4 x 2 Jeep Utility Sta. Wgn.	58
F4-134 & L6-226 4WD Truck	55
DJ-3A Dispatcher	56
FJ-3 Fleetvan (Post Office)	62
FJ-3A Fleetvan (Other)	62
CJ-3B, CJ-5, CJ-6 Universal Jeep	57
FC-150 Forward Control	65
FC-170 Forward Control	61

SERIAL NUMBER attached in various locations:

NOTE - Number (example below) includes identification data.

① ② ③ ④ ⑤ ⑥

54 5 4 8 13 10001

① - See "Series Symbol" in Model Table above.
② - See "Body Style" in Body Style Table below.
③ - Engine Type **3** - 4 Cyl. 134 cu. in. "L" Head. **4** - 4 Cyl. 134 cu. in. "F" Head. **6** - 6 Cyl. 226 cu. in. "L" Head. **7** - Tornado Overhead Cam Engine.
④ - 2 Wheel Drive - 1 or 7 (LHD), 5 (RHD). 4 Wheel Drive - 2 or 8 (LHD), 6 (RHD).
⑤ - Indicates H.D. FC-170 with Dual Rear Wheels Number not used on other models.
⑥ - Factory Unit Production Number.

Body Style Table

Body Style	Series 54	55	56	57	58	61	65
Wagon	1					1	
Delivery	2						
Flat Faced Cowl	4	4					
Cowl Windshield	5	5					
Stripped Chassis	6	6	4	3		1	1
Cab Chassis	1					5	5
Pick-Up	2					5	5
Stake	3					5	5
Open Body & Canvas Top	①						
②	3						
Platform	5	5					

① - 3 (CJ-3B), 5 (CJ-5), 7 (CJ-6).
② - Open Body, Canvas Top, Soft Top, Hard Top, or Surrey.
③ - 4 (CJ-3B), 6 (CJ-5), 8 (CJ-6).

ENGINE NUMBER: Located as follows:

4 Cyl. Engines - Stamped on top of water pump boss at front of engine.
6 Cyl. Engines (Exc. Overhead Cam) - Stamped on boss on left front corner of engine block above generator.
6 Cyl. Engine (Overhead Cam) - Stamped on lower right front of cylinder block just behind ignition coil.

►*ENGINE NUMBER SUFFIX NOTE:* Letters **A, B, AB, or P** following engine number designates special sizes of some engine parts. *For details, refer to ENGINE NUMBER NOTE under Engine below.*

TUNE-UP

COMPRESSION PRESSURE: 4 Cyl. "L" Head 90-110 lbs.
4 Cyl. "F" Head 115-145 lbs. (6.9-1 Ratio), 120-130 lbs. (7.4 or 7.8-1 Ratio).
6 Cyl. "L" Head 120-130 lbs. (6.86-1 ratio), 125-140 lbs. (7.3-1 ratio).
NOTE - All cylinders must be equal within 10 lbs.
6 Cyl. Ov rh ad Cam Engine - 145-155 lbs. Cylinders equal to within 15 lbs.

VACUUM READING: 18-21" (Exc. Overhead Cam Eng.), 16-18" (Overhead Cam Eng.) at idle speed.

TAPPET CLEARANCE:	Intake	Exhaust
4 Cyl. "L" Head	.016"	.016"
4 Cyl. "F" Head	.018"	.016"
6 Cyl.	.014"	.014"

NOTE - Set clearance with engine COLD not running.

►*TAPPET ADJUSTMENT (FORWARD CONTROL MODELS):* Access panel provided in right front wheel housing.

MANIFOLD HEAT CONTROL: Used as follows:
4 Cyl. "L" Head - Thermostatic coil on manifold.
4 Cyl. "F" Head - Water jacketed intake manifold.
6 Cyl. - Exhaust heat control valve with spring tension of 180° wind-up on manifold.

CRANKCASE VENTILATION VALVE: Service at regular intervals and check operation before performing a "Tune-Up" for ignition and carburetion troubles. *See "Closed Crankcase Ventilation Systems" in Carburetion Section.*

IGNITION

FIRING ORDER: 1-3-4-2 (4 Cyl.), 1-5-3-6-2-4 (6 Cyl.).
SPARK PLUG GAP: .030".

►*SPARK PLUG & SECONDARY COIL CABLE NOTE: Resistor type cables used. DO NOT puncture cable. NOTE - When removing cable, grasp boot or terminal ONLY.*

Spark Plugs (Exc. Overhead Cam Eng.) - Prestolite (Autolite) A7 or Champion J8, 14 mm. Torque to 28-30 ft. lbs.

Spark Plugs (Overhead Cam Eng.) - Prestolite (Autolite) AE 42 or Champion L-7. 14 mm. Torque to 28-30 ft. lbs.

COIL: Prestolite (Autolite) No. 200564.
Ignition Current - 2.8-2.9 amps. at 12.5 volts idling or stopped.

DISTRIBUTOR: Prestolite (Autolite) used as follows:

Model	Distr. No.
4 Cyl. Jeeps & Fleetvans	IAY-4401
4 Cyl. Others	IAT-4405
6 Cyl. (Exc. Overhead Cam Eng.)	IAT-4404A
6 Cyl. (Overhead Cam Eng.)	IAT-4411

Distributor Removal & Installation (6 Cyl. Overhead Cam Eng.): Distributor driven from crankshaft by oil pump drive gear. *See "Electrical Notes" in Willys Special Data.*
Condenser - Prestolite (Autolite) 2-32.
Capacity - .21-.25 mfd. (Exc. Overhead Cam Eng.), .25-.28 mfd. (Overhead Cam Eng.).
Contact Point Set - Prestolite (Autolite) 1-45 (IAY Distr.), 1-47 (IAT Distr.).

Break r Gap - .020".
Cam Angl - 37-42° (4 Cyl.), 36-42° (6 Cyl.).
Break r Arm Spring Tension - 17-22 ozs.
Rotation - Counterclockwise at commutator end.

Automatic Advanc - IAY-4401, IAT-4405

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	425	2	850
6	1050	12	2100
10	1575	20	3150
11	1700	22	3400

Automatic Advance - IAT-4404A & 4411

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	300	0	600
1	375	2	750
4	600	8	1200
6	1175	12	2350
7.5	1700	15	3400

Vacuum Spark Control: Autolite (integral type). Not used on IAY-4401 Distributor.

Vacuum Advanc - IAT-4405

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	5 1/8
1	2	6 5/8
3	6	9 5/8
5	10	12 1/2
6	12	14

Vacuum Advanc - IAT-4404A & 4411

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

IGNITION TIMING

Setting - 5° BTDC (All Models).
Timing Mark (4 Cyl. "F" H ad) - Notch on rim of pulley to align with 5° mark on indicator on timing gear cover. Two marks on indicator - 5° and T (TDC).
Timing Mark (4 Cyl. "L" H ad) - 5° mark on flywheel in center of timing hole in flywheel housing. Flywheel marked T.C. (TDC), and 5° (5° BTDC).
Timing Mark (6 Cyl.) - Align correct graduation on damper with pointer on timing gear cover. Damper marked "0" at TDC with 1° graduations before and after this point.

CARBURETOR

►*CARBURETOR APPLICATION: Carter YF Carburetors used on all models except 6 Cylind r Ov rh ad Cam Engine, which uses a Holley 2-Bbl. Downdraft Carburetor.*

CARTER YF

Model	Cart r Carb. N.
4 Cyl. "L" HD. Jeep Dispatcher (Early)	YF 2392S
4 Cyl. "L" Hd. Jeep Dispatcher (Late)	YF-2392SA
4 Cyl. "F" Hd. Universal Jeep	YF 938SD
4 Cyl. "F" Hd. 4 x 2, 4 x 4, 4 WD	YF 951SA
4 Cyl. "F" Hd. Fleetvan (Post Office)	YF 3200S
4 Cyl. "F" Hd. Fleetvan (Others)	YF 938SD
4 Cyl. "F" Hd. Forward Control	YF 938SD
6 Cyl. "L" Hd. All Models	YF 2467S

Idl S tting - Initial setting ¾ to 1¾ turns open (938SD), 3200S, & 951SA), ½ to 2 turns open (2392S), 1 to 2½

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

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turns open (2467S). Turn screw out for richer mixture.
Idl Sp ed - 600 RPM (4 Cyl.), 550 RPM (6 Cyl.)
NOTE - Post Office Fleetvan (Auto. Trans.) selector lever in "N" neutral.
Fl at L v l - 5/16" - Gauge T109-107 (938SD, 951SA, 3200S), 9/32" - Gauge T109-126 (2392S, 2467S), from top of float at free end to gasket seat on cover with assembly inverted and float resting on intake needle.
Fast Idl : With choke held in wide open position, lip on fast idle arm should contact boss on body casting.

►*OTHER DATA: S e "Cart r YF Carburetors" in Carbu- r ti n Secti n.*

HOLLEY MODEL 2300

Holley No. R-2415-A used on 6 Cyl. Overhead Cam Engine.
Idle Setting - ½ turn open from a lightly seated position. Turn screw out for richer mixture.
Idl Spe d - 590-600 RPM.
Fu l L vel - ±1/16" from bottom line of check plug port. To adjust, loosen lockscrew and turn adjusting nut on top of fuel bowl assembly. Turn nut clockwise to lower fuel level (1/6 turn equals about 1/16" in fuel level). After adjustment, tighten lockscrew, then recheck and readjust if necessary.

►*OTHER DATA: Se "H lley Carburetors" in Carbu- r ti n S ction.*

CARB. EQUIPMENT

Air Cleaner: Oil Bath type (Exc. DJ-3A & FJ-3A), Dry Element type (DJ-3A & FJ-3A). Service every 2000 miles or sooner if operating in dusty areas.

Fu l Pump: AC & Carter used as follows:

M d l	AC No.	Carter No.
Uni. Jeep ℂ	4032	
Fleetvan (U.S. Post Office) ℂ	9716	
Jeep Dispatcher ℂ	9716	
Fwd. Control (FC-150) ℂ	4080	
Utility (4 Cyl.) ℂ	4080	
Fwd. Control (FC-170) ℂ		M957S
Utility (6 Cyl.) ℂ		M957S
6 Cyl. Overhead Cam Eng. ℂ		MP-3454S

ℂ - Fuel & Vacuum. ℂ - Fuel only.

Pressure - 2½-3¾ lbs. (AC pump), 3½-5½ lbs. (Carter pump), all at 1800 RPM.

►*FUEL FILTER NOTE:* Fuel filter spool located inside fuel tank on all models except Univ. Jeep & Jeep Dispatcher.

Gas lin Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator in fuel gauge.

BATTERY

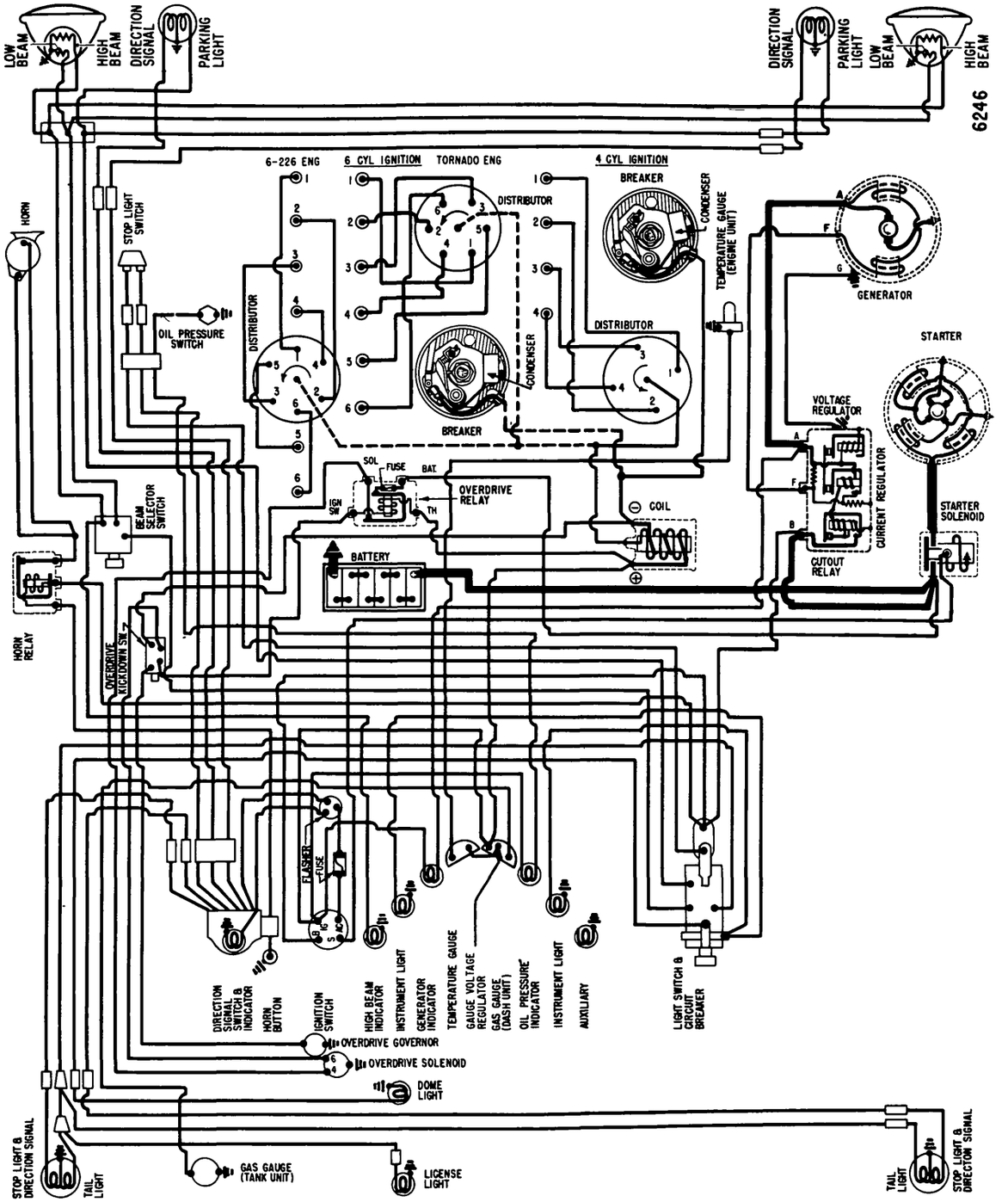
Autolite 11-HS. Used as follows.

Model	V lt	Plates	ℂCapacity
Exc. P.O. Fleetvan	12	9	50 Amp.
P.O. Fleetvan	12	11	70 Amp.

ℂ - 20 hr. rate.

Batt ry Gr und - Negative.
Engin Ground - Left front engine support (6 Cyl.), right front engine support (4 Cyl.).

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WILLYS JEEP & UTILITY MODELS WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

STARTER

Prestolite (Autolite) No. MDU-7004 (4 Cyl.), MDU-7003 (6 Cyl. exc. Overhead Cam Eng.), MDY-7021 (Overhead Cam Eng.).
Armature - Prestolite (Autolite) No. 16-82.
Drive - Bendix "Folo-Thru" type.
Rotation - Counterclockwise at commutator end.
Brush Spring Tension - 31-47 ozs. (MDU-7003 & 7004), 32-40 ozs. (MDY-7021).

Performance Data - MDU-7003,4

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Performance Data - MDY-7021

Torque	RPM	Volts	Amperes
0 ft. lbs.	4200	10.0	60
9 ft. lbs.	Lock	4.0	405

GENERATOR

Prestolite (Autolite) No. GJP-7402A (4 Cyl.), GJP-7402B (6 Cyl.). Armature - Prestolite (Autolite) No. 10-53.

Performance Data

Amperes	Volts	RPM
16	15.0	1750
30	15.0	2300
35	15.0	2600

Brush Spring Tension - 18-36 ozs.
Field Current - 1.6-1.7 amps. at 10.0 volts.
Motoring Current - 3.1-3.5 amperes at 10.0 volts.
Rotation - Counterclockwise at commutator end.
Belt Adjustment: ½-5/8" deflection midway between generator and water pump pulleys with normal thumb pressure.

GENERATOR REGULATOR

Prestolite (Autolite) No. VBO-4201E-4A.

Cutout Relay

Cuts In - 12.5-13.5 volts.
Cuts Out - 3-5 amps. discharge after charging at 7 amperes.
Contact Gap - .015" Minimum.
Air Gap - .025-.027" with contacts open (check at hinge end of core).

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F and charging at 7 amperes or with .25 ohm resistor in charging line.
Air Gap - .048-.052" with contacts just opening.

Current Regulator

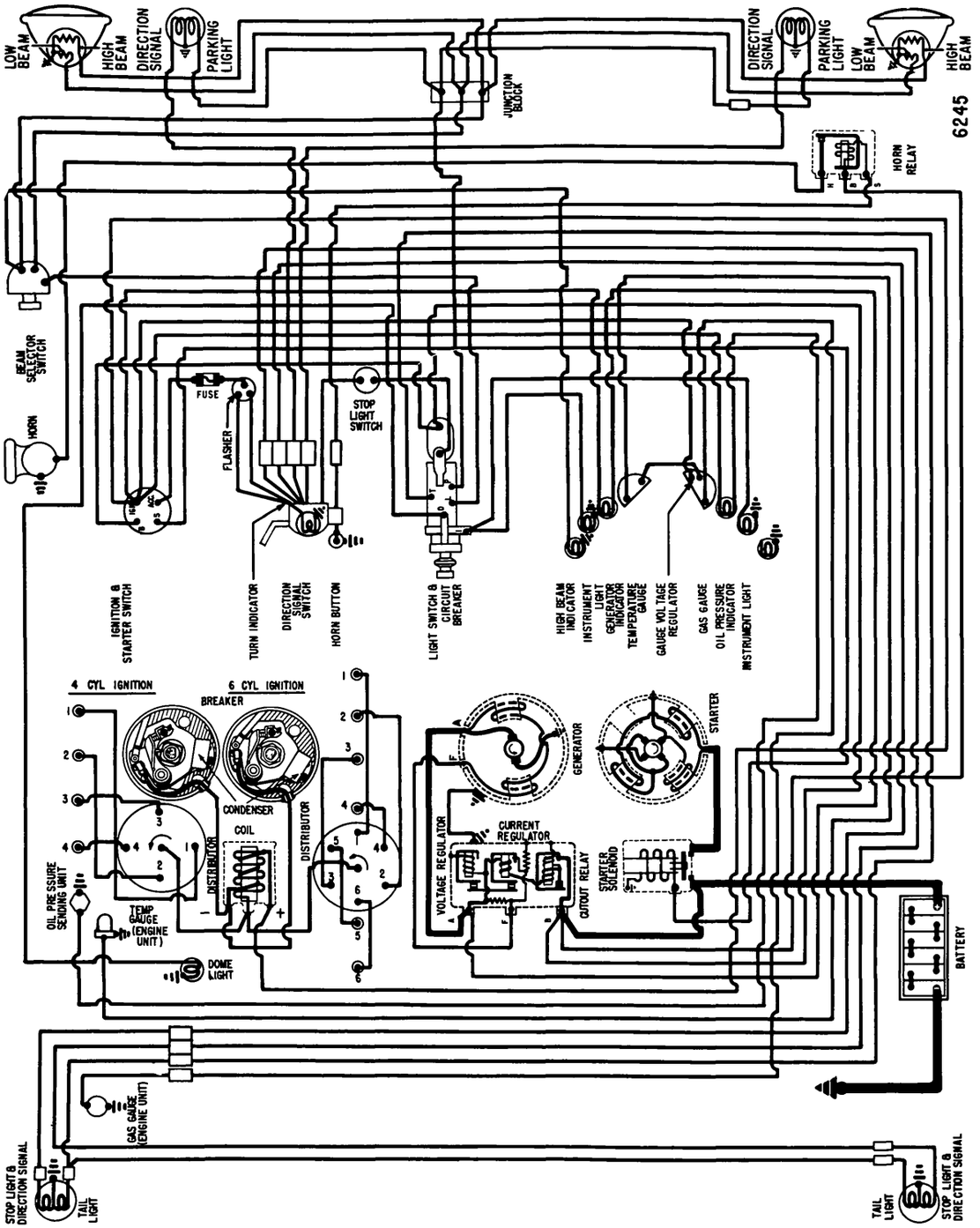
►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A	Operating Amperes	Test B
44 Amperes max.		35 (33-37) Amps.

Test A - After 15 minutes operation, charging at 7 amps.
Test B - After additional 15 minutes operation with current regulator operating (load applied to hold voltage down to 13.6-13.8 volts).
Air Gap - .048-.052" with contacts just touching.

►*OTHER DATA: See "Autolite Regulators" in Electrical Section.*

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WILLYS FORWARD CONTROL WIRING DIAGRAM

CONTINUED FROM PRECEDING PAGE

ALTERNATOR

Pr st lit (Aut lit) N . ALC-5001A. Three-phase A.C. unit with full wave rectifier.
R tation - Clockwise at drive end.
Fi ld Curr nt - 2.32-2.43 am ps. at 10 volts.
Rat d Output - 42 amps. at 14.2 volts and 4200 RPM.
►*OTHER DATA: S "Autolite Alternators & Regulators" in El ctrical S ction.*

ALTERNATOR REGULATOR

Pr st lit (Aut lit) N . VBS-6201A. Field control type. Temperature compensated. Vibrating type voltage regulator with two sets of contacts.
Air Gap - .034-.038". **P int Gap** - .010".
V ltag S tting - 13.9-14.3 volts (upper contacts), .1-.3 volt lower operating on lower c ntacts.
►*OTHER DATA: S "Autolite Alternators & Regulators" in El ctrical S ction.*

MISC. ELECTRICAL

Lighting Switch R moval: Loosen set screw on side of control knob and remove knob. Remove retaining nut and remove switch through panel.

CIRCUIT BREAKER: 25 Ampere. Protects Headlamps, High Beam Indicator, Parking, Tail, Stop, License Plate, Instrument and Dome Lights.

FUSES: 9 Amper . Direction Signals.
7½ Amper . Radio (Exc. Fwd. Control).
5 Amper . Radio (Forward Control).
9 Amp re. Heater (Exc. Fwd. Control).
19 Amper . Heater (Forward Control).

ENGINE

►*FOUR DIFFERENT ENGINES USED: See "Model Id ntification" for application.*

4 CYL. "F" HEAD

Mod l	B r	Stroke	Displacement
F4-134 (All)	3.125"	4.375"	134.2 cu. in.

Mod l	Compr.Rati	Rated HP	Developed HP
F4-134 (All)	7.4-1 Ⓒ	15.63	75 at 4000 RPM

Ⓒ - Optional ratios - Utility 7-8-1 & 6.9-1 Fwd. Control & Jeeps 6.9-1.

►*FOR ENGINE DATA, s Willys Car Model Pages in 1961 Final Data and not the following:*

VALVES: Tappet Clearanc - .018" Intake, .016" Exhaust, Cold.

Valve	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.371-.372"	5 51/64"

Valv	S at Angl Ⓒ	Lift	Stem Clearance
Intake	46°	.260"	.0007-.0022"
Exhaust	46°	.351"	.0025-.0045"

Ⓒ - Grind valve face to 45°.
►*EXHAUST VALVE NOTE:* Thompson Valve Rotators used.
Valv Seat Width - 3/32". Limit 1/8".

4 CYL. "L" HEAD

Mod l	B r	Strok	Displac ment
L4-134	3.125"	4.375"	143.2 cu. in.

Model	Com pr.Ratio	Rated HP	Developed HP
L4-134	7.0-1	15.63	60 at 4000 RPM

►*FOR ENGINE DATA, see Willys Car Model Pages in 1961 Final Data and note the following:*

VALVES: Tappet Clearance - .016" Cold (Intake & Exhaust).

Valve	Head Diam.	Stem Diam.	Length
Intake	1 17/32"	.373"	5 51/64"
Exhaust	1 15/32"	.371-.372"	5 51/64"

Valve	Seat Angle Ⓒ	Lift	Stem Clearance
Intake	46°	.351"	.0007-.0022"
Exhaust	46°	.351"	.0025-.0045"

Ⓒ - Grind valve face to 45°.
Valve Seat Width - 3/32". Limit 1/8".

6 CYL. "L" HEAD

Model	Bore	Stroke	Displacement
L6-226	3.3125"	4.375"	226.2 cu. in.

Model	Compr. Ratio	Rated HP	Developed HP
L6-226	6.86-1 Ⓒ	26.33	105 at 3600 RPM

Ⓒ - 7.3-1 Optl.

►*FOR ENGINE DATA, see Willys Car Model Pages in 1961 Final Data and note the following:*

►*METAL COVERED MANIFOLD GASKET NOTE (L6-226):* Use this metal covered gasket Part No. 930964 on L6-226 engines with single barrel carburetors that have considerable mileage or hours of service.
►*ENGINE NUMBER NOTE:* Letters following engine number denote the following:
"A" .010" Undersize main and connecting rod journals.
"N" .010" Oversize bore and pistons.
"AN" Indicates both above conditions.
"P" Indicates Late Production L-226 Engine equipped with new crankshaft, flywheel bolts, crankshaft bearings, connecting rods, and connecting rod bearings. *CAUTION - See following Parts Caution.*
►*LATE PRODUCTION L-226 ENGINE (WITH ENGINE NUMBER SUFFIX "P") PARTS REPLACEMENT CAUTION & CHANGEOVER NOTE:* Some late production L6-226 engines are equipped with new crankshaft, flywheel bolts, crankshaft bearings, connecting rods and connecting rod bearings, With the exception of flywheel bolt (Tufftrided bolt must be used on "P" Engine), parts for engines with "P" suffix MUST NOT BE INTERCHANGED with those of an engine without "P" suffix. *If new parts desired on engine without "P" suffix, replace all the above parts and stamp engine number with a "P" suffix.*

PISTON RINGS

Ring	Width	End Gap	Side Clearance
Compr. All	.0930-.0935"	.008-.016"	Ⓒ
Oil, All	.1545-.1550"	.008-.016"	.006-.010"

Ⓒ - .002-.004" (No. 1), .003-.007" (No. 2).
R plac m nt Rings: Ring sets and single rings furnished in following sizes for oversize ranges indicated: Std. (Std. - .009"), .020" (.010-.029"), .030" (.030-.039"), .040" (.040-.049"), .060" (.050-.060").

ENGINE

6 CYL. OVERHEAD CAM

M d l	B r	Str ke	Displacem nt
Tornado	3 11/32"	4 3/8"	230 cu. ins.

Compr.Ratio	Rated HP	Developed HP
8.5-1	26.77	140 at 4000 RPM

Compression & Vacuum Reading - *See TUNE-UP*
►*ENGINE NOTE:* The "Jeep" Tornado Engine is of new design and careful attention should be given to procedures below.
►*ENGINE NUMBER NOTE: Letters following engine number on lower right front of cylinder block denote the following:*
"A" - ..010" undersize main & connecting rod bearings.
"B" - .010" oversize pistons.
"AB" - Combination of A and B.
ENGINE REMOVAL: *See "Engine" in Willys Special Data.*
CYLINDER HEAD & GASKET: *See "Cylinder Head & Gasket" in Willys Special Data.*
TIGHTENING TORQUES: *See "Tightening Specifications" in Willys Special Data.*

PISTONS

►*ORIGINAL BORE DIAMETER:* 3.3430-3.3455".
►*PISTON OVERSIZE NOTE:* Letters B or AB after engine number indicate that cylinder bore and pistons are .010" Oversize.
Domed, aluminum alloy, cam ground, tin plated.
Removal - Pistons and rods removed from above.
Fitting New Pistons: Place .0015" x 1/2" ribbon feeler between thrust side of piston and cylinder wall. Pull required to remove feeler should be 5-10 lbs.
Replacement Pistons: Std. & .010", .020", .030", .040" Oversize.
Installing Pistons: "F" mark cast on piston pin boss relief to front of engine. *See Rod Installation.*

PISTON PIN

Diameter - .8592". **Length** - 2.779".
Clearance in Piston - .0002" selective fit. Light thumb push fit.
Clearance in Rod - .004-.0008". Palm press fit at room temperature.
Piston Pin Fitting - Palm push fit. Ream connecting rod bushing for proper fit of oversize pin.
Replacement Pins: Std., .003" & .005" Oversize.

PISTON RINGS

Compression rings cast iron, with upper ring face chrome plated. Oil ring is 2 steel rails with steel spacer expander, and chrome plated face.

Ring	Gap	Side Clearanc
Compr. (1 & 2)	.010-.045"	.002-.0031"
Oil (3)	.015-.055"	

Replacement Rings: Furnished Std., & .010", .020", .030", .040" Oversize.
Installing Rings: Install chrome plated compression ring in top groove. When installing oil ring, be sure both green and orange dots are visible at the spacer gap to indicate that the ends do not overlap.

CONNECTING ROD

Length (Center-to-Center) - 7.000".
Crankpin Journal Diamet r - 2.0619-2.0627".
►*CONNECTING ROD JOURNAL DIAMETER UNDER-*

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See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

SIZE NOTE: The letters A or AB following the engine number indicate that the main and connecting rod journals are .010" Undersize.

Bearings - Steel-backed, Copper-Lead, Tin plated. Removable.

Clearance - .0006-.0025".

Replacement Bearings: Std. & .002", .010", .020" Undersize.

Rod Installation: Install rod and bearing cap in original order. Oil spurt hole in connecting rod must face exhaust side of cylinder block and "F" mark cast in piston pin boss relief facing to front of engine.

CRANKSHAFT

►*CRANKSHAFT MACHINING CAUTION:* Because entire shaft was Tufftride treated, any machining must be followed by a reprocessing, using the Tufftride method.

Journal Diameter - 2.3747-2.3755".

►*JOURNAL DIAMETER UNDERSIZE NOTE:* The letters A and AB following engine number indicate .010" Undersize main and connecting rod journals.

Bearings - Steel-backed, Copper-Lead, Tin plated.

Clearance - .0005-.0025". Wear limit .001".

Replacement Bearings: Std. & .002", .010", .020" Undersize. Manufacturer recommends all bearings be replaced as a unit.

End Thrust: Taken by No. 4 (Rear) main bearing which is flanged type.

Endplay - .003-.007". Replace bearing if over .007".

Rear Bearing Oil Seal Installation: *See "Crankshaft & Main Bearings" in Willys Special Data.*

Crankshaft Front Oil Seal Installation: *See "Engine Front Cover" in Willys Special Data.*

CAMSHAFT

Journal Diameter - Front to rear: **(1)** 1.9965-1.9975", **(2)** 1.8715-1.8725", **(3)** 1.7465-1.7475", **(4)** 1.3715-1-3725".

►*CAMSHAFT NOTE:* Camshaft supported by 4 bearings in cam bearing support deck on cylinder head. Chain driven, camshaft sprocket mounts on pilot at front of camshaft and drives camshaft through a dowel. Camshaft has 6 cams, each of which operates the intake and exhaust valve rocker arms for one cylinder.

Bearings - Aluminum alloy, no bushings used. Replace cam bearing deck and/or camshaft when there is excessive clearance.

Clearance - .002-.004". Wear limit .004".

End Thrust: Controlled by thrust plate and a shim installed between thrust plate and cam bearing deck.

NOTE - Later production engines have no shim.

Endplay - .011-.018".

Camshaft Servicing: *See "Camshaft & Bearings" in Willys Special Data.*

Timing Chain: Timing chain tensioning device compensates for normal wear and stretch. If rubber facing of tensioner contact face is worn, replace tensioner. Timing chain should be replaced if distance between chain sides at narrowest point is less than 3.38" (Tensioner in place). *See "Timing Chain" in Willys Special Data.*

Camshaft Setting: Mesh chain with camshaft sprocket dowel downward & crankshaft sprocket key upward & copper links of chain aligned with timing marks on sprockets (No. 1 piston at TDC). *See illustration.*

Engine Front Cover Removal & Installation: *See "Engine Front Cover" in Willys Special Data.*

Engine Front Cover Oil Seal (Crankshaft Front Seal): *See "Engine Front Cover" in Willys Special Data.*

VALVES

Tappet Clearance: .006" Intake, .008" Exhaust. Rotate camshaft until cam lobe points to 6 o'clock position. Adjust both valve rocker arm stud nuts to provide proper clearance between rocker arm and top of valve stem.

►*VALVE NOTE:* Valves and valve parts are mounted entirely on cylinder head, which can be removed for repair and overhaul. One camshaft lobe operates both intake and exhaust valve rocker arm.

Valve	Head Diam.	Stem Diam.	Length
Intake	1.895"	.3400-.3410"	4.675"
Exhaust	1.618"	.3385-.3395"	4.485"

Valve	Seat Angle	Stem Clearance
Intake	45°	.001-.003"
Exhaust	45°	.0025-.0045"

Valve Seat Width - 5/64-3/32".

Valve Guides: Pressed in head. Replace when stem clearance specifications exceeded (see above). Using Tool W-265 press old guide out bottom of head and press new guide in from top of head. Use a spacing stop to limit distance guide can be installed. Properly positioned, top of valve guide will be .45" above machined surface of cylinder head. After installation, ream guide to .342-.343".

Rocker Arm Stud Replacement: *See "Rocker Arms" in Willys Special Data.*

Valve Springs: 1.60" free length.

Valve Spring Specifications

Valve	Lbs. Pressure	Length
Closed	57	1.26"
Open	130	.885"

VALVE TIMING

See "Camshaft Setting" under CAMSHAFT above.

►*VALVE TIMING NOTE:* Specifications are with tappet clearance as follows: .006" Intake, .008" Exhaust.

Intake Valves - Open 15° BTDC. Close 55° ALDC.

Exhaust Valves - Open 55° BLDC. Close 15° ATDC.

ENGINE OILING SYSTEM

►*ENGINE OILING SYSTEM: See "Engine Lubrication" under OILING SYSTEM in Willys Special Data.*

Crankcase Capacity - 4 qts. (4 Cyl.), 5 qts. (6 Cyl.), add additional qt. with filter change.

Normal Oil Pressure: 35 lbs. at 2000 RPM (4 Cyl.), 35 lbs. at 1700 RPM (6 Cyl. exc. Overhead Cam Eng.), 50 lbs. at 2000 RPM (Overhead Cam Eng.).

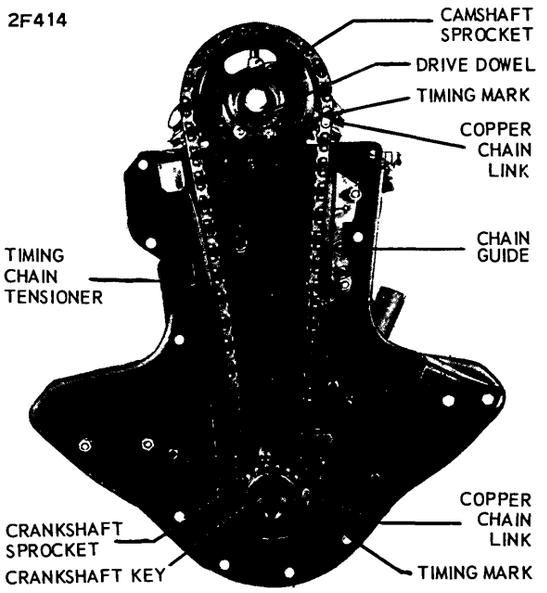
Pressure Regulator - In pump housing (4 Cyl. & 6 Cyl. Overhead Cam Eng.); right side of cylinder block below valve chamber to rear of engine (Other 6 Cyl.).

Oil Pressure Indicator: Red telltale light on instrument cluster operated by an oil pressure switch. Light comes on when ignition switch turned on and goes out when oil pressure reaches 6 lbs.

Oil Pump: 6 Cyl. Overhead Cam Eng. - Rotor type mounted on engine front cover.

Others - Rotor type on left side of engine (4 Cyl.), gear type attached to rear intermediate main bearing in crankcase (6 Cyl.).

Pump Overhaul - *See "Oiling System" in Willys Special Data.*



230" OHC VALVE TIMING MARKS

Oil Filter: 6 Cyl. Overhead Cam Eng. - Full-flow type located on right side of crankcase. Replace filter every 6000 miles or sooner if needed.

Partial-Flow Filter - Disposable type used on some engines. When replacing filter, tighten filter by hand until gasket contacts mounting flange, then tighten ½-turn additional.

Crankcase Ventilation: Standard - Filter in oil filler cap and outlet tube from crankcase ventilator baffle on side cover.

Positive - Road draft tube replaced by hose to manifold with valve in line. *See "Closed Crankcase Ventilation systems" in Carburetion Section.*

ENGINE COOLING SYSTEM

Water Capacity: 10 qts. (FC-150), 11 qts. (FC-170) & 6 Cyl. Overhead Cam Eng.), 11 qts. (Other 4 Cyl.), 12 qts. (Other 6 Cyl.). On all models, add 1 qt. for heater.

Pressure Valve: Radiator filler cap. 9 lbs. (All Fwd. Control), 13 lbs. (4WD 6 Cyl.), 7 lbs. (Others).

Thermostat: Harrison. In water outlet elbow in cylinder head (All exc. 6 Cyl. Overhead Cam Eng.), on intake manifold (Overhead Cam Eng.). Opens at 163-168°F.

Water Pump: Overhead Cam Eng. - Centrifugal, packless ball bearing type. Service by replacement.

All Exc. Overhead Cam Eng. - Centrifugal, packless ball bearing type. *See "Cooling System" in Willys Special Data.*

Temperature Gauge: Stewart-Warner Electric Constant Voltage type with gauge voltage regulator in fuel gauge.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

MODEL IDENTIFICATION

Model	Model Designation
Checker 4-Door Sedan	A-11
Checker Superba & Marathon 4-Door Sedan	A-12
Checker Superba & Marathon Station Wagon	A-12W

►*ENGINE REFERENCE NOTE: In the following data, reference to engines will be: L-Head for "L" Head engine, OHV Eng. for Valve-In-Head engine.*

SERIAL NUMBER: Stamped on plate attached to dash panel under hood. Number (example below) includes identification data as follows:

① ② ③
A-12 456 34534

① - Model designation. *See table above.*
② - Production Order Number.
③ - Vehicle Unit Number.

ENGINE NUMBER: Stamped on left side of cylinder block and on serial number plate on dash.

TUNE-UP

VALVE TAPPET CLEARANCE: L-Head - .014" Intake & Exhaust, with engine idling. **OHV Eng.** - .017" Intake, .023" Exhaust, with engine idling. *NOTE - Set exhaust valve clearance with inlet water temperature of 115-140°F, and set intake valve clearance with engine hot.*

MANIFOLD HEAT CONTROL: Thermostatic coil spring type with counterweight (L-Head); Water jacketed intake manifold (water circulated from cylinder head through manifold to water pump) used on OHV Engine.

IGNITION

FIRING ORDER: 1-5-3-6-2-4.

SPARK PLUG GAP: .028-.030" (L-Head), .032-.033" (OHV Eng.).

Spark Plug (L-Head) - Champion UD-16. 18 mm. Torque to 34 ft. lbs.

Spark Plug (OHV Eng.) - Champion N-8. 14 mm. Torque to 30 ft. lbs.

COIL: Prestolit (Autolite) No. 200654.

Ignition Current - 3.0 amps. stopped, 2.0 amps. idling.

Resistor - Prestolite No. 201008.

DISTRIBUTOR: Prestolit (Autolite) No. IGC-6002-1AC (L-Head), No. IAT-4406 (OHV Eng.). *NOTE - IGC Distributor has Centrifugal Advance only.*

Condenser & Contact Point Set - Prestolite.

Condenser Capacity - .20-.25 mfd. (IGC Distr.), .21-.25 mfd. (IAT Distr.).

Breaker Gap - .018-.022". Set at .020".

Cam Angle - 36-42°.

Breaker Arm Spring Tension - 17-20 ozs.

Rotation - Counterclockwise viewed from above.

Automatic Advance - IGC-6002-1AC

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	275	0	550
1	430	2	860
5	1060	10	2120
8	1525	16	3050
9	1685	18	3370

Automatic Advance - IAT-4406

Degrees Distr.	RPM	Degrees Eng.	RPM
Start	250	0	500
1	310	2	620
8	730	16	1460
15	1160	30	2320
16.5	1250	33	2500

Vacuum Spark Control: Prestolite integral type used on IAT Distributor only. None used on IGC Distributor.

Vacuum Advance - IAT-4406

Distr. Degrees	Eng. Degrees	Vacuum (" of Hg)
Start	0	10
1	2	11
3	6	13
4	8	14
5	10	15

IGNITION TIMING

Setting - 4° BTDC (L-Head), 3½° BTDC (OHV Eng.) at specified idle speed.

Timing Mark - Marks on vibration damper and pointer on engine front cover. Align correct mark with pointer. *NOTE - Facing the car, rear or left mark is TDC.*

CARBURETOR

►*CARBURETOR APPLICATION: Zenith single barrel used on L-Head Engine, Carter AS single barrel or Rochester 2GC two-barrel used on OHV Engine.*

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS. CARS): None required. Transmission shift points controlled by Vacuum & Solenoid unit on transmission case.

ZENITH

Zenith Model 228BV10C, No. 0-12469. Single barrel downdraft type with automatic choke. *NOTE - Automatic choke has an electric heating coil.*

Idle Setting - Initial setting ¾-1½ turns out. Turn screw out for richer mixture.

Idle Speed - Initial setting 1½ turns in from point where throttle stopscrew contacts stop on throttle body. Idle speed should be 375 RPM (Synchro-mesh), 425 RPM (Auto. Trans in "D").

Float Level - 1 1/2"±1/32" from machined surface of air horn casting to top of float. To adjust, bend float lever.

Accelerating Pump - Install hairpin cotter pin in proper groove in pump guide rod as follows: Bottom groove for full stroke (Winter), middle groove for ⅔ stroke (Normal), upper groove for ½ stroke (Summer).

Fast Idle: No adjustment. Fast idle will be correct when slow idle correctly set.

Automatic Choke Setting: 15 points rich.

►*OTHER DATA: See "Zenith Carburetors" in Carburetion Section.*

CARTER

Carter AS, No. 3290S. Single barrel downdraft type with automatic choke.

Idle Speed - 375 RPM (Synchro-mesh), 425 RPM (Auto. Trans. in "D").

►*OTHER DATA: See "Carter AS Carburetors" in Carburetion Section.*

ROCHESTER 2GC

Rochester 2GC, No. 7023096. Two-barrel downdraft type with automatic choke.

Idle Speed - 375 RPM (Synchro-mesh), 425 RPM (Auto. Trans. in "D").

►*OTHER DATA: See "Rochester 2G & 2GC Carburetors" in Carburetion Section.*

CARB. EQUIPMENT

Fuel Pump: Carter No. M873S. Fuel & Vacuum.
Fuel Pump Pressure - 3-5 lbs. at 500 RPM.

Gasoline Gauge: Stewart-Warner electric type.

Air Cleaner: Dry filter element type. Clean element every 5000 miles (2000 miles under severe dust conditions). *NOTE - Oil bath type optional on L-Head Engine.*

►*CLEANING CAUTION:* Clean element by tapping lightly or blowing out with a low pressure stream of air directed from the inside surface of element. DO NOT oil, wash or lubricate element.

BATTERY

Willard H-11-50. 12 volt, 9 plate, 50 ampere hour capacity (20 hour rate).

Battery Ground - Negative, to cylinder block.

STARTER

Prestolite (Autolite) No. MDL-6023 (Synchro-mesh), No. MDU-7002 (Auto. Trans.).

Drive - Bendix "Folo-Thru" type.

Rotation - Counterclockwise at commutator end.

Brush Spring Tension - 31-47 ozs.

Performance Data - MDL-6023

Torque	RPM	Volts	Amperes
0 ft. lbs.	3200	10.0	60
6.0 ft. lbs.	Lock	4.0	225

Performance Data - MDU-7002

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	280

Starting Switch: Magnetic switch controlled by Ignition and Starter Switch. Neutral Safety Switch mounted at lower end of steering column used on Automatic Transmission cars.

GENERATOR

Prestolite (Autolite) No. GJP-7103A. *NOTE - "B" circuit type. See "Prestolite (Autolite) B Circuit Regulators" in Electrical Section.*

Performance Data - GJP (Cold - 70°F)

Amperes	Volts	RPM
16.0 Min.	15.0	1750
35.0	15.0	2600 Max.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amps. at 10.0 volts and 70°F.

Motoring Current - 3.1-3.5 amps. at 10.0 volts and 70°F.

Rotation - Counterclockwise at commutator end.

GENERATOR REGULATOR

Prestolite (Autolite) No. VBO-6201-A1. "B" Circuit type.

Cutout Relay

Cuts In - 12.5-13.5 volts.

Cuts Out - 3-5 amps. discharge current after charging at 7 amps.

Contact Gap - .015" minimum.

Air Gap - .025-.027".

CONTINUED ON NEXT PAGE

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CONTINUED FROM PRECEDING PAGE

V Itag Regulat r

Setting - 14.3-14.8 volts charging at 7 amperes and 80°F or with a .25 ohm resistor in series between regulator and battery.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

Current Regulator

►*SETTING CAUTION: "Temperature Compensated" type. Set to following specifications at 70°F.*

Test A - Operating Amperes -	Test B
44	35 (33-37)

Test A - After 15 minutes operation charging at 7 amps.

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.

Air Gap - .048-.052" with contacts just opening (check at brass armature stop pin).

►*OTHER DATA: See "Prestolite (Autolite) B Circuit Regulators" in Electrical Section.*

ALTERNATOR

Prestolite (Autolite) No. ALD-5001 or ALB-5002. Three-phase type with internal rectifiers.

Rotation - Clockwise at drive end.

Rated Output - 40 amps. (ALD-5001), 60 amps. (ALB-5002).

Field Current - 2.34-2.42 amps. (ALD-5001) at 10 volts and 70°F.

Capacitor Capacity - .1 mfd.

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	Alt. RPM
ALD-5001	38	14.2	℄ 4200

℄ - 1750 Engine RPM.

►*OTHER DATA: See "Prestolite (Autolite) Alternator & Regulator" in Electrical Section.*

ALTERNATOR REGULATOR

Prestolite (Autolite) No. VBT-6201A (ALD-5001 Alternator). Field control type with voltage regulator only.

Contact Gap (Lower Contacts) - .010". **Air Gap** - .034-.038".

Voltage Setting - 13.9-14.3 volts at 80°F.

►*OTHER DATA: See "Prestolite (Autolite) Alternator & Regulator" in Electrical Section.*

MISC. ELECTRICAL

CIRCUIT BREAKERS: 15 Ampere - Entire lighting system (except direction signals and back-up lights). In headlight switch.

15 Ampere - Direction signals & back-up lights.

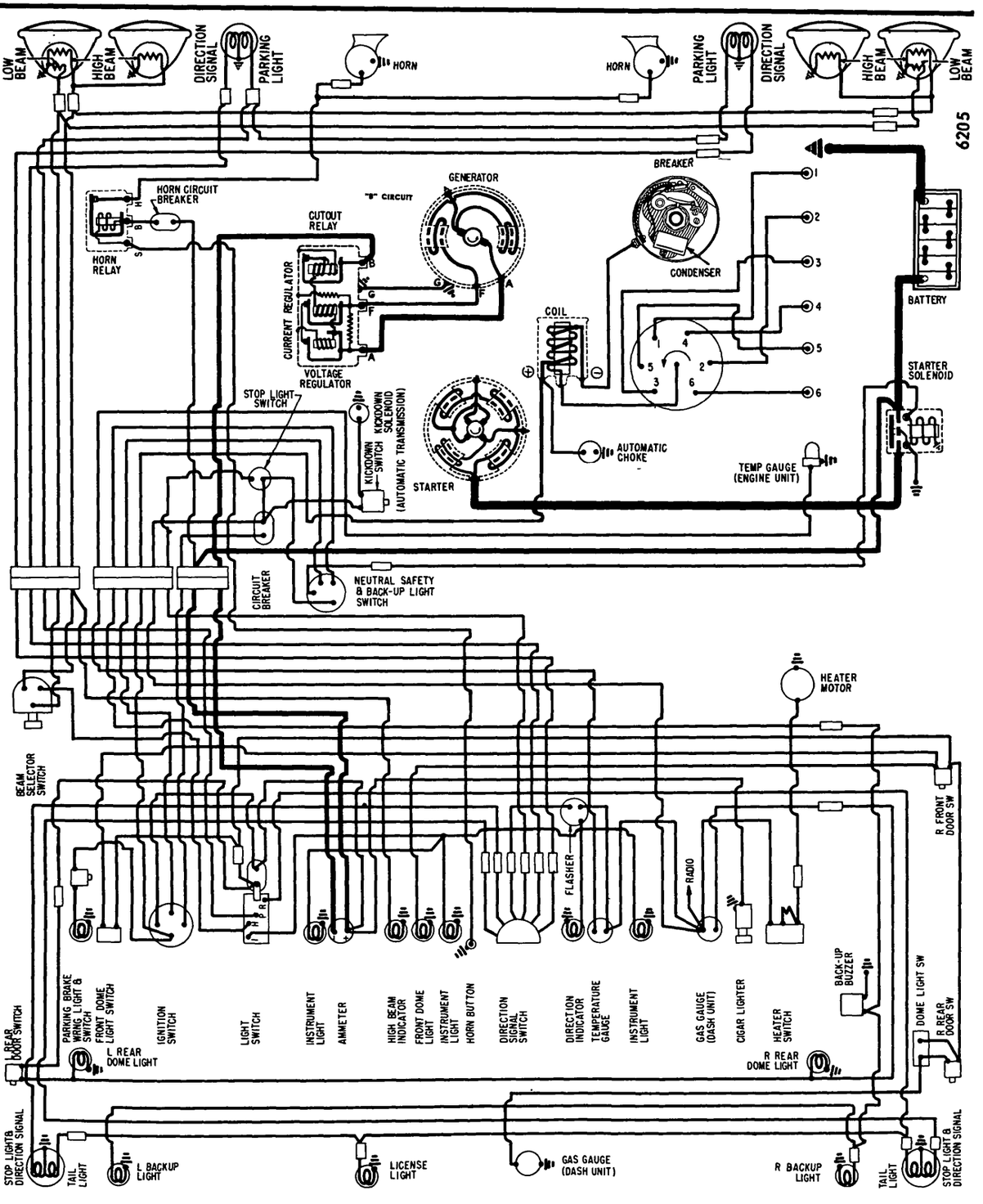
FUSES: 15 Ampere - Overdrive.

7.5 Ampere - Radio.

ENGINE

ENGINE SPECIFICATIONS: C ntinental M tors M d l F6226. 6 Cylinder with either "L" Head or Overhead Valve system.

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Bore	Stroke	Displacement	Rated HP
3.312"	4.375"	226 cu. ins.	26.33

Engine	Compr. Ratio	Developed HP
L-Head	7.3-1	80 at 3100 RPM
OHV (Carter AS Carb.)	8.0-1	122 at 4000 RPM
OHV (Rochester 2GC Carb.)	8.0-1	141 at 4400 RPM

CYLINDER HEAD & MANIFOLD: Tighten cylinder head bolts from center outward to 45 ft. lbs. Tighten intake and exhaust manifold bolts to 25-30 ft. lbs.

FLYWHEEL: Tighten flywheel-to-crankshaft bolts to 35-40 ft. lbs.

OIL PAN: Tighten oil pan bolts to 15-20 ft. lbs.

PISTONS

Aluminum alloy, flat head, cam ground with T-slot. L-Head engine has five rings per piston with 5th ring on piston skirt below piston pin. OHV Engine has standard four ring piston.

Weight - 16.448 ozs. (L-Head), 15.312 ozs. (OHV Engine).

Clearance - .0015-.0025" (L-Head), .0010-.0020" (OHV Engine) at bottom of skirt. Pull required to withdraw .002" feeler gauge inserted between piston and cylinder wall should be 5-10 lbs.

Replacement Pistons: L-Head - Furnished in 14 sizes in .0005" steps from 3.31095" to 3.31745" for engines "A" through "N".

OHV Engine - Furnished Std. size only finished or semi-finished with or without rings and pin.

PISTON PIN

Floating type with retaining ring at each end.

Diameter - 55/64". **Length** - 2 13/16".

Clearance In Piston - .0001-.0003" (L-Head), .0002" (OHV Engine). Light push fit.

Clearance In Rod - .0003-.0005".

Replacement Pins: Furnished Std., & .003", .005" Oversize.

PISTON RINGS

L-Head - Nos. 1, 2, 3, 5 are compression rings, No. 4 is oil ring.

OHV Engine - Nos. 1 & 2 are compression rings, Nos. 3 & 4 are oil rings.

L-Head Engine

Ring	Width	End Gap
Compr. (1)	3/32"	.010-.020"
Compr. (2 & 3)	1/8"	.010-.020"
Oil (4)	1/4"	.010-.018"
Compr. (5)	5/32"	.010-.020"

OHV Engine

Ring	Width	End Gap
Compr. (1 & 2)	3/32"	.010-.020"
Oil (3)	ℂ	.015-.055"
Oil (4)	5/32"	.010-.018"

ℂ - Three-piece steel rail type.

Replacement Rings: L-Head - Std. & .020", .040", .060" Oversize. **OHV Engine** - Furnished Std. size only.

CONNECTING ROD

Length (Center-to-Center) - 7".

Weight - 32.24 ozs.

Crankpin Journal Diameter - 2.062".

Lower Bearing - Babbitt lined steel back type.

Clearance - .0027". **Sid play** - .008".

►*BEARING INTERCHANGEABILITY NOTE:* Bearings No. 1, 3, 5 are **not** interchangeable with bearings No. 2,4, 6.

Connecting Rod Bearing Cap Bolt Torque - 35-40 ft. lbs.

Replacement Bearings: Furnished Std. & .020" Undersize.

CRANKSHAFT

Journal Diameter - 2.375".

Bearings - Babbitt lined steel back type.

Clearance - .0034".

Replacement Bearings: Furnished Std. & .020" Undersize.

►*BEARING INTERCHANGEABILITY NOTE:* Bearings No. 2 & 3 are interchangeable.

Main Bearing Cap Bolt Torque - 85-95 ft. lbs.

End Thrust: L-Head - Taken by thrust washers, shims, and thrust plate assembled behind crankshaft timing gear. Shims furnished in .002" & .008" thicknesses.

Endplay - .004-.006".

OHV Engine - Taken by flanged rear main bearing.

Endplay - .002-.006".

Crankshaft Rear Oil Seal Replacement: Remove filler block and oil guard and clean thoroughly. Crush new jute seal in a vise until narrow enough to fit grooves in filler block and oil guard. Press seal in until firmly seated and expanded to seize sides of block and guard. Cut ends of seal so they protrude 1/32" above surface of castings. Insert guard into cylinder block. Hold neoprene filler block-to-oil pan seal in place with a small spot of non-hardening cement at center of seal and insert into groove in filler block. Install front filler block seal in same manner. Tighten filler block retaining bolts to 15-20 ft. lbs.

CAMSHAFT

Bearings - Steel back babbitt lined bushings.

Clearance - .001-.003" except No. 3 bearing. No. 3 bearing .001-.0027".

End Thrust: Controlled by thrust plate located behind camshaft sprocket.

Timing Chain: Width 7/8". **Pitch** 1/2". **Length** 46 links.

Engine Front Cover Bolt Torque - 15-20 ft. lbs.

Vibration Damper Bolt Torque - 15-20 ft. lbs.

VALVES

Tappet Clearance: L-Head - .014" Intake & Exhaust, with engine idling.

OHV Engine - .017" Intake, .023" Exhaust, with engine idling.

►*TAPPET CLEARANCE NOTE:* Set exhaust valve clearance with inlet water temperature of 115-140°F, and set intake valve clearance with engine hot.

Valve Specifications - L-Head Engine

Valve	Head Diameter	Stem Diameter	Length
Intake	1 33/64"	11/32"	5 3/16"
Exhaust	1 21/64"	11/32"	5 11/64"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	.284"	.0012-.0030"
Exhaust	44°	.284"	.0032-.0050"

Valve Specifications - OHV Engine

Valve	Head Diameter	Stem Diameter	Length
Intake	1 25/32"	11/32"	4.941"
Exhaust	1 27/64"	11/32"	5.4165"

Valve	Seat Angle	Lift	Stem Clearance
Intake	30°	.4088"	.0012-.0030"
Exhaust	44°	.4088"	.0032-.0052"

Exhaust Valve Seat Inserts - Used on OHV Engine. Replacement inserts furnished .010" Oversize for shrink fit.

Valve Stem Oil Seal - "O" ring seal used on stems of intake valves on OHV Engine.

Valve Rotators - Used on exhaust valves of OHV Engine.

Valve Guides - Pressed in block or head.

Valve Springs: Single spring used on all valves.

Spring Specifications - L-Head Engine

Valve	Pressure	Length
Closed	47-53 lbs.	1 21/32"
Open	103-110 lbs.	1 3/8"

Spring Specifications - OHV Engine

Valve	Pressure	Length
Closed	72.5-79.5 lbs.	1.817"
Open	174.3-175.7 lbs.	1.405"

Spring Free Length (L-Head Engine) - 1 31/32".

Valve Lifters: Mechanical barrel type used on all engines.

Rocker Arm Assembly (OHV Engine): Rear end bracket is drilled for oil supply line to rocker shaft assembly. Front end bracket is drilled for locating plug to retain rocker shaft in position. These brackets are not interchangeable with other support brackets.

VALVE TIMING

Valve Timing Specifications - L-Head Engine

Intake Valves - Open 2° BTDC. Close 42° ALDC.

Exhaust Valves - Open 42° BLDC. Close 8° ATDC.

Valve Timing Specifications - OHV Engine

Intake Valves - Open 17° BTDC. Close 54° ALDC.

Exhaust Valves - Open 62° BLDC. Close 9° ATDC.

ENGINE OILING SYSTEM

Crankcase Capacity: 5 quarts refill.

Normal Oil Pressure: 25 lbs. at 375 RPM.

Oil Pressure Relief Valve (OHV Engine) - In pump body, not adjustable.

Oil Pressure Indicator: Direct reading, non-electric type.

Oil Pump: Gear type. Mounted on center main bearing cap (L-Head), on right side of cylinder block (OHV Engine).

Oil Pump Attaching Bolt Torque - 25-30 ft. lbs. (L-Head), 15-20 ft. lbs. (OHV Engine).

Oil Filter: Partial flow, disposable type.

Crankcase Ventilation: Filter element in oil filler cap and breather tube in engine right side cover. Clean filter in filler cap by washing in solvent and oiling with light engine oil.

ENGINE COOLING SYSTEM

Water Capacity: 12 quarts. Add 1 quart for heater.

Pressure Valve: 4 lb. radiator filler cap.

Thermostat: Choke type located in water outlet elbow.

L-Head - 170° type. Starts to open at 167-177°F.

OHV Engine - 180° type. Starts to open at 177-182°F.

Water Pump: Packless sealed ball bearing type. No lubrication required.

Pump Removal & Disassembly - Remove fan hub and remove pump from engine. Remove pump cover and gasket and pull impeller from shaft. Remove seal and shedder, shaft and bearing retaining rings and press shaft through front of body.

Water Pump Attaching Bolt Torque - 25-30 ft. lbs.

Temperature Gauge: Stewart-Warner Direct reading electric type. Engine unit located between No. 5 & No. 6 spark plugs.

See INDEXES on Pgs. 4 to 9 for complete CARBURETION, ELECTRICAL, MECHANICAL data.

CARTER AFB 4-BARREL CARBURETORS

	Carter Carb. No.
BUICK	
Series 440 (Power Pack)	3297S
Series 4600, 4800	3297S
CADILLAC	
All Series (Exc. Air Cond.)	3351S
All Series (Air Cond.)	3352S
CHEVROLET & CORVETTE 327" ENG.	
300 HP & 340 HP (Early)	3269S
300 HP & 340 HP (Late)	3310S
CHEVROLET 409" ENG.	
380 HP (Early)	3270S
380 HP (Late)	3345S,SA
409 HP	(Front) 3361S, (Rear) 3362S
CHRYSLER & IMPERIAL	
383" Eng. (Spec. Police)	3375S
383" Eng. (Spec. Police) (CCV) ①	3374S
413" Eng. (Std. Bore Carb.)	3251S
413" & 426" Engs. (Large Bore Carb.)	3397S
413" Eng. (Std. Bore Carb.) (CCV) ①	3256S
413" Eng. ②	(Front) 3258S, (Rear) 3259S
413" & 426" Engs. ③	(Two) 3084S
DODGE, DODGE DART & PLYMOUTH	
318" Eng. (Auto. Trans.)	3247S
318" Eng. (Auto. Trans.) (CCV) ①	3249S
361" Eng. (Synchro-mesh)	3252S
361" Eng. (Auto. Trans.)	3253S
361" Eng. (S.M. & Auto. Trans.) (CCV) ①	3257S
383" Eng. (Std. Bore Carb.)	3438S
413" Eng. (Std. Bore Carb.)	3251S
383" Eng. (Std. Bore Carb.) ①	3437S
383" & 413" Engs. (Large Bore Carb.)	3397S
361", 383" & 413" Engs. ②	(Front) 2790S, (Rear) 2791S
361", 383" & 413" Engs. ②	(Front) 3258S, (Rear) 3259S
413" Eng. ③	(Two) 2903S
413" Eng. ③	(Two) 3447S
PONTIAC	
Synchro-mesh	3123SA
3-Spd. Auto. Trans. ④	3300S,SA
4-Spd. Auto. Trans. ⑤	3326S,SA

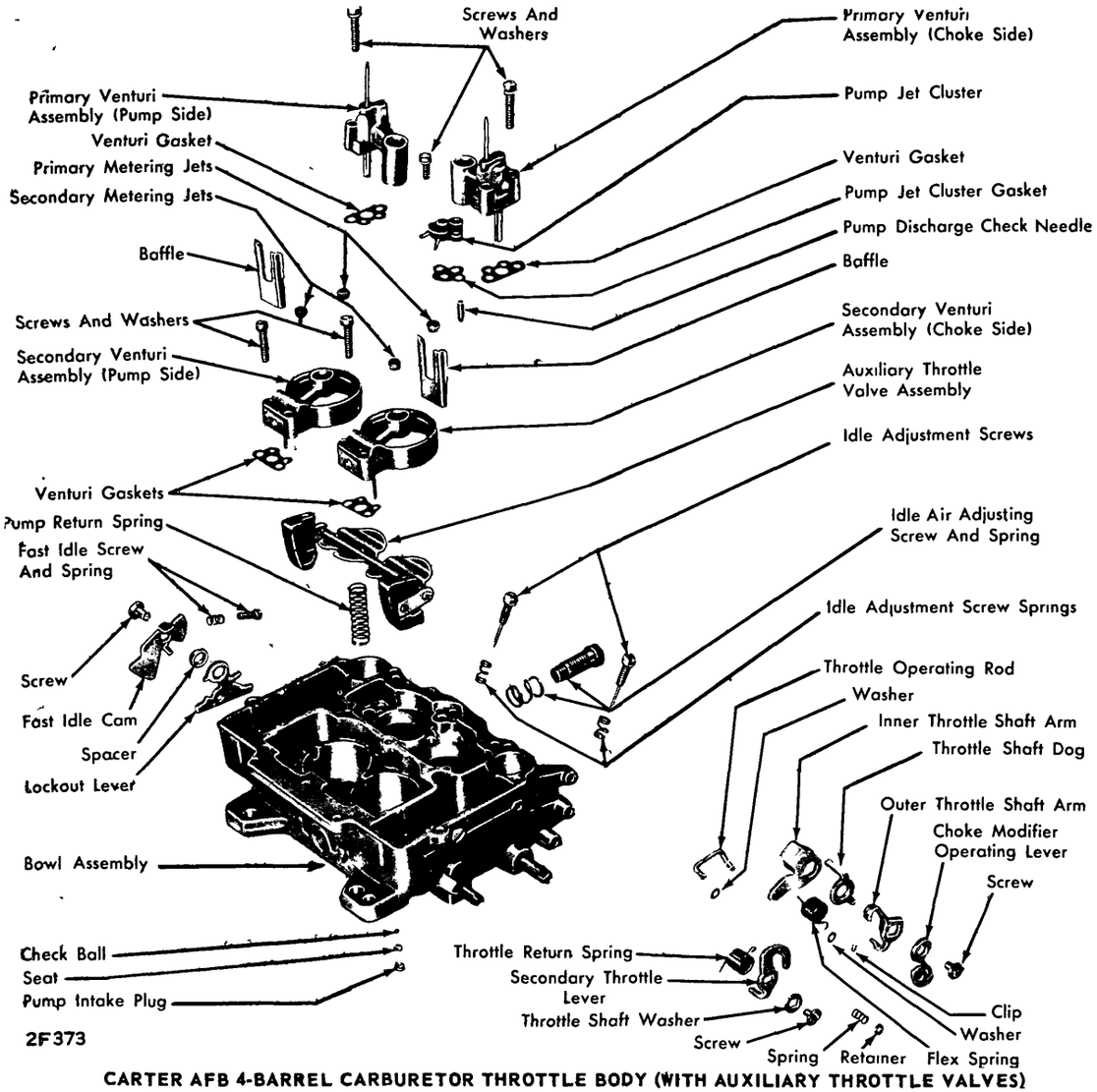
① - Closed Crankcase Ventilator.
② - Runner intake manifold.
③ - Ram intake manifold.
④ - Roto-Hydra-Matic.
⑤ - Super Hydra-Matic.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 CADILLAC COLD WEATHER HARD STARTING CORRECTION & PRODUCTION CHANGE:* A new choke baffle, Part No. 1480363 is being used in production after Eng. No. 083297 and may be used on earlier models to prevent partial choke "come on" in cold weather at low traffic speeds, and, to improve restarting. If new baffle is installed on carburetors before above engine number, be sure to position the two locating tabs on inside of the restriction in the inside diameter of heat passage (this will assure correct positioning of baffle).

►*1962 DODGE & PLYMOUTH (EXC. 318" ENG.) EXCESSIVE EARLY WARM-UP RICHNESS CORRECTION: Adjust "Cross-Over" type choke, Carter Part No. 170-BA-706A, to Index. Original setting is two notches rich. NOTE - Choke units identified with red paint or dye have been changed to "Centered on Index".*

►*1962 CHRYSLER, DODGE & PLYMOUTH AUTOMATIC CHOKE COIL STICKING CORRECTION:* Loosen both attaching screws and shift choke assembly as far rearward as possible and retighten screws. Check choke rod for improper bends that may cause binding. Check choke rod for possible binding within limits of choke travel. Check choke shaft for free operation. *NOTE - When engine is at normal operating temperature, choke valve in carburetor must be wide open. Make sure air cleaner is installed so intake air horn is slightly to right hand side of engine and is not interfering with choke operation.*



CARTER AFB 4-BARREL CARBURETOR THROTTLE BODY (WITH AUXILIARY THROTTLE VALVES)

►*1962 DODGE & PLYMOUTH 361" ENGINE CHOKE OVERLOADING CORRECTION & PRODUCTION CHANGE:* On early cars, this condition may be caused by improper choke vacuum piston "pull-off" at idle speed due to choke piston link brackets (on choke valve) being bent toward the piston which causes an enrichening condition. To correct, bend bracket on choke valve away from choke piston, being careful not to bend it in excess of 5° beyond the straight (perpendicular to valve) position. After bending bracket, make sure the link passes freely through the port in end of piston cylinder, since over-bending can cause

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CARTER AFB 4-BARREL CARBURETORS (C nt.)

interference at about half open choke. Cars build after approximately Oct. 1, 1962 have the above changes made in production.

►*1962 PONTIAC (HYDRA-MATIC TRANS. CARS) CARBURETOR PRODUCTION CHANGE (To Eliminate Part Throttl Stumbl and to Improve Operation During Warm-up):* Carburetors, No. 3300S and 3326S have been replaced in production by Carburetors, No. 3300SA and 3326SA which have recalibrated metering rods, Part No. 7016797, and new step-up springs, Part No. 1332553. A new choke piston, Part No. 7017538 is also used with later carburetors.

DESCRIPTION: Four-barrel downdraft type with automatic choke. *NOTE - Automatic choke, fast idle and unload r syst ms n t us d n secondary (front) carburet r of dual-carbur t r quipped engines.* Carburetor design is similar to previous AFB carburetors having the following features.

Idl Air Syst m (Cadillac 3351S, 3352S; Chrysler, Dodge, Plym uth 2790S, 2791S, 2903S, 3084S, 3447S, 3258S, 3259S; P ntiac 3123S,SA, 3300S,SA, 3326S,SA): Throttle valves are completely closed at "slow" idle speed with air admitted through Idle Air System which consists of an air bypass passage (primary side only). Air for closed throttle operation is taken from above throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore. An Idle Speed Screw (single screw for both primary bores) controls adjustable orifice and all idle speed adjustments are made with this screw (throttle stop-screw not used). Throttle valves are completely closed at "slow" idle speed.

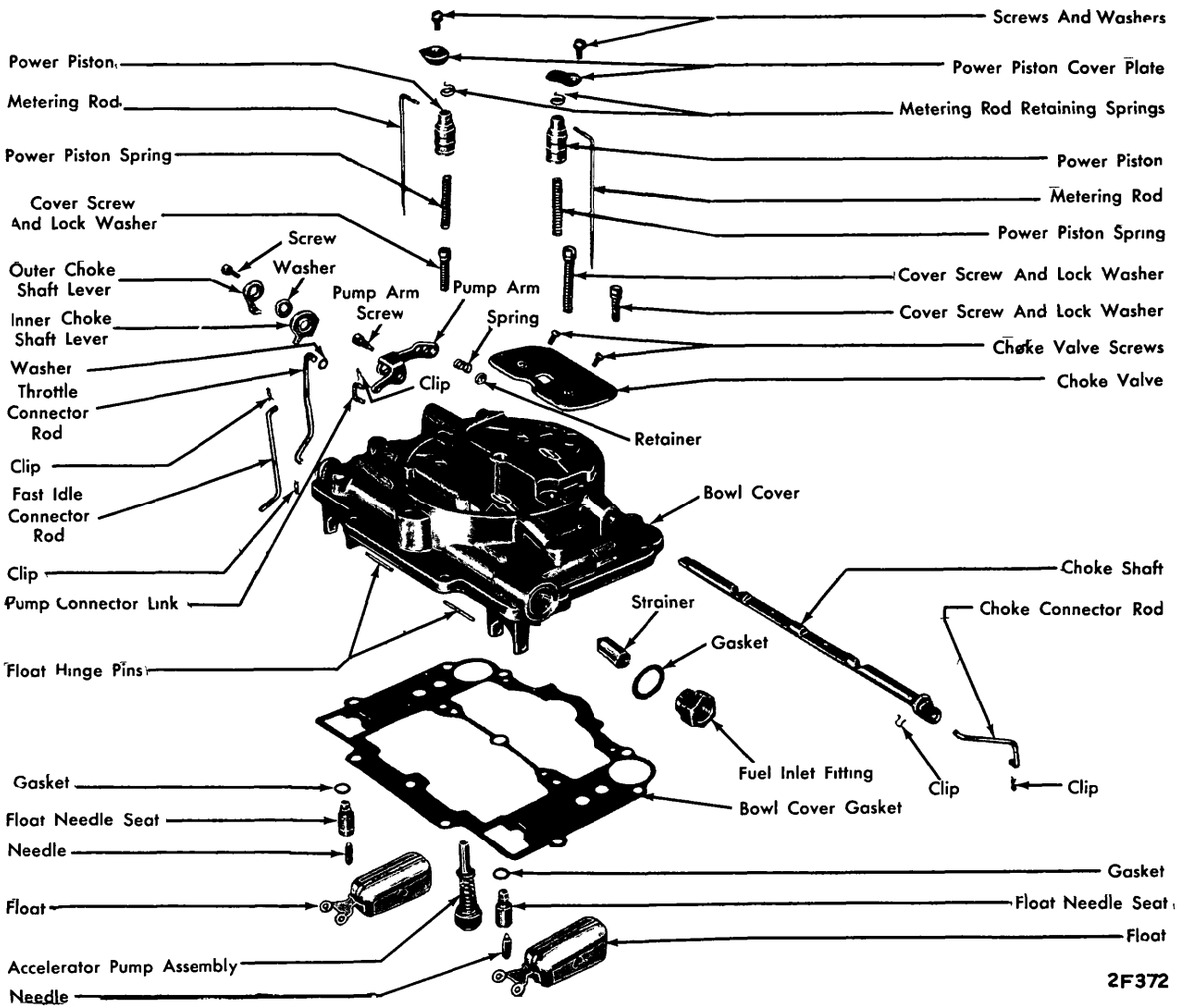
Idl C mp nsat r Valv (Buick 3297S; Cadillac 3351S, 3352S; P ntiac 3300S,SA, 3326S,SA): Assembly is mounted between main venturi on secondary side and consists of a valve, bi-metal strip, holder and mounting bracket. Unit is not adjustable and must be replaced if faulty. Purpose of compensator is to admit additional air under hot operating conditions and to prevent stalling. With high air temperature in carburetor, the valve opens and allows additional air to be drawn into carburetor bores below throttle valve to offset enrichening effects of hot idle. *CAUTION - Idl c mpensator must be closed whil adjusting idl spe d.*

Cr ss-Ov r Typ Aut matic Choke (Chrysler 3251S, 3256S; D dg & Plymouth 3247S, 3249S, 3252S, 3253S, 3257S): This type automatic choke is a separate unit mounted in a well in intake manifold (at exhaust cross-over passage) and linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in carburetor air horn and linked directly to choke valve. *S "Carter Cr ss-Over Type Automatic Choke" in 1957 Final Data, Pag 244, or later Manual edition.*

ADJUSTMENTS: Make all adjustments as indicated below.

►*CHRYSLER, DODGE & PLYMOUTH IDLE SETTING CAUTION:* When making idle speed and mixture adjustments, observe the following:

1) Turn headlights on to high beam to compensate for alternator load (alternator charges battery at idle speed).



CARTER AFB 4-BARREL CARBURETOR AIR HORN & FLOAT ASSEMBLY (TYPICAL)

2) On automatic transmission cars (Exc. 300H), loosen carburetor throttle rod locknut in sliding link so transmission internal stop will not interfere with carburetor throttle lever. When adjustments are completed, move throttle lever rod to rear against its stop and tighten locknut.

Idle Mixture & Speed Adjustment (Cars with One Carburetor): *CAUTION - On cars with Idle Compensator, the compensator valve must be held closed while adjusting idle speed (use pencil or other instrument to hold compensator down on its seat). On cars with Idle Air System, adjusting the air adjustment screw (to adjust ngin sp d) will chang th idl mixture s tting which should always b r ch ck d aft r an ngine idl sp d adjustm nt has b n mad .* If initial adjustment required to allow engine to be warmed up, turn both idle mixture screws in until lightly seated, then back screws out the correct number of turns shown in table below. Run engine until it reaches normal operating temperature with choke valve wide open and fast idle inoperative (engine idling at hot or slow idle speed). Then proceed as follows; Connect vacuum gauge and tachometer. Adjust ending idle speed to correct RPM shown in table below. *NOTE - Make sure transmission selector lever is in correct range as indicated in idle speed table.* Make this adjustment by turning throttle stop-screw (or Idle Air Bypass Screw on carburetors with this type adjustment). Adjust each idle mixture adjusting screw in or out for smooth idling, highest vacuum reading and engine RPM. *NOTE - On Buick, s t ach scr w midway*

CONTINUED ON NEXT PAGE

CARTER AFB 4-BARREL CARBURETORS (C nt.)

lean and rich mixtur . Recheck and if necessary reset idle speed, then recheck idle mixture setting. *CAUTION* - On cars with Idle Air Bypass adjusting screw, always recheck idle mixture adjustment after changing setting of idle air adjusting screw. On cars with automatic transmission, check and adjust Throttle Linkage. *See Throttle Linkage Adjustment under CARBURETOR on each car model page.*

Idle Mixture Screw Setting

Car & Carb.	Idle Screw Opening
Buick 3297S	1/4-1 3/4 turns
Cadillac 3351S, 3352S	1-3 1/4 turns
Chevrolet 3269S, 3270S	1 1/2 turns
Chrysler & Imperial 3084S	1/8-1 1/2 turns
Dodge & Plymouth 2903S	1/8-1 1/2 turns
Dodge & Plymouth 2790S, 2791S	1/2-2 turns
Dodge & Plymouth 3251S	3/4-2 1/4 turns
Dodge & Plymouth 3258S, 3259S	1/8-2 turns
Dodge & Plymouth 3247S, 3249S	1/4-2 1/4 turns
Dodge & Plymouth 3252S, 3253S, 3257S	1/2-2 1/4 turns
Pontiac 3123SA	1/4-1 1/4 turns
Pontiac 3300S, SA, 3326S, SA	1 1/2 turns

① Idle Speed Setting (Synchro-mesh Transmission)

Car Model	Engine RPM
Chevrolet (Exc. 409" Eng.)	500
Chevrolet (409" Eng.)	700
Chrysler (Exc. 300H) Std. Engine	② ③ 500
Chrysler (300H) Std. Engine	② ③ 650
Chrysler (All) Spec. Option Hi-Perf. Eng.	② ③ 700-800
Dodge & Plymouth (All) Std. Engine	② ③ 500
Dodge & Plymouth (All) Spec. Hi-Perf. Eng.	② ③ 700-800
Dodge & Plymouth (With 3447S Carbs.)	② 900
Pontiac (Std.)	480-500
Pontiac (Air Cond.)	④ 540-560

① Idle Speed Setting (Automatic Transmission)

Car Model	Engine RPM
Buick (Std.)	⑤ 525
Buick (Air Cond.)	④ ⑤ 575
Cadillac (All Models)	③ ⑥ 480
Chevrolet	⑥ 475
Chrysler (Exc. 300H) Std. Engine	② ③ 500
Chrysler (300H) Std. Engine	② ③ 650
Chrysler (All) Spec. Option Hi-Perf. Eng.	② ③ 700-800
Dodge & Plymouth (All) Std. Engine	② ③ 500
Dodge & Plymouth (All) Spec. Hi-Perf. Eng.	② ③ 700-800
Dodge & Plymouth (With 3447S Carbs.)	② 900
Pontiac (Std.)	⑥ 480-500
Pontiac (Air Cond.)	④ ⑥ 540-560

① - Throttle stopscrew or Idle Air Adjusting Screw.
② - With headlights turned on.
③ - Air Conditioner turned ON.
④ - Air Conditioner turned OFF.
⑤ - Transmission in "N" (Neutral) or "P" (Park).
⑥ - Transmission in "D" (Drive).

Idl Mixture & Sp ed Adjustment (Chrysler, D dg & Plymouth M d ls With Two Carbur t rs): *NOTE - Th s carbur tors hav an Idl Air Bypass Scr w for idl speed adjustment.* Before adjusting idle speed, check and adjust interconnecting linkage *(see CARBURETOR on car model pag)*, and ignition timing. *NOTE - If pr liminary adjustm nt required to enable ngin to b started for warm-up, s t all idl mixture screws 1-2 turns p n from a lightly seat d p sition and set idle air bypass screws (one on each carburetor) 1 turn open.* Connect a tachometer, then operate engine until it reaches normal operating temperature. Adjust Ram Manifold (separate carburetors for each engine bank), and Runner Manifold (front and rear carburetors on single manifold) as follows:

Ram Manifold Engine - Turn engine off and disconnect each carburetor throttle rod at bellcrank on manifold. Turn all adjusting screws (mixture and idle bypass) in finger tight, then open idle air bypass screw (one on each carburetor) one full turn. Open each idle mixture screw (two on each carburetor) ¾ turn. Start the engine and turn idle mixture screws on left carburetor 1/8 turn at a time until smoothest idle is obtained. Repeat this procedure on right carburetor, keeping mixture screws within 1/8 turn of each other. With transmission in "N" (Neutral), air conditioner ON (if so equipped), adjust idle speed to engine RPM indicated in table (above) by adjusting idle air bypass screw on each carburetor equally. Repeat the idle mixture adjustment and idle speed adjustment until a smooth idle is obtained at indicated engine RPM. Connect each carburetor throttle rod at bellcrank.

Runner Manifold Engine - Turn engine off and disconnect interconnecting linkage at rear carburetor throttle lever. With engine at curb idle speed (off fast idle), turn idle mixture screws 1-2 turns open, then set idle bypass screws one turn open and adjust idle speed to engine RPM indicated in table (above) by opening or closing bypass screws. *CAUTION - Rotate both bypass screws equally.* Adjust idle mixture screws on front carburetor for maximum engine RPM, then repeat on rear carburetor. Readjust front carburetor if necessary. Readjust idle air bypass screws as necessary to maintain correct engine idle speed. *NOTE - Before attaching interconnecting rod at rear carburetor (on Automatic Transmission cars), check and adjust throttle linkage so that idle position is not disturbed.*

Idle Speed & Mixture Adjustment (Chevrolet 409" Engine With Two Carburetors): *NOTE - If preliminary adjustment required to enable engine to be started for engine warm-up, set all idle mixture screws ¼ turn open from a lightly seated position, then back both idle speed screws just off throttle levers, and turn in 1½-2 turns.* Start engine and bring to normal operating temperature, then adjust both idle speed screws equally to obtain an engine speed of 700 RPM. Adjust each idle mixture screw separately to obtain highest vacuum and engine RPM, then readjust idle speed screws equally to maintain proper engine RPM. Repeat idle mixture screw and idle speed screw adjustment.

►*CADILLAC IDLE SPEED ADJUSTMENT CAUTION:* Due to vacuum released parking brake, it is impossible to set the brake with transmission selector lever in "DR" position unless vacuum release is disconnected. Disconnect vacuum diaphragm at neutral safety switch and tape switch opening to prevent any air leakage.

►*CHRYSLER, DODGE & PLYMOUTH IDLE SPEED ADJUSTMENT CAUTION: S "Idle S tting Cauti n" ab v .*

Anti-Stall Dashp t (Throttl Return Check): Dashpot is a separate unit mounted on carburetor or elsewhere in throttle linkage. *For adjustm nt, s "Throttl Linkag Adjustment" und r CARBURETOR on car model pag s.*

Idl Sp ed-Up C ntrol (Cadillac Air Conditi ned Cars): This unit increases engine idling speed when air conditioner is turned on and transmission selector lever is in neutral. *For adjustment, se CARBURETOR on Cadillac car model page.*

Metering Rods: No adjustment required. Metering rods not used on secondary side.

Float Setting: *NOTE - Befor adjusting float lev l and float drop, floats must b align d as follows:* Align floats by sighting down side of float to determine if side of float is parallel to outer edge of air horn casting. To adjust, bend float lever by applying pressure to end of float shell with finger while supporting float lever with thumb. *CAUTION - Apply only n ugh pr ssur to bend float lever.* After aligning float, remove as much clearance as is possible between arms of float lever and support lugs on air horn by bending both arms of lever. Arms should be parallel to inner surfaces of support lugs and float must operate freely without excess clearance on hinge pin.

►*FLOAT SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEAT):* When bending float lever to adjust height on carburetors with resilient inlet valve seats, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. Float level specifications are different for carburetors with resilient type inlet valve seats. *See "Fl at Lavel S ttina" bel w.*

Float Level - Both floats are set to same height. With air horn inverted, bowl cover gasket in place and needle valve seated, measure distance from top of float at outer end to air horn gasket with proper gauge (see table below). Adjust by bending float arm.

Float Drop - With bowl cover held in upright position so that floats hang down at lower end of travel, measure from outer (free end) of float to float bowl gasket. This should be 23/32" plus or minus 1/16" for all models.

Float Lev l S tting

Car & Carb.	① H ight	Gauge N .
Buick 3297S	7/32"	T109-106
Cadillac 3351S, 3352S	3/8"	T109-80
Chevrolet 3269S	5/16"	T109-107
Chevrolet 3270S, 3361S, 3362S	7/32"	T109-106
Chrysler 3251S, 3256S, 3259S	7/32"	T109-106
Chrysler 3374S, 3375S	7/32"	T109-106
Chrysler 3084S, 3258S	9/32"	T109-126
Dodge & Plymouth 2791S, 3247S	7/32"	T109-106
Dodge & Plymouth 3249S, 51S, 52S	7/32"	T109-106
Dodge & Plymouth 3253S, 57S, 59S	7/32"	T109-106
Dodge & Plymouth 2790S, 2903S	9/32"	T109-126
Dodge & Plymouth 3258S	9/32"	T109-126
Dodge & Plymouth 3447S	7/32"	T109-106
Pontiac (All Carbs.)	② 21/64"	T109-294

① - If inlet valve is equipped with a resilient type seat, REDUCE float setting 1/32".
② - Float gauge must be placed in line with center of indentation (at outer end).

Accelerating Pump Stroke: This is a pump stroke adjustment and not a seasonal setting. On all models with provision for seasonal setting, make certain that connector rod is engaged in correct hole of pump arm as

CONTINUED ON NEXT PAGE

CARTER AFB 4-BARREL CARBURETORS (Cont.)

listed below. Back out throttle stopscrew so that throttle valves fully seated, then use scale to measure from top surface of bowl cover to top of pump plunger stem. If this distance not correct as shown in table below, adjust by bending connector rod at lower angle using Tool T109-213.

Pump Stroke Setting

Car & Carb.	Plunger Height	Connector Rod
Buick 3297S	7/16"	Center
Cadillac 3351S, 3352S	15/16"	Inner
Chevrolet 3269S, 3270S	1/2"	Non. Adj.
Chevrolet 3361S, 3362S	1/2"	Non. Adj.
Chrysler 3251S. 3256S	7/16"	Center
Chrysler 3258S, 3259S	7/16"	Center
Chrysler 3374S, 3375S	7/16"	Center
Chrysler 3084S	27/64"	Center
Dodge & Ply. 2790S, 91S	7/16"	Center
Dodge & Ply. 3247S, 49S	7/16"	Center
Dodge & Ply. 3251S, 52S	7/16"	Center
Dodge & Ply. 3253S, 57S	7/16"	Center
Dodge & Ply. 3258S, 59S	7/16"	Center
Dodge & Ply. 2903S	27/64"	Center
Dodge & Plymouth 3447S	7/16"	Center
Pontiac (All Carbs.)	5/16"	Inner

Automatic Choke (Cross-Over Type): This choke assembly is mounted in well in intake manifold "cross-over" passage. To adjust with unit off engine, loosen mounting post locknut and turn mounting post with screwdriver until index mark on disc is positioned opposite correct mark on scale (see table below for proper setting). When choke is installed on engine, lift cover disc and open and close choke manually to make sure connector rod clears sides of hole in housing cover. If rod does not clear, replace unit (bending rod will affect choke calibration).

Automatic Choke (Integral Type): *NOTE - Adjust choke after Choke Piston Lever Adjustment or Choke Countershaft Adjustment has been completed.* Settings are shown in table below. Adjust by loosening choke cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Car & Carb.	Choke Setting
Buick 3297S	Centered
Cadillac 3351S, 3352S	1 Point Rich
Chevrolet 3269S, 3270S, 3361S, 3362S	Centered
Chrysler 3251S. 3256S, 3259S, 3375S	① 2 Points Rich
Chrysler 3258S, 3259S	1 Point Rich
Chrysler 3084S	① 1 Point Rich
Dodge & Plymouth 2791S	① 1 Point Rich
Dodge & Plymouth 3247S, 3249S, 3251S	① 2 Points Rich
Dodge & Plymouth 3252S, 3253S, 3257S	①② Centered
Dodge & Plymouth 2903S, 3259S	1 Point Rich
Pontiac 3123SA, 3300S, SA, 3326S, SA	1 Point Rich

① - "Cross-Over" type choke.
② - This supersedes previous setting of 2 points rich.

Choke Piston Linkage Adjustment: Remove choke cover and coil assembly (except carburetors with "Cross-Over" type choke) for access to choke piston.

Buick - Bend .026" wire gauge (Tool T109-189) at a 90° angle approximately 1/8" from end, then open choke valve and insert wire gauge so that bent portion is between top of slot in choke piston cylinder and bottom of slot in piston. Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. There should be 3/32" clearance (Gauge T109-125) between top of choke valve and air horn. To adjust, bend choke connector rod.

Cadillac - With choke valve closed, choke piston should be flush with top of piston housing. To adjust, bend choke connector rod. *NOTE - Choke valve should be held closed by applying pressure to piston lever in piston housing.*

Chevrolet - Use same procedure as for Buick (see above). Clearance between top of choke valve and air horn should be .210" (409" Engine); .0825" (327" Engine).

Chrysler, Dodge & Plymouth (2903S, 3084S, 3259S) - Use same procedure as for Buick (see above). Clearance between top of choke valve and air horn should be 1/8".

Pontiac - With choke valve closed, piston should be flush to 1/64" below outer lip of cylinder. To adjust, bend choke connector rod.

Fast Idle Linkage: This adjustment must be made before checking and adjusting Fast Idle and Unloader. Adjust each model as follows:

Buick 3279S; Chevrolet 3269S, 3270S, 3362S; Chrysler 3374S, 3375S, 3251S, 3256S; Dodge & Plymouth 3251S, 3252S, 3253S, 3257S - With choke valve closed, index mark on fast idle cam should align with adjusting screw. To adjust, bend fast idle connector rod.

Cadillac 3351S, 3352S; Chrysler 3259S; Dodge & Plymouth 2791S, 3247S, 3249S, 3259S - With choke valve tightly closed and lug on outer choke shaft lever contacting stop on inner choke shaft lever, align index mark on cam with adjusting screw. To adjust, bend fast idle connector rod.

Chrysler, Dodge & Plymouth 2903S; Pontiac 3123SA, 3300S, SA, 3326S, SA - With choke valve tightly closed, trip lever and cam arm in alignment, align center of fast idle screw with index mark on cam. To adjust, bend fast idle connector rod.

Fast Idle Setting: *NOTE - This adjustment can be made with carburetor on the bench (Off Engine) but setting should be checked after carburetor is installed (On Engine) as follows:*

Fast Idle Adjustment (Off Engine) - Open throttle and close choke valve tightly (this will allow fast idle cam to assume fast idle position). With choke valve closed and index mark on fast idle cam aligned with fast idle adjusting screw, turn screw in or out until throttle valve opening or clearance between lower edge of valve and carburetor wall is correct as shown in table below.

Fast Idl Setting (Off Engin)

Car & Carb.	Valve Op ning	Checking Gaug
Buick 3297S	.030"	T109-29
Cadillac 3351S, 3352S	.023"	T109-189
Chevrolet 3270S, 3362S	.025"	T109-189
Chrysler 3251S, 3256S	.020"	T109-29
Chrysler 3374S, 3375S	.020"	T109-29
Chrysler 3259S	.012"	T109-200
Chrysler 3084S	.010"	T109-200
Dodge & Ply. 3247S, 3249S	.020"	T109-29
Dodge & Ply. 3251S, 3252S	.020"	T109-29
Dodge & Ply. 3253S, 3257S	.020"	T109-29
Dodge & Ply. 2791S	.012"	T109-200
Dodge & Ply. 2903S	.010"	T109-200
Pontiac 3213SA, 3300S, SA	.026"	T109-189
Pontiac 3326S, SA	.026"	T109-189

Fast Idle Adjustment (On Engine) - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of fast idle cam and in alignment with index mark (Exc. Buick). On Buick, place fast idle adjusting screw on lowest (last) step of fast idle cam. On all models, operate engine and adjust fast idle screw for correct engine speed as listed below.

Fast Idle Setting (On Engine)

Car Model	Engine RPM
Buick	①650
Cadillac	1700-1750
Chevrolet	1750
Chrysler (Exc. 3259S)	1800
Chrysler 3259S	1400
Dodge & Plymouth 318" Eng. (Single Carb.)	1800
Dodge & Plymouth 361" Eng. (Single Carb.)	②2200
Dodge & Plymouth 2791S & 3259S	1400
Pontiac	2200

① - With fast idle screw on lowest (last) step of fast idle cam.
② - Supersedes previous setting of 1800 RPM.

Unloader: After fast idle linkage adjusted (see above), rotate primary throttle valves to wide open position and check choke valve opening or clearance between upper edge of valve and air horn wall using gauge listed in table below. If clearance not correct, adjust by bending unloader lip on primary throttle lever using bending tool T109-214.

►*PONTIAC NOTE: Car manufacturer recommends that throttle valves be opened by depressing accelerator pedal (to simulate actual driving conditions and assure unloader functioning properly in service).*

Unloader Setting

Car Model	Choke Opening	Checking Gaug
Buick	7/32"	T109-106
Cadillac	5/16"	T109-107
Chevrolet	1/4"	T109-31
Chrysler	1/4"	T109-31
Dodge & Plymouth	1/4"	T109-31
Pontiac	5/32"	T109-154

Auxiliary Throttle Valves: Velocity type valves (counterweighted free valves without linkage). No adjustment required. Used on all models except as indicated in following note. *NOTE - Auxiliary throttl valves used on Chrysler 3258S & 3259S.*

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CARTER AFB 4-BARREL CARBURETORS (Cont.)

Secondary Throttle Lever Adjustment: This adjustment required to insure correct action of primary and secondary throttle valves.

Chevrolet - *NOTE - Pickup lever located on primary throttle shaft has two points of contact with loose lever on primary shaft. Caution should be taken that pickup lever contacts loose lever at both points at same time.*

Buick, Cadillac, Chrysler, Dodge, Plymouth & Pontiac - Block choke valve wide open. Open throttle valves until clearance between lower edge of valve and throttle bore on side opposite idle port is correct as shown in table below. Secondary valves should just start to open at this point. Adjust by bending secondary throttle operating rod using Tool T109-213. Open primary valves fully.

Car & Carb.	Secondary Throttle Lever Setting Primary Throttle Opening
Buick	23/64"
Cadillac	23/64"
Chrysler 3251S, 3256S, 3374S, 3375S	3/8"
Chrysler 3258S, 3259S	23/64"
Chrysler 3084S	29/64"
Dodge & Plymouth 2790S, 2791S, 3247S, 3249S	3/8"
Dodge & Plymouth 3251S, 3252S, 3253S, 3257S	3/8"
Dodge & Plymouth 3258S, 3259S	23/64"
Dodge & Plymouth 2903S	29/64"
Pontiac (All Carbs.)	7/16"

Secondary Throttle Lockout Adjustment: Open throttle valves slightly to clear fast idle cam, then open and close choke valve manually Lockout tang on secondary throttle lever should freely engage notch in lockout dog. Adjust by bending tang on secondary throttle lever

Cadillac 3351S, 3352S; Chrysler, Dodge & Plymouth 3259S; Dodge & Plymouth 2791S - Hold lockout dog tight against stop on flange. With secondary valves partially open, clearance between secondary throttle lever and lockout arm should be .026" (Cadillac), .020" (Others). Bend arm at slot on lockout dog

Primary & Secondary Throttle Lever Closing Shoe Adjustment: With primary and secondary throttle valves closed, check clearance between positive closing shoes on throttle levers using Gauge T109-29 (.020"). Clearance at closest point should be .010-.030" Adjust by bending shoe on secondary lever

OVERHAUL: *See 1958 Final Data, Page 240, or later Manual edition.*

1962 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.		Metering Jet Size	No.	Step-Up Rod No.	Venturi Assembly Low Spd. Jet	Part No. ①	Part No. ②	Pump Jet Assy. Size	No.
2790S	Pri.	.089"	120-159	16-40③	.031"	58-324S	58-325S	.031"	48-258S
	Sec.	.055"	120-174			58-221S	58-222S		
2791S	Pri.	.089"	120-159	16-26④	.031"	58-324S	58-325S	.031"	48-258S
	Sec.	.055"	120-174			58-221S	58-222S		
2903S	Pri.	.089"	120-159	16-119	.035"	58-461S	58-462S	.028"	48-270S
	Sec.	.0595"	120-196			58-347S	58-348S		
3123SA	Pri.	.0935"	120-166	16-169	.043"	58-548S	58-549S	.028"	48-270S
	Sec.	.0785"	120-194			58-587S	58-588S		
3247S	Pri.	.089"	120-252	16-160		58-483S	58-484S	.028"	48-270S
	Sec.	.057"	120-193			58-208S	58-209S		
3249S	Pri.	.089"	120-252	16-165		58-515S	58-516S	.028"	48-270S
	Sec.	.057"	120-193			58-208S	58-209S		
3251S	Pri.	.089"	120-252	16-160	.032"	58-556S	58-557S	.031"	48-258S
	Sec.	.065"	120-226			58-232S	58-233S		
3252S	Pri.	.089"	120-252	16-162	.032"	58-639S	58-640S	.031"	48-258S
	Sec.	.065"	120-226			58-254S	58-255S		
3253S	Pri.	.089"	120-252	16-161	.032"	58-508S	58-509S	.031"	48-258S
	Sec.	.0635"	120-176			58-232S	58-233S		
3256S	Pri.	.089"	120-252	16-160	.032"	58-556S	58-557S	.031"	48-258S
	Sec.	.065"	120-226			58-232S	58-233S		
3257S	Pri.	.089"	120-252	16-159	.032"	58-542S	58-543S	.031"	48-258S
	Sec.	.065"	120-226			58-254S	58-255S		
3258S	Pri.	.099"	120-159	16-81	.031"	58-349S	58-350S	031"	48-258S
	Sec.	.067"	120-185			58-221S	58-222S		
3259S	Pri.	.099"	120-159	16-192	.031"	58-349S	58-350S	.031"	48-258S
	Sec.	.055"	120-174			58-221S	58-222S		
3270S	Pri.	.1015"	120-162	16-193	.040"	58-595S	58-596S	.028"	48-264S
	Sec.	.086"	120-165			58-151S	58-152S		
3297S	Pri.	.092"	120-256	16-167	.033"	58-536S	58-537S	028"	48-264S
	Sec.	.082"	120-158			58-347S	58-348S		
3351S	Pri.	.098"	120-163	16-197	.032"	58-612S	58-613S	.028"	48-270S
	Sec.	.082"	120-158			58-270S	58-271S		
3352S	Pri.	.098"	120-163	16-197	.032"	58-612S	58-613S	028"	48-270S
	Sec.	.082"	120-158			58-270S	58-271S		
3374S	Pri.	.089"	120-252	16-157	.032"	58-508S	58-509S	.031"	48-258S
	Sec.	.0689"	120-228			58-232S	58-233S		
3375S	Pri.	.089"	120-252	16-157	.032"	58-508S	58-509S	.031"	48-258S
	Sec.	.0689"	120-228			58-232S	58-233S		

① - Choke side of carburetor
② - Pump side of carburetor

1962 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.		Metering Jet Size	No.	Metering Rods Std.	Metering Rods 1 Size Lean	Low Speed Jet Size	No.	Pump Jet Size	No.
2829S	Pri.	.089"	120-159	75-1345	75-1377①	035"	11-294S	035"	48-243S
	Sec.	.0635"	120-176						
2830S	Pri.	089"	120-159	75-1345	75-1377①	035"	11-294S	035"	48-243S
	Sec.	.0635"	120-176						
3165S	Pri.	089"	120-159	75-1547	75-1548②	037"	11-321S	035"	48-243S
	Sec	.0635"	120-176						
3166S	Pri	089"	120-159	75-1547	75-1548②	037"	11-321S	035"	48-243S
	Sec.	0635"	120-176						
3190S	Pri.	086"	120-165	75-1586		028"		025"	48-288S
	Sec.	.0635"	120-176			.028"			
3191S	Pri	086"	120-165	75-1586				025"	48-288S
	Sec	0635"	120-176						
3419S	Pri	089"	120-159	75-1547	75-1548②	037"	11-321S	035"	48-243S
	Sec	0635"	120-176						
3420S	Pri	089"	120-159	75-1547	75-1548②	037"	11-321S	035"	48-243S
	Sec	0635"	120-176						
3422S	Pri	089"	120-159	75-1345	75-1377①	035"	11-294S	035"	48-243S
	Sec	.0635"	120-176						
3423S	Pri	089"	120-159	75-1345	75-1377①	035"	11-294S	035"	48-243S
	Sec	0635"	120-176						

① - 2 Sizes Lean 75-1378U ② - 2 Sizes Lean 75-1549U.

CARTER WCFB 4-BARREL CARBURETORS

CHEVROLET 327" ENGINE	Carter No.
Pass. Cars & Corvette (Auto. Trans.)	3190S
Pass. Cars & Corvette (Synchro-mesh)	3191S
STUDEBAKER LARK & HAWK	
V8 Eng. (Synchro-mesh) Early	2829S
V8 Eng. (Synchro-mesh) Early (CCV)℄	3165S
V8 Eng. (Synchro-mesh) Later	3422S
V8 Eng. (Synchro-mesh) Later (CCV)℄	3419S
V8 Eng. (Auto. Trans.) Early	2830S
V8 Eng. (Auto. Trans.) Early (CCV)℄	3166S
V8 Eng. (Auto. Trans.) Later	3423S
V8 Eng. (Auto. Trans.) Later (CCV)℄	3420S

℄ - Closed Crankcase Ventilation

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 STUDEBAKER CARBURETOR PRODUCTION CHANGE & SERVICE MODIFICATION (To correct rough idl or a stumbl condition on acceleration at at low r car sp ds, particularly on left turns):* New carburetors (see application list above) are being used in later production to correct the above conditions. Early carburetors (2829S, 2830S, 3165S, 3166S) can be modified by installing the new parts listed below and changing carburetor adjustments as indicated.

N w Adjustments (Primary Float Level) - Adjust primary float level to 9/64" (Studebaker Gauge No. J-7479-4). *CAUTION - R silient type Needle Valve & Seat Ass mbly is us d. When bending float tab to adjust, do not apply any pr ssure to needle valve.*

Idl Sp ed & Mixture - When making idle speed & mixture adjustments, thermostatic air bleed valve on throttle body must be held closed.

Aut matic Chok - 1 point rich.

Ch k Unl ad r - 1/8" clearance between lower edge of choke valve and air horn. *See "Unloader" adjustm nt below.*

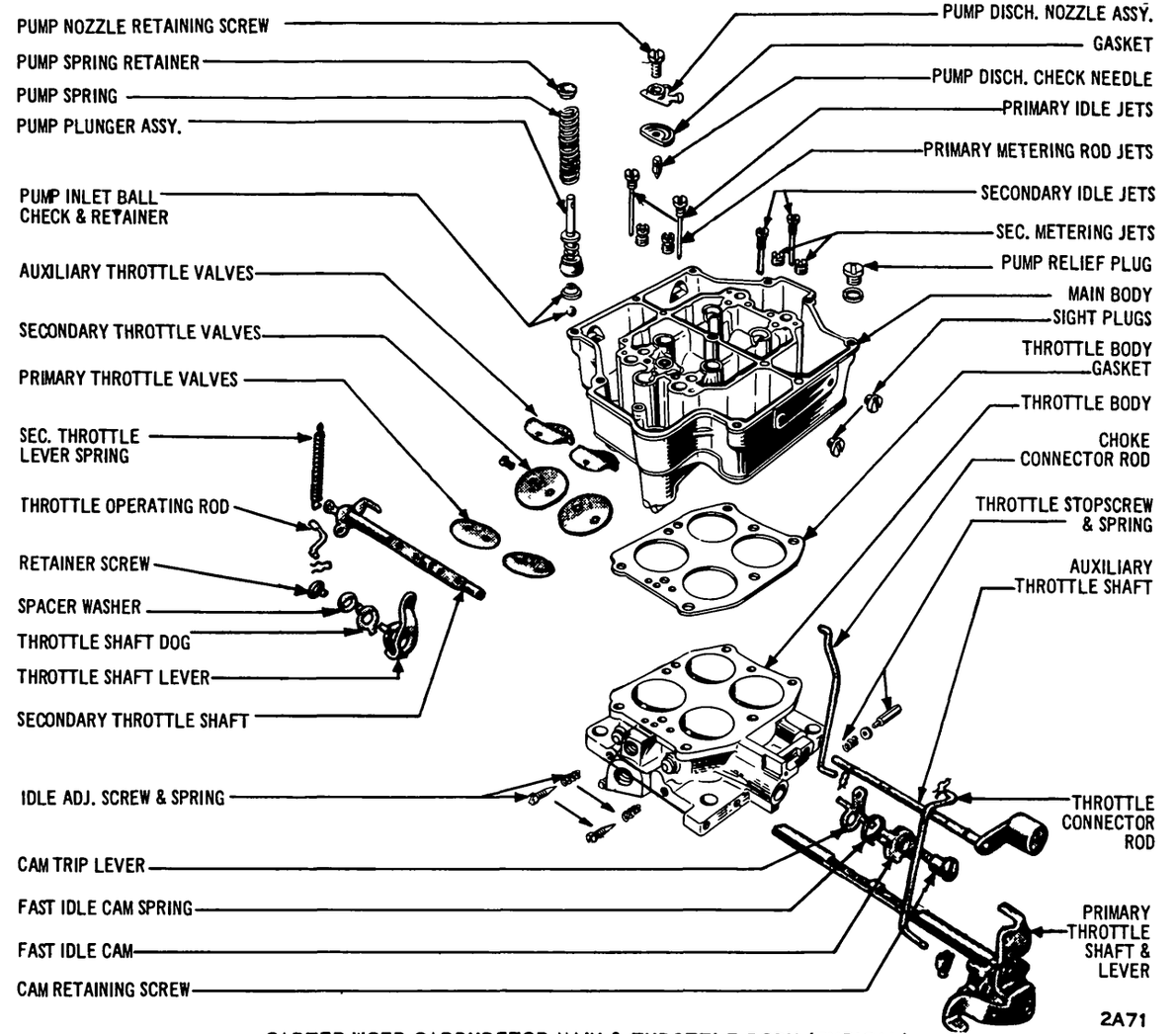
Carbur t r Modification Parts

D scripti n	Studebaker Part No.
Thermostatic Air Bleed Valve	1556107
Throttle Body Gasket	1556399
Air Horn Assembly	1556400
Float	1556401
Bushing	1556402
Needle Valve & Seat Assembly	1556488
Gasket	537187
Gasket	537188
Gasket	537189
Tee ℄	G444255
Screws (Two)	537168

℄ - Use on cars with closed crankcase ventilation.

DESCRIPTION: 4-barrel downdraft type of same general design used on previous models. These carburetors include the following features:

Therm static Air Ble d Valve (Studebaker 3419S, 3420S, 3422S, 3423S): This valve, which is screwed into carburetor throttle body casting, assists in reducing rich air and fuel mixture during hot idling by allowing additional air to be drawn into carburetor at a point below the throttle valves. When adjusting idle speed, hold thermostatic valve closed.



CARTER WCFB CARBURETOR MAIN & THROTTLE BODY (TYPICAL)

Auxiliary Throttle Valves; Velocity type valve located directly over secondary throttle valves in main body. Auxiliary throttle valve action is controlled by counterweight on shaft and is not operated by throttle linkage. On Chevrolet models, auxiliary throttle valves are locked out when choke is operating and this lockout must be adjusted. *See Adjustments below.*

ADJUSTMENTS: *Make all adjustments in sequence indicated below.*

Idling Adjustment: If necessary, make preliminary idle mixture and idle speed adjustments to enable engine to be warmed up. Run engine until it reaches normal operating temperature with choke valve wide open and fast idle inoperative. Then make adjustments as follows:

Ch vr let - Connect vacuum gauge and tachometer. Set throttle stopscrew for correct idling speed. Adjust each idle mixture screw for highest RPM and vacuum reading. Reset idle speed.

Studebaker - *CAUTION - On later carburetors with Thermostatic Air Bleed Valve (Throttle Body) hold valve closed when making idle speed adjustments.* Set throttle stopscrew for correct idle speed. Adjust both idle mixture screws equally for smooth idling performance, then turn screws out (richer mixture) until engine RPM shows a slight drop. Reset engine idle speed.

Idle Mixture Setting

Car & Carb.	Idle Screw Opening
Chevrolet 3190S, 3191S	½-2 turns
Studebaker 2829S, 2830S, 3422S, 3423S	½-1½ turns
Studebaker 3165S, 3166S, 3419S, 3420S	¼-1½ turns

CONTINUED ON NEXT PAGE

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
Chevrolet	500	①475
Studebaker	550-600	②550-600

① - Transmission selector lever in "D" (Drive).
② - Transmission selector lever in "N" (Neutral).

Throttle Return Check (Dashpot Adjustment): *See "Throttle Linkage" under CARBURETOR on each car model page.*

Accelerating Pump Stroke: *This is a linkage adjustment and not a seasonal change recommendation, and is not dependent on operating conditions.* Remove dust cover, place connector link in hole indicated in table below.

Car	Initial Stroke Setting
Chevrolet	Outer Hole
Studebaker	Outer Hole

Pump Stroke Adjustment - Back off throttle stopscrew so that primary throttle valves are fully closed. Hold a straightedge across dust cover boss at pump arm. Flat on top of arm should be parallel with straightedge. Adjust by bending pump connector link at lower angle.

Metering Rod (Primary Side): No gauge required for this adjustment and no metering rods are used on secondary side. With dust cover removed and primary throttle valves fully seated (as for Pump Stroke Adjustment), loosen setscrew in metering rod arm on pump countershaft enough so that arm has a slight bind on shaft, then lift arm slightly and depress metering rod link until metering rods just bottom in bowl casting. Position metering rod arm so that it just contacts link and tighten setscrew. Adjust Atmospheric Idle Vent (below).

►*FLOAT LEVEL SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEATS):* When bending float lever to adjust height on carburetors with resilient inlet valve seats, do not allow float lever to contact inlet needle seat as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. Float level setting specifications are different for carburetors with resilient type inlet valve seats. *See "Float Level Setting" below.*

Float Setting: *CAUTION - Primary and secondary floats must be checked and adjusted separately and both Float Level and Float Drop must be checked for each assembly.*

Float Level - Check and adjust as follows: Remove bowl cover gasket (take out float hinge pins, remove float assemblies with intake needles and clips attached, then remove gasket and reinstall float assemblies). Invert bowl cover. Install correct gauge for each float assembly (see table below) on bowl cover under center of floats with notched ends of gauge fitted tightly against side of bowl cover casting. Both floats should just clear horizontal section of gauge (adjust by bending float arms as required) and each float should just touch vertical uprights on gauge (bend arms sideways for clearance). This sideway adjustment is extremely important to prevent floats hanging up on sides of bowl casting.

Float Level Setting
Primary Floats

Car & Carb.	Height	Gauge No.
Chevrolet (All Carbs.)①	7/32"	T109-283
Chevrolet (All Carbs.)②	3/16"	T109-222
Studebaker (All Carbs.)③	3/16"	T109-222
Studebaker (All Carbs.)④	9/64"	⑤J-7479-4

Secondary Floats

Car & Carb.	Height	Gauge No.
Chevrolet (All Carbs.)①	9/32"	T109-284
Chevrolet (All Carbs.)②	1/4"	T109-223
Studebaker (All Carbs.)	3/16"	T109-222

① - With solid needle seat.
② - With resilient needle seat.
③ - Early carburetors without Thermostatic Air Bleed Valve.
④ - Later carburetors with Thermostatic Air Bleed Valve.
⑤ - Studebaker gauge number.

Float Drop: Hold bowl cover assembly upright so floats hang down freely. Use a scale to measure distance from bottom of float at free end to bowl cover (Chevrolet); from top of float at center to bowl cover (Studebaker). If distance not correct (see table below), adjust by bending tab on float bracket. *CAUTION - Do not put any pressure on inlet needle valve when adjusting floats.*

Float Drop Setting

Car & Carb.	Primary	Secondary
Chevrolet (All Carbs.)	2"	2"
Studebaker (All Carbs.)	11/16"	11/16"

Bowl Vapor Vent (Atmospheric Idle Vent): Chevrolet - With dust cover and gasket installed, back out throttle lever stopscrew so that primary throttle valves are fully closed. Check clearance between lower edge of vapor vent valve and dust cover. Vent clearance should be 3/32". Adjust by bending vapor vent valve arm (remove dust cover).

Automatic Choke: See table below for setting. Adjust by loosening choke cover screws and rotating cover and coil assembly, then adjust connector rod.

Automatic Choke Setting

Car & Carb.	Choke Setting
Chevrolet (All)	Centered
Studebaker①	1 point lean
Studebaker②	1 point rich

① - Early carburetors without Thermostatic Air Bleed Valve.
② - Later carburetors with Thermostatic Air Bleed Valve and early carburetors that have been modified. *See "Correction" above.*

Choke Rod: This adjustment is preliminary to checking and adjusting fast idle, unloader, and secondary throttle lockout. Loosen choke lever clamp screw and insert .020" wire gauge, Tool T109-29, between tang on fast idle cam and boss on throttle body casting (hold gauge in place by pressure on choke lever) and take up all slack in linkage. Hold choke valve tightly closed and tighten clamp screw.

Choke Piston Lever Adjustment (Chevrolet): Bend a .026" wire gauge (T109-189) at a 90° angle 1/8" from end, then remove choke coil housing, gasket and baffle plate. Block throttle about half open so fast idle cam does not contact adjusting screw. Open choke valve and insert wire gauge so bent portion is between top of slot in choke piston cylinder and bottom of slot in choke piston. Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. Clearance between top of choke valve and air horn should be .067" (Gauge T109-234). To adjust, bend choke connector rod.

Unloader: After choke rod adjusted, rotate primary throttle valves to wide open position and close choke. Clearance between upper edge of choke valve (Chevrolet), lower edge of choke valve (Studebaker), and inner wall of air horn should be 1/4" (Chevrolet), 9/64" (Studebaker early carburetors without Thermostatic Air Bleed Valve), 1/8" (Studebaker later carburetors with Thermostatic Air Bleed Valve and early carburetors that have been modified, *see "Corrections" above*). Adjust by bending unloader tang on throttle shaft lever with Tool T109-41. With correct setting, choke valve should have a slight drag on gauge.

Fast Idle (Off Engine): Studebaker - With fast idle screw on high step of fast idle cam, there should be a clearance of .023" between throttle valve and bore on side opposite idle port. To adjust, turn fast idle screw.

Fast Idle (On Engine): Chevrolet - 1600-1800 RPM with engine at normal operating temperature and idle speed screw on high step of fast idle cam. No adjustment.

Secondary Throttle Lever Adjustment: Chevrolet - Block choke valve wide open and back out throttle stopscrew so primary valves are seated in bores. With primary valves open 7/32" (Gauge T109-125), secondary valves should just start to open. To adjust, bend throttle operating rod. *NOTE - Secondary valves will be a few degrees from wide open position when primary throttle valves are wide open.* With primary and secondary valves tightly closed, there should be .010-.030" (Gauge T109-29) clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.

Studebaker - Primary and secondary throttle valves should reach wide open position at the same time. *NOTE - Secondary valves will be a few degrees from wide open position.* To adjust, bend throttle operating rod at upper angle with Tool T109-213. With primary and secondary throttle valves in tightly closed position, there should be .010-.030" clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.

Secondary Throttle Lockout Adjustment: Studebaker - Crack throttle valves and hold choke valve closed, then close throttle. Tang on secondary throttle lever should engage notch in lockout lever. To adjust, bend tang on secondary throttle lever. *NOTE - With choke valve open, lockout lever should fall free allowing secondary throttle valves to open before primary valves reach wide open position.*

Auxiliary Throttle Lockout Adjustment: Chevrolet - Crack throttle valves and hold choke valve tightly closed, then close throttle valve. Tang on lockout arm should freely engage notch in auxiliary throttle shaft dog. To adjust, bend tang on lockout arm.

OVERHAUL: *See 1957 Final Data, Page 221, or later Manual edition.*

CARTER AS SINGLE BARREL CARBURETORS

CHECKER SUPERBA	Carter No.
Overhead Valve Engine	3290S
RAMBLER	
Classic Six, Auto. Trans.	3206S
STUDEBAKER	
Lark 6 Cyl. (Exc. Taxi)	3370S
Lark 6 Cyl. (Exc. Taxi), Governor	3371S
Lark 6 Cyl. (Exc. Taxi) (CCV) ℂ	3372S
Lark 6 Cyl. (Exc. Taxi), Governor (CCV) ℂ	3373S
Lark 6 (Taxi) (CCV) ℂ	3186S

ℂ - Closed Crankcase Ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 STUDEBAKER STUMBLE DURING SLOW SPEED ACCELERATION CORRECTION:* This condition is noticeable briefly after engine is restarted, and can be improved by installing a new Accelerator Pump Plunger, Part No. 64-285S (Carter Carburetor No.). This new plunger has a bleed hole diameter of .024" (earlier type has a .016" bleed hole). Later production carburetors have the above change made during manufacture. Also, later carburetors have a larger idle tube orifice of .031" in carburetors used on cars without closed crankcase ventilation.

DESCRIPTION: Single barrel downdraft type with automatic choke.

ADJUSTMENT: Make all adjustments exactly as follows:

Idling Adjustment: Warm up engine thoroughly, so that choke valve is wide open and fast idle inoperative. See table for idle screw setting. Turn screw out for richer mixture. See car model pages for complete tune-up data.

Idl Mixture Setting

Car & Carb.	Idle Screw Opening
Checker	1/2-1 3/4 turns
Rambler (All)	1/2-1 1/4 turns
Studebaker (Exc. 3186S)	1/8-1 1/2 turns
Studebaker (3186S)	1/2-2 turns

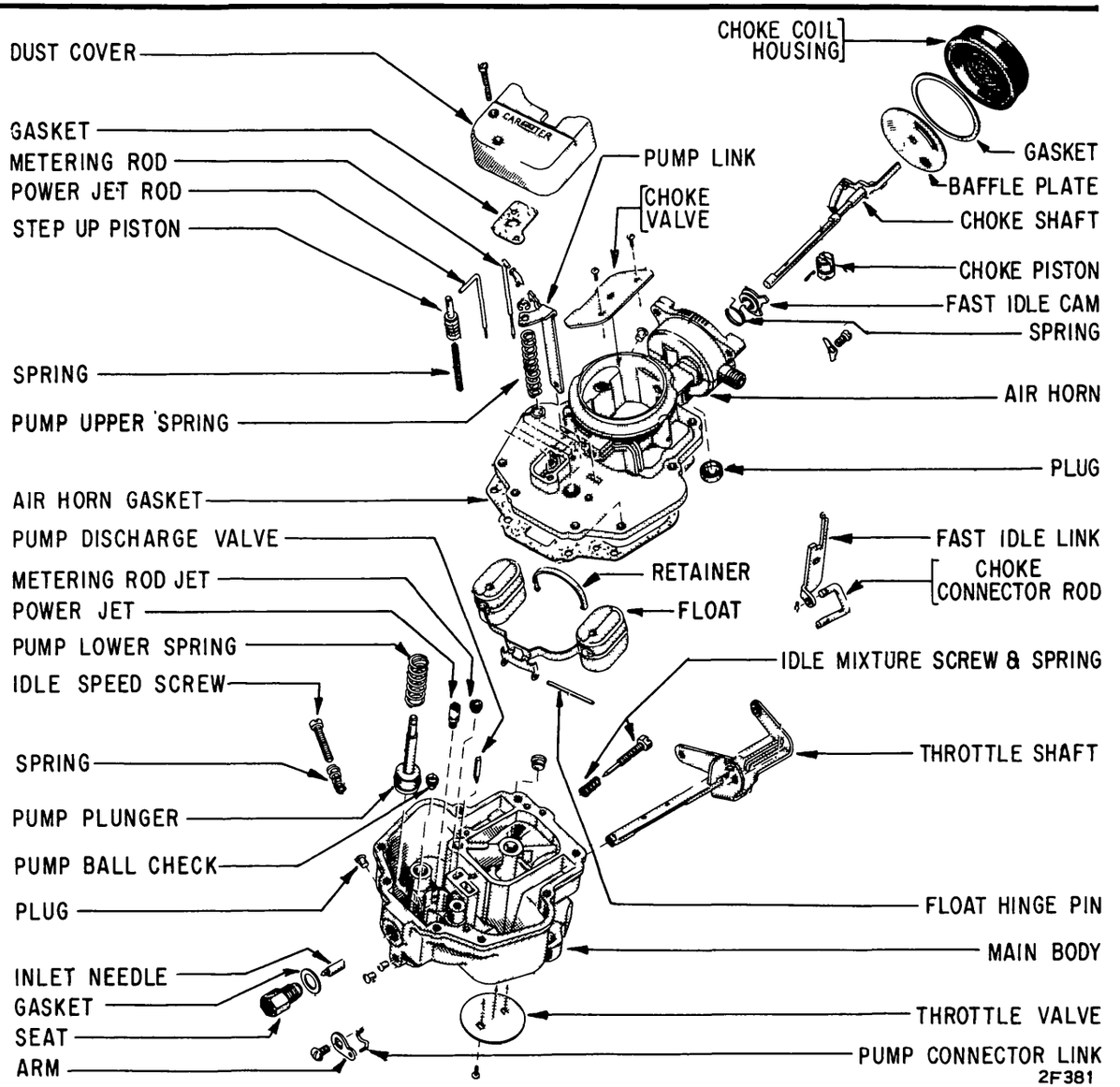
Idl Speed Setting

Car	Engine Speed
Checker	ℂ 400 RPM
Rambler	ℂ ② 500 RPM
Studebaker (All Trans.)	ℂ 550 RPM

ℂ - Auto. Trans. in "N" (Neutral).
② - Air Conditioner turned ON.

Float Level: *NOTE - "Split Type" float used in Checker Superba carburetors. "Single Type" float used in all other carburetors.*

►*FLOAT SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEAT):* Resilient type inlet valve seats used on all 1962 "AS" carburetors (Exc. 2858S & 3186S). When bending float lever to adjust height on carburetors with resilient inlet valve seat, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. If resilient inlet needle valve assembly is installed on 2858S & 3186S reduce float setting 1/16" from setting indicated in "Float Setting Table".



CARTER "AS" CARBURETOR

"Split Type" Floats (Checker Superba) - Remove bowl cover gasket and float pin retainer. Check each float separately while holding lip of float arm against seated needle. *CAUTION - Float pin must be at bottom of guide slots.* Place correct gauge squarely on top edge of bowl at free end of float with ridge on top of float just contacting step of gauge. Adjust by bending lip on float arm. Make sure that floats clear side of bowl (adjust float arms as required). Install float pin retainer, then invert carburetor so that both floats rest against seated needle. Clearance between overlapping tangs on float levers should be .010-.015". Adjust by bending long tang on left hand float. Recheck float level.

"Single Type" Floats (Resilient Type Inlet Needle Valve Seat) - With body gasket removed, invert bowl assembly while holding float pin lever retainer in place so weight of float only is resting on needle. Distance from top of float at free end to top of gasket surface on bowl should be as indicated in table below. To adjust, remove float lever pin retainer and install float holding tool, T109-389 and bend float lip as

CONTINUED ON NEXT PAGE

CARTER AS SINGLE BARREL CARBURETORS (C nt.)

necessary. *NOTE - Tool T109-389 prevents needle from pushing against resilient needle valve seat.* After adjustment, remove tool and install lever pin retainer, then recheck float setting.

"Single Type" Floats (Solid Type Inlet Needle Valve Seat) - With gasket removed, invert bowl assembly and measure distance from top of each float at free end to gasket surface on bowl. This distance should be as indicated in table below. To adjust, bend float lip.

Float Setting

Car & Carb.	Checking Gauge	Float Setting
Checker	T109-282	① 1/4"
Rambler 3206S	T109-148	① 5/32"
Rambler 3206S	T109-50	② 3/32"
Studebaker(Exc.3186S)	T109-338	② 3/16"
Studebaker 3186S	T109-280	① 5/16"

① - "Solid Type" Inlet Needle Valve Seat.
② - "Resilient Type" Needle Valve Seat.

Pump Adjustment: Top of pump arm that engages slot in pump shaft must be parallel to top surface of bowl cover with throttle in wide open position. Adjust by bending pump arm up or down as necessary.

Metering Rod Adjustment: With throttle wide open, metering rod should just bottom in carburetor casting. To adjust bend metering rod arm. When metering rod is properly adjusted, some movement can be noted around eye of metering rod retainer clip when throttle is moved slightly from wide open position. If rod is too low, it will tend to push metering rod retainer clip up. If rod is too high, it will be possible to push rod down.

Fast Idle Adjustment: Remove thermostat coil housing, gasket and baffle plate. Crack throttle valve and hold choke valve closed to rotate fast idle cam to fast idle position. Close throttle. Measure clearance between throttle valve and bore of carburetor (side opposite idle port) using gauge listed in table below. Adjust by bending choke connector rod at lower angle using bending tool T109-213.

►*RAMBLER FAST IDLE (ON CAR) ADJUSTMENT NOTE: 1800-2000 RPM. Engine at normal operating temperature and fast idle link on high step of fast idle cam.*

Fast Idle Setting

Car & Carb.	Checking Gaug	Throttl Opening
Checker (All Carbs.)	T109-29	.030"
Rambler (All Carbs.)	T109-193	.037"
Studebaker (All Carbs.)	T109-234	.065"

Unloader Adjustment: Hold throttle valve wide open and close choke valve without forcing it. Measure clearance between upper edge of choke valve and inner wall of carburetor air horn. See table below. To adjust, bend choke shaft unloader arm.

Unloader Setting

Car & Carb.	Checking Gauge	Choke Opening
Checker (All Carbs.)	T109-34	9/64"
Rambler (All Carbs.)	T109-36	1/8"
Studebaker (All Carbs.)	T109-28	3/16"

Automatic Choke: Adjust by loosening cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Car & Carb.	Setting
Checker	1 Point Rich
Rambler (All Carbs.)	Centered (On Index)
Studebaker (Exc. 3186S)	Centered (On Index)
Studebaker 3186S	1 Point Lean

OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Take out two dust cover retaining screws, remove dust cover and gasket. Remove step-up jet piston, rod and spring from bowl cover. Disconnect spring clip from actuating link and remove metering rod and spring clip retainer. Take out throttle shaft arm screw, remove throttle shaft arm and pin assembly. Remove choke piston link-to-throttle valve arm lever connector rod retainer and remove rod. Take out cover retaining screws and remove bowl cover and gasket. Push accelerating pump plunger toward cover and disconnect it from actuating link, remove plunger and actuating link. Remove spring from pump plunger. Take out choke cover retaining screws, remove choke cover and coil assembly, gasket, and baffle. Slip fast idle link out of housing. Remove staking from ends of choke valve screws, remove screws, lift choke valve out. Disconnect fast idle cam spring from choke shaft lever, rotate choke shaft to withdraw choke piston from cylinder, remove choke shaft, lever, and piston assembly from housing. Disconnect piston by pushing out piston pin. Remove fast idle cam and spring assembly from choke housing. Remove float lever pin retainer, remove needle valve and seat assembly, remove float and pin assembly. Separate floats by taking out the retaining pin. Remove metering rod jet, step-up jet, and low speed jet. Remove pump discharge ball retainer and check ball. Remove idle mixture adjusting screw and spring, and idle speed screw and spring.

Inspection: Thoroughly clean and inspect all carburetor parts. *CAUTION* - Take care not to damage percolator tube which extends above top surface of carburetor bowl. Replace all worn or damaged parts.

Reassembly: Use all new gaskets. Reassemble all parts in reverse order to disassembly procedure and note the following points:

Accelerating Pump Jet Aim (Stud bak r) - Check pump discharge jet by filling bowl with clean gasoline and operating pump plunger with several quick full strokes. Pump jet should be parallel to choke shaft and stream should strike side of small venturi about 1/8" down from top edge. Adjust by bending pump jet tube. *CAUTION - Use care not to damag m t ring end of tub .*

Assembling Air Horn to Body - Install body gasket on air horn. Install metering rod retainer on pump lifter link but **do not install metering rod**, insert pump lifter link through operating slot in air horn, place pump spring over pump plunger and install plunger in air horn, install fast idle link in choke piston housing. Hold pump plunger, lifter link, and gasket in position and lower air horn and bowl cover onto carburetor body.

Metering Rod Installation - Place metering rod retainer in position on actuating link. Lower metering rod into place until end of rod enters hole in retainer, push metering rod and retainer down into operating position, push retainer toward rod until retainer ears engage slot in arm on lifter link.

Service Parts

Gasket Sets - Carter No. 332 (2858S); No. 350 (3370S, 3372S, 3186S); No. 367 (3206S).
Re-Carburetion Kit - Carter No. 1936 (3858S); No. 5036N (3186S); No. 5047N (3206S); No. 5054X (3370S, 3372S).
Zip Kit - Carter No. 900-128 (3186S); No. 900-129 (3206S); No. 902-140 (3370S, 3372S).

CARTER ABD 2-BARREL CARBURETORS

LINCOLN CONTINENTAL	Lincoln No.③	Carter No.
Exc. Air Cond. ①	C2VE-9510-B	3327S
Exc. Air Cond. ②	C2VE-9510-D	3329S
Air Cond. ①	C2VE-9510-A	3328S
Air Cond. ②	C2VE-9510-E	3330S

① - 0 to 5000 ft. Alt.
② - 5000 to 10,000 ft. Alt.
③ - Lincoln number stamped on air horn near inlet valve and seat.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 LINCOLN CARBURETOR CHOKE STICKING CORRECTION:* An accumulation of deposits on choke mechanism may be causing a sticking condition due to fuel vapor entering choke housing through inlet air opening. To correct, use piece of 1/8" O.D. copper or brass tubing 3/4" long (remove burrs from inside at both ends), then taper one end slightly with a file. *NOTE - Make sure inside of tube is clean.* Insert tapered end of tube in choke air inlet opening (small 1/8" diameter hole located in boss adjacent to vertical wall on choke side of air horn opening). Carefully tap tube into hole approximately 3/16", then prick punch boss in several places adjacent to tube to secure tube in position.

►*1962 LINCOLN HARD COLD STARTING CORRECTION:* This condition may be caused by choke valve not closing properly because of gummy deposits on choke and carburetor linkage. Use a carburetor cleaning solvent, lacquer thinner, or alcohol to wash dirt, gum, carbon, and other material off linkage pivot points. Rinse parts with kerosene and blow dry with air. DO NOT OIL linkage pivots and connections. After cleaning, make sure choke assembly is operating properly.

DESCRIPTION: Design is similar to previous carburetor models having an Idle Air Bypass System. In addition, a new automatic choke assembly controlled by engine heated water is used.

CONTINUED ON NEXT PAGE

CARTER ABD 2-BARREL CARBURETORS (Cont.)

Automatic Choke: Heated water for choke control is obtained from heater hose connection on intake manifold. Water flow from choke control is routed to water return line from heater to engine pump. Engine water does not contact thermostatic spring in choke housing. Only heat radiated from housing jacket affects spring.

Idle Air Bypass System: Throttle valves are completely closed at slow idle speed. Air for closed throttle operation is taken from top of primary venturi through an adjustable orifice to throttle bores below throttle valves. An Idle Air Speed Screw controls the adjustable orifice and all idle speed adjustments are made with this screw. Throttle stop screw not used.

ADJUSTMENTS: *NOTE - All adjustments except float setting and fast idle throttle clearance can be made with carburetor installed on engine.*

Idle Mixture & Speed Setting: For initial adjustment, turn idle mixture screws (one for each throttle bore) 1/4-2 turns open from a lightly seated position, then turn Idle Air Speed Screw 3½ turns open from a lightly seated position. For final adjustment, with engine at normal operating temperature, adjust Idle Air Screw for correct idle speed of 450-475 RPM (transmission selector lever in "D"), or 500-550 RPM (transmission selector lever in "N"). Adjust each idle mixture screw for smooth idling and highest vacuum reading and engine RPM. Recheck and if necessary, reset idle speed, then reset idle mixture setting. *NOTE - Hold hot idle compensating valve closed while adjusting idle speed.*

Fast Idle Speed: With engine at normal operating temperature, transmission selector lever in "D" (Drive) and fast idle screw on lowest (slowest) step of cam, adjust fast idle screw to obtain 600-650 RPM.

Anti-Stall Dashpot: .090—.120" clearance between dashpot plunger and throttle operating lever with dashpot plunger held in to limit of travel and with throttle valves closed. To adjust, loosen locknut and rotate dashpot in bracket.

Choke Setting: 1 point rich. To adjust, loosen three retaining screws attaching choke assembly to carburetor and rotate assembly as necessary. *NOTE - Do not loosen center screw retaining jacket to choke coil housing unless it is necessary to replace gasket or clean unit. The special jacket retaining screw can be removed by using a screwdriver that has been slotted in center portion of blade.*

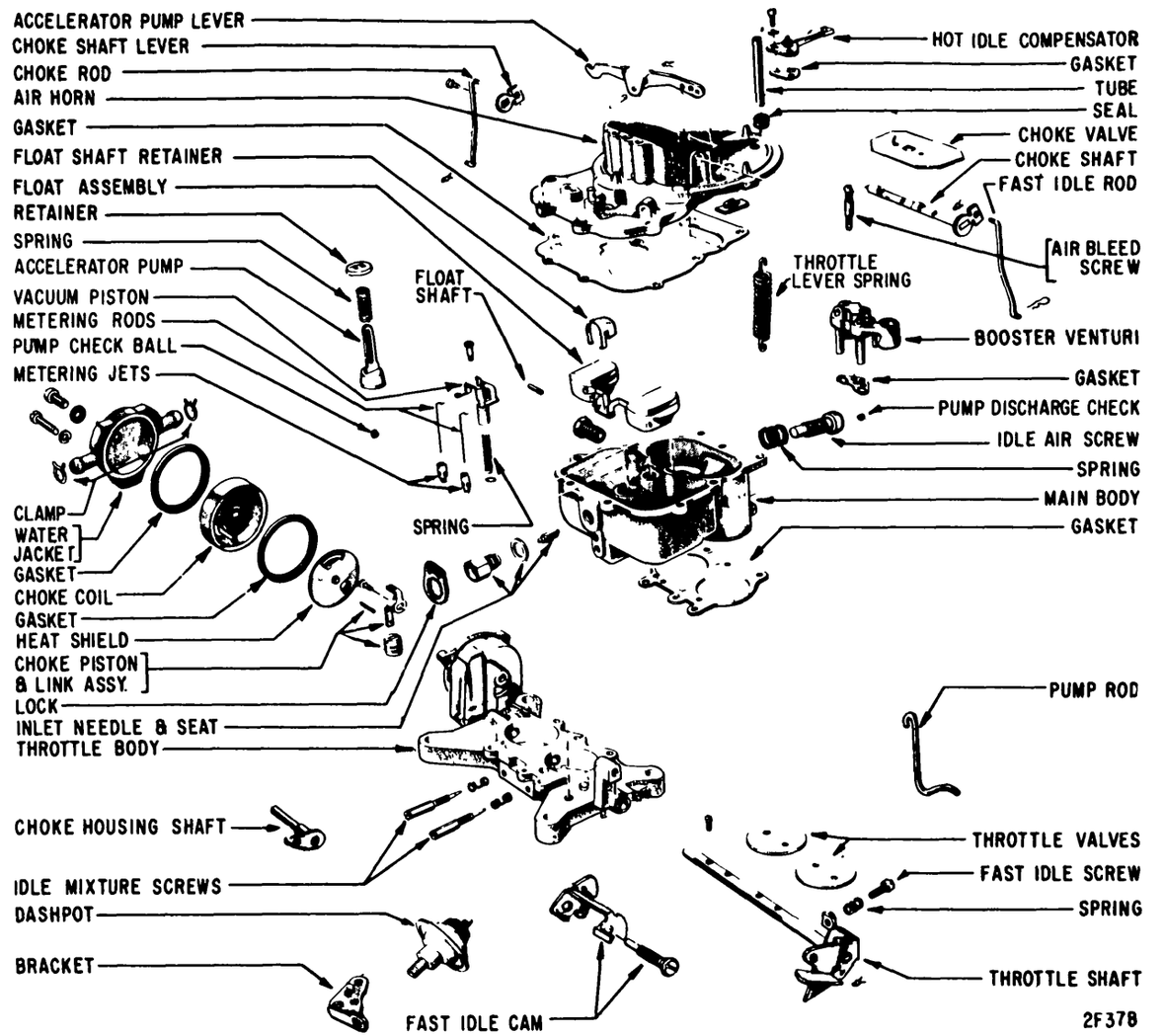
►*ACCELERATING PUMP STROKE ADJUSTMENT CHANGE: For average temperature, year around operation, place accel rator pump operating rod in hole marked "W" on throttle lever. For extremely high temperature and/or high altitude operation, place pump operating rod in hole marked "S" on throttle lever. Change accel rator pump lever return spring to correspond ing summer or winter hole.*

Accelerating Pump: 17/32" from top of accelerator pump plunger to top of bowl cover with pump operating rod in outer hole (marked "W") of throttle lever with throttle valve closed.

Choke Valve & Piston Lever Linkage: Bend 1/8" of end of Tool T109-189 (.026" wire gauge) at a 90° angle, then insert bent end of gauge into choke housing piston bore so that it is between bottom of slot in choke piston and top edge of vacuum slot in choke housing. Close choke valve by pressing on piston lever until it stops, then check clearance between upper edge of choke valve and air horn which should be 5/32" (Tool T109-154). To adjust, use parallel jaw pliers and bend choke operating lever at the reduced area to obtain proper adjustment.

Unloader: 1/8" clearance between upper edge of choke valve and wall of air horn with throttle valves wide open. To adjust, use 1/8" gauge, Tool T109-36 or a 1/8" drill to check clearance. Bend tang on choke unloader lever as required.

Fast Idle Cam: With choke valve closed, fast idle adjusting screw should rest at index mark on high step of fast idle cam. To adjust, bend fast idle cam pickup lug on choke unloader lever as required.



CARTER ABD 2-BARREL CARBURETOR ASSEMBLY

Fast Idle Throttle Valve Clearance: With fast idle adjusting screw on index mark of cam, clearance between lower edge of valve and throttle bore should be .015".

Float Level: 5/16" measured at free end of float as follows: Press down on float shaft retainer and hold float and lever assembly in uppermost position against fuel inlet needle. Distance between top of float (end furthest from hinge pin) and top machined surface of main body should be 5/16" (Tool T109-280). Bend float lever arm as required to obtain proper alignment (parallel). Bend inlet needle tab as required for correct float level.

OVERHAUL: *See 1960 Annual Data, Page 268, or later Manual edition.*

SERVICE PARTS: Gasket Set - Carter No. 484. Zip-Kit - Carter No. 902-180.

CARTER BBD 2-BARREL CARBURETORS

CHRYSLER	Carter N.
383" Eng. (Std.)	3244S
361" & 383" Eng. (CCV) ℄	3245S
DODGE V8 & PLYMOUTH V8	
318" Eng. Synchro-mesh (Std.)	3240S
318" Eng. Auto. Trans. (Std.)	3241S
361" Eng. (Custom 880) (CCV) ℄	3245S

℄ - Closed crankcase ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 DODGE & PLYMOUTH FLAT SPOT OR STUMBLE (DURING PART THROTTLE ACCELERATION) CORRECTION:* Replace Step-up Piston Spring, Part No. 61-538 with Part No. 61-549.

►*1962 DODGE & PLYMOUTH 318" ENG. (CARB. 3241S) CONSTANT SPEED SURGE CORRECTION:* Richen fuel mixture by installing Metering Rod, Part No. 75-1600 to replace Part No. 75-1605. Make sure float setting set at 1/4"

►*HARD COLD WEATHER STARTING CORRECTION:* This condition may be caused by choke vacuum unloader piston sticking. To correct, remove air cleaner and squirt a suitable carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke valve to flush out gum formation.

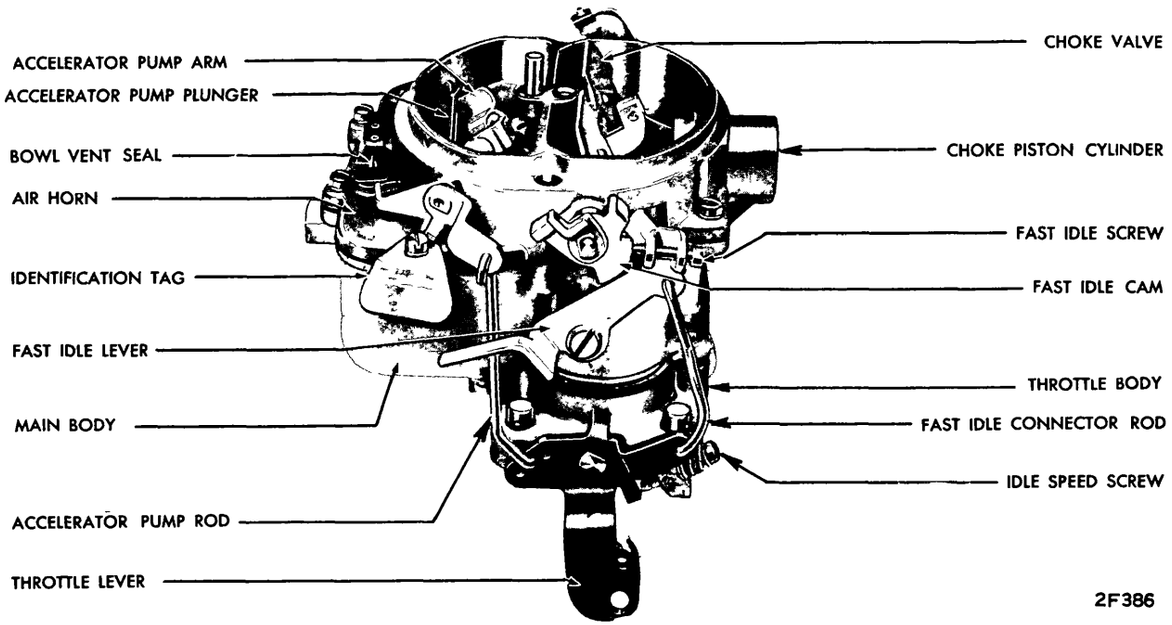
DESCRIPTION: Two–barrel downdraft type with "Cross–Over" type automatic choke. Design is similar to previous models having the following features:

Bowl Vapor Vent (3244S,3245S): Consists of an atmospheric vent in bowl cover flange which is closed by a rubber grommet on a spring arm (saxophone key). A loose lever on pump countershaft opens bowl vent when throttle valve is closed. Bowl vapor vent adjustment should be checked whenever accelerator pump setting is changed.

Bowl Vapor Vent (3240S,3241S): Consists of an atmospheric vent in bowl cover flange at slot for accelerator pump shaft. The vent valve which is installed over the accelerator pump shaft is operated by a special clip (adjustable) on pump shaft that opens vent when throttle valves are closed. *NOTE – If pump rod is installed in either the long or short stroke hole in throttle lever, it will be necessary to move clip (located under vent valve) either up or down to compensate for change in pump stroke.*

Fast Idle (3244S, 3245S): Fast idle cam is located directly on end of choke shaft. Fast idle lever is pivoted on side of main body and is linked to throttle lever by a fast idle connector rod.

Fast Idle (3240S, 3241S): Fast idle cam is located on carburetor main body adjacent to throttle lever and is linked to choke shaft lever by a connector rod. The fast idle lever is pivoted on throttle valve shaft and contacts the fast idle cam.



CARTER BBD CARBURETOR ASSEMBLY (3244S, 3245S)

Automatic Choke (Cross-Over Type) All Models - This type of automatic choke is a separate unit located in well in intake manifold (in exhaust cross-over passage) and is linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder on the air horn and is linked directly to choke valve. *See "Carter Cross–Over Type Automatic Choke" in 1957 Annual Data, Page 244, or later Manual editions.*

ADJUSTMENTS: *Make all adjustments exactly as detailed below.*

►*IDLE SETTING CAUTION:* When making Idle Speed & Mixture adjustments, note the following: Turn headlights on High Beam to compensate for alternator load (alternator charges battery at idle speed). On automatic transmission cars (except Ram Induction Engines), loosen nut on sliding link of carburetor–to–bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move carburetor throttle rod to rear against its stop and tighten locknut.

Idle Adjustment: Make preliminary setting of both idle mixture screws by turning each screw in until it is lightly seated and then backing screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative.

Idle Mixture - With engine at normal operating temperature and idling at correct idle speed, adjust idle mixture screws until engine operates smoothly. Recheck engine idle speed, adjust for correct engine RPM.

Carburetor	Idle Mixture Setting Idle Screw Opening
3240S, 3241S	1/4-1 1/2 turns
3244S, 3245S	1/8-1 1/2 turns

Car	Idle Speed Setting Synchro-mesh	℄Aut. Trans.
Chrysler	500 RPM	℄500 RPM
Dodge & Plymouth	500 RPM	℄500 RPM

℄ - Automatic transmission in "N" (Neutral).
℄ - Air Conditioner operating.

Accelerating Pump (3244S, 3245S): Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as indicated below: *CAUTION – Bowl vapor vent adjustment must be checked whenever pump setting is changed.*

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that pump connector rod engaged in center hole (medium stroke) of throttle lever. Use scale to measure distance from top surface of bowl cover to top of pump plunger shaft (within air horn - remove air cleaner for access). This distance should be 1"±1/64" (all models) Adjust by bending connector rod at lower angle.

Pump Seasonal Setting - Standard setting is with connector rod engaged in center hole of throttle lever (medium stroke). Outer hole will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

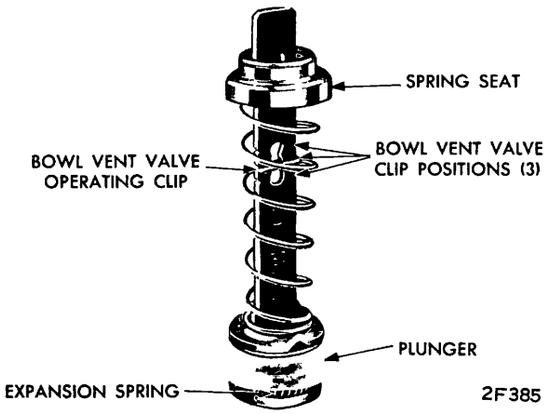
Accelerating Pump (3240S, 3241S): Three holes in throttle lever and two holes in pump arm are provided for connector rod engagement to provide seasonal setting as indicated below. *CAUTION - Bowl vapor vent adjustment must be checked whenever pump setting is changed.*

CONTINUED ON NEXT PAGE

CARTER BBD 2-BARREL CARBURETORS (Cont.)

Pump Stroke Adjustment - *NOTE - Pump stroke adjustment will be correct when bowl vapor vent is properly adjusted (see "Bowl Vapor Vent" below).*
Pump Seasonal Setting - Standard setting is with connector rod engaged in center hole of throttle lever and inner hole of pump arm (Medium Stroke). Outer hole in throttle lever will provide maximum stroke (greater discharge) and inner hole minimum stroke (less discharge).

Bowl Vapor Vent Adjustment (3240S, 3241S): Back off idle speed adjusting screw and open choke valve so throttle valves are fully closed (fast idle adjusting screw not contacting fast idle cam). With pump operating rod in medium stroke hole in throttle lever, and bowl vent clip on pump stem in center notch, close throttle valves tightly. Clearance between bowl vent and air horn should be 5/64". To adjust, bend pump operating rod. *CAUTION - If pump rod is installed in either the long or short stroke holes, it will be necessary to move hairpin clip, located directly under bowl vent valve, either up or down to compensate for change in pump stroke and to maintain proper adjustment.*



ACCELERATING PUMP PLUNGER ASSEMBLY (3240S, 3241S)

Fast Idle Cam Clearance: Open throttle valves and hold choke valve fully closed, then close throttle valves and release choke valve only. Index mark on cam should split center of fast idle adjusting screw. To adjust, bend tang on choke shaft lever as necessary until index mark on cam indexes with adjusting screw.

Fast Idle Throttle Valve Clearance: On Bench - With fast idle adjusting screw on index mark of cam, clearance between throttle valve and carburetor wall on side opposite idle ports should be .015" (3240S, 3241S); .018" (3244S, 3245S). To adjust, rotate fast idle screw.

Fast Idle Speed (On Car): With engine at normal operating temperature, adjust idle speed to 1400 RPM (All Models), with fast idle adjusting screw on index mark of fast idle cam.

Unloader: All Models - Hold throttle valves in wide open position, then insert a 1/4" (3240S, 3241S); 15/64" (3244S, 3245S) drill shank between upper edge of choke valve and inner wall of air horn. With slight pressure against choke valve, a slight drag should be felt as drill shank is withdrawn. To adjust, bend tang on fast idle lever (3244S, 3245S); unloader tang on throttle lever (3240S, 3241S) for correct clearance.

Bowl Vapor Vent Adjustment (3244S, 3245S): With throttle valves held closed, clearance between bowl vent valve and air horn should be .060" (use a drill shank). To adjust, bend short tang on vent valve operating lever until correct clearance is obtained.

Float Level: *NOTE - Either a "Viton" tipped inlet needle valve or a "Resilient" type inlet valve seat is used. Float level specifications for both types is the same (see table below). When checking float level, weight of float only, should be forcing needle against the seat.* Invert main body so that weight of float only is resting on needle valve (hold finger against retainer to fully seat fulcrum pin). Distance from surface of fuel bowl to crown of each float at center should be as indicated in table. To adjust, hold floats on bottom of bowl and bend float lip as necessary.

Float Level Setting

Carburetor	Checking Gauge	Float Level
3240S, 3241S	T109-282	1/4"
3244S, 3245S	T109-229	9/32"

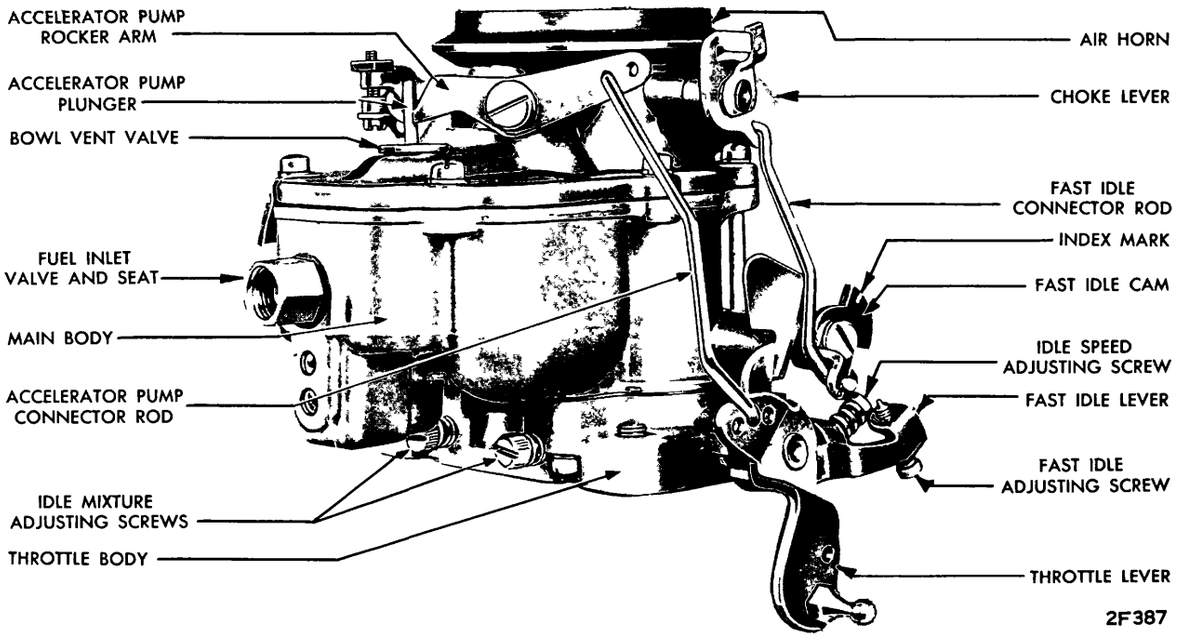
Automatic Choke: Cross-over Type. *See "Carter Cross-Over Type Automatic Choke".*

Automatic Choke Setting

All Models ..... Centered (At Index)

OVERHAUL: *See 1959 Final Data, page 269, or later Manual edition.*

SERVICE PARTS: Gasket Set - Carter No. 353 (3244S, 3245S); No. 300 (3240S, 3241S).
Zip Kit - Carter No. 902-134 (3244S, 3245S); No. 902-106 (3240S, 3241S).



CARTER BBD CARBURETOR ASSEMBLY (3240S, 3241S)

1962 CARTER BB UPDRAFT CARBURETOR JET SPECIFICATIONS

Car Model Yr.	Carb. No.	Main Metering Screw: Standard Flow Part No.	Main Metering Screw: 1 Size Lean Part No.	Main Metering Screw: 2 Sizes Lean Part No.	Main Nozzle Size Part No.	Step Up Jet Power Orifice Size Part No.	Idle Orifice Tube Size Part No.	Idle Passage Tube	Pump Valve Size Part No.
CHEVROLET Trk. 6 Cyl. Fwd. Cont. 1962	871SC	339-343cc...159-100	159-129	159-35	12-505	.036"....162-27	.031".....123-58	123-45	.0635".....149-65S

CARTER BBS SINGLE BARREL CARBURETORS

DODGE DART 6 & PLYMOUTH 6	Carter N.
225" Eng. Synchro-mesh	3231S
225" Eng. Auto. Trans.	3232S
225" Eng. Synchro-mesh & Auto.Trans.(CCV) ℄	3235S
170" or 225" Taxi	3233S
170" or 225" Taxi (CCV) ℄	3236S
LANCER & VALIANT	
170" Eng. Synchro-mesh	3229S
170" Eng. Auto. Trans.	3230S
170" Eng. Synchro-mesh & Auto.Trans.(CCV) ℄	3234S
170" Eng. Taxi, All Trans.	3286S
170" Eng. Taxi, All Trans. (CCV) ℄	3287S
225" Eng. Synchro-mesh	3237S
225" Eng. Auto. Trans.	3238S
225" Eng. Synchro-mesh & Auto.Trans.(CCV) ℄	3239S

℄ - Closed Crankcase Ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 6 CYL. ENGINE HARD COLD STARTING & SLOW WARM-UP PERFORMANCE CORRECTION:* Check to see if a 1961 model choke assembly, Part No. 170-BC-634S or 170-BC-667S is installed in place of a correct 1962 choke assembly, Part No. 170-BC-716S (Exc. Taxi); 170-BC-717S (Taxi). *The 1962 Series choke rod is slightly shorter than the 1961 Series choke rod.*

►*HARD COLD WEATHER STARTING CORRECTION:* This condition may be caused by choke vacuum unloader piston sticking. To correct, remove air cleaner and squirt a suitable carburetor cleaner, lacquer thinner or alcohol through piston link opening while operating choke valve to flush out gum formation.

DESCRIPTION: Single barrel downdraft type similar to design used on previous models.

ADJUSTMENTS: *Make all adjustments exactly as listed below.*

Idle Adjustment: Make preliminary setting of idle adjustment screw by turning screw in until it is lightly seated, then turn screw out 1 turn. Bring engine to normal operating temperature so that choke valve is wide open and fast idle is inoperative. Set engine speed to correct RPM, then adjust idle mixture as follows:

Idle Mixture Setting - With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn idle mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine RPM.

►*IDLE SPEED SETTING CAUTION:* When making Idle Speed & Mixture adjustments, turn headlights on high beam to compensate for alternator load (alternator charges battery at idle speed). On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank so that stop in transmission will not interfere with free movement of carburetor throttle lever. After adjustment is completed, screw the ball joint connector up or down until ball on bellcrank will exactly mate with socket, then snap into place.

Idl Sp d - 550 RPM (All Models). *S "Idl Spe d S tting Caution" abov .*

Acc l rating Pump & B wl V nt Adjustment: *NOTE - Thr hol s ar provided in throttl l v r for pump connector r d engag m nt t pr vid s asonal pump s tting as indicated below.* With throttle stopscrew backed off and throttle valve fully closed, place connector rod in center hole (Exc. 3233S, 3235S, 3286S, 3287S); inner hole (3233S, 3235S, 3286S, 3287S) of throttle lever and plunger pin spring in center groove (Exc. 3233S, 3235S, 3286S, 3287S); in upper groove (3233S, 3235S, 3286S, 3287S), bend connector rod as necessary to provide a measurement of 27/32" between top of air horn and end of plunger shaft. With plunger shaft correctly adjusted, there should be 5/64" clearance between top of bowl cover and bowl vent valve.

Pump Seasonal Setting - Standard setting is with pump connector rod engaged in center hole (Exc. 3233S, 3235S, 3286S, 3287S); inner hole (3233S, 3235S, 3286S, 3287S) of throttle lever. *NOTE - Outer hole in throttle lever provides greater discharge. Inner hole provides less discharge.*

Float Level: *NOTE - Either a "Viton" tipped inlet needle valve or a "Resilient" type inlet valve seat is used. Float level specifications for both types is the same (see table below). When checking float level, weight of float only, should be forcing needle against seat.* Invert main body so that weight of float only is resting on needle valve (hold finger against retainer to fully seat fulcrum pin). Distance from surface of bowl to crown of each float at center should be as indicated in table. To adjust, hold float on bottom of bowl and bend float lip as necessary.

Float Level Setting

Carburetor	Checking Gauge	Float Level
Exc. 3233S, 36S, 86S, 87S	T109-239	7/32"
3233S, 36S, 86S, 87S	T109-239	9/32"

Fast Idle Cam Index Setting: With choke valve tightly closed and choke connector rod in upper end of slot in cam, align center of adjusting screw with index mark on cam. To adjust, bend throttle connector rod.

Fast Idl Thr ttle Valve Clearanc : With adjusting screw on index mark of cam, there should be .030" - Gauge T109-29 (Exc. 3233S, 3236S, 3286S, 3287S); .026" - Gauge T109-189 (3233S, 3236S, 3286S, 3287S) clearance between lower edge of throttle valve and bore.

Fast Idle Speed: 170" Eng. - 1300 RPM (Auto. Trans. without Closed Crankcase Ventilation). 1400 RPM (Others).

225" Eng. - 1300 RPM (Synchro-mesh), 1400 RPM (Auto. Trans.).

Unloader: After completing fast idle adjustment (above), hold throttle valve in wide open position, then close choke valve as far as possible without forcing. Measure choke valve opening or clearance between upper edge of valve and air horn wall using gauge listed in table below. Adjust by bending arm on choke trip lever which actuates choke lever. After adjustment, reassemble and adjust automatic choke.

Unloader S tting

Carburetor	Checking Gaug	Ch k Opening
All Carbs.	T109-28	3/16"

Automatic Choke: Cross-over type. *S "Carter Cross-Over Type Automatic Chok ".*

Automatic Ch k S tting

All Models	2 Notches Rich

OVERHAUL: *See 1960 Final Data, Pag 277, r lat r Manual edition.*

SERVICE PARTS: Gasket Set - Carter No. 334 (3230S, 3231S, 3232S, 3235S, 3237S, 3238S, 3239S); No. 355 (3229S, 3233S, 3234S).

Zip Kit - Carter No. 902-135 (3229S, 3233S, 3234S, 3236S); No. 902-139 (3230S, 3231S, 3232S, 3235S, 3237S, 3238S, 3239S).

CARTER BB UPDRAFT

CHEVROLET TRUCKS	Carter No.
1962 6 Cyl. Forward Control Models	871SC

►**ACCESS TO CARBURETOR (for Adjustment or Removal): Forward Control Models**—Remove toe pan attaching screws, disconnect wires at stop light switch, disconnect accelerator pedal rod from throttle control rod, remove toe pan.

DESCRIPTION: Plain tube, updraft type of same design as used on previous Chevrolet models

ADJUSTMENT & SERVICING: *See complete "Carter (BB) Updraft Type" carburetor in Carburetor Section of Manual and set this carburetor to the following specifications:*

IDLING ADJUSTMENT

Idle Screw Setting—½-1½ turns open (turn screw out for richer mixture).

Idle Speed—450-500 RPM (Std. Trans.), 400-450 RPM (Auto. Trans. in Neutral).

FLOAT LEVEL SETTING

Float L v l—0-1/32" (Carter Gauge T109-49 or Chevrolet J-818-13A) from top of float to top edge of bowl with needle valve seated.

CAUTION—Use 1/32" side of gauge (other side used for 1/16" settings).

Intake Needle & Seat Ass mbly— Carter No. 25-44S

ACCELERATING PUMP

Pump Seasonal Setting—Short Stroke—Summer, Long Stroke—Winter.

Pump Stroke - 9/16" (Short Stroke) with connecting screw in holes in throttle lever and pump link nearest throttle shaft, 1" (Long Stroke) with screw in holes farthest from shaft.

THROTTLE VALVE SETTING

Idle Port—.005-.009" from top of lower idle port to lower edge of throttle valve.

Vacuum Spark Port—.000-.004" top of port below lower edge of throttle valve.

NOTE—Above specifications apply with throttle valve. tightly closed.

SERVICE PARTS

Gask t S t - Carter No. 202.

R pair Pkg. (With Std. Met ring J t) - Carter No. 1539A.

CORVAIR MONZA SPYDER SUPERCHARGER

C rvair M nza (1962)

DESCRIPTION: This is an exhaust driven supercharger unit consisting of a precision balanced rotating group with a turbine wheel at one end and a centrifugal impeller at the other. Hot gases directed against turbine wheel blades spin the wheel, shaft and impeller at a high rate of speed, causing the compressor impeller to draw air-fuel mixture from carburetor and direct it into intake manifold at a higher-than-atmosphere pressure. The supercharger is provided with a semi-floating sleeve bearing which is lubricated with engine oil taken from the oil filter adapter and drained through a larger tube into rocker arm area of right hand cylinder head.

►*CAUTION: DO NOT attempt to install a supercharger unit fr m a special Corvair engine on a standard Corvair engin . The sp cial engine is designed with heavy duty parts for us with a supercharger.*

INSPECTION: Each Tim Engine is Serviced - Inspect hoses and connections of air intake system between carburetor and supercharger and from supercharger to intake manifold for leakage due to cracks, damaged gaskets, loose clamps or connections and for restrictions due to collapsed hoses or dented tubing. Inspect for exhaust leakage due to cracked exhaust manifold, loose supercharger mounting or damaged gaskets. Inspect oil lines and fittings for kinks, damage or leakage. Check engine exhaust. Excessive smoking may indicate a restricted air cleaner, overrich mixture, or faulty supercharger (seal) operation.

Ev ry 50,000 Mil s: *NOTE - This inspection should also be mad wh n v r troubl is suspected in supercharger.* Disconnect oil drain line at supercharger elbow, then connect a hose from elbow to a separate container at side of engine. Start engine and run at idle speed for one minute to determine oil flow (should be approximately one quart per minute at idle speed). Remove supercharger and carburetor assembly (see below), then remove carburetor from supercharger assembly. Inspect turbine wheel for cracks, erosion, chipped, nicked, missing or bent blades. Check for carbon build-up on blades and for carbon accumulation on back face of turbine wheel. Depress shield plate, back of turbine wheel, against spring ring and rotate turbine wheel. If turbine wheel does not rotate freely, dissassemble unit and inspect for damaged parts or foreign material causing interference. Remove compressor housing and gasket and inspect for scoring, wiping, erosion or pit marks on inner contour. Inspect impeller wheel for damaged blades or evidence of rubbing on housing. Check for oil accumulation on impeller or in housing which would indicate a defective oil seal. If necessary to clean impeller, use a nylon bristle brush and diesel fuel or kerosene. *CAUTION - Failure to remov all dirt may r sult in a more severe unbalance than xisted prior to cl aning.* Check endplay and radial play of turbine shaft (see below). If unit is in good condition, install compressor housing, using a new gasket, and tighten housing bolts to 80 inch lbs.

TURBINE SHAFT ENDPLAY: .005"-.008". To check endplay, attach a dial indicator to bearing housing so that indicator point is contacting impeller nut, then rest supercharger assembly squarely on hub of turbine wheel and push down on housing. Record the indicator reading, then release pressure on housing and repeat the operation at least once more to check measurement. *NOTE - Th shi ld spring acts to return wh el and shaft opposite pressure on housing. It is not necessary to hold shield away from turbine wheel.*

TURBINE SHAFT RADIAL PLAY: .022" (maximum). Place supercharger assembly on support ring, Tool J-21004, and position dial indicator so its point is resting on a flat of impeller nut. With indicator needle at zero, push impeller from side to side against indicator point and record the reading. Repeat this operation to to check reading. Recheck at 90° position to give a cross reading. If radial play is not within limits, the supercharger should be rebuilt.

TROUBLE SHOOTING: Smoking Exhaust, Loss of Engine Power, Low Boost Pressure - Dirty or undersize air cleaner. Restricted intake manifold or piping. Foreign matter or dirt accumulation on impeller. Interference or binding in rotary assembly. Damaged impeller or turbine wheel. Excessive oil leakage from seals.

Noisy Rotating Assembly: Damaged bearing or other components causing rotating assembly to rub against housing. Foreign matter or carbon accumulation obstructing rotation.

Excessive Vibration: Damaged bearing. Damaged impeller or turbine blades. Restricted induction system.

Excessive Oil in Intake Manifold or Exhaust Stack: Excessive oil leakage from seals.

Supercharger Speed Low, Power Low (Clean Exhaust): Insufficient fuel supply to engine. Leaking intake or exhaust manifold connections. Back pressure on supercharger exhaust too high. Improper accelerator linkage adjustment. Improper ignition timing.

Fails T Return T Idl : Faulty throttle return check valve. Accelerator linkage adjustment.

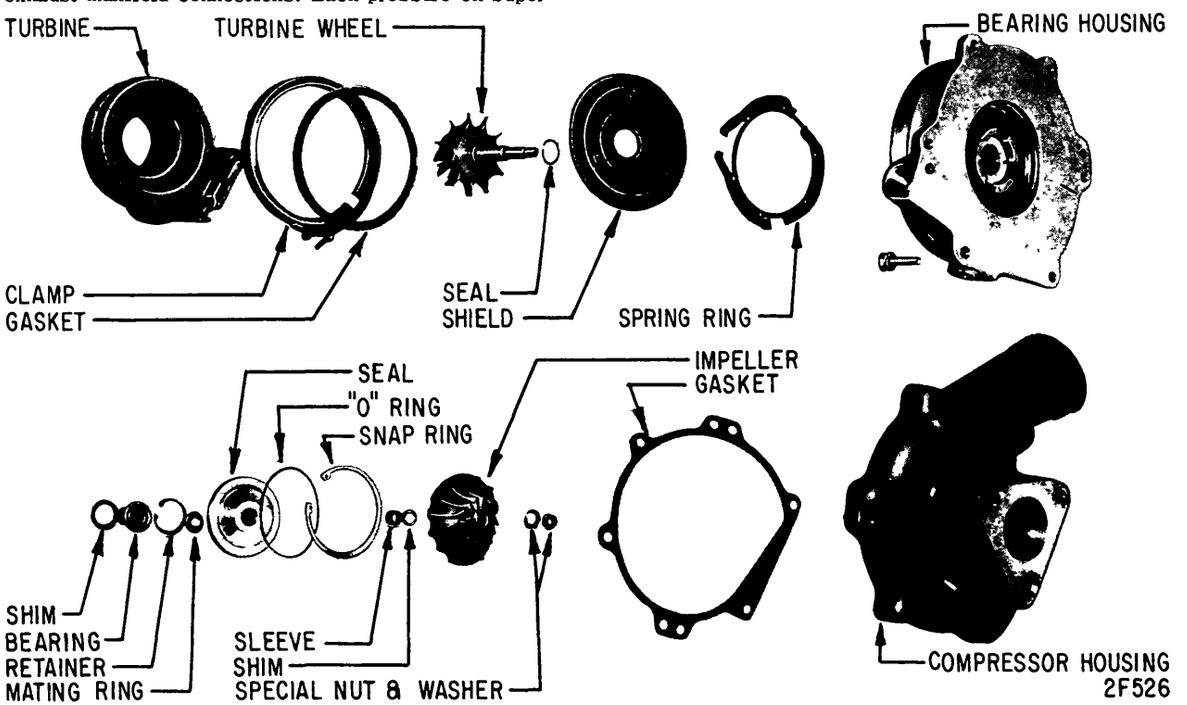
CARBURETOR: *See "Carter YH Carburetors" in this section.*

SUPERCHARGER OVERHAUL: *NOTE - Always cov r supercharger openings when working on other parts f engine requiring supercharger openings to be expos d or when unit is stored.*

Removal: Remove spare tire, then remove air cleaner assembly and disconnect oil feed line and drain line at supercharger housing. Disconnect accelerator linkage at carburetor. Loosen turbine housing "V" clamp nut, then support supercharger and carburetor; remove clamp and lift assembly out of car carefully to avoid damage to turbine wheel or spillage of gasoline from carburetor. Remove carburetor attaching nuts and remove carburetor from supercharger housing.

Disassembly: *NOTE - Disassemble supercharger in a clean, dust-free location, using clean tools and equipment. Avoid contact with dust or grit that could scor machined parts.* Remove compressor housing from bearing housing, then hold turbine wheel blades with a cloth and remove self-locking nut *(Left Hand Threads)* from impeller end of turbine shaft, then remove washer. Support supercharger in a press with parallel blocks or support ring, Tool J-21004 so impeller wheel is upward. *NOTE - Place a folded cloth on bed of press or insid*

CONTINUED ON NEXT PAGE



CORVAIR SUPERCHARGER

CORVAIR MONZA SPYDER SUPERCHARGER (C nt.)

support ring to avoid damage to turbine wheel as it drops out of housing. Place a ¼" diameter brass rod on end of turbine shaft and press turbine shaft from impeller wheel. Remove impeller wheel, shims, shaft sleeve, turbine wheel and shaft assembly, turbine shield and shield spring ring. Remove oil seal retaining ring from bearing housing with snap ring pliers, then turn bearing housing over and push oil seal, "0" ring, and mating ring out of housing with a ½" diameter rod. Remove bearing retaining ring, bearing and shim.

Cleaning & Inspection: Wash all parts with diesel oil or kerosene, allowing to soak, if required, to remove carbon deposits. Use a nylon bristle brush to remove heavy carbon deposits. *CAUTION - Never use caustic solutions or other cleaner that may attack metal, or a wire brush that could score finished parts.* Inspect each part as follows:

Turbine Housing - Wiping, scoring or pit marks in inner contour. Cracks along dividing tongue, damaged threads in tapped holes or on studs.
Compressor Housing - Wiping, scoring, eroding or pit marks in inner contour and scroll. Damage on gasket surface.
Turbine Wheel & Shaft Assembly - Nicked, bent, broken or missing blades. Cracks at edge of blades. Scoring on back face or back hub. Excessive side wear or carbon build-up in shaft seal groove. Shaft discoloration due to overheating. *NOTE - Normal color of shaft is light tan.*
Impeller - Nicked, broken or missing blades. Evidence of rubbing on blades or back face. Fit of impeller on turbine shaft (impeller must be a press fit).
Bearing Housing - Scoring, heavy wear on bearing bore. Cracked or damaged bearing flange face. Damaged "0" ring seats or snap ring grooves. Thread damage in oil inlets or outlets. A secure bearing roll pin.

Bearing - Scuffing, pit marks or scratches. Imbedded foreign material. Damage to thrust surfaces. Damage on external diameter or shim surface.
Turbine Shield - Check for flatness, scoring, eroding or pitting. Damage to spring ring such as warpage or loss of tension. Check mating ring for scuffing, discoloration or carbon buildup on sealing or thrust surfaces.
Oil Seal Assembly - Chipping, scoring or uneven and excessive wear on carbon face seal insert. "0" ring groove damage. Make sure carbon seal is free floating and has a satisfactory spring tension.

Reassembly: *NOTE - Replace all gaskets "0" ring seal, and damaged or worn parts.*

1) Support bearing housing on ring, Tool J-21004, with flat surface (impeller side) upward, then install a new roll pin in bearing housing (if required) so slot is aligned radially inward.
2) Check shaft-to-bearing play as follows: Place bearing, mating ring and sleeve on turbine shaft. Hold mating ring against shoulder on turbine shaft, then hold bearing up against mating ring and measure clearance between bearing and lower shoulder with a feeler gauge. Record this measurement for later use when determining impeller end clearance.
3) Determine bearing-to-housing endplay and select proper shims as follows: Install bearing into housing, lining up roll pin and hole in flange, then install bearing snap ring. Position a dial indicator with point resting on bearing, and set indicator to zero. Push bearing upward against retaining ring and then down to bottom in housing and record the variation (repeat this measurement at least once to be sure of reading). Remove retaining snap ring and bearing and select a shim that will reduce endplay to .001-.002". As an example: If endplay was .015", use one .014" shim to reduce endplay to .001-.002". *NOTE - Shims are available in thicknesses of .008", .009", .010", .011", .012", .014".* The adjusted endplay of bearing-to-housing (.001-.002") plus shaft-to-bearing endplay (see paragraph 2) is total shaft endplay.
4) Install selected shim, bearing and bearing retainer ring (beveled side upward), then position mating ring so it is centered on bearing flange face. Lubricate "0" ring seal with silicone grease and install in groove of oil seal assembly. Install oil seal assembly into housing by pressing by hand as far as it will go, then install retaining ring (beveled side upward) to hold it in place.
5) Determine impeller shims requirements (for impeller-to-housing clearance) as follows: Place shaft sleeve in center of oil seal assembly, then place the impeller over seal so its center hub rests on shaft sleeve. Install gasket and compressor housing in position on bearing housing and install every other bolt. Tighten to 80 inch lbs. Position a dial indicator with point contacting impeller hub and set indicator at zero. Use long nose pliers to hold hub of impeller and lift straight up on impeller as far as it will go, then record indicator reading. Repeat this operation to check reading. Subtract total shaft endplay (paragraph 3) from the indicator reading just recorded and select shims to reduce impeller clearance to .015-.020". As an example: If impeller movement indicated a clearance of .037", subtract total shaft endplay (.005" as an example); leaving an indicated clearance of .032". Shim thickness must be between .012" and .017" to provide a maximum clearance of .015-.020". *NOTE - Shims are available in thicknesses of .010" and .015".*
6) Remove compressor housing, gasket, impeller and shaft sleeve from bearing housing, then turn bearing housing over (on ring support tool) and install spring ring. Position turbine shield to install with three projections spaced over flat areas of spring ring. Lubricate turbine shaft seal ring groove with oil and install ring into groove. Compress ring into groove using a tag wire or a plastic compression ring. *NOTE - If tag wire is used, make one twist with pliers and bend wire to form it around curvature of shaft and back face of turbine wheel. Remember dir ction of twist in wire for easy removal.*
7) Lubricate bearing area of shaft and install shaft through bearing. *NOTE - If a plastic compr ssion ring was used, leave it on shaft as it will burn away after installation. If tag wire was used to compr ss ring, remove wire by a reverse twist and slid it out from between shield and whe l. Hold wh l so it will not slide out past ring.*
8) Hold turbine wheel tightly against shield (so seal ring will not fall out of seal area), then turn assembly over and place in a press so turbine wheel hub rests on press plate. Install shaft sleeve, impeller shim (as determined in paragraph 5), and start impeller on turbine shaft. Press impeller onto shaft, using a hollow spacer, until it bottoms. *NOTE - As an alt rnate method of installation, the impeller may be heated to a temperature of not more than 300°F and installed onto shaft by hand, without the need of a pr ss.* Remove assembly from press and position special impeller washer with dished head upward and install self-locking nut (left hand threads) on shaft. Hold turbine wheel with a folded cloth and tighten nut to 80 inch lbs.

9) Place gasket and compressor housing on bearing housing, secure with six bolts and tighten to 80 inch lbs. Remove holding tool from oil drain opening, then with assembly in approximate installed position, add oil into oil inlet until it flows from drain opening. Install holding tool and install carburetor. *NOTE* - If supercharger is not going to be installed immediately, cover all openings to prevent damage or entrance of foreign matter.

10) If it is necessary to replace turbine housing (attached to exhaust pipe flange), disconnect inlet and outlet flanges, then loosen muffler mounting strap so turbine outlet pipe can be wobbled. Slide turbine outlet pipe flange from turbine by wobbling as needed, then remove from inlet pipe flange. Remove choke heat tubes from inlet flange on housing and install them in new housing flange. To reinstall turbine housing, reverse removal procedure and tighten stud nuts to 80 inch lbs.

Installation: Reverse removal procedure and tighten clamp nut to 30-40 inch lbs.

CARTER YH HORIZONTAL CARBURETORS

CORVAIR **Cart r Carb. N .**

1962 Monza (Supercharged Engine).....3311S

DESCRIPTION: Single barrel, side draft (horizontal) type with diaphragm operated metering rod (vacuum & mechanically controlled by action of accelerator pump assembly). An automatic choke assembly is used on all models. Heated fresh clean air is drawn from carburetor air cleaner through choke heat passages in turbine housing-to-exhaust pipe attaching flange, then into choke housing for automatic choke control.

►*SUPERCHARGER NCTE: See "Corvair Supercharger" in this s ction.*

ADJUSTMENTS: Idle Setting - For initial adjustment to start and warm-up engine, turn idle mixture screw out 3/4 turn from a lightly seated position. With engine at normal operating temperature (tachometer and vacuum gauge connected), proceed as follows:

Idl Sp ed: 850 RPM with choke valve fully open and fast idle inoperative.

Idl Mixtur : With engine operating at correct idle speed, adjust idle mixture screw to obtain highest vacuum. Readjust idle speed and repeat idle mixture adjustment.

Thr ttle R turn Check: With engine at normal operating temperature and correct idle speed (choke valve fully open and fast idle not operating), measure distance between throttle valve lever and return check valve bolt. This distance should be .030". To adjust, hold a wrench on flat of diaphragm stem and turn self-locking nut as necessary.

Fl at Lev l: 5/8". Invert bowl cover and measure distance between float at center and gasket surface of bowl cover (gasket removed). Adjust by bending float arm.

Fl at Drop: 2 3/8". Hold bowl cover in upright position and float hanging free. Measure distance between gasket surface (gasket removed) and float seam at free end of float. Adjust by bending tang at hinge end of float.

Aut matic Ch ke: 1 notch rich. Loosen choke coil housing retaining screws and rotate cover as necessary.

Fast Idle (On Engin): No adjustment required.

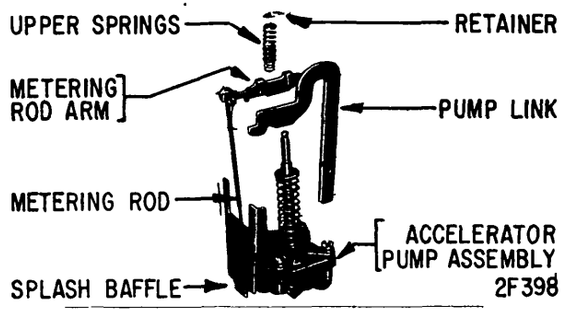
Fast Idl (Off Engin): Hold choke valve tightly closed and close throttle valve as far as it will go (fast idle link on high step of fast idle cam). Clearance between throttle valve and bore on side opposite idle port should be .030". Adjust by bending fast idle connector link. *NOTE - Fast idl adjustm nt must be made before unl ad r is adjusted.*

Unloader: With fast idle properly adjusted, open throttle to wide open position while holding tension on choke valve. Measure distance between edge of choke valve and side of bore opposite vent tube. This measurement should be 7/16". To adjust, bend unloader tang on fast idle cam.

Metering Rod: With throttle valve held tightly closed, remove metering rod and install Tool T109-104 in metering jet. Push down on pump diaphragm rod until metering rod arm just touches lifter link. At this point, metering rod arm pin should just contact top gauging surface of tool. To adjust, bend metering rod arm at undercut portion. Remove gauge and reinstall metering rod.

OVERHAUL: Disass mbly - Remove inlet filter screen nut and screen, then remove float bowl cover. Remove float and float needle and seat. Remove bowl cover gasket and tip carburetor and remove pump discharge needle valve. Loosen pump lever screw from throttle shaft and slide lever off shaft and link. Depress small spring on pump with a screwdriver and remove spring seat and spring, then lift metering rod arm and rod from pump rod and metering jet. Raise pump arm enough to remove link, and remove pump arm. Remove diaphragm pump assembly, splash deflector plate and metering jet. Remove choke link clip and choke link, then remove choke housing cover, gasket and baffle plate, and slide choke lever out of housing. Remove throttle body flange assembly from carburetor main body, then remove idle speed screw and spring from throttle body. *NOTE - Do not remove choke valve, choke piston, or throttle valve unless shaft and piston are binding or if parts must be replaced.* File staked ends of throttle plate and choke plate screws level with shaft, then remove screws and plates. Remove throttle shaft by sliding out of throttle body. Rotate choke shaft until piston comes out of bore, then slide shaft assembly from main body. Remove choke housing and discard vacuum passage "O" ring.

Inspection: Wash all parts except choke coil housing assembly in cleaning solution. Remove all carbon from throttle body bore and blow out all passages with air. If choke piston is not free in housing bore, remove welch plug from housing and clean cylinder bore with fine sandpaper if necessary. Install a new welch plug

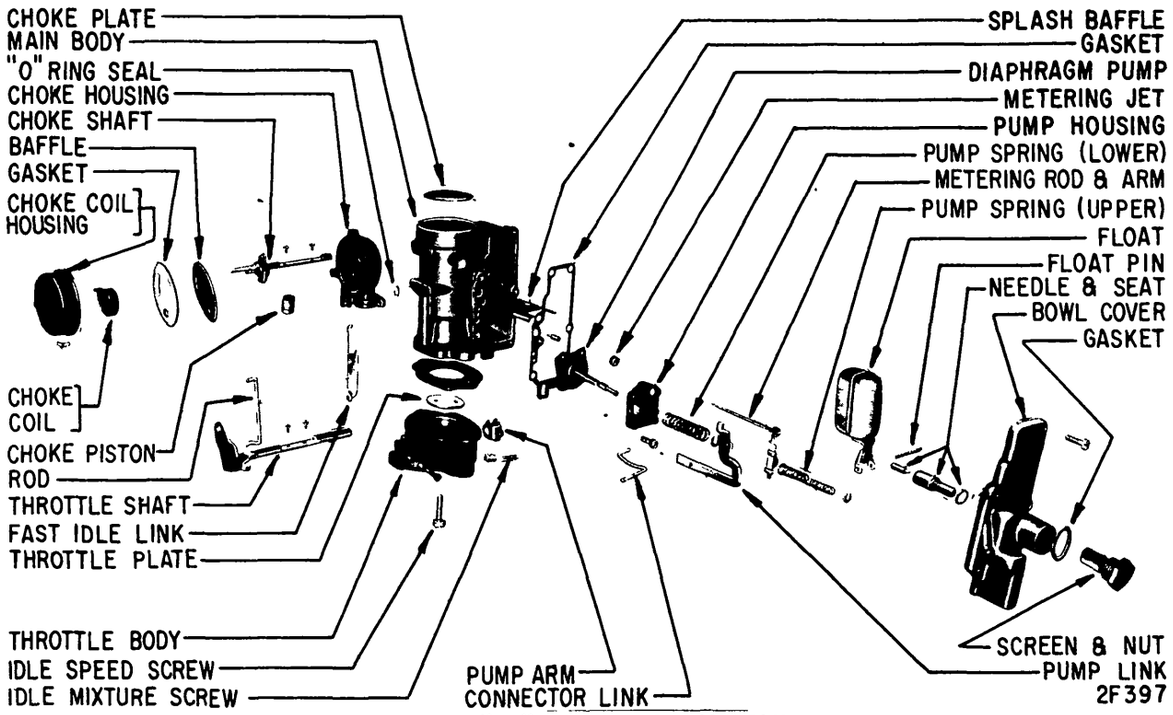


ACCELERATOR PUMP & LINKAGE

so it is air tight. Inspect all parts for wear or damage and replace as necessary.

Reassembly: If throttle shaft was removed, slide shaft into throttle body and position throttle plate on flat of shaft with numbered side to shaft, then install screws loosely. Center throttle plate on shaft and in throttle bore, then tighten screws and peen securely. If choke shaft was removed, install a new "O" ring seal and position choke housing on air horn. Tighten attaching screws just snug. Slide choke shaft into air horn part way, then install piston to shaft and position shaft by rotating while installing piston into cylinder bore. Tighten choke housing screws securely.

CONTINUED ON NEXT PAGE



CARTER "YH" CARBURETOR ASSEMBLY

CARTER YH HORIZONTAL CARBURETORS (Cont.)

Position choke plate on flat of shaft so identification numbers are on air cleaner side, then complete installation in same manner as for throttle plate. Install throttle body on main body and tighten attaching screws securely (use a new gasket). Install diaphragm assembly in diaphragm housing, then install lower spring and retainer. Install metering jet (no gasket), then install diaphragm housing screws and thread them in two or three turns to hold diaphragm in alignment and install diaphragm assembly in carburetor bowl. Tighten attaching screws securely. Install splash shield between metering rod jet and pump housing, then install metering rod onto rod arm, hook spring, and install clip. Place pump lifter link in guide opening and insert throttle lever connector link onto pump lifter link (connector must be installed before lifter link assembly is completely in position) then place lifter arm down over pump rod. Place metering rod in jet with arm over pump rod and lifter arm, then place upper springs over pump rod. Compress springs with a screwdriver and install retainer. Install throttle shaft pump lever over throttle shaft and pump link, then tighten retaining screw. Adjust metering rod (see above). Install float needle seat, needle valve, and float assembly in bowl cover (float hinge pin shoulder to outboard side of of bowl), and adjust float level and drop. Install pump discharge needle, then install bowl cover (and a new gasket) and tighten cover screws. Install fast idle link into choke housing and hook unloader projection over tang on fast idle cam assembly. Install choke link connector link to throttle lever keyed hole, then to choke link with a clip. Adjust fast idle (see above), then adjust unloader. Install choke baffle plate, gasket, choke coil housing, retainer clips and screws. Adjust automatic choke (see above).

CARTER WCD 2-BARREL CARBURETORS

RAMBLER — **Carter No.**
Classic 6 Cyl. 3322S

DESCRIPTION: Dual downdraft carburetors with automatic choke. Same design as used on previous models.

ADJUSTMENT: *Make all adjustments exactly as follows:*
Idling Adjustment: Warm up engine thoroughly so that choke valve wide open and fast idle inoperative. Adjust throttle stopscrew for correct engine speed, then adjust both idle mixture screws equally for smooth running and highest RPM. Turn screws out for richer mixture. Recheck idle speed.

Idle Mixture Screw Setting

Car	Idle Screw Opening
Rambler	½-2 turns

Idle Speed Setting

Car	Synchro-mesh	① Auto. Trans.
Rambler	550 RPM	② 500 RPM

① - With selector lever in "N" (Neutral).
② - Air Conditioner turned ON.

Accelerating Pump: Check and adjust pump stroke as follows: With pump connector link installed in outer hole (long stroke) of pump arm under dust cover on bowl cover, back off throttle stopscrew so that throttle valves fully closed. Place straightedge across dust cover boss directly above pump arm. Flat on top of pump arm should be parallel to straightedge. Adjust by bending throttle connector rod at upper angle using bending tool T109-213.

Metering Rods: *CAUTION - Check and adjust metering rods after Pump Stroke Adjustment has been completed.*
Metering Rod Adjustment - No gauge required. With throttle stopscrew backed off and throttle valves fully closed, loosen metering rod arm clampscrew (on countershaft under dust cover on bowl cover). Press down on vacumeter link until both metering rods just bottom in carburetor casting, then rotate metering rod arm until finger on arm contacts lip on vacumeter link, carefully tighten clampscrew. *CAUTION* - Do not disturb arm position.

Float Level: *NOTE* - Float assembly consists of two floats (right and left hand) and auxiliary lever. Floats are adjusted separately and should be set for uniform height (float level or vertical adjustment)

►*FLOAT SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEAT):* When bending float lever to adjust height on carburetors with resilient inlet valve seat, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. Float level specifications are different for carburetors with resilient type inlet valve seats. *See "Float Level Setting" below.*

Float Level Setting - With bowl cover and float assembly removed from carburetor, invert assembly, remove cover gasket, install correct gauge (see table below) on cover directly below floats with notched portions of gauge fitted over edge of cover casting. Make vertical and lateral adjustments on each float

Vertical Adjustment - Top of each float should just clear horizontal portion of gauge. Adjust by bending float arms. *CAUTION* - Adjust both floats evenly.

Lateral Adjustment - Sides of floats should barely touch vertical uprights of float gauge (necessary to prevent floats hanging up in bowl). Adjust by bending float arms.

Float Level Setting

Car	Float Level	Checking Gauge
Rambler	① 5/32"	T109-196

① - If inlet valve is equipped with resilient type seat, REDUCE float level setting 1/32".

Fast Idle: *CAUTION - Two settings (1) and (2) required.*

(1) Fast Idle Cam Clearance - Loosen choke lever clampscrew on choke valve shaft, insert correct gauge (see Checking Gauge (1) in table below) between lip on fast idle cam and boss on flange casting. Hold choke valve tightly closed and remove all slack from linkage by pressing choke lever toward closed position, tighten choke lever clampscrew.

(2) Fast Idle Screw Setting - With choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening or clearance between edge of valve and carburetor bore on side opposite idle ports is correct (see Checking Gauge (2) in table below).

Fast Idle Setting

Car	Setting & Checking Gauge (1)	(2)
Rambler	.010" T109-200	.020" T109-29

Fast Idle Speed (On Car): 1750-1850 RPM with engine at normal operating temperature and fast idle screw on high step of fast idle cam.

Unloader: Hold throttle valve wide open and check choke valve opening or clearance between edge of valve and air horn wall. Adjust by bending unloader lip on throttle lever using bending tool T109-41.

Unloader Setting

Car	Choke Opening	Checking Gauge
Rambler	3/16"	T109-28

Automatic Choke: Adjust by loosening choke cover screws and rotating cover and coil assembly.

Automatic Choke Setting

Rambler	Centered (At Index)

THROTTLE VALVE SETTING: Check when overhauling carburetor.

Throttle Valve Setting

Car	Idle Port	Vacuum Spark Port
Rambler	① .095-.101"	② .028-.038"

① - Opening above upper edge of throttle valve.
② - Top of port above top edge of valve.

OVERHAUL: *See 1955 Annual Data, Page 257, or later Manual Edition.*

Service Parts

Gasket Set - Carter No. 360.

Zip Kit - 900-126.

CARTER YF SINGLE BARREL CARBURETORS

RAMBLER	Carter No.
American (Exc. "E" Stick)	2014S
American ("E" Stick)	3331S
WILLYS	
4 Cyl. "L" Head Jeep Dispatcher (Early)	2392S
4 Cyl. "L" Head Jeep Dispatcher (Late)	2392SA
4 Cyl. "F" Head Universal Jeep	938SD
4 Cyl. "F" Head 4x2, 4x4, 4WD	951SA
4 Cyl. "F" Head Fleetvan (Post Office)	3200S
4 Cyl. "F" Head Fleetvan (Others)	938SD
4 Cyl. "F" Head Forward Control	938SD
6 Cyl. "L" Head All Models	2467S

DESCRIPTION: Single barrel downdraft type with automatic choke (Rambler), manual choke control (Willys). Same design as used on previous models.

ADJUSTMENT: *Make all adjustments exactly as follows:*

Idling Adjustment: Warm up engine thoroughly so that choke valve wide open and fast idle inoperative. Adjust throttle stopscrew for correct engine idle speed, then adjust idle mixture screw for smoothest running and highest RPM. Turn screw for richer mixture. Recheck idle speed.

Idl Mixtur Screw Setting

Car & Carb.	Idle Screw Opening
Rambler 2014S, 3331S	½-1½ turns
Willys 938SD, 951SA, 3200S	¾-1¾ turns
Willys 2392S, 2392SA	½-2 turns
Willys 2467S	1-2½ turns

Idl Speed Setting

Car	Synchro-mesh	Auto. Trans.
Rambler	① 550 RPM	①② 500 RPM
Willys 4 Cyl.	600 RPM	② 600 RPM
Willys 6 Cyl.	550 RPM	

① - 500 RPM (Air Cond. Cars) with compressor operating.
② - Transmission selector lever in "N" (Neutral).

Float Setting: Invert air horn and float cover assembly allowing float to hang freely, then measure from top of float at free end to bowl cover (gasket removed). Adjust by bending lip that contacts inlet needle valve (do not bend float arm).

►*FLOAT SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEAT):* Resilient type inlet valve seat used on some 1962 YF carburetors. When bending float lever to adjust height on carburetors with resilient inlet valve seat, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. If resilient type inlet valve seat assembly is installed in a carburetor having a solid type needle valve (not spring loaded), float level setting is not changed. If resilient type inlet valve seat assembly is installed in a carburetor having a spring loaded type needle valve, adjust float level to ½". *See "Float Setting Table" below.*

►*WILLYS CARBURETOR FLOAT SETTING CAUTION: A "spring loaded" intake needle valve is used on all models. Do not compress this spring when checking float level as a false float setting will be obtained.*

Float Level Setting

Car & Carb.	Float Setting	Checking Gauge
Rambler 2014S, 3331S	① 1/2"	T109-83
Willys 938SD, 951SA, 3200S	② 5/16"	T109-107
Willys 2392S,SA, 2467S	② 9/32"	T109-126
Willys (All Carbs.)	③ 1/2"	T109-83

① - With either a "resilient type" or solid inlet valve seat.
② - With solid inlet valve seat.
③ - With "resilient type" inlet valve seat and "spring loaded needle valve".

Accelerating Pump: Diaphragm type pump on all models, with ball check discharge valve (except 2467S), discharge needle (2467S). *CAUTION - On 2467S only, check pump adjustment whenever carburetor disassembled or pump linkage disturbed BEFORE checking and adjusting Metering Rod.*

Pump Adjustment (2467S) - With idle screw backed out so that throttle valves are fully seated, press down on upper end of diaphragm shaft until it is bottomed in diaphragm housing (Tool T109-212 may be used to hold diaphragm shaft down in this position). In this position, metering rod arm should contact lifter link at outer end nearest the springs. Adjust by bending pump connector link at lower angle using bending Tool T109-213. *CAUTION - Bending link at any other point may cause binding of pump lifter link.*

Metering Rod Adjustment: With throttle valve seated in bore of carburetor, press down on upper end of diaphragm shaft until diaphragm bottoms in vacuum chamber. Tool T109-212 may be used to hold diaphragm shaft down while adjusting metering rod. Metering rod should contact bottom of metering rod well and metering rod arm should contact lifter link at outer end nearest the springs and at supporting lug. Adjust by bending lip of metering rod arm to which metering rod is attached.

Automatic Choke: *Used on Rambler 2014S & 3331S only. Willys carburetors have manual choke control.* Adjust by loosening cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Rambler 2014S, 3331S	1 Point Lean

Fast Idle Adjustment (Manual Choke Control): With choke valve in wide open position, check to see that lip on fast idle arm is in contact with boss on carburetor body casting. To adjust, bend fast idle arm rod at lower offset.

Fast Idle Adjustment (Automatic Choke Control): Remove thermostatic coil housing gasket and baffle plate. Crack throttle and hold choke valve fully closed, then close throttle. With fast idle cam revolved to fast idle position, hold choke valve and throttle valve closed as far as possible, there should be .054" clearance (Gauge T109-193) between throttle valve and bore of carburetor (side opposite idle ports). Adjust by bending connector link at lower angle.

Unloader Adjustment (Automatic Choke Control Carbs.): *NOTE - This adjustment must be made after fast idle adjustment.* Hold throttle valve in wide open position and close choke valve as far as possible without forcing. Clearance between lower edge of choke valve and inner wall of air horn should be 9/32" (Gauge T109-126). Adjust by bending arm of choke trip lever.

Anti-Stall Dashpot (Rambler with "E-Stick" Clutch Control): Turn idle speed screw out to allow throttle valve to close tightly in bore. Depress dashpot diaphragm stem fully, then adjust by turning dashpot in or out to obtain a clearance of 1/8" between dashpot stem and throttle lever. Tighten locknut, then reset idle speed.

OVERHAUL: *See 1956 Final Data, Page 258, or later Manual edition.*

Service Parts

Gasket Set: Carter No. 206S (938SD, 951SA); No. 216 (2014S, 3331S); No. 200 (2392S,SA); No. 241 (2467S).
Re-Carburetion Kit - Carter No. 1764R (938SD, 951SA); No. 1590N (2014S, 3331S); No. 1546N (2392S,SA); No. 1849N (2467S).
Zip-Kit - Carter No. 900-31 (938SD, 951SA); No. 900-38 (2014S, 3331S); No. 900-77 (2392S,SA); No. 900-78 (2467S).

1962 CARTER SINGLE & DUAL BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Standard Metering Rod Part No.	Standard Metering Jet Size	Standard Metering Jet Part No.	Main Vent Tube Size	Main Vent Tube Part No.	Venturi Assembly Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.	Idle Tube Size	Idle Tube Part No.	Venturi Cover Screw Part No.	Venturi Cover Screw Idle Air Bleed	Venturi Cover Screw Idle Restriction
938SD	YF	75-1500	.0935"	120-166				.028"	11-163S	.031"						
951SA	YF	① 75-1500	.0935"	120-166				.028"	11-163S	.031"						
2014S	YF	⑬ 75-779	.102"	120-170				.028"	11-202S							
2392SA	YF	③ 75-708	.096"	120-160				.031"	11-160S	.025"						
2467S	YF	② 75-1279	.098"	120-163				.028"	11-163S	.028"						
2858S	AS	75-1384	.1065"	120-171				.028"	11-290S	.028"						
3186S	AS	④ 75-1542	.0935"	120-166				.0292"		.026"						
3206S	AS	⑤ 75-1561	.1065"	120-171				.031"		.032"						
3229S	BBS	75-1592	⑥	120-265S	.0354"	145-242		.0295"		.0275"	48-194	.0295"	123-84S		.061"	.0571"
3230S	BBS	75-1591	⑦	120-263S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.052"
3231S	BBS	75-1590	⑦	120-263S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.052"
3232S	BBS	75-1591	⑦	120-263S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.052"
3233S	BBS	75-1208	⑧	120-209S	.0354"	145-91		.028"		.0275"	48-194	.028"	123-76S		.0629"	.0512"
3234S	BBS	75-1593	⑥	120-265S	.0354"	145-242		.0295"		.0275"	48-194	.0295"	123-84S		.061"	.0571"
3235S	BBS	75-1594	⑦	120-263S	.0354"	145-136		.0315"		.0275"	48-194	.0315"	123-74S		.0629"	.052"
3236S	BBS	75-1208	⑧	120-209S	.0354"	145-91		.028"		.0275"	48-194	.028"	123-76S		.0629"	.0512"
3237S	BBS	75-1581	⑦	120-163S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.052"
3238S	BBS	75-1580	⑦	120-163S	.0354"	145-136		.0295"		.0275"	48-194	.0295"	123-84S		.0629"	.052"
3239S	BBS	75-1583	⑦	120-163S	.0354"	145-136		.0295"		.0275"	48-194	.0315"	123-74S		.0629"	.052"
3240S	BBD	75-1600	⑨	120-213S	.0393"		58-127S	.0255"		.0275"				101-440	.059"	.055"
3241S	BBD	⑩ 75-1605	⑨	120-213S	.0393"		58-127S	.0255"		.0275"				101-440	.059"	.055"
3244S	BBD	75-1526	⑪	120-249S	.0292"		58-426S	.0295"		.0275"				101-454	.059"	.051"
3245S	BBD	75-1525	⑪	120-249S	.0292"		58-426S	.0295"		.0275"				101-450	.055"	.051"
3286S	BBS	75-1208	⑧	120-209S												
3287S	BBS	75-1208	⑧	120-209S												
3322S	WCD	⑫ 75-1431		120-159S				.028"		.033"						
3327S	ABD	⑬ 75-1468		120-255S			58-531S	.031"		.0292"				101-476	.0635"	.050"
3328S	ABD	75-1468		120-255S		145-227	58-531S	.031"		.0292"				101-476	.0635"	.050"
3329S	ABD	75-1496		120-236S			58-531S	.031"		.0292"				101-476	.0635"	.050"
3330S	ABD	75-1496		120-236S		145-227	58-531S	.031"		.0292"				101-476	.0635"	.050"
3331S	YF	⑬ 75-779	.102"	120-170S				.028"	11-202S	.035"						
3370S	AS	① 75-1536	.1015"	120-162				.028"		.026"						
3371S	AS	① 75-1536	.1015"	120-162				.028"		.026"						
3372S	AS	⑭ 75-1537S	.1015"	120-162				.031"		.026"						
3373S	AS	⑭ 75-1537S	.1015"	120-162				.031"		.026"						

① - 1 Size Lean 75-808. 1 Size Rich 75-913.
② - 1 Size Lean 75-1339. 2 Sizes Lean 75-1340.
③ - 1 Size Lean 75-720.
④ - 1 Size Lean 75-1543S. 2 Sizes Lean 75-1544S.
⑤ - 1 Size Lean 75-1554S. 2 Sizes Lean 75-1555S.
⑥ - 1 Size Lean 120-266S. 2 Sizes Lean 120-271S.
⑦ - 1 Size Lean 120-267S. 2 Sizes Lean 120-268S.
⑧ - 1 Size Lean 120-211S. 2 Sizes Lean 120-210S.
⑨ - 1 Size Lean 120-212S. 2 Sizes Lean 120-209S.
⑩ - 1 Size Rich 75-1600.
⑪ - 1 Size Lean 120-251S. 2 Sizes Lean 120-259S.
⑫ - 1 Size Lean 75-1464. 2 Sizes Lean 120-1465.
⑬ - 1 Size Lean 75-793. 2 Sizes Lean 75-794.
⑭ - 1 Size Lean 75-1538S. 2 Sizes Lean 75-1539S.

FORD 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

FORD & MERCURY	①Tag N.	②Stamp d N.	R plac ment N.
221" Eng. (Synchro-mesh)③	C2OE-9510-N	C2OF-9510-N	C2OZ-9510-A
221" Eng. (Synchro-mesh)⑨	C2OE-9510-S	C2OF-9510-S	C2OZ-9510-A
221" Eng. (Auto. Trans.)③	C2OE-9510-R	C2OF-9510-R	C2OZ-9510-A
221" Eng. (Auto. Trans.)⑨	C2OE-9510-T	C2OF-9510-T	C2OZ-9510-A
260" Eng. (Synchro-mesh)③	C20E-9510-U,AA	C20F-9510-U,AA	C20Z-9510-F
260" Eng. (Synchro-mesh)⑨	C20E-9510-Y,AC	C20F-9510-Y,AC	C20Z-9510-F
260" Eng. (Auto. Trans.)③	C20E-9510-V,AB	C20F-9510-V,AB	C20Z-9510-F
260" Eng. (Auto. Trans.)⑨	C20E-9510-Z,AD	C20F-9510-Z,AD	C20Z-9510-F
292" Eng. (Synchro-mesh)③	C2AE-9510-Y	C2AF-9510-AA	C2AZ-9510-C
292" Eng. (Synchro-mesh)⑨	C2AE-9510-AA	C2AF-9510-AC	C2AZ-9510-C
292" Eng. (Auto. Trans.)③	C2AE-9510-Z	C2AF-9510-AB	C2AZ-9510-C
292" Eng. (Auto. Trans.)⑨	C2AE-9510-AB	C2AF-9510-AD	C2AZ-9510-C
352" Eng. (Synchro-mesh)③	C2AE-9510-AC	C2AF-9510-AE	C2AZ-9510-D
352" Eng. (Synchro-mesh)⑨	C2AE-9510-AE	C2AF-9510-AG	C2AZ-9510-D
352" Eng. (Auto. Trans.)③	C2AE-9510-AD	C2AF-9510-AF	C2AZ-9510-D
352" Eng. (Auto. Trans.)⑨	C2AE-9510-AF	C2AF-9510-AH	C2AZ-9510-D

4-BARREL CARBURETORS

FORD & MERCURY	①Tag No.	②Stamped No.	Replacement No.
390" Eng. (Synchro-mesh)③	C2AE-9510-AG	C2AF-9510-N	C2AZ-9510-G
390" Eng. (Synchro-mesh)⑨	C2AE-9510-AJ	C2AF-9510-S	C2AZ-9510-G
390" Eng. (Auto. Trans.)⑤	C2AE-9510-AK	C2AF-9510-T	C2AZ-9510-G
390" Eng. (Synchro-mesh) Police③	C2AE-9510-AL	C2AF-9510-U	C2AZ-9510-G
390" Eng. (Synchro-mesh) Police⑨	C2AE-9510-AN	C2AF-9510-Y	C2AZ-9510-G
390" Eng. (Auto. Trans.) Police⑤	C2AE-9510-AR	C2AF-9510-Z	C2AZ-9510-G

THUNDERBIRD	①Tag No.	②Stamped No.	Replacement N.
390" Eng. (Auto. Trans.) Early⑤	C2SE-9510-C	C2SF-9510-A	C2SZ-9510-A
390" Eng. (Auto. Trans.) Late⑤		C2SF-9510-B	C2SC-9510-D

① - Number stamped on tag attached to carburetor cover.
② - Number stamped on fuel bowl.
③ - Without closed crankcase ventilation.
⑨ - With closed crankcase ventilation.
⑤ - With or without closed crankcase ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 221" ENGINE STUMBLE OR HESITATION CORRECTION:* This condition may be caused by improper fuel level setting. If fuel inlet needle is tipped with a resilient type material (Viton), check and adjust as indicated below for "Fuel Level Setting (Wet)".

►*1962 390" ENGINE STALLING, ROUGH, OR EXCESSIVE SMOKING ON STARTING CORRECTION:* Adjust fast idle speed and automatic choke initial choke valve "pull-down" to proper specifications (see below). If the loading condition exists after correct adjustments are made, replace original choke housing torsion spring with Part No. C2AZ-9A590-BI (plain color).

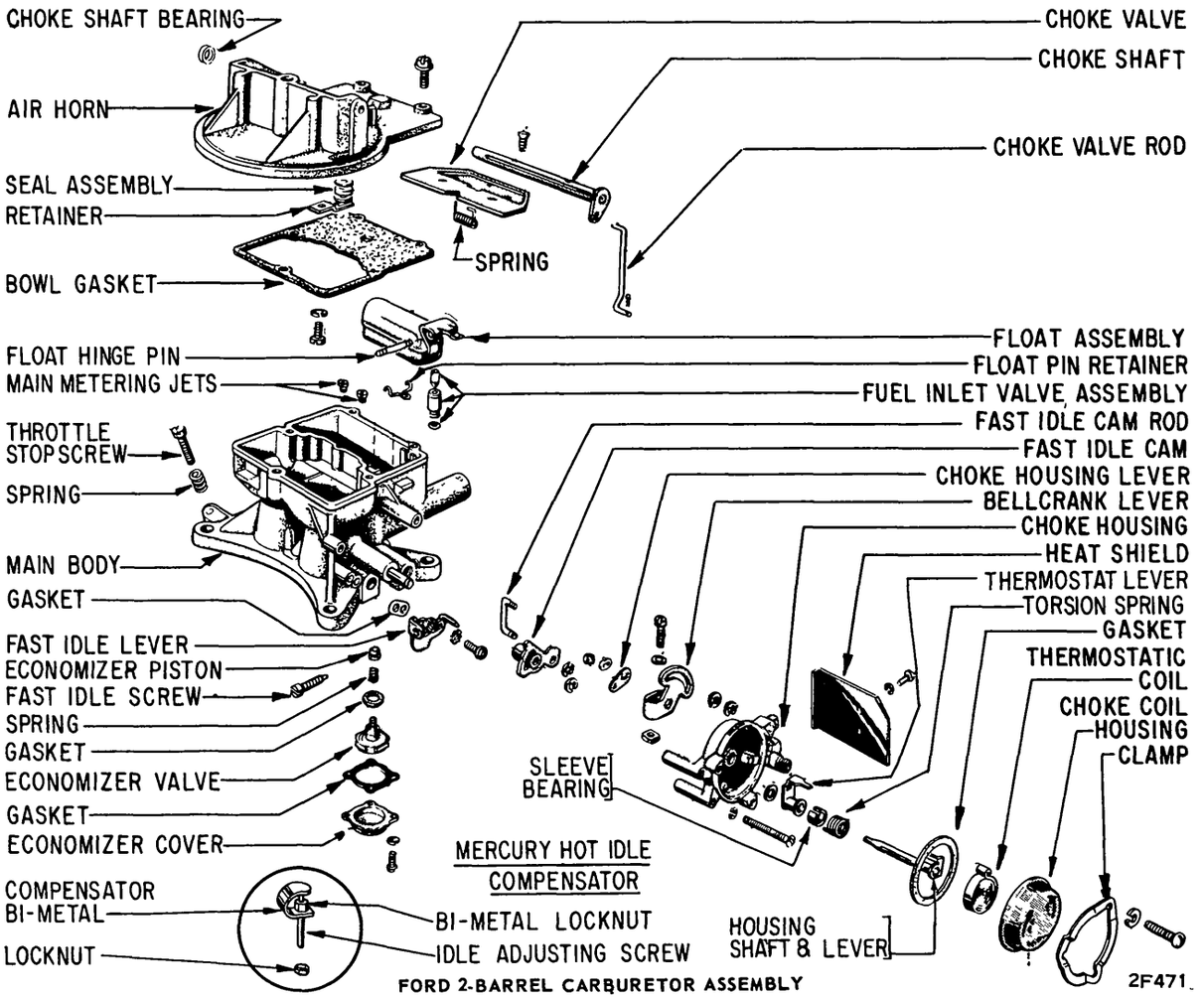
DESCRIPTION: Design is the same as used on previous models except as follows: Float design on 2-Barrel carburetors has been changed (same as primary float on 4-Barrel Carburetors). On all carburetors, the accelerator pump diaphragm has been changed, and the choke shaft design has been changed to provide for torsion spring adjustment. *NOTE - By adjusting torsion spring tension, the initial cold start opening of choke plate can be controlled.* Choke plate clearance adjustment procedure has been changed as noted below. On some carburetors, the fuel inlet needles are tipped with "Viton" to assure more positive closing.

ADJUSTMENT

►*ADJUSTMENT NOTE: Adjustments are the same for 2-Barrel and 4-Barrel carburetors except as noted below.*

Idle Mixture Setting: Initial adjustment is 1-1½ turns open from a lightly seated position (to warm-up engine). For final adjustment, with engine at normal operating temperature, and at normal idle speed (see idle speed below), proceed as follows: Turn idle mixture screws in until engine begins to run rough from lean mixture, then turn idle mixture screws out until engine begins to roll from rich mixture. Finally turn screws in just enough for smooth idling and highest vacuum reading. *NOTE - Always favor a slightly rich mixture rather than a lean mixture.* Recheck and adjust engine idle speed.

CONTINUED ON NEXT PAGE



FORD 2-BARREL CARBURETOR ASSEMBLY

FORD 2 & 4-BARREL CARBURETORS (C nt.)

Idle Speed Setting (Hot Engine)

Engine	Idle Speed
All Exc. 390" (Synchro-mesh)	500-525 RPM
221" & 260" (Auto. Trans.)	Ⓒ475-500 RPM
221" (Auto. Trans.)	Ⓒ475-500 RPM
292" & 352" (Auto. Trans.)	Ⓒ450-475 RPM
390" Std. (Auto. Trans.)	Ⓒ475-500 RPM
390" Police (Synchro-mesh)	575-600 RPM
390" Police (Auto. Trans.)	Ⓒ550-575 RPM

Ⓒ - Automatic transmission in "D" (Drive).

►*AIR CONDITIONED CAR IDLE SPEED NOTE: Operate air conditioner at least 20 minutes before setting idle speed.*

Anti-Stall Dashpot (Auto. Trans. Cars): *See Car Model pages for adjustment.*

Manual Throttle Control (Air Conditioned Cars): *See Car Model pages for adjustment.*

Accelerating Pump Stroke: *NOTE - Pump overtravel lever has four holes and the accelerating pump link has two holes.*

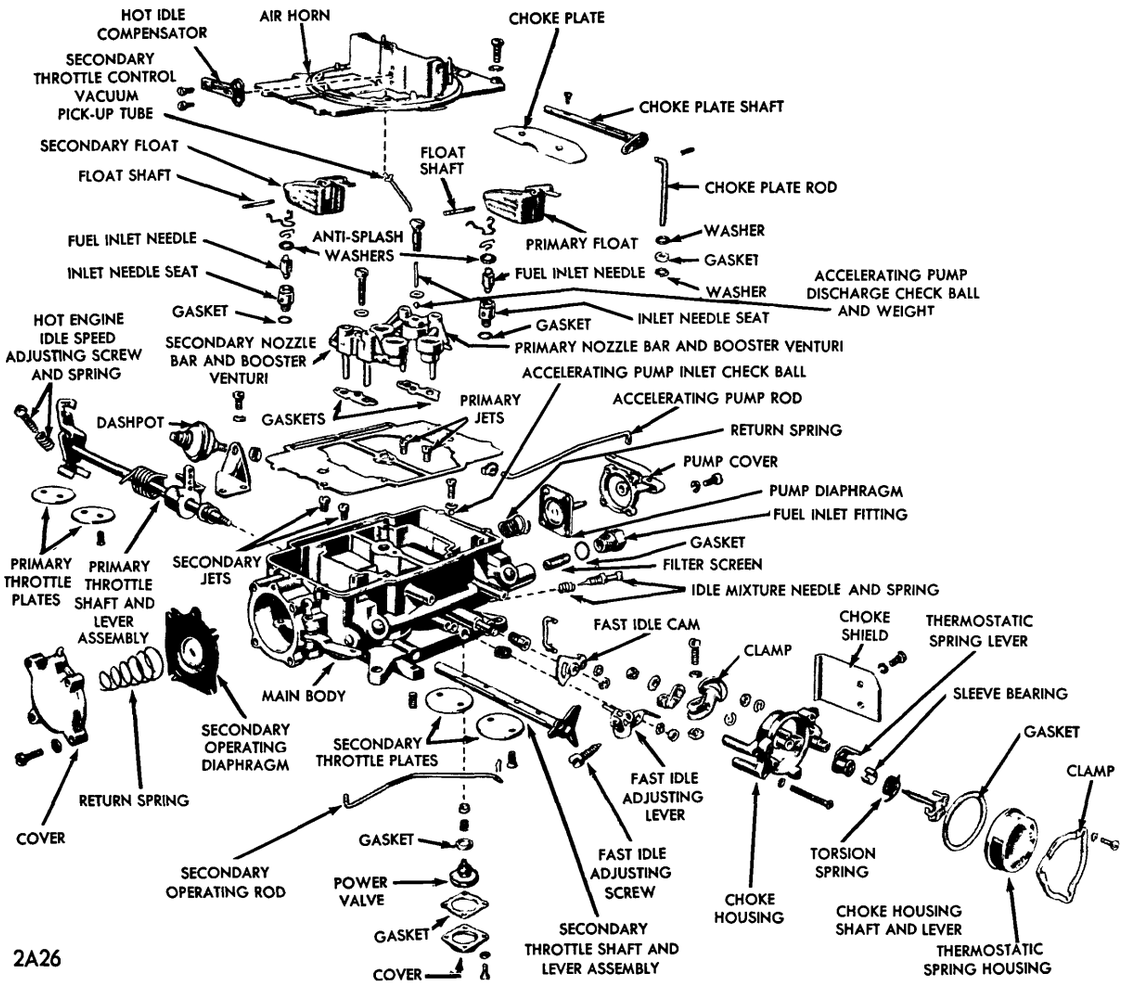
292", 352" & 390" Engines - Install accelerating pump operating rod in second hole from throttle shaft (average year around operation); in third holes from throttle shaft (extremely low operating temperatures); in first hole from throttle shaft (extremely high operating temperatures). Install opposite end of pump rod in inner hole of pump operating link (for all climatic conditions).

221" & 260" Engine - Install accelerating pump operating rod in outer holes, furthest from throttle shaft (average year around operation); in inner hole, nearest throttle shaft (extremely high operating temperatures). Install opposite end of pump rod in inner hole of pump operating link (for all climatic conditions).

Float Level (Initial Bench Setting): *CAUTION - Do not place excessive force on float needle as it may be tipped with "Viton" and damage would result.* Remove air horn, then with float raised and needle seated, check distance between gasket surface of main body and top of float at a point 1/8" from free end of float and 5/16" in from side of float adjacent to inside wall of fuel bowl. This measurement should be 21/32" (All Carbs.). To adjust, bend tab on float arm.

Fuel Level (Dry): *NOTE - If fuel inlet needle is "Viton" tipped, see "Fuel Level (Wet)" below.* With correct float setting, fuel level should be 29/32" ± 1/16". Secondary fuel level on 4-Barrel carburetors is the same as primary fuel level.

Fuel Level (Wet): *NOTE - If fuel inlet needle is "Viton" tipped, fuel level must be adjusted with carburetor installed on engine.* With engine at normal operating temperature and car on a flat level surface, remove air cleaner and carburetor air horn. Temporarily install air horn gasket in position on carburetor main body and start the engine. Allow engine to idle for several minutes, then remove air horn gasket. Distance from top machined surface of carburetor main body to level of fuel in bowl (with engine idling) should be 7/8" ± 1/16" (221" Eng.); 29/32" ± 1/16" (All other engines). *CAUTION - To obtain a true measurement, scale or depth gauge must be at least ¼" from any vertical surface because of capillary action of the fuel. Use care to measure fuel at the point of contact with the fuel and not after fuel is attracted to scale by capillary action.* To adjust, stop engine and bend float tab contacting fuel inlet valve upward to raise the fuel level, and downward to lower it. Each time an adjustment is made, restart engine and allow to idle for at least three minutes to stabilize fuel level. Recheck after each adjustment until correct fuel level is obtained.



FORD 4-BARREL CARBURETOR ASSEMBLY

Fast Idle Cam & Bellcrank Lever (On Bench): Open throttle valves (primary throttle valves on 4-Barrel carburetors) so fast idle adjusting screw will not interfere with fast idle cam when bellcrank is rotated, then hold choke plate in closed position by turning choke housing shaft to left (counterclockwise). Measure clearance between cast stop on back of choke housing and edge of fast idle cam. This clearance should be .050" (221" & 260" Engs.); .040" (All others). To adjust, loosen bellcrank lever screw and turn bellcrank lever as necessary to obtain correct clearance. *NOTE - To maintain proper vertical alignment between bellcrank lever and fast idle cam, bellcrank lever must be positioned against "E Clip" retainer on choke housing shaft.*

Fast Idle (On Engine): With slow (hot) idle speed properly adjusted, engine at normal operating temperature and throttle valves in closed position, position fast idle screw on second step of fast idle cam so it is against shoulder of highest step, then turn screw to obtain an engine speed as indicated below.

Fast Idle Speed

Engine	Engine RPM
221" & 260" Eng. (Synchro-mesh)	1300 RPM
221" & 260" Eng. (Auto. Trans.)	1600 RPM
292", 352", 390" Eng. (Synchro-mesh)	1200 RPM
292", 352", 390" Eng. (Auto. Trans.)	1500 RPM

CONTINUED ON NEXT PAGE

FORD 2 & 4-BARREL CARBURETORS (Cont.)

Fast Idl (Off Engin): With fast idle screw resting on lower step of fast idle cam next to shoulder of highest step, turn fast idle adjusting screw until clearance between throttle valve and carburetor bore on side opposite idle ports is .017" (221" & 260" Eng.); .020" (292" Eng.); .028" (352" Eng.); .018" (390" Eng.).

Aut matic Ch k : Loosen thermostatic coil housing clamp screws and align index mark on coil housing with middle index mark on choke housing (292", 352", 390" Eng. with synchro-mesh transmission); 2 points lean (All other engines).

Automatic Chok Housing Torsion Spring Adjustment: *NOTE - After a cold start at low temperatures, if engine stumbl s or h sitat s (caused by lean mixture) or if engin runs rough (caused by rich mixture), change torsion spring t nsion as foll ws:* Remove thermostatic spring housing and place short tang of spring in the left prong to increase tension and correct for leanness. Place tang of spring in right prong to decrease tension and correct for richness. *NOTE - Normal position of spring tang is in the center prong.*

Automatic Choke Initial Choke Valve "Pull-Down" Opening Adjustment: Turn choke coil housing 90° counterclockwise to position choke linkage in fully closed choke position, then press choke valve toward open position until resistance to movement is felt. *CAUTION - Do not use force or tang on the lever in choke housing will be bent.* Measure clearance between lower edge of choke valve and inside vertical surface of air horn. This clearance should be 7/64" (221" & 260" Eng.); 3/16" (292", 352", 390" Eng. with synchro-mesh transmission); 5/32" (292", 352", 390" with automatic transmission). To adjust clearance, loosen setscrew on choke plate operating lever clevis with a 1/16" Allen wrench and move choke plate operating lever up or down as necessary to obtain correct clearance. Recheck fast idle-to-stop on choke housing clearance and adjust if necessary.

OVERHAUL: *See 1958 Final Data, Pg. 269, or later Manual Edition and note the following:*

Choke Housing Removal & Disassembly: Remove choke shield, fast idle cam retainer, thermostatic spring housing, clamp and gasket. Remove choke housing and gasket, then remove choke housing lever retaining nut, spacer and lever. Loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft. Remove fast idle cam pickup rod from fast idle cam and bellcrank lever. Remove retainer from choke housing shaft and slide shaft assembly out of choke housing. Remove spacer, lever, and torsion spring from shaft.

1962 FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

CARB. NO.	Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.
C2AE-9510-AA	2-Bbl.	.049"	C1AZ-9533-C	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	C1AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-AB	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C1AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-AC	2-Bbl.	.056"	C1AZ-9533-D	.054"	C1AZ-9533-A	.052"	C1AZ-9533-L	C0AE-9A523-A	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-AD	2-Bbl.	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	.051"	C1AZ-9533-M	C0AE-9A523-A	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-AF	2-Bbl.	.056"	C1AZ-9533-D	.054"	C1AZ-9533-A	.052"	C1AZ-9533-L	C1AF-9A523-C	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-AG Pri.	4-Bbl.	.055"	C1AE-9533-B	.053"	C1AZ-9533-H	.051"	C1AZ-9533-M	C1AZ-9A523-D	C0AE-9A565-A	C0AZ-9577-A
Sec.		.063"	C1AE-9533-C	.051"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C2AE-9510-AJ Pri.	4-Bbl.	.056"	C1AZ-9533-D	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	C2AZ-9A523-A	C0AE-9A565-A	C0AZ-9577-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C2AE-9510-AK Pri.	4-Bbl.	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	.050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0AZ-9577-A
Sec.		.062"	C1AE-9533-D	.060"	C1AZ-9533-S	.058"	C1AZ-9533-U	.....	.....	.....
C2AE-9510-AL Pri.	4-Bbl.	.055"	C1AE-9533-B	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	C1AZ-9A523-D	C0AE-9A565-A	C0AZ-9577-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C2AE-9510-AN Pri.	4-Bbl.	.055"	C1AE-9533-B	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	C2AZ-9A523-A	C0AE-9A565-A	C0AZ-9577-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C2AE-9510-AR Pri.	4-Bbl.	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	.050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0AZ-9577-A
Sec.		.063"	C1AE-9533-C	.061"	C1AZ-9533-R	.059"	C1AZ-9533-T	.....	.....	.....
C2AE-9510-Y	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	.....	C0AE-9A565-D	C0AZ-9577-A
C2AE-9510-Z	2-Bbl.	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	.043"	C1AZ-9533-J	.....	C0AE-9A565-D	C0AZ-9577-A
C2SE-9510-C Pri.	4-Bbl.	.054"	C1AE-9533-A	.052"	C1AZ-9533-L	.050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0AZ-9577-A
Sec.		.062"	C1AE-9533-D	.060"	C1AZ-9533-S	.058"	C1AZ-9533-U	.....	.....	.....
C2SF-9510-B Pri.	4-Bbl.	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sec.		.....	.....	.....	.....	.....	.....	.....	.....	.....
C20F-9510-AA	2-Bbl.	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	C2OZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C20F-9510-AB	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C2OZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C20F-9510-AC	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C2OZ-9A523-C	C0AE-9A565-D	C0AZ-9577-A
C20F-9510-AD	2-Bbl.	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	C2OZ-9A523-C	C0AE-9A565-D	C0AZ-9577-A
C20E-9510-N	2-Bbl.	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	.041"	C1AZ-9533-B	C2OZ-9A523-E	COAE-9A565-D	C0AZ-9577-A
C20E-9510-R	2-Bbl.	.044"	C1AZ-9533-F	.042"	C0AZ-9533-C	.040"	C0AZ-9533-A	C2OZ-9A523-E	COAE-9A565-D	C0AZ-9577-A
C20E-9510-S	2-Bbl.	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	.042"	C0TZ-9533-C	C2OZ-9A523-D	COAE-9A565-D	C0AZ-9577-A
C20E-9510-T	2-Bbl.	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	.041"	C1AZ-9533-B	C2OZ-9A523-D	COAE-9A565-D	C0AZ-9577-A
C20F-9510-U	2-Bbl.	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	C2OZ-9A523-B	COAE-9A565-D	C0AZ-9577-A
C20F-9510-V	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C2OZ-9A523-B	COAE-9A565-D	C0AZ-9577-A
C20F-9510-Y	2-Bbl.	.048"	C1AZ-9533-A	.046"	C1AZ-9533-B	.044"	C1AZ-9533-F	C2OZ-9A523-C	COAE-9A565-D	C0AZ-9577-A
C20F-9510-Z	2-Bbl.	.047"	C1AZ-9533-G	.045"	C1AZ-9533-K	.043"	C1AZ-9533-J	C2OZ-9A523-C	COAE-9A565-D	C0AZ-9577-A

HOLLEY 2 & 4-BARREL CARBURETORS

TRIPLE 2-BARREL CARBURETORS

FORD GALAXIE	① Ford No.
390" & 406" Eng. ..... (Center)	② C1AE-9510-AV
390" & 406" Eng. .....(Front & Rear)	② C1AE-9510-AU
THUNDERBIRD	**① Ford No.**
390" Eng. ..... (Center)	③ C2SE-9510-A
390" Eng. ..... (Front & Rear)	④ C2SE-9510-E
MERCURY MONTEREY	**① Ford No.**
406" Eng. ..... (Center)	② C1AE-9510-AV
406" Eng. ..... (Front & Rear)	② C1AE-9510-AU

2-BARREL CARBURETORS

FORD TRUCKS	① Ford No.
292" MD Eng. (Synchro-mesh).....	⑤ C2TE-9510-N
292" MD Eng. (Auto. Trans.).....	⑤ C2TE-9510-M
292" MD Eng. (Hand Throttle).....	⑥ C2TE-9510-R
RAMBLER AMBASSADOR	**Holley No.**
Synchro-mesh & Overdrive	Model 2300, No. 2442
Auto. Trans.....	Model 2300, No. 2463
WILLYS	
6 Cyl. Eng. (Overhead Cam)	Model 2300, No. 2415A

4-BARREL CARBURETORS

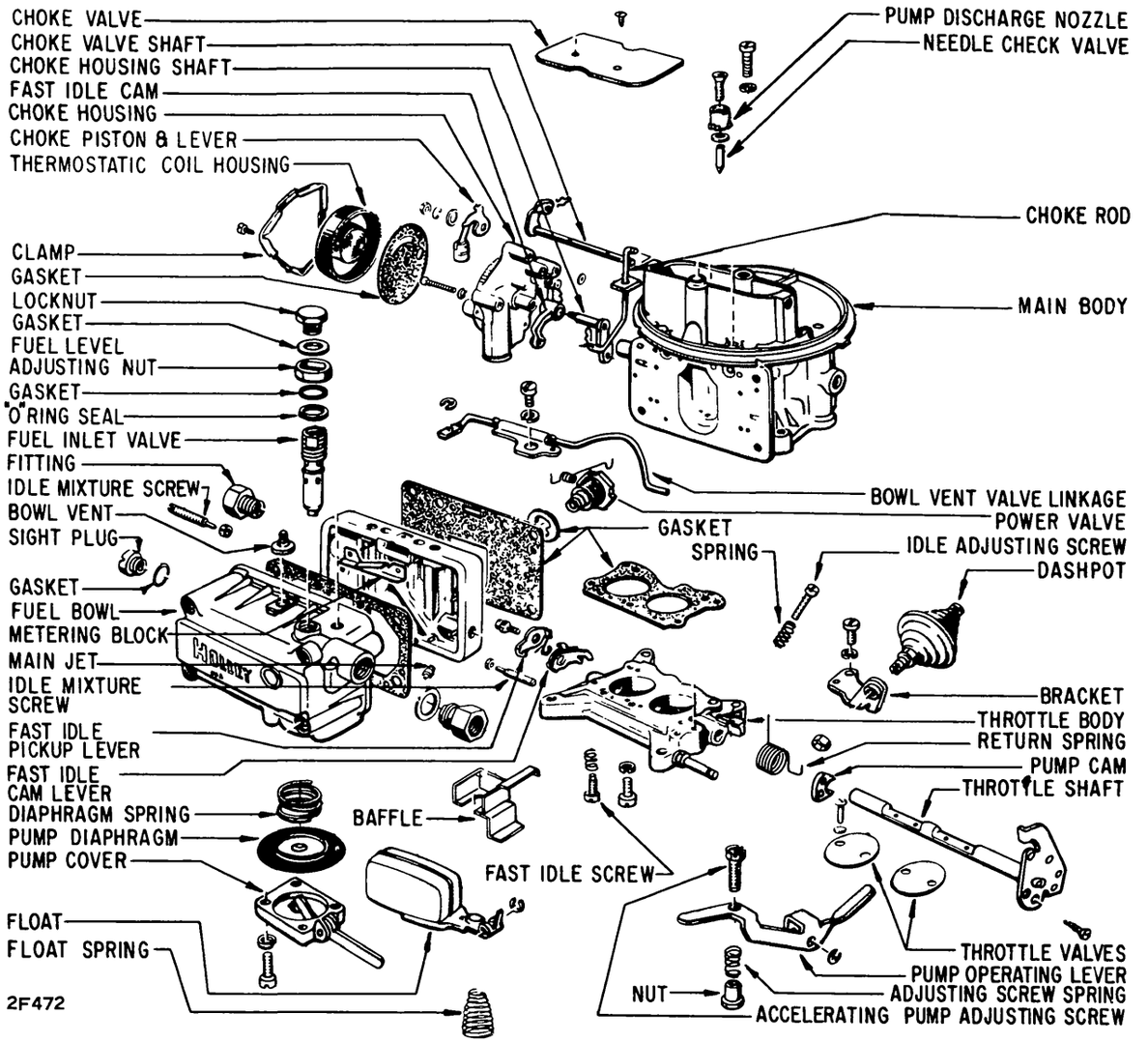
FORD GALAXIE	① Ford No.
390"&406"Eng (Synchro-mesh)(CCV)⑦...	C1AE-9510-AM
MERCURY MONTEREY	**① Ford No.**
406" Eng. (Synchro-mesh)(CCV)⑦	C1AE-9510-AM
FORD TRUCKS	**① Ford No.**
292" HD Eng. (All Trans.)	② C1TE-9510-AM
292" HD Eng. (All Trans.)(CCV)⑦.....	⑧ C1TE-9510-A
RAMBLER AMBASSADOR	**Holley No.**
Synchro-mesh & Overdrive	Model 4150, No. 1957-1
Auto. Trans.	Model 4150, No. 2464

① - This number stamped on choke plate flange.
② - Replacement carburetor part number is same as stamped on choke plate flange.
③ - Replacement carburetor, Ford No. C2SZ-9510-B.
④ - Replacement carburetor, Ford No. C2SZ-9510-C.
⑤ - Replacement carburetor, Ford No. C2TZ-9510-D.
⑥ - Replacement carburetor, Ford No. C2TZ-9510-E.
⑦ - Closed Crankcase Ventilator.
⑧ - Replacement carburetor, Ford No. C1TE-9510-AM.

DESCRIPTION: 2 & 4-Barrel carburetors similar in design to 1961 carburetors.

ADJUSTMENTS: Idle Mixture Setting (Exc. Ford & Mercury Triple Carburetors) - Initial adjustment is 1 turn open (Rambler); 1-1½ turns open (Ford Pass. Cars, Ford Trucks & Mercury); ½-turn open (Willys), from a lightly seated position. For final adjustment, bring engine to normal operating temperature and place transmission selector lever in "N" (Neutral). Turn both idle mixture screws in until engine runs rough from a lean mixture, then turn screws out until engine rolls from a rich mixture. Finally turn screws in just enough for smooth idling at highest RPM and highest vacuum. Reset engine idle speed to correct RPM (see table below).

Idle Mixture Setting (Ford & Mercury Triple Carburetors): Initial adjustment is 1-1½ turns open (Center Carb.); ¾-1¼ turns open (Front & Rear Carbs.), from a lightly seated condition. For final adjustment, proceed as for other models (see above), adjusting each carburetor separately, starting with center carburetor, followed by front carburetor, then rear carburetor.



HOLLEY 2-BARREL CARBURETOR (TYPICAL)

Initial Idle Speed Setting (Ford & Mercury Triple Carburetors): Back off idle speed adjusting screws on front and rear carburetors enough to allow plates to seat in throttle bores, then turn idle speed screws inward until screws end just touches throttle shaft arm. Turn screws in one full turn additional. *NOTE - Final idle speed adjustment must be made on center carburetor only.*

Synchronizing Throttle Linkage (Ford & Mercury Triple Carburetors): Disconnect linkage at front and rear carburetors and at bellcrank lever (center carburetor-to-bellcrank rod). Adjust length of front carburetor rod so that, when installed, throttle lever on front carburetor will be against wide open throttle stop when center carburetor lever is in wide open position against stop. Adjust length of rear rod in same manner, then install front and rear carburetor rods on throttle levers and tighten rod locknuts. Adjust length of center carburetor-to-bellcrank rod to 7¼" (center-to-center) and install rod on bellcrank lever. Disconnect accelerator-to-bellcrank lever rod at bellcrank lever, then synchro-mesh transmission cars (without overdrive), adjust length of accelerator-to-bellcrank rod to obtain wide open throttle when accelerator pedal is depressed to floor. On overdrive transmissions, depress accelerator pedal enough to close overdrive kickdown switch, then with accelerator in this position, adjust length of accelerator-to-bellcrank rod to obtain wide open throttle on center carburetor. Assemble rod to bellcrank lever and tighten clevis locknut.

CONTINUED ON NEXT PAGE

HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

Idl Sp d (H t Engin) S tting: All Models - *NOTE - On Ford & M rcury Tripl Carburetors, idle speed adjustm nt is mad on c nt r carburetor only. If engine will not idl at sp cifi d RPM, adjust front and rear carbur tors (s "Initial Idl Speed Setting, Ford & Mercury Tripl Carbur tors" above).* With engine at normal operating temperature, fast idle screw backed off so it does not touch fast idle cam, choke valve wide open, and transmission in neutral (synchro-mesh) proper range (automatic transmission - see table below). adjust engine idle speed to correct RPM (see table below).

Car M d l	Engin Idle Speed S.M. Trans.	Auto. Trans.
Ford Pass. Car (All)	675-700 RPM	
Ford Truck (2-Bbk.)	500-550 RPM	① 475-525 RPM
Ford Truck (4-Bbl.)	525-575 RPM	① 475-525 RPM
Mercury (All)	675-700 RPM	
Rambler	500 RPM	②③ 475 RPM
Willys	590-600 RPM	

① - Transmission in "D" (Drive).
② - Transmission in "N" (Neutral).
③ - 500 RPM on Air Cond. cars with compressor operating.

Acc l rating Pump Ov rride Adjustment: Hold throttle valves wide open and depress pump arm fully. Distance between pump lever adjusting screw hex head and pump arm should be .015" (Exc. Rambler 2-Barrel Carbs.). To adjust, hold hex nut stationary and turn screw on pump lever. On Rambler 2-Barrel carburetors, turn adjusting screw in until it just contacts pump lever, then tighten screw ¼ turn. Check accelerating pump to make sure that when throttle lever starts to move pump lever also starts to move.

Acc l rating Pump Strok Adjustment: *NOTE - This is a seas onal s tting on all models.*

N rmal (Summ r) Setting - Install pump cam screw in No. 1 hole in cam. *NOTE - This provides minimum strok .*

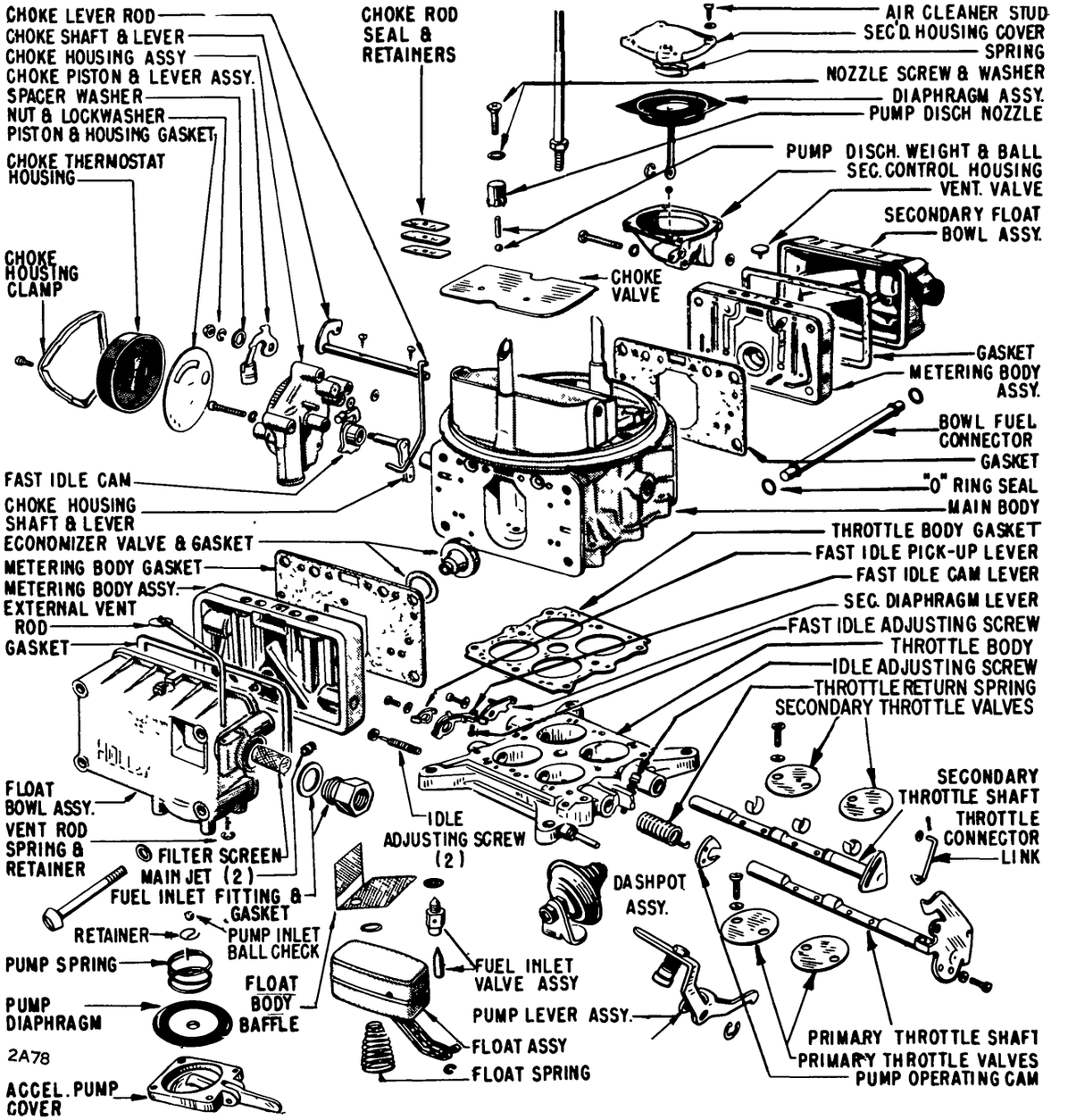
Winter Setting - Install pump cam screw in No. 2 hole in cam. *NOTE - This provides maximum stroke.*

Fu l Bowl V nt Setting (Rambler): With throttle valves fully closed, distance between top of fuel bowl and vent button should be .050-.070". To adjust, bend vent arm of accelerating pump lever. *CAUTION - Do not bend v nt valv rod.*

Fl at Lev l (Dry S tting - On Bench): *NOTE - Float l vel s ttings are int nded for initial bench adjustment only. Aft r carbur tor installed on engine, the fuel l v l must b ch ck d and the necessary float level adjustments made. S "Fuel Level" below. Float level will be correct when fuel level adjusted.* With fuel bowl inverted, lower side of float should be parallel to floor of fuel bowl (Exc. Ford & Mercury 390" and 406" Engines with 4-Barrel carburetor or with Triple Carburetors & Ford Truck). On Ford & Mercury 390" & 406" Engines with 4-Barrel carburetor or Triple Carburetors & Ford Truck, distance from lower side of float to fuel bowl should be 7/8" (2-Barrel Carbs. and Primary float on 4-Barrel Carbs.). To adjust, loosen top lock screw on needle and seat assembly and rotate adjusting screw as necessary.

Fu l Lev l: With car on a level floor, bring engine to normal operating temperature, then remove air cleaner and stop engine. Remove sight plug in end of fuel bowl (use container to catch fuel). Fuel level within bowl should be at lower edge of sight plug hole (±1/16"). To adjust, proceed as follows

Fuel Level T o High - With engine stopped, loosen lockscrew on top of fuel bowl just enough to allow rotation of nut underneath. *CAUTION - Do not unl ck lockscrew or attempt to adjust fuel level with engine running.* Turn adjusting screw ½ turn clockwise to lower fuel level below specifications. Tighten lock-



HOLLEY 4-BARREL CARBURETOR (TYPICAL)

CONTINUED ON NEXT PAGE

HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

screw, then run engine to stabilize fuel level. Check fuel level at sight plug hole. If level is not below specified level, repeat above step. With fuel level below specified level, turn adjusting nut in increments of 1/6 turn until correct fuel level is obtained. *NOTE - 1/6 turn of adjusting nut will change fuel level at sight plug opening 3/64".*

Fuel Level Too Low - Proceed as for "Fuel Level Too High" except that it will not be necessary to initially decrease fuel level below specifications.

Unloader (Rambler): With throttle valves in wide open position, distance from top of choke valve to wall of air horn should be 3/16". To adjust, bend tab on throttle shaft lever (where it contacts fast idle cam).

Fast Idle - Off Engine (Rambler): With choke valve fully closed and fast idle adjusting screw on high step of fast idle cam, the clearance between throttle valve and bore on side opposite idle ports should be .025" (4-Barrel Carb.); .024" (2-Barrel Carb.). To adjust, turn fast idle adjusting screw.

Fast Idl - Off Engin (F rd Pass. Cars & M rcury with 4-Bbl. Carb.): With fast idle cam in slow idle position (bottom step of cam contacting fast idle screw), turn fast idle screw until it just touches lowest step on cam, then back screw off ¼ turn (.005-.008" clearance between fast idle adjusting screw and fast idle cam).

Fast Idle - On Engine (Ford Pass. Cars & Mercury 390" & 406" Engines with 4-Bbl. or Triple Carbs.) With fast idle screw on top step of fast idle cam, engine at normal operating temperature, adjust fast idle screw (center carburetor only with triple carburetors) to obtain an engine speed of 1800 RPM (Triple Carbs.); 1500 RPM (4-Bbl. Carb.).

Fast Idle - On Engine (Ford Trucks): *NOTE - On 2-Barrel carburetors, fast idle will be properly adjusted when engine hot idle speed is adjusted.* On 4-Barrel carburetors, proceed as follows: With engine at normal operating temperature and "hot" idle speed adjusted, place primary throttle valves in closed position and check clearance between fast idle cam and head of fast idle screw. Clearance should be .010-.015". If clearance not correct, remove governor housing and insert a .060" wire rod into hole in end of fast idle screw fitting to prevent it turning, then turn fast idle screw as necessary for desired clearance. *NOTE - ¼ turn f scr w (in r out) will change cl aranc approximately .008".*

Fast Idl - On Engin (Rambler): With engine at normal operating temperature, place fast idle screw on high step of fast idle cam and adjust engine speed to 1600-1800 RPM.

Fast Idle - On Engine (Willys): Fast idle will be properly adjusted when engine hot idle speed is adjusted.

Automatic Choke Setting (Exc pt F rd Trucks & Willys): Loosen choke cover retaining screws and rotate cover to align index mark on cover with correct mark on choke housing as indicated in table below.

Automatic Chok S tting

Car & Carb.	Ch ke S tting
Ford Pass. Cars (All)	Centered (On Index)
Mercury (All)	Centered (On Index)
Rambler (2-Barrel)	Centered (On Index)
Rambler (4-Barrel)	1 Point Lean

OVERHAUL: *See 1958 Final Data, Pag 274, or lat r Manual edition and note the following:*

Balance Tube (Ford Truck 4-Barr l Carbur t r): Install balance tube "O" rings and washers so balance tube extends equally from faces of primary and secondary metering bodies.

1962 HOLLEY (FORD) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part N .	Pump Nozzl Part No.
C1AE-9510-AM Pri.	4-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	B9LE-9A511-A	B8AZ-9A565-A	B8A-9577-A
Sec.		.....	.....	.....	.....	.....	.....	.....	.....	.....
C1AE-9510-AU	2-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	C1AZ-9A511-B	.....	B8A-9577-B
C1AE-9510-AV	2-Bbl.	.061"	B4Q-9533-A	.....	.....	.....	.....	C1AZ-9A511-B	B8AZ-9A565-A	B8A-9577-B
C1TE-9510-A Pri.	4-Bbl.	.052"	86H-9533	.050"	78-9533-A	.048"	78-9533-B	C1TZ-9A511-C	B8TZ-9A565-A	B8A-9577-B
Sec.		.058"	78-9533-F	.056"	78-9533-E	.054"	06H-9533	B9TE-9A513-A	.....	.....
C1TE-9510-AM Pri.	4-Bbl.	.051"	59A-9533-A	.049"	59A-9533-B	.047"	59A-9533-C	C1TZ-9A511-C	B7TZ-9A565-A	B8A-9577-B
Sec.		.058"	78-9533-F	.056"	78-9533-E	.054"	06H-9533	B9TE-9A513-A	.....	.....
C2SE-9510-A	2-Bbl.	.057"	26H-9533	.....	.....	.....	.....	C2SZ-9A511-A	.....	.....
C2SE-9510-E	2-Bbl.	.060"	1GA-9533-C	.....	.....	.....	.....	C2SZ-9A511-B	.....	.....
C2TE-9510-M	2-Bbl.	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	C2TZ-9A511-C	B7TZ-9A565-A	B8A-9577-B
C2TE-9510-N	2-Bbl.	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	C2TZ-9A511-C	B7TZ-9A565-A	B8A-9577-B
C2TE-9510-R	2-Bbl.	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	C1TZ-9A511-B	B7TZ-9A565-A	B8A-9577-B

1962 HOLLEY (RAMBLER) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Type	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Chok Coil Housing Part No.
R-1957-1A Pri.	4150C	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	47R-116A
Sec.	.....	.....	.035"	22R-40-35	34R-1942A	25R-237A-85	.....	.....
R-2442A	2300	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-21	47R-114A
R-2463A	2300	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-21	47R-114A
R-2464A Pri.	4150C	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	47R-116A
Sec.	.....	.....	.035"	22R-40-35	34R-1942A	25R-237A-85	21R-572-21	.....

HOLLEY SINGLE BARREL 1904 & 1908 CARBURETORS

FORD GALAXIE & MERCURY MONTEREY (6 CYL.)	℄ Ford Part No.
223" Eng. Synchro-mesh & O.D.	C2AE-9510-A
223" Eng. Synchro-mesh & O.D. (CCV)②	C2AE-9510-B
223" Eng. Auto. Trans.	C2AE-9510-E
223" Eng. Auto. Trans. (CCV)②	C2AE-9510-F
223" Eng. Taxi, Economy (CCV)②	C2AE-9510-AS
223" Eng. Taxi, Synchro-mesh (CCV)②	C2AE-9510-C
223" Eng. Taxi, Auto. Trans. (CCV)②	C2AE-9510-D
ECONOLINE TRUCKS	**℄ Ford Part No.**
144" Eng.	C2UE-9510-A
144" Eng. (CCV)②	C2UE-9510-B
170" Eng. (Early)	C1UE-9510-D
170" Eng. (Late)	C2UE-9510-C
170" Eng. (Later)	C2UE-9510-E
FORD TRUCKS (CONVENTIONAL) 6 CYL.	**℄ Ford Part No.**
223" Eng. Synchro-mesh	C2TE-9510-E
223" Eng. Synchro-mesh (CCV)②	C2TE-9510-F
223" Eng. Auto. Trans.	C2TE-9510-H
223" Eng. Auto. Trans. (CCV)②	C2TE-9510-J
262" Eng. Synchro-mesh (CCV)②	C2TE-9510-L
FORD TRUCKS (PARCEL DELIVERY) 6 CYL.	**℄ Ford Part No.**
144" Eng. (P-100)	C2UE-9510-D
223" Eng. (P-100)	C2TE-9510-C
223" Eng. (Exc. P-100)Synchro-mesh	C2TE-9510-G
223" Eng. (Exc. P-100) Auto. Trans.	C2TE-9510-K
223" Eng. (Exc. P-100)	C2TE-9510-T
RAMBLER	**Holley Carb. No.**
American (Without "E" Stick Clutch)	R-2381-1A
American (With "E" Stick Clutch)	R-2446-A
Classic Six	R-2138-1A

℄ - Part No. stamped on carburetor.
② - Closed Crankcase Ventilation.

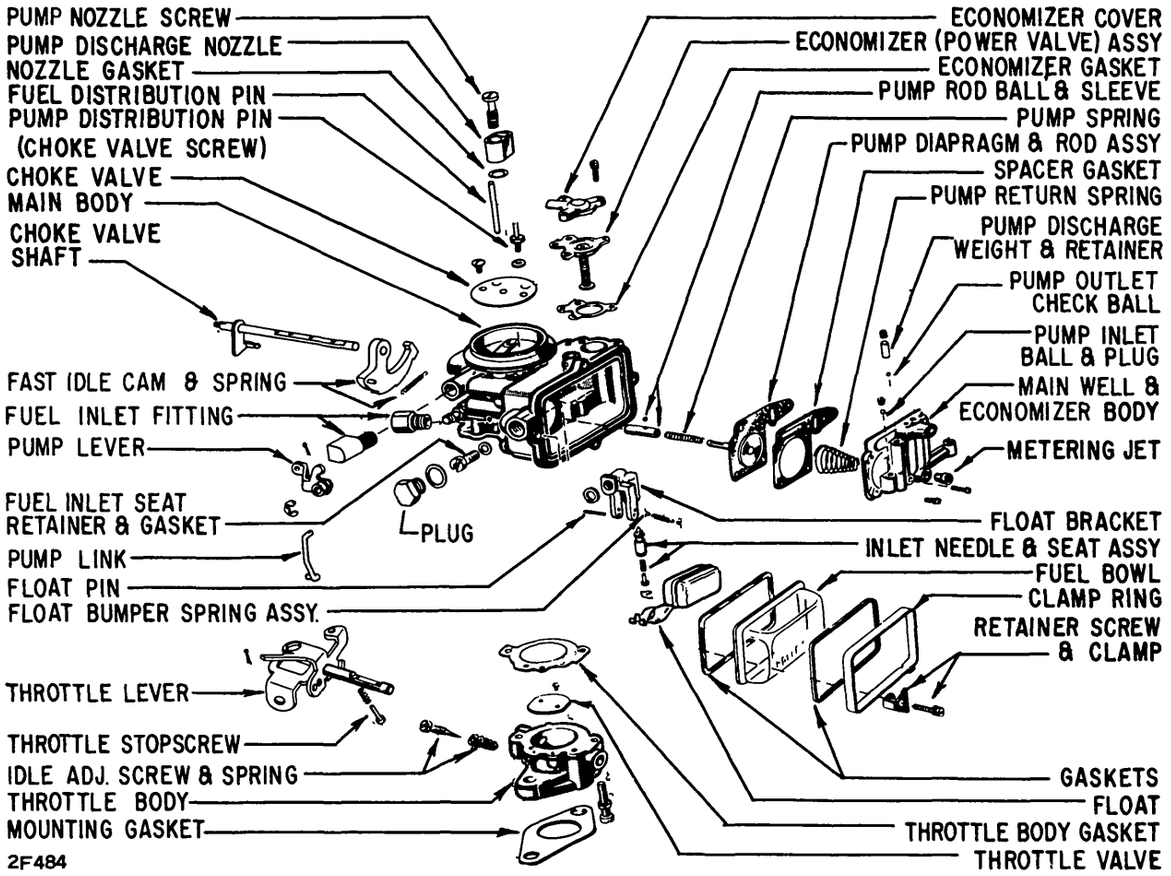
►CHANGES, CAUTI NS, CORRECTIONS

►*CARBURETOR IDENTIFICATION NOTE: Part number is stamp d n flat surfac of main body at fuel inlet.*

►*HIGH FUEL CONSUMFTION CORRECTION (EXC. ECONOMY CARBS):* Power valve may be damaged or improperly installed. Check diaphragm for tears and replace if necessary, then install as follows: Be sure there are no restrictions in vacuum passages of cover, then install screws through cover. Carefully thread screws through diaphragm and plate and install gasket next to plate. Hold assembly together (do not allow diaphragm to drop away from cover) and locate the assembly squarely on carburetor bowl and tighten the screws to 13-17 inch pounds evenly. *CAUTION - Do not ov rtight n cover scr ws.*

DESCRIPTION: Single barrel downdraft type with either manual or automatic choke. Designs are similar to previous models and have the following features:

H lley Model 1904: Main nozzle tube is pressed into venturi wall directly below choke valve axis and discharges into a cutout section of choke valve. A fuel distribution pin (crosswise in choke shaft) extends into air stream and improves nozzle action. Pump discharge nozzle is a separate part mounted on upper ledge of venturi and is retained by a special nozzle retainer screw. *NOTE - This nozzle must be adjusted after carburetor is installed on engine.*



HOLLEY MODEL 1904 SINGLE BARREL CARBURETOR (WITH MANUAL CHOKE)

Holley Model 1908: Main nozzle tube and pump discharge nozzle are pressed into wall of venturi and are not removable. Choke valve plate is linked to choke shaft and lever assembly, choke valve plate is mounted in upper part of air horn. On models with automatic choke, fast idle cam is mounted on choke shaft (behind choke housing) and, on Rambler models, serves as a stop for idle speed adjusting screw (separate fast idle adjustment not required).

Spark Control Valve (Holley 1904 & 1908 Models, Except Rambler): This unit is a spring loaded diaphragm type valve located in distributor control vacuum passage terminating at throttle valve edge (manifold vacuum). The valve is normally open but closes momentarily during acceleration (when manifold vacuum drops) to prevent excessive distributor advance (second port terminating at venturi provides vacuum to control distributor under these conditions). The valve also provides an intermediate distributor retard position under load conditions when normal spark advance would be too great and where wide open throttle spark retard is not required. No adjustment is provided.

ADJUSTMENT: Make all adjustments as follows:

Idling Adjustment: If initial adjustment required to warm engine, turn idle mixture screw in until lightly seated, then back screw out 1-1½ turns (Exc. Rambler); 1¼ turns (Rambler). Operate engine at fast idle until normal operating temperature reached, then adjust as follows: **Idle Mixture** - With engine at normal operating temperature (choke valve wide open, fast idle inoperative), adjust idle speed (see below), turn idle mixture adjusting screw in until engine runs rough from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough so that engine idles smoothly. This will provide a slightly rich mixture which is desired. Recheck idle speed.

Idle Speed - With engine at normal operating temperature so that throttle stopscrew resting on lowest point of fast idle cam (choke lever), adjust stopscrew for correct idle speed as listed in table below. *NOTE* - On Fordomatic cars, set hand brake to hold car and place selector lever in Neutral, then recheck idle speed with selector lever in Drive "D" position.

CONTINUED ON NEXT PAGE

HOLLEY SINGLE BARREL 1904 & 1908 CARBURETORS (C nt.)

Idle Speed Setting

Car Model	Synchro-mesh	Auto. Trans.
Econoline Truck	525-575 RPM	
Ford Pass. Cars	500-525 RPM	② 450-475 RPM
Ford Truck (144" Eng.)	525-575 RPM	
Ford Truck (Others)	500-575 RPM	② 475-525 RPM
Mercury	500-525 RPM	② 450-475 RPM
Rambler	① 550 RPM	③ 500 RPM

① - 500 RPM on Air Conditioned Cars, with compressor operating.
② - Transmission in "D" (Drive) Range.
③ - Transmission in "N" (Neutral).

Anti-Stall Dashpot Adjustment (Exc. Rambler): *See CARBURETOR on Car Model pages.*

Accelerating Pump: Seasonal adjustment provided by two holes in throttle lever for pump link engagement:
Inner Hole - Normal or hot weather (short stroke).
Outer Hole - Cold weather operation (long stroke).

Fuel Level: *See table below for fuel level and checking gauge.* To check fuel level, remove Power Valve diaphragm cover and valve assembly. Install checking gauge in this opening and crank engine to fill bowl. Fuel in bowl should touch "Low" gauge pin and should not touch "High" gauge pin. If adjustment required, remove float bowl and install dummy bowl (with open top) using three of the regular retaining screws. Adjust by using bending tool to bend float arm tab, recheck fuel level before installing regular bowl.

RAMBLER NOTE - Use scale inserted through power valve mounting hole to measure fuel level.

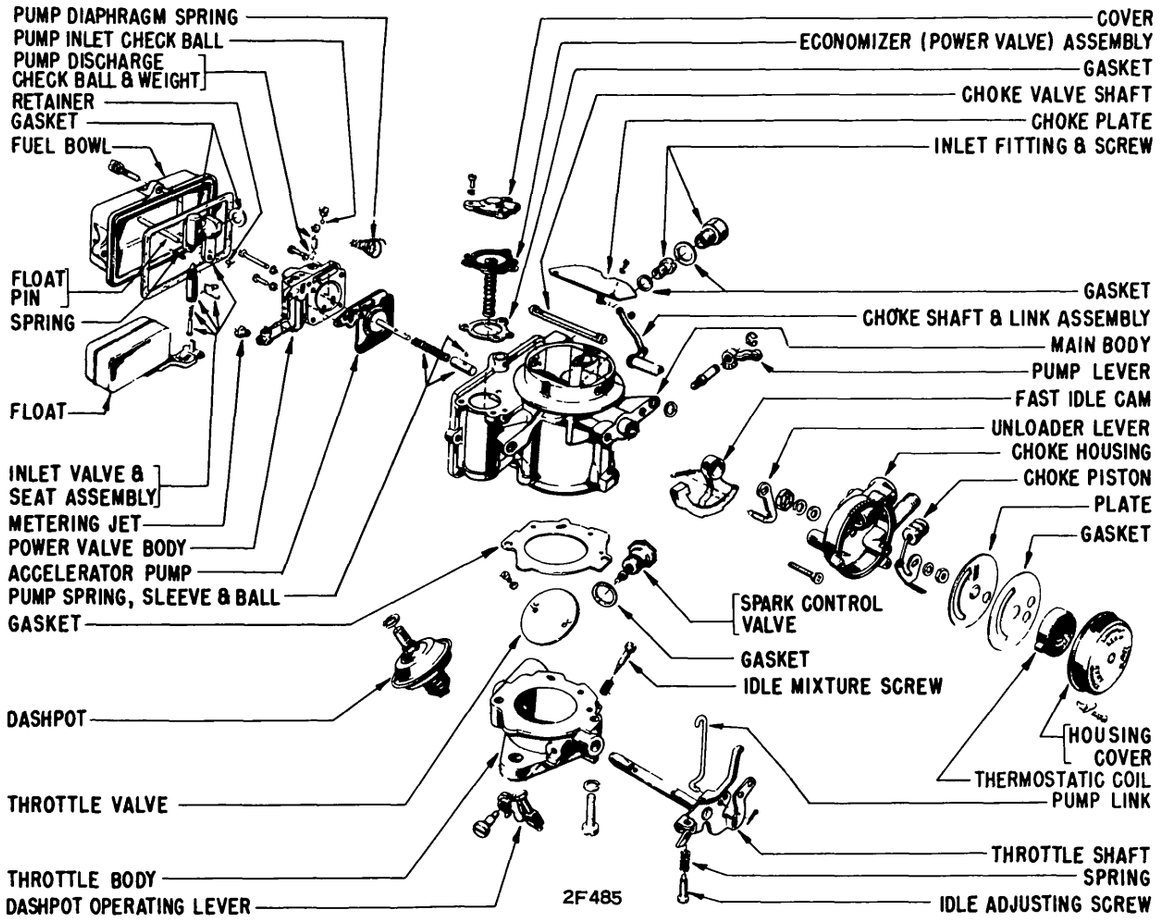
Fuel Level Setting

Car Model	① ② Fuel Level	Checking Gauge
Econoline Trucks	23/32"	T52L-9550-AEE
Ford Pass. Cars	11/16"	T52L-9550-AEE
Ford Truck (144" Eng.)	23/32"	T52L-9550-AEE
Ford Truck (262" Eng.)	3/4"	
Ford Truck (Others)	11/16"	T52L-9550-AEE
Mercury	11/16"	9550-AE-3
Rambler (R2381-1A, R2446-A)	3/4"	Scale
Rambler (R2138-1A)	11/16"	Scale

① - Plus or Minus 1/32".
② - Below mounting surface of power valve.

Float Level: *This is a bench check and Fuel Level should be checked after carburetor has been installed on engine.* On all models, use float gauge furnished in repair package (see table below). *NOTE - On Rambler models, if gauge is not furnished with repair package, use Holley Tool No. indicated in table.* With bowl removed and carburetor inverted, place gauge on bowl mounting flange at free end of float. Lowest point on float should clear lower leg of gauge. Adjust by bending small tab on float lever that contacts head of fuel inlet needle.

►*FLOAT SETTING CAUTION (CARBURETORS WITH "VITON" TIPPED INLET NEEDLE VALVE):* When bending float lever or tab on carburetors equipped with "Viton" tipped inlet needle valve, do not allow float lever or tab to contact inlet needle valve as tip can be compressed enough to cause a false setting or result in damage to tip. Check float level with weight of float only resting on needle.



HOLLEY MODEL 1908 SINGLE BARREL CARBURETOR (WITH AUTOMATIC CHOKE)

Float Level Setting

Car Model	① Float Level	Checking Gauge
Econoline Truck	11/64"	MC-157
Ford Pass. Cars	13/64"	MC-157
Ford Truck (144" Eng.)	11/64"	MC-157
Ford Truck (262" Eng.)	17/64"	MC-157
Ford Truck (Others)	13/64"	MC-157
Mercury	13/64"	9590-1
Rambler		② 10-231

① - Plus or minus 1/64". ② - Holley Tool number.

Power Valve: *NOTE - Used on all carburetors except "Economy Models".* No adjustment provided. Power valve opens when manifold vacuum drops to 4-7" Hg.

Spark Control Valve (Except Rambler): Spark control valve is not adjustable.

Automatic Choke (Rambler): Adjust by loosening cover retaining screws and rotating cover and thermostatic coil assembly. Set choke at Index (Exc. R-2381-1A & 2446-A); 3 Points Lean (R-2381-1A & 2446-A).

Fast Idle: No adjustment required.

Unloader (Rambler): With throttle valve in wide open position and choke valve closed against unloader lever, clearance between edge of choke valve and wall of air horn should be 7/16". To adjust, bend unloader tab on throttle lever.

OVERHAUL: *See 1960 Final Data, Page 289, Rambler Manual edition.*

SERVICE PARTS: Gasket Set - Ford Part No. B8A-9502-C (C2AE-9510-A,B,E,F); COAZ-9502-C (C2AE-9510-AC,C,D); CODZ-9502-A (C2UE-9510-A,B,C,D, C1UE-9510-D, C2TE-9510-C); C1TZ-9502-B (C2TE-9510-E,F,G,H,J,K,L). Holley No. 85G-1006 (R-2381-1A, R-2138-1A, R-2446-A).
Repair Kit - Ford Part No. C2AZ-9590-C (C2AE-9510-A, B, C2TE-9510-E,F,G,H,J,K); C2AZ-9590-D (C2AE-9510-E,F); C2AZ-9590-B (C2AE-9510-AC,C,D); C2UZ-9590-A (C2UE-9510-A,B,C,D); C2UZ-9590-B (C2UE-9510-E); C1UZ-9590-B (C1UE-9510-D); C2TZ-9590-A (C2TE-9510-L); C1DZ-9590-A (C2TE-9510-C). Holley No. 85R-1127 (R-2381-1A, R-2138-1A, R-2446-A).

HOLLEY SINGLE BARREL MODEL 1909 CARBURETORS

FORD FALCON & FAIRLANE	℄ Ford Carb. No.
144" Eng. (Synchro-mesh) Early	C2DE-9510-A
144" Eng. (Auto. Trans.) Early	C2DE-9510-B
144" Eng. (Synchro-mesh) Late	C2DE-9510-L
144" Eng. (Auto. Trans.) Late	C2DE-9510-M
170" Eng. (Synchro-mesh) Early	C2DE-9510-C
170" Eng. (Auto. Trans.) Early	C2DE-9510-D
170" Eng. (Synchro-mesh) Late	C2DE-9510-N
170" Eng. (Auto. Trans.) Late	C2DE-9510-R
170" Eng. Taxicab (Synchro-mesh)	C2DE-9510-J
170" Eng. Taxicab (Auto. Trans.)	C2DE-9510-K

COMET & METEOR	℄ Mercury Carb. No.
144" Eng. (Synchro-mesh) Early	C2GE-9510-A
144" Eng. (Auto. Trans.) Early	C2GE-9510-B
144" Eng. (Synchro-mesh) Late	C2GE-9510-J
144" Eng. (Auto. Trans.) Late	C2GE-9510-K
170" Eng. (Synchro-mesh) Early	C2GE-9510-C
170" Eng. (Auto. Trans.) Early	C2GE-9510-D
170" Eng. (Synchro-mesh) Late	C2GE-9510-L
170" Eng. (Auto. Trans.) Late	C2GE-9510-M

℄ - This number stamped on brass tag and on main body of carburetor .

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 COMET & METEOR CARBURETOR HIGH FREQUENCY BUZZ CORRECTION:* On cars built before Feb. 1, 1962, increase diameter of vacuum passage in carburetor air horn to expose a larger area of power valve piston to manifold vacuum (later carburetors have been modified in production). Remove air horn and cover assembly, then remove float assembly and fuel inlet needle. Use Tool 9904-E and remove power valve piston assembly. Enlarge vacuum orifice at top of piston bore by drilling a 3/16" diameter counterbore to a minimum depth of 3/64" or all the way through to a connecting horizontal passage. Use a hook type tool and compressed air to clean, scrape, and blow out all burrs and metal passages. Install power valve piston assembly and restake retainer securely in four places. Reassemble carburetor using a new air horn-to-main gasket. Readjust idle speed and mixture.

►*1962 CARBURETOR PRODUCTION CHANGE:* Late carburetors (see application above) have been changed in production as follows:

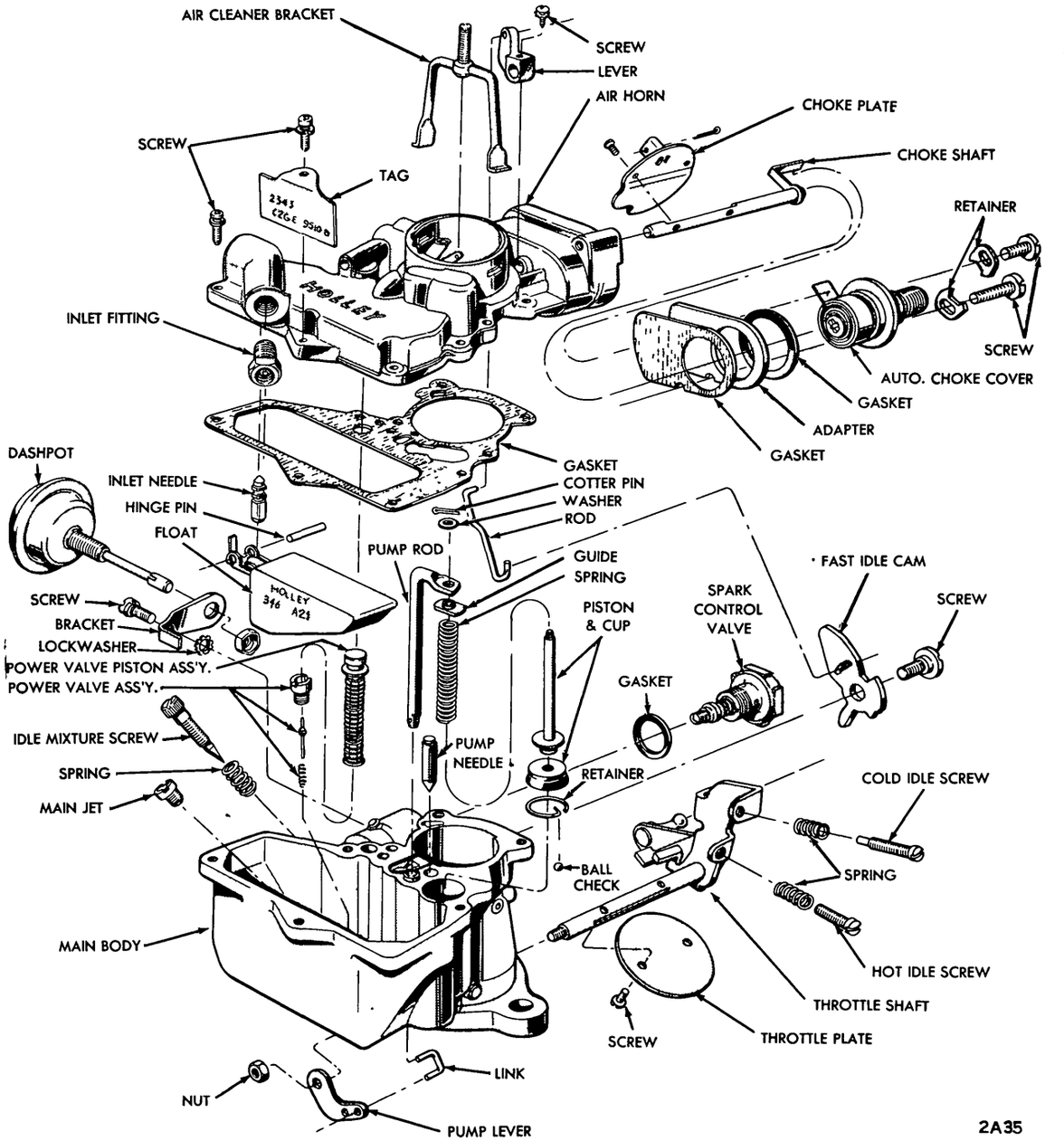
Main Well in Carburetor Body - Diameter has been increased to ¼" and a standpipe has been inserted into vertical passage of main discharge nozzle.

Accelerator Pump Vent - Pump well vent has been eliminated and venting is now accomplished with a free floating piston cup. Pump check ball retainer has been eliminated and an accelerator pump plunger return spring has been added. Return spring also serves as a check ball retainer.

Float Assembly - A boss has been added to air horn casting directly above free end of float to limit float overtravel. Float hinge tab has been reinforced by the addition of an embossed rib.

Check Cover Retainer - A one-piece automatic choke cover retainer replaces the two individual retainers.

Main Jets - One size larger main jets are used to compensate for flow characteristics of main well changes.



HOLLEY (MODEL 1909) CARBURETOR ASSEMBLY WITH AUTOMATIC CHOKE

DESCRIPTION: Single barrel downdraft type of new design with manual choke (Ford Falcon & Fairlane), and automatic choke (Mercury Comet & Meteor). This carburetor consists of two main sub-assemblies (air horn and main body) with the throttle body assembly integral with main body. The float is made of plastic material and the fuel inlet needle is tipped with "Viton". Accelerating pump is plunger type.

CONTINUED ON NEXT PAGE

HOLLEY SINGLE BARREL MODEL 1909 CARBURETORS (Cont.)

ADJUSTMENT

Idling Adjustment: If initial adjustment required to warm-up engine, turn idle mixture screw in until lightly seated, then back screw out 1-1½ turns (Ford Falcon & Fairlane), 1½ turns (Mercury Comet & Meteor). Operate engine at fast idle until normal operating temperature is reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature (choke valve wide open, fast idle inoperative), adjust idle speed (see below), then turn idle mixture adjusting screw in until engine runs rough from lean mixture. Now turn screw out until engine begins to roll from rich mixture. Finally turn screw in just enough so that engine idles smoothly. This will provide a slightly rich mixture which is desired. Recheck idle speed.

Idle Speed - With engine at normal operating temperature so that throttle stopscrew is resting on low step of fast idle cam, adjust throttle stopscrew for correct engine idle speed as indicated in table below. *NOTE - On automatic transmission cars, selector lever must be in "D" (Drive) position.*

Car Model	Idle Speed Setting Synchro-mesh	① Auto. Trans.
All Models (Std.)	500-550 RPM	475-525 RPM
All Models (CCV) ②	550-600 RPM	525-575 RPM

① - Automatic transmission in "D" (Drive).

② - Closed crankcase ventilation.

Anti-Stall Dashpot (Automatic Transmission Cars): With engine idle speed and mixture properly adjusted, loosen locknut and screw the dashpot away from throttle lever. Hold throttle lever in closed position, then depress plunger to bottom with a screwdriver blade. Screw dashpot toward throttle lever until clearance between throttle lever and tip of plunger is .120-.150".

Accelerating Pump: Seasonal adjustment provided by two holes in accelerating pump lever (on throttle shaft) for pump link engagement. *NOTE - The following adjustments supersede previous recommendations.*

Average Temperature (Year Around Operation) - Install pump operating link in outer hole of pump operating lever (hole furthest from throttle shaft).

High Temperature (And High Altitude) - Pump link may be placed in inner hole of pump operating lever (hole closest to throttle shaft) to suit individual operating conditions.

Fl at Level: *NOTE - Fuel level cannot be checked and adjusted with carburetor on engine. Float level setting is a bench check and adjustment when overhauling carburetor.* With air horn inverted and weight of float on inlet needle valve, measure distance between float (at a point ¼" from toe) and gasket surface (gasket removed) of air horn. This distance should be 5/16"± 1/64", Gauge 10-238 (Falcon & Fairlane); Gauge 9550-MFC (Meteor & Comet). To adjust, bend float tab with needle nose pliers to decrease float clearance, or with a thin bladed screwdriver to increase clearance. *CAUTION - To prevent damage to float or "Viton" tipped needle valve, never d cr as clearance by pr ssing d wn on float.*

P wer Valv : Not adjustable. Power valve opens when vacuum drops to 5-8" Hg. (Falcon & Fairlane); 4.5-7.5" Hg. (Comet & Meteor).

Spark Control Valv : Not adjustable.

Automatic Ch k (Comet & Meteor): Centered (On Index). To adjust, loosen cover retaining screws and rotate choke cover and ther mostatic coil assembly.

Choke Piston: To check choke plate initial opening, insert a small wire between piston link and side of slot in air horn, positioning wire so that piston is forced against stopscrew. While holding piston against screw, press check plate lightly towards closed position. Clearance between upper edge of choke valve and air horn wall should be 3/16" (144" Engine); 7/32" (170" Engine. If necessary to adjust, turn stopscrew located in piston housing to obtain proper setting.

Fast Idle (Comet & Meteor): With engine at normal operating temperature, idle speed and mixture properly adjusted, place fast idle screw on high step of fast idle cam and turn fast idle screw to obtain an engine speed of 1500 RPM (Synchro-mesh), 1800 RPM (Auto. Trans.).

Unloader (Comet & Meteor): With throttle valve in wide open position, clearance between inner wall of air horn and choke plate should be 9/32". To adjust, bend unloader lever portion of throttle shaft lever.

OVERHAUL

Disassembly: Air Hom - Remove fuel inlet fitting, gasket, and screen, then compress air cleaner bracket with channel lock pliers and remove bracket from air horn. *CAUTION - Do not compress bracket more than is necessary to clear air horn.* On automatic transmission cars, remove dashpot and bracket. On Comet & Meteor, remove fast idle cam retaining screw and disconnect choke operating rod from choke shaft lever, then remove automatic choke cover and gasket and the adapter plate and gasket. On all models, remove air horn attaching screws and remove air horn and gasket. Remove plastic float hinge pin, float, and needle. Remove power valve piston assembly with tool 10-238 (Falcon & Fairlane); 9904-E (Comet & Meteor). On Comet & Meteor, remove cotter pin retaining choke piston link to choke plate. On all models, remove choke plate screws and remove plate from choke shaft. On Comet & Meteor, remove choke operating rod lever from choke shaft. On all models, slide choke shaft out of air horn. On Falcon & Fairlane, remove choke shaft operating lever spring from slots and separate choke shaft and operating lever.

Main Body - Tip throttle body to remove accelerating pump needle, then remove nut and lockwasher from throttle shaft and remove accelerating pump operating lever and link. Pull pump piston from main body and remove piston cup. Remove accelerating pump ball check retainer and ball, then remove spark control valve and gasket. Remove main jet using a main jet socket wrench. Remove power valve, pin, and spring with tool 10-185 (Falcon & Fairlane); 9904-G (Comet & Meteor), then remove idle mixture adjusting screw and spring. If it is necessary to remove throttle valve plate and shaft, lightly scribe a light line along throttle shaft so plate can be installed in its exact original position. *NOTE - Throttle plate and shaft are not interchangeable between carburetors, nor are they serviced as separate parts.*

Reassembly: Air Horn - On Falcon & Fairlane, position choke shaft operating lever and spring on choke shaft and slide choke shaft into air horn. On Comet & Meteor, install choke shaft in air horn, then position operating rod lever and piston link. *NOTE - D not install lev r retaining screw at this time.* On all models, install choke plate and hold plate in a closed position while installing attaching screws. On Comet & Meteor, install choke operating lever screw. On all m dels, open and close choke to make sure there is no binding. If choke is operating freely, fully tighten attaching screws and stake the screws with duckbill pliers or other suitable staking tool. On Comet & Meteor, secure choke piston link to choke plate with cotter pin. On all models, install power valve piston with tool 10-236 (Falcon & Fairlane); 9904-F (Comet & Meteor). Use a prick punch to stake piston assembly in four places to air horn. Install fuel inlet needle, float and plastic hinge pin. *CAUTION - Do not tap needl into its s at, causing damage to "Vito n" tipped n edle valv .* Adjust float level (see "Float Level Adjustment" above). Carefully compress air cl aner bracket and install bracket in slots in carburetor air horn.

Main Body - If throttle plate was removed, reinstall it and align plate with previously scribed marks. Install idle mixture screw and spring and turn screw in until it is lightly seated, then back off 1-1½ turns. Install power valve assembly with tool 10-185 (Falcon & Fairlane); 9904-G (Comet & Meteor). *NOTE - Spring must be positioned on shoulder of needl and th assembly must be placed on t ol and installed in main body with main body in an inv rted positi n.* Install main jet using same tool used for removal. Install spark control valve and gasket, then install accelerator pump ball check and retainer. *NOTE - Proj ction of retainer must be positioned over th ball check. S at ball check with one gentle tap of a light hamm r and a brass drift.* Install accelerating pump piston cup on pump assembly and install it into main body. *NOTE - Plastic pump guide must be p sitioned properly to avoid interference with air horn.* Install accelerating pump lever, lockwasher and nut, then install connecting link in hole closest to throttle shaft (warm weather) and hole furthest from throttle shaft (cold weather). Install accelerating pump needle valve in passage next to pump rod. Position cover gasket and air horn on main body and install retaining screws. Install carburetor identification tag under the end bowl retaining screw. On Comet & Meteor, install automatic choke adaptor plate and gasket and the cover plate and gasket. *NOTE - Tab of thermostatic spring must b positioned so spring pressure closes chok plat .* Lock cover in position with screws and retainers so that index mark is at its midposition (centered on index). Position fast idle cam operating rod in choke lever and fast idle cam, then secure cam with shoulder screw. On all models with automatic transmission, install dashpot assembly. On all models, install fuel inlet fitting and screen.

SERVICE PARTS: Gasket Set - Ford Part No. C2DZ-9502-A (Falcon & Fairlane); Mercury Part No. C2GY-9502-A (Comet & Meteor).

Repair Kit - Ford Part No. C2DZ-9590-A (C2DE-9510-A,B); C2DZ-9590-B (C2DE-9510-C,D); C2DZ-9590-C (C2DE-9510-L,M); C2DZ-9590-D (C2DE-9510-N,R); C2DZ-9590-B (C2DE-9510-J,K). Mercury Part No. C2GY-9590-A (C2GE-9510-A,B); C2GY-9590-B (C2GE-9510-C,D); C2GY-9590-D (C2GE-9510-J,K).

HOLLEY SINGLE BARREL MODEL 1920 CARBURETORS

DODGE DART & PLYMOUTH 6 CYL.	Holley No.
225" Eng. (Synchro-mesh)	R-2418A
225" Eng. (Auto. Trans.)	R-2419A
DODGE LANCER & PLYMOUTH VALIANT	**Holley No.**
170" Eng. (Synchro-mesh)	R-2136A
170" Eng. (Auto. Trans.)	R-2416A
225" Eng. (Synchro-mesh)	R-2303A
225" Eng. (Auto. Trans.)	R-2417A

►*CLOSED CRANKCASE VENTILATION NOTE:* Carter BBS Carburetor used on all models with closed crankcase ventilation.

DESCRIPTION: Single barrel downdraft type of new design consisting of a single casting (air horn, main body and throttle body are integral). A separate fuel bowl cover is used to enclose the float assembly. Power valve (economizer) and accelerating pump assemblies are diaphragm type. The float in this carburetor is made of a solid plastic material. A separate "cross-over" type automatic choke is used with the choke piston incorporated into the air horn assembly.

ADJUSTMENT

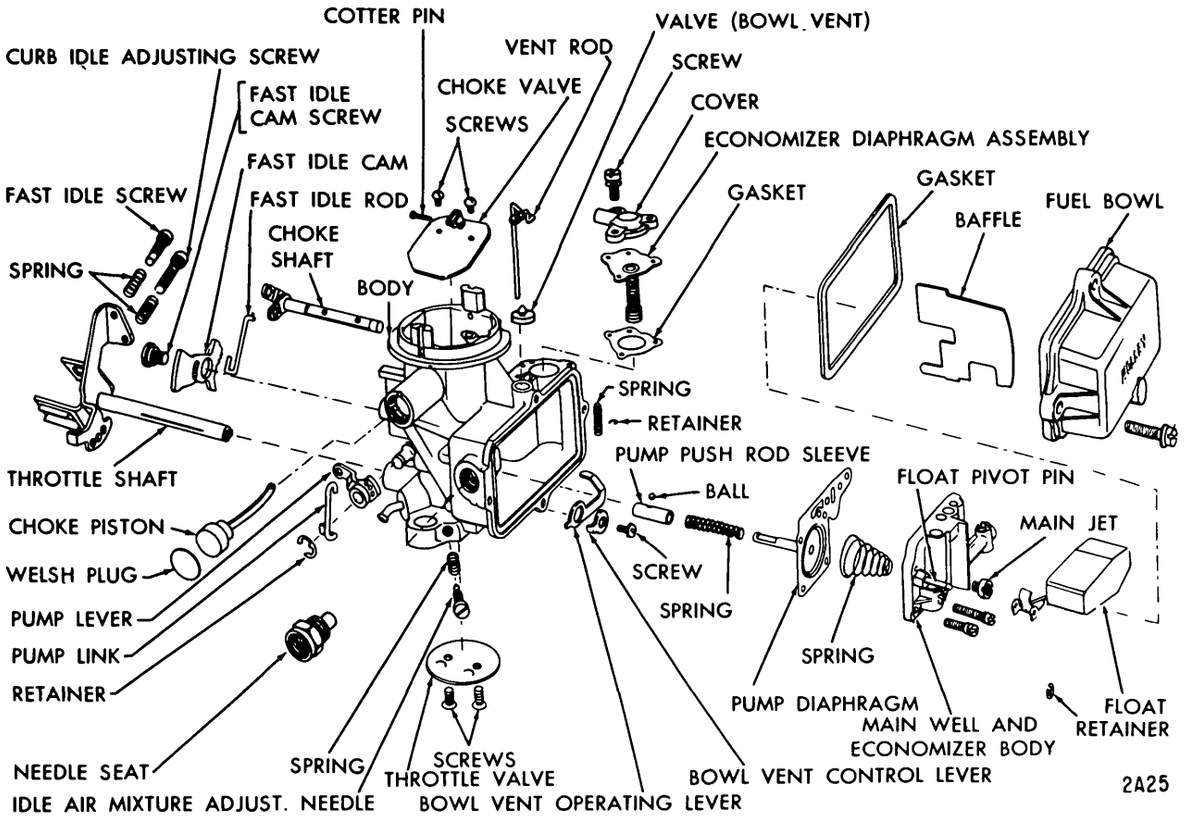
Idling Adjustment: If initial adjustment required to warm-up engine, turn idle mixture screw in until lightly seated, then back screw out approximately 1 turn. Operate engine at fast idle until normal operating temperature is reached, then adjust as follows:

Idle Mixture & Speed Setting - *NOTE - Turn headlights on to assure setting idle speed to compensate for alternator load, then proceed as follows:* On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank. Adjust idle speed screw to obtain an engine speed of 550 RPM, making sure that choke valve is fully open and that fast idle adjusting screw is not contacting fast idle cam. Adjust idle mixture screw to obtain highest engine RPM, then turn idle mixture screw clockwise (leaner) until engine speed starts to drop. Turn screw in opposite direction just enough to recover speed lost. Adjust idle speed screw as necessary to bring engine speed to 550 RPM. Repeat adjustment of idle mixture screw. When idle speed is correct, on automatic transmission cars, screw ball joint connector at accelerator bellcrank up or down until ball on bellcrank freely enters socket, then snap into place.

Fast Idle Adjustment (On Car): With engine at normal operating temperature and running, open throttle slightly and rotate fast idle cam until fast idle screw contacts second step of fast idle cam (step below highest step), then release throttle. Rotate fast idle screw to obtain an engine speed of 1500 RPM (Synchro-mesh); 1800 RPM (170" Eng. with Auto. Trans.); 1700 RPM (225" Eng. with Auto. Trans.).

Fuel Level Check: *NOTE - This is a check only. To adjust fuel level, see "Float Level" below.* With engine running and car on a level floor, remove power valve (economizer) diaphragm cover and assembly. Measure distance from machined surface of opening to the exact fuel surface with a 6" depth gauge. This measurement should be 11/16".

Bowl Vent Adjustment: With throttle valve at curb idle speed, it should be possible to insert a 1/16" drill between bowl vent and seat. *NOTE - This measurement should never exceed 3/32".* To adjust, bend tab on operating arm until correct clearance is obtained. *CAUTION - Be sure vent rod does not bind in guide after adjusting.*



HOLLEY SINGLE BARREL (MODEL 1920) CARBURETOR ASSEMBLY

Unloader: Unloader will be properly adjusted when fast idle cam is properly indexed (see below).

Automatic Choke: Centered (on index). *CAUTION - This unit is serviced as a complete assembly. Do not attempt to repair or change the adjustment.*

Fast Idle Cam Index (Carburetor Off Engine): Open throttle valve and hold choke valve in fully closed position, then close throttle valve. Index mark on cam should be centered on end of fast idle screw. To adjust, bend fast idle connector rod at the angle as necessary to center mark on screw,

Float Level (Carburetor Off Engine): *NOTE - The following procedures are new and supersede previous float level adjustment procedures.* With carburetor inverted, position float gauge C-3903 on carburetor body with "touch" leg of gauge at bottom. *NOTE - Use two cover attaching screws to hold gauge in position.* The float should come within 3/32" of gauge (use a 3/32" drill to measure distance). Reverse the gauge and check the "no touch" leg. Float should clear by 3/32" to 1/8". To adjust, bend float tab (which touches end of fuel inlet needle) with a pair of needle nose pliers. *CAUTION - To prevent damage to "Viton" tipped fuel inlet needl and to obtain a corr ct float setting, do not allow float tab to contact needle when bending float tab.* Recheck float setting. After carburetor is installed on engine, check fuel level (see above).

OVERHAUL

DISASSEMBLY: Remove bowl vent rod retaining clip and slide rod and bowl vent valve out of carburetor, then remove bowl vent lever spring. Remove fuel inlet needle valve and seat. Remove power valve (economizer) retaining screws, then lift economizer cover, diaphragm and stem out of carburetor. Remove fuel bowl, baffle and gasket, then slide baffle out of bowl and discard gasket. Remove float retaining clip and slide float off fulcrum pin. Remove screws attaching economizer body and plugs, then remove economizer body. Lift out pump return spring. Slide pump diaphragm and spacer assembly out of fuel bowl. To disassemble pump diaphragm, compress spacer slightly toward diaphragm until ball drops out, slide spacer and spring off diaphragm stem. Use Tool C-3748 and remove main jet from economizer body. Remove pump cam retaining clip and slide cam off pivot, then disengage choke link. Remove idle mixture adjusting screw from throttle flange and remove fast idle and throttle stop screws and springs from throttle lever. Invert carburetor and

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HOLLEY SINGLE BARREL MODEL 1920 CARBURETORS (C nt.)

remove bowl vent operating lever and dog retaining screw, then remove lever and dog from end of throttle shaft. Remove cotter pin connecting choke piston link to choke valve and disengage link from choke plate. Remove screws holding choke valve plate assembly to choke shaft. *NOTE - These screws are staked in place.* Lift out choke valve and slide choke shaft out of carburetor. Use a sharp punch to pierce center of choke piston welch plug and remove plug, then remove piston and link. If necessary to remove throttle valve shaft, mark position of throttle valve in bore and scribe a line across valve at shaft, then remove screws holding valve to shaft and slide shaft out of throttle body and valve out of bore. *NOTE - Valve-to-shaft screws are staked in place.*

REASSEMBLY: If throttle valve and shaft were removed, install shaft and valve, then install new screws, but do not tighten. Hold valve in place with fingers pressing on high side of valve. Tap valve lightly with a screwdriver to seat in throttle bore, then tighten screws securely and stake by squeezing with pliers. Install idle mixture screw and spring, turning it lightly against its seat, then back screw off one full turn. Slide choke piston and link into piston cylinder, with piston link arc uppermost. Install a new welch plug and seat by tapping with a ball peen hammer at center of plug. Slide choke shaft into position, then install choke valve plate assembly. Install new attaching screws, but do not tighten. Check choke valve for binding, then tighten screws and stake in place with pliers. Install fast idle screw and spring and throttle stop-screw and spring in throttle lever. Slide pump diaphragm spacer spring over diaphragm stem, followed by the spacer. Compress spring and spacer far enough to install the ball. Use Tool C-3748 and install main jet in economizer body. Slide pump diaphragm and stem into position in carburetor, then install pump return spring. Turn carburetor so bowl opening is up, then position main well and economizer body in carburetor and tighten attaching screws securely. *CAUTION - Be sure spring is correctly centered.* Engage pump cam link with cam and throttle lever, then install cam and secure with clip. *NOTE - Install link in center hole of throttle lever.* Engage choke link with choke lever and fast idle cam, then place cam in position and install and tighten retaining screw. Position bowl vent operating lever and dog on end of throttle shaft and retain with screw. Slide float into position over fulcrum pin and secure with clip, then install fuel inlet needle, seat and new gasket. Tighten seat securely, then adjust float level (see above). Slide power valve (economizer) diaphragm and stem assembly into position, making sure that vacuum holes are aligned and that stem is on the power valve. Install cover and tighten screws securely. Slide baffle into position in fuel bowl and install fuel bowl cover and gasket. Tighten screws alternately to prevent distorting cover. Slide bowl vent rod down into position, at the same time threading spring over rod, then secure with clip.

SERVICE PARTS: Gasket S t - Holley Part No. 85G-1088 (All Models).
Repair Kit - Holley Part No. 85R-1087 (All Models).

1962 HOLLEY (FORD) SINGLE BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Standard Size	Standard Part No.	Main Metering Jet 1 Size Lean Size	1 Size Lean Part No.	2 Sizes Lean Size	2 Sizes Lean Part No.	Power Jet No.
C1UE-9510-D	.060"	1GA-9533-C	.059"	B4Q-9533-B	.058"	78-9533-C	(19)
C2AE-9510-A	.061"	B4Q-9533-A	.060"	1GA-9533-C	.058"	78-9533-C	(11)
C2AE-9510-AC	.048"	78-9533-B	.....	.....	.....	.....	(12)
C2AE-9510-B	.062"	1GA-9533-B	.060"	1GA-9533-C	.058"	78-9533-C	(11)
C2AE-9510-C	.048"	78-9533-B	.....	.....	.....	.....	(12)
C2AE-9510-D	.048"	78-9533-B	.....	.....	.....	.....	(12)
C2AE-9510-E	.060"	1GA-9533-C	.059"	B4Q-9533-B	.057"	26H-9533	(13)
C2AE-9510-F	.061"	B4Q-9533-A	.059"	B4Q-9533-B	.057"	26H-9533	(11)
C2DE-9510-A,B①	.054"	06H-9533	.053"	B4T-9533-B	.052"	86H-9533	(14)
②	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	(14)
C2DE-9510-C,D③	.060"	1GA-9533-C	.059"	B4Q-9533-B	.058"	78-9533-F	(14)
④	.062"	1GA-9533-B	.061"	B4Q-9533-A	.060"	1GA-9533-C	(14)
C2DE-9510-J,K	.042"	C202-9533-E	.....	.....	.....	.....	..
C2DE-9510-L,M	.056"	78-9533-E	.....	.....	.....	.....	..
C2DE-9510-N,R	.062"	1GA-9533-B	.....	.....	.....	.....	..
C2GE-9510-A ⑤	.054"	06H-9533	.053"	B4T-9533-B	.052"	86H-9533	(14)
⑥	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	(14)
C2GE-9510-B ⑦	.054"	06H-9533	.053"	B4T-9533-B	.052"	86H-9533	(14)
⑧	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	(14)
C2GE-9510-C	.061"	B4Q-9533-A	.060"	1GA-9533-C	.059"	B4Q-9533-B	(14)

Carb. No.	Standard Size	Standard Part No.	Main Metering Jet 1 Size Lean Size	1 Size Lean Part No.	2 Sizes Lean Siz	2 Sizes Lean Part No.	Power Jet No.
C2GE-9510-D ⑨	.061"	B4Q-9533-A	.060"	1GA-9533-C	.059"	B4Q-9533-B	(14)
⑩	.062"	1GA-9533-B	.061"	B4Q-9533-A	.060"	1GA-9533-C	(14)
C2GE-9510-J	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	(14)
C2GE-9510-K	.056"	78-9533-E	.055"	B4T-9533-A	.054"	06H-9533	(14)
C2GE-9510-L	.062"	1GA-9533-B	.061"	B4Q-9533-A	.060"	1GA-9533-C	(14)
C2GE-9510-M	.062"	1GA-9533-B	.061"	B4Q-9533-A	.060"	1GA-9533-C	(14)
C2TE-9510-C	.052"	86H-9533	.....	.....	.....	.....	(15)
C2TE-9510-E	.065"	5GA-9533-A	.063"	5GA-9533-B	.061"	B4Q-9533-A	(16)
C2TE-9510-F	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	(14)
C2TE-9510-G	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	(17)
C2TE-9510-H	.065"	5GA-9533-A	.063"	5GA-9533-B	.061"	B4Q-9533-A	(16)
C2TE-9510-J	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	(16)
C2TE-9510-K	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	(17)
C2TE-9510-L	.064"	1GA-9533-A	.062"	1GA-9533-B	.060"	1GA-9533-C	(17)
C2TE-9510-T	.066"	8MB-9533-B	.064"	1GA-9533-A	.062"	1GA-9533-B	(17)
C2UE-9510-A	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	(18)
C2UE-9510-B	.053"	B4T-9533-B	.051"	59A-9533-A	.049"	59A-9533-B	(20)
C2UE-9510-C	.060"	1GA-9533-C	.059"	B4Q-9533-B	.058"	78-9533-F	(19)
C2UE-9510-D	.053"	B4T-9533-B	.051"	59A-9533-A	.048"	59A-9533-B	(20)
C2UE-9510-E	.068"	1GA-9533-B	.059"	B4Q-9533-B	.058"	78-9533-F	(19)

① - Use on carburetors with identification numbers 2292 or 2346 stamped on main body.
② - Use on carburetors with identification numbers 2292* or 2346* stamped on main body.
③ - Use on carburetors with identification numbers 2344 or 2345 stamped on main body.
④ - Use on carburetors with identification numbers 2344* or 2345* stamped on main body.
⑤ - Use on carburetors with identification number 2311 stamped on main body.
⑥ - Use on carburetors with identification number 2311* stamped on main body.
⑦ - Use on carburetors with identification number 2342 stamped on main body.
⑧ - Use on carburetors with identification number 2342* stamped on main body.
⑨ - Use on carburetors with identification number 2343 stamped on main body.
⑩ - Use on carburetors with identification number 2343* stamped on main body.

(11) - B8A-9594-B
(12) - B5AE-9594-A
(13) - C2AZ-9594-A
(14) - C2DZ-9594-A (Power Valve)
(15) - C1JZ-9594-C
(16) - B8A-9594-A
(17) - C1TZ-9594-D
(18) - C1DE-9594-D
(19) - C1UZ-9594-A
(20) - C1DE-9594-E

1962 HOLLEY SINGLE BARREL CARBURETOR JET SPECIFICATIONS

CHRYSLER CORP. CARBURETORS

Carb. No.	Model	Metering Jet Standard Size	Standard Part No.	Metering Jet 1 Size Lean Size	1 Size Lean Part No.	Metering Jet 2 Size Lean Size	2 Size Lean Part No.
R-2136A	1920	.052"	22R-40-52	.050"	22R-40-50	.048"	22R-40-48
R-2303A	1920	.056"	22R-40-56	.054"	22R-40-54	.052"	22R-40-52
R-2416A	1920	.055"	22R-40-55	.053"	22R-40-53	.051"	22R-40-51
R-2417A	1920	.055"	22R-40-55	.053"	22R-40-53	.051"	22R-40-51
R-2418A	1920	.056"	22R-40-56	.054"	22R-40-54	.052"	22R-40-52
R-2419A	1920	.055"	22R-40-55	.053"	22R-40-53	.051"	22R-40-51

RAMBLER CARBURETORS

Carb. No.	Model	Std. Main Metering Jet Size	Std. Main Metering Jet Part No.	Main Well & Economizer Part No.	Pwr. Valve Restriction Size	Economizer Stem Assy. Part No.
R-2381-1A	1908FC	.051"	22R-40-51	34R-3385A	.032"	25R-166A
R-2446-1	1908FC	.051"	22R-40-51	34R-3185A	.032"	25R-166A
R-2138-1A	1908FC	.055"	22R-40-55	34R-3453A	.037"	25R-166A

1962 ROCHESTER FUEL INJECTION

Corvette (1962)

►*1962 CORVETTE HOT STARTING & UNLOADING NOTE:* Hold throttle valve WIDE OPEN to prevent high manifold vacuum at cranking signal valve (air volume is increased and fuel flow is reduced).

►*FUEL FILTER NOTE:* Either a replaceable element filter or a throw-away canister type filter is used in production. Replace element or canister every 15,000 miles.

DESCRIPTION: Design is similar to previous models except for a new cold enrichment and diffuser cone assembly which incorporates a conventional blade type choke valve. The electrically heated thermostat coil, mounted on air meter inlet, positions the choke valve to provide necessary venturi signal boost for fuel enrichment. Fuel meter design is the same except for a poppet type metering valve in place of the spill plunger.

ADJUSTMENT

Idle Speed & Idle Fuel: For initial adjustment, turn idle speed screw and fuel adjusting screw out 1½ turns from a lightly seated position. With engine at normal operating temperature, adjust idle speed screw for an engine speed of 700 RPM, then adjust idle fuel screw for best engine idle operation. Readjust idle speed screw as necessary. *NOTE - It is possible to develop a condition where the two idle adjusting screws become compl tely out of phase. If this happens, purge system or shut the engine off and repeat Idle Speed & Idle Fuel Adjustment.*

Fast Idle Speed: *NOTE - Before adjusting fast idle speed, check to make sure there is clearance between fast idle screw and edge of fast idle cam when cam is in the "off" position. If necessary, bend connecting link to provide a small amount of clearance.* With engine off, slightly open throttle valve and close cold enrichment, then allow throttle valve to close (this will position fast idle screw on fast idle cam). Release cold enrichment valve and start engine, then adjust fast idle screw to obtain a fast idle speed of 1800 RPM (hot engine).

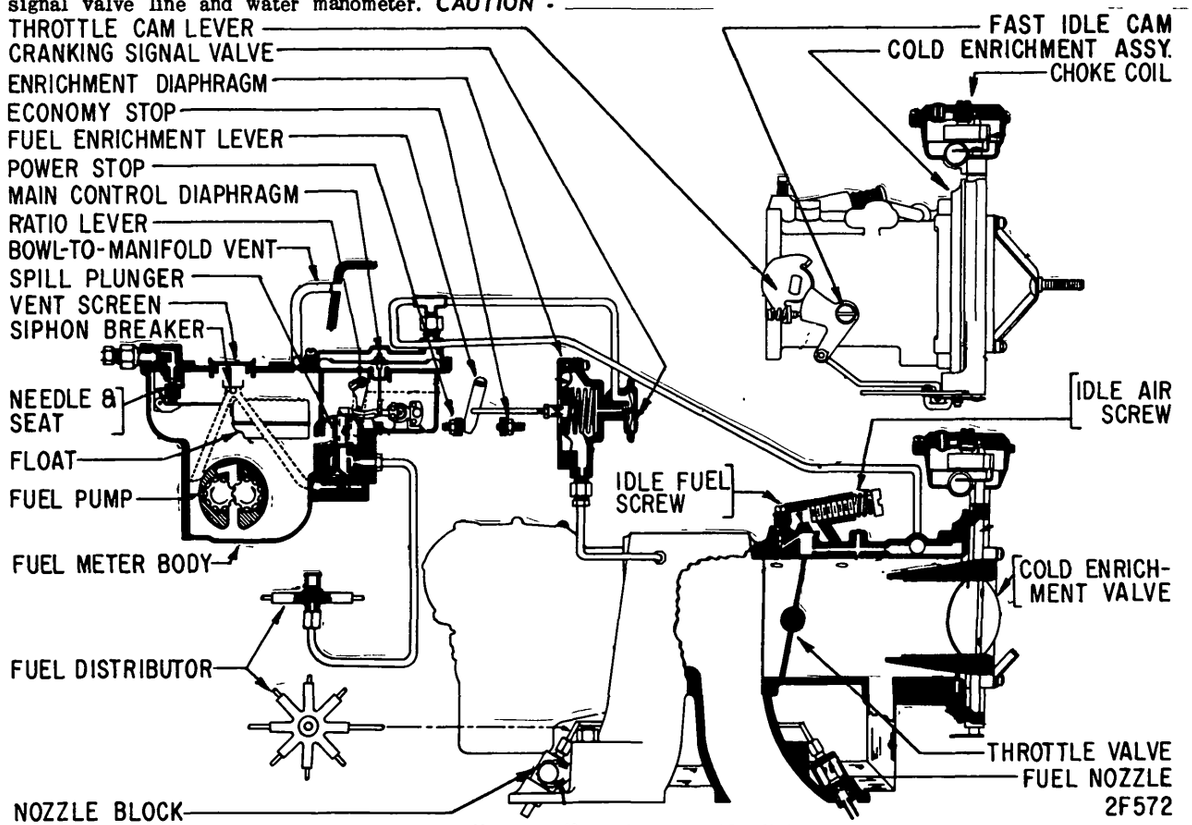
Cold Enrichment: 3 notches lean. To adjust, rotate cold enrichment cover. *NOTE - Check to see that air meter adapter does not interfere with valve linkage at main diaphragm vent tube connection.*

Ratio Lever Stop Settings: With engine at normal operating temperature, proceed as follows:

Manometer Installation - Attach manometer unit, Tool J-7090, in a suitable location (see illustration). Use the two position bracket to obtain the most vertical position possible, then level unit with the attached leveling vial. Open both manometer valves and check water manometer to see if a zero reading can be obtained. Adjust to zero by turning oil leveling screw. *NOTE - If zero reading cannot be obtained, back leveling screw out and add red oil (specific gravity of .826).* Remove both hose adapters on mercury manometer and punch out plug located in each adapter. Install tee fitting in fuel nozzle circuit most easily accessible (see illustration), then connect fuel pressure line to tee fitting and mercury manometer. *CAUTION - Make sure fuel trap inlet is properly located in line.* Connect venturi signal line with clamp to cranking signal valve line and water manometer. *CAUTION - Make sure clamp is closed securely on this line during engind starting, otherwise high vacuum will cause red oil to be lost.* Remove main diaphragm vent tube and install large rubber tube (part of Tool J-7090) in its place. Set mercury manometer at zero inches by sliding scale up or down. Check leveling vial again and adjust as necessary.

Economy Stop - With engine at normal operating temperature and Tool J-7090 installed, check to see that unit is operating on economy stop. *NOTE - If engine will not start with cranking signal valve line disconn-*

CONTINUED ON NEXT PAGE



ROCHESTER "RAMJET" FUEL INJECTION SYSTEM

ROCHESTER FUEL INJECTION (Continu d)

nected, reconnect lin during initial starting procedure. Increase engine speed until a reading of 0.5" is obtained on water manometer, then hold engine at this speed by using fast idle screw and cam. Record reading on mercury manometer, then return engine to a lower speed and repeat the above procedure. Take three readings, the average of which should be 1.0" Hg. ± .1" Hg. To adjust, rotate "Economy Stop" setscrew on Fuel Meter (screw closest to diaphragm) as necessary to obtain correct reading.

Power Stop - With manometer connected as for "Economy Stop" (above), disconnect and plug vacuum line going to enrichment diaphragm. This will cause injection unit to operate on "Power Stop" only. *NOTE - Prolonged operation on "Power Stop" will cause spark plug fouling.* Take three mercury manometer readings in same manner as for "Economy Stop" (above). Average of the three readings should be 2.2" Hg. ± .1" Hg. To adjust, rotate "Power Stop" setscrew on Fuel Meter (screw farthest from diaphragm) as necessary to obtain correct reading.

Float Setting: With fuel reservoir cover inverted and weight of float resting on inlet valve needle, distance from surface of cover to top of float at outer end should be 2 9/32". To adjust, bend float arm.

Float Drop: With fuel reservoir cover held upright and float hanging free, distance between machined surface of cover and bottom of float at outer end should be 2 27/32". To adjust, bend tang on float arm.

Enrichment Diaphragm Clearance: .040" minimum, measured with a wire gauge between diaphragm and diaphragm housing (through rod opening in housing). To adjust, change rod length as necessary. *CAUTION - Hold shaft securely while loosening locknut.*

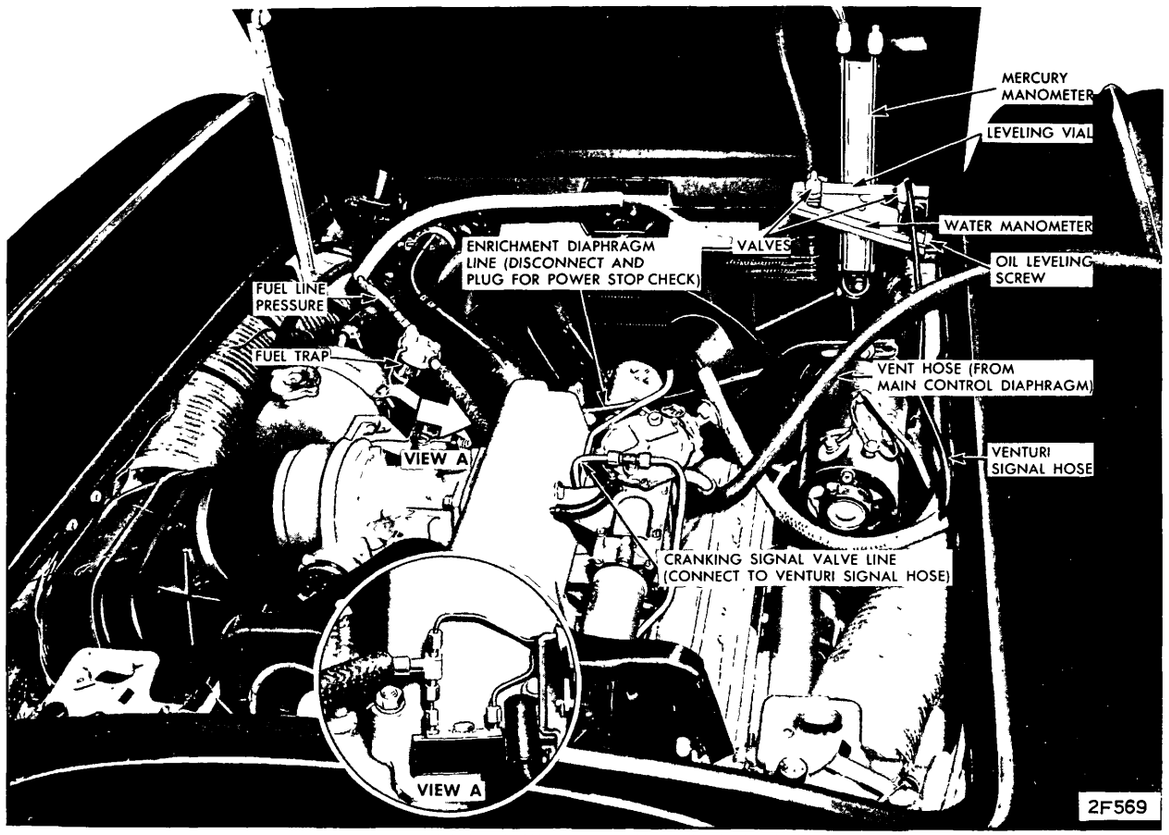
Throttle Valve Clearance: .0045" clearance, measured between throttle valve and air meter body directly below idle fuel screw with throttle resting solidly against stopscrew. To adjust, remove lead plug in boss on housing adjacent to throttle valve lever and turn setscrew. *CAUTION - Change throttle valve setting only if a poor or no-idle condition can be traced to improper setting.*

TROUBLE SHOOTING & DIAGNOSIS

FAILS TO START: No fuel to fuel meter (check fuel supply and engine fuel pump). No fuel at nozzles (check for broken fuel meter pump drive cable). No vacuum signal at main control diaphragm (check for leaking or ruptured main control diaphragm, defective cranking signal valve, or broken main control diaphragm linkage).

DIFFICULT STARTING: Improper cold starting procedure (check fast idle cam setting and operation; check for choke valve stuck open). Improper hot starting or unloading procedure (use wide open throttle when starting; che ck for defective cranking signal valve). No vacuum boost at disconnected signal line (check for defective cranking signal valve or cold enrichment housing; check for vacuum leaks at main control diaphragm or signal line).

NO IDLE (High Sp d Operati n Not Aff ct d): Idle adjusting screws out of phase *(see "Adjustments" abov)*. Idle speed too low- distributor advance in-



MANOMETER INSTALLATION FOR TESTING

correct (adjust idle speed, check distributor, check air meter throttle valve clearance). Idle fuel screw turned all the way out (check for dirty air meter passages, vacuum or air leaks, or defective main diaphragm). Idle fuel screw turned all the way in (check nozzle vent tubes and nozzles for plugged condition; check nozzle-to-insulator gaskets for defects). No idle boost signal (check defective cranking signal valve; check for plugged main control diaphragm vent tube, check for sticking spill plunger, check for main diaphragm shrinkage).

ROUGH IDLE (High Speed Operation Not Affected): Idle adjusting screws out of phase *(see "Adjustments" above)*. Excessive fuel at idle (purge system by accelerating a few times to clear manifold, check for defective cranking signal valve, check for plugged nozzles and nozzle vent tubes, check main diaphragm vent tube for obstruction, check engine valve lash setting).

ERRATIC IDLE SPEED (High Speed Operation Not Affected): Engine idle speed fails to return to same speed each time pedal is operated (check for sticking throttle valve shaft at air meter bushings or for linkage binding, check for sticking spill plunger or choke valve).

POOR ACCELERATION (Idl & Wide Op n Throttle Operation Not Affected): Unit will take throttle when applied slowly (check for defective fuel meter pump drive cable or pump drive shaft, check for dirty signal tube, check for interference between enrichment housing and diaphragm, check for improper "Power Stop" setting, check for sticking spill plunger).

POOR PERFORMANCE: Hesitation or flat spot (check for defective main control diaphragm or vacuum leaks; check for faulty spill plunger operation, check for incorrect "Economy Stop" setting). Surging at steady engine speed (check for plugged nozzles or nozzle vent tubes, check for incorrect "Economy Stop" setting, check for faulty integral siphon breaker operation, check for plugged main control diaphragm vent tube). Wide open throttle - engine missing (check fuel meter pump drive cable and drive shaft for out of square condition, check engine fuel pump, check for dirty air cleaner or fuel filter, check for defective spark plugs). Excessive fuel consumption (check for defective cranking signal valve or cold enrichment housing valve sticking, check for open electric choke coil, check for fuel leakage or faulty integral siphon breaker operation, check for fouled plugs).

ROCHESTER 4GC 4-BARREL CARBURETORS

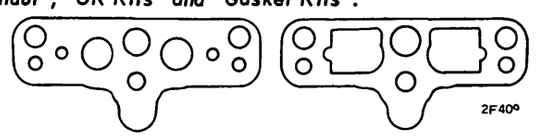
	Rochester No.
BUICK (EXC. SPECIAL)	
Series 4400, 4600, 4800	7020040
Series 4400, 4600, 4800 (CCV)	7020041
Service Replacement	7016200
BUICK SPECIAL	
Synchro-mesh Trans.	7020045
Auto. Trans.	7020043
Service Replacement (Synchro-mesh)	7016151
Service Replacement (Auto. Trans.)	7016150
CADILLAC	
All Series (Without Air Cond.)	7019030
All Series (Air Cond.)	7019031
Service Replacement	7016101
CHEVROLET PASS. CARS	
327" Eng. (Without Air Cond.)	7020006
327" Eng. (Air Cond.) Early	7020012
327" Eng. (Air Cond.) Late	7020022
Service Replacement	7016211
OLDSMOBILE (EXC. F-85)	
Super 88 & 98 (Without Air Cond.)	7020950
Super 88 & 98 (Air Cond.)	7020955
Service Replacement	7016217
OLDSMOBILE F-85	
Without Air Conditioning (Early)	7020952
Air Conditioning (Early)	7020953
All Models (Later) ℂ	7020985
All Models (Latest)	7022752
Service Replacement (7020952, 53)	7016224
Service Replacement (7020985)	7016298
Service Replacement (7022752)	7016269

ℂ - Carburetor No. 7020984 may be found on some models without air conditioning.

PONTIAC TEMPEST	
4 Cyl. Eng. (Synchro-mesh)	7020079
4 Cyl. Eng. (Auto. Trans.)	7020066
V8 Eng. (Synchro-mesh & Auto. Trans.)	7020078
Service Replacement, 4 Cyl. Eng. (Synchro-mesh)	7016234
Service Replacement, 4 Cyl. Eng. (Auto. Trans.)	7016233
Service Replacement, V8 Eng.	7016255

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 BUICK SPECIAL & 1962 PONTIAC TEMPEST V8 4-BBL. CARBURETOR VENTURI CLUSTER GASKET REPLACEMENT CAUTION:* When replacing the venturi cluster gasket on Carburetors No. 7020043, 7020045, 7020078, make sure the gasket is Part No. 7007803 (see illustration). DO NOT USE Gasket No. 7021637 on these carburetors. *NOTE - Both f thes gaskets ar included in some "Overhaul", "OK Kits" and "Gasket Kits".*

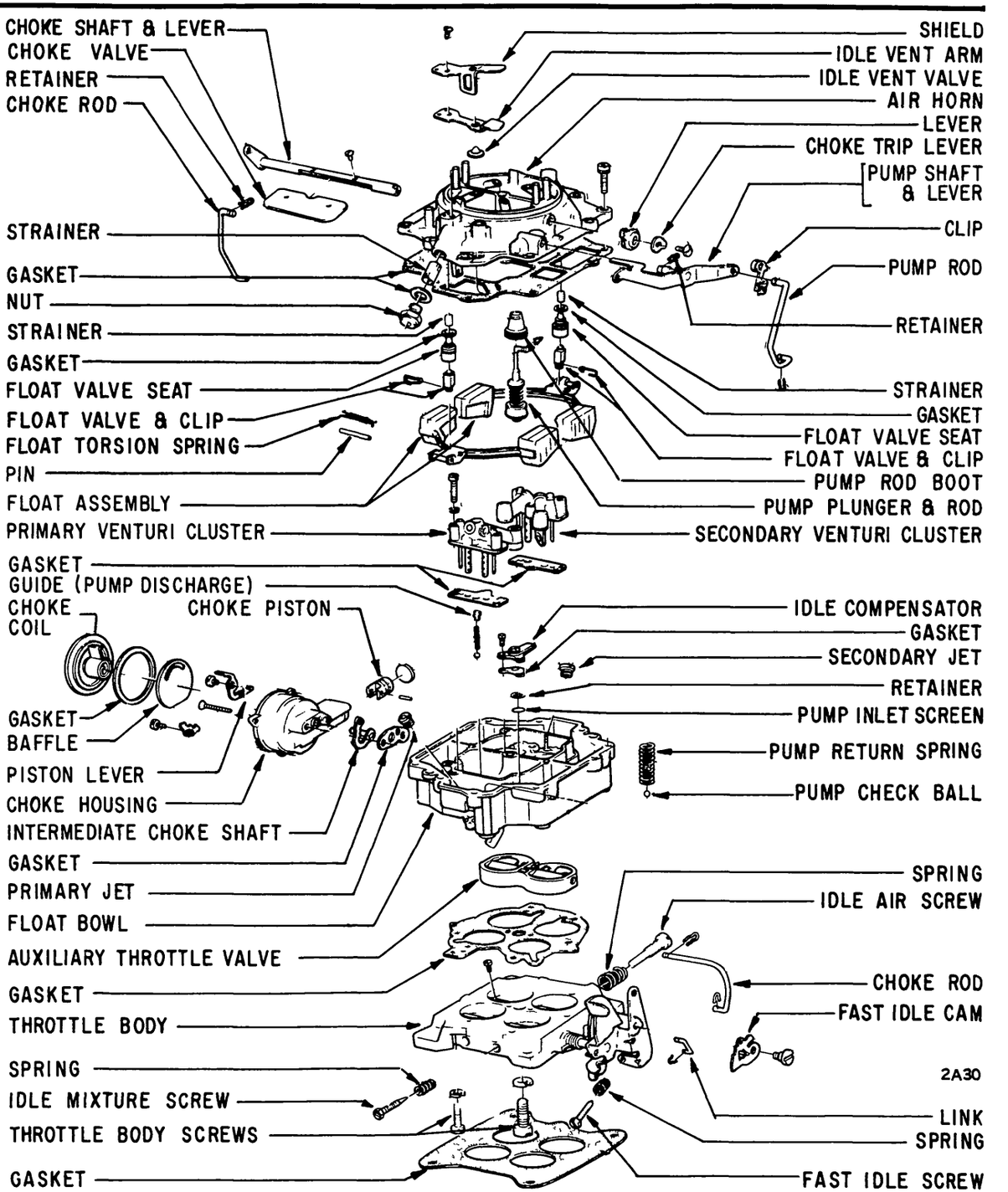


7007803 7021637

VENTURI CLUSTER GASKET

►*1961-62 BUICK SPECIAL HESITATION ON ACCELERATION CORRECTION:* If carburetor accelerator pump system is not defective, trouble may be due to

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ROCHESTER 4-BARREL CARBURETOR ASSEMBLY (TYPICAL)

ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

incorrect pump stroke setting which depends on average daytime temperature. S *"Acc lerating Pump Adjustment" below.*

DESCRIPTION: 4-barrel downdraft type with automatic choke. Design is similar to carburetors used on corresponding previous models.

ADJUSTMENTS: *Make all adjustments in sequence given below (except for Idle Speed & Mixture adjustments).*

►*CADILLAC & PONTIAC TEMPEST 4 CYL. ENG. IDLE SPEED SETTING NOTE:* Throttle valves are completely closed at low idle speed and air is admitted through Idle Air System which consists of a bypass passage (primary side only) through which air for closed throttle operation is taken from above the throttle bores through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore. An idle speed screw (single screw for both primary bores) controls the adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used).

►*IDLE SETTING CAUTION (CARS WITH IDLE COMPENSATOR):* Make sure that idle compensator is closed when adjusting idle speed. If necessary, idle compensator valve can be closed with a pencil. After idle speed is adjusted, press down on idle compensator valve to see if speed is affected. If speed drops, readjust idle speed, being sure that idle compensator valve is closed.

Idle Speed & Mixture Setting (Except Cadillac & Pontiac Tempest 4-Cyl): If preliminary adjustment required to warm-up engine, set both idle mixture screws 1½ turns open from a lightly seated position. With engine at normal operating temperature (choke valve wide open and fast idle inoperative so that engine idles at hot or slow idle speed), set throttle stopscrew for correct idle speed as listed below. Adjust both primary idle mixture screws equally so that engine idles smoothly and RPM is at maximum (see special notes below). Recheck idle speed.

►*BUICK NOTE:* Turn each adjusting screw in until engine begins to lag or run unevenly from lean mixture then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough to provide smoothest operation. Adjust both screws alike.

►*CHEVROLET NOTE:* Turn adjusting screw in to lean mixture until engine is moderately rough (slight vacuum and RPM drop), then turn screw out ¼ turn to enrich mixture. Adjust both screws alike.

►*OLDSMOBILE NOTE:* After adjusting idle mixture screws (above) for smoothest idle with highest RPM, turn each adjusting screw out ¼ turn (vacuum and RPM will drop slightly).

Idle Speed & Mixture Setting (Cadillac & Pontiac Tempest 4-Cyl. Eng.): On Cadillac, disconnect parking brake vacuum diaphragm line from neutral safety switch and tape over switch opening to prevent any air leak (hose must be disconnected at this connection only). On all cars, with engine at normal operating temperature, transmission in "N" (Neutral) choke valve fully open and carburetor on slow idle speed (throttle valves fully closed), connect a tachometer to engine. On Cadillac, loosen front and rear throttle valve jam nuts at carburetor throttle lever trunnion. On all cars, place automatic transmission in "D" (Drive), then adjust engine idle speed to (see below) using the idle air bypass screw (idle speed adjusting screw on throttle body). Turn one idle mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with other idle mixture screw. Check and reset engine idle speed. Repeat idle mixture adjustment until turning the idle mixture screws will not increase engine speed and the smoothest idle is obtained. *CAUTION - Idle mixture screws must be adjusted last and must always be re-adjusted when the idle speed screw setting is changed.*

Idle Speed Setting (Eng. RPM)

Car Model	Synchro-mesh	Auto. Trans.
Buick (All Models)	⑤ 525	⑤⑥ 525
Cadillac		Ⓒ② 480
Chevrolet	500	Ⓒ 475
Oldsmobile (All Models)	③⑦ 550	Ⓒ③⑦ 500
Pontiac Tempest V8	580-600	Ⓒ③ 580-600
Pontiac Tempest 4-Cyl.	③ 680-700	Ⓒ④ 580-600

Ⓒ - Transmission in "D" (Drive).
② - Air Conditioner operating.
③ - Air Conditioner turned off.
④ - Air Cond. cars 630-650 with air conditioner off.
⑤ - Transmission in "P" (Park).
⑥ - Air Cond. cars 575 RPM.
⑦ - Air Cond. cars 550 RPM.

Anti-Stall Dashpot & Throttle Return Check Adjustment: *See "Throttle Linkage Adjustment" under CARBURETOR on car model page.*

Float Setting: *Both Primary and Secondary Float Assemblies must be checked and adjusted separately and FLOAT LEVEL & FLOAT DROP (Vacuum Assist Spring on carburetors with this feature) must be checked for each assembly.* Remove bowl cover and float assemblies from carburetor but do not remove bowl cover gasket.

Primary & Secondary Float Level Adjustment (Chevrolet & Pontiac Tempest 4 Cyl.): *NOTE - Both floats are adjusted in same manner. Different gauges and settings required for primary and secondary floats are listed below.* With bowl cover and float assembly inverted and gasket in place, install correct float level gauge over floats and against curvature of air horn so that gauging legs rest on cover gasket with locating lugs on inner legs extending into air horn. Make two adjustments as follows: 1) With gauge vertical, upper surface of floats should just touch edge of cutouts in float gauge. Adjust by bending arm at rear. 2) With gauge still in place and centered in air horn, floats should be centered between gauge legs. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub on sides of gauge legs.

Primary Float Level Adjustment (Except Chevrolet & Pontiac Tempest 4 Cyl.): *NOTE - Pump side of gauge should always face pump assembly when checking float level.* With air horn inverted and gasket in place, install float level gauge under heel of primary float With gauge vertical, float should just touch gauge. To adjust, bend float arm at rear. Slide gauge under toe of floats. Lower surface of float should just touch gauge. Bend float arm adjacent to float as necessary. Lower surface of floats should be parallel with air horn surface and gauge should slide freely under floats. On all carburetors (except Buick, Buick Special & & Pontiac Tempest V8), leave gauge under floats and hold lug on lower surface of gauge against outside of air horn casting. Floats should just center in cutout portion between gauge legs. To adjust, bend float arms horizontally until floats are centered at heel and toe. Move float assembly from side to side at hinge pin and check to make sure floats do not rub sides of gauge legs.

Secondary Float Level Adjustment (Exc pt Ch vrolet & Pontiac Tempest 4 Cyl.): After checking primary floats (above) and with air horn inverted, place float gauge over heel end of secondary floats so that gauging legs rest on cover gasket with locating lugs on inner gauge legs extending into air horn. Make two adjustments as follows: 1) With gauge vertical, upper surface of floats should just touch edge of cutouts in gauge. Adjust by bending float arms at rear. 2) With gauge still in place and centered in air horn, floats should be centered between gauge legs. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub on sides of gauge legs. Check and adjust float toe.

Secondary Float Toe Adjustment (Buick, Buick Sp cial & Pontiac Tempest): With air horn inverted and gasket in place, distance from center of dimple on side of float at toe to gasket should be 3/8". To adjust, bend toe of float as necessary while holding float arm adjacent to float. Recheck float heel adjustment if toe adjustment is necessary.

Secondary Float Toe Adjustm nt (Cadillac & Oldsmobil): With bowl cover and float assembly inverted, raise gasket and sight across flat surface of cover at toe end of secondary floats. Toe end of each float must be FLUSH with this surface. Adjust by bending float arm at point close to float. *CAUTION - Aft r making this adjustment, recheck float l v l and adjust if n cessary.*

Float Alignment (Except Chevrol t): After centering floats, recheck alignment by aligning screw holes in air horn gasket with screw holes in air horn, then make sure float pontoons are centered in cutout areas of gasket and sides of float pontoons are parallel with adjacent edges of gasket.

Float L v l S tting

Car Model & Carb.	Height & Gaug No. Primary	S condary
Buick (7020040, 41)	9/64" BT-178	1 3/8" BT-171
Buick Spec. (7020043, 45)	9/64" BT-178	1 3/8" BT-171
Cadillac (All)	15/64" BT-172	1 3/8" BT-172
Chevrolet (All)	1 33/64" BT-182	1 37/64" BT-183
Olds (7020950, 55)	9/32" BT-171	1 3/8" BT-171
Olds F-85 (7020952, 53)	7/32" BT-198	1 3/8" BT-198
Olds F-85 (7020984, 85)	9/32" BT-171	1 3/8" BT-198
Olds F-85 (7022752)	9/32" BT-171	1 3/8" BT-198
Tempest (7020066, 79)	1 21/64" BT-196	1 21/64" BT-196
Tempest (7020078)	9/64" BT-178	1 3/8" BT-171

Primary Float Vacuum Assist Spring Adjustm nt (Cadillac & Oldsmobile): With bowl cover and float assembly held upright, hold vacuum piston in full up position, jounce floats slightly to make certain that vacuum assist spring cup is not binding on piston stem. Use a scale to measure from face of gasket to center of dimple on side of primary float at toe (free end) with power piston held in up position. If this distance is not 1 3/32" (Cadillac), 1 1/32" (Olds F-85, 7020984, 7020985); 29/32" (Olds F-85, 7020952, 7020953), adjust by bending tang on

CONTINUED ON NEXT PAGE

ROCHESTER 4GC 4-BARREL CARBURETORS (Cont.)

float arm which engages power piston stem. Use Bending Tool BT-142.

Float Drop Setting: *Check the Float Drop after Float Level Setting & Vacuum Assist Spring Adjustments have been made.*

Primary & Secondary Float Drop Adjustment (Exc. Chevrolet) - *NOTE - On carburetors with Vacuum Assist Spring Primary Floats, vacuum assist piston must be fully extended in the "down" position when checking float drop of primary floats.* With bowl cover and float assembly held upright, use a scale to measure from face of gasket to center of dimple on side of float at toe (free end). *CAUTION - On vacuum assist spring type primary floats, make certain that piston is fully extended so that float is positioned by stop tang on rear of float arm rather than by tang engaging vacuum piston spring.* If this distance not correct as shown in table below, adjust as follows: Bend tang at rear of float arm toward needle seat (or balance spring) to decrease drop, and away from needle seat (or balance spring) to increase drop.

Float Setting

Car Model	Primary Floats	Secondary Floats
Buick (Exc. Spec.)	1 7/16"	1 5/16"
Buick Special	1 9/16"	1 9/32"
Cadillac	1½"	1 5/16"
Olds (Exc. F-85)	1½"	1 5/16"
Olds F-85 (7020952,53)	1½"	1 3/8"
Olds F-85 (Others)	1½"	1 1/8"
Tempest 4 Cyl.	1⅛"	1 1/4"
Tempest V8	1 9/16"	1 9/32"

Primary & Secondary Float Drop Adjustment (Chevrolet) - With bowl cover and float assembly held upright, use a scale to measure from face of gasket to lowest portion of float (bottom of float at center). This distance should be 2¼". Adjust by bending tang at rear of float arm toward needle seat to decrease float drop, away from needle seat to increase float drop.

Accelerating Pump Adjustment: Back out slow idle speed and fast idle speed screws until throttle valves are completely closed. Make sure pump rod is connected in proper hole of arm as indicated in table below. Hold throttle valves in closed position and use indicated gauge (see table below) or scale to check pump adjustment. *NOTE - If gauge is used, place it on top of air horn next to pump plunger.* End of pump plunger shaft should slide freely into hole in gauge marked "Pump". If a scale is used, measure distance from top of air horn casting to bottom of pump plunger shaft. If height not correct (see table below) adjust by bending pump rod with Tool BT-18.

Accelerating Pump Stroke Setting

Car Model	Gauge No. ⑥	Pump Shaft Height
Buick (Exc. Spec.)	Scale	①1 1/64"
Buick Special	Scale	②61/64"
Cadillac	BT-180	27/32"
Chevrolet	BT-145	31/32"
Olds (Exc. F-85)	BT-166A	③1 1/64"
Olds F-85	BT-213	④1 1/64"
Tempest 4 Cyl.	Scale	③⑤15/16"
Tempest V8	Scale	①61/64"

① - With pump rod in center hole of pump arm.
② - Dependent on average daytime temperature as follows: Below 0°F (Inner hole); 0° to 60°F (Center hole), Above 60°F (Outer hole). *NOTE - Place pump rod in center hole of pump arm for checking and adjusting, then replace in proper hole.*
③ - With pump rod in inner hole of pump arm.
④ - With pump rod in outer hole of pump arm.
⑤ - Five holes in pump arm (Inner hole is No. 1). Normal setting is with rod in No. 3 (center) hole. Install in other holes to provide satisfactory performance. Adjust idle vent after moving pump rod from one hole to the other.
⑥ - Use either indicated gauge or scale.

Atmospheric Idle Vent Adjustment: Cadillac - *NOTE- Make fast idle adjustment before adjusting idle vent.* With fast idle screw on high step of fast idle cam, vent valve should just be closed. To adjust, bend tang on pump lever.

Chevrolet & Oldsmobile - Place combination "Pump" and "Vent" gauge BT-145 (Chevrolet); BT-166A (Oldsmobile, Exc. F-85); BT-213 (Oldsmobile F-85) next to pump plunger shaft. Open throttle valves to point where vent valve is just closed. With throttle valves held in this position, hole in gauge marked "Vent" should slide freely over pump shaft. To adjust, bend tang on pump lever. If a scale is used instead of gauge, distance from top of air horn to bottom of pump plunger shaft should be 31/32" (Chevrolet); 29/32" (Oldsmobile, Exc. F-85); 15/16" (Oldsmobile F-85).

Pontiac 4-Cyl. Tempest - Measure distance from top of air horn casting to bottom of pump plunger rod (primary throttle valves opened to a point where idle vent valve just closes). This distance should be 55/64" (Synchro-mesh); 53/64" (Auto. Trans.). To adjust, bend tang on pump lever.

Automatic Choke Setting (All Models): Loosen three retaining screws and rotate thermostat cover until index mark is in line with correct mark on housing (see table below). Tighten cover retaining screws. *NOTE - "Centered" point on housing is indicated by a raised section on housing casting.*

Automatic Choke Setting

Car Model	Choke Setting
Buick (All Models)	Centered (At Index)
Cadillac	1 Point Rich
Chevrolet	Centered (At Index)
Oldsmobile (All Models)	Centered (At Index)
Olds F-85 (7020952,53)	1 Point Rich
Olds F-85 (7020985, 7022752)	2 Points Rich
Tempest 4-Cyl. (All)	①1 Point Rich
Tempest V8	Centered (At Index)

① - Supersedes previous setting of "Centered At Index" on synchro-mesh transmission cars.

Intermediate Choke Rod Adjustment (Exc. Oldsmobile & Olds. F-85) *NOTE - This rod connects lever on choke valve shaft to choke lever on automatic choke housing.* Hold choke valve completely closed and bend intermediate choke rod as necessary so choke piston is flush with end of choke piston sleeve.

Oldsmobile & Olds F-85 - *NOTE - Make fast idle adjustment before adjusting intermediate choke rod (see below).* With fast idle properly adjusted, place fast idle screw on high step of fast idle cam and raise intermediate choke lever to its full up position. Make sure all lash is removed from rods in slots. Choke piston should be flush to 1/32" out from end of choke piston sleeve. To adjust, bend intermediate choke rod to correctly position choke piston.

Fast Idle Setting: *NOTE - Chevrolet Fast Idle adjustment will be correct when "slow idle" speed and choke rod adjustments have been made. On other models, the "On Engine" fast idle adjustment must be made after carburetor installed to insure proper warm-up performance.*

"Off Engine" Adjustment - Turn fast idle screw against high step of fast idle cam until throttle opening or clearance between edge of throttle valve and bore on side opposite idle mixture adjusting screws is correct as shown in table below.

Fast Idle Setting

Car Model	Throttle Valve Opening	Checking Gaug
Buick (Exc. Spec.)	.028"	BT-79
Buick Special	.032"	BT-121
Cadillac	.024"	BT-90
Oldsmobile (Exc. F-85)	.024"	BT-90
Oldsmobile F-85	.024"	BT-90
Tempest 4-Cyl.	.028"	BT-79
Tempest V8	.032"	BT-121

"On Engine" Adjustment - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of fast idle cam (Exc. Buick & Buick Special); on low step of cam (Buick & Buick Special). Start engine and adjust fast idle speed for correct engine RPM as shown in table table below. *NOTE - On Chevrolet, fast idle engine RPM will be correct after hot or slow idle speed has been correctly set.*

Fast Idle Speed

Car Model	Engine Speed
Buick (All Models)	①625 RPM
Cadillac	1700-1750 RPM
Oldsmobile	1600 RPM
Olds F-85	1800 RPM
Tempest 4-Cyl. (Synchro-mesh)	2800 RPM
Tempest 4-Cyl. (Auto. Trans.)	3000 RPM
Tempest V8	2800 RPM

① - With fast idle screw on low step on fast idle cam.

Choke Rod Adjustment: *NOTE - On all carburetors except Oldsmobile (All Models), this rod connects choke valve shaft to fast idle cam. On Oldsmobile (All Models), the rod connects intermediate choke lever to fast idle cam.* Rotate choke valve and fast idle cam until fast idle screw (slow idle screw on Chevrolet) is in contact with SECOND step of fast idle cam and against shoulder of highest step of fast idle cam. On Oldsmobile, raise the intermediate choke lever to full up position making sure that intermediate rod and choke rod are at upper limit of travel in the slots and that all lash is removed. On all models, bend choke rod to obtain specified clearance between choke valve and dividing wall of air horn. *See table below.*

Choke Rod Setting

Car Model	Choke Opening	Gauge No.
Buick (Exc. Spec.)	.052"	BT-68
Buick Special	.045"	BT-131
Cadillac	.040"	BT-102
Chevrolet	.055"	BT-216
Oldsmobile (All Models)	.052"	BT-68
Tempest 4-Cyl.	.028"	BT-79
Tempest V8	.045"	BT-131

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ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

Unloader Adjustment: With throttle valves wide open, clearance between upper edge of choke valve and dividing wall of air horn should be as indicated in table below. To adjust, bend tang on fast idle cam using Tool BT-69.

Car Model	Unloader Setting Choke Opening	Gauge No.
Buick (All Models)	.128"	BT-135
Cadillac	.125"	BT-102
Chevrolet	.250"	BT-211
Oldsmobile (Exc. F-85)	.115"	BT-90
Oldsmobile F-85	3/16"	BT-217
Tempest 4-Cyl.	.152"	BT-119
Tempest V8	.128"	BT-135

Secondary Throttle Lockout Adjustment: Close choke valve fully so that lockout lever tang is engaged in slot of fast idle cam. Measure clearance between side of lockout lever tang and edge of slot in cam (use feeler gauge). Clearance should be .015" (all models). Adjust by bending tang on fast idle cam using tool BT-18 or BT-91A.

Secondary Throttle Contour Adjustment: Open choke valve fully so that tang on lockout lever is positioned over contoured section of fast idle cam. Measure clearance between tang and edge of fast idle cam (use feeler gauge). If clearance is not .030" (Buick, Buick Special, Oldsmobile, Oldsmobile F-85 & Pontiac V8); .015" (others), adjust by bending tang up or down using bending tool BT-91A.

Secondary Lock Spring Adjustment (Pontiac Tempest 4-Cyl.): After idle speed adjustment is made (be sure secondary valves are closed), place idle screw on second step of fast idle cam. Clearance between secondary lock spring and secondary lever should be .028". To adjust, bend lock spring.

OVERHAUL: *Se 1958 Final Data, Page 279, or lat r Manual editions.*

Service Parts

Gasket Kit - Rochester No. 7015940 (Buick, Exc. Special); No. 7016250 (Buick Spec. & Pontiac Tempest V8); No. 7015941 (Cadillac); No. 7015948 (Chevrolet); No. 7015954 (Oldsmobile, Exc. F-85); No. 7016279 (Oldsmobile F-85); No. 7016243 (Pontiac Tempest 4-Cyl.).

Repair Kit - Rochester No. 7015920 (Buick, Exc. Special); No. 7016249 (Buick Spec. & Pontiac Tempest V8); No. 7015921 (Cadillac); No. 7016223 (Chevrolet); No. 7015934 (Oldsmobile, Exc. F-85); No. 7016278 (Oldsmobile F-85); No. 7016235 (Pontiac Tempest 4-Cyl. Auto. Trans.); No. 7016236 (Pontiac Tempest 4-Cyl. Synchro-mesh).

Off-Kar Kit - Rochester No. FR-104 (Buick, Exc. Special); No. FR-105A (Buick Special & Pontiac V8); No. FR-204 (Cadillac); No. FR-307 (Chevrolet); No. FR-504 (Oldsmobile, Exc. F-85); No. FR-506 (Oldsmobile F-85); No. FR-604 (Pontiac Tempest 4-Cyl.).

ROCHESTER 2G & 2GC 2-BARREL CARBURETORS

	Rochester Carb. No.
BUICK (EXC. SPECIAL)	
1962 4400 Series (Std.)	2GC 7020056
1962 4400 Series (Std.) (CCV)Ⓒ	2GC 7020048
1962 4400 Series (Air Cond.)	2GC 7020047
1962 4400 Series (Air Cond.) (CCV)Ⓒ	2GC 7020049
Service Replacement (All Carbs.)	2GC 7016201
BUICK SPECIAL	
1962 V6 Eng. Synchro-mesh (Std.)	2GC 7020141
1962 V6 Eng. Synchro-mesh (CCV)Ⓒ	2GC 7020143
1962 V6 Eng. Auto. Trans. (Std.)	2GC 7020140
1962 V6 Eng. Auto. Trans. (CCV)Ⓒ	2GC 7020142
1962 V8 Eng. Synchro-mesh (Early)	2GC 7019093
1962 V8 Eng. Synchro-mesh (Late)	2GC 7020147
1962 V8 Eng. Auto. Trans. (Early)	2GC 7019090
1962 V8 Eng. Auto. Trans. (Late)	2GC 7020146
Service Replacement (7020140, 42)	2GC 7016237
Service Replacement (7020141, 43)	2GC 7016238
Service Replacement (7019090)	2GC 7016102
Service Replacement (7019093)	2GC 7016103
Service Replacement (7020146)	2GC 7016258
Service Replacement (7020147)	2GC 7016259
CHECKER	
1962 Superba & Marathon	7023096
CHEVROLET PASS. CARS (283" ENG.)	
1962 Synchro-mesh	2GC 7020007
1962 Auto. Trans.	2GC 7020008
1962 Air Conditioned	2GC 7020018
CHEVROLET TRUCK	
1962 283" Eng. (Std.)	2G 7015015
1962 283" Eng. (Velocity Governor)	2G 7013011
1962 327" Eng. (Vacuum Governor)	2G 7020109
Service Replacement (7015015)	2G 7016006
Service Replacement (7013011)	2G 7015913
Service Replacement (7020109)	2G 7016215
OLDSMOBILE (EXC. F-85)	
1962 Series 88 (No Air Cond.)	2GC 7020052
1962 Series 88 (No Air Cond.) (CCV)Ⓒ	2GC 7020954
1962 Series 88 (Air Cond.)	2GC 7020058
1962 Series 88 (Air Cond.) (CCV)Ⓒ	2GC 7020956
Service Replacement	2GC 7016218
OLDSMOBILE F-85	
1962 Synchro-mesh (Early)	2GC 7020053
1962 Synchro-mesh (Late)	2GC 7020981
1962 Synchro-mesh (Early) (CCV)Ⓒ	2GC 7020959
1962 Synchro-mesh (Late) (CCV)Ⓒ	2GC 7020983
1962 Auto. Trans. (Early)	2GC 7020051
1962 Auto. Trans. (Late)	2GC 7020980
1962 Auto. Trans. (Early) (CCV)Ⓒ	2GC 7020957
1962 Auto. Trans. (Late) (CCV)Ⓒ	2GC 7020982
Service Replacement (7020051,57)	2GC 7016214
Service Replacement (7020053,59)	2GC 7016219
Service Replacement (7020980,82)	2GC 7016280
Service Replacement (7020981,83)	2GC 7016297
PONTIAC (EXC. TEMPEST)	
1962 Std. Eng. (Synchro-mesh)	2GC 7020060
1962 Std. Eng. (4-Spd. Auto. Trans.)Ⓒ	2GC 7020070
1962 Std. Eng. (3-Spd. Auto. Trans.)Ⓒ	2GC 7020071
1962 Std. Eng. (4-Spd. Auto. Trans.)Ⓐ	2GC 7020072
1962 Std. Eng. (3-Spd.) Auto. Trans.)Ⓐ	2GC 7020073
1962 425E Eng. (4-Spd. Auto. Trans.)Ⓒ	2GC 7020074
1962 425E Eng. (3-Spd. Auto. Trans.)Ⓒ	2GC 7020075
1962 425E Eng. (4-Spd. Auto. Trans.)Ⓐ	2GC 7020076
1962 425E Eng. (3-Spd. Auto. Trans.)Ⓐ	2GC 7020077
1962 Triple Carburetor Option	Ⓓ
Service Replacement (7020060)	2GC 7016226
Service Replacement (7020070,71,72,73)	2GC 7016227
Service Replacement (425E Eng.)	2GC 7016225

Ⓒ - Closed Crankcase Ventilator.
Ⓒ - Without Air Conditioning.
Ⓐ - With Air Conditioning.
Ⓓ - See SEPARATE "Rochester Triple 2-Barrel Carburetor" data.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 BUICK (EXC. SPECIAL) HESITATION DURING MODERATE ACCELERATION CORRECTION:* This condition which occurs after engine is warmed up can be corrected by installing a new power piston, Part No. 7006323. Carburetors having the code letter "B" or later stamped on metal tag will have the new piston installed in production.

►*1962 BUICK V6 ENG. CHOKE ASSEMBLY MODIFICATION NOTE & PRODUCTION CHANGE:* The following changes were made in production, and may be made in service, to cause choke to come off position more quickly and to insure choke remaining in off position during cold weather operation,

Choke Baffle - Install a new choke baffle, Part No. 7010598 (copper colored), having a reduced height of 1/16". Carburetors having the code letter "B" or later stamped on metal tag have the new baffle installed in production.

Choke Housing Outlet Restriction - On synchro-mesh cars, the outlet restriction has been increased from .081" to .093". Carburetors having the code letter "C" stamped on metal tag will have the larger size hole drilled in production. When increasing the hole size on earlier carburetors, use a hand drill and be careful not to deepen outlet hole.

Heat Insulator Tube - On early cars, install heat tube insulator, Part No. 1170891 which is longer and made of heavier material for better insulation.

►*1962 PONTIAC NEEDLE VALVE INSTALLATION NOTE:* DO NOT install push-pull clip to needle valve when overhauling carburetor. If clip is included with overhaul kit, it should be discarded and not used.

►*1962 OLDSMOBILE (EXC. F-85) FLOAT SETTING CHANGE:* Carburetors having code letter "B" or later stamped on metal tag should be set to 13/32". Float level on earlier carburetors should be set to ½". *See "Float Setting" below.*

DESCRIPTION: Dual (2-Barrel) downdraft carburetor with manual choke control (2G), automatic choke (2GC). Carburetors are similar to previous models and have the following features.

Idle Air Compensator (Buick 7020047, 7020049; Chevrolet 7020018; Oldsmobile 7020058, 7020056; Pontiac 7020072, 7020073, 7020076, 7020077) - Consists of a thermostatically controlled idle air bypass which opens during prolonged hot idling to supply additional air at a point below the throttle valves to offset en-

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ROCHESTER 2G & 2GC 2-BARREL CARBURETORS (C nt.)

richening effects of high engine temperature. This idle compensator must be held closed when making idle mixture and idle speed adjustments.

Idl C mp nsat r (Olds F-85) - This "Carb-Airator" is a separate unit attached to carburetor on air conditioned cars to assist in reducing rich fuel mixture during hot idling. *Se "Carb-Airator Adjustment" below.*

Automatic Ch k Ass mbly (Oldsmobile 7020052, 7020058, 7020954, 7020956; Pontiac 7020070, 7020071, 7020072, 7020073) - Choke assembly is mounted on throttle body and linked to choke shaft lever by an intermediate rod. This intermediate choke rod must be adjusted for correct choke operation.

Aut matic Ch k Ass mbly (Except Above) - Choke assembly is mounted on air horn and directly connected to choke shaft. Intermediate rod adjustment not required.

ADJUSTMENT: *Mak all adjustments exactly as follows:*

Idling Adjustm nt: If preliminary adjustment required to warm engine, turn both idle mixture screws in until lightly seated, then back each screw out 1½ turns. Operate engine until normal operating temperature is reached with choke valve wide open and fast idle inoperative. Connect tachometer and vacuum gauge to engine, then adjust throttle stopscrew for correct engine idle speed (see table below). Adjust each idle mixture screw for smoothest idle performance with highest manifold vacuum and engine RPM *see special notes below.*

CAUTION - On cars with Idle Air Compensator, hold compensator valv cl s d by pressing in on spring-load d button n sid f main body (Chevrolet), removing air cleaner and pressing down on valve in air horn (Oldsmobil). Recheck engine idle speed.

CHEVROLET NOTE - Idle mixture adjustment can be made by leaning the mixture (turn screws in) for a moderate rough idle with slight vacuum and RPM loss, and then richening the mixture by turning the screws out ¼ turn.

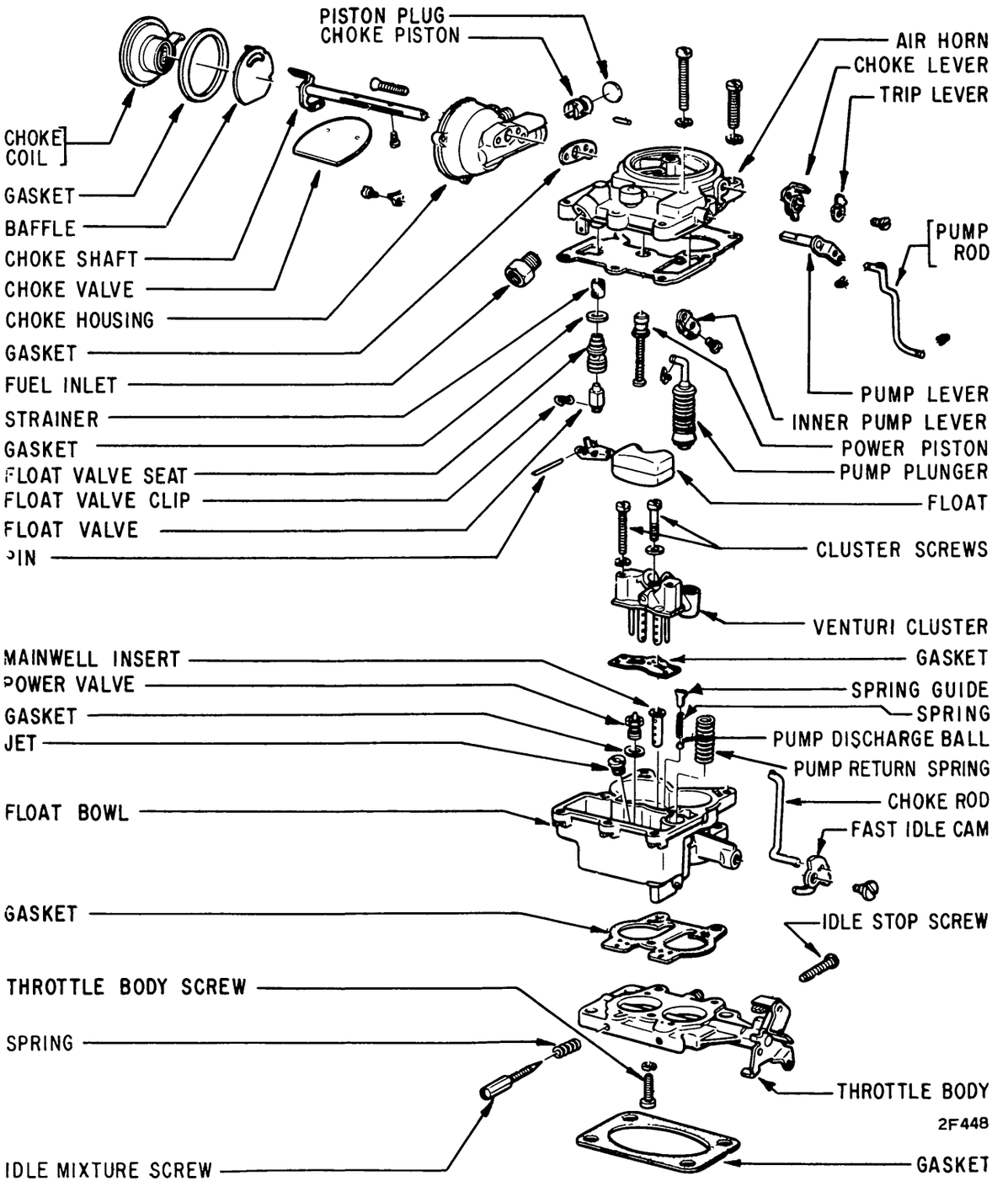
OLDSMOBILE NOTE - After adjusting both idle mixture screws for highest manifold vacuum and engine RPM, turn each screw out ¼ turn for slightly richer mixture. Recheck idle mixture and idle speed after air cleaner installed.

Idl Sp ed Setting

Car M d l	Synchro-mesh	Auto. Trans.
Buick (Exc. Special)		①② 525 RPM
Buick Special V8	525 RPM	①② 525 RPM
Buick Special V6	575 RPM	①② 575 RPM
Chevrolet Pass.	500 RPM	③ 475 RPM
Chevrolet Truck	475 RPM	③ 450 RPM
Oldsmobile (Exc. F-85)	550 RPM	③ 500 RPM
Oldsmobile F-85	550 RPM	③④ 500 RPM
Pontiac(Exc.Tempest)	⑤480-500 RPM	③⑤ 480-500 RPM

① - 575 RPM on Air Conditioned cars.
② - Transmission selector lever in "N" or "P".
③ - Transmission selector lever in "D".
④ - 500 RPM on Air Conditioned cars.
⑤ - 540-560 on Air Conditioned cars with Air Cond. OFF.

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ROCHESTER "2GC" CARBURETOR (TYPICAL)

ROCHESTER 2G & 2GC 2-BARREL CARBURETORS (C nt.)

Carb-Airator Adjustment (Olds F-85): *NOTE - Make sure Carb-Airator valve closes when engine is started after normal idle speed adjustment (70°F).* If in extreme hot temperatures), (95°F outside temperature), engine idle is rough and erratic, or stalling occurs, tighten the temperature screw (upper screw on Carb-Airator) one turn and road test. *CAUTION - Do not upset normal idle and do not overtighten temperature screw.* If engine idles too fast under extreme hot conditions, tighten the air screw (lower screw on Carb-Airator).

Throttle Return Check (Dashpot) Adjustment: Used on Chevrolet and Oldsmobile with automatic transmission. *See "Throttle Linkage Adjustment" under CARBURETOR on each car model page for adjustment data.*

Float Level: *CAUTION- Two separate adjustments (Float Level & Float Drop) required.*

Float Level Setting (Chevrolet Pass. Cars & Truck, & Buick Special) - Remove and invert bowl cover and float assembly but DO NOT remove cover gasket. Install correct float gauge (see table below) over float with side of gauge resting against pump side of power piston shaft, and with outer leg of gauge in line with center of float. Bend float hinge arm so floats just clear top edge of gauge cutout and sides of floats are parallel with gauge legs.

Float Level Setting (Buick, Exc. Special; Oldsmobile, Olds F-85 & Pontiac - Remove and invert bowl cover and bowl assembly but DO NOT remove gasket. Install correct float gauge (see table below) on bowl gasket at free end of float. Lower edge (sharp edge) of float seam should just touch gauge. Adjust by bending float hinge arm.

Float Level Setting

Car & Carb.	Float Level	Checking Gauge
Buick (Exc. Spec.) (All)	23/32"	BT-214
Buick Special (All)	1 17/64"	BT-210
Chevrolet Pass. (All)	1 23/64"	BT-152
Chevrolet Truck (All)	1 23/64"	BT-152
Oldsmobile 88 (All) Early ①	1/2"	BT-197
Oldsmobile 88 (All) Later ②	13/32"	BT-212
Olds F-85 7020051,53,957,959	35/64"	BT-187
Olds F-85 7020980,81,82,83	25/32"	BT-215
Pontiac 7020070,71,72,73	5/8"	BT-177
Pontiac 7020060,74,75,76,77	11/16"	BT-176

① - Carburetors with "A" or no letter on tag.
② - Carburetors with "B" or later on tag.

Float Drop Setting (All Models) - Hold bowl cover and float assembly upright so that float hangs down at bottom of travel. Measure distance from lower face of cover gasket to bottom of float at free end using a scale or combination float setting gauge (see float checking gauge above). Distance should be 1 29/32" (All cars except Oldsmobile Series 88 & Pontiac); 1 3/4" (Oldsmobile Series 88 & Pontiac). Adjust by bending tang on rear of float hinge arm toward needle seal to decrease drop, or away from needle seat to increase drop.

Accelerating Pump Rod: *CAUTION - On Buick Special and Oldsmobile F-85, pump connector rod must be positioned in OUTER hole (furthest from pump shaft) of accelerating pump shaft lever. Other carburetors have a single hole.* With throttle stopscrew (and Fast Idle Screw on Oldsmobile 88) backed out so that throttle valves are completely closed, measure distance from top of air horn ring (Buick, except Special; Oldsmobile 88 and Pontiac); from top of air horn surface (Olds F-85); from top of pump housing (Buick Special, Chevrolet Pass. Cars & Trucks) to top of connector rod with a scale or combination gauge (see below). *NOTE - If gauge is used, leg of gauge should just touch top of connector rod.* To adjust, bend pump connector rod with Tool BT-18.

Accelerating Pump Rod Setting

Car & Carb.	Pump Rod Setting	Checking Gauge
Buick, Exc. Spec. (All)	1 7/16"	BT-214
Buick Special V6 (All)	1"	BT-210
Buick Special V8 (All)	1 3/32"	BT-188
Chevrolet Pass. Cars (All)	57/64"	BT-152
Chevrolet Trucks (All)	57/64"	BT-152
Oldsmobile 88 (All)	1 7/16"	BT-197 or 212
Oldsmobile F-85 (All)	59/64"	BT-187
Pontiac 7020070,71,72,73	1 3/4"	BT-177
Pontiac 7020060,74,75,76,77	1 1/8"	BT-176

Idle Vent: Adjust only after Accelerating Pump Rod Setting has been checked and adjusted. Use the same gauge (installed in same manner) as for pump rod setting (above). *NOTE - On Oldsmobile (Exc. F-85) & Pontiac, invert gauge so that leg marked "Vent" is down toward pump connector rod.* Slowly open throttle valves to point where vent valve just closes (rubber valve seats on pump housing on air horn). At this point, edge of cutout in gauge marked "Vent" (Chevrolet), or lower end of gauge marked "Vent" (Oldsmobile 88 & Pontiac), should just touch top of pump connector rod. Adjust by bending tang on pump lever which contacts vent valve arm.

Idle Vent Setting

Car & Carb.	Vent Setting	Checking Gauge
Chevrolet Pass. & Truck	49/64"	BT-152
Oldsmobile 88	1 11/32"	BT-197 or 212
Pontiac 7020060,74,75,76,77	1 5/64"	BT-176
Pontiac 7020070,71,72,73	1 17/64"	BT-177

Intermediate Choke Rod Adjustment (Oldsmobile 88) - *NOTE - Choke shaft lever has three holes for installation of intermediate choke rod. Normal position of rod in lever is "Center" hole. Other holes are for temperature and climatic condition adjustment, see "Automatic Choke Setting" below.* With intermediate choke rod installed in center hole of choke shaft lever, remove thermostatic cover and coil assembly and inside baffle plate. Open throttle valves and hold choke valve completely closed by pushing upward on intermediate lever. Adjust intermediate choke rod as necessary by bending so that choke piston first "V" groove is flush with end of piston bore.

Intermediate Choke Rod Adjustment: Pontiac 7020070, 71,72,73 - Remove choke cover and coil assembly, gasket and baffle plate. Hold choke valve completely closed by lifting up on intermediate lever. In this position, inner end of vacuum position should be flush with end of choke piston bore. Adjust by bending intermediate choke rod.

Automatic Choke Setting (All 2GC Carburetors): Adjust by loosening retainer screws on choke cover and rotating cover and coil assembly. Centered setting is with scribed index mark on cover in line with center (longest) mark on housing. *NOTE - Choke valve should be lightly closed at room temperature (75°F).*

Automatic Choke Setting

Car Model	Setting
Buick (Exc. Special)	Centered (At Index)
Buick Special V6	1 Point Lean
Buick Special V8	Centered (At Index)
Chevrolet Pass. (7020008,18)	Centered (At Index)
Chevrolet Pass. (7020007)	1 Point Lean
Oldsmobile 88	1 Point Lean
Oldsmobile F-85	Centered (At Index)
Pontiac	Centered (At Index)

►*OLDSMOBILE 88 CHOKE SETTING "TAILORING" FOR CLIMATIC & TEMPERATURE CONDITIONS:* Moving intermediate choke rod to next OUTER hole (away from choke shaft) will provide richer mixture during warm-up for acceleration or load. Moving intermediate rod to next INNER hole will provide leaner mixture under same operating conditions.

Fast Idle (2GC Carburetors): Adjust each model as follows:

All Models (Except Oldsmobile 88) - No separate fast idle adjustment required as fast idle speed is automatically set when hot (or slow) idle speed is adjusted (same screw controls both settings).

Oldsmobile 88 - As a preliminary adjustment (with carburetor off engine), close choke valve and place fast idle screw on high step of fast idle cam. Adjust fast idle screw for a throttle valve opening of .030" (Gauge BT-121) measured between edge of valve and carburetor bore on side opposite idle adjusting screw. Make final adjustment with carburetor on engine as follows: Connect tachometer, place transmission selector lever in "N" (Neutral) position, then rotate fast idle cam so fast idle screw is on high step of cam. With engine at normal operating temperature, adjust fast idle screw for an engine speed of 1900 RPM. *NOTE - Set engine speed at 2200 RPM for sub-zero operation.*

Choke Rod: Buick (Exc. Special), Oldsmobile F-85 & Pontiac - Turn idle screw into normal idle position (1½ turns open), then place idle screw on second step of fast idle cam and against shoulder of high step. Distance between upper edge of choke valve and wall of air horn should be as indicated in table (see below). To adjust, bend counterweight tang.

Buick Special, Chevrolet, & Oldsmobile 88 - Position fast idle screw (Oldsmobile 88), idle speed screw (others), on second step of fast idle cam, then close choke valve until screw is against shoulder of high step. *NOTE - On Oldsmobile 88, press up on intermediate choke lever and make sure that intermediate rod is at end of slot in intermediate lever.* In this position, choke valve opening, or clearance between upper edge of choke valve and air horn wall should be as indicated in table (see below). To adjust, bend choke lever tang (Exc. Oldsmobile 88); choke rod (Oldsmobile 88).

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ROCHESTER 2G & 2GC 2-BARREL CARBURETORS (C nt.)

Car & Carb.	Choke Valve Opening	Checking Gauge
Buick (Exc. Special)	.095"	BT-68
Buick Special	.052"	BT-190
Chevrolet Pass.	.089"	BT-108
Oldsmobile 88	.150"	BT-159
Oldsmobile F-85	.082"	BT-191
Pontiac 7020070,71,72,73	.080"	BT-195
Pontiac 7020060,74,75,76,77	.056"	BT-167

Unloader (2GC Carburet rs): Move throttle valves to wide open position (see Pontiac Note below) so that choke valve is partially open. Measure the choke valve opening or clearance between upper edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever using bending tool BT-69.

PONTIAC CHECKING NOTE - It is recommended that the throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in driver's seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. Above procedure will eliminate all variances in linkage, floor mat, or pedal location.

Car Model	Choke Valve Opening	Checking Gauge
Buick (Exc. Special)	.250"	BT-211
Buick Special	.157"	BT-189
Chevrolet	.360"	BT-108
Oldsmobile 88	.250"	BT-211
Pontiac 7020060,74,75,76,77	.163"	BT-168
Pontiac 7020070,71,72,73	.163"	BT-162

OVERHAUL: *See 1960 Final Data, Page 301, or later Manual edition.*

SERVICE PARTS: Gasket Sets - Rochester No. 7016240 Carb. No. 7020046, 7020047, 7020048, 7020049); No. 7016246 (Carb. No. 7020140, 7020141, 7020142, 7020143); No. 7016260 (Carb. No. 7020146, 6020147); No. 7020091 (Carb. No. 7019090, 7019093). No. 7015952 (Carb. No. 7020007, 7020008, 7020018); No. 7015969 (Carb. No. 7013011, 7015015). No. 7015970 (Carb. No. 7020109); No. 7016277 (Carb. No. 7020052, 7020058, 7020954, 7020956); No. 7016299 (Carb. No. 7020051, 7020053, 7020957, 7020959); No. 7016275 (Carb. No. 7020980, 7020981, 7020982, 7020983); No. 7016147 (Carb. No. 7020060, 7020074, 7020075); No. 7016041 (Carb. No. 7020070, 7020071, 7020072, 7020073); No. 7016140 (Carb. No. 7020076, 7020077).

Off-Kar Kit - Rochester No. TR-101 (Carb. No. 7020046, 7020047, 7020048, 7020049); TR-102 (Carb. No. 7020140, 7020141, 7020142, 7020143); TR-103 (Carb. No. 7020146, 7020147); TR-508 (Carb. No. 7019090, 7019093); TR-304 (Carb. No. 7020007, 7020008, 7020018); TR-305 (Carb. No. 7013011, 7015015); TR-509A (Carb. No. 7020052, 7020058, 7020954, 7020956); TR-511 (Carb. No. 7020051, 7020053, 7020957, 7020959); TR-510 (Carb. No. 7020980, 7020981, 7020982, 7020983); TR-612 (Carb. No. 7020060); TR-614 (Carb. No. 7020070, 7020071, 7020072, 7020073); TR-615 (Carb. No. 7020074, 7020075); TR-610 (Carb. No. 7020076, 7020077).

Repair Kits - Rochester No. 7016220 (Carb. No. 7020046, 7020047, 7020048, 7020049); No. 7016239 (Carb. No. 7020140, 7020141, 7020142, 7020143); No. 7016256 (Carb. No. 7020146, 7020147); No. 7016126 (Carb. No. 7019090, 7019093); No. 7015924 (Carb. No. 7020007); No. 7015951 (Carb. No. 7020008, 7020018); No. 7015926 (Carb. No. 7013011, 7015015); No. 7015932 (Carb. No. 7020109); No. 7016257 (Carb. No. 7020052, 7020058, 7020954, 7020956); No. 7016127 (Carb. No. 7020051, 7020053, 7020957, 7020959); No. 7016275 (Carb. No. 7020980, 7020981, 7020982, 7020983); No. 7016120 (Carb. No. 7020060); No. 7016137 (Carb. No. 7020070, 7020071, 7020072, 7020073); No. 7016138 (Carb. No. 7020074, 7020075); No. 7016121 (Carb. No. 7020076, 7020077).

OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM

Olds F-85 Jetfir (1962)

►*OLDSMOBILE F-85 SUPERCHARGED JETFIRE SERVICE NOTE: For s rvice procedures on Supercharg r, se "Oldsmobil F-85 Jetfire Supercharger"*

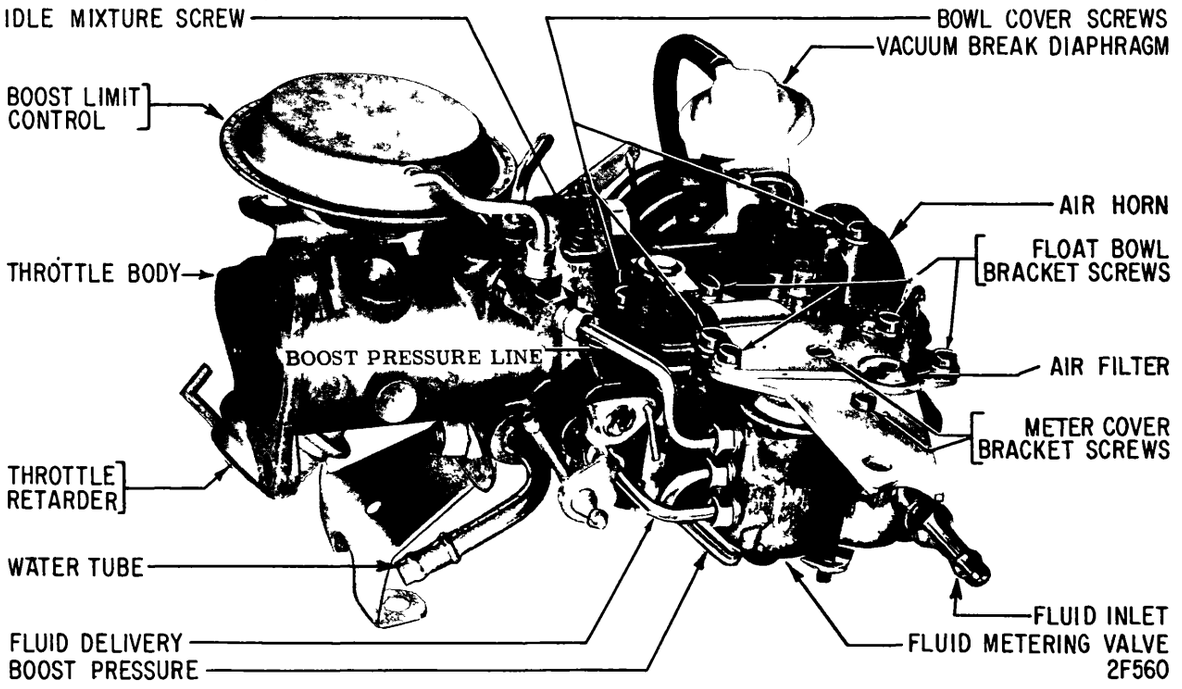
►*TURBO-ROCKET FLUID FILTER NOTE:* Sealed type filter located in line between supply tank and fluid metering valve. If filter becomes clogged or plugged, replace filter unit. DO NOT attempt to clean.

DESCRIPTION: This carburetion and fluid injection system consists of the following components:

Turb -Sup rcharger: *For d scription and servicing, see "Olds F-85 J tfir Supercharger" in this section.*

Carbur tor: Rochester Model "RC" side draft type of new design with automatic choke (Auto. Trans.); manual choke (Synchro-mesh). The float, idle, pump, and choke systems are similar to other Rochester carburetors. In the main metering system, a metering rod is used in place of a power valve. The rod is down in main metering jet during part throttle operation when manifold vacuum is high. In the power system, the vacuum operated power piston is connected to the metering rod to control fluid flow through main jet. When engine vacuum drops and more fuel is required, the power piston is forced upward by spring pressure, pulling metering rod out of main jet orifice, allowing more fuel to flow through jet. A Throttle Retard unit is used on all carburetors to control closing of throttle valve throughout entire range of throttle opening. On automatic transmission cars, a vacuum controlled Throttle Return Check prevents rapid closing of throttle valve. A secondary throttle valve located between primary throttle valve and supercharger is operated by Boost Limit Diaphragm to restrict maximum boost to 1.0 p.s.i. in the event Turbo-Rocket Fluid supply is exhausted or blocked. The manual choke assembly (synchro-mesh cars) is similar to the conventional automatic choke (Auto. Trans. Cars) except for the addition of an external operating lever and the substitution of a wrap-up type spring in place of the bi-metal spring. A spring loaded diaphragm mounted in a Delrin plastic case has been added to automatic and manual choke systems to provide a pulling action on choke shaft against tension of bi-metal or wrap-up

CONTINUED ON NEXT PAGE



CARBURETOR & FLUID METERING VALVE ASSEMBLY

OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM (Cont.)

choke coil spring. This pull provides a definite amount of vacuum break for starting. An Idle Compensator Valve located on bottom of carburetor between air horn and fuel bowl consists of a thermostatically controlled idle air bypass which opens during prolonged hot idling to supply additional air at a point below the throttle valve to offset enrichening effects of high engine temperature.

Turbo-Rocket Fluid Injection System: Consists of a Fluid Metering & Boost Limit Control Valve Assembly, Check & Relief Valve, Depressure Valve, and Fluid Tank. The fluid injection system is designed to deliver Turbo-Rocket Fluid through carburetor throttle body to engine any time intake manifold pressure exceeds 1.0 p.s.i.

ADJUSTMENT

ADJUSTMENT: There are no adjustments required on turbo-charger or fluid injection system.

Throttle Linkage & Throttle Return Check Adjustment: *See CARBURETOR on car model page.*

Idle Mixture: For initial adjustment, turn idle mixture screw out approximately 1½ turns from a lightly seated position. After engine is brought to normal operating temperature, adjust idle mixture screw for highest manifold vacuum and engine RPM, then turn screw out ¼ turn for slightly richer mixture.

Idle Speed: 550 RPM (Exc. Air Cond.); 600 RPM (Air Cond. with compressor not operating). Place automatic transmission in "D" (Drive) when adjusting idle speed.

Fast Idle: With engine at normal operating temperature, transmission in neutral (air conditioner turned off), place fast idle screw on second step of fast idle cam and adjust engine speed to 1500 RPM.

Float Level: 12/32", measured from machined surface of bowl flange (gasket removed and carburetor upright) to top of float at end opposite fuel inlet with float needle seated by pressing downward at rear of float arm. If gauge BT-62-16 is used, top corner of float should just touch gauge. To adjust, bend float pontoon at float arm. Check to make sure float is centered in bowl and is not rubbing on walls.

Float Drop: Not required.

Vacuum Break Adjustment: 5/32" clearance between edge of choke valve and inner wall of air horn with diaphragm seated. To adjust, bend tang on linkage. Make sure that when diaphragm is released, choke valve closes completely. *NOTE - If a second method of adjustment is required, linkage arm may be bent slightly.*

Choke Rod Adjustment: .140-.160" clearance between edge of choke valve and inner wall of air horn with fast idle screw on second step of fast idle cam and against highest step. To adjust, bend choke rod (rod between fast idle cam and choke shaft lever) at center angle.

Unloader Adjustment: .308-.348" clearance between edge of choke valve and inner wall of air horn with throttle valve wide open. To adjust, bend tang on fast idle cam.

Thr ttl R tard Unit Adjustm nt: With throttle valve wide open and throttle retard plunger fully extended, connecting rod must freely enter hole in throttle lever. To adjust, bend rod at center angle.

Automatic Ch k : Centered (At Index).

Manual Ch k : P int r Adjustm nt - Loosen pointer screw, then with throttle held open to prevent weight of fast idle cam from affecting the adjustment, rotate pointer counterclockwise, then clockwise, until choke valve just closes. Continue rotating clockwise three notches, then tighten pointer screw.

Cable Adjustment - With choke cable wire set screw loosened and choke knob pushed all the way "in", adjust choke wire so that distance between choke valve lever and edge of cable conduit clamp is 2 5/8". Tighten cable wire setscrew and bend end of wire so it cannot contact adjacent hoses.

TESTING

CHECK & RELIEF VALVE ASSEMBLY, DEPRESSURE VALVE, SUPPLY TANK & HOSES: Install Gauge BT-6225 on fluid supply tank and start engine. Pump up gauge to 8 lbs. with engine idling. Pressure relief valve should drop pressure to 5¼-6¼ lbs. If pressure drops below 5¼ lbs., the depressure valve may not be closing, or leaks may be present in or about relief valve or hoses. To locate the leakage, clamp upper hose leading from fluid tank with Vise-Grip pliers Install Gauge BT-6225 and pump up to 8 lbs. Fluid tank should hold this pressure for 30 seconds. If gauge pressure drops, clamp upper and lower hoses, then pump system up to 8 lbs. If gauge holds the 8 lbs. for 30 seconds, leakage is in Fluid Metering & Boost Valve assembly. If gauge pressure continues to drop, check for air pressure leaks at fluid tank. If leaks are not detected, remove pliers from upper tank hose, then clamp hose between relief valve assembly and depressure valve. Pump system up to 8 lbs. If pressure drops below 5¼ lbs., check for external leaks at relief valve assembly. If neither of these show a leak, the relief valve may be leaking internally. Remove gauge and clamps.

TURBO-ROCKET FLUID TANK CAP: Install fluid tank cap on Gauge BT-6225 with cap reset button depressed, then pump tester up to 5 lbs. Cap should hold this pressure for 30 seconds. Pump up tester to 7½ lbs. Cap should release pressure between 6½ and 7½ lbs.

TROUBLE SHOOTING & DIAGNOSIS

DULL WHINE ON ACCELERATION OR DECELERATION: Center housing shaft bushings may be worn. Compressor impeller or turbine wheel may be rubbing on housing.

PRESSURE CAP RELEASES: Exhaust bypass valve or controller stem may be stuck.

MAXIMUM PERFORMANCE CANNOT BE OBTAINED: Primary diaphragm in controller may be broken.

NO BOOST OPERATION: Turbo-rocket fluid tank empty or fluid filter may be plugged. Fluid tank cap released (popped). Depressure valve not closing, or check and relief valve is defective. Leakage in fluid tank or hoses. Leak in upper diaphragm of fluid metering and boost limit control valve assembly. *NOTE - Test system (see above). If checking indicates malfunction in fluid metering and boost limit control valve assembly, disassemble and inspect upper diaphragm. If testing do s not show l akag in any compon nt, and still "no boost", insp ct lower diaphragm of fluid m t ring and boost limit control valve ass mbly for le akag . Also ch ck for brok n auxiliary throttl valv r turn spring.*

REMOVAL & INSTALLATION

TURBO-ROCKET FLUID TANK: Rem val - Loosen fluid filter clamp and lift filter up from mounting bracket, then disconnect and clamp fluid supply hose at fluid metering valve. Lower hose and filter to underside of car, release clamp and drain fluid into a clean container. Disconnect gauge wire and remaining hoses at tank. Remove attaching bolts and nuts at each side of tank, and remove tank.

Installation: Reverse removal procedure, then fill tank and check for leakage.

CHECK & RELIEF VALVE ASSEMBLY: R m val - Disconnect hoses and remove coil, valve assembly and nylon gasket. Lift connector, large washer and "O" ring from intake manifold.

Installation: Reverse removal procedure and tighten valve to 12-18 ft. lbs.

TURBO-ROCKET FLUID METERING VALVE: R moval - *NOTE - It is not necessary to r move carburetor.* Remove metering valve bracket-to-bowl screws, then remove three copper tubes, being careful not to damage rubber gaskets, and remove valve assembly.

Installation: Connect the three copper tubes, middle tube first, making sure that all tubes are in line with holes before tightening. Install valve bracket-to-bowl attaching screws.

CARBURETOR: Removal - *NOTE - If ngine is warm, release pressure in cooling system by loos ning radiator cap.* Remove hood, then remove air cleaner. Disconnect steel line from filter-to-carburetor inlet at carburetor, and compressor housing-to-throttle body water hose at throttle body. Disconnect line from turbocharger to bottom of float bowl at tee on bottom of float bowl, then disconnect carburetor rod. Disconnect choke cable if so equipped. Disconnect turbo-rocket fluid supply hose from metering valve, and the check valve-to-throttle body hose. Disconnect crankcase ventilation valve-to-throttle body hose, then remove carburetor lower mounting bracket bolts. Remove nuts attaching carburetor-to-turbo-charger. Remove remaining water hose and remove carburetor.

Installation: Reverse removal procedure. Install a new gasket between carburetor and turbo-charger. Tighten carburetor-to-turbo-charger attaching nuts to 9-12 ft. lbs. Oil mounting bracket-to-intake manifold bolts with engine oil and tighten to 20-25 ft. lbs.

OVERHAUL

CARBURETOR: Disassembly (Fl at Bowl) - Remove fluid metering valve and float bowl bracket. Retain felt air filter covering meter vent, then remove bowl cover attaching screws and cover. Remove cover gasket. Remove float hinge pin spring retainer, then remove float assembly and hinge pin together. Remove screen from main well, then remove float needle valve, seat, gasket and retainer. Remove power piston and metering rod assembly by turning small pin to one side, at top of power piston. *CAUTION - Piston is spring load d.* Pry upward on the small guide disc at top of main metering jet well, then use Tool BT-62-15 to remove main metering jet. Remove T-shaped retainer, spring and discharge ball check from discharge well with a pair of long nosed pliers. To remove pump plunger assembly, remove link connecting pump plunger to

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OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM (Cont.)

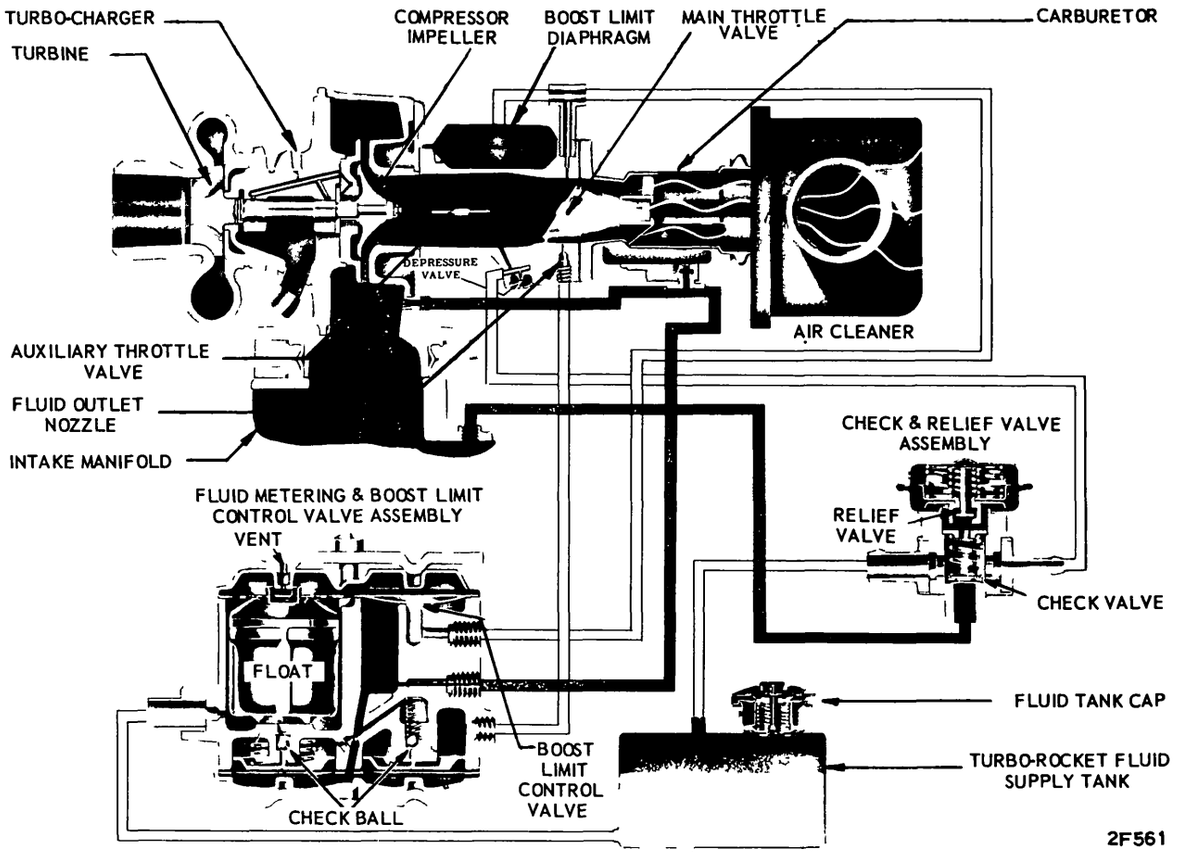
throttle lever. Rotate throttle lever to wide open position, then remove pump plunger from pump well. Remove pump return spring. To remove pump arm and duration spring from plunger, remove spring clip at top of plunger stem. *NOTE - Idle tube and main well tube ar pr ss d in plac and should not be removed.*

Throttl B dy - Remove depressure valve, diaphragm cover and diaphragm. Remove boost limit diaphragm opening spring and disconnect diaphragm linkage from auxiliary throttle valve lever by removing hairpin clip. Loosen boost limit line from boost limit diaphragm and from tee fitting at base of float bowl, but do not try to pull line from tee fitting. Remove diaphragm from throttle body. Remove idle mixture screw and spring. If necessary to remove auxiliary throttle valve and shaft, remove valve-to-shaft attaching screws and remove valve, then remove shaft. *CAUTION - Main throttle valve and shaft sh uld not b r moved. If necessary to replace ith r valv r shaft, r place complete throttle body ass mbly.* Disconnect throttle retarder linkage, then remove nut holding bracket to throttle body. Disconnect throttle body from main body, then remove throttle return check (if so equipped).

Ch k (Manual & Aut matic) - *NOTE - Manual choke ass mbly is similar t automatic choke assembly ex- c pt f r th substituti n f a wrap-up coil spring used in plac f th bi-m tal spring. Choke housing hot air inlet is capped on manual choke carburetors.* Remove fast idle cam attaching screw, cam and link, then remove choke cover and gasket. Remove baffle plate, choke piston lever attaching screw, then remove lever link and piston assembly. Remove choke housing attaching screws and remove choke housing and spring loaded plastic washer from air horn assembly. Remove washer spring. Disconnect link from vacuum break diaphragm and slide vacuum hose from plastic case. Remove bracket and diaphragm assembly. Remove choke valve-to-shaft attaching screws and remove choke valve. Slide choke valve shaft out of air horn. Remove idle compensator cover and passage cover.

Cl aning & Inspecti n: Wash parts, except pump plunger, felt air filter, gaskets and diaphragms, in a cold immersion type carburetor cleaner. Blow out all passages with air. *CAUTION - Do not pass drills through j ts r m t ring passag s. Inspect all parts for wear or damag and replac as necessary.*

R ass mbly: Ch ke (Manual & Automatic) - Install choke shaft in air horn, then install choke valve on shaft and install screws loosely. Seat choke valve in air horn bore and tighten attaching screws securely. *NOTE - L tt rs "RP" n valv must face upward on choke valve shaft.* Install vacuum break diaphragm assembly on air horn and connect vacuum tube, then connect diaphragm link to choke lever and secure with hairpin clip. Assemble plastic washer and spring to choke housing and install housing on air horn. Tighten attaching screws securely. Install choke piston and link assembly in housing, positioning piston lever over choke shaft. Tighten retaining screw securely. Install choke baffle plate, then install thermostatic coil or wrap-up type spring and cover assembly. Install retaining screws and adjust choke *(see "Adjustment" above).* Install choke link and fast idle cam (looped ends of link facing away from air horn casting). Install fast idle cam attaching screw and tighten securely. Install new idle compensator passage gasket and cover and retain in place with two screws.



TURBO-ROCKET FLUID SYSTEM (SCHEMATIC)

Throttle Body - Install throttle retarder on throttle body and connect linkage to throttle valve. *NOTE - Link should be installed in hole in throttle lever closest to heated water inlet tube. Bend in link should point toward engine.* Install auxiliary throttle shaft and lever into throttle body bore, then install auxiliary throttle valve with identification on valve toward manifold mounting surface. Install screws and tighten securely. Install boost limit diaphragm on mounting bracket, then position boost pressure tube in fitting. Install diaphragm and bracket assembly on throttle body casting, connecting pressure tube at same time to tee fitting at base of float bowl. Tighten attaching screws securely, then tighten tube fittings. Install auxiliary throttle valve link to auxiliary throttle valve lever. *NOTE - Auxiliary throttle body diaphragm (b st limit c ntrol) should b centered on mounting brack t so that diaphragm plung r is parall l with thr ttl l v r, th n tight n diaphragm to brack t bolts.* Connect boost limit control diaphragm opening spring to auxiliary throttle shaft lever and to hole on diaphragm bracket (ends of spring loops pointing toward diaphragm). Install diaphragm in fluid tank depressure valve chamber, then install diaphragm cover, making sure diaphragm is not wrinkled. Install holding bracket and tighten screws evenly and securely. Install idle mixture screw and spring. Turn in until lightly seated, then back screw out 1½ turns for initial adjustment.

Float Bowl - Install new gasket on throttle body assembly, lining up holes in gasket with holes on face of throttle body flange, then install throttle body on main body so unloader tang on fast idle lever is above tang on fast idle cam. Install throttle return check on lower mounting stud, then install throttle body-to-main body attaching nuts and tighten evenly and securely. *NOTE - Make sure plunger on throttle return check lines up with pad on fast idle lever.* Connect throttle return check vacuum tube to fitting on air horn. Install pump return spring in pump well, pushing it into position so it is seated properly, then install pump plunger into pump well. *CAUTION - Do not distort pump cup.* Install pump link into pump plunger rod, then hook other end of link to throttle lever and retain in place with spring clip. Install pump discharge ball, spring, and T-shaped retainer into pump discharge well. Install

CONTINUED ON NEXT PAGE

OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM (Cont.)

main metering jet with Tool BT-62-15, then install metering rod guide into top of main metering jet well. Install power piston spring into chamber, then install power piston over spring, while guiding metering rod through guide. *CAUTION - Make sure metering rod nters orifice in main metering jet.* Retain power piston in place by turning retainer wire toward power piston. Install screen into main well. Install float needle seat and gasket and tighten securely with Tool BT-52 so that needle seat will not be distorted, then install needle valve. Install hinge pin into float arm, then install float assembly in float bowl with hinge pin located in guide channels of bowl. Install spring retainer against float hinge pin with loop of spring upward toward bowl cover. Adjust float level *(see "Adjustment" above)*. Install float bowl cover gasket, pushing slotted section over power piston and metering rod assembly, locating gasket on lugs on side of float bowl. Install float bowl cover and tighten attaching screws. Attach fluid metering valve bracket to bowl cover bracket and tighten both screws securely, then install the assembly on carburetor, making sure fluid metering valve fittings are properly aligned with their respective fittings in throttle body and boost limit diaphragm line. Tighten attaching screws evenly and securely, then tighten all fittings.

TURBO-ROCKET FLUID METERING VALVE: Disassembly - Remove screws connecting upper and lower valve cover retaining brackets together (hold valve covers in place while removing brackets). Remove top cover, while holding bottom cover, and remove top gasket. Carefully remove diaphragm spacer, diaphragm, float weight and float assembly. *NOTE - Diaphragm can be removed from float by carefully bending tangs in float weight slot together, then remove weight and diaphragm from float.* Remove bottom cover and diaphragm (cover is spring loaded. Be careful not to damage diaphragm). Remove diaphragm from cover, then remove spacer and gasket. Remove diaphragm plunger and spring from float side, and diaphragm plunger from boost side of valve. *NOTE - Plungers are interchangeable.* Remove fluid outlet check ball retainer, check ball and spring.

Reassembly: Install check ball, spring, and retainer in housing (tapered end of spring toward ball). Assemble float to top of diaphragm with flat valve on diaphragm facing downward. *NOTE - Pr ngs n top f fl at should be installed thr ugh diaphragm at right angl s to c nt rline. Plac fl at w ight v r top f diaphragm and bend retaining clips on fl at into sl t in w ight.* Assemble float and diaphragm assembly in housing, making sure that wrinkles are removed from diaphragm and that it lays flat on face of housing. Install diaphragm spacer over diaphragm so center holes line up with holes in diaphragm and casting. Install gasket, then diaphragm cover, making sure center holes are aligned properly and that prongs on cover are aligned with holes in diaphragm. Install gasket into lower cover, then install copper spacer next to gasket. Line up holes in gasket and spacer with holes in cover, then install diaphragm in cover, lining up holes and prong apertures. Set diaphragm plungers in their centered positions on diaphragm with plunger stems pointing upward. Place diaphragm plunger spring on top of plunger on float side of fluid meter, then with casting held in upright position, lower casting onto cover making sure diaphragm plunger stems fit into their respective holes. Make sure diaphragm does not wrinkle, then assemble cover to casting. Install upper and lower cover retainer brackets and tighten both screws evenly and securely. *NOTE - Brackets are installed c rrectly wh n liquid inlet is pointing away from fl at bowl.*

OLDSMOBILE F-85 JETFIRE SUPERCHARGER

Olds F-85 Jetfire (1962)

DESCRIPTION: Exhaust driven turbo supercharger assembly consisting of the following units:

Turbine & Compressor: Turbine wheel and compressor wheel are mounted on a common shaft (turbine wheel is welded to shaft and compressor wheel is pressed onto shaft and retained with a nut). The turbine wheel and compressor impeller are enclosed in separate housing by two floating bushings lubricated by engine oil pumped through housing and drained back to right hand rocker arm cover.

Controller Assembly: The poppet type bypass valve located in turbine housing is operated by the controller. When engine is first started the bypass valve is closed, causing increased engine RPM (and increased exhaust) to turn turbine at a greater speed. The bypass valve controls the amount of exhaust pressure used to turn turbine and compressor, thereby controlling engine power output and speed of turbo-charger. The controller unit bolted to compressor housing, with two passages to compressor housing, senses compressor inlet and outlet pressures. When pressure differential is enough to overcome controller spring (within controller), controller opens bypass valve to divert exhaust gases from turbine wheel. The controller limits the pressure the turbo-charger will deliver to engine to 5 to 6 p.s.i.

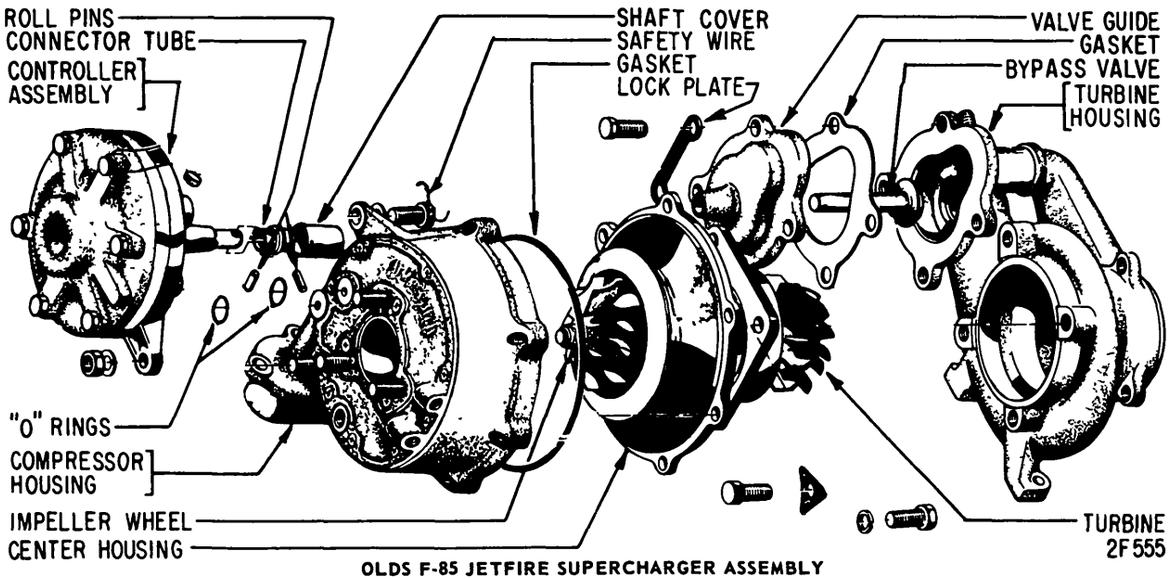
LUBRICATION: Periodic lubrication, other than changing engine oil at specified interval is not required.

REMOVAL: *CAUTION - Clean as much dirt as possible off unit and carburetor. Cover oil inlet and outer ports with tape or plastic plugs to prevent dirt entering unit.*

Turbo-Charger: Remove carburetor *(see "Rochester RC Carburetor" in this section)*, then remove turbo-charger exhaust inlet pipe by disconnecting at upper and lower flanges. *CAUTION - Install tool BT-6219 at turbo-charger and manifold p ning r cov r openings with tap.* Disconnect turbo-charger exhaust outlet pipe at upper flange, then drain engine coolant below level of turbo-charger. Disconnect oil feed line at center housing and disconnect oil return line. Disconnect compressor water inlet hose at compressor housing. *NOTE - Do not close compressor housing water hand shut-off valve.* Remove turbo-charger-to-intake manifold attaching nuts and remove turbo-charger.

Controller Assembly: *NOTE - Controller can be removed for service without removing turbo-charger.* Cut and remove safety wire, then loosen bolt at top of controller and nut at bottom mounting ear (remove carburetor rod to gain access to bottom nut). Slide cover on shaft toward controller and remove roll pin from bypass valve end of connector tube. Remove bolt and nut attaching controller to turbo-charger, then hold throttle valve wide open and remove controller. Remove sensing port "O" rings. Remove shaft cover and remaining roll pin, then remove connector tube.

Bypass Valve: *NOTE - Bypass Valv can b r moved for service without rem ving turbo-charg r.*



OLDS F-85 JETFIRE SUPERCHARGER ASSEMBLY

ROCHESTER H SINGLE BARREL CORVAIR CARBURETOR

CORVAIR PASS. CARS & TRUCKS Rch st r Carb. N .
Synchro-mesh 7020101
Powerglide.....7020100

DESCRIPTION: Single barrel downdraft type with automatic choke, fast idle and unloader. The automatic choke assembly consists of a thermostatic coil assembly mounted to lower side of engine cylinder head and linked directly to carburetor choke valve shaft. A vacuum diaphragm mounted on carburetor air horn replaces the conventional choke vacuum piston.

ADJUSTMENTS: Make final adjustments with carburetor installed on engine.

Final Adjustment (Synchr nization, Idle Speed & Mixture, Fast Idl , Aut matic Choke): *See CARBURETOR on car mod l pag .*

Initial Adjustm nt (Carburetor Off Engine): Idle Speed - Back out idle speed screw, then open choke valve so throttle lever does not touch fast idle cam. Place a .003" feeler gauge between idle speed screw and throttle lever, then turn idle speed screw in until it just touches feeler gauge. Turn idle speed screw in an additional 1½ turns.

Idl Mixtur - Turn idle mixture screw out 1½ turns from a lightly seated position.

Vacuum Diaphragm - Hold diaphragm arm in against diaphragm and measure clearance between lower edge of choke valve and air horn wall. Clearance should be .145-.170". To adjust, bend diaphragm link. *NOTE - Throttl l ver fast idle tang sh uld r st on s cond highest step of fast idle cam when making this adjustment. If necessary, bend outer choke shaft lever tang .*

Pump Rod - Back out idle speed screw until throttle valve is completely closed, then bend pump rod as necessary to align index mark on upper pump lever with sharp edge on air horn casting. *NOTE - On cars with Powerglide (with two holes in lower pump lever), adjustment should be made with rod in outer hole. After adjustment is completed, move rod to inner hole of lever for proper operation.*

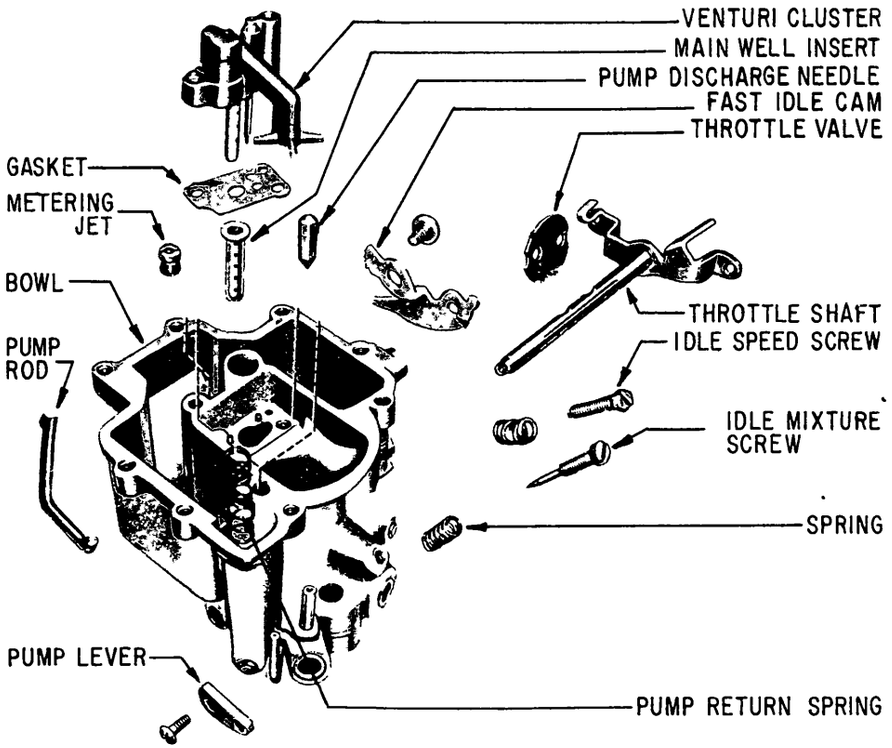
Float Level - 1 13/64" (Gauge BT-174) between air horn gasket and top surface of float with air horn inverted. Floats must be parallel with air horn. To adjust, bend tang at rear of floats.

Float Drop - With air horn assembly held upright and floats hanging free, distance from gasket to bottom of float at lowest point should be 1¾" (Gauge BT-174). To adjust, bend tang at end of float hinge arm.

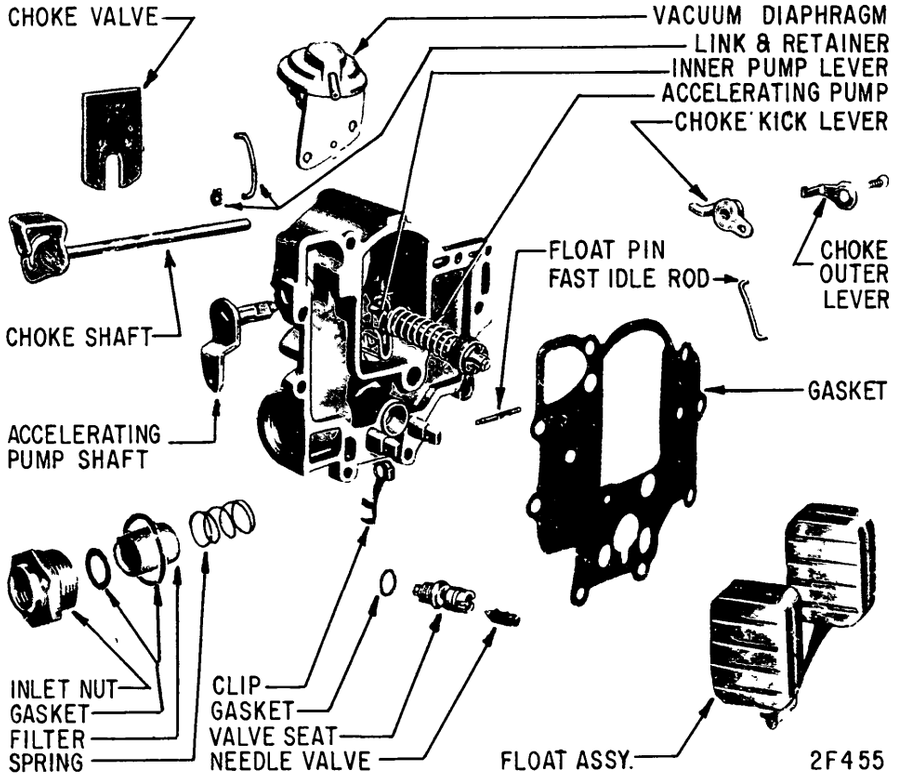
Choke Rod - With fast idle tang on second step of cam next to highest step, close choke valve so trip lever on choke shaft just contacts choke tang on plastic lever and collar assembly. Clearance between lower edge of choke valve and inner wall of air horn should should be .161" (BT-194). Bend Tang on trip lever.

OVERHAUL: Disass mbly - Disconnect pump rod from pump lever, then remove fuel filter element and spring. Remove choke trip lever attaching screw and levers from choke shaft. Remove vacuum diaphragm assembly by rotating the assembly to align notch and free it from link. Remove float assembly and float needle, seat and gasket. Remove clip from accelerator pump and remove pump, then remove clip, shaft and lever. Remove screws from venturi cluster and lift out cluster, gasket and main well insert. Remove pump discharge valve, idle mixture adjusting needle and main metering jet.

Reassembly: Install throttle shaft and valve, carefully centering and seating valve in shaft end bore. Tighten screws securely. Install venturi cluster and gasket and install screws and lockwashers. Install accelerator pump assembly and pump return spring, then install pump discharge needle. Install choke valve, choke kick lever and outer lever cam. Tighten choke valve screws securely. Make sure choke shaft assembly rotates freely without binding. Install float needle valve seat and needle valve, then install a new air horn gasket and install float assembly. Adjust float level and float drop (see above), then install air horn assembly on bowl and install screws and lockwashers in their original positions. Replace filter return spring, filter gasket, gasket and inlet nut. Install pump rod.



ROCHESTER "H" CARBURETOR BOWL ASSEMBLY



ROCHESTER "H" CARBURETOR COVER ASSEMBLY

ROCHESTER B & BC SINGLE BARREL CARBURETORS

CHEVY II	Rch st r Carb. N.
1962 4 Cyl. Synchro-mesh (Early)	7020103
1962 4 Cyl. Synchro-mesh (Late)	7020115
1962 4 Cyl. Powerglide (Early)	7020104
1962 4 Cyl. Powerglide (Late)	7020114
1962 6 Cyl. Synchro-mesh	7020105
1962 6 Cyl. Powerglide	7020108
Service Replacement (7020103, 7020115)	7016207
Service Replacement (7020104, 7020114)	7016208
Service Replacement (7020105)	7016205
Service Replacement (7020108)	7016206
CHEVROLET PASS. CARS	
1962 Synchro-mesh (Std.)	7020003
1962 Powerglide (Std.)	7020000
1962 Synchro-mesh (Economy)	7020107
1962 Powerglide (Economy)	7020106
1962 Velocity Governor	7020005
Service Replacement (7020000)	7016202
Service Replacement (7020003)	7016203
Service Replacement (7020106, 7020107)	7016204
CHEVROLET TRUCKS	
1962 6 Cyl. 235" Eng. (Std.)	7015011
1962 6 Cyl. 235" Eng. (Economy)	7015021
1962 6 Cyl. 261" Eng.	7015013
Service Replacement (7015011)	7016001
Service Replacement (7015021)	7016003
Service Replacement (7015013)	7016004
PONTIAC TEMPEST	
1962 4 Cyl. Synchro-mesh	7020061
1962 4 Cyl. Auto. Trans.	7020062
Service Replacement (7020061)	7016229
Service Replacement (7020062)	7016230

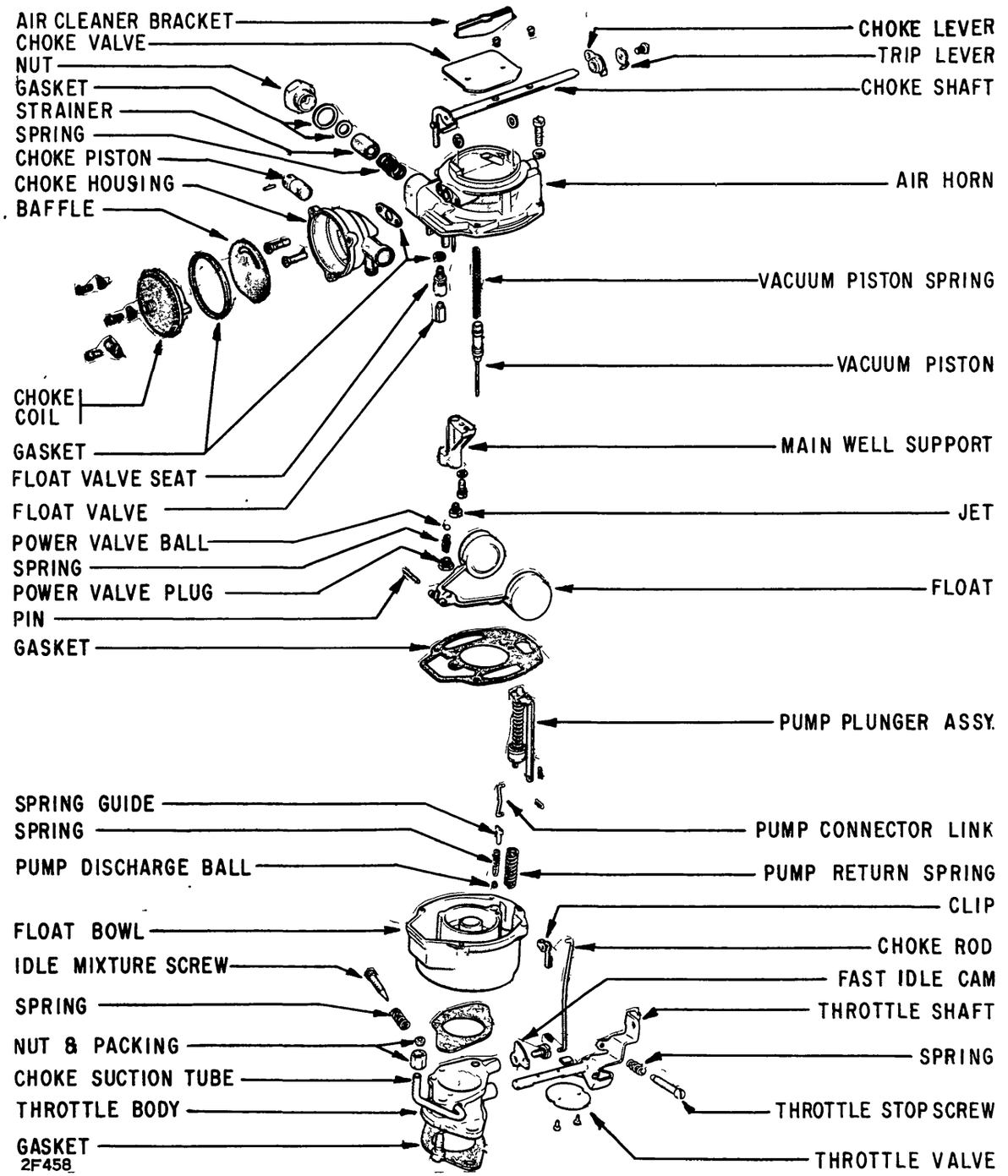
►CHANGES, CAUTIONS, CORRECTIONS

►*1962 6 CYL. CHEVY II & CHEVROLET PASS. CARS (WITH SYNCHRO-MESH TRANS.) CARBURETOR LOAD-UP DURING WARM-UP CORRECTION & PRODUCTION CHANGE NOTE (EARLY CARS):* To minimize engine load-up after a cold start, change choke setting from "1 Point Rich" to "Index" (Chevy II); from "Index" to "1 Point Lean" (Chevrolet Pass. Cars). Later cars have this change made in production.

►*1962 CHEVY II 4 CYL. ENGINE CARBURETOR PRODUCTION CHANGE:* New carburetors, No. 7020114 & 7020115 with spring loaded float needle valve replace earlier carburetors in production. The new spring loaded needle valve can be installed in earlier carburetors by installing Float Assembly, Part No. 7022675 and Float Needle & Seat Assembly Unit, Part No. 7020681. *Procedure for adjusting float level on carburetors with spring loaded needle valve is different than on carburetors with solmd needle valve (see "Float Level" below).*

►*1962 CHEVY II 4 & 6 CYL. ENGINE SURGE CORRECTION (EARLY CARS):* If a surge condition exists on early cars with carburetors, No. 7020103, 7020105 (4 Cyl.); 7020105, 7020108 (6 Cyl.) which are equipped with Main Metering Jets, Part No. 7002652 (7020104); 7002654 (7020103); 7002658 (7020105); 7002654 (7020108), install a 1 step richer main metering jet. Later carburetors have the larger size jet installed in production.

CONTINUED ON NEXT PAGE



ROCHESTER "BC" CARBURETOR (TYPICAL)

ROCHESTER B & BC SINGLE BARREL CARBURETORS (C nt.)

DESCRIPTION: Single barrel downdraft carburetor with manual choke control (Model B), automatic choke (Model BC). Design is similar to previous carburetors except that the Model B carburetor used on Pontiac Tempest has an adjustable positive idle stop (eccentric washer).

►*FUEL STRAINER NOTE:* Strainer screen (under fuel inlet fitting nut) can be removed for cleaning. Replace filter every 15,000 miles or sooner if needed.

ADJUSTMENTS: Make all adjustments exactly as detailed below.

Idling Adjustment: If preliminary setting is required to warm up engine, turn idle mixture screw in until lightly seated, then back screw out correct number of turns (see table below). Start engine and allow to idle until normal operating temperature is reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature and idling at correct speed (see below), turn idle mixture adjusting screw in or out until smoothest engine performance is secured. Recheck idle speed.

Idle Mixture Setting

Car Model	Idle Screw Opening
Chevy II	2 turns
Chevrolet Pass	1½ turns
Chevrolet Truck	1½—2½ turns
Pontiac Tempest	1½ turns

Idle Speed - With engine at normal operating temperature, adjust throttle stopscrew for correct idling speed as listed below (*CAUTION* - On "BC" carburetors, stopscrew must be resting on lowest step of fast idle cam when adjustment being made).

Idle Speed Setting

Car Model	Synchro-mesh	Auto. Trans.
Chevy II 4 Cyl.	600 RPM	① 600 RPM
Chevy II 6 Cyl.	500 RPM	① 600 RPM
Chevrolet Pass.	475 RPM	① 450 RPM
Chevrolet Trucks	475 RPM	① 450 RPM
Pontiac Tempest	③ 680-700 RPM	①② 580-600 RPM

① - Automatic transmission in "D" (Drive).
② - 630-650 RPM on Air Conditioned cars.
③ - Air Conditioner turned off.

Throttle Return Check (Pontiac "BC" Carbs.): *See CARBURETOR n car model page.*

►*1962 PONTIAC 4 CYL. (WITH AUTOMATIC TRANSMISSION) THROTTLE RETURN CHECK NOTE & PRODUCTION CHANGE:* Later production cars WITHOUT air conditioning do not have a throttle return check. In the event of faulty throttle return check operation on these models, remove diaphragm, bracket, and hose, then plug manifold vacuum fitting. Do not replace any of these items with new parts.

Float Level: *CAUTION - Carburetors with "Spring Loaded" float needle valve require a different adjustment procedure than carburetors with "Solid Needle". See below.*

Float Level Setting - *CAUTION - When removing air horn and bowl cover on carburetors with automatic choke, disconnect at suction tube at upper coupling nut and use care not to disturb seal at lower end of tube.*

Carburetors With "Solid Needle Valve" - 1 9/32" (Gauge M-250) with air horn inverted, gasket in place and gauge tang inserted in discharge nozzle. Top of each float must just touch gauge and float must be centered between gauge legs. To adjust, bend tang on float arm.

Carburetors With "Spring Loaded Needle Valve" - 1 9/32" (Gauge M-250) with air horn inverted, gasket in place and gauge tang inserted in discharge nozzle. While setting float level, a 1/32" shim must be inserted between head of float needle pin and float arm. To adjust, bend float arms (there is no tang on float arm). *After adjustment, remove shim from between float needle and float arm.*

Float Drop: Hold float bowl cover assembly upright so that floats drop down to limit of travel. Measure distance from lower face of gasket on cover to bottom of floats at center using a scale. This distance should be 1¾" (all carburetors). Adjust by bending tang at rear of float assembly.

Positive Idle Stop Eccentric (Pontiac Tempest Manual Choke Carbs.): *NOTE - Not necessary to adjust unless eccentric becomes loose or is removed.* With choke valve wide open, rotate eccentric washer to a position where a clearance of .001—.006" is maintained between upper end of "kick—lever" and the "kick—cam". Secure eccentric washer in place with screw.

Fast Idle ("BC" Carburetors): *NOTE* - Fast idle speed is automatically set when hot or slow idle speed is adjusted (same screw controls both settings). Adjust fast idle cam position as follows:

Fast Idle Cam Position - Rotate fast idle cam until throttle stopscrew is on second (next to highest) step of cam and against the shoulder of the highest step. Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending choke connector rod at central angle using bending tool BT—18.

Fast Idle Cam Setting

Car & Carb.	Choke Opening	Checking Gauge
Chevy II "BC" Carbs.	.040"	BT-102
Chevrolet "BC" Carbs.	.040"	BT-102
Pontiac "BC" Carbs.	.081"	BT-193

Unloader ("BC" Carburetors): Open throttle valves to wide open position which will open choke valve slightly. Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever which contacts fast idle cam with bending tool BT—69.

Unloader Setting

Car & Carb.	Check Opening	Checking Gauge
Chevy II "BC" Carbs.	.230"	BT-99
Chevrolet "BC" Carbs.	.230"	BT-99
Pontiac "BC" Carbs.	.161"	BT-195

Automatic Choke: Adjust by loosening three retainer screws on choke cover and rotating cover and coil assembly. Centered setting is with scribed index mark on cover in line with longest (center) cast mark of scale on housing.

Choke Setting

Model & Carb.	Choke Setting
Chevy II (All)	① Centered (At Index)
Chev. Pass. (7020000, 106)	2 Points Rich
Chev. Pass. (7020003)	② 1 Point Lean
Chev. Pass. (7020107)	1 Point Rich
Chev. Pass. (7020005)	Centered (At Index)
Pontiac (All)	③ Centered (At Index)

① - Supersedes previous setting of "1 Point Rich" on synchro-mesh transmission cars.
② - Supersedes previous setting of "Centered At Index" on synchro-mesh transmission cars.
③ - Supersedes previous setting of "2 Points Rich".

OVERHAUL: *See 1961 Final, Page 261 and note the following:*

►*HEAT SUCTION TUBE SERVICING NOTE:* If tightening of loose seal with Tool BT—45 does not correct leakage, install new seal as follows: With carburetor fully assembled, loosen throttle body—to—bowl casting screws, then insert flared end of heat suction tube into hole in throttle body and tap seal lightly into position with Tool BT—45. Rotate tube while tapping to insure starting uniformly into throttle body. Tighten coupling nut at upper end of tube finger tight, using new packing on tube. Use a light hammer and Tool BT—45 to spread seal securely in throttle body (rotate tool to secure uniform spreading of seal). Loosen coupling nut at upper end of tube and check tube tightness in throttle body (tube should not turn). Tighten coupling nut securely, then tighten throttle body—to—bowl casting screws. Check seal for leaks after carburetor installed on engine.

SERVICE PARTS: Gasket Sets - Rochester No. 7015965 (Carb. No. 7015011, 7015021, 7015013); No. 7015966 (Carb. No. 7020000, 7020005, 7020106, 7020107, 7020003); No. 7016143 (Carb. No. 7020061, 7020062); No. 7016241 (Carb. No. 7020105, 7020108); No. 7016242 (Carb. No. 7020103, 7020115, 7020104, 7020114).
Off-Kar Kit - Rochester No. SR-301 (Carb. No. 7015011, 7015021, 7015013); SR-302 (Carb. No. 7020000, 7020003, 7020005, 7020106, 7020107); SR-306 (Carb. No. 7020105, 7020106); SR-307 (Carb. No. 7020103, 7020104); SR-308 (Carb. No. 7020114, 7020115); No. SR-603 (Carb. No. 7020062); No. SR-604 (Carb. No. 7020061).
Repair Kits - Rochester No. 7015936 (Carb. No. 7020005); No. 7015936 (Carb. No. 7020000, 7020003); No. 7015964 (Carb. No. 7015013, 7015011, 7015021); No. 7015976 (Carb. No. 7020106, 7020107); No. 7016129 (Carb. No. 7020062); No. 7016221 (Carb. No. 7020105, 7020108); No. 7016222 (Carb. No. 7020103, 7020104); No. 7016231 (Carb. No. 7020061); No. 7016268 (Carb. No. 7020114, 7020115).

ROCHESTER TRIPLE CARBURETORS

PONTIAC	Rochester Carb. No.
Synchro-Mesh Cars	
Front	2G 7013063
Center	2GC 7020064
Rear	2G 7013065
Automatic Transmission Cars	
Front	2G 7013063
Center (3-Spd. - 4-Stage - Hydra-matic)	2GC 7020069
Center (3-Spd. Hydra-Matic)	2GC 7020067
Rear	2G 7013065

DESCRIPTION: Carburetor design is same as used on previous models.

ADJUSTMENTS: Idle Speed & Mixture - *CAUTION - Make sure that the front and rear carburetor throttle valves are fully closed.* With engine at normal operating temperature, automatic choke not operating (choke valve wide open) and fast idle inoperative so engine idles at hot (or slow idle speed), and transmission selector lever in "D" (Drive) range on automatic transmission cars, proceed as follows: *NOTE - Carburetor air cleaner must be installed.* Set idle speed to correct engine RPM (see table below). Turn one idle mixture screw in or out to obtain highest vacuum and engine RPM, then repeat with other mixture screw (center carburetor only). Reset engine idle speed, then readjust idle mixture screws until highest engine RPM and smoothest idle mixture is obtained with highest vacuum.

►*IDLE SPEED ADJUSTMENT NOTE (Carburetors with Idle Compensator):* **This valve must be closed when idle speed is adjusted.** Press in on button located in idle compensator cover plate to hold valve closed during idle speed adjustment.

Car Model	Idle Speed Setting Synchro-mesh Trans.	Automatic Trans.
Pontiac (No Air.Cond.)	480-500 RPM	②480-500 RPM
Pontiac (With Air Cond.)	①540-560 RPM	②540-560 RPM

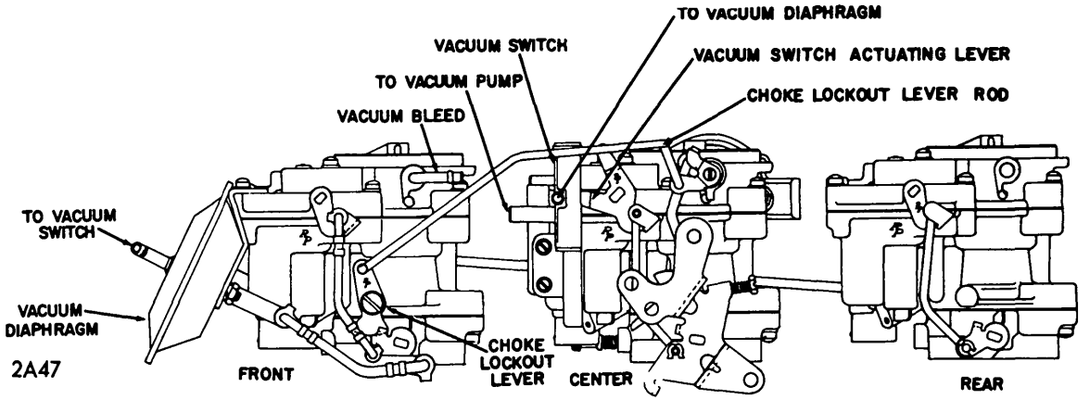
① - With Air Conditioner turned "OFF".
② - Transmission selector lever in "D" (Drive) range.

Throttle Return Check Adjustment: *See CARBURETOR on car model pages.*

Float Level: *CAUTION - Two separate adjustments (Float Level & Float Drop) required.*

Float Level Setting - Remove and invert float bowl cover and float assembly but do not remove cover gasket. Install Float Gauge BT-175 (23/32") on cover gasket at free end of float with long leg of gauge "T" seating squarely on gasket. Edge of float seam should just clear upper edge of gauge. Adjust by bending float arm near hinge pin.

Float Drop Setting - Hold bowl cover and float assembly upright so float hangs down at bottom of travel. Measure distance from lower face of cover gasket to bottom of float at free end using a scale or float level gauge BT-175 (with end of long leg of float gauge against cover gasket, bottom of float should be even with scribed line on gauge). This distance is 1¾". Adjust by bending float tang on rear of float arm as necessary.



ROCHESTER TRIPLE CARBURETOR INSTALLATION (TYPICAL)

Accelerating Pump Rod: *CAUTION - This is a linkage adjustment and not a seasonal setting.* With throttle valve completely closed (throttle stopscrew backed off on center carburetor), check distance from top of air horn as follows: Place float gauge squarely across top edge of air cleaner ring on air horn with "Pump" end of gauge "T" down toward connector rod. End of gauge should just touch top of pump connector rod. This distance is 1 1/8" (Center Carbs.); 55/64" (Front & Rear Carbs.). Adjust by bending pump connector rod.

Idle Vent (Center Carburetor): *NOTE - Adjust only after Accelerating Pump Rod Setting has been checked and adjusted.* Use the same gauge installed in same manner as for pump rod setting check (above) except that gauge should be inverted so that leg marked "Vent" is down toward connector rod. Slowly open throttle valves to point where vent valve just closes (rubber valve seats on pump housing on air horn). At this point, top of connector rod should just touch end of gauge. Adjust by bending tang on pump lever which contacts vent valve arm. Vent setting should be 1 1/32" (Gauge BT-175).

Vacuum Switch Setting (Center Carburetor): With throttle valves wide open, measure distance from top of switch housing to top of sliding switch post. This distance should be 1 5/32". To adjust, loosen two switch retaining screws holding switch on bracket, then move switch up or down as required. Check adjustment by opening and closing throttle valves with sliding switch post in upward position. Inside edge of vacuum switch closing tang must clear side of switch post.

Automatic Choke (Center Carburetor): Adjust by loosening choke cover retaining screws and rotating cover thermostatic coil assembly so it is Centered (At Index). *NOTE - With this setting, choke valve should be lightly closed at 75°F.*

Fast Idle Setting: Fast idle adjustment will be correct after "slow idle" speed and choke rod adjustments have been made (see below).

Choke Rod (Center Carburetor): Place idle speed screw on second step of fast idle cam next to high step. With choke trip lever in contact with choke counterweight lever, clearance between upper edge of choke valve and air horn wall should be .056" (Gauge BT-167). To adjust, bend tang on choke counterweight.

Unloader (Center Carburetor): With throttle valve held wide open, clearance between upper edge of choke valve and side of air horn wall should be .163", with .143-.183" permissible (Gauge BT-168). To adjust, bend tang on throttle lever as necessary to obtain correct clearance.

►*PONTIAC CHECKING NOTE:* It is recommended that throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in drivers seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. Above procedure will eliminate all variances in linkage, floor mat, or pedal location.

Throttle Linkage (Front-to-Rear Carburetors): Disconnect throttle rod at rear carburetor throttle lever. With front and rear carburetor throttle valves completely closed, throttle rod should center in slot in throttle lever. Adjust by bending rod at existing bend, then connect rod.

Vacuum Diaphragm Link: With end carburetor throttle valves completely closed and vacuum diaphragm stem fully extended, end of vacuum unit actuating link should fit freely in hole in throttle lever on front carburetor. Adjust by bending actuating link.

OVERHAUL: *See 1960 Final Data, Page 301, or later Manual edition.*

SERVICE PARTS: Gasket Sets - Rochester No. 7015957 (Carb No. 7013063, 7013065); No. 7016148 (Carb. No. 7020067, 7020069); No. 7016146 (Carb No. 7020064).

Off-Car Kit - Rochester No. TR-607 (Carb. No. 7013063, 7013065); No. TR-611 (Carb. No. 7020064); No. TR-613 (Carb. No. 7020067, 7020069).

Repair Kit - Rochester No. 7015939 (Carb. No. 7013063, 7013065); No. 7016124 (Carb. No. 7020067, 7020069); No. 7016125 (Carb. No. 7020064).

1962 ROCHESTER SINGLE, DUAL & 4-BARREL CARBURETORS JET SPECIFICATIONS

Carb. No.	Model	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Cluster	Main Well Support	Power Valve	Power Piston & Spring	Pump Assembly	Float Needle & Seat
7013011	2G	.060"	7001860	7012486	.....	.....	.....	7012456	.....
7013063	2G	.066"	7008666	7013381	.....	.....	.....	7019519	7013787
7013065	2G	.066"	7008666	7013381	.....	.....	.....	7019519	7013787
7015011	B	.060"	7001860	.....	7016884	.....	7005601	7002091	7002359
7015013	B	.064"	7002964	.....	7016883	.....	7005601	7002091	7002359
7015015	2G	.060"	7001860	7012486	.....	7010918	7006323	7009353	7012524
7015021	B	.043"	7002943	.....	7015198	.....	7005601	7002091	7002359
7019030 Pri.	4GC	.058"	7002658	7013909	.....	7010918	7011947	7016986	7012144
Sec.		.078"	7008678	7015142	.....	.....	.....	.....	7012144
7019031 Pri.	4GC	.058"	7002658	7013909	.....	7010918	7011947	7016986	7012144
Sec.		.078"	7008678	7015142	.....	.....	.....	.....	7012144
7019093	2GC	.048"	7002948	7019575	.....	7006331	7006323	7019486	7012524
7020000	BC	.055"	7002955	.....	7020861	7006121	7010002	7010012	7002359
7020003	BC	.056"	7002956	.....	7021862	7006121	7010002	7010012	7002359
7020005	BC	.056"	7002956	.....	7021862	7006121	7010002	7010012	7002359
7020006 Pri.	4GC	.057"	7002657	7022204	.....	7011989	7009718	7000208	7017488
Sec.		.068"	7008668	7013662	.....	.....	.....	.....	7017488
7020007	2GC	.060"	7001860	7013640	.....	.....	7020296	7019164	7012524
7020008	2GC	.060"	7001860	7013640	.....	.....	7020296	7019164	7012524
7020012 Pri.	4GC	.057"	7002657	7022204	.....	7011989	7009718	7000208	7012144
Sec.		.068"	7002668	7013662	.....	.....	.....	.....	7012144
7020018	2GC	.060"	7001860	7013640	.....	.....	7020296	7019164	7012524
7020022 Pri.	4GC	.057"	7002657	7022204	.....	7011989	7009718	7000208	7012144
Sec.		.068"	7002668	7013662	.....	.....	.....	.....	7012144
7020040 Pri.	4GC	.051"	7002651	7017411	.....	7010918	7017406	7012417	7012907
Sec.		.076"	7008676	7013463	.....	.....	.....	.....	7012906
7020041 Pri.	4GC	.051"	7002651	7017411	.....	7010918	7017406	7012417	7012907
Sec.		.076"	7008676	7013463	.....	.....	.....	.....	7012906
7020043 Pri.	4GC	.047"	7002647	7019831	.....	7010918	7020338	7020246	7012906
Sec.		.053"	7002653	7020332	.....	.....	.....	.....	7012906
7020045 Pri.	4GC	.048"	7002648	7020475	.....	7010918	7020338	7020246	7012906
Sec.		.054"	7002654	7020332	.....	.....	.....	.....	7012906
7020046	2GC	.060"	7002660	7020539	.....	7011989	7009718	7016475	7019218
7020047	2GC	.060"	7002660	7020539	.....	7011989	7009718	7016475	7019218
7020048	2GC	.060"	7002660	7020539	.....	7011989	7009718	7016475	7019218
7020049	2GC	.060"	7002660	7020539	.....	7011989	7009718	7016475	7019218
7020051	2GC	.046"	7002946	7021625	.....	7006331	7006323	7019486	7012524
7020052	2GC	.063"	7008663	7021516	.....	7011989	7006323	7016475	7019932
7020053	2GC	.047"	7002947	7021632	.....	7006331	7006323	7019486	7012524
7020058	2GC	.064"	7008664	7016267	.....	7011989	7006011	7016475	7019932
7020060	2GC	.062"	7008662	7019588	.....	7011989	7006011	7019518	7012253
7020061	B	.058"	7002658	.....	7021234	7006121	7010002	7021495	7002359
7020062	BC	.057"	7002657	.....	7021409	7006121	7010002	7019828	7002359
7020064	2GC	.063"	7008663	7019478	.....	7017950	7011478	7019518	7012602
7020066 Pri.	4GC	.044"	7002644	7021030	.....	7011989	7010332	7021406	7012144
Sec.		.086"	7002686	7021547	.....	.....	.....	.....	7012144

1962 ROCHESTER SINGLE, DUAL & 4-BARREL CARBURETORS JET SPECIFICATIONS

Carb. No.	Model	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Cluster	Main Well Support	Power Valve	Power Piston & Spring	Pump Assembly	Float Needle & Seat
7020067	2GC	.062"	7008662	7019746	.....	7011989	7006011	7019518	7012602
7020069	2GC	.062"	7008662	7019746	.....	7011989	7006011	7019518	7012602
7020070	2GC	.065"	7008665	7020750	.....	7011989	7012266	7020584	7012253
7020071	2GC	.065"	7008665	7020750	.....	7011989	7012266	7020584	7012253
7020072	2GC	.066"	7008666	7012784	.....	7011989	7012028	7020584	7012253
7020073	2GC	.066"	7008666	7012784	.....	7011989	7012208	7020584	7012253
7020074	2GC	.061"	7008661	7020475	.....	7011989	7006011	7020585	7012253
7020075	2GC	.061"	7008661	7020475	.....	7011989	7006011	7020585	7012253
7020076	2GC	.061"	7008661	7020475	.....	7011989	7006011	7020585	7012253
7020077	2GC	.061"	7008661	7020475	.....	7011989	7006011	7020585	7012253
7020078 Prl.	4GC	.047"	7002647	7019831	.....	7010918	7020338	7020246	7012906
Sec.		.053"	7002653	7007803	.....	.....	.....	.....	7012906
7020079 Prl.	4GC	.046"	7002646	7021031	.....	7011994	7010332	7021406	7012144
Sec.		.086"	7002686	7021628	.....	.....	.....	.....	7012144
7020100	H	.049"	7002649	7021654	.....	.....	.....	7019457	7015789
7020101	H	.050"	7002650	7021656	.....	.....	.....	7019457	7015789
7020103	B	.055"	7002655	.....	7021468	7002360	7010002	7021904	ℂ
7020104	B	.053"	7002653	.....	7021772	7002360	7010002	7021904	ℂ
7020105	BC	.059"	7002959	.....	7020568	7006121	7010002	7021495	7002359
7020106	BC	.042"	7002642	.....	7015291	7002360	7010002	7010012	7002359
7020107	BC	.042"	7002642	.....	7015291	7002360	7010002	7010012	7002359
7020108	BC	.055"	7002655	.....	7021549	7002161	7010002	7021495	7002359
7020109	2GC	.053"	7002653	7021473	.....	7010918	7006323	7019162	7012524
7020114	B	.054"	7002654	.....	7021772	7002360	7010002	7021904	7022675
7020115	B	.056"	7002656	.....	7021468	7002360	7010002	7021904	7022675
7020140	2GC	.045"	7002645	7021477	.....	7004659	7009718	7015871	7012524
7020141	2GC	.045"	7002645	7022206	.....	7004659	7009718	7015871	7012574
7020142	2GC	.045"	7002645	7021477	.....	7004659	7009718	7015871	7012574
7020143	2GC	.045"	7002645	7022206	.....	7004659	7009718	7015871	7012574
7020146	2GC	.046"	7002946	7019718	.....	7006331	7006323	7015871	7012524
7020147	2GC	.048"	7002948	7019575	.....	7006331	7006323	7015871	7012524
7020950 Prl.	4GC	.054"	7001607	7021214	.....	7010918	7011947	7013472	7012207
Sec.		.084"	7008684	7013475	.....	.....	.....	.....	7012144
7020952 Prl.	4GC	.043"	7002643	7020323	.....	7011989	7011947	7020248	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144
7020953 Prl.	4GC	.043"	7002643	7020323	.....	7011989	7011947	7020248	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144
7020954	2GC	.065"	7008665	7021516	.....	7011989	7006323	7016475	7019932
7020955 Prl.	4GC	.054"	7001607	7021214	.....	7010918	7011947	7013472	7012207
Sec.		.084"	7008684	7013475	.....	.....	.....	.....	7012144
7020956	2GC	.066"	7008666	7016267	.....	7011989	7006011	7016475	7019932
7020957	2GC	.048"	7002948	7016257	.....	7011989	7006011	7016475	7019932
7020959	2GC	.047"	7002947	7016247	.....	7011989	7006011	7016475	7019932
7020980	2GC	.047"	7002947	7021625	.....	7006331	7006323	7019486	7021991
7020981	2GC	.047"	7002947	7021625	.....	7006331	7006323	7019486	7021991
7020982	2GC	.048"	7002948	7021632	.....	7006331	7006323	7019486	7021991
7020983	2GC	.048"	7002948	7021633	.....	7006331	7006323	7019486	7021991
7020985 Prl.	4GC	.043"	7002643	7020323	.....	7011989	7011947	7020248	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144
7022752 Prl.	4GC	.043"	7002643	7020323	.....	7011989	7011947	7020248	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144

ℂ - Use Float & Needle Seat Modification Kit, Part No. 7022705.

STROMBERG WWC 2-BARREL (CHRYSLER & DODGE) CARBURETORS

CHRYSLER & DODGE	Str mb rg Cod No.
Chrysler Newport 361" Eng.	WWC 3-201
Dodge Custom 880 361" Eng.	WWC 3-201

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 CARBURETOR LEAN CONDITION CORRECTION:* A lean road load performance condition can be corrected by installing .066" jets to replace the standard .065" jets. *CAUTION - Do not use Stromberg Part No. 38811-68 or 69 j ts. Th se ar for earlier carburetors and must not b us d on 1962 models.*

►*HARD COLD WEATHER START CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke to flush out gum formation.

DESCRIPTION: 2-Barrel downdraft type of same design as previous models.

ADJUSTMENT: Make all adjustments as follows:

Idle Setting: For initial setting, turn idle mixture screws 1-1½ turns open from a lightly seated position, then bring engine to normal operating temperature with choke fully open and fast idle inoperative.

Idl Sp ed – 500 RPM with transmission in "N" (Neutral). *NOTE – 550 RPM with air conditioning compressor operating (if s equipped).* Adjust idle speed with throttle stop screw on throttle body casting.

Idl Mixtur – Turn both idle mixture screws in equally until engine begins to run rough, then turn screws out until engine rolls (from rich mixture). Now turn screws in to a point about halfway between these two positions where smoothest idle is obtained. *NOTE – Both screws must turn equally.* Recheck idle speed.

Fast Idl Sp d (On Car): With engine at normal operating temperature and fast idle screw on TOP step of fast idle cam, adjust fast idle screw to obtain an engine speed of 1400 RPM.

Fast Idle (Off Car) & Cam Position Adjustment: Back throttle. stop screw out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw out so it can be positioned on **second step** of cam (against top step), and **turn fast idle screw in 3½ turns.** Distance between edge of choke valve and air horn should be 15/64". To adjust, bend fast idle rod at upper angle.

Unloader: With choke valve held lightly closed, open throttle valves to wide open position. Clearance between top edge of choke valve and wall of air horn should be 15/64" (use a 15/64" drill to measure). To adjust, bend tang (long narrow extension) on throttle lever. Make sure throttle valves fully open and close when choke valve is wide open.

Accelerating Pump: With throttle valves fully closed, pump travel from fully closed to fully open positions should be 9/16", measured at small raised boss near connecting rod end of pump lever. To adjust, bend pump rod at right angle bend. *NOTE – Pump rod must be installed in center slot of pump arm.*

Bowl Vent Valve: With idle speed screw backed out, hold throttle valves in closed position and choke valve wide open. Opening of vent valve at center of hole, with rubber valve hanging free, should be 5/64". To adjust, bend bowl vent lever (extension of accelerator pump lever).

►*CAUTION: Make sure th v nt valve is not distort d and that it properly seals the bowl vent hole when throttle valve is open.*

Choke Vacuum Piston: Remove welch plug from choke piston cylinder and insert a hook gauge (.036" to .040" diameter) into slot in cylinder wall. Rotate hook end so that it engages end groove in piston. Apply light closing pressure against choke valve so that hook gauge is gripped between groove in piston and end of slot. With choke piston in this position, a .170" drill (No. 18) should fit between choke valve and air horn. To adjust, bend bracket on choke valve.

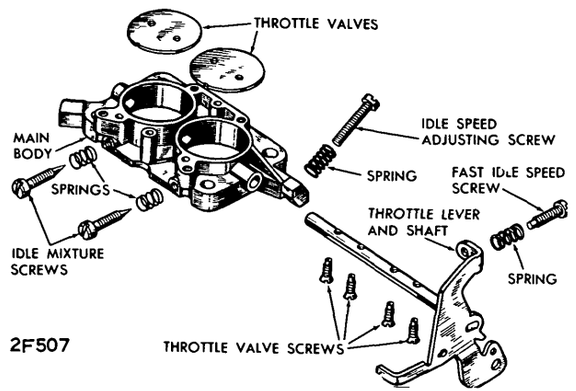
Float Level: With float installed in float bowl and lip of float held against inlet needle, distance from top of float at center to top of float bowl (gasket removed) should be 1/8". Use Gauge 73725 or "T" scale. To adjust, bend lip of float with Tool 73605.

►*FLOAT LEVEL CHECKING NOTE:* With carburetor installed on engine, the air horn can be removed as follows: Remove three short air horn-to-main body attaching screws, then remove one long air horn-to-throttle body screw next to fuel bowl. Assemble a short screw through main body flange and thread into throttle body. Remove long screw from side away from fuel bowl and on opposite side, then assemble a short screw through main body flange. Securely tighten the short screws, then remove remaining two long screws and lift off air horn. Assemble air horn to main body by reversing removal procedure.

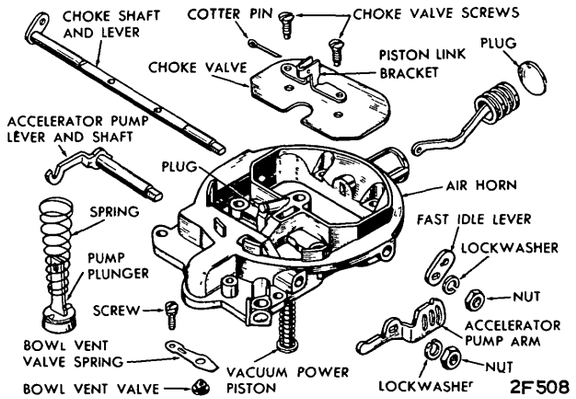
Automatic Choke: Cross–Over type mounted in well in intake manifold. *See "Stromberg (Cross–Over) Typ Automatic Choke".*

Setting - 1 Point Lean (Chrysler); 2 Points Rich (Dodge).

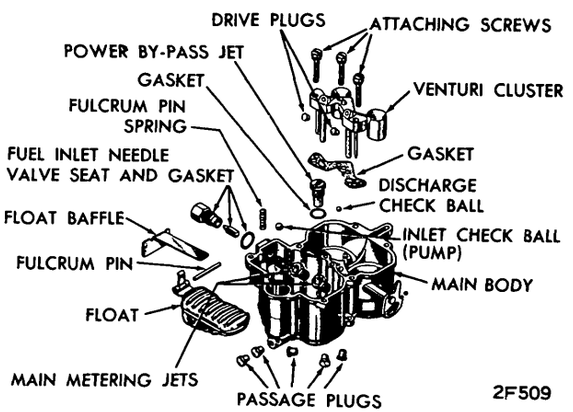
OVERHAUL: *See 1960 Final, Page 310, or later Manual edition.*



THROTTLE BODY (EXPLODED VIEW)



AIR HORN (EXPLODED VIEW)



MAIN BODY (EXPLODED VIEW)

STROMBERG WW 2-BARREL (DODGE & PLYMOUTH) CARBURETOR

DODGE DART & PLYMOUTH	Stromberg Code No.
1962 318" Eng. (Synchro-mesh)	WW 3-198
1962 318" Eng. (Auto. Trans.)	WW 3-199
1962 318" Eng. (All Trans.) (CCV)℄	WW-3-200

℄ - Closed crankcase ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 DODGE & PLYMOUTH STUMBLE OR SURGING (DUE TO LEANNESS) CORRECTION (AUTO. TRANS. CARS WITH WW 3-199 CARB.):* Replace standard .051" jets with .052" jets. *NOTE - In extreme cases, use .053" jet.* Make sure float level is properly adjusted.

►*1962 DODGE & PLYMOUTH STUMBLE ON ACCELERATION OR ENGINE DYING DURING WARM-UP CORRECTION:* This condition may be caused by a bent accelerator pump rocker arm. Check to make sure the rocker arm is not bent in its center section adjacent to pivot screw. *The center section of rocker arm, between normal bends at outer ends, must be straight.* If straightening pump rocker arm does not provide specified bowl vent opening, bend pump operating rod. *(See "Accelerating Pump & Idle Vent Adjustment" below).*

►*1962 DODGE & PLYMOUTH HARD COLD WEATHER START CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove gum formation by removing air cleaner and squirting carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke

DESCRIPTION: Dual downdraft type of same design used on previous models. Automatic choke is "Cross-Over" type mounted in a well in intake manifold and connected to choke shaft lever by linkage.

ADJUSTMENTS: Make all adjustments as outlined below.

►*DODGE & PLYMOUTH IDLE SETTING CAUTION:* When making idle speed and idle mixture adjustments, turn headlights on to high beam to compensate for alternator load. On automatic transmission cars, loosen nut on sliding link of carburetor-to-bellcrank rod so transmission internal stop will not interfere with carburetor throttle lever. When adjustments completed, move sliding link to rear against its stop and tighten locknut.

Idle Adjustment: For initial adjustment, turn idle mixture screws 1¼ turns open from a lightly seated position. Bring engine to normal operating temperature with choke valve wide open and fast idle inoperative. Set engine idle speed (see below), then adjust idle mixture.

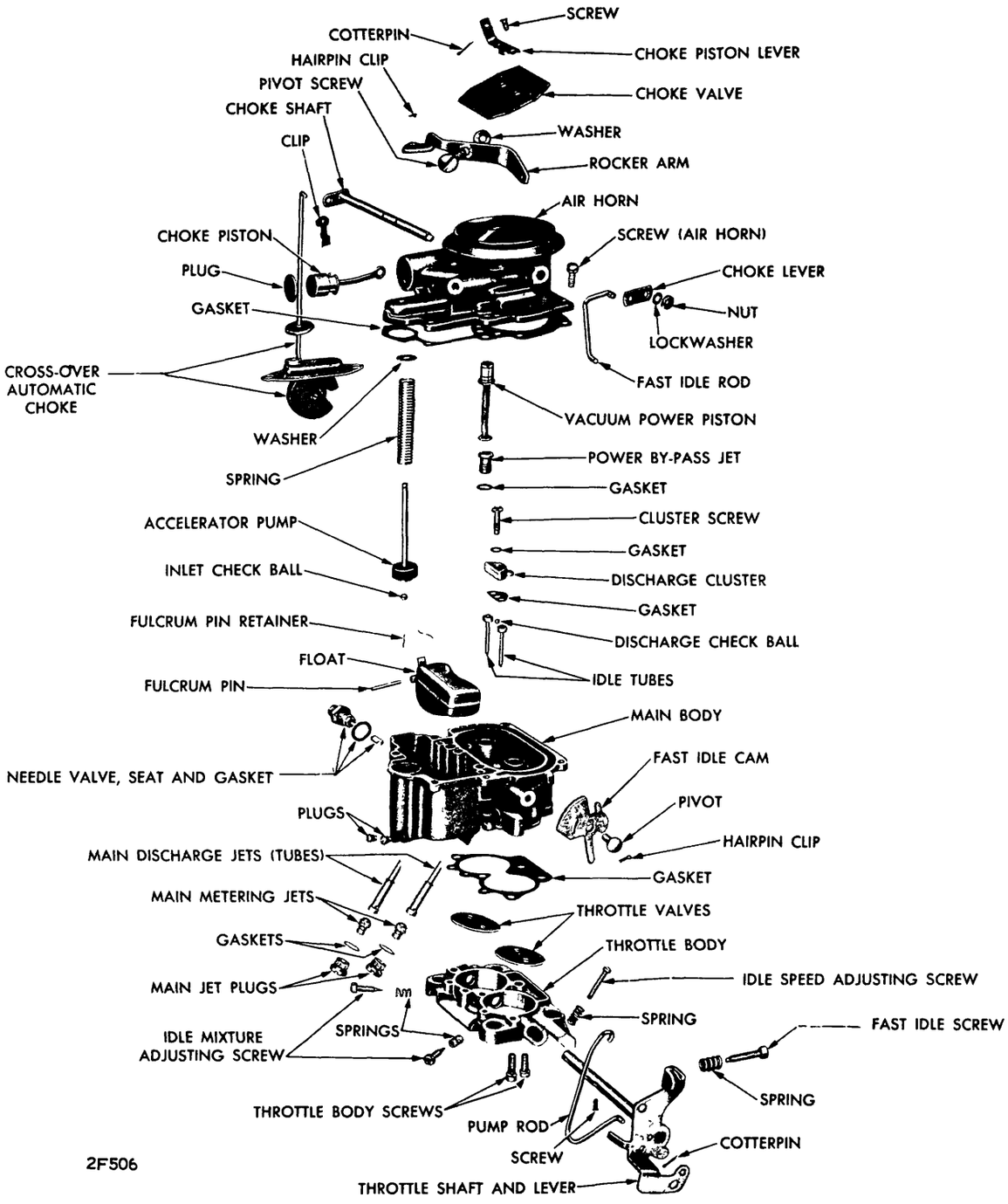
Idle Mixture - Turn both idle mixture adjusting screws in equally until engine begins to run roughly from a lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about half way between these positions where smoothest idle is obtained. Recheck idle speed.

Idle Speed - Adjust by turning throttle stopscrew located on boss on throttle body for desired speed as follows:

Car Model	Idle Speed Setting Engine Speed
Dodge & Plymouth	℄ ℗ 500 RPM

℄ - 550 RPM on Air Conditioned cars.
℗ - Headlights turned on.

CONTINUED ON NEXT PAGE



STROMBERG WW (DODGE & PLYMOUTH) DOWNDRAFT CARBURETOR WITH CROSS-OVER CHOKE

STROMBERG WW 2-BARREL (DODGE & PLYMOUTH) CARBURETORS (Cont.)

Fast Idle (On Car): With engine at normal operating temperature and fast idle adjusting screw contacting top step of fast idle cam, adjust engine speed to 1250 RPM.

Float Level (Dodge & Plymouth): *NOTE - Fuel inlet needle is rubber tipped. Do not allow more than weight of float to rest on needle when checking float level.* Invert float bowl and check distance between surface of fuel bowl (gasket removed) and top of float at center with Gauge 73725 or a "T" gauge (Scale). This measurement should be 7/32". To adjust, hold float at bottom of bowl and bend tang on float as necessary. *CAUTION - When bending float tang, do not allow tang to push against needle. When float is correctly set, float tang should be perpendicular to needle or slanted not more than 10° away from needle.*

►*ADJUSTMENT NOTE: Make following adjustments in the order indicated.*

Fast Idle (Off Car) & Cam Position Adjustment (Dodge & Plymouth): Back throttle stop screw out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw out so it can be positioned on **second step** (against top step), and **turn fast idle screw in 7½ turns.** Distance between edge of choke valve and air horn wall should be 13/64". To adjust, bend fast idle rod at upper angle.

Unloader (Dodge & Plymouth): Close choke valve lightly, then fully open throttle valves. Clearance between choke valve and wall of air horn should be 15/64" (No. 1 drill). To adjust, bend tang on throttle lever.

Choke Vacuum Piston (All Models): Bend a .040" wire gauge so it will engage slot at bottom of choke vacuum piston cylinder, then with gauge in place, lightly close choke valve until inner end of piston grips gauge at end of slot. Measure choke valve opening or clearance between upper edge of choke and air horn wall using a gauge or drill rod. Clearance should be 21/64" (Auto. Trans.); 13/32" (Synchro-mesh). To adjust, bend ear on piston lever.

Accelerating Pump & Idle Vent (Dodge & Plymouth): *NOTE - This is a combination adjustment. Accelerator pump travel is automatically set when bowl vent is properly adjusted.* Back off idle adjusting screw and open choke valve so that when throttle valves are closed, fast idle screw will not contact cam. Place pump rod in center hole in throttle lever and pump vent clip (located on pump stem under bowl vent valve) in center notch. With throttle valves closed tightly, clearance between bowl vent and bowl vent seat should be 5/64" (pump travel should measure 9/32"-5/16"). To adjust, bend pump rod at lower angle.

►*DODGE & PLYMOUTH ACCELERATING PUMP ADJUSTMENT CAUTION: If pump rod is moved to either the short or long stroke position, a corresponding change must be made in location of bowl vent clip, and the amount of lift of bowl vent rechecked and adjusted.*

Automatic Choke (Dodge & Plymouth): "Cross-Over" type mounted in well in intake manifold. *See "Stromberg Cross-Over Automatic Choke".*

Setting - Centered (At Index).

OVERHAUL: *See 1958 Final Data, Page 294, or later Manual editions.*

STROMBERG WW 2-BARREL (STUDEBAKER) CARBURETORS

STUDEBAKER	Stromberg Code No.
V8 Engine	WW 6-127, 127A
V8 Engine (CCV)℄	WW 6-128

℄ - Closed Crankcase Ventilation.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 ENGINE SURGE (UNDER LOAD AT 30-50 MPH) CORRECTION:* This condition may be caused by a lean condition and can be corrected by installing .055" main metering jets to replace the standard .054" main metering jets. On cars with closed crankcase ventilation, install accelerator pump link in the long stroke position in addition to the larger main metering jets.

►*1962 AUTOMATIC CHOKE STICKING CORRECTION:* Replace choke rod with later type choke rod, Part No. 1555388. Check all other components of choke assembly for proper operation.

DESCRIPTION: 2-Barrel downdraft type similar to previous models. Automatic choke housing is mounted on throttle body and is connected to choke shaft lever by linkage.

ADJUSTMENT: Make all adjustments exactly as detailed below.

Idle Setting: For initial setting, set idle adjusting screws (located in throttle body below float chamber) 1¼ turns out from a lightly seated position. Bring engine to normal operating temperature with carburetor air cleaner in place, choke fully open, carburetor off fast idle.

Idle Speed – 550–600 RPM with selector lever in "N" on Flightomatic cars. Set idle speed by turning throttle stopscrew located on boss on throttle body until correct speed is obtained.

Idle Mixture – Turn both screws in equally until engine begins to run roughly from lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about halfway between these positions where smoothest idle is obtained. Both screws must be turned equally. Recheck idle speed.

Accelerating Pump: No seasonal adjustment. Three holes provided in throttle lever for pump connector rod engagement.

Center Hole – Normal operating conditions.
Upper Hole – Shorter stroke, less fuel discharge.
Lower Hole – Longer stroke, more fuel discharge.

Float Level: 3/16" from top of float to top of main body with air horn and gasket removed. Use Gauge J–7477. Top of float should just touch gauge. To adjust, bend float lip.

Fast Idle: With choke valve closed and high step of fast idle cam touching fast idle screw, adjust fast idle screw so that a .030" gauge wire can be inserted freely between throttle valve and throttle body on idle port side.

Fast Idle Cam: Place fast idle screw on highest step of fast idle cam, then close choke valve until fast idle rod contacts upper end of slot in fast idle cam. With choke valve in this position, clearance between top edge of choke valve and air horn wall should be 9/64" (Gauge J-9598). To adjust, bend fast idle rod.

Unloader: To check setting, hold choke valve closed lightly, then open throttle valve to wide open position so throttle lever stop rests against throttle body stop. Clearance between choke valve and wall of air horn should be .196" (Gauge J-7477). To adjust, bend ear on throttle lever.

Choke Vacuum Piston: Open choke valve and place end of .040" wire gauge in inner end of choke piston housing slot. *NOTE - Bend wire as necessary to insert int choke piston housing from within air horn.* Close choke valve until end of wire gauge is gripped between skirt end of vacuum piston and end of slot. Clearance between top edge of choke valve and wall of air horn should be .228" (Gauge J-9598). To adjust, bend piston lever bracket on choke valve.

Choke Thermostatic Spring Operating Lever: With thermostatic coil cover assembly removed, and with choke valve closed, distance between top of tang on thermostat lever and center of screw hole directly above lever should be 1 3/32". To adjust, bend rod connecting thermostat lever to lever on choke shaft.

Automatic Choke: Centered (At Index). To change setting, loosen cover screws and rotate cover as necessary.

OVERHAUL: Disassembly - 1) Remove accelerating pump lever (pivot screw has left hand thread) and unhook from pump rod. Remove cotter pin from lower end of pump rod and remove rod from throttle shaft lever. Disconnect fast idle rod from fast idle cam, then disconnect upper end of choke rod from choke shaft lever.

CONTINUED ON NEXT PAGE

1962 STROMBERG 2-BARREL (DUAL) CARBURETORS JET SPECIFICATIONS

Carb No.	Model	Standard Metering Jets Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power Jet (Two Stage) Size
3-198	WW	.053"	.051"	.049"	.028"&.047"
3-199	WW	.051"	.049"	.047"	.028"&.067"
3-200	WW	.053"	.051"	.049"	.028"&.047"

Carb. No.	Model	Standard Metering Jet Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power Jet (Two Stage) Size
3-201	WWC	.065"	.063"	.061"	.040"&.075"
6-127	WW	.054"	.052"	.050"	.....
6-128	WW	.054"	.052"	.050"	.....

STROMBERG WW 2-BARREL (STUDEBAKER) CARBURETORS (C nt.)

2) Remove cover assembly from main body, then remove accelerating pump spring from end of pump plunger (spring may remain in pump cylinder). Remove accelerating pump piston from cover and disassemble pump by removing flat washer and retaining spring from pump rod. Remove pump duration spring by depressing spring and slipping retainer out of groove in piston rod. Remove cover gasket, then remove staking from around vacuum power piston retaining washer and remove vacuum power piston.

3) To remove choke vacuum piston, use a sharp awl to remove welch plug, then remove cotter pin from choke piston lever at choke valve bracket and remove piston and connecting rod assembly. To remove choke valve shaft, remove fast idle lever from choke shaft, then remove valve retaining screws and choke piston lever and bracket. Remove choke valve and choke lever.

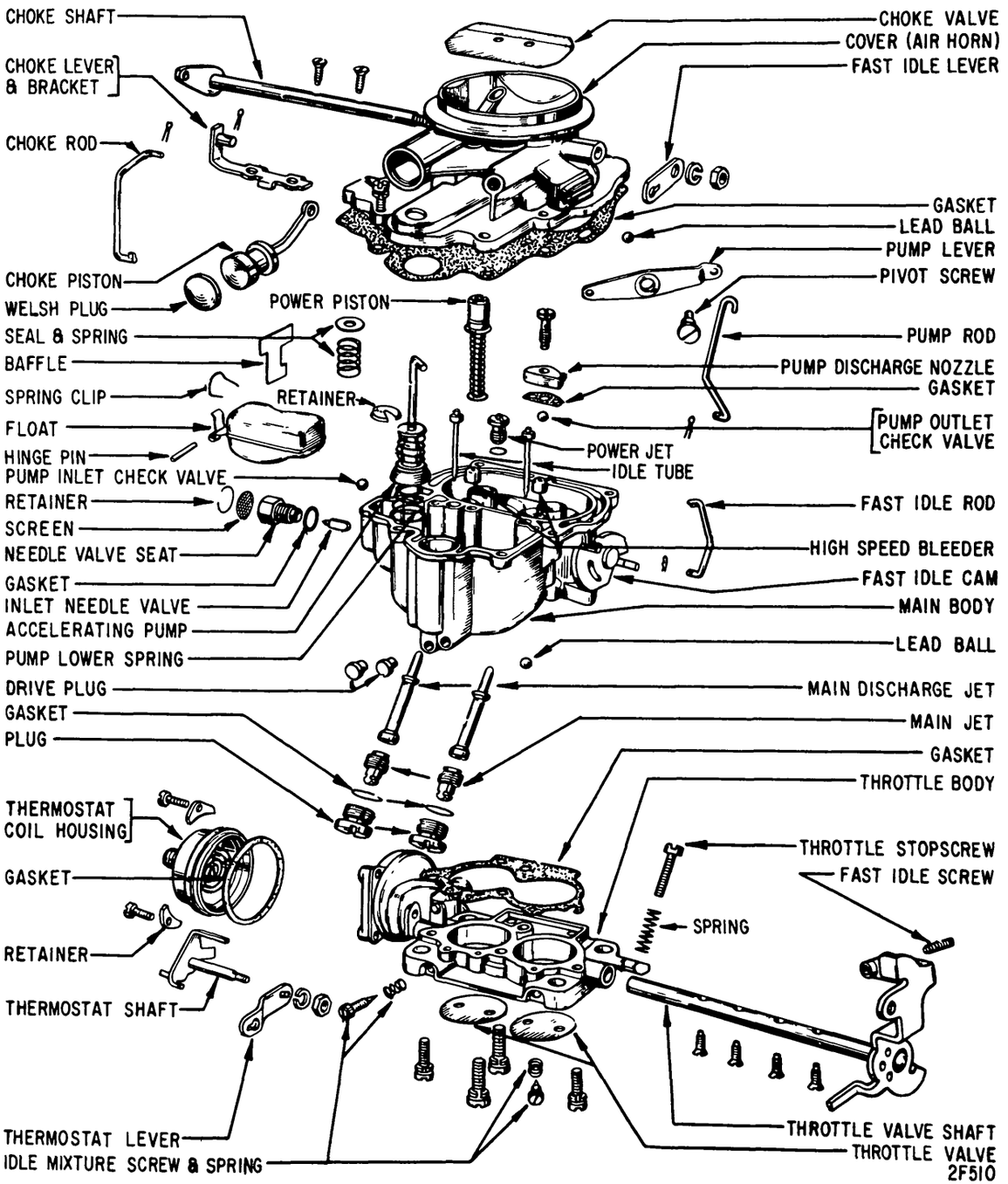
4) Remove thermostat cover and gasket. To remove thermostat spring operating lever and shaft assembly, remove lower choke rod lever retaining nut and washer and slip operating lever and shaft assembly out of choke housing.

5) Remove idle tubes from carburetor body, then tip main body and remove inlet check ball from accelerating pump well. Invert bowl assembly and remove throttle body retaining screws and lockwashers, then separate main body from throttle body. Remove main metering jet plugs and gaskets, then use Tool J-1561 to remove main metering jets; and Tool KMO-269-S-4 to remove main discharge jets. Remove pump discharge nozzle and gasket. Place a hand on top of main body, invert the body, and catch pump outlet check ball.

6) Remove inlet pipe fitting and remove screen retainer and screen. Remove needle valve, seat, and gasket. Remove baffle from main body assembly, then remove spring float retainer, float pivot pin and float. Remove power bypass jet and gasket. Remove idle mixture adjusting screws and springs. If it is necessary to remove throttle valves and shaft because of damage or wear, mark each throttle valve and place corresponding marks on throttle body to insure installation in original location. Remove throttle valve retaining screws and remove throttle valves, then pull shaft out of throttle body.

Cl aning & Inspection: Wash all parts with a suitable carburetor cleaner and rinse with solvent. Dry all parts with air and blow out all passages. Replace all damaged or worn parts and use new gaskets at reassembly. *NOTE - Do not clean carburetor cover ass mbly with cleaner or solvent unless choke vacuum piston is removed (liquid can be trapped in cylinder and passages and prev nt pr p r p rati n).*

R ass mbly: Reverse disassembly procedure.



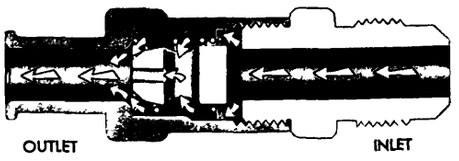
STROMBERG WW 6-127 & 6-128 (STUDEBAKER) CARBURETOR

CLOSED CRANKCASE VENTILATION (EXCEPT OLDSMOBILE F-85 JETFIRE)

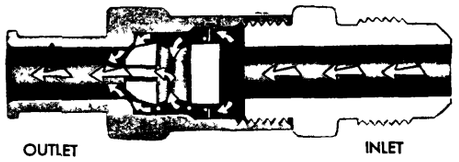
DESCRIPTION: Closed crankcase ventilation systems utilize vacuum in intake manifold to remove unburned gases from engine crankcase and return them to the combustion chambers to be burned. This unit which consists of a check valve, hose, and carburetor adapter or carburetor connection, replaces the conventional crankcase ventilator tube.

OPERATION: The crankcase vent valve assembly automatically meters flow of gases so that normal operation of engine is not disturbed. Under high vacuum conditions such as at idle or during deceleration, the valve is held closed and only small amounts of gases are allowed to pass through a metered orifice and into intake manifold. During periods of low vacuum in intake manifold, a spring holds the valve open and larger amounts of gases pass through to intake manifold. Fuel vapor is prevented from entering crankcase by the crankcase vent valve which is held closed by any reverse air flow.

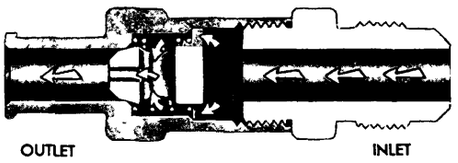
SERVICING: See table below for servicing intervals. *NOTE - Indicated intervals are for normal operation. If car is operated under low temperature conditions; in "stop and go" service, or in dusty areas, ventilation system should be cleaned or serviced more frequently. A clogged system will result in erratic idle speed, stalling at low speed, or stumble on acceleration.* Remove ventilator hose from connections and blow out with air (replace hose if necessary). Remove crankcase vent valve and disassemble by unscrewing connector and removing check valve and spring. *NOTE - A "crimped type valve assembly is used on Pontiac V8 and Pontiac Tempest 4 Cyl. engines. These valves cannot be disassembled and must be replaced with new ones at the indicated intervals.* Clean all parts in solvent or carburetor cleaner and blow dry with air. Clean out metering orifice using a suitable size drill to remove varnish and carbon accumulation. *CAUTION - Do not enlarge metering hole.* Inspect all parts for damage or excessive wear and replace valve if necessary. Install spring on valve until spring is properly seated in groove in valve, then place valve and spring in valve body and install connector. *CAUTION - Do not stretch or distort valve spring.* If damaged, replace assembly. Clean crankcase and intake manifold (or carburetor) connectors. Clean crankcase oil filler cap in solvent and blow dry with air. *NOTE - On Lincoln models, install new oil filler cap.* Reinstall ventilating system.



LOW VACUUM



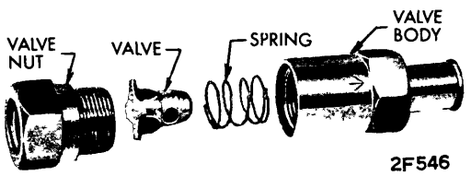
INTERMEDIATE VACUUM



HIGH VACUUM

2F545

CRANKCASE VENT VALVE OPERATION



2F546

CRANKCASE VENT VALVE ASSY. (TYPICAL)

►*CADILLAC NOTE: It is recommended that crankcase vent valve be removed and cleaned every 8,000 miles by sloshing it in carburetor cleaner and blowing dry with air. Do not disassemble unless absolutely necessary. Clean out hose and connections with air. Use a drill to clean out metering orifice.*

①Maximum Servicing Intervals

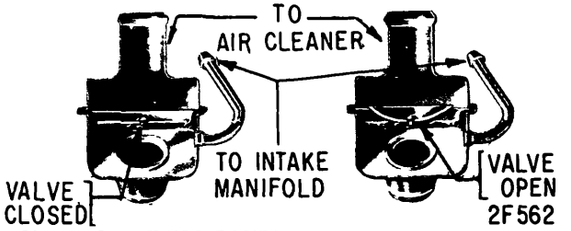
Car	Mileag
Buick & Buick Special	8,000 miles
Cadillac	②③4,000 miles
Chevy II	④
Chevrolet Pass. Cars	④
Chevrolet Trucks	④
Corvair	5,000 miles
Chrysler	8,000 miles
Dodge & Lancer	8,000 miles
Comet	6,000 miles
Falcon	6,000 miles
Ford Pass. Cars	6,000 miles
Ford Trucks	4,000 miles
Lincoln	6,000 miles
Mercury (All)	6,000 miles
Oldsmobile & Olds F-85	10,000 miles
Pontiac	⑤⑥ 12,000 miles
Pontiac Tempest 4 Cyl	⑤⑥ 12,000 miles
Pontiac Tempest V8	⑥ 12,000 miles
Plymouth & Valiant	8,000 miles
Rambler	10,000 miles
Studebaker	10,000 miles
Willys	④

① - If car is operated in cold temperature, "stop & go" service or in dusty areas, clean system more frequently.
② - Service at time of engine oil change.
③ - See "Cadillac Note" above.
④ - At each tune-up, overhaul, or as required.
⑤ - Vent valve cannot be disassembled, Replace unit.
⑥ - Every 12,000 miles or 12 months

OLDSMOBILE F-85 JETFIRE CLOSED CRANKCASE VENTILATION

DESCRIPTION: Vacuum diaphragm type ventilator check valve located on left hand rocker arm cover controls flow of crankcase vapors between crankcase breather cap and intake manifold and air cleaner.

OPERATION: At idle, and low engine RPM, crankcase vapors are drawn into intake manifold from crankcase side of diaphragm valve (valve is closed) through a small tube connected to carburetor throttle body. At higher engine RPM, air flow through carburetor air cleaner snorkel opens diaphragm valve allowing major portion of crankcase vapors to be drawn through large tube into air cleaner. Orifices in breather cap assembly control this flow.



2F562

OLDS F-85 JETFIRE POSITIVE CRANKCASE VENT VALVE

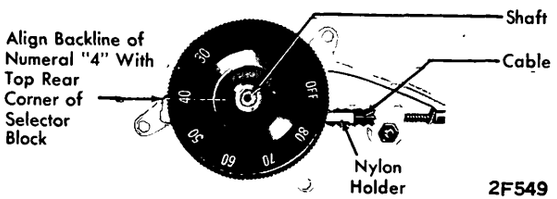
SERVICING: Every 10,000 miles, remove hoses and blow out with air. Remove diaphragm check valve assembly and clean in kerosene. *NOTE - Diaphragm check valve cannot be disassembled.* Install valve and hoses.

CRUISE CONTROL & AUTOMATIC SPEED CONTROL

Cadillac (1962)
Chevrolet (1962)
Lincoln (1962)
Mercury (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 CADILLAC CRUISE-CONTROL FAILURE TO "LOCK-IN" FOR AUTOMATIC SPEED CONTROL:* Make sure the brake stop light switch is not faulty or is not out of adjustment. If switch circuit is normal, the probable cause of "no lock-in" is a broken spring washer in the speed selector shaft which results in a poor ground. To check for a broken spring washer, disconnect negative cable at battery, then disconnect speed selector control cable from regulator. Remove screws retaining upper instrument panel cover to lower panel, then remove left windshield reveal molding. Remove screws at speed selector control panel, raise upper instrument panel and move extension panel away from its mounting far enough to disconnect light bulb wire at its connector. Check to see if a cadmium plated spring washer is used under the retainer in the speed selector shaft. If so, replace cadmium washer as follows: Remove selector control-to-extension screws and pull control cable through grommet in firewall. *CAUTION - Do not remove control cable from selector head.* Remove selector dial, then lay dial end of selector shaft against a wooden block and tap the base of three or four retainer prongs with a sharp punch to loosen retainer. Remove retainer and spring washer. Install a new spring washer, Part No. 1479947 and a new retainer, Part No. 1479948 on selector shaft and tap into place with a 5/16" I.D. sleeve. Set dial on shaft without the hold-down screw, rotate counter-clockwise as far as possible without forcing, then rest dial on shaft so that backline of the numeral "4", when in a horizontal position, aligns with top rear corner of selector block and install dial retaining screw. *CAUTION - This alignment is very important, as it calibrates speed setting of selector dial with speedometer. See illustration.* Reassemble selector assembly to car and adjust control cable.



CADILLAC CRUISE CONTROL SELECTOR ADJUSTMENT

DESCRIPTION: Electrically controlled speed warning devise and automatic speed control of same design used on previous models.

TROUBLE SHOOTING & DIAGNOSIS: *Same as for 1959 Cadillac Cruise Control. See 1959 Annual Data, Page 259, Chilton's Manual edition.*

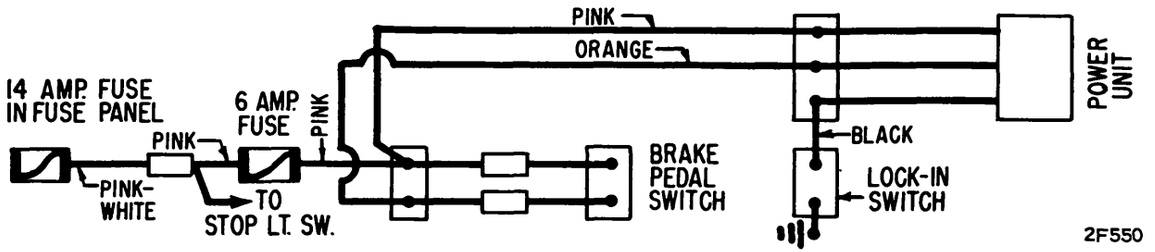
ADJUSTMENTS: Accelerator Linkage (Cadillac) - With transmission throttle control rod properly adjusted (see "Carburetor" on Car Model page), start engine and operate at slow idle speed with transmission selector lever in "P" (Park) or "N" (Neutral). Remove cotter pin securing accelerator linkage trunnion on locking arm plate, remove washers, and separate linkage from locking arm. Insert Locking Arm Gauge, J-7652, over stop stud and hold locking arm plate securely against gauge. Turn trunnion on accelerator linkage until it aligns with and enters hole in locking arm plate freely, then install washers on trunnion and connect trunnion to locking arm plate. Install cotter pin and remove gauge.

Chevrolet - Remove cotter pin from swivel and remove swivel from regulator lever, then start engine and run at slow idle speed. Insert gauge pin *(NOTE - This is a .0625" pin furnished with accessory package)* over gauge bolt (located on housing adjacent to regulator lever) and hold regulator lever securely against gauge pin. Adjust swivel on long regulator rod until it will assemble to regulator lever. Replace swivel and cotter pin, then remove gauge pin.

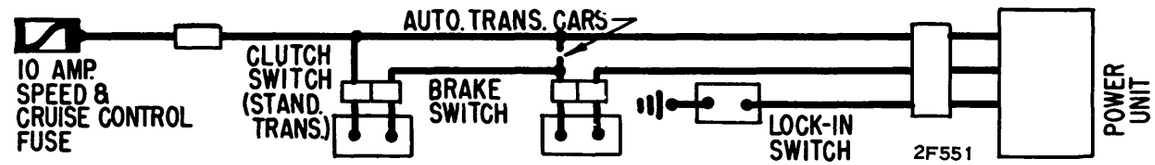
Lincoln & Mercury - Remove cotter pin from accelerator linkage and pull linkage from exterior arm, then start and run engine until it operates at slow idle. Insert gauge pin over gauge bolt and hold exterior arm securely against gauge pin. *NOTE - Gauge pin is made from a 2" length of 5/16" copper tubing, and is supplied in Speed Control Kits.* Adjust swivel on throttle linkage until linkage will assemble to exterior arm. Replace linkage and cotter pin and remove gauge.

Control Cable: Cadillac - Loosen setscrew on end of dust shield and work control cable back and forth making certain that ferrule end of cable is free to move when dial is rotated. Rotate selector dial backward to "Low" position, as far as it will go without forcing it. Carefully insert ferrule back into dust shield without forcing, until ball socket just bottoms in housing. *NOTE - After positioning ferrule in dust shield, recheck selector ferrule in dust shield, recheck selector dial to be sure it is in extreme "Low" position.* Tighten setscrew securely on end of dust shield, being careful not to change cable position when tightening.

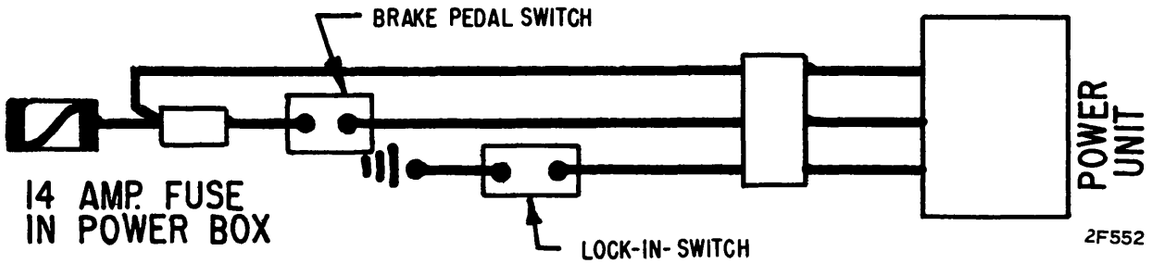
Chevrolet, Lincoln & Mercury - Turn selector knob counterclockwise as far as it will go without forcing, then hold dust shield so it will not rotate and unscrew clamp nut. Let clamp nut slide down cable. *NOTE - this nut holds control cable from bottom of dust shield.* Pull control cable out of dust shield until ferrule at end of cable is free from bottom of dust shield. *NOTE - If ferrule is tight in dust shield, carefully pry the four fingers apart until ferrule slides out freely. In some cases it may be necessary to unscrew the dust shield from unit in order to pry fingers apart. Hold hex fitting at top of dust shield so it cannot turn when unscrewing dust shield.* Reinsert ferrule in dust shield and push lightly on control cable until it stops. *CAUTION - Do not force cable beyond this point.* Fingers of dust shield must clamp ferrule on its largest diameter. Again try to rotate selector knob counterclockwise only, in order to make sure it is at low setting (this will position control cable to dust shield). Tighten clamp nut on bottom of dust shield securely.



CADILLAC CRUISE CONTROL WIRING DIAGRAM



CHEVROLET CRUISE CONTROL WIRING DIAGRAM



LINCOLN & MERCURY SPEED CONTROL WIRING DIAGRAM

CHRYSLER CORP. STARTERS (REDUCTION GEAR TYPE)

DESCRIPTION: Four pole, four brush starter of conventional design. Field windings consist of three series coils and one shunt coil electrically ahead of the armature. Starter drive is overrunning clutch, solenoid pinion shift type with a 3.5-1 reduction gear set built into motor assembly. Motor drive end housing is die cast aluminum. This housing also forms the integral solenoid housing.

SPECIFICATIONS: R tati n - Clockwise at pinion end.
Brush Spring Tensi n - 32-48 ozs.
Armature Endplay - .010-.035".
Performanc Data - Se *individual Car Model pages.*

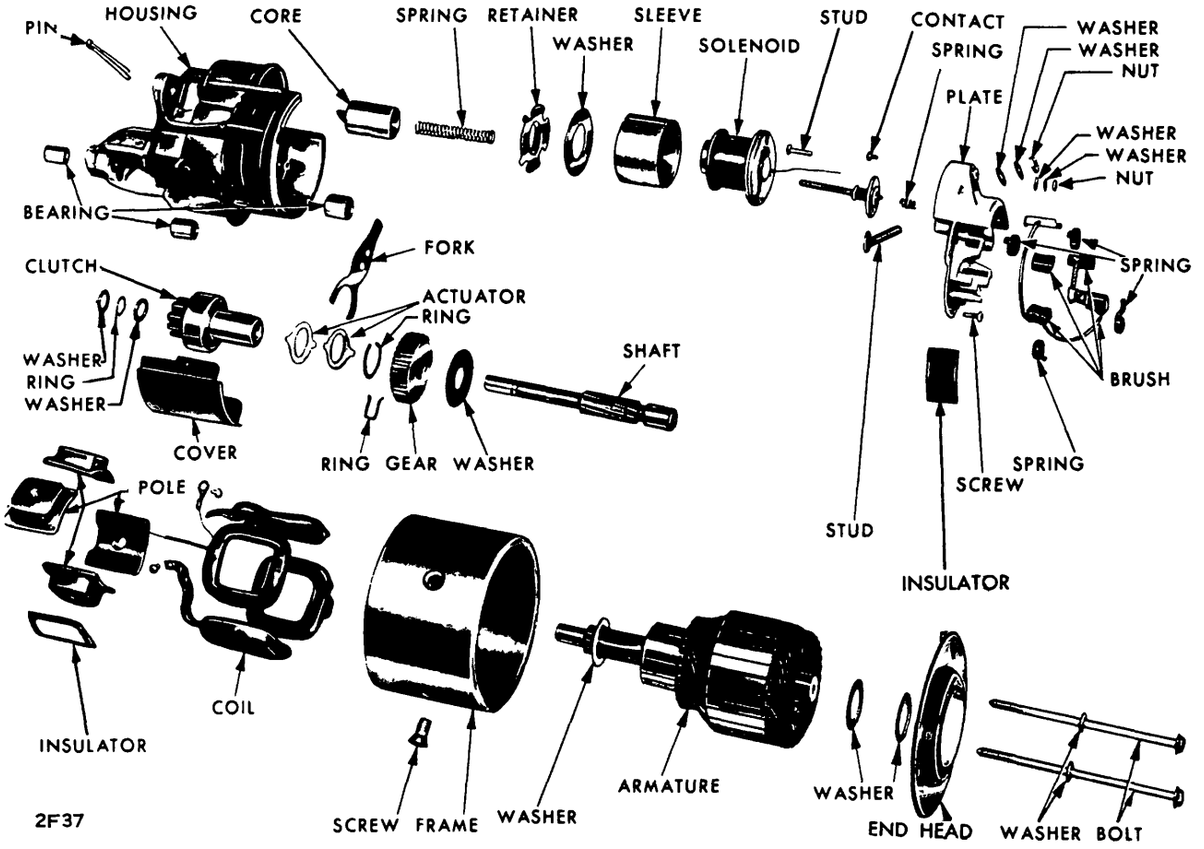
TESTING: Fr Running T st - Connect ammeter and carbon pile rheostat in series with battery positive post and starter terminal. Connect a voltmeter across starter. Turn all resistance into circuit, then connect battery negative post to starter frame. Adjust rheostat to obtain proper voltage and note current draw and starter RPM. S e *Car M d l pages for specifications.* Current draw and starter RPM should be as specified.

Stall T rqu T st: Mount starter in a test stand and follow test equipment manufacturer's instructions. Torque, volt, and ampere readings should be as specified. S *Car M d l pag s for specifications.*

DISASSEMBLY: 1) Remove through bolts and commutator end plate assembly. Remove armature, then remove steel and fiber thrust washers. *NOTE - Shunt field coil wir is s ld r d t brush t rminal and one set of brushes is c nn ct d t this t rminal. Other set of brushes is c nn ct d t s ri s fi ld coils by a terminal screw. Pull frame and fi ld ass mbly up just enough to expose t rminal scr w and s ld r c nnection at brush terminal. Plac tw w od blocks b tween frame and gear housing to aid r moval f t rminal screw and unsoldering of shunt fi ld wir .* Remove terminal screw and unsolder shunt coil lead. Remove brush insulator.

2) Remove brush holder plate-to-gear housing attaching screw, then remove brush holder plate, brushes, and solenoid as an assembly. Unsolder solenoid winding from brush terminal. Remove nut (11/32" wrench), steel washer, and nylon washer from solenoid terminal. Separate brush holder plate from solenoid. Remove nut and washers from starter battery terminal. Remove battery terminal from brush holder plate, then remove solenoid contact assembly.

3) Remove solenoid coil sleeve, return spring, retainer washer, and coil retainer from solenoid housing. Remove dust cover from gear housing. Remove snap ring holding driven gear on pinion shaft. *CAUTION - Use care to prev nt ring fr m flying away during removal as ring is und r t nsi n.* Remove retainer ring at front of pinion shaft. *CAUTION - Do not spread this ring any greater than utsid diameter f pinion shaft.* Push pinion shaft to rear of housing, remove snap ring, thrust washers, clutch and pinion assembly, with both shifter fork nylon actuators. Remove driven gear and friction washer. Pull shifting fork forward and remove solenoid moving core. Remove shifting fork retainer pin, then remove shifting fork assembly.



CHRYSLER CORP. REDUCTION GEAR STARTER ASSEMBLY (EXPLODED)

CLEANING: *DO NOT immerse parts in cleaning solvent.* Clean field frame and coil assembly, armature, and clutch unit by wiping with a clean cloth only. Clean clutch outer housing and pinion gear by wiping with a cloth moistened with cleaning solvent, then wipe dry with a clean dry cloth.

TESTING: Armature - Check for shorted armature with a growler. Check for ground to shaft with a test lamp. Commutator runout should not exceed .003". Reface commutator if necessary and undercut mica segments.

Field Coils & Frame: Remove frame assembly from starter, drill out rivet holding series coil ground lead and shunt coil ground lead to frame. Insulate field coil leads from frame. Use a 110-volt test lamp with one probe to series coil lead and other probe to frame. Repeat for shunt coil. If lamp lights, field coils are grounded and must be replaced.

REPLACEMENT & SERVICING: Brush s & Springs - Replace oil-soaked brushes and brushes worn to less than ½ the length of new brushes. Measure brush spring tension with spring scale hooked near end of spring. Pull scale parallel to edge of brush. Replace springs if not within specifications. *CAUTION - Make a strong, low resistance connection when soldering shunt field and solenoid lead, using high temperature solder and rosin flux only. Do not break shunt field wire when replacing brushes.*

Field Coils: Use a pole shoe impact screwdriver (C-3475) for replacing field coils. Make sure space between leads and frame is clean. Peen new rivet securely to insure good electrical contact (this rivet grounds both series and shunt coils to starter frame).

Bushings: Inspect armature and pinion shaft bearing surfaces and bushings for wear. If bushings worn, install new bushings, or replace commutator end plate and gear housing as necessary.

Clutch Unit: *CAUTION - Do not immerse clutch unit in cleaning solvent. Unit is pre-lubricated at factory, and solv nt will wash lubricant from unit.* Rotate pinion. Pinion gear should rotate (not necessarily easily) in one direction, but should not rotate in op-

CONTINUED ON NEXT PAGE

CHRYSLER CORP. STARTERS (REDUCTION GEAR TYPE) (Continued)

posite direction. If unit does not operate properly, or if pinion is worn, chipped, or burred, replace clutch unit.

REASSEMBLY: 1) *NOTE - There should be approximately 1/16" side movement of shifter fork plates for proper pinion gear engagement. Lubricate between plates with a very small amount of SAE 10 engine oil.* Install shifter fork in drive housing, then install fork retainer cotter pin. *One tip of pin should be straight, other tip should be bent at 15° angle away from housing. Fork and retainer pin should operate freely after bending pin tip.* Install solenoid moving core and engage core in shifting fork. Install pinion shaft into housing, then install friction washer and drive gear. Install clutch and pinion assembly, thrust washer, retaining ring and thrust washer. Finish installing pinion shaft and engage shifter fork with clutch actuators. *NOTE - Friction washer must be placed on shoulder of pinion shaft splines before driven gear is installed.* Install driven gear snap ring, and pinion shaft retaining ring (ring must fit tightly in shaft groove). Install solenoid coil retainer with tangs down. *NOTE - Retainer must be installed so the four tangs rest on ridge in housing bore and not in recesses.* Install solenoid coil retainer washer, and solenoid return spring. *NOTE - If solenoid switch contacting washer is burned from arcing, disassemble contact switch assembly and reverse washer.* Install solenoid contact assembly making sure contact spring is placed on contact assembly. Thread solenoid lead wire through hole in brush holder, then assemble solenoid stud, insulating and flat washers, and nut. Solder solenoid lead wire to solenoid contact terminal.

2) Install solenoid coil and coil sleeve into gear housing and place brush plate assembly into starter gear housing. Align tongue of ground terminal with notch in brush holder. Install and tighten brush holder attaching screw to 10-15 inch-lbs. Install flat insulating washer and hold with friction tape. Retract brushes with a suitable tool (C-3855), place field frame in correct position and solder field coil lead. Install brush terminal screw. Install armature thrust washer on brush holder plate, then install armature, making sure splines of shaft engage reduction gear. Remove brush holder tools. Install fiber thrust washer and steel thrust washer on armature shaft. Install commutator end plate, then install through bolts and tighten securely. Install gear housing dust cover, making sure dimples on cover are securely engaged in holes in gear housing.

DELCO-REMY DISTRIBUTORS (PIVOTED BREAKER PLATE)

DESCRIPTION: Single breaker, fully automatic type with aluminum housing. Breaker plate consists of a fixed lower plate mounted rigidly in distributor housing, and a moveable upper plate which is pivoted at one end. Condenser and contact points are mounted on pivoted upper breaker plate. Centrifugal advance mechanism is conventional type with weights and springs mounted under breaker plate. Vacuum advance controlled by conventional type vacuum unit mounted on distributor housing and linked to breaker plate at opposite end of pivot point.

ADJUSTMENT: As follows:

►*ADJUSTMENT & TESTING CAUTIONS:* **1) All Models** - Contact point gap and cam angle settings must be made with vacuum unit disconnected from vacuum source.

2) Chevy II - Contact point gap and cam angle must be adjusted with distributor on engine because of single bearing design of distributor.

3) Corvair - When mounting distributor in test stand, lower 1 3/8" of distributor shaft must be protected with a protective adapter furnished by test equipment manufacturer.

Automatic Advance: Check in test machine in the usual manner. Adjust or replace weights, springs, or cam in the usual manner. *See Car Model Pages for specifications.*

Vacuum Advance: Check in test machine after automatic advance checked and adjusted. If not within specifications, replace vacuum unit. *See Car Model Pages for specifications.*

Contact Point Gap, Alignment & Cam Angle: Check point opening with feeler gauge or dial indicator. To adjust, insert screwdriver through slot in breaker plate and turn adjusting screw as necessary. Align points by bending fixed contact support. DO NOT bend breaker plate. Check cam angle with accurate dwell meter. *See Car Model Pages for specifications.*

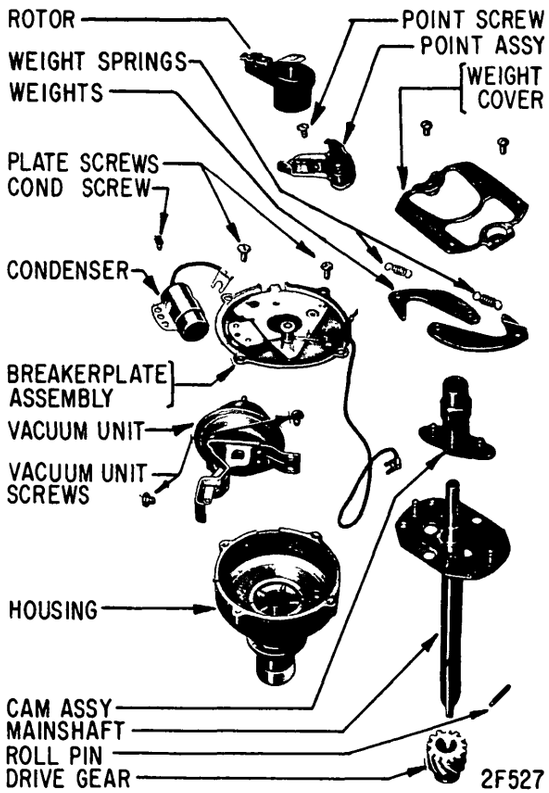
►*CHEVY II CAM ANGLE NOTE:* Variation in cam angle from idle to 1750 engine RPM should be not more than 3°. Readings taken above 1750 engine RPM may not be accurate.

Breaker Arm Spring Tension: Check with spring scale hooked to breaker lever. Pull should be exerted at 90° to breaker lever, and readings taken as points just start to separate. To adjust, bend spring. *See Car Pages for specifications.*

DISASSEMBLY: Remove cap and rotor and vacuum unit from housing. Disconnect condenser leads at quick disconnect and remove condenser and contact point set. Remove breaker plate from housing. *Do not disassemble breaker plate.* Remove driven gear retaining roll pin and slide gear from mainshaft, then remove mainshaft and cam from housing. Remove weight cover, springs, and weights, and slide cam assembly from mainshaft. Remove mainshaft bushing felt washer from housing and remove gasket from housing. *NOTE - Housing bushings are not furnished separately. Replace bushings and housing as a complete unit.*

Inspection: Wash and clean all parts. Check for wear, burrs, roughness and replace parts as necessary. Mainshaft runout should not exceed .002" (check in "V" blocks).

REASSEMBLY: Reverse removal procedure and note that contact point set pilot must engage matching hole in breaker plate.



DELCO-REMY PIVOTED BREAKER PLATE DISTRIBUTOR (EXPLODED)

DELCO-REMY DELCOTRON (1-D, 2-D, 3-D, 4-D SERIES)

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING OR USING A BOOSTER BATTERY TO START ENGINE CAUTIONS: R v rs d polarity or excessive voltage will r sult in xt nsiv damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE:*

Batt ry Installati n - Alternator polarity determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or r ctifiers will b damag d.*

Charging Batt ry - If a "Fast Charger" is used, both car battery cables must be disconnected from battery. *DO NOT us a "Fast Charger" to provide starting voltag .*

B st r Batt ry (Us d To Start Engine) - Booster battery must be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

►*ALTERNATOR CIRCUIT NOTE:* Alternators may be either "A" or "B" circuit type. On "B" circuit types, ground brush is grounded directly to end housing and "F2" terminal position (if provided) is not used. *NOTE - Both slip rings are insulated from rotor shaft.*

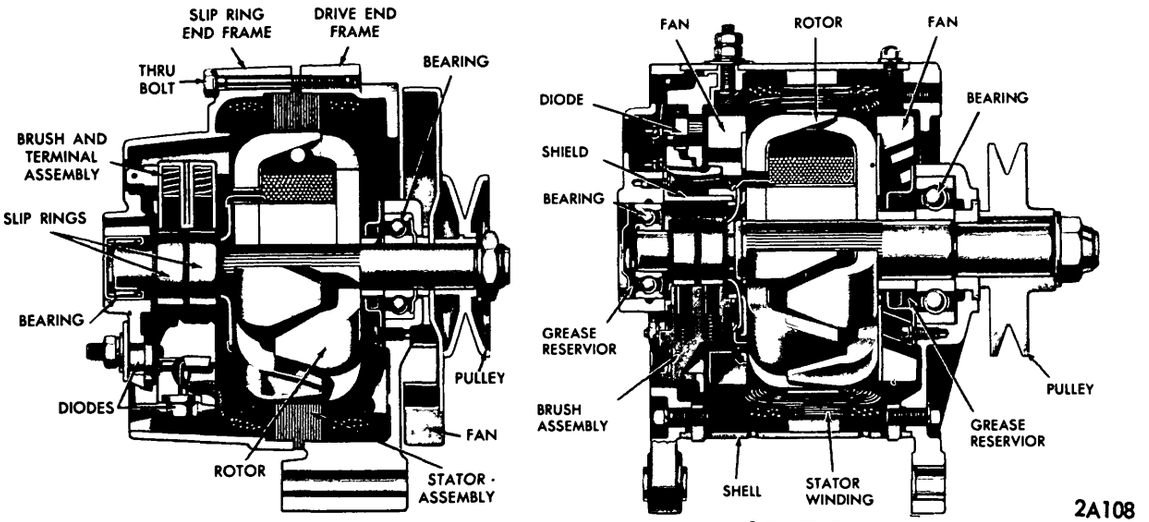
DESCRIPTION: Conventional three-phase, self-rectifying type alternators. Alternators are of various series depending on design differences (regardless of part number series). Each series may be different in construction to the extent of having heavy duty or long-life components. All series, except 3-D Series as described below, have a single field winding wound on rotor shaft and encased between two multi-fingered overlapping iron pole pieces assembled on rotor shaft. Field winding (all series) is connected to two slip rings assembled on, but insulated from, rotor shaft.

1-D Seri s - 5.5" diameter, two-piece aluminum frame held together by through-bolts. Frame pieces enclose entire assembly. Some models may have "gull wing" type heat sink for positive diodes with diodes facing 90° to rotor axis. All other models have flat heat sink design (all diodes visible from rear of unit). Rotor shaft rear bearing is needle-roller type.

2-D S ri s - 6.2" diameter. Stator mounted inside a perforated frame piece. Two end frames, attached separately to stator frame, complete the assembly. Both front and rear rotor shaft bearings are ball bearing type.

3-D Seri s - 5¾" diameter. Outer surface of stator core forms alternator frame, and two end frames held together by through-bolts complete the assembly. Rotor consists of four field windings wound on a four pole rotor and shaft. Rotor shaft front and rear bearings are ball bearing type. Some models may have three A.C. terminals on slip ring end housing in addition to output ("BAT") terminal so a transformer may be connected to step up A.C. voltage or for conversion to operate D.C. powered accessories.

4-D Series - 6 9/16" diameter. Similar in design to 3-D Series except for larger diameter and single field winding with multi-fingered overlapping field pole pieces.



1-D SERIES 2-D SERIES

DELCO-REMY "DELCOTRON" ALTERNATORS

LUBRICATION: No periodic lubrication required. At time of overhaul, if bearings reusable (except slip ring end needle-roller bearings), pack grease reservoir ¼-½ full with Delco-Remy Lubricant, No. 1948791, and also pack bearings with same lubricant. *NOTE - Replace bearings if lubricant supply exhausted. DO NOT attempt to relubricate or reuse needle-roller type bearing.*

OUTPUT TEST

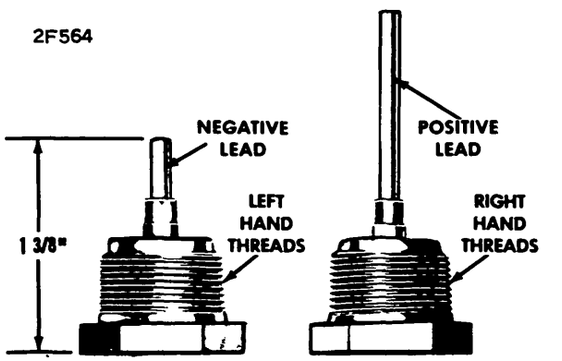
►*CAUTION:* 1) *Do not short across or ground any of the terminals on alternator or regulator.*
2) *Do not polarize alternator as it is not required and doing so will damage entire system.*
3) *Do not operate alternator on open circuit. Make sure all connections are secure and tight.*
4) *Before making test connections, ignition switch must be off.*

OUTPUT TEST: Connect an ammeter in series at alternator "BAT" terminal, and a voltmeter from alternator "BAT" terminal to ground. Connect alternator field directly to battery (regulator out of circuit) with a jumper wire. Turn on switch and slowly increase alternator speed and check for rated output *(see Car Model Pages for specifications). CAUTION - Load battery (carbon pile rheostat or turn headlights and other accessories on) to prevent high voltage. Do not allow alternator voltage to exceed voltage setting of regulator.*

OVERHAUL

DISASSEMBLY: 1) Scribe mark all mating parts for reassembly. Remove through-bolts or end housing retaining screws and separate drive end housing and rotor assembly from slip ring end housing and stator assembly. Tape slip ring end housing needle-roller bearing to prevent dirt entry. *NOTE - Brushes may drop ont rot r shaft during s paration of c mp nents and com into contact with lubricant. Cl an brushes before installation with a non-toxic cleaner such as tri-chlorethylene.* Install rotor in a soft-jawed vise and remove shaft nut, washer, pulley, fan, and collar. Separate rotor from end housing. Remove drive end housing bearing by removing retainer plate, or pressing bearing from rotor shaft, depending on construction. 2) Separate stator from end housing as follows: On 3-D and 4-D Series with A.C. terminals, remove terminal leads, then pry both parts apart slowly, using a screwdriver to pry apart nylon stator winding-to-rectifier connector. On Other Series, remove stator lead attaching nuts, or cut diode soldered conneetors just below crimp mark, or cut diode leads as close to diode stem as possible, depending on construction. Separate stator from end housing. *NOTE - On 2-D Series, carefully note stator lead connections and location of h at sink in relation to end housing locating notch on sh ll. Also, note proper position of output terminal and insulator washers used on heat sink.*

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THREADED TYPE DIODE IDENTIFICATION

DELCO-REMY DELCOTRON (1-D, 2-D, 3-D, 4-D SERIES) Cont.

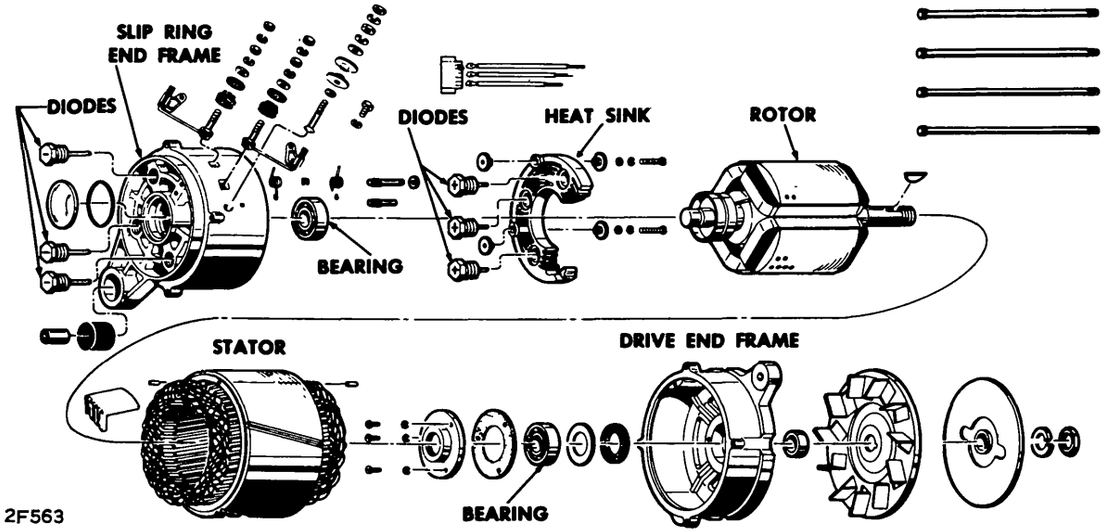
CLEANING & INSPECTION: Wash all metal parts except stator and rotor assemblies. Clean ball bearings and check for pitting, roughness, and proper sealing. Slip rings may be cleaned with 400 grain polishing cloth (rotate shaft while cleaning to prevent flat spots on rings). Slip ring maximum out-of-round limit is .002". Turn slip rings in a lathe to correct and remove only sufficient material to make rings smooth and round.

TESTING: Rotor - To test for grounded coils, connect a 110-volt test lamp or ohmmeter from either slip ring to rotor shaft or to poles or laminations. If lamp lights or ohmmeter reading is low, field windings are grounded. To test for open circuit, connect test lamp or ohmmeter to each slip ring. If lamp does not light or ohmmeter reading is high, windings are open. To test for short circuit, connect a 12-volt battery and an ammeter in series with slip rings. If ammeter reading is higher than specified *(see "Field Current Draw" on Car Model Pages)*, field windings are shorted. Replace rotor assembly or field windings as necessary.

Stator: To test for grounded coil, connect a 110-volt test lamp or an ohmmeter from any stator lead to stator frame. If lamp lights or ohmmeter reading is low, windings are grounded. For open circuit, connect test lamp or ohmmeter successively between each pair of stator leads. If lamp does not light or ohmmeter reading is high, stator windings are open. A short circuit in stator may be assumed if all other electrical checks are normal and alternator does not produce rated output.

Diodes: Use an ohmmeter or 12-volt test lamp as follows:
1) Ohmmeter - *CAUTION - Use ohmmeter with 1½-volt cell and a scale on which 300 ohm value is at or near mid-scale and can be accurately read. Ohmmeter polarity MUST be determined before checks are made.* Connect one ohmmeter lead to diode lead, and other ohmmeter lead to heat sink or end housing and note reading. Reverse ohmmeter leads and note reading. If both readings very low or very high, diode is defective. A good diode will give one low reading and one high reading.
2) 12-Volt Test Lamp - *CAUTION - DO NOT use 110-volt test lamp or diodes will be damaged.* Connect one test lamp lead to diode lead and other test lamp lead to heat sink or end housing, then reverse the leads. If lamp lights in both directions, or does not light in both directions, diode is defective. A good diode will cause lamp to light in only one direction.

REPAIRS: Diode Replacement - *Proceed as follows for different types, observing "Replacement Cautions" listed below.*



DELCO-REMY "DELCOTRON" ALTERNATOR (3-D SERIES)

►*DIODE REPLACEMENT CAUTIONS:* When cutting diode leads, leave ½" of lead on each side of diode to match new diode. Do not bend diode leads. Use only 60% tin, 40% lead solder, or other solder with 360°F or higher melting point.

Threaded Type Diodes - Coat new diode threads with silicone grease or light engine oil before installing, and torque new diode to 200 inch-lbs.

Pressed-In Type Diodes - Support end housing or heat sink with a suitable tool (J-9600-3) and press out diode with press or vise and suitable driver (J-9600-1). *CAUTION - Do not strike diode as shock will damage it and other diodes.* To install, press diode into heat sink or end housing with suitable installer (J-9600-2) and arbor press. Diode must be square with end housing or heat sink and started straight. *CAUTION - Do not move or bend diode stem or internal damage and diode failure will result.*

Slip Ring End Housing Replacement: When replacing slip ring end housing, note parts stack-up on terminals and brush holder very carefully to insure proper insulation of parts. If possible, insert a pin or wire in hole in bottom of brush holder to hold brushes in place. After unit assembled, remove pin or wire so brushes will drop into place on slip rings.

Bearing Replacement: Bearings may be removed from end housings after retainer plate removed. If bearing pressed on rotor shaft, press bearing off and on shaft in usual manner. *CAUTION - Use suitable tools when replacing bearings so pressure is exerted on bearing inner race only, and that rotor, end housings, are suitably supported.* Pack new bearings partly full with Delco-Remy Lubricant, No. 1948791, and also partly fill bearing grease reservoir with same lubricant. *See "Lubrication" above.*

Brush Replacement: Replace brushes if worn more than halfway or if contaminated. Replace brush springs if distorted or weakened (if brushes appear satisfactory and move freely in brush holder, springs may be reused).

Heat Sink Replacement: Remove terminal and heat sink attaching bolts and remove heat sink. Cut diode leads if diodes not previously removed. *NOTE - Observe carefully stack-up of parts on terminals so they can be reassembled in same manner.*

REASSEMBLY: Reverse disassembly procedures, and lift brushes from slip rings when installing rotor to prevent brush and slip ring damage. Make sure solder connections are good and that proper solder is used *(see "Diode Replacement Cautions" above).*

DELCO-REMY DOUBLE CONTACT ALTERNATOR REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTIONS: Reverse polarity or excessive voltage will result in extensive damage to alternator system. Observe all cautions as detailed on appropriate alternator data pages.*

►*CIRCUIT TYPE NOTE:* These units are "B" circuit type (field winding grounded at alternator).

DESCRIPTION: Regulators are of conventional design. Three different types, containing a double contact voltage regulator, a field relay, and sometimes an indicator light relay, are used as follows:

Type 1 - Identified by conventional lug-type terminals. Units may contain voltage regulator, field relay, and indicator light relay. If used on applications where an ammeter is used instead of an indicator light, regulator will contain a voltage regulator and field relay only.

Type 2 - Identified by blade type terminals to fit matching car wiring harness connector. Unit contains a voltage regulator and a field relay. This type used in circuits with an indicator light but a separate indicator light relay is not used. Indicator light circuit is such that closing of field relay contacts causes indicator light to go out.

Type 3 - Identified by blade type terminals to fit matching car wiring harness connector. Unit contains a voltage regulator and a field relay. Used in circuits

CONTINUED ON NEXT PAGE

DELCO-REMY DOUBLE CONTACT ALTERNATOR REGULATORS (C ntinued)

with either an ammeter or an indicator light. When used with indicator light, a separate double contact indicator light relay is also used.

TESTING & TROUBLE SHOOTING

►*DATA REFERENCE NOTE:* In the following testing and checking procedures, reference for test meter connections and other procedures will be made to type of regulator described above. All test connections are not the same for each type of circuit.

►*CAUTION: 1) Do not short across or ground any of the terminals on alt rnator r regulator.*
2) Do n t polariz alt rnator as it is not required and doing so will damag ntire system.
3) D not p rate alt rnator on open circuit. Make sure all conn cti ns ar s cure and tight.
4) Befor making t st meter connections, ignition switch must b off.

►*BLADE TYPE TERMINAL REGULATOR TESTING NOTE:* A special crble assembly or adapter must be used for testing this type so that meter connections can be made to the terminals. Adapter is available from various test equipment manufacturers. Except as described for Type 3 indicator light check below, all test connections must be made at the regulator.

►*BLADE TYPE TERMINAL REGULATOR TERMINAL NUMBERING NOTE:* With regulator terminals facing you, terminals are numbered from left to right as follows: F, 2, 3, 4. Test meter connections will be indicated according to terminal number.

INDICATOR LIGHT CIRCUIT: Type 1 - If bulb not burned out, check as follows: Connect a voltmeter from "R" terminal to regulator base (ground). With alternator operating, voltage should not be more than 5 volts. If more than 5 volts, relay is faulty. If 5 volts or less, other trouble is indicated.

Typ 2 - Disconnect wiring harness connector from from regulator. Turn on ignition switch (do not start engine) and momentarily (not more than 10 seconds) connect a jumper wire from No. 4 terminal of harness to regulator base (ground). If light still does not light, bulb is burned out or wiring between battery and jumper lead is open. If light comes on, connect a jumper from harness connector "F" terminal to No. 4 terminal. If light comes on again, circuit in regulator is open. If light does not come on, there is an open circuit in field lead between regulator and alternator, or in alternator field.

►*NOTE:* If light does not go out with alternator operating, trouble is elsewhere in system. If light does not go out when ignition switch is off, an alternator diode is shorted.

Type 3 - Test procedures and conclusions are same as for Type 1 above. Connect voltmeter from alternator "R" terminal to ground.

UNDERCHARGED BATTERY: Drive belt loose, battery defective, open resistor, field relay faulty, high circuit resistance, faulty alternator, low voltage regulator setting.

Open Resistor: Type 2 - *NOTE - Test not applicable to Types 1 & 3.* Connect a voltmeter from No. 4 terminal of wiring harness (regulator disconnected) to regulator base (ground). Turn ignition switch to "ACC" position. If voltmeter reading is zero, resistor on "ACC" terminal of ignition switch is open. *NOTE - Resistor may be a separate unit or a resistance wire.* Resistance value is 10 ohms; wattage is 6.25 watts minimum.

Field Relay: Type 1 - Connect voltmeter from regulator "F" terminal to ground. Turn on ignition switch (do not start engine). Voltmeter should read battery voltage. If reading zero, *see "Checking & Adjusting"*

Type 2 - If indicator light functions normally, field relay is operating normally. If indicator light does not go out when alternator operating, determine if field relay or alternator is faulty as follows: With regulator in circuit, connect a voltmeter from No. 2 terminal to ground. Run alternator at moderate speed and note voltmeter reading. If reading 5 volts or above and indicator light does not go out, relay is faulty. If voltmeter reading is below 5 volts, alternator is faulty.

Type 3 - With regulator in circuit, connect a voltmeter from "F" terminal to ground. Turn switch to "IGN" and note voltmeter. Reading should be battery voltage. If reading is zero, line between switch and regulator No. 2 terminal is open, or field relay is faulty.

High Circuit Resistance: Type 1 - *NOTE - Test not applicable to Types 2 & 3.* Connect voltmeter from battery positive terminal to alternator "F" terminal. Turn on ignition switch (do not start engine). If voltmeter reading exceeds .3 volt, there is excessive line resistance. After terminals and connections tightened and cleaned, if voltage reading still exceeds .3 volt, clean all regulator contact points. If reading still more than .3 volt, check alternator field by removing lead from regulator field terminal and connecting an ammeter in series with alternator field winding. Field coil draw must be within specifications.

Alternator Output: All Types - Connect an ammeter in series at alternator "BAT" terminal, and a voltmeter from alternator "BAT" terminal to ground. Connect alternator field directly to battery (regulator out of circuit) with a jumper wire. Turn on ignition switch and slowly increase alternator speed and check for rated output. *CAUTION - Load battery (carbon pil rheostat or turn on headlights and other accessori s) to prevent high voltage. Do not allow alternator voltage to exceed voltage setting of regulator.*

OVERCHARGED BATTERY: Check for shorted battery cell, high circuit resistance (see "Undercharged Battery" above), or high voltage regulator setting.

►*VOLTAGE SETTING TAILORING NOTE:* If no circuit defects are found during all of the above tests and battery remains constantly over, or undercharged, voltage regulator setting may be raised or lowered .3 volt to compensate for various operating conditions.

ADJUSTMENT

►*CAUTION: Observe all cautions listed under "Testing & Trouble Shooting" above.*

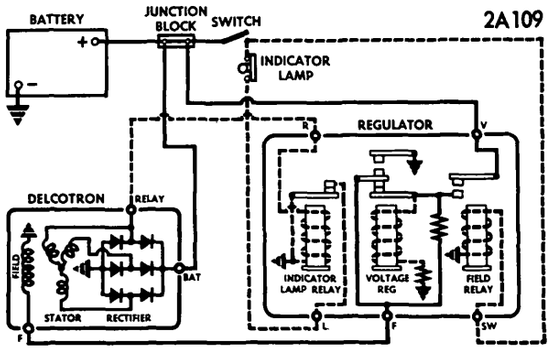
VOLTAGE REGULATOR

Contact Gap: Measure upper contact gap with lower contacts just touching. To adjust, bend upper contact arm. *Do not bend hinge.*

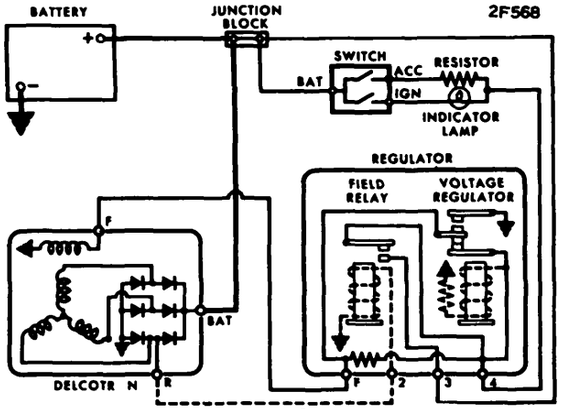
Air Gap: Measure gap between armature and core with lower contacts just touching. To adjust, turn nylon nut on contact support (Types 2 & 3). To adjust Type 1, loosen contact support bracket screw 1/8-1/4 turn, insert screwdriver into slot in contact support and into molded insulator. Raise screwdriver handle to increase air gap, lower handle to decrease gap. Tighten contact support bracket screw.

►*NORMALIZING THE REGULATOR:* Before checking or adjusting voltage regulator, bring regulator to operating temperature of 125°F by connecting a ¼ ohm fixed resistor and an ammeter in series with battery and alternator "BAT" terminal, and operating alternator for 15 minutes at approximately 3500 RPM (1500 Engine RPM) with 10 amperes or less output, with the regulator cover in place, until regulator heated and stabil-

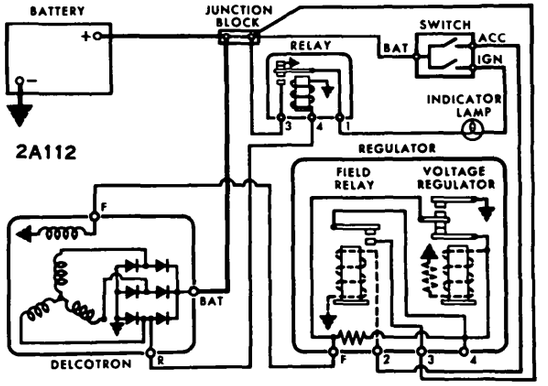
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TYPE 1 REGULATOR CIRCUIT DIAGRAM



TYPE 2 REGULATOR CIRCUIT DIAGRAM



TYPE 3 REGULATOR CIRCUIT DIAGRAM
(WITH INDICATOR LIGHT & SEPARATE RELAY)

DELCO-REMY DOUBLE CONTACT ALTERNATOR REGULATORS (C ntinued)

ized. Accessories and lights must be turned off. After warm-up completed, cycle alternator by stopping and restarting.

Voltage Setting: Test Meter Connections - Leave ammeter and ¼ ohm resistor connected as described under "Normalizing The Regulator" above. Connect a carbon pile rheostat across battery. Make other test connections as follows:

Type 1 - Connect a 25 ohm, 25 watt variable resistor in series with field winding at regulator "F" terminal. Disconnect lead from regulator "V" terminal. Connect a voltmeter from "V" terminal to regulator base (ground), and a jumper wire from "V" terminal to alternator "BAT" terminal.

Types 2 & 3 - Maintain connections at No. 2 & 4 terminals (No. 4 not used on Type 3). Connect a 25 ohm, 25 watt variable resistor in series at "F" terminal. Disconnect No. 3 terminal lead from wiring harness connector and connect a jumper lead from No. 3 adapter wire to alternator "BAT" terminal, and a voltmeter from No. 3 adapter wire to regulator base (ground).

Cycling - To cycle alternator during testing, proceed as follows: Turn variable resistor in field circuit to full resistance position. Momentarily disconnect and reconnect jumper lead from "V" terminal (Type 1), lead at No. 4 terminal on wiring harness connector (Type 2), jumper lead at alternator "BAT" terminal. *CAUTION - Do not disconnect leads with variable resistor in "no resistance" position.*

Checking Procedure - 1) Bring engine speed to 2500 RPM (approximately 6000 Alternator RPM) and note voltage reading which should be as specified in table below. Regulator should be operating on upper contacts. *NOTE - Best method of determining which contacts are in use is to use earphones to note the transfer. If regulator will not operate on upper contacts, partially recharge battery.* Adjust voltage within specifications for ambient temperature (see table below) by turning adjusting screw to adjust armature spring tension Cycle alternator (see above), recheck and readjust upper contact setting.

2) To check operation on lower contacts, operate engine at 2500 RPM (approximately 6000 Alternator RPM), and slowly turn variable resistance into the circuit until regulator operates on lower contacts, and note voltage which should be .1-.3 volt lower than when operating on upper contacts. *NOTE - If turning resistance into circuit does not make regulator operate on lower contacts, turn variable resistance out, load battery (carbon pile or turn headlights on), then adjust variable resistor for lower contact operation.* To increase difference in voltage between upper and lower contacts, increase armature air gap **slightly**; to decrease difference, decrease air gap **slightly**. *NOTE - This adjustment can be made with regulator operating. If necessary to make adjustment, recheck voltage setting of both sets of contacts.*

►*VOLTAGE SETTING TAILORING NOTE:* If battery consistently over- or undercharged after voltage regulator properly set and all other checks indicate no circuit defects, voltage regulator setting may be raised or lowered .3 volt to compensate for various underhood temperatures and other operating conditions. Allow reasonable length of time to check performance. Proper setting is obtained when battery remains fully charged with minimum use of water.

Voltage Regulator Specifications

Regulator Model	Air Gap	Contact Gap	Voltage Setting
1119501, 2, 3, 5	.067"	.016"	Chart No. 1
1119506, 7, 12	.060"	.014"	Chart No. 1

Voltage Setting - Ambient Temperature (Chart No. 1)

Temp.	ℂ Setting	Temp.	ℂ Setting
65°F	13.9-15.0	145°F	13.4-14.2
85°F	13.8-14.8	165°F	13.2-14.0
105°F	13.7-14.6	185°F	13.1-13.9
125°F	13.5-14.2		

ℂ - Operating on upper contacts. .1-.3 volt lower when operating on lower contacts.

FIELD RELAY

Air Gap: Check air gap between armature and core with contacts just touching. To adjust, carefully bend flat contact support spring.

Contact Gap: Type 1 - Normally not adjusted. If air gap and closing voltage within specifications, relay will operate satisfactorily even if contact gap not exactly as specified.

Type 2 & 3 - Adjust by bending armature stop.

Closing Voltage: Test Meter Connections - Make meter connections as follows:

Type 1 - Connect a 50-75 ohm variable resistor in series at "SW" regulator terminal. Connect a voltmeter from "SW" terminal to regulator base (ground).

Type 2 & 3 - Connect voltmeter from regulator base to regulator No. 2 terminal. Connect a 50-75 ohm variable resistor from regulator No. 2 terminal to wiring harness connector No. 3 terminal. *Other leads from regulator to wiring harness must be disconnected.*

Checking Pr c dur - Turn all resistance into circuit, turn on ignition switch, then slowly decrease resistance and note closing voltage of relay. If not as specified, adjust by bending armature heel iron as necessary.

Field Relay Sp cificati ns

Regulator Model	Air Gap	C ntact Gap	Closing V ltag
1119500	.015"		6.5-8.5 volts
1119502	.015"		6.5-8.5 volts
1119503	.015"		6.5-8.5 volts
1119505	.015"		6.5-8.5 volts
1119506	.015"	.030"	2.3-3.7 volts
1119507	.015"	.030"	6.3-8.3 volts
1119512	.015"	.030"	2.3-3.7 volts

INDICATOR LIGHT RELAY

Air Gap: Measure air gap with contacts just touching (integral type - Type 1), with upper contacts closed (separate type - Type 3). To adjust, bend upper contact support.

Contact Gap (Separate Relay): Measure upper contact gap with lower contacts just touching.

Voltage Setting: *NOTE - On int gral typ r lays, setting is contact opening voltag . On s parat typ r lays, setting is lower contact cl sing voltag .* Connect a voltmeter from regulator "R" or No. 4 (Center) terminal to regulator base (ground). Connect a 50-75 ohm variable resistor in series with this same terminal and the battery. With all resistance turned into circuit, slowly decrease resistance and note opening (or closing) voltage. If not correct, adjust by bending armature heel iron.

Indicator Light R lay Sp cifications

(Integral Typ)

Regulator No.	Air Gap	Op ning V ltag
1119502, 503	.012"	3.8-5.2 volts

(Separat Type)

Relay Model	Air Gap	Contact Gap	Cl sing V ltag	S aling Voltag
1115823	.011"	.015"	3.8-5.2	5.7 max.

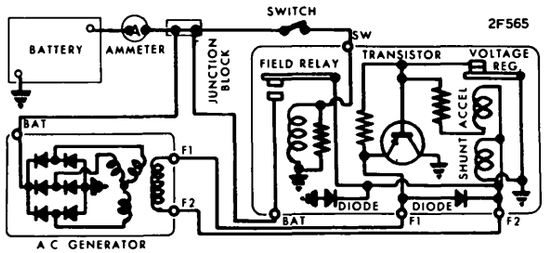
DELCO-REMY TRANSISTORIZED ALTERNATOR REGULATORS ("A" CIRCUIT TYPE)

►*BATTERY INSTALLATION, CHARGING, & BOOSTER BATTERY CAUTIONS: Observe the cautions for battery installation, battery charging, and using a booster battery as detailed at beginning of appropriate alternator data pages.*

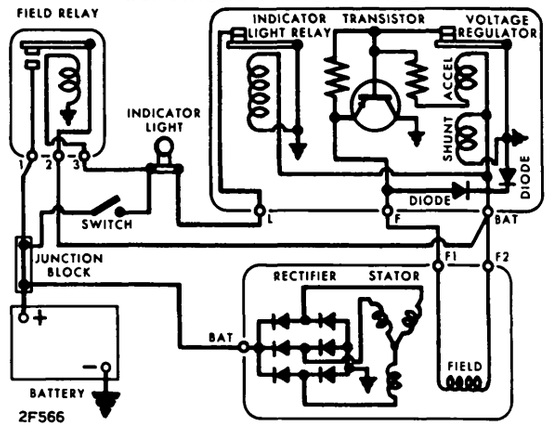
DESCRIPTION: Transistorized type with two diodes. Transistor works with a conventional type voltage regulator unit to limit alternator voltage to pre-set value. Field discharge diode reduces arcing at voltage regulator contacts by dissipating energy created in alternator field windings when contacts separate. Suppression diode prevents damage from transient voltage in system. Two types of regulators are used:

4-Terminal Type - Used in circuits with an ammeter. Assembly contains a conventional vibrating type volt-

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ALTERNATOR & REGULATOR WIRING DIAGRAM (4-TERMINAL TYPE)



ALTERNATOR & REGULATOR WIRING DIAGRAM (3-TERMINAL TYPE)

DELCO-REMY TRANSISTORIZED ALTERNATOR REGULATORS ("A" CIRCUIT TYPE) Cont.

age regulator and a field relay. Terminals are marked "BAT", "F-1", "F-2", "SW".

3-T rminal Type - Used in circuits with either an ammeter or charge indicator light. Assembly contains a conventional vibrating type voltage regulator and an indicator light relay. Terminals are marked "L", "F", "BAT". When an ammeter is used instead of a charge indicator light, the indicator light relay is not used and no connection is made at the "L" terminal. On all charging system circuits using this type regulator, an additional separately mounted field relay is used to energize alternator field current.

SPECIFICATIONS: *S e individual Car Mod l Pag s.*
TESTING & TROUBLE SHOOTING: *See 1961 Final Data, Page 281.*
CHECKING & ADJUSTMENT: *See 1961 Final Data, Page 283.*
UNIT REPLACEMENT: *See 1961 Final Data, Page 283.*

DELCO-REMY TRANSISTORIZED ALTERNATOR REGULATORS ("B" CIRCUIT TYPE)

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, CHARGING, & BOOSTER BATTERY CAUTIONS: Observe the cautions for batt ry installation, batt ry charging, and using a booster batt ry as d tail d at beginning of appropriate alternator data pag s.*

►*CIRCUIT TYPE NOTE:* These units are "B" circuit type (field winding grounded at alternator).

DESCRIPTION: Transistorized type with two diodes. Transistor works with a conventional type voltage regulator unit to limit alternator voltage to pre-set value. Diodes prevent damage from possible transient voltages in system. Assembly also contains a field relay for control of alternator field. When an indicator light is used on instrument panel, a separate indicator light relay is used for control of this circuit.

TESTING & TROUBLE SHOOTING

►*CAUTION: 1) Do n t short across or ground any of the t rminals n alt rnat r or regulator.*
2) Do n t p lariz alt rnator as it is not required and d ing so will damag ntire system.
3) D n t p rat alt rnator on open circuit. Make sur all c nn ctions ar secure and tight.
4) B f r making test meter connections, ignition switch must b ff.

INDICATOR LIGHT RELAY CHECK: If indicator light stays on with alternator operating, connect a voltmeter from indicator light "R" terminal and note voltage with alternator operating. If voltage is above 11-11.6 volts, relay is faulty and should be replaced.

UNDERCHARGED BATTERY: Drive belt loose or battery defective. Alternator faulty, high circuit resistance, low voltage regulator setting, field relay faulty or open transistor, faulty diodes.

Alt rnat r Output: Connect an ammeter in circuit at alternator "BAT" terminal and voltmeter from alternator "BAT" terminal to ground. Remove lead from regulator "F" terminal and connect to regulator "V" terminal. Slowly increase alternator speed and check for rated output. *CAUTION - Load battery (carbon pile rh ostat or turn on headlights and other accessories) to pr v nt high voltag . Do not allow alternator voltag to xce d voltag s tting of regulator.*

High Circuit R sistanc : Connect a voltmeter from battery insulated terminal to regulator "V" terminal. Turn on ignition switch (do not start engine) and note voltage drop. If voltage drop exceeds .3 volt, high circuit resistance is indicated.

Low V ltag R gulator Setting: Connect a voltmeter from regulator "F" terminal to regulator base (ground). Turn on ignition switch (do not start engine). If voltmeter reads 9 volts or above, voltage regulator setting is too low. If reading is less than 9 volts, field relay contacts are not closed, or resistor and transistor are burned open.

Diodes Faulty: Disconnect "F" and "V" leads from regulator, remove cover, and unsolder both diode leads. Connect an ohmmeter from diode case to diode lead and note readihg. Reverse ohmmeter connections and note reading. If both readings less than 2 ohms, diode is faulty. If both readings are very high (infinite), diode is faulty. A good diode will give one low reading and one high reading. Check other diode in same manner. *CAUTION - Use ohmmeter with 1½-volt cell and use lowest range scale. When replacing diode, limit solder time to minimum as high heat will damage diode.*

OVERCHARGED BATTERY: Make all tests as listed under "Undercharged Battery" above, and check for shorted transistor as follows:

Transistor Shorted: Connect a voltmeter from regulator "F" terminal to ground. Remove regulator cover, turn on ignition switch, and hold voltage regulator contacts open. If voltage reading above 9 volts, transistor is shorted and must be replaced. *NOTE - Replace transistor by removing attaching screws and unsoldering connections directly above transistor. Limit soldering time to minimum as high heat will damage transistor.*

►*VOLTAGE SETTING TAILORING NOTE:* If no circuit defects are found during all of the above tests and battery remains constantly over- or undercharged, voltage regulator setting may be raised or lowered .3 volt to compensate for various operating conditions.

ADJUSTMENT

►*CAUTION: Observe all cautions listed under "Testing & Trouble Shooting" above.*

FIELD RELAY

Air Gap: Check air gap between armature and core with contacts just touching. To adjust, carefully bend flat contact support spring.

Contact Gap: Normally not adjusted. If air gap and closing voltage within specifications, relay will operate satisfactorily even if contact gap not exactly as specified.

Closing Voltage: Connect a 50 ohm variable resistor in series from ignition switch to regulator "SW" terminal. Connect a voltmeter from regulator "SW" terminal to regulator base (ground). Turn all resistance into circuit, turn on ignition switch, and slowly decrease resistance and note relay closing voltage. If not as specified, adjust by bending armature heel iron as necessary.

Field Relay Specifications

Regulator Model	Air Gap	Contact Gap	Closing Voltage
9000566, 567	.014"	.027"	5-9.5 volts
9000585, 586	.014"	.027"	5-9.5 volts

VOLTAGE REGULATOR

Air Gap: Measure air gap with armature pressed down to point where contacts just touch. To adjust, move upper contact support bracket as necessary.

Voltage Setting: 1) Connect an ammeter in ignition switch lead at alternator "BAT" terminal. Disconnect lead at regulator "V" terminal and connect a jumper wire from "V" terminal to alternator "BAT" terminal. Connect a voltmeter from regulator "V" terminal to regulator base (ground). Place a carbon pile rheostat across battery.

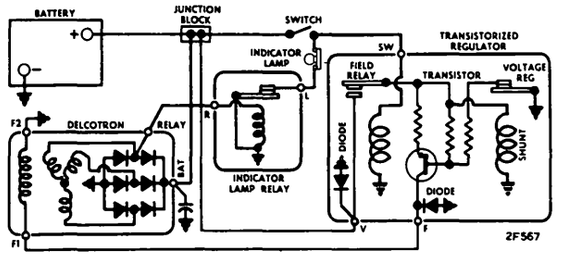
2) Bring regulator to ambient temperature of 125°F by operating alternator at 3000 RPM for 15 minutes with 3-10 amperes output, with regulator cover in place. After warm-up completed, cycle alternator by turning off switch, stopping alternator, and temporarily disconnecting jumper lead at regulator "V" terminal. Reconnect jumper lead, operate alternator at 3000 RPM and note voltage reading. If not within specifications listed below, adjust by turning adjusting screw to adjust armature spring tension. Recycle, recheck, and readjust if necessary. *NOTE - Always make final adjustment by turning adjusting screw clockwise. If alternator voltage drops below 3 amperes minimum, load battery with carbon pile rheostat or turn on headlights and other accessories to obtain 3-10 amperes alternator output.*

Voltage Regulator Specifications

Regulator	Air Gap	Voltage Setting
9000566	.075"	ℂ 13.2-14.2 volts
9000567	.075"	ℂ 13.2-14.2 volts
9000585	.075"	ℂ 13.2-14.2 volts
9000586	.075"	ℂ 13.2-14.2 volts

ℂ - At 125°F. Adjust to 13.7 volts.

►*VOLTAGE SETTING TAILORING NOTE:* If battery consistently over- or undercharged after voltage regulator properly set and all other checks indicate no circuit defects, voltage regulator setting may be raised or lowered .3 volt to compensate for various underhood temperatures and other operating conditions. Allow reasonable length of time to check performance. Proper setting is obtained when battery remains fully charged with minimum use of water.



ALTERNATOR & REGULATOR WIRING DIAGRAM (TYPICAL)
(NEGATIVE GROUND TYPE SHOWN)

PRESTOLITE (AUTOLITE) 12 VOLT "A" CIRCUIT REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

►*GENERATOR POLARIZING:* Whenever regulator or generator leads are disconnected for any reason, the generator must be polarized as follows: After generator and regulator leads are reconnected, connect jumper wire between "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator windings. This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of contact relay points).

►*NORMALIZING THE REGULATOR:* Before checking regulator, bring it to normal operating temperature as follows: Operate generator at speed of 1500 RPM, adjust charging rate to 10 amperes (connect .25 ohm resistor in charging line, use a variable resistance across battery, or turn on headlights and other accessories). Continue operation for 15 minutes to "normalize" regulator (bring to operating temperature). Temperature can be checked by placing an accurate thermometer 2" from regulator cover.

DESCRIPTION: Similar in design to previous types with two resistors.

CHECKING & ADJUSTMENT: Connect ammeter in charging line at regulator "BAT" terminal (in series with battery). Connect voltmeter between regulator "BAT" terminal and ground (except for cutout relay cut-in voltage test when voltmeter should be connected between regulator "ARM" terminal and ground). Make tests as follows:

VOLTAGE REGULATOR

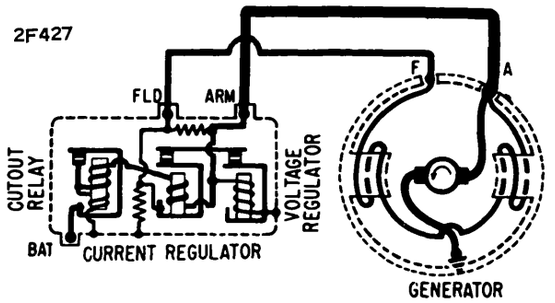
Air Gap: .048-.052". Check with wire gauge placed between armature and core at contact side of stop pin. Contacts should be closed with .052" gauge and should just open when armature pressed down against .048" gauge. Adjust by loosening stationary contact support screw and raising or lowering contact support.

Voltage Setting: After regulator normalized, and with generator charging at 7 ampere rate, note voltmeter reading and regulator temperature. If voltage setting not within specifications in table below, adjust regulator.

Adjustment - Decrease generator speed to slow idle, remove regulator cover, adjust voltage regulator by bending armature spring lower hanger down (increase spring tension) to increase voltage setting, or up (decrease tension) to lower voltage setting. After each adjustment, check setting by first cycling regulator (decrease speed until cutout relay contacts open), then rechecking voltmeter and temperature readings at correct charging rate.

Voltage Regulator Settings

Regulator Model	Voltage Setting Table
All VBO-4200 Series (Except 4201C, -1)	No. 1
VBO-4201C, -1	No. 2



VBO-4200 SERIES 12-VOLT REGULATORS (INTERNAL WIRING DIAGRAM)

Voltage Setting Tables

Table No. 1 Temp.	℃ Volts	Table No. 2 Temp.	② Volts
50°F	14.7	50°F	15.2
80°F	14.5	80°F	15.0
110°F	14.3	110°F	14.8
140°F	14.1	140°F	14.6

℃ - Plus or minus .3 volt. ② - Plus or minus .4 volts.

CURRENT REGULATOR

Air Gap: .048-.052". Check and adjust in same manner as Voltage Regulator (above)

Current Setting: After regulator normalized, current regulator setting should agree with "Test A" specifications in tables below. For "Test B", operate generator at 2000 RPM and add sufficient load to cause current regulator to operate (turn on lights and accessories, add additional load such as a light bank or carbon pile, or use a variable resistance across battery) with voltage of 13.6-13.8 volts. Continue to operate generator for 15 minutes to normalize current regulator by bringing it up to operating temperature (place an accurate thermometer 2" from regulator cover to check temperature). At end of total 30 minutes operation, current setting should agree with "Test B" specifications in table below. If not within range shown in "Test B" column, adjust current regulator.

Adjustment - Make adjustment in same manner as for Voltage Regulator (above).

Current Regulator Nominal Settings

Regulator Model	Nominal Setting
VBO-4201B-1	40 Amps.
VBO-4201E-4A	35 Amps.
VBO-4223F-1	35 Amps.
VBO-4223G-1	30 Amps.
VBO-4223H-1	25 Amps.

Current Setting Specifications (25 Amps. Nominal Setting)

Temp. (°F)	Test A - Amperes - Test B
50°	34 max. 25-29
70°	32 max. 23-27
90°	30 max. 21-25
110°	28 max. 19-23
130°	26 max. 17-21

(30 Amps. Nominal Setting)

Temp (°F)	Test A - Amperes - Test B
50°	39 max. 30-34
70°	37 max. 28-32
90°	35 max. 26-30
110°	33 max. 24-28
130°	31 max. 22-26

(35 Amps. Nominal Setting)

Temp. (°F)	Test A - Amperes - Test B
50°	46 max. 35-39
70°	44 max. 33-37
90°	42 max. 31-35
110°	40 max. 29-33
130°	38 max. 27-31

(40 Amps. Nominal Setting)

Temp. (°F)	Test A - Amperes - Test B
50°	51 max. 40-44
70°	49 max. 38-42
90°	47 max. 36-40
110°	45 max. 34-38
130°	43 max. 32-36

CUTOUT RELAY

Air Gap: .025-.027" with contacts open. Check with feeler gauge between lower face of armature and core as close to armature hinge as possible. Use .025" and .027" gauges for "go" and "no go". Adjust by bending armature upper stop as required.

Contact Gap: .015" minimum. Check with feeler gauge. Adjust by bending stationary contact support as required.

Cut-In (Closing) Voltage: With ammeter in charging line in series with battery at regulator "BAT" terminal, and voltmeter between regulator "ARM" terminal and ground, connect a variable resistor in circuit between regulator "FLD" and generator "F" terminals. With regulator normalized, operate generator at engine slow idle speed and turn all resistance into circuit. Slowly decrease resistance and note voltmeter reading at instant relay contacts close (needle will jump slightly). If cut-in voltage does not agree with settings shown below, adjustment is required. After checking and adjusting cut-in voltage, check cut-out amperage (below).

Adjustment - Adjust in same manner as Voltage Regulator (above).

Cut-Out (Opening) Amperag : After checking cut-in voltage (above), turn resistance completely out of field circuit and note ammeter reading. If ammeter does not indicate charging current of 7 amperes, increase generator speed until correct ammeter reading is obtained. Turn resistance into field circuit slowly and note ammeter reading at point where ammeter indicates maximum discharge current (ammeter pointer will drop to zero, then go beyond the zero point, and finally return to zero). Take reading just before ammeter pointer snaps back to zero. This reading is the cut-out amperage and should agree with settings shown below. To adjust, vary contact gap.

Cutout Relay Settings

Regulator Model	Cuts-In	Cuts-Out
All VBO-4200 Series	12.5-13.5 volts	3-5 amps.

DELCO-REMY 12 VOLT "SINGLE CONTACT" REGULATORS

►*1962 PONTIAC CONTACT BURNING CORRECTION:* Generators No. 1102303 & 304 have 4.5 ohm resistance field windings which tend to produce high field current under slow driving conditions. To correct regulator contact point burning or material build-up, install a rectifier resistor, No. 1960461, between generator Field and Armature terminals.

DESCRIPTION: "Single Contact" type similar in design to previous models. Air Gap adjustment on some regulators is made by turning a nylon nut located at top or regulator unit. Point contact gap setting is made in same manner as for previous models. All voltage regulators and some current regulators are "temperature compensated" as indicated below.

CHECKING & ADJUSTMENT: Make all checks and adjustments in following sequence: Voltage Regulation, Cutout Relay Operation, and Current Regulation AFTER regulator has been brought up to normal operating temperature as directed below. Generator must be repolarized each time leads are reconnected and before operating.

►*GENERATOR REPOLARIZING:* After generator and regulator leads reconnected, connect jumper lead between regulator "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator winding. This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of relay contact points).

VOLTAGE REGULATOR

►*NORMALIZING THE REGULATOR:* Before checking voltage setting, bring regulator to operating temperature as follows: Connect 1/4 ohm resistance in series with battery, see that regulator cover in place, operate regulator for 15 minutes continously with no other load than ignition (*NOTE* - If variable resistor used in place of fixed 1/4 ohm resistor, set resistor for 1-10 ampere charging rate).

Air Gap: .075" (except 1119004 and "E" Suffix Regulators), .062" (1119004), .060" (All "E" Suffix Regulators), with contacts just touching. Adjust by loosening upper contact mounting screws and raising or lowering contact bracket (models without nylon adjusting nut); by turning nylon adjusting nut (models with nylon nut). *NOTE* - On models without nylon adjusting nut, align contacts and tighten bracket mounting screws.

Voltage Setting: With regulator "Normalized" (see above), setting can be checked using either "Fixed Resistance" or "Variable Resistance" method as indicated below.

Fixed 1/4 Ohm Resistance Method

1) Connect 1/4 ohm fixed resistor (not less than 25 watts) in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal and ground.

2) Cycle the generator using either of the following methods: (A) Move voltmeter lead from regulator "BAT" terminal to "GEN" terminal. Reduce generator speed until voltmeter reading is 4 volts, then move voltmeter lead back to "BAT" terminal. (B) Connect variable resistance in field circuit (in line between generator and regulator "F" terminals), turn out all resistance, operate generator at 3500 RPM and turn in resistance until generator voltage reduced to 12 volts, then turn out all resistance and remove variable resistor.

3) Operate generator at 3500 RPM (cars & trucks), note voltmeter reading with regulator cover in place. This is the voltage setting (see data below). Adjust by turning adjusting screw at voltage regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Variable Resistance Method

1) Connect variable resistance (not less than 25 watts) and ammeter in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal and ground.

2) Cycle the generator (use either method outlined in step 2 of Fixed 1/4 Ohm Resistance Method above).

3) Check and adjust voltage setting as outlined in step 3 of Fixed 1/4 Ohm Resistance Method above.

Voltage Setting Specifications

Setting - As indicated in table below with regulator at a specific ambient temperature. When a voltage range only is given, set regulator within that range at 125°F ambient temperature. Regulator settings can be "tailored" to keep battery in satisfactory state under particular operating conditions as directed below.

►*AMBIENT TEMPERATURE NOTE:* "Ambient Temperature" is temperature of the air surrounding the regulator approximately 1/4" from regulator cover when regulator is at operating temperature ("Normalizing" procedure given above will result in an approximate ambient temperature of 125°F) and can be measured by placing a thermometer 1/4" from regulator cover. See table below for specific regulator settings at various ambient temperatures.

Voltage Regulator Setting

Regulator	Voltage Range or Table No.
1119000, 1, 1E, 2, 2E, 3	No. 3
1119004	13.6-14.3
1119122	No. 3
1119168	No. 3
1119235, 42, 53, 53E, 63, 64, 77, 99	No. 3

Ambient Temperature Voltage Tables (Volts)

Ambient Temp.	Table No. 3
165°F	13.1-13.9
145°F	13.5-14.3
125°F	13.8-14.7
105°F	14.0-14.9
85°F	14.2-15.2
65°F	14.4-15.4

"Tailoring" Voltage Regulator Setting

If battery is consistently undercharged or overcharged (using too much water), adjust voltage regulator within range specified for the ambient temperature in which the regulator is operating, as directed above. *CAUTION - Regulator setting above 14.8 volts (at 125°F) may cause damage to lights and other voltage sensitive equipment and should be avoided.*

1) Battery uses too much water. If voltage regulator setting **above** normal range listed above, reduce setting to within upper portion of normal range and check battery condition over a period of time. If voltage regulator setting **within** normal range listed above, reduce voltage setting 0.1 or 0.2 volts and check battery condition over period of time. This should be continued until battery remains charged with minimum use of water.

2) Battery is consistently undercharged. If voltage regulator setting is **below** normal range listed above, increase setting to within lower portion of normal range and check battery condition over a period of time. If voltage regulator setting is **within** normal range listed above, increase voltage setting 0.1 volt and check battery condition over period of time. This should be continued until battery remains charged with minimum use of water.

CUTOUT RELAY

►*ADJUSTMENT CAUTION: Disconnect battery lead before making Air Gap and Contact Gap adjustments.*

Air Gap: .020" with contacts just touching. To check press down on armature until points just close (use finger pressure on armature directly above contacts), and measure gap between armature and center of core. To adjust, loosen two screws at armature hinge on back of relay, raise or lower armature as necessary. *CAUTION - On relays with two sets of contacts, make sure both sets close simultaneously.*

Contact Gap: .020" with armature up against upper stop. *CAUTION - Gap must be same for both sets of contacts to insure simultaneous closing.* Use feeler gauge to check gap. To adjust, bend upper armature stop up or down as necessary.

Cut-In (Closing) Voltage: 11.8-13.5 volts (except 1119004), 11.5-13.0 volts (1119004). To check with regulator properly connected to generator and battery, connect voltmeter between regulator "GEN" terminal and ground. Use either of the following methods to check cut-in voltage.

1) Slowly increase generator speed and note voltmeter reading at instant contacts close, then decrease generator speed and make certain that relay contacts open. See item (3) for adjustment.

2) Connect a variable resistor in the field circuit between regulator "F" terminal and generator "F" terminal (use 25 ohm-25 watt resistor). Operate generator at medium speed with all resistance turned in, slowly turn out resistance and note voltmeter reading at instant relay contacts close. Slowly turn in resistance and make certain that relay contacts open. Adjust as follows:

3) Turn adjusting screw under armature spring (adjacent to contacts) in or clockwise to increase cut-in voltage, out or counter-clockwise to decrease cut-in voltage.

CURRENT REGULATOR

►*CHECKING & ADJUSTMENT CAUTION:* Temperature Compensated Current Regulators should be checked by the "Load Method" which provides for bringing the regulator up to operating temperature. Regulators which are not temperature compensated can be checked by the "Jumper Lead" Method.

Air Gap: .075" with contacts just touching. Check and adjust air gap in same manner as Voltage Regulator (above).

Current Setting: Use correct method for each type as listed below. *CAUTION - Do not attempt to short out voltage regulator by inserting screwdriver through hole in base (will short out both voltage and current regulators and cause generator to operate without control).*

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DELCO-REMY 12 VOLT "SINGLE CONTACT" REGULATORS (C nt.)

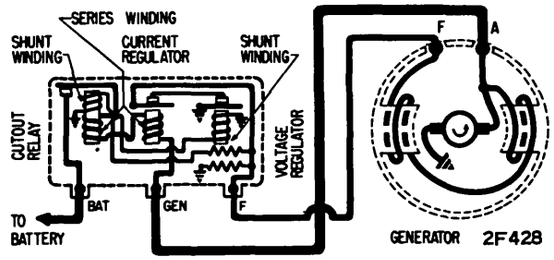
Load Method
(For Temperature Compensated Regulators)

1) Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery).

2) Turn on all accessory load (lights, radio, etc.) and connect additional load (carbon pile rheostat or bank of lights) to reduce voltage to approximately 1.0 volt below voltage regulator setting.

3) Operate generator at 3500 RPM (cars & trucks) for 15 minutes with regulator cover in place. This will bring regulator up to operating temperature.

4) Cycle the generator by using either of the following methods: **(A)** Connect voltmeter between regulator "GEN" terminal and ground, reduce generator speed until voltmeter reading is 4 Volts, then increase generator speed to 3500 RPM. **(B)** Connect variable resistance in field circuit (in line between generator and regulator "F" terminals), operate generator at 3500 RPM with all resistance turned out, turn resistance in until generator voltage reduced to 12 volts, then turn out all resistance.



DELCO-REMY 12-VOLT REGULATOR WIRING DIAGRAM

5) Operate generator at 3500 RPM and note ammeter reading which is the current setting. Adjust by turning the adjusting screw at the current regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Jumper Lead Method
(For Non-Temperature Compensated Regulators)

1) Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery).
2) Connect short jumper lead across voltage regulator points (from upper contact bracket to armature).
3) Turn on all lights and accessories or connect additional load (see step 3 under Load Method above) to cause current regulator to operate.

4) Operate generator at 3500 RPM (cars & trucks) and note ammeter reading which is the current setting. Adjust as directed in step (5) under Load Method above.

℃ Current Regulator Setting

Model	Setting	Model	Setting
1119000	No. 8	1119235	No. 10
1119001,1E	No. 6	1119242	No. 10
1119002,2E	No. 10	1119253,3E	No. 10
1119003	No. 6	1119263	No. 6
1119004	℃37-42	1119264	No. 10
1119122	No. 8	1119277	No. 10
1119168	No. 10	1119299	No. 10

℃ - Ampere range for "Non-Temperature Compensated" types. Specification Table Number (see below) for "Temperature Compensated" type.
℃ - Check at operating temperature established after 15 minutes continuous current regulator operation.

Current Setting Tabl s

Ambient Temp.	Spec. No. 6	Sp c. No. 8	Spec. N . 10
65°F	30.0-35.0	25.0-30.0	35.0-40.0
85°F	29.0-34.0	24.5-29.0	34.0-38.5
105°F	28.0-32.5	23.5-28.0	32.5-37.0
125°F	27.0-31.0	23. 0-27.0	31.0-35.5
145°F	25.0-30.0	21.5-25.5	29.5-33.5
165°F	24.5-28.5	20.5-24.5	
185°F	23.0-27.0	19.5-23.5	

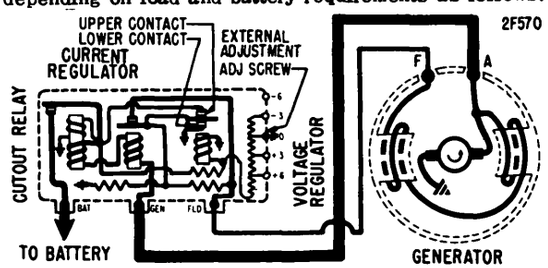
DELCO-REMY 12 VOLT "DOUBLE CONTACT" REGULATORS

►*REGULATOR TESTING & SERVICE CAUTION: When testing generator and this type regulator, observe the following precautions:*

1) *DO NOT GROUND GENERATOR FIELD WITH REGULATOR CONNECTED TO GENERATOR.* This will cause upper set of contacts in Voltage Regulator to burn up immediately.

2) *DO NOT FILE REGULATOR CONTACTS.* All contacts of the double contact voltage regulator are soft alloy and should be cleaned with crocus cloth or other fine abrasive and washed with carbon tetrachloride.

DESCRIPTION & OPERATION: Three unit regulator with conventional design, Cutout Relay and Current Regulator. Voltage Regulator has additional set of upper contacts connected directly across the generator field (to short out generator field circuit). Lower contacts are connected in series with the generator field. Regulator operates either on upper contacts or lower contacts (both sets are never in operation at the same time), depending on load and battery requirements as follows:



REGULATOR WIRING DIAGRAM (WITH EXTERNAL ADJUSTMENT)

Lower Contact Operation (Low Speed & High Load - High Generator Field Requirement) - Regulator armature travel opens and closes lower contacts (vibrating action), cutting regulator resistance in and out of field circuit. This operation is same as on regulators with a single set of contacts.

Upper Contact Operation (High Speed & Low Load - Low Generator Field Requirement) - Under these conditions, voltage control shifts to upper set of contacts. Armature travel opens and closes upper contacts (vibrating action) to short out the field (contacts closed), or to insert resistance into the field circuit (contacts open).

►*EXTERNAL ADJUSTMENT TYPE REGULATOR NOTE:* Some regulators in this series have an external adjustment feature to provide quick adjustment of voltage regulator setting for temporary unusual driving conditions and high or low battery temperature, without removing regulator cover, using electrical meters, or warm-up periods to bring regulator to operating temperature. External adjustment made by placing adjusting screw in one of the holes provided on side of regulator to add or remove additional resistance in circuit. *NOTE - Under normal conditions, external adjustment screw should be in middle or "0" position.*

ADJUSTMENT

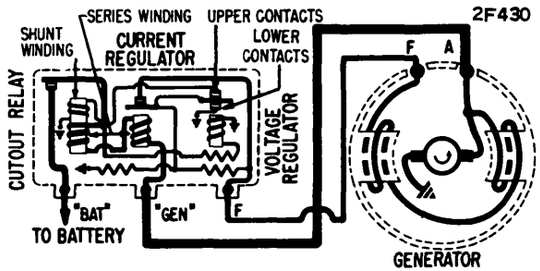
►*TEMPERATURE COMPENSATION NOTE:* All Voltage Regulator units and some Current Regulator units are "Temperature Compensated". It is necessary to bring regulator to operating temperature ("Normalized"), before checking and adjusting, and that regulators be adjusted to setting specified in specification tables below for the "ambient temperature" of unit. "Ambient Temperature" is temperature of air surrounding regulator measured ¼" from regulator cover.

►*"NORMALIZING" THE REGULATOR:* Bring regulator to operating temperature as follows: Connect ¼ ohm resistor in series with battery and operate regulator (with cover in place) for 15 minutes with no other load than ignition. *NOTE - If variabl resistor used in place of fixed ¼ ohm resistor, s t r sistor for 1-10 ampere charging rate.*

CUTOUT RELAY: Air Gap - .020" (Except 1119635 & 1119654), .023" (1119635 & 1119654) with contacts just touching. To adjust, loosen screws at armature hinge on back of relay and raise or lower armature as necessary.

Contact Gap: .020" (All Models) with armature against upper stop. To adjust, bend upper armature stop up or down as necessary.

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REGULATOR WIRING DIAGRAM (WITHOUT EXTERNAL ADJUSTMENT)

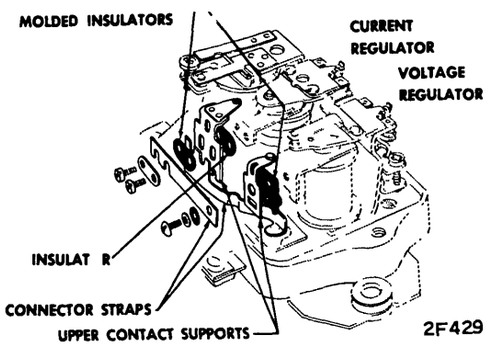
DELCO-REMY 12 VOLT "DOUBLE CONTACT" REGULATORS (Cont.)

Cut-In (Closing) V ltag : 11.8-13.0 volts (Except 1119634), 11.5-12.7 volts (1119634). *For checking and adjustment, se "D lc -Remy 1119000 Series 12-Volt Single Contact R gulators" in this section.*

VOLTAGE REGULATOR: Air Gap - .067" (All Models) with lower contacts just touching. To adjust, loosen contact support bracket screw, place a screwdriver in slot in contact support bracket and into molded insulator, then raise or lower screwdriver handle as necessary. Tighten screw securely after adjustment made.

C ntact Gap: .016" (upper contacts) with lower contacts just touching (All Models). To adjust, bend upper contact arm (on armature assembly) as necessary.

Voltage S tting: *CAUTION - On regulators with external adjustm nt, mak v ltag setting with adjusting screw in middl ("0" positi n) hole.* Connect a ¼ ohm fixed resistor in series with battery at regulator "BAT" terminal. Connect a voltmeter from regulator "BAT" terminal to ground. Connect a 25 ohm, 25 watt variable resistor in series with field circuit. *NOTE - Variable r sistor sh uld hav an "open" position to aid in cycling generator.* With all resistance out of circuit, operate generator at medium or higher speed so voltage regulator will operate on **upper** contacts. Operate for 15 minutes to establish temperature, cycle generator (turn resistance to "open" position momentarily), and slowly turn out all resistance. Regulator should be operating on upper contacts and within range given for ambient temperature in table below. Now slowly turn resistance into circuit until regulator operates on lower contacts. Operating voltage on lower contacts should be .1-.3 volt lower than operating on upper contacts. If adjustment necessary, see "Adjustment" below.



REGULATOR CONTACT ASSEMBLIES

Adjustment - Upper Contacts - Turn adjusting screw clockwise to increase voltage and counterclockwise to decrease voltage. *CAUTION - If adjusting screw turned down beyond range, spring support may not return when screw backed off. If this happens, turn screw counterclockwise until there is good clearance between screw head and spring support, then bend spring support up car fully until it touch s scr w head. Final s tting should be mad by increasing spring t nsion.* After each adjustment, replace regulator cover and cycle generator.

Lower Contacts - Difference in operating voltage of upper and lower contacts is increased by **slightly** increasing armature air gap. If adjustment necessary, recheck voltage setting of **both** sets of contacts.

CURRENT REGULATOR: Air Gap - .075" (All Models) with contacts just touching. To adjust, loosen contact mounting bracket screws and raise or lower contact mounting bracket as necessary.

Current Setting: *See tables below for specifications.* On "Temperature Compensated" types, adjust to setting specified for ambient temperature of unit. *For checking and adjustment, see "Delco-Remy 1119000 Seri s 12-Volt Single Contact Regulators" in this section.*

Voltage Regulator Setting

Regulator	Table No.
1119600,1,2,3,4,5,6,7,8,9,10,11,12	No. 1
1119613,14,15,17,19,21,23,24,25,27,28	No. 1
1119629,30	No. 1
1119631	①No. 1B
1119632,33	No. 1
1119634	No. 1C
1119635	No. 1
1119636,37,38,39,40,41,42,43,44,45,46	①No. 1B
1119647	①No. 1B
1119648,49,50,51	No. 1
1119652	①No. 1B
1119654,55,57,58,59	No. 1
1119660,61	①No. 1B
1119663, 64, 67, 68	No. 1
1119669	①No. 1B
1119670, 71	No. 1

① - Make adjustment with external adjustment screw at "0".

Voltage Setting - Ambient Temperature

Temp.①	②Table No. 1	②Table No. 1B	②Table No. 1C
65°		13.9-15.0	
85°	14.1-14.9	13.8-14.8	13.4-14.2
105°	14.0-14.8	13.7-14.6	13.3-14.1
125°	13.8-14.6	13.5-14.4	13.1-13.9
145°	13.7-14.5	13.4-14.2	13.0-13.8
165°	13.5-14.4	13.2-14.0	12.8-13.7
185°	13.4-14.2	13.1-13.9	12.7-13.5
205°	13.3-14.1		12.6-13.4

① - Ambient temperature taken within ¼" of cover.
② - Operating voltage will be .1-.3 volts **lower** on lower contacts.

①Current Regulator Setting

Regulator	Setting	Regulator	Setting	Regulator	Setting	Regulator	Setting
1119600	No. 2	1119617	No. 3	1119634	23-27	1119650, 51	53-57
1119601	No. 3	1119619	No. 8	1119635	No. 5	1119652	No. 8
1119602	No. 4	1119621	27-33	1119636	53-57	1119654	No. 7
1119603	43-47	1119623	No. 2	1119637	48-52	1119655	38-42
1119604	No. 5	1119624	No. 7	1119638	38-42	1119657	23-27
1119605	53-57	1119625	22-26	1119639	No. 7	1119658	48-52
1119606, 07	48-52	1119627	38-42	1119640	38-42	1119659	No. 3
1119608	No. 6	1119628	58-62	1119641	No. 5	1119660, 61	48-52
1119609	43-47	1119629	No. 9	1119642	33-37	1119663	27-33
1119610	No. 7	1119630	No. 7	1119643,44	No. 11	1119664	9-11
1119611, 12	33-37	1119631	48-52	1119645	23-27	1119667	27-33
1119613	53-57	1119632	No. 8	1119646, 47	19-21	1119668	No. 5
1119614	9-11	1119633	No. 9	1119648	No. 6	1119669	53-57
1119615	58-62			1119649	No. 5	1119670, 71	No. 7

① - Ampere Range for "Non-Temperature Compensated" types. Specification Table number (see below) for "Temperature Compensated" types.

CURRENT SETTING - AMBIENT TEMPERATURE

Ambient Temp.	Spec. No. 2	Spec. No. 3	Spec. No. 4	Spec. No. 5	Spec. No. 6	Spec. No. 7	Spec. No. 8	Spec. No. 9	Spec. No. 10	Spec. No. 11	Ambient Temp.
65°F				35.0-40.0	45.5-50.5	40.5-45.5	50.0-55.0	50.7-59.6	32.4-37.3	30.0-35.0	65°F
85°F	43.0-51.5	44.5-49.0	43.0-48.5	34.0-38.5	44.0-48.5	39.0-43.5	49.0-53.5	48.0-56.4	31.0-35.7	29.0-34.0	85°F
105°F	40.5-48.0	43.5-48-0	40.0-45.5	32.5-37.0	42.5-47.0	37.5-42.0	47.5-52.0	45.3-53.2	29.4-34.0	28.0-32.5	105°F
125°F	38.0-45.0	42.5-47.0	37.5-42.0	31.0-35.5	41.0-45.5	36.0-40.5	46.0-50.5	42.8-50.0	27.8-32.4	27.0-31.0	125°F
145°F	35.0-42.0	41.5-46.0	34.5-39.0	29.5-33.5	39.5-43.5	34.5-38.5	44.5-48.5	40.1-46.7	26.3-30.7	25.0-30.0	145°F
165°F	32.5-38.5	40.5-45.0	32.0-36.0				43.0-47.0	37.6-43.6	24.7-29.0	24.5-28.5	165°F
185°F	30.0-36.0	39.5-44:0	29.0-33.0				41.5-45.5	35.0-41.0	23.2-27.3	23.0-27.0	185°F
205°F	27.5-34:5	38.5-42.5	26.0-30.0								205°F

FORD MOTOR CO. 12 VOLT "SINGLE CONTACT" REGULATORS

►CAUTIONS

►*GENERATOR POLARIZING: (NOTE* - Polarization is not necessary except when generator has been rebuilt or if new pole shoes have been installed). To polarize a generator on the car, disconnect the field wire and the battery wire from the regulator and momentarily connect the two wires together (engine not running). *CAUTION - Do not polarize generator by any method that applies battery voltage to field terminal of regulator.*

►*NORMALIZING THE REGULATOR:* **On the Car**–Clip special thermometer T56L-10505-A on regulator cover (see Note below). Operate engine with generator charging at 10 ampere rate for 30 minutes or until regulator temperature is stabilized.

On the Bench–Procedure is same as on the car except that a small fan should be mounted 12-15" from the regulator so as to circulate air over the regulator cover while it is being warmed up.

Thermometer T56L-10505-A Note–This thermometer is calibrated in 10° F. increments and has additional Voltage scales indicating the correct voltage regulator setting for each temperature reading (both 6 volt and 12 volt scales provided).

►*AMBIENT TEMPERATURE NOTE:* Ambient temperature is the temperature taken adjacent to the regulator, using Thermometer T56L-10505-A.

DESCRIPTION: These 12 volt regulators are the same design as previous 12 volt units.

CHECKING & ADJUSTMENT: *CAUTION*–Regulators are temperature-compensated and must be brought up to normal operating temperature before checks are made. This normal temperature is that existing adjacent to the regulator cover after 1/2 hour of operation in the car or after the regulator has been heated until the temperature is stabilized (standard normal temperature is 70-80° F.

►*TEST METER CONNECTIONS:* If special Test Sets used, make all connections in accordance with manufacturer's instructions. If individual meters used, make connections as follows: Connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal, from regulator terminal to ground (Ford). *CAUTION - Disconnect battery cable.* On other cars, connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal in series with battery. Connect voltmeter between regulator "ARM" terminal and ground (regulator base or battery grounded terminal). Connect a 50 ohm variable field rheostat (2 amp. rating) in generator field circuit (disconnect field lead at regulator "FIELD" terminal, connect rheostat between this lead and regulator "FIELD" terminal).

CUTOUT RELAY

Cut-In (Closing) Voltage: After regulator normalized and with test meters connected (see above), check cut-in voltage as follows:

Comet, Falcon, Ford - With field resistance completely turned in the field circuit, operate engine at 1500 RPM, slowly turn resistance out of field circuit and note voltmeter reading when relay contacts close (pointer will drop back slightly). Repeat this check several times by turning resistance in and out of field circuit.

Mercury - With all the resistance turned out of the field circuit, slowly increase generator speed and note voltmeter reading at instant relay contacts close (pointer will drop back slightly). Repeat this check several times by decreasing generator speed until contacts open and then increasing speed until contacts close. If closing voltage not correct as shown in setting table below, adjustment is required.

Adjustment - Bend adjusting arm under armature spring (to left of relay contacts) upward to increase cut-in voltage, or downward to decrease cut-in voltage. Replace regulator cover and recheck the setting.

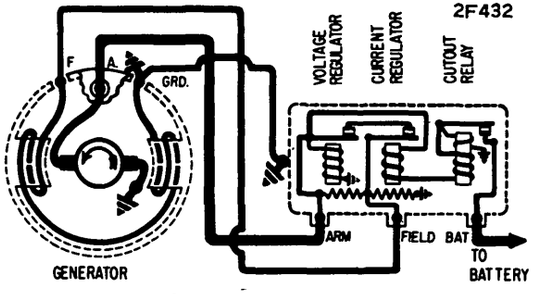
Cut-In (Closing) Voltage Setting

12.0-2.8 volts (25 & 30 Amp.), 12.4-13.2 volts (35 & 40 Amp.).

Cut-out (Opening) Discharge Current: This can be checked after checking cut-in voltage by increasing generator speed (or turning out field resistance) until charging current is approximately 10 amperes, then slowly decrease generator speed (or turn in field resistance) until maximum discharge current indicated on ammeter (ammeter will return to zero as contacts open).

Cut-Out (Opening) Discharge Current

6-9 amps. (25 & 30 Amp.), 8 amps. (35 & 40 Amp.), reverse current.



GENERATOR & REGULATOR WIRING DIAGRAM

VOLTAGE REGULATOR

Voltage Setting: After Cutout Relay checked (above), cycle regulator by decreasing generator speed until cutout relay contacts open and then increase speed to 1500 RPM. Clip special thermometer on regulator cover to establish regulator ambient temperature and corresponding voltage setting (see Voltage Regulator Settings for various ambient temperatures below). Turn resistance completely out of field circuit (charging rate should be approximately 10 amperes). Note voltmeter reading. This is the voltage setting and should agree with setting listed below.

Final Test (Ford) - Remove all test leads except voltmeter leads and install "BAT" and "F" wires on regulator. Run engine at 1500 RPM (under battery load) and note voltmeter reading (voltage will rise to regulated value after a few moments operation).

Adjustment–Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase voltage setting, or downward to decrease voltage setting. Replace regulator cover and recheck the setting after each adjustment.

Voltage Setting

14.6-15.4 volts, with ambient air temperature of 75° F, *See table below.*

Ford Voltage Regulator Settings (Ambient Temperature Correction)

Ambient Temp. (° F)	All Exc. Auto-Lite 40 Amp. (Volts)	Auto-Lite 40 Amp. (Volts)
25°	15.1-15.9	14.3-15.2
35°	15.0-15.8	14.3-15.2
45°	14.9-15.7	14.3-15.1
55°	14.8-15.6	14.3-15.0
65°	14.7-15.5	14.3-14.9
75°	14.6-15.4	14.2-14.9
85°	14.5-15.3	14.1-14.8
95°	14.3-15.1	14.1-14.7
105°	14.2-15.0	14.0-14.7
115°	14.1-14.9	14.0-14.6
125°	13.9-14.7	13.9-14.5
135°	13.8-14.6	13.8-14.4
145°	13.6-14.4	13.8-14.4

CURRENT REGULATOR

Current Setting: This check requires that a load be added, or that the generator voltage be dropped to approximately 13 volts, to cause current regulator to operate. It is recommended that a heavy duty variable resistance (carbon pile) be connected across the 1-1/2 ohm fixed resistor in the charging line (connect resistance from ammeter lead terminal of fixed resistor to ground–see Test Meter Connections above). After Voltage Regulator checked (above), and with all resistance turned out of the field circuit, operate generator at 1500 RPM (Comet, Falcon, Ford), 2000 RPM (Mercury), decrease the resistance until voltage drops to approximately 13 volts and ammeter reading is at maximum. This ammeter reading is the current setting. If not correct (see table below), adjust as follows:

Adjustment–Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase current setting, or downward to decrease current setting. Replace regulator cover and recheck setting.

Current Setting

25 Amp. Regulator - 23-27 amperes (all models).
30 Amp. Regulator - 28-32 amperes (all models).
35 Amp. Regulator - 33-37 amperes (all models).
40 Amp. Regulator - 38-42 amperes (all models).

RAMBLER REPLACEMENT REGULATORS

DESCRIPTION: Three unit generator regulator of conventional design containing a cut-out relay, voltage regulator, and current regulator. Regulators are either 6-volt or 12-volt type.

CHECKING & ADJUSTING: Make all checks and adjustments with regulator at normal operating temperature and stabilized. Regulator cover and gasket must be fastened to regulator base and regulator mounted in normal operating position whenever readings are taken.

►*NORMALIZING THE REGULATOR:* Bring regulator to operating temperature as follows: Operate generator for at least 20 minutes at 3000 RPM with fully charged battery and sufficient load to equal 10 ampere (6-Volt), 5 ampere (12-Volt) charging rate. *NOTE - Specifications below are for regulator at 75°F ambient temperature.*

►*ADJUSTMENT CAUTION: Make all adjustments EXACTLY in the order given below.*

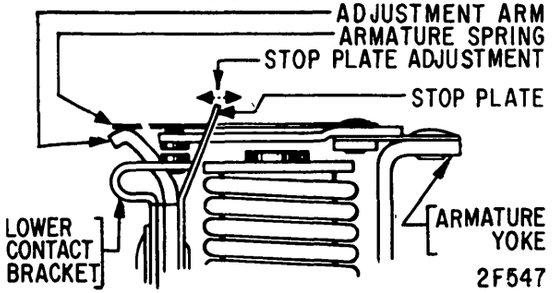
CUT-OUT RELAY

Air Gap: 1) Fr P sition - Bend armature stop plate to vertical position and bend armature spring adjustment arm down until tension removed from spring. Bend lower contact bracket down until points separate, then adjust armature free air gap at armature yoke to specifications (see below).

2) Cl s d P siti n - Close points by hand and adjust armature closed air gap to specifications (see below) by bending lower contact bracket upward. *NOTE - Maintain contact p int alignm nt.*

C ntact Gap: Bend armature spring adjustment arm up until armature touches stop plate, then bend stop plate down until specified contact gap is obtained (see below).

Cut-In Voltage: Bend armature spring adjustment arm up or down as required for correct voltage (see below).



RAMBLER REGULATOR CUT-OUT RELAY

Cut-Out Relay Specifications
(Mechanical)

Regulator Number	Air Gap (Free)	Air Gap (Cl sed)	Contact Gap
3203654	.001-.008"	.011-.014"	.025-.030"
3203655	.001-.008"	.011-.014"	.025-.030"
3203656	.001-.008"	.011-.014"	.025-.030"
3203657	.001-.008"	.011-.014"	.025-.030"
3203658	.001-.008"	.011-.014"	.025-.030"
3203659	.001-.008"	.011-.014"	.025-.030"
3203660	.001-.008"	.011-.014"	.025-.030"

(Electrical)

Regulator Number	℃ Voltage Setting
3203654,55,56(6-volt)	6.0-6.4 volts
3203657, 58, 59, 60 (12-volt)	12.6-13.4 volts

℃ - At ambient temperature of 75°F.

CURRENT REGULATOR

Air Gap: Bend armature spring adjustment arm down until tension removed from spring, then, with contact points open, adjust air gap to specifications (see below) by bending armature yoke. Now bend upper contact bracket until points are just touching.

Current Setting: Bend armature spring adjustment arm as required to bring current setting to specifications (see below).

Current Regulator Specifications

Regulator Number	Air Gap	Current Setting (Amps.)
3203654	.035-.045"	38-42
3203655, 56	.035-.045"	40-44
3203657, 58	.035-.045"	28-32
3203659, 60	.035-.045"	28-32

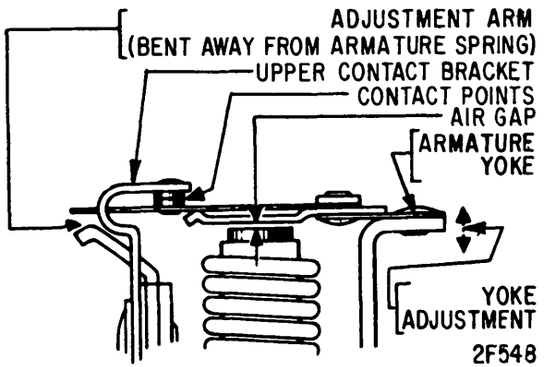
VOLTAGE REGULATOR

Air Gap: Bend armature spring adjustment arm down until tension removed from spring, then, with points open, adjust air gap to within .001-.005" of specifications (see below) by bending armature yoke. Insert a drill shank .001" larger in diameter than required air gap between armature and core adjacent to brass eyelets, and bend upper contact bracket until points just touch. Remove drill. With points just touching, air gap should be as specified.

Voltage Setting: Bend armature spring adjustment arm up to obtain correct voltage setting (see below).

Voltage Regulator Specifications

Regulator Number	Air Gap	Voltag Setting
3203654	.035-.038"	7.6-7.9
3203655	.035-.038"	7.6-7.9
3203656	.035-.038"	7.6-7.9
3203657	.033-.036"	14.6-15.4
3203658	.037-.040"	14.6-15.4
3203659	.030-.033"	14.6-15.4
3203660	.033-.036"	14.6-15.4



RAMBLER REGULATOR VOLTAGE & CURRENT REGULATOR

LINCOLN CONTINENTAL "DOUBLE CONTACT" REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

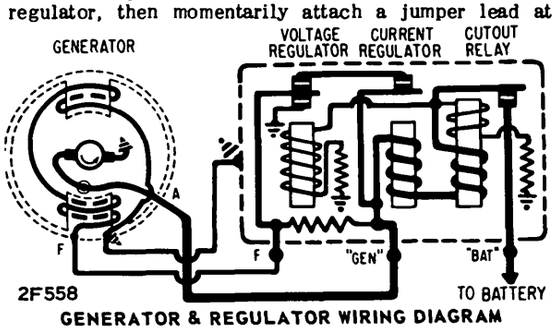
►*1962 INTERMITTENT OR INOPERATIVE CHARGING SYSTEM CORRECTION:* May be caused by a broken or poor weld at splice in wiring harness at armature lead of regulator. This splice connects heavy gauge armature wire and lighter gauge charge indicator wire. Correct by repairing splice using rosin core solder and plastic electrical tape.

DESCRIPTION: Three unit type of same design used previously. All wires at regulator terminals are entirely sealed at terminals and end in two multiple connectors. One connector contains field, ground, and armature leads. Other connector contains battery wire and charge indicator light wire.

►*GENERATOR & REGULATOR TEST CONNECTION NOTE:* **1)** All test connections must be made at battery and generator. Special adapter tool, Sun Electric No. 7052-001, is available to mount on battery positive post. Adapter has a bypass switch for starting engine.

2) On sedans, raise front of car and remove generator splash shield to attach tester leads to generator armature terminal. On convertibles, attach tester leads to generator junction terminal on right fender apron.

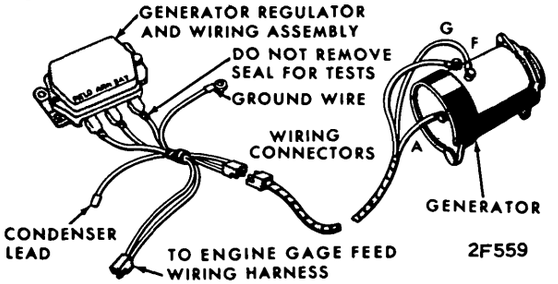
►*GENERATOR POLARIZING:* Polarize generator as follows: Separate connector between generator and regulator, then momentarily attach a jumper lead at generator "F" terminal and battery positive post.



GENERATOR & REGULATOR WIRING DIAGRAM

DIAGNOSIS, TESTS, & ADJUSTMENTS: *See 1961 Final Data, Page 294, and note the following:*

Test Connections - Make test connections at generator and battery as described under "Generator & Regulator Test Connection Note" above.



GENERATOR & REGULATOR EXTERNAL WIRING CONNECTIONS

BUICK SPECIAL & OLDSMOBILE F-85 POWER BRAKE UNIT

Buick Special (1962)
Oldsmobile F-85 (1962)

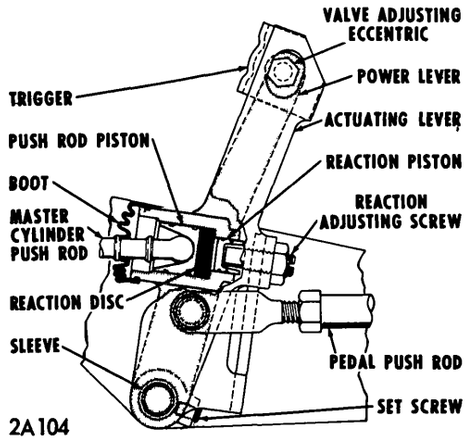
DESCRIPTION: Pedal-assist type power unit mounted on engine side of firewall and connected by pedal pushrod to brake pedal. The power unit consists of an air-vacuum bellows, mounting bracket, power lever assembly, actuating lever assembly, pedal pushrod and brake master cylinder.

OPERATION: Brake power lever is connected to valve housing of power unit through shank of valve adjusting eccentric bolt and it is also connected to master cylinder pushrod through the reaction disc and pushrod piston. The actuating lever is controlled by movement of brake pedal through the pedal pushrod and carries the valve actuating bracket or "trigger". It is also connected to reaction disc through the reaction piston and reaction adjusting screw. The actuating lever (and trigger) movement is transmitted through air control valve button and controls operation of the valves. In unapplied position, power unit bellows is fully extended and is filled with air (atmospheric pressure). Application of movement on brake pedal causes actuating lever to close the air valve and open vacuum valve, permitting vacuum to be applied to bellows, evacuating a controlled amount of air (depending on pedal pressure), causing it to contract and move power lever which, with actuating lever, moves pushrod into master cylinder. As fluid pressure increases in master cylinder, a reaction force is transmitted through pushrod to reaction disc and reaction piston to apply a pressure on actuating lever through the reaction adjusting screw. This reaction force moves actuating lever (and trigger) away from air valve button to close off vacuum port. This reaction force balances the force exerted on actuating lever, providing driver with brake "feel". When pedal pressure is held at any stage of application or release, both air and vacuum valves immediately close and hold power unit in a fixed position.

REMOVAL & INSTALLATION: Remove stoplight switch wires from master cylinder. Disconnect hydraulic line, vacuum hoses, and air supply hose. Disconnect pedal pushrod from brake pedal. Remove attaching bolts and remove master cylinder and power unit assembly. To install, reverse removal procedures and torque attaching bolts to 25 ft. lbs.

ADJUSTMENT: Valve Operation - *NOTE - Valve adjustment must be made without master cylinder installed.* Mount power unit assembly on car or clamp in a vise (make sure master cylinder pushrod is removed so that cut-in of unit can be checked without interference). Attach vacuum supply hose to unit and apply vacuum. *CAUTION - If a shutoff valve is used in vacuum line, DO NOT APPLY unit with shutoff valve closed.* Turn valve adjusting eccentric until unit chatters when pedal is depressed in a sharp and rapid movement. Then turn eccentric until chatter disappears. Do not turn eccentric more than necessary or the unit cut-in will be excessively high. Tighten eccentric nut to 180-220 inch pounds, then recheck adjustment.

Pushrod Adjustment: Buick - *NOTE - Adjustment must be made if master cylinder parts, power lever parts or pushrod has been changed.* With master cylinder and boot removed from unit, insert master cylinder pushrod into pushrod piston in power lever and hold it in with light pressure. Adjust pushrod length so distance between master cylinder mounting face and end of pushrod is .096-.116". Tighten locknut and recheck adjustment. With boot installed on master cylinder, attach master cylinder to mounting bracket and tighten nuts to 25 ft. lbs. *CAUTION - If pushrod adjustment is too long, it may force master cylinder piston forward, closing off compensating port and causing brakes to lock.. If this adjustment is too short, a "clunk" may be noticeable on operation of power unit.*



POWER LEVER ASSEMBLY

Oldsmobile F-85 - Adjust pushrod length until end of pushrod just touches master cylinder piston, then tighten locknut. Remove master cylinder filler cap and look for bubbles or spurt of fluid when brakes applied (indicates proper adjustment), then check and adjust fluid level in master cylinder (¼" below lip of master cylinder). *CAUTION - If pushrod adjustment is too long, it may force master cylinder piston forward, closing off compensating port and causing brakes to lock. If adjustment too short, a "clunk" may be noticeable when power unit operated.*

Reaction Adjusting Screw Adjustment: *NOTE - This adjustment must be made only if adjustment has been changed or actuating lever or reaction piston has been replaced. Either of the following methods may be used:*

Recommended Method - Install a gauge in hydraulic system and bleed system. Apply a 30 lbs. load perpendicular to pedal. Hydraulic pressure on gauge should be 340-350 psi. Adjust reaction adjusting screw to obtain this pressure. *NOTE - Make final adjustment by turning screw IN.* Tighten adjusting screw locknut and recheck setting.

Alternate Method - *NOTE - If gauges are not available, an approximate setting can be made as follows:* With unit completely assembled, and valve adjusting eccentric properly adjusted, turn reaction adjusting screw IN until rear of reaction piston skirt is FLUSH with back face of power lever. *NOTE - A light rearward pressure on master cylinder pushrod will maintain contact between reaction adjusting screw and reaction piston.* **Back off adjusting screw 1 2/3 turns and lock in place with jam nut.** After installation of unit in car and after all adjustments have been made, apply a load of 70 lbs. or more at pedal. Rear of reaction piston skirt should then be flush or exposed not more than .010".

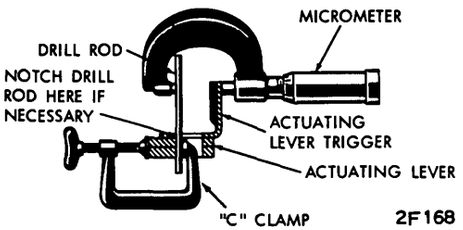
Pedal Height Adjustment: Buick - Distance from center of brake pedal pad to floor should be 4⅛". To adjust, remove clevis pin at inner end of pushrod and adjust length of rod as necessary. *NOTE - This specification supersedes previous 3¾" for better pedal feel.*

POWER BRAKE DISASSEMBLY: Remove master cylinder boot, and pushrod assembly (leave boot on power lever). *NOTE - Do not disassemble pushrod unless replacement is necessary.* Remove cotter pin from pedal pushrod actuating lever clevis and retract clevis pin through side of mounting bracket. Remove pedal pushrod assembly and dash panel boot (discard boot). Remove valve adjusting eccentric nut and remove spring washer and bushing. Remove valve actuating eccentric from power lever, then remove and discard rubber collar from eccentric. Remove and discard nylon bushing from valve housing. Remove pivot pin nut and lockwasher and slide pin out of mounting bracket. Remove power lever assembly and actuating lever assembly as a unit. Remove and discard nylon bushings in power lever sleeve, then remove sleeve setscrew. Push sleeve out of power lever assembly and separate power lever and actuating lever. Remove power lever boot, pushrod piston, reaction disc, and reaction piston from power lever. Discard boot and reaction disc. *CAUTION - Do not damage finish of bore of pistons. Do not remove reaction adjusting screw and locknut unless actuating lever is being replaced.*

POWER BRAKE REASSEMBLY: 1) Check actuating lever trigger position as shown in illustration. Drill rod must be perpendicular to flat side of actuating lever and tight against side of slot (notch drill rod if necessary to maintain squareness). Trigger position measured with micrometer must be .950"±.005". Bend trigger arm or replace actuating lever as necessary.

2) Reassemble reaction disc, pushrod piston, boot, and reaction piston into power lever (lubricate pushrod piston and reaction piston with lubriplate). Assemble power lever to actuating lever and apply lubriplate to outside of power lever sleeve. Install sleeve into power lever and actuating lever and lock in place with setscrew, then install sleeve bushings. *NOTE - If reaction adjusting screw has been moved, adjust as described under "Adjustments" above.* Install power lever and actuating lever assembly in mounting bracket and install pivot pin and lock in place with nut and lockwasher. Install nylon bushing in valve housing and coat with lubriplate. Install new rubber collar under eccentric (start collar under one side of hex, then

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TRIGGER LEVER POSITION CHECKING

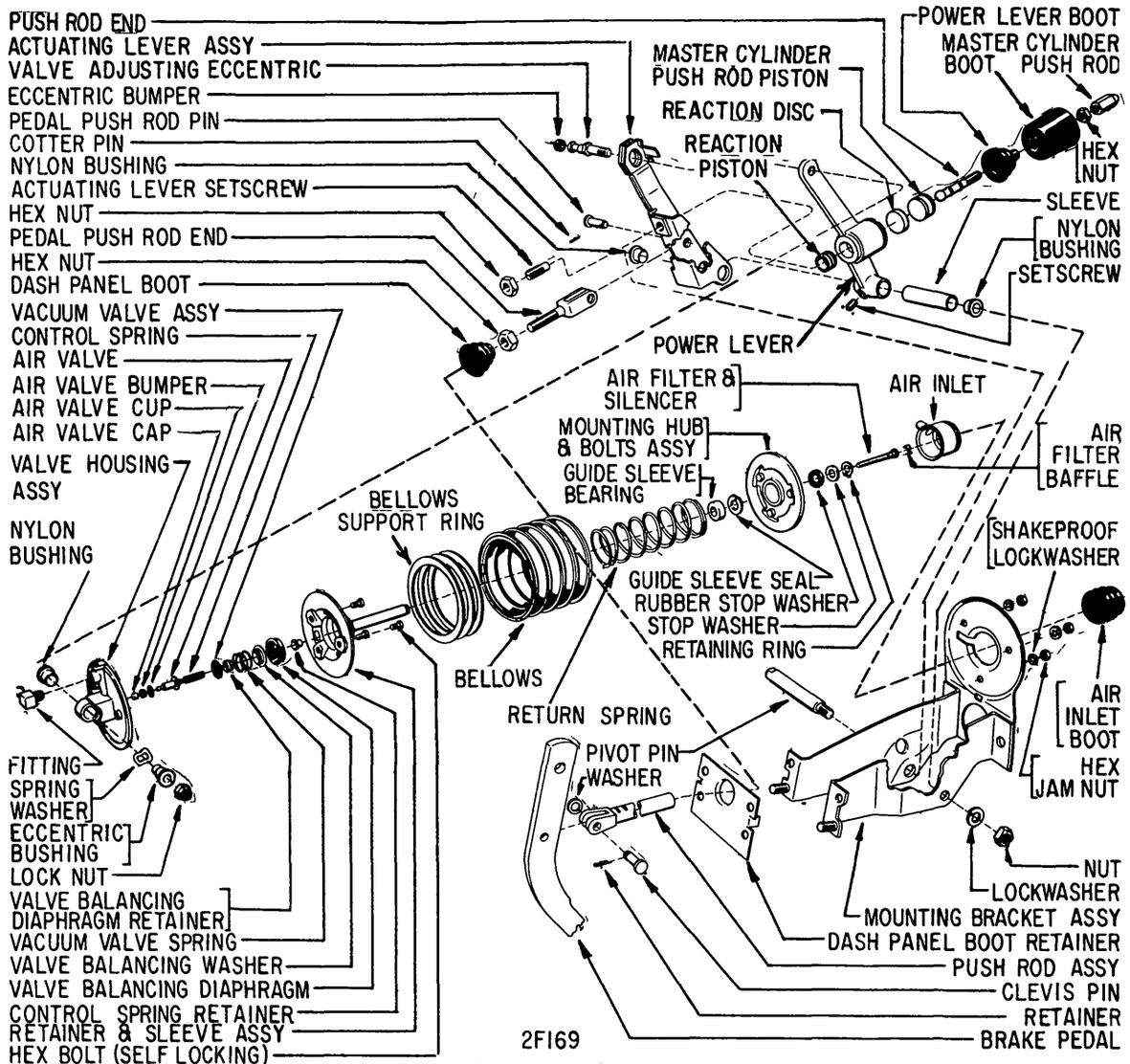
BUICK SPECIAL & OLDSMOBILE F-85 POWER BRAKE UNIT (C nt.)

force over hex with thumb pressure). Assemble power unit to power lever and actuating lever assembly by installing valve adjusting eccentric bolt. *NOTE - Be sur nd f actuating l v r trigger does not strike side f air valv butt n. Curv of trigger should rest against nd f air valv button.* Install spring washer over spherical bushing, slide assembly over valve adjusting eccentric bolt and into valve housing, then install nut. Tighten valve adjusting eccentric nut until eccentric bolt is firmly locked to power lever but can still be turned for adjustment. Install pedal pushrod and boot and attach to actuating lever with clevis pin (use new cotter pin). Make Valve Operation, Pushrod, and Reaction Adjusting Screw Adjustments as detailed under "Adjustment" above, then install master cylinder and install unit on car. Make brake pedal height adjustment.

POWER UNIT DISASSEMBLY: Remove mounting bracket from power unit, then remove air inlet housing and boot. Clamp unit in a soft-jawed vise and remove air filter baffle from retainer sleeve by pushing down and sideways to unhook, then lift out air filter with baffle. Hold mounting hub and bellows against return spring and remove retaining ring, steel stop washer and rubber stop washer from guide sleeve. *CAUTION - Do not op n r taining ring t o wide or it will be damaged.* While still holding mounting hub down, remove lip of bellows from hub and then lift mounting hub assembly and return spring from power unit. Remove retainers and guide sleeve assembly with bellows from valve housing, then remove retainers and sleeve assembly from bellows. Remove air valve control spring, valve balancing diaphragm, vacuum valve spring, vacuum valve assembly, and air valve assembly from valve housing. Remove valve balancing washer and retainer from valve balancing diaphragm.

Cl aning & Insp cti n: Clean all metal parts (except mounting hub assembly), including air filter, in alcohol or other oil-free solvent and dry thoroughly. *CAUTION - Lubricant in l ather seal in mounting hub as s mbly must n t b wash d out.* Clean bellows in mild soap and warm water. Inspect all parts for wear or damage. If vacuum valve seat in valve housing is damaged, valve housing must re replaced. *Replace all parts suppli d in repair kit even if they do not show w ar r damage.*

POWER UNIT REASSEMBLY: 1) Clamp valve housing in a soft-jawed vise so alignment notch is visible. Install air valve assembly, vacuum valve, vacuum valve spring, valve balancing diaphragm with washer and retainer (small diameter of retainer toward diaphragm). Install balancing diaphragm with retainer first and make sure retainer is centered in vacuum valve spring and that center bead in retainer is pressed down snugly and evenly over neck or hub of vacuum valve assembly. Apply lubriplate to outside diameter of valve balancing diaphragm. *CAUTION - DO NOT apply brake fluid t rubb r parts.* Install bellows with support rings in place over retainers and guide sleeve assembly. Make sure three bosses in retainer are aligned with three recesses in bellows, and that guide sleeve projects into (not out of) bellows. Install bellows assembly over valve balancing diaphragm with a twisting motion,



POWER BRAKE UNIT (EXPLODED)

then place on valve housing. Install screws, check alignment marks for proper positioning, then tighten self-locking screws evenly to 85-115 inch-pounds. Sight down guide sleeve and see that air valve control spring is squarely in retainer.

2) Remove assembly from vise and test air valve operation by pressing down with a screwdriver. Two stages of movement should be felt: In first stage, only air valve control spring is compressed; in second stage, resistance of vacuum valve spring is added. When pressure released, valve should snap back. Apply lubriplate to guide sleeve and inside of leather seal in mounting hub. Install return spring around guide sleeve and retainer assembly, slide mounting hub assembly (threaded studs up) over guide sleeve, then hold hub down against return spring and assemble flange of bellows evenly over outside edge of hub. Place rubber stop washer, then steel stop washer over guide sleeve, install retaining ring and make sure it is properly seated in groove. Assemble air filter baffle and air filter and installl into guide sleeve (air baffle clips over end of guide sleeve and into same groove with and above retaining ring). Install air inlet housing and boot (air inlet hose must be in alignment with clearance slot in mounting bracket). Install mounting bracket on hub, align slot in bracket with tab on bellows, and tighten attaching nuts to 85-115 inch-pounds.

DELCO-MORAINE VACUUM SUSPENDED POWER BRAKE UNIT

Cadillac, All Series (1962) ℂ
Chevrolet Pass. Cars (1962) ℂ
Chevy II (1962) ℂ

ℂ - "Bendix Power Brake Unit Diaphragm (Vacuum Suspended) Type" also used.

►CHANGES, CAUTIONS, CORRECTIONS

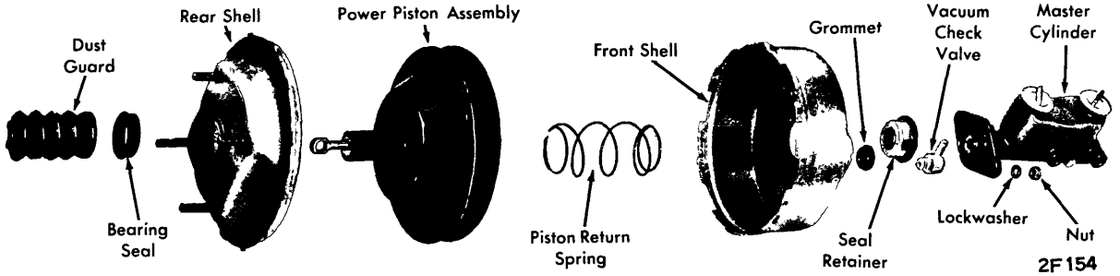
►*1962 CADILLAC VACUUM CHECK VALVE BUZZING NOISE CORRECTION (Early Cars):* On cars before Engine No. 014925, install a conical shaped check valve spring to replace original cylindrical shaped spring. New spring dampens valve flutter and was installed on cars after the above engine number.

DESCRIPTION: "Vacuum Suspended", folding diaphragm type consisting of a vacuum power cylinder which contains the power piston assembly that houses control and reaction assemblies, and the power piston return spring. Brake control valve assembly is composed of an air valve and floating control valve assembly. Brake reaction assembly consists of a hydraulic piston reaction plate and a series or reaction levers. Power unit hydraulic pushrod is provided with an adjusting screw to insure correct relationship between vacuum piston and master cylinder piston.

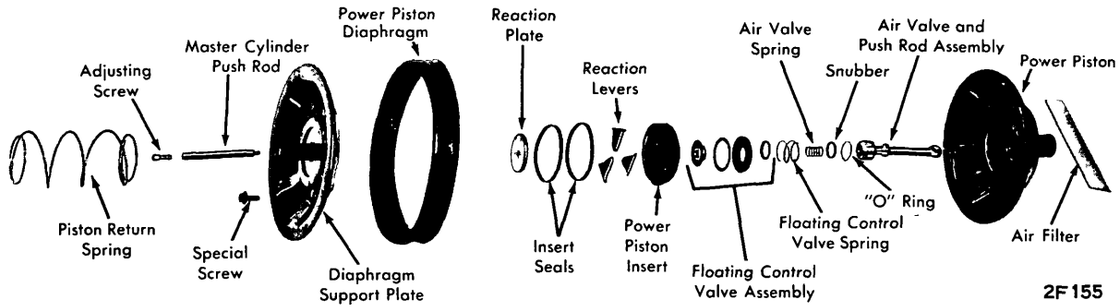
LUBRICATION & SERVICE: No lubrication required. Clean air cleaner filter twice a year as follows: Slide rubber boot to rear to remove filter. Wash filter in cleaning solvent and let dry before reinstalling.

REMOVAL & INSTALLATION: Disconnect vacuum line from power unit and hydraulic lines from master cylinder. Disconnect power unit pushrod from brake pedal assembly. Remove power unit-to-firewall attaching bolts and remove power unit and master cylinder as an assembly. To install, reverse removal procedure. *NOTE - On Chevrolet Pass. Cars, adjust brake pedal height by turning clevis on brake pedal pushrod at brake pedal. Pedal height should be 4 7/8" (Biscayne & Bel Air), 4 5/8" (Impala).*

DISASSEMBLY: Remove master cylinder from power unit. Scribe mark front and rear shells for mating at reassembly. Disconnect linkage (if equipped) at air valve pushrod. Place unit in a vise with rear shell up. Place metal bar (or Shell Separator J-9504) over studs, press down on bar and rotate rear shell counterclockwise to unlock shells. *CAUTION - Do not damage or loosen studs in shell, and make sure there is no pressure on plastic power piston extension.* Remove rubber boot from power piston extension and separate power piston from rear shell. Remove air filter element from extension. Remove mounting gasket and power piston bearing from rear shell. *CAUTION - Use extreme care when handling power piston diaphragm so that there is no grease, oil, foreign matter, nicks, scratches, or gouges on diaphragm.* Support power piston in upright position (master cylinder pushrod up) and remove support plate from piston assembly. Remove rolling diaphragm from support plate. Remove master cylinder pushrod from support plate, and press reaction plate from pushrod if necessary. Remove reaction levers from seats in power piston insert, then remove air valve return spring from air valve counterbore. Remove power piston insert, and both seals from O.D. of insert. Lift air valve and pushrod assembly from power piston, and remove snubber and "O" ring from air valve. Push floating control valve assembly out of position and disassemble valve. After floating control valve removed, floating control valve spring and seat can be removed. Remove power piston return spring from front shell, then remove front shell from vise. Remove support plate seal retainer from front shell and remove gasket and seal. Pull check valve from grommet and remove grommet.



DELCO-MORAINE POWER UNIT ASSEMBLY (EXPLODED)

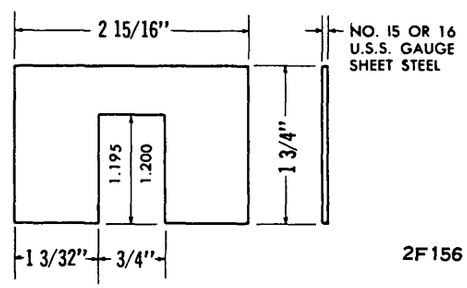


DELCO-MORAINE POWER PISTON ASSEMBLY (EXPLODED)

CLEANING & INSPECTION: Use "Declene" or brake fluid to clean all metal, plastic and rubber parts. Blow out all passages, orifices, and valve holes with clean, dry air, and air dry all parts. Slight rust on inside of housing can be polished with crocus cloth or fine emery cloth. There should be no cuts, nicks or distortion of any rubber part. If in doubt about the condition of a part, replace the part.

REASSEMBLY: 1) Place power piston bearing in rear shell with large flange to outside. Lubricate grooves in I.D. of bearing. Install check valve grommet and check valve in front shell. Press reaction plate over small knurled end of master cylinder pushrod until plate rests against shoulder of pushrod. Install pushrod through support plate until reaction plate is against support plate. Place power piston in a vise with extension down. Do not clamp piston. Install floating valve spring and spring seat in piston, then assemble floating valve diaphragm over flanged hub of floating control valve. *NOTE - Flat surface of diaphragm will be on side opposite rubber face of floating control valve. Install* diaphragm plate under lip of diaphragm. Press floating control valve and diaphragm assembly into power piston so control valve bears against spring seat and compresses spring. *CAUTION - Do not distort diaphragm when pressing floating control valve assembly into power piston.* Install "O" ring and snubber on air valve, then place pushrod through floating control valve and into piston extension so pushrod passes through loading slot in extension. Install seals in insert and place insert over air valve. Install air valve return spring, then install reaction levers in insert. Place unfolded diaphragm over support plate with second bead on outside wall. Place support plate on power piston and make sure beaded edge of diaphragm is between flange on support plate and flange on edge of power piston. Install support plate to power piston and torque retaining screws to 80-100 inch-pounds. 2) Wrap filter around pushrod and slide filter into power piston extension. Install master cylinder retaining nuts on studs and place power unit in a vise so vise jaws bear against nuts. Install power piston return spring. Place power piston (air valve pushrod first) into rear shell until piston extension passes through piston

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PUSHROD GAUGE TOOL

DELCO-MORAINE VACUUM SUSPENDED POWER BRAKE UNIT (Cont.)

bearing. Fold rolling diaphragm over rear shell and apply talcum powder or rubber lubricant to beaded part of diaphragm. Install rear shell and power piston assembly into front shell (support plate extension must go through power piston return spring). Rotate rear shell to align scribe marks, then lock assembly together. *NOTE - If unit does not lock easily, hold shells tight and apply vacuum to check valve (support plate seal or retainer must be installed if vacuum assist unnecessary).* Install rubber boot over pushrod and power piston bearing flange. Connect linkage (if equipped) to air valve pushrod.

3) Rotate unit in vise so master cylinder pushrod is up. Adjust pushrod to proper height (see below). Install support plate seal in retainer so flat surface of seal is against bottom of retainer. Install gasket, and place retainer in front shell cutout so gasket is between front shell and retainer flange. Install master cylinder on power unit and torque master cylinder retaining nuts to 15-20 ft. lbs. Install mounting gasket on rear shell.

PUSHROD ADJUSTMENT: *NOTE - No periodic adjustment of pushrod height is necessary. Check pushrod height if unit disassembled or if adjusting screw length is changed.* Place Pushrod Gauge J-7723-01 over end of pushrod with legs of gauge resting on face of power unit. Pushrod should just touch gauge at center. To adjust, hold pushrod at serrated end with pliers and turn adjusting screw as necessary.

►*GAUGE TOOL & PUSHROD HEIGHT NOTE:* If Gauge J-7723-01 is not available, a suitable gauge can be made according to dimensions shown in illustration. Pushrod height should be 1.195-1.200" (All Models).

MORAINE HYDRAULIC (DIAPHRAGM) REACTION BRAKE POWER UNIT

Buick (Except Special) (1962)
Oldsmobile 88, S88, 98 (1962) ①
Pontiac (Except Tempest) (1962) ②
① - "Bendix Power Unit Hydraulic (Disc) Reaction Type" also used.
② - "Bendix Power Unit Hydraulic (Disc) Reaction Type" and "Bendix Power Unit Diaphragm (Vacuum Suspended Type)" also used.

DESCRIPTION: Design is similar to previous models except for the use of selective shims between power cylinder and brake master cylinder. On Buick models, an additional reaction disc is used between master cylinder piston reaction plate and reaction levers.

OPERATION: As brake pedal is depressed, the operating rod moves air valve forward until its seat contacts floating control valve, sealing off atmospheric pressure. Further movement carries floating valve away from seat on power piston and opens the area forward of diaphragm to vacuum source while air valve remains closed. As air is exhausted forward of diaphragm, atmospheric pressure on opposite side moves diaphragm and piston assembly forward. As diaphragm and piston assembly moves forward, the master cylinder piston is depressed into master cylinder. As pressure builds up in master cylinder, the hydraulic piston reaction plate moves away from its stop and presses against the reaction levers. These levers in turn swing around their pivots and push the valve reaction plate back against the floating control valve snubbers. In this manner, approximately 40% of the load on master cylinder piston is transferred through air valve and operating rod to the brake pedal.

REMOVAL: Power Brake & Master Cylinder - Disconnect hydraulic line from master cylinder and vacuum line from power unit, then disconnect pushrod from brake pedal. Remove nuts attaching power unit to firewall and remove unit.

Master Cylinder: *NOTE - Master cylinder can be removed from power unit without removing power unit from car.* Remove hydraulic connection from master cylinder (cover opening and pipe to prevent dirt entering). Remove master cylinder attaching nuts and remove master cylinder from vacuum unit. *NOTE - Master cylinder piston assembly will remain attached to vacuum unit. If necessary to replace piston, it will be necessary to disassemble vacuum unit.*

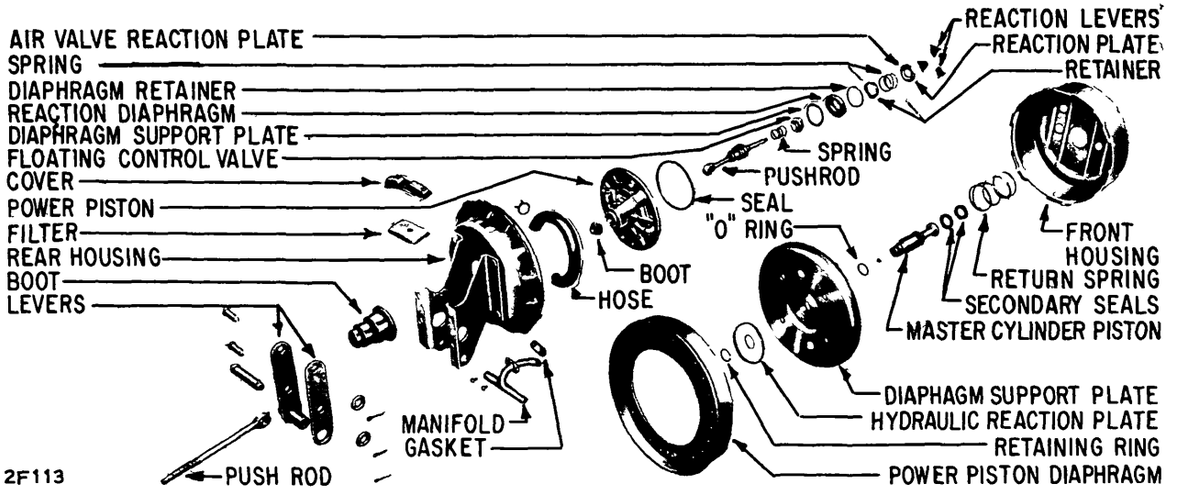
►*DISASSEMBLY & OVERHAUL CAUTION: Use care to prevent damage to parts. Do not allow oil or grease to come in contact with diaphragm or other rubber parts.*

OVERHAUL: *See 1959 Final Data, Page 317, or later Manual edition and note the following:*

Disassembly: If necessary to remove power cylinder from master cylinder be careful not to damage selective shims found between these two parts. If shims are damaged, replace with new shims of the same thickness.

►*1962 BUICK & OLDSMOBILE GAUGE TOOL NOTE:* 1962 Buick and Oldsmobile units have a different shape front housing and require Gauge Tool J-8531-01 to obtain proper master cylinder piston height. Gauge J-8531 may also be used if modified as follows: Grind a 45° chamfer 1/4" from outer end of each gauge leg, and cut a 1/16" deep notch on inner end of each gauge leg to a distance of 1 3/8" from center of gauge.

Gauging Master Cylinder Piston: *NOTE - It is necessary to gauge piston if front or rear housing, power piston assembly, master cylinder piston, or master cylinder assembly is replaced with a new part.* To check master cylinder piston, remove front housing from master cylinder (DO NOT remove selective shims from studs). *CAUTION - Be sure parts are not displaced from bore of master cylinder.* Place Gauge J-8531 so that it stands perpendicular to front housing next to two lower studs, and bridges over end of master cylinder piston. Piston should be flush with gauge plus or minus .010". If there is excess clearance under legs of gauge, add shims (gasket material) over front housing studs as required to take up clearance. If there is excessive clearance at center of gauge, remove shims. When all shims are removed, and piston end is still lower than gauge, check for deformed parts and replace as required. Install front housing on master cylinder and tighten nuts to 20 ft. lbs. *NOTE - The dimension of Gauge J-8531 provides a measurement of 1.833-1.844" from end of master cylinder piston to master cylinder surface on power cylinder.* If more than five .010" shims are required for correct adjustment, recheck assembly of vacuum piston.



MORAINE BRAKE POWER UNIT ASSEMBLY

BENDIX TANDEM DIAPHRAGM POWER BRAKE UNIT

Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962) ℂ
Plymouth (1962) ℂ

ℂ - Early cars. Later cars use Midland-Ross Power Unit. *See "Midland-Ross Diaphragm Type Power Brake Unit" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

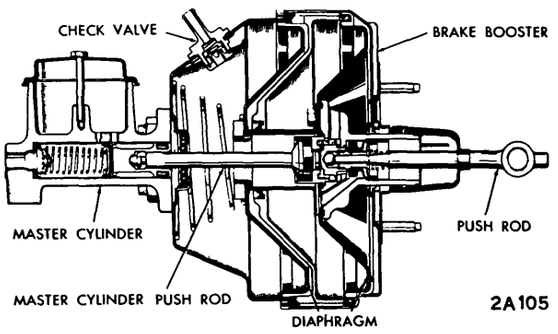
►*1962 DODGE (EXC. CUSTOM 880) & PLYMOUTH POWER BRAKE HIGH PEDAL OR LOW & SENSITIVE PEDAL CORRECTION:* This condition may be caused by installation of either a Chrysler or Dodge Custom 880 power brake unit and master cylinder. To check, remove unit from car and remove master cylinder. Pushrod length measured from face of unit to head of self-locking screw should be .905-.920" (.912" preferred) and master cylinder bore should be 1". The power unit used on Dodge Custom 880 & Chrysler is similar to that used on Dodge & Plymouth, however, pushrod length is 1.240-1.255" and master cylinder bore is 1 1/8". *CAUTION - Do not attempt to adjust pushrod length. Replace complete unit with correct assembly.*

►*1962 ERRATIC BRAKE OPERATION CORRECTION:* This condition accompanied by slow pedal return or build-up, and a loud scrubbing noise on pedal release (especially when unit cold). Caused by insufficient lubrication on power unit center plate hub.

DESCRIPTION: Vacuum-hydraulic power brake assembly with tandem vacuum diaphragms. This unit is a "vacuum suspended" type and does not require a vacuum reservoir. The vacuum power chamber consists of a front and rear shell, center plate, front and rear diaphragm, hydraulic pushrod and a vacuum diaphragm return spring. The hydraulic master cylinder is connected directly to vacuum chamber.

REMOVAL & INSTALLATION: From under dash, remove pushrod nut and bolt from brake booster and brake pedal, then disconnect brake line from master cylinder and vacuum line from check valve. Remove four brake booster attaching nuts and washers and withdraw power brake assembly from support bracket. Remove master cylinder attaching bolts and remove master cylinder from power unit. To install, reverse removal procedure.

OVERHAUL: *CAUTION - Do not attempt to disassemble power unit. Return to authorized manufacturer's service station.*



CHRYSLER CORP. POWER BRAKE UNIT

BENDIX HYDRAULIC (DISC) REACTION POWER BRAKE UNIT

Lancer (1962)
Lincoln Continental (1962)
Oldsmobile 88, S88, 98 (1962) ①
Pontiac (Except Tempest) (1962) ④
Studebaker (Except Hawk) (1962) ②③
Valiant (1962)

① - "Moraine Power Unit (Hydraulic Diaphragm Reaction Type)" also used.
② - "Hydrovac Piston Type" used on Hawk models.
③ - Early Cars up to Serial Nos. 62S-16410 & 62V-11992. Later Cars use "Bendix Power Brake Unit Diaphragm (Vacuum Suspended) Type".
④ - "Bendix Power Brake Unit Diaphragm (Vacuum Suspended Type)" and "Moraine Power Unit (Hydraulic Diaphragm Reaction Type)" also used.

DESCRIPTION: Similar in design to units used on previous models. A plastic type piston plate is used on some models. Service procedures for this type plate are different than for die-cast plate.

OPERATION: *See 1959 Final Data, Page 316, or later Manual edition.*

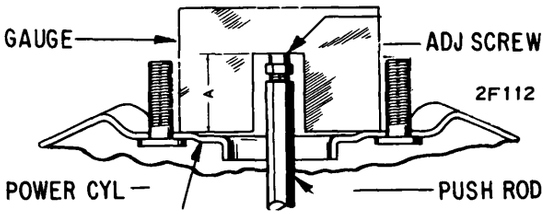
REMOVAL & INSTALLATION: *See 1959 Final Data, Page 316, or later Manual edition and note the following:*

Master Cylinder: *NOTE - Master cylinder can be removed from all cars without removing power brake assembly from car.* Disconnect hydraulic brake line from master cylinder and remove nuts and bolts securing master cylinder to power brake unit. *CAUTION - Keep area around pushrod clean.*

Pushrod Adjustment (All Cars): *NOTE - The self-locking screw on end of pushrod is set to correct height on original assembly and adjustment is not required unless hydraulic pushrod has been replaced, or if adjustment has been changed. If necessary, adjust as follows:* With piston assembly free in cylinder and firmly seated in a released position, hold pushrod seated against reaction disc and centered in spring of master cylinder. Use Gauge indicated in table below or measure distance from mounting face of power cylinder to end of pushrod adjustment screw (see table for correct dimension). Rotate adjusting screw as necessary to obtain correct adjustment.

Pushrod Adjustment

Car Model	Gauge No.	Dimension
Lancer	C-3815	1.195-1.200"
Lincoln Continental		1.175-1.180"
Oldsmobile	J-7723	1.195-1.200"
Pontiac	J-7723	1.195-1.200"
Studebaker		1.195-1.200"
Valiant	C-3815	1.195-1.200"

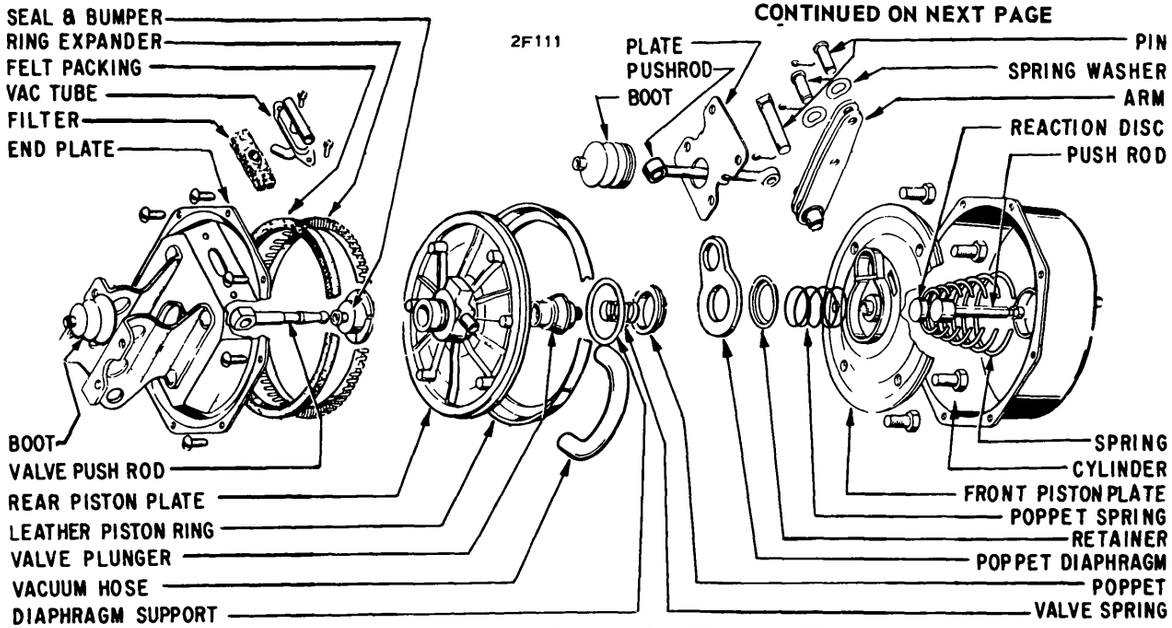


PUSHROD ADJUSTMENT

OVERHAUL: *See 1959 Final Data, Page 316, or later Manual edition and note the following:*

Vacuum Power Piston (Plastic Type): Disassembly - Remove piston felt and expander ring from piston assembly, then lift rod seal and bumper boot from rear piston plate and slide off eye end of operating rod. Remove capscrews from front piston plate, separate

CONTINUED ON NEXT PAGE



BENDIX "HYDRAULIC (DISC) REACTION" POWER BRAKE UNIT

BENDIX HYDRAULIC (DISC) REACTION POWER BRAKE UNIT (C ntinued)

front and rear piston plates, and remove leather packing. Remove poppet spring, valve, return spring retainer, poppet diaphragms, poppet, poppet spacer, and plunger and rod assembly. *NOTE - Do not separate valve p rating rod from valv plunger unless replacement f valve rod or plunger is necessary.* If valve rod or plunger must be replaced, hold assembly with valve plunger down and inject alcohol into cavity around valve rod to wet rubber lock in valve plunger, then drive or pry valve plunger off valve rod. Use care not to damage plunger if it is to be reused. Remove rubber reaction disc from front piston plate if necessary. *CAUTION - When cleaning, use only alcohol on parts containing rubber or plastic.*

Reassembly - Position plunger and rod assembly into rear piston plate, and install rod seal and bumper boot. Position spacer washer into cavity inside rear piston plate, then assemble poppet through poppet diaphragm, and install poppet spring retainer on end of poppet. Position leather packing on rear piston plate, then install poppet spring and valve return spring on plunger and poppet reaction plate. Position and align front piston plate against rear piston plate, and secure in position with capscrews. Soak piston felt in shock absorber fluid, then insert felt in expander ring, and position expander and felt in groove around rear piston plate with expander teeth up.

BENDIX DIAPHRAGM TYPE (VACUUM SUSPENDED) POWER BRAKE UNIT

Cadillac, All Seri s (1962) ①
Chevrolet Pass. Cars (1962) ①
Chevy II (1962) ①
P ntiac, Except T mp st (1962) ④
Rambler, All S ries (1962)
Studebak r (Except Hawk) (1962) ②③

① - "Delco-Moraine Power Brake Unit (Vacuum Suspended Type)" also used.

② - "Hydrovac Piston Type" used on Hawk models.

③ - Later Cars after Serial Nos. 62S-16410 & 62V-11992. Early Cars use "Bendix Power Brake Unit (Hydraulic Disc Reaction Type)".

④ - "B ndix Power Brake Unit (Hydraulic Disc Reaction Ty pe)"and "Moraine Power Brake Unit (Hydraulic Diaphragm Reaction Type)" also used.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 RAMBLER CLASSIC (6210 SERIES) BRAKE SENSITIVITY CORRECTION:* Install Power Brake Reaction Disc Kit, No. 3204350, according to instructions in kit.

►*1962 STUDEBAKER VACUUM CHECK VALVE NOISE CORRECTION:* To correct, install new type check valve, Part No. 1556983.

DESCRIPTION: "Vacuum Suspended", disc reaction, diaphragm type power brake unit. Vacuum power chamber consists of a front and rear shell, vacuum power diaphragm, diaphragm return spring and a hydraulic pushrod. The mechanically actuated control, integral with vacuum power diaphragm, controls degree of brake application or release depending on pressure applied to valve operating rod through brake linkage. Control valve assembly consists of a single poppet valve with both atmospheric port and vacuum port.

LUBRICATION & SERVICE: No lubrication required. Clean air cleaner filter twice a year as follows: Slide rubber boot to rear to remove filter. Wash filter in cleaning solvent and let dry before reinstalling.

REMOVAL & INSTALLATION: Disconnect vacuum line from power unit and hydraulic lines from master cylinder. Disconnect power unit pushrod from brake pedal assembly. Remove power unit-to-firewall attaching bolts and remove power unit and master cylinder as an assembly. To install, reverse removal procedure. *NOTE - On Chevrol t Pass. Cars, adjust brake pedal height by turning cl vis on brake pedal pushrod at brake pedal. Pedal height should be 4 7/8" (Biscayne & Bel Air), 4 5/8" (Impala).*

DISASSEMBLY: 1) Remove master cylinder from power unit, then remove master cylinder filter, piston seal assembly and master cylinder pushrod from front shell. Remove rubber boot and retainer plate from rear shell. If equipped, remove air valve pushrod linkage and mounting bracket. Remove filter retainer from diaphragm plate extension, then remove air filter. *CAUTION - Us xtr me car when rem ving air filt r r - tain r so that plastic diaphragm plat is not chipped. Pry at several places around retainer until freed.* Scribe an alignment mark on both shells for mating at reassembly. Use holding Fixture J-9576-1 and Bar Wrench J-9504 and separate shells. *CAUTION - Use care when separating shells so that diaphragm spring pressure does not cause rear shell to fly off.* Remove power piston from rear shell and remove separating tools.

2) Disassemble power piston as follows: Remove diaphragm from diaphragm hub. Hold diaphragm plate with pushrod in horizontal position, depress pushrod slightly (about 1/16"), and rotate piston so air valve lock will fall out. Remove air valve pushrod assembly. Remove reaction disc from diaphragm plate bore (use pushrod or suitable tool to push disc from seat). *Do not chip diaphragm plate.*

3) Remove rear shell bearing seal with a punch or thin screwdriver. *CAUTION - Remove seal only if a new one is available. DO NOT reuse seal if it has been removed.* Remove vacuum check valve and grommet.

CLEANING & INSPECTION: Use "Declene" or brake fluid to clean all metal, plastic and rubber parts. Blow out all passages, orifices, and valve holes with clean, dry air, and air dry all parts. Slight rust on inside of housing can be polished with crocus cloth or fine emery cloth. There should be no cuts, nicks or distortion of any rubber part. If in doubt about the condition of a part, replace the part.

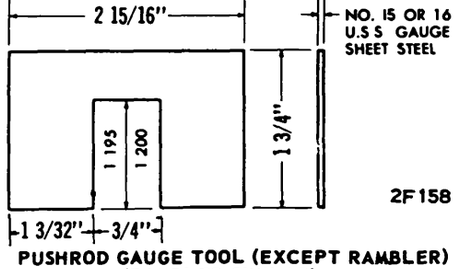
REASSEMBLY: 1) Install vacuum check valve grommet (beveled edge on inside), then install check valve. Install Holding Fixture J-9576-1 on front shell. Install new rear shell bearing seal with Installer J-9540 (tool will bottom against shell when seal properly installed).

2) Assemble power piston as follows: Lubricate outer diameter of diaphragm plate and extension, valve and plunger bearing surfaces, and outer edge of valve poppet. Install valve and rod into diaphragm plate extension. Depress pushrod slightly and install air valve lock (lock must index and retain air valve). Install rolling diaphragm in diaphragm plate hub groove. Lubricate reaction disc and install disc (use master cylinder pushrod to seat disc in diaphragm plate bore). *NOTE - If disc not fully seated, pushrod height will be incorrect.*

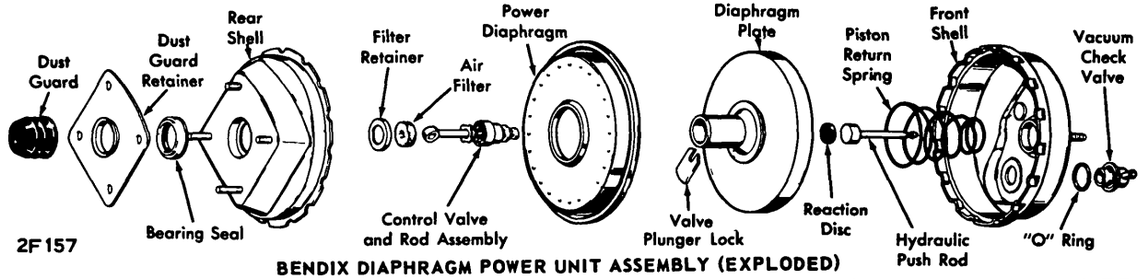
3) Lubricate inside of bearing seal and diaphragm bead contact surface of rear shell. Install power piston return spring, and power piston, then lock shells together with Bar Wrench J-9504. Install air cleaner filter and retainer. Install boot retainer and rubber boot. If equipped, install air valve linkage and mounting bracket. Lubricate the hydraulic pushrod lightly and install pushrod into center bore of power piston until fully seated against reaction disc. Install seal and master cylinder filter (press seal into front shell until bottomed in shell recess). Make master cylinder pushrod adjustment (see below). Install master cylinder

PUSHROD ADJUSTMENT: *NOTE - No periodic adjustment of pushrod height is necessary. Check pushrod height if unit disassembled or if adjusting screw length is changed.* Place Pushrod Gauge J-9571 (Rambler), J-7723-01 (All Others) over end of pushrod with legs of gauge resting on face of power unit. Pushrod should just touch gauge at center. To adjust, hold pushrod at serrated end with pliers and turn adjusting screw

►*GAUGE TOOL & PUSHROD HEIGHT NOTE:* If Gauge J-7723-01 or J-9571 are not available, a suitable gauge can be made according to dimensions shown in illustration. Pushrod height should be 1.195-1.200" (Cadillac, Chevrolet, Chevy II, Pontiac, Studebaker).



PUSHROD GAUGE TOOL (EXCEPT RAMBLER) (RAMBLER SIMILAR)



BENDIX DIAPHRAGM POWER UNIT ASSEMBLY (EXPLODED)

MIDLAND ROSS DIAPHRAGM TYPE POWER BRAKE UNIT

Dodge & Dodge Dart (1962) Ⓒ
Ford Fairlane & Galaxie (1962)
Mercury Meteor & Monterey (1962)
Plymouth (1962) Ⓒ
Thunderbird (1962)

Ⓒ - Later cars. *For early cars, see "Bendix Tandem Diaphragm Power Brake Unit" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 FORD GALAXIE & MERCURY MONTEREY PUSH-ROD RATTLE OR LOOSENESS CORRECTION:* May be caused by broken plastic pushrod retainer. To correct, install new retainer, No. 376417-S.

►*1962 FORD MOTOR CO. MODELS NO INITIAL POWER ASSIST (AFTER STANDING FOR SEVERAL HOURS) CORRECTION & PRODUCTION CHANGE:* Caused by incomplete seating of atmospheric valve. To correct, install Atmospheric Valve Return Spring, No. C2AZ-2A157-A, between atmospheric valve and reaction load ring. *NOTE - This spring installed in production on later cars.*

►*1962 POWER BRAKE BOOSTER CHATTER CORRECTION:* Make sure there is no air in system (bleed brakes), and that master cylinder pushrod is properly adjusted.

DESCRIPTION: Self-contained vacuum actuated diaphragm type power unit similar in design and operation to previous models.

LUBRICATION: At 6000 mile intervals lubricate mechanical linkage lightly with SAE 10W engine oil.

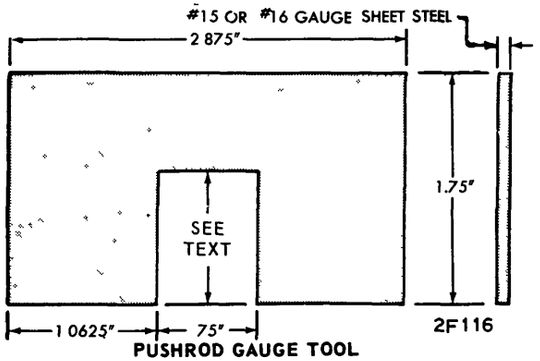
TROUBLE SHOOTING: *See 1961 Final Data, Page 298.*

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 298 and note the following:*

Brake Pedal Height Adjustment (Fairlane & Meteor): After power unit installed, adjust brake pedal height as follows: Turn eccentric bolt at brake pedal pushrod so so brake pedal is 1 7/16" above accelerator pedal.

OVERHAUL: *See 1961 Final Data, Page 298, and note the following:*

Pushrod Adjustment: Place a gauge made to the dimensions shown in illustration against master cylinder mounting surface of booster body. Pushrod adjusting screw should just touch inner edge of slot in gauge. If gauge not used, distance from master cylinder mounting surface on booster body to end of pushrod adjusting screw should be .910-.920" (Dodge & Plymouth), .995-1.005" (All Ford Motor Co. Models).



PUSHROD GAUGE TOOL

CHEVROLET TRUCK TWINPLEX BRAKES

Chevrolet Trucks, Series 40,50,60 (1962) Rear Only Ⓒ

Ⓒ-*For Front Brakes, see "Chevrolet-Bendix Hydraulic" in this section.*

DESCRIPTION: Two cylinder, four anchor type (each shoe anchored at each end and linked to wheel cylinder at each end). Brakes are radially self-centering.

ADJUSTMENT: Each shoe has one adjustment (adjusting screw at adjustable anchor end). Adjustment is same for both wear and for new or relined shoe clearance.

Brake Pedal Adjustment: *See "Chevrolet-Bendix Hydraulic" for data.*

Brake Shoe Adjustment: Jack up both rear wheels, remove adjusting hole covers from backing plates (two holes at each wheel - one for each shoe). Use Tool J-4707 or screwdriver inserted through rear (lower shoe) adjusting hole and turn adjusting screw up (move outer end of tool toward center of wheel) until light brake drag is felt on wheel, then back off adjusting screw 3 notches for correct running clearance. Adjust upper shoe similarly by inserting tool through front adjusting hole.

Parking (Hand Brake) Adjustment: Parking brake is independent type mounted on propeller shaft at rear of transmission.

1½ & 2 Ton - Fully release brake lever. Loosen locknut on outer shoe adjusting screw then tighten to secure a clearance of .010" to .015" measured at point directly above screw. Tighten locknut. Loosen locknut on link between hand brake lever and shoe actuating lever. Tighten adjusting nut on link to secure a clearance of .010-.015" between shoe and drum. Tighten locknut.

Tilt Cab Over-Center Lever Adjustment - With lever fully released, turn adjusting knob until cable link pivot is at bottom of guide slot. *Adjust parking brake as detailed above.* Turn lever adjusting knob as required to obtain over-center locking position.

MASTER CYLINDER: Removal & Filling - *See "Chevrolet-Bendix Hydraulic" in this section.*

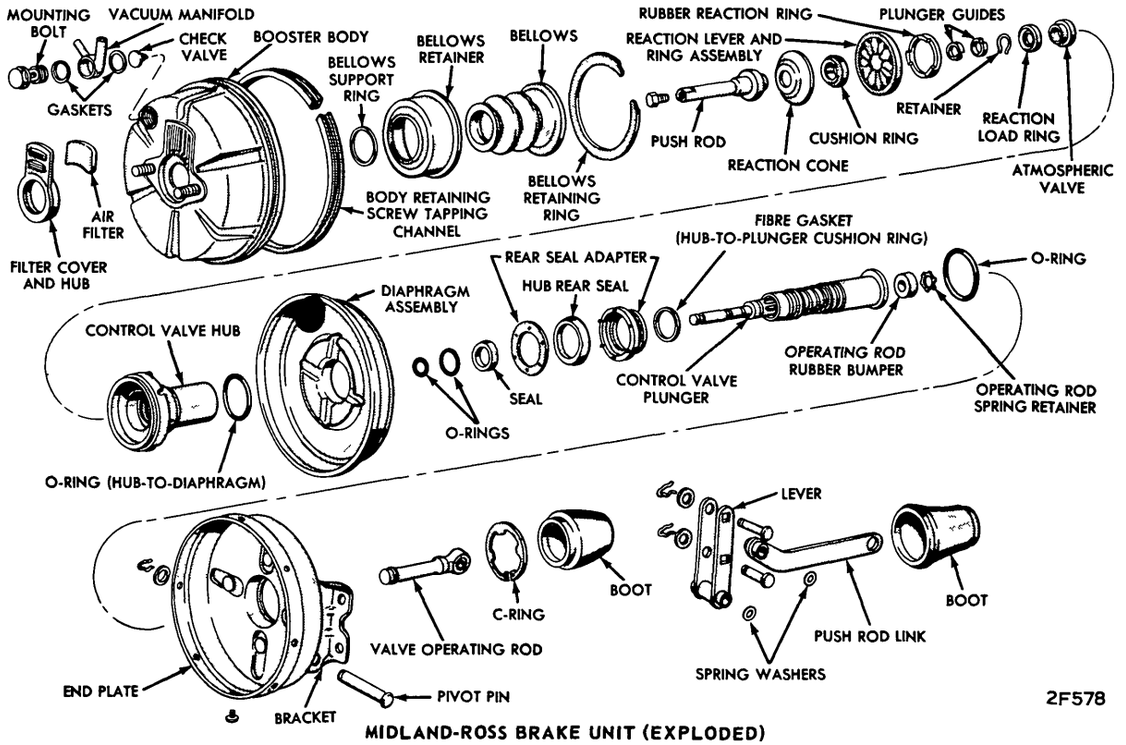
BLEEDING BRAKE SYSTEM: *See 1961 Final Data, Page 314.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

1962 CHEVROLET TRUCK TWINPLEX BRAKE & LINING SPECIFICATIONS

Rear Drum Diameter	Wheel Cyl. Diameter	Master Cyl. Diameter	Lining Thickness	Lining Width	% Braking Power Front	% Braking Power Rear
14.955"	1.5"	1.125"	.375"	4"	Ⓒ30	Ⓒ 70

Ⓒ - C-40 - 29% Front, 71% Rear.



MIDLAND-ROSS BRAKE UNIT (EXPLODED)

BENDIX & MORAINE DUAL PISTON BRAKE MASTER CYLINDERS

Cadillac, All Series (1962)
Rambler, All Series (1962)

►*MASTER CYLINDER APPLICATION NOTE: Either Bendix or Morain units are used on Cadillac models. On Rambler models, Bendix units are used on all models with power brakes and on early models with manual brakes. Morain units are used on later models with manual brakes.*

DESCRIPTION: Dual piston master cylinder assemblies consist of a single cylinder in which two pistons operate in tandem, actuated by a single brake pushrod. Pressure spaces are provided at forward end of each piston with each pressure space having conventional inlet and outlet ports, check valve, and reservoir. Front wheel brakes are actuated by rear master cylinder piston and rear wheel brakes are actuated by front piston, providing two separate brake systems. A failure in one systemdoes not result in failure of both systems. Fluid reservoirs on Moraine units are separated from each other by a full partition that prevents fluid from one reservoir entering the other reservoir. On Bendix units, a baffle separates the two reservoirs and prevents a flow of fluid from one reservoir to the other except when both reservoirs are full. A vented filler plug is provided for each reservoir.

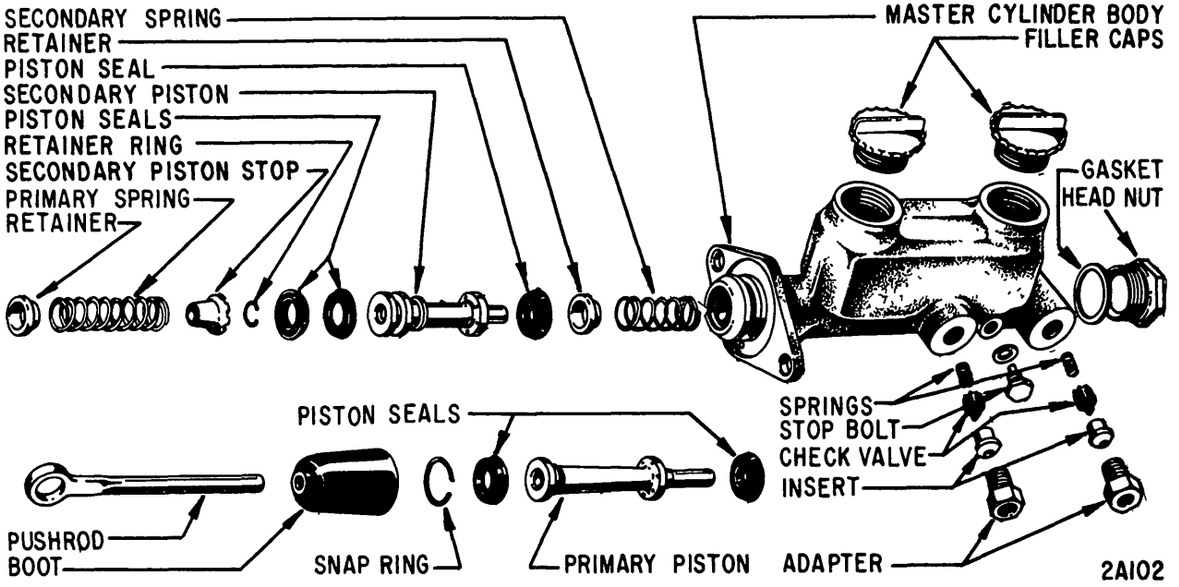
BLEEDING BRAKES: *NOTE - Master cylinder is self-bleeding and requires no bleeder fitting. Make sure car is level or front end is lower than rear.*

Bendix Brake Unit: Remove filler caps and connect bleeder hose to front reservoir. Install a solid (vent plugged) filler cap on rear reservoir. *NOTE - A solid filler cap can be made by plugging vent hole on any filler cap.* Attach drain hose to bleeder fitting on each wheel cylinder, then back fitting off 3/4 turn and bleed brake fluid into a partially filled bottle of clean brake fluid until bubbles stop, then close fitting.

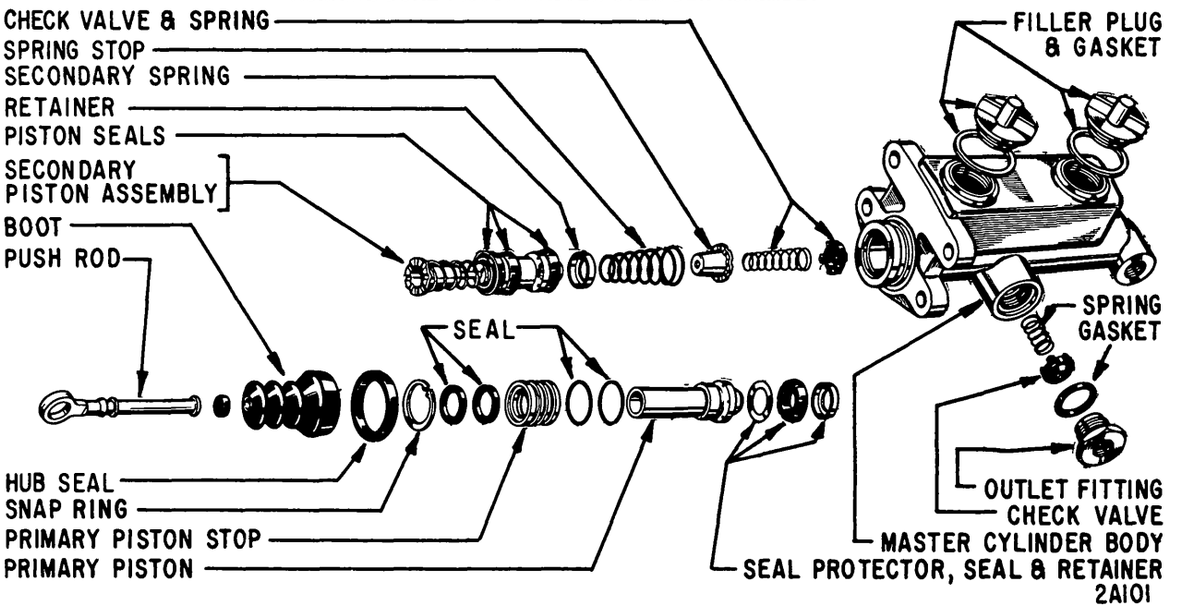
Moraine Brake Unit: Connect bleeder hose to front reservoir, then build up pressure in bleeder. Attach a drain hose to bleeder fitting on each rear wheel cylinder. Back off fitting 3/4 turn and bleed brake fluid into a partially filled bottle of clean brake fluid until bubbles stop, then close fitting. Connect bleeder hose to rear reservoir and repeat procedure for front wheel cylinders.

►*CADILLAC MASTER CYLINDER BLEEDING NOTE:* If brake fluid lines have been disconnected at power brake mastercylinder forremoval of unit, mastercylinder can be bled after installation as follows: Install output lines to master cylinder and tighten nuts snugly, then back off one full turn. Completely fill both reservoirs, then pump brake pedal a minimum of five complete strokes and tighten brake lines at connections. If necessary, add fluid to both reservoirs. *CAUTION - If pedal is too low and spongy, or if some other part of hydraulic system has been disconnected, then entire system must be bled.*

►*CADILLAC SECONDARY PISTON OVERHAUL NOTE & CAUTION:* If secondary piston has been disassembled during overhaul, piston must be assembled and adjusted exactly as follows: Coat piston cups with brake fluid and install cups on spring end of secondary piston with cups back-to-back. Install cup retainer on outer cup. Stand piston on end opposite cups and install spring and spring retainer. Install spring adjusting screw into retainer and start screw into piston. Tighten screw until distance from end of spring retainer to surface that protector washer seats against is 3 35/64". *CAUTION - Spring adjustment must be correct or too much pedal travel before brakes apply (piston covering inlet port) will occur if screw adjust dt far; or piston will cover compensating port in master cylinder if screw not adjusted far enough.*



MORAINE DUAL PISTON MASTER CYLINDER ASSEMBLY



BENDIX DOUBLE SAFETY MASTER CYLINDER ASSEMBLY

CADILLAC & OLDSMOBILE AUTOMATIC ADJUSTER TYPE BRAKES

Cadillac, All Series (1962)
Oldsmobile 88, S88, 98 (1962) ℂ

ℂ - Cars with Power Brakes. *For cars without power brakes, see "Bendix Hydraulic Single Anchor Brakes" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 CADILLAC BRAKE SQUEAK OR MOAN CORRECTION:* When noise occurs as car comes to a stop, probable cause is vibration between brake linings and brake drums. To correct squeak, draw file lining to remove any glaze and install a Shoe Stabilizer Kit, Part No. 5461160, on each front brake. To correct moan, install two Drum-To-Wheel Clip Kits, Part No. 3632110 (Kelsey-Hayes Wheels), No. 3632111 (Motor Wheels).

DESCRIPTION: Hydraulic single anchor type brake (without eccentric) with Bendix type shoes. Brake shoe anchor pins are fixed in backing plate and require no adjustment. Moraine automatic adjusting mechanism consists of a link, actuating lever, pawl, and pawl return spring.

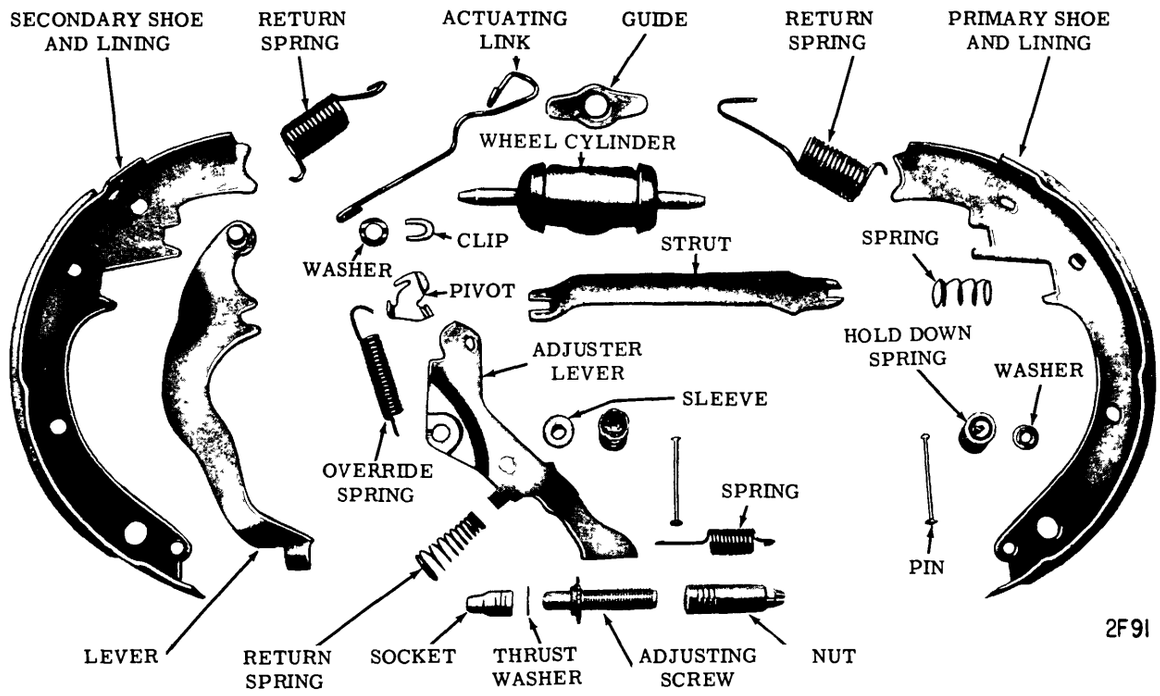
Master Cylinder (Cadillac) - "Split System" type master cylinder used, having a separate piston and fluid chamber for front and rear brakes respectively.

OPERATION (AUTOMATIC ADJUSTER): The adjusters operate only when brakes are applied as car is moving in reverse. As the brake drums move rearward, the wrap around action of the brake shoes forces upper end of primary shoe against anchor pin and the secondary shoe away from anchor pin. The link which holds top of actuating lever stationary, forces actuating lever to pivot on secondary shoe. This pivoting action forces pawl downward against end of a tooth on the star wheel adjusting screw. If lining-to-drum clearances are correct, the downward movement will stop before star wheel is turned. If clearances are too wide, the secondary shoe will move outward and the pawl will move downward far enough to turn star wheel one notch and take up the adjustment.

ADJUSTMENTS: Make adjustments as follows:

Brake Shoe Adjustment (Cadillac): *NOTE - Adjustment should be required only after shoe relining or replacement, or when length of star wheel has been changed.* Remove adjusting hole cover in drum and rotate star wheel to expand shoes until drum can just be rotated forward with a two-foot bar between the wheel mounting studs. Reach through adjusting hole and disengage adjuster pawl from star wheel (use a hooked tool) and back off star wheel **exactly 40 notches**. Drive car forward and backward and apply brakes moderately 5 or 6 times in each direction for final adjustment.

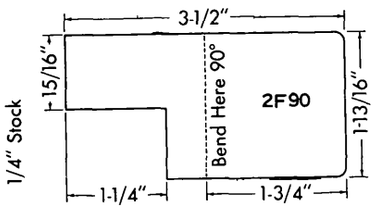
Brake Shoe Adjustment (Oldsmobile): *NOTE - Adjustment should be required only after shoe relining or replacement, or when length of star wheel has been changed.* Remove brake drum and place Brake Shoe Gauge BT-6211 over brake linings (gauge is offset for oversize linings). Rotate adjusting wheel to expand shoes until gauge is a snug fit on linings. Rotate gauge slightly to be sure that gauge contacts linings at largest diameter. Remove gauge. *NOTE - If necessary to back off adjustment, hold adjuster lever away from star wheel.*



AUTOMATIC ADJUSTER BRAKE ASSEMBLY (REAR SHOWN - FRONT SIMILAR)

Parking Brake Adjustment (Cadillac): *TOOL NOTE - Make a gauge tool from ¼" flat steel stock as shown in illustration.* With service brakes properly adjusted, lubricate parking brake linkage and check for free movement of cables in conduit and equalizer. Check rear relay lever spring and replace if necessary. With parking brake mechanism in fully released position, insert 15/16" part of gauge tool in gap between relay lever and end of slot in frame. Adjust intermediate cable at front clevis until gauge is a slip fit. Back off equalizer nut so relay lever can be moved forward to insert 1 13/16" end of gauge into frame slot. *NOTE - must be slack in rear cables when 1 13/16" end of gauge is in place.* Tighten equalizer nut to obtain a near lock-up drag on rear wheels when wheels are turned by hand in forward direction. Remove gauge. Parking brake pedal should now travel 1¾-2¾" with approximately 50 lbs. pressure on pedal.

Parking Brake Adjustment (Oldsmobile): With parking brake lever fully released, tighten equalizer adjusting nut until a heavy drag is felt at rear brakes, then loosen equalizer adjusting nut 10 turns and tighten locknut.



CADILLAC PARKING BRAKE GAUGE TOOL

BRAKE SHOE REPLACEMENT: *Removal - CAUTION - Note position and color of brake assembly springs for reinstallation in exactly the same locations.* Disconnect parking brake cables at rear wheels. Disconnect primary and secondary brake shoe retracting springs, and remove shoe hold-down cups, springs, pins, and sleeve. Remove pawl return spring, pawl and actuating lever. Disengage shoes from wheel cylinder and rotate shoes until link disengages from shoe plate (front), or anchor (rear).

Installation: 1) Install backing plates and torque attaching bolts to specifications listed in table below.

2) Place shoes on backing plate and install connecting spring and star wheel assemblies. *CAUTION - Do not interchange star wheel assembly between sides of car or shoes will retract instead of expand. Right hand threads are for left side of car; left hand threads are for right side of car.* Install parking brake parts on rear brake. Install link actuating lever, pawl spring, pawl, and shoe hold-down springs and other parts. Install retracting springs. Install brake drums. Make wheel bearing, service, and parking brake adjustments.

Brake Torque Specifications (Ft. Lbs.)

Part	Cadillac	Oldsmobil
Front Backing Plate	65	80-130
Anchor Pin (Front)		55-80
Rear Backing Plate	40 ℂ	45-60

ℂ - 70 Ft. Lbs. on Commercial Chassis.

CONTINUED ON NEXT PAGE

CADILLAC & OLDSMOBILE AUTOMATIC ADJUSTER TYPE BRAKES (Cont.)

PARKING BRAKE ASSEMBLY REPLACEMENT (CADILLAC): Disconnect cable at relay lever beneath car. Disconnect hose from vacuum diaphragm. Remove parking brake assembly-to-instrument panel mounting bolts then remove parking brake assembly-to-cowl mounting bolts and move assembly away from cowl. Push brake lever to fully depressed position (to expose clevis), then remove cable from clevis. Remove assembly.

Vacuum Unit Replacement: With parking brake assembly removed (see above), drill out diaphragm retaining rivets (Series 60, 62), straighten diaphragm retaining tangs (Series 75, CC). Disconnect link from manual release lever (retained by rivet on Series 60, 62), and remove diaphragm. When installing, secure diaphragm to parking brake assembly, then connect link and manual release lever.

MASTER CYLINDER: Service as follows:

Cadillac: Removal - Master cylinder is removed during disassembly of power unit.

Filling - Fluid should be within ¾" of top of each filler opening.

1962 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Cadillac							
60, 62	11.995-12.005"	11.995-12.005"	1 3/16"	1"	1"	59	41
75	11.995-12.005"	11.995-12.005"	1 3/16"	1"	1"	59	41
Commercial	11.995-12.005"	11.995-12.005"	1 3/16"	1 1/8"	1"	52.8	47.2
Oldsmobile	11"	11"	1 1/8"	1"	1"	56	44

1962 BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Front - Length - Primary	Front - Length - Secondary	Rear - Length - Primary	Rear - Length - Secondary	Thickness Front	Thickness Rear
Cadillac								
60, 62	2 1/2"	2 1/2"	10.05"	12.98"	10.05"	12.98"	1/4"	1/4"
75	2 1/2"	2 1/2"	12.98"	12.98"	12.98"	12.98"	1/4"	1/4"
Commercial	2 1/2"	2 1/2"	12.98"	12.98"	12.98"	12.98"	1/4"	1/4"
Oldsmobile	2 1/2"	2"	9 3/8"	12 1/32"	9 3/8"	12 1/32"	7/32"	7/32"

Overhaul - *See "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.*

Oldsmobile: Removal - Master cylinder is removed during disassembly of power unit.

Filling - Fluid should be ¼" below reservoir opening.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: Cadillac - *See "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.*

Oldsmobile: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CHEVROLET-BENDIX HYDRAULIC BRAKES

Chevrolet Pass. Cars (1962)
Chevy II (1962)
Corvair Cars & Trucks (1962)
Corvette (1962)
Chevrolet Trucks, Series 10,20,30 (1962) Front & Rear
Chevrolet Trucks, Series 40,50,60 (1962) Front Only Ⓒ

Ⓒ - *For Rear Brakes, see "Chevrolet Truck Twinplex" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*PASS. CAR & HALF-TON BRAKE SHOE GRINDING CAUTION:* If bench grinder used, grind shoes to .057-.087" smaller than drum size. If spindle grinder used, grind shoe to drum diameter.

►*BRAKE DRUM REPLACEMENT CAUTION:* Use suitable volatile non-toxic greaseless type solvent to clean oil from braking surface of drum before drum is installed.

►*METALLIC BRAKE LINING CAUTION:* This special purpose optional type lining may be used with the old standard drums provided surface of drum is smooth. Service adjustments are the same as for standard brakes except as noted in data below.

►*BRAKE SHOE ANCHOR PIN INSTALLATION CAUTION:* Tighten brake shoe anchor pins to torque indicated in table below.

Anchor Pin Tightening Torque

Car Model	Ft. Lbs.
Chevrolet Pass. Car	65
Chevy II	60-90 (Front), 90-130 (Rear)
Corvair	60-85 (Front), Ⓒ 100-125 (Rear)
Truck, Series 10 (Front & Rear)	100-125
Truck, Series 20, 30 (Front & Rear)	150-175
Truck, Series 40, 50, 60 (Front)	150-175

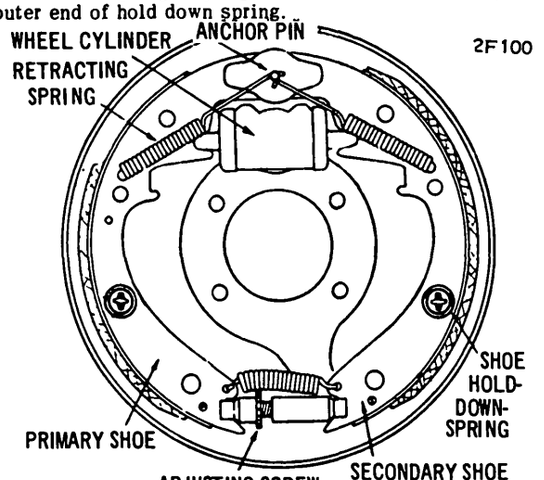
Ⓒ - Anchor pin is fixed on Corvair Truck Rear Brake.

DESCRIPTION: Duo-Servo, single anchor, hydraulic type without eccentric adjustment.

►*METALLIC LINING SERVICE NOTES:* When servicing the special purpose optional type lining it is important that the items below are followed:

Pull Back Spring Installation - Heat resistant type springs used as follows; PINK' pull back springs must be used with front primary shoes and both rear shoes. YELLOW pull back springs must be used with front secondary shoes. Use GREEN hold down springs on all eight shoes. Paint on the springs will become blistered and burnt in operation but does **not** indicate that springs have been excessively hot.

Hold Down Spring Cup Installation - Install large hold down spring cup against web and small cup at outer end of hold down spring.



FRONT BRAKE ASSEMBLY

Drum Replacement - Blue heat discoloration is normal and drum should not be replaced if surface of drum is smooth.

Seating New Lining - After brakes properly adjusted, make six to eight stops from 30 MPH with moderate pedal pressure (aids seating and eliminates tendency to dive). Now make six to eight complete stops from maximum legal highway speed at approximately 1 mile intervals. Readjust brakes if necessary.

ADJUSTMENT: Make adjustments as follows:

Brake Pedal Adjustment: Before adjustments made, make sure pedal returns to fully released position freely, with no binding, and that pedal retracting spring (if used) has not lost its tension.

Chevrolet Pass. Cars, Chevy II, Corvair Cars - 1/8-3/8" (Chevrolet), 1/16-1/4" (Chevy II & Corvair) pedal movement before contact of pushrod and master cylinder piston. To adjust, loosen check nut on brake pedal pushrod and turn pushrod as necessary. Tighten check nut.

Corvair Trucks – With projection on head of pushrod pivot bolt toward front of truck, rotate bolt in either direction until 1/8" brake lever freeplay is obtained. Measure freeplay at bottom of pedal post underneath truck.

Trucks (With Eccentric Bolt Type Adjustment) - Rotate eccentric bolt (located at point master cylinder pushrod connects to brake pedal) to obtain a free pedal travel of 1/8" measured at center of pedal pad. *NOTE - Stop light switch should be adjusted to make electrical contact at approximately 13/16" pedal travel.*

Trucks (With Threaded Rod Type Adjustment) - Adjust pushrod so that pedal free travel measured at center of pedal pad is 1/8". *NOTE - Stop light switch should be adjusted to make electrical contact at approximately 13/16" pedal travel.*

CONTINUED ON NEXT PAGE

CHEVROLET-BENDIX HYDRAULIC BRAKES (Cont.)

Minor Adjustment (Front Wheels): Jack all wheels clear of floor. On passenger cars, loosen check nut at brake cable equalizer to remove tension from brake cable. On trucks, disassemble clevis of parking brake pull rod. On all cars and trucks, remove adjusting hole covers from flange plates. Expand brake shoes by turning adjusting screw with Tool J-4707 or J-9485 until a light uniform drag is felt on brake drum (move outer end of tool toward center of wheel to expand shoes). Now turn adjusting screw in opposite direction specified number of notches as listed in table below to relieve brake drag. Replace adjusting hole covers, reconnect and adjust parking brake.

Brake Shoe Adjustment Specifications

Car Model ①	Notches
Chevrolet Pass. Cars	12
Chevy II	12
Corvair (All Models)	12
½-Ton Truck	12
Other Trucks	7

① - Specifications apply to both conventional and sintered iron segmented lining.

►*MAJOR ADJUSTMENT NOTE: All brakes have "fixed" anchor pins and major brake adjustments are not required.*

HAND (PARKING) BRAKE: Passenger Cars and ½ & ¾ Ton Trucks adjusted differently. 1, 1½, 2 and some ¾ Ton Trucks have propeller shaft mounted parking brakes. *CAUTION* - Service brakes must be properly adjusted before making parking brake adjustment.

Adjustment (Chevrolet Pass. Cars): *NOTE - A spring loaded pedal return and a ratcheting mechanism to permit a second stroke of pedal, if necessary, is used. Parking brake application is assured even if rear service brakes are out of adjustment. Pedal returns to normal position after each stroke and will not indicate brake application. When parking brake is applied, the release handle will "pop out" about 2", indicating that brakes are applied. If more than two strokes are required to set brakes, check both service and parking brake adjustment.* Raise rear wheels and check location of idler lever with respect to swivel rod bracket on frame for correct front cable adjustment. To adjust front cable, disconnect equalizer and adjust check nuts on forward cable for correct clearance (clearance will be correct even after long periods of service). Depress parking brake pedal 6 notches from fully released position (release lever fully out) and adjust equalizer adjusting nuts for slight drag on both rear wheels. Tighten check nuts and release parking brake. No drag should be felt.

Adjustment (Chevy II): With parking brake lever pulled up 1 notch from fully released position, loosen equalizer forward check nut and tighten rear nut for a moderate drag on rear wheels. Tighten check nuts and release the lever. Wheel should rotate without drag.

Adjustment (Corvair): Raise rear of car and pull parking brake lever up 4 notches from fully released position. Loosen forward check nut on equalizer and tighten the rear one until a heavy drag is felt at rear wheels. Tighten check nuts securely. Fully release parking brake and rotate rear wheels; no drag should be felt.

Adjustment (Corvette): Pull hand brake out 7 clicks of pawl (not notches). Loosen check nuts on cable ends, then turn forward check nuts against clevis plates until a moderate drag is felt when rotating brake drums. Tighten check nuts and set parking brake lever to 2 notches from full released position. No drag should be felt.

Adjustment (Trucks Without Propeller Shaft Parking Brake): With service brakes properly adjusted, raise rear wheels and apply parking brake lever 4 notches from a fully released position. Loosen jam nut on threaded rod at end of forward cable. *NOTE - If threaded rod length is insufficient to obtain adjustment, move primary lever to next supplemental adjusting hole toward rear of truck.* Tighten rear nut on threaded rod until a light drag is felt at rear wheels, then tighten jam nut and lower truck to floor.

Adjustment (¾ & 1 Ton Trucks using propeller shaft mounted parking brakes): Adjust clevis on brake pull rod so distance from end of rod to center line of clevis pin hole is 1 7/16". Place the hand brake lever in fully released notch of ratchet sector. Loosen locknut on brake pull rod. Remove cotter pin from clevis pin holding brake rod to brake cam (leave loose). Set brake cam rest flat on upper brake band bracket. Back off adjusting nuts (at lower end of spring) and adjusting nut at top of adjusting bolt (bolt joins lower part of band to bracket). (*CAUTION* - Do not remove nuts, loosen only). Remove lock wire from anchor screw. Adjust anchor screw until there is .010-.015" clearance between lining and drum at anchor screw. Tighten adjusting bolt (bolt without spring) until there is .020" clearance between drum and lower end of brake band. Tighten locknut. Tighten adjusting nut at lower end of spring until there is .020" clearance between drum and upper end of brake band. Tighten locknut. Adjust brake pull rod so clevis pin can be installed while brake cam rests flat on upper brake band bracket. Install cotter pin in clevis pin of brake pull rod and tighten locknut on brake pull rod. Install lock wire on anchor screw. Recheck all points of facing for correct clearances.

Adjustment (1½ & 2 Ton Trucks): Propeller shaft mounted, shoe type. *See "Chevrolet Twinplex" for data.*

MASTER CYLINDER: Removal (Chevrolet Pass. Cars, Corvair Cars, Chevy II) - Disconnect hydraulic line and remove master cylinder attaching bolts. Remove master cylinder.

Filling (All Models): Fluid should be within ¼" of reservoir rim.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

1962 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Chevrolet	11"	11"	1.1875"	1"	1"	58.5	41.5
Chevy II	9"	9"	1"	.875"	1"	56.7	43.3
Corvette	11"	11"	1.1875"	1"	1"	58.5	41.5
Corvair Cars	9"	9"	.875"	.9375"	1"	46.0	54.0
Corvair Trucks	10.995"	10.995"	1.125"	1"	1"	56.0	44.0
Truck Series 10	10.995"	11"	1.125"	1.125"	1.125"	56.0	44.0
Truck Series 20	① 11.105"	① 11.152"	1.125"	1.125"	1.125"	②	②
Truck Series 30	① 11.105"	③ 12.958"	1.125"	④ 1.125"	1.125"	⑤ 48.0	⑤ 52.0
Truck Series 40	11.105"		1"		1.125"	29.0	71.0
Truck Series 50,60	13.955"		.875"		1.125"	30.0	70.0

① - 11.955" on P Series. ② - 49% Front, 51% Rear on C Series; 50% Front on P Series.
③ - 12.955" on P Series. ④ - 1.25" on P Series. ⑤ - 41% Front, 59% Rear on C Series.

1962 BRAKE LINING SPECIFICATIONS (CONVENTIONAL TYPE)

Car Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickness
Chevrolet	2.75"	2"	9.30"	11.70"	9.30"	11.70"	.168"
Chevy II	2.25"	1.75"	8.62"	9.40"	8.62"	9.40"	.160"
Corvette	2"	1.75"	9.29"	11.69"	9.29"	11.69"	.168"
Corvair Cars	1.75"	1.75"	8.62"	9.40"	8.62"	9.40"	.160"
Corvair Trucks	2"	2"	9.30"	11.70"	9.30"	11.70"	②
Truck Series 10	2"	2"					.165"
Truck Series 20	① 2"	① 2"					.249"
Truck Series 30	① 2"	2.5"					③
Truck Series 40	2.75"						.249"
Truck Series 50,60	2.50"						.250"

① - 2.75" on C Series. ② - .168" Primary, .164" Secondary. ③ - .249" Front Wheel, .252" Rear Wheel.

1962 BRAKE LINING SPECIFICATIONS (SEGMENT TYPE)

Car Model	Width Front	Width Rear	Length All Shoes	Thickness Front	Thickness Rear
Chevrolet	1.37"	1.00"	①	.210"	.330"
Chevy II	1.12"	.875"	1.64"	.210"	.330"
Corvette	1.00"	.875"	2.00"	.175"	.295"
Corvair Cars	.875"	.875"	1.64"	.210"	.330"

① - 1.64" Primary Shoe, 2.00" Secondary Shoe.

CHRYSLER, IMPERIAL, DODGE "THREE PLATFORM" TOTAL CONTACT HYDRAULIC TYPE

Chrysler (1962)
Imperial (1962)
Dodge Custom 880 (1962) ©

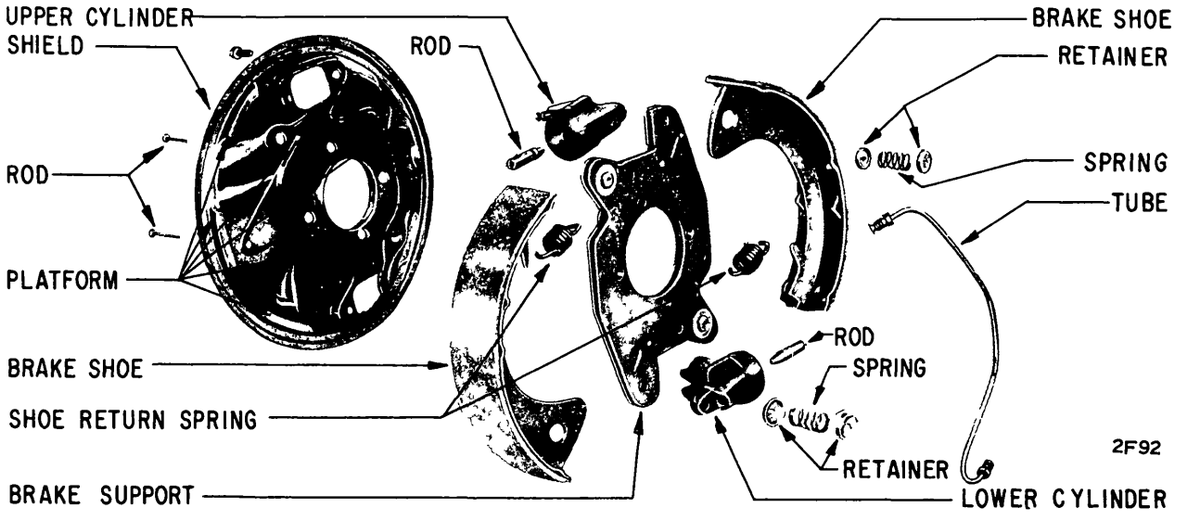
©-For other Dodge and Dodge Dart Models, *see "Bendix Automatic Adjuster Hydraulic Brakes" in this section.*

►*HEAVY DUTY LINING NOTE:* Heavy duty lining is available for use on Police, Ambulance, High Performance, and other heavy duty vehicles for increased lining life and to prevent brake fade.

►*BRAKE LINING REPLACEMENT CAUTION:* Use only a lining set with same color identification as used on opposite wheel.

►*REAR WHEEL REMOVAL CAUTION:* **Do not apply service brake to hold shoes against drum while using wheel puller.** To hold hub and drum from turning while using wheel puller, back off brake shoes from drum with adjusting cams. Apply hand brake and allow one rear wheel to remain on floor, or block wheel in suitable manner.

DESCRIPTION: These hydraulic brakes have three raised platforms (for each shoe) pressed into dust shield and three contact loops on each brake shoe so that shoe will ride on the platforms. An additional loop in brake shoe is for the attachment of return spring. The platforms act as guides to maintain proper shoe alignment and to reduce vibration and noise. Return spring is hooked in center of brake shoe eliminating need for flat guide springs. On front wheel brakes, two single piston cylinders (single action) are attached to support plate assembly, the upper cylinder actuating the front shoe and the lower cylinder actuating the rear shoe. On rear wheel brakes one double piston cylinder (double action) is attached to top of support plate assembly and actuates both brake shoes. An anchor pin in support plate assembly holds spring link in fixed position at one end. The other end of link is positioned by brake shoe adjusting cam, providing constant-loaded spring length. Side rattle and twisting of shoe is controlled by shoe retainer spring which maintains a constant pressure against platforms.



THREE PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - FRONT WHEELS

ADJUSTMENTS: Place car on stands, so that all four wheels are free. Check master cylinder and see that fluid level is not over ½" below top of cylinder. Place parking brake lever in fully released position.

Brake Pedal Adjustment: Not required. Pedal freeplay controlled by stop in master cylinder.

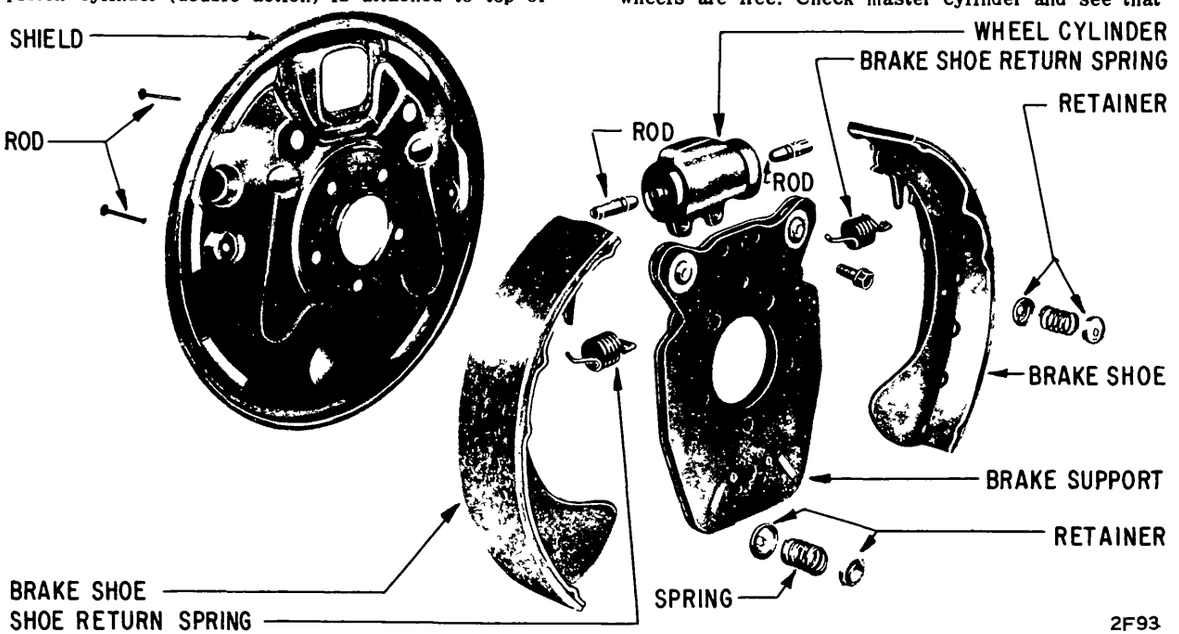
Front Wheel Adjustment: Turn each adjusting cam on both front shoes in the direction of FORWARD wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

Rear Wheel Adjustment: Turn front shoe adjusting cam in direction of **forward** wheel rotation and rear shoe adjusting cam in direction of **reverse** wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

►*RELINED OR NEW SHOE ADJUSTMENT NOTE:* Apply brake pedal prior to adjusting brakes to properly center shoes in brake drum and to assist in adjustment.

Hand Brake Adjustment (External Type): *NOTE - Free play between brake anchor bracket and brake anchor must not exceed .005" or brake band distortion will result.* With parking brake pedal and lever in fully released position, adjust anchor bolt for .015-.020" clearance between lining and drum, then install locking wire through anchor screw. *NOTE - Do not draw locking wire tight or brake band position may be distorted.* Adjust guide screw for slight drag on bottom half of brake band. Tighten adjusting nut for only a slight drag from top half of brake band. Apply parking brake several times and test for excessive drag when released.

Hand Brake Adjustment (Internal Type): With adjusting screw cover plate removed, turn adjusting nut until slight drag is felt on drum, then back off adjusting nut at least one full notch or until drum is free. *NOTE - Two raised shoulders on adjusting nut must be seated*



THREE PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - REAR WHEELS

CONTINUED ON NEXT PAGE

CHRYSLER, IMPERIAL, DODGE "THREE PLATFORM" TOTAL CONTACT HYDRAULIC TYPE (C nt.)

in groove n adjusting sle ve. If brake pedal depresses more than 3½" from fully released position, readjust the brake.

BLEEDING BRAKE SYSTEM: Use compressed air refiller, Tool C-3496 attached to master cylinder to keep master cylinder filled. Back off adjusting cams all the way, then starting with right rear wheel cylinder, attach bleeder hose, Tool C-650 to valve, with other end in jar partially filled with brake fluid. Bleed intermittently, opening and closing valve (at wheel cylinder) until fluid runs out of bleeder hose in a solid stream without bubbles. Repeat this operation on left rear wheel, right front wheel and finally left front wheel. At front wheels (with two cylinders), bleed lower cylinder first to force air out of connecting line to upper cylinder, then bleed upper cylinder. Repeat bleeding operation if brake action indicates air still in lines. Readjust cams after completing bleeding operation.

BRAKE SHOE REPLACEMENT: Removal - 1) Remove wheel, hub and drum assembly using puller C-845 to remove drum assembly.

2) Insert wrench C-3462, in the inner support plate hole, with tool cam slot engaging the spring hook. Turn tool handle to disengage spring from spring link, and turn handle in opposite direction to release the spring. Remove both springs in this manner. *CAUTION* - Do not use brake spring pliers or damage to lining will result.

3) Turn brake shoe guide spring retainer 1/4 turn and remove (the lip on end of spring is for correct positioning on outer support assembly). Slide shoes from support assembly.

Installation: Position brake shoe in support plate and make sure wheel cylinder pushrods properly engage toe end of shoes and that shoes are in alignment. Check tension of shoe return springs by hooking a scale at toe of shoe and pulling in direction of piston movement. Scale should read 45-55 ft. lbs. (11" brakes) at instant toe of shoe moves. *NOTE - On 12" brakes, torque specifications are 15% greater.* Install guide rod and retainers (lip of guide rod must be properly positioned in spring retainer).

LINING REPLACEMENT: Drum diameter should not exceed .004" out of round at any point. Grind lining to specified clearance of .010"-.024" below drum diameter.

►*BRAKE BACKING PLATE & BRAKE SHOE LOOP NOTE:* Platforms for each shoe must be uniform in height and flatness (use surface gauge to check) and mating loops on brake shoes must be uniform and smooth. Replace backing plate when platform heights vary more than .010".

WHEEL CYLINDER & SUPPORT PLATE: Removal & Disassembly - 1) Disconnect flexible brake hose at wheel cylinder (upper cylinder on front), and remove wheel cylinder mounting screws and lockwashers at rear of brake shield.

2) Remove support plate mounting bolts and remove support plate with wheel cylinders and connector tube attached.

3) With assembly on bench, remove cylinder connector tube and wheel cylinders.

Assembly & Installati n: 1) Assemble wheel cylinders on support plate (Install connector tube on front assembly).

2) Position support plate on brake shield and install cylinder mounting screws and lockwashers, but do not tighten.

3) Install support plate bolts, lockwashers and nuts. Tighten to 35 ft. lbs. and cylinder mounting screws to 20 ft. lbs.

WHEEL CYLINDER OVERHAUL: Wheel cylinder pistons that are badly scored or corroded should be replaced. Use new piston cups when reconditioning cylinders. Cylinder walls that have light scratches, or show signs of corrosion, can usually be cleaned up with crocus cloth. Cylinders that have deep scratches or scoring, may be honed using Tool C-3080. Diameter of cylinder bore should not be increased more than .002". If a cylinder does not clean up at .002" it should be replaced (*NOTE* - Black stains on cylinder walls are caused by piston cups and will do no harm).

MASTER CYLINDER: Removal - Disconnect pushrod, brake tube, and remove attaching bolts. Remove master cylinder.

Filling - Fluid should be even with top edge of filler opening.

TROUBLE SHOOTING: *See "Hydraulic Brak Troubl Shooting" in Brake Section f Manual.*

1962 BRAKE SIZE APPLICATION

Car Model	Brake Size
Chrysler Newport (Except Station Wagon)	11"
All Other Chrysler Models	12"
Imperial	12"
Dodge Custom 880 (Except Station Wagon)	11"
Dodge Custom 880 Station Wagon	12"

1962 PARKING BRAKE SPECIFICATIONS

Drum Diameter	Width	Lining Length	Thickness
7" ①	2"		5/32"
7" ②	2"	③ 6.53"	5/32"

① - External Contracting type.
② - Internal Expanding type. ③ - Each Shoe.

1962 BRAKE LINING SPECIFICATIONS

Brake Size	Lining Width Front	Lining Width Rear	Lining Length All Sho s	Lining Thickn ss
11"	2½"	2½"	11.52"	11/64"
12"	2½"	2½"	12.60"	11/64"

1962 HYDRAULIC BRAKE SPECIFICATIONS

Brake Size	Drum Diameter	Wheel Cyl. Diam.	Master Cyl. Diam.	% Braking Power
11"	11"	1 1/8"	1 1/8"	60% Front
12"	12"	1 1/8"	1 1/8"	60% Front

BENDIX HYDRAULIC SINGLE ANCHOR

Buick (1962)
Buick Special (1962)
Lancer (1962) ①
Oldsmobile (1962) ②
Oldsmobile F-85 (1962)
Pontiac (1962)
Pontiac Tempest (1962)
Valiant (1962) ①
Willys FC-170 (1962) ③

① - Bendix Automatic Adjuster type may be used. *See "Bendix Automatic Adjuster Hydraulic Brakes" in this secti n.*
② - Cars Without Power Brakes. *For cars with pow r brak s, see "Cadillac & Oldsmobil (B ndix-Morain) Aut matic Adjuster Brak s" in this section.*
③ - With Dual Rear Wheels.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 LANCER & VALIANT PARKING BRAKE LACK OF ADJUSTMENT AT ADJUSTING SCREW CORRECTION:* Caused by cable conduit wires slipping in cable end fittings resulting in insufficient screw threads at equalizer yoke. To correct, install 1" tubular metal spacer or stack of washers between equalizer yoke and adjusting nut.

►*1962 LANCER & VALIANT SLOW BRAKE PEDAL RETURN, PEDAL BUILD-UP, OR ERRATIC STOP-LIGHT SWITCH OPERATION CORRECTION:* May be caused by burrs on pedal bracket, pedal pivot nylon bushings broken, pedal bracket mounting holes misaligned, or oversize pedal-to-pushrod cross bolts. To correct, remove burrs, replace bushings, and make other corrections to remove bind as necessary. *CAUTION - When grinding or polishing parts, d n t r m v any more metal than necessary.*

►*1962 TEMPEST PARKING BRAKE CABLE FREEZING CORRECTION:* May be caused by water entering seal at rear cable housing and freezing. To correct, dry seal, inside of cable housing and cable, and pack inside of seal with light grease or chassis lubricant.

DESCRIPTION: Single anchor, without eccentric, hydraulic type of same design used previously. Fixed anchor pins are used on all models except Pontiac Front Wheels. Fixed anchor pins are not adjustable

ADJUSTMENTS: Before attempting any adjustments, car should be placed on stands with all wheels free. Brake pedal should operate freely and there should be no bind in brake lever or cables.

CONTINUED ON NEXT PAGE

BENDIX HYDRAULIC SINGLE ANCHOR (C ntinu d)

Brak P dal Adjustm nt: This adjustment should conform with recommendations before any other adjustment.

Buick & Buick Sp cial - *NOTE - Brake pedal height cannot b adjusted on ither manual or power brake cars.* A non-adjustable pushrod connects directly to brake pedal. External brake pedal return spring is not used and pedal return depends entirely on a spring within the cylinder. Make sure pedal returns completely when released slowly. If pedal does not return freely, check all pivot points for binding or lack of lubrication.

Lanc r - No adjustment provided. Freeplay controlled by stop built into master cylinder.

Oldsm bil - Two adjustments required. **Pedal Height** - Measurement should be as listed below. To adjust, loosen locknut and adjust stopscrew located on underside of brake pedal support. **Pedal Freeplay** - Push master cylinder pushrod until it contacts hydraulic piston, then turn pushrod until clevis pin can freely be installed into brake pedal. Shorten pushrod one full turn for proper freeplay. Tighten locknut and connect pushrod to brake pedal. *NOTE - If pedal height is chang d, adjust st p light switch.*

P dal H ight - 8"±1/8" from top of brake pedal pad to floor pan (carpet turned back).

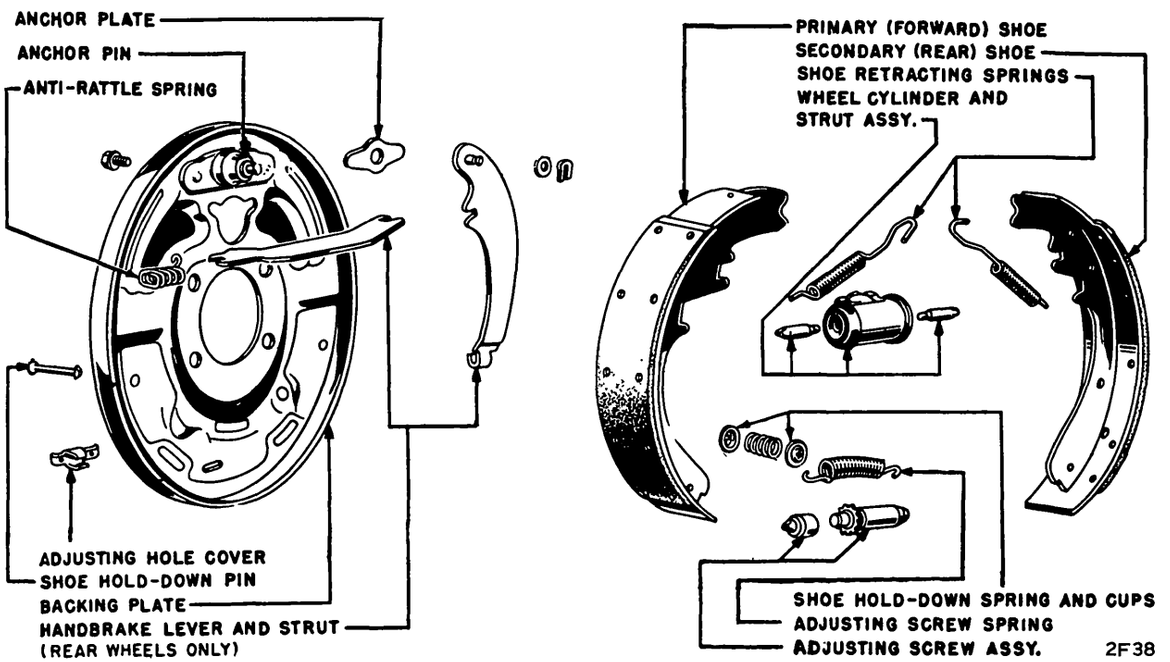
Oldsm bil F-85 - Two adjustments required. **Pedal Height** - This measurement should be 6½"±1/8" from top of brake pedal pad to floor pan (carpet turned back). To adjust, loosen locknut and adjust stop bracket on underside of brake pedal bracket. **Pedal Freeplay** - Freeplay should be 3/16". To adjust, *see "Oldsmobile" abov .*

P ntiac & Pontiac T mpest - Adjust pedal stop bracket to provide 6-6¼" (Pontiac), 4½" (Tempest) pedal pad to floor mat. When pedal height changed, adjust stop light switch. *CAUTION* - Do not lower pedal more than specifications.

Valiant - No adjustment provided. Freeplay controlled by stop built into master cylinder.

Willys - Pedal freeplay should be at least ½". Adjust by rotating pushrod eccentric bolt. *CAUTION - Comp nsating port in mast r cylinder should be wide open when pedal is in fully rel ased position.*

Minor W ar Adjustm nt: Check and adjust brake pedal clearance (see Brake Pedal Adjustment), release hand brake lever, and see that cables are free and are not holding brake shoes against drum. At each wheel, expand brake shoes by turning adjusting screw up until wheel can just be turned by hand, adjust hand brake (cars where hand brake adjusted with shoes "expanded", see Hand Brake Adjustment), then back off adjusting screw the number of notches or "clicks" as shown in table below. Check wheel for freedom of drag. If drag noted, tap backing plate to assist centralization of shoes, then recheck. If drag still exists, anchor pin adjustment may be in order. See Major adjustment.



BENDIX HYDRAULIC SINGLE ANCHOR BRAKE ASSEMBLY

Major Adjustment (Cars with Adjustable Type Anchor Pins): *NOTE - Major adjustment not required on cars with fixed anchor pins.* Make this adjustment when new or relined shoes are installed or when minor adjustment is not satisfactory. Jack up all four wheels, loosen or disconnect parking brake cables at equalizer or intermediate lever, then remove adjusting hole covers on backing plate and inspection hole covers on drum (remove wheels for access). Check pedal clearance (see Brake Pedal Adjustment). Adjust each wheel brake as specified by car manufacturer (see below). *NOTE - If hand brake cables not disconnected or loosened, shoes may be held in on position by cabl .*

Pontiac (Front Wheels) - *NOTE - Pontiac rear wheels do not require a major adjustment as the anchors are "fixed" to backing plate.* Insert a .015" feeler gauge between lining and drum 1½" from adjusting screw end of secondary (rear) lining and expand shoes with adjusting screw until feeler gauge cannot be withdrawn. Back off adjusting screw until only a slight drag is felt on feeler gauge. *NOTE - This insures that sho s are against anchor pin and primary shoe is against drum.* Withdraw feeler gauge and insert it between lining and drum about 1½" from anchor pin end of secondary lining. This should give a slightly heavier drag (than near the adjustment screw). Adjust anchor pin to provide adjustment. Tighten anchor pin locknut to 60-90 ft. lbs. Complete adjustment as shown in minor adjustment above, and hand brake adjustment below.

Adjusting Screw Setting

Car Model	Setting
Buick & Buick Special	15 Notches
Lancer	10-12 Notches
Oldsmobile	16 Notches
Oldsmobile F-85	15 Notches
Pontiac	12 Notches
Pontiac Tempest	10 Notches (Front), 12 Notches (Rear)
Valiant	10-12 Notches
Willys	Until Free

1962 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam Front	Wheel Cyl. Diam Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Buick	① 12"	① 12"	1 1/8"	1"	1"	56	44
Buick Special	② 9 1/2"	② 9 1/2"	1"	7/8"	1"	57	43
Lancer	9"	9"	1"	13/16"	1"	60	40
Oldsmobile	11"	11"	1 1/8"	1"	1"	56	44
Oldsmobile F-85	9 1/2"	9 1/2"	1"	7/8"	③ 1"	57	43
Pontiac	11"	11"	1 3/16"	1"	1"	58.5	41.5
Pontiac Tempest	9"	9"	1 1/16"	15/16"	1"	56.3	43.7
Valiant	9"	9"	1"	13/16"	1"	60	40
Willys	12"	13"	1 1/8"	1 1/4"	1 1/8"	50	50

① - 11.997-12.007". Maximum rebore limit 12.080". ② - 9.495-9.505". Maximum rebore limit 9.565".
③ - 1 1/8" on cars with Power Brakes.

CONTINUED ON NEXT PAGE

BENDIX HYDRAULIC SINGLE ANCHOR (C ntinu d)

Hand (Parking) Brake Adjustment: *CAUTION - Brake shoes must be expanded on some cars when adjusting hand brake cables.* Adjust each car as follows:

Buick – *NOTE – Make Parking Brake Adjustment whenever cables disconnected, or if cables are stretched, or whenever service brake pedal has good reserve but parking brake pedal depresses more than 8 ratchet clicks.* Make Minor Adjustment (see above). With parking brake assembly fully released, there should be 3/8" distance from rear face of parking brake idler lever to end of its slot in the frame. Adjust front cable clevis to correct. Depress parking brake pedal **exactly 2 ratchet clicks.** Tighten rear cable adjusting nut to obtain a heavy two–hand drag at rear wheels. Release parking brake lever and check rear wheels for free rotation in either direction.

Buick Special - Make "Minor Wear Adjustment" above. Pull out parking brake lever exactly 8 ratchet clicks. Hold threaded end of intermediate parking brake cable (to prevent twisting of cable) and tighten adjusting nut until left rear wheel can just be turned backward using both hands. Release parking brake lever and pull out exactly 3 ratchet clicks. Both rear wheels must turn freely in either direction.

Lancer - Loosen parking brake cables and make "Minor Wear Adjustment" (see above). Loosen cable adjusting and lock nuts and adjust length of front cable for 1/8" slack or freeplay. Tighten locknut and check brake pedal and release handle for free operation.

Oldsmobile (1961-62) - Release parking brake and make "Minor Wear Adjustment" above if brake pedal total travel is less than 1 3/4" (1961 Power Brakes), 4" (All Standard Brakes). Adjust rear cables by first tightening equalizer adjusting nut until a heavy drag is felt at rear wheels, then loosen equalizer adjusting nut 10 turns and tighten locknut.

Oldsmobile F-85 - Make "Minor Wear. Adjustment" above if total service brake pedal travel exceeds 4". Adjust rear cables by first tightening equalizer adjusting nut until a heavy drag is felt at rear brakes, then loosen equalizer adjusting nut 9 turns and tighten locknut.

Pontiac - Apply hand brake at first notch and check equalization. Loosen adjusting screw of tightest brake if not equal. If more than a few notches are required, loosen clamp screws on spreader and pull downward on the tight side of cable. This should equalize cable. Tighten spreader clamp screws while parking brake lever is still in applied position. When lever fully released, wheels should turn freely with cable pulled down by gripping cable midway between conduit and and guide on frame. When adjusting rear end of front cable for close adjustment for tension, be sure to turn clevis on or off cable end but do not twist cable. Coarse adjustment is secured by selecting the correct hole in spreader.

P ntiac T mp st - Make "Minor Wear Adjustment" above. Parking brake cable is properly adjusted when a 30 lb. pull downward on cable 49" from front of torque tube places cable 2¼" below bottom of torque tube (parking brake lever fully released). Adjust cable at equalizer for proper tension, then tighten locknut to 5-10 ft. lbs. Make sure cable slides freely in equalizer and that rear wheels turn freely without drag.

Valiant - *Procedure is same as for Lancer (above).*

Willys (Transmission Mounted Type) - Release fully the parking brake handle. Make sure cable and linkage do not bind. Rotate drum so a pair of access holes in drum expose shoe adjusting screw wheels in brake. Rotate adjusting wheels until shoes are snug against drum then back off each wheel 7 notches for proper clearance.

MASTER CYLINDER REMOVAL & FILLING: *NOTE - Procedures below apply for standard brakes. For removal with Power Unit, see Power Brake Unit pages in this section.*

Buick - Remove connector from stop light switch and disconnect brake pipe from master cylinder. Remove locknut, shoulder bolt, and spring washer connecting brake pedal to master cylinder pushrod. Remove master cylinder-to-dash panel bolts and remove master cylinder.

Filling - Fluid should be 1/8" below lip of filler opening.

Buick Special - Remove stop light switch connector and disconnect brake pipe from master cylinder. Remove retainer pin, washer, and clevis pin holding brake pedal to master cylinder pushrod. Remove master cylinder-to-dash panel bolts and remove master cylinder.

Filling - Fluid should be 1/8" below lip of filler opening.

Lancer - Disconnect master cylinder pushrod from brake pedal and disconnect brake line from master cylinder. Remove master cylinder attaching bolts and remove master cylinder.

Filling - Fluid should be even with top edge of master cylinder.

Oldsm bile - Disconnect brake pipe from master cylinder. On Synchro-mesh cars, install gauge pin in frame side rail holes to hold clutch linkage in position and disconnect clutch linkage from clutch pedal bellcrank and remove bellcrank. Remove master cylinder attaching nuts and remove cylinder.

Filling - Fluid should be ¼" below bottom of filler opening.

Oldsmobile F-85 - Disconnect brake pipe from master cylinder, remove attaching nuts and remove cylinder. *NOTE* - Unnecessary to disconnect pushrod and clevis.

Filling - Fluid should be ½" below filler cap.

Pontiac & Pontiac Tempest - Disconnect brake pedal return spring. Disconnect master cylinder pushrod from brake pedal by removing cotter pin and clevis pin from clevis. Disconnect brake pipe from master cylinder, remove master cylinder-to-cowl attaching bolts and remove cylinder.

Filling - Fluid should be within 7/8" of top of gasket surface of filler opening.

Valiant - *Procedure and filling r c mmendation sam as for Lancer (above).*

Willys - Master cylinder located under instrument panel in front of steering column. Access hole for filling provided on instrument panel to right of speedometer.

Filling - Fluid should be ½" below top of filler hole.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brak Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brak Tr ubl Shooting" in Brake Section of Manual.*

TRANS. MOUNTED PARKING BRAKE

Car	Drum Diam.	Length - Lining - Width	Thickn ss
Willys	8"	8 1/8" ©	1 3/4" .211"

© - Each Shoe.

1962 HYDRAULIC BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickn ss Front	Thickn ss Rear
Buick	2 1/4"	2"	10.040"	12.959"	10.040"	12.959"	.265"	.220"
Buick Special	2"	1 3/4"	7.523"	9.793"	7.523"	9.793"	.196"	.196"
Lancer	©	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
Oldsmobile	2 1/2"	2"	9 3/8"	12 1/32"	9 3/8"	12 1/32"	7/32"	7/32"
Oldsmobile F-85	2"	1 3/4"	7.523"	9.793"	7.523"	9.793"	9/32"	9/32"
Pontiac	2 1/2"	2"	9.29"	11.94"	9.29"	11.94"	.220"	.220"
Pontiac Tempest	1 3/4"	1 3/4"	7.15"	9.31"	7.15"	9.31"	.222"	.222"
Valiant	©	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
Willys	2"	2 1/2"	11 50"	13"	12 5/8"	13 15/16"	.238"	.238"

© - Primary 2 1/4"; Secondary 2 1/2".

BENDIX (LOCKHEED) SELF-CENTERING

Willys, All M dels (1962) Ⓒ
Ⓒ - For FC-170 with Dual Rear Wheels, s *"Bendix Hydraulic Singl Anchor Brakes" in this section.*

►*WILLYS FORWARD CONTROL MASTER CYLINDER*

NOTE: Master cylinder mounted on inside front panel of cab, just underneath instrument panel. Access to filler plug is through hole cover on panel to right of speedometer.

DESCRIPTION: "Self-Centering" hydraulic type with non-adjustable anchor ramps for each shoe. An eccentric adjusting cam is used for brake shoe adjustment.

ADJUSTMENT: Before making adjustments, jack up all four wheels, check brake pedal clearance or free travel (see below), fully release hand brake and make certain that rear wheels are free, then adjust each wheel as follows:

Brak Sh Adjustm nt (For Wear or New Linings):

►*CAUTION: Brak sh s must be "centralized" by s veral hard brak applications before adjusting.*

Ecc ntric Adjustm nt - Adjust eccentric for each brake shoe by turning eccentric up and out until brake shoe firmly applied and wheel is locked, then back eccentric off until wheel just rotates freely without drag. Shoe clearance will then be approximately .010".

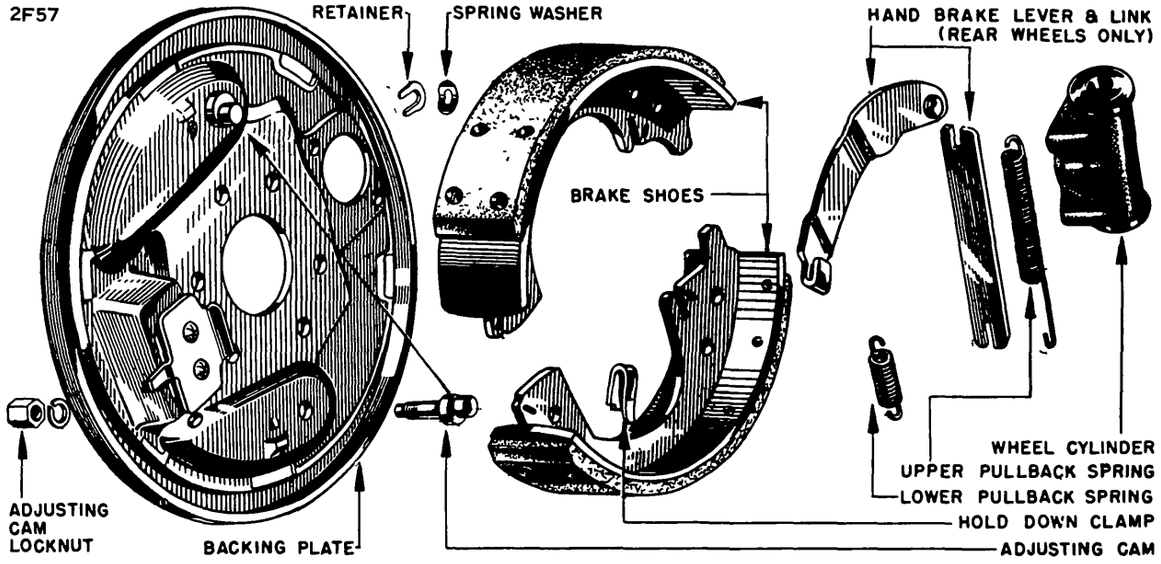
Anch r Lip Adjustm nt - Pressure required to pull shoe outward from support plate should be 15 lbs. Measure with spring scale hooked in end of shoe. Adjust by bending anchor lip slightly toward brake support plate to obtain this 15 lb. coil spring pressure to hold shoes on support plate ledges.

Hand Brak Adjustm nt: Remove all slack from rear wheel brake cables as follows:

Willys (V hicl s with cable connected to rear wheel s rvic brak s) -Pull hand lever "on" three notches, loosen front nut on connecting link between intermediate lever on frame crossmember and rear cable equalizer, tighten rear nut on link until slight drag noted at each rear wheel, then tighten front nut to lock adjustment. .Release hand lever and check for freedom of drag.

Willys (Vehicles using propeller shaft mounted parking brak s). Fully release hand brake lever, check linkage for freedom from bind. Rotate brake drum so one pair of three sets of holes are over adjusting screws Use tool or screwdriver to rotate each adjusting screw away from drive shaft until shoes are snug against drum, then back off each screw 7 notches for running clearance.

Willys (V hicl s with Operator Adjustable Hand Brake L ver) – 1) Adjusting knob on hand brake lever handle compensates for lining wear or for unusual holding conditions. With lever in "off" position, turn adjusting knob clockwise while applying and releasing handle every ¼–turn of knob until definite "snap over center" action takes place. *CAUTION – Over adjustment caus s hard hand l v r action but does not incr as brak ffici ncy. F r maj r adjustment proceed as f ll ws:*



BENDIX (LOCKHEED) SELF-CENTERING REAR BRAKE (FRONT SIMILAR EXCEPT HAND BRAKE PARTS OMITTED)

2) With adjusting knob turned fully counterclockwise, place handle in "on" position. Tighten parking brake cables at equalizer adjusting nut until slight drag is felt at rear wheels. Tighten locknut. Release control handle. Rear wheels should be free. Turn adjusting knob clockwise for desired tension.

Brake Pedal Adjustment: Adjust master cylinder pushrod by loosening locknut and turning rod for following pedal travel with master cylinder piston and pushrod back against stop:

Brake Pedal Freeplay – ½" (All Models).

MASTER CYLINDER: Fluid Level – Maintain fluid level to ½" below top of filler opening.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Troubl Shooting" in Brake Section of Manual.*

TRANS. MOUNTED PARKING BRAKE

Model	Drum Diam.	Length - Lining - Width	Thickn ss
All	8"	8 1/8" Ⓒ 1 3/4"	.211"

Ⓒ - Each Shoe

1962 HYDRAULIC BRAKE SPECIFICATIONS

Willys Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
DJ-3A & FJ-3	9"	9"	1.125"	.812"	1"	65	35
CJ-3B, 5 & 6	9"	9"	1.000"	.750"	1"	65	35
Utility & Truck	11"	11"	1.125"	1.000"	1"	57	43
FC-150 & 170	11"	11"	1.125"	Ⓒ .875"	1"	57	43

Ⓒ - FC-170 is 1.000".

1962 BRAKE LINING SPECIFICATIONS

Willys Model	Width Front	Width Rear	Front - Length - Primary	Front - Length - Secondary	Rear - Length - Primary	Rear - Length - Secondary	Thickness Front	Thickness Rear
DJ-3A & FJ-3	Ⓒ 2"	Ⓒ 2"	9.875"	7.688"	9.875"	7.688"	.214"	.214"
CJ-3B, 5 & 6	1¾"	1¾"	10.219"	6.609"	10.219"	6.609"	.211"	.211"
Utility & Truck	2"	2"	12.250"	10.03"	12.250"	10.030"	.212"	.212"
FC-150 & 170	2"	2"	12.250"	10.03"	12.250"	10.030"	.212"	.212"

Ⓒ - Primary. Secondary 1¾".

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE

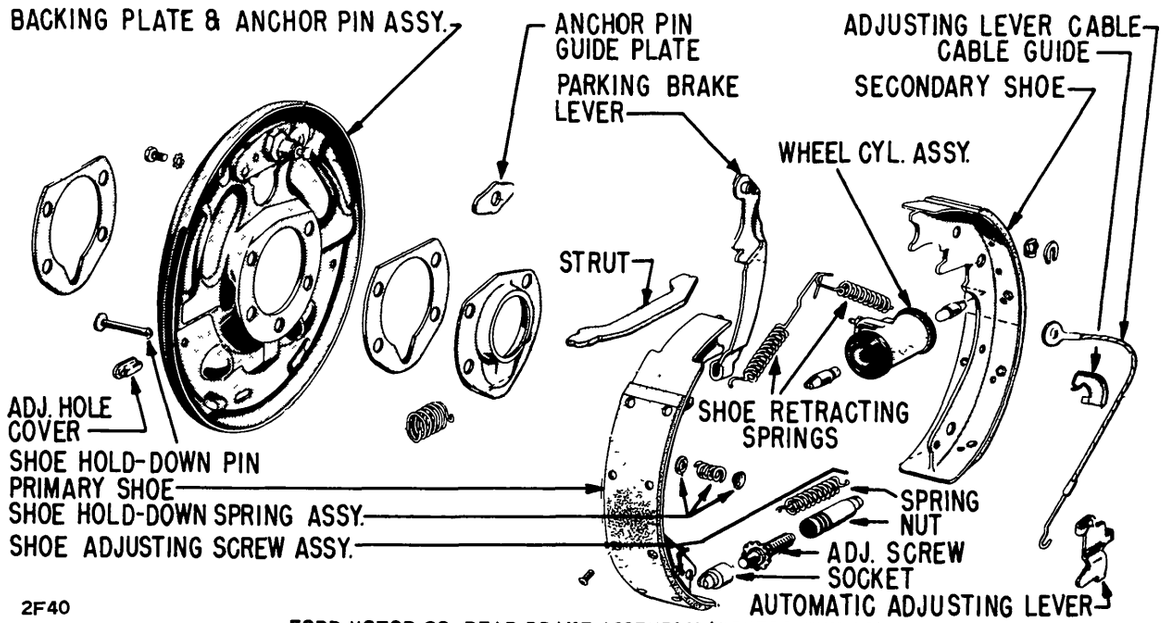
Dodge & Dodge Dart (1962) ©
Ford Fairlane & Galaxie (1962)
Lincoln Continental (1962)
Mercury Meteor & Monterey (1962)
Plymouth (1962)
Rambler American & Ambassador (1962)
Thunderbird (1962)

© - Except Dodge Custom 880. *For brakes used on this model, see "Chrysler, Imperial & Dodge Custom 880 Three Platform Total Contact Brakes" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 DODGE & PLYMOUTH SLOW BRAKE PEDAL RETURN, PEDAL BUILD-UP, OR ERRATIC STOP-LIGHT SWITCH OPERATION CORRECTION:* May be caused by burrs on pedal bracket, pedal pivot nylon bushings broken, pedal bracket mounting holes misaligned, or oversize pedal-to-pushrod cross bolts. To correct, remove burrs, replace bushings, and make other corrections to remove bind as necessary. *CAUTION - When grinding or polishing parts, do not remove any more metal than necessary.*

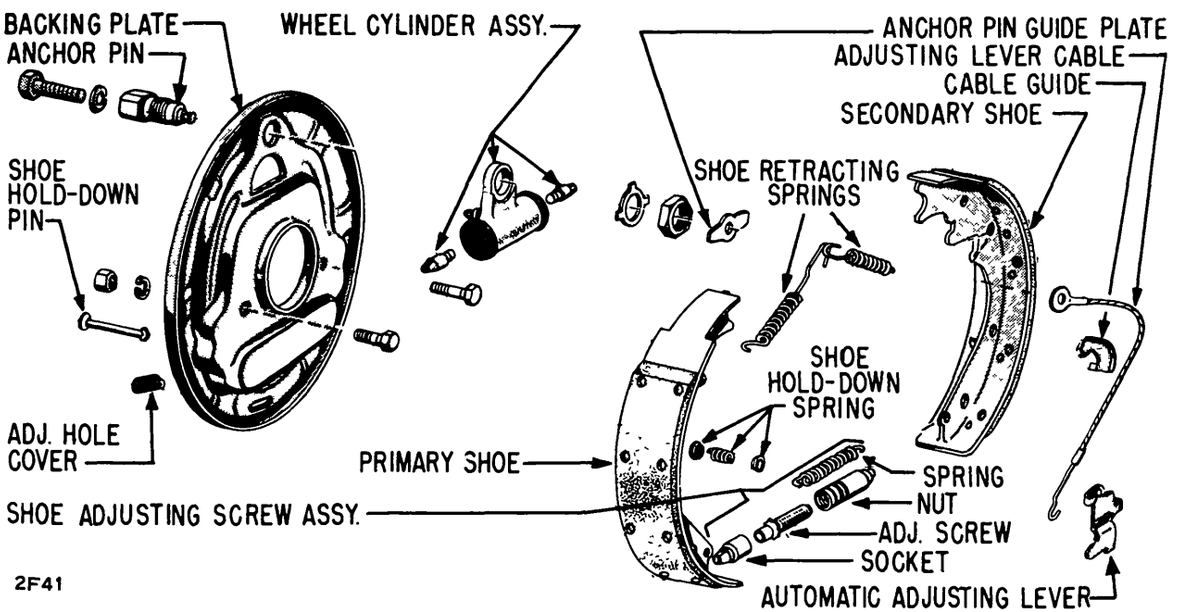
►*1962 DODGE & PLYMOUTH BRAKE SCRAPING NOISE CORRECTION (Early Cars):* If condition occurs in left rear brake on hard brake application, trouble may be caused by secondary shoe moving out toward drum. There may be an interference mark at adjuster end of secondary shoe and matching mark on inside of drum near junction of ring section and inside of drum. To correct, install additional Hold-Down Spring Retainer, Part No. 2260792, on secondary shoe hold-down spring (3 retainers total). Use second additional retainer on severe cases only if necessary. *NOTE - This additional retainer installed in production on later cars after approximately October 12, 1961.*



FORD MOTOR CO. REAR BRAKE ASSEMBLY (OTHERS SIMILAR)

►*1962 DODGE & PLYMOUTH ADJUSTER LEVER NOT ENGAGING STAR WHEEL CORRECTION (10" Brakes):* Make sure proper length adjuster cable is used. Cable should be 9 51/64-9 27/32" long.

►*1962 DODGE & PLYMOUTH PARKING BRAKE LACK OF ADJUSTMENT AT ADJUSTING SCREW CORRECTION:* Caused by cable conduit wires slipping in cable end fittings resulting in insufficient screw threads at equalizer yoke. To correct, install 1" tubular spacer or stack of washers between equalizer yoke and adjusting nut.



FORD & MERCURY FRONT BRAKE ASSEMBLY (OTHERS SIMILAR)

DESCRIPTION: Similar in design to previous Bendix Single Anchor (Without Eccentric) brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of rear (secondary) shoe during a reverse brake application to turn brake adjusting screw a small amount after a predetermined amount of wear on front and rear linings. The adjuster consists of a steel cable with a hook and anchor fitting permanently attached, a cable guide, adjusting lever, adjusting screw, pivot nut, socket and spring.

Master Cylinder (Rambler) - Master cylinder used is "Double Safety" type having a separate piston and fluid chamber for front and rear brakes respectively.

OPERATION: When lining has worn enough to require adjustment (approximately .0005" on each shoe), secondary shoe on which adjuster is mounted moves far enough from shoe anchor during a reverse application to cause cable to lift adjuster lever into engagement with the next tooth in the adjusting screw. When brake is released, secondary shoe returns to the anchor. Movement of the adjusting screw is 1/24th of a revolution each time it is moved by the adjuster. In forward braking, adjusting parts move with secondary shoe as a unit, and there is no lifting of the lever to engage a new tooth in adjusting screw.

ADJUSTMENTS: Make adjustments with drums cool and contracted. If car raised on frame hoist, disconnect

CONTINUED ON NEXT PAGE

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE (Cont.)

parking brake cables. *NOTE – Anchor pins are fixed in backing plate and no major adjustment is required.*

Pedal Free play: Adjust brake pedal freeplay as follows:

Dodge & Plymouth - No adjustment. Freeplay controlled by stop built into master cylinder.

Ford, Lincoln, Mercury, Thunderbird - Pedal freeplay is not adjustable.

Rambler - Rotate brake pedal-to-pushrod eccentric bolt to obtain 1/8-3/8" pedal freeplay. Adjust for maximum pedal height on power brake equipped cars. Pedal height from top of pedal pad to floor mat should be 6¼".

Initial Adjustment After Overhaul: As follows:

Dodge & Plymouth - Make sure parking brake is fully released, then raise car. Remove adjusting hole covers from brake backing plates. Insert an adjusting wrench (C-3784) into star wheel and tighten brake until wheel turns with a slight drag. Hold adjusting lever away from star wheel (icepick or other suitable tool) and back off star wheel 10-12 notches. Wheel should turn without drag.

Ford, Lincoln, Mercury, Thunderbird - Raise car and disconnect parking brake cables. Remove access hole cover plate from backing plate and turn adjusting screw upward with Tool 2018 or screwdriver to expand shoes against drum until a slight drag is felt. Remove brake drum. Hold adjusting lever away from adjusting screw and back off adjusting screw ¾-turn with fingers. *NOTE - If screw cannot be turned with fingers, screw must be freed or adjusting lever will not turn screw.* Install wheel and drum, then back car in reverse and make 5 or 6 brake applications to complete adjustment.

Rambler - Lengthen adjusting screw to expose 3/8" of adjusting screw threads, then install drum. Drive cars cautiously in reverse, making 10 brake applications before road testing. Make sure pedal height is correct (see above).

Parking Brake Adjustment: Adjust as follows:

Dodge & Plymouth - With parking brake lever fully released, loosen cable adjusting and lock nuts and adjust length of front cable for 1/8" slack or freeplay. Tighten locknut and check brake pedal and release handle for free operation.

Ford Galaxie & Thunderbird - With parking brake cables fully released, loosen locknut on equalizer rod and turn adjusting nut several turns forward. Turn locknut forward against equalizer until cables are just tight enough to remove slack. *CAUTION - Excessive tightening of cables may pull brake shoes off anchors.* Tighten both nuts against equalizer. Remove all slack from cable between parking brake pedal and equalizer lever without moving equalizer lever.

Ford Fairlane & Mercury Meteor - With parking brake cables fully released, pull up on parking brake handle until third notch is engaged. Loosen locknut on equalizer rod and turn adjusting nut several turns forward. Turn locknut forward against equalizer until cables are just tight enough to stop forward rotation of rear wheels. Tighten both nuts against equalizer and release the handle.

Lincoln - Fully release parking brake and raise car. Loosen cable at equalizer lever, then depress parking brake pedal 1¾" from normal released position. Adjust cable until there is a slight drag at rear wheels. Tighten equalizer rod locknut. Release brake and make sure brake shoes return to fully released position. Depress parking brake pedal 2". Car should be held satisfactorily under normal conditions.

Mercury Monterey - Release parking brake pedal, raise car, then loosen parking brake cable at equalizer lever. Depress parking brake pedal 1¾" from fully released position. Adjust front and rear cables until a slight drag is felt when turning rear wheels. *NOTE – The adjustment should be evenly divided between the two cables to maintain proper equalizer lever action.* Equalizer lever will be properly positioned when distance from rear cable clevis pin on equalizer bar to rear face of crossmember (to which parking brake bracket is attached) is 5½", with parking brake pedal fully released. Tighten locknut on equalizer rod, then release parking brake and check to make sure that shoes return to fully released position. Depress parking brake pedal 2". Under normal conditions, this should hold car satisfactorily.

Rambler (Hand Operated Type) - Pull handle from fully released position to fifth notch and tighten cable at equalizer until rear wheels are locked in forward rotation. Release handle and make sure wheels rotate without drag.

Rambler (Foot Operated Type) - Set brake lever on first notch from fully released position and tighten cable at equalizer until rear wheels are locked in forward rotation. Release foot lever and make sure wheels rotate without drag.

Automatic Adjuster: Removal - Disengage adjusting lever from adjusting screw by pulling backward on lever. Move outboard side of adjusting screw upward and back up pivot nut as far as possible. Pull adjusting lever, cable and adjusting spring down toward rear to unhook pivot hook from large hole in secondary shoe. *CAUTION - DO NOT pry pivot hook out of hole.* Remove anchor springs and unhook cable anchor. Remove shoe guide plate. Remove cable guide from secondary shoe and remove shoe hold-down springs, shoes, adjusting screws, pivot nut and socket.

Installation - Install brake shoes on backing plate with hold-down spring pin, springs and cups. Install parking brake link and spring. Connect parking brake cable. Install shoe guide plate on anchor pin. Place cable anchor over anchor pin with crimped side toward backing plate. Install primary and secondary shoe to anchor springs. *CAUTION - Be sure that cable end is not cocked or binding on anchor pin.* Install cable guide on secondary shoe web with flanged hole fitted in hole in web. Thread cable through guide groove, not between guide and shoe web. Turn adjusting screw in to limit of threads then back off ½ turn. *CAUTION - Place left hand screw on right side of car, right hand screw on left side of car.* Install adjusting socket on screw, place assembly between shoe ends with adjusting screw nearest secondary shoe. Hook cable hook into hole in adjusting lever from backing plate side. Place pivot hook into large hole in secondary shoe web. Place

CONTINUED ON NEXT PAGE

1962 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diameter Front	Wheel Cyl. Diameter Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Dodge	10" ①	10" ①	1 1/8"	② 15/16"	1"	60.0	40.0
Galaxie	11"	11"	1 3/32"	15/16"	1"		
Fairlane	10"	10"	1 1/8"	29/32"	1"		
Lincoln	11.062"	11.062"	1 3/32"	15/16"	7/8"		
Monterey	11.030"	11.030"	1 3/32"	15/16"	1"		
Meteor	10"	10"	1 1/8"	29/32"	1"		
Rambler Amer.	9"	9"	1"	13/16"	1"	60.2	39.8
Rambler V8	10"	10"	1 1/8"	7/8"	1"	62.4	37.6
Plymouth	10" ①	10" ①	1 1/8"	② 15/16"	1"	60.0	40.0
Thunderbird	11.030"	11.030"	1 3/32"	15/16"	7/8"		

① - 11" Optional on Police, High Performance & Other Heavy Duty Applications.

② - 13/16" on some Police Cars with 11" brakes.

1962 HYDRAULIC BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickness Front	Thickness Rear
Dodge 10"	2½"	2½"	8.50"	11.00"	8.50"	11.00"	.1875"	.1875"
Dodge 11"	3"	2½"	9.25"	12.125"	9.25"	12.125"	.1875"	.1875"
Galaxie	2½" ①	2½"	9.28"	11.93"	9.28"	11.93"		
Fairlane	2¼"	1¾"	9.30"	10.45"	9.30"	10.45"	7/32"	7/32"
Lincoln	3"	3"	9.39"	12.21"	9.39"	12.21"	②	②
Monterey	2½" ①	2½"	9.30"	11.95"	9.30"	11.95"	.195"	.195"
Meteor	2¼"	1¾"	9.30"	10.45"	9.30"	10.45"	7/32"	7/32"
Rambler Amer.	2"	2"	7.62"	9.82"	7.62"	9.82"	.1875"	.1875"
Rambler V8	2½"	1¾"	8.90"	11.06"	8.46"	10.88"	.1875"	.1875"
Plymouth 10"	2½"	2½"	8.50"	11.00"	8.50"	11.00"	.1875"	.1875"
Plymouth 11"	3"	2½"	9.25"	12.125"	9.25"	12.125"	.1875"	.1875"
Thunderbird	3"	3"	9.39"	12.21"	9.39"	12.21"		

① - 3" on Station Wagon, Taxi & Police. ② - .225" Primary, .287" Secondary.

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE (C nt.)

hooked end of adjuster spring into large hole in primary shoe web and loop end of spring to adjuster lever. Check action of adjuster by pulling cable toward secondary shoe to lift lever past tooth. Spring will pull lever to original position (when cable released) advancing screw one tooth (1/24 revolution). Lever should contact adjusting wheel 3/16±1/32" above centerline of screw. Cable guide groove should be parallel with shoe web and body of guide should be flat against web. Pivot hook surfaces should be square with body of lever. Adjusting screw must be seated properly in shoe web. Replace damaged or incorrect parts. Follow adjustment procedures given above.

MASTER CYLINDER: Remove as follows:

Dodge & Plymouth - Disconnect pedal return spring and pushrod. Disconnect brake tube at master cylinder. Remove attaching bolts and remove master cylinder.

Filling - Fluid should be even with top edge of master cylinder.

Ford, Lincoln, Mercury, Thunderbird - Disconnect speed control linkage at exterior arm (remove cotter pin). Disconnect rubber boot, brake line, and stop light switch wires from master cylinder and stop light switch. Remove master cylinder attaching bolts and remove master cylinder.

Filling - Maintain fluid to within 3/8" (Ford & Thunderbird), 1/4" (Lincoln & Mercury) of top of master cylinder.

Rambler - Disconnect pipes from master cylinder, remove attaching bolts and remove master cylinder.

Filling - Fluid *in each res rv ir* should be within ½" of top of filler openings.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: **Rambler** - *See "B ndix & M rain Dual Pist n Brake Master Cylinders" in this s ction.*

All Other Models: *See "Hydraulic Brak Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *Se "Hydraulic Brak Trouble Shooting" in Brake Section f Manual.*

FORD TRUCK BENDIX UNI-SERVO

Ford Trucks, F-250, P-350 (1962) Front & Rear
Ford Trucks, F-350, P-400 (1962) Front Only Ⓒ
Ford Trucks, F-500, 600; B-500, 600; P-500; C-550, 600 (1962) Front Only ②

Ⓒ - "Ford Bendix Hydraulic" type used on Rear.
② - "Ford Truck Self-Centering" type used on Rear.

DESCRIPTION: Bendix "Uni-Servo" single anchor, hydraulic type with single-acting wheel cylinder mounted on the backing plate and actuating the primary shoe through a strut (no direct connection to secondary shoe). Brake shoes are conventional Bendix type.

ADJUSTMENTS: Make adjustments with brake drums at normal temperature and with wheels either jacked up or contacting road (if wheels on road so they cannot be checked for drag, make this check by striking drum with a hammer - sound will be deadened if shoes contacting drum).

Minor Adjustment: Remove adjustment hole cover from brake carrier plate. Rotate adjusting screw, with a suitable tool, until shoe begins to drag, then back off shoe 10-12 notches until drum can be turned without drag.

Major Adjustment: Rotate drum until feeler slot is at lower end of Secondary (rear) shoe, then insert a .010" thick feeler gauge between brake shoe and drum. Rotate drum and feeler gauge up along secondary shoe until feeler is wedged between secondary shoe and drum. Turn adjusting screw (star wheel) to expand shoes until a heavy drag is felt against drum, then back off adjusting screw just enough to give clearance of .010" between shoe and drum at a point 1½" from each end of secondary shoe. *NOTE - This clearance will give operating clearance for both primary and secondary shoes.* When this clearance cannot be obtained, anchor pin must be adjusted.

Anchor Pin Adjustment - Loosen anchor pin nut just enough so anchor pin can be moved up or down (by tapping with soft hammer) centering shoes in drum and providing the .010" operating clearance at above positions. Tighten anchor pin nut to 80-100 ft. lbs. Check other brake assembly.

Brake Pedal Adjustment: Brake pedal free travel should not be less than 3/16" nor more than 3/8" before pushrod touches master cylinder piston. Adjustable at master cylinder pushrod.

Parking Brake Adjustment (Rear Wheel): *See "Ford Bendix Hydraulic" in this section.*

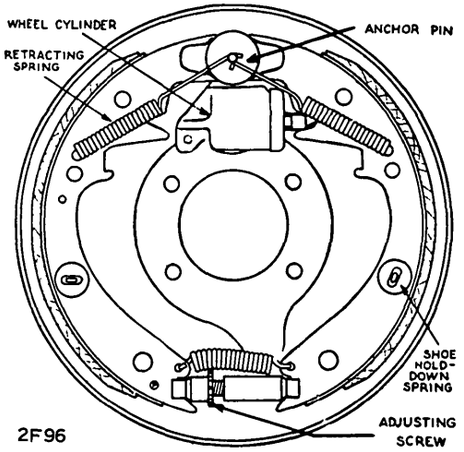
Parking Brake Adjustment (Propeller Shaft): *See "Ford Truck Self-Centering" in this section.*

MASTER CYLINDER: Removal (F & B Series) – With all air pressure or vacuum removed from system, disconnect stop light switch wires and brake line from master cylinder. Force as much fluid as possible from master cylinder, then disconnect rubber boot from end of master cylinder, remove attaching bolts, and remove master cylinder.

Removal (C Series) – Procedure is same as for F & B Series with access to master cylinder under floor plate.

Removal (P Series) – Procedure is same as for F & B Series after turning front wheels all the way to the left and removing fender apron for access to master cylinder.

Filling (All Series) – Maintain fluid to within ½" of top of filler neck.



BENDIX UNI-SERVO BRAKE ASSEMBLY

BRAKE SPECIFICATIONS: *Se "Brake Sp cification Table" in "Ford Truck Self-C nt ring" data in this section.*

BLEEDING BRAKE SYSTEM & OVERHAUL OF BRAKE UNITS: *See "Hydraulic Brake S rvicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *Se "Hydraulic Brak Troubl Shooting" in Brake Section of Manual.*

FORD TRUCK SELF-CENTERING

Ford Trucks F-500, 600; B-500, 600; P-500; C-550, 600 (1962) Rear Only Ⓒ

Ⓒ - "Ford Bendix Uni-Servo" used on Front.

DESCRIPTION: Two cylinder, two shoe, four anchor type hydraulic brakes. Each shoe is anchored at each end and linked to wheel cylinder at each end so that all shoes are self–energizing for both forward and reverse motion. All shoes are radially self–centering.

ADJUSTMENT: Wear Adjustment – With wheels raised, remove adjusting slot covers. Turn rear (secondary shoe) adjusting screw until brake shoe drags against drum. Back off adjusting screw so drum rotates freely. Depress brake pedal to center the shoes, then back off adjusting screw one additional notch. Repeat procedure for primary shoe.

Brak P dal Adjustm nt: 3/16–3/8" pedal freeplay. On F, B & C Series, loosen locknut on eccentric bolt connecting master cylinder pushrod to brake pedal and rotate bolt as necessary. On P Series, turn hex head on master cylinder pushrod to obtain proper adjustment. Tighten locknut to 30–35 ft. lbs.

Parking Brake Adjustment: Ext rnal Band Typ – On cable controlled type, move parking brake lever to fully released position. On rod type linkage, set lever at first notch. Flat part of adjusting rod cam must rest on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, then adjust clevis rod as necessary. Install clevis pin and cotter pin. Remove lock wire from anchor adjusting screw,

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FORD TRUCK SELF-CENTERING (C ntinued)

turn adjusting screw clockwise to obtain .010" clearance between brake lining and brake drum at anchor bracket. Loosen locknut on adjusting screw for lower half of brake band, adjust screw to obtain .010" clearance between lining and drum at lower half of band. Tighten locknut. Turn upper band adjusting nut for same .010" clearance. Be sure to install lock wire in anchor adjusting screw.

Int rnal Sh (9" Diam t r) Type – With parking brake lever fully released, remove linkage adjusting clevis pin. Lengthen adjusting link by turning clevis until shoes seat against drum with clevis pin installed. Remove clevis pin and shorten linkage to obtain .010" clearance between shoes and drum measured at all points around drum with clevis pin installed. Install clevis retaining cotter pin.

Int rnal Sh (12" Diam ter) Type – Remove pin from adjusting rod clevis, loosen nuts on adjusting rod, and turn clevis so there is 1/4–3/8" free play on brake operating lever. Tighten clevis nuts and install clevis pin.

DISASSEMBLY: Make sure there is no vacuum or air pressure in system. Remove wheel and drum or hub and drum assembly. Proceed as follows:

1) Un qual Length R tracting Springs – Clamp boots against cylinder, note location of retracting springs and remove with Tool 2035–N. Remove brake shoe guide bolt lock wire, nut, washer, and bolt from both shoes, then remove shoes from carrier plate.

2) Equal L ngth R tracting Springs – Clamp boots against cylinder and remove retracting springs with Tool 2035–N. Remove brake shoe guide bolt cotter pin, nut, washer, and bolt from both shoes, then remove shoes from carrier plate.

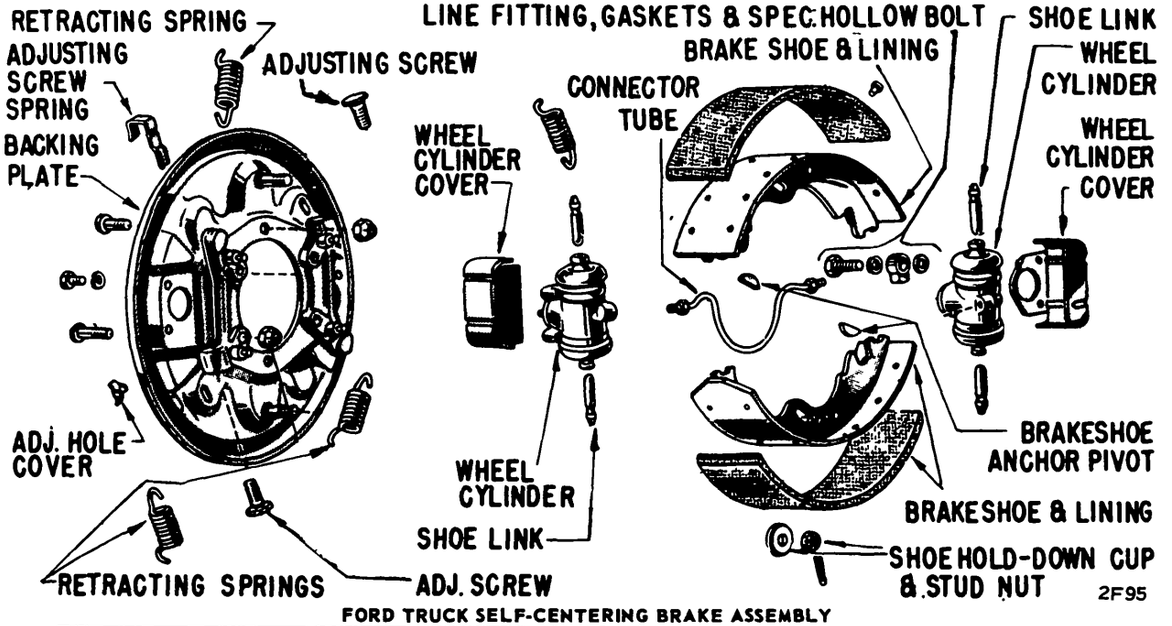
REASSEMBLY: 1) Un qual Length Retracting Springs – Position adjusting wheel, slide adjusting screw through anchor pin support and index adjusting wheel tab in slot on adjusting screw. Install and tighten adjusting wheel lock. Place brake shoes in anchor pin slot on support bracket and engage other end of shoe in cylinder link. Install shoe guide bolt, washer, and nut. Tighten nut finger tight, then back off 1 full turn and install lock wire. Install retracting springs with Tool 2035–N, making sure springs are installed in original locations.

2) Equal L ngth R tracting Springs – Thread adjusting screw and wheel into anchor pin support and install adjusting wheel lock. Thread adjusting wheel into support so shoe will rest against wheel end. Install brake shoe over both retracting spring anchor pins, insert ends in cylinder links and install shoe guide bolt, washer and nut. Tighten nut finger tight, then back off 1 full turn and install cotter pin. Install retracting springs with Tool 2035–N.

MASTER CYLINDER: R moval & Filling – *See "Ford Truck B ndix Uni–S rvo" brakes in this section.*

BLEEDING BRAKE SYSTEM: Bleed **top** wheel cylinder **first,** then lower. If power unit used, unit must be bled before wheel cylinders, with engine off and no vacuum in power unit system. *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "H,draulic Brak Troubl Shooting" in Brake S ction of Manual.*



FORD TRUCK SELF-CENTERING BRAKE ASSEMBLY

FORD TRUCK BRAKE SPECIFICATIONS

Truck Model		Brake Drum Diameter (Inches)		Brake Lining Dimensions (Inches)						Cylinder Bore Diameter (Inches)	Master Cylinder Piston Diameter (Inches)
				Length		Width		Thickness			
		Normal	Maximum Oversize	Pri-mary	Second-ary	Pri-mary	Second-ary	Pri-mary	Second-ary		
F-100	Front	11	11 060	10 65	11 91	2	2	0 187	0 250	1 1/16	1 1/16
	Rear	11	11 060	10 65	11 91	1¾	1¾	0 187	0 250	⅞	
F 250	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	
F 350	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
P 350 (Spicer 60)	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	
P 350 (Timken B 140 rear axle), P 400	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
F-500, B 500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	1 5/16	1¼
	Rear	15	15 060	15 31	15 31	4	4	0.375	0 375	1½	
P 500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	1 5/16	1¼
	Rear	14⅛	14 185	14 42	14 42	3½	3½	0 375	0 375	1½	
F , B 600 (max)	Front	14	14 060	13 66	15 03	2½	2½	0 250	0 250	1	1¼
	Rear	15	15 090	15 31	15 31	4½	4½	0 500	0 500	1½	
C 600 (7000 lb front axle)	Front	16	16 060	16 75	16 75	2½	2½	0 250	0 250	1¼	1¼
	Rear	15	15 090	15 31	15 31	4	4	0 375	0 375	1½	

FORD-BENDIX HYDRAULIC

Ford Falcon, All Models (1962)
Econoline Trucks, All Models (1962)
Mercury Comet, All Models (1962)
Ford Trucks, F & P-100 (1962) Front & Rear
Ford Trucks, F-350, P-400 (1962) Rear Only ①

① - "Ford Truck Bendix Uni-Servo" type used on Front.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 COMET & FALCON WHEEL CYLINDER HONING CAUTION:* Front wheel cylinders having orificed baffle **cannot** be honed. If honing required, replace cylinder. *Use care when bleeding system so no air is trapped by orificed baffle.*

►*1962 COMET & FALCON BRAKE SHOE ADJUSTER INSULATOR NOTE & CAUTION: NOTE - Insulator not used on production cars having later type "O" ring wheel cylinder pistons (see below).* 1) To prevent damage and freezing of insulator, coat insulator with a light film of lubriplate when assembling adjuster. *This supersedes previous "no lubrication" recommendation.*

2) There must be 1/16-1/8" clearance maintained between end of socket and near edge of adjusting screw star wheel when assembly installed in the brake (add or remove 1 insulator as necessary).

►*1960-62 COMET & FALCON BRAKE SQUEAL CORRECTION & 1962 WHEEL CYLINDER PISTON PRODUCTION CHANGE:* To correct brake squeal, new front wheel brake cylinder pistons, No. C2DZ-2196-A, installed in 1962 production. These pistons have an "O" ring in an annular groove on outer diameter of each piston. These pistons may be installed on 1960-62 cars to reduce brake squeal. *NOTE - Replace "O" rings whenever wheel cylinders are serviced. "O" ring type pistons may be used along with brake shoe adjuster insulators, but insulators will not be used on production cars having "O" ring type pistons.*

DESCRIPTION: Duo-Servo, single anchor, hydraulic type without eccentric. Anchor pins are fixed and are not adjustable.

ADJUSTMENTS: Before making any adjustments, jack up all four wheels, check brake pedal clearance (see below), fully release hand brake lever and make certain that all wheels turn freely. Parking brake cables should be disconnected when car raised on frame hoist.

Brake Pedal Adjustment: Adjust as follows:

Comet, Falcon, Econoline – 1/4–7/16" (Falcon & Econoline), 5/16–7/16" (Comet) pedal freeplay. Loosen master cylinder pushrod–to–brake pedal eccentric bolt locknut and rotate bolt until freeplay is within specifications.

Ford Trucks – 3/16–3/8" pedal freeplay. On F Series, loosen locknut on eccentric bolt connecting master cylinder pushrod to brake pedal and rotate bolt as necessary. On P Series, turn hex head on master cylinder pushrod to obtain proper adjustment. Tighten locknut to 30–35 ft. lbs.

Parking Brake Adjustment: With service brakes properly adjusted, adjust parking brake as follows:

Comet & Falcon – Pull release handle 3 notches from fully released position. Turn front nut on equalizer several turns forward, then turn rear nut forward until cables prevent forward rotation of rear wheels. Tighten front nut against equalizer. Release the handle.

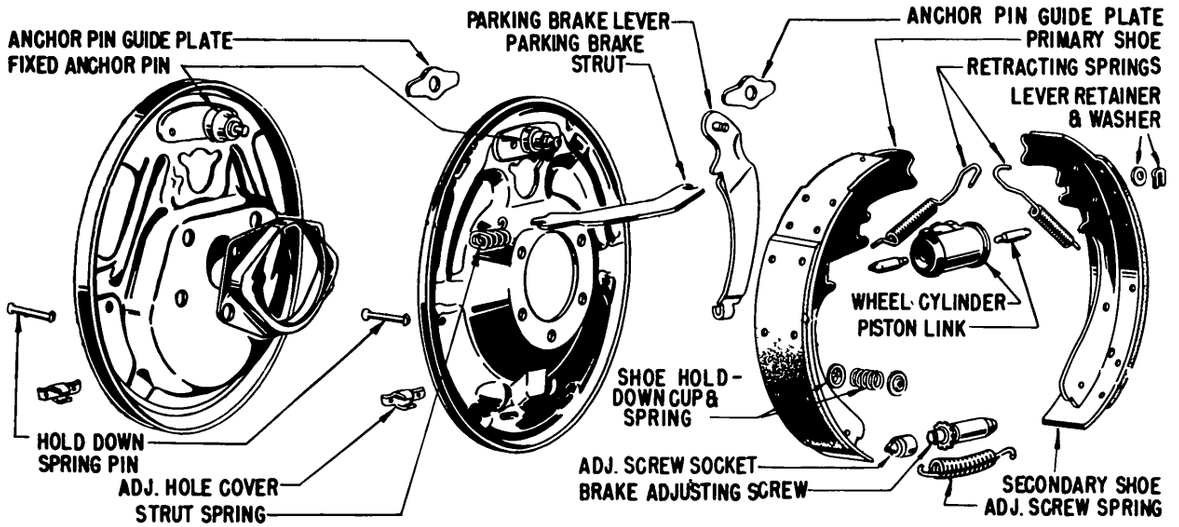
Econoline – Pull release handle 1 notch from fully released position. Turn front nut on equalizer forward several turns, then turn rear nut forward until there is a medium drag at rear wheels. Tighten front nut against equalizer. Release the handle.

Ford Trucks - With parking brake handle fully released, turn nut on front of equalizer several turns forward. Turn rear nut forward until cables are just tight enough to remove all slack. Tighten front nut against equalizer. *NOTE – For propeller shaft mounted parking brakes, see "Ford Truck Self-Centering" brakes in this section.*

Minor (Wear) Adjustment: Comet & Falcon – Remove adjusting hole cover and turn adjusting screw until there is a slight drag on the drum, then back off adjusting screw until wheel turns freely.

Econoline – Remove adjusting hole cover and turn adjusting screw until there is a moderate drag on the drum, then back off adjusting screw 10 notches to allow wheel to turn freely.

Ford Trucks – Remove adjusting hole cover and turn adjusting screw until the shoes drag against the brake drum, then back off adjusting screw 10–12 notches so wheel turns freely.



FORD TRUCK FRONT AND REAR BRAKE (OTHERS SIMILAR)

MASTER CYLINDER: Removal (Comet & Falcon) – Disconnect rubber boot, brake lines, and stop light switch wires from master cylinder. Remove attaching bolts and remove master cylinder.

Filling – Maintain fluid to within 3/8" (Falcon), 1/4" (Comet) from top of reservoir.

Removal (Econoline) – Remove forward splash shield and disconnect brake pedal return spring. Remove pushrod eccentric bolt. Remove snap ring from brake pedal pivot pin. Remove brake pipe outlet fitting bolt and washers (outlet fitting will be disconnected from master cylinder). Remove mounting bolts and remove master cylinder (swing down and remove from brake pedal pivot pin).

Filling–Maintain fluid to within ½" of top of reservoir.

Removal (Ford Trucks) – *See "Ford Bendix Uni-Servo" brakes in this section.*

Filling – Maintain fluid to within ½" of top of filler neck.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

BLEEDING BRAKE SYSTEM & OVERHAUL OF BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

1962 COMET, FALCON & ECONOLINE HYDRAULIC BRAKE & LINING SPECIFICATIONS
►*FOR FORD TRUCK LINING SPECIFICATIONS, SEE "FORD TRUCK SELF-CENTERING" DATA.*

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diameter Front	Wheel Cyl. Diameter Rear	Master Cyl. Diameter	Lining Width Front	Lining Width Rear	Lining Thickness
Falcon	9"	9"	1.062"	.8125"	1"	2.25"	② 1.50"	
Comet	9"	9"	1.062"	① .8125"	1"	2.25"	② 1.50"	
Econoline	10"	10"	1.125"	.8125"	1"	2.50"	1.75"	

① - .875" on Sta. Wgn. ② - 2.25" on Sta. Wgn.

WAGNER AUTOMATIC ADJUSTER (PRIMARY SHOE ACTUATION)

Rambler Classic Six, Series 6210 (1962) ①

① - Used on cars before Serial Nos. E-51962 and W-54336. *For brakes used on later cars, see "Wagner Automatic Adjuster Hydraulic Brakes (Secondary Shoe Actuation)" in this section.*

DESCRIPTION & OPERATION: Similar in design and operation to previous models. Adjuster is actuated by movement of primary shoe on forward brake application. Master Cylinder is "Double Safety" type having a separate piston and fluid chamber for front and rear brakes respectively.

ADJUSTMENT: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid is ½" below top of filler opening of each reservoir Place parking brake handle in fully released position, then adjust as follows:

Brake Pedal Freeplay Adjustment: Rotate brake pedal-to-pushrod eccentric bolt to obtain 1/8-3/8" pedal freeplay. Adjust for maximum pedal height on power brake equipped cars. Pedal height from top of pedal pad to floor mat should be 6¼".

Brake Shoe Adjustment: Adjustment not normally required, however, if a manual adjustment is necessary (after installation of new lining or shoes), proceed as follows: Remove access hole cover and use a screwdriver to rotate star wheel. To tighten, rotate backing plate side of star wheel toward axle. To back off star wheel, it may be necessary to insert a second tool, past the star wheel, to force automatic adjusting lever off of star wheel. Back off star wheel to eliminate drag.

Parking Brake (Foot Operated Lever): Set brake lever on first notch from fully released position and tighten cable at equalizer until rear wheels are locked in forward rotation. Release foot lever and make sure wheels rotate without drag.

BRAKE SHOE REPLACEMENT: *See "Wagner (Lockheed) Self-Centering" and note the following:*

Automatic Adjuster Installation: With shoes installed on backing plate, install anchor block on anchor pin with convex side facing primary shoe (arrow on block should point in direction of forward drum rotation), then install shoe guide plate. Install **red** secondary shoe return spring with long hook end flat against shoe guide plate. Install **blue** primary spring **last** with short hook end flat against shoe table when hooked on tab of primary shoe. Slip anchor pin cable guide down in slot on anchor pin and install adjuster guide on primary shoe (do not tighten guide screw). Install adjuster lever into larger hole near end of primary shoe and connect adjuster lever spring between small hole in secondary shoe and slot in lever. Thread adjusting cable through shoe hold—down springs and over cable guide on anchor pin, hooking eye end of cable over secondary shoe return spring hook. Route cable around cable guide and swivel lever upward and engage barrel fitting end of cable in lever slide. With brake released, push primary shoe cable guide out to pull cable taut until bottom edge of adjusting lever is engaging star wheel tooth and parallel to star wheel shank. Tighten cable guide screw and test action by pulling cable.

MASTER CYLINDER: Removal - Disconnect pipes from master cylinder, remove attaching bolts and remove master cylinder.

Filling - Fluid **in each reservoir** should be within ½" of top of filler openings.

Overhaul: *See "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.*

BRAKE SPECIFICATIONS: *See "Wagner Automatic Adjuster Hydraulic Brakes (Secondary Shoe Actuation)" in this section.*

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

WAGNER AUTOMATIC ADJUSTER (SECONDARY SHOE ACTUATION)

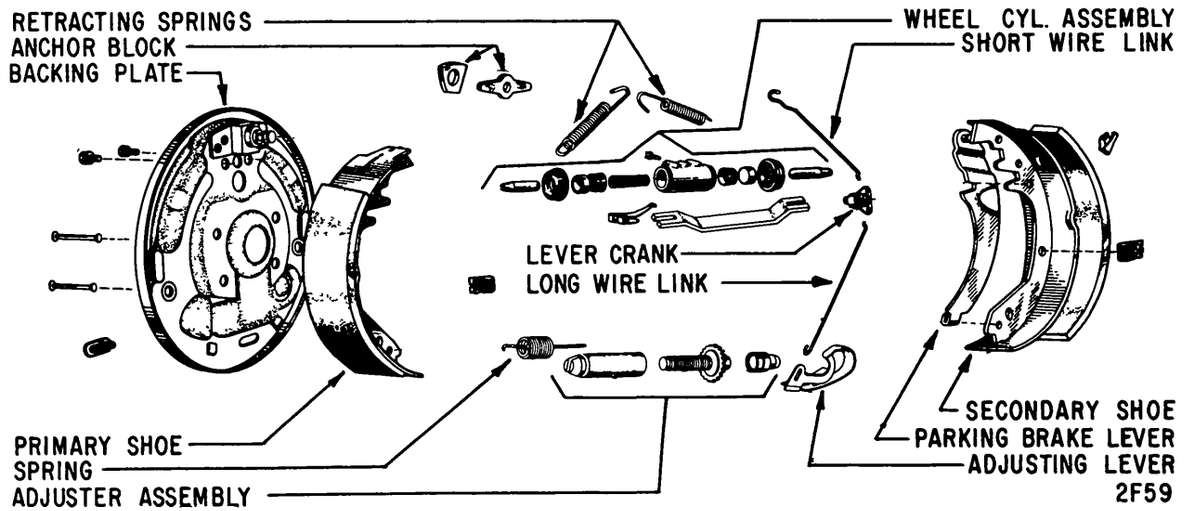
Rambler Classic Six, Series 6210 (1962) ①

① - Used on cars after Serial Nos. E-51962 and W-54336. *For brakes used on early cars, see "Wagner Automatic Adjuster Hydraulic Brakes (Primary Shoe Actuation)" in this section.*

DESCRIPTION: Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies similar in design to Wagner (Lockheed) Self-Centering Brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of **rear (secondary) shoe** during brake applications to turn brake adjusting star wheel a small amount as determined by lining wear. The adjuster consists of an adjusting lever, a lever crank on secondary shoe, and two adjusting wire links. Master Cylinder used is "Double Safety" type, having a separate piston and fluid chamber for front and rear brakes respectively.

OPERATION: After lining wears enough to require adjustment, adjusting links will lift adjusting lever into position to engage with next tooth of star wheel when brakes are applied during **reverse** rotation. When brake is released, shoes return to brake shoe anchor. This action will repeat on subsequent brake applications, if necessary, until lining-to-drum clearance is reduced to a point where shoe movement is not enough to cause links to lift lever to next tooth. The automatic adjuster is located on the rear (secondary) shoe, and the adjusting action, when required, occurs when applying brakes during reverse movement of car.

ADJUSTMENT: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid is ½" below top of filler opening of each reservoir. Place parking brake lever in fully released position, then adjust as follows:



WAGNER AUTOMATIC ADJUSTER BRAKE ASSEMBLY (SECONDARY SHOE ACTUATION)
REAR SHOWN - FRONT SIMILAR

Brake Pedal Freeplay Adjustment: Rotate brake pedal-to-pushrod eccentric bolt to obtain 1/8-3/8" pedal freeplay. Adjust for maximum pedal height on power brake equipped cars. Pedal height from top of pedal pad to floor mat should be 6¼".

Brake Shoe Adjustment (Initial Adjustment After Overhaul): With 3/16-1/4" of star wheel threads exposed during installation procedure, install drum and rotate star wheel toward axle until wheel is in locked position. Back off star wheel at least 15-20 notches. *CAUTION - DO NOT insert a tool past star wheel to lift or pry adjusting lever off star wheel teeth.*

Parking Brake Adjustment (Foot Operated Lever): Set brake lever on first notch from fully released position and tighten cable at equalizer until rear wheels are locked in forward rotation. Release foot lever and make sure wheels rotate without drag.

CONTINUED ON NEXT PAGE

WAGNER AUTOMATIC ADJUSTER (SECONDARY SHOE ACTUATION) (Continued)

BRAKE SHOE REPLACEMENT: Automatic Adjuster Removal - Remove long wire link from adjuster lever and lever crank, then remove upper (short) wire link. Remove star wheel spring, star wheel, and adjusting lever. Unscrew lever crank from secondary shoe.

Brake Unit Assembly: Place shoes on backing plate and secure with hold down pin and clip. Install adjuster lever on secondary shoe web (slot in lever must engage completely with slot in shoe web). *NOTE - Adjuster levers are painted red for right side, blue for left side. DO NOT INTERCHANGE.* Install star wheel and adjust so approximately 3/16-1/4" of threads are exposed between star wheel and star wheel nut. *CAUTION - Make sure star wheel is installed over adjusting hole in backing plate. If star wheels are interchanged between sides of car, brake shoes will retract instead of expand.* Install spring at lower end of shoe webs (long hook end in small hole of secondary shoe **under** shoe web; and short hook end in small hole of primary shoe web). Spring should not interfere with either adjusting lever or star wheel. Install anchor block with arrow pointing in direction of drum forward rotation. Install guide plate over anchor pin and install shoe return spring (lock hook end flat against guide plate). Install lever crank into secondary shoe web. *NOTE - Cranks are makred "L" and "R" for identification. Lever must rotate freely on hexagon head screw.* Install short (upper) wire link as follows: Insert "S" shape offset end into lever crank hole closest to hexagon head, then snap hook end of link in top groove of anchor pin. Install long (lower) wire link as follows: Insert "S" shaped end into lever crank, then lift adjuster lever up to hook link into slot of adjusting lever. Adjusting lever should now engage star wheel teeth at centerline of star wheel assembly ±1/16". Install wheel and drum, then make brake shoe adjustment (see above).

MASTER CYLINDER: Removal - Disconnect pipes from master cylinder, remove attaching bolts and remove master cylinder.

Filling - Fluid **in each reservoir** should be within ½" of top of filler openings.

Overhaul: *See "Bendix & Morain Dual Piston Brake Master Cylinders" in this section.*

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Bendix & Morain Dual Piston Brake Master Cylinders" in this section.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

1962 RAMBLER BRAKE SPECIFICATIONS

Drum Diameter	9" Front & Rear
Wheel Cylinder Diameter	1 1/8" Front, 15/16" Rear
Master Cylinder Diameter	1"
% Braking Power	65.7% Front, 34.3% Rear

1962 RAMBLER BRAKE LINING SPECIFICATIONS

Lining Width	2 1/4" Front ①, 2" Rear
Lining Length (Pri.)	7 5/8" Front & Rear
Lining Length (Sec.)	9 53/64" Front, 9 31/32" Rear
Lining Thickness	3/16" Front & Rear

① - Primary Shoe. 2½" Secondary Shoe.

Checker Superba (1962)
Studebaker, All Models (1962)

DESCRIPTION: Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies.

ADJUSTMENTS: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid level is ½" below top of cylinder. Place parking brake handle in fully released position. Adjust as follows:

Studebaker Brake Pedal Free Travel Adjustment: Turn adjustable pedal stop on pedal bracket to obtain ¼–3/8" pedal free travel (measured from brake pedal pad) before pressure stroke starts.

Brake Shoe Adjustment: Remove adjusting hole cover from backing plate, insert screwdriver or special adjusting tool through adjusting hole and turn adjusting screw to expand shoes until drum is just locked (pivot tool on edge of slot, move handle upward to expand shoes). Then back off the adjusting screw 8 notches (used lining), 10 notches (new lining), or more if necessary until drum is free of any drag. Replace adjusting hole cover, adjust parking brake.

PARKING BRAKE ADJUSTMENT: As follows:

Studebaker - Set control handle four notches from fully released position. Adjust rear wheel cables at equalizer on frame side rail by backing off front nut until all slack is removed from cables and a heavy drag noted when rotating rear wheels by hand. Tighten front adjusting nut. Release control handle fully and see that wheels are free of any drag.

BRAKE SHOE REMOVAL & INSTALLATION:

Removal: Install wheel cylinder clamp to prevent hydraulic system leakage. Unhook the two shoe return springs at anchor. On rear brakes, swing the hand brake lever on the secondary shoe toward the axle to slacken cable. Lift cable from lever slot. Compress and remove hold-down spring clip on each shoe. Spread shoes and lift off brake support plate. On rear brakes, remove parking brake link and anti-rattle spring. Separate shoes by removing star wheel adjusting assembly and spring. On rear brakes, pull clip from parking brake lever mounted on secondary shoe and remove lever from shoe. Anchor plate and anchor block may now be lifted from anchor pin.

WAGNER (LOCKHEED) SELF-CENTERING

Installation: Reverse removal procedure. *NOTE* - On Studebaker Taxi and all 8 cylinder models, the parking brake lever is mounted on inner side of rear shoe. On other models, parking brake lever is mounted on outside of shoe.

WHEEL CYLINDER: Removal & Disassembly - Disconnect flexible hose from cylinder. Remove screws attaching cylinder to backing plate. Remove cylinder.

Assembly & Installation: Reverse disassembly and removal procedures.

MASTER CYLINDER: Remove as follows:

Removal (Studebaker) – Disconnect pushrod from brake pedal, remove shoulder bolt from pushrod, and nylon bushings from pushrod. Disconnect stop light switch wire and hydraulic line. Remove attaching bolts and remove master cylinder.

Filling – Maintain fluid to within ½" of top of cylinder.

BLEEDING BRAKE SYSTEM & OVERHAULING OF MASTER CYLINDER & WHEEL CYLINDERS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

1961 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter Front	Drum Diameter Rear	Wheel Cyl. Diam. Front	Wheel Cyl. Diam. Rear	Master Cyl. Diameter	% Braking Power Front	% Braking Power Rear
Checker	11"	11"	1"	7/8"	1"		
Studebaker 6	10"	9"	1"	13/16"	1"	62	38
Studebaker V8	11"	10"	1 1/16"	7/8"	1"	62	38
Studebaker Taxi	11"	10"	1 1/16"	7/8"	1"	62	38

1961 BRAKE LINING SPECIFICATIONS

Car Model	Width Front	Width Rear	Length - Front Primary	Length - Front Secondary	Length - Rear Primary	Length - Rear Secondary	Thickness Front	Thickness Rear
Checker	2 1/4"	2 1/4"	9 5/16"	12"	9 5/16"	12"	7/32"	7/8"
Studebaker 6	2"	2"	8 15/32"	10 53/64"	7 9/16"	9 3/4"	② 3/16"	3/16"
Studebaker V8	2 1/4"	2"	9 21/64"	11 57/64"	8 15/32"	10 27/32"	③ 3/16"	3/16"
Studebaker Taxi	2 1/4"	2"	11 1/2"	11 1/2"	10 7/16"	10 7/16"	7/32"	3/16"

① - 2 1/2" Secondary. ② - 1/4" Secondary. ③ - 7/32" Secondary.

RAMBLER "E-STICK" AUTOMATIC CLUTCH

Rambler American, Series 6201 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING CAR BY TOWING NOTE:* To start car by towing, proceed as follows: With "Tow Start" handle all the way in, place shift lever in 2nd gear, pull overdrive handle all the way out, and turn on ignition switch. When speed reaches 10 MPH, pull "Tow Start" handle all the way out and hold in position. Clutch will now be engaged. As soon as engine starts, push "Tow Start" handle all the way in and move shift lever to neutral position. *"Tow Start" handle must be pushed all the way in at all times when driving the car.*

►*PARKING CAR IN GEAR NOTE:* Use REVERSE gear ONLY as follows: With ignition off, place transmission in reverse gear and pull "Tow Start" all the way out and turn handle ¼-turn clockwise to lock in position. Clutch will now be engaged. *"Tow Start" handle must be pushed all the way in at all times when driving the car.*

►*CLUTCH DISC STICKING TO FLYWHEEL OR PRESSURE PLATE CORRECTION:* Higher asbestos yarn content of clutch facings may induce sticking to flywheel if clutch left in engaged condition for any length of time. If car parked for 48 hours or more, use parking brake instead of "Tow Start" handle to hold car.

►*ROAD WASH ENTERING CLUTCH HOUSING CORRECTION:* Be sure throw-out lever boot is placed behind throw-out lever adjusting nut (on front side of throw-out lever).

►*CONTROL VALVE BODY REMOVAL NOTE & CAUTION:* If wheelhouse inner panel interferes with valve body removal, proceed as follows: Remove both lower capscrews and loosen top capscrew. Pull oil pump and valve body from engine approximately ¼" and rotate pump and valve body clockwise (to front of car) until capscrew and valve body can be removed from pump. *CAUTION - On "L" head engines, do not pull oil pump more than ¼" from engine or distributor shaft will disengage from driven gear and put engine out of time.* When installing valve body, torque capscrews to 13-15 ft. lbs. Overtightening will distort valve body.

DESCRIPTION: Fully automatic clutch operating mechanism using engine oil pressure to apply the clutch and which eliminates the need for a clutch pedal on cars with synchro-mesh transmission (with or without overdrive). Unit consists of the following components:

Clutch - Single plate, dry disc type of conventional design but with clutch pressure plate springs eliminated and release levers arranged to engage driven plate to flywheel instead of releasing it (clutch is disengaged at rest or in neutral). Some units may have a ball spring on driven plate hub to prevent driven plate contact with pressure plate when clutch is disengaged. Ball type clutch throw-out bearing rotates constantly when car is moving in gear. A retracting spring attached to outer end of throw-out lever holds clutch disengaged until applied by engine oil pressure.

Oil Pump - Gear type with larger gears for increased oil capacity. Engine oil pressure relief valve specification is increased to 55-60 lbs. at 2200 RPM, and an additional minimum lube pressure relief valve is installed in control valve body to insure that engine oil pressure requirements are met before oil is diverted for clutch operation. This valve opens at 10 lbs. pressure.

Dashpot - Because it is possible to leave transmission in gear at idle speed (clutch engaged), a dashpot is installed in throttle linkage for time delay purposes when throttle is closed rapidly.

Control Mechanism - Consists of a control valve body mounted on engine oil pump and serving as the pump cover, a vacuum modulator diaphragm and a vacuum dump diaphragm connected in series with each other and to intake manifold, an air valve solenoid in dump diaphragm line, and a neutral safety switch on steering column.

Servo - Conventional hydraulic power cylinder with a piston and seal, and piston rod contacting clutch throw-out lever. Hydraulic pressure in servo pushes piston rod against throw-out lever to engage clutch. A check valve with a metered orifice in line between servo and control valve body permits a large amount of oil under high pressure to enter servo for fast partial clutch engagement. Remaining oil needed for full engagement enters servo at a slower rate to insure smooth clutch engagement and operation.

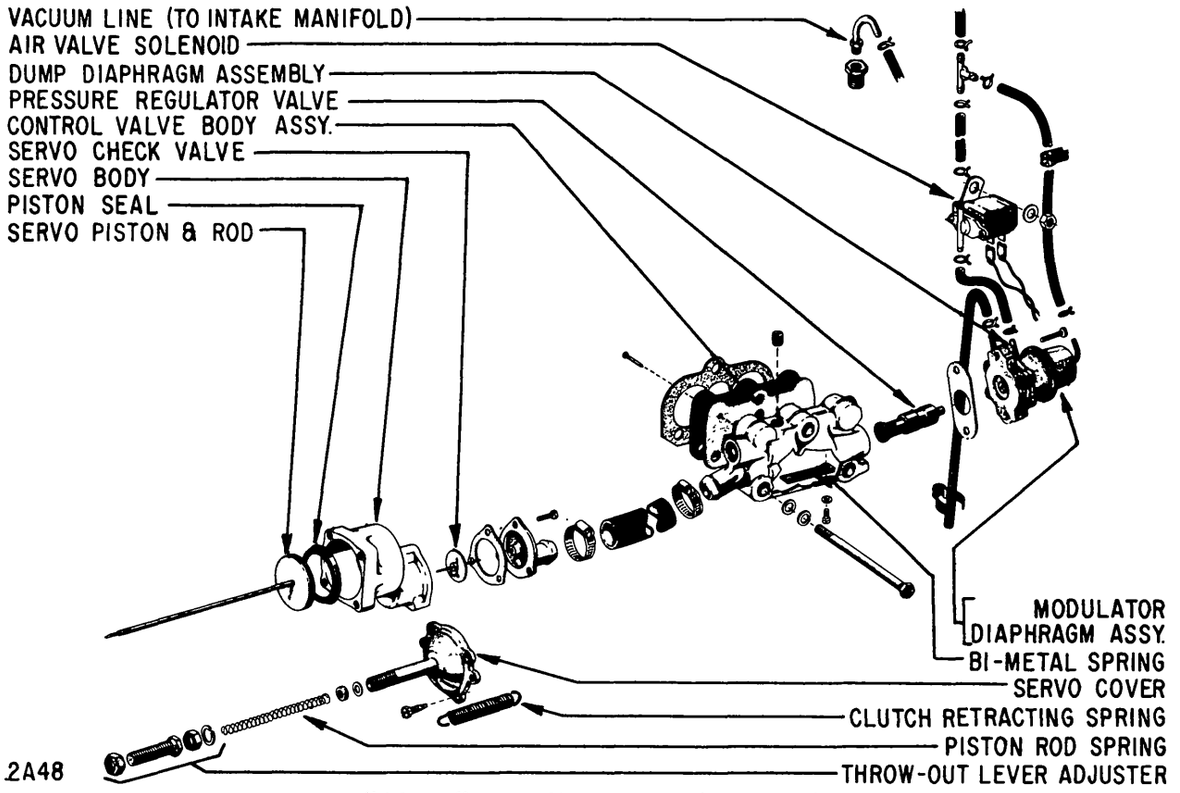
►*MANUAL CONTROL NOTE:* A "Tow Start" handle on instrument panel connected by an adjustable cable linkage to throw-out lever is provided for manual engagement of clutch.

OPERATION: In Neutral At Idle Speed - With gear shift lever in neutral, neutral safety switch contacts are closed, energizing air valve solenoid which pulls in to open vacuum line from intake manifold to dump diaphragm. Combined vacuum in dump and modulating diaphragms (modulating diaphragm connected directly to intake manifold) plus atmospheric pressure on underside of modulating diaphragm pulls springs in both diaphragms up to hold pressure regulator valve open so there is no oil flow from engine oil pump to servo, and clutch is disengaged.

In Gear At Idle Speed: When transmission is placed in gear, neutral safety switch contacts open to release air valve solenoid which shuts off vacuum supply to dump diaphragm. Atmospheric pressure in dump diaphragm lets full diaphragm spring pressure close pressure regulator valve. *NOTE - Spring-loaded ball check in regulator valve maintains a 7 lb. minimum pressure in valve body and servo. This pressure is just enough to overcome slightly the clutch retracting spring tension and produce a slight drag on clutch to take up drive line backlash and to initiate coasting engagement for engine braking.* With regulator valve closed, servo pressure will be regulated by main orifice from oil pump discharge side until servo oil pressure begins to overcome dump diaphragm spring pressure (17 lbs. approx.).

In Gear At Road Load: As servo oil pressure under load increases, dump diaphragm spring pressure is not sufficient to hold regulator valve closed. But at the same time, engine manifold vacuum is dropping off because

CONTINUED ON NEXT PAGE



"E-STICK" CONTROL MECHANISM (EXPLODED)

RAMBLER "E-STICK" AUTOMATIC CLUTCH (Continued)

of increased engine speed. When vacuum drops, modulating diaphragm spring pressure is allowed to combine with dump diaphragm spring pressure to hold pressure regulator valve closed. This combined pressure is approximately 45 lbs. and is sufficient to keep clutch engaged.

Gear Shifting Sequence: The above sequence of operations takes place when shifting through various transmission gears because releasing accelerator pedal causes manifold vacuum to increase to maximum, and moving the gear shift lever through neutral position for each shift allows air solenoid valve to introduce vacuum into dump diaphragm, thereby releasing the clutch.

TROUBLE SHOOTING & DIAGNOSIS

► *TROUBLE SHOOTING NOTE: When diagnosing clutch troubles, check for the usual clutch malfunctions such as bent or distorted driven and pressure plates, worn or oil soaked facings, misalignment, etc., in addition to the following special points.*

EXCESSIVE SLIP: Low servo oil pressure; Throw-out lever improperly adjusted or improperly installed; Engine oil level low; Air valve solenoid faulty, Check valve orifice in servo plugged; Diaphragm pushrod stuck in valve and diaphragm assembly; Diaphragm vent plugged; Minimum lube pressure valve stuck partially open.

EXCESSIVE CREEP: Engine idle speed too high; Clutch retracting spring too light or broken; Servo oil pressure too high; Retractor straps broken.

NO CLUTCH RELEASE: Diaphragm cover bent or damaged; Vacuum line leak; Control valve stuck in valve body; Neutral safety switch faulty or not adjusted properly; Wiring to air valve solenoid faulty; Air valve solenoid faulty; Throw-out lever or "Tow Start" cable improperly adjusted; Servo piston binding; Servo body air vent plugged; Diaphragm leak in diaphragm assembly.

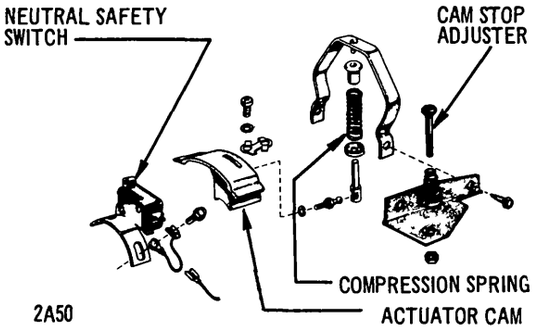
ENGINE OVERSPEEDS WHEN CLUTCH ENGAGES: Throw-out lever improperly adjusted; Servo piston binding; Servo body air vent plugged; Oil regulator valve not seating; Servo check valve sticking on shaft; Check valve orifice in servo plugged.

NO CLUTCH ENGAGEMENT: Neutral safety switch faulty or improperly adjusted; Air valve solenoid or wiring faulty; Minimum lube pressure valve stuck; Servo piston binding; Dump diaphragm spring broken; Pressure regulator valve stuck open; Engine oil level low.

EXCESSIVE GEAR CLASH ON ENGAGEMENT (1ST OR REVERSE): Throw-out lever improperly adjusted; Engine idle speed not correct.

ADJUSTMENT

Anti-Stall Dashpot Adjustment ("L" Head Engine - Carter Carb.): Turn idle speed screw out so throttle valve is tightly closed, fully depress dashpot plunger, turn dashpot in or out to obtain 1/8" clearance between end of plunger and throttle lever. Tighten locknut.



NEUTRAL SAFETY SWITCH & ACTUATOR CAM ASSEMBLY

Anti-Stall Dashpot Adjustment (Overhead Valve Engine - Holley Carb.): With engine idling at normal operating temperature, depress dashpot plunger fully, and turn adjusting screw on throttle lever to obtain a clearance of 9/64" between adjusting screw and dashpot plunger.

Neutral Safety Switch & Actuator Cam Stop Adjustment: Adjust neutral safety switch in mounting bracket so there is the same amount of gear shift lever movement when coming out of 2nd gear as there is when coming out of 3rd gear before neutral switch "clicks". Place gear shift lever in high gear and adjust actuator cam stop nut (upper nut at small end of spring) to take up approximately ½ of lever free movement (will center slot in 2nd and 3rd operating lever over selector key to remove any tension)

Throw-Out Lever Adjustment: With parking brake firmly set, engine idling at 550 RPM, and transmission shift lever in neutral, loosen locknut on throw-out lever adjusting screw. Turn adjusting screw so throw-out lever moves to rear of car until slight transmission gear clash is heard when moving shift lever **slowly toward 1st gear.** *CAUTION - DO NOT engage in gear.* Back off adjusting nut 2 turns and tighten locknut. Make "Tow Start" cable adjustment (see below).

"Tow Start" Cable Adjustment: After throw-out lever adjusted (see above), loosen locknut on "Tow Start" cable and turn adjusting sleeve so pivot clears throw-out lever by 1/8", then tighten locknut.

TESTING

STALL TEST: Method 1) is preferred method, but method 2) may be used as follows:

1) Bring engine to normal operating temperature and install an electric tachometer. Drive car on level ground in 3rd gear at 10 MPH. Move throttle to wide open position (apply brakes to hold at 10 MPH) and note tachometer reading. Engine speed should be 975-1125 RPM.

2) Bring engine to normal operating temperature and install an electric tachometer. Set parking brake and place transmission in 3rd gear. Apply brakes and open throttle fully. Engine speed should settle to 975-1125 RPM. *CAUTION - DO NOT hold throttle open for more than 2 seconds and DO NOT race at this test until ½ hour has elapsed.*

Test Conclusions - If engine RPM is higher than specified, refer to "Excessive Slip" under TROUBLE SHOOTING above for possible causes. If engine RPM is lower than specified, engine is not developing full power or servo oil pressure is too high.

OIL PRESSURE TEST: Bring engine to normal operating temperature and install pressure gauge at pipe plug fitting on control valve body assembly (use Adapter Fitting J-9622). Place transmission in neutral and set engine speed to 550 RPM. Remove vacuum hose at intake manifold and plug **manifold** opening (do not plug loose end of hose). Install an electric tachometer. Oil pressure should be as listed in table below for various engine speeds. *Be sure to check at all three speeds.* If pressure less than 45 lbs. at 2200 RPM, and diaphragm vent is not plugged and regulator valve is not stuck in valve body, replace diaphragm assembly. If pressure below 4.5 lbs. at 550 RPM, or below 24 lbs. at 1100 RPM, free pressure regulator valve or replace valve body.

Control Pressure Specifications

Engine Speed	Control Pressure
550 RPM	4.5-6.5 lbs.
1100 RPM	24.0-28.0 lbs.
2200 RPM	45.0-49.0 lbs.

AIR VALVE SOLENOID: Remove solenoid from mounting bracket, disconnect vacuum hoses, but leave wiring connected. With ignition off, solenoid is not energized, and you should not be able to blow through port "V". This checks vacuum part of solenoid in closed position. Now turn ignition on. Solenoid should be energized and you should be able to blow through port "V". This checks vacuum valve in open position. With ignition on, and solenoid energized, close port "D" with a finger. You should not be able to blow through port "V". This checks atmospheric end of valve for proper seating. Replace air solenoid valve if any of above conditions not met.

SERVO & CHECK VALVE: Engage clutch manually with "Tow Start" handle. Move servo pushrod back and forth to check for binding. If oil leaks at rear of servo, check servo piston seal and cylinder bore. If oil leaks at front of servo, check hose clamp and servo gasket.

CLUTCH

CLUTCH: Removal - Remove transmission, flywheel housing lower cover, and disconnect retracting spring and "Tow Start" cable from throw-out lever. Remove clutch. *NOTE - Mark cover, pressure plate and flywheel for reassembly in same positions.*

Disassembly: Clutch may be disassembled by removing the three pressure plate attaching screws.

Inspection: Inspect all parts for wear, damage, distortion, etc. Replace parts as necessary. Replace cover if any drive straps are broken. *CAUTION - Do not wash release bearing in gasoline or any solvent. Unnecessary and impossible to lubricate bearing as it is packed for life.*

Reassembly: Reverse disassembly procedure and apply small amount of lubriplate to release lever fulcrums.

Installation: Reverse removal procedure and use Aligning Tool J-1625 or J-5442 to insure correct clutch alignment. *NOTE - Before removing aligning tool, attach "Tow Start" cable and pull handle all the way out to hold clutch in place to aid transmission installation.*

BORG & BECK

CHEVROLET CARS & CORVETTE	Mdl	Cvr No.	Disc N.
409" V8 & Corvette	10.5A9W	361510	382932
CHEVROLET TRUCKS			
261" 6 Cyl. (Std.)	11A9	361483	382860
261" 6 Cyl. (Optl.)	12A5	361563	381391
CHRYSLER			
Newport & 300	10.5A8WW	361506	383269
300H	11A8W	361579	387762
DODGE, DART, PLYMOUTH, LANCER, VALIANT			
170" 6 Cyl. (Std.)	9A7	361574	383045
170" 6 Cyl. (H.D.)	10A5	361545	383082
170" 6 Cyl. (H.D.)	10A5	361576	383082
225" 6 Cyl. (Std.)	9A7	361577	383081
225" 6 Cyl. (H.D.)	10A5	361576	383082
318" V8 (Std.)	10¼A8WW	361505	383044
318" V8 (H.D.)	10.5A8WW	361570	387380
361" V8	10.5A8WW	361506	383269
Super Hi-Perf. Eng.		ℂ 2401095	ℂ 2401097

ℂ - Chrysler Corp. Part Number.

PONTIAC & TEMPEST			
Pontiac (Std.)	10.5A9W	361595	383109
Pontiac (H.D.)	10.5A9WW	361596	383109
Tempest	9A7	361581	383206
RAMBLER			
6 Cyl. "L" Head Std.	8A7	361531	382347
6 Cyl. "OHV" Std.	8.5A7	361530	② 382394
6 Cyl. "OHV" H.D.	9A7	361494	382828
6 Cyl. All H.D.	8.5A7	361416	② 382394
6 Cyl. All Fleet	8.5A6	361360	② 382248
V8 Eng. Std.	10.5A6	361442	383036
V8 Eng. H.D.	10.5A6	361449	383036

② - No. 382490 with Overdrive.

STUDEBAKER			
6 Cyl. (Std.)	8.5A7	361586	③ 383292
6 Cyl. (H.D.)	9A7	926	383183
6 Cyl. (Taxi)	10.5A8	361559	383182
V8 (3-Speed Trans.)	10A7	361555	382650
V8 (4-Speed Trans.)	10¼A8WW	361558	383181
V8 (Taxi & Police)	10.5A8	361560	383182

③ - No. 383291 with Overdrive.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 RAMBLER GEAR CLASH ON ENGAGEMENT CORRECTION:* Make sure clutch pedal total travel and freeplay are correctly adjusted (see below).

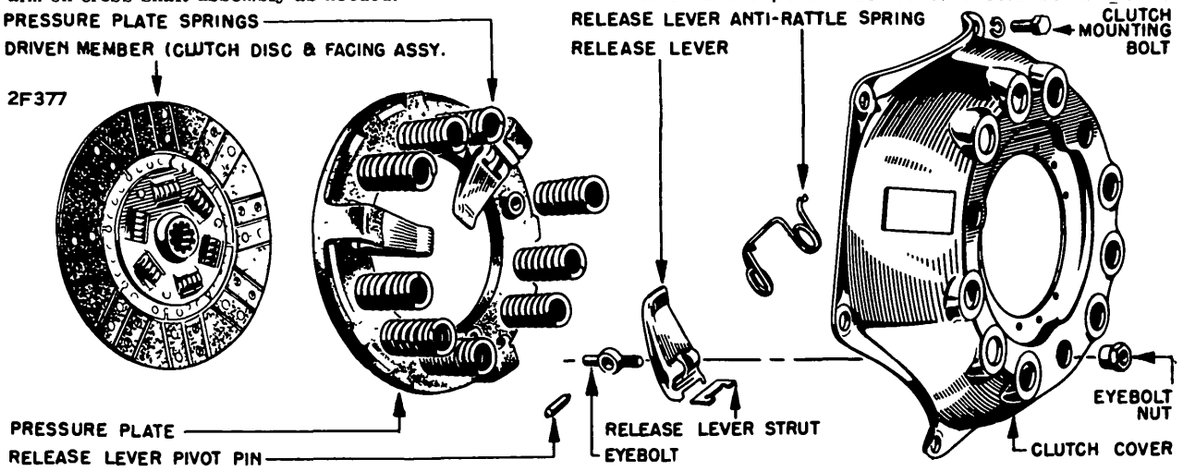
DESCRIPTION: Single plate, dry disc type. Three release levers, mounted on bolts piloted in pressure plate and retained in clutch cover, actuate clutch struts which provide "knife-edge" action. *NOTE - Some models may have four release levers.*

►*SEMI-CENTRIFUGAL CLUTCH NOTE:* These clutches ("W" or "WW" suffix in model number) have three roller assemblies in grooves in pressure plate directly under clutch cover. Centrifugal action on these rollers increases the pressure plate load as the engine speed increases.

CLUTCH PEDAL & LINKAGE ADJUSTMENTS: As follows:

Chevrolet Pass. Cars: Free travel should be 7/8-1 1/8". To adjust, remove pedal return spring and back off pedal pushrod lower locknut (at swivel end) about ½". Hold pushrod so pedal is against bumper stop, and hold cross shaft lever so throw-out bearing is against clutch fingers. Adjust pushrod upper locknut so there is 3/16-1/4" clearance between this locknut and upper edge of swivel. Release pushrod and cross shaft lever, tighten lower locknut to lock swivel against upper locknut, and install return spring.

Corvette: Free travel should be approximately 1". To adjust, disconnect lower pushrod swivel from cross shaft lever and hold pushrod in direction of clutch release (throwout bearing against release levers). Adjust swivel so it freely enters hole in cross shaft lever (to remove all lash), then shorten pushrod 2 full turns of swivel and connect swivel to cross shaft lever. Recheck pedal free travel. Clutch pedal total travel should be 6½" (4½" on fast release position cars). To increase travel, trim rubber bumper as necessary; to decrease travel, adjust pedal free travel as necessary. Clutch over-center spring load should require 6-9 lbs. force to push pedal away from bumper. To adjust, disconnect clutch fork pushrod and adjust arm on cross shaft assembly as needed.



BORG & BECK CLUTCH ASSEMBLY (TYPICAL)

Chevrolet Trucks: 1) Adjust pedal height so pedal pad is even with brake pedal pad by moving clutch pedal bumper as necessary. Disconnect clutch fork return spring, bottom slave cylinder pushrod and piston (push to front of truck as far as possible), and pull clutch fork to rear of truck until throw-out bearing touches clutch release levers. Clearance between slave cylinder pushrod fulcrum ("V" block) pivot and clutch fork should be 5/32" (use 5/32" diameter drill rod to measure). To adjust, turn adjusting nut behind pushrod fulcrum.

2) Clutch pedal free travel should be 1/8" before clutch pushrod touches master cylinder piston. To adjust, turn adjustable pushrod on master cylinder as necessary.

Chrysler Corp. Models: Shorten or lengthen clutch release fork rod by turning adjusting nut until there is 5/32" free movement of clutch fork outer end. *NOTE - This adjustment will provide correct 1" pedal freeplay.*

Pontiac (Except Tempest): Make following adjustment to maintain clutch pedal free travel at ¾". *NOTE - Following procedure supersedes previous recommendations.* Loosen clutch fork rod adjusting nut and adjust silencer bumper (if equipped) so countershaft is lifted .015-.020" off stop. With throw-out bearing just touching clutch release levers, turn adjusting nut until nut just seats in fork, then back off nut 4¼ turns (3/16"), recheck adjustment and tighten locknut to 8 ft. lbs. Install adjusting rod to fork spring and and install cotter pin. Pedal height should be 6¾-7" above floor mat. To adjust, loosen pedal nut upper trunnion jam nuts and adjust as necessary. Tighten jam nuts to 8 ft. lbs.

Rambler: 1) Clutch pedal total travel should be 7¼-7¾" from top face of pedal (cushion removed) to **bare** floor pan measured at 90° to clutch pedal face. If less than 7¼", pull up on pedal against stop for proper dimension.

2) Free travel should be ½-¾" (½" preferred). To adjust, turn throw-out lever-to-inner release idler lever assembly connecting link as necessary.

Studebaker: *CAUTION - Brake pedal must be properly adjusted as follows before making clutch pedal adjustments. Brake pedal free travel should be 1/4-3/8". Adjust by turning adjustment screw at pedal bracket.* With brake pedal properly adjusted, turn clutch pedal stopscrew so that the clutch pedal is at the same height as brake pedal. *NOTE - On power brake cars, adjust so clutch pedal height is 6¼-6½" from top of pedal pad to floor mat.* Turn adjusting nut on clutch over-center spring so spring length is 10", then adjust clutch pedal-to-bellcrank rod so there is ½" clearance between top end of bellcrank and body flange on front side of firewall. Now turn clutch operating rod adjusting nuts as necessary for ½-1" pedal free travel measured at pedal pad.

►*HILL HOLDER NOTE:* Check setting whenever clutch pedal adjusted and adjust operating rod so Hill Holder releases at same time clutch is engaged.

Tempest: Back off silencer bumper so it does not touch pedal, then adjust pedal stop bracket assembly for pedal height of 4½-4¾" from lower edge of pedal pad to floor mat. Place silencer bumper so it just contacts pedal arm when clutch fully released. Disconnect rear end of clutch fork rod and pull clutch fork to rear of car until throw-out bearing solidly contacts clutch release levers, turn adjusting nut back against fork, then turn

CONTINUED ON NEXT PAGE

BORG & BECK (Cont.)

nut forward 5 turns and tighten locknut. *This supersedes previous settings.* Connect clutch fork rod. *NOTE - Clearance between throw-out bearing and release levers with clutch fully released should be .060" minimum.*

CLUTCH REMOVAL: As follows:

Chevrolet Pass. Cars: Remove transmission *(see Transmission Section).* Remove throw-out bearing and tension spring from clutch fork, then disconnect fork from pushrod. Disconnect fork from ball stud by forcing to center of car. *NOTE - On V8 engines only, ball stud can be removed from clutch housing with an allen wrench.* Remove clutch assembly attaching bolts and remove clutch.

Corvette: Remove transmission *(see Transmission Section).* Remove flywheel underpan and throw-out bearing from clutch fork. Support clutch assembly and mark cover and flywheel for reassembly. Remove clutch assembly attaching bolts and remove clutch. *NOTE - To hold release levers down during clutch removal, place nut or spacers between release levers and clutch cover.*

Chevrolet Trucks: Remove transmission *(see Transmission Section).* Disconnect slave cylinder from clutch fork and remove throw-out bearing. Press clutch fork away from mounting with a screwdriver until fork snaps loose from ball, or remove ball stud from clutch housing. *NOTE - Remove retainer from fork by prying with a small screwdriver.* Support clutch assembly and mark cover and flywheel for reassembly. Remove clutch assembly attaching bolts and remove clutch. *NOTE - To hold release levers down during clutch removal, place nuts or spacers between release levers and clutch cover.*

Chryxler Corp. Models: Remove transmission *(see Transmission Section).* Remove clutch housing pan and dust seal, and disconnect release fork rod at fork. Remove retracting spring. Remove release fork, dust seal, sleeve, and throw-out bearing. Mark flywheel and pressure plate for reassembly, remove attaching bolts and remove clutch assembly.

Rambler: Remove transmission *(see Transmission Section).* Disconnect linkage and remove clutch housing and pan. Mark flywheel and clutch for reassembly and take out clutch fork. Remove clutch attaching bolts and remove clutch assembly.

Pontiac (Except Tempest): Disconnect battery, then remove transmission and propeller shaft *(see Transmission Section).* Remove throw-out bearing and clutch fork pushrod, then disengage pedal pushrod from countershaft. Remove over-center spring (rotate countershaft assembly), then remove countershaft. Remove starter and flywheel housing front shield. Remove flywheel housing. Mark flywheel and clutch for reassembly, remove attaching bolts, and remove clutch.

Studebaker: Disconnect battery. On 6 Cyl., remove oil level gauge and tube, and disconnect starter and tie out of way (unnecessary to disconnect cables). On V8, remove starter completely. Remove clutch operating shaft and transmission *(see Transmission Section).* Disconnect engine rear support from crossmember and raise engine sufficiently to take weight off crossmember. Remove crossmember (and clutch housing cover plate on V8 cars). Remove clutch housing. Mark flywheel and clutch for reassembly, remove attaching bolts, and remove clutch assembly.

Tempest: Disconnect stabilizer bar from frame side rail, disconnect exhaust pipe, and disconnect front of torque tube from clutch housing *(see "Propeller Shafts" in Rear Axle Section).* Disconnect clutch rod from clutch fork, and linkage link from clutch housing, then remove clutch housing assembly. Mark flywheel and clutch for reassembly, then remove clutch assembly from flywheel.

OVERHAUL: Mark all parts before dismantling clutch and reassemble in same position to maintain clutch balance. Replace grooved, checked or warped pressure plates. Replace springs when pressure plate discolored from heat.

►*PONTIAC & TEMPEST OVERHAUL NOTE: Car manufacturer does not recommend overhaul of clutch assembly.*

Disassembly: Place clutch on fixture or arbor press (support pressure plate under release levers), place block across cover resting on spring bosses, compress cover slightly, remove metal staking in adjusting nuts by running hacksaw blade through slot, remove nuts. Release pressure slowly, remove cover and springs. Remove release levers by grasping lever and eyebolt between thumb and forefinger, so that inner end of lever and upper end of eyebolt are pressed together, lift strut over ridge in end of lever (press lower end back against lug), lift lever and eyebolt out.

Clutch Spring Specifications

Cover No.	Springs - No. & Color	Lbs. Pressure
926	9-Lavender	145-155 at 1 1/2"
361360	9-Lavender	145-155 at 1 1/2"
361416	6-White	239-251 at 1 1/2"
361442	6-No Color	150-160 at 1 11/16"
	6-Light Green	170-180 at 1 11/16"
361449	3-Dark Blue	183-197 at 1 11/16"
	9-Light Green	170-180 at 1 11/16"
361483	6-Tan	155-165 at 1 1/2"
	6-Red or No Color	189-201 at 1 1/2"
361494	6-White	239-251 at 1 1/2"
361505	9-Red or No Color	189-201 at 1 1/2"
361506	3-White	239-251 at 1 1/2"
	6-Red or No Color	189-201 at 1 1/2"
361510	12-Red or No Color	189-201 at 1 1/2"
361530	6-Black	223-237 at 1 1/2"
361531	6-Red or No Color	189-201 at 1 1/2"
361545	3-Tan	155-165 at 1 1/2"
	6-Lavender	145-155 at 1 1/2"
361555	3-No Color	150-160 at 1 11/16"
	6-Pink	209-225 at 1 11/16"
361558	9-Orange	165-175 at 1 1/2"
361559	6-Red or No Color	189-201 at 1 1/2"
361560	3-Lavender	145-155 at 1 1/2"
	6-Red or No Color	189-201 at 1 1/2"
361563	3-Red or No Color	189-201 at 1 1/2"
	9-Lavender	145-155 at 1 1/2"
361570	6-Orange	165-175 at 1 1/2"
	6-Red or No Color	189-201 at 1 1/2"
361574	3-White	239-251 at 1 1/2"
	3-Red or No Color	189-201 at 1 1/2"
361576	9-White	239-251 at 1 1/2"
361577	3-Red or No Color	189-201 at 1 1/2"
	6-Orange	165-175 at 1 1/2"
361579	6-Orange	165-175 at 1 1/2"
	6-White	239-251 at 1 1/2"
361581	3-Tan	155-165 at 1 1/2"
	6-Red or No Color	189-201 at 1 1/2"
361586	3-Red or No Color	189-201 at 1 1/2"
	3-Orange	165-175 at 1 1/2"
361595	3-Yellow	135-145 at 1 1/2"
	9-Red or No Color	189-201 at 1 1/2"
361596	6-Orange	165-175 at 1 1/2"
	6-Black	223-237 at 1 1/2"

Reassembly: Place pressure plate on fixture or arbor press supporting plate under release lever lugs. Install lever, eyebolt and strut assemblies by reversing removal procedure. On semi-centrifugal models, install roller assemblies in pressure plate grooves. Install clutch springs on pressure plate. Install anti-rattle springs on release levers in cover. Place cover on pressure plate. Make certain that springs are seated in cover recesses and anti-rattle springs in place on release levers. Compress cover slowly and guide eyebolts through holes in cover. If assembly made in fixture, use clamps to clamp cover flange to plate at mounting holes. Install eyebolt nuts and turn nuts down flush with head of bolt. Compress and release clutch several times to seat all working parts. Then adjust release lever heights.

Clutch Springs: Note spring color and install in same relative position (groups of two different springs used on some clutch models). Springs should check with table below. Replace springs if weak or burned or if clutch has been subjected to excessive heat.

Release Lever Setting
(Borg-Warner Fixtures UF-300 & UF-400)

Clutch Assy.	℄ Lever Height	Clutch Assy.	℄ Lever Height
926	2 3/16"	361558	2 1/8"
361360	2 1/4"	361559	2 3/8"
361416	2 5/32"	361560	2 3/8"
361442	2 5/32"	361563	2 9/32"
361449	2 5/32"	361570	2 3/16"
361483	2 9/32"	361574	2 3/16"
361494	2 9/16"	361576	2 1/4"
361505	2 3/16"	361577	2 3/16"
361506	2 3/16"	361579	2 5/16"
361510	2 5/16"	361581	2 3/32"
361530	2 5/32"	361586	2 5/32"
361531	2 9/32"	361595	2 7/32"
361545	2 1/4"	361596	2 7/32"
361555	2 1/16"		

℄ - Using three 3J lands and 3X indicating plate.

Release Lever Adjustment (With Borg-Warner Universal Fixtures UF-300, 400): Special lands must be installed on fixture under pressure plate lever lugs. Set adjusting arm on adjusting sleeve so that height of lower side arm above bottom of sleeve is correct for each model (see table below). Install indicating plate on levers. Adjust each lever so that it just contacts indicating plate or adjusting arm, lock lever adjusting nuts by peening nut against notches in eyebolt.

Release Lever Adjustment (Using Gauge Plate): Install clutch on flywheel in car, or on dummy flywheel on bench, with Borg & Beck Gauge Plate installed in place of regular driven member *(CAUTION* - Machined lands on gauge plate should be directly under release levers). Depress each lever several times to seat all parts, then place straightedge or sheet metal height gauge on gauge plate boss directly above release lever and adjust lever height until lever tip contacts lower edge of height gauge ("Flush" setting).

CHEVROLET (OWN)

DESCRIPTION: Single plate dry disc type with a diaphragm spring (replacing conventional clutch release springs and release levers). Diaphragm is shaped like a dished washer, with inner rim slotted to form 18 release fingers and is pivoted on inner and outer pivot rings mounted on 9 bolts in clutch cover. *NOTE* - Clutches used on 235" engine, 283" engine with 2-Bbl. Carb., and Corvair engine all have straight-finger clutches. All other models using this type clutch, have six of the fingers (18 total) bent upward with weights at outer ends to provide centrifugal action for increased clutch pressure at higher clutch speeds.

Clutch Linkag Adjustm nt: Chevrolet Pass. Cars - Free travel should be 7/8-1 1/8". To adjust, remove pedal return spring and back off pedal pushrod lower locknut (at swivel end) about 1/2". Hold pushrod so pedal is against bumper stop, and hold cross shaft lever so throw-out bearing is against clutch fingers. Adjust pushrod upper locknut so there is 3/16-1/4" clearance between this locknut and upper edge of swivel. Release pushrod and cross shaft lever, tighten lower locknut to lock swivel against upper locknut, and install return spring.

Ch vy II - Free travel should be 3/4-1" measured at pedal pad. To adjust, loosen locknut on clutch fork pushrod and shorten or lengthen pushrod as necessary, then tighten locknut. Recheck pedal free travel. *NOTE - 1/8" cl aranc between pushrod and pushrod s at in clutch f rk will give proper pedal free travel.*

C rvair Pass. Car - 1) Attach return spring to clutch lever control cable cross-shaft outboard lever lower hole. *NOTE* - Clutch fork pull rod must be disconnected from cross-shaft lever.

2) Adjust clevis swivel until outboard lever on clutch lever control cable cross shaft has a clearance of 1/8" to 3/4".

3) Hold pull rod to remove all slack at bearing and align swivel with upper hole of outboard lever, then back off swivel 3 complete turns and assemble swivel to lever and install clip.

Corvair Truck & Greenbrier - *NOTE* - Pedal should have at least 3/4" travel before release bearing engages diaphragm.

1) Disconnect **rear** clutch return spring. *CAUTION* - **Fr nt** spring must be in operation to hold pedal bumper in contact with toe-board.

2) Remove retainer clip, clevis pin and washer from clutch control idler lever and remove rear cable clevis.

3) Let idler lever hang free to furnish guide for correct line of action of cable clevis.

4) Pull cable clevis rearward to remove all slack forward of this point, then pull clutch fork pull rod until all slack is taken up at clutch fork.

5) With cable clevis and pull rod in this position, adjust pull rod clevis to align holes in both clevises.

6) With pull rod clevis position established, unscrew clevis 3½ turns (lengthen rod 5/32"). Tighten jam nut.

7) Line up holes in cable clevis, pull rod clevis, and clutch fork pull rod idler lever and insert clevis pin and retainer clip. Install return spring.

Trucks - Adjust pushrod so as to obtain free travel between master cylinder pushrod and piston. This will amount to 1/8" free travel measured at center line of pedal pad, just before pushrod contacts piston. *NOTE* - This insures piston uncovering port in reservoir.

Pedal Adjustment (Total Travel): Trucks - 1) Adjust clutch pedal bumper so clutch pedal pad (fully released) is even with brake pedal, then disconnect return spring.

2) Push slave cylinder pushrod forward as far as possible and pull clutch fork rearward until all slack is removed at throwout bearing, then turn adjusting nut behind slave cylinder pushrod fulcrum ("V" block) to obtain 5/32" clearance between fulcrum pivot and clutch fork (use shank of 5/32" drill).

Removal: Pass. Cars - Remove transmission. Remove clutch throwout bearing from fork, then remove clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of vehicle. Install Clutch Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one at a time until tension of spring is released. Remove tool, then remove clutch assembly from vehicle. When installing clutch, align "X" mark on cover and flywheel.

Chevy II - Raise and support car and remove transmission (see Transmission Section). Disconnect return spring from clutch fork and remove throw-out bearing from fork. Remove clutch housing (cover plate will hang from starter gear housing). Remove clutch fork from ball stud and dust boot. Support clutch assembly with Tool J-5824, then remove clutch assembly by loosening attaching bolts a little at a time until all clutch spring tension is relieved.

►*CHEVY II CLUTCH DISC INSTALLATION CAUTION:* Extended end of hub with damper springs must be installed toward flywheel.

Corvair - *See "Engine" in Corvair Special Data.*

Trucks - Remove transmission, then disconnect slave cylinder at clutch fork and remove bearing from fork. Press fork away from ball mounting (use screwdriver), or remove ball stud from rear of clutch housing. *NOTE - Pry retainer out of fork with small screwdriver.* Install Tool J-5824 to support assembly. Loosen clutch attaching bolts gradually to release spring tension then remove tool and remove clutch assembly.

Bleeding System: (Trucks) - Same as for brake system. Bleed clutch hydraulic line at clutch slave cylinder bleed holes.

OVERHAUL: 1) Remove three drive strap-to-pressure plate bolts and retracting springs, then remove pressure plate from cover. *NOTE* - When disassembling, note position of grooves on edge of pressure plate and cover for reassembly to maintain balance.

2) Inspect spring, rings and cover for excessive wear or damage. If defect found, replace assembly.

CHEVROLET CLUTCH APPLICATION

Model	Cover Assembly No.	Clutch Disc No.	Clutch Disc Size	Hub Color
Chevy II (Std. 4 Cyl.)	3788655	ℂ 3791264	8"	None
Chevy II (Std. 6 Cyl.)	3788655	ℂ 3791266	9"	None
Chevy II (Heavy Duty)	3792398	ℂ 3815215	10"	None
Corvair (Exc. Truck)	3787882	ℂ 3784300	8"	None
Corvair Truck	3777875	ℂ 3779872	9"	None
Chevrolet Cars & Trucks				
6 Cyl. Pass. (Exc. H.D.)	3819914	ℂ 3815218	9.5"	None
6 Cyl. Pass. (H.D. & Taxi)	3792398	ℂ 3815215	10"	None
235" Ser. 10-30 (Exc. H.D.)	3819914	ℂ 3836119	10"	Red
235" Ser. 10-30 (H.D.)	3819927	ℭ 3758678	11"	White
261" & 283" Ser. 10-30 (Exc.H.D.)	3819927	ℂ 3836119	10"	Red
261" & 283" Ser. 10-40 (H.D.)	3819927	ℭ 3758678	11"	White
261"& 283" Ser. 10-30 (Exc. H.D.)	3819927	ℭ 3836097	10"	Orange
283"Pass. (Exc. Police)	3819914	ℂ 3779757	10"	None
283" Police	3799139	ℂ 3815216	10"	None
327" Pass.	3799139	ℂ 3815216	10"	None

ℂ - Woven. ℭ - Molded.

AUBURN

Car Model	Clutch No.
Checker	
Dodge Dart & Plymouth	
170" Engine	100306-1
225" Engine	100300
Willys 4 & 6 Cylinder	Ⓒ

Ⓒ - 3-spring and 6-spring types used. Rockford clutches also used on some models.

DESCRIPTION: Single plate, dry disc type of same design used on corresponding previous models.

PEDAL ADJUSTMENT

Dodge Dart & Plymouth: Freeplay Adjustment - Adjust self-locking nut on clutch fork rod to provide 5/32" free movement at fork-to-pushrod pin. This will provide correct 1" pedal freeplay.

Willys Freeplay Adjustment: 4 Cyl. (Jeep & Jeep Dispatcher) - 1½" pedal freeplay. To adjust freeplay, loosen yoke locknut on cable between throwout lever and cross shaft lever and turn yoke as required.

4 Cyl. (Trks. and Sta. Wgn. Exc. FC-150) - 1" pedal freeplay. To adjust, loosen control rod locknut and screw adjusting nut (on threaded connection between clutch control lever and control tube lever) in or out. Retighten locknut.

6-226 Models (Exc. FC-170) - 1" pedal freeplay. To adjust, loosen locknuts on pedal adjusting rod. Turn nuts forward to increase or backward to decrease freeplay. Tighten both locknuts against trunnion (without changing adjustment).

FC-150 & FC-170 Models - ½" pedal freeplay. To adjust, change cable length so pedal has ½" free movement from fully engaged position before resistance is felt.

REMOVAL

Dodge Dart & Plymouth 6 Cyl.: Remove transmission. Pull out release bearing and sleeve. Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to release spring tension. Remove clutch assembly.

Willys: Jeep & Jeep Dispatcher - Remove transmission or transmission and transfer case. Remove engine from chassis (labor will be saved if engine is removed without bell housing). Mark pressure plate and flywheel for reinstallation of clutch. Remove clutch cover screws (turn all screws out evenly to reduce spring pressure) and remove cover assembly and clutch disc from flywheel.

Forward Control Models - Remove transmission or transmission and transfer case. On FC-150 models, remove bell housing from engine. On FC-170 models, remove flywheel housing pan from bottom of housing. On all models, mark pressure plate and flywheel for reinstallation. Loosen attaching screws evenly (to release spring pressure and prevent distortion of bracket), then remove clutch assembly from flywheel.

Utility Models - On 6-226 models (with split bell housing), disconnect both front and rear propeller shafts and pull transmission to rear sufficiently to clear transmission main driveshaft from clutch, then remove bottom pan from bell housing. Mark both pressure plate and flywheel for reassembly. Loosen pressure plate to flywheel screws evenly in sequence a little at a time to prevent distortion of clutch bracket. Remove assembly from vehicle.

OVERHAUL: *See 1959 Final Data, Page 332, or later Manual edition and note the following:*

►*OVERHAUL TOOL NOTE: Use Tool C-585A (Dodge Dart & Plymouth 6 Cyl.). C-585-C (Willys).*

Clutch Springs: Use correct springs (see table below). Replace all springs that are burned or do not meet specifications.

Clutch Spring Specifications

Model	No. & Color	Lbs. Pressure
Dodge Dart & Plymouth		
170" Engine	3 Black	196 at 1.84"
225" Engine	3 Red	236 at 1.81"
Willys		
FC-150, Jeep (Std.)	3	220-230 at 1 9/16"
Jeep (Optl.)	3	160-176 at 1 13/16"
Utility 4 Cyl. (Std.)	3	220-230 at 1 9/16"
Utility 4 Cyl. (Optl.)	3	160-176 at 1 13/16"
Utility 6 Cyl. Ⓒ (Std.)	3	220-230 at 1 9/16"
Utility 6 Cyl. Ⓒ (Optl.)	3	239-264 at 1 13/16"
6 Cyl. OHC Eng. (Std.)	3	253-281 at 1 13/16"
6 Cyl. OHC Eng. (Optl.)	6	152-168 at 1 1/2"

Ⓒ - "L" Head Engine.

Release Lever Setting Spacer

Model	Spacer No.
Dodge Dart & Plymouth	43
Willys (All)	17

LONG MODEL 8½

Clutch Cover Assembly

Car Model	Long No.	Ford & Mercury No.
Comet & Falcon Std.	260013	CODD-7563-B
Comet & Falcon H.D.	260138	C1UU-7563-A
Fairlane & Meteor 6 Cyl. Ⓒ	261256	C2OZ-7563-C
Econoline Trucks	260138	C1UU-7563-A

Clutch Disc

Car Model	Long No.	Ford & Mercury No.
Comet & Falcon Std.	280122	C1DD-7550-E
Comet & Falcon H.D.	280214	C1DD-7550-C
Fairlane & Meteor 6 Cyl. Ⓒ	280461	C2OZ-7550-E
Econoline Trucks	280214	C1UU-7550-A

Ⓒ - Standard Clutch. 6 Cyl. H.D. & V8 clutch is Long CF (semi-centrifugal) type. *See "Long CF & NC Clutches" in this section.*

DESCRIPTION: Single plate, dry disc type. Three flat release levers extend through slots in cover and engage slots in pressure plate bosses. Pressure plate springs are installed between pressure plate and cover between the release levers.

PEDAL ADJUSTMENT

Comet & Falcon: Assist Spring Adjustment - Adjust retainer in link so distance from inside radius of spring hook to front face of link is 1 3/16"

Total Travel Adjustment - Move bumper and bracket as required to secure 6-6½" of travel. Make this adjustment prior to making Freeplay Adjustment.

Freeplay Adjustment - Loosen pedal-to-equalizer rod nuts and move equalizer bar as required to obtain 7/8-1 1/8" movement of pedal from fully released position until release fingers contact release bearing, then tighten nuts against trunnion without altering adjustment.

Fairlane & Meteor: Pedal Linkage & Height Adjustment - Disconnect interlock shift rod at interlock shift lever, then measure total travel of clutch pedal. *NOTE - Measure distance from steering wheel to clutch pedal with pedal fully released, then again with pedal fully depressed.* If travel not within specifications, move clutch pedal bumper and bracket up or down until travel is correct (6 5/8-6 7/8"). *CAUTION - Always check and adjust total travel before checking free travel.* With clutch pedal against its bumper (fully released) distance between assist spring eye centers should be 10". Adjust spring retainer hook length as necessary. With engine idling, depress clutch pedal just enough to take up free travel and note reading on tape (distance between steering wheel and clutch pedal). Difference between this reading and reading where pedal is released should be 15/16-1 1/16". If not within specifications, adjust clutch pedal-to-equalizer rod. To increase free travel, loosen rearward adjusting nut and tighten forward nut. To reduce free travel, loosen forward nut and tighten rearward nut. Tighten both nuts against trunnion after adjustment. With transmission in neutral and interlock pawl snugly engaged, connect interlock rod. As a final check, measure pedal free travel with transmission in neutral and engine running at 3000 RPM. If free travel at this speed is not ½", readjust clutch pedal-to-equalizer rod as necessary. *CAUTION - Free travel must be exactly as specified.*

►*FAIRLANE & METEOR INTERLOCK LINKAGE NOTE:* If interlock shift linkage does not operate correctly, or if disturbed during clutch linkage and height adjustment, adjustment must be made on interlock linkage. *See "Ford & Mercury 3-Speed Synchro-mesh Transmission" in Transmission Section.*

Econoline: Freeplay Adjustment - Loosen nut on turnbuckle on release rod and rotate turnbuckle to obtain freeplay or travel of 7/8-1 1/8", measured from fully released position until release fingers contact release bearing. Tighten nut. *NOTE - When freeplay is correct, total travel (6-6½") will be correct.*

REMOVAL & INSTALLATION: All Models - Remove transmission (see Transmission Section), then remove starter motor and dust seal. Disconnect retracting spring, then disconnect pedal from equalizer rod at equalizer bar. Remove release bearing and hub. Remove flywheel housing and inspection or dust cover. Remove clutch assembly from flywheel.

OVERHAUL: *CAUTION - Parts are not furnished and manufacturer recommends that clutch not be disassembled.* Replace pressure plate and cover assembly if release levers do not operate freely or if lever heights not equal. *See Release Lever Checking below.*

Release Lever Checking: Assemble pressure plate and cover assembly on flywheel with a .250" shim installed in place of regular driven member. Use depth gauge or dial indicator to measure height of inner end of each release lever. All levers must be equal within .031". If lever variation greater than .031" replace pressure plate and cover assembly.

LONG "CF" & "NC"

CLUTCH COVER ASSEMBLY

BUICK	Long Model	Long Assy. No.
Special	9½CF	260154
OLDSMOBILE		
F-85	9½CF	260154
88	10CF	260225
88 & 98, Police & Taxi	11CF	260174

	Long Model & Assy. No.	Ford & Mercury No.
FAIRLANE & METEOR		
170" 6 Cyl. H.D.	9½CF 260245	① C2OZ-7563-A
221", 260" V8 Std.	10CF 260251	② C2OZ-7563-D
221", 260" V8 H.D.	10½CF 260259	③ C2OZ-7563-B
GALAXIE & MONTEREY		
223" 6 Cyl. Std.	9½CF 260294	④ C1AZ-7563-A
223" 6 Cyl. Taxi	11NC 260186	⑤ C1AA-7563-F
292" V8 Std.	10CF 260295	⑥ C1AZ-7563-B
292" V8 H.D.	11CF 260296	⑦ C1AZ-7563-E
352" V8	11CF 260296	⑦ C1AZ-7563-E
390", 406" V8 (Early)		⑧ C1AZ-7563-C
390", 406" V8 (Later)		⑨ C2AZ-7563-A
FORD TRUCKS		
F-100, 250 6 Cyl. 11	10CF	10 B6A-7563-B
F-100, 250 V8 11	10½CF 267371	B6C-7563-A
F, B-500, 600; C-550, 600; P-500	11½CF 260093	C1TT-7563-B
All Others	11CF 260162	C0TT-7563-A

Color Mark On Cover: ① - Green & Orange. ② - Grey. ③ - Pink Ink. ④ - Black. ⑤ - Bronze Ink. ⑥ - Brown & Yellow. ⑦ - Pink & Orange. ⑧ - Pink. ⑨ - Yellow & Green. 10 - Yellow on Cover, Black on Pressure Plate.
11 - Except 4-Wheel Drive and/or 4-Speed Transmission.

CLUTCH DISC

BUICK	Long No.
Special	280152
OLDSMOBILE	
F-85	280266
88	280353
88 & 98, Police & Taxi	282687

	Long No.	Ford & Mercury No.
FAIRLANE & METEOR		
170" 6 Cyl. H.D.	280462	C2OZ-7550-F
221" V8 Std.	288855	①
221" V8 H.D.	280393	②
260" V8 Std.	280485	①
260" V8 H.D.	280497	②
GALAXIE & MONTEREY		
223" 6 Cyl. Std. ③	288849	B8A-7550-A
223" 6 Cyl. Std. ④	280287	C1MM-7550-B
223" 6 Cyl. Taxi	288851	B8A-7550-B
292" V8 Std.	288852	B8A-7550-C
292" V8 H.D.	288351	B8A-7550-F
352" V8	⑤	B8A-7550-F
390", 406" V8		C0AA-7550-B
FORD TRUCKS		
Clutch Model 10CF		B7C-7550-A
Clutch Model 10½CF	287335	C1TT-7550-F
Clutch Model 11CF	⑥ CD607	⑦ C0TT-7550-B
Clutch Model 11½CF	280135	⑧ C1TT-7550-E

① - Fairlane No. C2OZ-7550-C. Meteor No. C2YY-7550-A.
② - Fairlane No. C2OZ-7550-A.
③ - Galaxie. ④ - Monterey.
⑤ - No. 288351 or 280267. ⑥ - Or No. 280341.
⑦ - Or No. C1TZ-7550-B (B9TT-7550-A Special Equipment). ⑧ - Or No. C2TZ-7550-B.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 BUICK SPECIAL CLUTCH LINKAGE BINDING CORRECTION:* Lubricate all pivot points, then realign linkage as necessary to eliminate bind at any point. Adjust equalizer perpendicular to engine.

►*1962 BUICK SPECIAL CLUTCH FAILURE TO RELEASE CORRECTION:* May be caused by equalizer lever separating from equalizer shaft because of insufficient weld. To correct, install new type equalizer assembly, Part No. 1354402.

DESCRIPTION: Single plate, dry disc type. Model CF is semi-centrifugal type. Model NC is not centrifugal.

CLUTCH LINKAGE & PEDAL ADJUSTMENT: Buick Special - Pedal free travel should be 7/8-1". To adjust, pull outer end of clutch fork rearward until throw-out bearing contacts clutch release levers. Free movement at outer end of clutch fork should be 3/16". Remove clevis pin from rear of clutch release rod and rotate rod as necessary for proper clutch fork free movement. Install clevis pin and check pedal free travel.

Ford & Mercury (Except Trucks): Disconnect interlock shift rod at interlock shift lever, then measure total travel of clutch pedal. *NOTE - Measure distance from steering wheel to clutch pedal with pedal fully released, then again with pedal fully depressed.* If travel not within specifications, move clutch pedal bumper and bracket up or down until travel is correct (6 5/8-6 7/8"). *CAUTION - Always check and adjust total travel before checking free travel.* With clutch pedal against its bumper (fully released), distance between assist spring eye centers should be 10". Adjust spring retainer hook length as necessary. With engine idling, dpresss clutch pedal just enough to take up free travel and note reading on tape (distance between steering wheel and clutch pedal). Difference between this reading and reading where pedal is released should 15/16-1 1/16". If not within specifications, adjust clutch pedal-to-equalizer rod. To increase free travel, loosen rearward adjusting nut and tighten forward nut. To reduce free travel, loosen forward nut and tighten rearward nut. Tighten both nuts against trunnion after adjustment. With transmission in neutral and interlock pawl snugly engaged, connect interlock rod. As a final check, measure pedal free travel with transmission in neutral and engine running at 3000 RPM. If free travel at this speed is not ½", readjust clutch pedal-to-equalizer rod as necessary. *CAUTION - Free travel must be exactly as specified.*

►*FORD & MERCURY INTERLOCK LINKAGE NOTE:* If interlock shift linkage does not operate correctly, or if disturbed during clutch linkage and height adjustment, adjustment must be made on interlock linkage. *See "Ford & Mercury 3-Speed Synchro-mesh Transmission Section.*

Ford Trucks: F & B Series - Pedal total travel should be 8 1/16-8 5/16". Adjust pedal stop as necessary. Pedal free travel should be 1 3/8-1 1/2". To adjust, back off jam nut on release pushrod and turn spherical nut as necessary. There should be 1/4" clearance between spherical nut and release lever. *NOTE - Make adjustment with r tracting spring in plac* . Tighten jam nut.
C Series - Initial pedal free travel before master cylinder pushrod contacts piston should be 5/32-1/4". Adjust eccentric bolt and pedal stop as necessary. Disconnect retracting spring and push slave cylinder pushrod as far to front of truck as possible, then pull release lever to rear of truck until release bearing touches pressure plate release fingers. Clearance between slave cylinder pushrod spherical nut and release lever should be 1/4". Loosen jam nut and turn spherical nut as needed. Final free travel should be approximately 2".
P Series - Initial pedal free travel should be 1/16-1/4". Adjust master cylinder pushrod extension as necessary (with pedal retracting spring attached). Now disconnect retracting spring and adjust clearance between slave cylinder pushrod spherical nut and clutch release lever to 1/4" by loosening jam nut and turning spherical nut. Final free travel should be approximately 2".

Oldsmobile F-85: Pedal height should be approximately 6½". Pedal free travel should be 7/8-1". To adjust free travel, disconnect clutch lower control rod from equalizer and turn rod in or out of trunnion nut as necessary. Reconnect control rod and check free travel.

Oldsmobile 88, S88, 98: Install a ¼" gauge pin in gauging holes in frame side rail, then disconnect pedal bellcrank-to-release bellcrank rod at pedal bellcrank. Loosen lock and adjusting nuts on release bellcrank rod until rod is free. Adjust pedal stopscrew at upper end of pedal until pedal is 8" from floor pan (turn back carpet). Adjust upper clevis on pedal bellcrank-to-release bellcrank rod until gauge pin is free in frame holes (rod connected to pedal bellcrank), then lock rod to clevis and bellcrank. Adjust release bellcrank rod (clutch release rod) for 1-1¼" pedal free travel, tighten locknut and remove gauge pin.

CLUTCH REMOVAL: Buick Special - Remove transmission *(see Transmission Section)*, then remove flywheel lower housing and throw-out bearing. Disconnect release rod from fork and unhook fork boot from flywheel housing opening. Free release fork from ball stud (push inward on fork) and remove fork from bottom of housing. Mark all clutch parts and flywheel for reassembly and remove clutch assembly. *NOTE - Install metal spacers (¼" nuts) between release levers and inner edge of cover to aid removal and installation.*

Ford & Mercury (Except Ford Trucks): Remove transmission *(see Transmission Section)*, then remove starter motor and dust seal. Disconnect retracting spring, then disconnect pedal from equalizer rod at equalizer bar. Remove release bearing and hub. Remove flywheel housing and inspection or dust cover. Remove clutch assembly from flywheel.

Ford Trucks: Remove retracting spring and pushrod at release lever. Remove slave cylinder attaching bolts. Remove transmission *(see Transmission Section)*. Remove dust cover from clutch housing and remove release bearing and hub from lever. Mark pressure plate and cover assembly and flywheel for reinstallation in same position. Loosen cover bolts uniformly to relieve spring tension, then remove clutch assembly through opening in bottom of clutch housing.

Oldsmobile F-85: Remove transmission *(see Transmission Section)*. Remove lower flywheel housing and release bearing. Mark flywheel and clutch cover for reassembly, and remove clutch assembly.

Oldsmobile 88, S88, 98: Remove transmission *(see Transmission Section)*. Remove transmission bearing retainer sleeve and right and left lower flywheel housing bolts. Disconnect adjustable rod at yoke. Support rear of

CONTINUED ON NEXT PAGE

LONG "CF" & "NC" (C nt.)

engine, then remove rear frame crossmember. Remove clutch housing and release yoke from flywheel housing. Mark flywheel and clutch cover for reassembly, then remove clutch assembly.

OVERHAUL: *NOTE - Car manufacturers (Buick, Ford, Mercury & Oldsmobile) do not recommend Clutch Cover & Pressure Plate Assembly overhaul. On these models, if lever height does not meet specifications shown in "Release Lever Setting" table or if levers do not operate freely without bind, replace the assembly.* Mark all parts for disassembly and reassemble in same relative positions.

Clutch Fixture Note: Manufacturer recommends use of Borg-Warner Universal Clutch Fixture UF-300 or UF-400 for all servicing and rebuilding operations.

Disassembly: Place clutch on fixture (supporting pressure plate on special lands under lugs) or arbor press. Compress cover plate slightly, take out assembly screws (lever yoke mounting screws) on cover. release pressure on cover plate slowly, lift off plate. Note whether washers used on yokes under assembly screws (these washers must be reinstalled if old pressure plate used again). See special directions below on removing and reinstalling release levers.

Clutch Springs: Pressure springs should check with table below.

Clutch Spring Specifications

Cover Assy.	Springs(No. & Color)	Lbs. Pressure
260093	12-Purple	140-150 at 1.677"
260154	6-Aluminum	200-210 at 1.751"
260162	9-Pea Green	170-180 at 1.762"
260174	9-Aluminum	200-210 at 1.751"
260186	3-Pea Green	170-180 at 1.762"
	6-Brown & White	154-164 at 1.736"
260245	6-Aluminum	200-210 at 1.751"
260251	9-Buff (Bronze)	137-147 at 1.747"
260259	9-Buff (Bronze)	137-147 at 1.747"
260294	6-Aluminum	200-210 at 1.751"
260295	9-Buff (Bronze)	137-147 at 1.747"
260296	9-Pea Green	170-180 at 1.762"
267371	9-Buff (Bronze)	137-147 at 1.747"

R lease Lever Assembly: Mount lever yoke on release lever, fasten by inserting flat-sided lever pin (flat side out or toward cover) and roller (place roller on flat side of pin). Insert lever in pressure plate lug, use roller pin sawed off to length of lever width as a guide and insert needle bearings, insert roller pin, pushing guide pin out, lock both lever pins with cotter pins. Thread release lever adjusting screws in ends of levers, turning screws down completely.

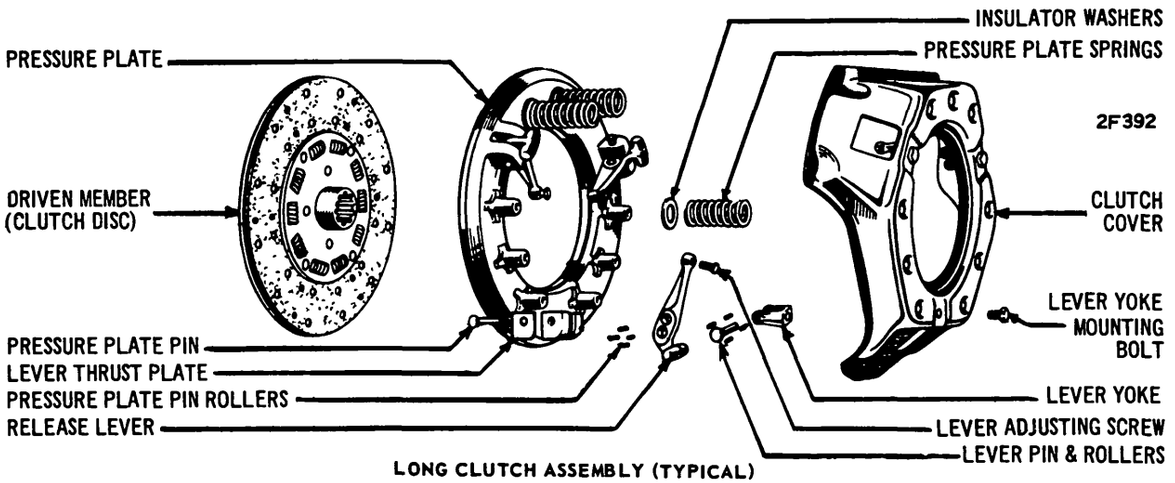
Assembly: Place pressure plate on fixture or arbor press. Assemble pressure springs, locator washers or insulator washers on plate, place washers on lever yokes (if washers used previously and old pressure plate being used). Place cover plate in position (lining up marks made before dismantling), compress cover slowly guiding lever weights through holes in cover and lining up yokes under cover plate holes. See that pressure springs are seated, insert cover screws in yokes, using lockwasher under screw head, tighten screws securely. Compress and release clutch several times (using weight on release levers) to seat all parts. Then adjust release lever heights.

Release Lever Adjustment (on Fixture): Place special lands on fixture under pressure plate lugs, assemble lever adjusting arm and sleeve setting bottom of adjusting arm correct distance as shown in table (all figures plus or minus 1/32") above bottom of sleeve and lock the adjusting arm with the thumbscrew. Swing arm over each release lever in turn, back off adjusting screw on tip of lever until rounded screw head just contacts arm, lock screws by inverting clutch so that screw head is supported and stake or peen lever into adjusting screw slot. Do not disturb lever yoke screws when making this adjustment.

R l as Lev r Ch cking & Adjustm nt (With ut Fixtur):

Ford Motor Co. Models: Mount clutch assembly on spare flywheel with three .250" thick spacers (drill rod or precision washers may be used) in place of regular driven member. *NOTE - Plac spac r under ach r - lease lever.* Use dial indicator to measure lever heights. All levers must be equal within .031". Replace pressure plate and cover assembly if greater variation noted.

Oldsmobile 88, S88, 98: Install special lever setting Gauge J-1048 on flywheel in place of driven member. Mount pressure plate assembly on flywheel tightening screws one or two turns at a time (to prevent distortion of cover). Lay short straightedge across center boss of the gauge as a guide for positioning levers. Bearing surfaces of all lever adjusting screws should be from .000-.062" below level of gauge center boss, and each lever should be within .015" of the other two levers. *NOTE* - If levers are not more than .025" out of plane, lightly tap release yoke mounting screw heads with 8 ounce hammer to bend pressure plate cover to bring levers within .015" of same plane. When levers are more than .031" out of plane, or do not lie within .000-.062" below center boss, adjust levers as directed under "Release Lever Adjustment (On Fixture)" above.



LONG CLUTCH ASSEMBLY (TYPICAL)

BUICK (EXCEPT SPECIAL) HYPOID

Buick L Sabr , Invicta, El ctra (1962)

►*REAR AXLE HOUSING CAUTION:* When housing replaced, readjust pinion nose angle. *See "Propeller Shaft Alignm nt" in this s ction.*

►*AXLE SHAFT INSTALLATION CAUTION:* Coat axle shaft lightly with rear axle lubricant from sealing surface to six inches inboard before installation to prevent damage to lip of wheel seal. *See "Rear Axle Lubricant Not " b l w for proper lubricant.*

►*REAR AXLE LUBRICANT NOTE:* Flushing and seasonal lubricant changes are not recommended for either Conventional or "Positive Traction" axles. Maintain fluid level at ¼" below filler opening. Use only lubricants listed as follows: **Conventional Axle–** Factory Hypoid Lubricant (under 1000 miles operation), SAE 80 or 90 Multi–Purpose Gear Lubricant (over 1000 miles operation), **P sitiv Traction Axle –** Special Positive Traction Lubricant, Part No. 531536 (any other lubricant must conform to Buick Specification No. 723).

DESCRIPTION: Hypoid gear, semi–floating type with drive from axle housing through one upper and two lower control arms.

►*AXLE RATIO & IDENTIFICATION NOTE:* Ratio number stamped on bottom of axle housing. The numbers one above the other indicate axle ratio, for example: 3 over 2 is 3.23–1; 2 over 78 is 2.78–1. Positive Traction axle identified by a cross in a circle on bottom of differential carrier flange, and by a lubrication caution tag on filler plug. Following ratios are available: 2.78 (14–39), 3.07 (14–43), 3.23 (13–42), 3.36 (14–47), 3.58 (12–43), 3.91 (11–43), 4.45 (11–49).

Axle Shaft R moval: Place stands under rear axle so wheels clear floor, then remove wheel and drum. Remove wheel bearing retainer plate-to-backing plate nuts (leave bolts in place to support backing plate). *NOTE - Left sid wh l bolts have left hand threads.* Use Puller J-6176 with Slide Hammer to pull axle assembly. Replace two backing plate nuts finger tight to hold plate in place.

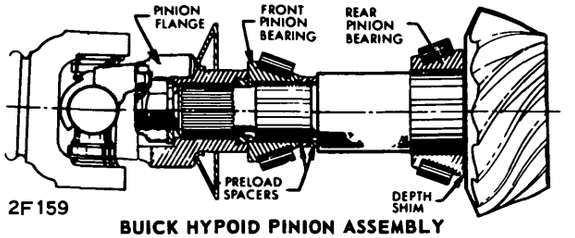
Carri r Ass mbly R moval: Place jacks under rear axle housing and raise car. Mark rear universal joint for proper alignment for reassembly, then disconnect rear joint "U" bolts. Push rear propeller shaft forward and wire it to upper control arm bracket out of way. Remove axle shafts, see above, then back off two opposite carrier to axle housing nuts to last few threads and remove all other nuts. Place drain pan under carrier and pull carrier forward to drain lubricant. Place transmission jack under carrier and remove from housing.

Wh l B aring Adjustment: None required.

OVERHAUL: Positiv Traction Differential – *See "P w r–L ck Diff rential (Plate Clutch Type with B ll vill Springs)" in this section.*

Conv nti nal Axl : *S 1956 Final Data, Page 331, or later Manual editi ns, and note the following:*

Diff r ntial B aring Supp rt Removal (With Tool J–6553): This tool should be used to pull bearing supports on 1960–62 models as follows: Retract pins in tool by turning expander screw in puller body counterclockwise, then insert puller body into bearing support until reference line on tool is flush with end of support and punch mark on tool is in general direction of hole in support. Expand tool a slight amount by turning expander screw clockwise until a slight drag on pins is felt, then move tool as required to engage pins with holes in support. Fully expand pins. Place tool sleeve over tool and install draw bolt, thrust washer, thrust bearing, and small washer, then thread draw bolt in tapped hole in puller body. Apply a reasonable amount of torque to draw bolt, then strike carrier pedestal with a solid hammer blow.



BUICK HYPOID PINION ASSEMBLY

Wheel Bearing & Seal Replacement: Notch wheel bearing retaining rings in 3 or 4 places with a chisel to expand ring and slide ring off shaft. Press wheel bearing off with Remover J-6525 either in a press or with use of Ram and Yoke Assembly J-6180 and Adapter J-6258. Install new retainer plate. Press new bearing against shoulder with Installer J-6257 either in press or by using Ram and Yoke Assembly J-6180 and Holder J-6407 with Ring J-6407-2. Press new retaining ring against bearing in same manner. Remove old seal by inserting Puller J-6199 through seal and expanding it so it can be removed with a slide hammer. Coat outside diameter of seal with sealer, position seal over Installer J-9194 and drive seal straight into housing until installer bottoms against wheel bearing shoulder.

Drive Pinion & Bearing Removal: Install Holder J-8614-01 on pinion flange with two 5/16" - 18 x 2" bolts with flat washers. Remove pinion nut and washer. Use Puller J-8614-02 in Holder J-8614-01 to pull pinion flange. *NOTE - Hold pinion while flange is being removed to prevent falling out of carrier.* Remove pinion carefully to prevent damage to bearing races.

Pinion Bearing Preload Adjustment: Place original shim pack against head of pinion, and use bearing Replacer J-6377 and Holder J-6407 with Ring J-6407-2 in press to install bearing on pinion shaft. *NOTE - Original shims used only as a starting adjustment.* For starting pinion preload bearing adjustment, use original preload spacers. Place spacers on pinion, and hold pinion in carrier. Oil front bearing and place in position on pinion. Hold pinion in position and use Installer J-8913 to drive bearing into fully seated position. Install new "O" ring seal with sealing compound using Installer J-8913. Fill space between lips of oil seal with wheel bearing grease and apply thin coat of same grease to seal surface of pinion flange. Install pinion flange sufficiently to add washer and start nut. Hold flange with Holder J-8614-01 and torque nut to 80 ft. lbs. with wrench J-1313 on outer end of Handle J-6246 (this amounts to 250 ft. lbs. torque at nut). Rotate pinion 3-4 times to seat bearings. Preload should be 15-35 inch-lbs. including drag on new seal. When preload too low, reduce total spacer thickness .001" for each added 10 inch-lbs. preload needed; if too high, increase total pinion spacer thickness .001" for each 10 inch-lbs. to be subtracted. Spacers are furnished in pairs to supply thickness range from .400" to .470" by thousandths.

BUICK SPECIAL & OLDSMOBILE F-85 HYPOID

Buick Sp cial, All S ri s (1962)
Oldsm bil F–85, All Seri s (1962)

►*BUICK SPECIAL REAR AXLE LUBRICANT NOTE:* Flushing and seasonal lubricant changes are not recommended for either Conventional or "Positive Traction" axles. Maintain fluid level at ¼" below filler opening. Use only lubricants listed as follows: **Conventional Axle –** Factory Hypoid Lubricant (under 1000 miles operation), SAE 80 or 90 Multi–Purpose Gear Lubricant (over 1000 miles operation). **Positiv Traction Axle –** Special Positive Traction Lubricant, Part No. 531536 (any other lubricant must conform to Buick Specification No. 723).

►*OLDSMOBILE F–85 REAR AXLE LUBRICANT NOTE:* Flushing and seasonal lubricant changes are not recommended. Maintain fluid level at filler plug level. Use only Special Lubricant, Part No. 531536 (small amounts of SAE 90 Multi–Purpose Gear Lubricant may be used to replenish differential).

DESCRIPTION: Hypoid gear, semi–floating type, with drive from axle housing through two upper and two lower control arms.

►*1962 BUICK SPECIAL AXLE RATIO & IDENTIFICATION NOTE:* Axle ratio or a code letter stamped on right side of axle housing cover. Letter indicates axle ratio, number indicates day axle was built. Positive Traction axle identified by a cross in a circle on bottom of differential carrier flange, and by a lubrication caution tag on filler plug. Following ratios are available:

Ratio	Code	Ratio	Cod
3.08 (13–40)	A	3.90 (10–39)	F
3.23 (13–42)	B	4.30 (10–43)	G
3.36 (11–37)	C	3.63 (11–40)	
2.78 (14–39)	D		

►*1962 OLDSMOBILE F–85 AXLE RATIO & IDENTIFICATION NOTE:* Letter prefix of axle ratio code number stamped on right side of axle housing cover near axle housing cover near axle shaft tube as follows: **A** 3.08 (40–13), **B** 3.23 (42–13), **C** 3.36 (37–11).

Axle Shaft Removal: Remove wheel and brake drum. *NOTE – Left hand wheel bolts have left hand threads and nuts are marked "LF".* Remove four axle bearing retainer nuts. Attach Puller J–2619 and Adapter J–8617 and pull axle shaft from housing. *CAUTION – Support axle shaft carefully while pulling shaft out to prevent cutting seal lip.* Left shaft is shorter than right shaft.

OVERHAUL: Positive Traction Differential – *See "Power–Lock Differential (Plate Clutch Type With Belleville Springs)" in this section.*

Conventional Axle: *See 1961 Final Data, Page 325, and note the following:*

Pinion Bearing Preload Spacers – Pinion bearing preload spacers furnished in sizes from .200–.260" in thousandths to provide possible combined thickness ranges from .400–470" in thousandths.

►*1962 BUICK SPECIAL DIFFERENTIAL CASE & RING GEAR OVERHAUL NOTE & CAUTION (3.90 & 4.30 RATIOS):* A special differential case is used on some cars with above axle ratios. However, to permit use of standard differential case with these ratios, a spacer is used between ring gear and differential case. If spacer used, it **must** be reinstalled when gear is assembled to case. If no spacer used (special differential case), none is necessary and spacer furnished in ring gear and pinion service package should not be used. If axle ratio changed to 3.90 or 4.30, use spacer in service package to use existing differential case.

CHEVROLET HYPOID (PASS. CAR. & ½ TON TRUCK)

Chevrolet Pass. Cars (1962)
Chevy II (1962)
Chevrolet Corvette (1962)
Chevrolet ½-Ton Truck (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 LUBRICANT LEAK AT COMPANION FLANGE NUT CORRECTION:* To correct, pack cavity between hypoid pinion shaft, pinion flange and pinion nut washer with sealant.

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls rear axle pinion bearing preload. Before loosening nut, note torque required to turn pinion through several revolutions and tighten to same torque when nut installed. *See "Pinion Bearing Preload Adjustment" below.*

►*REAR AXLE LUBRICANT NOTE:* Flushing or seasonal changes are not recommended for either Conventional or Positraction axles. Maintain fluid level at filler opening (axle warm), ½" below filler opening (axle cold). Use SAE 90 Multi-Purpose Gear Lubricant for Conventional axle. Use **only** Positraction Gear Lubricant, G.M. No. 3758790 or 3758791, for Positraction axle.

DESCRIPTION: Semi-floating, hypoid type with separate carrier and Hotchkiss drive. Design similar to previous models. On ½-Ton Truck, axle shaft spacer block has been eliminated so that end of axle shaft rides against differential pinion shaft.

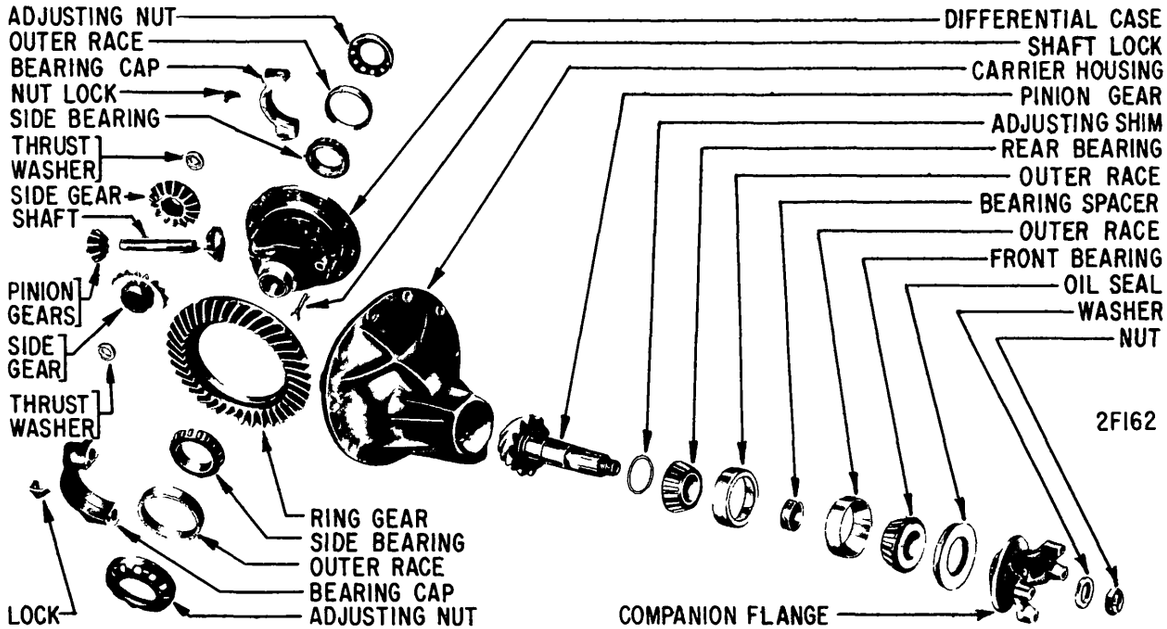
►*AXLE RATIOS & IDENTIFICATION NOTE:* Serial number stamped on right front side of differential carrier identifies axle ratio. Letter prefix of serial number is axle ratio code as listed in table below. Positraction axle identified by letter "P" on front side of differential carrier and also by a lubrication caution tag on filler plug.

Axle Ratio Code Table

Axle Ratio	②Chevrolet Pass.	①Serial No. Prefix
3.08–1 (37–12)	AW, BW, AX, BX, AJ, AR, AV	
3.36–1 (37–11)	AB, BB, AD, BD, AM, BM, AG, AQ, AY	
3.55–1 (32–9)	AA, BA, AK, BK, AE, AN, AZ	
3.70–1 (37–10)	AC, BC, AH, BH, AF, AP	
4.11–1 (37–9)	AL, AT	
4.56–1 (41–9)	AS, AU	
Axle Ratio	**Chevy II**	**①Serial No. Prefix**
3.08–1 (37–12)	DB, DF, DJ, DK	
3.36–1 (37–11)	DA, DE, DL, DM	
3.55–1 (32–9)	DC, DD, DN, DP	
Axle Ratio	**Corvette**	**①Serial No. Prefix**
3.08–1 (37–12)	CT, CU, CV, CW	
3.36–1 (37–11)	CA, CB, CH, CK	
3.55–1 (32–9)	CC, CL	
3.70–1 (37–10)	CD, CM, CQ, CX, CY	
4.11–1 (37–9)	CE, CN, CR	
4.56–1 (41–9)	CF, CP, CS	
Axle Ratio	**½-Ton Truck**	**①Serial No. Prefix**
3.38–1 (44–13)	MB, ME, MZ	
3.90–1 (39–10)	MA, MC, MD, MF, MG, MW, MY	
4.11–1 (37–9)	MT, MU	

①–Stamped on right front side of differential carrier.
②–Positraction may also be available in following ratios: 4.88–1, 5.14–1, 5.43–1.

Axle Shaft Removal: Raise and support car, remove tire, wheel, and brake drum assembly. Remove bearing retainer bolts from axle housing flange. Use Adapter Plate J–5748 or J–8617 and suitable slide hammer and remove axle shaft and bearing assembly, using care not to disturb backing plate inner gasket. Fasten backing plate to prevent falling. If bearing retainer and parking brake strut interfere, raise strut slightly for clearance. *CAUTION – When removing axle shaft from housing, do not damage lip of axle shaft seal.*



CHEVROLET HYPOID REAR AXLE ASSEMBLY (EXPLODED)

Axle Shaft Bearing Removal & Installation: Install Tool J–5741 (and Adapter Plate J–9439 for Chevy II) between axle flange and bearing with land of plates against bearing and inside the retainer. Install bolts in plates. *NOTE – Necessary to remove retainer plate attaching bolts to allow installation of tool between retainer and bearing.* Press bearing from shaft with press plate parting line resting on press bed. *NOTE – This operation may damage bearing retainer so that it must be replaced.* Install new bearing with Tool J-9436 (Chevy II), J–6661 (Others), pressing it on until bearing bottoms on shaft against shoulder. *NOTE – New bearing retainer must be on shaft before bearing is installed.* Install new axle shaft bearing retainer ring on shaft and use installing tool in arbor press to seat ring against bearing.

Companion Flange, Oil Deflector, or Oil Seal Replacement: Raise and support one corner of car (to lock one wheel and to provide clearance). Disconnect rear universal joint and support propeller shaft. Install an inch–pound torque wrench on companion flange nut and rotate pinion through several revolutions and note torque required to keep pinion moving. Hold drive flange with Tool J–2637 or J–8614–1 and remove companion flange nut and washer. Discard nut. Remove drive flange with Tool J–8614–1–2 or J–0820 bolted over J–2637. Pry out oil seal. Make sure drive flange oil seal surface is smooth and that there are no worn drive splines. Install new deflector with Tool J–5749 or J–9491. Soak new seal in light engine oil for 10 minutes before installation, then coat O.D. of seal with sealer (G.M. Sealing Compound, Part No. 987266). Install new oil seal with Tool J–5154 or J–9451. Install drive flange (pull flange on shaft with Tool J–5780 or J–9458 if necessary). *CAUTION – Do not hammer flange on pinion shaft or bearings will be damaged.* Install washer and new companion flange nut. Tighten nut to remove endplay, then tighten in small increments while checking preload torque until torque is same as before nut was removed. Connect propeller shaft.

Differential Carrier Removal: Raise and support car, remove rear wheels and pull axle shafts out far enough to clear differential side gears. Disconnect rear universal joint and support propeller shaft. Remove carrier attaching locknuts and pull carrier out far enough to drain lubricant. Remove differential carrier assembly.

OVERHAUL (POSITRACTION DIFFERENTIAL): **Passenger Cars** – *See "Power-Lock Differential (Plate Clutch Type With Bellevill Springs)" in this section.*
Trucks – *See 1960 Final Data, Page 361, Rear Axle Manual edition.*

OVERHAUL: (CONVENTIONAL AXLE): Proceed as follows:

DISASSEMBLY: Mark bearing caps and carrier for reassembly. Remove adjusting nut locks and bearing cap bolts, then remove bearing caps and adjusting nuts. *CAUTION – Do not use screwdriver to pry cap off.* Remove differential and ring gear assembly from housing. *CAUTION – Do not drop bearing cups.* Remove differential pinion gear shaft from differential case. Remove differential pinion, side gears, and thrust washers. Hold companion flange from turning (Tool J–2637 or J–8614–1) and remove companion flange nut and washer, then remove companion flange (Tool J-0820 or J-8614-2 bolted to the flange with holding tool in place). Remove pinion from carrier. Remove pinion shaft oil seal, pinion front bearing, and bearing spacer (discard 1/16" shim, if found, behind spacer). **CONTINUED ON NEXT PAGE**

CHEVROLET HYPOID (PASS. CAR. & ½ TON TRUCK) (C nt.)

INSPECTION: Wash all parts thoroughly in solvent. Inspect bearing cups, races and rollers for scoring, chipping or excessive wear. Inspect large end of rollers for wear. *NOTE – Pini n bearings are preloaded type and natural w ar patt rn is a frosted condition with possibl slight scratch s on races or rollers. This do s not indicate a d f ctive bearing.* Inspect oil seal for wear or damage. Inspect ring gear and pinion teeth for scoring, cracking, or chipping. Inspect differential case for cracks, or scores on side gear and pinion gear thrust faces. Inspect side gear thrust washers for wear, scoring, cracks or any other damage. Check fit of side gears in case and fit of side gear and axle shaft splines. Inspect pinion shaft for wear, scoring, or damage. Inspect carrier for cracks or crossed threads on bearing caps and bosses.

DRIVE PINION BEARING REPLACEMENT: Remove bearing cups with brass drift. Install new bearing cups in carrier with Tool J–0270–6 or J–7817 on front cup, and J–0270–14 or J–7818 on rear cup. Bearing cups should seat against shoulders of carrier. Remove pinion rear bearing with Tool J–8331 or J–7028 and note size of shim between bearing and gear.

PINION GEAR SETTING: *NOTE – If original ring gear and pinion, pini n r ar b aring assembly and differential carri r will all b r installed, the original shim or n f th sam thickness may be used. If the ring g ar and pinion, pini n rear bearing assembly or differential carri r ar to b r placed, the correct thickness of the pinion depth shim may be determined as follows:*

►*PINION MARKING NOTE:* The number marked on pinion shaft will indicate in thousandths the pinion mounting distance.

1) Lubricate pinion bearing cone and roller assemblies with rear axle lubricant. Position rear bearing in its cup in carrier. Rotate bearing several times to make sure it is seated. Position gauge plate part of Tool J–6266 on bearing so that chamfered corner is toward pinion side and top of differential as installed in car.

2) While holding front cone and roller assembly in its cup with the clamp plate, insert clamp screw part of Tool J–6266 through gauge plate, both bearings and clamp plate. Tighten only sufficiently to center bearings in cup. Check that neither gauge block nor clamp plate tough housing. Oscillate gauge plate and bearings several times to be sure bearings are seated and then draw up hex nut until 20 inch–pounds of torque are required to oscillate plate and bearings. *NOTE – 60 ft. lbs. t rqu may b r quired to tighten nut on clamp bolt to btain simulat d preload on bearings. After tight ning clamp bolt nut, measure turning torque with an inch–pound t rqu wrench.*

3) Install body assembly part of Tool J–6266 across differential bores. Plunger on body must point inward toward center of pinion rear bearing. Mount a dial indicator on tool body post with indicator button on top of tool plunger. Swing body so that plunger **does not** touch gauge plate, and set dial indicator at zero.

4) Slowly swing inner end of tool plunger across gauge plate until highest indicator reading is obtained. Record this measurement and recheck to see that it is correct. Record factory marking on pinion. **Subtract** measurement obtained with tool from marking on pinion. The **diff r nc** between these two figures determines thickness of pinion depth shim to be installed with particular pinion and ring gear, and rear bearing and carrier being checked. Shims are available in different thicknesses as follows: .021", .024", .027", .030", .033", and .036". Use shim closest to difference in measurement.

5) Remove indicator tool. Install shim selected on pinion and install new bearing cone and roller assembly on pinion with Tool J–5590 (press cone against shim and rear face of pinion).

DIFFERENTIAL BEARING REPLACEMENT: Remove bearings with Tool J–8107 and Adapter Plug J–8107–4 (J–7112 on Positraction). Install new bearing on hub with thick side of inner race toward case and drive into place with Tool J–5768 or J–9537. *NOTE – Tool is counterbored and has a pilot for proper installation and seating of bearing.*

RING GEAR OR DIFFERENTIAL CASE REPLACEMENT: Remove ring gear from case (tap with a soft hammer). Make some guide pins from 3/8"–24 x 1½" capscrews with heads cut off and ends slotted to ring gear. With back face of ring gear and face of case free of dirt and burrs, mount case on "V" blocks placed at side bearings and check face runout. Runout should not exceed .003". Place ring gear over pilot diameter of case and install every other ring gear bolt and lockwasher and draw up evenly and snugly until gear face is flush with face of case. Remove guide pins and install remaining bolts, then torque all bolts evenly to 40–60 ft. lbs.

REASSEMBLY: Lubricate pinion bearings and install pinion in carrier. Install **new** pinion bearing spacer with large end toward gear, then install front pinion bearing cone and roller assembly on pinion shaft. Soak new seal in light engine oil for 10 minutes and then coat O.D. of seal with sealer (G.M. Sealing Compound, No. 987266). Install new seal with Tool J–5154 or J–9451. *NOTE – Install seal so top of seal is 3/16" + 1/32", –0" from front of differential carrier. Seal must bottom.* Install companion flange and deflector assembly with Tools J–8614–1 and J–9458 or J–5780 and J–2637. Install special washer and a **new** self–locking companion flange nut. *Adjust pinion bearing preload (see below).* Install differential assembly in carrier and install outer races and adjusting nuts. *CAUTION – Install adjusting nuts carefully so threads on nuts and carrier mate.* Install bearing caps, making sure that alignment marks on caps and carrier mate. Tighten capscrews snugly. Lubricate differential side gear hubs and thrust washers and install into case. Roll both differential pinions into position and install pinion gear shaft and pinion gear shaft lockscrew.

PINION BEARING PRELOAD ADJUSTMENT: Tighten companion flange nut (hold companion flange from turning) until torque required to turn pinion is 15–25 inch–pounds (new bearings), 5–15 inch–pounds (old bearings). *NOTE – If spring scale used to determine preload, hook scale at an 8" radius from notches f Holding Tool J–8614–1. Scale should read 1-7/8 – 3-1/8 lbs. (new bearings), 5/8–1-7/8 lbs. (old bearings).*

RING GEAR & PINION BACKLASH ADJUSTMENT: Back off right adjusting nut and tighten left adjusting nut (Tool J–0972) while turning ring gear. Tighten left nut until all lash is removed, then lock left nut (torque bearing cap bolts to 70–75 ft. lbs.). Tighten right adjusting nut to force left bearing firmly into contact with left adjusting nut. Now loosen right nut and again tighten snugly against bearing. *NOTE – Bearing rollers begin to move when contact made.* Tighten right adjusting nut a minimum of 2 additional notches to a maximum of 3 notches to a locking position (this preloads differential bearings). Mount dial indicator on carrier and check backlash. Backlash should be .003–.010" (.005–.008" preferred). Tighten right bearing cap bolts to 70–75 ft. lbs. and recheck backlash. Install both adjusting nut locks.

RING GEAR & PINION TOOTH CONTACT PATTERN: Check tooth contact pattern before installing carrier assembly into housing. If there is toe contact (insufficient backlash), move ring gear away from pinion by loosening left hand differential adjusting nut and tightening right hand nut **one notch at a time.** If there is heel contact (too much backlash), move ring gear toward pinion by loosening right hand nut and tighten left hand nut **one notch at a time.** *Backlash must remain within limits after either of above adjustments.* If there is face contact, increase pinion depth shim .003" or more as necessary. If there is flank contact, decrease pinion depth shim thickness .003" or more as necessary. *If correction made for face or flank contact, readjust backlash.*

CHEVROLET TRUCK HYPOID

Chevrolet Truck, ¾–Ton (1962) ①
Chevrolet Truck, 1, 1½, 2–Ton (1962) ②
① – Torque–arm Drive. ② – Hotchkiss Drive.

DESCRIPTION: Full–floating, hypoid gear type, with straddle mounted pinion shaft. Similar in design to previous models.

Axle Ratio Identification

Axle Ratio	①Serial No. Prefix
4.57–1	MH, MJ, MP, MQ, MK
5.14–1	ML, MN, MR, MS, PA, PB, PL, PN, PC, PK, PM
5.43–1	PS
6.17–1	RP, RU
6.60–1	RA
7.20–1	RB, RD, RF, RG, RH, RJ, RQ

① – Serial number stamped on forward upper surface of differential carrier.

Axle Shaft Removal (Series 20,30): Remove eight capscrews and lockwashers in axle shaft flange, install two ½"x13" screws in special threaded holes in flange (between regular mounting screw holes), turn these screws up evenly to loosen the shaft, withdraw shaft from housing, remove and discard gasket. *Us new gask t wh n installing shaft.*

►*CAUTION:* Thoroughly clean all lubricant from axle shaft flange and end of wheel hub before installing axle shaft. *Grease at this point will cause loosening of axle shaft flange capscrews.*

►*AXLE SHAFT NOTE:* Shafts unequal length (right shaft longer than left) Install in correct position.

Axle Shaft Removal (Series 40,50,60): Remove hubcap, then thread Tool J-1436-1 into hole in axle shaft and use slide hammer to remove shaft.

NOTE - When reinstalling axle shaft, tap flange splines into engagement with wheel hub splines (if necessary, rotate wheel slightly to align splines on shaft with both wheel hub and differential side gear splines), use new hub gasket.

►*AXLE SHAFT NOTE:* Some models have different length axle shafts. Install longer shaft on right side.

Wheel Bearing Adjustment: Remove wheels and axle shafts see above, bend back lip of lock in locknut notch, remove locknut and adjusting nut lock. Tighten inner adjusting nut to 50-65 ft. lbs. (Series 20 & 30), 75-100 ft. lbs. (Series 40,50,60), with special wrench J-2222 (Series 20 & 30), J-870 (Series 40), J-5670 (Series 50 & 60) while turning hub, then back off nut 1/8 turn. Check

CONTINUED ON NEXT PAGE

CHEVROLET TRUCK HYPOID (Cont.)

hub for free turning, install adjusting nut lock with tangs aligned with adjusting nut slots, bend tang into adjusting nut slot. Install outer locknut and tighten securely, then bend lock tang down into notch in locknut.

DIFFERENTIAL CARRIER: Removal - Drain lubricant, remove axle housing cover and axle shafts, see axle shaft removal above. Remove two trunnion bearing "U" bolts from rear yoke and split rear universal joint (hold bearings on trunnion with tape). Remove bolts and lockwashers holding carrier to axle housing, support carrier on floor jack and roll from under car.

OVERHAUL: "No-Spin" Differential – *See "Chevrolet Truck No-Spin Differential" in this section.*

Conventional Axle: *See 1960 Final Data, Page 350, or later Manual edition and note the following:*

On ¾ Ton & 1 Ton, the bearing spacer has been eliminated and a double row ball bearing used in place of tapered rollers. Same tool used to remove bearing. Replace double row bearing with a press and 2" pipe of suitable length, pressing against inner race. **On 1½-ton & 2-ton,** press oil seal into retainer with seal lip toward pinion bearing, until it is a minimum of .12" below top of seal bore. This compresses and spreads felt packing to assure proper sealing around pinion drive flange.

CADILLAC HYPOID

Cadillac, All Series (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE SERVICE CAUTION:* Manufacturer recommends that all service on Standard or Controlled Differential Assembly other than oil seal or universal joint yoke replacement (and necessary pinion bearing preload adjustment) be handled by replacement of complete assembly. *No disassembly or adjustment of these units should be attempted in the field.*

►*REAR AXLE IDENTIFICATION MARKS:* Gear ratio of axle is indicated by a letter stamped on bottom side of carrier on flange adjacent to rear axle housing; or by a number stamped on front face of carrier assembly at end of oil return passage. A Controlled Differential is identified by letter "G" following axle code letter, or letter "G" preceding axle code number. *See "Axle Ratios" below.*

►*PINION BEARING ADJUSTMENT CAUTION:* Pinion bearing adjustment (preload) controlled by rear universal yoke nut which compresses spacer or sleeve between pinion bearings.

►*CAUTION:* Loosening or removal of the pinion shaft nut (for oil seal or yoke replacement) will disturb pinion bearing preload so that the detailed procedure, given below, must be followed to avoid overloading bearings or collapsing bearing spacers.

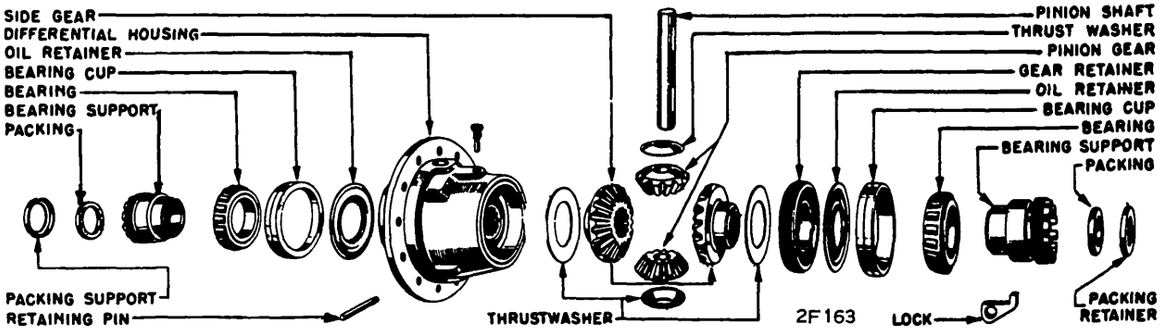
DESCRIPTION: Hypoid gear with torque arm drive (coil spring rear suspension, except commercial) of same design used on previous models.

Axle Ratios

Model	Ratio	Ⓒ Code
60, 62 Series (No Air Cond.)	2.94-1	2 or T
60, 62 Series (With Air Cond.)	3.21-1	1 or W
75 Series	3.36-1	6 or X
Commercial (Optl. on 75)	3.77-1	7 or Y

Ⓒ - Letter "G" following code letter or preceding code number indicates Controlled Differential.

Axle Shaft & Bearing (Exc. Comm. Chassis): Removal - Raise car and remove wheel and brake drum. Remove four bearing retainer and backing plate nuts and use Puller J-8131 and Slide Hammer J-2619 to pull axle shaft. Groove spacer with chisel and hammer, but do not split spacer. Drive chisel into spacer until spacer can be slipped off shaft. Assemble rear axle shaft and bearing assembly to "U" shaped piece of Bearing Plate and Pin Assembly J-2986-1 and place on press. Assemble Bearing Holding Tool J-2986-3 around bearing and dowels (to keep bearing from exploding while under arbor press load) and press shaft through bearing. **Reassembly** - Install new bearing on shaft so bearing seal is toward flange end of axle shaft. Place assembly through ring of Installer Tool J-6257 and position in press. Press bearing on shaft until distance from outer surface of axle shaft flange to inner end of wheel bearing inner race is 3.180". Remove shaft from tool and assemble new spacer on shaft and reinstall assembly on tool. Press shaft through spacer until spacer just touches bearing. Install oil ring seal on bearing. **Installation** - Lubricate wheel bearing bore in housing. Place new "O" ring seal on wheel bearing and install axle shaft (shorter shaft on left side), but do not damage seal. Install backing plate and bearing retainer, retainer nuts, brake drum and wheel.



CADILLAC REAR AXLE ASSEMBLY

Rear Axle Oil Seal (Comm. Chassis): Replacement - New oil seal must be installed whenever old seal removed. Fashion a plate with oblong center hole so it fits behind seal and remove seal with slide hammer. Coat surface of sealing lip with lubricant and outside diameter of seal with non-hardening gasket sealer before installation. Press seal squarely into its bore

Differential Carrier: Removal - Disconnect rear universal joint at pinion yoke. Remove rear axle lubricant with suction gun. Remove axle shafts, see above, and remove carrier to axle housing nuts and washers. Remove entire assembly with gasket. **Installation** - *NOTE* - If carrier was removed because of failure, inspect axle housing and rear wheel bearings for metal chips and thoroughly clean as required. Reverse removal procedure and note the following: On Controlled Differential carrier be sure internal splines of differential side gears and cone clutches are aligned by inserting axle shaft splines in each side approximately 4" until they bottom on differential pinion shaft.

Pinion Oil Seal & Yoke: Removal - Raise rear of car and remove both rear wheels and brake drums to eliminate drag when measuring torque readings. Use suction gun to remove approximately 1½ pints of lubricant. Disconnect rear universal joint from pinion yoke. Use a 50 inch pound torque wrench and Socket J-2571-1 with Adapter J-2571-2 to measure inch pounds required to rotate shaft (2 full turns). Record torque reading. Mark pinion shaft and yoke with punch mark for reinstallation. Install Holding Tool J-6544 on yoke, and install Socket J-2571-1 on pinion nut through hole in holding tool and remove nut using 3/4" drive socket wrench. Remove yoke from pinion shaft with Tool J-6295-01. Pry out old seal and remove staking marks on shaft **Installation** - Coat outer edge of seal with non-hardening gasket sealer and lubricate sealing lip with rear axle lubricant. Position seal in carrier and place Seal Installer J-8436 against seal and secure with pinion nut and washer. Install Socket J-2571-1 on pinion nut and press seal into carrier by tightening nut with socket wrench. Remove socket tool, pinion nut and washer, and seal installer. Install yoke on pinion shaft splines with punch marks up. Install pinion nut, holding flange of yoke with Pinion Yoke Holding Tool J-6544. Tighten pinion nut until proper preload is attained. Preload is attained when inch pounds torque required to rotate pinion shaft is 2 to 5 lbs. greater than the torque required to rotate shaft prior to seal and yoke removal above. *NOTE - It is necessary to remove Yoke Holding Tool J-6544 to install 50 inch pound torque wrench.* Tighten nut approximately ½ flat and check torque. Repeat this operation until proper torque is obtained but do not overtighten or back off nut to reduce preload. Maximum allowable torque on an assembly with over 1,000 miles is 15 inch lbs. (used seal) or 20 inch lbs. (new seal). The torque of a new assembly is 50 inch lbs.

Rear Axle Backlash: To measure rear axle assembly backlash, raise car on hoist and fasten one end of piece of bar stock to yoke on pinion shaft and the other end to frame side rail by means of a "C" clamp, to prevent rotation of drive shaft. Apply brake cable at one wheel to hold wheel stationary, and measure movement of outer circumference of opposite tire tread. A stiff wire pointer fastened to fender of car will aid in this measurement. Maximum backlash at tire tread should not exceed ½".

CHRYSLER CORP. HYPOID

Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962) ①
Plymouth (1962) ①
① – For Lancer & Valiant models, see "Lancer & Valiant Hypoid" in this section.

DESCRIPTION: Semi–floating, hypoid gear type of same design used previously.

►*AXLE RATIO & IDENTIFICATION NOTE:* Ratio identification number stamped on identification pad on carrier housing. "Sure–Grip" differential identified by letter "S" stamped on this pad and by a lubrication caution tag attached to a carrier housing bolt. Both conventional and "Sure–Grip" differentials available with same ratios. Following Ratios are available:
Std. Ratios – 2.76 (17–47), 2.93 (14–41), 3.23 (13–42), 3.31 (13–43), 3.55 (11–39), 3.58(12–43), 3.91(11–43).
High Perf. Ratios – 3.15 (13–41), 3.36 (11–37), 3.42 (12–41), 3.73 (11–41), 4.10 (10–41), 4.30 (10–43), 4.56 (9–41), 4.89 (9–44), 5.12 (8–41), 5.38 (8–43), 5.57 (7–39), 5.83 (6–35), 6.17 (6–37).

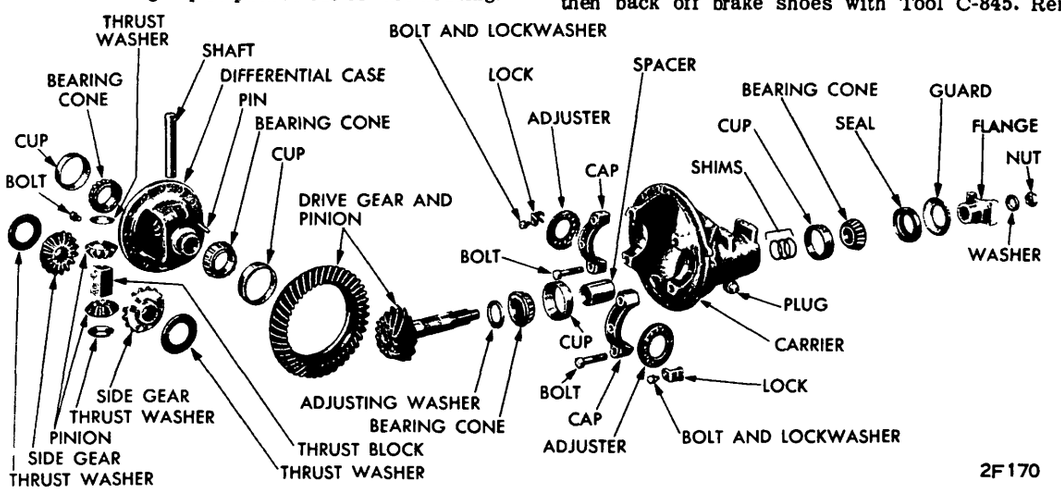
AXLE SHAFT REPLACEMENT & ENDPLAY ADJUSTMENT: Loosen brake shoe cams and remove rear hub and drum assemblies with Puller, Tool C-845. *(NOTE - Do not attempt to remove brake drums by hammering on end of axle drive shaft as damage to bearings and thrust block will result).* Disconnect brake line at each cylinder and remove brake support plates and dust shields as assemblies. Remove axle shaft keys and install Tool C-745 to protect outer axle seal. Remove shim pack between brake backing plate and axle housing flange. Pull axle shaft with Puller C-499. Remove shaft bearings with Puller C-293-13, inner oil seals with Puller C-637, and brake dust shield outer seal with Driver C-3565. Clean all parts and inspect for wear or distortion. To install, reverse removal procedure, then adjust axle shaft endplay (see below).

Endplay Adjustment (8¼" Ring Gear): Push both axle shafts in toward center as far as possible. Now push one shaft in as far as it will go. Measure amount opposite shaft bearing cup is pushed out of axle housing. If distance less than .040", no shims needed on that side. If distance more than .040", subtract .040" from distance and add shims equal to this result to side just measured, then install brake support plate. Now push opposite shaft and bearing cup in as far as possible. Add .018" to distance bearing cup is out of housing and add shims to this total to the side being measured. Install brake support plate. Total axle shaft endplay should be .013–.023". If not within specifications, change shims as necessary **on side assembled last.**

Endplay Adjustment (8¼" Ring Gear): Install shims totaling .040" at one end of axle housing (shims available in .005", .0125", .015", .030" thicknesses). Lubricate bearing and install axle shaft, bearing and cup, then using Tool C-413, drive bearing cup into axle housing until tool bottoms tightly against the shims. Remove tool and install dust shield, lockwashers and nuts. Tighten nuts to 30-35 ft. lbs. Working from opposite side of axle housing, install other axle shaft with bearing until inner end of shaft contacts the axle shaft thrust block. Lightly tap end of axle shaft with a fibre mallet to insure shaft is contacting the thrust block (opposite shaft will be forced away from thrust block to its full travel). Install bearing carefully until no axle shaft endplay exists without preloading the bearing (rotate shaft during bearing installation to check against preload). At this point the bearing cup will protrude beyond face of axle housing flange. Hold Tool C-413 firmly against bearing cup and measure the distance between end of tool and flange with a feeler gauge. To obtain the correct endplay of .013-.018", add .013" shims to the above measurement *(NOTE - If this gives a total thickness of shims that cannot be built up from the existing shims, use the next larger shim combination).* Remove tool and install total shim pack and brake dust shield. Tighten nuts to 30-35 ft. lbs.

DIFFERENTIAL CARRIER ASSEMBLY REMOVAL & INSTALLATION: Raise car and block brake pedal so it cannot be depressed. Drain differential housing, then back off brake shoes with Tool C-845. Remove axle shafts (see above). *(NOTE - Retain shims found at each end of rear axle housing and mark them for reassembly in the same location).* Disconnect rear universal joint and drop the propeller shaft. Remove bolts attaching carrier to housing and remove the carrier assembly. To install, reverse removal procedure.

OVERHAUL: *"Sure–Grip" Differential – See "Power–Lock Differential (Plate Clutch Type With Belleville Springs)" in this section.*
Conventional Axle: *See 1957 Final Data, Page 320, or later Manual edition and note the following:*
Pinion Side Gear Clearance – .001–.012".
Ring Gear Attaching Bolts – 60 ft. lbs. torque.
Ring Gear & Pinion Backlash – .006–.008".
Pinion Rear Bearing Removal – To remove rear pinion bearing, use Tool C–293 and four No. 37 Adapters (pinions without spacers), four No. 36 Adapters (pinions with spacers).
Pinion Bearing Preload – Preload should be 20–30 inch–pounds (new bearings), 0–15 inch–pounds (old bearings). Torque on companion flange attaching nut should be 240 ft. lbs.
Pinion Setting & Bearing Preload Adjustment (Cars Without Spacer on Pinion Shaft) – Adjustment procedures for this type rear axle assembly are the same as for Chrysler New Yorker and Imperial as indicated in 1957 Final Data or later Manual edition.



CHRYSLER CORP. HYPOID REAR AXLE ASSEMBLY (EXPLODED)

LANCER & VALIANT HYPOID

Lancer (1962)
Valiant (1962)

DESCRIPTION: Semi–floating, hypoid gear type with differential carrier integral with rear axle housing.

Axle Ratios: The following axle ratios are available: 2.93–1 (41–14), 3.23–1 (42–13), 3.55–1 (39–11), and 3.91–1.

Axle Shaft & Bearing Removal: Remove wheel and drum. Disconnect brake line at wheel cylinder. Work through axle shaft flange to remove retainer nuts and use Puller C–3725 to pull axle shaft and rear brake assembly. Carefully remove brake assembly from axle shaft without damaging seal contact area. Remove seal from housing. Use same tool to remove bearing from axle shaft (when necessary to replace bearing). Bearing is made unfit for reuse during removal. *NOTE – If bearing retainer interferes with proper positioning of Tool C–3725, saw through retainer and remove, then split bearing collar to relieve interference fit between collar and axle shaft. Tool can now be positioned.*

Rear Axle Assembly Removal: Raise car and support body at front of rear wheels. Block brake pedal up. Remove rear wheels and disconnect hydraulic flex line. Disconnect parking brake cable at transmission, and propeller shaft at yoke. Remove spring clips (U–bolts) and shock absorbers. Remove assembly.

OVERHAUL: *See 1960 Final Data, Page 358, or later Manual edition and note the following:*
Differential Case Reassembly: Torque ring gear attaching bolts to 55 ft. lbs.
Differential Side Bearing Preload Adjustment: Select two new spacer washers having a total thickness equal to the two spacers installed for trial, plus thickness of feeler gauge, **plus .010".**
Pinion Setting (With Tool C–3715): Tighten tool nut to produce 15–25 inch–pounds of turning torque.
Pinion Bearing Preload Adjustment: Pinion bearing preload should be 15–25 inch–pounds (new bearings), 0–13 inch–pounds (used bearings).
Driven Gear & Pinion Backlash Adjustment: Backlash should be .004–.007".

FORD & MERCURY "DEEP-OFFSET" HYPOID

Ford Fairlane & Galaxie (1962)
Ford F & P-100 Trucks (1962) Ⓒ
Mercury Meteor & Monterey (1962)
Thunderbird (1962)
Ⓒ – Spicer Model 44 used with Equa–Lock Differential.

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 DIFFERENTIAL CASE ASSEMBLY PRODUCTION CHANGE:* For improved lubrication of differential pinion shaft, new differential case with oil feed holes and a sheet metal oil scoop used in production approximately the end of November, 1961. Differential side gears have four opposing spline teeth omitted (90° apart) to complete oil flow circuit. These parts are interchangeable with previous units.

►*REAR AXLE LUBRICANT CAUTION:* On 390" and 406" Engine cars, and all Equa–Lock differentials, use only Axle Lubricant, Ford & Mercury No. C1AZ-19580-E or F, with 4 ozs. Additive, No. No. C1AA-19B546-A per axle fill on Equa-Lock units.

DESCRIPTION: Banjo type housing, semi–floating type with "deep–offset" straddle mounted drive pinion, with separate differential carrier assembly. Design similar to previous models.

►*AXLE RATIO & IDENTIFICATION NOTE:* Ratio code stamped under AXLE on car patent plate on left front door hinge pillar. Axle ratio may also be stamped on a tag under a carrier attaching bolt.

Axle Ratios & Code Identification

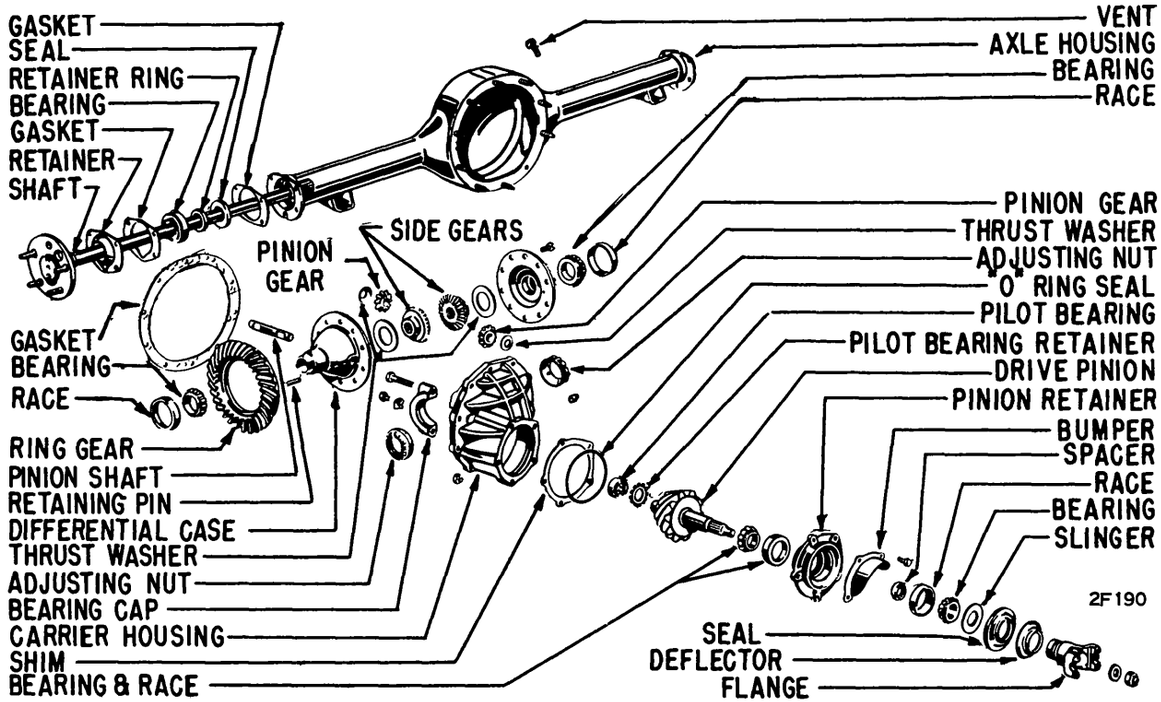
Axle Ratio	ⒸRatio Code
3.00–1 (39–13)	A or 1
3.20–1 (32–10)	3
3.22–1④	10
3.25–1 (39–12)	4
3.50–1 (35–10)	5
3.56–1 (32–9)	②F, ③B or 6
3.70–1 (37–10)④	11
3.80–1	7
3.89–1 (35–9)	②H, ③F, ⑤ 8,④12
4.11–1 (37–9) ④	13

Ⓒ – Number indicates Conventional Differential. Letter indicates Equa–Lock Differential.
②–Galaxie. ③–Monterey. ④–Trucks. ⑤–Pass. Cars.

►*HIGH PERFORMANCE AXLE RATIO NOTE:* Following special high performance axle ratios are available: 3.40 (34–10), 4.11 (37–9), 4.29 (30–7), 4.57 (32–7), 4.71 (33–7), 4.86 (34–7), 5.14 (36–7), 5.43 (38–7), 5.67 (34–6), 5.83 (35–6).

Axle Shaft Removal: Remove wheel and tire assembly, then remove brake drum. Work through hole in axle shaft flange to remove wheel bearing retainer nuts. Pull axle shaft with Adapter 4235–C and a slide hammer. Install one backing plate nut to hold plate in position.

Axle Shaft Seal & Bearing Replacement: *NOTE – Tool Set T60K–1225–A is available to remove and install bearing and retainer.* Nick bearing retainer with a chisel to loosen it for removal from shaft. Remove bearing by pressing or pulling it from shaft. Install bearing and retainer with same tools used for removal. *CAUTION – Bearing must seat firmly on axle shaft retainer. DO NOT press bearing and retainer on shaft at the same time.* Remove seal with suitable tool which will grip inside of seal. Install seal with suitable tool which will bear around outside diameter of seal. Use oil resistant sealer on outside of new seal.



FORD MOTOR CO. "DEEP-OFFSET" HYPOID REAR AXLE ASSEMBLY (EXPLODED)

►*SPECIAL TOOL NOTE:* When servicing axle assemblies, use suitable pullers, adapters, supports, and other tools which will properly remove and install axle parts without distortion or damage.

OVERHAUL: Equa–Lock Differential – *See 1959 Final Data, Page 336, or later Manual edition.*

Conventional Axle: *See 1957 Final Data, Page 322, or later Manual editions and note the following:*

Rear Axle Torque Specifications (Ft. Lbs.)

	Fairlane & Meteor	All Others
Diff. Bearing Capscrews	55–65	70–80
Diff. Bearing Adjusting Locknuts	12–20	15–20
Carrier–to–Housing Bolts	30–40	30–40
Pinion Retainer–to–Carrier Bolts	30–40	30–40
Ring Gear Attaching Bolts	65–75	75–85
Axle Shaft Retainer Bolts	30–40	Ⓒ30–40

Ⓒ – 55–65 ft. lbs. on Heavy Duty axle.

Ring Gear & Pinion Backlash: .008–.012" (Galaxie, Monterey, Fairlane, Meteor); .004–.009" (Thunderbird and Trucks).

Drive Pinion Depth Setting: Nominal pinion depth setting is .020" (.020" shim required).

Drive Pinion Retainer Seal Installation: Soak new seal in SAE 10W engine oil for ½–hour before installation.

Differential Case Assembly: On units having sheet metal oil scoop on differential case, be sure oil holes in scoop and feed holes in case are aligned during reassembly.

Four Pinion Differential: Disassembly – Same as for two pinion differential except as follows: After removing differential assembly from carrier, drive out three differential pinion shaft retainers with drift and separate. Drive out long pinion shaft from end opposite retainer hole. Remove two short pinion shafts, driving each from center outward. Lift out center block and remove gears and thrust washers.

Reassembly – Place a thrust washer and side gear in differential case bore. Install four thrust washers and place pinion gears on side gear. Align washers and pinion gears with pinion shaft holes in case. Install center block so its four small diameter holes are aligned with holes in pinion gears and case. Use brass drift to drive in two short pinion shafts from outside of case. *NOTE – Align shaft retainers as each shaft is driven in place.* Drive long pinion shaft into place from retainer hole end of case (align shaft retainer hole with that in case). Place second side gear and thrust washer on top of four pinion gears, then install differential case cover so that the three shaft retainer holes in cover align with their corresponding holes in case. Install the three shaft retainer pins with a drift. A pinion or axle shaft can be inserted in the side gear spline to check free movement of gears.

FORD ECONOLINE TRUCKS, COMET & FALCON HYPOID

Comet (1962)
Falcon Cars & Trucks (1962)
Ford Econoline Trucks (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*RING GEAR & PINION INSTALLATION CAUTION:* Some ring gear and pinion assemblies may be of the "non-hunting" type (pinion gear teeth mesh with the same ring gear teeth). It is important that marked tooth on pinion gear be meshed with marked tooth on ring gear if marks are found on assembly.

►*AXLE SHAFT REMOVAL NOTE:* To prevent corrosion due to moisture in rear axle housing wheel bearing bores, lightly coat bearing bores with ball joint lubricant, No. C1AZ-19590-A, any time rear axle shafts are removed.

►*DRIVE PINION BEARING PRELOAD CAUTION: Rear universal joint companion flange nut controls pinion bearing preload. If this nut is loosened, pinion bearing preload must be adjusted.*

DESCRIPTION: Semi-floating, hypoid gear type with an integral type housing and Hotchkiss drive. Design is similar to that used on previous models.

►*AXLE RATIO & IDENTIFICATION NOTE:* Ratio code stamped under AXLE on car patent plate, and may also be stamped on a tag under a housing cover bolt.

Axle Ratios & Code Identification

Axle Ratio	Ratio Code
3.10-1 (31-10)	2
3.20-1 (32-10)	3
3.50-1 (35-10)	5 (Comet & Falcon), 01 (Econoline)
4.00-1 (36-9)	9 (Comet & Falcon), 02 (Econoline)

AXLE HOUSING ASSEMBLY: Removal – Raise vehicle and support it on the underbody, then loosen carrier rear cover and drain lubricant. Disconnect drive shaft at pinion flange and shock absorbers at axle housing. Remove both axle shafts (see below). Remove hydraulic brake "T" connection from axle housing (do not open hydraulic brake system line), then remove brake line from retainer clip on housing. Remove both brake backing plates from housing and support them out of way with wire. *CAUTION – Be careful not to damage brake lines or cables.* Support axle housing on a jack, then remove spring plates and "U" bolts. Remove axle assembly from under car.

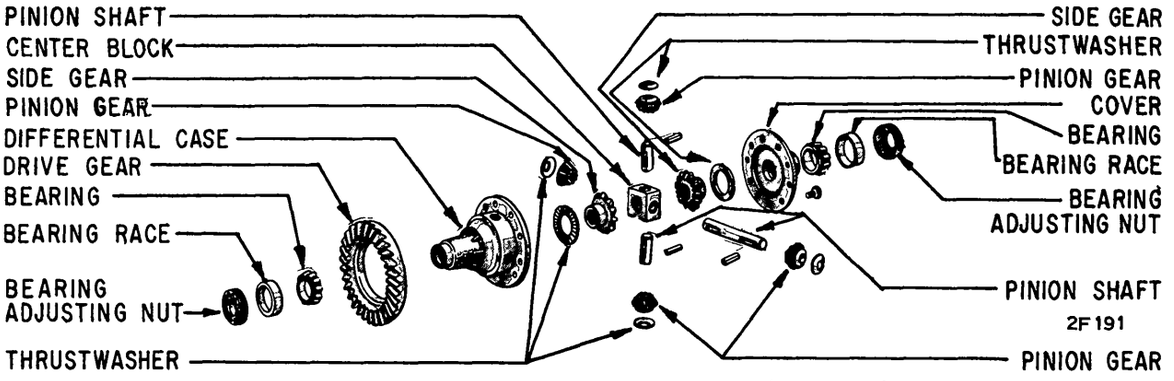
Installation: Reverse removal procedure and tighten spring "U" bolt nuts to 13-20 ft. lbs.

AXLE SHAFT: Removal – Remove wheel assembly from brake drum, then back off rear brake shoe adjustments. Remove brake drum-to-axle shaft flange nuts and remove. Working through hole in axle shaft flange, remove nuts securing wheel bearing retainer, then remove axle shaft from axle housing using a suitable "sliding hammer" type puller. *CAUTION – Do not dislodge brake backing plate. Use a single nut to hold plate in position after removal of axle shaft.*

Bearing & Seal Replacement – Remove seal from axle housing with a suitable puller. To remove bearing from shaft, nick bearing retainer deeply with a chisel, using care not to damage shaft, and remove retainer. Press bearing from axle shaft using an arbor press and a suitable tool to hold and support bearing. When installing seal in axle housing, coat outside edges of new seal with sealing compound, then install seal in housing with Tool 1177-B (Comet), T62P-1177-A (Falcon), T61E-1190-B1 (Econoline) making sure sealing lips point inward and that seal is seated against shoulder in housing. Install outer bearing race on shaft, then press new bearing on shaft, seating it firmly against shoulder. Press a new bearing inner retainer on shaft, seating it firmly against bearing. *CAUTION – Do not attempt to press bearing and inner retainer on shaft at the same time.*

Installation: Reverse removal procedure and tighten bearing retainer mounting nuts to 30-35 ft. lbs.

OVERHAUL: *See 1960 Final Data, Page 352, or later Manual edition, and note the following:*



FORD ECONOLINE TRUCK DIFFERENTIAL CASE (EXPLODED)
(COMET & FALCON SIMILAR)

Rear Axle Torque Specifications

Item	Ft. Lbs.
Housing Cover Bolts	10-17
Differential Bearing Capscrews	40-50
Differential Bearing Adjuster Locknuts	12-20
Ring Gear Attaching Bolts	40-50

Ring Gear & Pinion Backlash: .006-.010" (Comet & Falcon), .008-.012" (Econoline).

Pinion Depth Setting: Nominal pinion depth setting is .018" (.018" shim required). Shims furnished from .008-.024" thick.

Pinion Bearing Preload: Minimum torque on pinion flange nut should be 140 ft. lbs. to obtain pinion bearing preload of 17-27 inch-pounds (new bearings), 6-12 inch-pounds (used bearings).

Drive Pinion Seal Installation: Soak new seal in SAE 10W engine oil for ½-hour before installation.

Differential Bearing Preload: 2-3 notches tight (Falcon & Econoline), 1-2 notches tight (Comet with Light Carrier), 1-1½ notches tight (Comet with Heavy Carrier).

Differential Case (Two-Piece Type): Disassembly – Use a suitable puller and remove differential side bearings, then remove bolts attaching drive gear to differential case. Press drive gear from case or tap it off with a hammer. On passenger cars, drive out the single pinion shaft retainer and separate two-piece differential case. Drive out pinion shaft with a brass drift and remove gears and thrust washers. On Trucks, drive out the three pinion shaft retainers and separate differential case. With a brass drift, drive out long pinion shaft (drive from end opposite retainer hole), then remove two short pinion shafts (use a brass drift and drive from center outward). Lift out center block, then remove gears and thrust washers.

Reassembly – Place a thrust washer and side gear in differential case bore. *NOTE – Lubricate all parts with rear axle lubricant as they are assembled.* On passenger cars, drive pinion shaft into case with a soft hammer far enough to support a pinion thrust washer and pinion gear, then install thrust washer and slide pinion gear onto shaft and mesh with side gear. Place second pinion gear and thrust washer in position, and drive pinion shaft all the way into position. *NOTE – Be sure to align shaft retainer holes as shaft is being driven in.* Place second side gear on top of two pinion gears, then position thrust washer and install differential cover so shaft retainer hole in cover is aligned with hole in case. On truck models, install four pinion thrust washers, and place pinion gears on side cover, then align washers and pinion gears with pinion shaft holes in case. Install center block so that its four small diameter holes are aligned with holes in pinion gears and with holes in case. Use a brass drift and drive the two short pinion shafts into center block, being sure to align shaft retainer holes as each shaft is driven into place. Drive long pinion shaft into place from retainer hole end of case, being sure to align retainer hole with hole in case. Place second side gear and thrust washer on top of the four pinion gears and install differential case cover so that the three shaft retainer holes are aligned with holes in case. On all models, install shaft retainer pins with a drift (one on passenger cars and three on truck models). *NOTE – A pinion or axle shaft spline can be inserted in side gear spline to check for free rotation of differential gears.* Place drive gear on differential case and tighten bolts to 40-50 ft. lbs.

FORD TRUCK "BANJO HOUSING" HYPOID

F, B, P–500, 600; C550, 600 (1962) Std. Equipm nt

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE LUBRICANT NOTE:* Rear axle lubricant should be changed after first 8,000 miles (on or off highway), and at each 32,000 mile interval thereafter.

DESCRIPTION: Full floating, hypoid gear type with Hotchkiss drive. Differential carrier is multiple casting type having a separate drive pinion carrier.

►*AXLE RATIO & IDENTIFICATION NOTE:* Ratio code stamped under AXLE on truck patent plate. On Timken axles, ratio (and model information) stamped on Rockwell Standard Serial No. Plate on right rear face of axle housing above brake line. On Eaton axles, ratio (and carrier assembly number) stamped on pad on top surface of carrier housing.

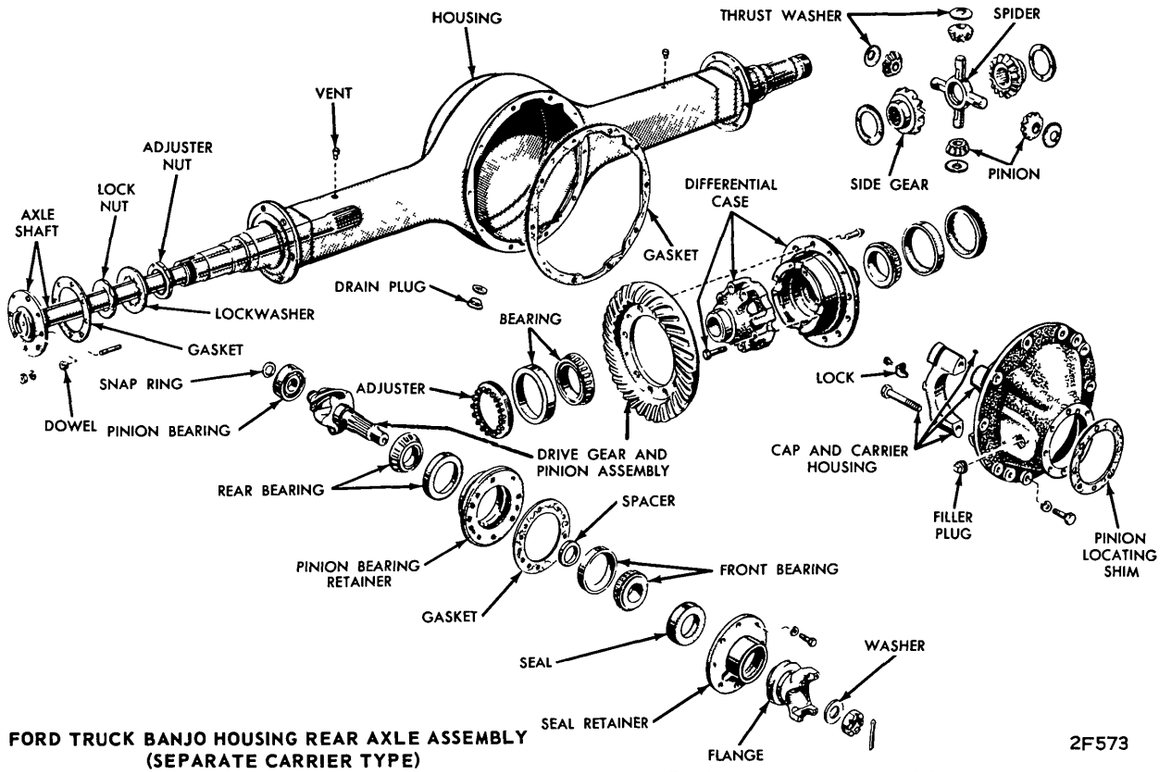
Axle Application, Ratios, & Ratio Code

Truck Model	Axle Model	Code	Ratio
F, B, P–500	Timken C–100	32	6.20
		34	6.80
F, B–500; C–550	Timken D–100	41	5.83
		42	6.20
		44	6.80
C–600	Timken F–104	52	6.20
		54	6.80
F, B, C–600	Timken F–106	62	6.20
		64	6.80
		66	7.20
F, B, C–600	Eaton 1614–15	73	6.50
		75	7.17

Axle Shaft Replacement: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To install, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50–70 ft. lbs.

Carrier Removal: Remove axle shafts (see above), disconnect drive shaft at rear joint flange. Support carrier assembly and remove carrier attaching bolts. Tighten puller screws (if provided) to loosen carrier from housing. Remove carrier.

Wheel Bearing Adjustment: Remove axle shafts (see above). Torque adjusting nut to 50–80 ft. lbs. while rotating wheel in both directions. When bearing rollers



FORD TRUCK BANJO HOUSING REAR AXLE ASSEMBLY (SEPARATE CARRIER TYPE)

are firmly seated, back off adjusting nut 3/8–turn and install lockwasher. *If adjusting nut has a locking dowel, dowel must enter lockwasher hole closest to dowel. If lockwasher has tabs, bend a tab over adjusting nut.* Torque locknut to 100–150 ft. lbs. Wheel must still rotate freely and with .001–.010" endplay. Bend a lockwasher tab over locknut (if equipped), then install axle shaft.

OVERHAUL: *See 1956 Final Data, Page 337, or later Manual editions, and note th following:*

Ring Gear & Pinion Backlash: .006–.012" (Timken), .008–.015" (Eaton).

Differential Bearing Preload Adjustment: 2 notches (Timken), 1½–2 notches (Eaton) tight from zero endplay position.

Pinion Bearing Preload: 5–15 inch–pounds (Timken), 15–35 inch–pounds (Eaton).

Pinion Shaft Nut Torque: 300–400 ft. lbs. (Timken), 325–450 ft. lbs. (Eaton).

FORD TRUCK 2-SPEED

F, B, P–500, 600; C–550, 600 (1962)

DESCRIPTION: Two–speed planetary differential assembly with either a spiral bevel or hypoid ring gear and pinion. Spiral bevel pinion shaft is piloted at rear by a roller bearing. Shift control is electrically operated.

Truck Model	Axle Model	Code	Ratio
P,B,C–500	Eaton 1350	D1	5.83/8.11
C–600	Eaton 13800	E1	5.83/8.11
	Eaton 13800	E2	6.33/8.81
F,B,C–600	Eaton 13802	F1	5.83/8.11
	Eaton 13802	F2	6.33/8.81
F,B,C–600	Eaton 16802,03	G3	6.50/9.04

►*AXLE IDENTIFICATION CODE & RATIO NOTE:* Code (type of axle used) is located on Rating Plate on left front cab pillar or glove door, see table above. Axle ratio stamped on top of carrier housing below carrier assembly number.

AXLE SHAFT & WHEEL BEARING REPLACEMENT: Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing. Remove axle shaft stud nuts. Loosen dowels by striking drift at center of flange and remove dowels and axle shaft. Remove seal assembly from studs and wiper from housing (if so equipped). Remove locknut, lock washer and adjusting nut. Plate wheel type jack under wheels and relieve load on bearings. Remove outer bearing cone and pull wheel off axle. Use hard wood block to drive outer bearing cone and inner seal out of hub. If bearing cups are to be replaced, drive them out with a drift. Use Tool T53T–1239–A and Detail 17 to replace cups. *NOTE – Pack b aring gr ase on both sides of ach cup.* Place each bearing and roller assembly into wheel hub, then install new inner seal with Tool T54T –1175–E(F,B,C–600). Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal. Install outer bearing cone and adjusting nut. Torque adjusting nut to 50–80 ft. lbs. while rotating wheel in both directions, then back off nut 3/8 turn and install lockwasher. *NOTE – Wh n adjusting nut has locking dow l, dow l must nter lock washer hole closest to dow l. Wh n quipp d with tabs, run locknut against lockwash r and b nd tab of nut.* Torque locknut to 100–150 ft. lbs. Wheel will rotate freely with .001–.010" endplay. Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets removed). Install axle shaft.

OVERHAUL: *S e R ar Axle S ction of Manual.*

FORD TRUCK "INTEGRAL HOUSING" HYPOID

F-100 With P w r-L ck Differ ntial (1962) ①
F-250, 350; P-350, 400 (1962)
① – F r C nv ntional Axle, see "Ford Motor Co. Deep-Offs t Hyp id" in this s ction.

► *REAR AXLE LUBRICANT NOTE:* Rear axle lubricant should be changed after first 8,000 miles (on or off highway), and at each 32,000 mile interval thereafter.

DESCRIPTION: Spicer Models 44, 60, and 70. Full-floating, hypoid gear type with Hotchkiss drive. This axle does not have a separate carrier assembly.

► *AXLE RATIO & IDENTIFICATION NOTE:* Ratio code stamped under AXLE on truck patent plate. Ring gear and pinion tooth combination stamped on ratio tag on axle housing cover.

Axl Application, Ratios, & Ratio Code

Truck M del	Axl M del	Code	Ratio
F-100	Spicer 44	A1①	3.73 (41-11)
		A2①	3.92 (47-12)
F-250	Spicer 60	B4①	4.56 (41-9)
		B6①	4.88 (39-8)
		24②	4.56 (41-9)
		26②	4.88 (39-8)
F, P-350; P-400	Spicer 70	22②	4.88 (39-8)
		23②	5.13 (41-8)
		29②	5.87 (47-8)

①—Power-Lock Differential.
②—Conventional Differential.

SPECIAL REAR AXLE TOOLS

TOOL	AXLE MODEL	
	44	60 & 70
Housing Spreader	4000-A	4000-A (Altered)
Diff Bearing Remover	OTC-1001 With 1001-1B, 1011, and Adapter	T56L-400-A
Diff Bearing Replacer	T57L-4221-A2	T53T-4221-C
Pinion Flange Holder	T57T-4851-B	T57L-4851-A
Pinion Flange Remover	T56L-4851-C	T56L-4851-C
Pinion Flange Seal and Outer Bearing Cone Remover	T58L-101-A with T50T-100-A	T58L-101-A with T50T-100-A
Pinion Inner Bearing Cone Remover	OTC-951	T56T-4630-C (4.55:1 Ratio) T56T-4630-A (4.88:1 Ratio)
Pinion Inner Bearing Cone Replacer	T53T-4621-B	T53T-4621-C
Pinion Inner and Outer Bearing Cup Remover	OTC-960	OTC-960
Pinion Inner and Outer Bearing Cup Replacer	T53T-1239-A with A6 Adapter and T56T-4616-A2	T53T-1239-A with T56T-4616-A (Details 1 & 2)
Pinion and Flange Installer	4858-B	T53T-4851-B-2 with T56T-4851-A
Pinion Depth Gauge	T56T-4020-A	T56T-4020-A
Pinion Flange Seal Replacer	T55P-4676-A	T56T-4676-A

AXLE SHAFT & WHEEL BEARING REPLACEMENT: Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing. Remove axle shaft stud nuts. Loosen dowels by striking drift at center of flange and remove dowels and axle shaft. Remove seal assembly from studs and wiper from housing tube (if so equipped). Remove locknut, lock washer and adjusting nut. Place wheel type jack under wheels and relieve load on bearings. Remove outer bearing cone and pull wheel off axle. Use hard wood block to drive outer bearing cone and inner seal out of hub. If bearing cups to be replaced, drive them out with a drift. Use Tool T53T-1239-A and Detail 17 to replace cups. *NOTE – Pack bearing grease on both sides of each cup.* Place each bearing cone and roller assembly into wheel hub then install new inner seal with Tool T53T-1175-D (F-250, P-350), T53T-1175-B (F-350). Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal. Install outer bearing cone and adjusting nut. Torque adjusting nut to 50-80 ft. lbs. while rotating wheel in both directions, then back off nut 3/8 turn and install lockwasher. *NOTE – When adjusting nut has locking dowel, dowel must enter lock washer hole closest to dowel. When equipped with tabs, run locknut against lockwasher and bend tab of nut.* Torque locknut to 100-150 ft. lbs. Wheel will rotate freely with .001-.010" endplay. Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets removed). Install axle shaft.

REMOVAL OF REAR AXLE ASSEMBLY: Loosen wheel stud nuts and axle shaft nuts. Disconnect rear shock absorbers from spring seat caps. Raise rear end of vehicle frame to remove weight from springs and place stands under frame. Disconnect hydraulic line at frame, parking brake cable (if so equipped) at equalizer and remove cables from support brackets. Disconnect drive shaft at universal joint and remove nuts from "U" bolts and remove spring seat caps. Roll axle from truck and drain lubricant.

OVERHAUL: Power-Lock Differential – *See "Power-Lock Differential (Plate Clutch Type With Bellevill Springs)" in this section.*

Conventional Axle: *See 1957 Final Data, Page 324, r later Manual editions, and note the following:*

Ring Gear & Pinion Backlash – .008-.013" (Model 44 & 60), .005-.010" (Model 70) and must not vary more than .002" (Model 44 & 60), .003" (Model 70) between positions checked.

Pinion Depth Setting – After pinion is installed in housing and preload is within limits, check depth setting (actual assembly dimension) with Depth Gauge, using small discs for Model 44 and large discs for Model 60 and 70. Place dial indicator on high step. Nominal setting is 2.625" (Model 44), 3.125" (Model 60 & 70).

Pinion Bearing Preload Shim Pack – When original shim pack is lost or questionable, use a .065" shim pack for trial build-up.

Pinion Flange Nut Torque – 200-220 ft. lbs. (Model 44 & 60), 250-270 ft. lbs. (Model 70).

LINCOLN CONTINENTAL HYPOID

Lincoln Continental (1962)

DESCRIPTION: Semi-floating hypoid gear type with integral carrier housing and Hotchkiss drive. Similar in design to previous models.

► *AXLE RATIO & IDENTIFICATION NOTE:* Ratio code number or letter stamped under AXLE on car patent plate. Ratio also stamped on tag attached to a housing cover bolt. Directed Power differential also identified by additional tag on housing cover.

Axle Ratio & Identification

Model Year	Conventional – Code – Dir. Power	Ratio
1961	7 G	2.89-1
1962	1 A	2.89-1

AXLE SHAFT REPLACEMENT: *See 1959 Final Data, Page 337, or later Manual edition, and note Tool No. Table below.*

REAR WHEEL BEARING & SEAL REPLACEMENT: *See 1959 Final Data, Page 377, or later Manual edition, and note Tool No. Table below.*

DRIVE PINION SEAL & COMPANION FLANGE REPLACEMENT: *See 1959 Final Data, Page 337, or later Manual edition, and note Tool No. Table below.*

AXLE ASSEMBLY REMOVAL: Raise and support car, then drain lubricant by loosening housing cover bolts. Mark drive shaft, universal joints, slip yoke and companion flange for reinstallation in original position to maintain drive line balance. Remove two "U" bolts at rear universal joint and slide drive shaft forward to remove shaft. Cover output shaft with Tool 7657-J to stop oil leakage from transmission. Remove wheels, brake drums, wheel bearing retainer nuts and pull axle shafts and bearings. Disconnect rear shock absorbers, then remove brake line to axle clips and bolt holding junction block to axle housing. Remove parking brake cable retainers from "U" bolts then remove backing plates and brake lines (wire them to body). Remove axle "U" bolt nuts, bolts and spring insulator retainers. Remove axle housing assembly.

OVERHAUL: Directed Power Differential – *See "Power-Lock Differential (Plate Clutch Type With Bellevill Springs)" in this section.*

Conventional Axle: *See 1959 Final Data, Page 337, or later Manual edition, and note Tool No. Table below.*

1961-62 Lincoln Continental Tool Numbers

Item	Number
Grease & Oil Seal Remover	1175-AE
Axle Shaft Brg. Remover	1225-DA
Diff. Housing Spreader	4000-C
Pinion Depth Gauge	4020-B
Pinion Depth Gauge Block	4020-BA
Pinion Shaft Drive Nut	4201
Blacklash & Runout Gauge	4201-C
Diff. Assy. Bench Mount	4205-B
Axle Hsg. (Dummy) Bearings	4205-C
Pinion Tension Scale	4209-C
Diff. Side Brg. Remover	4221-C
Diff. Brg. Cones Remover	4222-H
Axle Shaft & Brg. Assy. Remover	4235-C
Wheel Brg. Seal Installer	4245-B
Pinion Front Brg. Cup Installer	4616
Pinion Brg. Installer	4621-A
Pinion Rear Brg. Remover	4621-BA
Pinion Rear Brg. Cup Installer	4628
Pinion Front Brg. Cup Remover	4628-B
Pinion Rear Brg. Cup Remover	4628-D
Pinion Shaft Oil Seal Installer	4676
Companion Flange Holder	4851-K
Companion Flange & Pinion Brg. Installer	4858-B
Companion Flange Remover	4858-D
Pinion Flange Nut Wrench	4858-G
Companion Flange Dust Shield Installer	4859

OLDSMOBILE (EXCEPT F-85) HYPOID

Oldsmobile 88, S88, 98 (1962)

DESCRIPTION: Semi-floating, Hypoid gear type of own design similar to previous models.

►*REAR AXLE RATIO & IDENTIFICATION NOTE:* Axle ratio code number stamped on lower right side of differential carrier flange. "L" in addition to code number indicates "Anti-Spin" Differential.

Axle Ratios & Identification Code

Axle Ratio	Code Number	Axle Ratio	Code Number
2.69-1 (43-16)	2	3.42-1 (41-12)	8
2.56-1 (41-16)	3	3.23-1 (42-13)	9
2.87-1 (43-15)	7	3.08-1 (40-13)	0

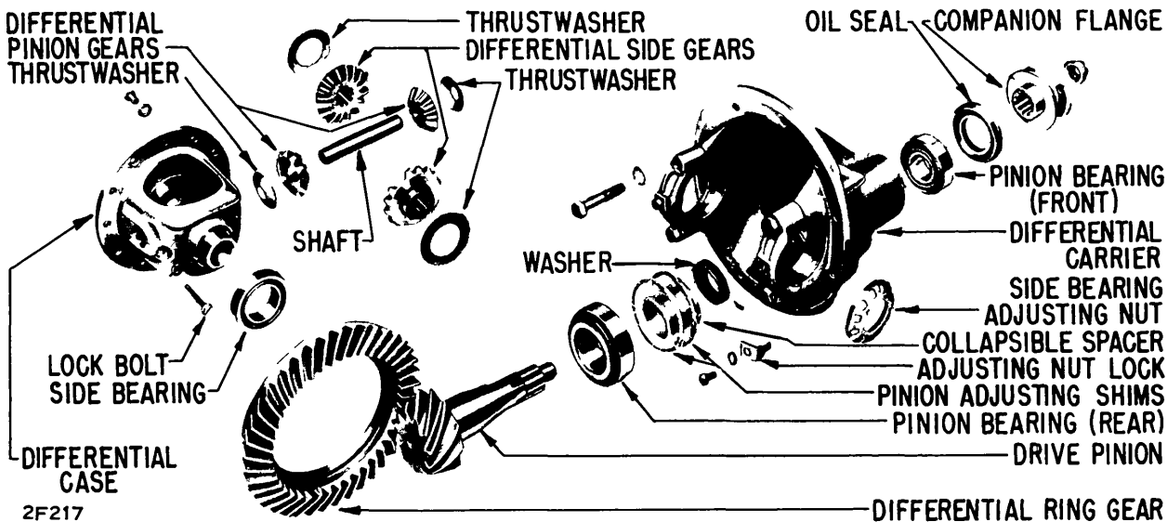
►*REAR AXLE LUBRICATION CAUTION:* Use only Special Lubricant, Part No. 531536, in both conventional and "Anti-Spin" axle assemblies.

AXLE SHAFT: Removal - Remove wheel (left wheel has left hand threads) remove drum by removing two Tinnerman nuts from wheel studs If nuts removed by turning off threads, they can be reused If nuts damaged, new nuts must be used Loosen backing plate nuts and loosen bearing retainer (do not move backing plate or brake line may be damaged) Pull shaft and bearing with Puller J-942 (do not allow shaft to drag on oil seal) Replace one nut to hold backing plate in position

WHEEL BEARING & OIL SEAL REPLACEMENT: *(NOTE-* Wheel bearings have .012-.015" endplay between balls and the races. Do not reject bearing unless endplay is greater than 020" or if there is definite roughness between ball and race). With axle shaft removed, remove bearing retainer collar after splitting with a cold chisel. *(CAUTION* - Do not damage axle when removing collar). Using Tool J-947-2 and J-947-1, press off bearing in an arbor press. To install bearing, use Tool J-947-3 and Plate J-947-1 with an arbor press and press bearing over axle shaft, being sure that pressure is being applied to inner race of bearing. After bearing has been pressed firmly against axle shaft shoulder, press new bearing retainer collar on shoulder of shaft against bearing. Be careful not to damage shaft surface on which oil seal runs.

Oil Seal: With axle shaft removed, remove seal. Before installing a new seal, apply sealer around its outside diameter then install seal in housing with Tool J-5818. *CAUTION* - When installing axle shaft, be careful not to damage seal.

PINION SHAFT OIL SEAL REPLACEMENT: Mark pinion shaft nut before loosening so that it may be retightened to the exact same location. This will avoid necessity of resetting pinion bearing preload. Remove companion flange nut and washer, then remove companion flange with Tool 6295-01. Remove seal by driving it out of housing with a blunt chisel. Lubricate new seal and coat outer diameter with sealing compound. Tap seal into place using Tool J-5395. Apply seal lubricant, Part No. 567196 to outer diameter of flange and to lip of new seal. Install flange and tighten nut to marked position, then tighten nut 1/16" beyond alignment mark.



OLDSMOBILE & PONTIAC REAR AXLE ASSEMBLY (TYPICAL)

OVERHAUL: *"Anti-Spin" Differential - See "Power-Lock Differential (Plate Clutch Type With Belleville Springs)" in this section.*

Conventional Axle: *See 1957 Final Data, Page 326, or later Manual editions, and note the following:*

Drive Pinion Bearing Preload: 24-32 inch-pounds (new bearings), 10-15 inch-pounds (used bearings).

Differential Side Bearing Preload: 2-3 notches tight.

Ring Gear Backlash & Differential Side Bearing Adjustment: If backlash is not within limits of .005" minimum, .009" maximum, adjust backlash to 007" to .008" (preferred setting)

Pinion Gear Setting Shims: Pinion shims are furnished in the following sizes and are identified (other than by thickness) as follows 004" (no notch), .005" (1 notch), 006" (2 notches), 007" (no notch), 010" (no notch), 013" (1 notch), 014" (2 notches), 015" (no notch), 016" (1 notch), 017" (2 notches).

PONTIAC HYPOID

Pontiac (1962)

DESCRIPTION: Semi-floating, hypoid gear type with Hotchkiss drive. Similar in design to previous models.

Axle Ratios & Identification

Axle Ratio	①Code	②③Color
2.56-1 (41-16)	3	Gray
2.69-1 (43-16)	2	Red
2.87-1 (43-15)	7	Orange
3.08-1 (40-13)	0	Yellow
3.23-1 (42-13)	9	Brown
3.42-1 (41-12)	8	White
3.64-1 (40-11)	6	Blue
3.90-1 (39-10)	4	No Color

① - Stamped on lower right side of differential carrier attaching flange. ② - Color mark on end of axle shaft. ③ - Safe-T-Track Differentials also have color Green and lubrication tag next to oil filler plug.

AXLE SHAFT REMOVAL: Raise body to provide clearance and remove wheel Clean dirt from end of housing to protect wheel bearing and remove brake drum Remove bearing outer retainer bolt nuts Use Puller J-942-1, if necessary, to remove axle shaft *CAUTION - DO NOT dislodg backing plate or brak pip may be damag d.*

►*AXLE SHAFT CAUTION* Axle shaft with left thread on wheel bolts must be installed on left side of car

PINION SHAFT OIL SEAL REPLACEMENT: Mark position on companion flange, pinion nut, and pinion shaft to insure reassembly in the same location. *NOTE - If companion flange is to b r plac d, it will not be necessary to mark the abov parts as pini n bearing preload will have to b r adjust d.* Measure pinion bearing preload with an inch-pound torque wrench and note reading. Remove drive pinion nut and washer using Holding Tool J-6289, then remove companion flange with Puller J-6295. Remove oil seal by prying it out of carrier with a blunt tool. Oil lip of new seal and coat outer diameter with a suitable sealer. Install seal by tapping into place with Tool J-5395. Install companion flange, then install washer and nut. Tighten nut until it and the companion flange are in the same position as marked at disassembly, then tighten nut an additional 1/32" beyond locating marks. *CAUTION - Do not exceed 1/32" additional tightening.* Recheck pinion bearing preload. Preload should be same as noted at removal.

OVERHAUL: Safe-T-Track Differ ntial - *S "P w r-Lock Differential (Plate Clutch Typ With B llevill Springs)" in this section.*

Conv nti nal Axle: *Se 1957 Final Data, Pag 328, r lat r Manual editions, and n te th foll wing:*

CONTINUED ON NEXT PAGE

PONTIAC HYPOID (C nt.)

Wheel Bearing & Oil Seal Replac m nt: With axle shaft removed, remove oil seal from axle housing with Tool J–943. To remove bearing from shaft, install axle shaft in Tool J–947–P so tool engages outer race of bearing and ring enclosing bearing, then press bearing and retainer from shaft with an arbor press. To install bearing, install outer bearing retainer on shaft (if removed), then install bearing on shaft with Tool J–947–P (tool should bear only on inner race), pressing it into position with an arbor press. Press a new bearing inner retainer ring in place against bearing with Tool J–947–P. *CAUTION – Do not press bearing and inner retain r on in on op rati n as edge radius of retainer will climb ver corner of bearing inn r rac and forc grease seals into balls.* To install seal in housing, coat new seal lip with oil and coat outside of seal retainer with Permatex No. 3 or similar compound, then install seal with Tool J–5818. Install axle shaft. *NOTE* – If both axle shafts removed, shaft with left hand threads on wheel bolts must be on left side of car. Install bearing outer retainer and gasket and tighten self-locking retainer nuts to 30–45 ft. lbs.

Ring Gear Backlash & Differential Side Bearing Adjustment: Backlash should be between .005"-.009". Tighten bearing-cap bolts to 65–85 ft. lbs.

Carrier Oil Gallery Plug Replacement: *NOTE - This plug is l cated at forward nd of diff r ntial carri r h using lower reinforcing web.* Mark position of companion flange, pinion nut and pinion shaft so all parts may be installed in exactly the same positions to maintain proper pinion bearing preload. Remove companion flange from pinion shaft, then thread a ½" bottom tap into plug until plug starts to turn. Remove plug by turning tap and pulling at the same time. To install plug, apply a light coat of permatex No. 3 to hole in carrier and to plug, then install plug, making sure that it does not enter drain hole. *CAUTION - Do not attempt to drill a hole in plug for removal as shavings will fall into drain hole.*

SPICER HYPOID

CHECKER	Spicer Model No.
Superba & Marathon	44
STUDEBAKER	
Lark 6 & V8 (Except Below)	27
Lark Taxi, Police, Station Wagon	44
Gran Turismo Hawk	44
WILLYS (REAR)	
CJ-3B, CJ-5, CJ-6	44
DJ-3A	27
F4-134, 4 x 4, 4 x 2	44
F4-134 4WD (4500 GVW)	53-2
F4-134 4WD (5000 GVW)	53
L6-226, 4 x 4, 4 x 2	44
L6-226 4WD	53
FC-150	44-1
FC-170 (Std.)	53
FC-170 (Dual Wheel)	70
FJ-3	27

►CHANGES, CAUTIONS, CORRECTIONS

► *1962 STUDEBAKER HOUSING COVER GASKET INSTALLATION NOTE:* New type laminated cover gasket (double thickness from center of bolt holes to inner edge) **must** be installed with smooth side of gasket next to axle housing.

► *1962 STUDEBAKER MODEL 27 AXLE PINION SHAFT OIL SLINGER PRODUCTION CHANGE & OVERHAUL NOTE:* Early type axles have 2 pinion shaft oil slingers. Later type have slinger between pinion gear and rear bearing cone omitted and a .030" shim (Part No. 1557102) installed between rear bearing cone and axle housing along with pinion depth shim pack. Manufacturer recommends that when servicing axle assemblies having two oil slingers, that the second slinger (between pinion gear and rear bearing cone) be eliminated and the above .030" shim installed instead.

► *1962 WILLYS FC–170 (DUAL REAR WHEELS) AXLE BEARING NUT LOCKWASHER PRODUCTION CHANGE & REPLACEMENT NOTE:* New type lockwasher, Part No. 929721, used on later trucks. New washer is thicker and has wider keyway tab. Also, two washers used at each bearing. Install one washer between bearing and adjusting nut, and second washer between adjusting nut and locknut. Use new lockwasher whenever replacement necessary.

DESCRIPTION: Hypoid gear type with semi–floating axles on Models 27, 44, 44–1, 53, 53–2. Full–floating axles used on Model 70. Rear wheel bearings are "roller type" on all semi–floating axles. Model 70 axle differential case is "split type" and has four differential pinions.

► *AXLE RATIO & IDENTIFICATION NOTE:* Axle ratio stamped on metal tag attached to an axle housing cover bolt. Power–Lock differential identified by "45" or "T" on a second metal tag attached to an axle housing cover bolt; and also by a lubrication caution tag attached to filler plug. Following axle ratios are available:

Checker – 3.73 (41–11), 3.31 (43–13), 4.09 (45–11), 3.54–1, 4.55–1.

Studebaker – 3.07–1, 3.31–1, 3.73–1, 4.09–1, 4.10–1, 4.55–1, 4.56–1.

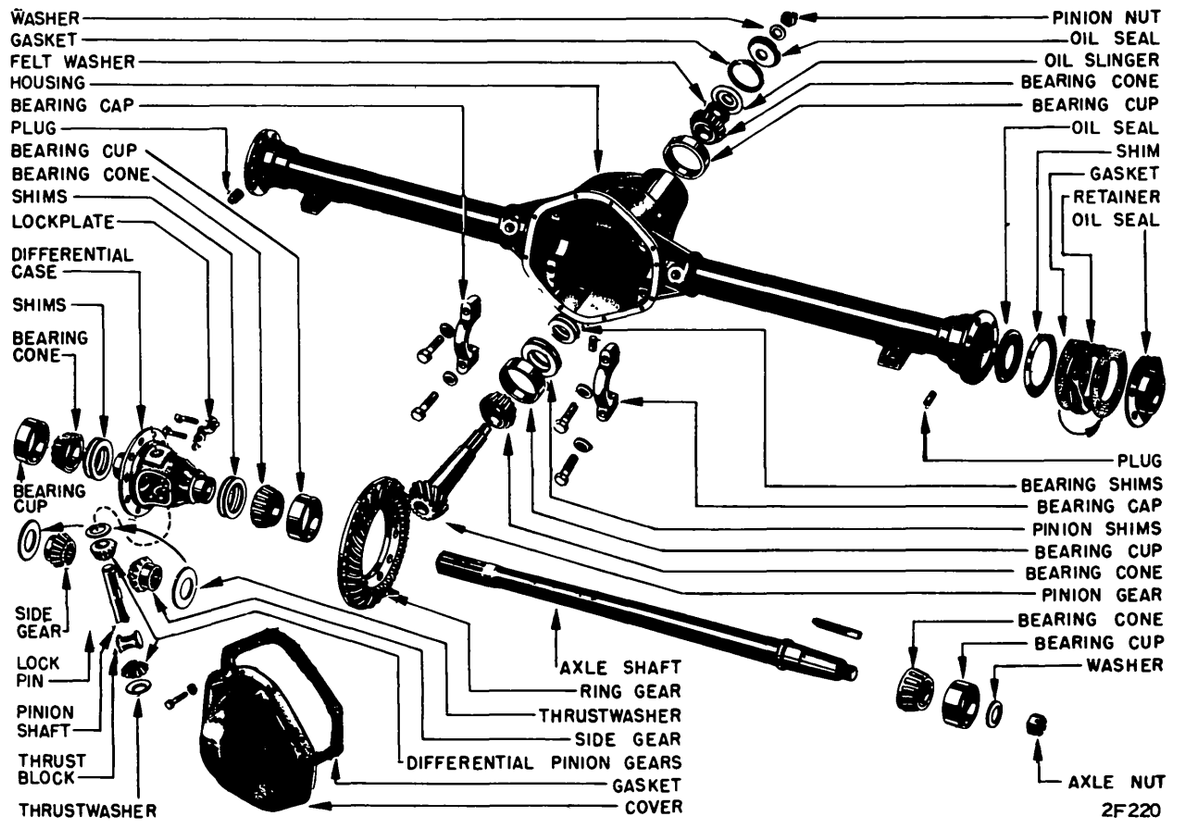
Willys – **Model 27 Axle** – 4.27 (11–47), 4.56 (9–41) 5.38 (8–43).

Model 44 & 44–1 Axle – 4.56 (9–41), 4.89 (9–44) 5.38 (8–43).

Model 53 & 53–2 Axle – 4.27 (11–47), 4.88 (8–39), 5.38 (8–43).

Model 70 Axle – 4.88 (8–39), 5.87 (8–47).

CONTINUED ON NEXT PAGE



SPICER HYPOID REAR AXLE ASSEMBLY

SPICER HYPOID (C nt.)

AXLE ASSEMBLY REMOVAL: Proceed as follows:

Studebak r (All Mod ls) Remove the nub caps, loosen wheel nuts and remove axle shart nut. Raise rear of car and support on stands under frame just ahead of rear springs. Remove wheels, hubs, and drums. Disconnect brake line at each rear wheel cylinder, remove brake pipe clamps and free brake line from rear axle housing. Take out backing plate bolts, pull backing plate out over end of axle shaft and tie up out of way. Remove adjusting shims located beneath backing plate. *(CAUTION – Save for reinstallation).* Disconnect propeller shaft by removing rear universal joint U-bolts and nuts (wire caps together). Remove rear spring U-bolts from axle housing, disconnect rear shock absorbers. Remove rear axle assembly from beneath car.

Willys - Raise rear end of vehicle with hoist and support frame ahead of rear springs. Remove wheels and disconnect propeller shaft at rear universal joint companion flange. Disconnect brake hydraulic hoses, remove spring to axle "U" bolt clips and slide assembly from under vehicle.

AXLE SHAFT REMOVAL: Proceed as follows:

Studebaker (All Models) - Remove wheel and hub using Puller J-1644-A. Remove backing plate retaining bolts and remove outer washer, retainer, reinforcing plate and felt washer (discard this washer). Free, hand brake cable from equalizer and frame guides and disconnect hydraulic brake line at wheel cylinder. Pull backing plate out over end of axle shaft and tie it up out of way. Remove endplay adjusting shims *(CAUTION - Save for reinstallation).* Use Puller J-7935 with Hammer J-2619 to remove axle shaft.

Willys - Jack up wheel and remove hub cap, axle shaft nut. Use Puller C-319 to remove wheel hub. Remove screws attaching brake dust shield, grease and bearing retainers and brake assembly. Remove wheel shield and retainer. Pull axle shaft out but DO NOT lose adjusting shims.

AXLE SHAFT ENDPLAY ADJUSTMENT (SEMI-FLOATING AXLES): Total endplay for both axle shafts should be .001–.006" (Studebaker), .003–.007" (Willys). Endplay is controlled by shims located between backing plate and axle housing flange. Adjust endplay to proper specifications by adding or removing shims. *NOTE – Adjusting shims may be found on one side only or on both sides.*

WHEEL BEARING ADJUSTMENT (FULL-FLOATING AXLES): Bend lip of nut lockwasher so locknut and lockwasher can be moved, then raise wheel so it can be rotated. While rotating wheel, tighten adjusting nut (Tool DD–1241) until wheel binds, then back off nut about 1/6–turn or more if necessary until wheel rotates freely without side shake. Replace lockwasher and locknut and bend over lockwasher lip. If adjustment still satisfactory, install axle shaft.

AXLE SHAFT OIL SEAL REPLACEMENT: *See 1959 Final Data, Page 341, or later Manual dition.*

OVERHAUL: **Power–Lock Diff r ntial** – *S "Pow r–Lock Differential (Plate Clutch Type With Bell vill Springs)" in this section.*

Conventional Axle: *See 1959 Final Data, Page 341, or later Manual edition, and not th following:*

Pinion Depth Setting (Studebak r M d l 27 Axl): This dimension should be 2.094" + .0015".

1962 Studebaker M d l 27 Axl T ls

Tool Name	T l Numb r
Rear Pinion Bearing Replacer	J–8671
Differential Side Bearing Replacer	J–8668
Front Pinion Bearing Replacer	J–8672
Rear Pinion Bearing Puller	J–8669
Differential Side Bearing Puller	J–8670
Adapter Used With J–8670	J–8670–2

1962 Willys FJ–3 M d l 27 Axl Tools

Tool Name	T l Number
Axle Shaft Oil Seal Driver	W–263
Pinion Front Bearing Driver	W–264
Pinion Rear Bearing Sleeve Installer	W–262
Pinion Setting Block/Gauge	WW–99–B, "H" or W–101–24
Differential Case Bearing Cone Driver	C–3716

►*MODEL 70 GAUGE BLOCK NOTE: Us bottom surface of gauge block "G".*

RAMBLER HYPOID

Rambler, All Series (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 6 CYLINDER AXLE SHAFT OUTER SEAL PRODUCTION CHANGE & INSTALLATION NOTE:* Later production cars have a one–piece seal and retainer assembly, and rear wheel bearing gasket is not needed with new type seal. *NOTE* – Previous sealing recommendation of applying sealer to axle tube flange and to brake support plate mounting area is applicable to new seal also.

DESCRIPTION: Own hypoid gear type. Semi–floating with Hotchkiss drive (American), Torque Tube drive (Classic & Ambassador).

Available Axle Ratios

6 Cylinder		V8	
Ratio	No. of Teeth	Ratio	No. of Teeth
2.87–1	15–43	2.87–1	15–43
3.31–1	13–43	3.15–1	13–41
3.78–1	9–34	3.54–1	11–39
4.11–1	9–37	4.10–1	10–41

REAR AXLE ASSEMBLY REMOVAL: American - Drain lubricant, raise car and support rear of body. Remove wheels then remove hubs. Disconnect hand brake cables at brakes. Use wrench J-4486 to remove propeller shaft coupling nut. Disconnect rear shock absorbers, rear brake line at bracket on floor pan and rear springs from body. Remove axle and springs as an assembly and remove springs.

Classic & Ambassador – Remove cover and drain lubricant. Raise car and support it at rear of body. Disconnect parking brake at equalizer and housing at torque tube bracket. Disconnect torque tube from transmission, brake hose at bracket on body pan, shock absorbers at brackets, stabilizer bar at axle tube. *NOTE - Rear springs held in position in seats by car weight and shock absorber travel limits.* Roll axle from chassis and disconnect truss rods, torque tube, and propeller shaft from axle. "Slip" or "Union" type couplings used which can be slipped off pinion shaft.

Axle Shaft Removal: *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly whenever hub removed.* To remove axle shaft, pull hub with Puller J-1644-B or J-736-B. Disconnect brake line and cable. Remove brake support plate by sliding plate, oil seal, and shims off axle shaft. Use special Puller J-2498-B to remove shaft from housing.

Axle Shaft Installation: Reverse removal procedure and note the following: *CAUTION* - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations. Tighten axle shaft nut to 250 ft. lbs. torque.

►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in hub when it is assembled on axle shaft. New hub may be installed on old shaft (if serrations in shaft are in good condition) but an old hub must NOT be installed on a new shaft (serrations will not match). Tighten axle shaft nut to 250 ft. lbs. torque and check distance from outside face of hub to end of taper on shaft (hub overhang on threaded portion of shaft). This distance must be 3/16". Punch mark new hub in line with mark on shaft.

OVERHAUL: **"Twin–Grip" Diff r ntial (6 Cyl.)** – *Se 1959 Final Data, Page 340, r later Manual editi n.*

"Power–Lock" Differential (V8): *S "P w r–Lock Differential (Plate Clutch Typ With B ll vill Springs)" in this section.*

Conventional Axle: *See 1958 Final Data, Page 329, r later Manual edition, and n t th foll wing:*

1962 Rambler R ar Axl Tools

Pinion Setting	6 Cyl.	–T I N . –V8
Bearing Preload Checking	J–8715	J–8715
Depth Checking Set	J–5223–01	J–5223–01
Pinion Bearings		
Rear Bearing Remover	J–7828	J–2245–A
Rear Bearing Cup Remover	J–9349	J–9350
Rear Bearing Cup Installer	J–7818	J–2533
Rear Bearing Race Installer	J–2995	J–2995
Front Bearing Cup Remover	J–9351	J–9352
Front Bearing Cup Installer	J–7817	J–2531
Oil Seal Protector	① J–9347	
Oil Seal Installer	① J–9348	
Differential Side Bearings		
Side Bearing Remover	J–2497–01	J–2497–01
Side Bearing Installer	②③ J–2100	④ J–2104

① – American Only. ② – Or J–5364.
③ – And Driver Handle J–8092 or J–8592.
④ – Or J–2646.

►*DIFFERENTIAL SIDE BEARING & PINION PRELOAD SHIM NOTE:* **Differential Side Bearing Shims are available from .142" to .176" in .002" variation. Pinion bearing preload shims are available in .170", .002", .003", .005", .010" as complete sets.**

CHEVROLET TRUCK (4-WHEEL DRIVE)

Chevr l t ½ & ¾–T n Trucks, 4–Wh l Driv (1962)

DESCRIPTION: Spicer Model 44-5F. Full-floating, integral housing, hypoid gear type with yoke and trunnion type axle shaft universal joints. Differential assembly is similar to differential assembly used in Spicer 44 rear axle.

Axl Rati & Id ntification Note: Axle model stamped on front left face of center section, ratio tag attached to cover bolt.

Model	Ratio
½-Ton	3.91-1 (47-12)
¾-Ton	4.55-1 (50-11)

AXLE ASSEMBLY REMOVAL: Disassemble propeller shaft from front axle differential. Raise front end of truck to remove weight from springs and support truck on stands placed behind front springs. Disconnect connecting rod from steering arm and brake hoses from frame fittings, shock absorbers from axle brackets and disconnect U-bolts from axle and roll front axle from under truck.

AXLE SHAFT REMOVAL: Support vehicle with front wheel free. Place drain pan under wheel and remove hub grease cap. Remove axle shaft snap ring and remove drive shaft as follows: On K14 models, pull splined drive flange from shaft and hub and remove spacer from hub. On K25 models, remove stud nuts and washers, remove drive flange and gasket. On all models, remove bearing lock nut and lock ring and remove adjusting nut. Remove wheel, hub and drum as an assembly. Remove bolts and lock washers holding brake flange plate and spindle to steering knuckle. Remove flange plate from steering knuckle and support the plate so brake hose will not be damaged. Slide spindle from shaft and remove axle shaft and joint assembly.

WHEEL BEARING ADJUSTMENT: Adjust bearings by tightening nut using "T" handle wrench (12" long on each side). Rotate drum and tighten snugly. Loosen nut 45° and assemble lock washer by loosening nut to nearest hole then assemble outer nut. Tighten nut to 40 ft. lbs.

STEERING KNUCKLE: Removal – With axle shaft assembly removed (see above), disconnect steering connecting rod from steering arm, then disconnect tie rod from steering knuckle. Remove 2–piece seal retainer from knuckle. Remove felt seal, rubber seal, and seal ring from knuckle (let these pieces hang on axle housing so they can be kept in proper order). Remove upper and lower bearing retainers and shims from knuckle. Remove steering knuckle from axle housing, then remove bearing cones from axle housing.

Bearing Cup R placement – If new bearings installed, remove cups from axle housing, then press new cups firmly to bottom of counterbore.

Seal Replac ment – If new seals and retainer being installed, hang them on axle housing in same order as old parts (felt seal inboard, rubber seal, then seal ring outboard).

Installation & Knuckle Bearing Adjustment: Install bearing cones in axle housing cups, then install steering knuckle and bearing retainers. Use same number and size shims as removed (or equivalent) and tighten bearing retainer bolts or nuts to 25 ft. lbs. Check bearing preload as follows: Install an inch–pound torque wrench on upper bearing retainer nut and note knuckle turning torque. Torque should be 120–180 inch–pounds (or 18–27 lbs. pull with spring scale hooked in tie rod hole). If preload not correct, adjust shim pack as necessary. Install seal ring, rubber seal and felt seal against inboard face of steering knuckle, then install 2–piece retainer. Connect steering connecting rod and tie rod. Install axle shaft assembly and make wheel bearing adjustment (see above).

DIFFERENTIAL OVERHAUL: Power–Lock Differential – *See "Power–Lock Differential (Plate Clutch Type With Belleville Springs)" in this section.*

Conventional Differential: *See 1959 Final Data, Pag 341, or later Manual edition.*

FORD TRUCK (4-WHEEL DRIVE)

F rd Truck F–100 & F–250 4–Wheel Drive (1962)

DESCRIPTION: Spicer Models 44–6F & 44–6HDF. Full-floating, hypoid gear type with Spicer "Cross Type" universal joints. Differential assembly is similar to differential assembly used in Spicer Model 44 rear axle.

► *AXLE RATIO & IDENTIFICATION NOTE:* Ratio code is last digit stamped under AXLE on truck patent plate. Ring gear and pinion tooth combination stamped on ratio tag on axle housing cover.

Axl Rati	Ratio Code
3.92–1 (47–12)	A
4.55–1 (50–11) Standard	B
4.55–1 (50–11) Heavy Duty	D

Axl Shaft: R m val - Remove hub grease cap, hub retaining snap ring, slide driving hub from between axle shaft and wheel hub and remove driving hub spacer. Remove locknut, washer and wheel bearing adjusting nut from spindle and remove wheel, hub and drum assembly (outer bearing will also come out). Remove inner bearing. Remove oil baffle from brake carrier plate. Remove brake carrier plate and spindle from spindle arm (unnecessary to disconnect brake line). Support carrier plate. Remove axle shaft assembly.

Installati n & Wh l Bearing Adjustment - Install axle shaft assembly. Install spindle and brake carrier plate on spindle arm, tighten retaining screws and install oil baffle. Install wheel inner bearing on spindle, driving hub spacer, and wheel outer bearing and adjusting nut. While rotating wheel forward and rearward, tighten bearing adjusting nut with Tool T59T-1197-A until bearings are firmly seated and then back off adjusting nut 1/8 turn (45°). Install lockwasher on spindle (locking dowel on adjusting nut must enter lockwasher hole most closely aligned with dowel). Torque locknut to 40 ft. lbs. Install driving hub, snap ring and grease cup. Fill spindle arm with proper lubricant.

Spindle Arm: Removal - With axle shaft removed (see above), disconnect steering drag link from spindle arm and spindle connecting rod at both spindle arms. Remove 2-piece seal retainer from spindle arm, felt, rubber and steel rings from spindle arm (place on axle housing). Remove upper and lower spindle arm bearing caps and shims and remove spindle arm. Remove upper and lower spindle bearings with Tool T58L-101-A inserted in bearing and Puller Tool T50T-100-A.

Installation - Make sure felt and rubber seals and steel retainer are placed on axle housing in same order as removed (felt seal toward center of truck, then rubber seal and steel retainer). Install upper and lower spindle bearing cups in axle housing with Handle T53L-200-A and Driver T57P-4625-A and place bearings in cups (retain lower bearing with wheel bearing grease). Install spindle arm on axle housing and install upper and lower bearing caps (use old shims for a trial pack). Torque bearing cap bolts and stud nuts to 25 ft. lbs. Check bearing preload by rotating spindle arm with an inch-pound torque wrench installed on one of the bearing cap bolt heads. Turning torque should be 50-70 inch-pounds. Adjust shim pack at bearing caps to obtain correct preload. Install steel retainer, rubber and felt seals and 2-piece retainer. Connect spindle connecting rod and drag link. Install axle shaft assembly and adjust wheel bearing (see above).

Axle Housing Removal: Raise truck so front axle hangs freely. Remove axles and spindle arms (see above). Disconnect shock absorbers at lower end and front drive shaft at pinion flange. Support axle and remove spring clip (U-bolt) nuts and spring seats. Remove axle housing assembly.

DIFFERENTIAL ASSEMBLY OVERHAUL: Power–Lock Differential – *See "Power–Lock Differential (Plat Clutch Type With Belleville Springs)" in this section.*

Conventional Differential: Procedures and specifications are the same as for Spicer Model 44 rear axle. S *"Ford Truck Integral Housing Hypoid" in this section and note the following:*

Axle Shaft Guide & Seal Replacement – Drive guide and seal out toward inside of housing. Install guide and seal from inside of housing.

WILLYS JEEP, UTILITY & FORWARD CONTROL (4-WHEEL DRIVE) FRONT AXLE

Willys CJ-3B, 5, 6 (1962) ①
Willys FC-150, FC-170 (1962) ①
Willys Utility & Truck (1962) ①
① – For Rear Axle, See "Spicer Hypoid" in this section.

DESCRIPTION: Spicer Models 25, 44–1F, and 44F. Full-floating, integral housing, hypoid gear type with Spicer "Cardan Cross", "Bendix", or "Rzeppa" constant velocity universal joints. Differential assembly is similar to differential assembly used in rear axle.

►*AXLE RATIO & IDENTIFICATION NOTE:* Spicer model number stamped in center section of housing. Axle ratio tag is attached by a housing cover bolt. Power-Lock differential identified by "T" on cover ratio tag and by a lubrication caution tag on filler plug. Available axle ratios are as follows:
Model 25 – 4.27 (11–47), 4.88 (8–39), 5.38 (8–43).
Model 44-1F & 44F – 4.27 (11–47), 4.89 (9–44), 5.38 (8–43), 5.89 (9–53).

Removal: Support front end of car securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage (at idler lever on frame front cross member). Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs, remove axle assembly from beneath car.

Axle Shaft & Universal Joint Assy. Removal: Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange cap screws and remove flange with puller. Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly. *(CAUTION–*Use care not to damage oil seal). Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing.

►*INSTALLATION CAUTION:* Adjust front wheel bearings and bleed brakes after installation completed.

Wheel Bearing Adjustment: Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back off nut 1/6 turn and install locking washer and nut. Tighten locknut securely and bend lockwasher over the locknut.

Steering Knuckle Bearings: Steering knuckle assembly is mounted on two "stub" kingpins with taper roller bearings seated in ball end of axle housing at inner end of each kingpin. Upper bearing cap has shim pack for bearing adjustment. Disassemble bearings as follows:

Disassembly – First remove hub and brake drum assembly, wheel bearings, axle shaft and universal joint assembly, wheel spindle, and steering tie rod socket. Remove screws holding oil seal retainer halves, remove screws retaining upper and lower bearing caps. Withdraw bearing cap and stub shaft assemblies. *(CAUTION – Do not lose bearing adjusting shims under top bearing cap).* Lift steering knuckle off axle housing. If necessary to remove bearing cups from axle housing, use special driver, Tool W–138. Wash all parts in cleaning solution and inspect bearings and races for wear, scores, or cracks.

Reassembly & Bearing Adjustment – Reverse disassembly procedure and note the following: Install one each .003", .005", .010", .030" shims at the top only. *NOTE – A shim pack of .058" thickness is added at bottom face of kingpin boss on steering knuckles at production. Maintain this shim pack at bottom and make adjustments at the top only.* Install bearing caps, lockwashers, and screws and tighten securely. Check preload on bearings by hooking a spring scale in hole in knuckle arm for tie rod socket. Take a reading when knuckle has just started its sweep. King pin bearing preload should be 12–16 lbs. with seal and axle shaft removed. Remove or add shims to secure this preload. A washer may be added between end of cap and bearing when removal of all shims does not correct preload, then reinstall and adjust shims.

Oil Seal Assembly – Before installing oil seal felt, make a diagonal cut across top side of felt so it may be slipped over axle. Install assembly as follows: Split oil seal, backing ring assembly, oil seal felt and the two seal retainer plate halves. Install eight retaining screws.

DIFFERENTIAL OVERHAUL: Power-Lock Differential – *See "Power-Lock Differential (Plate Clutch Type With Belleville Springs)" in this section.*
Conventional Axle: *See 1959 Final Data, Page 341, or later Manual edition.*

CHEVROLET TRUCK "NO-SPIN" POWER-LOCK DIFFERENTIAL

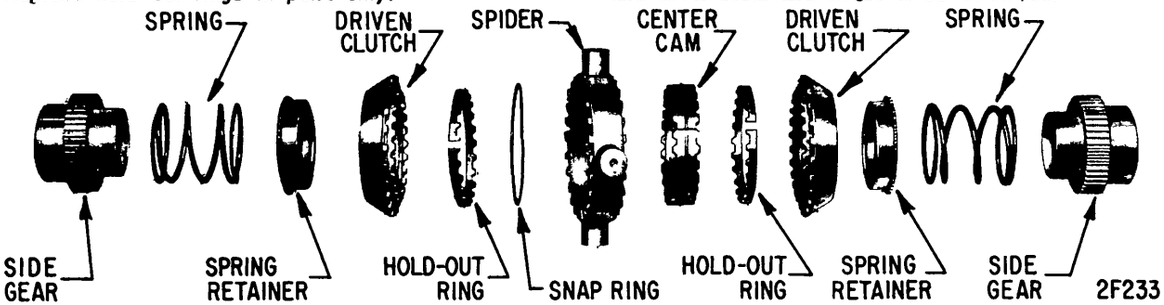
Chevrolet ½ & 1-Ton Trucks (1962)

DESCRIPTION: Limited slip type differential assembly consisting of a cross shaft and center drive cam assembly, two dog type driven clutches, hold-out rings, springs, retainers, and two side gears with straight external splines.

DISASSEMBLY: Make alignment marks on differential case. Install a long retainer bolt and nut with large washers through unit to hold assembly together until case halves are opened. *CAUTION – Use of retainer bolt is very important as unit is under spring tension and damage and serious injury could result if unit not held together during removal of case bolts.* Remove case and cover bolts, separate case halves carefully, then remove "No Spin" unit. *NOTE – Do not remove ring gear unless necessary.* Remove side gears, spring, retainers, and driven clutches. Remove split hold-out rings with snap ring pliers. *NOTE – Do not disassemble spider, center cam, and snap ring assembly as parts are not furnished separately.*

Inspection: Wash all parts. Check side gear and driven clutch splines for excessive wear or fracture. Check spider, center cam, hold-out rings and driven clutch dog teeth for chipping or burring. *Minor chips or burrs may be stoned smooth.* Check spring retainer seat and splines for fractures. Spring free height should be 2½" + 1/8". Replace parts as necessary. *NOTE – Replace hold-out rings in pairs only.*

REASSEMBLY: Lubricate all teeth. Install split hold-out rings into center cam and spider assembly (align spider key with slot in hold-out ring). Install driven clutches, spring retainers, springs, and side gears into spider assembly. *NOTE – Make sure springs ends are positioned inside spring retainer cups.* Compress assembly with retainer bolt used at disassembly. Install case and cover bolts and torque to 85–90 ft. lbs.



CHEVROLET TRUCK "NO SPIN" DIFFERENTIAL ASSEMBLY (EXPLODED)

POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE WITH BELLEVILLE SPRINGS)

Buick & Buick Special (1962)
Chevrolet Passenger Cars (1962)
Chevy II (1962)
Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962)
Ford F-100 & F-250 Trucks (1962)
Lincoln Continental (1962)
Oldsmobile 88, S88, 98 (1962)
Plymouth (1962)
Pontiac (1962)
Rambler V8 (1962) ①
Studebaker (1962)
Willys (1962)

① – *For Rambler 6 Cyl. Cars, see 1959 Final Data, Page 340, Chrysler Manual edition.*

DESCRIPTION: This assembly replaces conventional differential assembly and consists of a multiple disc type clutch pack with Belleville type plates located between each side gear and differential housing.

AXLE IDENTIFICATION & RATIOS: *See appropriate Conventional Rear Axle data for each car model.*

LUBRICATION: *NOTE – To insure proper operation of unit and to prevent differential chatter, some manufacturers recommend that only the special lubricants listed below be used in Power-Lock axle assemblies.*

Buick & Buick Special – Special Lubricant, Part No. 531536. Any other lubricant must conform to Buick Specification No. 723.

Chevrolet & Chevy II – Positraction Lubricant, G.M. No. 3758790 or No. 3758791.

Chrysler Corp. Cars–Sure-Grip Lubricant, No. 1879414.

Lincoln Continental – Special Lubricant, Part No. COLY-19A508-B.

Oldsmobile – Special Lubricant, Part No. 531536.

Pontiac – Multi-Purpose Hypoid Gear Lubricant.

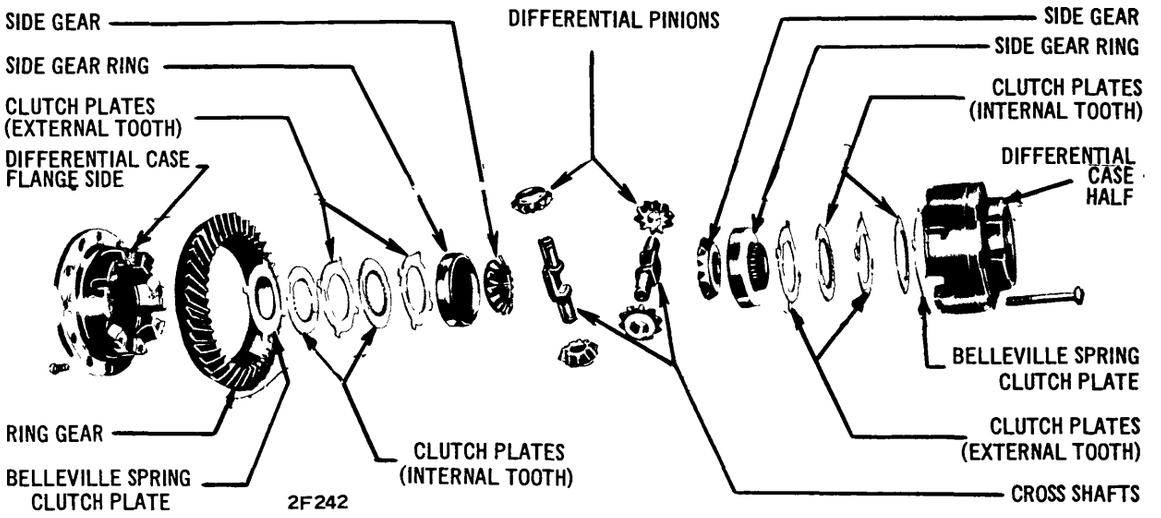
Rambler – American Motors "Twin-Grip" Lubricant.

Studebaker – Studebaker-Packard "Twin Traction" Lubricant.

Willys – Willys Powr-Lok Differential Oil, Part No. 94557.

DIFFERENTIAL OR AXLE ASSEMBLY REMOVAL: *See appropriate Conventional Rear Axle data for each car model.*

OVERHAUL: *NOTE – Procedures below are for Power-Lock Differential assembly only. For other axle components and for specifications and checking, see appropriate Conventional Rear Axle Data for each car model.*



POWER-LOCK DIFFERENTIAL ASSEMBLY WITH BELLEVILLE SPRINGS (EXPLODED)

Disassembly: Remove ring gear from case if either ring gear or case are to be replaced. Remove differential bearing outer race from case if bearing is to be replaced. Scribe mark both case halves for proper alignment at reassembly, and note cross shaft markings for proper reassembly. Remove bolts holding assembly together and separate case halves. Remove case cover half cross shaft, pinions, side gear, side gear ring, clutch plates and discs. Remove same parts from flange half of case. *NOTE – Keep parts for each case half together.*

► *DISASSEMBLY CAUTION: Note exact sequence, position, and number of plates and discs in each clutch pack so that parts may be reassembled in identical arrangement. "Belleville" (dished) type plate and/or disc must have convex side away from center of differential.*

Cleaning & Inspection: Clean and dry all parts. Inspect for worn, pitted, or scored parts and replace as necessary. *NOTE – Case halves must be replaced in pairs only.* Replace clutch packs if any clutch disc or plate worn, cracked, or distorted.

Reassembly: Install ring gear and new differential bearing outer race if these parts were removed. On flange half of case, install clutch pack on side gear, install side gear ring in case half, then install side gear and clutch pack into case. Install pinion gear and cross shafts (beveled sides of cross shafts must match ramps on case). Install other side gear, clutch pack, and retaining ring, aligning clutch plate lugs with slots in case. Place other case half on assembly with scribe marks in alignment, then install assembly bolts and torque to 35–45 ft. lbs. (60–70 ft. lbs. on Model 60 or 70 axles). Check that metal-to-metal contact exists between pinion cross shafts and case "V" ramps. If more than .002" clearance exists, clutch pack may have to be replaced.

CONSTANT VELOCITY UNIVERSAL JOINTS

Buick (1962)
Buick Special (1962)
Lincoln Continental (1962)
Oldsmobile F-85 (1962)

► *1961-62 BUICK & BUICK SPECIAL TOOL KIT NOTE:* Tool Set J-9522 for use with a 12-ton press ram, is available to service constant velocity universal joints.

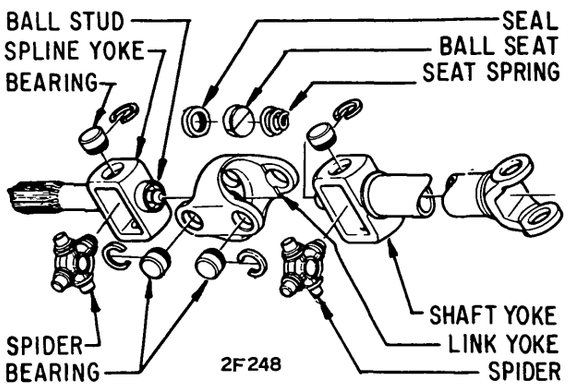
► *PROPELLER SHAFT HANDLING CAUTION: To prevent damage to constant velocity universal joint center metal ball when removing shaft assembly from car or when handling the assembly after removal, care must be taken to support shafts at both sides of constant velocity joint if shaft is moved horizontally. Do not allow one end of shaft to hang free or allow universal joint to bend at a sharp angle. Shaft assembly may be carried in a vertical position without damage to constant velocity joint.*

DESCRIPTION: Constant velocity type universal joint consists of two single joints connected with a special link yoke with a center ball and socket between joints to maintain relative position of the two units. This center ball causes each of the two joints to operate through exactly one half of the complete angle between front and rear propeller shafts, resulting in both shafts turning at a constant velocity.

LUBRICATION: Buick - *NOTE - Universal joints are lubricated for life and require no additional lubrication except as follows:* Center metal ball must be lubricated every 5000 miles with Multi-purpose Grease E.P. No.1. Fitting in universal joint is accessible through rear hole of frame tunnel (rotate drive line to line up fitting with hole). A special nozzle, Alemite Part No. 326375, or equivalent, is required to apply lubricant to fitting.

Lincoln: Lubricate three fittings on universal joint with chassis lubricant every 6000 miles.

Oldsmobile : Every 20,000 miles, disassemble and clean universal joint, then repack with sodium soap, fine fibre grease (Marfak Heavy Duty or equivalent).



CONSTANT VELOCITY UNIVERSAL JOINT

BUICK, CADILLAC, OLDSMOBILE PROPELLER SHAFT ALIGNMENT

Buick (1962)
Buick Special (1962)
Cadillac (1962)
Oldsmobile (1962)
Oldsmobile F-85 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

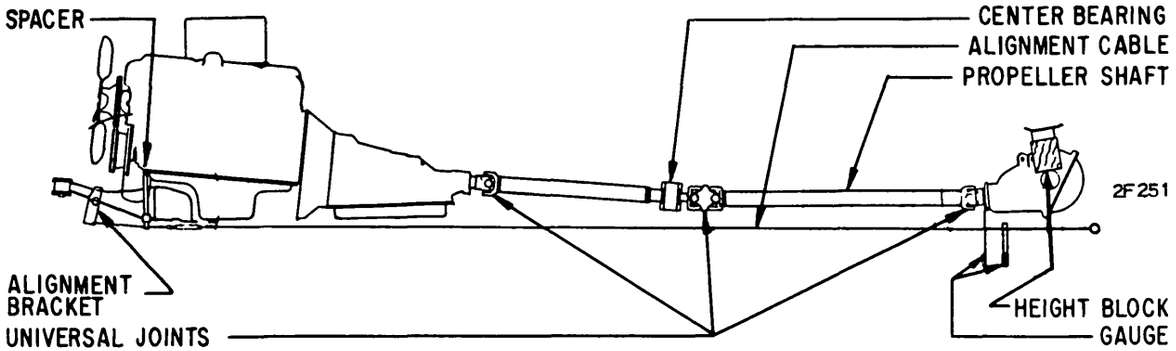
►*1962 BUICK (EXCEPT SPECIAL) LIGHT DRIVELINE SHUDDER ON LIGHT ACCELERATION CORRECTION:* If propeller shaft rear universal joint angle correctly adjusted, slight deviations from specifications may correct the trouble. *CAUTION – If rear joint angle decreased, part throttle shudder will be decreased, but full throttle shudder may be increased. If rear joint angle increased, part throttle shudder will be increased, and full throttle shudder decreased. If rear joint angle too large, it may cause roughness at 25–30 MPH.* If varying rear joint angle does not correct shudder, use Buick Special type lower control arm adjusting shims and shim between transmission mounting pad assembly and transmission support crossmember. Do not shim in excess of 1/4" and make sure there is no less than 5/8" clearance between transmission case and underbody. If transmission raised more than 1/8", install longer mount attaching bolts.

►*OLDSMOBILE F-85 DRIVE LINE SHUDDER WHEN STARTING CORRECTION:* Caused by too high nose angle setting. Check nose angle and reset to specifications.

►*PROPELLER SHAFT HANDLING CAUTIONS: To prevent damage to constant velocity universal joint center metal ball when removing shaft assembly from car or when handling the assembly after it is removed, care must be used to support shaft on both sides of constant velocity joint if shaft is moved horizontally. Do not allow one end of shaft to hang free or allow universal joint to bend at a sharp angle. Shaft assembly may be carried in a vertical position without damage to constant velocity universal joint.*

DESCRIPTION: Measurement of rear universal joint angle (for correct propeller shaft alignment) is accomplished by the use of a spring loaded steel cable stretched between front of chassis and rear axle carrier, on centerline of propeller shaft. When rear universal joint angle is adjusted correctly, the steel cable will clear underside of pinion flange by a definite amount.

CHECKING & ADJUSTING PROPELLER SHAFT ALIGNMENT: Buick (Exc. Buick Special) - Use Alignment Set, J-8973 as follows: Raise rear of car body and install Rear Tubular Spacers, J-8973-19 with upper end over head of rear compression bumper mounting bolt (at each side of car) and with lower ends of spacers resting on axle housing, then lower car body onto spacers. Remove nut from differential carrier mounting stud on each side of lowest stud. Thread Extensions, J-8973-17 on these two studs and attach Bracket J-8973-16 with bent lip toward rear, using original stud nuts. Attach hook of Bracket J-8973-15 over center of front frame crossmember, then with shallow slot of Engine Height Plate J-8973-14 down, place wide upper end against flange of engine oil pan being certain plate rests on **flat** portion of pan flange. With cable in notch in spacer, pull clamp tight and hook it through a slot in rear bracket so one of the stops is to rear of bracket. Measure distance from centerline of cable to machined surface immediately in front of slinger on pinion flange. Distance should be 3 1/4" ± 1/32" on 4400 & 4600 Series, 3 3/8" ± 1/32" on 4800 Series. If measurement is not within specifications, remove adjusting bolt (through two holes) and loosen two clamping bolts (through hole and slotted hole) and adjust arm until universal joint angle is correct. Install adjusting bolt through set of holes that most nearly coincide. Tighten bolts to 60 ft. lbs. Recheck measurement.



PROPELLER SHAFT ALIGNMENT GAUGE TOOL INSTALLATION

Buick Special: Use Alignment Set, J-8973 as follows: Raise rear of car body and install spacer blocks J-8973-20 (Station Wagons), J-8973-21 (Sedans) so slots straddle rubber bumpers. Hold spacer block up against bumper mounting straps and allow car to settle until axle housing contacts blocks. Remove differential cover bolt on each side of lowest cover bolt, then using these two bolts, attach Rear Bracket J-8973-16 so slotted portion of bracket is vertical. Tighten bolts securely. Engage Front Attaching Bracket J-8973-13 in front crossmember assembly using hole immediately to rear of front mount. Hook slot of bracket into rear of hole. **On V8,** place Engine Height Rod J–8973–3 (notched end down) through round hole in front crossmember assembly so upper end of pin bears against engine oil pan between front oil pan bolts. **On V6,** place Engine Height Rod J–8973–31 so that upper end bears against engine oil pan between two **rear** oil pan bolts. **On all cars,** place cable in notch of height rod, pull cable tight and hook into rear bracket so one of stops on cable is to rear of bracket slot. Measure perpendicular distance from cable to machined surface immediately in front of slinger on rear flange. This distance should be 3 3/16" ± 1/32". If measurement is not within specifications, shims must be added or subtracted between lower control arm forward mounting brackets and underbody side rail. *Add or remove shims in equal amounts on both sides of car.*

Cadillac Vertical Alignment: Use Propeller Shaft Alignment Gauge Set J-8905 as follows Place car on a level surface or on a suitable hoist. *NOTE - Gasoline tank must be full.* Remove two bolts from bottom front face of flywheel cover and install Bracket J-8905-20, securing it in place with the two bolts removed from cover. Remove two nuts and washers from two lower studs on front face of differential carrier assembly and install Rear Bracket J-8905-7, securing it in place with nuts. Measure and record standing height (direct vertical distance between top of rear axle housing and frame). *NOTE - Use average of right and left hand measurements.* Install Spacer Rods, J-8905-16, between top of rear axle housing and lowest underside surface of frame on both sides, then load down or raise car to hold spacers securely. Install spring end of Alignment Cable, J-8905-2 in slot in Front Bracket and other end of cable in Rear Bracket. *CAUTION - Propeller shaft must be checked at rear, center, and front before any adjustment is made. When checking, make certain that gauges are held as vertically as possible, and all gauge readings should be taken with marked side of gauges facing front of car.* Check propeller shaft height at rear by placing end of Gauge J-8905-21, on bottom of propeller shaft, ½" forward of weld at rear yoke. Note propeller shaft height by checking relation of gauge notch "R" to cable. Check propeller shaft height at center by inserting end of Gauge J-8905-21, in hole in bottom of frame tunnel until gauge rests against bottom of propeller shaft. Note propeller shaft height by checking relation of gauge notch "C" to cable. Check propeller shaft height at front by placing end of Gauge J-8905-6 against machined surface of transmission slip yoke (rounded surface of shaft that enters transmission extension) Note propeller shaft height by checking relation of notch in gauge arm to cable. If propeller shaft was not within specifications as indicated by gauges and cable, adjust as indicated in table below.

Propeller Shaft Adjustment

Checking Location	Shaft Too High ①	Shaft Too Low ①	Adjusting Location
Rear	Add	Remove	②
Center	Remove	Add	③
Front	Remove	Add	④

① - Add or remove shims.
② - Rear Lower Control Link. See adjusting procedure below.
③ - Propeller shaft center mount. See adjusting procedure below.
④ - Engine rear mount. See adjusting procedure below

Adjustment (Rear Lower Control Link) - Add or remove shims between front mounting brackets for lower control arm links and the No. 4 outriggers. Shims are available in thicknesses of 1/32" and 1/16" *CAUTION - Shims of equal thickness must be added or removed from right and left control links.*

CONTINUED ON NEXT PAGE

BUICK, CADILLAC, OLDSMOBILE PROPELLER SHAFT ALIGNMENT (Continued)

Propeller Shaft Center Mount - Add or remove shims between bottom of center bearing support bracket and frame tunnel. Shims are available in thicknesses of 1/8" and 1/16".

Engine Rear Mount - Add or remove washers between engine rear mount and engine rear support crossmember. Washers of equal thickness must be added or removed at both legs of mount.

►*CADILLAC ADDITIONAL ADJUSTMENT TO COMPENSATE FOR INCORRECT STANDING HEIGHT:* In the event standing height at rear of car was not within specifications of 5¾"-6" as measured and recorded before checking propeller shaft alignment (see above), variations must be made in propeller shaft alignment as follows: If standing height was 5½-5¾", add 1/16" shim at center mount. If standing height was 6-6¼", remove 1/16" shim at center mount. *NOTE - If there are no shims at center mount, remove 1/16" shim from both lower control link brackets, and add 5/64" washers to both engine rear mount legs.* If standing height was 6¼-6½", remove 3/32" shim thickness from both lower control link brackets and remove 1/16" shim from center mount. *NOTE - If there are no shims at center mount, remove 1/8" shim thickness from both lower control link brackets, and add 5/32" washer to both engine rear mount legs.*

Cadillac Horizontal Adjustment: After checking vertical alignment, proceed as follows: Hang plumb bobs, J-8905-14 over both front and rear of propeller shaft so they hang free and clear any obstruction, then hang Alignment Gauge, J-8905-17, on cable at rear of propeller shaft between plumb bob lines. Move cable in slot in rear bracket until extended arm of gauge (upper part) is centered between plumb bob lines. Hang Horizontal Alignment Gauge, J-8905-17 on cable at front of propeller shaft between plumb bob lines. Move cable in slot in front bracket until arm of gauge (lower part) is centered between plumb bob lines. *NOTE - If it was necessary to align cable at either end, recheck cable alignment at opposite end.* Hang gauge on cable (using proper slot) with printed side of gauge facing front of car. Position gauge just under center bearing support mounting bolts. Check alignment of bolt head centers in relation to marks on gauge. Bolt heads should align with marks on gauge within 1/16". If shaft is out of horizontal alignment, it will be necessary to move center bearing support either to right or left as required. *NOTE - In some cases, bolt mounting holes may have to be slotted with a rat-tail file. Slide front of propeller shaft toward rear of car to provide clearance for filing bolt holes.*

Oldsmobile (Std.): Use Tool BT-30-1 and BT-30-2. Connect cable at front frame crossmember, see diagram. Install rear bracket on the two lower right studs on differential carrier. Hook cable in upper hole on rear bracket, then install spacer between cable and bottom of front engine mount. Install hold down clamps around axle housing (lower hook end should point toward front end of car). Install upper hook into 3/4" hole in frame immediately above axle housing. Adjust turn buckles on clamps until wooden blocks fit snugly between axle housing and rubber bumpers. *NOTE - It may be necessary to lift car to install wooden blocks.* Position gauge, see diagram, and check differential nose angle alignment. If cable is not within limits of gauge notch, the nose angle can be corrected by lengthening or shortening the lower suspension arm.

Oldsmobile F-85: Use alignment tool BT-30-2 and install on car in the same manner as for Buick Special (above), including special spacer block between axle housing and rubber bumpers. With indicator of Tool Set BT-30-2 placed against differential pinion companion flange cable must be in correct notch, see Tool Modification below. If necessary to adjust, remove shims from front of rear lower suspension arm (cable below notch); add shims (cable above notch. *NOTE* - The same amount of shims must be added or removed from both sides of car. 1/8" shim will raise or lower nose angle of differential assembly approximately 1/16".

►*F-85 TOOL KIT BT-30-2 CHECKING GAUGE MODIFICATION NOTE:* Remove Plastic handle. Cut two new 1/8" notches (opposite sides) exactly 3 31/64" (Station Wagon), 3 27/64" (Sedan) from center of notch to end of tool from which you removed handle. Reinstall handle on opposite end and scribe the words "Station Wagon" and "Sedan" on respective side of tool.

CHRYSLER CORP. PROPELLER SHAFT ALIGNMENT

Chrysler Imperial (1962)
Dodge & Dodge Dart (1962)
Plymouth (1962)
Lancer & Valiant (1962)
ALL MODELS (EXCEPT IMPERIAL)

REAR UNIVERSAL JOINT OPERATING ANGLE: Check and adjust as follows:

►*CHECKING CAUTION:* Car weight must be on wheels (use drive-on type hoist or platform) and there must be no extra weight in trunk.

Checking Rear Universal Joint Angle: 1) Remove rebound plate and bumper from top of differential carrier housing. Place spirit level protractor on machined surfaces of rebound plate bosses. Level bubble and note reading. *NOTE - Carrier housing should incline downward slightly. To adjust, install a tapered shim between rear spring and seat on axle housing with thick end toward rear of car.* Recheck angle.

2) Place protractor on underside of propeller shaft near rear universal joint. Center bubble and note reading. Add this reading and pinion angle reading (above). Total should be 1–3°. Add or remove shims as above to obtain this angle. Tighten rebound plate assembly bolts to 200 inch–pounds, and rear spring U–bolt nuts to 70 ft. lbs.

IMPERIAL

PROPELLER SHAFT: Removal - Remove front universal joint clamps from transmission yoke (unnecessary to remove bushings if retainer strap used). Remove rear universal joint clamp in same manner. Remove center bearing housing bolts and shims from under housing. Remove front and rear propeller shaft and center bearing as an assembly.

Installation: Insert front propeller shaft over body crossmember and tighten front universal joint-to-transmission yoke bolts to 170 inch-lbs. Connect rear universal joint to rear axle pinion yoke and tighten bolts to 170 inch-lbs. Place same number of shims as removed under center bearing housing, install housing and tighten bolts to 35 ft. lbs.

CENTER BEARING: Disassembly - After propeller shaft assembly removed, clean bearing housing and note the index marks on rear of front shaft and shoulder of sliding yoke. Straighten tab of star washer and unscrew cap from front shaft. Slide star washer and slinger from center bearing housing. Pull sliding yoke, cap, and seal from front shaft. Remove bearing housing from front shaft and press bearing from housing.

►*BEARING SERVICE NOTE:* Bearing is permanently sealed and no lubrication or service required except replacement.

Reassembly: Repack internal splines of front shaft with multi-purpose grease and install slinger on shaft. Press bearing into housing and install on front shaft. Install slinger and star retaining washer. Lubricate inside of seal and install cap and seal on sliding yoke using care not to damage seal on splines of yoke. Align index marks of front shaft and yoke and install yoke. Tighten retaining cap enough to compress seal firmly on shaft of yoke but free enough to permit free back and forth movement of yoke in front shaft. Lock retaining cap by bending tab of washer into notch in cap.

PROPELLER SHAFT ALIGNMENT: *NOTE - Make sure fuel tank is full and check shaft indexing by unscrewing cap seal retainer. "O" mark on splined yoke should line up with keyway in shaft.* With car level and weight of car on the wheels, remove differential carrier rebound bumper plate. Remove shims from both rear axle control strut frame brackets. Place Aligning Gauge J-6845 on machined pads of differential carrier and center the bubble. *NOTE - Level of gauge must be on same side of propeller shaft each time gauge is used.* Place gauge on rear propeller shaft near rear universal joint. Entire bubble should be within three graduations from center of gauge. If edge of bubble is ahead of the third graduation, change rear axle pinion angle as follows: Install 2° tapered shims between both rear springs and axle housing pads with thick edge of shim toward front of car. Tighten spring U-bolt nuts and install shims behind control strut brackets so space is filled. Tighten brackets. Install differential carrier rebound bumper plate.

CENTER BEARING HEIGHT ADJUSTMENT: Install Gauge Adapter part of Tool J-6845 on front propeller shaft near front universal joint. Place gauge of tool on rear propeller shaft at rear universal joint and adjust gauge to center bubble. Attach gauge to pins on adapter. For each graduation leading edge of bubble is forward of center, add one shim under center bearing housing bracket. For each graduation trailing edge of bubble is to rear of center, remove one shim from under center bearing housing bracket.

CHEVROLET (PASS. CAR) PROPELLER SHAFT ALIGNMENT

Chevr l t Pass. Cars (1962)

►*PROPELLER SHAFT SHUDDER CORRECTION:* Correct propeller shaft angle as indicated below.

PROPELLER SHAFT ANGLE CHECK & ALIGNMENT: Front shaft angle "A", rear shaft angle "B", pinion shaft angle "C" and frame riding height "D" must be within limits as shown in table below. *NOTE* - When vehicle driven continuously at maximum load conditions, angle "B" may be increased approximately ¼-½° (in negative direction).

Angle "A" - Is relation of engine angle to front propeller shaft angle. Place protractor on rocker arm cover for engine angle, up against front propeller shaft for front shaft angle. *NOTE* - DO NOT lean on front fender when taking engine angle.

Angle "B" - Is relation of front and rear propeller shaft angles. To determine rear propeller shaft angle, place protractor up against rear propeller shaft.

Angle "C" - Is relation of rear propeller shaft angle to pinion shaft angle. To determine pinion shaft angle, rotate rear universal joint to bring machined surface down parallel with floor and place protractor on this surface.

Riding Height "D" - Is distance from top of axle housing to frame kick-up. This measurement must be equal within ¼" on each side.

NOTE - Support car on tires, ramp or twin post hoist (not on frame hoist) when making angle checks.

Determining Angles - Angles "A", "B", "C" are the result of subtracting rearmost of the two angles from preceding one (example - Engine angle minus front propeller shaft angle), except when second angle is "up at rear" (Higher at rear of protractor than at front), the second angle should be added to first one.

Correcting Angles - Std. Procedure - 1) When angle "A" is not correct, change number of shims under transmission support. Adding shims reduces angle, reducing shims increases angle.

2) When angle "C" is incorrect, change number of shims at upper arm attaching point. Adding shims reduces angle, reducing shims increases angle.

NOTE - Correcting angles "A" and "C" should automatically correct angle "B". See Optional Procedure below for correcting angles "A" and "C".

Optional Procedure - For correcting angles "A" and "C", loosen or remove frame center bearing support bolts (under center section) and insert transmission shims between frame section and the support inside driveshaft tunnel. *CAUTION* - Always recheck angles "A" and "B".

Vibration Note - If objectional vibration exists when joint angles are within specifications, readjust angle toward opposite limit (high toward low or low toward high limit).

Angles & Height Specifications

Angle "A"	Angle "B"	Angle "C"	Height "D"
Pos. 2½-3°①	Neg. 1-1½°②	Pos. 2¾-3¼°③	Pos. 6¼ ± 3/8"

① - Pos. 2¾° desired. ② - Neg. 1¼° desired.
③ - Pos. 3° desired.

LINCOLN CONTINENTAL PROPELLER SHAFT ALIGNMENT

Lincoln Continental (1962)

PROPELLER SHAFT ANGLE: *NOTE* - Vibration or "shudder" upon fast acceleration, or when coasting using engine as a brake, may be caused by either rear axle being loose in springs or by excessive propeller shaft angle. Propeller shaft angle is the result of Pinion Nose Angle in relation to Riding Height with "U" bolt nuts tight.

Pinion Nose Angle - Place vehicle on known level surface that will allow access to rear axle pinion nose. Drill a small hole in common protractor at exact center of base (0°) line, and insert a line through hole with a light weight attached for bob. Place base of protractor vertically against front face of pinion housing and read where lines crosses scale.

Riding Heights - Place vehicle on smooth level floor. Inflate tires to 24 lbs. with full fuel tank and all loading removed from passenger and luggage compartment. Push rear bumper down (at center) 1" and release slowly. Measure distance from top center of axle housing to top of frame kick-up at rear of bumper bracket. Raise center of bumper 1" and release slowly and again measure distance. Average of two readings is true riding height. Riding height should be 7.2-8.5" with 8" normal.

Riding Height	①Pinion Nose Angle
6 inches	4° Down
7 inches	3½° Down
8 inches	3° Down
9 inches	2½° Down

① - Tolerance ±¼°.

Check Pinion Nose Angle with Riding Height as shown in table above. When Nose Angle does not correspond with Riding Height, remove rear axle "U" bolt nuts and install appropriate wedges (½, 1, & 1½°), between each spring insulator upper retainer and axle housing mounting pad, with no more than one wedge to be used on a side. Install "U" bolts and torque to 50-60 ft. lbs. *NOTE - Be sure lower insulator retainer contacts upper retainer.*

STUDEBAKER PROPELLER SHAFT ALIGNMENT

Studebaker, All Models (1962)

►*1962 PROPELLER SHAFT-FLOOR PAN INTERFERENCE CORRECTION (Daytona Hardt p & R gal Cruiser With V8 Eng. & 4-Sp d Trans.):* If propeller shaft interferes with floor pan with rear springs in full jounce position, make sure there are no ¼" spacers between engine rear insulators and clutch housing.

DRIVE LINE ALIGNMENT: Raise rear wheels off floor and put transmission in neutral. Clean shaft with sandpaper. With dial indicator, measure runout of propeller shaft at front, center, and rear, while turning shaft slowly by hand. *NOTE – Mak nd measurem nts about 1½" back from weld j int.* Maximum runout should be .010" at front or rear and .015" at center. If not within limits check flanges of transmission and differential. Measure shaft runout and end nearest flange and mark flange at highest runout. Disconnect universal joint, rotate flange 180° and reassemble. Check runout again. If high side of runout is still on same side, flange is at fault. If rotating flanges does not correct runout, replace shaft and/or flanges.

DRIVE LINE ANGLE CHECKING & ADJUSTMENT: Check angles with level gauge or protractor. *NOTE – Manufacturer recommends us of Sp cial Protractor Gauge J–7181 for best results.* Raise car on drive—on hoist with weight on wheels and frame level. Bounce body up and down several times to normalize spring position and DO NOT DISTURB this position when taking angle checks.

Front Universal Joint Angle: Place gauge against clean surface of propeller shaft near front universal joint, so pendulum or pointer is free to swing. Move protractor scale so pointer is set at 90° mark. Remove gauge (do not disturb setting) and place it on clean bottom surface of starter housing. When pointer comes to rest, read degrees indicated from 90° mark. This reading represents front universal joint angle. Angle should be 4–5°.

Rear Universal Joint Angle: Proceed as for Front Universal Joint Angle Check except in second operation, place adjusted gauge vertically against forward edge of differential housing in back of universal joint. *NOTE – Gauge must not contact pinion b aring oil s al.* When pointer comes to rest, read degrees indicated from the 180° mark. This reading represents rear universal joint angle. Angle should read 4½–5½°.

CAUTION – For best results th r should b approximately ½° greater angle at r ar than at front.

ADJUSTMENTS: To change fr nt universal joint angle, add or remove shims or spacer washers at engine rear support insulators. To change r ar universal joint angle, add or remove wedge type caster shims at axle pad and rear springs.

PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE

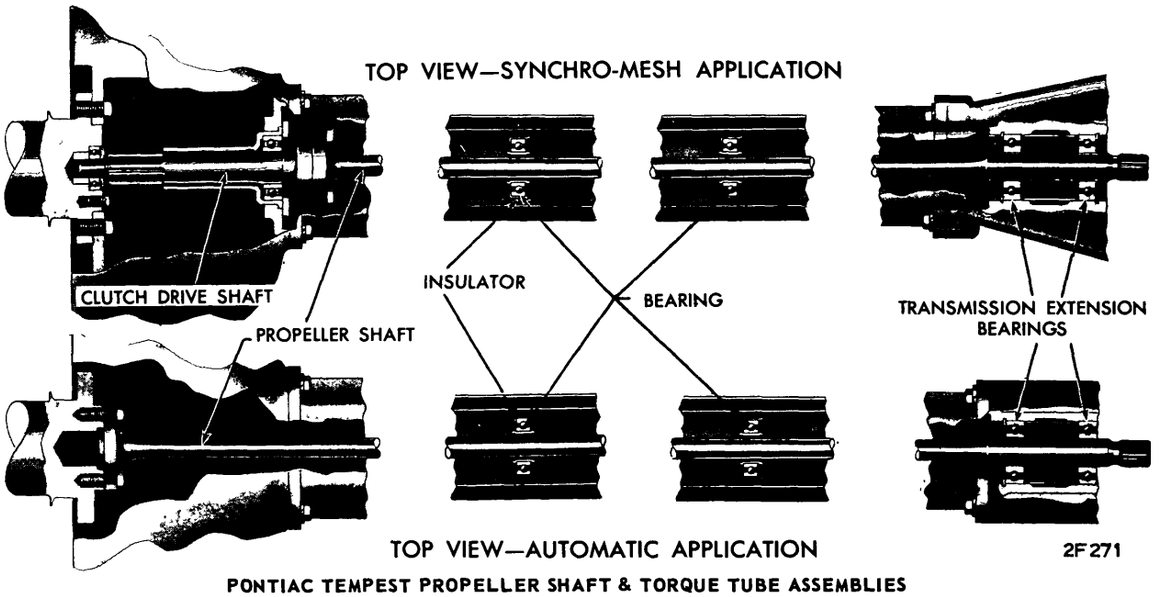
Pontiac Tempest (1962)

DESCRIPTION: Flexible type propeller shaft enclosed within rigid torque tube and ball bearing assembly similar to previous models. Rubber insulator assemblies, pressed on ball bearings, support bearings in torque tube.

REMOVAL: Synchro-mesh Transmission Cars – Remove parking brake cable from torque tube, then remove complete exhaust system (break at engine and slide system off). Remove gearshift housing, and flywheel housing bottom cover. Remove torque tube access cover. Remove bolts from propeller shaft flange and place a piece of rag or rubber hose between propeller shaft and torque tube to prevent damage to coating on shaft, then disconnect torque tube from flywheel housing. Support torque tube and pry away and down from housing. Put a 2" square wood block between transmission extension and car floor to position transmission for reassembly. Remove torque tube–to–transmission bolts. *CAUTION – Torque tube and propeller shaft are now held in place only by bearings in transmission extension and must be supported to prevent bearing or shaft damage.* Remove torque tube and shaft as an assembly by pulling on propeller shaft flange. *CAUTION – Pull propeller shaft straight out of transmission so that shaft will not bind in transmission or transmission extension.* Place assembly on a bench and pull propeller shaft out of torque tube. *CAUTION – DO NOT damage coating on propeller shaft.*

Automatic Transmission Cars: Remove parking brake cable and vacuum line from torque tube, then remove stabilizer bar. Remove exhaust system (break at engine and slide system off). Remove flywheel bottom cover, then disconnect propeller shaft from flywheel. Back out about half–way, bolts holding torque tube to flywheel housing. Place a rag or rubber hose between propeller shaft and torque tube to prevent damage to coating on shaft, then pry propeller shaft flange to rear sufficiently for pilot to clear recess in flywheel. Disconnect torque tube from flywheel housing and put a 2" square block of wood between transmission extension and car floor to position transmission for reassembly. Remove torque tube–to–transmission bolts. *CAUTION – Torque tube and propeller shaft are now held in place only by bearings in transmission extension and must be supported to prevent bearing or shaft damage.* Remove shaft and torque tube assembly by pulling on shaft flange. *CAUTION – Pull shaft straight out of transmission so shaft will not bind in transmission or extension.* Place assembly on a bench and pull propeller shaft out of torque tube. *CAUTION – DO NOT damage coating on propeller shaft.*

PROPELLER SHAFT BEARINGS: Removal – Use Tool Set J–9528, Parts 3 & 4, to pull bearing off half-shell, then remove half–shells from propeller shaft. Support insulator with J–7022 or suitable tool and press bearing from insulator using a socket.



PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE ASSEMBLIES

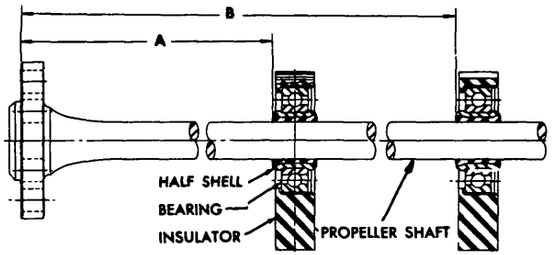
Installation: Place half–shells on shaft at dimensions indicated in illustration and clamp in position with Tool Set J–9528, Parts 1 & 2. Place bearing and insulator on shaft between arrows on tool parts 1 & 2, install tool part 4 on shaft and install bolts through tool parts 1 & 2 and into tool part 3. Tighten bolts evenly so tool does not cock and tighten until tool is completely closed (this will locate bearing on half–shell). Remove tool from shaft and inspect for centering (nibs on each side of I.D.). Also make sure shells are not cocked or edge damaged (will cause rubber–to–metal bond failure).

INSTALLATION: Synchro–mesh Cars – With propeller shaft installed in torque tube, place rag or rubber hose between shaft and tube to protect shaft. Coat spline with axle oil and install shaft into extension seal. *CAUTION – DO NOT let shaft rest on seal.* Engage spline into transmission and journal diameter into transmission extension bearings (do not damage journal surface). *CAUTION – Check spline alignment into transmission extension, and if absolutely necessary, tap front flange lightly with a soft rubber hammer. Be sure splines are completely engaged in transmission.* Tighten torque tube–to–transmission extension bolts to 30–45 ft. lbs., then remove wood block from between transmission and car floor. Tighten torque tube–to–flywheel housing bolts finger tight, then tighten propeller shaft–to–clutch drive shaft bolts finger tight. Remove rag or rubber protector. Tighten propeller shaft flange bolts and torque tube–to–flywheel bolts to 30–45 ft. lbs. Install torque tube access cover and tighten bolts to 40–80 inch–pounds. Install gearshift housing and exhaust system.

Automatic Transmission Cars: Installation procedure is same as for synchro–mesh cars (above). Install stabilizer bar before installing exhaust system, then install parking brake cable and vacuum line.

USAGE	DIM. A	DIM. B
AUTOMATIC	27 1/32"	54 1/32"
3 SPEED S.M.T.	20 7/8"	47 5/8"
4 SPEED S.M.T.	20 7/8"	47 5/8"

2F272



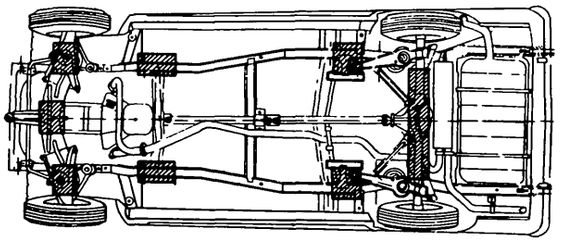
CENTER BEARING LOCATING DIMENSIONS

BUICK & BUICK SPECIAL

Jacking & Hoisting: All Cars - *CAUTION - When lifting at lower control arm, lifting pad must not contact steering arm or linkage or damage will result.*

Buick Special - Jack or lift car at points shown in illustration.

Buick - Jack car at spring seat on front lower control arms or center of front crossmember (front), and along entire length of rear axle housing (rear). Lift car at front frame side rails just forward of body floor pan (front), and rear of frame side rails at lower control arm front pivot (rear).



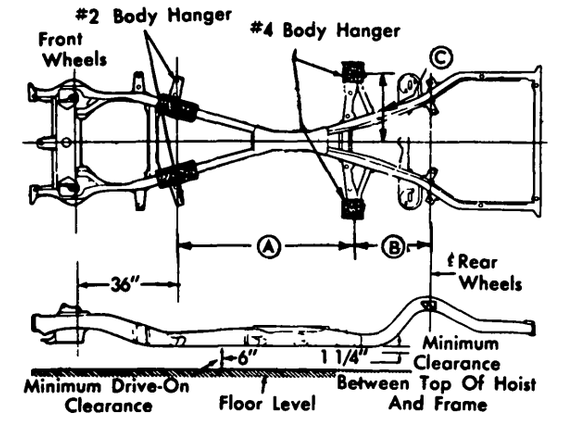
BUICK (SPECIAL) FRAME CONTACT POINTS 2A88

CADILLAC

Hoisting: Hoisting equipment that engages suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipe and mufflers. When using a frame contact type hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration. Take care to prevent hoist adapters contacting any part of the No. 2 body hanger. Hoist contact at rear should be at outer ends of No. 4 body mounting brackets. In no case should rear contacts be less than 32½" apart. *CAUTION - Hoist should not contact rear lower control link front mounting bracket. DO NOT lift Series 75 or Commercial Chassis cars on frame contact hoist as severe stress and misalignment will result due to length of frame and car.*

Cadillac Frame Dimensions

Series	Dimension A	Dimension B	Dimension C
60 & 62	64.50"	29.50"	16.25"



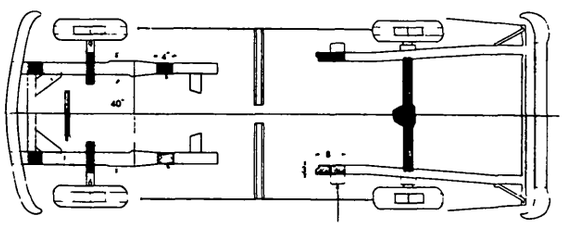
CADILLAC FRAME CONTACT POINTS 2A89

CHEVY II

Jacking (Bumper Jack): Locate bumper jack under bumper at point of attachment to support. *See diagram.*

Jacking (Floor Jack): Floor jack can be located under lower control arms, rear axle housing, forward ends of rear frame members, both ends of front frame members and front crossmember (located just forward of oil pan). *See diagram.*

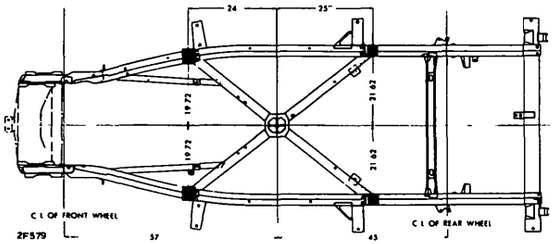
Hoisting (Frame Contact Hoist): Position hoist so contact is made at forward end of rear frame members and rear ends of front frame members. *See diagram.*



CHEVY II FRAME CONTACT POINTS 2A87

CHEVROLET CARS & CORVETTE

Hoisting: Equipment engaging suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipes and mufflers. When using a frame contact hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration.

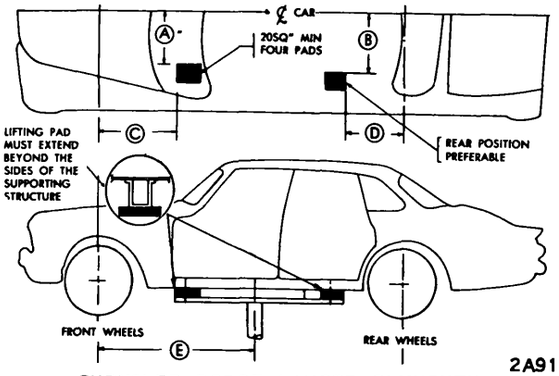


CORVETTE FRAME CONTACT POINTS

CHRYSLER, DODGE, DODGE DART, LANCER, PLYMOUTH, VALIANT

Hoisting (Frame Contact Hoist): This type hoist must be equipped with proper adapters so car will be supported in correct places as shown in illustration, and to specifications listed below.

	A	B	C	D	E
Chrysler SC1, 2	16.50"	17.25"	24"	22"	54"
Chrysler SC3	16.50"	17.25"	28"	22"	59"
Dodge	16"	17.50"	26.5"	20"	53"-58"
Lancer	14:20"	16.20"	20.3"	23.7"	48"
Plymouth	16"	17.50"	26.5"	20"	53"-58"
Valiant	14.20"	16.20"	20.3"	23.7"	48"



2A91

CHRYSLER, DODGE, LANCER, PLYMOUTH & VALIANT FRAME CONTACT POINTS

CHEVROLET TRUCKS

Jacking: Following list of jacking points will assist wheel and tire assembly changes with vertical type emergency jacks supplied with trucks.

Front

10, 20, 30 Models - Lower arm pivot or torsion bar socket.

40 Models - Frame side rail ahead of steering gear or idler support.

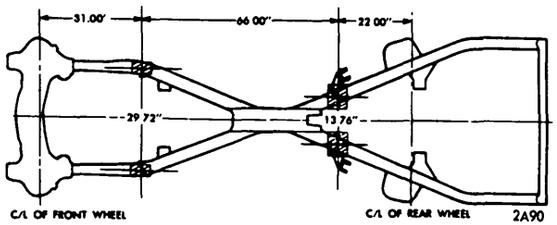
50, 60 Models - Frame side rail behind front crossmember. Use hardwood block between front crossmember and upper control arm to reduce jack travel.

Rear

10, 20, 30 Models - Axle housing.

40 Models - Spring, ahead or behind axle.

50, 60 Models - Spring, in front of axle housing.



2A90

CHEVROLET FRAME CONTACT POINTS

COMET, FALCON, FAIRLANE, METEOR & THUNDERBIRD

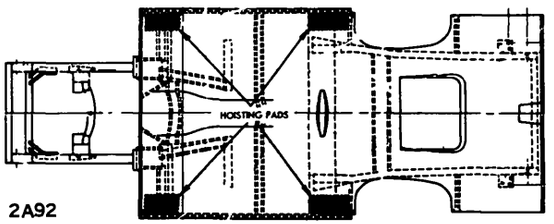
Jacking (Exc. Thund rbird): Either side of car may be raised at front by jack contact at lower control arm strut connection. Either side of car may be raised by jack contact on front crossmember, or on crossmember to which stabilizer is connected. Either side of rear end of car may be raised by jack contact on rear crossmember.

Jacking (Thund rbird): Either side of car may be raised at front by jack contact at either lower control arm. *CAUTION - Mak sur jack saddle is large enough to acc mm date control arm securely.* Either side of front end may be raised by jack contact on front crossmember or on crossmember to which stabilizer is connected. Either side of rear end may be raised by jack contact on rear crossmember.

H isting: Check all drive-on type hoists for possible interference with car underbody. Modify hoist and approach ramps as necessary to provide clearance.

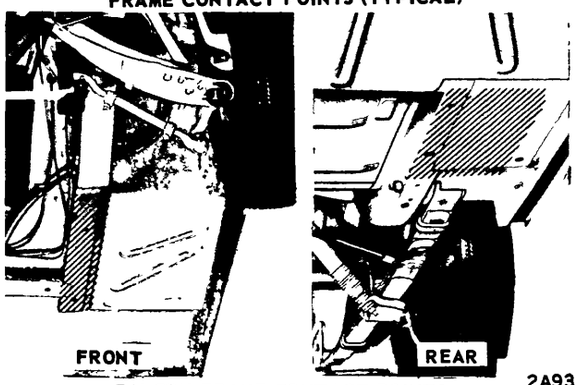
Rail & F rk Lift (Twin Post) Hoists - Front adapters or hoist plates must be carefully positioned to contact lower suspension arms and must be large enough to cover entire spring seat area. Rear adapters or forks must be positioned under rear axle (forks must not contact axle at points more than 1" outboard from circumference welds near differential housing). *CAUTION* - Raise car slowly and make certain that rear shock absorbers are not damaged.

Fram Contact Hoist (All Models) - Frame contact hoist adapters are necessary to lift car. Hoist adapters should cover at least 12 square inches (Comet, Falcon, Fairlane & Meteor); 24 square inches (Thunderbird) of underbody area shown in illustration.



2A92

FAIRLANE, METEOR & THUNDERBIRD FRAME CONTACT POINTS (TYPICAL)



2A93

FALCON FRAME CONTACT POINTS

CORVAIR CARS & TRUCKS

SEDANS, STATION WAGONS, GREENBRIER, TRUCKS

Jacking: Sedans & Station Wagons - Jack at lifting areas shown in illustration. *CAUTION* - Jack tab must catch outer body flange to prevent jack sliding too far under car.

Greenbrier & Trucks - Use jack pads between front and rear wheels as shown in illustration. Pin on load rest of jack must engage in hole in jack pad.

Hoisting (Frame Contact Hoist): All Models - Hoist must contact shaded lifting areas shown in illustrations.

OLDSMOBILE

Jacking: Support car at suspension points only. Do not support car at extreme ends of frame or at center of frame side rails.

Hoisting (Frame Contact Hoist): Lift car at shaded areas shown in illustration.

OLDSMOBILE F-85

Hoisting (Frame Contact Hoist): Place contact pads of hoist at circled lifting points shown in illustration. Lift arms must not interfere with hand brake intermediate lever.

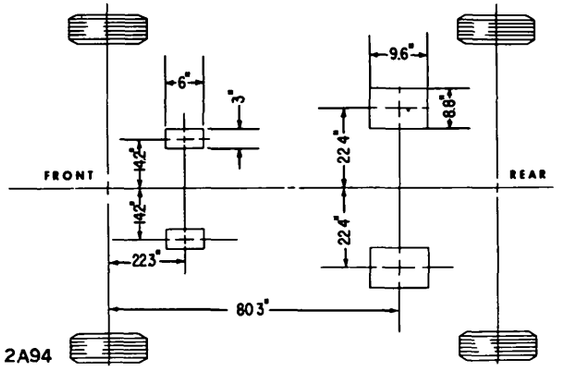
PONTIAC

Hoisting (Frame Contact Hoist): Lifting pads must be positioned at shaded areas shown in illustration to prevent damage to other parts. Ground clearance is 7½" front, 6" rear.

PONTIAC TEMPEST

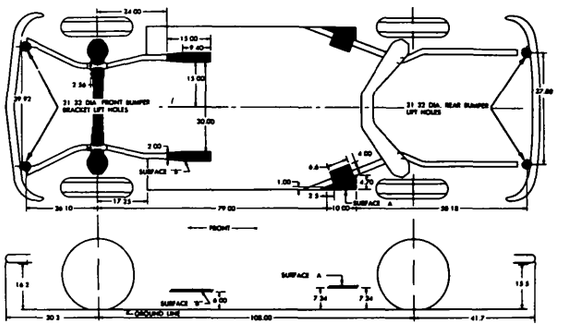
Lifting: Lift car at any accessible point on frame side rail, at front crossmember, or front or rear lower control arms. *CAUTION* - 1) Avoid rear shock absorber brackets. 2) DO NOT lift at bumpers, torque tube, axle shafts, transaxle or engine. 3) Torque tube and exhaust system are lower than frame side rails and adapters must be used to provide clearance.

Towing: Tow **only** at front or rear crossmembers. DO NOT tow by bumpers, axle shafts, or steering linkage.

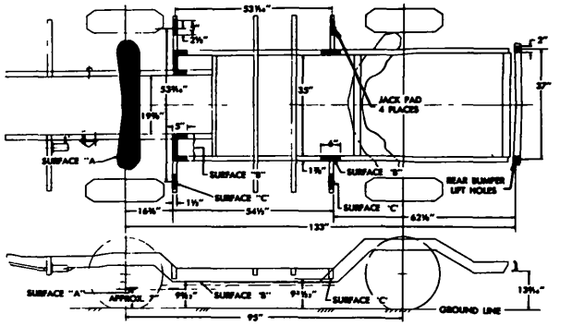


2A94

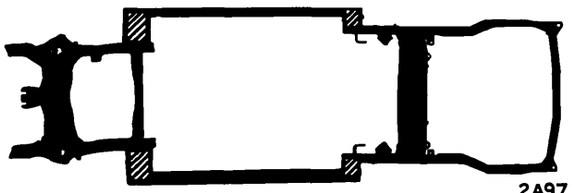
COMET FRAME CONTACT DIMENSIONS



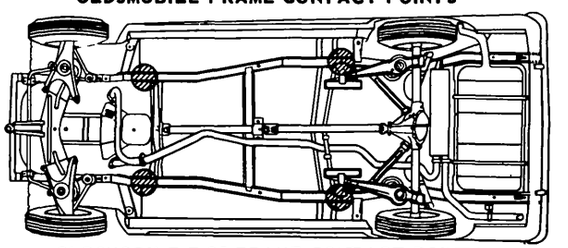
CORVAIR (SEDANS & STATION WAGONS) 2A95



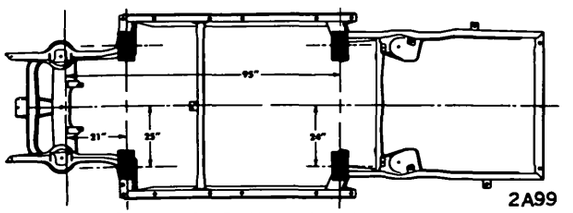
CORVAIR (GREENBRIER & TRUCKS) 2A96



OLDSMOBILE FRAME CONTACT POINTS 2A97



OLDSMOBILE F-85 FRAME CONTACT POINTS 2A98



2A99

PONTIAC FRAME CONTACT POINTS

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT

►*WHEEL ALIGNMENT NOTE:* Before checking and adjusting wheel alignment, car must be at normal curb weight with the items listed below properly checked and adjusted. Also make sure that looseness in front suspension components not excessive.

Trim Height - Must be within limits specified for both front and rear. *See Individual Car Model Suspension Data in this section.*

Tire Inflation - Tires must be at correct pressure. *See Data below.*

Wheel Bearings - Must be properly adjusted. *See "Front Wheel Bearing Adjustment" in this section.*

AMERICAN MOTORS

RAMBLER AMERICAN

ADJUSTMENT: Caster and camber adjustments are made by installing or removing shims between lower control arm mounting pivot bar and mounting bracket on underbody. *NOTE - Lower control arm pivot bar brace must be loosened before making caster and camber adjustments. When installing, tighten bolts to 70-80 ft. lbs.*

Tire Inflation (Cold): 24 lbs. front and rear.

Caster: Adjust caster by increasing or decreasing the thickness of shims at either front or rear mounting bolts as necessary.

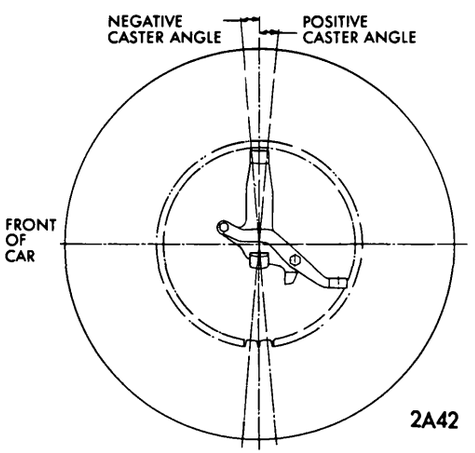
Camber: Adjust camber by increasing or decreasing the thickness of shims equally at both front and rear mounting bolts as necessary.

RAMBLER CLASSIC & AMBASSADOR

ADJUSTMENT: Caster and camber adjustments are made by turning lower control arm mounting bolts which are provided with eccentric washers. After adjustment, tighten eccentric bolt nut to 50-55 ft. lbs.

Tire	Tire Inflation Pressure (Lbs.) Front	Rear
6.50, 6.70, 7.50	24	24
8.00	22	20
Captive Air ℂ	29	29
Captive Air ℂ	24	24

ℂ - Inner Chamber. ℂ - Outer Chamber.



CASTER ANGLE

Caster: Loosen attaching bolt nut and turn with rear front or rear eccentric bolt as necessary for correct caster.

Camber: Loosen attaching bolt nut and turn both front and rear eccentric bolts equally to obtain correct camber.

CHRYSLER CORPORATION

CHRYSLER, DODGE, LANCER, PLYMOUTH & VALIANT

ADJUSTMENT: Caster and camber adjustments are made by rotating eccentric cam assemblies at inner end of upper control arm front and rear legs. *NOTE - On all models, except Chrysler, access holes to loosen upper control arm cam bolt nuts have been provided in fender side shields. Front access hole is covered by a splash shield.*

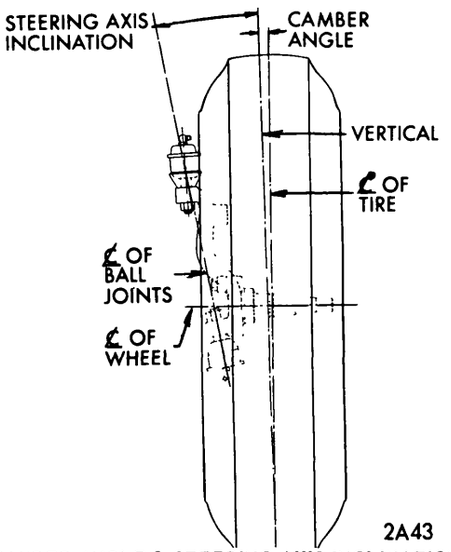
Car Model	Tire Inflation (Cold) Pressure (Lbs.) Front	Rear
Imperial & Chrysler 300H	24	24
Chrysler, Others (Except Sta. Wagon)	24	22
Chrysler Station Wagon	22	ℂ 24
Dodge, Dart 6 Cyl. (Except Sta. Wagon)	24	24
Dodge, Dart V8 (Except Sta. Wagon)	24	22
Dodge, Dart Station Wagon (Except 880)	24	ℂ 26
Dodge Custom 880 Station Wagon	22	ℂ 24
Plymouth 6 Cyl. (Except Sta. Wagon)	24	24
Plymouth V8 (Except Sta. Wagon)	24	22
Plymouth Station Wagon	24	ℂ 26
Lancer & Valiant	24	24

ℂ - With station wagon fully loaded, increase cold pressure to 28 lbs.

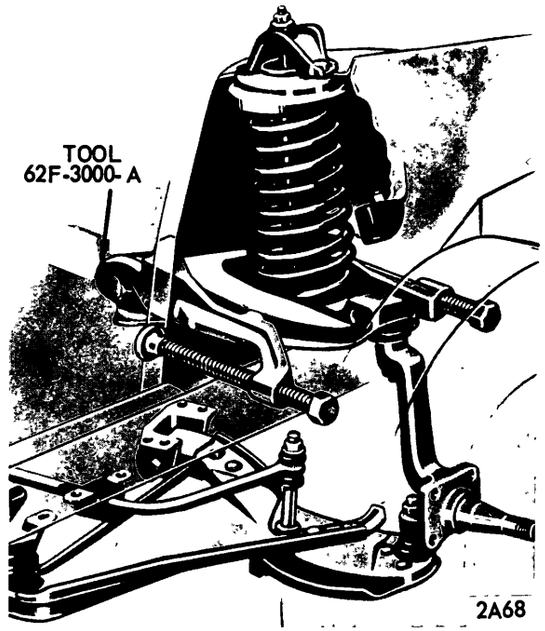
ℂ - With station wagon fully loaded, increase cold pressure to 30 lbs.

Caster: Adjust by turning one eccentric bolt at a time as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in opposite directions affects caster with a minimum amount of change in camber.*

Camber: Adjust camber by turning both eccentric bolts equally in same direction as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts equally in same direction affects camber with a minimum amount of change in caster.*



CAMBER ANGLE & STEERING AXIS INCLINATION



MERCURY METEOR & FORD FAIRLANE WHEEL ALIGNMENT TOOL

FORD MOTOR CO.

FALCON, COMET, GALAXIE & MONTEREY

ADJUSTMENT: Caster and camber adjustments are made by adding or removing shims from between upper control arm inner shaft and frame member at shaft mounting bolt locations. After adjustments are completed, tighten control arm inner shaft mounting bolts to 65-90 ft. lbs. (Falcon & Comet); 65-85 ft. lbs. (Galaxie & Monterey).

Car Models	Tire Inflation (Cold) Pressure (Lbs.) ℂ Front	ℂ Rear
Comet		
Sedans	24	24
Sta. Wagon (Pass. Load)	22	26
Sta. Wagon (Cargo Load)	24	30
Falcon		
Sedans	24	24
Sta. Wagon (Pass. Load)	22	26
Sta. Wagon (Pass. & Cargo)	22	30
Sta. Wagon (With Snow Tires)	22	30
Galaxie & Monterey	24	ℂ 24

ℂ - Add 4 lbs. for heavy loads or high speed driving.
ℂ - 28 lbs. for station wagon.

Caster: Remove or install shims at either front or rear mounting bolt. Removal of shims at front bolt or installation of shims at rear bolt will move ball joint forward. Removal of shims at rear bolt or installation of shims at front bolt will move ball joint to rear. A 1/32" (Falcon & Comet); 1/16" (Galaxie & Monterey) shim change at either bolt will change caster ½°.

Camber: Remove or install shims of equal thickness at both bolts. The removal of shims will move upper ball

CONTINUED ON NEXT PAGE

►*FOR ALIGNMENT SPECIFICATIONS, SEE ALIGNMENT SPECIFICATION TABLE ON PAGE 364.*

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Cont.)

joint inward. Installation of shims will move ball joint outward. A 1/16" shim change at both bolts will change camber 1/3° (Falcon & Comet); ¼° (Galaxie & Monterey). *NOTE* - Total shim pack thickness at each bolt should not exceed 9/16" (Falcon & Comet); 5/8" (Galaxie & Monterey).

FAIRLANE & METEOR

►*1962 UPPER CONTROL ARM SHAFT HARD MOVING CORRECTION:* If control arm shaft hard to move for making caster and camber adjustments, trouble may be due to shaft frozen to its mount by the action of serrations on shaft and nut. To correct, rap head of retaining bolt sharply after bolt has been backed out two or three turns. This should drive nut away from sheet metal. If necessary, lift cross shaft from serrations with a pry bar.

►*1962 MERCURY METEOR ALIGNMENT TOOL MODIFICATION:* If fender shield will not permit Tool 3000-1 to be installed properly for wheel aligning, modify tool by removing adjusting screw from tool and grinding length of threaded end of tool to 3/4" minimum.

ADJUSTMENT: Caster and camber adjustments are made by moving upper control arm assembly in or out in elongated bolt holes. To control movement of upper control arm after upper control arm-to-underbody attaching bolts are loosened, install Tool 62F-3000-A (see illustration). *NOTE - Do not install tool from underneath car. For proper installation, face outside of wheel and r ach behind each end of wheel under fender with each half of tool. Turn both tool adjusting screws until tool is snug between upper control arm and lower corners of front suspension housing. Loosen upper control arm inner shaft bolts two or three turns, then turn wheels to extreme right and left positions to free upper control arms. Turn whe ls to straight ahead position, and turn upper control arm inn r shaft bolts snug (not tight).*

CONTINUED ON NEXT PAGE

Ⓒ - Pos 2° preferred.
② - Preferred - 0° Right, Pos ¼° Left.
③ - Pos 1° preferred.
④ - Pos ½° preferred.
⑤ - Pos ¼° preferred.
⑥ - Both sides equal within ½° maximum.
⑦ - 4-Wheel Drive Models: 7½° (3000 lb. axle), 8° (3500 lb. axle). C Series: 5½°.
⑧ - Pos. 3° (F-100, 250; P-400 & 500 134" WB; All C Series). Pos. 3½° (P-500 154"WB). Pos. 4° (All Others).
⑨ - 4-Wheel Drive: Pos. 1½°.
⑩ - Both sides equal within ¾°.
⑪ - Pos 1/3° desired.
⑫ - **Right Whe l** - Pos 1/8° to Neg 3/8°, 0° preferred. **L ft Wh el** - Pos 3/8° to Neg 1/8°, Neg 1/4° preferred.
⑬ - **Manual Ste ring** - 3/16" to 1/4"; **Power Steering** - 1/16" to 1/8".
⑭ - Neg ½° preferred.
⑮ - Toe-Out (Not Toe-In) with indicated trim height: 1/4" (6½-7½"), 3/16" (5½-6½"), 1/16" (3-5½").
⑯ - Adjust left side ¼° greater than right side.

1962 WHEEL ALIGNMENT SPECIFICATIONS

KEY R- Right. L- Left. Man- Manual Steering. Pwr- Power Steering.	Steering Axis Inclination	Caster	Camber	Toe-In	Toe-Out On Turns	
					Inner	Outer
AMERICAN MOTORS						
American	8°	Man 0° ± ¼° Pwr Pos 1½ to 2° Ⓒ	Pos ¼° to Neg ¼°②	1/16" to 3/16"	20°	18°
Others	6° 11'	Man 0° ± ¼° Pwr Pos ½° to 1° ③	Pos ¼° to Neg ¼° ②	1/16" to 3/16'	20°	17°46'
CHRYSLER CORP.						
All Cars	5½° to 7½°	Man 0° to Neg 1° Pwr Pos ¼° to 1¼°	R 0° to Pos ½° ④ L Pos ¼° to ¾° ⑤	1/8" ± 1/32"	20°	17°±1°
FORD MOTOR CO.						
Comet & Falcon	.....	Pos ½° ± ½° ⑥	Pos ½° ± ½° ⑥	1/4" to 5/16"	20¾°	20°
Fairlane & Meteor	7° 15'	0° ± ½°	Pos ½° ± ½° ⑥	1/16" to 3/16"	20¾°	20°
Galaxie & Monterey	.....	0° ± ½°	Pos ¼° to 1° ⑥	1/8" to 1/4"	24¼°	20°
Thunderbird	.....	Pos ¾° ± ¾°	0° to Pos ¾°	1/16" to 3/16"	20½°	20°
Lincoln Cont.	7° @ ¾° Camber	Neg ½° to 2° ⑥	0° to Pos ¾° ⑤⑥	1/16" to 3/16"	20°	17°48'
Ford Truck						
Econoline	7½°	Pos 3½° ± ¾°	Pos 3/8° ± 1/4°	3/32" ±1/32"	21½°	20°
Others	4° ⑦	⑧	Pos 1° ⑨	1/16" to 3/16"	.....	.....
GENERAL MOTORS						
Buick (Exc. Spec.)	7½°	Neg 2° ± ½° ⑩	Neg ¼° to 1° ⑩	1/8" to 3/16"	23° 40'	20°
Buick Special	9° 52'	Neg 2° ± 1° ⑩	Pos 1° to Neg ½° ⑩ ⑪	3/16" to 9/32"	22° 5'	20°
Cadillac	6°	Neg ½° to 1½° ⑥	⑫	3/16" to 1/4"	22° 11'	20°
Chevrolet Cars	7¼° ± ½°	0° ± ½°	Pos ½° ± ½°	1/8" to 1/4"	20°	18°
Chevy II	7° ± ½°	Pos 1° + ½°, - 1° ⑥	Pos ½°+1°, -½° ⑥	1/4" to 3/8"	20°	18½°
Corvair						
Pass. Cars	7° ± ½°	Pos 1½° to 2°	Pos ½° ± ½°	1/4" to 3/8"	20°	18½°
Greenbrier & Tks.	7¼° ± ½°	Pos 2½° ± ¼°	Pos ¼° ± ¼°	1/16" to 3/16"	23°	20°
Corvette	4° ± ½°	Pos 2° ± ½°	½° ± ½°	1/8" to 1/4"	20°	17°
Chevrolet Trucks						
Forward Control	7½° ± ½°	Pos 2° ± ½°	Pos 1½° ± ½°	1/4" to 5/16"	23½°	20°
4-Wheel Drive	7½° ± ½°	Pos 3° ± ½°	Pos 1½° ± ½°	1/8" to 3/8"	21¾°	20°
Series 10 to 40	8½° ± ½°	Pos 1° ± ½°	Pos ½° ± ½°	3/16" to 1/4"	21¾°	20°
Series 50 & 60	7° ± ½°	L Neg 1° to 0° ⑭ R 0° to Pos 1° ⑫	0° ± 1/3°	⑮	23°	20°
Oldsmobile						
88, S88, 98	11°	0° to Neg 1°	Neg ¼° to Pos ½°⑥	0" to 1/16"	Man 23° Pwr 24°	20° 20°
F-85	7° 30'	Neg ¾° to 1¾°	Neg 3/8° to Pos 3/8° ⑥	0" to 1/8"	23°	20°
Pontiac						
Tempest	6° 50'	Neg 1° 40' ± 30'	Pos 0°8' ± 30' ⑯	0" to 1/8"	20°	18-19°
Others	4° 50'	Neg 1½° ± ½°	Pos ¼° ± ½° ⑯	0" to 1/8"	20°	18-19°
STUDEBAKER						
Lark	6°	Pos ¼° to Neg 1¼°⑥	0° to 1°	⑭	20°	17-18°
Hawk	6°	Neg 1½° to 3° ⑥	0° to 1°	⑭	20°	17-18°
WILLYS						
2-Wheel Drive	7½°	Pos 3°	Pos 1°	3/64" to 3/32"	21°45'	20°
4-Wheel Drive	7½°	Pos 3°	Pos 1½°	3/64" to 3/32"	20°	20°

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Continu d)

After adjustments are completed, tighten upper control arm attaching bolts to 115-135 ft. lbs. (Fairlane), 150-160 ft. lbs. (Meteor).

Tire Inflation (Cold): 24 lbs. front and rear. For high speed driving or heavy loads, add 4 lbs.

Caster: To increase positive caster or decrease negative caster, turn front screw on tool clockwise or rear screw counterclockwise. To decrease positive caster or innegative caster, turn front screw on tool counterclockwise or rear screw clockwise.

Camber: To increase positive camber or decrease negative camber, turn front and rear screws clockwise an equal number of turns. To decrease positive camber or increase negative camber, turn front and rear screws counterclockwise an equal number of turns.

THUNDERBIRD

ADJUSTMENT: Caster adjustment is made by repositioning the strut on lower control arm. End of strut and surface on lower control arm are serrated and mounting holes in strut are elongated. Camber adjustment is made by adding or removing shims between pivot bracket of lower control arm and mounting bracket on underbody in engine compartment. After adjustments are completed, tighten strut-to-lower control arm nuts to 85-115 ft. lbs. Tighten shim retaining nut securely.

Tire Inflation: 24 lbs. front and rear.

Caster: Loosen nuts and bolts attaching strut to lower control arm and lift strut so serrations are free of serrations on lower control arm. To decrease caster, lengthen distance between strut forward mount and side of control arm. To increase caster, shorten distance between strut forward mount and side of control arm.

Camber: To move lower ball joint inward, remove shims between mounting and pivot brackets. To move ball joint outward, install shims between mounting and pivot bracket. A 1/16" change in shim thickness will change camber angle 1/3°. *NOTE - Total shim thickness should not exceed 11/16".*

LINCOLN

ADJUSTMENT: Caster and camber adjustments are made by moving the serrated upper control inner shaft assembly in elongated slots in front suspension crossmember bracket. When adjustments are completed, tighten upper control arm inner shaft-to-crossmember bracket attaching bolts to 100-125 ft. lbs.

Tire Inflation (Cold): 24 lbs. front and rear.

Caster: Loosen bolts securing upper control arm shaft to bracket, then with aid of a pry bar, move control arm assembly at **either of the two bolt locations** as necessary. Inboard movement of front bolt or outboard movement of rear bolt will change caster in negative direction. Outboard movement of front bolt or inboard movement of rear bolt will change caster in positive direction. *NOTE - A movement of 3/32" at either front or rear bolt location will change caster ½°.*

Camber: Inboard movement of control arm shaft **equally at front and rear bolts** will change camber in negative direction. Outboard movement of upper control arm shaft equally at front and rear bolts will change camber in positive direction. *NOTE - A movement of 3/64" f ntir shaft will chang camb r ¼°.*

GENERAL MOTORS CORP.

BUICK (EXCEPT SPECIAL)

ADJUSTMENT: *NOTE - Correct alignment height must be maintained while checking camber and caster. Install an Alignment Height Tool, J-8973-23, at each side of car between frame and front lower control arm, locating tool between coil spring and rebound bumper with long lip at upper end of tool pointing outboard. Install an Alignment Height Tool, J-8973-19, at each side of car between frame and rear axle housing, locating top of tool over rear attaching bolt of rear axle housing bumper. Lower end of tool must rest on axle housing. Weight of car will hold tools in position.*

►*CASTER & CAMBER ADJUSTING NOTE:* Shims located between upper control arm inner shaft and brackets on frame. Do not exceed a thickness of .500" in any one shim pack. After adjustments are completed, tighten upper control arm mounting bolt nuts to 90-110 ft. lbs.

Tire Inflation (Cold): 24 lbs. front and rear (28 lbs. rear on station wagons). *NOTE - For temperatures below freezing, add 2 lbs.*

Caster: To **increase** caster, increase amount of shims at front bolt and decrease by an equal amount at rear bolt. To **decrease** caster, decrease amount of shims at front bolt and increase by an equal amount at rear bolt.

Camber: To **increase** camber, remove an equal amount of shims at front and rear bolt. To **decrease** camber, add an equal amount of shims at front and rear bolt.

►*NOTE:* To increase camber and caster simultaneously, remove shims at **rear bolt only.** To decrease camber and caster simultaneously, add shims at **rear bolt only.**

BUICK SPECIAL

ADJUSTMENT: *NOTE - Correct alignment height must be maintained while checking camber and caster. Install an Alignment Height Tool J-8973-22 at each side of car between frame and front lower control arm, locating tool between coil spring and rebound bumper with long lip at upper end of tool pointing outboard. Raise rear of car slightly and place Spacer Block J-8973-20 (station wagon) or J-8973-21 (all others) at each rear wheel, positioning cutout in block over rubber bumper with bottom of block resting on axle housing. Weight of car will hold tools in position.*

►*CASTER & CAMBER ADJUSTING NOTE:* Shims located between upper control arm inner shaft and brackets on frame. Do not exceed a thickness of .380" in any one stack. After adjustments are completed, tighten upper control arm mounting bolt nuts to 60-85 ft. lbs.

Tire Inflation (Cold): 22 lbs. front and rear (26 lbs. rear on station wagons). *NOTE - For temperatures below freezing, add 2 lbs.*

Caster: Adding shims at front bolt location will change caster toward negative. *NOTE - This will also change camber toward negative.* Adding shims at rear location will change caster toward positive. *NOTE - This will also change camber toward negative.*

Camber: Adding equal amounts of shims at both front and rear bolts will change camber toward negative. *NOTE - Caster will not be changed.*

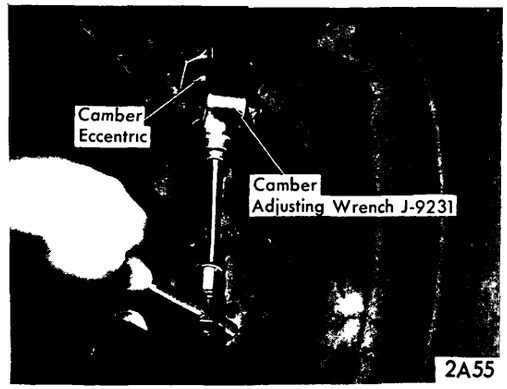
CADILLAC

►*TOE-IN ADJUSTMENT NOTE* Before checking toe-in, make sure drag link height is correct. *Se "St ring Linkage" in St ering Section.*

ADJUSTMENT: Caster adjustment is made by turning retaining nuts on forward ends of tie-struts at front frame crossmember. *NOTE - To gain acc ss to r taining nuts, it is n c ssary to remov splash shi ld.* Camber adjustment is made at the camber eccentric located in steering knuckle upper support. Upper spherical joint stud fits through camber eccentric and knuckle. Turning the camber eccentric repositions upper spherical joint stud.

Series	Tire Inflati n (C ld) Pr ssur (Lbs.) Fr nt	R ar
60 & 62	24	24
75	28	28
Commercial Chassis	24	32

Caster: For increased negative caster, lengthen struts by loosening front bushing retaining nuts and tightening rear bushing retaining nuts. One turn of retaining nuts provides approximately ½° change in caster. For more positive caster, shorten struts by loosening rear bushing retaining nuts and tightening front bushing retaining nuts. After proper adjustment, tighten front retaining nuts to 35 ft. lbs. *NOTE - Wh n tight ning front retaining nut, hold r ar nut s cur ly to pr v nt changing caster setting.*



CADILLAC CAMBER ADJUSTING TOOL

Camber: Loosen spherical joint stud one turn and tap bottom of stud with a soft hammer to loosen camber eccentric in knuckle. *NOTE - If cc ntric will not break loose in the above mann r, it may b n c ssary to loosen stud nut on turn and install a plain nut halfway on stud. Then us a 7/16" diam t r st el rod approximately 20" long, ins rt d insid nut and resting on stud. Tap stud with a h avy h a m m r to loosen eccentric.* Use Camber Adjusting Wrench, Tool J-9231, and turn camber eccentric to obtain correct setting. *NOTE - Final position of ball joint should b in the rear position of camb r cc ntric in ord r to keep steering arm angle corr ct.* After proper camber adjustment is obtained, tighten spherical joint stud nut to 60 ft. lbs.

CHEVROLET PASS. CARS

ADJUSTMENT: Camber and caster adjustments are made by adding or removing shims between upper control arm inner shaft and bracket on frame. After adjustments are completed, tighten upper control arm inner shaft attaching bolts to 45-55 ft. lbs.

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►FOR ALIGNMENT SPECIFICATIONS, SEE ALIGNMENT SPECIFICATION TABLE ON PAGE 364.

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Cont.)

Tire Inflation (Cold): 24 lbs. front and rear (28 lbs. rear on station wagons). *NOTE - For improved station wagon handling under heavy loads, decrease front pressure 2 lbs. and increase rear pressure 2 lbs.*

Caster: To decrease positive caster, add shims at front attaching bolt or remove shims from rear attaching bolt. A 1/32" shim at one bolt will change caster ¼°.

Camber: To decrease positive camber, add shims at both front and rear attaching bolts. A 1/32" shim will change camber 1/6°.

CHEVROLET TRUCKS

ADJUSTMENT: On all models, camber adjustment is made by adding or removing shims between upper control arm spacer and bracket (Series 10, 20, 30, 40); or between upper control bracket and support (Series 50, 60) equally at both front and rear attaching bolts. On Series 10, 20, 30, 40, caster adjustment is made by adding or removing shims at either front or rear attaching bolts. On Series 50, 60, caster adjustment is made by changing location of lower control arm shafts with reference to notched plates welded to crossmember. After adjustments completed, tighten upper control arm attaching bolts to 70-90 ft. lbs. (Series 10, 20); 90-120 ft. lbs. (Series 30, 40); 125-165 ft lbs. (Series 50, 60). Tighten lower control arm attaching bolts to 180-240 ft. lbs. (Series 50, 60 Std.); 315-420 ft. lbs. (Series 50, 60 Hvy. Duty).

Caster (Series 10, 20, 30, 40): One .299" shim added to rear bolt changes caster Neg. 24' (and camber, Neg. 1'). One .0299" shim removed from rear bolt changes caster Pos. 24' (and camber Neg. 2').

Caster (Series 50, 60): *NOTE - If there is insufficient adjustment to obtain the preferred setting of Neg. ½° (Left Side), set left side as close as possible to this desired negative angle. Caster on right side should then be set 1° greater than caster at left side without exceeding caster limits. In any event, right wheel caster should be at least ½° more positive than left wheel caster.* To adjust, check caster to determine amount of change required to obtain proper caster, then mark location of lower control arm shaft with reference to notched attaching plates, then move shaft rearward to decrease caster or forward to increase caster. *NOTE - Moving shaft a distance of one notch changes caster approximately ½°. Tighten bolts and recheck adjustment.*

Camber (All Models): Adding shims equally at both front and rear attaching bolts increases camber. Removing shims decreases camber. One .0299" shim added or removed at both bolts changes camber 10'38" (Series 10, 20, 30, 40); ½° (Series 50, 60).

►*CASTER & CAMBER ADJUSTING SHIM NOTE: In addition to .0299" shims, .0598" and .1196" shims are available to reduce number of shims in pack. DO NOT exceed 5/8" shim pack at each bolt location. Total difference in shim pack thickness at front and rear bolt should not exceed .330".*

CHEVY II

ADJUSTMENT: Caster adjustments are made by lengthening or shortening the lower control arm strut at front underbody connection. Camber adjustments are made by rotating eccentrically mounted washers located on lower control arm inner pivot bolt.

Tire Inflation (Cold): 24 lbs. front, 26 lbs. rear (28 lbs. rear on station wagons). *NOTE - For improved station wagon handling under heavy loads, decrease front pressure 2 lbs. and increase rear pressure 2 lbs.*

Caster: Turn the two nuts at front end of lower control arm strut as necessary. Shortening the strut rod increases caster. Lengthening the rod decreases caster. When adjustment completed, tighten nuts to 100-125 ft. lbs.

Camber: Loosen lower control arm pivot bolts and rotate cams on pivot as necessary to move control arm in or out for correct camber. Tighten pivot to 60-95 ft. lbs.

CORVAIR

(FRONT WHEELS)

ADJUSTMENT: Caster adjustments are made by lengthening or shortening lower control arm strut (All except 1200 Series); by adding or removing shims between upper control arm inner shaft and mounting bracket at **either** front or rear mounting bolts (1200 Series). On all models, camber adjustments are made by adding or removing shims between upper control arm inner shaft and mounting bracket **equally** at front and rear mounting bolts.

Tire Inflation (Cold): 15 lbs. front, 26 lbs. rear.

Caster: Series 500, 700, 900 - Adjust caster by turning nuts at rear of strut rod. Lengthening rod increases caster. Shortening rod decreases caster. *NOTE -* Because of manufacturing tolerances, it is possible to run out of threads on strut rod or cause front spring to be cocked in its seat and rub spring tower. Only when this happens is it permissable to shim unevenly at upper control arm. If shims are changed, check camber.

Series 1200: To adjust, loosen upper control arm support shaft-to-crossmember bolts and add or remove shims at either front or rear bolt to obtain correct caster adjustment. *NOTE - To adjust right side, direct air heater front duct must be removed for access to upper control arm shaft attaching bolts.*

(REAR WHEELS)

Caster: Pos. 1½°-2° at curb load (Series 500, 700, 900). Neg. 1°±½° at design load (Series 1200). Not adjustable.

Camber: Pos. ½°±½° at curb load (Series 500, 700, 900). Pos. 1½°±½° at curb load (Series 1200). Not adjustable. If camber is not within limits, either the crossmember is out of alignment or has become distorted due to collision.

Toe-In: 1/8-3/8" (All Models). *NOTE - If drive-on type equipment is used, reverse car and back into position. Toe-in (overall) will be read as toe-out (readings taken from rear of tires rather than front).* To adjust, add or remove shims equally at each side of front edge of transmission case, with engine rear support loosened. *CAUTION - Shims must be added or removed equally from each side. DO NOT attempt to adjust one wheel at a time.* A shim added to each side will decrease toe-in. Removal of shim from each side will increase toe-in. *NOTE - Because of manufacturing tolerance and parts "stack-up" it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust the wheel with toe-out as close as possible to specifications, but not letting opposite wheel go out of specification. If for example, one wheel toes-out by ¼", the opposite wheel must toe-in enough to give overall specified toe-in.*

CORVETTE

ADJUSTMENT: Caster and camber adjustments are made by rotating upper control arm-to-steering knuckle eccentric bolt.

Tire Inflation (Cold): 24 lbs. front and rear (Normal Driving), 36 lbs. front and rear (Sustained High Speed Driving).

Caster: Loosen clamp bolt in upper end of steering knuckle support, then remove lubrication fitting at outer end of upper control arm. Insert an Allen wrench through hole and turn pivot until correct caster setting is obtained. *NOTE - Pivot pin must be turned in full turns only for caster setting, otherwise camber will be changed.*

Camber: After adjusting caster, rotate pivot pin not more than 1/2 turn in either direction to secure correct camber. Entire range of adjustment is obtained in 1/2 turn of pivot pin.

►*TOE-IN ADJUSTMENT NOTE:* Adjust toe-in at right hand tie rod only.

OLDSMOBILE 88, SUPER 88, 98, & F-85

ADJUSTMENT: Camber and caster adjustments are made by removing or adding shims between upper control arm inner shaft and bracket on frame. After adjustments are completed, tighten upper control arm attach-bolts to 85-110 ft. lbs. (Series 88 & 98); 60-85 ft. lbs. (F-85).

Tire Inflation (Cold)

Model	Pressure (Lbs.) Front	Rear
F-85 Without Air Cond.	22	22
F-85 With Air Cond.	① 24	① 24
88 & S88 (8.00 tires)	24	② 22
88 & S88 (8.50 tires)	22	② 22
98	③ 22	22

① - 22 lbs. with 7.00 x 13 tires.
② - 24 lbs. on station wagon.
③ - 24 lbs. with 8.50 tires and Air Cond.

Caster: To decrease positive caster (increase negative caster), add shims at front bolt. To increase positive caster (decrease negative caster), remove shims at front bolt. Removal or installation of .020" shim will change caster 3/8°.

Camber: To increase positive camber, remove shims at both front and rear bolts. To decrease positive camber, add shims at both front and rear bolts. Removal or installation of .020" shim at both bolts will change camber 1/8°.

PONTIAC (EXCEPT TEMPEST)

ADJUSTMENT: Caster and camber adjustments are made by removing or adding shims between upper control arm inner shaft and bracket on frame. After adjustments are completed, tighten upper control arm attaching bolt nuts to 80-95 ft. lbs.

Tire Inflation (Cold)

Tire & Model	Pressure (Lbs.) Front	Rear
8.00 (Exc. Air Cond.)	22	22
8.00 Air Cond.	24	22
8.50 (Exc. Sta. Wgn. & Air Cond.)	20	20
8.50 Air Cond. (Exc. Sta. Wgn.)	22	20
8.50 Station Wagon	22	24

CONTINUED ON NEXT PAGE

►FOR ALIGNMENT SPECIFICATIONS, SEE ALIGNMENT SPECIFICATION TABLE ON PAGE 364.

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Cont.)

Caster: To decrease positive caster, add shims to front bolt. To increase positive caster remove shims from front bolt. A .030" shim change will change caster 0°23'.

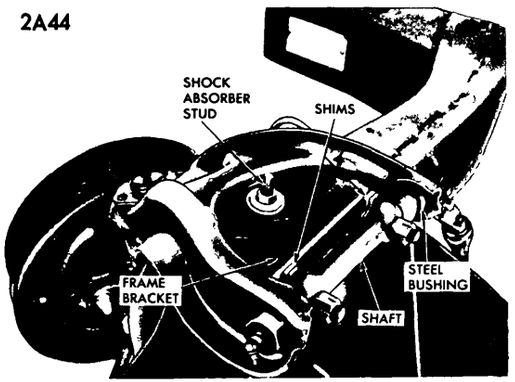
Camber: To increase camber, remove shims from both front and rear bolts. To decrease camber, add shims to both front and rear bolts. A .030" shim change at both front and rear bolts will change camber approximately 1/6°.

►*NOTE: Adding or removing an equal amount of shims at both front and rear bolts will change camber without changing caster.*

PONTIAC TEMPEST (FRONT WHEELS)

ADJUSTMENTS: Caster adjustment is made by adjusting length of strut rod. *NOTE - Shims between upper control arm inner shaft and frame brackets at front and rear bolts must be of equal thickness.* Camber is adjusted by adding or removing shims equally at front and rear bolts of upper control arm inner shaft mounts.

2A44



PONTIAC (EXC. TEMPEST) CAMBER & CASTER SHIM LOCATION

After adjustments are completed, tighten bolts 55-70 ft. lbs.

Tire Inflation (Cold): 22 lbs. front and rear (26 lbs. rear on station wagon).

Caster: To increase caster, lengthen strut rod by rotating outer nut. To decrease caster, shorten the strut rod. After adjustment, tighten nut at rear of strut to 70-85 ft. lbs.

Camber: Adding shims equally between upper control arm inner shaft and frame bracket at front and rear attaching bolts will decrease positive camber. Removing shims increases positive camber. *NOTE - Shim packs at front and rear bolts must be of equal thickness. Adding or removing an equal amount of shims at both front and rear bolts will change camber without changing caster.*

(REAR WHEELS)

Toe-In: 0-¼". *NOTE - If drive-on type equipment is used, reverse car and back into position. Toe-in (overall) will be read as toe-out (readings taken from rear of tires rather than front).* To adjust, add or remove shims equally at each side of front edge of differential. *CAUTION - Shims must be added or removed equally from each side. DO NOT attempt to adjust on wheel at a time.* A shim added to each side will decrease toe-in. Removal of shim from each side will increase toe-in. *NOTE - Because of manufacturing tolerance and parts "stack-up" it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust the wheel with toe-out as close as possible to specifications, but not letting opposite wheel go out of specification. If for example, one wheel is toe-out by ¼", then opposite wheel must toe-in enough to give overall specified toe-in.*



STUDEBAKER CAMBER & CASTER ADJUSTMENT

STUDEBAKER CORP.
LARK & HAWK

ADJUSTMENT: Caster and camber adjustments are made by rotating upper control arm outer pin at steering knuckle.

Tire Inflation (Cold)

Model	Pressure (Lbs.) Front	Rear
6 Cyl.		
All Except Taxi & Sta. Wgn.	24	20
Taxi	22	22
Station Wagon	26	26
Captive Air Tires	24	① 22
V8		
All	24	② 20
Captive Air Tires	24	24

① - 24 lbs. rear on Police Station Wagon.
② - 24 lbs. rear on Station Wagons.

Caster: *NOTE - Adjust caster before making camber adjustment.* Loosen steering knuckle clamp bolt, then remove lubrication fitting from rear bushing at upper control arm outer pin. Insert an Allen wrench into pin (through lubrication fitting hole) and turn it in full turns until proper caster is obtained. *NOTE - One full turn will change caster 1/2.*

Camber: After adjusting caster, rotate pivot bolt not more than 1/2 turn in either direction to secure correct camber. *NOTE - Entire range of adjustment is obtained in 1/2 turn of pivot pin.*

►*FOR ALIGNMENT SPECIFICATIONS, SEE ALIGNMENT SPECIFICATION TABLE ON PAGE 364.*

1962 FRONT WHEEL BEARING ADJUSTMENT

BUICK & BUICK SPECIAL

Turning spindle nut to 19 ft. lbs. while turning wheel, then back off nut and retorque to 11 ft. lbs. while rotating wheel. If cotter pin hole in spindle does not line up with slot in nut, back off nut 1/12 turn (Buick), 1/6-3/12 turn (Special) and install cotter pin.

CADILLAC

Rotate wheel and tighten adjusting nut to 30 ft. lbs., then back off nut ¼ turn and install cotter pin. *NOTE - If cotter pin cannot be installed in either of the two spindle holes, loosen adjusting nut and back off as necessary.*

CHEVROLET, CHEVY II, CORVAIR

Rotate wheel and tighten spindle nut to 15 ft. lbs. or 180 inch-lbs. (Chevrolet & Corvair Trucks), 100 inch-lbs. (Chevy II & Corvair Cars), then back off adjusting nut 1 flat (1/6 turn) and install cotter pin. If slot and cotter pin hole do not line up, back off nut an additional 1/2 flat or less as necessary. *NOTE - Wheel bearings should have no preload and .000-.007" endplay when properly adjusted.*

CORVETTE

While rotating wheel, tighten spindle nut to 33 ft. lbs., then back off nut until bearings are loose. Retorque to 12 ft. lbs. If slots line up, insert cotter pin. If slots do not line up, back off nut to nearest hole, and insert cotter pin.

CHEVROLET TRUCKS

While rotating wheel or hub, tighten spindle nut to 15 ft. lbs. (10 Series), 33 ft. lbs. (20-40 Series), 40 ft. lbs. (50-60 Series), then back off adjusting nut to nearest hole in spindle (ball bearings), 1/6 turn or 1 flat (taper roller bearings) and install cotter pin.

CHRYSLER, DODGE, DART, PLYMOUTH LANCER, VALIANT

Rotate wheel and tighten wheel bearing adjusting nut to 90 inch-lbs. (Chrysler, Imperial, Dodge, Dart, Plymouth), 70 inch-lbs. (Lancer, Valiant). Place nut lock on nut with one pair of slots in line with cotter pin hole, then back off lock and adjusting nut to next slot. Install cotter pin.

ALL FORD MOTOR CO. MODELS (EXCEPT FORD & ECONOLINE TRUCKS)

►*1962 COMET FRONT WHEEL BEARING NOISE CORRECTION:* Noise may be caused by cotter pin head rubbing against inside of grease cup or static collector spring. To correct, flatten head of cotter pin as necessary.

CONTINUED ON NEXT PAGE

WHEEL BEARING ADJUSTMENT (C ntinu d)

Rotate wheel and tighten spindle nut to torque listed in table below for each car model. Install nut lock with castellations indexed with cotter pin hole, then back off spindle nut and nut lock to next castellation (Except Comet & Falcon), next 2 castellations (Comet & Falcon), and install cotter pin.

F rd M t r C . Wh el Bearing Nut Torque

Car M d l	Torque
Comet	15-20 ft. lbs.
Falcon	12-15 ft. lbs.
Fairlane & Galaxie	15-20 ft. lbs.
Meteor & Monterey	12-15 ft. lbs.
Thunderbird	15-20 ft. lbs.
Lincoln Continental	15-20 ft. lbs.

FORD TRUCKS (EXCEPT ECONOLINE)

With front wheel rotating, tighten adjusting nut to 50-80 ft. lbs., then back off adjusting nut at least one but not more than two castellations. Lock adjusting nut in this position with cotter pin.

FORD ECONOLINE TRUCKS

While rotating wheel, tighten adjusting nut to 11½-12½ ft. lbs. Back off adjusting nut at least one castellation but not more than two castellations. Loosen nut if necessary to align cotter pin hole with nearest slot in nut, and install cotter pin.

OLDSMOBILE 88, S88, 98

While revolving wheel **at least 3 times speed of nut rotation,** tighten adjusting nut to 23-25 ft. lbs. Back off nut ½ turn and retighten to 15-17 ft. lbs., then back off nut 1/6 to 1/4 turn so cotter pin hole and slot in nut line up, and install cotter pin.

OLDSMOBILE F-85

While rotating wheel, tighten adjusting nut to 10-15 ft. lbs., then back off nut 1/6 to 1/4 turn and install cotter pin.

PONTIAC & TEMPEST

NOTE - Following procedure supersedes previous information. Rotate wheel and tighten nut to 10-12 ft. lbs., then back off nut 1 flat (1/6 turn) and install cotter pin. If holes do not line up, back off adjusting nut to nearest hole. Final adjustment should be 1-1½ flats backed off. Nut should be finger loose, with .001-.010" bearing endplay.

RAMBLER

Rotate wheel and tighten adjusting nut until it is firmly seated and causes a drag on wheel. Back off adjusting nut to first castellation or until cotter pin hole is aligned, then install cotter pin. *NOTE - Wheel must be free to rotate without play in hub and bearings.*

STUDEBAKER

Rotate wheel to make sure all bearing surfaces are in contact, and at same time tighten wheel bearing nut until wheel binds on bearings. Back off nut to next castellation or as necessary for wheel to turn freely, and install cotter pin.

WILLYS 2-WHEEL DRIVE

Rotate wheel and tighten adjusting nut until wheel binds, then back off adjusting nut 1/6 turn. If necessary, back nut off further for installation of cotter pin.

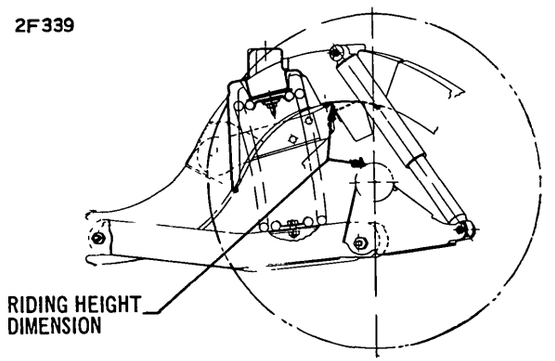
BUICK (EXCEPT BUICK SPECIAL) REAR SUSPENSION

Buick L Sabr , Invicta, El ctra (1962)

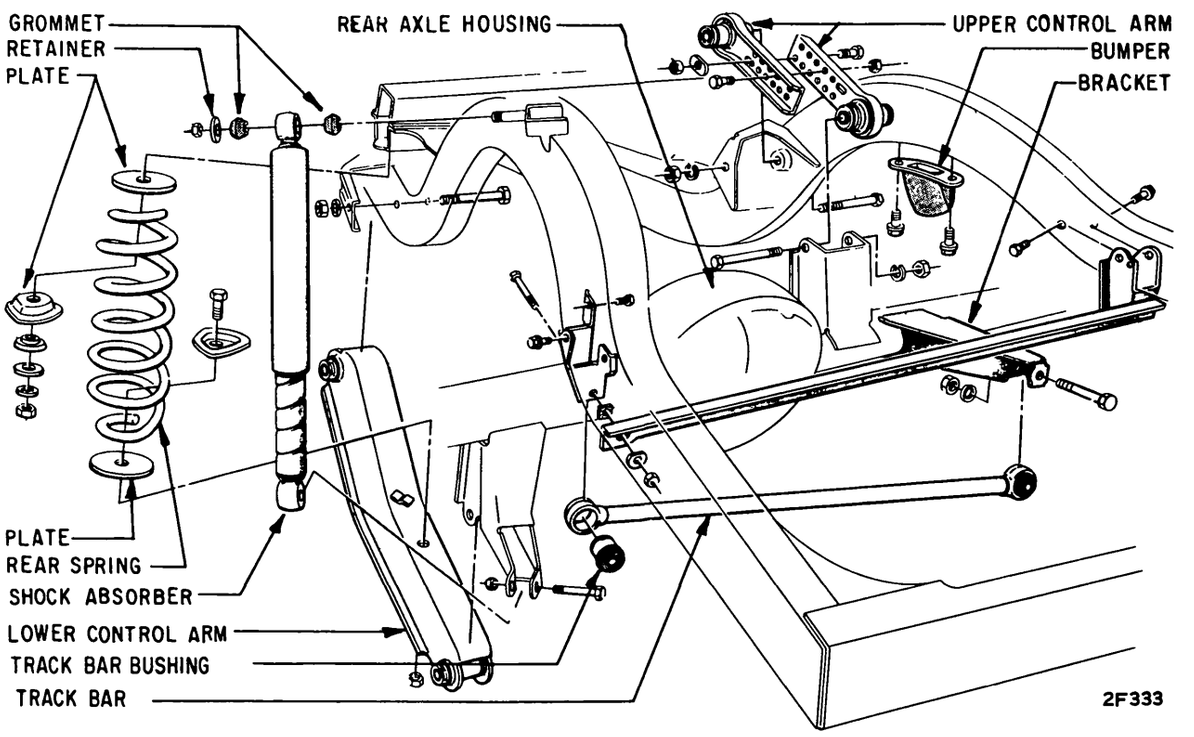
DESCRIPTION: Coil spring, three link type rear suspension having two lower control arms connected between rear axle housing outer ends and frame side rails. These two control arms take all driving and braking forces. A single upper control arm connected to right side of rear axle housing and to right frame side rail prevents axle housing from rotating during braking and acceleration. This upper control arm is a two piece design having vernier-spaced holes and two slotted holes for adjustment of rear universal joint angle (differential housing "nose" angle).

R ar Riding H ight: 7.75" (Except Station Wagon), 7.00" (Station Wagon) measured from axle housing to axle rebound bumper at front mounting bolt location. To adjust, install additional spring insulators divided between upper and lower ends of spring. If more than three insulators required, replace the spring.

REMOVAL & INSTALLATION: *See 1961 Final Data, Pag 349.*



BUICK REAR RIDING HEIGHT



BUICK (EXCEPT SPECIAL) REAR SUSPENSION ASSEMBLY

BUICK (EXCEPT BUICK SPECIAL) FRONT SUSPENSION

Buick LeSabre, Invicta, Electral (1962)

►CHANGES, CAUTIONS, CORRECTIONS

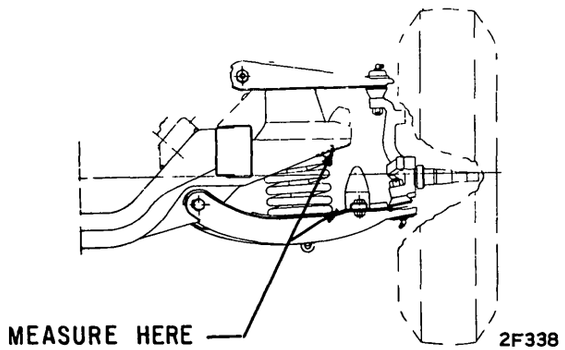
►*1962 FRONT SPRING SHIM USAGE CAUTION:* Some cars may have shims on top of front springs. These shims must be reinstalled if removed during overhaul procedures.

►*1962 SHOCK ABSORBER NOISE CORRECTION:* If noise occurs on cold mornings or after car has been standing for a long time, and disappears after a few minutes of car movement, correct by lubricating shock absorber piston rod with Silicone Rubber Lubricant when shock absorber is fully extended.

DESCRIPTION: Ball joint type front suspension assembly with lower control arms pivoted to frame members by rubber bushings. Lower control arms are maintained in position by brake reaction rods mounted between lower control arms and frame members. Upper control arms are pivoted on a shaft attached to a bracket on frame member.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Front Riding Height: 5.40" (All Models), measured between upper surface of lower crossmember and spring housing on crossmember. *See illustration.* To correct, add 1/8" shim between top of spring and housing. If more than three shims are required, replace the spring.



BUICK RIDING HEIGHT MEASUREMENT

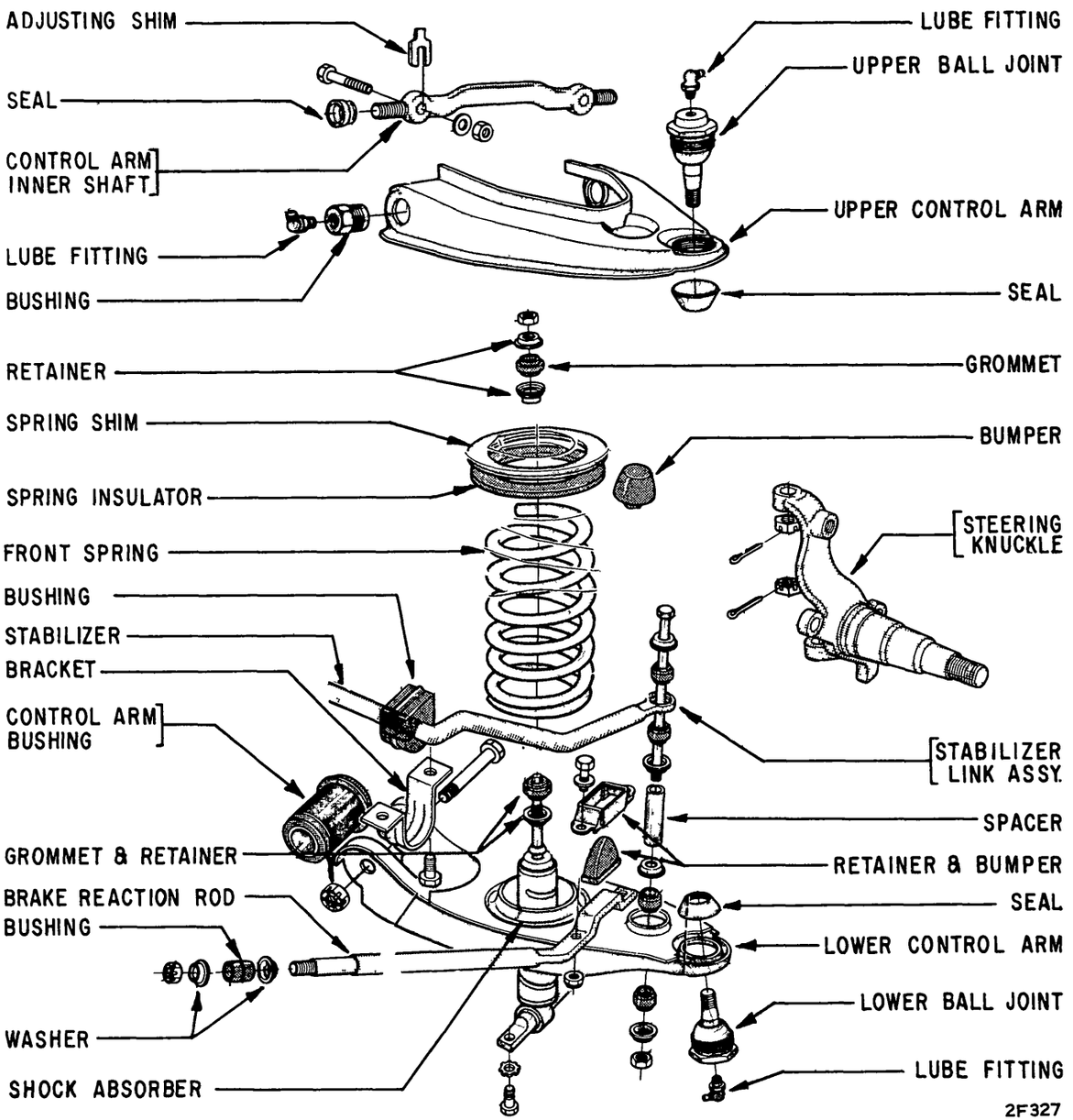
REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove upper mounting stem nut, grommet retainer, and grommet, then remove two lower mounting bracket-to-lower control arm bolts and lower shock through lower control arm.

Installation: Install lower grommet retainer and grommet (small end up) on shock stem and install shock through lower control arm. Install shock bracket to lower control arm bolts and tighten to 15-25 ft. lbs. Assemble top grommet (small end down), grommet retainer, and nut on stem and tighten to 5-10 ft. lbs.

UPPER BALL JOINT: Removal - Raise and support car under frame, then remove wheel and tire. Loosen but do not remove nut on ball joint tapered stud, then rap steering knuckle sharply in area of stud to disengage stud. With another jack, support car weight under lower control arm and remove nut from ball joint stud. Lower jack under lower control arm slightly, being careful not to damage brake hose. Raise upper control arm and remove rubber bumper under upper control arm. Use a 1 7/8" socket and unscrew ball joint from control arm.

Installation: Install replacement ball joint and carefully pick up original threads on upper control arm and seat ball joint securely against control arm. Turn grease fitting toward rear of car. Turn ball joint stud so cotter pin hole is fore and aft and assemble dust shield over stud. Move knuckle up by jacking under outer edge of lower control arm. Clean stud and tapered hole in knuckle, then install stud in knuckle and tighten nut to 30-40 ft. lbs. and install cotter pin. Reinstall rubber bumper, wheel and tire assembly.



BUICK (EXCEPT SPECIAL) FRONT SUSPENSION ASSEMBLY

CONTINUED ON NEXT PAGE

BUICK (EXCEPT BUICK SPECIAL) FRONT SUSPENSION (C nt.)

LOWER BALL JOINT: R moval - Raise car and support under frame side rails, then remove wheel and tire. Remove wheel hub, then remove brake backing plate and place above upper control arm on frame spring seat. *NOTE - It is not necessary to remove brake hose from wheel cylinder.* Place a floor jack under lower control arm as far outboard on arm as possible, leaving approximately ½" clearance between jack and control arm. Loosen but do not remove nut on ball joint stud. *CAUTION - Do not loosen nut more than 1/8".* Rap knuckle in area of stud to disengage stud from knuckle, then raise jack against lower control arm. Remove nut and raise knuckle off ball joint stud. Use a 2 1/8" socket and unscrew ball joint from lower control arm.

Installati n: Install a new ball joint into threads of lower control arm and seat ball joint firmly against control arm. Point grease fitting toward centerline of car, then install grease shield. Install knuckle over ball joint stud and rap with a hammer to seat stud in knuckle. Install nut and tighten to 60-70 ft. lbs. and install cotter pin. Install a new "O" ring seal over spindle and install backing plate and hub assembly. Tighten the ¾" bolt and nut to 60-75 ft. lbs.; 11/16" bolt and nut to 40-60 ft. lbs.; and the brake anchor bolt to 130-150 ft. lbs. Install wheel and tire, then adjust wheel bearings.

STEERING KNUCKLE: Removal - Remove upper and lower ball joint studs from steering knuckle (see above) and remove knuckle.

Installati n: Reverse removal procedure.

UPPER CONTROL ARM: Removal - Remove upper control arm ball joint from steering knuckle (see "Upper Ball Joint" above), then remove control arm shaft-to-frame bracket nuts, carefully noting location and thickness of adjusting shims between shaft and frame bracket. Remove control arm assembly. *NOTE - If right hand upper control arm is being removed, it will be necessary to remove generator.*

Disassembly: Clamp arm assembly in a vise and remove bushings and shaft. If necessary, remove ball joint assembly (see "Upper Ball Joint" above).

R assembly: Assemble new grease seals on shaft and position shaft in arm. Start new bushing in original threads of arm and thread shaft into bushing to aid in alignment. Tighten bushing to 70 ft. lbs. Start second bushing into original threads of arm with shaft threaded into opposite bushing. After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing. Tighten bushing to 70 ft. lbs. *NOTE - Shaft should be free to turn by hand.* Install grease fittings and lubricate bushings. Rotate shaft to center shaft in arm so there is an equal distance between bolt holes in shaft and arm at both sides.

Installation: Reverse removal procedure, being careful to locate the steel washers under heads of shaft-to-frame bracket bolts. Install original shim packs in their proper locations between shaft and frame bracket. Tighten shaft-to-frame bracket bolts to 80-120 ft. lbs. Install upper ball joint (see "Upper Ball Joint" above), then check and adjust front end alignment.

COIL SPRING: Removal - Raise car and support under frame side rails. *NOTE - Raise car sufficiently high to allow lower control arm to be positioned nearly straight down with a jack placed beneath ball stud end of control arm.* Remove wheel, brake drum, and bearings, then remove steering arm-to-knuckle bolts and nuts. Remove brake anchor pin-to-knuckle bolt and slide backing plate assembly off spindle and place out of way. Remove brake reaction rod-to-lower control arm bolts, nuts and special flat washers, then remove control arm-to-frame compression bumper. Remove stabilizer link, spacer, grommet and retainers. Remove stabilizer bar bracket and shock absorber. Place a floor jack under lower control arm as far outboard as possible without damage to ball joint grease fitting or remove grease fitting and place jack under ball joint. *NOTE - Floor jack must be placed parallel with lower control arm with handle of jack toward opposite side of car to allow lower control arm to travel through its normal arc without bending arm or deforming inner bushing. Control arm must be lowered nearly straight down to remove spring.* Disconnect lower ball joint from knuckle (see "Lower Ball Joint" above), then lower jack to allow control arm to swing completely down and relax spring. Use a long pry bar to release spring from spring seat. *CAUTION - Spring, insulator, and shim (if used) will pop out on floor. Stand clear of spring to avoid injury.*

Installation: Place spring in upper spring seat and align lower end of coil with small hole in lower control arm. *NOTE - When spring assembled, lower coil must be within ¼" of this hole.* Place Plate J-7592-7 (parts of Spring Installing Tool J-9552) between 4th and 5th coil from bottom of spring (step in plate will fit contour of coil). Install Bolt J-9552-1 through plate so threaded end of bolt goes through shock absorber hole in frame spring seat. Install Nut J-9552-2 on upper end of bolt so shoulder of nut protrudes through hole in upper spring seat to protect bolt threads. With a box wrench on Nut J-9552-2, tighten Bolt J-9552-1 with a 7/8" socket and extension to compress spring until at least 1¾-2" of bolt extends through upper nut of tool. Force spring onto seat in lower control arm, then remove tool. Raise lower control arm with jack and attach lower ball joint tapered stud to knuckle. With rubber dust cover in place on ball joint, tighten nut to 70 ft. lbs. and install cotter pin. Install shock absorber (torque upper nut to 10 ft. lbs., and lower bolts to 20 ft. lbs.). Attach brake reaction rod and compression bumper to control arm, and torque nuts to 90 ft. lbs. *CAUTION - If there is any question of serviceability of brake reaction rod-to-lower control arm bolts, nuts and washers, see "Brake Reaction Rod" below for special parts required. DO NOT use standard bolts, nuts, or washers at this location.* Install stabilizer bar and grommets. Install backing plate, wheel, hub, and brake drum assembly, and adjust front wheel bearings.

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove bolt and nut at inner end of lower control arm and remove arm. Remove bushing by pushing or driving from frame using a suitable tool.

Installation: Drive a new lower control arm bushing into frame until it bottoms. Slip lower control arm over bushing and install bolt and nut. Tighten nut to 80-120 ft. lbs. and install a cotter pin. DO NOT back off nut to align hole in bolt for cotter pin installation. Bend tabs of cotter pin. Reinstall coil spring (see above).

BRAKE REACTION ROD: *CAUTION - Whenever it is necessary to replace brake reaction rod-to-lower control arm attaching bolts, nuts, and washers, use th special parts furnished in Service Package, Part N . 1389760 only. DO NOT USE standard bolts, nuts, and washers.*

Removal: Raise front of car and remove nut from front end of brake reaction rod. Remove control arm-to-frame compression bumper, then remove brake reaction rod by sliding it out of its rubber bushing on frame front crossmember.

Installation: Remove and replace old rubber bushing if worn, then install larger diameter washer on brake reaction rod first, with concave side away from nut. Install rod through bushing in frame bracket and install washer with smaller diameter, and nut. Do not tighten. Install frame compression bumper over brake reaction rod, then install two bolts and washers and tighten to 90 ft. lbs. *CAUTION - This torque is important as brake reaction rod is an integral part of lower control arm assembly and looseness can cause undesirabl car handling characteristics.* Tighten nut at front end of reaction rod to 70 ft. lbs. and install cotter pin. Check and adjust caster and camber.

BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION

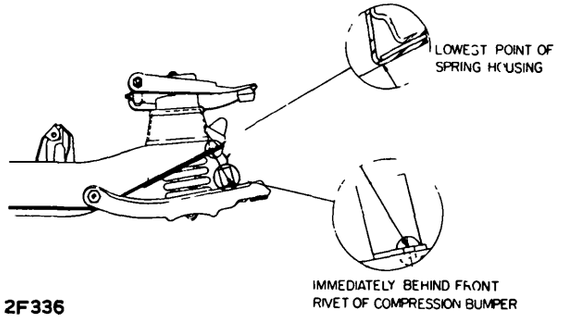
Buick Special (1962)
Oldsmobile F-85 (1962)

►*1962 BUICK SPECIAL SHOCK ABSORBER NOISE CORRECTION:* If noise occurs on cold mornings or after car has been standing a long time, and disappears after a few minutes of car movement, correct by lubricating shock absorber piston rod with Silicone Rubber Lubricant when shock absorber is fully extended.

DESCRIPTION: Independent suspension with ball joints connecting steering knuckle to upper and lower control arms. The entire front suspension system is mounted on front suspension crossmember which is attached to car underbody by three isolation mounts. The complete suspension unit can be removed from car as a single unit.

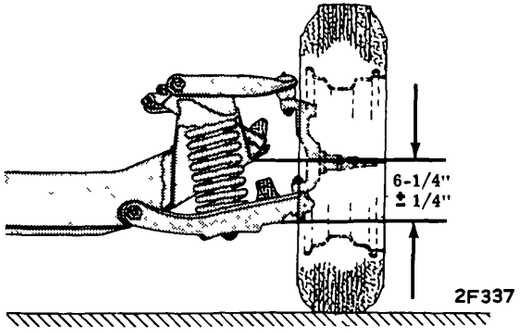
ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Front Riding Height: Buick Special - 4.40" (All models at curb weight) measured from a point immediately behind front rivet of compression bumper on lower control arm to lowest point of spring housing (see illustration). *NOTE - Spring shims are not available for adjusting riding height.*

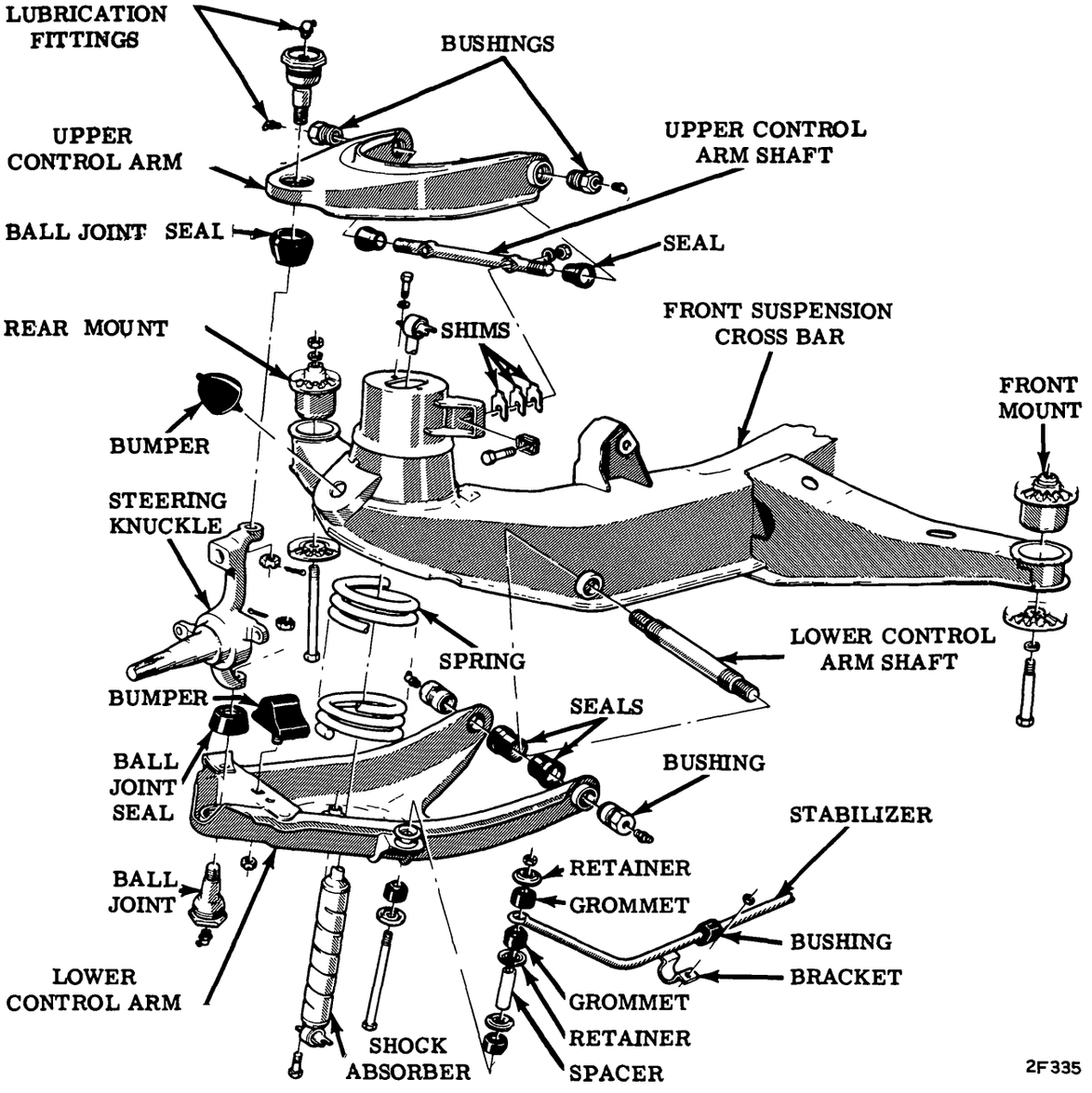


BUICK SPECIAL RIDING HEIGHT

Oldsmobile F-85 - 6¼±⅛" (All Models at curb weight) measured from lower side of gauge hole in lower control arm to metal surface of spring upper housing (see illustration).



OLDSMOBILE F-85 RIDING HEIGHT



BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION ASSEMBLY

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove two upper and two lower shock absorber attaching bolts, then raise car (support on wheels) and remove shock absorber through lower control arm.

Installation: Reverse removal procedure and tighten attaching bolts to 15-25 ft. lbs.

►*UPPER & LOWER BALL JOINT REPLACEMENT NOTE:* If ball joints are pressed into control arm (joint identified by circular head), control arm must be replaced.

LOWER BALL JOINT: Removal - Raise and support car at front crossmember, then place a jack ¼" below coil spring under lower control arm. Loosen ball joint nut (do not remove), then rap steering knuckle at ball joint stud with a brass drift or hammer to loosen stud. Remove nut and unscrew ball joint.

Installation: Lubricate with aluminum soap grease, then

CONTINUED ON NEXT PAGE

BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION (Cont.)

tighten ball joint in control arm until hex starts to shave metal from arm. Raise stud into knuckle and install nut, then tighten to 35-60 ft. lbs. and install cotter pin.

UPPER BALL JOINT: Removal - Raise and support car at front crossmember, then remove wheel and tire. Loosen ball joint nut (do not remove), then rap steering knuckle at ball joint stud with a brass drift or hammer to loosen stud. Support brake assembly, raise arm and unscrew ball joint from upper control arm.

Installation: Lubricate with aluminum soap grease, then tighten ball joint in control arm until hex starts to shave metal from arm. Insert stud in knuckle and install nut, then tighten to 35-60 ft. lbs. and install cotter pin. Install wheel and tire.

STEERING KNUCKLE: Removal - Raise and support car at front crossmember, then remove wheel, hub and drum assembly. Remove backing plate without disconnecting brakehose (leave steering arm connected to tie rod end). *NOTE - Support backing plate out of the way.* Disconnect ball joints from steering knuckle (see above), then remove steering knuckle.

Installation: Reverse removal procedure and tighten ball joint stud nuts to 35-60 ft. lbs. and backing plate to steering knuckle bolts to 55-80 ft. lbs.

COIL SPRING: Removal - Raise front of car and support at underbody with floor stands. Remove wheel assembly and disconnect stabilizer link from lower control arm, then remove shock absorber. Position a floor jack to support lower control arm ball, between spring seat and ball joint. Disconnect lower control arm ball joint from steering knuckle (see "Lower Ball Joint" above). Slowly lower floor jack until spring is fully extended and remove spring.

Installation: *NOTE - Top of spring is identified by a flat coil.* While holding spring against pilot in front crossmember, tilt spring so it will pilot in lower control arm, then rotate spring so end of bottom coil will index with edge of hole in control arm spring seat. *NOTE - Coil should not cover any portion of hole.* Position floor jack between spring seat and ball joint, then raise control arm until ball joint is tight in steering knuckle. Tighten ball joint nut to 35-60 ft. lbs. Install shock absorber and connect stabilizer to lower control arm and tighten nut to 13-17 ft. lbs.

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove pivot shaft bushings from control arm assembly and remove control arm.

Installation: Lightly coat threads of shaft with chassis lubricant and start bushing onto threads of shaft. Place Spacer Tool J-8808 on shaft between control arm and crossmember, then with spacer against front crossmember and control arm against spacer, tighten bushing until hex of bushing seats firmly into arm. Remove spacer and install bushing at opposite end of shaft.

LOWER CONTROL ARM SHAFT: Removal - Remove lower control arm, then thread Installer & Remover J-8907 or J-8907-1 on rear of lower control arm shaft approximately 7/8" and tighten lock bolt of tool to hold tool to shaft. *NOTE - Do not thread tool tightly on shaft.* Turn Tool J-8907 clockwise to remove shaft through front of crossmember. Remove tool, then remove shaft. *NOTE - Threads on rear of shaft are smaller than threads at front of shaft.*

Installation: Position shaft through front of crossmember with "F" on shaft toward front. Install same tool used for removal, then coat threads of shaft with Lubriplate and thread shaft into crossmember until shaft extends an equal distance from front and rear of crossmember (approximately 1 11/16"). *CAUTION - Measure and make sure shaft extends an equal distance from front and rear of crossmember.* Install lower control arm

UPPER CONTROL ARM: Removal - Raise car and support under lower control arm, then remove wheel. Disconnect upper ball joint from knuckle (see "Upper Ball Joint" above). Support hub assembly, then remove inner control arm shaft bolts and remove arm. Note location of shims between shaft and crossmember bracket,

Disassembly: Clamp arm assembly in a vise and remove old bushings and shaft.

Reassembly: Assemble new grease seals on shaft, then apply a light coating of Lubriplate to shaft threads and position shaft in arm. Start new bushing in original threads of arm and thread shaft into bushing to aid in alignment. Tighten bushing until hex section of bushing seats firmly into arm. Start second bushing into original threads of arm with shaft threaded into opposite bushing. After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing. Tighten bushing until hex section seats firmly into arm. *NOTE - Shaft should be free to turn by hand.* Install grease fittings and lubricate bushing. Rotate shaft so distance between shaft bolt holes and arm are equal at both sides.

Installation: Assemble upper control arm and shaft assembly to bracket and install original shim packs in their proper location. Tighten shaft-to-bracket bolts to 60-85 ft. lbs. Reinstall upper ball joint on knuckle, then install wheel and adjust front end alignment.

ISOLATION MOUNTS (FRONT CROSSMEMBER): Removal - Raise front of car and support at car underbody and front crossmember. Support engine with a chain fall or other suitable means, then disconnect engine mounts at front crossmember brackets. Disconnect exhaust pipe at crossover and remove front wheels. Disconnect brake lines at hoses on both sides. Disconnect stabilizer links, then disconnect steering shaft at flexible coupling. If equipped with Power Steering, disconnect hoses at power steering pump. Remove isolation mount-to-body member bolts and disconnect ground strap at front mount (if so equipped). Lower front crossmember assembly and drive isolation mount up out of crossmember.

Installation: Press a new isolation mount into position and install mount attaching bolts and washer assemblies and tighten to 65-90 ft. lbs. Complete installation by reversing removal procedure.

BUICK SPECIAL & OLDSMOBILE F-85 REAR SUSPENSION

Buick Special (1962)
Oldsmobile F-85 (1962)

DESCRIPTION: Coil spring, four link type suspension having two lower control arms mounted between outer ends of rear axle housing and car underbody. Two upper control arms are mounted angularly between rear axle differential housing and car underbody.

ADJUSTMENT: *NOTE - Rear universal joint angle must be checked and adjusted whenever rear lower control arms are replaced. See "Propeller Shafts" in Rear Axle Section.*

REAR RIDING HEIGHT: Buick Special - 6.65"±3/8" (Exc. Station Wagon); 5.94"±3/8" (Station Wagon) measured from top of rear axle tube of axle housing to base of rebound bumper on car underbody.

Oldsmobile F-85: 6¼-6¾" (Exc. Station Wagons); 5 7/8-6 3/8" (Station wagons) measured from top of rear axle tube of axle housing to base of rebound bumper on car underbody.

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 352, and note the following:*

Shock Absorber: Tighten upper attaching nut to 60-80 ft. lbs.

CADILLAC FRONT SUSPENSION

Cadillac, All S ri s (1962)

DESCRIPTION: "Ball-Joint" type with upper and lower control arms connected to frame members by rubber bushings. A "tie strut" is connected between outer end of lower control arm and front crossmember to carry fore-and-aft load of front wheels. Caster adjustments are made by adjusting nuts on threaded end of struts. The upper control arm ball joints connect upper control arm to steering knuckle through a camber adjustment eccentric. Camber adjustments are made by turning this eccentric to reposition upper ball joint stud.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Trim Dimensions: Before checking trim height, make sure that trunk is empty and fuel tank is full. Normalize position of springs by working bumper up and down and release slowly, permitting car to assume normal position. At the front, measure distance from top of rear flange on lower control arm to center of forward lower rivet on frame side rail. *NOTE - The above mentioned rivet is nearly on centerline of front coil spring. When measuring, hold rule vertical, seating in on lowest part of support arm flange, directly below rivet.* Standing trim height should be equal on both sides of car within 3/8" (see table below). To adjust, add shims at top of spring seat inside frame tower. At rear of car, measure distance between top of rear axle housing to lower under side surface of frame. Rear standing trim height should be equal within ½" on both sides of car (see table below). To adjust, add shims at top of spring seat inside tower. No more than three shims should be used at each side.

1962 Cadillac Trim Heights

Car Model	Front Height	Rear Height
Series 60,62	7 3/4"±3/8"	5 15/16"±3/8"
Series 75	8 1/4"±3/8"	7"±3/8"

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Remove upper retaining nut, retainer, and grommet at upper suspension arm frame mounting bracket, then remove bolt holding lower end of shock to lower suspension arm. Remove shock.

Installation: Reverse removal procedure and tighten bolt at lower end to 90-110 ft. lbs.

FRONT STABILIZER: Removal - Disconnect stabilizer at lower control arm, then remove brackets and stabilizer from frame.

Installation: Reverse removal procedure and tighten bracket-to-frame bolts to 18-25 ft. lbs.

LOWER CONTROL ARM TIE-STRUT: Removal - Raise front of car and place jack stands under frame side rails, then remove splash shield covering inner ends of tie strut. Disconnect stabilizer link from lower arm. Remove nut and retainer from threaded end of strut at front frame crossmember, and back off rear nut. Disconnect strut from lower control arm and remove rear bushing retainer and nut from strut. Remove bushings and bushing spacer from frame.

Installation: Insert bushing in rear spacer and install assembly in frame through rear side of crossmember. Install nut on tie strut and run to bottom of thread, then install rear bushing retainer with concave side toward nut. Install tie strut through rear bushing in front crossmember and install front bushing on end of tie strut, sliding it into position in frame crossmember (front bushing should lock in rear bushing). Install bushing retainer with flat side against bushing and install nut (do not tighten). Attach end of tie strut to lower control arm and tighten nuts to 30-40 ft. lbs. Connect stabilizer link to lower control arm, then lower car to floor and tighten front nut on tie strut to 30-40 ft. lbs. Tighten rear nut, compressing bushing until retainer bottoms on metal spacer in bushing. Adjust caster (see above), then install splash shield.

UPPER CONTROL ARM BALL JOINT SEAL: Removal - Raise front of car and place jack stands under lower control arms, then remove lock nut and special flat washer from ball joint stud. Scribe a mark on camber eccentric and steering knuckle (for alignment at installation), then strike ball joint stud with a soft mallet to free it from steering knuckle. Raise up on upper control arm and remove ball joint from knuckle. Using Puller, J-8990, remove camber eccentric from ball joint stud. Wipe seal surface clean, then remove garter spring and seal. Clean joint pivot with solvent and inspect for looseness or binding. Replace joint if necessary.

►*BALL JOINT STUD REMOVAL NOTE:* If difficulty is encountered loosening stud from knuckle, see "Upper Control Arm Removal" below for method of loosening ball joint stud and eccentric.

Installation: Using a new seal, turn seal inside out, then place snap ring inside seal, just over bottom hole, pressing in on bottom of seal until snap ring seats itself in groove around hole. Apply a small amount of lubricant around hole in seal and install seal on ball joint stud. Unroll seal until lip engages in recess around joint housing. Allow air to enter seal by momentarily prying lip of seal away from joint housing with a small screwdriver. Squeeze seal, sliding snap ring end up on stud, then install new garter spring with Tool J-9148. *CAUTION - Make sure spring secures lip of seal in recess all around joint housing.* Install camber eccentric and align marks on eccentric and steering knuckle. Install a standard nut on ball joint stud and tighten until eccentric locks in knuckle, then remove standard nut, and install special flat washer and locking nut. Tighten to 50-65 ft. lbs. Pry out service plug from ball joint cover and discard plug. Use Repacking Gun, J-9280 and repack joint through plug hole with special lubricant. *CAUTION - Fill joint with lubricant, but do not allow seal to "balloon".* Install new service plug in ball joint cover. Check camber and adjust if necessary.

LOWER CONTROL ARM BALL JOINT SEAL: Removal - Remove lower control arm and coil spring (see below), then secure control arm in a vise and remove ball joint seal in same manner as for upper control arm ball joint seal. *NOTE - Seal can be replaced on lower control arm ball joint without removing control arm from car as follows:* Break ball joint loose from steering knuckle, then loosen anchor bolt and brake backing plate-to-steering knuckle bolts for clearance and disengage ball joint stud from knuckle. Move knuckle out of way and remove ball joint seal in same manner as for upper control arm ball joint.

Installation: Reverse removal procedure.

►*UPPER CONTROL ARM BALL JOINT REPLACEMENT NOTE: Do not attempt to remove ball joint assembly from upper control arm. Upper control arm and ball joint are serviced as a complete assembly.*

LOWER CONTROL ARM BALL JOINT: R moval - Remove lower control arm and coil spring (see below), then remove garter spring and seal from joint. Position Tool J-8999-7 on arbor press anvil and place lower control arm on tool with ball joint cover resting on tool. Position Ball Joint Remover, Tool J-8999-9 over joint stud until it seats on joint housing, and press ball joint out of arm.

Installation: Position support, Tool J-8999-7 on arbor press anvil and place lower control arm on support, so that ball joint mounting hole is encompassed by support. Insert new ball joint in arm, stud end first, then position Ball Joint Installer, J-8999-5 on flanged portion of joint housing and press joint into arm until joint flange bottoms on mounting hole flange. Install lower control arm and coil spring.

UPPER CONTROL ARM: Rem val - Raise and support front of car with jack stands under lower control arms. Remove wheel, then remove locking nut and special flat washer from ball joint stud. *NOTE - If difficulty is encountered in freeing stud from knuckle, see not below.* Strike bottom of stud with a soft hammer to free it from knuckle support. Remove shaft mounting bolts at frame tower and remove control arm and shaft assembly. If necessary, remove camber eccentric with Puller J-8990. *CAUTION - Ball joint and upp r control arm are serviced as a complete assembly. Do not attempt to remove joint from arm.*

►*BALL JOINT STUD REMOVAL NOTE:* If difficulty is encountered loosening stud from knuckle, cut a piece of 7/16" diameter steel rod and cut to a length of 20", then proceed as follows: Remove stud nut and special flat washer, then install a standard nut about halfway up stud. Insert round end of steel rod inside nut and against bottom of stud, then pound on end of tool with a heavy hammer to break it free.

Installation: Position upper arm assembly on frame tower and install mounting bolts and locknuts. Tighten nuts to 60 ft. lbs. Install camber eccentric on ball joint stud if previously removed, then install ball joint stud and camber eccentric into knuckle and install a standard nut on end of ball joint stud. Tighten nut until camber eccentric locks in knuckle support, then remove standard nut and install special flat washer and locking nut and tighten to 60 ft. lbs. Install wheel and check front end alignment. *CAUTION - If n cessary to replace bolt, nut, or wash r attaching control arm inner shaft to frame, use only Bolt, Part No. 427569; Washer, Part No. 1477585; Nut, Part No. 9411971.*

UPPER CONTROL ARM SHAFT & BUSHINGS: R m val - *NOTE - Following procedure supers des previous procedures for both 1961 and 1962 models.* Use Tool Set J-8999 and make two spacer plates from cold rolled steel or similar material according to dimensions shown in illustration. Obtain two ½" x 2" bolts and nuts to tighten spacers around shaft. Proceed as follows: Remove screw, lockwasher, and flat washer from each end of shaft, then remove ground strap. Install the fabricated plate spacers around shaft between arm ends, insert bolts and nuts and tighten securely. Insert Driver J-8999-6 through bushing and into shaft. Place Support J-8999-2 on press bed and place opposite end of control arm on support. Drive shaft downward, using arbor press on driver until

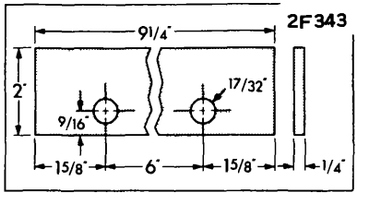
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CADILLAC FRONT SUSPENSION (Continu d)

spacer plates touch extruded flanges of control arm. Repeat procedure for other end of shaft. One bushing should be stripped from one end of shaft. Tap bushing with hammer to complete removal and tap opposite end of bushing to complete shaft removal from control arm. Remove shaft sleeves and other bushing in a vise or arbor press.

Installation: Position Bushing Installer, Tool J-8999-16 on arbor press anvil, then insert bushing in one end of arm and place arm and bushing on installer, with outer end of bushing seated in installer tool. Place shaft between arm ends, aligning end of shaft with bushing inner sleeve. Position bushing on opposite end of shaft and place second Bushing Installer J-8999-16 on top of bushing. Hold assembly in place by exerting a light pressure on arbor press. Check alignment of bushing, arm ends, and shaft, then install Spacer J-8999-1 around shaft between arm ends to prevent arms from collapsing when bushings are installed. Press bushing onto shaft until both bushing flanges bottom on arms. *NOTE - If bushings do not butt flush against shoulder of shaft, attaching bolts, when installed, will seat them in position.* Remove tools from arm assembly, then install ground strap at one end, and flat washer, lockwasher, and screw on each end of shaft. *CAUTION - Do not tighten screws until control arm is installed on car and car weight is on wheels, then tighten screws to 60 ft. lbs.*

LOWER CONTROL ARM & COIL SPRING: Removal - Disconnect shock absorber at its upper mount, then raise front of car support with jack stands under frame side rails. Disconnect stabilizer link and tie strut at lower control arm, then remove shock absorber. Remove wheel assembly and brake drum and loosen the two bolts securing brake backing plate to steering knuckle. Remove nut from pivot bolt in lower control arm at frame mount. Position jack under outer end of lower control arm so jack is not supporting control arm, then remove locking nut from lower ball joint stud and install a standard nut on stud, running it to within two threads of knuckle support (this will prevent control arm from dropping when ball joint is broken free of knuckle support). Strike knuckle support with a hammer in area of ball joint stud to break it loose. *NOTE - Raise opposite rear corner of car to increase spring load on lower control arm and aid in breaking joint loose.* Raise jack under lower control arm sufficiently to remove spring load, then remove nut from ball joint stud. Tilt brake backing plate outward from bottom and slowly lower jack, then remove spring and insulator. Remove pivot bolt from lower control arm at frame mount and remove control arm.



UPPER CONTROL ARM SHAFT & BUSHING REMOVER SPACER TOOL

Installation: *NOTE - Air conditioned cars (except Series 75) use a shim on top of right (1961), left (1962) coil spring in addition to insulator.* Place end of lower control arm in frame mount and install pivot bolt (do not install nut), then tape rubber insulator (and shim if used) to top of spring. *NOTE - Either end of spring may be used at top. Both ends are the same.* Install top of spring in upper seat of spring tower and rotate spring so that bottom tang end fits between raised edge on top of lower control arm and centerline of shock absorber. *NOTE - Raised edge of lower control arm faces front of car on right side and rear of car on left side.* With a hydraulic jack placed under outer end of lower control arm, tilt brake backing plate outward from bottom, and raise arm into position. Guide spring into position with tang end between raised edge on top of lower control arm and centerline of shock absorber. *NOTE - When control arm is raised, shock may have a tendency to rotate, mispositioning tang end. End of tang must be between raised edge of arm and centerline of shock after spring is installed.* Guide ball joint stud into knuckle support, then install a standard nut on joint stud and tighten nut until stud seats in knuckle support. Remove standard nut and install special locking nut on stud, tightening it to 60-75 ft. lbs. Install nut on lower control arm pivot bolt but do not tighten until car is resting on all four wheels. Tighten anchor bolt on brake backing plate to 90-110 ft. lbs. and bend locking tang over one flat of bolt head. Install shock absorber (see above) but do not tighten lower nut until car is resting on all four wheels. Install tie strut on lower control arm and tighten nuts to 30-40 ft. lbs., then install stabilizer link. Install brake drum and wheel assembly and lower front end of car. Connect shock absorber at upper end and tighten nut on lower end to 90-110 ft. lbs. Tighten nut on lower control arm pivot bolt to 60 ft. lbs. Check wheel alignment and adjust if necessary.

LOWER CONTROL ARM BUSHING: Removal - With lower control arm removed, position Support, Tool J-8999-2 on arbor press anvil and insert larger diameter end of bushing in support. Place Spacer, Tool J-8999-8 around bushing sleeve between flanged sides of arm, then position Bushing Remover, Tool J-8999-10 on bushing sleeve and press bushing out of arm.

Installation: Position Support, Tool J-8999-2 on arbor press anvil and insert smaller diameter flanged end of bushing mount in support. Install new bushing in arm, smaller diameter end of bushing first, until bushing pilots itself in opposite flanged end. Place Spacer, Tool J-8999-8 around sleeve of bushing between flanged sides of arm, then position bushing Installer, Tool J-8999-9 over end of bushing and press bushing into arm until installer tool bottoms on flanged bushing mount. Install lower control arm and coil spring.

STEERING KNUCKLE: Removal - Raise front of car and place jack stands under frame side rails, then remove wheel assemblies and brake drum. Straighten locking plate on anchor bolt and remove anchor bolt, locking plate, and two bolts securing brake backing plate to steering knuckle. Position steering arm out of way and remove support plate, grease guard, and brake backing plate from knuckle. Wire backing plate to a convenient location to prevent damage to brake hose. Place a jack under lower control arm, then remove stud nut and break ball joint loose from control arm. Break joint loose from upper control arm and remove stud from upper knuckle support. Remove steering knuckle from lower ball joint stud.

Installation: Reverse removal procedure, tightening brake backing plate attaching bolts to 60 ft. lbs. and anchor bolt to 90-110 ft. lbs.

CADILLAC REAR SUSPENSION

Cadillac, Except Commercial Chassis (1962)

DESCRIPTION: Four link, coil spring type similar to design used on previous models.

REAR TRIM HEIGHT: With car trunk empty (except spare tire), and with a full tank of gas, normalize position of springs by working bumper up and down, then release bumper and allow car to assume its normal position. Measure distance from top of rear axle housing straight up to lower underside surface of frame. This distance should be as indicated in table below. *NOTE - Rear standing height should be equal within ½" on both sides of car.*

1962 Rear Trim Dimensions

Series	Rear Height
60, 62	5 15/16"±3/8"
75	7"±3/8"

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 356, and note the following:*

Control Arm Attaching Bolts: Tighten front and rear control arm bolts to 80 ft. lbs.

CHEVROLET PASS. CAR FRONT SUSPENSION

Chevrolet Pass. Cars (1962)

►*UPPER BALL JOINT STUD REPLACEMENT NOTE:* If upper control arm ball stud replacement unit, Part No. 3813205, has ¼" attaching holes in flange, drill holes to 5/16" diameter. Special 5/16" diameter bolts furnished in unit must be used to attach ball stud.

DESCRIPTION: Ball joint type with coil springs and direct acting shock absorbers similar in design to previous models.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Riding Height: With car on a level floor, bounce car, then allow to settle to normal height. At front, measure distance from floor to center of front inner pivot of lower control arm, then record this measurement. Measure distance from floor to lower face of lower steering knuckle ball joint boss (on the same side of car) and record this measurement. The difference between the above two measurements should be as indicated in table below. If not within limits, replace spring. At rear, measure distance from top of rear axle housing to the frame kick-up which should be as indicated in table below. If not within limits, replace spring. *NOTE - Spring ends on both front and rear springs are not flat and shims should not be used.*

1962 Front Riding Height

Model	Front Height
All 6 Cyl.	4 1/4"±1/2"
All V8	4 7/16"±5/16"

1962 Rear Riding Height ℄

Model	6 Cyl.	8 Cyl.
2 & 4-Dr.Sed. (Exc.Spt.Sed)	5 43/64"	5 59/64"
2 & 4-Door Sport Sedan	5 43/64"	5 43/64"
Convertible	5 9/16"	5 9/16"
Station Wagon	6 11/64"	6 11/64"

℄ - Measurements are plus or minus ¼".

REMOVAL & INSTALLATION

SHOCK ABSORBER: Removal - Hold upper stem of shock absorber from turning (¼" wrench), then remove retaining nut and lockwasher. Remove bolts retaining lower shock absorber pivot to lower control arm and pull shock absorber assembly and mounting out at bottom of spring housing.

Installation: Reverse removal procedure and tighten upper retaining nut to 15-25 ft. lbs.

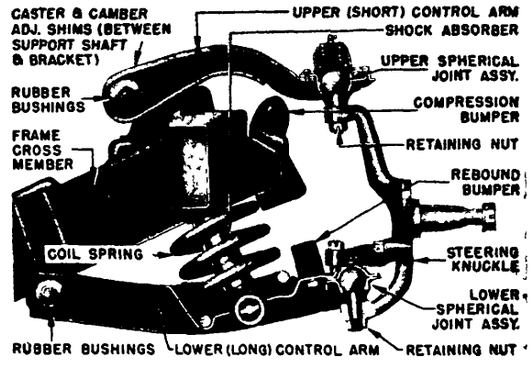
COIL SPRING: Removal - Raise and support car at frame side rails so control arms swing free, then remove wheel, stabilizer bar (if so equipped), and shock absorber. Loosen lower ball joint-to-steering knuckle nut and the two lower control arm cross shaft bushing bolts. Place Tool J-6874-1 across top of sixth coil, then loosely secure Tool J-6874-2 to upper shoe of tool, using attaching capscrews and washers. *NOTE - "V" notch in upper shoe of tool and raised notch in lower shoe should contact spring.* Insert Tool J-6874 up through center of spring and attach to upper and lower shoe assembly with bolt and nut. Position spacer under shock absorber mounting hole and against bottom of lower control arm. Install special bearing washer and Tool J-6874-5. Locate bearing against spacer and large washer against bearing, then insert screw, Tool J-6874-5 up through large washer bearing and spacer and thread into Tool J-6874 and tighten snugly. Center shoe assembly on spring and tighten screw until a very slight amount of compression is placed on spring, then firmly tighten down the two capscrews securing upper and lower shoes to lock these shoes to spring. Turn head of screw until spring is compressed just enough to clear spring tower, then remove lower ball joint-to-steering knuckle nut. *NOTE - If may be necessary to assist spring out of tower with a pry bar.* Disconnect lower ball joint from steering knuckle and lower control arm and spring. Immediately release compression on spring. *CAUTION - Be very careful when lowering control arm to prevent injury or damage.*

Installation: *NOTE - If a new spring is being installed, remove spring compressing tool assembly from old spring and install on new spring in same manner. Place spring in its seat on lower control arm and install remaining parts of tool and compress spring.* With spring compressed sufficiently to clear spring tower, immediately install lower ball joint into steering knuckle and secure in place with nut. Release compression on spring and at the same time use a drift to guide spring into its proper seat. Tighten lower ball joint-to-steering knuckle nut to 60-94 ft. lbs., and install cotter pin. Install shock absorber, stabilizer bar, and wheel and drum assembly, then remove car from support. Tighten two lower control arm cross shaft bushing bolts to 45-55 ft. lbs.

LOWER CONTROL ARM: Removal - Remove coil spring (see above), then remove control arm cross shaft-to-frame attaching bolts and remove control arm.

Disassembly: If necessary to remove ball joint (see "Ball Joint" below). Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" - 20 capscrew (furnished with Tool J-5888) to bottom of threads in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, making sure that bushing flange does not contact support, then press on capscrew until bushing is free of control arm. Remove bushing from other end of cross shaft in same manner.

Reassembly: With cross shaft in position in control arm and control arm supported on Tool J-7052-1 & J-5888-3, start bushing into control arm and over end of cross shaft. *NOTE - End of cross shaft with two bolt holes must be toward front of control arm.* Install Tool J-7052-5 over bushing, being sure that three piece spacer is not overlapping bushing holes in control arm. Press bushing into control arm until flange contacts control arm. Install bushing in opposite arm in same manner. After complete installation, cross shaft should be free enough to be rotated by hand. Install collar, lockwasher, and capscrew in each end of cross shaft but DO NOT TIGHTEN.



CHEVROLET FRONT SUSPENSION 2F348

Installation: With control arm in position, attach with three lockwashers and special washers under rear bolt; front bolts and anchor nuts. After coil spring is installed, and car is on floor with weight on wheels, tighten cross shaft bushing bolts to 45-55 ft. lbs.

UPPER CONTROL ARM: Removal - Raise and support car at outer end of lower control arm, then remove wheel. Remove ball joint stud from steering knuckle with Tool J-6627 (Pitman Arm Puller). Disconnect upper control arm inner shaft from crossmember, noting number and thickness of shims at each bolt location. *NOTE - Bolts attaching control arm to frame member must be cut off or removed to allow proper clearance for control removal.* Remove upper control arm from car.

Disassembly: If necessary to remove ball joint (see "Ball Joint" below). Remove capscrews, lockwashers, and collars from both ends of cross shaft, then install 3/8" - 24 capscrew (furnished with Tool J-5888) in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, making sure that bushing flange does not contact support, then press out bushing. Remove bushing from other side of arm in same manner.

Reassembly: Install arm in arbor press with Tool J-7052-2 in place and press in one bushing while supported on Tool J-5888-3. Install cross shaft in arm, then invert in press and press in second bushing, using the same tools. Cross shaft should be able to be turned by hand. Install collar, lockwasher and capscrew in ends of shaft, but DO NOT TIGHTEN.

Installation: Install upper control arm in car and make sure attaching studs are in position. Install two nuts and bolts retaining upper control arm shaft to crossmember, then install same thickness of shims as removed at each bolt location. Install new rubber seal on ball joint stud, then install ball stud through knuckle and tighten to 42-47 ft. lbs. Install wheel and lower car to floor. Bounce front end of car to centralize bushings, then tighten collar bolts to 35-40 ft. lbs.

BALL JOINT (UPPER & LOWER): Testing - *NOTE - If excessive wear is indicated in upper ball joints, both upper and lower ball joints should be replaced.* To check upper ball joint, raise and support car under outer end of lower control arm, then remove wheel assembly. Remove ball joint stud from steering knuckle with Tool J-6627 (pitman arm puller). Install a stud nut on ball stud and measure torque required to turn the ball joint assembly with a torque wrench. This torque should be 2 ft. lbs. minimum or 15 lbs. maximum.

Removal: With car supported as above and joint disconnected from steering knuckle (support knuckle assembly to avoid damage to brake hose), center punch rivets, then drill them out, being careful not to enlarge holes in control arm.

Installation: On upper control arms, ream rivet holes out to 21/64" diameter. *NOTE - Upper and lower ball joint replacement parts are in three pieces. Metal inner seal is to be carefully pressed in place in joint housing, and the rubber outer seal should then be placed over inner seal.* Install new joint against underside (lower arm), top side (upper arm) and retain in place with special bolts and nuts supplied with new joints. Tighten to 20-25 ft. lbs. *NOTE - Tighten nut on ball joint forging to 35-45 ft. lbs.*

CHEVROLET PASS. CAR REAR SUSPENSION

Ch vr let Pass. Cars (1962)

DESCRIPTION: Rear suspension is similar in design to previous models except that lower control arm bushings are a new design and the upper control arm is now connected to rear axle housing at right hand side on top of axle tubes and to bracket on frame right side rail. A tie rod is attached to frame left side rail and to right hand side of rear axle housing.

REMOVAL & INSTALLATION: *See 1958 Final Data, Pag 343, r lat r Manual editions, and note the f ll wing:*

Upp r C ntr l Arm & Bushings: Removal - Raise car on a hoist that will support rear axle housing or wheels, then remove rear pivot bushing bolt at rear axle housing. *NOTE - R ar axle must be supported in such a way as to prev nt axle housing from rotating about the low r control arm rear pivot, and to also relieve load on pivot bushings.* Remove bolts, lockwashers, and nuts securing upper control arm bracket to frame bracket or crossmember. *CAUTION - NOTE number of shims removed at these control driveline angles.* Remove arm from car. Remove bolt, nut and washer attaching upper control arm to bracket and separate control arm from bracket. With control arm bushing centered over Tool J-7574-4 and Tool J-7574-3 in place and with arm resting horizontally by supporting at opposite end, press or tap bushing from arm using Tool J-7574-1 and Tool J-7079-2 (Driver Handle). Repeat procedure for opposite end of control arm.

Installati n - Turn arm to opposite side (bushing can only be installed from one direction), center bushing hole over support Tool J-7574-4 and install Tool J-7574-3 between flanges at hole location. *NOTE - Tool J-7574-3 will prevent overcompression of arm during overtravel.* Fix Tool J-7574-2 on driver handle, then start bushing into hole and press or tap in place. Check to see that no interference or cocking takes place. Flange of bushing must be seated against arm. Repeat procedure for opposite end of arm. Tap front of upper control arm into control arm bracket, then install bolt, lockwasher and nut but do not tighten. Set control arm (with front bracket installed) on axle housing bracket and tap into place. Install bolt (head of bolt must be toward outboard side), lockwasher and locknut but do not tighten. Align forward end of upper control arm bracket with frame bracket or crossmember, then install two lower bolts through control arm bracket and frame bracket or crossmember. *CAUTION - Make sure shims removed at disassembly are reinstalled in original locations.* Install both nuts and lockwashers. Install upper bolt and flat washer from front of bracket, then install lockwasher and nut. Tighten the three bracket bolt nuts to 60-80 ft. lbs. *NOTE - If a new control arm was installed, check driveline angles (see "Propeller Shafts" in Rear Axle Section).* Lower car to floor, then bounce rear of car several times to settle bushings. Tighten upper control arm nuts to 80-90 ft. lbs.

Lower Control Arm Bushing Replacement: Removal (Front Bushing) - With control arm and bushing centered over Tool J-7574-4 and with Tool J-7574-3 in place, and with arm resting horizontally by supporting at opposite end, press or tap bushing from arm using Tool J-7574-5 and driver handle. *NOTE - Be sure to place the remover n nd f bushing with the flange.* **(R ar Bushing)** - Repeat above operations for opposite end using Tool J-7574-1 in place of Tool J-7574-5.

Installati n (Front Bushing) - Fix Tool J-7574-6 onto driver handle, then start bushing into hole and press or tap in place. Check to see that there is no interference or cocking. Flange of bushing must seat against arm. **(Rear Bushing)** - Repeat above operation for rear bushing using Tool J-7574-2 in place of Tool J-7574-6.

Rear Suspension Tie Rod: Removal - Remove nut, washer and bolt from left hand side and nut and washer from stud on right side that secures tie rod to brackets. Remove tie rod.

Bushing Replacement - With tie rod centered over Tool J-7877-2 and with tie rod supported horizontally, press or drive bushing from rod, using Tool J-7877-1 and J-7079-2. With tie rod centered over Tool J-7877-2 and rod supported horizontally, press or drive bushing into arm using Tools J-7877-3 and J-7079-2. *NOTE - Tool J-7877-2 should bottom on rod when bushing is fully seated.*

Installation - Mount tie rod to right hand stud, then install nut and special washer but do not tighten. Install bolt, lockwasher and nut to left hand bracket but do not tighten. Lower car to floor and bounce rear end several times, then tighten nuts to 55-70 ft. lbs.

Rear Standing Height Measurement ℄

Model	6 Cyl.	8 Cyl.
2 & 4 Dr. Sed. (Exc. Spt. Sed.) ..	5 43/64"	5 59/64"
2 & 4 Dr. Spt. Sed.	5 43/64"	5 43/64"
Convertible	5 9/16"	5 9/16"
Station Wagon	6 11/64"	6 11/64"

℄ - Measurements are plus or minus ¼".

Corvair, All M d ls (1962)

►*CORVAIR 95 BALL JOINT STUD REPLACEMENT*

NOTE: If upper control arm ball stud replacement unit, Part No. 3813205, has ¼" diameter attaching holes in flange, drill holes to 5/16" diameter. Special 5/16" diameter bolts furnished in unit must be used to attach ball stud assembly.

DESCRIPTION: Ball joint type suspension with ball and socket joint connecting upper and lower control arms to steering knuckles. Coil springs are mounted between lower control arm and tower in front crossmember. Shock absorbers are mounted within coil springs on lower control arm and connected at top to tower in front crossmember. On 500, 700, and 900 Series, a strut rod is connected between outer ends of lower control arms and brackets that trail back from front crossmember. On these models, caster adjustment is made with this strut rod. On 1200 Series (including Greenbriar), the lower control arm is of different design, having front and rear legs, similar to upper control arm. A strut rod is not used on these models and caster adjustment is obtained by shimming at upper control arm.

ADJUSTMENT: *S "Wh l Alignment Specifications & Adjustm nt" in this s ction.*

Riding H ight: With car at curb weight (full gas tank, and spare tire, no passengers), position car on a level floor, then bounce and rock car several times and allow to settle. *NOTE - Proc dures b low are for ch cking front riding h ight. For rear height checking, s "Corvair & Pontiac Tempest Rear Suspension" in this section.* Measure distance from center of lower control arm pivot bolt to floor. Distance should be as in table below and equal within ½" on each side of car. If not within limits, replace springs. *CAUTION - Springs do not have flat ends and shims must not be used.*

1962 Riding Height

Model	Front Height
Pass. Cars	12"±1/2"
Greenbrier & Trucks	11 7/8"±1/2"

CORVAIR FRONT SUSPENSION

REMOVAL & INSTALLATION

See 1960 Final Data, Page 376, or later Manual edition, and note the following:

1962 Ball Joint Stud Tightening Torques

Model	Upper	Lower
Pass. Cars	30-40 ft. lbs.	30-40 ft. lbs.
Greenbrier & Trucks	42-47 ft. lbs.	60-94 ft. lbs.

COIL SPRING (SERIES 1200): Removal - Pry out upper rebound bumper, then raise car and support on jack stands so front control arm hangs free. *NOTE - Position stands so control arms may be raised or lowered with a floor jack.* Remove shock absorber, then position a piece of 2" x 4" lumber, 16¼" long between top of upper control arm and behind reinforcing channel above wheel. Make sure upper corner of this wood support is placed behind reinforcing channel toward inside of car. Place a floor jack under lower control arm and raise until wood support is forced firmly against channel. Disconnect lower control arm ball joint stud from steering knuckle, then raise lower control arm and free stud from knuckle boss. Swing wheel out far enough to clear lower arm, and block or wire in this position. Carefully lower jack supporting control arm until spring is decompressed and remove spring.

Installation: Seat spring in tower with end of spring coil in contact with step in spring seat, then swing lower control arm up as far as possible and seat spring in control arm. Place floor jack under lower control arm and raise until ball joint stud may be placed into steering knuckle boss (make sure dust cap is in position on ball stud). When stud will enter hole in knuckle, lower jack and install stud nut. Tighten to 60-94 ft. lbs. and continue to tighten until cotter pin holes are lined up and install cotter pin. Raise lower control arm and install upper rebound bumper in proper hole, then to seat it in position, slowly lower the control arm until upper arm presses point of bumper through hole in spring tower.

LOWER CONTROL ARM (1200 SERIES): Removal - Remove coil spring (see above), then disconnect lower control arm inner shaft from crossmember.

Disassembly: Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" - 20 capscrew (furnished with Tool J-5888) to bottom of

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CORVAIR FRONT SUSPENSION (C ntinu d)

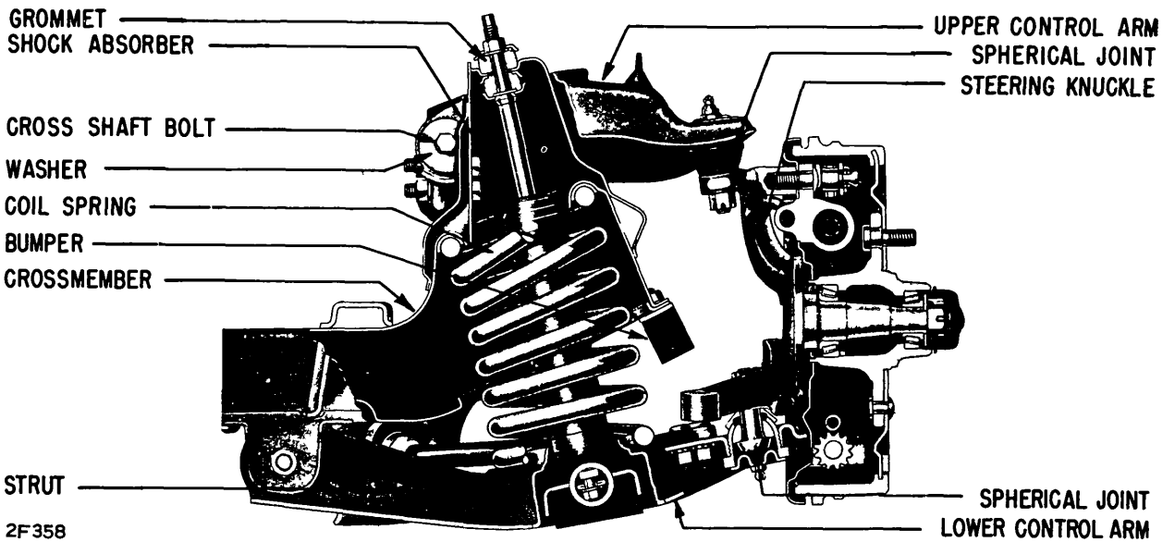
threads in one end of cross shaft Support control arm in an arbor press on Tool J-5888-3, being careful not to allow bushing flange to contact support, then press on capscrew until bushing is free of control arm Repeat this operation to remove bushing from opposite end of shaft.

Reassembly: Install cross shaft in control arm and position Tool J-7052-1, then support control arm with Tool J-5888-3 and hand start bushing into control arm and over end of cross shaft *NOTE - End of cross shaft with two bolt holes must be toward front of control arm.* Install Tool J-7052-5 so three piece spacer does not overlap bushing holes in control arm, then press bushing into control arm until flange concontacts arm Repeat procedure for bushing at opposite end of cross shaft. Install collar, lockwasher and capscrew in each end of shaft but DO NOT TIGHTEN

Installation: Install control arm on crossmember and attach with lockwashers, bolts and anchor nuts. Install coil spring, then with car weight on wheels, tighten cross shaft bushing bolts to 45-55 ft. lbs

UPPER CONTROL ARM (1200 SERIES): Removal - Raise and support car under outer end of lower control arm, then remove wheel assembly. Disconnect and remove ball joint stud from steering knuckle with Tool J-6627 (pitman arm puller), then wire hub, drum and steering knuckle in position to prevent damage to brake hose. Remove nuts retaining upper control arm to crossmember, noting number and thickness of shims found at each bolt, and remove control arm.

Disassembly: Remove capscrews, lockwashers and collars from both ends of cross shaft, then install a 3/8" - 24 capscrew (furnished with Tool J-5888) in one end of shaft. Support control arm in an arbor press on Tool J-5888-3, being sure that flange of bushing does not contact support, then press bushing out of arm, repeat this procedure for opposite bushing.



CORVAIR SERIES 500, 700, 900 FRONT SUSPENSION ASSEMBLY

Reassembly: Install control arm in press with Tool J-7052-2 in place between legs of control arm and press in bushing Install cross shaft in arms and invert assembly in press, and press in second bushing *NOTE - Cross shaft should be free enough to turn by hand* Install collar, lockwasher and capscrew in each end of cross shaft, but DO NOT TIGHTEN

Installation: Reverse removal procedure and lower car to floor Bounce front end to centralize bushings, then with weight of car of wheels, tighten bushing capscrews to 35-40 ft lbs

BALL JOINTS (UPPER & LOWER): Removal - With coil spring removed and control arms hanging free, remove lube fitting from joint, then mark center of rivet heads with a center punch and drill through head with a ¼" drill Cut off heads with a chisel and remove balance of rivets with a punch Remove ball joint

Installation: On upper control arms, ream rivet holes out to 21/64" Position new ball joint assembly on control arm and install special bolts through mounting holes and tighten nuts securely. *CAUTION - Us only th bolts (specially hardened) furnish d with ball joint assembly.* Complete installation by reversing removal procedure

FRONT SUSPENSION CROSSMEMBER: Removal - Remove steering relay rod from car, then remove bolts retaining idler arm to frame Disconnect brake main cylinder line and rear brake feed line from junction block at top center of cross member Use a suitable jack under crossmember and remove the four bolts holding crossmember to underbody, then remove crossmember

Installation: Reverse removal procedure and note the following Tighten crossmember mounting bolts to 100-110 ft lbs and idler arm-to-frame nuts to 13-22 ft lbs

CORVAIR & PONTIAC TEMPEST REAR SUSPENSION

C rvair, All Models (1962)
P ntiac Tempest (1962)

►*1962 PONTIAC TEMPEST REAR SHOCK ABSORBER NOISE CORRECTION:* Before replacing shock absorber for noise, torque shock absorber upper mounting bolt to new specification of 65-80 ft. lbs *Supersedes previous 45-60 ft lbs.*

DESCRIPTION: Independently sprung with individual single control arm on each side of car Coil type rear springs are mounted between control arm and frame crossmember. Shock absorbers are mounted within coil springs

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustm nt" in this section.*

R ar Riding H ight: With car at curb weight (full tank of gas and spare tire), position car on a smooth level floor, then bounce rear end several times and allow to settle to its normal height

Corvair Series 500, 700, 900 - Measure distance from floor to bottom of rocker panel 29" ahead of centerline of rear wheel This measurement should be 9"±½" Measure opposite side of car in same manner The difference between the two measurements must not exceed ½" To correct riding height, replace springs *CAUTION - These springs do not have flat ends and shims must not be used*

Corvair Series 1200 - Measure distance from center of rear suspension control arm pivot bolt to floor This measurement should be 14 5/16"±1/2" Measure opposite side of car in same manner The difference between the two measurements must not exceed ½" To correct riding height, replace springs *CAUTION - These springs do not have flat ends and shims must not be used*

P ntiac Temp st - 3 7/8", measured directly behind rear spring between control arm upper bumper bolt and top of upper control arm To correct riding height, replace springs

REMOVAL & INSTALLATION: *S 1960 Final Data, Page 377, or later Manual editi n, and not the following*

Rear Suspension Crossmemb r (P ntiac T mp st): Remove transmission and differential assembly (see "Pontiac Tempest Transaxle"), then remove both shock absorbers and coil springs (support control arms with a jack) Disconnect parking brake cables at rear equalizer, then remove fuel line and brake line from clip on top of crossmember Disconnect brake lines at junction block and remove two bolts at each side connecting crossmember to body, then lower crossmember from car *CAUTION - B sure that crossmember is properly supp rted before lowering from car*

Installati n: Place crossmember in position and install four attaching bolts, tightening them to 60-80 ft lbs Complete installation by reversing removal procedure

CHEVY II FRONT SUSPENSION

Chevy II (1962)

►*1962 FRONT SUSPENSION NOISE CORRECTION:* Noise similar to mispositioned front spring or worn ball joint may be caused by dry spring lower seat pivot shaft bearing. Make sure bearing is lubricated at regular intervals at lubrication fitting on underside of pivot shaft bearing (reach through large opening in upper control arm).

DESCRIPTION: New design "ball joint" type front suspension system with coil springs mounted between top of upper control arms and towers in front end sheet metal. Inner ends of upper and lower control arms pivot on front end sheet metal chassis structure and are mounted on rubber bushings. A cam-shaped lower control arm inner pivot bolt provides lateral movement for camber adjustment. A strut rod connects each lower control arm (at outer end) to a bracket attached between frame and radiator support at front of car. Adjusting nuts at forward end of strut rod are used to change length of rod for caster adjustments. Front shock absorbers are mounted within front coil springs.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Riding Height: With car at curb weight (full tank of gasoline and spare tire), position car on a level floor, then bounce front of car several times and allow it to settle. Measure distance from floor to centerline of lower control arm pivot, then measure distance from floor to lower ball joint seat. The difference between these two measurements should be 2½"±½". *NOTE - Both sides must be equal within ½".* To adjust, replace spring. DO NOT shim springs.

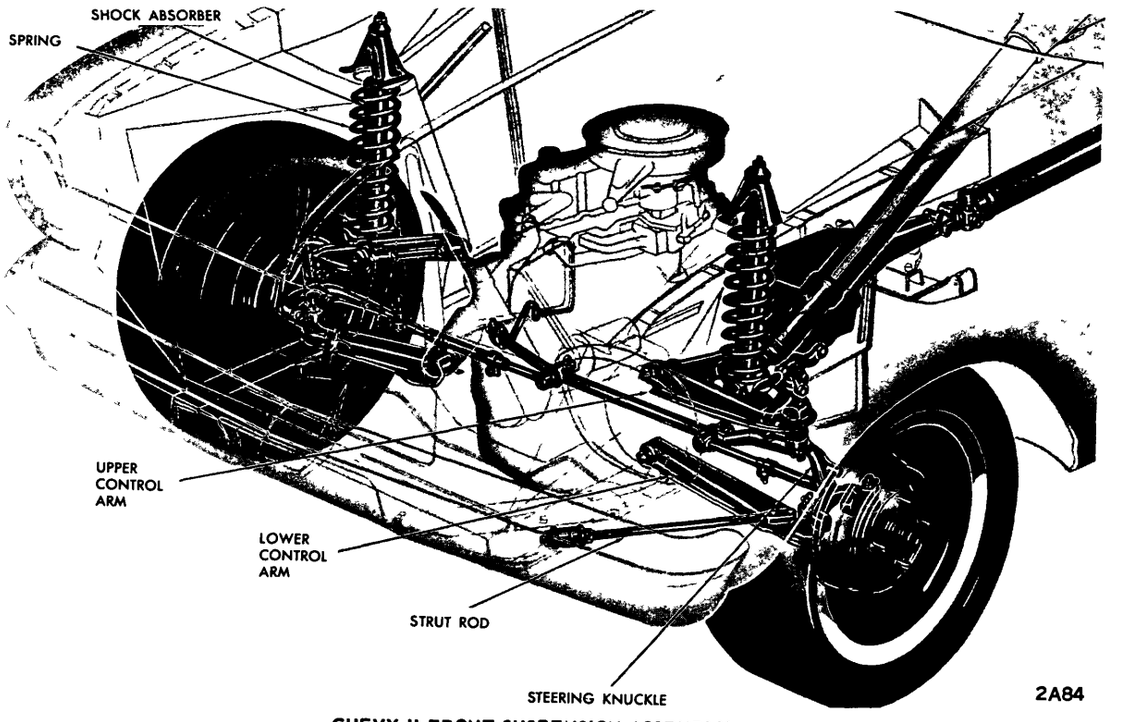
REMOVAL & INSTALLATION

►*UPPER CONTROL ARM SUPPORT TOOL (TO BE MADE LOCALLY):* Fabricate a support for each side of the car as indicated in the illustration. Right hand support is shown. When making left hand support, the angled support must be placed and welded to reverse side of plate.

►*BALL JOINT INSPECTION NOTE:* Upper ball joint is a loose fit when not connected to upper control arm. Lower ball joint is a tight fit at all times. Check wear as follows:

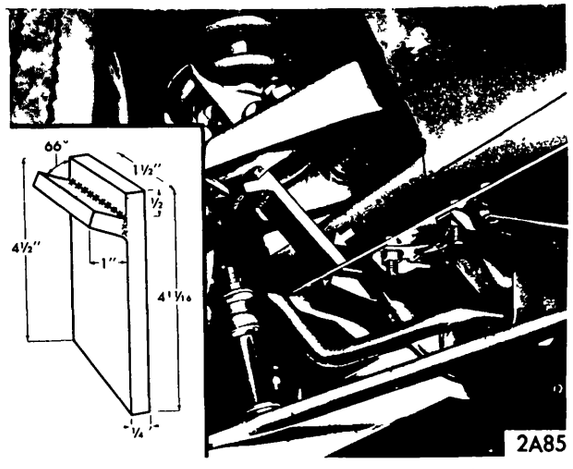
Upper Ball Joint - With weight of car on wheels, insert upper control arm support (see illustration), then raise car and allow wheel and tire to hang free. Measure distance from tip of ball stud to top surface of control arm. Place an adjustable jack stand under tire and raise slightly to take up ball joint looseness. Repeat the measurement taken with weight on wheel and if the difference in measurements is greater than 3/32", the joint is excessively worn and should be replaced.

Lower Ball Joint - With upper control arm support in position (same as for upper ball joint), disconnect lower ball joint from steering knuckle. Assemble nut to lower ball joint stud and check rotating torque with a torque wrench. Specifications for new joints are 4-8 ft. lbs. If torque readings are excessively high or low, replace ball joint.



CHEVY II FRONT SUSPENSION ASSEMBLY

BALL JOINT REPLACEMENT (ON CAR): Upper Ball Joint - With weight of car on wheels, insert upper control arm support (see illustration), then raise car and remove wheel. Disconnect stabilizer link (if so equipped) and strut rod at lower control arm. Remove cotter pin and nut from upper ball joint stud, then strike steering knuckle adjacent to ball joint stud, backing up with another hammer, to loosen stud in knuckle. Drop lower control arm, steering knuckle and brake assembly with a floor jack until upper control arm ball joint is easily accessible. Use a large chisel and cut off the three ball joint retaining plate rivet heads. *NOTE - It may be necessary to drill out rivet heads before chiseling.* Remove ball joint and inspect ball joint seat in control arm for cracking or damage. *CAUTION - If arm is damaged in any way, replace arm.* Install replacement ball joint assembly, using special bolts furnished with replacement kit, and tighten to 20-25 ft. lbs. *CAUTION - Use only special hardened bolts furnished with replacement joint. DO NOT use other non-hardened bolts and do not attempt to rivet replacement joint to control arm.* Complete installation by reversing removal procedures. Tighten ball joint stud nut to 42-47 ft. lbs. Lubricate joint and adjust front wheel alignment.



UPPER CONTROL ARM SUPPORT TOOL

Lower Ball Joint: Install upper control arm support while weight of car is on wheels (see illustration), then raise car and remove lower ball joint stud nut. If car is equipped with stabilizer, disconnect at upper link. Strike lower steering knuckle boss, backing up with another hammer, to loosen stud, then lower the control arm until ball joint is accessible. Replace ball joint on lower control arm in the same manner as for upper control arm ball joint (see above). Tighten attaching bolts to 20-25 ft. lbs. and ball joint stud nut to 42-47 ft. lbs.

SHOCK ABSORBER: Removal - With weight of car on wheels, position upper control arm support (see illustration), then raise car and remove wheel assembly.

CONTINUED ON NEXT PAGE

CHEVY II FRONT SUSPENSION (C ntinu d)

Disconnect lower shock absorber mounting nuts and remove lockwashers, and rubber washers from lower spring seat. Remove shock absorber upper mounting bracket bolts and lift bracket and shock absorber assembly from car. Remove shock absorber from bracket.

Installation: Reverse removal procedure. Tighten shock absorber-to-bracket nut and bracket-to-tower nuts to 9-12 ft. lbs. Tighten shock absorber lower mounting nuts to 25-35 ft. lbs.

COIL SPRING: Removal - Raise car and remove wheel assembly, then support lower control arm with a floor jack and raise it slightly from full rebound position. Remove shock absorber (see above). *NOTE - It is not necessary to install upper control arm support.* Install spring compressor J-6874-4-5 with adapters J-6874-8-9 into upper spring tower so that lower U-bolt fits into shock absorber mounting holes in spring seat. Secure two lower studs to spring seat with nuts. Install tool upper pilot on top of spring and compress spring by tightening nut until screw is bottomed. Remove lower spring seat retaining nuts, then lift spring and seat assembly from control arm and guid it down and out through fender skirt. Release spring tension. If spring seat is to be repaired, disconnect spring compressor from spring seat.

Installation: Install spring seat to spring compressor (if removed). If a new spring seat is to be installed, install spring compressor and compress spring until screw is bottomed. *NOTE - Spring coil ends should be about 1/8" from spring stops in upper and lower seat to prevent squeaks.* Lift spring and tool assembly into place and position so that upper spring stop is inboard. Install lower spring seat to control arm and tighten nuts to 25-35 ft. lbs. Loosen spring compressor until spring is properly seated in upper spring tower and remove compressor. Install shock absorber (see above).

SPRING SEAT: Disassembly - Tap one bolt out of pivot shaft and remove rubber boots, then unscrew pivot shaft, drawing free end of shaft through threaded sleeve. Inspect pivot shaft and sleeve for damage to threads and for distortion. Inspect rubber shaft boots and replace if necessary.

Reassembly: Screw pivot shaft into spring seat until bolt hole centerlines are equal distance from spring seat (within .050"). Insert lip of rubber boot into groove in spring seat sleeve, then insert bolts into pivot shaft and lubricate spring seat assembly through lube fittings.

UPPER CONTROL ARM: Removal - Remove spring and shock absorber (see above), then position a floor jack under lower control arm. Remove cotter pin and nut from upper ball joint stud and strike steering knuckle boss to loosen stud. Drop lower control arm and steering knuckle assembly, then remove upper control arm pivot shaft stud nuts from fender skirt and remove upper control arm. Inspect arm for cracks or bending and replace if necessary.

Ball Joint Replacement: *See "Ball Joint Replacement (On Car)" above.*

Pivot Shaft Bushing Replacement: Removal - *NOTE - If a new pivot shaft is to be installed, also install pivot shaft bushings.* With upper control arm removed, remove nut, lockwasher and metal spacer from pivot shaft end, then stand control arm and pivot shaft assembly on support J-5888-3 and insert J-9513-1 over threaded end of pivot shaft. Press pivot shaft down (in an arbor press) until upper bushing diameter is visible for approximately 5/16", then insert J-9513-2 over journal. Release tension on pivot shaft, then invert control arm and support on J-5888-3 and press out bushing with J-9513-1. Press second bushing out in the same manner.

Installation - Insert new bushing in control arm and over pivot shaft, then support arm on J-5888-3 and insert spacer J-8345-1 and press bushing into place with installer J-9513-3. Invert arm and press remaining bushing in place with J-9513-3. Install bushing spacers, lockwashers and nuts on pivot shaft ends and tighten to 40-60 ft. lbs. *CAUTION - Pivot shaft bolts must be in horizontal position (toward centerline of car) before tightening nuts.*

UPPER CONTROL ARM: Installation - Insert upper control arm pivot shaft studs into reinforced fender skirt openings, then install lockwashers and nuts and tighten to 60-90 ft. lbs Raise lower control arm and steering knuckle assembly into position, insert upper ball joint stud into steering knuckle. Install ball stud nut and tighten to 42-47 ft. lbs. Install cotter pin. Lubricate ball joint and check front wheel alignment.

LOWER CONTROL ARM: Removal - With weight of car on wheels, install upper control arm support (see illustration) and raise car Remove lower control arm ball stud cotter pin and loosen nut. Strike lower control arm steering knuckle boss to loosen ball stud and remove nut, then drop lower control arm. Mark lower control arm pivot bolt and adjusting cam for alignment in same position, then remove nut securing pivot bolt and cam assembly. Remove pivot bolt and cam and remove lower control arm.

Ball Joint Replacement: *See "Ball Joint Replacement (On Car)" above.*

Pivot Shaft Bushing Replacement: Removal - Support control arm on Tool J-7574-4 and insert spacer J-9514. Press bushing out with Tool J-9226 and handle J-7079-2.

Installation - With spacer still in control arm, invert control arm and press in new bushings with Tool J-7574-2 and handle J-7079-2 until bushing is fully seated. *CAUTION - Bushing diam t rs ar un qual and bushing must b pr ss d into p siti n through larger diameter only.*

LOWER CONTROL ARM: Installation - Insert lower control arm into its bracket, then index pivot bolt and cams and tighten nut to 90-120 ft. lbs. Raise lower control arm ball stud into steering knuckle boss and install nut. Tighten nut to 42-47 ft. lbs. and install cotter pin. Lubricate ball joint and install wheel. Lower car and remove upper control arm support, then check front wheel alignment

STEERING KNUCKLE: Removal - With weight on wheels, install upper control arm support (see illustration), then raise car and place a floor jack under lower control arm. Remove brake drum and hub and disconnect brake shoe return springs. Remove brake shoes and clamp wheel cylinder, then remove brake anchor pin and two bolts securing brake backing plate and steering arm to steering knuckle. Remove brake backing plate and steering arm from knuckle and wire backing plate to underbody member. *NOTE - Do not disconn ct brake hos .* Remove lower control arm ball joint stud nut and strike steering knuckle boss to loosen stud and disengage steering knuckle Disengage upper ball joint stud from knuckle in same manner, then remove steering knuckle

Installation: Reverse removal procedure and tighten ball joint stud nuts to 42-47 ft. lbs Tighten brake backing plate-to-knuckle and steering arm bolts to 55-75 ft. lbs. Tighten brake anchor pin to 60-90 ft lbs.

FRONT STABILIZER (STATION WAGONS): Rem val - Raise car and support both front wheels, then disconnect stabilizer bar from link at each lower control arm. Remove stabilizer bar bracket from front radiator crossmember and remove stabilizer. Disconnect stabilizer link bolts, spacers and rubber bushings from lower control arms

Installation: Reverse removal procedure and tighten bracket bolts to 14-22 ft. lbs and link bolts to 9-12 ft lbs *NOTE - If new insulators ar n c ssary, coat stabilizer with recommended rubber lubricant and slide insulators into position.*

STRUT ROD: Removal - Raise car and remove forward nut, retainer and rubber bushing from front end of strut rod, then remove two nuts from strut rod-to-lower control arm bolts and remove bolts and washers. Withdraw strut rod from bracket and remove remaining bushing, sleeve, retainer and nut from rod.

Installation: Reverse removal procedure and tighten strut rod-to-lower control arm bolts to 40-50 ft. lbs. Check front wheel alignment

CORVETTE FRONT SUSPENSION

Chevrolet Corvette (1955-62)

DESCRIPTION: Independent, linked parallelogram type with direct acting shock absorbers and coil springs. "Threaded Bushing" pivot joints used on upper and lower control arms for connection to steering knuckle. Steering knuckle is conventional reverse Elliott type which pivots on a kingpin through split, floating bushings. A stabilizer bar, linked to lower control arms, is used. Caster and camber adjustments are made by rotating upper control arm pivot bolt (eccentric).

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Front Riding Height: With car on a level floor, bounce front end up and down and allow to settle. Distance from centerline of lower control arm inner pivot shaft to floor should be 11" ± ½" (8¾" ± ½" 1957-59 cars with H.D. springs). If height not correct, add a shim to top of coil spring. *CAUTION - Do not add more than 1 shim. If necessary to add more than 1 shim, replace spring.*

REMOVAL & INSTALLATION

STABILIZER: Removal - Disconnect stabilizer bar from links by removing link attaching nut and bolt. Disconnect stabilizer brackets from radiator support crossmember, and remove stabilizer bar and brackets.

Installation - Reverse removal procedure but do not tighten bracket attaching bolts at radiator crossmember until after car is lowered to floor and bounced several times to align stabilizer. Then tighten mounting bolts to 17-22 ft. lbs.

SHOCK ABSORBER: Removal - Disconnect shock absorber at both upper and lower ends (hold upper stem from turning when removing retaining nut, grommet retainer, and grommet), then remove shock absorber from bottom of spring housing.

Installation - Reverse removal procedure. Tighten retaining nuts to 4-6 ft. lbs. and stake in place.

COIL SPRING: Removal - Disconnect stabilizer bar from link on lower control arm, then remove shock absorber (see above). Raise and support car with jacks under frame side rails. Place jack under control arm inner shaft, then drive out control arm shaft bracket bolts. Lower jack slowly to relieve spring pressure (lower control arm will drop down), and remove spring. Remove shim (if used) from upper spring seat.

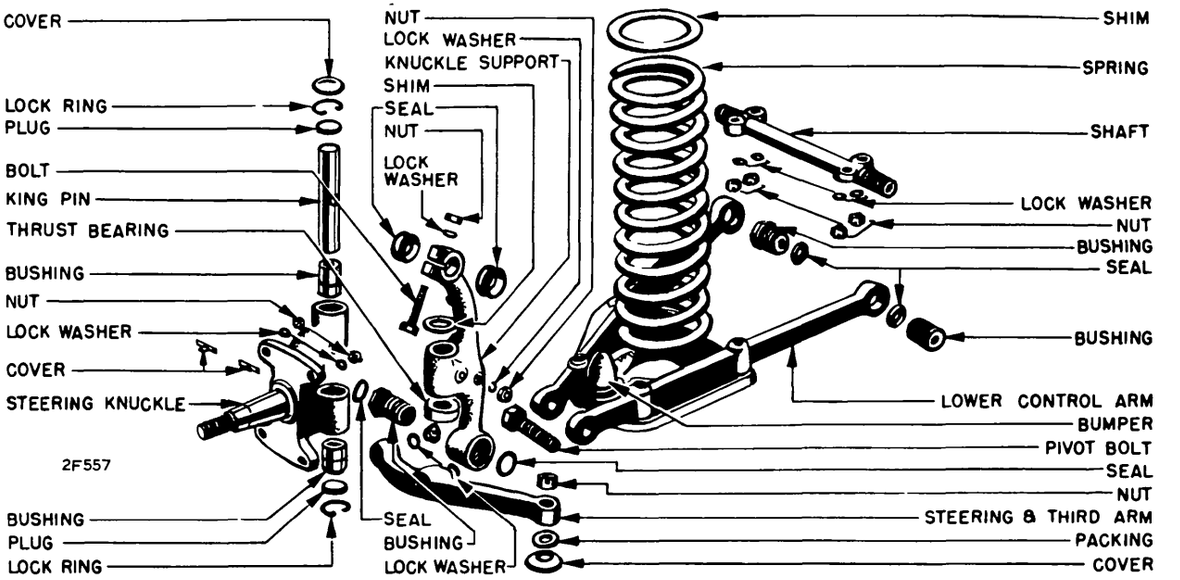
Installation - Install spring with flat end up and reverse removal procedure.

LOWER CONTROL ARM: Removal - Remove wheel and tire. Remove front spring (see above), then remove tie rod end from steering arm. Remove lower control arm pivot bolt nut and bolt and remove control arm.

Installation - Reverse removal procedure.

LOWER CONTROL ARM CROSS SHAFT & BUSHING: *NOTE - Service procedures may be performed with control arm either installed in, or removed from the car.*

Replacement: *NOTE - Replace one bushing at a time to insure proper alignment of control arm and shaft.* Remove one bushing, make sure shaft is centered in control arm bushing hole, then thread new bushing onto shaft and into control arm. Tighten to 85-100 ft. lbs. Replace other bushing in same manner. *NOTE - When replacing cross shaft, place shaft in control arm and position by scale measurement, then install bushings.*



1955-62 CORVETTE FRONT SUSPENSION ASSEMBLY

LOWER CONTROL ARM PIVOT BOLT & BUSHING: Removal - Remove wheel and tire and tie rod end. Place jack under inner side of lower spring seat. Remove pivot bolt lock nut and lubrication fitting, then remove bolt from control arm and knuckle support. Turn wheel to extreme outward position (to lock knuckle support so it cannot move outward at bottom), then remove lower pivot bolt bushing from knuckle support.

Installation - Install bushing into knuckle support from rear and tighten to 150-170 ft. lbs. Place new seals over ends of bushing and start pivot bolt into control arm from rear. Hold knuckle support in center of yoke of control arm and thread pivot bolt into bushing. *NOTE - Be very careful to keep knuckle support centered in yoke.* Screw pivot bolt in until it contacts front face of control arm, then, if threads on control arm and bolt index properly, screw bolt into control arm until bolt head seats firmly against rear face of control arm. *NOTE - If threads do not index properly, compress control arm ends slightly with "C" clamp to insure alignment.* Tighten pivot bolt to 100-200 ft. lbs., then install locknut and tighten to 90-120 ft. lbs. Slip seals off ends of support bushing and into seal seats. Install tie rod and lubrication fittings. Lubricate bushings, install wheel and tire, and check front end alignment.

UPPER CONTROL ARM CROSS SHAFT & BUSHINGS: Removal - *CAUTION - Do not remove cross shaft unless shaft damaged or unserviceable.* Raise and support car under outer end of lower control arm. Remove wheel and tire and lubrication fittings from bushings. Remove front and rear bushings from control arm outer pivot and remove seals from ends of pin. Remove pivot pin clamp bolt from knuckle support and slide pivot pin from support with a ¼" Allen wrench. Swing knuckle support and hub and drum assembly away from upper control arm. Remove cross shaft bushings and remove control arm from cross shaft. Remove seals from cross shaft, then remove cross shaft from spring housing from rear to front with Tool J-2958.

Installation - Lubricate shaft threads, then install shaft into spring housing from front to rear with Tool J-2958. Drive shaft into housing until end projects 1 1/8" out back of housing. *CAUTION - Rear end of shaft with identification mark has tapered threads. DO NOT drive shaft in too far because backing off will leave shaft loose in spring housing.* Install new seals over shaft ends and install control arm shaft. Start both bushings on shaft, position arm by scale measurement, then tighten bushings until they seat, and then to 30-40 ft. lbs. Install lubrucation fittings, lubricate and check operation of arm (arm should fall of its own weight). Install splash guard over steering gear housing and pivot pin and bushings (see below).

UPPER CONTROL ARM PIVOT PIN & BUSHINGS: Removal - Raise car and support under spring seat. Remove wheel and tire and lubrication fitting from rear bushing. Remove pivot pin bushings from control arm, then remove seals from pivot pin. Remove clamp bolt from upper end of knuckle support and slide pivot pin from knuckle support with a ¼" Allen wrench.

Installation - Place pivot pin through control arm and into knuckle support (Allen wrench hole to rear of car). Center pivot pin in support and install lock bolt, lockwasher and nut and tighten to 30-35 ft. lbs. Install new seals over pin ends. Start front bushing onto pin, keep support centered, and carefully index bushing threads into control arm. Repeat with rear bushing. Thread bushings until heads seat, then tighten to 30-40 ft. lbs. Install wheel and tire, lubrication fittings, then lubricate. Lower car and adjust front end alignment.

CONTINUED ON NEXT PAGE

CORVETTE FRONT SUSPENSION (C ntinu d)

STEERING ARM: R m val - Raise car and support under spring lower seat, then remove wheel and tire. Remove wheel hub and brake drum assembly. Disconnect brake shoe return springs and let shoes hang freely. Remove brake anchor pin. Remove bolts holding brake backing plate and steering arm to steering knuckle. Remove steering arm from knuckle and wire backing plate up out of way. Disconnect steering arm from tie rod end. **Installation** - Reverse removal procedure, then adjust wheel bearings and front end alignment.

KINGPIN & BUSHINGS: Removal - Remove steering arm (see above). Remove kingpin lock pin, upper kingpin bearing plug cover, upper and lower lock rings, and lubrication fittings. Remove kingpin bearing plugs (drive a sharp drift through lower plug, driving kingpin upward until upper plug removed). Remove kingpin through bottom. Remove steering knuckle and thrust bearing from knuckle support and remove bushings from knuckle. *CAUTION - Do n t damag brake hos .*

Installation - *NOTE - Unnecessary to ream new bushings, but be sure oil grooves in bushings line up with lubrication fitting hole in steering knuckle.* Install new bushings in steering knuckle and install knuckle on support. Install thrust bearing between lower yoke of knuckle and support, making sure shield on bearing is toward top. Install kingpin from bottom and make sure lock pin slot is aligned with slot in support. If clearance between steering knuckle and knuckle support is is greater than .006", install a steel shim between knuckle and top of support. Install lock pin, bearing plugs, lock rings and upper bearing plug cover. Install lubrication fittings and lubricate. Install wheel and tir e, lower car, and check and adjust toe-in.

CHEVROLET TRUCK FRONT SUSPENSION

Chevrolet Trucks (1962)℄

℄ - Except 4-Wheel Drive & Forward Control Models. These models use "I-Beam" front axle. *For alignment specifications, see "Wheel Alignment Specifications & Adjustment" in this section.*

DESCRIPTION: Torsion bar type suspension of same design used on corresponding previous models.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Truck Curb Height: *NOTE - Curb height must be checked and corrected before making camber and caster adjustment.*

10,20,30,40 Series - 4¼" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. Adjust torsion bar rear anchor to obtain correct height.

50, 60 Series - 5 1/16" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. No adjustment provided. If dimension not correct, replace torsion bars.

REMOVAL & INSTALLATION: *See 1960 Final Data, Page 369, or later Manual edition, and note the following:*

Torsion Bar Installation (Units Without Locating Dimple In Front Socket): Before assembly of rebound bumper, and with suspension in full rebound position, install front hex of torsion bar into lower control arm socket and slide forward to position rear of bar at center of crossmember. Place upper spacer and nut on top of crossmember, then install special washer and lower spacer on bolt and insert bolt up through crossmember and upper spacer and start into nut. *NOTE - Spacer and nut must have rocker groove of spacer and ridge of nut parallel to crossmember, with locating lug on lower spacer inboard.* Assemble torsion bar arm to rear hex of bar so spacer and bolt can be slipped into arm when bolt engages about half of threads of nut. Place arm to bar so rear face of arm is flush with rear end of bar within 3/32". Make sure locating lug on lower spacer is inboard, then tighten torsion bar adjusting bolt on each side until truck assumes normal curb height. Install rebound bumper.

OLDSMOBILE (EXCEPT F-85) REAR SUSPENSION

Oldsmobile (Exceot F-85) (1962)

DESCRIPTION: Coil spring type with two upper and two lower control arms. Upper control arms are connected to rear axle housing adjacent to differential carrier and to bracket on frame side rail. Lower control arms are connected between outer ends of rear axle housing and bracket on frame side rail. Lower control arms are adjustable for length and control the differential nose angle.

RIDING HEIGHT: 5 13/16-6 9/16" (Exc. Sta. Wgn.); 5 3/8-6 1/8" (Sta. Wgn.) measured from top of axle housing to frame.

REMOVAL & INSTALLATION: As follows:

►*SHOCK ABSORBER INSTALLATION NOTE:* Tighten upper pivot bolt and nut to 45-55 ft. lbs., and lower stud nut to 30-46 ft. lbs.

COIL SPRING: Removal - Raise rear of car and disconnect shock absorber from axle housing, then disconnect parking brake cable clamp at frame and loosen suspension arms at frame and axle. Support frame, then remove upper and lower spring mounting bolts, washers, insulators and clamps. Remove coil spring and two remaining insulators.

Installation: Place upper insulator snugly in end of spring coil. Place spring with insulator against upper seat and install clamp but do not tighten upper attaching bolt. *NOTE - Locate clamp so it nests in insulator (tang in notch), then torque mounting bolt to 35-45 ft. lbs.* Place lower end of spring on axle housing pad, then raise axle housing to compress spring to normal carrying height. Install Spring Holding Tool BT-6102 at front of spring, then lower axle housing and place other spring insulator in spring coil. Raise axle housand install lower clamp. With lower clamp nesting in insulator, torque lower mounting bolt to 35-45 ft. lbs. Remove Tool BT-6102. Connect shock absorbers and tighten suspension arm bolts to 70-90 ft. lbs. with weight of car on rear springs. Place parking brake cable at locating marks and tighten cable clamps.

CONTROL ARMS: *See 1961 Final Data, Pag 370, and tight n attaching b lts t 70-90 ft. lbs.*

OLDSMOBILE (EXCEPT F-85) FRONT SUSPENSION

Oldsm bil (Except F-85) (1962)

DESCRIPTION: Ball joint type with shock absorbers mounted within front coil springs. Design is similar to that used on previous models except that upper and lower control arm inner pivot shaft bushings are not replaceable. Control arm, shaft and bushing assembly is furnished only as a complete unit.

ADJUSTMENT: *See "Wheel Alignm nt Specificati ns & Adjustment" in this secti n.*

Riding Height: Front - 11 3/8" to 12 1/16" measured from underside of front spring lower seat to underside of upper seat. To measure, insert a 1/8" welding rod in drain hole of lower spring seat (inboard side of spring) push rod up to contact underside of upper spring seat. Mark rod, then remove and measure distance rod was inserted. To adjust, replace spring.

Rear - 5 13/16" to 6 9/16" (Except Station Wagon), 5 3/8" to 6 1/8" (Station Wagon) measured from top of axle housing to frame. To adjust, replace spring.

REMOVAL & INSTALLATION: *S 1961 Final Data, Page 369, and note the following:*

►*UPPER CONTROL ARM INNER SHAFT BUSHING NOTE:* Upper control arm bushings are not replaceable. Control arm and bushing assemblies are furnished only as a complete unit, including control arm pivot shaft. If necessary, tighten upper control arm shaft-to-bushing screws to 35-45 ft. lbs. Lower control arm shaft bushings may be replaced as indicated below.

LOWER CONTROL ARM SHAFT BUSHINGS: Disassembly - With Tools J-9516 and J-8877 and arbor press, press bushings and shaft from control arm until ear on shaft contacts control arm side rail. Form a suitable spacer around cross shaft and continue to press shaft and bushings from control arm.

Reassembly - Use arbor press and Tools J-8877 and J-9481 to install bushings in control arm. Press bushings in until offset in bushing contacts flange on control arm side rail.

LOWER CONTROL ARM BALL JOINT SEAL REPLACEMENT: Support lower control arm and disconnect ball joint from steering knuckle. Clean outside of joint. On Thompson joints, drive seal retaining ring from joint and discard seal assembly. On Saginaw joints, pry garter spring from bottom of seal, then remove seal and garter spring. *CAUTION - Us xtr m car not t get dirt into ball joints.* Clean joint pivot and wipe out as much old grease as possible. Remove and discard service plug, then fill ball joint reservoir with clean Ball Joint Grease, Part No. 585617. Install new service plug and wipe all excess grease from joint. Put a thin film of grease on outside of new seal and on saw-tooth part of seal that fits around ball stud. On Thompson joints, place seal inside of Installing Tool J-9516 and drive seal onto joint, making sure seal is not cocked. On Sagainw joints, place garter spring around Installer J-9517, place seal on joint, slide tool over seal, then roll garter spring off tool and into seal groove. Connect ball joint to steering knuckle.

PONTIAC (EXCEPT TEMPEST) FRONT SUSPENSION

P ntiac (Except T mp st) (1962)

DESCRIPTION: Ball joint type with shock absorber mounted within coil spring. Same design as used on previous models.

ADJUSTMENT: *See "Wh l Alignment Specifications & Adjustm nt" in this s ction.*

Riding H ight: Fr nt - 3¾" (Except Grand Prix), 3¼" (Grand Prix) measured from top of lower control arm to underside of frame directly behind centerline of spring. *NOTE - F r camber and caster adjustment, a spacer bar cut t c rr ct l ngth may be installed between l w r c ntr l arm and crossmember at centerline of spring to p siti n car for correct riding height.*

Rear - 9.70" measured from top of axle housing to top of spring seat at a point approximately 1½" outward from rubber bumper on frame. *NOTE - A spacer bar cut to c rrect l ngth may b installed at this location to position car f r c rr ct riding height when making caster and camb r adjustm nt.*

REMOVAL & INSTALLATION

SHOCK ABSORBER: R m val - Raise and support car so weight is off front wheels, then remove nut, retainer and grommet attaching upper end of shock to frame. *NOTE - Do not turn piston rod while loosening nut.* Remove lower bolts and remove shock absorber through lower control arm.

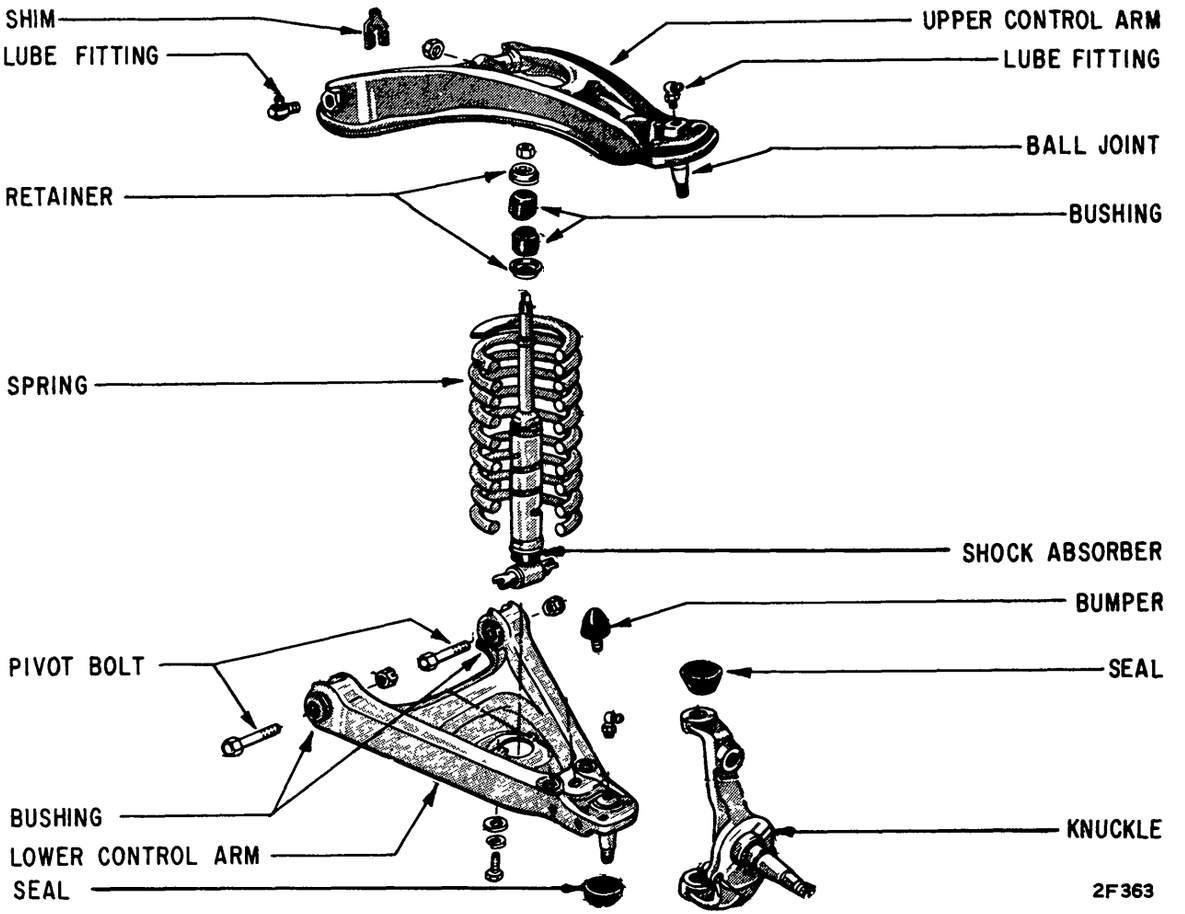
Installation: Reverse removal procedure and note the following: Tighten upper nut to 60-120 inch pounds, and lower bolts to 15-25 ft. lbs.

COIL SPRING: Rem val - Raise and support front of car with a jack placed under front crossmember, then remove wheel, shock absorber, and disconnect lower end of stabilizer link from lower control arm. Disconnect steering linkage from knuckle. Install spring compressor, Tool J-7592 as follows: Locate one compressor plate in one of the upper coils of spring so that ramp faces down against coil, then locate other plate in one of the lower coils with ramp facing up. *NOTE - Plates must parallel cent rlin of spring with holes in plate properly align d.* Place retainer, J-7592-6, cup side up, over threaded end of rod, J-7592-5, followed by bearing, then start long nut, J-7592-3 on rod. Insert rod, hex end first, up through both plates, then slide retainer, J-7592-4, cut side down, over end of hex rod and secure with "C" clip, seating clip down in retainer. While holding upper end of rod, turn nut at lower end and compress spring. Disconnect inner end of lower control arm from frame crossmember, then swing inner end of arm down and remove spring. *NOTE - If desired, spring can b remov d by disconnecting ball joint stud from knuckl and swinging out r end of arm down.*

Installati n: Reverse removal procedure and tighten control arm attaching bolts at inner end to 150-175 ft. lbs., steering arm-to-knuckle nut to 60-95 ft. lbs.

LOWER CONTROL ARM: Removal - Remove front spring, then disconnect and remove ball joint stud from steering knuckle with Tool J-6627.

Bushing Replac ment: With lower control arm removed, use an arbor press and support arm on remover, J-7022-1, then place spacer, J-7022-7 around bushing. With sleeve, J-7022-3 between control arm and arbor, press bushing from arm. Remove other bushing from opposite leg of arm in same manner. Press new bushings into arm by supporting arm on remover, J-7022-1, in an arbor press. Install spacer, J-7022-7 between sides of control arm leg and use sleeve, J-7022-3 between arbor and bushing to press bushing into position. Repeat with other bushing on opposite leg.



PONTIAC (EXC. TEMPEST) FRONT SUSPENSION ASSEMBLY

Installation: Reverse removal procedure and tighten control arm-to-frame bolts to 150-175 ft. lbs. Tighten ball joint stud nut to 80-95 ft. lbs.

UPPER CONTROL ARM: Removal - Place a jack under lower control arm, then raise and remove wheel. Remove ball joint stud from steering knuckle with J-6627. Disconnect control arm shaft from frame and remove shaft and arm assembly.

Disassembly: Remove front and rear threaded bushings from control arm assembly and remove control arm shaft.

Reassembly: Place tool, J-7167 in position and expand until distance between inner faces of arms is 8 31/32", then place pivot shaft with new rubber seals in position on control arm. Lubricate pivot shaft threads with graphite grease, then start bushing on pivot shaft and into arm at the same time. Tighten so head of bushing is firmly seated against control arm (150-175 ft. lbs.). Center pivot shaft in control arm and install other bushing, being sure threads index so there is no bind. Tighten so head of bushing is tightly against control arm (150-175 ft. lbs.), and remove spreader tool. Check to see that distance between inner faces of shaft ends of control arms is correct. Turn shaft in arm to centralize so distance between bolt hole to arm is equal at both ends. *NOTE - Frictional drag of shaft in bushings should not exceed 50 inch pounds.*

Installation: Position upper control arm and shaft on frame member and install bolts and self-locking nuts. Tighten to 80-95 ft. lbs. Assemble control arm to upper ball stud and tighten nut to 80-95 ft. lbs. Lubricate control arm shaft and ball studs.

BALL JOINT REPLACEMENT (UPPER & LOWER): With control arm removed, chisel or drill heads of rivets retaining ball joint to control arm and drive out rivets, then remove ball joint assembly. Install a new joint, retaining with special bolts, nuts and washers supplied with new joints. *CAUTION - Us nly sp cial alloy bolts supplied with stud packag for this operation.* Tighten nuts to 10-12 ft. lbs.

PONTIAC TEMPEST FRONT SUSPENSION

Pontiac Tempest (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 FRONT SUSPENSION NOISE CORRECTION:* If caused by interference at crossmember spring pocket, install Spring Insulator, Part No. 543660, between upper end of spring and spring seat.

►*LATE 1961 & ALL 1962 UPPER CONTROL ARM REMOVAL NOTE:* No access holes are provided to remove upper control arm retaining bolts. To remove control arm, cut 1¼" holes in inner fender panel opposite retaining bolts. After control arm installed, plug each hole with Plug, Part No. 540402.

►*1962 BALL JOINT & STEERING KNUCKLE REPLACEMENT NOTE:* If necessary to replace lower ball joint assembly because of broken or bent stud, or loose stud nut, steering knuckle must also be replaced.

DESCRIPTION: Independent wheel suspension with an "A" frame type upper control arm and a cantilever type lower control arm combined with a compression strut mounted between outer end of lower control arm and front crossmember side rail. Rear end of strut rod is threaded and mounted in a rubber bushing. Front end is bolted to lower control arm. The front suspension unit is constructed so it is integral with front crossmember and can be removed as a complete assembly (after removal of coil springs).

ADJUSTMENT

See "Wheel Alignment Specifications & Adjustment" in this section.

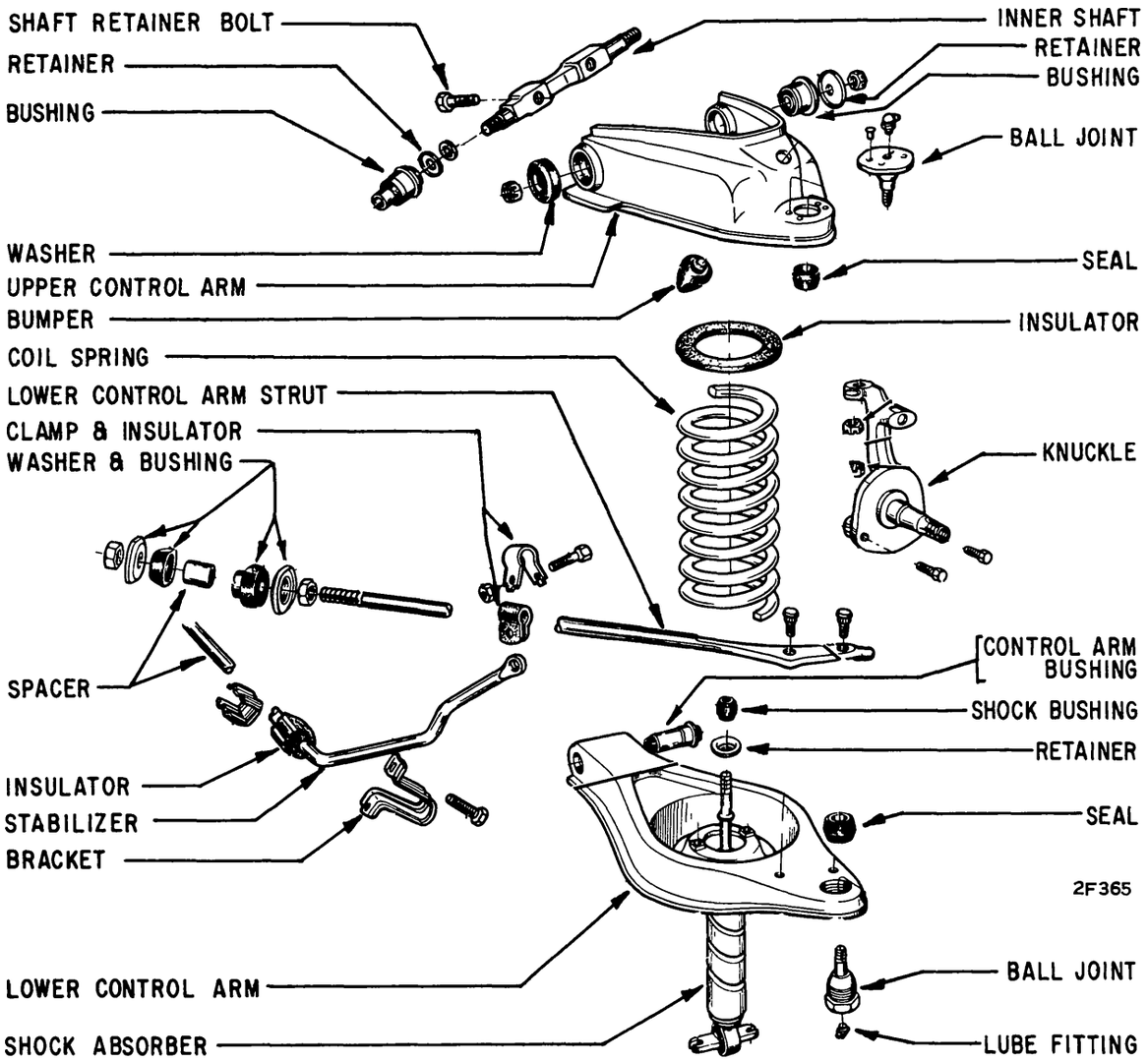
Riding Height: Front - 4 7/8" measured between top of lower control arm at strut rod and lower control arm bumper bolt, directly in front of spring. *NOTE - For camber and caster adjustment, a spacer bar cut to correct length may be installed at this location to position car for correct riding height.*

Rear - 3 7/8" measured at a point directly behind spring between top of control arm and bumper attaching bolt. *NOTE - For camber and caster adjustment, a spacer bar cut to correct length may be installed at this location to position car for correct riding height.*

REMOVAL & INSTALLATION

SHOCK ABSORBER REPLACEMENT: Support car on side rails so front suspension hangs freely and so that clearance is sufficient on front lower control arms to allow removal of shock absorber. Hold flat part of shock upper stud and remove nut, cup washer and grommet, then remove lower attaching bolts. Withdraw shock absorber and remove cup washer and grommet. To install, reverse removal procedures and tighten lower attaching bolts to 15-25 ft. lbs. Tighten upper nut to 5-10 ft. lbs. *NOTE - Upper nut must be bottomed at end of threads.*

FRONT COIL SPRING REPLACEMENT: Remove shock absorber (see above), then remove strut rod-to-control arms nuts and lockwashers. *NOTE - Studs are pressed into strut and strut is under slight tension from rubber grommet on opposite end.* Place a jack stand under control arm and take up slightly on spring tension. Remove lower ball stud from steering knuckle with Tool J-6627, then raise hoist until spring is free and withdraw spring. *NOTE - A bar placed through control arm and into spring tower will retain spring and keep it from slipping free.* To replace, set rubber insulator in place in crossmember spring tower and place spring on control arm. Use a jack stand under outer end of control arm, then raise arm by lowering hoist. Install ball stud in steering knuckle and tighten nut to 55-70 ft. lbs. *CAUTION - Do not back off nut when aligning holes to install cotter pin.* Attach strut rod to control arm and tighten nuts to 40-55 ft. lbs. *NOTE - Do not change position of large nuts at grommet end of strut as caster adjustment will be changed.* Install shock absorber (see above).



PONTIAC TEMPEST FRONT SUSPENSION ASSEMBLY (EXPLODED)

LOWER CONTROL ARM REPLACEMENT: Remove shock absorber and coil spring, then remove control arm inner pivot nut, flat washer and bolt and remove control arm. To install, set control arm in position and install bolt washer and nut but do not tighten until coil spring and shock absorber have been installed and lowered to floor, then bounce car several times and tighten control arm pivot bolt to 75-90 ft. lbs.

UPPER CONTROL ARM REPLACEMENT: Support car at outer end of lower control arm, then remove wheel and tire assembly. Remove upper stud from knuckle with

CONTINUED ON NEXT PAGE

PONTIAC TEMPEST FRONT SUSPENSION (C ntinu d)

Tool J-6627. Remove two nuts retaining upper control arm shaft to front crossmember, noting the number of shims at each bolt. Drill access holes in inner fender panel, or remove hole plugs opposite control arm retaining bolts *(s "upp r Control Arm Removal Note" ab v)*, then remove bolts through access holes. To install control arm, reverse removal procedures and note the following: Install same number of shims as removed, between crossmember and pivot shaft at each bolt location, then tighten bolts to 55-70 ft. lbs. Install a new rubber seal on ball joint stud and tighten nut to 70-85 ft. lbs. (supersedes previous 55-70 ft. lbs.). *NOTE - D n t back off nut when aligning holes to install c tt r pin.* Install wheel and tire assembly, lower car to floor, jounce front end to centralize bushings, then tighten cross shaft nuts to 55-80 ft. lbs.

LOWER BALL JOINT REPLACEMENT (ON CAR): Support control arm at outboard end to remove spring pressure from joint. Remove wheel and tire. Disconnect lower stud at steering knuckle and block upper control arm and steering knuckle up out of way. On 1961 models, thread stud assembly out of control arm. On 1962 models, stud can be driven out.

BALL JOINT REPLACEMENT (OFF CAR): Lower Control Arm - With lower control arm in a vise, either remove self-tapping joint from control arm with a 1 9/16" socket, or press ball joint from arm with Tool J-4160-A or other suitable tool, depending on year model. To install, thread joint into control arm with a 1 9/16" socket, or use Tool J-4174 or suitable tool to press joint into arm. Install lube fitting in bottom of joint and lubricate with chassis lubricant. Install a rubber cap over stud.

Upper Control Arm: Prick punch center of the four rivets and drill through the heads. Use a sharp chisel and cut off rivets, being careful not to enlarge holes in control arm. Tap rivets out with a punch and remove ball joint. To install, place a new joint against upper side of control arm and secure joint to arm with four special nuts and bolts furnished with replacement part. Tighten nuts to 10-12 ft. lbs. *CAUTION - Use only alloy bolts furnished for this p rati n.*

STRUT ROD REPLACEMENT: Remove nuts securing rod to lower control arm, then remove nut, lock tab, washer and grommet from rear end of rod. Remove rod from crossmember bracket and remove rubber grommet, spacer, washer, lock tab and nut. Studs in end of rod are pressed in and can be removed by driving them out. To install, install forward nut on rear end of shaft and position it about 1" from end of threads. Install lock tab, washer, spacer and grommet. Place rod in position in crossmember bracket and install remaining grommet, washer, lock tab and nut, then snug up rear nut. Install rod on lower control arm and tighten nuts to 60-75 ft. lbs. *NOTE - This supersed s pr vi us 40-55 ft. lbs.* Lower car to floor and adjust caster. Tighten nut at rear of rod to 70-85 ft. lbs. and bend over lock tabs on front and rear nuts.

FRONT SUSPENSION CROSSMEMBER: Removal - *NOTE - Front crossmember can be r moved as a c mpl t unit including whe ls and brake ass mbli s, r aft r all components hav be n r moved. It is sugg sted that front springs be removed before disconnecting crossmember from car.* Raise car and install jack stands under crossmember assembly so as to support crossmember when disconnected from car, then install a suitable engine support. Remove wheels and disconnect steering linkage at tie rod ends. Disconnect engine mounts at crossmember and remove ground straps from crossmember on both sides. Disconnect brake lines at junction block on crossmember and fuel line from crossmember clip. Remove three crossmember retaining bolts, washers, and nuts at each side of crossmember, then raise car and remove crossmember.

Installation: Reverse removal procedures and note the following: Tighten crossmember attaching bolts to 60 ft. lbs. (supersedes previous 70-85 ft. lbs. to prevent stripped threads), engine mount bolts to 30-45 ft. lbs., and tie rod end nuts to 55-70 ft. lbs. *NOTE - Do not back off nuts when aligning holes to install cotter pins.*

PONTIAC (EXCEPT TEMPEST) REAR SUSPENSION

Pontiac (Except Tempest) (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 REAR SHOCK ABSORBER NOISE CORRECTION:* Before replacing shock absorber for noise, torque shock absorber upper mounting bolt to new specification of 65-80 ft. lbs. Supersedes previous 45-60 ft. lbs.

DESCRIPTION: Coil spring type suspension consisting of a lower control arm at each side connected between outer end of axle housing and frame member. An upper control arm on each side is connected to rear axle housing adjacent to differential carrier and to outboard end of frame crossmember. Upper and lower control arms are not adjustable.

RIDING HEIGHT: 9.70" measured from top of axle housing to top of spring seat at a point approximately 1½" outboard from rubber bumper on frame. To correct, install new springs.

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 372, and note the following:*
Shock Absorber: Tighten attaching nuts to 65-80 ft. lbs.

CHRYSLER, IMPERIAL, DODGE 880 "TORSION-AIRE" SUSPENSION

Chrysler & Imperial (1962)
Dodge Custom 880 (1962) ℂ

ℂ - For other Dodge & Dart models, see "Dodge, Dart, Lancer, Plymouth, Valiant Torsion-Aire" in this section.

DESCRIPTION: Upper control arms attach to brackets welded to the frame by the use of special bolts having an integral cam at the head of the bolt. A matching removable cam is installed at threaded end of bolt. The brackets are provided with slotted holes and each bracket has cam retainers welded to its front and rear faces to engage cams on upper control arm attaching bolts .Rotating the head of cam bolts causes the upper control arm to move horizontally in slots provided in bracket. Turning one bolt will move the upper control arm ball joint fore or aft to affect caster (more than camber). Turning both bolts on one side an equal amount in same direction will move the upper ball joint in or out to affect camber.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Front Suspension Height: Checking - Make sure car is on a level floor, tires inflated to recommended pressure, and car at curb weight (full gas tank, no passengers or load).. Measure from lowest point of lower support arm ball joint to floor and from underside of lower control arm bushing (at center line of bushing housing). *NOTE - Under car weight, the bushing housing will always b higher than the ball joint housing.* The difference between these two figures should be as specified in table below. If the difference in measurements between the two sides of the car are less than 1/8" of each other and are within limits specified, suspension height is correct. If these measurements differ more than 1/8" or if one or both of them are outside specified limits, the torsion bars must be adjusted.

►*HEIGHT CHECKING GAUGE NOTE:* Checking Gauge No. C-3895 or C-3914, is available for checking front suspension height.

►*TORSION BAR ADJUSTMENT NOTE: Torsion bar adjusting bolt should only be loosened or tightened with a torque wrench, with car supported to relieve load on torsion bars. If more than 200 ft. lbs. is required to turn adjusting bolt, then bolt and swivel must be r placed.*

Adjustment - Tighten or loosen adjusting bolt at rear end of each torsion bar until measurement differences are as specified. *NOTE - Jounce car at front and rear after making adjustment prior to height check. Also when torsion bar spring adjustment is made, ch ck alignment of front wheels and headlight aiming.*

Front Suspension Height Limits

Car Model	ℂ Height Difference
Imperial	2" ±1/8"
Chrysler (Except Station Wagon & 300H)	2" ±1/8"
Chrysler Station Wagon	2 3/8" ±1/8"
Chrysler 300H	1 3/4" ±1/8"
Dodge Custom 880 (Except Station Wgn)	2" ±1/8"
Dodge Custom 880 Station Wagon	2 3/8" ±1/8"

ℂ - Maximum variation between sides of car 1/8".

REMOVAL & INSTALLATION: *Se 1957 Final Data, Pag 341, r later Manual editions.*

DODGE, DART, LANCER, PLYMOUTH "TORSION-AIRE" SUSPENSION

D dge & D dg Dart (1962)℄
Lancer (1962)
Plymouth (1962)
Valiant (1962)

℄ - Except Custom 880. *For this model, see "Chrysler, Imperial, & Dodge Custom 880 Torsion-Aire" in this section.*

DESCRIPTION: Independent type with torsion bars instead of conventional type coil springs. Upper control arms are attached to brackets which are welded to shock absorber tower and to body horizontals (side rails). Lower control arms are attached to the "K" type front suspension crossmember which is connected to body horizontals (side rails). Ball joints are used to attach both upper and lower control arms to steering knuckles. Torsion bars are anchored at rear to engine rear support member in the body and at the front to lower control arm. Eccentric bolt assemblies at upper control arms control camber and caster adjustments. Car riding height is controlled by an adjusting bolt and lever assembly at front end of each torsion bar.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

►*RIDING HEIGHT ADJUSTMENT NOTE:* Car must be at normal curb weight (full gas tank, no luggage or passengers), and with tires at recommended pressure. Jounce car up and down several times at center of bumpers (rear bumper first) prior to taking each measurement. Car should be jounced same number of times and the bumper should be released at the same point in cycle each time.

►*HEIGHT CHECKING GAUGE NOTE:* Checking Gauge, No. C-3895 or C-3914, is available for checking front suspension height.

Fr nt Riding Height: Jounce car and measure distance from height adjusting lever directly below center of lower control arm inner pivot to floor, and from lowest point of steering knuckle arm to floor on same side. Subtract the two measurements. Difference should be as listed in table below. The difference from one side of car to other should not exceed 1/8". To adjust, turn adjusting bolt at front of torsion bar as necessary. After adjusting, jounce car and recheck height.

1962 Front Suspension Height Limits

Car Model	℄Height Difference
Dodge & Dart (Std. Suspension)	1 3/4"±1/8"
Dodge & Dart (Heavy Duty Susp.)	2 1/8"±1/8"
Lancer (Std. Suspension)	2"±1/8"
Lancer (Heavy Duty Susp.)	2 3/4"±1/8"
Plymouth (Std. Suspension)	1 1/2"±1/8"
Plymouth (Heavy Duty Susp.)	1 7/8"±1/8"
Valiant (Std. Suspension)	1 7/8"±1/8"
Valiant (Heavy Duty Susp.)	2 1/4"±1/8"

℄ - Maximum variation between sides of car 1/8"

REMOVAL & INSTALLATION

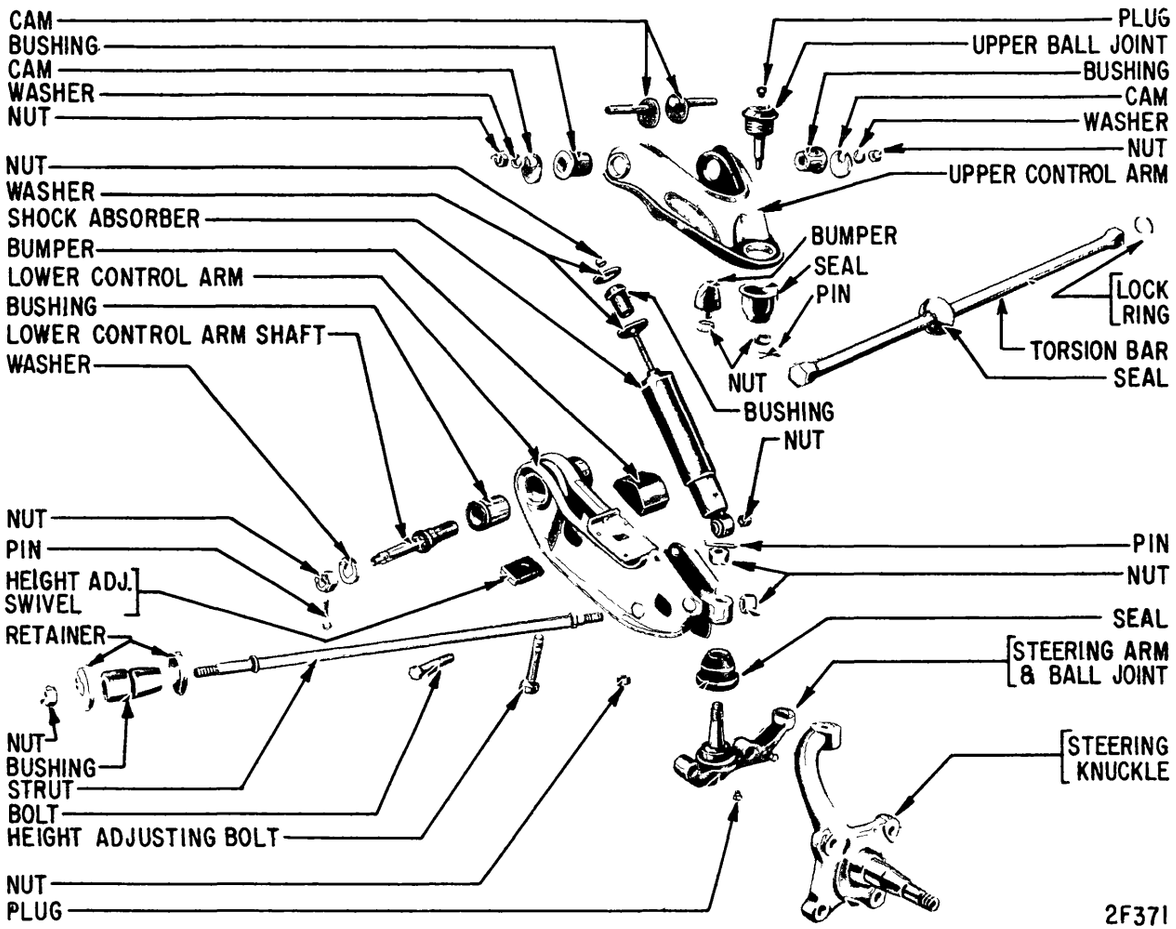
TORSION BAR: Removal - Remove rebound bumper from under upper control arm. Raise and support car so that front suspension is in full rebound position. *NOTE - If car raised at "K" m mber, plac a support under "K" member t distribute w ight.* Back off torsion bar adjusting bolt to release load from torsion bar. Remove lock ring from rear of torsion bar rear anchor. Remove torsion bar from anchors with Tool C-3728. *NOTE - Place tool to rear of torsion bar to allow clearance for hitting the striking pad of tool. DO NOT apply heat to torsion bar or either front or rear anchor. On cars with 225" 6 Cyl. engine, remove exhaust pipe from manifold to remove left torsion bar.* Remove tool and slide rear anchor balloon seal off anchor, then remove torsion bar by sliding out through rear of rear anchor. Do not damage balloon seal when removing from torsion bar.

Installation: Replace balloon seal if damaged. Dress torsion bar to remove sharp edges of scratches and nicks and paint repaired area with a good rust preventative. Remove all foreign material from hex openings in anchors and hex ends of torsion bar. Replace adjusting bolt and swivel if corroded or damaged, then lubricate for easy operation. Insert torsion bar through rear anchor and slide balloon seal over bar with cupped end to rear of bar. Coat hex ends of bar with multipurpose grease and slide torsion bar into lower control arm. Install lock ring in rear of bar rear anchor and pack opening in rear anchor completely full with multipurpose grease. Place balloon seal on rear anchor so lip of seal engages groove in anchor. Tighten adjusting bolt to place load on torsion bar, lower car to floor, and adjust front suspension height (see above). Install upper control arm rebound bumper.

LOWER BALL JOINT: Rem val - *NOTE - L wer ball joint is integral with steering arm and is not servic d separately. Do not replace low r ball joint for l osen ss unless axial endplay (vertical mov m nt) xce ds .050".* Remove upper control arm rebound bumper, then raise car so front suspension is in full rebound position. Remove wheel and drum assembly. Remove steering arm-to-steering knuckle attaching bolts (brake backing plate lower bolts). Remove tie rod from steering arm with Tool C-3894. *Do not damag s al.* Remove ball joint stud from lower control arm with Tool C-3846, then remove steering arm and ball joint assembly.

Installation: Install new ball joint seal with lip of seal seated on ball joint housing. Install steering arm and ball joint assembly on steering knuckle and tighten mounting bolts to 100 ft. lbs. (Lancer & Valiant), 120 ft. lbs. (Dodge & Plymouth). Install ball joint stud

CONTINUED ON NEXT PAGE



DODGE, LANCER, PLYMOUTH, VALIANT FRONT SUSPENSION ASSEMBLY (EXPLODED)

DODGE, DART, LANCER, PLYMOUTH "TORSION-AIRE" SUSPENSION (Cont.)

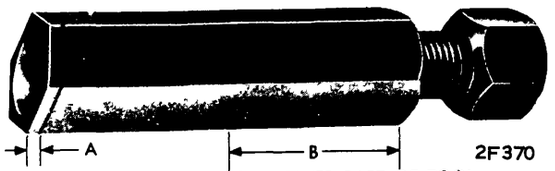
to lower control arm and tighten stud nut to 100 ft. lbs. and install cotter pin. Repack joint with proper grease through plug hole in bottom of joint until seal passes grease or balloons, then replace grease fitting with plug. Connect tie rod to steering knuckle arm and tighten nut to 40 ft. lbs. Install stone shield, wheel and drum assembly, and upper control arm rebound bumper.

UPPER BALL JOINT: Removal - *NOTE - Tool C-3711 must be modified as shown in illustration.* Raise car with jack under lower control arm as close to wheel as possible, then remove wheel and drum assembly. Remove upper and lower ball joint stud nuts. *NOTE - On Lancer & Valiant, add approximately 7/16" of flat washers over lower ball joint stud so Tool C-3711 can be used without damaging lower ball joint stud threads.* Place Tool C-3711 over ball joint studs with threaded part of tool locked securely against upper stud. Spread tool so upper stud is under load, then strike steering knuckle sharply with hammer to loosen stud. *CAUTION - DO NOT force stud from steering knuckle with tool alone.* Remove tool, then remove ball joint stud from steering knuckle. Unscrew ball joint from upper control arm with Tool C-3714 (Lancer & Valiant), C-3560 (Dodge & Plymouth). Seal will come off when ball joint removed.

Installation: *CAUTION - Always replace balloon seals after they have been removed. Ball joint threads must engage control arm threads squarely.* Screw ball joint into control arm by hand as far as possible. With Tool C-3714 (Lancer & Valiant), C-3560 (Dodge & Plymouth) tighten ball joint until it bottoms on housing (125 ft. lbs. minimum). Install new seal over stud with Tool C-3713 (Lancer & Valiant), C-3736 (Dodge & Plymouth). Install ball joint stud into steering knuckle and tighten retaining nut to 55 ft. lbs. (Lancer & Valiant), 100 ft. lbs. (Dodge & Plymouth). Pack joint with proper grease through plug hole in top until seal passes grease or balloons, then replace grease fitting with plug. Install lower ball joint stud nut and tighten to 100 ft. lbs., and install cotter pin. Install wheel and drum assembly.

STEERING KNUCKLE: Removal - Remove upper control arm rebound bumper, then raise car so front suspension is in full rebound position. Remove wheel and drum assembly. Back off torsion bar adjusting bolt to remove all load from bar, then remove upper ball joint stud from steering knuckle (see above). Remove backing plate-to-steering knuckle, and steering arm-to-steering knuckle attaching bolts and remove steering knuckle.

Installation: Install steering knuckle to brake backing plate and tighten nuts finger tight. Install steering arm to steering knuckle and tighten nuts finger tight. Tighten upper ball joint stud nut to 55 ft. lbs. (Lancer & Valiant), 100 ft. lbs. (Dodge & Plymouth), and install cotter pin. Tighten steering knuckle upper bolts to 55 ft. lbs. and lower bolts to 100 ft. lbs. (Lancer & Valiant), 120 ft. lbs. (Dodge & Plymouth). Load torsion bar by turning adjusting bolt, install wheel and drum assembly, upper control arm rebound bumper and torque nut to 200 inch-lbs.



A. REMOVE 1/16 INCH FROM LOWER PART OF TOOL
B. ROUND OFF PORTION OF THE TOOL THAT IS POSITIONED NEXT TO THE STEERING KNUCKLE ARM.

TOOL C-3711 MODIFICATION

SWAY BAR: Removal - Remove sway bar link retaining nuts and washers. Remove sway bar cushion retaining nuts, washers, and bolts. Remove sway bar assembly. Remove sway bar link insulating bushings from frame washers over ends of links with concave side up, then slide links up through bushings and install washers with concave side down. Install nuts and tighten to 100 inch-lbs.

bracket and replace bushings if worn or deteriorated.

Installation: Install sway bar insulating bushings with a twisting motion and water lubricant. Place cushion housing on struts and install lock plates. Install bolts, washers, and nuts and tighten to 35 ft. lbs. Install

LOWER CONTROL ARM: Removal - Remove torsion bar (see above). Disconnect shock absorber from lower control arm and push out of way. Remove lower ball joint (see above). Remove strut nut and bushing retainer from forward end of "K" member. Remove cotter pin, nut, and washer from lower control arm shaft and tap end of shaft with a soft hammer to aid removal, then remove lower control arm, shaft, and strut as an assembly from "K" member. Remove strut bushing inner retainer from "K" member if it did not come out with strut. *NOTE - Remove strut rubber bushing from "K" member only if damaged or destroyed.*

Disassembly: Put strut part of control arm in a vise and remove strut from arm, then remove rebound bumper, and torsion bar adjusting nut and swivel. With assembly in an arbor press with torsion bar hex opening up, place a brass drift into hex opening and press shaft out of control arm (bushing inner shell will remain on shaft). Cut and remove rubber part of bushing from control arm. Insert a 1 3/8" NF 12 tap into pivot shaft bushing outer shell to about half the depth of bushing and force bushing from control arm with a hand press and blunt drift. Remove bushing shell from tap and bushing inner shell from pivot shaft.

Reassembly: Place new bushing on shaft (flange end of bushing first) and seat bushing on shaft shoulder. Press shaft and bushing assembly into lower control arm with Tool C-3848 and arbor press. Install torsion bar adjusting bolt and swivel. Install bounce bumper and torque to 200 inch-lbs. Place strut in lower control arm and tighten nut to 110 ft. lbs.

Installation: Install new strut bushing in "K" member using a twisting motion and water lubrication if necessary. Place lower control arm shaft and strut into mountings in "K" member (strut bushing inner retainer placed over shaft before strut inserted into bushing). Install strut bushing outer retainer and nut, and lower control arm shaft washer and nut finger tight only. Install steering knuckle and steering arm (see above). Connect tie rod and install stone shield. Connect shock absorber to lower control arm and tighten nut to 55 ft. lbs. Install torsion bar (see above), and wheel and drum assembly. Lower car and tighten strut nut at "K" member to 40 ft. lbs. Adjust front suspension height and tighten lower control arm shaft nut to 180 ft. lbs. and install cotter pin.

LOWER CONTROL ARM STRUT: Removal Remove lower control arm, shaft, and strut assembly (see above). Remove strut attaching nut and remove strut from control arm.

Installation: Reverse removal procedure and tighten strut attaching nut to 110 ft. lbs.

UPPER CONTROL ARM: Removal - Disconnect upper ball joint stud from steering knuckle (see "Upper Ball Joint Removal" above). Remove nuts, lockwashers, cams, and cam bolts holding upper control arm and bushings to front and rear support brackets, then remove upper control arm.

Disassembly: Mount control arm in a vise and use Tool C-3710 to press bushing from arm. Remove ball joint from control arm (if necessary) with Tool C-3714 (Lancer & Valiant), C-3560 (Dodge & Plymouth).

Reassembly: Place flange end of new bushing in Tool C-3710, support control arm squarely, and force bushings into control arm from outside until tapered part of bushing seats on arm. Install ball joint into control arm with same tools used for removal and tighten until seated (125 ft. lbs. minimum). Install new seal.

Installation: Slide control arm into position and install cam bolts, cams and nuts. Install upper and lower ball joint studs and tighten nuts to specifications (See above). Install wheel and tire assembly.

FRONT SUSPENSION CROSSMEMBER ("K" MEMBER): Removal - Remove engine mount-to-"K" member attaching bolts and carburetor air cleaner. On 6 Cyl., raise engine until mounts clear "K" member. On V8, remove carburetor and support engine. On all models, remove lower control arm assemblies on both sides (see above). Remove idler arm from "K" member, then disconnect steering gear housing and support to relieve all tension. Install frame stands under body side rails. Remove "K" member attaching bolts and remove "K" member.

Installation: Reverse removal procedure and tighten "K" member attaching bolts to 150 ft. lbs., engine mount bolts to 85 ft. lbs., and steering gear attaching bolts to 50 ft. lbs. Tighten idler arm nut to 45 ft. lbs.

COMET & FALCON FRONT SUSPENSION

Ford Falcon (1962)
Mercury Comet (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 LOWER BALL JOINT SEAL RUPTURE PREVENTION:* If lower ball joint seal has no grease relief, proceed as follows to prevent seal ballooning or rupture under continuous lubrication: Heat a 1/16" diameter wire red hot and pierce a hole through wall of seal the size of wire outside diameter. *CAUTION - Do not make hole larger than specified.*

►*1962 FRONT SUSPENSION NOISE CORRECTION:* Raise car, remove wheel and tire, and use only Special Lubricant, No. C1AZ-19590 (M1C-47), as follows: Lubricate, spring seat in both loaded and unloaded conditions until old chassis lube is forced out and special lubricant can be seen at inner circumference and around top half of spring seat bushing. Lubricate both upper and lower ball joints, first in unloaded condition, then in loaded condition until all old grease has been forced out. *CAUTION - Road test for minimum of 5 miles on rough roads to insure that noise is eliminated.*

►*1962 FRONT SUSPENSION PRODUCTION CHANGES & PARTS NON-INTERCHANGEABILITY NOTE:* Lower control arm and other parts have been redesigned in production and later parts are **not** interchangeable with earlier parts. Make sure correct parts are used during front suspension servicing. Parts affected (and changes) are as follows:

Lower Control Arm & Ball Joint - Ball joint and stud larger; strut attaching holes farther apart.

Front Wheel Spindle - Larger stud hole. Torque for stud nut increased to 60-80 ft. lbs.

Lower Arm Strut - Larger diameter and thread size. Front attaching nut torque increased to 45-60 ft. lbs. Strut length changed *(see "Strut Adjustment" below).*

Strut Mounting Bracket - Redesigned for larger strut.

Steering Arm Stop - Redesigned because of strut relocation on lower control arm. Hole spacing 1½" apart.

Strut Arm Insulator & Spacer - Larger diameter for larger strut.

Front Stabilizer Bar - Diameter increased, and rod bent at outboard ends (was straight).

Front Side Member & Apron Assembly - Reinforcement on inner rail.

Horn & Bracket Assembly - Redesigned and horns reversed (high horn on left side, low horn on right side). *NOTE - Use universal horn bracket, No. B9A-13830-A, for service replacement.*

DESCRIPTION: "Ball Joint" type suspension with front coil spring and shock absorber mounted between upper control arm and tower in wheel housing. Lower control arm is connected to underbody with a mounting bolt. A strut connected between outer end of lower control arm and bracket at forward end of underbody prevents horizontal movement of lower control arm. Shims located between upper control arm inner shaft and mounting bracket control camber and caster adjustment.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Front Riding Height (Comet): With car at curb weight on a level surface, measure the distance between center of lower control arm-to-frame attaching bolt and surface of floor, then measure distance between lower surface of lower control arm ball joint (zerk fitting) and floor. The difference between these two measurements is the front riding height and should be as in table below

℄ 1962 Comet Front Riding Height Specifications

Body Type	Synchro-mesh	Auto. Trans.
2-Door Sedan	4 3/16"	4 7/16"
4-Door Sedan	4 1/4"	4 3/8"
2-Door Sta. Wagon	4 1/4"	3 15/16"
4-Door Sta. Wagon	4 1/16"	4 5/16"

℄ - All measurements ±3/8".

Rear Riding Height (Comet): With car at curb weight on a level surface, measure the distance from the top surface of rear axle housing tube at spring vertically upward to underside of side rail member approximately 7/16" rearward of axle bumper bracket flange. Distance should be as listed in table below.

1962 Comet Rear Riding Height Specifications

Body Type	Rear Height
2 & 4-Door Sedans	6 9/16"±7/16"
2 & 4-Door Station Wagons	6 15/16"±7/16"

Lower Control Arm Strut Adjustment: Adjust length of strut by turning front and rear nuts securing strut rod to bracket on frame member to a length of 17 5/8" (Early Cars), 16 15/16" (Later Cars - *See "Production Change Note" above*), measured from back face of rear insulator washer to center strut-to-lower control arm attaching bolt. The correct distance between insulator washers (Measured from outer surfaces) should be 1.27"±1/32" when strut rod nuts are tightened to 40-55 ft. lbs. (Early Cars), 45-60 ft. lbs. (Later Cars).

REMOVAL & INSTALLATION: *See 1960 Final Data, Page 374, or later Manual edition, and note the following:*

Lower Ball Joint Stud Nut Torque - 35-65 ft. lbs. (Early Cars), 60-80 ft. lbs. (Later Cars). *See "Production Change Note" above.*

Strut Rod Front Attaching Bolt Torque - 40-55 ft. lbs. (Early Cars), 45-60 ft. lbs. (Later Cars). *See "Production Change Note" above.*

FORD FAIRLANE & MERCURY METEOR FRONT SUSPENSION

Ford Fairlane (1962)
Mercury Meteor (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 UPPER CONTROL ARM SHAFT BUSHING SQUEAK CORRECTION:* May be caused by insufficient lubricant at bushing. To correct, remove bushing and lubricate control arm shaft threads with Special Lubricant, No. C1AZ-19586-B. Also place a small amount of lubricant in bushing cavity. *CAUTION - Too much lubricant in bushing cavity may force "O" ring seal from bushing during or after assembly.*

►*1962 FRONT SUSPENSION NOISE ON ROUGH ROAD CORRECTION & PRODUCTION CHANGE:* On cars before February 20, 1962, noise may be caused by hardness of butyl rubber jounce bumper when upper control arm hits bumper. To correct, install new softer natural rubber bumper, No. C2OZ-3020-B. This new bumper used in production after above date.

DESCRIPTION: "Ball Joint" type with front coil spring and shock absorber mounted between upper control arm and tower in wheel housing. Upper control arm inner shaft and mounting bracket on front suspension housing are serrated to provide camber and caster adjustments by movement of upper control arm shaft. Lower control arm is connected to underbody with a pivot bolt and bushing assembly. On Fairlane, a strut connects outer end of lower control arm to a bracket on underbody at forward end to prevent horizontal movement of lower control arm. On Meteor, to limit lower control arm horizontal movement, a forward extension arm is bolted to lower control arm and connected to a spring cushion pivot link on underbody just forward of stabilizer bar.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Meteor Suspension Riding Height: Measure riding height with tires properly inflated and car at curb weight (no passengers or cargo, full fuel tank, radiator, and engine oil level, and with spare tire, jack and jack handle in trunk).

Front Height - With car on level floor, jounce car to equalize suspension. Push front bumper down 1" and let car slowly come to normal position. Measure difference between distance from floor to centerline of lower control arm attaching pivot bolt, and distance from floor to bottom of lower ball joint assembly. Raise bumper 1", let car come to normal position, and repeat measurements. Average both measurements. Difference in measurements must be 3 3/4" +11/16", -7/16". If difference less by no more than 3/4" of specifications, install a .42" shim on front spring. *CAUTION - DO NOT install more than 1 shim.* If difference less than 13/16" or more than specified, replace spring.

Rear Height - Using same procedure as listed for front height (above), make two measurements from top of axle housing at spring U-bolt to bottom of frame side rail. Average of both measurements should be 7 1/10" ± 1/2". If not within specifications, replace spring.

REMOVAL & INSTALLATION

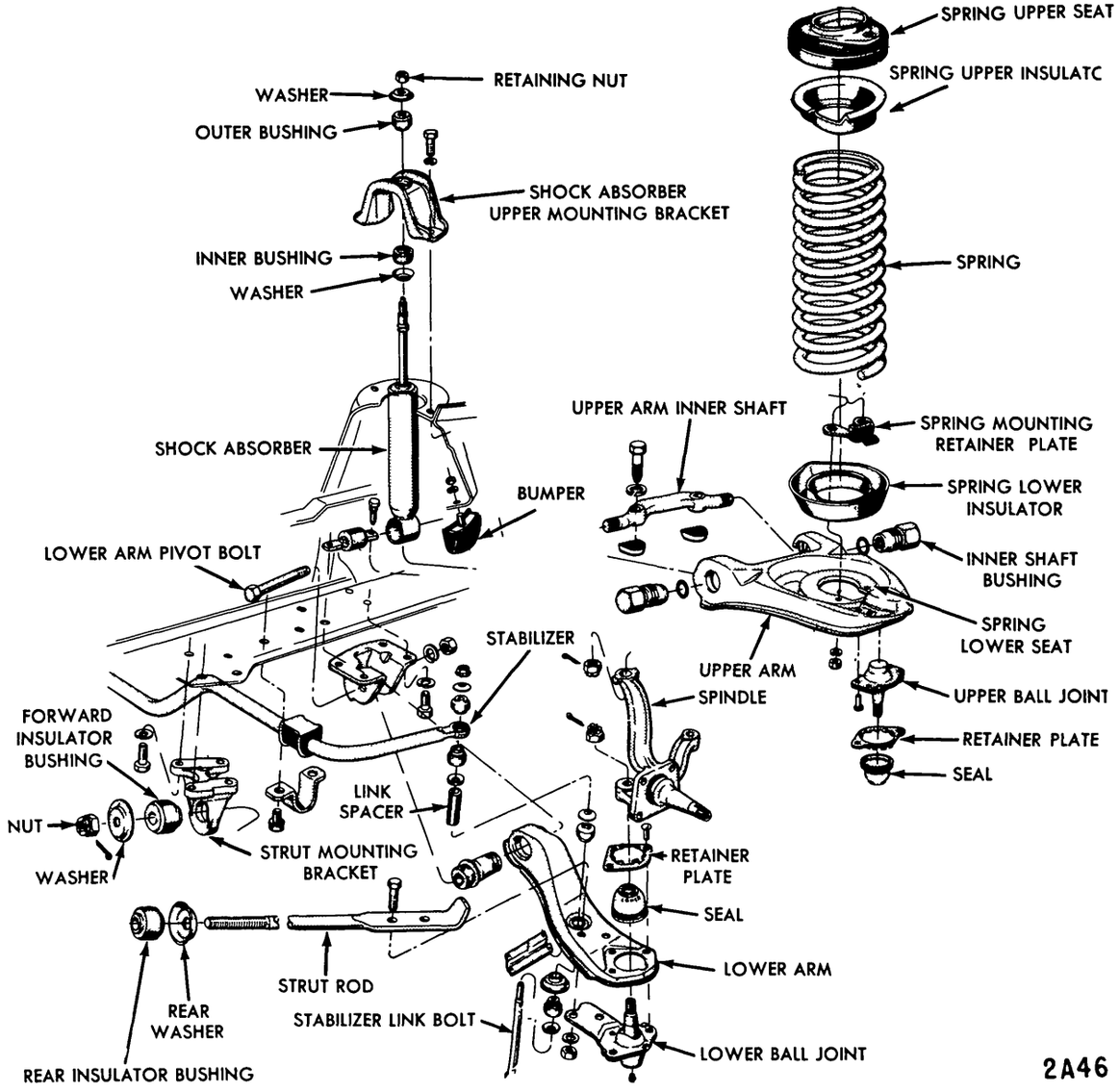
SHOCK ABSORBERS: Raise car and install safety stands, then remove shock absorber lower retaining nuts and washers. Raise hood and remove shock absorber upper mounting bracket retaining bolts. Move mounting bracket-to-dash panel brace to one side, then remove mounting bracket and shock absorber as an assembly. Remove shock absorber upper retaining nut, bushing, and washer, then separate shock absorber from mounting bracket. Remove inner bushing. To install, reverse

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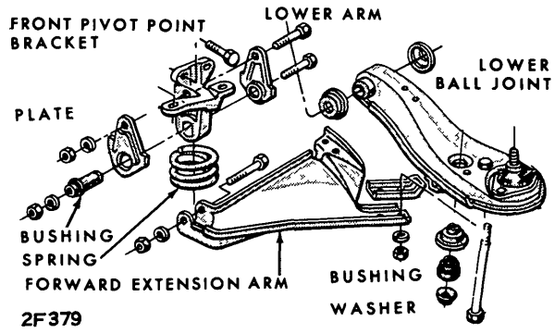
FORD FAIRLANE & MERCURY METEOR FRONT SUSPENSION (C nt.)

removal procedure and tighten lower retaining nuts to 30-40 ft. lbs. Tighten upper mounting stud nut to 20-35 ft. lbs. and upper bracket to body nut to 36-46 ft. lbs.

UPPER BALL JOINT (In Car): *NOTE – Lower ball joint is r plac d only as a c mplete assembly with lower control arm. For r plac m nt of lower ball joint seal, s b l w.* Position a suitable support between upper control arm and frame side rail to hold upper control arm in position while replacing ball joint, then raise car and place on jack stands. Remove wheel and tire, then remove cotter pin from upper ball joint stud and loosen stud retaining nut. Position ball joint remover, Tool T62F-3006-A with Tool T57P-3006-A, so tool is seated firmly against ends of both upper and lower studs (not against lower stud nut). Turn tool with a wrench until tool is under tension, then tap spindle with a hammer near upper stud to loosen stud from spindle. *CAUTION – Do not loosen stud with tool pressure alone.* Remove stud retaining nut and lift stud out of spindle. Remove ball joint from arm. If ball joint is riveted to control arm, drill a 1/8" pilot hole completely through each rivet, then drill off rivet head through pilot hole with a 3/8" drill. Drive rivets out of holes. *CAUTION – Do not bend arm when driving rivets out.* Remove all burrs from holes and clean arm, then attach new ball joint and seal, using only the special bolts, nuts and washers furnished with new ball joint. *Do not rivet ball joint and seal retainer to arm.* Reassemble by reversing disassembly procedure and tighten ball joint stud nuts to 60-80 ft. lbs.



FAIRLANE & METEOR FRONT SUSPENSION ASSEMBLY
(SEE SEPARATE ILLUSTRATION FOR METEOR EXTENSION ARM ASSEMBLY)



METEOR FORWARD EXTENSION ARM ASSEMBLY

LOWER BALL JOINT: *NOTE – Lower control arm ball joint is serviced only as a complete assembly with lower control arm.* If only the rubber seal requires replacement, remove all rivets in the same way upper control arm ball joint rivets are removed (see above), then remove retainer plate and seal. Install seal to ball joint, align rivet holes in seal retainer and ball joint with holes in arm. Secure these parts together with special bolts and nuts.

FRONT WHEEL SPINDLE: Removal - Disconnect upper ball joint stud from spindle arm as detailed under "Upper Ball Joint" above after first removing stud nut from lower ball joint. Tap lower ball joint stud loose from spindle. Disconnect spindle connecting rod from spindle. Remove spindle.

Installation: Reverse removal procedure and tighten upper and lower ball joint stud nuts to 60-80 ft lbs. Tighten spindle connecting rod ball joint stud nut to 35-40 ft. lbs.

FRONT SPRING: Removal – Remove shock absorber (see above), then remove suspension bumper and bracket assembly. *NOTE – Install one shock absorb r upper mounting bracket bolt to hold spring upper s at to spring housing while spring is being compress d.* Install tool upper plate on spring, then fit tool pilot into spring upper seat. Place tool bearing over pilot and insert tool shaft through bearing and pilot. Install lower tool plate under third coil from bottom of spring, then secure plate to coil and tool shaft with tool retainer. Compress spring by turning tool shaft with an impact wrench. Remove bolt and washer holding spring upper seat to housing, then remove spring and tool from housing as an assembly. Position spring and tool assembly in a vise, gripping lower coil of spring, then

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FORD FAIRLANE & MERCURY METEOR FRONT SUSPENSION (Cont.)

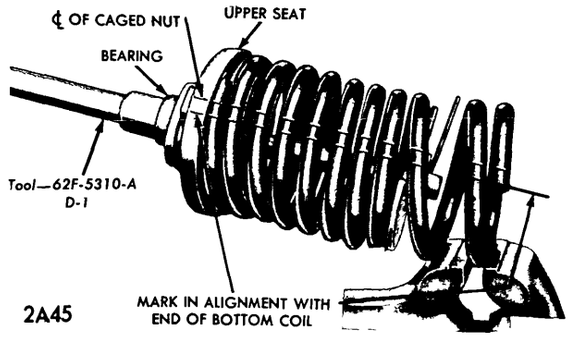
scribe 2 lines on narrow side of spring upper seat for proper alignment with replacement spring. *NOTE – The first line should be aligned with center line of caged nut. The second line should be ¾" from first line and in alignment with end of bottom coil.* Release spring tension and remove tool and seat assembly from spring.

Installation: Reverse removal procedure and note the following: Position upper seat and insulator assembly on spring so that mark made during removal is aligned with end of bottom coil. *NOTE – If a new seat is being installed, first scribe a line at centerline of caged nut on narrow side of seat. Position seat on spring so line on caged nut is aligned with bottom coil. Scribe a second line ¾" clockwise from first line, then turn seat counterclockwise until second line is aligned with the end of bottom coil.* Install tool and compress spring, then install tool and spring assembly in spring housing with end of bottom coil bearing against punched end of recess in spring lower seat. Secure spring upper seat to top of spring housing with two bolts and washers (this will hold spring in correct position while it is being released). Release spring tension, then remove the two temporary bolts and remove tool from spring.

UPPER CONTROL ARM: Removal – Remove front spring (see above), then remove upper control arm ball joint from steering knuckle (see "Upper Ball Joint" above). *NOTE – If lower control arm is being removed also, loosen lower ball joint in same manner as for upper ball joint.* Working from engine compartment, remove upper control arm inner shaft retaining bolts and lockwashers. Remove nut from upper ball joint stud, lift stud out of spindle, then remove control arm from car.

Installation: Reverse removal procedure and tighten upper control arm inner shaft retaining bolts to 115-135 ft. lbs. (Fairlane), 150-160 ft. lbs. (Meteor).

UPPER CONTROL ARM SHAFT & BUSHING REPLACEMENT: Remove front spring (see above), then remove upper control arm inner shaft retaining bolts and lockwashers. Pull upper control arm and shaft assembly away from underbody and swing 180° outward. Position a stand under control arm for support. Remove bushings from shaft and arm, then remove shaft. Install a new shaft and apply grease to new bushings and install bushings loosely on shaft and arm. Turn bushings so that shaft is exactly centered in arm. *NOTE – Shaft will be properly centered when the distance between center of attaching bolt hole at each end of shaft is an equal distance from inner side of control arm flange.* Make an 8" spacer from ¾" diameter pipe or rod and position spacer parallel with inner shaft, and force spacer between flanges of upper control arm. *CAUTION – If spacer cannot be forced between arm flanges, directly below inner shaft, replace upper control arm.* With spacer positioned in arm, tighten bushings securely. Move control arm on shaft to make sure there is no binding, then remove spacer. Reinstall by reversing removal procedure and tighten inner shaft to underbody bolts to 115-135 ft.lbs. (Fairlane), 150-160 ft. lbs. (Meteor).



FRONT SPRING COMPRESSION TOOL ASSEMBLY

LOWER CONTROL ARM: Removal - Position a support between both left and right upper control arms and frame side rail to hold upper control arms in position while removing lower control arm. Raise car and support on jack stands, then disconnect stabilizer bar from lower control arm. Disconnect strut or forward extension arm from lower control arm. Remove lower control arm ball joint stud from steering knuckle in the same way upper ball joint stud is removed (see above). Remove nut from lower stud. Remove control arm-to-underbody pivot bolt (Fairlane), control arm mounting bracket-to-underbody bolts (Meteor), then remove control arm.

Installation: Reverse removal procedure. Torque Meteor control arm mounting bracket bolts to 32-42 ft. lbs., and forward extension arm-to-lower control arm bolts to 50-65 ft. lbs., and control arm-to-mounting bracket bolt to 50-65 ft. lbs. Torque Fairlane control arm-to-underbody pivot bolt to 50-65 ft. lbs., and strut rod-to-control arm bolt to 70-90 ft. lbs. On all cars, torque stabilizer bar-to-control arm bolt to 10-15 ft. lbs.

LOWER CONTROL ARM BRACKET (METEOR): Removal - Remove lower control arm (see above), then remove bracket attaching bolt and remove bracket from control arm with a soft hammer. *NOTE - Bushing in lower control arm is not serviced separately from control arm.*

Installation: Place control arm bushing end with cupped washers on each side in a vise so vise jaws cover about ½ of hole in washers. Compress ends of torsion bushing with cupped washers by tightening vise jaws. Place lower edge of mounting bracket over top of cupped washers and position bracket downward and over washers with a soft hammer. Loosen vise and install bracket completely on control arm. Install retaining bolt, lockwasher, and nut, and torque to 50-65 ft. lbs.

LOWER CONTROL ARM STRUT & BUSHING REPLACEMENT (FAIRLANE): Position a support between upper control arm and frame side rail to hold upper control arm in position, then raise car and place on jack stands. Remove wheel, then disconnect strut from front bracket and from lower control arm and remove strut assembly. To install, place a new washer and bushing on forward end of strut rod and position strut rod into front mounting bracket and on lower control arm. Tighten lower control arm-to-strut rod retaining bolts and nut to 70-90 ft. lbs. Install forward insulator bushing, washer, and nut and tighten nut to 36-46 ft. lbs. Complete reassembly by reversing removal procedure.

FORWARD EXTENSION ARM (METEOR): Removal - Raise car and place a support under lower control arm. Remove extension arm-to-front pivot point bracket bolt, and extension arm-to-lower control arm bolts. Remove forward extension arm and steering stop.

Installation: Attach extension arm to lower control arm but do not tighten attaching bolts. Install front pivot point bracket to extension arm and torque attaching bolt to 50-65 ft. lbs., then tighten attaching bolts at lower control arm to 70-90 ft. lbs. (tighten bolts near lower ball joint first). Remove support stand and lower car.

FRONT PIVOT POINT BRACKET (METEOR): Removal - Support lower control arms, then disconnect pivot point from forward extension arm. Remove bracket-to-underbody attaching bolts and remove bracket.

Disassembly: Install Spacer Tools 3069-M-7 between side plates and main casting and place assembly in arbor press. Support assembly with Tool 6306-AC and use a 15/16" socket and 6" extension to press out bushing. Place assembly in a vise, compress one side of coil spring with vise, and other side of spring with a vise-grip pliers. *CAUTION - Coil spring must be completely compressed before removing side plate retaining bolt.* Remove side plate retaining bolt and remove side plates and main casting. Remove spring from pliers and vise.

Reassembly: *NOTE - Main bushing serviced only with main casting.* With main casting in an "on car" position, install coil spring on casting. Install side plates in correct position as follows: Side plate with **large** bushing hole to **front** of car. Slide plate with **small** bushing hole to **rear** of car. Compress coil spring with vise and pliers as given under "Disassembly" above, then install side plate retaining bolt, lockwasher, and nut and torque to 36-46 ft. lbs. Install bushing through largest hole and press into position with a 1¼" socket and 6" extension and support tools used for removal.

Installation: Reverse removal procedure and torque pivot bracket-to-extension arm retaining bolt to 50-65 ft. lbs. Torque bracket-to-underbody retaining bolts to 32-42 ft. lbs.

FORD GALAXIE & MERCURY MONTEREY FRONT SUSPENSION

Ford Galaxie (1962)
Mercury Monterey (1962)

►CHANGES, CAUTIONS, CORRECTIONS

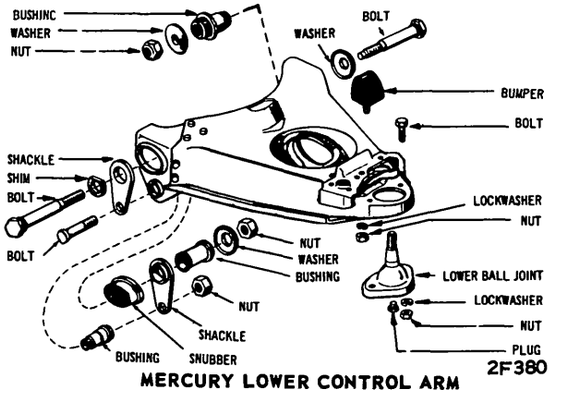
►*1962 FRONT STABILIZER LINK SQUEAK CORRECTION:* May be caused by improperly installed front stabilizer link insulators. To correct, place car in a normal curb load position, loosen stabilizer links and reposition insulators at top and bottom of links so insulators seat solidly. Torque retaining nuts to 10-15 ft. lbs.

DESCRIPTION: Ball joint type suspension similar to design used on previous models except that lower control arms used on Mercury are connected at the front to frame crossmember through a shackle and rubber bushing. On all models, threaded steel bushings are used on upper control arm inner shaft pivots. Camber and caster adjustments on all models are controlled by shims located between upper control arm inner shaft and bracket on frame crossmember.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

OVERHAUL: *See 1957 Final Data, Page 344, or later Manual additions, and not the following:*

UPPER CONTROL ARM INNER PIVOT SHAFT BUSHING: Removal & Installation - With upper control arm shaft removed from car, hold shaft in a vise and turn bushing off shaft and out of control arm. Install a new "O" ring seal in each bushing, then coat inside of each bushing with a small amount of multi-purpose lubricant (coat outer threads also). *CAUTION - An excessive amount of lubricant inside bushing will force the "O" ring out of place when bushing is installed.* Insert inner shaft in upper control arm, making sure that "bow" in shaft is upward, then install Tool T58P-3044A (Ford); Tool 3082-A (Mercury). With tool inserted between arms of upper control arm to properly locate arms the correct distance apart, place tool in a vise and thread bushing on each end of shaft, then turn



MERCURY LOWER CONTROL ARM

bushings in until hex heads bottom on upper arm. *NOTE - New upper arms are not threaded. Bushings are self-tapping type.* Tighten bushing to 160-190 ft. lbs. Remove assembly from vise and remove tool, then check to see that shaft rotates with moderate effort. If shaft binds, check for misalignment

LOWER CONTROL ARM (MERCURY): Removal - Remove in same manner as for conventional lower control arm assembly.

Disassembly: *NOTE - Do not wash ball joint assembly with solvent.* Remove shackle nut, then tap the two horseshoe-shaped spacers of Tool 3079-M7 between shackle plates and ends of large elliptical bushing. Using an arbor press, support arm and shackle assembly with support cup, Tool 3069-M1 (small end) against inner shackle plate. Insert remover, Tool 3069-M2 into upper inner bushing and press bushing through both shackle plates and into support cup. Remove inner shackle plate and the outer plate and bolt assembly. Press lower bushing from arm using support cup, Tool 3069-M1 (small end) and remover, Tool 3069-M4. Press upper outer bushing from arm using support cup. Tool 3069-M1 (large end) and remover, Tool 3060-M6. Remove lower arm rear bushing using support cup, Tool 3069-M1 (small end) and remover, Tool 3069-J.

Reassembly: *NOTE - Clean bushing bores in arm. Use silicone or liquid soap as lubricant during reassembly.* Install rear bushing using replacer, Tool 3069-M5, support cup, Tool 3069-M1 (small end), and a piece of flat stock across large end of support cup. Press bushing into place until points of ribs on bushing sleeve bottom on arm. Start upper outer bushing squarely into arm by lightly tapping it into position. Use a piece of flat stock on bed of press to support upper outer bushing and press bushing into place using support cup, Tool 3069-M1 (large end) and Tool 3069-M6 over small end of support cup. Press bushing into place until shoulder of bushing sleeve bottoms on arm. Press lower bushing into arm using replacer, Tool 3069-M3, support cup, Tool 3069-M1 (small end), and a piece of flat stock across large end of support cup. Insert bolt of shackle plate and bolt assembly through lower bushing with threaded end of bolt toward inside of arm. Add inner shackle plate, then install and snugly tighten nut. Position the two horseshoe-shaped spacers, Tool 3069-M7 between shackle plates and upper outer bushing, then center shackle plates. Support the assembly and, using replacer, Tool 3069-M5, lightly tap upper inner bushing to start it squarely into position in inner shackle plate. Press upper inner bushing through shackle plates using replacer, Tool 3069-M5, support cup, Tool 3069-M1 (small end), and a piece of flat stock over large end of support cup. Remove spacers and tighten nut. *NOTE - If ball joint was removed, install new joint using parts supplied in ball joint kit. Tighten nuts to 28-35 ft. lbs. Make sure ball joint is completely filled with specified lubricant.*

Installation: Reverse removal procedure.

THUNDERBIRD FRONT SUSPENSION

Ford Thunderbird (1962)

DESCRIPTION: Ball joint type front suspension system with coil spring mounted between top of upper control arm and bracket attached to car underbody. Design is similar to that used on previous models.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 365, and not the following:*

FRONT SPRING: Removal - Raise front of car and place a safety stand under lower control arm, then lower car slightly. Remove shock absorber (see above), then remove wheel, hub, and drum assembly. Remove upper suspension arm bumper and raise car slightly off safety stand to lower upper control arm. Insert the lock bar of Tool T61B-5310-A through top of spring and position bar on seventh coil from bottom. Slide tool bearing over tool shaft against the integral nut. Insert shaft through shock absorber mounting hole in lower spring seat so that end of shaft will thread into lock bar. Compress spring by turning shaft into lock bar until top coils are drawn out of spring upper seat. Remove tapered shim and pivot spring outward. Turn tool shaft out of lock bar to release spring, then remove tool bar and shaft from spring and lift spring out of lower seat.

Installation: Install tapered shim in top of spring housing with thick part of shim to centerline of car. Retain shim with tape. Insert one helix insulator between the two top coils of spring and attach other insulator to bottom coil and secure with tape. Place flat rubber insulator over top of spring and secure in three places with tape. Place lower end of spring in lower seat, slide bearing of Tool T61B-5310-A over tool shaft against integral nut, then insert shaft through shock absorber mounting hole in lower seat. Insert lock bar of Tool T61B-5310-A on seventh coil from spring lower end. Thread shaft of tool into lock bar until spring is completely compressed, then tilt spring inward so top coils align with spring upper seat. Turn tool shaft out of lock bar and spring will release top coils into upper seat. Remove lock bar through top of spring and slide tool shaft out of shock absorber mounting hole in lower seat. Install shock absorber at upper mounting, then lower car slightly with stand under lower control arm so shock absorber can be installed at lower end. Install upper arm bumper and bracket assembly.

UPPER CONTROL ARM: Removal - Raise front of car and support under lower control arm, then remove front spring (see above). Remove upper ball joint (see "Wheel Spindle" above). Remove upper control arm inner shaft retaining nuts and washers, then remove upper control arm.

Disassembly: Position upper arm inner shaft in a vise and unscrew bushings from shaft and arm. Remove assembly from vise and separate inner shaft from arm.

Reassembly: *NOTE - If either bushing is worn or damaged, replace both bushings. When replacing inner shaft, use only new bushings.* Position shaft in arm and install new bushings on shaft and arm. *NOTE - Turn bushings so shaft is centered in control arm (centerline of shaft attaching bolts holes should be 1.85±.02" from side of arm).* Tighten bushings to 15-25 ft. lbs.

Installation: Reverse removal procedure and torque inner arm-to-underbody nuts to 50-70 ft. lbs.

LOWER CONTROL ARM: Tighten pivot bracket bolt to 60-80 ft. lbs.

LINCOLN CONTINENTAL FRONT SUSPENSION

Lincoln Continental (1962)

DESCRIPTION: Ball joint type suspension system of same design used on previous models.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

Riding Height: Front - With car on a level floor and tires properly inflated, gas tank full and luggage compartment empty, push front bumper down 1", release slowly and let car assume normal position. Measure distance between top of drag strut and inside of No. 2 crossmember next to forward edge of bumper striking pad. Raise bumper up 1" and repeat measurement. Average of both readings should be 5.5-6.1" (Normal), 6.2" (Maximum), 5.2" (Minimum). If not correct, shim or replace spring.

Rear - Make two measurements after pushing bumper up and down as detailed under front height measurement (above), and measure distance from top of axle housing to underbody at rear of rebound bumper bracket rear attaching bolt. Distance should be 7.7-8.7" (Normal), 8.8" (Maximum), 7.0" (Minimum). If not correct, replace spring.

REMOVAL & INSTALLATION: *See 1961 Final Data, Page 367.*

RAMBLER (EXCEPT AMERICAN) REAR SUSPENSION

Rambler Classic & Ambassador (1962)

DESCRIPTION: Rear springs are mounted between seats on rear axle housing and seats on car underbody and are held in position by weight of car on springs and by extended limits of shock absorbers. A rear stabilizer bar connected between car underbody on right side and a bracket on left side of rear axle housing prevents prevents lateral movement of rear axle assembly. Shock absorbers are mounted adjacent to rear springs on forward side of rear axle housing and are connected to a bracket on rear axle housing and to car underbody assembly. Rear wheel driving force is transmitted to car body by a torque tube between rear axle housing and transmission.

SHOCK ABSORBERS: Removal - Disconnect shocks from car underbody and from bracket on rear axle housing and remove shock.

Installation: Reverse removal procedure.

REAR COIL SPRINGS: Removal - Raise and support rear of car with a jack stand placed under car underbody, then raise rear axle assembly to approximately normal ride position. Disconnect shock absorbers at bracket on rear axle, then lower rear axle sufficiently to free springs from seats. Springs can then be lifted out. *CAUTION* - When lowering rear axle assembly be careful not to lower it to the point where a strain will be placed on torque tube connection at transmission.

Installation: Reverse removal procedure.

STUDEBAKER FRONT SUSPENSION

Studebaker (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 TIE-ROD REPLACEMENT CAUTION:* Both 1961 and 1962 type tie rods are used in production. Be sure to replace tie rod with correct part, as tie rods are **not** interchangeable.

►*UPPER CONTROL ARM BUSHING PRODUCTION CHANGE & SERVICE NOTE (TAXI & POLICE CARS):* Threaded steel bushings, replacing rubber bushings, entered production beginning Serial Nos. 62S-12830 & 62V-10608, for longer service life under severe operating conditions. Service procedures for these bushings are different as detailed below.

►*LOW FRONT END RIDING HEIGHT CORRECTION:* If front riding height too low because of accessories or optional equipment, front spring spacers may be installed at one or both ends of front spring. Table below indicates amount a single spacer will raise front of car (if two spacers used, double the specification).

Front End Height Spacer Specifications

Spacer No.	Thickness	℄ Raises Car Approx.
526830	3/16"	5/16"
436420	3/8"	5/8"
436417	1/2"	13/16"

℄ - If one spacer only is installed.

DESCRIPTION: Independent coil spring type of same design used on previous models.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

REMOVAL & INSTALLATION: *See 1957 Final Data, Page 351, or later Manual editions, and not the following:*

Upper Control Arm Bushing Replacement (Threaded Steel Type): Place control arm in a vise and remove bushings from inner shaft. Shift shaft as far as possible to one side, move opposite end of shaft out of control arm end and remove shaft and seals from control arm, then remove grease seals. To install, place grease seals on inner shaft and insert one end of shaft into control arm, then bring other end into position and insert into control arm. Spread inner ends of control arm .015" with Spreader Tool J-3957, with J-3957-7 & 8 at inner ends of arm. Turn hexagon of tool until hand tight, then tighten an additional two flats which will spread arms desired .015". Centralize inner shaft between ends of control arm and install bushings securely. *Shaft must be free to turn.*

RAMBLER FRONT SUSPENSION

Rambler, All Series (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 UPPER CONTROL ARM CLICKING NOISE CORRECTION (CLASSIC & AMBASSADOR):* A sharp clicking noise when brakes applied or when turning wheels right and left while parking, may be caused by upper control arm spacer serrations digging into control arm and causing looseness in arms. To correct, install new larger diameter spacer, No. 3169234. Make sure upper control arm metal surfaces in spacer area are smooth before installing spacer. If control arm badly marred, install new arm. Use special unplated hardened steel bolt, No. G-455017, and nut, No. G-225857, DO NOT lubricate these parts, and torque to 90-100 ft. lbs. *NOTE - Above recommendations supersedes previous instructions.*

►*LOWER CONTROL ARM THROUGH BOLT TIGHTENING CAUTION:* The lower control arm through bolt which also acts as the front shock absorber lower anchor (on all models) is specially heat treated and must be properly tightened to 110-125 ft. lbs. *DO NOT REPLACE THIS BOLT WITH ONE THAT IS NOT HEAT TREATED.*

►*TOE-IN ADJUSTMENT NOTE (Cars with Power Steering):* Operate engine to permit steering pump oil pressure to center valve spool in control valve assembly before checking or adjusting toe-in.

►*CAR LEVELING NOTE (EXCEPT AMERICAN):* On 1956-62 cars, an aluminum alloy front spring spacer (¼" thick), Part No. 3202359, is available to assist in leveling a car that leans at right or left front corner. Install spacer on spring seat with spring cushion and spring resting on spacer. *CAUTION - If two spacers are used, install one spacer on upper spring seat at and one on lower spring seat.* The addition of one spacer will raise affected corner approximately ½".

DESCRIPTION: Basic design is similar to that used on previous models. Upper control arms are connected to steering knuckles by trunnion assemblies. On Rambler American, the upper trunnion assembly is integral with front spring lower support. On other models, coil spring lower support is threaded on upper trunnion.

ADJUSTMENT: *See "Wheel Alignment Specifications & Adjustment" in this section.*

REMOVAL & INSTALLATION: *See 1958 Final Data, Page 355, or later Manual editions.*

STEERING LINKAGE

►*POWER STEERING LINKAGE NOTE:* Linkage on these cars is essentially the same as linkage for manual steering cars.

AMERICAN MOTORS

Rambl r (All Seri s): Linkage - Consists of relay rod connected between pitman arm and steering idler arm with tie rod on left side connected between pitman arm and steering arm. On right side, tie rod is connected between idler arm and steering arm. Ball and socket joints are adjustable on Series 01 (American), and not adjustable on Series 10 & 80 (Classic & Ambassador).

Ball & Socket J int Adjustment - On idler arm side, tighten adjusting plug until solid contact made, then back out to first cotter pin hole (no more than 3/8-turn, no less than 1/8-turn). On pitman arm side, tighten adjusting plug until solid contact made, then back out 3/4-turn and install cotter pin in holes nearest this position.

CHRYSLER CORP.

Chrysl r, Imp rial, D S t , Dodge, Dart, Lancer, Plymouth, Valiant: Linkag – Consists of idler arm bracketed to right frame side member and connected to right end of drag link. Pitman arm is connected to left end of drag link. Individual tie rods, connected to drag link near its center, have sleeve adjustment for toe–in.

Idl r Arm Bushing R placement – Idler arm with bushing is serviced only as an assembly. When bushing worn, replace assembly.

FORD MOTOR CO.

Com t, Falcon, F rd Pass. Cars, Lincoln, Mercury, Thund rbird: Linkag – Consists of steering (pitman) arm–to–idler arm rod which transmits motion from steering gear through steering arm which is attached to left end of steering arm–to–idler arm rod, then to front wheels through the tie rods. Tie rods have adjustable sleeves on outer ends for toe–in adjustment. An idler arm is attached to right side of underbody.

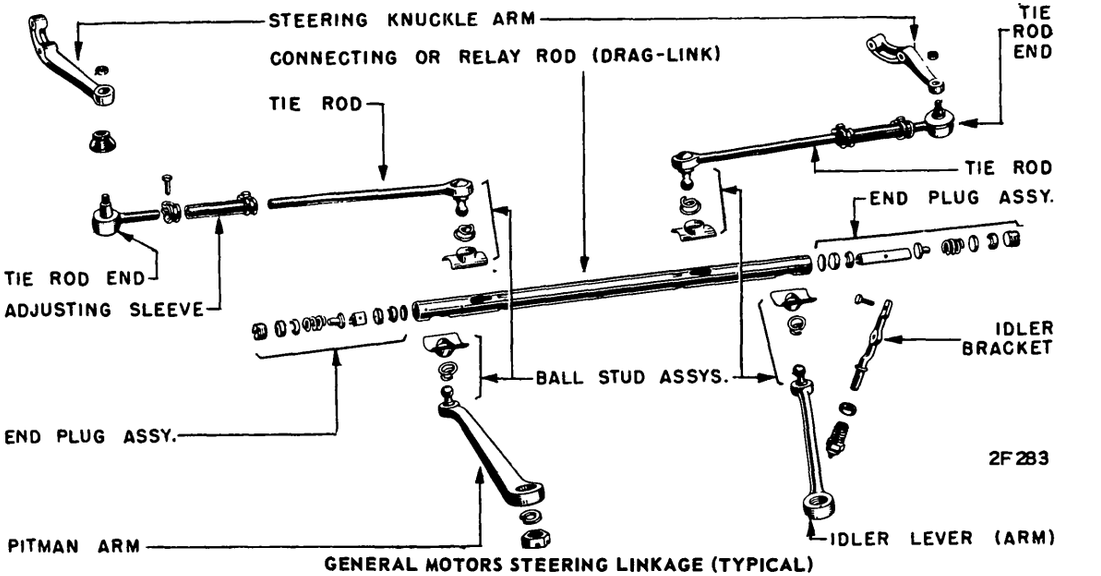
Ti R d End Replac ment – *NOTE – Idler (interm diat) rod nds ar not replaceable. Complete rod ass mbly should b r placed when rod ends are worn.* Remove nut from ball end stud, then place a support behind arm near stud and tap with a soft hammer to drive it out of arm. *CAUTION – DO NOT use a wedge typ ball stud separator because of special design of ball stud seals.*

Idl r Arm & Bushing Replacement - *NOTE - If one bushing is w rn, b th bushings must be replaced.* Replace bushings with Tool Set T61P-3355-A or 3355 (or suitable puller). *CAUTION - Replace idler arm bracket if thr ads ar worn or bracket is bent. DO NOT attempt to straight n a b nt idler arm bracket.*

F rd Trucks: *C SERIES NOTE - See "Production Change" b l w.*

Linkag - Consists of a connecting rod between front wheels. Rod has adjustable features at both ends. Spindle arm, attached to connecting rod at left end, is in turn attached to a one-piece drag link with manual adjustment features at both ends. Rear of drag link is attached to sector shaft arm.

Drag Link Adjustm nt - Remove cotter pins from each end of drag link. Tighten each drag link plug until drag link ball springs are fully compressed. Back off each plug to first cotter pin hole, then install new cotter pins.



GENERAL MOTORS STEERING LINKAGE (TYPICAL)

►*1962 C SERIES LINKAGE PRODUCTION CHANGE & ADJUSTMENT NOTE:* Later production trucks have single adjustable type drag link. With steering wheel centered, adjust drag link for length of 39 1/8"±1/16". Clamp bolt torque should be 35-45 ft. lbs. *CAUTION - Greater offset in curved drag link must be to front for proper tire clearance. Rear clamp opening must face right side of truck, and front clamp opening must face left side of truck.*

GENERAL MOTORS

Buick (Except Special): Linkage – Parallelogram type linkage consisting of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each front wheel. Adjustable sleeves at end of each tie rod for toe-in adjustment. No intermediate rod end plug adjustment is provided.

Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 2 15/16–3 1/16".

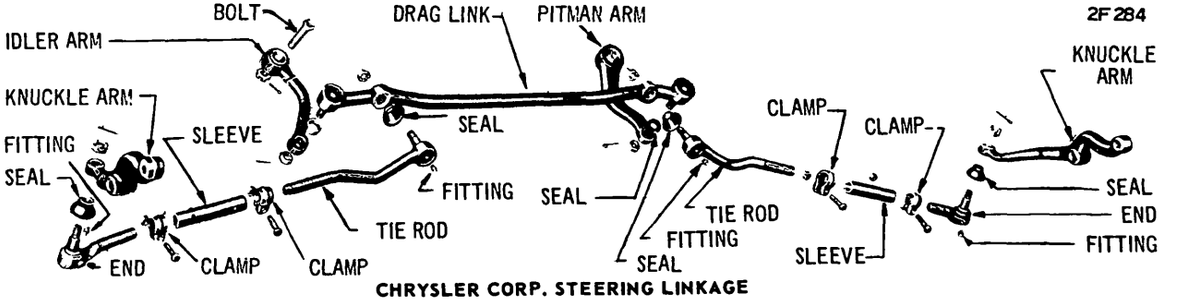
Buick Special: Linkage – Parallelogram type linkage consisting of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each front wheel. Adjustable sleeves at end of each tie rod for toe–in adjustment. Intermediate rod end plug adjustment provided at both pitman arm and idler lever ends of intermediate rod on both manual and power steering cars.

Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 7/16".

Intermediate Rod End Plug Adjustment – Adjust plugs on both pitman arm and idler lever ends of intermediate rod as follows: Turn end plug up tight, then back off plug ¼ – ¾ turn (½ turn preferred) and install cotter pin.

Cadillac: Linkage – Consists of a drag link between steering gear pitman arm and idler arm mounted on right frame side rail, and individual tie rods between drag link and each wheel. Adjustable sleeves at outside ends of tie rods for toe–in adjustment. No. adjustment plugs are provided at drag link ends as drag link is attached to idler and pitman arms by spherical pivots.

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CHRYSLER CORP. STEERING LINKAGE

STEERING LINKAGE (C nt.)

Drag Link Height Adjustm nt – Place a straight bar across two adjustable jacks directly below drag link. Adjust height of jacks so distance from top of bar to centerline of lower control arm pivot bolts is equal on both sides (adjust jacks so distance is an even number of inches). Measure distance from top of bar to lower edge of drag link on both sides using a combination square and level with bubble centered in level. *CAUTION – Do not reposition bar or move car.* Difference in measurement between 1st measurement (top of bar to centerline of lower control arm pivot bolts) and 2nd measurement (top of bar to lower edge of drag link) should be 2 15/16"±1/16" and equal at both inner pivot points within 1/16". If idler arm end of drag link not within limits, loosen idler arm support mounting screws and move support. If proper adjustment still not obtainable, remove and bend idler arm slightly. If pitman arm end of drag link not within limits, loosen steering gear mounting bolts and move gear. If proper adjustment still not obtainable, remove and bend pitman arm slightly. *CAUTION – Bend pitman and idler arms off the car and cold.*

Chevrolet Pass. Cars: Linkage – Consists of steering relay rod between pitman arm and idler arm. Pitman arm connected to relay rod by an adjustable ball and socket joint. Individual adjustable tie rods are installed between relay rod and each front wheel.

Relay Rod Ball Joint Adjustment – Remove cotter pin from end of relay rod and tighten end plug until springs are compressed and plug bottoms. Back off end plug ¾ turn plus amount necessary to insert cotter pin, then insert pin.

Idler Arm Inspection – Remove idler arm from bracket and remove relay rod from idler arm. Remove idler arm stud seals and all grease, then inspect idler arm for damage or wear. Place idler arm in vise, turn nut on stud until nut bottoms on threads. Torque to turn stud should be not less than 1 ft. lb., nor more than 10 ft. lbs. Replace idler arm when turning torque not within limits.

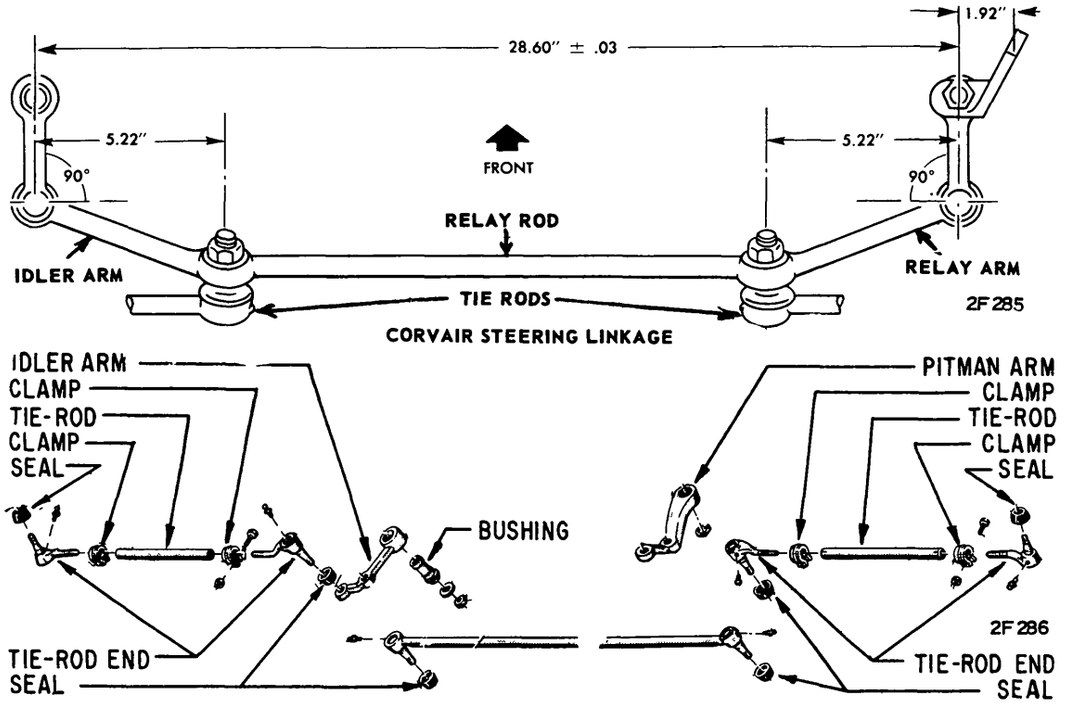
Chevy II: Linkage - Consists of steering relay rod between pitman arm and idler arm. Pitman arm connected to relay rod by an adjustable ball and socket joint. Individual adjustable tie rods are installed between relay rod and each front wheel.

Relay Rod Ball Joint Adjustment - Remove cotter pin from end of relay rod and tighten end plug until springs are compressed and plug bottoms. Back off end plug ¾-turn plus amount necessary to insert cotter pin, then insert cotter pin.

Chevrolet Trucks: Linkage – Consists of twc tie rod assemblies connected between pitman arm and wheel on left hand side and between idler arm and wheel on right hand side. A relay rod is connected between pitman arm and idler arm.

Idler Arm Inspection–*See "Chevrolet Pass. Cars" above.*

Idler Arm Bushing Replacement – *NOTE – On Series 10 through 40, idler arm bushing is not replaceable.* On Series 50 & 60 remove idler arm, then press bushing out with Tool J–1614. *NOTE – Wh n pr ssing bushing from housing, pr ssing t l must thr ad d wn through n bushing and nt top of l w r bushing. Aft r pr ssing this bushing ut, turn support housing v r and press sec nd bushing ut. Always press from inn r rim of bushing t ward utside f housing.*



Press new bushing into place with Tool J–7079–2 and J–8522 Bushings will be properly located in bore when pressed in until tool contacts housing

Relay Rod Ball Joint Adjustm nt (If Equipped) - Turn adjusting plug in until it is solid, then back out 3½ turns to nearest cotter pin hole, then install cotter pin.

Steering Connecting Rod Length - Steering connecting rod length should be as in table below. *CAUTION - On non-adjustable type rods, replace rod if length not within specifications.*

Steering Connecting Rod Length

Truck Model	Rod Length
K10 & K20	16 9/16"±1/16"
P20 & P30	17"±1/16"
T60	18 13/16"±1/16"

Corvair: Linkage – Consists of a relay rod connected between pitman arm and steering idler arm located on right hand side of frame. Tie–rods are connected between relay rod and each front wheel. Bushing on pitman arm end of relay rod is replaceable.

Relay Rod Bushing Replacement – With relay rod removed from car, drive bolt out of bushing, then use a suitable size socket to press bushing sleeve and rubber out of relay rod. Press a new bushing into place with Tool J–8357. *CAUTION – When installing relay rod in car, idler arm and pitman arm must be in proper alignm nt (s illustration). B sur to h ld hex .h ad of bushing bolts s bushing will n t be twist d.*

C rvett : Pitman arm connected by a short drag link to a "third arm" bolted to underside of suspension crossmember at center. Equal length tie rods connect from "third arm" to steering arms at brake backing plates and steering knuckles. "Third arm" pivots on a double row ball bearing inside arm and arm is mounted to crossmember by a stud through ball bearing. A "Fast Steering Adapter" which changes steering ratio from 21.1-1 to 16.3-1 may be found mounted on "third arm" on some cars.

"Third Arm" Assembly - R m val - Disconnect drag link from third arm, then disconnect tie rods from third arm. Remove third arm from crossmember.

Disassembly - Remove grease seal and lock snap ring from inside arm opening. Install a nut on stud and hold nut firmly in vise. Hold other end of arm and use a hammer to tap around arm opening to remove stud and ball bearing.

Assembly - Press bearing and stud assembly into arm with suitable driver (2 3/8"pipe cut to suitable length). Install lock snap ring into groove, making sure it is seated to full depth of groove.

Installation - Pack cavity between bearing lock snap ring and outer edge of arm opening with cup grease. Place seal around outer edge of arm opening. Reverse removal procedure, tighten retaining nut to 60-85 ft. lbs. and install cotter pin.

Drag Link End Plug Adjustment - Tighten end plugs to remove all endplay from ball and socket, then back off each plug 1/4-1/2 turn plus amount necessary to insert cotter pin.

Oldsmobil (Exc pt F–85): Linkag – Consists of steering relay rod between pitman arm and idler arm, bracketed to right frame side rail. Individual adjustable tie rods are attached to center portion of steer-

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STEERING LINKAGE (C nt.)

ing relay rod and are provided with adjustable sleeves for toe–in adjustment. Toe–in adjustment is the only adjustment necessary for steering linkage.

Oldsm bil F–85: Linkag – Consists of steering relay rod between pitman arm and idler arm which is bracketed to right frame side rail. Individual adjustable tie rods are attached to relay rod and are provided with adjustable sleeves for toe–in adjustment.

R lay R d End Plug Adjustment – Thread plugs into relay rod until tight, then back off ¼–¾ turn and install cotter pin with head to front of car.

Idl r Arm & Support Adjustment – Thread idler arm support with seal into bushing until distance from upper face of idler arm to shoulder of support is ½". *NOTE – Idl r arm must be able to rotate 90° in each dir cti n fr m straight ah ad position.*

P ntiac & P ntiac T mp st: Linkag – Consists of steering connecting rod between pitman arm and idler arm, bracketed on right frame side rail, and individual adjustable tie rods between steering connecting rod and each front wheel. Tie rods have adjusting sleeves at outer ends for toe–in adjustment.

Idler Lever & Support Adjustment – With lever and support off car, thread idler support into bushing until distance between upper face of idler arm and shoulder at thread end of idler support is 11/16".

►*1962 TEMPEST STEERING LINKAGE PRODUCTION CHANGE & PARTS NON-INTERCHANGEABILITY CAUTION:* Later cars have linkage with plastic lined ball joints which are lubricated for life. Early and later type parts are **not** interchangeable.

STUDEBAKER CORP.

Studebaker Lark & Hawk: Linkage – Consists of two adjustable tie rods attached to bellcrank mounted at center of frame crossmember. Bellcrank is attached to steering gear pitman arm by a reach rod (drag link).

B llcrank B aring Adjustm nt – Insert shims between lower thrust washer and shaft until there is no endplay. Shaft should turn freely in bearings. Lock nut securely with cotter pin.

WILLYS MOTORS

Willys (All Models): Linkage – Bellcrank on frame crossmember linked to each front wheel by adjustable tie rods and to steering gear pitman arm by a steering connecting rod (drag link).

Connecting Rod End Plug Adjustment – On idler arm end of connecting rod, screw plug in firmly against ball, then back off ½ turn (except FC–150), 1/8–1/4 turn (FC–150), and install cotter pin. On pitman arm end, screw plug in firmly against ball, then back off 1 full turn (except FC–150), 1/8–1/4 turn (FC–150) and install cotter pin.

Chrysler (1962)
D dg Custom 880 (1962) ①
F rd Trucks (Except F-100 & F-250) (1962) ②
Rambler American (1962) ③

① - *For other D dg Mod ls, see "Saginaw Ball Bearing Worm & Nut" in this section.*
② - *F r F-100 & F-250, see "Saginaw Ball Bearing Worm & Nut" in this s ction.*
③ - *For Rambl r Classic & Ambassador, see "Saginaw Ball B aring Worm & Nut" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 RAMBLER STEERING COLUMN BINDING OR SCRAPING CORRECTION:* May be caused by insufficient lubrication at lower nylon bushing in lower jacket tube. If bushing has no oiler, drill a 1/8" hole above the bushing and apply oil through the hole.

DESCRIPTION: Similar in design to units used on previous models. Roller shaft adjusting screw is secured in end of roller shaft with a snap ring on some models. Chrysler Corp. cars have flexible coupling between steering gear worm shaft and steering tube.

ADJUSTMENT: *NOTE – Adjustments must be made in th foll wing s qu nc .*

W rm B aring: All Except Ford Trucks – Turn steering wheel about one turn from straight ahead position and secure wheel to prevent any movement. Determine endplay by shaking front wheels sideways noting any movement that may be felt between steering wheel hub and steering jacket tube. If endplay is present, adjust worm bearing by loosening the four bottom cover bolts about 1/8", then separate top shim with a knife blade and remove. *CAUTION – Do not mutilate remaining shims or gask t.* Tighten cover and recheck for endplay. *NOTE – R move only one shim at a time to prevent btaining too tight an adjustment.*

F rd Trucks (F, B, P Series) – Disconnect pitman arm from drag link (or from control valve ball stud on power steering models). Turn steering wheel two complete turns from straight ahead position, then install an inch–pound torque wrench on steering wheel nut and measure torque required to keep wheel moving at a constant rate for at least one complete turn. If torque or preload is not within specifications in table, adjust as indicated below.

GEMMER WORM & ROLLER

Adjustment – Disconnect horn wire at bullet connector just below steering column housing. Remove bolts attaching endplate to steering gear housing, then remove or install one gasket at a time to obtain proper preload. Gaskets are available in thicknesses of .002", .005", .010". *NOTE – Removal of gasket will increase preload and installation of gasket will decrease preload.* To remove a gasket, separate outer gasket from pack by passing a knife blade all around inner face of gasket being careful not to cut or tear remaining gaskets in pack. Install endplate and recheck preload. *NOTE – On P Series, steering gear and column must be loosened before endplate can be removed for installation of gasket.*

Ford Trucks (C Series) – Disconnect pitman arm from drag link (or from control valve ball stud on power steering models). Remove lower universal joint retaining bolt and nut and raise steering shaft assembly off steering gear, then install a 4" block of wood between steering wheel and upper steering column tube flange. Bend a piece of light strap iron (10" long) so a 1" section is at right angles to longer section, then use a heater hose clamp and fasten strap iron to worm shaft so longer section of iron forms a lever. Turn worm shaft two complete turns from straight ahead position and measure pull required to keep worm shaft moving at a constant rate for at least one complete turn, using a spring scale hooked to lever at a point 8½" from outer diameter of steering shaft. If pull required to turn shaft not within specifications in table, adjust as indicated below.

Adjustment – *Same as for F, B, P Series above.*

Ford Truck Worm Bearing Preload

Truck Model	Worm Preload
F, B, P Series ①	②4½–9 lbs.
F & B–600 Series③	②4½–11¼ lbs.
C Series	④9–13½ lbs.

① – Except F & B–600 With 6000 Lb. Front Axle.
② – Inch–lbs. With inch–pound torque wrench on steering wheel nut.
③ – With 6000 Lb. Front Axle.
④ – Pounds pull. With spring scale installed on steering wheel at right angle to spoke.

Cr ss Shaft R ller & W rm M sh: Chrysler & D dge - Disconnect pitman arm at link, then rotate steering wheel to mid-position and check for backlash by moving pitman arm back and forth. If backlash exists, loosen roller shaft adjustment screw locknut and tighten adjusting screw enough to eliminate freeplay. Rotate steering wheel to one end of its travel and apply a spring scale at rim of steering wheel. A pull of 1-2 lbs. should be required to turn wheel. Tighten adjusting screw locknut while holding adjusting screw from turning.

Ford Trucks (F, B, P Series) – Disconnect drag link from pitman arm, install an inch–pound torque wrench on steering wheel nut and measure torque required to turn wheel through straight ahead (high point) position. If torque not within limits in specification table, adjust as indicated below.

Adjustment – Loosen adjusting screw locknut at engine side of steering gear housing and adjust by turning screw inward (clockwise) to tighten mesh, outward (counterclockwise) to loosen mesh. Hold adjusting screw stationary and tighten locknut.

Ford Truck Worm & Mesh Setting

Truck Model	Worm & Roller Mesh
F, B, P Series ①	②13½–22 lbs.
F & B–600 Series ③	②15¾–24¼ lbs.
C Series	④18½–29¾ lbs.

① – Except F & B–600 With 6000 Lb. Front Axle.
② – Inch–lbs. With inch–pound torque wrench on steering wheel nut.
③ – With 6000 Lb. Front Axle.
④ – Pounds pull. With spring scale installed on steering wheel at right angle to spoke.

Ford Trucks (C Series) – Disconnect pitman arm from drag link. Remove lower universal joint retaining bolt and nut and raise steering shaft assembly off steering gear, then install a 4" block of wood between steering wheel and upper steering column tube flange. Bend a piece of light strap iron (10" long) so a 1" section is at right angles to longer section, then use a heater hose clamp and fasten strap iron to worm shaft so longer section of iron forms a lever. Turn worm shaft so it is at straight ahead position and measure pull required to turn worm shaft through straight ahead (high point) position, using a spring scale hooked to

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GEMMER WORM & ROLLER (Continued)

lever at a point 8½" from outer diameter of steering shaft. If pull not within limits in specification table, adjust as indicated below.

Adjustment – *Same as for F, B, P Series above.*

Rambler American – With pitman arm disconnected and steering wheel at mid position of turning limits, shake pitman arm sideways to determine worm and cross shaft roller clearance; or hook spring scale to rim of steering wheel and note pull required to pull wheel through center of travel. Pitman arm movement should not exceed 1/32", and pull on steering wheel should be 7/8-1 1/8 lbs. To adjust, loosen locknut on adjusting screw and tighten screw as necessary. DO NOT OVERTIGHTEN.

STEERING WHEEL & HORN BUTTON REMOVAL:

Chrysler & Dodge: Disconnect battery, then remove two screws from underside of steering wheel to remove horn ring, retainer and attaching screws. Disconnect horn wire at switch, then remove horn switch. Loosen steering wheel nut several turns and use Puller C-3428 to remove steering wheel and nut.

Ford Trucks: Disconnect horn wire at bullet connector under instrument panel. Remove horn button or ring by pressing down and turning counterclockwise. Remove steering wheel nut. Install a steering wheel puller such as 3600—AA, and remove steering wheel.

Rambler American: Remove horn button or ring and pull steering wheel with Tool J—5290. To replace steering wheel, turn steering shaft until mark on shaft is at top center, then place wheel on shaft with steering wheel spokes equal distance from center.

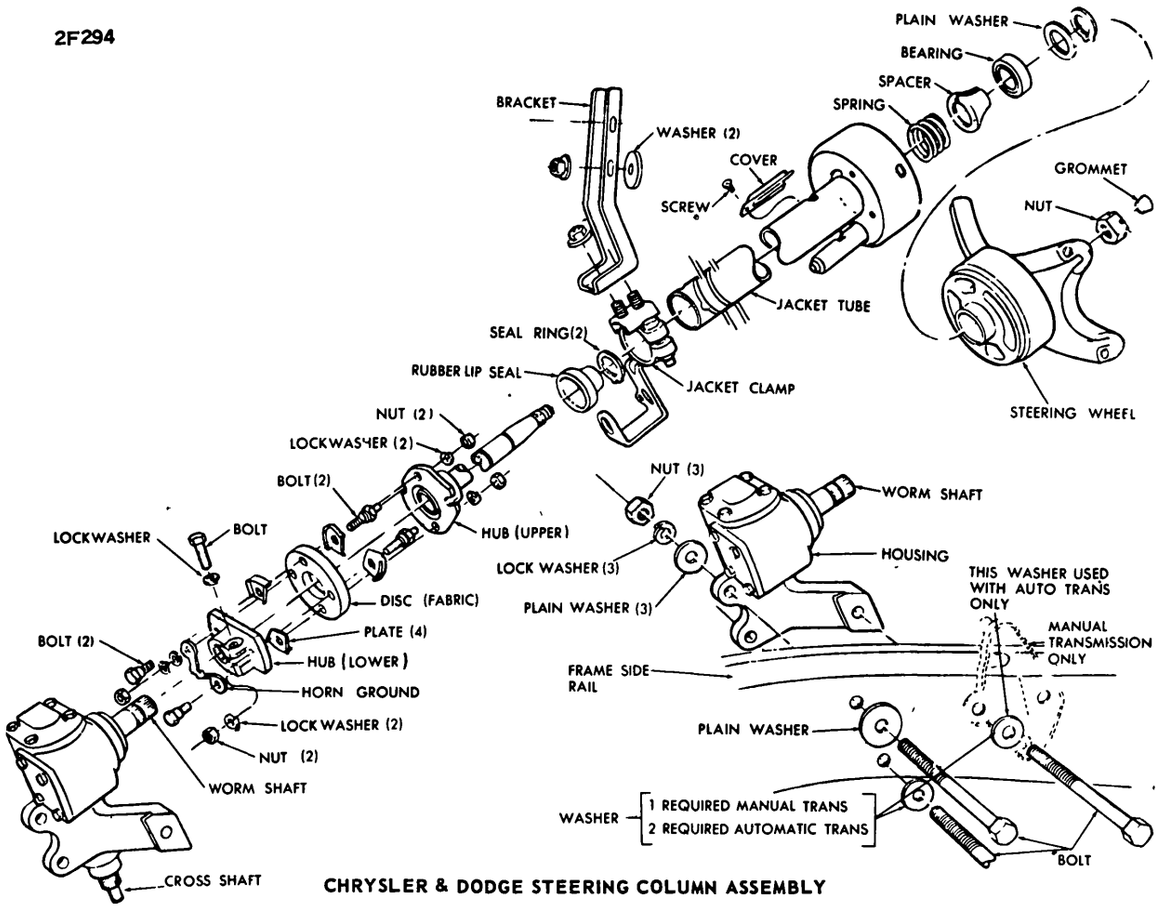
STEERING GEAR REMOVAL, INSTALLATION & ALIGNMENT: Note the special alignment procedures outlined below.

Chrysler & Dodge: Removal - Remove pitman arm from sector shaft with Tool C-3646, then remove flexible coupling-to-steering gear worm shaft attaching bolt and washer. Remove steering gear-to-frame side rail attaching bolts and slide gear assembly forward to disengage flexible coupling from worm shaft. Raise gear and remove through engine compartment.

Installation – Place steering gear worm shaft on exact center of travel (high point). Mark master spline in outer row of serrations on worm shaft, then install gear in engine compartment. Align index mark on outside of flexible coupling hub with master spline on worm shaft. Slide coupling on worm shaft and install gear housing—to—frame attaching bolts and tighten bolts evenly to 50 ft. lbs. Position flexible coupling bolt hole in line with groove on worm shaft and install bolt and lockwasher and tighten to 30—35 ft. lbs. Install pitman arm and tighten nut to 125 ft. lbs.

Alignment – Check steering tube for alignment in steering column seal. If tube is not centered, proceed as follows: *NOTE – Steering tube must be centered in steering column seal, also lip of seal which contacts tube must be well lubricated with wheel bearing lubricant.* Loosen steering column clamp bolts at instrument panel, then loosen lower column clamp bolt and support bracket at both firewall and at column clamp. Hold steering column so it is centered on tube while aligning column support bracket to firewall and lower column clamp. When properly located, tighten support bracket stud nuts at firewall and at column

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CHRYSLER & DODGE STEERING COLUMN ASSEMBLY

clamp to 100 inch—pounds. Tighten steering column—to—instrument panel clamp bolts to 15 ft. lbs., then tighten lower steering column clamp bolt to **200 inch—pounds.**

Ford Trucks (F & B Series): Disconnect battery ground cable, then disconnect horn wire from bullet connector below steering gear housing and remove wire from clips on frame and fender apron. Loosen steering column lower clamp and slide clamp down. Disconnect transmission shift control rod or rods at shift levers. Remove steering wheel (see above), then remove steering column upper bushing spring and bushing. Disconnect turn signal wires, and remove from retaining clip at instrument panel bracket. Remove steering column bracket clamps and rubber sleeve. If truck has a floor mounted gear shift lever, pull steering column tube off shaft. On a truck with automatic transmission or a remote type gearshift lever, remove steering column shields from floor pan. If truck has a V8 engine, remove engine oil filter. On a clutch equipped truck, disconnect clutch retracting spring and remove clutch equalizer shaft outer bearing bracket and shaft (do not loosen split bearings). On F—350 with remote type shift, remove inner bearing bracket. Remove pitman arm. Disconnect steering gear from frame side rail. On a model with floor mounted gearshift, remove steering gear assembly from under truck. On models with automatic transmission or a remote type gearshift, remove assembly through passenger compartment. If steering column tube has not been removed, loosen lower clamp and remove tube. To install, reverse removal procedure.

Ford Trucks (C Series): Remove horn wire brush from steering column just below instrument panel bracket. Remove universal joint upper retaining nut and bolt, then turn wheels to right and remove pitman arm. Remove steering gear housing—to—frame bolts and remove steering gear with universal joint attached. Install by reversing removal procedure.

Ford Trucks (P Series): Remove steering wheel (see above), then remove steering column bracket bolts from instrument panel. Raise front of truck, install stands, then remove pitman arm. Loosen steering column lower clamp, and disconnect horn wire. Move steering gear to left and remove from beneath truck.

Rambler American: Removal – Remove steering wheel (see above), and pitman arm. Loosen steering jacket tube assembly at support plate and at instrument panel mounting bracket. Remove steering gear attaching

CONTINUED ON NEXT PAGE

GEMMER WORM & ROLLER (C ntinued)

bolts and remove gear from beneath car.

Installati n – Reverse removal procedure.

Alignm nt – Loosen housing mounting bolts and align housing at angle determined by height setting of jacket tube bracket. Use shims between housing and mounting surface as necessary. Tighten mounting bolts. Loosen jacket tube bracket and let it match gear column position, then tighten.

OVERHAUL (STEERING GEAR ASSEMBLY): Disass mbly – Remove seal from pitman arm end of sector shaft with a suitable puller. Loosen sector shaft adjusting screw locknut, remove sector shaft cover, adjusting screw and sector shaft as an assembly. Remove housing lower cover plate, shims, spring, seal, washer, and lower bearing. Remove worm shaft and upper bearing from housing. Drive sector shaft bushings or bearing from housing with suitable removing tools.

Reassembly: *NOTE – DO NOT lubricate any parts until unit is reassembled.* Install lower sector shaft bushing to within 1/16" of end of counterbore in housing, and upper bushing flush with housing bore face, using suitable tools. Install worm and shaft in housing with both upper and lower bearings properly seated. Install housing lower cover and shims, making sure no bind exists in worm shaft. Check worm bearing preload as follows: *See above for Ford Trucks.* For other cars, temporarily install steering wheel on worm shaft and tighten cover screws so endplay disappears with 3/8 to 3/4 pound pull required to rotate shaft. Remove or install shims between cover and housing as necessary. Install worm shaft upper seal using a protector over shaft spline to prevent seal damage. Install sector shaft and cover with adjusting screw turned all the way out. Make worm and roller mesh adjustment as detailed above. Fill housing with steering gear lubricant and check for leaks.

Buick & Buick Sp cial (1962)
Check r Sup rba & Marathon (1962)
Chevr let Pass. Cars (1962)
Ch vy II (1962)
Ch vr l t Trucks (1962)
C m t (1962)
C rvair Cars & Trucks (1962)
D dg & D dg Dart (1962) ①
Falcon Cars & Trucks (1962)
F rd Fairlane & Galaxie (1962)
F rd Ec n line Trucks (1962)
Ford F-100 & F-250 Trucks (1962) ②
Lanc r (1962)
M rcury Meteor & M nter y (1962)
Oldsm bil & Oldsm bil F-85 (1962)
Plym uth (1962)
Pontiac & P ntiac T mp st (1962)
Rambl r (Except Am rican) (1962) ③
Stud baker (Exc pt Hawk) (1962) ④
Valiant (1962)

① - Except Dodge Custom 880. *For this model, see "G mm r Worm & R ll r" in this section.*
② - Except 4-Wheel Drive Models. *For these models, s "G mm r Worm & R ller" in this section.*
③ - Except American. *For this model, see "Gemmer W rm & Roll r" in this s ction.*
④ - Except Hawk. *F r this model, see "Gemmer Worm & R ller" in this secti n.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 MERCURY METEOR & FORD FAIRLANE RUBBING NOISE IN STEERING COLUMN CORRECTION:* May be caused by steering shaft not centralized and consequently binding in steering column. To correct, adjust cover plates at firewall. *DO NOT shim steering g ar b x.*

►*1962 MERCURY MONTEREY (WITH ECCENTRIC STEERING COLUMN) EXCESSIVE STEERING SHAFT ENDPLAY CORRECTION:* Torque upper bearing retainer screws to 25-35 inch-pounds (supersedes previous 19-23 inch-pounds). Make sure the 3 bearing retainer rings are properly installed. Make sure that rubber bearing sleeve is properly installed and not mutilated. Make sure bearing is not loose on steering shaft.

►*1962 PONTIAC STEERING COLUMN LOWER SUPPORT BRACKET-TO-MOUNTING BRACKET SCREW TORQUE CHANGE NOTE:* Steering column lower support bracket-to-mounting bracket screw torque has been changed to 5-10 ft. lbs. (supersedes previous 10-20 ft. lbs.) to prevent collapsing of steering column reinforcement.

SAGINAW BALL BEARING WORM & NUT

►*1962 PONTIAC STEERING COLUMN SEAL PRODUCTION CHANGE:* New foam rubber steering column seal, Part No. 544463, used on cars after February 1, 1962 to replace felt seal for easier installation of steering column jacket beneath toe plate grommet.

►*1962 RAMBLER STEERING WHEEL STOP ON STRUT ROD RUBBING ON STEERING ARM ON SHARP TURNS CORRECTION:* To correct, slightly round the square edge of strut rod contact area and apply some fibre grease to the contact points.

►*1962 RAMBLER STEERING COLUMN BINDING OR SCRAPING CORRECTION:* May be caused by insufficient lubrication at lower nylon bushing in lower jacket tube. If bushing has no oiler, drill a 1/8" hole above the bushing and apply oil through the hole.

►*1962 STUDEBAKER PROCEDURE TO CHANGE STEERING WHEEL HEIGHT:* Steering wheel height can be changed by adding or removing shims between upper steering jacket clamp and pedal mounting bracket. *NOTE - A 1/8" shim will change wheel height 1/4". Cars are produced with one 1/8" shim between each end of upper jacket clamp and pedal mounting bracket.* Proceed as follows: Loosen steering gear attaching bolts. To lower wheel, install 1/8" shims, Part No. 1555827, between ends of steering jacket upper clamp and pedal mounting bracket (clamp-to-bracket bolt lengths will permit installation of 3 shims at each bolt). To raise wheel, remove shims between steering jacket upper clamp and pedal mounting bracket. Tighten steering gear attaching bolts.

►*STEERING GEAR NOISE CORRECTION:* May be due to insufficient lubricant caused by an air bubble in gear housing. Make sure correct amount of lubricant is used and turn wheels from stop to stop while filling to eliminate any air bubble.

DESCRIPTION: Recirculating ball nut type. Nut mounted on worm and driven through steel balls which circulate in helical grooves in both worm and nut. Return guides attached to nut serve to recirculate the two sets of balls through grooves. Gear teeth on nut mesh with sector teeth on cross shaft so that cross shaft (and steering gear pitman arm) rotate as steering wheel is turned, causing nut to move up and down.

ADJUSTMENTS

►*NOTE:* Make adjustments in the following sequence.

Steering G ar Alignment: Before any adjustments are made to steering gear, check for binding at frame bracket mounting bolts and at instrument panel bracket or flexible coupling. Disconnect relay rod from pitman arm and check tightness of pitman arm nut. Back off pitman shaft adjusting screw just enough to obtain a slight backlash between ball nut and pitman shaft. Steering shaft should turn through full range in both directions without bind or hard pull and be free of any rough spots. A bind indicates misaligned steering gear on mountings or couplings. Rough spots indicate damaged bearings or parts. Hard pull indicates excessive preload adjustment.

Steering Gear Shaft Worm Bearing Preload Adjustm nt (All Models): With relay rod disconnected from pitman arm and pitman arm properly tightened on steering gear pitman shaft, loosen pitman shaft adjusting screw to obtain a slight backlash between ball nut and pitman shaft. Loosen worm thrust bearing adjuster locknut at upper or lower end of worm shaft depending on car model, and turn adjuster until a slight load is felt (with steering wheel at extreme right or left positions), then tighten locknut. Install a spring scale at right angles to spoke or install an inch-pound torque wrench on steering shaft *(see "Worm Bearing Setting" tabl below for proper method to use in checking preload).* Note spring scale or torque wrench reading required to keep steering wheel moving (when off high point). Rotate adjusting nut as necessary to obtain correct reading on spring scale or torque wrench (see table below).

WORM BEARING SETTING

Car Model	Preload Setting (lbs.)
Buick & Buick Special	① 2-7
Chevrolet Pass. Cars	② 3/8-5/8
Chevy II (Manual Steering)	②③ 1/2-7/8
(Power Steering)	②④ 1/2-3/4
Chevrolet Trucks, Series P-20 & 30	② 1-1 1/2
Series 50 & 60	② 1 1/2-2
Other Series	② 1/4-3/4
Comet	① 3-6
Corvair Cars (On Car)	② 7/16-11/16
(On Bench)	① 2-6
Corvair Trucks	② 1/2-3/4

① - Inch-lbs. With torque wrench on steering shaft.
② - Pounds pull. With spring scale installed on steering wheel at right angle to spoke.
③ - Combined preload and backlash settings must not exceed 1 3/4 lbs.
④ - Combined preload and backlash settings must not exceed 1 1/4 lbs.

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SAGINAW BALL BEARING WORM & NUT (C nt.)

WORM BEARING SETTING (Cont.)

Car Model	Preload Setting
Dodge & Dodge Dart (On Car)	⑤ 2 1/2-6
(On Bench)	⑤ 1 1/2-6
Falcon	① 3-6
Ford Fairlane (Manual Steering)	① 4-7
(Power Steering)	① 2-4
Ford Galaxie (Manual Steering)	① 2-7
(Power Steering)	① 3 1/2-5
Ford Trucks & Econoline	① 3-6
Lancer (On Car)	⑤ 2 1/2-6
(On Bench)	⑤ 1 1/2-6
Mercury Meteor (Manual Steering)	① 3-7
(Power Steering	① 2-6
Mercury Monterey (Manual Steering)	① 2-7
(Power Steering)	① 3-5 1/2
Oldsmobile (Except F-85)	② 1/2-7/8
Oldsmobile F-85	② 1/4-3/4
Plymouth (On Car)	⑤ 2 1/2-6
(On Bench)	⑤ 1 1/2-6
Pontiac (Except Tempest)	① 6-10
Pontiac Tempest (Manual Steering)	① 6-10
(Power Steering)	① 1 1/2-5 1/2
Rambler	② 1/2-3/4
Studebaker	① 2 1/4-6 3/4
Valiant (On Car)	⑤ 2 1/2-6
(On Bench)	⑤ 1 1/2-6

① - Inch-lbs. With torque wrench on steering shaft.
② - Pounds pull. With spring scale installed on steering wheel at right angle to spoke.
③ - Combined preload and backlash settings must not exceed 1¾ lbs.
④ - Combined preload and backlash settings must not exceed 1¼ lbs.
⑤ - Use Torque Wrench C-3380.

Pitman Shaft Endplay (Gear Mesh) Adjustment: With bearing preload adjustment completed (see above), check effort required to pull steering wheel through center (high point) of gear. If turning effort is not within specifications (see table below), turn pitman shaft adjusting screw clockwise to increase turning effort and counterclockwise to decrease turning effort. With locknut tightened, recheck turning effort and adjust as necessary.

►*PITMAN SHAFT ENDPLAY ADJUSTMENT CAUTION: This is a push-pull type adjustment and controls pitman shaft endplay as well as gear mesh.*

STEERING WHEEL & HORN RING OR BUTTON REMOVAL

Buick & Buick Special 1962:

Steering Wheel Removal - Disconnect horn wire at connector at mast jacket. Remove emblem from steering wheel hub. On Buick Special, remove cap assembly with a screwdriver inserted through hole in cap to loosen retaining screw, and unplug horn connector brush wire from cap. On all models, loosen steering wheel retaining nut several turns, attach a suitable puller to wheel hub and pull wheel up to nut. Remove puller, nut, and steering wheel.

Chevrolet Pass. Cars 1962:

Steering Wheel Removal - Disconnect horn wire and direction signal harness from mast jacket switch. Remove steering wheel nut and washer from steering shaft and install a puller (J-2927) into threaded holes in steering wheel hub. Remove steering wheel.

Chevy II 1962:

Steering Wheel Removal - Pry out horn button, then remove screws holding receiver cup (or horn ring) and bushing spacer to steering wheel. Remove flat belleville spring. Remove steering wheel nut and washer from shaft. Use Puller J-2927 to remove steering wheel. *NOTE - Do not lose spring or seal on shaft under steering wheel.*

Chevrolet Trucks 1962:

Steering Wheel Removal - Remove horn button and steering shaft nut and washer. Install a puller (J-2927) into threaded holes in steering wheel hub. Remove steering wheel.

Corvair Cars & Trucks 1962:

Steering Wheel Removal - Pry out horn button, then remove screws holding receiver cup and bushing spacer to steering wheel and remove flat bellville spring. Remove nut and washer from steering shaft and insert a puller (J-2927) into threaded holes in steering wheel hub. Remove steering wheel. *CAUTION - Do not lose spring or seat on shaft under steering wheel.*

Dodge & Plymouth 1962:

Steering Wheel Removal - Turn horn button ¼-turn counterclockwise to remove. Remove horn ring by removing screws on underside of steering wheel. Remove steering wheel nut and washer, then pull steering wheel from shaft with Puller C-612.

Comet & Falcon 1962:

Horn Button Removal - Disconnect horn wire under instrument panel at left side of steering column, then press down on horn button or ring and turn counterclockwise until it lifts out of steering wheel. Remove horn button and spring, then remove steering wheel (see below). Remove turn indicator lever and indicator mechanism retaining screws, and lift mechanism to one side. Remove screws retaining horn button contact and pull wire and contact from steering column.

Steering Wheel Removal - Remove horn button or ring (see above), then remove steering wheel nut and pull wheel from shaft with Puller 3600-AA or 3826 (Comet), 3600-N (Falcon).

Ford Fairlane & Mercury Meteor 1962:

Steering Wheel Removal - Disconnect battery, remove horn button or ring by pressing down and turning counterclockwise. Remove steering shaft nut, then remove steering wheel with Puller 3600-AA or 3826.

Ford Galaxie 1962:

Horn Button Removal - Disconnect horn wire at bullet connector under instrument panel, then push down on horn ring assembly and turn counterclockwise until it lifts out. Remove horn ring spring and horn ring contact brush, then remove steering wheel (see below). Remove wire cover on left side of steering column, then remove two contact retaining screws and remove contact and wire assembly.

Steering Wheel Removal - With horn ring, spring and horn contact brush removed (see above), remove steering wheel with Puller 3600-AA.

Ford Trucks 1962:

Steering Wheel Removal - Disconnect horn wire at instrument panel or at horn relay. Press down on horn button or ring and turn counterclockwise until it lifts out, then remove horn button and spring. Remove steerwheel nut and remove steering wheel with Puller 3600-N (Econoline), 3600-AA (Others).

Mercury Meteor 1962: *See "Ford Fairlane & Mercury Meteor 1962" above.*

Mercury Monterey 1962:

Horn Button Removal - Remove horn ring or steering wheel hub cap by pressing down and turning counterclockwise. Remove steering wheel (see below), then

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PINION SHAFT ENDPLAY SETTING

Car Model	Backlash Setting (lbs.)
Buick & Buick Special	① ⑦
Chevrolet Pass. Cars	② 7/8-1 1/2
Chevy II (Manual Steering)	② ④ 1/2-1 1/4
(Power Steering)	② ⑤ 3/8-7/8
Chevrolet Trucks, Series P-20 & 30	② 2-2 1/2
Series 50 & 60	② 2 3/4-3 1/4
Other Series	② 7/8-1 1/2
Comet	① 8-13
Corvair Cars (On Car)	② 1 1/8-1 1/2
(On Bench)	① 7-12
Corvair Trucks	② 1-1 1/2
Dodge & Dodge Dart (On Car)	① ⑥ 11-15
(On Bench)	① ⑥ 10-15
Falcon	① 8-13
Ford Fairlane (Manual Steering)	① 9-14
(Power Steering)	① 5-9
Ford Galaxie (Manual Steering)	① 9-15
(Power Steering)	① 8-13
Ford Trucks & Econoline	① 8-13
Lancer (On Car)	① ⑥ 11-15
(On Bench)	① ⑥ 10-15
Mercury Meteor (Manual Steering)	① 9-15
(Power Steering)	① 4-10
Mercury Monterey (Manual Steering)	① 9-15
(Power Steering)	① 8-13
Oldsmobile (Except F-85)	② 1 1/2-2
Oldsmobile F-85	② 7/8-1 1/2
Plymouth (On Car)	① ⑥ 11-15
(On Bench)	① ⑥ 10-15
Pontiac (Except Tempest)	① ⑦
Pontiac Tempest (Manual Steering)	① ⑥
(Power Steering)	① ⑨
Rambler	② 1-1 3/4
Studebaker	① 8-9
Valiant (On Car)	① ⑥ 11-15
(On Bench)	① ⑥ 10-15

① - Inch-lbs. With torque wrench on steering shaft.
② - Pounds pull. With spring scale installed on steering wheel at right angle to spoke.
③ - 4-8 lbs. greater than worm bearing preload. Total overcenter pull not to exceed 13 inch-lbs.
④ - Combined preload and backlash settings must not exceed 1 3/4 lbs.
⑤ - Combined preload and backlash settings must not exceed 1 1/4 lbs.
⑥ - Use Torque Wrench C-3380.
⑦ - Worm bearing preload plus 2-6 inch-lbs.
⑧ - Worm bearing preload plus 2-6 inch-lbs. Total overcenter pull not to exceed 17 inch-lbs.
⑨ - Worm bearing preload plus 3-7 inch-lbs. Total overcenter pull not to exceed 11 inch-lbs.

SAGINAW BALL BEARING WORM & NUT (C nt.)

remove horn contact plate and brush assembly.

Steering Wheel Removal - With horn ring and related parts removed, remove nut from steering shaft and remove steering wheel Puller 3600-AA or 3826.

Lancer & Valiant 1962:

St ring Wheel R m val - Pry horn button out with screwdriver inserted into slot in steering wheel at edge of horn button. Remove steering wheel retaining nut and washer, then remove steering wheel with Puller C-612.

Oldsm bile (Except F-85) 1962:

H rn Button R moval - Disconnect horn wire from harness. On standard type wheel, remove cap-to-steering wheel attaching screw and lockwasher, then pull cap from wheel. Disconnect horn switch wire from contact assembly. On deluxe wheel, remove setscrew if present, then pry cap and emblem assembly from shroud. On all models, remove steering wheel (see below). On deluxe wheel, disconnect horn switch wires from contact assembly lead, then remove the four shroud attaching screws and shroud. Remove staking from wheel hub and remove contact assembly from steering wheel.

Steering Wheel Rem val - With cap and emblem removed (see above), remove steering wheel nut, then pull wheel with Puller BT-61-9.

Oldsm bil F-85 1962:

Steering Wh el R m val - On standard wheel, remove cap by loosening attaching screw with a Phillips screwdriver inserted into access hole in side of cap, then slide cap off wheel. On deluxe wheel, pry cap from wheel. Disconnect horn wire and remove nut and washer from steering shaft. Pull steering wheel from shaft with Puller BT-61-9.

Plym uth 1962: *S "Dodge & Plymouth 1962" above.*

P ntiac (Except T mpe st) 1962:

St ering Wh el Rem val (Std. Wheel) - Pry horn button out, remove horn button retainer, contact ring, pivot contact, spring and insulator. Remove steering shaft nut and washer and contact plate. Remove steering wheel with Puller J-3044. Remove coil spring and seat from shaft.

Steering Wheel Removal (Deluxe Wheel) - Twist and lift out steering wheel ornament. Remove lock nut, retaining nut, and washer from steering shaft, then pull horn ring and contact assembly from shaft. Remove contact assembly from horn ring. Remove pivot contact, spring and insulator from steering wheel hub, then pull steering wheel with Puller J-3044. Remove coil spring and seat from shaft.

P ntiac Tempest 1962:

Steering Wheel Removal - Lift ornament out and remove both nuts and washer from steering shaft. Remove horn ring or receiver cup, then remove pivot ring and bellville spring. Remove contact assembly. Pull steering wheel with Puller J-3044-01.

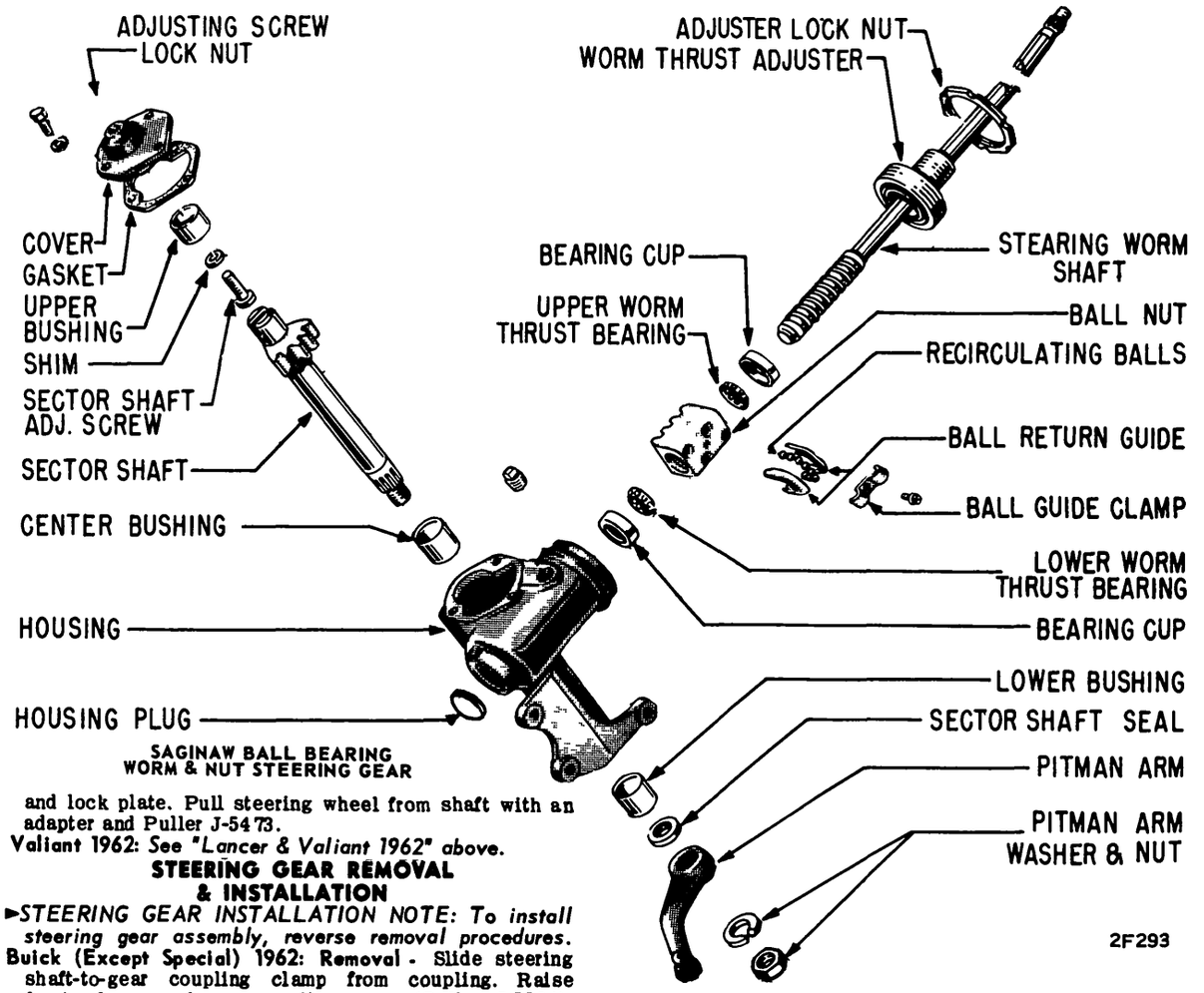
Rambl r 1962:

Ste ring Whe l Rem val - Remove horn ring or button and pull steering wheel from steering shaft with Puller J-5290.

Stud baker 1962:

Steering Wh el Rem val - Pry out steering wheel cap, then remove horn ring retaining screws and remove ring and insulators. Remove steering wheel retaining nut and lock plate. Pull steering wheel from shaft with an adapter and Puller J-5473.

Valiant 1962: *See "Lancer & Valiant 1962" above.*



SAGINAW BALL BEARING WORM & NUT STEERING GEAR

STEERING GEAR REMOVAL & INSTALLATION

►*STEERING GEAR INSTALLATION NOTE: To install steering gear assembly, reverse removal procedures.*

Buick (Except Special) 1962: Removal - Slide steering shaft-to-gear coupling clamp from coupling. Raise front of car and remove pitman arm (Puller J-5504). Remove steering gear attaching bolts and remove steering gear.

Buick Special 1962: Rem oval - *NOTE - Pitman arm cannot be removed or installed with steering gear installed on crossmember. If pitman arm is to be removed from gear, loosen pitman arm nut before disconnecting gear from crossmember. When installing gear, do not tighten pitman nut until after steering gear is installed on crossmember.* Remove lower coupling clamp bolt and nut, then loosen clamp retaining mast jacket to toe pan cover and "U" bolt retaining jacket to instrument panel. Pull mast jacket assembly up far enough so lower coupling can be removed from worm shaft. Raise car and disconnect pitman arm from intermediate rod, then loosen pitman arm nut with Tool J-8987. Remove steering gear-to-crossmember attaching bolts and remove gear assembly. *NOTE - Do not remov pitman arm from shaft unl ss pitman shaft assembly r seal is to b r moved.*

Chevrolet Pass. Cars 1962: Removal - Remove pitman arm (Tool J-6632 or J-5504). Remove splash pan, then remove steering gear-to-frame bolts and shims. Remove coupling clamp bolts and remove steering gear and shaft from under car.

►*CHEVROLET LOWER COUPLING REPLACEMENT NOTE:* If lower coupling is to be removed, it will be necessary either to lower the steering gear from its original position, or the mast jacket, upper steering gear shaft, coupling and intermediate shaft must be loosened and pulled up far enough to permit coupling to be removed from worm shaft.

Chevy II 1962: Removal - Remove power brake cylinder and/or clutch pushrod. Remove pitman arm from sector shaft (Puller J-6632). Disconnect transmission linkage from shift levers and remove lower steering gear attaching bolts. Disconnect wires from horn junction, direction signal and back-up light switches on steering

CONTINUED ON NEXT PAGE

SAGINAW BALL BEARING WORM & NUT (C nt.)

column. Remove steering wheel (see above). Remove mast jacket hole seal-to-toe panel screws. Remove mast jacket-to-steering gear clamp (Powerglide cars). Remove nuts from mast jacket-to-dash brace clamp. Move mast jacket and steering gear assembly down and away from dash while pivoting on upper steering gear attaching bolt. Now move front seat as far rearward as possible so mast jacket assembly can be pulled to rear of car and rotated so shift levers will pass through toe pan opening. Remove steering gear upper mounting bolt and remove steering gear assembly.

Chevrolet Trucks 1962: Removal - Loosen bolt attaching lower end of intermediate shaft to steering gear, then disconnect pitman arm from steering shaft, using Puller J-6632. Remove all steering gear-to-frame attaching bolts and remove steering gear.

C rvair Pass. Cars 1962: Removal - Remove pitman arm with Tool J-6627, then disconnect coupling, remove gear attaching bolts, and remove gear by sliding it forward and down.

C rvair Trucks 1962: Removal - Remove bumper and left front outer extension panel. Remove steering connecting rod from pitman arm. Remove steering wheel (see above). Remove direction signal assembly and mast jacket-to-dash clamp. Remove steering gear attaching bolts and remove steering gear.

Dodge & Plymouth 1962: Removal - Remove pitman arm from sector shaft, then remove bolt from coupling clamp at upper end of steering gear worm shaft. Disconnect steering column from instrument panel at clamp just sufficient to disengage tab on clamp from slot in column jacket. Slide steering column up and away from steering gear to disengage coupling from worm shaft. *NOTE - Unnecessary to disconnect gear shift linkage. Also DO NOT loosen floor plate-to-toe board bolts or steering column will be placed out of alignment.* Remove steering gear attaching bolts and remove steering gear from engine compartment (6 Cyl.), from beneath car (V8).

Comet & Falcon 1962: Removal - Raise front of car and place on stands, then remove pitman arm from sector shaft. Remove steering gear bolts from underbody and disconnect transmission shift rods at shift levers . Pull rubber seal up on steering column and fold floor mat aside. Move dash panel. insulation out of way, then remove retaining screws from steering column weather seal on dash panel and remove column cover plates and gasket. Disconnect horn and direction signal wires under instrument panel. Also disconnect neutral switch wires. Remove steering wheel (see above). Remove upper bearing sleeve and spring, then remove turn indicator lever. Remove steering column clamp-to-instrument panel bolts and remove clamp (upper and lower halves) and remove insulator. Slide steering column tube assembly from steering shaft, guiding shift levers up through rubber seal at dash panel. Remove steering gear and shaft assembly out toward front through engine compartment.

Ford Fairlane & Mercury Meteor 1962: Removal - Raise front of car and remove power steering cylinder mounting bracket (if equipped). Remove pitman arm from sector shaft. Disconnect flexible coupling from steering gear worm shaft. Remove steering gear attaching bolts and remove steering gear.

F rd Galaxi &Mercury M nter y 1962: R m val - Remove pitman arm from sector shaft and disconnect muffler inlet pipe if necessary. Remove steering gear attaching bolts and flexible coupling clamp bolt. Remove steering gear.

Ford F-100 & F-250 Trucks 1962: Removal - Disconnect horn wire from bullet connector below instrument panel, loosen steering column lower clamp and slide clamp down. Disconnect remote control shift control rods at shift levers. Remove steering wheel (see above). Remove steering column upper bushing spring and bushing. Disconnect direction signal wires and remove from retaining clip. Remove steering column bracket clamps and rubber sleeve. On floor mounted gearshift lever models, pull steering column tube off shaft. On remove control shift models, remove steering column shields from floor pan. Remove engine oil filter on V8 trucks. Remove exhaust pipe from exhaust manifold if necessary on 6 Cyl. trucks. Disconnect clutch retracting spring and remove clutch equalizer shaft outer bearing bracket and shaft (do not loosen the four split bearings). Remove inner bearing bracket. Remove pitman arm from sector shaft and wedge sector shaft opening in arm if necessary. Remove steering gear attaching bolts and remove gear from under truck (floor mounted gear shift lever), through passenger compartment (remote control shift lever). Loosen steering column tube lower clamp and remove tube.

Ford Econoline Trucks 1962: Removal - Disconnect horn and direction signal wires under instrument panel and free them from retaining clip. Fold floor mat out of way, pull up rubber seal, and remove steering column floor pan cover. Remove steering column-to-instrument panel clamp, disconnect transmission shift rods from shift tube arms. Remove steering gear attaching bolts, and pitman arm attaching bolt and nut. Spread pitman arm and partially remove it from sector shaft, then remore steering gear from pitman arm. Lift steering column, shift tube, and steering gear assembly out through passenger compartment.

Lancer 1962: Removal - *See "Dodge & Plymouth 1962" above.*

Oldsmobile (Except F-85) 1962: Removal - Remove steering wheel (see above), upper bearing spring and seat, then remove mast jacket cover plate from toe pan. Disconnect horn, direction signal, and neutral switch wires from switches and connector. Remove cap from upper mast jacket bracket and disconnect upper clamp. Disconnect shift linkage and battery cable sleeve from lower end of mast jacket. Loosen lower clamp and remove mast jacket from gear and worm shaft. Remove pitman arm from pitman shaft. Remove steering gear attaching bolts and remove steering gear.

Oldsmobile F-85 1962: Removal - Remove the coupling clamp bolt and slide the clamp off of the coupling onto steering gear worm shaft. Disconnect horn wire at harness and remove horn shroud from center of steering wheel. Remove steering wheel (see above). Pull horn contact plate out of recess in actuator assembly and remove upper bearing-to-actuator assembly retaining clip. Pull steering shaft up out of steering column about 2" and block in position. Pull relay rod off pitman arm. Remove steering gear attaching bolts and remove steering gear.

Plym uth 1962: Rem val - *S "Dodg & Plymouth 1962" abov .*

P ntiac (Exc pt T mp st) 1962: R m val - Remove pitman arm from pitman shaft, scribe mark worm shaft flange and steering shaft, and disconnect lower flange from steering shaft. Remove steering gear attaching bolts and remove steering gear.

Pontiac Tempest)1962: Rem val - Remove steering wheel (see above). Remove steering gear attaching bolts and remove steering gear and shaft assembly.

Rambler 1962: Removal - Disconnect battery, remove steering wheel (see above) and jacket tube support plate screws. Loosen jacket tube bracket-to-instrument panel mounting bolts. Remove pitman arm. Support front of engine and remove engine front support crossmember. Mark location of turning radius stop plate, then remove plate. Remove steering gear attaching bolts and remove steering gear.

Studebaker 1962: Removal - Remove battery, disconnect horn switch wire at connector, and battery cable at starter switch. On Hawk, remove battery box. Remove steering wheel and steering post jacket assembly. *NOTE - On V8 models (except Hawk), r mov distributor cap, disconnect left front ngin support and rais left front corner of engin about 1½".* Remove reach rod from pitman arm. Remove steering gear attaching bolts, turn gear upside down, lift and remove through engine com partment.

Valiant 1962: Removal - *See "D dg & Plym uth 1962" above.*

OVERHAUL

►*CHRYSLER CORP. CARS BALL NUT DISASSEMBLY*

CAUTION: Steering gear ball nut and w rm shaft assembly is serviced as an ass mbly nly. No separate parts furnished. DO NOT disass mbl this unit.

DISASSEMBLY: Remove pitman arm from sector shaft if arm still attached. Loosen sector shaft adjusting screw locknut, back out adjusting screw, then remove housing side cover with sector shaft attached. Remove gasket. Separate sector shaft from side cover by unscrewing adjusting screw. *Do not los shim.* Loosen worm thrust bearing adjuster locknut and back out adjuster several turns, then remove housing end cover and gasket. Remove lower thrust bearing, worm shaft, and upper bearing from housing. *CAUTION - Do not allow ball nut to run down to either end of worm or damage to ends of ball guides will r sult.* If ball nut is to be disassembled, remove ball return guide clamps and guides from ball nut, turn ball nut over to remove balls. *CAUTION - Hold shaft and ball nut assembly over a wide pan while disassembling to retain all balls. It is very important that balls be counted and the sam number of balls reinstalled when gear is ass mbl d. Remove ball nut from worm shaft.*

►*CHEVRCLET BALL NUT REASSEMBLY NOTE:* Some steering gears have ball nut guides with a top loading hole for the balls. To assemble this type, coat inside of worm, ball nut, and guides with oil and install guides into ball nut with nut installed on worm. Load all balls through holes in guide and then install guide clamp. *CAUTION - DO NOT us a 1961 typ clamp in a 1962 gear with holes in ball guid s as balls may fall out.*

REASSEMBLY: 1) Use suitable tools to remove and install bushings, bearings, bearing cups, and seals as necessary. On some models, sector shaft bearings are needle bearing type; other models use bushings. New

CONTINUED ON NEXT PAGE

SAGINAW BALL BEARING WORM & NUT (C nt.)

bushings do not require reaming.

2) Place worm shaft flat on bench and slip nut over worm with ball guide holes up and shallow end of rack teeth to left of steering wheel position. Align grooves in worm and nut by sighting through guide holes. Count out one-half the number of balls removed at disassembly and drop them into one of the guide holes while turning the worm gradually away from the hole until guide hole is full from bottom of one guide hole to the bottom of the other. *NOTE - In cases where balls ar stopped by nd of worm, hold down the balls alr ady dropped int hol and rotate worm back and forth.* Lay one-half of guide, groove up, on bench and place remaining balls in it. These remaining balls should fill guide. Close this half of guide with other half and hold both halves of guide together and plug each end with vaseline to hold balls in place. Push guide into holes of nut to complete one circuit. Repeat same operation with other circuit. Reassemble ball guide clamp to nut with lockwashers under clamp screws and tighten screws securely.

3) Place worm shaft and nut assembly into housing and place upper roller bearing over worm shaft. Place new housing end cover gasket over end of worm shaft, then slide housing end cover over worm shaft and assemble it to housing. Install lower roller bearing. Install worm bearing adjuster and locknut. *NOTE - Worm bearing preload adjusting may be made at this time, or made when steering gear is assembled.* Assemble sector shaft adjuster and shim in slot in end of sector shaft. Insert a feeler gauge between head of adjuster screw and bottom of slot. Adjuster screw must be free to turn and endplay must not exceed .002". Change adjuster shim as necessary (shims furnished .063", .065", .067", .069" thick). Start sector shaft pilot into bushing or bearing in side cover, then using a screwdriver through hole in cover, turn lash adjuster in counter-clockwise direction to pull sector shaft pilot into its bushing as far as it will go. Rotate worm shaft by hand until ball nut is at center of travel. Place a new gasket on side cover, then push side cover assembly including sector shaft into place. After making sure there is some play between rack and sector teeth, assemble and tighten side cover bolts. Perform worm bearing preload adjustment (if not already adjusted), then adjust pitman shaft endplay (gear mesh). *See "Adjustments" above.* Fill steering gear with proper lubricant.

BENDIX LINKAGE TYPE POWER STEERING

Checker (1962)
Ford Fairlane & Galaxie (1962)
Mercury Meteor & Monterey (1962)
Studebaker (1962)

►CHANGES, CAUTIONS, CORRECTIONS

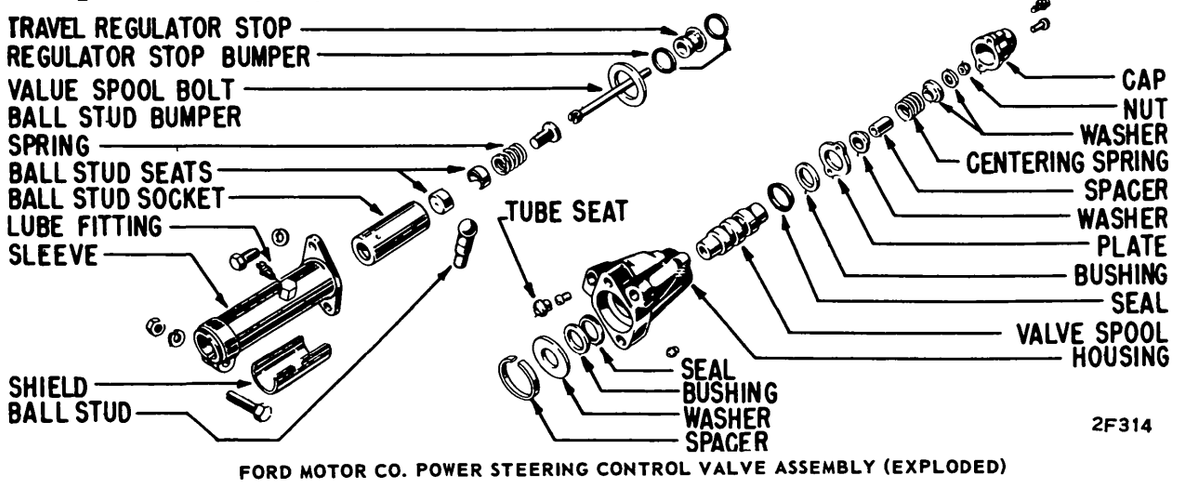
►*1962 MERCURY METEOR & FORD FAIRLANE RUBBING NOISE IN STEERING COLUMN CORRECTION:* May be caused by steering shaft not centralized and consequently binding in steering column. To correct, adjust cover plates at firewall. DO NOT shim steering gear box.

►*1962 MERCURY MONTEREY (WITH ECCENTRIC STEERING COLUMN) EXCESSIVE STEERING SHAFT ENDPLAY CORRECTION:* Torque upper bearing retainer screws to 25-35 inch-lbs. (supersedes previous 19-23 inch-lbs.). Make sure the 3 bearing retainer rings are properly installed. Make sure that rubber bearing sleeve is properly installed and not mutilated. Make sure bearing is not loose on steering shaft.

►*1962 STUDEBAKER POWER STEERING PUMP RESERVOIR LEAK CORRECTION:* May be caused by reservoir fluid level being too high or by a restricted reservoir vent. Maintain fluid level at ¼" below lowest point of reservoir opening flange with front wheels in straight-ahead position. Clean cover retaining nut and stud threads to clear the vent (reservoir vented between cover retaining stud and wing nut). *CAUTION - Do not remove seal under cover wing nut flat washer, or modify flat washer or more severe oil loss will result.*

►*1962 STUDEBAKER PROCEDURE TO CHANGE STEERING WHEEL HEIGHT:* Steering wheel height can be changed by adding or removing shims between upper steering jacket clamp and pedal mounting bracket. *NOTE - A 1/8" shim will change wheel height 1/4". Cars are produced with one 1/8" shim between each end of upper jacket clamp and pedal mounting bracket.* Proceed as follows: Loosen steering gear attaching bolts. To lower wheel, install 1/8" shims, Part No. 1555827, between ends of steering jacket upper clamp and pedal mounting bracket (clamp-to-bracket bolt lengths will permit installation of 3 shims at each bolt). To raise wheel, remove shims between steering jacket upper clamp and pedal mounting bracket. Tighten steering gear attaching bolts.

►*1962 STUDEBAKER HAWK SLOW RECOVERY FROM TURNS CORRECTION:* If not corrected after all other steering and suspension checks and adjustments made, install new higher rate control valve centering spring, No. 1545318, in control valve. *CAUTION - Do not install new spring on cars with less than 2000 speedometer miles.*



FORD MOTOR CO. POWER STEERING CONTROL VALVE ASSEMBLY (EXPLODED)

DESCRIPTION: Linkage type similar to previous models. Main control valves on Ford Motor Co. models have a "Reaction Limiting Valve" which limits amount of effort required to turn wheel when parking or making sharp turns at low speed. Some models may have a hydraulically operated idle speed-up control valve to prevent engine stalling when steering linkage stops are contacted (as in parking the car). Valve is operated by hydraulic pressure from power steering pump.

ADJUSTMENT: Idle Speed-Up Control Valve - *See appropriate Car Model pages.*

Pump Drive Belt: *CAUTION - Do not pry or lift against pump reservoir to raise pump assembly.*

Ford Motor Co. Models - Use a suitable belt tension gauge and adjust pump mounting bracket for 120-150 lbs. (new belt), 90-120 lbs. (used belt) tension. *NOTE - Used belt is any belt operated for 10-15 minutes or longer. On V8 engines, it may be necessary to install a "C" clamp on adjusting bracket to adjust belt tension.* Tighten adjusting and pivot bolts to 12-15 ft. lbs. (170" Engine), 20-25 ft. lbs. (All Other Engines).

Studebaker - Belt deflection should be 1/4-3/8" with 4 lbs. pull midway between pulleys. To adjust, loosen bracket mounting screws and shift pump body to secure proper belt tension.

LUBRICATION: Check fluid level every 6000 miles (Ford Motor Co. Models), 5000 miles (Checker & Studebaker). Start engine and turn steering wheel right and left a few times, then shut off engine. Add Automatic Transmission Fluid Type A, Suffix A, to bring level up to following specifications:

Checker - Bring level to within 1" of top.

Ford Motor Co. Models - Bring level up to "F" mark on dipstick.

Studebaker - Maintain fluid level at ¼" below lowest point of reservoir opening flange with front wheels in straight-ahead position.

TESTING: Turning Effort - With wheels properly aligned and tire pressure correct, place car on dry concrete, set parking brake, then proceed as follows: With engine running at normal idle speed, turn wheel to right and

CONTINUED ON NEXT PAGE

BENDIX LINKAGE TYPE POWER STEERING (Cont.)

left several times to bring fluid to normal operating temperature. Hook a spring scale to steering wheel rim and measure pull required to turn wheel at least one full turn in both directions. Pull should be about equal in both directions as listed in table below:

Turning Effort Specifications

Car Model	Turning Effort
Fairlane & Meteor	4½ lbs. max.
Galaxie & Monterey	12 lbs. max.
Studebaker	11 lbs. max.

Pump Pressure: Install a suitable pressure gauge between pump hose and pump outlet with pressure gauge between pump and shutoff valve of pressure gauge. Run engine at idle speed (with shutoff valve open) for two minutes to normalize oil temperature. Turn wheels all the way to right and left, noting fluid pressure reading on gauge when wheels are against stops. *CAUTION - Do not hold wheel against stop for more than 30 seconds.* Fluid pressure with wheels against stops should be as listed in table below. Close gauge valve and check pressure. If pressure is less than minimum, pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and steering gear does not function properly, trouble is in control valve or power cylinder.

Pump Pressure Specifications

Car Model	Pump Pressure
Fairlane & Meteor	750-900 lbs.
Galaxie & Monterey 6 Cyl. & 292" V8	700-900 lbs.
Galaxie & Monterey Other V8	950-1100 lbs.
Studebaker	850 lbs.
Checker	700-900 lbs.

OVERHAUL & TROUBLE SHOOTING: *See 1957 Final Data, Page 364, or later Manual editions, and note the following:*

Control Valve Removal (Studebaker): Disconnect hoses at pump body, pump reservoir, and power cylinder. Drain fluid from hoses, then remove hose retaining clips. Disconnect reach rod from steering bellcrank, then remove pitman arm from steering gear shaft with Puller J-5664. Remove control valve, reach rod, and hoses from car as an assembly. *NOTE - Before removing valve assembly from reach rod, clean assembly to remove dirt and grease from valve body, then loosen clamp on actuator sleeve and screw valve assembly off reach rod, counting the number of turns required to unscrew valve from reach rod. Record the number of turns for use at installation to maintain proper reach rod length.*

Valve Sleeve Mounting Bolt Tightening Torque: Tighten the two bolts to 30-35 ft. lbs. (Ford Motor Co. Models), 140-170 inch-lbs. (Studebaker).

Control Valve Installation Measurement

Car Model	℄ Dimension
Fairlane	4 3/16"
Meteor	4.150"
Galaxie & Monterey	11 15/16"
Studebaker	See Note Below

℄ - This measurement is the distance between center of pitman arm ball stud and tie rod ball stud.

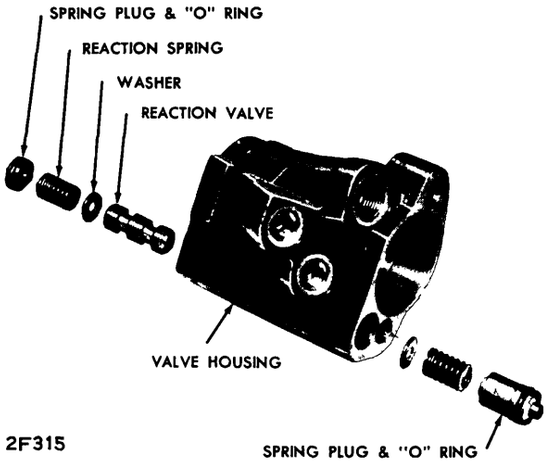
►*STUDEBAKER INSTALLATION NOTE:* With control valve reinstalled and control valve assembly screwed into reach rod the same number of turns (recorded at time of removal), set wheels in straight ahead position and center wheel in the high spot. Slip pitman arm on steering gear shaft, aligning marks on arm and shaft, then check distance between center of pitman arm ball and reach rod ball by holding end of reach rod in position at bellcrank. Adjust length of reach rod so that reach rod ball stud will slip into bellcrank without moving front wheels from straight ahead position. *NOTE - It is necessary to remove unit from car to make adjustments.*

Reaction Limiting Valve (Ford & Mercury): Disassembly - After disassembly of control valve, remove aluminum plug and "O" ring assembly from each end of control valve body, then remove springs, washers, and reaction valve.

Reassembly - Insert washer, spring, and longest plug and "O" ring assembly into valve housing from sleeve end. Carefully insert reaction valve into bore of valve housing from spring cap end, then insert washer, spring and short plug into housing.

Cylinder Rod Tightening Torque: With outer insulator, washer and nut installed on piston rod, tighten nut to 18-24 ft. lbs. (Ford Motor Co. Models), 45-50 ft. lbs. (Studebaker).

POWER STEERING PUMP: Eaton Roller Type - *See 1958 Final Data, Page 398, or later Manual editions.*



REACTION LIMITING VALVE

MONROE LINKAGE TYPE POWER STEERING

Rambler, All Series (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 RAMBLER STEERING COLUMN BINDING OR SCRAPING CORRECTION:* May be caused by insufficient lubrication at lower nylon bushing in lower jacket tube. If bushing has no oiler, drill a 1/8" hole above the bushing and apply oil through the hole.

►*1962 RAMBLER CLASSIC & AMBASSADOR POWER CYLINDER ASSEMBLY PRODUCTION CHANGE & OVERHAUL CAUTION:* To limit internal hydraulic action on extreme turns, longer piston rod assembly, and a piston rod stop are used on cars after Serial Nos. W-120926 & E-121305. Four washers are installed on each side of piston rod grommet retainers to control turning radius. These washers may be varied on either side to equalize turning radius, but total of 8 washers must be used. Production cars have 2 washers to inside of inner grommet retainer (next to rod shoulder), and 6 washers between outer grommet retainer and nut.

DESCRIPTION: Linkage type of same design used on previous models.

ADJUSTMENT: *See 1959 Final Data, Page 390, or later Manual edition, and note the following:*

Pump Belt Adjustment: Use a strand tension gauge to adjust belt tension to 110-120 lbs. (new belt), 70-80 lbs. (used belt). *NOTE - If deflection method used, there should be no more than ¼" belt deflection midway between pulleys.*

OVERHAUL & TROUBLE SHOOTING: *See 1959 Final Data, Page 390, or later Manual edition.*

POWER STEERING PUMP: American & Classic Models - Slipper type pump. *See 1960 Final Data, Page 403, or later Manual edition, and note the following:*

Pulley Mounting Dimension - 1 3/4" (single groove pulley), 2 1/64" (double groove pulley).

Ambassador Models: Eaton Roller Type. *See 1958 Final Data, Page 398, or later Manual editions.*

PRESSURE TEST: With fluid level in reservoir correct, install oil pressure gauge J-5548-A in main oil line at control valve assembly, then start engine and bring oil to normal operating temperature. Turn wheels against curbing or other obstacle and hold tension on wheel. Oil pressure should be 800-900 lbs. (Roller Type Pump); 850-950 lbs. (Slipper Type Pump). Turn wheel in opposite direction and note pressure. If there is a variation between right and left turn, internal leakage is indicated. If pressure is low, stop engine and disconnect gauge from cylinder and valve assembly and cap pressure line. Restart engine and note pressure. If pressure is within specifications, pump is operating properly. If pressure is low (belt tension correct), trouble exists in pump. *CAUTION - Do not hold wheels at maximum pressure longer than is necessary to obtain a steady pressure reading.*

CHRYSLER CORP. "CONSTANT CONTROL" POWER STEERING

Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962)
Lancer (1962)
Plymouth (1962)
Valiant (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 POWER STEERING OIL LEAK CORRECTION & "O" RING AND SEAL REPLACEMENT CAUTIONS:* Power steering unit ordinarily needs overhaul only at extreme high mileage. Most leaks can be corrected by replacing external seals or "O" rings. Manufacturer recommends that Seal Kits, No. 2279985 (Valve Package), No. 2279986 (Cross Cover Seal Package); and a Cross Shaft Outer Oil Seal, be used to correct leaks.

►*1962 STEERING SHAFT OIL SEAL LUBRICATION NOTE:* To prevent corrosion of steering shaft and to reduce coefficient of friction of seal on shaft, make sure that cars produced before November 14, 1961 have steering gear shaft bore cavity below seal filled with multi-purpose chassis grease. When replacing this seal, fill cavity with this grease after installing new seal, retainer washer, and snap ring, and before installation of pitman arm.

DESCRIPTION & OPERATION: Similar in design and operation to previous 1959-61 models.

ADJUSTMENTS: *See 1958 Final Data, Page 387, or later Manual editions and note the following:*

Pump Belt Adjustment (Pumps With Load Reaction Belt Tensioner): Loosen adjusting bracket bolts and install Adapter C-3832 over edge of mounting bracket as close as possible to outer edge of bracket. Insert torque wrench into adapter and tighten belt until torque wrench reads 45 ft. lbs. Hold tension with wrench, and tighten mounting bracket bolts to 30 ft. lbs. torque.

Pump Belt Adjustment (Pumps Without Load Reaction Belt Tensioner): Deflection Method - There should be 1/16" (Except 361" Eng.), 1/8" (361" Eng.) new belt deflection, or 1/8" (Except 361" Eng.), 3/16" (361" Eng.) used belt deflection, midway between pulleys under a 5 lb. load.

Torque Method - With a torque wrench in pump mounting bracket, tighten belt to specification listed in table below.

Belt Tightening Specifications (Ft. Lbs.)

Engine	New Belt	Used Belt
170"	100	60
225"	80	45
318"	85	50
361"	90	55

LUBRICATION: Check fluid level in reservoir every 4000 miles. Fluid level should be at bottom of filler neck when fluid is cold, and should be about half-way up filler neck when fluid is hot. **Use only MoPar Power Steering Fluid, Part No. 2084329.** DO NOT OVERFILL.

BLEEDING SYSTEM: All air can be expelled from unit by turning steering wheel several times from full right to full left and back again.

HYDRAULIC PRESSURE TEST: Disconnect pump-to-steering gear pressure hose at steering pump and connect test hose C-3388 with proper adapters between pump and gauge C-3309-B with shut-off valve between gauge and steering gear. With engine idling at 500 RPM and oil at normal operating temperature (150°-170°F., checked with thermometer in reservoir), pressure should be less than 100 lbs. Increase engine speed to 1000 RPM and slowly close shut-off valve. Pump pressure should be as indicated in table below. *CAUTION - Do not hold valve closed for more than a few seconds.* If pressure is in excess of maximum, relief valve is faulty or pump has wrong relief valve. If pressure less than minimum, relief valve or pump is defective.

Power Steering Pump Pressure

Car Model	Lbs. Pressure
Imperial	1150-1300 lbs.
Chrysler	1000-1100 lbs.
Dodge & Plymouth ①	850-950 lbs.
Dodge & Plymouth ②	900-1000 lbs.
Lancer & Valiant	650-750 lbs.

① - Without Load Reaction Belt Tensioner.
② - With Load Reaction Belt Tensioner.

TROUBLE SHOOTING: *See 1958 Final Data, Page 387, or later Manual editions.*

REMOVAL & INSTALLATION: Steering Wheel & Horn Button (Chrysler) - Press down on center ornament and turn ¼" to remove. Disconnect horn wire, then remove screws, bushings, horn blowing ring, rubber insulator and horn terminal plate. Disconnect direction signal wires and horn wire at connectors. Loosen steering wheel nut three turns and use Puller C-3428 to remove steering wheel.

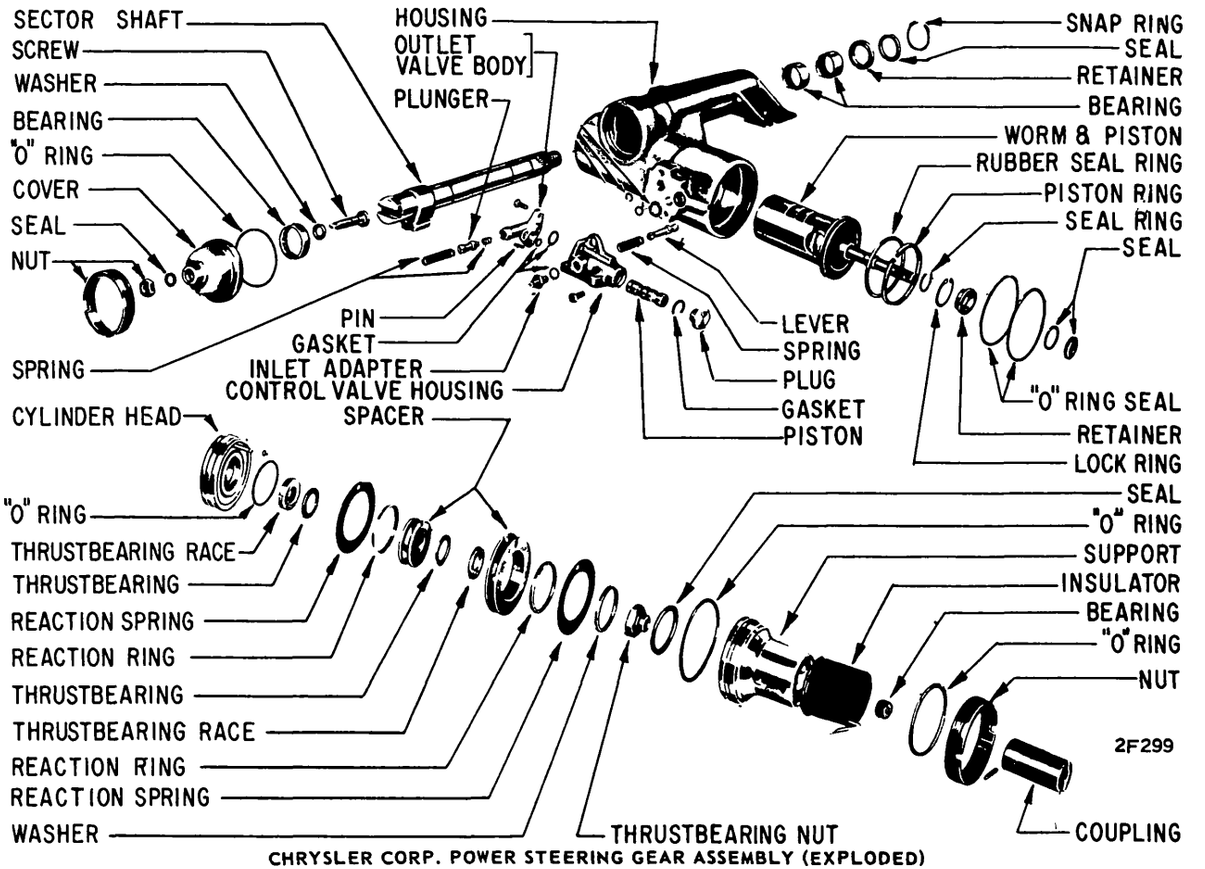
Steering Wheel & Horn Button (Imperial): Remove screws from underside of steering wheel and remove horn blowing actuator and steering wheel cover. Disconnect horn wire at switch. Remove screws, insulators, then remove horn blowing switch. Remove horn blowing ring mounting plate. Loosen steering wheel nut three turns and use Puller C-3428 to remove steering wheel.

Steering Wheel & Horn Button (Dodge & Plymouth): Turn horn button ¼-turn counterclockwise to remove. Remove horn ring by removing screws on underside of steering wheel. Remove steering wheel nut and washer, then pull steering wheel from shaft with Puller C-612.

Steering Wheel & Horn Button (Lancer & Valiant): Pry horn button out with screwdriver inserted into slot in steering wheel at edge of horn button. Remove steering wheel retaining nut and washer, then remove steering wheel with Puller C-612.

Steering Gear Removal (Chrysler, Imperial, Dodge Custom 880): Remove steering wheel (see above), then remove direction switch lever and steering column lower cover. Remove direction signal switch and wiring from steering shaft. Remove retainer snap ring from groove in steering tube at top of bearing with Tool C-3229. Remove jacket tube shield for access to column tube

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CHRYSLER CORP. POWER STEERING GEAR ASSEMBLY (EXPLODED)

CHRYSLER CORP. "CONSTANT CONTROL" POWER STEERING (C nt.)

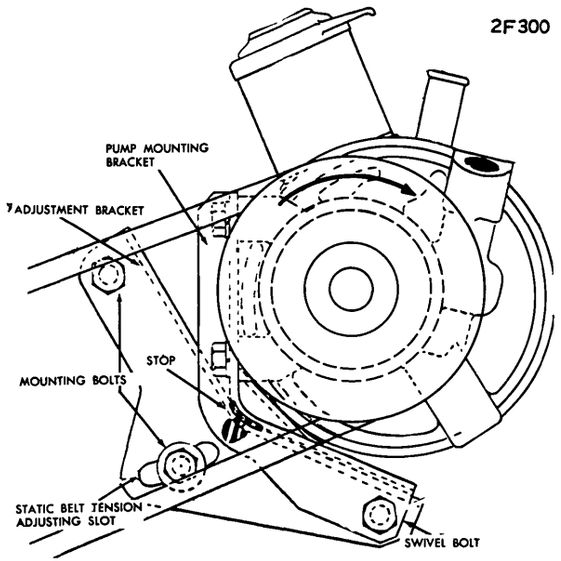
clamp and remove screw attaching steering jacket tube clamp at instrument panel and remove clamp. Raise carpet and move rubber grommet up on jacket column, then remove screws attaching rubber dust boot to firewall. On Imperial, remove floor inspection panel. Loosen jacket tube clamp at steering gear housing. Remove cotter key and nut at drag link and disconnect link from steering arm, then remove steering arm nut and washer at steering gear shaft. Slide Tool C-3646 up on steering arm and place shoe of puller behind steering arm and pull steering arm from gear shaft. *CAUTION - Do not remove steering arm by prying with a lever or striking with a hammer.* Disconnect hydraulic brake line at master cylinder and brake tee and remove line, then disconnect pressure and return hoses at steering gear (fasten ends of hoses above reservoir oil level and cap all openings). Slide jacket tube up and off steering gear through driver's compartment, then remove jacket tube upper spring and retainer. Remove steering shaft coupling pin, two plastic inserts, horn ground strap, rubber insulator and upper steering tube. Remove gear housing-to-frame bolts, washers, and alignment wedge. Slide steering gear upwards and toward rear of car and at the same time raise lower end of gear and remove gear from engine compartment (Chrysler), from driver's compartment (Imperial).

Installation - Reverse removal procedures and note the following: Make sure there is at least 1/16" clearance between bottom face of jacket tube clamp and column support spanner nut. With steering gear completely installed (gear assembly-to-frame bolts not tightened), tighten front upper and lower gear housing-to-frame attaching bolts to 20 ft. lbs. Install wedge over rear bolt between housing and frame so that tapered surfaces match, tapping it lightly into place, then tighten all three gear attaching bolts to 50 ft. lbs.

Steering Gear Removal (Dodge & Plymouth V8): Disconnect battery. Remove steering jacket cover plate at instrument panel and loosen (do not remove) jacket clamp screw. Disconnect hydraulic hoses at steering gear and fasten end of hoses above reservoir oil level and cap all openings. Remove steering shaft coupling-to-worm shaft clamp bolt. Lift steering column assembly up and off end of worm shaft. Raise car. Remove pitman arm from sector shaft (Tool C-3646). On 318" engine cars, disconnect transmission oil cooler lines from oil filter and radiator. Remove starter. Remove steering gear attaching bolts and remove steering gear.

Installation - Reverse removal procedure and note the following: Position steering jacket assembly so steering shaft is centered at mid-point of vertical travel. *NOTE - Coupling is centered when dimension from top of coupling to centerline of 3/16" gauge hole in steering column shaft is 13/16".* After coupling is centered, tighten column jacket-to-instrument panel clamp bolts to 90 inch-lbs.

Steering Gear Removal (Dodge & Plymouth 6 Cyl., Lancer & Valiant): Remove pitman arm from sector shaft (Tool C-3646). Disconnect hydraulic lines from steering gear (fasten ends of hoses above reservoir oil level and cap all openings). Remove steering gear attaching bolts. Remove bolt from coupling clamp at upper



LOAD REACTION BELT TENSIONER

end of worm shaft. Support steering gear assembly and tap coupling assembly upward until free of worm shaft splines. Remove steering gear.

Installation - Reverse removal procedure and note the following: With steering shaft coupling clamp in position on coupling assembly, install clamp bolt so it engages groove in worm shaft, then tighten clamp bolt nut to 30 ft. lbs.

OVERHAUL: *See 1958 Final Data, Page 387, or later Manual editions, and note the following:*
Steering Valve End Plug Torque - 25 ft. lbs.
Column Support Spanner Nut Torque: 110-200 ft. lbs.
Cover Spanner Nut Torque - 110-200 ft. lbs.

Power Train Reassembly: With Tool C-3676 held securely in vise, place piston and ring assembly in tool with lower part of piston and ring resting in tool land. Pressing down on piston will cause piston ring to bottom in its groove, forcing open ends of ring upwards for ease of locking the piston ring (ring should be positioned with ring hooks in line with ball guide hole). *NOTE - Positioning hooks in this manner will control internal leakage through the ring.* Wire brush knurled area of worm shaft to remove staking deposits. Lubricate each part with Automatic Transmission Fluid, then place piston on bench in a vertical position (worm shaft up). Install cylinder head assembly on worm shaft making sure that gap on worm shaft seal is closed to avoid damaging the ring when cylinder head is bottomed against piston top flange. Install lower reaction plate over ferrule on cylinder head, then install lower reaction ring on pressure plate with flange up so that ring protrudes through pressure plate. Lubricate following parts with Automatic Transmission Fluid and slide them over shaft in the following order: Lower (thick) thrust bearing race, lower thrust bearing, center bearing race, upper thrust bearing and upper (thin) thrust bearing race. Install a new worm shaft thrust bearing nut and tighten nut as follows: Grip piston assembly in a soft jawed vise, then turn worm shaft counterclockwise one-half turn and while holding worm shaft in this position, tighten worm shaft nut to 50 ft. lbs. to preset the bearings. *CAUTION - If worm shaft is turned more than one-half turn, the cylinder head sleeve will clear the oil seal ring on worm shaft. Always position worm shaft oil seal ring before bottoming the cylinder head against piston top flang to avoid damaging oil seal ring.* Loosen the adjusting nut and place several rounds of cord around center bearing race, then make a loop in one end of cord and hook the loop of a distributor breaker arm spring scale (Tool MTU-36) in the cord loop. Pulling cord will cause bearing race to rotate. Retighten worm bearing adjusting nut while pulling on the cord with the scale. If adjusting nut is tightened properly, reading on scale should be 8-16 ounces (12 inch ounces preferred) while bearing race is turning. *CAUTION - Place a support under the adjusting nut during the staking operation to avoid brinnelling piston and worm bearings.* Stake the upper part of worm shaft adjusting nut into knurled area of shaft as follows: Hold a ¼" flat end punch on centerline of worm shaft and perpendicular to worm shaft at a slight angle to nut flange. Strike the punch a sharp blow with a hammer and recheck preload. If adjusting nut moved during the staking operation, it can be corrected by striking the nut a glancing blow in direction required to regain proper preload. After proper preload, stake the nut at three more locations 90° apart around upper part of nut. To test staking, torque nut to 20 ft. lbs. in either direction. If nut does not move, the staking operation is satisfactory. Recheck adjustment. Install center bearing spacer assembly over center bearing race and engage dowel pin of spacer in slot of race and slot of spacer entered over cylinder head ferrule. *NOTE - This will align valve lever hole in center bearing race with valve lever hole in center bearing spacer assembly.* Place reaction ring (outer) with flange, down against center bearing spacer. Place reaction ring (inner), without flange, inside of the outer reaction ring, with flange, and install upper reaction pressure plate over both reaction rings and over cylinder head ferrule and "O" ring making sure reaction rings enter circular groove in jacket support. *CAUTION - Form a .0015" feeler into a coil and insert with jacket support to protect seal lip when installing over worm-shaft serrations.* Align parts on power train so that valve lever hole in center bearing spacer assembly is 90° counterclockwise from piston rack teeth and lock all parts in worm shaft by entering a drill rod or suitable drift through jacket support holes and groove in worm shaft. Complete reassembly of steering gear as outlined in 1958 Annual Data or later Manual edition.

Cross Shaft Adjustment (On 8 nch): With hydraulic power to unit and with gear shaft on center plus or minus 2°, readjust gear shaft backlash. This will require loosening the adjusting screw until backlash is evident. Retighten adjusting screw until backlash just disappears, then continue to tighten for 3/8 or 1/2 turn from this position and tighten locknut to 50 ft. lbs. to maintain this setting. Starting from a point at least one full turn either side of center, the torque at gear shaft required to turn unit through center at 2 RPM in each direction shall not exceed 20 ft. lbs. or vary more than 5 ft. lbs.

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CHRYSLER CORP. "CONSTANT CONTROL" POWER STEERING (C nt.)

from left to right. Position steering valve to obtain equal torque and tighten valve body attaching screws to 15 ft. lbs. With unit at or near full turn in either direction, attempt to return the unit to center by applying a torque wrench at steering gear cross shaft. Hold worm shaft until cross shaft torque builds up to 50 ft. lbs. Release worm shaft and maintain a constant steady pull on cross shaft (turning cross shaft slowly). If cross shaft torque does not drop to 25 ft. lbs. maximum as the piston passes through center, check for too much interior drag; binding valve lever, binding valve spool, or cross shaft adjustment is too tight. With unit under power, but with no load, the torque required to rotate the worm shaft through an inclined angle of 180° (90° either side of center) shall be 6-9 inch lbs. Disconnect test equipment and mounting fixture and install unit in car.

POWER STEERING PUMP: *See 1960 Final Data, Pag 403, or later Manual edition.*

CHEVROLET & PONTIAC TEMPEST LINKAGE TYPE POWER STEERING

Chevr l t Pass. Cars (1962)
Chevy II (1962)
P ntiac T mp st (1962)

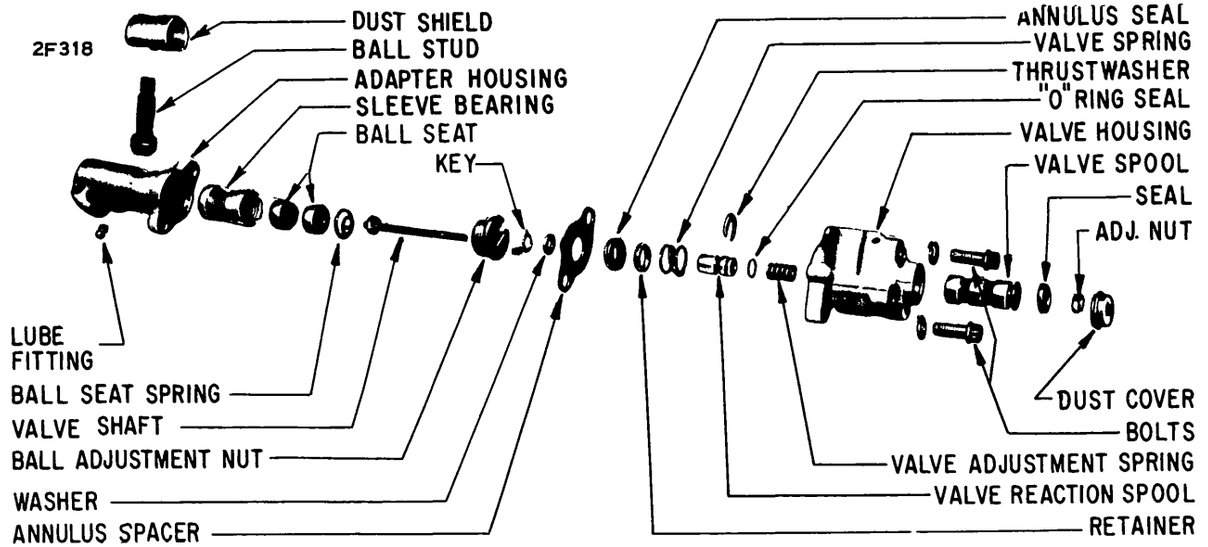
DESCRIPTION: Linkage type with power cylinder mounted between steering relay rod and bracket on frame side rail. Control valve assembly is mounted on left side relay rod and is operated by pitman arm acting on spool valve assembly. The control valve assembly is adjustable to provide greater uniformity of operation and faster response. Power steering pump is mounted on engine and is driven by a belt from crankshaft pulley.

ADJUSTMENT: P w r St ring Pump Belt (Chevrolet & Chevy II) - Loosen power steering pump-to-bracket attaching bolts and move pump with belt in place until belt is tensioned so that a 15 lbs. force applied at midpoint between fan pulley and pump pulley will cause a ½" to ¾" belt deflection, then tighten mounting bolts. *NOTE - If strand tensi n gauge used, a reading of 75 lbs. (n w belt), 50 lbs. (used belt) should be obtained.*

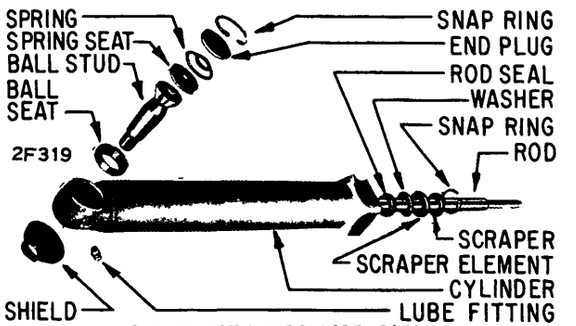
P wer Ste ring Pump B lt (Tempest): Strand tension gauge should read 70-75 lbs.

Control Valv Balancing: *NOTE - If a hard steering effort is required (in on direction), balance control valve as follows:* With car on a hoist, engine running, and power cylinder rod disconnected from frame bracket, piston rod will be fully retracted or fully extended (if valve is out of balance). If piston rod remains retracted, turn adjusting nut clockwise until rod begins to move out, then turn nut counterclockwise until rod begins to move in. Now turn nut clockwise to exactly one-half the rotation needed to change direction of shaft movement. If rod remains extended, move nut counterclockwise until rod begins to retract, then clockwise until rod begins to move out. Now position nut to exactly one-half the rotation needed to change direction of shaft movement. *CAUTION - Do not turn nut back and forth more than is absolutely necessary to balance valve.* With valve properly balanced, it should be possible to move rod in and out manually. Stop engine and connect cylinder rod to frame bracket, then restart engine. If front wheels (still on hoist) do not turn in either direction from center the valve is properly balanced. With valve properly adjusted, install dust cap.

LUBRICATION: Checking Fluid Level – With oil at normal operating temperature, check fluid level on dipstick. Fill to indicated level with Automatic Transmission Fluid.



CHEVROLET & TEMPEST POWER STEERING CONTROL VALVE ASSEMBLY



POWER CYLINDER ASSEMBLY

Bleeding Hydraulic System: Fill reservoir to proper level and let oil remain undisturbed for at least two minutes, then start engine and run at idle speed for two minutes. Add oil if necessary, then raise front of car so wheels are off ground. Increase engine speed to 1500 RPM (Chevrolet), 1000 RPM (Pontiac), and turn wheels from full right to full left, contacting stops lightly. Lower car and turn wheels right and left on ground. Check oil level and refill as necessary. Continue this process as long as required to bleed all air from system.

PRESSURE TEST: Install pressure gauge J-5176 or equivalent between pump and pressure line at pump. *NOTE - Adapter J-5900 or J-7786 or equivalent may be necessary to install pressure gauge to pump.* With gauge valve open and engine at idle speed, turn wheels against stops a few times to bring power steering fluid to 150-170°F. With wheels against stops, pressure should not be less than specified in table below. If pressure less, slowly close valve and check for pressure increase. Pressure will increase if pump in good condition. If pressure does not increase with valve closed, pump is faulty. *CAUTION - Do not hold gaug valve closed more than 15 seconds.* After removing gauge, bleed hydraulic system (see above).

Pump Pressure Specifications

Car Model	ℂ Pump Pressur
Chevrolet Pass. Cars	870-1000 lbs.
Chevy II	870-1000 lbs.
Tempest	775 lbs.

ℂ - At engine idle speed and steering oil at 150-170°F.

REMOVAL, INSTALLATION & OVERHAUL: *S 1960 Final Data, Pag 398, r later Manual edition.*

POWER STEERING PUMP: Saginaw Vane Type With Integral Res rv ir. *See 1961 Final Data, Pag 390.*

SAGINAW ROTARY VALVE POWER STEERING

Buick (1962)
Buick Special (1962)
Cadillac (1962)
Chevrolet Truck (1962)
Oldsmobile (1962)
Oldsmobile F-85 (1962)
P ntiac (Except Tempest) (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 ADJUSTER PLUG & UPPER THRUST BEARING PRODUCTION CHANGE & REPLACEMENT NOTE:* On later cars, adjuster plug and upper thrust bearing are a single-piece unit. Steering gear units having a daub of green paint will have this new assembly. New adjuster plug assembly, No. 5686866, should be installed on early type gears whenever they are serviced. Only later type assembly will be furnished for service.

►*1961-62 BUICK (EXCEPT SPECIAL) STEERING SHAFT LOWER COUPLING REPLACEMENT NOTE:* If coupling is to be replaced, it is unnecessary to replace steering shaft and coupling assembly. Use a Lower Coupling, Part No. 5689730, and a Lower Coupling Bolt & Reinforcement Kit, Part No. 5689776.

►*1962 PONTIAC STEERING COLUMN LOWER SUPPORT BRACKET-TO-MOUNTING BRACKET SCREW TORQUE CHANGE NOTE:* Steering column lower support bracket-to-mounting bracket screw torque has been changed to 5-10 ft. lbs. (supersedes previous 10-20 ft. lbs.) to prevent collapsing of steering column reinforcement.

►*1962 PONTIAC STEERING COLUMN SEAL PRODUCTION CHANGE:* New foam rubber steering column seal, Part No. 544463, used on cars after February 1, 1962 to replace felt seal for easier installation of steering column jacket beneath toe plate grommet.

DESCRIPTION: All Models Except Chevrolet Truck - Similar in design and operation to previous models.

Chevrolet Truck: The control valve assembly of this linkage type power steering unit is located directly on the steering gear and is similar to the control valve assembly used on cars with "integral" type power steering. Service procedures for control valve are the same as for other models. For steering gear overhaul procedures, *see "Saginaw Ball Bearing Worm & Nut" in this section.*

PUMP BELT ADJUSTMENT: Proceed as follows:

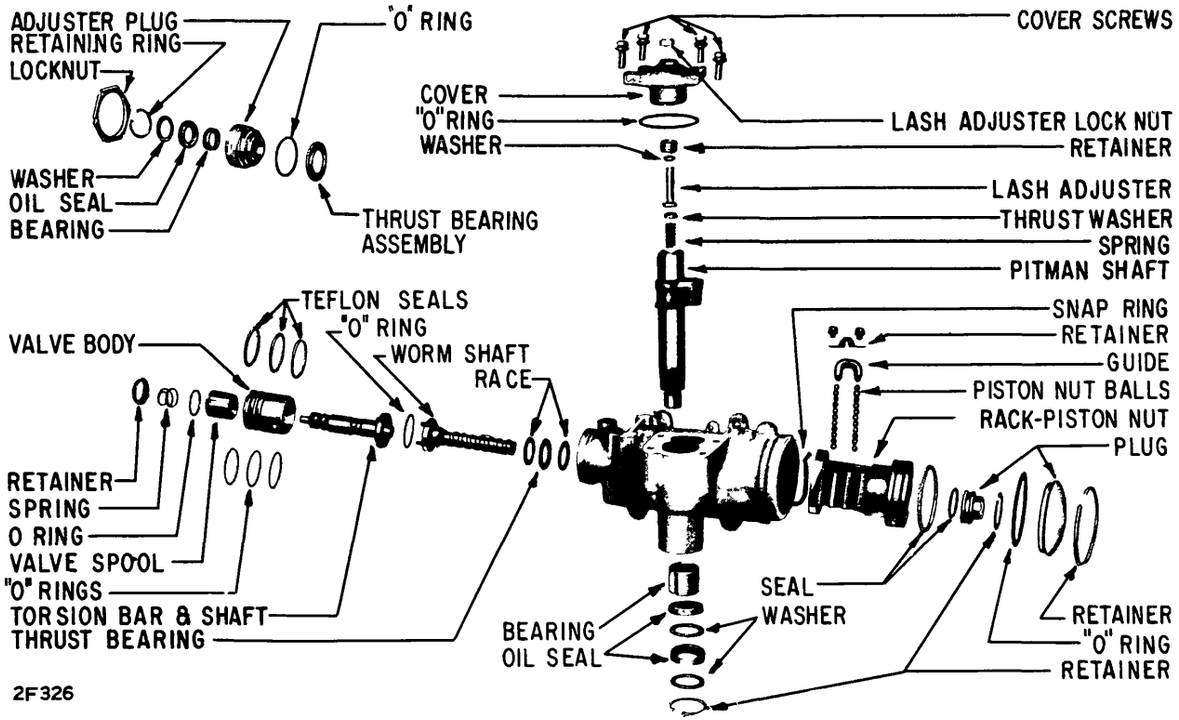
Buick (Except Special): Use strand tension gauge and adjust pump in mounting bracket for 100 lbs. belt tension.

Buick Special: Loosen power steering pump mounting bolts and rotate pump assembly to tighten belt until torque required to slip pulley on belt with a torque wrench applied to pulley nut is 40-45 ft. lbs. *NOTE - If strand tension gauge used, tighten belt until a reading of 80 lbs. is obtained.*

Cadillac: Use strand tension gauge and adjust pump in mounting bracket for 90 lbs. (new belt), 60 lbs. (used belt) tension. Tighten mounting bracket bolts to 30 ft. lbs.

Chevrolet Truck: Use a strand tension gauge and adjust pump in mounting bracket for 75 lbs. (new belt), 70 lbs. (used belt) tension.

Oldsmobil (All Mod ls): Position Tension Gauge 33-70 on pump belt, then loosen pump attaching bolts and adjust belt tension by moving pump away from engine until pointer on gauge indexes with groove in gauge



SAGINAW ROTARY VALVE POWER STEERING GEAR ASSEMBLY (EXPLODED)

plunger. Tighten attaching bolts to 20-28 ft. lbs. and recheck adjustment.

Pontiac: Loosen pump mounting bolts, then move pump until belt has ¼" deflection with a 5-6 lbs. load applied midway between fan and steering pump pulleys, or a 70-75 lb. load is indicated on a strand tension gauge. Tighten mounting bolts to 25-35 ft. lbs.

LUBRICATION: Check fluid level in power steering pump reservoir every 1000 miles (Buick & Chevrolet Truck), at each engine oil change (Cadillac, Oldsmobile, Pontiac) with steering gear and fluid at normal operating temperature. If necessary, add automatic transmission fluid to bring level to mark on reservoir filler neck. If steering gear and fluid are cold, bring fluid level to lower end of filler neck. *NOTE - On Chevrolet Trucks, also check lubricant level in gear box and add "Multi-Purpose" lubricant as necessary.*

CHECKING & ADJUSTMENT (ON CAR): Disconnect pitman arm at intermediate arm or drag link (Buick Special, Cadillac, Oldsmobile F-85 & Pontiac). Remove pitman arm from shaft (Buick, Exc. Special & Oldsmobile, Exc. F-85), then proceed as follows:

Buick & Buick Special: Remove horn emblem from steering wheel hub, then turn steering wheel to extreme right or left position and attach a 0-25 inch pound torque wrench to wheel retaining nut and check torque required to turn wheel steadily for 1/8 turn from extreme position (this is where lash exists). Reading on torque wrench should be 1-11 inch pounds. Turn steering wheel ½-¾ turn off "high point" center position and check torque required to turn wheel. The reading should be 1-5 inch pounds (Exc. Buick Special); 2-5 inch pounds (Buick Special) higher than reading taken at extreme right or left position. Check torque required to turn gear through gear "high point". This reading should be 4-8 inch pounds higher than reading taken at ½-¾ turn off "high point". To adjust for proper overcenter torque, loosen lash adjuster locknut and use an Allen wrench to turn lash adjuster.

►*BUICK & BUICK SPECIAL ADJUSTMENT NOTE: Thrust bearing preload and ball nut pr load can only be adjusted with steering g ar out of car.*

Cadillac: 1) Thrust Bearing Pr l ad - Remove pitman arm from drag link and turn steering wheel 2 turns "off center". Attach a spring scale to rim of steering wheel and pull at right angle to wheel. Pull required to pull wheel through an arc not to exceed 1" should be 2-12 ozs. If not as specified, back out adjuster plug 1/8-turn and recheck. Now adjust preload by tightening adjuster plug to obtain 2-6 ozs. in excess of total drag just measured with adjuster plug backed off 1/8-turn. Tighten locknut.

2) Worm & Ball Preload - Turn steering wheel ½-turn "off center" and measure pull required to move steering wheel at this position. This reading should be 2-8 ozs. greater than thrust bearing preload reading obtained above. If preload incorrect, worm shaft balls should be replaced. If roughness evident when wheel turned between ½-turn and 1-turn "off center", worm should be replaced.

3) Pitman Shaft Endplay - With wheel "on center", measure pull required to pull wheel through an arc

CONTINUED ON NEXT PAGE

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

not to exceed 3". Reading should be at least 8 ozs., but not more than 36 ozs. greater than reading at ½-turn "off center" obtained above. If endplay not within limits, adjust so "on center" preload is 16-18 ozs. greater than ½-turn preload but still not more than 36 ozs.

Ch vr let Truck: There are no "On Car" adjustments.

Oldsmobil & Oldsm bil F–85: *NOTE – The over–center adjustm nt is th only power steering gear adjustm nt which can b made on the car; however, in order to mak this adjustment, it is also necessary to check c mbin d ball and thrust bearing preload.* On Oldsmobile, remove pitman arm from pitman shaft. On Oldsmobile F–85, disconnect pitman arm from relay rod. Loosen pitman shaft adjusting screw locknut and thread adjusting screw out to limit of its travel. Disconnect horn wire at relay, then remove horn button or ornament from steering wheel. Turn steering wheel through its full travel, then locate wheel at its center of travel. Check combined ball and thrust bearing preload with an inch pound torque wrench on steering wheel nut by rotating through center of travel (approximately ¼–turn in each direction) and note the highest reading. Tighten pitman shaft adjusting screw until torque wrench reads 4–8 inch pounds (Oldsmobile), 3–6 inch pounds (Oldsmobile F–85), higher than previous reading. *NOTE – Total preload must not exceed 16 inch pounds (Oldsmobile); 14 inch pounds (Oldsmobil F–85).* Tighten locknut and recheck. Install horn button, horn wire, and reconnect pitman arm.

Pontiac: Remove horn button or ring and install an inch pound torque wrench on steering wheel nut. *NOTE – Wh n taking t rqu r adings, take reading when pulling torqu wr nch to l ft and to right, then total both r adings and av rage them out.* To check adjuster plug preload, turn steering wheel one full turn off center "high point" and check torque required to turn wheel. This should not exceed 10 inch pounds. *NOTE – If r ading is b low 3 inch pounds, there may be some lash in thrust b aring.* To adjust (with unit in car), loosen plug locknut using a drift punch, then move flexible coupling as necessary to install Tool J-7624 (spanner wrench) on plug. Tighten plug as necessary to obtain a bearing preload of 3–5 inch pounds, then tighten adjuster plug locknut. *NOTE – Bearing pre- l ad must b measured with spanner removed and locknut tightened.* To check worm preload, turn steering wheel one–half turn off center "high point". This reading should be 0.5–5.0 inch pounds higher than previous reading. *NOTE – Worm preload is controlled by fit of rack–piston balls.* To adjust pitman shaft lash, take reading while turning wheel through center "high point". This reading should be 4–8 inch pounds higher than worm preload reading. If not within specifications, loosen pitman shaft adjuster nut and adjust lash with a 7/32" Allen wrench. Tighten locknut to 20-30 ft. lbs. Reassemble steering wheel and connect pitman arm.

PUMP PRESSURE TEST: Install pressure gauge J-5176 or equivalent between pump and pressure line at pump *NOTE - Adapter J-5900 or J-7786 or quival nt may be n cessary to install pr ssur gaug t pump.* With gauge valve open and engine at idle speed, turn wheels against stops a few times to bring power steering fluid to 150-170°F. With wheels against stops, pressure should not be less than specified in table below. If pressure less, slowly close valve and check for pressure increase. Pressure will increase if pump in good condition. If pressure does not increase with valve closed, pump is faulty. *CAUTION - Do not hold gauge valve closed more than 15 seconds.* After removing gauge, bleed hydraulic system (see below).

Pump Pressure Specifications

Car Model	℄ Pump Pressure
Buick (Except Special)	1000 lbs.
Buick Special	750 lbs.
Cadillac	1100 lbs.
Chevrolet Trucks	900 lbs.
Oldsmobile (Except F-85)	1100 lbs.
Oldsmobile F-85	800 lbs.
Pontiac	900 lbs.

℄ - At engine idle speed and steering oil at 150-170°F.

BLEEDING HYDRAYLIC SYSTEM: Fill reservoir to proper level and let oil remain undisturbed for at least two minutes. Start engine and run at idle speed for a very short time and add necessary oil to maintain fluid at proper level. Raise front wheels off floor, increase engine speed to approximately 1500 RPM and turn wheels full right and left, contacting stops lightly. Lower car and turn wheels right and left on the floor. Check oil level and refill as necessary. Continue this process as long as necessary to bleed all air from system.

STEERING WHEEL & HORN BUTTON: *See "Saginaw Ball Bearing Worm & Nut (Manual Steering Gear) in this section, and note the following:*

Cadillac: Steering Wheel Removal - Carefully pry cap from steering wheel hub. Disconnect horn wire from top of steering shaft, then remove upper steering shaft nut. Lift horn control shroud and switch assembly from steering wheel. Scribe alignment marks on hub and steering shaft for reassembly, then remove steering wheel with suitable puller (J-1859-02). To install, make sure scribe marks are in alignment, then reverse removal procedure. Torque upper steering shaft nut to 50 ft. lbs.

TROUBLE SHOOTING: *See 1959 Final Data, Page 379, or later Manual edition.*

STEERING GEAR REMOVAL & INSTALLATION: As follows:

Buick (Except Special): Removal - Disconnect hydraulic lines from steering gear and elevate ends higher than pump reservoir. Remove lower coupling flange pinch bolts. Remove pitman arm from steering shaft. Remove steering gear attaching bolts and remove steering gear. **Installation** - Reverse removal procedure. Torque steering gear attaching bolts to 60-75 ft. lbs. Torque coupling flange pinch bolt to 20-35 ft. lbs.

Buick Special: Removal – *NOTE – Pitman arm cannot be removed or installed with steering gear installed on crossmember. If pitman arm is to be removed from gear, loosen pitman arm nut before disconnecting gear from crossm mb r. Wh n installing g ar, do not tight n pitman nut until aft r st ering g ar is install d on crossmemb r.* Remove lower coupling clamp bolt, then loosen clamp retaining mast jacket to toe pan cover and "U" bolt retaining jacket to instrument panel. Pull mast jacket assembly up far enough so lower coupling can be removed from worm shaft. Raise car and disconnect pitman arm from intermediate rod, then loosen pitman arm nut with tool, J–8987. Remove steering gear–to–crossmember attaching bolts and remove gear assembly. *NOTE – Do not remove pitman arm from shaft unless pitman shaft assembly or seal is to be replaced.*

Installation: Reverse removal procedure and note the following: Tighten gear–to–crossmember attaching bolts to 55 ft. lbs., and pitman arm nut to 165 ft. lbs. Make sure that tang of mast jacket saddle engages slot in jacket and that steering shaft is centered in end of jacket assembly. Align coupling and clamp with groove on worm shaft and install clamp bolt and nut.

Cadillac: Removal - Remove steering flange attaching nuts, and remove ground wire from flange bolt. Disconnect hoses from pump and cap all openings. Raise car and remove pitman arm with a suitable puller. Remove steering gear attaching bolts and remove steering gear with hoses attached.

Installation - Apply sodium soap fiber grease to gear mounting pads. Make sure alignment pin on gear housing enters hole in frame side rail. Make sure flexible coupling is not distorted, then tighten steering gear attaching bolts to 60-80 ft. lbs., and pitman shaft nut to 90-120 ft. lbs.

Chevrolet Truck: Removal – Disconnect steering shaft from lower coupling, then remove hoses from valve. Remove pitman arm nut, lockwasher and pitman arm. Remove mounting bolts and steering gear.

Installation – Reverse removal procedure.

Oldsmobile (Exc. F–85): Removal – Scribe alignment marks on steering shaft flange and coupling flange, remove coupling flange attaching nuts and ground wire from attaching bolts. Disconnect hoses from pump, then raise car on a hoist. Remove pitman arm from shaft using puller J–5504, then remove gear to frame attaching bolts and remove gear.

Installation –Reverse removal procedure and note the following: Apply a soap fine fibre grease to gear mounting pads. Make sure alignment pin on gear housing enters proper hole in frame side rail, and that gear is properly aligned with steering shaft. Tighten gear–to–frame bolts to 60–80 ft. lbs. and pitman shaft nut to 90–120 ft. lbs.

Oldsmobile F–85: Removal – Remove coupling flange attaching nuts and ground wire, then disconnect hose from power steering pump. Remove steering shaft coupling clamp bolt and slide clamp off coupling housing onto steering gear worm shaft. Mark steering shaft in line with slot at coupling clamp surface. Disconnect horn wire from harness and horn shroud from center of steering wheel. Remove steering wheel (see above), then pull horn contact plate up out of recess in actuator assembly for necessary clearance to allow removal of upper bearing–to–actuator assembly retainer clip. Use a small screwdriver and pry upper bearing-to-actuator assembly retaining clip out of actuator housing. Pull steering shaft up out of steering column and block shaft up approximately 2". Raise car and remove pitman arm from relay rod. Disconnect steering gear from crossmember and remove from car.

CONTINUED ON NEXT PAGE

SAGINAW ROTARY VALVE POWER STEERING (Cont.)

Installation – Reverse removal procedure and note the following: Tighten pitman nut to 150–180 ft. lbs. and steering gear–to–crossmember bolts to 45–60 ft. lbs.

Pontiac: Removal – Disconnect pressure and return hoses from housing, then disconnect pitman arm from shaft using puller J–5504. Scribe mark on steering shaft worm and worm shaft flange and disconnect gear lower flange from steering shaft. Remove gear housing–to–frame bolts noting number and location of frame shims (if any), and remove steering gear.

Installation – Reverse removal procedure and note the following: Locate any shims that were removed in their original position between housing and frame. Tighten housing-to-frame bolts to 70-90 ft. lbs., pitman arm nut to 100-140 ft. lbs., and flange attaching nuts to 10-20 ft. lbs.

OVERHAUL: *See 1959 Final Data, Page 379, or later Manual edition, and note the following:*

►*ADJUSTER PLUG & THRUST BEARING SERVICE NOTE:* Following procedures are applicable whether adjuster plug and thrust bearing are early type two-piece unit, or later type single-piece unit (delete instructions to separate units when working on a single-piece unit).

Adjuster Plug: Removal - On Oldsmobile and Chevrolet Trucks, scribe marks on stub shaft and coupling flange to make sure they are assembled in same position. *NOTE - This is not necessary on other models.* On Oldsmobile and Chevrolet Truck, remove stub shaft to flange retaining screw and remove flange assembly. On other models, remove lower flange pinch bolt and remove flange from shaft. Loosen and remove adjuster plug locknut and remove adjuster plug with Tool J-7624.

Disassembly - Remove thrust bearing retainer with a screwdriver, being careful not to score needle bearing bore. Discard retainer. Remove thrust bearing spacer, thrust bearing, and thrust bearing races. Remove adjuster plug "O" ring and discard, then remove stub shaft seal retaining snap ring. On Chevrolet Truck, remove seal back-up washer. On other cars, remove and discard dust shield. On all models, remove stub shaft seal by prying out with a screwdriver and discard. Inspect needle bearing in adjuster plug, and if rollers are broken or pitted, remove needle bearing from adjuster plug by pressing from thrust bearing end using Bearing & Seal Remover, Tool J-6221 (Buick & Cadillac), J-5254 (Oldsmobile), J-5188 (Pontiac), J-8524-2 & J-7079-2 (Chevrolet Truck), Discard the bearing.

Inspection - Inspect thrust bearing spacer for cracks, then inspect thrust bearing rollers for wear, pitting, scoring or cracking. If any of these conditions are found, replace both thrust bearing races and check thrust bearing spacer. Inspect thrust bearing races for wear, pitting, scoring, cracking, or brinelling. Replace if necessary. Check thrust bearing and thrust bearing spacer.

Reassembly - Install needle bearing by pressing from thrust end of adjuster plug against identification end of bearing using the same tool used for removal. *NOTE - End of bearing must be flush with bottom surface of stub shaft seal bore.* Lubricate stub shaft seal with automatic transmission fluid, then, on Chevrolet Trucks, install seal and back-up washer. On other models, install seal with spring in seal toward adjuster plug. *NOTE - Use Tool J-8524-1 (Chev. Truck), J-5188 (Buick, Cadillac, Pontiac), J-5254 (Oldsmobile) to install seal far enough in plug to provide clearance for retaining ring (Chev. Truck), dust seal and retaining ring (Other Models).* On Chev. Truck, install retaining ring. On other models, install dust shield with lip up in plug, then install retaining ring. Lubricate "O" ring seal with petroleum jelly and install on adjuster plug. Assemble large diameter thrust bearing race, thrust bearing, small thrust bearing race, and thrust bearing spacer on adjusting plug. Press bearing retainer into needle bearing bore with a brass or wooden dowel. *NOTE - Radial position of dimples is not important.*

Installation - Install adjuster plug in end of housing just enough to make certain that all parts are properly seated in gear housing. Back adjuster plug off 1/8 turn and measure valve assembly drag, using a torque wrench. Use a spanner wrench and adjust thrust bearings so that preload of 1–3 inch–pounds in excess of valve assembly drag is obtained. Total thrust bearing preload and valve drag should not exceed 8 inch–pounds (Cadillac, Oldsmobile & Chevrolet Truck); 11 inch–pounds (Buick & Buick Special); 10 inch–pounds (Pontiac). Hold adjuster plug in position and install and tighten locknut. Install coupling shaft assembly on stub shaft (align marks made at disassembly on Oldsmobile & Chevrolet Truck). On all models except Oldsmobile & Chevrolet Truck, align groove in lower flange with pin extending from stub shaft and install flange. On Oldsmobile and Chevrolet Truck, install coupling flange bolt and tighten to 20–25 ft. lbs. On other models, install lower flange pinch bolt and tighten to 30 ft. lbs.

►*VALVE ASSEMBLY NOTE (CHEVROLET TRUCKS):* Overhaul procedures are the same as for other models with power steering except that free length of valve spool spring is .760-.790".

►*RACK PISTON END PLUG REMOVAL NOTE:* Plug may take on permanent set as it is tightened to 50 ft. lbs. torque. Plug could break if not handled carefully. To remove, rap plug with a plastic hammer or rawhide mallet to unseat threads.

►*RACK PISTON REMOVAL NOTE:* Some models have a snap ring in upper end of piston bore in housing. *Do not remove this snap ring during disassembly procedures.*

Control Valve Housing & Steering Gear Overhaul (Chevrolet Trucks): Control valve housing forms steering gear top cover, and can be removed by removing attaching bolts. *For steering gear overhaul, see "Saginaw Ball Bearing Worm & Nut" (Manual Steering Gear) in this section.*

POWER STEERING PUMP: Saginaw Vane Type With Integral Reservoir. *See 1961 Final Data, Page 390.*

POWER CYLINDER

CHEVROLET TRUCK

POWER CYLINDER: Disassembly - *NOTE - The only repair to make in the field on the power cylinder is to replace piston rod seals.* Before removing piston rod seal parts from rod end of power cylinder, clean the exposed portion of seal cavity with clean solvent, brush and compressed air. Remove snap ring. To dislodge scraper, washer, dust seal, seal back-up washer and "U" cup seal, use air hose and apply pressure to cylinder port (right hand port looking down), and seal the left hand port. Remove seal parts from rod.

Cleaning & Inspection: Clean all parts in solvent and dry with compressed air. *CAUTION - Do not use wast to wipe off spool or inside bore of valve housing.* Protect spool edges and bore of valve housing from damage during disassembly and reassembly. Inspect parts for nicks and burrs and excessive wear. Check cylinder scraper washer for fit on piston rod, which should be .0001-.0035". Replace if worn.

Reassembly: Assemble open side of "U" cup seal over the rod and into bearing cavity, seal back-up washer, dust seal (with open side away from seal cavity), and scraper washer. Slide parts in place on rod and lock in place with snap ring.

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING

Linc ln C ntinental (1962)
Thund rbird (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 LINCOLN CONTINENTAL NOISE IN POWER STEERING CORRECTIONS:* 1) If caused by upper part of flexible coupling loose on steering shaft, loosen setscrew and pry **slightly** up on upper part of coupling and tighten setscrew to 18-22 ft. lbs. *CAUTION - Do n t put xcessiv prel ad on steering shaft upper bearing and n fl xibl part f coupling.*
2) Reduce sector adjusting screw-to-sector clearance to minimum. Adjust worm bearing preload to 5-8 inch-lbs., and sector mesh load to 8-10 inch-lbs. greater than worm bearing preload setting. *NOTE - These specificati ns sup rsede pr vious specifications of 3-6 inch-lbs. w rm b aring pr l ad.* Adjust valve spool centering. Power piston backlash desired for minimum noise is .0015".

►*1962 LINCOLN CONTINENTAL POWER STEERING FLUID LEAK AT INLET HOSE SEAT CORRECTION:* May be caused by housing porosity at inlet hose sealing area. To correct, install new type oil resistant "O" ring, Part No. C2AZ-3B699-A, in inlet hose seat in housing. Install "O" ring carefully to prevent damage when hose fitting connected. *CAUTION - Install this new seal only on units that l ak, and on units with seal installed in producti n (gr n paint at inlet boss area) whenever inl t hos disc nn ct d.*

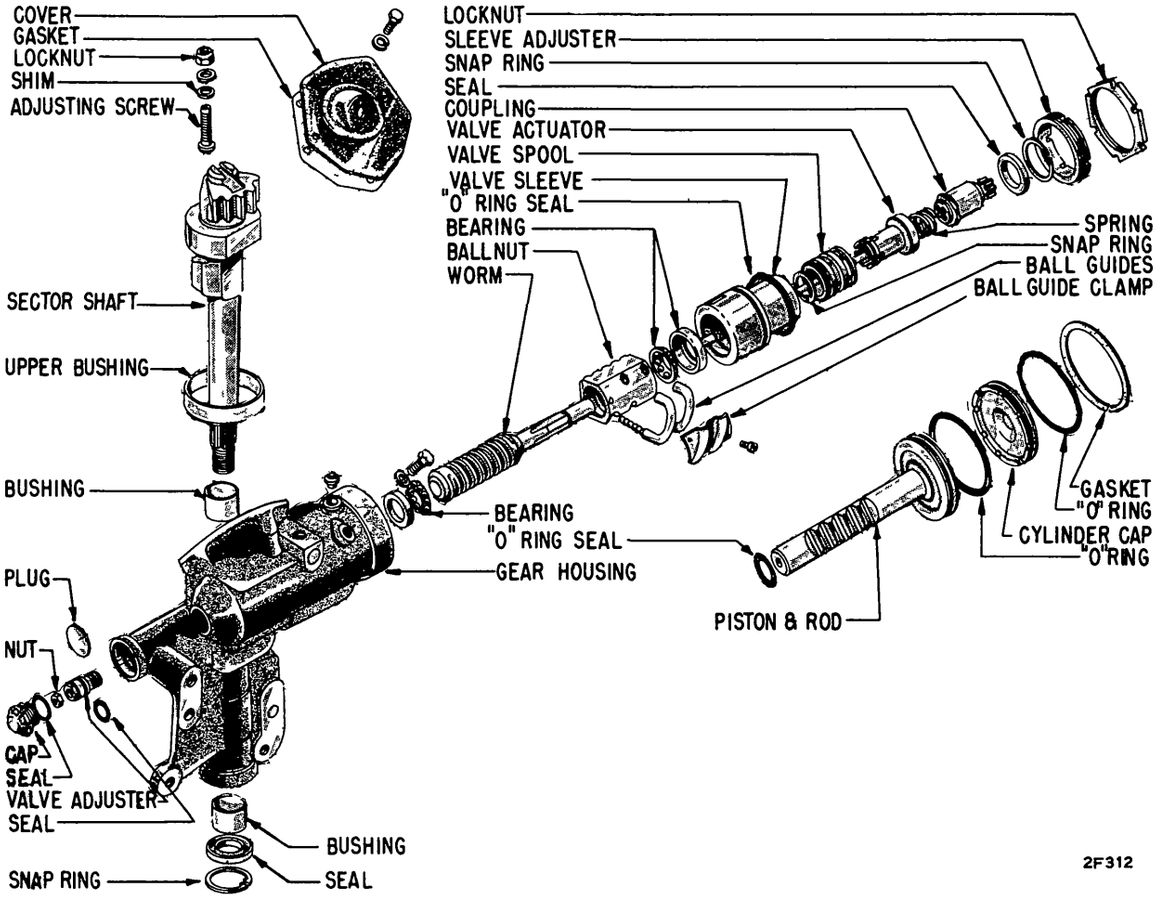
DESCRIPTION: Piston type hydraulic assist power unit having a torsion bar operated control valve combined with a ball nut and worm steering gear enclosed in a single housing. Hydraulic fluid under pressure is supplied to steering gear by a positive displacement type pump. Design and operation are similar to previous models.

PUMP BELT ADJUSTMENT: Lincoln Continental - No adjustment. Pump is mounted on engine front cover and driven by engine crankshaft.
Thund rbird - Use a suitable belt tension gauge and adjust pump mounting bracket for 120-150 lbs. (new belt), 90-120 lbs. (used belt) tension. *NOTE - Used belt is any b lt op rated for 15 minutes or longer.*

LUBRICATION: Check fluid level in reservoir every 6000 miles. Fluid should be at "F" mark on dipstick. Use only Automatic Transmission Fluid Type "A", Suffix "A", or Ford & Lincoln Lubricant C1AZ-19582-A.

BLEEDING SYSTEM: If air is in system due to low oil level in pump reservoir, or to disassembly of gear, fill pump reservoir to proper level, start engine, turn on windshield wipers on Lincoln Continental, and turn steering wheel through its entire travel three or four times to allow air to escape. Recheck fluid level and add fluid as required. *CAUTION – Do not hold wheels against their stops when bleeding system.*

HYDRAULIC PRESSURE TEST: Connect a pressure gauge with a hand shut–off valve in pressure line between pump and steering gear (pressure gauge must be between pump and shut–off valve). With shut–off valve on gauge fully open, allow steering fluid to come to operating temperature (cycle gear from stop to stop), then note gauge readings with wheels at full left and full right positions. Pressure should be 700–850 lbs. (Thunderbird), 1120–1250 lbs. (Lincoln Continental). If pressure less than minimum, close gauge valve and note reading. *CAUTION – Do not leave valve closed for more than 15 seconds.* If pressure still less than minimum, pump is faulty. If pressure increases, steering gear is at fault.



"TORSION BAR" POWER STEERING ASSEMBLY (EXPLODED)

ADJUSTMENTS (LINCOLN CONTINENTAL)

Worm Bearing Preload & Sector Mesh Adjustments: 1) Disconnect pitman arm from sector shaft and drain fluid from steering gear housing and from reservoir. *NOTE – Fluid in system will cause incorrect readings.* Remove steering wheel and horn ring. *NOTE – Correct readings cannot be obtained with steering wh l and horn ring installed as segment typ h rn ring caus s ass mbly to be unbalanced.* Lock two nuts on steering shaft and attach an inch–pound torque wrench to upper nut. Turn shaft to either stop, back off ¼ turn, and measure torque required to keep shaft turning at a constant rate for one complete turn. This is worm bearing preload and should be 5-8 inch-lbs. *NOTE - This supersedes previous specification of 3-6 inch-lbs.* To adjust, loosen worm bearing adjuster locknut and turn adjuster as necessary. *NOTE - Always make final adjustment in tightening direction.*
2) Turn steering shaft so ball nut and sector are centered (approximately two turns from either stop), then note torque required to turn shaft through center position. Torque should be 8-10 inch-lbs. greater than for worm bearing preload (above). To adjust, loosen sector shaft adjusting screw locknut and turn adjusting screw as necessary.

Valve Spool Centering: 1) Place steering gear on a bench near fender and insert a 3/8" drive, 3" extension into flexible coupling and retain extension with setscrew. Remove adjuster cap and install a 7/16" midget socket and a 9/16" offset box end wrench on adjuster. Connect a pressure gauge between pressure line from pump and inlet port (upper hole) of steering

CONTINUED ON NEXT PAGE

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING (Cont.)

gear. Disconnect return line from windshield wiper control valve lower connection and attach line to outlet port of steering gear. Make sure shut–off valve on gauge is fully open.

2) Start engine and bring gear housing to operating temperature (cycle from stop to stop), check and add fluid if necessary. Turn gear coupling to left turn position, attach an inch–pound torque wrench to extension in coupling, then turn torque wrench so pressure gauge reads 300 lbs. Note torque wrench reading. Repeat for right turn position. Torque reading for both positions should be equal within 3 inch–lbs. To adjust, loosen adjuster locknut and turn adjuster in direction of low reading. For example, if reading low in left turn position, turn adjuster toward left turn position. *NOTE – Only slight movement of adjuster is necessary to change valve spool position.* Tighten locknut and recheck.

(THUNDERBIRD)

Valve Spool Centering: Install an inch–pound torque wrench on steering shaft (unnecessary to remove steering wheel), bring power steering fluid to normal operating temperature (cycle from stop to stop), and have engine idling. With front wheels straight ahead, measure torque necessary to make a right turn and a left turn. Difference in readings between turns should not be more than 3 inch–lbs. If difference more, remove adjuster cap, loosen locknut and turn adjuster in direction of low reading. For example, if reading low in left turn position, turn adjuster toward left turn position. Tighten locknut and recheck adjustment.

Worm Bearing Preload & Sector Mesh Adjustments: 1) Disconnect pitman arm from steering arm–to–idler arm rod. Loosen sector shaft adjusting screw locknut and back out sector shaft adjusting screw. With an inch–pound torque wrench on steering shaft (unnecessary to remove steering wheel), note torque required to rotate wheel **very slowly** through one complete turn from center position. This is worm bearing preload and should be 2-4 inch-lbs. To adjust, loosen bearing adjuster locknut and turn adjuster as necessary. Tighten locknut and recheck.

2) Center steering wheel and turn sector shaft adjusting screw in until 6 inch-lbs. maximum torque is required to turn steering wheel through center position. Turn wheel slowly, no backlash allowed at 30° on either side of center. *NOTE - When adjusting, always turn adjusting screw in one direction to reach adjustment. If screw turned too far, back out one full turn and readjust.*

TROUBLE SHOOTING

See 1958 Final Data, Page 390, or later Manual editions.

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

Lincoln Continental: To remove cap from steering wheel hub, press down on cap and turn counterclockwise. Remove steering shaft nut, attach a suitable puller to steering wheel, and remove wheel and horn ring assembly. To install, align mark on wheel hub with mark on shaft. Install wheel and horn ring and torque steering shaft nut to 25–35 ft. lbs. Stake the nut.

Thunderbird: Unsnap hub cap from horn ring, remove steering wheel nut, and pull steering wheel and horn ring with a suitable puller. To install, reverse removal procedure, torque nut to 25-35 ft. lbs., and stake the nut.

STEERING GEAR REMOVAL & INSTALLATION

Lincoln Continental: Disconnect hoses from steering gear and tie hoses higher than reservoir. Raise car and remove transmission linkage splash shield. Remove left exhaust manifold–to–resonator pipe. Remove pitman arm from sector shaft. Remove transmission linkage rods from equalizer shaft and force shaft outward. Loosen setscrew locking flexible coupling to steering shaft. Remove steering gear attaching bolts and remove steering gear. To install, reverse removal procedure and make sure sector shaft is centered in gear. Torque steering gear attaching bolts to 35–50 ft. lbs., and pitman arm attaching nut to 100–130 ft. lbs.

Thunderbird: Disconnect fluid lines from steering gear, plug gear openings and cap lines. Remove pivot bracket clamp bolts, bracket upper mounting nut and flat washer, then remove pivot bracket. Remove cotter pin and steering shaft retainer pin. Disconnect pitman arm from sector shaft. Remove steering gear housing mounting bolts and remove housing. To install, reverse removal procedure. Torque gear mounting bolts to 35-50 ft. lbs., pitman arm attaching bolt to 110-150 ft. lbs., pivot bracket clamp bolts to 19-23 ft. lbs., and pivot bracket stud nut to 9-12 ft. lbs.

OVERHAUL

See 1958 Final Data, Page 390, or later Manual editions, and note the following:

1) When installing torsion bar sleeve bearing in sleeve, bearing must be pressed in so there is .095-.105" clearance between upper surface of bearing and seal seat surface of sleeve.

2) During and after reassembly, check worm bearing preload and sector mesh adjustments, and valve spool centering according to "Adjustments" above.

HYDRAULIC PUMP

Lincoln Continental: *See 1960 Final Data, Page 404, or later Manual edition, and note the following:*

Pump Pressure - 1120-1250 lbs.

Bleeding System - Turn on windshield wipers in addition to the procedure listed.

Thunderbird: *See 1958 Final Data, Page 398, or later Manual editions.*

THUNDERBIRD MOVABLE STEERING COLUMN

DESCRIPTION: Consists of a lateral movement mechanism at instrument panel with a flexible steering shaft coupled to steering gear torsion bar. Steering column tube lower end pivots on a bracket fastened to steering gear housing.

OPERATION: With steering column in straight ahead position and transmission selector lever in any position other than "P", column is locked to brake pedal support assembly by a pawl–type lever controlled by selector tube. Two coil springs assist pressure from selector tube and provide positive engagement of pawl in lock plate. When selector lever moved to "P" position, latch type bracket fastened to selector tube disengages pawl from locking plate. Steering column assembly can now be moved about 10" to right. When column is moved over, transmission cannot be shifted. When column moved back to straight ahead position, pawl engages locking plate. Transmission can now be shifted.

ADJUSTMENTS: Track–To–Column Bracket – Track notched edge must be centered under bracket notch for full distance of track travel. To adjust, loosen track–to–pedal support bolts.

Slide Tension: Adjust friction between track and steering column bracket by loosening or tightening nuts on cam type friction adjustment bolts. *Both bolts must be adjusted equally.*

Lock Plate: Adjust engagement of lock pawl in lock plate, by loosening lock plate mountings and adjust cam bolt and screws so lock pin clears bottom of lock plate by no more than 1/32" for the full travel. Pawl must be fully engaged in lock plate when column is locked.

Stops: With selector lever out of "P" position and nylon button of detent spring in its track center notch, position stop bracket against bumper. Pawl pin must engage fully and also clear corner of notch as pin enters or leaves. There should be no lateral movement of column as pawl pin engages or disengages. *NOTE – On air conditioned cars, spring projects left of its attaching bolt and left notch in track is used. If right shroud hits air conditioning unit, adjust right stop as necessary.*

TROUBLE SHOOTING: Binding, Rough, or Rasping Column Movement: Track–to–column bracket misaligned; Lock plate rubbing pawl; Shroud interferes with instrument panel.

Hard Column Movement: Slide tension out of adjustment; Track–to–column bracket misaligned; Lock plate rubbing pawl.

Transmission Shift Into Reverse With Column At Extreme Right: Lock plate out of adjustment.

Poor Shift Into or Out of Park: Left stop out of adjustment; Lock pawl arm binding in pivot bushing.

Lateral Looseness In Column When Locked: Lock pawl arm loose in pivot bushing; Pivot bracket loose at steering gear.

Vertical Looseness In Column When Locked: Loose track or braces; Pivot bracket loose at steering gear; Slide tension out of adjustment.

Right Shroud Hits Air Conditioning Unit: Right stop bolt on track out of adjustment.

FORD TRUCK LINKAGE TYPE POWER STEERING

F rd Trucks, Exc pt Tilt Cab M d ls (1962) ℂ
F rd Trucks, Tilt Cab M dels (1962) ℂ
ℂ - Power cylinder used.
ℂ - Booster (rack & piston) cylinder used.

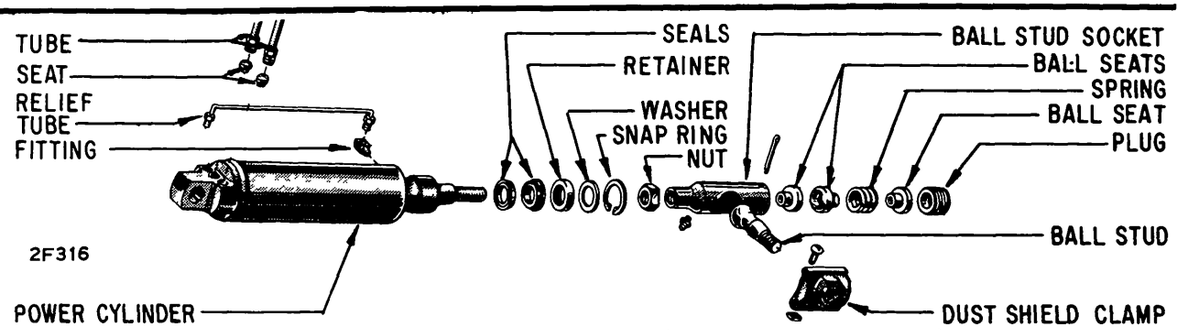
DESCRIPTION: Linkage type with control valve assembly connected directly to steering gear pitman arm. On Tilt Cab Models, the operating cylinder is a "rack & piston" booster type cylinder connected between pitman arm and wheel spindle. On other models, the hydraulic power cylinder is anchored to left side of front axle with the piston rod connected to center of spindle connecting rod. The only basic differences between the two units is in the construction of the operating cylinders.

LUBRICATION: Check fluid level in reservoir every 4000 miles (On Highway), 500 miles (Off Highway). Fluid should be at "F" mark on dipstick or within 1" of top of reservoir. Check fluid at normal operating temperature. Use only Automatic Transmission Fluid Type "A", Suffix "A"; or Ford Lubricant C1AZ-19582-A.

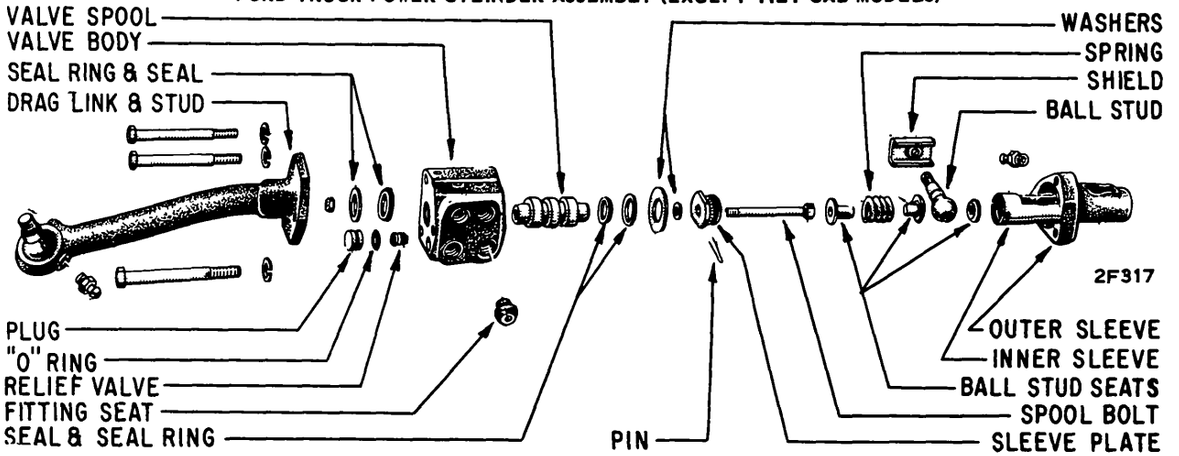
ADJUSTMENT: Pump Driv Belt – ¼" belt deflection midway between pulleys. Tighten belt adjusting bolt to 30–35 ft. lbs.

TESTING: Turning Eff rt – With front wheels properly aligned and tire pressure correct, place car on dry concrete, set brakes, then proceed as follows: With engine at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to rim of steering wheel and measure pull required to turn wheel at least one complete turn in both directions. Pull should be 35–65 lbs., and about equal in both directions.

Pump Pr ssur : Install pressure gauge, Tool T56L–33610–D, between pump hose and pump outlet with pressure gauge between pump and shut–off valve of tool. Run engine at idle speed (with shut–off valve open) for two minutes to normalize oil temperature. With wheels in straight ahead position, pressure should be no higher than 700 lbs. with engine at 900 RPM. If pressure higher, check for faulty pump or control valve. Increase engine speed to 3000 RPM and slowly close shut–off valve of gauge. Pressure should be about 1150 lbs. when shut–off valve fully closed. *CAUTION– Do n t l av shut–off valve closed for more than 15 seconds.* If the pressure is less, then the pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and power steering is not satisfactory, trouble is in control valve or power cylinder.



FORD TRUCK POWER CYLINDER ASSEMBLY (EXCEPT TILT CAB MODELS)



FORD TRUCK POWER STEERING CONTROL VALVE ASSEMBLY (TILT CAB MODELS)

TROUBLE SHOOTING: *See 1959 Final Data, Page 391, or later Manual editions.*

REMOVAL & INSTALLATION: Power Steering Pump – Remove as much fluid as possible through reservoir filler opening. Disconnect pressure hose from pump and return line from cooler, and tie hoses to prevent fluid loss. *NOTE – It is easier on Tilt Cab Models to disconnect hoses after pump removed from mounting bracket.* Loosen adjusting bracket bolt and pivot bolt and remove pump belt. Remove pump attaching bolts and remove pump and reservoir as an assembly. To install, reverse removal procedure.

Control Valve (Except Tilt Cab): Drain reservoir, disconnect hoses from control valve, then disconnect ball studs and piston mounting bolts. Remove control valve. To install, reverse removal procedure.

Control Valve (Tilt Cab): Remove hoses from valve, then disconnect studs from idler arm and sector shaft arm. Remove control valve and drag link. To install, reverse removal procedure.

OVERHAUL: *See 1959 Final Data, Page 391, or later Manual editions.*

POWER STEERING PUMP: Eaton Roller Type - See *1958 Final Data, Page 398, or later Manual editions.*

BUICK SPECIAL & OLDSMOBILE F-85 3-SPEED SYNCHRO-MESH

Buick Special (1962)
Oldsmobile F-85 (1962)

DESCRIPTION: Same design as used on previous models.

REMOVAL & OVERHAUL: *See 1961 Final Data, Page 395.*

TRANSMISSION CONTROL ADJUSTMENT: *NOTE - Before adjusting linkage, make sure that shift equalizer is properly aligned and is not binding. Check to see that equalizer pin which is welded to underbody side rail goes through outboard side of equalizer at right angles and that it is located in center of hole in equalizer by rubber washer. If necessary to adjust alignment of pin, bend bracket to desired position. Be careful not to break the weld.* Place transmission in neutral and loosen shift rod clamps at transmission and equalizer. Loosen the lever retaining ring bolt on mast jacket at lower end of steering column, then install fixture J-8992 on mast jacket. Position second and third shift lever against fixture. Tighten second and third adjusting clamp on equalizer (make sure lever is against fixture), to 10-12 ft. lbs. Move first and reverse shift rod until a good cross-over point is obtained. To do this, lift shift control lever at steering wheel several times until no interference is felt when moving lever from second-third to first-reverse neutral position. When lever is released in first-reverse neutral position it should spring down to second-third neutral position. Hold lever midway in this cross-over position and tighten adjusting clamp. Recheck for smooth cross-over operation. Remove fixture and retighten retainer ring bolt.

CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH

Chevy II (1962)
Chevrolet Pass. Cars (1962)
Chevrolet Trucks, ½ & ¾ Ton (1962) Light Duty
Corvette (1962)
Pontiac (1962)

DESCRIPTION: Same design as used on previous models.

REMOVAL & INSTALLATION

REMOVAL: Drain transmission and remove propeller shaft. *NOTE - On Chevy II, Pontiac, and Chevrolet Trucks, disconnect rear universal and slide shaft to rear. On Chevrolet Pass. Cars, remove bolts attaching center support to frame, then disconnect rear propeller shaft and slide shaft assembly to rear to disengage from transmission.* Disconnect speedometer at transmission and shifter rods at transmission levers. Support rear of engine (Exc. Chevrolet Trucks) with a floor jack, then remove transmission support crossmember from transmission and frame members (Chevy II & Chevrolet Pass. Cars); disconnect at transmission bracket (Pontiac). *NOTE - On Chevrolet Pass. Cars, retain shims found between transmission mounting block and support for installation in same location when transmission is reinstalled.* Remove upper transmission attaching bolts and install suitable guide pins in these holes, then remove lower attaching bolts. *NOTE - If vehicle is equipped with overdrive, disconnect overdrive wires and controls.* Slide transmission straight back on guide pins (on Pontiac, tilt rear of transmission upward to disengage bracket studs from transmission support) until transmission shaft clears clutch assembly, and remove from vehicle.

INSTALLATION: Reverse removal procedure.

OVERHAUL

DISASSEMBLY: 1) Remove transmission side cover and gasket. Do not disassemble cover unless necessary for replacement of parts. Remove clamp, bracket and insulator from extension housing (if so equipped), then disconnect extension from transmission.

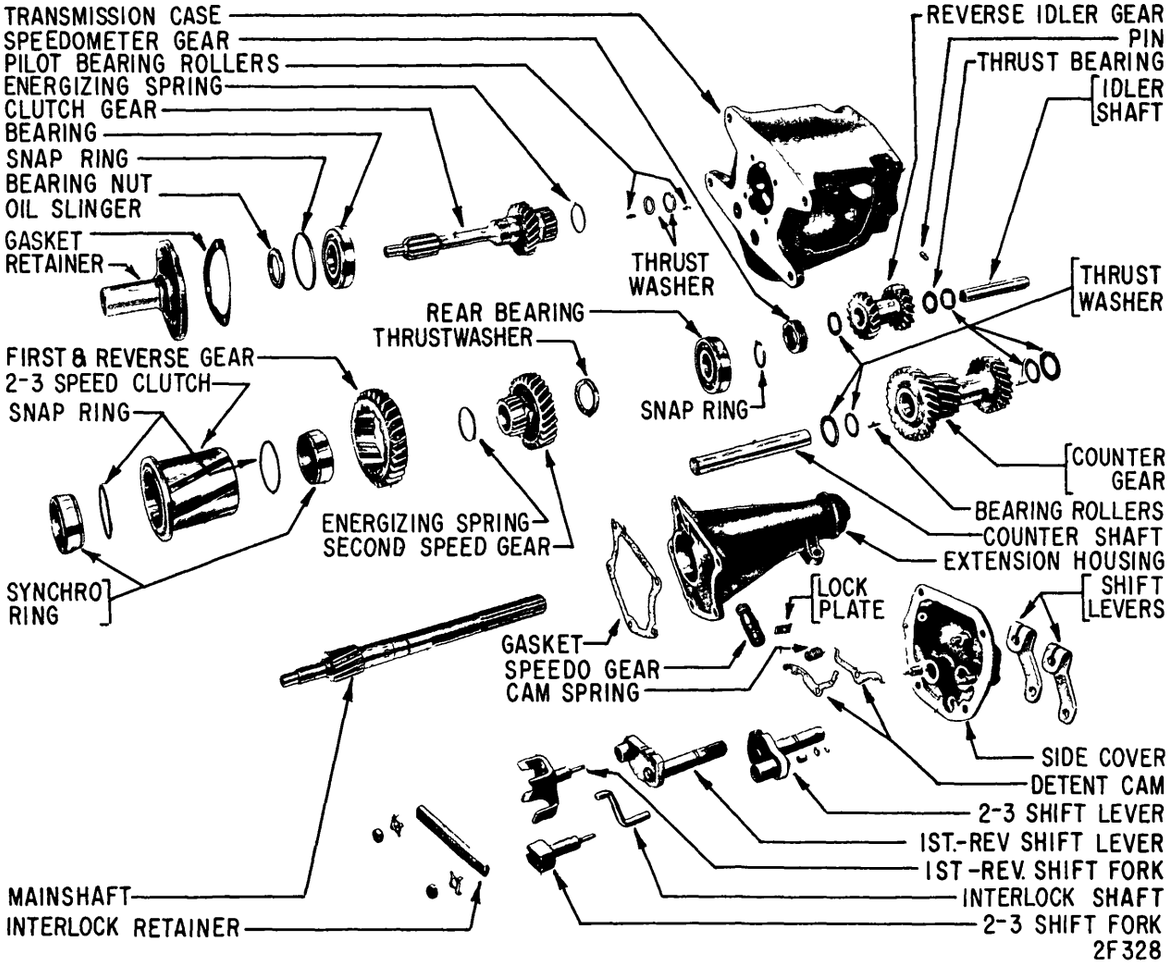
2) Carefully pull extension and mainshaft assembly out of transmission case, leaving second and third speed clutch assembly and first and reverse sliding gear in case. *CAUTION - Do not force mainshaft. Slowly rotate mainshaft and second speed gear to obtain alignment of synchronizing clutch teeth and splines on mainshaft. Be careful not to allow needle bearings in clutch gear to drop into case.*

3) Slide first and reverse gear from second and third speed clutch and remove through side opening in case, then remove second and third speed clutch from clutch gear and remove the 24 rear and 14 larger front pilot bearing rollers and thrust washer from inside clutch gear.

4) Remove front bearing retainer and gasket, then remove countershaft by tapping it from front to rear of case, using a suitable "dummy" shaft. Lower countergear and "dummy" shaft into bottom of case.

5) Remove clutch gear bearing snap ring, then tap shaft toward rear, moving gear and bearing assembly into case. Remove through side opening or through rear of case. *NOTE - On Chevrolet Pass. Cars (Exc. Chevy II)*

CONTINUED ON NEXT PAGE



CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH (TYPICAL)

CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH (C nt.)

with 6 Cyl. Eng. or with v rdriv , clutch g ar as- s mbly can b r mov d by pulling it out front of case aft r b aring r tain r and gasket have been removed.

6) Remove countergear from case and remove "dummy" shaft, then remove 25 needle bearing rollers and thrust washers from each end of countergear. Tap reverse idler shaft lock pin into shaft (pin is shorter than shaft diameter), then use a drift punch and tap rear of idler shaft, driving out case plug ahead of shaft. *CAUTION - Do not turn shaft while removing as lock pin may drop down b tw en idler gear bushings.*

7) Remove reverse idler gear, front thrust washer, radial roller thrust bearing and rear thrust bearing washer.

8) To remove mainshaft from rear extension, remove speedometer driven gear assembly, then ex pand rear bearing snap ring and tap mainshaft forward and out of extension.

SUB-ASSEMBLY OVERHAUL

Inspecti n: Wash all parts thoroughly, then inspect case for cracks and front face of case for burrs. Check gears and shafts for wear or damage. Check first and reverse sliding gear for free movement on clutch sleeve and check clutch sleeve for free movement on mainshaft.

Mainshaft: Disass mbly - Press speedometer drive gear off mainshaft using a suitable split plate in an arbor press. Remove bearing retaining snap ring and press bearing off shaft. Remove second speed gear thrust washer and second speed gear.

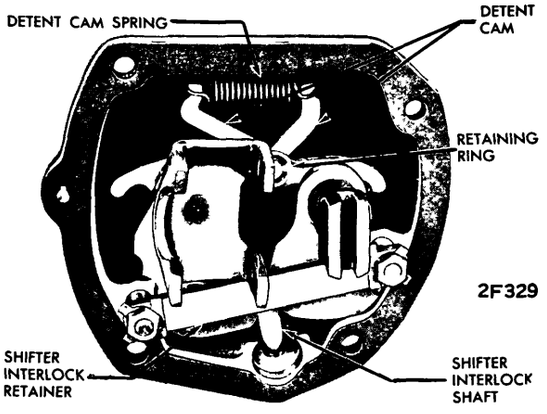
R ass mbly - Coat bore of second speed gear with transmission lubricant, then slide gear on shaft and install thrust washer with oil grooves toward gear. Install a new bearing with groove in outer diameter toward second speed gear, then select one of four selective fit snap rings (see table below) so endplay of bearing on shaft is a maximum of .004" (use thickest ring that will enter snap ring groove in shaft). Start speedometer drive gear on shaft with chamfered inner diameter of gear toward bearing, then press gear on shaft until forward face of gear is 7/8" (Exc. Pontiac); 53/64" (Pontiac) from rear face of bearing.

R ar B aring Snap Rings

Thickness	Part No.
.086-.088"	3707188
.089-.091"	3707189
.092-.094"	3707190
.095-.097"	3707191

Clutch G ar B aring: R m val - Place clutch gear in a vise with soft jaws and remove bearing retainer nut and oil slinger with Tool J-0933. *NOTE - Retaining nut and oil sling r is a on -pi ce steel casting machined with a l ft hand thread and is locked in place on clutch g ar ass mbly by being staked into a hole provided for that purpos .* Install clutch gear and bearing in transmission case and install snap ring on bearing. Support rear of case in an arbor press and press shaft from bearing, then tap bearing from case.

Installati n - Press clutch bearing on clutch gear with an arbor press (ring groove of bearing toward front of clutch gear). Install combination bearing retainer nut and oil slinger and tighten it securely with Tool J-0933.



SIDE COVER ASSEMBLY



SYNCHRONIZER RING ENERGIZING SPRINGS

Lock retaining nut oil slinger in place by staking it into hole provided with a center punch, being careful not to damage threads of shaft. *CAUTION - Bearing must turn as freely after it is installed on shaft as it turned before being installed.*

Clutch Sleeves & Synchronizer Rings: Disassembly - Remove first and reverse sliding gear, then turn synchronizer ring in clutch sleeve until ends of ring retainer can be seen through slot in clutch sleeve. Use a suitable pair of snap ring pliers (Tool J-0932) and expand retainer into counterbore in clutch sleeve, then slip ring out of sleeve. Check cones for wear or for looseness in clutch sleeve. *NOTE - If cones are damaged in any way, replace clutch sleeve assembly and both rings.* Inspect rings for smoothness then place ring in synchronizer cones and check with thumbs to see that rings do not rock. Excessive rocking would indicate a poor fit.

Reassembly: Install synchronizer ring retainers in counterbores in ends of clutch sleeve, then use a suitable pair of snap ring pliers (Tool J-0932) in slot in clutch sleeve and expand each retainer in counterbore. Lubricate each synchronizer ring with light oil and install in clutch sleeve. *CAUTION - Mak sur retain rs s at in groove all th way ar und rings s rings willturn fre ly.* Install first and reverse sliding gear on clutch sleeve.

►*SYNCHRONIZER ENERGIZING SPRING REPLACEMENT CAUTION:* One of the ends of these springs is slightly offset. Each spring must be assembled in its groove in clutch gear and second speed gear with the offset or locking end between the third and fourth teeth of either of the two banks of teeth on these gears, thus keeping spring from turning in its groove. If necessary to replace energizing springs, be careful not to distort springs by expanding them too far when sliding them over clutch gear teeth and second speed gear.

Transmission Extension Oil Seal & Bushing Replacement: Pry out oil seal and drive bushing into case using a suitable tool. Drive a new bushing in from rear of case until bushing is slightly below counterbore for seal. Coat inner diameter of bushing with transmission lubricant, then install a new seal.

►*REVERSE IDLER GEAR INSPECTION NOTE:* Clearance between idler shaft and gear bushing should be .002-.004". If not within limits, replace gear and shaft. Bushings are not serviced separately.

Side Cover: Disassembly - Remove nuts and locks from shifter interlock retainer and remove retainer, then remove detent cam spring to release detent cam. Remove both shifter shafts and shift fork assemblies. Remove retaining ring and remove detent cam, then remove shifter interlock shaft..

Reassembly - Reverse disassembly procedure. *NOTE - When cover is installed on transmission, flanged side of first-reverse shifter fork must face rear of transmission.*

REASSEMBLY: 1) Coat reverse idler thrust washers and bearing with grease, then position thrust bearing against rear of gear, (end with chamfered gear teeth), and position large thrust washer against bearing. Position small thrust washer at front end of gear.

2) From rear of case, install idler shaft, aligning lock pin hole in shaft with hole in case, and tap shaft in until front of shaft is flush with inner side of rear boss. Position reverse idler gear assembly in case so radial roller thrust bearing is toward rear of case and gear is lined up with shaft. Use a soft hammer and tap shaft in until lock pin holes are lined up.

3) Coat new idler shaft lock pin with sealer and drive it in approximately 1/16" beyond flush with case. Peen hole slightly to secure lock pin. Install new idler shaft expansion plug in front of case.

4) Coat roller bearing area at each end of countergear with grease and insert a suitable "dummy" shaft into gear. Install 25 roller bearings over "dummy" shaft at each end of gear, then apply grease to bearing thrust washers and countergear thrust washers and place bearing thrust washers, followed by countergear thrust washers, at both ends of case, making sure that tangs on countergear thrust washer face out. With "dummy" shaft in position, place countergear assembly in bottom of case.

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CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH (C nt.)

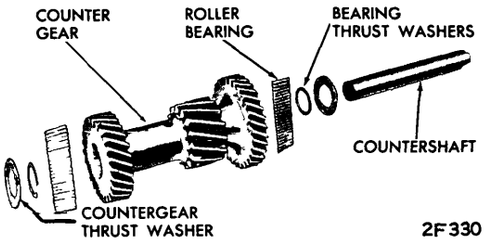
5) From inside case, push clutch gear assembly through opening in front face of case, then use a brass drift and tap the assembly in until bearing locating groove is outside front of case. *NOTE - On Chevrolet Pass. Car with 6 Cyl. Engine or Overdrive, install clutch assembly from front of case.* Install clutch gear bearing snap ring in groove and tap the assembly to rear until snap ring is seated against face of case. Install bearing retainer and gasket. Gasket must not protrude beyond edge of retainer. *NOTE - Retainer can be installed in one position as holes in retainer are unevenly spaced.* Apply sealer to retainer bolts, then install bolts and special lockwashers and tighten to 12-15 ft. lbs.

6) Turn transmission case so top side is downward while guiding countergear assembly into position so that idler gear, clutch gear and countergears mesh properly. *CAUTION - Do not allow thrust washers at ends of countergear to become dislodged.* Lubricate and start countershaft in case from rear, making sure that flat on end of shaft is horizontal and toward bottom of case (except transmission with overdrive); horizontal and toward top of case (transmission with overdrive). *NOTE - Flat on shaft must be as indicated to permit installation of extension housing or overdrive adapter.* Align countergear with shaft and use a soft hammer to tap shaft through, pushing "dummy" shaft out front of case until flat on end of shaft is flush with rear face of case.

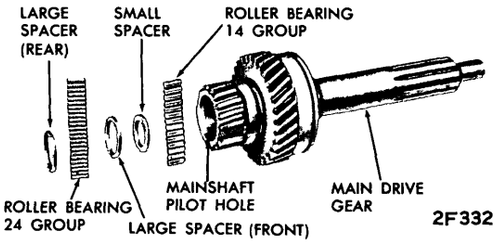
7) Coat pilot holes in clutch gear to retain pilot needle bearings, then insert 14 large bearings and the small inner diameter spacer. Insert large inner diameter front spacer, followed by 24 large needle bearings. Insert large inner diameter rear spacer with chamfered side out.

8) Install synchronizing clutch assembly (shoulder to front), through rear opening of case, then line up two inner lugs of clutch sleeve synchronizing ring with two wide grooves in clutch gear and slide clutch assembly onto clutch gear. Through side opening of case, insert first and reverse sliding gear, positioning wide inner bevel and small round depression toward rear. Guide first and reverse gear onto clutch, then position transmission case so clutch gear shaft is downward (place transmission on suitable pedestals so end of shaft clears working surface of bench).

9) Install mainshaft assembly in extension housing, then spread mainshaft bearing snap ring and tap front end of mainshaft with a soft hammer until snap ring seats in bearing groove. Install a new gasket on transmission case, then align clutch splines on mainshaft with clutch splines on second speed gear so as to receive the two inner lugs of second and third speed clutch synchronizing ring. *NOTE - Mark splines with red lead for later identification.* Lower mainshaft assembly through opening at rear of transmission case, making sure two inner lugs of synchronizing ring engage previously marked grooves of mainshaft and second speed gear. *CAUTION - Use care when lowering main-*



COUNTERGEAR ASSEMBLY



CLUTCH GEAR ASSEMBLY

shaft assembly into transmission to prevent needle roller bearings from falling into mainshaft pilot hole. Sudden weight on synchronizer rings may cause them to lock up.

10) Rotate extension housing to line up with case, then install attaching bolts and lockwashers, applying sealing compound to threads of bolts, and tighten finger tight. Turn transmission, top side up, on bench, then maneuver second and third speed clutch until extension housing fits flush against transmission case. Tighten attaching bolts to 40-45 ft. lbs. Install speedometer gear and side cover.

SHIFT LINKAGE ADJUSTMENT

TRANSMISSION CONTROL ADJUSTMENT: Chevy II - Loosen swivel assemblies on shift rods at transmission levers, then move both of the transmission shift levers to the neutral position. *NOTE - Check for neutral position by starting engine with clutch disengaged, then release clutch slowly.* Move selector lever on steering column to neutral and align first and reverse shifter tube lever with second and third shifter tube lever on mast jacket at lower end of steering column. *NOTE - Shift tube key is engaged with slot on second and third shift tube lever when selector lever is in neutral position.* Adjust swivels at end of shift rods for free entry into transmission shift levers, making sure that shifter levers at lower end of steering column are in proper alignment. Move selector lever through all positions and check adjustment.

Chevrolet Pass. Cars (Exc. Corvette): With transmission control rods disconnected at lower end of steering column, move both transmission levers to neutral position. Move transmission selector lever to neutral position and engage the second-third shift lever at the lower end of the steering column with relay lever. Center levers in the mast jacket by measuring from the edge of the slot in the jacket to the edge of the slot in spacer at each side of lever, then adjust swivel of second-third shift rod for free entry in hole in lever and install retainer. Move first-reverse lever on tube until lug on lever lines up with slot in relay lever (pull relay lever to make sure lug mates with slot), then adjust swivel of first-reverse shift control rod for free entry into hole in lever and install retainer. Check shifts in all positions for smooth action and overtravel.

Chevrolet Truck: Check clearance between lower edge of gearshift lever and upper edge of support. If clearance not 3/32" to 1/8", remove upper control shaft assembly from steering column and screw upper support up or down as necessary for proper clearance, then replace upper control shaft assembly. Measure clearance between end of gearshift lever and underside of steering wheel rim which should be 3¾" ± 1/8". If not within limits, loosen gearshift control shaft and housing assembly clamp bolts and move housing assembly (with upper and lower control shafts and gearshift lever) as necessary for proper clearance, then tighten clamp bolts. Loosen second–third speed control rod swivel clamp at housing outer lever and adjust swivel so gearshift lever is in horizontal plane. Remove housing cover to make sure shift gates in inner levers are aligned. If necessary to adjust, loosen first–reverse control rod swivel clamp at housing and adjust swivel until shifter gates are aligned.

Pontiac: Position selector lever in neutral. then disconnect shift rods at transmission. Line up shift levers at lower end of steering column so they move freely back and forth (neutral position with slots lined up). With shift levers on transmission in neutral detent, adjust trunnion at idler lever (second–third), and at shift lever (first–reverse) for free entry into shift levers, then tighten trunnion locknuts to 5–10 ft. lbs. Move selector lever into first gear and check key at first–reverse shift lever at lower end of steering column. Key should just clear lower side of opening in steering column. Shift selector lever to third gear and check key at second–third shift lever. Key should again just clear lower side of opening. Lubricate linkage joints and check shift pattern.

CHEVROLET & PONTIAC 3-SPEED HEAVY DUTY

Chevrolet Trucks, ½, ¾, 1-T n (1962) H avy Duty Pontiac (1962) See Note.

►*1962 PONTIAC TRANSMISSION NOTE: This transmission is standard equipm nt on Star Chief, B nn vill (Exc. Safari), Grand Prix mod ls, heavy duty chassis, taxi cabs and police cars.*

DESCRIPTION: Transmission is same design as previous models.

SHIFT LINKAGE ADJUSTMENT: Same as for standard 3-speed synchro-mesh.

TRANSMISSION REMOVAL: Same as for standard three speed transmission. *See "Ch vr l t & Pontiac 3-Speed Synchro-mesh" in this secti n.*

OVERHAUL: *See 1958 Final Data, Pag 406, or lat r Manual diti n and n t th f llowing:*

Ch vr l t Truck: Front bearing retainer now incorporates a lip type seal. The former bearing washer (special oil sealing type) has been eliminated.

CHEVROLET TRUCK 4-SPEED SYNCHRO-MESH

Ch vr l t Trucks ½, ¾, 1, 1½-T n (1962)

DESCRIPTION: Four speed, constant mesh, synchro-mesh (second, third & fourth), sliding gear (low reverse), of same design as used on previous models.

REMOVAL OF TRANSMISSION: Drain lubricant, then remove parking brake lever. *NOTE - Not necessary to r mov parking brak l ver on Series 10 Trucks.* Remove propeller shaft. Slide open end of Tool J-8109 over shift lever and engage lugs of tool in open slot of retainer, then press down on tool and turn it to left to disengage lugs on retainer and remove shift lever. Remove screws and slide steering column jacket grommet up jacket, then remove accelerator pedal and floor mat. Remove transmission cover. On Forward Control models, remove front and rear floor pans. On all models, remove speedometer cable at transmission. Remove two upper transmission attaching bolts and install guide pins, J-1126, then remove flywheel lower pan and lower transmission attaching bolts. Slide trans straight back on guide pins until clear of clutch assembly and remove transmission.

OVERHAUL: *S "Ch vrolet Truck 4-Speed Helical G ar (Synchro-m sh) in Transmission Section of Manual and not th following:*

Third G ar Mainshaft B aring Installation: To insure proper initial lubrication when installing third gear mainshaft bearing, it is important to place grease on that area of mainshaft on which the bushing will be placed.

Design Changes: A needle bearing replaces the roller bearing and spacer at front countergear position. New design ball bearings are used at clutch gear, mainshaft rear bearing, and rear countergear positions. A spline lock feature is used for third and fourth gear clutch assembly. A new disc-shaped magnetic chip collector is bonded to inside of transmission case.

►*COUNTERGEAR FRONT BEARING INSTALLATION NOTE:* This bearing cannot be installed with Tool J-994. Install bearing flush with front of transmission case by tapping or pressing on a steel plate or other flat surfaced tool positioned to cover entire front face of bearing assembly. If a bearing that is intended to be re-used is removed from case, it should be tapped out of case using a tool that will provide full circle contact on rim of bearing assembly rear face. *Distortion of bearing will result if bearing is n t removed and installed as directed.*

CHRYSLER CORP. 3-SPEED SYNCHRO-MESH

D dg & Plym uth 6 Cyl. & V8 (1962)
Lanc r & Valiant (1962)

►*TRANSMISSION LUBRICATION NOTE: SAE-80 Multi-Purpos G ar Lubricant r Automatic Transmission Fluid Typ "A" (Suffix "A") may be used.*

DESCRIPTION: Transmission is same design as used on corresponding previous models.

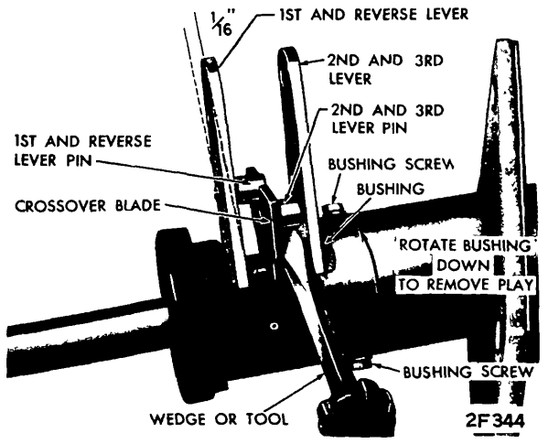
►*OPTIONAL SYNCHRO-MESH TRANSMISSION NOTE:* An optional three-speed heavy duty transmission identified by the breather being located on top of transmission case, and by a riased hump at front cover, is available on some models. *See "Chrysler Corp. Heavy Duty 3-Sp d Synchro-m sh" in this section.*

REMOVAL OF TRANSMISSION: Drain lubricant, remove propeller shaft, speedometer housing and cable, then disconnect parking brake cable and backup light switch wires. Install a suitable support under engine and raise engine slightly. Remove rear support crossmember attaching bolts. Support transmission with a jack and remove bolts attaching transmission to clutch housing. Slide transmission to rear until pinion shaft clears clutch disc before lowering transmission, then remove from under car.

OVERHAUL: *S 1960 Final Data, Page 407, or later Manual editi n and not th following.*

S c nd Sp d G ar Endplay: .002-.011".

TRANSMISSION CONTROL ADJUSTMENT: With 2nd and 3rd control rod disconnected from lever on end of steering column and 1st-reverse control rod disconnected from lever on transmission, position both levers on transmission in neutral. *CAUTION - Make sure n utral d t nt balls are properly engaged.* Check axial freedom of shift levers in steering column. If outer end of levers move axially more than 1/16", loosen the two upper bushing screws and rotate plastic bushing (downward) until all freeplay of levers is removed, then tighten bushing screws securely. Install a wedge or suitable tool between crossover blade and 2nd-3rd lever, so that crossover blade is engaged with both lever crossover pins. Adjust swivel on end of 2nd-3rd control rod until stub shaft of swivel enters hole in steering column lever, then secure swivel to lever and tighten locknut to 70 inch lbs. *NOTE - During the above adjustment, 2nd-3rd shift control rod should also be adjusted to position selector lever at steering wheel so it is 5° (116" wheelbase cars), 10° (106" wheelbase cars) above horiz ntal (transmission in neutral).* Slide clamp and swivel (on end of 1st-reverse shift rod) until swivel stub enters hole in transmission lever and secure in position. Determine mid-backlash position in linkage and tighten clamp bolt to 100 inch lbs. Remove positioning wedge or tool from crossover blade and lever, then move selector lever through all positions to check adjustment and crossover smoothness.



STEERING COLUMN SHIFT ASSEMBLY

CHRYSLER CORP. 3-SPEED HEAVY DUTY SYNCHRO-MESH

Chrysl r 300 (1962)
Chrysler Newport (1962) Std.
Dodge Custom 880 (1962) Std.
Dodge (Exc. Custom 880) & Plymouth (1962) Hvy Duty
Plymouth (1962) Hvy. Duty

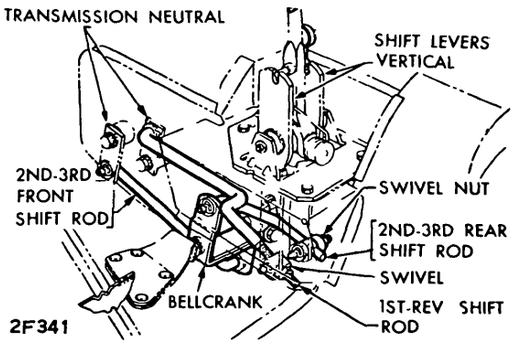
►*TRANSMISSION PRODUCTION CHANGE & SERVICE REPLACEMENT PARTS CAUTION:* Transmissions built after Dec. 18, 1961, identified by the building date 12-18-61 (or later), have "rolled" splines at forward end of transmission mainshaft, instead of the milled splines formerly used. As a result of this change, transmission mainshaft, clutch gear, and clutch gear snap ring are not interchangeable individually with their respective earlier parts. However, the new parts are interchangeable with other transmission parts provided all three new parts are replaced at the same time.

DESCRIPTION: Transmission is same design as used on corresponding previous models.

REMOVAL & OVERHAUL: *See 1961 Final Data, Page 399.*

TRANSMISSION CONTROL ADJUSTMENT: Dodge & Plymouth (Steering Column Mounted) - See "Chrysler Corp. 6 & V8 Std. 3-Speed Synchro-mesh" in this section.

Chrysler 300, Newport & Dodge Custom 880 (Floor Mounted): Remove screws holding upper boot and retainer to floor pan and slide boot up on gearshift lever. Disconnect shift rods at lower end of shift assembly levers, then place shift levers on transmission in neutral position. With crossover pin in shift control lever engaged in 2nd-3rd lever, the gap from crossover pin to 1st-reverse lever should not exceed .055". Clip corssover pin tool over 2nd-3rd end of crossover pin so that pin engages both shift levers. *NOTE - A suitable wedge can be used at the same location to engage crossover pin in both levers if tool is not available.* With shift levers on shift assembly vertical and shift levers on transmission in neutral position, adjust swivel on end of 1st-Reverse shift rod so it freely enters hole in shift lever. Repeat this procedure for 2nd-3rd shift lever-to-bellcrank rod. When adjustment completed, tighten swivel nut to 20 inch pounds, then remove crossover pin tool or wedge. Replace upper boot and check shift in all positions



FLOOR MOUNTED GEARSHIFT ASSEMBLY

FORD & MERCURY 3-SPEED SYNCHRO-MESH

Ford Fairlane & Galaxie (1962)
Mercury Meteor & Monterey (1962)

►*1962 MERCURY MONTEREY HARD SHIFTING INTO INTERMEDIATE CORRECTION:* This condition may be caused by interference between intermediate and high shift rod and clutch release lever. If correct adjustment of shift linkage (see below) does not eliminate the interference, remove high-intermediate shift lever from transmission and place in a vise, then bend lower end of lever about 3/16" outward (in relation to transmission case), reinstall and adjust.

►*1962 & EARLIER COUNTERGEAR & THRUST WASHER REPLACEMENT CAUTION:* Beginning approximately July 1961, a new countergear without oil grooves in thrust faces entered production and for service replacement on earlier models. A new thrust washer, Part No. C1AR-7119-A, having oil grooves must be used with the later type countergear. For service replacement, there must be oil grooves in either gear thrust face or thrust washer surfaces. Do not reassemble unless one surface has oil grooves.

DESCRIPTION: Three-speed synchro-mesh transmission similar to design used on previous models except for the new interlock mechanism that prevents shifting transmission until clutch is fully disengaged.

REMOVAL OF TRANSMISSION: Drain transmission and remove propeller shaft. Disconnect speedometer cable and shift rods at transmission. On cars with overdrive, disconnect overdrive wires and control cable. Disconnect parking brake cable and support engine with a jack, then remove engine rear support and crossmember as a unit. Remove transmission-to-flywheel housing attaching bolts and install two guide pins in lower bolt holes. Move transmission to rear until it clears clutch assembly and remove from car.

ADJUSTMENT: *NOTE - Clutch linkage and pedal height must be correctly adjusted before adjusting transmission interlock.*

Gearshift Linkage: With transmission in neutral, loosen locknut on each lever (at lower end of steering column). On Fairlane & Meteor, center levers in retainer on steering column (selector lever should be approximately 10° above horizontal), then tighten lever locknuts. On Galaxie, position selector lever horizontal. On Monterey, position selector lever 7½° above horizontal. Tighten high intermediate rod, then tighten low-reverse rod in a position so that cross-over operation is smooth.

Clutch Pedal Linkage & Height: Disconnect interlock shift rod at interlock shift lever, then measure total travel of clutch pedal. *NOTE - Measure distance from steering wheel to clutch pedal with pedal fully released, then again with pedal fully depressed.* If travel is not within specifications, move clutch pedal bumper and bracket up or down until travel is correct (6 5/8-6 7/8"). *CAUTION - Always check and adjust total travel before checking free travel.* With clutch pedal against its bumper (pedal released), measure distance between assist spring eye centers which should be 10". With engine idling, depress clutch pedal just enough to take up the free travel and note reading on tape (distance between steering wheel and clutch pedal). The difference between this reading and the reading where pedal is released should be 15/16-1 1/16". If not within specifications, adjust clutch pedal-to-equalizer rod. To increase free travel, loosen rearward adjusting nut and tighten forward nut. To reduce free travel, loosen forward nut and tighten rearward nut. Tighten both nuts against trunnion after adjustment. With transmission in neutral and interlock pawl snugly engaged, connect interlock rod. As a final check, measure pedal free travel with transmission in neutral and engine running at 3000 RPM. If free travel at this speed is not ½", readjust clutch pedal-to-equalizer rod as necessary. *CAUTION - Free travel must be exactly as specified.*

Interlock (On Transmission): With interlock shift rod disconnected at equalizer bar (Fairlane & Meteor); at interlock lever (Galaxie & Monterey), proceed as follows: Place transmission in neutral, then loosen bolts attaching notched plate (Fairlane & Meteor), pawl plate (Galaxie & Monterey). Position plate so it fits snugly into shift lever projection or notch, then tighten plate bolts. Shift transmission into low and into neutral to check operation of interlock. Adjust length of interlock rod so that low-reverse shift lever is engaged by interlock until clutch pedal enters overtravel area. If necessary, readjust plate on interlock lever for a snug fit. With transmission in neutral, connect interlock rod and check shift linkage operation. *NOTE - If interlock is properly adjusted, it should be impossible to clash low-reverse transmission gears with clutch pedal fully released.*

OVERHAUL: *See 1960 Final Data, Page 410, or later Manual edition and note the following:*

Bolt Torque Specifications: As follows:

Location	Ft. Lbs. Torque Ford	Mercury
Extension Housing-to-Case	37-42	42-50
Shift Cover-to-Case	12-15	14-19
Shift Lever-to-Shaft	12-15	14-19
Front Bearing Retainer	12-15	19-25

COMET & FALCON 3-SPEED SYNCHRO-MESH

Comet (1962)
Falcon (1962)

DESCRIPTION: Three-speed, constant mesh, synchromesh (second & high), sliding gear (low & reverse), All helical gear type of same design used on previous models.

REMOVAL OF TRANSMISSION: Remove propeller shaft then disconnect speedometer cable and gearshift rods at transmission. Remove extension housing-to-support bolt (on Falcon Station Wagon, remove nuts from insulator retaining bolts and remove brake cable support). Place a jack under flywheel housing and raise rear of engine slightly. *NOTE - On Falcon Station Wagon, loosen two engine rear support bolts on right side and remove bolts from left side.* Remove transmission mounting bolts and install two guide pins in lower holes, then move transmission to rear to clear input shaft and guide pins, and remove from car. *NOTE - To prevent oil leakage after propeller shaft removal, install Tool T60K-7657-A (Falcon), 7657-G (Comet). Tool must be removed before transmission can be removed from car.*

OVERHAUL: *See 1960 Final Data, Page 406, or later Manual edition.*

FORD TRUCK 3-SPEED SYNCHRO-MESH

Ford Trucks (1962)

DESCRIPTION: Same design as used on previous models.

REMOVAL OF TRANSMISSION: Drain lubricant, disconnect speedometer cable, propeller shaft, and gearshift linkage at transmission. On propeller shaft type parking brake, disconnect cable clevis at cam and remove cable conduit clamp. On models with overdrive transmission, disconnect wires and control cable at transmission. On 4—Wheel Drive models, remove transfer case shift lever bracket from transmission. On all models, remove transmission attaching bolts and install guide studs, then pull transmission rearward until input shaft clears clutch assembly and remove transmission.

OVERHAUL: *See "Ford Truck 3-Speed Light & Medium Duty" or "Ford Truck 3-Speed Heavy Duty" in Transmission Section of Manual.*

FORD TRUCK 4-SPEED SYNCHRO-MESH

Ford Trucks (1962)

DESCRIPTION: Same design as used on previous models.

REMOVAL OF TRANSMISSION: On all models except Tilt—Cab, remove floor mat and accelerator pedal, then remove transmission cover plate. Disconnect parking brake and remove gearshift housing. On Tilt—Cab models, disconnect parking brake rod at transmission and remove rear cross—shaft housing. On all models, disconnect drive shaft and speedometer cable, then remove two upper transmission attaching bolts and secure jack to transmission. Remove remaining transmission attaching bolts and slide transmission rearward to clear clutch assembly and remove from truck.

OVERHAUL: *See "Ford Truck 4-Speed (Synchro-mesh)" in Transmission Section of Manual.*

FORD ECONOLINE TRUCK 3-SPEED SYNCHRO-MESH

Ford Econoline Trucks (1962)

DESCRIPTION: Same design transmission as used on previous models.

REMOVAL OF TRANSMISSION: Drain transmission and remove propeller shaft, then disconnect speedometer cable and shift rods at transmission. Support engine with a jack and remove rear support anchor bolt and nut, then lower engine to clear support. Remove transmission attaching bolts and move transmission to rear to clear clutch assembly and remove from truck.

TRANSMISSION CONTROL ADJUSTMENT: Loosen trunnion nuts at transmission shift levers enough to allow rods to slide in trunnions. Insert a ¼" drill rod through pilot hole in shift tube floor mounted bracket until it just enters adjustment hole in both upper and lower shift lever, then place transmission shift levers in neutral position and tighten trunnion nuts. Remove ¼" rod and check operation in all shift positions.

OVERHAUL: *See 1961 Final Data, Page 402.*

WARNER 3-SPEED SYNCHRO-MESH

Car & Mdl	Transmission Mdl
Checker Superba	T-90
Rambler American	T-96
Rambler Classic (Std.)	T-96
Rambler Classic (Hvy. Duty)	T-86
Rambler Ambassador	T-89
Studebaker 6 Cyl. (Exc. Taxi)	T-96
Studebaker 6 Cyl. (Taxi)	T-90
Studebaker V8 (Exc. Taxi)	T-86
Studebaker V8 (Taxi)	T-89
Willys 4-Wheel Drive	T-90
Willys 4 Cyl. 2-Wheel Drive (Exc. Fleetvan)	T-96
Willys 6 Cyl. 2-Wheel Drive	T-86
Willys Fleetvan	T-90

►*NOTE: Transmission model number is cast in side of transmission case.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 STUDEBAKER REMOTE CONTROL SHIFT TUBE ASSEMBLY PRODUCTION CHANGE & LINKAGE ADJUSTMENT PROCEDURE CHANGE:* Beginning with Car Serial No. 62S-14689 (6 Cyl.) and No. 62V-10406 (V8), a new shifter tube assembly which requires different shift linkage adjustment, is being installed in production. *See "Transmission Control Adjustment" below.*

►*1962 STUDEBAKER T-86 & T-96 TRANSMISSION SYNCHRONIZER BLOCKER RING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* New blocker rings, Part No. 1555429 having three machined grooves across face of clutching surface are being used in production and may be used for service replacement on previous transmissions.

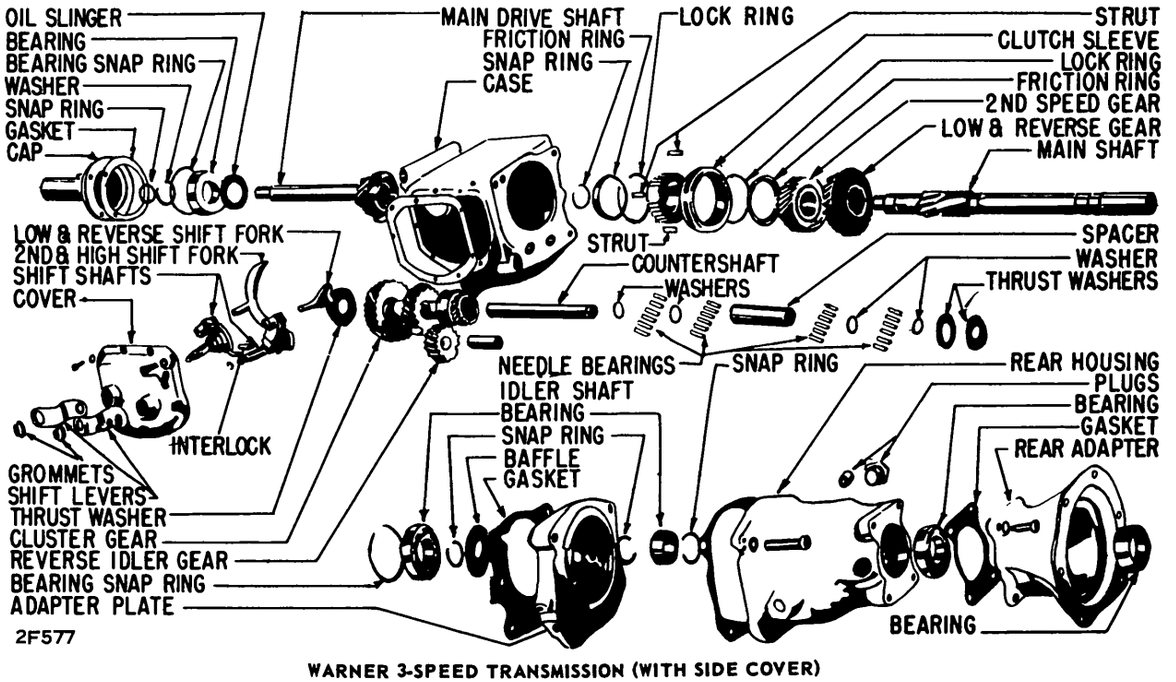
►*1962 WILLYS 4-WHEEL DRIVE TRANSMISSION MAINSHAFT NUT TIGHTENING CAUTION:* When attaching transfer case input shaft to transmission mainshaft, tighten the slotted mainshaft nut to a minimum of 80-100 ft. lbs. then tighten nut just enough further to line up slots in nut with cotterpin holes in mainshaft. **Do not tighten nut beyond this point.**

DESCRIPTION: Same design as used on previous models.

TRANSMISSION REMOVAL: Rambler – On Rambler American, disconnect rear spring front brackets from floor pan, brake hose bracket, and brake cable at equalizer. On other models, disconnect brake tube bracket from floor pan, parking brake cable at equalizer, and cable housing at torque tube bracket, then disconnect torque tube from transmission. On all models, disconnect shock absorber at lower mounting and move rear axle assembly to rear, disengaging drive line from transmission. Disconnect shift levers, speedometer cable (and overdrive cable and wires if so equipped). Remove transmission attaching bolts and install two guide pins, Tool J-1434, in upper bolt holes, then slide transmission back to clear clutch assembly

Studebaker: Disconnect propeller shaft at rear joint flange and slide it out of transmission housing. Disconnect rods at transmission levers, and speedometer cable at transmission housing, then remove speedometer pinion. Remove clutch operating shaft, bracket, and bearing at transmission, then support transmission and remove attaching bolts. Move transmission back to clear clutch assembly and remove from car.

Willys (2-Wheel Drive): Disconnect shift rods at transmission levers, and speedometer cable at transmission



WARNER 3-SPEED TRANSMISSION (WITH SIDE COVER)

(and overdrive cable and wires if so equipped). Disconnect propeller shaft at front universal. Remove support at rear of overdrive and take out overdrive governor. Position jack under engine for support and remove frame crossmember with insulators attached. Back out transmission attaching screws as far as possible yet support transmission, then pull transmission back to provide an opening between it and bell housing. Insert a long screwdriver through opening in side of bell housing and pry clutch release fork from engagement with release bearing carrier. Remove transmission attaching screws and pull transmission back to clear bell housing, then remove from car.

Willys (4-Wheel Drive): Drain transmission and transfer cases, then remove access cover from floor pan and remove gearshift housing (Exc.) models with remote control). On Remote control models, disconnect shift linkage at transmission. On all models, remove transfer case shift lever pivot pin, shift levers and springs. *NOTE – If equipped with power take-off, remove shift lever plate and lever.* Disconnect propeller shafts at transfer case (disconnect end of power take-off shaft at transfer case if so equipped). Disconnect speedometer cable at case, then disconnect hand brake cable. On Forward Control models, disconnect clutch release cable at bellcrank. On all models, place jacks under transmission and engine and remove nuts attaching rear mounting to frame crossmember, then remove transfer case snubbing rubber bolt at crossmember. Remove engine rear support crossmember, then remove transmission attaching bolts. Force transmission to right side to disengage clutch control lever tube ball joint, then lower jacks under engine and transmission and slide transmission and transfer case toward rear until clutch shaft clears bell housing.

OVERHAUL: *See 1959 Final Data, Page 398, or later Manual edition.*

TRANSMISSION CONTROL ADJUSTMENT: Adjust various systems as follows:

►*RAMBLER AMERICAN "E-STICK CLUTCH & SHIFTING NOTE: For adjustment of this unit, see "Rambler "E-Stick" Automatic Clutch".*

►*STUDEBAKER SHIFT LINKAGE ADJUSTMENT CHANGE: Shift linkage adjustment procedures are different for early and later cars. See below.*

►*RAMBLER SHIFT LINKAGE ADJUSTMENT NOTE: "Ainsworth" type and "Douglas" type shift systems are used. Adjustment procedures are different.*

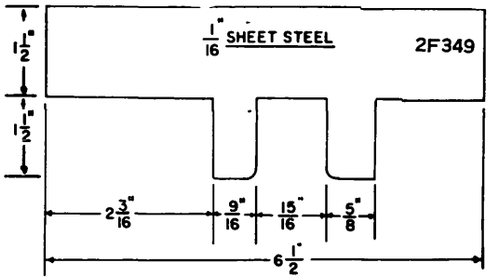
RAMBLER: Ainsworth Type - *NOTE - On this type unit, shift levers are actuated by a shift gate slot engaging pin on shaft lever.* Remove pins from gearshift rod trunnions and transmission levers, and disconnect rods. Line up both levers at lower end of steering column and insert a 7/16" screwdriver blade between upper shift lever and shift gate, then pry gate downward to align lower lever pin with upper lever pin and lock both ends of lever pins in slot in shift gate. Insert Tool J-8698 between second-high shift lever and shift gate and remove screwdriver. Move operating levers and aligning tool down until bottom edge of tool contacts cutout section of jacket tube (this is neutral position). Adjust trunnions on rods so they will freely enter into transmission shift levers (with shift levers in neutral). Install retaining pins and washers and lubricate trunnions with light oil, then remove tool and lubricate operating levers, lever spacer and nylon bushing at bottom of steering column tube. Check gearshift operation in all positions.

CONTINUED ON NEXT PAGE

WARNER 3-SPEED SYNCHRO-MESH (Cont.)

Douglas Typ : *NOTE - On this typ unit, shift l v rs actuated by lugs on shifter tube engaging in shift levers.* Raise car on a hoist and disconnect shifter rods at transmission levers, then place transmission levers in neutral detent position. Install aligning tool J-9230 (if necessary, fabricate tool locally as indicated in illustration, bending it into a 2 1/8" circle to fit around jacket tube) on bottom of jacket tube to hold both operating levers in neutral position. Adjust trunnions on both shifter rods to line up with holes in transmission shift levers, then secure trunnions with flat washers and cotter pins. Remove tool and check shift lever operation.

STUDEBAKER: *NOTE - On early cars before Serial No. 62S-14689 and 62V-10406, check to make sure that a spring washer is located between large flat washer on upper end of shift rods and remote control insulators. If spring washers are missing, install Spring Washer Part No. 192057, between flat washers and lever insulators with concave side of spring toward flat washer.* Disconnect both rods at transmission levers , then place levers in neutral position. Index hand lever support at upper end of steering column by placing a pencil mark above hand lever support socket, then locate center of travel by moving shift lever to extreme left and place a pencil mark on steering jacket upper bracket opposite index mark on hand lever support. Repeat this indexing procedure on the right hand side, then place hand lever index mark at the mid-position between the two marks on upper bracket and mark this position on upper bracket to indicate neutral. With second and high shift lever engaged (hand lever in neutral away from steering wheel), adjust second and high shift rod so neutral marks on hand lever support and upper bracket line up. *NOTE - Do not hold hand lever while making this adjustment.* Move shift lever to second, to high, then back to neutral and recheck adjustment. Neutral marks should line up with hand lever at rest and transmission in neutral. With an assistant holding lever in neutral, and with low and reverse shift lever engaged (hand lever up toward steering wheel), adjust low and reverse shift rod so that "neutral" index marks on hand lever support



RAMBLER SHIFT ADJUSTING GAUGE

and upper bracket line up. Adjust rod so there is no freeplay and clevis pin enters shift lever with a slight drag on forward side of hole (Cars before Serial No. 62S-14689 & 62V-10406); enters shift lever freely (Cars after above serial numbers). Secure all clevis pins and tighten clevis locknuts, then check shift operation in all positions. *NOTE - On early cars (before Serial No. 62S-14689 & 62V-10406), if resistance is encountered at crossover point from low to second, shorten low and reverse rod as necessary, up to 10 turns from neutral index.*

WILLYS: 2-Wheel Drive Models - Place shift levers in neutral position and disconnect both control rods at transmission levers. On all models, except those with 6-226 Engines, install a ¼" rod through aligning holes in steering column. On models with 6-226 Engine, position Tool W-259 on slot and insert a 3/16" rod through steering colhmn shift levers and index rod in slot at top of gauge. On all cars, adjust steering column end of shift rods so that lower ends will enter transmission levers freely. If shift pin strikes edges of slot in lever clutches, disconnect low-reverse rod at transmission lever (rear lever) and lengthen or shorten rod slightly so pin will engage both slots freely.

Forward Control Models: With gearshift lever in neutral, loosen jam nut at rear end of remote control rods, then remove rods from transmission shift levers. Make sure levers on transmission are in neutral position, then adjust length of control rods so they easily slip into holes in transmission shift levers. Replace cotter pins and tighten jam nuts and check shift for smooth operation.

OLDSMOBILE (EXCEPT F-85) 3-SPEED SYNCHRO-MESH

Oldsmobile, Exc. F-85 (1962)

DESCRIPTION: Same design transmission as used on previous models.

REMOVAL OF TRANSMISSION: Drain transmission and disconnect control rods and speedometer cable at transmission. Remove propeller shaft, then remove four transmission-to-clutch housing bolts and slide transmission rearward until main shaft clears clutch housing. Remove transmission from under car.

TRANSMISSION CONTROL ADJUSTMENT: Shift Lever Adjustment - Place outer lever on transmission in second gear position (outer lever forward, inner lever to rear), then disconnect shift rod from steering column lower shift lever at clevis. Hold steering column lower shift lever upward against its stop in mast jacket, then install clevis pin through lower shift lever from bottom side and adjust clevis so it slides freely over pin. Shorten shift rod by turning clevis **5½ turns.** Install clevis pin and cotter pin, and tighten clevis locknut.

Cross Shift Linkage Adjustment: Disconnect cross shift rod from steering column cross shift lever. With transmission selector lever on transmission against its stop (rearward), adjust upper clevis so that clevis pin will easily enter hole in cross shift lever at lower end of steering column. Remove clevis pin and lengthen rod by turning clevis **5 turns.** *NOTE - This should bring selector lever at steering wheel within 4 7/16" ±1/4" of front face of wheel.* Install clevis pin and cotter pin, then tighten clevis locknut.

OVERHAUL: *See 1957 Final Data, Page 369, or later Manual edition.*

WARNER 4-SPEED (WILLYS) SYNCHRO-MESH

Willys 4-Wheel Drive Models (1962)

DESCRIPTION: 4-Speed synchro-mesh (2nd, 3rd, & 4th), sliding gear (low & revefse). Low & reverse gears are spur type; others are helical type. *NOTE - 4-Speed can be identified by its length of 11 7/8".*

DISASSEMBLY: Remove transmission-to-transfer case adapter plate and gasket, then remove oil seal from plate. Proceed as follows:

1) Remove control housing assembly from top of transmission case, then mark blocking rings, synchronizer gears, and synchronizer sleeves on both synchronizing units with lacquer or an electric pencil to insure installation in original positions. Remove transmission-to-bellhousing adapter plate and front bearing retainer.

2) Slide low speed gear toward rear of transmission case, then disengage reverse gearshift arm from reverse idler gear and remove arm from case mounting pin. Move low speed gear back into neutral position, then remove snap rings from forward end of main drive gear shaft and outer race of transmission front bearing. Remove front bearing with a bearing puller, and remove oil slinger.

3) Remove snap ring from outer bearing race of transmission rear bearing, then drive main shaft rearward by striking end of main drive gear shaft with a lead hammer. Install bearing puller plates and remove rear bearing. Separate main drive assembly from main drive gear being careful not to lose any of the main shaft pilot rollers. Remove main shaft assembly out of case, then remove main drive gear from case and remove main shaft pilot rollers.

4) Mark relation between synchronizer gears and splines on main shaft, then remove snap ring which holds third and high synchronizer assembly on main shaft. Remove snap ring holding second speed synchronizer assembly on main shaft, then slide second speed synchronizer and second speed gear off shaft. *CAUTION - When sliding second speed gear off shaft, be careful not to lose any of the bearing rollers.* Remove two remaining snap rings, spacer and thrust washer from main shaft.

5) Remove two large lock rings holding synchronizer clutch hub in direct and third clutch sleeve and push hub out of sleeve. If second speed synchronizer assembly is to be disassembled, wrap the assembly in a cloth to prevent losing the lock balls and springs, then push gear out of sleeve in the direction opposite the shift fork groove. Remove cloth and lift balls, springs and plates out of the gear.

CONTINUED ON NEXT PAGE

WARNER 4-SPEED (WILLYS) SYNCHRO-MESH (C nt.)

6) Remove lock plate for countershaft and idler gear shaft, then use a pry bar in slot of reverse idler gear shaft to loosen the shaft. Slip reverse idler gear shaft out of housing and gear and remove idler gear assembly from transmission case.

7) To remove countershaft, use a heavy brass drift and drive countershaft towards rear of case. When countershaft end is just about even with inside of transmission case, use a dummy shaft to force it the rest of the way. *NOTE - A dummy shaft can be made from a piece of 1 1/8" diameter rod cut to 9.850" long. Break sharp edges with a file.* Keep dummy shaft in contact with countershaft at all times to prevent dropping bearing rollers or thrust washers. With dummy shaft in position, place transmission case on its side and carefully roll countershaft gear cluster out of case.

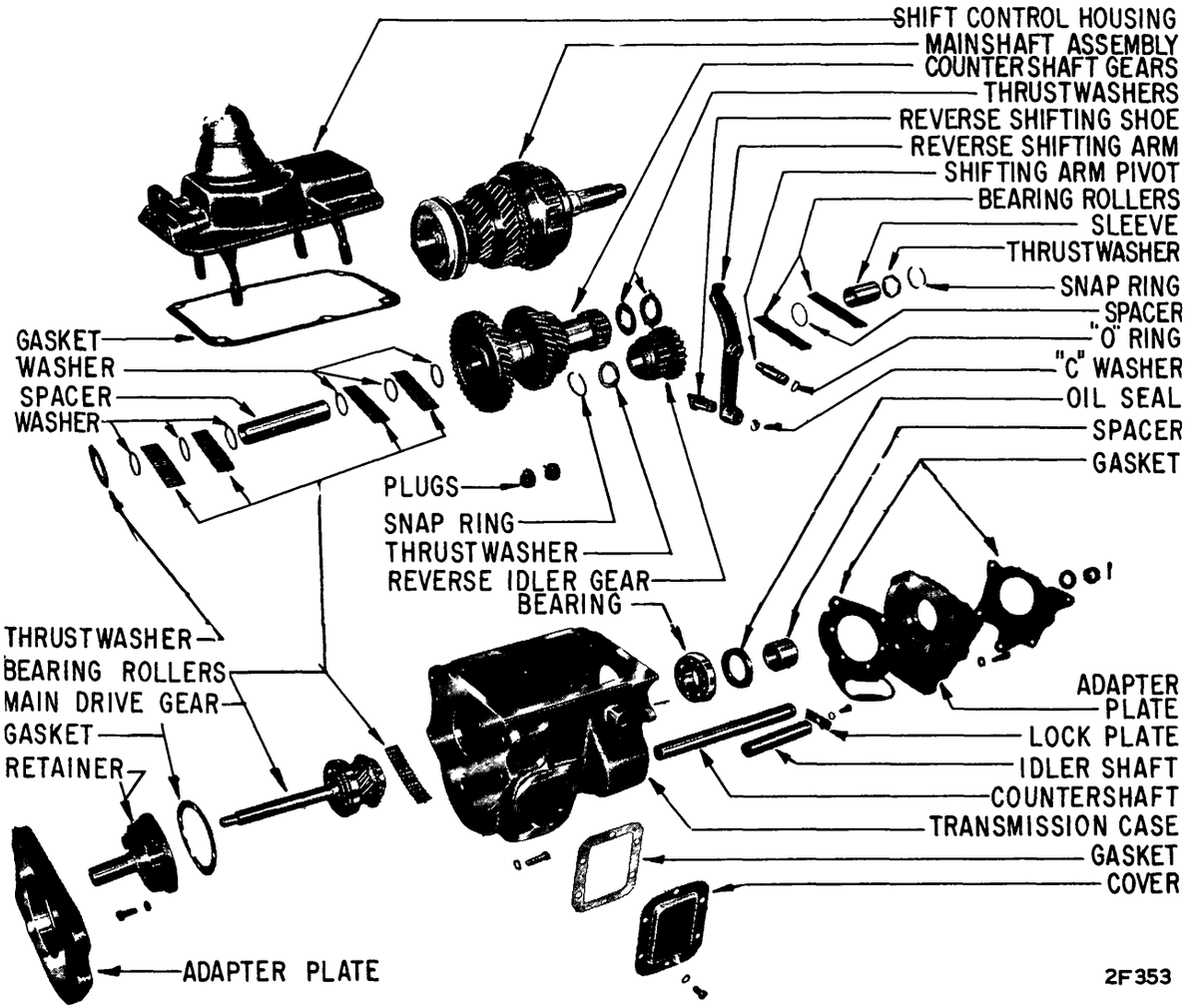
8) Complete disassembly by removing dummy shaft, thrust washers, four sets of bearing rollers, and spacer.

9) To disassemble reverse idler gear assembly, remove one of the snap rings and tap out the washer, both sets of bearing rollers, center spacer, and sleeve. Remove remaining snap ring.

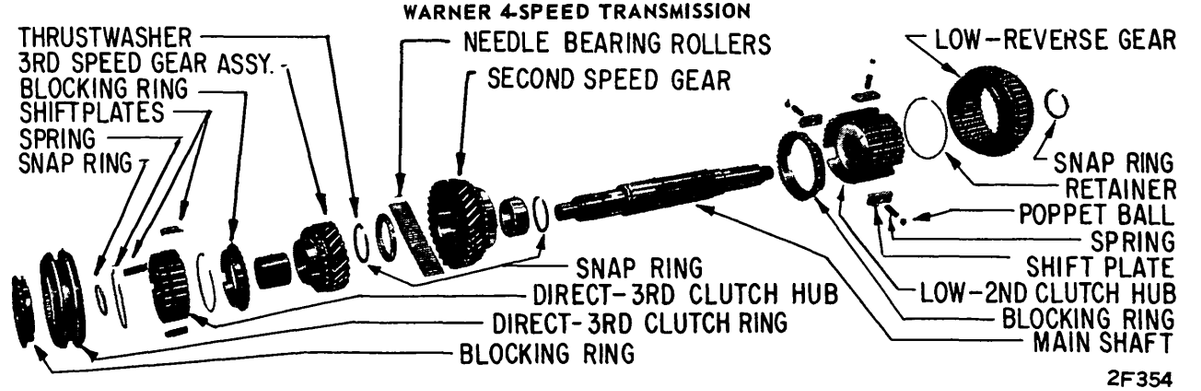
10) On floor mounted gearshift models if it is necessary to disassemble transmission control housing, proceed as follows: Remove screws from shifter forks, then remove expansion plugs from front and rear of gearshift lever base. Remove center (third & direct) shifter rail first, driving it out rear of lever base. As rail is withdrawn, remove interlock pin from crossover hole in rail, then, before rail is completely removed, place a finger over hole to prevent loss of poppet ball and spring. Remove low & second shift rail in same manner. Remove shifter rail lock balls and springs, then with a piece of wire, push two shifter rail interlocks out of pockets in center section of gearshift base. A spring loaded plunger located in end of reverse shifter rail prevents shifting into reverse accidentally. If necessary to replace this part, remove cotter pin from end of shifter rail assembly and at the same time hold finger over hole to prevent loss of spring. Shake out ball and spring and remove plunger. Compress spring until "C" washer groove just clears end of casting and remove "C" washer.

11) On Forward Control models if it is necessary to disassemble transmission control housing, proceed as follows: Place shift rails in neutral position and remove lock screws from both gearshift forks and the reverse shift rail end. Remove expansion plugs from rear of control housing, then remove snap rings from 1st and 2nd shift rail and drive shift rail out of housing. *NOTE - Before shift rail is removed from center section of housing, place a finger over the hole to prevent loss of poppet ball and spring.* Remove 3rd & 4th and reverse shift rails in same manner. Remove poppet balls and springs. With a piece of wire, push the two shift rail interlock plungers out of pockets in center section of housing.

REASSEMBLY: Reverse disassembly procedures.



WARNER 4-SPEED TRANSMISSION



WARNER 4-SPEED MAINSHAFT ASSEMBLY

WARNER 4-SPEED SYNCHRO-MESH

Buick Special (1962)
Chevrolet Pass. Cars (1962)
Chevy II (1962)
Corvette (1962)
Ford Galaxie (1962)
Mercury Monterey (1962)
Oldsmobile F-85 (1962)
Pontiac (1962)
Studebaker (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 PONTIAC HARD 3-4 SHIFT CORRECTION:* If the hard shift condition continues to exist after correct gear shift linkage adjustment (see *"Transmission Controls" below),* drain transmission and remove side cover. Check for excessive wear on shoulders of forware speed shift fork and for binding of poppet springs and detent balls located between shifter shaft and detent plate assembly. If shift fork is worn excessively or if detent balls fail to seat properly, replace necessary parts. In the event shift fork is not excessively worn, check to make sure 3rd and 4th gear synchronizing rings operate freely and are not locked up or cocked.

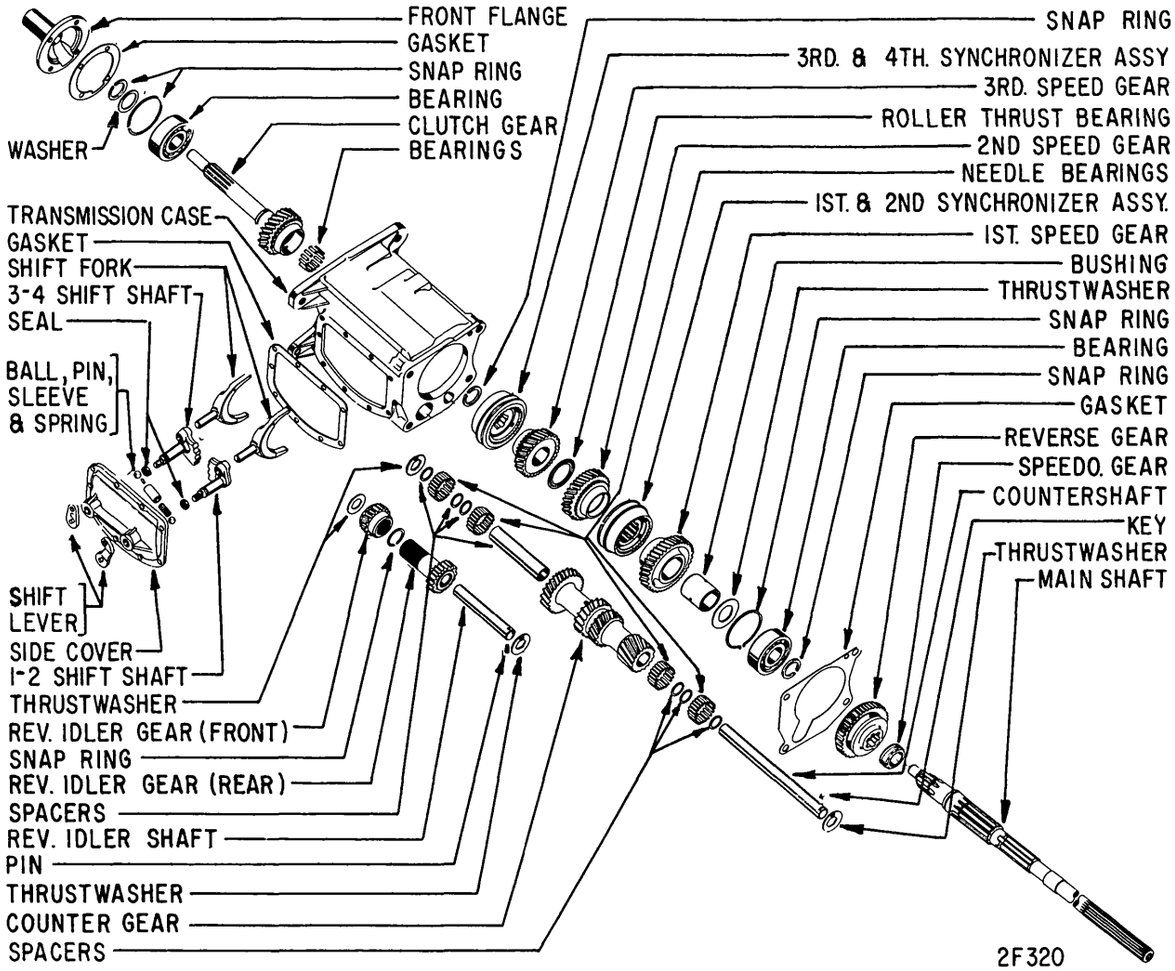
►*1962 PONTIAC CAR SERIAL NUMBER NOTE (CARS WITH 4-SPEED SYNCHRO-MESH):* Car serial numbers are stamped on top of 4-Speed transmission case to facilitate recovery in event car or transmission is stolen.

►*1962 STUDEBAKER CLUSTER GEAR AND MAIN DRIVE PINION REPLACEMENT CAUTION:* Two transmission models are used in production and differ only in number of teeth in main drive pinion and in cluster gear. If replacement is necessary, make sure proper part is installed. Cluster Gear, Part No. 1553083 must be used with Main Drive Pinion, Part No. 1553088 (27 Teeth). Cluster Gear, Part No. 1555476 must be used with Main Drive Pinion, Part No. 1555475 (25 Teeth).

►*1962 STUDEBAKER PROPELLER SHAFT INTERFERENCE WITH FLOOR PAN (J8 & Y8 MODELS) CORRECTION:* Remove the ¼" spacer washers which are installed between engine rear insulator and clutch housing.

DESCRIPTION: 4-speed helical gear type (except reverse), with constant mesh, synchro-mesh in all forward speeds. Sliding gear (reverse).

REMOVAL: Buick, Pontiac & Oldsmobile - Drain transmission, then remove boot retainer screws and slide boot over shift lever. Disconnect speedometer cable at transmission. Disconnect shift control rods from shift levers on transmission, then remove manual shift lever and bracket assembly from extension housing. Remove complete drive line assembly and support rear of engine. On Buick, remove transmission mounting plate bolts and washers, then remove support-to-underbody bolts and remove transmission support. On Pontiac, remove transmission extension bracket to crossmember retaining nuts. On all models, remove two top transmission-to-clutch housing bolts and insert guide pins in these holes. Remove lower transmission-to-clutch housing bolts and slide transmission straight back on guide pins (on Pontiac, tilt rear of transmission upward to disengage bracket studs from crossmember support). *NOTE - On long wheelbas Pontiac models it is necessary to remove crossmember support before removing transmission.*



WARNER 4-SPEED SYNCHRO-MESH TRANSMISSION

Chevrolet & Corvette: Disconnect speedometer cable at transmission, then disconnect shift rods at shift levers and remove shift assembly from extension housing. On all models except Corvette, remove bolts attaching center support to frame member, then remove propeller shaft and bearing assembly. On Corvette, disconnect propeller shaft at rear universal and remove it from transmission. On all models, support rear of engine and remove transmission support crossmember. Remove two top transmission-to-clutch housing bolts and install guide pins in these holes. Remove lower attaching bolts and slide transmission straight back on guide pins until shaft is clear of clutch assembly and remove transmission.

Ford & Mercury: Remove transmission gear shift lever boot retainer, then remove shift lever retaining bolts and remove lever from shift assembly. Remove propeller shaft and disconnect speedometer cable from extension. Disconnect parking brake cable at equalizer bar and support engine with a transmission jack. Remove bolts retaining extension housing to engine rear support, then raise rear of engine with transmission jack and remove crossmember and engine rear support as a unit. Support transmission on a jack and remove transmission-to-clutch housing bolts. Install two guide pins in lower bolt holes and slide transmission to rear until input shaft clears clutch housing. *CAUTION - Do not depress clutch pedal while transmission is removed.*

Studebaker: Drain transmission, then disconnect and remove shift assembly. Disconnect crossmember under transmission and slide it to rear along exhaust pipes for clearance. Disconnect propeller shaft at rear and remove from transmission. Remove speedometer and drive pinion from case, then remove transmission attaching bolts. Pull transmission to rear until shaft clears clutch assembly, and remove transmission from under car.

CONTINUED ON NEXT PAGE

WARNER 4-SPEED SYNCHRO-MESH (C nt.)

OVERHAUL

SPEEDOMETER DRIVEN GEAR: *(NOTE - This gear may be removed with transmission in car).*

Removal: Disconnect speedometer cable, remove lock plate-to-housing bolt and lockwasher, then remove lock plate. Insert screwdriver in lock plate slot in fitting and pry fitting, gear and shaft from housing. Pry "0" ring from groove in fitting.

Installati n: Install new "0" ring seal in groove in fitting and insert shaft. Hold assembly so slot in fitting is toward lock plate boss on housing and install in housing. Push fitting into housing until lock plate can be inserted into groove and attached to housing.

SIDE COVER: *(NOTE - Side cover can be removed with transmission in car after shift rods have been disconnected and transmission drained).*

Rem val: Remove nine bolts from side cover and remove side cover, gasket, and shifter forks.

Disassembly: Remove outer shifter lever clamp bolts and pull levers from shaft. Carefully push shifter shafts into cover, allowing detent balls to fall free, then remove shifter shafts. Remove interlock sleeve, interlock pin, and poppet spring.

R assembly: Install interlock sleeve and one shifter shaft. Place steel detent ball into sleeve followed by poppet spring and interlock pin. Start second shifter shaft into position and place second detent ball on poppet spring. Compress ball and spring with screwdriver and push shifter shaft fully in. With synchronizers in neutral and shifter forks in place, lower side cover into place. Install bolts (using sealer on lower right bolt), and tighten evenly.

MAINSHAFT OIL SEAL: *(NOTE - Seal may be removed with transmission in car).*

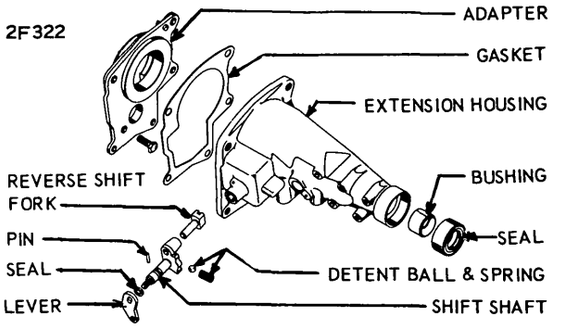
R m val: Remove nuts and bolts retaining rear universal joint trunnion bearings to drive flange. Lower rear end of propeller shaft and slide front flange off mainshaft. Remove mainshaft oil seal using a suitable tool.

Installation: Press new seal into place in extension *(CAUTION - Do not force seal against seat in extension).* Install propeller shaft and connect rear universal joint.

TRANSMISSION CASE: Disassembly - Remove side cover (above), remove front bearing retainer bolts, remove retainer and gasket. Drive retainer pin from reverse shifter lever boss and pull shifter shaft out far enough to disengage shifter fork from reverse gear. Remove bolts attaching extension case to rear bearing retainer plate, then tap extension with a soft hammer, in a rearward direction. When reverse idler shaft is out as far as it will go, move extension to left so reverse fork clears reverse gear and remove extension case and gasket. Remove rear reverse idler gear and tanged thrust washer and front reverse idler gear and flat thrust washer. Remove speedometer gear, using a puller, and reverse gear. Remove self locking bolt attaching rear bearing retainer to transmission case, then carefully remove entire mainshaft assembly. Unload needle bearings from clutch gear and remove fourth speed synchronizer blocker ring. Remove clutch gear retaining snap ring and spacer, then press clutch gear out of bearing toward inside of case. Tap front bearing and snap ring out of case from inside. From front of case, press out countershaft, then remove countergear and thrust washers. Remove the 80 rollers, 6.050" spacer, and roller spacers from countergear.

Cleaning & Inspection: Wash case inside and out with cleaning solvent and inspect for cracks. Inspect front face which fits against clutch housing for burrs. Remove any burrs with a fine cut mill file. Wash front and rear bearings in solvent and blow dry with air. Check for roughness, then oil them with light engine oil. Check clutch and countergear needle bearings and countershaft for wear.

EXTENSION CASE: Disassembly - Drive rear idler shaft lockpin into boss until it falls into clearance hole in shaft. Pry out extension plug at end of shaft and press shaft from extension. Remove shifter fork from shifter shaft, then drive shifter shaft into case, allowing ball detent to drop into case. Remove shaft and detent ball spring.

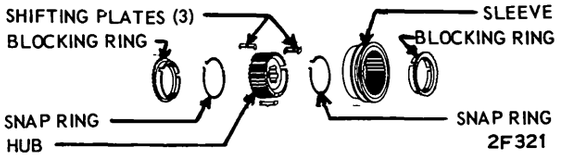


TRANSMISSION EXTENSION (TYPICAL)

MAINSHAFT: Disassembly - Remove mainshaft front snap ring, third and fourth speed clutch synchronizer assembly, third speed gear and synchronizer blocker ring, second and third speed gear spacer (needle roller bearing), and second speed gear and blocker ring. Spread rear bearing snap ring and press off the retainer. Remove mainshaft rear snap ring. Support first and second speed synchronizer assembly and press on rear of mainshaft to remove rear bearing, first speed thrust washer, first speed gear and synchronizer blocker ring, second speed synchronizer assembly, and first speed gear sleeve.

► *SYNCHRONIZER ASSEMBLY CAUTION:* Synchronizer hubs and sliding sleeves are a selected assembly and should be kept together as originally assembled (the three keys and two energizing springs may be replaced if worn or broken). To remove keys and springs, push hub from sliding sleeve. The keys will fall out and the springs can be removed. Reinstall by placing the two energizing springs in position (one on each side of hub), so that tanged end of each spring falls into same keyway in hub. Place keys in position and hold them in place while sliding hub into sleeve.

R assembly: From rear of mainshaft, assemble first and second gear synchronizer assembly on mainshaft (tapered end of clutch sleeve toward first speed gear), use



SYNCHRONIZER ASSEMBLY (TYPICAL)

a suitable tool to press first gear sleeve on shaft in an arbor press. Install first speed gear synchronizer blocker ring so that notches in ring correspond with keys in synchronizer hub. Install first speed gear (with hub toward front) and first speed gear thrust washer (grooves in washer must face toward gear). Press rear bearing on shaft (snap ring groove toward front of transmission) using a suitable tool. Choose correct selective fit snap ring (available in thicknesses of .087", .093", .099") that will produce a clearance of 0-.005" between rear face of bearing and front face of snap ring. *CAUTION - Always use a new snap ring when reassembling transmission and do not expand ring further than is necessary for assembly.* From front of mainshaft, install second speed gear synchronizer blocker ring so that notches in ring correspond to keys in synchronizer hub. Install second speed gear with hub of gear toward back of transmission, and install second and third speed gear spacer (needle bearing). Install third speed gear with hub to front of transmission, and the third speed gear synchronizer blocker ring (notches to front of transmission). Install third and fourth speed gear synchronizer assembly (hub and sliding clutch sleeve taper toward the front) making sure that keys in synchronizer blocker ring correspond to notches in third speed gear synchronizer blocker ring. Install snap ring (.086-.088" thick) in groove in front of third and fourth synchronizer assembly. *NOTE* - With correct size snap ring, the third speed gear will have correct amount of endplay which should be .010-.015" maximum, with the third and fourth speed clutch hub forward against the snap ring. Install rear bearing retainer plate. Spread the selective snap ring (use largest ring that will fit in groove) on plate to allow it to drop around rear bearing, and press on end of mainshaft until snap ring engages groove in rear bearing. Install reverse gear with shift collar to rear. Press speedometer drive gear onto mainshaft using a suitable press plate. Position speedometer gear to get a measurement of 4½" from center of gear to flat surface of adapter plate (Exc. Ford, Mercury & Studebaker); 8 7/8" (Mercury), 4 13/16" (Studebaker) from rear surface of adapter plate to rear face of speedometer gear; 9¼" (Ford) from rear face of speedometer gear to end of output shaft.

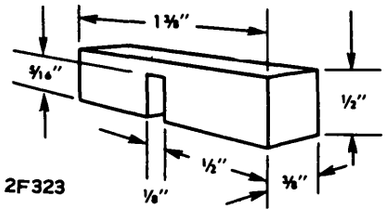
EXTENSION CASE: Reassembly - Place ball detent spring into detent spring hole and start reverse shift shaft into hole in boss. Place detent ball on spring and, holding ball down with a suitable tool, push shifter shaft into place and turn until the ball drops into place in detent on shifter shaft detent plate. Install shifter fork *(NOTE - Do not drive shifter shaft locking pin into place until ext nsion case has been installed on transmission cas).* Line up locking pin hole in rear idler shaft with hole in boss. Install idler shaft and lock

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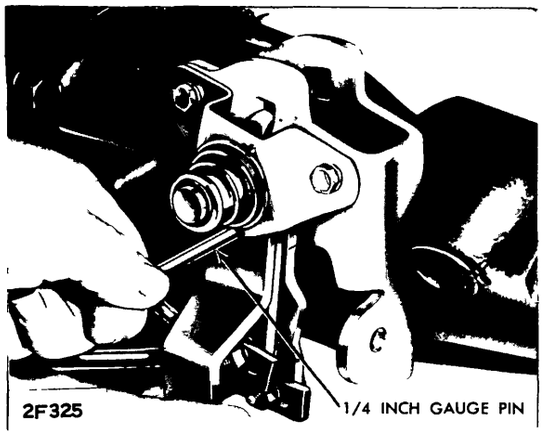
WARNER 4-SPEED SYNCHRO-MESH (C nt.)

in place with pin. Install new expansion plug behind idler shaft, using sealing compound on plug.

TRANSMISSION CASE: Reassembly - Install roller spacer (6.050" long) in countergear, then, using heavy grease to retain them, install 20 rollers in first gear end of countergear, two .050" spacers, 20 more rollers, and a .050" spacer on top of second race of rollers. Install the same amount of rollers and spacers in the same order in the other end of countergear. Rest transmission on its side with side cover opening upward. Place countergear tanged thrust washers in position, retaining them with heavy grease and making sure that tangs are resting in notches in case. Set countergear in place in bottom of case, making sure that tanged thrust washers are not moved out of position. Press front bearing onto clutch gear, with snap ring groove in front, using a suitable tool. Install spacer washer and selective fit snap ring in groove on clutch gear ahead of front bearing. Install clutch gear and bearing assembly through side cover opening and into position in transmission front bore. Tap lightly into place with a plastic hammer. Place snap ring in groove in front bearing. Lift countergear, mating fourth speed gear of cluster with clutch gear, then install countershaft into position from rear of case (*NOTE* - Be sure thrust washers remain in place). Install woodruff key in end of countershaft and press shaft into place until shaft is flush with rear face of case. Attach a dial indicator to case so contact button of indicator rests against face of a gear on countergear cluster and check endplay of countergear which should not be in excess of .025". Install the fourteen pilot roller bearings into clutch gear, using heavy grease to retain them in place. Using heavy grease, place gasket into position on front face of rear bearing retainer. Install fourth speed synchronizer blocker ring on clutch gear with notches toward rear of transmission. With front face of transmission case facing down, install the mainshaft assembly into case, making certain that notches on fourth speed synchronizer blocker ring correspond to keys in synchronizer assembly. Install self locking bolt attaching rear bearing retainer to transmission case

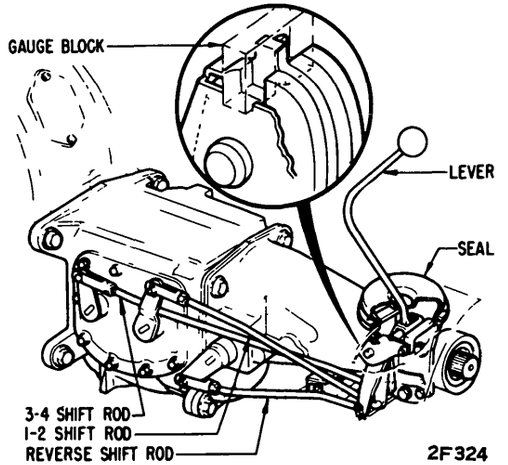


SHIFT LINKAGE GAUGE BLOCK (EXC. FORD & MERCURY)



FORD & MERCURY SHIFT LINKAGE ADJUSTMENT

and tighten to 20-30 ft. lbs. Using heavy grease, install flat thrust washer onto rear face of rear idler thrust boss. Shift transmission into second gear and carefully install the small half of the reverse idler gear into place along side of thrust washer (notches toward rear). From rear of case, insert rear half of reverse idler gear, engaging notches of portion of gear within transmission case. Using heavy grease, place gasket into position on rear face of rear bearing retainer. Install remaining thrust washer into place on rear idler shaft, making sure that tang on thrust washer is in notch in idler thrust face of the extension. Retain thrust washer in place with heavy grease. With transmission facing downward, forward speed gears in neutral, and the reverse shifter shaft as far forward as possible, lower the extension case onto transmission case. Engage reverse shifter fork with the reverse gear flange and lower the extension case into position while moving reverse shifter shaft rearward. Install three extension and retainer-to-case attaching bolts and tighten to 35-45 ft. lbs. Install one extension-to-retainer bolt and tighten to 20-30 ft. lbs. Use a sealing compound on lower right hand attaching bolt. Move shifter shaft to line up groove in shaft with holes in boss and drive in the locking pin. Install shift lever. Install front bearing retainer, gasket and four attaching bolts, using sealing compound on bolts. Tighten to 15-20 ft. lbs. Install shifter fork in each synchronizer (first and second speed gear shifter fork must have its flat surface facing the reverse idler thrust boss). Place both synchronizers in neutral, then install side cover gasket and carefully lower side cover into place. Install attaching bolts and tighten evenly to avoid distortion of cover. *NOTE - Use a sealing compound on side cover lower right hand bolt.*



SHIFT LINKAGE ASSEMBLY (EXC. FORD & MERCURY)

SHIFT LINKAGE ADJUSTMENT

All Models (Exc. Ford & Mercury): *NOTE - The gauge block (see illustration) will facilitate adjustment, however, the adjustments can be made by having an assistant hold manual shift lever in neutral position.* Remove transmission gearshift lever seal from floor pan, then place transmission in neutral and install gauge block. Remove cotter pin, anti-rattle washer and clevis pin at each shift lever. On each shift rod, adjust threaded clevis to permit free entry of clevis pin into hole in transmission shift lever. Reconnect clevises to shift levers, then remove gauge block and check shifts. If roughness still exists, determine rod and clevis requiring adjustment by sighting along the slot where gauge block was used.

Ford & Mercury: Place shift lever in neutral, then raise car on a hoist and insert a ¼" drill or alignment rod into alignment hole (located in center of shift levers on extension housing). If rod will not enter, check for bent or bellied connecting rods. If rods are correct shape, check for loose lever locknuts at rod ends. Adjust linkage by loosening rod-retaining locknuts and moving the levers until ¼" drill or rod will enter alignment holes. *NOTE - Make sure transmission shift levers are in neutral and the reverse shifter lever is in neutral detent. If there is any doubt about location of neutral position, disconnect shift rods at retaining locknuts and rotate each forward-speed shift lever through its three positions until the center (neutral) detent is positively located. Move reverse shift lever forward until positive engagement is felt. Install shift rods and tighten locknuts.* Check operation of shift for smooth crossover.

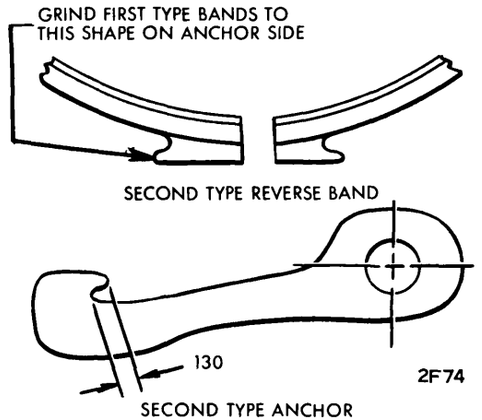
BUICK TWIN TURBINE AUTOMATIC TRANSMISSION

Buick L Sabr , Invicta, Electra (1962)

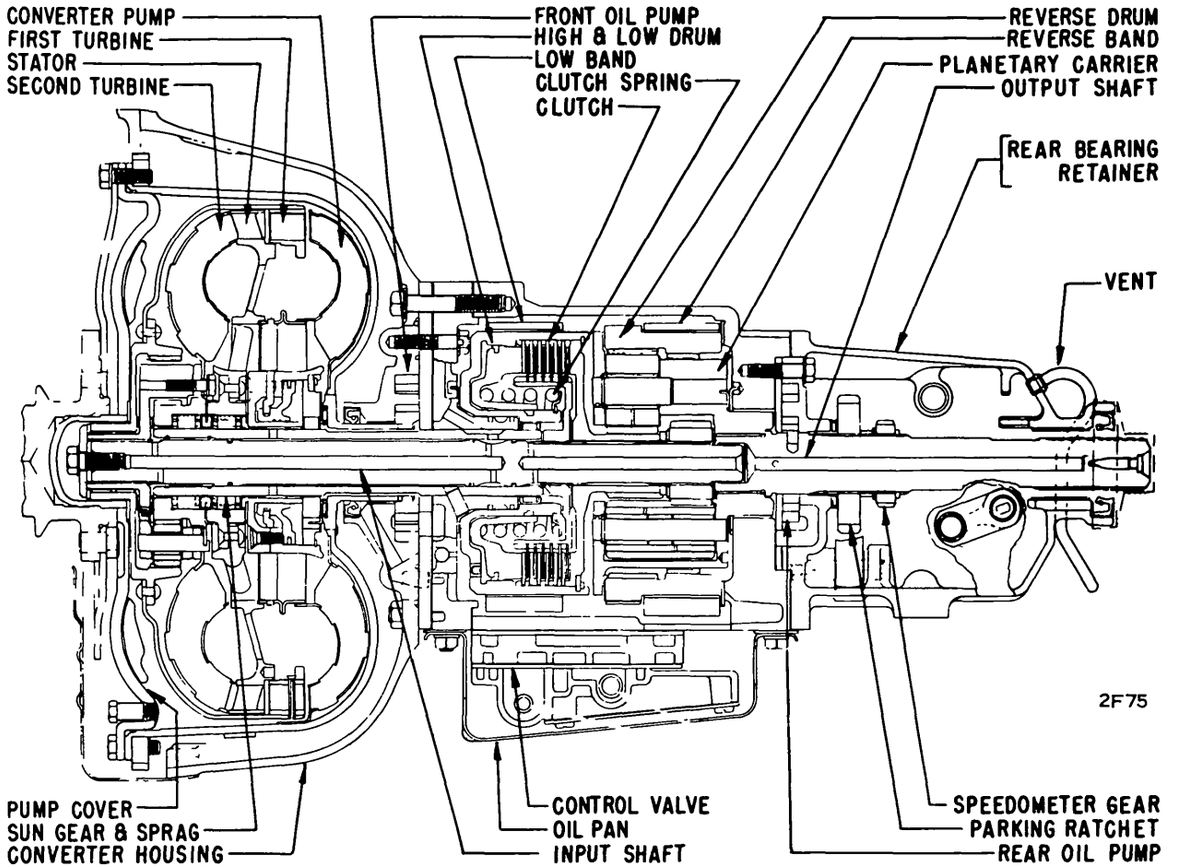
►CHANGES, CAUTIONS, CORRECTIONS

►*1962 TWIN TURBINE TRANSMISSION CODE NUMBER NOTE:* A code number consisting of a letter followed by a number is stamped on lower edge of reaction shaft flange directly to rear of high (left) accumulator. This number should be used as identification when ordering parts or for service procedure changes.

►*1962 TWIN TURBINE TRANSMISSION REAR BAND & ANCHOR PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Later production reverse band and anchor assemblies have been changed so as to have a more shallow "hook" than earlier assemblies. If necessary to use a later type anchor with first type band on any earlier transmission (except 1958-59 Triple Transmissions), it will be necessary to grind down band lip on "anchor side" as indicated in illustration.



LATER 1962 REAR BAND & ANCHOR



BUICK TWIN TURBINE AUTOMATIC TRANSMISSION SECTIONAL VIEW

DESCRIPTION

DESCRIPTION: Twin turbine torque converter and automatic transmission of same design as used on previous models.

LUBRICATION

Check fluid level every 1,000 miles. Drain and refill every 25,000 miles.

►*CAUTION: Fluid must be warm and engine must be idling when checking fluid level. Make sure transmission is at normal operating temperature before draining.*

Checking Fluid L vel: With transmission fluid at normal operating temperature and transmission selector lever in "P" (Park) position with engine idling, check fluid level on dipstick. Add recommended fluid as necessary to maintain fluid level between "ADD OIL" and "FULL" marks on dipstick. *NOTE - One pint of fluid will raise level from "ADD OIL" mark to "FULL" mark. Do not overfill.*

Draining & Refilling: Remove bell housing cover, then loosen one converter drain plug. Rotate converter until opposite drain plug is straight down and remove this plug to allow converter to drain. Remove filler pipe fitting from oil pan and allow oil pan to drain. *CAUTION - Do not remove accumulator caps.* Remove oil pan and oil screen clean thoroughly and reinstall. Tighten oil pan bolts to 10-12 ft. lbs. Install converter drain plug and tighten both plugs securely. Tighten oil filler fitting to 30-35 ft. lbs., then install bell housing cover. Install 3 qts. of recommended fluid in transmission, then with engine idling, transmission selector lever in "P" (Park), add sufficient fluid to bring level on dipstick between "ADD OIL" mark and "FULL" mark. With transmission at normal operating temperature, fluid level should be at "FULL" mark.

R commended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity: Approximately 12 qts. (refill). A completely dry transmission requires an additional 1 3/4 pints.

LINKAGE ADJUSTMENT

Throttle Linkage & Stator Control Linkage: *See CARBURETOR on Car Model pages.*

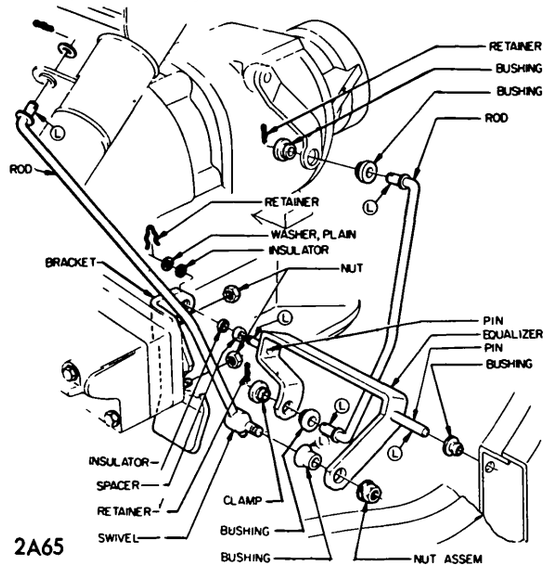
Manual Shift Linkage: Place transmission selector lever in "P" (Park) position, then raise car and loosen clamp nut at lower end of upper rod. Move transmission manual lever several times to make sure lever is in "Park" detent, then tighten clamp nut. To check adjustment, distance from "Drive" detent to "Drive" stop should be approximately equal to distance from "Low" detent to "Low" stop. *NOTE - If pointer does not line with "D" on dial with transmission manual lever in "Driv " detent, remove lower steering column housing, th n either loosen dial pointer setscrew or carefully b nd pointer to line up pointer with "D" in "Drive" rang . Tighten setscrew.*

Neutral Safety Switch: Place transmission selector lever in "N" (Neutral), then insert a 3/32" drill through gauging hole in operating lever and through gauging hole in switch body. *CAUTION - D not all w s l ctor l v r to move out of position.* If drill will not go through

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BUICK TWIN TURBINE (C nt.)

holes or is not parallel to center line of steering column, loosen switch mounting screws and move switch as necessary for alignment, then tighten screws and check operation. *NOTE - Engine should start in "P" (Park) r "N" (Neutral) only.*



MANUAL SHIFT LINKAGE

BAND ADJUSTMENT

►*BAND ADJUSTMENT NOTE: Bands cannot be adjusted with transmission installed in car. Adjustment is ordinarily required only at time of overhaul.*

L w & Reverse Band Adjustment: Remove band adjusting cover, then loosen locknut and turn adjusting screw clockwise until considerable resistance is felt indicating that band is in full contact with drum (low) or ring gear (reverse). Back off screw until just a trace of play can be felt by prying up on locknut with a screwdriver. From that point, back off screw **6 complete turns** and tighten locknut finger tight. Note position of adjusting screw slot, then tighten locknut to 20-25 ft. lbs. Remove torque wrench and check to make sure that adjusting screw did not turn. Install band adjusting cover with a new gasket.

TESTING

If performance not satisfactory, make following tests **with transmission thoroughly warmed up and at operating t mperature:**

Oil Level: Check oil level, add fluid as necessary to bring level up to FULL mark on dipstick, recheck performance with correct oil level. If car has been losing oil at rate of 1 pint or more each 1000 miles, make thorough check for oil leaks.

Manual C ntr l Linkag : Check and adjust manual control linkage. See Linkage Adjustment.

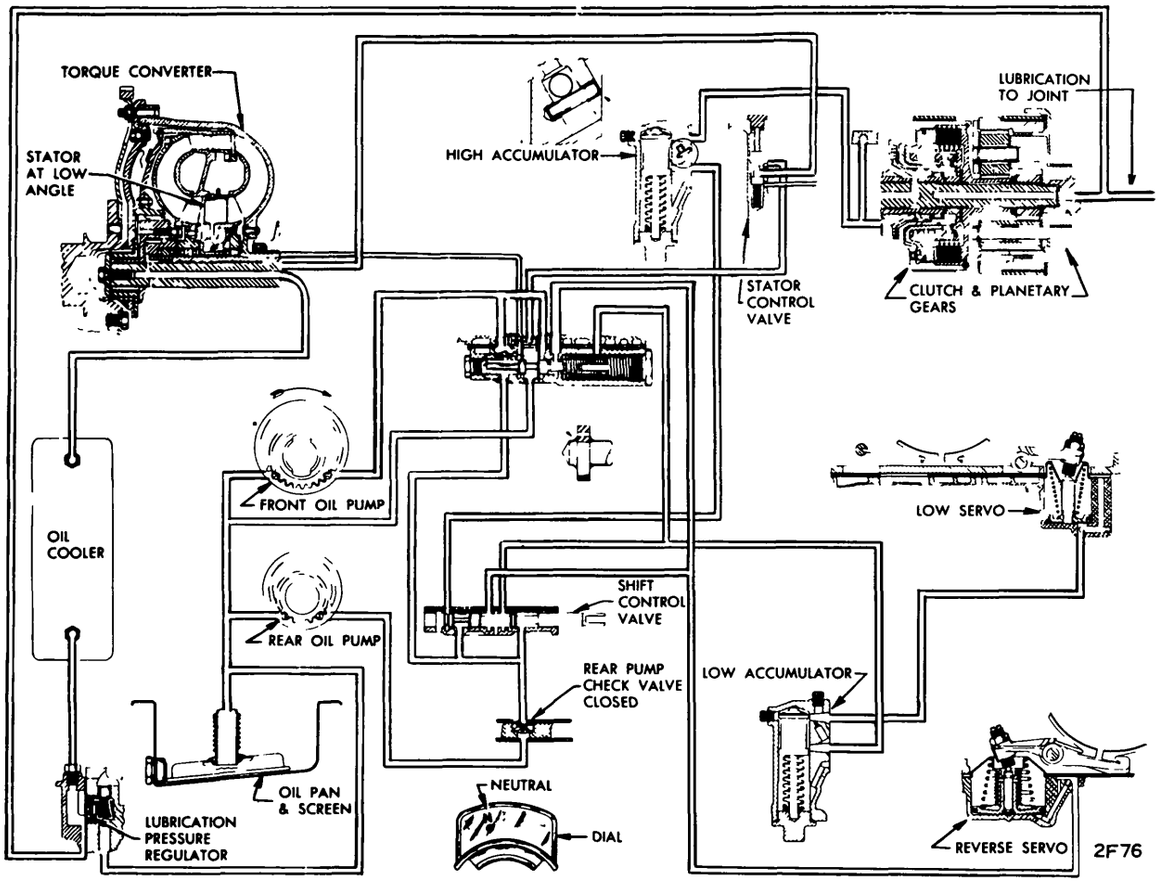
Hydraulic Control System Pressures: Use Transmission Oil Pressure Gauge J-2575. Support rear end of car solidly with wheels off floor so that transmission can be operated. Remove transmission cover in floor pan for access to pressure take-off points.

Connect gauge and make tests as follows:

Front Oil Pump - Connect pressure gauge at pipe plug opening on left side of transmission case. Run engine at 500 RPM, check pressure with selector lever in **Low, Drive, and Reverse ranges.** Repeat tests at 1000 RPM, and at 1800 RPM **in Low and Reverse only.** See table below for correct pressures. Low or erratic pump pressures indicate air leaks in suction lines, improper pressure regulator valve action. or excessive pump clearances.

Front Oil Pump Pressures

Selector Lever–	Low	Drive	Reverse
500 RPM	120 lbs.	90 lbs.	120 lbs.
1000 RPM	180 lbs.	90 lbs.	
1800 RPM	180 lbs.	90 lbs.	



BUICK TWIN TURBINE AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

High & L w Accumulator - Connect pressure gauge at pipe plug opening on top of accumulator body (**High**–left side of car); (**Low**–right side of car). Place selector lever in **Drive Range** (High Accumulator Test); **L w Range** (Low Accumulator Test). Run engine and check pressures at speeds indicated in tables below. Low accumulator pressure may be caused by leakage past accumulator body gasket. If accumulator pressure more than 10 lbs. lower than front pump pressure, check for leakage between accumulator and multiple disc clutch and for restricted or plugged metering orifice in accumulator dump valve.

Accumulator Pr ssur s

Selector Lever–	Low	Driv
500 RPM	115 lbs.	80 lbs.
1000 RPM	175 lbs.	85 lbs.
1800 RPM	175 lbs.	85 lbs.

Stat r - Connect pressure gauge at pipe plug opening on left end of reaction shaft flange. Test pressure in **Driv Rang** at 500 RPM, 1000 RPM, and 1800 RPM.

CONTINUED ON NEXT PAGE

BUICK TWIN TURBINE (C nt.)

Stat r Pressures

Select r Lev r -	Drive
500 RPM	10 lbs.
1000 RPM	65 lbs.
1800 RPM	75 lbs.

TROUBLE SHOOTING & DIAGNOSIS

►*EXCESSIVE DYNAFLOW WHINE CORRECTION: (This c nditi n is usually the result of excessive clearanc b tw n input shaft and bearing in the reaction shaft).* If transmission is to be disassembled to correct whine, perform the following:

1) Remove converter cover, twin turbine assembly, and sun gear, then mount dial indicator on end of input shaft with indicator button contacting reaction shaft. Position indicator button 90° to left of top center (facing end of shaft) then move input shaft away from and toward indicator while noting the gauge reading. Repeat this check at 45° to left of top center. If dial reading exceeds .005", excessive clearance exists between input shaft and bearing in reaction flange.

2) Before replacing bearing, remove reaction flange assembly and input shaft and observe the following: (a) Inspect bearing surface on input shaft. If surface appears abnormally rough or scored, replace input shaft; if not, polish journal area with crocus cloth. (b) Inspect the two oil seal rings toward rear of input shaft and the mating surface in the reaction shaft for scoring or other damage. If reaction shaft or input shaft shows evidence of scoring or other damage, replace worn or damaged parts.

3) If inspection reveals that condition of reaction shaft and input shaft are satisfactory, replace only the input shaft bearing (see Overhaul data).

4) If input shaft, reaction flange, or the bearing requires replacement, it will be necessary to replace the converter sun gear and planet pinions. *NOTE* - When installing reaction flange service bushing, be sure the assembly is supported on rear end of reaction shaft to prevent distortion of aluminum reaction flange.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With s l ct r in any Range (rear wheels free). If car will n t m v for 1-8 minutes after standing over night - Check front pump oil pressure (see Testing) after allowing car to stand for several hours. If zero pressure noted, check pump for excessive clearances allowing pump to lose its prime. Check alignment of of bell housing and converter primary pump hub.

►*CAUTION: If this condition found, inspect Clutch and Bands for xcessive wear due to slippage caused by low oil pressure.*

If car will n t mov aft r extended operation in Reverse - Check for air leaks in pump suction line (at rear oil pump gaskets), or excessive clearance in front pump (at pump gears and covers). Check alignment of bell housing and converter primary pump hub.

2) With s lector in any Rang (rear wheels l ck d). Parking lock engaged. Broken parts in transmission or rear axle. Parking brake applied.

3) With s l ct r in Driv Rang . Check front oil pump pressure and High Accumulator pressure. If OK, check for sticking Low Band Anchor Piston, remove and inspect Clutch for worn or sticking clutch plates, leaking clutch seal rings. If High Accumulator pressure pressure low, also check rear pump Check Valve for correct installation and proper seating, check for leaks at accumulator body gasket, reaction flange gasket, clutch piston outer seal and clutch ball check valve, and leaks at sealing rings on reaction shaft flange and low drum.

4) With selector in Reverse Range. Check reverse band for displaced operating strut caused by too loose adjustment, improper installation, or broken band anchor (indicated by free up and down movement of band operating lever). If band assembly OK (no free movement of lever), check servo operation by running engine and shifting into Reverse. Remove Valve & Servo Body and check for reverse servo piston seal leaks.

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, or poor acceleration).

1) In all Speed Ranges. Low oil level. Incorrect manual control linkage adjustment. Air leak in oil pump suction pipe at oil screen sealing ring. Low front oil pump pressure caused by wear or excessive clearances in in pump. Leaks at front pump cover or reaction shaft flange, pressure regulator valve. Valve & Servo Body gasket. Pressure regulator valve defective.

2) In Drive Range. Incorrect manual control linkage adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, check for leaking clutch sealing rings, sticking clutch piston, worn or sticking clutch plates.

3) In Low Range. Incorrect manual control linkage adjustment. Incorrect low band adjustment. Low band and drum worn or scored. If Low Accumulator pressure If Low Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, remove Valve & Servo Body and check for gasket leaks or leaks at low servo piston seal.

4) In Reverse Range. Incorrect manual control linkage adjustment. Reverse band out of adjustment, strut out of place, or anchor broken. If front oil pump pressure low, remove Valve & Servo Body and check for gasket leaks and leaking reverse servo piston seal.

CAR CREEPS (Forward or Backward).

1) Creeps forward with selector in Neutral. Incorrect manual control linkage adjustment. Sticking low servo piston (check by removing low band adjustment cover), Sticking clutch caused by warped, binding, or incorrectly assembled clutch plates (not stacked properly with "dish" in same direction).

If Car Creeps only when engine accelerated to 2500 RPM - Check clutch vent ball checks in clutch piston and reaction shaft flange.

2) Creeps forward with selector in Reverse or backward with selector in Low. Incorrect manual control linkage adjustment.

SHIFTS ARE ROUGH

1) Low-to-Drive Shift. Incorrect Low Band adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket and for dump valve or accumulator piston sticking down (top land of piston should be visible through top port in body). Sticking low band anchor piston (remove Valve & Servo Body to check), or incorrect piston location (see piston shimming data in Valve & Servo Body Reassembly). Valve & Servo Body gasket leaks. Clutch plates worn or binding.

EXCESSIVE CHATTER OR CLUNK ON STARTING

►*CAUTION: Slight "clunk" when shifting into Low or Reverse is normal, and slight chatter when car starting to move in reverse (disappearing as soon as car in motion) is also normal.*

1) In Low & Reverse Range. Incorrect Low or Reverse Band adjustment. Engine and transmission mountings loose or incorrectly adjusted, thrust pad at transmission mounting broken (see Engine Mountings in Buick Special Data). Clutch plates warped, sticking, or incorrectly assembled (not stacked properly with "dish" in same direction). Reverse ring gear bushing worn. Planet pinion needle bearing rough.

NOISE IN TRANSMISSION.

►*CAUTION: Hum or low whine in Neutral or Parking is normal (due to free rotation of all planetary g ars) and slight hum in Low and Reverse may be expected.*

1) Buzzing Noise. Low oil level. Front pump check valve hanging up on edge of gasket between valve and servo bodies. If noise noticed in Parking or Neutral, pressure regulator valve clearance in body may be excessive or orifice in valve land oversize (correct by replacing valve and body).

2) Clicking Noise. If noticed in all ranges, may be caused by foreign material in converter. If noticed only when car in motion, may be caused by parking lock pawl contacting ratchet wheel due to incorrect manual control linkage adjustment.

3) Abnormal Hum or Whine (see Caution above). If noted in all ranges, may be caused by worn parts or excessive front pump clearances (front pump noise will increase in Low and decrease at car speeds above 45 MPH. in Direct Drive). Check front pump for excessive clearances by testing for low pump pressure. If noise noted in all ranges except Direct Drive, may be caused by trouble in planetary gears (gears locked out in Direct Drive).

4) Squealing or Screeching following installation f of Front Oil Pump. Pump driving gear installed backward.

►*CAUTION: Above condition must be corrected WITHOUT FURTHER OPERATION OF TRANSMISSION or sev re damage will result.*

TRANSMISSION REMOVAL & INSTALLATION

Transmission Assembly: Removal - **1)** Raise car and place on jack stands, then disconnect exhaust pipes. Remove converter housing cover and drain converter, then remove oil filler pipe and drain transmission. Disconnect cooler lines. *NOTE - If transmission is being removed to correct clutch or band troubles, cooler and lines must be flushed with air and oil to remove residue.*

2) Remove flywheel-to-converter bolts and disconnect speedometer cable, stator control rod (at accumulator), and lower shift rod at lever. Disconnect propeller shaft at rear companion flange. *NOTE - Mark shaft and flange so parts can be reassembled in same position. Support shaft up out of way to prevent damage to center joint caused by weight of shaft.*

3) Place transmission jack or hoist in position and adjust it to securely support transmission, then remove center bearing support bolts and slide propeller shaft rearward and disengage it from transmission. Remove

CONTINUED ON NEXT PAGE

BUICK TWIN TURBINE (C nt.)

bolts attaching rear mounting pad to rear bearing retainer, then raise engine and transmission assembly just enough to take load off transmission support (crossmember) and remove support. *CAUTION - If shims are used between support and frame side rails, note number of shims and location, so they may be reinstalled in same position.*

4) Place a jack under rear of engine lower crankcase and lower transmission just enough so converter housing bolts can be reached, then with engine and transmission supported by separate jacks, disconnect converter housing from engine. Move transmission rearward and disengage hub of converter pump cover from crankshaft and remove transmission from under car.

Installation: Reverse removal procedure and note the following: Turn flywheel so one converter attaching bolt hole is straight up, then install transmission, aligning converter bolt holes with holes in flywheel. Install and tighten all converter housing-to-engine bolts to 45-55 ft. lbs. Tighten flywheel-to-ring gear bolts to 30 ft. lbs. Tighten rear bearing-to-mounting pad bolts to 50-60 ft. lbs.

TRANSMISSION OVERHAUL

OVERHAUL: *See 1960 Final, Page 414, or later Manual edition and note the following:*

Reaction Shaft Flange, Oil Pump, Accumulators & Clutch: Removal - Compress low band with Tool J-9478 to remove band from case.

Rear Bearing Retainer, Rear Bushing, Parking Lock, and Speedometer Drive Gear: Removal - *NOTE - These units can be removed with transmission in car by removing oil pan and disconnecting propeller shaft.* Disconnect valve operating rod from upper operating rod (if not previously done), then remove retainer-to-case bolts, retainer and gasket. Remove speedometer gear and ratchet wheel retaining ring with snap ring pliers and remove speedometer drive gear, shims and spacer.

Disassembly - Remove spring from detent roller lever and support, then remove nut at adjusting lever. Pull roller lever and support assembly into bearing retainer and remove. *NOTE - Inspect "0" ring on support shaft and replace it damaged.* Remove cotter pin and clip from valve operating rod. *NOTE - If valve operating rod does not have a hole for installation of cotter pin, install later type valve operating rod and parking lock operating rod.* Thread parking lock operating rod ball stud out of lever. Thread a ¼" - 20 bolt into pawl shaft and withdraw shaft from retainer. Pull lever shaft from retainer in same manner, then remove parking lock pawl and lever assembly from retainer. Drive roll pin out of cross shaft and remove cross shaft and lever assembly and cross sleeve and lever. *NOTE - Inspect cross shaft seal and lever and replace if seal is worn or damaged. If bearing is worn so excessive freeplay exists between it and cross shaft, mark position of bearing in retainer and drive out bearing with a drift. Press a new bearing into place to same position as original b aring. Inspect output shaft bushing and if necessary, drive it out with Tools J-7273-7 and J-7013-1.*

R ass mbly - If new output shaft bushing is to be installed, drive bushing into position (flush with counterbore) with Tools J-7273-7 and J-7013-1. Coat outer diameter of new seal with Permatex and install with Tool J-8864. Lubricate cross shaft seal and position it in recess over cross shaft bearing with lip inward. Hold valve operating lever and shaft in position inside retainer and slide cross shaft through bushing and seal inside valve operating lever and sleeve Line up holes and install roll pin. Install detent roller lever and support, then assemble linkage adjusting lever on support shaft and install nut and lockwasher. Install detent spring, then assemble parking lock operating rod to operating lever assembly using a lockwasher under ball end hex. *NOTE - Full pivoting ball end of rod must be assembled to operating lever.* Position pawl levers and rod assembly in retainer and slide pawl and lever shafts into place making sure that tapped holes are outward. Attach parking lock operating ball end to upper lever using a lockwasher under ball end hex. Assemble valve operating rod to valve operating lever with a clip and cotter pin. *NOTE - If rod does not have a cotter pin hole, replace rod with later type.*

Rear Oil Pump & Lubrication Oil Pressure Regulator Valve: Removal - Do not remove lube oil pressure regulator valve. Use compressed air and solvent to clean valve.

Valve & Servo Bodies: Disassembly (Valve Body) - Remove lower valve operating lever and linkage adjusting lever-to-upper lever shaft and remove levers. Remove safety nuts and washers from studs and lift valve body and gasket from servo body, then remove shift control valve from valve body. Remove rear pump delivery check valve and spring from servo body. Cover large pressure regulator valve plug with a wadded cloth and pull plug retaining pin out of valve body. *CAUTION - Use care when removing retaining pin as there is heavy spring pressure behind plug.* Remove two springs and spring seat. Remove small plug retaining pin, then thread a ¼" - 20 capscrew into plug and remove plug from valve body. Remove pressure regulator valve. Remove valve body plate and gasket, then remove front pump delivery check valve and spring.

Reassembly (Valve Body) - Place front pump delivery check valve spring in body with large end down and place check valve on spring with ridged side up. Install valve body plate and a new gasket, making sure that check valve is seated against plate and not caught under gasket. Check oil orifice in pressure regulator valve and land to make sure it is clear, then install valve with land outward. Assemble "0" ring on small plug and install plug with tapped hole outward and install short retaining pin with shoulder of pin toward valve body plate side of body. Assemble spring seat on inner spring and install springs and seat into valve body through large plug openig. Clamp a drift or dowel in a vise and position a 1" inside diameter pipe nipple over the dowel. Position plug and "0" ring over spring ends and against dowel. Slide pipe nipple over plug so that when pressure is exerted to compress springs into valve body, plug will not slip off dowel. Push valve body toward dowel to push plug into valve body. Install long retaining pin with shoulder toward valve body plate side of valve. Install shift control valve with slotted end on same end of valve as large pressure regulator plug. Install rear pump delivery check valve in its seat in servo body, ridged face inward, and place valve spring on valve with large end up. Install a new gasket and the valve body on servo body, using care to keep pump delivery check valve spring below gasket, then install lock washers and safety nuts on two studs adjacent to control valve and tighten nuts evenly to 11-15 ft. lbs. Insert valve operating upper lever shaft through bearing in servo body, then with upper lever pointing toward reverse servo, place lower lever with linkage adjusting lever on shaft so that forked end of lower lever engages shift valve pin, then install lockwasher and nut.

Planetary Gear Set: Installati n - Install reverse ring gear thrust washer and planet carrier rear thrust washer in case, then compress ends of reverse band with band installing clip, Tool J-2595, and install in case. *NOTE - When installing band, make sure that heavy side of band is in correct position so that it will attach to reverse anchor and not to strut.* Remove clip, then rotate servo band toward servo opening. Insert anchor through opening and engage with hooked end of band, then rotate band and anchor back to normal position. Hold band operating lever (with offset end) in place with strut shoulder toward inside of case and insert anchor shaft through case, anchor, and lever. *NOTE - Tapped end of shaft must be outward. If adjustment screw is not centered in servo opening, the low band operating lever has been installed by mistake.* Install reverse ring gear slipper in case, then install assembled planetary gearset.

Low Band, Clutch & Input Shaft: Installation - To install low band, compress ends with Tool J-9478.

Reaction Shaft Flange, Front Oil Pump & Accumulator: Installation - To check endplay, assemble a suitable dial indicator support to transmission case. *NOTE - A 3/8" - 16 bolt with a .312" rod welded to head makes good arrangement.* Assemble dial indicator so plunger bears on end of output shaft. Push shaft forward with some force and rotate a few turns to squeeze grease from thrust surfaces. Set dial indicator at zero, then pull output shaft rearward and check indicator reading. If reading is more than .040", select a thicker washer for installation forward of needle thrust bearing and recheck endplay. If reading is less than .020", select a thinner washer and recheck. Endplay should be between .020" and .040".

Valve & Servo Body Assembly & Oil Pan: Installation - To adjust control valve, check position of groove in first land of valve which should be flush with boss of valve body. If edge of groove is not flush, loosen bolt and nut on adjustment lever and move to position valve correctly, then tighten nut and recheck valve position.

Speedometer Driven Gear & Positiv Park Stop: Installation - Check "0" ring seal on speedometer driven gear and replace if necessary. Lubricate "0" ring and gear and install in case, then install driven gear retainer and lever stop *(see "Manual Linkage Adjustment" above). NOTE - If transmission not originally equipped with lever stop to prevent over travel in "P" (Park) position, install a new stop.*

BUICK SPECIAL AUTOMATIC TRANSMISSION

Buick Special, Series 4000 & 4100 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: The engine cannot be started by pushing (or pulling) car. If necessary, a "booster" battery must be used.*

►*TOWING BUICK AUTOMATIC TRANSMISSION CARS:* Cars may be towed (or pushed) for short distances with transmission in "N" (Neutral) and at a speed not to exceed 25 MPH. If cars are to be moved any extended distance, rear wheels should be raised off ground or the drive line should be disconnected at the rear. *CAUTION - When drive line is disconnected, it must be suitably supported to prevent damage to center universal joint.*

►*1962 BUICK SPECIAL TRANSMISSION COMPANION FLANGE REMOVAL OR SEAL REPMACEMENT NOTE:* When companion flange is removed or companion flange is removed or companion flange seal is installed, fill space between lips of seal with a good grade wheel bearing grease to prevent entrance of moisture.

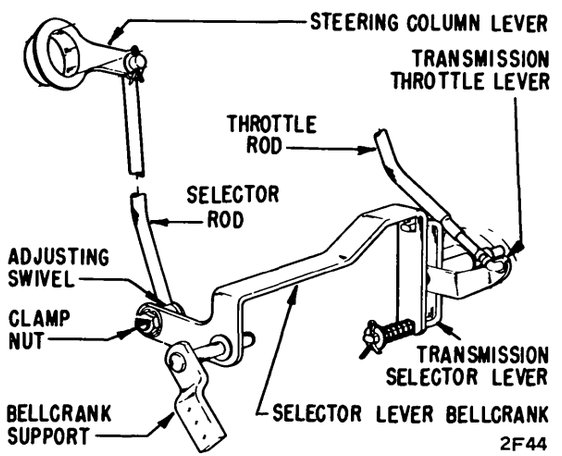
DESCRIPTION: Two-speed hydraulically controlled transmission and air cooled torque converter assembly of same design as used on previous models. *For detail description, see 1961 Final Data, Page 404.*

OPERATION: *See 1961 Final Data, Page 404.*

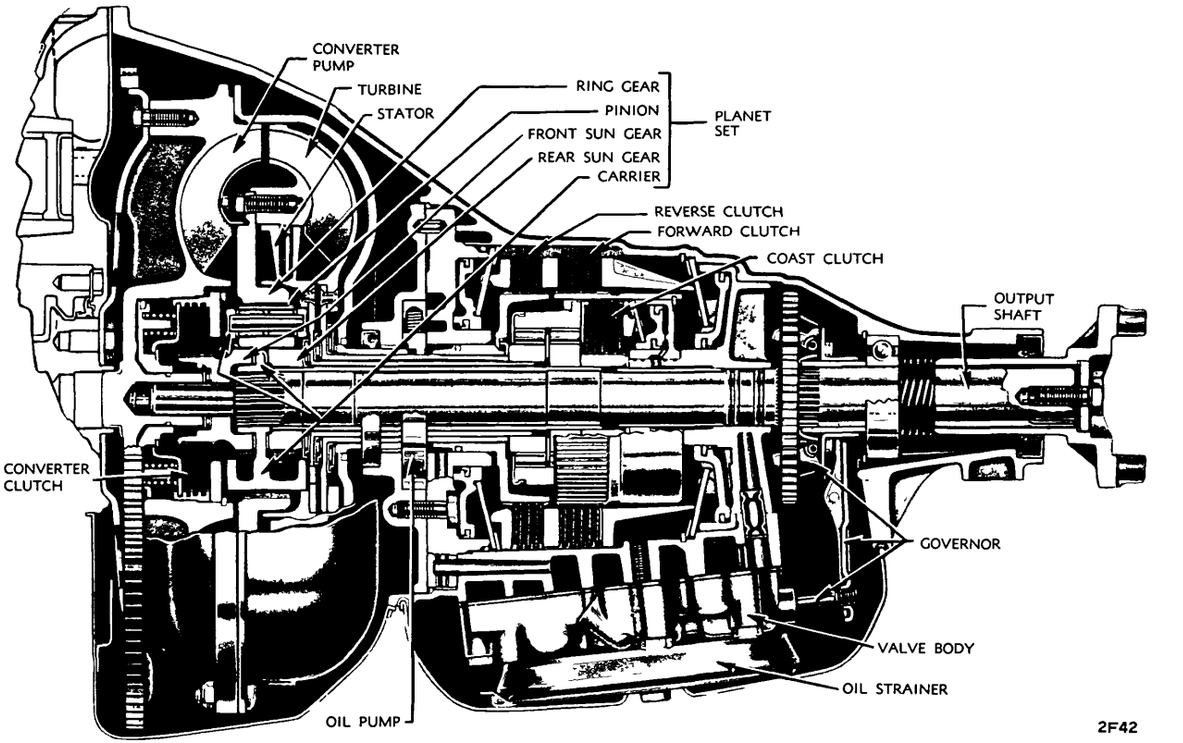
LUBRICATION

LUBRICATION: Check fluid level every 1000 miles, drain and refill every 25,000 miles.

Checking Fluid Level: Check level with transmission at normal operating temperature. With engine idling and transmission selector lever in "P" (Park) position, transmission oil level should be at "Full" mark on dipstick (dipstick located under right side of hood in engine compartment). If oil level is below "Add" mark, add sufficient Automatic Transmission Fluid Type "A" (Suffix "A") to bring level to "Full" mark. *CAUTION - Do not fill transmission above "Full" mark.*



MANUAL SELECTOR LINKAGE



BUICK SPECIAL AUTOMATIC TRANSMISSION SECTIONAL VIEW

Draining & Refilling: *CAUTION - Accurate foot pound and inch pound reading torque wrenches must be used.* Remove single bolt and seal attaching oil pan to transmission case and drain transmission, then remove oil pan and seal. Remove two oil strainer strap bolts and remove strainer and "O" ring seal. Install a new strainer and "O" ring seal and tighten strainer strap bolts to **100 inch pounds exactly.** DO NOT OVERTIGHTEN. Clean oil pan and install a new seal on oil pan being careful not to stretch seal, then install oil pan and seal, oil pan bolt and seal, and tighten oil pan to case bolt to 15-20 ft. lbs. DO NOT OVERTIGHTEN. Add 5 pints of oil to transmission, then start engine and allow to idle in neutral. Immediately add oil to bring level up to ½" below full mark. With engine at normal operating temperature, add oil to bring level up to full mark on dipstick.

Capacity - Approximately 6 qts.

LINKAGE ADJUSTMENT

ADJUSTMENTS: Throttle Linkage - *See CARBURETOR on Car Model page.*

Manual Linkage: Loosen adjusting swivel on selector lever bellcrank and place transmission selector lever in neutral detent. Move shift lever against neutral stop and tighten adjusting swivel clamp nut.

TESTING

TESTING: Road Test - With throttle and manual linkage properly adjusted and engine at normal operating temperature, accelerate from a stop with accelerator pressed just to detent. Upshift should occur smoothly at 40-45 MPH. If upshift occurs at speeds other than those specified, see "Trouble Shooting & Diagnosis" below.

TROUBLE SHOOTING & DIAGNOSIS

TROUBLE SHOOTING & DIAGNOSIS: Upshift At Too Low Speed - Governor valve not adjusted properly or is sticking. Shift valve or shift valve regulator sticking. Throttle valve pressure too low (worn or broken spring or valve sticking).

Upshift At Too High Speed: Governor valve not adjusted properly or is sticking. Shift valve or shift valve regulator sticking. Throttle valve pressure too high (valve sticking).

Slow Engagement of Converter Clutch: Converter pressure regulator valve sticking (lowering converter pressure too slowly).

Fast Engagement of Converter Clutch: Converter charging pressure too low. Converter pressure regulator valve sticking.

CONTINUED ON NEXT PAGE

BUICK SPECIAL AUTOMATIC TRANSMISSION (C nt.)

TRANSMISSION REMOVAL & INSTALLATION

Removal: 1) Raise car and support front and rear, then disconnect exhaust crossover pipe at both ends and at transmission, then remove pipe.

2) Remove universal joint "U" bolts and slide front propeller shaft rearward to separate universal joint at transmission. Support weight of propeller shaft.

3) Place a jack under transmission and fasten securely to transmission, then remove transmission mounting pad to crossmember bolts. Remove transmission support crossmember to frame rail bolts and remove crossmember.

4) Disconnect speedometer cable, then remove shift linkage equalizer from transmission range selector outer lever. Remove transmission filler pipe, then support engine at oil pan and remove transmission converter housing cover.

5) Mark flywheel and converter for reassembly in same position, and remove three converter pump to flywheel bolts. Remove transmission case to engine block bolts.

6) Move transmission to rear for clearance between converter pump and engine crankshaft, then lower transmission out of car.

Installation: 1) Install transmission on a suitable jack and raise transmission into position for installation on engine. Rotate converter to align it with marks made on flywheel and converter when removed.

2) Install transmission case to engine block bolts and tighten to 30-35 ft. lbs. *CAUTION - Do not overtighten.* Install flywheel to converter pump bolts and tighten to 18-25 ft. lbs.

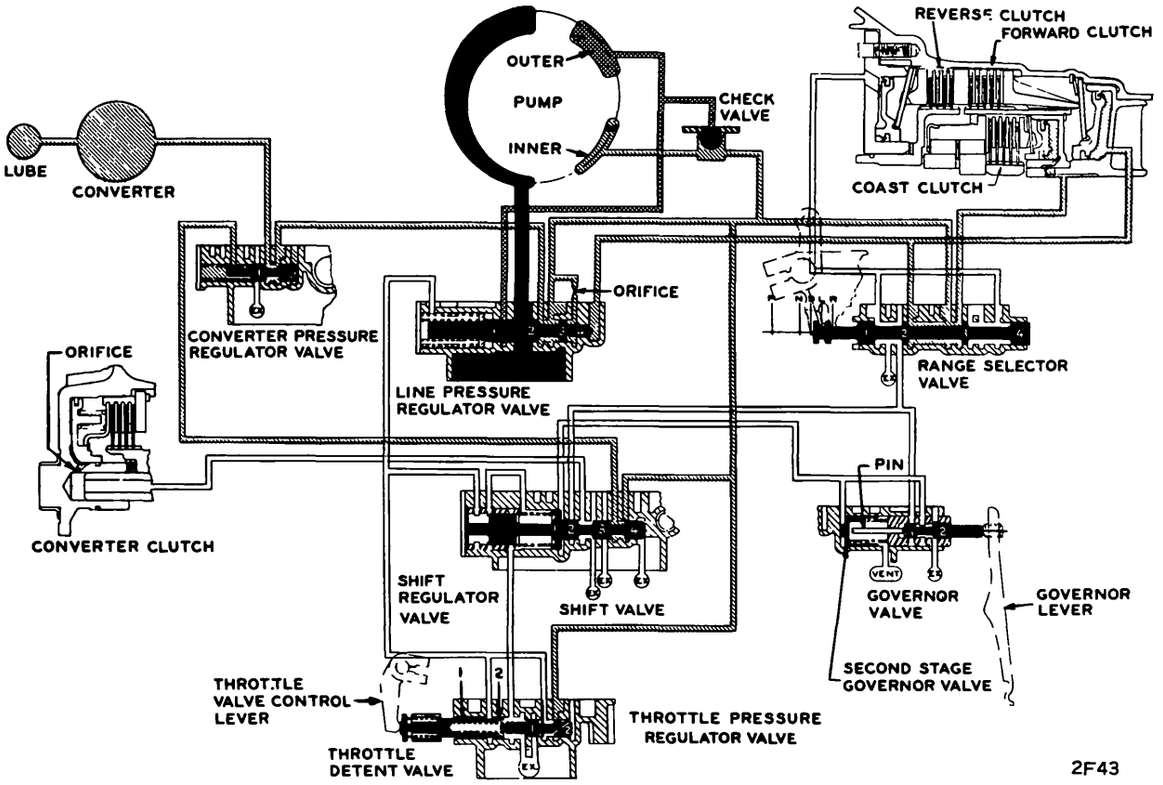
3) Install transmission support crossmember and install transmission to mounting pad bolts, then remove transmission jack and engine support. Install transmission converter housing cover.

4) Install filler pipe and clamp using a new "O" ring seal. Reconnect speedometer cable, then connect front propeller shaft to transmission companion flange and install "U" bolts. Reinstall exhaust crossover pipe and refill transmission. *See "Draining & Refilling" above.*

TRANSMISSION OVERHAUL

►*OVERHAUL NOTE: See 1961 Final, Page 404 and note the following:*

TORQUE CONVERTER & GEARSET REMOVAL & DISASSEMBLY: *See 1961 Final Data, Page 406, and note the following:* After removal of front sun gear, needle thrust bearing and two selective fit needle bearing races, remove planet carrier retaining ring using a thin bladed screwdriver to pry ring out of groove.



BUICK SPECIAL AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

COMPANION FLANGE & SEAL: Installation - When installing seal, coat outer diameter of seal with Permatex to prevent possible leakage.

RANGE SELECTOR LEVERS & SHAFT, THROTTLE VALVE CONTROL LEVERS & SHAFT, & PARKING LOCK ACTUATOR: Removal - Use a 3/8" socket and 7/16" wrench to remove screw and nut attaching lever to shaft. Slide inner lever off shaft and remove, then slide outer lever and shaft out of range selector shaft. Check "O" ring and remove if worn or damaged. Use the same tools and remove screw and nut attaching range selector inner lever to shaft. Slide range selector inner lever off shaft, then remove inner lever and parking lock assembly. Check "O" ring and remove if worn or damaged. If parking lock actuator is bent or damaged, or if range selector requires replacement, pry retainer off actuator rod. To install, reverse removal procedure.

COAST & OVERRUNNING CLUTCH, FORWARD CLUTCH PACK, RELEASE SPRING & APPLY LEVERS: Installation - *See 1961 Final Data, Page 409, and note the following:* With transmission case in a vertical position, install forward clutch levers, then install forward clutch release spring flat on levers (inner edge of spring downward). Position spring centering tool J-9313 over coast clutch support to rest on levers and center spring. Install spring retainer over spring and press down and outward to slightly compress spring and position retainer in groove of case. *CAUTION - It is necessary that retaining ring be installed correctly.* Check to make sure ring is in groove all the way around. Remove tool J-9313.

TORQUE CONVERTER & GEAR SET: Reassembly & Installation - *See 1961 Final Data, Page 410, and note the following:*

9) Place planet carrier over rear sun gear with tanged thrust washers in place at front and rear. *NOTE - Deeper pocket of carrier "down" toward rear sun gear and splined portion "up".* Use a small screwdriver to install retaining ring in groove of output shaft. Assemble new converter pump oil seal to pump (do not twist square seal). Lubricate and install needle thrust bearing and two select fit bearing races into front sun gear. Retain in place with chassis lubricant. *NOTE - The .030" bearing race must be toward sun gear.*

TRANSMISSION VENT: Replacement & Disassembly - Remove vent assembly from case by pulling straight up. To reinstall, reverse removal procedure. To remove float from vent pipe, remove cotter pin and slide float out of tube. Wipe off float and clean tube in solvent. To reassemble, install float, pointed end first, then install cotter pin.

CHEVROLET (CAST IRON) POWERGLIDE

Chevrolet Pass. Cars, 6 Cyl. 235" Eng. (1962)
Chevrolet Pass. Cars, V8 283" Eng. (1962)
Chevrolet Trucks (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Place selector lever in "N" (Neutral) position. When car reaches a speed of 16-20 MPH, move selector lever to "L" (Low) position to crank engine. After engine starts, move selector lever to "N" (Neutral).

►*TORQUE CONVERTER OVERHAUL NOTE: Both "welded" and "bolted" type torque converters are used in production on a mixed basis. Welded type torque converters, identified by a "W" suffix on transmission serial number, cannot be disassembled for overhaul.*

►*1962 POWERGLIDE "HIGH" CLUTCH PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* This new clutch assembly, identified by 12 tangs on Low Sun Gear Flange (in place of 6 tangs on previous assemblies) entered partial production beginning Dec. 12, 1961. This new clutch assembly can be used for service replacement on all 1962 model transmissions. *DO NOT USE on earlier models.*

DESCRIPTION

DESCRIPTION: Transmission design is the same as for previous models having "waved" High Clutch drive plates, clutch hub thrust washer having an extruded center section, and a counterbored Low Sun Gear & Clutch Flange Assembly. In addition, the control valve body has a shorter length oil delivery sleeve (31/32") than previous models which had an oil delivery sleeve measuring 1 3/32" from end of sleeve to face of oil ring groove boss.

OPERATION: Same as for previous models.

LUBRICATION

Checking Fluid Level: Check fluid level every 1,000 miles. *NOTE - Periodic draining & refilling is not required. See "Draining & Refilling" below.*

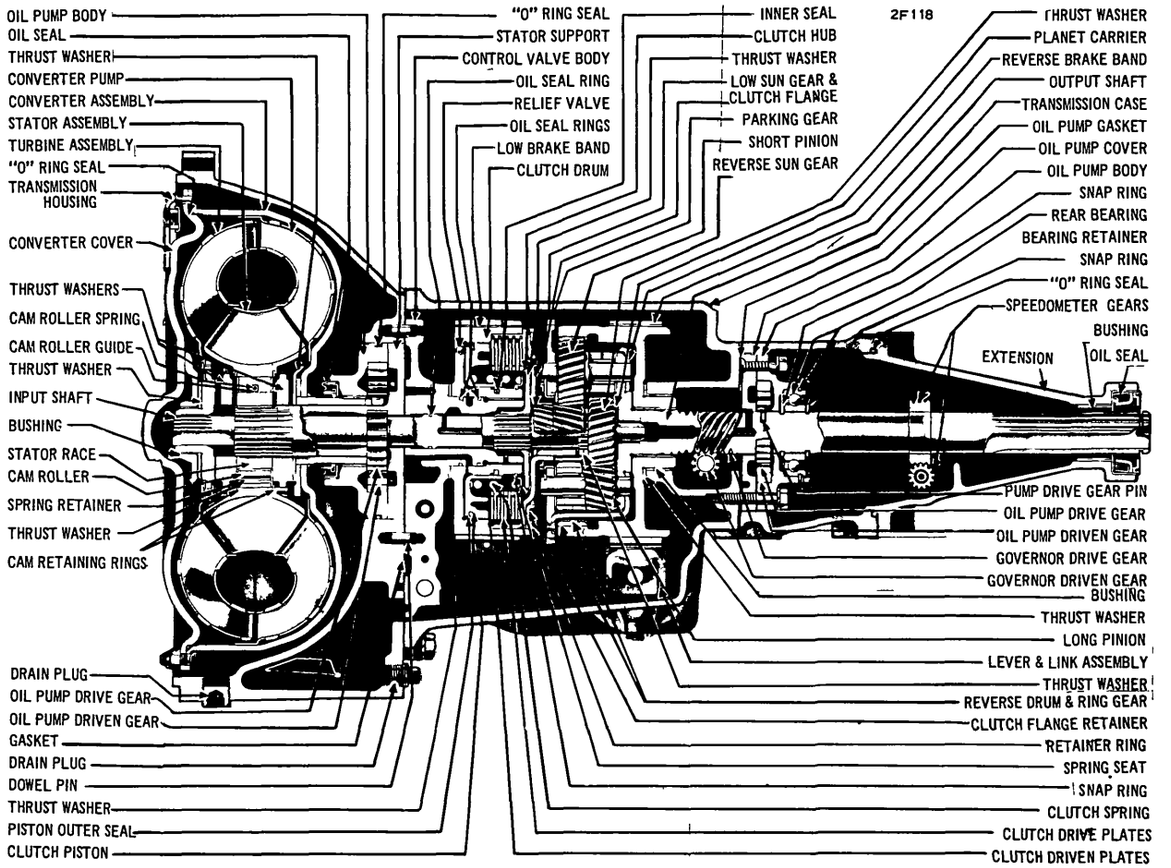
Recommended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity: Approximately 4½ qts. (after transmission drained). 10½ qts. (Pass. Cars); 10 qts. (Trucks) after overhaul with transmission and torque converter dry.

Draining & Refilling: *NOTE - Draining & refilling of transmission is not recommended other than for transmission repairs.* Remove transmission oil pan drain plug (no drain plug on converter). To refill transmission, install drain plug, then pour in 3½ qts. of recommended fluid. Operate engine with transmission selector lever in "N" (Neutral) until fluid warms up, then add sufficient fluid to raise level to "FULL" mark on dipstick. DO NOT OVERFILL. If converter was emptied, follow above procedure and add approximately 7½ qts. of fluid after transmission is at normal operating temperature.

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on car models pages.*



POWERGLIDE (CAST IRON) SECTIONAL VIEW

Manual Control Linkage: Place manual selector lever in "D" (Drive) position, then loosen clamp nut on shift control rod at its attachment to shift control lever on mast jacket. Place shift lever on transmission in "D" (Drive) position, then adjust position of clamp on shift control rod for free entry into shift lever on mast jacket and tighten clamp nut. Shift transmission into all ranges and check operation.

Neutral Safety Switch: Located on steering column mast jacket under instrument panel. Place selector lever in "N" (Neutral) position and loosen two screws securing neutral safety switch retainer. While holding ignition switch in "Start", adjust position of neutral safety switch until engine starts cranking. Hold switch in this position and tighten retaining screws. Check adjustment for cranking with selector lever in "N" and "P" positions.

BAND ADJUSTMENT

►*BAND ADJUSTING NOTE: Band adjustment not ordinarily required in service (bands adjusted when reassembling transmission). Reverse band adjustment requires removal of Servo Cover Assembly (see "Disassembly" below).*

Low Servo Band: Adjusting screw located on left side of transmission under adjusting screw cover. To adjust band, remove adjusting screw cover and tighten low servo adjusting screw to 5-7 ft. lbs. using a torque wrench (Tool J-5853). *NOTE - Rotate input and output shafts simultaneously to properly center low band on clutch drum.* **Back adjusting nut off 4 turns, then** tighten locknut securely and install adjusting screw cover. *CAUTION - Adjusting screw must be backed off exactly as specified, after torqueing to 5-7 ft. lbs.*

Reverse Servo Band (Reverse Piston Linkage): *CAUTION - Band adjustment must be verified by actual measurement of reverse piston travel.* Rotate reverse drum to center it in reverse band, then use Tool J-4277 and tighten adjusting screw to 5-7 ft. lbs., **then back screw off 2½ turns.** Check for proper adjustment as follows: Measure distance from face of reverse piston outward to side of case with the piston in its retracted position (inboard) with a small scale and record this dimension. Pull reverse piston outward to its full travel by grasping its hub with a pair of pliers, then again measure distance from face of piston to outboard

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

side of case. The difference between these two measurements should be 3/32-5/32". If travel is too great, tighten adjusting screw. If too little, loosen adjusting screw. Recheck piston travel after adjustment. Tighten adjusting screw locknut to 20-25 ft. lbs.

TROUBLE SHOOTING

CLOSE THROTTLE DOWNSHIFT "CLUNK": May be caused by: High engine idle speed. Faulty downshift timing valve (replace valve). High mainline pressure caused by Vacuum Hose to modulator leaking or disconnected. Modulator diaphragm ruptured. Sticking valve (pressure regulator booster valve, pressure regulator valve, or modulator valve).

MOMENTARY RUN AWAY IN LOW UP TO 30 MPH (WIDE OPEN THROTTLE ACCELERATION): May be caused by a broken forced throttle cushion valve spring retainer. Check mainline pressure which will be lower just prior to shift, and the stall pressure will be low if the faulty transmission operation is caused by a broken retainer. *See "Closed & Forced Throttle Valve Spring Retainer Production Change" above.*

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, poor acceleration, or engine runs away on turns).

1) In all Speed Ranges - Low oil level. Incorrect control linkage adjustment. Air leak in oil pump suction pipe. Low front oil pump pressure.

2) In Drive Range - Incorrect control linkage adjustment. Damaged or leaking clutch piston seal (worn or burned clutch plates resulting from partially engaged clutch).

3) In Low Range - Incorrect control linkage adjustment. Low Band out of adjustment. Sticking accumulator valve, modulator lever, or modulator valve. Damaged or worn Low Servo Piston Ring resulting in poor band application or excessive oil leakage into clutch apply circuit causing partial clutch application and possibly burned clutch plates (check by connecting pressure gauges to Low Servo Apply and to High Clutch test points - there should be no pressure indicated at High Clutch point with selector lever in "L").

CAR CREEPS (Forward or Backward):

1) With Control Lever in Neutral - Incorrect control linkage adjustment. Clutch piston vent valve stuck closed. Clutch plates sticking or incorrectly assembled (not "stacked" in correct order).

2) Creeps forward with Control Lever in Reverse or backward with Lever in Low - Incorrect control linkage adjustment.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With Control Lever in any range (rear wheels free). If this occurs at other times than after reversing car, see causes listed under EXCESSIVE SLIPPAGE above. If this occurs only after reversing car (indicating loss of front pump pressure) check: Rear pump air leakage into front pump suction line (causing front pump to lose its prime). Rear pump gasket leakage. Front pump clearance excessive.

2) With C ntr l L v r in any rang (r ar wheels locked). Parking pawl lock engaged. Broken parts in transmission- Parking brake applied.

3) With C ntrol Lever in Driv Range (rear wheels free). If engine runs away and transmission is hot, check for: Low radiator water level, clogged oil cooler, sticking thermostatic valve, or dragging Low Range Band (causing over-expansion of clutch parts due to excessive heat).

SHIFTS ARE ROUGH:

1) Low-to-Drive Shift (car in motion). Incorrect Low Band adjustment. Clutch plates worn or binding. Modulator control lever or piston sticking (will cause excessive pressures). Accumulator dump valve orifice plugged.

If engine speeds up during this shift.- Check for incorrect low band adjustment and worn or binding clutch plates.

2) Drive-to-Low Shift. Incorrect Low Band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

3) Neutral-to-Reverse. Incorrect reverse band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

CHATTERS WHEN STARTING:

1) In Low Range. Incorrect Low Band adjustment. Worn or rough band, scored drum. Clutch not disengaging properly due to distorted or binding plates, sticking clutch piston, sticking piston vent valve, or damaged or worn Low Servo Piston Ring allowing oil leakage into clutch apply circuit and causing partial clutch application (see tests for Excessive Slippage in Low Range above).

2) In Drive Range. Incorrect Low Band or Reverse Band Adjustment. Bands worn or rough, drums scored.

3) In Reverse Range. Incorrect Reverse Band adjustment. Worn or rough band, scored drum. Reverse ring gear and drum bushing worn or damaged.

REVERSE OPERATION JERKY OR DRAGGING.

1) Clutch plates are incorrectly assembled (not "stacked" properly) or sticking. Clutch piston vent valve stuck closed.

REVERSE CANNOT BE ENGAGED WITH ENGINE RUNNING: If reverse can only be engaged when engine not running, check for accumulator snap ring being out of place (allowing accumulator valve and body to be forced against clamp nut on parking lock lever shaft and apply spring assembly, blocking shift into reverse). *NOTE* - Above condition will not prevent shift into Low Range).

DRIVE-TO-LOW or LOW-TO-DRIVE SHIFT DIFFICULT: May be caused by improperly drilled high clutch feed orifice in valve body resulting in slow clutch application in Drive Range and slow clutch release when shifting from Drive to Low (restricted orifice will cause slow oil flow). Check by connecting pressure gauges to Low Servo Apply and to High Clutch (low servo release side) and noting pressures as follows:

1) Move selector from Neutral to Drive with engine idling. If pressure builds up much more rapidly on Low Servo Apply gauge than on High Clutch gauge, a restriction in the passage (undersized orifice) is indicated.

2) Move selector from Drive to Low. Pressure in High Clutch gauge drops slowly,oil drainage from clutch is restricted. *NOTE* - This will result in slow Low Band application and clutch drag (may cause burned clutch plates).

HIGH CLUTCH PLATES BURNED OR CLUTCH FAILURE:

►*CAUTION: When High Clutch failur n ted, following tests should be made befor transmissi n removed, and transmission should also be carefully xamined after removal and disassembly.*

1) Connect pressure gauges to Low Servo Apply, High High Clutch (low servo release side), and to Reverse Servo points. Operate engine to supply oil pressure.

2) Place selector lever in Drive position and note pressure build-up in High Clutch gauge. Slow build-up indicates restriction in high clutch apply orifice resulting in clutch slippage and burned plates.

3) Place selector lever in Low position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage past Low Servo Piston Ring resulting in partial clutch application and burned clutch plates.

4) Place selector lever in Reverse position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage between the converter "out" and low servo "release" channels in valve body or damaged Housing-to-Valve Body gasket. This condition will cause partial clutch application and burned clutch plates.

NOISE IN TRANSMISSION:

1) Buzzing Noise (All Ranges). Low oil level. Pump gear interference with crescent in pump. Pump check valve not seating.

2) Ringing Noise in Converter. Low oil level. Air leak in pump suction line (pump not seated properly) resulting in low oil level in converter. Pressure regulator valve stuck (closing converter inlet port). Leakage in oil line between front pump and regulator valve.

3) Clicking Noise. Incorrect manual linkage adjustment (causing interference between parking lock pawl and gear).

4) Whining Noise. Transmission gear teeth worn. Pump gear clearance excessive or pump gear bushings worn.

FUEL CONSUMPTION EXCESSIVE:

1) Transmission Causes. Converter stator freewheeling cams and roller incorrectly assembled. Clutch piston vent valve stuck open.

TRANSMISSION OIL BEING FORCED OUT OF FILLER PIPE: Caused by aeration and foaming of the oil due to one or more of the following:

NOTE - This condition may also cause Loss of Power and Lower Stall Speed (due to converter turbulence and lower pressures in control circuits).

1) Oil level too high allowing planet carrier to revolve in oil and aerate it. Correct by lowering oil level to correct point (see LUBRICATION) and driving car for 5 miles to work out air bubbles.

2) Oil suction pipe split, seal damaged, bore for suction pipe in housing too deep, or suction pipe retainer ears bent (preventing proper compression of the seal) resulting in air leaks in oil suction line.

3) Sand hole in suction bore of transmission case or housing or in suction cavity in valve body resulting in air leaks in oil suction.

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

TESTING

►*TESTING NOTE: Befor making tests, bring fluid level in transmission up to FULL mark on dipstick, then operat transmission and bring up to normal operating t mp ratur .*

ROAD TEST: Road test car to determine transmission shift points as indicated in tables below.

TRANSMISSION SHIFT POINTS (CARS)

Sel ct r In "D" (Drive)

6 Cyl. Engine

Thr ttle P siti n	Upshift	Downshift
Light Throttle	12-15 MPH	10-13 MPH
To Detent	27-44 MPH	13-17 MPH
Through Detent	44-49 MPH	41-48 MPH

283" V8 Engine (Air Cond.) ①

Thr ttle P siti n	Upshift	Downshift
Light Throttle	12-15 MPH	10-13 MPH
To Detent	37-50 MPH	13-17 MPH
Through Detent	50-56 MPH	47-53 MPH

283" V8 Engine ②

Throttle Positi n	Upshift	Downshift
Light Throttle	13-16 MPH	11-14 MPH
To Detent	40-55 MPH	14-19 MPH
Through Detent	55-61 MPH	51-58 MPH

① - 3.36-1 axle ratio. ② - 3.08-1 axle ratio.

TRANSMISSION SHIFT POINTS ① (TRUCKS)

½-Ton, 6 Cyl. ③

Thr ttl Position	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	25-40 MPH	12-16 MPH
Through Detent	40-45 MPH	38-44 MPH

½-T n V8 ③

Thr ttl P siti n	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	34-44 MPH	12-16 MPH
Through Detent	46-52 MPH	43-49 MPH

¾-T n 6 Cyl. ④

Thr ttl P sition	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	25-40 MPH	12-15 MPH
Through Detent	40-45 MPH	37-44 MPH

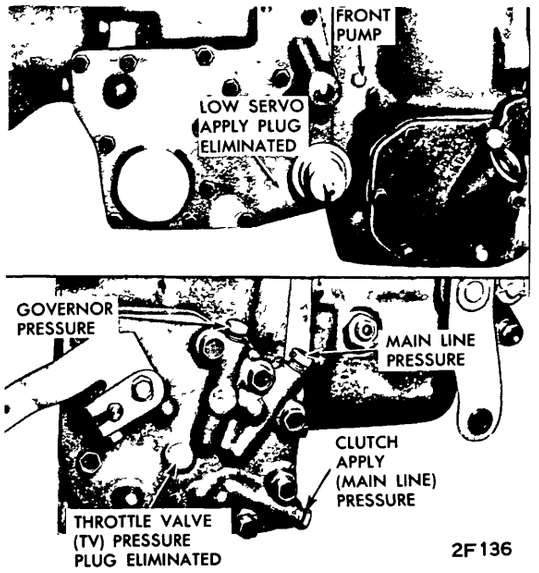
¾-T n V8 ④

Thr ttl P siti n	Upshift	Downshift
Light Throttle ②	11-14 MPH	9-12 MPH
To Detent	34-44 MPH	12-15 MPH
Through Detent	46-51 MPH	43-48 MPH

① - Shift speeds given in table will vary slightly for tire sizes other than indicated.
② - Closed throttle position for "downshift" speeds.
③ - 6.70-15 tires. ④ - 7.00-17 & 7.50-17 tires.

►*STALL TEST CAUTION: D not stall test transmission.*

PRESSURE TESTS: *NOTE - Throttle valv test plug and low servo apply test plug have been eliminated.* Install pressure gauge hose to test fittings (see illustration) at front pump, governor, main line, and clutch apply.



PRESSURE TEST POINTS

Gauge lines should be run into driving compartment by pushing aside steering column mast jacket seal, and connected to Gauge Set J-4872-A.

Wide Open Throttle Upshift: This shift should occur at 82-90 lbs. pressure (V8 Eng.), 68-74 lbs. pressure (6 Cyl. Eng.) as indicated on main line gauge. After shift is completed, pressures on both main line and high clutch gauges should indicate similar readings. If pressures are correct and clutch slippage is felt, mechanical trouble in clutch is indicated. If high clutch pressure is more than 5 lbs. lower, check for leak in high pressure line between low and drive valve body and high clutch.

Idle Pressure in "Drive" Range: *NOTE - In addition to oil pressure gauges, a vacuum gauge is required for this test.* With parking brake applied and shift selector lever in "D" (Drive) range, adjust engine idle speed until a steady 16" of vacuum is indicated on vacuum gauge. Main line pressure should be 60-70 lbs. (V8 Eng.), or 55-65 lbs. (6 Cyl. Eng.). If pressures not within this range, check the following: Pressure regulator valve, Vacuum modulator valve, or stuck Booster valve. Leak at low servo piston ring (between ring and bore). Leakage at valve body-to-case gasket. Leakage between valve body and housing. Front pump clearances not correct. Leak at low drive valve body (check gasket and shifter valve). Check passages in transmission housing for porosity. Loosen suction screen connection.

Manual Low Range Pressure: Connect a tachometer to engine, then place transmission selector lever in "L" (Low) range and adjust engine speed to 1000 RPM with car stationary. Main line pressure should be 114-127 lbs. (V8 Eng.), 70-80 lbs. (6 Cyl. Eng.). Pressure not within specified ranges indicate following possibilities: Partially plugged oil suction screen. Broken or damaged ring in low servo. Pressure regulator valve stuck. Leak at valve body-to-case gasket. Leak between valve body and housing. Leak at servo center. Front pump clearances not correct.

Driv Rang Overrun (Coast) Pressure: With car coasting in "D" (Drive) range at 20-25 MPH and engine vacuum at approximately 20" hg, main line pressure should be 47-53 lbs. (all models).

Governor Pressure: Governor pressure is relative to transmission output shaft speed and can be checked in terms of MPH by referring to following table.

Governor Pressure ①

Speed	Pressure	Speed	Pressur
5 MPH	2-4 lbs.	35 MPH	47½-53½ lbs.
10 MPH	8½-13 lbs.	40 MPH	55-62 lbs.
15 MPH	21-27½ lbs.	45 MPH	63½-71½ lbs.
20 MPH	31½-34½ lbs.	50 MPH	73½-82 lbs.
25 MPH	35½-40 lbs.	55 MPH	84-93½ lbs.
30 MPH	41-46 lbs.	60 MPH	95½-106 lbs.

① - Governor pressures for cars with 3.08-1 rear axle ratio will be approximately 2 lbs. lower than specified in table.

Reverse Pressure: With parking brake applied and vacuum hose disconnected, place selector lever in "R" (Reverse) and adjust engine idle speed to 1,000 RPM. Pressure reading on front pump gauge should be 240-275 lbs. (V8 Eng.), 167-191 lbs. (6 Cyl. Eng.).

TRANSMISSION REMOVAL

►*TRANSMISSION REMOVAL NOTE:* Transmission and torque converter are removed as an assembly. Use special tool to retain converter while assembly is being removed.

REMOVAL: Raise car and drain transmission, then remove oil filler tube. Disconnect oil cooler lines, vacuum modulator hose, and speedometer drive cable fitting at transmission. *NOTE - Tie all lines out of way.* Disconnect body ground strap, then disconnect manual shift and throttle valve control rods at transmission levers. Disconnect propeller shaft at transmission, then install suitable transmission lifting equipment on transmission. Disconnect engine rear mount on transmission extension and remove transmission support crossmember. *CAUTION - Remove any shims which may be installed between extension mounting boss and cr ss member as these shims must be installed at time of transmission installation.* Remove flywheel cover and remove flywheel-to-converter attaching bolts (rotate converter using a remote control starter button). Lower rear of transmission slightly so that three upper transmission housing-to-engine attaching bolts can be removed. *NOTE - Use a universal socket and approximately a 39" extension.* Remove upper bolts. *CAUTION - When lowering rear of transmission, be car ful not to allow distributor housing to be forced against firewall.* Support engine at oil pan rail with a jack, then remove remainder of transmission-to-engine attaching bolts. Move transmission to rear and downward. *NOTE - At this point, install converter holding to l J-5384. DO NOT tip front of transmissi n d wnward until holding tools hav b n install d.* Remove transmission from below car.

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

TRANSMISSION DISASSEMBLY

DISASSEMBLY: 1) Place transmission assembly in a suitable holding fixture and remove converter assembly, then drain converter. *NOTE - If transmission has been removed for replacement of front pump seal, see "Front Pump Seal Replacement" under OVERHAUL below.* 2) Remove transmission low and drive body assembly and gasket. *NOTE - Do not remove throttle valve outer lever assembly at this time as it holds throttle valve inner lever assembly to cover.* Remove vacuum modulator and pushrod, then remove servo cover bolts and lockwashers, and remove servo cover assembly and gasket. *CAUTION - Reverse servo and spring, pressure regulator valve spring and low servo piston return spring exert pressure against this cover. Be careful when removing cover and maintain pressure against it to prevent cover breakage.*

3) Remove reverse servo spring, pressure regulator valve spring and remove pressure regulator valve. Remove servo cover locating screw if it did not come out with servo cover. Remove low band adjusting screw cover, then loosen low band adjusti ng screw locknut with Tool J-4277, and tighten low band adjusting screw to hold clutch assembly in place. *CAUTION - Make sure low piston assembly does not fall out of bore.*

►*LOW BAND ADJUSTING SCREW NOTE:* Low band adjusting screw has a ¼" Allen head. Remove screwdriver retainer and special screwdriver from Tool J-4277, and use a ¼" Allen wrench in its place.

4) Working from inside converter housing, remove converter housing-to-transmission case self-locking bolt. Remove exterior transmission-to-converter housing bolts and lockwashers and install two 3/8" - 16 x 3 3/4" guide pins (part of Tool J-3387), then shift transmission into "Low" range and carefully separate transmission from converter housing. Remove valve body-to-transmission case gasket.

5) Remove manual valve from valve body and manual lever from converter housing, then remove bronze thrust washer from clutch hub on valve body. Remove all bolts and lockwashers attaching valve body to converter housing and front pump to valve body. Remove valve body and gasket.

6) Remove oil baffle and pickup pipe suction screen, then install front pump driver, Tool J-4263-5, and remove pump assembly from converter housing. Back off low servo adjusting screw and remove transmission input shaft, clutch assembly, and low sun gear thrust washer from transmission case as an assembly.

7) Remove input shaft snap ring from behind low sun gear thrust washer and remove thrust washer. Remove low servo band, strut assembly, low servo piston and piston return spring. Remove speedometer driven gear retainer screw and lockwashers, then remove retainer and speedometer driven gear, fitting, and "O" ring seal.

8) Remove governor cover-to-transmission case attaching bolts and lockwashers and remove cover and gasket. Remove governor assembly, allowing it to turn in clockwise direction when removing from bore. Use Tool J-3383 and engage parking lock spring, then rotate spring to unhook end from case. Remove spring and parking lock pawl. Disconnect short manual shift rod from parking lock lever and remove parking lock lever. Remove parking lock lever shaft assembly and oil seal from case.

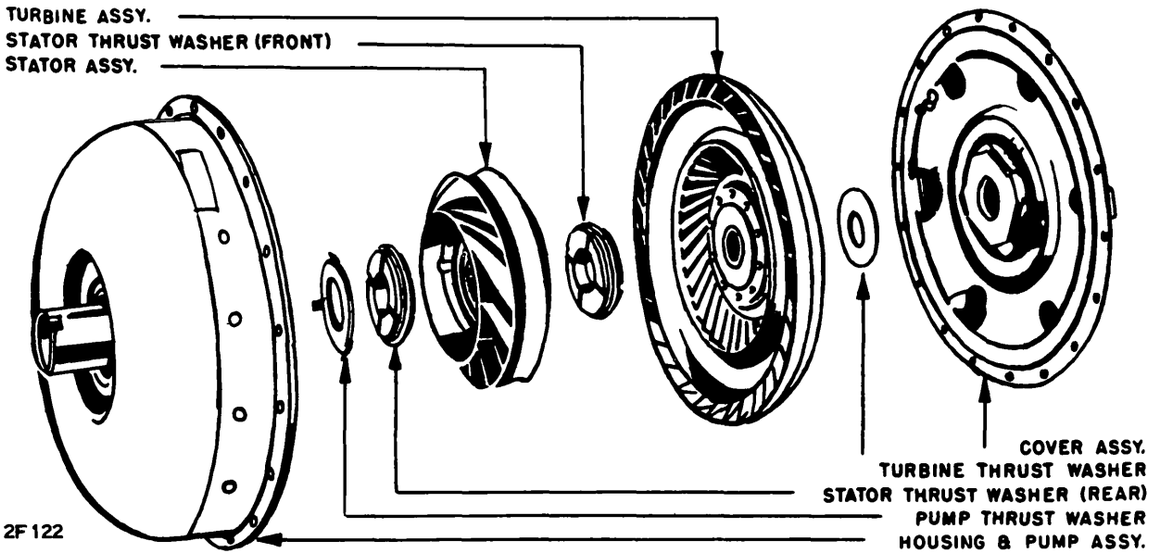
9) Remove extension oil seal with Tool J-5859, then remove extension assembly from transmission case. Use Tool J-5814 and remove speedometer drive gear from output shaft. Remove rear bearing locating rear snap ring from transmission output shaft. *CAUTION - Do not attempt to remove planet carrier assembly until transmission rear bearing locating snap rings, retainer and bearing are removed.* Remove rear bearing from output shaft with Tool J-5814; then remove rear bearing locating front snap ring. *CAUTION - Make sure bearing locating front snap ring is removed.*

10) Working from rear of transmission case, position the "O" stamped on face of output shaft at top center (this aligns drive pin in output shaft with eyebrow opening in rear oil pump cover). Remove planet carrier assembly through front of transmission case. *CAUTION - Do not drive on end of output shaft, and be careful not to lose rear oil pump drive pin located in output shaft.*

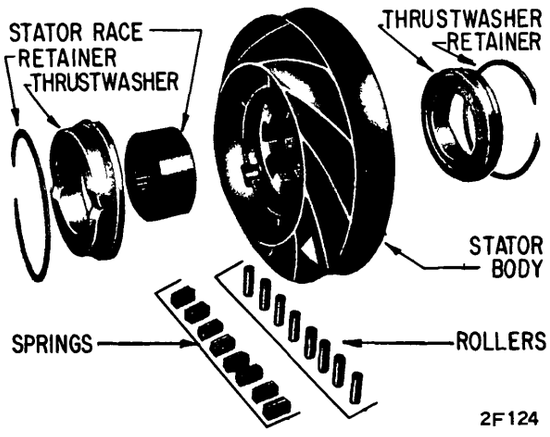
11) Remove rear drum and thrust washer, then use Tool J-4277 to loosen reverse servo adjusting screw locknut. Back off adjusting sctew and remove reverse brake band assembly and reverse servo piston. Remove rear pump assembly and gasket, then remove lubrication pressure relief valve from transmission case.

TRANSMISSION UNIT OVERHAUL

►*"O" RING SEAL NOTE:* Replace all "O" ring seals during overhaul or whenever one is removed. To insure proper installation of "O" rings, make sure all parts are clean and that sharp edges or burrs are removed. Be careful not to twist seals during installation. Before assembly, lubricate "O" ring seals with Automatic Transmission Fluid.



TORQUE CONVERTER ASSEMBLY



STATOR ASSEMBLY

CONVERTER & STATOR: *NOTE - W ld d c nv rt rs, which cannot be overhaul d, are used in part producti n and are identified by 'a "W" f ll wing transmission serial number. If this typ c nvert r is leaking, small welds may be made to correct leakag .*

Di sassembly: Remove converter cover attaching lock nuts and bolts, then remove converter cover, turbine assembly and converter pump thrust washer. *CAUTION - Do not pry cover off with a scr wdriv r.* Remove thrust washer from turbine hub, then remove "O" ring seal from converter cover. Remove front cam retaining snap ring and remove front stator thrust washer. *CAUTION - When s parating parts f stat r, mak sur cam roll rs and springs are not l st.* Remove stator race, cam rollers, springs, and overrun cam from stator body.

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

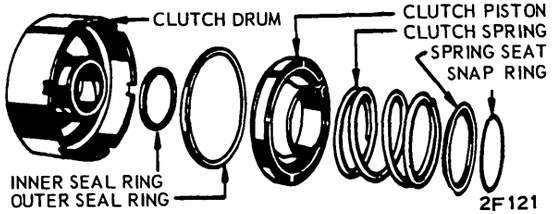
Remove rear cam retaining snap ring and remove rear stator thrust washer.

In sp ction: Wash all parts in solvent and blow dry with air, then inspect all parts for galling, wear or scoring. Check vanes for looseness or damage. Replace parts as necessary.

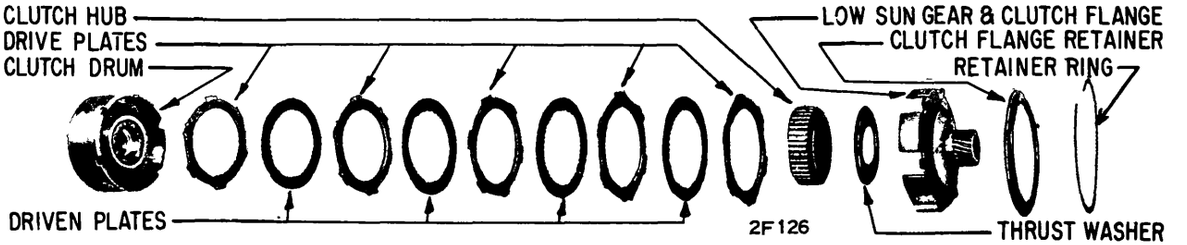
C nv rter C ver Bushing Replacement: Insert converter cover bushing remover, Tool J-5381, in bore of bushing and turn puller screw clockwise to remove bushing. Place new bushing on pilot end of converter cover bushing replacer, Tool J-5382, and press bushing into place with an arbor press.

Reassembly: Place stator body face down on bench and install the rear stator thrust washer (the front and the rear stator thrust washers are the same), then install the retaining snap ring, making sure that it is fully seated in the groove. *NOTE - Front of the stat r is identified by th word "Front" cast on stator body. Stator van s ar also thicker at the fr nt.* Reverse stator body and key overrun cam to stator body. Assemble cam rollers and springs in overrun cam with open end of springs toward hub. *NOTE - Inc rr ct ass mbly will cause excessive wear between springs and rac .* Coat stator race and Tool J-5390 with a light film of oil, then place stator race on pilot end of loading tool and carefully rotate stator over tapered end of tool and stator race, being careful not to dislodge rollers. Install front stator thrust washer and retain with cam retaining snap ring. Check operation of stator which should free wheel in clockwise direction (when viewed from fr nt) and lock up in a counter-clockwise direction. Place converter pump on bench and install thrust washer on converter hub, making sure tabs are engaged in notches of hub flange. Install stator assembly with front toward converter pump cover, then install thrust washer on turbine hub and and assemble turbine to converter pump. Install a new "O" ring seal on converter cover, then align blue stripe on converter cover with blue stripe on converter pump and install cover. Install attaching bolts and locknuts and tighten to 20-25 ft. lbs.

CLUTCH: Disass mbly - Remove clutch flange retainer ring and flange, then remove low sun gear and clutch flange assembly from clutch drum. Remove clutch hub thrust washer, hub, and clutch plates from clutch drum. Place clutch drum in arbor press and install piston spring compressor J-5133 to compress clutch release spring. Remove clutch spring snap ring, then release pressure slowly and remove clutch spring seat and spring. Rap clutch drum, face down on wood surface to remove clutch piston. Remove piston outer ring seal



CLUTCH DRUM ASSEMBLY



MULTIPLE DISC CLUTCH

from piston and inner seal from hub of clutch drum.

Inspection: Wash all parts in solvent and blow dry with air. Inspect brake drum surface for excessive wear, scoring or burning. Check drum bushing for scoring or excessive wear. Check steel ball in clutch drum drum that acts as a relief valve. Make sure ball is free and that orifice leading to front of drum is open. Check fit of clutch flange in drum slots. There should be no appreciable radial play between these two parts. Check low sun gear for nicks or burrs. Check clutch plates for burring, pitting, or metal pickup. Check to see that composition plates are a free fit over clutch hub and that steel plates are a free fit in clutch flange. Check for excessive wear on friction facing of drive plate teeth, and for interference of teeth and spring. If clutch relief valve check ball in clutch drum is loose enough to come out or not loose enough to rattle, replace clutch drum as an assembly. *CAUTION - Replacement or restaking of ball should not be attempted.* If new clutch plates are required, make sure they are the new design identified by a green dye stripe. New drive (faced) plates are waved and the steel driven plates are flat. **Do not mix new waved face plates with the steel reaction plates used in past model transmission.**

Reassembly: Install new piston outer ring seal on clutch piston being careful not to stretch seal (lip of seal should be installed so it is toward pressure side of piston). Install new piston inner ring seal on inner hub of clutch drum with lip of seal toward bottom of piston pocket. Place a small amount of transmission fluid on inner diameter of clutch drum and onto seals, then carefully install piston into clutch drum using a piece of feeler stock to insure seating of outer ring seal in drum. Install clutch spring and seat, then place entire unit in an arbor press. Use Tool J-5133 and compress spring and install snap ring. *CAUTION - When compressing spring, be careful spring seat does not hang up in snap ring groove, causing damage to spring seat and groove.* Place clutch hub with thrust washer on clutch flange with open side of clutch hub upward, then install five steel and four composition plates alternately, starting with a steel plate. Assemble clutch drum over clutch flange, then invert and install clutch flange retainer and retainer ring. Check endplay with a feeler gauge between clutch flange drive lug and drive slot in drum. Maximum endplay is .013". *NOTE - Retainer rings are available in thicknesses of .055", .064", .073" to control endplay of sun gear and clutch flange assembly in clutch drum.*

SERVO COVER: Disass mbly - Remove pressure regulator reverse booster valve only.

Inspecti n: Wash all parts in solvent and blow dry with air, making sure that all the passages are blown out and are open. Inspect cover for nicks or cracks which might result in leakage. Use a small punch or similar tool, then, working through opening in bypass disc seat, exert pressure on lubrication bypass disc to make sure disc and spring are free to operate. Check disc for seating properly on its seat. *NOTE - Do not remove seat unless there is evidence of damag .* Inspect pressure regulator reverse booster valve for free operation in bore of booster valve sleeve. *CAUTION - Do not push down on booster valve sleeve as sleeve has been properly located by servo cover l - cating sleeve.*

Reverse Booster Valve & Sleeve Replacement: If valve is stuck tight in sleeve, apply air pressure to modulator passage (this may or may not blow out sleeve along with valve). To remove sleeve, form a hook end on a piece of 3/32" rod and insert hook into feed hole in large diameter bore. *CAUTION - This operation will damaged bore of sleeve and sleeve should not be reused.* Remove booster sleeve limit spring with needle nose pliers, and discard. Place a new limit spring in bottom of servo cover bore with wide tabs seating on bottom of bore. Install "O" rings on new booster valve sleeve and push into bore so that end of sleeve is 13/32" below finished face of servo cover. *CAUTION - Do not push sleeve in beyond 13/32".*

Reassembly: Install reverse booster valve.

LUBRICATION BYPASS VALVE ASSEMBLY REPLACEMENT: Use a suitable tool and remove steel bypass disc seat, then remove disc and spring. Inspect bypass disc for burrs or damage, and spring for distortion or damage. Inspect walls of bypass cavity for roughness, nicks, or burrs. Also make sure that bypass spring seats properly in bottom of cavity. Insert bypass disc in its cavity to make sure its movement is not restricted, then remove disc from cavity. *NOTE - If either disc or spring are damaged, replace as necessary.* Install bypass disc spring in its cavity in servo cover, then install disc. With servo cover inner surface facing upward, position a new bypass disc seat over its opening in cavity and press into place using a socket of proper size. *NOTE - It should be flush to .005" below inner surface of cover. Under no circumstances should old bypass disc be reinstalled.*

FRONT PUMP: Disassembly - Remove stator support from pump body, then remove pump gears, being careful not to damage them. These gears are not heat treated. Remove "O" ring seal from pump body.

Inspection: Wash all parts in solvent and blow out all passages. Inspect all parts for nicks, scoring or other damage. If necessary to replace seal, pry it out and replace using Tool J-6839 to drive new seal

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

into position. Be sure stamped steel plug is properly installed in drill hole in edge of stator support *(see "Front Pump" illustration)*. When properly installed, plug will allow oil flow from hole in rear face of stator support toward hub. Inspect pump body bushing for galling or scoring. Check clearance between pump body bushing and converter pump hub. Maximum clearance should be .005". With all parts clean and dry, install pump gears and check clearance between outer diameter of driven gear and body. This clearance should be .0035-.0065". Check clearance between inner diameter of driven gear and crescent which should be .003-.009". With a scale placed across gears and pump body, check clearance between scale and gears. Clearance should be .0005-.0015".

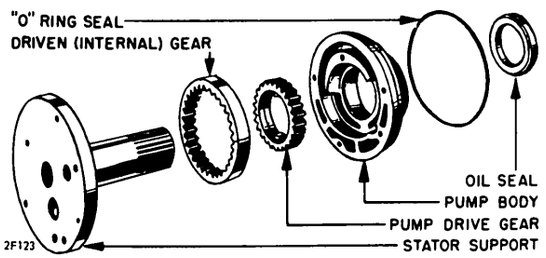
Reassembly: Install new "O" ring seal in pump body, then remove gears from body, lubricate with transmission fluid and reinstall. Assemble stator support through drive gear, aligning attaching holes.

FRONT PUMP SEAL REPLACEMENT: With transmission installed in holding fixture and converter removed, screw Tool J-6793 into bore of old seal and pull seal by driving outward with a sliding hammer. Lightly hone any burrs that may exist in front pump bore, then position new front pump seal in bore and drive it into position with Tool J-6839. *NOTE - Outer diameter of seal should be coated with a non-hardening sealer before installation.*

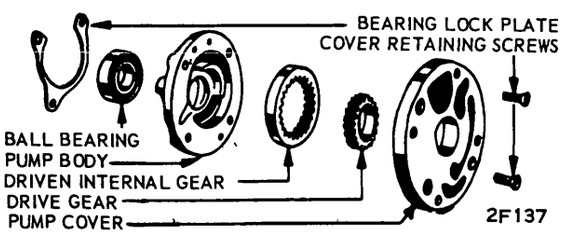
REAR PUMP: Disassembly - Remove pump body plate and lubrication hole pin from pump body.

Inspection: Same as for front pump (see above).

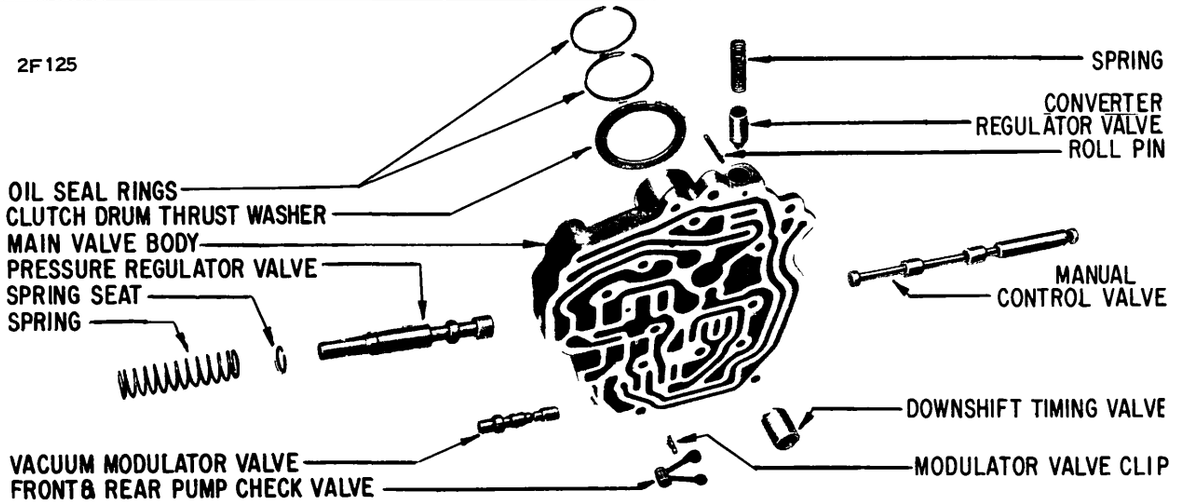
Reassembly: Lubricate gears with transmission fluid and install in pump body, then install lubrication pin in body with headed end toward body plate. *CAUTION - Make sure this pin is properly installed. If omitted, leaks may result because of over-lubrication.* Install pump body plate and tighten screws to 3½-5 lbs.



FRONT PUMP ASSEMBLY



REAR OIL PUMP



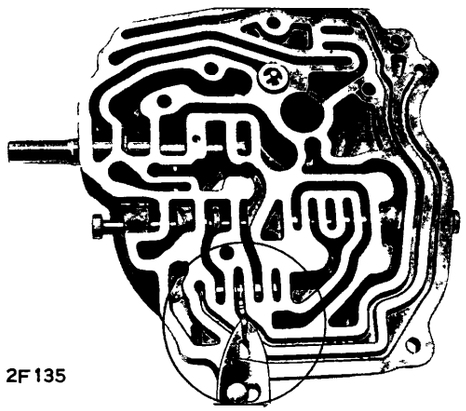
MAIN CONTROL VALVE ASSEMBLY

MAIN VALVE BODY: Disassembly - Use needle nose pliers and remove hairpin retainer from vacuum modulator valve, then remove valve from body. Place valve body assembly face down on two blocks of equal thickness, then drive out converter pressure regulator valve retaining pin and remove valve and spring from bore. Remove two clutch drum oil seal rings from oil delivery sleeve. Remove front and rear oil pump check valve from valve body. *NOTE - Downshift timing valve must not be removed unless replacement is necessary as indicated by poor "coast" downshift. Make sure all linkage adjustments are correct before downshift timing valve is considered faulty.* Remove manual control valve.

Inspection: Wash all parts in solvent, air dry, and blow out all passages. *CAUTION - Make sure that drilling immediately below vacuum modulator valve is plugged with a stamped metal plug.* Check all valves for nicks, burrs, scoring, galling or other damage and make sure valves move freely in respective bores. Check springs for distortion or damage. Check oil seal rings for nicks and burrs and for freeness in ring grooves. Install rings in clutch drum bore and make sure hooked ring ends have clearance.

Downshift Timing Valve Replacement: Pry out old valve assembly with a small pin punch being careful not to damage bore in valve body. Use an arbor press and a 7/16" socket and press new downshift timing valve into valve body until tip on check ball end of valve assembly is flush to .015" below surface of valve body.

Reassembly: Place valve body face down on wood blocks, then assemble converter pressure regulator valve spring in valve. Install this assembly in valve body and install retaining pin. Install manual valve, then install vacuum modulator valve and attach retaining clip in valve groove. Install spring clip on pressure regulator valve and insert valve into bore in valve body. Install front and rear oil pump check valve in valve body, making sure it is flush with or below valve body face. Install the two clutch drum oil seal rings in ring grooves of oil delivery sleeve.



VACUUM MODULATOR VALVE CLIP LOCATION

LOW & DRIVE VALVE BODY: *DO NOT disturb or tamper with throttle valve inner l ver adjustm nt unl ss it is necessary to install new parts that would aff ct this adjustment. See "Throttl Valve Inn r Lev r Adjustment" below, if adjustment is n c ssary.*

Disassembly: Remove valve body from side cover (hold valve body in one hand and with a soft faced hammer, tap in inner side of cover until it is free of locating pins). *CAUTION - Exert pr ssur n det nt valv wh n separating valve body fr m c v r t pr v nt loss or damage of parts.* Remove detent valve, spring, spring seat and throttle valve spring regulator assembly. Remove throttle valve retainer clip, then remove throttle valve and spring. Use special snap ring pliers, Tool J-5403, and remove low and drive regulator cap retainer. Remove low and drive regulator valve cap, sleeve, and valve as an assembly, low and drive valve inner and outer springs, and low and drive valve. Remove low and drive body end plate and gasket. Remove throttle valve control outer lever assembly, then remove

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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

throttle valve lever shaft shield and throttle valve inner lever assembly. Remove throttle valve lever shaft seal from counterbore in cover.

Insp ctI n: Inspect all valves, seats, and parts for nicks, burrs, scoring or damage. Make sure all valves operate freely in their respective bores. Check all springs for distortion or damage. Inspect throttle valve inner lever assembly shaft for galling and lever for tightness on shaft. Check shaft for freeness in bore in side cover. If detent valve stop in cover is distorted or damaged, replace with a new stop. Replace locating pins in valve body if distorted or damaged. *NOTE - One locating pin should b in valve body and the other in sid c v r.* Inspect mating surfaces for nicks or burrs.

R assembly: Install low and drive valve in valve body bore. *CAUTION - L w and drive valve must be guided into its b r in valv body to prevent damage to bore as foll ws: Ins rt a pi c f brake tubing into valve shank bore in r ar f valv b dy, engaging protrusion on end f shank in pening in tube, then slowly move valve into its prop r position.* Install low and drive regulator inner and outer springs in valve body bore, then assemble low and drive regulator valve and cap to low and drive regulator valve sleeve. Install this assembly in valve body bore, making sure that inner spring is properly seated on seat of low and drive regulator sleeve. Compress low and drive valve assembly into valve body bore and install retainer, using Tool J-5403, so it is properly seated in groove of bore. Install throttle valve spring and valve in valve body bore, then install throttle valve clip. *NOTE - This clip prev nts vertrav l f thr ttle valve.* Install low and drive body end plate and gasket and tighten screws to 1½-2½ ft. lbs. Install throttle valve spring regulator assembly in valve body bore and make sure it is seated on throttle valve spring. Install detent valve spring and detent valve in valve body bore, threading pin of throttle valve spring regulator assembly through opening in detent valve. Place side cover in vise, face up and align locating pin hole in low and drive body assembly and locating pin in side cover. Exert pres-pressure on valve body to keep locating pin in locating hole, and at the same time compress detent valve into valve body bore. Rotate valve body counterclockwise until locating pin in valve body enters locating hole in side cover. *CAUTION - Be sure face of det nt valv is r sting against detent valve stop pin in sid cov r.* Install low and drive body attaching bolts and lockwashers and tighten to 3½-5 ft. lbs. Install throttle valve inner lever assembly to side cover, then install new seal over shaft and into counterbore in cover. Install shield, then install throttle valve control outer lever assembly on inner lever shaft. From the underside, install outer lever attaching bolt and tighten securely.

THROTTLE VALVE INNER LEVER ADJUSTMENT: Rotate throttle valve inner lever until it just contacts face of detent valve, then hold lever in this position and turn adjusting screw until it just contacts flat surface of step in lever. **Back ff one c mpl t turn and tight n l cknut secur ly.**

GOVERNOR: *NOTE - Exc pt f r driv g ar, g v rnor ass mbly is furnish d only as a compl t unit. If n c s-sary to disassemble for cleaning, proceed as follows:*

Disassembly: Cut off one end of each governor weight pin, then remove pins, governor thrust cap, governor weight assemblies and governor valve from governor sleeve.

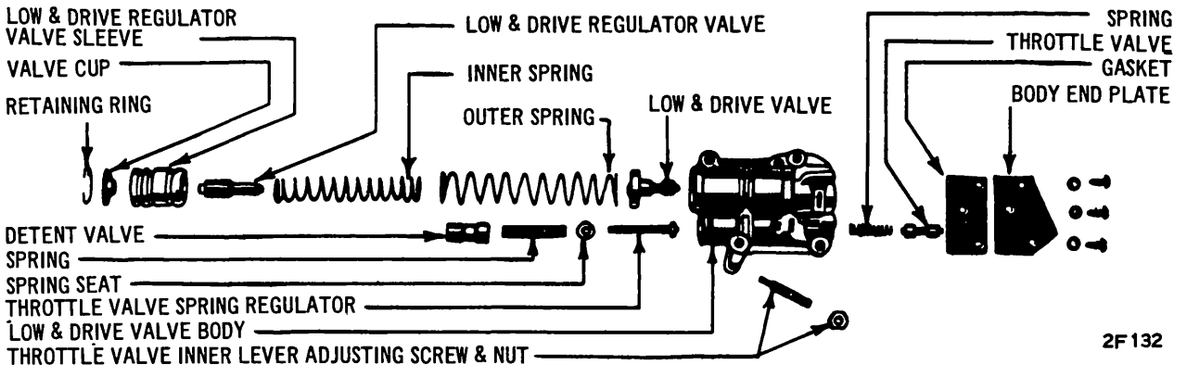
Inspection: Inspect governor sleeve, valve, and gear for nicks, burrs, scoring, or damage. Check sleeve and valve for free operation in bores. Check drive gear for looseness on sleeve and governor weight for distortion or damage. Check weights for free operation in their retainers but do not disassemble weights. Check valve opening at entry and exhaust (.020" minimum). Bend tangs on governor weights as necessary.

Governor Driven Gear Replacement - With governor weights and valve removed (see above), drive out governor gear retainer split pin with a small punch. Support governor on 3/16" plates installed in exhaust slots of governor sleeve, then place in an arbor press and use a long punch to press gear out of sleeve. To install, clean out any chips in governor sleeve, then support governor (gear end of sleeve upward) on 3/16" plates installed in slots of sleeve. Position new gear in sleeve and with a suitable socket, press gear into sleeve until nearly seated, then carefully remove any chips that might have shaved off gear hub and press gear in until it bottoms on shoulder. *CAUTION - A socket must be used to prevent damage to thrust button on end of gear.* While supporting governor in arbor press, use a No. 24 (.152") drill and drill a new hole 90° from existing hole (through sleeve and gear). Wash governor assembly thoroughly to remove any chips.

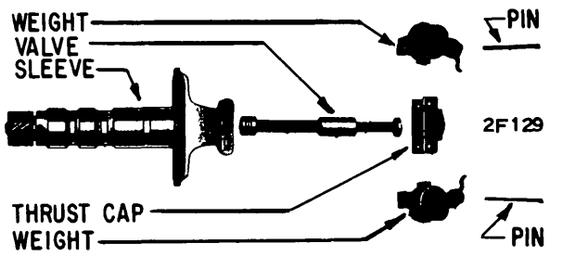
Reassembly: Install governor valve in bore of sleeve, then align governor weight pin holes in thrust cap, weight assemblies, and sleeve and install new pins. Crimp both ends of pins and check weight assemblies for free operation on pins.

REVERSE SERVO & LOW SERVO PISTONS: Remove reverse servo piston ring from piston and install in reverse piston bore. Check ring gap which should be .005-.010". If gap is greater, replace ring. Assemble reverse servo piston ring on piston. Remove and check low servo piston ring in same manner. Install ring on low servo piston and insert feeler gauge between side of ring and one wall of groove. Clearance should be .0005-.005".

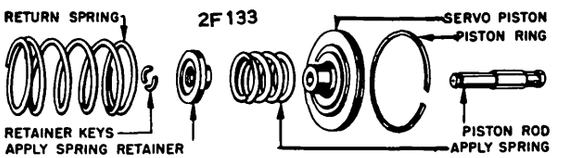
PLANET ASSEMBLY & INPUT SHAFT: *NOTE - Do not disass mbl unl ss insp ction indicates videnc of w ar r damag .*



LOW & DRIVE VALVE BODY ASSEMBLY



GOVERNOR ASSEMBLY



REVERSE SERVO PISTON ASSEMBLY

Inspection: Inspect reverse brake drum outer diameter for scoring or burning. Check internal gear for tooth damage and drum hub bushing for scoring or damage. Inspect planet pinion for nicks or other tooth damage, then check end clearance of all planet pinions which should be .006-.030". Check input sun gear for tooth damage and rear thrust washer for wear or damage. Inspect output shaft bearing surface for nicks or scoring and inspect input pilot bushing. Inspect input shaft splines for nicks or damage and check fit in clutch hub and reverse sun gear. Check fit of splines in turbine hub. Check oil seal rings for damage. Rings must be free in input shaft ring groove. Remove ring and insert in valve body bore and check to see that hooked ends have clearance. Replace ring on shaft.

Disassembly: Place planet carrier assembly in a vise so that parking lock gear end faces upward, then use a prick punch and mark each pinion shaft and planet carrier assembly for installation of parts in same location. Remove pinion shaft lock plate screws and rotate lock plate counterclockwise to remove it. Starting with a short pinion, and using a short steel drift, drive on lower end of pinion shaft until shaft is raised above

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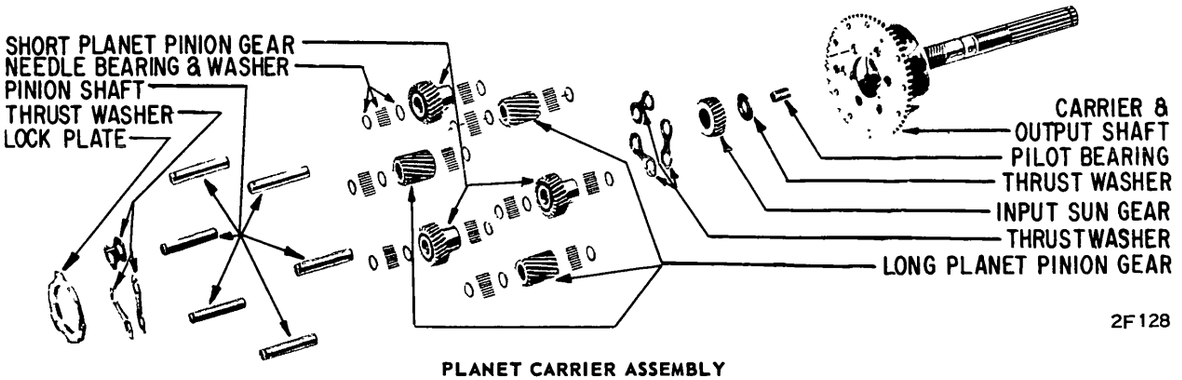
CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

press fit area of output shaft flange. Feed Tool J-4599 into short planet pinion from lower end, pushing planet pinion shaft ahead of it until tool is centered in pinion and pinion shaft is removed from the assembly. Remove short planet pinion, tool, needle bearings and spacers. *CAUTION - Do not lose needle bearings. Twenty bearings are used in each end of pinion and are separated by a spacer.* Remove long planet pinion adjacent to removed short pinion in same manner. Repeat the above procedure for removal of remaining pinions. Remove input sun gear and thrust washer.

R assembly: *NOTE - Before reassembly, inspect needle bearings and replace all bearings if wear or damge is indicated. Inspect input shaft pilot roller bearing installed in base of output shaft. If damaged, pry out and r place, using pilot end of input shaft as a press tool.* Use Tool J-4599 and assemble needle bearing spacer and needle bearings (twenty at each end) in a long planet pinion, using cup grease to hold needle bearings in position. Position long planet pinion, with Tool J-4599 centered in pinion assembly and with thrust washers at each end, in planet carrier. *NOTE - Oil grooves in thrust washers must be toward gears. Long planet pinions are located opposite closed portions of carrier, while short planet pinions are located in openings.* Feed second Tool J-4599 in from top, picking up the upper thrust washer and planet pinion and pushing the first Tool J-4599 out lower end. As first tool is pushed down, check to make sure it picks up lower thrust washer. Select proper pinion shaft (as marked at disassembly), then lubricate shaft and install it from top, pushing Tool J-4599 ahead of it. Turn pinion shaft so slot or groove at upper end faces center of assembly. With a brass or soft drift, drive pinion shaft until lower end is flush with lower face of planet carrier. Follow the above reassembly procedure and assemble and install a short planet pinion adjacent to the installed long pinion. *NOTE - Thrust washers already installed with long pinion also suffice for this short pinion as both pinions are paired together on one set of thrust washers.* Install input sun gear thrust washer and input sun gear. Assemble and install remaining planet pinions in pairs, by installing long pinion and then adjacent short pinion. Check end clearance of planet gears which should be .006-.030". Place pinion shaft-lock plate in position, then with extended portions of lock plate aligned with slots in pinion shafts, rotate lock plate clockwise until three attaching screw holes are accessible. Install attaching screws and tighten to 2½-3 ft. lbs.

TRANSMISSION CASE & REAR BUSHING: Check case for cracks and inspect rear bushing for wear or damage. Replace bushing if necessary.

Bushing Replacement: Place transmission case in an arbor press with rear of case upward, then use a cape chisel to cut bushing and remove from case. Install rear bearing in its bore in rear oil pump assembly and install rear pump in case to serve as a pilot when installing new bushing. Place transmission case in an arbor press with front of case upward, then place a new bushing on Tool J-7559, with square end of bushing against shoulder of tool. Insert in case, entering pilot of tool in rear bearing, and press bushing into place.



PLANET CARRIER ASSEMBLY

TRANSMISSION EXTENSION HOUSING: Check housing for cracks and inspect rear bushing for wear or damage. Replace bushing if necessary.

Bushing Replacement: With extension housing in an arbor press with rear of case upward, press old bushing out with Tool J-5778. Place a new bushing on pilot end of Tool J-5778 and press bushing into place.

LOW & REVERSE BRAKE BANDS: Inspect bands for wear, cracks, and scored or burned lining. Inspect linkage for wear. Replace parts as required.

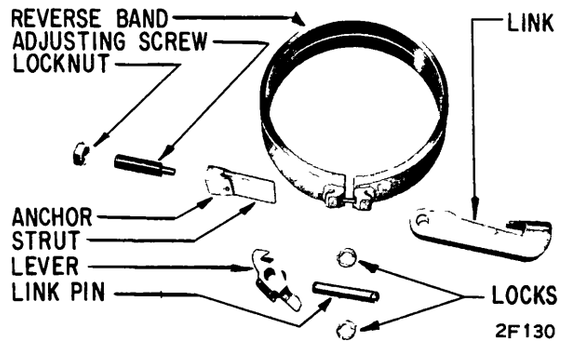
TRANSMISSION & CONVERTER HOUSING REASSEMBLY

TRANSMISSION: Rear Oil Pump - Install two 5/16" - 18 x 3" guide pins (part of Tool J-3387) in pump attaching bolt holes, then place a new gasket over guide pins and install pump. Align suction and delivery holes, install bolts and tighten to 12½-15 ft. lbs.

Lubrication Pressure Relief Valve: Clean valve and make sure openings are not obstructed and that valve disc and spring operate freely. Install valve in mounting hole in rear of transmission case and tighten securely.

Reverse Servo Piston, Band & Drum: Compress piston ring with Compressor, Tool J-3365, then install servo piston in case with notch in shaft toward front of case. Install reverse band and lever assembly, then install anchor and strut assembly and thread adjusting screw in until it indexes with hole in anchor. Install thrust washer on hub of reverse drum and install drum into case and reverse band.

Planet Carrier: Rotate rear pump drive slot to top of pump, then fill drive pin hole in output shaft of planet carrier assembly with cup grease and install drive pin. *CAUTION - Make sure drive pin does not fall out of shaft during assembly.* Install planet carrier assembly including steel thrust washer on shaft in drum, positioning the "O" stamped on face of output shaft of planet carrier assembly at top center. *NOTE - This aligns drive pin in output shaft with drive slot in internal gear of rear pump.* Install rear bearing locating front snap ring in groove in output shaft, then install rear bearing assembly, using Tool J-5814. *NOTE - Groove in outer diameter of rear bearing should be to r ar of transmission.* Install rear bearing retainer in groove in outer diameter of rear bearing and attach to rear oil pump, then tighten screws to 9-11 ft. lbs. Install rear bearing rear snap ring in its groove in output



REVERSE BAND ASSEMBLY

shaft. Use Tool J-5814 and install speedometer gear on output shaft, centering gear on raised ground surface of shaft so it will mesh properly with speedometer driven gear. Install a new "O" ring seal on speedometer driven gear fitting, then assemble gear in fitting and install the assembly in extension housing. Tighten retainer attaching screw to 3½-5 ft. lbs. Position a new "O" ring seal on extension housing, then install extension housing on transmission case. Tighten attaching screws to 15-18½ ft. lbs. Install transmission extension oil seal with Tool J-5154.

Reverse Band Adjustment: Adjust reverse band at this point. See *BAND ADJUSTMENT* above.

Transmission Endplay Check & Adjustment: *NOTE - The gauging procedure is new and r quir s the r work of Tool J-4260 as follows: Pr ss low sun g ar pilot pins from tool bar, then remove spring and spring r tainer from gauge rod. Install a steel ball (similar to Rochester Carburetor pump outlet check ball) under end of gauge rod setscrew in tool bar. Slide gaug collar (J-4260-15) onto gauge rod between tool bar and knurl d end of rod* Hold the tool bar solidly across the front face of transmission case and push gauge rod into firm contact with the front face of the input sun gear, then tighten setscrew in tool bar to lock gauge rod. Slide gauging collar down rod until it seats on tool bar. Securely tighten collar thumbscrew against rod and remove tool with setting retained. *NOTE - The above tool setting was obtained without low sun gear washer positioned*

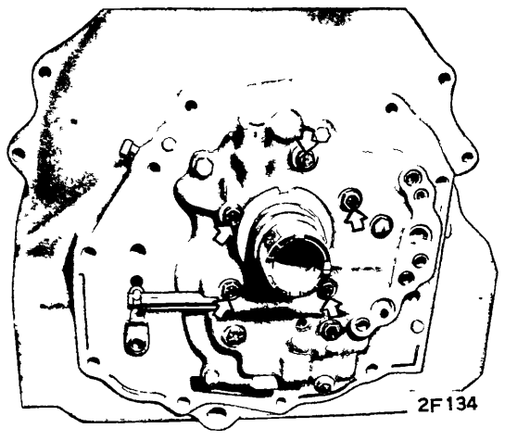
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CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

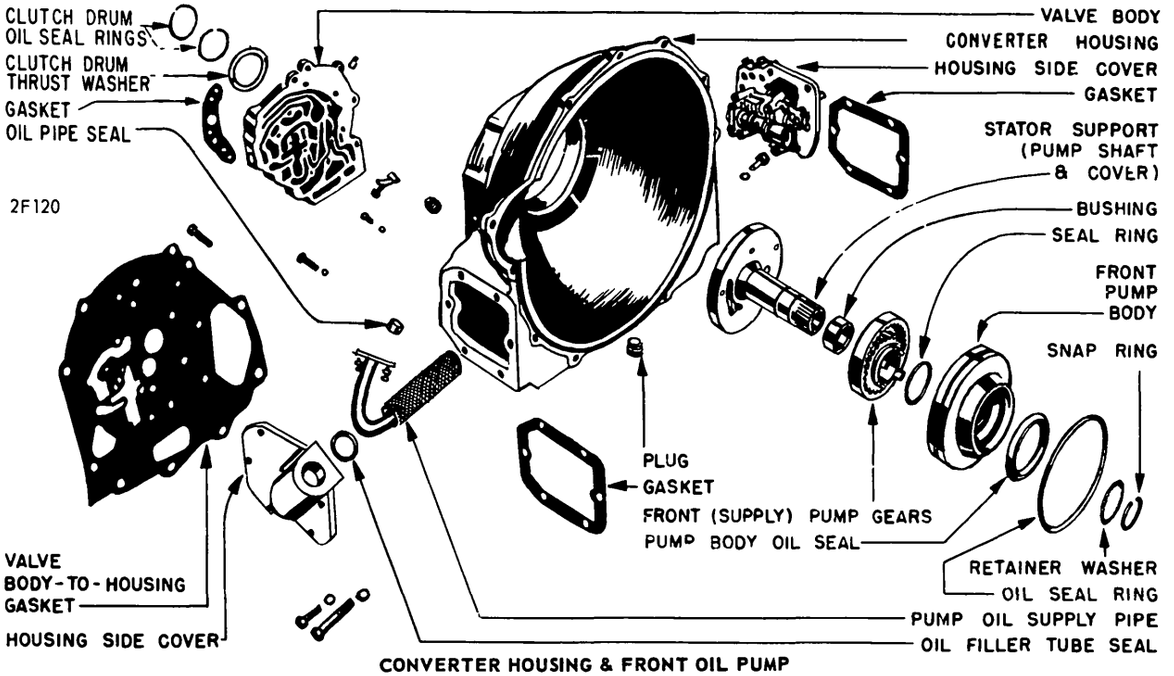
against input sun g ar. Place transmission main valve body assembly on a sheet of glass or a smooth table top, then install a clutch drum thrust washer on valve body and lower clutch assembly onto stack. Center low sun gear thrust washer on top of low sun gear. *NOTE - If low sun g ar is flang d type, insert washer flange in inn r diam t r f low sun gear.* Place pre-set Tool J-4260 on top of low sun gear thrust washer, with gauge rod down through center of clutch and valve body so rod end rests on glass or table top. Loosen setscrew in tool bar and allow bar to drop onto low sun gear thrust washer. Use a feeler gauge and measure clearance between top side of bar and bottom face of gauging collar. This dimension represents clearance in transmission and should be .025-.050". If clearance is not within limits, substitute a new clutch drum thrust washer of proper thickness to bring clearance within limits. Clutch drum thrust washers are available in thicknesses of .061", .078", .106". After proper thrust washer has been obtained, remove clutch assembly and thrust washer from oil delivery sleeve.

Parking L ck Mechanism: Install parking lock lever shaft and apply spring assembly in case, then install small lip seal over end of parking lock lever shaft and into counterbore of case with lip of seal toward inside of case. Install flat washer and parking lock lever on end of parking lock lever shaft, pushing lever onto shaft to obtain .000-.010" clearance between lever and washer. Connect short manual shift rod to parking lock lever and tighten clamp screw to 5-7 ft. lbs. Install parking lock pawl over pawl support rod and install parking lock pawl spring. Wind up pawl spring with Tool J-3383, so that spring catches on inside of case.

C nv rter Housing: Install two ¼" - 20 x 3½" guide pins (part of Tool J-3387) in valve body attaching holes in converter housing, then install oil baffle and sump screen. Install a new valve body gasket on converter housing, then install valve body over guide pins and tighten attaching bolts to 7½-10 ft. lbs. (see illustration for attaching bolts which are indicated by **absence of arrows**). *NOTE - L w r left bolt directly over manual valve bore is a self-locking bolt. Make sure this bolt is in proper position.* Tighten all bolts in a criss-cross manner, then check for free operation of manual and pressure regulator valve. Align holes in stator support assembly with holes in front oil pump body and install two ¼" - 20 x 3½" guide pins (part of Tool J-3387) in front pump, then install pump to converter housing with Tool J-4263-2. *NOTE - When installing pump. line up suction and delivery holes on left side of pump.* Install five bolts through valve body and into pump and tighten to 7½-10 ft. lbs. (see illustration for attaching bolts which are indicated by **arrows**). *CAUTION - After tightening bolts, check pressure regulator and manual valve for free operation.* Check and make sure front oil pump operates freely. Install two 5/16" - 18 x 3" guide pins (part of Tool J-3387) in converter housing as guides for low and drive valve body, then install new gasket. Install low and drive valve body over guide pins and tighten bolts and lockwashers to 15-18½ ft. lbs.



MAIN CONTROL VALVE BODY ATTACHING BOLTS

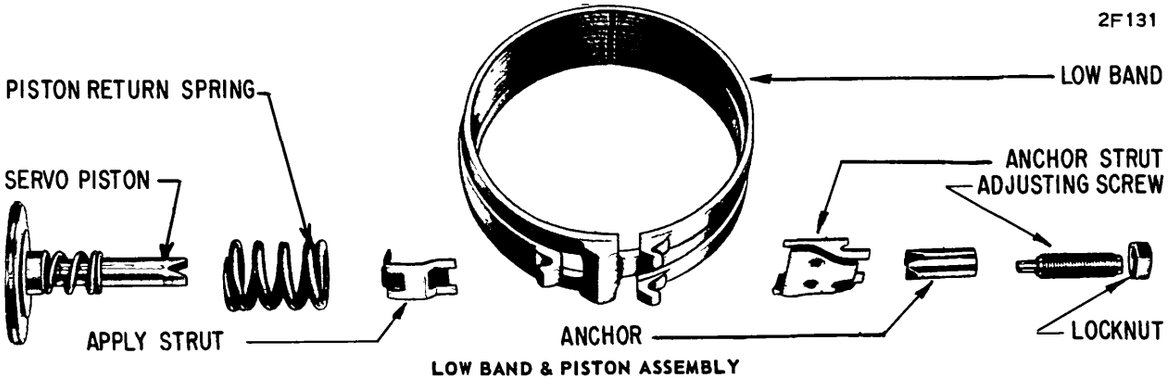


CONVERTER HOUSING & FRONT OIL PUMP

Input Shaft & Clutch Assembly: Install input shaft to clutch unit, then install low sun gear bushing on input shaft spline, bottoming bushing against shoulder on shaft. Assemble low sun gear thrust washer into planet carrier by tilting washer slightly to permit flange to enter behind short planet pinions. If necessary, retain washer in position with petroleum jelly. Install clutch and input shaft assembly into case, aligning thrust washer on input shaft and indexing low sun gear with short pinions in planet carrier.

Low Servo Piston & Band Assembly: Install low servo piston release spring on servo piston rod and install piston and spring into case using ring compressor,

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LOW BAND & PISTON ASSEMBLY

CHEVROLET (CAST IRON) POWERGLIDE (C ntinu d)

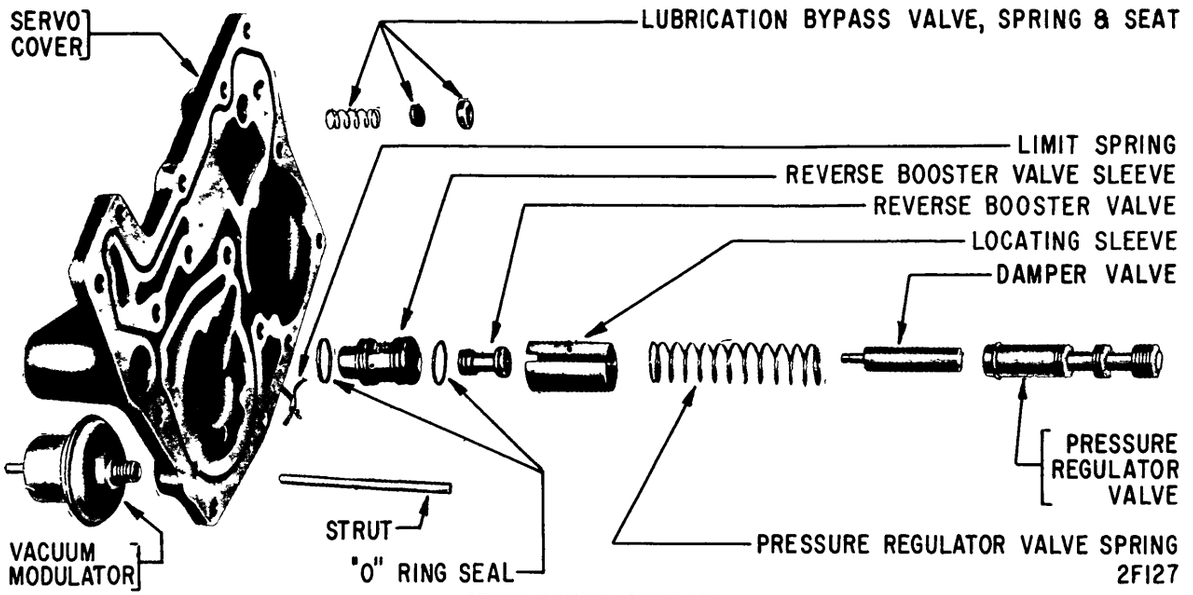
Tool J-3365, then install low brake band over clutch drum. Place apply strut in piston shaft slot with other end of apply strut engaging brake band. Place brake band anchor strut assembly in brake band groove, then engage slotted end of anchor over strut, locating other end of anchor over adjusting screw. *NOTE - Do not adjust band at this point.*

Governor: Install governor assembly in bore in transmission case, allowing it to rotate in a counterclockwise direction as driven gear of governor meshes with drive gear of output shaft. Be careful not to damage gear teeth. Install two 5/16" - 18 x 3" guide pins (part of Tool J-3387) as guides for g overnor cover and install a new gasket. Install governor cover over guide pins and tighten attaching bolts to 9-11 ft. lbs.

Transmission-to-Converter Housing Assembly: 1) Install manual valve in valve body and manual valve inner lever in converter housing, indexing lever pin with pickup slot in valve. Set manual valve so end of valve protruces 1 11/16" from face of valve body (this places valve in "Low" position). Install a new valve body-to-case gasket.

2) Raise transmission manual lever to top detent position ("Low" position) to align reaction lever so it will index with manual valve inner lever. Place clutch drum thrust washer over oil delivery sleeve, then install two 3/8" - 16 x 3 3/4" guide pins (part of Tool J-3387) in converter housing. Push transmission case and converter housing together, checking to see that reaction lever indexes with manual valve inner lever, then install case-to-housing bolts and lockwashers and tighten to 29-37½ ft. lbs.

3) From front of converter housing, install special self-locking bolt and tighten to 29-37½ ft. lbs. Install two 5/16" - 18 x 3" guide studs (part of Tool J-3387) as guides for servo cover, then install a new servo cover gasket. Install servo cover locating sleeve in bore of servo cover. *CAUTION - Do not exert any downward force on reverse booster valve sleeve.* 4) Install pressure regulator valve and spring, and reverse servo return spring. Install servo cover on guide pins, then applying pressure to cover to compress springs, make sure locating sleeve is in alignment with pressure regulator valve bore. Secure cover with bolts and lockwashers but do not tighten. *NOTE - Use a non-hardening sealer under head of bolt installed directly above vacuum modulator.*



SERVO COVER ASSEMBLY

5) Before servo cover attaching bolts are tightened, vacuum modulator hole in servo cover and the through hole in transmission case must be aligned. *CAUTION - Failure to install servo cover with these holes concentric to each other causes vacuum modulator strut to bind, resulting in improper pressures, harsh shifts, and possible clutch failure.* To properly align servo cover, proceed as follows:

6) Use a defective vacuum modulator which has been separated at diaphragm and screw the threaded half into modulator hole in servo cover. Slide a standard 15/64" drill through both modulator hole and strut holes in case. Drill should slide freely through both holes if alignment is correct; otherwise shift by tapping laterally or vertically on edges of servo cover with a soft hammer. When alignment is correct, tighten all servo cover bolts to 15-18½ ft. lbs., then remove vacuum modulator half-body and 15/64" drill. Install strut and modulator. *CAUTION - B sur pr ssur r gulat r valve spring and reverse serv r turn spring s at prop r-ly in their locations in servo c v r.*

7) Adjust low servo *(see "Band Adjustment" abov)*, then install c nverter assembly in converter housing, aligning from pump drive gear lugs with drive slots in converter pump hub. *CAUTION - Aft r conv rter is installed, check to insure ngag m nt of c nv rt r pump hub drive slots in lugs f front pump driv gear by measuring from front fac f c nvert r-to-flywhe l attaching bracket to bolt circl flang f conv rt r housing. This distance should b 9/16" r l ss.* Install converter holding tool J-5384 on converter housing.

TRANSMISSION INSTALLATION

INSTALLATION: Reverse transmission removal procedure and note the following: Install exactly the same number (and thickness) of shims between extension mounting boss and crossmember as were removed. *NOTE - These shims maintain corr ct drive lin angl .* Fill transmission and adjust linkage.

CHEVROLET (ALUMINUM) POWERGLIDE

Chevr let Pass. Cars, 327" Eng. (1962)
Chevy II, 4 & 6 Cyl. (1962)
C rvette (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 ENGINE SPEED INCREASE OR RUNAWAY AT HIGHER SPEED NOTE:* This condition which could occur during upshifts or forced downshifts may be caused by low oil level, improper band adjustment or a stuck vacuum modulator valve. If this condition is diagnosed as low oil level on early cars, check for correct transmission fluid dipstick (see below).

►*1962 TRANSMISSION FLUID LEVEL DIPSTICK PRODUCTION CHANGE & FLUID LEVEL NOTE:* A new dipstick, Part No. 3818930 (Chev. Pass. & Chevy II); No. 3818931 (Corvette), identified by a formed "bridge" (to keep it centered in filler tube) is used in production and for service replacement. The new dipstick has the "Full" mark located approximately ½" higher than on earlier dipstick. Replace with later dipstick.

DESCRIPTION: New design 2-speed planetary type transmission with hydraulic control. With transmission selector lever in "D" (Drive), shifting between 1st and 2nd speed is automatic. The transmission case is a one-piece aluminum casting and the torque converter assembly is a welded unit. Two clutch assemblies ("Drive" & "Reverse") are disc type with multiple "coil" release springs. The "Low" band is actuated by a servo unit. The control valve assembly is located at bottom of transmission case and is accessible when oil pan is removed.

LUBRICATION

Ch cking Fluid L v l: Check fluid level every 1,000 miles. With transmission at normal operating temperature, selector lever in "N" (Neutral), fluid level should be at "FULL" mark on dipstick. *NOTE – Periodic draining and r filling of transmission is not required. S e "Draining & R filling" below.*

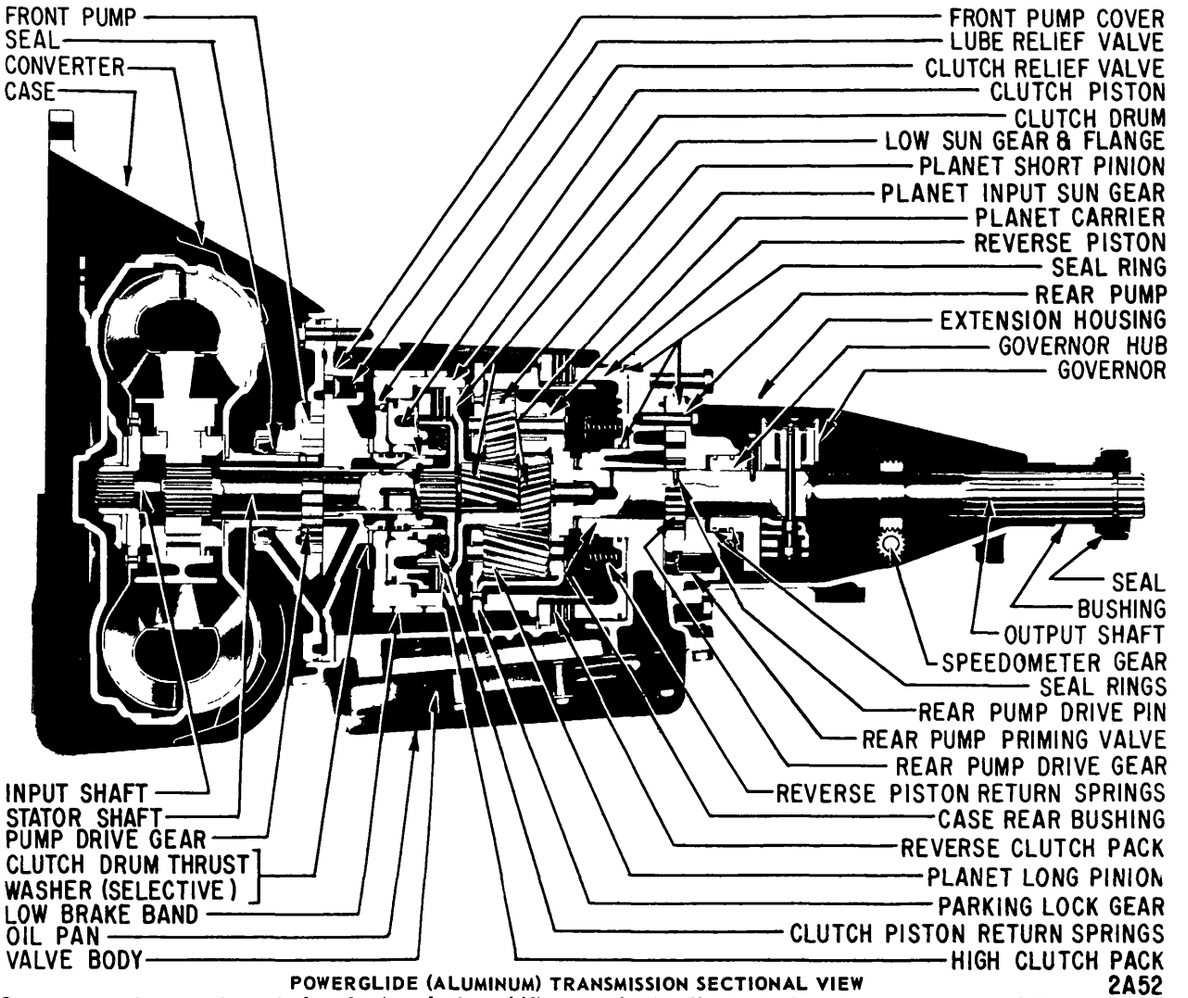
R comm nd d Fluid – Automatic Transmission Fluid Type "A" (Suffix "A").

Draining & R filling: *NOTE – Periodic draining and refilling of transmission is not required.* If necessary to remove transmission for repairs, drain and refill as follows: Carefully loosen oil pan bolts and drop one end of pan so fluid will drain out. To refill transmission, remove dipstick and pour in sufficient fluid to bring level up to "Full" mark on dipstick. Start engine and operate at normal idle speed, then shift transmission selector lever through all ranges. Run engine at 800-1000 RPM with transmission in "N" (Neutral) until fluid warms up, then add fluid as required to raise level to "Full" mark on dipstick. DO NOT OVERFILL. **Capacity –** 1½ qts. (refill after oil pan removed). Total capacity including torque converter is 7½ qts. (Chevy II); 9 qts. (Chev. Pass. Cars & Corvette).

LINKAGE ADJUSTMENT

Throttl Linkage: *See CARBURETOR on car model pages.*

Manual Control Linkage: *NOTE - To check shift linkage for proper adjustment, stop engine and move selector lever to a position where transmission DRIVE detent is felt. Slowly release l ver to fe l if shaft l ver tang freely nt rs lock plate. Ch ck REVERSE d tent in a similar manner. If tang do s not freely enter lock plate in both detents, adjust linkag .*



POWERGLIDE (ALUMINUM) TRANSMISSION SECTIONAL VIEW 2A52

Corvette - Disconnect control rod at selector shift lever, then loosen clevis nut at bellcrank end of rod. Place bellcrank and selector shift lever in PARK position, then adjust control rod at clevis so control freely enters hole in selector shift lever.

Except Corvette - Place selector lever in "D" (Drive) range, then disconnect shift control rod at its swivel attachment on lower end of mast jacket. Place shift lever on transmission in "D" (Drive) position (first detent position clockwise from fully counterclockwise detent position), then hold shift lever at lower end of mast jacket against DRIVE stop of lock plate (with control rod through swivel) and tighten clamp nut. Check transmission selector lever in all ranges.

Neutral Safety Switch (Except Corvette): Place transmission selector lever in "N" (Neutral), then loosen two screws securing neutral safety switch retainer. While holding ignition switch in "Start" position, adjust position of neutral switch until engine turns over. Hold switch in this position and tighten retainer screws. Check adjustment for engine cranking in "N" (Neutral) and "P" (Park). Engine must not start in any other selector lever position.

BAND ADJUSTMENT

►*LOW BAND ADJUSTMENT CAUTION: Low band adjustment is not ordinarily required in service (adjustment is made when transmission is overhauled).* Tighten low servo adjusting screw located on left side of transmission case to **40 inch pounds.** *NOTE – Input and output shafts must be rotated simultaneously to properly center low band on clutch drum.* Back off adjusting screw EXACTLY four complete turns, and tighten locknut.

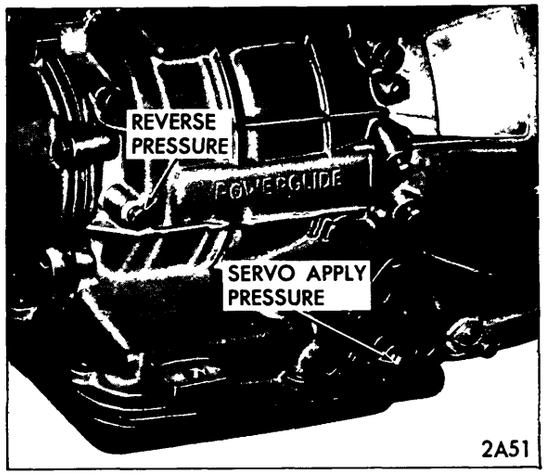
THROTTLE VALVE ADJUSTMENT

►*THROTTLE VALVE ADJUSTING NOTE:* No provision is made for checking throttle valve pressures. However, if operation of transmission is such that some adjustment of throttle valve is indicated, pressures may be

CONTINUED ON NEXT PAGE

CHEVROLET (ALUMINUM) POWERGLIDE (Continu d)

raised or lowered by adjusting the position of the jam nut on throttle valve assembly (on control valve body). To raise throttle valve pressure 3 psi, back off jam nut one full turn. This increases the dimension from jam nut to throttle valve assembly stop. Tightening the jam nut one full turn lowers throttle valve pressure 3 psi. A difference of 3 psi. in throttle valve pressure will cause a change of approximately 2 to 3 MPH in wide open throttle upshift point. Small pressure adjustments can be made by partial turns of jam nut. The



PRESSURE TEST POINTS

end of throttle valve adjusting screw has an Allen head so screw may be held stationary while jam nut is moved. *CAUTION – Use care when making this adjustment since no pressure point is provided to check throttle valve pressure.*

TESTING

PRESSURE TESTS: *CAUTION – Stall tests that allow engine vacuum to drop below 10" Hg. are not recommended.* Connect pressure gauge hoses at low servo apply (main line), and reverse test points (see illustration), then run gauge lines into driving compartment by pushing aside mast jacket seal. Tie lines out of way and connect to gauge set J-4872-4. Test as follows:

Wide Open Throttle Upshift Pressure Test: Wide open throttle upshift should occur at 79-86 lbs. (Chevy II, 4-Cyl.), 92-101 lbs. (Chevy II, 6 Cyl.), 85-95 lbs. (Chevrolet 327" Eng.), as indicated on low servo apply (main line) gauge.

Idle Pressure Table

Engine	Main Line Pressure 10" Hg.	16" Hg.
Chevy II (4-Cyl.)	78-86 psi	61-69 psi
Chevy II (6-Cyl.)	86-96 psi	63-74 psi
Chevrolet 327" Eng	85-95 psi	62-73 psi

►*NOTE: If pressures are not within the above range, check for oil circuit leakage.*

SHIFT SPEEDS (MPH)

THROTTLE POSITION	Chevy II 4-Cyl. Upshift	Chevy II 4-Cyl. Downshift	Chevy II 6-Cyl Upshift	Chevy II 6-Cyl Downshift	Chevrolet ① 327" Eng. Upshift	Chevrolet ① 327" Eng. Downshift	Chevrolet ② 327" Eng. Upshift	Chevrolet ② 327" Eng. Downshift	Corvett ① 327" Eng. Upshift	Corvett ① 327" Eng. Downshift
Closed	10-13	9-12	12-15	10-13	14-16	11.5-15	12-15	10.5-14	12-15	11-14
To Detent	34-43	18-27	38-47	19-30	48-58	17-25	49-60	16-25	50-62	16-26
Through Detent	42-48	39-46	47-53	43-50	59-65	55-63	59-66	56-63	61-68	58-65

① - Std. Eng. with 3.08-1 rear axle ratio. ② - High performance engine with 3.36-1 rear axle ratio.

Idle Pressure in "Drive" Range Test: *NOTE – In addition to pressure gauges, connect a vacuum gauge to engine intake manifold.* With parking brake applied and selector lever in "D" (Drive), low servo apply (main line) pressure should be as indicated in table.

Manual "Low" Range Pressure Test: Connect a tachometer to engine, then apply parking brake and place selector lever in "L" (Low) and adjust engine speed to 1000 RPM, with car stationary. Low servo apply (main line) pressure should be 89-98 lbs. (Chevy II, 4-Cyl.); 126-131 lbs. (Chevy II, 6-Cyl. & Chevrolet 327" Eng.).

►*NOTE: If pressures are not within specified ranges, check for one or more of the following conditions: Partially plugged oil suction screen. Broken or damaged ring in low servo. Pressure regulator valve stuck. Leakage at valve body-to-case gasket. Leak between valve body gaskets. Leak at servo center. Front pump clearances not correct.*

Drive Range Overrun (Coast) Pressure Test: With car coasting in "D" (Drive) range at 20-25 MPH with engine vacuum at approximately 20" Hg., low servo apply (main line) pressure should be 48-54 lbs. (all models).

TROUBLE SHOOTING

ENGINE SPEED FLARES ON STANDSTILL BUT ACCELERATION LAGS: Low band partially applied. Low oil level. Clogged oil suction screen. Improper band adjustment. Servo apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding. *NOTE – This last condition (stator not holding) is a very rare occurance.*

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Improper band adjustment. Clogged oil screen. High clutch partially applied, blocked feed orifice. High clutch plates worn. High clutch seals leak. High clutch piston hung up. High clutch drum relief ball not seating. Vacuum modulator line plugged.

NO UPSHIFT: Low band not releasing because of one or more of the following malfunctions: Stuck low-drive valve. Defective governor. No rear pump output caused by stuck priming valve, sheared drive pin or defective pump. Throttle valve stuck or not adjusted properly. Manual valve lever not adjusted properly.

UPSHIFTS HARSH: Incorrect throttle valve linkage adjustment. Improper low band adjustment. Vacuum modulator line broken or disconnected; diaphragm leakage; or valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE (COAST) DOWNSHIFTS HARSH: Improper low band adjustment. High engine idle speed. Downshift timing valve not operating properly. High mainline pressure because of vacuum modulator failure or because of hydraulic modulator valve sticking. Check for sticking pressure regulator valve.

NO DOWNSHIFT: Sticking low-drive shift valve. Low-drive shift plug stuck. High governor pressures or low throttle valve pressure.

CLUTCH FAILURE – BURNED PLATES: Low band adjusting screw backed off more than specified. Improper order of clutch plate assembly. Extended operation with low oil level. Clutch drum relief valve stuck. Abnormally high speed upshifts which may be due to improper governor action or operating transmission at high speed with selector lever in "L" (Low).

CAR CREEPS IN DRIVE: Idle speed too high.

NO DRIVE IN REVERSE: Incorrect manual lever adjustment. Reverse clutch piston stuck. Reverse plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

CAR CREEPS IN NEUTRAL: Incorrect manual lever adjustment. High clutch or low band not released.

IMPROPER SHIFT POINTS: Incorrectly adjusted throttle linkage or throttle valve. Governor defective. Rear pump priming valve stuck.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pin on output shaft. Drive pin sheared off. Rear pump priming valve not sealing.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Water in oil. Leakage in pump suction circuits.

TRANSMISSION REMOVAL

►*TRANSMISSION REMOVAL NOTE: Transmission and torque converter must be removed from car as an assembly. Keep front of transmission upward during removal to prevent converter falling out. After removal, immediately install a suitable holding tool (J-9549) or a length of wire which may be stretched across bell-housing opening.*

TRANSMISSION ASSEMBLY REMOVAL: Raise car and drain oil pan, then replace pan, using several bolts. On Standard Chevrolet, remove oil cooler lines, then on all models, remove modulator and speedometer drive cable fitting at transmission (tie lines out of way). Disconnect control lever rods at transmission and remove propeller shaft from transmission. Attach a suitable lifting device to transmission and disconnect engine rear mount on transmission extension, then remove transmission support crossmember. On Std. Chevrolet & Corvette, remove any shims that may be found between extension mounting boss and crossmember. *CAUTION - The same number of shims removed must be used when transmission is installed.* Remove converter underpan and scribe flywheel-converter relation-

CONTINUED ON NEXT PAGE

CHEVROLET (ALUMINUM) POWERGLIDE (Continued)

ship for use at installation, then remove flywheel-to-converter attaching bolts. Support engine at oil pan rail with a jack or other suitable support, then lower rear of transmission slightly so that upper transmission housing-to-engine attaching bolts can be reached using a universal socket and a long extension and remove upper bolts. *CAUTION - On V8 engines, use care not to lower rear of transmission too far as distributor housing may be forced against dash.* Remove remainder of attaching bolts, then remove transmission by moving it slightly to rear and downward, then out from under car. *CAUTION - Make sure converter moves toward rear with engine. If it does not, pry it free of flywheel.*

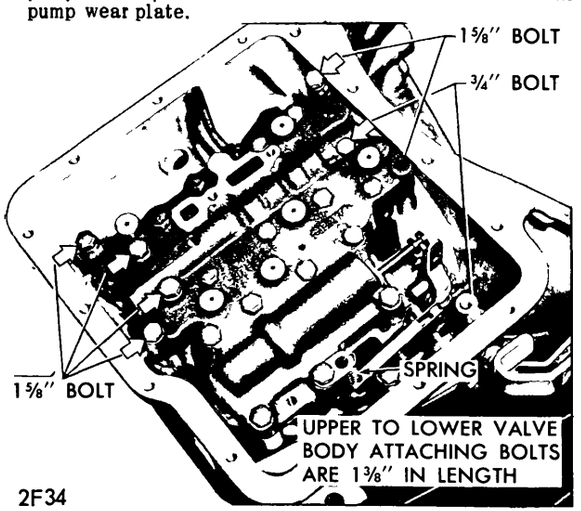
TRANSMISSION DISASSEMBLY

►*DISASSEMBLY NOTE: Mount transmission assembly in a suitable holding fixture such as J-3289-01 and adapters J-9506. Clean all parts in solvent and blow dry with air. DO NOT use wiping cloths. Make sure solvent being used will not damage rubber seal rings or clutch plate facings.*

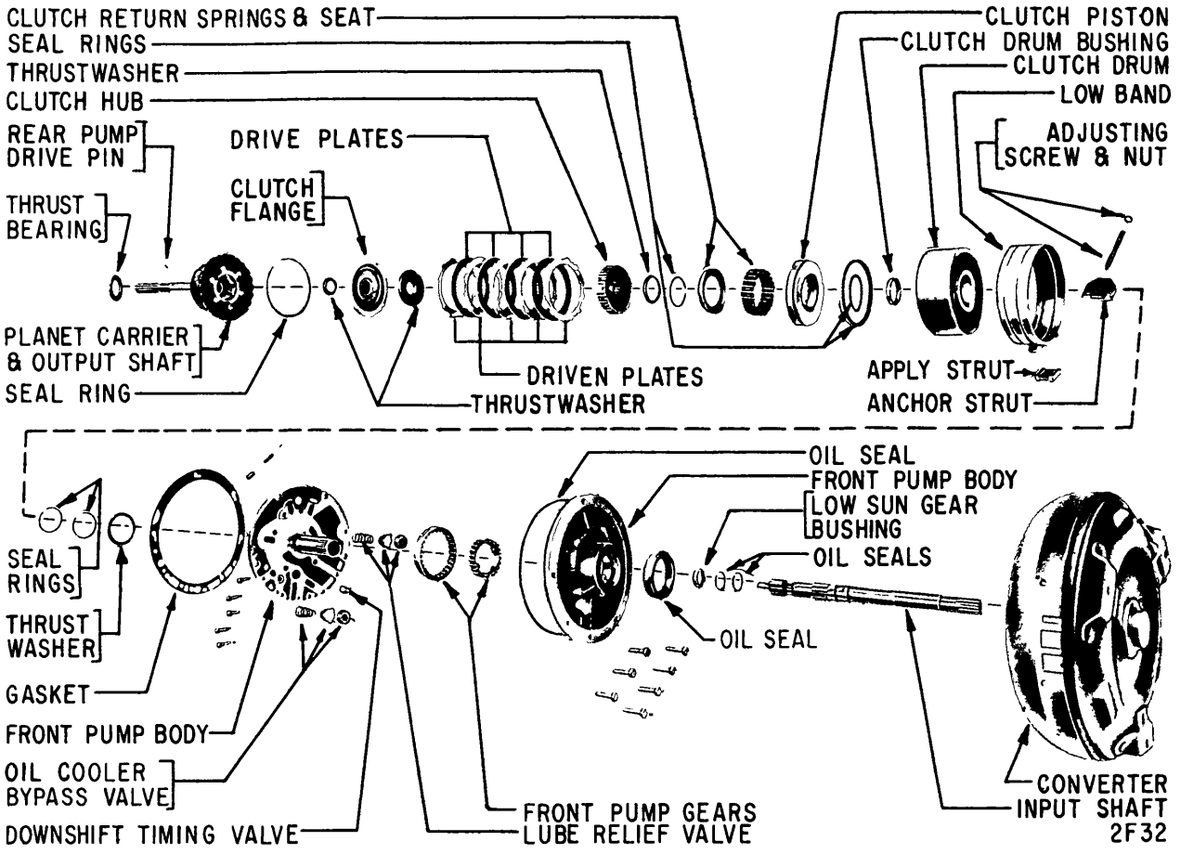
1) Remove speedometer driven gear (if replacement is necessary). Loosen capscrew and retainer clip holding driven gear in extension. Remove extension housing attaching bolts and remove extension from transmission case, then remove speedometer drive gear from output shaft. *NOTE - Speedometer drive gear is a press fit on shaft and must be removed with Tool J-5814.*

2) Remove "C" clip from governor shaft on weight side of governor, then remove shaft and governor valve from opposite side. Also remove the two "Belleville" type damping springs. Loosen governor drive screw and remove governor assembly over end of output shaft.

3) Remove rear pump attaching bolts and remove pump body and drain back baffle extension seal ring, then remove pump drive and driven gears. *CAUTION - When* pump drive gear is removed, drive pin may fall out if hole is on bottom and shaft is horizontal. **Remove oil pump drive pin if it does not fall out.** Remove rear pump wear plate.



VALVE BODY ATTACHING BOLTS



TRANSMISSION ASSEMBLY NO. 1

4) Rotate holding fixture until front of transmission is facing up, then remove front oil pump attaching bolts. Remove front oil pump and stator shaft assembly and the selective fit thrust washer with Tool J-9539 (or two 3/8" - 16 x 10" bolts and suitable sliding weights). Install tools in the two threaded holes provided in pump body. Remove pump seal ring and gasket.

5) Release tension on low band adjustment, then with transmission horizontal, grasp transmission input shaft and carefully work it and clutch drum assembly out of transmission case. *NOTE - Do not lose low sun gear splined bushing from input shaft. Low sun gear thrust washer may remain in planet carrier.* Remove low brake band and struts.

6) Make sure rear oil pump drive pin has been removed, then remove planet carrier and output shaft thrust bearing (caged) from front of transmission. Remove reverse ring gear if it did not come out with planet carrier. Use a large screwdriver and remove reverse clutch pack retainer ring, then lift out reverse clutch plates. *NOTE - On Chevy II transmissions, also remove the "Belleville" type cushion spring.*

7) Install Tool J-9542 through rear bore of case with flat plate on rear face of case and turn down wing nut to compress rear piston spring retainer and springs, then remove snap ring, tool, retainer and 17 piston return springs. Remove rear piston by applying air pressure to reverse port in rear of transmission case, then remove inner and outer seals.

8) Remove servo cover, piston and spring. Rotate holding fixture so transmission is upside down, then remove oil pan and gasket. Remove vacuum modulator, gasket and valve. Remove two bolts attaching detent guide plate to valve body and transmission case, then remove guide plate and range selector detent roller spring. Remove remaining valve body-to-transmission case attaching bolts (see illustration) and carefully lift out valve body and gasket, disengaging servo apply tube from transmission case as valve body is removed. If necessary, the throttle valve, shift and parking actuator assembly levers, and parking pawl and bracket may be removed.

TRANSMISSION UNIT OVERHAUL

FRONT PUMP: Seal Replacement - Remove pump from transmission, then pry out and replace seal. Drive new seal into place, fully seating it in counterbore with Tool J-6839. If no further work is required on pump,

CONTINUED ON NEXT PAGE

CHEVROLET (ALUMINUM) POWERGLIDE (Continued)

install it in transmission case. *NOTE - Outer diameter of seal should be coated with a non-hardening sealer before installation.*

Disassembly: Remove bolts attaching pump cover-to-body and remove cover, then remove pump gears. *CAUTION - Do not drop or nick pump gears. These gears are not heat treated.* Remove rubber seal ring from pump body.

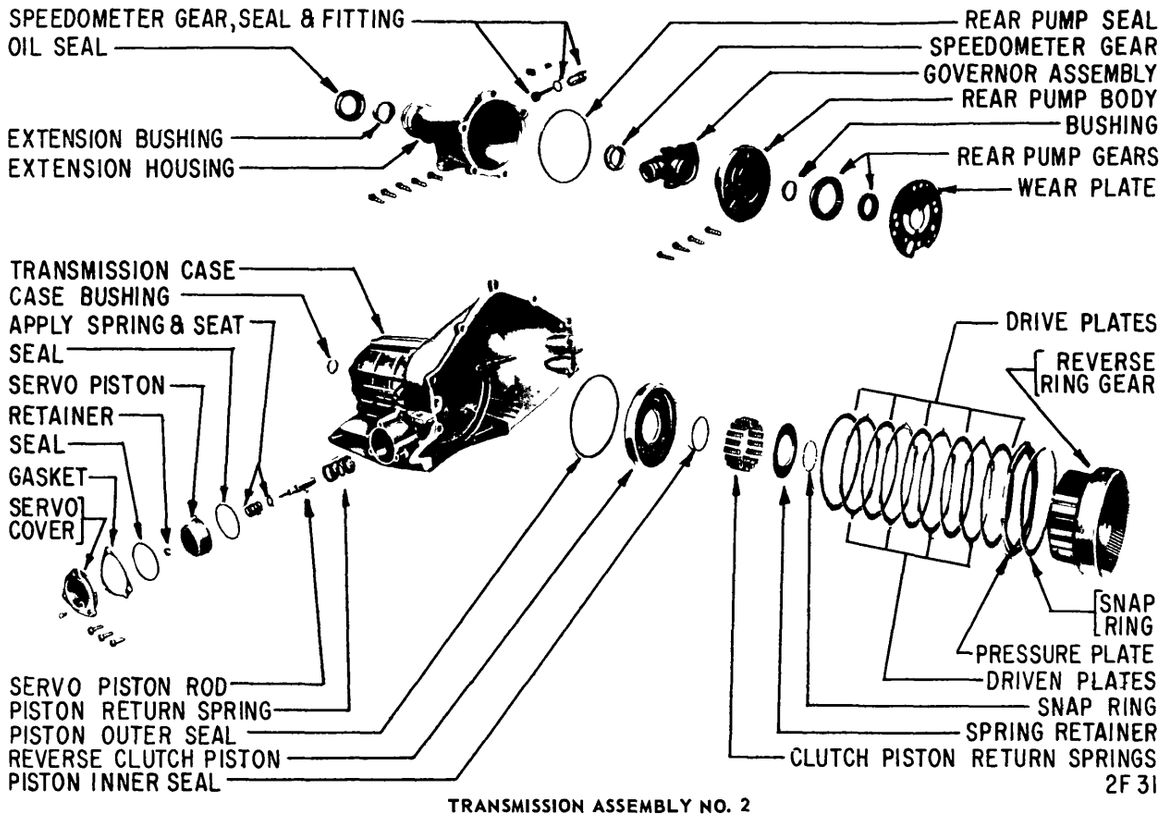
Inspection: Inspect all parts for nicks, scoring, or damage and check operation of pump priming valve. Check clearance between body bushing and converter pump hub. This clearance should be .005" maximum. *NOTE - If bushing is damaged, replace front pump body.* Check converter hub for nicks or burrs that might damage front pump seal or bushing. Replace if necessary. If necessary, remove oil seal and install a new seal, using Tool J-6839, seating seal fully in counterbore. *NOTE - Coat outer diameter of seal with non-hardening sealer before installation.* Check condition of oil cooler bypass (if so equipped) and lube relief valve. Replace valves if leaking. With parts clean and dry, check clearance between outer diameter of driven gear and body. Clearance should be .0035-.0065". Clearance between inner diameter of driven gear and crescent should be .003-.009". Gear end clearance, measured with a feeler gauge and straightedge, should be .0005-.0015".

Reassembly: *NOTE - If transmission not completely disassembled and only the front pump was removed for repairs, remove input shaft, clutch drum, low band and struts (see "Transmission Disassembly" above).* Install downshift timing valve, conical end out, into place in pump cover, then lubricate pump gears with transmission fluid and install in pump body. Carefully set pump cover in place over body and loosely install two attaching bolts. Place pump assembly, less rubber seal ring, **upside down** into pump bore of case (using guide pins) and install remaining cover-to-pump body attaching bolts and tighten to 15-20 ft. lbs. Remove pump assembly from case bore. *NOTE - If transmission not completely disassembled and only front pump was removed for repairs, proceed as follows; otherwise set pump assembly aside for installation at a later point:* Replace clutch drum and input shaft, low band and struts (see *"Transmission Reassembly" below).* Replace rubber seal ring in its groove in pump body and install pump assembly **right side upward** in place in transmission case bore, using a new gasket. *CAUTION - Be sure selective fit thrust washer is in place.* Install attaching bolts, using new "O" rings on bolts.

CONVERTER & STATOR: This is a welded assembly and cannot be disassembled for service. Check seams for stress or breaks and replace converter if necessary.

REAR PUMP: *NOTE - Disassembly and reassembly of rear pump is covered under "Transmission Disassembly" and "Transmission Reassembly". When installing rear pump priming valve, retain washer, spring, and valve in bore with retaining seat, installed with small hole first.*

Bushing Replacement: If necessary to replace rear pump bushing, remove bushing with Tool J-9557 (and handle J-7079). Install bushing with Tool J-6582, pressing or driving bushing in from front of pump.



TRANSMISSION ASSEMBLY NO. 2

CLUTCH DRUM: Disassembly - *CAUTION - Do not allow machined face of clutch drum to become scratched, scored, nicked, or otherwise damaged. Protect this surface at all times.* Remove retainer ring and low sun gear and clutch flange assembly from clutch drum, then remove hub rear thrust washer. Remove clutch hub, then remove clutch pack and hub front thrust washer. Remove spring retainer with Tool J-9542, or if using an arbor press, use Tool J-5133 and adapter ring, J-7782. Compress springs far enough to allow removal of retainer snap ring; then, release tension on springs and remove retainer and 24 springs. *NOTE - When using Tool J-9542, place a piece of cardboard or cloth between tool and front side of clutch drum as a protection for machined surface.* Lift up on piston with a twisting motion to remove from drum, then remove inner and outer seals.

Inspection: Wash all parts in solvent and blow dry with air, then check drum for scoring or excessive wear. Check steel ball in clutch drum (acts as a relief valve), making sure it is free to move in hole and that the orifice leading to front of drum is open. If clutch relief valve check ball in clutch drum is loose enough to come out or not loose enough to rattle, replace clutch drum as an assembly. *CAUTION - Do not attempt to replace or restake ball.* Check fit of clutch flange in drum slots (there should be no appreciable play between these two parts). Check low sun gear for nicks or burrs, and bushing for wear. Check clutch plates for burning and wear.

Bushing Replacement: Remove old bushing with Tool J-9546, using care not to damage bushing bore or machined surface on front of clutch drum. Use the same tool to install bushing. Press bushing into clutch drum from machined face side of drum, pressing only far enough so that tool meets drum. *CAUTION - Do not force tool against drum machined face.*

Reassembly: Install new piston inner seal in hub of clutch drum with lip of seal downward (toward front of transmission), then install a new piston seal in clutch piston, with lip of seal toward clutch drum (front of transmission). Lubricate seals with automatic transmission fluid and install piston in clutch drum with a twisting motion. Place 24 springs in position on piston, then place retainer in position on springs. Use Tools J-5133 and J-7782 and an arbor press (or use Tool J-9542 as a hand operation), and depress retainer plate and springs far enough to allow installation of of spring retainer snap rings in its groove on clutch drum hub. Install hub front washer with its lip toward clutch drum, then install clutch hub. Install steel reaction plates and faced drive plates, beginning with a steel reaction plate, in the following order: **4 Cyl.** - 3 steel plates and 2 faced plates installed alternately.

CONTINUED ON NEXT PAGE

CHEVROLET (ALUMINUM) POWERGLIDE (Continued)

6 Cyl. - 4 steel plates and 2 faced plates installed: Steel, faced, steel, steel, faced, steel. **V8 Engs.** - 5 steel plates and 4 faced plates installed alternately. Install rear hub thrust washer with its flange toward low sun gear, then install low sun gear and flange assembly and secure with retainer ring. When installed, openings in retainer ring should be adjacent to one of the lands of clutch drum. Check assembly by turning clutch hub to be sure it rotates freely.

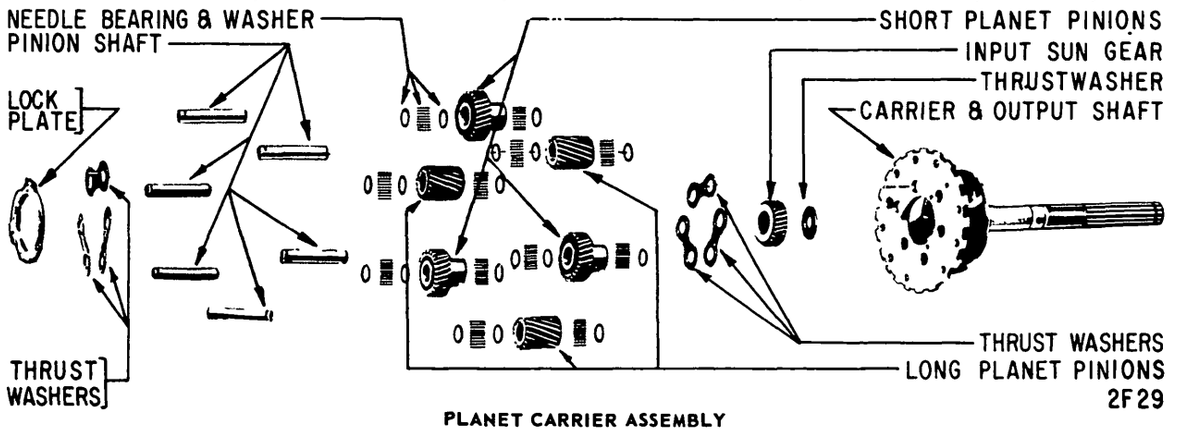
LOW BAND: Inspection - Check lining for scoring or burning and bands and lining for cracks. Check band linkage for excessive wear.

PLANET ASSEMBLY & OUTPUT SHAFT: *NOTE - It is not necessary to disassemble planet assembly unless inspection indicates damage or wear.*

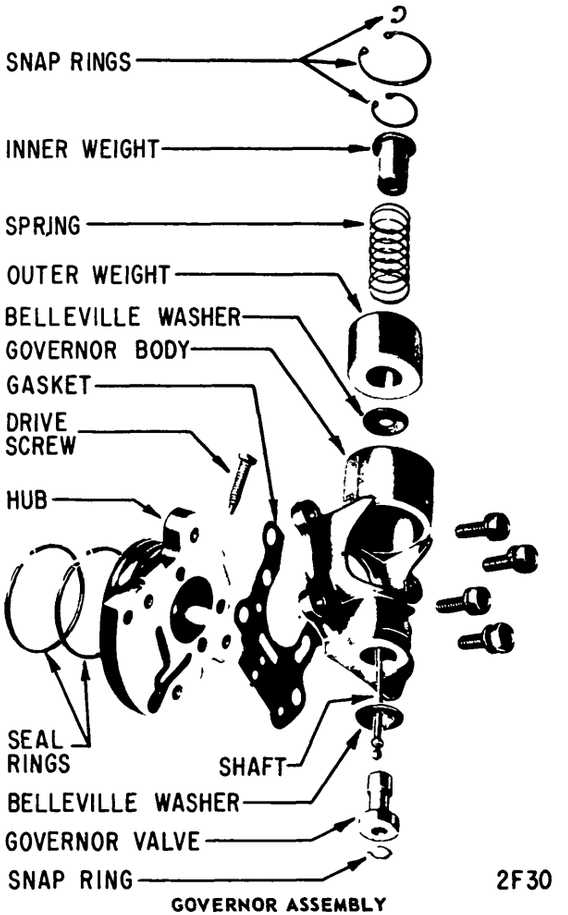
Inspection: Inspect planet pinions for nicks or other tooth damage. Check clearance of planet gears which should be .006-.030". Check input sun gear for tooth damage, and input sun gear rear thrust washer for damage. Inspect output shaft bearing surface for wear, nicks, or scoring, and inspect input shaft bushing. Inspect input shaft splines for nicks or damage and check fit in clutch hub and input sun gear. Check fit of splines in turbine hub. Check oil seal rings for damage (rings must be free in input shaft ring grooves). Remove ring and insert in stator support bore and check to see that hooked ring ends have clearance. Replace ring on shaft.

Disassembly: Place planet carrier assembly in a fixture or a vise so that front (parking lock gear end) of the assembly faces upward, then using a prick punch or similar tool, mark each pinion shaft and hole in planet carrier assembly so that, when reassembling, each pinion shaft will be reinstalled in same location from which it was removed. Remove pinion shaft lock plate screws and rotate lock plate sufficiently counterclockwise to remove. Starting with a short pinion, and using a soft steel drift, drive on lower end of pinion shaft until pinion shaft is raised above press fit area of output shaft flange. Feed Tool J-4599 into short planet pinion from lower end, pushing planet pinion shaft ahead of it until tool is centered in pinion and pinion shaft is removed from the assembly. *NOTE - Tool J-4599 comes in two pieces, both alike. Only one piece is used for disassembly. Two pieces are used for reassembly.* Remove short planet pinion from the assembly, then remove tool, needle bearings and spacers from pinion. *CAUTION - Do not lose any of the needle bearings. Twenty needle bearings are used in each end and are separated by a bearing spacer in the center.* Use this same procedure and remove the adjacent long planet pinion that was paired by thrust washers to short pinion. Remove upper and lower thrust washers. Remove and disassemble remaining planet pinions in pairs, by first removing a short pinion, then the long adjacent pinion. Remove input sun gear and input sun gear thrust washer. Wash all parts in solvent and blow dry with air, then recheck all parts for wear, nicks, or tooth damage. Inspect bearings and if worm, replace all bearings. If pinion shafts are worn, replace shaft. Inspect input shaft bushing installed in base of output shaft. If damaged, thread Tool J-9534 into bushing and pull bushing out, using a sliding hammer. Press new bushing in so it is flush or below surface with pilot end of input shaft as the pressing tool.

Reassembly: Use Tool J-4599 and assemble needle bearing spacer and needle bearings (20 in each end) in one of the long planet pinions. Use cup grease to aid in assembly and hold needle bearings in position. Position the long planet pinion with Tool J-4599, centered in pinion assembly, and with thrust washers at each end, in planet carrier. *CAUTION - Oil grooves in thrust washers must be toward gears. Long planet pinions are located opposite closed portions of carrier, while short pinions are located in the openings.* Feed the second Tool, J-4599 in from top, picking up the upper thrust washer and planet pinion and pushing the already installed Tool J-4599 out the lower end. As first tool is pushed down, check that it picks up lower thrust washer. Select proper pinion shaft (marked at disassembly), then lubricate shaft and install it from the top, pushing assembly tools ahead of it. Turn pinion shaft so that slot or groove at upper end faces center of the assembly. With a brass or soft steel drift, drive pinion shaft in until lower end is flush with lower face of planet carrier. Follow the same procedure and install a short pinion in planet carrier adjacent to long planet pinion now installed. *NOTE - Thrust washers already installed with long planet pinion also suffice for the short planet pinion as the two pinions are paired together on one set of thrust washers.* Install input sun gear thrust washer and install input sun gear. Assemble and install remaining planet pinions in pairs, by first installing long planet pinions and then the adjacent short pinion. Check end clearance of planet gears which should be .006-.030". Place pinion shaft lock plate in position, then with extended portions of lock plate aligned with slots in planet pinion shafts, rotate lockplate clockwise until three attaching screw holes are accessible. Install lock plate attaching screws and tighten to 2½-3 ft. lbs.



PLANET CARRIER ASSEMBLY



GOVERNOR ASSEMBLY

GOVERNOR: *NOTE - Governor assembly is a factory balanced unit. If body replacement is necessary, the two sections must be replaced as a unit.*

Disassembly: *NOTE - Governor valve and shaft were disassembled during removal.* Remove outer weight assembly by sliding toward center of body, then remove inner weight retainer snap ring and remove inner weight and spring. If necessary, remove the four body assembly bolts and separate body, hub, and gasket, then remove seal rings.

Inspection: Clean with solvent and blow dry with air.

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CHEVROLET (ALUMINUM) POWERGLIDE (C ntinu d)

Check the assembly and replace any bent, damaged, or scored parts.

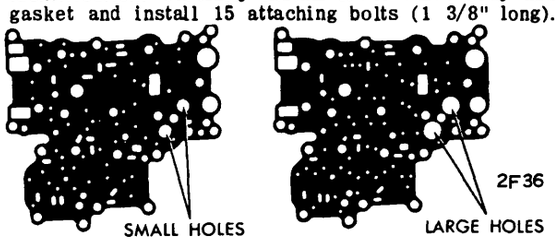
R assembly: Reassemble governor weights and install in body bore. Replace seal rings on hub. *NOTE - Further assembly is made when it is installed in transmission (see "Transmission Reassembly" below).*

VALVE BODY: *NOTE - If valve body is to be removed with transmission in car, the vacuum modulator and valve, oil pan and gasket, guide detent plate and range selector detent roller spring must be removed in order to remove valve body (see "Transmission Disassembly" above).*

Di sassembly: Remove manual valve, suction screen and gasket, then remove valve body bolts and carefully remove lower valve body and transfer plate from upper valve body. Remove front and rear pump check valve and springs, then from upper valve body, remove throttle valve and detent valves and downshift timing valve as follows: To remove throttle valve and detent valve, wedge a thin screwdriver under head of retaining pin and remove pin, then remove detent valve assembly and throttle valve spring. Tilt valve body to allow throttle valve to fall out. If necessary, remove "C" clip and disassemble detent valve assembly. *CAUTION - Do not disturb setting of adjustment hex nut on detent valve assembly. This is a factory adjustment and should not normally be changed. If adjustment is necessary, see "Throttle Valve Adjustment" above.* To remove downshift timing valve, drive out roll pin and remove valve spring and downshift timing valve. From the lower valve body, remove low-drive shift valve snap ring and tilt valve body to remove low-drive regulator valve sleeve and valve assembly, valve spring seat, valve springs and shifter valve. Remove snap ring from pressure regulator valve bore, then tilt valve body to remove hydraulic modulator valve sleeve and valve, pressure regulating valve spring seat, spring, damper valve, spring seat and valve.

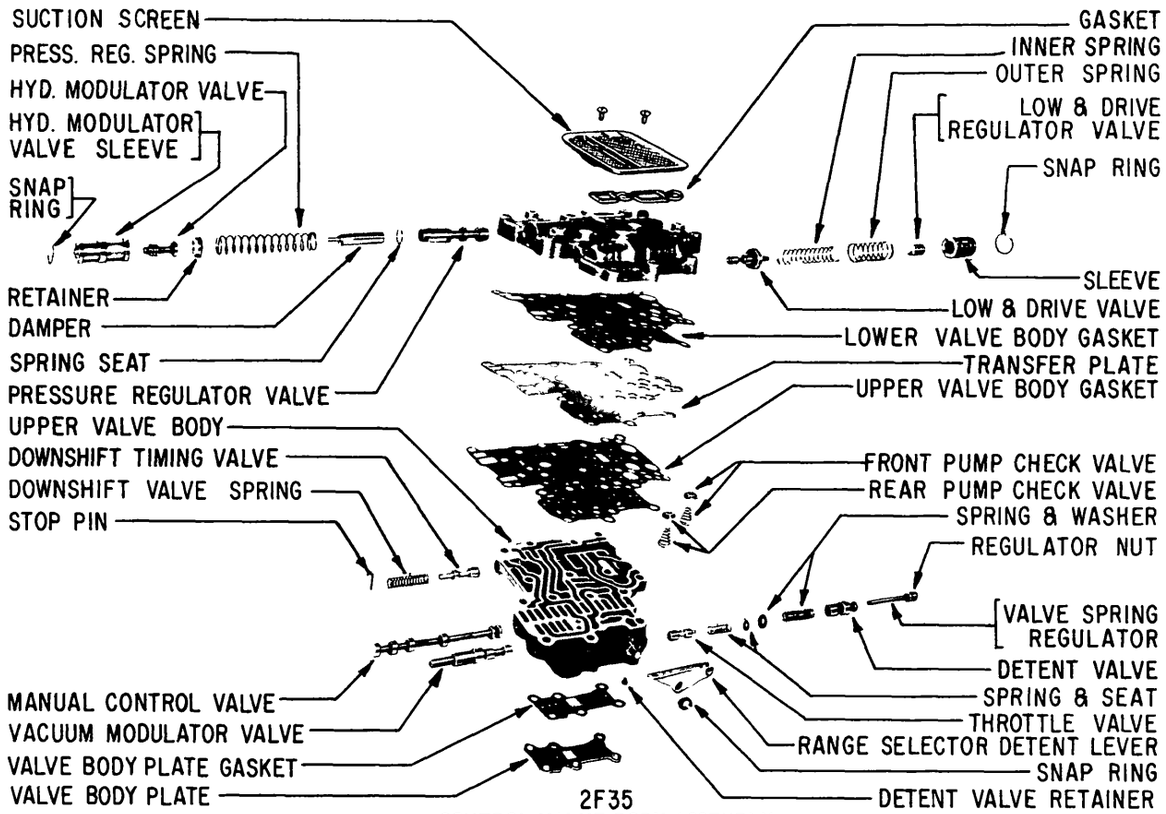
Inspection: Clean all parts in solvent and make sure there is no foreign material preventing proper valve operation. Check all valves and bores for burrs or other damage that could cause valves to hang up.

R assembly: Replace valve components in proper bores, reversing disassembly procedure *(see "Valve Body Assembly" illustration for correct order)*, and note the following: Place front and rear pump check valves and springs into place in upper valve body and install gasket and transfer plate. *NOTE - Upper and lower valve body gaskets are different. See illustration for identification.* Carefully install lower valve body and gasket and install 15 attaching bolts (1 3/8" long).



LOWER VALVE BODY UPPER VALVE BODY

CONTROL VALVE BODY GASKETS



CONTROL VALVE BODY ASSEMBLY

Tighten to 8-11 ft. lbs.

VACUUM MODULATOR: Inspection - Check modulator valve for nicks and burrs. If any nicks or burrs cannot be properly repaired with a stone, replace valve. Check vacuum modulator with a vacuum source for leakage. Other repairs to vacuum modulator are not possible; replace as an assembly.

TRANSMISSION CASE: Inspection - Wash case with clean solvent, air dry, then blow out all passages with air. Inspect case for cracks, and case rear bushing for damage or excessive wear. *CAUTION - This is a precision bushing and if damaged or worn excessively, it must be replaced.* Check shifter shaft seal. If leakage or damage is indicated, pry out old seal and install a new one so it is firmly seated in counterbore of case.

Rear Bushing Repl cement: Remove bushing by driving or pressing from within case using Tool J-9557 and handle J-7079. Drive a new bushing into place from rear of case using Tool J-9557 and handle J-7079. *CAUTION - Install bushing only until shoulder of tool contacts rear face of case. Do not use excessive force or aluminum case may be damaged.*

TRANSMISSION REASSEMBLY

►*REASSEMBLY NOTE: Us only transmission fluid r p trol um jelly as lubricants r t r tain b arings or rac s during ass mbly. Lubricat all b arings, s al rings and clutch plates befor ass mbly.*

1) Install parking lock pawl and shaft and insert a new retaining roll pin (early transmissions) or "E" ring (later transmissions) into shaft. Install parking lock pawl pull-back spring over its boss to rear of pawl. *NOTE - Short leg of spring should locat in hole in parking pawl.* Install parking lock pawl reaction bracket with its two bolts, then fit actuator assembly between parking lock pawl and bracket.

2) Insert outer shift lever into case, being careful of shaft seal, and pick up the inner shaft lever and parking lock assembly, then tighten Allen head nut. Insert outer throttle valve lever and shaft special washer and "O" ring into case and pick up inner throttle valve lever. Tighten Allen head nut.

3) Install inner and outer rear piston seals on reverse piston, then lubricate piston and case with transmission fluid and install piston into case. If necessary, carefully slide a feeler gauge around outer diameter of piston to start seal ring into bore.

4) With transmission case turned so it is facing upward, install 17 reverse piston return springs and their retainer ring. Carefully install Tool J-9542 over retainer ring and through rear bore of case. With flat plate on rear face of case, turn down on wing nut to compress return springs and allow retaining snap ring to be in-

CONTINUED ON NEXT PAGE

CHEVROLET (ALUMINUM) POWERGLIDE (Continued)

stalled, then remove compressor tool. *CAUTION - Be careful when installing spring retainer that mark surface is not damaged by catching on edge of hub or in snap ring groove.*

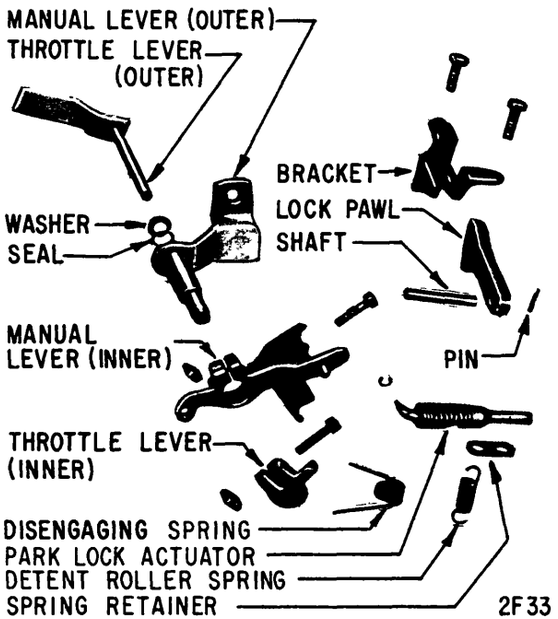
5) On 4 Cyl. and 6 Cyl. Models, install large Belleville type cushion spring, with small end down. On all models, lubricate and install reverse clutch pack beginning with a reaction (spacer) plate and alternating with the drive plates (faced) until all reaction and drive plates are installed. *NOTE - Plates required for the various engines are as follows: 3 drive and 3 reaction plates (4 Cyl.); 4 drive and 4 reaction plates (6 Cyl.); 6 drive and 6 reaction plates (V8). In all transmissions, the rear reaction plate is a selective fit.* Install reaction plates so notched lug on plate is installed in groove at "7 o'clock" position in case, then install the thick pressure plate which has a dimple in one lug to align with the same slot in case as the notched lugs on other reaction plates. Install clutch plate retainer ring.

6) Check for correct selective reverse reaction spacer plate running clearance as follows: Position transmission so case is horizontal, then use feeler gauge and measure clearance between any reaction plate and adjacent faced plate. *NOTE - Because faced plate is waved, it will be necessary to side feeler gauges in an arc several inches to obtain an average reading.* If proper selective reverse reaction spacer is installed, clearance will be .012-.030" (4 Cyl.); .016-.040" (6 Cyl.); .025-.060" (V8). If clearance is not within specifications, remove reverse clutch pack and install a thicker or thinner selective reverse plate as required, next to piston, then recheck running clearance. Selective plates are furnished in thicknesses of .070"±.002" (Part No. 3799210); .102"±.002" (Part No. 3799212); .134"±.002" (Part No. 3799214).

7) With rear of case downward, align internal lands and grooves of reverse clutch pack faced plates, then engage reverse ring gear with these plates. *NOTE - This engagement must be made by "feel" while turning and jiggling ring gear.* Place output shaft thrust bearing over output shaft and install planetary carrier and output shaft into transmission case.

8) Install low sun gear thrust washer on sun gear in the planetary gear set with flange of thrust washer toward front of transmission and retain it in place with a small amount of petroleum jelly. Move transmission into a horizontal position, then with the two input shaft seal rings in place on input shaft, install clutch drum (machined face first) onto input shaft and install the low sun gear bushing (splined) against shoulder on shaft. Install clutch drum and input shaft assembly into case, aligning thrust washer on input shaft and indexing low sun gear with the short pinions on planet carrier.

9) Remove rubber seal ring from front pump body, then using guide studs, Tool J-3387, install front pump and gasket, and selective fit thrust washer into transmission case. Install two pump-to-case bolts. Check for correct thickness of selective fit thrust washer as follows: Mount a dial indicator so that plunger of indicator is resting on end of input shaft (use Tool J-5492 or suitable support for indicator), then set indicator to zero. Push up on transmission output shaft and note reading on indicator, which should be .030-.054". If reading is within limits, proper selective washer is being used. If not within limits, remove front pump and install a different thickness thrust washer as necessary to obtain specified clearance, then recheck clearance. Selective fit washers are available in thicknesses of .061", .078", .092", .106".



TRANSMISSION LEVER ASSEMBLIES

10) Install servo piston, piston ring, and spring into servo bore, then use a new gasket and "O" ring seal and install servo cover. Make sure that gasket is properly aligned with the three bolt holes and drain back passage in case.

11) Remove front pump and selective fit washer from case, and install low brake band, anchor and apply strut into case. Tighten low band adjusting screw enough to prevent struts from falling out of case. Place seal ring in groove around front pump body and the two seal rings on pump cover extension, then install pump, gasket and thrust washer into case. Remove guide pins and install all pump bolts, replacing any damaged "O" ring seals. Tighten bolts to 13-17 ft. lbs.

12) Turn transmission so output shaft is upward, then install rear pump wear plate, drive pin, and drive gear, indexing gear to drive pin. Install rear pump body and driven gear, drain back baffle and pump-to-case attaching bolts. *NOTE - Bolt holes are offset and pump can be installed in one position only.* Install governor hub in place on output shaft, then install gasket and governor body over output shaft. Install governor shaft and line up properly with output shaft and install body attaching bolts. Tighten bolts to 6-8 ft. lbs. Install governor valve, two Belleville washers (concave side of washers against output shaft), and retaining "C" clips. Center shaft in output shaft bore and tighten governor drive screw.

13) Install speedometer drive gear on output shaft with Tool J-5814, then place extension seal ring over rear pump body and install transmission extension and five retaining bolts and tighten to 20-30 ft. lbs. Replace speedometer driven gear if removed.

14) With transmission upside down, install valve body (servo apply tube and manual valve installed) and a new gasket. Carefully guide servo apply line into its boss in case as valve body is positioned. Install six mounting bolts and the range selector detent roller spring. *NOTE - Position manual valve actuating lever fully forward when installing valve body to more easily pick up manual valve.* Install guide plate, making sure that inner lever picks up manual valve, then install attaching bolts. Tighten valve body-to-transmission case bolts to 8-11 ft. lbs.

15) Install vacuum modulator valve, vacuum modulator and gasket, then install oil pan and new gasket, and tighten attaching screws to 6-9 ft. lbs. Install converter and a suitable holding strap (to keep converter from falling off during transmission assembly installation). Tighten low servo adjusting screw to 40 inch pounds while rotating input and output shaft simultaneously to properly center low band on clutch drum, then back off adjusting screw 4 complete turns, and tighten locknut.

TRANSMISSION INSTALLATION (EXCEPT CORVETTE)

►*INSTALLATION NOTE: The "light" side of converter is indicated by a BLUE stripe painted across ends of converter cover and housing. This marking should be aligned as closely as possible with the WHITE strip painted on engine side of flywheel outer rim which indicates "heavy" side of engine.*

TRANSMISSION ASSEMBLY INSTALLATION: Mount transmission on suitable lifting equipment, then remove converter holding tool. *CAUTION - Do not allow converter to move forward after removal of holding tool.* Raise transmission into position and install transmission case-to-engine upper mounting bolts, then install remainder of mounting bolts and tighten to 25-30 ft. lbs. Remove support from beneath engine, then raise rear of transmission to final position. Align balance marks on converter and flywheel (see "Installation Note" above). If converter and flywheel scribed during removal, align scribed marks. Install converter-to-flywheel attaching bolts and tighten to 15-20 ft. lbs. Install flywheel cover and transmission support crossmember to transmission and frame. Remove transmission lifting equipment and complete installation by reversing removal procedure. Refill transmission *(see "Draining & Refilling" above).*

CORVAIR TRANSAXLE

Corvair (1961)
Corvair 1200 Series Trucks (1961)

►CHANGES, CAUTIONS, CORRECTIONS

►*PUSHING CAR TO START ENGINE (AUTOMATIC TRANS.):* Place transmission selector lever in "N" (Neutral) until car reaches 25 MPH, then move selector lever to "L" (Low) until engine starts.

►*TOWING AUTOMATIC TRANSMISSION CARS:* With transmission selector lever in "N" (Neutral), car may be towed at speeds not to exceed 30 MPH.

DESCRIPTION

DESCRIPTION: The Transaxle consists of either an integral differential (rear axle) assembly and synchro-mesh transmission; or a differential (rear axle) assembly and a Powerglide transmission as follows:

Differential (Rear Axle) Assembly: Straddle mounted hypoid gear type of new design with transmission input & output shafts running axially through differential pinion shaft. This unit which is contained in a separate carrier housing is located between transmission (either Synchro-mesh or Powerglide) and the engine assembly.

Ratios - 3.27-1, 3.55-1 & 3.89-1. *NOTE - 3.27-1 ratio not used on models with Super Turbo-Air engine. 3.89-1 ratio is standard on 1200 Series (3-Spd. & Powerglide); 3.27-1 (4-Speed).*

Synchro-mesh Transmission: Three-speed and Four-speed Synchro-mesh types integral with rear axle differential carrier. Because of attachment to differential carrier, a hollow mainshaft is used to permit passage of the clutch shaft to front of transmission for engagement of clutch gear with countergear. *NOTE - On three-speed transmission, all transmission gears are interchangeable with conventional Chevrolet 3-Speed Synchro-mesh, except for clutch gear and countergear.*

Transmission Ratios (3-Speed) - 3.50-1 (1st Speed), 1.99-1 (2nd Speed), 1.0-1 (3rd Speed), 3.97-1 (Reverse).

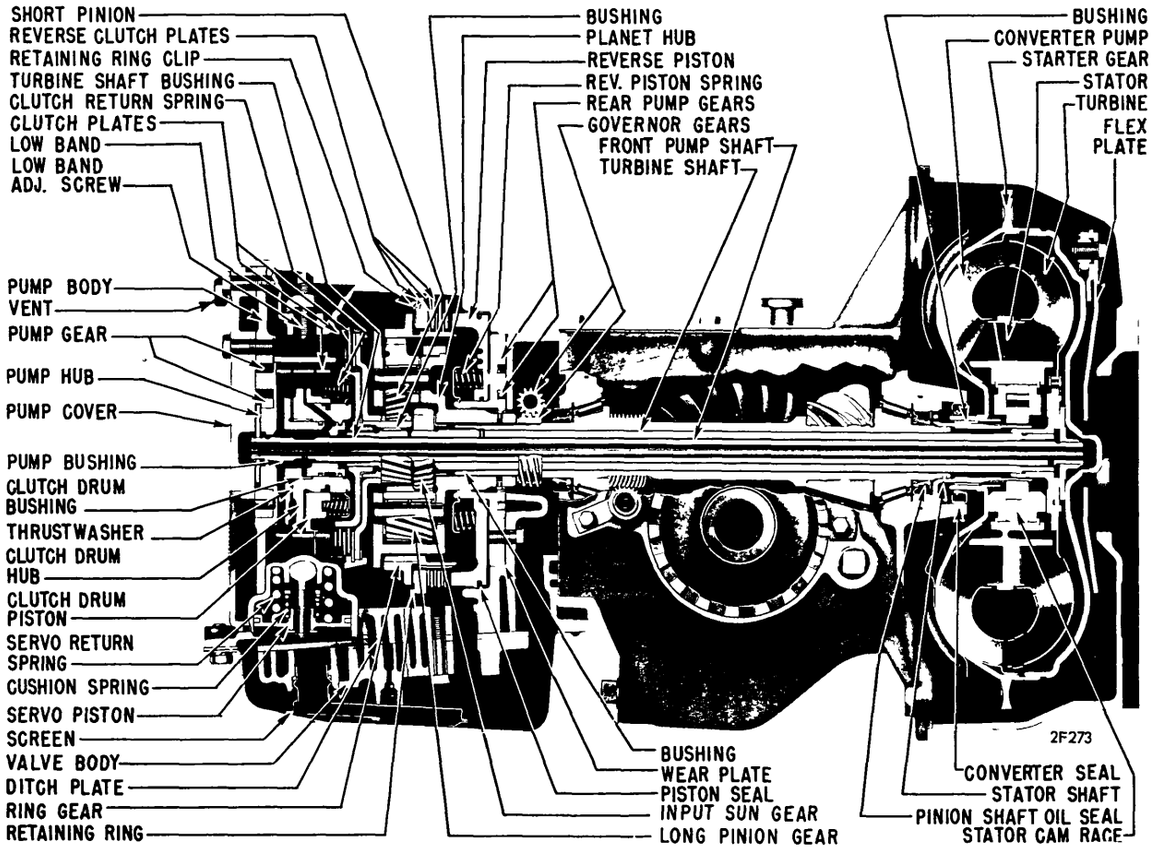
Transmission Ratios (4-Speed) - 3.65-1 (1st Speed), 2.35-1 (2nd Speed), 1.44-1 (3rd Speed), 1.0-1 (4th Speed), 3.66-1 (Reverse).

Powerglide Transmission: Three element torque converter and a hydraulically operated two-speed type automatic shift transmission integral with rear axle differential carrier. Converter torque from the welded type torque converter assembly located between differential carrier and engine is transmitted to transmission through two hollow shafts running through the hollow differential pinion shaft. One shaft runs from converter cover hub to transmission front pump and the other from turbine to transmission input sun gear.

LUBRICATION

Check fluid level in all units every 1000 miles. Drain and refill every 10,000 miles (Rear Axle & Synchro-mesh Trans.). *NOTE - Draining & Refilling of Powerglide Transmission not recommended except for overhaul.*

Recommended Oil (Rear Axle & Synchro-mesh Transmission) - SAE 80 "Multi-Purpose" gear lubricant or SAE 80-90 Multi-Viscosity "Multi-Purpose" gear lubricant. *CAUTION - SAE 90 Viscosity lubricants are not recommended. DO NOT use "Mineral Oil" gear lubricants or any "active sulphur soap" lubricants.* Differential carrier and transmission are connected by internal passages.



CORVAIR POWERGLIDE TRANSMISSION SECTIONAL VIEW

Powerglide Trans. - Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic transmission is sealed off from differential carrier.*

Checking Fluid Level: Rear Axle & Synchro-mesh Trans. With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential carrier, also check level in transmission. *NOTE - Fluid should be level with bottom of filler plug hole under operating condition.*

Powerglide Transmission - With transmission at normal operating temperature and transmission selector lever in "N" position, engine idling, check fluid level on dipstick in filler tube at right side of engine near firewall. Add fluid as necessary to bring level to "Full" mark on dipstick, using recommended fluid.

Draining & Refilling: Rear Axle - Drain carrier housing and replace drain plug. Refill housing with 3.1 pints of recommended fluid.

Rear Axle & Synchro-mesh Trans. - Remove drain plug in transmission housing and in differential carrier housing. *NOTE - Transmission drain plug is on left side adjacent to idler arm on side of transmission case.* Refill by adding lubricant to both units (5 pints total).

Powerglide Trans. - *NOTE - Not required except at time of transmission overhaul.* Drain oil by loosening filler tube attaching nut in oil pan. Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel J-4264. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark. Capacity is 6 pints (approximately) for normal refill. 13 pints (approximately) with transmission and torque converter dry.

ADJUSTMENTS

Transmission Shift Linkage (Synchro-mesh Transmission): *NOTE - Before making any adjustment, lash in system must be taken up by moving shift control rod to rear.* Adjust as follows:

500 & 700 Series (3 & 4-Speed Trans.) - With seat in full forward position, shift transmission to first gear, then loosen coupling clamp nut on transmission shift control rod. Adjust shift lever so distance from lever to edge of seat is ½". Test shifts in all ranges.

900 Series (3 & 4-Speed) - Shift transmission into reverse, then loosen coupling clamp nut on transmission shift control rod. Adjust shift lever so distance between

CONTINUED ON NEXT PAGE

CORVAIR TRANSAXLE (Cont.)

center of gearshift lever housing, rearward, to center of gearshift lever knob is 2¼" (3-Speed Trans.); 3¼" (4-Speed Trans.). Tighten clamp nut and check shift in all ranges.

1200 Series (3 & 4-Speed) - Remove spring from gearshift lever shaft. Rotate gearshift control rod to left side of truck and pull out until third gear is engaged (3-Speed Trans.); fourth gear (4-Speed Trans.), then loosen control rod coupling nut. Insert a 1½" wood block between rod end and front flange of the front crossmember. Remove gauge block and tighten clamp nut, then install spring. Check shift in all ranges.

Clutch Linkage (Synchro-mesh Trans.): *See "Borg & Beck Clutch" in Clutch Section.*

Transmission Throttle Linkage (Powerglide Trans.): *See "Accelerator Control Linkage Adjustment" under CARBURETOR on car model page.*

Manual Linkage (Powerglide Trans.): Drain transmission oil and remove oil pan. Place transmission selector lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body. With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so Tool J-8365 is held in a horizontal position. Recheck adjustment. Install oil pan and fill transmission with fluid.

Neutral Starter Switch Adjustment (Powerglide Trans.): Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to "Start" position, then move Neutral Switch fore and aft until engine cranking begins. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral).

Low Band: Remove parcel shelf behind rear seat and remove plug covering access hole in floor. Loosen locknut and tighten the square head adjusting screw to 40±5 inch pounds, **then back off adjusting screw 4 full turns exactly.** Hold adjusting screw stationary and tighten locknut.

►*ADJUSTING TOOL NOTE:* A wrench for turning the adjusting screw locknut can be made by welding two ¾" tubular steel spark plug wrenches together (end-to-end) so wrench can be installed over adjusting screw locknut. A square socket wrench can be inserted through this tool to engage adjusting screw.

TROUBLE SHOOTING
(AUTOMATIC TRANSMISSION)

NO DRIVE IN ANY SELECTOR LEVER POSITION (CANNOT LOAD ENGINE): Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming ball not seating.

ENGINE SPEED FLARES ON STANDSTILL STARTS BUT ACCELERATION LAGS: Low band only partially applied caused by one or more of the following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief ball not seating. Vacuum modulator hose collapsed.

TRANSMISSION WILL NOT UPSHIFT: Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.

HARSH UPSHIFT: Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE HARSH DOWNSHIFT: Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body.

CAR CREEPS EXCESSIVELY IN DRIVE: Idle speed too high.

CAR CREEPS IN NEUTRAL: Incorrect manual valve lever adjustment. High clutch or low band not released.

NO DRIVE IN REVERSE: Manual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

IMPROPER SHIFT POINTS (see "Shift Speed" table below): Incorrect accelerator control linkage adjustment. Throttle valve incorrectly adjusted. Governor defective. Rear pump priming ball stuck.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Oil pickup pipe split or not sealed causing air entrainment.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.

TESTING

►*TESTING NOTE: Transmission must be at normal operating temperature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.*

ROAD TEST: Road test car to determine transmission shift points as indicated in table below.

Transmission Shift Speeds

	MPH
UPSHIFTS:	
Minimum Throttle	10–12½
Full Throttle	41–47
Part Throttle (Detent Touch)	34–41
DOWNSHIFTS:	
Closed Throttle	8–12
Full Throttle	38–44
Part Throttle (Detent Touch)	23–30
Manual Low (Inhibited)	41–46

PRESSURE TESTS: *NOTE – Pressure tests can be made by raising rear wheels 3–5" off floor on jack stands.*

►*FRONT PUMP PRESSURE TEST CAUTION: Front pump pressures must be obtained with engine at idle speed (16" Hg.). A very slight increase in engine speed, even that caused by an inaccurately set engine idle speed, will allow rear pump to take over, causing front pump pressure to fall to zero. If no front pump pressure is indicated, check first for proper engine idle speed.*

Front Pump: Remove plug located at "6 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. With engine at idle speed (approx. 16" of vacuum), pressures should be as follows with selector lever in the indicated range: 81–98 lbs. (Reverse); 47–57 lbs. (Neutral & Drive); 71–82 lbs. (Low). Disconnect vacuum hose at balance tube, then with engine at idle speed, check pressure which should be: 140–157 lbs. (Reverse); 71–82 lbs. (Neutral, Drive & Low). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft, or missing plug from front end of front pump shaft. Moderately low front pump pressures in all ranges indicate a restricted front pump inlet. Failure of pressure to raise when vacuum hose disconnected (or high pressures with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.

Rear Pump: With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D" (Drive) and accelerate engine. Front pump pressure should drop to approximately 0–5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged or rear pump check ball is not seating.

Throttle Valve: Remove plug located at "8 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. Disconnect throttle valve rod at carburetor and vacuum hose at balance tube, then with engine at idle speed, depress accelerator to wide open position. *NOTE – By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressures should be as follows with selector lever in the indicated range: 0 lbs. (Reverse & Neutral); 52–54 lbs. (Drive); 66–77 lbs. (Low). If pressures not as specified, they can be corrected by adjusting the position of the jam nut located on end of detent valve assembly (part of throttle valve assembly inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut as necessary. To raise pressure, back off jam nut (one full turn is equal to 3 psi). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

POWER TRAIN (ENGINE, TRANSMISSION & REAR AXLE): This complete assembly must be removed as a unit. *See "Engine" in Corvair Special Data.*

SYNCHRO-MESH TRANSMISSION: Removal - With "Power Train" removed from car, support Transaxle assembly with a chain fall or suitable lift and sling, then drain transmission and differential carrier. Remove starter and the two screws securing clutch pull rod dust seal assembly, then remove pin attaching pull rod to clutch fork. Separate Transaxle from engine by removing attaching bolts securing differential carrier to clutch housing. Pull Transaxle away horizontally to prevent damage to clutch fork. Remove clutch shaft (transmission input shaft). Remove clutch fork and clutch release bearing from differential carrier. *NOTE - Fork is attached to carrier by a ball and socket and spring*

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CORVAIR TRANSAXLE (C nt.)

retainer. Separate three-speed transmission from differential carrier by removing the four attaching bolts and disengaging transmission output shaft from splines in differential carrier.

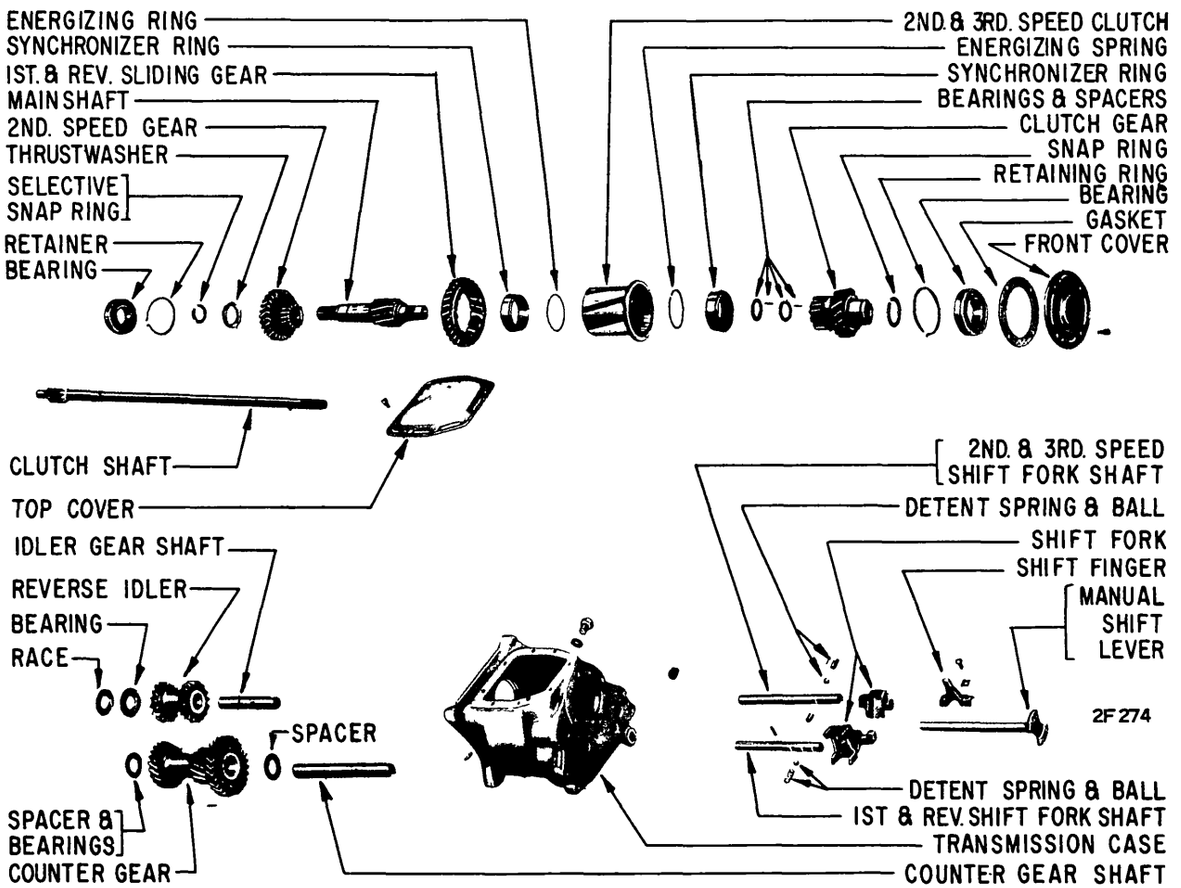
Installation: Use a new gasket (hold in place with petrolatum), then couple transmission to differential carrier, being sure to engage splines of transmission mainshaft to internal splines of pinion in differential carrier. Secure transmission to carrier with four bolts (install two bolts on right side from transmission end and the two on left side from carrier end). Tighten bolts to 24-32 ft. lbs. Install clutch release bearing and clutch fork on differential carrier. *NOTE - Clutch release bearing slips over shaft and the fork has a spring retainer and socket which attaches to ball stud on carrier.* Install clutch shaft in Transaxle, then check distance from end of clutch release bearing shaft to end of clutch shaft. If fully engaged, the dimension should be 2 9/16"±1/32". Support Transaxle with a chain fall or other suitable lift and sling, then align attaching bolt holes in carrier and clutch housing. Pilot clutch shaft splines into clutch, then install attaching bolts and tighten securely. Connect clutch pushrod to clutch fork with pin, then position and secure clutch pushrod dust seal assembly. Install starter and fill transmission and differential carrier.

POWERGLIDE TRANSMISSION: Removal - With "Power Train" removed from car, drain transmission, then disconnect hose connecting modulator tube to carburetor balance tube. Remove engine front shield and remove starter. Disconnect converter from engine flex plate by removing the three attaching bolts through the access hole (at 12 o'clock position) in converter housing. Support Transaxle with a chain fall or suitable lift and sling, then remove attaching bolts and lockwashers securing differential carrier to converter housing. Pull Transaxle away from engine and remove converter assembly. Pull turbine shaft out of Transaxle assembly. Place Transaxle on a flat surface and remove screws securing governor assembly and remove governor. Remove three bolts securing transmission to carrier, then carefully pull transmission straight away from carrier to prevent pump shaft from damaging bushings in transmission and pinion shaft. Remove gasket from carrier, then remove governor gear and selective spacers from pinion shaft of carrier.

Installation: *CAUTION - Before connecting Powerglide transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper size thrust washer, install a new gasket to either carrier or rear face of transmission (hold in place with petrolatum). Align carrier and transmission on a flat surface and carefully guide the pump shaft through differential carrier so as not to damage bushing in pinion, then engage splines of pinion shaft with planet carrier internal splines in transmission. Install governor, then secure the transmission-to-carrier with four bolts. Drive the two bolts from carrier side first (to minimize chance of cocking mating surfaces), then tighten bolts to 24-32 ft. lbs. Install turbine shaft, being careful not to damage its bushings as it is inserted over pump shaft splines. *NOTE - Be sure to engage the two splits of splines (forward splines engage clutch drum and the rear set engage into sun gear in planet gearset).* DO NOT tip rear of Transaxle downward after installation unless converter holding plates are used. Position Transaxle adjacent to engine on a chain fall or similar lift, then remove converter holding plates if installed. Align converter with flex plate, then pilot converter hub onto crankshaft. Align mounting holes in differential carrier and converter housing, then secure top left bolt (11 o'clock position). Install flex plate to converter bolt accessible at the "1 o'clock" position to prevent accidental turning of converter or flex plate and loss of attaching hole alignment. Drive remaining converter housing-to-differential carrier mounting bolts, then install starter. Drive the two remaining converter-to-flex plate bolts through the access hole in converter housing. Install engine front shield, then reinsert filler tube through front shield and connect it to oil pan. Connect vacuum modulator to carburetor balance tube with a short length of hose. Refill transmission *(See "Draining & Refilling" above).*

Rear Selective Thrust Washer: *CAUTION - Any time repairs are made that require the separation of Powerglide transmission and differential carrier, the proper thickness of thrust washer to be used at front face of governor gear must be determined as follows:* Install dial indicator on Support J-8364 and install a 3" indicator extension. Without gasket, place support on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator tip rests on planet carrier hub. Adjust indicator as required to permit maximum indicator travel, then set dial to zero. *NOTE - Transmission must face downward when indicator is zeroed.* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero position. *NOTE - If indicator is properly positioned on support, indicator should not deflect more than .050" (one-half turn) when removed; otherwise raise or lower dial indicator on support post as required and again "zero" gauge.* Place support and dial indicator on governor gear on differential carrier pinion shaft (support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator can be counted. *NOTE - Measurement starts once the indicator needle reaches "zero".* Fully depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear.

CONTINUED ON NEXT PAGE



3-SPEED SYNCHRO-MESH TRANSMISSION ASSEMBLY

CORVAIR TRANSAXLE (C nt.)

►*NOTE: Aft r sel ct d spacers ar install d n governor gear, recheck measurement. If spacer stack is correct, indicator reading will now be between .025-.045". If not add or remove spacers until reading is within this rang .*

Thrust Spacer Chart

Indicator Reading	No. Req'd	② Spacer Thickness
.025-.046"①	None	
.047-.062"	1	.016" ± .001"
.063-.078"	2	.032" ± .002"
.079-.094"	3	.048" ± .003"
.095-.110"	4	.064" ± .004"
.111-.126"	5	.080" ± .005"
.127-.142"	6	.096" ± .006"
.143-.155"	7	.112" ± .007"

① - If initial indicator reading is below .025", replace thrust washer at clutch hub (front pump) with a .050" thrust washer, then repeat entire rear thrust spacer selection procedure.

② - Spacer, Part No. 6256827 (.016" thick) furnished. Use number indicated.

OVERHAUL

STANDARD DIFFERENTIAL CASE

S 1960 Final, Pag 433, or later Manual edition and not th following:

Differential case has been redesigned to accommodate side gears of equal length. Because of this change, universal joint trunnions are unequal in length and the differential pinion shaft has flats on both sides to clear longer universal joint trunnions. A new "pressed on" speedometer gear replaces the former integral gear.

Diff r ntial Sid B aring Installation - Use Tool J-8359 to install side bearings on differential case and cover.

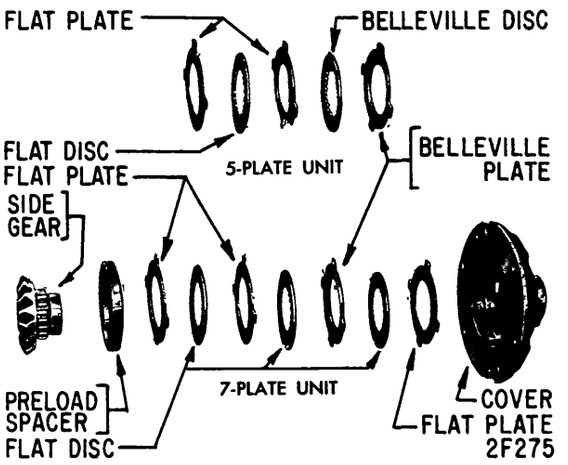
►*DRIVE PINION DEPTH SETTING NOTE (When Installing Service Replacement Drive Pinion):* Ring gear and drive pinion sets manufactured after February 1, 1961 and date coded 2-61 and later will not be marked for pinion mounting distance. On these later service replacement units, select shims using pinion code "14" as indicated in "Pinion Setting Shim Chart" under "Corvair Transaxle" in 1960 Annual Data or later Manual edition.

POSITRACTION DIFFERENTIAL CASE

►*POSITRACTION DIFFERENTIAL UNIT PRODUCTION CHANGE: Early type units consist of seven clutch plat s whil lat r typ units have five plates (see illustration).*

DESCRIPTION: This unit consists of a special differential case which incorporates a multi-plate clutch pack in the right hand side of differential case.

PRELOAD CHECK (ON CAR): If traction is not sufficient under one-wheel slip conditions, check clutch pack pre-load setting as follows: Raise rear of car so both wheels are off ground, then remove wheel and tire assembly from one side only. Install Tool J-8617 with adapter J-2619-4 to rear wheel studs, then back off rear wheel brake adjustment. Rotate axle shaft using a torque wrench while other wheel is held by an assistant. *NOTE - Synchro-m sh transmissi n must b in n utral.* Torque required to turn axle should be a minimum of 15 ft. lbs. (early seven plate clutch); 20 ft. lbs. (later five plate clutch). If torque is below specifications, remove differential assembly and inspect clutch pack.



POSITRACTION DIFFERENTIAL CLUTCH PACK

OVERHAUL: *REMOVAL & INSTALLATION NOTE - See 1960 Final, Page 433, or later Manual edition. Positraction differential case is removed in same manner as for standard differential case.*

Disassembly: Remove differential side bearings with a suitable puller, then remove ring gear attaching bolts and remove ring gear. Mark case and cover with a punch or chisel for proper alignment at reassembly, then remove two flat head screws holding case and cover together. *NOTE - These flat head screws are used during production and it is not necessary to install them at reassembly.* If necessary to disassemble left hand differential gear, pinion shaft, and pinions, see "Standard Differential Case" above. Remove right hand side gear, clutch pack preload spacer and clutch pack.

Inspection: Clean and inspect clutch plates and discs, preload spacer and side gear thrust surfaces for excessive wear, overheating, scoring or surface cracking and replace complete clutch pack if necessary. Clean and inspect preload spacer mating surface on differential case for wear or damage.

Reassembly: Lightly oil clutch plates and side gear, then install clutch plates and discs in the order indicated in illustration. Install preload spacer with chamfered edge upward, then install side gear into clutch pack, making sure splines engage clutch plate splines. Align differential case and cover to marks made at disassembly, then install ring gear. Install ring gear attaching bolts and case and cover together. Tighten bolts to 40-60 ft. lbs. and install side bearing assemblies.

Preload Check (On Bench): Clamp differential assembly in a soft jawed vise, then insert a scrap disassembled axle shaft yoke into one side gear. Slide a piece of 1" x 14" bar stick into yoke, then install a pull scale 12" from differential centerline. Check torque required to rotate yoke and side gear. Torque should be a minimum of 15 ft. lbs. (early 7 plate clutch); 20 ft. lbs. (later 5 plate clutch).

3-SPEED SYNCHRO-MESH TRANS.

S 1960 Final, Page 433, or lat r Manual editi n and not th foll wing: Transmission case has been redesigned to provide piloting on differential carrier pinion front adjusting sleeve. In addition, a cast iron transmission case is used and the transmission mainshaft has been lengthened at output end.

4-SPEED SYNCHRO-MESH TRANS.

See 1961 Final, Page 423.

POWERGLIDE TRANSMISSION

See 1960 Final, Page 433, or later Manual edition and note the following: Line pressure limiting valve has been eliminated and facing material is no longer used on reverse clutch thick reaction ring. On 1200 Series Trucks, transmission oil is cooled by circulating it through a cooler located in left front wheel housing compartment. On these models, a bypass valve located in front pump body allows oil to circulate within the transmission case in the event of any restriction creating a pressure build-up of more than 15 lbs. On all models, the planet carrier assembly can be disassembled for repair as follows:

Planet Carrier: Disassembly - 1) With planet carrier removed from transmission assembly, wash carrier in clean solvent, then blow out all passages and dry with air. Inspect complete unit for damage and wear. Check clearance of planet gears which should be .005-.0035". Place planet carrier assembly in a vise with splined end facing down.

2) Starting with a short planet pinion, and using a soft steel drift punch, drive on upper end of pinion shaft until shaft is driven beyond staked position and press fit area of carrier housing. Feed Tool J-9560-1 into short planet pinion from upper end, pushing planet pinion shaft ahead until tool is centered in pinion. Remove short planet pinion and lower pinion thrust washer from the assembly, then remove pinion shaft.

3) Remove Tool J-9560-1, needle bearings, and needle bearing washers from short planet pinion. *CAUTION - Do not lose any of the planet pinion needle bearings. Twenty long bearings are used with short pinion. Forty short needle bearings are used with long pini ns (twenty on each end with a spacer in the middle).* Remove and disassemble remaining short planet pinions.

4) Remove input sun gear thrust washer, then by following the procedure outlined for removal of short pinions, remove the long planet pinions and upper and lower pinion thrust washers. Wash all parts in solvent and blow dry with air. Recheck all needle bearings and parts and replace as necessary. *CAUTION - If needl bearings are worn, all bearings must be replac d.*

Reassembly: 1) Use Tool J-9560-2 and assemble needle bearing spacer and short needle bearings (20 in each end) in a long planet pinion. *NOTE - Use cup grease to hold needle bearings in position during assembly.* Place a needle bearing washer at each end of planet pinion, then reverse position of planet carrier in vise and position the long planet pinion (with Tool J-9560-2 centered in pinion and with thrust washers at each end) in planet carrier. *NOTE - Oil grooves in thrust washers must be towards gear. Locate short pinions in carri r op nings and l ng pini ns opposit clos d portions of carri r.*

2) Align thrust washers with carrier holes, then select the proper pinion shaft (lubricate it with oil) and in-

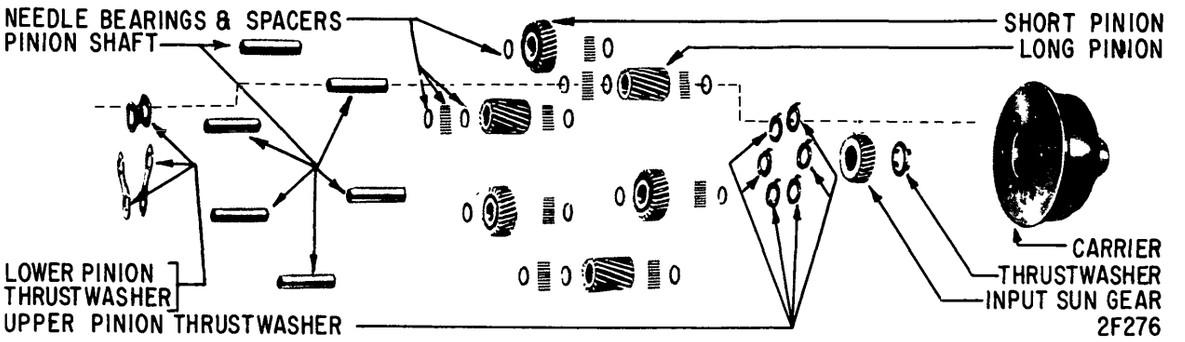
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CORVAIR TRANSAXLE (Cont.)

stall it by tapping with a hammer, pushing Tool J-9560-2 ahead of it. Use a brass or soft steel drift punch and drive pinion shaft until lower end engages staked positions on lower face of carrier.

3) Assemble and install remaining long planet pinions in the same manner, then install input sun gear thrust washer and input sun gear. Follow the same general procedure as outlined for long pinions and assemble and install short pinions in carrier. *NOTE - Paired thrust washers are used on pinion thrust surface toward flanged side of planet carrier, from the short to the long planet pinions while the opposite thrust surface has an individual thrust washer.*

4) Check end clearance of gears which should be .005-.035". Use a chisel or centerpunch and restake pinion shaft at four places on both ends of planet carrier.



POWERGLIDE PLANET CARRIER ASSEMBLY

CHRYSLER CORP. TORQUEFLITE SIX

D dg 6 Cyl. (1962)
Lanc r (1962)
Plym uth 6 Cyl. (1962)
Valiant (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: (Towing car t start is not r comm nd d because of sudden surge f pow r wh n ngin starts).* Turn ignition switch on, then push the "L" (Low) button in and depress accelerator pedal slightly. After car attains a speed of 15 MPH the transmission will start engine.

►*TOWING TORQUEFLITE CARS: Following procedure is r comm nded.*

Transmissi n Op rating Pr perly – Car may be towed safely in "N" (Neutral) at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be disconnected.

Transmissi n In p rativ – Tow car with rear end raised or remove propeller shaft.

►*1962 PARKING SPRAG POOR ENGAGEMENT OR OPERATION CORRECTION:* Check adjustment of park sprag cable *(s "Linkage Adjustment" below).* If adjustment is correct, disconnect propeller shaft from transmission output shaft flange and park sprag cable from sprag adapter cover. Push in and hold park sprag adapter in "apply" position using a 3/8" or 7/16" diameter rod approximately 4" long. Apply 150 ft. lbs. torque to output shaft flange nut in a counterclockwise direction. While holding this torque, remove rod used to push in park sprag adapter. If sprag does hold, release sprag adapter and rotate output shaft. Test sprag at four different positions of output shaft. If sprag holds at all four positions under the above conditions, park cable adjustment or park lock control lever adjustment on push button control box is incorrect. If park sprag will not hold at any one position under the above conditions, replace park sprag pawl in transmission.

►*1962 FRONT PUMP HOUSING BUSHING PRODUCTION CHANGE & 1960–EARLY 1962 TORQUE CONVERTER HUB "SCUFFING" CORRECTION:* Beginning with Transmission Serial No. 396878, a new babbitt Front Pump Housing Bushing, Part No. 2204953, is used in production and for service replacement to prevent scuffing of torque converter hub. *For installation of bushing, s "Ov rhaul" b low.*

DESCRIPTION: Transmission design is same as used on previous models. On all models, a parking pawl in transmission housing is actuated by a cable connected to a lever below push button range selector unit on instrument panel.

OPERATION: In drive range the transmission shifts through all three gear ratios automatically. Shift points are determined by throttle opening and car speed. If additional acceleration is required while in drive range, the transmission will downshift (depending on speed) to second gear automatically when accelerator pedal is completely depressed. When transmission is in intermediate or second position range, operation is in the first two gears only. The low, or first, position range keeps the transmission in first gear only.

LUBRICATION

Ch cking Fluid L vel: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to "N" (Neutral) after button is pushed in. Oil level should be between "Full" mark and "Add 1 Pint" mark. *NOTE - If transmission is cold, fluid level should be at "Add 1 Pint" mark.* Add or remove transmission fluid as necessary.

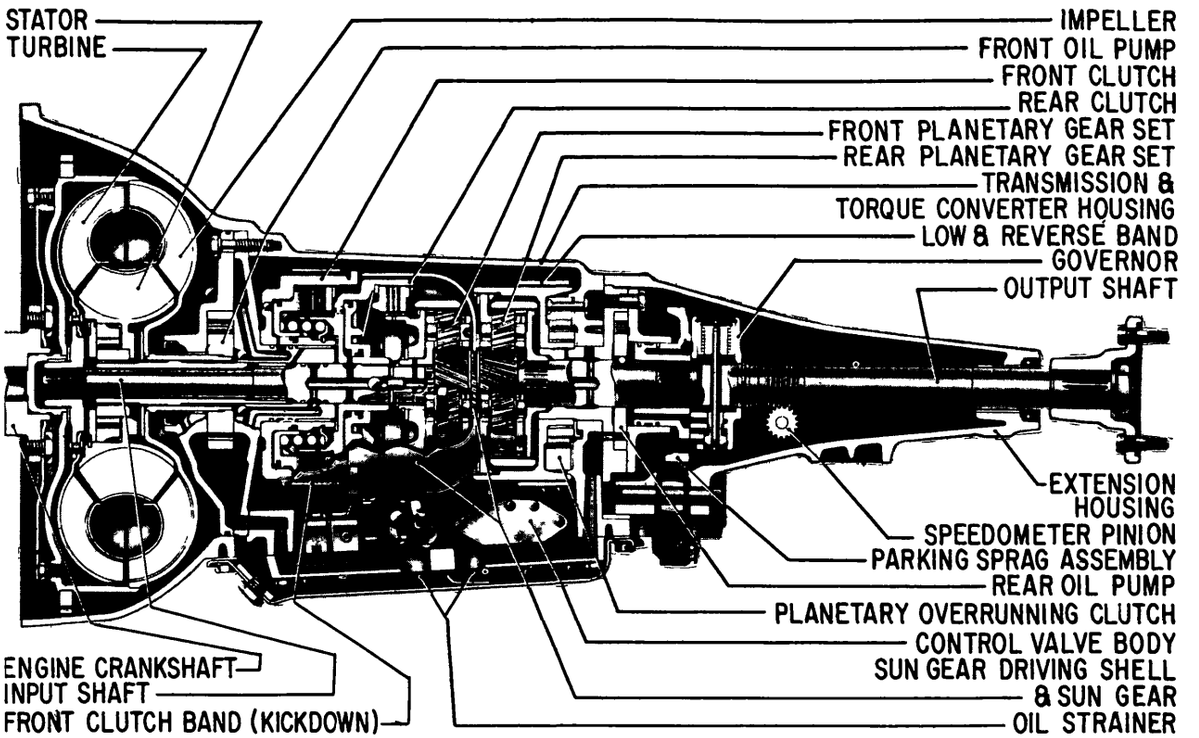
Recommended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

►*CHECKING FLUID LEVEL NOTE:* The above specifications are new and supersede previous specifications. If fluid is checked with transmission COLD, fluid level should be at "Full" mark on dipstick.

Draining & Refilling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and add ten pints (5 qts.) of Automatic Transmission Fluid Type "A" (Suffix "A") through transmission oil filler tube. Start engine and add approximately three more pints with engine idling. Allow engine to idle for two minutes, then operate all pushbuttons, pausing momentarily in each position, and ending with the "N" (Neutral) button pushed in. Check fluid level and add sufficient fluid to bring level to "F" mark on dipstick.

Fluid Capacity: Approximately 14 pints (all models).

►*TRANSMISSION MAINTENANCE NOTE: It is r comm nded that wh n transmission is drained, oil pan should b r moved and cleaned, oil screen clean d, and transmission bands and linkage be adjusted.*



TORQUEFLITE SIX TRANSMISSION SECTIONAL VIEW

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See "Carburetor" on car model pages.*

Manual Control Cable Adjustment: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse) pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lockscrew at left side of transmission case.

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only three or four threads are showing behind wheel on the guide. *CAUTION – Check wheel for free turning on guide and remove any burrs in threads that might interfere. Lubricate threads with a few drops of transmission fluid.*

3) Hold cable guide centered in hole in transmission case and apply only enough inward pressure to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 30–50 inch pounds.

Parking Lock Cable Adjustment: To check adjustment, operate parking lock lever from one end of slot in instrument panel to the other. The lever should have clearance at both ends. *NOTE – On hole in parking*

CONTINUED ON NEXT PAGE

CHRYSLER CORP. TORQUEFLITE SIX (C nt.)

lock arm is slotted to permit parking lock lever adjustment. To adjust, move lever to fully OFF position, then loosen two nuts attaching lock arm to push button housing. *NOTE – Loosen nuts just enough to free lever arm.* Block locking lever 1/16" from OFF position end of slot, then tighten both nuts on push button housing. Recheck lever travel to be sure clearance exists at both ends of travel. Have an assistant hold parking lock lever on instrument panel in OFF position, then loosen clamp bolt securing cable housing in parking pawl lever cover on bottom of transmission extension housing. Tap end of clamp lightly to release its hold on cable, then pull gently outward on cable housing to limit of its travel and tighten clamp bolt to 10 inch pounds. *CAUTION – Do not use pliers or similar tool to pull outward on cable as cable cover might be damaged.* Check adjustment by allowing car to roll slowly on a slight incline. Parking pawl should freely engage sprag with lever in ON position, and there should be no ratcheting noise with lever in OFF position.

Neutral Safety Switch Adjustment: Raise car and drain approximately two quarts of fluid from transmission, then unscrew neutral safety switch and check to see that switch operating lever is aligned with center of switch opening in case. Place cupped washer and "O" ring over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and the other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3–½ turn. *NOTE* – Switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust the switch. Remove test lamp and connect wire to switch. Add fluid to transmission to bring up to proper level.

BAND ADJUSTMENT

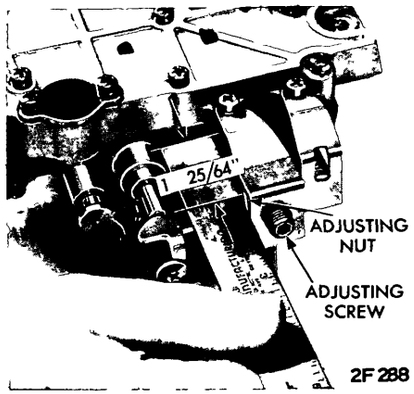
Kickdown (Front) Band: Kickdown band adjusting screw is located on left side of transmission case near throttle shaft lever. Loosen locknut and back off approximately five turns. Check adjusting screw for freeness in transmission case, then tighten adjusting screw to a reading of **47–50 inch pounds** using Tool C–3380 with Adaptor Tool C–3790. Using a reference mark of chalk or colored pencil on corner of adjusting screw square and transmission case, back the adjusting screw out **exactly** 2 turns (225" Engine); 2 5/8 turns (170" Engine). While holding adjusting screw stationary, tighten locknut to 20–25 ft. lbs.

Low-Reverse Band: Drain transmission and remove oil pan, then loosen the adjusting screw locknut and back locknut off approximately five turns. *NOTE – Adjusting screw is located in low-reverse band lever.* Check adjusting screw for free turning in lever, then tighten adjusting screw to a reading of **47–50 inch pounds** using Tool C–3380 and Adaptor Tool C–3790. Back off adjusting screw exactly 5¼ turns (all models) and tighten locknut to 20–25 ft. lbs. *NOTE – Hold adjusting screw from turning while tightening locknut.*

TESTING

HYDRAULIC CONTROL PRESSURE TESTS: All of the following pressure tests must be made with the transmission at normal operating temperature.

Line Pressure & Front Servo Release Pressure: Install a tachometer on engine, then raise car and position the tachometer so it can be read under the car. Connect two 0–100 psi pressure gauges, Tool C–3292, to pressure takeoff points at top of accumulator and at front servo release (see illustration). With transmission selector lever in "D" (Drive) position, and wheels free to turn, speed up engine slightly until transmission shifts into direct drive. Reduce engine speed slowly to 800 RPM. Line pressure at this time must be 52–60 lbs., and front servo release pressure should be 45 lbs. or higher. Disconnect throttle linkage at transmission lever and hold transmission throttle lever at detent position. Increase engine speed to 3500 RPM with transmission in direct drive. At this point, line pressure should be 90–96 lbs. and front servo release pressure should be 80 lbs. or greater. *NOTE – Open transmission throttle lever when operating engine at speeds in excess of 1500 RPM.* If line pressure is not 52–60 lbs. at 800 RPM, adjust pressure (see below). *CAUTION – Do not adjust line pressure to correct reading at 3500 RPM.*



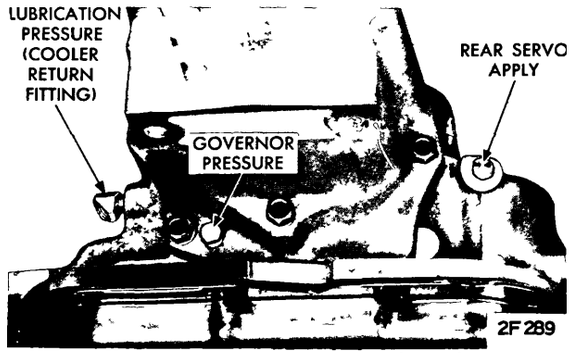
LINE PRESSURE ADJUSTMENT

Line Pressure Adjustment: Remove valve body assembly from transmission and adjust the "Allen" type screw in end of pressure regulator spring bracket so the measurement between valve body and inner edge of adjusting nut on end of spring is 1 25/64" (see illustration). *NOTE – The above adjustment can be varied to obtain specified line pressure. Turning screw counterclockwise increases pressure.*

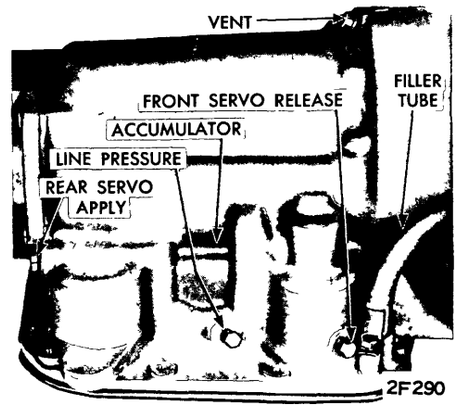
Lubrication Pressure: Install a "tee" fitting between cooler return line fitting and fitting hole in transmission case at rear left side of transmission case. Connect a 0–100 psi pressure gauge, Tool C–3292, to "tee" fitting. At 800 RPM, with throttle lever in closed position and transmission in direct drive, pressure should be 5–25 lbs.

Rear Servo Apply Pressure: Connect a 0–300 psi pressure gauge, Tool C-3293, to apply pressure takeoff point at rear servo, then with transmission selector lever in "R" (Reverse) and engine speed at 1600 RPM, the reverse servo pressure should be 230–280 lbs. Not adjustable.

Governor Pressure: Connect a suitable pressure gauge to governor pressure take-off point located on lower left side of extension housing just back of extension housing mounting flange. Governor pressure should be within limits indicated in table below. If pressure not correct, governor valve or weights are sticking.



PRESSURE TEST LOCATIONS (REAR)



PRESSURE TEST LOCATIONS (RIGHT SIDE)

Governor Pressure (Lancer & Valiant 170" Engine)

Governor Pressure	Car Speed (MPH & Axle Ratio) 3.23–1	3.55–1
15 lbs.	16–17	14–15
45 lbs.	29–39	27–35
60 lbs.	59–66	54–60

Governor Pressure (Dodge & Plymouth 225" Engine)

Governor Pressure	Car Speed (MPH) & Axle Ratio 2.93-1	3.23-1	3.31-1	3.58-1
15 lbs.	17-19	16-17	15-17	14-16
45 lbs.	30-39	27-36	27-35	25-32
60 lbs.	63-72	56-65	55-63	50-58

Governor Pressure (Lancer & Valiant 225" Engine)

Governor Pressure	Car Speed (MPH) & Axle Ratio 2.93-1	3.23-1	3.55-1
15 lbs.	17-19	15-17	14-15
45 lbs.	29-38	26-34	24-31
60 lbs.	60-69	55-63	50-57

Throttle Pressure: *NOTE – No provision is made to check throttle pressure. However, if pressure adjustment is made correctly, as indicated below, pressure is assumed to be correct.*

CONTINUED ON NEXT PAGE

CHRYSLER CORP. TORQUEFLITE SIX (C nt.)

Throttl Pr ssur Adjustm nt – Remove valve body assembly from transmission, then loosen throttle lever stop screw locknut and back off screw approximately five turns. Insert gauge pin of Tool C–3763 between throttle lever cam and kickdown valve. By pushing in on tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body. As force is being exerted to compress the spring, tighten throttle lever stop screw finger tight against throttle lever tang with throttle lever cam touching the tool and throttle valve bottomed. *CAUTION – B sure th adjustment is made with spring fully c mpr ss d and valve bottomed in valve body.* Remove tool and tighten stop screw locknut securely.

AIR PRESSURE TESTS: Front clutch, rear clutch, kickdown servo, and low-reverse servo may be checked by applying air pressure to their respective passages after valve body assembly is removed. See illustration for location of passages.

Front Clutch: Apply air pressure to front clutch passage and listen for a dull "thud" indicating that front clutch is operating. Hold air pressure on for a few seconds and check system for excessive oil leakage.

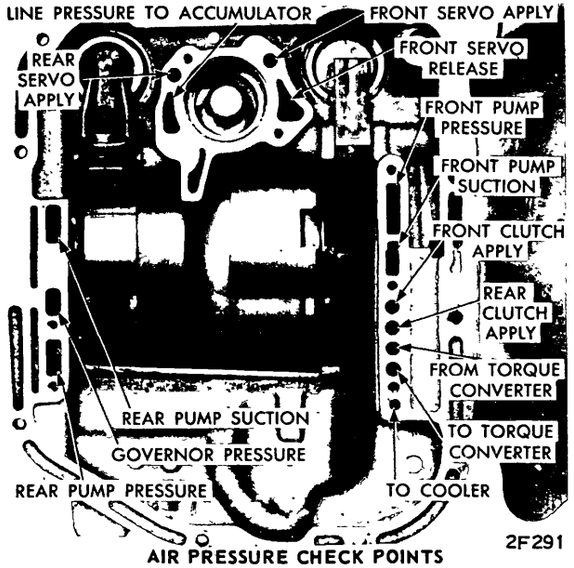
R ar Clutch: Apply air pressure to rear clutch passage and listen for dull "thud" indicating that rear clutch is operating. Hold pressure on for a few seconds and check system for excessive oil leakage.

►*NOTE: If a dull "thud" cannot be heard in the clutches, place finger tips on clutch housing and again apply air pressure. Piston mov ment can be felt as clutch is applied.*

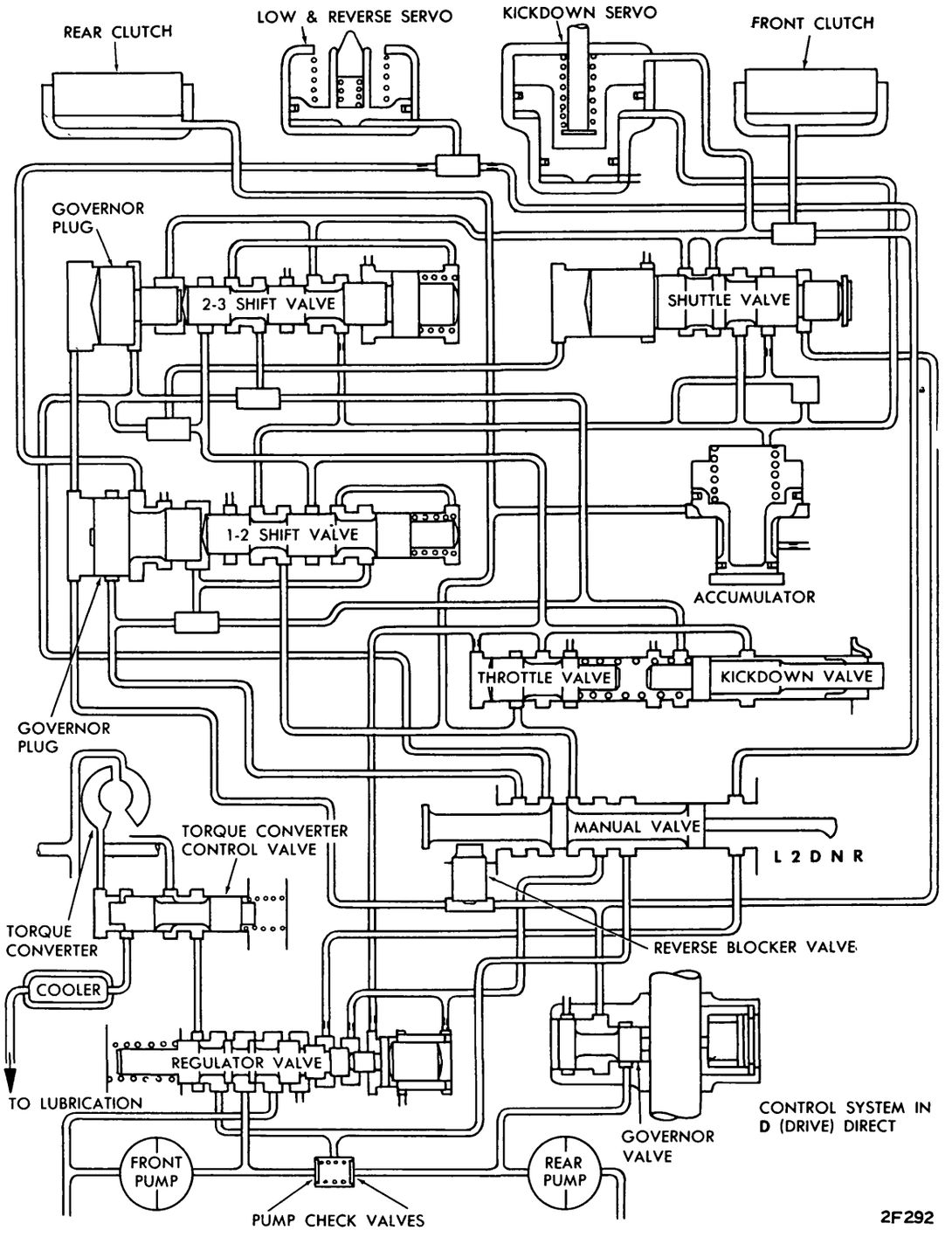
Kickd wn Serv : Direct air pressure into kickdown servo "apply" passage. Operation of servo is indicated by a tightening of front band. Spring tension on servo piston should release the band.

Low-R v rs S rv : Direct air pressure into low-reverse servo "apply" passage. Operation of servo is indicated by a tightening of rear band. Spring tension on servo piston should release band.

CONTINUED ON NEXT FAGE



AIR PRESSURE CHECK POINTS



HYDRAULIC CIRCUIT DIAGRAM

CHRYSLER CORP. TORQUEFLITE SIX (Cont.)

►*AIR PRESSURE TEST NOTE: If all the above units operate properly, "no drive", "erratic" and "no upshift" conditions are caused by trouble in the control valve assembly.*

Transmission Shift Speeds (Lancer & Valiant 170" Engine)

Throttle Position	Car Speed (MPH) & Axle Ratio	
	3.23-1	3.55-1
Closed (1-2 Upshift)	6-11	6-10
Closed (2-3 Upshift)	10-14	9-13
Wide Open (1-2 Upshift)	25-41	23-36
Wide Open (2-3 Upshift)	58-69	52-63
Kickdown Limit (3-2)	46-62	42-56
Kickdown Limit (3-1)	24-35	22-32
Downshift (Closed)	4-10	4-9

Transmission Shift Speeds (Lancer & Valiant 225" Engine)

Throttle Position	Car Speed (MPH) & Axle Ratio		
	2.93-1	3.23-1	3.55-1
Closed (1-2 Upshift)	7-13	6-12	6-10
Closed (2-3 Upshift)	11-16	10-14	9-13
Wide Open (1-2 Upshift)	28-40	25-36	23-33
Wide Open (2-3 Upshift)	59-72	53-65	49-59
Kickdown Limit (3-2)	46-63	42-57	38-53
Kickdown Limit (3-1)	27-33	24-30	22-28
Downshift (Closed)	5-12	4-19	4-10

Transmission Shift Speeds (Dodge & Plymouth 225" Engine)

Throttle Position	Car Speed (MPH) & Axle Ratio			
	2.93-1	3.23-1	3.31-1	3.58-1
Closed (1-2 Upshift)	7-13	7-12	6-12	6-11
Closed (2-3 Upshift)	12-16	10-15	10-14	9-13
Wide Open (1-2 Upshift)	29-41	26-37	25-36	23-33
Wide Open (2-3 Upshift)	62-75	55-68	54-66	50-61
Kickdown Limit (3-2)	49-66	44-60	42-58	39-54
Kickdown Limit (3-1)	28-35	25-31	24-30	22-28
Downshift (Closed)	5-12	5-11	4-11	4-10

GEARSHIFT CONTROL UNIT & PARKING LOCK

PUSH BUTTON CONTROL UNIT (ALL MODELS): Removal – Disconnect ground cable from battery, then remove parking handle from lever. Disconnect back-up lamp switch wire connectors (if so equipped). Remove three nuts securing control assembly on instrument panel and carefully work assembly to rear out of cluster. Remove push buttons by pulling them off push button slides, then unscrew two nuts and remove mounting bracket from control assembly. Remove hairpin lock securing gearshift control cable on actuator and remove cable. Disconnect parking lock cable from control and remove parking lock arm from control.

Adjustment: *NOTE – If transmission fails to shift into Neutral when parking lock is applied, check parking lock cable adjustment at transmission before adjusting push button control unit.* Remove overcenter spring and back off lever stop screw. Make sure there is no binding in neutral slide, neutral slide pin and bushing, cam pivot, and that all parts are lubricated. Hold neutral slide in against rocker bar with about 5—10 lbs. load, then loosen locknut and rotate cam so the lever nose just touches neutral slide pin as it passes over pin when moving parking lock lever from OFF to ON position. *NOTE – Only light contact should occur so that lever does not hang up on pin.* Hold cam in this position and tighten locknut to 95 inch pounds, then install overcenter spring. Adjust lever stop screw to obtain .010" clearance between neutral slide pin and lever heel. Tighten lever stop screw locknut securely.

Installation: Install parking lock arm on control unit and secure with washers and nuts. Connect parking lock cable and secure cable in control bracket, then place end of gearshift control cable on actuator and secure with hairpin clip. Secure cable in control bracket. Install mounting bracket on control and tighten nuts securely, then install push buttons in proper order on control actuator slides. Carefully guide control unit into position from rear of instrument housing and tighten retaining nuts securely. Operate push buttons and correct any binding that might exist, then install parking lock control handle and connect back up switch wires.

MANUAL CONTROL CABLE: Removal - Drain 2 quarts of fluid from transmission, then depress "L" (Low) push button. Remove neutral starting switch and remove control cable-to-adjusting wheel lock screw. Insert screwdriver through neutral starting switch opening, then push screwdriver gently against upper projecting portion of cable lock spring and pull outward on cable to remove cable from adapter and transmission case.

Installation: Have an assistant hold the "R" (Reverse) button fully depressed, then back adjusting wheel off until two or three threads are showing behind wheel on guide. Lubricate cable guide with transmission lubricant, insert cable in transmission case, push inward on cable making sure lock-spring engages cable. Adjust control cable *(see "Adjustment" above)*, then fill transmission with recommended fluid.

PARKING LOCK CABLE (TRANSMISSION END): Removal – Loosen parking lock cable clamp bolt where cable enters housing cover, then remove housing cover lower plug. With a screwdriver inserted through plug opening, push gently against projecting portion of lock spring, then withdraw lock cable. *CAUTION – Do not use pliers or similar tools to withdraw cable from adapter cover as cable might be damaged.*

Installation: Place parking lock lever on instrument panel in OFF position, then insert screwdriver through plug opening and position it behind cable adapter stop washer. Hold adapter outward while pushing cable in as far as possible, making sure lock spring engages cable. Gently pull outward on cable to its limit of travel, release and then tighten clamp bolt to 10 inch pounds. Reinstall plug in cover and tighten to 35 inch pounds.

PUSH BUTTON LAMP REPLACEMENT: Lancer & Valiant – Lamp is located just above main light switch on back side of instrument panel. Remove bulb socket from back of instrument panel.

Dodge: Lamp is located on back of instrument panel just above push buttons. Remove bulb socket from rear of instrument panel.

Plymouth: Lamp is located approximately in center of push button cluster. Instrument cluster must be removed, as follows, for access to bulb. Disconnect speedometer cable, and remove heater blower switch and temperature control knobs. Remove instrument cluster retaining screws and lift out cluster assembly. Slide a short piece of tight fitting rubber hose over bulb to remove it from socket.

BACK-UP LIGHT SWITCH REPLACEMENT: All Models - Remove push button control housing assembly, then straighten tabs securing switch to housing. Install switch and bend tabs to retain it in place. Install housing and connect switch and lamp wires.

TORQUE CONVERTER

►*TORQUE CONVERTER NOTE: This is a sealed unit and cannot be disassembled for overhaul. In the event of parts failure in transmission, the torque converter should be flushed as described below.*

FLUSHING TORQUE CONVERTER: With torque converter assembly removed from engine, place it in an upright position and pour two quarts of clean solvent or kerosene into converter through impeller hub. Turn and shake converter so as to swirl solvent through internal parts. *NOTE - Turning turbine and stator with transmission input and reaction shafts will help to dislodge foreign material.* Position converter in its normal operating position with drain plug at lowest point, then drain solvent. Rotate turbine and stator, and shake converter while draining. Repeat the above operation at least once, or as many times as required until solvent is drained out clean. After flushing, shake and rotate converter several times with drain plug out to remove all solvent and dirt. Reinstall drain plug and tighten to 20 ft. lbs.

TRANSMISSION REMOVAL & INSTALLATION

►*TRANSMISSION & TORQUE CONVERTER REMOVAL CAUTION:* Transmission and torque converter must be removed and installed as an assembly to prevent damage to converter drive plate, front pump bushing, and oil seal. *DO NOT allow weight of transmission to rest on plate during removal or installation.*

REMOVAL: 1) Connect a suitable Remote Control Starter Switch (Tool C-763 or equivalent) so engine can be rotated from under car, then disconnect high tension lead from distributor. Raise car on a hoist or support on stands and drain converter and transmission.

2) Mark converter and drive plate for use at reassembly. *NOTE - Crankshaft flange bolt circle, inner and outer circle of holes in drive plate, and the four tapped holes in front face of converter all have one hole offset so these parts will be installed in original position.*

3) Rotate engine to locate two converter-to-drive plate bolts at "5" and "7" o'clock positions and remove bolts, then rotate engine and remove remaining two bolts. *CAUTION - Do not rotate converter or drive plate by prying with a screwdriver or other tool. DO NOT engage starter if drive plate is not attached to converter with at least one bolt or if transmission case-to-engine bolts have been loosened.*

4) Position control cable for removal by depressing "1" (Low) pushbutton, then disconnect negative cable from battery. Remove starter motor assembly, then remove starter neutral safety switch from transmission case. Remove pushbutton control cable-to-transmission adjusting wheel lockscrew and insert a screwdriver through neutral starter switch opening and push gently against upper projecting portion of cable lock-spring, then pull outward on cable to remove it from adaptor and transmission case.

5) Remove throttle link and lever assembly from transmission throttle shaft, then disconnect oil cooler lines

CONTINUED ON NEXT PAGE

CHRYSLER CORP.
TORQUEFLITE SIX (C nt.)

at transmission and remove oil filler tube. Remove speedometer pinion and sleeve assembly, then loosen transmission parking pawl cable clamp where cable enters cover and remove housing cover lower plug. Insert a screwdriver through hole and gently exert pressure against projecting portion of cable lock spring and withdraw cable.

6) Disconnect propeller shaft at transmission and secure out of way. Remove nuts and washers securing transmission extension housing insulator to crossmember, then install support fixture C–3806 and raise engine slightly. Remove crossmember, then place a transmission jack under transmission to support the assembly. Attach a small "C" clamp to edge of bell housing to hold converter in place during removal.

7) Remove bell housing retaining nuts, then carefully work transmission and converter assembly toward rear off engine block dowels and disengage converter hub from end of crankshaft. Remove transmission and converter from under car. To remove converter assembly, remove "C" clamp from edge of bell housing, then carefully slide converter assembly out of transmission.

INSTALLATION: 1) To install converter on transmission, rotate front pump rotors with Tool C–3756 until two small holes in tool handle are vertical, then carefully slide converter assembly over input shaft and reaction shaft, making sure that converter impeller shaft slots are also vertical and engage front pump inner rotor lugs. *CAUTION – Check for full engagement by placing a straight dge across face of case. Surface of conv rter front cov r lug should be at least ½" to rear of straight dg wh n converter is pushed all the way into transmission.* Attach a "C" clamp in same manner as for transmission removal.

2) Coat converter hub hole in crankshaft with wheel bearing grease, then place transmission and converter assembly on jack and raise into position. Rotate converter so mark (made at removal) will align with mark on drive plate. *NOTE – The offset holes are located n xt t 1/8" h l in inner circle of plate. A stamped "V" mark id ntifi s offs t hole in converter front cover.*

3) Carefully work transmission forward over engine block dowels with converter hub entering crankshaft opening. After transmission is in position, install bell housing bolts and tighten to 25–30 ft. lbs. Install and tighten two lower drive plate–to–converter bolts to 270 inch lbs., then install starter motor and connect battery ground cable. Rotate engine with remote starting switch and install remaining two drive plate–to–converter bolts and tighten to 270 inch lbs.

4) Install crossmember and insulator assembly and tighten attaching bolts to 75 ft. lbs., then lower transmission so extension housing rests on, and is aligned, with insulator. Install insulator–to–extension housing bolts and tighten to 35 ft. lbs.

5) Insert a screwdriver through parking lock cover plug opening and position it behind cable adapter stop washer, then hold adapter outward while pushing cable in as far as possible. Make sure lock spring engages cable, then gently pull outward on cable housing to its limit of travel and tighten clamp bolt to 10 inch lbs. Remove screwdriver and install plug. Connect propeller shaft, oil cooler lines and oil filler tube. Install speedometer drive pinion and sleeve, then position throttle lever on transmission throttle and tighten clampscrew.

6) Have an assistant engage "R" (Reverse) push button and hold it firmly depressed. Insert push button control cable in transmission case, then push inward on cable, making sure lock spring engages cable. Install control cable adjusting wheel retaining screw. Install neutral starting switch and connect wire, then install cover plate in front of converter assembly.

7) Install transmission case–to–cylinder block brace. *NOTE – Converter cover plate must be between case and brace with oil line bracket attached in front of brace. Tighten the bolts holding brace to case before attaching brace to cylinder block.* Refill transmission and adjust linkage and cable controls. *See "Adjustment" above.*

TRANSMISSION OVERHAUL

See 1960 Final Data, Page 449, or later Manual edition and note the following:

► *1962 FRONT PUMP HOUSING BUSHING PRODUCTION CHANGE & 1960–EARLY 1962 TORQUE CONVERTER HUB "SCUFFING" CORRECTION:* Beginning with Transmission Serial No. 396878, a new babbitt Front Pump Housing Bushing, Part No. 2204953 is being used in production and for service replacement to prevent scuffing of torque converter hub. Install bushing as follows: With front pump housing removed from transmission, place pump housing (seal face–down) on a smooth firm surface, then place removing head, Tool SP–3551, in bushing and install handle, Tool SP–3549, in removing head. Drive bushing straight down and out of pump housing bore. *CAUTION – Do not cock tool in bore.* Position a new type bushing on installing head, Tool SP–3624, then with front pump housing on a smooth surface, start bushing and installing head in bushing bore. Install handle, Tool SP–3549, in installing head and drive bushing into housing until tool bottoms in pump cavity. *CAUTION – Do not cock tool in bore.* Stake bushing in place with a punch or similar tool (a slight tap at each stake slot location is all that is necessary). Use a narrow blade knife or similar tool and remove burrs or high points around staked area. *CAUTION – Do not use a file or other tool that will remove more metal than is necessary.* Clean pump housing thoroughly and install in transmission.

Front Pump & Torque Converter: Driving lugs on front pump inner rotor are located in center of inner rotor and both faces of lugs are square. The diameter which pilots rotor on converter impeller hub is also located at center of rotor. Converter impeller has two slots to drive rotor instead of two tangs used on previous models. There is no difference between front and rear side of rotor, however, marks (made at time of disassembly) must be aligned when reassembled.

R acti n Shaft Supp rt–t –Fr nt Clutch Thrust Wash r: A fibre thrust washer has been added between reaction shaft support and front clutch assembly. This washer is .043–.045" thick and should be replaced if worn or damaged.

Front Clutch (170" Engine): Three friction discs and the three steel plates are used (replacing the previous four friction discs and four steel plates). Front clutch clearance for the new assembly is .042–.087". *CAUTION – These new discs, Part No. 2205203, ar not interchangeable with those used on previ us models. DO NOT use for replacement on 225" engin transmissions.* A three disc clutch assembly can be used to replace a four disc assembly in any 170" engine transmission providing the following parts are used: Front Clutch Retainer Assembly, Part No. 2205325; Front Clutch Disc Assembly, Part No. 2205203; Front Clutch Piston Spring, Part No. 2205233; Front Clutch Plate 1942403.

Packing Pawl & Lever: Removal – Remove parking lock cable adapter cover from bottom of extension housing and remove adapter from lock lever. Slide shaft out of extension housing to remove lock lever and shim. Slide bushing sleeve out of housing to remove pawl and spring.

Inspection – Check bushing sleeve and shaft for scores and free movement in housing and in pawl and lever. Check roller for nicks, burrs and free turning. Inspect square lug on pawl for broken edges or other damage.

Reassembly – Position parking pawl and spring in housing and insert sleeve. Make sure square lug on pawl is toward the sprag, and the spring is positioned so as to lift pawl away from sprag. Attach cable adapter to lock lever. *NOTE – Make sure adapter is prop rly attached.* Insert small punch through cable opening in adapter cover and into end of adapter. Carefully lower cover into position, feeding adapter into cable opening in cover. Install retaining screws and tighten to 150 inch lbs.

Governor & Parking Sprag: Removal – Remove large snap ring from weight end of governor housing and lift out weight assembly. Remove snap ring from inside governor weight, then remove inner weight and spring from outer weight. If lugs on parking sprag are damaged, remove four screws and separate sprag from governor.

Inspection – Inspect all parts for burrs and wear. Check inner weight for free movement in outer weight, and outer weight for free movement in governor housing. Weights and valves should fall freely when clean and dry. Remove rough surfaces with crocus cloth. Check governor weight spring for distortion. Inspect lugs on sprag for broken edges or other damage.

Reassembly – If parking sprag was separated from governor housing, assemble and tighten screws finger tight. *CAUTION – Make sure oil passages of govern r housing align with passages in sprag, then tight n screws.* Assemble governor weights and springs, and secure with snap ring inside of large governor weight. Place weight assembly in housing and install snap ring.

CHRYSLER CORP.
TORQUEFLITE EIGHT

Chrysler & Imperial (1962)
Dodge V8 (1962)
Plymouth V8 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: (Towing car to start is not recommended because of sudden surge of power when engine starts).* Turn ignition switch on, then push the "L" (Low) button in and depress accelerator pedal slightly. After car attains a speed of 15 MPH, the transmission will start engine.

►*TOWING TORQUEFLITE CARS: Following procedure is recommended:*

Transmission Operating Properly - Car may be towed safely in "N" (Neutral) position at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be disconnected.

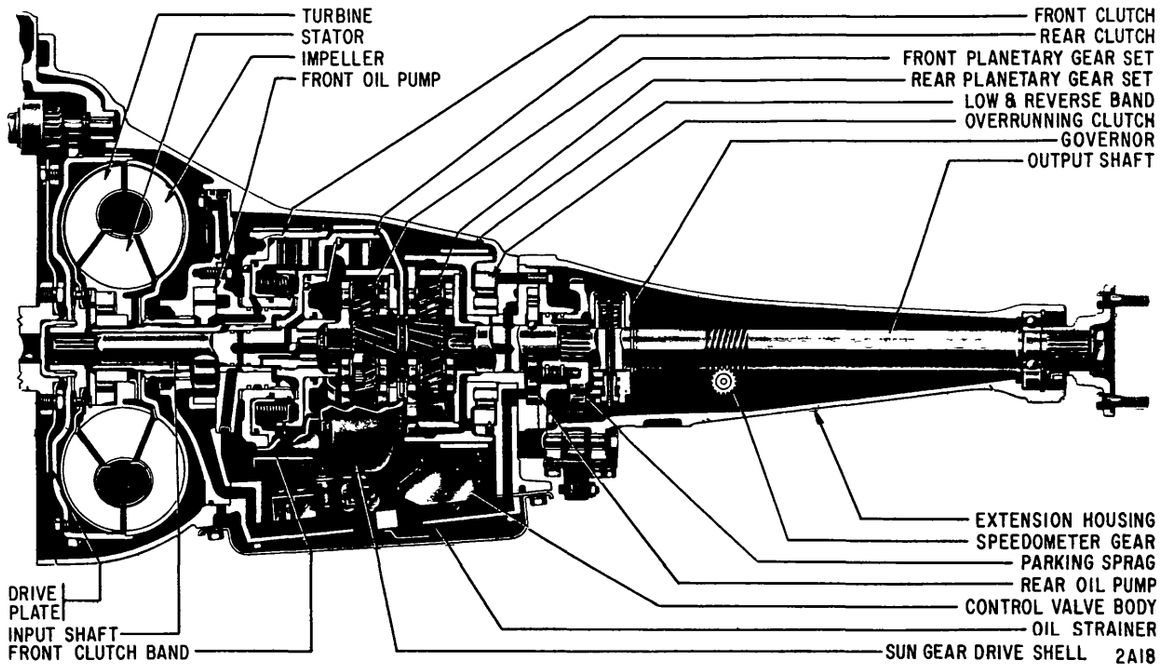
Transmission Inoperative - Tow car with rear end raised or remove the propeller shaft.

►*1962 (EARLY) TORQUEFLITE EIGHT OIL LEAKAGE AT FRONT PUMP HOUSING AIR VENT CORRECTION:* Attach Baffle, Part No. 2400479, to the two top reaction shaft support bolts inside front pump housing. Baffle will shield vent opening and prevent oil passing through vent. Make sure baffle has sufficient clearance between pump housing and clutch retainer. Transmissions after Serial No. 154439 have the baffle installed in production.

►*1962 TORQUEFLITE EIGHT (EXCEPT CHRYSLER & DODGE 880) PARKING SPRAG POOR ENGAGEMENT OR OPERATION CORRECTION:* Check adjustment of park sprag cable (see "Linkage Adjustment" below). If adjustment is correct, disconnect propeller shaft from transmission output shaft flange and sprag cable from sprag adapter cover. Push in and hold park sprag adapter in the "apply" position using a 3/8" or 7/16" diameter rod approximately 4" long. Apply 150 ft. lbs. torque to output shaft flange nut in a counterclockwise direction. While holding this torque, remove rod used push in park sprag adapter. If sprag does hold, release sprag adapter and rotate output shaft. Test sprag at a minimum of four different positions of output shaft. If sprag holds at all four positions under the above conditions, park sprag cable adjustment or park lock control lever adjustment on the push button control box is incorrect. If park sprag will not hold at any one position under the above conditions, replace park sprag pawl.

DESCRIPTION: Three-speed automatic transmission and torque converter consisting of two multiple disc clutches, an overrunning clutch, two servos and bands, and two planetary gear sets. The torque converter housing and transmission case are an integral aluminum casting. The hydraulic system consists of a front and rear pump, and a single valve body which contains all of the valves except governor valve. Transmission fluid is cooled by circulating through an oil-to-water type cooler located in radiator lower tank. A disposable type filter with an integral relief valve is located in cooler-to-transmission return line. The torque converter is a sealed unit which cannot be disassembled.

OPERATION: Neutral - No clutches are engaged or bands applied.



TORQUEFLITE EIGHT TRANSMISSION SECTIONAL VIEW

Drive: In direct (high), front and rear clutches are engaged and front and rear bands are released. Front planetary pinions cannot rotate, therefore, the front planetary cage (splined to output shaft) rotates output shaft at same speed as input shaft thus obtaining direct drive.

Second: Rear clutch is engaged, driving front annulus gear, pinions and sun gear. At the same time, the front band is applied, holding the front clutch, driving shell and sun gear stationary. With rear clutch engaged, the clutch, front annulus gear and front planetary pinions all rotate clockwise. The applied front band holds the driving shell and sun gear from turning, therefore, with sun gear held stationary, planet pinions roll clockwise around sun gear, turning front planetary cage (splined to output shaft) in same direction at reduced speed.

Low: Rear clutch is engaged and drives front annulus gear, front planetary pinions and sun gear. Low and reverse drum and rear planetary cage are held stationary by rear band and overrunning clutch. With rear clutch engaged, the clutch, front annulus gear, and front planetary pinions all rotate clockwise, which turns sun gear counterclockwise. With rear planetary cage held stationary, sun gear (rotating counterclockwise), rotates rear planet pinion clockwise which turns rear annulus gear (splined to output shaft) in same direction at reduced speed.

Revers : Front clutch is engaged to drive the driving shell and sun gear. Low and reverse drum and rear planetary cage are held stationary by rear band. With front clutch engaged, the clutch, driving shell and sun gear all rotate clockwise. With rear planetary held stationary, the sun gear (rotating clockwise) rotates rear planet pinions counterclockwise, which turns rear annulus gear (splined to output shaft) in reverse direction at a reduced speed.

Breakaway (Car standing, engine perating, and "D" button depressed): Rear clutch is engaged, which drives front annulus gear, front planetary pinions and sun gear. Rear planetary cage is prevented from turning counterclockwise by overrunning clutch. With rear clutch engaged, the clutch, front annulus gear and front planetary pinions all rotate clockwise which turns the sun gear counterclockwise. The sun gear tends to rotate rear planetary cage and drum counterclockwise, which is immediately locked by overrunning clutch. With rear planetary cage held stationary, then sun gear (rotating counterclockwise) rotates rear planetary pinions clockwise which turns rear annulus gear (splined to output shaft) in the same direction at low range ratio.

Kickdown (Direct Drive to Sec nd): In kickdown from direct drive, the transmission shifts back to same power flow as outlined for "Second".

Kickdown (Second to Low): In kickdown from second the transmission shifts back to same power flow as outlined for "Breakaway".

Retarding: When retarding in low gear, the low and reverse drum and rear planetary cage are held stationary by the low and reverse band to provide engine braking.

CONTINUED ON NEXT PAGE

CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

LUBRICATION

Checking Fluid L v l: Check transmission fluid level every 4000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. Fluid level should be between "FULL" mark and "ADD ONE PINT" mark. *CAUTION - Fluid should nev r be abov "FULL" mark with transmissi n at n rmal perating temperature.* If transmission fluid level is checked with transmission cold, fluid level should be at "ADD ONE PINT" mark to 3/8" below "ADD ONE PINT" mark.

R c mm nd d Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity - 18 pints (Dodge & Plymouth); 19 pints (Chrysler).

Draining & Refilling: Drain & refill transmission and torque converter every 32,000 miles (more frequently for cars operating in hot weather or with abnormal loads). Remove transmission drain plug, then remove access cover from torque converter housing and drain converter. Remove lower plug from parking sprag cover and allow to drain (except Chrysler). Install and tighten drain plugs, then replace fluid filter (located in oil cooler-to-transmission return line). Pour 8 qts. of recommended fluid into transmission, then start engine and allow it to idle for at least two minutes. Apply parking brake and depress each pushbutton momentarily, ending with neutral button pushed in. Add sufficient fluid to bring level to "ADD ONE PINT" mark on dipstick. Recheck fluid level after transmission is at normal operating temperature. Fluid level should be as indicated in "Checking Fluid Level" above.

►*TRANSMISSION MAINTENANCE NOTE:* It is recommended that when transmission is drained, oil pan should be removed and cleaned, oil screen cleaned, transmission bands adjusted, and pushbutton cable adjusted.

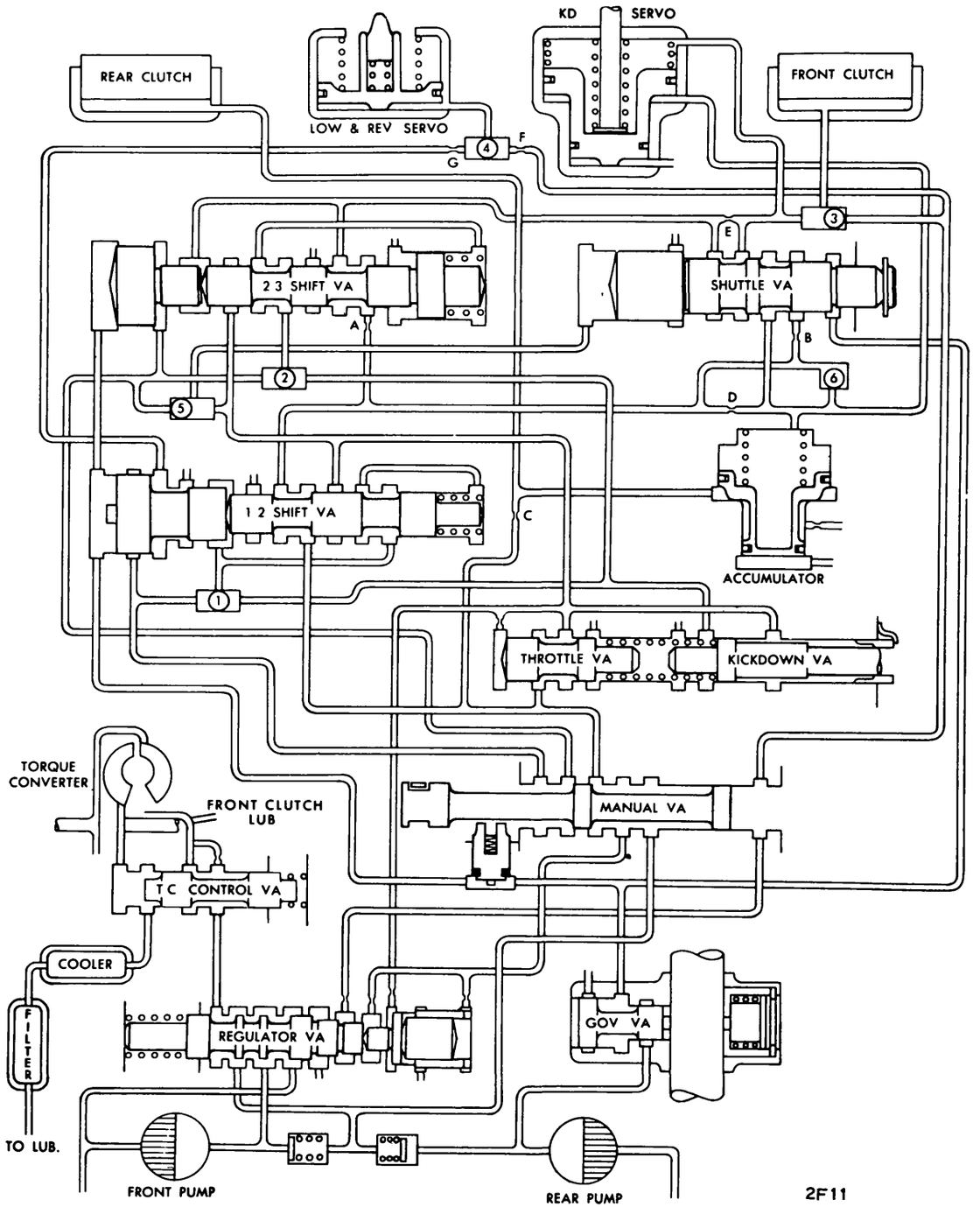
►*CONVERTER FLUSHING NOTE: CAUTION - Converter must be removed from car for flushing. DO NOT rotate conv rt r with start r with transmission removed.* With converter in an upright position, pour two quarts of clean solvent or kerosene into converter through converter hub. Turn and shake converter to force solvent through all internal parts. *NOTE - Turning turbine and stator with transmissi n input and reaction shafts will aid in dislodging foreign material.* Position converter in its normal operating position with drain plug at bottom, then drain converter. Rotate turbine and stator, and shake converter while draining to prevent particles from settling. Repeat flushing operation as many times as necessary. Finally flush any remaining solvent from converter with two quarts of new transmission fluid.

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE:* See *"Carburetor" on car model pag s.*

Manual C ntrol Cabl Adjustment: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse)

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HYDRAULIC CIRCUIT DIAGRAM

CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lock screw at left side of transmission case.

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only two or three threads are showing behind the wheel on the guide. *CAUTION - Check wheel for free turning on guide and remove any burrs in threads that might interfere. Lubricate threads with a few drops of transmission fluid.*

3) Hold cable guide center in hole of transmission case and apply only enough inward force to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 75 inch pounds.

Parking Lock Cable Adjustment (Except Chrysler & Dodge 880): To check adjustment, operate parking lock lever from one end of slot in instrument panel to the other. The lever should have clearance at both ends. *NOTE – One hole in parking lock arm is slotted to permit parking lock lever adjustment.* To adjust, move lever to fully OFF position, then loosen two nuts attaching lock arm to push button housing. *NOTE – Loosen nuts just enough to free up lever arm.* Block locking lever 1/16" from OFF position end of slot, then tighten both nuts on push button housing. Recheck lever travel to be sure clearance exists at both ends of travel. Have an assistant hold parking lock lever on instrument panel in OFF position, then loosen clamp bolt securing cable housing in parking pawl lever cover on bottom of transmission extension housing. Tap end of clamp bolt lightly to release its hold on cable, then gently pull outward on cable housing to its limit of travel and tighten clamp bolt to 10 inch pounds. *CAUTION – Do not use pliers or similar tools to pull outward on cable as cable cover might be damaged.* Check adjustment by allowing car to roll slowly on a slight incline. Parking pawl should freely engage sprag with lever in ON position, and there should be no ratcheting noise with lever in OFF position.

Neutral Switch Adjustment: With manual control cable properly adjusted, depress "N" (Neutral) button, then raise car on a hoist and drain approximately 2 quarts of fluid from transmission. Unscrew neutral starting switch from case and check to see that switch operating lever is aligned with center of switch opening in case. Place cupped washer and "O" ring over threads of switch, then screw switch into transmission a few turns. Connect one lead of a test lamp to battery current and other lead to switch terminal. Screw switch into transmission until lamp lights, then tighten switch an additional 1/3 to 1/2 turn. *CAUTION - Switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust switch.* Remove test lamp and connect wire to switch. Add sufficient fluid to bring level to proper point on dipstick *(see "Checking Fluid Level" above).*

BAND ADJUSTMENT

Kickdown (Front) Band: *NOTE - Kickdown band adjusting screw is located on left side of transmission near throttle lever shaft.* Loosen locknut and back off approximately five turns, then check adjusting screw for free turning in case. Use wrench, Tool C-3380 with adapter, C-3705 and tighten band adjusting screw to 47-50 inch pounds. *NOTE - If adapter, C-3705 is not used, tighten adjusting screw to 72 inch pounds with torque wrench (Tool C-3380).* **Back off adjusting screw 2 turns,** then hold in this position and tighten locknut to 29 ft. lbs.

Low-Reverse (Rear) Band: Raise car and drain transmission fluid, then remove transmission oil pan. Loosen adjusting screw locknut and back off nut approximately five turns. Check adjusting screw for free turning in lever. Use wrench, C-3380 with adapter, C-3705 and tighten band adjusting screw to 47-50 inch pounds. *NOTE - If adapter, C-3705 is not used, tighten adjusting screw to 72 inch pounds with torque wrench (Tool C-3380).* **Back off adjusting screw 3 turns,** then hold in this position and tighten locknut to 35 ft. lbs. Reinstall oil pan using a new gasket, and tighten oil pan bolts to 150 inch pounds. Refill transmission *(see "Draining & Refilling" above).*

TESTING

ROAD TESTING TRANSMISSION: *NOTE - Before road testing, engine must be properly tuned and idle speed set to correct specifications.* With engine at normal operating temperature and fluid at proper level, all shifts and kickdowns should occur within the speed ranges given in "Shift Pattern" tables below.

►*ROAD TESTING NOTE: All shift speeds may vary somewhat due to production tolerances, type of engine, rear axle ratios and tire sizes. All shifts, however, should be smooth, responsive and with ut noticeable engine runaway.*

HYDRAULIC CONTROL PRESSURE TEST & ADJUSTMENT: Line Pressure & Front Servo Release Pressure Test - With transmission at normal operating temperature and in "D" (drive) position with rear

CONTINUED ON NEXT PAGE

SHIFT PATTERN TABLE (MPH)

	CHRYSLER			DODGE & PLYMOUTH			
SHIFT CONDITION	Newport 300 New Yorker	C-300H	Imperial	Standard 2.76-1 Axle	Standard 3.23-1 Axle	Hi-Perf. 2.76-1 Axle	Hi-Perf. 3.23-1 Axle
Closed Throttle 1-2 Upshift	8-15	7-13	8-15	8-14	7-12	7-14	6-12
Closed Throttle 2-3 Upshift	13-19	12-17	14-20	13-18	11-15	13-18	11-16
Wide Open Throttle 1-2 Upshift	32-47	40-53	34-48	32-45	27-38	42-57	36-48
Wide Open Throttle 2-3 Upshift	69-83	73-84	73-85	68-80	58-68	79-89	67-76
3-2 Kickdown Limit	60-76	65-77	64-78	59-73	51-63	70-83	60-70
3-1 Kickdown Limit	30-40	28-46	32-41	30-38	25-33	30-50	24-47
Closed Throttle Downshift	5-13	5-12	5-14	4-13	4-11	5-13	4-11

GOVERNOR PRESSURE TESTS

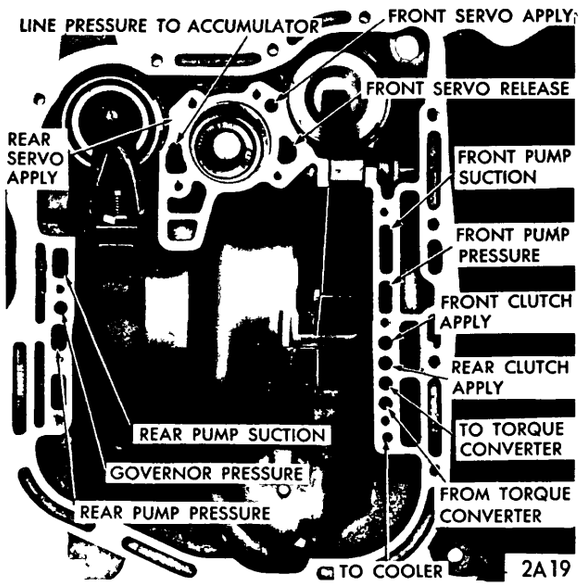
Tests are made with transmission in "D" (Drive) and with wheels free to turn.

CHRYSLER					DODGE & PLYMOUTH				
					Standard Governor		Hi-Perf. Governor		
Newport & 300 (SC1 & SC2)	New Yorker (SC3)	C-300H (SC2-300H)	Imperial (SY1)	Governor Pressure	2.76-1 Axle	3.23-1 Axle	2.76-1 Axle	3.23-1 Axl	Governor Pressure
17-22 MPH	18-23 MPH	16-21 MPH	19-24 MPH	15 psi	18-22 MPH	15-19 MPH	18-22 MPH	15-19 MPH	15 psi
40-51 MPH	41-53 MPH	48-58 MPH	43-55 MPH	50 psi	40-51 MPH	34-43 MPH	51-61 MPH	44-52 MPH	50 psi
58-68 MPH	61-71 MPH	64-73 MPH	62-73 MPH	65 psi	58-68 MPH	50-58 MPH	68-77 MPH	58-66 MPH	65 psi

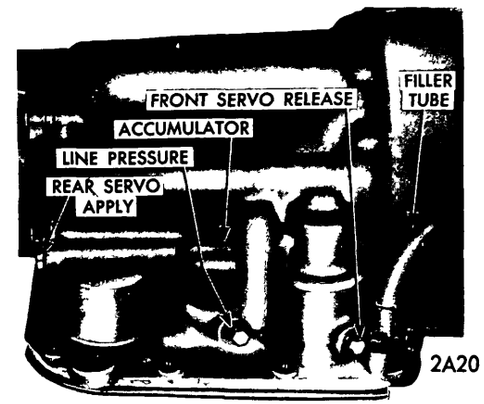
CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

wheels free to turn, install an engine tachometer, then raise car on a hoist and position tachometer so it can be read from under car. Connect two 0-100 psi pressure gauges (Tool C-3292) to pressure take-off points at side of accumulator and at front servo release (see illustration). With control in "D" (drive) position, speed up engine slightly until transmission shifts into direct. *NOTE - Front servo release will be pr ssurized in direct.* Reduce engine speed slowly to 1000 RPM. Line pressure should be 54-60 lbs. and front servo release pressure must not be more than 3 lbs. below line pressure. Disconnect throttle linkage from transmission throttle lever and move throttle lever to full throttle position gradually. Line pressure must rise to a maximum of 90-96 lbs. just before or at kickdown into low gear. Front servo release pressure must follow line pressure up to kickdown point and should not be more than 3 lbs. below line pressure. If line pressure is not 54-60 lbs. at 1000 RPM, adjust line pressure as outlined below. If front servo release pressures are less than pressure specified and line pressures are within limits, excessive leakage in front clutch or front servo circuits is indicated. *CAUTION - Always inspect external transmission throttle lev r f r looseness n valve body shaft when making pressure t sts.*

Line Pr ssure Adjustment: *NOTE - Check and correct throttl pressure adjustment before adjusting line pressure (see b l w).* To adjust line pressure, remove control valve assembly from transmission and measure distance from valve body to inner edge of adjusting nut (this nut is located between spring retainer bracket and end of regulator valve spring) with an Allen screw protruding through retainer bracket. The approximate measurement should be 1 15/16". *NOTE - The Allen adjusting screw may be turned counterclockwise to increase pressure or clockwise to decrease pressure. Turning screw one complete turn changes closed throttle line pressure approximately 1 2/3 psi.*



AIR PRESSURE CHECK POINTS



HYDRAULIC PRESSURE TEST LOCATIONS (RIGHT SIDE)

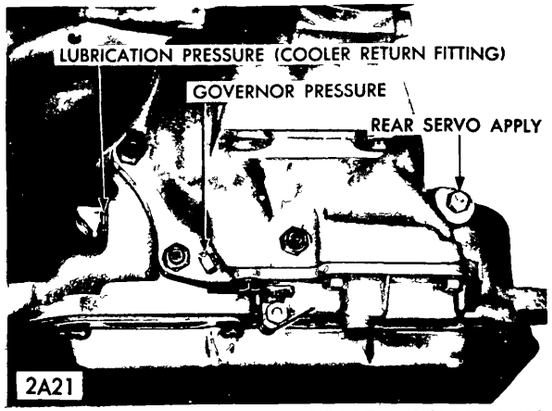
Lubrication Pressure Test: *NOTE - This test can be made at same time "Line Pressure & Front Servo Release Pressure Test" is made.* Install a tee fitting between cooler return line fitting and fitting hole in transmission case at rear of left side of transmission case (see illustration), then connect a 0-100 psi gauge (Tool C-3292) to tee fitting. With engine operating at 1000 RPM, throttle closed and transmission in direct, lubrication pressure should be 5-15 lbs. *NOTE - Lubrication pressure will be approximately doubled as throttle is opened to maximum line pressure.*

Rear Servo Apply Pressure Test: Connect a 0-300 psi gauge (Tool C-3293) to apply pressure take-off point at rear servo (see illustration). With transmission control in "R" (reverse) position and engine speed at 1600 RPM, reverse servo apply pressure should be 240-280 lbs.

Governor Pressure Test: Connect a 0-100 psi gauge (Tool C-3292) to governor pressure take-off point, located at lower left side of extension near mounting flange. Governor pressures should fall within limits given in tables (below). If governor pressures are incorrect at given car speeds, governor valve or weights are probably sticking. *NOTE - The governor pressure should respond smoothly to changes in car speed and should return to 0-1½ lbs. when car is stopped. High pressure at standstill (above 2 lbs.) will prevent transmission from downshifting.*

Throttle Pressure Test: *NOTE - No provisions are made to test throttle pressure. Incorrect throttle pressure should only be suspected if the part throttle shift speeds are either very delayed or occur too early in relation to car speeds. In which case, the throttle linkage should be adjusted before throttle pressure setting is adjusted.*

Throttl Pr ssure Adjustment: Remove valve body assembly from transmission, then loosen throttle lever stop screw locknut and back off approximately five turns. Insert gauge pin of Tool C-3763 between throttle lever cam and kickdown valve. By pushing in on tool, compress kickdown valve against its spring so the throttle valve is completely bottomed inside valve body. As force is being exerted to compress spring, tighten throttle lever stop screw finger tight against throttle lever tang with throttle lever cam touching the tool and the throttle valve bottomed. *CAUTION - Make sure adjustment is made with spring fully compressed and valve bottomed in valve body.* Remove tool and tighten stop screw locknut.



HYDRAULIC PRESSURE TEST LOCATIONS (REAR END)

AIR PRESSURE TESTS: The front clutch, rear clutch, kickdown servo, and low and reverse servo may be checked by applying air pressure to their respective passages when valve body is removed (*CAUTION - Air supply must be free of all dirt and moisture*). Refer to "Oil Passages in Transmission Case" illustration for location of air passages.

1) Raise car on hoist, drain transmission fluid and remove transmission oil pan.

2) **Front Clutch** - Apply air pressure to front clutch "apply" passage and listen for a dull thud which indicates that front clutch is operating. Hold air pressure for a few seconds and inspect system for excessive leakage.

3) **Rear Clutch** - Apply air pressure to rear clutch "apply" passage and listen for a dull thud which indicates that rear clutch is working. Check for excessive leakage.

►*FRONT & REAR CLUTCH CHECKING NOTE: If a dull thud cannot be heard in the clutches, place fing r tips on clutch housing and again apply air pressure. Movement of piston can be felt as clutch is applied.*

4) **Kickdown Servo** - Direct air pressure into front servo "apply" passage. Operation of servo is indicated by a tightening of front band. Spring tension of servo piston should release band.

5) **Low & Reverse Servo** - Direct air pressure into rear servo "apply" passage. Operation of servo is indicated by tightening of rear band. Spring tension on servo piston should release band.

►*AIR PRESSURE TEST NOTE: If all the above units operate prop rly, "n driv ," "rratic" and "n upshift" conditions ar caus d by troubl in th control valv ass mbly.*

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CHRYSLER CORP.
TORQUEFLITE EIGHT (Cont.)

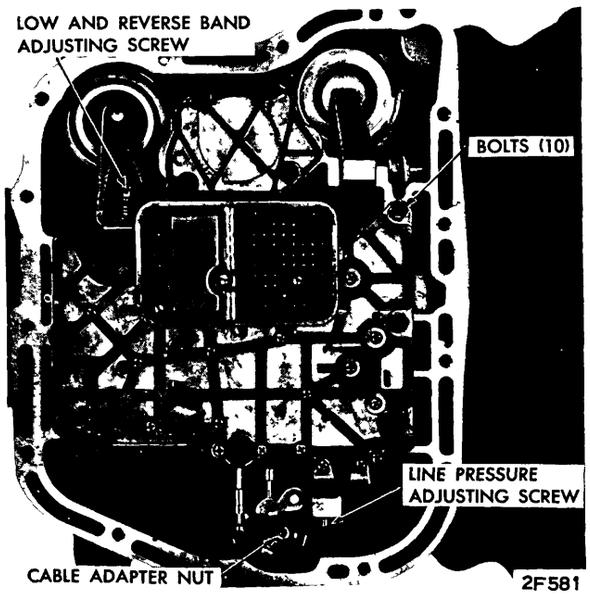
TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Except where noted, the following operations can be performed without removing the transmission from the car.*

HARSH-NEUTRAL-TO-DRIVE OR NEUTRAL-TO-REVERSE INITIAL ENGAGEMENT: Adjust engine idle speed and low-reverse band. Check accumulator and make air pressure tests. *Transmission must be removed for the following:* Clean and inspect front and rear clutch plates, return spring and piston. Check both circuits for leakage.

DELAYED INITIAL ENGAGEMENT NEUTRAL-TO-DRIVE: Check and adjust fluid level. Adjust gearshift control cable. Check hydraulic pressures. Check accumulator and make air pressure checks. *Transmission must be removed for the following:* Clean and inspect rear clutch plates, return spring and piston. Check input shaft and reaction shaft support seal rings for leakage.

RUNAWAY ON 2-3 AND 3-2 SHIFTS: Check and adjust fluid level, throttle linkage, and gearshift control cable. Check hydraulic pressures and adjust kickdown band. Check kickdown servo and make air pressure tests. *Transmission must be removed for the following:* Check front oil pump. Clean and inspect front and rear clutch plates, return spring and piston. Check both circuits for leakage. Check input shaft and reaction shaft support seal rings for leakage.



TRANSMISSION CASE (BOTTOM)

HARSH 2-3 AND 3-2 SHIFTS: Adjust throttle linkage and kickdown band. Check hydraulic pressures. Check operation of kickdown servo. Check valve body. *Transmission must be removed for the following:* Clean and inspect front clutch plates, return spring and piston.

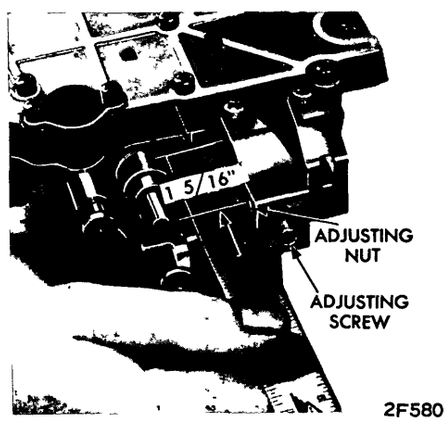
NO UPSHIFT: Check and adjust fluid level, throttle linkage and gearshift control cable. Check hydraulic pressures. Adjust kickdown band and check operation of kickdown servo. Make air pressure tests. *Transmission must be removed for the following:* Clean and inspect front clutch plates, return spring and piston. Check operation of overrunning clutch. Check input shaft and reaction shaft support seal rings for leakage.

NO KICKDOWN OR NORMAL DOWNSHIFT: Check and adjust fluid level, throttle linkage, gearshift control cable and engine idle speed. Check hydraulic pressures. Adjust kickdown band. Check rear pump. Remove and inspect control valve. Check operation of kickdown servo. Make air pressure tests.

ERRATIC SHIFTING: Make same checks as for "No Kickdown or Normal Downshift" (above) and proceed as follows: *Transmission must be removed for the following:* Check front oil pump. Check input shaft and reaction shaft support seal rings for leakage.

SLIPS IN FORWARD DRIVE ONLY: Check and adjust fluid level and gearshift control cable. Check hydraulic pressures. Check operation of kickdown servo and make air pressure tests. *Transmission must be removed for the following:* Check front pump. Clean and inspect front and rear clutch plates, return spring and piston. Check operation of overrunning clutch. Check input shaft and reaction shaft support seal rings for leakage.

SLIPS IN REVERSE ONLY: Adjust control cable and low-reverse band. Check hydraulic pressures. Check operation of kickdown servo, low-reverse servo, and accumulator. *Transmission must be removed for the following:* Check operation of front pump. Check input shaft and reaction shaft support seal rings for leakage.



HYDRAULIC LINE PRESSURE ADJUSTMENT

SLIPS IN ALL POSITIONS: Check and adjust fluid level. Check hydraulic pressures. Check operation of kickdown servo. *Transmission must be removed for th following:* Check operation of front oil pump. Check input shaft and reaction shaft support seal rings for leakage.

NO DRIVE IN ANY POSITION: Check and adjust fluid level. Check hydraulic pressures. Remove and inspect control valve body assembly. Check operation of kickdown servo. *Transmission must be removed for the following:* Check converter drive plate and front pump.

NO DRIVE IN FORWARD POSITIONS: Check hydraulic pressures, band adjustment, kickdown servo, and low-reverse servo. Make air pressure test. *Transmission must be removed for the following:* Clean and inspect rear clutch plates, return spring, and piston. Check operation of overrunning clutch.

NO DRIVE IN REVERSE ONLY: Check hydraulic pressures. Adjust low-reverse band. Check operation of accumulator. *Transmission must be removed for the following:* Clean and inspect front clutch plates, return spring, and piston.

DRIVES IN NEUTRAL: Adjust gearshift control cable. *Transmission must be removed for the following:* Clean and inspect rear clutch plates, return spring, and piston.

DRAGS OR LOCKS: Adjust kickdown band, low-reverse band, and parking lock. Check operation of transmission oil cooler. Inspect low-reverse servo and accumulator. *Transmission must be removed for the following:* Clean and inspect front and rear clutch plates, return spring, and piston. Inspect planetary gear sets, and overrunning clutch.

SCRAPING, GROWLING OR RATCHETING NOISE: Adjust parking lock. Check operation of transmission oil cooler. Inspect governor, rear oil pump and oil strainer. *Transmission must be removed for the following:* Check converter drive plate, front oil pump, front clutch, planetary gear sets, and overrunning clutch.

BUZZING NOISE: Check and adjust fluid level. Check operation of kickdown servo.

HARD TO FILL, OIL BLOWS OUT FILLER TUBE: Check and adjust fluid level. Remove and inspect control valve body assembly. Check operation of kickdown servo. *Transmission must be removed for the following:* Check front oil pump and transmission vent.

TRANSMISSION OVERHEATS: Check and adjust fluid level. Adjust kickdown band, and low-reverse band. Check operation of transmission oil cooler. Inspect extension housing bushing or bearing. Examine oil strainer and check operation of kickdown servo. *Transmission must be removed for the following:* Check front oil pump. Clean and inspect front and rear clutch plates, return spring and piston.

FAILURE TO PUSH START: Check and adjust fluid level and gearshift control cable. Check hydraulic pressures. Adjust low-reverse band. Check oil strainer and accumulator. *Transmission must be removed for the following:* Check rear clutch, planetary gear sets, and overrunning clutch. Check input shaft and reaction shaft support seal rings for leakage.

STARTER WILL NOT ENERGIZE: Adjust gearshift control cable. Check and adjust neutral starting switch.

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CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

GEARSHIFT CONTROL UNIT & PARKING LOCK

PUSH BUTTON CONTROL UNIT (CHRYSLER, IMPERIAL & DODGE 880): R m val – *NOTE – On Imperial models, r mov sp domet r. S "Misc. Electrical" on car model pag .* Disconnect ground cable at battery, then remove pushbutton bezel retaining screws and carefully remove bezel, and rubber or felt seal. Remove all push buttons by pulling them off push button slides, then disconnect backup switch wire connectors (if so equipped). On Chrysler models & Dodge 880, remove four nuts retaining control unit and bracket assembly to instrument panel bracket. Carefully remove the assembly, then remove mounting bracket and disconnect control cable assembly from control unit. On Imperial models, remove four nuts attaching control unit, brackets and lighting panel assembly to instrument panel. Disconnect lighting panel connector and carefully remove control unit from instrument panel. Remove lighting panel and mounting brackets from control units, then disconnect control cable assembly from unit.

Installati n: Reverse removal procedure and check operation of push buttons, correcting any binding of buttons that might exist.

PUSHBUTTON CONTROL UNIT (EXC. CHRYSLER, IMPERIAL & DODGE 880): Removal – Disconnect ground cable from battery, then remove parking handle from lever. Disconnect back–up lamp switch wire connectors (if so equipped). Remove three nuts securing control assembly on instrument panel and carefully work assembly to rear out of cluster. Remove push buttons by pulling them off push button slides, then unscrew two nuts and remove mounting bracket from control assembly. Remove hairpin lock securing gearshift control cable on actuator and remove cable. Disconnect parking lock cable from control and remove parking lock arm from control.

Adjustm nt: *NOTE – If transmission fails to shift into N utral wh n parking lock is applied, check parking lock cabl adjustm nt at transmission before adjusting push button control unit.* Remove overcenter spring and back off lever stop screw. Make sure there is no binding in neutral slide, neutral slide pin and bushing, cam pivot, and that all parts are lubricated. Hold neutral slide in against rocker bar with about 5–10 lbs. load, then loosen locknut and rotate cam so the lever nose just touches neutral slide pin as it passes over pin when moving parking lock lever from OFF to ON position. *NOTE – Only light contact should occur so that l v r do s not hang up on pin.* Hold cam in this position and tighten locknut to 95 inch lbs., then install overcenter spring. Adjust lever stop screw to obtain .010" clearance between neutral slide pin and lever heel. Tighten lever stop screw locknut securely.

Installati n: Install parking lock arm on control unit and secure with washers and nuts. Connect parking lock cable and secure cable in control bracket, then place end of gearshift control cable on actuator and secure with hairpin clip. Secure cable in control bracket. Install mounting bracket on control, and tighten nuts securely, then install push buttons in proper order on control actuator slides. Carefully guide control unit into position from rear of instrument housing and tighten retaining nuts securely. Operate push buttons and correct any binding that might exist, then install parking lock control handle and connect backup light switch wires.

PARKING LOCK CABLE, TRANSMISSION END (EXC. CHRYSLER, IMPERIAL & DODGE 880): Removal – Loosen parking lock cable clamp bolt where cable enters housing cover, then remove housing cover lower plug. With a screwdriver inserted through plug opening, push gently against projecting portion of lock spring, then withdraw lock cable. *CAUTION – Do not use pliers or similar tool to withdraw cable from adapter cover as cable might be damaged.*

Installation: Place parking lock lever on instrument panel in OFF position, then insert screwdriver through plug opening and position it behind cable adapter stop washer. Hold adapter outward while pushing cable in as far as possible, making sure lock spring engages cable. Gently pull outward on cable to its limit of travel, release and then tighten clamp bolt to 10 inch lbs. Reinstall plug in cover and tighten to 35 inch lbs.

PUSHBUTTON LAMP REPLACEMENT: Chrysler & Dodge 880 – Lamp is located in push button bezel. To replace, remove four screws and lift off bezel.

Imperial: Push buttons are illuminated by a panelescent lighting panel. Lighting panel can be replaced by removing control unit and bracket assembly.

Dodge (Exc. 880): Lamp is located on back of instrument panel just above push buttons. Remove socket from rear of instrument panel.

Plymouth: Lamp is located approximately in center of push button cluster. Instrument cluster must be removed, as follows, for access to bulb. Disconnect speedometer cable, and remove heater blower switch and temperature control knobs. Remove instrument cluster retaining screws and lift out cluster assembly. Slide a short piece of tight fitting rubber hose over bulb to remove it from socket.

TRANSMISSION UNIT REMOVAL & INSTALLATION (TRANSMISSION IN CAR)

OUTPUT SHAFT OIL SEAL REPLACEMENT: Disconnect propeller shaft at front flange, then apply parking brake or hold brake drum (Chrysler & Dodge Custom 880); hold transmission flange (Other models). *NOTE– Use Tool C–3281 to hold brake drum or transmission flange.* Remove retaining nut and washer and slide flange or brake drum off output shaft. On models with brake drum, remove brake support grease shield spring and grease shield (being careful not to damage neoprene insulator). On all models, screw taper threaded end of Tool C–748 into seal, then tighten screw of tool to remove seal. To install new seal, position seal in opening of extension housing with lip of seal facing inward, then drive seal into housing with Tool C–3837. Complete installation by reversing removal procedure. Tighten output shaft nut to 175 ft. lbs.

EXTENSION HOUSING: Removal – Remove speedometer drive pinion and sleeve assembly, then remove transmission flange or parking brake drum *(see "Output Shaft Oil Seal Replacement" above).* On cars with parking brake on transmission, disconnect parking brake cable. On all models, drain approximately 2 qts. of fluid from transmission. On models without parking brake on transmission, loosen parking lock cable clamp bolt where it enters housing cover, then remove housing cover lower plug. Insert screwdriver through hole, then while exerting pressure against projecting portion of the cable lock spring, withdraw lock cable. On Chrysler & Dodge Custom 880, remove engine rear mount insulator–to–extension housing bolts. On other models, remove bolts securing extension housing–to–crossmember insulator. On all models, raise engine slightly with a suitable jack and remove crossmember. Remove extension housing attaching bolts and remove extension housing. *NOTE – If necessary, tap extension housing lightly with a soft mallet to loosen from transmission.*

Bearing Replacement – Remove oil seal, then remove bearing snap ring from housing. Drive bearing rearward out of housing with Tool C–3275. To install, drive new bearing into housing with Tool C–3204, then install snap ring and a new output shaft seal.

Installation: Reverse removal procedure and tighten extension housing attaching bolts to 24 ft. lbs.; crossmember bolts to 75 ft. lbs.; insulator–to–extension housing bolts to 35 ft. lbs. On models without parking brake on transmission, install and adjust parking lock cable *(see "Linkage Adjustment" above).*

GOVERNOR & PARKING SPRAG OR SUPPORT: Removal – Remove extension housing, then use a screwdriver and pry snap ring from weight end of governor valve shaft and slide valve and shaft assembly out of housing. Remove large snap ring from weight end of governor housing and lift out governor weight assembly. Remove snap ring from behind governor housing, then slip governor housing and parking sprag (or support assembly) off output shaft. If necessary, remove four bolts and separate governor housing from parking sprag (or support).

Installation: Assemble governor housing to parking sprag (or support assembly) and tighten bolts finger tight. *CAUTION – Make sure oil passage of governor housing aligns with passage in parking sprag (or support).* Position governor housing and sprag (or support assembly) on output shaft, then align assembly so governor valve shaft hole in governor body aligns with hole in output shaft. Slide the assembly into place and install snap ring behind governor housing. Tighten housing–to–parking sprag (or support) bolts to 100 inch pounds and bend ends of lock straps against bolt heads. Assemble governor weights and spring and install snap ring inside large governor weight. Place weight assembly in governor housing and install snap ring. Place governor valve on governor shaft, insert assembly into housing and through governor weights. Install valve shaft retaining snap ring. Check for free movement of valve and weight assembly, then install extension housing.

REAR OIL PUMP: Removal – Remove extension housing, governor and support assembly, then unscrew rear oil pump cover retaining bolts and remove cover. Slide oil pump inner rotor off output shaft. *CAUTION – Inn r rotor is driven by a small ball. Do not lose ball when removing inner rotor.* Remove outer rotor from pump body. *NOTE – If necessary to replace rear oil pump body, it will be necessary to disassemble transmission.*

Inspection: Inspect all parts for damage, nicks, burrs, scoring, or pitting. With gears clean and installed in pump body, place a straightedge across face of rotors and pump body. Clearance between straightedge and face of rotors should be .0015"–.003". Replace parts as necessary.

Installation: Reverse removal procedure and tighten pump cover bolts to 140 inch pounds.

NEUTRAL SAFETY SWITCH: Removal – Drain two quarts of fluid from transmission, then disconnect wire from switch and unscrew switch from case.

Installati n: With gearshift control cable properly adjusted and "N" (Neutral) button depressed, check to

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CHRYSLER CORP. TORQUEFLITE EIGHT (Cont.)

see that switch operating lever is aligned in center of switch opening in case. Place cupped washer and "O" ring seal over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3 – 1/2 turn. *CAUTION – Switch must be tight nough to prevent oil leakage. If not, add a thin washer and readjust switch.* Remove test lamp and connect wire to switch. Add fluid as necessary to bring level up to proper point *(see "Checking Fluid Level" above).*

VALVE BODY ASSEMBLY & ACCUMULATOR: Removal – Drain transmission fluid and remove oil pan and gasket. Loosen clamp bolt and lift throttle lever, washer and seal off transmission throttle lever shaft. Shift manual lever into "Low" position to expose nut attaching cable adapter to lever, then remove nut and disengage cable adapter from manual lever. Place drain pan under transmission, then remove ten hex-head valve body attaching bolts being careful to hold valve body in position while removing bolts. Lower valve body assembly out of transmission case, being careful not to cock throttle lever shaft in case hole or lose accumulator spring. Remove accumulator piston from transmission case and inspect piston for scoring.

Installation: Reverse removal procedure being careful to tighten valve body attaching bolts evenly, then tighten bolts to 100 inch pounds.

PARKING LOCK (PLYMOUTH & DODGE, EXC. CUSTOM 880): Removal – Remove extension housing, then remove parking lock cable adapter cover from bottom of extension housing. Carefully remove cable adapter from parking lock lever. *NOTE – Replace spring on adapter if it becomes distorted during removal.* Remove plug from extension housing and slide out shaft to remove parking lock lever and shim. Slide bushing sleeve out of housing to remove parking pawl and spring.

Installation: Position parking pawl and spring in housing and insert bushing sleeve. *NOTE – Make sure square lug on pawl is toward sprag and the spring is positioned so as to lift pawl away from sprag.* Position lock lever and shim in housing and install lever shaft. *NOTE – Lever roller must be on top of pawl so as to push it into engagement with sprag.* Tighten plug to 150 inch pounds. Attach cable adapter to parking lock lever, making sure it is properly positioned. Place a new adapter cover gasket on extension housing, then insert a small punch through cable opening in adapter cover and into end of adapter. Carefully lower cover into position, feeding adapter into cable opening in cover. Install cover retaining bolts and tighten to 150 inch pounds. Install extension housing and complete installation.

TRANSMISSION REMOVAL & INSTALLATION

► *REMOVAL & INSTALLATION NOTE: Transmission and converter must be removed as an assembly. If not, converter drive plate, front pump bushing, and oil seal will be damaged. DO NOT allow weight of transmission to be supported on drive plate at any time.*

REMOVAL: Connect a suitable remote control starter switch to starter solenoid and position switch so engine can be rotated from under car. Disconnect high tension cable from ignition coil, then raise car and support with jack stands. Drain transmission and converter *(see "Draining & Refilling" above).* Mark converter and drive plate for use at reassembly. *NOTE – Crankshaft flang bolt hol s, inner and outer circl of bolt hol s in driv plat , and th four tapped holes in front face f convert r all hav on hole offs t to insur assembly in original location.* Rotate engine to locate two converter–to–drive plate bolts at "5 and 7 o'clock" positions. Remove the two bolts, then rotate engine and remove remaining two bolts. *CAUTION – Do not rotate converter or drive plate by prying with a screwdriver or similar tool as the drive plate may become distorted. Do not engage starter if drive plate is not attached to converter with at least one bolt or if the transmission case–to–engine bolts have been loosened.* Depress "L" (Low) button, then disconnect ground cable from battery and remove starter assembly. Remove pushbutton control cable–to–transmission adjusting wheel lockscrew and insert a screwdriver through neutral starting switch opening. Push lightly on upper projecting portion of cable lock spring and pull outward on cable to remove cable from adapter and transmission case. Disconnect throttle rod from lever on side of transmission case, then disconnect oil cooler lines at transmission and remove oil filler tube. Remove speedometer pinion and sleeve. On Chrysler and Dodge Custom 880, disconnect parking brake cable from parking brake. On other models, loosen transmission parking lock cable clamp bolt where cable enters the cover, then remove housing cover lower plug. Insert screwdriver through hole, then gently exert pressure against projecting portion of lock spring and withdraw lock cable. On all models, disconnect front universal joint and tie propeller shaft out-of-way. *NOTE – On Chrysler Imperial models, remove propeller shaft center bearing housing bolts and slide front propeller shaft rearward to disengage front universal joint from front flange.* Disconnect extension housing from crossmember, then install support fixture, Tool C–3487, and raise engine slightly. Place a transmission jack under transmission to support the assembly, then attach a small "C" clamp to edge of converter housing to hold converter in place during removal of transmission. Remove converter housing retaining bolts and carefully work transmission rearward off engine block dowels and disengage converter hub from end of crankshaft. Lower transmission jack and remove transmission and converter assembly. Remove "C" clamp from edge of converter housing, then slide assembly out of transmission.

INSTALLATION: Reverse removal procedure and note the following: To install converter on transmission, rotate front pump rotors with Tool C–3881 until two small holes in handle of tool are vertical, then carefully slide converter assembly over input shaft and reaction shaft. Make sure converter impeller shaft slots are also vertical and fully engage front pump inner rotor lugs. Inspect for full engagement by placing a straightedge on face of case. Surface of converter should be at least ½" to rear of straightedge when converter is pushed all the way into transmission. Attach a "C" clamp to edge of converter housing to hold converter in place during installation of transmission. Coat converter hub hole in crankshaft with wheel bearing lubricant and rotate converter so mark on converter (made during removal) will align with mark on drive plate. *NOTE – Offset holes in plate are located next to 1/8" hole in inner circle of plate. A stamped "V" mark identifies offset hole in converter front cover.* Tighten converter bolts to 25–30 ft. lbs., drive plate bolts to 270 inch pounds, extension housing insulator bolts to 35 ft. lbs., propeller shaft–to–front flange bolts to 35 ft. lbs., and crossmember attaching bolts to 75 ft. lbs. *NOTE – On Chrysl r Imp rial mod ls, place pr p ll r shaft c nter b aring h using s h i m s under housing, then install retaining bolts and tighten to 35 ft. lbs.* To install control cable in case, engage "R" (Reverse) button and hold it firmly depressed. Insert push button control cable into transmission case and push inward on cable, making sure lock spring engages cable. Adjust control cable *(see "Linkage Adjustment" above).*

TRANSMISSION UNIT REMOVAL

FRONT PUMP OIL SEAL: *NOTE – Fr nt pump oil s al can be replaced without r moving front pump, and reaction shaft support assembly from transmission cas as follows:* With transmission removed from car, screw seal remover, Tool C–3861 into seal and tighten screw of tool to withdraw seal. To install a new seal, place seal in opening of front pump housing with lip side facing inward, then use Tool C–3860 and drive seal into housing until tool bottoms.

VALVE BODY ASSEMBLY & ACCUMULATOR PISTON: *See "Transmission Unit Removal & Installation – Transmission in Car" above.*

DRIVE TRAIN ENDPLAY MEASUREMENT: *NOTE – Before removal of parking brak drum or univ rsal joint flange, check endplay as follows:* Attach a dial indicator to transmission bell housing with plunger seated against end of input shaft, then move input shaft in and out to obtain endplay reading. Endplay should be .030–.070". Record the reading obtained as it will be necessary to change the thrust washer between reaction shaft support and front clutch retainer during assembly if endplay is not within specifications.

EXTENSION HOUSING: *See "Transmission Unit R moval & Installation – Transmission in Car" abov .*

GOVERNOR & PARKING SPRAG (OR SUPPORT): *S "Transmission Unit Removal & Installation – Transmission in Car" above.*

REAR OIL PUMP: Remove oil pump rear cover, then remove inner and outer rotors. *NOTE – Use car in removing inner rotor so as not to los th small ball us d to key rotor to shaft. If pump body is to b r placed, drive it rearward out of cas aft r transmission is completely disassembled (s b low).*

FRONT OIL PUMP AND REACTION SHAFT SUPPORT: Remove pump housing retaining bolts, then tighten front band adjusting screw until band is tight on front clutch retainer (this prevents clutch retainer coming out with front pump which might cause damage to clutches). Attach Tool C–3752 (sliding hammers) to pump housing flange by threading screws of tools into flange holes at "9 and 3 o'clock" positions. Bump evenly outward on the two weights to withdraw pump and reaction shaft support assembly from case.

FRONT BAND & FRONT CLUTCH: Loosen front band adjuster, then remove band strut and slide band out of case. Slide front clutch assembly out of case.

INPUT SHAFT & REAR CLUTCH: Grasp input shaft and slide shaft and rear clutch assembly out of case. *CAUTION – Be careful not to lose thrust wash r located between rear end of input shaft and forward nd of output shaft.*

PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL: While supporting output shaft and driving shell, carefully slide the assembly forward and out through case. *CAUTION – Be v ry car ful not to damag ground surfac s on output shaft during r moval.*

REAR BAND & LOW–REVERSE DRUM: Remove low–reverse drum, then loosen rear band adjuster. Remove band strut and band from case.

CONTINUED ON NEXT PAGE

CHRYSLER CORP.
TORQUEFLITE EIGHT (C nt.)

OVERRUNNING CLUTCH: Note position of overrunning clutch rollers and springs before disassembly, then carefully slide out clutch hub and remove rollers and springs. *NOTE – If v rrunning clutch cam and/or roll r spring r tain r ar found to be damaged or worn, r f r to "Ov rrunning Clutch Cam Replacement" below.*

KICKDOWN SERVO: Compress kickdown servo spring by using Engine Valve Spring Compressor, Tool C–3422, then remove snap ring. Remove rod guide, springs and piston rod from case, being careful not to damage piston rod or guide during removal. Insert Tool C–484 inside piston and withdraw piston from transmission case.

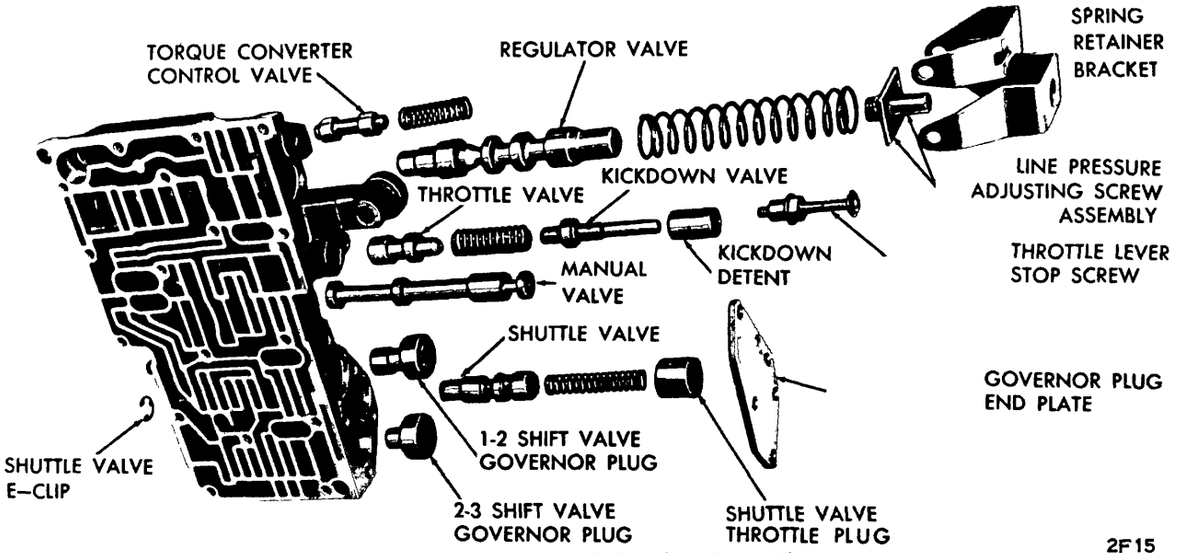
LOW & REVERSE SERVO: Compress low and reverse servo piston spring in same manner as for kickdown servo (above), then remove snap ring. Remove spring retainer, spring, and servo piston and plug assembly from case.

TRANSMISSION UNIT OVERHAUL

►*OVERHAUL NOTE: At r assembly, coat each part with Automatic Transmission Fluid Type "A" (Suffix "A").*

VALVE BODY: Disass mbly – *CAUTION – Never clamp any portion of valv body or transfer plate in a vise. Wh n r moving or installing valves or plugs, use care. Do not forc .* Place valve body assembly on repair stand, Tool C–3749, then remove three screws from oil screen and remove screen. While holding spring retainer bracket firmly against spring pressure, remove bracket retaining screws, spring bracket, torque converter control valve spring, and regulator valve spring with line pressure adjusting screw assembly. *CAUTION – Do not alter s tting of line pressure adjusting screw and nut. Th nut has an interference thread and does not turn easily on screw.* Slide regulator valve and the torque converter control valve out of valve body. Invert transfer plate assembly and remove stiffener plate. Remove retaining screws securing steel plate to transfer plate and carefully lift off steel plate. Remove rear pump check valve and spring. Remove reverse blocker valve cover and lift out spring and valve. Note location of the six steel balls in valve body (one of them is larger than the other five and is in the larger chamber). Remove steel balls, front pump check valve and spring. Invert valve body and lay it on a clean cloth or paper, then remove E–clip from throttle lever shaft. *NOTE – Remov any burrs from shaft.* Then while holding manual lever detent ball and spring in their bore with Tool C–3765 or similar tool, slide manual lever off shaft. Remove detent ball and spring. Remove manual valve by sliding it carefully out of valve body with a twisting motion, then remove throttle lever and shaft. Remove shuttle valve cover plate and remove E–clip from exposed end of shuttle valve. If necessary, remove throttle lever stopscrew assembly, being careful not to disturb the setting any more than is necessary. Remove kickdown detent, kickdown valve, throttle valve spring and throttle valve. Remove governor plug end plate, then tip valve body to allow shuttle valve throttle plug, spring, shuttle valve, and the shift valve governor plugs to slide out into the hand. *NOTE – 1–2 shift valv plug is identified by its longer stem.* Remove shift valve end plate and slide out two springs and valves. Remove regulator valve end plate, then slide regulator valve line pressure plug, sleeve, and regulator valve throttle pressure plug out of valve body.

Inspection: Check all parts for nicks, burrs, scores and scratches. Remove minor blemishes with crocus cloth.

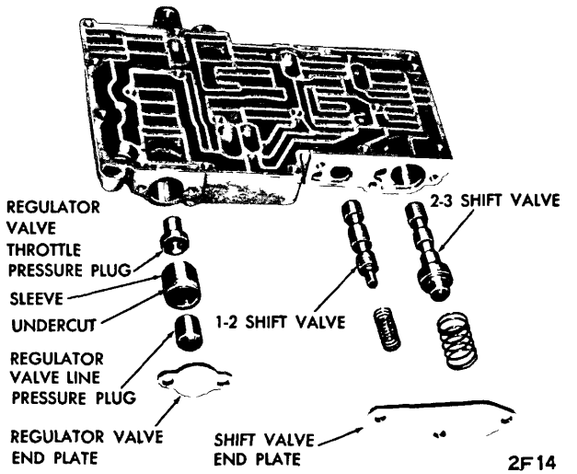


2F15

CONTROL VALVE ASSEMBLY (LEVER SIDE)

using only a light pressure. *NOTE – When using crocus cloth on valves and plugs, use extreme care not to round off sharp edges.* Check all valves and plugs for free operation in valve body bores. When bores, valves and plugs are clean and dry, the valves and plugs should fall freely in bores.

Reassembly: Place rear pump check valve and spring in transfer plate, then position steel plate on transfer plate. Hold rear pump check valve in its bore with a thin steel blade, and install four steel plate–to–transfer plate retaining screws. Make sure bolt holes in steel plate and transfer plate are aligned, then tighten screws evenly to 28 inch pounds. Check rear pump check valve for free movement in transfer plate, then install stiffener plate and tighten retaining screws to 28 inch pounds. Turn transfer plate over and install reverse blocker valve spring and valve, rotating valve until it seats through the steel plate. Hold valve down and install blocker valve cover plate and tighten retaining screws to 28 inch pounds. Place 1–2 and 2–3 shift valve governor plugs in their respective bores. Install shuttle valve, spring and shuttle valve throttle plug. Install governor plug end plate and tighten retaining screws to 28 inch pounds. Install E–clip on end of shuttle valve and install shuttle valve cover plate and tighten retaining screws to 28 inch pounds. Install 1–2 and 2–3 shift valves and springs, then install shift valve end plate and tighten retaining screws to 28 inch pounds. Install regulator valve throttle pressure plug, sleeve (undercut on sleeve toward end plate), and line pressure plug. Install regulator valve end plate and tighten retaining screws to 28 inch pounds. Install throttle valve and spring, then slide kickdown detent on kickdown valve (counterbore side of detent toward valve) and install assembly in valve body. Install throttle lever stopscrew and tighten locknut finger tight, then install manual valve. Install throttle lever and shaft on valve body and insert detent spring and ball in its seat in valve body. Depress ball and spring with Tool C–3765 or similar tool and slide manual valve lever over throttle shaft so that it engages manual valve and detent ball. Install retaining E–clip



2F14

CONTROL VALVE ASSEMBLY (SHIFT VALVE SIDE)

on throttle shaft. Position valve body assembly on holding stand, then place the six steel balls in valve body chambers with large ball in large chamber, then place front pump check valve and spring in valve body. Position transfer plate assembly on valve body, and while holding front pump check valve in its bore with a thin steel blade, install 14 retaining screws. Starting at center and working outward, tighten screws to 28 inch pounds. Install torque converter valve and regulator valve and spring retainer ring. Position torque converter valve spring and regulator valve spring over ends of their respective valves. Place line pressure adjusting screw assembly on end of regulator valve spring with long dimension of nut at right angles to valve body. Install spring retainer bracket, making sure con-

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CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

verter valve spring is engaged on tang and positioned squarely in bracket. Tighten bracket retaining screws to 28 inch pounds. Install oil strainer and tighten retaining screws to 28 inch pounds.

ACCUMULATOR PISTON & SPRING: Inspection – Inspect seal rings for wear and make sure they turn freely in piston grooves. *NOTE – It is not necessary to remove rings unless damage is evident.* Inspect piston for nicks, burrs, scores and wear. Check piston bore in case for burrs, scores or other damage and check piston spring for distortion. Replace parts as required.

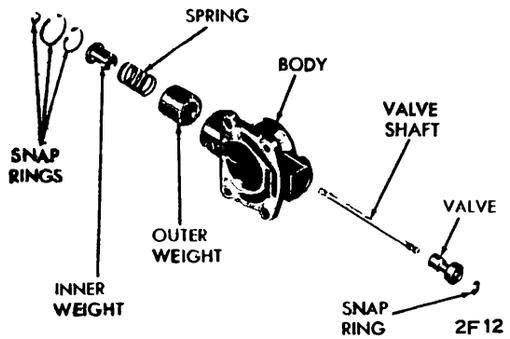
EXTENSION HOUSING BEARING & OIL SEAL: Replacement – Pry or drive oil seal out of extension housing with a suitable blunt drift punch, being careful not to damage oil seal surface in extension housing. Remove bearing snap ring from housing and drive bearing rearward out of housing with Tool C–3275. Place a new bearing in opening of housing and drive it into position using Tool C–3204, then install snap ring. Install a new seal using Tool C–3837, driving seal in until tool bottoms.

GOVERNOR & SUPPORT OR PARKING SPRAG: Disassembly – Remove large snap ring from weight end of governor housing and remove weight assembly. Remove snap ring from inside governor weight and remove inner weight and spring from outer weight. If necessary, remove bolts and separate support (or parking sprag) from governor housing.

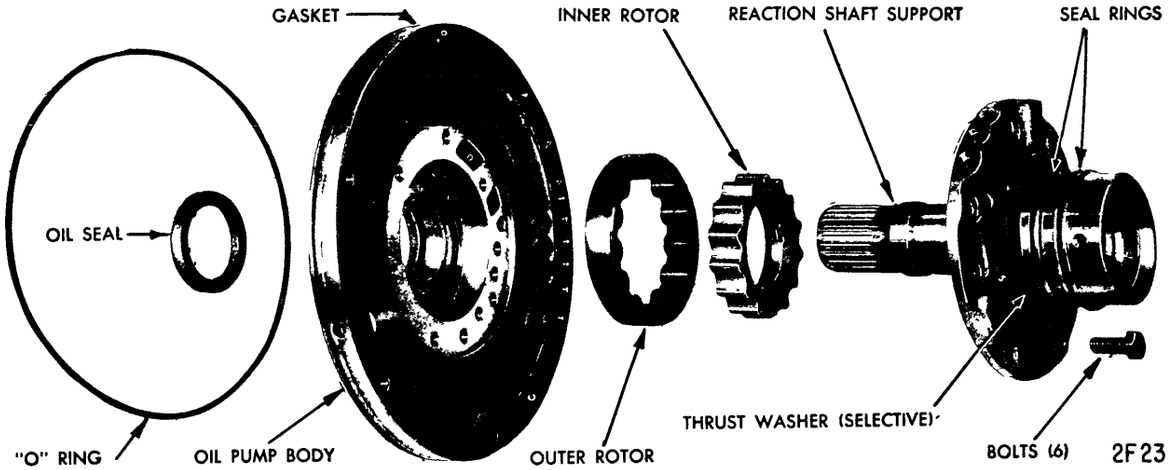
Inspection: Inspect all parts for burrs or wear. Test inner weight for free movement in outer weight, and outer weight for free movement in governor housing. Weights and valve should fall freely in bores when clean and dry. If necessary, remove rough surfaces with crocus cloth.

R assembly: If support (or parking sprag) was separated from governor housing, assemble and tighten bolts finger tight. Make sure oil passages of governor housing align with passage in support (or parking sprag). Assemble governor weights and spring and secure with snap ring inside large governor weight. Place weight assembly in governor housing and install snap ring.

PARKING PAWL & LEVER: Disassembly – Remove parking lock cable adapter cover from bottom of extension housing, remove adapter from lock lever. Remove plug and slide shaft out of extension housing to remove parking lock lever and shim. Slide bushing sleeve out of housing to remove parking pawl and spring.



GOVERNOR ASSEMBLY

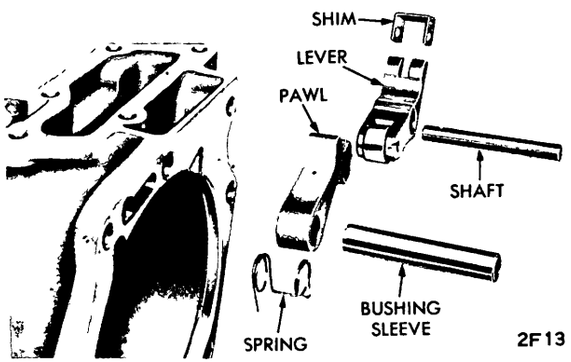


FRONT PUMP ASSEMBLY

Inspection: Check bushing sleeve and shaft for scores and free movement in housing, and in pawl and lever. Check roller for nicks, burrs and free turning. Inspect square lug on parking pawl for broken edges or other damage. Replace parts as required.

Reassembly: Position parking pawl and spring in housing and insert bushing sleeve, making sure square lug on pawl is toward sprag, and spring is positioned so as to lift pawl away from sprag. Position lock lever and shim in housing and install lever shaft. Lever shaft roller must be on top of pawl so as to push it into engagement with sprag. Attach cable adapter to parking lock lever. Place a new adapter cover gasket on extension housing, then insert small punch through cable opening in adapter cover and into end of adapter. Carefully lower cover into position, feeding adapter into cable opening in cover. Install cover screws and tighten to 150 inch pounds.

REAR OIL PUMP: Inspection – Inspect pump body and cover surfaces for nicks and burrs. Inspect rotors for scoring or pitting. With rotors cleaned and installed in pump body, place a straightedge across face of rotors and pump body, then use a feeler gauge and measure clearance between straightedge and face of rotors. Clearance limits are .0015–.003".



PARKING PAWL ASSEMBLY
(EXC. CHRYSLER & DODGE CUSTOM 880)

Replacement (Pump Body): Drive pump body rearward out of transmission case with a wood block and hammer. To prevent distortion of pump body during installation, use the following procedure. Screw two pilot studs, Tool C–3288 into case to guide pump body during installation, then chill pump body in ice. After thorough chilling, quickly position body over pilot studs, and drive it firmly into place with a wooden block and hammer. Remove guide studs.

FRONT OIL PUMP & REACTION SHAFT SUPPORT: Inspection – Inspect interlocking seal rings on reaction shaft support for wear or broken locks, and make sure they turn freely in grooves. *NOTE – Do not r mov rings unless replacement is n c ssary.* Inspect bushing in reaction shaft for wear, and machined surfaces on oil pump body and reaction shaft for nicks and burrs. With rotors cleaned and installed in pump body, use a feeler gauge and measure clearance between straightedge and face of rotors. Clearance limits are .0015–.003".

Reassembly: Install pump rotors in housing, then install reaction shaft support. Install retaining bolts and tighten to 150 inch pounds. Place a new seal in opening of pump housing with lip of seal inward, then use Tool C–3860 and drive seal in until tool bottoms.

FRONT CLUTCH: Disassembly – Remove large snap ring securing pressure plate in piston retainer, then remove pressure plate and clutch plates. Install compressor, Tool C–3863, over piston spring retainer and compress spring. Remove snap ring and slowly release tool until spring retainer is free of hub, then remove tool, retainer and spring. Invert clutch retainer assembly and bump on a wood block to remove piston. Remove seals from piston and clutch retainer hub.

Inspection: Inspect driving discs for burring, glazing and flaking off of facing material. *NOTE – Scratch facings with finger nail, if material c ll cts und r nail, r plac all driving discs.* Inspect disc splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burring, scoring or damaged driving lugs and replace if necessary. Inspect steel plate driving disc grooves in clutch retainer for smooth surfaces. Inspect band contacting surface on clutch retainer for scores. Inspect check ball in clutch retainer and make sure ball moves freely. Inspect all seal surfaces for nicks or deep

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CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

scratches, and make sure neoprene seals have not deteriorated, worn, or become hardened. Inspect piston springs, retainer, and snap ring for distortion.

REASSEMBLY: Lubricate and install inner seal on hub of clutch retainer, making sure lip of seal faces down and is properly seated in groove. Install outer seal on clutch piston, with lip of seal toward bottom of clutch retainer. Apply a coat of "Door Ease" or other suitable lubricant to outer edge of seal for easier installation of piston assembly. Place piston assembly in retainer and carefully seat piston in bottom of retainer. Place ten springs on piston hub exactly as indicated in illustration, then position spring retainer and snap ring. Compress springs with Tool C–3863, and seat snap ring in hub groove, then remove compressor tool. Lubricate all clutch plates (see table below for correct number in clutch pack), then install one steel plate followed by a lined plate until all plates are installed. Install pressure plate and snap ring, making sure snap ring is properly seated. With front clutch completely assembled, insert a feeler gauge between pressure plate and snap ring. The clearance should be .024–.123". If not, install a snap ring of proper thickness to obtain specified clearance. *NOTE – Snap rings are same as th se us d in r ar clutch and are available in thickn ss s of .060–.062", .074–.076", .088–.090".*

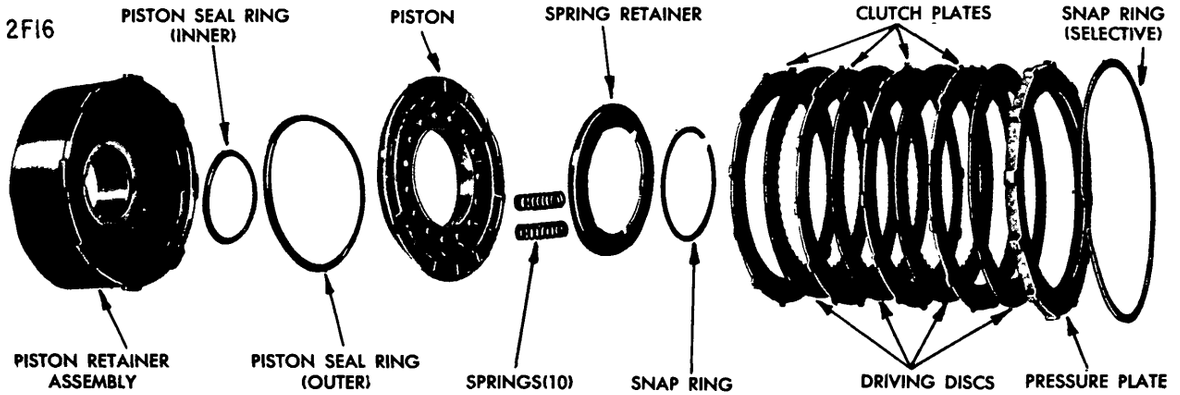
Front & R ar Clutch Packs

L cati n	Engine	Number Required
Front Clutch Plates	All	4
Front Clutch Discs	All	4
Rear Clutch Plates	318"	2
Rear Clutch Discs	318"	3
Rear Clutch Plates	361", 383", 413"	3
Rear Clutch Discs	361", 383", 413"	4

REAR CLUTCH: Disass mbly – Remove large snap ring securing pressure plate in clutch retainer, then remove pressure plate, clutch plates, and inner pressure plate out of retainer. Remove piston spring snap ring and remove spring. Invert clutch piston retainer assembly and bump on a wood block to remove piston, then remove seals from piston. If necessary, remove snap ring and press input shaft from clutch piston retainer.

Inspecti n: Inspect in same manner as for front clutch (see above) and note the following: Inspect interlocking seal rings on input shaft for wear or broken locks, and make sure they turn freely in grooves. *NOTE – Do not remov rings unl ss r placement is necessary.* Inspect bushing in input shaft for wear or scores. Inspect rear clutch–to–front clutch thrust washer for wear. Washer thickness should be .061"–.063", replace if necessary.

Reass mbly: If removed, press input shaft into clutch piston retainer and install snap ring. Lubricate and install inner and outer seal rings on clutch piston, making sure lip of seals face toward head of clutch retainer, and seals are properly seated in piston grooves. Place piston assembly in retainer, and using a twisting motion, seat piston in bottom of retainer. Position clutch retainer over piston retainer splines and support the assembly so clutch retainer remains in place. Place spring over piston with outer edge of spring positioned below snap ring grooves. Start one end of snap ring in groove, making sure spring is exactly centered on piston, then progressively tap snap ring into groove. Install inner pressure plate in clutch retainer with raised portion of plate resting on spring. Lubricate all clutch plates (see table above for correct number in clutch pack), then install one lined plate followed by



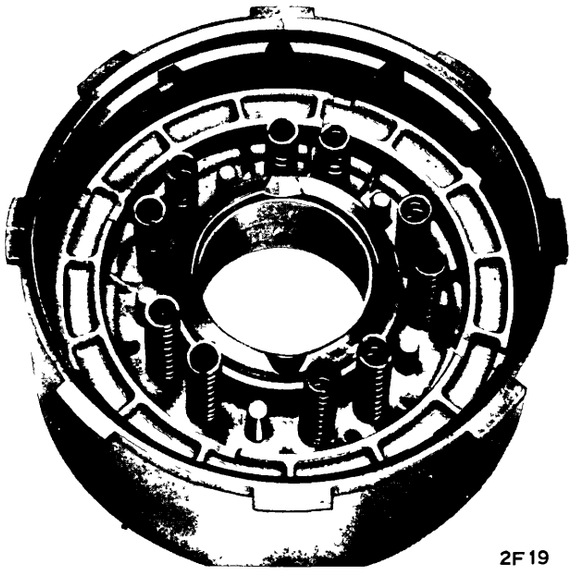
FRONT CLUTCH ASSEMBLY

a steel plate until all clutch plates are installed. Install outer pressure plate and snap ring. With rear clutch completely assembled, insert feeler gauge between pressure plate and snap ring and measure clearance. On "three disc" clutch, clearance should be .022–.042", and .026–.054" on "four disc" clutch. If not within limits, install a snap ring of proper thickness to obtain specified clearance. *NOTE – Low limit clearances are desired. Snap rings are available in thicknesses of .060–.062", .074–.076", .088–.090".*

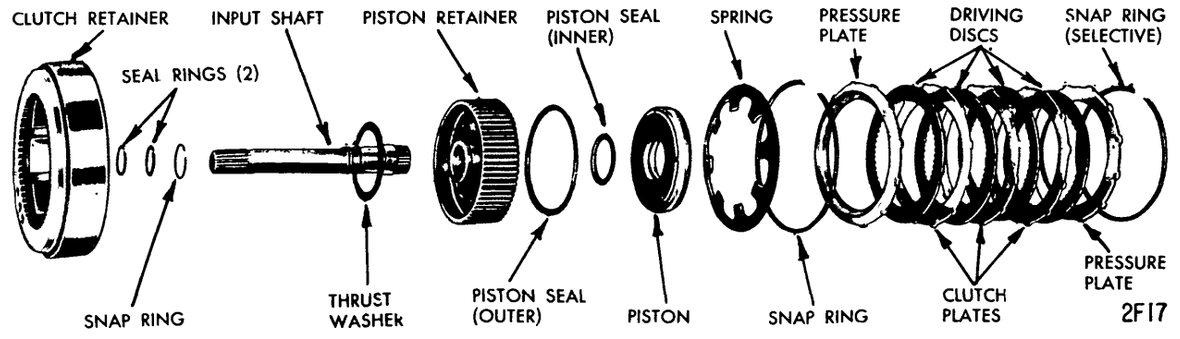
PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL: *NOTE – Measure endplay of planetary gear assemblies, sun gear and driving shell before removing these parts from output shaft as follows: With assemblies in an upright position, push rear annulus gear support downward onto output shaft, then insert a feeler gauge between rear annulus gear support hub and shoulder on output shaft. Clearance should be .012–.055".*

Disassembly: Remove thrust washer and snap ring from forward end of output shaft, then slide front planetary assembly off shaft. Slide front annulus gear off planetary gear set. Slide sun gear, driving shell and rear planetary assembly, with low and reverse drum, off output shaft. Lift sun gear and driving shell off rear planetary assembly, then remove thrust washer from inside driving shell. Remove snap ring and steel washer from sun gear (rear side of driving shell), and slide

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FRONT CLUTCH PISTON RETURN SPRING LOCATION



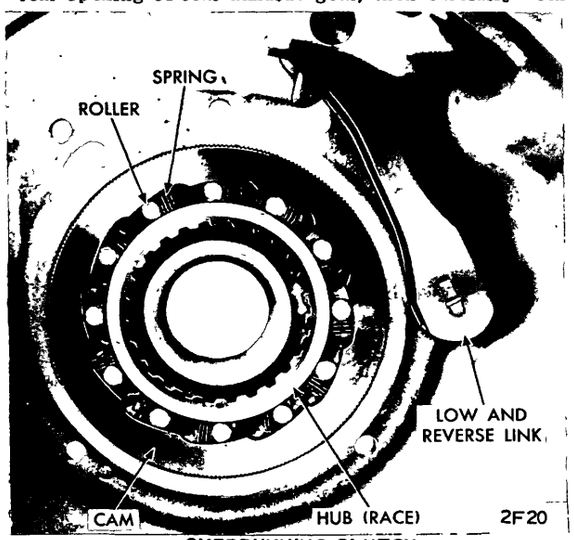
REAR CLUTCH ASSEMBLY

CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

sun gear out of shell. Remove front snap ring from sun gear if necessary. *NOTE – Front end of sun gear is longer than rear.* Remove thrust washer from forward side of rear planetary gear assembly, then remove planetary gear set from annulus gear.

Inspection: Inspect all parts for nicks or damage and make sure all passages in shaft are open and clean. Inspect bushings in sun gear for wear or scores and replace sun gear assembly if bushings are damaged. Inspect all thrust washers for wear and scores, and replace if damaged or worn below specifications. Inspect planetary gear carrier for cracks and pinions for broken or worn gear teeth. Inspect annulus gear and driving gear teeth for damage. Replace distorted lock rings.

Reassembly: Position rear planetary gear assembly in rear annulus gear, then place thrust washer on front side of planetary gear assembly. Insert output shaft in rear opening of rear annulus gear, then carefully work shaft through annulus gear and planetary gear assembly. Make sure splines are fully engaged in splines of annulus gear. Install snap ring in front groove of sun gear (long end of gear), then insert sun gear through front side of driving shell, and install rear steel thrust washer and snap ring. Carefully slide driving shell and sun gear assembly on output shaft, engaging sun gear teeth with rear planetary pinion teeth. Place thrust washer inside front of driving shell. Place thrust washer on rear hub of front planetary gear set, then slide the assembly into front annulus gear. Carefully work front planetary and annulus gear assembly on output shaft, meshing planetary pinions with sun gear teeth. With all components porperly positioned, install retaining snap ring on front end of output shaft.

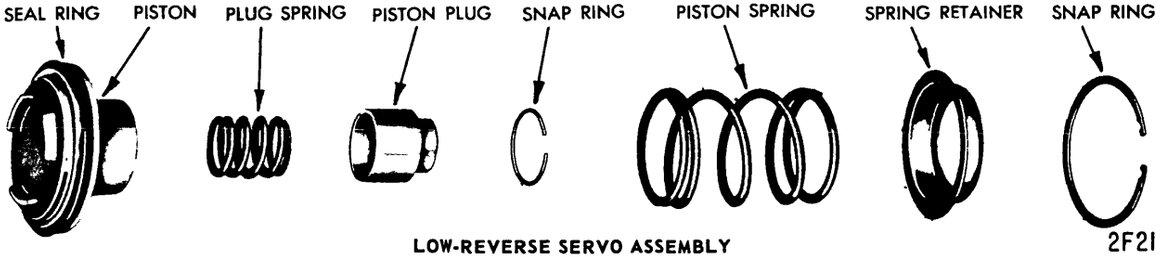


OVERRUNNING CLUTCH

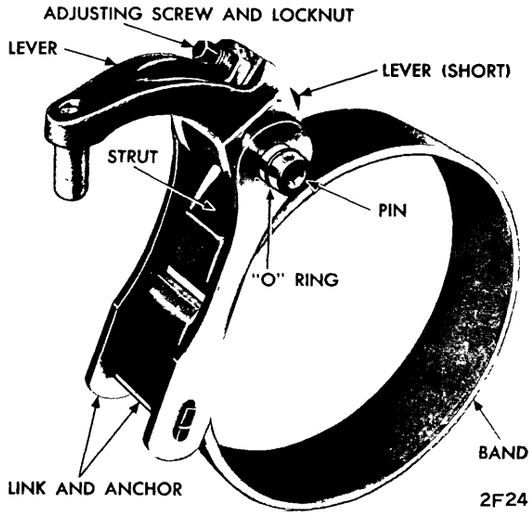
OVERRUNNING CLUTCH: Inspection – Inspect rollers for flat spots or chipped edges and roller contacting surfaces in cam and race for brinelling. Check roller springs for distortion, wear or damage. Inspect cam setscrew for tightness. If loose, tighten and restake the case around screw.

Overrunning Clutch Cam Replacement: – Remove setscrew from case below clutch cam, then insert a punch through pump body bolt holes and drive cam from case. *NOTE – Alternate punch from one bolt to another so cam will be driven evenly from case.* Clean all chips and burrs from cam area in case. Place spring retainer on cam, making sure retainer lugs snap firmly into place in notches on cam. Position cam in case with cam serrations aligned with those in case. Tap cam **evenly** into case as far as possible with a soft mallet. Install Tool C–3863 and tighten nut on tool to seat cam into case. Make sure cam is firmly bottomed, then install cam retaining setscrew. Stake case around screw to prevent it coming loose.

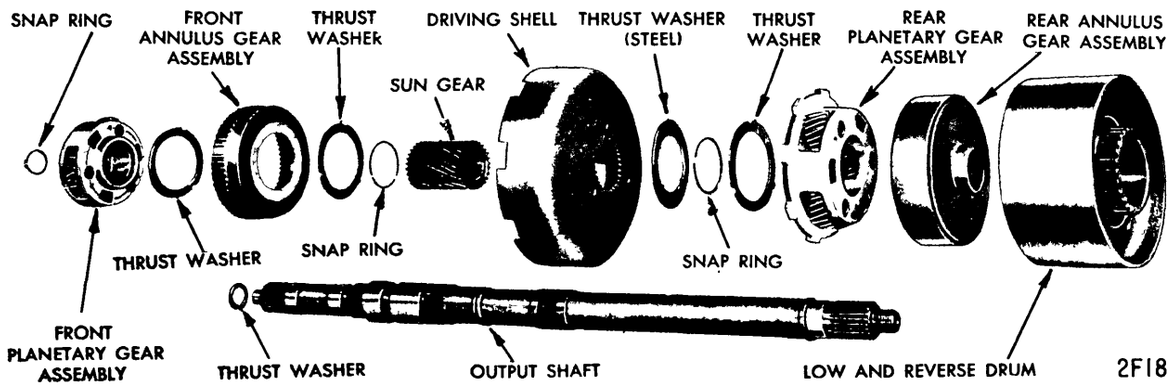
KICKDOWN & LOW–REVERSE SERVOS & BANDS: Inspection – *NOTE – These parts were disassembled when removed from transmission cas . Th only additional disassembly requir d is to r mov snap ring from low–reverse servo piston and r mov piston plug and spring.* Inspect piston and guide seal rings for wear, and make sure they turn freely in grooves. Do not remove seals unless replacement is necessary. Inspect piston for nicks, burrs, scores, and wear. Check piston bore in case for scores or other damage. Check fit of guide on piston rod and piston spring for distortion. Check band lining for wear and bond of lining to band. Check lining for black burn marks, glazing, non-uniform wear pattern and flaking. If lining is worn so grooves are not visible at the ends or any portion of band, replace band. Inspect band for distortion cracked ends. On low-reverse servo piston, lubricate and install piston plug and spring in piston, and secure with snap ring.



LOW-REVERSE SERVO ASSEMBLY



LOW-REVERSE BAND ASSEMBLY



PLANETARY UNIT, LOW-REVERSE DRUM & OUTPUT SHAFT ASSEMBLY

TRANSMISSION UNIT INSTALLATION

► *INSTALLATION NOTE: Lubricat all parts with Automatic Transmission Fluid Typ "A" (Suffix "A") wh n assembled or installed.*

OVERRUNNING CLUTCH: With transmission case in upright position, insert clutch race inside cam, then install overrunning clutch rollers and springs as shown in illustration.

LOW–REVERSE SERVO & BAND: Carefully work servo piston assembly into case with a twisting motion, then place spring, retainer and snap ring over piston. Compress low-reverse servo piston spring by using engine

CONTINUED ON NEXT PAGE

CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

valve spring compressor (Tool C–3422), then install snap ring. Position rear band in case and install short strut, then connect long lever and strut to band (see illustration). Screw in band adjuster just enough to hold struts in place. *CAUTION – Be sure long lever and strut ass mbly is installed correctly.* Install low-reserve drum.

KICKDOWN SERVO: Carefully push servo piston into case bore, then install piston rod, the two springs, and guide. Compress kickdown servo springs using same tool as used for low-reverse servo (above), then install snap ring.

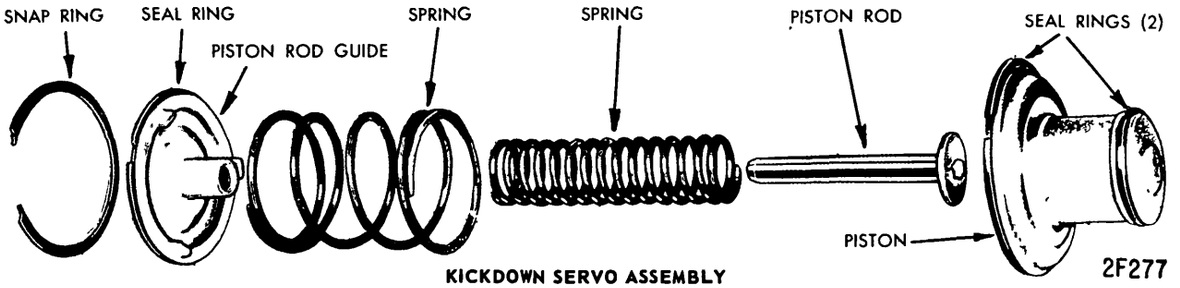
PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL: While supporting assembly in case, insert output shaft through rear pump housing, then carefully work the assembly rearward engaging rear planetary carrier lugs into low-reverse drum slots. *CAUTION – B v ry car ful n t t damage ground surfaces on output shaft during installati n.* Apply a coat of grease on input–to–output shaft thrust washer, and install washer on front end of output shaft.

INPUT SHAFT & REAR CLUTCH: Invert transmission and support in an upright position with output shaft downward, then align rear clutch plate inner splines and lower input shaft and clutch assembly into position in case. Carefully work clutch assembly in a circular motion to engage clutch splines over splines of front annulus gear. Coat one side of the fibre thrust washer with heavy grease, then position washer in recess on front face of rear clutch piston retainer.

FRONT CLUTCH: Align front clutch inner splines, and lower clutch assembly into position in case. Carefully work clutch assembly in a circular motion to engage clutch splines over splines of rear clutch piston retainer. Make sure front clutch driving lugs are fully engaged in slots in driving shell.

FRONT BAND: Slide band over front clutch assembly, then install band strut, and screw in adjuster just enough to hold strut in place.

FRONT OIL PUMP & REACTION SHAFT SUPPORT: *CAUTION – If driv train endplay was not within specificati ns (.030–.070") when checked at disassembly, r plac thrust wash r on reaction shaft support hub with on of prop r thickness. Thrust washers are availabl in th following thicknesses and are identifi d as indicated: .043–.045" (Natural); .061–.063" (Gr n); .084–.086" (R d).* Screw two pilot studs, Tool C–3288, in front oil pump opening in case, then install a new gasket over studs. Place a new rubber seal ring in groove on outer flange of oil pump housing and make sure seal is not twisted. Insert aligning Tool C–3881 through pump body and engage with inner rotor, then install pump assembly in case and tap lightly into position with a soft mallet. *CAUTION – If difficulty was encounter d in r moving front pump assembly from cas b caus f an xceptionally tight fit, it may be n c ssary to xpand case with heat during pump installati n. If h at is nec ssary, use a suitable heat lamp and h at cas in ar a of front pump for a few minut s prior to installing pump and reaction shaft support assembly.* With pump installed in case, place deflector over vent opening and install four pump body bolts, then remove studs and install remaining bolts. Snug all bolts down evenly, then tighten evenly to 150 inch pounds. Rotate pump rotors with Tool C–3881 until the two small holes in handle of tool are vertical (this will locate inner rotor so converter impeller shaft will engage inner rotor lugs during installation).



KICKDOWN SERVO ASSEMBLY

REAR OIL PUMP: Place outer rotor in pump body, then turn output shaft so inner rotor driving ball pocket is up. Install ball and slide inner rotor on output shaft in alignment with ball. Install oil pump cover with retaining bolts threaded in a few turns. Slide aligning sleeve, Tool C–3864 all the way in until it bottoms against rotors, then tighten cover bolts evenly to 150 inch pounds.

GOVERNOR & PARKING SPRAG (OR SUPPORT): *See "Transmission Unit Removal & Installation – Transmission in Car" above.*

EXTENSION HOUSING: *See "Transmission Unit Removal & Installation – Transmission in Car" above.*

VALVE BODY ASSEMBLY & ACCUMULATOR PISTON: *See "Transmission Unit Removal & Installation – Transmission in Car" above.*

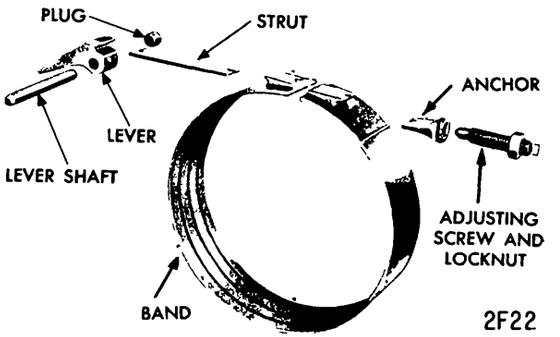
TRANSMISSION BUSHING REPLACEMENT

►*NOTE: The transmission bushings indicated below are available for service replacement. Bushings in the sun gear are not serviced separately.*

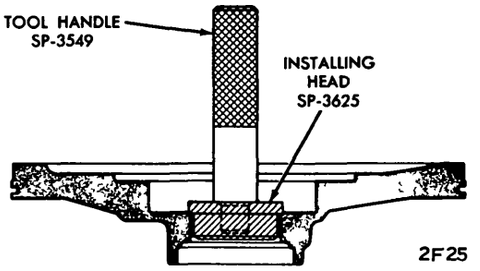
FRONT PUMP BUSHING: Position front pump housing on a smooth surface with rotor cavity down, then place removing head, Tool SP–3550, in bushing and install handle, Tool SP–3549, in removing head. Drive bushing straight down and out of bore. *CAUTION – Be careful not to cock tool in bore.* To install bushing, position a new bushing on installer head, Tool SP–3625, then with hub end down on a smooth surface, start bushing and installing head in bushing bore. Install handle, Tool SP–3549, on installing head and drive bushing into housing until tool bottoms in pump cavity (see illustration). Stake bushing in place with a blunt punch at each staking slot in pump housing. Use a narrow knife blade so similar tool and remove high points or burrs around staked area. *CAUTION – Do not use a file or other tool that will remove more metal than is necessary. Clean pump housing before installation.*

REACTION SHAFT BUSHING: For removal of bushing, assemble tools as indicated in illustration. *CAUTION – Do not clamp any part of reaction shaft or support in a vise.* With cup of tool held firmly against reaction shaft, thread remover into bushing as far as it will go by hand, then use a wrench and screw remover into bushing three or four additional turns to firmly engage threads in bushing. Turn hex nut down against cup to pull bushing from reaction shaft, then clean shaft to remove any chips. Slide a new bushing (chamfered end first) on installing head of tool and then into bore of reaction shaft. Support reaction shaft upright on a smooth surface and install handle in installing head. Drive bushing into shaft until tool bottoms. Clean reaction shaft before installation.

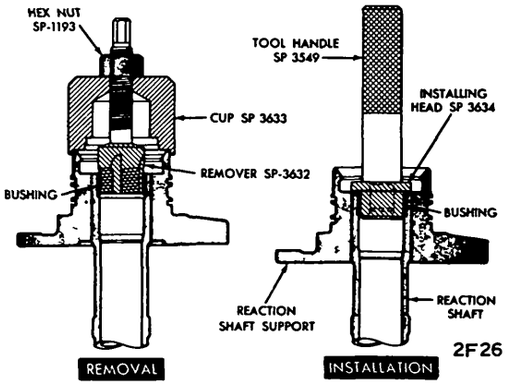
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FRONT (KICKDOWN) BAND & LINKAGE



FRONT PUMP BUSHING INSTALLATION



REACTION SHAFT BUSHING REPLACEMENT

CHRYSLER CORP. TORQUEFLITE EIGHT (C nt.)

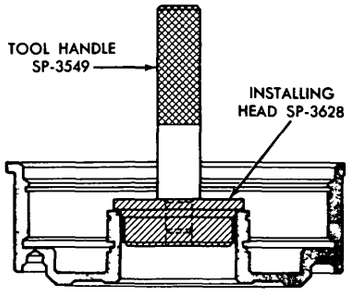
FRONT CLUTCH RETAINER BUSHING: Lay clutch retainer (open end down) on a smooth surface and place removing head, Tool SP–3629, in bushing. Install handle in removing head and drive bushing straight down and out retainer bore, being careful not to cock tool in bore. To install bushing, start bushing into bore using tools indicated in illustration and drive bushing in until tool bottoms. Clean retainer before assembly and installation.

INPUT SHAFT BUSHING: Clamp input shaft in a vise with soft jaws, being careful not to clamp on seal ring lands or journal. Assemble tools as indicated in illustration, then thread remover into bushing as far as possible by hand. Use a wrench and screw remover into bushing an additional three or four turns to firmly engage threads in bushing. Turn hex nut down against cup and pull bushing from shaft. Clean input shaft to remove all chips. *CAUTION – Make sure small lubrication hole next to ball in end of shaft is not plugged with chips, and that chips are not lodged next to steel ball.* Slide a new bushing on installing head and start them into bore of input shaft. Stand input shaft upright on a smooth surface and install tool handle, then drive bushing into shaft until tool bottoms. Clean input shaft and clutch piston retainer before assembly and installation.

STARTER RING GEAR REPLACEMENT

►*REPLACEMENT NOTE: Any of the following methods may be used to heat and expand starter ring gear for installation on converter.*

Oven – Place ring gear in oven (C–794) and set temperature at 200°F. Allow ring gear to remain in oven 15 or 20 minutes.



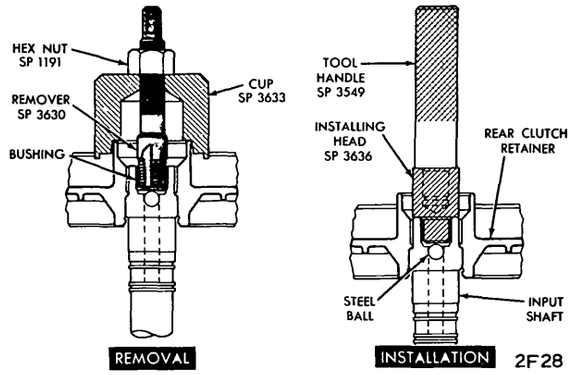
FRONT CLUTCH RETAINER BUSHING REPLACEMENT

Boiling Water – Place ring gear in a shallow container, add water, and heat for approximately eight minutes after water has come to a boil.

Steam – Place ring gear on flat surface and direct a steam flow around gear for approximately two minutes.

Flame – Place ring gear squarely on a flat surface, then use a medium size tip and direct a slow flame around inner rim of ring gear. *CAUTION – Do not apply heat to gear teeth.* Place a few drops of water on surface of gear at intervals during heating process. When gear is hot enough to just boil the water, installation of gear on torque converter can be made.

RING GEAR: Removal – Cut through weld material at rear side of ring gear with a hack saw or grinding wheel, being very careful not to cut into front cover stamping. Scribe a heavy line on front cover next to front face of ring gear to aid in locating new gear, then support converter with the four lugs faces resting on blocks of wood. *CAUTION – Converter must not rest on front cover hub during this operation.* Use a blunt chisel and hammer, tap downward on ring gear near welded areas to break any remaining weld material, then tap around ring gear until it comes off converter. Smooth off any weld areas on cover with a file.



INPUT SHAFT BUSHING REPLACEMENT

Installation: After ring gear is expanded by heating, place gear in position on converter front cover. Tap gear on cover evenly with a plastic hammer until front face of gear is even with scribed line around full circumference of front cover. Reweld ring gear to front cover, being careful to place weld material in exactly the same location, and in the same amount as used in original weld. Place welds alternately on opposite side of cover to minimize distortion.

►*WELDING NOTE:* Do not gas weld. Use a D.C. welder that is set at straight polarity or an A.C. welder if proper electrode is available. Use a 1/8" diameter welding rod, and a welding current of 80–125 amps. Direct arc at intersection of gear and front cover from an angle of 45° from rear face of gear. Inspect gear teeth and remove all nicks where metal is raised and weld metal splatter in order to insure quiet starter operation.

FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION

COMET DRIVE
C m t, All M d ls (1962)

FORDOMATIC
Fairlan , All M d ls (1962)
Falc n, All M d ls (1962)
F rd Pass. Cars. Exc. 390"& 406" Eng. (1962)

MERC-O-MATIC
M rcury M nt r y, Exc. 390"& 406" Eng. (1962)
M rcury Met r, All M d ls (1962)

►CHANGES, CAUTIONS, CORRECTIONS

► *1961-62 MERCURY & FORD 292" ENGINE RUNAWAY DURING 1-2 UPSHIFT CORRECTION:* If this condition occurs under light throttle (15—23 MPH), remove vacuum diaphragm assembly, Part No. C1AP-7A377-C, and install Part No. C1AP-7A377-B which is identified by a yellow stripe. If this condition occurs under light and heavy throttle (15 MPH up to and beyond 23 MPH), check for proper front servo return spring, Part No. B9AZ-7A003-C, identified by a yellow stripe. Install proper spring. If condition still exists after correct spring is installed, it will be necessary to disassemble transmission for a complete investigation.

► *1962 LOW SERVO PISTON INSTALLATION NOTE:* After removal and installation of low servo piston during transmission repairs, and before transmission has been road tested, move transmission selector lever from "N" (Neutral) to "D" (Drive) approximately 20 times with car standing still and engine at fast idle speed. This procedure will exhaust any air trapped in low servo piston cylinder and insure proper shift quality.

► *1961-62 TRANSMISSION LOW LINE PRESSURE CORRECTION:* This condition may be caused by wear at end of throttle control valve rod and can be corrected by installing a new rod. Throttle control valve rod should measure 2.084—2.094" in length.

► *TRANSMISSION IDENTIFICATION NOTE:* A number of different transmission models are used on the various engines as indicated in table below. For identification, refer to service identification tag attached to oil pan flange or to rear servo cover mounting bolt. This tag will be stamped with transmission serial number prefix and suffix and will include a figure indicating service identification code number.

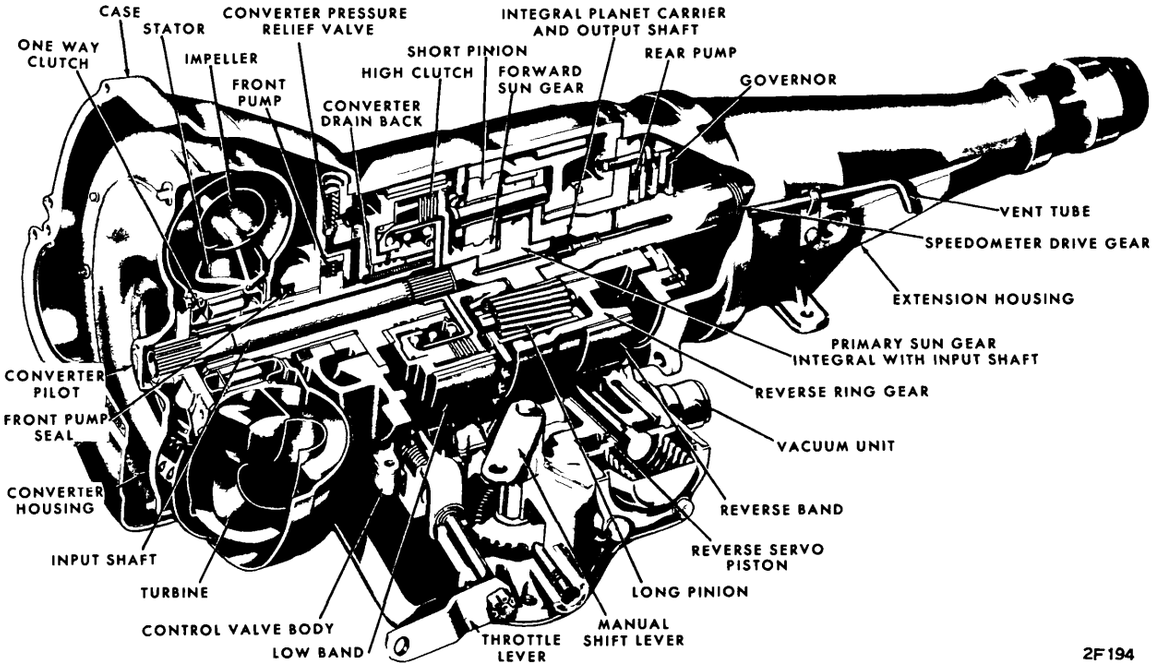
Transmissi n Identification

Engin	Serial Prefix
144" 6 Cyl	PCL
170" 6 Cyl	PCM
221" V8	PCN
223" 6 Cyl	PCH
260" V8	PCP
292" V8	PCJ
352" V8	PCK

► *TOWING CAR CAUTIONS: If transmission in working condition, car may be towed for a distance not to exceed 15 miles and at a speed not greater than 30 MPH with transmission selector lever in "N" (Neutral). If transmission inoperable, disconnect and remove propeller shaft or tow car with rear wheels off ground.*

DESCRIPTION

DESCRIPTION: Same design as used on later 1961 models with vacuum controlled throttle and control pressures.



FORD MOTOR 2-SPEED AUTOMATIC TRANSMISSION

LUBRICATION

Check fluid level every 1000 miles (Comet), every 6000 miles (All Others). Periodic draining and refilling is not required except at time of overhaul.

Checking Fluid Level: With transmission at normal operating temperature and engine at normal idle speed, shift transmission through all ranges, then place in "P" (Park) position. Check fluid level on dipstick and add recommended fluid as required to bring level up to "F" mark on dipstick. *CAUTION – Do not overfill.*

Draining & Refilling: Periodic draining and refilling is not required except at time of overhaul. To fill a dry transmission, install 5 qts. of recommended fluid, then start engine and shift transmission through all ranges. Place selector lever in "P" (Park) position and recheck fluid level. *CAUTION – Do not overfill.* When a partial drain and refill is required (due to front band adjustment or minor service) proceed as follows. To drain transmission, remove oil pan bolts and loosen front end of pan, then allow transmission fluid to drain. Install oil pan and new gasket (new filter if so equipped). On Falcon & Comet, add one quart of fluid, then run engine at idle speed for two minutes, and add one more quart of fluid. On other models add fluid to bring level up to "F" mark on dipstick. On all models, run engine at fast idle speed with transmission in "N" (Neutral) until transmission is at normal operating temperature. *CAUTION – Do not race engine.* Shift selector lever through all ranges, then place selector lever in "P" (Park) and check fluid level. If necessary, add fluid to bring level up to "F" mark on dipstick.

Recommended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity (Refill, Dry Transmission): 6½ qts. (Comet & Falcon), 6¼ qts. (Fairlane & Meteor), 9¼ qts. (All Others). *CAUTION – These capacities are approximat . Check fluid level on dipstick and adjust. See "Checking Fluid Level" above.*

ADJUSTMENTS

LINKAGE ADJUSTMENT: Throttle Linkage Adjustment– *See CARBURETOR on car model pages.*

Manual Shift Linkage: Adjustments are different for the various car models as indicated below.

Comet, Falcon, Fairlane & Meteor – With engine stopped, loosen clamp at shift lever so that shift rod is free to slide in clamp at lower end of steering column. Position selector lever so pointer lines up in "D" (Drive) position, then shift manual lever at transmission into "D" detent (second from rear). Tighten clamp on shift rod at lower end of steering column and check pointer for alignment in all selector lever positions.

Galaxie & Monterey – With engine stopped, loosen clamp at shift lever on lower end of steering column so that shift rod is free to slide in clamp, then position selector lever in "D" against stop on steering column. Shift manual lever at transmission into "D" detent (second from rear), then tighten clamp on shift rod and check pointer for alignment.

NEUTRAL SAFETY SWITCH ADJUSTMENT: (F rd Galaxie) – Loosen switch–to–steering column attaching screws, then shift selector lever to "N" (Neutral).

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FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION (Cont.)

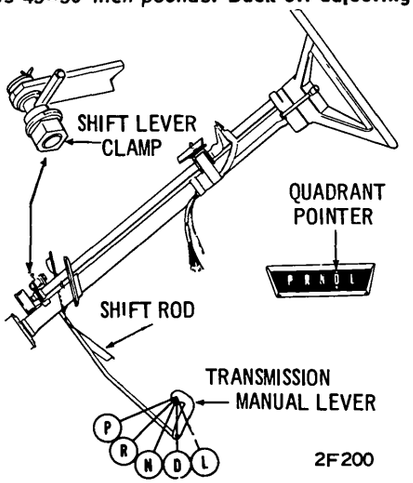
Rotate switch as far as it will go in either direction, then insert a .060" pin through switch housing and gauge pin hole. Hold pressure against gauge pin and rotate switch in free direction until pin engages hole in plate. With gauge pin through housing and into plate, tighten attaching screws and remove gauge pin. Check starter circuit in all selector lever positions. Starter must operate with selector lever in "N" or "P" only.

Comet, Fairlane, Falcon, Mercury & Meteor: Loosen screws securing switch to steering column, then move switch as necessary to obtain starter operation with transmission selector lever in "N" or "P" only. Tighten switch attaching screws.

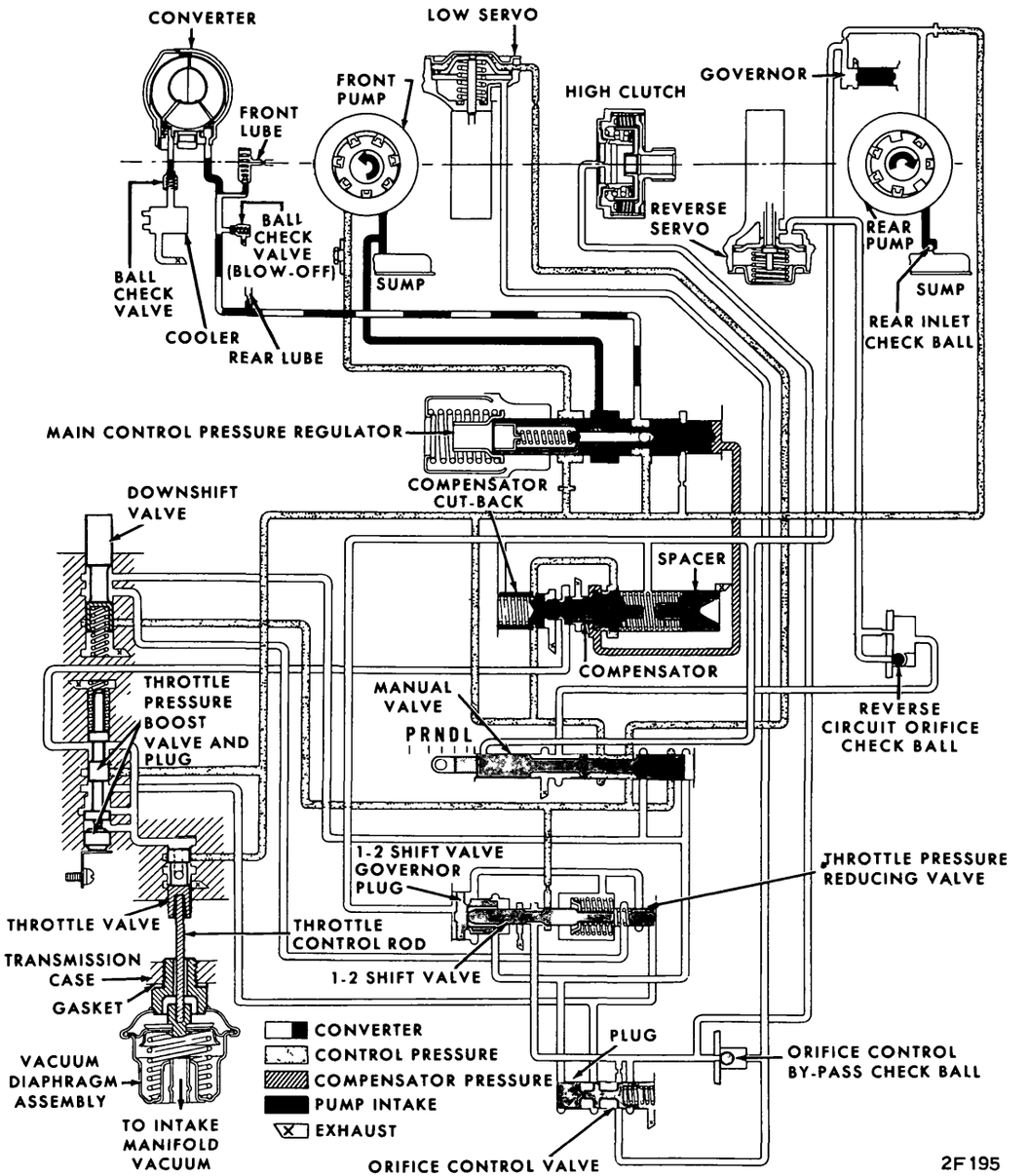
BAND ADJUSTMENT: Periodic band adjustment is not required. Check band adjustment each time oil pan is removed and adjust as necessary.

Front Band (Low Range): Loosen locknut on adjusting screw on left front side of transmission case, then tighten adjusting screw with Tool T59P-77370-A or B (Fairlane, Falcon, Galaxie); Tool 7345 (Comet, Mercury, Meteor) until tool handle snaps (breaks) over center. *NOTE – These tools are preset torque wrenches which overrun when torque on screws reaches 10 ft. lbs.* **Back off adjusting screw exactly two full turns.** Hold adjusting screw at this point and tighten locknut to 35–40 ft. lbs.

Rear Band (Reverse Range): Remove oil pan and screen, loosen rear servo piston rod locknut and adjusting nut, and install adjusting tool as follows: If Ford Tool T59P-77409-A is used, place tool on rear servo rod so two forks straddle band apply lever. *NOTE – The inner fork must engage flat on servo piston rod. The outer fork is a ¼" spacer and must be inserted between piston rod seat and adjusting nut.* If Mercury Tool 7355-A is used, insert tool between adjusting nut and piston rod–to–actuating lever seat, with opposite end of tool resting on raised boss on control valve assembly. With wrench T59P-77423-A (Ford), or No. 7355-B (Mercury), tighten adjusting nut until wrench handle snaps (breaks) over center. *NOTE – These tools are pre-set torque wrenches which overrun when torque on nut reaches 45–50 inch pounds.* **Back off adjusting nut exactly two turns.** Hold adjusting nut at this position and tighten locknut to 15–18 ft. lbs. Remove tools from servo piston rod. Install oil pan and screen using a new gasket, then refill transmission with recommended fluid.



MANUAL LINKAGE ADJUSTMENT



HYDRAULIC CIRCUIT DIAGRAM

TESTING

STALL TEST: *NOTE – Make s parat stall t st in "D" (Driv), "L" (Low), and in "R" (R verse).* With parking and service brakes applied and selector lever in "D", "L" or "R", open throttle through detent and note pressure and vacuum gauge readings and engine RPM. Vacuum should drop below 1.5" Hg. and the pressure should reach maximum limits as indicated in "Hydraulic Control Pressure Table" below. Engine speed at stall should be as indicated in "Engine Stall Speed Table." *CAUTION – Do not stall t st for mor than 5 s conds. B tween t sts, run ngin for at l ast 2 minutes at*

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION (Cont.)

1000 RPM with transmission selector lever in "N" (Neutral) to prevent overheating. If engine runs away on a stall test in "D" or "L", but is held within limits in "R", the low band is slipping. If engine runs away in "R" during a stall test, but is held within limits in "D" or "L", the reverse band is slipping. *NOTE – Transmission "high" clutch cannot be tested since the clutch applies at road speeds above 15 MPH.*

ENGINE STALL SPEEDS

Engine	Low Limit–RPM–Limit	High
144" 6 Cyl	1600	1800
170" 6 Cyl	1750	1950
221" V8	1600	1800
223" 6 Cyl	1300	1500
260" V8	1800	2000
292" V8	1550	1750
352" V8	1550	1750

AIR PRESSURE TESTS (With Transmission in Car): Raise car on hoist, then remove transmission oil pan and control valve assembly. Proceed as follows:

Clutch Apply: Apply pressure to front clutch passage (see illustration). A dull thud indicates that clutch is operating. Retain air pressure in passage for several seconds to check for leakage

Low & Reverse Servos: Apply pressure to "Low Band Apply" and "Reverse Band Apply" holes in case (see illustration). Band operation can be observed.

SHIFT TEST: Shift points and low gear operation should be as indicated in table below. *NOTE - These speeds are approximate.*

CONTROL PRESSURE RISE TEST: With engine and transmission at normal operating temperature, connect a suitable pressure gauge (300 lbs.) to pressure take-off hole on left side of transmission case above shift levers, then proceed as follows:

1) During operation of engine from idle to wide open throttle (stall test), with selector lever in "D", "L" or "R", control pressure should rise as indicated in "Hydraulic Control Pressure Table."

2) In "D" position, if this rise does not occur, there are three possible causes (throttle and compensator pressures, pump capacity, and excessive leakage). Before control valve body or transmission is removed for inspection, make the following checks.

3) Install a vacuum gauge in vacuum line (preferably at diaphragm). Vacuum reading and pressure should be as indicated in control pressure table. If control pressure is low (below specifications), vacuum diaphragm and connecting lines are probably all right. If control pressure is high (above specifications), disconnect tube from rear of diaphragm unit and alternately plug and free end of tube. Engine should slow down and speed up as this is done. If engine speed does not vary, check line for leakage between diaphragm and intake manifold. Also check for restrictions in line. If vacuum line is all right, remove diaphragm unit and rod, then replace unit without the rod. Control pressure should now remain at idle specifications regardless of manifold vacuum. *CAUTION – Do not run engine under load for more than five seconds with diaphragm rod removed.* Start engine and check control pressure at engine idle speed with selector lever in "D" position. If control pressure is still too high, trouble is in transmission control system. If pressure is now within limits, diaphragm unit is not operating properly and should be replaced.

4) Check control pressure in "D", "L" and "R". If pressure rise is normal in any one position, throttle and compensator pressures, and pump capacity are normal. The probable cause of no pressure rise in other positions is leakage in hydraulic system ahead of manual valve.

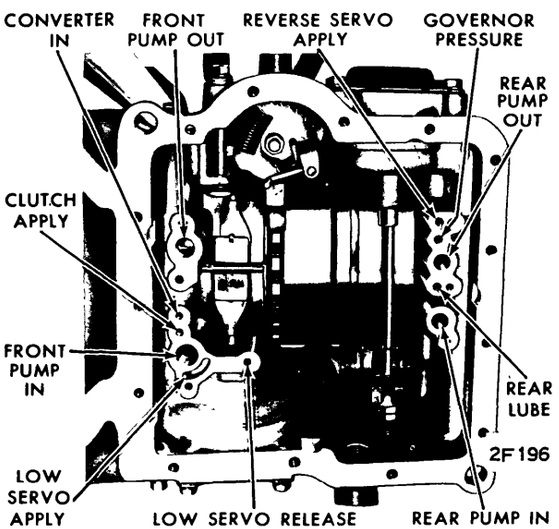
HYDRAULIC CONTROL PRESSURE TABLE

Throttle Position	Manifold Vacuum (" Hg.)	Shift Lever Position	CONTROL PRESSURES 144" Eng.	170" Eng.	Others
Closed	Above 15.0"	All	40-48 lbs.	46-63 lbs.	45-63 lbs.
As Required	15.0"-12.5"	"D", "L", "R"	②	②	②
Wide Open ①	Below 1.5"	"D", "L", "R"	145-170 lbs.	175-200 lbs.	175-200 lbs.

① - Through detent. ② - Pressure starts to rise.

SHIFT SPEED SPECIFICATIONS

ENGINE	AXLE RATIO	SHIFT SPEED (MPH) 1 - 2 Upshift Minimum Throttle	1 - 2 Upshift Throttle Through Detent	2 - 1 Downshift Throttle Through Detent	2 - 1 Downshift Closed Throttle
144" Eng.	3.50-1	13-15	44-50	42-48	6-13
	4.00-1	12-14	40-44	38-42	5-12
170" Eng.	3.50-1	13-15	46-51	45-50	6-12
	3.20-1	14-16	51-55	50-54	7-13
221" Eng.	3.00-1	16-18	53-60	52-59	8-14
	3.25-1	14-17	49-55	48-54	7-14
223" Eng.	3.56-1	14-17	43-49	41-47	6-14
292" Eng.	3.00-1	16-21	55-64	53-62	8-16
352" Eng.	3.00-1	16-19	51-60	49-59	8-16



TRANSMISSION CASE OIL PASSAGES

TROUBLE SHOOTING & DIAGNOSIS

HARD SHIFTING: Vacuum supply tube disconnected. Throttle valve sticking. Vacuum diaphragm loose in transmission case. Engine idle speed too high. Engine operation faulty, resulting in loss of vacuum.

ENGINE OVERSPEEDS DURING 1–2 UPSHIFT: Vacuum diaphragm throttle rod bent or missing. Throttle valve sticking. Vacuum diaphragm connected to constant vacuum source (power brake or windshield wiper lines).

HARSH INITIAL ENGAGEMENT IN "D", "L", OR "R": Check engine idle and fluid level.

SLIPS OR CHATTERS IN "D" OR "L": Check fluid level, throttle linkage, control pressure, low band adjustment. Make an air pressure check. Inspect for loose or worn engine or transmission mounts. Check operation of low servo and band. Check for leakage in low servo apply circuit.

SLIPS OR CHATTERS IN "R": Check fluid level, throttle linkage, control pressure, reverse band adjustment. Make an air pressure check. Inspect for worn or loose engine mounts. Check operation of reverse servo. Check for leakage in reverse servo apply circuit.

CREEPS EXCESSIVELY IN "D": Engine idle speed too fast.

ENGINE OVERSPEEDS DURING 1-2 SHIFT: Check fluid level. Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment, control pressure, low band adjustment. Make an air pressure check. Check control valve body for malfunction. Check for leakage in clutch apply or low servo release circuit. Check planetary gears.

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION (C nt.)

MOMENTARY LOCKUP DURING 1-2 SHIFT: Check fluid level, throttle linkage, control pressure and low band adjustmeht. Low servo and band not operating properly. Check high clutch for malfunctiori. Check for possible broken low servo return spring.

SEVERE 2-1 SHIFT DURING COAST-DOWN: Check engine idle speed and throttle linkage. Check control valve body for malfunction. Make a control pressure check.

NO 1-2 SHIFT IN "D": Check fluid level. Check fluid odor for possibly burned clutch plates. Check manual linkage adjustment. Check for improperly operating governor. Check for leakage in control pressure main circuit. Check high clutch and low servo and band for improper operation.

DELAYED 1-2 UPSHIFT: Check throttle linkage. Check for improperly operating governor. Check for leakage in control pressure main circuit.

SLIPS CONTINUOUSLY AFTER 1-2 SHIFT: Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment and fluid level. Make a control pressure check and an air pressure check. Check high clutch for improper operation and for leakage in clutch apply or low servo release circuit.

NO 2-1 FORCED DOWNSHIFT (KICKDOWN): Check throttle linkage adjustment. Check control valve body for malfunction. Check for leakage in control pressure main circuit.

NO 2-1 SHIFT DURING COAST-DOWN: Check for malfunction in control valve body or governor.

FLUID FORCED OUT FILLER TUBE OR VENT: Check fluid for contamination by engine coolant. Transmission external vent plugged. Check fluid for aeration.

TRANSMISSION OVERHEATS: Check control pressure. Check oil cooler flow.

ACCELERATION NORMAL (MAXIMUM SPEED APPROXIMATELY 45 MPH): Converter one-way clutch not operating properly.

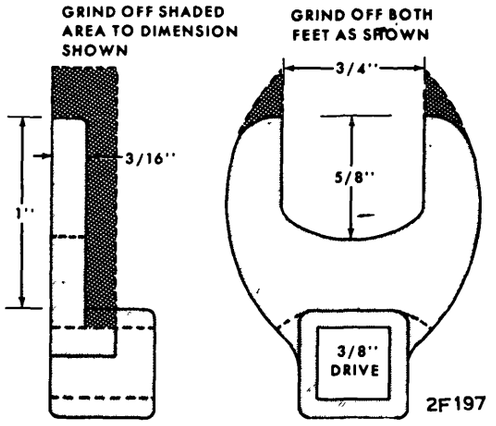
ACCELERATION VERY POOR (OPERATION ABOVE 30 MPH AT STEADY THROTTLE IS NORMAL): Converter one-way clutch not operating properly.

ENGINE DOES NOT START BY PUSHING CAR: Check fluid level and manual linkage adjustment. Check for malfunction in control valve body. Rear pump not operating properly. Check for leakage in control pressure main circuit.

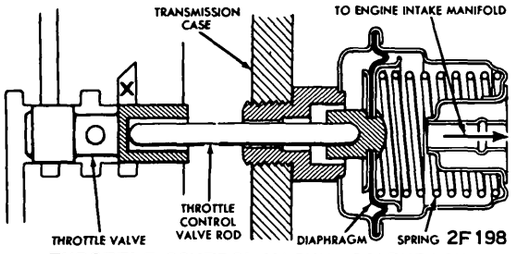
PARKING LOCK DOES NOT HOLD OR BINDS: Check manual linkage adjustment. Check parking linkage.

MINOR REPAIRS (TRANSMISSION IN CAR)

Vacuum Diaphragm: Removal – To remove diaphragm assembly without removing oil pan and throttle valve body, modify a ⅜" "Crow–foot" wrench as illustrated below and use it on "hex" portion of diaphragm to turn diaphragm assembly out of transmission case. The diaphragm assembly can also be removed by removing oil pan, throttle valve assembly, and throttle valve control rod, then insert a 3/16" Allen wrench into end of diaphragm assembly (from inside transmission case) and turn diaphragm assembly out of case. *CAUTION –*



VACUUM DIAPHRAGM WRENCH



THROTTLE CONTROL VACUUM DIAPHRAGM

Do not apply any pressure to diaphragm housing.

Installation – Reverse removal procedure and tighten diaphragm assembly to 15–18 ft. lbs.

Control Valve Body: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove six bolts attaching control valve body to transmission case, then lower control valve body and work the manual shift valve link out of manual valve.

Installation - Position control valve assembly in transmission case, then connect manual valve shift link to manual valve, and position the throttle valve lever between downshift valve and the stop plate on upper valve body. Install control valve attaching screws and tighten to 8-10 ft. lbs. Install fluid screen and oil pan, using a new gasket. Tighten attaching bolts to 10-13 ft. lbs. Install drain plug and tighten to 10-13 ft. lbs. Refill transmission with recommended fluid and adjust throttle linkage and manual linkage.

Front Servo Piston Assembly: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove main control valve assembly (see above), and disconnect fluid filler tube from transmission case. Remove two opposing bolts from front servo cover, then install two longer bolts (5/16" - 18 x 2") and nuts to hold cover in position against servo spring tension while removing remaining servo cover bolts. Remove servo cover by slowly unscrewing nuts on long bolts until all servo spring tension is released from cover. Remove the long bolts, nuts and servo cover. *NOTE - B for r moving s rvo cov r, note position of front band actuation struts. This will aid in reass mbly in cas struts ar dislodged.* Remove servo piston assembly and servo spring from transmission case and remove servo piston seal ring from piston.

Installation - Inspect front servo piston for nicks, burrs and a warped or bent condition. Inspect servo piston bore for burrs, wear, and scoring. Install new seal ring on servo piston and install servo piston spring and piston assembly in servo bore with air bleed hole toward top of case. Clean servo cover and mounting face and position new "O" ring seal on cover, then place servo cover on servo piston. Retain servo cover in place with the two long bolts used at disassembly (5/16" - 18 x 2"), and nuts. Pull servo cover partially into position by turn the nuts on long bolts to compress servo spring. Install regular cover attaching bolts in the open threaded holes. Remove both long bolts and nuts and install remaining two cover attaching bolts. *NOTE - Check position of front band actuating strut while tightening servo cover bolts to assure that s rvo piston rod enters actuating strut prop rly. If struts have been dislodged, loosen front s rvo band adjusting screw and position them correctly.* Tighten servo cover attaching bolts evenly to avoid distorting cover, then when cover is firmly seated, tighten bolts to 12–15 ft. lbs. *CAUTION - Use care when positioning "O" ring seal and servo cover to pr v nt future leakag .* Install main control valve assembly, then connect manual shift valve link to manual valve and position throttle lever between downshift valve and stop plate on upper valve body. Tighten control valve attaching bolts to 8-10 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install fluid screen and transmission oil pan and refill transmission. Adjust Linkage.

►*FRONT SERVO COVER GASKET REPLACEMENT:* Remove low band adjusting screw locknut and tighten adjusting screw with wrench, Tool T59P-77370-A (Ford), Tool 7345 (Mercury) until wrench overruns. Loosen cover capscrews approximately two turns each, then tighten band adjusting screw until wrench overruns. Repeat this procedure until servo cap is removed (low band strut will be seated against bottom of servo casting and will be held in place). To install cover, use two 5/16" - 18 x 1¼" hex head bolts in place of the regular bolts, then place servo cover over piston and start the two bolts. Tighten bolts snugly to bring cover into contact with piston and to position piston stem in band strut (piston stem will be back in position in cup face of band strut). Loosen band adjusting screw two turns, then tighten servo cover capscrews approximately two turns or until they are snug (band will again be tight against drum). Repeat this procedure until cover is drawn close enough so that regular cover capscrews can be installed in rest of cover holes, then remove the two temporary bolts and replace them with regular bolts. Continue to repeat the above procedure until cover is fully installed. Install low band adjusting screw locknut and adjust the band.

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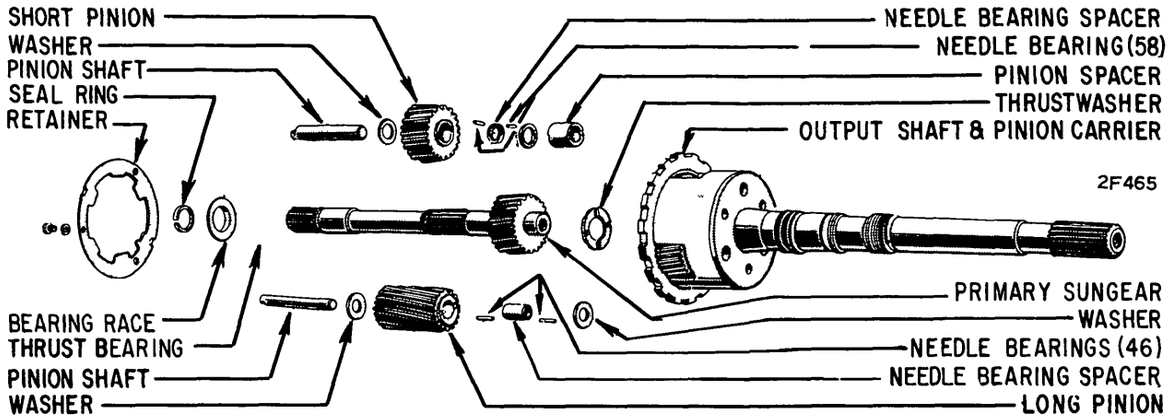
FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION (C nt.)

R ar Serv Pist n Ass mbly: Removal - Disconnect accelerator pedal connecting rod, then raise car and remove transmission oil pan, fluid screen and main control valve. Remove four bolts and remove rear servo cover, "O" ring seal, and servo piston spring. *CAUTION - Servo cover is spring loaded.* Remove locknut, adjusting nut, and half-ball rod seal from rear servo piston rod. Remove rear engine mount from under transmission housing, then lower extension onto frame crossmember. Remove servo piston rod from transmission case. Remove servo piston and seal ring from piston bore. *NOTE - Push outward on piston stem from inside transmission cas or apply air pressure to reverse servo apply passag in transmission case to remove piston.* Remove seal ring from piston.

Installati n - Inspect piston, stem and rod for nicks or burrs. Check rod for wear or for a bent or warped condition. Inspect piston bore, for burrs, wear and scoring. Install new seal on piston, then install piston assembly into bore in case. Push piston to bottom of bore. Install piston rod through piston, then position band operating lever and install the half-ball rod seal, adjusting nut, and locknut loosely. Raise transmission from frame crossmember and install rear engine mount. Install new "O" ring seal on servo cover, then install servo cover, maintaining pressure against cover while tightening the attaching bolts. Tighten bolts slowly and evenly until cover is firmly seated, then tighten bolts to 12-15 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install main control valve assembly, fluid screen, transmission oil pan, and drain plug. Refill transmission (see "Draining & Refilling" above). Connect accelerator rod and adjust pedal to 3½" above floor. Adjust throttle and manual linkage.

EXTENSION HOUSING & GOVERNOR: Removal - Raise car and drain fluid from transmission, then disconnect driveshaft at rear universal and remove driveshaft. Remove bolts attaching rear engine support to transmission, then use a transmission jack and raise transmission until extension housing clears rear engine support and frame crossmember. Remove extension housing from transmission case. To remove governor, remove snap ring from output shaft and remove governor and governor drive ball. *NOTE - Replace output shaft seal if worn or damaged.*

Installati n - Reverse removal procedure.



PINION CARRIER & PRIMARY SUN GEAR ASSEMBLY

►*EXTENSION HOUSING BUSHING & SEAL REPLACEMENT NOTE: Replaceable with suitable tools. Coat seal with non-hardening compound.*

REMOVAL & INSTALLATION

COMET, FALCON, FAIRLANE & METEOR

REMOVAL: *NOTE - Transmission and converter are removed as an assembly.*

1) Place car on a hoist, then disconnect battery and remove starter motor. On six cylinder engines, remove two "Z" bar bracket retaining bolts from top of converter housing. On all models, raise car and drain transmission *(see "Draining & Refilling" above).*

2) Remove dust shield from bottom of converter housing, then disconnect cooler lines if so equipped. Disconnect drive shaft at rear and remove from transmission. Disconnect manual and throttle linkage, speedometer cable, and vacuum line at transmission. Disconnect parking brake cable from rear support, then disconnect front parking brake cable from equalizer bar.

3) If so equipped, remove bolts attaching engine rear support spring to extension housing. On all models, place a transmission jack under transmission and raise it slightly to take weight off engine rear support member. On Comet & Falcon, remove bolts attaching engine rear support to underbody and move support aside. On other models, remove transmission–to–crossmember bolts, then remove crossmember–to–body bolts and remove crossmember.

4) Lower transmission and engine, then support engine with a jack stand. Remove nuts attaching converter to drive plate, and remove converter housing–to–engine block bolts. Work converter housing off engine dowel pins, and work converter pilot out of engine crankshaft. Secure converter to converter housing and lower transmission.

►*V8 ENGINE REMOVAL NOTE: On some models it may be necessary to remove part of engine exhaust system in order to remove transmission assembly.*

INSTALLATION: Reverse removal procedure and note the following: Tighten converter housing–to–engine block bolts to 25–30 ft. lbs. Tighten converter–to–flywheel bolts to 15–26 ft. lbs. Tighten coolant lines to 10–12 ft. lbs. With transmission completely installed and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least twenty times to bleed air out of low servo release cavity. Adjust manual and throttle linkage.

GALAXIE & MONTEREY

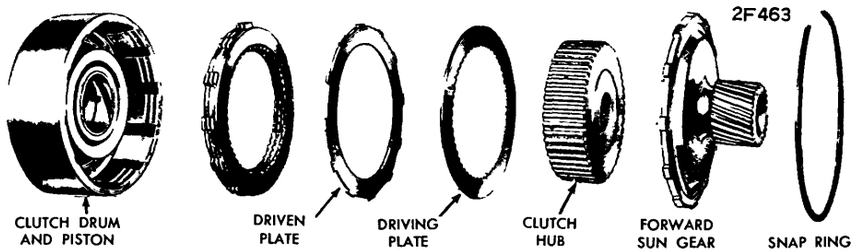
REMOVAL: Transmission and converter are removed as an assembly.

1) Raise car and drain transmission and converter, then disconnect drive shaft at pinion flange and remove shaft Install extension housing seal replacer in extension housing seal *(see "Extension Housing Bushing and/ r Seal Replacement" above for tool number).*

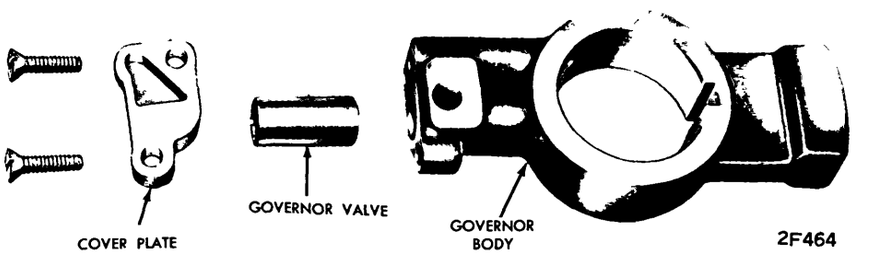
2) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable from extension housing. Disconnect oil cooler lines at transmission, then remove lines from clamp at engine block Disconnect oil filler tube at transmission case.

3) Remove starter from converter housing and disconnect parking brake cables at the equalizer. Remove two engine rear support bolts from extension housing and remove support clamp.

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CLUTCH DRUM ASSEMBLY



GOVERNOR ASSEMBLY

FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION (Cont.)

4) Position a transmission jack under transmission and raise it slightly to take weight off crossmember. Support rear of engine in this position with an engine support bar or stand, then remove crossmember.

5) Remove bolts attaching converter-to-flywheel and remove converter housing-to-engine block bolts. Secure converter to transmission so it will not fall out when transmission is separated from engine, then work transmission off engine block dowel pins and toward rear until converter pilot clears crankshaft. Lower transmission and remove it from car.

INSTALLATION: Reverse removal procedure and note the following: Tighten insulator-to-crossmember bolts to 23-29 ft. lbs. Tighten converter-to-flywheel stud nuts to 23-28 ft. lbs. With transmission completely installed, and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least twenty times to bleed air out of low servo release cavity. Adjust manual and throttle linkage.

TRANSMISSION OVERHAUL

See 1959 Final Data, Page 452, or later Manual edition and note the following:

CONTROL VALVE: Disassembly – 1) Remove manual valve, then remove control pressure regulator valve spring retainer, spring and spring seat, and valve. Remove hold-down plate near compensator cut-back valve cover, then remove cover. Remove compensator cut-back valve spring and valve from lower body.

2) Remove 1-2 shift valve governor plug cover and governor plug. At opposite side of lower body, remove compensator and control pressure regulator cover plate. *CAUTION – Maintain pressure on this plate (against spring pressure) until all screws are removed.* Remove compensator valve spacer, spring and valve. *NOTE – Temporarily install hold-down plate and screw so that separator plate is held on upper body.*

3) Remove orifice control valve cover plate. Remove throttle reducing valve and spring and orifice control valve spring, valve, and plug. From upper body, remove downshift valve stop plate, then remove downshift valve and spring.

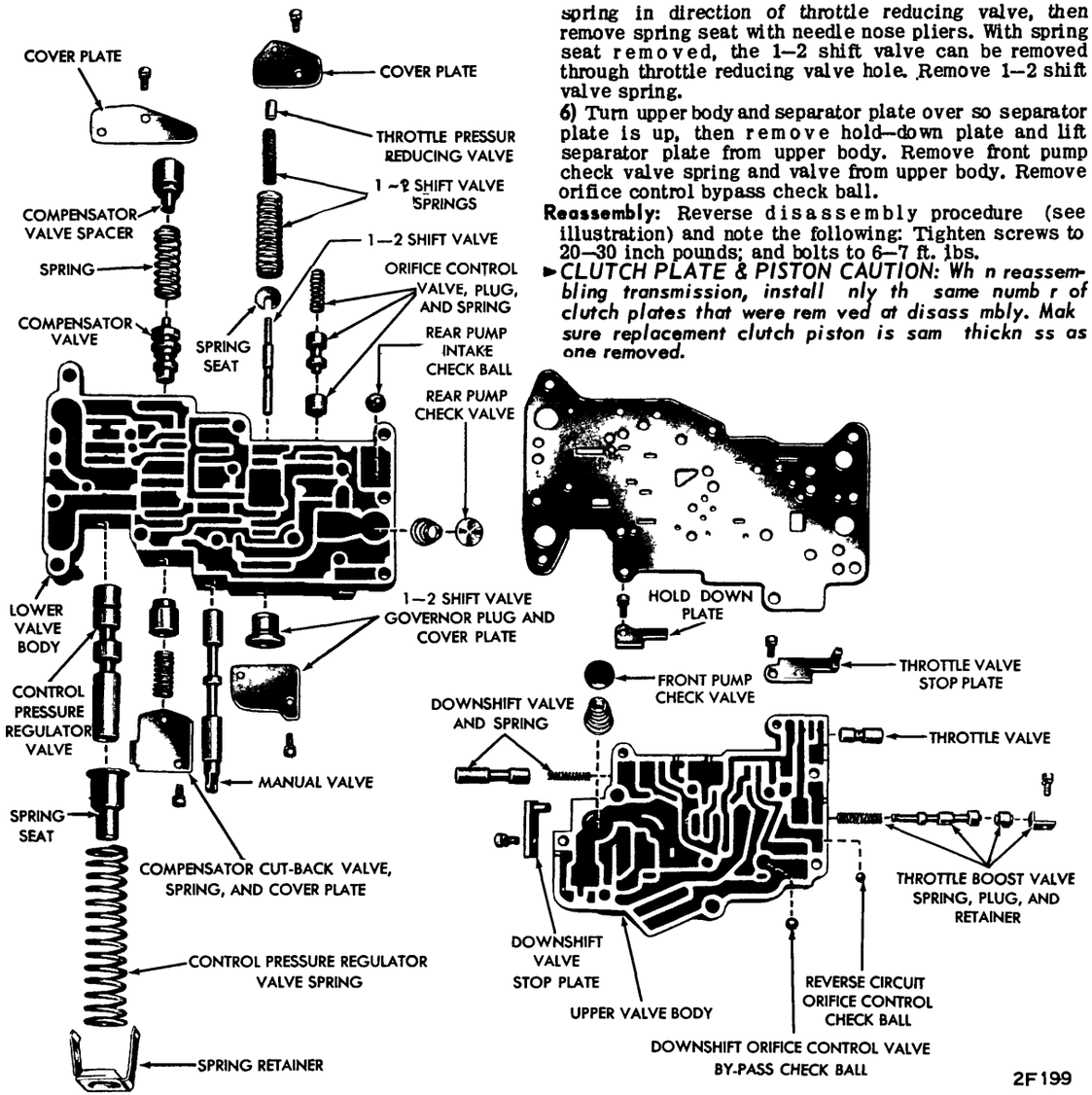
4) Remove throttle valve stop plate and throttle valve from opposite end of upper body. Remove throttle boost valve retainer, plug, throttle boost valve and spring. Remove three screws and five bolts holding upper body, separator plate, and lower body together.

5) Lift upper body and separator plate from lower body, then remove rear pump check valve and spring. Remove rear pump check ball from lower body. To remove 1-2 shift valve from lower body, compress 1-2 shift valve spring in direction of throttle reducing valve, then remove spring seat with needle nose pliers. With spring seat removed, the 1-2 shift valve can be removed through throttle reducing valve hole. Remove 1-2 shift valve spring.

6) Turn upper body and separator plate over so separator plate is up, then remove hold-down plate and lift separator plate from upper body. Remove front pump check valve spring and valve from upper body. Remove orifice control bypass check ball.

Reassembly: Reverse disassembly procedure (see illustration) and note the following: Tighten screws to 20-30 inch pounds; and bolts to 6-7 ft. lbs.

► *CLUTCH PLATE & PISTON CAUTION: When reassembling transmission, install only the same number of clutch plates that were removed at disassembly. Make sure replacement clutch piston is same thickness as one removed.*



MAIN CONTROL VALVE ASSEMBLY

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION

CRUISE-O-MATIC
F rd Galaxie (1962)
Thund rbird (1962)
F rd Trucks, F-100, 250, 350, P-350, 400, 500 (1962)
MULTI-DRIVE
M rcury Monterey (1962)

►CHANGES, CAUTIONS, CORRECTIONS

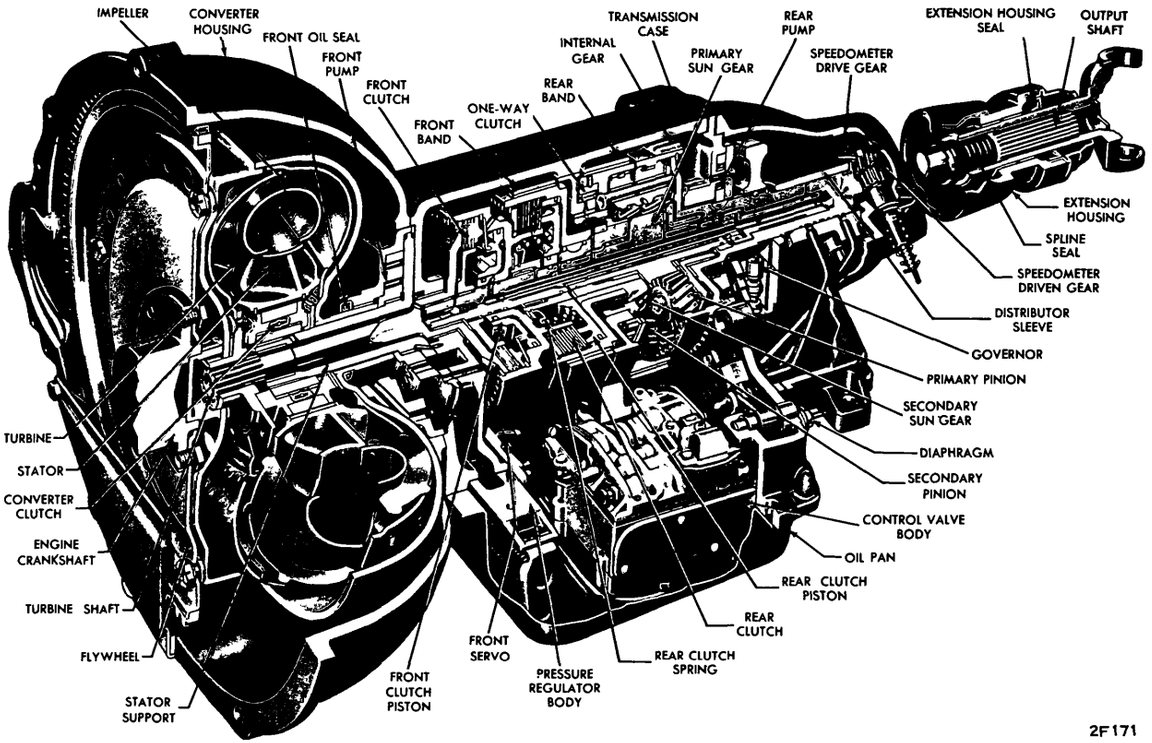
►*1962 NYLON SPEEDOMETER DRIVE GEAR NOTE:* A nylon speedometer drive gear is being installed on some transmissions in production. A steel gear is available for service replacement. If necessary to remove a nylon speedometer gear, and it does not slide off shaft freely, remove output shaft, rear pump, governor oil distributor sleeve and tubes, and the speedometer drive gear from transmission as an assembly. Remove distributor tubes from sleeve, then remove speedometer drive gear snap ring from output shaft. Move oil distributor sleeve and speedometer gear toward rear of output shaft by prying between boss on sleeve and governor counterweight. *CAUTION – Do not pry against gov rnor drive body.* Slide distributor sleeve toward front of transmission, then tap drive gear off output shaft with a brass drift or hammer. To prevent gear cocking, tap gently all the way around gear. To install nylon gear, heat to 180°F. by placing gear on a 100 watt light bulb for five minutes on each side. *NOTE – Coat g ar lib rally with automatic transmission fluid b for h ating.*

►*TRANSMISSION IDENTIFICATION NOTE:* A number of different transmission models are used on these car models as indicated in following table. For identification, refer to identification plate located on side of case, or to additional identification tag fastened on oil pan by one of the oil pan attaching bolts. On the identification plate, the prefix letters to Transmission Serial Number indicate transmission models (Example "PCD-C" followed by serial number). These same letters are used on identification tag to indicate transmission model. An additional figure on identification tag indicates detail changes made to transmission and should be referred to for service and parts replacement.

Transmission Identification

Model	Engine	Serial Prefix
Ford Pass	292"	PCC-C,D
Ford Pass	352"	PCD-C,D,D-1,F
Ford Pass	390"	PCE-G,S
Police Interceptor	390"	PCE-J, K
Thunderbird	390"	PCE-H,T
Ford Truck F-100	223"	PBC-R
Ford Truck F-100	292"	PBW-L
Ford Truck F-250	223"	PBC-M
Ford Truck F-250	292"	PBW-K
Ford Truck F-350	223"	PAU-L
Ford Truck F-350	292"	PBY-G
Ford Truck P-350,400,500	223"	PAU-M
Ford Truck P-350,400,500	292"	PBY-H
Mercury	292"	PCC-C
Mercury	352"	PCC-D
Mercury	390"	PCE-G

►*FAST IDLE OPERATION (FOR SUSTAINED PERIOD) CAUTION:* To prevent transmission overheating, do not operate engine with transmission in Neutral or Park for periods longer than 10 minutes unless fluid lever, manual and throttle linkage, and parking brake adjustments are within specifications. It is suggested the car be raised and properly supported, and operated in gear if long periods of operation at fast idle are required.



FORD & MERCURY 3-SPEED AUTOMATIC TRANSMISSION SECTIONAL VIEW

►*STARTING ENGINE BY TOWING OR PUSHING CAR:* Pushing is recommended. Place selector lever in Neutral "N" position. When car reaches 20 MPH speed, turn on ignition, move selector lever to "LO", depress accelerator pedal to half throttle position until engine begins to run. *NOTE – On ice or snow where traction not good, move selector lever to "DR" position to crank engine.*

►*TOWING CAR CAUTIONS: Do not tow at speed greater than 40 MPH and observe following precautions:*

If Transmission Operating Properly – Place selector lever in Neutral "N" position. Car can be towed normally for distances not to exceed 12 miles. **For greater distances, use same procedure as for inoperative transmission.**

If Transmission Inoperative – Tow car with rear wheels lifted off road, or disconnect and remove propeller shaft and protect rear end of transmission from entry of dirt (U-joint Knuckle, Part No. 1M-4841 can be installed and wired in place for this purpose).

DESCRIPTION

DESCRIPTION: Same design as previous dual-range automatic transmissions having a vacuum controlled throttle valve. The spring loaded vacuum diaphragm unit mounted on rear of transmission case is actuated by engine vacuum against spring pressure. At high engine vacuum, diaphragm moves against spring pressure to move pushrod away from throttle valve, cutting off throttle pressure. As vacuum drops, spring loaded diaphragm moves pushrod to open throttle valve and increase throttle pressure. A transmission oil cooler is provided on all models.

OPERATION

OPERATION: Same as for 1957 models (*see "Ford-O-Matic, Merc-O-Matic & Turbo-Drive Transmissions" in 1957 Final Data, or later Manual editions and note the following*). On dual-range transmissions, with selector lever in "Dr 1" range, the car starts in first gear and upshifts to 2nd, then to 3rd. With selector lever in "Dr 2" range, the car starts in 2nd gear (same as for single range type transmissions) and upshifts to 3rd gear. Power flow through dual-range transmission is same as for single range type transmissions except that with selector lever in "Dr 1" range, the pinion carrier is held against rotation by a one-way sprag clutch instead of rear band. First gear in "Dr 1" range is the only gear that uses the sprag clutch.

LUBRICATION

Checking Fluid Level: Check fluid level every 4000 miles (Ford, Thunderbird, Mercury); 1000 miles (Ford Truck - On highway operation); Daily (Ford Truck - Off highway operation). Apply hand brake, place selector lever in "N" position, then run engine at fast idle

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

speed to bring transmission to normal operating temperature. Move selector lever through all positions in turn, then move selector lever to "P" (Park) position. Check fluid level and add recommended transmission fluid as required to bring level to "F" (Full) mark on dipstick.

Recommended Fluid – Automatic Transmission Fluid Type "A" (Suffix "A").

► *TRANSMISSION DRAINING & REFILLING NOTE: Periodic draining and refilling is not recommended, except at time of overhaul.*

Capacity (All Models) – 10 qts. (drain & refill); 11½ qts. (transmission dry).

Draining & Refilling: *NOTE – Not recommended except at time of transmission overhaul.* Remove converter housing lower cover and drain converter by removing one drain plug, then rotate engine 180° and remove second drain plug. Disconnect oil filler tube from transmission oil pan to drain fluid from transmission. Tighten converter drain plugs to 15–28 ft. lbs., then install transmission filler tube. Install 5 qts. of recommended fluid, then start engine and allow to run 2-4 minutes at idle speed. Add remaining amount of fluid (see above) and bring engine and transmission to normal operating temperature. Place transmission in "P" (Park) position and check fluid level. Add fluid to bring level up to "F" (Full) mark on dipstick. *CAUTION – Correct fluid level should be determined by dipstick reading rather than actual quantity of fluid installed.*

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on car model pages.*

FORD PASS. CARS & MERCURY (EXC. THUNDERBIRD)

Manual Linkage Adjustment: With engine stopped, loosen clamp at shift lever on lower end of steering column so shift rod is free to slide in clamp. Position selector lever in "D1" position, then shift manual lever on transmission to "D1" position (second from rear). Tighten clamp on shift rod, then check pointer alignment for all selector lever detent positions.

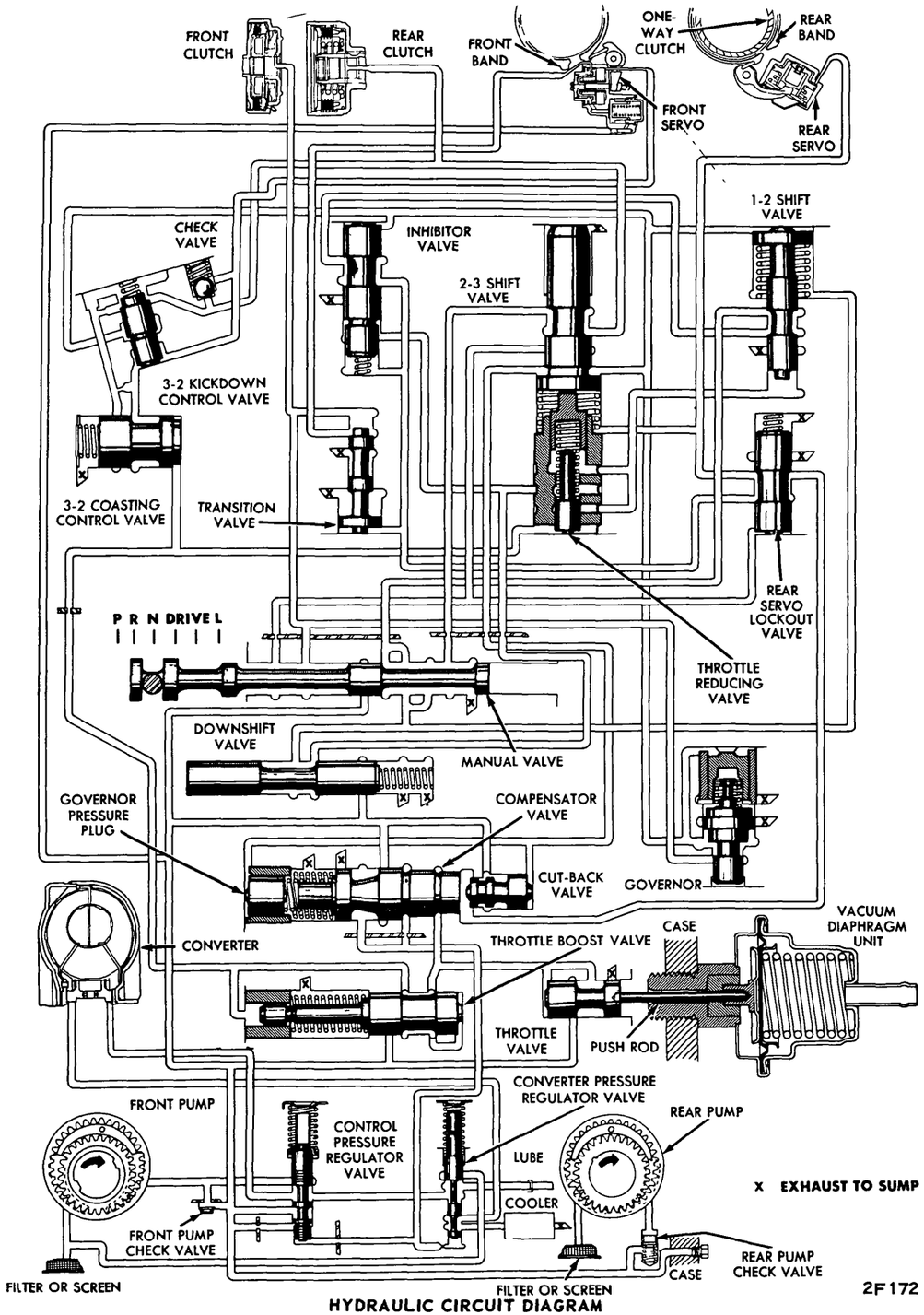
THUNDERBIRD

Manual Linkage Adjustment: With engine stopped, loosen nut at lower end of manual shift rod on transmission shift lever. Position manual selector lever so pointer is against steering column stop in "D1" position (large green dot is "D1" position). Move shift lever on transmission to "D1" detent position (second from bottom), then tighten nut on shift rod and shift lever. Check pointer alignment for all positions of selector lever and reset if necessary.

FORD TRUCK

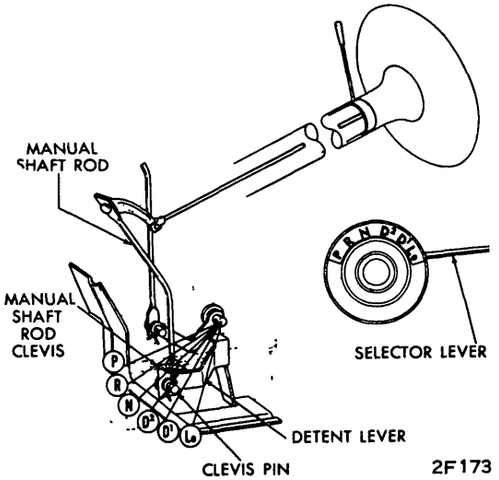
Manual Linkage Adjustment: With engine stopped, disconnect upper end of manual shift rod from selector lever, then position lever so pointer is down against steering column stop in "Dr" position (Fordomatic); "D1" position (Cruise–O–Matic). Shift manual lever on transmission to second detent position from bottom. Rotate adjusting sleeve on manual shift rod until pin can easily be inserted in lever, then lengthen rod by **turning adjusting sl v tw full turns.** Lock adjusting sleeve in position and connect rod to selector lever. Check pointer alignment for all positions of selector lever.

CONTINUED ON NEXT PAGE



HYDRAULIC CIRCUIT DIAGRAM

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)



MANUAL SHIFT LINKAGE

NEUTRAL SAFETY SWITCH ADJUSTMENT

Ford Pass. Cars (Exc. Thunderbird): Loosen switch–to–steering column attaching screws at lower end of steering column, then shift selector lever to "N" (Neutral) position. Move switch in elongated mounting holes until a .090" gauge pin can be inserted through switch housing and into switch plate. With gauge pin in place, tighten attaching screws, then remove gauge pin. Check starter circuit in all selector lever positions. Starter circuit should be open in all positions except "N" or "P".

Thund rbird & Mercury: Switch is located on lower side (Thunderbird); upper side (Mercury) of steering column (inside drivers compartment). To adjust, loosen steering column–to–switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws. *NOTE – Starter circuit must be open in all positions except "N" or "P"*

Ford Trucks: Loosen screws attaching switch to bracket on steering column, then position switch so that starter circuit is closed when selector lever is in "N" or "P" positions. *NOTE – Circuit must be open in all other positions.* Tighten attaching screws and check operation in all lever positions.

BAND ADJUSTMENT

► *BAND ADJUSTMENT NOTE: Adjust bands every 12,000 miles under normal operation. For severe operation, adjust bands more frequently as required.*

FRONT BAND ADJUSTMENT (Except Mercury): Drain fluid from oil pan and remove pan and oil screen. Loosen front servo adjusting screw locknut two full turns and check adjusting screw for free rotation in actuating lever. Pull adjusting screw end of actuating lever away from servo body and insert adjusting tool gauge block (part of Tool T58L–7195–A) between servo piston stem and adjusting screw. *NOTE – See illustration for details of Tool T58L–7195–A and other tools required for front band adjustment.* Install special ½" drive socket handle on 9/16" deep socket, then insert special T–handle extension through socket handle and socket, and install screwdriver socket on end of T–handle extension. Place assembled tools on adjusting screw so screwdriver socket engages adjusting screw and 9/16" socket engages adjusting screw locknut. With a torque wrench on T–handle extension, tighten adjusting screw to 10 inch pounds, then **back off screw exactly one full turn.** *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly one full turn.* Hold adjusting screw stationary and tighten locknut to 20–25 ft. lbs. Remove gauge block, install screen and oil pan and refill transmission with fluid.

Mercury: Drain transmission and remove oil pan and screen, then loosen front servo adjusting screw locknut two full turns. Pull back on actuating rod and insert Gauge Block, Tool 7225–C13–B (part of Tool T–7225–C) between front servo piston stem and adjusting screw. Tighten adjusting screw until wrench overruns, **then back off adjusting screw exactly one complete turn,** hold adjusting screw and tighten locknut to 20–25 ft. lbs. *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly one full turn.* Install screen and oil pan and refill transmission with fluid.

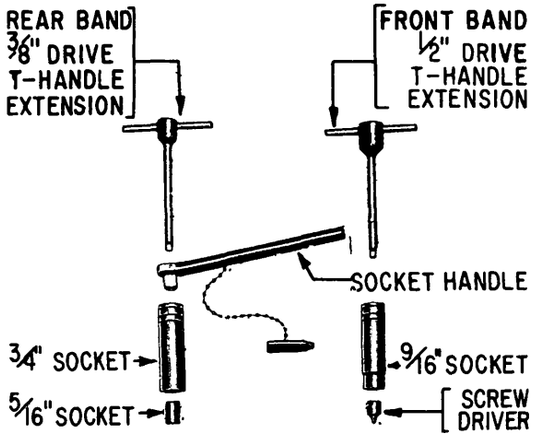
REAR BAND ADJUSTMENT (Except Mercury): On all models except Thunderbird, fold back floor mat at right side of floor pan and remove access hole cover. On Thunderbird, remove console and right side heater duct floor director, then remove access hole cover. On all models, place socket handle (part of Tool T58L-7195-A) on ¾" deep socket. *NOTE – See illustration for details of Tool T58L–7195–A and other tools required for rear band adjustment.* Insert special 3/8" drive T–handle extension through handle and socket, then install 5/16" 8–point socket on extension. Insert assembled tools ir access hole so that adjusting screw and locknut are engaged. Loosen adjusting screw locknut and tighten adjusting screw to 10 ft.- lbs. Remove torque wrench from T–handle extension and **back off adjusting screw exactly 1½ turns.** *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly 1½ turns.* Hold adjusting screw stationary and tighten locknut to 35–40 ft. lbs.

Mercury: Fold back floor mat on right side and remove access hole cover. Loosen band adjusting screw locknut with Tool 7195–C, then use T–handle portion of tool to tighten adjusting screw until wrench overruns. *CAUTION – If screw is found to be tighter than wrench capacity (10 ft. lbs.), loosen screw and retighten until wrench overruns.* **Back off adjusting screw 1½ turns,** then tighten locknut to 35–40 ft. lbs. while holding adjusting screw stationary. *CAUTION – Damage will result to transmission if adjusting screw is not backed off exactly 1½ turns.*

TESTING

► *TRANSMISSION STALL TEST NOTE: Stall test procedures are the same for "Single–Range" and "Twin–Range" transmissions. When making the stall test, never hold throttle open longer than 5 seconds.*

STALL TEST: With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kick-down position), and note engine speed (see Stall Speed Table below). *CAUTION – If engine speed exceeds maximum limits in table, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows: **"D1"** – Front clutch and one–way clutch engaged at all accelerator pedal positions. **"D2"** – Front clutch and front band applied at all accelerator pedal positions. **"L"** – Front clutch and rear band applied. **"R"** – Rear clutch and rear band applied. *NOTE – Engine over-speeding is an indication of clutch or band slippage.*



TOOL T58L-7195-A 2F174

FORD BAND ADJUSTING TOOL

ENGINE STALL SPEEDS

Engine	Engine RPM
Pass. Car 292" Eng	1500–1700
Pass. Car 352" Eng	1600–1800
Pass. Car 390" Eng (Std.)	1800–2000
Pass. Car 390" Eng (Police)	1850–2050
Truck 223" Eng	1400–1600
Truck 292" Eng	1520–1720

SHIFT TESTS (Twin–Range Transmissions With Vacuum Throttle Control):

1–2, 2–3 Upshift (Minimum Throttle): Place selector lever in "D1" range. Starting from a standstill, transmission should start in first gear and shift to second, then at a higher speed, shift to third.

3–2, 2–1 Downshift (Forced): With transmission in third gear, depress accelerator pedal to floor (through detent). Transmission should shift from third to second, or from third to first, depending on car speed.

3–1 Downshift (Minimum Throttle): Coasting down from approximately 30 MPH in third gear, transmission should downshift from third to first. *NOTE – A 3–2–1 downshift may be experienced under the above conditions.*

3–2, 2–1 Downshift (Partial Throttle): With transmission selector lever in "D1" position and car speed at approximately 30 MPH, depress and hold accelerator at half throttle position and at the same time apply service brakes to a point where road speed is slowly decreased. The 3–2 and 2–1 shifts should occur as road speed decreases.

CONTROL PRESSURE TESTS (PASS. CARS): Attach tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet at rear of

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (C nt.)

transmission case. Apply parking brake and adjust idle speed to 450–475 RPM with transmission selector lever in "D1" or "D2" position. *NOTE – If idle speed cannot be brought within limits by adjusting carburetor throttle stopscrew, check throttle and downshift linkage for binding and check for vacuum leakage at transmission diaphragm unit.* With engine at indicated idle speed and engine vacuum at 18.0" Hg., control pressure should be as indicated in table below. If control pressure is within these limits, place selector lever in "D1" or "D2" and apply service brakes. Advance throttle until engine vacuum drops below 16–13.7" Hg. As vacuum gauge reading passes through this range (16–13.7"), transmission control pressure should start to rise and continue to rise with throttle opening until maximum control pressure for stall in "D1" or "D2" is obtained. *NOTE – In "P", "L" or "R", control pressure rise is not dependent on diaphragm unit. When selector lever is shifted into these positions and engine speed is increased, control pressure should rise immediately and reach maximum before engine speed reaches stall RPM.*

CONTROL PRESSURES

Ford Pass. Cars, Thunderbird & Mercury (Except Police Cars)

Engine Speed	Lever Position	Pressure
Idle	N, D1, D2	57–72 lbs.
Idle	P, R, L	57–213 lbs.
Stall	D1, D2	145–170 lbs.
Stall	R, L	201–213 lbs.

Police Cars

Engine Speed	Lever Position	Pressure
Idle	N, D1, D2	70–95 lbs.
Idle	P, R, L	70–228 lbs.
Stall	D1, D2	170–200 lbs.
Stall	R, L	212–228 lbs.

CONTROL PRESSURE TEST (TRUCKS): Install a pressure gauge to pressure take-off tube in engine compartment (located to rear of carburetor), then install a tachometer on engine and bring engine to normal operating temperature. Adjust engine to correct idle speed, then set hand brake and place selector lever in "D1" or "D2". Check idle pressure which should be within specifications (see table below). Increase engine speed and note control pressure indicated on gauge. If pressure is not within limits, adjust throttle control rod to obtain required pressure, then recheck idle pressure. With selector lever in one of the above positions, increase engine speed to stall condition and note pressure and engine RPM which should be within specifications.

Ford Trucks

Engine Speed	Lever Position	Pressure
Idle Speed	All	57–67 lbs.
1000 RPM	D1 or D2	80–85 lbs.
Stall	D1 or D2	153–170 lbs.
Stall	R or Lo	203–214 lbs.

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan, and control valve assembly, Proceed as follows:

Fr nt Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of system.

Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

Rear Clutch: Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).

Rear Band & Servo: Apply pressure to rear servo oil passage (see illustration), and observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If servos, bands, clutches, and governor operate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" in OVERHAUL BELOW.*

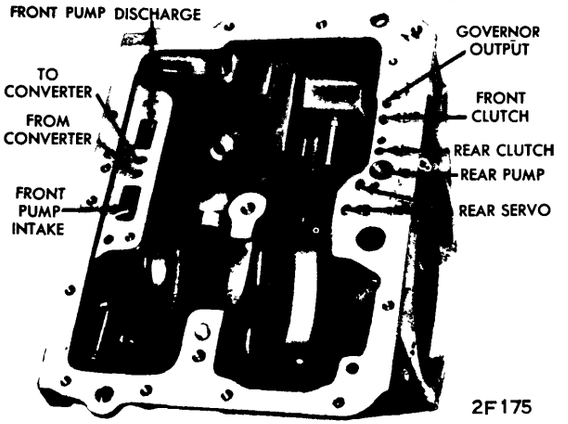
TRANSMISSION SHIFT SPEEDS

RANGE	AXLE RATIO	SHIFT SPEEDS (MPH) D1 Min.	D1 Max.	D1 or D2 Min.	D1 or D2 Max.	D1 Min.	D1 or D2 Max.	D1 Max.	D2 Min.	MAN. SHIFT L
THROTTLE SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1	3-2	2-1
Ford Pass. Cars	3.56-1	6-8	31-38	12-20	50-59	6-7	47-55	22-30	6-9	16-22
Ford Pass. Cars	3.10-1	7-9	35-44	14-23	58-69	6-8	54-64	26-36	6-10	18-26
Ford Pass. Cars	2.91-1	8-10	38-48	15-25	62-74	7-9	58-69	27-38	7-11	19-27
Thunderbird	All	7-9	37-44	14-23	60-69	6-8	56-64	27-36	6-10	18-26
Ford Truck F-250	All	6-11	25-40	8-20	40-62	3-8	36-58	16-27	3-8	12-22
Ford Truck (Exc. F-250)	All	5-10	22-38	7-19	35-58	3-7	31-54	14-26	3-7	10-20
Mercury (Exc. Pol. Inteptr)	All	6-10	31-48	12-25	50-73	6-9	47-69	22-38	6-11	16-27
Mercury (Police Inteptr.)	All	6-11	47-56	14-27	79-90	6-8	73-81	37-46	4-11	21-31

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Make corrections in sequence shown, testing operation of transmission after each correction.*

SEVERE ENGAGEMENT ("Lo", "Dr", or "R" Ranges): Check engine idle speed and throttle linkage adjustments. Adjust rear band. Perform a control pressure test. Remove and clean main control valve assembly and pressure regulator valve.



TRANSMISSION CASE OIL PASSAGES

1–2, 2–3 SHIFT POINTS LOW, HIGH, OR ERRATIC: Check fluid level. Adjust throttle and manual linkage. Check governor operation. Perform a pressure control test. Remove and clean main control valve assembly and pressure regulator valve.

SEVERE 2–3 SHIFT: Adjust throttle linkage. Adjust front band. Remove and clean main control valve assembly and pressure regulator valve. Remove and inspect front servo.

ENGINE OVERSPEEDS (2–3 SHIFT): Adjust front band. Remove and clean main control valve assembly.

NO 1–2 OR 2–3 SHIFTS: Remove and inspect governor. Remove and clean valve assembly. Rear clutch slippage. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

NO FORCED DOWNSHIFTS: Adjust throttle linkage. Perform control pressure check. Remove and clean main control valve assembly. Check operation of inner and outer throttle levers.

SEVERE 3–2 OR 3–1 SHIFTS (CLOSED THROTTLE): Check engine idle speed and throttle linkage. Remove and clean main control valve assembly.

SLIPPAGE OR CHATTER IN 2ND SPEED: Check fluid level. Adjust throttle linkage. Adjust front band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front servo not performing properly. Front clutch slipping. Leakage in hydraulic system.

SLIPPAGE OR CHATTER IN 1ST SPEED: Check fluid level. Adjust throttle linkage. Adjust rear band. Clean main control valve and pressure regulator assemblies. Check inner and outer throttle levers. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

SLIPPAGE OR CHATTER IN REVERSE: Check fluid level. Adjust throttle linkage. Adjust rear band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "DR" OR "D2" RANGE: Adjust front band. Clean main control valve assembly. Make an air pressure check. Front clutch slipping. Leakage in hydraulic system. Fluid distributor in output shaft faulty.

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FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

NO DRIVE IN "D1" RANGE: Adjust manual linkage. Rear pump not operating properly. Planetary one-way clutch not operating properly.

NO DRIVE IN "R" RANGE: Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Make an air pressure check. Rear clutch not operating. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "LO" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN ANY RANGE: Check fluid level. Adjust manual linkage. Check control pressure. Clean main control valve and pressure regulator assemblies. Make an air pressure check. Leakage in hydraulic system.

LOCKUP IN "DR" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "R" RANGE: Adjust front band. Front servo not operating properly. Front clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "LO" RANGE: Adjust front band. Front servo not operating properly. Clean main control valve assembly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

PARKING LOCK BINDS OR WILL NOT HOLD: Adjust manual linkage. Check parking linkage.

UNABLE TO START ENGINE BY PUSHING: Check fluid level. Adjust manual linkage. Clean main control and pressure regulator valve assemblies. Rear pump not operating. Leakage in hydraulic system.

TRANSMISSION OVERHEATING: Converter cooling air passages blocked. Oil cooler and connections faulty. Clean pressure regulator assembly. Converter one-way clutch slipping or faulty.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Adjust front band. Clean main control valve and regulator valve assembly. Front servo not operating properly. Leakage in hydraulic system.

MAXIMUM SPEED BELOW NORMAL (POOR ACCELERATION): Converter one-way clutch not operating properly.

NO 2-1 DOWNSHIFT: Adjust throttle linkage. Clean main control valve assembly. Rear servo not operating properly.

NO 3-1 DOWNSHIFT: Adjust engine idle speed and throttle linkage. Remove and clean main control valve assembly.

NOISE IN NEUTRAL: Clean and inspect pressure regulator. Engine rear oil seal faulty. Front clutch not releasing properly. Front pump faulty.

NOISE IN 1ST, 2ND OR REVERSE SPEEDS: Clean and inspect pressure regulator. Fault in planetary assembly. Front or rear clutch faulty. Front pump faulty.

NOISE IN PARK RANGE: Clean and inspect pressure regulator. Front pump faulty.

NOISE WHEN COASTING IN NEUTRAL (20-30 MPH) WITH ENGINE OFF: Rear pump faulty.

MINOR REPAIRS (TRANSMISSION IN CAR)

► *MINOR REPAIR NOTE: The following transmission units can be removed for repair without removing transmission assembly from car. Raise car on a hoist for these operations, then drain fluid from transmission and remove oil pan. For disassembly and overhaul of these units, see OVERHAUL (TRANSMISSION UNITS) below.*

GOVERNOR: Removal – *NOTE – It is not necessary to remove transmission oil pan for this operation.* Remove governor inspection cover from extension housing, then rotate drive shaft until governor is in line with inspection hole. Remove governor valve body from counterweight. *CAUTION – Do not drop attaching bolts or governor parts into extension housing.*

Installation: Lubricate governor valve parts with transmission fluid and make sure valve works freely in body bore. Install governor valve body on counterweight so that valve body cover is facing rearward, then tighten attaching bolts securely. Install inspection cover and a new gasket and tighten screws to 20–30 inch pounds.

CONTROL VALVE BODY: Removal – Drain fluid from oil pan, then disconnect hose from vacuum diaphragm and remove diaphragm from transmission case. *CAUTION-Use a tool such as FCO-24. DO NOT USE pliers or a pipe wrench on diaphragm housing.* Remove oil pan and gasket, then remove screen retaining clip and screen. Remove two tubes which connect to pressure regulator and to control valve body (not necessary to remove regulator lubrication tube). Loosen front servo attaching bolt three turns, then remove three control valve body attaching bolts, and lower valve body while pulling it off the front servo oil tube.

Installation: *NOTE – Before installing control valve body, check for bent manual valve by rolling valve on a flat surface.* Install but do not tighten attaching bolts, then install the two tubes to pressure regulator and control valve body. Move control valve body toward center of case as far as attaching bolts will allow, then tighten attaching bolts to 8–10 ft. lbs. Turn manual valve one full turn in each detent position and check for binding. If valve binds against actuating pin in any detent position, loosen valve body attaching bolts and move body away from center of case only enough to relieve binding. Retighten attaching bolts and check for binding. Position pushrod in bore of vacuum unit, then using diaphragm as a guide, insert pushrod into threaded opening of case. Tighten diaphragm unit to 20–30 ft. lbs. Complete installation by reversing removal procedure.

FRONT SERVO: Removal – Drain fluid from transmission, then remove oil pan and screen. Remove vacuum diaphragm and pressure regulator lubrication tube. Loosen three control valve body attaching bolts, then remove bolts attaching front servo to case. Hold strut with fingers and remove servo.

Installation: Position front band forward in case with ends of band facing downward. Align large end of servo strut with servo actuating lever, and align small end with band end. Rotate band, strut, and servo to align anchor end of band with anchor in case. Push servo body onto control valve body and pressure regulator tubes, then install and tighten attaching bolt to 30–35 ft. lbs. Tighten control valve body attaching bolts to 8–10 ft. lbs. *NOTE – Check clearance between manual valve and actuating pin (see "Control Valve Body" above).* Install pressure regulator lubrication tube, then adjust front band *(see "Adjustments" above).* Install vacuum diaphram unit, fluid screen and oil pan, then fill transmission with fluid. Adjust downshift and manual linkage.

REAR SERVO: Removal – Remove control valve body (see above) and two front servo oil tubes. Remove attaching bolts from rear servo, hold actuating and anchor struts with fingers, and remove servo.

Installation: Position servo anchor strut on servo band, and rotate band to engage strut, then hold strut in position with fingers and position actuating lever strut, and install servo. Install servo attaching bolts (longer bolt in inner bolt hole) and tighten to 40–50 ft. lbs. Complete installation by reversing removal procedure, then adjust rear band *(see "Adjustments" above).*

PRESSURE REGULATOR: Removal – Drain transmission and remove oil pan and screen, then remove pressure regulator lubrication tube. Remove the small compensator pressure tube and the large control pressure tube from control valve body and pressure regulator. Remove pressure regulator spring retainer, springs, and spacer. *CAUTION – Maintain pressure on retainer to prevent springs from flying out.* Remove pressure regulator attaching bolts and washers, and remove regulator. *NOTE – Leave pressure regulator-to-front servo tube in servo body.*

Installation: Reverse removal procedure. *NOTE – Make sure converter pressure and control pressure valves operate freely in bores.*

EXTENSION HOUSING BUSHING & REAR SEAL REPLACEMENT: Remove propeller shaft from transmission output shaft. If rear seal only is to be replaced, remove seal with a tapered chisel. If bushing is being replaced, install Tool T57P-7697-A and remove bushing and seal. Install new bushing with Tool T57P-7697-B. Before installing new seal, inspect sealing surface of universal joint yoke for scores. If scored, replace yoke. Inspect counterbore of housing and polish off any burrs with crocus cloth. Drive a new seal into housing using Tool T61-7657-B, firmly seating it in bore. Coat inner diameter of seal with a suitable lubricant, then coat universal joint spline with lubricant and install propeller shaft.

OIL COOLER FLUSHING: *NOTE – Use the following procedure when clutch or bands fail or other internal trouble has occurred in transmission.* Disconnect fluid return line from rear of transmission, then start engine and drain about two quarts of fluid from cooler. If there is no fluid flow or fluid does not flow freely from return line, shut off engine and disconnect both lines at cooler and at transmission. Use an air hose with not more than 100 lbs. pressure to reverse flush lines and cooler, then connect both lines at cooler, and the pressure line at transmission. Start engine and check fluid flow. If fluid flows freely, connect return line at transmission and fill transmission with new fluid to specified level. If there is no flow or if flow is restricted, replace radiator. *CAUTION – Do not attempt to correct cooler or cooler line leaks by closing off the lines.*

TRANSMISSION & CONVERTER REMOVAL & INSTALLATION FORD PASS. CARS (EXC. THUNDERBIRD)

1) Place car on hoist but do not raise. Pull back floor mat and remove converter access hole covers, then remove two upper bolts attaching converter housing to engine.

2) Raise car, and remove cover from lower front side of converter housing, then drain converter and transmission *(see "Draining & Refilling" above).* Remove vacuum hose from vacuum diaphragm unit.

3) Remove flywheel to converter bolts. *NOTE – On "Dual-Range" type transmissions, install converter hub using front plate to hold converter in place when*

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

transmission is removed.

4) Disconnect battery cable at starter, and transmission to body ground cable from transmission, then remove starter.

5) Disconnect oil cooler lines from transmission, then disconnect manual and throttle linkage from transmission levers.

6) Disconnect speedometer cable from extension housing, and remove drive shaft. Remove remaining converter housing–to–engine attaching bolts. Remove two engine rear support–to–transmission bolts, and raise transmission slightly to take weight off crossmember, then remove crossmember.

7) On V8 models with single exhaust, loosen and drop exhaust system to allow converter to clear muffler inlet pipe.

8) If clearance needed to remove transmission and converter assembly from car, tilt rear of assembly upward slightly and to rear of car (enough to allow removal of flywheel–to–crankshaft bolts). Move assembly to rear and remove it. *NOTE – If there is enough clearance, remove flywheel–to–converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft.*

9) To install transmission and converter assembly, reverse removal procedures and note the following: Tighten flywheel housing–to–engine block bolts to 40–50 ft. lbs. Tighten converter–to–flywheel bolts to 15–28 ft. lbs.

Torque Converter Removal (From Transmission): *See "Torque Converter Overhaul" below.*

THUNDERBIRD

►*NOTE: Transmission and torque converter must be removed as separate assemblies. See "Transmission Removal (Without Converter)" below.*

FORD TRUCKS

1) Place truck on hoist, but do not raise. Remove converter access hole convers in floor pan and remove two upper converter housing–to–engine bolts. Raise truck on hoist and remove cover from lower front side of converter housing. Drain transmission and converter. (*see "Draining & Refilling" below*).

2) Remove flywheel–to–converter bolts. On V8 models, install converter housing front plate to hold converter in place during transmission removal. On 6 cyl. models, wedge converter in place.

3) Disconnect starter cable at starter, then disconnect body ground cable at transmission. Remove starter. On 6 cyl. models, remove linkage splash shield. On trucks with oil cooler, disconnect water hoses at cooler.

4) Disconnect manual and throttle linkage from transmission levers, then disconnect speedometer cable from extension housing. Remove drive shaft.

5) Remove both engine rear support bolts, then raise engine and transmission high enough to remove engine rear supports. Lower engine against floor stand or engine support bar so converter housing is clear of crossmember when all weight is off transmission jack. Remove remaining converter housing–to–engine attaching bolts.

6) On V8 models with single exhaust system, loosen and drop exhaust system, to allow converter to clear muffler inlet pipe.

7) If clearance is needed to remove assembly, tilt rear of assembly upward slightly and to the rear (enough to allow removal of the six flywheel–to–crankshaft bolts). Move assembly to the rear. *NOTE: If there is enough clearance, remove flywheel–to–converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft.*

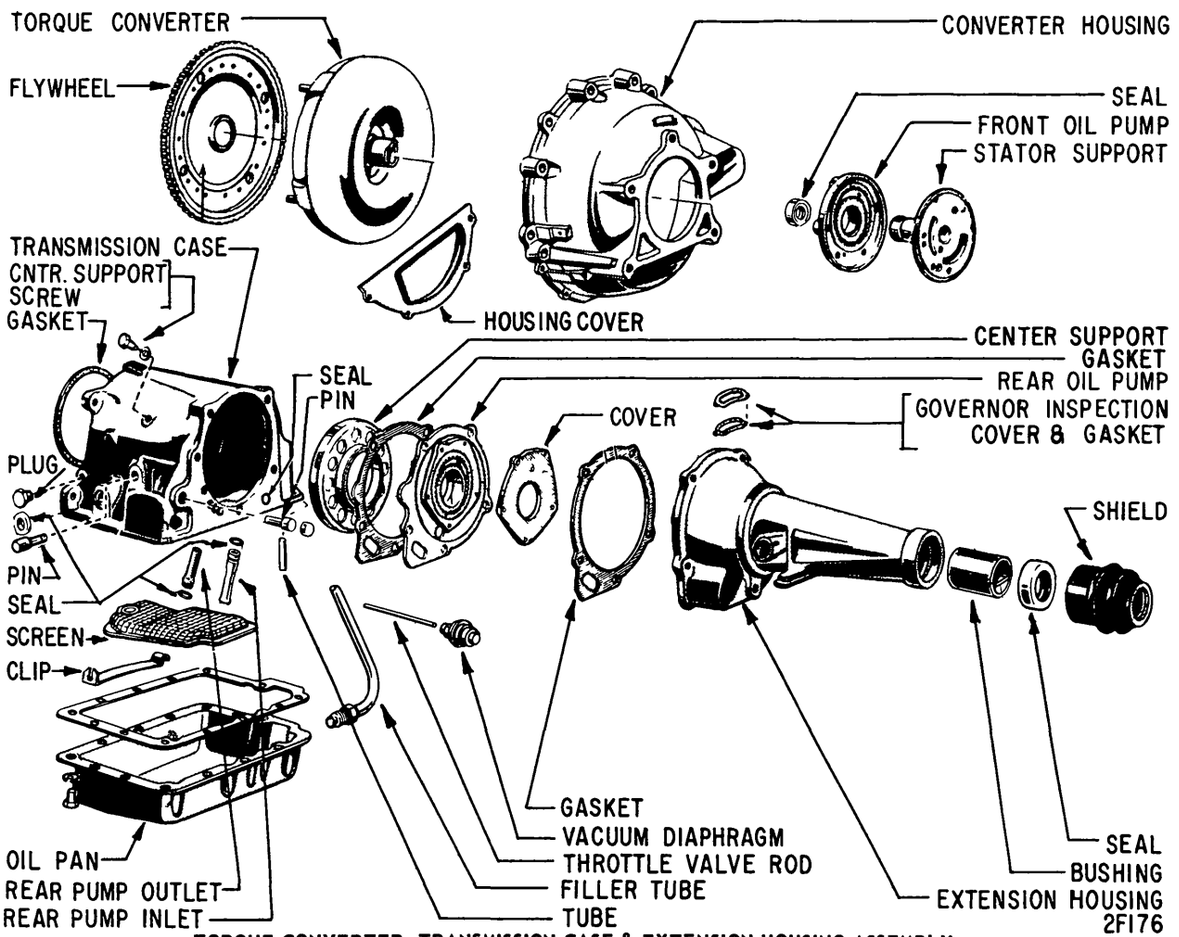
8) To install transmission and torque converter assembly, reverse removal procedures and note the following: Tighten converter housing–to–engine bolts to 45–50 ft. lbs. Tighten converter–to–flywheel bolts to 15–28 ft. lbs.

Torque Converter Removal (From Transmission): *See "Torque Converter Overhaul" below.*

MERCURY

1) Connect a starter remote control to starter solenoid, then remove three converter housing–to–engine attaching bolts and the starter motor upper bolt at right side of engine.

2) Raise car and remove converter housing lower plate and drain oil from converter assembly. *NOTE – Use starter remote control to rotate converter.* Disconnect selector rod and downshift control rod at transmission, then disconnect speedometer cable and vacuum diaphragm engine vacuum tube.



TORQUE CONVERTER, TRANSMISSION CASE & EXTENSION HOUSING ASSEMBLY

3) Drain transmission and remove filler tube from transmission. Disconnect oil cooler lines at transmission, then disconnect parking brake cables at equalizer. Disconnect drive shaft at rear universal and remove driveshaft.

4) Remove converter–to–flywheel retaining nuts. *NOTE – Use starter remote control to turn flywheel.* Remove starter cable at starter and remove starter. Position a transmission jack under transmission and slightly raise transmission.

5) Remove engine rear support insulator bolts and engine rear support crossmember bolts and remove crossmember. *NOTE – If car is equipped with dual exhaust system, it may be necessary to disconnect exhaust pipes at exhaust manifolds and lower pipes to obtain clearance for removal of crossmember.*

6) Remove converter housing–to–engine lower retaining bolts, then remove transmission and converter assembly from under car.

7) To install converter and transmission assembly, reverse removal procedures and note the following: Tighten rear support insulator bolts and converter housing

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FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (C nt.)

lower bolts to 40-45 ft. lbs. Tighten converter-to-flywheel retaining nuts to 15–28 ft. lbs.

T rqu C nv rt r R m val (From Transmission): *See "T rqu Conv rt r Ov rhaul" below.*

TRANSMISSION REMOVAL & INSTALLATION (WITHOUT CONVERTER) FORD PASS. CARS & FORD TRUCKS

►*NOTE: Transmission and torque converter must be r mov d as an ass mbly on Sunliner models.*

1) Raise car or truck on a hoist and drain transmission and torque converter, then disconnect oil cooler lines. On truck models, disconnect water hoses from oil cooler. On Pass. Cars, disconnect vacuum tube from vacuum diaphragm unit.

2) Remove linkage splash shield, then disconnect manual and throttle linkage from transmission levers. Disconnect speedometer cable from extension housing.

TORQUE CONVERTER REMOVAL & INSTALLATION

►*TORQUE CONVERTER NOTE:* Torque converter assembly on all models is welded construction and cannot be disassembled for service. The only service required is the inspection of one–way clutch and converter endplay (converter thrust washer inspection) as noted below.

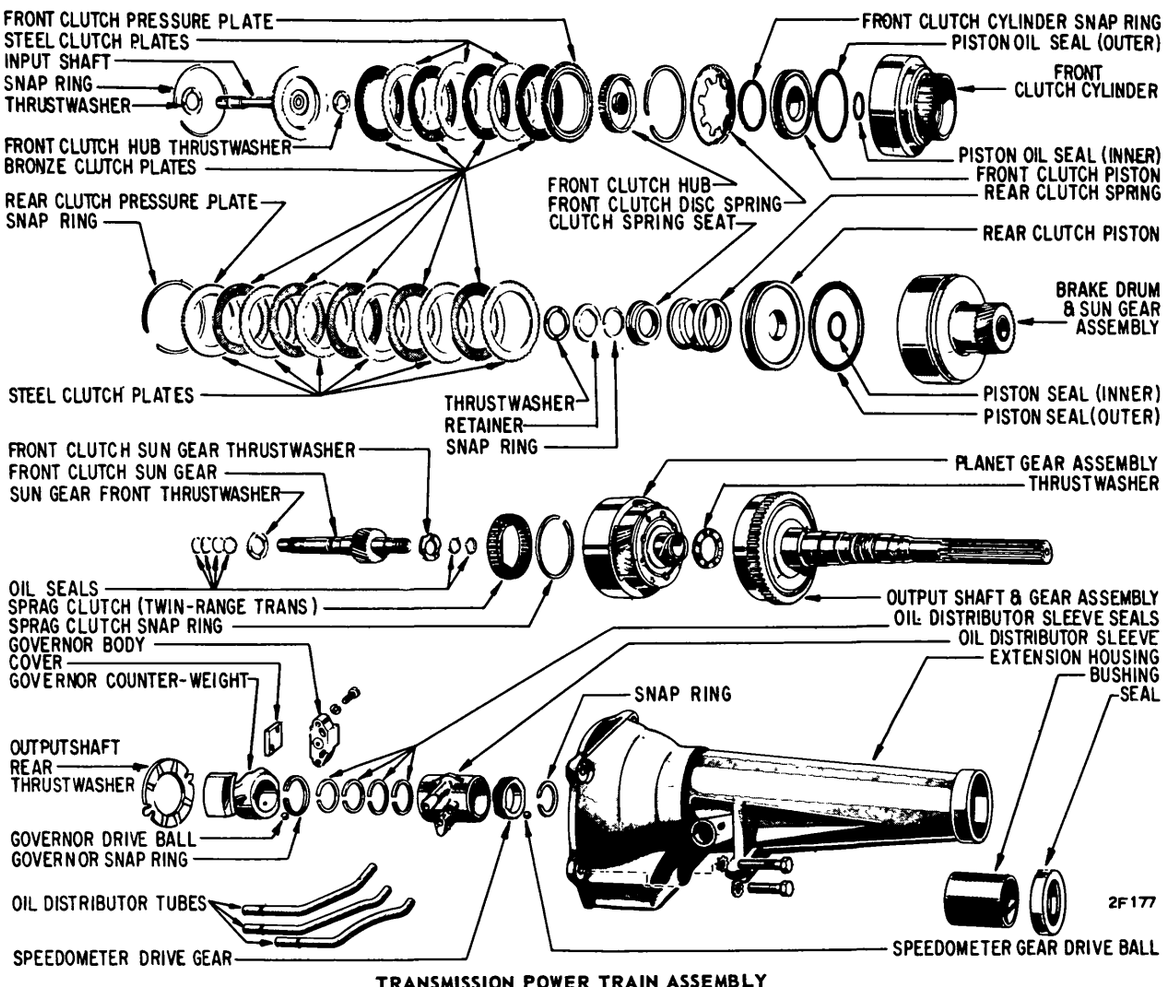
ALL MODELS

REMOVAL: Fr m Engin – With transmission assembly removed, remove stud nuts attaching converter, then install converter housing lower cover to prevent converter from falling when housing is removed. Remove starter motor, then remove converter housing-to-engine bolts. Work converter off engine dowel pins and remove housing and converter.

INSTALLATION: On Engin – Place converter in housing and retain it there by installing lower front cover. Raise housing and converter into position and start housing on engine dowel pins. Start converter housing-to-engine bolts. Remove converter housing front cover and position converter on flywheel. Install converter-to-flywheel stud nuts and tighten to 15-28 ft.lbs. Tighten converter housing-to-engine bolts to 40-45 ft.lbs., then install converter front cover and install transmission.

CONVERTER ONE–WAY CLUTCH INSPECTION: Ford Pass. Cars, Thund rbird & Trucks – Install one stator outer race holding tool in one of the four holes provided in stator, then install Tool T58L-7902-A in converter pump drive hub (as tool enters converter, the pins will engage stator clutch inner race spline). Place a torque wrench on tool. Tool (and stator inner race) should turn freely **cl ckwis** (from pump drive hub side of converter). It should lock up and hold a 10 ft. lbs. pull when wrench is turned **c unt rcl ckwis** . Try clutch for lockup and hold in at least five different locations around converter. If clutch fails to lockup and hold a 10 ft. lbs. torque, replace converter unit.

M rcury: Install Tool 7946-A in converter hub, then install torque wrench on tool. Rotate torque wrench in a clockwise direction (viewed from rear). Tool should rotate freely. If tool cannot be rotated, overrunning clutch is binding and converter must be replaced. Swing tool so steel rod is positioned against opposite pump drive lug. Apply a 10 ft. lbs. torque while attempting to rotate converter counterclockwise (viewed from rear). Rotate tool clockwise and attempt to turn converter counterclockwise at least five times. If tool fails to hold on any attempt to turn converter counterclockwise, the one–way clutch is slipping and converter must be replaced. *NOTE – One–way clutch inspection can be performed with converter installed on engine, if transmission has been removed.*



TRANSMISSION POWER TRAIN ASSEMBLY

CONVERTER ENDPLAY CHECK: Ford Pass. Cars, Thunderbird & Ford Truck – Install Tool T58L-7902-A into converter pump drive hub until it bottoms, then install guide over converter pump drive hub. Expand split fibre bushing in turbine spline by tightening adjusting nut until tool is securely locked in spline. Attach a dial indicator to tool and position indicator button on converter pump drive hub lug, then set dial indicator to zero. Lift tool upward as far as it will go and note indicator reading. If total endplay exceeds .060", replace converter unit.

M rcury: Install Thrust Washer Check Tool (endplay checking tool), Tool 7937-A, into converter pump drive hub. Tap lightly on end of tool to drive it forward to eliminate end thrust movement. Install dial indicator on rod so indicator lever rests against outside surface of converter, then pull toward rear of converter and note movement on dial indicator. If movement exceeds .060", replace converter assembly. *NOTE – Convert r endplay can be checked with converter installed on engine, if transmission is removed.*

TRANSMISSION DISASSEMBLY (INTO MAJOR UNITS)

►*TRANSMISSION DISASSEMBLY NOTE: Before removing any sub-assemblies, thoroughly clean outside of transmission case.*

1) Remove converter and converter housing, then place transmission in a suitable holding fixture. Remove oil pan, gasket, and screen clip, and lift screen off forward tube, then lift it off rear tube. Remove spring seat from pressure regulator. *CAUTION – Maintain constant pr ssure n seat to pr v nt dist rtion of*

CONTINUED ON NEXT PAGE

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

spring s at and sudden r l as f springs. Remove pressure regulator springs and spacers, but do not remove valves. Loosen, but do not remove, regulator body attaching screws. Remove lubrication tube from pressure regulator and rear pump, being careful not to bend or distort tubes.

2) Lift rear pump intake tube out of hole in transmission case, then remove compensator pressure tube. Remove control pressure tube from pressure regulator and control valve body. If necessary, tap tubes with a soft hammer but do not distort them. Loosen front and rear servo band adjusting screws several turns, then loosen front servo attaching bolts three turns. Remove vacuum diaphragm assembly and control rod. *NOTE – To prevent damage to diaphragm unit, use a hex wrench on hex portion of diaphragm.*

3) Remove main control valve body attaching bolts, then align internal levers to permit removal of main control valve body. Lift valve body to clear transmission case, then pull valve body off servo tubes and remove control valve assembly from transmission case. Remove pressure regulator body from case (retain control pressure valve and converter pressure regulator valve in pressure regulator to avoid damage to valves).

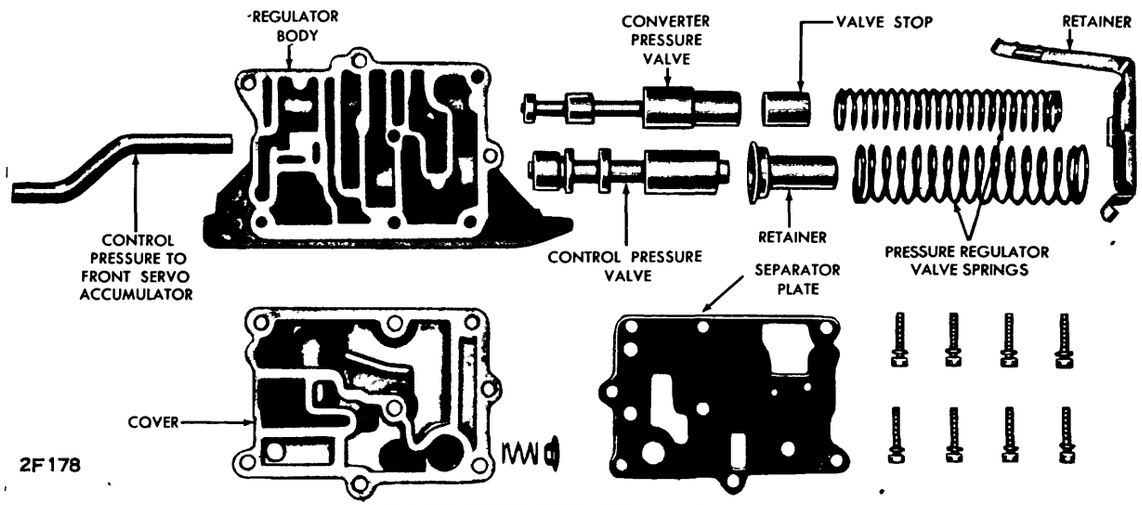
4) Remove front servo apply, accumulator, and release tubes, then remove front servo attaching bolts. Hold front servo strut and remove servo assembly from case. Remove rear servo attaching bolts, then hold actuating and anchor struts and remove servo from case.

5) *NOTE – At this point, check and record transmission endplay as follows:* Remove one front pump attaching bolt and mount a suitable support for a dial indicator in bolt hole. Mount a dial indicator on support so that indicator contact rests on end of turbine shaft. *NOTE– Install extension housing seal replacer on output shaft to support the shaft.* Pry front cylinder toward rear of transmission with a large screwdriver, then set dial indicator to zero. Remove screwdriver and pry units toward front of transmission by inserting a screwdriver between large internal gear and transmission case. Record indicator reading for use during transmission assembly. Endplay should be .010–.029". Remove indicator support, then remove seal replacer from output shaft.

6) Remove front pump attaching bolts and remove front pump from transmission case. Remove extension housing attaching bolts and pull housing off transmission and output shaft, being careful not to damage extension housing oil seal. Remove speedometer gear snap ring, then slide speedometer gear off output shaft. *CAUTION – Do not lose speedometer drive gear drive ball,*

7) Remove distributor sleeve and tubes from output shaft by tapping sleeve with a soft hammer. Remove four seal rings and the spacer washer from output shaft. Remove governor snap ring and slide governor off output shaft. Remove governor drive ball. Remove rear pump discharge tube using Tool 77869A or W (Ford), Tool 77869 (Mercury), from discharge passage in case.

8) Remove rear pump from case and remove extension housing and pump gaskets. Remove rear pump drive key from shaft, then remove bronze thrust washer. Hold rear drum forward and remove output shaft and the selective fit thrust washer. Remove two oil seal rings from primary sun gear shaft, and remove planet carrier. Remove thrust bearing from primary sun gear shaft, then remove thrust bearing race from inside pinion carrier. *CAUTION – Note the rear band position for reference in assembly. The end of the band next to adjusting screw has a depression in center of boss.* Squeeze ends of band together, then tilt band to rear and remove band from case.



PRESSURE REGULATOR VALVE ASSEMBLY

9) Remove two center support outer bolts from each side of transmission case. Exert enough pressure on end of turbine shaft to hold clutch units together, then remove center support and front and rear clutch assemblies as a unit.

OVERHAUL (MAJOR UNITS)

PRESSURE REGULATOR: Disassembly – Remove valves from regulator body. *NOTE – As valves are removed, check to make sure they work freely in valve bores.* Remove pressure regulator valve body cover and separator plate, then remove front pump check valve and spring from regulator cover.

Inspection: Wash all parts in solvent and blow dry with air. Inspect body and cover mating surfaces for burrs or scores. Burrs and scores can be removed with crocus cloth. Check all fluid passages for obstructions. Inspect control pressure and converter pressure valves and bores for burrs and scores. Remove all burrs with crocus cloth. Check for free movement of valves in their bores. Each valve should fall freely into its bore when both valve and bore are dry. Check valve springs to be sure they are the correct springs and inspect springs for distortion.

Reassembly: Position front pump check valve spring and valve on regulator cover, then position separator plate on cover. Position regulator cover and separator plate on regulator body, then install valves in their respective bores. *NOTE – Springs, spacers and spring retainer will not be assembled until pressure regulator is installed in transmission case.*

MAIN CONTROL VALVE BODY: Disassembly–*CAUTION – Do n t separat upper and low r valve bodies and cov r until valv s hav b en removed.* Remove manual valve, then remove throttle body and separator plate. Remove throttle valve. Remove one screw attaching separator plate to lower valve body, then remove upper body front plate. *NOTE – Upp r b dy fr nt plate is spring loaded. Apply pressur t plate whil rem ving attaching screws.* Remove compensator sleeve and plug, and remove compensator valve springs. Remove compensator valve. Remove throttle boost short valve and sleeve, throttle boost valve spring and valve. Remove downshift valve and spring, then remove upper valve body rear plate. Remove compensator cut back valve, then remove lower body side plate. *NOTE – Lower body side plate is spring l aded. Apply pr ssure to plate while removing attaching scr ws.* Remove 1–2 shift valve and spring, and the inhibitor valve and spring. Remove screws attaching separator plate to cover, then remove lower body end plate. *NOTE – Lower body end plate is spring l aded. Apply pr ssure to plate while removing attaching screws.* Remove rear servo lockout valve and spring. Remove 2–3 delay and throttle reducing valve sleeve, throttle reducing valve, spring, and the 2–3 shift delay valve. Remove 2–3 shift valve spring and valve. Remove transition valve. Remove end plate from valve body cover, then remove check ball spring and ball. Remove 3–2 kickdown control valve spring and valve. Remove 3–2 coasting control valve spring retainer from cover, then remove spring and valve. Remove through bolts and separate bodies. *NOTE – Inspect r ar pump ch ck valv f r freedom of movement (this valv s ats in low r body, is staked for a firm fit, and sh uld not be r mov d unless a new one is to be installed).*

Inspection: Clean all parts in clean solvent and blow dry with air. Inspect all mating surfaces for burrs, scratches, and flatness. Check all passages for obstructions. Inspect all valves and valve bores for free movement in bores (valves should slide in bores of their own weight when all parts are dry). Valves can be polished with crocus cloth. *CAUTION – Do not round off sharp edges of valv s and plugs.*

Reassembly: *NOTE – Lubricat all parts with aut matic transmission fluid b for installing in valv body. Wh n installing valv s and plugs in bor s, rotat thes parts to av id sh aring soft body casting.* Position separator plate on upper body (do not tighten screws).

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FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (C nt.)

Make sure rear pump check valve spring, valve, and seat in lower body are correctly installed, then position lower body on upper body, and install but do not tighten attaching screw. Position cover and separator plate on lower valve body and install four bolts (do not tighten bolts). Align separator with upper and lower valve body attaching bolt holes, then install and tighten four bolts to 4–6 ft. lbs. *CAUTION – Overtightening will distort valve bodies and cause valves and plugs to stick.* Install 3–2 kickdown control valve and spring, and check ball and spring in cover. Install plate. Install 3–2 coasting control valve, spring, and spring retainer in cover, then install transition valve in lower body. Install 2–3 shift valve and spring, then install 2–3 shift delay valve and spring and throttle reducing valve in sleeve. Slide sleeve and valve into position in lower body. Install rear servo lockout valve spring and valve, then install lower body end plate. Install inhibitor valve spring and valve in lower body, then install 1–2 shift valve spring and valve and install lower body side plate. Install compensator cut back valve in upper valve body and install upper body rear plate. Install downshift valve spring and valve. Install throttle boost valve and spring, throttle boost short valve and sleeve. Install compensator valve, inner and outer compensator springs, and the compensator sleeve and plug. Position front plate, applying pressure to plate while installing two attaching screws. Install throttle valve in throttle valve body. Position separator on upper body and install throttle valve body and three attaching screws. Install four screws attaching cover to lower body, two screws attaching separator plate to upper body and one screw attaching separator plate to lower body. Tighten all body screws to 20–30 in. lbs. Install manual valve.

FRONT PUMP: Disassembly – Remove stator support attaching screws and remove stator support. *NOTE – Mark top surface of pump gears for correct reassembly.* Remove drive and driven gears from pump body.

Inspection: Inspect pump body housing, drive gear bushing, gear pockets, and crescents for scores. Inspect mating surfaces of pump body and cover for burrs. Inspect drive and driven gear bearing surfaces for scores, and check gear teeth for burrs. Inspect stator support splines for wear and burrs. Check fluid passages for obstructions. *NOTE – If any parts other than stator support are found to be damaged or defective, replace pump as a unit. Minor burrs or scores may be removed with crocus cloth.*

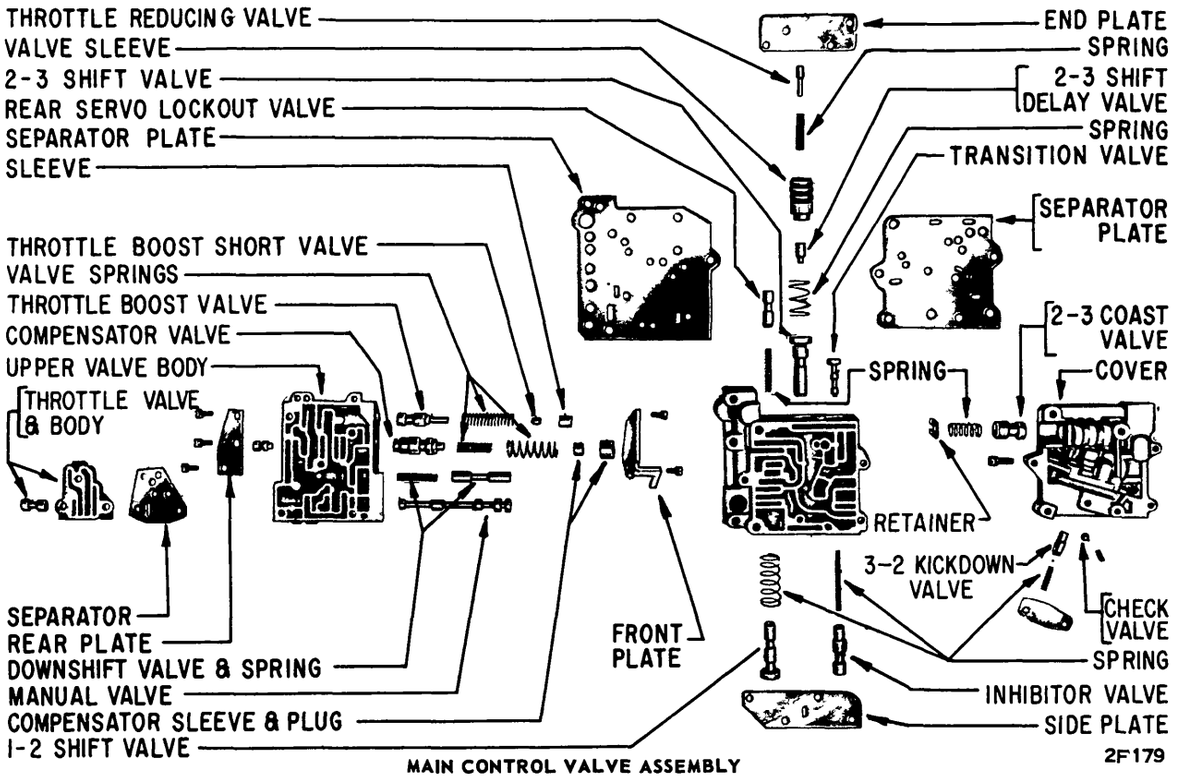
Reassembly: Bolt front pump to transmission case with capscrews, then install oil seal remover, Tool 1175-AE (Mercury) or other suitable tool and remove seal from pump body. Remove pump body from transmission case, then coat outer diameter of new seal with sealing compound and drive seal into pump body with Tool 77837 (Ford & Mercury), until it is seated firmly. Place pump driven gear in pump body with mark on gear (made at disassembly) facing upward, then install driven gear. Install stator support, single attaching screw and lockwasher and tighten securely. Check pump for free movement of pump and driven gears. *NOTE – One screw only is used to attach stator support to pump body.*

REAR PUMP: Disassembly – Remove pump cover and mark top face of pump drive and driven gear with prussian blue for correct installation of gears at assembly. Remove drive and driven gears.

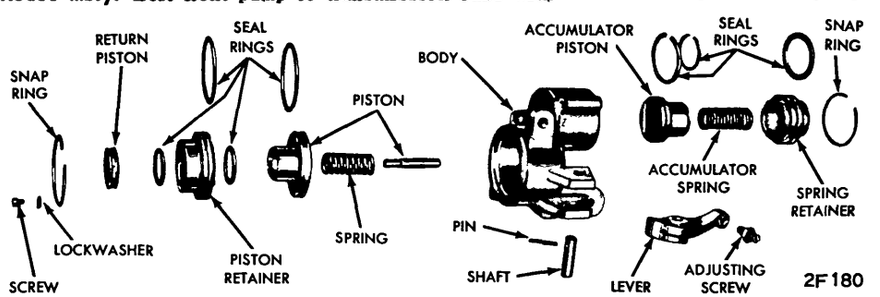
Inspection: Inspect gear pockets and crescent of pump body for scores or pitting. Inspect inner bushing and drive and driven gear bearing surfaces for scores. Check all fluid passages for obstructions and check mating surfaces and gasket surfaces of pump body and cover for burrs. Inspect pump cover bearing surface for scores. *NOTE – Minor burrs or scores can be removed with crocus cloth. If any pump parts other than pump cover are defective, replace pump as a unit.*

Reassembly: Place pump driven gear in pump body with mark (made at disassembly) facing upward, then install drive gear in same manner. Install pump cover and

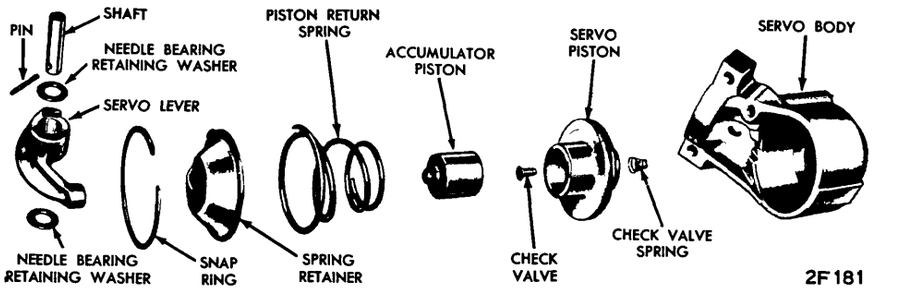
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MAIN CONTROL VALVE ASSEMBLY



FRONT SERVO ASSEMBLY



REAR SERVO ASSEMBLY

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

tighten attaching screws to 25–35 inch pounds (small screws); 80–90 inch pounds (larger ¼" screws).

FRONT SERVO: Disassembly – Remove servo piston retainer snap ring. *CAUTION – Servo piston is spring loaded. Apply pressure to piston when removing snap ring.* Remove servo piston retainer, servo piston, and return spring. *NOTE – Tap piston stem lightly with a soft hammer to separate retainer from servo body.* Remove screw and plain washer from end of piston stem, separate piston retainer, return spring and servo piston. Remove all seal rings, and remove spring from servo body. Apply pressure to accumulator piston, then remove snap ring. Remove accumulator piston retainer and piston from servo body, then separate piston and retainer. Remove spring from piston (accumulator piston is the heavier of two springs). Remove seal ring from accumulator retainer and remove piston rings from accumulator piston.

Inspection: Inspect servo body for cracks or scores. Check fluid passages for obstructions. Check all parts for damage and wear. Check actuating lever for free movement. If necessary to replace actuating lever or shaft, remove retaining pin and push shaft out of bracket. *NOTE – If shaft is not retained by a pin, it is retained by serrations on one end of shaft. To remove shaft with serrations, press on end opposite serrations.* Inspect adjusting screw threads and threads in lever. Check servo spring and servo band strut for distortion. Inspect servo band lining for excessive wear and bonding to metal. *NOTE – Band should be replaced if worn to a point where grooves are not clearly evident.* Inspect band ends for cracks and check band for distortion.

R assembly: Reverse disassembly procedure.

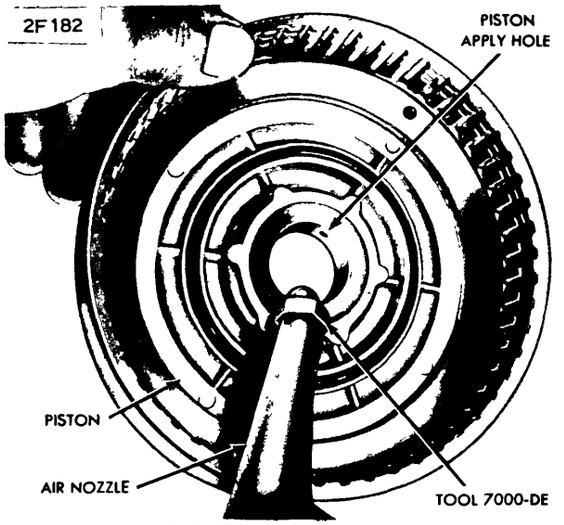
REAR SERVO: Disassembly – Remove servo actuating lever pin with a 1/8" punch, then remove shaft and actuating lever needle bearings and thrust washers. Press down on servo spring retainer and remove snap ring. *CAUTION –Release pressure on retainer slowly to prevent spring flying out.* Remove retainer and servo spring. Force piston out of servo body with air pressure (hold hand over piston to prevent damage). Remove piston seal ring, then remove accumulator piston from servo piston.

Inspection: Inspect in same manner as for front servo (see above). In addition, check orifice in servo piston for dirt. Inspect check valve in servo piston for free movement and proper seating.

Reassembly: Reverse disassembly procedure and note the following: Install servo spring with small coiled end against servo piston, then install retainer. Compress spring with a "C" clamp and install snap ring. *NOTE – Make sure snap ring is fully seated in groove.*

FRONT & REAR CLUTCHES: Disassembly – Lift front clutch from primary sun gear and rear clutch, then remove bronze and steel thrust washers from primary sun gear shaft. Remove front clutch seal rings from primary sun gear shaft. *CAUTION – Use care when removing rings as they are easily broken.* Lift rear clutch assembly from primary sun gear shaft, using care not to lose needle bearings. *NOTE – Do not rock the assembly whil lifting, to pr v nt damag to s al rings.* Remove rear clutch seal rings and thrust washer from primary sun gear shaft.

Fr nt Clutch Disass mbly – Remove front clutch snap ring, then remove turbine shaft from clutch drum. Remove fibre thrust washer from clutch hub, then remove bronze and steel thrust plates and pressure plate. Use an arbor press and Tool 77565 (Ford & Mercury) to compress Belleville spring so that clutch release spring snap ring can be removed. Remove Belleville clutch release spring from clutch cylinder. Install special nozzle, Tool 7000-DD or DE on air hose, place nozzle against clutch apply hole in front clutch housing (see illustration) and force piston from housing. Remove piston inner seal from clutch housing and outer seal from groove in piston.

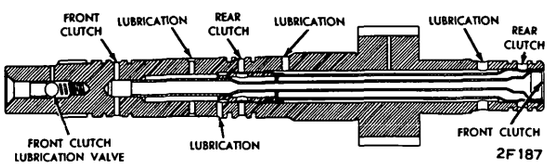


FRONT CLUTCH PISTON REMOVAL

Front Clutch Inspection – Inspect clutch cylinder thrust surfaces, piston bore and clutch plate serrations for scores or burrs. Remove minor burrs or scores with crocus cloth. Check fluid passages in clutch cylinder for obstructions and clean out all passages. Inspect piston check valve for free movement and proper seating. Check release spring for distortion and cracks and replace if necessary. Inspect bronze composition, and steel clutch plates, for scored bearing surfaces, then check pressure plate. Replace any plates that are deeply scored. Check clutch plates for flatness and fit on clutch hub serrations. If plates do not slide freely on serrations, replace plates. *CAUTION – Front and rear clutch plates are different and are not interchangeable.* Check clutch hub thrust surfaces for scores and clutch hub splines for wear. Inspect turbine shaft bearing surfaces for wear. Inspect bushing in turbine shaft for scores and lubricating hole for obstructions.

Front Clutch Reassembly – Lubricate all parts with automatic transmission fluid, then install new piston inner seal ring in clutch cylinder and a new piston outer seal ring in groove of piston. Install piston in clutch cylinder, making sure steel bearing ring is in place on piston. Position release spring in clutch cylinder with concave side up, then place release spring compressor on spring and compress spring with an arbor press. Install snap ring, making sure it is fully seated in groove. *NOTE – Do not compl t ly ass mbl front clutch at this point.*

R ar Clutch Disass mbly – Remove clutch pressure plate snap ring, and remove pressure plate from drum,



PRIMARY SUN GEAR SHAFT PASSAGES

then remove bronze and steel plates. Compress rear clutch return spring in an arbor press with Tool 77515 (Ford & Mercury), and remove snap ring. *NOTE – Guid spring retainer while releasing arbor pr ss t pr v nt retainer from locking in snap ring gr v .* Position primary sun gear shaft in rear clutch, then place an air hose nozzle in one of the rear clutch apply holes in shaft, and place a finger over other hole. Force clutch piston out of drum with air pressure. Remove clutch piston inner seal ring from clutch drum and clutch piston outer seal ring from groove in piston.

Rear Clutch Inspection – Inspect rear clutch in same manner as for front clutch (see above) and note the following: Inspect drum band surfaces, bushing, and thrust surfaces for scores. Remove minor scores with crocus cloth. Inspect needle bearing rollers for wear. Check air bleed valve in clutch piston for free movement. Position steel plates on a flat surface and check "coning" with a feeler gauge. Plates are "coned" .000–.010". *CAUTION – Front and rear clutch plat s are not interchangeable.*

Primary Sun Gear Inspection – Check fit of seal rings in grooves of shaft and make sure they enter grooves freely without binding. Check fit of seal rings in their respective bores, then install seal rings on shaft, and check for free movement in grooves. If front clutch lubrication check valve in front of shaft is not operating properly, install a new repair kit.

Rear Clutch Reassembly – *NOTE – Lubricate all parts with automatic transmission fluid b for installation.* Install a new clutch piston inner seal on groove of clutch drum and a new seal on clutch piston, then install piston in clutch drum. Install clutch release spring and position retainer on spring. Position clutch assembly in an arbor press, and position Tool 77515 on spring retainer, then compress piston and install snap ring. *NOTE – While compr ssing spring, guid retainer into place to avoid int rf r nc of r tain r with snap ring groove.* Alternately install bronze plates and steel plates (same number of each type as removed during disassembly), starting with a steel plate. *CAUTION – Because of "coning", all st l plat s must face the same way with ith r all conv x sid s or all concave sides up.* Install clutch pressure plate with bearing surface down, then install clutch pressure plate snap ring. Make sure snap ring is fully seated.

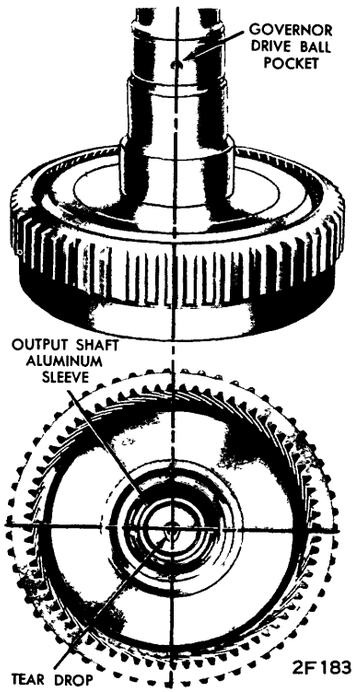
Reassembly: Install bronze thrust washer on primary sun gear shaft, then place sun gear shaft in a suitable holding fixture. Install rear clutch on primary shaft. *CAUTION – Center the seal rings on primary sun g ar shaft to prevent breakage. If r ar clutch hub is quipp d with a needle bearing that contains loos n dl s, b sure all needles are in plac b for assembling clutch assembly on sun gear shaft.* Install steel and bronze thrust washers on secondary sun gear. *NOTE – If outer dg of ste l wash r is chamf r d on on sid , install it with chamf r d sid down.* Install the two seal rings in groove of primary shaft, making sure that rings have

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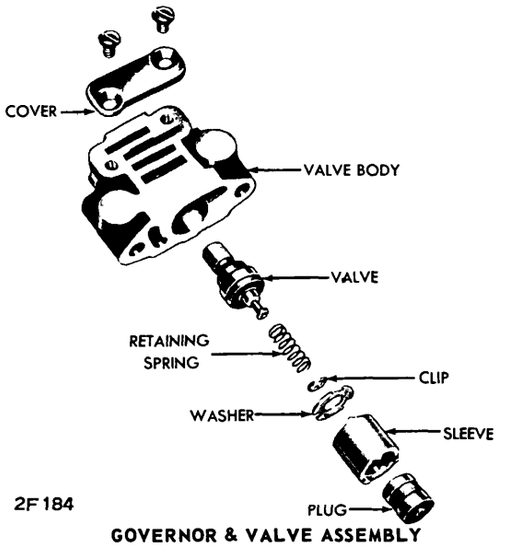
FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (C nt.)

a free movement in grooves and in their respective bores. Install front clutch housing on primary sun gear shaft by rotating clutch units to mesh plates with clutch hub. *CAUTION – Do not break seal rings on sun g ar shaft during installation.* Install front clutch hub in clutch cylinder with deep counterbore down, then install thrust washer on clutch hub. Install pressure plate in clutch cylinder with bearing surface up, then alternately install bronze plates and steel plates (same number of each type as removed during disassembly), starting with a bronze plate. *NOTE – Lubricate plat s b for installation.* Install turbine shaft in clutch cylinder and install snap ring.

OUTPUT SHAFT: Insp cti n – Inspect thrust surfaces and journals of shaft for scores and inspect internal gear for broken or worn teeth. Inspect aluminum sleeve for scores or leakage. Inspect ring grooves for burrs. Inspect keyway and drive ball pocket for wear, and inspect splines for burrs or wear. Inspect output shaft sleeve for alignment with governor drive ball (see illustration). *NOTE – Mak an additional check by inserting a piec of drill rod through g o v e r n o r pressure apply hole into c nt r of output shaft and through the aluminum sl v . If sl ve has turned, drill rod will not nt r c nt r ar a of output shaft.* Inspect external parking pawl gear teeth for damage and the speedometer drive gear teeth for burrs. *NOTE – If necessary to r plac speedom t r drive gear (nylon type), see "Nylon Speedometer Drive Gear Note" above.* If either output shaft or ring gear has been replaced, place the assembled unit, with gear face down, on a bench and push shaft downward. Check clearance between top of snap ring and its groove. If this clearance exceeds .002", replace snap ring with a thicker ring to reduce clearance to less than .002". Check rubber boot seal and stop ring at front of output shaft spline.



OUTPUT SHAFT & SLEEVE ALIGNMENT



GOVERNOR & VALVE ASSEMBLY

DISTRIBUTOR SLEEVE & TUBES: Inspection – Check sleeve for internal oil ring scores or wear and check oil passages for cross leaks or cracks. Check fit of each oil tube into distributor sleeve and check each tube for damage, distortion or leakage.

GOVERNOR: Disassembly – Remove governor weight retaining screws from counterweight, then remove governor valve assembly. Remove plug, sleeve, washer and valve from valve body.

Inspection: Inspect governor valve and bores for scores, and remove minor scores with crocus cloth. If valve or valve body is deeply scored, replace governor. Check for free m o v e m e n t of valve in bore. Inspect fluid passages in valve body, and counterweight for obstructions. Inspect mating surfaces of valve body and counterweight for burrs or distortion. Mating surfaces must be smooth and flat.

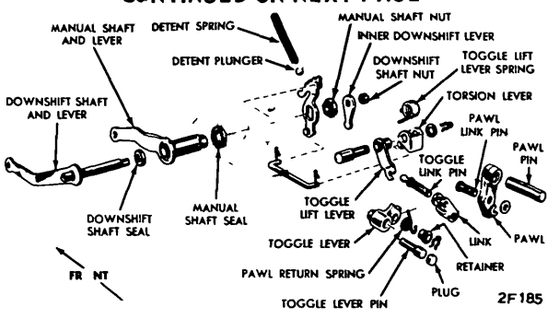
Reassembly: Install governor valve and spring assembly in bore of valve body, then install washer, sleeve and plug. *NOTE – Make sure the three points on end of sleeve seat in slots in washer.* Install body assembly on counterweight, aligning fluid passages in body and counterweight. Tighten attaching screws to 50–60 inch pounds. Position valve body cover on body and tighten screws to 20–40 inch pounds.

CASE & LINKAGE: Disassembly – Remove inner throttle lever shaft nut, then remove inner throttle lever. Slip outer throttle lever and shaft out of transmission case. Remove throttle shaft seal from manual lever and shaft. Remove retaining pin from each end of parking pawl torsion rod, then remove rod. Rotate manual lever until detent lever clears detent ball, then remove detent ball and spring. *NOTE – H ld n hand ov r d t nt ball whil r tating manual l v r to pr v nt l ss of spring and ball.* Remove nut securing detent lever to shaft, then remove inner lever. Slip outer manual lever and shaft out of case. Tap on toggle lever until toggle lever pin plug is removed, then remove toggle lever pin and remove pawl pin and toggle assembly. Remove pawl link pin and remove pawl pin and needle bearings. Remove manual lever shaft seal and remove vent from transmission case.

Inspection: Clean transmission case with solvent and blow out all passages. Inspect case bushing for scores, and inspect torsion lever pin for wear. Inspect case for cracks and stripped threads. Check gasket surfaces and mating surfaces for burrs. Inspect center support bushing for scores and one–way clutch for damage. Inspect torsion lever, toggle lift lever, inner throttle lever, detent lever, manual lever, and throttle lever for wear. Inspect toggle lift lever spring and detent spring for distortion. Inspect toggle link and link pin for wear. Check vent to make sure it is clean and free of obstructions.

Reassembly: Install manual lever seal in case with Tool 77288, then install vent in transmission case. Assemble link to pawl with pawl link pin, washer, and pawl return spring. Assemble toggle lever to link with toggle link pin. Position pawl return spring over toggle link pin, and secure it in place with washer and small retainer clip. Install assembly in transmission case by installing pawl pin and toggle lever pin. Install torsion lever assembly, then position spring on torsion lever with a screwdriver. *NOTE – Make certain that sh rt side of toggle does not extend beyond largest diamet r of ball on toggle lever pin. Tap toggle lever in or out as necessary to center toggle lever on ball.* Install manual lever and shaft in transmission case, then position detent lever on shaft and secure it with a nut. Tighten nut to 35–40 ft. lbs. Rotate manual lever to rear of case and position detent spring in case. Hold detent ball on spring with a 3/16" socket wrench, then depress spring until ball is flush with case. Carefully rotate manual lever to front of case to secure the ball. *NOTE – A piece of thin-walled tubing may be used to depress ball in place of the 3/16" socket.* Position ends of parking pawl torsion lever rod in detent lever and torsion lever, and secure with two small retaining pins. Install a new seal on throttle lever shaft, then install outer throttle lever and shaft in case. Position inner throttle lever on inner end of shaft with the mark "O" facing toward center of case. Install lockwasher and nut, and tighten nut to 35–40 ft. lbs.

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TRANSMISSION MANUAL & KICKDOWN LINKAGE

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION (Cont.)

TRANSMISSION REASSEMBLY

►*REASSEMBLY NOTE: Lubricate all parts with automatic transmission fluid before installation. Use all new gaskets and seals.*

1) Install front band in transmission case so that anchor end is aligned with anchor in case, then install clutch assemblies in case while positioning front servo band on rear clutch drum. *CAUTION – Do not allow clutch assemblies to separate during installation.*

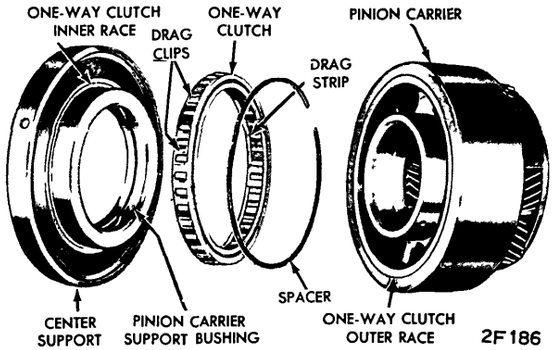
2) On the bench, install one–way clutch on center support with flanged side of cage rings up and the drag spring down. Carefully compress each drag spring as it is started on inner race. After all drag springs are started on race, rotate clutch to tilt sprags, then push clutch all the way down on center support.

3) Install center support and one–way clutch assembly in case, then install right hand, then left hand, center support special bolts and tighten to 28–33 ft. lbs. Install rear band in case with depression in band facing anchor pin side of case. Install needle bearing thrust washers and race on primary sun gear shaft with needle bearings resting against face of sun gear.

4) Place a rubber band around one–way clutch to compress sprags. *NOTE – This may be done before or after rear band is positioned in case.* Install planet carrier through rear of case, through rear band, and onto the one–way clutch. After planet pinions are meshed, pull rubber band off the one–way clutch and push planet carrier forward as far as it will go.

5) Install selective fit thrust washer on pinion carrier. *NOTE – If endplay was not within specifications when checked before disassembly (see "Transmission Disassembly–Into Major Units" above), replace washer with one of proper thickness. Selective fit washers are available in thicknesses of .063–.061", .069–.067", .076–.074", .083–.081".*

6) Install and check oil rings on end of primary sun gear shaft, making sure that all rings are properly positioned and that ends of rings are locked together. Install output shaft, carefully meshing internal gear with pinions. *CAUTION – Do not break oil rings on sun gear shaft as output shaft is assembled.* Position rear pump drive key in keyway on output shaft, then position new front and rear gaskets on rear pump body, retaining gaskets with transmission fluid. Install thrust washer on pump body with bronze side up, aligning thrust washer tangs with bosses on pump body, then install rear pump. *CAUTION – Be sure drive key is aligned with keyway in pump drive gear.* Position governor drive ball in pocket in output shaft, then install governor assembly with governor body plate toward rear of transmission, and with groove aligned with drive ball. Install governor snap ring.



PINION CARRIER, ONE-WAY CLUTCH & CENTER SUPPORT

7) Place the four seal rings in distributor drive sleeve, and check ring gap, then install rings in grooves of output shaft. *NOTE – Check freeness of rings in output shaft by closing and releasing rings.* Install the three tubes in distributor sleeve, then install sleeve on output shaft with chamfer facing forward. Slide sleeve forward over the oil seal rings, and at the same time start tubes into case holes. *CAUTION – Use care not to damage oil seal rings on output shaft.*

8) Position governor drive gear ball in pocket of output shaft, then install speedometer drive gear and snap ring. *NOTE – If drive gear is nylon, see "Nylon Speedometer Drive Gear Note" above.* Install a new seal on rear pump outlet tube and install tube in transmission case and rear pump body. Install extension housing on transmission case and tighten bolts to 28–38 ft. lbs. *NOTE – Rolled edge of lockwashers must be toward transmission case.*

9) Position a new front pump gasket in counterbore of transmission case, then install front pump, aligning pump bolt holes with holes in case. Install three of the front pump attaching bolts and tighten to 17–22 ft.lbs. *NOTE – At this point, check transmission endplay. See "Transmission Disassembly (Into Major Units)" above. If endplay is not within specifications, it will be necessary to change thickness of thrust washer on pinion carrier assembly (see Step 5 above for thrust washer thicknesses).* Remove indicator and holding tool from pump housing and install pump attaching bolt and tighten to 17–22 ft. lbs.

10) Position front band forward in case with band ends up, then position front servo strut with slotted end aligned with servo actuating lever, and with small end aligned with band end. Rotate band, strut, and servo into position engaging anchor end of band with anchor pin in case. Locate servo on transmission case and install attaching bolts, tightening them only two or three threads. Install servo tubes, then position rear servo anchor strut, and rotate rear band to engage strut. Position rear servo actuating strut with a finger, then install servo and tighten bolts to 40–45 ft. lbs.

11) Install pressure regulator body and attaching bolts, then install tube between regulator body and front servo. Tighten pressure regulator attaching bolts to 17–22 ft. lbs. Install control and converter valve spacers and springs, then install spring retainer. Recheck springs and spacers to make sure they are seated and properly aligned. Install a new seal on rear pump intake tube and install tube in case.

12) Install main control valve assembly, carefully aligning servo tubes with control valve. Align inner downshift lever between the stop and downshift valve, then shift manual lever to "L". Align manual valve with actuating pin in manual detent lever, then install but do not tighten control valve body attaching bolts. Install main control pressure tube in valve body and regulator, and compensator pressure tube in valve body and regulator. Move main control valve body toward center of case as far as bolts will permit, then tighten attaching bolts to 8–10 ft. lbs. (tightening center bolts first).

13) *NOTE – Turn manual valv on full turn in ach manual lever detent position. If valv binds against actuating pin in any detent p sition, loosen valve body attaching bolts and move body away from c nt r of case only enough to reliev binding. R –tight n attaching bolts and check manual valv for binding. Install lubrication tube in rear pump and r gulator body.*

14) Tighten front servo attaching bolts to 30–35 ft. lbs., then adjust front and rear bands. *See "Band Adjustment" above.* Install oil screen over rear pump inlet tube and front pump inlet tube, then press screen firmly in place and install retaining clip. Install vacuum diaphragm unit and control rod. As diaphragm unit is assembled, make sure that end of control rod is centered in throttle valve and the opposite end of rod is properly positioned into diaphragm unit. Tighten diaphragm to 20–30 ft. lbs.

CAUTION – Make sure control rod is not bent during assembly of diaphragm unit. Place a new gasket on transmission case and install oil pan. Tighten attaching bolts to 10–13 ft. lbs.

15) Remove transmission from holding fixture and install converter housing. Tighten attaching bolts to 35–45 ft. lbs. Install converter, making sure that converter hub aligns properly with front pump drive gear and that converter drain plug is tightened to 15–20 ft. lbs.

LINCOLN AUTOMATIC TRANSMISSION

Linc ln C ntin ntal (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE: An identification tag fasten d t oil pan attaching bolt is stamped with Transmission M del letters "PCA–D" which may be follow d by an additional figure indicating changes in transmission construction.*

►*STATOR SUPPORT–TO–FRONT PUMP ATTACHING BOLT NOTE:* One of the two stator support–to–front pump attaching bolts has been removed in production. As these bolts are required only for locating purposes prior to assembly, only a single bolt is necessary.

►*TOWING CAR CAUTIONS: Do not tow car at speed greater than 40 MPH and observe following precautions:*
Transmissi n Op rating Properly – Place transmission in "N" (Neutral) position. Car can be towed normally for distances not to exceed 12 miles. ***For great distanc s, use sam proc dure as for inoperative transmissi n.***
Transmissi n In perativ – Tow car with rear wheels lifted off ground or disconnect and remove propeller shaft. *NOTE – Be sur and protect rear end of transmission from entry of dirt.*

DESCRIPTION

DESCRIPTION: Three speed hydraulically controlled planetary transmission and torque converter which provides automatic shifting between low, intermediate and high (selector lever in "D1"), and between intermediate and high (selector lever in "D2"). "Lo", "R", & "P" are controlled manually. Transmission throttle valve is controlled by engine vacuum operating a diaphragm assembly at rear of transmission, eliminating throttle control linkage. A downshift lever actuated by accelerator pedal allows transmission to be downshifted by depressing accelerator pedal past the full throttle detent position. Front and rear servos are machined into transmission and external front and rear band adjusting screws have been provided. Transmission fluid is filtered through an internal filter, and is cooled in an oil cooler located in car radiator.

LUBRICATION

►*TRANSMISSION FLUID LEVEL CAUTION: Transmission fluid l v l must not be allowed to drop more than ONE PINT b low normal FULL level.*

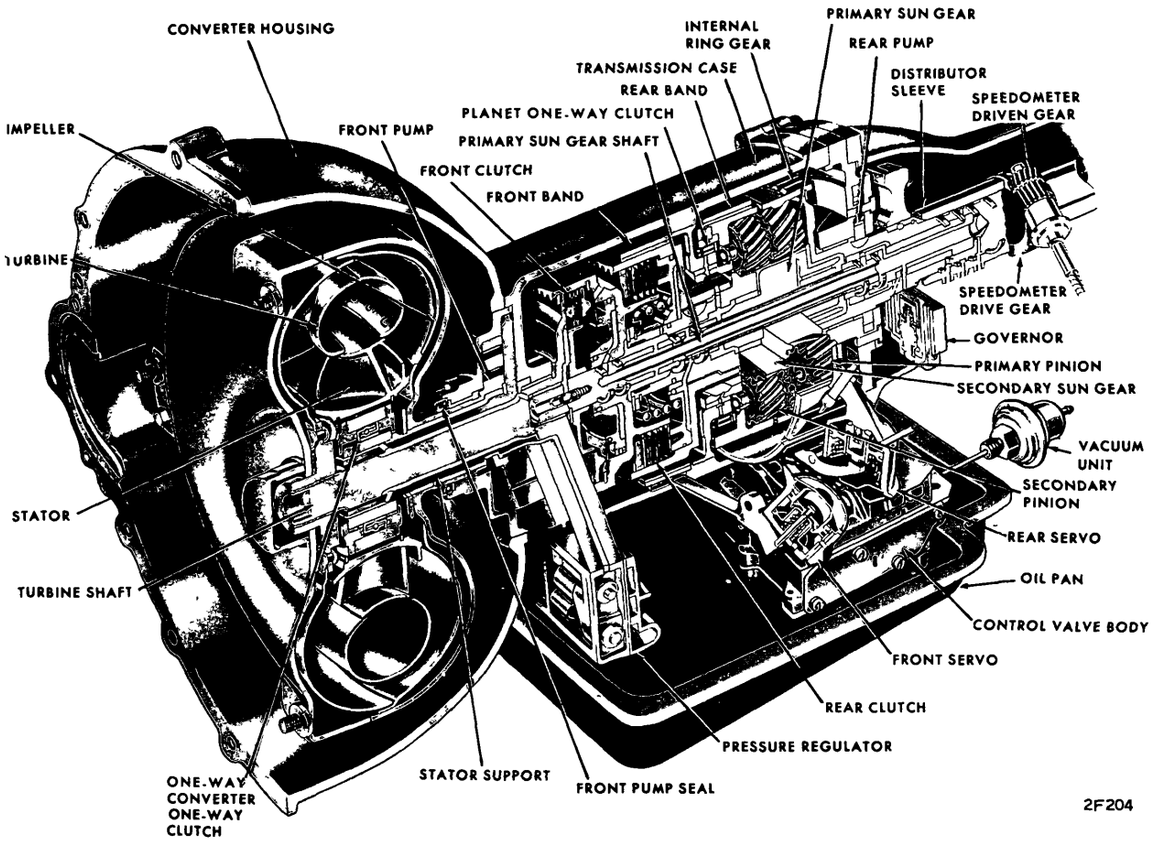
Ch cking Fluid L vel: Check fluid level every 6000 miles. With engine and transmission at normal operating temperature, shift transmission through all ranges, then place selector lever in "P" (Park) position. Check fluid level on dipstick and add sufficient recommended fluid to bring level up to FULL mark on dipstick. *CAUTION – Do not overfill.*

Draining & R filling: Periodic fluid changes not recommended except at time of transmission overhaul.

Capacity: 23 pints (transmission and torque converter dry).

R c mm nd d Fluid: Lincoln Part No. C1AZ–19582 or Automatic Transmission Fluid Type "A" (Suffix "A").

Transmission Fluid Filter: This is a Dacron type filter which does not require periodical change. If necessary to change because of transmission failure and filter contamination, replace filter assembly. *DO NOT ATTEMPT TO CLEAN OLD FILTER.*



LINCOLN AUTOMATIC TRANSMISSION

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on car model pages.*

Manual Linkage Adjustment: With engine off and transmission selector lever in "D1" position against stop, raise car and remove splash shield. Disconnect adjustable link from transmission manual shift lever on transmission and make sure shift lever is fully engaged in second detent from bottom. Loosen locknut on adjustable link, then pull downward on link to hold selector lever against stop. Adjust rod length as necessary until hole in link aligns with stud on transmission manual lever, then lengthen link one–half turn additional and connect to transmission shift lever. Check selector lever through all positions. *CAUTION – Do not make compensating adjustments in manual control linkage to overcome misalignment of selector lever indicator or starter neutral switch.*

NEUTRAL SAFETY SWITCH ADJUSTMENT

Lincoln (1962): Remove lower radio speaker and grille, then remove hood release handle from instrument panel. On convertible models, remove top control switch from instrument panel. On all models, remove lower left instrument panel cover and lower section of left vent. Remove wire connector from neutral safety switch, then position transmission selector lever in "D1" or "D2" range and loosen screws attaching neutral switch to steering column. Connect a self–powered test lamp to lower two terminals (back–up lamp) on neutral safety switch. Position selector lever in "R" position and pull switch to its farthest downward position. Slowly move switch upward until test lamp goes on. Tighten one switch mounting screw and move selector lever up and down without moving it out of "R" position. Test lamp should remain on. Attach test lamp lead to upper two terminals on switch and shift selector lever to "P" or "N" position. Test lamp should light. Apply a slight up and down pressure on selector lever while in "P" and "N" positions. Test lamp should not go out. Tighten switch attaching screws and connect wire connector to switch, then install vent extension, lower

CONTINUED ON NEXT PAGE

LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

instrument panel cover, hood release handle, and lower radio speaker and grille.

BAND ADJUSTMENT

► *BAND ADJUSTMENT NOTE: Adjust bands every 12,000 miles under normal operation. For severe operation, adjust bands every 6,000 miles.*

FRONT BAND ADJUSTMENT: *NOTE – Front band adjusting screw is located on left side of transmission case (above plug for line pressure check). It is not necessary to remove oil pan for front band adjustment.* Raise car and remove transmission linkage splash shield, then remove all dirt from adjusting screw threads and oil threads. Loosen adjusting screw locknut, then install Tool 7345 and tighten adjusting screw until handle "breaks" over center. *CAUTION – If adjusting screw is tighten than wrench capacity (10 ft. lbs.), loosen adjusting screw and readjust.* **Back off adjusting screw exactly three full turns.** Hold adjust- screw stationary and tighten locknut to 35–40 ft. lbs. *CAUTION – Damage may result to transmission if adjusting screw is not backed off exactly three full turns.*

► *FRONT BAND ADJUSTING TOOL NOTE:* Tool 7345 consists of two parts, adjusting screw locknut wrench (Tool 7345–L) and adjusting screw ratchet wrench (Tool 7345). Adjusting screw wrench is designed to be inserted through locknut wrench.

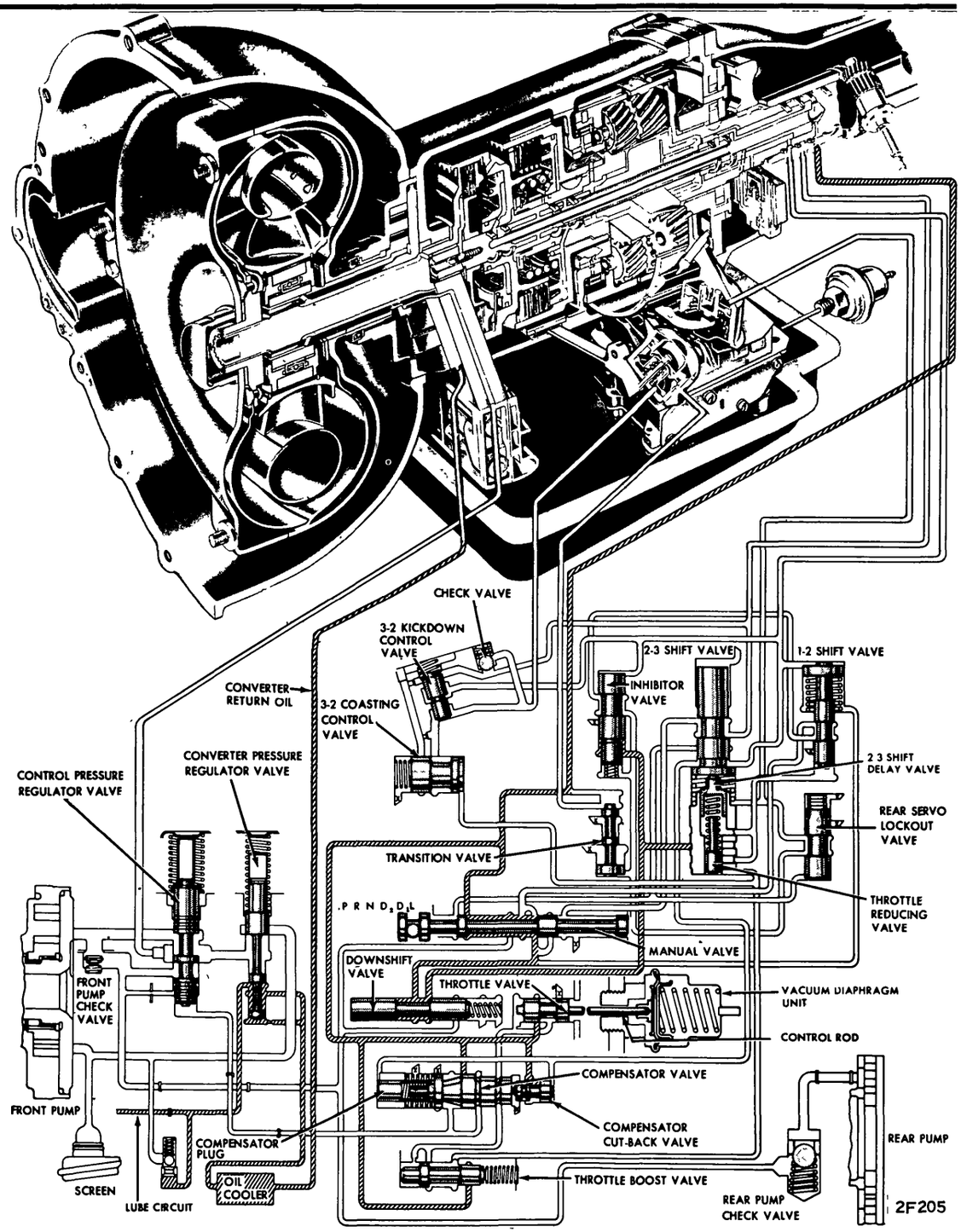
REAR BAND ADJUSTMENT: *NOTE – Rear band adjusting screw is located on right side of transmission and is accessible through a hole in floor pan.* Fold back floor mat on right side and remove cover from access hole in floor pan. Remove dirt from adjusting screw and oil the threads, then loosen adjusting screw locknut with Tool 7195–C. Use T–handle of tool and tighten adjusting screw until wrench overruns. *CAUTION – If adjusting screw is tighter than wrench capacity (10 ft. lbs.), loosen adjusting screw and readjust.* **Back off adjusting screw exactly 1½ turns** and tighten locknut to 35–40 ft. lbs. *CAUTION – Damage may result to transmission if adjusting screw is not backed off exactly 1½ turns.*

TESTING

► *TRANSMISSION STALL TEST NOTE: When making stall test, never hold throttle open longer than 5 seconds.*

STALL TEST: With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kickdown position), and note engine speed which should be 1600–1800 RPM. *CAUTION – If engine speed exceeds maximum limits, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows: **"D1"** – Front clutch and one–way clutch engaged at all accelerator pedal positions. **"D2"** – Front clutch and front band applied at all accelerator pedal positions. **"L"** – Front clutch and rear band applied. **"R"** – Rear clutch and rear band applied. *NOTE – Engin v rsp ding is an indication f clutch r band slippag .*

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LINCOLN AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

SHIFT TESTS: Select a smooth road for tests. Make tests as outlined below and refer to "Shift Speed Table" for correct speed where shift should occur.

1–2, 2–3 Upshift (Minimum Throttle): Place selector lever in "D1" range, and starting from a standstill, transmission should start in first gear and upshift to second, then at a higher speed, upshift to third.

2–3 Upshift (Minimum Thr ttle): Place selector lever in "D2" range, and starting from a standstill, transmission should start in second gear and upshift to third gear.

1–2, 2–3 Upshift (Maximum Throttle, Through Detent): Place selector lever in "D1" range, then depress accelerator through detent and hold there. Transmission should upshift at speeds indicated. *NOTE – 2–3 Upshift with s lector l v r in "D2" range will occur at sam sp ed as for "D1" range.*

3–2, 2–1 D wnshift (F rc d): With transmission in third gear, depress accelerator pedal to floor (through detent). Transmission should shift from third to second, or from third to first, depending on car speed.

3–1 D wnshift (Minimum Throttle): Coasting down from approximately 30 MPH in third gear, transmission should downshift from third to first. *NOTE – A 3–2–1 d wnshift may b exp rienced under the above conditions.*

"DR" to "LO" (Manual Shift): With car speed approximately at 50 MPH, shift selector lever from "D1" or "D2" to "Lo". Transmission should shift from high to second. When car speed is reduced within range indicated in table, transmission should shift to low gear.

TRANSMISSION SHIFT POINTS

RANGE THROTTLE SHIFT	AXLE RATIO	SHIFT SPEEDS (RPM)								MANUAL SHIFT
		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	Lo
		Min. 1-2	Max. 1-2	Min. 2-3	Max. 2-3	Min. 3-1	Max. 3-2	Max. 2-1	Min. 3-2	2-1
Continental	2.89-1	8-11	40-50	11-25	65-77	7-9	62-72	21-32	7-11	19-28

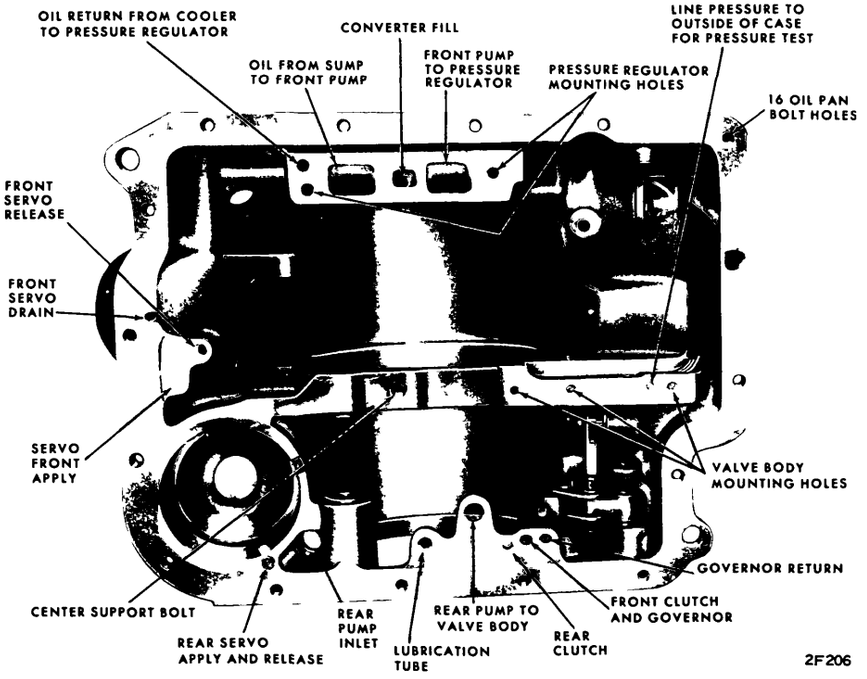
CONTROL PRESSURE TESTS: Attach a tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet on side of transmission (directly below front band adjusting screw on left side of case). Apply parking brake and adjust idle speed to 450–475 RPM with transmission selector lever in "D2" position. With engine at indicated idle speed and engine vacuum above 16" Hg, and with transmission in either "D1", "D2" or "Lo", pressure should be 57-72 lbs. In "P", "N" or "R", pressure should be 57–213 lbs. If control pressures are within limits, apply service brakes and place transmission selector lever in "D1" or "D2", then increase engine speed slowly until line pressure starts to rise. At this point, manifold vacuum should be 16.0" to 13.7" Hg. As vacuum reading passes through this range, transmission control pressure should start to rise and continue to rise with throttle opening, reaching a maximum pressure of 145–170 lbs. At maximum pressure, vacuum reading should be 1.5" Hg. *CAUTION – Do not h ld transmission under stall condition for more than fiv seconds.* If control pressures are not correct, erratic, or fail to rise with increased engine speed, s *"Trouble Shooting & Diagnosis".*

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan and control valve assembly, then proceed as follows:

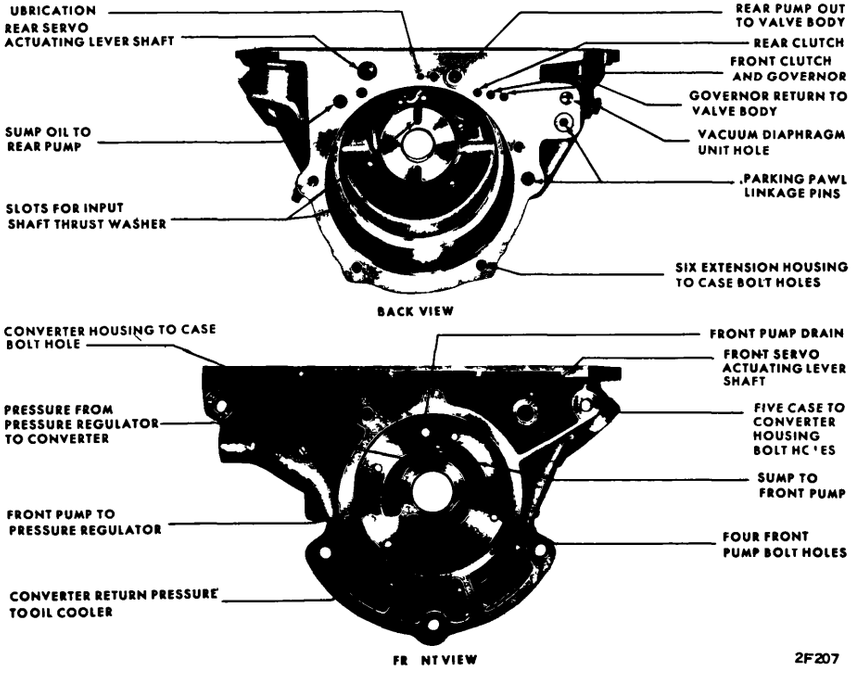
Front Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for a dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leakage in this part of system.

Governor Valve: Remove governor inspection cover, then apply air pressure to same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

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TRANSMISSION CASE PASSAGES (BOTTOM VIEW)



TRANSMISSION CASE PASSAGES (FRONT & REAR VIEWS)

LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

Rear Clutch: Apply air pressure to rear clutch oil passage (see illustration) and listen for a dull thud to indicate clutch is operating. Check for leakage in same manner as for front clutch (above).

Rear Band & Servo: Apply pressure to rear servo oil passage (see illustration) and check band application.

Front Band & Servo: Apply pressure to front servo apply hole and check band application.

TROUBLE SHOOTING & DIAGNOSIS

CONTROL PRESSURE LOW: If pressure is low at idle speed in all selector lever positions, check for excessive leakage in front oil pump, case, and control valve body. *NOTE – Control pressure in "P", "L", & "R" is regulated entirely by control pressure regulator valve and its spring.*

CONTROL PRESSURE HIGH: If control pressure is high at idle speed with transmission selector lever in "N", "D1" & "D2", trouble may be in diaphragm unit or its connecting tubes or hoses. Check engine manifold vacuum. Check diaphragm pushrod for bends and for corrosion. Install diaphragm unit with pushrod removed and recheck control pressure in "N", "D1" or "D2". If control pressure is still too high, trouble is in transmission control system. If pressure is within limits, diaphragm unit is not operating properly.

CONTROL PRESSURE DOES NOT RISE WITH THROTTLE OPENING: If control pressure does not rise in "D1" or "D2" as engine vacuum falls below 16–13.7" Hg, check transmission pressure rise capacity by shifting to "L" or "R". In these positions, maximum control pressure should be obtained at not more than engine stall RPM. If pressure rise is normal in "R" & "L", remove hose from diaphragm unit and check hose and tube. *NOTE – To check, hold thumb over end of hose and check for vacuum. If engine speeds up when hose is disconnected and slows down as thumb is held against end of hose, vacuum source is satisfactory.* If vacuum reading at end of hose is 18" Hg or greater, change diaphragm unit and recheck pressure rise with throttle opening in "D1" or "D2". If control pressure does not rise now, trouble is in transmission. Check for internal leakage in components that have pressure in them in "D1" and "D2" but do not have pressure in them in "R" or "L".

CONTROL PRESSURE IS EXTREMELY ERRATIC: If control pressure is erratic in "N", "D1" and "D2", check diaphragm unit tubes, hoses and diaphragm pushrod (see "Control Pressure High" above). If vacuum is satisfactory, replace diaphragm unit and retest control pressure. If no improvement noted, clean and inspect control valve body and pressure regulator.

ROUGH INITIAL ENGAGEMENT: Adjust engine idle speed. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check control pressure. Adjust front and rear bands.

SHIFT POINTS INCORRECT OR NO SHIFT POINTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check for sticking governor valve or plug. Check control pressure. Check position of valves in control valve body (Check control pressure at each detent position during road test).

ROUGH SHIFT POINTS: Check engine idle speed, throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check for sticking governor valve or plug. Check control valve body. Adjust front band. Check rear servo accumulator.

SLIPPAGE DURING SHIFTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check for sticking governor valve or plug. Check control valve assembly. Adjust front band. Check front servo circuit (air pressure check). Check rear clutch and circuit (air pressure check).

SLIPS (INITIAL ENGAGEMENT "D2", "D1" & "Lo": Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check front clutch and circuit (air pressure check).

SLIPS (REVERSE ONLY – OR NO REVERSE): Check control pressure. Adjust rear band. Check rear servo circuit (air pressure check). Check control valve body. Check rear clutch and circuit (air pressure check). Check for turned oil distributor sleeve in output shaft.

SLIPS ("D1" LOW GEAR ONLY – OR NO DRIVE IN "D1"): Check operation of planet carrier one–way clutch. Check adjustment of manual and transmission linkage.

LOSS OF INTERMEDIATE GEAR IN "D1" & "D2": Check front band adjustment. Check front servo circuit (air pressure check). Check control valve body.

SLIPS IN REVERSE (OR IN HIGH GEAR IN "D1" & "D2"): Check rear clutch and circuit (air pressure check). Check control valve body. Check control pressure. Check for turned oil distributor sleeve in output shaft.

NO CLOSED THROTTLE DOWNSHIFTS: Check for sticking governor valve or plug. Check control pressure. Check control valve body.

NO FORCED DOWNSHIFT: Check for correct accelerator pedal height. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control valve body.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Check control pressure. Check control valve body. Check front servo circuit (air pressure check). Adjust front band. Check operation of planet carrier one–way clutch.

CAR CREEPS EXCESSIVELY (SELECTOR LEVER IN ANY DRIVING RANGE): Excessive engine idle speed.

CAR MOVES FORWARD IN NEUTRAL: Check manual and transmission linkage adjustment. Check front clutch and circuit (air pressure check).

NO DRIVE IN ANY RANGE: Check transmission fluid level. Check manual and transmission linkage adjustment. Check control pressure. Check for broken converter lugs or input shaft.

COMPLETE LOCK–UP IN ANY RANGE: Check for wrong clutch and/or band application. Check control valve body. Check operation of planet carrier one–way clutch. Check for turned oil distributor sleeve in output shaft. Check front clutch and circuit (air pressure check). Check rear clutch and circuit (air pressure check). Check for release of parking linkage.

UNABLE TO START BY PUSHING: Check transmission fluid level. Check rear pump assembly. Check for broken converter lugs or input shaft. Check front clutch and circuit (air pressure check).

PARK LINKAGE WILL NOT HOLD: Check manual and transmission linkage adjustment. Check parking linkage.

TRANSMISSION OVERHEATS: Check transmission fluid level. Check control pressure. Check for restricted or leaking oil cooler and lines. Check converter one–way clutch operation. Check front band adjustment. Check rear band adjustment.

POOR ACCELERATION (MAXIMUM SPEED TOO LOW): Check transmission fluid level. Check operation of converter one–way clutch. Check engine performance.

TRANSMISSION NOISY ON COASTING 40–20 MPH: Check rear pump assembly.

MINOR REPAIRS (TRANSMISSION IN CAR)

PARKING PAWL REPLACEMENT: Loosen locknut on rear band adjusting screw and tighten adjusting screw with Tool 7195–C until wrench overruns. *NOTE – This holds planet carrier, front and r ar clutch ass mblies in place during parking pawl replacement.* Raise car on a hoist and support front of transmission with a jack stand and wooden block, then drain transmission oil pan. Mark drive shaft and rear companion flange (for reassembly at same location), then remove drive shaft. Remove oil pan and screen. Remove three short tubes from main control valve that directs rear clutch, front clutch and governor return pressure to case. Remove cross member at extension housing and remove extension housing. Remove distributor sleeve snap ring and move distributor back until rear clutch, front clutch and governor return tubes are removed from case. Remove output shaft and rear pump, then remove toggle return spring from lever pin, and remove .328" diameter washer and pin. Remove parking pawl support pin with a magnet and remove parking pawl parts. To reassemble, reverse disassembly procedure using new gaskets. Adjust rear band and fill transmission case with fluid.

GOVERNOR REPLACEMENT: Raise car and remove inspection cover from extension housing. Rotate drive shaft until governor is in line with inspection hole in housing, then remove two governor valve body retaining bolts and governor from counterweight. *CAUTION– Do not drop any parts into xtensi n h using.* Make sure all parts are thoroughly cleaned and that governor valve moves freely in valve body before valve body assembly is assembled to counterweight. Install governor valve assembly to counterweight so that valve body cover is faced toward rear of car, then tighten attaching bolts to 50–60 inch pounds. Install a new gasket on inspection cover and install cover.

TRANSMISSION & CONVERTER REMOVAL & INSTALLATION

REMOVAL: *NOTE – Transmission and c nv rt r must*

CONTINUED ON NEXT FAGE

LINCOLN AUTOMATIC TRANSMISSION (C ntinu d)

b remov d as an ass mbly. One additional converter h using–to–transmission case bolt is located behind conv rter ass mbly where it is not accessible until after convert r is removed.

1) Remove upper converter housing–to–engine bolts (from under hood), then install starter remote control so engine can be rotated from under car. Place transmission selector lever in "N" (Neutral), then raise car and drain transmission oil pan.
2) Remove converter access cover from front of converter housing and remove transmission linkage splash shield. Mark drive shaft and rear companion flange for installation in same position and remove drive shaft.
3) Remove parking brake equalizer bar retracting spring and disconnect parking brake cables and equalizer assembly. Disconnect transmission downshift rod and manual linkage parts at transmission levers, then disconnect vacuum line hose at vacuum diaphragm and speedometer cable at transmission.
4) Remove engine stabilizer bar from converter housing and converter–to–flywheel retaining nuts. *NOTE– As c nv rt r is r tated, r mov conv rt r drain plugs and drain c nv rt r.* Turn front wheels fully to right and remove starter motor, then disconnect oil cooler lines at transmission and at radiator and remove lines. Remove transmission filler tube and underbody reinforcing plate.
5) Position transmission jack, with Adapter Kit 7000–EG and Bracket Kit 7000–LC, under transmission and raise transmission slightly. Remove rear support crossmember and brackets from extension housing and car underbody.
6) Detach vacuum line at converter housing, then remove manual linkage equalizer assembly mounted between transmission and underbody. Remove remaining converter housing–to–engine retaining bolts and move transmission and converter toward rear and from under car.

INSTALLATION: Reverse removal procedure and note the following: Tighten crossmember–to–underbody bolts to 13–18 ft. lbs. and body bracket–to–body bolts to 20–30 lt. lbs. Tighten rear universal joint bolts to 15–20 ft. lbs. Tighten converter housing retaining bolts and underbody reinforcement plate bolts to 40–50 ft. lbs. Tighten converter housing–to–flywheel retain- bolts to 20–25 ft. lbs.

CONVERTER & HOUSING: R m val – With transmission removed from car, hold converter assembly with both hands and pull converter directly forward. *CAUTION – To prevent damage to front pump seal, do not rock converter assembly from side to side.* Remove one bolt from inside converter housing (holding converter housing to transmission case). Remove remaining five bolts holding converter housing to transmission case and remove housing.

Installation: Position converter housing on case and install five bolts and washers from outside converter housing and one self–locking bolt from inside housing. Install converter so drive lugs on converter are between lugs on front pump drive gear. *CAUTION – Do not move converter from side to side or up and down when it is being assembled.*

OVERHAUL

► *TORQUE CONVERTER NOTE: This is a welded unit and cannot be disassembled.*

TRANSMISSION OVERHAUL: *See 1961 Final Data, Page 462.*

DUAL-COUPLING (4-SPEED) HYDRA-MATIC

Cadillac (1962)
Pontiac (1962)

►*TRANSMISSION IDENTIFICATION NOTE: A serial number prefix stamped on serial number plate located at lower left hand corner on rear face of transmission case identifies the various transmissions as indicated in table below.*

Car Model	Serial Number Prefix
Cadillac Series 60 & 72	C
Cadillac Series 75	CA
Pontiac, 2–Bbl. Carb.①	PS–62
Pontiac, 2–Bbl. Carb.②	PES–62
Pontiac, 4–Bbl. Carb	PBS–62
Pontiac, Triple Carbs	PAS–62

① – 10.25–1 compression ratio.
② – 8.6–1 compression ratio.

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR NOTE: Due to the elimination of the rear pump in this transmission, it is not possible to start the engine by pushing, towing, or coasting the car.*

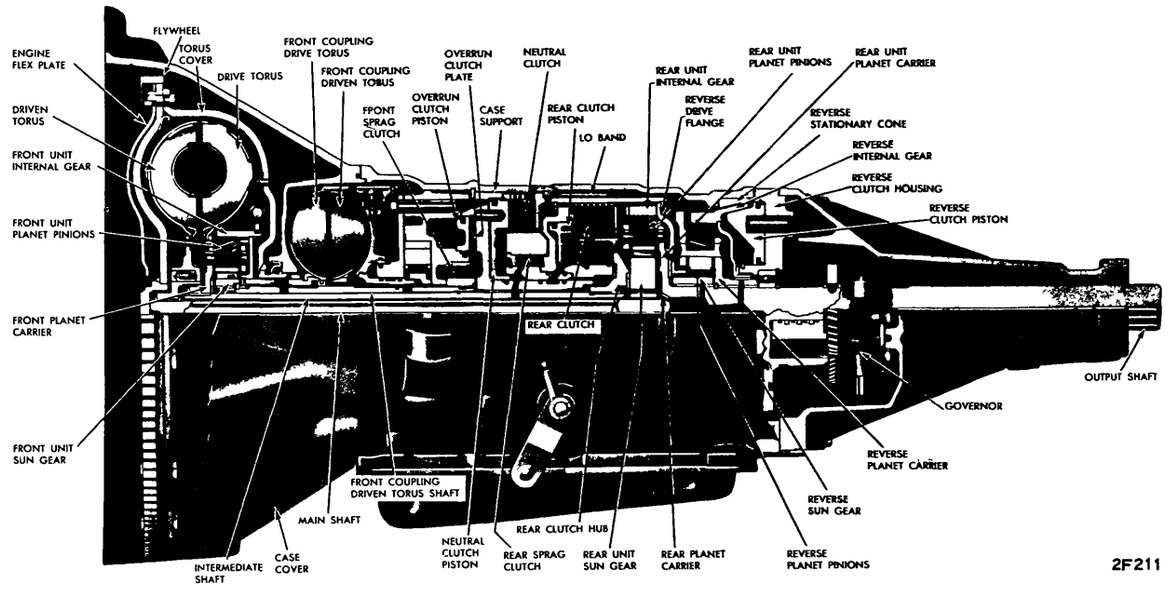
►*TOWING HYDRA-MATIC DRIVE CARS: Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with the transmission. When towing at speeds above 30 MPH or if transmission known to be out of order, disconnect propeller shaft from transmission. CAUTION - After towing, check fluid level and if necessary, bring to proper level.*

►*1961–EARLY 1962 HYDRA-MATIC GEAR WHINE CORRECTION:* The whine, which is heard when decelerating from approximately 15 MPH to stop, may be caused by governor drive gear being held too tightly by its front wave type snap ring. To correct, install a new type snap ring, Part No. 8622243 (Cadillac), identified by a daub of green paint; Part No. 8618752 (Pontiac), identified by a daub of white paint.

►*1962 HYDRA-MATIC REAR BEARING NOISE CORRECTION:* This low frequency noise is most pronounced at 20–30 MPH with transmission operating in high speed with normal load and may be mistaken for speedometer cable or transmission governor noise. Check by operating transmission on a hoist while listening in area of reverse clutch housing. To correct, install a new rear bearing, Part No. 906883.

►*1962 PONTIAC HYDRA-MATIC TRANSMISSION LEAKAGE NOTE:* If leakage is occurring around dust plug of universal joint slip yoke, replace slip yoke assembly.

►*1962 PONTIAC HYDRA-MATIC CONSOLE TYPE SHIFT LEVER BUTTON BREAKAGE CORRECTION (EARLY CARS):* Remove console assembly, then remove shift lever, bracket, and switch assembly. Remove shift lever from bracket, then remove shift guide retaining nut. Disengage shift guide from lever assembly and remove guide, spring and rod from lever assembly. Install "O" ring, Part No. 3732225 over upper end of rod and seat against pawl. Grind .040" of stock off lower edge of "Park" and "Reverse" lockouts on bracket. Reassemble unit and install a new plastic release button, Part No. 543234, in shift knob.



DUAL COUPLING (4-SPEED) HYDRA-MATIC

DESCRIPTION: Four-speed hydraulically controlled planetary type transmission of same design used on previous models.

LUBRICATION

LUBRICATION: Check fluid level each time engine oil is changed (Cadillac); at every 2000 mile chassis lubrication (Pontiac). Drain and refill every 16,000 miles (Cadillac), every 25,000 miles (Pontiac). *CADILLAC NOTE: Original factory fill should be changed at 30,000 miles or one year, whichever occurs first.*

►*FLUID LEVEL CAUTION: Due to the smaller size of this transmission, it is extremely important that the proper fluid level be maintained. DO NOT check or change the fluid level when transmission is extremely hot or cold because of fluid expansion and contraction.*

Recommended Lubricant: Use Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - On Pontiac, Automatic Transmission Type "A" may be used.*

CHECKING FLUID LEVEL: With transmission selector lever in "N" or "P" position and transmission at normal operating temperature (engine at idle speed), check fluid level on dipstick. Add oil with engine running to bring level up to "Full" mark on dipstick. *NOTE - It requires approximately 1 pint of fluid to bring level from "Low" to "Full". DO NOT OVERFILL TRANSMISSION.*

DRAINING & REFILLING: Remove transmission oil pan drain plugs or disconnect filler tube from side of transmission oil pan, then remove plugs from flywheel or torus cover (remove flywheel cover or inspection plate). Allow fluid to drain completely and then reinstall plugs and filler tube. Pour 7 qts. (Cadillac), 8 qts. (Pontiac) of recommended fluid into transmission through filler tube (tube is located under hood and also houses dipstick). Run engine at 800 RPM (Cadillac), fast idle speed (Pontiac) for 1½ minutes with transmission selector lever in "P" (Park) position. Add fluid as required to bring level up to FULL mark on dipstick (on Cadillac, reduce engine speed to normal idle before adding fluid). *NOTE - After transmission has been warmed to normal operating temperature, check fluid level to make sure it is at FULL mark.*

Capacity: Refill - 9 qts. (Cadillac & Pontiac).
After Overhaul - 10 qts. (Cadillac), 10½ qts. (Pontiac).
CAUTION - The transmission fluid capacities indicated above are approximate, follow procedure outlined above (see "Checking Fluid Level").

►*CADILLAC TRANSMISSION OIL FILTER: A paper element type oil strainer on oil intake pipe (in oil pan) should be replaced every 30,000 miles or when any major transmission failure has occurred.*

LINKAGE ADJUSTMENT

►*THROTTLE VALVE LINKAGE ADJUSTMENT NOTE: See "Carburetor" on individual Car Mod I pages for throttle valve linkage adjustm nt.*

CADILLAC

MANUAL LEVER LINKAGE ADJUSTMENT: Remove slush deflector, then remove clevis from manual lever on transmission. Loosen adjusting nuts on transmission manual rod and place manual lever in DR-4 position. Place selector lever on steering column in DR-4 position, then adjust length of manual rod until hole in manual lever lines up with hole in clevis. Increase length of rod **one turn.** Install clevis and tighten adjusting nuts. Check operation of selector lever. It should be free to enter "P" (Park) position and DR-4 stop in steering column should correspond to DR-4

CONTINUED ON NEXT PAGE

DUAL-COUPLING (4-SPEED) HYDRA-MATIC (C ntinu d)

detent position in transmission. Readjust if necessary.

N utral Saf ty Switch Adjustment (Combination Neutral Saf ty Switch, Back-up Light Switch): Located on steering column forward of instrument panel. Loosen attaching screw on switch and position it on jacket so starter is not operative in any position except "N" (Neutral) or "P" (Park).

PONTIAC

MANUAL LEVER LINKAGE ADJUSTMENT: Place selector lever and transmission manual lever in "P" (Park) position; and with outer transmission shift lever trunnion nuts backed off clear of trunnion, pull shift rod down toward transmission as far as possible. While holding in this position, run the upper trunnion nut down to just contact trunnion, then run lower nut up to contact trunnion and lock nuts securely.

N utral Saf ty Switch Adjustment: Located at lower end of steering column in engine compartment. Place selector lever in "N" (Neutral) position, then loosen switch mounting screws. Adjust switch to index with selector lever. *NOTE - Starter must not operate when ignition key is turned to start position with selector lever in "D" (Driv) position.* Test to see that engine starts when selector lever is in "P" (Park) or "N" (Neutral) position. Tighten switch mounting screws securely.

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *See "Dual-Coupling Hydra-Matic" Shift Point Table for correct shift speeds.*

OIL PRESSURE TEST: Connect oil pressure gauge, Tool J-2540-A (Cadillac), J-5907 (Pontiac) to take-off hole at bottom of reverse clutch housing using a hose and fitting. Drive car until normal operating temperis reached, then test as follows:

Z r Throttl Pr ssure (Pontiac): Check pressure in all ranges. Pressure should be 50 lbs. minimum in all ranges with a maximum variation of 10 lbs. (may be higher in reverse).

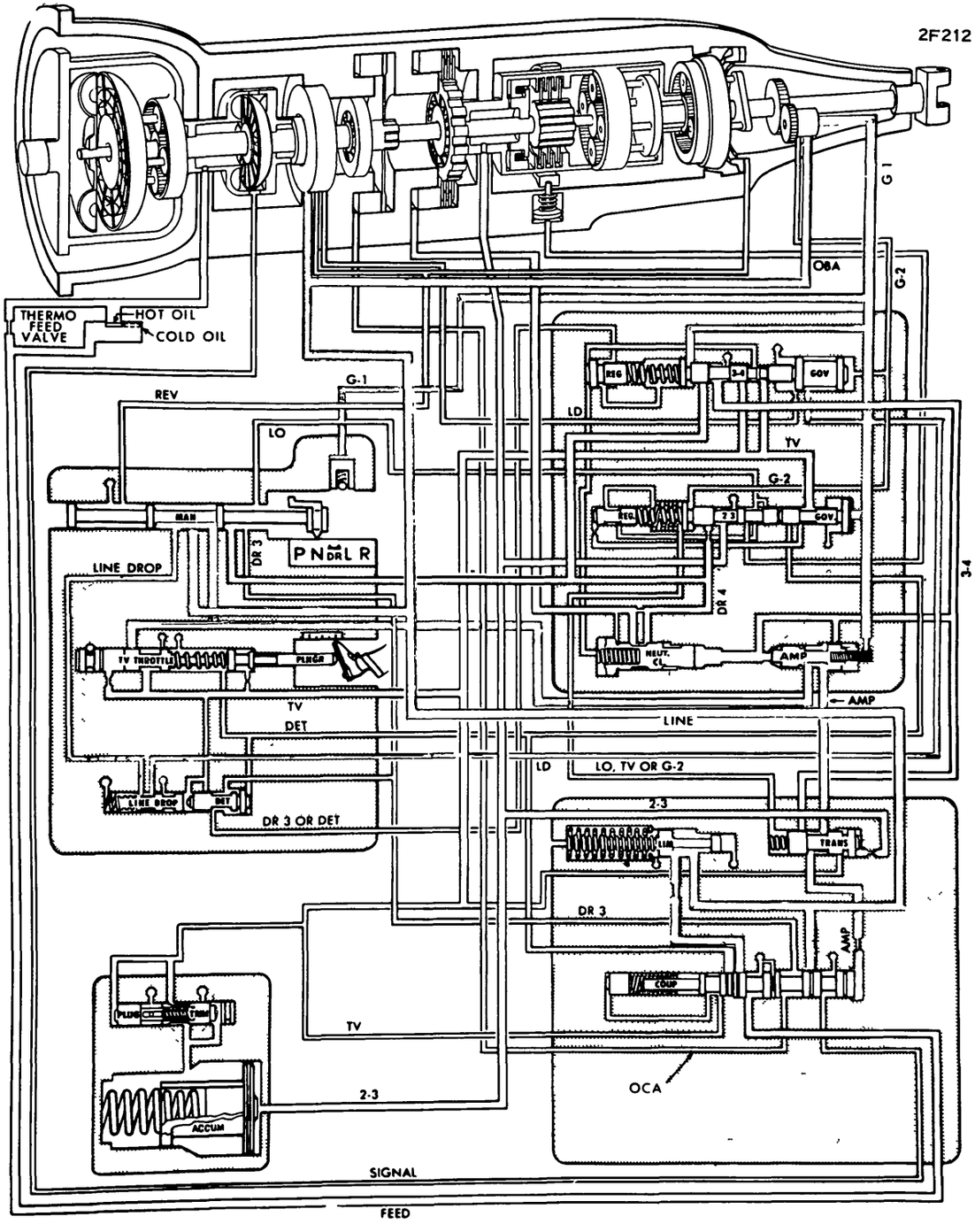
Driv "Right" Pr ssur (Pontiac): With transmission selector lever in Drive "Right" position and car speed at approximately 25 MPH, pressure should be 90-100 lbs. *NOTE - Pressure at any speed is constant regardless of throttle pressure as throttle valve pressure is not used to modulate line pressure.*

Driv "Left" Pr ssur (Pontiac): While driving at 25 MPH, move selector lever to Drive "Left" position so that transmission will shift into 4th Speed. Oil pressure should drop to 60-70 lbs. in 4th.

Zer Thr ttl Pr ssur T st (Cadillac): Above 20 MPH in fourth speed with zero throttle, oil line pressure should be 60—70 lbs.

Full Thr ttl Pr ssur T st (Cadillac): In any drive range, pressure should be at least 30 lbs. higher than zero throttle pressure test reading (see above).

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HYDRAULIC CIRCUIT DIAGRAM

DUAL-COUPLING (4-SPEED) HYDRA-MATIC (C ntinued)

Reverse Pressure Test (Cadillac): With selector lever in "R", apply foot brake and increase engine speed to half throttle. Pressure range under these conditions should be 175—200 lbs.

CADILLAC (ALL SERIES)

	(Engine Speed - RPM)		
UPSHIFTS:	**1-2**	**2-3**	**3-4**
"Dr4" (Min. Throttle)	850	1380	1270
(Full Throttle)	2810	3850	4170
"Dr3" (Min. Throttle)	850	1380	4170
(Full Throttle)	2810	3850	4170
"Lo" (Min. Throttle)	850	4590	4170
(Full Throttle)	2810	4590	4170
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr4" (Min. Throttle)	630	540	470
(Full Throttle)	2485	1590	1000
"Dr3" (Min. Throttle)	2485	540	470
(Full Throttle)	2485	1590	1000
"Lo" (Min. Throttle)	2485	2560	470
(Full Throttle)	2485	2560	1000

PONTIAC (ALL MODELS)

	(Car Speed - MPH)		
UPSHIFTS:	**1-2**	**2-3**	**3-4**
"Dr Left" (Min. Throttle)	5-9	11-15	21-25
(Full Throttle)	11-15	39-43	65-75
"Dr Right" (Min. Throttle)	5-9	11-15	
(Full Throttle)	11-15	39-43	74-80
"Lo" (Min. Throttle)	4-9		
(Full Throttle)	11-15	47-54	74-80
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr Left" (Closed Throttle)	Ⓒ 18-15	Ⓒ 10-6	Ⓒ 8-3
(Full Throttle)	② 70-33	25-14	12-3
"Dr Right" (Closed Throttle)	74-68	10-6	8-3
(Full Throttle)	② 74-28	25-14	12-3
"Lo" (Closed Throttle)	70-60	48-44	8-3
(Full Throttle)	② 70-28	48-44	12-3

Ⓒ - When this shift occurs, transmission will freewheel and it is not possible to observe shift with throttle closed. To check for shift, decelerate, with throttle closed, to specified speed, then accelerate to determine which speed transmission is in.
② - Forced.

TROUBLE SHOOTING & DIAGNOSIS

NO UPSHIFTS OR ERRATIC: Governor valves stuck. Broken governor rings. Sticking valves or dirt in valve body. G-2 bushing turned. Front unit internal gear bushing seized on shaft.

MISSES 2ND SPEED: Governor boost valve stuck. Transition valve stuck away from plate. Sticking valves or dirt in valve body. Governor sticking.

MISSES 3RD, OR 2-4-3: Transition valve sticking. Sticking valves or dirt in valve body. Throttle valve adjustment too long. Rear clutch or transition valve spring faulty.

LOCKS UP IN 2ND AND 4TH: Front sprag clutch broken. Overrun clutch applied or sticking.

LOCKS UP IN 3RD OR 4TH: Rear sprag clutch broken. Low band not releasing.

ROUGH 2-3 SHIFT: Accumulator valve stuck or accumulator piston stuck. Accumulator gasket broken or leaking. Restricted or leaking oil passages. Broken accumulator spring. Broken or leaking piston oil seal rings. Control valve faulty or throttle valve adjusted improperly. Rear clutch pack faulty. Case passages restricted or leaking.

UPSHIFTS ROUGH: Throttle linkage adjusted short. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking or restricted main line feed to governor.

UPSHIFTS LOW: Throttle linkage adjusted long. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking throttle valve oil.

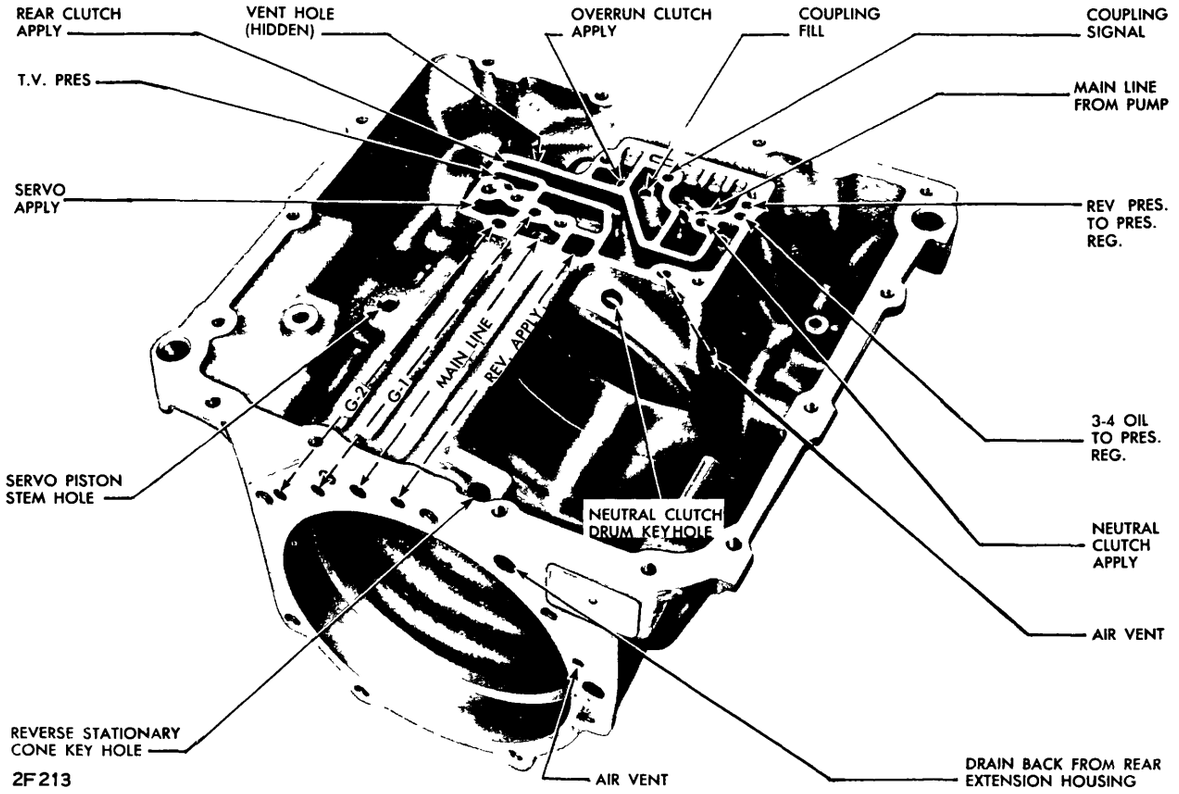
NO REVERSE, SLIPS OR LOCKS UP: Manual linkage incorrectly adjusted. Manual valve not engaged with drive pin. Reverse piston apply restricted or leaking. Low oil pressure. Overrun clutch apply leaking. Pressure regulator faulty. Neutral clutch not released. Flash restricting neutral clutch exhaust port or manual body.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Governor valves sticking or broken governor rings. Reverse blocker piston stuck. Manual linkage interference.

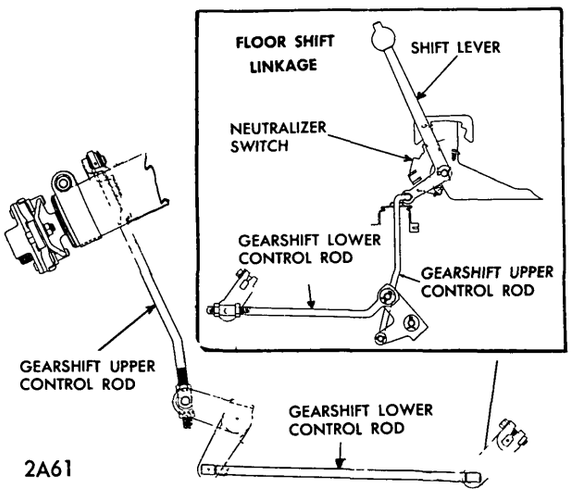
REVERSE DRIVE IN NEUTRAL: Reverse stationary cone sticking.

DELAYED 1-2 SHIFT: Coupling valve sticking. Governor boost valve sticking. G-1 valve sticking. Wrong

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TRANSMISSION CASE OIL PASSAGES



PONTIAC MANUAL SHIFT LINKAGE

DUAL-COUPLING (4-SPEED) HYDRA-MATIC (C ntinu d)

spring on coupler valve.

SLIPS IN 1ST AND 3RD: Front sprag clutch slipping. Front sprag clutch broken.

SLIPS IN OR MISSES 2ND AND 4TH: Front unit torus cover seals leaking. Front unit torus cover exhaust valves sticking or missing. Front unit torus cover feed restriction or leak. Front unit torus cover signal restriction or leak. Low oil pressure. Coupling valve sticking. Sticking valves or dirt in valve body. Coupling snap ring improperly installed, or missing. Limit valve faulty. Coupling passage restricted or leaking. Front unit torus vanes damaged.

SLIPS IN ALL DR RANGES: Manual linkage improperly adjusted. Neutral clutch clipping or burned. Neutral clutch apply restricted or leaking (case support or valve body). Incorrect number of neutral clutch plates. Low oil pressure. Control valve faulty. Torus members (check valve) faulty. Intake pipe "O" ring damaged or missing. Pressure regulator valve stuck in pump. Pump slide stuck.

SLIPS IN 1ST OR 3RD (DR RANGE): Rear sprag clutch slipping or improperly assembled. Rear sprag clutch broken. Neutral clutch burned, restricted or the piston is sticking.

SLIPS IN 3RD OR 4TH: Rear unit clutch slipping or burned. Rear unit clutch apply restricted or leaking. Incorrect number of clutch plates (rear). Accumulator faulty. Center support leakage at 2-3 passage. Low oil pressure. Accumulator valve stuck (3rd only).

SLIPS IN 3RD IN DR RIGHT ON COAST: Overrun clutch slipping or burned. Overrun clutch apply restricted or leaking. Sticking valves or dirt in valve body. Overrun clutch passages restricted or leaking.

SLIPS IN 1ST AND 2ND LO RANGE ON COAST: Low servo apply restricted or leaking. Low band not anchored to case or broken. Low servo piston and rod binding in case or servo and accumulator body. Band facing worn or loose. Anchor dowel pin loose or missing in case.

NO DRIVE IN DR RANGE: Manual linkage incorrectly adjusted or manual valve not engaged with drive pin. Low oil pressure (pressure regulator stuck). Front pump intake pipe improperly installed. Front sprag broken (front pump bushing or front unit drive torus shaft). Front and/or rear sprag not properly installed. Rear sprag broken. Front sprag inner race broken. Rear sprag outer race broken. Neutral clutch plates burned. Neutral clutch piston, control valve or front pump not operating properly.

DRIVE IN LO RANGE ONLY: Rear sprag broken. Neutral clutch not applying.

NO FORCED DOWNSHIFTS (4-3 OR 3-2): Control valve faulty or linkage not properly adjusted.

2-3 RUNAWAY OR 2-1-3 SHIFT: 2-3 passage in center bearing support restricted or leaking. Plug out of accumulator. Rear clutch burned. Valve body faulty (transition valve or case passages in the 2-3 circuit).

WILL NOT GO INTO PARK: Parking links broken. Mechanical interference. Manual linkage or parking pawl faulty.

STARTS IN 2ND SPEED: Valves sticking. Governor sticking or governor boost valve stuck.

DRIVES FORWARD IN REVERSE AND NEUTRAL: Neutral clutch piston stuck in applied position.

LUNGES FORWARD BEFORE BACK-UP WHEN PLACING SELECTOR IN REVERSE: G-2 plunger stuck in outward position. Restricted neutral clutch release oil supply.

TRANSMISSION REMOVAL & INSTALLATION

CADILLAC

REMOVAL: 1) Place car on a hoist or on jack stands and disconnect battery. Remove starter motor and slush deflector and lower flywheel cover front cover.

2) Drain transmission at oil pan and flywheel, then remove transmission filler pipe bracket bolt from right cylinder head. Clean dirt from pipe flange and slide filler pipe out of sleeve in transmission case.

3) Disconnect brake cables from parking brake relay lever, then remove retracting spring and remove relay from frame. Remove propeller shaft assembly and remove intermediate frame crossmember below flywheel housing. Disconnect speedometer cable from extension housing. Remove throttle valve and manual levers from shafts.

4) Remove four nuts from flywheel-to-drive plate screws, then place a jack under rear of engine oil pan (use a wood block to prevent damage to plan). Place transmission jack under transmission and raise it just enough to take strain off rear engine support. Disconnect engine rear support at transmission extension housing and remove crossmember that carries support.

5) Disconnect oil cooler pipes from adapter on transmission case and cap the lines to prevent leakage.

6) Remove six screws holding flywheel housing to engine then remove transmission and flywheel housing as a unit by moving assembly toward rear of car, disengaging flywheel housing from locating dowels on engine, and then tilting front unit downward to lower it from car. Remove washer from pilot hole in crankshaft.

INSTALLATION: 1) Install spacer in pilot hole in crankshaft, then raise transmission into position carefully with transmission jack and align drive plate with torus cover screws and drive dowel holes in flywheel housing with dowels on engine. Install flywheel housing-to-crankcase screws, making sure that flywheel is as far forward as possible. Connect oil cooler lines and tighten securely.

2) Lift engine and transmission to about one inch above its normal height and install engine rear support bracket on frame. Tighten three bracket bolts on one side only. Install three bracket bolts on other side loosely. Lower transmission carefully and install two support screws. Remove block from engine pan and remove transmission jack.

3) Install four nuts attaching drive plate to flywheel and tighten to 15-20 ft. lbs. *CAUTION - Mak sur drain plugs in flywh l and il pan ar tight.* Install flywheel housing front cover making sure to attach the two exhaust braces. Install starter motor.

4) Install filler tube in transmission with support bracket properly positioned on cylinder head. Install manual and throttle valve levers on transmission shaft, making sure that serrations on levers are lined up with serrations on their respective shafts and tighten securely. Install speedometer cable, and install slush deflector.

5) Wedge screwdriver in between frame and end of rear support bracket which was left loose, to spring frame slightly. Install frame crossmember below flywheel housing with six bolts. Remove screwdriver and tighten bolts. Tighten three remaining bolts on engine rear support bracket.

6) Install propeller shaft assembly, then install parking brake relay lever and retracting spring in position on frame. Connect brake cables to lever and adjust cable. Lower car to floor and connect battery.

7) Install filler pipe bracket to cylinder head screw, then fill transmission with fluid *(see "Draining & Refilling" above)*. Adjust manual and throttle valve linkage. *See "Linkage Adjustments" above.*

PONTIAC

REMOVAL: 1) Remove one battery cable and release the parking brake, then raise car and drain transmission (see "Draining & Refilling" above). Disconnect oil cooler lines by either removing clamps and pulling hoses or by cutting the hoses. Disconnect drive line from transmission output shaft, then remove complete drive line assembly.

2) Disconnect speedometer cable from drive gear and remove gearshift lower control rod. Remove cross shaft bracket, cross shaft lever and bushing from transmission. Remove lower end of throttle valve upper control rod (engine-to-transmission idler lever), then remove throttle valve lever control rod and throttle idler lever.

3) Remove both starter cables and remove starter and splash shield. Remove flywheel bottom cover and remove flywheel-to-flex plate attaching bolts. Position automatic transmission jack under transmission and and remove two rear support-to-frame crossmember bolts. Disconnect crossmember at each frame side rail and raise transmission so rear mount supports are clear of cross member, then rotate crossmember slightly in frame and remove parking brake return spring and cable guide rod from crossmember.

4) Remove crossmember, then lower transmission enough to remove flywheel housing-to-engine bolts. Work transmission rearward to disengage dowels from front flywheel housing and remove transmission.

INSTALLATION: Reverse removal procedure and note the following: With transmission in position engaging dowels into engine and torus cover bolts into flex plate, install and tighten two flywheel housing attaching screws. *NOTE - If pilot on flywheel has entered end of crankshaft properly, flywheel and torus cover should move back and forth slightly.* Rotate flywheel to bring one flex plate mounting pad down to lowest position, then push flywheel forward slightly to seat it against crankshaft. Measure clearance between pad on flex plate and flywheel with a feeler gauge. Minimum clearance should be .015". If less, move trans-

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DUAL-COUPLING (4-SPEED) HYDRA-MATIC (Continued)

mission away from engine and install special spacer over flywheel pilot. Move transmission back into position and install two flywheel housing-to-engine bolts. When installing flex plate-to-flywheel attaching nuts, tighten nuts to 15 ft. lbs. using a torque wrench with extension, Tool No. J-6498.

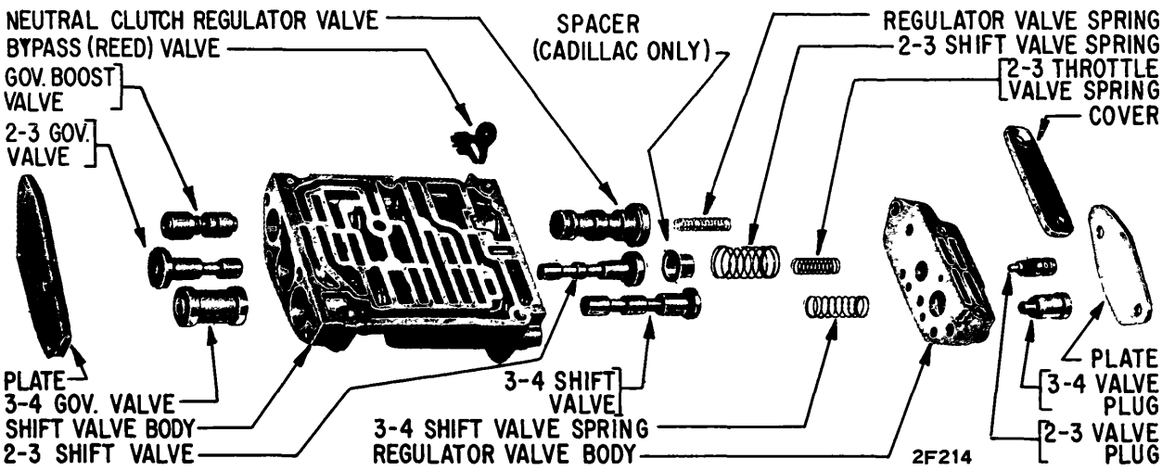
TRANSMISSION OVERHAUL

►*1962 CADILLAC 2–3 SHIFT VALVE ASSEMBLY*

NOTE: An additional spacer is used between end of 2–3 Shift Valve and 2–3 Shift Valve Spring (see "Shift Valve Body Assembly" illustration). When installing the spacer, it should fit on end of 2–3 Shift Valve with rim of spacer against large land on valve.

OVERHAUL: *See 1960 Final Data, Page 467, or later Manual edition and note the following:*

Rear Clutch Hub-to-Rear Clutch Unit Thrust Washer: Position bronze thrust washer next to rear clutch hub, then position steel backing washer between bronze thrust washer and rear unit clutch cover with flange on backing washer toward clutch cover.



SHIFT VALVE BODY ASSEMBLY

3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION

Oldsmobile, 88, Super 88 & 98 (1962)
Pontiac (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE: A serial number prefix stamped on the serial number plate located on left side of transmission case identifies the various transmissions as indicated in table below.*

Car Model	Serial Number Prefix
Oldsmobile Series 88 ① ②	062
Oldsmobile Series 88 ① ③	OC62
Oldsmobile All Series ④	OA62
Oldsmobile Starfire	OB62
Pontiac ① ③	P–62
Pontiac ① ⑤	PES–62
Pontiac ③ ④	PB–62
Pontiac ⑥	PA–62
Pontiac ⑤ ⑦	PEH–62

① – 2-Bbl. Carb. ② – 8.75-1 Comp. Ratio.
③ – 10.25-1 Comp. Ratio. ④ – 4-Bbl. Carb.
⑤ – 8.6-1 Comp. Ratio.
⑥ – 425A Eng. 10.75-1 Comp. Ratio
⑦ – 8.6-1 Comp. Ratio. 2–Bbl. Carb. Heavy Duty.

►*TOWING HYDRA-MATIC DRIVE CARS:* Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with transmission. When towing at speeds above 30 MPH or if transmission is known to be out of order, disconnect propeller shaft from transmission. *CAUTION – After towing, check fluid level and if necessary, bring to proper level.*

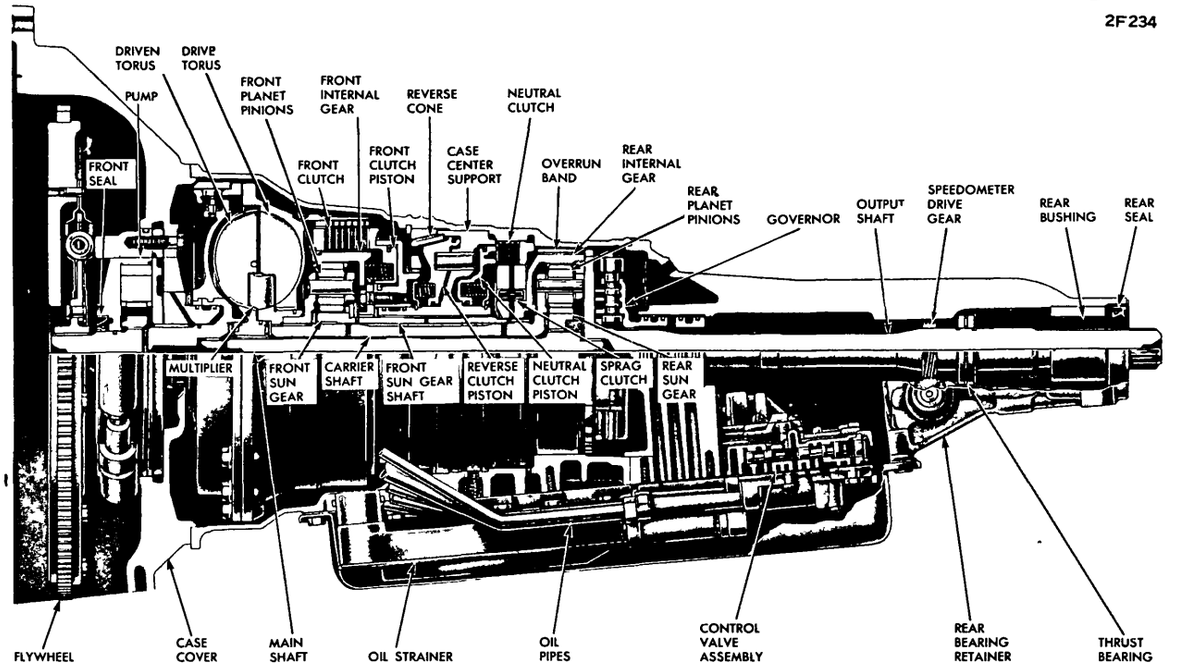
►*STARTING ENGINE BY PUSHING CAR NOTE: It is not possible to start engine in this manner.*

►*1962 PONTIAC HYDRA-MATIC CONSOLE TYPE SHIFT LEVER BUTTON BREAKAGE CORRECTION (EARLY CARS):* Remove console assembly, then remove shift lever, bracket, and switch assembly. Remove shift lever from bracket, then remove shift guide retaining nut. Disengage shift guide from lever assembly and remove guide, spring and rod from lever assembly. Install "O" ring, Part No. 3732225, over upper end of rod and seat against pawl. Grind .040" of stock off lower edge of "Park" and "Reverse" lockouts on bracket. Reassembly units and install a new plastic release button, Part No. 543234.

►*1962 PONTIAC HYDRA-MATIC TRANSMISSION LEAKAGE NOTE:* If leakage is occurring around dust plug on universal joint slip yoke, replace slip yoke assembly.

►*1962 PONTIAC REAR BEARING RETAINER PRODUCTION CHANGE & MANUAL SHAFT "O" RING SEAL REPLACEMENT:* Later rear bearing retainers have been changed to provide a new method for retaining manual shaft. The parking brake bracket and parking brake shaft have also been changed. The manual shaft retaining key has been replaced by a retaining pin. To replace a manual shaft "O" ring seal on later transmissions, it will be necessary to remove or move back the rear bearing retainer to allow retaining pin to be removed. Move manual shaft and detent lever toward outside of case for access to "O" ring seal.

►*1962 HYDRA-MATIC REAR UNIT GEAR TRAIN PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Later type units which include sun gear, internal gear, pinions and carrier assembly are "counter–phased" and are not interchangeable with early type units. When replacing any of these parts, make sure the new parts have the same number of teeth and the carrier assembly has the same spacing for pinion pins.



3-SPD. (4-STAGE) HYDRA-MATIC SECTIONAL VIEW

DESCRIPTION

DESCRIPTION: Three speed (Four Stage) "split torque" type hydraulically controlled automatic transmission consisting of a torque converter assembly and planetary type gear train. Design is similar to 1961 transmission used on corresponding models, with the following exceptions:

Coupling Cover–to–Case Cover Thrust Bearing: This new needle thrust bearing has 32 rollers.

Pump–to–Case Cover Seal Ring: New design has a square cut for improved sealing.

Reverse Stationary Cone: Cone and retaining key are integral.

One–Way Clutch: Sprag and race assembly (same as 1961 models) or a new design roller type clutch are used in mixed production.

Front Sun Gear Shaft–to–Rear Internal Gear Snap Ring: This snap ring is not used in 1962 transmissions.

Front Pump Assembly: 1962 units incorporate an additional ball check which has been added as part of the line drop system on 2–3 shift.

Transmission Case Cover Assembly: Case cover provides a feed hole for the line drop ball check, located in oil pump.

OPERATION

OPERATION: Neutral – Engine torque is transmitted through torus cover to drive torus member causing it to rotate driven torus and turn main shaft and rear sun gear unit in direction of engine rotation. The neutral clutch being disengaged, prevents one–way clutch (sprag or roller type) assembly from holding rear unit internal gear against turning opposite to engine rotation. Therefore, as rear unit sun gear turns in direction of engine rotation, rear unit pinions turn opposite to engine rotation, driving rear internal gear opposite to engine rotation. The front unit sun gear being mechanically connected to rear internal gear, causes front unit pinions to rotate in direction of engine rotation, driving front internal gear in same direction. With both rear unit internal gear and front unit internal gear spinning freely, there is no transmission of torque from front or rear units to carrier or output shaft.

First & Second Stages: Engine torque is transmitted through torus cover to torus drive member, then through oil to torus driven member which directs it through the stator (multiplier) and back to the driven member. This action multiplies engine torque and applies it to mainshaft and rear sun gear. As car speed increases, the difference in speed between drive torus, multiplier, and driven torus decreases so multiplier ceases to be needed. As this happens, the torus assembly begins to function as a simple fluid coupling and the effective ratio of transmission changes from approximately 3.50–1 to approximately 2.93–1 (second stage). Neutral clutch is applied, locking one–way clutch (Sprag or Roller Type) outer race to case, and the rear unit internal gear is held stationary. The rear unit sun gear, turning in direction of engine rotation attempts to drive pinions and internal gear opposite to engine rotation; however, because one–way clutch assembly holds internal gear stationary, the output shaft, through the

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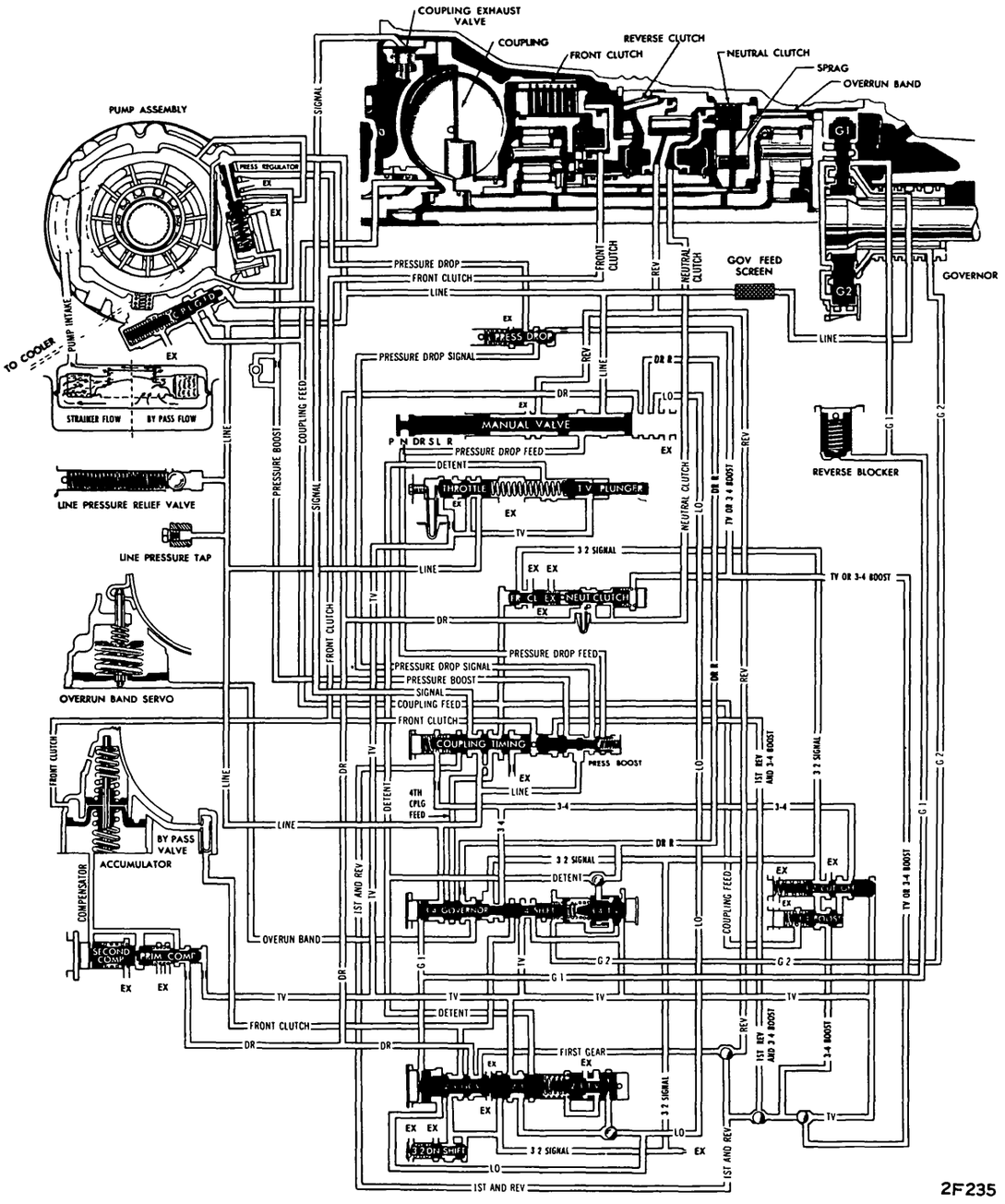
3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION (Continu d)

pinions, is compelled to rotate in direction of engine rotation within the internal gear at reduced speed and with increased torque. As the rear carrier and output shaft rotate in this manner, the front carrier, which is mechanically connected to rear unit, also rotates in same direction at a reduced speed. Because the one—way clutch assembly is holding front unit sun gear from turning opposite to engine rotation, carriers and pinions rotate the front unit internal gear in direction of engine rotation at approximately one—half engine speed. Because the front clutch is released, the reduction in first speed is due to the rear unit reduction, times the coupling torque multiplication, plus the .3 engine torque acting on output shaft through the torque multiplier.

Third Stage: Engine torque is transmitted through torus cover to torus drive member. The front clutch is applied and coupling is empty so engine torque is mechanically applied to front unit internal gear. Front unit sun gear assembly is splined to one—way clutch inner race and is prevented from turning opposite to engine rotation by sprags or rollers when neutral clutch is applied. Engine torque at front internal gear is applied to pinions, and because sun gears cannot rotate opposite to engine rotation, the planet pinions and carrier are forced to rotate in direction of engine rotation around sun gear in reduction. Front carrier is splined to rear unit carrier and shaft assembly which in turn is bolted directly to output shaft.

Fourth Stage: Engine torque is transmitted through torus cover and is applied through front clutch in front unit internal gear. Front unit internal gear, through pinions, tends to turn front sun gear against the one—way clutch causing front unit to run in direction of engine rotation, in reduction. With rear carrier rotating in same direction, and rear internal gear tending to be stationary against the one—way clutch, rear unit pinions attempt to rotate opposite to engine rotation on their pins, thus driving rear unit sun gear and driven torus in direction of engine rotation faster than engine speed. However, because coupling is filled, coupling driven member and rear unit sun gear cannot revolve faster than torus which turns at engine speed. Therefore, rear sun gear is slowed down to approximately engine speed. As a result, rear unit pinions are also slowed down. The carrier and pinions change direction of load against internal gear causing it to overrun the one—way clutch and revolve with carrier and sun gear at same speed. With output shaft and carriers connected to converter stator (multiplier), the stator is also turning at same speed as drive and driven members so that it has no effect in multiplying torque in the torque converter. As a result, the entire drive train must revolve as one common unit in direct drive.

Reverse: Engine torque is applied to mainshaft in same manner as in "First & Second Stage" above. Rear unit sun gear then drives rear unit pinions as idlers which in turn drive rear unit internal gear in direction opposite engine rotation (neutral clutch is released making one—way clutch ineffective for holding internal gear). With rear unit internal gear turning opposite to engine rotation, front unit sun gear is turning in same direction. The reverse cone, which is applied, holds front unit internal gear stationary so that front unit pinions and carrier are forced to walk around front internal gear in a direction opposite to engine rotation, and in reduction. The output shaft being connected to front and rear unit carrier is also turning in a direction opposite to engine rotation, and in reduction.



HYDRAULIC CIRCUIT DIAGRAM

CONTINUED ON NEXT PAGE

3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION (C ntinu d)

LUBRICATION

LUBRICATION: Check fluid level every 2000 miles (Oldsmobile); every 4000 miles (Pontiac). Drain and refill every 24,000 miles (Oldsmobile); every 25,000 miles (Pontiac).

R c mm nd d Fluid: Use only Automatic Transmission Fluid Type "A" (Suffix "A").

CHECKING FLUID LEVEL: With car on a level floor, transmission at operating temperature, engine idling, and selector lever in "P" (Park) position, check fluid level on dipstick located at right rear of engine. Add recommended fluid as necessary to bring level to FULL mark on dipstick. *NOTE – 1 pint of fluid is required to bring l v l fr m ADD mark to FULL mark. With transmission cold, il l vel sh uld be at ADD mark. DO NOT OVERFILL.*

DRAINING & REFILLING: Oldsmobile – With transmission at normal operating temperature, remove oil filler pipe from transmission and drain fluid. Replace filler pipe and add 5 qts. of recommended fluid to transmission. Place selector lever in "P" (Park) position and start engine. Add fluid to bring level to FULL mark on dipstick. *NOTE – Recheck fluid level after transmission is warm.*

P ntiac: *NOTE – Drain fluid immediately after operation bef r it has an opp rtunity to cool.* Disconnect fluid filler pipe from right side of transmission oil pan and allow transmission to drain. Remove oil pan and strainer and thoroughly clean, then install strainer using a new "O" ring on pump intake pipe. Install oil pan and a new gasket and tighten bolts to 12–15 ft. lbs., then connect filler pipe to oil pan and tighten securely. Pour 4 qts. of recommended fluid into transmission. *NOTE – If valv body r moved, pour in 5 qts. If transmissi n v rhaul d, p ur in 8 qts. for initial fill before starting ngin .* Start engine and run at slow idle with selector lever in "P" (Park). With transmission warm and engine idling, recheck fluid level and adjust as required. *D n t verfill.* Replace dipstick and turn handle 1/8 turn to lock it in filler tube.

Capacity: Oldsm bile – 5½ qts. (after drain); 6½ qts. (after pan removed); 9 qts. (after overhaul).
P ntiac – 4½ qts. (after drain); 8½ qts. (after overhaul).

LINKAGE ADJUSTMENT

LINKAGE ADJUSTMENT: Throttle Linkage – *See CARBURETOR on car model pages.*

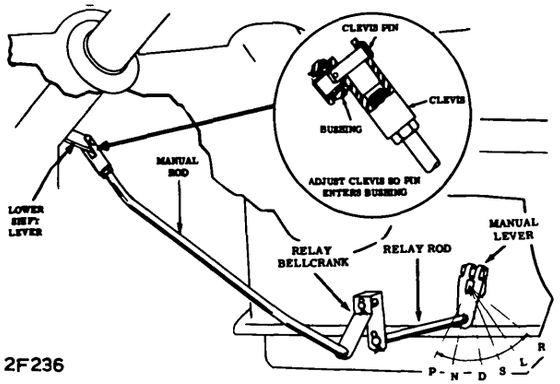
Manual Shift Linkag : Steering Column Shift – Place transmission selector lever on steering column in "P" (Park) position, then back off locknuts on upper control rod trunnion (at equalizer) so they are free of trunnion. Place manual lever on transmission in "P" (Park) detent, then pull upper control rod down toward transmission as far as possible. While holding rod in this position, run trunnion upper locknut down to just contact trunnion. Run lower locknut up to contact trunnion and lock nuts securely. After making adjustments, check parking lock with car on an incline for positive locking.

Fl r Shift (P ntiac Grand Prix) – Place selector lever in "P" (Park) position, then loosen both trunnion nuts on gearshift lower control rod and back them away from trunnion. While holding lower control rod toward rear of car (to remove slack from linkage) run rear nut up to contact trunnion. Run forward nut down to contact trunnion and lock securely in position.

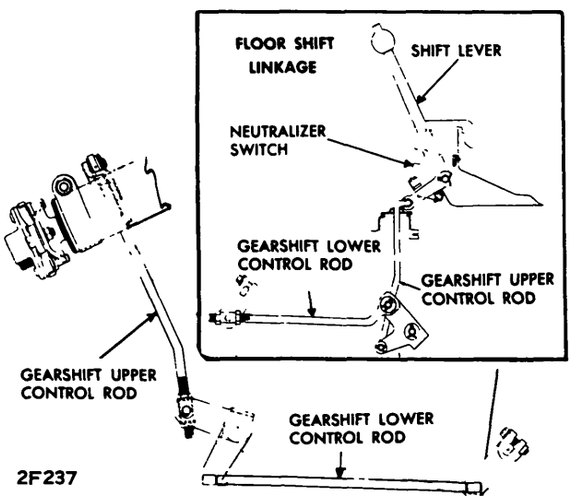
Floor Shift (Pontiac B nnevill) – Place shift lever in "P" (Park) position and disconnect gearshift lower control rod at forward end. While holding gearshift lower control rod toward rear of car, turn adjusting nut on control rod so that it fits on upper shift lever stud while lever is in its detent position, then lock adjusting nut.

NEUTRAL SAFETY SWITCH: Oldsmobile – Place selector lever in "N" (Neutral) position, then loosen switch mounting screw on steering column jacket below instrument panel. Adjust switch to index with selector lever. Starter must operate when transmission selector lever is in "P" (Park) or "N" (Neutral) positions and must not operate in any other position. Tighten switch mounting screw securely.

Pontiac – *NOTE – There is no adjustment for neutral safety switch on cars with steering column mounted selector lever. Neutral switch should allow engine to be started only in "P" (Park) or "N" (Neutral).* On cars with floor shift, remove console compartment box and then console center bracket–to–floor screws. Remove four remaining screws attaching console, then remove compartment light switch, indicator bulb, courtesy light connections and shift lever knob. Lift console over shift lever and remove toward rear seat. Loosen two neutral safety switch attaching screws and adjust switch so engine starts only with shift lever in "N" (Neutral) or "P" (Park). Install assembly by reversing removal procedure.



OLDSMOBILE MANUAL SELECTOR LINKAGE



PONTIAC MANUAL SELECTOR LINKAGE

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *NOTE - Make sure engine is operating at peak performance.* See "Shift Speed Tables" below for correct shift speeds under different operating conditions.

►*CAUTION: Do not stall test transmission under any conditions.*

OIL PRESSURE TEST: With oil pressure gauge connected to the upper of the two test holes on left-hand side of rear bearing retainer, check the oil pressure while on road test with selector lever in Drive Right position and with transmission in second speed at approximately 25 MPH. Minimum pressure should be 98.6 lbs. Maximum pressure should be 111.4 lbs. If not within specifications, check the following:

Low Oil Pressure: Oil level is low. Booster plug is the wrong one or is stuck. Pressure regulator valve is not operating properly. Strainer and "O" ring are leaking. Manual valve is misaligned with quadrant. Fluid is foaming or cavitation is occurring. Internal leakage. Stuck valve in control valve assembly. Front pump slide is stuck causing low output.

High Oil Pressure: Pressure regulator valve is stuck. Booster plug is the wrong one or is stuck. Manual valve is misaligned with quadrant. Stuck valve in control valve assembly. Front pump stuck causing high output.

SHIFT SPEED TABLES

UPSHIFTS		2–3	3–4
"Dr. Left"	(Min. Throttle)	14-18	18-23
	(Full Throttle)	33-40	76-89
"Dr. Right"	(Min. Throttle)	14-18	...
	(Full Throttle)	33-40	76-89
"Lo"	(Min. Throttle)	...	...
	(Full Throttle)	...	76-89

DOWNSHIFTS		4–3	3–2
"Dr. Left"	(Closed Throttle)	20-15	16-13
	(Full Throttle)	84-68	29-25
"Dr. Right"	(Closed Throttle)	84-72	16-13
	(Full Throttle)	84-72	29-25
"Lo"	(Closed Throttle)	84-72	52-46
	(Forced)	84-72	52-46

►*NOTE:* Minimum throttle denotes a fixed throttle opening only sufficient to provide acceleration enough to accomplish each of the shifts.

TROUBLE SHOOTING & DIAGNOSIS

NO UPSHIFT: "G-1" valve in governor is sticking closed or the 1-2 shift valve train in control valve assembly is sticking. *(NOTE* - To determine if "G-1" valve is sticking, drive car between speed of 15-20 MPH, then very carefully attempt to momentarily engage the reverse position to see if reverse blocker piston is working. If selector lever can be moved beyond "LO"

CONTINUED ON NEXT PAGE

3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION (Continu d)

range position, reverse blocker is not operating properly, due in most cases to a stuck "G-1" valve. If a thorough rinsing of governor in clean solvent does not free "G-1" valve, replace governor assembly). *CAUTION - When making test, DO NOT fully engage selector lever in Reverse position or leave lever in partial Reverse position.*

NO DRIVE IN DRIVE RANGE: Check Neutral Clutch, Sprag assembly (or Race), Fluid Coupling, Oil Level & Pressure, Manual Linkage, Control Valve Assembly, Sticking Reverse Cone, and for Restricted Passages.

DRIVE IN NEUTRAL: Check operation of Neutral Clutch for Manual Linkage Adjustment.

NO REVERSE: Check Manual Linkage Adjustment, Low Pressure, Restricted Passages, and check operation of Reverse Cone Clutch and Neutral Clutch.

DRIVE IN "RIGHT DRIVE" OR LOW RANGE ONLY: Check operation of Sprag Assembly and Neutral Clutch.

FORWARD DRIVE IN REVERSE: Check Manual Linkage and operation of Neutral Clutch.

REVERSE DRIVE IN NEUTRAL: Check operation of Reverse Cone Clutch.

DRIVE IN THIRD & FOURTH ONLY: Check operation of Reverse Cone Clutch.

DRIVE IN FIRST, SECOND & FOURTH ONLY: *NOTE - This condition may be reported as a 2-3 Slippage.* Check for malfunction in Control Valve Assembly or Fluid Coupling.

DRIVE IN FIRST, SECOND & THIRD ONLY: Check operation of Governor and for malfunction in Control Valve Assembly.

SLIPPING 2-3 SHIFT: *NOTE - This condition may be reported as "Drive in 2 or 4 Only."* Check operation of front clutch or Accumulator, malfunction in Control Valve Assembly, and for Accumulator Body Assembly not operating properly. Check Throttle Valve Linkage Adjustment and check for Low Oil Pressure. Check for restricted 2-3 oil passages.

SLIPPING 3-4 SHIFT: Check malfunction in Fluid Coupling and in Control Valve Assembly. Front Clutch not operating properly.

SLIPPING IN ALL RANGES: Low Oil Pressure.

ROUGH 2-3 SHIFT: Accumulator, Compensator Body Assembly, or Front Clutch not operating properly. Malfunction in Control Valve Assembly or in Fluid Coupling. Throttle Valve Linkage not adjusted properly. Front Clutch Passage restricted.

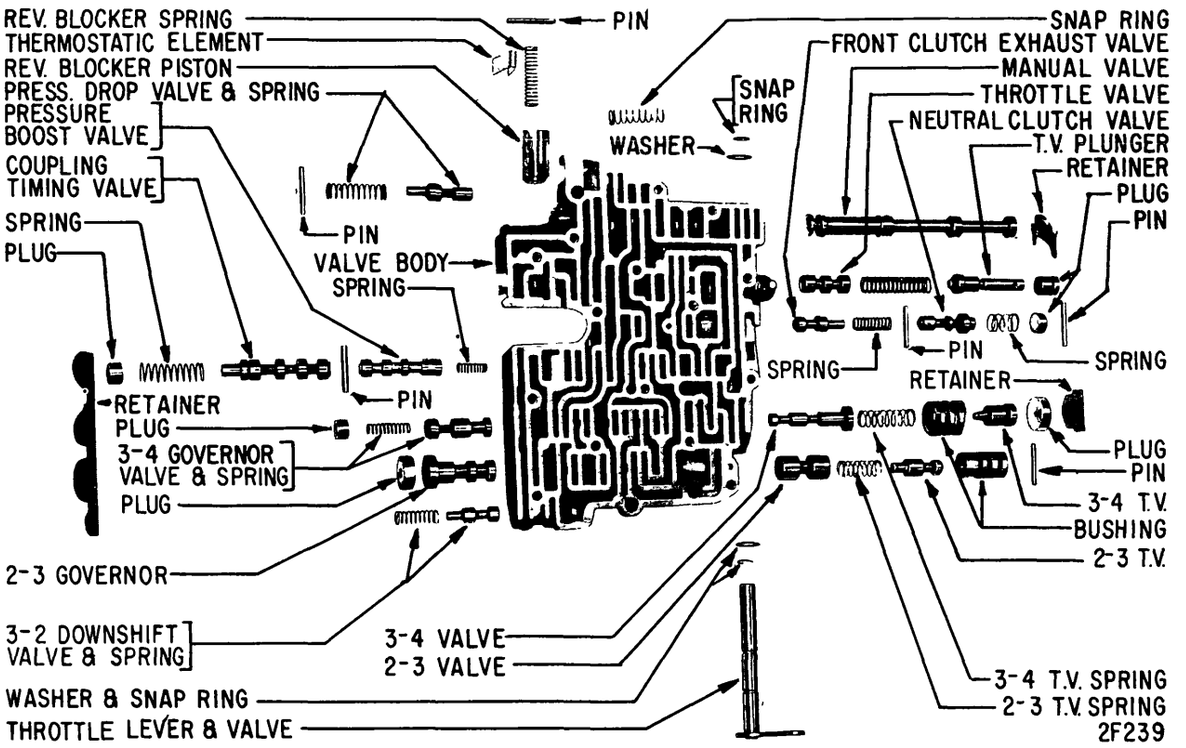
ERRATIC SHIFTS: Governor Assembly or Control Valve Assembly not functioning correctly.

HIGH OR LOW UPSHIFTS: Throttle Valve Linkage not properly adjusted (if too short, upshifts will be high, if too long, upshifts will be low). Control Valve Assembly or Governor malfunctioning. Throttle Valve Lever bent. Governor Oil Passage restricted. Throttle Valve or Line Pressure not correct.

NO ENGINE BRAKING (INTERMEDIATE OR LOW RANGE): Overrun Band or Servo not operating.

NO PART THROTTLE OR DETENT DOWNSHIFT: Check Throttle Valve Linkage Adjustment and Accelerator Travel. Malfunction in Control Valve Assembly or Governor.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Check Manual Linkage Adjustment, operation of Governor, and Reverse Blocker Valve.



CONTROL VALVE ASSEMBLY

SELECTOR LEVER WILL NOT GO INTO PARK: Check Parking Linkage and Adjustment of Manual Linkage.

TRANSMISSION REMOVAL & INSTALLATION

►*TRANSMISSION REMOVAL & INSTALLATION PROCEDURE NOTE: See Page 475 in 1961 Final Data.*

TRANSMISSION OVERHAUL

OVERHAUL: *See 1961 Final Data, Page 475 and note the following:*

CONTROL VALVE BODY: Disassembly - 1) Remove channel body from valve body assembly (two screws on valve body side and thirteen screws on channel plate side), then remove neutral clutch bypass valve from cored side of channel plate. Remove front clutch bypass valve.

2) If necessary to remove pressure relief valve and spring, proceed as follows: Turn channel plate over to casting side and remove retaining pin. *CAUTION - Pin is under extreme pressure.* Remove pressure relief valve spring and ball. After cleaning and inspection, reassemble channel plate by installing pressure relief ball, spring and retainer, neutral clutch bypass and front clutch bypass valve, then set channel plate aside and continue with valve body disassembly.

3) Remove channel plate-to-valve body spacer and place on channel plate and check alignment of bypass valves. Remove two check balls and throttle valve thermostatic element. Remove throttle valve plunger guide retainer located in cored passage near throttle valve adjusting screw. Position control valve assembly with cored side up and throttle valve lever positioned on top right hand side.

►*DISASSEMBLY NOTE: Refer to valve body illustration and note the following:*

4) Remove multiple valve plug retainer (plugs are under spring tension), then remove 2-3 downshift valve and spring. Remove valve bore plug from adjacent bore by inserting snap ring pliers in hole in plug.

►*VALVE PLUG REMOVAL NOTE: Valve plugs are non-operating plugs used in valve bores. Remove and install with snap ring pliers.*

5) Remove 2-3 governor valve, then remove 3-4 governor valve plug and 3-4 governor valve. Remove plug from coupling timing valve bore and remove spring and coupling timing valve. Remove pressure boost valve retaining pin from center of cored side of valve body (in coupling timing valve bore) and remove pressure boost valve.

6) From the opposite side of the valve body, remove the pin retaining 2-3 throttle valve bushing and the 2-3 throttle valve. From same bore remove 2-3 shift valve and springs. From the next bore, remove valve bore plug retainer and plug (plug is under spring tension), then remove 3-4 throttle valve, spring and bushing, and 3-4 shift valve and spring.

7) Remove retaining pin from neutral clutch valve bore, then remove plug, neutral clutch valve and spring. From the same bore, remove front clutch exhaust valve retaining pin on cored side of valve body (use a small

CONTINUED ON NEXT PAGE

3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION (C ntinu d)

screwdriver to relieve tension on pin for removal), then remove clutch exhaust valve spring and valve.

8) Mark throttle valve adjustment screw and **loosen xactly five turns.** Turn valve body over and remove throttle lever by removing outside "C" ring and washer, positioning shaft so that lever will clear throttle valve adjusting screw, then remove washer. Remove throttle valve plunger, guide, spring and valve.

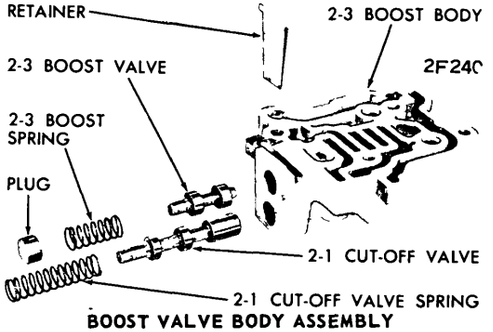
9) If necessary, remove reverse blocker piston retaining pin, spring, and reverse blocker piston. Remove detent spring. *NOTE – Do not remove detent lever unless n c ssary to r plac . If necessary to replace, drive pin out with a small punch. A new lever will be requir d at r ass mbly.* Remove pressure drop retaining pin, spring and valve.

R ass mbly: *NOTE: All attaching screws must be tighten d to 2.5–3.5 ft. lbs., and all attaching bolts to 6–8 ft. lbs.*

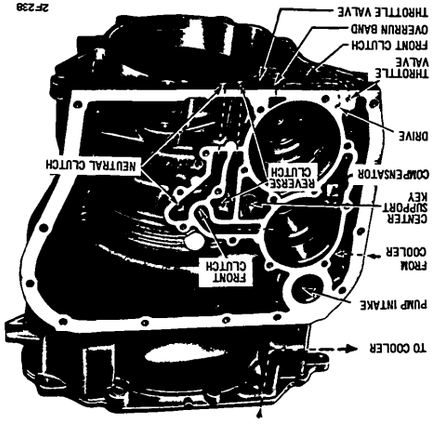
1) Install manual detent lever and pin, then install detent spring. Install reverse blocker piston, spring and pin. Install pressure drop valve (stem end of valve last), spring and retaining pin in top bore adjacent to detent spring.

2) Install throttle valve (round end first), spring, plunger and sleeve in throttle valve bore adjacent to manual valve bore. Place washer against "C" ring on throttle valve lever shaft, then install shaft through hole in valve body so throttle valve lever will index between plunger and throttle adjusting screw. Install washer and "C" ring securing lever assembly to valve body. Turn throttle valve adjusting screw back to original position **(xactly fiv turns).** Install throttle valve plunger guide retainer through cored side of valve body into annular groove in throttle valve plunger.

3) Install front clutch exhaust valve (land end first) and front clutch exhaust valve spring in bore adjacent to throttle valve bore. Install short retaining pin through



BOOST VALVE BODY ASSEMBLY



TRANSMISSION CASE OIL PASSAGES

cored side of valve body while compressing exhaust valve spring, then install neutral clutch valve and spring in same bore. Compress valve spring and install valve bore plug (threaded end out) and long copper retaining pin.

4) Install 3–4 valve and spring as a combination, then install 3–4 throttle valve spring into pocket of 3–4 valve. Install 3–4 throttle valve into 3–4 regulator bushing so that valve will completely enter bore of bushing. Install 3–4 throttle valve and bushing into 3–4 bore in valve body (small end of throttle valve first), then install 3–4 valve bore plug (threaded end out), and retainer.

5) Install 2–3 valve in bore adjacent to 3–4 valve trains and install 2–3 throttle valve and shift valve springs in same bore. Install 2–3 throttle valve into bushing with stem end out, then install 2–3 throttle valve and bushing into 2–3 bore (valve end first). Depress bushing and install short retaining pin from cored side of valve body.

6) In the bore adjacent to "U" shaped cutout, install pressure boost valve, using a brass rod to guide valve into bore (long land first). Install retaining pin through same bore from core face of body. Install coupling timing valve (land end first) into same bore, then install coupling timing valve spring over stem end of coupling timing valve. Install valve bore plug in valve body, compressing and partially installing multiple plug retainer. Install retainer in such a manner that only one corner of the plug is retained (this will permit installation of remaining valves).

7) Install 3–4 governor valve and spring into valve bore (flat end first), then install 3–4 valve bore plug against 3–4 governor valve, compressing plug against spring tension into bore and position retainer again so that edge of plug is secured and the adjacent bore hole is unobstructed by retainer.

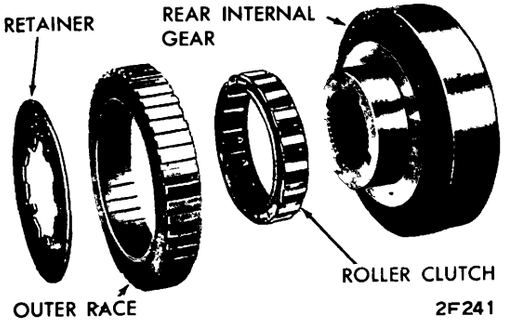
8) Install 2–3 governor valve into 2–3 shift valve bore, then install bore plug in 2–3 bore, compressing the valve against spring pressure and position multiple retainer, making sure remaining bore is unobstructed. Install 3–2 downshift valve (land end first) into remaining bore, then place 3–2 downshift spring over 3–2 downshift valve. Compress spring and secure with multiple retainer.

►*SPRAG CLUTCH OR ROLLER CLUTCH NOTE: Eith r type is used in production. For "Sprag Clutch" s 1961 Final, Page 483.*

REAR INTERNAL GEAR & ROLLER CLUTCH: Disassembly – Remove roller clutch and outer race from rear internal gear, then carefully remove roller clutch assembly from outer race. Remove rollers and energizing springs from cage.

Inspection: Inspect rollers for pitting, scratches, pickup, galling or flat spots. Inspect springs for distortion, cracks, permanent set or loss of tension. Inspect outer race for pitting, scratches, cracks, galling or broken ramp corners. Inspect cage for bent or broken struts, broken or distorted corners or teeth.

Reassembly: Install release springs on cage struts with upper tab on springs pointing in same direction as teeth or stops on race. *NOTE – Be sure center spring tab snaps securely over strut to retain the spring.* Install rollers into cage between springs in such a way that the upper tab on the spring fits over rollers. Carefully install roller clutch assembly into outer race so that rollers do not pop out. *NOTE – Teeth or stops on cage should align with ramps in outer race.* Place outer race and roller clutch assembly on bench with word "front" on roller clutch cage facing bench, then twist internal gear counterclockwise into roller clutch assembly.



ROLLER TYPE ONE-WAY CLUTCH

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC

Oldsmobile F–85 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE: A serial number prefix stamped on serial number plate located n left side of transmission case identifies the various transmissions as indicated in table below.*

Car Model	Serial Number Prefix
F–85 (2–Bbl. Carb.)	O–562
F–85 (4–Bbl. Carb.)	OD–562
F–85 (4–Bbl. Carb. with console)	OE–562

►*TOWING HYDRA–MATIC DRIVE CARS:* Car may be towed at speeds up to 30 MPH if there is nothing wrong with transmission. When towing at speeds above 30 MPH or if transmission is known to be out of order, disconnect propeller shaft from transmission.

►*PUSHING CAR TO START ENGINE NOTE: It is not possible to start engine in this manner.*

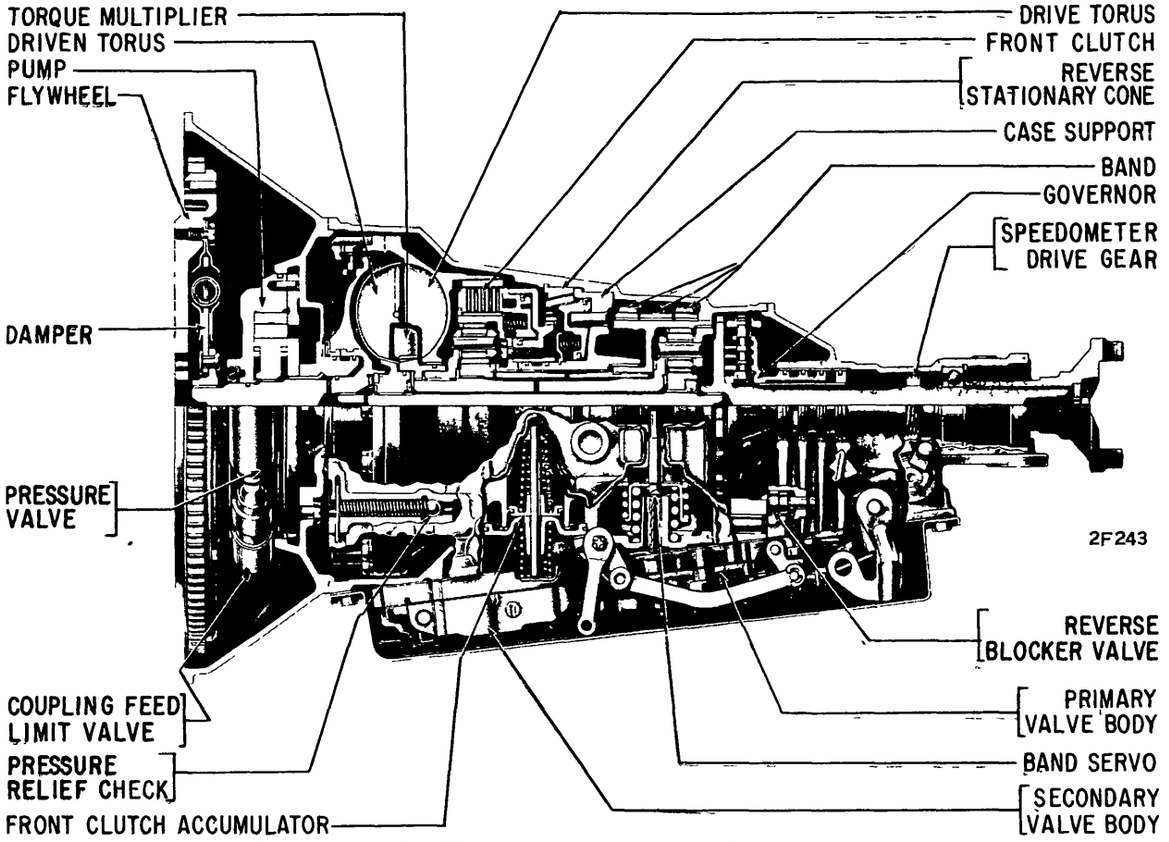
DESCRIPTION: "Split Torque" type 3–speed (4–stage) hydraulically controlled automatic planetary transmission and torque converter (fluid coupling and torque multiplier) of same design as used on previous models.

OPERATION: Neutral Range - Engine torque is transmitted through torus cover to drive torus member causing it to rotate driven torus and turn mainshaft and rear unit sun gear in direction of engine rotation. In neutral, the band is released and allows rear unit internal gear to turn. As rear unit sun gear turns in direction of engine rotation, rear unit pinions turn in opposite direction, driving rear internal gear opposite engine rotation. The front unit sun gear being mechanically connected to rear internal gear is also turning opposite engine rotation causing front unit pinions to turn in direction of engine rotation, driving front internal gear in same direction. With both rear unit internal gear and front unit internal gear spinning freely, there is no transfer of torque from front or rear units to carriers or output shaft.

First Stage: Engine torque is transmitted through torus cover to torus drive member then through oil to torus driven member which redirects it through the stator (torque multiplier) and back to driven member. This action multiplies the engine torque and applies to mainshaft and rear unit sun gear. The band is applied locking rear unit internal gear stationary causing output shaft to rotate in direction of engine rotation within the internal gear at a reduced speed and with increased torque. As rear carrier and output shaft rotate clockwise at reduced speed the front carrier, which is mechanically connected to rear carrier, also rotates in direction of engine rotation at a reduced speed. As the band is holding front unit sun gear stationary, the carrier and pinions rotate front unit internal gear in direction of engine rotation at approximately one-half engine speed.

Second Stage: As car speed increases, power from engine is transmitted to output shaft in same manner as for "First Stage" (above), except that oil in torque converter is not redirected by torque multiplier, causing torque converter to function as a fluid coupling.

Third Stag : Engine torque is transmitted through torus cover to torus drive member. The front clutch is applied and coupling is empty so engine torque is mechanically applied to front unit internal gear. Front unit sun gear is splined to rear unit internal gear and is prevented from turning opposite engine rotation when band is applied. Engine torque at front internal gear is then applied to pinions, and because sun gear cannot rotate opposite engine rotation then planet pinions and carrier are compelled to revolve in direction of engine rotation around the sun gear in reduction. Front carrier is splined to rear unit carrier and shaft assembly which in turn is bolted directly to output shaft.



OLDSMOBILE F-85 3-SPEED HYDRA-MATIC TRANSMISSION SECTIONAL VIEW

Fourth Stage: Engine torque is transmitted through torus cover and is applied through front clutch to front unit internal gear. Front unit internal gear, through pinions, tends to turn front sun gear opposite engine rotation. This would cause front carrier to run in direction of engine rotation, in reduction. The rear carrier, then must also attempt to rotate in direction of engine rotation, in reduction. With rear carrier rotating opposite engine rotation in reduction, and rear unit internal gear tending to turn in opposite direction, the rear unit pinions attempt to rotate in direction of engine rotation on their pins, thus driving rear unit sun gear and driven torus in direction of engine rotation faster than engine speed. As the fluid coupling is filled, coupling driven member and rear unit sun gear cannot revolve faster than drive torus which turns at engine speed. Therefore rear unit sun gear is slowed down to approximately engine speed. In so doing, rear unit pinions are slowed down in their rotation on pinion pins. Carriers and pinions then change direction of load against internal gear causing it to revolve in direction of engine rotation with carrier and sun gear at the same speed. Because output shaft and carriers are connected to the stator (torque multiplier) in the coupling, the torque multiplier is also turning at same speed as drive and driven members so that it has no effect in multiplying torque in coupling, causing the entire train to rotate as one common unit.

Reverse: Engine torque is applied to mainshaft in same manner as in "First Speed" above. Rear unit sun gear then drives rear unit pinions as idlers which in turn drive rear unit internal gear in a direction opposite to engine rotation. With rear unit internal gear turning opposite engine rotation, front unit sun gear is turning in same direction. The reverse cone which is applied holds front unit internal gear stationary so that front unit pinions and carriers are compelled to walk around front internal gear in a direction opposite to engine rotation, and in reduction. The output shaft being connected to

CONTINUED ON NEXT PAGE

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC (Continued)

front and rear unit carrier is also turning in a direction opposite engine rotation, and in reduction.

LUBRICATION

LUBRICATION INTERVALS: Check fluid every 2000 miles. Drain and refill every 24,000 miles.

Recommend d Lubricant: Use only Automatic Transmission Fluid Type "A" (Suffix "A").

CHECKING FLUID LEVEL: With car on a level floor, transmission at normal operating temperature and selector lever in "P" (Park) position, check fluid level on dipstick. Add recommended fluid as necessary to bring level to FULL mark on dipstick. *NOTE - 1 pint of fluid is required to bring level from ADD mark to FULL mark. DO NOT OVERFILL.*

DRAINING & REFILLING: Remove drain plug from transmission oil pan and drain fluid, then replace plug. Remove dipstick and add 3½ qts. of recommended fluid, then with selector lever in "P" (Park) position and car on a level floor, start engine. With engine running, add sufficient fluid to bring level to FULL mark on dipstick. *CAUTION - Do not overfill.*

Capacity: Approximately 4 qts. (after drain); 5 qts. (after removal of pan); 7 qts. (after overhaul).

LINKAGE ADJUSTMENT

THROTTLE LINKAGE ADJUSTMENT: *See "Carburetor" on car mod l pag .*

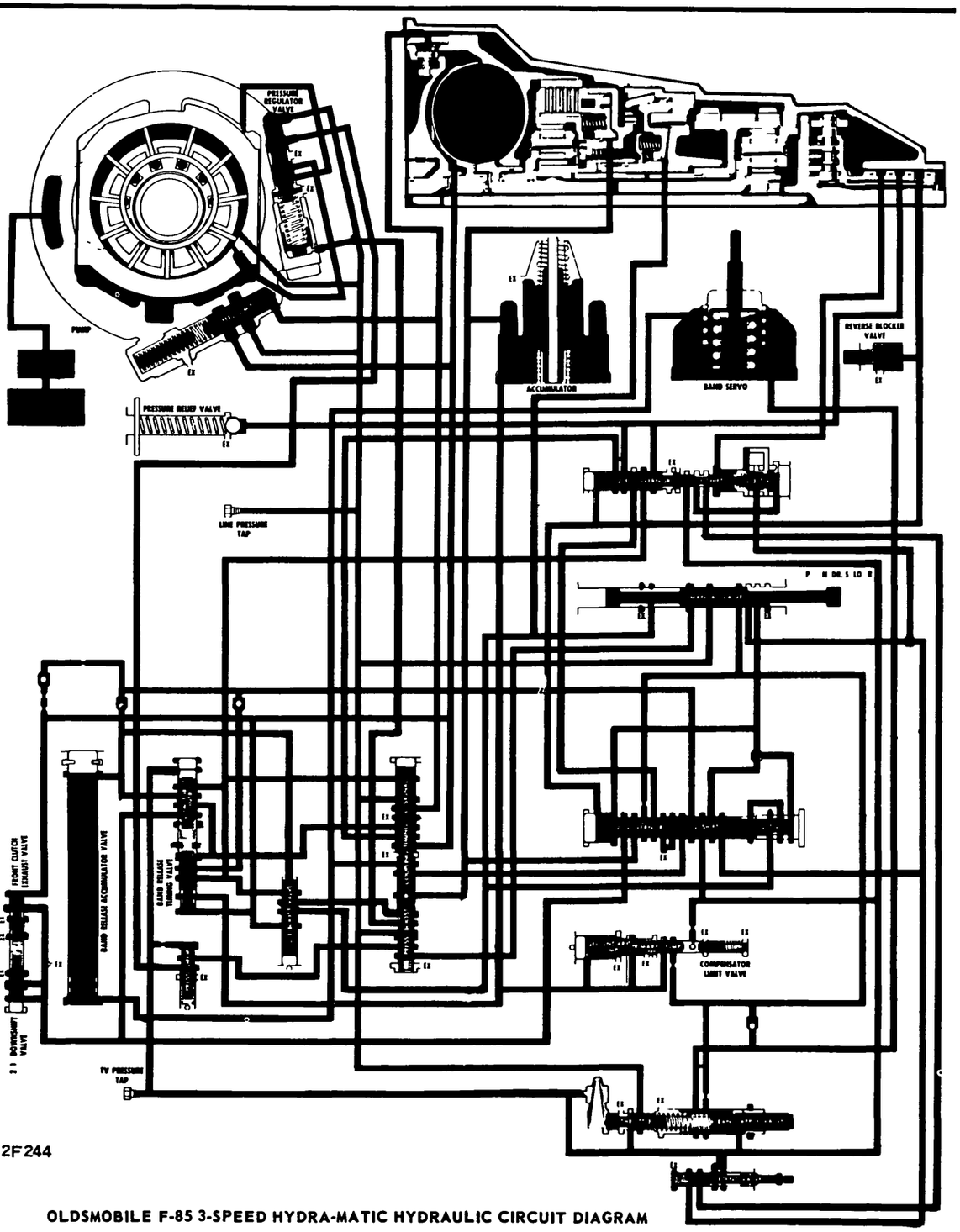
THROTTLE VALVE LEVER (ON TRANSMISSION) ADJUSTMENT: Remove lower throttle valve rod from throttle valve lever and place pin of Throttle Valve Lever Gauge, BT-33-2 in threaded hole in case (located in boss on left side of transmission case at forward end). If hole in lever does not align WITHIN the hole in gauge, bend throttle valve lever as necessary with Bending Tool, BT-33-7 to align center of hole WITHIN gauge hole.

MANUAL LINKAGE ADJUSTMENT (Steering Column & Floor Mounted Selector Levers): Place selector lever in "N" (Neutral) position, then loosen front and rear locknuts at manual lever on transmission. Hold manual rod so that shift lever is positioned against the stop. Tighten rear locknut until it just contacts swivel, then tighten two more turns. Tighten front locknut.

BAND ADJUSTMENT: Adjust every 26,000 miles. Remove oil pan and cleaner and loosen adjusting screw locknut. Use an inch pound torque wrench and Tool J-8591 and tighten adjusting screw to 20 inch pounds. Loosen screw two complete turns and hold while tightening locknut. Tighten locknut to 18-20 ft. lbs.

THROTTLE STOPSCREW ADJUSTMENT: *NOTE - This adjustment is required whenever channel body and throttle body have been separated or either has been replaced.* Disconnect throttle valve rod from outer throttle valve lever on transmission, then insert Tool BT-33-6 between throttle valve plunger and throttle valve lever by pushing plunger into its bore and holding the lever rearward. Adjust stopscrew against lever

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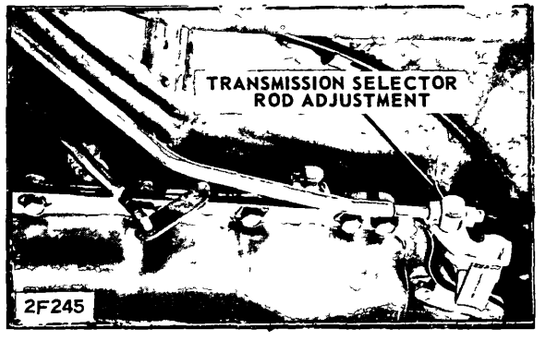
OLDSMOBILE F-85 3-SPEED HYDRA-MATIC HYDRAULIC CIRCUIT DIAGRAM

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC (C ntinued)

until throttle valve plunger bottoms in its bore, **then back stopscrew out only enough to permit removal of gauge.**

NEUTRAL SAFETY SWITCH ADJUSTMENT (Steering Column Mounted Selector Lever): Loosen switch attaching screws on mast jacket, then with selector lever in "N" (Neutral), position switch so that a .090" pin can be inserted through hole in switch arm and into hole in face of switch. Tighten switch attaching screws and remove pin. Check to make sure starter is not operative in any selector lever position except "N" (Neutral) and "P" (Park).

Floor Mounted (Console) Selector Lever: Remove console, then loosen switch attaching screws. With selector lever in "N" (Neutral), position switch so that a .090" gauge pin can be inserted through hole in switch arm and hole in face of switch. Tighten switch attaching screws and remove pin. Check to make sure starter is not operative in any selector lever position except "N" (Neutral) or "P" (Park).



MANUAL SELECTOR LINKAGE

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. See "Shift Speed Tables" below for correct shift speeds under different operating conditions.

►*CAUTION: Do not stall test transmission under any conditions.*

OIL PRESSURE TEST: Main Line Pressure - Connect a 300 lbs. pressure gauge to main line passage in case (remove plug in side of case just forward of outer throttle valve lever). With engine at normal operating temperature, engine idling at 500 RPM and parking brake applied, pressure should be 60-125 lbs. in all transmission ranges. Pressure should not vary more than 10 lbs. between ranges. With pressure gauge connected, operate car on road. Pressures should be as indicated in table below.

Operating Pressure Test

Selector Lever Position	Shift	℄ Pressure
Dr., S., L., Rev.	1st	118-175 lbs.
S (30 MPH)	2nd	98-111 lbs.
Dr. (Zero Throttle, 30 MPH)	3rd	68-78 lbs.

℄ - A drop in pressure of approximately 10 lbs. as each shift is made is normal, but gauge reading should stabilize after each shift is made.

SHIFT SPEED TABLES

	2–3	CAR SPEED	3–4
UPSHIFTS			
Drive Rang			
Min. Throttle	12-15 MPH		17-24 MPH
Max. Throttle	24-30 MPH		58-65 MPH
Super Range			
Min. Throttle	12-15 MPH		60-68 MPH
Max. Throttle	24-30 MPH		60-68 MPH
Lo Range			
Min. Throttle	℄		℄
Max. Throttle	60-68 MPH		60-68 MPH
DOWNSHIFTS			
Drive Range	**4–3**	**CAR SPEED**	**3–2**
Medium Throttle	30-16 MPH		12-8 MPH
Part Throttle	30-16 MPH		None
Detent	58-50 MPH		22-8 MPH
Super Range			
Medium Throttle	58-50 MPH		12-8 MPH
Part Throttle	58-50 MPH		None
Detent	58-50 MPH		22-8 MPH
Lo Range			
Medium Throttle	58-50 MPH		28-22 MPH
Part Throttle	58-50 MPH		28-22 MPH
Detent	58-50 MPH		28-22 MPH

℄ - Not possible.

TROUBLE SHOOTING & DIAGNOSIS

NO DRIVE IN DRIVE RANGE: Check for low oil level or low pressure. Manual linkage out of adjustment. Sticking valve in control valve assembly. Band not applying. Check for internal leakage. Check for restricted passage with air pressure. Coupling not filling.

MISSING ALL SHIFTS: Sticking governor valve. Sticking valve in control valve assembly. Clutch not applying.

DRIVE IN THIRD & FOURTH ONLY: Sticking valve in control valve assembly. Clutch is locked (too many plates).

DRIVE IN THIRD & FOURTH ONLY (This may be reported as a 2–3 Slip): Sticking valve in control valve assembly. Coupling not emptying.

DRIVE IN SECOND & FOURTH ONLY: Governor "G–2" valve sticking. Sticking valve in control valve assembly.

DRIVE IN FOURTH ONLY: Sticking valve in control valve assembly. Band not applying. Sticking governor valve.

DRIVE IN NEUTRAL (REVERSE OR FORWARD): Internal manual linkage engaging. Neutral clutch mispositioned. Reverse cone clutch not applying.

NO REVERSE: Internal manual linkage mispositioned. Low oil pressure. Reverse cone clutch not engaging. Restricted passage. Band not releasing.

ROUGH 2–3 UPSHIFT: Throttle valve linkage not adjusted properly. Sticking valves in control valve assembly. Sticking parts in accumulator. Coupling not emptying fast enough. Front clutch slipping. 2–3 oil passage restricted.

ROUGH 3–4 UPSHIFT: Band not releasing fast enough. Sticking parts in servo.

SLIPPING IN ALL STAGES: Low oil pressure.

SLIPPING 2–3 UPSHIFT: Throttle valve linkage too long. Low oil pressure. Check for restricted or sticking parts in accumulator. Sticking valves in control valve assembly. Band slipping. Check number of plates in front clutch. 2–3 oil passage restricted.

SLIPPING 3–4 UPSHIFT: Sticking valves in control valve assembly. Coupling not filling fast enough.

NO ENGINE BRAKING IN INTERMEDIATE OR LOW RANGE: Sticking valves in control valve assembly. Band slipping or servo not applying.

NO PART THROTTLE OR DETENT DOWNSHIFT: Throttle valve linkage too long. Sticking valves in control valve assembly. Accelerator travel too short. Governor valves sticking.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Internal manual linkage mispositioned. Reverse blocker valve stuck open. Governor "G-2" valve stuck open.

SELECTOR LEVER WILL NOT GO INTO PARK: Parking linkage broken, improperly assembled or distorted. Manual linkage not properly adjusted.

FORWARD DRIVE IN REVERSE: Internal manual linkage improperly assembled or distorted.

HIGH UPSHIFTS: Throttle valve linkage too short. Sticking valve in control valve assembly or in governor. Throttle valve lever bent. Throttle valve pressure too high. Line pressure too high. Governor oil passage restricted.

LOW UPSHIFTS: Throttle valve linkage too long. Control valve assembly or governor valves sticking. Throttle lever bent. Throttle valve or line pressure too low. Governor passages restricted.

HANGING IN THIRD OR ENGINE STALL UPON STOP: Control valve assembly or governor valves sticking. Throttle valve linkage too short. Clutch not releasing.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: Install Engine Support Tool J-8974, then remove oil filler tube and breather tube. Disconnect propeller shaft, shift and throttle linkage, cooler lines and speedometer cable. Remove exhaust pipe and transmission rear support bar, then place transmission lift in position and remove transmission to engine bolts.

Installation: Reverse removal procedures and note the following: Lubricate threads of transmission-to-engine block bolts with Lubricant, Part No. 980131 and tighten to 30-35 ft. lbs.

TRANSMISSION OVERHAUL

OVERHAUL: *See 1961 Final, Page 488, and not th following:*

Control Valve: Disassembly (Compl te C ntr l Valv): Place control valve assembly on a clean surface with channel plate–to–case spacer down, and the rear throttle valve lever located on lower left hand corner. Remove the one retaining screw from each valve body, then turn control valve assembly over so rear throttle valve lever is located in upper left hand corner. Remove three screws retaining channel plate–to–case spacer plate and remove spacer plate. Remove two large and two small ball checks from channel plate, and three channel plate–to–valve body attaching screws. Remove manual valve from primary valve body, then remove channel plate and rear throttle valve lever from valve bodies. Remove the three ball checks, then remove channel plate–to–valve body spacer. Remove sleeve, detent valve and spring from primary valve body. *NOTE – To remov throttl valv l ver fr m channel plate, remove the "E" ring.*

Primary Valve B dy Disass mbly – 1) Remove band apply valve bushing retainer, then remove band apply valve and bushing from throttle valve bore. Remove

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OLDSMOBILE F-85 3-SPEED HYDRA-MATIC (C ntinu d)

band apply valve spring, throttle valve spring and valve. Remove retaining pin from 2–3 valve bore while holding 2–3 throttle valve bushing, then remove 2–3 throttle valve bushing, 2–3 throttle valve and spring, and the 2–3 shift valve.

2) Remove 3–4 bore plug retainer and bore plug, then remove 3–4 throttle valve bushing and 3–4 throttle valve. Remove 3–4 throttle valve from bushing. Remove 3–4 shift valve and spring.

3) Remove bore plug retainer and bore plug from other end of 3–4 shift valve bore, then remove 3–4 shift valve spring and governor valve. Remove bore plug retaining pin and bore plug from 2–3 valve bore and remove 2–3 shift valve spring. Remove 2–3 governor valve.

4) Remove bore plug retaining pin from compensator bore while holding the bore plug, then remove compensator bore plug and secondary compensator valve and spring. Remove primary compensator valve and spring. Remove compensator limit valve retainer pin by compressing limit valve spring with a brass rod, then remove compensator limit valve and spring. *CAUTION – D n t disturb th rmostatic throttle valve element adjusting scr w.* Remove throttle valve element clip and element.

Primary Valv B dy R ass mbly – 1) Install compensator limit valve spring and valve, then install retaining pin by compressing limit valve spring with a brass rod.

2) Install primary compensator valve (land end first) and spring, then install secondary compensator spring and valve (small end first). Install compensator bore plug and retaining pin.

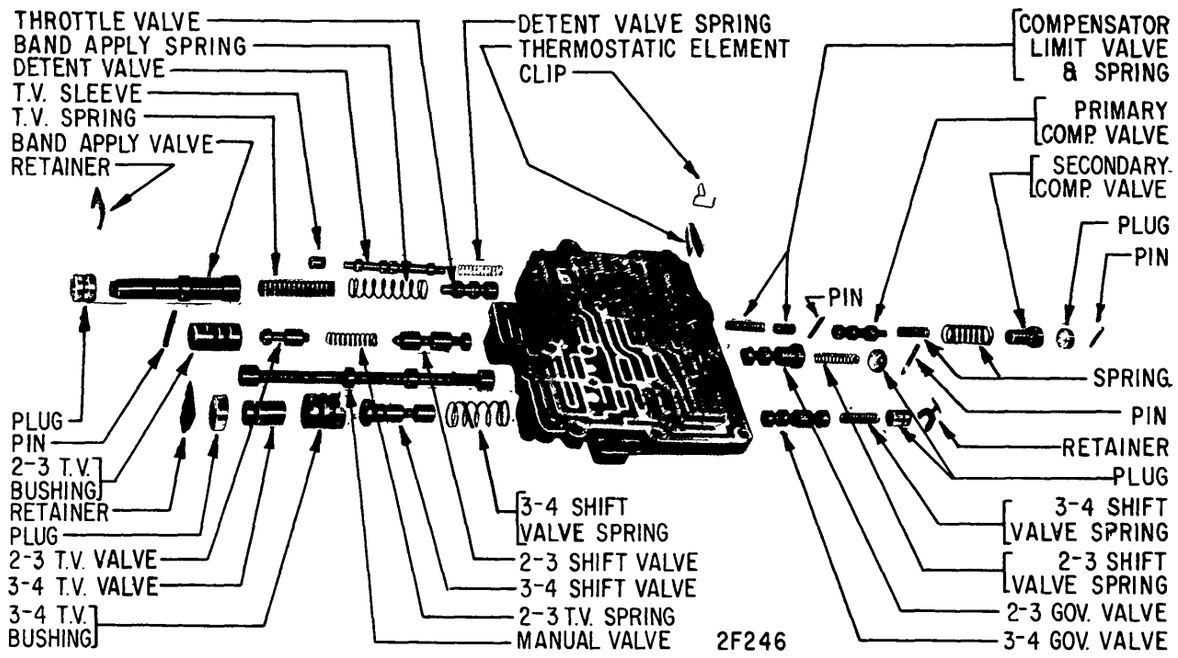
3) Install 3–4 governor valve, shift valve spring and bore plug, then install retaining pin. Install 3–4 rear shift valve spring and shift valve into other end of 3–4 shift valve bore. Install 3–4 throttle valve in the 3–4 throttle valve bushing so that it completely enters bushing, then install valve and bushing, bore plug, and retainer.

4) Install 2–3 shift valve (small end first) in 2–3 bore. Install 2–3 throttle valve spring, then install 2–3 throttle valve into 2–3 throttle valve bushing (land end first), and install 2–3 throttle valve and bushing. Install retaining pin while holding springs compressed.

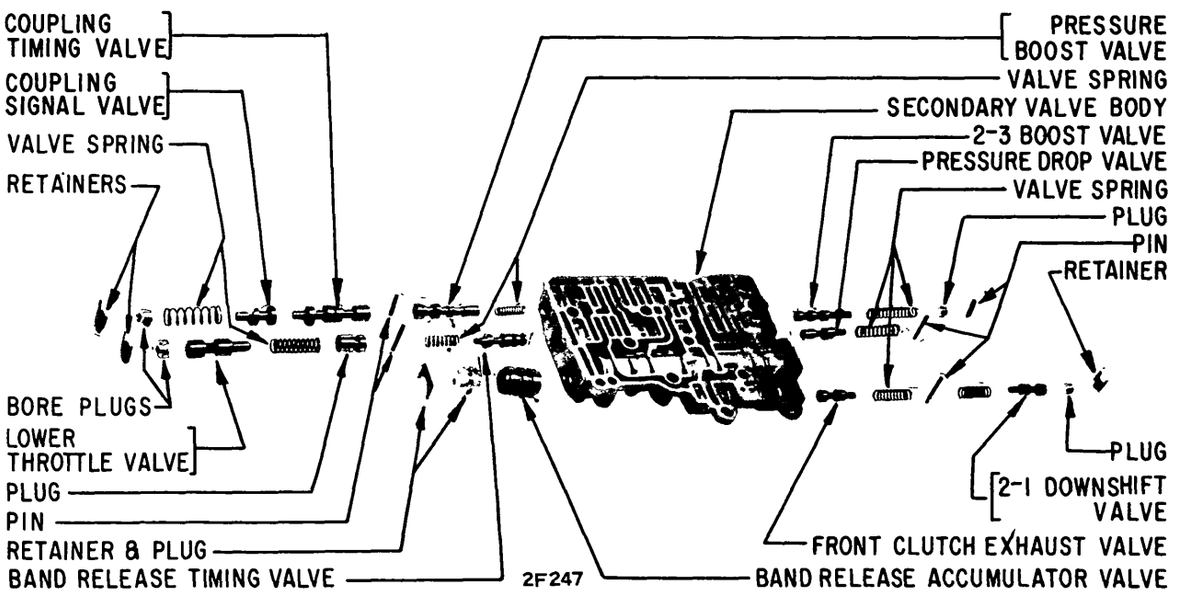
5) Install throttle valve (stem end out) in throttle valve bore. Install band apply valve spring and throttle valve spring, then install band apply valve (spring pocket first). Install band apply valve bushing on band apply valve, then install band apply valve retainer while holding valve and bushing compressed. Install throttle valve element and clip. *NOTE – Do not install manual valve and det nt valve train at this time.*

Secondary Valv B dy Disassembly & Reassembly – Same as for previous models except that 2–3 Boost Valve parts are now referred to as 3–4 Boost Valve parts; and the 2–1 Downshift Valve and Spring is now referred to as the 3–2 Downshift Valve and Spring. See *"S c ndary Valve B dy Assembly" illustration.*

Contr l Valv : Reass mbly (Complete Control Valve): Reverse disassembly procedure and note the following: Manual valve must be installed so that land with hole is outward. To align primary valve body to channel plate, insert a ¼" drill through one of the attaching holes, then tighten countersunk flathead screw.



PRIMARY VALVE BODY ASSEMBLY



SECONDARY VALVE BODY ASSEMBLY

PONTIAC TEMPEST TRANSAXLE

Pontiac Tempest (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*PUSHING CAR TO START ENGINE (AUTOMATIC TRANSMISSION):* Place transmission selector lever in "N" (Neutral) until car reaches 25 MPH, then move selector lever to "L" (Low) until engine starts.

►*TOWING AUTOMATIC TRANSMISSION CARS:* With transmission selector lever in "N" (Neutral) car may be towed at speeds not to exceed 30 MPH. If transmission is not operating properly, raise rear wheels off ground to tow car.

DESCRIPTION

DESCRIPTION: The Transaxle assembly consists of either an integral differential (rear axle) unit and synchro-mesh transmission; or a differential (rear axle) unit and an automatic type transmission as follows:

Differential (Rear Axle) Assembly: Straddle mounted hypoid gear design which is contained in a separate housing attached directly to transmission case. On cars with automatic transmission, the torque converter is located to rear of differential housing with transmission input and output shafts running axially through differential pinion shaft. Each axle shaft is independently suspended and is free to move in a vertical plane in an arc. Axle shafts are attached to universal joints which are splined into differential side gears.

Axle Ratios - *NOTE - Axle ratio stamped on right side of carrier housing on flat surface next to side cover.* 3.08-1 (37-12), 3.31-1 (43-13), 3.55-1 (39-11), 3.73-1 (41-11), 3.90-1 (39-10).

Synchro-mesh Transmission: 3-Speed & 4-Speed synchro-mesh types integral with rear axle differential carrier. **Transmission Ratios (3-Speed)** - 2.94-1 (1st Speed), 1.68-1 (2nd Speed), 1.00-1 (3rd Speed), 3.32-1 (Reverse). **Transmission Ratios (4-Speed)** - 3.65-1 (1st Speed), 2.35-1 (2nd Speed), 1.44-1 (3rd Speed), 1.00-1 (4th Speed), 3.66-1 (Reverse).

Automatic Transmission: Three element torque converter and a hydraulically operated two-speed type automatic shift transmission which is integral with rear axle differential carrier. Engine torque is transmitted through converter pump shaft (located within hollow turbine shaft) to torque converter turbine, then back to transmission through the hollow turbine shaft (located within hollow differential driven pinion shaft). Transmission output shaft is splined directly to differential drive pinion shaft.

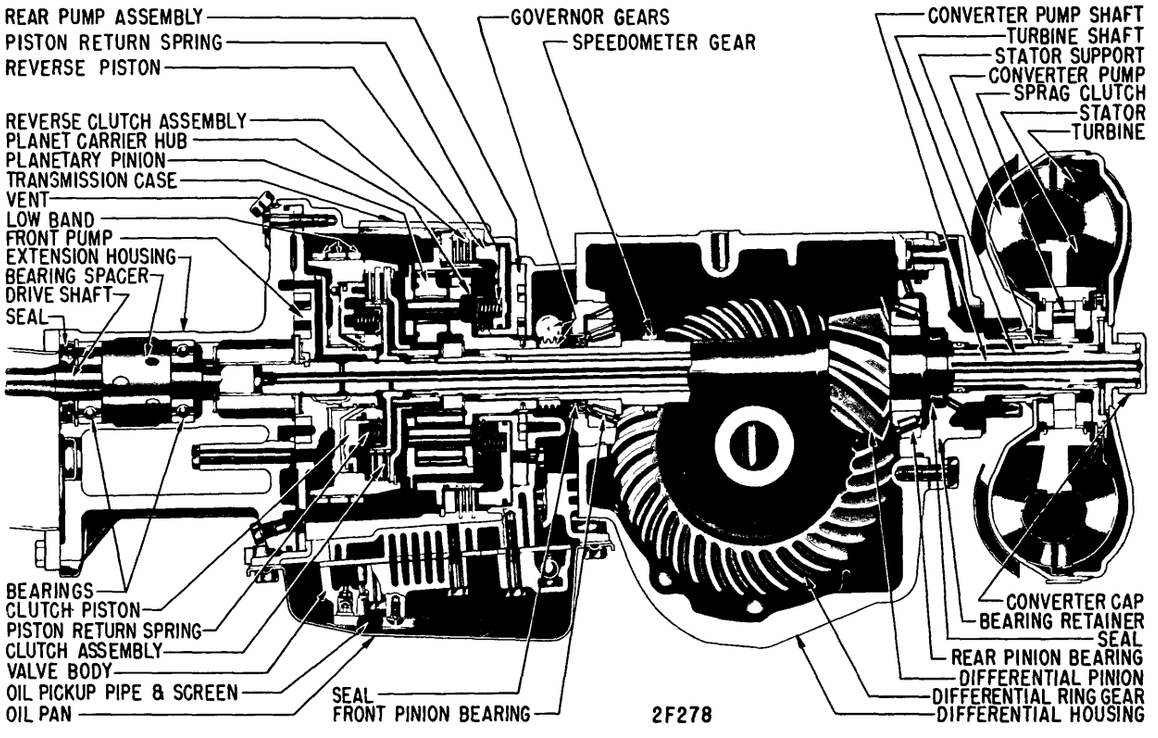
LUBRICATION

Check fluid level in all units every 4,000 miles.

►*AUTOMATIC TRANSMISSION NOTE: Draining and refilling of automatic transmission is not recommended except at time of overhaul.*

Recommended Oil (Rear Axle & Synchro-mesh Trans.) - SAE 80 or SAE 90 "Multi-Purpose" gear lubricant. *CAUTION - Do not use straight mineral oil gear lubricants or lubricants containing active sulphur soap.* Differential carrier and synchro-mesh transmission are connected by internal passages.

Automatic Transmission - Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic Transmission is sealed off from differential carrier.*



PONTIAC TEMPEST TRANSAXLE (WITH AUTOMATIC TRANSMISSION)

Checking Fluid Level: Rear Axle & Synchro-mesh Transmission - With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential case, also check level in transmission housing. *NOTE - With unit at operating temperature, fluid should be level with bottom of filler plug hole.*

Automatic Transmission - With transmission at normal operating temperature and transmission selector lever in "N" (Neutral) position, engine idling, check fluid level on dipstick in filler tube located under a plate in right-front of luggage compartment. Add recommended fluid as necessary to bring level to "Full" mark on dipstick. Approximately one pint of oil is required to raise level from "Add" to "Full".

Draining & Refilling: Rear Axle & Synchro-mesh Transmission - *NOTE - Not recommended except at time of overhaul or repair.*

Capacity - 2.8 pints (3-Speed Transmission), 3.75 pints (4-Speed Transmission), 3 pints (Differential).

Automatic Transmission - *NOTE - Not recommended except at time of transmission overhaul.* Drain oil by loosening filler tube attaching nut in oil pan. To refill, tighten filler tube nut and add 4 pints of recommended fluid using fillet tube and funnel. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark.

Capacity - 6 pts. (after draining). 12 pts. (after overhaul).

ADJUSTMENT

Transmission Throttle Linkage (Automatic Trans.): *See CARBURETOR on Car Mod l pag .*

Manual Linkage (Automatic Trans.): Drain transmission oil and remove oil pan. Place selector lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body. With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so Tool J-8365 is held in a horizontal position. Recheck adjustment. Install oil pan and fill transmission with fluid.

Neutral Starter Switch Adjustment (Aut matic Trans.): Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to start position, then move neutral switch fore and aft until engine cranking begins. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral). *NOTE - N utral switch is located n rear of gearshift c ntrol and indicat r ass mbly.*

Low Band: *NOTE - Periodic adjustm nt is not rec m-*

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PONTIAC TEMPEST TRANSAXLE (C ntinued)

m nd d, h w ver, if n c ssary, proceed as follows: Lower transmission for access to adjusting screw, then loosen locknut and tighten screw to 40±5 inch lbs. torque, **then back off f ur full turns exactly.** Hold adjusting screw stationary and tighten locknut.

TROUBLE SHOOTING
(AUTOMATIC TRANSMISSION)

NO DRIVE IN ANY SELECTOR LEVER POSITION (CANNOT LOAD ENGINE): Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming ball not seating.

ENGINE SPEED FLARES ON STANDSTILL STARTS BUT ACCELERATION LAGS: Low band only partially applied caused by one or more of the following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief ball not seating. Vacuum modulator hose collapsed.

TRANSMISSION WILL NOT UPSHIFT: Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.

HARSH UPSHIFT: Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE HARSH DOWNSHIFT: Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body.

CAR CREEPS EXCESSIVELY IN DRIVE: Idle speed too high.

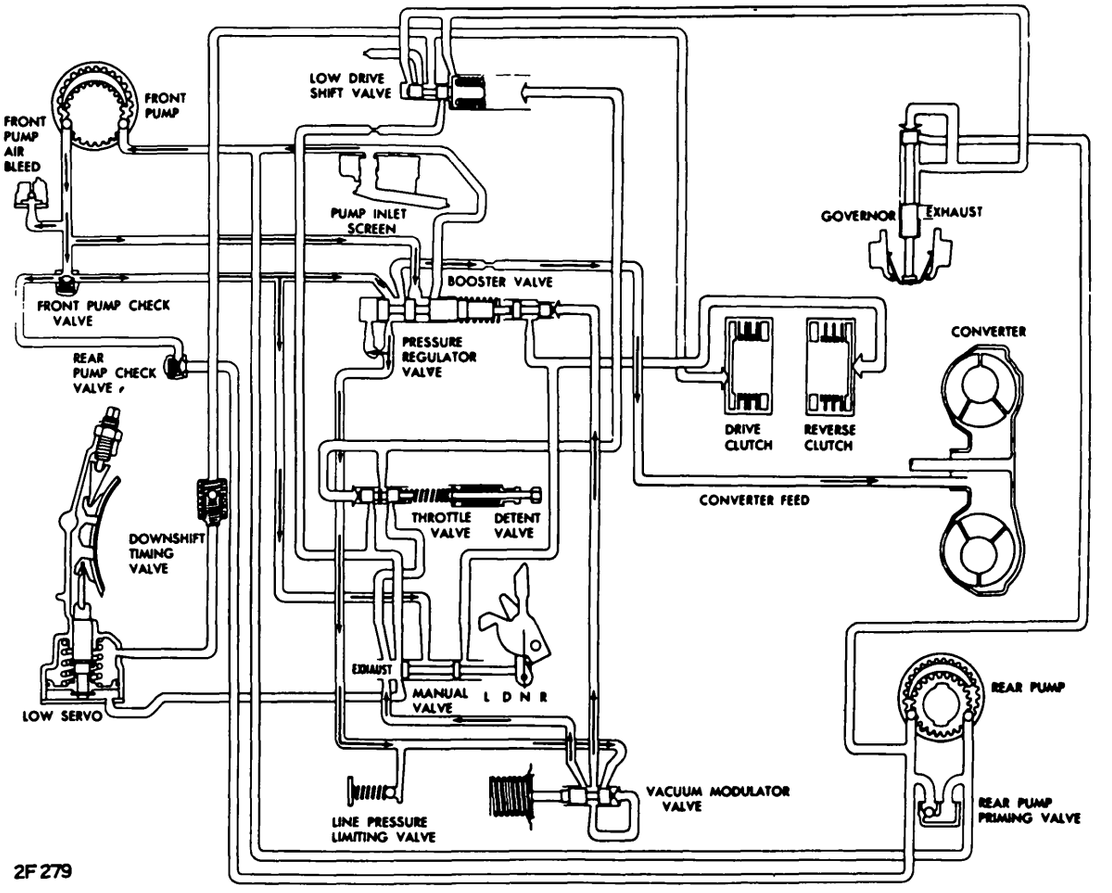
CAR CREEPS IN NEUTRAL: Incorrect manual valve lever adjustment. High clutch or low band not released.

NO DRIVE IN REVERSE: Manual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

IMPROPER SHIFT POINTS (s "Shift Sp d" tabl bel w): Incorrect accelerator control linkage adjustment. Throttle valve incorrectly adjusted. Governor defective. Rear pump priming ball stuck.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Oil pickup pipe split or not sealed causing air entrainment.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.



PONTIAC TEMPEST AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

TESTING
(AUTOMATIC TRANSMISSION)

►*TESTING NOTE: Transmission must be at normal operating temperature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.*

ROAD TEST: Road test car to determine transmission shift points as indicated in table below.

Transmission Shift Speeds

UPSHIFTS	℄MPH 4 Cyl.	V8
Minimum Throttle	12-15	17-21
Full Throttle	43-50	49-55
Part Throttle (Detent Touch)	35-45	40-49

DOWNSHIFTS	℄MPH 4 Cyl.	V8
Closed Throttle	9-15	14-18
Full Throttle	39-46	45-51
Part Throttle (Detent Touch)	21-33	28-37

℄ - With 3.55-1 ratio rear axle. *NOTE - To convert for other axle ratios, multiply MPH x 3.55 and divide result by desired ratio.*

PRESSURE TESTS: *NOTE - Pressure tests can be made by raising rear wheels 3-5" off floor on jack stands.*

Front Pump: Remove pipe plug located at 6 o'clock position in front face of transmission extension housing and connect pressure gauge. With engine at idle speed (approximately 16" of vacuum), pressures should be as indicated in table below. Disconnect vacuum hose at modulator, then with engine at idle speed, check pressures again (see table below). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft or missing plug from front end of converter pump shaft. Moderately low front pump pressure in all ranges indicate a restricted

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PONTIAC TEMPEST TRANSAXLE (C ntinu d)

front pump inlet. Failure of pressure to rise when vacuum hose disconnected (or high pressure with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.

Rear Pump: With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D" (Drive) and accelerate engine. Front pump pressure should drop to approximately 0-5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged or rear pump check ball is not seating.

Front Pump Pressures (At Indicated Engine Speed)

	Idle Speed ℂ		1000 RPM ℂ	
Shift Lever Position	**4 Cyl.**	**V8**	**4 Cyl.**	**V8**
Reverse	106-130	110-139	198-222	202-231
Neutral	55-67	59-73	101-114	105-120
Drive	55-67	59-73	101-114	105-120
Low	124-137	130-151	124-137	130-151

ℂ - At 16" Hg. Vacuum.
℃ - With vacuum hose disconnected.

Throttle Valve: Remove plug located at 8 o'clock position in front face of transmission extension housing and connect pressure gauge. Disconnect throttle valve at carburetor and vacuum hose at vacuum modulator, then with engine at idle speed, depress accelerator to wide open position. *NOTE - By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressure should be as follows with selector lever in indicated range. **Reverse** - 0 lbs. **Neutral** - 0 lbs. **Drive** - 50-52 lbs. (4 Cyl.); 48-50 lbs. (V8). **Low** - 119-132 lbs. (4 Cyl.); 125-146 lbs. (V8). If pressures not as specified, they can be corrected by adjusting position of jam nut located on end of detent valve assembly (inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut (one full turn is equal to 3 psi.). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

►*AXLE FLANGE RUNOUT NOTE: Flange runout should not exceed .010" when checked just outside wheel bolts.*

AXLE SHAFT: Removal - Remove wheel and brake drum, then remove axle bearing retainer-to-brake backing plate attaching nuts (accessible through hole in axle shaft flange) and pull backing plate out slightly. Push backing plate back on control arm studs to break plate away from bearing retainer. Remove universal joint-to-rear axle flange U-bolts and pull axle shaft to separate flange from U-bolts. Remove axle shaft with Tool J-8614 and pull axle shaft from lower control arm.

Installation: Insert axle shaft through lower control arm and install flange on axle splines. *NOTE - It may be necessary to lightly tap flange onto splines.* Install and securely tighten axle shaft-to-flange bolt. Attach universal joint to flange on axle shaft with U-bolts and tighten nuts to 14-20 ft. lbs. With bearing retainer and brake backing plate holes aligned with control arm studs, insert universal joint splined yoke through seal at side bearing and index with splines of side gears. *NOTE - Coat lip of seal and splines with hypoid lubricant to prevent damage to seal.* Install nuts securing bearing retainer to backing plate (through access hole in axle flange) and tighten to 30-45 ft. lbs. Install wheel and drums and tighten mounting nuts to 70-85 ft. lbs.

TRANSAXLE (TRANSMISSION & DIFFERENTIAL CARRIER): Removal - Raise car and support transaxle assembly and rear of engine, then drain lubricant from transmission and differential carrier housing *(see "Draining & Refilling").* Remove axle bearing retainer-to-brake backing plate attaching nuts and pull axle shafts out far enough to remove universal joints from differential assembly (cover universal joint splines). Remove propeller shaft damper bearing retainer bolts at both bearings, then remove speedometer driven gear from differential assembly. Disconnect transmission control rods and cables from transmission and remove cables and lines from torque tube. On synchro-mesh cars, remove gearshift lever housing. On cars with V8 engine, remove exhaust crossover pipe. On all cars, remove flywheel cover and torque tube access hole cover, then disconnect propeller shaft from flywheel or clutch drive extension. *CAUTION - Place a rag between shaft and torque tube to protect propeller shaft coating.* Disconnect torque tube from flywheel housing, then disconnect transaxle from rear crossmember (remove two bolts through access hole in trunk or from under car). Remove transaxle, propeller shaft, and torque tube as an assembly.

Installation: With torque tube and propeller shaft installed on transaxle, position the assembly in car and install two bolts securing transaxle assembly to rear crossmember (through access holes in trunk) and tighten to 65-85 ft. lbs. Install propeller shaft on flywheel and secure front flange to flywheel, tightening bolts finger tight. Remove protecting rag or cloth from propeller shaft and secure torque tube to flywheel housing, tightening bolts finger tight. Tighten propeller shaft flange-to-flywheel or clutch drive shaft to 30-35 ft. lbs., then tighten torque tube-to-flywheel housing bolts to 30-45 ft. lbs. Install axle shaft universal joint splines in differential carrier assembly. *NOTE - Coat lip of seal and splines with hypoid lubricant to prevent damage to seal.* Install rear axle bearing retainer in position on brake backing plate and tighten attaching nuts to 30-45 ft. lbs. Tighten universal joint U-bolts 14-20 ft. lbs. *CAUTION - Make sure universal joint snap rings are properly installed.* Install wheel and brake drum assemblies, flywheel cover and torque tube access cover plate. On V8 models, install exhaust crossover pipe. Remove support from transaxle and engine, then install transmission control rods and cables. Install parking brake cable on torque tube and adjust. Install speedometer cable in differential carrier assembly and fill transmission and differential housing with proper lubricant *(see "Lubrication" above).* Idle engine approximately one minute, then tighten propeller shaft bearing bolts to 8-12 ft. lbs.

SYNCHRO-MESH TRANSMISSION: Removal - With transaxle assembly removed from car (see above), remove bolts attaching torque tube to transmission, then remove propeller shaft and torque tube as a unit by pulling on propeller shaft flange. Remove transmission-to-differential carrier attaching bolts and separate transmission from differential carrier.

Installation: Install transmission on differential carrier and tighten attaching bolts. Install propeller shaft and torque tube being careful to engage spline of propeller shaft into transmission and journal diameter into transmission extension bearings so journal surfaces are not damaged.

CAUTION - Check alignment of propeller shaft into transmission extension and, if absolutely necessary tap front flange of propeller shaft lightly with a soft rubber hammer. Be sure splines are completely ngag d in transmission. To complete installation in car, see "Transaxle" above.

AUTOMATIC TRANSMISSION: Rem val - With transaxle removed from car, remove converter cover cap using Tool J-9183 or other suitable "strap wrench" to hold converter. Remove converter retaining ring and converter. *NOTE - Reinstall cap on converter after removal and place cap side down to r tain oil.* Remove bolts attaching torque tube to transmission, then remove propeller shaft and torque tube as a unit by pulling on propeller shaft flange. Remove speedometer driven gear, governor assembly and "0" ring, then pull turbine drive shaft out of transmission. Remove screws retaining transmission to differential carrier and separate transmission from differential carrier.

Installation: *CAUTION - Before conn cting Automatic Transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper thickness thrust washer, install a new gasket to either carrier or rear face of transmission. Align carrier and transmission on a flat surface and carefully guide pump shaft through differential carrier so as not to damage bushing in differential pinion, then engage splines of pinion shaft with planet internal splines in transmission. Install governor and "0" ring seal and secure transmission to carrier with four screws. *NOTE - Drive two screws from carrier side first to minimize chance of cocking mating surface of transmission and carrier.* Tighten screws to 30-35 ft. lbs. Install turbine shaft into converter, then install converter and turbine shaft into transmission, being careful not to damage turbine shaft bushings when sliding over converter pump shaft. *CAUTION - Do not use forc wh n ngaging splines in converter and at end of turbine shaft. Engagement will occur easily if splines are correctly align d* Retain converter with retaining ring, then install converter cap and seal assembly. Tighten to 60-70 ft. lbs. *NOTE - If not previously installed, install modulator valve and vacuum modulator assembly.*

Rear Selective Thrust Washer: Any time repairs are made that require separation of automatic transmission and differential carrier, the proper thickness of thrust washer to be used at front face of governor gear must be determined as follows: Install dial indicator on Support J-8364 and install a 3" indicator extension. Without gasket, place support J-8364 on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator extension tip rests on planet carrier hub. Adjust indicator as required to permit maximum indicator travel, then set dial to zero. *NOTE - Transmission must fac downward when indicator is z roed.* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero Position. *NOTE - If indicator is properly positioned on support, indicator*

CONTINUED ON NEXT PAGE

PONTIAC TEMPEST TRANSAXLE (C ntinu d)

should not deflect more than .050" (one-half turn) when removed; otherwise raise or lower dial indicator on support as required and again "zero" indicator. Place support and dial indicator on governor gear on differential carrier pinion shaft (Support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator needle can be counted. *NOTE - Measurement starts once the needle reaches "zero".* Finally depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear.

►*NOTE: After selected spacers are installed on governor gear, recheck measurement. If spacer stack is correct, indicator r ading will now be between .025-.038". If not, add or remove spacers until reading is within this range.*

T arust Spacer Chart

Indicator R ading	No. R qd.	© Spacer Thickness
.025-.046"	None	
.047-.062"	1	.016"±.001"
.063-.078"	2	.032"±.002"
.079-.094"	3	.048"±.003"
.095-.110"	4	.064"±.004"
.111-.126"	5	.080"±.005"
.127-.142"	6	.096"±.006"
.143-.155"	7	.112"±.007"

© - Spacer, Part No. 6256827 (.016") furnished. Use number indicated in table.

DIFFERENTIAL CARRIER: Removal & Installation - *See instructions above for "Synchro-mesh" or "Automatic" Transmissions.*

OVERHAUL

OVERHAUL: *Se 1961 Final, Page 497 and note the following:*

4-SPEED SYNCHRO-MESH TRANSMISSION

DISASSEMBLY: Transmission Case - 1) Remove front bearing retainer and side cover, then remove plug, detent spring and ball from 3-4 detent channel at left rear of case. Place 3-4 shift fork into fourth gear (fully forward), then drive roll pin from shift fork with a pin punch. Remove 3-4 shift shaft with a drift and remove fork. *NOTE - Shaft can be driven out of case in ith r direction.*

2) Remove plug, spring and detent ball from 1-2 detent channel at front of case, then place shift fork in second gear (fully forward). Remove pin, fork and shaft in same manner as for 3-4 shift fork assembly.

3) Remove snap rings located in clutch gear bore (between clutch gear and bearing, and between clutch gear bearing and case). Install clutch bearing puller J-8880 as follows: Assemble puller plates J-8880-1 onto clutch gear bearing by inserting plates into bearing groove, then secure puller plates together with two screws. Insert adapter plug J-8880-2 into bore of clutch gear, then attach body J-8111-3 to puller plates with two ½"-13 x 2½" screws and two flat washers. Remove clutch gear bearing.

4) Remove two snap rings securing rear mainshaft bearing retainer in place, then remove mainshaft with assembled gears and rear bearing retainer through rear of case. *NOTE - It may be necessary to jiggle output shaft, making sure that clutch gear does not separate from mainshaft.* After removal of mainshaft assembly from transmission, shift synchronizer sleeves to neutral.

5) Drive roll pin from reverse shifter head with a pin punch, then remove shifter head and shaft from case by tapping shaft out in either direction. Drive out reverse idler gear and reverse shifter fork shafts from case by driving rearward with a drift (do not lose woodruff key used in reverse idler gear shaft). Remove idler gear and reverse shifter fork from case. Lift reverse shifter lever off its pin in case.

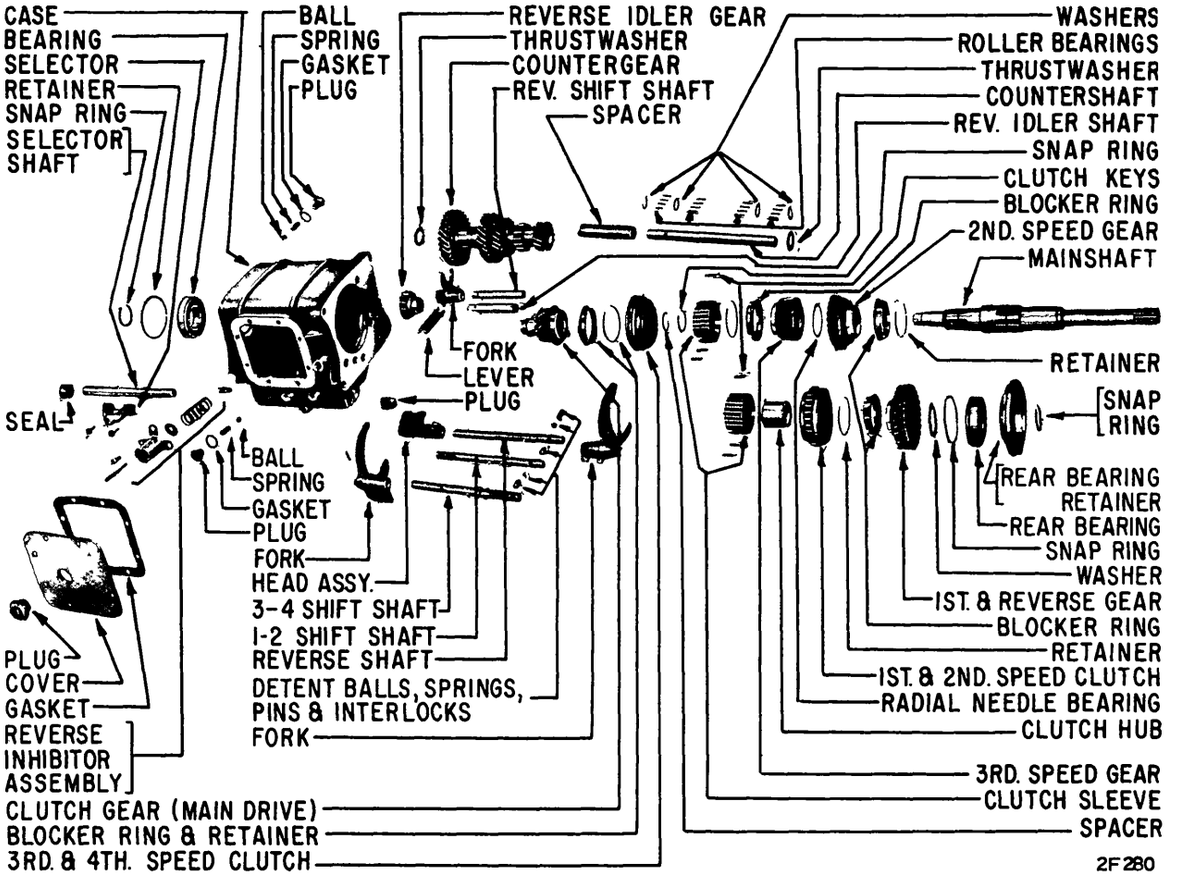
6) To remove countergear, improvise a dummy shaft by cutting a piece of 5/8" diameter roll stock 7" long. then drive countershaft rearward, using the dummy shaft, until countershaft is removed and dummy shaft is within countergear. Remove countergear and dummy shaft from case being careful not to allow dummy shaft to slip out of gear. Remove countergear thrust washers from case.

7) Remove two interlocks, ball and spring from 3-4 detent channel (use a magnet or tip case). Remove shift finger from selector shaft by first flattening lock tabs securing retainer screws, then remove shifter shaft plug in rear of case. Tap shaft rearward out through case. Remove screws securing reverse inhibitor to case and remove inhibitor.

Mainshaft: Place clutch gear downward against bench top, then lift mainshaft out of clutch gear to prevent disturbing clutch gear roller bearings. Remove special snap ring from front of mainshaft, then slide 3-4 synchronizer unit with blocker rings, third speed gear, radial needle bearing and second speed gear from mainshaft. Remove rear bearing selective snap ring and remove rear bearing and retainer as an assembly. Remove first speed gear thrust washer, first speed gear, and 1-2 blocker rings. Press mainshaft out of 1-2 synchronizer unit and first speed gear sleeve. *CAUTION - Clutch hubs and sliding synchronizer sleeves are a matched assembly and must be kept together.*

INSPECTION: Wash all parts in solvent and blow dry with air. Inspect transmission case for cracks and check for burrs on rear face of case. If necessary dress off any burrs on machined surfaces with a flat file. Check condition of shifter shaft oil seal and re-

CONTINUED ON NEXT PAGE



4-SPEED SYNCHRO-MESH TRANSMISSION

PONTIAC TEMPEST TRANSAXLE (Continued)

place if necessary. Make sure all bearings are clean, then lubricate with light engine oil and check for roughness. Replace all worn clutch gear and countergear bearings and spacers. Replace any gears or thrust washers that are worn or damaged.

►*SYNCHRONIZER CLUTCH SLEEVE & HUB KEY & SPRING REPLACEMENT:* If necessary to replace keys and springs, push hub from sliding sleeves and remove springs. To install, place two springs in position (one on each side of hub), so a tanged end of each spring falls into same keyway in hub. Hold keys in position and align etched marks in sleeve and hub, then slide hub into sleeve (be sure etched marks are aligned after assembly).

►*REAR BEARING RACE REPLACEMENT:* If necessary to replace rear bearing, place bearing and retainer in a press, then expand retainer ring and press out bearing. Reverse procedure to install bearing.

REASSEMBLY: Mainshaft - Install 1-2 synchronizer hub onto mainshaft with shift fork groove of hub downward, then place first gear sleeve on mainshaft. Press both first gear sleeve and synchronizer hub onto mainshaft until they bottom, using Tool J-5590 or other suitable tool. Install blocker ring in rear of 1-2 synchronizer, being sure that notches in blocker ring engage keys in synchronizer unit. *NOTE - Blocker rings used in 1-2 synchronizer have slightly longer hubs than those used in 3-4 synchronizer.* Slide first speed gear and its thrust washer onto mainshaft, then install rear bearing retainer assembly onto mainshaft and secure with selective fit snap ring. *CAUTION* - With proper snap ring installed (available in three sizes), maximum play between rear face of rear bearing and snap ring will be .005". Invert mainshaft, then install second blocker ring (long hub) in front side of 1-2 synchronizer, being sure that blocker ring notches are engaged with keys in synchronizer unit. Install second gear speed gear with clutch teeth toward 1-2 synchronizer, and place radial needle bearing on second speed gear. Install third speed gear, clutch teeth upward, onto mainshaft and seat it against radial needle bearing. Place 3-4 blocker ring on cone surface of third speed gear, then slide 3-4 synchronizer unit onto blocker ring, being sure that notches in blocker ring engage clutch keys in synchronizer unit. Install second blocker ring onto 3-4 synchronizer unit. *NOTE - If clutch gear roller bearings have been displaced, load 33 bearings into innermost diameter and 37 needle bearings into outermost diameter, using a generous amount of petroleum jelly to prevent rollers dropping out.* Carefully slide clutch gear onto mainshaft, then set the assembly aside for later installation.

Transmission: 1) Position reverse inhibitor body in transmission case on its dowel pin and secure with screws and lockwashers. *NOTE - Be sure to install plunger in inhibitor body.* Coat selector shaft with grease, then insert through seal from inside case. *CAUTION - Do not install shaft from front of case as notches in shaft will damage seal.* Attach shift finger to selector shaft with bolts and lock tabs. Bend tabs onto bolt heads after tightening bolts, then install plug at rear of shaft. Install countergear thrust washers in case and retain in place with petroleum jelly, making sure that thrust washer tabs engage grooves in case.

2) Insert countergear with its roller bearings and dummy shaft into case through rear bearing hole, then lift countergear into alignment with countershaft holes and tap countershaft into gear from rear of case. *CAUTION - Be careful to keep dummy shaft tightly against countershaft during installation to prevent roller bearing dropping out of place.* Tap countershaft in until it is flush with rear face of case. *NOTE - Countershaft is a slight press fit at front of case.*

3) Place reverse shifter lever on pin in case with tapered end away from reverse inhibitor. Place reverse idler gear shift fork in case with its pin toward the front and engage fork pin with reverse shift lever, then insert shift fork shaft.

4) With reverse idler gear shift fork fully rearward, engage reverse idler gear to shift fork, then align woodruff key groove in idler gear shaft with keyway in rear face of case and slide shaft almost fully into case. Install woodruff key in shaft and fully bottom shaft in case. Tap both reverse idler and shift fork shaft to insure full seating, then stake each shaft bore in two places below rear face of case adjacent to shaft chamfer. *CAUTION - Be sure stakes do not protrude above rear face as this will disrupt mating surface for axle.*

5) Insert a detent spring and ball in 3-4 detent channel, checking to make sure spring goes fully to bottom of channel and that detent ball does not roll out the reverse shifter head shaft hole in detent channel.

►*SHIFTER SHAFT IDENTIFICATION NOTE:* With interlock notches aligned (lay shafts out in this manner) shafts can be identified as follows:

Reverse Shifter Head Shaft - 8 3/32" overall length, and roll pin hole is approximately centered on shaft.

1-2 Shift Fork Shaft - 7 19/32" overall length, with two interlock notches in shaft and these notches are connected by a drilled hole which houses interlock pin.

3-4 Shift Fork Shaft - 7 19/32" overall length, and roll pin hole is closest to end of shaft opposite detent notched end.

6) Depress detent ball and spring in 3-4 detent channel slightly with a small drift and insert reverse shifter head shaft partially into case to compress detent, then engage pin of reverse shifter head with yoke of reverse shift lever. Check that shaft pin hole is aligned with pin hole in shifter head and push shaft through until pin holes in head and shaft align. Secure shifter head to shaft with a roll pin.

7) To install assembled mainshaft in case, shift synchronizers into second and fourth simultaneously (both fully forward) to provide clearance to pass the countergear. Insert mainshaft through rear bearing bore into case. Align rear bearing retainer snap ring cutouts into rear face of case, then tap rear bearing retainer into case until flush with rear face. *CAUTION - Make sure clutch gear stays securely in place.* With large snap ring installed in outer diameter of front bearing, tap bearing into case from front and over clutch hub until large snap ring seats against front face of case. Install proper snap ring to retain clutch gear in bearing so that maximum clearance between snap ring and bearing is .005". Install two rear bearing retainer snap rings.

8) Before installation of 1-2 shift fork shaft, shift the 1-2 synchronizer and the 3-4 synchronizer to neutral, then install one interlock in 3-4 detent channel. With interlock pin in hole in interlock notch end, push 1-2 shift fork shaft partially into case. *NOTE - The interlock end (two opposite notches) of the shaft goes to rear of case.* Engage 1-2 shift fork (identified by through gate at shift location) with 1-2 synchronizer. Align pin holes in shaft and fork, then tap shaft rearward until it engages interlock, and secure fork to shaft with a roll pin. Install detent ball, spring, gasket and cap in 1-2 detent channel. *NOTE - Cap used at this location has the longer shank.*

9) Drop remaining interlock into 3-4 detent channel, then push 3-4 shift fork shaft partially through hole in front of case. Engage 3-4 shift fork in 3-4 synchronizer, align pin hole in shift fork and shaft, then push shaft fully into rear of case until it engages interlock. Secure shift fork shaft with a roll pin. Install remaining detent ball, spring, nylon washer, and cap in 3-4 detent channel at left rear of case.

10) Before installing front cover, test operation of shift forks by actuating shift selector lever with a small pin punch inserted in hole in shifter shaft. If transmission shifts satisfactorily, install side cover with a new gasket and tighten bolts to 3-4 ft. lbs.

RAMBLER SIX AUTOMATIC TRANSMISSION

Rambl r Am rican (1962)
Rambl r Classic Six (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 ONE-WAY SPRAG CLUTCH INSTALLATION NOTE:* When installing sprag clutch in planet carrier assembly, the three copper tension springs must be located in the downward position in outer race of planet carrier assembly. When installing center support in one-way sprag clutch and planet carrier assembly, center support must freewheel in a counterclockwise direction and lock-up in a clockwise direction.

DESCRIPTION

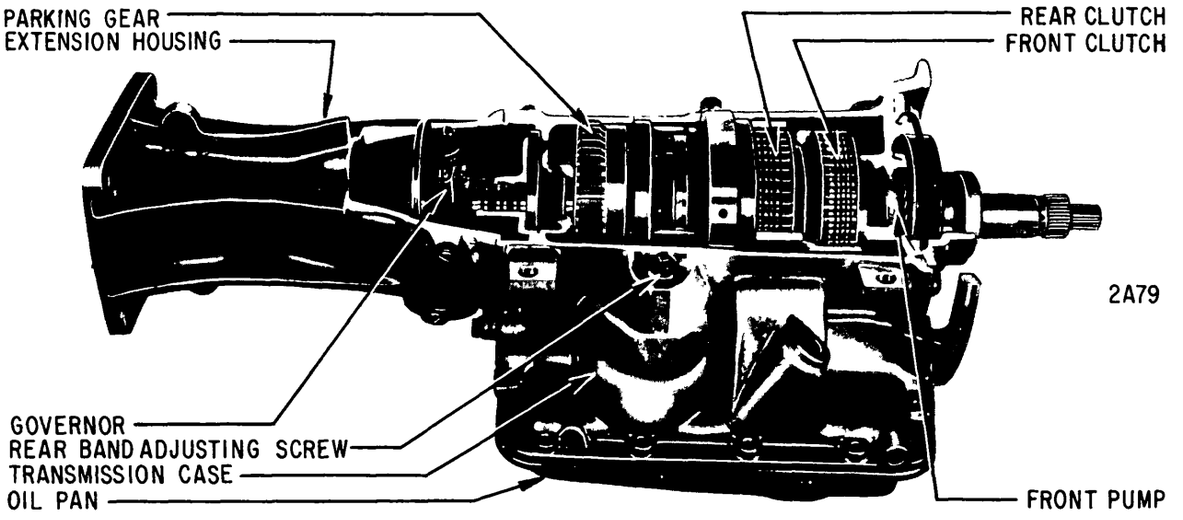
DESCRIPTION: Three speed hydraulically controlled automatic planetary transmission of new design. With pushbutton or transmission selector lever in "D1" or "D2", transmission upshifts and downshifts are automatic. Additional "L" (Low), "R" (Reverse), and "P" (Park) ranges are controlled manually. A cable connected to carburetor throttle linkage controls the transmission throttle valve in main control valve assembly and varies the throttle pressure as necessary. On Rambler American, a transmission range selector lever, located on steering column and connected to transmission manual lever by linkage, positions manual valve in transmission. A neutral safety switch, mounted on steering jacket tube beneath instrument panel, permits starting engine when selector lever is in either "P" (Park) or "N" (Neutral) position. On the Rambler Classic, a pushbutton transmission range selector control located at left of instrument panel consists of five buttons operating a cable connected to manual lever on transmission. A "Park" lever mounted directly below pushbuttons operates a mechanical parking pawl which engages external teeth on rear internal gear. When "Park" lever is pushed in, all buttons except "N" (Neutral) are locked and cannot be operated. With either of the forward or reverse buttons pushed in, "Park" lever is locked and cannot be engaged.

LUBRICATION

►*LUBRICATION CAUTION:* Check fluid level every 4,000 miles. Drain and refill every 25,000 miles.

Ch cking Fluid L v l: With engine and transmission at normal operating temperature, place transmission selector lever or pushbutton in each range momentarily, finally ending with selector lever or pushbutton in "N" (Neutral). Check fluid level on dipstick. Add recommended fluid to bring level up to full "F" mark on dipstick. *NOTE - Approximately 1½ pints of fluid required to rais l v l from "L" mark to "F" mark on dipstick. Do not verfill.*

Draining & R filling: Raise car and remove converter drain plug, then remove drain plug from right side of transmission oil pan and allow to drain. After complete draining, install converter drain plug and tighten to 7-10 ft. lbs. Tighten oil pan drain plug to 10-14 ft. lbs. Pour 5 qts. of recommended fluid into transmission, then start engine and run at idle speed with transmission in "N" (Neutral). Add 4 qts. and check fluid level on dipstick. Add sufficient fluid to bring level up to "F" mark on dipstick. Do not overfill.



RAMBLER SIX FLASH-O-MATIC TRANSMISSION SECTIONAL VIEW

Recommended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity: Approximately 9 qts.

ADJUSTMENTS

Throttle Linkage: *See CARBURETOR on car model page.*

Manual Linkage (Rambler American): Place selector lever in "L" (Low) range, then disconnect gearshift rod trunnion from transmission lever. Make sure transmission lever is in extreme rear position and adjust trunnion on gearshift rod to enter freely into hole in bushing of transmission lever, then replace washer and cotter pin. Check gear selector lever in all positions.

Pushbutton Control Cable (Rambler Classic): Disconnect cable at manual lever on transmission, then push in "L" (Low) button and move manual lever on transmission all the way to rear. Adjust cable linkage clevis, aligning holes in clevis and lever. Install clevis pin and washer and tighten clevis securely. Check adjustment in all positions.

Neutral Safety Switch Adjustment (Rambler American): *NOTE - Switch is located on steering jacket tube beneath instrument panel.* To adjust, loosen two capscrews securing switch to steering column jacket tube, then place transmission selector lever in "N" (Neutral). Use a 3/32" pin for alignment and insert pin in hole on face of switch, rotating switch until pan freely enters hole in switch toggle. Tighten the two attaching screws and remove alignment pin. *NOTE - Tang of switch must enter channel on operating shaft before securing switch to jacket tube. Check to make sure engine will start in "N" or "P" only.*

Rambler Classic - Neutral safety switch is incorporated into pushbutton control assembly and adjustment is not required. Adjustment will be correct when switch is properly installed.

Parking L v r Adjustm nt (Rambl r Classic): Disconnect cable at transmission lever, then pull park lever handle out. Transmission lever will then lay free against inner parking pawl. Adjust clevis to align with hole in parking lever on transmission. Install clevis pin and washer and tighten clevis securely.

Front Band: With oil pan removed, loosen locknut or adjusting screw and insert .250" gauge block (Part of Tool J-5880-01) between end of adjusting screw and servo rod. Use adapter J-9639 and an inch pound torque wrench and tighten adjusting screw to 9 inch pounds. Tighten locknut securely and remove gauge block.

Rear Band: Loosen locknut on right side of transmission case and install Tool J-7847 on adjusting screw. Tighten adjusting screw with a torque wrench to 7 ft. lbs., then mark adjusting screw for reference point and back off screw 3/4 turn and tighten locknut securely.

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Before making any corrections to transmission, check and adjust fluid level, manual linkage and throttle linkage, th n recheck operation of transmission to determine if trouble has been improved or corrected.*

HARSH DRIVE ENGAGEMENT: Control valve assembly not tightened properly. Throttle valve sticking. Primary or secondary regulator valve sticking. Front clutch frozen or warped.

DELAYED DRIVE ENGAGEMENT: Improper idle speed. Oil tubes missing or not installed properly. Seal rings missing or broken. Control valve assembly not tightened properly. Primary regulator valve sticking. Front clutch ball check missing or sticking. Failure in front or rear clutch. Converter slipping.

NO "D-2" RANGE: Front band not adjusted properly. Oil tubes missing or not properly installed. Sealing rings missing or broken. Control valve not properly tightened. Primary regulator valve sticking. Front clutch ball check sticking or missing. Front clutch failure. Front band failure or faulty servo. Input shaft broken. Front pump drive tangs broken or converter broken. Worn front pump or converter failure.

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RAMBLER SIX AUTOMATIC TRANSMISSION (Continu d)

NO "D-1" or "L" RANGE: Oil tubes missing or improperly installed. Sealing rings missing or broken. Control valve not properly tightened. Secondary regulator valve sticking. Failure in front clutch or front clutch check ball missing or sticking. Sprag clutch slipping or improperly installed. Input shaft broken. Front pump or converter failure.

NO "R" RANGE: Oil tubes missing or improperly installed. Sealing rings missing or broken. Control valve not properly tightened. Primary regulator valve sticking. Governor valve sticking or improperly installed. Reverse inhibitor valve sticking. 1-2 shift valve sticking. 2-3 shift valve sticking. Front clutch frozen or warped. Rear clutch failure, faulty piston, broken return spring or worn plates. Rear band failure of faulty servo. Input shaft broken or converter broken. Front pump failure.

LOCK-UP FORWARD OR REVERSE: Front or rear clutch frozen or warped. Sprag clutch frozen.

NO NEUTRAL: Front clutch frozen or warped.

NO 1-2 UPSHIFT: Bands not adjusted properly. Governor valve, modulator valve or throttle valve sticking. Oil tubes missing or not properly installed. Control valve not properly tightened. 1-2 shift valve sticking. Front band slipping or servo faulty.

NO 2-3 UPSHIFT: Oil tubes missing or not properly installed. Sealing rings missing or broken. Control valve not properly tightened. Throttle valve sticking. Governor valve sticking or not properly installed. 2-3 shift valve sticking or plug missing. Failure in rear clutch. Annular piston not seating.

LOW 1-2 & 2-3 UPSHIFT: Oil tubes missing or not properly installed. Seal rings missing or broken. Control valve not tightened properly. Throttle valve sticking or not properly installed. Governor valve sticking. 2-3 shift valve plug sticking.

HIGH 1-2 & 2-3 UPSHIFT: In addition to corrections for "Low 1-2 & 2-3 Upshift" (above), check for sticking modulator valve. 1-2 or 2-3 shift valves sticking, or 2-3 shift valve plug sticking.

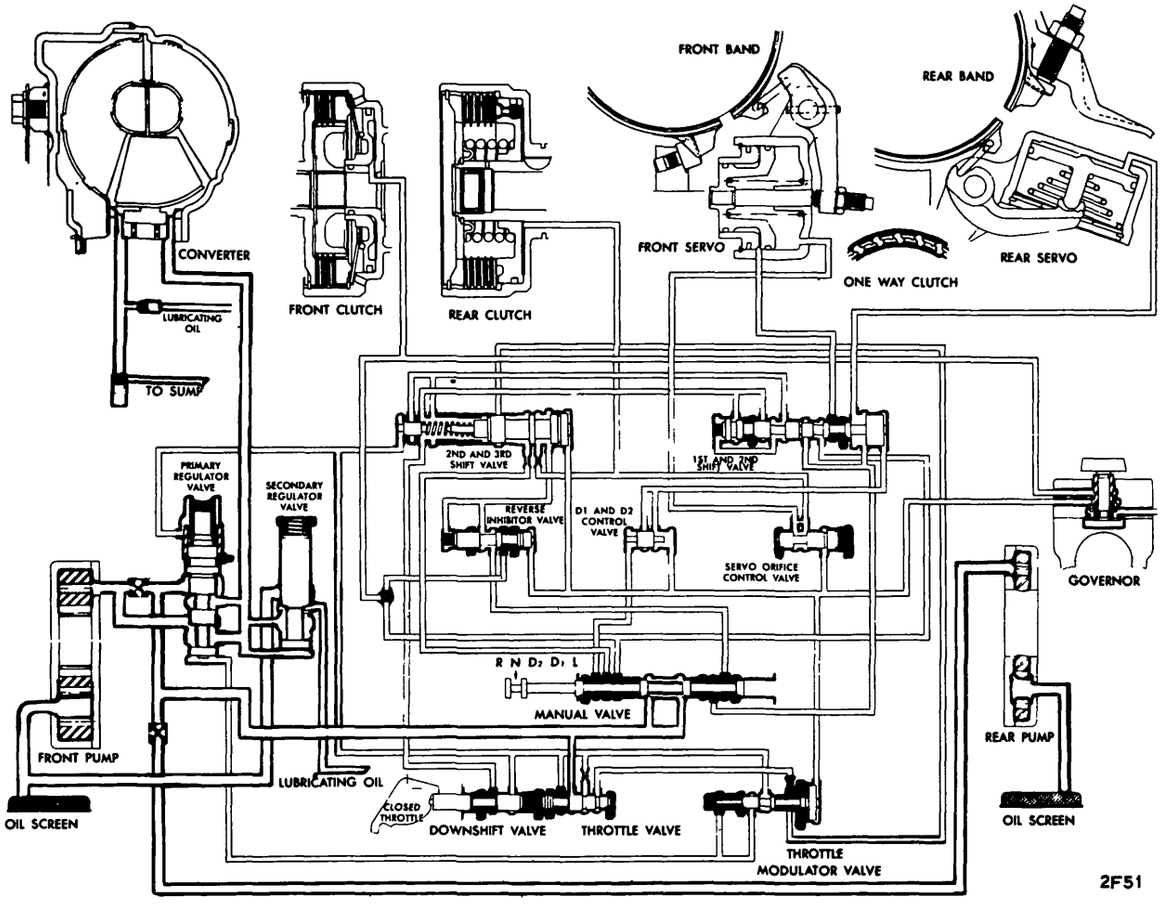
SLIPPING 1-2 & 2-3 SHIFT: Front band not properly adjusted. Oil tubes missing or improperly installed, Sealing rings missing or broken. Control valve assembly not tightened properly. Primary regulator valve or throttle valve sticking. Governor valve sticking or improperly installed. If 1-2 shift is slipping, check for front clutch ball check sticking or missing, or faulty front servo. If 2-3 shift is slipping, check for worn or slipping rear clutch plates.

HARSH 1-2 & 2-3 SHIFT: Front band not properly adjusted. Control valve assembly not properly tightened. Primary regulator, throttle valve, or modulator valve sticking. Governor valve sticking or not properly installed. If 1-2 shift is harsh, check for front clutch slippage or for frozen sprag clutch. If 2-3 shift is harsh, check for warped or frozen rear clutch.

FAULTY 1-2 SHIFT: Improper rear band adjustment. Rear clutch frozen. Sprag clutch frozen.

FAULTY 2-3 SHIFT: Improper front band adjustment. Oil tubes missing or not properly installed. Control valve assembly bolts missing or not properly tightened.

NO 2-1 DOWNSHIFT: Control valve assembly not properly tightened. Throttle valve sticking. Governor valve sticking, leaking or not properly installed. D-1 & D-2 control valve sticking. 1-2 shift valve sticking.



RAMBLER SIX AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

NO 3-2 DOWNSHIFT: Control valve assembly not properly tightened. Throttle valve or governor valve sticking. 2-3 shift valve or plug sticking.

LOW 2-1 & 3-2 DOWNSHIFT: Seal rings missing or broken. Control valve assembly not tightened properly. Throttle valve or governor valve sticking. 1-2 shift valve sticking. 2-3 shift valve or plug sticking.

HIGH 2-1 & 3-2 DOWNSHIFT: Sealing rings missing or broken. Control valve assembly not properly tightened. Throttle valve, modulator valve or governor valve sticking. 2-3 shift valve or plug sticking.

SLIPPING 2-1 DOWNSHIFT: Sprag clutch slipping or not properly installed.

SLIPPING 3-2 DOWNSHIFT: Improper front band adjustment. Oil delivery tubes missing or not properly installed. Seal rings missing. Control valve assembly not tightened properly. Primary regulator valve, throttle valve, or governor valve sticking. Rear clutch failure. Front band slipping or faulty servo.

HARSH 3-2 DOWNSHIFT: Front band not properly adjusted. Control valve assembly not tightened properly. Throttle valve sticking. Rear clutch frozen or warped.

TESTING

STALL TEST: With engine at normal operating temperature, place transmission in "D1" position. Apply parking brake and foot brake and accelerate engine with wide open throttle to 1400 RPM. *CAUTION - Do not hold throttle open for mor than 15 s conds.* If engine speed will not reach 1400 RPM, poor engine performance is indicated. An engine speed over 1400 RPM indicates transmission or converter slippage.

ROAD TEST: Shift Speeds - Drive car and check for upshifts and downshifts as indicated in following table.

SHIFT SPEEDS

Upshift	Light Throttle	Full Thr ttl	Kickd wn
1-2	6-10 MPH	26-30 MPH	38-42 MPH
2-3	12-16 MPH	45-49 MPH	66-70 MPH
Downshift	**Closed Throttl**	**Part Thr ttl**	**Kickdown**
3-1	4-8 MPH	23-28 MPH	22-26 MPH
3-2			57-61 MPH

AIR PRESSURE CHECKS: Fr nt S rv - Remove front servo apply tube and apply pressure where tube enters servo body.

CONTINUED ON NEXT PAGE

RAMBLER SIX AUTOMATIC TRANSMISSION (C ntinu d)

R ar S rv : Remove rear servo apply tube and apply pressure where tube enters servo body.

R ar Clutch: Remove rear clutch tube and apply pressure where tube enters hole in case. A dull thud should be heard.

Gov rn r: To check governor, remove valve body and apply pressure to Governor oil passage in case. See illustration.

Fr nt Clutch: To check front clutch, remove valve body and apply pressure to front clutch and governor feed oil passage in case. See illustration. A dull thud should be heard.

OIL PRESSURE TEST: CAUTION - Make this test only if transmission is not shifting properly after checking throttle linkage for proper adjustment. Connect a suitable pressure gauge to control pressure test point on rear of transmission case (above oil pan flange toward left side of case). With transmission fluid at 190°F, pressure should be 108±10 lbs. (OHV Eng.); 120±10 lbs. ("L" head Eng.) at 1000 RPM engine speed. At idle speed of 475 RPM, pressure should be 50-60 lbs.

TRANSMISSION REMOVAL & INSTALLATION

RAMBLER (EXCEPT RAMBLER AMERICAN CONVERTIBLE)

REMOVAL: Disconnect battery, then raise car and drain transmission. Disconnect speedometer cable at transmission and rear brake hose bracket from floor pan. Disconnect shift rods at transmission levers, then disconnect throttle cable at throttle shaft on carburetor and at cable bracket. Disconnect shock absorbers at rear axle. On Rambler American, disconnect front brackets of rear springs from floorpan, then slide rear axle rearward to disengage front universal joint from transmission shaft. On Rambler Classic, disconnect torque tube, propeller shaft, and parking brake cable, then lower rear axle and move rearward to separate torque tube and propeller shaft from transmission. On all models, place a suitable transmission jack under transmission, then remove transmission-to-converter housing screws. With transmission jack positioned so transmission is in alignment with converter housing, pull transmission and jack assembly to rear to disengage transmission from housing and converter.

►*TRANSMISSION, BELL HOUSING & CONVERTER ASSEMBLY REMOVAL NOTE:* These parts may be removed as a complete assembly as follows: In addition to transmission removal procedure (see above), remove starter attaching bolts and remove starter, then support transmission and remove crossmember to side sill bolts. Lower engine and bell housing assembly. *NOTE - When lowering this assembly, the oil pan will rest on side sill crossmember supporting the engine.* Remove bell housing-to-engine bolts and bell housing lower mud pan. Remove capscrews retaining torque converter to drive plate, then with transmission jack positioned so transmission and converter assembly are in alignment, pull complete assembly to rear, disengaging housing and converter from engine.

INSTALLATION: Reverse removal procedure and note the following: If transmission removed separately, position front pump drive tangs on converter in a horizontal position, and position front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 17-22 ft. lbs. If converter has been removed, converter-to-drive plate attaching capscrews must be tightened to 23-28 ft. lbs.

RAMBLER AMERICAN CONVERTIBLE

►*TRANSMISSION REMOVAL NOTE: Transmission and torque converter cannot be removed as a complete assembly. Transmission must be removed separately, then converter and bell housing can be removed. Procedure for removing converter assembly is the same as for other models.*

REMOVAL: *See "Rambler (Except Rambler American Convertible)" above and note the following:* Disconnect parking brake cable from adjusting rod and parking brake bellcrank from cross frame. Disconnect and remove rear axle "U" bolt brackets, then raise rear axle to clear center bolts and slide rear axle on rear springs to remove universal joint from transmission shaft.

INSTALLATION: Reverse removal procedure and note the following: Position front pump drive tangs on converter in a horizontal position, and position front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 17-22 ft. lbs. If converter has been removed, converter-to-drive plate attaching capscrews must be tightened to 23-28 ft. lbs.

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

OIL PAN & SCREEN: Removal - Raise car and drain transmission, then remove transmission oil pan. Remove Alnico magnet from head of rear servo attaching bolt. To remove inlet screen, remove filister head screws from rear screen and the two valve body retaining screws.

Installation: Replace screen and tighten the two valve body retaining screws to 55-66 inch pounds. Install a new oil pan gasket on transmission oil pan flange and hold it in place with Lubriplate. Install pan and tighten capscrews to 100-120 inch pounds, then refill transmission with fluid.

CONTROL VALVE BODY & PRESSURE REGULATOR: Removal - Remove oil pan, then remove throttle lever cable attaching rod. Remove retaining clip from shift lever rod. Remove Alnico magnet, rear servo apply tube, rear clutch tube, and front servo apply and release tubes. Remove three valve body assembly retaining screws and remove valve body. Remove front pump suction tube, front pump pressure tube, and converter in-and-out tubes.

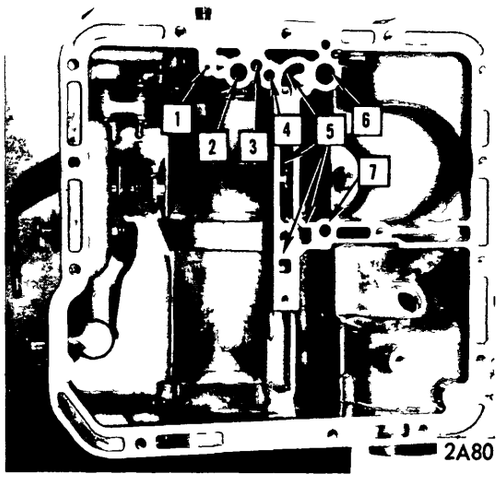
Installation: Reverse removal procedure and tighten valve body attaching screws to 55-66 inch pounds. Tighten oil pan capscrews to 100-120 inch pounds.

FRONT SERVO: Removal - Remove oil pan and gasket, front servo apply and release tubes, and rear clutch tube. Remove two capscrews retaining front servo to transmission case, then lower front servo and actuating rod from case.

Installation: Rotate band to engage anchor end of band with transmission case, then apply Lubriplate to end of actuating lever and insert actuating strut. Holding servo in one hand with tension on the adjusting screw, engage actuating strut with band strut. Install retaining capscrews and lockwashers and tighten to 100-120 inch pounds. Install front servo apply and release tubes, rear clutch tube, oil pan and gasket. Adjust front band *(see "Adjustment" above).*

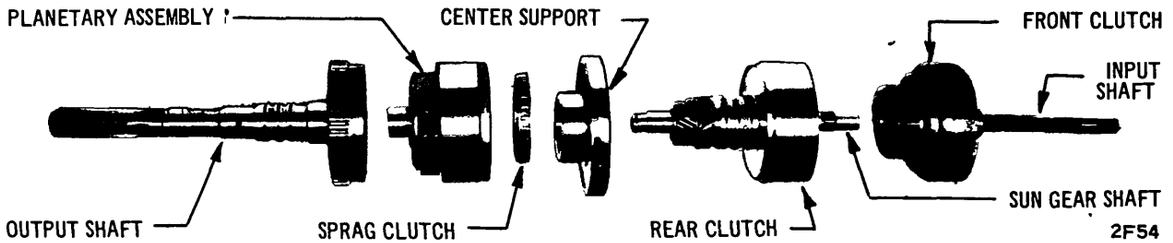
REAR SERVO: Removal - Remove oil pan and gasket, Alnico magnet, front servo apply tube, then remove two rear servo capscrews retaining rear servo to transmission case. Remove rear servo and actuating strut.

CONTINUED ON NEXT PAGE



1. Control Pressure
2. Rear Pump Pressure
3. Front Clutch and Governor Feed
4. Governor
5. Lubrication
6. Rear Pump Suction
7. Rear Clutch Apply

TRANSMISSION CASE OIL PASSAGES



PLANETARY GEAR TRAIN

RAMBLER SIX AUTOMATIC TRANSMISSION (C ntinu d)

Installation: Rotate band against anchor in case, then apply Lubriplate to rear servo actuating lever and insert strut in arm. Holding servo in one hand, place servo on case engaging face end of strut with rear band actuating strut. Install capscrews and lockwashers and tighten to 120-154 inch pounds. Adjust rear band *(see "Adjustment" above).*

CONTROL SHAFT INNER LEVERS OR MANUAL CONTROL SHAFT SEALS: Removal - Remove oil pan and throttle control cable from case, then remove control valve assembly. Remove trunnion and rod from outer manual control lever, then remove hex nut and inside lever from end of shaft. Remove tapered pin from case with Tool J-9644; and remove manual valve control lever shaft.

Installation: Install "O" ring seal on manual control lever shaft, then start shaft into case, aligning shaft groove with tapered pin. Tap tapered pin into place and install inside lever and hex nut on inner end of shaft and tighten securely. *NOTE - If manual control shaft is past the tapered pin groove, "O" ring seal will be cut and damaged.* Replace control valve assembly, throttle control cable, oil pan and gasket. Place outer manual control lever toward rear of transmission, then place shift lever in "L" (Low) position and install trunnion and rod in rubber grommet of outer manual control lever so that trunnion fits freely in control lever. Install washer and retain trunnion with cotter pin.

PARKING BRAKE CONTROL TOGGLE HUB SHAFT (RAMBLER AMERICAN): Removal - Remove oil pan and throttle control cable from transmission case, then remove control valve assembly. Remove park lever assembly by removing retaining spring and washer on inner end of toggle hub and remove toggle lift assembly from shaft. Remove tapered pin from case with Tool J-9644 and remove parking brake control toggle hub shaft from case.

Installation: Install "O" ring seal on parking brake toggle hub shaft, then install shaft in case and tap tapered pin into place. Install parking pawl lift assembly on shaft, aligning teeth with shift control inner lever, and install washer and retaining pin. Install control valve assembly, oil pan and gasket.

PARKING BRAKE CONTROL SHAFT (CLASSIC SIX): Removal - Remove oil pan and throttle control cable from transmission case, then remove control valve assembly. Remove trunnion from outer parking brake lever. Remove hex nut and parking pawl spring assembly, then remove tapered pin from case with Tool J-9644 and remove parking brake control shaft from case.

Installation: Install "O" ring seal on parking control lever shaft, then install shaft in case and tap tapered pin into place. Install parking pawl spring assembly on shaft and tighten nut securely. Pull parking lever out at push button control, then position outer parking lever in its lower position and adjust cable trunnion so trunnion screw fits freely and tighten trunnion nut securely. Install control valve and oil pan.

PARKING PAWL (ALL MODELS): Removal - Remove oil pan and control valve, then remove parking brake toggle roll pin and remove toggle pin. Remove bolts from rear extension housing and transmission case. *NOTE - On Classic Six, als r m v bolts from xtension h using and torqu tub adapter.* Rotate extension housing counterclockwise and remove parking brake anchor pin using a magnet. Remove parking brake toggle link and pawl assembly.

Installation: Reverse removal procedure.

GOVERNOR BODY: Removal - Remove inspection hole cover from extension housing, then rotate shaft until governor is in alignment with inspection hole and remove the two retaining screws and lockwashers. Remove governor body.

Installation: Reverse removal procedure.

EXTENSION HOUSING REAR OIL SEAL: Removal - Raise car and remove torque tube (if so equipped) and propeller shaft from transmission output shaft. Remove extension housing oil seal with Tool J-2619 and J-4830-02.

Installation: Position seal in housing with felt part of seal toward rear of housing, then install seal with Tool J-9617. Install propeller shaft, and torque tube (if so equipped), on transmission, then check fluid level in transmission and fill as necessary.

TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

1) With outside of transmission case cleaned, install tranemission in a holding fixture and remove oil pan, Alnico magnet, rear servo apply tube, rear clutch tube, front servo apply and release tubes, then remove throttle control rod retaining clip and remove throttle rod. Remove shift rod retaining clip and release rod from inside detent lever.

2) Remove valve body-to-case capscrews and remove valve body assembly. Remove front oil pump pressure tube, suction tube, and converter in and out tubes from front pump. Remove two front servo capscrews and remove servo and servo strut, then remove rear servo and strut.

3) At this point of disassembly, check transmission endplay for reference at reassembly. Remove one of the front pump attaching capscrews and mount a dial indicator so that contact button of indicator rests on end of input shaft. Pry front clutch cylinder to rear of transmission with a large screwdriver, then remove screwdriver and set dial indicator to zero. Pry transmission units to front of case by inserting a screwdriver between large internal gear and case. Record indicator reading for use at reassembly. Endplay should be .009 -.0322".

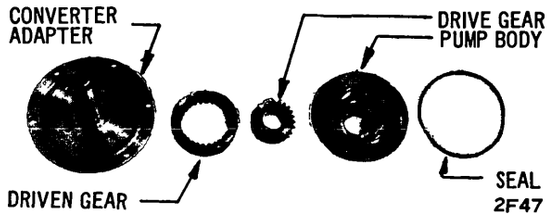
4) Remove front pump attaching capscrews and remove front pump assembly, gasket, and selective thrust washer. Remove front and rear clutch assemblies and forward sun gear assembly, starting units out of case by inserting a large screwdriver between rear clutch drum and center support. *CAUTION - Keep these units together for disassembly at a later time.* Remove front band through front of case.

5) Remove two capscrews from sides of case, then remove center support and planet carrier assemblies. *NOTE - Sprag clutch is located between center support and planet carrier assembly.* Remove rear band through front of case. *NOTE - Front and r ar bands ar th same and are int rchangeabl .*

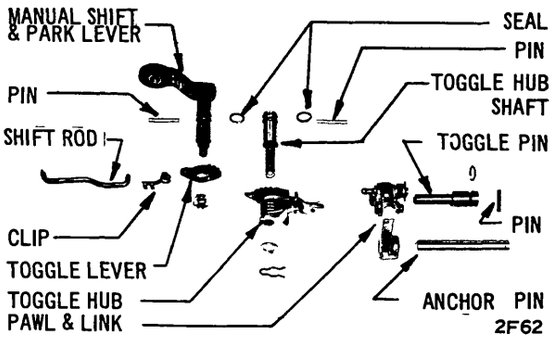
6) Before removing rear extension housing, remove rear oil seal (if it is necessary to replace) with Tool J-2619 and J-4830-02. Remove capscrews and carefully remove extension housing and gasket from output shaft assembly. Remove outer snap ring from output shaft and remove speedometer drive gear, ball bearing and inner snap ring. Remove snap ring, governor assembly and ball bearing from output shaft.

7) Remove six large and one small fillister head screws from rear pump body and remove rear pump body and driven gear. Remove three oil seal rings from output shaft, then remove rear pump drive gear carefully from output shaft. Remove rear pump drive gear key from output shaft, then remove rear pump body plate. Remove output shaft and rear thrust washer through front of case.

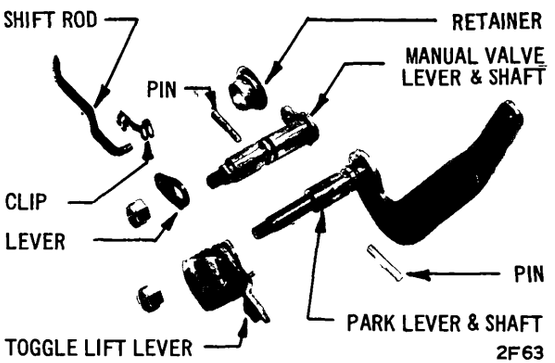
8) Remove tapered pin retaining manual valve linkage shaft using Tool J-9644, then remove manual valve shaft assembly by removing hex nut on inner end of shaft, and remove shaft from case. Remove tapered pin retain-



FRONT PUMP ASSEMBLY



MANUAL & PARK LINKAGE (RAMBLER AMERICAN)



MANUAL & PARK LINKAGE (CLASSIC SIX)

CONTINUED ON NEXT PAGE

RAMBLER SIX AUTOMATIC TRANSMISSION (C ntinu d)

ing park lever toggle nuts, using Tool J-9644. On Rambler American, remove park lever assembly by removing retainer spring and washer on inner end of toggle hub shaft and remove toggle lift lever assembly from shaft. Remove shaft from case. On Classic Six, remove park lever assembly by removing hex nut on inner end of shaft and remove toggle lift lever assembly from shaft. Remove shaft from case.

9) On all models, remove parking brake toggle roll pin by tapping out of case, then remove toggle pin from case (starting removal with long nose pliers). Remove parking brake anchor pin from case (use a magnet to draw pin out of bore in case). Remove parking brake toggle link and pawl assembly.

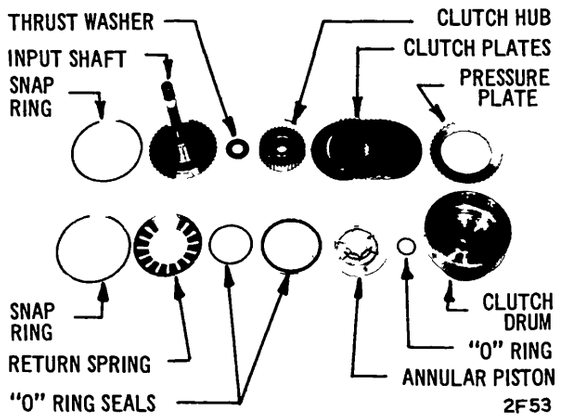
TRANSMISSION UNIT OVERHAUL

FRONT CLUTCH: Disassembly - Place front clutch, rear clutch, and forward sun gear assembly into planet carrier assembly (using planet carrier assembly as a holding fixture), then lift front clutch and input shaft assembly off rear clutch and remove input shaft snap ring and input shaft. Remove clutch hub and fibre thrust washer, drive and driven plates and pressure plate from front clutch cylinder. Remove front clutch return spring snap ring and remove return spring. Insert nozzle of air hose in inside diameter of hub at oil apply hole and blow out annular piston from clutch cylinder.

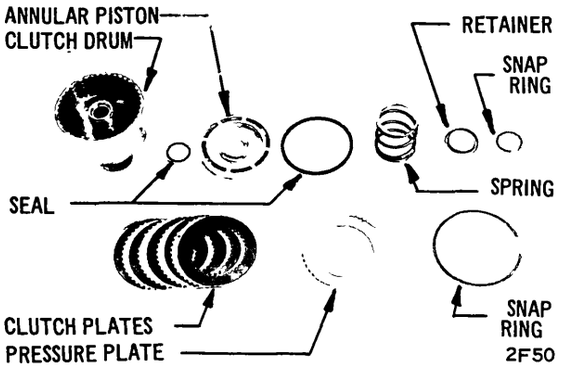
Inspecti n: Inspect all parts for nicks, wear, scratches and other damage. *NOTE - Always use new "O" ring s als wh n r ass mbling.*

R assembly: Install small "O" ring on front clutch cylinder hub and large "O" ring on annular piston. Place annular piston in Tool J-9620-1 and tap piston down into bore of tool. Place Tool J-9620-2 into front clutch cylinder, centering annular piston on hub of cylinder, then using Tool J-5886-2, install annular piston into front clutch cylinder. Install return spring in front clutch cylinder and install snap ring.

REAR CLUTCH: Disass mbly - Remove bronze and steel thrust washers from rear clutch drum, then remove two oil seal rings from forward sun gear shaft. Remove



FRONT CLUTCH COMPONENTS



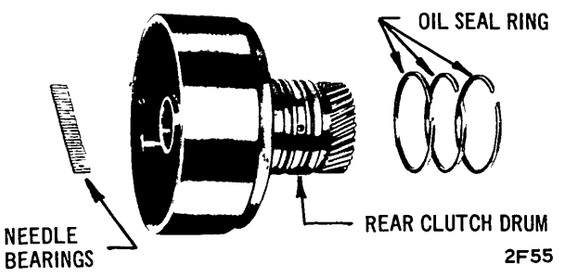
REAR CLUTCH COMPONENTS

rear clutch drum assembly from forward sun gear shaft, then remove forward sun gear shaft from planet carrier (which was used as a holding fixture). *NOTE - Forward sun gear shaft has a locking oil ring at rear end and Torrington bearings on each side of sun gear.* Remove snap ring from rear clutch drum and remove pressure plate, drive, and driven plates. Install rear clutch spring compressor, Tool J-5886 with adapter Tool J-5886-5, and compress return spring to remove snap ring, then with air pressure, blow annular piston out of rear clutch drum. *NOTE - Rear clutch drum assembly consists of reverse sun gear, locking oil seal rings, and needle bearings. Use care when removing assembly from forward sun gear shaft as the thirty needle bearings will fall out.*

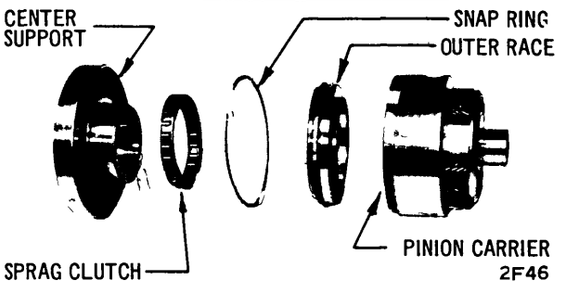
Reassembly: Install "O" ring seal on annular piston and place in Tool J-9621, then tap annular piston down into bore of tool with Tool J-2995. Place tool assembly in rear clutch drum and drive annular piston into rear clutch drum. Install return spring, retainer and snap ring, then compress spring with Tool J-5886 and adapter J-5886-5 and install snap ring. Install drive and driven plates and pressure plate. *NOTE - Steel plates are concave and must be installed with concave side up toward pressure plate.* Place forward sun gear in planet carrier (using planet carrier as a holding fixture) with one Torrington bearing on top side of gear and install rear clutch assembly on shaft. Install two oil seal rings on forward sun gear shaft, then install steel and bronze thrust washers, keeping them in place with Lubriplate. Install front clutch cylinder on shaft, aligning cylinder with plates in rear drum. Install front clutch hub and fibre thrust washer, then install front clutch pressure plate with smooth side up. Install drive and driven plates starting with a lined plate, then alternating with a steel plate, to complete clutch pack. Install input shaft and snap ring.

CENTER SUPPORT: Serviced only as a complete assembly. Inspect support for burrs or distortion. Inspect bearing for nicks and scratches.

PINION CARRIER ASSEMBLY: Serviced only as a complete assembly. Inspect band surface and inner and outer bushings for scores. Rotate pinions on their shafts to check for freedom of movement and for worn or broken teeth. Use a feeler gauge and check endplay which should be .010-.020". Inspect pinion shaft for



REAR CLUTCH DRUM



CENTER SUPPORT, SPRAG CLUTCH & PINION CARRIER ASSEMBLY

tightness to pinion carrier. *NOTE - Sprag clutch is incorporated in pinion carrier assembly and contains 24 sprags. Outer race is fitted in carrier assembly and is held in place with a snap ring.*

FRONT PUMP: Disassembly - With front pump assembly removed from transmission case, remove capscrews and fillister head screws and remove front pump from adapter and converter support. Remove drive and driven gears and remove rubber "O" ring seal from pump body, then remove suction "O" ring seal.

Inspection: Inspect pump body and adapter for nicks, scratches, burrs or scores and check bushings for wear. Clean all parts and lubricate before assembly.

Reassembly: Install new oil pump body-to-adapter "O" ring seal, then lubricate seal and assemble pump body into adapter and tighten the capscrews to 17-22 ft. lbs. Tighten fillister head screw to 25-35 inch pounds. Install pressure apply tube "O" ring seal in pump body. *NOTE - Front pump seal can be removed and replac d without removing oil pump assembly as follows: With transmission removed, pry out oil seal, then install a new seal using Tool J-9615.*

FRONT SERVO: Disassembly - Remove front servo piston guide and piston, then remove piston from servo guide. Remove spring and remove "O" ring seals from guide and piston. To remove actuating lever, remove remove roll pin from body with a 1/8" drift punch.

Inspection: Inspect body for cracks, burrs or obstructions in fluid passages. Inspect piston bore and stem for scores. Inspect actuating lever and shaft for wear and freeness.

R ass mbly: Install new "O" ring seals, lubricating all parts with transmission fluid before assembly. Assemble servo piston and guide together, then install

CONTINUED ON NEXT PAGE

RAMBLER SIX AUTOMATIC TRANSMISSION (C ntinu d)

spring in body and install piston and guide. Press guide into body and install snap ring. Install actuating lever, shaft and roll pin, then check servo piston for freeness by pressing down on piston or by using air pressure.

REAR SERVO: Disassembly - Remove rear servo snap ring, then remove retainer, release spring, and piston. If necessary to replace actuating lever or shaft, remove roll pin by prying it out with side cutters.

Inspection: Inspect body for cracks, burrs or obstructions in fluid passages. Inspect piston and bore for scores.

R assembly: Install new "O" ring seal in piston, then install piston in servo body and install return spring (small end on piston stem). Install retainer and snap ring. If actuating lever removed, replace lever and shaft, then tap roll pin into place

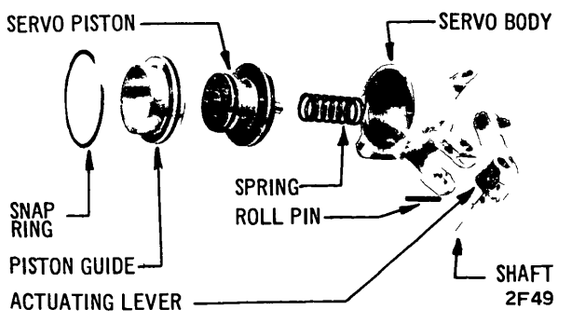
CONTROL VALVE: Disassembly - 1) Remove both oil screens, then remove 8 fillister head screws from lower valve body (2 screws are 1 1/8" long; 1 screw is 1 3/8" long; and 5 screws are 1" long). Turn valve body over and remove 4 fillister head screws, then lift upper body off two dowels in lower valve body.

2) Remove rear cover plate from upper valve body, holding pressure on plate, as it is under spring tension. Remove reverse inhibitor valve and spring, 2-3 shift valve and spring, servo orifice control valve, and the 2-3 shift valve plug.

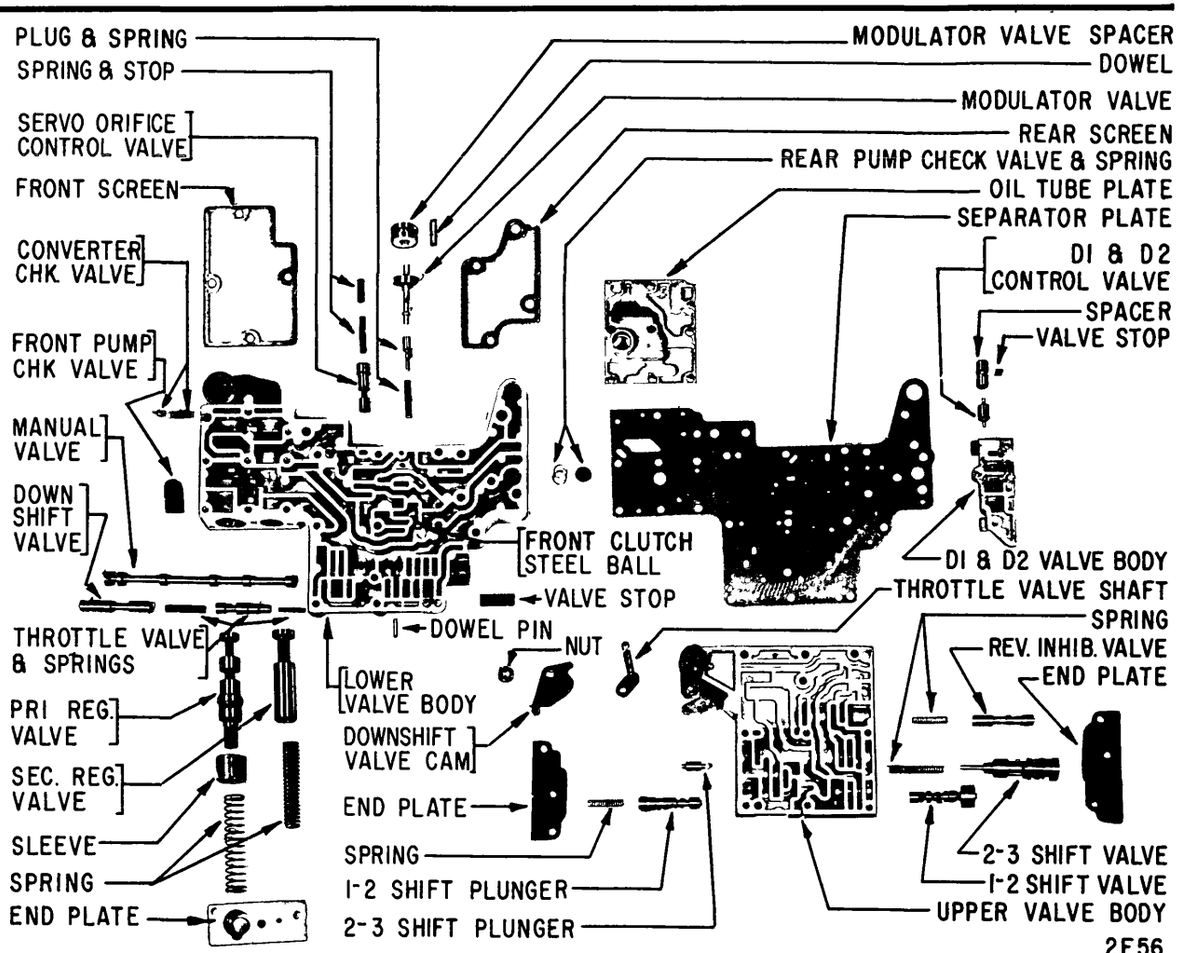
3) Remove separator plate from lower valve body being careful not to lose front and rear pump check valves. *CAUTION - Note the location of these two valves (one is a ball type and the other a reed type) so they may be replaced in their proper locations.* Use the Alnico magnet to remove reed type front pump check valve and ball and spring type rear pump check valve.

4) Remove manual valve and the downshift valve and spring, then remove throttle valve spring with Alnico magnet. Remove throttle valve, throttle valve spring, and stop plate. Remove throttle valve plug pin with Alnico magnet by relieving pressure on plug. Remove modulator valve spacer, throttle modulator valve, plug and spring.

5) Remove three fillister head screws from pressure regulator end plate on lower body. *CAUTION - Apply pressure to plate as it is under heavy spring tension.* Remove plate, primary regulator valve spring, sleeve and valve. Remove secondary regulator valve spring and valve.

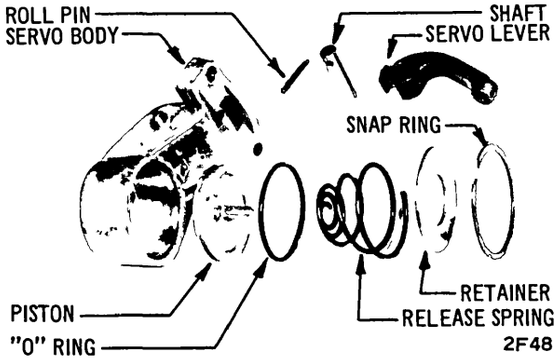


FRONT SERVO ASSEMBLY



TRANSMISSION CONTROL VALVE ASSEMBLY

6) Remove D-1 and D-2 control valve spacer stop, spacer plug and D-1 and D-2 control valve "range control valve" from D-1 and D-2 control valve body.



REAR SERVO ASSEMBLY

Inspection: Clean all parts in solvent and blow dry with air. Inspect all valve and plug bores for scores. Check fluid passages for obstructions. Inspect check valves for free movement. Inspect all mating surfaces for burrs and distortion and all valves and plugs for burrs and scores. *NOTE - Crocus cl th may b used to p lish valves and plugs providing car is tak n t av id rounding sharp edges of valv s and plugs.* Inspect all springs for distortion, then check valves and plugs for free movement in their respective bores. *NOTE - Valves and plugs, when dry, must fall f th ir wn w ight in their respective bores.*

Reassembly: 1) Install D-1 and D-2 control valve in control valve body, then install spacer plug and spacer stop. Install 1-2 shift valve, 2-3 shift valve spring, and 2-3 shift valve, reverse inhibitor valve spring and valve in upper valve body, then install rear end plate with three fillister head screws and lockwashers. 2) Install 1-2 shift plunger, 1-2 shift valve spring, and 2-3 shift plunger in upper valve body, then install front

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RAMBLER SIX AUTOMATIC TRANSMISSION (C ntinu d)

end plate with three fillister head screws and lockwashers. Install secondary valve and spring, primary valve, sleeve, and spring in lower valve body, then install lower valve body end plate with three fillister head screws and lockwashers.

3) Install orifice control valve and spring in lower valve body, then compress spring with a small screwdriver and insert orifice control valve stop. Install modulator valve spring, plug, valve spacer, and insert dowel pin to retain spacer.

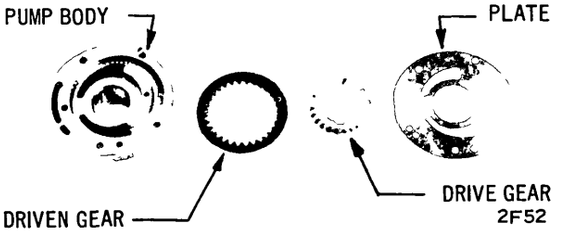
4) Install throttle valve stop, throttle valve return spring, throttle valve, throttle valve spring, and the downshift valve, then insert dowel pin. Install manual valve. Install converter out check spring and ball, then install steel ball (front clutch), rear pump check valve, and front pump check valve spring and check valve. Install spacer plate and check for freeness of pump check valve before installing upper valve body.

5) Install upper valve body on lower valve body in alignment with the two dowel pins on lower valve body, making sure manual valve is aligned with detent lever. Install four fillister head screws, then turn valve body over and install the two 1 1/8" screws that retain D-1 and D-2 valve body. Install five 1" screws and the 1 3/8" screw through lower valve body. Tighten all fillister head screws to 20-30 inch pounds.

6) Install oil tube cover and the eight fillister head screws and. tighten to 20-30 inch pounds. Install rear screen with the two fillister head screws and the front oil screen with the four flat head screws.

TRANSMISSION UNIT INSTALLATION (TRANSMISSION OUT OF CAR)

1) Install output shaft and rear thrust washer through front end of case, then install rear pump plate, rear pump drive pin, and drive gear on output shaft. Install the three oil seal rings on output shaft and lubricate them with transmission fluid, then install rear pump



REAR PUMP ASSEMBLY

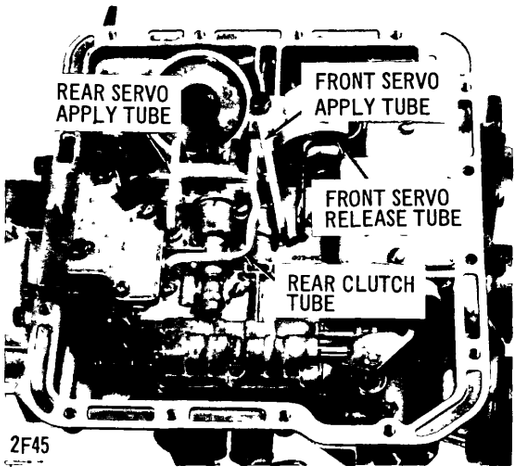
body and driven gear. Tighten large fillister head screws to 55-66 inch pounds and small fillister head screw to 20-30 inch pounds.

2) Install governor drive ball bearing in output shaft, then install governor assembly and retain in place with snap ring. *NOTE - When installing governor, plate on governor assembly is positioned to rear.* Install front snap ring, speedometer gear drive ball, speedometer gear and rear snap ring, then install extension housing and gasket and tighten attaching capscrews to 100-120 inch pounds.

3) Install rear band in transmission case with anchor strut toward rear band adjusting screw. Install planet carrier assembly, sprag clutch, and center support together. Line up center support oil holes with holes in case and install the two center support screws in case. Tighten screws to 120-154 inch pounds.

4) Install front and rear clutches and forward gear shaft assembly, making sure that the one small and three large oil seal locking rings are properly locked in the oil grooves. Install front pump assembly and selective thrust washer, then tighten front pump body attaching screws to 100-120 inch pounds. After installation of front pump, recheck transmission endplay *(see "Transmission Unit Removal - Transmission Out of Car" above)*. Transmission endplay should be .009-.0322". If not within limits, remove front pump assembly and install a selective thrust washer of proper thickness to obtain correct endplay.

5) Install oil pressure tube, converter in and out tubes and oil suction tube in front pump. Install valve body on



OIL TUBE IDENTIFICATION

transmission case and tighten the three capscrews to 55-66 inch pounds. Install shift rod and throttle rod to linkage on valve body.

6) Install rear servo in case using Lubriplate to hold actuating strut in actuating arm, then insert actuating strut in band strut and tighten capscrews to 120-154 inch pounds. Install front servo in case using Lubriplate to hold actuating strut in actuating arm. Hold pressure on adjusting screw while inserting actuating strut in band strut, then tighten capscrews to 100-120 inch pounds.

7) Install rear servo apply tube, rear clutch tube, front servo apply and release tubes. *CAUTION - Do not distort tubes during installation. Short bend of front servo apply tube and long bend of release tube is installed in servo body.* Adjust front and rear servos *(see "Adjustments" above)*. Install throttle cable to inside throttle rod and install throttle cable bracket. Install oil pan gasket on oil pan and hold in place with Lubriplate, then install pan and tighten screws to 100-120 inch pounds.

RAMBLER EIGHT & CHECKER AUTOMATIC TRANSMISSION

DRIV-ER-MATIC & DUAL RANGE
Checker (1962)
FLASH-O-MATIC
Rambler Ambassador, Series 6280 (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING THE ENGINE BY PUSHING CAR: NOTE* - Pushing rather than towing is recommended (to avoid possibility of car ramming towing vehicle). Place selector lever in Neutral "N" position. When speed of 15-20 MPH is reached, turn ignition "on" and move selector lever to "D-1" or "D-2" position.

►*TOWING THE CAR:* If transmission inoperative, always tow car with rear wheels raised or with propeller shaft disconnected. If transmission operating properly car can be towed for **short distance** with selector lever in Neutral "N". Prolonged towing may cause damage to transmission.

DESCRIPTION: Same design as used on corresponding previous models.

LUBRICATION

►*LUBRICATION NOTE: Check fluid level every 1000 miles (Checker); 4000 miles (Rambler). Drain and refill every 15,000 miles (Checker); 25,000 miles (Rambler).*

Capacity (Drain & Refill) - Approximately 9½ qts. (Rambler); 10 qts. (Checker).

After Overhaul - Approximately 11 qts. (Rambler).

Checking Fluid Level - With engine and transmission at normal operating temperature and running at idle speed, operate transmission through all ranges. Place transmission in "N" (Neutral) on Rambler American, and in "D-2" range (other models), then check fluid level on dipstick and add fluid as required to bring level to "F" mark. *NOTE - Approximately 1½ pts. of fluid are required to raise fluid level from "L" to "F" mark.*

Draining & Refilling - With transmission at normal operating temperature, rotate converter until one of the drain plugs is visible through opening in converter bell housing. Remove plug and turn converter 180° and remove second drain plug. Disconnect oil filler tube at oil pan and drain transmission. After draining, replace plugs and tighten converter plugs to 7-10 ft. lbs. Install 6 qts. (Rambler); 5 qts. (Checker) of recommended fluid, then set hand brake and run engine with transmission in "N" (Neutral) position. Add 3½ qts. (Rambler); 4 qts. (Checker) of fluid and move selector lever through all ranges. Check oil level, and if necessary, add fluid to bring level to "F" mark on dipstick. *RAMBLER NOTE - 1½ pints approximately, is required to raise fluid level from "L" mark to "F" mark. DO NOT OVERFILL.*

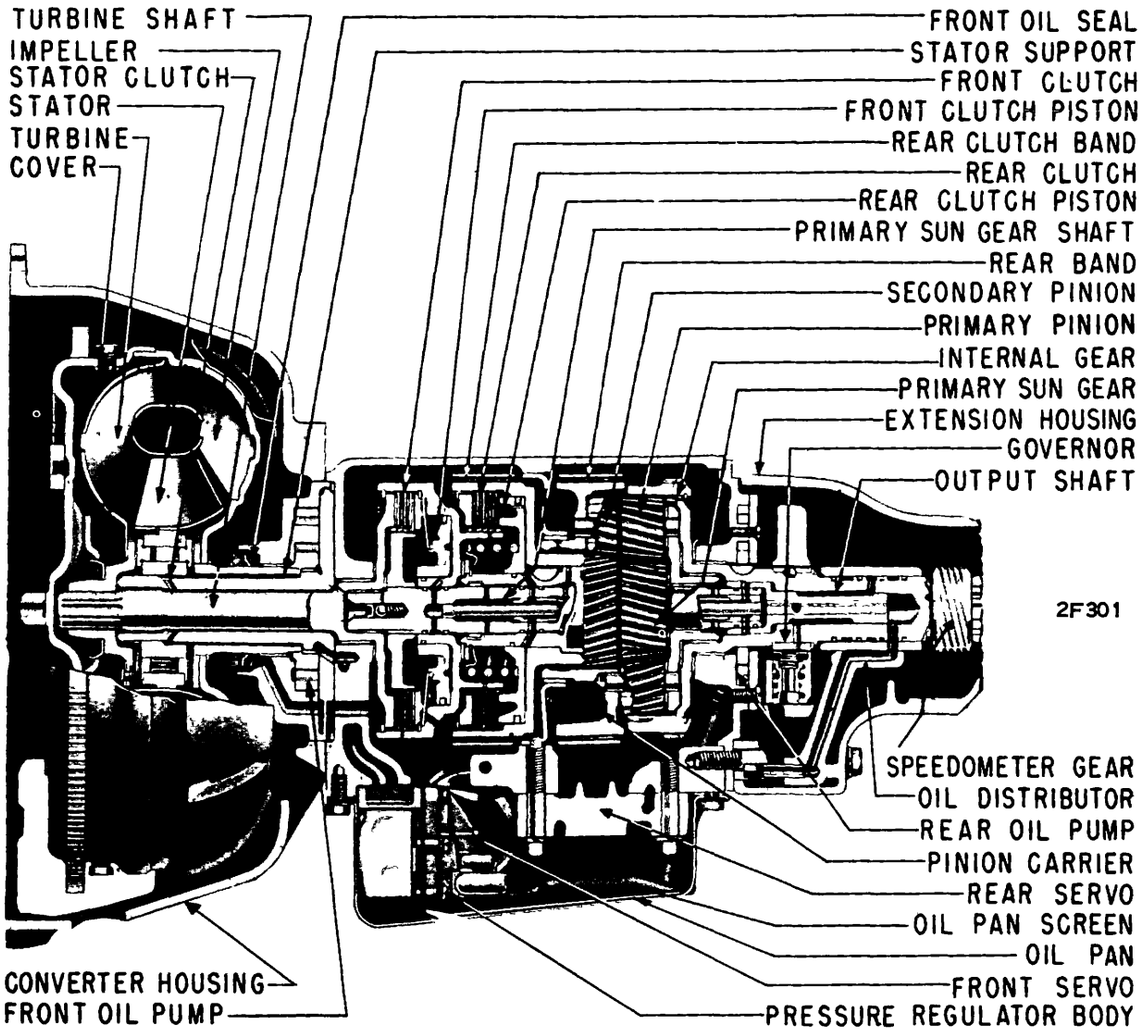
Recommended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

CHECKER

Manual Linkag Adjustm nt: Disconnect manual shift rod from selector lever on steering column and from lever on transmission. Position transmission selector lever so indicator is down against stop in "D" (Drive) position. Place transmission manual lever in the "D" (Drive) detent (second from top of transmission), then adjust length of manual shift rod so it fits into ball joint on steering column and into shift lever on transmission without changing position of selector lever or transmission shift lever. Tighten ball joint nut at steering column and install washer and cotter pin at transmission lever. Move selector lever through all positions and check operation.

Neutral Safety Switch Adjustment: Starter circuit must be open in all positions except "N" (Neutral). To adjust, loosen neutral switch-to-steering column screws and position switch so starter circuit is closed when selector lever is at "N" (Neutral).

Kickd wn Switch Adjustm nt: Loosen the two nuts on kickdown switch (one above and the other below toeboard) and rotate the upper nut to obtain a clearance of ¼" between switch and accelerator pedal when carburetor throttle valves are in a wide open position.



RAMBLER EIGHT FLASH-O-MATIC TRANSMISSION SECTIONAL VIEW

PUSH BUTTON CONTROL

RAMBLER

Gear Selector Pushbutton C ntrol Adjustment: Disconnect cable at transmission lever, then push "L" (Low) button in and move selector lever on transmission all the way to rear. Adjust cable linkage at clevis to align holes in clevis and lever. Install clevis pin and washer and tighten clevis securely. Check adjustment in all five positions.

CONTINUED ON NEXT PAGE

RAMBLER EIGHT & CHECKER AUTOMATIC TRANSMISSION (C nt.)

Parking L v r Adjustment: Pull "Park" lever handle out and disconnect cable at transmission (transmission outer lever will be in its off position and inner lever will lay against toggle lever pin). Adjust clevis on cable to index perfectly with hole in lever. Install clevis, pin and washer and tighten.

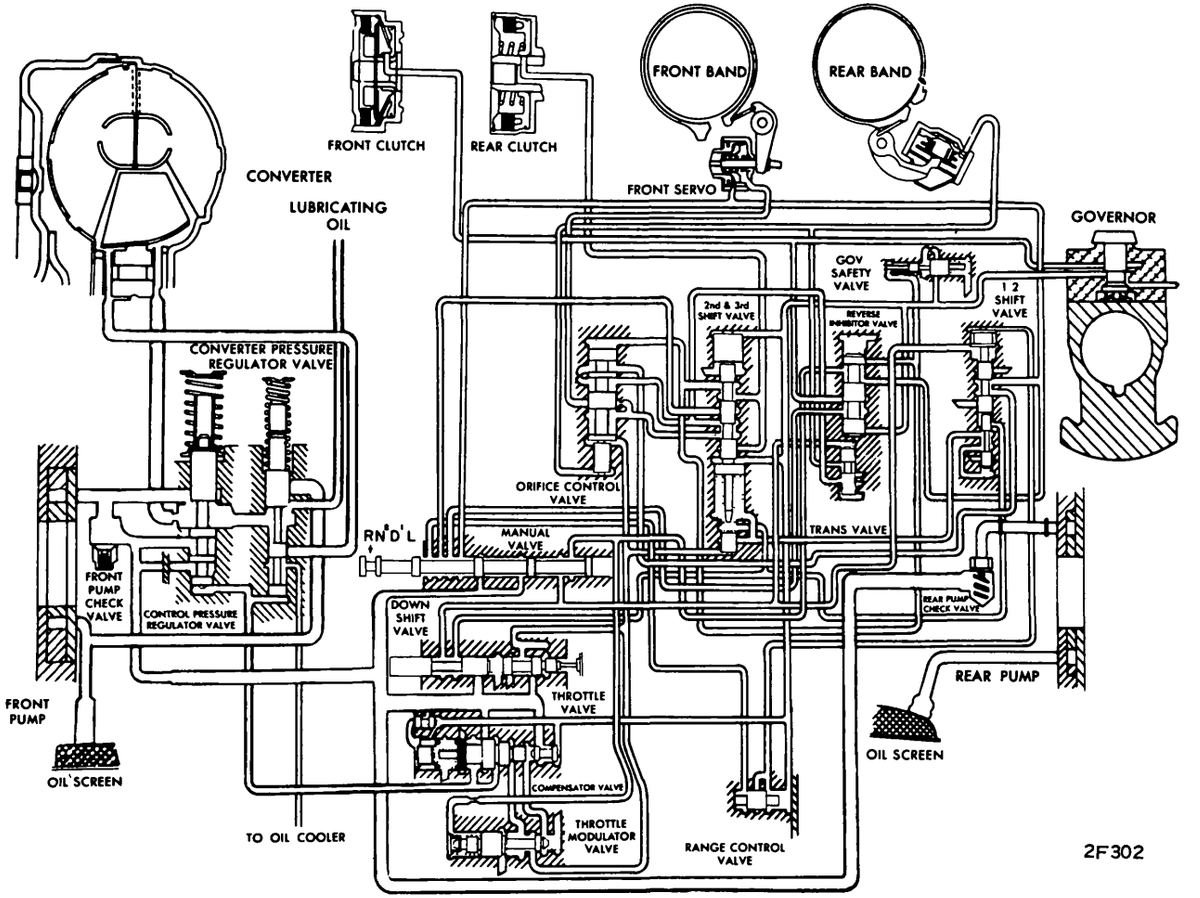
Gear S lector Assembly R moval: Disconnect battery, then disconnect back-up light wire at connector and from junction block at firewall. Disconnect control light bulb from connector under instrument panel, then disconnect neutral safety switch wire from junction block and relay at left wheelhouse panel and pull wires through wall. Remove gear selector escutcheon from instrument panel, then remove the three screws retaining gear selector control and move the unit forward to clear pushbuttons from instrument panel. Lower unit and move it toward rear and remove retainer nuts from both cable attaching pins. Pry cable outer looms from brackets of control unit. *NOTE - If safety switch or back-up light switch r quire replacing, bend prongs of switch up with a screwdriver. When installing switch, bend prongs d wn car fully.* To install the assembly, reverse removal procedures.

CONTROL UNIT ADJUSTMENT
RAMBLER

Adjustm nt: *NOTE - Th following instructions supers d all previous testing procedures.* Remove pressure test plug at left front side of transmission and install the 1/8" pipe plug extension provided with Tool J-8773 (Vacuum & Solenoid Control Adjusting Kit), then connect an oil pressure gauge to the extension. Disconnect vacuum line at vacuum and solenoid unit and attach vacuum gauge to "T" fitting on test line. Start engine and bring to normal operating temperature with transmission in neutral. At engine idle speed of 475 RPM, transmission in neutral, turn needle valve on test line to lower vacuum reading on gauge to obtain a vacuum reading of 13.8" Hg. With correct vacuum reading, oil pressure reading should be 85 lbs. plus or minus 3 lbs. If oil pressure reading is not correct, loosen vacuum and solenoid unit locknut and turn unit in toward case if pressure is too low; away from case if pressure is too high. After correcting adjustment, cover bleed holes provided in needle valve to stop atmospheric pressure entering test line. This will increase vacuum reading on the test gauge to highest engine vacuum and oil pressure gauge should then read 55-65 lbs. With rear wheels raised off floor, place transmission in "D-2" position, then cover bleed hole in needle valve. Accelerate engine until transmission shifts into direct drive. Pressure gauge should read 25-35 lbs.

CHECKER

Adjustment: *NOTE - Aft r unit is installed on transmissi n cas , it sh uld be initially adjusted by screwing it in r out so th distance between front edge of unit and transmissi n cas is 3/8".* Remove 1/8" pipe plug from lower left corner of transmission case and install a 300 lb. pressure gauge. Remove fitting at rear of vacuum solenoid unit and install a vacuum gauge using a "T" fitting. Install vacuum line so unit will operate and vacuum gauge will register. Connect a tachometer to engine, then start engine and run several minutes to bring to normal operating temperature.



HYDRAULIC CIRCUIT DIAGRAM (RAMBLER V8)

Place selector lever in "D1" ("D" on Superba A1OL) and apply parking and service brakes. Accelerate engine until a reading of 10.5" HG is obtained on vacuum gauge. Reading on pressure gauge should be 90-105 lbs. If pressure is below specifications, turn vacuum and solenoid unit inward to increase pressure; outward to decrease pressure. When correct pressure has been obtained, tighten locknut. *NOTE - It is recommended that vacuum and solenoid unit not be turned more than 1/2 turn either way from initial setting of 3/8".*

►*CAUTION: When making the above tests, do not operate engine for more than 10 seconds at any one interval.*

BAND ADJUSTMENT

►*TORQUE WRENCH DIAL READING NOTE:* To obtain correct dial reading on wrench, compensate for the additional length of adapter Tool J-7847 as follows: Multiply "9" (torque required on adjusting nut) by lever length of wrench (middle of handle to center of wrench socket drive). Record the product of this multiplication. Add length of torque wrench to length of adapter, Tool J-7847 (6"). Record sum of this addition. Divide product of the multiplication by the sum of the addition. The quotient of this division will be the reading on torque wrench dial which will be required to obtain 9 ft. lbs. on rear band adjusting nut.

Front Band: Remove transmission oil pan, gasket, and screen. Use Tool J-5880 (Rambler), Tool No. 7195 (Checker Superba) and loosen adjusting screw, then insert gauge block (part of tool) between end of adjusting screw and servo piston rod. Turn screw in until it overruns and remove gauge block. *NOTE* - It may be necessary to back adjusting screw off slightly to remove gauge block. If so be sure to tighten screw the same amount after block is removed. Tighten locknut to 20-25 ft. lbs. and install screen, gasket, and transmission oil pan. Refill transmission.

Rear Band: Rambler - Loosen locknut on adjusting screw located on left side of transmission case and install Tool J-7847 on adjusting screw. Tighten screw with torque wrench to 9ft. lbs. *(see "Torque Wrench Dial Reading Not " above).* Mark adjusting screw with a reference point and **back off adjusting scr w 1½ turns.** Tighten locknut securely.

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RAMBLER EIGHT & CHECKER AUTOMATIC TRANSMISSION (C nt.)

Ch ck r Sup rba - Remove cover plate from floor pan and position Tool No 7225 on adjusting screw and loosen locknut Using "T" handle of tool, tighten adjusting screw until wrench overruns (10 ft lbs), then **back off adjusting screw 1½ turns.** Hold adjusting screw stationary and tighten locknut to 35-40 ft lbs

TESTING

STALL TEST: Connect tachometer to engine and place it where it can be easily read from driver's seat Set hand brake and start engine Place selector lever in "D1" position, apply service brakes and operate engine at full throttle. Note tachometer reading. *(CAUTION - Do not operate engine at high speed while selector lever is in one of the driving ranges, with rear wheels held stationary, for more than 10 seconds at a time to prevent overheating transmission)* Normal stall speeds are as indicated in table below If stall speed is greater than normal, slippage in transmission is indicated If stall speed is below normal, poor engine performance is indicated

Stall Speeds

Model	Engine RPM
Series 80	1600

SHIFT SPEEDS
(Rambler Ambassador)
(Series 80)

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	10-14 MPH	26-30 MPH	37-41MPH
2-3	21-25 MPH	46-50 MPH	64-68 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	16-20 MPH	28-32 MPH	58-62 MPH
2-1	6-10 MPH		25-29 MPH

(Checker Superba)

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	5-8 MPH	22-30 MPH	
2-3	10-13 MPH	41-50 MPH	
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	7-11 MPH		35-49 MPH
2-1	3-7 MPH		

AIR PRESSURE TEST (Transmission in Car)· Raise car on hoist and remove transmission oil pan and control valve assembly The front servo tubes should remain in front servo and the servo attaching screw must be tight *NOTE - When making air pressure tests, hold a clean towel over transmission opening to prevent excessive oil spray.*

Front Clutch· Apply air pressure to front clutch passage (on transmission case rear flange). Listen for a dull thud indicating clutch is operating. Retain air pressure in this passage for several seconds to check for leaks in this circuit

G vernor Valve· Remove governor inspection hole cover and apply air pressure to front clutch passage (see above) Listen for a click and watch valve snap inward Replace inspection hole cover

R ar Clutch: Apply air pressure to rear clutch passage (on transmission case rear flange). Listen for a dull thud indicating clutch is operating. Retain air pressure in this passage for several seconds to check for leaks in this circuit

Front Band & Servo: Apply air pressure to front servo apply tube (rear tube) and observe band application.

Rear Band & Servo: Apply pressure to rear clutch oil passage (transmission case rear flange), and observe band application.

► *TESTING NOTE· If servos, bands, clutches, and governor operate with air pressure, then the no-drive problems, erratic shift, or no-upshift conditions indicate that the control valve assembly and pressure regulator valve assembly is the cause of the trouble. See "Control Valve" and "Pressure Regulator Valve" below.*

TROUBLE SHOOTING & DIAGNOSIS

INITIAL ENGAGEMENT TOO ROUGH: Idle speed may be too high Control pressure may be too high caused by improper adjustment of throttle control vacuum unit. Regulator control valve may be dirty

INITIAL ENGAGEMENT DELAYED: Check fluid level On Rambler American, adjust the rear band as it may be too loose. The control pressure may be too low at idle speed Clean control valve assembly and pressure regulator assembly Check front pump for wear Check fluid circuits for leaks and correct as necessary

INOPERATIVE IN ALL RANGES: Check fluid level Manual linkage may be disconnected No control pressure, which may be caused by trouble at front pump Check rear band adjustment Check rear servo action with air pressure Inspect and clean control valve assembly Check engine stall speed, as converter may not be operating properly

NO DRIVE IN "D" OR "L" POSITION: Check fluid level Manual linkage not properly adjusted Control pressure may be low Adjust vacuum control unit Clean control valve and pressure regulator valve assemblies Check front clutch action with air pressure. On Rambler American, check the rear servo and the band with air pressure. Check the transition valve in the control valve assembly as it may be stuck

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be too low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly

LOCKS UP IN "D" POSITION· Rear clutch or front band may be applied Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failure.

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo or "one-way" clutch for mechanical failure Check rear clutch Clean control valve assembly assembly

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band, or "one-way" clutch may be applied Clean control valve assembly

LOCKS UP IN "R" POSITION: Check front clutch and band and front servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited, check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Control pressure may be too high. Check and correct vacuum and solenoid adjustment. Check and adjust bands. Clean governor valve assembly.

1-2 UPSHIFT SLIPPAGE (LIGHT THROTTLE): This condition may be caused by an unbalanced vacuum condition due to clogged vacuum ports or vacuum leakage at carburetor. Check adjustment of Vacuum & Solenoid Control Unit on transmission *(See "Control Unit Adjustment" above).*

1-2 UPSHIFT SLIPS: Adjust vacuum and solenoid unit. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.

NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check for stuck governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Adjust vacuum solenoid unit.

2-3 UPSHIFT ROUGH: Control pressure may be too high, adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for stuck governor valve.

2-3 UPSHIFT "PILE-UP" (LIGHT THROTTLE): Se *"1-2 Upshift Slippage (Light Throttl)" above*

2-3 UPSHIFT SLIPS: Control pressure may be too low, adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for internal leaks and stuck governor valve.

NO 2-3 UPSHIFT: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit Adjust vacuum solenoid unit.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Orifice control valve may be stuck.

3-2 KICKDOWN (EARLY): Check for stuck governor valve.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Rear servo check valve may be stuck

WILL NOT START BY PUSHING: Rear pump not opera-

CONTINUED ON NEXT PAGE

RAMBLER EIGHT & CHECKER AUTOMATIC TRANSMISSION (C nt.)

ting. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust vacuum solenoid unit. Check for damaged internal linkage or pawl.

TRANSMISSION REMOVAL & INSTALLATION

RAMBLER

►*TRANSMISSION REMOVAL NOTE (CARS WITH SINGLE EXHAUST): Disc nnect cross-over (right) exhaust pip at manifold flange and "U" clamp conne ctions at l ft exhaust pip .*

REMOVAL: Disconnect battery cable, then raise car on a hoist and place jack stands under rear of car at body sills. Disconnect oil filler tube at oil pan and drain transmission, then disconnect oil cooler lines at transmission. Disconnect vacuum line and wire terminal at vacuum unit located at rear of transmission. Disconnect speedometer cable at transmission and rear brake hose bracket from floor panel. Disconnect shift cable from lever at transmission, then disconnect rear shock absorbers from rear axle. Disconnect torque tube, propeller shaft, and parking brake cable, then lower rear axle and move rearward, separating torque tube and propeller shaft from transmission. Place a hydraulic hoist with a suitable cradle in position under transmission oil pan, then remove transmission-to-converter housing upper capscrews and remove shift cable bracket. Install two guide pins, Tool J-1434 into capscrew holes, then remove lower capscrews and washers. With hydraulic hoist and cradle adjusted so transmission is in alignment with converter housing, pull transmission to rear to disengage it from housing and converter assembly. Lower assembly and remove from car.

►*TRANSMISSION, BELL HOUSING & CONVERTER ASSEMBLY REMOVAL NOTE:* These parts may be removed as an assembly as follows: In addition to transmission removal procedure (see above), remove the starter attaching bolts and remove starter. Support transmission and remove crossmember at side sill bolts. Lower engine and block engine on both sides from the top ledges of oil pan to side sill crossmember (these blocks should be 5" long and 2" square). Remove bell housing-to-engine bolts and bell housing lower mud pan. Remove six capscrews attaching torque converter to drive plate. Complete removal as outlined above.

INSTALLATION: Reverse the removal procedure and note the following: If transmission removed separately, position front pump drive tangs on converter in a horizontal position and position the front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 40-45 ft. lbs. If converter has been removed, converter-to-drive plate attaching capscrews must be tightened to 23-28 ft. lbs.

CHECKER

REMOVAL: Raise car and drain transmission fluid, then loosen tube clip capscrew at extension on starter motor and rotate filler tube out of the way. Disconnect vacuum line at vacuum unit (rear of transmission), then disconnect hand brake cable at drive shaft if chassis is so equipped. Disconnect manual shift linkage at shift lever on transmission, then disconnect the two oil cooler lines on right side of transmission (if so equipped). Disconnect propeller shaft at transmission companion flange and wire propeller shaft out of the way. Place a hydraulic hoist with a suitable transmission lift cable in position under transmission oil pan and adjust hoist to align cradle with oil pan flange, then hoist enough to support transmission. Remove transmission case to converter housing upper capscrews and lockwashers and install two pilot studs into screw holes. Remove lower transmission case to converter housing capscrews. Pull transmission straight toward rear of car to disengage it from converter housing and converter assembly.

INSTALLATION: Reverse removal procedure, being careful to align turbine shaft splines with turbine hub splines and the converter impeller lugs with slots in front pump drive gear.

TRANSMISSION OVERHAUL

►*CONVERTER OVERHAUL NOTE:* Torque converter is a sealed assembly (case is welded together during manufacture) and cannot be disassembled for service.

TRANSMISSION OVERHAUL: *See "Warner Automatic Transmission" in 1960 Final Data, page 506, or lat r Manual edition.*

STUDEBAKER FLIGHTOMATIC TRANSMISSION

Studebaker Lark & Hawk (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Move selector lever to "N" (Neutral) position. When car speed reaches 20 MPH, turn the ignition switch on and move transmission selector lever to the "L" (Low) position. It is recommended that the car be pushed to start it rather than be towed.

►*TOWING CAR CAUTION:* Car can be towed for very short distances with the transmission selector lever in the "N" position. Prolonged towing will result in damage to the transmission unless the drive shaft is disconnected or the rear wheels are off the ground.

DESCRIPTION

DESCRIPTION: Transmissions used on all models are similar to transmissions used on corresponding previous (1961) models. Heavy duty and Taxicab transmissions are water cooled by circulating transmission fluid through an oil cooler located in car radiator. The transmission used on 170" Over-Head-Valve engines is similar to the other transmissions except that a one-way (sprag) clutch is used in the planetary gear train to eliminate application of rear band when transmission is operating in "D" (Drive) range. *NOTE - Rear band is applied only when selector lever is in "L" (Low) or "R" (Reverse).* In conjunction with the addition of a sprag clutch, the control valve assembly was also changed to eliminate the rear servo check valve and spring.

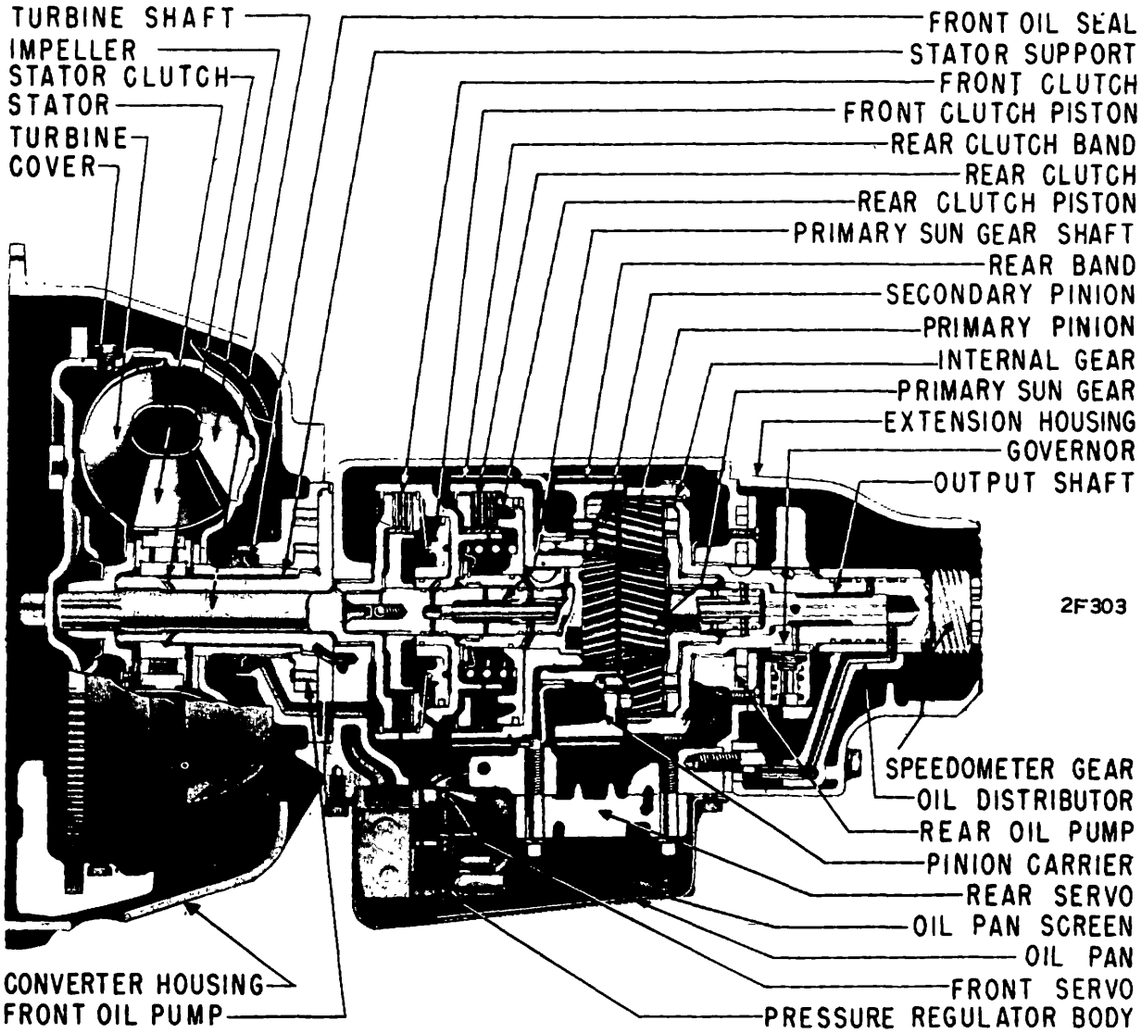
LUBRICATION

►*CAUTION: Check fluid level at 1000 mile intervals. Drain and refill at 15,000 mile intervals, using Automatic Transmission Fluid Type "A" (Suffix "A").*

Capacity - 9 qts. (Exc. Taxicab & Heavy Duty Trans.). 9½ qts. (Taxicab & Heavy Duty Trans.).

Checking Fluid Level–Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission have reached normal operating temperature. Roll up the floor mat from right side until oil level inspection hole cover in floor pan is accessible, and remove cover. Clean all dirt and foreign material from around transmission fluid dipstick. Apply the parking brake and foot brake and move selector lever slowly from "P" position to "R" position and then back to "D" position. Remove dipstick and wipe clean, then install it in transmission and **turn clockwise to the lock position.** Remove dipstick and check fluid level. Add fluid through dipstick hole to raise level to the "F" mark on dipstick. *NOTE*–The amount of fluid required to raise the level from "L" mark on dipstick to "F" mark is approximately 1½ pints.

Draining & Refilling–Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission are at normal operating temperature. Stop engine and raise car on hoist. Remove transmission dipstick (*see "Checking Fluid Level" above*). Remove transmission drain plug. Rotate the converter until one of the drain plugs is visible through hole in converter housing, remove drain plug and quickly rotate converter 180°, and remove the other converter drain plug. After fluid has drained from transmission and converter, install transmission drain plug using a new gasket, and the two converter drain plugs. Lower the car to floor and install three quarts of Automatic Transmission Fluid Type "A" (Suffix "A") through dipstick hole. Apply parking brake and foot brake, then start engine and operate it with selector lever in "N" (Neutral) position. Slowly pour four quarts of fluid into transmission. Move selector lever through all ranges. Check oil level on dipstick (see "Checking Fluid Level" above). Add sufficient oil to bring level up to "F" mark on dipstick.



STUDEBAKER FLIGHTOMATIC TRANSMISSION SECTIONAL VIEW

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on Car Model Pages.*

Manual Linkage Adjustment: Disconnect shift lever-to-transmission manual valve lever rod at transmission manual valve lever by removing the ball joint assembly. Place selector lever in "D" (Drive) position and place the manual lever on transmission in the "D"

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC TRANSMISSION (C ntinu d)

(Drive) position (this is center of manual valve lever travel). Adjust the shift lever-to-manual valve lever rod until the ball joint stud will slip freely through the hole in the manual valve lever. Install ball joint stud locknut and lock to rod.

N utral Saf ty Switch Adjustment: Place transmission selector lever in "N" (Neutral), then loosen switch bracket on steering column jacket. Align pin hole in switch lever with corresponding hole in switch body and install pin to maintain alignment. Tighten bracket attaching screws. Test operation of switch. Engine should start only with selector lever in "P" (Park) or "N" (Neutral) position.

BAND ADJUSTMENT

Fr nt Band: Remove transmission oil pan, gasket and screen. Loosen the front servo adjusting screw locknut two full turns with a 9/16" wrench. Check the adjusting nut for free rotation in the actuating lever and free the adjusting screw if necessary. Install the gauge block of the adjusting tool (J-5880) between the servo piston rod and the adjusting screw. Place the Front Band Adjusting Tool J-5880, on the adjusting screw and tighten until the tool overruns. **Back off the adjusting scr w n full turn,** and tighten locknut to 20-25 ft. lbs. Place the screen over the rear pump inlet first then over the front pump inlet, and install the screen retaining clip. Position a new oil pan gasket on transmission oil pan flange and hold it in place with petroleum jelly. Align oil pan on transmission flange and install capscrews and lockwashers. Tighten to 10-13 ft. lbs. Install drain plug and fill transmission *(s "Lubrication" above).*

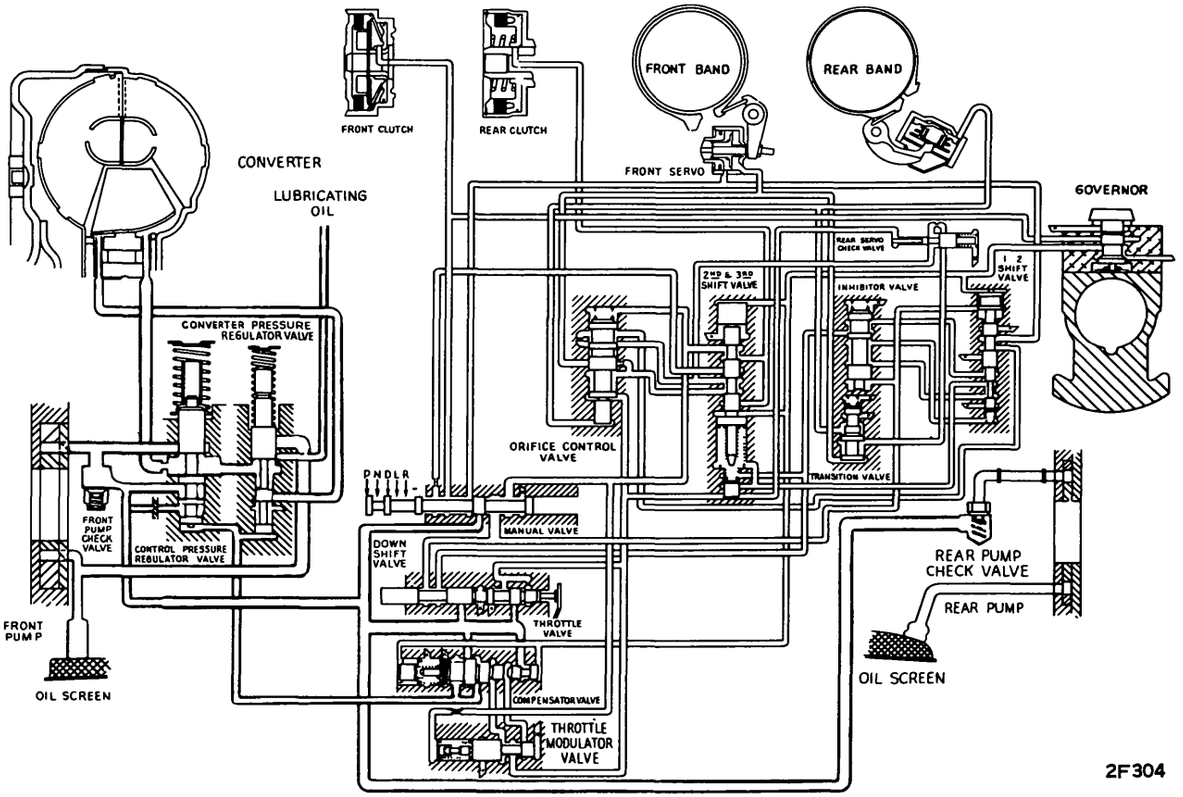
Rear Band: Remove inspection cover in center of front compartment floor and clean all dirt and foreign material from around rear band adjusting screw and locknut. Oil adjusting screw threads, then using Tool J-5883, tighten screw until tool overruns. **Back off adjusting screw 1½ turns** and tighten locknut to approximately 35-40 ft. lbs. *CAUTION - It is very important that the adjusting screw be backed off 1½ turns to avoid damage to band and s rvo.*

THROTTLE VALVE STOP ADJUSTMENT

Thr ttl Valv St p: Remove oil pan and screen, then remove compensator tube and bellcrank-to-throttle valve lever rod from throttle valve lever. Hold throttle valve lever against throttle valve stop and measure distance from center of hole in throttle valve lever to machined surface on rear of transmission case. This distance should be a minimum of 4 7/32" and not to exceed 4 5/8". If not within specifications, bend throttle valve stop as necessary. To bend the stop, remove compensating pressure tube from pressure regulator valve assembly and control valve assembly and bend stop with Tool J-5887.

TESTING

STALL TEST: Connect tachometer to the engine and place it where it can be easily read from the drivers



HYDRAULIC CIRCUIT DIAGRAM (6 CYL. MODELS)

seat. Set the hand brake and start the engine. Place selector lever in "D" (Drive) position, apply service brakes and operate the engine at full throttle. Note tachometer reading. Repeat this procedure with selector lever in "L" and "R" positions. *(CAUTION–Do not operate the engine at high speed while the selector lever is in one of the driving ranges, with the rear wheels held stationary, for more than 10 seconds at a time or for a total time greater than one minute in any half hour period).* Normal stall speeds are 1450-1550 RPM (6 Cyl.), 1550-1650 (259" V8 Eng.), 1750-1850 (289" V8 Eng.), If stall speed is greater than normal, slippage in transmission is indicated. If stall speed is between 900-1000 RPM (if engine is normal), slippage is indicated in torque converter free-wheel unit.

ROAD TEST: A thorough test must be made to determine the shift speed and transmission performance. The initial application of the various bands and clutches should be checked in all driving ranges by stopping the car and moving the selector lever to "D", "Lo", & "R" ranges. A driving test should be made in the "D" range to check the shift speeds. *See "Shift Speeds" below.*

FLUID PRESSURE TESTS: Fluid pressure tests should be made to ascertain whether or not the pressure regulator system is functioning correctly and to determine if there is fluid leakage in the clutch circuits. Remove the 1/8" pipe plug located near throttle lever and manual lever, and install pressure gauge hose (pressure gauge should be in drivers compartment). Connect a tachometer to engine and position it so it can be read from driver's compartment. Make the following tests:

►*FLUID PRESSURE TEST CAUTION (CARS WITH CLOSED CRANKCASE VENTILATION):* Disconnect airflow valve from carburetor or manifold, and temporarily plug carburetor or manifold vacuum port during pressure tests or adjustments.

1) Idle Pressure Test - With engine and transmission at normal operating temperature, and with engine at normal idle speed, move selector lever to "D", "L" & "R" positions. The pressure reading should be approximately 50-60 lbs. (6 Cyl.); 50-80 lbs. (V8, Exc. Taxicab); 59-95 lbs. (V8 Taxicab), in all ranges. If pressure is low in any one range, a fluid leak in that circuit is indicated. If pressure is high, the throttle linkage should be checked and adjusted. *See CARBURETOR on Car Model pages.*

2) Pressure Regulation Test - Move selector lever to "D" (Drive) range and firmly set hand brake and foot brake. Run engine at 1000 RPM and check pressure gauge. Pressure should be approximately 70-75 lbs. (6 Cyl.); 80-85 lbs. (V8, Exc. Taxicab); 95-100 lbs.

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC TRANSMISSION (Continued)

(V8 Taxicab). If pressure is less, it indicates the throttle linkage is too long and must be adjusted. If pressure is greater, it indicates throttle linkage is too short.

3) Stall Pressure Test - Firmly set hand and foot brakes and operate engine at full kickdown position. Move selector lever to "D", "L", "R" ranges and check pressure gauge. Pressure in "D" & "L" should be 100-130 lbs. (6 Cyl.); 130-175 lbs. (V8, Exc. Taxicab); 132-184 lbs. (V8 Taxicab). In "R" range, the pressure should be 160 lbs. minimum (6 Cyl.); 170-190 lbs. (V8, Exc. Taxicab); 184-203 lbs. (V8 Taxicab). If pressure is not within limits, control valve assembly and pressure regulator valve assembly must be removed and cleaned.

FLIGHTOMATIC SHIFT SPEEDS

Minimum Throttle Upshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
1-2	7-9 MPH	6-8 MPH	
2-3	16-19 MPH	14-17 MPH	12-18 MPH

Maximum Throttle Upshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
1-2	35-38 MPH	28-32 MPH	34-42 MPH
3-2	59-64 MPH	41-46 MPH	63-73 MPH

Maximum Kickdown

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
3-2	50-55 MPH	34-39 MPH	60-70 MPH
3-1	15-19 MPH	10-14 MPH	20-26 MPH
2-1	10-14 MPH	6-10 MPH	12-18 MPH

Closed Throttle Downshift

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
3-2	7-11 MPH	6-10 MPH	3-8 MPH

Inhibited Downshift (Selector Lever in "L")

Shift	6 Cyl. (Std.)	6 Cyl. (Taxi)	V8
2-1	15-22 MPH	14-18 MPH	15-21 MPH

AIR PRESSURE TEST (With Transmission in Car): Raise car on hoist and remove transmission oil pan and control valve assembly. Proceed as follows:

Front Clutch: Apply pressure to front clutch and governor input passage (case rear flange). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of the system.

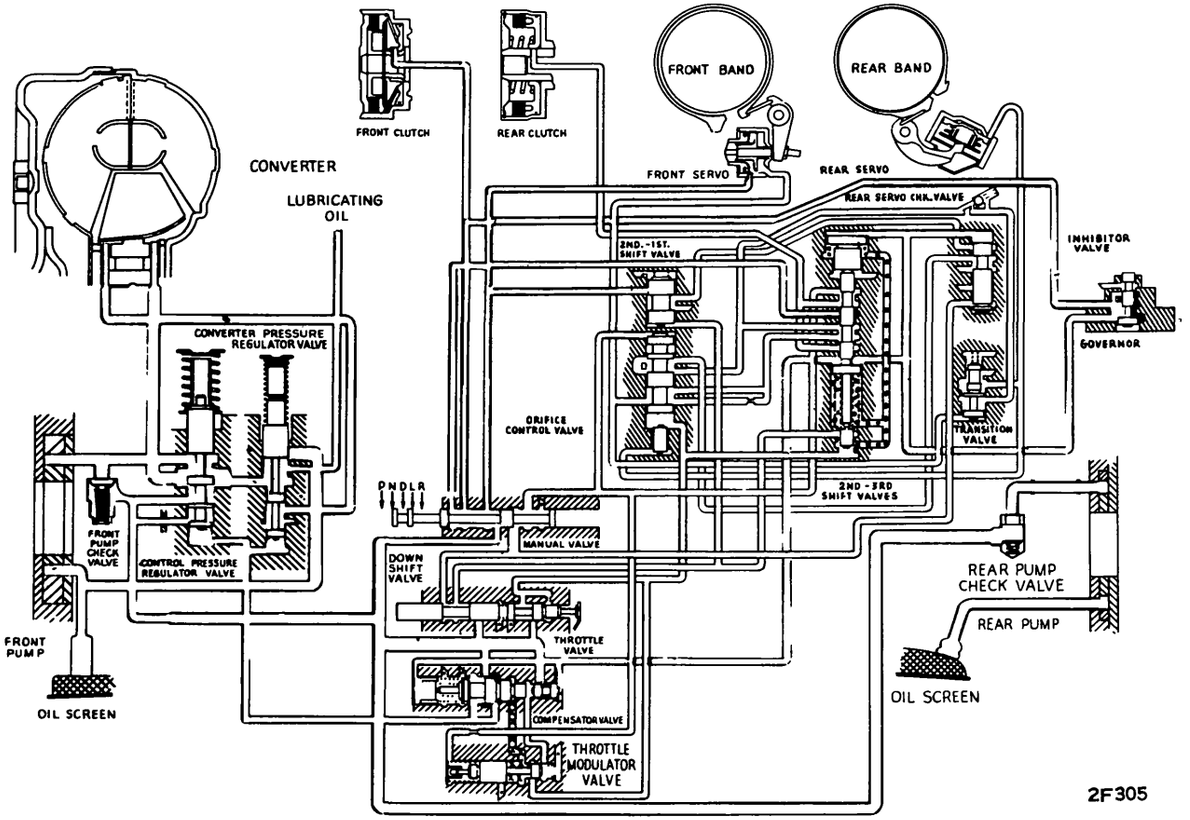
Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

Rear Clutch; Apply air pressure to rear clutch oil passage (case rear flange). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).

Rear Band & Servo: Apply pressure to rear servo oil passage (case rear flange), observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If servos, bands, clutches and governor operate with air pressure, then no drive problems, erratic shifts, or no upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" below.*



HYDRAULIC CIRCUIT DIAGRAM (V8 MODELS)

TROUBLE SHOOTING

►*DIAGNOSIS OF TRANSMISSION SLOW ENGAGEMENT OF FRONT & REAR CLUTCHES: This condition noted* at times when manual selector lever is shifted to a position that requires application of either front or rear clutch with car standing still, and at idle (transmission at normal operating temperature). Check as indicated below.

1) Perform "Initial Engagement Delay" below.

2) Check control pressure at 1000 RPM and at idle during time complaint condition is noticeable. Make comparative readings in all ranges.

3) Isolate rear clutch or rear band areas by adjusting rear band so it mechanically locks rear drum. If trouble is corrected, leakage within rear band servo is indicated. If complaint remains, it indicates that problem is in rear clutch circuit.

4) If the above procedures do not correct the complaint, but indicate a pressure leak in either front or rear clutch circuits, remove and disassemble transmission, then inspect all parts for nicks, scores and wear. Check all seal rings and grooves. Check all valves and valve bores.

►*CONTROL VALVE BUZZ (PARK & REVERSE RANGES) CORRECTION:* This condition may be due to highly aerated oil in the transmission which could be caused by a leak in the transmission. When abnormally severe valve buzz is encountered, remove the dipstick and check for indications of air bubbles in the oil. If air is present, check and correct as follows:

1) Sand holes or porosity in transmission case.

2) Leakage between pressure regulator valve assembly and the machined surface of case. This condition can be due to nicks or other damage on either of the mating surfaces, or by improper torqueing of the capscrews.

3) Leakage between front pump and transmission case due to damaged gasket or improper torqueing of capscrews.

4) Incorrect control pressures or sticking valves.

INITIAL ENGAGEMENT TOO ROUGH: Idle speed may be too high. Control pressure may be too high caused by improper throttle valve linkage or dirt in control valve assembly or regulator valve assembly. Check throttle valve stop and reset if necessary.

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC TRANSMISSION (C ntinu d)

INITIAL ENGAGEMENT DELAYED: Check fluid level. Adjust rear band as it may be loose. Control pressure may be too low at idle speed. Clean control valve assembly and pressure regulator assembly. Check front pump for wear. Check fluid circuits for leaks and correct as necessary.

INOPERATIVE IN ALL RANGES: Check fluid level. Manual linkage may be disconnected. No control pressure which may be caused by trouble at front pump. Check rear band adjustment. Check rear servo action with air pressure. Inspect and clean control valve assembly. Check engine stall speed, as converter may not be operating properly.

NO DRIVE IN "D" OR "L" POSITION: Check fluid level. Manual linkage may be disconnected. Control pressure may be low. Adjust throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Check front clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly as it may be stuck.

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be low. Check and adjust throttle valve linkage, and clean control valve and regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo action with air pressure. Check transition valve in control valve assembly.

LOCKS UP IN "D" POSITION: Rear clutch or front band may be applied. Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failures.

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo, and rear clutch for mechanical failure.

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band may be applied. Check bands and servo for mechanical failure. Clean control valve assembly.

LOCKS UP IN "R" POSITION: Check front clutch and band and front band servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Check throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited; check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.

SLIPS IN "R" POSITION: Check fluid level. Check and adjust throttle control linkage. Clean control valve and regulator valve assemblies. Check rear servo for limited travel. Check front clutch for mechanical failure as it may be slipping. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Check and correct throttle control linkage as control pressure may be too high. Clean and adjust bands. Governor valve may be stuck.

1-2 UPSHIFT SLIPS: Check and adjust throttle control as control pressure may be too high. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.

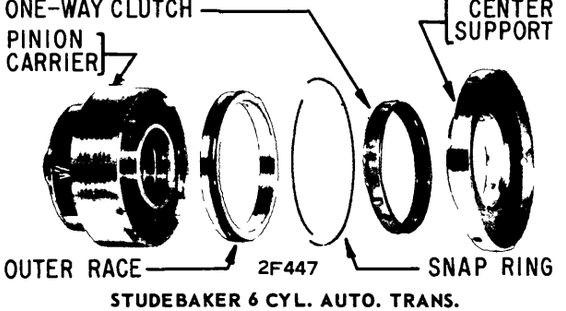
NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check for stuck governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Check and adjust throttle control linkage. Clean control valve assembly.

2-3 UPSHIFT ROUGH: Control pressure may be too high; adjust throttle control linkage and clean control valve assembly. Adjust front band. Check tor stuck governor valve.

2-3 UPSHIFT SLIPS: Control pressure may be too low; adjust throttle control linkage and clean control valve assembly. Adjust front band. Check for internal leaks and for stuck governor valve.



STUDEBAKER 6 CYL. AUTO. TRANS.
ONE-WAY CLUTCH

NO UPSHIFT 2-3: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit. Adjust throttle control linkage.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Orifice control valve stuck

3-2 KICKDOWN (EARLY): Adjust throttle control linkage.

NO KICKDOWN: Adjust throttle control linkage.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Rear servo check valve may be stuck.

WILL NOT START BY PUSHING: Rear pump not operating. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust throttle control linkage. Check for damaged internal linkage or pawl.

TRANSMISSION & CONVERTER REMOVAL & INSTALLATION

►*TRANSMISSION REMOVAL & INSTALLATION PROCEDURE NOTE: See Page 515 in 1961 Final Data.*

TRANSMISSION OVERHAUL

CONVERTER OVERHAUL: Converter assembly is welded together and cannot be disassembled for servicing or overhaul.

TRANSMISSION OVERHAUL: *See "Warner Automatic Transmission" in 1960 Final Data, page 506, or later Manual edition and note the following:*

Control Valve Assembly (6 Cyl. Models): Lower Valv Body Cover - Rear Servo Check Valve and Spring not used. The only valve at this location is the 1-2 shift valve and spring.

Pinion Carrier & One-Way (Sprag) Clutch: Disassembly - *NOTE - Pinion Carrier cannot be disassembled exc pt as follows:* The one-way clutch may be removed by slipping it out of outer race, then the outer race can be remove by removing the snap ring. *NOTE - Do not remove outer race unless replacement is necessary.* **Reassembly** - Install one-way clutch outer race and secure in position with snap ring. Install one-way clutch into pinion carrier and outer race assembly with flanged end of one-way clutch towards pinion carrier. Properly assembled, the brass drag strips attached to inner cage of one-way clutch will be located away from pinion carrier

FORD MOTOR CO.
ELECTRIC TYPE

Ford Galaxie (1962)
Mercury Monterey (1962)
Thunderbird (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*WINDOW SWITCH FAILURE PREVENTION:* If a switch has failed because of water entering switch, seal replacement switch with waterproof tape before installing.

DESCRIPTION: Electrically controlled windows operated a reversible type motor combined with each individual window regulator assembly. Individual switches located near each window for separate control, and a master control switch on left front door to control all windows. A lock-out switch on master control switch enables windows to be operated only by the driver of the car. A safety relay on right side of cowl prevents window operation except when ignition switch in ON or ACC positions. *NOTE - For electrically operated station wagon tailgate window, see "Ford Motor Co. Tailgate Window" in this section.*

TROUBLE SHOOTING & DIAGNOSIS: All Windows Will Not Operate In Either Direction - Trouble will be in main feed circuit breaker, safety relay, ignition switch, or lock-out switch; or any of appropriate control wiring. with a voltmeter or jumper wire, test for current at various parts of control circuit.

One Window Will Not Operate In Either Direction Through Either Switch Circuit: If motor runs freely, it is loose and pulled away from coupling. Check for defective motor circuit breaker, faulty wiring from switches to motor (or faulty switch feed wire), motor armature or field windings faulty.

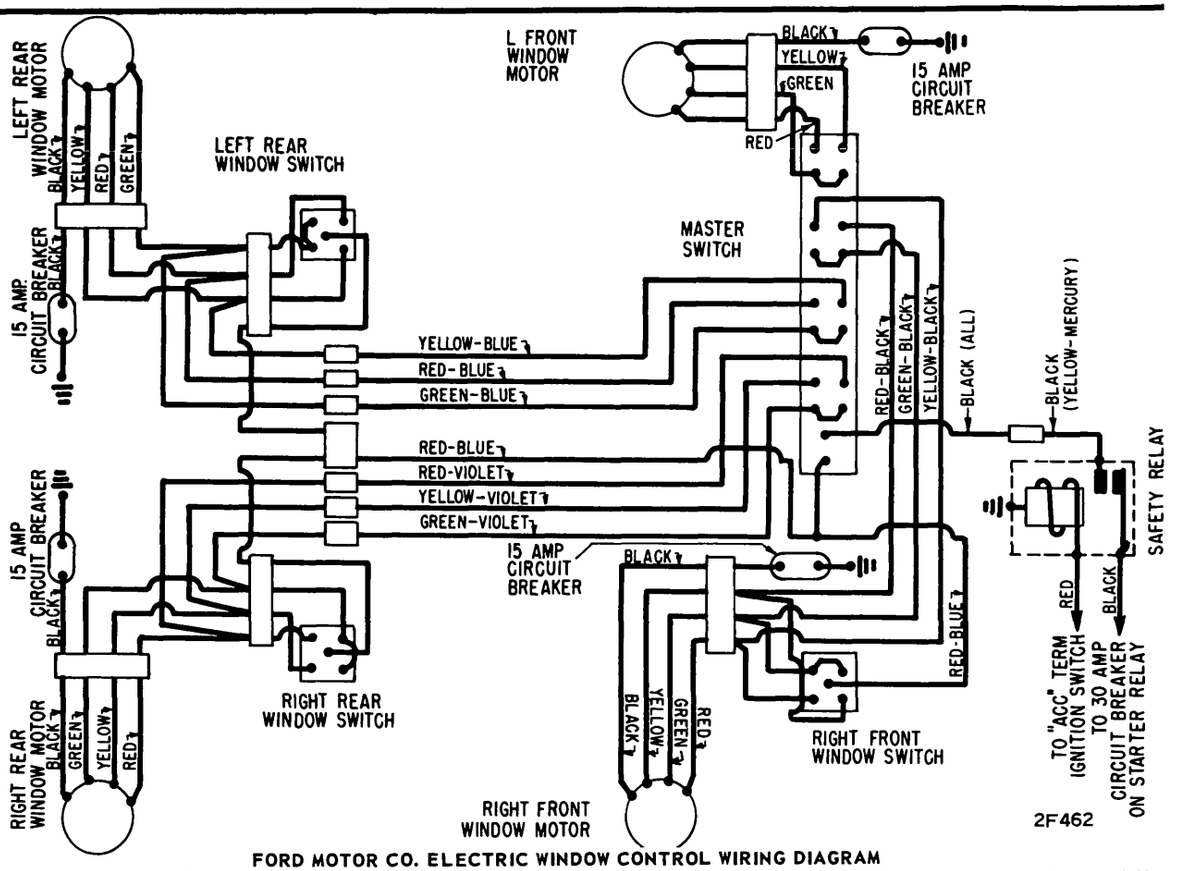
One Window Operates In One Direction Through Either Switch: Check for faulty switch or faulty wiring between switch and motor. Check for faulty motor field coil.

Window Operates In Both Directions Through One Switch Only: Check for defective switch or faulty wiring between switch and motor.

Window Operates Opposite To Switch: Check for improperly mounted switch.

Window Operates Sluggishly: Check regulator and window runs for binding. Check for frayed insulation on wires which may cause partial ground. Check that paint does not insulate ground wires or ground circuit breakers. Check for loose connections or corrosion causing high resistance. Check motor current draw with an ammeter. Normal current draw during operation should not exceed 20 amperes. Current draw with mechanism against a stop should be 30-50 amperes. If current draw excessive, replace motor. Motor no-load current draw should not exceed 14 amperes at 12 volts.

REMOVAL & INSTALLATION: Motor (Ford & Thunderbird) - Remove door trim panel, disconnect wires, remove motor mounting nuts and motor brace. Pull motor free of rubber coupling and remove motor.



FORD MOTOR CO. ELECTRIC WINDOW CONTROL WIRING DIAGRAM

Motor (Mercury - Front Doors): Disconnect battery, remove door trim panel and trim water shield. Disconnect motor wires, and remove motor bracket attaching screw. Disconnect motor and coupling from regulator assembly, then remove motor.

Motor (Mercury - Rear Doors or Quarter): *Motor removed with regulator as an assembly. See "Regulator Removal" below.*

►*REGULATOR ARM TENSION SPRING REPLACEMENT NOTE:* Spring can be replaced after regulator removed. Regulator arm must be at point of maximum upward travel to reduce amount of spring tension to overcome.

Front Door Regulator: Ford - Remove door trim panel and loosen water shield. On 2-door and 4-door hardtop models, disconnect regulator at arm and plate. On other 4-door models, disconnect regulator from glass channel roller. Secure glass by hand in raised position. On 4-Door models (except hardtop), disconnect front run bracket from inner panel to provide access. On all models, remove regulator retaining screws and remove regulator. To install, reverse removal procedure.

Mercury - *NOTE - Procedure is for removal of regulator and motor as an assembly.* Disconnect battery, remove door trim panel and trim water shield. Remove window lower stop. Disconnect motor wires. With wire hook, remove retainers from window rollers and separate regulator arm pivots from rollers. Secure window in fully raised position. Remove regulator assembly attaching screws and remove regulator and motor assembly.

Thunderbird - Remove door trim panel and loosen water shield. Block window in fully raised position, and remove regulator arm from plate assembly. *NOTE - If arm and plate assembly are to be removed, lower window and disconnect arms from the two glass roller assemblies, then remove arm and plate assembly.* Remove regulator assembly retaining screws and remove regulator. To install, reverse removal procedure.

Rear Door Regulator: Ford - Remove door trim panel and loosen water shield. Lower glass about halfway and disconnect regulator arms, then support glass in fully raised position. Remove regulator retaining screws, slide equalizer arm out of bracket or guide, then remove regulator. To install, reverse removal procedure.

Mercury - With window fully raised, disconnect battery, remove door trim panel and trim water shield. On 4-door hardtop, remove window upper stop. On all models, disconnect motor wires, and remove retainers from window rollers with a wire hook. Separate regulator arms from rollers and prop window up. On 4-door hardtop, remove center guide assembly. On all models, remove regulator and motor bracket mounting screws.

CONTINUED ON NEXT PAGE

FORD MOTOR CO.
ELECTRIC TYPE (C ntinued)

Slide equalizer arm out of bracket and remove regulator and motor as an assembly. To install, reverse removal procedure.

R ar Quarter R gulator: Ford - Remove rear seat cushion and back, remove trim panel and pull water shield away from access holes. Lower window, disconnect regulator from glass channel rollers, and support window in fully raised position. Remove regulator retaining screws, slide regulator arm out of equalizer bracket, and remove regulator. To install, reverse removal procedure.

Mercury - Remove rear seat cushion, back and trim panel. Lower window, remove retainer clips from window rollers, separate regulator arms from rollers, then remove rollers. Secure window in fully raised position. Remove motor from regulator. Disconnect regulator from quarter panel, slide equalizer arm out of equalizer arm bracket and remove regulator assembly. To install, reverse removal procedure.

Thunderbird - Remove quarter trim panel and water shield. Remove window upper stop. Disconnect regulator arms from glass channel. Lower glass, lift glass from front guide, then remove glass assembly. Remove regulator retaining bolts, slide regulator equalizer arm roller out of bracket, and remove regulator. To install, reverse removal procedure.

FORD MOTOR CO. TAIL GATE WINDOW

F rd Falc n & Galaxie, Station Wagon (1962)
Mercury C m t & Monter y, Station Wagon (1962)

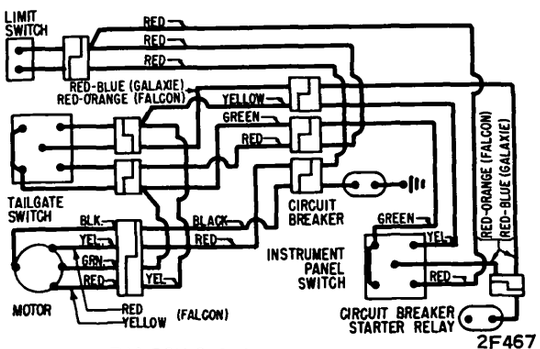
►CHANGES, CAUTIONS, CORRECTIONS

►*1962 MERCURY MONTEREY TAILGATE SWITCH OR WIRE SHORTING OUT CORRECTION:* May be caused by wiring at switch rubbing lower edge of tailgate inner access panel. To correct, install ¼" diameter rubber tubing or electrical tape on lower edge of panel.

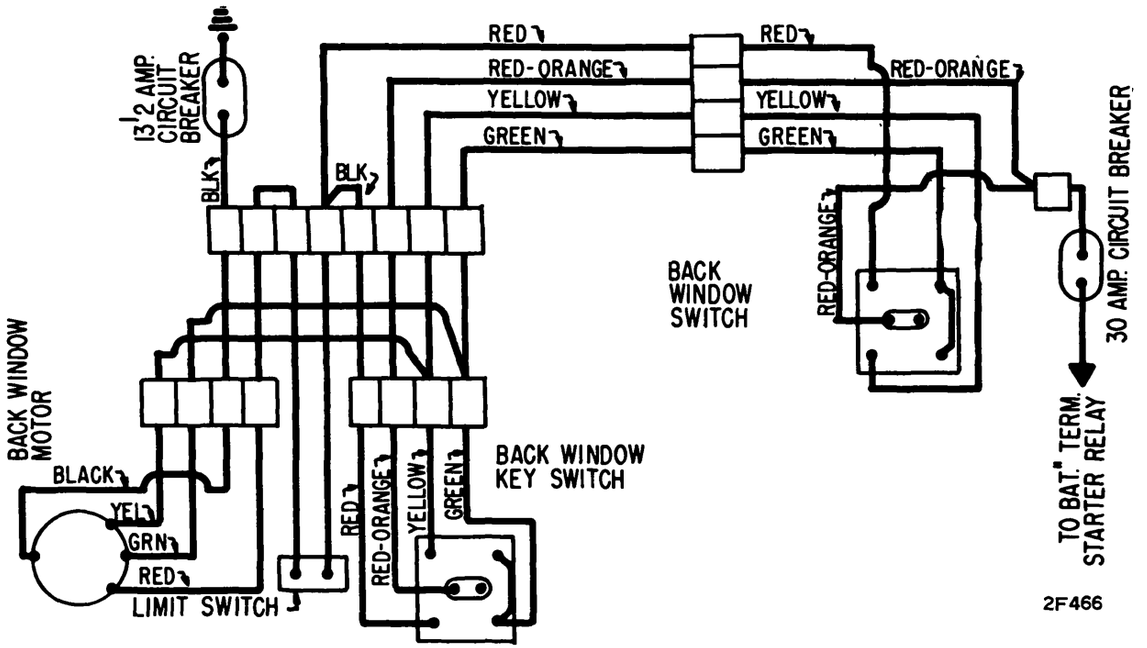
DESCRIPTION: Electrically controlled station wagon tailgate window operated by a reversible electric motor and a window regulator mechanism in tailgate. Control is through a key operated lock switch on upper center of tailgate outer panel, and a toggle switch on left front door for driver control. A limit switch located at right side of tailgate pillar post prevents operation of window when tailgate is open.

EMERGENCY MANUAL OPENING: Opening Tailgate If Window Is Fully Raised - Remove trim panel retaining screws, trip lock handle to relieve pressure, then remove trim panel by pulling up and forward to slide it out of lower retainer. Remove water shield and access hole cover from inner panel. Remove regulator arm roller retaining pins and disengage rollers from regulator arms. Push window into full down position and open tailgate.

Op ning Tailgate If Window Is Partially Raised: Remove quarter window rear garnish moldings, and quarter window outside rear moldings. Remove tailgate window glass upper side run retaining screws. Open tailgate and window as an assembly by removing upper runs simultaneously.



FALCON & GALAXIE STATION WAGON TAILGATE WINDOW WIRING DIAGRAM



COMET & MONTEREY STATION WAGON TAILGATE WINDOW WIRING DIAGRAM

TROUBLE SHOOTING & DIAGNOSIS: *CAUTION - When testing circuits with tailgate lowered and limit switch held closed, operate circuit only momentarily. Continuous operation of window in horizontal position will damage motor,*

Window Will Not Operate Through Either Switch Circuit: Check control circuit for continuity. Check feed and ground circuit breakers. Check all wiring for continuity. Motor armature or field coil windings may be faulty. Limit switch or wiring may be defective (down cycle).

Window Operates Through One Switch Only: The other switch is defective. Wiring from other switch faulty.

Window Operates In One Direction Only: Check for continuity of wiring for the inoperative cycle. Check relay or circuit breaker. Check for faulty limit switch or motor.

REMOVAL & INSTALLATION: Window - Lower tailgate, disconnect hinge supports at tailgate, remove trim panel and trim panel water shield. Remove retainers from window channel rollers and disconnect regulator arms from rollers. Remove window.

Motor: Remove window (see above), disconnect wiring from motor, and remove motor-to-regulator attaching nuts .Remove motor.

Regulator: *NOTE - Motor and regulator may be remov d as an assembly if desired.* Remove window (see above), disconnect motor wiring at motor, and remove regulator attaching nuts. Remove regulator and motor assembly.

Limit Switch: Lower tailgate. If switch not visible, remove access cover behind tail light or trim panel and water shield as necessary. Remove limit switch attaching screws and remove switch.

L ck Switch: Switch can be removed after window, motor, and regulator are removed.

LINCOLN CONTINENTAL ELECTRIC TYPE

Lincoln Continental (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 INOPERATIVE REAR WINDOWS CORRECTION:* If cause of failure is not immediately evident, trouble may be due to wiring harness assembly being damaged by contact with rear seat assembly. To correct, remove rear seat back and cushion assembly, make necessary repairs to wiring, and relocate wiring away from seat toward center of car.

DESCRIPTION: Two kinds of system used as follows:

Conventional Type - Similar in design and operation to previous 1961 models. Power operated front door vent windows are now available and may be found on some cars. Design and operation of vent windows is similar to door windows.

Automatic Type - Similar in design and operation to previous 1961 type except that door handle switch has been eliminated and automatic lowering action is initiated by the striker plate switch. *See "Operation" below for 1962 sequence.*

OPERATION (AUTOMATIC TYPE): Window operation is divided into down and up cycles as follows:

Window Down Cycle: 1) When door inside handle or outside pushbutton is moved to open door, door striker plate switch upper contacts are closed and current flows through upper contacts of striker plate switch, to window stop switch, to down relay coil and stop relay contacts. Down relay is now energized and down relay contacts are closed. Down relay is kept energized by a "lock-in" circuit with current supplied and recirculated from down relay contacts.

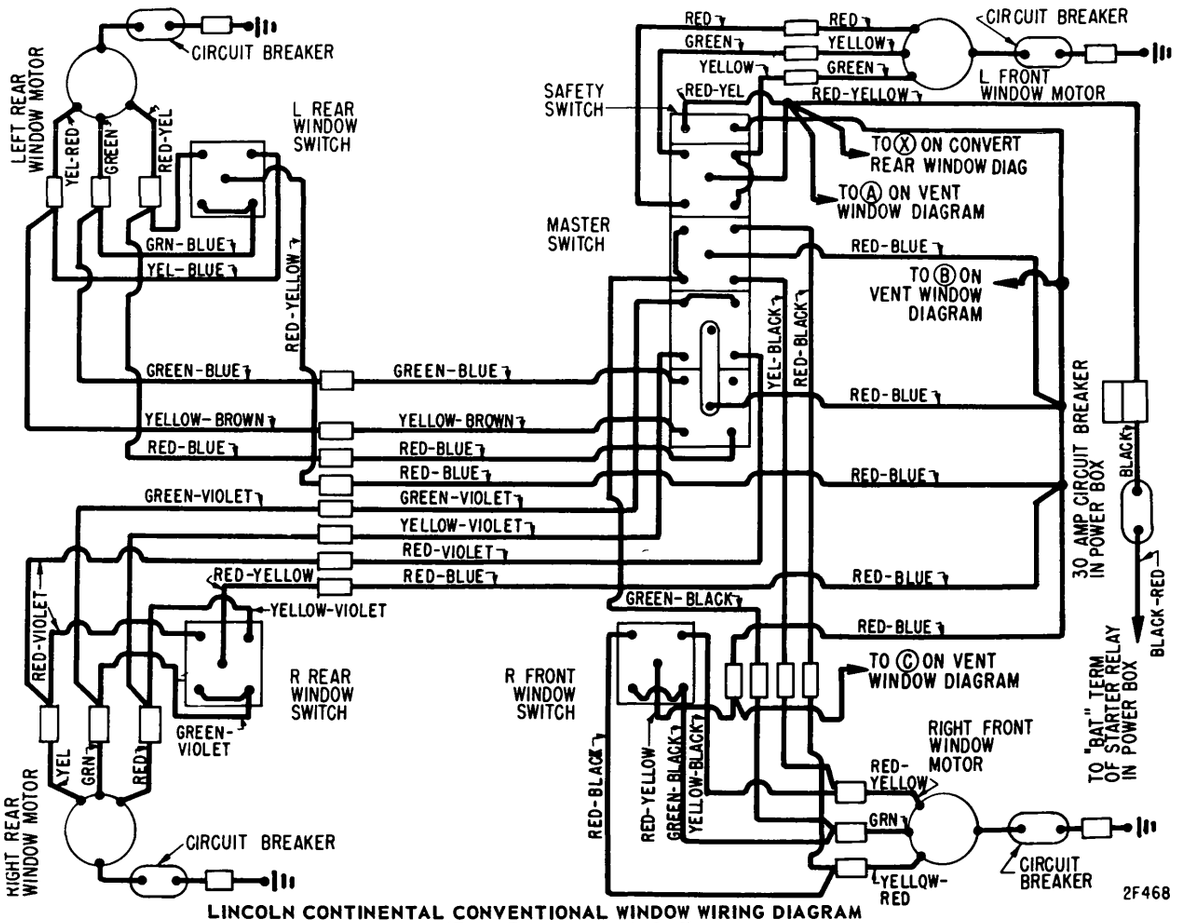
2) When down relay contacts are closed, current flows through down relay contacts, to motor down field, to armature relay coil, and stop relay coil to ground. Energizing armature relay coil closes armature relay contacts and current flows from battery, through armature relay, motor armature, and stop relay coil to ground. Motor is then energized and window begins to lower.

3) When window is 4-6" down, window down stop switch will be opened to open down relay and motor down field circuits to stop motor.

4) No. 1 contacts of door striker plate switch are closed when door is open. Current now flows through door striker plate switch No. 1 contacts, window cut-off switch, up relay coil, stop relay contacts and coil, and bypass switch to ground. Up relay is now energized but window will not raise until striker plate switch is depressed when door closed to close motor up field circuit. As soon as up relay coil is energized a "lock-in" circuit is completed through the up relay contacts to keep the circuit functioning until door is closed.

Window Up Cycle: 1) When door is closed, striker plate switch is depressed to close striker plate switch No. 2 contacts. Current now flows through up relay contacts, striker plate switch No. 2contacts, motor up field, armature relay coil, stop relay coil, and bypass switch to ground. Energizing armature relay coil closes armature relay contacts and current flows from battery, through armature relay, to motor armature, and stop relay coil to ground. Motor is then energized and window begins to rise.

2) About ¼" before window reaches closed position, window actuates bypass switch to open switch contacts. Current now flows only through stop relay coil to ground. Stop relay coil now carries full motor current (becomes an overload cutout). When window is fully closed, motor stalls and draws maximum current. This current energizes stop relay coil to open stop relay contacts which open complete window up circuit and deactivate the system.



LINCOLN CONTINENTAL CONVENTIONAL WINDOW WIRING DIAGRAM (EXCEPT VENT WINDOWS)

►*MANUAL OPERATION & CUT-OFF SWITCH FUNCTION NOTE:* **1)** If window has been lowered more than 6" before door is opened, cut-off switch is actuated (contacts open) and relay circuit is disconnected so no automatic window operation will take place.

2) When window has been lowered automatically and door is open, motor up field can be completed only through No. 2 contacts of door striker plate switch when door is closed. Therefore window cannot be raised manually.

3) With door open and window lowered automatically, either switch can be operated to lower window completely. However cut-off switch contacts will be opened and window will not raise automatically when door is closed. Window must be raised manually after door is closed to reset circuit for automatic operation.

ELECTRICAL COMPONENTS & LOCATIONS (AUTOMATIC WINDOWS): Following list of electrical components and their locations will aid in testing and in trouble shooting.

30 Ampere Circuit Breaker: Main power window feed. In power box.

10 Ampere Circuit Breaker: Protects relay and motor field circuits. On relay panel behind rear seat.

Motor: In lower inner door panel.

Window Stop Switch: On plate inside door panel above door lock.

Window Cut-Off Switch: On plate inside door panel above door lock.

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL ELECTRIC TYPE (C ntinued)

Door Strik r Plate Switch: In door latch striker plate.
Window Bypass Switch: Inside door panel at top of door on window rear up-stop bracket.
Armatur Relay: Relay panel behind rear seat.
Stop Relay: Relay panel behind rear seat.
Up Fi ld R lay: Relay panel behind rear seat.
D wn Field Relay: Relay panel behind rear seat.

TROUBLE SHOOTING & DIAGNOSIS (CONVENTIONAL WINDOWS): Bypass switches and relays as necessary when making tests. Use a continuity light for checking circuits.

One Window Op rates In One Direction Only Through Eith r Switch: Motor field or field circuit wiring open or shorted.

Window Operates In B th Directions Through One Switch Only: Switch defective or open wiring.

One Window T tally Inoperative: Motor armature and/or field windings, or circuit wiring open or shorted. Motor circuit breaker improperly grounded or faulty.

All Wind ws T tally Inoperative: 30 ampere main feed circuit breaker or main feed wiring defective.

TROUBLE SHOOTING & DIAGNOSIS (VENT WINDOWS): Use a voltmeter or test lamp for making tests. Check circuits and wiring in the usual manner.

On Wind w Op rates In One Direction Only Through Eith r Switch: One motor field winding has an open or short circuit.

Wind w Op rat s Thr ugh One Switch Only: Defective switch or open wiring.

One Wind w In perativ : If window will not operate in either direction from either switch, check for open circuits or faulty motor.

All Wind ws In p rativ : Feed circuit breaker faulty.

TROUBLE SHOOTING & DIAGNOSIS (AUTOMATIC WINDOWS): *NOTE - Sinc automatic window circuit is built around conv nti nal electric window system, ch ck that conventional part of system is in proper op rating conditi n b fore checking automatic window circuits. Us th f llowing guide for automatic window ch cks.*

Window Will N t Low r Aut matically: Check 10 ampere circuit breaker, motor down relay, striker plate switch, window stop switch.

Window L wers C mpletely: Check stop switch actuator lever spring, window stop switch, motor down relay.

Wind w Will Not Raise: Check 10 ampere circuit breaker, motor up relay, window cut-off switch, door striker plate switch.

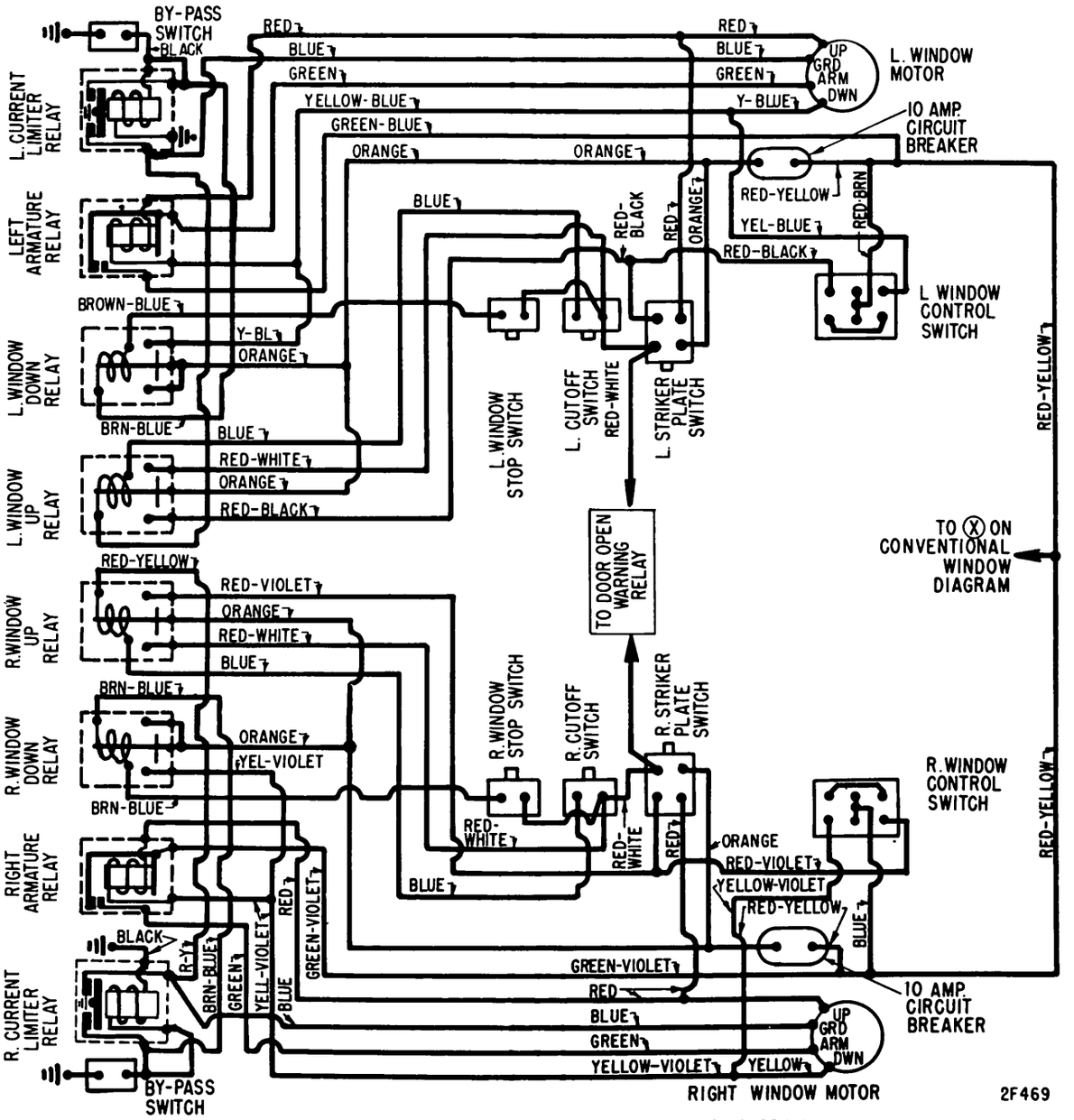
Window Cl ses But M tor D s Not Stop: Check window stop relay and window bypass switch.

SWITCH ADJUSTMENTS (AUTOMATIC WINDOWS):

Bypass Switch: Open door, remove trim panel, disconnect battery and switch leads. Mark window up stop position and remove stop and bypass switch as an assembly. Adjust switch so threaded part of switch is flush with lower surface of window stop bracket. *NOTE - Threaded part must not protrud b yond bracket.* Reinstall switch and window stop.

Striker Plate Switch: Open door, remove center pillar trim, disconnect battery and switch leads. Mark striker plate position and remove striker plate and switch assembly. Adjust switch so threaded part of switch is flush with inner surface of striker plate. *NOTE - Threaded part must not protrude into lock throat of striker plate.* Install striker plate and switch assembly.

Window Cut-Off & Stop Switches: *NOTE - Both switches m unted on a singl mounting plat and two typ s of mounting plat hav been used. Typ 1 uses hairline meth d for cut-off switch adjustment. Typ 2 uses gaug pin h l m thod for cut-off switch adjustment.* Adjust switches as follows: Open door, lower window, disconnect battery, and remove access cover just above door lock. Remove outer switch plate mounting screws, pull on switch plate, and remove inner screw and switch plate together (prevents dropping inner screw inside door). Disconnect switch leads and remove assembly.



CONVERTIBLE AUTOMATIC REAR WINDOW WIRING DIAGRAM

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL ELECTRIC TYPE (C ntinued)

Cut-Off Switch Type 1 - Loosen cut-off switch (switch without roller) on mounting plate and align switch actuator lever surface contacting switch with vertical hairline scribed on switch. Move switch toward actuator until contacts click, then tighten switch retaining screws. Check adjustment by moving actuator arm against switch. Click should occur when actuator is in line with hairline.

Cut-Off Switch Type 2 - Insert 1/8" diameter pin into aligning hole in switch mounting plate and swing switch actuator against pin. Hold actuator lever against pin and move switch toward actuator until contacts click. Tighten switch mounting screws. Check adjustment by moving actuator arm against switch. Click should occur just as actuator contacts gauge pin.

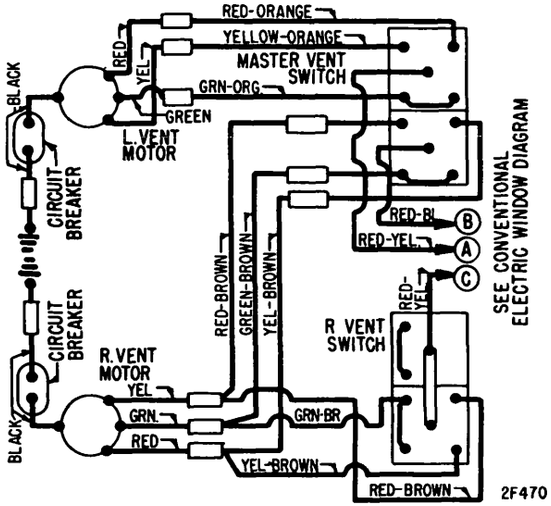
Stop Switch - Loosen switch retaining screws and place actuator arm so it just touches cut-off switch blade. Hold actuator in this position and adjust switch tightly against actuator until no free travel is present, then tighten switch retaining screws. When installing assembly in door, position actuator lever on top of window mechanism actuating pin.

REMOVAL & INSTALLATION: Door Window Motor - Remove door trim panel, access cover, and rear guide on rear doors. With window in fully raised position, remove motor-to-regulator attaching nuts, disconnect wiring, and remove motor. To install, reverse removal procedure.

Vent Window Motor - With door glass in fully raised position, remove door hardware, power window switches, trim panel assembly and watershield, and front door air duct panel assembly. Remove motor attaching screws and remove vent motor. To install, reverse removal procedure.

Window Cut-Off & Stop Switches - *See "Switch Adjustments" above for removal.*

Bypass Switch & Striker Plate Switch - *See "Switch Adjustments" above for removal.*



ELECTRIC VENT WINDOW WIRING DIAGRAM

G.M. ELECTRIC TYPE

Buick & Buick Special (1962)
Cadillac (1962)
Chevrolet Pass. Cars (1962)
Chevy II (1962)
Oldsmobile & Oldsmobile F-85 (1962)
Pontiac & Pontiac Tempest (1962)

►CHANGES, CAUTIONS, CORRECTIONS

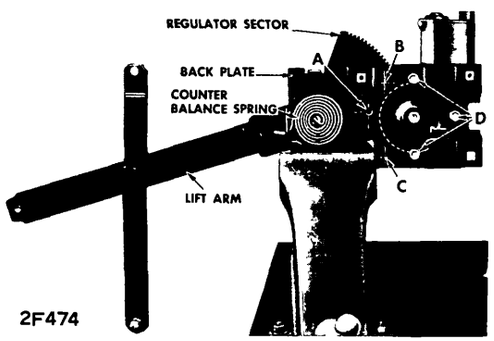
►*1962 BUICK WIRING MODIFICATION NOTE:* Some cars may have wiring modified so that top, electric window, and electric seat operation occurs only through ignition switch. Modification consists of a relay in circuit in series with power feed circuit breaker and ignition switch terminal of fuse box.

DESCRIPTION: Door Windows - Window regulators individually powered by reversible electric motors in each door which are geared directly to regulator assembly. On Cadillac, vent windows in both front and rear doors are also power operated. On Buick and Oldsmobile, front door vent windows are also power operated. Two-way switches on each door and a master control switch on left front door control window operation. On Oldsmobile, a control relay wired to power source and to ignition switch prevents window operation until ignition switch is in ON or ACC positions. **Tailgate Window** - Dropping type window in tailgate operated by a reversible electric motor in tailgate. Control is by a switch on instrument panel. Tailgates which are hinged at the bottom have a lock switch in center of tailgate outer panel. Three-seat station wagons have additional passenger control switch at rear of rear quarter inner panel trim.

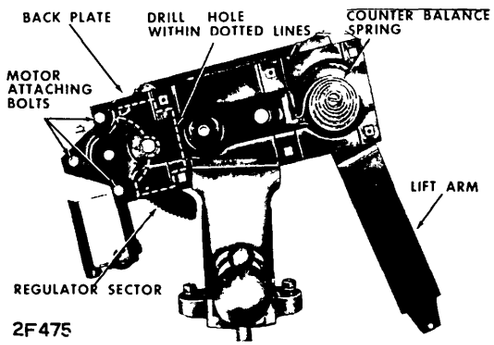
EMERGENCY OPENING OF TAILGATE: On tailgates hinged at bottom, safety switch may fail and prevent window being lowered to open tailgate. Proceed as follows: Remove spare tire cover and all accessible screws from tailgate inner panel. Pull panel forward, cut water deflector over right hand access hole, remove access cover upper screws, and remove cover. Reach into bottom of tailgate and remove green wire from retaining clip and pull up far enough to pierce wire with pick or knife. Ground pick and lower window by means of control switch. *NOTE - If necessary to remove inner panel lower attaching screws to perform above operation, chisel screws off with a long, thin chisel inserted between tailgate inner panel and tailgate inner cover panel.*

TROUBLE SHOOTING & DIAGNOSIS (DOOR WINDOWS):
All Windows Inoperative - Power feed circuit faulty. Check feed wires, feed circuit breaker, and control relay (where equipped).
One Window Inoperative From Both Switches: Faulty circuit wiring; both switches faulty; motor defective; mechanical bind or failure in linkage.
One Window Inoperative From One Switch Only: The other switch or wiring from that switch is defective.
TROUBLE SHOOTING & DIAGNOSIS (TAILGATE WINDOW): *NOTE - On Oldsmobile, instrument panel and third seat control switches are wired through window control relay. Rear windows can be operated through these switches only if ignition switch is in ON or ACC positions.*
Window Inoperative From All Switches: Power feed circuit or control relay defective. Safety switch faulty or motor not grounded. Motor faulty. Mechanical bind or failure in linkage.

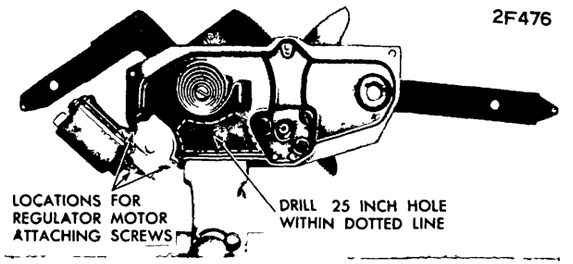
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FRONT DOOR REGULATOR ASSEMBLY



REAR DOOR AND QUARTER WINDOW REGULATOR ASSEMBLY



TAIL GATE REGULATOR ASSEMBLY

G.M. ELECTRIC TYPE (C ntinued)

Window In perativ From One Switch Only: Circuits to or from affected switch are defective. Affected switch is faulty. If both instrument panel and rear quarter switches are inoperative, check for faulty control relay.

Window Cann t Be Raised From Any Switch: Up cycle feed wire defective. Motor defective.

REGULATOR ASSEMBLY REMOVAL & INSTALLATION: *CAUTION - Do n t op rat regulator motor after window ass mbly is dis ngaged from regulator. Operation with load r mov d will damag motor.*

Fr nt D rs: All Mod ls (Except Buick Special & Oldsm bil F-85) - Lower door window, then remove door trim panel assembly and detach inner panel water deflector. Disconnect wiring harness feed wires from regulator motor at connector. Remove ventilator division channel lower adjusting stud and nut. On hardtop and convertible models, remove door ventilator assembly (see below). Disconnect lower sash channel cam from sash channel and remove cam. On hardtop and convertible models, remove window front and rear stops and remove window. On other models, prop window in "up" position. On all models, remove regulator assembly attaching screws, disengage regulator balance arm from inner panel cam, then remove regulator and motor assembly. To install, reverse removal procedure.

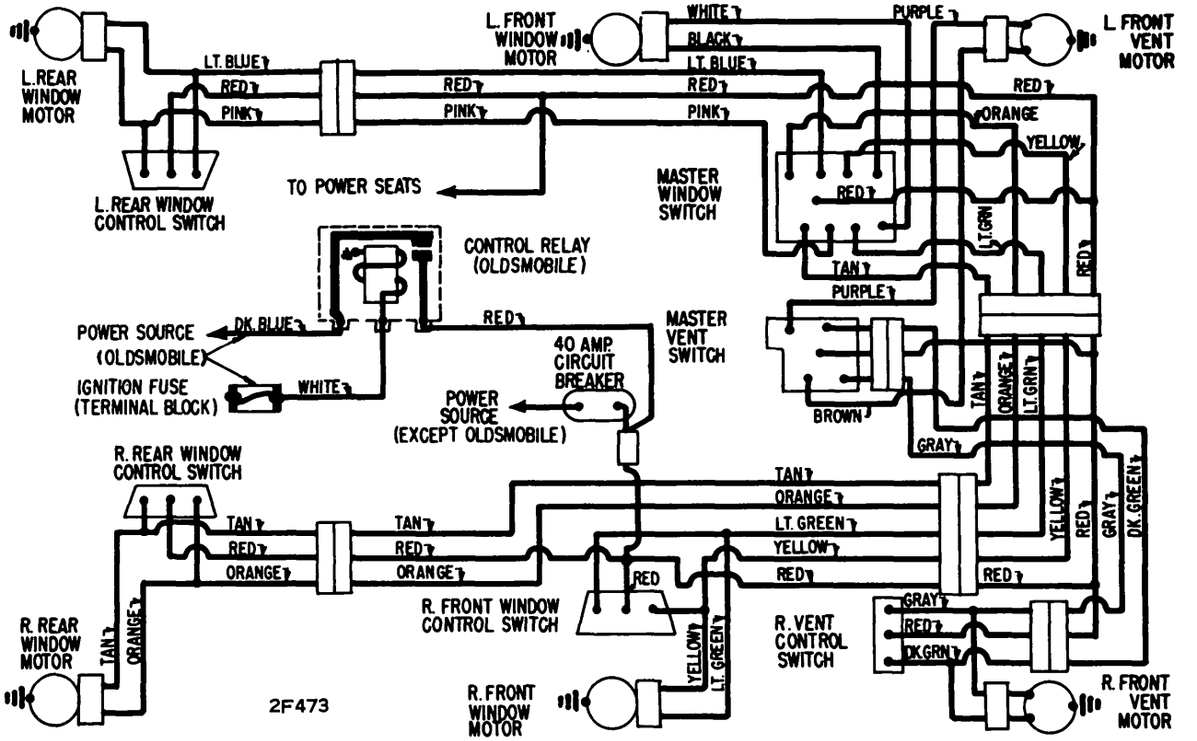
Buick Sp cial & Oldsmobile F-85 (Sedan & Stati n Wag n) - Remove door trim panel assembly and detach water deflector. On 2-door models, remove inner panel cam attaching bolts, slide cam rearward to disengage nylon roller of regulator balance arm, then remove cam through access hole. On all models, raise window and tape securely in "up" position. Remove control assembly and ventilator division channel lower adjusting stud and nut. Remove regulator attaching screws, disconnect wiring, and remove regulator and motor assembly. To install, reverse removal procedure.

Buick Special & Oldsmobile F-85 (Hardtop & Conv rtibl) - Remove door trim panel and detach water deflector. Remove ventilator division channel lower adjusting stud and nut, ventilator casting-to-frame attaching screws, and remove casting. Remove ventilator attaching screws and remove ventilator. Remove inner panel cam attaching bolts, slide cam rearward to disengage nylon roller of regulator balance arm, then remove cam through access hole. Remove window uptravel stop and glass run channel outer strip assembly. Raise window until lower sash channel cam is visible above inner and outer panels, slide window forward, and remove from door. Remove regulator attaching screws, disconnect wiring, and remove regulator and motor assembly. To install, reverse removal procedure.

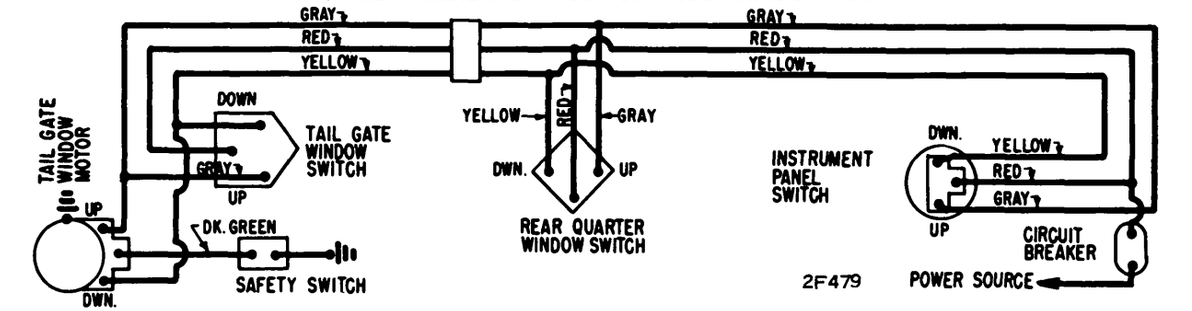
Fr nt D r V ntilators: Hardtops & Convertible - *NOTE - R gulator and motor assembly may be removed after door trim panel and wat r deflector removed. Procedure b low is for compl t v ntilator assembly removal (for door r gulator r moval).* Remove door trim panel assembly and detach inner panel water deflector. Lower door window and remove ventilator-to-door outer panel return flange attaching screw. Break cement bond holding front door hinge pillar sealing strip (at belt) to ventilator assembly (at front of ventilator). Remove ventilator division channel lower adjusting stud and nut. On electrically operated types, disconnect motor and regulator assembly from vent frame and remove motor and regulator assembly through large access hole. Loosen ventilator frame adjusting stud nut and remove ventilator attaching bolts. Lift ventilator assembly upward and rearward, and remove from door. To install, reverse removal procedure.

Sedan, Station Wagon & Limousine - Raise door window and remove door trim panel assembly, then detach inner panel water deflector. Disconnect ventilator regulator motor wires at connector. Remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage the ventilator regulator shaft

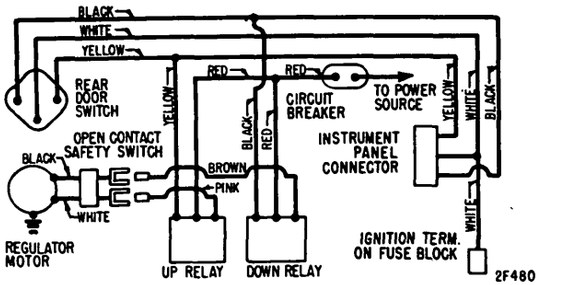
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G.M. (EXCEPT CADILLAC) WINDOW CONTROL WIRING DIAGRAM



CHEVROLET, CHEVY II, PONTIAC STATION WAGON TAILGATE CONTROL WIRING DIAGRAM



BUICK SPECIAL, OLDSMOBILE F-85, PONTIAC TEMPEST STATION WAGON TAILGATE CONTROL WIRING DIAGRAM

G.M. ELECTRIC TYPE (C ntinued)

from tee shaft and remove regulator and motor assembly through door access hole. To install, reverse removal procedure.

Re ar Doors (All Models): Lower door window and remove door trim panel assembly and detach inner panel water deflector. Remove door window lower sash channel cam and raise window and prop in "up" position. Disconnect wiring harness from motor at connector. On hardtop models, loosen rear guide cam upper attaching screws and remove lower adjusting stud and nut (to permit regulator removal). Remove regulator attaching screws, disengage balance arm from inner panel cam and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

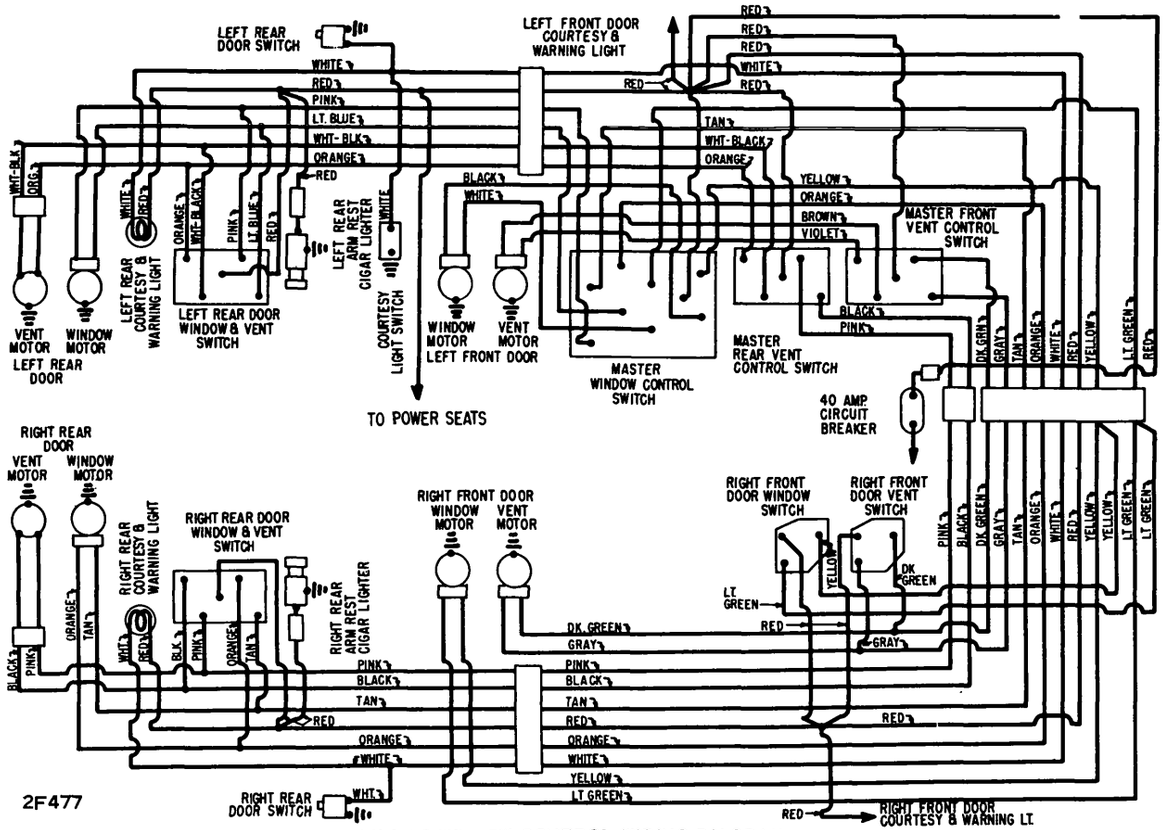
Rear Door Ventilator (Cadillac): Raise door window, remove door trim panel assembly, and detach inner panel water deflector to expose large door access hole. Disconnect wiring harness from ventilator motor connector. Remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage regulator from tee shaft and remove regulator and motor assembly. To install, reverse removal procedure and note the following: Too much play or flutter of ventilator at pivot can be corrected (with ventilator open) by tightening ventilator tee shaft-to-regulator attaching bolt. *CAUTION - Do not strip threads in regulator spiral gear shaft.*

Rear Quarter Window (Except Buick Special & Oldsmobile F-85): Sedan - Lower window and remove rear quarter trim assembly, then remove access hole cover from inner panel. Remove front guide upper attaching screw and glass run channel attaching screw. Disconnect wiring from motor at connector. Remove regulator attaching screws, disengage regulator arm roller from lower sash channel cam and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

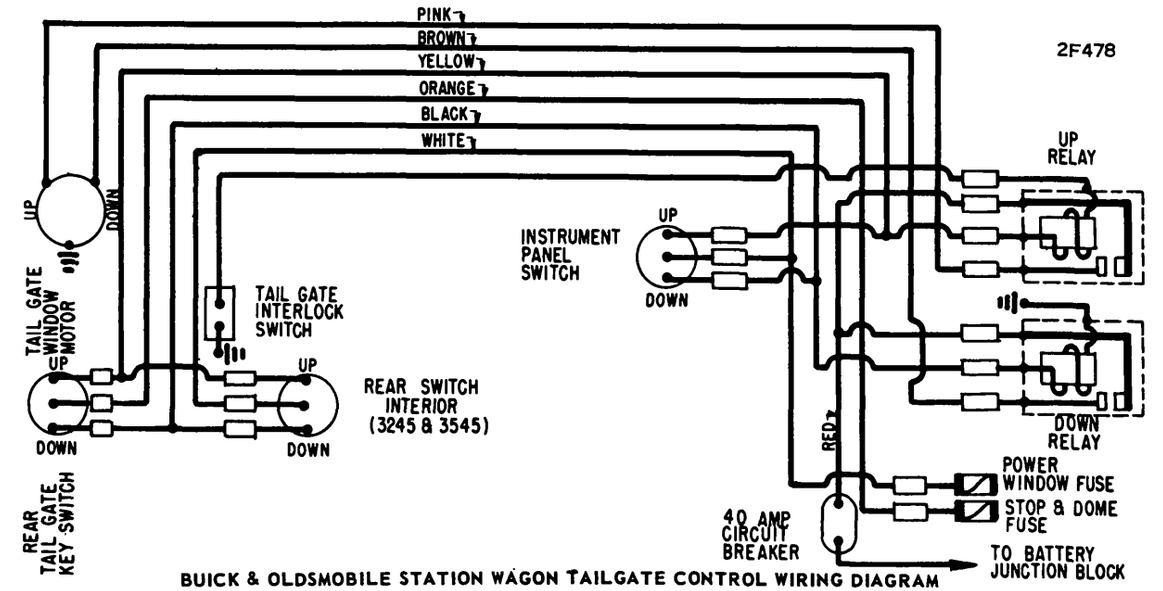
Hardtop (Except Buick Electra, Oldsmobile 98, & Cadillac) - Remove rear seat cushion and back assembly, rear quarter trim and arm rest, and inner panel access hole cover. Disconnect wiring from motor at connector Remove rear guide attaching screws, disengage rear guide from roller on lower sash channel and remove guide. Place window half-way down and remove lower sash channel cam attaching screws. Remove cam and front guide adjusting stud nuts. Disengage front guide adjusting studs from stud holes in inner panel, then disengage front guide from rollers on window. Remove window by lifting upward and inward. Remove regulator attaching screws and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Hardtop (Buick Electra, Oldsmobile 98, & Cadillac) - Remove rear seat cushion and back, arm rest and trim panel, and inner panel access hole cover. Disconnect wiring from motor at connector. Remove rear guide. Place window halfway down and remove lower sash channel cam attaching screws, detach cam from regulator arm roller and remove cam. Scribe mark position of lower stop on front guide for reassembly, loosen lower stop attaching screw and slide stop to bottom of

CONTINUED ON NEXT PAGE



CADILLAC WINDOW CONTROL WIRING DIAGRAM



BUICK & OLDSMOBILE STATION WAGON TAILGATE CONTROL WIRING DIAGRAM

G.M. ELECTRIC TYPE (C ntinu d)

guide. Lower window so lower roller on sash channel frame runs out of front guide channel at bottom, then lift window upward and inboard to disengage upper roller on sash channel from rear channel on front guide. Remove window assembly. Remove regulator attaching ing screws and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

C nvertibl - Remove rear seat cushion and back, top compartment side trim panel and rear quarter trim assembly. Remove inner panel access hole cover, then operate window to full "up" position and prop in place. Disconnect feed wire plug from motor, then remove regulator attaching screws. Disengage regulator lift arm roller from lower sash channel cam and remove regulator assembly through access hole. To install, reverse removal procedure.

R ar Quart r Wind w (Buick Special & Oldsmobile F-85): **Sedan** - Remove rear quarter trim panel, inner panel access hole cover, and inner sealing strip. With window up, remove window rear guide, then lower window enough to tilt rearward and disengage regulator lift arm roller from lower sash channel. Lift window upward and rearward to disengage lower sash channel roller from front guide, then remove window assembly. Disconnect wiring from motor at connector, remove front guide upper attaching bolt and regulator attaching bolts, then remove regulator and motor assembly through access hole. To install, reverse removal procedure. **Hardt p** - Remove trim panel and large inner panel access hole cover. With window almost completely down, remove lower sash channel-to-lower support assembly attaching screws. Bring window half-way up, disengage from lower support assembly, and remove window. Remove window rear guide and front guide adjusting stud nuts so front guide and lower support assembly can be disengaged from inner panel. Disengage regulator lift arm roller from lower support cam. Disconnect wiring from motor at connector, remove regulator attaching bolts, and remove regulator and motor assembly. To install, reverse removal procedure. **Convertible** - *Procedure is same as for other car models (see above).*

Tailgate Window (Types Hinged At Bottom): *NOTE - Use following procedure to avoid removal of tailgate glass and regulator assembly to service motor.* Lower window and place tailgate in horizontal position. Remove trim panel, then pull string used to open water deflector for service firmly in same direction as curvature of edge of panel to uncover right half of tailgate (to expose motor access door). Remove access door. *NOTE - Disengage remote control lock rod from clip on underside of access door as door is removed.* Block safety switch and use dash panel switch to run window to normally raised position (tailgate still horizontal), then support glass to prevent damage. Drill a 11/64" hole through main sector of regulator and regulator back plate 1/2" inboard from edge of large existing hole. *CAUTION - Do not allow drill to penetrate outer panel.* Install a sheet metal screw in this new hole to lock regulator assembly to retain counterbalance spring tension. *NOTE - Screw, Part No. 3783002, is recommended.* Remove motor mounting screws and loosen regulator mounting screws. Lift regulator slightly and remove motor, then disconnect wiring harness from motor. To install, reverse removal procedure and be sure to remove screw installed during removal.

Tailgat Wind w (Typ s Hinged At T p): Lower window, remove garnish moldings, and remove right stationary side window frame attaching screws and division channel lower adjusting stud; or rubber channel filler strip from side window rubber channel, depending on construction. Remove right division post, then remove right side stationary window. With dropping window almost fully up, move window to right to disengage regulator rollers from lower sash channel cams, then remove window. Disconnect wiring from motor at connector. Remove back door lock inside handle, remove control attaching screws, disconnect remote control from connecting rod, and remove remote control. Move remote control support plate to right side of door to disengage inner panel cam from regulator arm roller, then remove support plate. Remove regulator attaching screws and remove regulator and motor assembly. To install, reverse removal procedure.

REGULATOR MOTOR REMOVAL (WITH REGULATOR ASSEMBLY REMOVED FROM CAR): Clamp regulator and motor assembly securely in a vise, then drill a ¼" hole through back plate at the location indicated in illustrations. *NOTE - Drill the ¼" hole in front do r window regulators at either "A", "B" or "C" (s illustration), depending on position of lift arm. On other regulator assemblies, drill the hole within th area outlined by dotted lines in illustration. Do not locate hole less than ½" from edge of back plate or sector.* Insert a 3/16" bolt through hole in back plate and sector and install a nut but do not tighten. Remove motor attaching bolts and remove motor assembly from regulator. Clean all chips from regulator and motor pinion gear after drilling. To install, reverse removal procedure. *CAUTION - Be sure to remove temporary nut and bolt from regulator before installing in car.*

FORD THUNDERBIRD 4-WAY SEAT CONTROL

F rd Thund rbird (1962)

►*1962 SEAT CONTROL SWITCH, LIMIT SWITCHES, & WIRING PRODUCTION CHANGE NOTE:* Some early cars before September 26, 1961, have four limit switches in power seat circuit with additional two terminals on main control switch for appropriate wiring. *See 1961 Final Data, Pag 518, for details on this early type circuit.*

DESCRIPTION & OPERATION: Four-way power seat mechanism consisting of a reversible electric motor, control switch, motor control relay, gear housing and screw shaft, and two solenoid actuated nuts. Two duplicate assemblies are used, one for each front seat. Gear housing and screw shaft has a driving worm gear connected to motor by a rubber coupling and a driven gear which rotates screw shaft. Horizontal and vertical nut and solenoid assemblies are meshed to screw shaft and connected to seat track. When solenoid is energized, internally threaded nut is locked by solenoid pawl (ball), engaging a notch on nut. When screw shaft is rotated through locked nut, nut and solenoid move along shaft and move seat track.

1962 POWER SEAT CONTROLS

TROUBLE SHOOTING & DIAGNOSIS: Seat Will Not Operate - Check for properly grounded system at main (black) ground wire. Check for voltage to circuit breaker, at circuit breaker, and to main junction block at console panel. Check for voltage from junction block to control to control relay. Check for voltage from relay to control switch, and at each terminal of control switch. Check relay, motor, and wiring for voltage.

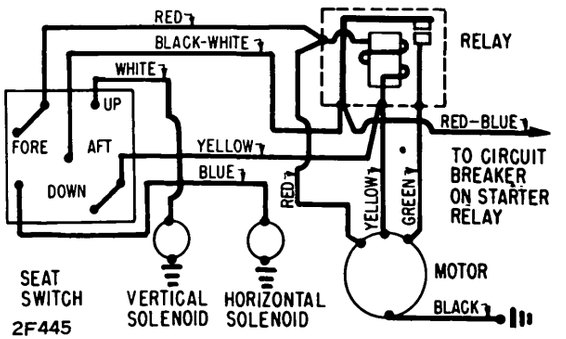
Motor Runs But Seat Does Not Move: Check for loose or broken motor coupling; faulty seat regulator worm, gear, or screw shaft; faulty wiring from control switch to solenoid; faulty solenoid and nut assembly.

Seat Moves In One Plane Only: If no voltage present at any switch terminal, switch is faulty. Check for inoperative solenoid.

Seat Ratchets At End Of Travel: Faulty solenoid and nut assembly.

REMOVAL & INSTALLATION: Seat M chanism - Remove seat track retaining nuts and washers and disconnect wiring to junction block. Remove seat assembly from car. Remove seat track-to-seat assembly retaining bolts, disconnect wiring at control switch, and remove seat track mechanism. To install, reverse removal procedure.

Seat Motor: Remove motor-to-drive assembly retaining nuts and washers and remove motor. Remove rubber coupling from motor shaft, and wiring from motor. To install, reverse removal procedure.



THUNDERBIRD 4-WAY SEAT CONTROL WIRING DIAGRAM

CHRYSLER CORP.
6-WAY SEAT CONTROL

Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962)
Plymouth (1962)

DESCRIPTION: 6-Way power seat operated by a single reversible electric motor located under the front seat. Motor drives a gear assembly which transmits power to slave units located in the seat tracks. Solenoid clutches in gear assembly, when energized by actuation of control switches on left side of front seat, engage the flexible drive cables with the gear assembly to operate the seat horizontally, vertically, and to tilt it.

TESTING & TROUBLE SHOOTING: Entire Unit Inoperative - Disconnect wire connector from switch to seat actuator and connect jumper wires as listed in table below for each seat operation. If operation normal when jumper wires connected, switch is faulty and should be replaced.

Electrical Testing Table

Seat Operation	Connect These Wires
Forward Horizontal	Red, Blue, Green
Forward Tilt	Red, Blue, Yellow
Straight Up	Red, Blue, Yellow, Brown
Rearward Horizontal	Red, White, Green
Rearward Tilt	Red, Blue, Brown
Straight Down	Red, White, Yellow, Brown

Motor Inoperative: Red feed wire, or control circuit breaker faulty. Relay or motor faulty.

Seat Inoperative (Motor Runs): Wiring harness to solenoid faulty, solenoid armature seized, or solenoid burned out.

Seat Inoperative (Motor Runs & Solenoids Click): Drive cable broken.

REMOVAL & INSTALLATION: *NOTE - Right and left seat tracks are not interchangeable, not adjustable, and are replaceable as an assembly only.*

Seat Assembly & Adjuster: Removal - Disconnect battery and remove mounting stud nuts holding front seat to adjuster, then tilt complete seat back assembly forward. Disconnect control wires at connector and remove front seat and cushion assembly. Disconnect seat adjuster red feed wire. Remove seat guide attaching stud nuts and remove adjuster.

Installation - Reverse removal procedure.

Flexible Cables: Removal - Remove front seat assembly and disconnect red feed wire. Remove retainer plate holding right side tubes to drive assembly and remove left seat guide attaching stud nuts, then remove guide and drive assembly. *CAUTION - Do not bend or damage right side tubes when sliding tubes from drive assembly.* Pull flexible cables from right side tubes. Remove bolts holding motor and drive assembly to left guide bracket. Remove drive assembly with tubes from left slave unit. Remove flexible cables from tubes.

Installation - *CAUTION - Seat guides must be in up and forward position when installing cables. Both guides must be at same position (in alignment).* Place all three left cable tubes into left slave unit, with shortest tube on inside and longest on outside, then install flexible cables in tubes (cables must seat in slave unit). Place drive unit on left side tubes, making sure cables seat in slot in drive unit. Bolt drive unit to guide bracket. Place right side cables in right side tubes, then place left guide and drive assembly on right side tubes, making sure cables seat in drive assembly Install right side tubes retainer plate, and bolt left guide assembly to floor pan. Connect red feed wire and check seat operation.

Seat Motor: Removal - Disconnect motor wires at relay and disconnect motor from drive unit. Remove motor from drive unit and rubber coupling, then remove relay from motor.

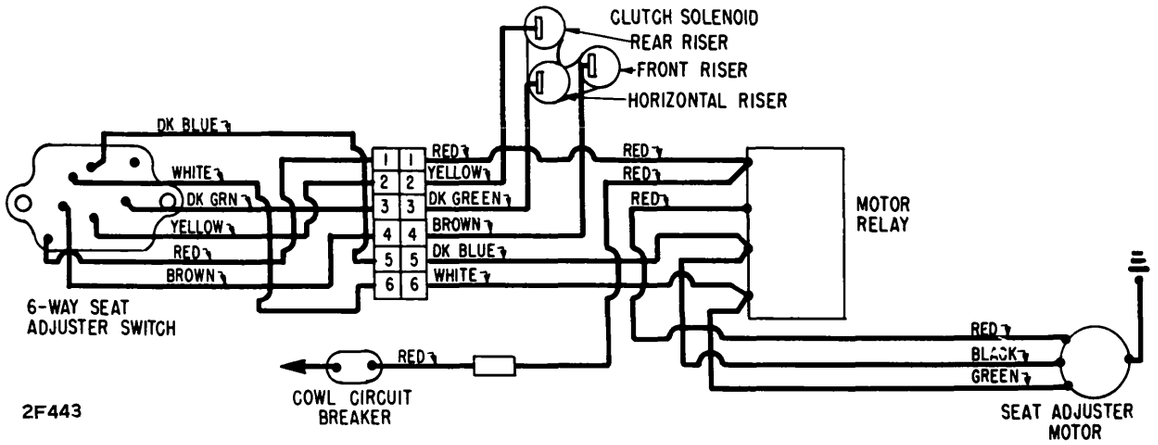
Installation - Reverse removal procedure.

Slav Unit: R m val - Remove drive unit and cables (see "Flexible Cables" above). Seat guide should be up and forward. Remove long clevis pin from front of guide, then remove front rack clevis pin. Remove slave unit cap. *CAUTION - Do not los springs und r cap (springs are between racks and slav cap).* Disconnect slave unit from guide and remove slave unit.

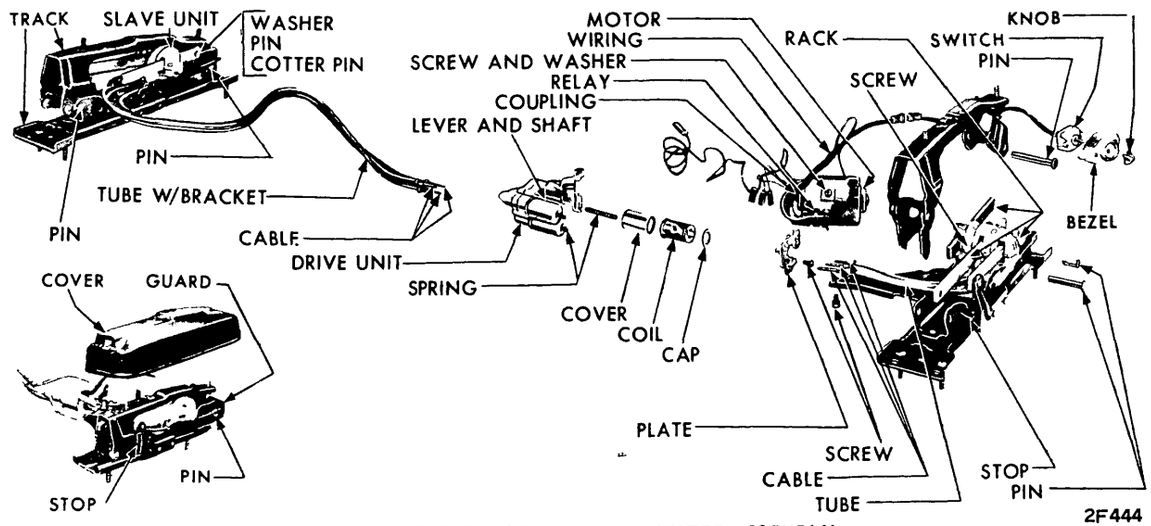
Installation - Reverse removal procedure.

OVERHAUL: Drive Unit & S l n id Ass mbly - Disassembly - Remove drive unit from seat assembly (see "Flexible Cables" above), then remove screws holding plate and solenoids from drive unit. Remove plate and solenoid assembly being careful not to lose three springs under solenoid. Bend back tabs of solenoid cover, unsolder coil ground wire at cover tab and remove coil cover from coil. Remove cover from drive unit and lift out clutch lever and shaft.

R assembly - Reverse disassembly procedure.



CHRYSLER CORP. 6-WAY SEAT ADJUSTER WIRING DIAGRAM



CHRYSLER CORP. 6-WAY SEAT ADJUSTER ASSEMBLY

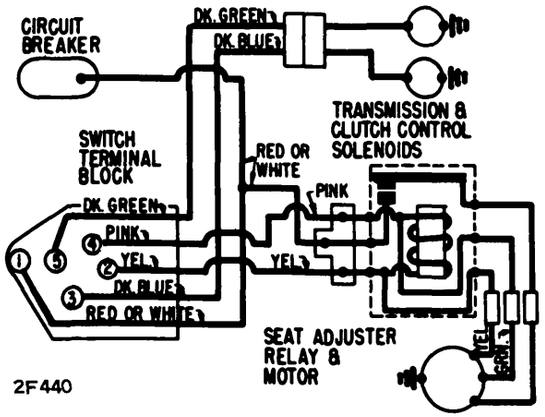
G.M. 4-WAY SEAT CONTROL

Buick (1962)
Oldsmobil (1962)

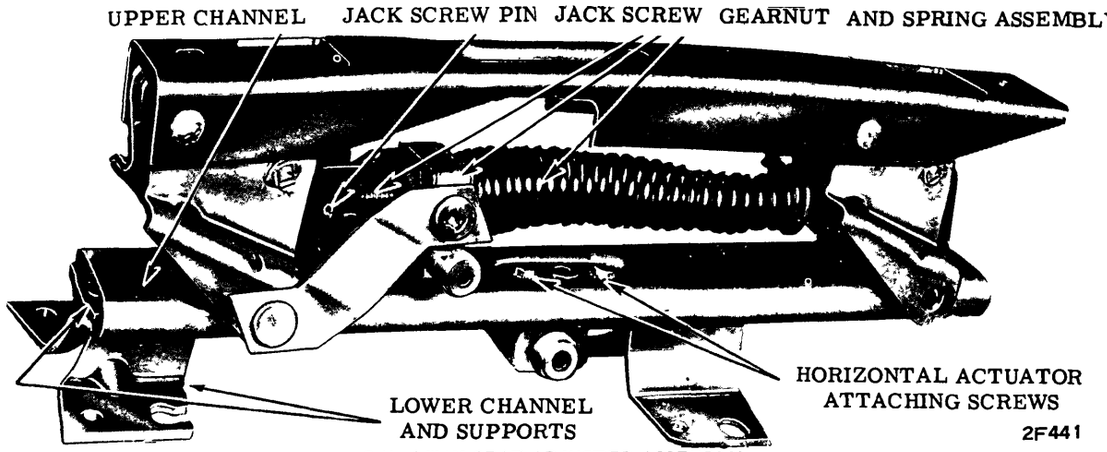
►*BUICK WIRING MODIFICATION NOTE:* Some cars may have wiring modified so that top, electric window, and electric seat operation occurs only through ignition switch. Modification consists of a relay in circuit in series with power feed circuit breaker and ignition switch terminal of fuse box.

DESCRIPTION & OPERATION: Similar in design and operation to previous models. Shunt-wound type motor is used.

TROUBLE SHOOTING & DIAGNOSIS: *See Page 515 in 1960 Final Data or later Manual edition.*
TESTING: *See Page 515 in 1960 Final Data or later Manual edition.*
REMOVAL & INSTALLATION: *See Page 515 in 1960 Final Data or later Manual edition.*



G.M. 4-WAY SEAT WIRING DIAGRAM



G.M. 4-WAY SEAT ADJUSTER ASSEMBLY

G.M. 6-WAY SEAT CONTROL

Buick (1962)
Cadillac (1962)
Ch vrol t Pass. Cars (1962)
Oldsm bil (1962)
P ntiac (1962)

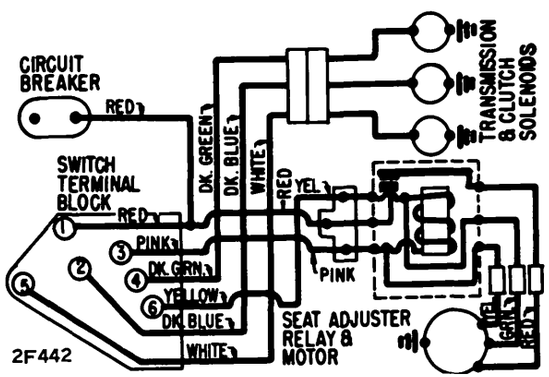
►*BUICK WIRING MODIFICATION NOTE:* Some cars may have wiring modified so that top, electric window, and electric seat operation occurs only through ignition switch. Modification consists of a relay in circuit in series with power feed circuit breaker and ignition switch terminal of fuse box.

DESCRIPTION & OPERATION: Similar in design and operation to previous models except as noted below:
Buick & Cadillac - When seat control switch is mounted in door arm rest, pink wire at No. 3 position controls seat forward and up cycle, and yellow wire at No. 6 position controls seat rearward and down cycle as shown in wiring diagram. When seat control switch is mounted in seat side panel, No. 3 and No. 6 switch position operations are reserved so that No. 3 position controls seat rearward and down cycle and No. 6 position controls seat forward and up cycle. This change is accomplished by reversing green and yellow leads from relay to seat motor.
Oldsm bil - Switch control circuit is from ignition switch through control relay to control switch, and power circuit is through seat circuit breaker and control relay to seat relay and motor. Ignition switch must be on for both motor and switch operation.

TROUBLE SHOOTING & DIAGNOSIS: *See Page 516 in 1960 Final Data or later Manual edition.*

TESTING: *See Page 516 in 1960 Final Data or later Manual edition, and note the following:*

►***OLDSMOBILE NOTE:* Ignition switch must be on before making any electrical tests.**



G.M. 6-WAY SEAT CONTROL WIRING DIAGRAM

Checking Seat Control Switch: Substitute known good switch or use a 3-way jumper wire and connect to switch block as listed below.

Three-Way Jumper Wire - Join two pieces of 12 gauge wire together at one end and insert joined end into feed location (No. 1 on diagram) in switch block. Insert other ends of wires into a field and a solenoid location (Nos. 2 through 6 on diagram) in switch block.

With Switch In Seat Side Panel -
1) To raise front edge, jumper in 6 & 5.
2) To lower front edge, jumper in 3 & 5.
3) To raise rear edge, jumper in 6 & 4.
4) To lower rear edge, jumper in 3 & 4.
5) To move seat forward, jumper in 6 & 2.
6) To move seat rearward, jumper in 3 & 2.

With Switch In Door Arm Rest -
1) To raise front edge, jumper in 3 & 5.
2) To lower front edge, jumper in 6 & 5.
3) To raise rear edge, jumper in 3 & 4.
4) To lower rear edge, jumper in 6 & 4.
5) To move seat forward, jumper in 3 & 2.
6) To move seat rearward, jumper in 6 & 2.

REMOVAL & INSTALLATION: *S Pag 516 in 1960 Final Data r later Manual edition.*

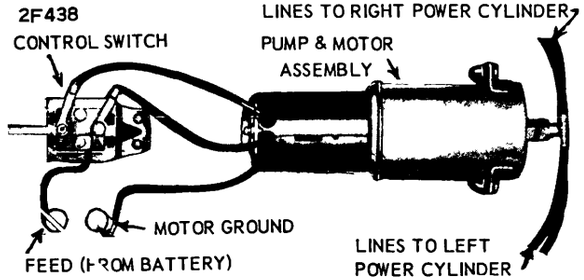
HYDRAULIC-ELECTRIC TYPE

Buick & Buick Special (1962)
Cadillac (1962)
Chevrolet Pass. Cars (1962)
Chevy II (1962)
Corvair (1962)
Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962)
Ford Pass. Cars (1962)
Mercury Monterey (1962)
Oldsmobile & Oldsmobile F-85 (1962)
Plymouth (1962)
Pontiac & Pontiac Tempest (1962)
Rambler American (1962)
Studebaker Lark (1962)

►*BUICK WIRING MODIFICATION NOTE:* Some cars may have wiring modified so that top, electric window, and electric seat operation occurs only through ignition switch. Modification consists of a relay in circuit in series with power feed circuit breaker and ignition switch terminal of fuse box.

DESCRIPTION: Similar in design and operation to models previously used. System is a sealed unit and is not vented to the atmosphere, making it unnecessary to replace hydraulic fluid periodically. System is "self-air bleeding".

CHECKING FLUID LEVEL: With top in raised position, disconnect positive or negative battery cable. Remove pump and motor shield, in rear compartment, and place absorbent material below reservoir. Remove filler plug from reservoir. On motor and pump assemblies installed horizontally, fluid should be at lower edge of filler cap hole. If fluid low, add hydraulic fluid Delco No. 11 (GM Hydraulic Brake Fluid Super No. 11).



PUMP, MOTOR & SWITCH ASSEMBLY

REPLACING FLUID (After Repairs): Cylinders and hydraulic system contains more fluid than one filling of reservoir will supply. Check reservoir frequently during refilling of system. Air in system will automatically bleed out with a few operations of top.

CHECKING HYDRAULIC PRESSURES: Remove motor and pump assembly. Install plug in one port and pressure gauge in port to be checked. Actuate motor with an applied terminal voltage of 9.5-11.0 volts. Gauge should show a pressure as specified below. Check pressure in other port. *NOTE* - A difference in pressure readings may exist between pressure port for top of cylinders and port for bottom of cylinders. This condition is acceptable if both readings are within limits specified. If pressure not within specified limits, unit is defective and should be repaired or replaced. **Hydraulic Pressure** - 340-380 lbs. (General Motors Cars), 240-280 lbs. (Rambler & Studebaker).

CHECKING OPERATION OF LIFT CYLINDERS: Remove rear seat cushion and folding top compartment side panel assembly. Operate folding top control switch and observe lift cylinders during up and down cycles for these conditions:

1) If movement of cylinder rods is not coordinated or sluggish when motor is actuated, check hydraulic hoses from the motor and pump to cylinders for kinks.
2) If one cylinder rod moves slower than other, cylinder with slow moving rod is defective and should be replaced.
3) If both cylinder rods move slowly, or do not move at all, check pressure of pump. See "Checking Hydraulic Pressure" above.

MOTOR & PUMP ASSEMBLY: *See "Power Operated Top Motor & Pump (Rotor Type)" in Miscellaneous Section of Manual.*

LINCOLN CONTINENTAL TOP CONTROL

Lincoln Continental (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 INOPERATIVE TOP CORRECTION:* If cause of failure is not immediately evident, trouble may be due to wiring harness assembly being damaged by contact with rear seat assembly. To correct, remove rear seat back and cushion assembly, make necessary repairs to wiring, and relocate wiring away from seat toward center of car.

DESCRIPTION: Completely automatic power top mechanism which is the same as late production 1961 models with all of the production changes included.

OPERATION: Same as late production 1961 models with all of the production changes included. *See 1961 Final Data, Page 530.*

EMERGENCY MANUAL OPERATION: *See 1961 Final Data, Page 532, and note the following:*

Manually Opening Deck Lid (Control Circuit Inoperative) - If top control circuit inoperative, bypass control circuit components to open deck lid as follows: Remove rear seat back and remove multiple plug from deck unlock relay. Make a three-ended jumper wire and energize deck unlock motor directly through multiple plug. *NOTE - If motor does not operate, unlock deck lid manually.* If deck lid will not operate through top control switch, remove multiple plug from deck open relay and energize deck motor and pump assembly directly through multiple plug. *NOTE - If motor inoperative, pendock lid manually.*

ELECTRICAL COMPONENTS & LOCATIONS: *See 1961 Final Data, Page 532.*

TESTING & TROUBLE SHOOTING: *See 1961 Final Data, Page 532.*

WIRING DIAGRAM: *See 1961 Final Data, Page 531.*

SWITCH ADJUSTMENTS: Deck Lock Limit Switch - With a test lamp attached to the two top terminals of switch, adjust switch so test lamp is lighted when deck lock screws contact deck lock nuts but goes out after lock screws engage lock nuts by one or two threads.

Top Down Limit Switch: With top retracted and a test light attached to upper terminals of switch, adjust switch against pivot arm until test light goes out, then tighten mounting screws.

Back Panel Erect Limit Switch: With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully open. With test light attached to two upper terminals of switch and back panel fully open, move switch against actuator until plunger is depressed and test light goes out. Tighten mounting screws.

Back Panel Retract Limit Switch: With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully folded. Attach test light to top terminals of switch. Fold back panel until rubber pads on underside of deck lid are compressed and back panel motor stalls. Move switch against actuator until plunger is depressed and test light goes out, then tighten mounting screws.

Top Lock Limit Switch: With top erected, but unlocked, remove access cover in No. 1 bow and move switch so plunger will not be compressed when top is locked. Operate top motor until top locks and motor stalls, then release control switch. With a test light attached to red wire terminals of switch, adjust switch against actuator until switch plunger is fully depressed and test light is on, then tighten mounting screws.

Top Unlock Limit Switch: With top erected and No. 1 bow access cover removed, raise deck lid and back panel until top just starts to unlock. Loosen switch so plunger will not be depressed when top is unlocked. Insert a .060" shim between switch plunger and actuator then unlock top fully until lock arm is firmly seated to rubber stop. With a test light attached to yellow and brown wire terminals of switch, adjust switch plunger against actuator until light goes out and plunger is fully depressed. Remove shim and tighten mounting screws. *CAUTION - Lock linkage stop must be adjusted so switch actuator will not hit switch body.*

Top Up Limit Switch/Top Lock Limit Switch No. 1: With No. 1 bow access cover removed and switch loosened, raise top until No. 1 bow rests firmly on windshield header and lock hooks are aligned with hook pockets. Attach a test light to yellow and red wire terminals of switch and adjust switch forward until test light comes on, then tighten mounting screws.

Top Up Limit Switch (In Main Pivot Casting): With deck lid opened, slide switch down so plunger will not be depressed when top fully erected. Raise top until No. 1 bow almost contacts windshield header. Disconnect double connector from switch, attach a test light to

CONTINUED ON NEXT PAGE

LINCOLN CONTINENTAL TOP CONTROL (C ntinued)

switch terminals, and slowly raise top until No .1 bow contacts windshield header and package tray reaches proper position. *NOTE - Make sure best weather seal at packag tray and rear side rail weatherstrips is obtained.* Move switch against top linkage until test light just goes out, then tighten switch mounting screws.

D ck Op n Limit Switch s No. 1 & 2: With deck lid partially opened, move switches so they will not be activated when deck lid fully open. Insert a 1/8" shim between both deck lid hinges and their opening stops, then open deck lid. Shims should be held in place by deck lid hinges. With a test light attached to rear two terminals of either switch, adjust switch plunger against actuator until test light goes on. Tighten switch mounting screws. Repeat for other switch.

Top Lock Cut-Off Switch: With deck lid fully raised and back panel completely folded under so it contacts rubber pads, place a .060" shim between switch plunger and actuator. Attach a test light to red and orange wire terminals of switch. Adjust switch until plunger is fully depressed and test light is out. Remove shim and tighten mounting screws.

HYDRAULIC FLUID LEVEL CHECK: *See 1961 Final Data, Page 533.*

LINCOLN CONTINENTAL DOOR LOCK

Linc ln C ntinental (1962)

►*1961-62 DOOR LOCK OPERATION WITHOUT DRIVER'S ASSISTANCE CORRECTION:* If door locks operate by themselves, trouble may be due to control knob being too far out on shaft and hanging up on bezel in down position, thereby keeping lock system energized. To correct, loosen control knob setscrew and relocate knob away from bezel, then retighten setscrew.

DESCRIPTION: Vacuum lock system similar in design to 1961 models. Rear door warning light system is same as late production 1961 models. *For Wiring and Vacuum Diagrams, Removal and Installation, Testing and Trouble Shooting, see Page 520 in 1961 Final Data.*

FORD THUNDERBIRD TOP CONTROL

F rd Thunderbird (1962)

DESCRIPTION & OPERATION: *See "Ford Thunderbird T p Control" on Pag 530 in 1960 Final Data or later Manual edition and n t th following:*

Relays - Deck solenoid power relay and top solenoid power relay have been eliminated. *See 1962 Wiring Diagram f r d tails.*

EMERGENCY MANUAL OPERATION: Unlocking Deck Lid - If deck lock motor fails to operate, manually unlock deck lid to gain access to deck lock motor as follows: Place floor jack under frame rear crossmember and raise car approximately 10". Remove each deck lid lock retaining screw (underside of each wheelhouse). Lift front edge of deck lid about 1 inch and operate top control switch to complete opening of deck lid.

Op ning D ck Lid - Unlock deck lid by operating top control switch or by using the above procedure. Loosen the two straps supporting the fuel tank and lower tank approximately 1 inch. DO NOT remove straps or tank. From beneath lower back panel, remove both deck cylinder retaining screws from each side. Complete opening of deck lid. If deck lid locks have been released from wheelhousings the nut and housing portion of locks will remain attached to deck lid.

Er cting Top - *NOTE* - It may be necessary to erect top manually if: Electric-hydraulic motor fails; there is an open circuit in motor feed; the top solenoid valves fail; there is an open circuit in the feed line; a top cylinder or linkage fails. Unlock and open deck lid. Energize both top solenoid valves using suitable jumper wires and 12 volt source. If either valve is inoperative, disconnect the hydraulic lines connected to the valves so that there will be no hydraulic block in top cylinders , then manually erect top

TROUBLE SHOOTING & DIAGNOSIS

►*TESTING NOTE:* Usual cause of top malfunction is a defective or improperly adjusted switch. Make switch checks before making further tests.

SUPPLY CIRCUIT TESTING: Use a continuity light between ground and various points in supply circuit. With ignition switch in ON or ACC position and selector lever in N or P, check the following in sequence: Circuit breakers, neutral switch relay, actuator switch, and relay power bus bar.

SWITCH CIRCUIT TESTING: Check switch for improper adjustment by depressing switch stem. Check for electrical failure by bypassing switch with jumper wire directly at switch contact terminals or wire connectors. *NOTE - Continuity light cannot be used to test switch circuits as current draw required by light will not allow relay coils to energize.* To bypass switch circuit, connect jumper wire between relay bus bar and relay coil terminal. If motor or solenoid operates, check switch circuit for defects. If audible "click" of relay is heard, switch circuit troubles are indicated. If motor or solenoid fails to operate and relay operates, check for defective motor, solenoid, or respective circuits.

MOTOR & SOLENOID TESTING: Use a 12-volt power source and jumper wire directly to motor or solenoid, or bypass motor ground circuit breaker to isolate trouble.

UNIT & OPERATION TESTING: Use a 100 Ampere scale ammeter between main feed 50 ampere circuit breaker on starter relay and motor supply lead (black wire) supplying control relay bus bars. If a switch is improperly adjusted so it closes the relay circuit for any cycle but still does not open the cycle just finishing; or if switch is faulty, ammeter reading will indicate the trouble. *See "Electrical Test Specifications" below.*

1962 ELECTRICAL TEST SPECIFICATIONS

Operation	Maximum Amperage Draw ℂ Amperes
Deck Lid Unlock	30
Deck Lid Open	63
Package Tray Extend	30
Package Tray Fold	20
Top Erect or Retract	65
Deck Lid Close	60
Deck Lid Lock	22

ℂ - Battery must be 11.5-12.5 volts for these tests.

Unit	Electrical Unit Current Draw ② Amperes
Pump Motor (Normal)	32-48
(Bypassing)	58
Tray Motor (Normal)	30-35
(No Load)	18-21
(Stalled)	100
Lock Motor (Normal)	18-22
(No Load)	15-18
(Stalled)	50
Solenoids (Each)	10

② - With 100 ampere scale ammeter between 50 amp. circuit breaker and relay feed wire.

HYDRAULIC CHECKS

►*NOTE:* Faulty hydraulic system operation can be caused by lack of fluid, leaks, air in system, obstructions or kinks in hoses, or faulty operation of cylinder or pump.

Fluid Level: Retract top, remove filler plug and check fluid level (bottom edge of filler hole). If low, check for leaks, adding heavy duty brake fluid as necessary.

Lift Cylinder Operation: Operate top control switch and observe operation of lift cylinders. If movement of piston rods is sluggish or uneven, check hoses from pump to cylinders for kinks. If one piston rod moves more slowly than the other, the cylinder with the slower rod is defective and should be replaced. If both rods move slowly or not at all, disassemble and repair pump.

ADJUSTMENT

Top Down Switch: Place switch in midpoint of adjustment slots, then lower top to full down position. Adjust switch as necessary to delay or advance deck lid closing operation.

Deck Closed Switch Adjustment: Use Tool T61B-15780-A. Pull apart the switch quick disconnect and attach a continuity test light to wires that go to bottom set of contact terminals. Press tool firmly into the lock nut and adjust switch upward until the test light attached to bottom set of contacts just goes on, then tighten switch mounting screws and remove tool.

Deck Closed Switch Actuator Adjustment: Use Tool T61B-15780-A. Position tool over lock screw, press tool firmly against lock screw shoulder. Pivot tool to line up with switch actuator. Bend actuator until it touches raised portion of tool. If operation of deck lid disclosed that deck lid pops up when opening, the switch actuator may be bent very slightly away from deck lid.

Top Up Switch: Raise top to full up position. Place .060" shim between end of switch shaft and roof hinge arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shim.

Tray Erect Switch: Extend package tray on the deck lid to end of its travel. Place .060" shim between end of switch shaft and switch actuator on the tray support arm. Adjust switch firmly to the end of its travel against the shim. Tighten switch mounting screws and remove shim.

Tray Retract Switch: Retract the package tray on the deck lid to the end of its design travel. Place .100" shim between end of switch shaft and the switch actuator on tray support arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shims.

CONTINUED ON NEXT PAGE

FORD THUNDERBIRD TOP CONTROL (C ntinued)

D ck Open Switches: Both right and left deck open switches are adjusted in same manner. Raise deck lid to full open position, place .060" shim between end of switch shaft and actuator. Adjust actuator so that the switch shaft is fully depressed. Tighten actuator mounting screws and remove shim.

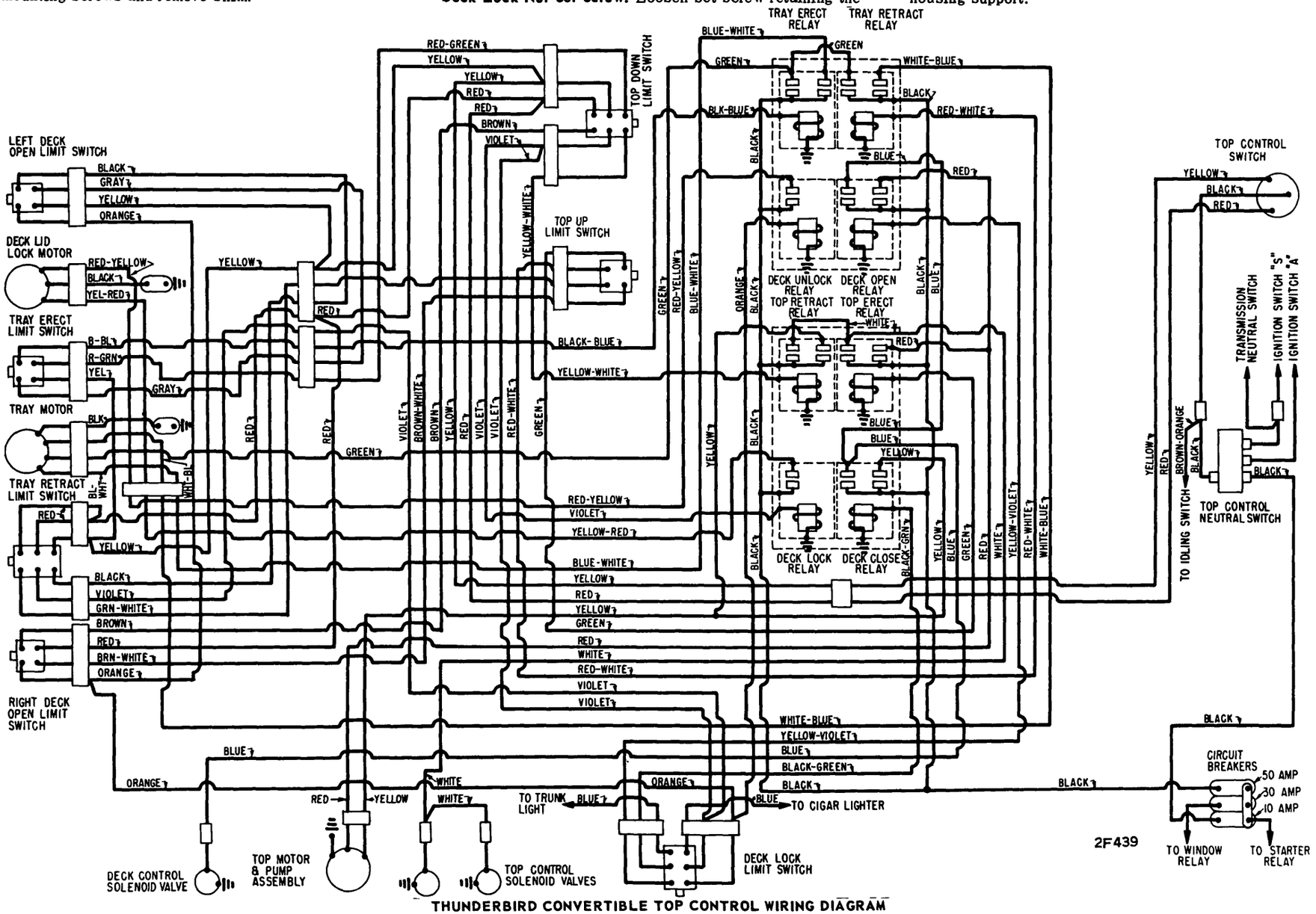
DECK LOCK ADJUSTMENT: *NOTE* - For adequate seal, deck lock screw assembly must be adjusted to engage properly with the lock nut assembly.

Deck Lock Screw Assembly: Loosen two nuts retaining lock screw assembly to deck lid and adjust the assembly fore and aft to align with lock nut assembly.

Deck Lock Nut Housing Support: Loosen two screws retaining lock nut housing support to quarter panel and adjust support side to side to align with lock screw.

Deck Lock Nut Set Screw: Loosen set screw retaining the locknut in housing assembly and turn lock nut in or out to the required position. The Tool T57P-53510-A may be used to turn lock nut as necessary. *CAUTION* - DO NOT attempt any trial locking of deck unless set screw is properly tightened.

Deck Lock Nut Housing Height: The foot of the lock nut housing assembly may be adjusted up or down from the wheelhouse to insure the correct positioning of the "O" ring. The "O" ring should be centrally located in housing support.



THUNDERBIRD CONVERTIBLE TOP CONTROL WIRING DIAGRAM

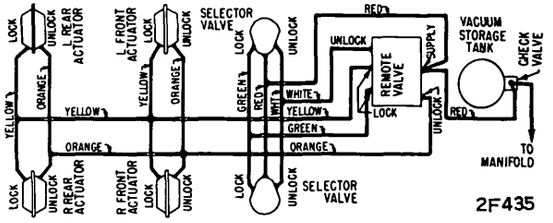
BUICK & CADILLAC VACUUM DOOR LOCK

Buick (1962)
Cadillac (1962)

DESCRIPTION & OPERATION: Consists of vacuum storage tank, vacuum lock remote control valve assembly, selector valve, and actuator assemblies.
Vacuum Tank - Attached to front of power brake mounting support on left side of body. Connected by hose to engine manifold with check valve in the line. A minimum of three complete cycles of operation (lock and unlock) is available immediately after engine has been shut off.
R mote Control Valv - Attached with screws below right hand defroster duct. Supplies vacuum from tank to lock actuators when selector valve is actuated.
S lector Valve - Located on each front door trim assembly.
Actuat r Assemblies - Located in each door are double acting vacuum diaphragms with vacuum supplied to each side. Diaphragm moves a linkage or bell crank connected to locking lever of lock.
►*NOTE:* All vacuum hoses and corresponding actuator ports are color coded, see diagram.

TROUBLE SHOOTING: Condition and cause as follows:
Syst m In p rativ - Hoses crossed at vacuum supply tank, vacuum supply hose pinched at remote control valve, door valve supply hose pinched at remote control valve, vacuum supply hose disconnected at tank, remote valve or engine, remote valve diaphragm leaking.
All Do rs Can Be L ck d But Not Unlocked - Main supply hose crossed with lock supply hose at remote control valve, unlock selector hose or supply hose disconnected at remote valve.
All D rs Can Be Unlocked But Not Locked - Main supply hose crossed with unlock hose on remote control valve, lock selector hose or supply hose disconnected at remote valve.
M ving Eith r Do r Valv t Unlock or Lock Produces the Opp sit Acti n f All Locks - Door lock selector valve hoses (small) crossed at remote control valve, actuator supply hoses (large) crossed at remote valve.
M ving One of Do r Valves to Lock or Unlock Produc s th Opp site Action of the Lock-Valve selector hoses crossed at one door valve, door selector valve reversed in trim assembly.
System Will N t L ck Fr m D r Valv r System Will Not Unlock From One Door Valve - Lock or unlock selector valve hose pinched or disconnected from affected door valve.
Lock Movement on Any Door Not Synchronized with Other Doors - Hoses crossed at affected door lock actuator.
One Door Lock Lags Behind Others When Locked or Unlocked - Lock or linkage binding.
System Inoperative from One Door Valve - Vacuum supply hose pinched or disconnected at affected door valve.
One Door Lock Will Not Lock or Unlock - Actuator hoses pinched or disconnected.
System Will Not Hold Vacuum for 48 Hours - Leak at remote control valve, any two door locks, storage tank and check valve, any part of harness connections.
L cks Inoperativ with Front Do r Cl sed, But Operative with Door Open - Door valve vacuum supply hose pinched at front body hinge pillar on side affected.

TESTING: For leaks not severe enough to be heard, use a suitable water testing device made from a quart jar and flexible tubing. I.D. of tube connected to remote control valve should be 7/32", and I.D. of tube connected to storage tank should be 5/32". Install tester hose not protruding into the water on bottom of check valve on tank. Install hose with end in the water to hose leading to remove control valve. After pressures in system normalized, a bubble will appear in water every 15 seconds or faster if there is an appreciable leak in system. Isolate system in usual manner by pinching hoses when making tests.



BUICK & CADILLAC VACUUM DOOR LOCK CONTROL DIAGRAM

RAMBLER VACUUM DOOR LOCK

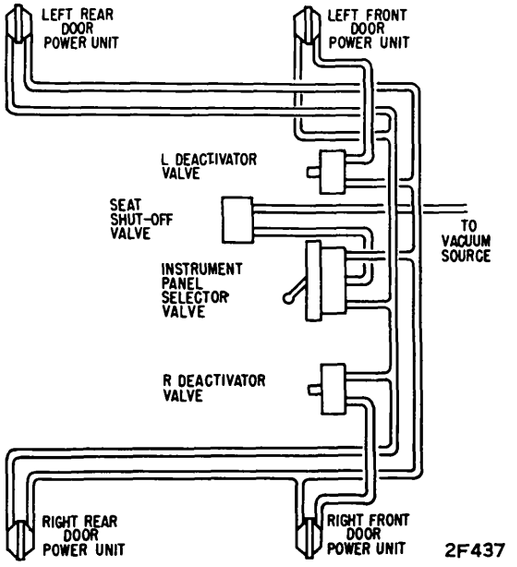
Rambler, Except American (1962)

DESCRIPTION: Vacuum operated door locking system consisting of the following components:
Selector Valve - Located on left lower edge of instrument panel. Controls locking and unlocking of doors when seat shut-off valve is opened by someone sitting in driver's seat.
Seat Shut-Off Valve - Fastened into driver's seat cushion springs by a bracket clamped to four of the coil springs. Valve is a master control and vacuum passes through valve **only** when someone sits in driver's seat. All vacuum to selector valve is shut off when seat valve is closed and doors will remain locked or unlocked as they were when driver moved from the seat cushion regardless of position of selector valve.
Deactivator Valve - Mounted on each front door body pillar. Serves as booster for operating front door locks when front doors are closed. When front door is closed, deactivator valve is pushed in to open valve so vacuum can lock or unlock door automatically.
Door Lock Units - Consist of special door lock and vacuum locking unit for each car door.

TESTING & TROUBLE SHOOTING: *CAUTION - DO NOT apply air pressure to any part of system or serious damage will result.* Insufficient vacuum may be due to kinked or broken hoses, or poor connections. Check for vacuum loss from source of vacuum to unit which does not operate according to Vacuum Route listing below.

Vacuum Route: *NOTE - When checking itesm 2,3,4 & 5 below, engine must be running, pressure applied to driver's seat cushion to open seat shut-off valve, and selector valve on instrument panel in "On" position. Front doors must also be closed so deactivator valves are opened.*
1) From engine source to seat shut-off valve.
2) From seat shut-off valve to selector valve.
3) From selector valve to hoses at both sides of car.
4) Hoses from "T" connectors at selector valve to "T" connectors in both front body pillars to doors.
5) From "T" connectors at both front body pillars to deactivator valves, then to door lock power unit.
6) From "T" connectors at both front body pillars to each rear door power unit.

►*HOSE REPAIR NOTE:* Unnecessary to replace entire hose. Cut hose at break and use copper tubing as connector repair. Copper tube should be of same inside and outside dimensions as "T" connectors.



RAMBLER VACUUM DOOR LOCK CIRCUIT DIAGRAM

CADILLAC TRUNK LID LOCK

Cadillac, Except Series 75 (1962)

DESCRIPTION: Vacuum operated trunk lid locking system used with a rotary bolt type lock. Vacuum release unit is attached to lock, and vacuum storage tank is located on cowl under hood. A vacuum switch located in glove compartment controls unit. A mechanical type lid closing unit is used in conjunction with vacuum lid lock to reduce effort required to close trunk lid.

OPERATION: Vacuum System - Operating vacuum switch in glove compartment introduces vacuum to vacuum unit which then pulls the lock to unlock the trunk lid. Trunk can be unlocked and opened with a key in the usual manner.

Mechanical Closing Unit: When trunk lid is lowered manually and lid lock engages striker, mechanical closing unit pulls lid to closed position. A hydraulic cylinder attached to a bellcrank at right trunk lid hinge and to closing unit by a cable acts as a safety feature to slow action of closing unit. When lid is lowered and lock latches to striker, but before mechanical closing unit is tripped, hydraulic piston extends to full out position. As lid is lowered to actuate mechanical closing unit, piston compresses fluid in cylinder to retard closing action of spring.

ADJUSTMENT: 1) *NOTE - No adjustment at lid lock. All adjustments must be made at pull-down unit on back panel.* Check lid alignment by lowering lid and checking visually. Adjust by loosening pull-down unit attaching screws and adjust unit to desired position. To check up and down adjustment, make sure that locking lever locks in second (upper) notch when lid is in closed position. If not correct, adjust pull-down unit upward. 2) *NOTE - Cable tension must be properly adjusted for proper operation of pull-down unit. If cable too tight, pull-down unit will not return to full up position and "cock". If cable too loose, pull-down effort in unit is lessened and trunk lid will be misaligned (too high). Adjust cable as follows:* To increase tension, place hydraulic cylinder end of cable in upper slot on lower end of cylinder. If more tension required, loosen cable adjusting bracket attaching screw and adjust bracket downward to increase cable travel. To decrease cable tension, place hydraulic cylinder end of cable in lower slot on hydraulic cylinder. For finer adjustment, move cable attaching bracket upward. *CAUTION - Point of contact between toggle and detent lever must be lubricated with Lubriplate to avoid excessive effort required to trip (unlock) pull-down unit.*

REMOVAL & INSTALLATION: Vacuum Release Unit - Remove lid lock cover panel and lid lock cylinder assembly. Remove vacuum unit attaching screws, disconnect vacuum line and remove unit. To install, reverse removal procedure.

Lid Lock: Remove lid lock cylinder assembly and vacuum release unit (see above). Remove lid lock attaching screws and remove lid lock. To install, reverse removal procedure.

Mechanical Pull-Down Unit: Remove pull-down unit cover panel, depress striker slightly to relieve tension on cable, then disengage clip holding cable to pull-down unit control arm. Disconnect clip holding cable conduit to cable adjusting bracket, then disengage cable and conduit from pull-down unit. Remove warning light switch attaching screw and remove switch from pull-down unit. Scribe mark position of pull-down unit to aid installation, then remove attaching screws and remove pull-down unit. To install, reverse removal procedure.

Pull-Down Unit Cable: Pull clip from cable at lower end of hydraulic cylinder, then disengage cable from slot in cylinder. Disengage cable conduit retaining clip from support on wheelhouse and remove cable and conduit from support. Repeat procedure at other end of cable, then remove cable. To install, reverse removal procedure.

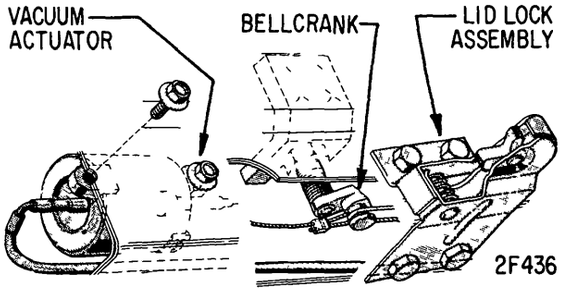
Hydraulic Cylinder: Remove cable from lower end of cylinder (see above). Lift cylinder to disengage upper end from shoulder of shaft on link assembly, then remove hydraulic cylinder. To install, reverse removal procedure.

LINCOLN CONTINENTAL TRUNK LID LOCK

Lincoln Continental, Except Convertible (1962)

DESCRIPTION: Vacuum operated system consisting of a control valve assembly (switch) located in glove compartment, and a door lock actuator assembly (vacuum motor) located on luggage compartment back panel. Vacuum source for system is from vacuum door lock system through a tee connection at door lock vacuum distributor supply line. Trunk lid can also be unlocked in the usual manner with a key.

TROUBLE SHOOTING: *CAUTION - DO NOT apply air pressure to system, or serious damage to vacuum actuator will result. If system inoperative, proceed as follows:* With engine running, listen for any obvious air leaks. Disconnect left hand hose from control valve in glove compartment and touch a finger to hose end. If vacuum not present, trouble is at source from door lock system. If vacuum present, reconnect hose. Disconnect right hand hose from control valve. If vacuum not present at hose, control valve is faulty. If vacuum present, reconnect hose. Unlock trunk lid with key and disconnect hose at actuator. Have a helper operate control valve and touch a finger to end of hose. If vacuum not present, hose from control valve to actuator is faulty. If vacuum present, actuator assembly is faulty.



LINCOLN CONTINENTAL
VACUUM TRUNK RELEASE MECHANISM

BUICK, OLDSMOBILE, PONTIAC TRUNK LID LOCK

Buick LeSabre, Invicta, Electra (1962)
Oldsmobile (1962)
Pontiac (1962)

DESCRIPTION & OPERATION: Vacuum operated trunk unlocking device consists of control lever in glove box, vacuum reserve tank on left inner fender skirt, and vacuum power unit in trunk lock mechanism. Vacuum reserve tank vacuum supply line located in "T" fitting in distributor vacuum advance line near carburetor. A check valve in tank prevents vacuum loss when intake manifold vacuum drops. If vacuum unit fails, trunk can be unlocked in the usual manner.

►*TRUNK LOCK & DISTRIBUTOR CAUTION:* To restore vacuum to supply tank, engine must be run above idle speed as there is no distributor vacuum advance at idle speed. Also, make sure that vacuum line from "T" fitting to reserve tank is in good condition and that there are no leaks at fittings or distributor vacuum advance will fail to operate.

REMOVAL & INSTALLATION: Open deck lid and remove screws holding vacuum unit to deck lid inner panel. Disconnect vacuum hose from vacuum unit and remove vacuum unit. To install, reverse removal procedure.

AIR CONDITIONING SERVICE CAUTIONS

HANDLING FREON: Though considered the safest and best refrigerant for use in Air Conditioning systems, the following precautions must be observed to avoid serious accidents or damage to the system.

Drum: 1) Do not leave drum uncapped (metal cap furnished with drum is for protection of valve and safety plug). It should be replaced after each use of drum.
2) Do not carry drum in passenger compartment of car. Place drum in luggage compartment or, if in an open truck, cover drum to protect it from radiant sun heat. If precaution not taken, resultant increase in pressure may cause safety plug to release or drum to burst.
3) When charging system, do not subject drum to high heat. Use water no warmer than 125°F (Hot rags will suffice). *Never place drum on radiator, stove, or use torches for heating during charging.* Keep drums upright.
4) Never permit a drum to be dropped or strike another drum violently.
5) Do not fill drum completely (when filling one drum from another). Leave space above liquid for expansion.

Personal: 1) Do not discharge Freon into room with exposed flame because concentrations of this gas in contact with open flame will produce a toxic gas.
2) Do not expose eyes to liquid, *USE GLASSES OR GOGGLES. Liquid Freon will freeze anything with which it comes in contact.* If Freon should strike eyeballs, splash water to area of eye to gradually get temperature above freezing point, apply a few drops of sterile mineral oil to eyes as an irrigator. If irritation continues, wash eyes with a weak solution of boric acid. *DO NOT RUB EYES. See an eye specialist at once.*
3) Do not inhale large quantities of Freon vapor as it will act an an anesthetic.
4) If Freon comes in contact with skin, injury should be treated for frostbite.

HANDLING REFRIGERANT LINES: 1) Keep refrigerant lines dry and clean. Whenever a connection or joint is broken, clean all dirt from joint or connection.
2) Parts from stock are capped and dehydrated. Caps should only be removed just prior to installation. Lines removed from system to be used again, should be capped immediately, to prevent dirt and moisture from entering lines.
3) Lines should be free of kinks, and should be carefully stored to avoid crushing or bending.
4) Proper size wrenches should be used when tightening fittings. Always use two wrenches to prevent twisting copper tubing.
5) Tubing that is left free to vibrate will harden and crystallize the area of the tubing at flare sections so that it may become brittle and break.
6) When using paint drying lamps, ovens, steam cleaners, or other heat producing devices, avoid heating any part of system. If sufficient heat applied, pressure will increase to a point where some part of system will rupture.
7) When undercoating, use care to see that undercoating does not plug evaporator drain. Do not coat air conditioning joints and connections.
8) Keep gauge set and lines free of moisture.
9) Compressor lubricant container must not be left open longer than necessary as the special oil is moisture free and will absorb moisture from air if left uncapped.

AIR CONDITIONING LEAK TESTS

LEAK TESTING CONFINED AREAS: For leak testing confined areas, such as sections of evaporator and condenser, a torch or flame type detector must be used. Two types are available. One type uses anhydrous methyl alcohol, under pressure, for producing the testing flame. The cylinder is refillable, and must be preheated to pressurize cylinder. The other type uses propane gas, under pressure, to produce the testing flame. The cylinder is replaceable and comes already pressurized, making it unnecessary to pre-heat cylinder in order to produce testing flame. Instructions for use of the detectors are furnished with the detector.

Leak Testing: With flame adjusted, explore for leaks by moving end of hose or sampling tube around all points where a leak may be. Especially check around bottom of connections, since Freon is heavier than air and will be more apparent at bottom of fitting. Color of flame will turn to a yellow-green when a small leak is detected. Large leaks will be indicated by a change in color to bright or brilliant blue or purple. When hose or tube is moved away from leak, flame will clear to an almost colorless pale-blue or green. *CAUTION*—Do not use lighted detector in any place where combustible or explosive gases, dust or vapors may be present. Do not breathe fumes and black smoke that are produced if leak is a big one. Before leak testing, be sure car is thoroughly aired (particularly if Freon tank used or if system opened for any reason) and moved to a Freon-free area in order that false readings may be prevented.

PIN-POINTING LEAKS: There are a number of fittings and places throughout the air conditioning unit where a leak detector solution or detergent may be used to pin-point leaks. Apply solution to suspected area with swab that is attached to bottle cap. Bubbles will form, within seconds, if there is a leak.

AIR CONDITIONING TROUBLE SHOOTING

►*CAUTION: Do not disconnect refrigerant lines, replace parts, or attempt adjustments without complete instructions. See "Air Conditioning Service Cautions".*

POOR COOLING: 1) Blowers Not Operating—Fuse blown or faulty circuit breaker; switch in "Off" position; defective switch; switch resistors or blower rheostats inoperative; broken wire or loose connections; blower motor defective; blower fans or motor improperly installed.
2) Restricted Air Flow—Filters clogged; dirt or other obstructions in air ducts; evaporator fins or coils clogged or restricted with frost or ice.
3) Refrigerant Flow to Cooling Coils or Fins Incorrect—Expansion valve improperly adjusted or defective; power element or temperature bulb does not contact pressure line properly; restriction in liquid line between receiver and cooling coils or fins; power element or temperature bulb discharged; insufficient refrigerant; by-pass valve, thermostatic switch or solenoid (if so equipped) not properly set or inoperative; modulator valve (if so equipped) defective; break in any part of closed refrigeration system.
4) Refrigerant Not Condensing Properly—Air flow through condenser, restricted, high engine operating temperatures; air or excess refrigerant in system; restriction in high pressure side of compressor and condenser.
5) Clutch (If So Equipped) Does Not Engage—Defective coil or relay; clutch plate lining worn or saturated with oil causing slippage; air conditioning "On" switch defective; thermostat inoperative; clutch adjustment incorrect.
6) Compressor—Belts not adjusted properly, worn, or broken; operating above normal pressures; disconnect pulley bolts not in place; valves faulty; service valves not fully open.
7) Electrical—Loose connections or broken wires between electrical units, blown fuses or faulty circuit breakers.

TOO COLD: 1) Clutch (If So Equipped) Does Not Disengage—Thermostat inoperative; relay stuck closed; air conditioning "On" switch inoperative.
2) Blower Speed Cannot be Reduced—Defective blower switch.

VIBRATION—NOISE: 1) Blowers—Loose on shaft; striking housing; foreign material; motor bearings or mounts loose or worn.
2) Compressor—Mounting brackets loose; loose internal parts; insufficient oil; too much refrigerant.
3) Air Flow—Foreign material in air system; small slits or openings in ducts.

INCORRECT OPERATING PRESSURE: 1) Excessive Pressure on High Pressure Side—Air or excess refrigerant in system; air flow through condenser core restricted; kinks or restrictions in line on high pressure side; high engine temperature; shut-off valve on high pressure side of compressor not fully open; insufficient air flow through cooling coil; defective expansion valve or incorrect adjustment.
2) Insufficient Pressure on High Pressure Side—Shortage of refrigerant; defective expansion valve or incorrect adjustment; leaky or broken compressor valves.
3) Excessive Pressure on Low Pressure Side—Power element or temperature bulb not making correct contact with pressure line; expansion valve needle stuck open or leaking.
4) Insufficient Pressure on Low Pressure Side—Restriction in lines, shortage of refrigerant; expansion valve needle stuck shut; expansion valve not open far enough, plugged, or defective; dehydrator-filter (strainer-drier) plugged; power element or temperature bulb charge lost or line plugged; compressor valves faulty; blower fans inoperative; temperature control thermostat does not cut out; moisture or freeze-up.

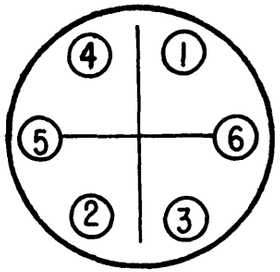
FORD MOTOR CO.

F rd Falc n, Fairlan , & Galaxi (1962)
Mercury Comet, Meteor, & Monterey (1962)
Lincoln Continental (1962)
Thunderbird (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 LINCOLN CONTINENTAL HOSE ROUTING NOTE:* To avoid hose interference in area of left hood hinge, route fuel hoses below rather than between air conditioner hoses and tape all hoses together. Check hoses and hinge for proper clearance.

►*1961-62 LINCOLN CONTINENTAL FREON LEAK AT COMPRESSOR SHAFT CORRECTION:* May be caused by seal plate gasket taking a set, or uneven torque at seal plate retaining bolts. To correct, loosen seal plate attaching bolts until free, then torque bolts evenly in sequence shown in diagram to 13-15 ft. lbs.



2F492

YORK COMPRESSOR SEAL PLATE BOLT TORQUE SEQUENCE

►*1962 LINCOLN CONTINENTAL "YORK" COMPRESSOR SHAFT SEAL REPLACEMENT NOTE:* Some cars may have an "O" ring seal in shaft seal plate. If replacement of "O" ring necessary, use standard York seal plate gasket.

►*1961-62 MERCURY MONTEREY (352" & 390" ENGINES) COMPRESSOR MOUNTING BRACKET NOTE:* Improved bracket, Part No. C2SZ-2882-A, available to minimize compressor induced car vibration, and to insure more accurate belt alignment.

DESCRIPTION: Conventional design air conditioning system similar to previous models. Two types system used: Larger (Select Aire) type has evaporator used in conjunction with conventional heater system to allow use of both fresh and recirculated air for cooling. Smaller "hang-on" (Polar Aire) type uses recirculated air only, and evaporator and air ducts are a self-contained unit.

ADJUSTMENT

COMPRESSOR BELT: Use a strand tension gauge (T62L-8620-A) and adjust belt tension as indicated in table below. On new belts, adjust tension initially and then adjust for used belt specifications after 15 minutes operation.

Compressor Belt Tension

Car Model	New	①Used
Lincoln Continental	100-150 lbs.	80-120 lbs.
All Others	120-150 lbs.	90-120 lbs.

①- Any belt operated 10-15 minutes or longer.

CONTROL ADJUSTMENTS: F rd Galaxi - *For hand control adjustm nt, s Car Mod l pages.* 1) With upper lever in "Low" position (to left of panel), adjust heater temperature regulator valve cable at control head so valve crank is at maximum forward (off) position. 2) With lower lever in "Off" position, adjust toe-board heat door at door or control head so door is closed, then adjust defroster cable at control head so defroster air valve is closed. Move lower lever to "Heat" position and make sure vacuum valve is opened so vacuum is applied to vacuum solenoid. Adjust solenoid and recirculating air door linkage so both doors close opening to passenger compartment when vacuum applied to solenoid. 3) Push both "Air" knobs all the way in and adjust left and right fresh air inlet valves so valves close openings into passenger compartment.

Mercury Monterey: Hand Throttle - *See Car Model pages.*

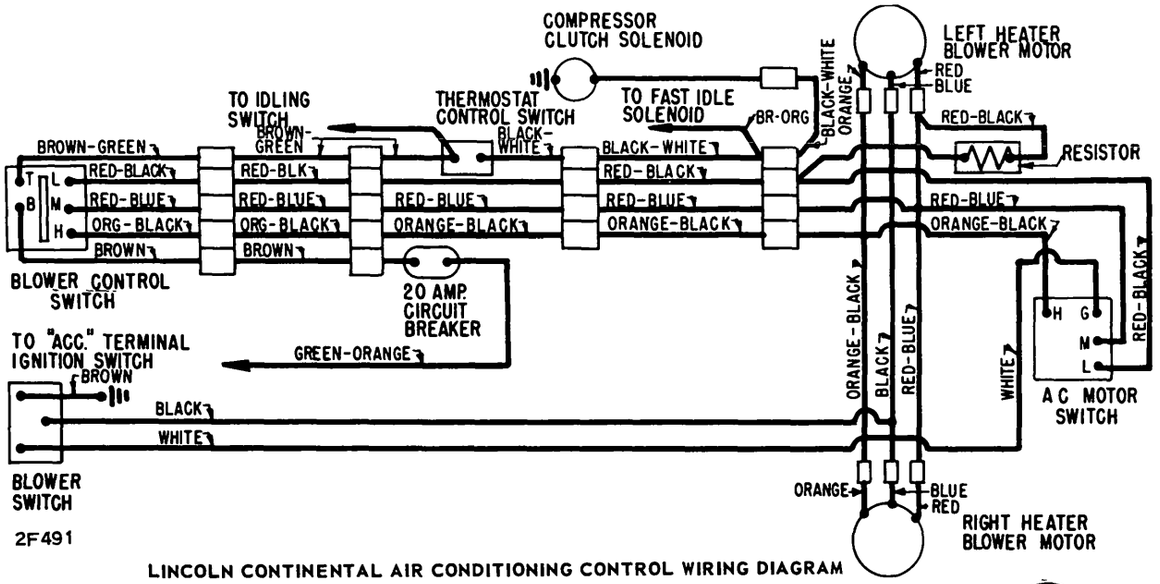
Air Vent Control - Make adjustment at both right and left ventilator doors. Loosen cable housing retainer screw at ventilator door and position vent control about 1/16" from fully in position, then move ventilation lever fully clockwise. Tighten cable retainer and check operation so that door opens and closes fully.

Heater Dump Door - Loosen cable housing retainer screw at door, then move lower control cable in off detent position and move door lever fully counterclockwise. Tighten retainer screw and check operation. In "Off" position, door should be closed; in "Heat", door should be fully open; in "Defrost", door should be closed.

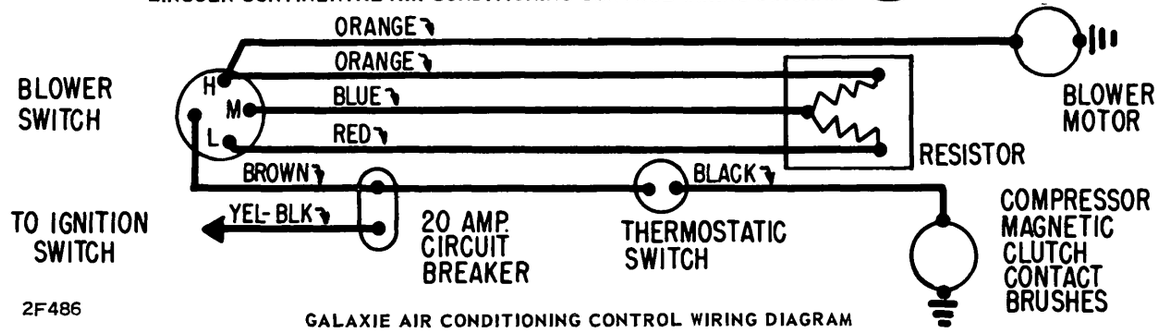
Defroster Air Door - Make adjustment at control head. Loosen cable housing retainer screw and place lower control lever in "Off" position. Adjust defroster door cable so door lever is fully clockwise and door is closed. Tighten retainer screw and check operation. Door should be closed in "Off" and "Heat", and open in "Defrost" position.

Heater Temperature Regulator Valve - Make adjustment at control head. Loosen upper cable housing retainer screw and place upper lever in "Low" position. Adjust cable so regulator valve lever is completely forward and valve is closed (move cable toward regulator valve). Tighten retainer screw and check operation. Valve should be fully closed with lever at "Low", and fully open with lever at "High".

CONTINUED ON NEXT PAGE



LINCOLN CONTINENTAL AIR CONDITIONING CONTROL WIRING DIAGRAM



GALAXIE AIR CONDITIONING CONTROL WIRING DIAGRAM FRESH AIR (SELECT AIRE) TYPE

FORD MOTOR CO. (Cont.)

Vacuum Valv Switch - Loosen switch retaining screw so switch bracket will move, then place lower lever in "Heat" position. Move vacuum valve switch against control lever flange until switch plunger is depressed, then tighten retaining screw. Connect vacuum hoses to switch and check operation of recirculating air doors.

R circulating Air D r Vacuum Unit - Set vacuum unit preload by positioning attaching bracket (with slotted holes) so, with no vacuum applied to unit, preload indicator is in line with edge of vacuum unit body. Check that recirculating air door is properly sealed.

Line In C ntinental: Th rm static Switch - Remove lower left instrument panel cover and loosen link adjusting screw on switch. Adjust link until preload indicator is flush with unit body (switch arm must be in full forward position for adjustment). Tighten adjusting screw and install instrument panel cover.

Ford Thund rbird: Vacuum Units - 1) Move right lever all the way to left and adjust cable at control head so defroster outlets are closed, then check adjustment by turning on blower and making sure no air comes out of defroster outlets.

2) Adjust cooling outlet register door vacuum unit so outlet door is closed (move crank fully counterclockwise), and preload notch in vacuum unit arm is flush with front face of unit. With vacuum applied, door should be wide open.

3) Adjust heater core outlet door vacuum unit so door to core is open (move crank fully counterclockwise), and preload notch in vacuum unit arm is flush with front face of unit. With vacuum applied, door should open recirculating grille opening.

4) Adjust each toe-board heat door vacuum unit so toe-board doors are open, and preload notch in vacuum unit arm is flush with front face of unit. On left door, make adjustment at adjustable actuating arm. To check, turn on blower. Air should come out of toe-board openings. With vacuum applied (control lever at "Defrost"), no air should come through.

Therm static & Fast Idle Switches - Set center lever in air outlet register in "Off" position, and adjust bowden cable at thermostatic switch so switch lever is at bottom position, then adjust fast idle switch adjusting screw so that fast idle switch is open.

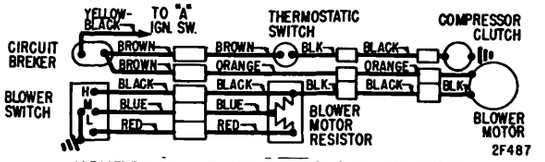
SERVICING

►*INTAKE & DISCHARGE SERVICE VALVE NOTE:* Intake and discharge service valves are hand-operated type mounted on top of compressor. Rotating valve stems *COUNTERCLOCKWISE* until fully seated is the normal operating position. This position also isolates the service valve gauge ports for connecting gauge manifold set. Rotating valves *CLOCKWISE* until fully seated isolates the compressor from the system. *CAUTION - Do not op rate compressor with service valv s fully s at d clockwis .*

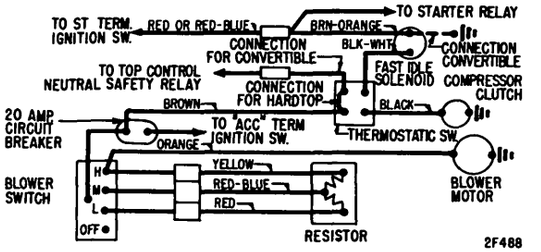
COMPRESSOR OIL LEVEL: Checking & Filling - Operate engine at 1500 RPM with compressor running, for 15 minutes, then turn off engine and isolate compressor. Remove oil filler plug from compressor and insert a flattened 1/8" diameter rod in oil filler hole until it bottoms. *NOTE - On some compr ssors, it may b necessary to bend rod slightly or rotate crankshaft by hand so dip rod will reach to bottom of compressor.* Oil level on rod should be as indicated in table below. Add refrigerant compressor oil as necessary. *NOTE - If oil level too high, withdraw oil as necessary.* Replace filler plug, evacuate and cut compressor back into air conditioning system.

C mpress r Oil L v l
(On Dip R d)

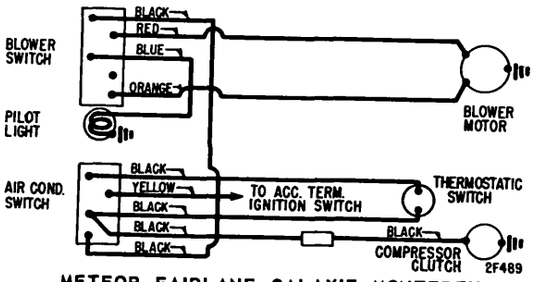
Car M d l	H ight	Capacity
Lincoln Continental	1½-1½"	10 ozs.
All Others	¾"	9 ozs.



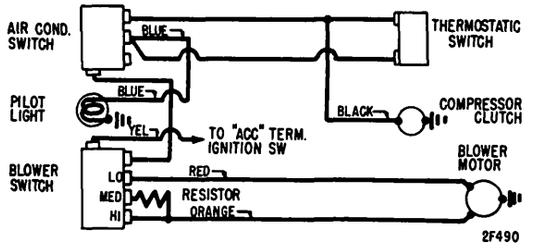
MONTEREY AIR CONDITIONING CONTROL WIRING DIAGRAM (FRESH AIR TYPE)



THUNDERBIRD AIR CONDITIONING CONTROL WIRING DIAGRAM



METEOR, FAIRLANE, GALAXIE, MONTEREY AIR CONDITIONING CONTROL WIRING DIAGRAM "HANG ON" (POLAR AIRE) TYPE



COMET & FALCON AIR CONDITIONING CONTROL WIRING DIAGRAM "HANG ON" (POLAR AIRE) TYPE

GAUGE SET INSTALLATION: Remove service valve stem covers and make sure that both service valves are turned fully counterclockwise. Remove service valve gauge port covers, and attach flexible hoses of gauge set to gauge ports. Connect hoses from center fitting on gauge set manifold to tank of Freon and to vacuum pump. Turn both manifold gauges to a fully seated clockwise position and close vacuum pump valve. *NOTE - Manifold valves are so arranged that when turned fully clockwise, center manifold connection is cut off from gauges, but gauges continue to read pressures in their respective hoses.*

DISCHARGING THE SYSTEM: *CAUTION - Discharge refrigerant from system before replacing any part of the system except compressor.* Connect gauge set to manifold as indicated above (do not connect manifold center connection hoses to Freon tank or to vacuum pump). Place open end of hoses from center connection on manifold in garage exhaust outlet or into an open area having sufficient air movement to dissipate gas. Set high pressure gauge valve on manifold to open position (fully counterclockwise). Open high pressure service valve a slight amount and allow refrigerant to discharge from system. *CAUTION - Do not allow refrigerant to rush out, as compressor oil will be forced along with refrigerant.*

EVACUATING THE SYSTEM: Connect gauge set, refrigerant tank, and vacuum pump to system (see "Gauge Set Installation" above). Refrigerant tank valve must be tightly closed. Place both compressor service valves at mid-position, and both gauge manifold valves at open (counterclockwise) position. *CAUTION - If Gauge Set ACL-53-3 is used, close service and gauge set high pressure valves (vacuum will damage high pressure gauge).* Open vacuum pump valve and operate pump until low pressure gauge reads at least 25", and as close to 30" of vacuum as possible. Operate pump for 20-30 minutes until system is completely evacuated, then close pump valve and turn pump off.

►*FREON CHARGING NOTE:* Correct amount of refrigerant introduced into system must be accurately determined as follows: Before charging, place refrigerant tank in a container of warm water (not to exceed 150°F), then place container and tank on an **accurate** scale. Weigh assembly and record total weight. As refrigerant enters system, the exact amount in pounds can be determined.

CHARGING THE SYSTEM (PARTIAL CHARGE): *NOTE - If a loss of refrigerant is indicated by bubbles appearing in sight glass, system can be brought up to proper charge of refrigerant as follows:* Use same procedure as detailed below for completely charging system (do not evacuate system), and charge system until all foam or bubbles disappear from sight glass, then add an additional ¼-pound (Comet & Falcon), ½ pound (All Others) of Freon.

CHARGING THE SYSTEM (COMPLETE CHARGE): Evacuate system (see above). Set compressor service valves at mid-position and close vacuum pump valve. Open both manifold gauge valves and refrigerant tank valve and purge hoses at compressor, then close high pressure gauge valve and refrigerant tank valve. Place refrigerant tank in warm water and then on an accurate scale (see "Freon Charging Note" above). Open refrigerant tank valve, set air conditioner controls for

CONTINUED ON NEXT PAGE

FORD MOTOR CO. (C nt.)

maximum cooling and operate engine at 1500 RPM. Charge system until proper amount of refrigerant has been weighed in and no bubbles appear in sight glass. *See table below for system capacity. CAUTION - Do not let low pressure gauge exceed 60 lbs., or high pressure gauge exceed 240 lbs. (see below).* After proper charge made, close refrigerant tank valve, check system for proper operation and for leaks, place both service valves fully counterclockwise, remove gauge set, and cap service valve gauge ports and valve stems.

System Refrigerant Capacity

Car Model	Capacity
Comet & Falcon	2 lbs.
Fairlane & Meteor	2 lbs.
Galaxie & Monterey	2½ lbs.
Thunderbird	2¾ lbs.
Lincoln Continental	2½ lbs.

►*HIGH PRESSURE (DURING CHARGING) NOTE: If system pressure exceeds 60 lbs. (low pressure gauge), 240 lbs. (high pressure gauge), stop engine and check for cause which may be due to overcharge of refrigerant, overheated engine, or air in lines in combination with high surrounding temperatures.*

PURGING COMPRESSOR: Remove service valve stem caps and turn both valves fully clockwise (front seated). Remove both valve port caps and connect a hose from low pressure valve to a tank or can of refrigerant. Open tank valve slightly and let refrigerant flow into compressor from low pressure side, then close tank valve and install port cap on high pressure service valve. Remove hose from low pressure valve and install cap on valve port. Turn both valves fully counterclockwise (back seated) and install valve stem caps.

REMOVAL & INSTALLATION

CONDENSER: Comet & Falcon - Discharge system, then remove front grille-to-radiator support bracket and hood latch. Disconnect hoses from condenser and remove condenser. To install, reverse removal procedure, evacuate and charge system, and check for leaks.

Fairlane & Meteor: Discharge system and remove hoses from condenser. Remove fan, radiator and shroud. Remove condenser mounting bolts and remove condenser. To install, reverse removal procedure, evacuate and charge system, and check for leaks.

Galaxie & Monterey: Remove radiator and shroud, then discharge system. Disconnect hoses from condenser, remove condenser attaching bolts and remove condenser. To install, reverse removal procedure, evacuate and charge system, and check for leaks.

Thunderbird: Discharge system and remove upper radiator shield. Disconnect hoses from condenser, then remove condenser lower mounting bolts. Push top of radiator backwards a few inches and remove condenser. To install, reverse removal procedure, evacuate and charge system, and check for leaks.

Linc ln Continental: Discharge system. Remove upper radiator support shield and front bumper splash shield. Disconnect condenser hoses, remove condenser attaching bolts and remove condenser. To install, reverse removal procedure and tighten condenser attaching bolts to 60-65 inch-lbs. Evacuate and charge system, and check for leaks .

COMPRESSOR: All Models - Isolate compressor as follows: Turn both service valves fully clockwise (front seated), and loosen cap on high pressure valve gauge port so gas will escape until compressor is relieved of refrigerant pressure. To remove compressor, disconnect hoses from both service valves and clutch wire at bullet connector. Loosen mounting bracket bolts and remove drive belt, then remove mounting bolts and compressor. To install, reverse removal procedure and cut compressor back into system by evacuating at high pressure valve and turning both service valves fully counterclockwise (back seated). Add a partial charge of refrigerant if necessary, and check compressor oil level. *NOTE - If necessary to r mov compressor clutch, do so b for r moving compressor for ease in breaking clutch loos from shaft as f llows: Energize clutch, remov mounting bolt, and install a 5/8 - 11 bolt in clutch drive shaft hole. Tighten bolt until clutch breaks loos from shaft, th n disconnect clutch wire .*

GENERAL MOTORS CARS

Buick & Buick Special (1962)
Cadillac (1962)
Chevrolet Pass. Cars (1962)
Chevy II (1962)
Corvair (1962)
Oldsmobile & Oldsmobile F-85 (1962)
Pontiac & Pontiac Tempest (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962 BUICK (EXCEPT SPECIAL) REFRIGERANT LEAK CORRECTIONS:* 1) If system is known to be leaking and leak cannot be found, check for possibility of leak in suction throttle valve piston diaphragm. Leak at piston diaphragm will let refrigerant be drawn into engine through intake manifold and no external leak will exist. To check, remove vacuum hose from suction throttle valve vacuum diaphragm, allow a few seconds for refrigerant to collect in diaphragm, then leak test at vacuum hose connection. If leak exists, replace piston diaphragm.

2) If leak exists between Schrader valve gauge connector fitting and suction throttle valve body, make sure connector is tightened to 10 ft. lbs. If leak still not corrected, install later type valve body and connector having an "O" ring at fitting. *CAUTION - Various types of valve body used, make sure correct parts are obtained.*

►*1962 CHEVY II INADEQUATE AIR CONDITIONING BLOWER SPEED CORRECTION:* Make sure correct blower resistor, Part No. 3791410, located in blower housing, is installed.

►*1962 CHEVROLET PASS. & CHEVY II RESTORATION OF BLOWER HIGH SPEED AT NIGHT PROCEDURE (ALTERNATOR EQUIPPED CARS ONLY):* On alternator equipped cars **only**, night blower cut-back feature may be eliminated (blower high speed restored) if desired, as follows **Chevrolet** - Cut yellow wire from rectifier adapter terminal (which connects to relay), and ground this wire to blower at blower-to-case screw. **Chevy II** - Cut yellow wire at dimmer switch (from switch to rectifier adapter), and ground this wire beneath dimmer switch.

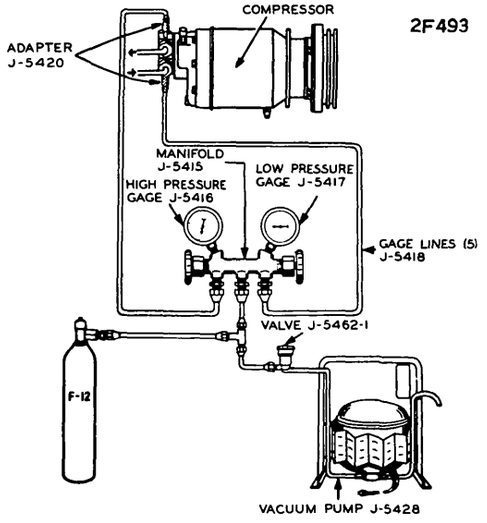
DESCRIPTION: Conventional type air conditioning systems similar to previous models. On most models, a suction throttle valve to control air outlet temperature is used in place of previous hot gas bypass valve. In this system, compressor operates all the time air conditioning is desired. On some other models a thermostatic switch on evaporator is used to control air outlet temperature by stopping and starting compressor as required. All models use a 6 cylinder compressor of double action piston design. All units are mounted in engine compartment or on front of dash. Cadillac Series 75 has an additional evaporator, suction throttle valve, and blower assembly in trunk. Some models use a "blower night cut-back" feature which does not permit blower to operate in high speed when headlights turned on. *NOTE - This cut-back feature may be eliminated on some cars - see above.* A muffler in compressor high pressure line is used on some models to reduce compressor noise.

►*SHUT-OFF VALVE NOTE:* Hand operated or Schrader type valves used in intake and discharge lines. *CAUTION - Schrad r typ valves ar op n d by sp cial adapters n charging h s s and h s s must b prop rly connected to th gaug s t, and s t manif ld valves must b completely closed b fore making c nn ctions to valves.*

►*SERVICE CAUTION: Before disconn cting any part of air conditioning system or lines, s "Air Conditioning Service Cautions" at b ginning of Air Conditioning Section.*

LEAK TESTING & TROUBLE SHOOTING: *S "L ak Testing & Trouble Shooting" at b ginning of Air Conditioning Section.*

CONTINUED ON NEXT PAGE



GAUGE SET INSTALLATION

GENERAL MOTORS CARS (C ntinued)

ADJUSTMENT

COMPRESSOR BELT: Adjust belt as follows:

Buick (Except Sp cial): Adjust belt so strand tension gauge J-7316 reads 90.

Buick Special: Adjust belt so strand tension gauge J-7316 reads 72.

Cadillac: Adjust belt tension for 90 lbs. (new belt), 60 lbs. (used belt) with Tension Gauge J-9646. *NOTE - This gauge should b us d to avoid internal compressor damage.*

Ch vr let, Ch vy II, C rvair: ½-¾" deflection with 15 lbs. load applied midway between crankshaft and compressor pulleys.

Oldsm bil & Oldsm bil F-85: With a strand tension gauge, adjust belt tension to 90 lbs. *This supersedes pr vious sp cifications. NOTE - If Gauge BT-33-70 is used, index groove on tool plunger should be aligned with th notches just above pointer. This supersedes pr vious setting.*

P ntiac & P ntiac Temp st: Adjust belt with Burroughs Belt Tension Gauge to obtain 100-105 lbs. belt tension.

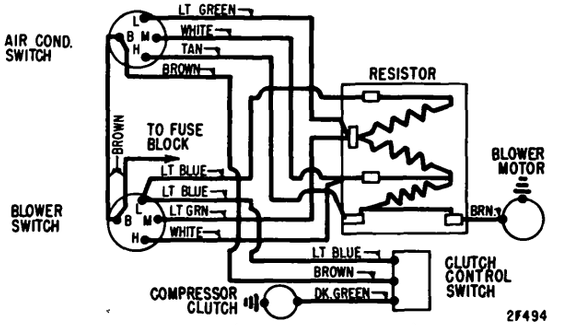
SERVICING

GAUGE SET INSTALLATION: Connect gauge set into system (see illustration and "System Gauge Connection Note" below). *NOTE - F r purging or adding oil to syst m, Freon tank and Vacuum Pump are not connected to cent r conn ction n manifold.* Make sure that shut-off valves on gauge set are fully closed and that shut-off valves on compressor head (cars with this type valve) are turned fully COUNTERCLOCKWISE (back seated).

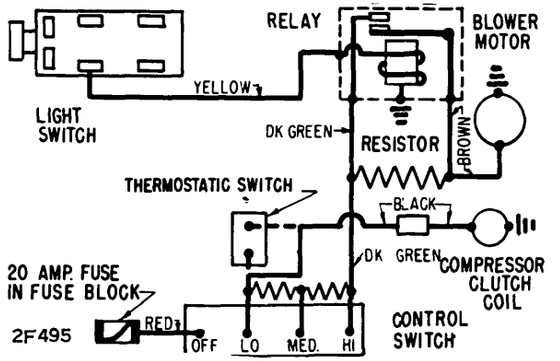
►*SYSTEM GAUGE CONNECTION NOTE:* Usual location for gauge set connections is at the compressor, however some cars may have high pressure valve at compressor muffler inlet and low pressure valve in line near air intake pipe at dash panel. On cars with suction throttle valve, a low pressure gauge valve is also located on suction throttle valve (or on a pipe attached to valve). *CAUTION - Gauge valve at suction throttle valv MUST NOT BE USED TO CHARGE SYSTEM unl ss th r is no low pr ssure valve at compressor, or severe damage to suction throttle valve will result.*

►*SCHRADER TYPE VALVE CONNECTION CAUTION: On cars using this type valve in place of hand operated shut- ff valv s in r frigerant lines at compressor h ad, it is n c ssary to connect Adapters J-5420 to gauge conn cting lin s and to make sure that both valv s on gaug s t ar completely closed before conn cting adapt rs to Schrader type valves as the adapters will automatically open these valves.*

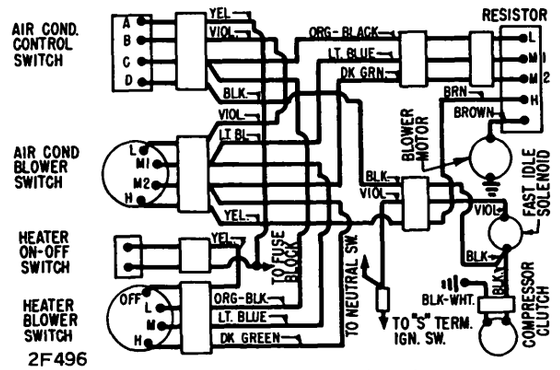
►*HAND OPERATED SHUT-OFF VALVE NOTE:* These are two-way valves. When turned COUNTERCLOCKWISE (back seated), compressor is connected to refrigerant lines and line to gauge fitting is closed. This is the normal operating position. When turned CLOCKWISE (front seated), compressor is closed off from refrigerant lines and open to gauge fitting. When valves are turned to middle position, compressor is open to both refrigerant lines and to gauge fitting. In this position, gauge readings can be taken with system in operation.



BUICK (EXCEPT SPECIAL)
AIR CONDITIONING WIRING DIAGRAM



BUICK SPECIAL AIR CONDITIONING WIRING DIAGRAM



CADILLAC SERIES 60 & 62
AIR CONDITIONING WIRING DIAGRAM

►*HIGH PRESSURE GAUGE CAUTION: Due to high operating capacity of compressor, a 600 lb. gauge must be used.*

ALL MODELS (EXCEPT CADILLAC, CHEVROLET & CORVAIR)

PURGING SYSTEM: Connect gauge set (see above), and turn hand shut-off valves (where equipped) partially clockwise. Open high pressure gauge valve so refrigerant escapes through gauge set and out the center fitting and hose. *CAUTION - DO NOT op n gauge valve too much as oil and liquid refrigerant will sc p . R frig rant should scap in vapor form only.* When hissing ceases, all refrigerant has been discharged from system. Close gauge high pressure valve. Leave gauge set connected in preparation for evacuating and charging.

CADILLAC

PURGING SYSTEM: Install Adapters J-5420 on high and low pressure valve fittings. Tighten adapters to depress valve cores until a **slight** hissing sound is heard. When hissing stops, system is discharged. *CAUTION - DO NOT overtighten adapters or oil and liquid refrigerant will escape. Refrigerant should escape in vapor form only.* Remove adapters as soon as system is purged.

CHEVROLET & CORVAIR

PURGING SYSTEM: Connect gauge set (see above).Open both compressor hand shut-off valves ¼-turn clockwise from fully counterclockwise position. *NOTE - Corvair has Schrader type valves and this step is unnecessary.* Remove cap from gauge center connection and open high pressure gauge valve, being careful not to open it too far, and slowly discharge **vapor** through center connection. *CAUTION - Opening valve too far will cause compressor oil to be discharged with th refrigerant.* When pressure is reduced below 100 lbs. on high pressure gauge, open low pressure gauge valve and continue discharging until all refrigerant has been released or pressure does not exceed 5 lbs. Close both gauge valves, and compressor hand shut-off valves. Leave gauge set connected in preparation for evacuating and charging.

ALL MODELS

EVACUATING SYSTEM (WITHOUT VACUUM PUMP): Connect gauges as indicated in illustration, but substitute a bottle or other suitable container in place of vacuum pump (container will catch the evacuated oil so it may be measured and a like amount of clean oil replaced). *CAUTION - Be sure the fitting on discharge valve is open to compressor with no restricti n from valve closure, caps, or plugs in attached lin before starting engine.* Turn both high and low pressure valves on compressor clockwise to gauge position. Leave low pressure gauge valve tightly closed, carefully open high pressure gauge valve and hand shut-off valve (vacuum line valve), being careful to avoid any accidental discharge of liquid refrigerant. Discharge refrigerant, air, and any oil into bottle. Start engine and set at low idle speed and turn air conditioner to maximum cooling position. *Maintain engin speed at slow idle at all times during evacuation.* Turn high pressure service valve to shut-off position. Operate system at low idle for five minutes, then turn off engine and air conditioner and close hand shut-off valve immediately. If system holds 26-28" of vacuum *(see "Vacuum Note" below)* for 10 minutes, system is not leaking. If not, locate and correct leak. Close high pressure gauge valve, open low pressure gauge valve and charge system with refrigerant at cylinder pressure, then repeat evacuation as indicated above. Again close high pressure gauge valve and open low pressure gauge valve and then complete charging with correct amount of refrigerant *(see "Charging System" below).*

EVACUATING SYSTEM (WITH VACUUM PUMP): Connect gauge set, vacuum pump, and container of refrigerant as shown in illustration. Check fluid level in vacuum pump and add correct oil if necessary. Make sure dust

CONTINUED ON NEXT PAGE

GENERAL MOTORS CARS (C ntinu d)

loss, add oil according to table below plus amount for compressor as in 1) above.

1962 System Component Oil Capacity

Component	℄ Capacity
Evaporator	3 ozs.
Condenser	1 oz.
Receiver-Dehydrator	1 oz.

℄ - Fluid measure.

REMOVAL & INSTALLATION

►*CAUTION: To prevent dirt and moisture entering air conditioning system, it is very important to cap all openings and to complete work on system as soon as possible.*

►*COMPRESSOR REMOVAL NOTE (TO WORK ON ENGINE):* If practicable or desirable, compressor may be repositioned in engine compartment for work on engine without disconnecting refrigerant lines. Follow procedure listed below but do not discharge system or disconnect compressor hoses.

COMPRESSOR: Buick (Except Special) - Purge system, then remove valve retaining plate from rear of compressor. Cover openings in lines and compressor. Disconnect clutch coil wire, loosen belts, and remove compressor from mounting bracket. To install, reverse removal procedure.

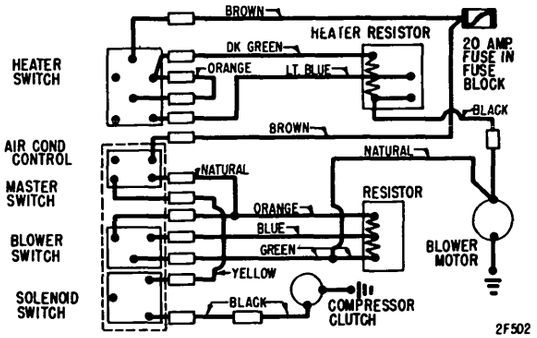
Buick Special (V6 Engine): Purge system, then remove line retaining plate bolt and remove lines from rear of compressor. Disconnect clutch wire from compressor, then remove belts. Remove rear head-to-rear bracket retaining bolts, then disconnect adapter from front mounting bracket and remove compressor. To install, reverse removal procedure.

Buick Special (V8 Engine): Discharge system and disconnect hoses from compressor. Raise car and disconnect front stabilizer bar. Disconnect compressor adapter from front bracket (or oil pump front bracket), then remove bolt holding compressor rear brace and rear head to cylinder block. Disconnect rear head from rear brace. Support compressor with stabilizer bar, roll compressor over and remove adapter from front head. Remove belt from pulley, slide stabilizer bar forward and remove compressor. To install, reverse removal procedure.

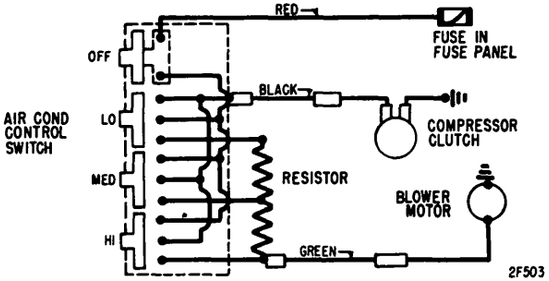
Cadillac: Purge system and disconnect hoses from compressor. Disconnect clutch coil wires and remove belt from compressor. Disconnect compressor from mounting brackets and remove compressor. To install, reverse removal procedure.

Chevrolet Pass. Cars: Purge system, and remove hose connector from compressor. Disconnect clutch coil lead, then loosen brace and pivot bolts and remove belt. Disconnect compressor brackets from mounting bracket and remove compressor. To install, reverse removal procedure.

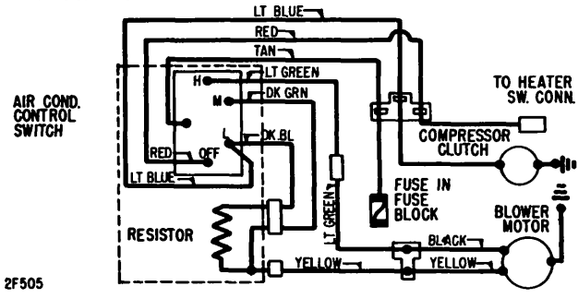
Ch vy II: Purge system, then remove service valve connector from compressor. Disconnect clutch coil lead and remove compressor belt. Disconnect compressor brackets from mounting bracket and remove compressor. To install, reverse removal procedure.



OLDSMOBILE (EXCEPT F-85) AIR CONDITIONING WIRING DIAGRAM



OLDSMOBILE F-85 AIR CONDITIONING WIRING DIAGRAM



PONTIAC & TEMPEST "COOL PACK" AIR CONDITIONING WIRING DIAGRAM

Corvair: Removal - Purge system, remove fittings block, and cap openings. Remove nut from compressor mounting bracket pivot bolt and remove compressor-to-adjusting bracket attaching parts. Remove belt. Disconnect electrical wires from compressor. Remove bolts attaching triangular bracket to front of compressor. Work long pivot bolt forward until threaded end is moved out of compressor rear mounting boss. Remove compressor.

Installation - Support compressor on mounting bracket and work mounting bracket pivot bolt rearward through compressor rear mounting boss. Loosely install pivot bolt nut and washer. Attach triangular bracket to compressor. Connect wiring, install drive belt, and compressor-to-adjusting bracket attaching parts. Adjust belt tension (see above), then tighten pivot bolt nut to apply light pressure on rubber mounting.

Oldsm bile (Exc pt F-85): Remove caps from hand shut-off valves and turn both valves fully clockwise. Disconnect clutch coil wire from compressor, then remove belts. Remove shut-off valve assembly from compressor, disconnect generator from compressor and bracket, remove compressor-to-bracket bolts, and remove compressor. To install, reverse removal procedure.

Oldsmobile F-85 (With Pow r St ring): Drain radiator and remove power steering pump pulley and belt. Remove power steering pump front and rear stud nuts. Disconnect refrigerant hoses from service valves (either turn valves fully clockwise before disconnecting hoses, or purge system). *CAUTION - Disconnect hoses carefully to avoid sudd n discharg of refrigerant and oil.* Raise car and remove compressor front and rear pivot bolts and compressor adjusting bolts (leave front compressor bracket attached to compressor). Loosen power steering pump bracket-to-cylinder block bolt. Lower car and remove compressor bracket-to-engine front cover bolts, then power steering pump and bracket. Disconnect compressor bracket from cylinder head, and remove compressor and hoses by rotating pulley upwards. To install, reverse removal procedure.

Oldsmobile F-85 (Without P wer St ring): Drain radiator, then disconnect refrigerant hoses from service valves (either turn hand shut-off valves fully clockwise, or purge system). *CAUTION - Disconnect hos s carefully to avoid sudden discharge of refrig rant and oil.* Raise car and remove compressor front and rear pivot bolts and adjusting bolts (leave front compressor bracket attached to compressor). Loosen compressor bracket-to-cylinder block lower bolt. Lower car and disconnect brackets from engine front cover and cylinder head. Remove compressor and hoses by rotating pulley upward. To install, reverse removal procedure.

Pontiac (Except Tempest): *NOTE - Procedure below is for compressor removal to servic engine (without disconnecting refrigerant lin s).* Disconnect wiring from compressor, then remove drive belt. Disconnect rear brace from cylinder head, then remove compressor front plate and lower adjusting mounting bolts. Disconnect compressor rear plate from mounting bracket. Place compressor on fender. *CAUTION - Do not kink or place excessive tension on hoses.* To install, reverse removal procedure.

Pontiac Tempest: *NOTE - Proc dure b low is for compressor removal to service ngin (without disconnecting refrigerant lines).* Disconnect wiring from compressor, remove front and rear mounting plate-to-compressor bolts, and remove drive belt. Place compressor on fender skirt and secure in position. *CAUTION - Do not kink or place excessive t nsion on hoses.* To install, reverse removal procedure.

CONDENSER: Cadillac - Purge system and disconnect lines from condenser and sight glass. Remove cradle support-to-lock pilot bracket. Disconnect condenser from support brackets on radiator cradle, then remove condenser and receiver-dehydrator assembly. To install reverse removal procedure.

Chevrolet: Remove hood lock catch support, catch, and horns. Purge system and disconnect lines from condenser and receiver-dehydrator. Remove condenser-to-radiator support attaching bolts and remove condenser. To install, reverse removal procedure.

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GENERAL MOTORS CARS (C ntinued)

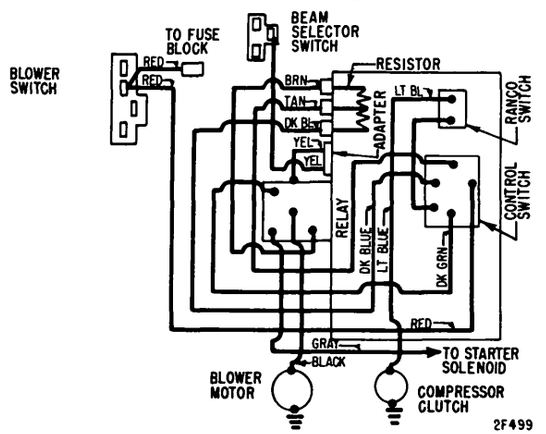
cap on discharge side of vacuum pump has been removed. Open high and low pressure valves on gauge set. *CAUTION – Shut–off valve on vacuum pump must be cl s d.* Start vacuum pump and SLOWLY open shut–off valve at pump. *NOTE – If oil is blown from pump, il must be r placed.* Operate pump to obtain approximately 28" of vacuum *(s e "Vacuum Note" below)* for 10 minutes. If vacuum of 28" cannot be obtained, close valve at pump and note low pressure gauge to see if vacuum in system holds. If vacuum holds, pump or gauge may be at fault. If vacuum will not hold, charge system with refrigerant, check for leaks, and repair as necessary, then purge system. Repeat evacuation procedure and when vacuum of 28" has been obtained for 10 minutes, close valve at pump, stop pump and check vacuum to see that it will hold. If vacuum holds and no leaks are apparent, open refrigerant container valve to charge system to cylinder pressure, then close valve. Evacuate system again and close gauge valves. The system is now ready for a complete charge.

►*VACUUM NOTE:* Vacuum specification of 28" is for sea level. For each additional 1000 feet of elevation above sea level, lower vacuum specification by 1".

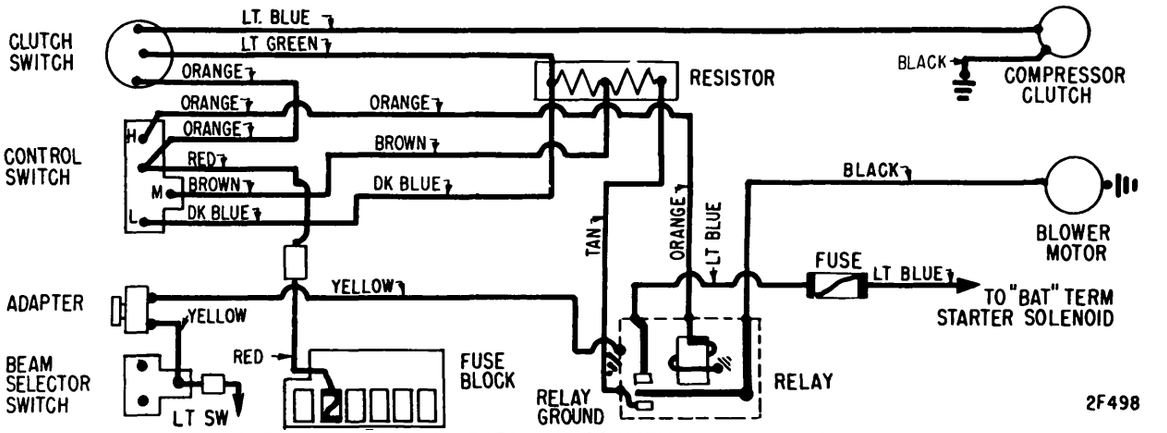
ALL MODELS

►*CHARGING SYSTEM CAUTION: DO NOT CHARGE SYSTEM THROUGH GAUGE VALVE AT SUCTION THROTTLE VALVE UNLESS THERE IS NO LOW PRESSURE VALVE AT COMPRESSOR. Severe damage to suction thr ttl valv will result if system charged through this valv . Gaug valve at suction throttle valve is for syst m p rformance check only (unless th r is no gaug valv at compressor).*

CHARGING SYSTEM: With system completely evacuated (gauge set and refrigerant tank connected), place refrigerant cylinder in a bucket of hot water (not to exceed 125°F). *CAUTION – Do not heat refrigerant cylind r above 125°F b cause fusible plug in cylinder valve m lts at 157°F and softens at a slightly l wer t mp ratur .* Place cylinder and bucket on a suitable scale and record total weight. Open low pressure valve on gauge set (high pressure valve on gauge set closed). Set both high and low pressure service valves on compressor in gauge position. Wearing goggles to protect eyes, fully open refrigerant cylinder valve and allow refrigerant vapor to flow into system. Operate engine at slow idle speed until the correct amount of refrigerant has been charged into the system (see "Refrigerant Capacity Table" below). *NOTE – It may be necessary to reheat water in bucket to maintain required pressure.* Close both valves on gauge set, close valve on cylinder and remove cylinder from bucket. Operate compressor with engine running at 1600 RPM, and check removal performance of air conditioner. If performance satisfactory, stop engine, then firmly backseat both high and low pressure service valves on compressor. Remove gauge lines and replace protective caps over gauge connections and shut–off valves. Check oil level in compressor (see below).



CHEVROLET "COOL PACK" AIR CONDITIONING WIRING DIAGRAM



CHEVROLET "ALL WEATHER" AIR CONDITIONING WIRING DIAGRAM

1962 Refrigerant Capacity Table

Car Model	Capacity
Buick (Except Special)	4½ lbs.
Buick Special	2½ lbs.
Cadillac (Except Series 75)	4 lbs.
Cadillac, Series 75	5¼ lbs.
Chevrolet Cars (All Weather System)	3 lbs., 12 ozs.
Chevrolet Cars (Cool Pack System)	3 lbs.
Chevy II	2 lbs., 8 ozs.
Corvair	5 lbs.
Oldsmobile (Except F-85)	4 lbs., 4 ozs.
Oldsmobile F-85	2 lbs., 8 ozs.
Pontiac (Circ-L-Aire System)	4¼ lbs.
Pontiac (Cool Pack System)	3¼ lbs.
Pontiac Tempest	3 lbs.

CHECKING & ADDING OIL: *CAUTION - Use only 525 viscosity refrigeration oil. See table below for system total capacities.*

1962 System Oil Capacity

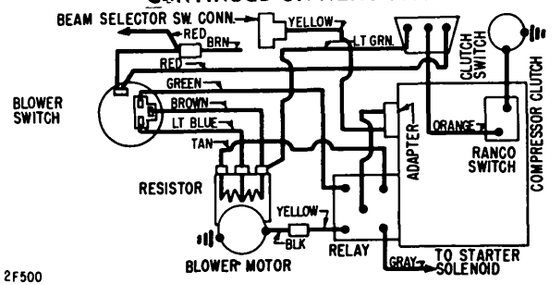
Car Model	① Capacity
Buick & Buick Special	10½ ozs.
Cadillac	②
Chevrolet, Chevy II, Corvair	10 ozs.
Oldsmobile (Except F-85)	10½ ozs.
Oldsmobile F-85	10 ozs.
Pontiac & Tempest	③ 11 ozs.

① - Fluid measure. ② - Not specified. ③ - Full charge new.

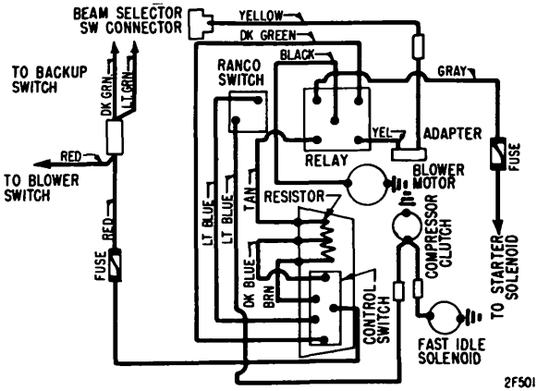
1) Compressor - Ordinarily compressor oil level need not be checked unless there has been a major oil loss from a broken hose or severe leak, or due to a collision. To check and determine how much oil to install, remove compressor, then drain and measure oil. If more than 4 ozs. drained, add the same amount. If less than 4 ozs. drained, add 6 ozs.

2) Other Components - If a system component (evaporator, condenser, receiver-dehydrator) being replaced (no major oil loss), pour oil directly into new unit according to table below. If there has been a major oil

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CHEVY II AIR CONDITIONING WIRING DIAGRAM



CORVAIR AIR CONDITIONING WIRING DIAGRAM

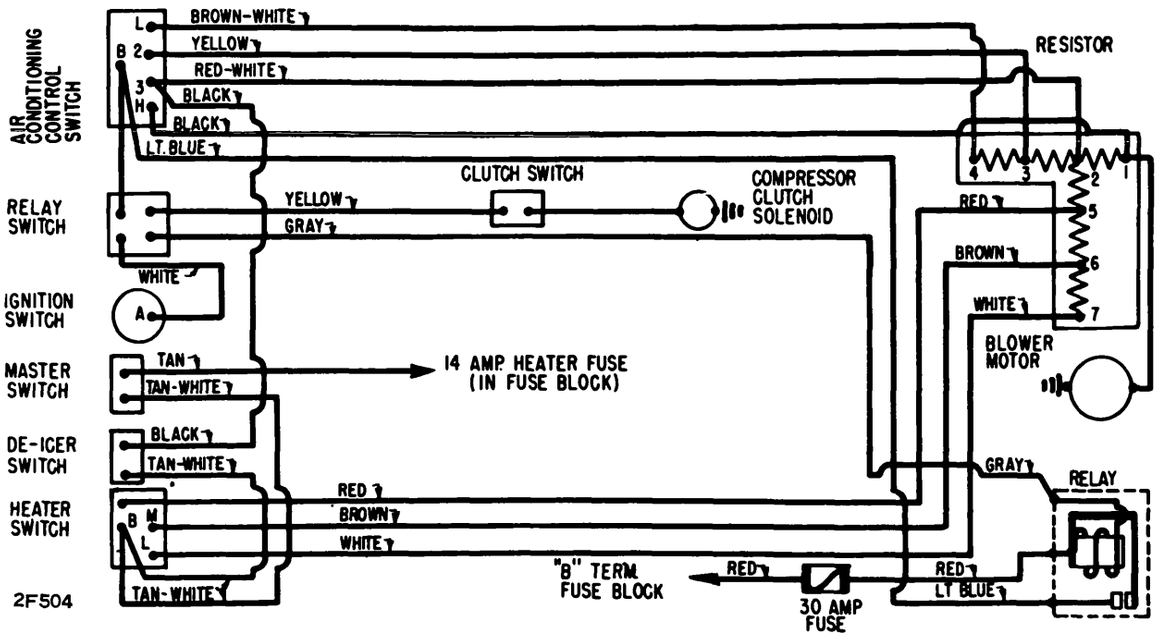
GENERAL MOTORS CARS (Continued)

Chevy II: Purge system. Remove bumper, bumper filler panel, grille, grille support, hook lock catch support and catch. Disconnect hoses from condenser and disconnect hoses from condenser baffle. Remove condenser-to-radiator support attaching bolts and remove condenser. To install, reverse removal procedure.

Corvair: *See "Engine Access Procedure Note" under TUNE-UP on Car Model pages.*

P ntiac (Except Tempest): Purge system. Remove right and left headlight doors and headlight assemblies. Remove upper grille bar and compressor discharge hose clamp. Disconnect hoses from compressor and cap openings. Remove battery and tray and disconnect right and left horns. Remove condenser. To install, reverse removal procedure.

Pontiac Tempest: Purge system, remove battery and right and left headlight doors. Remove radiator grille assembly, and hood latch bracket. Remove front fender and radiator brace assembly. Disconnect hoses from condenser and cap openings. Remove condenser attaching bolts and remove condenser. To install, reverse removal procedure.



PONTIAC "CIRC-L-AIRE" AIR CONDITIONING WIRING DIAGRAM

STUDEBAKER CORP. CARS

Studebaker, All Models (1962)

DESCRIPTION: Design and operation is similar to previous 1961 models. Sight glass is integral part of expansion valve and is located on right side of evaporator.

►*SERVICE CAUTION: Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

ADJUSTMENT

COMPRESSOR DRIVE BELT: Loosen idler pulley retaining nut and move pulley as required to tighten belt so a pull of 20 lbs. will deflect belt ½" with spring scale located midway between compressor pulley and idler pulley (6 cyl. models), between compressor pulley and fan pulley (V8 models).

SERVICING

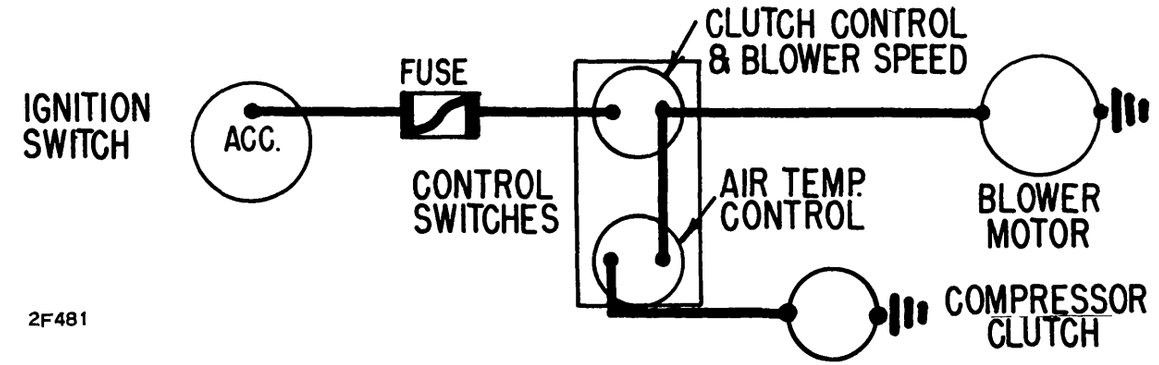
►*AIR CONDITIONER SERVICE NOTE: All service operations except for removal and installation of compressor for engine repairs should be performed by a competent refrigerant service man.*

Refrigerant Capacity - 3 lbs.

►*COMPRESSOR REMOVAL NOTE:* For access to engine on Silver Hawk models, the compressor hoses can be released from clamps on body and fender and the compressor can be moved out of the way. On other models, if necessary to remove compressor from its mounting, see *"Compressor Removal" below.*

COMPRESSOR REMOVAL (When Necessary to Disconnect Hoses): Remove caps and close the upper and lower service valves on compressor, then remove capscrews securing the two valves to compressor. Place tape over openings in compressor and valves. Remove compressor from engine compartment. *CAUTION* - Keep compressor in its horizontal position.

Installation: Reverse removal procedure and install new valve-to-compressor gasket. Secure both valves in positions before opening valves. *NOTE - Before installing compressor belt, turn compressor over a few times by hand to discharge any oil that may have collected on top of piston.*



STUDEBAKER AIR CONDITIONING CONTROL WIRING DIAGRAM

RAMBLER

Rambler, All S ri s (1962)

►CHANGES, CAUTIONS, CORRECTIONS

►*1961-62 AMERICAN (L-HEAD ENGINE) VIBRATION DURING AIR CONDITIONER OPERATION CORRECTION:* On cars without power steering, caused by slack in belt on drive side of compressor pulley which causes belt to pile-up and vibrate. To correct, install Idler Pulley Assembly Kit, Part No. 3203205. *NOTE - Belt adjustment on models with this idler pulley is diff rent (see below).*

►*1962 AMBASSADOR VIBRATION DURING AIR CONDITIONER OPERATION CORRECTION:* May be caused by vibration in long belt span between crankshaft and compressor pulleys. To correct, install Idler Pulley Kit, Part No. 3204341.

►*1962 CLASSIC & AMBASSADOR AUXILIARY AIR VENT PRODUCTION CHANGE:* On cars after Body No. 46207, auxiliary air vent incorporated in discharge duct and grille for additional cooling for driver floor area. This outlet may be installed on 1961 and early 1962 cars if desired. Part Numbers are as follows: No. 3462647 (Deflector), No. 3462648 (Air Outlet Tube), No. G-161869 (Cross Recess Pan Head Screw).

►*1962 TEMPERATURE CONTROL THERMOSTAT PRODUCTION CHANGE & NOTE:* On cars after Build Sequence No. W-38579 (Classic), W-38321 (Ambassador), Body Nos. 28678 & A-10908 (American), manually adjustable temperature control thermostat installed in production to replace automatic type previously used. Conversion to manual type may be made if desired, by installing Kit, Part No. 3166229 (American), No. 3166230 (Classic & Ambassador). *See below for thermostat location and operation.*

DESCRIPTION: Similar in design and operation to previous models with a manually operated temperature control thermostat on later cars (see "Production Change" above).

Temperature Control Thermostat (Manually Operated Type) - Located on left side of instrument panel over control console (American), over right hand ash tray (Classic & Ambassador) provides a temperature control range and a continuous operation feature. Control has variable temperature range of 37-62°F. When knob is turned clockwise through detent (click) position, system will run continuously in cold range of 37°F. *CAUTION - Use continuous operation position ONLY in desert or low humidity areas as evaporator coil will freeze up and result in loss of cooling.*

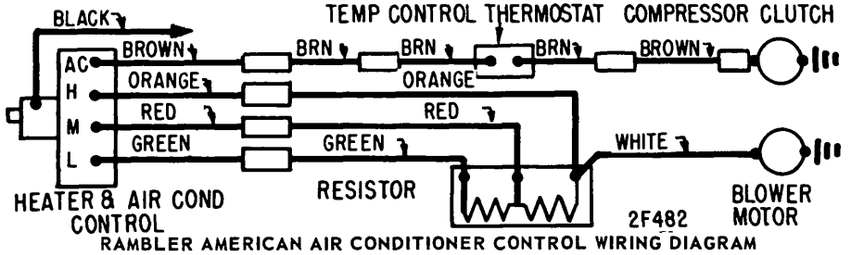
LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing & Trouble Shooting" at beginning of Air C nditioning Section.*

SERVICING

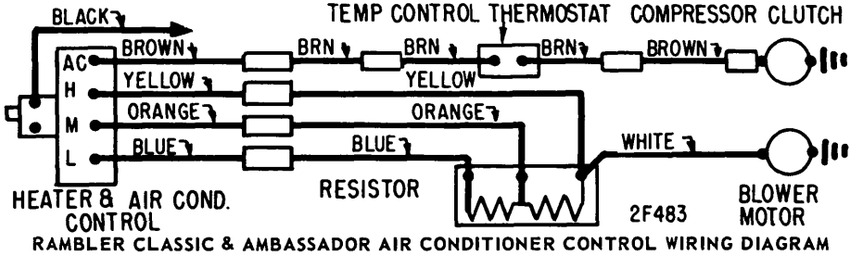
COMPRESSOR BELT: Use a strand tension gauge and place gauge between longest span between pulleys and move compressor or power steering pump on adjusting bracket to obtain a reading of 70-80 lbs. (used belt), 110-120 lbs. (new belt). *NOTE - On cars with idler pulley installed to correct vibration, adjust belt tension initially at compressor, then move idler pulley down into lower belt span until all slack is remov d from belt and tighten idler pulley mounting bracket nuts.*

►*OTHER DATA: See Page 539 in 1960 Final Data, or later Manual edition, and note the following:*

Freon Capacity - 2½ lbs. (American), 3 lbs. (Others).



RAMBLER AMERICAN AIR CONDITIONER CONTROL WIRING DIAGRAM



RAMBLER CLASSIC & AMBASSADOR AIR CONDITIONER CONTROL WIRING DIAGRAM

LINCOLN HYDRAULIC WINDSHIELD WIPER

Lincoln Continental (1962)

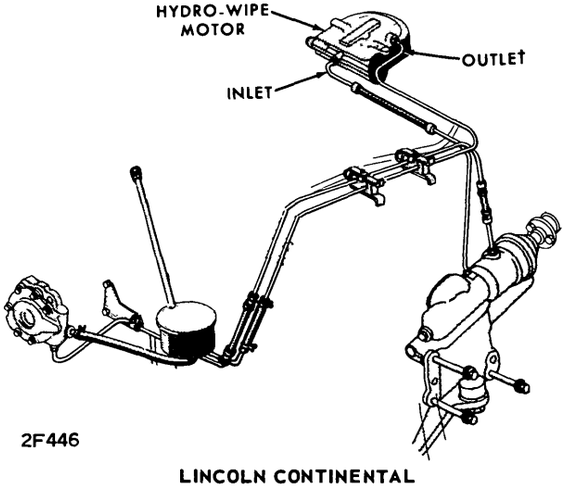
DESCRIPTION: Wip rs - Hydraulic type similar in design to previous models. Pressure regulator valve is now part of hydraulic motor assembly. Because radiator oil cooler is no longer used, oil return line is connected directly to power steering pump reservoir.

Wash r - An electric pump with a reservoir is mounted on right fender apron and controlled by washer switch mounted on windshield wiper control on instrument panel.

OPERATION: Wip rs & Washer - Operation is same as previous 1961 models.

TROUBLE SHOOTING: If power steering pump is operating properly but wipers do not, check control cable for proper operation and wiper arms for binding. If these items operate correctly, replace pressure regulator and motor assembly.

1962 WINDSHIELD WIPERS



LINCOLN CONTINENTAL HYDRAULIC CONTROL WINDSHIELD WIPER

REMOVAL & INSTALLATION: Pivot Shaft & Housing - Remove wiper arms and blades and cowl top ventilation grille and screen. On right side, disconnect drive arm from pivot shaft. On left side, disconnect drive arm from pivot shaft and from auxiliary drive. Remove pivot shaft retaining screws and nuts and remove pivot shaft and housing. To install, reverse removal procedure.

Wiper Motor: Remove washer coordinator hose, and oil return, feed, and control lines from motor. Disconnect and control cable at motor. Disconnect motor from auxiliary drive and remove motor. To install reverse removal procedure *and bleed power steering lines.*

Auxiliary Drive: Remove wiper arms and blades, ventilation grille and screen, and both washer nozzles. Disconnect pivot shaft drive arm from auxiliary drive. Remove attaching screws and remove auxiliary drive assembly. To install, reverse removal procedure.

Pressure Regulator Valve: Disconnect fluid lines at valve and remove valve attaching screws. Remove valve. To install reverse removal procedure *and bl ed power steering lines.*

CHRYSLER CORP. ELECTRIC TYPE

Chrysler & Imperial (1962)
Dodge & Dodge Dart (1962)
Plymouth (1962)
Lancer & Valiant (1962)

►*1962 DODGE & DART 2-SPEED WIPER ERRATIC OPERATION CORRECTION:* If equipped with foot operated windshield washer and wipers do not shut off or blades do not park properly after washer is used, trouble may be due to binding sliding switch contacts in washer pump. To correct, install a new switch, Part No. 2290628, as follows: Remove washer assembly from firewall and install the new switch on back side of washer assembly. Reinstall and check operation.

DESCRIPTION: Single and variable speed types used similar in design to previous models. Circuit breaker is built into wiper switch on single speed type, and attached to "B" terminal of switch on two-speed type. Two-speed type has "Off Glass" parking feature accomplished by reversing of motor and use of parking cams at pivot pins of intermediate crank arm.

TROUBLE SHOOTING & DIAGNOSIS: Wiper Operates Slowly - Linkage binding; High brush-to-armature contact; Carbon deposit in armature slots; Poor ground connection; Control switch faulty.

Wiper Inoperative: Linkage binding; Motor faulty; Wiring grounded or open; Control switch faulty. To check switch, connect a jumper wire from ammeter terminal post to windshield wiper motor terminal (A) on switch.

Motor Will Not Park: Poor ground at motor or control switch; Parking spring in parking switch plate bent too low and not breaking contact; Contact spring leaf on parking switch plate distorted; Contact points dirty or worn.

Wiper Blades Not Parking Off Glass (2-Speed Type): Parking switch out of adjustment; Link spring broken, not releasing, or not engaging stop on linkage.

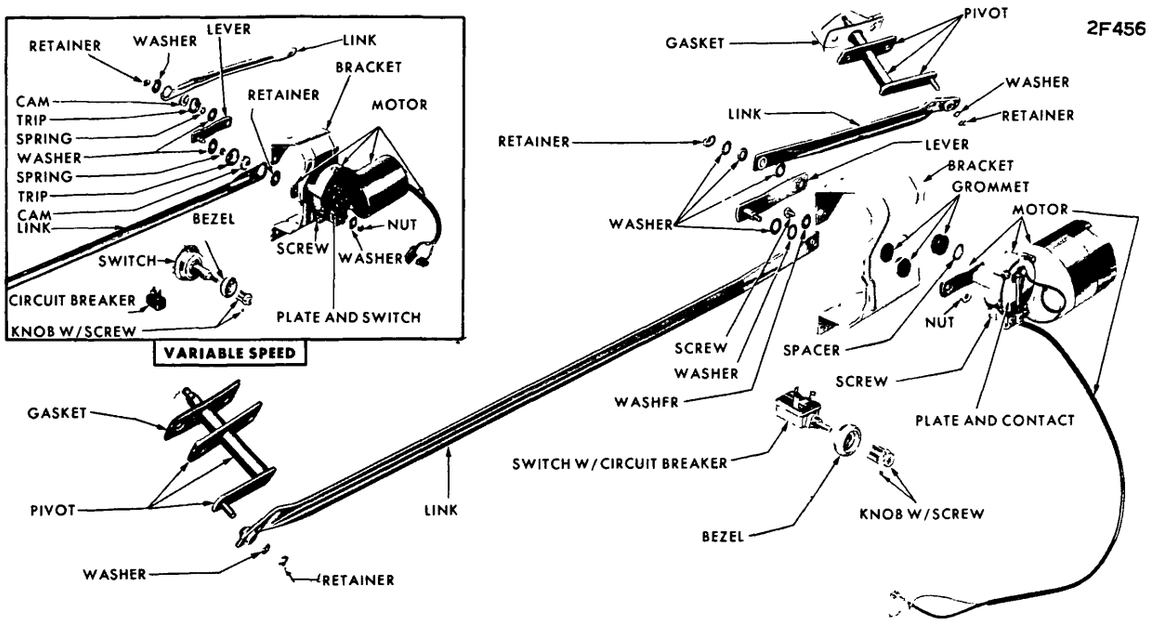
Blades Slap Windshield Moldings: Link spring trip improperly installed; Motor and pivots misaligned.

Blades Chatter: Wax on glass; Improper type blade; Arm twisted. *CAUTION - DO NOT try to straighten bent or twisted arm.*

Wiper Switch Testing (1-Speed): Remove switch from instrument panel. Connect a test light between "B" terminal of switch and battery negative post. Connect battery positive post to switch "P" terminal. With switch in "off" position, lamp should light. Lamp should go out when switch turned to "on" position. Connect battery positive post to switch "A" terminall Test lamp should light when switch turned "on", and go out when switch turned "off".

Wiper Switch Testing (2-Speed): Remove switch from instrument panel. Connect battery positive post to switch case and to "F1" switch terminal. Connect a test lamp between battery negative post and switch "B" terminal. Lamp should light when switch turned on and gradually dim when switch rotated clockwise. Lamp should go out when switch turned "off".

ADJUSTMENT: Wiper Blades - Adjust motor switch plate so blades park as low as possible, then loosen blade arms at pivots. Place blades 1" above windshield molding (single speed), against windshield molding (2-speed), and tighten pivot attaching nuts.



CHRYSLER CORP. ELECTRIC WINDSHIELD WIPER MOTOR & TRANSMISSION ASSEMBLY (TYPICAL)

Armature Endplay: Turn endplay adjusting screw in until it bottoms and back out ¼-turn.

REMOVAL & INSTALLATION: Wiper Motor (Chrysler & Imperial) - Remove glove box door and glove box. Disconnect motor bracket from cowl panel and from instrument panel brace. Disconnect wiring from motor. Disconnect links at pivot cranks (remove clips by lifting top tab and sliding sideways out of engagement with groove in pivot crank pin). Remove spacer washer and link from pivot crank. Slide motor and link assembly to left so right hand link clears glove box opening, then remove assembly. *Do not bend links.* To install, reverse removal procedure and adjust blades.

Wiper Motor (Dodge, Dart, Lancer, Plymouth, Valiant): Remove radio, speaker grille, and radio speaker. Disconnect motor bracket from cowl panel and instrument panel brace. Disconnect wiring from motor. Disconnect links at pivot cranks (remove clips by lifting top tab and sliding sideways out of engagement with groove in pivot crank pin). *NOTE - Access to right pivot is through glove box opening.* Tip motor and bracket on its side and remove left link. Remove right defroster tube, and pencil brace between instrument panel reinforcement and wiper motor mounting. Remove motor and bracket through speaker opening. To install, reverse removal procedure and adjust blades.

MOTOR BENCH TEST: Single Speed - Connect battery positive terminal to motor ground strap, then connect black and blue wires to battery negative terminal. Motor should run. Remove black wire from battery (leave blue wire connected). Motor should park.

Two-Speed: Connect yellow wire to motor ground strap, then connect battery positive terminal to motor ground strap. Connect red and black wires to battery negative terminal. Motor should operate in wipe direction. Connect blue and yellow wire to battery negative terminal and connect battery positive terminal to motor ground strap. Momentarily touch black wire to yellow and blue wire. Motor should park.

OVERHAUL: Disassembly (1-Speed) - Disassemble wiper links from motor crank arm being careful to note exact position and sequence of all parts for correct reassembly. Remove switch plate, then remove motor crank nut, washers, and motor crank arm, being careful to note exact position and sequence of washers for reassembly. Remove nylon gear after noting its position. Remove endplate through bolts and remove endplate. Remove armature.

Disassembly (2-Speed): Disassemble wiper links from motor crank arm being careful to note exact position and sequence of all parts for correct reassembly. Remove endplate through bolts and remove endplate using care not to break lead wire to brush holder. Remove switch plate and cover, then remove crank arm nut, washers, crank arms, gear, and armature.

Inspection & Repair: Clean, inspect, and test motor parts in the usual manner for electric motors. Commutator may be refaced and mica undercut in the usual manner if necessary.

Reassembly (1 & 2-Speed): Reverse disassembly procedures and note the following: Be sure gear teeth are covered with long fibre grease. On single speed type, after armature, nylon gear, and crank arm are installed, index contact plate on nylon gear with slot pointing in **opposite** direction as motor crank arm. On two-speed type, install contact follower with open cam pointing in same direction as motor crank arm. Reassemble wiper links in the same order as they were originally assembled.

G.M. ONE-SPEED & TWO-SPEED ELECTRIC WIPER & WASHER (RECTANGULAR MOTOR)

Buick LeSabre, Invicta, Electra (1962) ℂ
Buick Special (1962)
Chevrolet Passenger Cars (1962) ℂ
Chevrolet Trucks (1962) ℂ
Corvair (1962)
Chevy II (1962)
Pontiac (1962) ℂ
Pontiac Tempest (1962)

ℂ - 2-Speed wiper is "Round Motor" type. *See Page 544 in 1960 Final Data, or later Manual edition.*

►*OLDSMOBILE & OLDSMOBILE F-85 NOTE:* 1 & 2-Speed wipers are same design as 1961 models. **1-Speed** - *See Page 544 in 1961 Final Data.* **2-Speed** - *See Page 544 in 1960 Final Data, later Manual edition.*

WIPER

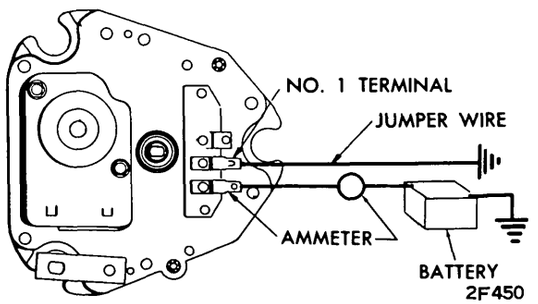
DESCRIPTION: Single speed motor is a rectangular shaped shunt wound type motor similar to previous models. Two speed motor is also rectangular shaped and is compound wound (series and shunt field). Gear train consists of a helical gear at end of armature shaft which drives an intermediate gear and pinion assembly. Pinion drives output gear and shaft; and crank arm, attached to output gear shaft, drives wiper transmissions through connecting link arms. No internal circuit breaker in motor is used. Circuit protection for wipers is through a fuse on fuse block. *See individual Car Model Wiring Diagram on Car Model Pages.*

TESTING & TROUBLE SHOOTING

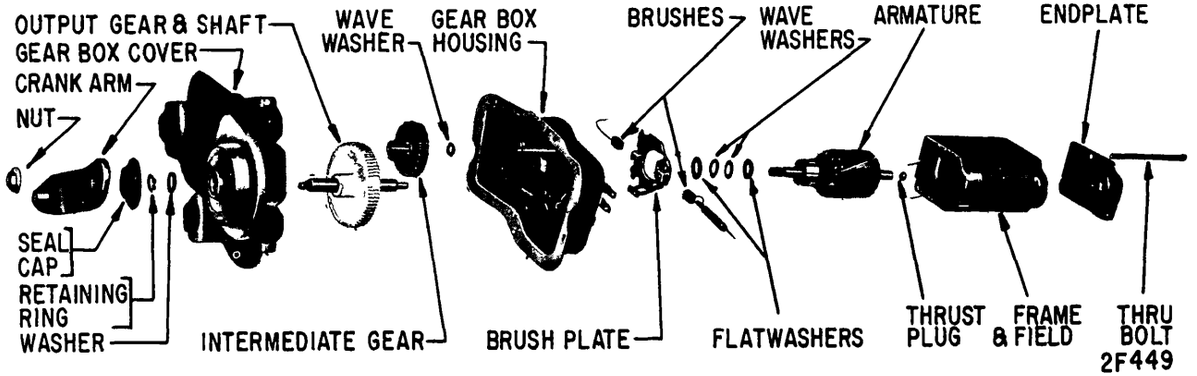
(1-SPEED)

ON CAR: Proceed as follows:

Wiper Inoperative; Check fuse, check for proper wiring harness terminal connections, ground strap at wiper properly connected, dash switch mounted securely. Disconnect wiring harness from wiper and check for voltage at harness terminals. No voltage indicates faulty car wiring. *CAUTION - DO NOT connect a hot line to No. 1 wiper terminal.* Connect 12 volts to No. 2 wiper terminal and a jumper wire from No. 1 terminal to ground. If wiper operates, dash switch or wiring is faulty. If wiper does not operate, disconnect transmission from crank arm. If wiper operates, linkage or transmission is faulty. If wiper does not operate, remove wiper and check as described under "Off Car" below.



SINGLE SPEED WIPER TEST CONNECTIONS



WINDSHIELD WIPER MOTOR & DRIVE ASSEMBLY (EXPLODED)

Wiper Will Not Shut Off: If wiper shuts off with wiring at dash switch disconnected, dash switch is faulty. If wiper operates with dash switch wiring disconnected, connect 12 volts to wiper No. 2 terminal. *CAUTION - DO NOT connect any jumper wire to No. 1 terminal.* If wiper shuts off correctly, lead between No. 1 terminal and dash switch is grounded. If wiper does not shut off, remove wiper and check as described under "Off Car" below.

Wiper Operates Intermittently: Check for loose ground strap, dash switch mounting, or loose connection.

Blades Fail To Return To Park Position: Check for dirty or broken park switch (remove wiper from car to check).

OFF CAR: Proceed as follows:

Wiper Inoperative: Connect a battery and ammeter to No. 2 wiper terminal and a jumper wire from No. 1 terminal to ground. If current draw 0 amps., check solder connection at terminal board, or disassemble motor (if necessary) and check all splice connections. If current draw 2-3 amps., disassemble motor and check for open armature, sticking brushes, improperly positioned brush springs, or faulty brush pigtail connections at splice joints. If current draw 10-12 amps., check for open shunt field circuit, or broken gear.

Wiper Runs Slow, Vibrates, and Current Draw Approximately 7-9 Amperes: Check for gear train binding, or shorted armature.

Wiper Shuts Off Before Crank Arm Reaches Park Position: If crank arm stops rotating as soon as jumper wire is disconnected from wiper No. 1 terminal, check for dirty, broken, or bent park switch contacts. *NOTE- When crank arm reaches park position, crank arm index grooves will line up approximately with ridges on gear box cover.*

Wiper Will Not Shut Off: If crank arm does not stop in park position when jumper wire removed from wiper No. 1 terminal, check that park switch contacts are opening, and that there is no ground in internal motor lead to No. 1 terminal.

(2-SPEED)

ON CAR: Proceed as follows:

Wiper Inoperative: Check wiring harness, wiper ground strap, and dash switch for proper connections and mounting. Check fuse. Check for voltage at wiper No. 2 terminal. To bypass switch, disconnect wiring at motor and connect a jumper wire from No. 1 & 3 terminals to ground, and a 12-volt source to No. 2 terminal. If wiper does not operate, disconnect transmissions from crank arm and operate. If wiper still does not operate, remove from car and test as indicated under "Off Car" below.

Wiper Will Not Shut Off: *NOTE - Wiper must operate in low speed during parking cycle.* Determine whether wiper has both speeds, low speed only, or high speed only, then operate wiper by bypassing switch as detailed under "Wiper Inoperative" above. If wiper operates correctly and had both speeds, lead to switch from No. 1 terminal is grounded. If wiper had low speed only, lead to switch from No. 3 terminal is grounded. If wiper had high speed only, lead to switch from No. 3 terminal is open. If wiper still does not operate, remove from car and check as indicated under "Off Car" below.

Wiper Operates In Low Speed Only and Shuts Off With Dash Switch In High Position: Reverse harness leads connecting to wiper No. 1 & 3 terminals.

Blades Do Not Return To Park With Wiper Off: Wiper ground strap may not be connected properly, or park switch contacts may be dirty, bent, or broken.

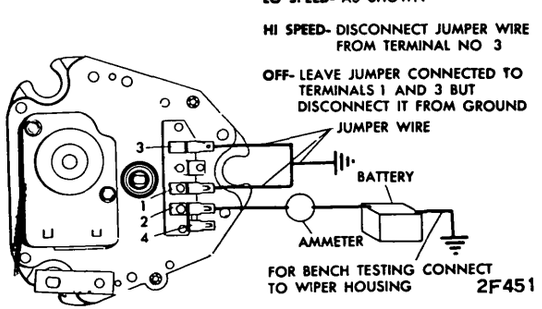
Wiper Speed Normal In Low, But Too Fast in High: Terminal board resistor may be open (remove from car to check).

Wiper Operates Intermittently: Loose wiper ground strap or dash switch mounting.

OFF CAR: Proceed as follows: *NOTE - Use ammeter of reading of 30 amperes minimum in feed wire circuit.*

Wiper Inoperative: Connect an ammeter and battery to No. 2 terminal, and a jumper wire from No. 1 & 3 terminals to ground (wiper will operate at low speed).

CONTINUED ON NEXT PAGE



TWO SPEED WIPER TEST CONNECTIONS

G.M. ONE-SPEED & TWO-SPEED ELECTRIC WIPER & WASHER (RECTANGULAR MOTOR) Cont.

If ammeter reading is 0, check for loose splice joints, or loose solder connection at No. 2 terminal. If reading 1-1.5 amps., check for sticking brushes, open armature, or loose splice joint. If reading 11.0 amps., check for broken gear or other stalling condition.

Wiper Will Not Shut Off: If wiper had both speed, park switch contacts may not be opening, or internal motor lead to No. 1 terminal is grounded. If wiper had low speed only, shunt field coil may be grounded, or internal wiper lead to No. 3 terminal is grounded. If wiper had high speed only, shunt field is open or internal lead to No. 3 terminal is open.

Wiper Operates Intermittently: Check for sticking brushes, loose splice joints, or other loose connections.

REMOVAL & INSTALLATION

TRANSMISSION: Remove arm and blade assemblies. Remove air intake grille and washer nozzles if equipped. Remove retaining clips holding crank arms to drive arms. Remove transmission attaching screws, and remove transmission.

WIPER MOTOR: *NOTE - On some cars, motor is mounted under air intake grille. On other cars, motor is mounted on engine side of firewall and connected to transmission arm on inside of car.* Remove air intake grille if necessary. Remove hoses and wiring from motor, then disconnect motor crank from transmission arm. Remove motor attaching screws and remove motor (and washer pump). To install, reverse removal procedure.

OVERHAUL

GEAR BOX: Disassembly - If equipped with washer pump, remove pump from wiper. Remove pump drive gear if required by wedging off shaft with two screwdrivers. Loosen crank arm retaining nut, then remove seal cap, retaining ring and endplay washers. Drill out gear box cover rivets and remove cover. *CAUTION - Mark ground strap location for reassembly.* Remove output gear and shaft assembly, then slide intermediate gear and pinion assembly off shaft. Remove terminal board and park switch by unsoldering motor leads from terminals and drilling out rivets holding terminal board and park switch ground strap to plate.

Reassembly: *NOTE - Service kit is available which contains necessary screws, nuts, and washers to replace rivets removed at disassembly.* Reverse disassembly procedure and make sure cover is located properly over locating dowel pins. Be sure to install ground strap. Install crank arm on output shaft so identification marks line up with marks in cover. Clamp crank in vise before tightening retaining nut.

WIPER MOTOR: Disassembly - After gear box disassembled (see above), remove through bolts, tap motor frame lightly, and remove motor from mounting plate. Release brush spring tension and slide armature and endplate from motor frame. Pull endplate from armature. *NOTE - Some models have a thrust plug between armature shaft and endplate.* Remove endplay adjusting washers (note arrangement for proper installation).

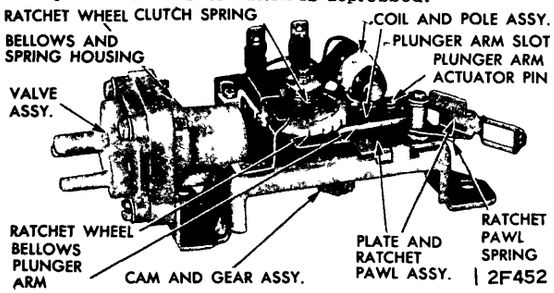
R assembly: Reverse removal procedure. Lubricate armature shaft bushings with light machine oil. *CAUTION - Armatur ndplay is aut matically c ntr lled by proper installation f ndplay adjusting wash rs. Install wash rs with c ncav sid f wash rs t ward each oth r.*

1962 Wiper Sp cificati ns

	1-Sp d	2-Sp d
Current Draw (Amps.)		
No Load	3.0 max.	3.6 max.
Dry Windshield	3.5 max.	4.5 max.
Stall	11.0 max.	12.0 max.
Shunt Field Resistor	24 ohms	
Crank Arm Speed (RPM - No Load)		
Low Speed	43 min.	34 min.
High Speed	65 min.	

WASHER

DESCRIPTION: Positive displacement, bellows type pump mounted on shaft of wiper output gear. Starting and completion of a wash cycle is accomplished electrically and mechanically by a relay assembly and ratchet wheel arrangement. Washer is controlled by a dash switch washer button which mechanically turns on wipers when washer button is depressed.



WASHER PUMP & DRIVE ASSEMBLY

TESTING & TROUBLE SHOOTING

ON CAR: Proceed as follows:

Washer Inoperative: **1)** Check the following: Sufficient water solution in jar; hoses undamaged and connections tight; screen in jar cover hose not plugged; electrical connections tight; nozzle not plugged.

2) If washer inoperative after items listed above are checked, start **wiper motor only,** then push washer button and listen for "click" of washer relay. If no "click" heard, check for voltage at washer No. 2 terminal. No voltage indicates faulty wiring. If "click" is heard, proceed to **4)** below.

3) If voltage correct in **2)** above, connect a jumper wire from washer No. 1 terminal to ground and turn on wiper. If washer relay "clicks" and pump operates correctly, dash switch is faulty, or there is an open circuit between pump and switch. If no "click" heard, relay coil open.

4) If relay "click" was heard in **2)** above, listen for soft clicking of pump ratchet wheel rotating. If soft click not heard, pump is faulty. If soft click is heard and pump does not operate, valve assembly faulty.

OFF CAR: Proceed as follows:

Washer Inoperative: **1)** Remove pump cover and connect a battery to washer No. 2 terminal and to ground. Connect a jumper wire from washer No. 1 terminal to ground. Turn ratchet pawl so holding contacts are closed. Pawl should be pulled toward relay pole and engage ratchet teeth. If not, relay coil is open.

2) If relay and ratchet pawl operate correctly in **1)** above, manually rotate three-lobe cam 1 lobe clockwise (looking at cam). Relay holding contacts should close and pump plunger arm should be released from lock-out position.

3) Disconnect jumper wire from No. 1 terminal. Relay coil should remain energized and hold ratchet pawl against ratchet wheel. If not, holding contacts are dirty.

4) If pump operated properly in **3)** above, manually rotate three-lobe cam until ratchet wheel has turned 360° or 21 teeth. At this point holding contact should be opened by "hump" on wheel and pump plunger arm should be in lock-out position.

Valve Assembly Checking: Attach a hose to intake (large) pipe. You should be able to blow through pipe, but not draw through it. Attach a hose to each exhaust (small) pipe. You should be able to draw through each pipe but not blow through them. If any valve allows air to pass in both directions, valve assembly is faulty.

OVERHAUL

RELAY: Remove washer pump cover and unsolder coil leads from terminals. Remove coil retainer clip and remove coil assembly from mounting bracket. To install, reverse removal procedure.

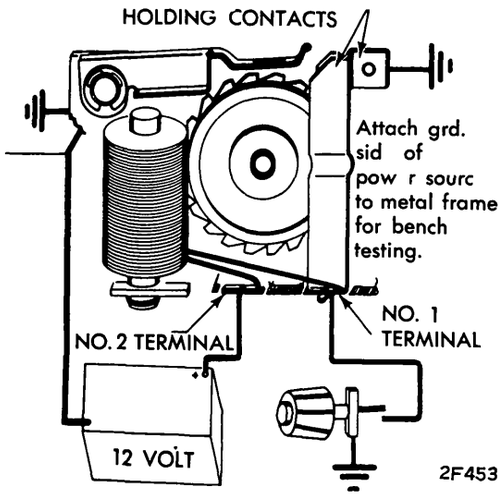
RATCHET PAWL: Remove washer pump cover and disengage spring from ratchet pawl. Remove "E" ring and slide pawl from shaft. To install, reverse removal procedure, and make sure spring is properly assembled before replacing pump cover.

VALVE ASSEMBLY: Remove valve assembly-to-bellows housing attaching screws and remove valve. *CAUTION - If necessary, car fully pry b ll ws lip ut of valve body groove.* To install, reverse removal procedure (make sure bellows lip in valve body groove).

BELLOWS: Remove valve body (see above), then manually operate pump to release pump from lock-out position. Hold bellows plunger arm from moving, push in on bottom of bellows with thumb and twist bellows 90°. Bellows and bellows spring should be released. To install, reverse removal procedure.

1962 Washer Pump Specificati ns

Number of Squirts - 12 (at full pressure).
Pressure - 11-15 lbs.
Coil Resistance - 20 ohms.



WASHER PUMP TEST CONNECTIONS

CHECKER, RAMBLER, WILLYS VACUUM TYPE

Checker (1962)
Rambler, All Models (1962)
Willys Utility Models & Trucks (1962)

DESCRIPTION: Vacuum operated type controlled by a pull type control on instrument panel. Drive is through link and crank arm arrangement (Checker & Rambler), through tension cables and pulley arrangement (Willys).

CABLE TENSION ADJUSTMENT (WILLYS): Make sure tensioner-to-firewall bolts are tight. *NOTE - Adjustment can be made at either right or left tensioner, or at both tensioners.* Loosen cable tensioner locknut on tensioner bracket. Slack in cables should be taken up automatically. If necessary, tap stud lightly to unseat lockwasher between bracket and base, then pry tensioner bracket slightly outboard to induce tensioner spring to take up slack. Tighten locknut firmly. If wipers still slap, reposition wiper arms one serration at a time until slap eliminated. *NOTE - If slap not eliminated, modify tensioners as indicated below.*

►*WILLYS TENSIONER MODIFICATION (TO ELIMINATE WIPER BLADE SLAP):* Elongate mounting holes in tensioner bracket toward center of vehicle 1/16". Bracket will now move outboard 1/16" additional for more tension on cables. Install bracket in new mounting position and check that cables have no interference.

REMOVAL & INSTALLATION (RAMBLER): As follows:

Wiper Arm: Lift arm against spring tension and slide cap away from serrated pivot shaft with screwdriver. To install, reverse removal procedure and note that motor should be in park position and that right blade should rest above left blade.

Pivot Shaft & Link (American): Remove glove box and defroster hose (unnecessary to remove radio). Remove wiper arm and blade assembly, then remove pivot shaft-to-cowl top nut and spacer. Disconnect link end from motor arm. Remove pivot shaft. To install, reverse removal procedure.

Pivot Shaft & Link (Classic & Ambassador): Disconnect link from motor and remove cowl vent intake cover-to-cowl top screws. Close hood and remove wiper arms and blades from pivot shaft. Remove pivot shaft hexagon nut and spacers, then remove cowl vent intake cover by lifting upward and disengaging from pivot shafts. Remove brass french nuts holding pivot shafts to cowl top and remove pivot shafts through opening in cowl top or wiper motor compartment. To install, reverse removal procedure.

Wiper Motor (American): Motor is mounted on a cover plate fastened to dash panel under instrument panel. Remove radio and bezel, and lower complete air conditioning unit from dash. Disconnect pivot shaft links from motor arm studs (remove spring clips), then remove cover plate-to-motor, and cover plate-to-dash mounting screws. Turn motor arm to vertical position (use wiper control), then raise cover plate high enough so upper end of motor arm will pass through cover plate hole. Lower plate and remove from wiper motor. Feed additional wiper hose and control cable into air intake chamber to lower motor so hose and cable can be disconnected from motor. Plastic cover must be removed before control can be disconnected. To install, reverse removal procedure and note the following: Control cable must be installed with washer at end of wire inserted in slot in slide valve. Conduit must butt against shoulders of anchoring slot and be fastened securely for proper valve operation. Check mounting gasket for proper sealing and control cable for kinks and bends.

Wiper Motor (Classic & Ambassador): Disconnect water hoses from heater core and plug (unnecessary to drain cooling system). Remove wiring harness clips at each hood hinge, then disconnect heater motor wires. Remove heater shroud, heater core and motor as an assembly. Mark location of wiper motor access hole cover and remove cover (cover holes must align with holes in shroud at reassembly). Disconnect link-to-motor retainers (retainers are key slotted and slide into a groove in actuating stud). Disconnect motor from bracket. Remove plastic cover, hose, and control cable from motor. Note location of control cable arm as it must butt against shoulder in recess in mounting bracket for proper adjustment when reinstalled. Remove motor. To install, reverse removal procedure and check hose and control cable for interference with pivot body shaft link, and air intake chamber hoses for drainage.

Wiper Control & Cable (American): Remove cable control knob. Remove wiper motor (see above) and disconnect control cable from motor. Remove control retaining nut on instrument panel, then remove control and cable. To install, reverse removal procedure and do not kink cable. *NOTE - Cable must be installed with washer at end of control wire inserted in slot in slide valve, and conduit must butt against shoulders of anchoring slot and fastened securely to insure proper operation of slide valve.*

Wiper Control & Cable (Classic & Ambassador): Remove wiper motor (see above). Remove control knob from shaft (retained by setscrew), then disconnect cable and conduit from motor. Remove control body-to-instrument panel attaching french nut and remove control unit and cable assembly. To install, reverse removal procedure making sure cable is routed properly through underside of instrument panel. *NOTE - To prevent kinks, cable should pass under defroster tube.*

STUDEBAKER CORP. ELECTRIC TYPE

Studebaker, All Models (1962)

DESCRIPTION: Two-speed electric type windshield wiper with drive to wiper blades through link and crank arm arrangement. Design and operation is similar to that used on previous models

►*WIPER MOTOR NOTE:* Prestolite (Autolite) and American Bosch type motors used.

ADJUSTMENT: Wiper Blade Park Position - Operate wiper for a few minutes to bring to operating temperature. If blades do not park properly move lever (Prestolite), turn hex head (Bosch) on front of wiper drive as required. Test operation and readjust as necessary.

Wiper Arm Tension: Hook a spring scale under wiper arm at point where connected to blade. Pull away from windshield and right angle until blade is just off glass. Jiggle wiper arm with free hand until arm reaches free rest position. Scale reading should be 7½-8½ ozs. If below 7½ ozs., oil tension spring and arm pivot rivet. If tension does not increase, replace arm. If reading above 8½ ozs. bend outer section of arm slightly. If correct pressure cannot be obtained by bending, replace arm.

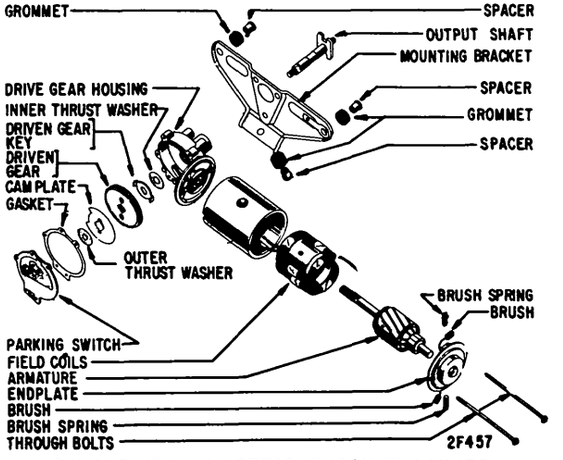
TESTING: Wiper blade speed should be 80-90 sweeps per minute (low speed), 132-135 sweeps per minute (high speed) on wet windshield (or with paper boot on blade). If wiper speed slow, check for fully charged battery and good electrical connections. Wiper arm tension may be too high (see "Adjustment" above). Links and drivers may be binding. If speed not within limits with main link disconnected from motor, replace motor.

REMOVAL & INSTALLATION:

Wiper Motor (Except Hawk): Disconnect battery and remove cowl air intake grille and screen. Disconnect multiple connector near motor and remove main wiper link retaining nut from motor drive shaft, then remove links from shaft. Remove wiper motor attaching nuts and remove motor. To install, reverse removal procedure.

Wiper Motor (Hawk): Remove radio and disconnect wiring from wiper switch. Swing aside cover on main link and remove main link nut, then remove main link from motor drive shaft. Disconnect motor from cowl panel and cowl panel flange, then remove motor. To install, reverse removal procedure.

Wiper Link & Driver: Remove clip from main link pin and remove right connecting link from pin. Remove wiper arms. Remove driver retaining nuts on outside of cowl and remove spacers and gaskets. Slip drivers down through cowl panel and remove driver and connecting link assemblies. *NOTE - Left connecting link cannot be removed from main link, and driver and connecting link for each side is serviced as an assembly. DO NOT disassemble driver.* To install, reverse removal procedure and note the following: Flanges of connecting links must face to rear of car, and links must be below drivers. To position main link properly on drive shaft, start motor and turn switch off. When motor stops place main link on drive shaft so lugs fit in drive slots. End of left link must be to left of center of main link and pin must be to right of center of main link. Install and tighten main link nut, then install right connecting link.



STUDEBAKER ELECTRIC WINDSHIELD WIPER MOTOR & DRIVE ASSEMBLY

1963 FINAL
NATIONAL SERVICE DATA

NATIONAL AUTOMOTIVE SERVICE
BERKELEY 10, CALIFORNIA

An entirely new system of indexing has been developed for the 1963 Final Data. It has been designed to quickly locate each and every subject.

The GENERAL INDEX, starting on the next page, lists individual car service items alphabetically by car models.

The EQUIPMENT INDEX, on pages 11 to 13 following the General Index, lists Equipment Articles alphabetically.

LATEST CHANGES & CORRECTIONS are printed on ORANGE paper at the end of this issue, starting on page 561. See individual Car and Equipment pages for other Changes & Corrections.

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★ For later Manual Edition

TUNE-UP SPECIFICATIONS

COMPRESSION PRESSURE

6 Cyl. L-Head	130 psi
6 Cyl. OHV	145 psi
V8	145 psi

Maxium variation b tween cylinders 10 psi (all ngines).

VALVE TAPPET CLEARANCE

6 Cyl. L-Head (Cold)	.016" Int., .018" Exh.
(Hot)	.015" Int.; .015" Exh.
6 Cyl. OHV Cast Iron (Hot)	.012" Int.; .016" Exh.
Aluminum	Hydraulic
V8	Hydraulic

SPARK PLUGS

Gap (All)	.033-.037"
Torque (All)	25-30 ft. lbs.

Spark Plug Type

All Engines ... Champion H-10 or H-18Y

DISTRIBUTOR

6 Cylinder

Point Gap	016"
Cam Angle	31-34°
Breaker Arm Spring Tension	17-21 ozs
Condenser Capacity	18- 23 mfd

V8

Point Gap	016" (30° Cam Angle)
Cam Angle	30° ±2°
Breaker Arm Spring Tension	17-21 ozs
Condenser Capacity	18- 23 mfd

TUNE-UP NOTES

► *1963 AMERICAN WITH RBS CARB (L-HEAD ENG) STEP-UP ROD DIAPHRAGM COVER PRODUCTION CHANGE* For positive seal at step-up rod diaphragm cover, new method of retaining cover used on carburetors effective Date Code K-2 (date stamped on carburetor flange) New method uses a flat washer pressed into diaphragm retainer Split Wire Ring, No 3204528, and Conical Washer, No 3204529, are available for service *See "Carter RBS Single Barrel Carburetor" in Carburetion Section*

► *1963 AMERICAN (OHV ENGINE) CONSTANT THROTTLE SURGE & ACCELERATION STUMBLE CORRECTION* 1) On cars before Sequence No E-40006, install Carburetor No 2387-1A (Holley No) This is the later production carburetor used on Classic models *Be sure to install the dashpot on "E-Stick" cars*

2) On cars after Sequence No E-40005, Kit, No 3204569, may be installed *See "Holley 1909 Single Barrel Carburetors" in Carburetion Section for details*

► *1963 AMERICAN (L-HEAD ENG) COIL PRODUCTION CHANGE* For improved cold weather starting, higher capacity coil, Delco-Remy No 1115033, installed effective Engine Code No 410A08 Coil may be installed on 1960-63 earlier cars to improve cold weather starts

► *1963 DISTRIBUTOR HOLD-DOWN CLAMP SCREW PRODUCTION CHANGE (OHV 6 CYL ENGINES)* Revised torque of 10-15 ft lbs supersedes previous 4-6 ft lbs

IGNITION TIMING

Set timing at specified idle speed. Degrees given are BTDC except as noted.

Regular Fuel

Engine	S.M. & O.D.	A.T.
6 Cyl L-Head	3°	3°
OHV (American)	8°	10°
OHV (Classic)	5°	5°
Classic V8 (2-Bbl)	5°	5°
Ambassador V8 (2-Bbl)	TDC	5°

Premium Fuel

Engine	S.M. & O.D.	A.T.
6 Cyl L-Head	6°	6°
OHV (American)	12°	14°
OHV (Classic)	8°	8°
Ambassador V8 (2-Bbl)	3°	8°
(4-Bbl)	5°	5°

HOT (SLOW) IDLE RPM

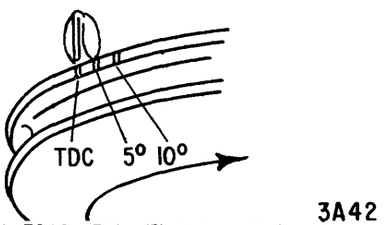
Engine	S.M. & O.D.	Auto. Trans.
6 Cyl.	ℂ 550	ℂ 500
V8	ℂ 550	ℂ 475

ℂ - 500 RPM with Air Conditioning "ON".

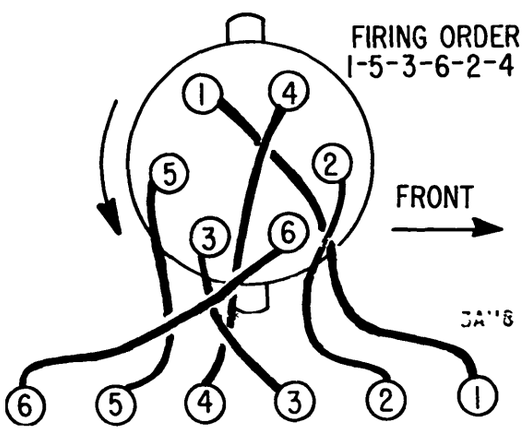
FAST IDLE RPM

With fast idle screw on high step of fast idle cam.

6 Cyl. (All Carbs.)	1800
V8 (All Carbs.)	1600-1800



V8 ENGINES IGNITION TIMING MARKS



6 CYL. ENGINE (L-HEAD) FIRING ORDER

AUTOMATIC CHOKE SETTING

6 Cyl	Carter AS	Centered
	Carter RBS	Centered
	Carter WCD	Centered
	Holley 2387A	1 Lean
	2387-1A, -1A*, 2555A, -1A, -2A	Centered
	2556A, -1A	Centered
	2557A	1 Lean
	2557-1A, -1A*	Centered
V8 (2-Bbl Carb)		Centered
(4-Bbl Carb)		1 Lean

FUEL PUMP PRESSURE & VOLUME

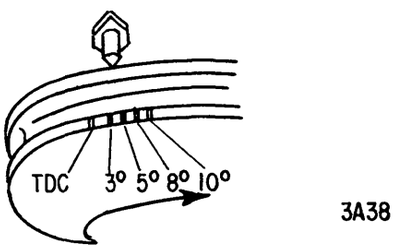
Pressure (All Engines) ... 4-5½ psi at 500 RPM
Volume (All Engines) ..... 1 qt. in 1 minute at 500 RPM

MANIFOLD HEAT CONTROL

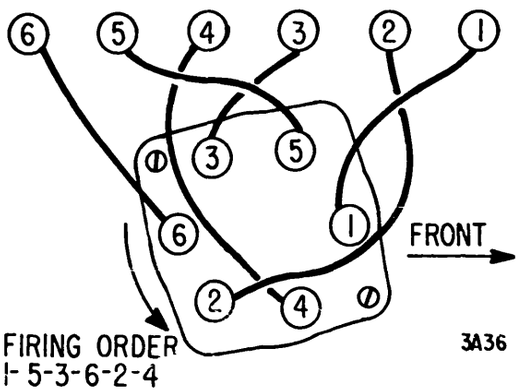
Check valve for binding and free and lubricate as necessary.

POSITIVE CRANKCASE VENTILATION

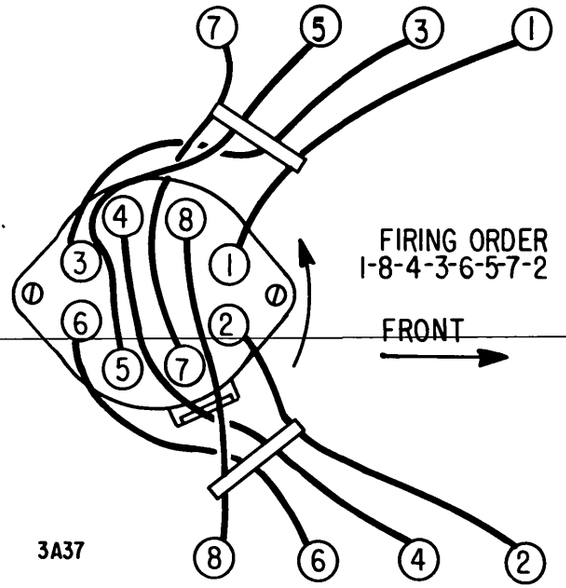
Check system for cleanliness and operation every 8,000 miles or socner under severe conditions. Valve may be cleaned in a suitable parts cleaner.



6 CYL. ENGINES IGNITION TIMING MARKS



6 CYL ENGINE (OHV) FIRING ORDER



V8 ENGINES FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110299

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	525	Start	4-6
1.5-3.5	700	5.5	9.75-11.5
4-6	1425		
6-8	2100		

For engine degrees & RPM, multiply by 2.

Delco-Remy 1110289

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
5-2 5	600	Start	5-7
5-7	900	11	15 5-17
7 5-9 5	1500		
10-12	2100		

For engine degrees & RPM, multiply by 2

Delco-Remy 1111025

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	350	Start	5-7
7.5-9.5	775	10	14.25-15.75
12-14	1300		
17-19	1900		

For engine degrees & RPM, multiply by 2.

Delco-Remy 1110308

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
5-2 5	600	Start	9-11
5-7	900	11	16 75-18 25
7 5-9 5	1500		
10-12	2100		

For engine degrees and RPM, multiply by 2

IGNITION COIL

Primary Resistance (6 Cyl.) ..... 3.3-4.1 ohms
(V8) ..... 1.28-1.42 ohms
Secondary Resistance (All) ..... 7200-9500 ohms
Ballast Resistor (Delco-Remy 1957154) ..... 1.80 ohms at 80°F

CARBURETOR

CARBURETOR SPECIFICATIONS			
Carburetor	Float Level	Float Drop	Choke Setting
Carter AS 3536S	3/32" ±1/32"		Centered
Carter RBS 3487S, 3498S	1 5/32" ±1/32"		Centered
Carter WCD 3434S, 3535S	1/8" ±1/32"	5/8"	Centered
Holley R-2387A	5/16"		1 Lean
1-Bbl R-2387-1A	27/64"		Centered
R-2387-1A*	5/16"		Centered
R-2555A	5/16"		Centered
R-2555-1A,2A	27/64"		Centered
R-2556A	5/16"		Centered
R-2556-1A	27/64"		Centered
R-2557A	5/16"		1 Lean
R-2557-1A	27/64"		Centered
R-2557-1A*	5/16"		Centered
Holley R-2442A, 63A 2-Bbl	℄		Centered
Holley R-1957-1A, 4-Bbl R-2464A	℄		1 Lean

℄ - **Fl at L v l** (dry - fuel bowl inverted) - Float parallel with bowl floor

W t Fu l L v l (at 5 lbs pressure) - Fuel level at bottom of sight plug opening

THROTTLE LINKAGE ADJUSTMENT (AUTO. TRANS. CARS)

6 CYL. - With throttle valve closed (engine stopped), disconnect cable at lever on carburetor throttle control shaft. Pull cable toward carburetor and adjust clevis for free pin fit in throttle shaft lever hole. On OHV engine, adjust clevis an additional 2 turns long.
V8 - None, vacuum controlled.

DASHPOT ADJUSTMENT (ALL ENGINES)

With throttle valve closed and dashpot stem fully depressed, clearance between dashpot stem and throttle lever should be as in table below. Turn dashpot to adjust.

Dashpot Specifications

Carburetor	Dashpot Clearance
Carter RBS & WCD	1/8"
Holley 1909	9/64"
Holley 2 & 4-Bbl	3/32"

ACCELERATING PUMP SETTING

Carter AS	none
Carter RBS	none
Carter WCD	Outer hole of pump arm (long stroke)
Holley 1909	Outer hole (No. 2 position)
Holley 2 & 4-Bbl	Pump cam screw in No. 2 position on throttle lever. Use No. 1 position for leaner discharge.

MANIFOLD FUEL DISTRIBUTION

Carbureter right barrels feed cylinders 2,3,5,8.
Carburetor left barrels feed cylinders 1,4,6,7.

ELECTRICAL

BATTERY

12-V lt

American & Classic - 50 Amp Hr (Std), 60 Amp Hr (Air Cond), 70 Amp Hr (Optl)
Ambassador - 60 Amp Hr (Std), 70 Amp Hr (Optl),
Battery Ground - Negative, to cylinder head or block.
Engine Ground - Transmission-to-crossmember.

STARTER

Delco-Remy 1107201

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

℄ - Includes solenoid.

Delco-Remy 1107282

Torque	RPM	Volts	℄ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

℄ - Includes solenoid.
Brush Spring Tension - 35 ozs. minimum.

GENERATOR

Delco-Remy 1102333

Amperes	Volts	Gen. RPM
30	14.0	2150

Brush Spring T nsi n - 28 ozs.
Field Curr nt - 1 48-1 62 amps at 12 volts & 80°F

S Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

GENERATOR REGULATOR

D lc -Remy 1119003E

Cutout Relay

Cuts In - 11.8-13.5 volts.
C ntact Gap - .020".
Air Gap - .020" with contacts just closed.

V ltage Regulator

S tting - 13.5-14.4 volts at 125°F.
Air Gap - .075" with contacts just touching.

Curr nt Regulator

S tting - 42.5-47 amps.
Air Gap - .075" with contacts just touching.

ALTERNATOR

MOTOROLA

M t r la A-12NAM451

Curr nt Output - 33 amperes at 15 volts.

LEECE-NEVILLE

Le ce-N ville A-0012116-AA

Curr nt Output - 60 amperes at 14 volts and 4800 alternator RPM.

DELCO-REMY

D lc -R my 1100647

Amper s	V lts	Alternator RPM
28	14.0	Ⓒ 2000
40	14.0	② 5000

Ⓒ - Approx. 900 Engine RPM.
② - Approx. 2300 Engine RPM.

ALTERNATOR REGULATOR

DELCO-REMY

D lc -Remy 1119512

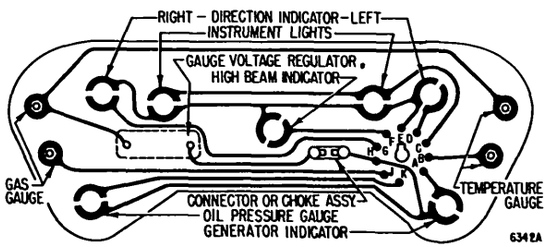
Conventional type containing a double contact voltage regulator, and a field relay.

Fi ld Relay

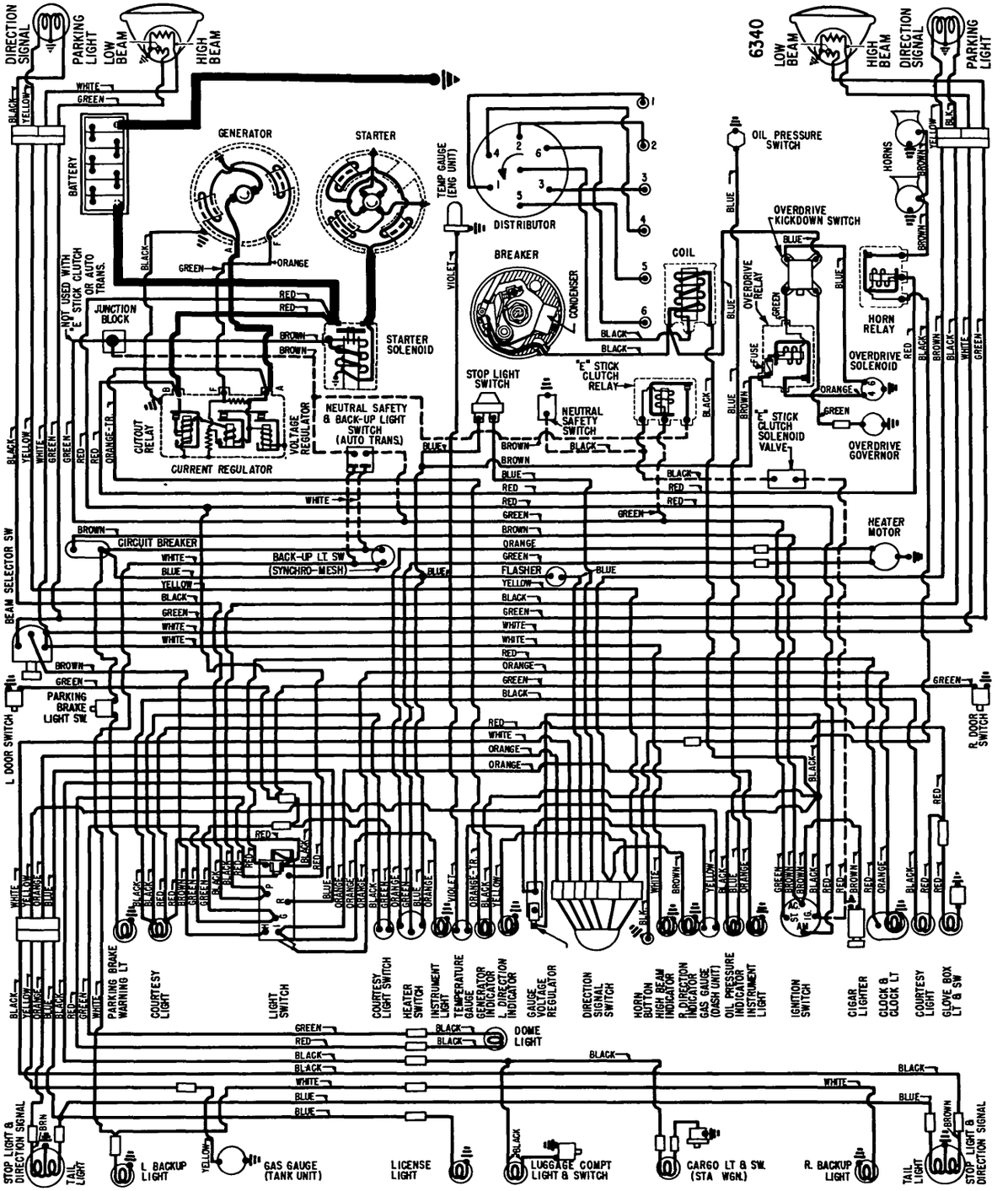
Cl sing V ltag - 1.5-2.7 volts.
C ntact Gap - .030".
Air Gap - .015" with contacts just touching.

V ltage Regulator

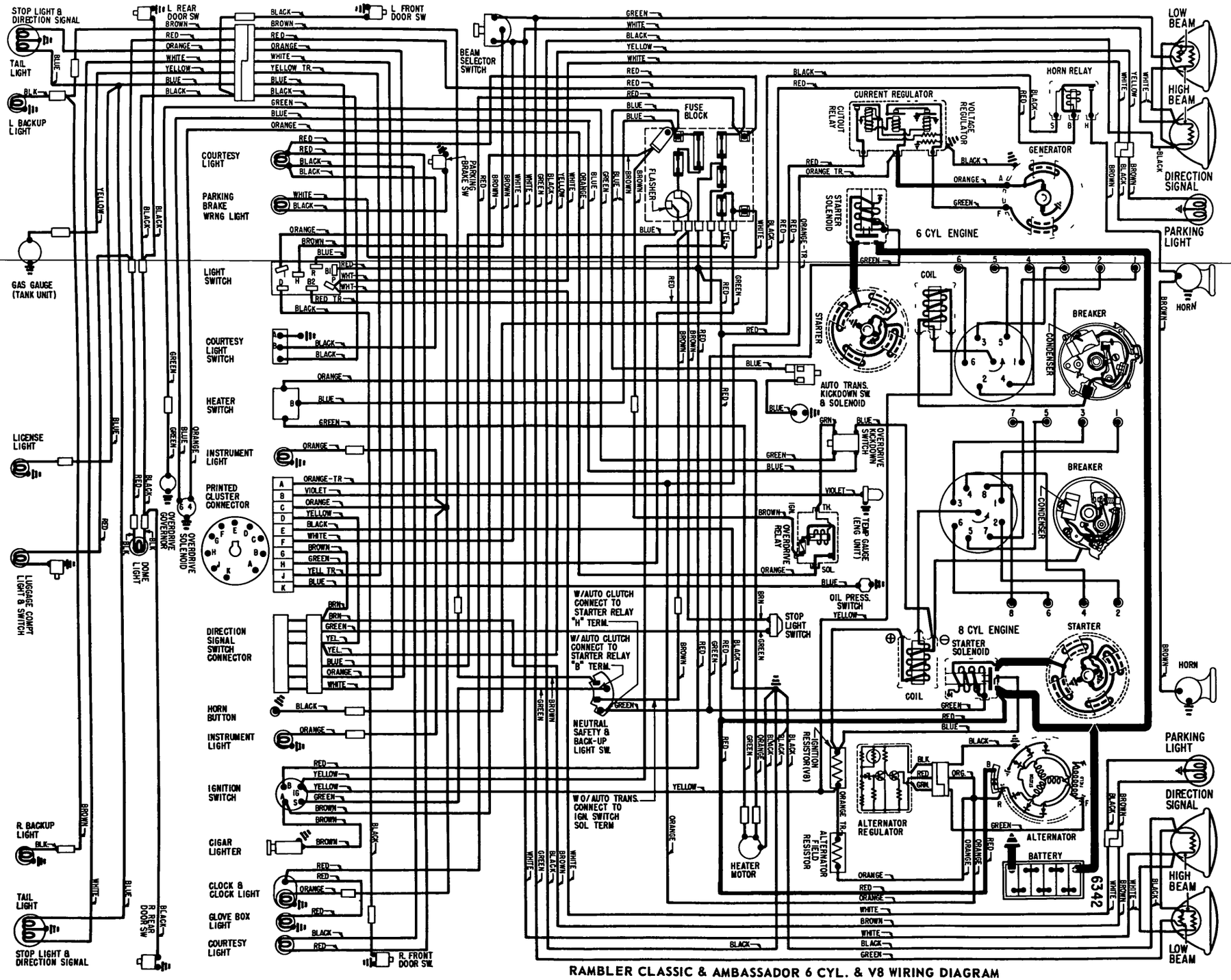
V ltag Setting - 13.5-14.4 volts at 125°F ambient temperature operating on upper contacts. .1-.3 volt lower when operating on l ower contacts.
C ntact Gap - .014" (upper contacts) with lower contacts just touching.
Air Gap - .067" with lower contacts touching.



CLASSIC & AMBASSADOR PRINTED CIRCUIT



RAMBLER AMERICAN WIRING DIAGRAM



RAMBLER CLASSIC & AMBASSADOR 6 CYL. & V8 WIRING DIAGRAM

MOTOROLA
Motorola TVR-12NAM6

Transistor type, permanently sealed, no adjustments. *For testing and circuit diagrams, see "Motorola Alternators & Regulators" in Electrical Section.*

LEECE-NEVILLE
Leece-Neville R-0013533-RA

Conventional type containing a double contact voltage regulator, and a load relay.

Load Relay

Closing Voltage - 6.8-7.0 volts.
Contact Gap - .024-.026".
Air Gap - .011-.013" with contacts closed.

Voltage Regulator

Voltage Setting - 13.6-13.8 volts (Upper Contacts), 13.7-13.9 volts (Lower Contacts). Transfer Voltage is 14.0-14.2 volts.
Contact Gap - .018-.020" (Upper Contacts - with lower contacts closed).
Air Gap - .031-.039" with lower contacts closed.

CIRCUIT BREAKERS

American

1 & 2 - Head and Tail light circuits. On lighting switch.
3 - Stop light and direction signal circuits. On ceiling of cowl under dash panel.

Classic & Ambassador

1 - Headlight circuit. In headlight switch.
2 - Electric windows. In fuse block.

FUSES

American

1 - Interior lighting circuits. On lighting switch.

Classic & Ambassador

Fuse block on left side of dash panel.

SWITCHES, GAUGES, & SPEEDOMETER

►*1963 INTERMITTENT HORN OPERATION CORRECTION (CLASSIC & AMBASSADOR):* May be caused by too much solder on horn brush transferring to horn contact plate. To correct, clean brush and contact plate with crocus cloth or fine file. Apply a thin film of lubriplate to contact plate. In some cases, variables in mounting of index plate to horn ring may also cause this condition. To correct, rotate index plate 120°.

NEUTRAL SAFETY SWITCH

E-Stick Cars - Located on steering column jacket tube under instrument panel.

Adjustment - **Adjust neutral safety switch in mounting bracket so there is the same amount of gear shift lever movement when coming out of 2nd gear as there is when coming out of 3rd gear before neutral switch "clicks". Place gear shift lever in 3rd gear and adjust actuator cam stop nut (upper nut at small end of spring) to take up approximately ½ of lever free movement (will center slot in 2nd and 3rd operating lever over selector key to remove any tension).**

Automatic Transmission Cars - Located on steering column jacket tube under instrument panel.

Adjustment - **Adjust so engine will start in "N" or "P" only. Loosen switch on column tube and put selector lever in "N". Insert a 3/32" pin in hole on switch face, then tighten switch attaching screws and remove pin.** ***NOTE - Tang of switch must enter into channel on operating shaft before switch is secured to jacket tube.***

INSTRUMENT CLUSTER & SPEEDOMETER REMOVAL

American - Disconnect wiring and speedometer cable from back of cluster. Remove two cluster attaching screws, loosen side brackets, slide cluster down to disengage tabs, remove through front face of instrument panel.

Classic & Ambassador - Disconnect wiring and speedometer cable from back of cluster. Remove cluster hood top (retained by 3 screws). Remove cluster attaching screws, lift cluster to disengage tabs, then tilt unit to right and remove through front face of instrument panel. *INSTALLING NOTE* - Install through front face of panel at an angle. The 2 locating lugs must have rubber insulators in place before cluster installed.

PRINTED CIRCUIT BOARD REMOVAL

Classic & Ambassador - With instrument cluster removed (see above), remove temperature and fuel gauge attaching nuts, the screw holding printed circuit board to instrument cluster, and the voltage regulator. Remove printed circuit board.

HEADLIGHT SWITCH

To remove, disconnect battery, put switch in "Off" position, and press release button on switch to remove shaft and knob assembly. Remove switch retaining nut (American), switch and bracket attaching screws (Classic & Ambassador),and remove switch.

STOP LIGHT SWITCH

Located on brake master cylinder. No adjustment.

TURN SIGNAL FLASHER

American - On ceiling of cowl under dash panel near stop light and turn signal circuit breaker.
Classic & Ambassador - On fuse panel (left side of dash).

BELT ADJUSTMENT

	New Belt	Used Belt
All Belts, All Applications	110-120 lbs.	70-80 lbs.

Use a strand tension gauge.

ENGINE

ALUMINUM ENGINE SERVICING

Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Carefully note the following:
1) Do not drop or slide machined surfaces on bench or floor.
2) Do not use gasket cement unless specifically indicated.
3) Tighten bolts and nuts to the specified torque. DO NOT OVERTIGHTEN.

ALUMINUM THREAD REPAIR

Use "Heli-Coil" thread repair kits to repair stripped or damaged threads in aluminum parts.

ENGINE REMOVAL

American (L-Head Engine) - *NOTE - Engine and transmission assembly is removed from below the car.* 1) Disconnect all wiring, hoses and lines from engine. Remove hood and radiator, and remove air conditioning compressor from engine and place or tie out of way. *NOTE - Unnecessary to discharge system.* Disconnect fuel line from carburetor, and loosen exhaust pipe from engine.
2) Attach a lifting fixture to cylinder head studs, and a block and tackle to the lifting fixture. Raise car (2-post hoist preferred) and support front of car with high-jacks under body side sills just forward of front crossmember. Disconnect fuel line from fuel pump and move exhaust pipe away from engine.
3) Remove front suspension crossmember (K brace). Move idler arm bracket from side sill mounting (or power steering).
4) Disconnect all controls, cables, and wiring from transmission. Remove parking brake linkage from rear crossmember. Drain engine and transmission oil.
5) With engine supported under tension by block and tackle, remove engine front and rear support crossmembers. Lower and remove engine by sliding forward to clear front U-joint.

American (OHV Engine) - 1) Remove hood, drain cooling system, and crankcase. Remove air cleaner, starter, radiator, heater cover, and water pump. Disconnect exhaust pipe from manifold.
2) Disconnect all wiring, lines, and hoses from engine and power steering. Remove air conditioning compressor from engine and tie out of way. *NOTE - Unnecessary to discharge system.*
3) Disconnect flywheel housing from engine, and flywheel from torque converter. Remove flywheel housing lower cover. Disconnect engine front mounts. Remove engine from above.

Classic & Ambassador (All Engines) - 1) Remove hood, battery, air cleaner, starter, and radiator. Disconnect all wiring, lines, and hoses from engine. Disconnect exhaust pipe. Remove flywheel lower cover.
2) *CAUTION - At this point, support flywheel housing at all times.* Attach a lifting fixture to engine. Disconnect flywheel housing from engine, and converter from flywheel. Remove power steering pump. Remove air conditioning compressor from engine and tie out of way *NOTE - Unnecessary to discharge system.*
3) Disconnect engine front mounts and remove engine from above.

(Continued)

See Pages 2 to 13 for complete Car Model General Index and Equipment Indexes

ENGINE (Continued)

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
6 Cyl. L-Head	90 at 3800	8.0-1	3 1/8"	4 1/4"	195.6 cu. ins.
6 Cyl. OHV 1-Bbl. Carb.	127 at 4200	8.7-1	3 1/8"	4 1/4"	195.6 cu. ins.
6 Cyl. OHV 2-Bbl. Carb.	138 at 4500	8.7-1	3 1/8"	4 1/4"	195.6 cu. ins.
Classic V8 2-Bbl.	198 at 4700	8.7-1	3 3/4"	3 1/4"	287 cu. ins
Ambassador V8 2-Bbl	250 at 4700	8.7-1	4"	3 1/4"	327 cu. ins.
Ambassador V8 4-Bbl.	270 at 4700	9.7-1	4"	3 1/4"	327 cu. ins.

ENGINE IDENTIFICATION

Engines can be identified by letter between 3rd. and 4th. digit of Engine Code Number stamped on left upper front corner of block beneath cylinder head (6 Cyl.), on plate attached to alternator mounting bracket (V8 Engines) as follows:

Engine	Code Letter	Engine	Code Letter
6 Cyl. (L-Head)	A	Classic V8	G
6 Cyl. (Al OHV)	B	Amb. V8 (8.7-1)	E
6 Cyl. (Cast Iron OHV)	C	Amb V8 (9.7-1)	F

SPECIAL ENGINE MARKS

Following marks, stamped under Engine Code Number, indicate special equipment or deviations from standard specifications.

Three Letter Group (A,B,C) - As follows for all engines:
First Letter - Size of bore.
Second Letter - Size of main bearings.
Third Letter - Size of connecting rod bearings.
A - Standard
B - .010" Undersize.
C - .010" Oversize.

OIL PAN REMOVAL

Classic & Ambassador - Remove front springs, support car, then support engine from above. Remove engine support cushion at engine. Remove idler arm from bracket, or power steering piston rod from bracket. Remove stabilizer bar. Disconnect front suspension crossmember from body sills and pry crossmember down for clearance (use wood blocks between crossmember and body side sill). Remove flywheel dust cover. Drain crankcase, remove oil pan. ***NOTE - On Classic, put No. 1 piston on upstroke.***

OIL PAN INSTALLATION (6 CYL. CAST IRON ENGINES)

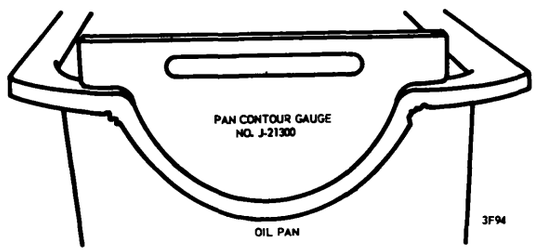
CAUTION - Following procedure for oil pan and gasket installation must be followed exactly to prevent oil leaks and for proper installation of new type gaskets, Set No. 3204493. See "Oil Leak Correction & Oil Pan Gasket Production Change" above.

1) Use special Oil Pan Contour Gauge J-21300 to check pan shape at rear seal area With gauge installed on oil pan, there should be complete contact between gauge and pan through entire arc of seal area. Maximum clearance of 050" is permitted. *See illustration.* Also make sure that pan gasket surface at attaching screw holes is flat and even.

2) Install rubber seal into rear of pan **without cement or lubrication.** Cement cork side gaskets to pan, maintaining perfect alignment with screw holes, and making sure tongue of cork gaskets is in cutout of rear rubber seal on both sides. *NOTE - For ease of assembly, a very small amount of fast drying cement may be used to hold cork gaskets into rubber seal.*

3) Use a small amount of No. 2 Permatex on threads of pan attaching screw hole in block which is directly under fuel pump (to prevent leak). Put a bead of No 2 Permatex along front edge of cylinder block at the two corners where cylinder block and engine front cover spacer meet. Apply Permatex also to each rear side surface of rear main bearing cap from the crankcase surface down about 1½".

4) Install oil pan being careful not to dislodge seal and gaskets, and torque attaching screws to specified 8-11 ft. lbs. *CAUTION - If screws overtightened, pan will be distorted, gasket will crack, and leaks will occur.*



6 CYL. (CAST IRON) OIL PAN CONTOUR GAUGE INSTALLATION

ENGINE NOTES

►*1963 CLASSIC & AMBASSADOR (ALL ENGINES) ENGINE VIBRATION CORRECTION & REAR MOUNT PRODUCTION CHANGE:* New dual rate rear mount insulator used on cars after Engine Code No. 502 (B,C,E,F, or G)16 to correct harmonic vibrations at various speeds. To correct vibration on early cars, Kit No. 3204537 (Classic), No. 3204538 (Ambassador), containing new type mount and bracket is available *NOTE* - On Ambassador with synchro-mesh or overdrive, grind transmission adapter slightly if necessary for a flat mating surface for new bracket. *CAUTION - Do not install insulator or crossmember-to-sill cushions under tension.*

►*1963 AMERICAN & CLASSIC 6 CYL. CAST IRON ENGINES OIL LEAK CORRECTION & OIL PAN GASKET PRODUCTION CHANGE:* 1) New type oil pan gaskets used on cars effective Engine Code No. 412A08 & 412C08. On early cars, Gasket Set No. 3204493, is available *Special procedures must be followed when installing these gaskets to prevent and correct oil leaks. See "Oil Pan Installation".*
2) New procedures, tool, and specifications for installing rear main bearing oil seal must be followed to correct and prevent oil leaks. *See "Crankshaft Rear Oil Seal Replacement."*

►*1963 V8 ENGINES CRANKSHAFT REAR OIL SEAL INSTALLATION CAUTION:* New procedures, tool, and specifications must be followed to prevent and correct oil leaks. *See "Crankshaft Rear Oil Seal Replacement".*

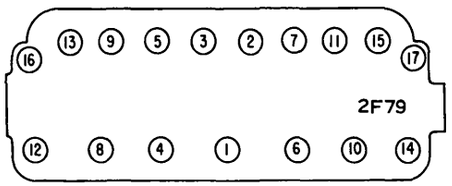
►*1963 V8 ENGINES VALVE GUIDE & VALVE STEM SEAL PRODUCTION CHANGE & INSTALLATION CAUTION:* New type valve guides and valve stem seals used on all 287" (Classic) engines, and on 327" (Ambassador) engines after Engine Code No. 411E02 & 411F02 for improved oil control. New type seals, Kit No. 3204513, to be used **only** on engines having new type valve guide. *Special seal installation procedures must be used to prevent damage to seal. See "Valve Stem Seal Installation".*

►*1963 ALUMINUM 6 CYL. ENGINE CYLINDER HEAD & EXHAUST VALVE PRODUCTION CHANGE & NON-INTERCHANGEABILITY CAUTION:* Beginning Engine Code No. 502B05 & 502B06 new cylinder head with larger coolant passages around valve seats and different pushrod opening angle used in production. Also new type exhaust valves used with new type head. 2nd type exhaust valves MUST BE USED WITH 2ND TYPE HEADS ONLY. **Identification of 2nd type parts: Cylinder Head** - 9 chaplet pads (bosses) adjacent to valve guides. **Exhaust Valves** - Valve stem length is 3 31/32" from tip of stem to relieved section near valve head (3 9/32" on early type).

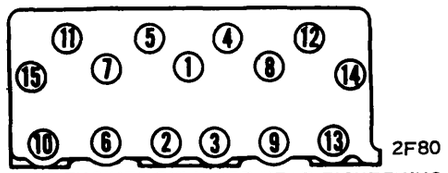
CYLINDER HEAD INSTALLATION

Cast Iron Engines - Tighten cylinder head stud nuts and head bolts in sequence shown in diagram to 58-62 ft. lbs. *V8 ENGINE NOTE* - Four different cylinder head bolt lengths are used and bolts must be correctly installed. Long (6 3/8") drilled bolt must be installed at rear rocker arm bracket location to provide for rocker arm and valve stem lubrication.

Aluminum Engin - Replace "O" ring seals on hollow guide pin at right front corner of block each time cylinder head removed (this is oil delivery tube to rocker arm shaft assembly). To replace seals, remove guide pin (gently rotate and pull pin out to free lower seal in block). Install new seals in guide pin grooves, lubricate with engine oil and tap guide pin lightly into cylinder block to one-half length, install head using care not to damage upper seal on guide pin. Tighten head bolts in 20 lb. increments and in sequence shown in diagram to 50-53 ft. lbs. Recheck head bolts with engine at normal operating temperature.



6 CYL. OHV (ALUMINUM) CYLINDER HEAD TIGHTENING



V8 ENGINES CYLINDER HEAD TIGHTENING

PISTONS, PINS, RINGS

Engine	PISTON Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
6 Cyl.	③ .0006-.0017" ④ .0006-.0012"	①	②	Compr. Oil	.010-.020" .015-.055"	.002-.004" .0001-.004"
V8	③ .0009-.0025" ④ .0009-.0015"	①	②	Compr. Oil	.010-.020" .015-.055"	.002-.006" .0001-.004"

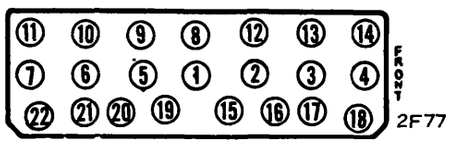
① - Palm press fit at room temperature. ② - Press fit. *See Replacing Pins*

③ - Measured at top of skirt. ④ - Measured at bottom of skirt.

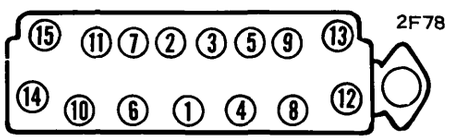
PISTON PIN REPLACEMENT

Pin must be a tight press fit in connecting rod.

Removal - Use Remover & Replacer Set J-6360 and an arbor press. Place piston in remover support so pin will enter support when pressed out with piloted driver.



6 CYL. (L-HEAD) CYLINDER HEAD TIGHTENING



6 CYL. OHV (CAST IRON) CYLINDER HEAD TIGHTENING

Installation - Place piston pin pilot in support, insert piston and connecting rod (this aligns piston and connecting rod pin bores). Press piston pin into connecting rod and piston assembly until lower pilot bottoms in support (will properly center pin in rod).

PISTON RING INSTALLATION

On compression rings, beveled inner edges on inside diameter of ring must be up.

PISTON & ROD INSTALLATION

6 Cyl. Engine - Notch or indentation on piston head toward front of engine and cylinder number on rod and bearing cap together and toward right or camshaft side of engine (oil squirt hole in rod on same side).

V8 Engine - Notch on rim of piston head and "F" marks at pin boss toward front of engine. Cylinder number on rod and bearing cap together and toward outside of cylinder bank in which assembly installed (oil squirt hole in rods toward inside of engine for cross-lubrication of cylinder walls).

TIGHTENING SPECIFICATIONS

6 CYL. CAST IRON ENGINES

Application	Ft. Lbs.
Cylinder Head	58-62
Intake Manifold - 5/16" (OHV)	15-20
1/4" (OHV)	8-11
Exhaust Manifold (L-Head)	20-25
Exhaust Manifold - End Nuts (OHV)	8-10
Center Nuts (OHV)	20-25
Oil Pan	8-11
Main Bearing Caps	66-70
Connecting Rod Caps	27-30
Flywheel	100-110
Vibration Damper Retaining Screw	70-80
Camshaft Sprocket	50-55
Camshaft Thrust Plate	21-25
Engine Side Cover	30-40 inch-lbs.
Rocker Arm Cover (OHV)	3-5
Engine Front Cover Dowel Bolt	21-25
Engine Front Cover Attaching Screws	15-17
Water Pump	8-12
Oil Pump (Except "E-Stick")	20-25
Oil Pump ("E-Stick")	13-15

6 CYL. ALUMINUM ENGINE

Application	Ft. Lbs.
Cylinder Head	50-53
Intake Manifold - 5/16"	15-20
1/4"	8-11
Exhaust Manifold - End Nuts	8-10
Center Nuts	20-25
Oil Pan	8-11
Main Bearing Caps	55-58
Connecting Rod Caps	27-30
Flywheel	100-110
Vibration Damper Retaining Screw	70-80
Camshaft Sprocket	50-55
Camshaft Thrust Plate	21-25
Main Oil Gallery Cover	15-17
Rocker Shaft Support Bracket	25-30
Rocker Arm Cover	3-5
Engine Front Cover Dowel Bolt	21-25
Engine Front Cover Attaching Screws	15-17
Water Pump	8-12
Oil Pump	15-17

V8 ENGINES

Application	Ft. Lbs.
Cylinder Head	58-62
Intake & Exhaust Manifolds	20-25
Oil Pan	8-11
Main Bearing Caps (Except Rear)	80-85
(Rear)	50-55
Connecting Rod Caps	46-50
Flywheel	100-110
Vibration Damper	70-80
Camshaft Sprocket	50-55
Camshaft Thrust Plate	21-25
Rocker Arm Cover	3-5
Tappet Chamber Cover	30-40 inch-lbs.
Engine Front Cover	18-22
Thermostat Housing Manifold	20-25
Thermostat Housing	10-15
Water Pump	8-12
Oil Pump	28-32
Engine Front Mount-to-Block	30-35
Engine Rear Mount-to-Case	25-30

See Pages 2 to 13 for complete Car Mod I General Indexes and Equipment Indexes

CRANKSHAFT REAR OIL SEAL REPLACEMENT

CAUTION - Following tools, specifications, and procedures supersede previous instructions to prevent and correct oil leaks. See "6 Cyl. Oil Leak & Pan Gasket Change" and "V8 Rear Oil Seal Caution" above.
6 Cyl. Cast Iron Engines - *Crankshaft must be removed to replace upper half of seal.* Use Tool J-21309 and press seal into cylinder block. Tool will form seal so that 5/64" of seal material will protrude from seal groove. Cut ends of seal flush with block. Install cap seal with same tool so that 5/64" of seal material protrudes from seal groove, then cut seal ends flush with cap. Partially install side seals into cap so that they are not completely seated in cap side grooves. Apply No. 1 Permatex to machined surface of cap around seal ends, and to chamfered edge of cap which seats in block. Install cap assembly and tighten capscrews to specifications.
6 Cyl. Aluminum Engine - *Crankshaft must be removed to replace upper seal.* Use Tool J-1610 to install and form seal in block and cap, then cut seal ends flush with block and cap surfaces. Dip cap side seals in kerosene and install **immediately** into cap side grooves (seals expand when wet). *CAUTION - Side seals furnished in correct length and must not be cut or altered.*

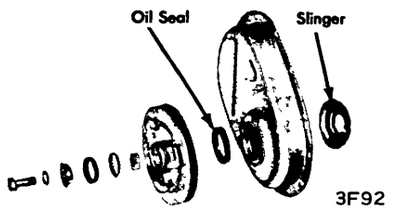
V8 Engines - *Crankshaft must be removed to replace upper seal.* Use Tool 21315 and press seal into cylinder block and cap. Tool will form seal so that 5/64" of seal material will protrude from seal groove. Cut ends of seal flush with block and cap surfaces. Dip cap side seals in kerosene and install **immediately** into cap side grooves (seals expand when wet). *CAUTION - Side seals furnished in correct length and must not be cut or altered.*

CRANKSHAFT FRONT SEAL REPLACEMENT (IN ENGINE FRONT COVER)

Remover J-9256 (6 Cyl.), J-9233 (V8); and Installer J-9163 (All Engines) are available to remove and replace crankshaft front seal without removing front cover.

ENGINE FRONT COVER REPLACEMENT

To prevent damage to front cover seal, cover must be aligned when installing vibration damper. To do this, install cover screws loosely, partially install vibration damper, then tighten cover screws to correct torque.



6 CYL. ENGINE FRONT COVER (EXPLODED)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING RODS		
	Bearing Diam.	Clearance	Thrust Bearing	Endplay	Bearing Diam.	Clearance	Sideplay
6 Cyl.	2.4793-2.4798"	.001-.0015"	No. 1	.003-.008"	2.0948-2.0955"	.001-.0015"	.005-.015"
V8	2.4988-2.4995"	.0006-.003"	No. 1	.003-.007"	2.2483-2.2490"	.0007-.0028"	.004-.012"

VALVES

Engine		Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
6 Cyl. L-Head	Intake	1.469"	44°	45°	.078-.093"	.3407-.3412"	.0025-.004"	.340"
	Exhaust	1.281"	44°	45°	.078-.093"	.3407-.3412"	.0025-.004"	.340"
6 Cyl. OHV	Intake	1.594"	44°	45°	.060-.075"	.341-.342"	.0015-.0035"	ℚ .369"
	Exhaust	ℂ	44½°	45°	.060-.075"	.3405-.3415"	.002-.004"	ℚ .369"
V8	Intake	1.787"	29°	30°	.078-.093"	.3715-.3725"	.001-.003"	.375"
	Exhaust	1.406"	44°	45°	.093-.104"	.3715-.3725"	.001-.003"	.375"

ℂ - 1.343" Cast Iron Engine; 1.250" Aluminum Engine.
ℚ - Cast Iron Engine. .406" Aluminum Engine.

CHECKING VALVE STEM CLEARANCE

Use dial indicator to measure sideplay at end of valve stem with valve 1/16" off its seat.

VALVE STEM SEALS

6 Cyl. L-Head Engine - None used.
6 Cyl. OHV Engine & V8 Engine - Rubber deflector on valve stem on all valves.

VALVE STEM SEAL INSTALLATION (V8 ENGINES)

CAUTION - Following special procedures are for new type seals (Kit No. 3204513). See "Valve Guide & Valve Stem Seal Production Change & Installation Caution" above. Seals must be installed with extreme care to prevent damage to inner Teflon part of seal.
1) With valve installed in guide, seal protector cap (included in seal kit) **must be installed** over valve stem to protect seal from damage or dislodgment.
2) Install seal on valve stem using both thumb nails on Teflon part of seal to push seal down until it contacts valve guide. Remove protective cap.
3) Place Valve Seal Installing Tool (Perfect Circle No. VSIT-1) on seal just above metal retaining ring. Push down on seal until metal ring is positioned over recess on valve guide.
4) Compress valve spring and install keepers. *CAUTION - If valve spring over-compressed, seal will be damaged.*

VALVE GUIDE SERVICING

Cast Iron Engines - Guides are replaceable. Install guides with Tool J-1429-01 to dimensions indicated in table below and finish ream guides to correct diameter as indicated in table below.

Valve Guide Specifications

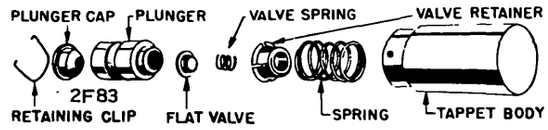
Engine	Guide I.D.	Guide Dimension
6 Cyl. L-Head	.3433-.3443" ℂ	ℚ
6 Cyl. OHV	.3433-.3443" ℂ	23/32" above head
V8	.3735-.3745" ℂ	3/4" above head

ℂ - Intake & Exhaust.
ℚ - Flush with guide bore opening in block.

Aluminum Engines - Guides are integral with cylinder head. When stem-to-guide clearance excessive, ream guide for valve with next size oversize stem. Use Reamer J-5830-1 (.003" oversize), J-5830-2 (.015" oversize), J-5830-3 (.030" oversize).

HYDRAULIC LIFTERS

See illustration for arrangement of parts.
Testing - Fill lifter body with kerosene and assemble lifter without snap ring. Check leakdown rate with suitable tester. Normal lifter should require 10-45 seconds to leak down when filled with kerosene (.125" travel with 50 lb. load).
Installation - Install lifters **without** an oil charge. They will fill themselves after 3-8 minutes of engine operation.



HYDRAULIC VALVE LIFTER (EXPLODED)

See Pages 2 to 13 for complete Car Model General Index s and Equipment Indexes

VALVE SPRINGS & LIFTERS

Engine	SPRINGS			LIFTERS	
	Free Length	℄ Pressure (Lbs.)			
		Valve Closed	Valve Open	Diameter	Clearance
6 Cyl. L-Head	.....	37-41 at 1 3/4"	75-82 at 1 7/16"	.....	.....
6 Cyl. OHV Cast Iron	.....	65-70 at 1 13/16"	115-125 at 1 7/16"	.....	.....
6 Cyl. OHV Aluminum	.....	75-85 at 1 13/16"	155-165 at 1 7/16"	.....	.....
V8	2.20"	85-91 at 1 13/16"	150-160 at 1 7/16"	.....	.....

℄ - Without Damper.

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. *See "Valve Closed" spring length in specification table.*

VALVE SPRING DAMPER NOTE: On cars with V8 engines and floor shift, a valve spring damper is installed in inside diameter of valve spring and must be removed prior to testing valve spring.



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V8 ENGINES ROCKER ARM & SHAFT ASSEMBLY

CAMSHAFT

Engine	Bearing Clearance	Camshaft Endplay	Cam Lobe Lift
6 Cyl. L-Head	.001-.003"	.004-.008"	.340"Int. .340"Exh.
6 Cyl. OHV Cast Iron	.001-.003"	.004-.008"	.262"Int. .263"Exh.
6 Cy.. OHV Aluminum	.001-.003"	.004-.008"	.254"Int. .254"Exh.
V8	.001-.003"	.003-.006"	.254"Int. .254"Exh.

CAMSHAFT & BEARINGS

Camshaft bearings are step-bored (largest at front, smallest at rear) for easy removal and installation of camshaft.

CAMSHAFT END THRUST

Taken by thrust plate between No. 1 bearing and camshaft sprocket.

CHECKING CAM LOBE LIFT

Check with dial indicator to specificati ns listed in Camshaft Table.

VALVE TIMING

Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ALDC)	Open (BLDC)	Close (ATDC)
6 Cyl. L-Head	10°	58°	49°	19°
6 Cyl. OHV	12°30'	51°30'	53°30'	10°30'
V8	12°30'	51°30'	53°30'	10°30'

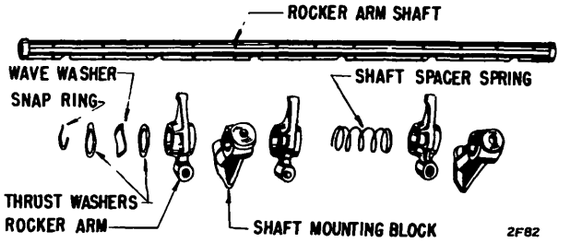
CHECKING VALVE TIMING

All 6 Cyl. Engines - Set valves on No. 1 cylinder at .003" lash. With No. 6 piston at TDC of firing stroke, timing will be correct if exhaust valve opens the same amount before DC on vibration damper as intake valve opens after DC as engine is rocked back and forth over DC.

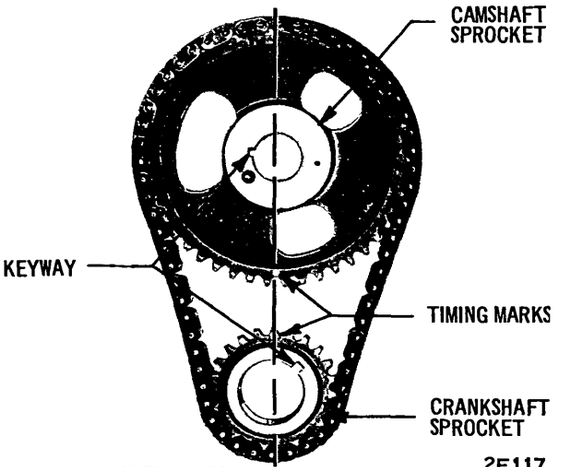
V8 Engine - Remove rocker arm cover and spark plugs. Turn crankshaft to bring No. 6 piston to TDC of compression stroke (No. 1 piston will be on exhaust stroke in overlap position). Rotate crankshaft 90° **counterclockwise.** Install dial indicator on No. 1 intake rocker arm pushrod end. Crank engine in a **clockwise** direction until dial indicator indicates pushrod movement (hydraulic lifter must be fully charged). At time indicator moves, ignition timing pointer on front cover should align with a point approximately 25/32" before TDC position on vibration damper. If mor than ½" variation in either direction, check timing chain for stretch. If chain deflection exceeds ½", replace.

ROCKER ARM ASSEMBLY

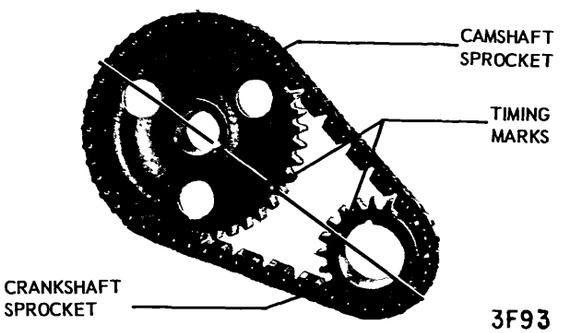
See illustrations for arrangement of parts. Rocker arms are "right" and "left" and must not be interchanged. When installing, lubricating holes in shaft must be down toward cylinder head. On V8 engines, special drilled capscrew must be installed in rear rocker arm support bracket to provide lubrication.



6 CYL. ROCKER ARM & SHAFT ASSEMBLY



V8 ENGINES VALVE TIMING MARKS



6 CYL. ENGINES VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE OILING

OIL PRESSURE

6 Cyl. Engines - 12 lbs minimum at 600 RPM, 50-58 lbs. maximum (L-Head & Cast Iron OHV). 15 lbs. minimum at 600 RPM, 60-65 lbs. maximum (Aluminum OHV).

V8 Engines - 10 lbs. minimum at 600 RPM, 55-60 lbs maximum.

PRESSURE REGULATOR VALVE

6 Cyl. L-Head & Cast Iron OHV - In cylinder block where oil enters oil distribution channel. Not adjustable. *NOTE - The two relief valves in valve body (pump cover) on "E-Stick" cars are for "E-Stick" operation only.*

6 Cyl. Aluminum OHV - In oil pump cover. Not adjustable.

V8 Engines - In oil pump body. Not adjustable.

ENGINE LUBRICATION

6 CYL. CAST IRON ENGINES

Description

Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and valve mechanism on cylinder head (Overhead Valve Engines only). All other parts are lubricated by oil spray.

Operation

Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage around pump body hub to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve under plug on right side of crankcase regulates pressure by bypassing oil from main oil gallery back into oil pan Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects lower part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

Valve Lifters, Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings.

Rocker Arms, Pushrods & Valve Stems (Overhead Valve Engine) - Oil tube connected to main oil gallery (at front of engine) and to fitting on side of cylinder head (at forward end directly above No. 1 spark plug) supplies oil to passage in cylinder head and through front rocker arm shaft support block to hollow rocker shaft. Rocker shafts have drilled oil holes at each rocker arm. Rocker arms are drilled (upper hole in arm allows oil to run down flat machined surface to each end of arm for pushrod and valve stem lubrication).

6 CYL. ALUMINUM ENGINES

Description

Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, valve lifters, and valve mechanism on cylinder head. All other parts lubricated by oil spray.

Operation

Gear type oil pump mounted externally on right side of crankcase. Pump draws oil through fixed strainer and intake pipe in oil pan (intake passage in crankcase registers with intake port in mounting face of pump body) and delivers oil through passage in pump body to main oil gallery which extends along right side of crankcase. Oil pressure regulator valve in pump cover regulates pressure by bypassing oil back into oil intake passage Oil is distributed through main oil gallery as follows:

Crankshaft & Camshaft Bearings - Oil passages in crankcase webs supply oil from main oil gallery to each camshaft and crankshaft bearing (passage intersects upper part of camshaft bearing bore and extends past this point to main bearing bore).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

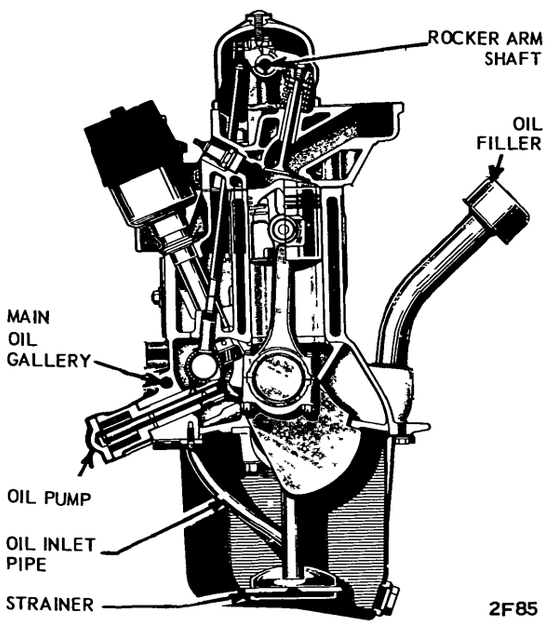
Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from oil hole in each side of connecting rod when these holes register with oil hole in connecting rod journal (these squirt holes are located 24° and 29° from rod center line).

Timing Chain & Sprockets - Lubricated by oil metered by front camshaft bearing.

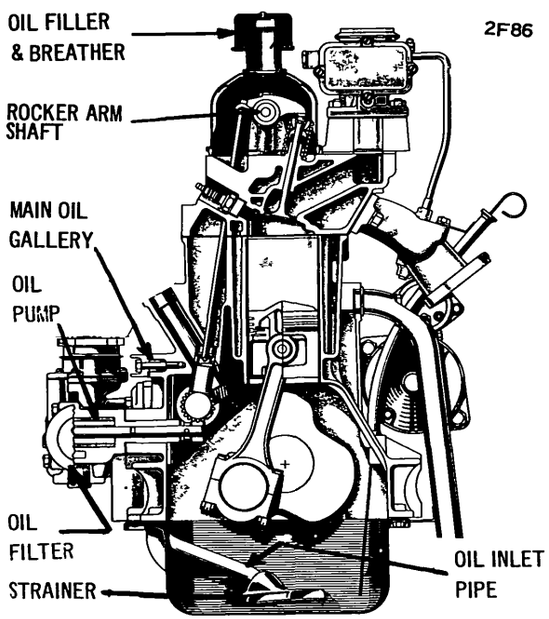
Cam Lobes, Distributor & Oil Pump Drive Gears - Lubricated by spray and oil mist thrown off by connecting rod and crankshaft bearings .

Rocker Arms, Pushrods, & Valve Stems - An oil gallery (vertical) located in right front corner of cylinder block distributes oil from main longitudinal oil gallery, through the hollow locator pin into the cylinder head where a pair of drilled passages connect into the front valve rocker arm support block and into the hollow rocker arm shaft. Each rocker arm is drilled to direct oil to flat machined surface of top, then to each pushrod, valve stem and spring. Holes on top of cylinder head drain oil back into oil pan.

Valve Lifters - Ports in main oil gallery supply lubrication to valve lifters.



6 CYL. CAST IRON ENGINE OILING SYSTEM



6 CYL. ALUMINUM ENGINE OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

V8 ENGINES

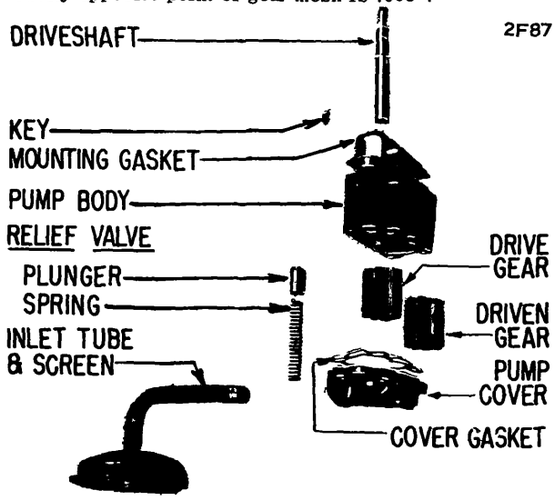
Refer to illustration and note the following:

1) Main oil gallery feeds two lifter galleries located on each side of main gallery and extending full length of block, through grooved channel in rear face of camshaft thrust plate which serves as a cover for the galleries on front face of engine block.
2) Special drilled bolts are used in **rear** rocker shaft bracket bolt holes in block to permit oil to flow upward, through and around undercut bolt stem, and through bracket to hollow rocker arm shaft.

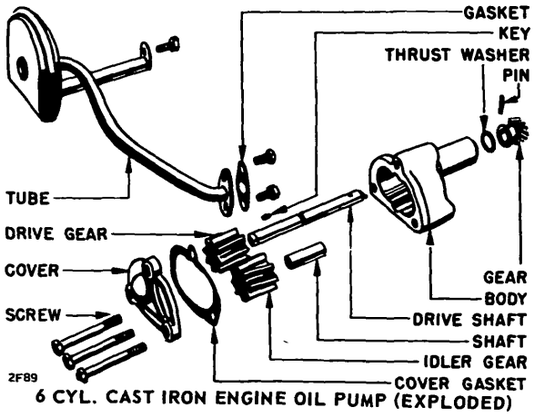
OIL PUMP

6 Cyl. Eng. - See illustration below. Prime new or reassembled pump before starting engine by removing relief valve plunger and filling pump with oil.

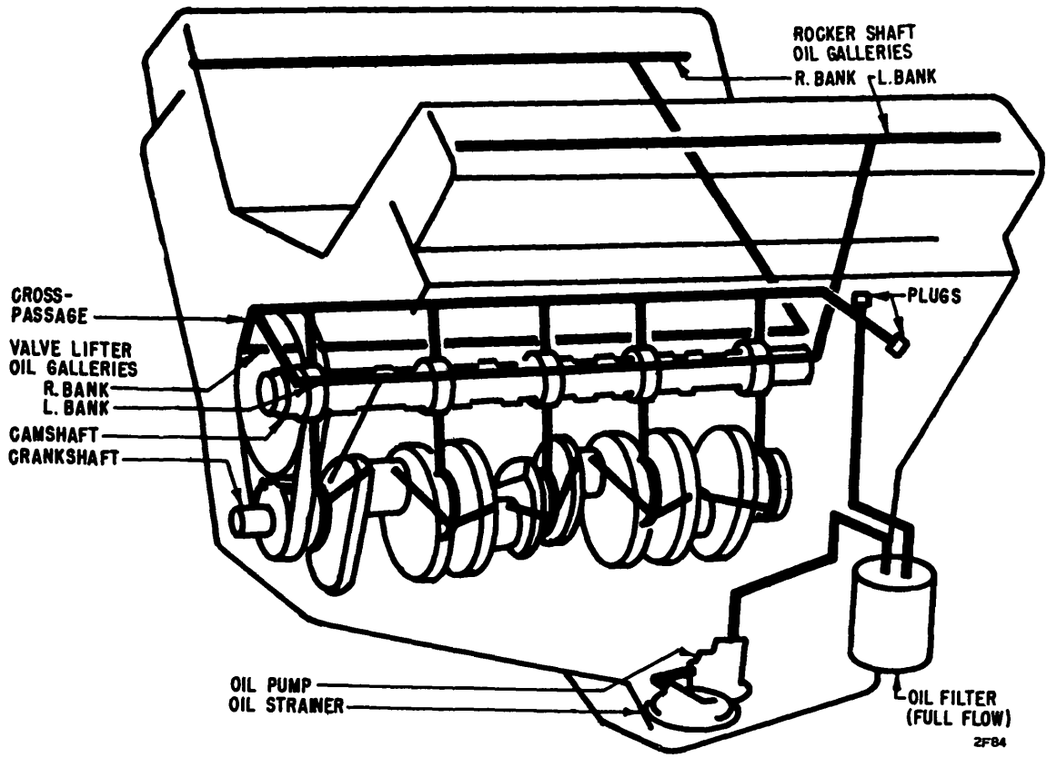
V8 Engines - 1) Gear-to-cover clearance should not exceed .004".
2) Maximum clearance between gears and walls of gear cavity opposite point of gear mesh is .008".



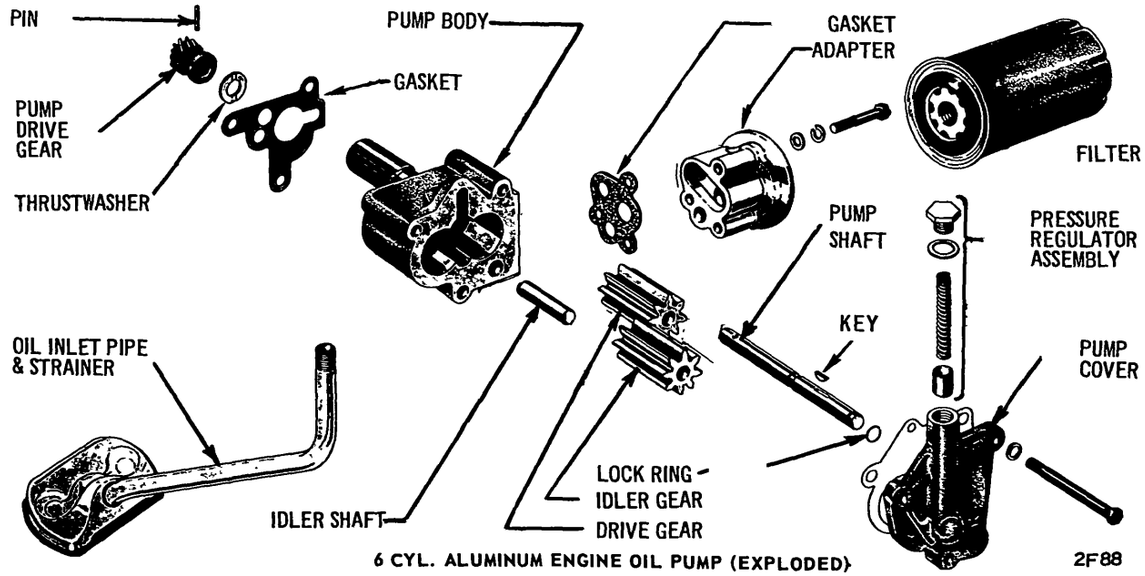
V8 ENGINES OIL PUMP (EXPLODED)



6 CYL. CAST IRON ENGINE OIL PUMP (EXPLODED)



V8 ENGINES OILING SYSTEM



6 CYL. ALUMINUM ENGINE OIL PUMP (EXPLODED)

OIL FILTER

6 Cyl. Cast Iron Engines - Partial flow type mounted on bracket on engine. Intake pipe is connected to main oil gallery and return pipe is connected to fitting on crankcase.

6 Cyl. Aluminum Engine - Full flow type externally mounted on adapter on oil pump body.

V8 Engines - Full flow type mounted on pad on left side of engine block. Bypass valve located in filter adapter on filter pad. Bypass valve allows oil to flow directly to outlet passage.

CAPACITIES

	American	Classic	Ambassador
Crankcase ①	4 qts.	4 qts.	4 qts.
Cooling System ②	11 qts. (L-Head)	9.5 qts.	18 qts.
	10 qts. (OHV)		
S.M. Trans.	1.5 pts.	④ 1.5 pts.	4 pts.
O.D. Trans.	2.75 pts.	⑤ 2.75 pts.	4 pts.
Auto. Trans.	9 qts.	9 qts.	11 qts.
Rear Axle	3 pts.	3 pts.	4 pts.
Fuel Tank	20 gal.	③	③

① - Add 1 quart with filter change.
② - Add 1 quart with heater.
③ - Sedans & 2-Seat Wagons 19 gal.; 3-Seat Wagons 17 gal.
④ - 6 Cyl. 2¼ pints with V8 Engine.
⑤ - 6 Cyl. 3½ pints with V8 Engine.

ENGINE COOLING

Pressure Valve - 13 lb. radiator filler cap (all models).
Thermostat - 195° type (all models). In water outlet housing.

WATER PUMP (ALL MODELS)

Packless, sealed ball bearing type. Serviced as an assembly only.

FILTERS & CLEANERS

	Check or Clean -MILES-	Replace or Service
Oil Filter		4,000
Air Cleaner (Oil Bath)	4,000	12,000
(Dry Type)	4,000	25,000
Oil Cap Filter		4,000
Fuel Filter		12,000

REPLACING OIL FILTER

Throw-away type. Tighten only by hand when installing.

SERVICING AIR CLEANER (DRY TYPE)

Shake dirt out. Do not wet element with any type liquid.

MODEL IDENTIFICATION

Car Model	Series Designation
American	6301
Classic	6310
Ambassador	6380

SERIAL NUMBER

On plate on top of right front wheelhouse panel under hood.

CAR BUILD SEQUENCE NUMBER

On bottom of body number plate. Plate located on left front door body hinge pillar on American; on left front door below door lock on Classic and Ambassador. Number not used for licensing.

ENGINE CODE NUMBER

On 6 Cyl., on machined pad on upper left corner of cylinder block. On V8, on tag on alternator mounting bracket. Number not used for licensing. *See ENGINE DATA for engine identification letters.*

ENGINE IDENTIFICATION MARKS

Stamped under engine code number. Indicate equipment or deviations (in production) from standard specifications. *See Engine Data.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

For Tune-Up on "Cleaner Air Pkg. (C.A.P.)" Cars, See Page 35

COMPRESSION PRESSURE

170" Engine ..... 110-140 psi
225" Engine ..... 110-140 psi
Maximum variation between cylinders 20 psi.

VALVE TAPPET CLEARANCE

170" Engine ..... .010" Int., .020" Exh.
225" Engine ..... .010" Int., .020" Exh.

SPARK PLUGS

Gap (All) ..... .035"
Torque (All) ..... 30 ft. lbs.
Spark Plug Type ..... Champion N-14Y

DISTRIBUTOR

Point Gap (All) ..... .017-.023"
Cam Angle (All) ..... 40-45°
Breaker Arm Spring Tension (All) ..... 17-20 ozs.
Condenser Capacity (All) ..... .25-.285 mfd.

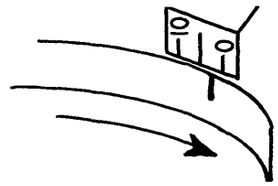
IGNITION TIMING

Set at 550 RPM with vacuum line disconnected.
All Models ..... 2½° BTDC

IDLE RPM

All Models ..... 550 RPM
Lights and Air Cond. ON.

►*IDLE SETTING CAUTION:* On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank. After idle adjustment, screw ball joint connector up or down until ball on bellcrank mates with socket. Snap into place.



3A101

IGNITION TIMING MARKS

FAST IDLE RPM

Engine hot and screw on second step of cam.

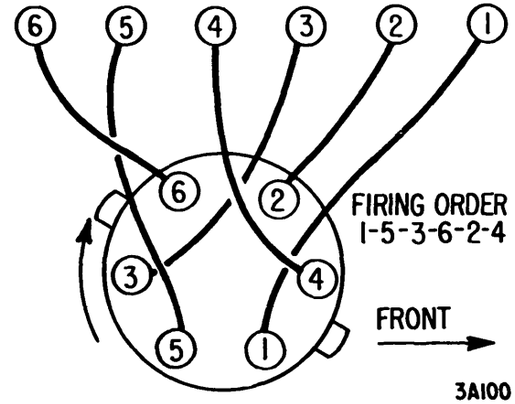
Engine	Carburetor	Transmission	RPM
170	Holley 1920	All	1500
170 (Exc. Taxi)	Carter BBS	Synchro-mesh	1500
170 (Exc. Taxi)	Carter BBS	Auto. Trans.	1400
170 (Taxi)	BBS 3287S	All	1400
170 (Taxi)	BBS 3236S	Synchro-mesh	1300
170 (Taxi)	BBS 3236S	Auto. Trans.	1400
225	Holley 1920	All	1500
225 (Exc. Taxi)	Carter BBS	All	1400
225 (Taxi)	BBS 3236S	Synchro-mesh	1300
225 (Taxi)	BBS 3236S	Auto. Trans.	1400
225	Stromberg	Auto. Trans.	1400

AUTOMATIC CHOKE SETTING

Do not change choke setting.
Carter ..... 4 Rich
Holley 1920 ..... 2 Rich
Stromberg ..... 2 Rich

FUEL PUMP PRESSURE & VOLUME

All Models ..... 3½-5 psi
Volume 1 qt. in 1 minute at 500 RPM.



3A100

FIRING ORDER

MANIFOLD HEAT CONTROL VALVE

Apply Manifold Heat Control Valve Solvent to each end of valve shaft (manifold cool) every 6 months or under adverse driving conditions.

CRANKCASE VENTILATION VALVE

Remove and clean valve and cap assembly every 6 months or 8000 miles (except Police and Taxi), at every Oil Change (Police and Taxi). If necessary, disassemble valve to clean. Free height of valve spring is 9/16".

TUNE-UP NOTES

►*STROMBERG WA CARB. EQUIPPED CARS HARD STARTING, STUMBLING (REPEATED STOPPING AFTER STARTING) CORRECTION:* See Stromberg WA Carburetors in Carburetion Section.

►*ENGINE CROSS-FIRE ON FIRST START (CAUSING STARTER DAMAGE) CORRECTION:* Replace distributor cap, rotor and cable with MoPar package No. P/N 2448273.

►*SPARK PLUG INSTALLATION CAUTION:* Spark plug gaskets are NOT required when installing plugs on 1963 six cylinder engines (counterbore added to plug holes in head). Replace spark plug tube seals each time plugs removed to prevent oil leakage past the seal.
NOTE - Spark plug gaskets should continue to be used on 1960-62 engines with Champion plugs.

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Chrysler 2098665

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	375-525	0	5-7.1
0-2.5	525	3-6	8.5
8-10	1010	6-8.5	10
12.5-14.5	2200		

For engine degrees and RPM, multiply by 2

Chrysler 2098670

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	390-560	0	4.9-7.1
0-2	560	3-5	10.5
6-8	1080	5.25-7.5	13
10.5-12.5	2500		

For engine degrees and RPM, multiply by 2.

Chrysler 2098675

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	325-475	0	5-7.1
0-8	475	3-6	8.5
7-9	610	6-8.5	10
12.5-14.5	2200		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms at 70-80°F
Primary Resistance (Chrysler 1688212)	1.65-1.79
(Autolite 200567)	1.65-1.79
(Chrysler 2095223)	1.41-1.55
(Essex 62-160-2)	1.41-1.55
Secondary Resistance (Chrysler 1688212)	9400-11700
(Autolite 200567)	9400-11700
(Chrysler 2095223)	9200-10600
(Essex 62-160-2)	9200-10600
Ballast Resistor (Chrysler 2095501)	0.5-0.6
Current Draw	1.9 amps. idling, 3.0 amps. stopped

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CARBURETOR

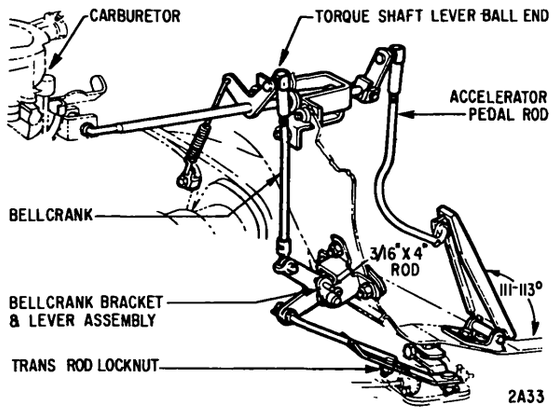
Carburetor	Fl at Level	Choke Setting
Carter BBS 3236S; 3287S, SA 3462S, 3463S, 3464S	① 9/32"	4 Rich
3465S, 3466S, 3468S, 3590S	① 7/32"	4 Rich
	① 7/32"	4 Rich
Holley R-2533A, 2534A	② 11/16"	2 Rich
2535A, 2536A, 2537A, 2538A	② 11/16"	2 Rich
Stromberg WA 3-219	③ 11/32"	2 Rich

① - Between top of each float ridge (at center of float) and top surface body casting.
② - With engine running (vehicle level), measure through economizer hole (diaphragm opening) using 6" scale with depth gauge. Measure from machined surface of opening.
③ - Use Tool 73725 or "T" scale to measure from surface of fuel bowl (gasket removed) to top of float at center.

ACCELERATING PUMP SETTING

Carburetor	Seasonal Setting
Holley 1920	none
BBS & WW 3	Center hole (normal) -Medium stroke
	Nearest - Short Stroke
	Furthest - Long Stroke

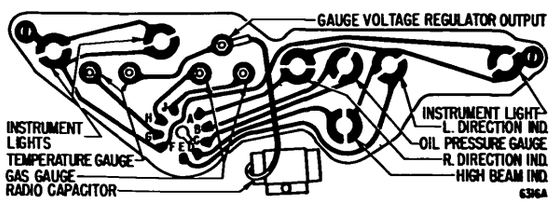
►*NOTE: On BBS and WW 3 carburetors be sure to move bowl vent hairpin clip on pump stem correspondingly.*



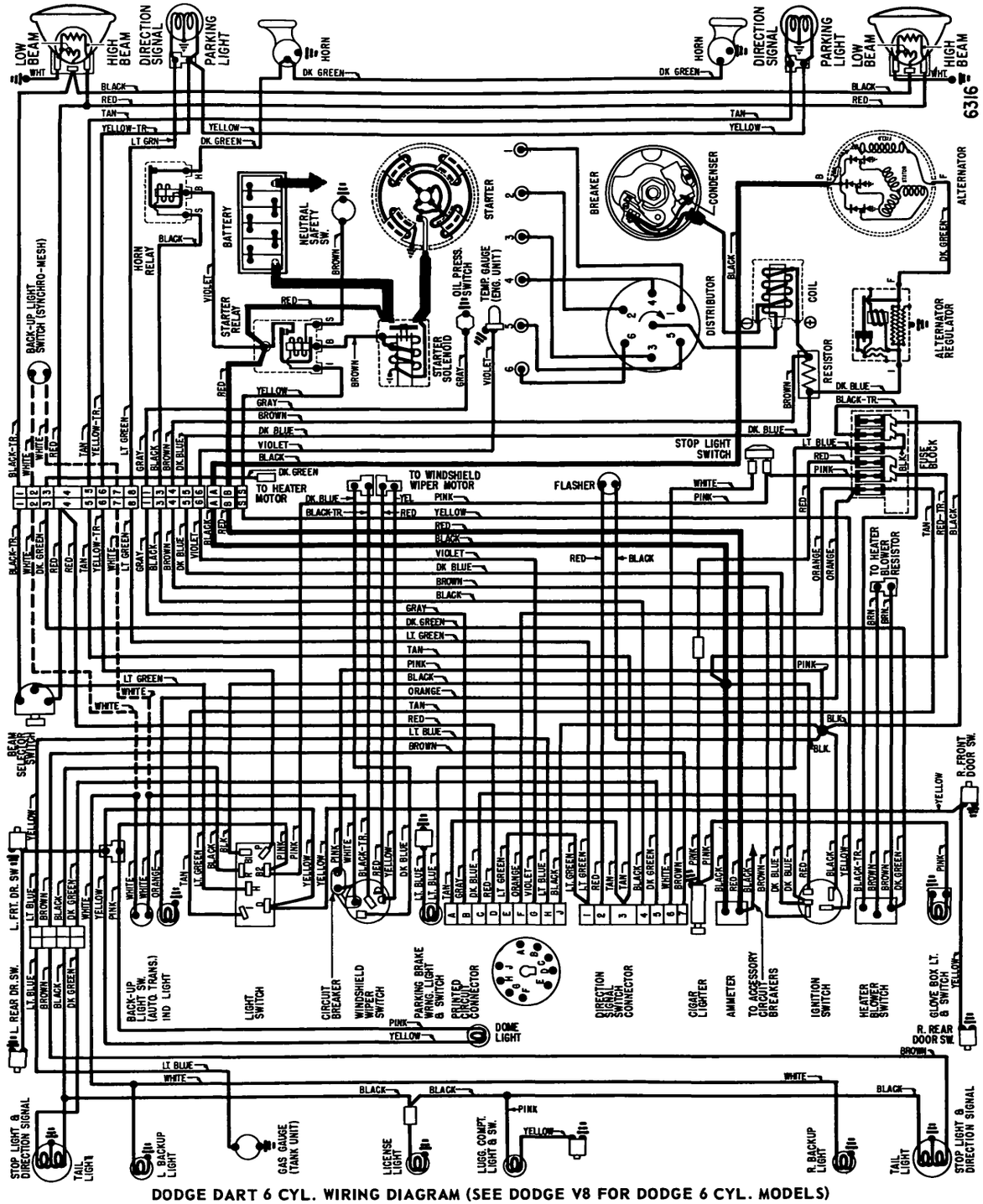
AUTOMATIC TRANSMISSION THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT

1) With linkage parts in place and ball joint socket to ball end at torque shaft bellcrank disconnected, lubricate outside surface of carburetor lever isolator grommet, torque shaft at firewall mounted plastic bushing, and ball stud on torque shaft rear lever (inside car).



DART PRINTED CIRCUIT



DODGE DART 6 CYL. WIRING DIAGRAM (SEE DODGE V8 FOR DODGE 6 CYL. MODELS)

2) Disconnect choke at carburetor or block choke valve fully open. Release fast idle cam.
3) With locknut loose in transmission rod, insert a 3/16" diameter rod (about 4" long) in transmission rod bellcrank bracket and lever assembly holes.
4) Move transmission lever forward against its stop and tighten transmission rod locknut.
5) Disconnect top end of accelerator pedal rod. Adjust rod length to provide 111-113° pedal angle. Reinstall top end of rod.
6) Remove 3/16" rod, then adjust length of transmission bellcrank to torque shaft rod (screw adjustment at top end). *NOTE - Corr ct rod length allows ball socket to lin up with ball nd when rod held upward against transmission stop.*
7) Install ball socket on torque shaft lever ball end. Connect choke rod or remove blocking fixture.

ELECTRICAL

BATTERY

12 Volt

Capacity - 38 Amp Hr (170" Eng), 48 Amp Hr (225" Eng) at 20 Hr Rate *NOTE* - 48 Amp Hr battery used on all cars with MDT-7009 Starter
Battery Gr und - Negative

STARTER

Pr st lite MDT-7009

Torque	RPM	Volts	Amperes
0 ft lbs	3600	10 0	56
8 5 "	Lock	4 0	350

Chrysl r 2098500

Torque	RPM	Volts	Amperes
0 ft. lbs.	2950	11	90
	Lock	4	340-420

Brush Spring T nsi n - 32-48 ozs.

ALTERNATOR

Chrysler N.	Amps.	Volts	Engine RPM
2098835	23.0-29.0	15	1250
2098830	31.5-37.5	15	1250

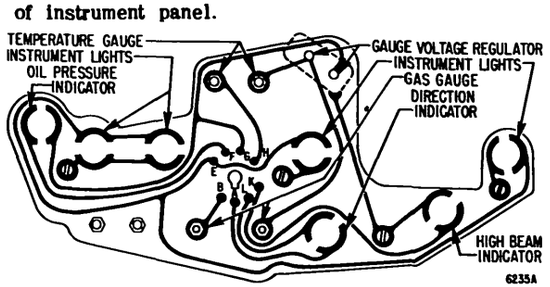
ALTERNATOR REGULATOR

Chrysl r N.	Setting (70°F)	Air Gap
2098300	13.7-14.3 Volts	.048-.052"

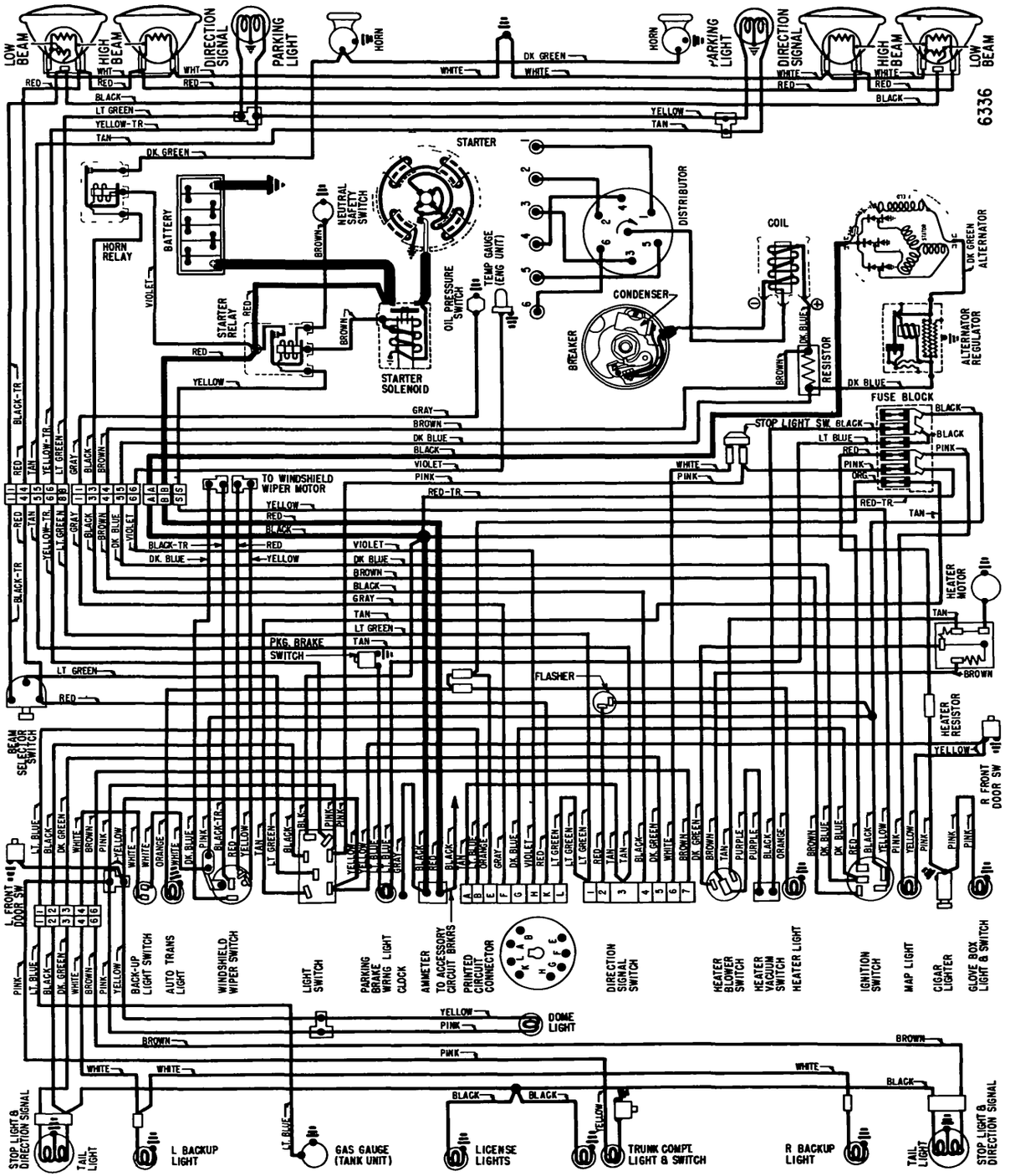
FUSES & CIRCUIT BREAKERS

JUNCTION BLOCK FUSES

Fuse Junction Block located at center, forward edge of instrument panel.



PLYMOUTH 6 CYL. PRINTED CIRCUIT



PLYMOUTH 6 CYL. WIRING DIAGRAM

IN-LINE FUSES

Rear window defroster, trunk light, back-up lights. Back-up lights also protected by windshield wiper circuit breaker.

CIRCUIT BREAKER

Windshield Wipers - Integral with wiper switch
Lighting System - Integral with headlight switch
Others - Located behind left front kick panel

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Located on transmission case Starter operates only when Neutral pushbutton depressed To adjust, make certain control cable properly adjusted, drain about 2 qts oil from transmission unscrew switch from transmission case, make certain switch operating lever aligned with center of switch mounting hole Screw switch into case (with cupped washer and "O" ring in place) until test lamp connected to switch terminal lights, tighten switch additional 1/4-3/8 turn *CAUTION- Switch must be tight to prevent oil leaks If necessary, add thin washer and readjust switch*

LIGHTING SWITCH REMOVAL

All Models - Disconnect battery Pull switch knob out and rotate it until flat on shaft is down Push knob in all the way Disconnect wires, press spring-loaded release button on top center of switch pull shaft and knob out of switch Remove switch mounting bezel on panel and remove switch

STOP LIGHT SWITCH ADJUSTMENT

Mounted on brake pedal lever bracket Adjust position of switch so stop light goes on in first 1/8" of pedal pushrod travel

TURN SIGNAL FLASHER

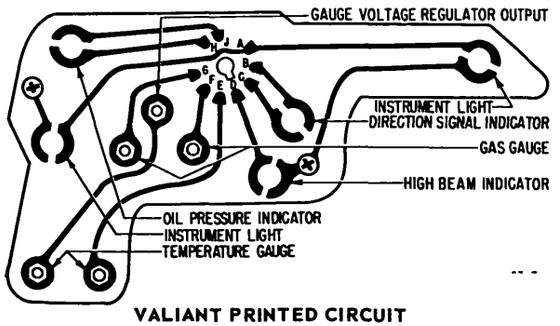
Located behind instrument panel on left side

INSTRUMENT CLUSTER REMOVAL

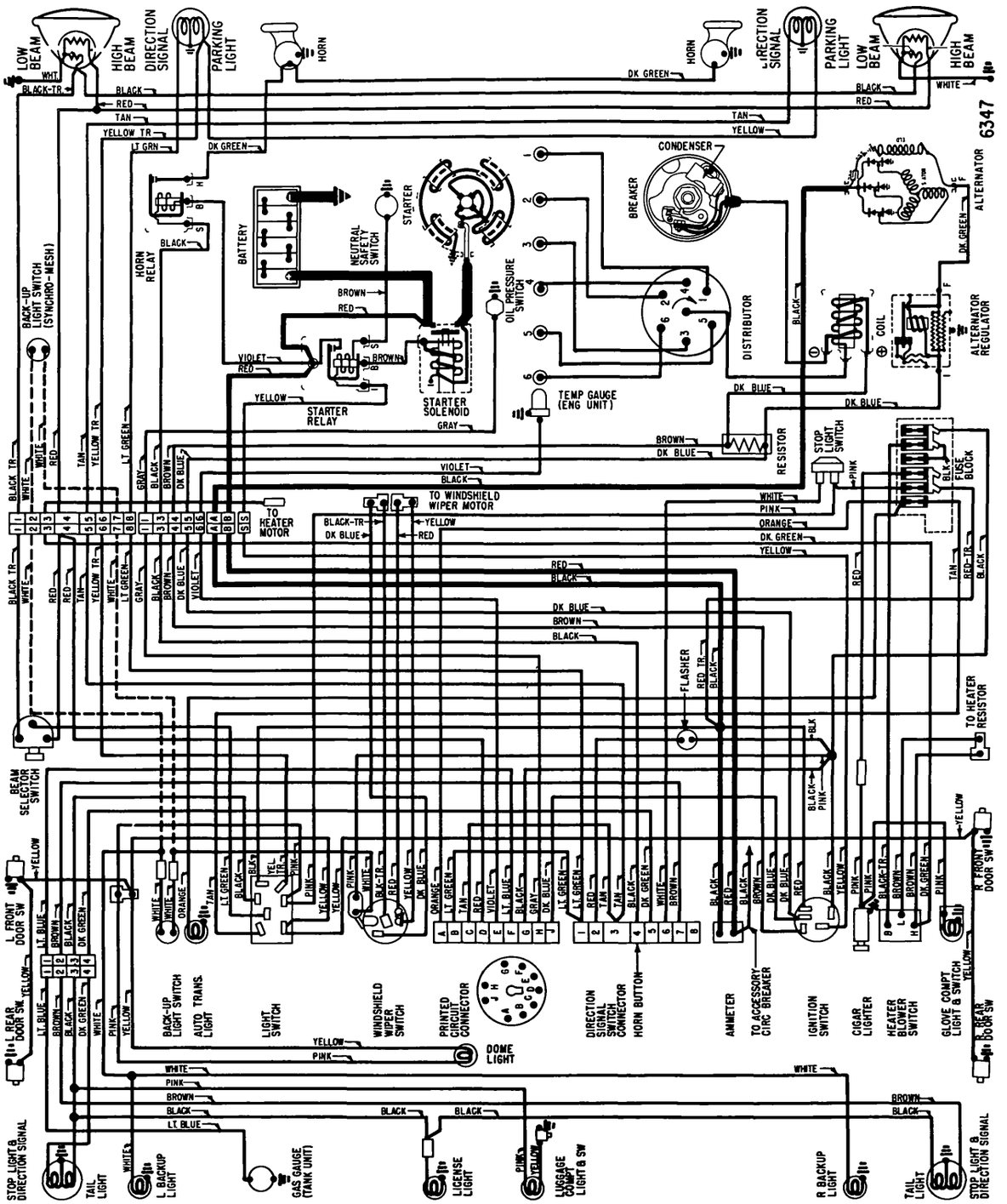
Dart & Valiant - Remove battery negative cable Loosen steering column clamp screws several turns and lower steering column slightly Disconnect speedometer cable Remove four screws on face of cluster and pull cluster forward Tilt cluster downward and to the right and disconnect all lead wires Remove cluster

Plymouth - Remove battery negative cable Remove temperature control knob and disconnect speedometer

(Continued)



VALIANT PRINTED CIRCUIT



VALIANT WIRING DIAGRAM

cable Remove four screws on cluster face Pull cluster forward and tilt it downward Disconnect lead wires Remove cluster

D dg (Exc pt Dart) - Remove battery negative cable Remove wiper switch knob and retaining bezel Pull headlamp knob to full OUT position and depress spring-loaded button on switch (under instrument panel) With button held down pull out headlamp knob and stem assembly Remove heater or air conditioning control knob Remove sleeve on this lever Remove four screws on cluster trim remove trim plate and remove two lower cluster screws Remove four screws on cluster face and pull cluster forward out of housing Disconnect speedometer cable Roll cluster downward and forward then disconnect wires and remove light sockets Remove cluster

SPEEDOMETER HEAD REMOVAL

Instrument cluster must be removed from vehicle (see above) Disassemble cluster assembly and remove speedometer head

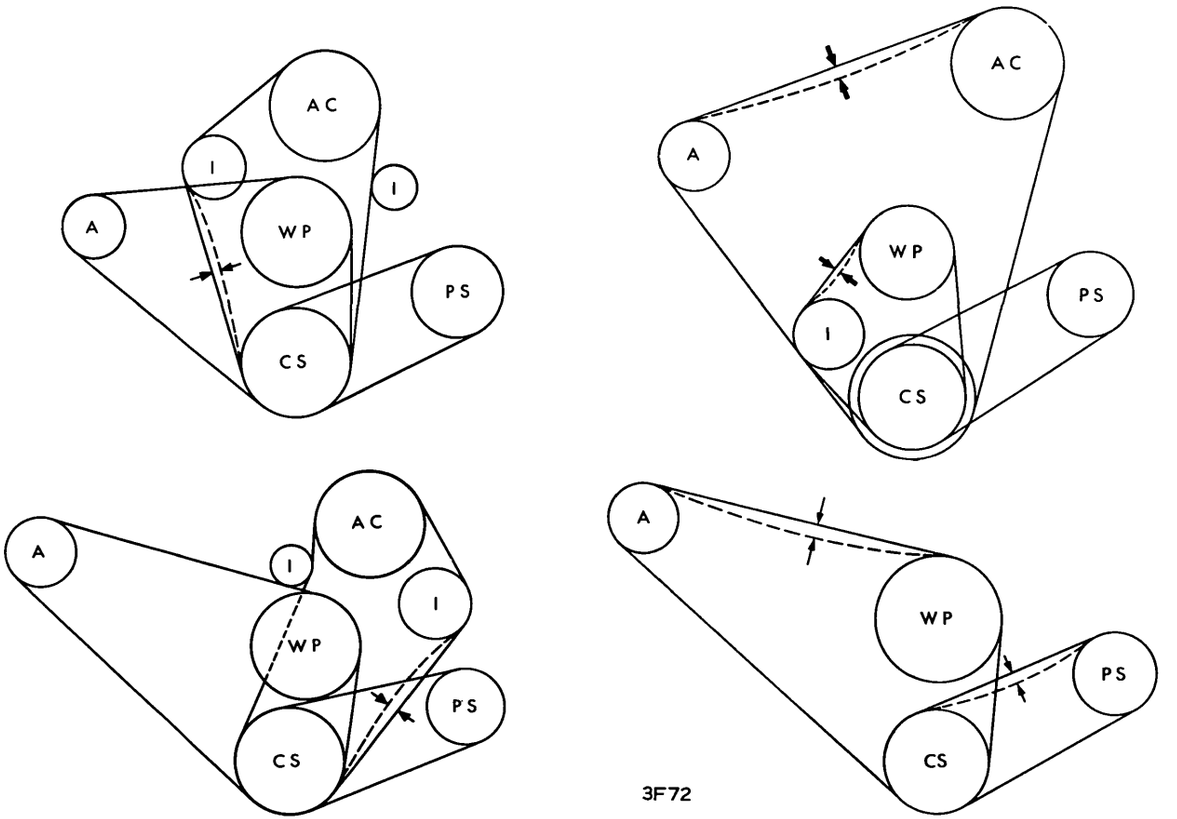
PRINTED CIRCUIT REMOVAL

Instrum nt cluster must be removed from vehicle (see ab ve) Disassemble cluster assembly and remove circuit board

BELT ADJUSTMENT

Deflection applied at belt midpoint under 5 lb. load (see illustration)

B lt	170" Engine Us d	170" Engine New	225" Engine Used	225" Engine New
Power Steering	1/8"	1/16"	1/8"	1/16"
Alternator				
Less Air Cond	1/4"	5/32"	1/4"	1/8"
With Air Cond		1/8"	1/4"	1/8"



BELT DEFLECTION CHECKING POINTS (ALL ENGINES)

ENGINE

ENGINE NUMBER MARKINGS

LC - Low compression engine.
HC - High compression engine.
HP - High performance engine.
MP - Maximum performance engine.

NOTE: Ab v l tters stamped on engine number pad.

"Maltese Cross" located on top pad (front right side of block) indicates .001" undersize crankshaft journals (**M** and **R** plus a number stamped on crankshaft counterweight indicates which **Main** and **Rod** journals are undersize)

X located on top pad (front right side of block) indicates .010" undersize crankshaft journals (**M-10** and **R-10** stamped on crankshaft counterweight indicates all rod and main journals are undersize)

A located on top pad (front right side of block) indicates .020" oversize cylinder bores

♦ plus a number located on top pad (front right side of block) indicates .008" oversize lifters (number indicates which lifter).

"o/s" located on front of head of thermostat boss indicates .005" oversize valves.

GENERAL SPECIFICATIONS

Engin	HP at RPM	Compressi n Rati	B r	Strok	Displacem nt
170"	101 at 4400	8.2-1	3.400"	3.125"	170 cu. ins.
225"	145 at 4000	8.2-1	3.400"	4.125"	225 cu. ins.

TIGHTENING SPECIFICATIONS

	Ft. lbs.
Cylinder Head	65
Exhaust Manifold	10
Intake-to-Exhaust Manifold	15
Oil Pan	*200 inch lbs*
Main Bearing Cap (Cast Iron Eng)	85
(Aluminum Eng)	50
Rear Main Bearing Seal Retainer	30
Connecting Rod Cap	45
Camshaft Sprocket	35
Rocker Shaft Support Bracket	30
Rocker Arm Cover	*40 inch lbs*
Engine Front Cover	15
Water Pump	30
Oil Pump Attaching Bolt	*200 inch lbs*
Oil Pump Cover	*130 inch lbs*
Oil Filter Stud	30
Engine Front Mount-to-Frame Nut	85
Engine Front Mount-to-Block Nut	45
Engine Rear Mount Bolts	35
Converter Brace-to-Engine Block	30

ALUMINUM ENGINE SPECIFICATIONS

Same as for Cast Iron Engine except where noted.

ALUMINUM ENGINE SERVICE CAUTIONS

Extreme caution must be observed when working on aluminum engines to prevent damage to aluminum parts. Note the following:

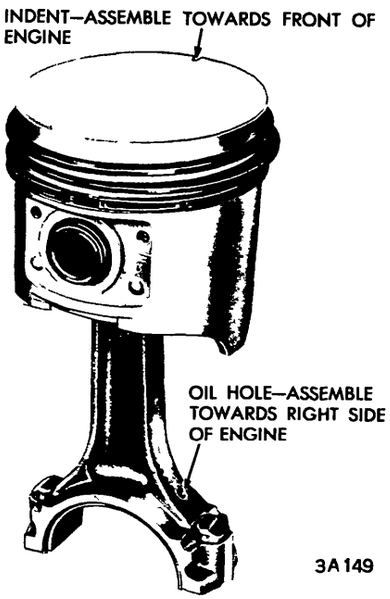
1) Do not drop or slide machined surfaces.
2) Do not use gasket cement except where indicated.
3) Lubricate all bolts or screws entering aluminum parts. Use engine oil or special thread lubricant on all threads.
4) Tighten bolts and nuts to specified torque. DO NOT OVERTIGHTEN. Torque values are for clean lubricated threads.

ALUMINUM ENGINE THREAD REPAIR

To repair aluminum engine damaged threads, use "Heli-Coil" tool and inserts.

ENGINE REMOVAL

1) Remove hood, drain cooling system, remove battery and air cleaner.
2) Remove radiator (plug transmission oil cooler lines). Remove crankcase vent system and disconnect all lines, wires, cables, and linkages from engine.
3) Disconnect exhaust pipe from manifold, remove clutch torque shaft, brake cables and rods.
4) Remove speedometer cable, gear shift rods, transmission oil cooler lines and filler tube (drain system first), and push button cable.
5) Support rear of engine and remove transmission.
6) Attach lifting fixture to cylinder head and disconnect engine front mounts. Remove engine.



CAST IRON ENGINE PISTON & ROD ASSEMBLY

OIL PAN REMOVAL & INSTALLATION

Hoist vehicle and drain oil. Using tie rod end puller Tool C-3742, remove steering and idler arm ball joints from steering linkage center link. Proceed as follows:

Dart & Valiant - 1) Remove dust shield and front motor mount stud nuts.
2) Lower car and remove horns (and brackets), then disconnect battery negative cable.
3) Install engine lifter plate Tool C-3804 and fixture Tool C-3809. Raise engine 1½-2". Raise car on hoist and remove oil pan.
4) To install oil pan, reverse removal procedure.

Dodge & Plymouth - 1) Remove dust shield.
2) Remove oil pan attaching bolts, rotate crankshaft to clear counterweights and remove oil pan.
3) To install oil pan, reverse removal procedure.

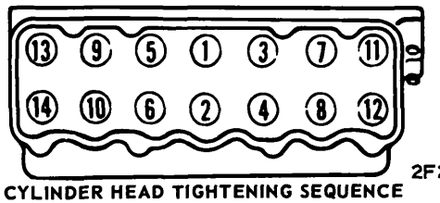
CYLINDER HEAD INSTALLATION

Coat new gasket with suitable sealer, install gasket and head over dowels in block. Tighten all cylinder head bolts in sequence shown in diagram to specifications, then retighten all bolts again to specifications. *CAUTION - Aluminum engine gasket must be installed with copper side down.*

ALUMINUM ENGINE NOTE - Cylinder head is interchangeable with Cast Iron engine head (not interchangeable with previous cast iron engine heads). Head bolts are longer (4 15/16") and use of shorter bolts may damage aluminum block.

MANIFOLD ASSEMBLY

Loosen three intake manifold-to-exhaust manifold bolts before installing assembly. Install manifolds on cylinder head with cup side of conical bolt washers against manifold. Tighten nuts to specifications. Tighten intake manifold-to-exhaust manifold bolts to specifications.

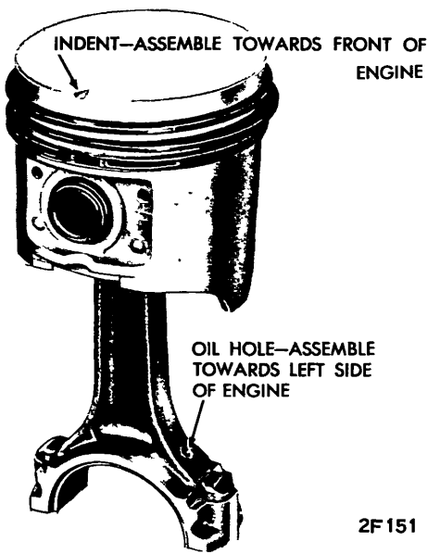


CYLINDER HEAD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

PISTON	PISTON PIN		PISTON RINGS		
Clearance ①	Piston Fit	Rod Fit	Ring	② End Gap	Side Clearance
.0005-.0015"	③ .00045-.00075"	④ .0007-.0012"	Compr. Oil	.010-.020" .015-.062"	.0015-.0040" .009" Maximum

① -Measured at top of skirt. ② - Measured 2" from bottom of cylinder bore.
③ - Sliding fit at 70°F. ④ - Interference fit.



ALUMINUM ENGINE PISTON & ROD ASSEMBLY

FITTING PISTON

With piston and cylinder wall clean and dry, clearance between top of skirt and cylinder wall should be .0005-.0015". Measure 90° to piston pin axis. Cylinder bores on used engines should be measured halfway down cylinder bore and 90° to crankshaft centerline.

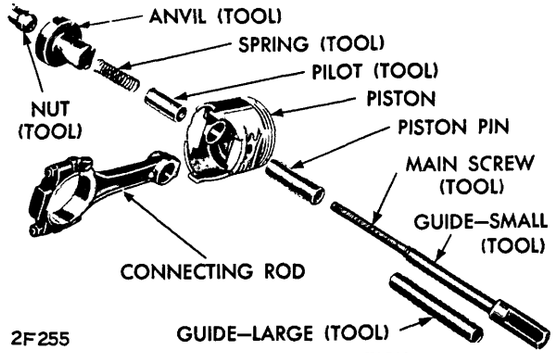
► *CONNECTING ROD INSTALLATION CAUTION:* **Cast Iron Engines** - Rods must be installed with oil squirt hole toward right or valve chamber side of engine (reversed from previous models) for improved lubrication. Numbers on rods should be toward right (visible from below). Notch on piston head should be toward front of engine (unchanged).

Aluminum Engines - Install rods with oil squirt hole toward left side of engine and pistons with notch in head toward front (unchanged from previous models).

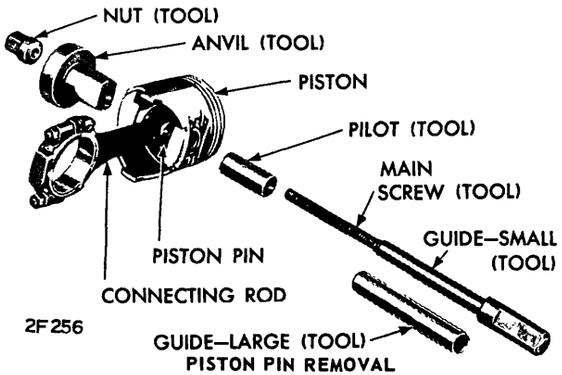
PISTON PIN REMOVAL

Press fit in rod. *See CONNECTING ROD INSTALLATION CAUTION below.* To install, lubricate pin bores and use Tool C-3724 shown in illustration. Press pin in until pin bottoms on pilot. To test for proper fit, assemble piston and rod with tool in same manner as for pin removal (see illustration). Clamp screw shaft end of tool in a vise. With torque wrench at nut (anvil end of tool,) apply 15 ft. lbs. torque. If pin does not move, the fit is correct. If pin moves in rod, replace rod.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



PISTON PIN INSTALLATION



PISTON PIN REMOVAL

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

MAIN BEARINGS				CONNECTING ROD BEARINGS		
Journal Diameter	Clearance	Thrust Bearing	Endplay	Journal Diameter	Clearance	Sideplay
2.7495-2.7505"	.0005-.0015"	No. 3	.002-.007"	2.1865-2.1875"	.0005-.0015"	.006-.012"

REAR MAIN BEARING OIL SEAL INSTALLATION

In Block - Install seal in block so both ends protrude Tap seal into position using Tool C-3743 (bridge removed) until tool seats in bearing bore. Hold tool in this position and cut off portions of seal that extend above block.

In Bearing Cap - Install seal in retainer so ends protrude. Install bridge on Tool C-3743 and tap seal into position until tool seats. Trim off portion of seal that protrudes above cap. Install two side seals in grooves in retainer. When installing retainer, torque to specifications.

MAIN BEARING REPLACEMENT (ALL ENGINES)

Original equipment bearings in cast iron and aluminum engines have different oil hole locations and must NOT be interchanged (replacement bearings have two oil holes and are interchangeable). Bearings are interchangeable in an engine only as follows: No. 1,2,4 lower bearings; Nos. 2 & 4 upper bearings. No. 1 upper bearing is chamfered on tab side (red marking on edge) and must be installed with chamfer forward to provide timing chain lubrication. Bearing caps are not interchangeable and should be numbered before removal.

MAIN BEARING CAP REPLACEMENT (ALUMINUM ENGINE)

Upper and lower cast iron bearing caps are line-bored and must be replaced as complete matched sets Install caps in numbered position (stamped and cast numbers on caps) with bearing tabs on left side of engine.

ENGINE FRONT COVER

Removal - Remove radiator and fan, pull vibration damper using Tool C-3722 or suitable puller, loosen oil pan bolts to provide clearance between pan and lower flange of cover, remove timing chain cover.
Installation - Install cover and tighten cover bolts to specifications. Check condition of oil pan front gasket, tighten oil pan bolts to specifications.

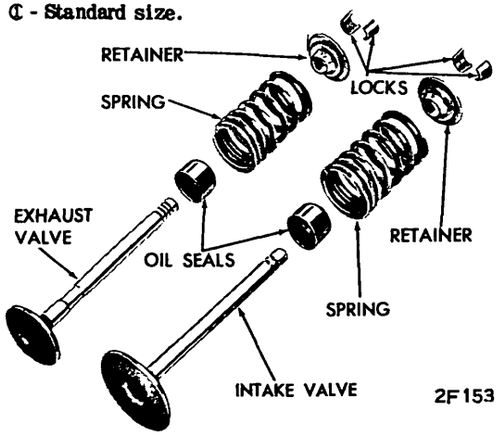
FRONT COVER OIL SEAL

Use Tool C-3506 or suitable puller and driver to remove and install seal from inside of cover. With seal properly installed, neoprene face of seal should be tight against face of cover (a .0015" feeler should not enter between neoprene face and cover).

VALVES

Valv	Head Diam.	Face Angle	Seat Angle	Seat Width	℄ Stem Diam.	Stem Clearance	Valve Lift
Intake	1.62"	45°	47°	5/64-3/32"	.372-.373"	.001-.003"	.375"
Exhaust	1.36"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.360"

℄ - Standard size.



VALVE ASSEMBLY

VALVE STEM SEALS

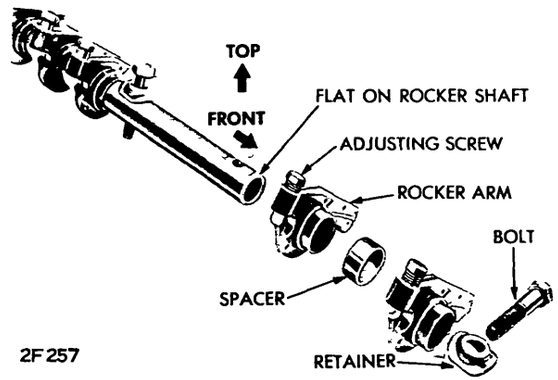
Cup type used on all valves. Long seal used on Intake Valve, short seal used on Exhaust Valve.

VALVE GUIDES

Integral with cylinder head.

Wear Check - Install sleeve, Tool C-3026 to hold valve at working height. Attach dial indicator Tool C-3339 to cylinder head with button against valve head (right angle to valve stem). Total sideplay should not exceed .012" (Intake), .017" (Exhaust).

Servicing - Ream to next oversize with Tool C-3433 (.005"), C-3430 (.015"), C-3427 (.030").



ROCKER ARM ASSEMBLY

ROCKER ARM ASSEMBLY

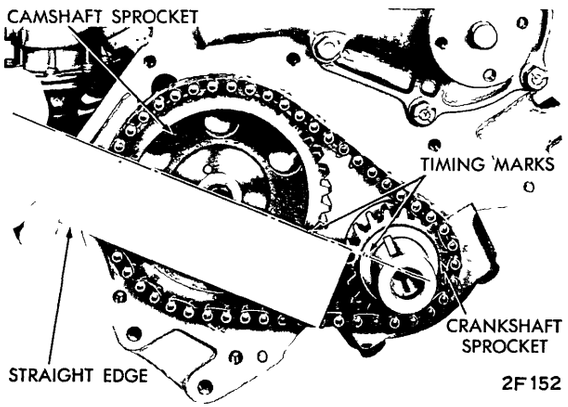
See illustration for assembly of parts. Install assembly with flat on end of shaft upward and toward front of engine (*CAUTION - Necessary to provide proper lubrication of rocker arms*), make certain that shaft retainers seated **between** extended bushings of rocker arms, install long retainer in center position and long rocker shaft bolt at rear of engine. Tighten shaft bolts evenly to specifications.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

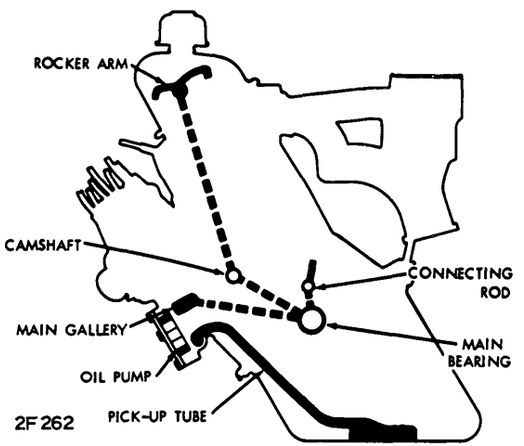
VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open BTDC	Close ALDC	Open BLDC	Close ATDC
All	8°	44°	48°	TDC

VALVE TIMING CHECK

1) Turn crankshaft until No. 6 exhaust valve is closing (No. 6 intake valve is opening).
2) Turn No. 1 intake valve adjusting screw in 1 turn to remove lash.
3) Install dial indicator so plunger contacts valve spring retainer at a 90° angle. Zero indicator.
4) Turn crankshaft clockwise (normal running direction) until intake valve has lifted .019". Timing indicator of crankshaft pulley should now read 12° BTDC-TDC.



ENGINE VALVE TIMING MARKS



ENGINE OILING SYSTEM

VALVE SPRINGS & LIFTERS				
SPRINGS			LIFTERS	
Pressure (Lbs.)		Free Length		
Valve Closed	Valve Open		Diameter	Clearance
53 at 1.69"	143.5 at 1.31"	1.92"	.9040-.9045"	.0012-.0025"

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. If height exceeds maximum of 1 11/16", install 1/16" spacer under spring to obtain normal height range of 1 5/8"-1 11/16".

CAMSHAFT				
Journal Diameter				Bearing
1	2	3	4	Clearance
1.998-1.999"	1.982-1.983"	1.967-1.968"	1.951-1.952"	.001-.003"

CAMSHAFT REMOVAL

Remove with engine out of the car.

► *CAMSHAFT OR LIFTER REPLACEMENT CAUTION:* When new parts installed, add one quart of approved Oil Additive to engine oil to aid break-in. Drain oil mixture at time of next normal oil change (minimum of 500 miles).

ALUMINUM ENGINE CAMSHAFT REAR PLUG REMOVAL

To prevent damage to aluminum block, punch a hole in center of plug with 1/8" sharp punch (do not drill hole), then tap hole for threads with 10-24 tap. Use a steel bar 1/4" x 1" x 6" with 1/4" hole drilled in center, across supports to pull plug with a 10-24 x 1 1/8" long screw placed in hole in bar. Remove all foreign material from block before inserting new plug.

CAMSHAFT BEARING REPLACEMENT

Use Tool Set C-3132-A to remove and install bearings. Install No. 1 bearing 3/32" in from front face of block. Install new welch plug at rear (Tool C-897).

TIMING CHAIN REPLACEMENT

To check chain for wear, use torque wrench on camshaft sprocket retaining bolt to rock camshaft sprocket back and forth while holding crankshaft sprocket stationary. Measure movement with scale at edge of chain link on camshaft sprocket. If total movement exceeds 11/64" with 15 ft. lbs. torque (head removed), 30 ft. lbs. torque (head installed), replace chain.

ENGINE OILING

Normal Oil Pressure - 45-65 lbs. at 1000 RPM.
Pressure Regulator Valve - In oil pump body. Not adjustable. *See Oil Pump Specifications.*

PRESSURE REGULATOR VALVE CLEANING (POLICE, TAXICAB, FLEET CARS)

In severe service, disassemble and clean regulator valve yearly (prior to cold weather operation). Use Carburetor Cleaner to remove varnish from plunger and cylinder, polish plunger with crocus cloth and remove all scratches, nicks, and burrs. See Oil Pump specifications for pressure regulator valve spring data.

ENGINE OILING SYSTEM

Refer to Engine Oiling System illustration and note the following:
Rocker Arms & Valves - Transverse channel in rear camshaft journal feeds oil from rear camshaft bearing up through channel in block and cylinder head to rear rocker arm shaft bracket (oil flows around rear bracket bolt into rocker shaft). Trough on upper surface of rocker arms lubricates pushrod seats and valve stems.

Oil Screen & Intake Pipe Installation - Turn pipe in until it is tight in block and right edge of screen is 1 1/8" in from vertical line projected down from inner flat surface of block on right side. Bottom of screen should be parallel with bottom of oil pan with 1/8" clearance when pan installed.

OIL PUMP REMOVAL & INSTALLATION

Removal - 1) Drain radiator, disconnect upper and lower hoses, disconnect fuel line at pump inlet, disconnect throttle linkage at carburetor (lay linkage on engine).
2) Support engine with jack placed under right front corner of oil pan, remove front engine mounts.
3) Raise engine just enough to insert 2" x 4" x 8" wood block between right front of oil pan and "K" member front rail (end of block against right engine mount support at "K" member weld).
4) With engine resting on wood block, pry lightly on right side until engine and wood block moved approximately 1½" to left (engine will tip slightly toward left).
5) Remove oil filter, oil pump cover, and pump outer rotor *(CAUTION - Rotor will fall out when cover removed).*
6) Remove pump mounting screws and slide pump out between engine and "K" member. *NOTE* - Above pro-

(Continued)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

cedure will provide just enough clearance to slide pump out.

Installation - Reverse removal procedure. Install outer rotor, pump cover, and filter after pump installed on engine.

OIL PUMP OVERHAUL

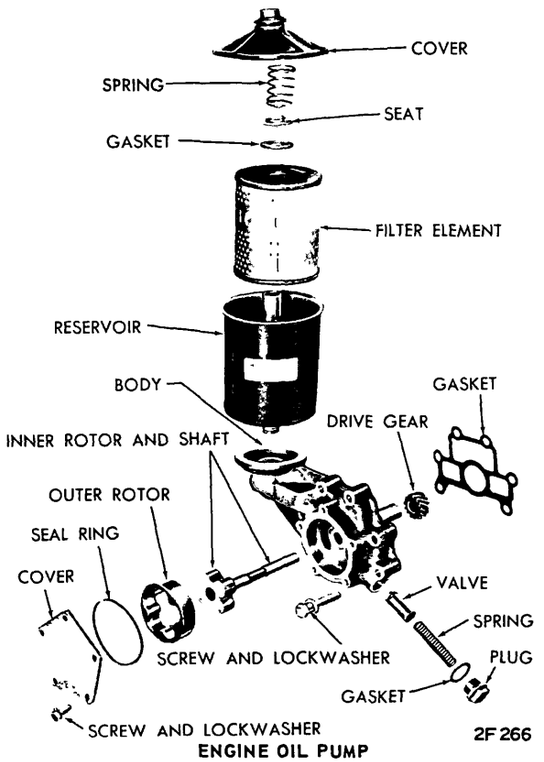
Replace all parts which measure less than specifications listed or where clearances exceed maximum listed.

Pump C v r Wear ..... .0015" Max.
(Place straightedge across inner face of cover, measure clearance between straightedge and face of cover with a feeler gauge).
Inn r & Outer Rotor Thickn ss ..... .649" Min.
Outer Rotor Diameter ..... 2.469" Min.
Outer Rotor Clearance in Body ..... .012" Max.
Inn r & Outer Rotor Clearance ..... .010" Max.
Rotor-to-Cover Clearance ..... 004" Max.
(Install rotors in pump body, place straightedge across pump face between bolt holes, measure clearance between straightedge and face of rotors with a feeler gauge).

Pressure Regulator Spring

Color & Us	Free Length	Pressure at 1 39/64"
Red (Std.)	2 19/64"	14.85-15.85 lbs.
Gray (Light)	2 3/16"	11.85-12.85 lbs.
Brown (Heavy)	2 25/64"	17.90-18.90 lbs.

NOTE - Replace with same color spring unless oil pressure above or below specifications.



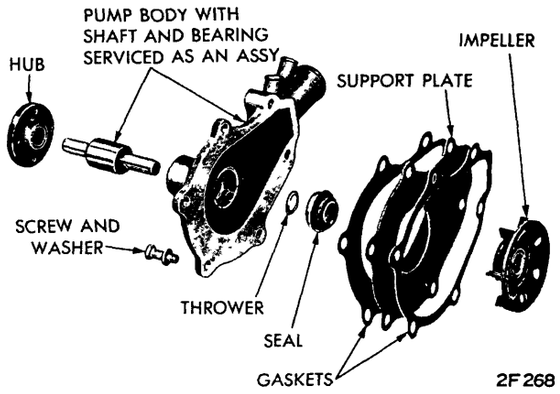
ENGINE OIL PUMP

ENGINE COOLING

Pressure Valve - 14 lbs. (Std.), 16 lbs. (Air Cond. Cars). Radiator filler cap.
Thermostat - 180°F (fully open at 200°F). Pellet type in water outlet fitting.

WATER PUMP

Use suitable pullers and press supports when overhauling pump. See illustration for assembly of parts.
Disassembly - If plastic impeller used, break impeller away from sintered metal hub, split hub with a chisel to remove it from shaft. Lift out seal and spring, use puller to remove seal retainer, press shaft and bearing assembly out toward **front** of pump.
Reassembly - Install seal assembly, position thrower ring on longer end of shaft 1/8" from bearing, press shaft and bearing assembly in through front end of housing until outer end of bearing flush with hub end of housing (press on bearing outer race only), press fan hub on so that shaft extends 13/32" beyond front face of hub, press new impeller on flush with end of shaft.



ENGINE WATER PUMP

MODEL IDENTIFICATION

DODGE & DART

Model	Model Designation
Dodge 330	TD1-L
Dodge 440	TD1-M
Dodge Polara	TD1-H
Dart 170	TL1-L
Dart 270	TL1-H
Dart GT	TL1-P

PLYMOUTH & VALIANT

Plymouth Savoy	TP1-L
Plymouth Belvedere	TP1-M
Plymouth Fury	TP1-H
Valiant V-100	TV1-L
Valiant V-200	TV1-H
Valiant Signet 200	TV1-P

SERIAL NUMBER

Stamped on plate attached to left front door hinge pillar.

① ② ③ ④ ⑤
7 1 3 2 500001

① - Model. 7 Dart. 4 Dodge. 2 Plymouth. 1 Valiant.
② - Model Series. See below.
③ - Year. 1963.
④ - Assembly Plant. See below.
⑤ - Starting number at each plant.

Car Model Series

1 - Plymouth Savoy, Valiant V-100, Dodge 330, Dart 170.
2 - Plymouth Belvedere, Dodge 440.
3 - Plymouth Fury, Valiant V-200, Dodge Polara, Dart 270.
4 - Valiant Signet 200, Dart GT.
5 - Plymouth Savoy Station Wagon, Dodge 330 Station Wagon.
6 - Dodge 440 Station Wagon.
7 - Plymouth Fury Station Wagon, Dodge Polara Station Wagon.
8 - Taxi. 9 - Police. 0 - Fleet.

Assembly Plant

1 - Detroit (Plymouth). 2 - Detroit (Dodge). 3 - Jefferson (Detroit). 5 - Los Angeles. 6 - Delaware. 7 - St. Louis.

ENGINE NUMBER

Stamped on right side of block just behind distributor or on a boss on top side of cylinder block back of water pump.

① ② ③
T 17 7 30

① - Year, 1963.
② - Cubic Inch Displacement. 17 170". 22 225".
③ - Month and day built.

OTHER ENGINE NUMBER MARKS

See "Engine Number Marks" under ENGINE.

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace at Oil Change
Air Cleaner	Clean at 8000 miles
Breather Cap	Clean at Oil Change
Fuel Filter	Replace at Tune-Up or 16,000 miles
Auto. Trans. Filter (Normal Use)	None
Heavy Duty Use	Replace at 32,000 miles

① - Replace or clean more often if necessary.

AUTOMATIC TRANSMISSION FILTER

Located in return line from oil cooler. Under **extreme** heavy duty use, replace filter, oil and clean screen at 10,000 mile intervals.

CAPACITIES

	Dodge	Dart & Valiant	Plymouth
Water (Qt.) ①	12	② 11	12
Crankcase (Qt.) ③	4	4	4
Fuel (Gal.) ④	20	20	20
Manual Trans. (Pt.)	5	5	4.5
Auto. Trans. (Pt.)	15	⑤	14
Rear Axle (Pt.)	4	2	4

① - Add 1 qt. for heater. ② - 12 on Valiant Power Pack.
③ - Add 1 qt. with filter change. ④ - 21.5 on Station Wagons.
⑤ - 15 pints on Dart, 14 pints on Valiant.

Tune-Up & Service - Plymouth & Valiant "Clean Air Pkg. (C.A.P.)" Cars

Plymouth With 225" 6 Cyl. and 318" V8 (1963) Ⓒ
Valiant With 225" Eng. (1963) Ⓒ

Ⓒ - Los Angeles built cars only.

► *TUNE-UP CAUTION: SPECIAL IGNITION AND CARBURETION SETTINGS REQUIRED ON CARS WITH THIS SYSTEM (SEE BELOW).*

DESCRIPTION

Special anti-air pollution system installed on some Los Angeles built Plymouth and Valiant cars. System consists of two separate systems as follows:

Closed Crankcase Ventilation System - Consists of ventilation valve in crankcase vent tube on rocker arm cover with hose to base of carburetor; and a second hose from oil filler cap to carburetor air cleaner. A special air cleaner filter element is used.

Cleaner Air Package (C.A.P) System - A system of exhaust emission control through ignition and carburetion. System consists of a special carburetor and distributor, and a Vacuum Advance Control Valve which provides distributor vacuum advance during deceleration for better burning of fuel flowing into engine during deceleration

VEHICLE IDENTIFICATION

Cars equipped with Cleaner Air Package (C.A.P.) System may be identified by presence of the Vacuum Advance Control Valve in engine compartment and a specification plate attached near this valve. Only cars built at Los Angeles have this system. See "Model Identification" on Car Model Pages for assembly plant designation from serial number plate.

SPECIFICATIONS

► *NOTE: Specifications not listed are same as for conventional 225" 6 Cyl. and 318" V8 Engines. See Car Model Pages.*

Hot (Slow) Idle RPM

With air cleaner installed, headlights on high beam, and auto. trans. throttle rod disconnected.

225" 6 Cyl	580 RPM
318" V8	550 RPM

Fast Idle RPM

225" 6 Cyl.	Ⓒ 1550 RPM
318" V8	② 1650 RPM

Ⓒ - Engine hot, choke open, adjusting screw on second step of cam.

② - Engine hot, choke open, adjusting screw on index mark on cam.

Ignition Timing

Set timing with headlights on high beam, and distributor vacuum line disconnected from distributor and plugged.

225" 6 Cyl.	Ⓒ 5° ATDC at Idle
318" V8	Ⓒ 5° ATDC at Idle

Ⓒ - May be set at 7° ATDC if fuel of sufficient octane to prevent detonation is not available. *Do not exceed 7° ATDC.*

Vacuum Reading

Distributor Vacuum at Idle 225" 6 Cyl.	6" Max.
318" V8	8" Max.
Manifold Vacuum at Idle (All)	15-20"

Distributor 2444218 (6 Cyl.)

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	275-425	Start	5-7.1
0-8	425	5-6	8.5
9-11	610	6-8.5	10
12½-14½	1700		

For engine degrees & RPM, multiply by 2.

Distributor 2444217 (V8)

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	275-425	Start	8-10
0-8	425	5-8	13
9-11	610	8½-11½	15 5
12½-14½	1700		

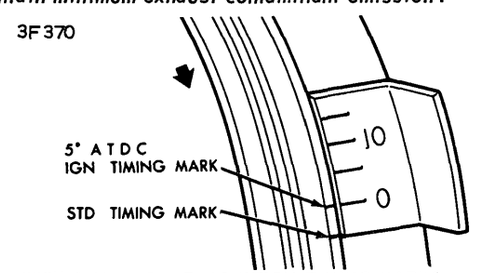
For engine degrees & RPM, multiply by 2.

TESTING & ADJUSTMENT

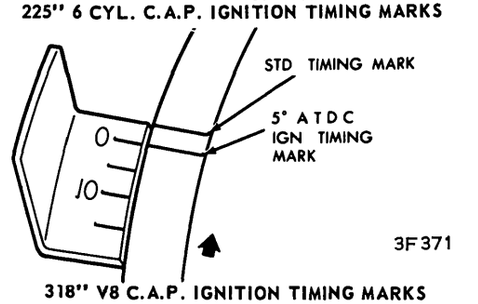
TEST EQUIPMENT REQUIREMENTS - Two vacuum gauges connected by "T" fittings at each side of vacuum advance control valve, an accurate tachometer, a timing light, and an exhaust analyzer are required for the following tests and adjustments

Carburetor Air-Fuel Ratio

Adjust idle fuel mixture for highest steady vacuum at specified slow idle speed, then set engine speed at 1400 RPM and hold for 1 minute Insert exhaust sample pick-up tube into tail pipe and turn on exhaust analyzer. Adjust fuel mixture in lean direction until 14.2 analyzer reading is obtained, making sure correct slow idle speed is maintained. *NOTE - Engine may run slightly rougher than normal, but this condition necessary to maintain minimum exhaust contaminant emission.*



225" 6 CYL. C.A.P. IGNITION TIMING MARKS



318" V8 C.A.P. IGNITION TIMING MARKS

Idle Speed & Ignition Timing

With engine at normal operating temperature and carburetor air cleaner in place, set hot (slow) idle speed and ignition timing according to specifications.

Mixture Test

NOTE - Air cleaner must be clean for this test. Note engine idle speed with air cleaner in place, then remove air cleaner and note any RPM change Engine speed should not drop more than 50 RPM. If mixture is too rich, engine speed will not drop but may increase when air cleaner removed *CAUTION - If 14.2 air-fuel ratio not obtainable with manifold vacuum of 15" minimum, let vacuum remain at 15" (exhaust analyzer could be faulty).*

Vacuum Advance Control Valve

Check distributor and manifold vacuum at idle speed (should be as specified) Increase engine speed to 2000 RPM. Distributor and manifold vacuum readings should be within 1" of each other Release throttle. Both vacuum readings should immediately increase to above 22", then drop to 22" or less with decrease in engine speed. Distributor vacuum should gradually lower until manifold vacuum is approximately 21", then suddenly drop below maximum specified slow idle vacuum Manifold vacuum should then stabilize at specified idle setting Make any adjustments by rotating vacuum advance control valve spring adjusting screw clockwise to increase tension, counterclockwise to decrease tension

Fast Idle Speed & Distributor

Set fast idle speed as indicated in specifications, and check and adjust distributor advance curves in the usual manner.

TROUBLE SHOOTING & DIAGNOSIS

Following diagnosis listing is for C.A.P. system only and is in addition to normal diagnosis of engine performance.

Engine Stalls - Idle speed too low Idle mixture leaner than 14.2 air-fuel ratio Vacuum leak in control valve or hoses Air cleaner improperly installed or gaskets missing.

Engine Extremely Rough At Idl - Adjustments not within specifications Vacuum leak in control valve or hoses. Fuel mixture too lean.

Idle Speed Cannot Be Adjust d - Vacuum advance control valve spring tension too weak

Vacuum Does Not Increas During Dec l rati n - Vacuum control valve spring tension too strong. Manifold-to-control valve vacuum hose collapsed.

Loss Of Power - Air cleaner dirty. Vacuum leak at control valve or hoses Ignition timing incorrect Distributor advance curves incorrect.

Vacuum Control Valve Noisy - *Buzzing noise is normal.* Hissing noise indicates faulty valve (engine may also run roughly). Condition usually caused by turning adjusting screw in too far (screw bottoms)

Engin Ov rheats - Ignition timing incorrect. Cooling system restricted.

Engin Det nati n - Ignition timing incorrect Poor grade of fuel.

TUNE-UP SPECIFICATIONS

For Tun -Up n "Cleaner Air Pkg. (C.A.P.)" Cars, S Pag 35

ENGINE IDENTIFICATION

Engine identified by digits following letter **T** in engine number as follows:

Engine	ℂ Displacement Designation
318"	318
361"	36
383"	38
413" Except 300J	41
300J	41 Early, ② C300J Later
426" Before Dec 19, 1962	42
After Dec 19, 1962	(11 0-1) 426TMP (13 5-1) 426TMP-HC

ℂ - *For other identifying marks on engine number pad, see beginning of "Engine" data and also "Model Identification".*
② - No letter **T**.

Engin Numb r Location

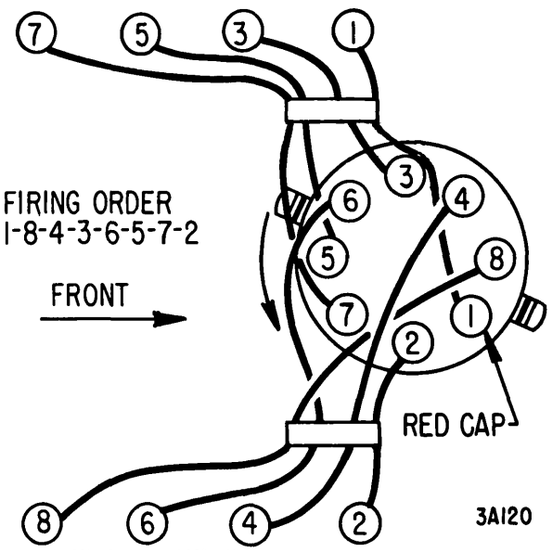
318" Engine - Left front of block under cylinder head **361", 383", 413", 426" Engines** - Right side of block below distributor, or on left front of block behind thermostat housing.

COMPRESSION PRESSURE

Pressure is with engine warm, plugs removed, throttle wide open at minimum cranking speed as indicated. Maximum variation between cylinders 20 lbs. (318", 361"), 25 lbs. (383", 413", 426").

318"	ℂ 120-150 lbs
361"	ℂ 125-155 lbs
383" Synchro-mesh	② 150-180 lbs.
Auto Trans.	③ 130-165 lbs
413" Synchro-mesh	ℂ 125-155 lbs
Auto Trans.	③ 130-165 lbs.
426"	ℂ(11 0-1) 140-180 lbs
	ℂ(13 5-1) 150-190 lbs.

ℂ - 120 RPM minimum cranking speed
② - 150 RPM minimum cranking speed
③ - 100 RPM minimum cranking speed



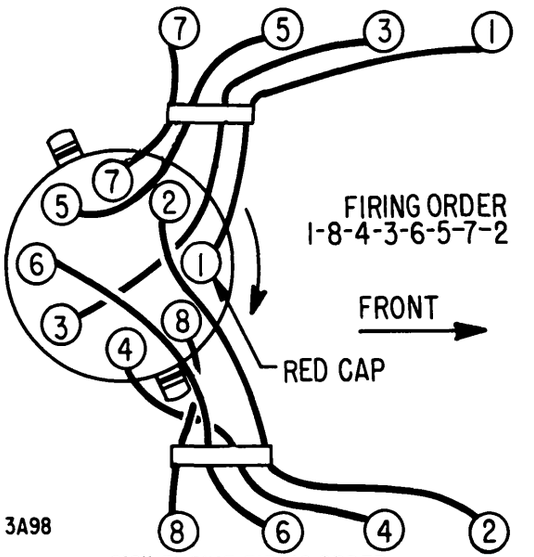
361", 383", 413", 426" ENGINES FIRING ORDER

VALVE TAPPET CLEARANCE

Engines not listed below use hydraulic lifters.

Engine	Intake	Exhaust
318"	.013" hot	021" hot
413" - 300J	.017" cold	028" cold
	015" hot	024" hot
413" - 11 0-1	016" cold	022" cold
383",426" - 268°,276° Cam	.016" cold	028" cold
300° Cam ℂ	.028" cold	032" cold

ℂ - Special procedure required.



318" ENGINE FIRING ORDER

SPARK PLUGS

Plugs may have attached gasket and can be reinstalled 4 or 5 times without replacing gasket.

Gap (All)	.035"
Torque (All)	30 ft. lbs.
Spark Plug Type	
318", 361"	J12Y
383" Hydraulic Lifters	J12Y
Mechanical Lifters	J9Y
413" Hydraulic Lifters	J12Y
Mechanical Lifters (300J)	XJ9Y
Mechanical Lifters (Others)	J9Y
426"	J10Y (supersedes J9Y)

VALVE CLEARANCE ADJUSTMENT (HI PERF. ENGINES WITH 300° CAMSHAFT)

Adjustment must be made with lifter on lowest point of cam base circle Use indicator light in ignition primary circuit to determine crankshaft position and make adjustments as detailed below. Set tappet clearance at .028" Intake, .032" Exhaust.

1) Set ignition timing at TDC and make chalk marks at TDC and 180° opposite TDC on vibration damper.
2) With No. 1 piston at TDC of compression stroke, adjust No. 2 & 7 Intake, No. 4 & 8 Exhaust.
3) Rotate crankshaft 180° (No 4 piston at TDC), and adjust No. 1 & 8 Intake, No. 3 & 6 Exhaust.
4) Rotate crankshaft another 180° (No. 6 piston at TDC), and adjust No 3 & 4 Intake, No. 5 & 7 Exhaust.
5) Rotate Crankshaft another 180° (No. 7 piston at TDC), and adjust No. 5 & 6 Intake, No. 1 & 2 Exhaust.
6) Reset ignition timing to specifications.

TUNE-UP NOTES

►*ENGINE CROSS-FIRE ON FIRST START (CAUSING STARTER DAMAGE) CORRECTION:* Clean distributor cap inside and out (use a non-flammable, general purpose type detergent). Inspect cap for carbon tracking. Replace cap if carbon tracking evident. *NOTE* - DO NOT use compressed air when drying cap.

►*HARD COLD WEATHER START CORRECTION (ALL MODELS):* May be caused by gum in air horn causing sticking of choke shaft and piston To correct, remove gum formation by squirting carburetor cleaner through piston link opening in air horn while moving choke blade back and forth Also apply cleaner to choke blade shaft at bearings.

►*1963 HARD COLD START CORRECTION (4-BBL. CARBURETOR ENGINES):* Insufficient choke application, excessive choking, or slow engine warm-up may be due to bind in choke connector rod caused by improperly formed angle at lower end of rod *See "Carter AFB Carburetors" in Carburetion Section for correction.*

►*1963 361" ENGINE HARD STARTING CORRECTION (STROMBERG WWC CARBS.):* May be caused by choke coil prong hanging up in choke pocket. *See "Stromberg WWC Carburetors" in Carburetion Section.*

►*1963 361" ENGINE STALLING ON COLD START CORRECTION & CARBURETOR PRODUCTION CHANGE (STROMBERG WWC CODE 3-221 CARBS.):* Correct by drilling choke piston (later production Code 3-221A carburetors incorporate this change). *See "Stromberg WWC Carburetors" in Carburetion Section.*

►*1963 383" 2-BBL. ENGINE EXTREME RICHNESS DURING WARM-UP CORRECTION (BBD CARB.):* May be caused by choke thermostat coil distortion due to high temperatures To correct, install later type choke coil, No 2463159, which will withstand high temperatures.

DISTRIBUTOR

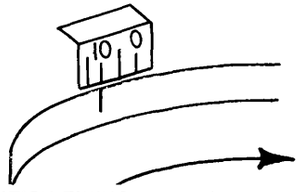
Point Gap (All)	014- 019"
Cam Angle (Single Breaker)	27-32°
(Double Breaker)	ℂ 34-40°
Breaker Arm Spring Tension (All)	17-21½ ozs
Condenser Capacity (All)	25- 285 mfd

ℂ - Both sets operating together Set each set of points to 27-32° operating separately

IGNITION TIMING

Set timing at specified idle speed with distributor vacuum line disconnected On regular engines, settings may be varied ±5° to suit various operating conditions

318" Synchro-mesh	5° BTDC
Auto Trans	10° BTDC
361"	10° BTDC
383" All	10° BTDC
413" Except 300J	10° BTDC
300J	12½° BTDC
426" All	10° BTDC



3A99

IGNITION TIMING MARKS (ALL ENGINES)

HOT (SLOW) IDLE RPM

Set idle speed with headlights and air conditioning ON On automatic transmission cars, loosen sliding link of carburetor-to-bellcrank rod, or unsnap ball joint connection at accelerator shaft bellcrank as appropriate so transmission internal stop does not interfere with free movement of carburetor throttle lever

318"	ℂ 500 RPM
361', 383", 413" Hydraulic Lifters	ℂ 500 RPM
383", 413", 426" Mechanical Lifters	ℂ 700-800 RPM
426"A & 426"II Mechanical Lifters	1000 RPM

ℂ - In Neutral

FAST IDLE RPM

With fast idle screw on top step of fast idle cam (Stromberg Carbs), with fast idle screw aligned with index mark on cam (Carter Carbs)

318 '	1400 RPM
361"	1400 RPM
383" 2-Bbl	1400 RPM
One 4-Bbl	2100 RPM
Two 4-Bbl	1400 RPM
413" Except 300J	1775-1825 RPM
300J	ℂ 1400 RPM
426"	Not Applicable

ℂ - For each carburetor with other carburetor at normal idle position *For adjustment procedures, see "Carter AFB 4-Barrel Carburetors" in Carburetion Section*

AUTOMATIC CHOKE SETTING

Choke Setting should not be changed Carburetors not listed use manual type choke

Carter BBD 3472S, 3473S	Centered
3475S, 3476S	2 Rich
Stromberg WW 3-222, A; 3-223, A	Centered
WWC 3-221, A	1 Rich
Carter AFB 3256S	2 Rich
3259S	1 Rich
3437S, SB; 3478S, SA	Centered

FUEL PUMP PRESSURE

318"	5-7 lbs at 500 RPM
361", 383", 413"	3½-7 lbs at 500 RPM
426"	6-8 lbs at 1500 RPM

FUEL PUMP VOLUME

All 1 Qt in 1 Minute at 500 RPM

MANIFOLD HEAT CONTROL VALVE

Located in right exhaust manifold Check operation at every Tune-Up and apply Manifold Heat Control Valve Solvent to bushing and shaft

CRANKCASE VENTILATION VALVE

Remove, disassemble, and clean valve and system every 8000 miles or sooner under severe operating conditions Clean carburetor air cleaner and oil filler cap filter at same time *CAUTION - Free height of ventilation valve spring is 9/16" Do not stretch spring*

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Autolite IBB-4202

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	500		
6	750	NONE	
12	1000		

For engine degrees & RPM, multiply by 2

Autolite IBS-4011A

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	400	Start	8
1	440	1	8 5/8
5 5	600	5	11 3/8
9	2000	8	13 3/4
10	2400	9	14 1/2

For engine degrees & RPM, multiply by 2

Autolite IBS-4011B

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	600	Start	7 1/2
1	650	1	8 1/2
2 5	740	5	11 1/2
4	820	7	12 3/4
5 5	900	10 5	14 3/8

For engine degrees & RPM, multiply by 2.

Autolite IBS-4006G

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	350	Start	8 3/8
1	400	1	8 7/8
8	750	6	11 7/8
11	1725	10	15
12	2050	11	16

For engine degrees & RPM, multiply by 2

Chrysler 2098690

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	310-490	0	6-9
0-2	490	4.5-7.5	12
3.5-5.5	800	6-8.5	13
8.5-10.5	2300		

For engine degrees & RPM, multiply by 2.

Chrysler 2095836

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	250-450	0	4.5-8
0-2	450	6-9	12
2.5-4.5	700	11.5-14.5	16.5
10.5-12.5	2150		

For engine degrees & RPM, multiply by 2.

Chrysler 2098680

Mechanical Advance		Vacuum Advanc	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	325-475	0	8-10
0-2	475	5-8	13
5.5-7.5	850	8.5-11.5	15.5
8.5-10.5	2000		

For engine degrees & RPM. multiply by 2.

Chrysler 2098685 & Prestolit IBP-4003Z

Mechanical Advance		Vacuum Advanc	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	330-570	0	8-10
0-2	570	5-8	13
3.5-5.5	1000	8.5-11.5	15.5
7.5-9.5	2600		

For engine degrees & RPM, multiply by 2.

IGNITION COIL

	Ohms at 70-80°F
Primary Resistance (Autolite 200567)	1.65-1.79
(Essex 62-160-2)	1.41-1.55
Secondary Resistance (Autolite 200567)	9400-11700
(Essex 62-160-2)	9200-10600
Ballast Resistor (Chrysler 2095501)	0.5-0.6

Current Draw 1.9 amps. idling, 3.0 amps. stopped.

CARBURETOR SPECIFICATIONS			
Carburet r	①② Float Level	③ Float Drop	Choke Setting
Carter			
BBD 3472S,3473S	1/4"		Centered
BBD 3475S,3476S	1/4"		2 Rich
AFB 3256S	7/32"	23/32"	2 Rich
3258S	9/32"	23/32"	None
3259S	7/32"	23/32"	1 Rich
3437S, SB	7/32"	3/4"	Centered
3447S, SA	9/32"	23/32"	Manual
3478S, SA	7/32"	3/4"	Centered
3505S, SA	9/32"	1/2"	Manual
3559S	7/32"	23/32"	Manual
Stromberg			
WWC 3-221,A	1/8"		1 Rich
WW 3-222,A;3-223,A	7/32"		Centered

① - On Carter AFB Carbs., reduce float setting 1/32" if resilient type seat used.
② - ±1/64" ③ - ±1/16".

MANIFOLD FUEL DISTRIBUTION

Carburetor left barrel (s) feed cylinders 1,4,6,7; right barrel (s) feed cylinders 2,3,5,8.

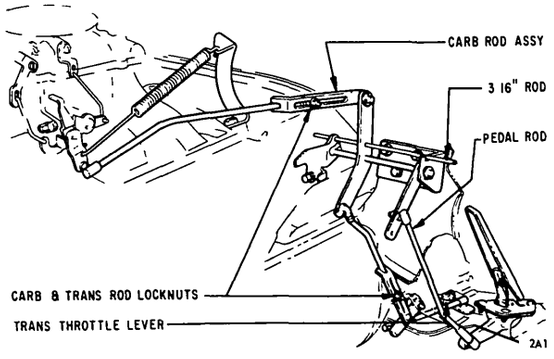
ACCELERATING PUMP SETTING

Carbur tor	Seasonal Setting
AFB	None
WWC 3	None
BBD & WW 3	Center hole (Normal)-Medium stroke

► *NOTE: On BBD 3472S, 3473S & WW 3-222, 223 be sure to mov bowl vent horseshoe clip on pump stem c rr sp ndingly.*

THROTTLE LINKAGE ADJUSTMENT

Chrysler (Exc. 300J), Imperial, Dodge 880 Auto. Trans. - 1) With slow (hot) idle properly adjusted, throttle linkage in place, disconnect or block choke valve in wide open position.



CHRYSLER (EXCEPT 300J) & DODGE 880 AUTOMATIC TRANSMISSION THROTTLE LINKAGE

CARBURETOR

2) Loosen nuts on carburetor and transmission rods and insert a 3/16" rod (10" long) through holes in bellcrank bracket and lever assembly.
3) Hold transmission lever forward against stop and tighten transmission rod locknut.
4) Disconnect one end of accelerator pedal rod (at transmission and dash bracket levers) and adjust rod length to obtain a pedal angle of 113-115° from horizontal and reinstall rod.
5) Remove the 3/16" rod and move link of carburetor rod assembly rearward until transmission lever is against stop. Tighten carburetor rod locknut and remove choke block.

Dodge & Plymouth (Except Dodge 880) Single Carburetor Auto. Trans. -

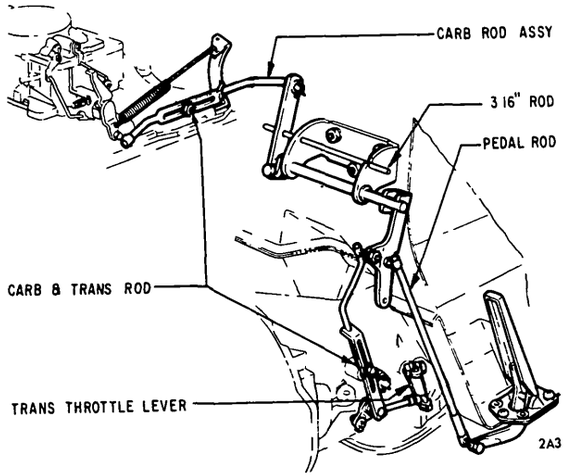
1) With slow (hot) idle properly adjusted, linkage in place (transmission rod ball socket to ball end not assembled), disconnect or block choke in wide open position. Release fast idle cam.

2) Apply a thin film of MS 3608 lubricant to accelerator shaft where it turns in shaft.

3) Hold transmission lever forward against its stop and adjust length of rod at threaded upper end. Ball socket must line up directly with ball end without exerting any force on rod. *Ball socket must be at same height as ball end when checking rod length.* Lengthen rod 1 turn.

4) Assemble ball socket to ball end. When carburetor opens, transmission lever should begin its travel with no vertical movement of lever or rod in lever.

5) Assemble remainder of linkage parts in place. With cable clamp loose, adjust position of cable housing ferrule so all slack removed from cable with carburetor at slow idle. To adjust, move ferrule in clamp away from carburetor lever.



IMPERIAL AUTOMATIC TRANSMISSION THROTTLE LINKAGE

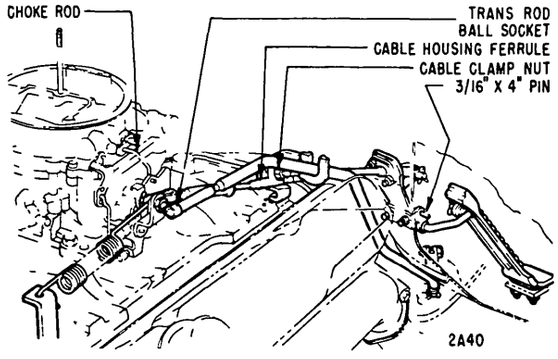
6) Back off ferrule 3/32" (provides freeplay between rear surface of dash cable fitting and front surface of rear cable clevis). Tighten clamp nut.
7) Route cable correctly (should not interfere with full travel of transmission rod).
8) Connect choke rod or remove blocking fixture.

Front & Rear Carb. (Runner Manifold) Interconnecting Linkage Adjustment - Both front and rear carburetor levers should operate freely and in same plane. Correct either bent or damaged levers. Install interconnecting rod with slotted end connected to **lower hol** in **front** carburetor throttle lever, and end connected at **top hole** of **rear** carburetor throttle lever Hold **rear** carburetor throttle wide open (choke in full open position) and adjust slotted end of rod so **front** carburetor throttle valves will also be in wide open position Tighten locknut and check operation. Interconnecting rod must rotate slightly on pivots without bind in any position.

300J (Ram Manifold) Auto . Trans. - *NOTE - On 426" Engine With Short Ram Manifold (one-piece. type fitting between rocker covers), linkage adjustment will be similar to procedure detailed below except that intake manifold bellcrank-to-carburetor rods use threaded type adjustment rather than sliding link type.* With slow (hot) idle properly set, engine at normal operating temperature, carburetor off fast idle, and choke valves open, proceed as follows:

1) *Refer to illustration.* Loosen locknuts "A" and "B". Insert a piece of 3/16" drill rod (10" long) into accelerator shaft bracket and through hole in lever.

2) Move transmission throttle control lever forward against its stop, then tighten locknut "A". Unsnap accelerator pedal-to-shaft rod. Turn threaded end of rod in or out until an angle of 114° is obtained between vehicle floor and flat face of pedal. Reconnect rod and remove locating drill rod.



DODGE (EXCEPT 880) & PLYMOUTH AUTOMATIC TRANSMISSION THROTTLE LINKAGE

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

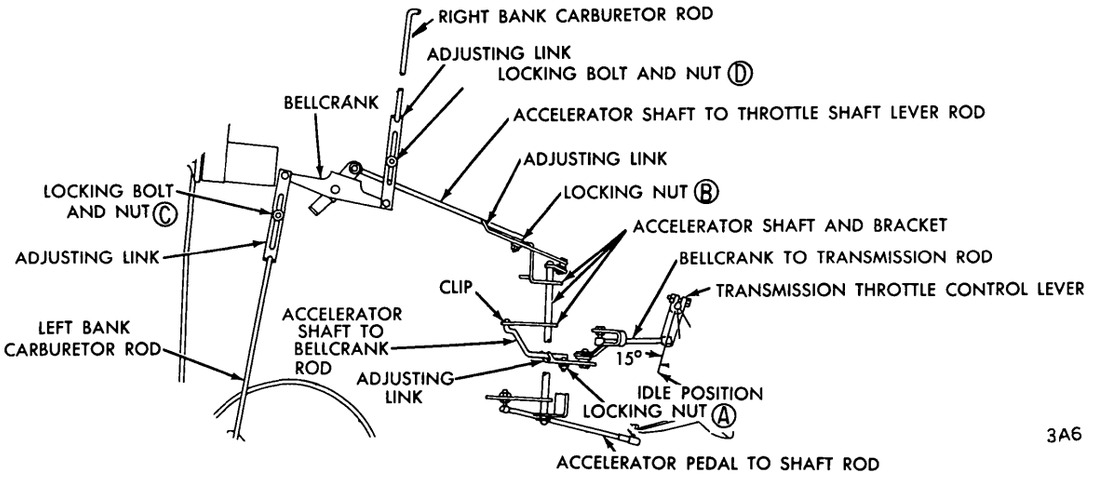
3) Check to be sure carburetor choke valves are open, fast idle cams are released, and throttle valves are closed

4) Loosen locknuts "C" and "D" (left and right bank carburetor rods) Back off anti-stall adjusting plunger to allow bellcrank to be pivoted

5) Pivot bellcrank until a 3/16" rod (3" long) can be inserted through bellcrank hole and locating hole in manifold Tighten locknuts "C" and "D" and remove locating drill rod from bellcrank

6) Push rearward on accelerator shaft-to-throttle shaft lever rod adjusting link until contact made with transmission stop, then tighten locknut "B"

7) With idle speed properly adjusted and engine at normal operating temperature, disconnect vacuum line from anti-stall unit With engine running and transmission in Neutral, turn anti-stall plunger toward or away from bellcrank to obtain 1500 RPM Reconnect vacuum line



CHRYSLER 300J AUTOMATIC TRANSMISSION THROTTLE LINKAGE

BATTERY

12 Volt

Car & Engine	Capacity (20 Hr. Rate)
Chrysler (Newport)	59 Amp Hr
Chrysler (Others)	70 Amp Hr
Dodge & Plymouth (318" Eng)	48 Amp Hr
Dodge & Plymouth (Others)	59 Amp Hr

Battery Ground - Negative

STARTER

Chrysler 1889200

Torque	RPM	Volts	Amperes
0 ft. lbs.	3800	11	78
8.5 ft. lbs.	Lock	4	350

Chrysler 2095150

Torque	RPM	Volts	Amperes
0 ft. lbs.	1925-2400	11	90
	Lock	4	400-450

Brush Spring Tension - 32-48 ozs. (All).

ALTERNATOR

► *1963 ALTERNATOR GROUND BRUSH "HANGING UP" IN HOLDER CORRECTION* Caused by burr on inside edge of ground brush holder To correct, clean inside of the end shield ground brush holder with a file around the upper edge, making certain all burrs are removed Install brush and make sure it moves freely in holder

Chrysler No.	Amps.	Volts	Engin RPM
2098830	31.5-37.5	15	1250
2098840	36.0-42.0	15	1250

ELECTRICAL

ALTERNATOR REGULATOR

Chrysler No.	Setting (70°F)	Point Gap	Air Gap
2098300	13 7-14 3 volts	012- 016"	048- 052"

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located at center, forward edge of instrument panel

IN-LINE FUSES

In-line fuse for rear cigar lighter located near ammeter

CIRCUIT BREAKERS

1 - Headlight circuit integral with headlight switch
2 - Windshield wipers and Back-up lights integral with, or attached to, wiper switch
3 - Other circuit breakers for electric windows, seats, convertible top electric door locks, cigar lighters, courtesy lamps, and power antenna are located behind left front kick panel

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Located on transmission case Starter should operate only when Neutral push button depressed To adjust, check control cable for proper adjustment Drain about 2 qts oil from transmission, then unscrew switch from transmission case Check to see that switch operating lever is aligned in center of switch opening in case Place cupped washer and "O" ring over switch threads and screw switch into transmission case a few turns Connect one lead of test lamp to battery current and other to switch terminal, then screw switch in until lamp lights Tighten switch additional 1/4-3/8 turn

CAUTION - Switch must be tight enough to prevent oil leak If not, add a thin washer and readjust switch Do not tighten over 60 lbs torque

STOP LIGHT SWITCH

Mechanical type mounted on brake pedal bracket Adjust switch so stop lights go on at 5/8-3/4" (With Power Brakes), 13/16-7/8" (Without Power Brakes) pedal travel, measured at center of brake pedal pad

HEADLIGHT SWITCH REMOVAL

With switch knob in full OUT position, remove knob and shaft by releasing button on switch body Remove bezel nut or retainer and trim plate (On Imperial, remove back plate dial and dial lamp) Remove switch

WINDSHIELD WIPER SWITCH REMOVAL

Loosen setscrew and remove control knob, then remove switch retaining bezel On Imperial, remove back plate dial and dial lamp Remove switch

TURN SIGNAL FLASHER

Located in center of instrument panel near fuse block

SPEEDOMETER REMOVAL

All Models - Speedometer can be removed from instrument cluster after cluster removed from car (see below)

INSTRUMENT CLUSTER REMOVAL

Chrysler - Remove upper and lower moldings at center of panel Remove heater bezel, disconnect Bowden cable, vacuum lines, and wiring at heater switch Remove instrument panel lower hood Remove windshield wiper switch (see above) Remove instrument cluster-to-instrument panel attaching screws, then remove cluster and disconnect wiring

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Chrysler, Imperial, Dodge, Plymouth V8 1963

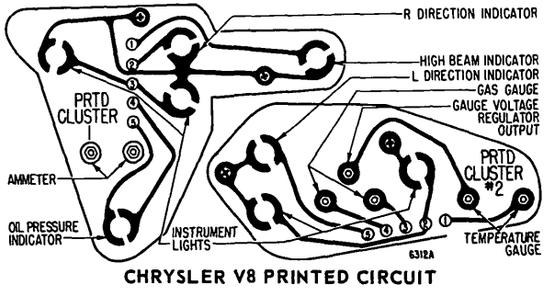
Imperial - *NOTE - Ammeter, Oil Pressure, Fuel, Temperature Gauges can be removed from underneath instrument panel without removing cluster. If car has heater or air conditioning (or both) remove defroster and spot cooler lines first.* Remove cluster as follows: Remove defroster and spot cooler hoses (if equipped). Disconnect speedometer and odometer reset cables. Remove 5 screws holding instrument cluster to instrument panel, tilt lower end of cluster outward, and remove cluster.

Dodge (Except 880) - Remove headlight and windshield wiper switches (see above). Remove heater or air conditioning control knob, then remove sleeve on control lever. Remove cluster trim plate. Disconnect instrument cluster from panel. Pull cluster forward out of panel housing, disconnect speedometer cable, then roll cluster downward and forward and disconnect wire connectors, snap out light sockets, and ammeter lead wires. Remove cluster.

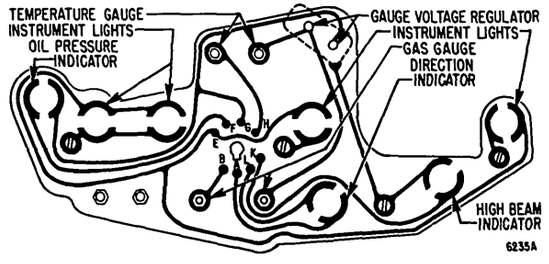
Dodge 880 - 1) Instrument Cluster - Remove heater and transmission push button trim plates and bezels. Remove the 8 cluster attaching screws, disconnect wiring, and remove cluster.

2) Speedometer - After cluster removed, disconnect speedometer cable, remove transmission push buttons and control box. Disconnect speedometer upper housing from instrument panel, then remove speedometer housing from car. Remove speedometer from housing.

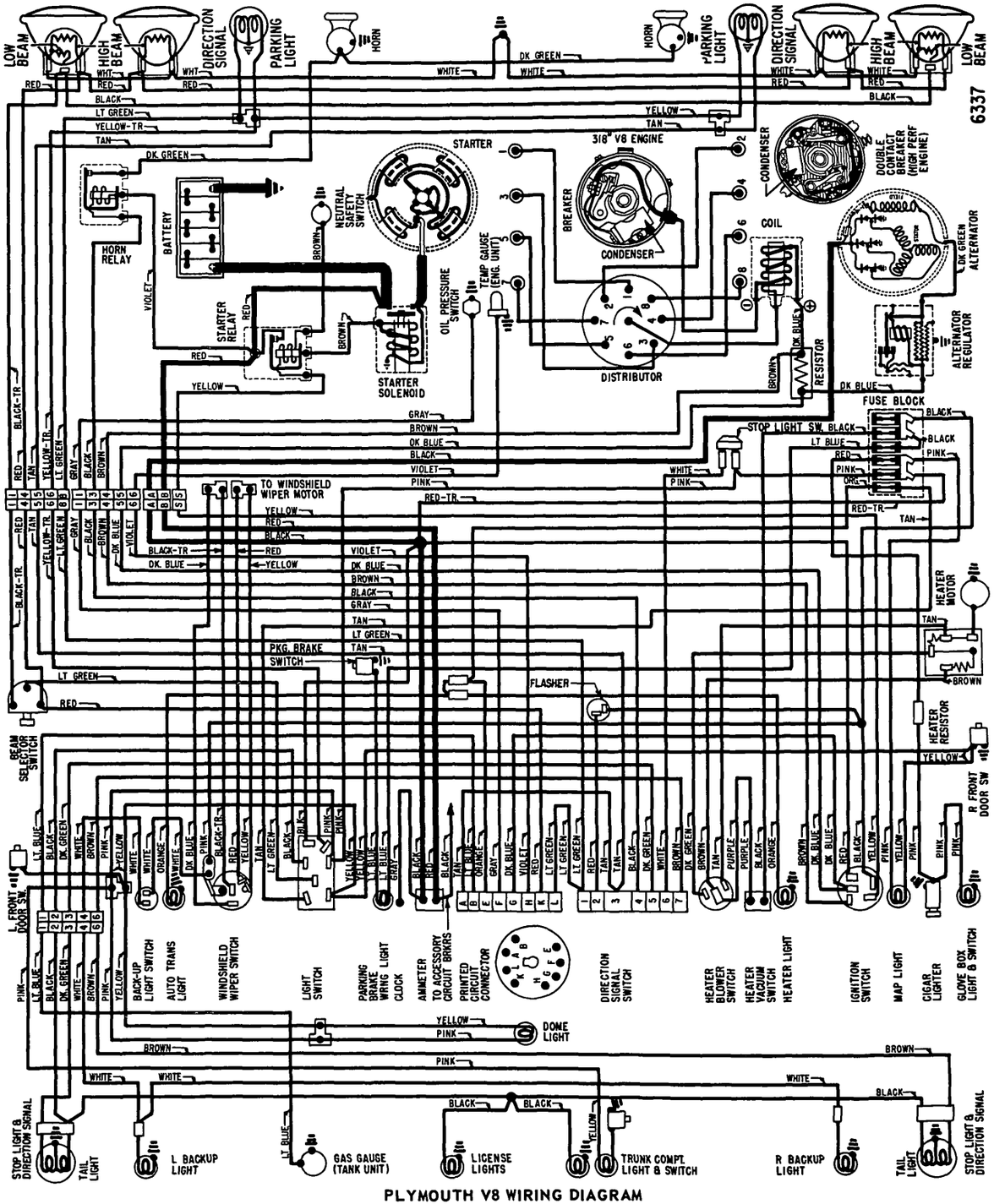
Plymouth - Remove heater blower switch and temperature control knobs. Disconnect speedometer cable. Remove the 4 screws from face of cluster bezel, then pull cluster forward and tilt downward to remove wiring and connectors. Remove cluster.



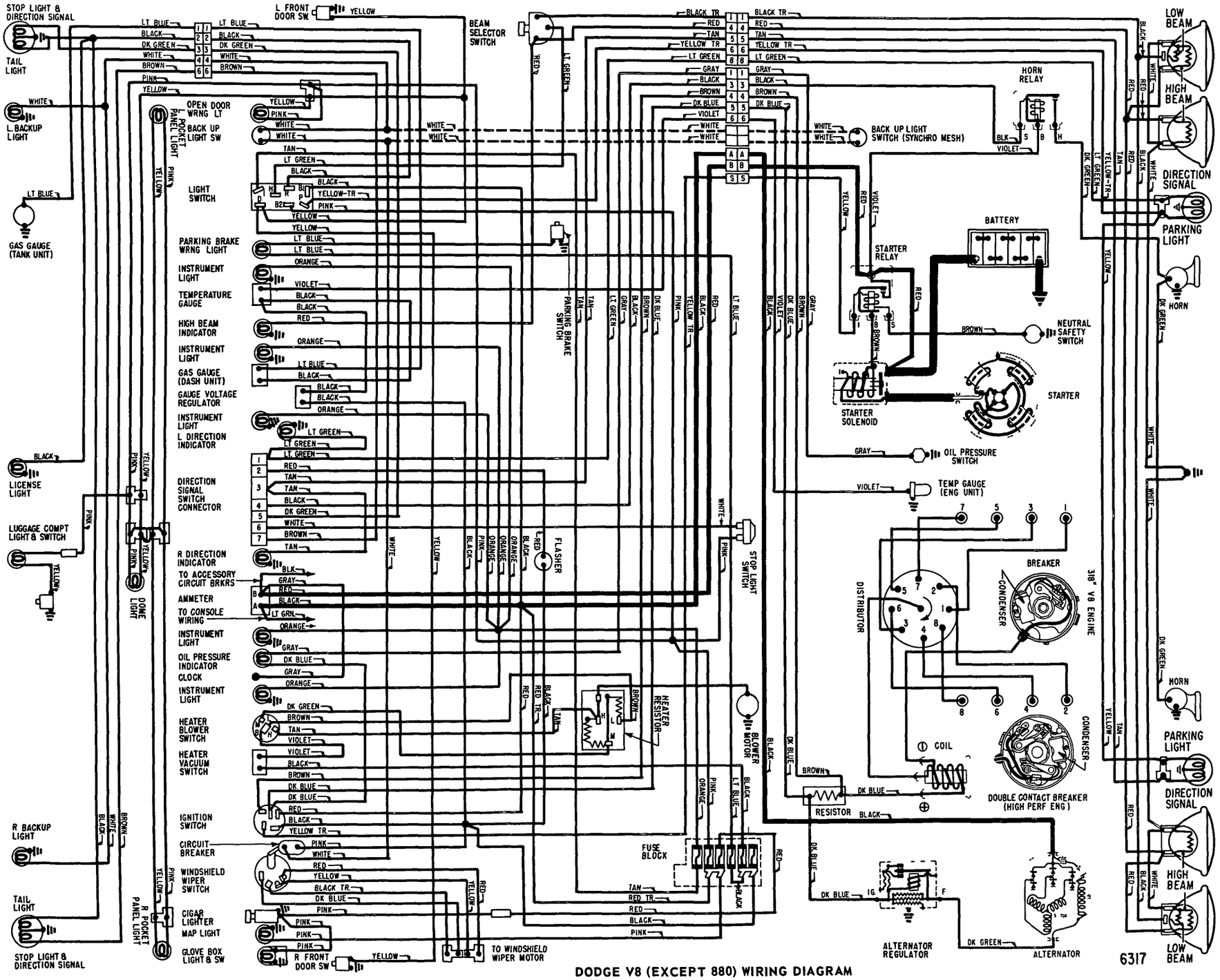
CHRYSLER V8 PRINTED CIRCUIT



PLYMOUTH V8 PRINTED CIRCUIT

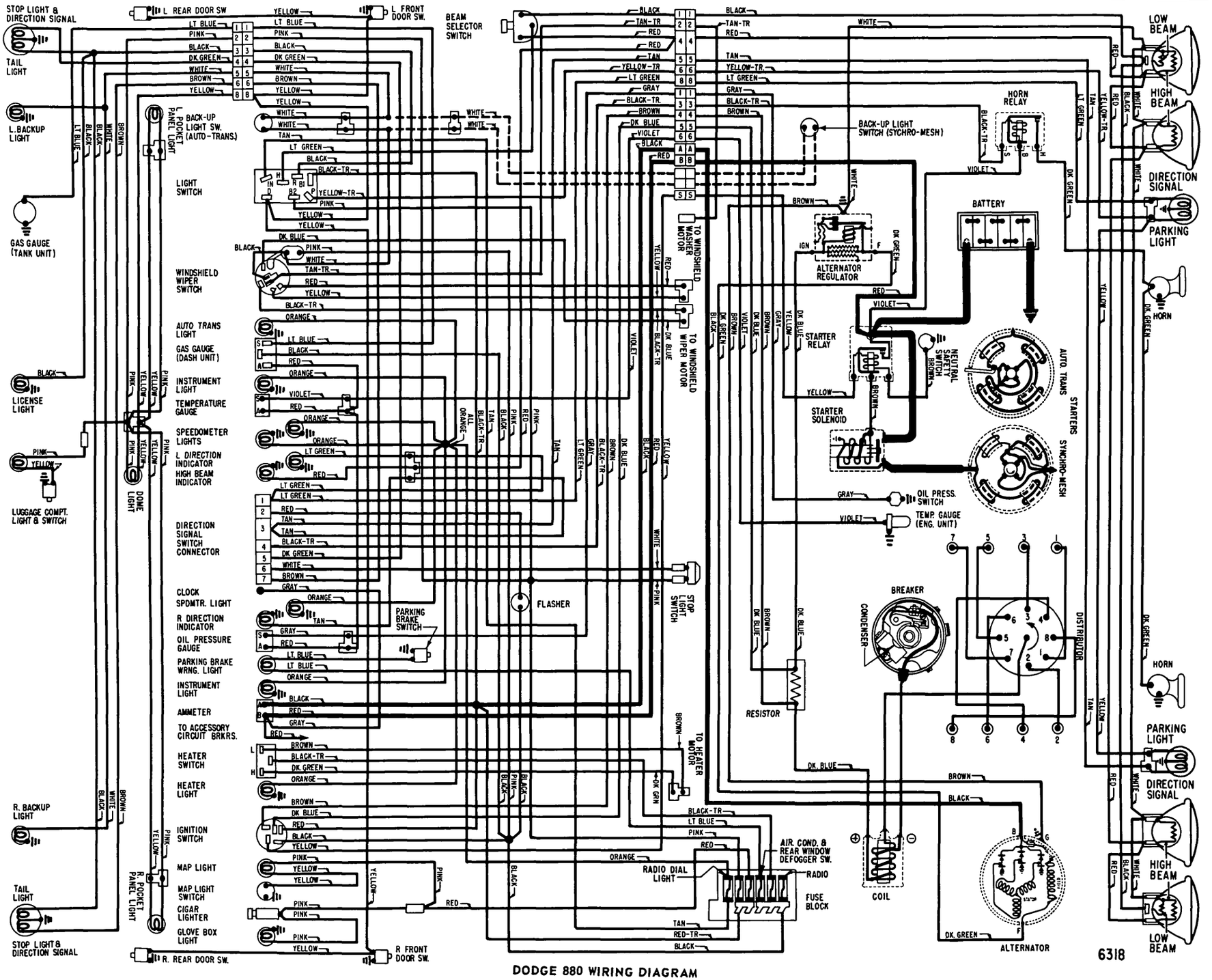


PLYMOUTH V8 WIRING DIAGRAM

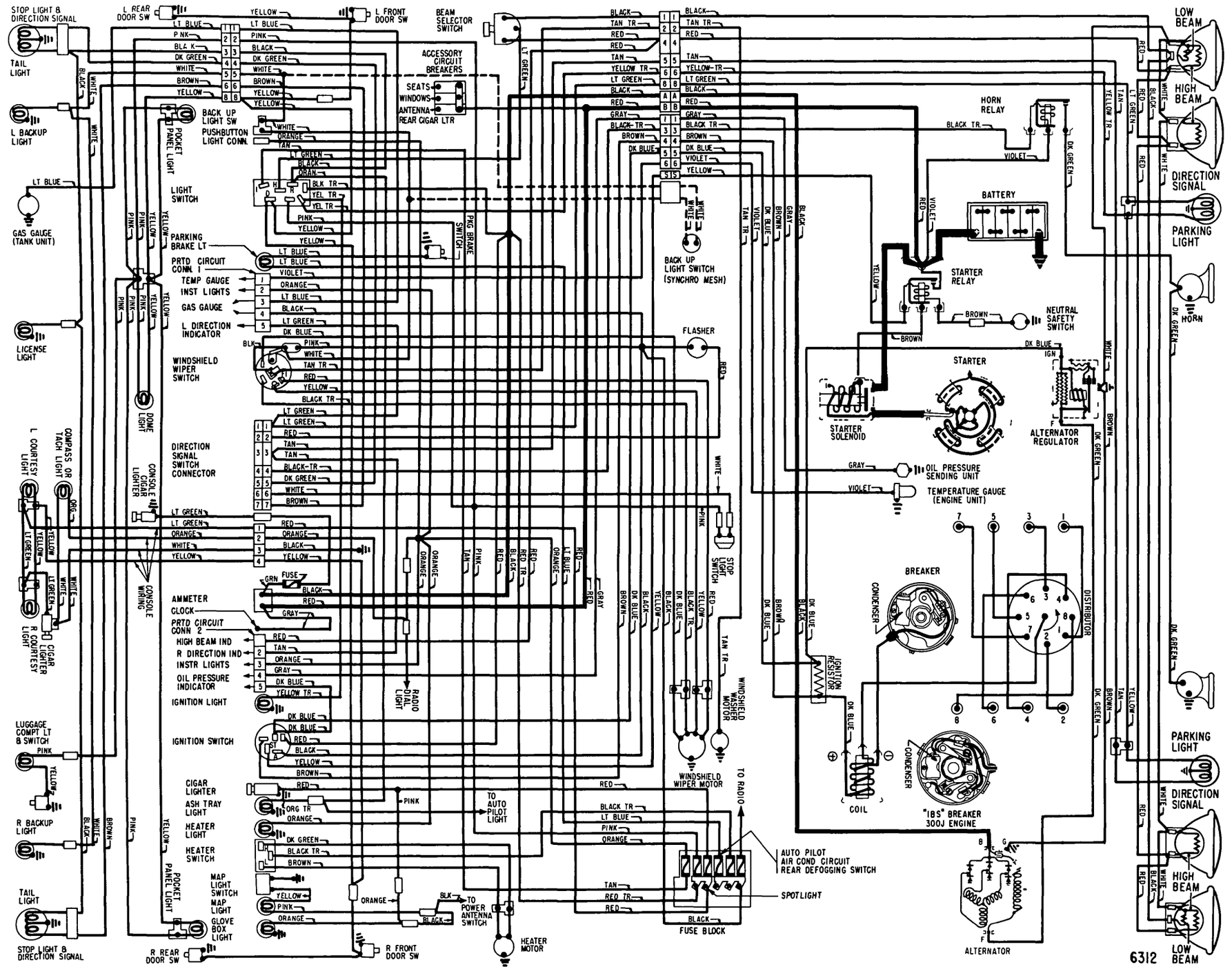


DODGE V8 (EXCEPT 880) WIRING DIAGRAM

Chrysler, Imperial, Dodge, Plymouth V8 1963

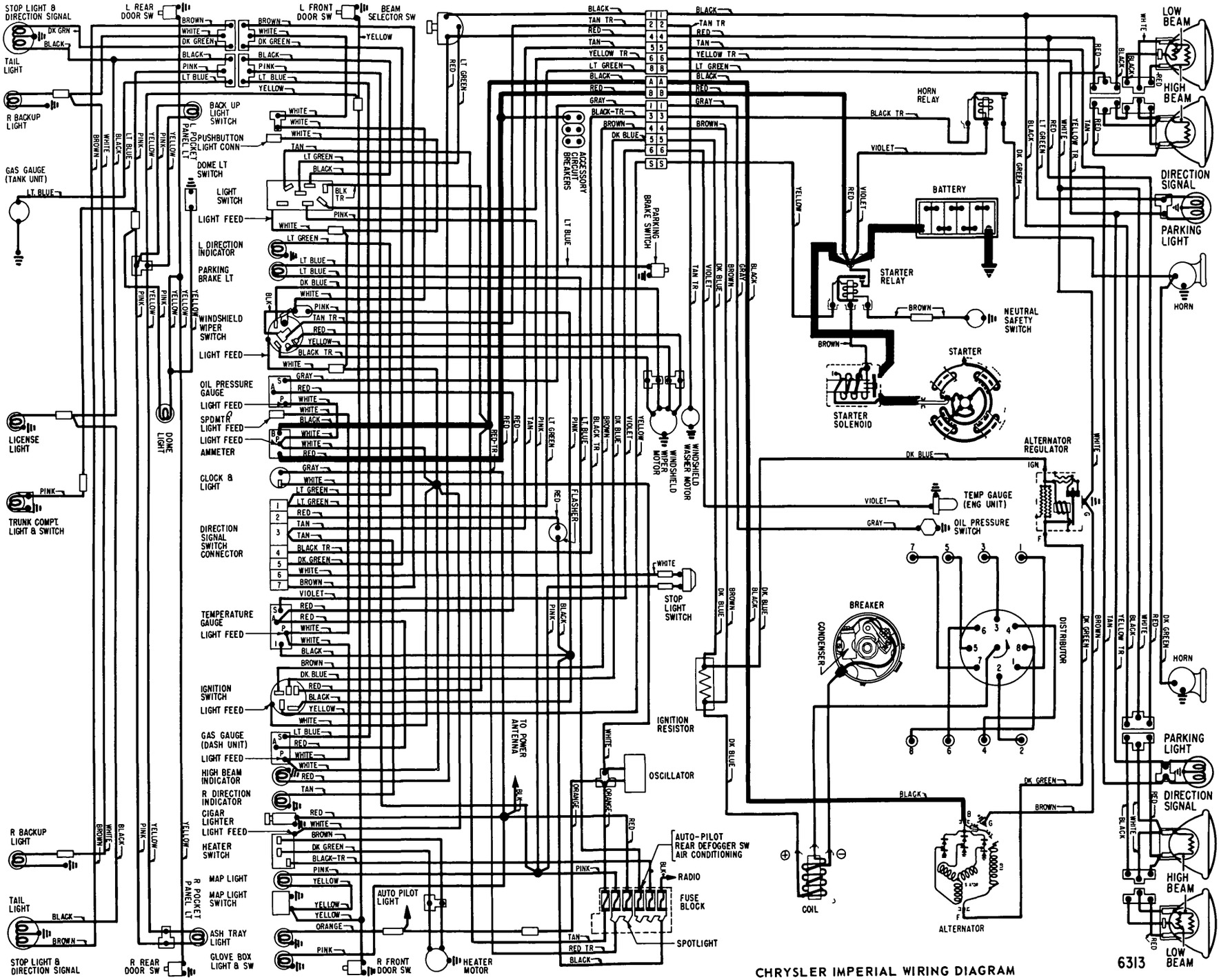


DODGE 880 WIRING DIAGRAM



CHRYSLER V8 WIRING DIAGRAM

Chrysler, Imperial, Dodge, Plymouth V8 1963



CHRYSLER IMPERIAL WIRING DIAGRAM

ENGINE IDENTIFICATION

Engine identified by digits following letter **T** in engine number as follows

Engine	① Displacement Designation
318"	318
361"	36
383"	38
413" Except 300J	41
300J	41 Early, ② C300J Later
426" Before 12/19/62	42
12/19/62 to 5/30/63	(11 0-1) 426TMP
	(13 5-1) 426TMP-HC
Beginning 5/31/63 ③	(11 0-1) 426-2-TMP
	(13 5-1) 426-2-TMP-HC

① - *For engine build date and serial number sequence codes, see "Model Identification"*
② - No letter **T**.
③ - Dodge Ramcharger 426A and Plymouth Super Stock' 426II Engines *See Engine Notes for details*

Engine Number Location

318" Engine - Left front of block under cylinder head

361", 383", 413", 426" Engines - Right side of block below distributor, or on left front of block behind thermostat housing

Engine Number Pad Markings

Various marks as listed below may be found on Engine Number pad and indicate variations in engine specifications which affect service procedures

Engine Specifications	Marking
Low Compression Engine	LC
High Compression Engine	HC
High Performance Engine	① HP
Maximum Performance Engine	MP
001" Undersize Crankshaft Journals	② Maltese Cross
010" Undersize Crankshaft Journals (318")	② B
(Others)	② Maltese Cross &X
020" Oversize Cylinder Bores	A
008" Oversize Valve Lifters	♦

① - *See "High Performance Engine Note"*
② - *Further identification on crankshaft counterweight See next table*

Other Identifying Marks

The following marks appear in other locations as follows

On End of Cylinder Head - **o/s** indicates valves with 005" oversize stems

On Crankshaft Counterweight - 318" - **M** and **R** indicate all crankshaft journals 010" undersize

361", 383", 413", 426" - **1)** **M** and **R** plus a number indicate which **Main** and **Rod** journals are 001" undersize **2)** **M-10** and **R-10** indicate all crankshaft journals are ,010" undersize

►*HIGH PERFORMANCE ENGINE NOTE:* Conventional engines characterized by hydraulic lifters, standard camshaft, 2 or 4-barrel carburetors, and which are optional engines in some models, may also be designated "High Performance" (HP) engines

ENGINE

GENERAL SPECIFICATIONS

Engine & Carburetion	Horsepower at RPM	Compr. Ratio	Bore	Stroke	Displacement
318" (All) ②	230 at 4400	9 0-1	3 91"	3 31"	318 cu ins
361" (All) ①	265 at 4400	9 0-1	4 12"	3 38"	361 cu ins
383" Standard (2-Bbl) ①	305 at 4600	10 0-1	4 25"	3 38"	383 cu ins
(4-Bbl) ①	330 at 4600	10 0-1	4 25"	3 38"	383 cu ins
383" High Perf (4-Bbl) ②	320 at 4600	11 0-1	4 25"	3 38"	383 cu ins
(Two 4-Bbl) ③	325 at 5200	11 0-1	4 25"	3 38"	383 cu ins
413" Standard 4-Bbl ④	340 at 4600	10 1-1	4 19"	3 75"	413 cu ins
(300J, Ram)	390 at 4800	9 6-1	4 19"	3 75"	413 cu ins
413" High Perf (4-Bbl) ①	360 at 4600	10 1-1	4 19"	3 75"	413 cu ins
(4-Bbl) ②	365 at 4800	11 0-1	4 19"	3 75"	413 cu ins
426" High Perf ②					
One 4-Bbl (3559S)	⑤ 370 at 4600	11 0-1	4 25"	3 75"	426 cu ins
One 4-Bbl (3397S)	375 at 4600	13 5-1	4 25"	3 75"	426 cu ins
Two 4-Bbl (Short Ram)	415 at 5600	11 0-1	4 25"	3 75"	426 cu ins
Two 4-Bbl (Short Ram)	425 at 5600	13 5-1	4.25"	3 75"	426 cu ins

① - Hydraulic Lifters
② - Mechanical Lifters
③ - Front & Rear on a Single Manifold
④ - Standard on New Yorker & Imperial
⑤ - or 373 at 4800

ENGINE NOTES

►*"SQUEAK" OR "CHIRPING" NOISE IN ENGINE COMPARTMENT CORRECTION* Noise may be caused by water pump seal, but does not affect pump operation or efficiency To correct, add 2 ozs Silicone Water Pump Lubricant, No 2298997 to cooling system If noise continues after 600 miles of operation, replace pump

►*361", 383", 413" CYLINDER HEAD PRODUCTION CHANGE:* Beginning with date code "2-1" (last digits of engine number), new cylinder heads, covers, and cover gaskets were used Covers and gaskets have two additional mounting holes on exhaust side and heads have bosses added for additional mounting studs New and old parts are interchangeable except *new gasket cannot be used with old head*

►*426" ENGINE (EARLY) DIPSTICK NOTE:* Make sure dipstick is correctly calibrated for correct oil capacity of 5 quarts (6 quarts with filter change)

►*RAMCHARGER (413" & 426") ENGINES CAMSHAFT REPLACEMENT CAUTIONS:* To avoid camshaft lobe failure, observe the following precautions when replacing camshaft· **1)** Always use **all new** lifters, and coat lifters and camshaft liberally with "MS" oil during installation **2)** Adjust valve lash correctly **before starting engine. 3)** Use premium oil, SAE 30W and add 1 can of MoPar Engine Oil Supplement, No 1879406 **4)** Operate engine for 3 hours at 2000-3200 RPM *Avoid unnecessary idling*

►*426" ENGINE DESIGN & OPERATING NOTES & CAUTIONS. Note the following when operating or servicing this engine.*

1) Cylinder Head & Block - Special type head with larger ports, and with heat crossover passage eliminated Extra large exhaust valves are used and cylinder block bores must be notched to provide valve clearance

2) Pistons - Forged type for high output Highest octane gasoline available is required to prevent damage There is no bi-metal thermal control on 13 5-1 ratio pistons *Do not operate engine over 6500 RPM, and wide open throttle bursts must be limited to 15 seconds*

3) Crankshaft - Journals are hardened and fillets are shot-peened Journals are ground 001" undersize to accommodate F-77 Tri-Metal heavy duty bearings

►*426' ENGINE PRODUCTION CHANGES (BEGINNING 5/31/63)* These engines identified by special Engine Number (see data above) and special marking on rocker cover "Ramcharger 426A" (Dodge) or "Super Stock 426II" (Plymouth) have the following changes in specifications and design

1) Cylinder Head Assembly - Heads are relieved in combustion chamber adjacent to intake valve and port approach angle to intake valve has been changed from 15° to 0° Combustion chamber volume is 82 cc (minimum), 87 cc (maximum)

2) Camshaft - Maximum performance type with 300° duration (Intake), 308° (Exhaust) Lift is 520" for all valves

3) Carburetors & Manifold - Carburetors are Carter 3705S with larger (1 11/16") bores Manifold is "Short Ram" type with larger 1 69" openings at carburetor mounting flanges

4) Other Specifications - *See Engine Data for other special specifications*

ENGINE REMOVAL

Engine may be removed in the usual manner after removing hood, battery, fan shroud, radiator, carburetor, and transmission

RAM MANIFOLD REMOVAL (LONG RAM TYPE - 300J)

Remove and install left manifold first Remove fender shield access plates Remove air conditioning compressor and brackets Remove either manifold with carburetor attached

OIL PAN REMOVAL

OIL PAN BOLT NOTE (361", 383", 413", 426") -The two rear center bolts are shorter (9/16") than other bolts and thread into rear bearing seal retainer DO NOT install longer bolts in these holes or retainer will be damaged and there will be an oil leak

Dodge (Except 880) & Plymouth - Observe the following Remove engine-to-torque converter housing brace on 318" Disconnect steering and idler arm ball joints from steering linkage center link Disconnect exhaust cross-over pipe from exhaust manifolds and let hang Remove oil pan *INSTALLING NOTE* - Bottom of oil strainer must be parallel with lower machined surface of engine block, and on 361", 383", 413", 426" engines, foot of strainer should touch bottom of oil pan

TIGHTENING SPECIFICATIONS

Application	318"	Foot-Pounds 361", 383" 413", 426"
Cylinder Head	①85	① 70
Intake Manifold	30	50
Exhaust Manifold	30	30
Oil Pan	15	15
Main Bearing Caps	85	85
Connecting Rod Caps	45	45
Rear Bearing Seal Retainer		30
Vibration Damper	135	135
Crankshaft Pulley	200 Inch-Lbs	15
Camshaft Sprocket	35	35
Camshaft Thrust Plate	210 Inch-Lbs	
Rocker Shaft Support Bracket	27	30
Valve Chamber Cover	50 Inch-Lbs	15
Rocker Arm Cover	36 Inch-Lbs	40 Inch-Lbs
Engine Front Cover	35	15
Water Pump	30	30
Oil Pump	35	35
Clutch or Converter Housing	30	30
Flywheel Housing	50	50

ENGINE MOUNT TORQUES

Application	Ft. Lbs.
Front Mount-to-Frame	85
Front Mount-to-Engine	45
Rear Mount-to-Transmission	35
Rear Mount-to-Crossmember	35
Rear Crossmember-to-Frame	75

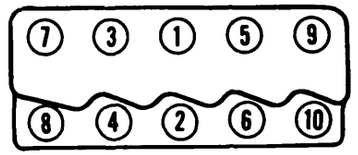
① - Tighten bolts 2 times around in sequence to the same torque specification

Dodge 880, Chrysler, Imperial - Observe the following Disconnect steering linkage from idler and pitman arms Remove exhaust pipe and converter dust shield Remove oil pan *INSTALLING NOTE* - Bottom of oil strainer must be on a horizontal plane with machined surface of cylinder block, and foot of strainer should touch bottom of oil pan

CYLINDER HEAD

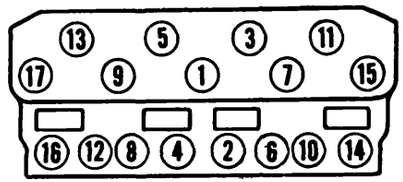
Removal - On air conditioned cars, No 8 exhaust valve must be open for clearance to remove rocker arm cover Remove intake manifold, carburetor and ignition coil as an assembly Remove exhaust manifold Take off rocker cover, remove rocker arm assembly, lift out all pushrods (keep in order for reassembly in same position)

Installation - Coat cylinder head gasket with suitable sealer, then install cylinder head in the usual manner Tighten head bolts 2 times around to correct torque in sequence shown in diagrams



2F253

318" ENGINE CYLINDER HEAD TIGHTENING SEQUENCE



2F254

361", 383", 413", 426" ENGINES CYLINDER HEAD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTONS Clearance ①	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS ③End Gap	RINGS Side Clearance
318"	0005- 0015"	0000- 0005" ②	0001- 0004" ②	Compr 1&2 Oil	010- 020" 010- 020"	0015- 003" 001- 009"
361", 383", 413"	0003- 0013"	00045- 00075"	0007- 0012" ④	Compr 1&2 Oil	013- 025" 013- 025"	0015- 003" 001- 009"
426"	0035- 0045" ⑤	0006- 0009"	0007- 0014" ④	Compr 1&2 Oil	⑥ ⑥	002- 0035" 001- 003"

① - Measured at top of skirt ② - Light thumb push fit at 70°F

③ - Measured 2" from bottom of cylinder bore ④ - Press (interference) fit *See text for Removal & Installation procedures*

⑤ - For 13 5-1 ratio 008- 010" ⑥ - 013- 025"(11 0-1), 023- 025"(13 5-1), 013- 050"(426A & 426II)

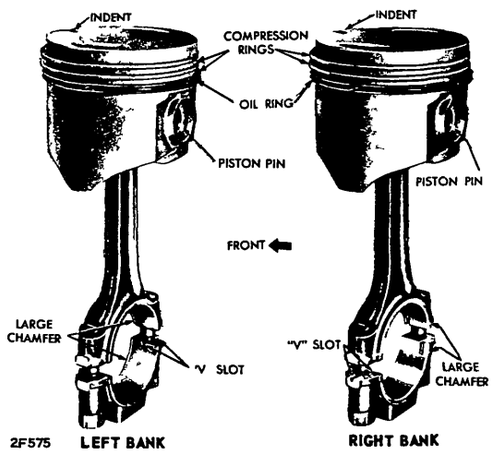
FITTING PISTONS

318 Engine - Coat cylinder bore lightly with engine oil and insert piston upside down. With ½" x .0015" feeler gauge inserted between thrust face of piston and cylinder wall, pull to withdraw feeler should be 5-10 lbs.

361, 383, 413, 426 Engines - Measure 90° to piston pin axis and at top of skirt Cylinder bores on used engines should be measured halfway down bore and 90° to crankshaft centerline

PISTON PIN REPLACEMENT (361", 383", 413", 426")

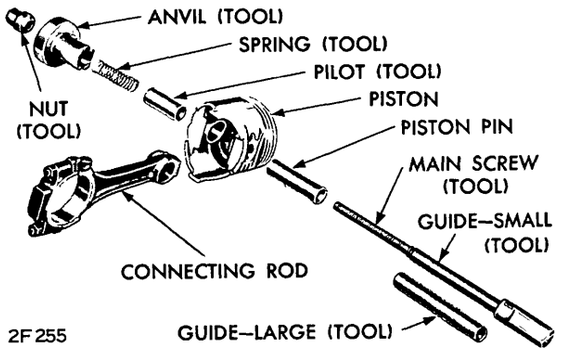
Removal - Use Tool C-3684 as shown in illustration to remove pin from piston and rod assembly When pin falls free of rod, stop press to prevent damage to anvil of tool



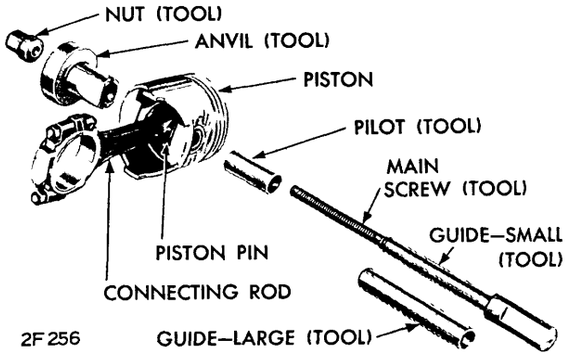
PISTON & ROD ASSEMBLY & INSTALLATION

Installation - *Do not ream pistons or connecting rods.* Lubricate pin bores in piston and rod and use Tool C-3684 as shown in illustration. Notch or "Front" on piston must face upwards when assembled in tool and with connecting rod properly positioned (see illustration), press piston pin in until pin bottoms on pilot.

Testing For Proper Fit - Assemble piston and rod with tool in same manner as for pin removal. Clamp screw shaft end of tool in a vise. With torque wrench at nut (anvil end of tool), apply 15 ft. lbs. torque. If pin does not move, fit is correct. If pin moves in rod, fit is incorrect and rod should be replaced.



361", 383", 413", 426" ENGINES PISTON PIN INSTALLATION



361", 383", 413", 426" ENGINES PISTON PIN REMOVAL

CRANKSHAFT REAR SEAL REPLACEMENT

Upper Seal - Use Tool C-3511 (318"), C-3625 with bridge removed (361", 383", 413", 426") and tap seal into position until tool is seated. Cut ends flush with block.

Lower Seal - Use Tool C-3511 (318"), C-3625 with bridge in place (361", 383", 413", 426") and tap seal into position until tool is seated. Cut ends flush with cap or retainer.

Side Seals - Dip side seals in mineral spirits or diesel fuel and install **immediately** into cap or retainer. On 318" engine, short seal must be on doweled side of cap. *CAUTION - Seals expand with oil. Failure to pre-oil seals will cause an oil leak.*

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS Journal Diam.	Clearance	Thrust Bearing	Crankshaft Endplay	CONNECTING ROD BEARINGS Journal Diam.	Clearance	① Sideplay
318"	2.4995-2.5005"	.0005-.0015"③	No. 3	.002-.007"④	2.124-2.125"	.0005-.0015"③	.006-.014"
361", 383"	2.6245-2.6255"	.0005-.0015"③	No. 3	.002-.007"④	2.374-2.375"	.0005-.0015"③	.009-.017"
413"	2.7495-2.7505"	.0005-.0015"③	No. 3	.002-.007"④	2.374-2.375"	.0005-.0015"③	.009-.017"
426"	2.7490-2.7500"②	.0015-.0040"⑤	No. 3	.002-.007"④	2.373-2.374"②	.002-.0045"⑥	.009-.017"

① - Total for both rods.
② - Ground .001" undersize to accommodate F-77 Tri-metal Heavy Duty Bearings.
③ - Wear limit .0025". ④ - Wear limit .010".
⑤ - Wear limit .0045". ⑥ - Wear limit .005".

MAIN BEARING NON-INTERCHANGEABILITY

Upper and lower bearing halves are **not** interchangeable because upper halves have oil hole and groove. On 361", 383", 413", 426" engines, No. 1 upper half is **not** interchangeable because it is chamfered on the tab side for timing chain lubrication (insert has red mark on edge).

ENGINE FRONT COVER REPLACEMENT

Front cover may be removed after radiator, water pump, and vibration damper and pulley are removed.

FRONT COVER SEAL REPLACEMENT

Use Tool C-3506 to replace seal as follows:

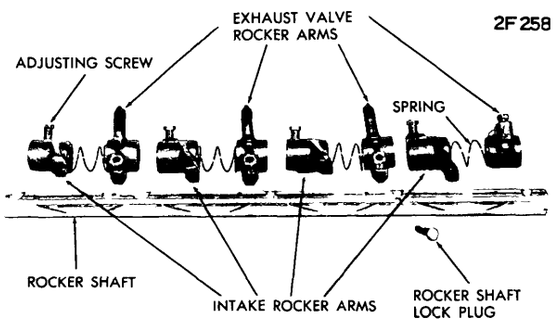
Removal - With inside of cover up, put puller screw through seal and position puller blocks directly opposite each other under flange of seal retainer. With washer and nut on puller screw, tighten nut so puller blocks distort seal retainer lip. Place sleeve over retainer and place removing and installing plate into sleeve. Place flat washer and nut on puller screw, hold center screw and tighten nut to remove seal.

Installation - Insert puller screw through removing and installing plate so thin shoulder faces up. Insert assembly through seal opening in front cover (inside of cover up), and place seal in opening with neoprene part of seal down. Place seal installing plate into seal with protective recess toward lip of seal retainer. With flat washer and nut on puller screw, hold screw and tighten nut until neoprene is tight against face of front cover. *If a .0015" feeler gauge CANNOT be inserted between neoprene and cover, seal is installed correctly.*

VALVES

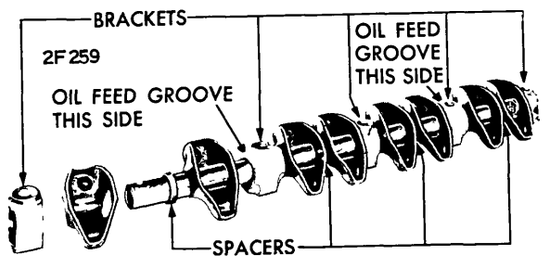
ROCKER ARM SHAFT REPLACEMENT

318" - To install assembly, slide rocker shaft into bore of strut, engage intake rocker arm, install spring and engage exhaust rocker arm. Repeat procedure until all rocker arms are installed. Make sure that rocker shaft bolt holes align with head bolt holes in struts. Also, plug hole in strut must align with hole in shaft. Install new rocker shaft end plugs.



318" ENGINE ROCKER ARM & SHAFT ASSEMBLY

361", 383", 413", 426" - Install rocker shafts so that the 3/16" lubrication holes point downward into rocker arms and 15° angle of holes points outward toward valve end of rocker arm. *NOTE - 15° angle of holes is determined from centerline of th bolt holes through the shaft which attach shaft and bracket assembly to cylinder head.* The two wide support brackets must be installed with oil feed grooves facing pushrod side of rocker arm.



361", 383", 413" ENGINES ROCKER ARM & SHAFT ASSEMBLY (HYDRAULIC LIFTERS - MECHANICAL LIFTERS SIMILAR)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

PUSHROD INSTALLATION

Small diameter end of pushrod must seat in lifter. Large diameter end must contact rocker arm. Improper installation will cause valves to be held open partially.

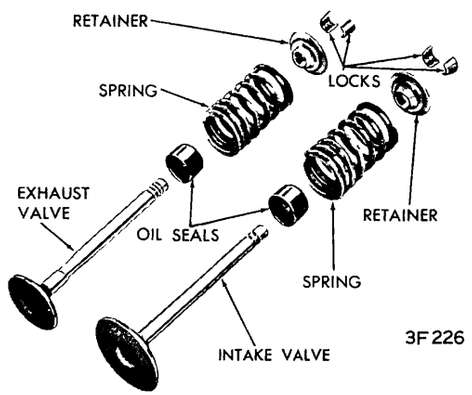
VALVE GUIDE SERVICING

Guides are integral with cylinder head.

Wear Check - Use Sleeve Tool C-3025 Intake, C-3026 Exhaust over valve stem to hold valve at working height. Check valve movement with dial indicator. Total movement should not exceed specifications in table below

Engine	Intake	Exhaust
318"	.008"	.014"
361", 383", 413", 426"	.010"	014"

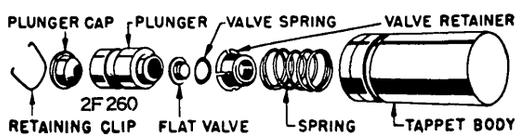
Servicing - Ream to next oversize with Reamer C-3433 (.005"), C-3430 (.015"), C-3427 (.030")



VALVE ASSEMBLIES (EXPLODED)

HYDRAULIC LIFTERS

See illustration for arrangement of parts. To test, remove cap from plunger, submerge upright lifter completely in clean kerosene and allow to fill. Replace cap. Place lifter upright in Lifter Testing Pliers C-3160 and check leakdown. If lifter collapses immediately, disassemble, clean, and test again. If rapid leakdown persists, replace lifter.



HYDRAULIC VALVE LIFTER (EXPLODED)

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. If height exceeds maximum (table below), install 1/16" spacer under spring.

Valve Spring Installed Height

Engines	Minimum	Maximum
318"		1 11/16"
361", 383", 413", 426"	1 53/64"	1 57/64"

VALVES

Engine (Horsepower) ①	Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	② Stem Diameter	⑦ Stem Clearance	Valve Lift
318" (All)	Int.	1.844"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.397"
	Exh.	1.563"	45°	45°	3/64-1/16"	.3715"	.002-.004"	.403"
361" (All)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.392"
	Exh.	1.60"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.390"
383" (305)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.392"
	Exh.	1.60"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.390"
(330)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.430"
	Exh.	1.60"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.430"
(320,325)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	③
	Exh.	⑤	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	④
413" (340,360)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	⑧ .392"
	Exh.	1.60"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	⑧ 390"
(365)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.444"
	Exh.	⑥	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.456"
(390)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.001-.003"	.444"
	Exh.	1.75"	45°	45°	3/64-1/16"	.371-.372"	.002-.004"	.450"
426" (370, 375, 415, 425)	Int.	2.08"	45°	45°	1/16-3/32"	.372-.373"	.002-.004"	③
	Exh.	1.88"	45°	45°	3/64-1/16"	.371-.372"	.003-.005"	④

① - See *GENERAL SPECIFICATIONS table.* ② - Standard size.

③ - .444" (268° Camshaft), .450" (276° Camshaft), .509" (300° Camshaft), .520" (300° Camshaft) (426A & 426II)

④ - .456" (268° Camshaft), .455" (276° Camshaft), .520" (300° Camshaft).

⑤ - 1.60" Standard, 1.74" Optional. ⑥ - 1.60" Standard, 1.74" and 1.88" Optional.

⑦ - Wear limit 004" (.005" on 426" Engine) Intake. Wear limit .006" (.007" on 426" Engine) Exhaust.

⑧ - .430" on 360 Horsepower Engine

GRINDING VALVES

Check valve height in head after grinding valves using Tool C-3648. If valve tip exceeds maximum (end of cylinder gauge), grind tip down to approach, but not below minimum height (slotted part of gauge).

VALVE STEM SEALS

Used on all valves except some early 426" engine intake valves. Seals and retainers can be installed on these early engines if desired as guides are already machined for seals.

VALVE SPRINGS & LIFTERS

Engine ①	SPRINGS			LIFTERS	
	Free Length	Pressure (Lbs.) ② Valve Closed	Pressure (Lbs.) ② Valve Open	Diameter	Clearance
318" (All)	1.92"	49-57 at 1 11/16"	137-150 at 1 5/16"	.9040-.9045"	0005- 0018"
361" (All)	2.34"	95-105 at 1 86"	187-203 at 1.47"	9040-.9045"	.0005- 0018"
383" (305,330 HP)	2.34"	95-105 at 1.86"	187-203 at 1.47"	.9040-.9045"	.0005-.0018"
(320,325 HP)	2.14"	90-100 at 1.86"	256-276 at 1.36"	.9040-.9045"	.0005-.0018"
413" (340,360 HP)	2 34"	95-105 at 1 86"	187-203 at 1.47"	.9040-.9045"	.0005-.0018"
(365 HP)	2.14"	90-100 at 1.86"	256-276 at 1.36"	.9040-.9045"	.0005-.0018"
(390 HP)	2.21"	85-95 at 1.86"	216-234 at 1.43"	.9040-.9045"	.0005- 0018"
426" (All)	③	④ 90-100 at 1.86"	⑤ 256-276 at 1.36"	.9030-.9035"	.0015-.0028"

① - See *GENERAL SPECIFICATIONS above for Horsepower.*

② - Includes damper if used (all engines).

③ - Outer spring 2.14"; Inner spring 1 867".

④ - Outer spring (including damper). Inner spring 28.5-31.5 at 1.562".

⑤ - Outer spring (including damper). Inner spring 74-80 at 1.132".

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE TIMING

Engine ©	INTAKE Open BTDC	INTAKE Close ALDC	EXHAUST Open BLDC	EXHAUST Close ATDC
318" (All)	19°	45°	59°	1°
361 '(All)	13°	59°	59°	13°
383" (305 HP)	13°	59°	59°	13°
(330 HP)	24°	64°	64°	24°
(320,325 HP)				
268° Cam	22°	66°	62°	26°
276° Cam	24°	72°	62°	34°
300° Cam	33°	87°	78°	42°
413" (340 HP)	13°	59°	59°	13°
(360 HP)	24°	64°	64°	24°
(365 HP)	22°	66°	62°	26°
(390 HP)	18°	70°	66°	22°
426" (370, 375, 415,425 HP)				
268° Cam	22°	66°	62°	26°
276° Cam	24°	72°	62°	34°
300° Cam	33°	87°	78°	42°
300-308° Cam	33°	87°	87°	41°

© - *See GENERAL SPECIFICATIONS above*

VALVE TIMING CHECK

318" Engine

1) Turn crankshaft until No 6 exhaust valve is closing and No 6 intake valve is opening Turn No 1 intake valve adjusting screw in 1 turn
2) Install dial indicator so plunger contacts valve spring retainer face at a 90° angle, then zero indicator
3) Turn crankshaft clockwise in normal running direction until No 1 intake valve has lifted 041" Timing indicator on front cover should read from 10° BTDC to 2° ATDC

361", 383", 413" Hydraulic Lifter Engines

1) Turn crankshaft until No 6 exhaust valve is closing and No 6 intake valve is opening Insert ¼" spacer between rocker arm pad and stem tip of No 1 intake valve Allow spring load to bleed lifter down so valve train is solid.
2) Install dial indicator so plunger contacts valve spring retainer face at a 90° angle, then zero indicator
3) Turn crankshaft clockwise in normal running direction until No 1 intake valve has lifted correct amount and timing indicator on front cover reads correctly *See table below*

383", 413", 426" Mechanical Lifter Engines

1) Turn crankshaft until No 6 exhaust valve is closing and No 6 intake valve is opening Turn No 1 intake valve adjusting screw down to zero clearance plus ½-turn
2) Install dial indicator so plunger contacts valve spring retainer face at a 90° angle, then zero indicator
3) Turn crankshaft clockwise in normal running direction until No 1 intake valve has lifted correct amount and timing indicator on front cover reads correctly *See table below*

Engin	Valve Timing Check Valve Lift	Pointer
318"	041"	10°BTDC-2°ATDC
361", 383", 413"	013"	10°BTDC-2°ATDC
413" (300J)	069"	5°ATDC-7°ATDC

CAMSHAFT

Engine	Journal Diameters 1	2	3	4	5	© Clearance
318"	1.998-1.999"	1.982-1.983"	1.967-1.968"	1.951-1.952"	1 5605-1 5615"	.001-.003"
361" 383", 413"	1.998-1.999"	1.982-1.983"	1.967-1.968"	1.951-1.952"	1 748-1 749"	.001-.003"
426"	1 998-1 999"	1 982-1 983"	1 967-1 968"	1 951-1 952"	1 748-1 749"	001- 003"

© - Wear limit 005"

DISTRIBUTOR DRIVE GEAR & BUSHING REPLACEMENT

Bushing - Remove bushing with Tool C-3052 To replace, slide new bushing over burnishing end of Tool C-3053 and insert into bore Drive tool and bushing into position with a soft hammer As burnisher is pulled through bushing by tightening puller nut, bushing is expanded for tight fit in block and burnished to correct size *Do not ream bushing*

Drive Gear Installation - Coat shaft and drive gear with engine oil Install shaft so that, after gear spirals into place and indexes with oil pump shaft, slot in top of drive gear will point to first intake manifold bolt on left side of engine (318"), will be parallel with centerline of crankshaft (361", 383", 413", 426")

TIMING CHAIN REPLACEMENT

When installing timing chain and sprockets, install Holding Tool C-3509 in place of distributor drive gear and shaft to prevent camshaft from contacting rear welch plug Leave tool in place until after timing chain and sprockets installed, then install distributor drive gear *NOTE - On 361", 383", 413", 426" engines, modify Tool C-3509 by grinding off index lug holding upper arm on tool and rotate arm 180°, th n install tool*

CAMSHAFT REPLACEMENT

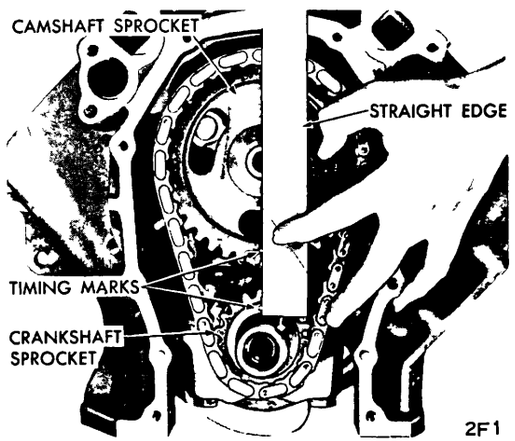
When installing camshaft, use Holding Tool C 3509 as detailed under "Timing Chain Replacement"above to prevent camshaft from contacting rear welch plug

CAMSHAFT BEARING REPLACEMENT

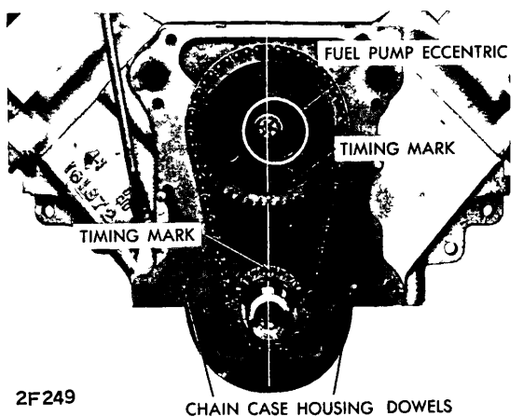
Tool Set C-3132A is available for replacing camshaft bearings Make sure all oil holes are perfectly aligned, and install a new rear welch plug On 361", 383", 413", 426" engines, No 1 bearing must be installed 1/32" inward from front face of cylinder block

CAMSHAFT END THRUST

318" Engine - Taken by thrust plate behind camshaft sprocket Endplay is 002- 006" (wear limit 010")
361", 383", 413", 426" Engines - Taken by rear face of camshaft sprocket riding directly on front of cylinder block



361", 383", 413", 426" ENGINES VALVE TIMING MARKS



318" ENGINE VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE OILING

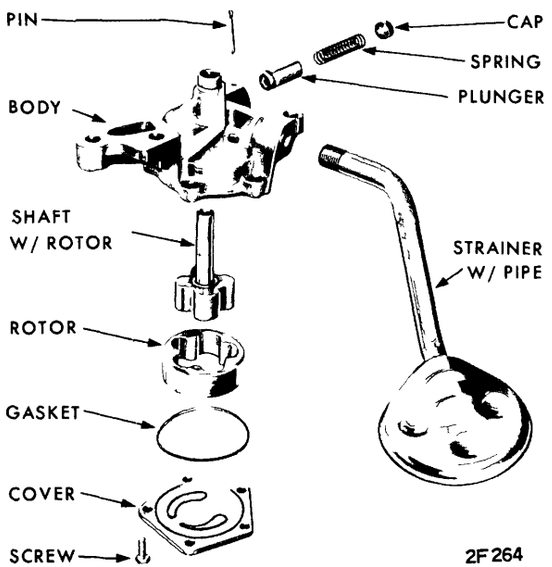
►*OIL PUMP RELIEF VALVE BUZZ OR FLUTTER CORRECTION:* On engines before April 25, 1963, above condition can be corrected by installing new type relief valve identified by narrow milled slot at one of the circumferential openings Later engines have this new type relief valve

Normal Oil Pr ssur - 45-65 lbs at 40-50 MPH.
Pressur R gulator Valve - In oil pump Not adjustable

ENGINE OILING SYSTEM

318" Engin
Refer to illustration. Force feed type using rotor type pump and **full-flow** oil filter (previous engines used by-pass type filter) Metering orifice in by-pass passage in block replaced by a solid plug so all oil is directed through the filter. *CAUTION - Full-flow filter must be used on 1963 engines.*

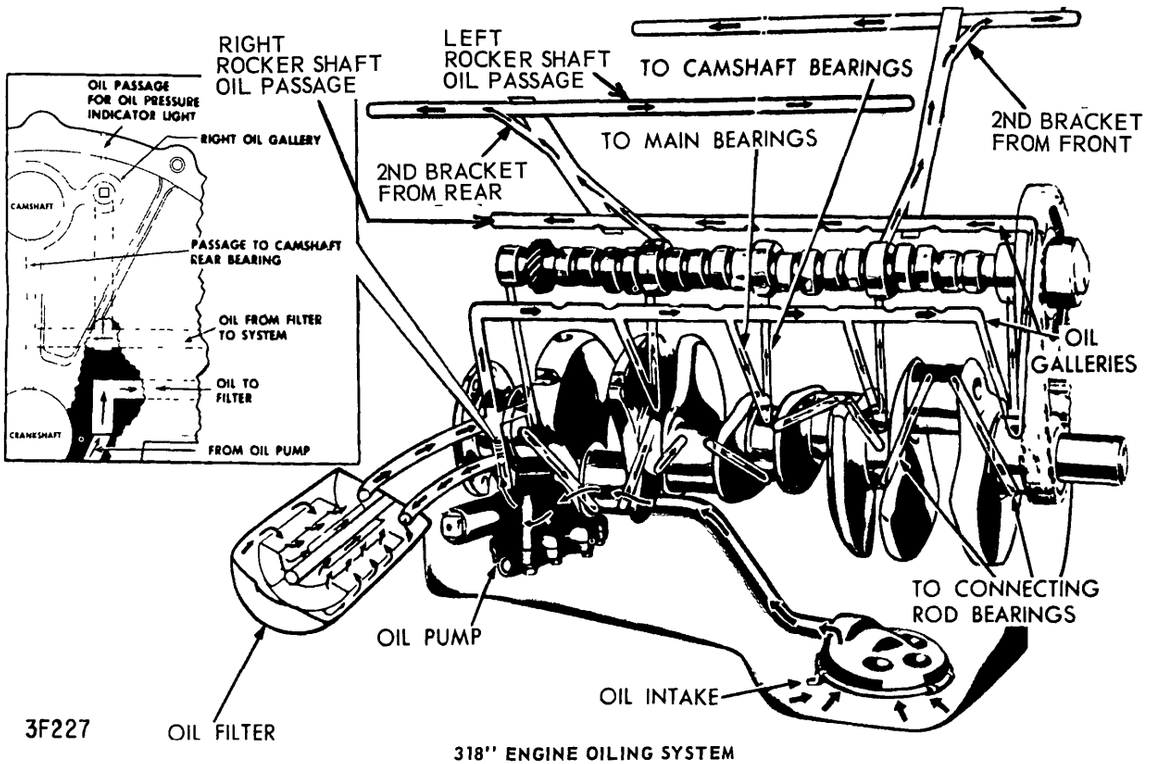
361", 383", 413", 426" Engines
Refer to illustration. Force feed type using rotor type pump and full-flow oil filter.



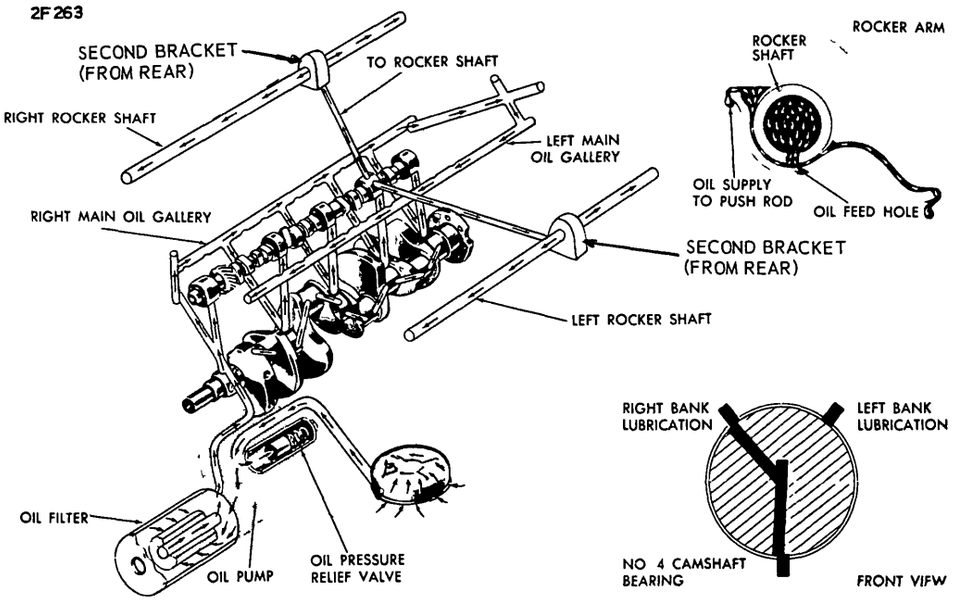
318" ENGINE OIL PUMP (EXPLODED)

OIL PUMP

Rotor type mounted on rear main bearing cap (318"), on left front corner of block (361", 383", 413", 426") *See illustration for arrangement of parts, and observe the following specifications:* Pump cover bolt torque is 10 ft. lbs



318" ENGINE OILING SYSTEM



361", 383", 413", 426" ENGINES OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

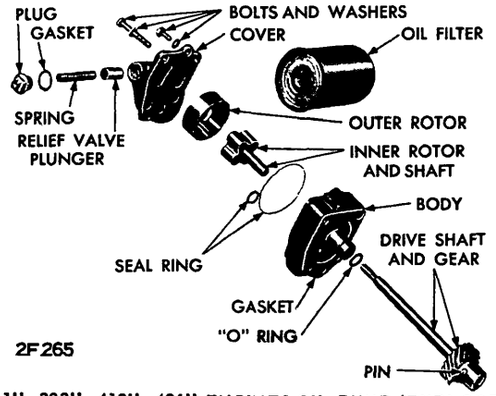
Oil Pump Specifications

Application	Engine 318"	361", 393", 413", 426"
Cover Surface Wear ①	.0015" Max.	.0015" Max.
Outer Rotor Length	.998" Min.	.943" Min.
Outer Rotor Diameter	2.244" Min	2.469" Min.
Inner Rotor Length	998" Min.	.942" Min.
Rotor End Clearance ②		
Inner Rotor	004" Max	.004" Max.
Outer Rotor	004" Max.	005" Max.
Outer Rotor-to-Body Clear	012" Max.	.012" Max.
Tip Clearance Btwn. Rotors	.012" Max.	010" Max.

① - At Rotor Area
② - Between end of rotor and top of pump body

Pressure Relief Valve Spring Specifications

Engine	Free Length	Load Length
318"	2 1/32"	2 1/16" at 19 5-20 5 lbs.
361",383",413"	2 19/64"	1 19/32" at 14 85-15.85 lbs.
426"	2 1/4"	



361", 383", 413", 426" ENGINES OIL PUMP (EXPLODED)

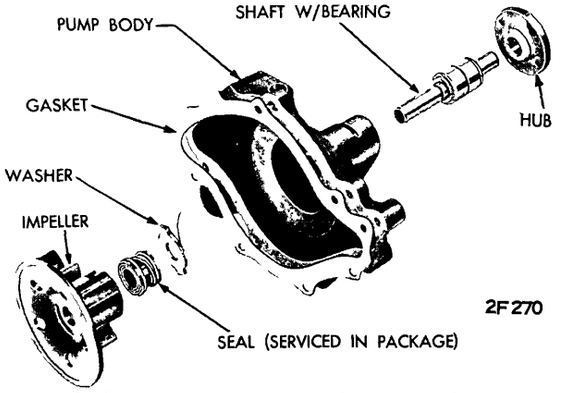
ENGINE COOLING

Thermostat - 180° pellet type in water outlet housing.
Pressure Valve - 14 lb (Std.), 16. lb. (Air Cond.) radiator filler cap.

WATER PUMP

See Illustrations for arrangement of parts.
Disassembly - Remove fan hub, support hub end of pump and remove impeller by breaking it away from metal insert Remove seal by sliding over shaft and insert With Splitter C-3476, split metal insert and remove from shaft Support hub end of pump body and press shaft and bearing through **front** of pump.
Reassembly - With pump body supported as close to center bore of pump as possible, press shaft and bearing assembly into body with Sleeve C-3468 and a press. *Distance from shoulder of seal retainer to front face of pump body must be .090".* Reface pump seal seat of housing (see below). Install new seal into impeller with ears on retaining washer engaged in slots in impeller. Support shaft at hub end and press impeller on shaft until it is flush with end of shaft. Support impeller end of shaft and press hub on shaft until shaft projects .330" beyond front face of hub

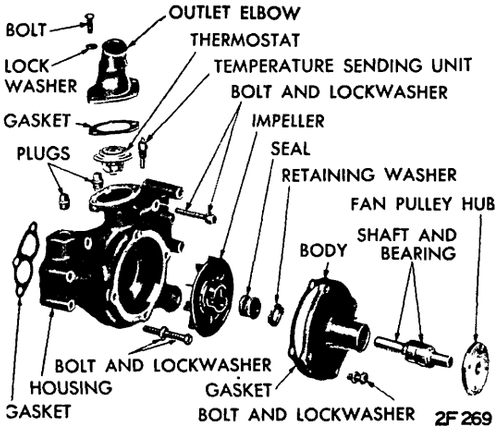
Refacing Seal Seat - Place Tool C-551 over pump shaft Turn tool in an even continuous clockwise motion until smooth surface is obtained Remove tool and install abrasive disc SP-1527 over end of tool and down against cutters Polish seat surface to a high polish *Turn by hand in a clockwise direction. Do not use motor.* Blow out with compressed air.



318" ENGINE WATER PUMP (EXPLODED)

FLUID FAN DRIVE

Drive is serviced as an assembly only. To test, cooling system must be at room temperature. Mark one blade of fan with chalk, attach a timing light to engine, and operate engine at 1700 RPM. Adjust engine speed so fan is stopped by timing light between 1550-1800 RPM (1600-1850 RPM on 413" Engine) If fan operates too slowly, overheating will result. If fan operates too fast, there will be excessive noise Replace unit if not within specifications



361", 383", 413", 426" ENGINES WATER PUMP (EXPLODED)

BELT ADJUSTMENT

Deflection applied at belt mid-point under 5 lb. load

Belt	① Used Belt 318	361	383 & 413
Power Steering	1/8"	3/16"	3/16"
Fan Idler		1/8"	1/8"
Alternator (with Air Cond.)	1/4"	3/8"	3/8"
(less Air Cond.)	1/4"	1/4"	1/4"

① - Any belt operated for ½-hour minimum.

Belt	New Belt 318	361	383 & 413
Power Steering	1/16"	1/8"	1/8"
Fan Idler		1/16"	1/16"
Alternator (with Air Cond.)	1/8"	1/4"	1/4"
(less Air Cond.)	1/8"	1/8"	1/8"

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace at Oil Change
Air Cleaner	Clean at 8000 miles
Breather Cap	Clean at Oil Change
Fuel Filter	Replace at Tune-Up or 16,000 miles
Auto. Trans. Filter (Normal Use)	None
(Heavy Duty Use)	Replace at 32,000 miles

① - Replace or clean more often if necessary.

AUTO TRANS. FILTER

Located in return line from oil cooler. (Under **extreme** heavy duty use, replace filter at 10,000 miles). Also drain transmission oil and clean screen.

OIL FILTER REPLACEMENT

Full-flow type used on all engines. Screw filter onto base until gasket contacts base, then tighten ½-turn more by hand. *Do not overtighten.* Start engine and check for leaks

CAPACITIES

	Chrysler, Imperial, Dodge 880	Dodge (Exc. 880), & Plymouth
Engine Oil ①	5 qts.	④ 4 qts
Cooling System ②	16 qts.	⑤
S.M. Trans.	4½ pts.	4½ pts.
Auto. Trans.	18 pts.	18 pts.
Rear Axle	4 pts.	4 pts.
Fuel Tank	③ 23 gal.	⑥ 20 gal.

① - Add 1 qt. with filter change.
② - Add 1 qt. for heater.
③ - 22 gal. on Station Wagon.
④ - 5 qts. on 320, 325 Horsepower 383" Engines & all 426" Engines.
⑤ - 20 qts. for 318" Engine; 16 qts. for 361", 383", 413", 426" Engines.
⑥ - 21½ gal. on Station Wagon.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MODEL IDENTIFICATION

CHRYSLER & IMPERIAL

Seri s	Series Designation
Chrysler	
Newport (Except Station Wagon)	1
(Station Wagon)	5
300 (Except Pacesetter)	2
(Pacesetter)	0
300J	4
New Yorker (Except Salon & Station Wagon)	3
(Salon)	8
(Station Wagon)	7
Taxi	8
Police	9
Fleet	0
Imperial	
Custom	1
Crown	2
LeBaron	3

DODGE & 880

S ri s	Series Designation
330 (Except Station Wagon)	1
(Station Wagon)	5
440 (Except Station Wagon)	2
(Station Wagon)	6
Polara (Except Station Wagon)	3
(Station Wagon)	7
Polara 500	4
880 (Except Station Wagon)	0
Custom 880 (Except Station Wagon)	1
880 & Custom 880 Station Wagon	5
Taxi	8
Police	9
Fleet	0

PLYMOUTH

Series	Series Designation
Savoy (Except Station Wagon)	1
(Station Wagon)	5
Belvedere (Except Station Wagon)	2
(Station Wagon)	6
Fury (Except Station Wagon)	3
(Station Wagon)	7
Sport Fury	4
Taxi	8
Police	9
Fleet	0

SERIAL NUMBER

Stamped on plate attached to left front door hinge pillar Number (example below) includes identification data

① ② ③ ④ ⑤
3 3 3 3 100001

① - Car Make **3** Plymouth, **5** Dodge 880, **6** Dodge (Except 880), **8** Chrysler, **9** Imperial
② - Car Series *See Series Designation Tables*
③ - Model Year **3** 1963
④ - Assembly Plant *See listing below*
⑤ - Beginning serial number at each assembly plant regardless of car make or series

Assembly Plant Designation

1 - Detroit (Plymouth)
2 - Detroit (Dodge)
3 - Detroit (Jefferson Ave)
5 - Los Angeles
6 - Newark-Delaware
7 - St Louis

ENGINE NUMBER

318" Engine

Stamped on left front of block under cylinder head Number (example below) includes the following·

① ② ③
T 318 1001

① - Model Year **T** 1963 *NOTE - "D" or "P" following "T" indicates "Dodge" or "Plymouth"*
② - Cubic Inch Displacement
③ - Beginning Serial Number

361", 383", 413" Engines

Stamped on right side of block below distributor, or on left front of block behind thermostat housing Number (example below) includes the following

① ② ③ ④
T 36 8 1

① - Model Year **T** 1963
② - Cubic Inch Displacement **36** 361", **38** 383", **41** 413" *NOTE - Later Chrysler 300J models use* **C300J** *in place of* **41.**
③ - Month Built ④ - Day of Month Built

426" Engine

Stamped on right side of block below distributor, or on left front of block behind thermostat housing Number (example below) includes the following

Before Dec. 19, 1962 - *Same as 361", 383", 413" Engines above*

After Dec. 19, 1962 -

① ② ③ ④ ⑤ ⑥ ⑦
426 T MP HC 12 19 01

① - 426 cu ins
② - Model Year **T** 1963
③ - Maximum Performance Engine (11 0-1 Compr Ratio)
④ - Maximum Performance High Compression Engine (13 5-1 Compr Ratio)
⑤ - Month Built ⑥ - Day of Month Built
⑦ - Consecutive Serial Number for each day's production

ENGINE IDENTIFYING MARKS

Other marks on engine number pad indicate various specifications *See "Engine Identification" under Engine Data for explanation of these marks*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE IDENTIFICATION

Engine can be identified by 5th figure of warranty number stamped on Warranty Plate Plate located on rear face of left front door.

Engine	Standard - CODE - Low Compression
144	S 2
170	U R
200	T
223" (Except Taxi)	V 5
223 (Taxi)	E

COMPRESSION PRESSURE

144" 170" 200'	150-190 lbs
223'	130-170 lbs

Maximum variation between cylinders 10 lbs

VALVE TAPPET CLEARANCE

144 170 200	ℂ Hydraulic
223 (Except Police & Taxi)	② Zero Lash Type
223' (Police & Taxi)	019 Intake & Exhaust

ℂ *For operating range adjustment, see Engine Data*
② - 025 clearance at valve stem tip with eccentric spring compressed *For initial adjustment, checking & minor running adjustment, see Engine Data*

TUNE-UP NOTES

► *1962 63 ENGINE FAILURE TO STAY IN TIME CORRECTION* May be caused by distributor turning from original setting To correct install later 1963 production distributor clamp No C3AZ-12270 A which is 1 3/16 wide No washer required

► *1963 ROUGH IDLE, POOR PERFORMANCE & FUEL ECONOMY CORRECTION* May be caused by carburetor air cleaner element being restricted by oil or water vapor To correct replace air cleaner element and install new type quick-acting carburetor vent lever No C3AZ-9D585-B *NOTE - Oil filler caps with more than 1 air metering hole must not be used on cars with Closed Crankcase Ventilation*

► *COLD HARD START CORRECTION (MANUAL CHOKE CARBURETORS)* May be caused by choke control cable being too long and interfering with pull-down rod or choke shaft lever when choke control knob pulled out To correct shorten cable as required and make sure cable housing extends ¼-½ beyond cable clamp at carburetor

► *1963 ENGINE STALLING AT IDLE CORRECTION* If engine stalls during hot idle operation replace fuel inlet seat fiber gasket with new rubber-coated aluminum gasket No C3AZ-9569 B and correctly adjust dry float level

► *1963 VERY ROUGH OR NO IDLE CORRECTION* May be caused by restricted idle fuel jet (check by removing air cleaner and covering idle air bleed with engine running - increase in RPM indicates restriction) To correct thoroughly clean all passages with compressed air

TUNE-UP SPECIFICATIONS

SPARK PLUGS

Gap (All)	035"
Torque (All)	15-20 ft lbs

Spark Plug Type

144" Engine	Autolite BF-82
170" Engine	Autolite BF-82
200' Engine	Autolite BF 82
223" Engine (with Economy Carb.)	Autolite BF-82
223" Engine (less Economy Carb.)	Autolite BTF-6

DISTRIBUTOR

Point Gap	.024-.026"
Cam Angle at Idle	35-38°
Condenser Capacity	.21-.25 mfd.
Breaker Arm Spring Tension	17-20 ozs

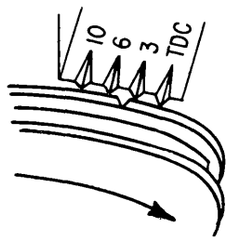
IGNITION TIMING

Set timing at idle speed with distributor vacuum line disconnected Degrees given are BTDC Minimum allowable setting is 2° BTDC Maximum allowable setting is 5° BTDC more than recommended figure

Ignition Timing Specifications

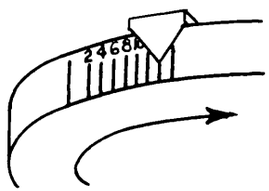
Engine	ℂ Synchro-mesh	ℂ Auto Trans.
144	8°	12°
170	6°	12°
200 '		10°
223 '	4°	10°

ℂ - May be advanced 2° when new points installed to compensate for rubbing block initial wear during first 6000 miles of operation



3A97

144", 170", 200" ENGINES IGNITION TIMING MARKS



3A130

223" ENGINE IGNITION TIMING MARKS

HOT (SLOW) IDLE RPM

223' Engine (Auto Trans in 'D)	475-500
All Others (Synchro-Mesh)	500-525
All Others (Auto Trans in "D")	ℂ 500-525

ℂ Supersedes previous 475-500 RPM for smoother operation
NOTE If equipped, run air conditioner 20 minutes before setting idle speed

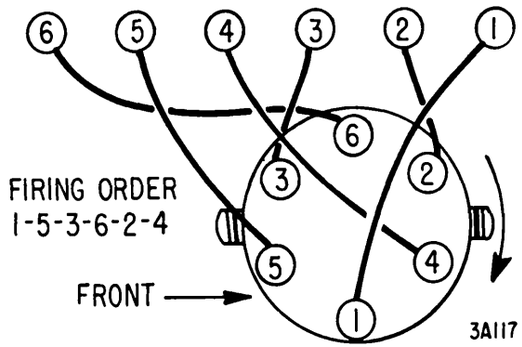
COLD (FAST) IDLE RPM

Comet (Synchro-mesh)	1500
Comet (Auto Trans)	1800
Meteor (Synchro-mesh)	1500
Meteor (Auto. Trans.)	1800

Fast idle screw on high st p of fast idle cam (hot engine)

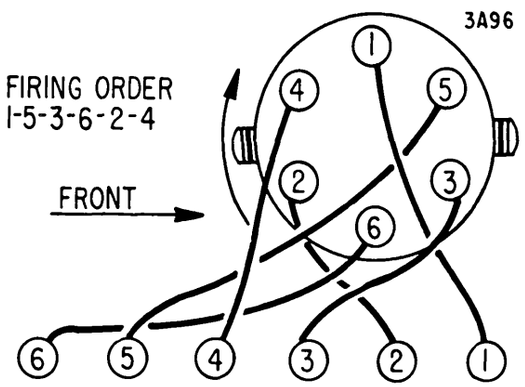
AUTOMATIC CHOKE SETTING

All Models Index



3A117

223" ENGINE FIRING ORDER



144", 170", 200" ENGINES FIRING ORDER

FUEL PUMP PRESSURE & VOLUME

Pressure (All)	3½-5½ lbs at 500 RPM
Volume (All)	1 Pint in 30 Seconds at 500 RPM

MANIFOLD HEAT CONTROL VALVE

223" Engine - Located in exhaust manifold Install with ¾-turn windup and hook over stop pin Lubricate every 6000 miles with Ford Solvent and Penetrating Fluid C0AA-19A501-A or equivalent

CRANKCASE VENTILATION

223" (Except Police & Taxi) & Early 144', 170', 200' - Air intake through oil filler cap and outlet from adapter on engine crankcase to carburetor air cleaner Clean hose and adapter every 12 000 miles with suitable solvents and blow dry with air

Later 144", 170", 200" - Air intake through oil filler cap and outlet from regulator valve on rocker arm cover to intake manifold at carburetor spacer Disassemble and clean regulator valve every 6000 miles and entire system every 12 000 miles

223" Police & Taxi - Air intake through oil filler cap and outlet from adapter on engine crankcase to regulator valve at intake manifold Clean valve and system every 6000 miles

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

C3DF-12127-E

Set test stand to 0° at 1000 RPM and 0" of Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr RPM
¾-1¼	0 35	500
1¾-2¾	0.45	600
5¾-6¾	1.30	1000
7¾-9	2.43	1400
9¾-11	4.10	2000
13¼ max.	10.00 max	

C3DF-12127-F

Set test stand to 0° at 1000 RPM and 0.48" of Hg

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1½-2½	0.35	500
4-5	0.80	800
6-7	1.80	1200
7½-8½	3.11	1600
8½-9¾	4.10	2000
12¼ max	10.00 max.	

C3DF-12127-G

Set test stand to 0° at 1000 RPM and 0" of Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
½-1½	0.30	500
4¾-5¾	0.80	800
8¼-9¼	1.80	1200
10-11¼	3.00	1600
11½-12¾	3.90	2000
16¼ max	10.00 max	

C3DF-12127-J

Set test stand to 0° at 1000 RPM and 0" of Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1-2	0.35	500
3½-4½	0.80	800
6-7	1.80	1200
9¼-10¾	3.90	2000
14 max	10.00 max	

C30Z-12127-C (200" 6 Cyl)

Set Test Stand to 0° at 250 RPM and 0" Hg

Distr Degrees	Vacuum (' of Hg)	Distr RPM
0	0 44	600
0-1	0 80	800
3¼-4¼	1 90	1200
5¼-6¼	3 00	1600
6¼-7½	3 80	2000
12½ Max	8 00	1000

For Engine Degrees & RPM, multiply by 2

C3AF-12127-G

Set test stand to 0° at 250 RPM and 0" of Hg.

Distr Degrees	Vacuum (" of Hg)	Distr. RPM
1¼-2¼	0.30	500
6-7¼	0.45	800
8¾-10	2.30	1400
10¾-12	4.30	2000
13¼ max	10.00 max	

C3AF-12127-H

Set test stand to 0° at 250 RPM and 0" of Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1-2	0.45	500
4¼-5¼	1.07	800
7-8	3.30	1400
7-8	6.00	2000
10¼	8.50	

IGNITION COIL

Primary Resistance (Ohms)	1 40-1 54 at 75°F
Secondary Resistance (Ohms)	8000-8800 at 75°F
Primary Resistance Wire (Ohms)	1 30-1 40 at 75°F
Current Draw (Amps)	2 5 idling 4 5 stopped

CARBURETOR

CARBURETOR SPECIFICATIONS		
Application	℄ Float Level	Choke Setting
144' 170' Fords	1"	Centered
144' 170 'Mercurys	1'	
200' Fords	15/16'	Centered
200' Mercurys	15/16"	
223 ' Galaxie	1'	

℄ - Measured from bottom of float to air horn with air horn inverted

► *1963 HESITATION ON ACCELERATION CORRECTION (Early Cars)* May be caused by improperly seated (staked) accelerator pump ball checks To correct stake balls properly

► *1963 FALCON 144" ENGINE CARBURETOR JET PRODUCTION CHANGE* 1 size leaner jets (stamped 52F) used on later carburetors with yellow or green paint on code tag Jet change made for improved fuel economy If lean condition encountered install 1 size richer jet (stamped 53F)

ACCELERATING PUMP SETTING

Roll pin should be in lower hole (marked HI) for operation in temperatures of 50°F and lower. Roll pin should be in upper hole (marked LO) for operation in temperatures of 50°F and higher and/or 5000 ft. and above altitude

THROTTLE LINKAGE ADJUSTMENT

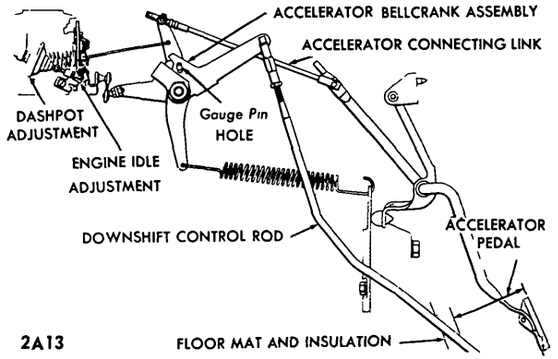
Galaxie Auto. Trans. Cars - Adjust engine idle speed and anti-stall dashpot (see below) then proceed as follows

1) Stop engine and make sure carburetor throttle lever is against idle adjusting screw.

2) Adjust accelerator connecting link for correct pedal height of 3 11/16" (measured from top front corner of accelerator pedal to floor mat).

3) Adjust downshift control rod length so a ¼" gauge pin will fit freely several times in gauge pin holes in accelerator bellcrank assembly.

Comet, Falcon, Fairlane & Meteor Auto. Trans. Cars - With engine at normal operating temperature and idle speed correctly set, make anti-stall dashpot adjustment (see below). Then proceed as follows



GALAXIE AUTO TRANS THROTTLE LINKAGE

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

1) Stop engine and adjust accelerator connecting link for accelerator pedal height of 3 15/16" (Fairlane); 4 5/16" (Meteor); 4¼" (Comet & Falcon). Measure from front top corner of accelerator to floor mat.

2) On Fairlane & Meteor adjust Tinnerman nut on downshift adjusting rod so there is 2 5/16" (Fairlane); 2 1/8" (Meteor) between nut and "Z" bar. *NOTE* - If downshift adjusting rod dimension must be reduced more than ¼" for proper kickdown shift, check for bent linkage or incorrect pedal height.

3) On Comet & Falcon, disconnect accelerator return spring at manifold, and kickdown spring at rod and "Z" bar. Pull downshift rod and "Z" bar up to full limit of travel (or hold accelerator pedal depressed and pull on downshift rod only). Slide stop bolt down against "Z" bar and tighten bolt. Install return springs. Check throttle and downshift linkage for full travel.

IDLE SPEED-UP CONTROL (POWER STEERING CARS)

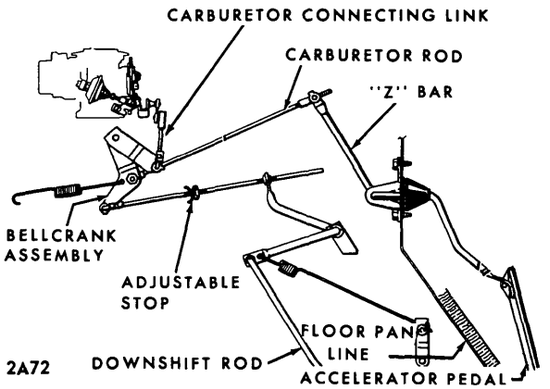
Adjustment - With engine at correct idle speed, turn wheels against linkage stops, loosen locknuts on control valve mounting bracket (on throttle linkage bellcrank) and adjust valve to maintain same idle speed with linkage against stops. *CAUTION - DO NOT hold wheels against stops for more than 15 seconds*

ANTI-STALL DASHPOT ADJUSTMENT

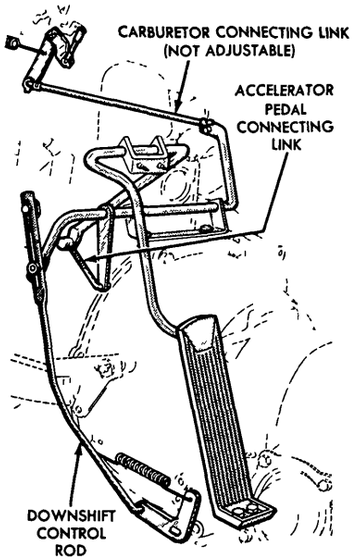
With slow idle correctly adjusted, turn dashpot adjusting screw inward until contact is made with plunger assembly. Turn adjusting screw inward (clockwise) 3¼-3¾ turns against dashpot diaphragm plunger assembly *NOTE - To correct objectionable slow return to idle, specification may be reduced to 2 turns*

MANUAL THROTTLE CONTROL ADJUSTMENT

Air Conditioned Cars - Attach a tachometer to engine and place transmission selector lever in "N" or "P" Turn air conditioning on and make sure magnetic clutch is engaged Using hand throttle, bring engine speed to 750-1000 RPM and secure stop closest to throttle control handle against cable armor so engine cannot be operated higher than above range with hand throttle



FAIRLANE & METEOR AUTO. TRANS. THROTTLE LINKAGE



FALCON & COMET AUTO. TRANS. THROTTLE LINKAGE

ELECTRICAL

BATTERY

► *1963 RECURRING RUN-DOWN BATTERY CORRECTION (60 AMP LEECE-NEVILLE ALTERNATOR CARS): See the Ford V8 Car Pages for correction.*

12-Volt

Capacity

Falcon, Fairlane, Comet, Meteor	**℄ Amp. Hours**
Standard	40
Optional	55
Galaxie	**℄ Amp. Hours**
Standard	55
Optional	65 or 70

℄ - 20 Hour Rate

Battery Ground - Negative to cylinder head

Engine Ground - At cylinder head (Falcon, Fairlane, Comet, Meteor), at converter or flywheel housing (Galaxie)

STARTER

► *1963 GALAXIE STARTER ENGAGEMENT NOISE CORRECTION.* Caused by misalignment of starter drive to flywheel due to tolerance build-up between alignment hole in center lug of starter and mounting hole in flywheel housing To correct, install starter with a shoulder bolt, No 376245-S8, and lockwasher, No 34847-S8, in alignment hole in center mounting lug of starter

Comet & Falcon

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12	70
8		5	450

Fairlane & Meteor

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12	70
9.6		5	500

Galaxie

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12	80-110
14.8		5	580

℄ - Engine idling.

Brush Spring Tension - 45 ozs. (except Galaxie); 48 ozs. (Galaxie).

GENERATOR

Ford No.	Amperes	Volts	Gen. RPM
C2DF-10000-B	25	15	2610
C2DF-10000-C	30	15	2525
C20F-10000-G	30	15	2525
C20F-10000-J	30	15	2600

Brush Spring Tension - 20-26 ozs. (except Comet & Falcon); 32-40 ozs. (Comet & Falcon).

Field Current (All) - 1 2-1 8 amps at 12 volts & 75°F

GENERATOR REGULATOR

Cutout Relay

Cuts In - 12.4-13.2 volts (25 Amp.); 12.0-12.8 volts (30 Amp.).
Cuts Out - 8 amps. (25 Amp.); 6-9 amps. (30 Amp.) reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F ambient temperature.

Current R gulator

Setting (25 Amp.) - 23-27 amperes.
Setting (30 Amp.) - 28-32 amperes.

ALTERNATOR

Leece-N ville N . A001 2074-AB

Current Output - 60 amperes at approximately 1600 Engine RPM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ALTERNATOR REGULATOR

L ece-Neville (Ford C2AZ-10316-A)

Conventional type containing a Load Relay, Double Contact Voltage Regulator, and a Current Regulator.

Load Relay

Closing Voltag - 5.6-6.4 volts.

Voltag Regulator

Voltage Setting - 13.5-14.3 volts at normal operating temperature.

Current Regulator

Curr nt Setting - 58-62 amps. at normal operating temperature.

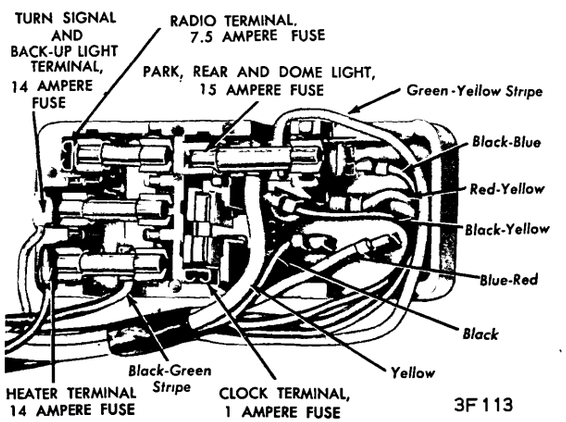
FUSES & CIRCUIT BREAKERS

CIRCUIT BREAKERS

1 - Headlight circuit. On headlight switch.
2 - Windshield wipers. At lower left end of instrument panel near steering column.
3 - Electric Windows (including Tailgate), Seats, Convertible Top. On starter relay.

FUSES

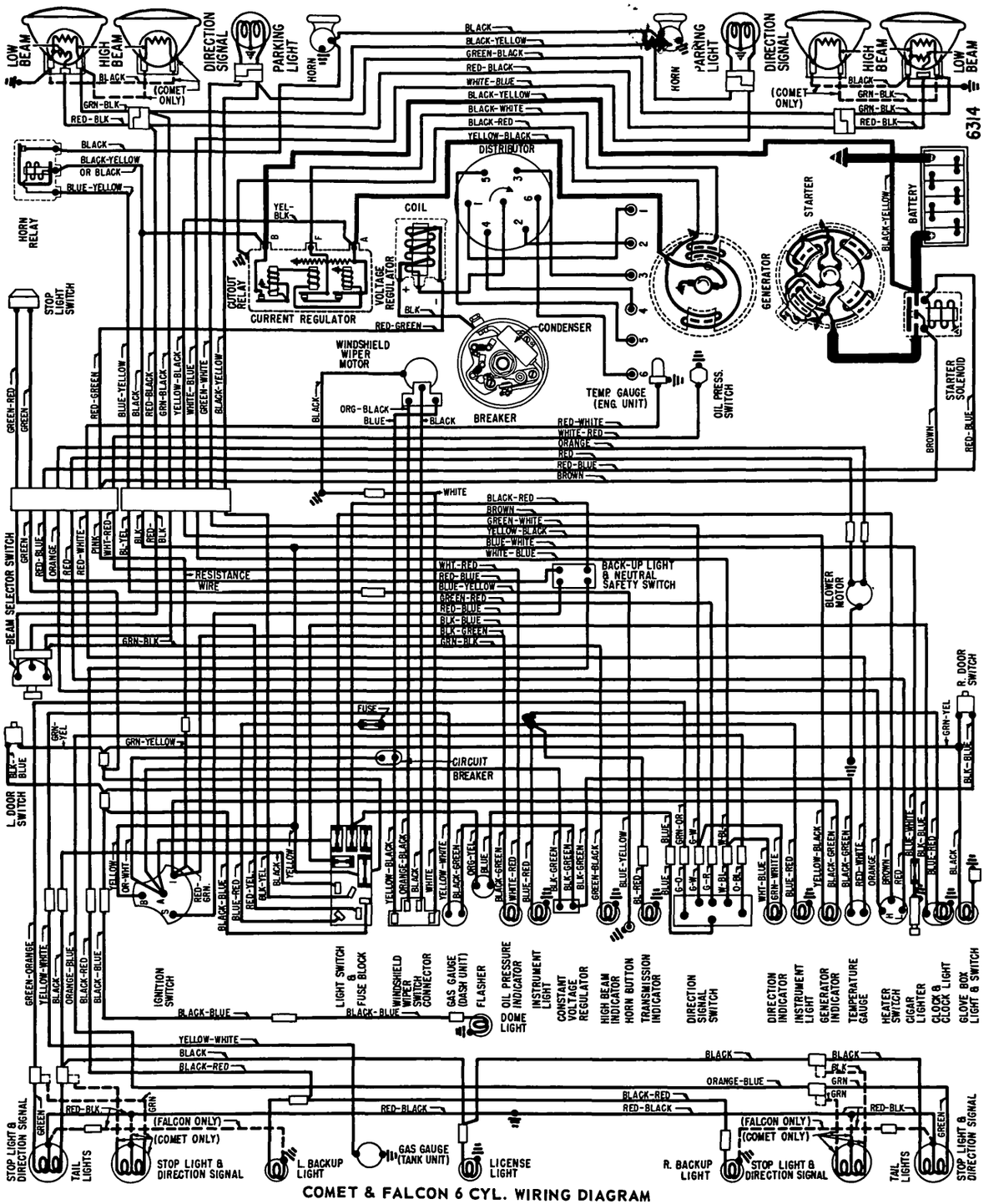
1 - Fuse block on headlight switch.
2 - In-line fuses in feed wire for each of the following units: Clock (Fairlane & Meteor only), Air Conditioner, Spotlight, Windshield Washer Pump, Instrument Panel Lamp Rheostat.
3 - Fuse on Overdrive Relay.



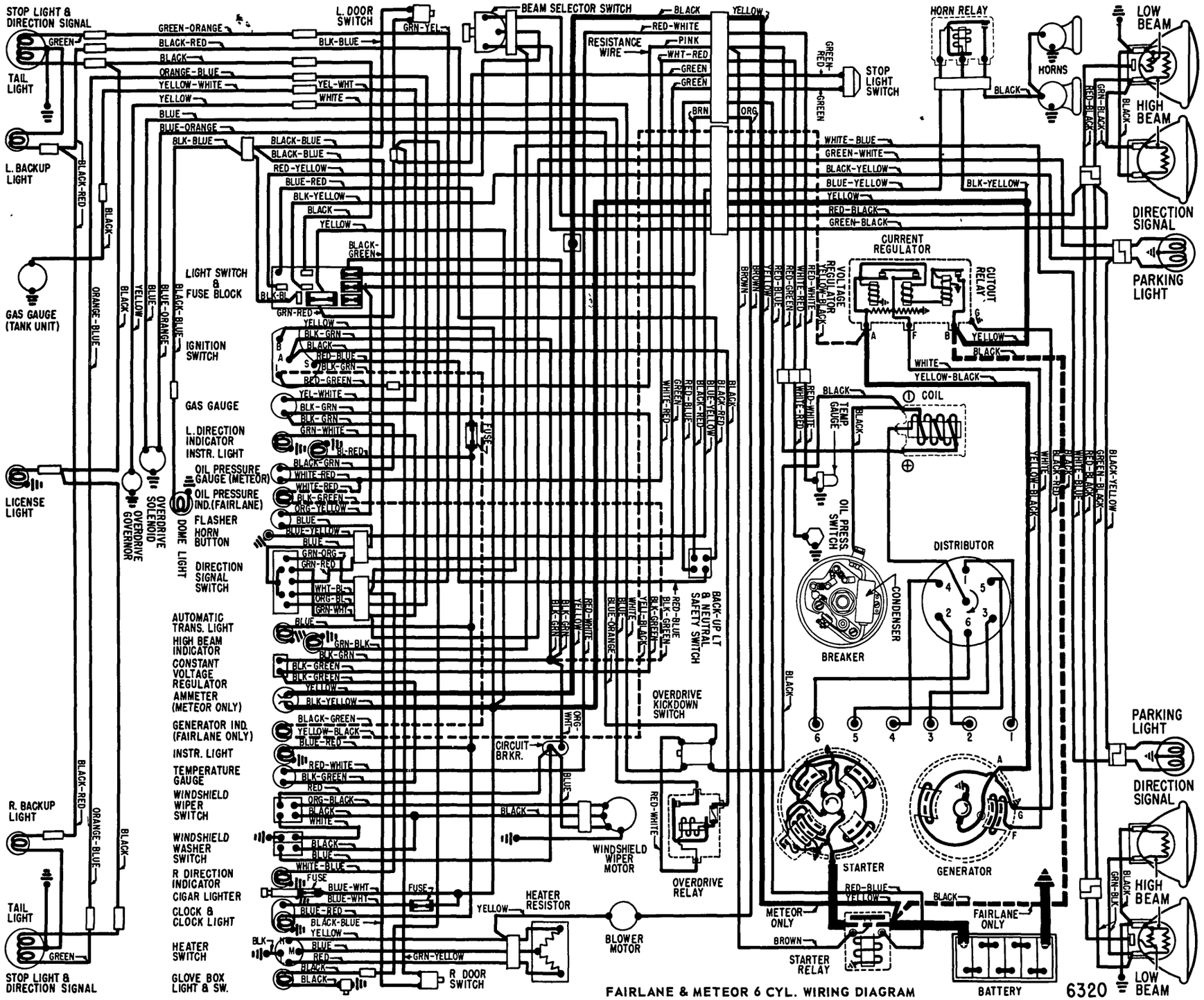
LIGHTING FUSE BLOCK

SWITCHES, GAUGES, & SPEEDOMETER

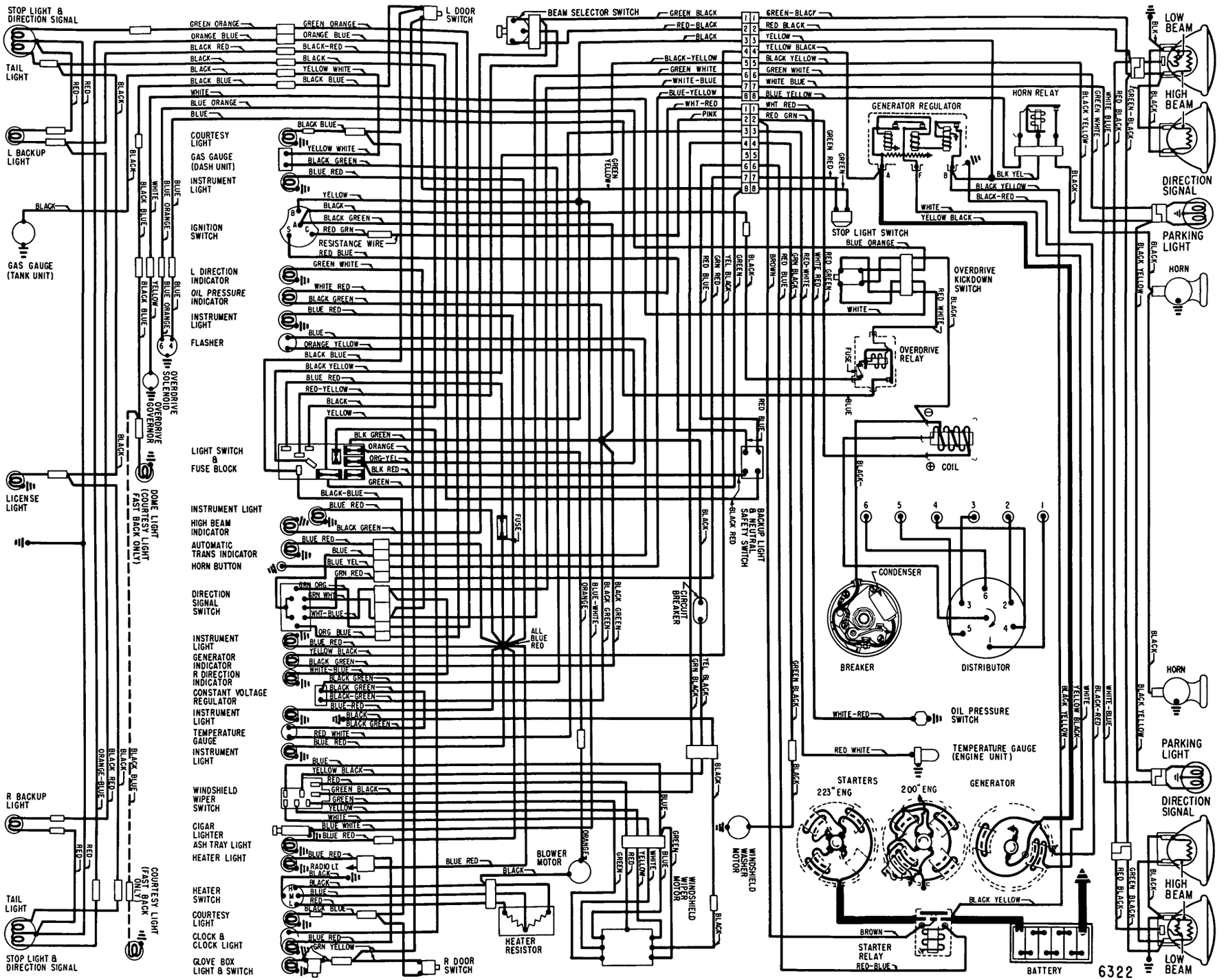
► *1963 GALAXIE TURN SIGNAL SWITCH NOT CANCELLING CORRECTION:* May be caused by turn signal lever binding on steering column tube and pin flange assembly. To correct, remove signal lever and grind off the 1/16" lip in slot in housing, using a fine mill file.



COMET & FALCON 6 CYL. WIRING DIAGRAM


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
L. BACKUP LIGHT
GAS GAUGE (TANK UNIT)
LICENSE LIGHT
R. BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
OVERDRIVE GOVERNOR
OVERDRIVE SOLENOID
L. DOOR SWITCH
LIGHT SWITCH & FUSE BLOCK
IGNITION SWITCH
GAS GAUGE
L. DIRECTION INDICATOR INSTR. LIGHT
OIL PRESSURE GAUGE (METEOR)
OIL PRESSURE IND.(FAIRLANE)
FLASHER
HORN BUTTON
DOME LIGHT
DIRECTION SIGNAL SWITCH
AUTOMATIC TRANS. LIGHT
HIGH BEAM INDICATOR
CONSTANT VOLTAGE REGULATOR
AMMETER (METEOR ONLY)
GENERATOR IND. (FAIRLANE ONLY)
INSTR. LIGHT
TEMPERATURE GAUGE
WINDSHIELD WIPER SWITCH
WINDSHIELD WASHER SWITCH
R DIRECTION INDICATOR
CIGAR LIGHTER
CLOCK & CLOCK LIGHT
HEATER SWITCH
GLOVE BOX LIGHT & SW.
R DOOR SWITCH
BEAM SELECTOR SWITCH
RESISTANCE WIRE
HEATER RESISTOR
BLOWER MOTOR
CIRCUIT BRKR.
WINDSHIELD WIPER MOTOR
OVERDRIVE KICKDOWN SWITCH
OVERDRIVE RELAY
BACK-UP LT & NEUTRAL SAFETY SWITCH
STOP LIGHT SWITCH
HORN RELAY
HORNS
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
CURRENT REGULATOR
VOLTAGE REGULATOR
CUTOUT RELAY
COIL
TEMP GAUGE
OIL PRESS. SWITCH
DISTRIBUTOR
CONDENSER
BREAKER
STARTER
GENERATOR
STARTER RELAY
METEOR ONLY
FAIRLANE ONLY
BATTERY
FAIRLANE & METEOR 6 CYL. WIRING DIAGRAM
6320

Ford & Falcon, Mercury & Comet 6 Cars 1963



FORD GALAXIE 6 CYL WIRING DIAGRAM (SEE COMET & FALCON FOR 200" ENGINE IGNITION WIRING)

SWITCHES, GAUGES, & SPEEDOMETER

► *INDICATOR GAUGES INACCURATE READING & MALFUNCTION NOTE:* **1)** On Temperature and Oil Pressure gauges, unit is grounded at sending unit threads. To insure good ground connection, use Sealer C3AZ-19554-B on threads of sending units. This sealer has aluminum particles in it to insure grounding.

2) On FM-radio equipped cars, radio suppression choke is installed on ignition (input) side of gauge voltage regulator. Make sure choke is installed on correct terminal before checking for malfunction or inaccurate readings.

NEUTRAL SAFETY SWITCH

All Models - Switch located on steering column under instrument panel. To adjust, loosen steering column-to-switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws. Starter circuit must be open in all positions except "N" or "P".

HEADLIGHT SWITCH REMOVAL

Press down on button on top of switch and remove knob and shaft. Remove retaining bezel nut (Tool No. 17470-N-51), and remove switch. Separate fuse block from switch and disconnect wiring.

STOP LIGHT SWITCH

On brake master cylinder. Not adjustable.

TURN SIGNAL FLASHER

Clipped on back of instrument cluster above and to left of speedometer (except Fairlane), at extreme left of instrument cluster (Fairlane).

SPEEDOMETER REMOVAL

Falcon & Comet - Disconnect speedometer cable, then remove instrument cluster bezel, lens, and cluster mask plate from cluster housing. Remove speedometer attaching screws and remove speedometer.

Fairlane, Meteor, Galaxie - Speedometer and other instruments may be removed from cluster after cluster removed from instrument panel (see below).

INSTRUMENT CLUSTER REMOVA L

Falcon & Comet - Remove instrument cluster bezel, lens, and cluster mask plate from cluster housing. Remove fuel or temperature gauge as required.

Fairlane & Meteor - Disconnect speedometer cable and remove wiring harness from retaining clamps. *NOTE - On Meteor, disconnect ammeter wire from terminal block on steering column right support and remove wire from ammeter loops.* Disconnect cluster from instrument panel and lay on steering column. Disconnect all wires and lamps from cluster, then remove cluster.

Galaxie - Remove steering column cover plate, and, on automatic transmission cars, turn shift indicator needle downward on shifting shaft. Disconnect speedometer cable. Remove wiring harness from retaining clips, then disconnect cluster from instrument panel and lay cluster on steering column. Disconnect all wiring, and remove lights from cluster. Remove cluster.

BELT ADJUSTMENT

Belt Tension (Lbs.) With T nsion Gauge T63L-8620-A

All Engines

Belt	① New	② Us d
Generator (Single Belt)	90-120	60-90
Generator (Dual Belt)		
Front	90-120	60-90
Rear	85-135	55-100
Power Steering	120-150	90-120
Air Conditioning	120-150	90-120

① - Run belt 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer.

ENGINE

ENGINE IDENTIFICATION

See MODEL IDENTIFICATION following.

ENGINE REMOVAL

Engine (without transmission) may be removed from above in the usual manner. Observe the following: Remove radiator, fan and pulley, and starter. On some models, the flywheel or converter housing upper retaining bolts are reached through access holes in floor pan. Be sure to support transmission and converter.

OIL PAN REMOVAL & INSTALLATION

Comet - Drain crankcase and remove dipstick. Disconnect engine front mounts, raise engine and place 2" wood blocks between mounts and engine. With engine resting on blocks, remove stabilizer bar attaching nuts and pull stabilizer bar down. Remove oil pan. *NOTE - Rotate crankshaft as necessary for clearance.* To install, reverse removal procedure.

Falcon, Fairlane, Meteor - Drain crankcase and remove dipstick. Remove clutch retracting spring. Remove front crossmember. Remove stabilizer bar attaching nuts and pull stabilizer down. Remove oil pan. *NOTE - Rotate crankshaft as necessary for clearance.* To install, reverse removal procedure.

Galaxie - R m val - Drain crankcase, then remove flywheel housing inspection cover and dipstick. On station wagons, disconnect stabilizer bar and pull bar as far forward as possible. On all models, remove crankcase ventilation system assembly. Remove oil pan. *NOTE - Rotate crankshaft as necessary for clearance.*

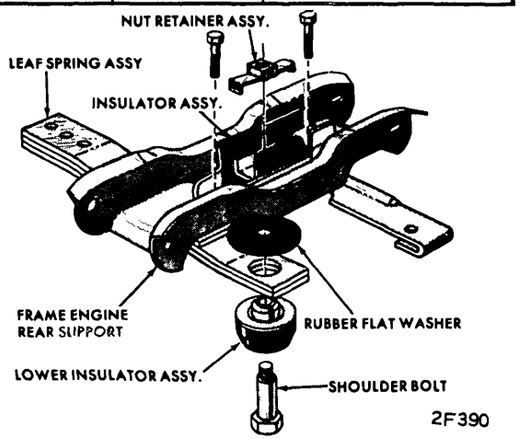
Installation - *CAUTION - Flywheel housing cover gasket must also be replaced whenever oil pan gasket replaced.* Oil pan gasket has a dovetail design which mates with flywheel housing cover gasket. Sealer (AB-19560-A or equivalent) must be applied to the junction points of oil pan and housing cover gaskets. Install oil pan by reversing removal procedure.

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displac m nt
144"	85 at 4200	8.7-1	3.50"	2.50"	144 cu. ins.
170"	101 at 4400	8.7-1	3.50"	2.94"	170 cu. ins.
200"	116 at 4400	8.7-1	3.68"	3.126"	200 cu. ins.
223"	138 at 4200	8.4-1	3.625"	3.60"	223 cu. ins.

ENGINE REAR MOUNT (CANTILEVER SPRING TYPE)

To prevent high frequency high speed vibration caused by transmission extension contact with rear mount, .20" minimum clearance must be maintained between rear mount upper insulator and transmission extension. Tighten spring-to-support attaching shoulder bolt until bolt bottoms. Do not add washers between lower insulator and spring as noise and vibration would result.



CANTILEVER SPRING ENGINE REAR MOUNT ASSEMBLY

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

FLYWHEEL INSTALLATION
(144", 170", 200")

Flywheel attaching bolt holes in crankshaft flange are drilled through flange Flywheel retaining capscrews must be coated with oil resistant sealer to prevent engine oil leak at this location (may be diagnosed as a rear oil seal leak)

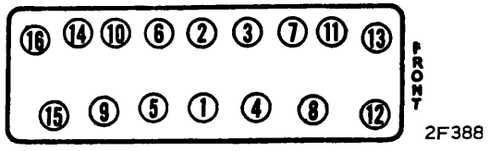
EXHAUST PIPE INSTALLATION
(144 , 170 , 200)

Exhaust manifold studs for exhaust pipe attachment have interference threads and nuts will not hold torque if used more than once Install new nuts whenever pipe disconnected from manifold and torque nuts to 40-50 ft lbs

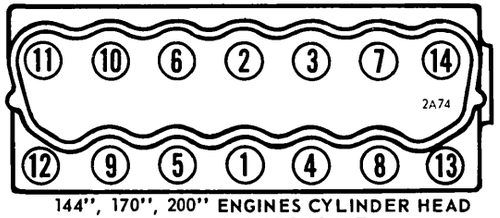
CYLINDER HEAD

R m val - When removing head install guide studs in front and rear cylinder head bolt holes on manifold side of head Make guide studs from 7/16 14 x 6 or 1/2 - 13 x 6 bolts depending on cylinder head bolt size by cutting off bolt head tapering end and slotting for screwdriver engagement

Installation - On 144 170 ' 200 engines coat both sides of new gasket with head gasket sealer On 223 engine gasket is ' sandwich ' type (steel core bonded between rubber asbestos sheets) and sealer must **not** be used On 144 170 200 ' engines coat right side front and rear head bolts with sealer On 223 ' engine coat all left side bolts with sealer Install head over guide studs (see Removal' above) install two end bolts finger tight to hold head then install remaining bolts Tighten bolts in sequence shown in diagrams in **three** steps to torque limits shown in table below **Do not disturb bolts after final step completed**



223" ENGINE CYLINDER HEAD TIGHTENING SEQUENCE



144", 170", 200" ENGINES CYLINDER HEAD TIGHTENING SEQUENCE

Cylinder Head Torques (Ft Lbs)

Engine	Step 1	Step 2	Step 3
144' 170 200'	55	65	75
223'	95	105	115

ENGINE NOTES

► *1962 63 FAIRLANE & METEOR ENGINE REAR MOUNT BOLT REPLACEMENT NOTE* New type bolt locking nut cotter pin and flat washer used to attach rear support bracket used on later cars Use new type for **all** service replacement Torque for new bolt is 58 75 ft lbs

► *1963 223 ENGINE EXHAUST VALVE PRODUCTION CHANGE & REPLACEMENT NOTE* New type valve No C3AZ-6505-A with diffused aluminum on head and face used to minimize burning and for resistance to detonation Use new type for service replacement on all 1961-63 engines *NOTE On "Zero Lash" rocker arm type engines, also install new rocker arm eccentric separating spring (see below)*

► *1963 223' ENGINE "ZERO LASH" ROCKER ARM SPRING CHANGE & ROCKER ARM NOISE CORRECTION* Use later type rocker arm eccentric separating spring (Rocker Arm Assy No C3AZ 6564-A Kit No C3AZ-6A521 A) which is used on later cars *NOTE Use this spring in conjunction with later type alum inumized exhaust valves (see above)*

► *1963 223" ENGINE OIL PAN GASKET INSTALLATION NOTE* New type gasket used on 1963 engines require special installation procedures *See "Oil Pan Instal lation"*

► *1963 GALAXIE TAXI (223 ' ENGINE) TIMING GEAR NOISE CORRECTION* Caused by burrs on timing gears To correct replace gears

► *1963 NOISY HYDRAULIC LIFTERS CORRECTION* May be due to oil contamination because of restricted carburetor air cleaner *See "Rough Idle, Poor Performance & Fuel Economy" under TUNE UP SPECIFICATIONS*

► *1960-63 144", 170", 200" ENGINES OIL PUMP INTERMEDIATE SHAFT REPLACEMENT NOTE* On units with oil pump cover made of cast iron oil pump intermediate shaft is chamfered at both ends and has no retaining ring Intermediate shaft may be replaced without removing oil pan and oil pump

► *1963 223" ENGINE CAMSHAFT & BEARINGS INSTALLATION & INTERCHANGEABILITY NOTE* Engines built after approximately October 18 1962 have camshaft with cross-drilled oil passage in No 3 bearing journal new bearings with larger oil holes and with anti-siphon hole in rocker arm shaft oil outlet tube eliminated Old and new parts are not interchangeable Make sure correct camshaft camshaft bearings and rocker arm shaft oil outlet tube are used when replacing parts

TIGHTENING SPECIFICATIONS

ENGINE TORQUES

Application	Foot-Pounds 144', 170', 200'	223"
Cylinder Head	①	①
Intake Manifold		23-28
Exhaust Manifold	13-18	23-28
Oil Pan	7 9	9-13
Main Bearing Caps	60 70	95-105
Connecting Rod Caps	19-24	40 45
Vibration Damper or Pulley	45-55	70-90
Camshaft Sprocket	35-45	35-45
Camshaft Thrust Plate	12-15	12-15
Flywheel	75-85	75-85
Rocker Arm Cover	3-5	4-7
Rocker Arm Bracket	30-35	50-60
Pushrod Chamber Cover		2-2½
Engine Front Cover	7 9	6-9
Water Outlet Housing	12-15	23-28
Water Pump	12-15	23 28
Oil Pump	12-15	30-35
Oil Filter Adapter	50-60	50-60
Flywheel Housing	②	②
Transmission Mounting	③	③

ENGINE MOUNT TORQUES

Comet & Falcon	Ft. Lbs.
Front Support Insulator to-Engine	18-24
Front Support Insulator-to-Bracket	11-15
Rear Support Bracket to-Crossmember	10-15
Rear Support-to Cantilever Spring	28-32
Cantilever Spring to-Trans Extension	25-28

Fairlane & Meteor	Ft Lbs
Front Support Bracket-to-Engine	18-24
Front Insulator-to-Support Bracket	15-21
Front Bracket-to Underbody	26-34
Rear Support Insulator-to-Extension Housing	32-42
Rear Insulator to Rear Support	10-15
Rear Support-to Mounting Bracket	④ 58-75
Rear Mounting Bracket-to-Underbody	41-53

Galaxie	Ft. Lbs.
Front Bracket-to-Insulator	40-45
Front Bracket to-Engine	35-40
Front Insulator to-Frame	45-55
Rear Support Retainer-to Extension Housing	40-45
Rear Support to Frame	12-15

① See 'Cylinder Head Installation' for tightening procedure Three different applications must be made
② 23-28 ft lbs (Comet Falcon) 40-50 ft lbs (Fairlane Meteor Galaxie)
③ 32 36 ft lbs (Comet Falcon), 37-42 ft lbs (Fairlane, Meteor Galaxie)
④ *See "Replacement Note" above*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

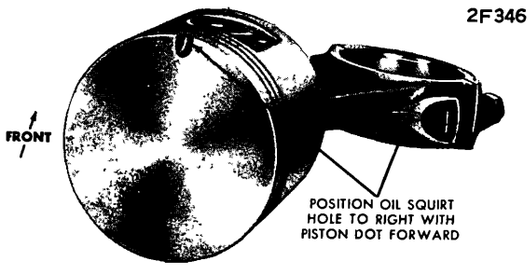
FITTING PISTONS

Place a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *Feeler must extend entire length of piston.* Pull feeler from cylinder with a spring scale and note reading on scale. Specifications should agree with table below.

PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0.0007	7	0.0025	7	0.0049
6	0.0004	6	0.0010	6	0.0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0.0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065

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PISTON & ROD ASSEMBLY

PISTON PIN REPLACEMENT (144", 170", 200")

TOOL T60K-6135-A MODIFICATION - If tool not previously modified to prevent damage to piston, make following modifications so piston will not be damaged when Detail 2 of tool seats against piston pin boss: Grind a 1/16" - 45° chamfer around outer edge of Detail 2.

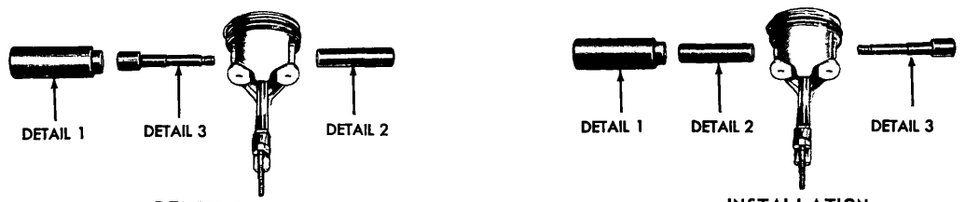
Removal - Press pin out of piston and connecting rod using Tool T60K-6135-A and vise and wrench, or Tool 6135-J and arbor press, as shown in illustrations.

Installation - Lightly coat all parts with engine oil, assemble piston and connecting rod correctly and press pin into piston and rod as follows: **1)** With Tool T60K-6135-A and vise and wrench, draw pin into assembly until pin seats in Detail 2. **2)** With Tool 6135-J and arbor press, press pin into assembly until Detail 2 is firmly seated in Detail 1. *See illustrations.*

PISTONS, PINS, RINGS

Engine	PISTON Clearance ①	PISTON PIN Piston Fit	PISTON PIN Rod Fit	PISTON RINGS Rings	PISTON RINGS End Gap	PISTON RINGS Side Clearance
144", 170"	.0018-.0036"	③.0001-.0003"	Press Fit ②	Compr. (1) (2) Oil	.010-.020" .010-.020" .015-.055"	.0019-.0036" ⑤.0026-.0046" Snug
200"	.0016-.0034"	③.0001-.0003"	Press Fit ②	Compr. (1) (2) Oil	.010-.020" .010-.020" .015-.055"	.0019-.0036" ⑤.0026-.0046" Snug
223"	.0008-.0026"	③.0001-.0003"	④.0001-.0005"	Compr. (1) (2) Oil	.010-.020" .010-.020" .015-.055"	.0019-.0036" ⑤.0015-.0035" Snug

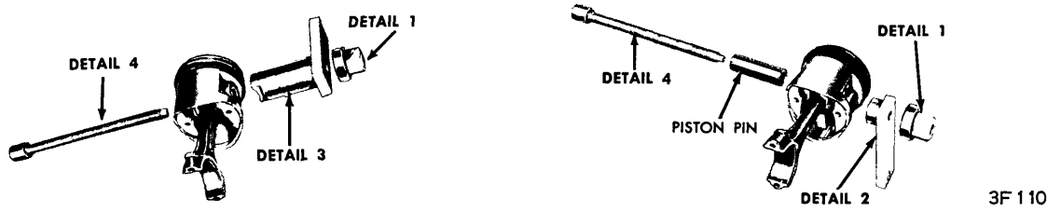
① - Measured at bottom of skirt. ② - See *REPLACING PINS*
③ - .0008" wear limit. ④ - .001" wear limit. ⑤ - .006" wear limit.



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REMOVAL INSTALLATION

PISTON PIN REPLACEMENT (ARBOR PRESS METHOD)



3F110

REMOVAL INSTALLATION

PISTON PIN REPLACEMENT (VISE & WRENCH METHOD)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	Color Code	MAIN BEARINGS Journal Diam.	MAIN BEARINGS ①Clearance	MAIN BEARINGS Thrust Brg.	MAIN BEARINGS ②Endplay	CONNECTING ROD BEARINGS Journal Diam.	CONNECTING ROD BEARINGS Clearance	CONNECTING ROD BEARINGS ③Sideplay
144", 170"	Red	2.2486-2.2490"	.0007-.0025"	No. 3	.004-.008"	2.1236-2.1240"	.0008-.0023"	.004-.008"
	Blue	2.2482-2.2486"	.0007-.0025"	No. 3	.004-.008"	2.1232-2.1236"	.0008-.0023"	.004-.008"
200"	Red	2.2486-2.2490"	.0007-.0025"	No. 3	.004-.008"	2.1236-2.1240"	.0008-.0023"	.004-.008"
	Blue	2.2482-2.2486	.0007-.0025"	No. 3	.004-.008"	2.1232-2.1236"	.0008-.0023"	.004-.008"
223"	Red	2.4984-2.4988"	.0009-.0033"	No. 3	.004-.008"	2.2984-2.2988"	.0006-.0028"	.005-.011"
	Blue	2.4980-2.4984"	.0009-.0033"	No. 3	.004-.008"	2.2980-2.2984"	.0006-.0028"	.005-.011"

① - Wear limit .0030" (144" & 170"), .0038" (223"). ② - Wear limit .012". ③ - Wear limit .014".

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MAIN BEARING CAP INSTALLATION

1) All Caps - Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine.

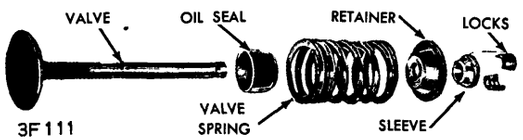
2) Rear Cap - Coat only rear mating surface of cap with oil resistant sealer. Do not use sealer forward of oil slinger groove (144", 170", 200"), forward of side seal grooves (223"). Install cap immediately after sealer applied so sealer will not set and cause an oil leak.

REPLACEMENT BEARINGS

Standard size replacement main and connecting rod bearings available in 2 sizes marked Red and Blue for selective fit. Any combination of red and blue inserts may be used to obtain desired clearances.

THRUST BEARING ALIGNMENT

Install all bearing caps except thrust bearing cap and torque to specifications. Install thrust bearing cap with bolts finger tight. Pry crankshaft to rear of engine, then to front of engine. While holding crankshaft forward, tighten thrust bearing cap bolts to specifications. Check crankshaft endplay.



VALVE ASSEMBLY (EXPLODED)

VALVE STEM OIL SEALS

Cup type used on all valves. Install cupped side down below upper spring retainer.

VALVE SPRING INSTALLATION

Valve spring ends must be square within 1/16". Install springs with damper (closed) coil end downward. Installed height of springs (measured from spring contact area on head to underside of spring retainer) should be 1 9/16- 1 39/64" (except Galaxie); 1 3/4- 1 25/32" (Galaxie). If height greater than maximum allowable, install .030" spacers as necessary to meet specifications. *CAUTION* - To avoid overstressing springs and overloading camshaft lobes, DO NOT INSTALL more than 2 spacers under each spring.

VALVE GUIDE SERVICING

To ream guides for installation of valves with oversize stems, always use reamers in sequence and reface valve seat after valve guide is reamed. Reamers are furnished .003" oversize with standard diameter pilot; .015" oversize reamer with .003" oversize pilot; and .030" oversize reamer with .015" oversize pilot.

REAR MAIN BEARING OIL SEAL

NOTE - Upper seal can be replaced only with crankshaft removed from engine.

Upper & Lower Seal - *CAUTION - Use Installing & Forming Tool as indicated in table below, and follow procedure listed exactly to prevent seal shift and oil leaks.* Pre-form seal by hand and install into block or cap with thumbs, seating seal at center and then working from the ends toward the center. Now place installing tool properly in block or cap as follows: Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap for lower seal. Tool flanges must bottom on seal groove rear flange and bearing saddle (insert removed). Hold tool firmly and strike top of tool sharply. Cut seal ends flush with block or cap. Trim frayed ends.

Side Seals (223") - Dip side seals in penetrating oil and install **immediately** into grooves. *CAUTION - DO NOT use sealer. Seals expand with oil.* Tap seals firmly into position. DO NOT trim ends.

Testing Seal Installation - Squirt a few drops of oil into parting lines between cap and cylinder block from the outside. Blow compressed air against seals from the inside of block. If air bubbles appear in oil, seal leaks.

Crankshaft Rear Seal Installing Tool

Engine	Tool No.
144", 170", 200"	T60K-6701 or 6701-D
223"	T52L-6701-AGD or 6701-A

ENGINE FRONT COVER

Removal - Drain crankcase and cooling systems. Remove radiator, fan, belt, pulley, damper, water pump, and oil pan. Remove front cover.

Installation - Use Pilot (alignment tool) as indicated in table below to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete installation.

Engine Front Cover Aligning Tool

Engine	Tool No.
144", 170", 200"	T61K-6019-A or 6059-E
223"	T52L-6306-AEE

TIMING CHAIN VIBRATION DAMPER(223")

There should be .030-.070" clearance between chain and snubber pad when all slack is removed from chain.

ENGINE FRONT COVER OIL SEAL

Remove old seal with punch and clean recess in cover. Drive new seal in cover with tool listed in table below until seal is fully seated and make sure spring is positioned properly in seal.

Front Cover Seal Installing Tool

Engine	Tool No.
144", 170", 200"	T60K-6700-A or 6700-C
223"	T52L-6700-BEE

VALVES

VALVE SPECIFICATIONS

Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	① Stem Diameter	② Stem Clearance	Cam Lobe Lift ③
144",170" Intake	④	44°	45°	.070-.080"	.3100-.3107"	.0008-.0025"	.232"
Exhaust	1.268"	44°	45°	.070-.080"	.3090-.3097"	.0018-.0035"	.232"
200" Intake	1.530"	44°	45°	.070-.080"	.3100-.3107"	.0008-.0025"	.232"
Exhaust	1.268"	44°	45°	.070-.080"	.3090-.3097"	.0018-.0035"	.232"
223" Intake	1.780"	44°	45°	.070-.090"	.3416-.3423"	.0010-.0024"	.260"
Exhaust	1.513"	44°	45°	.070-.090"	.3398-.3405"	.0028-.0042"	.260"

① - Standard. Also furnished .003", .015", .030" Oversize.
② - Wear limit .0045" Intake, .0055" Exhaust.
③ - Wear limit .005".
④ - 1.467" (144"), 1.530" (170"

VALVE SPRINGS & LIFTERS

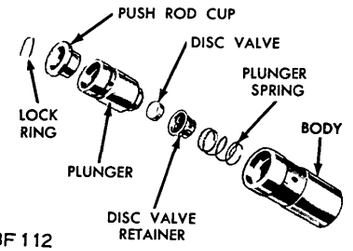
Engine	SPRINGS Pressure (Lbs.) Valve Closed	SPRINGS Pressure (Lbs.) Valve Open	Free Length	LIFTERS Diameter	LIFTERS Clearance
144", 170" 200"	① 47¾-56¼ at 1.585"	② 112-122 at 1.222"	2.00"	.8740-.8745"	③ .0005-.0020"
223" ⑦	④ 97-105 at 1.780"	⑤ 160-178 at 1.410"	2.33"	.4983-.4989"	⑥ .0011-.0027"
223" ⑧	⑨ 71-79 at 1.78"	⑩ 161-177 at 1.39"	2.09"	.4983-.4989"	⑥ .0011-.0027"

① - Wear limit 43 at 1.585". ② - Wear limit 101 at 1.222". ③ - Wear limit .005". ④ - Wear limit 88 at 1.780"
⑤ - Wear limit 144 at 1.410". ⑥ - Wear limit .0055". ⑦ - With "Zero Lash" rocker arms.
⑧ - Without "Zero Lash" rocker arms ⑨ - Wear limit 64 lbs. at 1.78" ⑩ - Wear limit 145 lbs. at 1.39"

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

HYDRAULIC LIFTERS

See illustration for arrangement of parts. Leakdown rate should be 10-100 seconds. Use a lifter tester according to directions of manufacturer.



HYDRAULIC VALVE LIFTER (EXPLODED)

HYDRAULIC LIFTER OPERATING RANGE ADJUSTMENT (144", 170", 200")

Place No. 1 piston at TDC of compression stroke and adjust intake and exhaust valves for that cylinder as detailed below. Repeat adjustment for each cylinder in firing order by turning crankshaft 1/3-turn at a time in direction of rotation. Proceed as follows: Loosen rocker arm adjusting screw (counterclockwise) until there is end clearance in pushrod, then turn adjusting screw clockwise until all pushrod-to-rocker arm clearance is just removed (check by moving pushrod with fingers as screw is tightened). **Now tighten adjusting screw an additional 2½ turns** to place lifter plunger at approximate center of its travel. *NOTE - With lifter fully collapsed, clearance between rocker arm and valve stem tip should be .067-.200".*

ROCKER ARM ADJUSTING SCREW NOTE - If torque required to turn self-locking adjusting screw less than 3 ft. lbs., install new standard or .002" oversize screw. If minimum 7 ft. lbs. torque cannot be obtained with oversize adjusting screw, replace rocker arm and adjusting screw assembly.

"ZERO LASH" ROCKER ARM ADJUSTMENT (223")

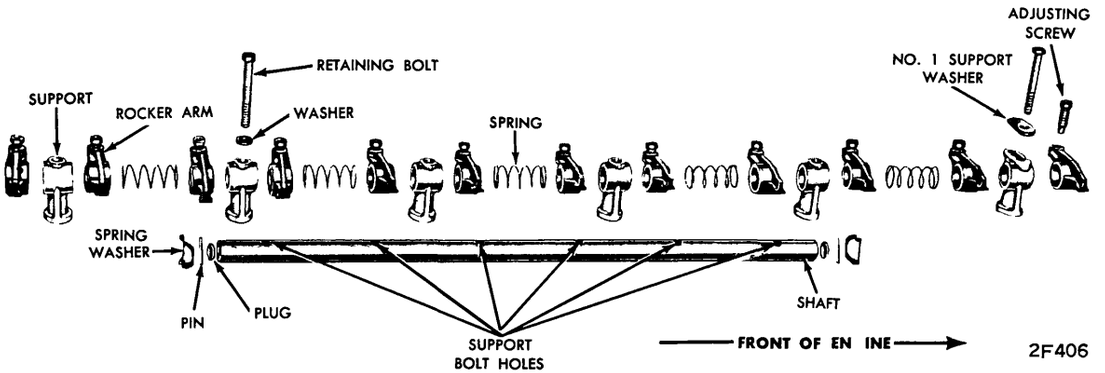
Adjust intake and exhaust valves of each cylinder in turn in firing order with each piston at TDC at end of compression stroke as follows:

1) Push rocker arm eccentric in toward rocker arm until recess mark on eccentric is inboard of valve stem tip (eccentric will remain in position when released and should be near limit of its travel). Push eccentric end of rocker arm down until eccentric contacts valve stem tip and all vertical and horizontal clearance in eccentric is removed.

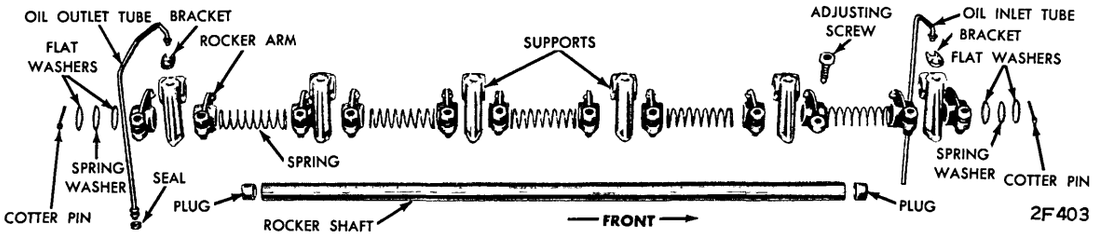
2) Tighten rocker arm adjusting screw to remove all lash between screw and pushrod socket. *CAUTION - Do not turn screw beyond this position or valve will be forced open.* Push outward slightly on eccentric. If all vertical clearance was not removed, eccentric will move out slightly until upper edge of eccentric bottoms in rocker arm, but recess mark must still be inboard of valve stem tip.

3) Continue to push eccentric outward and loosen rocker arm adjusting screw until recess mark in eccentric is centered directly over valve stem tip. Tighten adjusting screw locknut.

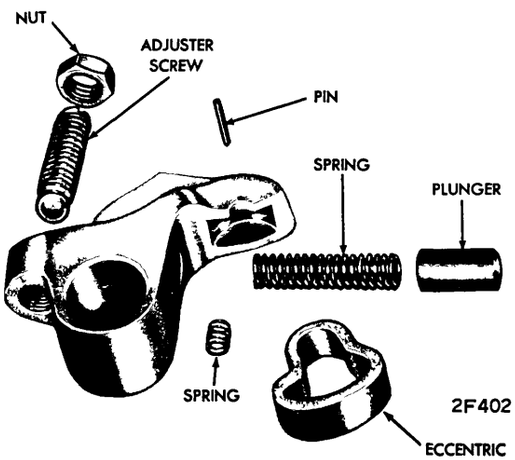
Final Adjustment - With engine idling at normal temperature, make minor adjustment with adjusting screw until eccentric recess mark is centered over valve stem tip during entire valve cycle of operation. Tighten adjusting screw locknut to 30-35 ft. lbs.



144", 170", 200" ENGINES ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)



223" ENGINE ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)



"ZERO LASH" ROCKER ARM ASSEMBLY (EXPLODED)

ROCKER ARM ASSEMBLY OVERHAUL

"Zero Lash" Type

Eccentric recess depth in rocker arm should not exceed .300" measured from radius corners of front cutout (below pin hole) perpendicular to greatest depth of recess. *See illustration for arrangement of parts.*

Eccentric Plunger Spring Specifications

Free Length	1.52"
Lbs. Pressure	ℂ 5.75-6.25 lbs. at 1.17"

ℂ - Wear limit 5.5 lbs. at 1.17".

Conventional Type

See illustration for arrangement of parts. End plugs must have cup side facing out, and oil holes in shaft must be facing downward. When installing, make sure that inlet line "O" ring seals are in place, and that support end of outlet pipe enters locating hole in shaft to position shaft properly.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT			
Engine	J urnal Diam ter	Bearing ℂClearance	Camshaft ℂ Endplay
144", 170", 200"	1.8095-1.8105'	001-.003"	.001-.007"
223"	1.9255-1.9265'	.001-.003"	.001-.007"

ℂ - Wear limit 006". ℂ - Wear limit .012".

CAMSHAFT REMOVAL

Camshaft can be removed with engine installed in car after removal of radiator and grille, and other appropriate parts.

CAMSHAFT BEARING REPLACEMENT

144", 170", 200" - Tool 6261-M & Adapter Set 6261-AB are available. No. 1 & No. 4 bearings are not interchangeable with each other or with any other bearing. No. 1 bearing must be installed .115-.125" below front face of bearing bore in block. No. 4 bearing has two oil holes and must be installed so forward edge of bearing is 24¾"±1/64" from thrust plate mounting surface of block.

223" - Tool T52L-6261-CEE & Adapter Set T54L-6250-B are available. No. 1 bearing is not interchangeable with other bearings. No. 1 bearing must be installed .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes

CHECKING CAM LOBE LIFT

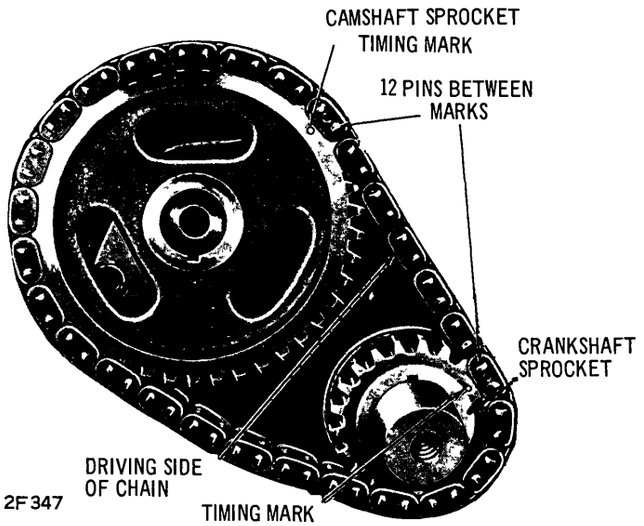
Check with dial indicator to specifications listed in Valve Table.

CAMSHAFT END THRUST

Taken by thrust plate and spacer located behind camshaft sprocket.

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open BTDC	Close ALDC	Open BLDC	Close ATDC
200"	ℂ 6°	ℂ 54°	ℂ 39°	ℂ 21°

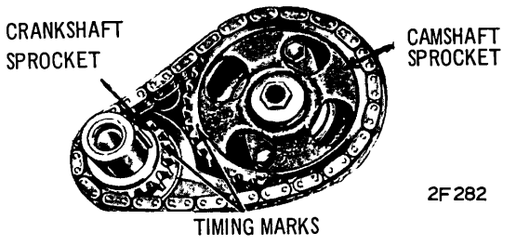
ℂ - Camlift .002". ℂ - Camlift .005".



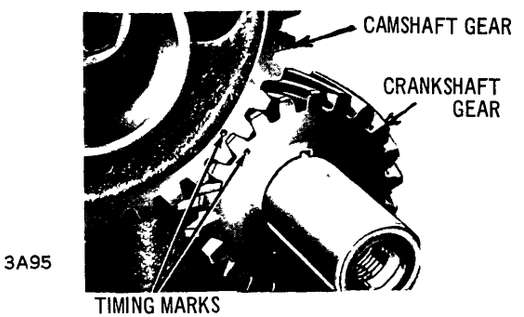
223" ENGINE VALVE TIMING MARKS (EXCEPT POLICE & TAXI)

VALVE TIMING

See illustration for alignm nt of sprocket marks. S "Cam Lobe Lift" in VALVES table to check cam lob wear.



144", 170", 200" ENGINES VALVE TIMING MARKS



223" POLICE & TAXI ENGINE VALVE TIMING MARKS

ENGINE OILING

Normal Oil Pressure - 35-55 lbs. at 2000 RPM (Hot).
Pressur Regulator Valve - In pump body. Not adjustable.

ENGINE OILING SYSTEM

144", 170", 200" Engines

Force feed type. Rotor type oil pump used. *See illustration and note the following:*

Hydraulic Lifters - Lubricated directly from main oil gallery.

Timing Chain & Sprockets - Lubricated by splash from oil pan.

Rocker Arms, Pushrods & Valve Stems - Oil from lower hole in rear camshaft bearing flows around grooved rear camshaft journal and out through upper hole in rear camshaft bearing through vertical passage in block and around left rear corner cylinder head bolt to oil port at rear rocker arm shaft bracket pad. Oil then flows around this bracket bolt to hollow rocker arm shaft, and is distributed to each rocker arm for rocker arm, pushrod, and valve tip lubrication. Excess oil is discharged from rocker arm shaft at front shaft bracket. Oil from rocker chamber runs down pushrods to lubricate pushrod seat and lifter and drains back into the oil pan through cored openings in the block.

Oil Filter - Full flow type. Mounted externally on left front corner of engine. Filter has integral bypass valve and anti-drain back diaphragm.

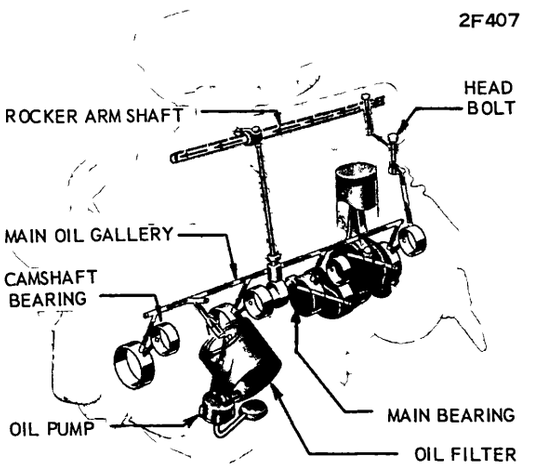
223" Engine

Force feed type with rotor type oil pump. *See illustration and note the following:*

Timing Chain & Sprockets - Lubricated through drilled passage in front end of block which directs oil from front camshaft bearing to crankshaft sprocket (camshaft journal has flat which registers with bearing supply hole and timing chain lubrication hole once in each revolution). Oil slinger on front end of crankshaft also throws oil onto chain.

Rocker Arms, Pushrods, & Valves - Drilled passage in No. 3 (rear intermediate) camshaft journal feeds oil at reduced pressure to drilled passage in block. A tube extending up through block and cylinder head directs

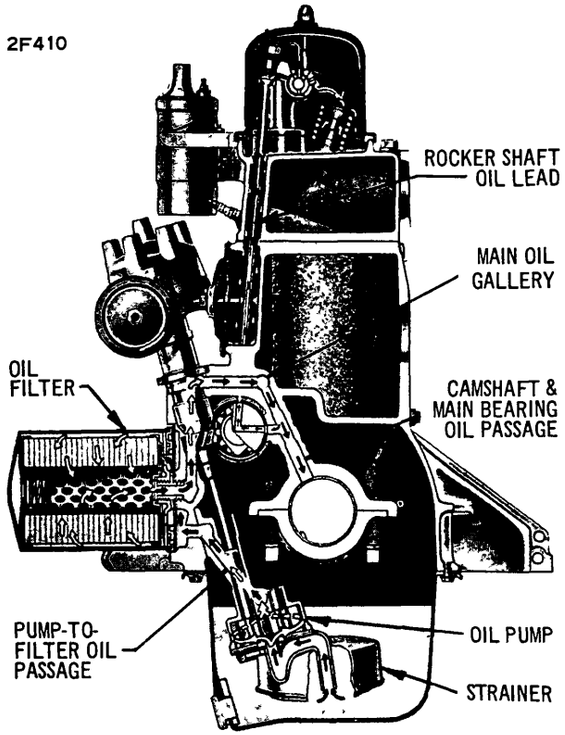
(Continued)



144", 170", 200" ENGINES OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

this oil to the No. 6 (rear) rocker shaft bracket and into the hollow rocker arm shaft. Oil then flows through drilled passages in rocker arm to lubricate rocker arm bushing, pushrod socket and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication. Excess oil from rocker arm shaft flows through outlet pipe at No. 1 (front) rocker shaft bracket. This pipe terminates at drilled hole in lifter chamber directly above distributor drive shaft for distributor and drive gear lubrication (see below). *"ZERO LASH" ROCKER ARM NOTE* - Spring in rocker arm recess between arm and eccentric separates arm and eccentric for increased oil flow around eccentric. Rocker arm plunger and spring assembly is filled with oil to provide a cushioning effect to eccentric movement.



223" ENGINE OILING SYSTEM

ENGINE COOLING

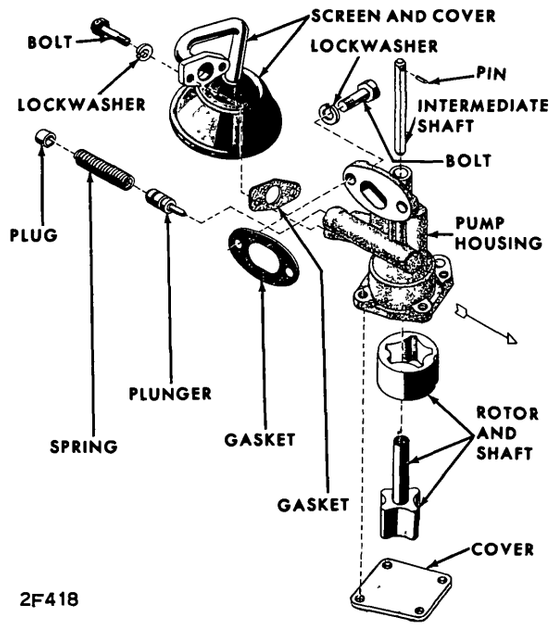
Thermostat - Located in water outlet elbow.
Low Temp. - Starts to open 155-162°F, fully open 182°F.
High Temp. - Starts to open 185-192°F, fully open 212°F.
Pressure Valve - 12-15 lb. radiator filler cap.

WATER PUMP

Special tool sets are available for water pump overhaul. Other suitable support plates and drivers may be used

(Continued)

Valve Lifter & Fuel Pump Eccentric - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. A drilled hole in the lifter chamber floor directly above fuel pump eccentric on camshaft provides lubrication for the eccentric. A return hole at rear of lifter chamber allows oil to drain back into the crankcase
Distributor & Drive Gear - Oil return pipe from rocker arm shaft terminates at drilled hole in lifter chamber. This hole is directly above distributor drive gear on camshaft and gears are lubricated by this return oil. A transverse passage in the block at the oil return pipe location in the lifter chamber directs drain oil to relieved section of distributor housing. Oil holes in housing direct oil to distributor lower bushing and drive gear.
Oil Filter - Full flow type mounted on pad on right side of crankcase. Filter has integral bypass valve and anti-drain back diaphragm.



223" ENGINE OIL PUMP (EXPLODED)

OIL PUMP

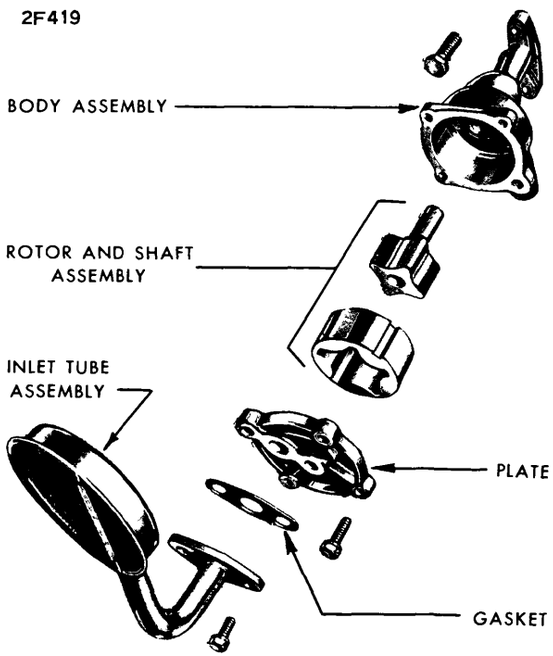
Rotor type pump used on all engines. See illustrations for arrangement of parts Pump cover screw torque is 6-9 ft. lbs.

Oil Pump Specifications (All Engines)

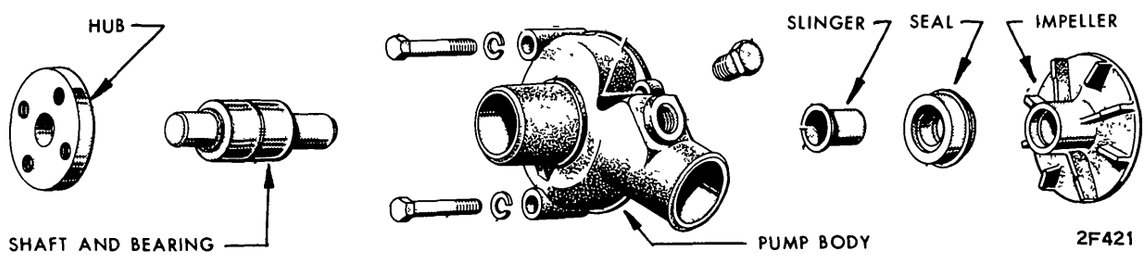
Item	Specification
Outer Race-to-Housing	.006-.012"
Rotor Endplay	.0011-.0041"
Shaft-to-Housing (144",170",200")	.0015-.0029"
(223")	.0025-.0039"
Relief Valve-to-Bore	.0015-.0029"

Relief Valve Spring Specifications

Engine	Lbs. Pressure	Length
144", 170", 200"	8.6-9.5	1.078"
223"	9.0-9.6	1.530"



144", 170", 200" ENGINES OIL PUMP (EXPLODED)



144", 170", 200" ENGINES WATER PUMP (EXPLODED)

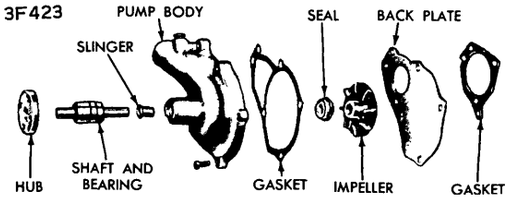
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

providing they support and apply pressure properly to shaft, bearing, housing, and other parts. *Observe the following specifications:*

Slinger - 144", 170", 220" - Clearance between underside of slinger flange and end of bearing race should be .220"

223" - Distance from slinger flange to end of shaft should be 1.94".

Impeller - Impeller-to-housing clearance should be .005-.025" (144", 170", 200"); 015-.025" (223").



223" ENGINE WATER PUMP (EXPLODED)

Hub - Distance from front face of hub to pump housing mounting face should be 3.94" (144", 170", 200"); 4.32" (223").

MODEL IDENTIFICATION

SERIAL NUMBER

Stamped on tab welded to top right side (weld flange) of dash panel in engine compartment. Also stamped under "Vehicle Warranty Number" on car patent plate on lock face of left front door Number carries identification data as follows:

① ② ③ ④ ⑤
3 S 19 U 100001

① - Year Model. **3** 1963.
② - Assembly Plant. *See listing below.*
③ - Car Model & Body Style. *See Model & Series listing above.*
④ - Engine Type *See listing below.*
⑤ - Consecutive unit number at each assembly plant (starting with 100001 for Ford models, 500001 for Mercury models)

Assembly Plant Code Letters

A - Atlanta	**H** - Lorain	**R** - San Jose
D - Dallas	**J** - Los Angeles	**S** - Pilot Plant
E - Mahwah	**K** - Kansas City	**T** - Metuchen
F - Dearborn	**N** - Norfolk	**U** - Louisville
G - Chicago	**P** - St Paul	**W** - Wayne
		Z - St. Louis

Engine Code Designation

Engine	Standard	Low Compression
144"	S	2
170"	U	4
200"	T	
223" (Except Taxi)	V	5
223" (Taxi)	E	

FORD FALCON MODELS

Model	Series
Standard Sedan	01, 02
Futura, Sprint	15, 16, 17, 19
Station Wagon	21, 22, 23, 24, 25, 26
Ranchero	27
Sedan Delivery	29

FORD FAIRLANE MODELS

Model	Series
Fairlane	31, 32, 38
Fairlane 500	41, 42, 43, 47, 48, 49

FORD GALAXIE MODELS

Model	Series
Ford 300	53, 54
Galaxie	51, 52
Galaxie 500 & 500XL	60, 61, 62, 63, 64, 65, 66, 67, 68, 69
Station Wagon	72, 74, 76, 78

MERCURY COMET MODELS

Model	Series
Comet	01, 02, 21, 22
Comet Custom	11, 12, 15, 17, 19, 23, 24, 26

MERCURY METEOR MODELS

Model	Series
Meteor	31, 32, 38
Meteor Custom	41, 42, 43, 47, 48, 49

CAR BUILD DATE CODE

Stamped under DATE on car patent plate. Number designates day of month, letter designates month as follows: **A** January through **M** December (**I** not used)

CAPACITIES

	Comet & Falcon	Fairlane & Meteor	Galaxie
Water (Qt.) ①	8½	8½	15
Crankcase (Qt.) ②	3½	3½	4
Fuel (Gal.)	14	16	③ 20
Manual Trans. (Pt.)	2½	2½	3
Auto. Trans. (Pt.)	7½	7½	10
Rear Axle (Pt.)	2½	4½	4½

① - Add 1 Qt. for heater.
② - Add 1 Qt. with filter change.
③ - 21 Gal. on Station Wagon.

ENGINE BUILD DATE CODE

Stamped on engine as indicated in table below. Number carries identification data as follows:

① ② ③ ④ ⑤
3 3 H 26 M

① - Engine Plant **1 & 2** - Cleveland; **3** - Dearborn; **4** - Lima; **5** - Green Island.
② - Year. **3** 1963.
③ - Month. **A** January through **M** December (**I** not used).
④ - Day of Month.
⑤ - Any of various inspectors marks.

Engine	Build Date Location
144", 170", 200"	Above Crankcase Vent Outlet Pipe
223"	Above Generator, Left Side

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace at Oil Change
Air Cleaner	② Clean at 6000 miles
Breather Cap	Clean at 6000 miles
Fuel Filter	Replace at 36,000 miles

① - Replace or clean more often if necessary.
② - Replace element at 24,000 miles.

REPLACING OIL FILTER

Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter surface, then tighten filter an additional ½-turn Run engine and check for leaks. *CAUTION - Do not overtighten.*

SERVICING AIR CLEANER (DRY TYPE)

Attach element to a ¼" drill and spin element for 2 minutes inside a splash shield set on floor. *Do not use solvent.* Inspect element for cracks or splits.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE IDENTIFICATION

Fifth figure of "Vehicle Warranty Number" on car patent plate identifies engine as follows:

Engine	Standard - CODE -	Low Compression
221"	L	3
260"	F	8
289" 2-Bbl	C	
4-Bbl	K	
352"	X	
390" 2-Bbl	Y	
4-Bbl Std	Z	9
4-Bbl Police	P	
Three 2-Bbl	M	
406" One 4-Bbl	B	
Three 2-Bbl	G	
427" One 4-Bbl	Q	
Two 4-Bbl	R	

COMPRESSION PRESSURE

Maximum variation between cylinders 10 lbs (all engines)

221", 260"	130-170 lbs
289", 352"	160-200 lbs
390" (10 5-1 Compr Ratio)	160-200 lbs
(10 8-1 Compr Ratio)	170-210 lbs
406", 427"	160-200 lbs

VACUUM READING

221"	16" at idle
260", 289", 352", 390"	18" at idle
406", 427"	13" at idle

TUNE-UP SPECIFICATIONS

VALVE TAPPET CLEARANCE

221", 260"	① Hydraulic
289" 2-Bbl	① Hydraulic
4-Bbl (Cold)	.024" Int & Exh
(Hot)	② .021" Int & Exh
352"	① Hydraulic
390" 2 & 4-Bbl Std , Three 2-Bbl	① Hydraulic
4-Bbl Police (Cold)	.028" Int & Exh
(Hot)	② .025" Int & Exh
406", 427" (Cold)	.028" Int & Exh
(Hot)	② .025" Int & Exh

① - *For operating range adjustment, see Engine Data*
② - After 30 minutes operation at 1200 RPM

SPARK PLUGS

Gap (All except 427")	.032-.036"
(427")	.028-.032"
Torque (All)	① 15-20 ft lbs

① - 20-30 ft lbs with new plug in new head

Engine	Spark Plug Type	Autolite No.
221", 260"	Normal and/or Severe Service	BF-42
	Light Service (Idling,Stop & Go)	BF-82
289" 2-Bbl		BF-42
4-Bbl		BF-32
352"		BF-42
390" 2 & 4-Bbl Std		BF-42
Three 2-Bbl		BF-32
4-Bbl Police		①
406", 427"		BF-32

① - BF-32 for sustained high speed; BF-42 for low speed, light load

DISTRIBUTOR

Engine	Point Gap	Cam Angle
221"	.014-.016"	26-28½°
260"	① .015-.018"	26-28½°
289" 2-Bbl	.014-.016"	26-28°
4-Bbl	.019-.021"	② 33-36°
352"	.014-.016"	26-28½°
390" All Carbs	.014-.016"	26-28½°
406"	.019-.021"	② 33-36°
427" Std Ignition	.019-.021"	② 33-36°
Transistor Ign	.019-.021"	③ 22-24°

① - .014-.016" on Falcon & Comet with Synchro-mesh
② - Both sets operating together (dual points)
③ - Single points (without condenser)

Breaker Arm Spring Tension

221", 260"	17-20 ozs
289" 2-Bbl	17-20 ozs
4-Bbl	25-28 ozs
352", 390" All Carbs	17-20 ozs
406"	27-32 ozs
427" Std Ignition	27-30 ozs
Transistor Ignition	21-24 ozs

Condenser Capacity

21-25 mfd for all engines *NOTE* - No condenser used on 427" with Transistor Ignition

TRANSISTOR IGNITION

See "Ford Motor Co Transistor Ignition" in Electrical Section

TUNE-UP NOTES

► *1963 VERY ROUGH OR NO IDLE CORRECTION:* May be caused by restricted idle fuel jet (check by removing air cleaner and covering idle air bleed with engine running - increase in RPM indicates restriction) To correct, thoroughly clean all passages with compressed air

► *1963 CARBURETOR MAIN METERING JET SIZE "TAILORING" TO CORRECT FOR RICHNESS OR LEANNESS:* A one size richer or leaner jet may be installed in place of the standard jet for better performance, depending on the particular condition *NOTE* - Make sure any factors contributing to a rich or lean condition have been eliminated before changing jets *See "Ford 2 & 4-Barrel Carburetor Jet Specification Table" in Carburetion Section*

► *1963 221" & 260" ENGINES HARD HOT START & ROUGH IDLE CORRECTION & PRODUCTION CHANGE:* May be caused by excess fuel vapors in carburetor bowl To correct, install new air horn, No C3OZ-9524-B, which has smaller internal diameter of vent tubes *NOTE* - This change made in production on December 14, 1962

► *1963 352" 2-BBL ENGINE CARBURETOR & DISTRIBUTOR MODIFICATIONS FOR IMPROVED ACCELERATION & FUEL ECONOMY:* 1) Distributor C2AF-12127-A used on 390" Engine used on later production on this engine Either install this distributor or modify existing distributor (COAF-12127-D or E) as follows: Install Orange Primary Weight Spring, B8A-12192-B, Green Secondary Weight Spring, B7A-12191-B, Blue Vacuum Diaphragm Spring, COTZ-12192-A, and Vacuum Advance Stop, COTZ-12202-A. Adjust Mechanical and Vacuum Advance of modified distributor to specifications listed for C2AF-12127-A *(see "Distributor Advance Specifications")*

2) Replace carburetor Booster Venturi Assembly "FA" (C1AZ-9A523-C) with "F" Booster Venturi Assembly (C0AE-9A523-A) *NOTE - Carburetors with "F" booster in production identified by orange paint on code tag*

3) Install 1 size leaner main metering jet *NOTE - Carburetors with this jet installed in production have "B" on code tag after prefix and suffix*

► *1963 HARD HOT START & FUEL ECONOMY CORRECTION & PRODUCTION CHANGE:* May be caused by excessive choke because choke spring is sensitive to cooler engine compartment air To correct, clamp heater hose to choke housing cover using Clamp C3AZ-18572-A, and three Cover Screws C3AZ-9B874-A *NOTE - Heater hose clamped to choke housing on later cars*

► *1963 HESITATION ON ACCELERATION CORRECTION (EARLY CARS).* May be caused by improperly seated (staked) accelerator pump ball checks To correct, stake balls properly

► *HESITATION, STUMBLE, ROUGH ENGINE IDLE CORRECTION (CARS WITH FORD CARBS).* *See "Automatic Choke Torsion Spring Adjustment" in Ford 2 & 4-Barrel Carburetors in Carburetion Section.*

► *1958-63 HESITATION OR STUMBLE ON ACCELERATION CORRECTION (CARS WITH FORD CARBS):* Plastic accelerator pump cavity filler block, No C3OZ-9F565-A, may be installed in accelerator pump cavity if carburetor not already equipped This filler block used in some late production 1962 cars and in most all 1963 cars

► *1963 ENGINE STALLING CORRECTION:* May be caused by engine coolant tag being drawn into air cleaner opening To correct, shorten tag wire and relocate tag

► *TRANSISTOR IGNITION CAUTION: Special procedure for connecting dwell meter, "bumping" engine, and other operations must be followed to prevent damage to transistor ignition system ,See "Ford Motor Co. Transistor Ignition" in Electrical Section*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

IGNITION TIMING

Set timing at idle speed (below 550 RPM to insur there is no mechanical advance) with distributor vacuum line disconnected Degrees given are BTDC Minimum allowable setting is 2° BTDC Maximum allowable setting is 5° BTDC more than recommended figure except as noted

NOTE - Timing may be advanced 2° (except where noted) when new points installed to compensate for rubbing block initial wear during first 6000 miles of operation

Ignition Timing Specifications

Engine	Synchro-mesh	Auto. Trans.
221"	4°	12°
260" Fairlane, Meteor	4°	10°
Galaxie, Falcon, Comet	6°	10°
289" 2-Bbl	6°	10°
4-Bbl	10°	
352"	5°	8°
390" 2-Bbl	6°	6°
4-Bbl Std (Exc T-Bird)	5°	8°
4-Bbl Thunderbird		6°
4-Bbl Police	ℂ 6° Max	ℂ 6° Max
Three 2-Bbl		6°
406" All Carbs	ℂ 8°	ℂ 8°
427" Std Ignition	8°	
Transistor Ignition	ℂ 8°	

ℂ - No further advance allowable

HOT (SLOW) IDLE RPM

On Air Conditioned cars, set idle speed after operating air conditioner for 20 minutes and with unit on

Engin	Synchro-mesh	ℂ Auto. Trans.
221", 260"	② 575-600	475-500
289" 2-Bbl	② 575-600	475-500
4-Bbl	② 575-600	
352"	② 575-600	475-500
390" 2 & 4-Bbl Std	② 575-600	475-500
4-Bbl Police	575-600	550-575
Three 2-Bbl		575-600
406" One 4-Bbl	675-700	
Three 2-Bbl	675-700	
Two 4-Bbl	750	
427" One 4-Bbl	675-700	
Two 4-Bbl	750	

ℂ - In "D" (Drive)

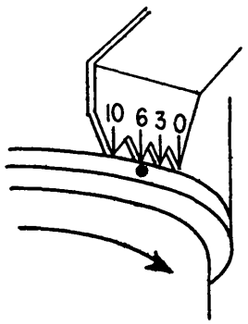
② - Supersedes previous 500-525 RPM for improved performance

FAST IDLE RPM

With fast idle screw on top step of fast idle cam

Engin	Synchro-mesh	Auto. Trans.
221", 260"	1300	1600
289" 2-Bbl	1400	1600
4-Bbl		
352"	1200	1500
390" 2 & 4-Bbl Std	1200	1500
4-Bbl Police	1200	1200
Three 2-Bbl		1800
406", 427" All Carbs	ℂ 1800	

ℂ - Front carburetor only on 2-carburetor installations



3A33

IGNITION TIMING MARKS (TYPICAL)

AUTOMATIC CHOKE SETTING

Engine	Setting
221", 260"	4 Lean
289" 2-Bbl	4 Lean
4-Bbl	Manual
352" Synchro-mesh	Centered
Auto Trans	2 Lean
390" 2-Bbl	2 Lean
4-Bbl Std Synchro-mesh	Centered
Auto Trans	2 Lean
4-Bbl Police	2 Lean
Three 2-Bbl	Centered
406", 427" (Except Two 4-Bbl)	Centered
(Two 4-Bbl)	ℂ

ℂ - Front Carb Centered; Rear Carb 90° Clockwise from Centered (no choke action)

FUEL PUMP PRESSURE

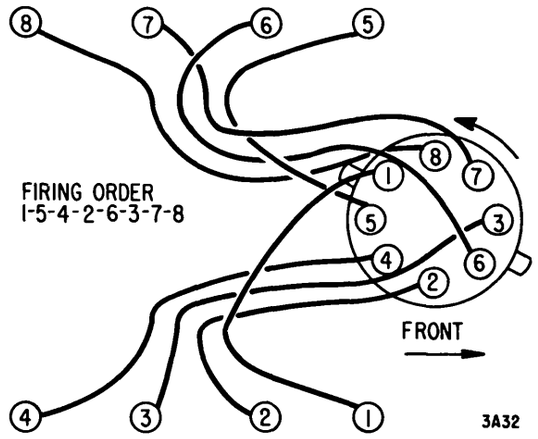
Engine	Pressure
221", 260", 289"	4-5 lbs at 500 RPM
352", 390", 406", 427"	4½-6½ lbs at 500 RPM

FUEL PUMP VOLUME

All Engines — 1 pint in 20 seconds at 500 RPM

POSITIVE CRANKCASE VENTILATION SYSTEM

Clean system and valve every 6000 miles



3A32

FIRING ORDER (ALL ENGINES)

MANIFOLD HEAT CONTROL VALVE

On applications where flywheel type counterweight used, counterweight must be installed between the manifold and fender apron (to the outside)

THERMOSTATIC AIR INTAKE DUCT

Description - Thermostatically controlled carburetor air cleaner intake duct to provide heated air to intake manifold.

Testing - 1) Remove assembly from engine and separate shroud and tube assembly from air cleaner duct and valve assembly.

2) If valve plate binds or does not move freely, remove thermostat and valve plate and clean thoroughly.

3) Place thermostat and air duct assembly in 75-78°F water for 3 minutes. Keep assembly immersed and turn thermostat as necessary to obtain "heat on" (no cold air) position, then tighten locknut.

4) Run water above 100°F over thermostat and duct assembly. If valve plate does not close, replace thermostat. Dry assembly with compressed air. Valve plate should move to "heat on" position.

IGNITION

DISTRIBUTOR SPECIFICATIONS

C20F-12127-J

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg. & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	400	0-1	5.0
¾-1¾	525	1-4	7.5
4-5	675	6-9	13.0
6½-7½	900	7½-10½	18.0
12-13½	2000	10½ max.	20.0

For engine degrees & RPM, multiply by 2.

C20F-12127-F

Mechanical Advance: Test stand at 0° & 350 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	425	1-4	9½
1-2	550	4-7¼	12½
4-5	800	7-10	17½
6¼-7¼	1100	7½-10½ max.	
8-9¼	1500		
10-11½	1950		

For engine degrees & RPM, multiply by 2.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

IGNITION (C ntinu d)

COAF-12127-D

M chanical Advanc : T st stand at 0° & 200 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr Degrees	Vacuum " of Hg
0	300	0-1	5
¾-1¾	500	5-8	10
5-6¼	1100	8-11	13½
11½-13	2000	9½-12½	17
18 max.		12½ max.	

For engine degrees & RPM, multiply by 2.

COAF-12127-E

Mechanical Advance: Test stand at 0° & 300 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr Degrees	Vacuum " of Hg
0	500	0-1	5
1-2	775	5-8	10
5-6¼	1250	8-11	13½
11½-13	2000	9½-12½	17
18 max.		12½ max.	

For engine degrees & RPM, multiply by 2.

COAF-12127-K

Mechanical Advance: Test stand at 0° & 250 RPM.

Mechanical Advance		Vacuum Advance
Distr. Degrees	Distr. RPM	
2¼-3¾	650	NONE
5-6½	800	
7¾-9	1125	
11½-13	2000	
14 max.	2500	

For engine degrees & RPM, multiply by 2.

C2AF-12127-A
(Also COAF-12127-D & E Modified)

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	325	0-2½	6
½-1¼	400	4-7	10
3½-4½	500	5½-8½	15
5-6	600	8½ max.	20
10¾-12¼	2000		

For engine degrees & RPM, multiply by 2.

C2SF-12127-A

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	325	0-2½	6
1¼-2¼	425	4-7	10
5-6	550	5½-8½	15
7½-8½	700	8½ max.	20
13-14½	2000		

For ngin degr es & RPM, multiply by 2.

C2SF-12127-B

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0	325	0-2½	6
1¼-2¼	425	4-7	10
5-6	550	5½-8½	15
7½-8½	700	8½ max.	20
9-10¼	1250		
11¼-12¾	2000		

For engine degrees & RPM, multiply by 2.

C3AF-12127-U

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
¼-1¼	500	2-5	10
1¼-2¼	600	5-8	14
3-4	900	7-10	18
5¾-7	1500	7½-10½	20
8¼-9¾	2000	10½ max.	

For engine degrees & RPM, multiply by 2.

C3AF-12127-AB

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
1½-2¼	500	0-3	10
5½-6½	700	2½-5½	12
8-9	1000	5-8	15
10-11¼	1400	6-9	20
11½-13	2000	9 max	25
13 max	2500		

For engine degrees & RPM, multiply by 2.

C3AF-12127-AD

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
1¼-2¼	600	1-4	7
3¼-4¼	700	4-7	10
7¼-8¼	1000	6-9	14-20
9¾-11	1500	9 max	25
12¼-13¾	2000		

For engine degrees & RPM, multiply by 2.

C3AF-12127-AE, AF

Mechanical Advance: Test stand at 0° & 250 RPM

Mechanical Advance		Vacuum Advance
Distr Degrees	Distr RPM	
¼-1¼	500	
1½-3	600	
5-6½	800	NONE
8-9¼	1200	
13½-15¼	2000	

For engine degrees & RPM, multiply by 2.

C3AF-12127-AG

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
1¼-2¼	500	2½-5½	12
3¼-4¼	600	5-8	15
4¾-5¾	800	6-9	20
6¾-8	1200	9 max	25
8½-10	2000		
10 max	2500		

For engine degrees & RPM, multiply by 2.

C3AF-12127-AH

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM

Mechanical Advance		Vacuum Advanc	
Distr. Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-1	400	1-3	8
2¾-3¾	600	4-7	12
4¼-5¼	800	4½-7½	20
6¼-7½	1200		
8½-9½	1600		
10-11¾	2000		
13 max			

For engine degrees & RPM, multiply by 2.

C3MF-12127-A

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advanc	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
1-2¼	500	1-4	7
5¼-6¼	700	3½-6½	10
8¼-9¼	1000	5-8	12
10¾-12¼	1500	7-10	17
13½-15	2000	10 max.	20

F r engine degr s & RPM. multiply by 2.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

IGNITION (C ntinu d)

C30F-12127-A,E

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

M chanical Advanc		Vacuum Advance	
Distr. Degrees	Distr, RPM	Distr. Degrees	Vacuum " of Hg
½-1½	500	0-3½	8.0
1¾-2¾	600	3½-6½	10.0
3-4	800	5½-8½	12.0
4¾-6	1400	6½-9½	14.0-20.0
6¾-8¼	2000	9½ max.	20.0

For ngin degr s & RPM, multiply by 2.

C30F-12127-B

M chanical Advanc : Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°,0" Hg, & 1000 RPM.

M chanical Advanc		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
1½-2½	500	1-4	8
4½-5½	800	5½-8½	12
6½-7¾	1200	7½-10½	16
8½-10	1600	8-11	20
10¾-12¼	2000	11 max	

For engine d grees & RPM, multiply by 2.

C30F-12127-D

Mechanical Advance: Test stand at 0° & 250 RPM.

Mechanical Advance		Vacuum Advance
Distr Degrees	Distr RPM	
0-1	450	
1½-3	600	
5-6½	800	
7¼-8¼	1200	NONE
8¼-9¾	2000	
9-10¾	2500	

For engine degrees & RPM, multiply by 2.

C30Z-12127-G

Mechanical Advance: Test stand at 0°, & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
½-1½	500	0-1	7
4-5	800	4-7	12
6¾-7¾	1200	6-9	15
9¼-11	2000	7½-10½	20
11 max	2500	10½ max	25

For engine degrees & RPM, multiply by 2.

C3SF-12127-D

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg, & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	500	0-1	6
½-1½	700	0-3	8
4½-5½	1000	3½-6½	12
7½-8½	1300	5-8	15-20
11-12½	2000		

For engine degrees & RPM, multiply by 2.

IGNITION COIL (STD. IGNITION)

Primary Resistance (Ohms) ..... 1.40-1.54 at 75°F
Secondary Resistance (Ohms) ..... 8000-8800 at 75°F
Primary Resistance Wire (Ohms)..... 1.30-1.40 at 75°F
Current Draw (Amps.) ..... 2.5 idling, 4.5 stopped

CARBURETOR

CARBURETOR SPECIFICATIONS			
Carburetor No. ①	Float Level ④	Fuel Level ⑤	Choke Setting
Ford 2-Bbl			
C30F-9510-C,D	21/32"	7/8"	4 Lean
C30F-9510-E,F	21/32"	29/32"	4 Lean
C3DF-9510-E,G	1/2"	3/4"	4 Lean
C3DF-9510-F,H	1/2"	3/4"	4 Lean
C3AF-9510-AK,AL	5/8"	7/8"	4 Lean
C3AF-9510-E	21/32"	29/32"	Centered
C3AF-9510-F	21/32"	29/32"	2 Lean
C3MF-9510-A,B	21/32"	29/32"	2 Lean
Ford 4-Bbl			
C3AF-9510-N	47/64"	63/64"	Centered
C3AF-9510-R,S,T	47/64"	63/64"	2 Lean
C2SF-9510-B	21/32"	29/32"	2 Lean
C3SF-9510-A	47/64"	63/64"	2 Lean
C3OF-9510-AB			None
Holley 2-Bbl			
C1AE-9510-AU	②	③	Centered
C1AE-9510-AV	②	③	None
C2SE-9510-A	②	③	Centered
C2SE-9510-B,E	②	③	None
Holley 4-Bbl			
C1AE-9510-AM	②	③	Centered
C3AE-9510-A,B	②	③	Centered
C2AE-9510-CB	②	③	⑥
C3AE-9510-C	②	③	⑥

① - Prefix & Suffix of number on tag on carburetor or stamped on main body (Ford Carb), on choke plate flange (Holley Carb)
② - Top of float parallel with top of fuel bowl with bowl inverted
③ - At lower edge of sight plug opening ± 1/16"
④ - ± 1/64" ⑤ - ± 1/32"
⑥ - Front Carb Centered; Rear Carb 90° Clockwise from Centered (no choke action)

ACCELERATING PUMP

FORD CARBURETOR NOTE - Pump over-travel lever has four holes (No. 1 hole is nearest throttle shaft, and No. 4 hole is furthest from throttle shaft). Accelerating pump plunger lever has two holes.

Ford Carb. (221", 260" Engines) - Accelerating pump operating rod must be installed in No. 4 hole (furthest from throttle shaft) for all operating conditions. Install opposite end of pump rod in inner hole (closest to pump plunger) of plunger lever.

Ford Carb. (289", 352", 390" Engines) - Install pump operating rod in proper hole of over-travel lever as indicated in table below for various operating conditions Install opposite end of pump rod in inner hole (closest to pump plunger) of plunger lever *NOTE - For operation over 5000 ft altitude, place pump operating rod in No. 1 hole*

Over-Travel Lever Hole	Operating Condition
No. 1	Over 80°F and/or 5000 Ft. Alt.
No. 2	40-80°F.
No. 3	Below 40°F
No. 4	Below -15°F

Holley Carb. (390", 406", 427" Engines) - Align No 1 (top) hole of pump cam with top hole of throttle lever for short stroke (warm weather or average conditions) Align No 2 (bottom) hole of pump cam with bottom hole of throttle lever for longest stroke (cold weather operation)

MANIFOLD FUEL DISTRIBUTION

Carburetor right barrel feeds cylinders 1,4,6,7. Carburetor left barrel feeds cylinders 2,3,5,8.

THROTTLE LINKAGE ADJUSTMENT

Falcon & Comet Auto. Trans. - With engine at normal operating temperature, and idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Adjust length of carburetor throttle lever-to-bellcrank connecting rod so a .245-.250" diameter rod can be repeatedly inserted in bellcrank alignment holes Leave rod inserted in bellcrank alignment holes and adjust accelerator connecting link to obtain accelerator pedal height of 4 7/16" measured from top front corner of pedal pad to floor mat Remove gauge rod

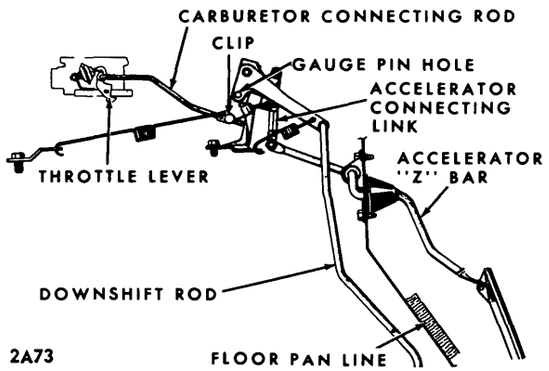
Fairlane & Meteor Auto. Trans. - With engine at normal operating temperature, and idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Stop engine and adjust accelerator connecting link for accelerator pedal height of 3 15/16" (Fairlane), 4 5/16" (Meteor) from top front corner of accelerator pedal to floor mat. Disconnect carburetor

(Continued)

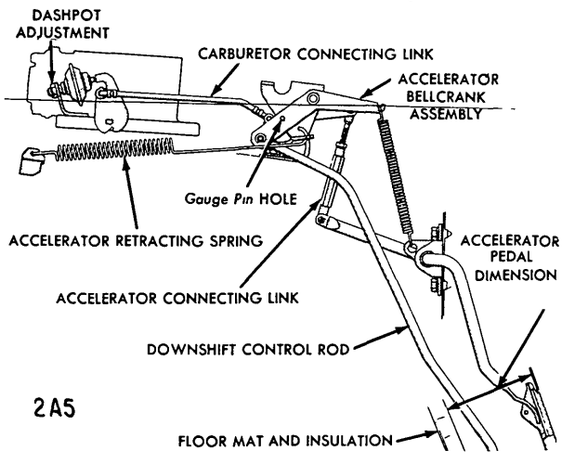
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

connecting rod from carburetor throttle lever and insert a 1/4" gauge pin through gauge pin holes in bellcrank. Adjust length of carburetor connecting rod for free fit into throttle lever with throttle lever held against hot idle screw. Gauge pin must be a free fit in gauging holes. Connect carburetor connecting rod and remove gauge pin.

Galaxie & Monterey 2-Speed Auto. Trans. - With engine idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Stop engine and make sure carburetor throttle arm stopscrew is against hot idle step of carburetor fast idle cam. Adjust accelerator connecting link for accelerator pedal height of 3 11/16" (Galaxie), 3 1/2" (Monterey) from top front corner of accelerator pedal to floor mat. Disconnect carburetor connecting link at carburetor, insert a 1/4" gauge pin through holes in bellcrank assembly, and adjust carburetor connecting link so gauge pin will slide in and out of holes freely several times when connecting link is connected to carburetor.



FAIRLANE & METEOR
AUTO. TRANS. THROTTLE LINKAGE



GALAXIE & MONTEREY
AUTO. TRANS. THROTTLE LINKAGE

Galaxie & Monterey 3-Speed Auto. Trans. - With engine idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Make sure carburetor throttle lever is against idle adjusting screw. Disconnect carburetor connecting link from accelerator bellcrank. Insert 1/4" gauge pin through holes in bellcrank assembly. Lift connecting link to normal operating position, maintain forward pressure on link so carburetor throttle lever is firmly against idle adjusting screw, and adjust length of link so sleeve fits freely into bellcrank lever. **Rotate sleeve one full turn counterclockwise to lengthen link.** Remove gauge pin and connect link. Make sure gauge pin will still enter gauging holes freely (adjust connecting link again as necessary). Adjust accelerator connecting link so pedal height is 3 11/16" (Galaxie), 3 1/2" (Monterey) from top front corner of pedal to floor mat.

Thunderbird Auto. Trans. - With engine idle speed correctly set, make anti-stall dashpot adjustment (see below), then proceed as follows: Make sure carburetor throttle lever is against idle adjusting screw. Disconnect carburetor connecting link at carburetor and adjust link to obtain accelerator pedal height of 3 11/16" from top front corner of pedal to floor mat. Place speed nut on downshift lever rod 1 1/4" from forward face of bushing in downshift lever (distance from bellcrank to nut will be 1 1/4").

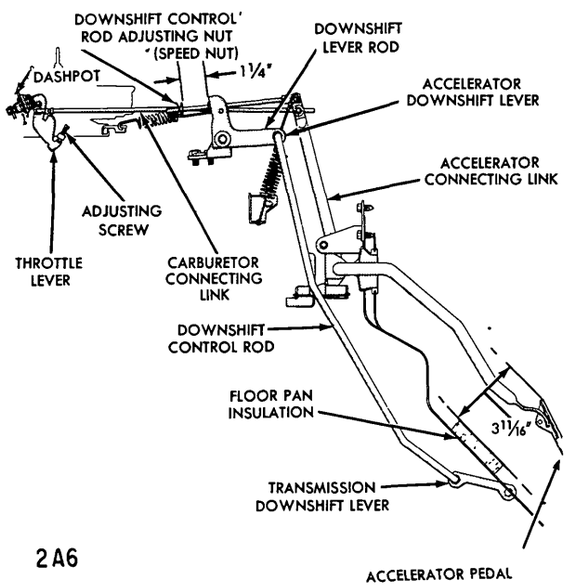
TRIPLE CARBURETOR LINKAGE SYNCHRONIZATION

All Triple Carburetor Equipped Cars - 1) Insert a 1/8" diameter gauge pin in gauging holes in bellcrank lever and bracket on left side of engine near distributor (at anti-stall dashpot if equipped) to lock lever in closed throttle position.

2) Disconnect throttle rods at both front and rear carburetor throttle levers, then disconnect center carburetor throttle rod at bellcrank lever. Adjust length of front carburetor throttle rod so that with rod installed, throttle lever of front carburetor will be completely closed when center carburetor throttle lever is closed against idle speed adjusting screw stop (normal idle position).

3) Adjust rear carburetor in same manner then install front and rear throttle rods to throttle levers and tighten locknuts.

4) With center carburetor throttle lever against idle stop, adjust throttle rod so trunnion will just engage in hole in bellcrank lever, then install rod retainer clip. Remove gauge pin and adjust anti-stall dashpot as required.



THUNDERBIRD AUTO. TRANS. THROTTLE LINKAGE

ANTI-STALL DASHPOT ADJUSTMENT

All Except Triple Carburetors - With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

Triple Carburetor Cars - With idle speed and mixture correctly set, and carburetor linkage synchronized, proceed as follows: Insert a 1/8" diameter gauge pin in gauging holes in bellcrank lever and bracket on left side of engine at dashpot. Clearance between dashpot plunger and bellcrank lever with dashpot plunger fully depressed should be 1/8-3/16". To adjust, turn dashpot in mounting bracket. Tighten locknut and remove gauge pin.

406" & 427" TWO-CARBURETOR ADJUSTMENT

Make adjustments in the following sequence:

INTER-CONNECTING LINKAGE

1) Disconnect inter-carburetor linkage at front and rear carburetors and at bellcrank lever. Disconnect accelerator rod at left side bellcrank lever (on manifold).

2) Adjust primary carburetor rod to length of 4 3/16" (from center of hole to center of bent end), install rod on bellcrank lever and upper stud of front carburetor lever. Move bellcrank lever so front carburetor throttle valves in wide open position and hold in this position.

3) Install slotted end of secondary carburetor rod on rear carburetor throttle lever, move throttle lever to wide open position, adjust rod so that hole in rod engages stud on bellcrank lever freely, connect rod..

4) Move left side of bellcrank assembly (on manifold) so that throttle valves on both carburetors are wide open *(CAUTION - Accelerator lever must b engaged between pin and pad of accelerator pedal).* Have someone depress accelerator pedal to the floor and hold pedal in this position. Accelerator rod pin should engage bellcrank lever. Adjust as necessary.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

INITIAL IDLE SPEED & MIXTURE

Turn throttle stopscrew on each carburetor in 3 full turns from point where throttle valves tightly closed Turn all idle mixture screws (2 on each carburetor) out 1-1/2 turns from lightly seated position

FINAL HOT IDLE SPEED & MIXTURE

1) Attach tachometer Operate engine in neutral until it reaches normal operating temperature *NOTE* - If equipped with Air Conditioning, engine must be operated at least 20 minutes
2) Set engine idle speed at 750 RPM by turning throttle stopscrew on each carburetor equally and alternately *CAUTION - Fast idle adjusting screw must not contact fast idl cam whil making this adjustment*
3) Adjust each idle mixture screw (front carburetor first, rear carburetor last) by turning screw in until engine runs rough (lean), then out until engine runs rough (rich), and finally in just enough to smooth out the roughness (will provide a slightly rich mixture) Final setting of all adjusting screws must be equal within 1/8 turn
4) Recheck idle speed and adjust as necessary

MANUAL THROTTLE CONTROL ADJUSTMENT

Air Condition d Car (If Equipped) - Attach a tachometer to engine and place transmission selector lever in "N" or "P". Turn air conditioning on and make sure magnetic clutch is engaged. Using hand throttle, bring engine speed to 750-1000 RPM and secure stop closest to throttle control handle against cable armor so engine cannot be operated higher than above range with hand throttle.

POWER STEERING IDLE SPEED-UP CONTROL ADJUSTMENT

Pow r Steering Cars (If Equipped) - With engine at correct idle speed, turn wheels against linkage stops, loosen locknuts on control valve mounting bracket, and adjust control valve to maintain same idle speed with linkage against stops. *CAUTION - Do not hold wheels against stops for more than 15 seconds.*

BELT ADJUSTMENT

Belt Tensi n (Lbs.) With Tension Gauge T63L-8620-A

	New Belt	ℂUsed Belt
Generator (Single Belt)	110-140	80-110
Generator (Dual Belt)		
Front	110-140	80-110
Rear	105-155	75-120
Power Steering	120-150	90-120
Air Conditioning Compressor	120-150	90-120

ℂ - Any belt operated 10 minutes or longer is a used belt.

ELECTRICAL

►*1963 RECURRING RUN-DOWN BATTERY CORRECTION (60 AMP LEECE-NEVILLE ALTERNATOR CARS):* If current output of system is correct, trouble may be caused by burned or stuck load relay contacts due to stop and go driving and subsequent high charging rate through contacts To check for current leak, turn off all electrical components, disconnect battery positive cable, and note if spark occurs If spark occurs, there is current leak To correct, replace load relay contacts, and remove wire from regulator "G" terminal and connect to regulator "B" terminal This removes load relay contacts from alternator output circuit and connects alternator output terminal directly to battery *NOTE - This change made on later production cars.*

BATTERY

12 Volt Type.

Engine	Capacity Amp. Hr. (20 Hr. Rate)
221", 260", 289" Std	55
Optl	65
352", 390" Synchro-mesh Std	55
Optl	65 or 70
352", 390" Auto Trans Std	65
Optl	70
406", 427" Std	70

Battery Ground - Negative, to cylinder head.

Engine Ground - Cylinder head, Intake manifold, or Cylinder block to dash.

STARTER

221", 260", 289" Engines

Torque	RPM	Volts	Amperes
0 ft. lbs.	ℂ	12.0	70
15.5 ft. lbs.		5.0	670

ℂ - With starter on engine and engine idling.

Current Draw & Cranking Speed - 100-150 amps. at 250-290 RPM.

352", 390", 406", 427" Engines

Torque	RPM	Volts	Amperes
0 ft. lbs.	ℂ	12.0	80-110
14.8 ft. lbs.		5.0	580

ℂ - With starter on engine and engine idling.

Current Draw & Cranking Speed - 155-210 amps. at 150-180 RPM.

Brush Spring Tension (All Models) - 45-58 ozs.

GENERATOR

Generator Type	Amperes	Volts	Gen. RPM
Ford	30	15.0	2525
Autolite	40	15.0	1800

Brush Spring Tension - 20-26 ozs. (Ford Gen.), 34-41 ozs. (Autolite Gen.).
Field Current - 1 2-1 8 amps at 12 volts & 75°F (All)

GENERATOR REGULATOR

Cutout Relay

Cuts In - 12.0-12.8 volts (Ford), 12.5-13.8 volts (Autolite).
Cuts Out - 6-9 amps. (Ford), 8 amps. (Autolite) reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts (Ford), 14.3-15.1 volts (Autolite) at 75°F.

Current Regulator

Setting - 28-32 amps. (Ford), 33-47 amps. (Autolite).

ALTERNATOR

FORD

Alternator	Amperes	Volts	Alt. RPM
30 Amp. Type	30	15.0	(hot) 6500
40 Amp. Type	40	15.0	(hot) 6500

LEECE-NEVILLE

Current Output - 60 amps. at 1600 Engine RPM.

ALTERNATOR REGULATOR

FORD

►*1963 THUNDERBIRD & MONTEREY REGULATOR PRODUCTION CHANGE:* Regulators with yellow paint on regulator base have been modified to correct engine compartment whine. *See "Engine Compartment Whin Noise Correction" under Engine Data (following).*

Field Relay

Closing Voltage - 3-4 volts.
Contact Gap - .015-.022". **Air Gap** - .022-.030".

Voltage Regulator

Setting - 14.1-14.9 volts at 75°F.
Contact Gap (Lower Contacts) - .010-.015".
Air Gap - .045-.052" with upper contacts closed.

LEECE-NEVILLE

Load Relay

Closing Voltage - 5.6-6.4 volts.

Voltage Regulator

Setting - 13.5-14.3 volts at 75°F.

Current Regulator

Setting - 58-62 amperes.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

FUSES & CIRCUIT BREAKERS

ALL (EXCEPT THUNDERBIRD)

CIRCUIT BREAKERS

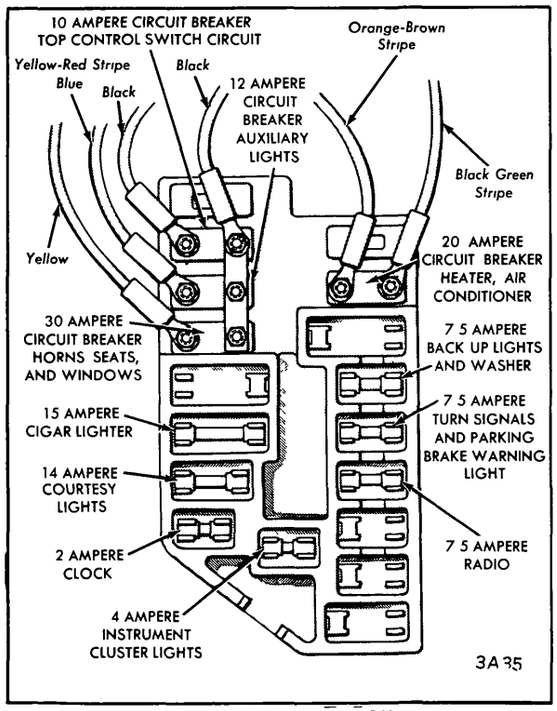
1 - Headlight circuit On headlight switch
2 - Windshield wipers At lower left end of instrument panel near steering column
3 - Electric Windows (including Tailgate), Seats, Convertible Top On starter relay

FUSES

1 - Fuse block on headlight switch
2 - In-line fuses in feed wire for each of the following units Clock (Fairlane & Meteor only), Air Conditioner, Spotlight, Windshield Washer Pump, Instrument Panel Lamp Rheostat
3 - Fuse on Overdrive Relay

THUNDERBIRD

See Fuse Box Illustration Fuse box located on right cowl panel under right end of instrument panel



THUNDERBIRD FUSE BOX

ELECTRICAL (C ntinu d)

SWITCHES, GAUGES, & SPEEDOMETER

► *1963 GALAXIE TURN SIGNAL SWITCH NOT CANCELLING CORRECTION* May be caused by turn signal lever binding on steering column tube and pin flange assembly To correct, remove signal lever and grind off the 1/16" lip in slot in housing using a fine mill file

► *INDICATOR GAUGES INACCURATE READING & MALFUNCTION NOTE* 1) On Temperature and Oil Pressure gauges, unit is grounded at sending unit threads To insure good ground connection, use Sealer C3AZ-19554-B on threads of sending units This sealer has aluminum particles in it to insure grounding

2) On FM-radio equipped cars radio suppression choke is installed on ignition (input) side of gauge voltage regulator Make sure choke is installed on correct terminal before checking for malfunction or inaccurate readings

► *1963 MONTEREY INOPERATIVE STOP LIGHTS (BLOWN FUSE) CORRECTION* May be caused by overload condition on circuit (includes parking, tail, dome, and instrument lights) if all lights are on at the same time To correct, connect stop lights into back-up light and turn signal circuit as follows Cut green-red wire (next to green-yellow wire) at female connector and splice into black-red wire at fuse block using a butt connector *See Wiring Diagram*

NEUTRAL SAFETY SWITCH STEERING COLUMN SHIFT AUTO TRANS.

All Models - Switch located on steering column under instrument panel To adjust loosen steering column-to-switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws Starter circuit must be open in all positions except "N" or "P"

NEUTRAL SAFETY SWITCH FLOOR MOUNTED SHIFT AUTO. TRANS.

All Models - 1) Remove shift lever detent button, spring, and knob assembly from lever. Remove console top chrome trim panel. Put selector lever in "N" and remove quadrant indicator assembly. Remove bulb socket, being careful not to scratch quadrant cover. 2) Loosen switch attaching screw, apply both service and parking brakes, turn ignition key to start position, and move switch until starter operates Tighten switch screws and check for starting in "P" position. Check operation of back-up lights. Tape detent rod to shift lever to hold rod in position, and reassemble console and shift lever assembly.

HEADLIGHT SWITCH REMOVAL

Press down on button on top of switch and remove switch knob and shaft Remove retaining bezel nut (Tool No 17470-N-51) and remove switch Separate fuse block from switch and disconnect wiring

STOP LIGHT SWITCH

On brake master cylinder Not adjustable

TURN SIGNAL FLASHER

Clipped on back of instrument cluster above and to left of speedometer (except Fairlane & Thunderbird), at extreme left of instrument cluster (Fairlane & Thunderbird)

SPEEDOMETER REMOVAL

Falcon & Comet - Disconnect speedometer cable, then remove instrument cluster bezel, lens, and cluster mask plate from cluster housing Remove speedometer attaching screws and remove speedometer

Fairlane, Meteor, Galaxie, M nt rey - Speedometer and other instruments may be removed from cluster after cluster removed from instrument panel (see below)

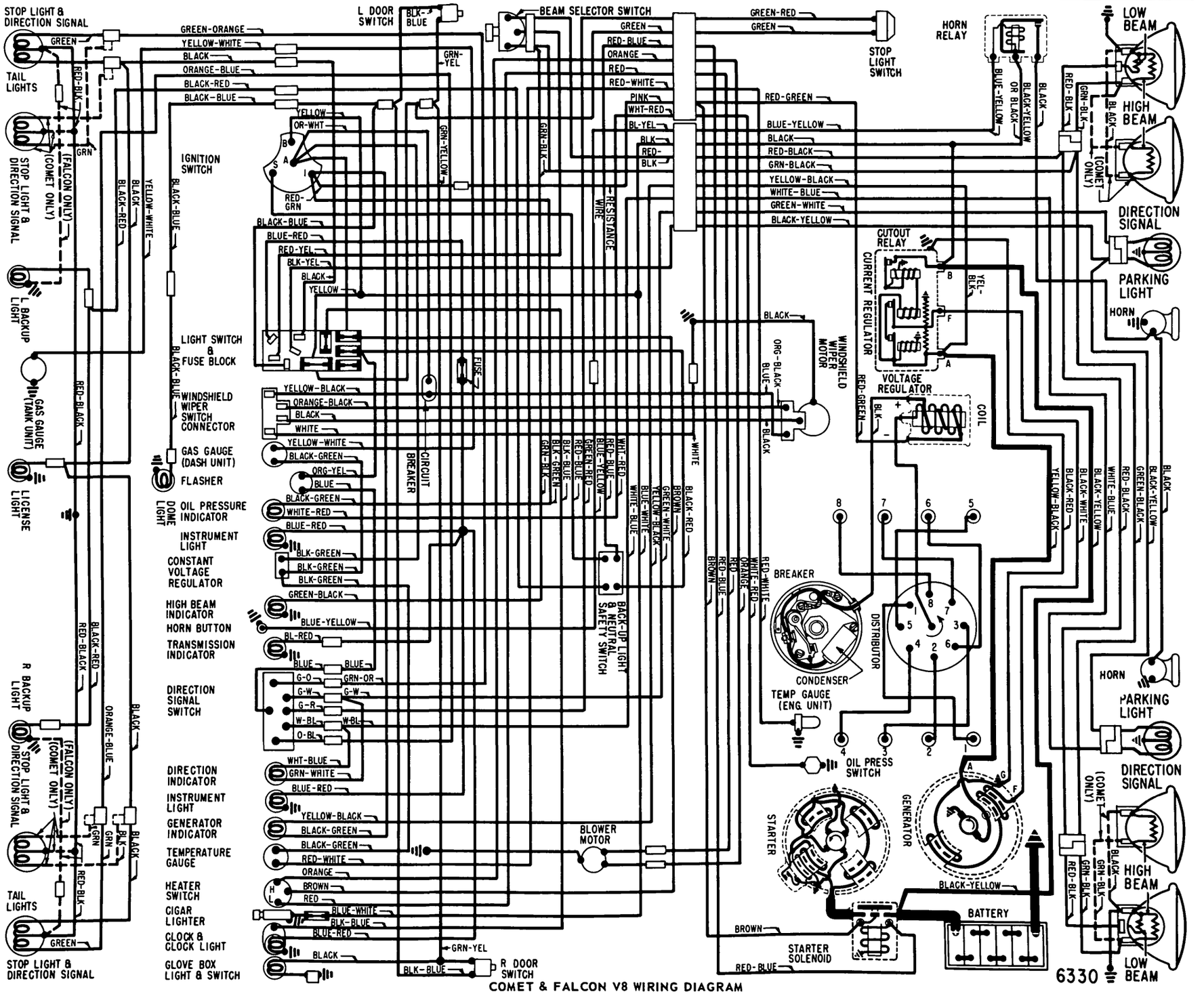
Thunderbird - Remove chrome ring retaining screws, then remove chrome ring Remove speedometer attaching screws and pull speedometer out to disconnect cable and remove lights Remove speedometer

INSTRUMENT CLUSTER REMOVAL

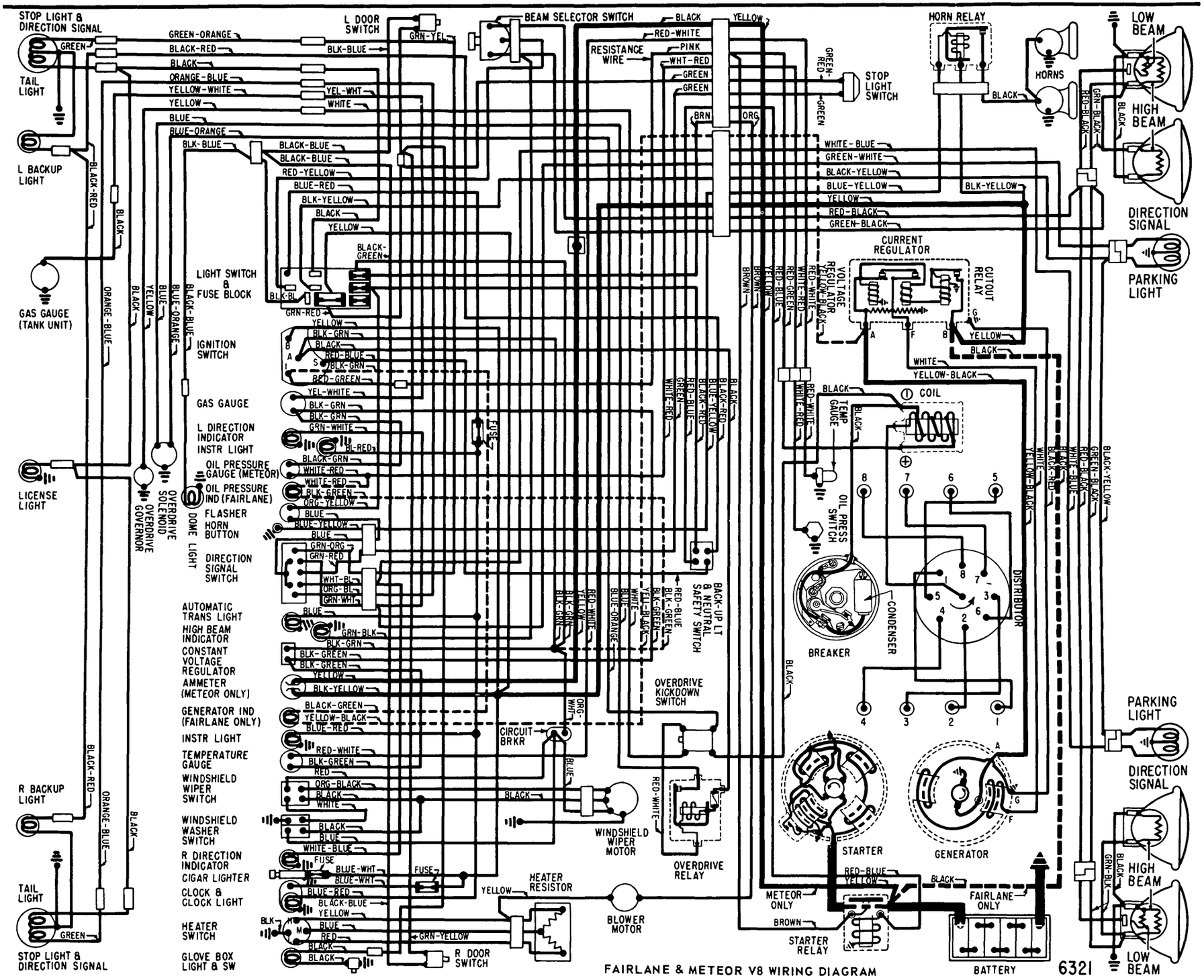
Falcon & Comet - Remove instrument cluster bezel, lens, and cluster mask plate from cluster housing Remove fuel or temperature gauge as required
Fairlane & Meteor - Disconnect speedometer cable and remove wiring harness from retaining clamps *NOTE - On Meteor, disconnect ammeter wire from terminal block on steering column right support and remove wire from ammeter loops* Disconnect cluster from instrument panel and lay on steering column Disconnect all wires and lamps from cluster, then remove cluster
Galaxie - Remove steering column cover plate, and, on automatic transmission cars, turn shift indicator needle downward on shifting shaft Disconnect speedometer cable Remove wiring harness from retaining clips, then disconnect cluster from instrument panel and lay cluster on steering column Disconnect all wiring, and remove lights from cluster Remove cluster
Monterey - Disconnect speedometer cable, then remove all cluster wiring from retaining clips on back of cluster Remove transmission selector cover Remove upper cluster-to instrument panel retaining screws (4 long screws at top of cluster, 4 short screws at bottom of cluster, and 2 screws just above steering column) Lay cluster on steering column, disconnect wiring remove socket and lamp assemblies, then remove cluster
Thunderbird - *Unnecessary to remove cluster to remove an individual instrument* To remove an instrument, remove chrome ring retaining screw, chrome ring, and instrument attaching screws Pull instrument from panel and disconnect wires or cables Remove instrument *NOTE - Constant voltag r gulator is on a bracket near the clock Remove clock for acc ss*

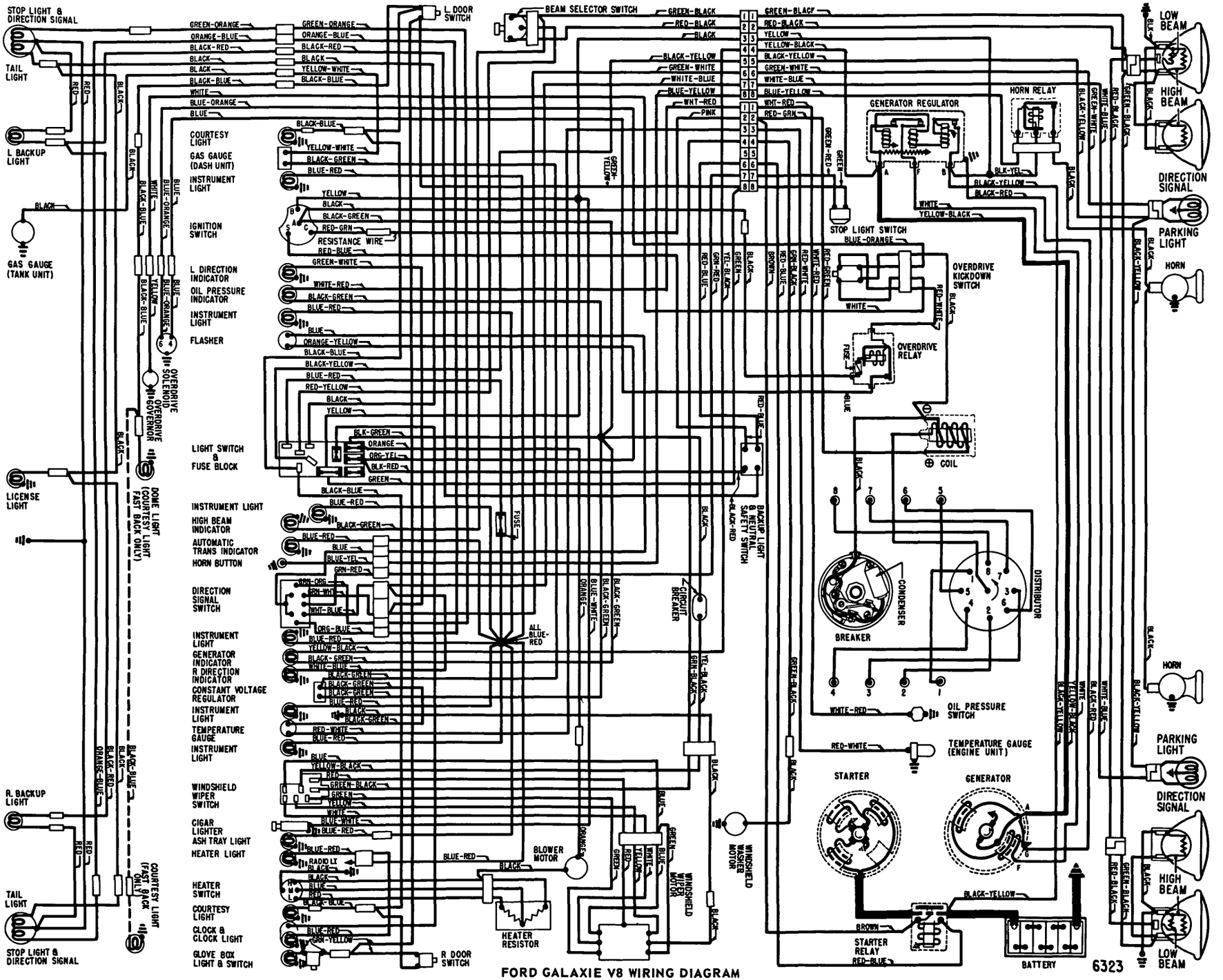
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Ford & Falcon, Mercury & Comet, Thunderbird V8 Cars 1963

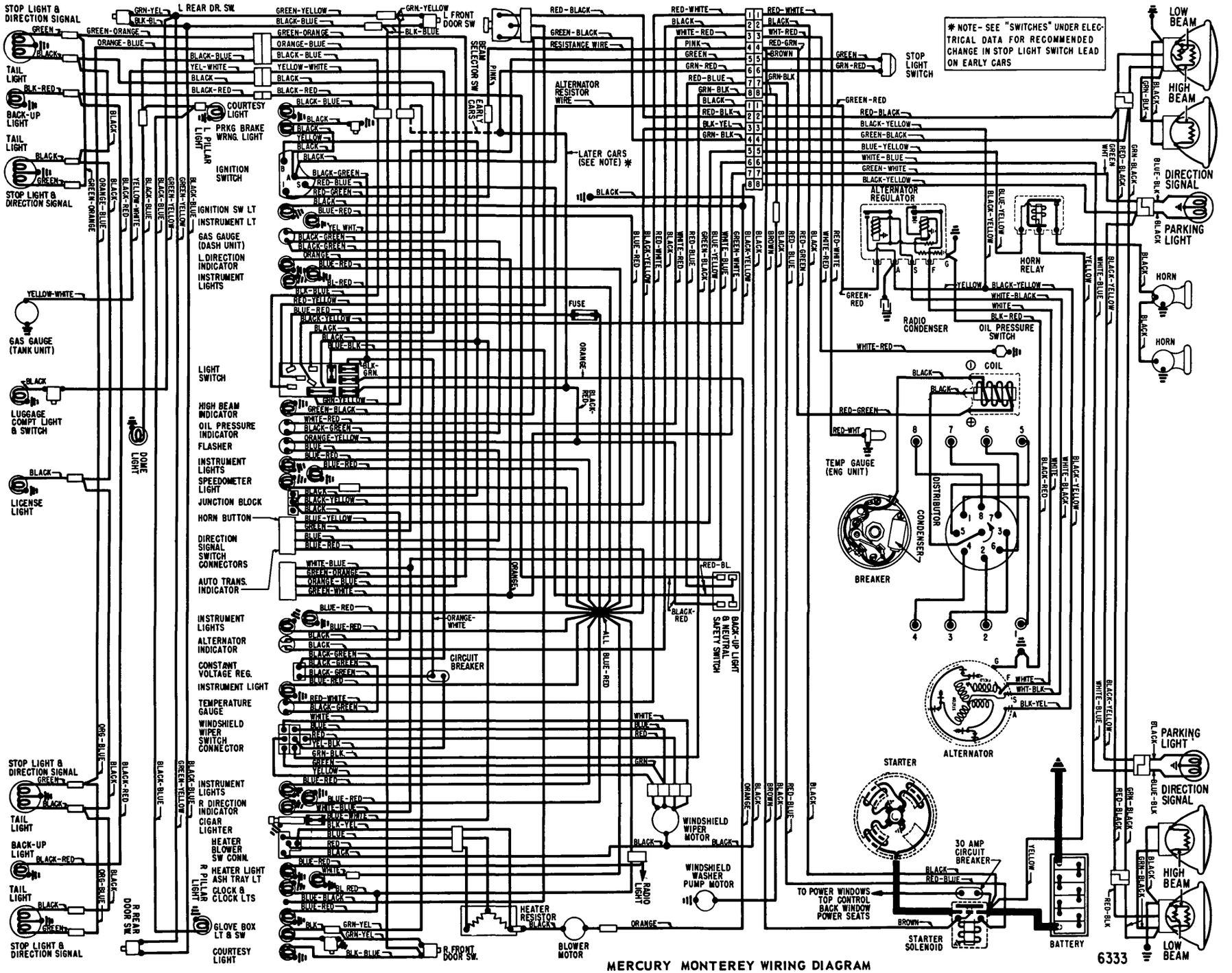


COMET & FALCON V8 WIRING DIAGRAM


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
LICENSE LIGHT
R BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
OVERDRIVE SOLENOID
OVERDRIVE GOVERNOR
L DOOR SWITCH
R DOOR SWITCH
BEAM SELECTOR SWITCH
RESISTANCE WIRE
STOP LIGHT SWITCH
HORN RELAY
HORNS
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
CURRENT REGULATOR
VOLTAGE REGULATOR
CUTOUT RELAY
COIL
TEMP GAUGE
OIL PRESS SWITCH
BREAKER
CONDENSER
DISTRIBUTOR
LIGHT SWITCH & FUSE BLOCK
IGNITION SWITCH
GAS GAUGE
L DIRECTION INDICATOR INSTR LIGHT
OIL PRESSURE GAUGE (METEOR)
OIL PRESSURE IND (FAIRLANE)
FLASHER
DOME LIGHT
HORN BUTTON
DIRECTION SIGNAL SWITCH
AUTOMATIC TRANS LIGHT
HIGH BEAM INDICATOR
CONSTANT VOLTAGE REGULATOR
AMMETER (METEOR ONLY)
GENERATOR IND (FAIRLANE ONLY)
INSTR LIGHT
TEMPERATURE GAUGE
WINDSHIELD WIPER SWITCH
WINDSHIELD WASHER SWITCH
R DIRECTION INDICATOR
CIGAR LIGHTER
CLOCK & CLOCK LIGHT
HEATER SWITCH
GLOVE BOX LIGHT & SW
BACK-UP LT & NEUTRAL SAFETY SWITCH
OVERDRIVE KICKDOWN SWITCH
CIRCUIT BRKR
WINDSHIELD WIPER MOTOR
OVERDRIVE RELAY
HEATER RESISTOR
BLOWER MOTOR
STARTER
GENERATOR
STARTER RELAY
METEOR ONLY
FAIRLANE ONLY
BATTERY
FUSE
FAIRLANE & METEOR V8 WIRING DIAGRAM
6321

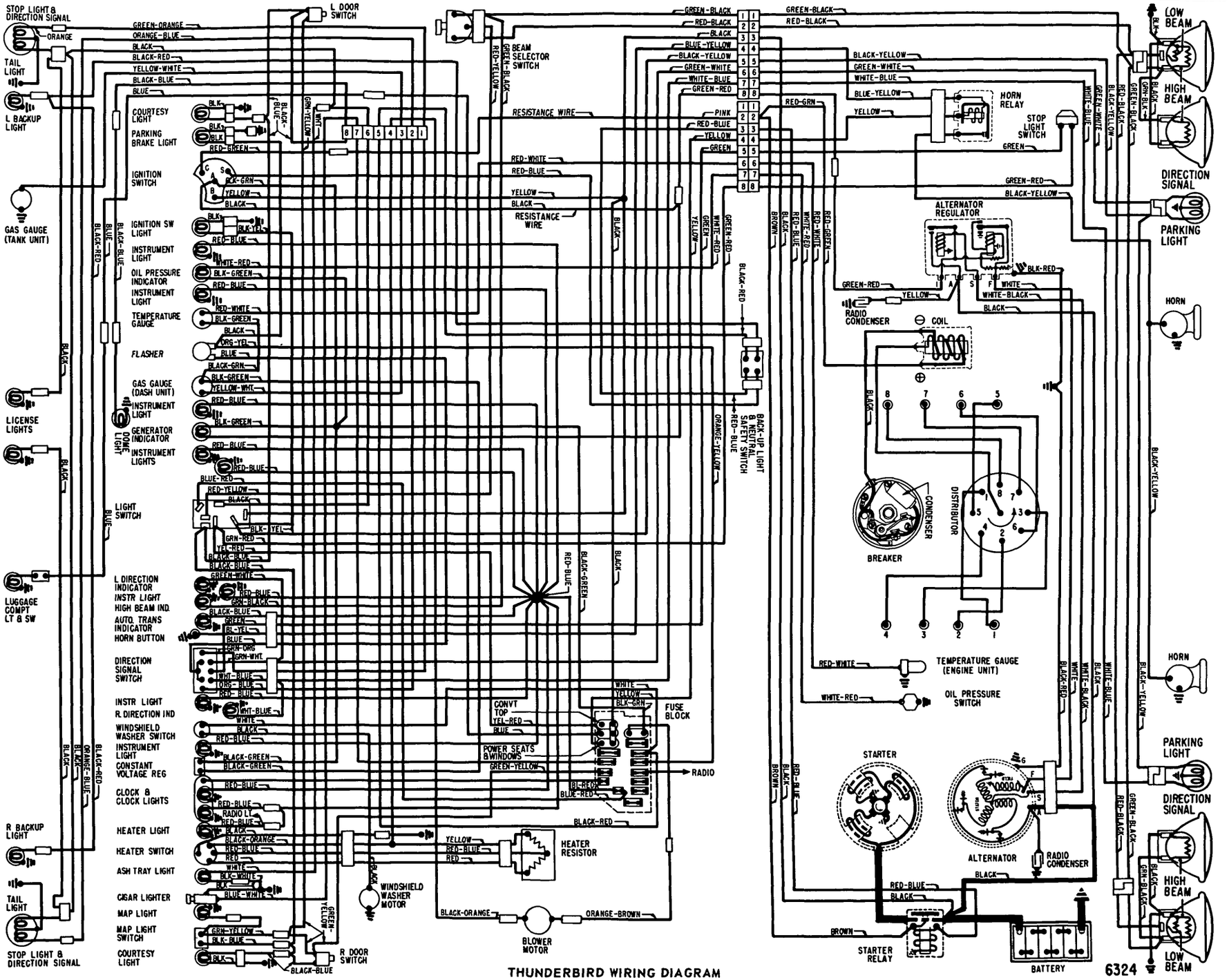


FORD GALAXIE V8 WIRING DIAGRAM



MERCURY MONTEREY WIRING DIAGRAM

Ford & Falcon, Mercury & Comet, Thunderbird V8 Cars 1963



THUNDERBIRD WIRING DIAGRAM

ENGINE

ENGINE IDENTIFICATION *See "Engine Code Designation" under MODEL IDENTIFICATION.*

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
221"	145 at 4400	8.7-1	3.50"	2.87"	221 cu. ins.
260"	164 at 4400	8.7-1	3.80"	2.87"	260 cu. ins.
289" 2-Bbl	195 at 4400	8 7-1	4 00"	2 87"	289 cu ins
289" 4-Bbl	271 at 6000	10 5-1	4 00"	2 87"	289 cu ins
352"	220 at 4300	8.9-1	4.00"	3.50"	352 cu. ins.
390" 2-Bbl.	250 at 4400	8.9-1	4.05"	3.78"	390 cu. ins.
390" 4-Bbl. Std.	300 at 4600	ℂ 10 8-1	4.05"	3.78"	390 cu. ins.
390" 4-Bbl. Police	330 at 5000	ℂ 10 8-1	4.05"	3.78"	390 cu. ins.
390" Three 2-Bbl	340 at 5000	ℂ 10 8-1	4 05"	3 78'	390 cu ins
406" 4-Bbl.	385 at 5800	11.5-1	4.13"	3.78"	406 cu. ins.
406" Three 2-Bbl.	405 at 5800	11.5-1	4.13"	3.78"	406 cu. ins.
427" One 4-Bbl	410 at 5600	11 5-1	4 23"	3 78"	427 cu ins
427" Two 4-Bbl	425 at 6000	11 5-1	4 23"	3 78"	427 cu ins

ℂ - Later Engines Early Engines were 10 5-1 *See "Compression Ratio & Cylinder Head Production Change"*

ENGINE REMOVAL

Engine (without transmission) may be removed from above in the usual manner Observe the following Remove hood, radiator, fan, pulley, and starter Disconnect power steering pump from engine and tie out of way (unnecessary to disconnect hoses or drain system) Isolate air conditioning compressor, then disconnect from engine and tie out of way *See "Ford Motor Co Air Conditioning" in Miscellaneous Section for compressor isolating procedure* Be sure to support transmission and converter, and tie or secure converter in housing

ENGINE FRONT MOUNTS (COMET & FALCON)

Right insulator bracket is painted with a yellow stripe to avoid improper installation Be sure to install this bracket on the right side

ENGINE REAR MOUNT (CANTILEVER SPRING TYPE)

To prevent high frequency high speed vibration caused by transmission extension contact with rear mount, 20" minimum clearance must be maintained between rear mount upper insulator and transmission extension Tighten spring-to-support attaching shoulder bolt until bolt bottoms Do not add washers between lower insulator and spring as noise and vibration would result

ENGINE NOTES

► *1962-63 221" & 260" ENGINES CYLINDER HEAD NON-INTERCHANGEABILITY & IDENTIFICATION NOTE* Cylinder head combustion chamber volume is different for these engines and heads must not be interchanged To identify, cast part number on head has suffix letter "E" for 221", "F" for 260" Cast number located below No 3 & 4 and No 5 & 6 exhaust ports, or on bottom side of head directly under end intake manifold hold-down boss (about 1" from top edge), or cast on one end of head and visible when head removed

► *1962-63 FAIRLANE & METEOR ENGINE REAR MOUNT BOLT REPLACEMENT NOTE.* New type bolt, locking nut, cotter pin, and flat washer used to attach rear support bracket on later cars Use new type for **all** service replacement Torque for new bolt is 58-75 ft lbs

► *1963 THUNDERBIRD & MONTEREY ENGINE COMPARTMENT "WHINE" NOISE CORRECTION:* Noise most noticeable at 5-18 MPH and 800-1000 RPM, and may be thought to be caused by transmission front pump, power steering, etc To check, disconnect wiring from alternator regulator If noise stops, replace regulator *NOTE - Regulators with yellow paint on regulator base have been modified to correct this noise*

► *406" & 427" ENGINES REBORE CAUTION:* Manufacturer recommends no reboring of these cylinder blocks

► *1963 390" 4-BBL ENGINES COMPRESSION RATIO & CYLINDER HEAD PRODUCTION CHANGE:* Later engines have 10 8-1 compression ratio (was 10 5-1) and new cylinder heads with C2SE-6090 casting number between No 3 & 4 or No. 6 & 7 spark plugs are used. These heads may be used on earlier engines if the correct distributor is used

► *352", 390", 406", 427" ENGINES INTAKE MANIFOLD SEAL INSTALLATION NOTE* Special procedures required for seal and manifold installation *See "Intake Manifold Installation" below*

► *1963 390" (EXCEPT POLICE) ENGINE CRANKSHAFT & CONNECTING ROD PRODUCTION CHANGE & NON-INTERCHANGEABILITY NOTE* Later type connecting rods have increased "I" beam cross section and crankshaft has increased counterweight and bob-weight sections These rods and shaft must be used together as a set, and may also be used on 1961-62 engines

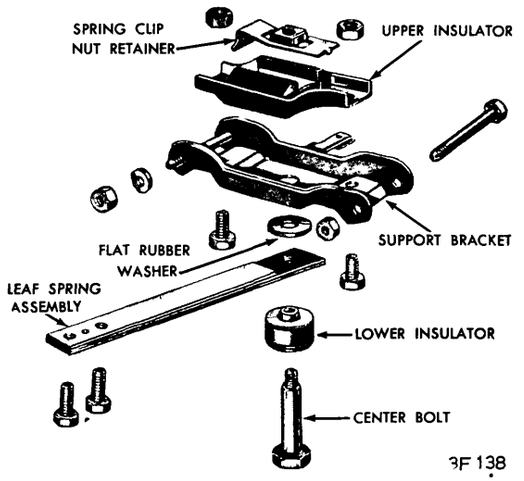
► *1962-63 390" POLICE & 406" ENGINES CONNECTING ROD PRODUCTION CHANGE & ROD CAP NUT INSTALLATION NOTE* New type connecting rod, No C3AZ-6200-A, used on later cars Rod bearing cap nut must be installed with machined shoulder contacting rod bearing cap Torque for this nut is 53-58 ft lbs

► *1962-63 406" ENGINE CYLINDER HEAD & VALVE SPRING SEAT PRODUCTION CHANGE, NON-INTERCHANGEABILITY CAUTION & CYLINDER HEAD INSTALLATION NOTE-* Later type heads have the internal valve spring pilot machined off to eliminate chamfering of pilot by spring and subsequent engine damage New separate valve spring seat, No C3AZ-6A536-A, with slots to measure valve spring height is used with new head *Do not intermix old and new design heads and spring seats* Also, Flatwashers, No 351453-S8, must be installed under each cylinder head bolt head to minimize bolts becoming embedded in head and losing torque

► *FALCON & COMET ENGINE LIFTING CAUTION* To avoid damage to accelerator linkage when raising or jacking engine (mount replacement, etc), disconnect accelerator shaft arm from accelerator pedal shaft

► *1963 390", 427" ENGINES OIL BEING DISCHARGED THROUGH FILLER CAP CORRECTION.* Caused by oil filler cap being loose on filler pipe and excessive crankcase pressure To correct, install new type oil filler pipe, C3AZ-6763-A (With internal bump to engage filler cap spring) and new type oil filler cap, C3AZ-6766-A (Chrome) C3AZ-6766-B (Black) which has six holes for improved crankcase ventilation *NOTE - Thes parts installed on later production engines*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



FALCON & COMET CANTILEVER SPRING ENGINE REAR MOUNT ASSEMBLY (EXPLODED)

OIL PAN REMOVAL

Falcon & Comet - Drain crankcase, then disconnect exhaust pipes from exhaust manifolds Disconnect stabilizer bar from underbody and pull bar down below oil pan Remove oil pan attaching bolts, crank engine as necessary for clearance, then remove oil pan *INSTALLATION NOTE - Tabs of oil pan front and rear seals must be installed over the oil pan side gaskets*

Fairlane & Meteor - Drain crankcase and remove dipstick. Remove front crossmember. Remove oil pan retaining bolts, crank engine for necessary clearance, and remove oil pan. *NOTE - When installing pan, tabs of oil pan front and rear seals must be over oil pan gasket.*

Galaxie (260" Engine) - Drain crankcase, remove dipstick, and remove starter and dust seal. Remove oil pan retaining bolts, crank engine for necessary clearance, and remove oil pan.

Galaxie & Monterey (352", 390", 406", 427" Engines) - Drain crankcase and remove dipstick.Remove flywheel housing lower cover. On Monterey, remove stabilizer bar from mounting studs and pull ends of bar down for clearance. On all cars, remove oil pan retaining screws and let pan rest on frame crossmember. Crank engine for necessary clearance between crankshaft counterweight and rear of oil pan. Swing oil pump pick-up tube and screen out of way or let drop into oil pan. Remove oil pan by moving forward and tilting down.

Thunderbird - Drain crankcase and cooling system. Disconnect radiator upper hose at supply tank. Remove oil pan retaining screws and let pan rest on underbody crossmember. Rotate crankshaft so counterweight will clear oil pan and move pan forward. Raise engine so there is tension on front engine mounts, disconnect mounts and raise engine so oil pump retaining bolts can be removed. Remove oil pan and pump.

ENGINE (Continued)

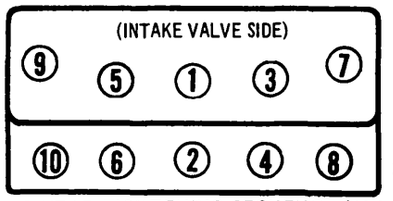
CYLINDER HEAD

Removal - On 221", 260", 289" engines, loosen rocker arm stud nuts and pivot rocker arms to one side so pushrods can be removed On 352", 390" Hydraulic lifter engines, observe rocker arm shaft removal procedure below

Installation - Coat new gasket on both sides with gasket sealer Gaskets must be installed with word "Front" to front of engine, and word "Top" facing upwards *NOTE - If gasket not marked "Top", make sure water passage holes line up as right and left gaskets are interchangeable* On 221", 260", 289" engines, coat head bolts with water resistant sealer On 406" engines (later type heads), Flatwashers, No 351453-S8, must be installed under each cylinder head bolt head to minimize bolts becoming embedded in head and losing torque On all engines, tighten bolts in sequence shown in diagram **3 times around** to torque limits shown in table below *Do not disturb bolts after final step completed.*

Cylinder Head Torques (Ft. Lbs.)

Engine	Step 1	Step 2	Step 3
221", 260", 289"	55	65	70
352", 390", 406", 427"	70	80	90



CYLINDER HEAD TIGHTENING SEQUENCE (ALL ENGINES)

TIGHTENING SPECIFICATIONS

ENGINE TORQUES

Application	Foot-Pounds 221", 260" 289"	352", 390", 406", 427"
Cylinder Head	①	①
Intake Manifold	②	③ 32-35
Exhaust Manifold	13-18	12-18
Oil Pan	7-9 (1/4") 9-11 (5/16")	9-13
Main Bearing Caps	60-70	④ 95-105
Connecting Rod Caps	19-24	⑤ 40-50
Vibration Damper or Pulley	70-90	70-90
Camshaft Sprocket	30-35	35-45
Camshaft Thrust Plate	6-9	12-15
Flywheel	75-85	75-85
Rocker Arm Cover	3-5	4-7
Rocker Arm Bracket	⑥	40-45
Engine Front Cover	12-15	12-15
Water Outlet Housing	12-15	12-15
Water Pump	12-15	23-28
Oil Pump	23-28	23-28
Oil Filter Adapter	60-100	12-15
Oil Filter Center Bolt	20-25	
Flywheel Housing	⑦	⑦
Transmission Mounting	⑧	⑧

① - See "Cylinder Head Installation" for tightening procedure Three different applications must be made
② - See "Intake Manifold Installation" for tightening procedure Three different applications must be made
③ - 25-28 ft lbs on 406", 427" Engines.
④ - For Cross-Bolts on 427" Engine, see "Main Bearing Cap Installation"
⑤ - 53-58 ft lbs on 406", 427" Engines
⑥ - Threaded type rocker arm stud on 289" 4-Bbl Engine is 60-70 ft lbs
⑦ - 40-50 ft lbs Synchro-mesh, 45-50 ft lbs Auto Trans
⑧ - 37-42 ft lbs Synchro-mesh, 35-45 ft lbs Auto Trans

ENGINE MOUNT TORQUES

Falcon & Comet	Ft. Lbs.
Front Insulator-to-Engine	18-24
Front Insulator-to-Insulator Bracket	26-35
Front Insulator Bracket-to-Support Bracket	20-28
Front Support Bracket-to-Body	26-34
Rear Support Bracket-to-Crossmember	10-15
Rear Support-to-Cantilever Spring	28-32
Cantilever Spring-to-Trans Extension	25-28

Fairlane & Meteor	Ft. Lbs.
Front Support Bracket-to-Engine	29-39
Front Insulator-to-Support Bracket	15-21
Front Support Bracket-to-Body Bracket	41-53
Front Mounting Bracket-to-Underbody	26-34
Rear Insulator-to-Trans Extension	32-42
Rear Insulator-to-Rear Support	10-15
Rear Support-to-Mounting Bracket	① 58-75
Rear Mounting Bracket-to-Underbody	41-53

Galaxie & Monterey	Ft. Lbs.
Front Insulator-to-Engine	35-40
Front Insulator-to-Frame	45-55
Front Support Bracket-to-Crossmember	45-50
Rear Support Retainer-to-Trans Extension	40-45
Rear Support-to-Frame	12-15

Thunderbird	Ft. Lbs.
Front Insulator-to-Engine	35-40
Front Insulator-to-Intermediate Bracket	45-60
Front Intermediate Bracket-to-Crossmember	45-60
Rear Support Retainer-to-Trans Extension	35-45
Rear Support-to-End Bracket	30-42

① - *See "Rear Support Mount Bolt Replacement Note" above*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

INTAKE MANIFOLD

Removal - On 352", 390" hydraulic lifter engines, observe rocker arm shaft removal procedure below.

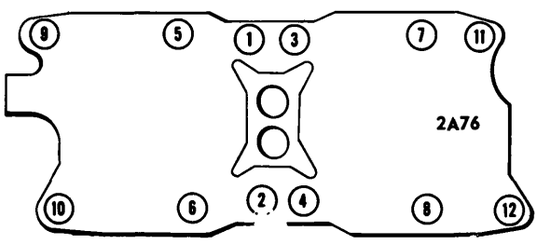
Installation (221", 260", 289") - Coat cylinder block seal surfaces with oil resistant sealer. Install new seals and gaskets. *Gaskets must be interlocked with seal tabs.* Install manifold and use aligning dowels in bolt holes No. 10 & 12 (left side). Tighten manifold attaching bolts in sequence shown in diagram **3 times around** to following torques: **Step 1** - 3-5 ft. lbs. (aligning tools in place); **Step 2** - 3-5 ft. lbs. for bolts 10 & 12 (aligning tools removed); **Step 3** - 11-14 ft. lbs. (all bolts); **Step 4** - 14-16 ft. lbs. (all bolts).

Installation (352", 390", 406", 427") - 1) Be sure all mating surfaces are free of old seal and oil. Apply a thin coat of quick-drying adhesive to seal mating surfaces of block, then apply non-hardening sealer (Permatex No. 2) to mating line of cylinder head and block.

2) Place locating tabs at each end of seal in slots of manifold gaskets and press seal into position on block. *Be sure seal is properly positioned as it will stick to adhesive immediately.* Press tabs of seal into slots in gaskets and cover the four connections with Permatex No. 2. Install manifold carefully so as not to dislodge seals and gasket. Apply Permatex No. 2 under head of each attaching bolt, then install and tighten bolts to correct torque, starting from the center bolts.

VALVE ROCKER COVER INSTALLATION

Apply oil-resistant sealer to one side of new cover gasket, position gasket in cover (cemented side toward cover), install cover, tighten bolts to specifications. Wait 2 minutes, then retorque bolts to same specifications



221", 260", 289" ENGINES
INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTON Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
221",260"	①④.0021-.0039"	②.0003-.0005"	③	Comp. 1 Comp. 2 Oil	.010-.020" .010-.020" .015-.055"	④.0019-.0036" ④.0020-.0040" Snug
289"	①④⑥.0008-.0038"	②.0003-.0005"	③	Comp. 1 Comp. 2 Oil	.015-.025" .015-.025" .015-.055"	④.0019-.0036" ④.0020-.0040" Snug
352"	①④.0012-.0030"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.015-.025" .015-.025" .015-.055"	④.0024-.0041" ④.0020-.0040" Snug
390"	①④.0017-.0035"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.015-.025" .015-.025" .015-.055"	④.0024-.0041" ④.0020-.0040" Snug
406", 427"	①④.0043-.0049"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.015-.025" .015-.025" .015-.055"	④.0024-.0041" ④.0020-.0040" Snug

① - 1/4" from bottom of skirt. ② - Wear limit .0008". ③ - Press Fit. *See "Replacing Pins" below.*
④ - Wear limit .006". ⑤ - Wear limit .001" ⑥ - 2-Bbl. Engine. For 4-Bbl. Engine, .0014-.0044".

PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0.0007	7	0.0025	7	0.0049
6	0.0004	6	0.0010	6	0.0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0.0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065

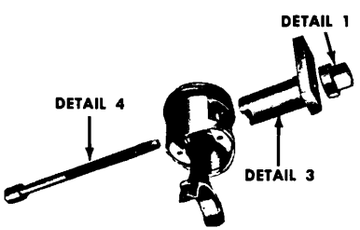
FITTING PISTONS

Place a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *Feeler must extend entire length of piston.* Pull feeler from cylinder with a spring scale and note reading on scale. Specifications should agree with table below.

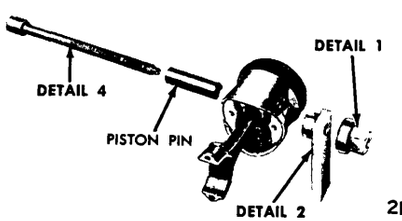
PISTON PIN REPLACEMENT (221", 260", 289")

TOOL T60K-6135-A MODIFICATION - If tool not previously modified to prevent damage to piston, make following modification so piston will not be damaged when Detail 2 of tool seats against piston pin boss: Grind a 1/16" - 45° chamfer around outer edge of Detail 2.

Removal - Press pin out of piston and connecting rod using Tool T60K-6135-A and vise and wrench, or Tool 6135-J and arbor press as shown in illustrations.

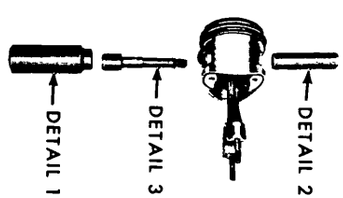


REMOVAL

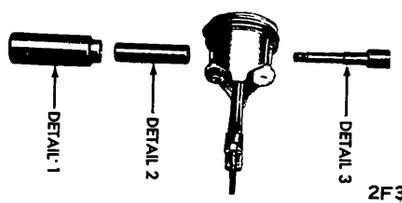


INSTALLATION

221", 260", 289" ENGINES PISTON PIN REPLACEMENT (VISE & WRENCH METHOD)



REMOVAL

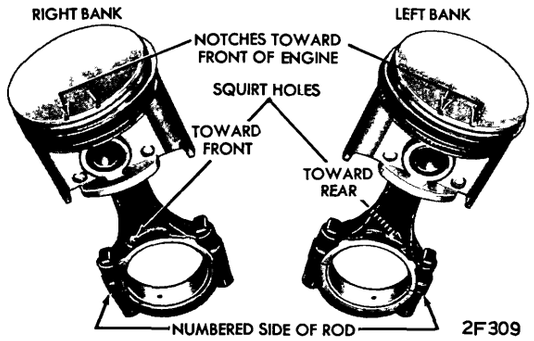


INSTALLATION

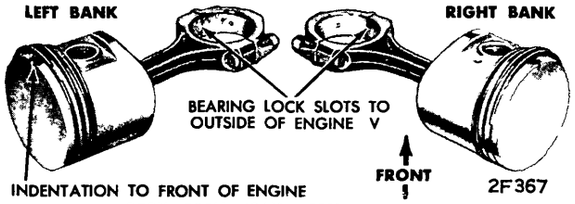
221", 260", 289" ENGINES PISTON PIN REPLACEMENT (ARBOR PRESS METHOD)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Installation - Lightly coat all parts with engine oil, assemble piston and connecting rod correctly and press pin into piston and rod as follows 1) With Tool T60K-6135-A and vise and wrench draw pin into assembly until pin seats in Detail 2 2) With Tool 6135-J and arbor press, press pin into assembly until Detail 2 is firmly seated in Detail 1 *See Illustrations*



221", 260", 289" ENGINES
PISTON & ROD INSTALLATION



352", 390", 406", 427" ENGINES
PISTON & ROD INSTALLATION

MAIN BEARING CAP INSTALLATION

1) All Caps - Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine

2) Rear Cap - Coat only rear mating surface of cap with oil resistant sealer Do not use sealer forward of oil slinger groove (221", 260", 289"), forward of side seal grooves (352", 390", 406", 427") Install cap immediately after sealer applied so sealer will not set and cause an oil leak

3) 427" Engine Intermediate Cap Cross-Bolts - Intermediate bearing caps have side bolts in crankcase Install caps as follows Torque all bearing cap bolts to 95-105 ft lbs Assemble cross-bolt spacers and washers properly (see illustration for markings) Torque cross-bolts in sequence shown in illustration in **2 steps:** 1) 20 ft lbs 2) 40 ft lbs

REPLACEMENT BEARINGS

Standard size replacement main and connecting rod bearings available in 2 sizes marked Red and Blue for selective fit Any combination of red and blue inserts may be used to obtain desired clearances

REAR MAIN BEARING OIL SEAL

NOTE - Upper seal can be replaced only with crankshaft removed from engine

CRANKSHAFT, MAIN BEARINGS, CONNECTING ROD

Engine	MAIN BEARINGS			CONNECTING RODS		
	① Journal Diam.	Clearance	Endplay	① Journal Diam.	Clearance	Sideplay
221",260"	② 2.2482-2.2486" ③ 2.2486-2.2490"	.0006-.0026"	④ .004-.008"	② 2.1232-2.1236" ③ 2.1236-2.1240"	.0009-.0025"	⑤ .006-.016"
289"	② 2 2482-2 2486" ③ 2 2486-2 2488"	0006- 0026"	④ 004- 008"	② 2 1228-2 1232" ③ 2 1232-2 1236"	0009- 0029"	⑤ 006- 016"
352",390"	② 2.7484-2.7488" ③ 2.7488-2.7492"	.0006-.0031"	④ .004-.008"	③ 2.4380-2.4384" ③ 2.4384-2.4388"	.0007-.0028"	⑤ .006-.016"
406", 427"	② 2.7484-2.7488" ③ 2.7488-2.7492"	⑥	④ .004-.008"	② 2.4380-2.4384" ③ 2.4384-2.4388"	.0009-.0029"	⑦ .014-.024"

① - Two different standard sizes, marked Red and Blue. ② - Blue ③ - Red.
④ - No. 3 Bearing. Wear limit .012". ⑤ - Wear limit. 019",
⑥ - **No. 1** - .001-.002", **No. 2,3,4,5** - .0010-.0031". ⑦ - Wear limit .027".

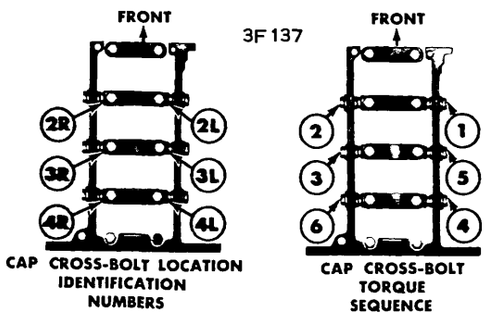
THRUST BEARING ALIGNMENT

Install all bearing caps except thrust bearing cap and torque to specifications Install thrust bearing cap with bolts finger tight Pry crankshaft to rear of engine, then to front of engine While holding crankshaft forward, tighten thrust bearing cap bolts to specifications Check crankshaft endplay

Upper & Lower Seal - *CAUTION - Use Installing & Forming Tool as indicated in table below, and follow procedure listed exactly to prevent seal shift and oil leaks* Preform seal by hand and install into block or cap with thumbs, seating seal at center and then working from the ends toward the center Now place installing tool properly in block or cap as follows Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap for lower seal Tool flanges must bottom on seal groove rear flange and bearing saddle (insert removed) Hold tool firmly and strike top of tool sharply Cut seal ends flush with block or cap Trim frayed ends

Side Seals (352", 390", 406", 427") - Dip side seals in penetrating oil and install **immediately** into grooves *CAUTION - DO NOT use sealer Seals expand with oil* Tap seals firmly into position DO NOT trim ends

Testing Seal Installation - Squirt a few drops of oil into parting lines between cap and cylinder block from the outside Blow compressed air against seals from the inside of block If air bubbles appear in oil, seal leaks



427" ENGINE BEARING CAP CROSS-BOLTS

Crankshaft Rear Seal Installing Tool

Engine	Tool No.
221", 260", 289"	T62F-6701-A or 6701-E
352", 390", 406", 427"	T58P-6701-A or 6701-C

ENGINE FRONT COVER

Removal (221", 260", 289") - Front cover with water pump attached is removed in the usual manner Unnecessary to remove radiator, or to disconnect fuel pump flexible line (lay fuel pump to one side)

Removal (352", 390", 406", 427") - Front cover is removed in the usual manner after observing the following: Remove radiator When removing power steering pump, it is unnecessary to disconnect lines or drain system (just tie pump out of way) If crankshaft sleeve is stepped down type, remove with three-jawed puller If crankshaft sleeve is not stepped down, remove with Puller T56P-6362-A Unnecessary to disconnect fuel pump flexible line (lay fuel pump to one side) Air Conditioner compressor brackets are attached by front cover screws

Installation (All Engines) - Use Pilot (alignment tool) as indicated in table below to center cover on crankshaft Push in on tool and tighten cover bolts to specifications Reverse removal procedure to complete the installation

Engine Front Cover Aligning Tool

Engine	Tool No.
221", 260", 289"	T61P-6019-A or 6059-F
352", 390", 406", 427"	T61P-6019-B or 6059-F

ENGINE FRONT COVER OIL SEAL

Remove old seal with punch and clean recess in cover Drive new seal in cover with tool listed in table below until seal is fully seated and make sure spring is positioned properly in seal

Front Cover Seal Installing Tool

Engine	Tool No.
221", 260", 289"	T58P-6700-B or 4676-H
352", 390", 406", 427"	T58P-6700-B or 6700-B

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE GUIDE SERVICING

To ream guides for installation of valves with oversize stems, always use reamers in sequence and reface valve seat after valve guide is reamed Reamers are furnished 003" oversize with standard diameter pilot; .015" oversize reamer with 003" oversize pilot; and .030" oversize reamer with 015" oversize pilot

VALVE STEM SEALS

Cup or umbrella type seals used on all valves. Install seals with cup side down over valve guide

VALVE SPRING INSTALLED HEIGHT

Installed height of valve spring must not exceed specifications listed in table below. Measure height from surface of cylinder head spring pad to underside of spring retainer. *NOTE - On 406", 427" Engines with separate type valve spring seat, measure spring height from one of the slots in valve spring seat to top of spring.* If height greater than specified, install .030" spacer on head under spring to bring height within limits *CAUTION - Install spacers only if necessary and do not use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Spring Height Specifications

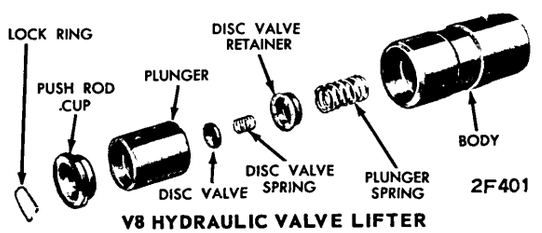
Engine	Installed Height
221", 260"	1 3/4 - 1 25/32"
289" 2-Bbl	1 3/4 - 1 25/32"
352"	1 13/16 - 1 27/32"
390" (Except Police)	1 13/16 - 1 27/32"
390" Police	1 51/64 - 1 53/64"
406", 427"	1 51/64 - 1 53/64"

VALVE SPRING INSTALLATION

Spring ends must be square within 1/16". Install springs with damper (closed) coil end down toward cylinder head If damper spring used, end of damper spring coil must be 135° counterclockwise from coil end of valve spring

HYDRAULIC LIFTERS

See illustration for arrangement of parts. Leakdown rate should be 10-100 seconds Use a lifter tester according to directions of manufacturer



V8 HYDRAULIC VALVE LIFTER

HYDRAULIC LIFTER OPERATING RANGE ADJUSTMENT(221", 260", 289")

1) With No. 1 and then No. 6 pistons at TDC of compression stroke, adjust valves indicated in Steps 2 & 3 below as follows: Loosen rocker arm stud nut until there is clearance at pushrod, then tighten nut until all pushrod-to-rocker arm clearance is just removed Then tighten stud nut an additional **2 turns** to place hydraulic lifter plunger in center of its travel *NOTE - Clearance between valve stem tip and rocker arm with lifter fully collapsed should be .082-.152".*

2) With No. 1 piston at TDC of compression stroke, adjust the following valves:

No 1 Intake	No 4 Exhaust
No 1 Exhaust	No 5 Exhaust
No 2 Exhaust	No. 7 Intake
No 3 Intake	No 8 Intake

3) With No. 6 piston at TDC of compression stroke, adjust the following valves:

No. 2 Intake	No 6 Intake
No. 3 Exhaust	No. 6 Exhaust
No 4 Intake	No 7 Exhaust
No 5 Intake	No. 8 Exhaust

HYDRAULIC LIFTER OPERATING RANGE ADJUSTMENT (352", 390")

1) With No 1 and then No 6 pistons at TDC of compression stroke, adjust valves indicated in Steps 2 & 3 below as follows: *NOTE - Tool T58P-6565-A or 6513-K is available for this operation.* Bleed lifter down and hold collapsed Insert 083" feeler or tool between valve stem tip and rocker arm If gauge or tool enters, use standard length pushrod If gauge or tool does not enter, use .060" **shorter** pushrod. If .183" feeler or tool can be inserted between valve stem tip and rocker arm, operating range is excessive (incorrect pushrod, or wear on other parts) If all other parts of valve train are within limits, install .060" **longer** pushrod

2) With No 1 piston at TDC of compression stroke, check the following valves:

No 1 Intake	No. 5 Exhaust
No. 1 Exhaust	No 7 Intake
No. 3 Intake	No. 8 Intake
No. 4 Exhaust	No. 8 Exhaust

VALVES

Engine		Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Cl aranc	Cam Lobe Lift
221",260"	Intake	1.582-1.597"	44°	45°	060- 080"	①3100-.3107"	②.0008- 0025"	④.2375"
	Exhaust	1.381-1.396"	44°	45°	060- 080"	① .3090-.3097"	③ 0018- 0035"	④.2375"
289"	Intake	1 662-1 677"	44°	45°	060- 080"	① 3416-.3423"	② 0010- 0027"	⑥
	Exhaust	1 442-1 457"	44°	45°	060- 080"	① 3406- 3413"	③ 0020- 0037"	⑥
352"	Intake	2.022-2.037"	44°	45°	.070-.090"	①.3711-.3718"	②.0010-.0024"	④.232"
	Exhaust	1.551-1.556"	44°	45°	070- 090"	① .3693-.3700"	③.0028-.0042"	④.232"
390"	Intake	2.022-2.037"	44°	45°	.070- 090"	①.3711-.3718"	②.0010-.0024"	⑤
	Exhaust	1.551-1.556"	44°	45°	070- 090"	① .3693-.3700"	③.0028-.0042"	⑤
406", 427"⑦	Intake	2.022-2.037"	29°	30°	070- 090"	①.3711-.3718"	②.0010-.0024"	④.298"
	Exhaust	1.645-1.660"	44°	45°	070- 090"	① .3701-.3708"	③.0020-.0034"	④.298"

① - Also furnished .003", .015", .030" Oversize.

② - Wear limit .0045"

③ - Wear limit .0055". ④ - Wear limit .005".

⑤ - For all valves: .2303" (2-Bbl.); 2316" (4-Bbl Std); .264" (4-Bbl.Police); 2576" (Three 2-Bbl.)

⑥ - For 2-Bbl Eng : .2303" Int., .2375" Exh
For 4-Bbl Eng.: 298" Intake & Exhaust

⑦ - For 427" Engine: Later Intake Valves have 2.09" Head Diameter.

3) With No. 6 piston at TDC of compression stroke, check the following valves:

No 2 Intake	No. 5 Intake
No 2 Exhaust	No. 6 Intake
No 3 Exhaust	No 6 Exhaust
No. 4 Intake	No 7 Exhaust

MECHANICAL LIFTER INITIAL ADJUSTMENT AFTER OVERHAUL (289", 390",406", 427")

Tappet Clearance (Cold) listed in table below. For hot clearance (after engine operated for 30 minutes at 1200 RPM), see Tune-Up Data.

1) Place No 1 piston at TDC of compression stroke Adjust following valve clearances: No. 1, 7, 8 Intake; No. 1, 4, 5 Exhaust

2) Turn crankshaft ½-turn or 180° (No 4 piston at TDC). Adjust following valve clearances: No 4 & 5 Intake; No 2 & 6 Exhaust

3) Turn crankshaft ¾-turn or 270° from second position above (No 3 piston at TDC) and adjust following valve clearances: No 2, 3, 6 Intake; No 3, 7, 8 Exhaust

Valve Tappet Clearanc (Cold)

Engine	Clearance
289" 4-Bbl.	.024" Int. & Exh
390" 4-Bbl Police	.028" Int. & Exh.
406", 427"	.028" Int & Exh.

ROCKER ARM ADJUSTING SCREW NOTE - If torque required to turn self-locking adjusting screw is less than 3 ft lbs., install new standard or .0023" oversize screw. If minimum 7 ft lbs. torque cannot be obtained with oversize adjusting screw, replace rocker arm and adjusting screw assembly

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ROCKER ARM STUD REPLACEMENT (221", 260", 289")

NOTE - On 289" 4-Bbl Engines, rocker arm studs are threaded into cylinder head instead of being pressed in When installing n w stud, torque to 60-70 ft lbs Tool Kit T62F-6A527-A is available for this operation After removing old stud always use reamers in sequence and finish ream before installing a new oversize stud Align stud and installer tool with stud bore, then tap sliding driver until it bottoms When installer contacts stud boss on head, stud is installed to correct height

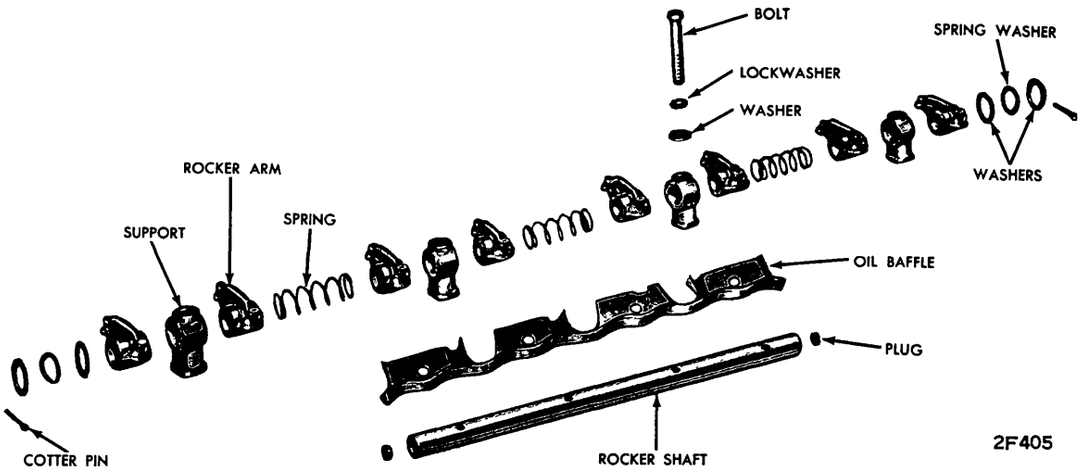
ROCKER ARM ASSEMBLY REPLACEMENT (352", 390" HYDRAULIC LIFTER ENGINES)

R moval - *CAUTION - Follow procedure listed exactly to prevent damage to valve train parts* Place No 1 piston at TDC at end of compression stroke and rotate crankshaft damper an additional 45° ("XX" on damper) Loosen right bank rocker arm shaft support bolts in sequence 2 turns at a time, starting at No 4 (rear) cylinder When bolts are loosened, remove rocker arm and shaft assembly Follow same procedure for left bank rocker arm shaft bolts, starting at No 5 (front) cylinder

Installati n - *CAUTION - To permit lifters to leak down, and to prevent damage to valve train parts, follow removal procedure in exactly the same way when installing rocker arm and shaft assemblies*

ROCKER ARM SHAFT ASSEMBLY OVERHAUL

See illustration for arrangement of parts End plugs must have cup side facing out, and oil holes in shaft must be facing downward



352", 390", 406", 427" ENGINES ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)

CAMSHAFT

Engin	J urnal Diamet r	Bearing Clearance	Camshaft Endplay
221",260"	①	②.001-.003"	③.001-.007"
289"	①	② 001- 003"	③ 001- 007"
352",390"	2.1238-2.1248"	②.001-.003"	③.001-.007"
406",427"	2.1238-2.1248"	②.001-.003"	③.001-.007"

① - 2.0805-2.0815" (1), 2.0655-2.0665" (2), 2.0505 - 2.0515" (3), 2.0355-2.0365" (4), 2.0205-2.0215" (5).
② - Wear limit .006". ③ - Wear limit .012".

CAMSHAFT REMOVAL

Remove grille (Galaxie & Monterey), radiator, engine front cover, sprockets and timing chain, distributor, rocker arm shaft assemblies, pushrods, intake manifold, lifters, oil pan and screen, and camshaft thrust plate Remove camshaft

VALVE SPRINGS & LIFTERS

Engine	SPRINGS Free Length	SPRINGS Pressure (Lbs.) Valve Closed	SPRINGS Pressure (Lbs.) Valve Open	LIFTERS Diameter	LIFTERS Clearance
221", 260"	2.15"	① 57-63 at 1.770"	② 161-178 at 1.380"	8740- 8745"	⑨ .0005-.0020"
289" 2-Bbl	2 09"	⑩ 71-74 at 1 780"	⑪ 161-177 at 1 390"	8740- 8745"	⑨ 0005- 0020"
289" 4-Bbl	2 04"	⑫ 83½-92½ at 1 77"	⑬ 234½-259½ at 1 32"	8740- 8745"	⑨ 0005- 0020"
352"	2.26"	③ 94-104 at 1.820"	④ 180-198 at 1.420"	.8740-.8745"	⑨.0005-.0020"
390" 2-Bbl. & 4-Bbl. Std.	2.15"	⑤ 74-84 at 1.820"	⑥ 190-208 at 1.420"	.8740-.8745"	⑨.0005-.0020"
390" 4-Bbl. Police & Three 2-Bbl	2.06"	⑦ 80-90 at 1.820"	⑧ 255-280 at 1.320"	.8740-.8745"	⑨.0005-.0020"
406", 427"	2.06"	⑦ 80-90 at 1.820"	⑧ 255-280 at 1.320"	.8740-.8745"	⑨.0005-.0020"

① - Wear limit 52 lbs. at 1.770".
② - Wear limit 145 lbs. at 1.380".
③ - Wear limit 85 lbs. at 1.820".
④ - Wear limit 162 lbs. at 1.420".
⑤ - Wear limit 67 lbs. at 1.820".
⑥ - Wear limit 171 lbs. at 1.420".
⑦ - Wear limit 72 lbs. at 1.820".
⑧ - Wear limit 230 lbs. at 1.320".
⑨ - Wear limit .005".
⑩ - Wear limit 64 lbs at 1 780"
⑪ - Wear limit 145 lbs at 1 390"
⑫ - Wear limit 75 lbs at 1 77"
⑬ - Wear limit 211 lbs at 1 32"

CAMSHAFT BEARING REPLACEMENT

Tool sets listed in table below are available for camshaft bearing replacement None of the bearings are interchangeable No 1 bearing must be installed 005- 020" below front face of cylinder block

Camshaft Bearing Replacing Tools

Engine	Tool	Adapter
221", 260", 289"	T52L-6261-CEE or 6261-M	T62F-6250-A or 6261-AB
352",390",406",427"	T52L-6261-CEE or 6261-F	T54L-6250-B or 6261-E

CAMSHAFT END THRUST

Taken by thrust plate (and spacer on 352", 390", 406", 427") behind camshaft sprocket Side of spacer with a chamfer on the inside diameter must be against the camshaft front journal Replace thrust plate if camshaft end thrust excessive

CHECKING CAM LOBE LIFT

Check with dial indicator to specifications listed in Valve Table

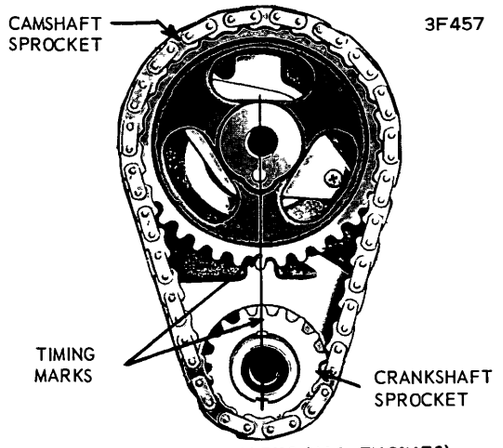
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VALVE TIMING

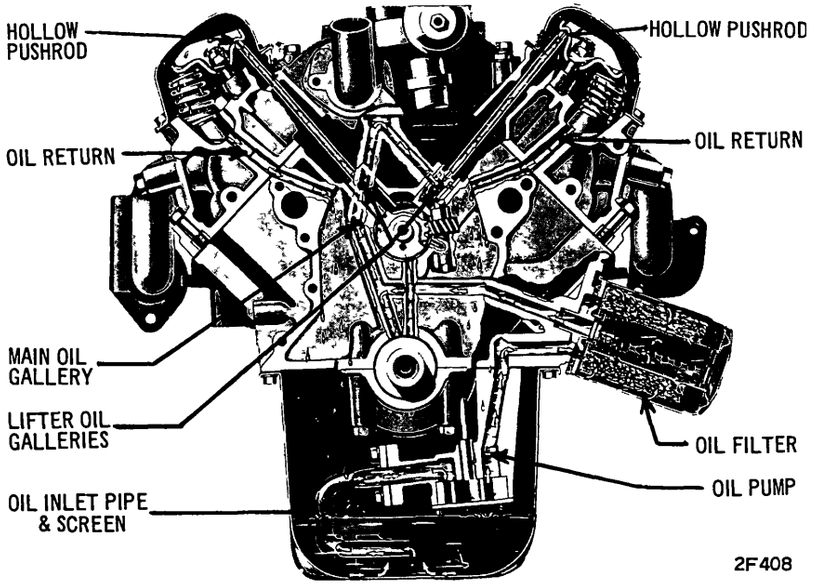
Engine	INTAKE Open BTDC	INTAKE Close ALDC	EXHAUST Open BLDC	EXHAUST Close ATDC
289" 2-Bbl.	① 20°	② 66°	③ 56°	④ 20°
289" 4-Bbl.	⑤ 44°	⑥ 82°	⑤ 92°	⑥ 34°
390" 2-Bbl.	① 14°	② 72°	① 59°	② 27°
390" 4-Bbl	③ 26°	① 64°	③ 67°	① 23°

① - Camlift .004". ② - Camlift 006" ③ - Camlift 002" ④ - Camlift 0055". ⑤ - Camlift .008" ⑥ - Camlift 0105".

See illustration for alignment of sprocket marks, and Valve Table for Camshaft Lobe Lift.



VALVE TIMING MARKS (ALL ENGINES)



221", 260", 289" ENGINES OILING SYSTEM

ENGINE OILING

Oil Pressure (Hot at 2000 RPM)

Engine	Oil Pressure
221", 260", 289"	35-55 lbs.
352"	35-55 lbs
390" 2 & 4-Bbl Std	35-55 lbs
390" 4-Bbl Police & Three 2-Bbl	45-70 lbs.
406", 427"	40-55 lbs.

Pressure Regulator Valve - In pump body, not adjustable. *NOTE - 406" & 427" Engines have additional Oil Pressure Safety Relief Valve assembly at rear end of main oil gallery (just above camshaft).*

ENGINE OILING SYSTEM

221", 260", 289" Engines

Force feed type with rotor type oil pump. *See illustration and note the following:*

Crankshaft & Camshaft Bearings - Oil from filter goes through passages in block to No 1 main and camshaft bearings, and to main oil gallery in right bank side of block Oil from main gallery is delivered to No. 2,3, 4,5, main bearings, and from each main bearing to each camshaft bearing by passages from main bearing webs

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from drilled hole in each connecting rod lower end when this hole lines up with oil hole in crankshaft

Valve Lifters - Oil passes from main oil gallery to passages at rear of block leading to lifter galleries

Rocker Arms. Pushrods, & Valves - Lubricated by oil passing through metered hole in upper end of valve lifter, through hollow pushrods, to friction areas of rocker arms Oil drains back through holes in both ends of cylinder heads and the block.

Distributor - Lower end of drive shaft is lubricated through passage from No 1 camshaft bearing bore.

Distributor Drive Gears, Timing Chain & Sprockets, and Fuel Pump Eccentric - Lubricated by oil deflected from front camshaft bearing by an oil drip trough on cylinder front cover

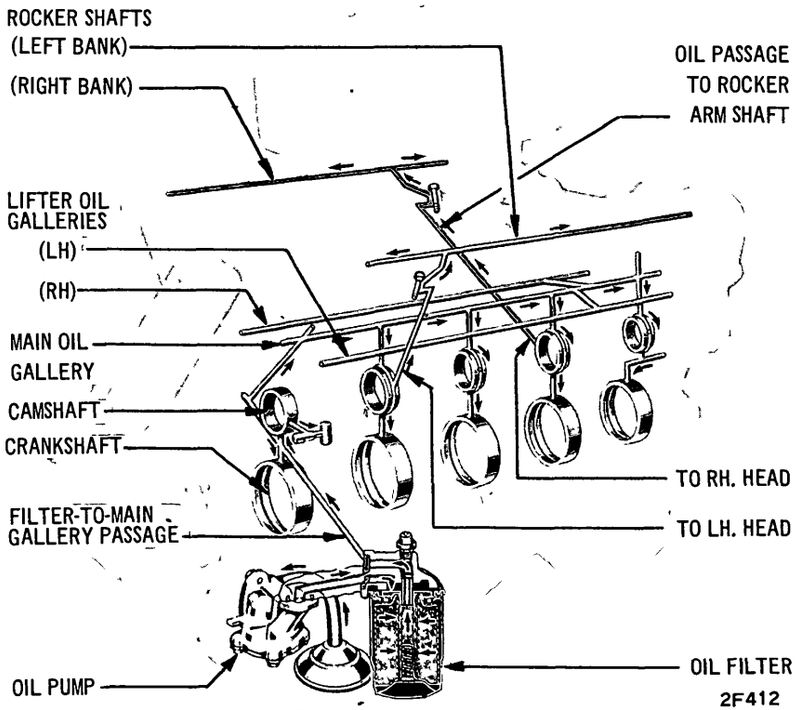
Oil Filter - Full flow type mounted on left front side of engine. Filter has integral bypass valve and anti-drain back diaphragm.

352", 390", 406", 427" Engines

Force feed type with rotor type oil pump. *See illustration and note the following:*

MECHANICAL LIFTER ENGINE NOTE - On engines with mechanical lifters, engine oiling system is changed

(Continued)



352", 390", 406", 427" ENGINES OILING SYSTEM

as follows 1) Jiggle pin in main oil gallery replaced by a cap plug 2) Passages from main oil galleries to right and left lifter galleries are plugged

Rck r Arms, Pushr ds, & Valves - Drilled passages in block at No 2 camshaft bearing (left bank), No 4 camshaft bearing (right bank) extend up through block and matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect this bolt hole with passage in block) An angle passage in the head connects cylinder head bolt hole with rocker shaft support bolt hole (No 2 support bracket for left bank, No 3 bracket for right bank) Oil then flows up around bracket bolt and through an angle passage into the hollow rocker arm shaft Oil holes in shaft and arm provide lubrication for rocker arm bushings pushrod ends and valve tips (baffle under rocker shaft assembly shields valve stems from oil splash) Oil drainage down pushrods lubricates pushrod seat in lifter Excess oil in rocker chamber is returned to oil pan through drain holes at each end of cylinder head and in lifter chamber

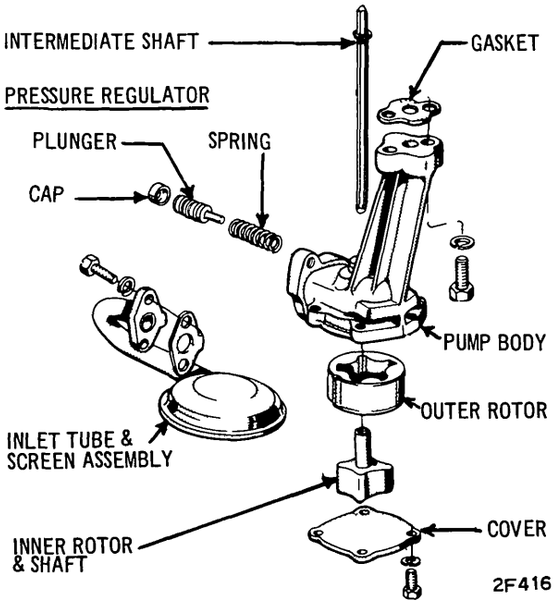
Timing Chain & Sprockets - Plug at forward end of main oil gallery has vent hole and jiggle pin to vent air trapped in gallery Oil passing through this vent lubricates timing chain and sprockets

Distributor & Driv Gear - Lubricated through cross-passage from No 1 camshaft bearing (see illustration)

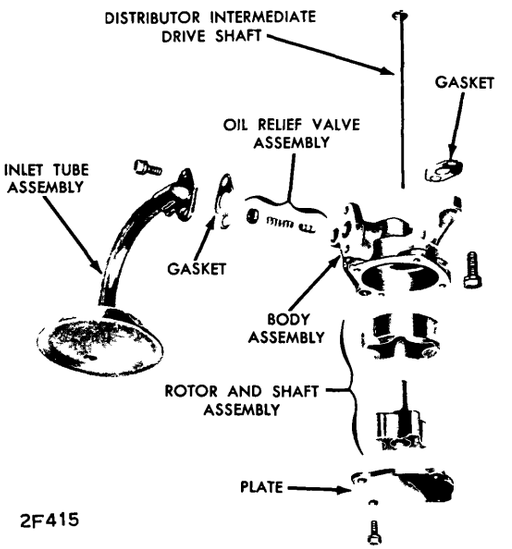
Oil Filter - Full flow type mounted on adapter at right front of crankcase Filter has integral bypass valve and anti-drain back diaphragm

OIL PUMP

Rotor type pump used on all engines See illustrations for arrangement of parts Pump cover plate screw torque is 6-9 ft lbs (All Engines) *Observe the following specifications*



221", 260", 289" ENGINES OIL PUMP (EXPLODED)



352", 390", 406", 427" ENGINES OIL PUMP (EXPLODED)

Oil Pump Specifications (All Engines)

Item	Specification
Outer Race-to-Housing	006- 012"
Rotor Endplay	0011- 0041"
Shaft-to-Housing	.0015- 0029"
Relief Valve-to-Bore	0015- 0029"

Relief Valve Spring Specifications

Engine	Lbs. Pressure	Length
221", 260", 289"	11 15-11 75	1 704"
352", 390"	9 0-9 6	1 530"
406", 427"	8 0-13 0	1 530"

ENGINE COOLING

Pressure Valve - 12-15 lb radiator filler cap (All Engines)

Thermostat - All Engines
Low Temperature - 155-162°F (fully open 182°F)
High Temperature - 185-192°F (fully open 212°F)

WATER PUMP

Special tool sets are available for water pump overhaul Other suitable support plates and drivers may be used providing they support and apply pressure properly to shaft, bearing, housing, and other parts *Observe the following specifications:*

Wat r Pump Specifications (All Engines)

Engine	ℂ Impeller	ℒ Hub
221", 260", 289"	030- 050"	5 150"
352", 390", 406", 427"	070- 080"	7 569"

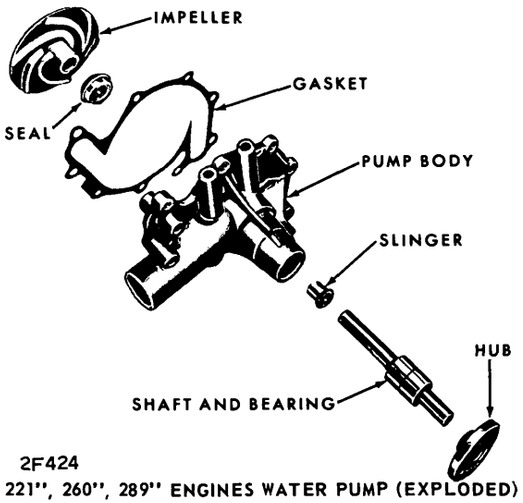
ℂ - Impeller-to-Housing Clearance
ℒ - Distance from front face of hub to pump housing mounting face

POWER BOOSTER FAN

Fluid coupling filled with silicone oil attached to water pump pulley at input side and to fan at output side A bi-metal strip on front of clutch moves out under higher temperatures and allows metal rod in center of clutch to move out This rod actuates a valve inside clutch to control amount of fluid admitted to coupling from a reserve chamber This action increases fan speed when air becomes hotter Reverse action takes place under colder temperatures

Trouble Shooting & Diagnosis - Poor cooling or noise may be caused by Actuating rod sticking, Bi-metal strip deformed or kinked, Excessive fluid leakage from clutch unit

Disassembly - Push bi-metal strip from retaining brackets and remove Clean clutch unit with rag dipped in solvent- *CAUTION - DO NOT immerse clutch unit in any kind of liquid Clean unit before removing actuating*



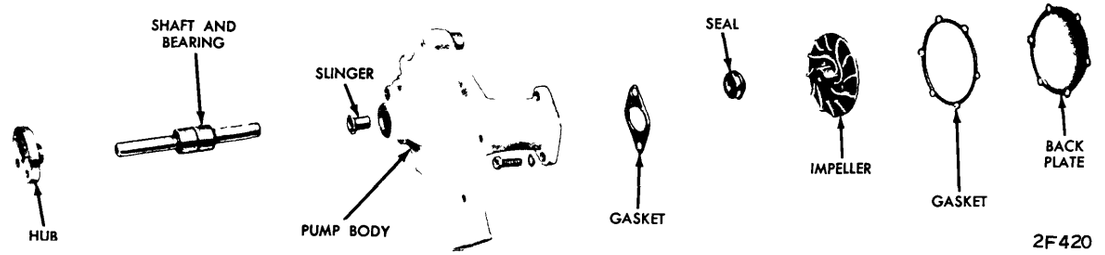
221", 260", 289" ENGINES WATER PUMP (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

rod to prevent damage Remove actuating rod with fingers or needle-nose pliers

Inspecti n - Replace entire clutch assembly if there is excess fluid leakage or if bi-metal strip kinked or bent *NOTE - Bi-metal strips NOT interchangeable among units* Clean actuating rod bore in clutch with crocus cloth Clean rod in solvent and make sure rod moves freely in clutch bore Replace damaged rod with replacement rod *CAUTION - Replacement rod must be same length as old rod Adjust Allen screw in service rod to obtain proper length*

Reassembly - Reverse disassembly pr ocedure



352", 390", 406", 427" ENGINES WATER PUMP (EXPLODED)

MODEL IDENTIFICATION

FORD FALCON MODELS

Model	Series
Standard Sedan	01, 02
Futura, Sprint	15, 16, 17, 19
Station Wagon	21, 22, 23, 24, 25, 26
Ranchero	27
Sedan Delivery	29

FORD FAIRLANE MODELS

Fairlane	31, 32, 38
Fairlane 500	41, 42, 43, 47, 48, 49

FORD GALAXIE MODELS

Ford 300	53, 54
Galaxie	51, 52
Galaxie 500 & 500XL	60, 61, 62, 63, 64, 65, 66, 67, 68, 69
Station Wagon	72, 74, 76, 78

SERIAL NUMBER

Stamped on tab welded to top right side (weld flange) of dash panel in engine compartment. Also stamped under "Vehicle Warranty Number" on Car patent plate on lock face of left front door. Number carries identification data as follows:

① ② ③ ④ ⑤
3 S 63 X 100001

① - Year Model. **3** 1963.
② - Assembly Plant. *See listing below.*
③ - Car Model & Body Style Code. *See Model & Series listing above.*
④ - Engine Type. *See listing below.*
⑤ - Consecutive unit number at each assembly plant (starting with 100001 for Ford models, 500001 for Mercury models).

Assembly Plant Code Letters

A - Atlanta	**J** - Los Angeles	**T** - Metuchen
D - Dallas	**K** - Kansas City	**U** - Louisville
E - Mahwah	**N** - Norfolk	**W** - Wayne
F - Dearborn	**P** - St Paul	**Y** - Wixom
G - Chicago	**R** - San Jose	**Z** - St Louis
H - Lorain	**S** - Pilot Plant	

CAR BUILD DATE CODE

Stamped under DATE on car patent plate. Number designates day of month, letter designates month as follows: **A** January through **M** December (**I** not used).

THUNDERBIRD MODELS

Model	Series
Thunderbird	83, 85, 87, 89

MERCURY COMET MODELS

Comet	01, 02, 21, 22
Comet Custom	11, 12, 15, 17, 19, 23, 24, 26

MERCURY METEOR MODELS

Meteor	31, 32, 38
Meteor Custom	41, 42, 43, 47, 48, 49

MERCURY MONTEREY MODELS

Monterey	51, 52, 53, 54, 57
Monterey Custom	60, 62, 63, 64, 65, 66, 67, 68, 69
Station Wagon	76

Engine Code Designation

Engine	Standard	Low Compression
221"	**L**	**3**
260"	**F**	**8**
289" 2-Bbl	**C**	
4-Bbl	**K**	
352"	**X**	
390" 2-Bbl	**Y**	
4-Bbl Std	**Z**	**9**
4-Bbl Police	**P**	
Three 2-Bbl	**M**	
406" One 4-Bbl	**B**	
Three 2-Bbl	**G**	
427" One 4-Bbl	**Q**	
Two 4-Bbl	**R**	

ENGINE BUILD DATE CODE

Stamped on engine as indicated in table below. Number carries identification data as follows:

① ② ③ ④ ⑤
3 3 H 26 M

① - Engine Plant. **1** & **2** - Cleveland; **3** - Dearborn; **4** - Lima; **5** - Green Island.
② - Year. **3** 1962 .
③ - Month. **A** January through **M** December (**I** not used).
④ - Day of Month.
⑤ - Any of various Inspectors marks.

Engine	Build Date Locati on
221", 260", 289"	Distributor Mounting Boss
352", 390"	Near Engine Dipstick
406", 427"	Right Front Corner Of Block

CAPACITIES

	221", 260" 289"	352", 390", 406", 427"
Crankcase (qts.) ①	4	5
Cooling System (qts.) ②	③ 13½	19
3-Speed S.M. Trans. (pts.)	3	3
4-Speed S.M. Trans. (pts.)	3½	3½
Overdrive Trans. (pts.)	3	4
2-Speed Auto. Trans. (qts.)	8½	9¼
3-Speed Auto. Trans. (qts.)		④ 10
Rear Axle (pts.)	4½	5
Fuel Tank (gals.)	⑤	⑤

① - Add 1 quart with filter change.
② - Add 1 quart for heater.
③ - 14 quarts on Galaxie
④ - Drain & Refill. 11½ quarts Dry.
⑤ - 14 (Falcon & Comet), 16 (Fairlane & Meteor), 20 (Galaxie, Monterey, T-Bird Except Station Wagon), 21 (Galaxie, Monterey Station Wagon)

FILTERS & CLEANERS

Filter or Cleaner	S rvice Interval (Miles)
Oil Filter	Replace 6000
Air Cleaner	Clean 6000, Replace 30,000
Oil Cap Filter	Clean 6000
Fuel Filter	① Replace 36,000
Power Steering Filter	Replace 36,000

① - Replace every 6,000 miles on 406", 427" Engines

REPLACING OIL FILTER

Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter surface, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - Do not ov rtighten.*

SERVICING AIR CLEANER

Attach element to a ¼" drill and spin element for 2 minutes inside a splash shield set on floor. *Do not us solvent.* Inspect element for cracks or splits.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

COMPRESSION PRESSURE

All ..... 160-200 psi

Maximum variation between cylinders 20 psi.

VACUUM READING

All ..... 18" at idle

VALVE TAPPET CLEARANCE

All ..... Zero Lash (Hydraulic)

SPARK PLUGS

Gap ..... .032-.036"
Torque ..... 15-20 ft. lbs.

Spark Plug Type

All ..... Autolite BF-42

DISTRIBUTOR

Point Gap ..... .014-.016"
Cam Angle ..... 26-28½°
Condenser Capacity ..... .21-.25 mfd
Breaker Arm Spring Tension ..... 17-20 ozs.

TUNE-UP NOTES

►*COLD ENGINE STALL OR STUMBLE CORRECTION (EARLY CARS):* May be caused by automatic choke leanness. Correct by installing new type carburetor spacer and gaskets. *CAUTION* - If new gaskets used with old spacer, gaskets must be reworked. *See "Carter AFB 4 Barr l Carburetors" in Carburetion Section.*

►*FUEL PUMP PUSHROD AND ECCENTRIC PRODUCTION CHANGE & REPLACEMENT CAUTION:* Cars after March 9, 1963 have new fuel pump drive parts which are not interchangeable individually with earlier type parts. When used together, following parts can be installed on previous engines: Fuel Pump Push Rod, Eccentric Drive Bushing and Drive Eccentric, and Eccentric Wear Plate.

►*AUTOMATIC CHOKE CAUTION:* Do not loosen center screw holding water jacket assembly to choke housing. Remove this screw only if jacket gasket is to be replaced or jacket cleaned. Slot the blade of a suitable size screwdriver to remove screw. Choke is adjusted in the usual manner without loosening center screw.

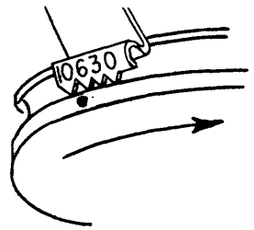
►*IDLE SPEED-UP CONTROL NOTE:* Used on air conditioned cars and operates only when air conditioner unit clutch engaged. Device is an electrical solenoid switch which operates an air valve in an external bypass system of carburetor to increase air flow below throttle plates. *NOTE* - Not necessary to operate air conditioning when adjusting Hot (Slow) Idle. When Hot Idle properly set, operation of Idle Speed-up device will give desired 800-900 RPM idle with air conditioning ON.

IGNITION TIMING

Set timing at specified idle speed with distributor vacuum line disconnected.

►*1963 IGNITION TIMING CAUTION: Following specifications supersede previous specifications of 8° BTDC, and must be used to avoid detonation and engine damage. DO NOT use fuel with octane rating below 98.6.*

	Normal	Minimum	Maximum
All	4° BTDC	2° BTDC	NONE



3A28

IGNITION TIMING MARKS

HOT (SLOW) IDLE RPM

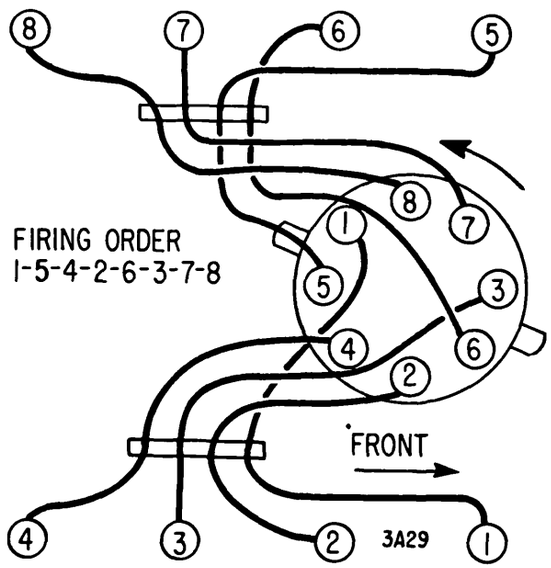
With hot idle compensator valve held closed.

All, Without Air Cond. (In "Drive") 450-475
All, With Air Cond. OFF (In "Drive") 450-475

FAST IDLE

With idle adjusting screw on first (lowest) step of fast idle cam.

All (In "Drive") 675-700



FIRING ORDER

AUTOMATIC CHOKE SETTING

All ..... Ⓒ 1 Rich

Ⓒ - *See "Automatic Choke Caution" above.*

FUEL PUMP PRESSURE

All ..... 4½-6½ lbs. at 500 RPM

FUEL PUMP VOLUME

All ..... 1 pint in 20 seconds at 500 RPM

POSITIVE CRANKCASE VENTILATION SYSTEM

Disassemble and clean system every 12,000 miles.

THERMOSTATIC AIR INTAKE DUCT

Description - Thermostatically controlled carburetor air cleaner intake duct to provide heated air to intake manifold.

Testing - Place duct assembly in pan of water at temperature below 75°F (thermostat must be covered by water). Valve should be in closed "heat on" position. Heat the water slowly. At temperature of 85°F, valve should start to open. *NOTE - If valve does not start to open, hold water temperature at 85°F for eight minutes before discarding thermostat as defective.* Increase water temperature to 100°F. Valve should now be wide open in "heat off" position. *NOTE - If valve not wide open, hold water temperature at 100°F for eight minutes before discarding thermostat as defective.* If valve operation not satisfactory, remove thermostat and spring assembly and check valve shaft for binding. If valve moves freely, replace thermostat and duct assembly. If valve does not operate correctly, adjust thermostat rod as follows:

Adjustment - Increase rod length to move valve toward "heat off" position, decrease rod length to move valve toward "heat on" position.

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS
Lincoln C3VY-12127-A

Mechanical Advance: Test stand at 0° & 250 RPM. Vacuum Advance: Test stand at 0°, 0" Hg. & 1000 RPM.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
1½-2½	500	½-3½	7
2¾-3¾	600	3½-6½	10
7-8¼	1200	4-7	12-20
10½-12	2000		

For engine degrees & RPM, multiply by 2.

IGNITION COIL

Primary Resistance (Ohms) ..... 1.40-1.54 at 75°F
Secondary Resistance (Ohms) ..... 8000-8800 at 75°F
Primary Resistance Wire (Ohms) ..... 1.30-1.40 at 75°F
Current Draw (Amps.) ..... 2.5 idling, 4.5 stopped

CARBURETOR SPECIFICATIONS			
Carter Carburetor No ①	Float Level	Float Drop ②	Choke Setting
AFB 3521S 22S	③	23/32	1 Rich

① Lincoln Nos C3VE 9510-A B D E on tag on carburetor or stamped on carburetor air horn Green tag on carburetor indicates Closed Crankcase Ventilation calibration red tag indicates High Altitude calibration

② ± 1/16

③ 3/16 ±1/64 (solid seat) 5/32 ±1/64 (resilient seat) measured between top of floats (at outer end) and air horn gasket

ACCELERATING PUMP

Three holes in pump arm Top hole is long stroke Place pump operating rod in appropriate hole

MANIFOLD FUEL DISTRIBUTION

Carburetor right barrels feed cylinders 1,4,6,7 Carburetor left barrels feed cylinders 2,3,5,8

THROTTLE LINKAGE ADJUSTMENT

With engine at normal operating temperature, and slow idle speed correctly set, proceed as follows

1) Downshift Rod Adjustment - Loosen downshift rod locknut and disconnect rod from ball stud on bellcrank assembly, then slide spring clip off rod *NOTE - Be sure movable outer bracket of bellcrank is against stop pin on inner mounting bracket on bellcrank assembly* Hold downshift rod upward against transmission internal stop and adjust length of rod until hole in rod is aligned with ball stud on bellcrank assembly Lengthen rod one turn and position it on ball stud. Slide spring clip over end of rod to lock rod to ball stud Tighten locknut securely *CAUTION - If bellcrank outer bracket does not remain against stop pin, lengthen downshift rod an additional turn*

2) Accelerator Pedal Height Adjustment - *CAUTION - Make this adjustment at accelerator connecting link only* With engine stopped, measure distance from top of accelerator pedal to carpet Nominal measurement should be approximately 3½" Depress accelerator pedal and check detent feel and kickdown action of bellcrank Adjust height to obtain proper downshift rod operation. *NOTE - Throttle plates in carburetor must be fully opened before making this adjustment* Road test to check kickdown operation

CARBURETOR

BELT ADJUSTMENT

Belt Tension (Lbs.) With Tension Gauge T63L-8620-A

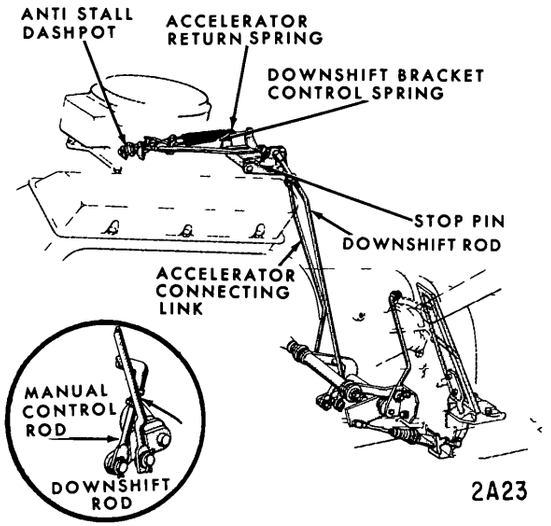
	①New Belt	②Used Belt
Alternator (Front Belt)	110-135	90-110
(Rear Belt)	105-140	85-115
Air Conditioning Compressor	120-150	90-120

① - Run belt for 5 minutes and reset tension.
② - Any belt operated 10 minutes or longer

ANTI-STALL DASHPOT ADJUSTMENT

1) With primary throttle plates closed, distance from top surface of air horn to top of dashpot plunger should be 1/8" To adjust, bend dashpot lever arm (between lever arm base and plunger) with Tool 9564-A

2) With primary throttle plates wide open, distance from top surface of air horn to top of dashpot plunger should be 7/16" To adjust, bend stop tang on opposite side of lever arm with Tool 9564-A



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

ELECTRICAL

BATTERY

12 Volt, 80 Amp Hr (20 Hr)

Battery Ground - Negative to engine block
Engine Ground - From engine (at battery ground cable connection) to body

STARTER

Lincoln C2VY-11002-A

Torque	RPM	Volts	Amperes
0 ft lbs	9500	12 0	70

Current Draw & Cranking Speed (Warm Engine) - 250 amps, 9 5 volts, 150 Engine RPM
Brush Spring Tension - 40 ozs

ALTERNATOR

Alternator	Amperes	Volts	Alt RPM
C3SZ-10346-B	40	15 0	①6500

① - Hot 5400 Alt RPM Cold

ALTERNATOR REGULATOR

►*1963 ALTERNATOR REGULATOR PRODUCTION CHANGE* Regulators with yellow paint on regulator base have been modified to correct engine compartment whine *See "Engine Compartment Whine Noise Correction" under Engine Data (following)*

►*ALTERNATOR SYSTEM NOT CHARGING PROPERLY* Make sure that connector plug at alternator regulator is tight and secure If terminals in plug are damaged replace wiring harness

Field Relay

Closing Voltage - 3-4 volts
Contact Gap - 015-022" **Air Gap** - 022-030"

Voltage Regulator

Setting - 14 1-14 9 volts at 75°F
Contact Gap (Low r Contacts) - 010-015"
Air Gap - 045-052" with upper contacts closed

FUSES & CIRCUIT BREAKERS

Headlight Circuit - Circuit breaker integral with main lighting switch

Convertible Top - 50 amp circuit breaker on mounting plate behind right cowl trim panel

Others - *See Fuse Box Illustration* Fuse Box accessible through opening in right side of glove compartment

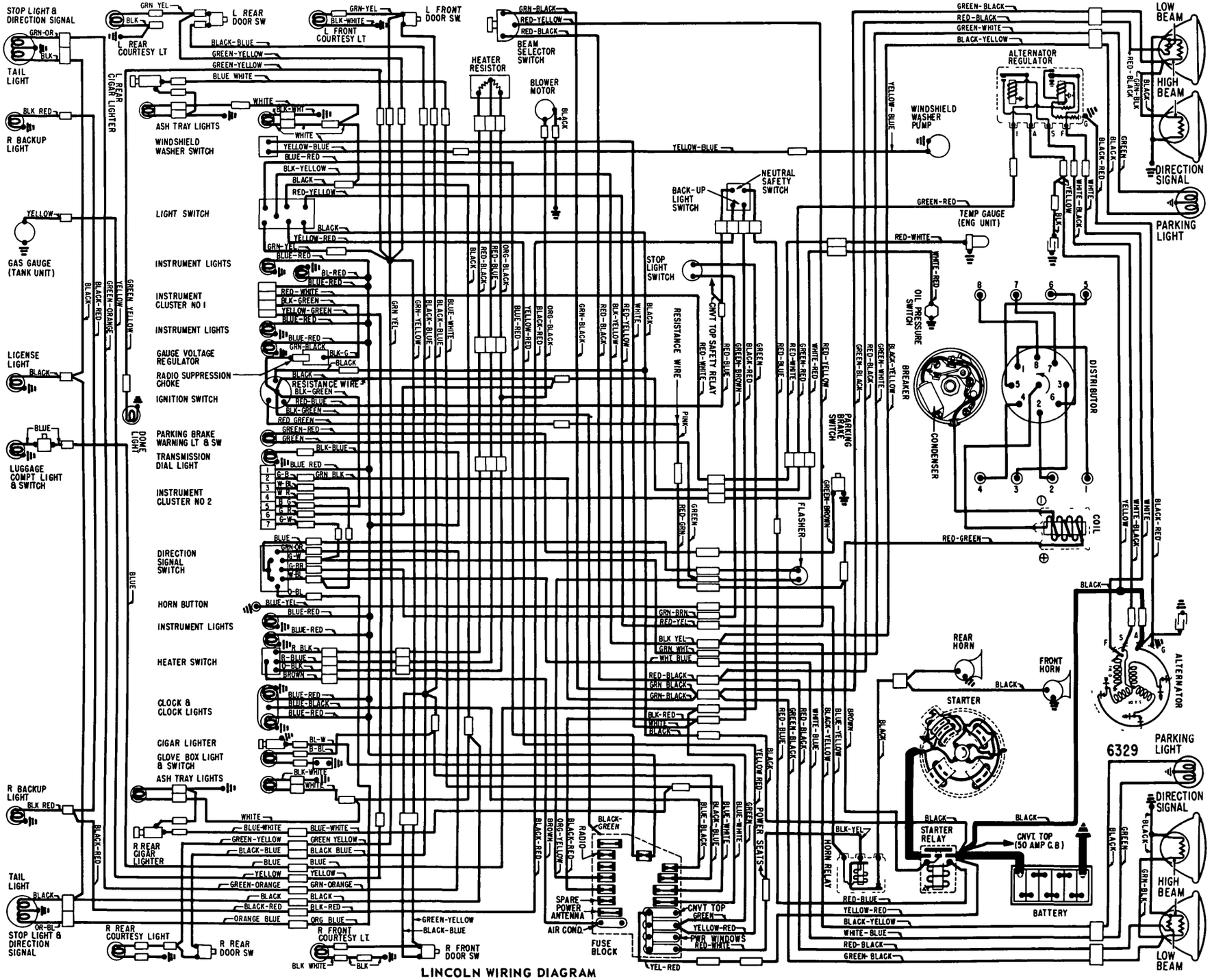
SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

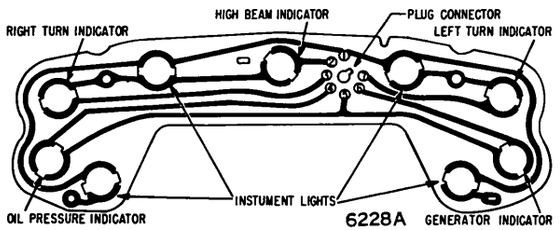
All Models - Remove lower radio speaker and grille, then remove hood release handle from instrument panel Remove lower left instrument panel cover and lower section of left vent Remove convertible top control switch from instrument panel Remove wire connector from neutral safety switch, then position transmission selector lever in "D1" or "D2" position and loosen

(Continued)

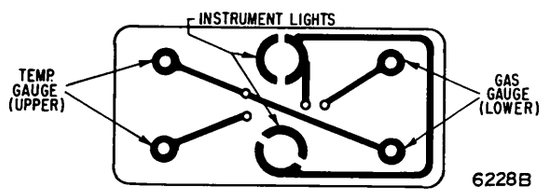
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
R BACKUP LIGHT
GAS GAUGE (TANK UNIT)
LICENSE LIGHT
LUGGAGE COMPT LIGHT & SWITCH
L REAR COURTESY LT
L REAR DOOR SW
L FRONT COURTESY LT
L FRONT DOOR SW
BEAM SELECTOR SWITCH
HEATER RESISTOR
BLOWER MOTOR
L REAR CIGAR LIGHTER
ASH TRAY LIGHTS
WINDSHIELD WASHER SWITCH
LIGHT SWITCH
INSTRUMENT LIGHTS
INSTRUMENT CLUSTER NO 1
INSTRUMENT LIGHTS
GAUGE VOLTAGE REGULATOR
RADIO SUPPRESSION CHOKE
IGNITION SWITCH
DOME LIGHT
PARKING BRAKE WARNING LT & SW
TRANSMISSION DIAL LIGHT
INSTRUMENT CLUSTER NO 2
DIRECTION SIGNAL SWITCH
HORN BUTTON
INSTRUMENT LIGHTS
HEATER SWITCH
CLOCK & CLOCK LIGHTS
CIGAR LIGHTER
GLOVE BOX LIGHT & SWITCH
ASH TRAY LIGHTS
R BACKUP LIGHT
R REAR CIGAR LIGHTER
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
R REAR COURTESY LIGHT
R REAR DOOR SW
R FRONT COURTESY LT
R FRONT DOOR SW
SPARE POWER ANTENNA
AIR COND.
FUSE BLOCK
RADIO
POWER SEATS
CNVT TOP
PWR WINDOWS
BACK-UP LIGHT SWITCH
NEUTRAL SAFETY SWITCH
STOP LIGHT SWITCH
CNVT TOP SAFETY RELAY
RESISTANCE WIRE
PARKING BRAKE SWITCH
FLASHER
HORN RELAY
STARTER RELAY
CNVT TOP (50 AMP C.B.)
BATTERY
STARTER
ALTERNATOR
REAR HORN
FRONT HORN
WINDSHIELD WASHER PUMP
ALTERNATOR REGULATOR
TEMP GAUGE (ENG UNIT)
OIL PRESSURE SWITCH
BREAKER
CONDENSER
DISTRIBUTOR
COIL
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
6329
LINCOLN WIRING DIAGRAM

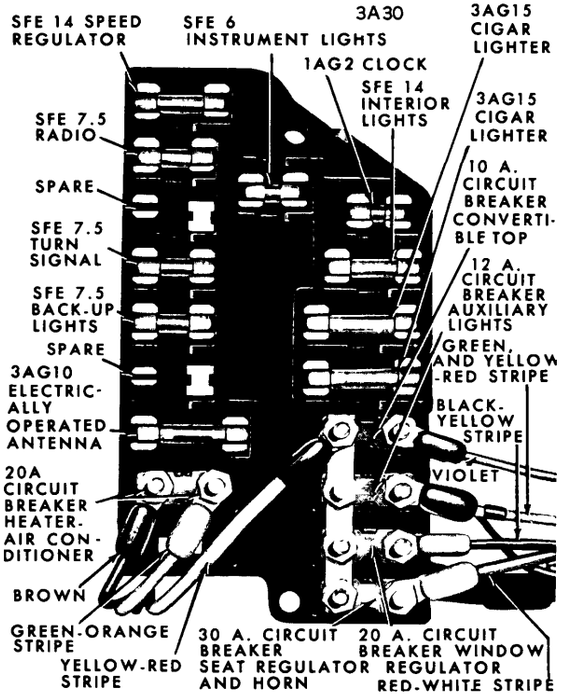
screws attaching switch to steering column. Connect a self-powered test lamp to lower two terminals (back-up lamp) on switch. Position selector lever in "R" position and pull switch to its farthest downward position. slowly move switch upward until test lamp goes on. Tighten one switch mounting screw and move selector lever up and down without moving it out of "R" position. Test lamp should remain on. Attach test lamp lead to upper two terminals on switch and shift selector lever to "P" or "N" position. Test lamp should light. Apply a slight up and down pressure on selector lever while in "N" or "P" positions. Test lamp should not go out. Tighten switch attaching screws and connect wire connector to switch, then install vent extension, lower instrument panel cover, hood release handle, top control switch, and lower radio speaker and grille.



INSTR. CLUSTER PRINTED CIRCUIT (NO. 2)



INSTR. CLUSTER PRINTED CIRCUIT (NO. 1)



FUSE BOX

TURN SIGNAL FLASHER

Located under instrument panel to right of radio speaker opening. Accessible after speaker grille, radio support panel assembly, and speaker are removed.

STOP LIGHT SWITCH

Located on brake master cylinder. No adjustment.

HEADLIGHT SWITCH

Remove shaft and knob from switch by pushing button on switch and pulling on shaft. Remove switch retaining nut and both bezels from switch. Remove hood release handle and cable from bracket. Remove switch and disconnect wiring.

INSTRUMENT CLUSTER & SPEEDOMETER

Instrument panel contains an upper cluster and a lower cluster. Upper cluster contains temperature and fuel gauges, speedometer, all indicator lights, and clock. Upper cluster, including light bulbs, is serviced from **front** of instrument panel. Gauge Voltage Regulator and Radio Suppressor Choke Coil are located on back of clock.

Clock - Attaching screw located below clock. Remove from front.

Speedometer - Remove bezel by loosening two lower retaining screws. Remove light shields. Remove speedometer attaching screws and remove speedometer.

Speedometer Printed Circuit Board - Remove bezel by loosening two lower retaining screws. Remove the 4 screws holding speedometer housing and printed circuit board to mounting and trim plate. Remove speedometer and housing, and circuit board.

Fuel & Temperature Gaug s - Bezel attaching screw is at bottom of housing. Remove the 4 plate attaching screws and pull gauges from housing.

ENGINE

ENGINE REMOVAL

NOTE - Engine only need be removed (unnecessary to remove transmission). Be sure to support the transmission when removing engine. *In addition to the usual procedure, observe the following points when removing engine:*

1) Remove speed control unit (if equipped), and horn and bracket assembly. Remove transmission filler tube slotted bracket from right exhaust manifold. Remove transmission fluid filter (if equipped) from underbody sidemember. Remove fuel pump heat shield. Remove radiator.

2) On non-air conditioned cars, remove fan blade assembly and spacer from water pump pulley.

3) On Air Conditioned cars, remove fluid fan clutch, fan, and compressor pulley from water pump pulley as a unit. Isolate and remove compressor *(see "Ford Motor Co. Air Conditioning" in Miscellaneous Section).* Remove compressor mounting bracket.

4) Remove underbody splash shield and access cover from converter housing. Remove oil filter and starter.

5) Attach lifting eyes to the rear of each exhaust manifold and in the lower front cylinder head bolt location on each cylinder head.

ENGINE LATERAL RESTRICTOR

Attached between converter housing and underbody side-rail to restrict engine side movement. See "Engine Mounts" illustration for arrangement of parts. *NOTE - When assembling unit, lips of rubber bushings must be seated properly in bores of inner and out r brack ts.*

GENERAL SPECIFICATIONS

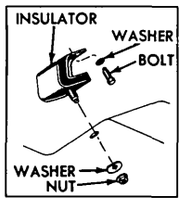
Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displac ment
All	320 at 4600	10.0-1	4.30"	3.70"	430 cu. ins.

ENGINE NOTES

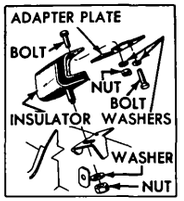
►*1963 PUSHROD COVER OIL LEAK CORRECTION:* Use new type one-piece cover bolt and washer, No. 377658-S, which has sealing material molded to underside of bolt and washer. Torque this bolt to 60-80 inch-lbs.

►*1963 ENGINE COMPARTMENT "WHINE" NOISE CORRECTION:* Noise most noticeable at 5-18 MPH and 800-1000 RPM, and may be thought to be caused by transmission front pump, power steering, etc. To check, disconnect wiring from alternator regulator. If noise stops, replace regulator. *NOTE - Regulators with yellow paint on r gulator bas hav b n modified to correct this nois .*

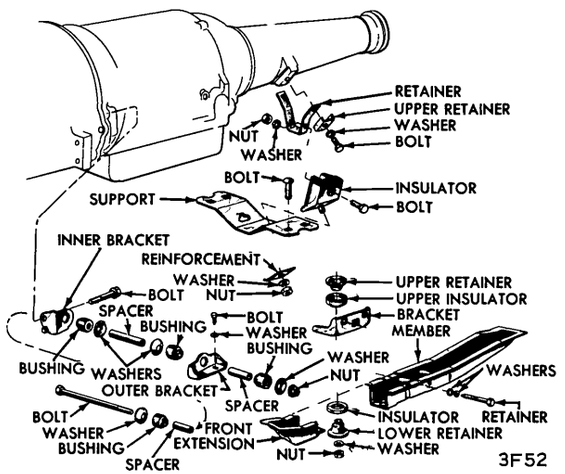
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



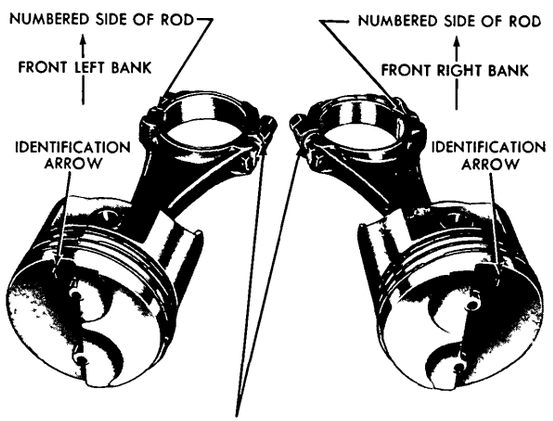
ENGINE FRONT SUPPORT— ALL EXCEPT CONVERTIBLE



ENGINE FRONT SUPPORT— CONVERTIBLE ONLY



ENGINE MOUNTS & LATERAL RESTRICTOR



POSITION OIL SQUIRT HOLE INWARD WITH PISTON IDENTIFICATION ARROW FORWARD TOWARD FRONT OF ENGINE. CAUTION PISTONS ARE NOT INTERCHANGEABLE FROM ONE CYLINDER BANK TO THE OTHER.

3F53

PISTON & ROD ASSEMBLY & INSTALLATION

TIGHTENING SPECIFICATIONS

ENGINE TORQUES

Bolt, Screw, or Nut	Ft. Lbs.
Cylinder Head	①
Intake Manifold	25-28
Exhaust Manifold	15-21
Oil Pan	4-6
Main Bearing Caps	95-105
Connecting Rod Caps	40-45
Vibration Damper or Pulley	75-90
Camshaft Sprocket	12-15
Flywheel	75-85
Rocker Arm Cover	2½-4
Rocker Shaft Support Bracket	45-50
Pushrod Chamber Cover	②③ 3½-5
Engine Front Cover	10-13
Radiator Supply Tank-to-Manifold	8-13
Water Pump	23-28
Oil Pump	23-28
Oil Filter Adapter	10-13
Converter Housing	40-50

ENGINE MOUNT TORQUES

Bolt, Screw, or Nut	Ft. Lbs.
Front Insulator-to-Sidemember	45-65
Front Insulator-to-Engine	45-60
Lateral Restrictor Outer Bracket-to-Sidemember	21-29
Lateral Restrictor Inner Bracket-to-Converter	40-50
Lateral Restrictor Rod Compression Nut	20-30
Rear Crossmember Support Bracket-to-Body	20-30
Rear Crossmember-to-Bracket	10-18
Rear Insulator-to-Support & Retainer	20-30
Support Retainer-to-Transmission	④ 20-30

① - See "Cylinder Head Installation" for tightening procedure. Three different applications must be made.
② - Torque center end bolts first.
③ - If one-piece type bolt & washers used (see "Push-rod Cover Oil Leak Correction"), torque to 60-80 inch-lbs.
④ - *Excessive torque of this bolt can cause noise or vibration.*

OIL PAN REMOVAL

All Models - Remove dipstick and turn crankshaft so No. 1 piston is 15° BTDC. Remove alternator splash shield and automatic transmission cooler line bracket bolt. Remove engine front support attaching pad nut, raise engine about 1", and place a ¾" wood block between insulator and underbody engine support pads. Remove both stabilizer arm bolts, washers, insulators, spacers, and nuts. Lower stabilizer arms for clearance. Remove oil pan bolts and free oil pan from block. Remove oil pump pick-up tube and screen assembly bolts, and drop assembly into oil pan. Remove oil pan.

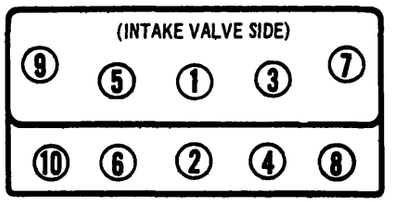
CYLINDER HEAD INSTALLATION

Tighten cylinder head bolts progressively in sequence shown in diagram. Torque bolts 3 times around as follows:

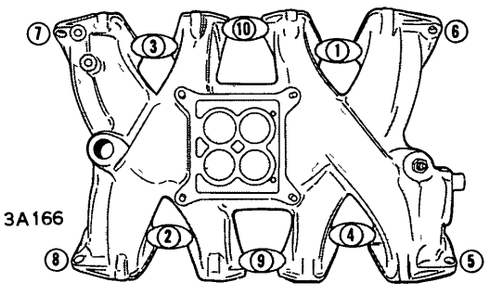
Step	Ft. Lbs.
1	85
2	95
3	105

INTAKE MANIFOLD INSTALLATION

Torque bolts to specified torque in sequence shown in illustration.



CYLINDER HEAD TIGHTENING SEQUENCE



INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTON Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
All	①④ .0011-.0029"	② .0002-.0004"	③	Comp. 1 Comp. 2 Oil	.015-.025" .015-.025" .025-.038"	① .0014-.0031" ① .001-.003" Snug

① - Wear limit .006". ② - Wear limit .0008". ③ - Press fit. *See "Replacing Pins" below.*
④ - Measured at bottom of skirt.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

FITTING PISTONS

Place a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *Feeler must extend entire length of piston.* Pull feeler from cylinder with a spring scale and note reading on scale. Specifications should agree with table below.

PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0.0007	7	0.0025	7	0.0049
6	0.0004	6	0.0010	6	0.0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0.0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065

MAIN BEARING CAP INSTALLATION

1) All Caps - Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine.
2) Rear Cap - Coat only rear mating surface of cap with oil resistant sealer. Do not use sealer forward of side seal grooves. Install cap immediately after sealer applied so seal will not set and cause an oil leak.

REPLACEMENT BEARINGS

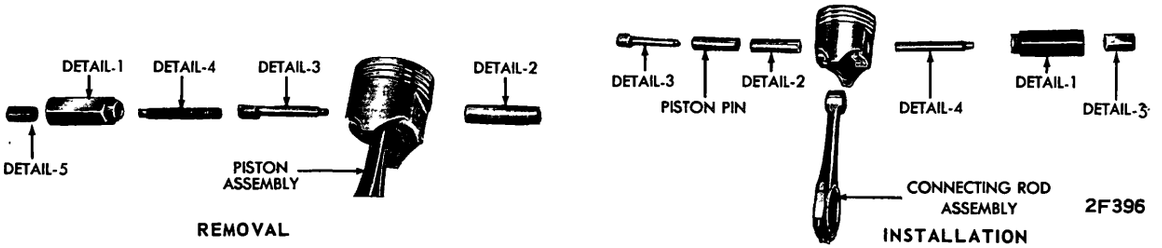
Standard size replacement main and connecting rod bearings available in 2 sizes marked Red and Blue for selective fit. Any combination of red and blue inserts may be used to obtain desired clearances.

THRUST BEARING ALIGNMENT

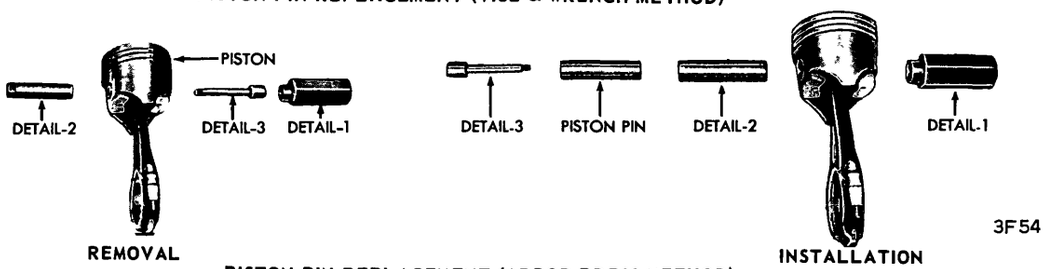
Install all bearing caps except thrust bearing cap and torque to specifications. Install thrust bearing cap with bolts finger tight. Pry crankshaft to rear of engine, then to front of engine. While holding crankshaft forward, tighten thrust bearing cap bolts to specifications. Check crankshaft endplay.

REAR MAIN BEARING OIL SEAL

NOTE - **1)** Upper seal can be replaced only after engine removed from car and with crankshaft removed.
2) When cap side seal does not compress firmly when forced into cap (cause of oil leak), an oversize seal is available for installation. DO NOT use oversize seal unless inspection shows that standard seal does not function properly.



PISTON PIN REPLACEMENT (VISE & WRENCH METHOD)



PISTON PIN REPLACEMENT (ARBOR PRESS METHOD)

PISTON PIN REPLACEMENT

Pins are a press fit in connecting rod. Use Tool 6135-F and arbor press or vise and wrench as shown in illustrations for removal and installation.
Installation & Checking Fit - Pin must be installed so it extends ¼" beyond face of piston boss. To check pin fit, install all parts of tool as for vise and wrench installation and place in a vise. Turn nut with torque wrench until pilot (Part No. 2 of tool) bottoms in anvil (Part No. 1 of tool). Minimum torque required to seat pilot is 20 ft. lbs. If less torque required, replace connecting rod.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS			CONNECTING RODS		
	① Journal Diam.	Clearance	Endplay	① Journal Diam.	Clearance	Sideplay
All	② 2.8994-2.8997" ③ 2.9000-2.9003"	④ .0008-.0024"	⑤ .004-.008"	② 2.5992-2.5995" ③ 2.5998-2.6001"	⑥ .0007-.0020"	⑦ .005-.015"

① - Two different standard sizes, marked Red and Blue. ② - Blue. ③ - Red. ④ - Wear limit .0039".
⑤ - Wear limit .012". ⑥ - Wear limit .0038". ⑦ - Wear limit .018"

Upper & Lower Seal - *CAUTION - Use Installing & Forming Tool 6701-B and follow procedure listed exactly to prevent seal shift and oil leaks.* Preform seal by hand and install into block or cap with thumbs, seating seal at center and then working from the ends toward the center. Now place installing tool properly in block or cap as follows: Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap for lower seal. Tool flanges must bottom on seal groove rear flange and bearing saddle (insert removed). Hold tool firmly and strike top of tool sharply. Cut seal ends flush with block or cap. Trim frayed ends.

Side Seal - Dip side seals in penetrating oil and install **immediately** into grooves. *CAUTION - DO NOT use sealer. Seals expand with oil.* Tap seals firmly into position. DO NOT trim ends.
Testing Seal Installation - Squirt a few drops of oil into parting lines between cap and cylinder block from the outside. Blow compressed air against seals from the inside of block. If air bubbles appear in oil, seal leaks.

ENGINE FRONT COVER

Removal - Drain cooling system and disconnect battery. Remove radiator supply tank, fan shield, drive belts, fluid fan and pulley assembly. Remove water pump (loosen power steering reservoir bracket mounting bolts for clearance). Remove crankshaft damper. Remove power steering pump (disconnect and plug lines). Remove fuel pump heat shield and fuel pump. Remove cup type plug from top of front cover and then remove fuel pump pushrod. Remove engine front cover.
Installation - Reverse removal procedure and note the following: **1)** Power steering pump rubber insulators must be properly installed. **2)** Lips of front cover seal must maintain proper contact with power steering pump.

FRONT COVER OIL SEAL

Seal must be seated in front cover. No special tool required.

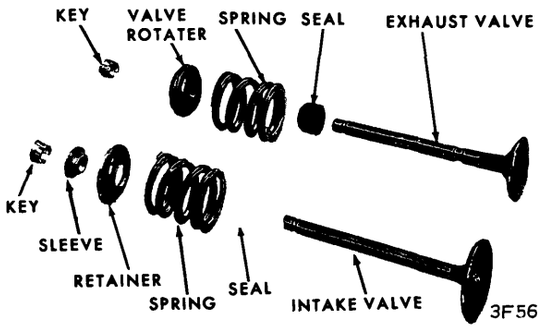
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE SPRING INSTALLED HEIGHT

Installed height of valve spring must not exceed specifications listed in table below. Measure height from surface of cylinder head spring pad to underside of spring retainer. If height greater than specified, install .030" spacer on head under spring to bring height within limits. *CAUTION - Install spacers only if necessary and do not use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valv Spring Height Specifications

Engin	Installed Height
All . .	.1 5/8-1 21/32"



VALVE ASSEMBLIES (EXPLODED)

VALVE SPRING INSTALLATION

Spring ends must be square within 3/64". Install springs with damper (closed) coil end down toward cylinder head.

VALVE GUIDE SERVICING

To ream guides for installation of valves with oversize stems, always use reamers in sequence and reface valve seat after valve guide is reamed. Reamers are furnished .003" oversize with standard diameter pilot, .015" oversize reamer with .003" oversize pilot, and .030" oversize reamer with .015" oversize pilot.

VALVE STEM SEALS

Umbrella type seals used on all valves. Install seals with cup side down over valve guide.

HYDRAULIC LIFTERS

Remove through pushrod holes Leakdown rate is 10-80 seconds under a 50 lb load

HYDRAULIC LIFTER OPERATING RANGE CHECK

Clearance between valve stem and rocker arm should be 078- 218" with lifter fully collapsed To check operating range of lifter, proceed as follows

1) Place No 1 piston at TDC of compression stroke Following valves will be adjusted No 1, 3, 7, 8 Intake, No 1, 4, 5, 8 Exhaust Bleed lifters down with Tool 6513-K and hold collapsed Insert a 078" feeler gauge between valve stem and rocker arm If gauge enters, use standard length pushrod If gauge does not enter, use 060" **shorter** pushrod (coded White) If 218" gauge can be inserted between valve stem and rocker arm, operating range is excessive (incorrect pushrod, excessive wear on pushrods, rocker arms, or valve stems) If all other parts of valve train are within limits, install 060" **longer** pushrod (coded Yellow)

2) Repeat above procedure with No 6 piston at TDC of compression stroke and check the following valves- No 2 4,5,6 Intake, No 2, 3, 6, 7 Exhaust

ROCKER ARM ASSEMBLY

See illustration for arrangement of parts *NOTE - When assembling and installing, identification notch on rocker arm shaft must be down and to rear of engine on left bank, down and to front of engine on right bank*

VALVES

Engine	Head Diam.	Face Angle	Seat Angle	① Stem Diameter	Stem Clearance	Cam Lobe Lift
All Intake	1.955-1.970"	44°	45°	②④ .3717-.3722" ③④ .3712-.3717"	⑤ .0008-.0018"	⑦ .2316"
Exhaust	1 645-1.660"	44°	45°	②④ 3705- 3709" ③④ .370 1-.3705"	⑥ .002-.003"	⑦ .2316"

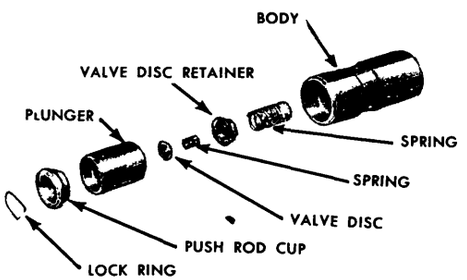
① - Two different standard sizes, marked Red and Green. ② - Green. ③ - Red.

④ - *Also furnished* 003", 015", .030" Oversize. ⑤ - *Wear Limit* 0045" ⑥ - *Wear Limit* 0055" ⑦ - Wear Limit 005"

VALVE SPRINGS & LIFTERS

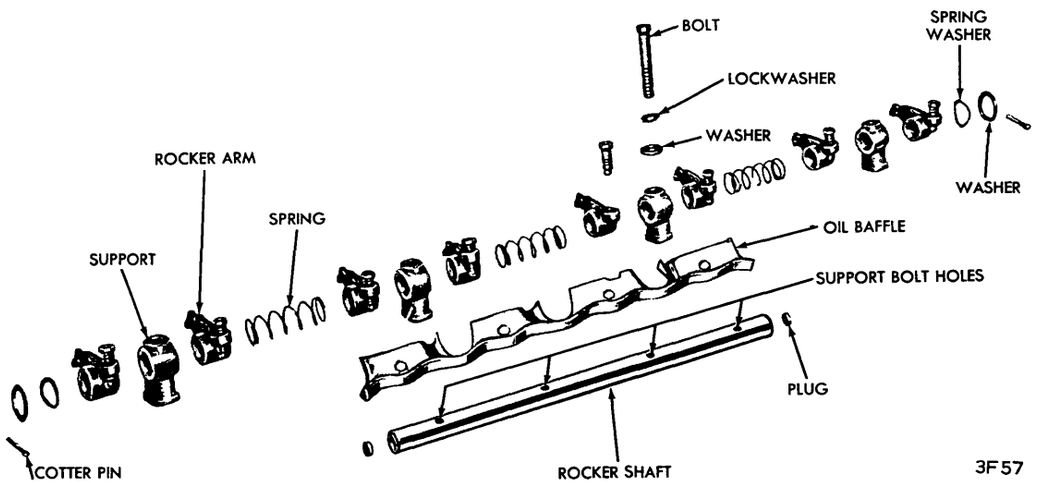
Engine	SPRINGS Free Length	SPRINGS Pressure (Lbs.) Valve Closed	SPRINGS Pressure (Lbs.) Valve Open	LIFTERS Diameter	LIFTERS Clearance
All	1.88"	① 65-75 at 1 640'	② 179-199 at 1.230"	.8742-.8745"	③ .0005-.0018"

① - Wear limit 59 lbs. at 1.640". ② - Wear limit 162 lbs. at 1.230". ③ - Wear limit .005".



NOTE Plunger and body are matched selective fit sets Do not mismate pairs 3F55

HYDRAULIC VALVE LIFTER (EXPLODED)



ROCKER ARM ASSEMBLY (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT						
Engine	Journal Diameters					Bearing Clearance
	No. 1	No. 2	No. 3	No. 4	No. 5	
All	2.3243-2.3248"	2.3093-2.3098"	2.2943-2.2948"	2.2793-2.2798"	2.2643-2.2648"	ℂ .0012-.0027"

ℂ - Wear limit .005".

CAMSHAFT REMOVAL

Remove hood, air conditioning condenser (unnecessary to disconnect lines), radiator, lower center grille, engine front cover, sprockets and timing chain, rocker arm shaft assemblies, pushrods, and lifters. Remove camshaft.

CAMSHAFT ENDPLAY

Thrust to rear. Taken by thrust face of camshaft sprocket riding against front surface of cylinder block.

CAMSHAFT BEARING REPLACEMENT

NOTE - Engine must be removed from car and disassembled for bearing replacement. Use Tool 6261-F & Adapter Set 6261-AC. *Camshaft bearing journals and I.D. of bearings are stepped (largest journal and largest bearing at front). DO NOT interchange bearings. Position number of bearing is stamped on each bearing.* No. 1 bearing must be installed with notch on bearing to front of engine and facing down toward bottom of block; and bearing must be .005-.020" below front face edge of cylinder block bearing bore. On other bearings, split in bearing must be up toward top of cylinder block.

ENGINE OILING

Normal Oil Pressure - 35-55 lbs. at 2000 RPM (hot).
Pressure Regulator Valve - In pump body. Not adjustable.

OILING SYSTEM

Refer to "Oiling System" illustration and note the following:

Crankshaft & Camshaft Bearings - All bearings are lubricated through vertical passages from main oil gallery (oil flow from filter is direct to main oil gallery).
Rocker Arms, Pushrods, & Valves - Drilled passages in block lead from right and left lifter oil galleries and connect with matching passages in cylinder head (passage in head is around one cylinder head bolt with offset channel in lower face of head to connect passage in block with this bolt hole). An angle passage in the head connects the cylinder head bolt with the rocker shaft support bracket hole (No. 1 support bracket for right bank, No. 2 bracket for left bank). Oil then flows up around bracket bolt and through angle passage in bracket into hollow rocker arm shaft. Oil holes in shaft and arm provide lubrication for rocker arm bushings, pushrod ends and valve tips. Oil drainage down pushrods lubricates pushrod seat in lifter. Excess oil in rocker chamber drains back into lifter chamber through holes at front and rear lower corners of head.
Timing Chain & Sprockets - Oil draining from front camshaft bearing flows onto thrust face of camshaft sprocket and is sprayed on timing chain and crankshaft sprocket.

CHECKING CAM LOBE LIFT

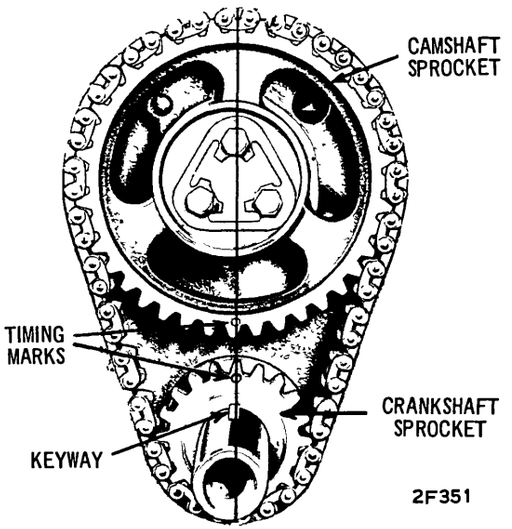
Check with dial indicator to specifications listed in Valve Table.

VALVE TIMING				
Engine	INTAKE		EXHAUST	
	Open (BTDC)	Close (ALDC)	Open (BLDC)	Close (ATDC)
All	ℂ 22°	ℭ 68°	ℂ 63°	ℭ 27°

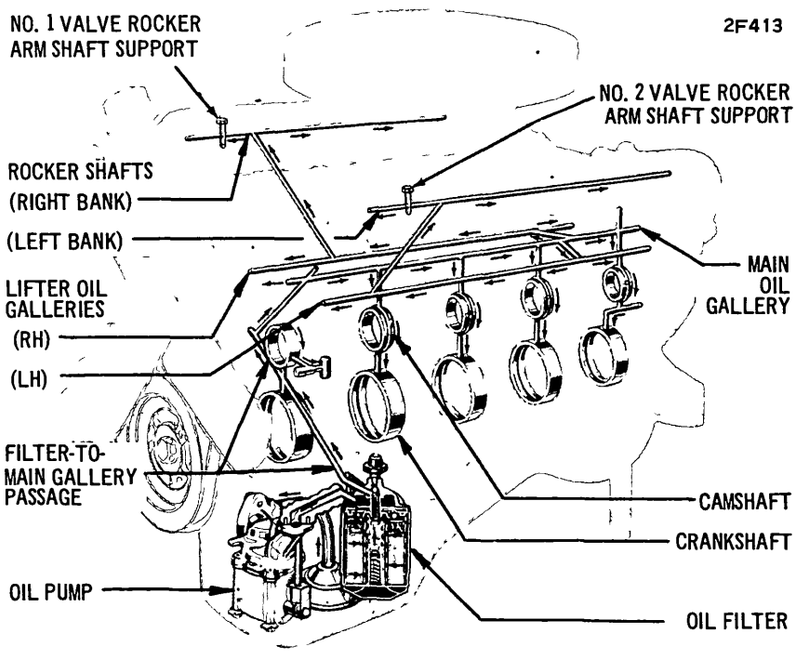
ℂ - Camlift .002". ℭ - Camlift .005".

CHECKING VALVE TIMING

Install a quadrant on crankshaft damper. Remove right rocker arm assembly. Install Dial Indicator Tool 6565 and Indicator Adapter Tool 6565-AB on cylinder head using Holding Fixture Tool 4201-D. Pushrod must be in lifter socket and actuating point of indicator in same plane as pushrod movement. Make sure timing pointer is not bent. Turn engine slowly until lifter is on heel of camshaft lobe. Set indicator on zero and turn engine slowly until indicator registers cam lobe lift as shown in Valve Table above. Compare crankshaft degrees indicated on quadrant with Valve Timing Table above. Continue to rotate engine to check valve closing specifications in same manner. If reading not correct, check for bent pointer, worn timing chain or sprocket before replacing camshaft.



VALVE TIMING MARKS



ENGINE OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PUMP

Rotor type mounted inside oil pan on lower left corner of block. Driven by distributor through an intermediate shaft. *Observe the following specifications:*

Oil Pump Specifications

Outer Race-to-Housing Clearance	.006-.012"
Rotor Endplay	.0011-.0041"
Shaft-to-Housing Clearance	.0015-.0029"
Relief Valve-to-Bore Clearance	.0015-.0029"
Relief Valve Spring Pressure	9.0-9.6 lbs. at 1.53"
Cover Plate Attaching Screw Torque	90-100 inch-lbs.

ENGINE COOLING

Pressure Valv - 12-15 lb. radiator filler cap.

Thermostats - As follows:
Main Thermostat (In Water Outlet Housing)
Standard - 155-162°F (fully open 182°F).
High T mp. - 185-192°F (fully open 212°F).

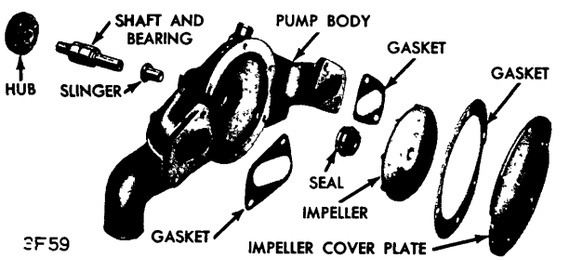
Cylinder Block Th rmostats - 137-142°F (fully open 162°F).

WATER PUMP

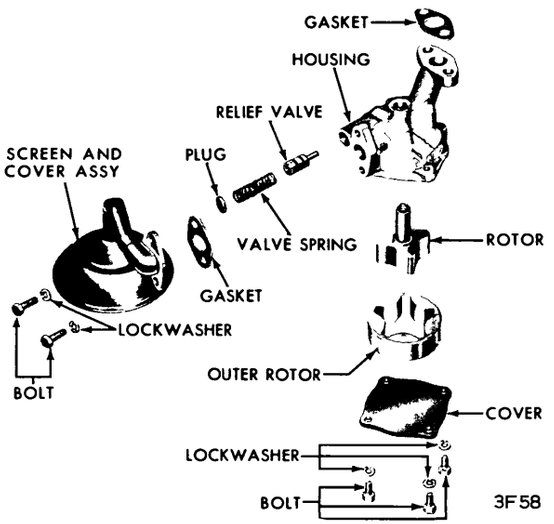
Special tool sets are available for water pump overhaul. Other suitable support plates and drivers may be used providing they support and apply pressure properly to shaft, bearing, housing, and other parts. *Observe the following specifications:*

Impeller Cl arance - .105-.115". *This is the distance the rear face of impeller is below the housing mounting face.*

Hub Dim nsi n - 7.094". *This is the distance from front face of pulley or hub to face of housing mounting legs.*



WATER PUMP (EXPLODED)



OIL PUMP (EXPLODED)

POWER SURGE FAN

Fluid coupling type mounted between fan and water pump pulley.

SAFETY CAUTION - Do not permit silicone oil to come in contact with the eyes as irritation will result.

TESTING CAUTION - Before testing, oil in unit must have minimum temperature of 65-70°F (park in heated garage overnight or operate engine at 1000 RPM for 20 minutes); and fan unit must be warm (operate for at least 5 minutes regardless of ambient air temperatures).

Testing & Trouble Shooting - *NOTE - Unit cannot be repaired and is serviced as an assembly only. If unit does not operate properly under the following test, it must be replaced.*

1) With engine stopped, fan should rotate under light finger pressure. If unit locked, replace it.

2) Mark one fan blade with chalk, connect a tachometer to engine and a timing light to No. 1 spark plug. Start engine and hold light beam at fan. Marked blade of fan should be stopped between 1700 and 1900 engine RPM. If above or below this range, replace unit.

MODEL IDENTIFICATION

SERIAL NUMBER

Stamped on right front fender apron above upper suspension arm opening. Also stamped under "Vehicle Warranty Number" on car patent plate at left front door area. Number carries identification data as follows:

① ② ③ ④ ⑤
3 Y 86 N 400001

① - Year Model. **3** 1963.
② - Assembly Plant. **Y** Wixom.
③ - Body Series Code. **82** 4-Door Special Sedan. **86** 4-Door Convertible.
④ - Engine Type. **N** 430" Std. **7** 430" Low Compression.
⑤ - Beginning vehicle number.

CAR BUILD DATE CODE

Stamped under DATE on car patent plate. Number designates day of month, letter designates month as follows: **A** January through **M** December (**I** not used).

ENGINE BUILD DATE CODE

Stamped on cylinder block in front of left cylinder head. Indicates place, year, month, day of month, and plant inspector. Not used for licensing.

CAPACITIES

Item	Capacity
Crankcase (Includes Oil Filter)	6 qts.
Cooling System (Includes Heater)	21 qts.
Automatic Transmission (Dry)	23 pints
Rear Axle	4.8 pints
Fuel Tank	21½ gals.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace 6000
Air Cleaner	Clean 6000, Replace 30,000
Oil Cap Filter	Replace 12,000
Fuel Filter	Replace 6,000
Power Steering Filter	Replace 36,000

REPLACING OIL FILTER

Coat gasket with light film of oil. Screw filter onto adapter by hand until snug, then tighten ¼-turn additional. *Do not overtighten.*

SERVICING AIR CLEANER

Attach element to a ¼" drill and spin element for 2 minutes inside a splash shield set on floor. *Do not use solvent.* Inspect element for cracks or splits.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE IDENTIFICATION

Fourth figure of "Vehicle Warranty Number" on truck patent plate identifies engine as follows:

Engine	Standard - CODE - Low Compression
144" 6 Cyl.	S ..... K
170" 6 Cyl.	T
223" 6 Cyl.	J
262" 6 Cyl.	B
292" V8 2-Bbl. Carb.	C
292" V8 4-Bbl. Carb.	D

COMPRESSION PRESSURE

144", 170"	150-190 psi
223", 262"	130-170 psi
292"	130-170 psi

Maximum variation between cylinders 10 psi (all engines).

VACUUM READING

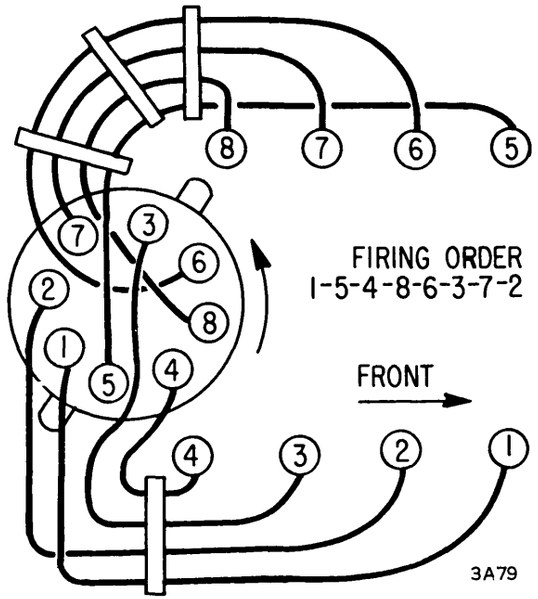
144"	16" at idle
170"	17" at idle
223", 262"	18" at idle
292"	18" at idle

VALVE TAPPET CLEARANCE

144", 170"	.018" Int. & Exh.
223", 262"	.019" Int. & Exh.
292" (Cold)	.019" Int. & Exh.
(Hot)	.018" Int. & Exh.

SPARK PLUGS

Engine	Gap	Torque (Ft. Lbs.)
144", 170"	.035"	15-20
223"	.030"	15-20
262"	.035"	15-20
292" 2-Bbl.	.030"	15-20
4-Bbl.	.035"	15-20



292" V8 ENGINE FIRING ORDER

TUNE-UP SPECIFICATIONS

Spark Plug Typ

144", 170"	Autolite BF-82
223"	Autolite BTF- 6
262"	Autolite BTF-31
292" 2-Bbl.	Autolite BTF-6
4-Bbl.	Autolite BTF-31

DISTRIBUTOR

Engine	Point Gap	Cam Angle
All 6 Cyl.	.024-.026"	35-38°
All V8	.014-.016"	26-28½°

Condenser Capacity (All Engines) - .21-.25 mfd.

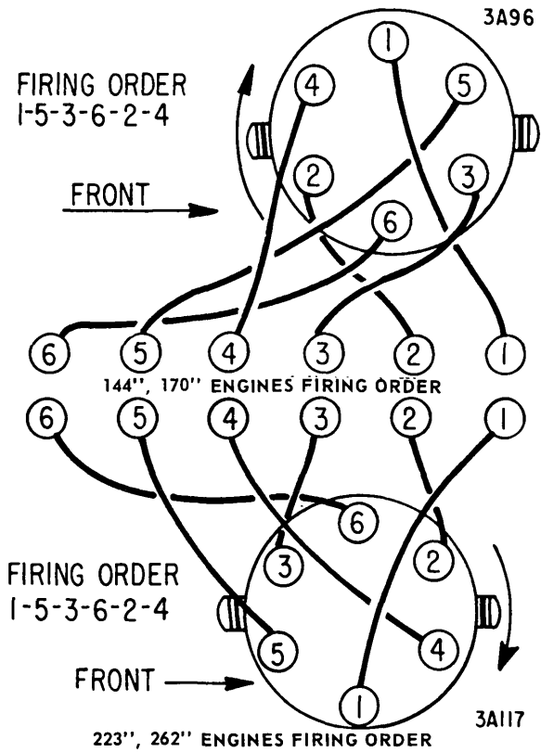
Breaker Arm Spring Tension (All Engines) - 17-20 ozs.

IGNITION TIMING

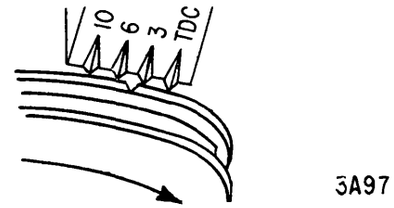
Set timing at idle speed with distributor vacuum line disconnected. Degrees given are BTDC except as noted. Minimum allowable setting is 2° BTDC. Maximum allowable setting is 5° BTDC more than recommended figure.

Engine	℄ Synchro-mesh	℄ Auto. Trans.
144", 170"	4°	
223"	4°	4°
262"	2°	
292" 2-Bbl.	6°	6°
4-Bbl.	8°	8°

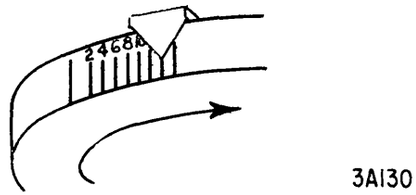
℄ - May be advanced 2° when new points installed to compensate for rubbing block initial wear during first 6000 miles of operation.



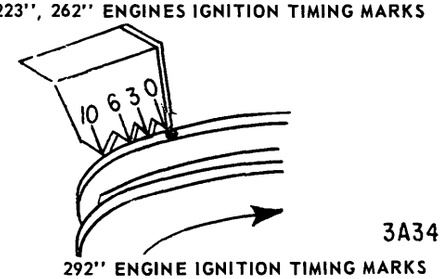
223", 262" ENGINES FIRING ORDER



144", 170" ENGINES IGNITION TIMING MARKS



223", 262" ENGINES IGNITION TIMING MARKS



292" ENGINE IGNITION TIMING MARKS

TUNE-UP NOTES

► *1963 262" 6 CYL. ENGINE FUEL PUMP REPLACEMENT NOTE:* If fuel pump replaced because of rocker arm return spring breakage or for interference between rocker arm and lower fuel pump body, use new type pump, No. C3TZ-9350-E.

► *1958-63 292" V8 HESITATION OR STUMBLE ON ACCELERATION CORRECTION (FORD CARBS.):* Plastic accelerator pump cavity filler block, No. C30Z-9F565-A, may be installed in accelerator pump cavity if carburetor not already equipped. This filler block used in some late production 1962 trucks and in most all 1963 trucks.

► *1963 6 CYL. COLD HARD START CORRECTION (MANUAL CHOKE CARBS.):* May be caused by choke control cable being too long and interfering with pull-down rod or choke shaft lever when choke control knob pulled out. To correct, shorten cable as required and make sure cable housing extends ¼-½" beyond cable clamp at carburetor.

► *1963 6 CYL. ENGINE STALLING AT IDLE CORRECTION:* If engine stalls during hot idle operation, replace fuel inlet seat fiber gasket with new rubber-coated aluminum gasket, No. C3AZ-9569-B, and correctly adjust dry float level.

► *1963 ECONOLINE HESITATION OR SURGE CORRECTION:* Caused by too lean fuel mixture. *See "Ford 1-Barrel Carburetors" in Carburetion Section.*

HOT (SLOW) IDLE RPM

On Air Conditioned trucks, s t idle speed after operating air conditioner for 20 minutes and with unit on.

Engin	Synchro-mesh	ℂ Auto. Trans.
144", 170"	550-575	
223"	500-525	500-525
262"	500-525	
292" 2-Bbl.	500-550	475-525
4-Bbl.	525-575	475-525

ℂ - In "D" (Drive).

FAST IDLE RPM

With choke lev r in full choke position.

All 2-Bbl. Carbs. 1900

FUEL PUMP PRESSURE

Engin	Pressure
All, Except 292" 4-Bbl.	3.5-5.5 lbs. at 500 RPM
292" 4-Bbl.	3.5-6.5 lbs. at 500 RPM

FUEL PUMP VOLUME

All Engines ..... 1 pint in 30 seconds at 500 RPM

POSITIVE CRANKCASE VENTILATION SYSTEM

Disassemble system and valve and clean system every 4000 miles (monthly or every 2000 miles under stop and go driving conditions).

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Ford C3UF-12127-E

Set test stand at 0°, 1000 RPM, & 0" Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1-2	0.30	500
4¾-5¾	0.80	800
8-9	1.80	1200
10-11	3.00	1600
11-12¼	3.90	2000
13½ max.	10.00 max.	

Ford C2TF-12127-A

Set test stand at 0°, 1000 RPM, & 0" Hg.

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	0-1½	0.42	400
A	5-6	1.03	800
A	7¾-8¾	1.62	1000
B	8½-9½	2.32	1200
C	8½-9½	5.65	2000
C	10¾-12¼	7.30	1600
D	13 max.	10.00 min.	1600

A - Adjust primary spring. B - Adjust stop washer.
C - Adjust spring washers. D - Replace breaker plate assembly.

Ford C0TF-12102-C

Mechanical Advance: Test stand at 0° & 250 RPM.

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance
Start	400	
½-1½	500	
5½-6½	900	NONE
8½-9½	1250	
10¾-12¼	2000	
18 max.		

For engine degrees & RPM, multiply by 2.

Ford C3TF-12127-A

Mechanical Advance: Test stand at 0° & 250 RPM.
Vacuum Advance: Test stand at 0°, 0" Hg & 1000 RPM.

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
1-2	500	0-1	6
5-6	700	1-4	9
8-9¼	1000	3½-6½	12
11-12¼	1500	20 max.	
13¾-15¼	2000		

For engine degrees & RPM, multiply by 2.

Ford C3TF-12127-D

Set test stand at 0°, 250 RPM, & 0" Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
1-2¼	0.30	500
3½-4½	0.45	600
7½-8½	1.75	1200
9-10¼	3.10	1600
10-11¼	4.20	2000
14¾ max.	8.00 max.	

Ford C3UF-12127-D

Set test stand at 0°, 1000 RPM, & 0" Hg.

Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
¼-1¼	0.45	600
3½-4½	0.75	800
7-8	1.75	1200
9¾-10¾	2.90	1600
11-12½	3.70	2000
15 max.	10.00 max.	

IGNITION COIL

Primary Resistance (Ohms)	1.40-1.54 at 75°F
Secondary Resistance (Ohms)	8000-8800 at 75°F
Primary Resistance Wire (Ohms)	1.30-1.40 at 75°F
Current Draw (Amps.)	2.5 idling, 4.5 stopped

CARBURETOR

CARBURETOR SPECIFICATIONS

Carbur tor N.	Float Level	Fuel Level
Ford 1-Bbl. ℂ C3UF-9510-A,B	1"	.....
C3TF-9510-A,B, C,D,E	1"	.....
Ford 2-Bbl. ℂ C3TF-9510-H,J,K	21/32"±1/64"	29/32"±1/64"
Holley 4-Bbl. ③ C3TE-9510-F	7/8" Pri.. 3/4" Sec.	④ ④

ℂ - Prefix & Suffix of number on main body above mounting stud hole (accelerating pump side).
ℂ - Prefix & Suffix of number on carburetor mounting flange.
③ - Stamped on choke plate flange.
④ - At lower edge of sight plug opening ±1/16".

ACCELERATING PUMP

Ford 1-Bbl. - Install roll pin in "LO" hole of pump lever for operation above 50°F and/or 5000 ft. altitude. Install roll pin in "HI" hole for operation below 50°F.

Ford 2-Bbl. - *NOTE - Pump over-travel lever has four holes (No. 1 hole is nearest throttle shaft, and No. 4 hole is furthest from throttle shaft). Accelerating pump plunger lever has two holes.* Install pump operating rod in proper hole of over-travel lever as indicated in table below for various operating conditions. Install opposite end of pump rod in inner hole (closest to pump plunger) of plunger lever.

Over-Travel Lever Hole	Operating Condition
No. 1	Over 80°F and/or 5000 Ft. Alt.
No. 2	40-80°F
No. 3	Below 40°F
No. 4	Below -15°F

Holley 4-Bbl. - Align No. 1 (top) hole of pump cam with top hole of throttle lever for short stroke (warm weather or average conditions). Align No. 2 (bottom) hole of pump cam with bottom hole of throttle lever for longest stroke (cold weather operation).

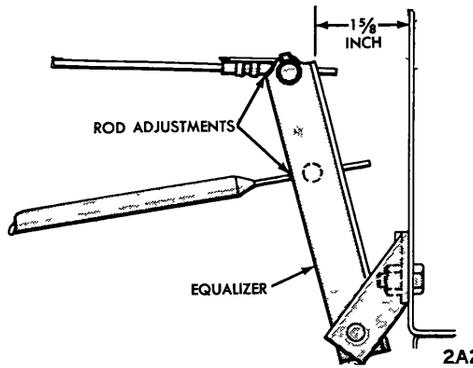
MANIFOLD FUEL DISTRIBUTION

V8 Engine - Carburetor right barrel feeds cylinders 2,3,5,8. Carburetor left barrel feeds cylinders 1,4,6,7.

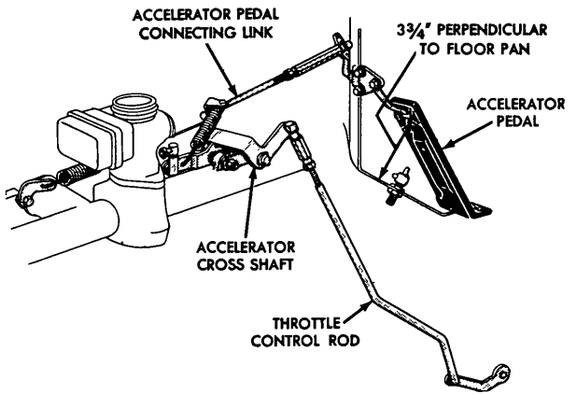
THROTTLE LINKAGE ADJUSTMENT

Econoline & Falcon Bus (Synchro-mesh) - Depress accelerator pedal to wide open throttle position and hold in this position while making the following adjustment. Adjust accelerator pedal connecting rod at equalizer on engine so there is 1 5/8" between upper end of equalizer and engine rear cover panel. Adjust carburetor-to-equalizer connecting rod at equalizer to obtain full throttle opening.

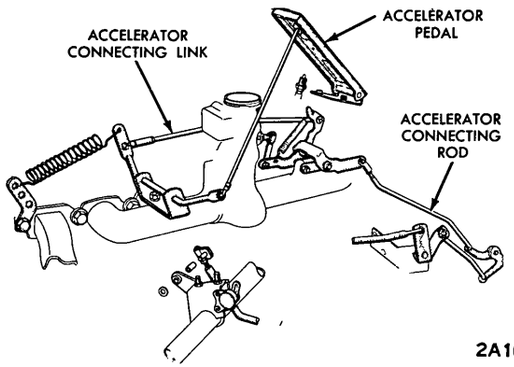
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



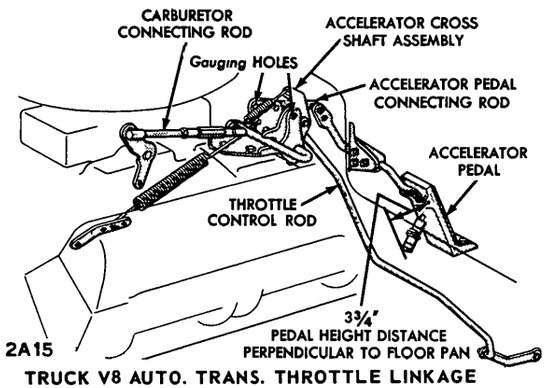
ECONOLINE THROTTLE LINKAGE (DETAIL)



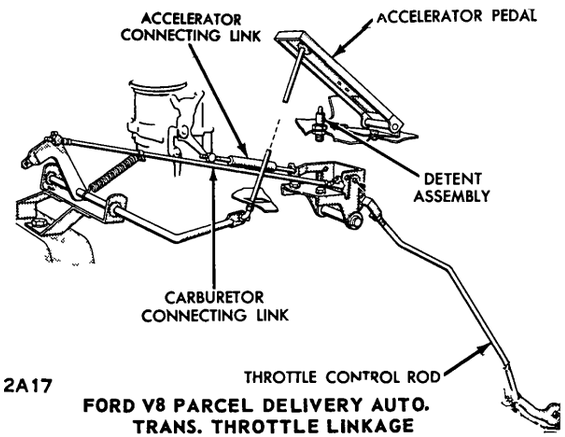
TRUCK 6 CYL. AUTO. TRANS. THROTTLE LINKAGE



6 CYL. PARCEL DELIVERY AUTO. TRANS. THROTTLE LINKAGE



TRUCK V8 AUTO. TRANS. THROTTLE LINKAGE



FORD V8 PARCEL DELIVERY AUTO. TRANS. THROTTLE LINKAGE

6 Cyl. Cruise-O-Matic Trans. - 1) With slow idle speed correctly set and engine at normal operating temperature, stop engine and proceed as follows: Remove lock from clevis pin on upper end of throttle control rod and loosen clevis locknut. Remove clevis and pull throttle control rod upward so throttle lever will be held against internal stop in transmission. Turn throttle rod clevis until pin enters hole in lever and lengthen throttle rod 3 turns. Connect throttle control rod, tighten locknut, install clevis lock.

2) Measure accelerator pedal height from point where linkage connects to pedal to floor mat. Distance should be 3¾" (Except P Series). On P Series, measure distance from center of hole in cross shaft (for accelerator rod) to a line parallel to bottom line of bracket. Distance should be 1 7/8". To adjust, turn threaded adjusting sleeve on accelerator pedal adjusting link. Adjust pedal detent so it barely contacts pedal at full throttle.

3) Make final adjustment by pressure method (see V8 below).

V8 Cruise-O-Matic Trans. - 1) With engine at normal operating temperature, slow idle speed and anti-stall dashpot adjustments correctly made, stop engine and proceed as follows: Disconnect throttle control rod and carburetor connecting rod from accelerator cross shaft assembly and insert a ¼" gauge pin through gauging holes in cross shaft assembly. Lift carburetor connecting rod to normal operating position (maintain forward pressure so carburetor throttle lever is solidly against idle adjusting screw), and adjust connecting rod length so rod is a free fit into accelerator cross shaft assembly lever, then turn adjusting sleeve 1 full turn counterclockwise to lengthen rod. Remove gauge pin and connect rod to lever.

2) Open throttle and let linkage seek its own normal position. Gauge pin holes must be in alignment and gauge pin must enter holes freely. Adjust carburetor connecting rod again as necessary.

3) With gauge pin removed, pull upward on throttle control rod so transmission lever is against internal stop. Rotate adjusting sleeve on throttle control rod so rod fits freely in accelerator cross shaft lever, then lengthen rod 3 turns counterclockwise (approximate setting). Connect throttle control rod.

4) Adjust pedal height to 3¾" measured from floor mat to point where linkage connects to pedal (Except P Series). On P Series, center of hole in cross shaft lever (for pedal rod) should be 9/16" above horizontal. To adjust, turn sleeve on accelerator pedal connecting rod. Adjust pedal detent so it just contacts pedal at full throttle.

5) Final Pressure Adjustment - Apply parking brake and connect a pressure gauge to pressure linkage tube (in engine compartment) using Adapter T60L-7000-B so pressure gauge can be read from driver's seat. Connect a tachometer to engine. Note gauge reading at 1000 RPM. If pressure below 80 lbs., lengthen throttle control rod (rotate sleeve). If pressure is over 85 lbs., shorten rod. Tighten locknut to hold rod adjustment.

ANTI-STALL DASHPOT ADJUSTMENT

Ford 1-Bbl. - With throttle plate at idle position, turn dashpot adjusting screw outward so it does not contact diaphragm plunger assembly, then turn screw inward until it just contacts plunger assembly. Now turn screw inward an additional 3¼-3¾ turns against plunger assembly *NOTE - To correct objectionable slow return to idle, specification may be reduced to 2 turns*

Ford 2-Bbl. - With throttle plate in hot idle position and dashpot plunger fully depressed, distance from dashpot plunger to throttle shaft lever should be .060-.090". To adjust, turn dashpot or dashpot adjusting nut.

ELECTRICAL

► *1963 RECURRING RUN DOWN BATTERY CORREC TION (60 AMP LEECE-NEVILLE ALTERNATOR TRUCKS)* If current output of system is correct trouble may be caused by burned or stuck load relay contacts due to stop and go driving and subsequent high charging rate through contacts To check for current leak turn off all electrical components disconnect battery positive cable and note if spark occurs If spark occurs there is current leak To correct replace load relay contacts and remove wire from regulator "G" terminal and connect to regulator "B" terminal This removes the load relay contacts from alternator output circuit and connects alternator output terminal directly to battery *NOTE - This change made on later production trucks*

BATTERY

12 Volt Type.

Batt ry Ground - Negative

Engine Ground - Cylinder head or block, or Flywheel housing to dash or frame

STARTER

► *1963 STARTER ENGAGEMENT NOISE CORRECTION (ALL ENGINES)* Caused by misalignment of starter drive to flywheel due to tolerance build up between alignment hole in center lug of starter and mounting hole in flywheel housing To correct install starter with a shoulder bolt No 376245-S8 and lockwasher No 34847 S8 in alignment hole in center mounting lug of starter

144" Engine

Torque	RPM	Volts	Amperes
0 ft lbs	℄	12 0	70
8 ft lbs.		5 0	450

℄ - With starter on engine and engine idling
Cranking Speed - 250-290 RPM.

170" Engine

Torque	RPM	Volts	Amperes
0 ft. lbs.	℄	12 0	70
9 6 ft. lbs		5.0	500

℄ - With starter on engine and engine idling
Cranking Speed - 250-290 RPM.

223", 262", 292" Engines

Torque	RPM	Volts	Amperes
0 ft lbs	℄	12 0	110
14 8 ft lbs.		5.0	. 580

℄ - With starter on engine and engine idling
Brush Spring Tension (All Models) - 45 ozs

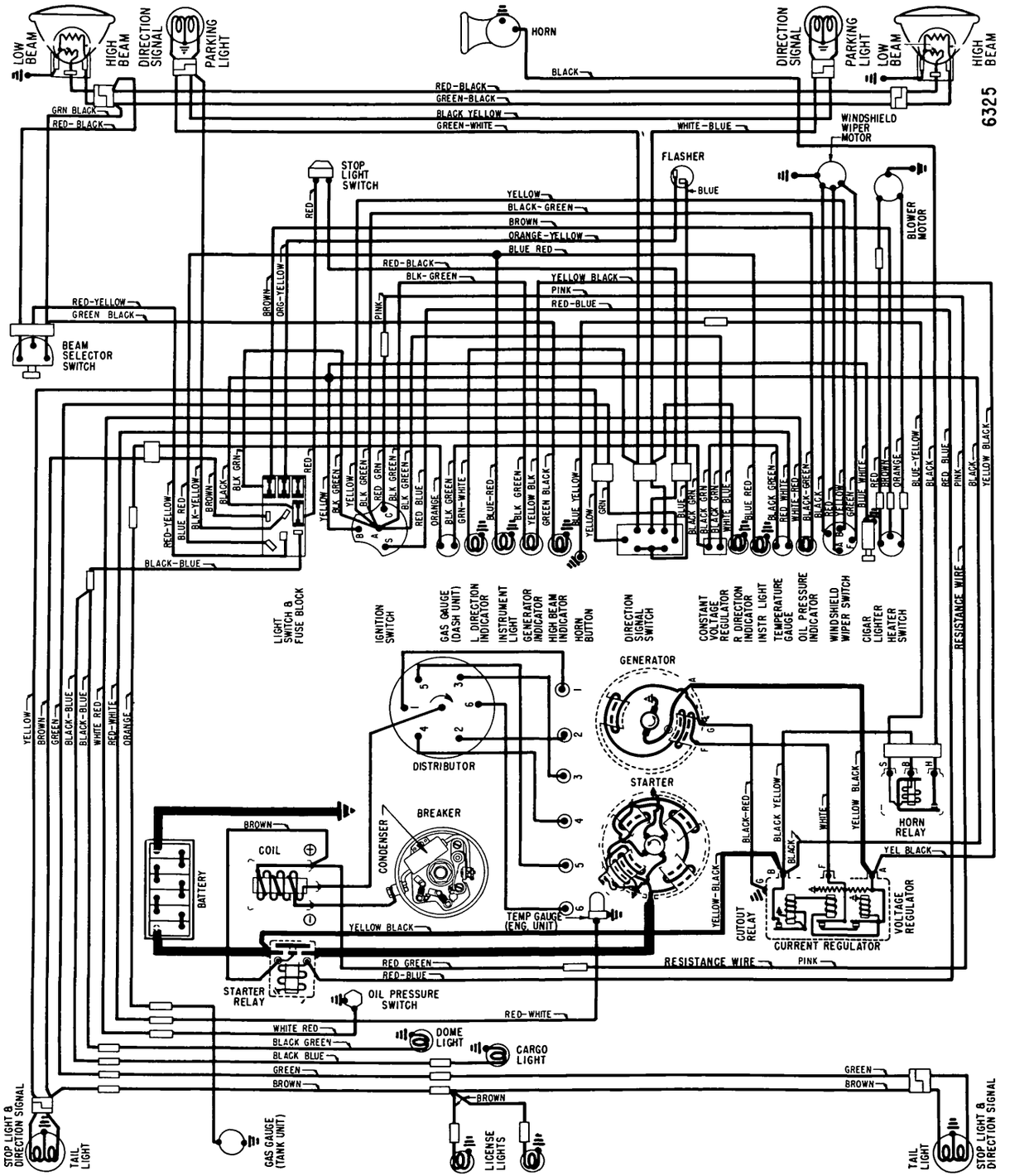
GENERATOR

G n rator ℄	Amper s	Volts	Gen. RPM
25 Amp	25	15 0	2610
30 Amp	30	15 0	2525
40 Amp	40	15 0	2650

℄ - Rated capacity is stamped or stenciled on unit

Brush Spring T nsi n - 20-26 ozs

Field Curr nt (All) - 1 2-1 8 amps at 12 volts & 75°F



FORD ECONOLINE WIRING DIAGRAM

ELECTRICAL (C ntinu d)

GENERATOR REGULATOR

Cutout Relay

Cuts In - 12.4-13.2 volts (25 & 40 Amp.), 12.0.12.8 volts (30 Amp.).
Cuts Out - 8 amps. (25 & 40 Amp.), 6-9 amps. (30 Amp.) reverse current.

Voltage Regulator

Setting - 14.6-15.4 volts at 75°F (all models).

Current Regulator

Setting - 23-27 amps. (25 Amp.), 28-32 amps. (30 Amp.), 38-42 amps. (40 Amp.).

ALTERNATOR

FORD

Rated Output - 42 amps. (630 watts at 15 volts).
Brush Spring Tension - 7-12 ozs.

ALTERNATOR REGULATOR

FORD
Field Relay

Closing Voltage - 3-4 volts.
Contact Gap - .015-.022". **Air Gap** - .022-.030".

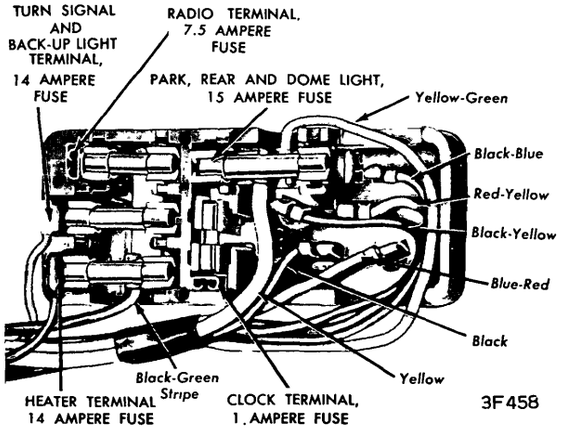
Voltage Regulator

Setting - 14.1-14.9 volts at 75°F.
Contact Gap (Lower Contacts) - .010-.015".
Air Gap - .045-.052" with upper contacts closed.

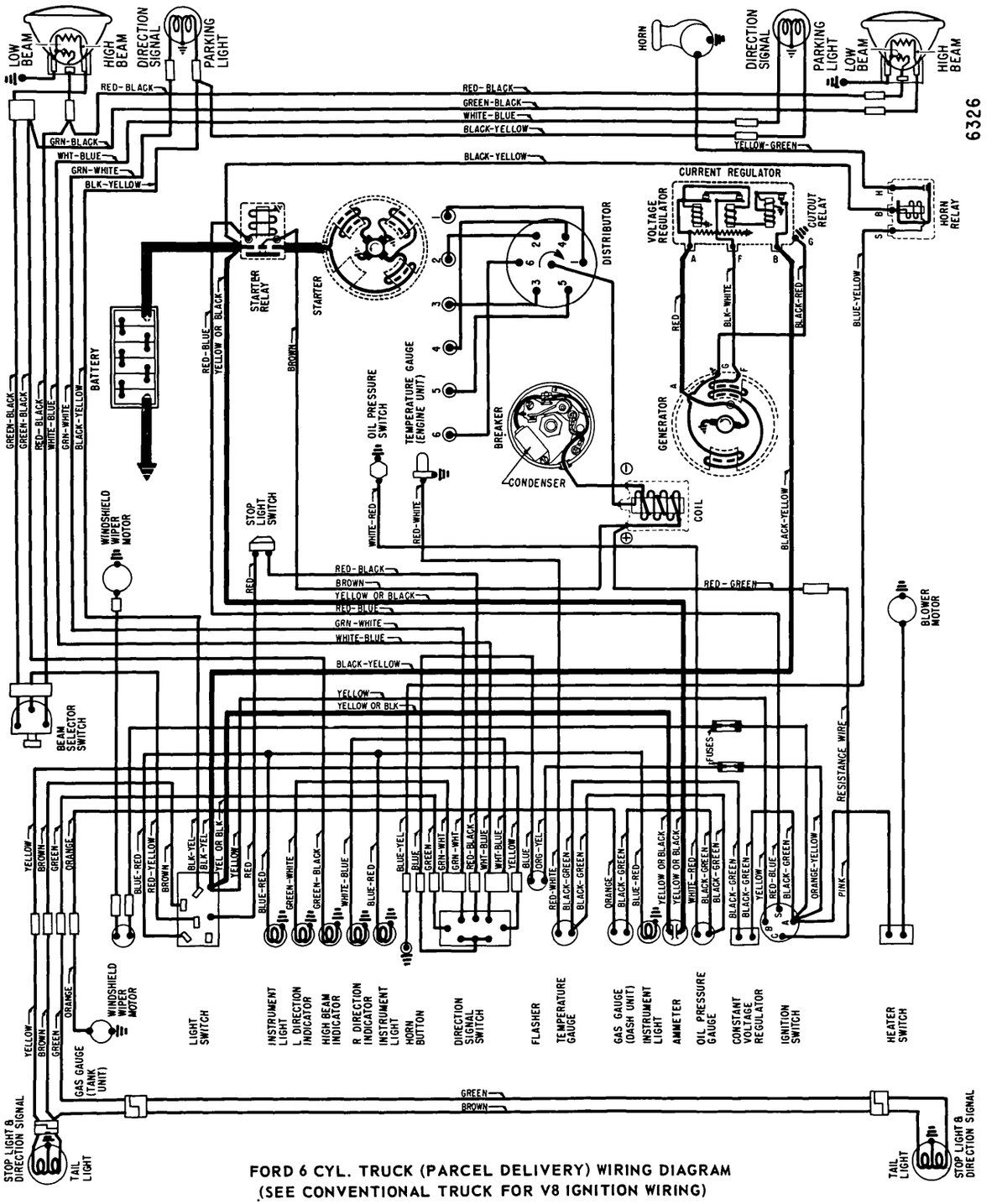
FUSES & CIRCUIT BREAKERS

FUSES

1 - Fuse panel on headlight switch.
2 - In-line fuses in feed wire for the following units: Spotlight, Instrument panel light rheostat, Emergency warning flasher.
3 - Fuse on overdrive relay.



LIGHTING FUSE BLOCK



FORD 6 CYL. TRUCK (PARCEL DELIVERY) WIRING DIAGRAM
(SEE CONVENTIONAL TRUCK FOR V8 IGNITION WIRING)

ELECTRICAL (C ntinu d)

CIRCUIT BREAKERS

H adlight Circuit - Integral with headlight switch

Windshield Wip rs - Integral with wiper switch

2-Sp d Axl - On fuse panel

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Cruise-O-Matic Trucks - Loosen screws attaching switch to bracket on steering column then position switch so that starter circuit is closed when selector lever is in 'N' or 'P' positions *NOTE - Circuit must be open in all other positions* Tighten attaching screws and check operation in all lever positions

STOP LIGHT SWITCH

Located on brake master cylinder Not adjustable

TURN SIGNAL FLASHER

Ford Trucks - Clipped to left side of support bracket under instrument panel

Econoline - At rear top center of instrument panel

HEADLIGHT SWITCH REMOVAL

Press down on button on top of switch and remove switch knob and shaft Remove retaining bezel nut (Tool No 17470-N-51), and remove switch Separate fuse block from switch and disconnect wiring

SPEEDOMETER & INSTRUMENTS REMOVAL

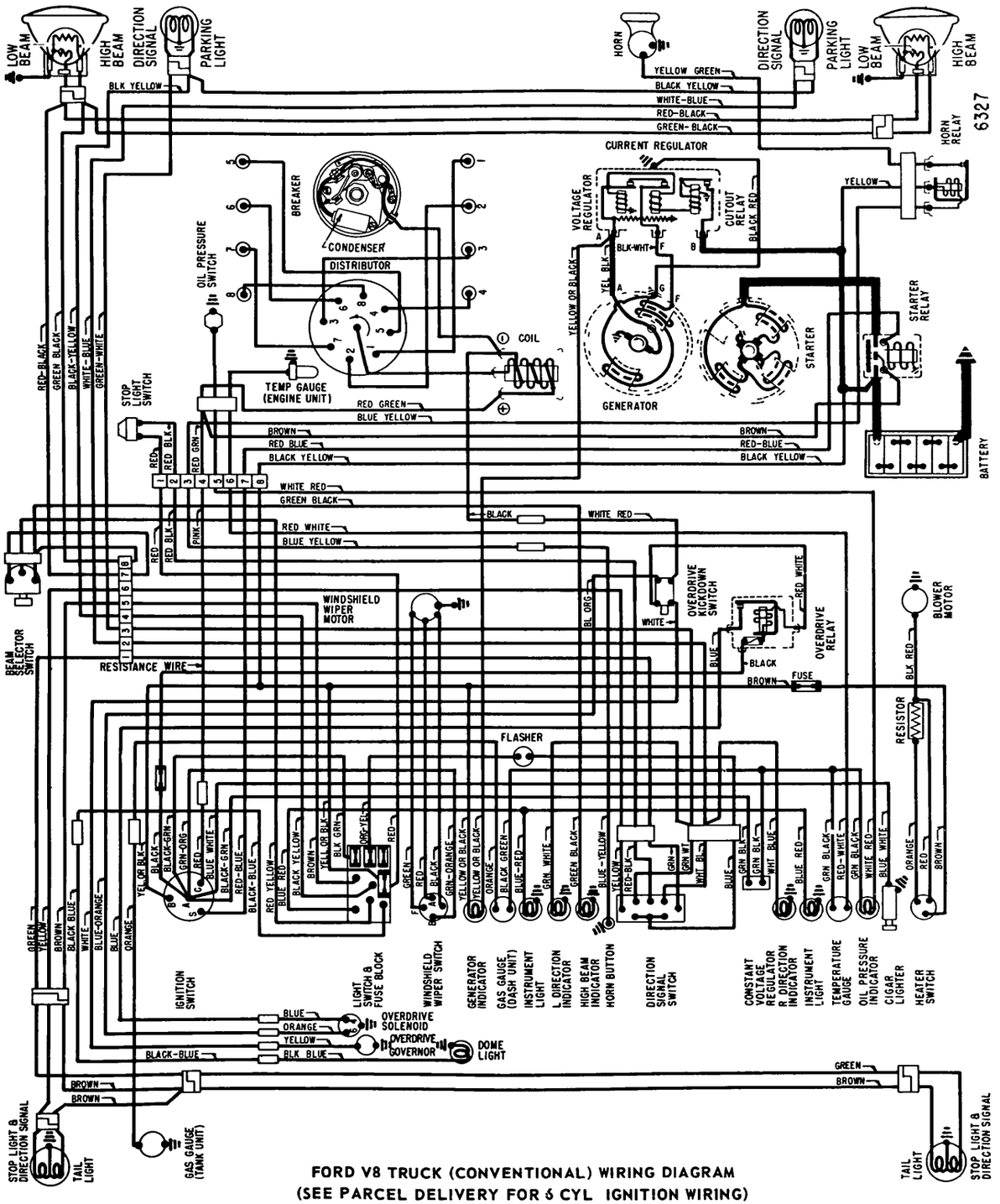
Speedometer and instruments are accessible from front of instrument panel after cluster face plate attaching screws are removed

BELT ADJUSTMENT

B lt Tensi n (Lbs.) With Tension Gauge T63L-8620-A

	New Belt	ℂUsed Belt
Generator (Single Belt)	90-120	60-90
(Dual Belt-Front)	90-120	60-90
(Dual Belt - Rear)	85-135	55-100
Power Steering	120-150	90-120
Air Compressor	120-150	90-120

ℂ - Any belt operated 10 minutes or longer is a used belt



FORD V8 TRUCK (CONVENTIONAL) WIRING DIAGRAM
(SEE PARCEL DELIVERY FOR 6 CYL IGNITION WIRING)

ENGINE

ENGINE REMOVAL

Falcon & Econoline Trucks

NOTE - Following procedure is for removal of engine and transmission assembly from beneath truck Drain cooling system and crankcase, and remove air cleaner Disconnect all wires, hoses, cables and lines from engine Raise and support truck Remove propeller shaft Disconnect transmission shift rods from transmission Disconnect clutch linkage from flywheel housing and underbody Remove exhaust pipe, muffler, and tail pipe assembly Lower truck about half-way for safety Use Transmission Jack KRW-7020 and Engine Adapter T61E-6000-A or other suitable equipment and support engine and transmission assembly after securing engine to adapter Disconnect engine right and left front mounts from engine, then remove right and left support members from underbody Disconnect transmission extension from hanger bracket Lower jack and raise truck to remove engine assembly from beneath truck

Ford Trucks

F & B Series - Engine (without transmission) may be removed from above in the usual manner Observe the following Remove radiator and shroud, fan and pulley and starter Unnecessary to remove power steering pump (just disconnect hoses and let system drain) On some models, access cover provided in floor pan to remove converter or flywheel housing bolts, accelerator assembly, and other parts Be sure to support transmission and converter

C Series - Tilt the cab and drain cooling system and crankcase Remove radiator and shroud assembly, fan and air cleaner Remove all wires, cables clips, lines, and hoses from engine Remove clutch release lever retracting spring Remove starter Disconnect exhaust pipes from manifolds Remove flywheel housing inspection cover, then disconnect engine from flywheel and front mounts Be sure to support transmission With suitable lifting hooks and sling remove engine

N Series - Drain cooling system and crankcase Remove hood Disconnect all wiring from headlights, horn horn relay and voltage regulator, then remove wiring

(Continued)

ENGINE NOTES

► *1963 223" & 292" 2-BBL ENGINES EXHAUST VALVE PRODUCTION CHANGE & REPLACEMENT NOTE* New type valve, No C3AZ-6505-A, with diffused aluminum on head and face used to minimize burning and for resistance to detonation Use new type valve for service replacement on all 1961-63 engines

► *1963 TILT CAB WITH 262" 6 CYL ENGINE EXCESSIVE EXHAUST SMOKING CORRECTION* May be caused by overfilled crankcase due to incorrect dipstick being installed Make sure correct dipstick used (27 20" long from dipstick tip to tube cover cap gasket)

ENGINE IDENTIFICATION *See "Engin Code Designation" under MODEL IDENTIFICATION.*

GENERAL SPECIFICATIONS

Engine	①HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
144"	79 at 4000	8 7-1	3.50"	2.50"	144 cu. ins
170"	85 at 3600	8.7-1	3 50"	2.94"	170 cu ins.
223"	②114 at 3600	8.4-1	3 625"	3.60"	223 cu. ins.
262"	132 at 3600	7.9-1	3 718"	4.03"	262 cu. ins
292" 2-Bbl.	135 at 3800	8.0-1	3.75"	3.30"	292 cu. ins
4-Bbl.	153 at 3600	8 0-1	3.75"	3.30"	292 cu. ins.

① - Certified Net Horsepower Stamped on truck patent plate.
② - 93 at 3400 RPM (Economy Engine).

TIGHTENING SPECIFICATIONS

6 CYL. ENGINE TORQUES

Application	Foot-Pounds 144", 170"	223', 262"
Cylinder Head	①	①
Intake Manifold		23-28
Exhaust Manifold	13-18	23-28
Oil Pan	7 9	9-13
Main Bearing Caps	60-70	95-105
Connecting Rod Caps	19-24	40-45
Vibration Damper or Pulley	45-55	②
Camshaft Sprocket	35-45	35-45
Camshaft Thrust Plate	12-15	12-15
Flywheel	75-85	75-85
Rocker Arm Cover	3-5	4-7
Rocker Arm Bracket	30-35	50-60
Pushrod Chamber Cover		2-2½
Engine Front Cover	7-9	6-9
Water Outlet Housing	12-15	23-28
Water Pump	12-15	23-28
Oil Pump	12-15	③
Oil Filter Adapter	50-60	50-60
Oil Filter Center Bolt		20-25
Flywheel Housing	40-50	④ 40-50
Transmission Mounting	32-36	⑤

① - See "Cylinder Head Installation" for tightening procedure Three different applications must be made
② - 70-90 ft lbs (223'), 140-150 ft lbs (262")
③ - 30-35 ft lbs (223') 12-15 ft lbs (262')
④ - 45-50 ft lbs with Cruise-O-Matic
⑤ - **Bolts** 7/16" - 30-38 ft lbs, 9/16" - 70-90 ft lbs, 5/8" - 96-120 ft lbs **Nuts** 7/16" - 35-45 ft lbs, 9/16' - 81-102 ft lbs, 5/8" - 115-140 ft lbs

V8 ENGINE TORQUES

Application	Foot-Pounds 292"
Cylinder Head	①
Intake Manifold	23-28
Exhaust Manifold	23-28
Oil Pan	9-13
Main Bearing Caps	80-90
Connecting Rod Caps	40-45
Vibration Damper or Pulley	70-90
Camshaft Sprocket	35-45
Camshaft Thrust Plate	12-15
Flywheel	75-85
Rocker Arm Cover	2-2½
Rocker Arm Bracket	12-15
Pushrod Chamber Cover	2-2½
Engine Front Cover	15-20
Water Outlet Housing	12-15
Water Pump	12-15
Oil Pump	12-15
Oil Filter Adapter	50-60
Oil Filter Center Bolt	20-25
Flywheel Housing	② 40-50
Transmission Mounting	③

① - See "Cylinder Head Installation" for tightening procedure Three different applications must be made

② - 45-50 ft lbs with Cruise-O-Matic

③ - **Bolts** 7/16" - 30-38 ft lbs, 9/16" - 70-90 ft lbs, 5/8" - 96-120 ft lbs **Nuts** 7/16" - 35-45 ft lbs, 9/16" - 81-102 ft lbs, 5/8' - 115-140 ft lbs

ENGINE MOUNT TORQUES

Falcon & Econoline Trucks	Ft. Lbs.
Front Insulator-to-Bracket	11-15
Front Insulator-to-Engine	18-24
Rear Bracket (Extension Housing) to Trans	42-50
Rear Bracket Anchor Bolt-to-Hanger Bracket	23-29

Ford Trucks	Ft. Lbs.
Front Insulator-to-Engine (1/2")	35-45
(7/16")	45-55
Rear Insulator-to-Engine	70-90

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE (C ntinued)

harness from radiator Remove fan blade assembly, then remove radiator support, radiator, grille, and grille side panels as an assembly Disconnect all wires hoses, linkage, cables, and lines from engine Remove starter Disconnect exhaust pipes from manifolds Disconnect crankcase breather reservoir from engine Disconnect engine from front mounts and flywheel raise transmission about ½" and support in position Attach suitable lifting fixtures and remove engine from above

P S ries - 1) 6 Cyl. & V8 - Drain cooling system and crankcase Remove driver's seat assembly master cylinder inspection cover, and steering column cover plates Disconnect dimmer switch wiring Remove left wheel house panel and center floor plate Disconnect right side of engine rear cover panel from right wheel house panel Disconnect engine rear cover rear flange from frame crossmember and center floor plate front bracket Remove crossmember (V8 only) Remove air cleaner from engine (leave attached to engine cover on 6 Cyl) Wedge right and left frame gussets open so rear flange of engine rear cover plate will clear the slots, then remove cover plate

2) 6 Cyl. - Remove accelerator bracket assembly and accelerator retracting spring Remove carburetor Disconnect exhaust pipe from manifold Disconnect all lines, wires, hoses, rods, and controls from engine Remove starter Remove fan blade and bracket assembly Remove radiator Disconnect engine from front mounts and from flywheel or converter housing Drain automatic transmission and disconnect converter from flywheel Raise rear of transmission Remove engine by swinging rear of engine about 30° to right then lift rear of engine to clear compartment and remove engine through right door

3) V8 - Disconnect all wires, lines, hoses pipes, and cables from engine Disconnect exhaust pipe from manifold Remove carburetor air cleaner stud Remove hand brake cable and bracket Disconnect engine front and rear supports then disconnect front universal joint from transmission Disconnect transmission and clutch controls Remove engine and transmission assembly from truck

OIL PAN REMOVAL

Ec n lin & Falcon Bus - Raise engine c mpartment cover, remove dipstick, then raise and support truck. Drain crankcase. Remove oil pan retaining screws, crank engine as necessary for clearance, then remove oil pan. Remove oil pump inlet tube and screen assembly.

F rd Truck 6 Cyl. - Drain crankcase and remove dipstick. Remove flywheel housing inspection cover. Remove oil pan retaining screws and remove oil pan.

F rd Truck V8 - Drain crankcase and remove dipstick. Remove converter housing dust cover. On C Series, place No. 1 piston at TDC. On all trucks, disconnect oil inlet tube from oil pump and remove "O" ring seal from tube. Remove oil pan retaining screws and remove oil pan.

CYLINDER HEAD

Removal - If cylinder head not equipped with locating dowels, install guide studs in front and rear cylinder head bolt holes on manifold side of head Make guide studs from 7/16 ' - 14 x 6 ' or 1/2 ' - 13 x 6 ' bolts depending on cylinder head bolt size, by cutting off bolt head tapering end and slotting for screwdriver engagement

Installation - On 144 ' 170 " engines, coat both sides of new gasket with head gasket sealer On 223 ", 262" engines gasket is "sandwich" type (steel core bonded between rubber-asbestos sheets), and sealer must **not** be used On 144", 170" engines, coat right side front and rear head bolts with sealer On 223 ", 262" engines coat all left side bolts with sealer Install head over guide studs (see 'Removal" above), install two end bolts finger tight to hold head then install remaining bolts On 292' V8 engines, install the long cylinder head bolts at the dowel locations Tighten bolts in sequence shown in diagrams in **three** steps to torque limits shown in table below **Do not disturb bolts after final step completed.**

Cylinder Head Torques (Ft. Lbs.)

Engine	Step 1	Step 2	Step 3
144' 170'	55	65	75
223 ' 262'	95	105	115
292' 2 Bbl	55	65	75
292 ' 4-Bbl	65	70	85

FLYWHEEL INSTALLATION (144", 170" 6 CYL.)

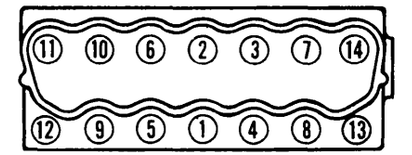
Flywheel attaching bolt holes in crankshaft flange are drilled through flange Flywheel retaining capscrews must be coated with oil resistant sealer to prevent engine oil leak at this location (May be diagnosed as a rear oil seal leak)

INTAKE MANIFOLD (292" V8)

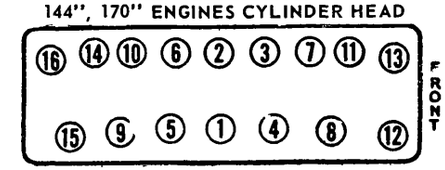
When installing, make sure gaskets are in place and tighten manifold attaching bolts to correct torque, starting from the center bolts

EXHAUST PIPE INSTALLATION (144", 170" 6 CYL.)

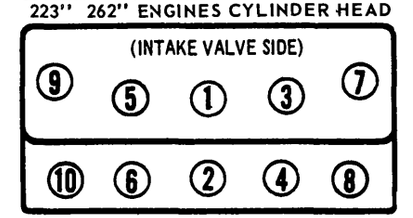
Exhaust manifold studs for exhaust pipe attachment have interference threads and nuts will not hold torque if used more than once Install new nuts whenever pipe disconnected from manifold and torque nuts to 40-50 ft lbs



144", 170" ENGINES CYLINDER HEAD 2A74



223" 262" ENGINES CYLINDER HEAD 2F388



2F389

292" ENGINE CYLINDER HEAD TIGHTFNING SEQUENCE

PISTONS, PINS, RINGS

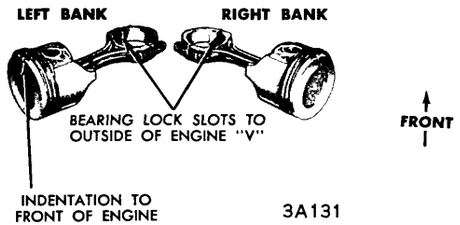
Engine	PISTON Clearance ⑥	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
144", 170"	①.0018-.0036"	②.0001-.0003"	③	Comp. 1 Comp. 2 Oil	.010-.020" .010-.020" .015-.055"	④.0019-.0036" ④.0020-.0040" Snug
223"	①.0008-.0026"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.010-.025" .010-.025" .015-.062"	④.0019-.0036" ④.0019-.0036" Snug
262"	①.0014-.0032"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.010-.025" .010-.025" .015-.062"	④.0019-.0036" ④.0019-.0036" Snug
292"	① .0008-.0026"	②.0001-.0003"	⑤.0001-.0005"	Comp. 1 Comp. 2 Oil	.010-.025" .010-.025" .015-.062"	④.0019-.0036" ④.0019-.0036" Snug

① - Wear limit .008". ② - Wear limit .0008". ③ - Press fit. *S e "R placing Pins" b low.*
④ - Wear limit .006". ⑤ - Wear limit .001". ⑥ - Measured at bottom of skirt

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



6 CYL. PISTON & ROD INSTALLATION



V8 PISTON & ROD INSTALLATION

FITTING PISTONS

Place a length of ½" wide feeler stock (see table below for feeler thickness) between inverted piston and cylinder wall 90° from piston pin holes. Hold piston in bore so bottom of piston skirt is about 1½" below top of block and piston pin bore is parallel to crankshaft. *Feeler must extend entire length of piston.* Pull feeler from cylinder with a spring scale and note reading on scale. Specifications should agree with table below.

PISTON PIN REPLACEMENT (144", 170")

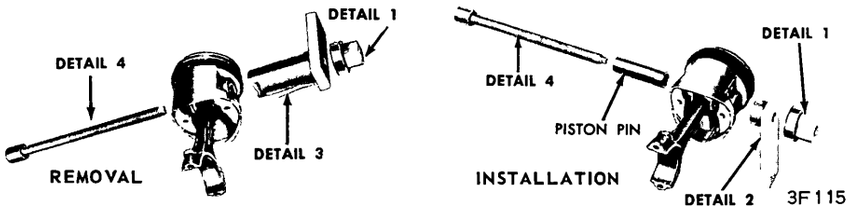
TOOL T60K-6135-A MODIFICATION - If tool not previously modified to prevent damage to piston, make following modification so piston will not be damaged when Detail 2 of tool seats against piston pin boss: Grind a 1/16" - 45° chamfer around outer edge of Detail 2.

Removal - Press pin out of piston and connecting rod using Tool T60K-6135-A and vise and wrench, or Tool 6135-J and arbor press as shown in illustrations.

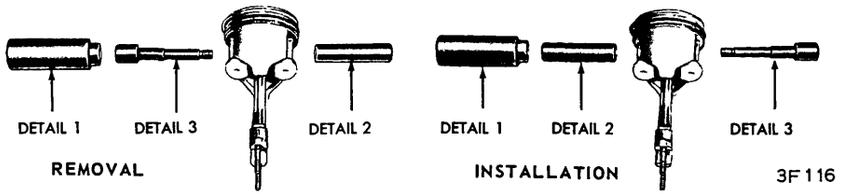
Installation - Lightly coat all parts with engine oil, assemble piston and connecting rod correctly and press pin into piston and rod as follows: **1)** With Tool T60K-6135-A and vise and wrench, draw pin into assembly until pin seats in Detail 2. **2)** With Tool 6135-J and arbor press, press pin into assembly until Detail 2 is firmly seated in Detail 1. *See illustrations.*

PISTON CLEARANCE CHART

RIBBON 0.0015 THICK & 0.500 WIDE		RIBBON 0.002 THICK & 0.500 WIDE		RIBBON 0.0035 THICK & 0.500 WIDE		RIBBON 0.006 THICK & 0.500 WIDE	
Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches	Ribbon Pull Lbs.	Clearance Inches
13	—	13	—	13	0.0012	13	0.0038
12	—	12	—	12	0.0014	12	0.0040
11	—	11	—	11	0.0016	11	0.0041
10	—	10	—	10	0.0018	10	0.0043
9	—	9	0.0002	9	0.0021	9	0.0045
8	—	8	0.0005	8	0.0023	8	0.0047
7	0.0002	7	0.0007	7	0.0025	7	0.0049
6	0.0004	6	0.0010	6	0.0027	6	0.0050
5	0.0007	5	0.0012	5	0.0030	5	0.0057
4	0.0009	4	0.0015	4	0.0032	4	0.0059
3	0.0012	3	0.0017	3	0.0033	3	0.0060
2	0.0015	2	0.0020	2	0.0036	2	0.0062
1	0.0017	1	0.0022	1	0.0038	1	0.0063
0	0.0020	0	0.0025	0	0.0040	0	0.0065



144", 170" ENGINES PISTON PIN REPLACEMENT (VISE & WRENCH METHOD)



144", 170" ENGINES PISTON PIN REPLACEMENT (ARBOR PRESS METHOD)

MAIN BEARING CAP INSTALLATION

1) All Caps - Caps are numbered from front of engine and should be installed in correct position with arrow on cap pointing to front of engine.

2) 6 Cyl. Rear Cap - Coat only rear mating surface of cap with oil resistant sealer. Do not use sealer forward of oil slinger groove (144", 170"), forward of side seal grooves (223", 262"). Install cap immediately after sealer applied so sealer will not set and cause an oil leak.

REPLACEMENT BEARINGS

Standard size replacement main and connecting rod bearings available in 2 sizes marked Red and Blue for selective fit. Any combination of red and blue inserts may be used to obtain desired clearances.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS			CONNECTING RODS		
	① Journal Diam.	Clearance	Endplay	① Journal Diam.	Clearance	Sideplay
144",170"	② 2.2482-2.2486" ③ 2.2486-2.2490"	.0007-.0025"	④ .004-.008"	② 2.1232-2.1236" ③ 2.1236-2.1240"	.0008-.0023"	⑤ .004-.008"
223"	② 2.4980-2.4984" ③ 2.4984-2.4988"	.0009-.0033"	④ .004-.008"	② 2.2980-2.2984" ③ 2.2984-2.2988"	.0008-.0028"	⑤ .005-.011"
262"	② 2.4976-2.4980" ③ 2.4980-2.4984"	.0009-.0034"	④ .004-.008"	② 2.2980-2.2984" ③ 2.2984-2.2988"	.0006-.0025"	⑤ .005-.011"
292"	② 2.4980-2.4984" ③ 2.4984-2.4988"	⑥	④ .004-.008"	② 2.1880-2.1884" ③ 2.1884-2.1888"	⑦	⑧ .006-.016"

① - Two different standard sizes, marked Red and Blue.
② - Blue. ③ - Red. ④ - No. 3 Bearing. Wear limit .012". ⑤ - Wear limit .014".
⑥ - .0006-.0030" (2-Bbl.) .0008-.0032" (4-Bbl.) ⑦ - .0005-.0024" (2-Bbl.) .0007-.0025" (4-Bbl.) ⑧ - Wear limit .019".

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

THRUST BEARING ALIGNMENT

Install all bearing caps except thrust bearing cap and torque to specifications. Install thrust bearing cap with bolts finger tight. Pry crankshaft to rear of engine, then to front of engine. While holding crankshaft forward, tighten thrust bearing cap bolts to specifications. Check crankshaft endplay.

REAR MAIN BEARING OIL SEAL

NOTE - Upper seal can be replaced only with crankshaft removed from engine.

Upper & Lower Seal - *CAUTION - Use Installing & Forming Tool as indicated in table below, and follow procedure list d exactly to prevent seal shift and oil leaks.* Preform seal by hand and install into block or cap (or retainer) with thumbs, seating seal at center and then working from the ends toward the center. Now place installing tool properly in block or cap (or retainer) as follows: Large flanged face of tool must be toward rear of engine for upper seal, and toward rear face of cap (or retainer) for lower seal. Tool flanges must bottom on seal groove rear flange and bearing saddle. (insert removed). Hold tool firmly and strike top of tool sharply. Cut seal ends flush with block or cap (or retainer). Trim frayed ends.

Side Seals (223", 262", 292") - Dip side seal in penetrating oil and install **immediately** into grooves. *CAUTION - DO NOT use sealer. Seals expand with oil.* Tap seals firmly into position. DO NOT trim ends. *292" SEAL RETAINER NOTE* - Coat entire mating surface of seal retainer with oil resistant sealer before installing retainer.

Testing Seal Installation - Squirt a few drops of oil into parting lines between cap (or retainer) and cylinder block from the outside. Blow compressed air against seals from the inside of block. If air bubbles appear in oil, seal leaks.

Crankshaft Rear Seal Installing Tool

Engine	Tool No.
144", 170"	T60K-6701 or 6701-D
223", 262", 292"	T52L-6701-AGD or 6701-A

Engine Front Cover Aligning Tool

Engine	Tool No.
144", 170"	T61K-6019-A
223"	T58P-6700-B
262", 292"	T52L-6059-AAE

ENGINE FRONT COVER OIL SEAL

Remove old seal with punch and clean recess in cover. Drive new seal in cover with tool listed in table below until seal is fully seated and make sure spring is positioned properly in seal.

Front Cover Seal Installing Tool

Engine	Tool No.
144", 170"	T60K-6700-A
223", 262", 292"	T52L-6700-BEE

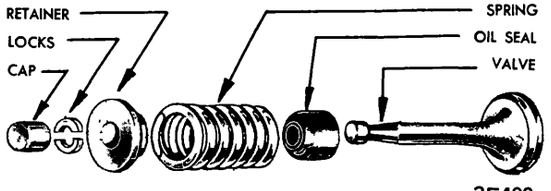
ENGINE FRONT COVER

Removal - Drain cooling system and crankcase. On P Series, remove hood, then remove grille, headlights, parking lights, wind deflector and hood lower weatherstrip as an assembly. Remove accelerator cross shaft. On all trucks, remove radiator, fan shroud, fan, spacer, brackets, pulleys, and damper. On V8 trucks, remove fuel pump, disconnect engine front mounts and raise engine slightly. On all trucks, remove oil pan and flywheel housing inspection cover. Remove engine front cover.

Installation - Use Pilot (alignment tool) as indicated in table below to center cover on crankshaft. Push in on tool and tighten cover bolts to specifications. Reverse removal procedure to complete the installation.

FREE TURNING VALVE CAP CLEARANCE CHECK

Clearance between end of valve stem and inside surface of cap with valve locks and spring retainer installed should be .0002-.004" measured with Tool 6513-CE-2. Lap open end of cap if clearance more than .004".



FREE-TURNING VALVE ASSEMBLY

EXHAUST VALVE SEAT INSERT INSTALLATION

Counterbore the recess in head about .001-.002" below old counterbore depth to clean recess. Clean all chips and oil from recess. Chill new oversize insert and tool in dry ice for ½ hour. Place insert on tool with small radius on outer edge facing outward, pilot tool in guide and drive insert into recess until fully seated. DO NOT peen around insert. Reface insert. *CAUTION - Installation must be made quickly after tool and insert are removed from dry ice.* Inserts should have .0015-.004" interference fit.

►*292" 4-BBL. ENGINE EXHAUST VALVE CAUTION:* Exhaust valves on this engine are sodium cooled. Use extreme care when disposing of valves to prevent fire or explosion.

VALVES

Engine	Head Diam.	Seat Angle	Face Angle	Seat Width	Stem Diameter	Stem Clearance	Cam Lobe Lift
144" Intake	1.462-1.472"	45°	44°	.070-.080"	①.3100-.3107"	②.0008-.0025"	④.2405"
Exhaust	1.261-1.276"	45°	44°	.070-.080"	①.3090-.3097"	③.0018-.0035"	④.2395"
170" Intake	1.522-1.537"	45°	44°	.070-.080"	①.3100-.3107"	②.0008-.0025"	④.2405"
Exhaust	1.261-1.276"	45°	44°	.070-.080"	①.3090-.3097"	③.0018-.0035"	④.2395"
223" Intake	1.775-1.785"	45°	44°	.070-.090"	①.3416-.3423"	②.0010-.0024"	④.273"
Exhaust	1.505-1.520"	45°	44°	.070-.090"	①.3398-.3405"	③.0028-.0042"	④.273"
262" Intake	1.775-1.785"	45°	44°	.070-.090"	①.3710-.3720"	②.0010-.0024"	④.273"
Exhaust	1.505-1.515"	45°	44°	.090-.110"	①.3693-.3703"	③.0025-.0042"	④.273"
292" Intake	1.642-1.652"	45°	44°	.070-.090"	①.3416-.3423"	②.0010-.0024"	④.264"
2-Bbl. Exhaust	1.505-1.520"	45°	44°	.070-.090"	①.3398-.3405"	③.0028-.0042"	④.262"
292" Intake	1.642-1.652"	45°	44°	.070-.090"	①.3416-.3423"	②.0010-.0024"	④.264"
4-Bbl. Exhaust	1.505-1.515"	45°	44°	.090-.110"	①.4343-.4350"	③.0018-.0032"	④.262"

① - Also furnished .003", .015", .030" Oversize. ② - Wear limit .0045".
③ - Wear limit .0055". ④ - Wear limit .005".

VALVE GUIDE SERVICING

To ream guides for installation of valves with oversize stems, always use reamers in sequence and reface valve seat after valve guide is reamed. Reamers are furnished .003" oversize with standard diameter pilot; .015" oversize reamer with .003" oversize pilot; and .030" oversize reamer with .015" oversize pilot.

VALVE STEM SEALS

Cup type seals used on all valves. Install seals with cup side down over valve guide.

INITIAL VALVE LASH ADJUSTMENT (AFTER OVERHAUL)

6 Cylinder Engines - Adjust intake and exhaust valves of each cylinder in firing order with each piston at TDC of compression stroke.

V8 Engines - 1) Place No. 1 piston at TDC of compression stroke. Adjust following valve clearances: No. 1, 4, 5 Exhaust; No. 1, 2, 7 Intake.

2) Turn crankshaft ½-turn or 180° (No. 4 piston at

(Continued)

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TDC). Adjust following valve clearances: No. 6 & 8 Exhaust; No. 4 & 5 Intake.

3) Turn crankshaft ¾-turn or 270° from second position above (No. 3 piston at TDC) and adjust following valve clearances: No. 2, 3, 7 Exhaust; No. 3, 6, 8 Intake.

ROCKER ARM ADJUSTING SCREW NOTE - If torque required to turn self-locking adjusting screw is less than 3 ft. lbs., install new standard or .002" oversize screws. If minimum 7 ft. lbs. torque cannot be obtained with oversize adjusting screw, replace rocker arm and adjusting screw assembly.

ROCKER ARM ASSEMBLY OVERHAUL

See illustration for arrangement of parts. End plugs must have cup side facing out, and oil holes in shaft must be facing downward. When installing, make sure that inlet line "O" ring seals are in place, and that support end of outlet pipe enters locating hole in shaft to position shaft properly.

VALVE SPRING INSTALLED HEIGHT

Installed height of valve spring must not exceed specifications listed in table below. Measure height from surface of cylinder head spring pad to underside of spring retainer. If height greater than specified, install .030" spacer on head under spring to bring height within limits. *CAUTION - Install spacers only if necessary and do not use more than 2 spacers (will overstress springs and overload camshaft lobes).*

Valve Spring Height Specifications

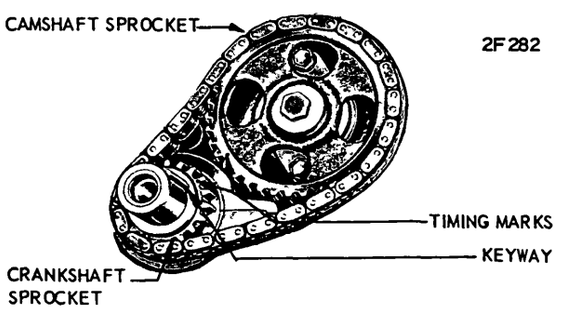
Engine	Installed Height
144", 170"	1 9/16 - 1 39/64"
223"	1 3/4 - 1 25/32"
262"	1 5/8 - 1 11/16"
292"	1 3/4 - 1 25/32"

VALVE SPRING INSTALLATION

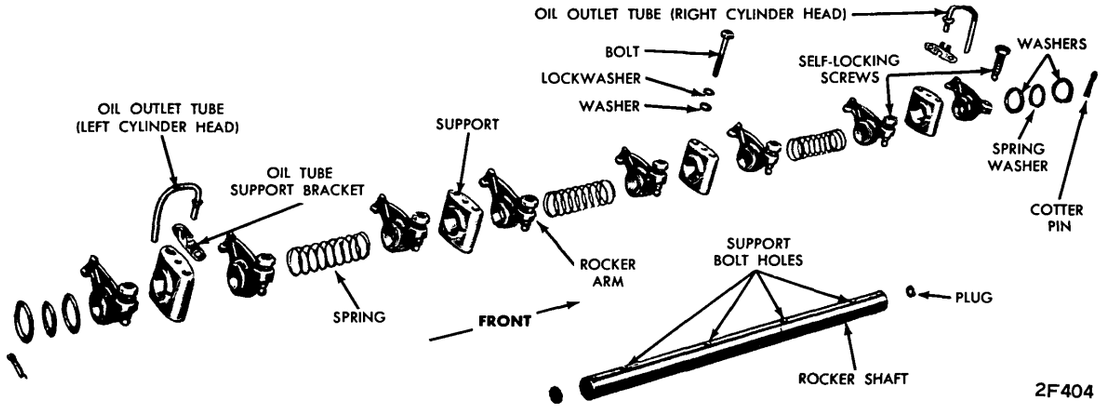
Spring ends must be square within .068" (262"), .072" (Others). Install springs with damper (closed) coil end down toward cylinder head.

VALVE TIMING

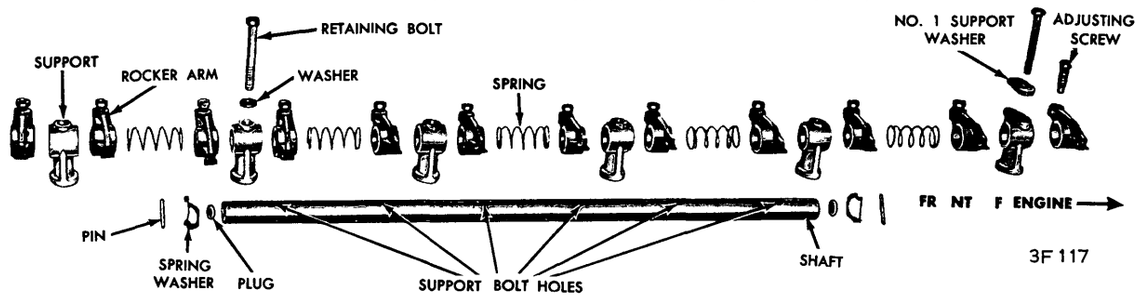
See illustration for alignment of sprocket marks, and Valve Table for Camshaft Lobe Lift.



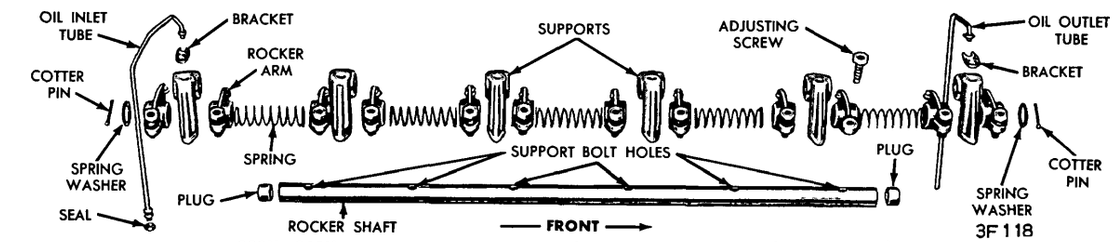
144", 170" ENGINES VALVE TIMING MARKS



292" V8 ENGINE ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)



144", 170" ENGINES ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)



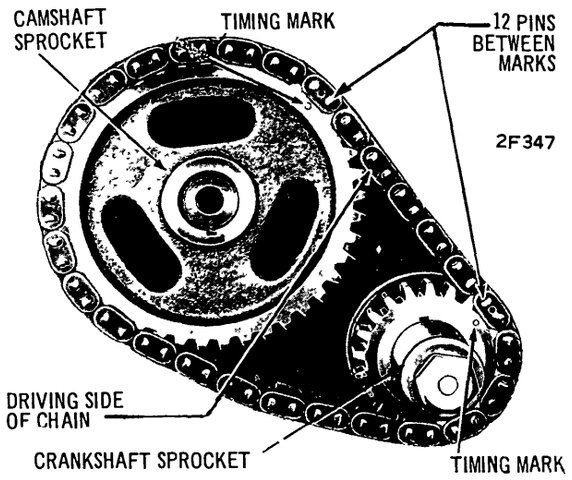
223", 262" ENGINES ROCKER ARM & SHAFT ASSEMBLY (EXPLODED)

VALVE SPRINGS & LIFTERS

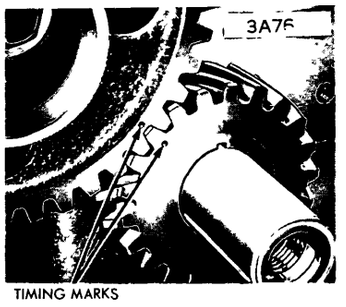
Engine	SPRINGS Free Length	SPRINGS Pressure (Lbs.) Closed	SPRINGS Pressure (Lbs.) Open	LIFTERS Diameter	LIFTERS Clearanc
144",170"	2.00"	① 47¾-56¼ at 1.585"	② 112-122 at 1.222".	.8740-.8745"	⑦ .0005-.0020"
223"	2.09"	③ 71 - 79 at 1.78"	④ 161-177 at 1.39"	.4983-.4989"	⑧ .0011-.0027"
262"	1.96"	⑤ 71 - 79 at 1.65"	⑥ 161-177 at 1.26"	.4989-.4995"	⑧ .0005-.0021"
292"	2.09"	③ 71 - 79 at 1.78"	④ 161-177 at 1.39"	.4989-.4995"	⑧ .0005-.0021"

① - Wear limit 43 lbs. at 1.585".
② - Wear limit 101 lbs. at 1.222".
③ - Wear limit 64 lbs. at 1.78".
④ - Wear limit 145 lbs. at 1.39".
⑤ - Wear limit 64 lbs. at 1.65".
⑥ - Wear limit 145 lbs. at 1.26".
⑦ - Wear limit .005".
⑧ - Wear limit .0055".

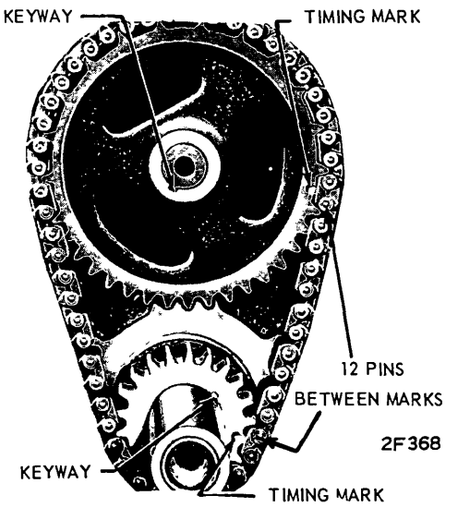
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



223" ENGINE VALVE TIMING MARKS



262" ENGINE VALVE TIMING MARKS



292" ENGINE VALVE TIMING MARKS

CAMSHAFT			
Engine	Journal Diam t r	Bearing Clearance	Camshaft Endplay
144",170"	1.8095-1.8105"	① .001-.003"	② .001-.007"
223"	1.9255-1.9265"	① .001-.003"	② .001-.007"
262"	1.9255-1.9265"	① .001-.003"	② .001-.007"
292"	1.9255-1.9265"	① .001-.003"	② .001-.007"

① - Wear limit .006". ② - Wear limit .012".

CAMSHAFT REMOVAL

Falc n & Econ line Trucks - Engine must be removed from truck to replace camshaft.

F rd Trucks - Camshaft can be removed with engine installed in truck after removal of radiator and grille, and other appropriate parts.

CAMSHAFT BEARING REPLACEMENT

144", 170" - Tool T52L-6261-CEE & Adapter Set T60K-6250-A are available. No. 1 & No. 4 bearings are not interchangeable with each other or with any other bearing. No. 1 bearing must be installed .115-.125" below front face of bearing bore in block. No. 4 bearing has two oil holes and must be installed so forward edge of bearing is 24¾"±1/64" from thrust plate mounting surface of block

223", 262", 292" - Tool T52L-6261-CEE & Adapter Set T54L-6250-B are available. No. 1 bearing is not interchangeable with other bearings. No. 1 bearing must be installed .005-.020" below front face of cylinder block. No. 3 bearing has 2 oil holes.

CAMSHAFT END THRUST

Taken by thrust plate and spacer behind camshaft sprocket.

CHECKING CAM LOBE LIFT

Check with dial indicator to specifications listed in Valve Table.

ENGINE OILING

Normal Oil Pressure - 35-55 lbs. at 2000 RPM (Hot).

Pressure Regulator Valve - In pump body. Not adjustable.

ENGINE OILING SYSTEM

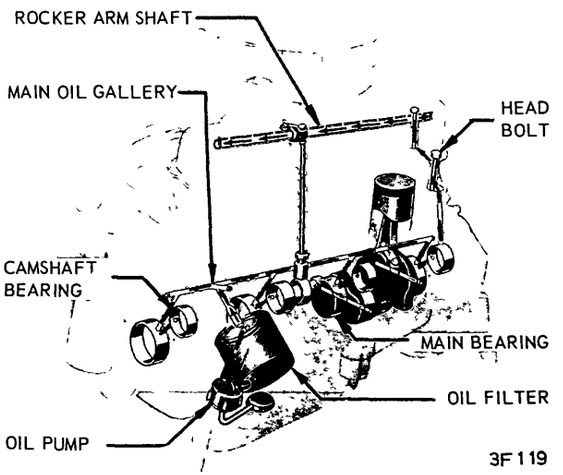
144" 170" Engines

Force feed type. Rotor type oil pump used. *See illustration and note the following:*

Timing Chain & Sprockets - Lubricated by splash from oil pan.

Rocker Arms, Pushrods & Valve Stems - Oil from lower hole in rear camshaft bearmg flows around grooved rear camshaft journal and out through upper hole in rear camshaft bearing through vertical passage in block and around left rear corner cylinder head bolt to oil port at rear rocker arm shaft bracket pad. Oil then flows around this bracket bolt to hollow rocker arm shaft, and is distributed to each rocker arm for rocker arm, pushrod and valve tip lubrication. Excess oil is discharged from the rocker arm shaft at front shaft bracket. Oil from rocker chamber runs down pushrods to lubricate pushrod seat and lifter and drains back into the oil pan through cored openings in the block.

Oil Filter - Full flow type mounted externally on left front corner of engine. Filter has integral bypass valve and anti-drain back diaphragm



144", 170" ENGINES OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

223", 262" Engines

Force feed type with rotor type oil pump. *See illustration and note the following:*

Timing Chain & Sprockets (Or Timing Gears) - Lubricated through drilled passage in front end of block which directs oil from front camshaft bearing to crankshaft sprocket (camshaft journal has flat which registers with bearing supply hole and timing chain lubrication hole once in each revolution). Oil slinger on front end of crankshaft also throws oil onto chain.

Rocker Arms, Pushrods, & Valves - Drilled passage in No. 3 (rear intermediate) camshaft journal feeds oil at reduced pressure to drilled passage in block. A tube extending up through block and cylinder head directs this oil to the No. 6 (rear) rocker shaft bracket and into the hollow rocker arm shaft. Oil then flows through drilled passages in rocker arm to lubricate rocker arm bushing, pushrod socket and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication. Excess oil from rocker arm shaft flows through outlet pipe at No. 1 (front) rocker shaft bracket. This pipe terminates at drilled hole in lifter chamber directly above distributor drive shaft for distributor and drive gear lubrication (see below).

Valve Lift r & Fu l Pump Ecc ntric - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. A drilled hole in the lifter chamber floor directly above fuel pump eccentric on camshaft provides lubrication for the eccentric. A return hole at rear of lifter chamber allows oil to drain back into the crankcase.

Distributor & Drive Gear - Oil return pipe from rocker arm shaft terminates at drilled hole in lifter chamber. This hole is directly above distributor drive gear on camshaft and gears are lubricated by this return oil. A transverse passage in the block at the oil return pipe location in the lifter chamber directs drain oil to relieved section of distributor housing. Oil holes in housing direct oil to distributor lower bushing and drive gear.

Oil Filter - Full flow type mounted on pad on right side of crankcase. Filter has integral bypass valve and anti-drain back diaphragm.

292" Engines

Force feed type with rotor type oil pump. *See illustration and note the following:*

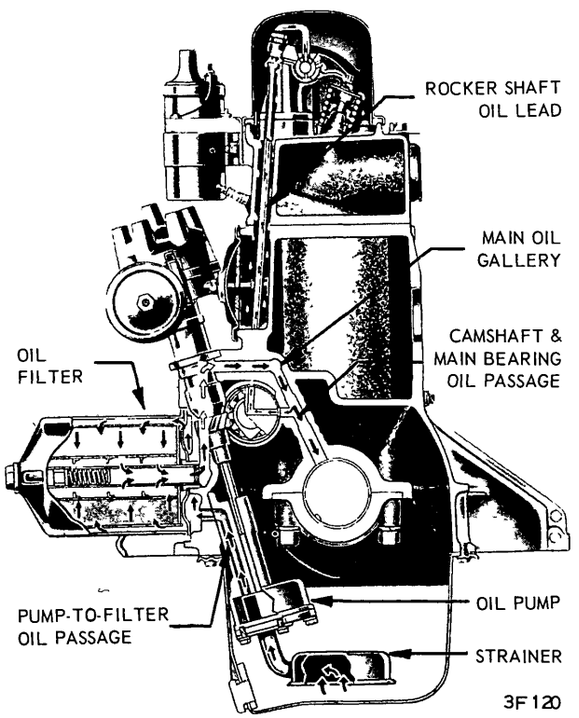
Rocker Arms, Pushrods, & Valves - Drilled passages in block at No. 3 camshaft bearing extend up through block and matching passages in cylinder heads (with offset formed by channel on lower face of head) and oil then flows up through drilled passage in No. 2 rocker shaft support bracket (Right Bank), No. 3 rocker shaft support bracket (Left Bank) to hollow rocker arm shaft. Oil holes in shaft and rocker arm provide lubrication for rocker arm bushing, pushrod ball end and valve tip. Oil drainage from rocker arm drains down pushrods for valve lifter lubrication (below). Excess oil from rocker shaft flows through outlet pipe at No. 1 rocker shaft bracket (Right Bank), No. 4 rocker shaft bracket (Left Bank) for timing chain and distributor lubrication (see below).

Valve Lifters & Pushrod Seats - Oil drainage from rocker arm flows down pushrods into lifter chamber for valve lifter and pushrod seat lubrication. Oil for this purpose is also supplied by rocker shaft outlet pipes which terminate in lifter chamber. Oil in lifter chamber is returned to oil pan through large opening at rear of chamber. This oil lubricates distributor drive gear.

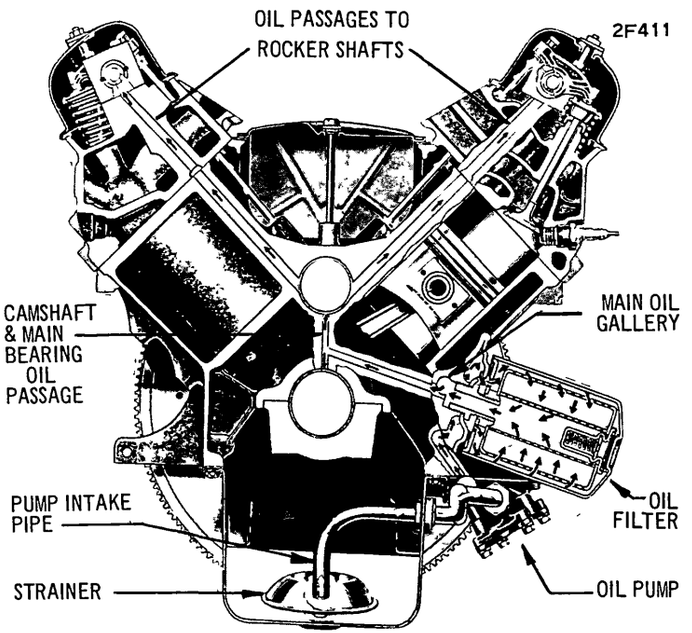
Distributor, Intermediate Shaft & Bushing - Lubricated by oil supplied through drilled passage from No. 5 camshaft bearing (camshaft journal is drilled and oil flows through this passage from camshaft bearing oil hole to distributor oil passage). *NOTE* - Distributor drive gear is lubricated by oil return from lifter chamber to oil pan through large opening at rear of lifter chamber.

Timing Chain & Sprockets - Oil return from right bank rocker chamber (outlet pipe at No. 1 rocker shaft bracket) is channeled by trough in lifter chamber to hole in front cylinder block wall through which the oil is directed on timing chain and sprockets. Oil slinger on crankshaft also throws oil on timing chain.

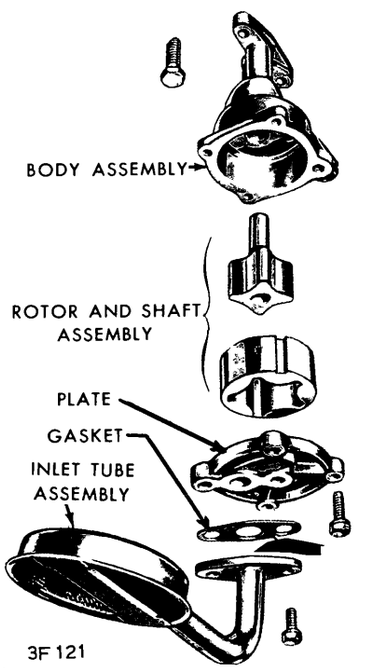
Oil Filter - Full-flow type mounted on pad on left side of crankcase. Filter has integral bypass valve and anti-drain back diaphragm in filter mounting recess.



223", 262" ENGINES OILING SYSTEM



292" V8 ENGINE OILING SYSTEM



144", 170" ENGINES OIL PUMP (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PUMP

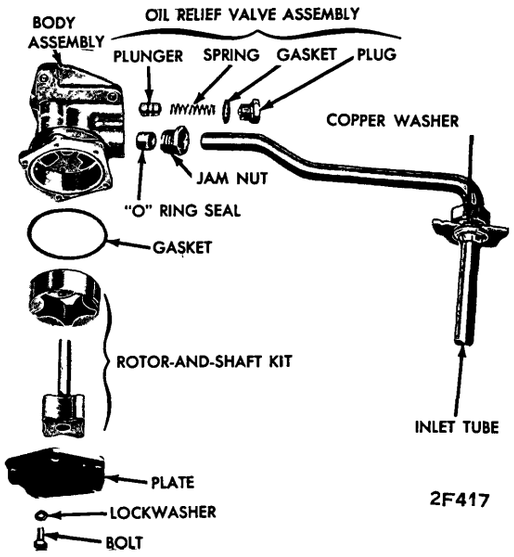
Rotor type pump used on all engines. See illustrations for arrangement of parts. Pump cover screw torque is 6-9 ft. lbs.

Oil Pump Specifications (All Engines)

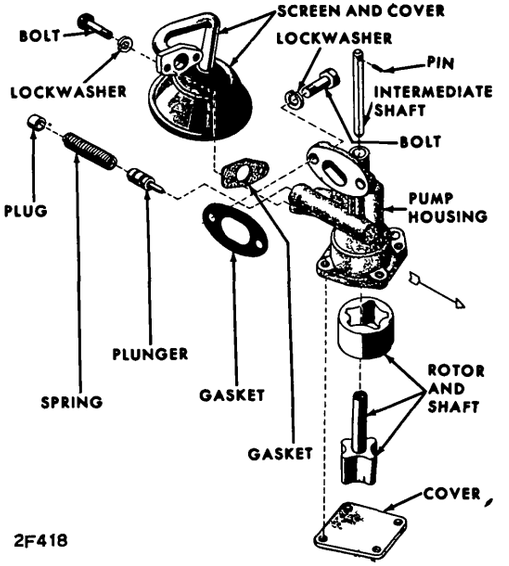
Item	Specification
Outer Race-to-Housing	.006-.012"
Rotor Endplay	.0011-.0041"
Shaft-to-Housing (144", 170")	.0015-.0029"
(223", 262")	.0025-.0039"
(292")	.0015-.0029"
Relief Valve-to-Bore	.0015-.0029"

Relief Valve Spring Specifications

Engine	Lbs. Pressure	Length
144", 170"	8.6-9.5	1.078"
223", 262"	9.0-9.6	1.530"
292"	8.7-9.9	1.710"



292" V8 ENGINE OIL PUMP (EXPLODED)



223", 262" ENGINES OIL PUMP (EXPLODED)

ENGINE COOLING

Pressure Valv - 12-15 lb. (144", 170"); 7 lb. (223", 262", 292") radiator filler cap.

Thermostat -
144", 170" Low Temp. 155-162°F (fully open 182°F).
144", 170" High Temp. 185-192°F (fully open 212°F).
223",262",292" L w T mp. 155-162°F(fully open 182°F).
223",262",292" High T mp. 174-181°F(fully open 201°F)

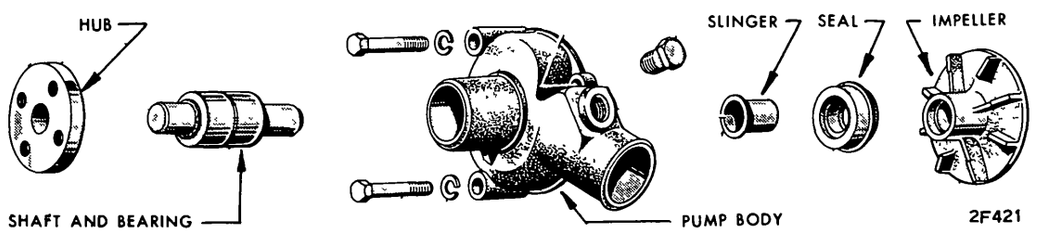
WATER PUMP

See illustrations for arrangement of parts. Special tool sets are available for water pump overhaul. Other suitable support plates and drivers may be used providing they support and apply pressure properly to shaft, bearing, housing, and other parts. *Observe the following specifications:*

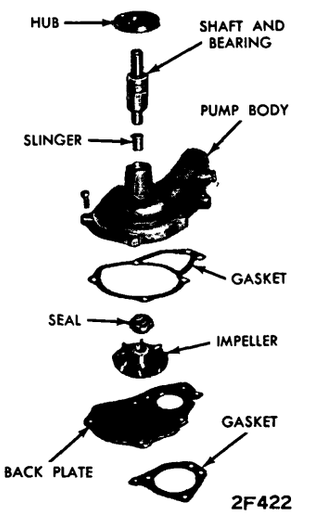
Water Pump Specifications (All Engines)

Engine	Slinger	① Impeller	② Hub
144", 170"	③ .220"	.005-.025"	3.94"
223"	④ 1.76"	.020-.030"	4.36"
262"		.020-.030"	4.70"
292"	④ 1.94"	.030-.040"	⑤ 4.72"

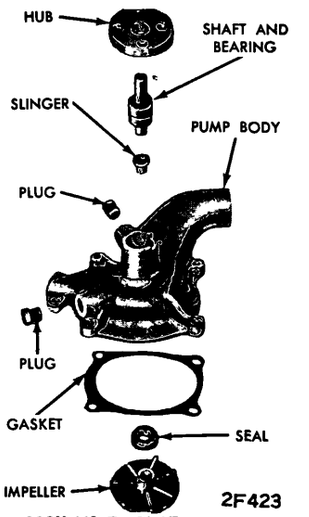
① - Impeller-to-Housing Clearance.
② - Distance from front face of hub to pump housing mounting face.
③ - Clearance between underside of slinger flange and end of bearing race.
④ - Distance from slinger flange to end of shaft.
⑤ - 4.15" on C Series.



144", 170" ENGINES WATER PUMP (EXPLODED)



223", 262" ENGINES WATER PUMP (EXPLODED)



292" V8 ENGINE WATER PUMP (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MODEL IDENTIFICATION

SERIAL NUMBER

Stamped under "Warranty Number" on truck patent plate. Also stamped in various locations on truck frame and body members. Number carries identification data as follows:

① ② ③ ④
F10 F U 325001

① - The letter and first two digits of series and model designation. *See table below.*
② - Engine type. *See table below.*
③ - Assembly plant. *See table below.*
④ - Consecutive unit number starting with 325001 for August, 1962 through 459999 for September, 1963.

Series & Model Designation

Letter	Type	Letter	Type
E	Econoline & Falcon Bus	C	Tilt Cab
F	Conventional Cab	P	Parcel Delivery
B	School Bus	N	Cab Over Engine

Number	Size
100, 250, 350, 400	Light Duty Models
500, 550, 600	Medium Duty Models

Engine Code Designation

Engine	Standard	Low Compression
144" 6 Cyl.	S	K
170" 6 Cyl.	T	
223" 6 Cyl.	J	1
262" 6 Cyl.	B	
292" V8 2-Bbl. Carb.	C	
292" V8 4-Bbl. Carb.	D	

Assembly Plant Code Letters

D - Dallas	H - Lorain	P - St. Paul
E - Mahwah	K - Kansas City	R - San Jose
G - Chicago	N - Norfolk	S - Pilot Plant

ENGINE BUILD DATE CODE

Stamped on engine as indicated in table below. Number carries identification data as follows:

① ② ③ ④ ⑤
3 3 H 26 M

① - Engine Plant. 1 & 2 - Cleveland; 3 - Dearborn; 4 - Lima; 5 - Green Island.
② - Year. 3 1963.
③ - Month. A January through M December (I not used).
④ - Day of Month.
⑤ - Any of various inspectors marks.

Date Code Location

Engine	Location
144", 170"	Below No. 1 Spark Plug
223", 262"	Above Generator
292"	Below Water Outlet Housing

CAPACITIES

Crankcase (Quarts) ①	Capacity
144", 170" Engines	3.5
223" Engine	5
262" Engine	6
292" Engine	5
Transmission (Pints)	
Ford 3-Speed	
Econoline & Falcon Bus	3
Truck, Except 4-Wheel Drive	3½
Truck, With 4-Wheel Drive	2¾
Overdrive	3¼
Warner T89 (3-Speed)	3½
T87 (3-Speed)	5½
T98 (4-Speed)	8
Transfer Case (4-Wheel Drive)	4½
Cruise-O-Matic	20
Front or Rear Axle (Pints)	
Ford Hypoid & Spicer 44 (Rear)	4½
Spicer 2414 & 2464 (Front)	② 3½
Spicer 60 & 70	6
Timken (All)	15
Eaton Single Speed	17
Eaton 2-Speed (Except 16802 & 16803)	13
Eaton 2-Speed 16802 & 16803	20

① - Add 1 quart with filter change.
② - Add ½-pint (2414), 1 pint (2464) for each steering knuckle.

FILTERS & CLEANERS

ECONOLINE & FALCON BUS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace 6000
Air Cleaner	Clean 6000
Oil Cap Filter	Clean 4000
Transmission Breather	Clean 1000

FORD TRUCKS

Filter or Cleaner	Service Interval (Miles) On Highway	Off Highway
Oil Filter	Replace 4000	Replace 2000
Carb. Air Cleaner	Clean 4000	① Clean 2000
Oil Cap Filter	Clean 4000	Clean 2000
Fuel Filters	② Replace 4000	③ Replace 2000
Pwr. Strg. Filter	Replace 24,000	Replace 12,000
Front Axle Breather	④ Clean 4000	Clean 500
Rear Axle Breather	④ Clean 4000	Clean 500
Transfer Case Breather	Clean 1000	Clean 500
S.M. Trans. Breather	④ Clean 1000	Clean 500
Vac. Brake Air Cleaner	⑤ Clean 8000	Clean 500
Air Compr. Filter	Clean 4000	Clean 500

① - Every 500 miles on 500, 600 Series.
② - Every 12,000 miles on 262" & 292" 4-Bbl. Engines.
③ - Every 4000 miles on 262" & 292" 4-Bbl. Engines.
④ - Every 4000 miles on 500, 600 Series.
⑤ - Every 4000 miles on C Series.

REPLACING OIL FILTER

Disposable Type - Coat gasket face of filter with oil, thread filter on bracket by hand until gasket contacts adapter surface, then tighten filter an additional ½-turn. Run engine and check for leaks. *CAUTION - Do not overtighten.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

ENGINE IDENTIFICATION

Second letter in production code number identifies engine displacement. Production code number located on front of crankcase below left cylinder head gasket or on top surface of engine crankcase just forward of valve lifter cover on right side (upside down when viewed from front of engine)

L - Std V6 engine
M - Std 215" AL V8
N - High Compr 215" AL V8
P - Export 215" AL V8
R - Std 401' V8 (2-Bbl)
S - Reg Gas Opt 401" V8
T - Std 401' V8 (4-Bbl)
U - Export 401' V8
W - Optional 425" V8
Z - Export V6

COMPRESSION PRESSURE

At cranking speed, cylinders equal within 15 psi

198" V6	160 psi
215" Al V8	175 psi
401' 425" V8	180 psi
(Low Compr Reg Gas)	160 psi

VALVE TAPPET CLEARANCE

All	Hydraulic

SPARK PLUGS

Gap (All)	035'
Torque (All)	30 ft lbs

Engin	Spark Plug Type Normal Operation	High Speed Operation
198" V6	AC 44S	AC 42COM
215" Al V8 (2-Bbl.)	AC 45FFS	AC 42FF
(4-Bbl.)	AC 44FFS	AC 42FF
401" 425' V8	AC 44S	AC 42COM

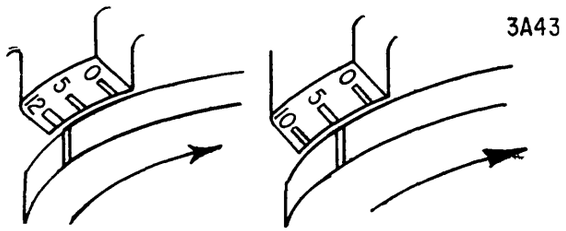
DISTRIBUTOR

Point Gap (All)	013- 019' (Adjust to 016')
Cam Angle (All)	29-31° (Adjust to 30°)
Breaker Arm Spring Tension (All)	19-23 ozs
Condenser Capacity (All)	18- 23 mfd

IGNITION TIMING

198" V6	5° BTDC
215' AL V8	5° BTDC
401 V8 (Synchro-mesh)	5° BTDC
(Auto Trans)	12° BTDC
425" V8	12° BTDC

At 400 RPM with vacuum line disconnected



IGNITION TIMING MARKS (ALL)

HOT (SLOW) IDLE RPM

198" V6	550
215" AL V8 (Less Air Cond)	500
(With Air Cond OFF)	550
401' V8 (Less Air Cond)	475
(With Air Cond OFF)	525
425" V8 (Less Air Cond)	525
(With Air Cond OFF)	575

All In Neutral (Synchro-mesh), in Drive (Auto Trans) Hot Idle Compensator must be in closed position when making adjustments

COLD (FAST) IDLE RPM

Rochester 2GC	Correct when Hot Idle Set
Rochester 4GC (Hot, on Low Step)	625
Carter AFB (Hot, on Low Step)	625

All in Neutral (Synchro-mesh), in Drive (Auto. Trans.).

AUTOMATIC CHOKE SETTING

Rochester 2GC 7023041,42,43,46,47,49	Centered
2GC 7023048	1 Rich
4GC 7023040,44,45	Centered
Carter AFB 3503S SA,3578S, 79S	Centered

FUEL PUMP PRESSURE

198"V6, 215" AL V8	4-5¼ lbs
401', 425" V8	4¾-6½ lbs

MANIFOLD HEAT CONTROL

198" V6, 401" & 425" V8 Engines - Automatic thermostatic type located in right exhaust manifold. Lubricate each end of shaft every 6000 miles.

215' Aluminum V8 Engine - None used. Intake manifold heated by engine coolant.

CRANKCASE VENTILATION VALVE

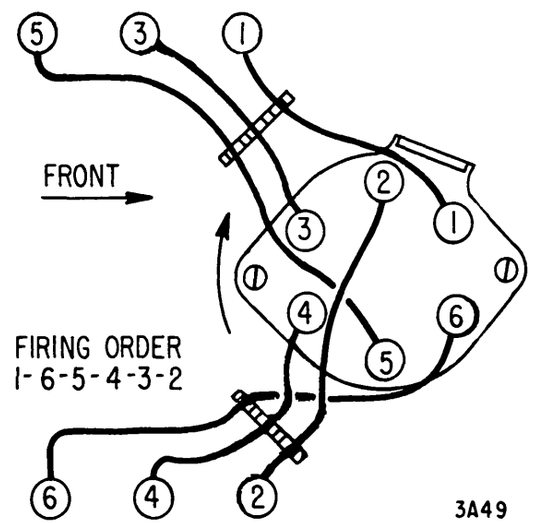
Replace every 6000 miles or sooner if necessary. To check operation squeeze off ventilator hose. If idle RPM drops less than 60 RPM, replace valve.

TUNE-UP NOTES

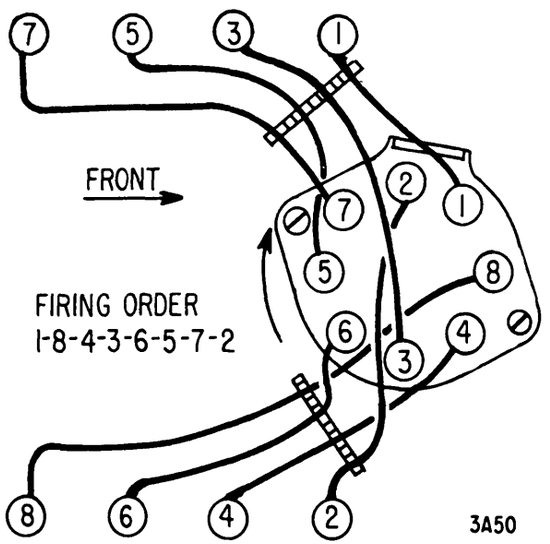
► *SLOW ENGINE WARM-UP DURING COLD WEATHER OPERATION (401" V8 with Synchro-mesh Transmission) CORRECTION* Install new intake manifold gasket (No 1179071) which provides larger diameter heat holes (.620")

► *CARBURETOR FLAT SPOT DURING WARM-UP (All V6 and Auto Trans 215" Aluminum V8 with 2-Bbl Carb) CORRECTION* Install correct flat spot package. *See "Rochester 2GC Carburetors" in Carburetion Section*

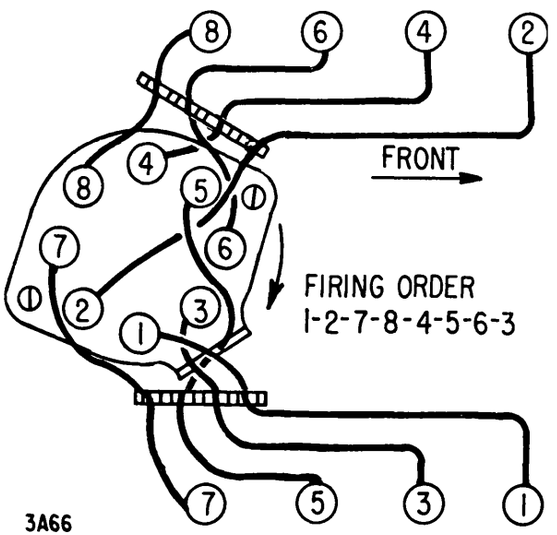
► *BUICK V6 ENGINE IGNITION SHORTING OUT:* Caused by coil high tension cable chafing against heater hoses. Route cable **under** both heater hoses.



V6 FIRING ORDER



215" ALUMINUM V8 FIRING ORDER



401", 425" V8 FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110977

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
0-2	525	0	6-8
6.5-8.5	1050	8	14.5-15.75
12-14	1850		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111030

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
1-3	450	0	8-10
7-9	1000	8	16.25-18
13-15	2000		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111031

Mechanical Advance Distr Degrees	Distr RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
0-2	400	0	6.5-8.5
4 5-6 5	625	9-10.5	12-14
10-12	1500		
13-15	1975		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110291

Mechanical Advance Distr Degrees	Distr RPM	Vacuum Advance Distr Degrees	Vacuum " of Hg
0-2	500	0	6-8
6-8	900	8	14 5-15 75
8.5-10 5	1500		
11-13	2100		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111007

Mechanical Advance Distr Degrees	Distr RPM	Vacuum Advance Distr Degrees	Vacuum " of Hg
0 5-2	550	0	6-8
5-7	. 950	8 5	14 5-15 75
8-10	1425		
11-13	1900		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110993

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
0-2	450	0	8-10
3-5	950	8	16.25-18
6-8	1425		
9-11	1900		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110999

Mechanical Advance Distr. Degrees	Distr. RPM	Vacuum Advance Distr. Degrees	Vacuum " of Hg
0-2	450	0	6.5-8.5
3-5	950	9-10.5	12-14
6-8	1425		
9-11	1900		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms at 80°F
Primary Resistance	1.28-1.42
Secondary Resistance	7200-9500
Resistance Wire (In Wiring Harness)	1.75-1.85

Current Draw (Exc 425" Eng) - 1 7 amps idling, 3 7 amps stopped.
Current Draw (425" Engine) - 2 3 amps idling, 3 8 amps stopped

CARBURETOR

►*HESITATION ON ACCELERATION (1961-63 Buick Special & Skylark with Rochester 4GC Carburetors):* Make certain that Accelerating Pump Setting is correct for average operating temperatures *See CARBURETOR data.*

CARBURETOR SPECIFICATIONS

Carburetor	Float Level	Float Drop	Choke Setting
Rochester			
2GC 7023041,42,43	① 21/32"	② 1 29/32"	Centered
7023046,47,49	① 21/32"	② 1 29/32"	Centered
7023048	① 21/32"	② 1 29/32"	1 Rich
7023142	① 21/32"	② 1 29/32"	Centered
4GC 7023040,143	③	④	Centered
7023044,45	③	⑤	Centered
Carter AFB 3503S,SA,78S,79S⑧	⑥	⑦	Centered

① - With air horn inverted, gasket in place, measure from gasket to lower (sharp) edge of float seam at outer end

② - Air horn upright, gasket in place, measure from gasket to bottom of float

③ - With air horn inverted, gasket in place, measure between gasket and top of float at heel (1 11/32' primary, 1 3/8" secondary); Float Toe measurement taken between gasket and center of dimple on side of float at toe end (9/16" primary, 3/8" secondary)

④ - 1 7/16" (primary), 1 1/4" (secondary) with air horn upright, power piston fully extended, gasket in place, measured from gasket to center of dimple on side of float at toe end

⑤ - 1 9/16" (primary), 1 9/32" (secondary) with air horn upright, power piston fully extended, gasket in place, measured from gasket to center of dimple on side of float at toe end

⑥ - 7/32" (solid seat, Gauge T109-106), 3/16" (resilient seat, Gauge T109-28) ±1/64"; with air horn inverted, gasket in place, measured between gasket and top of float at outer end

⑦ - 23/32" ± 1/16" with air horn upright, gasket in place, measured between gasket and top of float at outer end

⑧- Primary and Secondary

ACCELERATING PUMP SETTING

Special Series	Seasonal Setting
Rochester 2GC	Outer Hole (Normal)
Rochester 4GC①	Center Hole (0-60°F)
① - Buick Special & Skylark only	Outer Hole (Above 60°F)
	Inner Hole (Below 0°F)

MANIFOLD FUEL DISTRIBUTION

V6 Engine - Left barrels feed cylinders on left bank; right barrels feed cylinders on right bank

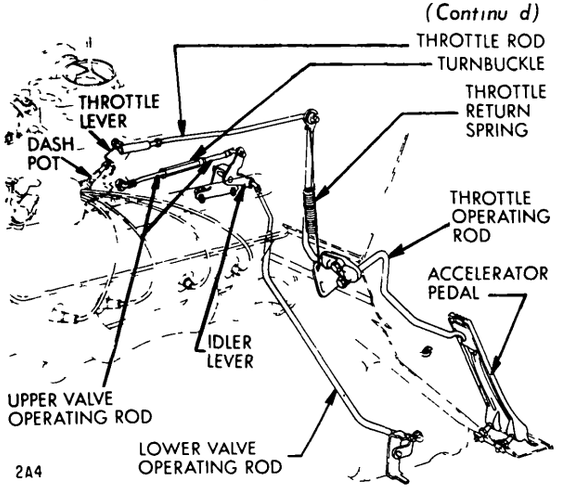
215" Aluminum V8 Engine - Right barrels feed cylinders 2-3-5-8, left barrels feed cylinders 1-4-6-7

401", 425" V8 Engines - Right barrels feed cylinders 1-4-6-7, left barrels feed cylinders 2-3-5-8

THROTTLE LINKAGE ADJUSTMENT

All Models - 1) On automatic transmission models, move throttle lever to wide open position and make sure carburetor-to-transmission linkage does not prevent throttle from opening fully If necessary, adjust carburetor-to-transmission linkage first (see below)

(Continued)



AUTO. TRANS. THROTTLE LINKAGE (TYPICAL)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

2) On all transmissions, disconnect rear of throttle rod from operating lever, then place throttle in wide open position and press accelerator pedal to floor. End of throttle rod must be **1/16" short** of entering hole in lever. Adjust as necessary, then connect rod to lever. *NOTE - Throttle should be at wide open position just as accelerator pedal strikes floor mat.*

CARBURETOR-TO-TRANSMISSION LINKAGE ADJUSTMENT

Automatic Transmission Models - 1) Move upper end of idler lever (located on engine) forward against pressure of valve spring in transmission.

2) On Buick (Exc. Buick Special), throttle lever on carburetor should make contact with stator lever just as throttle reaches wide open position. To adjust, rotate turnbuckle on transmission operating rod.

3) On Buick Special, move throttle lever to wide open position. Transmission idler lever (located on engine) and the throttle lever should reach their stops at the same time. To adjust, rotate turnbuckle on transmission operating rod as necessary.

ANTI-STALL DASHPOT ADJUSTMENT

Automatic Transmission Cars - 1) With engine at operating temperature, open throttle to clear fast idle cam, then rotate cam to extreme fast idle position and allow throttle to close against cam.

2) Adjust dashpot to just touch throttle lever.

3) With selector lever in Drive and brakes applied, jab accelerator pedal and release quickly. If engine stalls, move dashpot towards throttle lever. Move dashpot away from throttle lever if too much time required for throttle to come to fully closed position.

ELECTRICAL

BATTERY

12 Volt.
Capacity

Series	Amp. Hrs. (20 Hr.)
4000	44
4100, 4300	61
All Others	70

Battery Ground - Negative to right front corner of block (Special), to cylinder head (others).

Engine Ground - Rear of right cylinder head to dash (Special), each cylinder head to dash (others).

STARTER

Delco-Remy 1108303

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Delco-Remy 1107266

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Delco-Remy 1107221

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3800-6200	10.6	70-105
	Lock	3.0	480-540

Ⓒ - Includes solenoid.

Brush Spring Tension - 35 ozs. minimum.

ALTERNATOR

Delco-Remy No.	Amperes	Volts	RPM
1100631	25	14.0	2000
	35	14.0	5000
1100623	28	14.0	2000
	40	14.0	5000
1100622	32	14.0	2000
	50	14.0	5000

Field Current - 1.9-2.3 amps at 12 volts and 80°F (All models)

►*TURN SIGNAL & HIGH BEAM INDICATOR LIGHTS ERRATIC BEHAVIOR CORRECTION:* Securely ground the ground wire (black) from instrument cluster. Wire grounded at buzzer mounting screw (401" 425" V8 Engines), at pedal mounting bracket screw (Others).

ALTERNATOR REGULATOR

►*REGULATOR NOISE CORRECTION:* Install later production regulator Delco-Remy No. 1119515 (interchangeable with No. 1119512).

Delco-Remy 1119512, 515

Field Relay

Air Gap - .015"

Closing Voltage - 1.5-2.7 volts.

Voltage Regulator

Air Gap - .067" with lower contacts just touching.

Point Gap - .014" with lower contacts just touching.

Setting - 13.5-14.4 volts (upper contacts), 1.4 volts (lower contacts) at 125° ambient temperature.

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located under left side of instrument panel. Cigar lighter fuse located back of cigar lighter.

IN-LINE FUSES

Rear Window Defroster in wiring connector near switch.
Guide-Matic Amplifier in wiring connector near amplifier.
Antenna Motor in wiring connector near switch.

CIRCUIT BREAKERS

40 Ampere - Power window, seat, vent, top. Located in left shroud panel. Also circuit breaker in each motor.

15 Ampere - Headlights and front parking lights. Located in lighting switch.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Switch is mounted on steering column behind instrument panel, or in console at lower end of shift lever (Wildcat & Riviera with floor mounted shift lever).

Steering Column Mounted Switch - Starter should operate in Neutral and Park only. To adjust, place selector lever in Neutral and insert a 3/32" drill through gauging hole in operating lever and in switch body. *CAUTION - Do not allow lever to move out of position.* If drill will not enter holes or is not parallel to centerline of steering column, loosen switch mounting screws and move switch as necessary for proper alignment. Tighten screws and check starter operation in Neutral and Park positions.

Floor Mounted Switch - To adjust, loosen switch mounting screws, hold gearshift lever against neutral stop, align holes in switch and in lower end of gearshift lever (use a tapered punch or pin), tighten switch mounting screws. Check starter operation. Starter should operate only in Neutral and Park positions.

LIGHTING SWITCH REMOVAL

Disconnect battery ground cable, unplug multiple connector from switch. Pull switch knob out to last notch and depress spring-loaded latch button on left side of switch while pulling rod and knob assembly out of switch. Remove switch escutcheon and remove switch from instrument panel.

SPEEDOMETER REMOVAL

Buick Special & Skylark - Remove instrument cluster assembly (see below), then remove speedometer from cluster.

Buick (exc. Special & Skylark) - Speedometer can be removed from cluster assembly without removing cluster.

INSTRUMENT CLUSTER REMOVAL

►*NOTE* - It is necessary to remove instrument cluster to replace printed circuit.

Buick Special & Skylark - Disconnect battery ground cable. Remove cluster hood, then remove three cluster retaining stud nuts from under instrument panel. Disconnect speedometer cable and printed circuit plug. Unplug clock connector, light, and ground wire. Remove cluster.

Buick (exc. Special & Skylark) - Disconnect battery ground cable. Remove control panel and trim plate from center of instrument panel, then remove right and left lower access doors. Disconnect all wires. Disconnect speedometer cable, left and right vent control cables, buzzer or cruise control wiring, and speedometer reset knob. Remove upper left moulding and exposed screws. Remove nuts from studs on lower edge of cluster. Remove two screws from steering column support and lower complete column. Remove instrument cluster assembly.

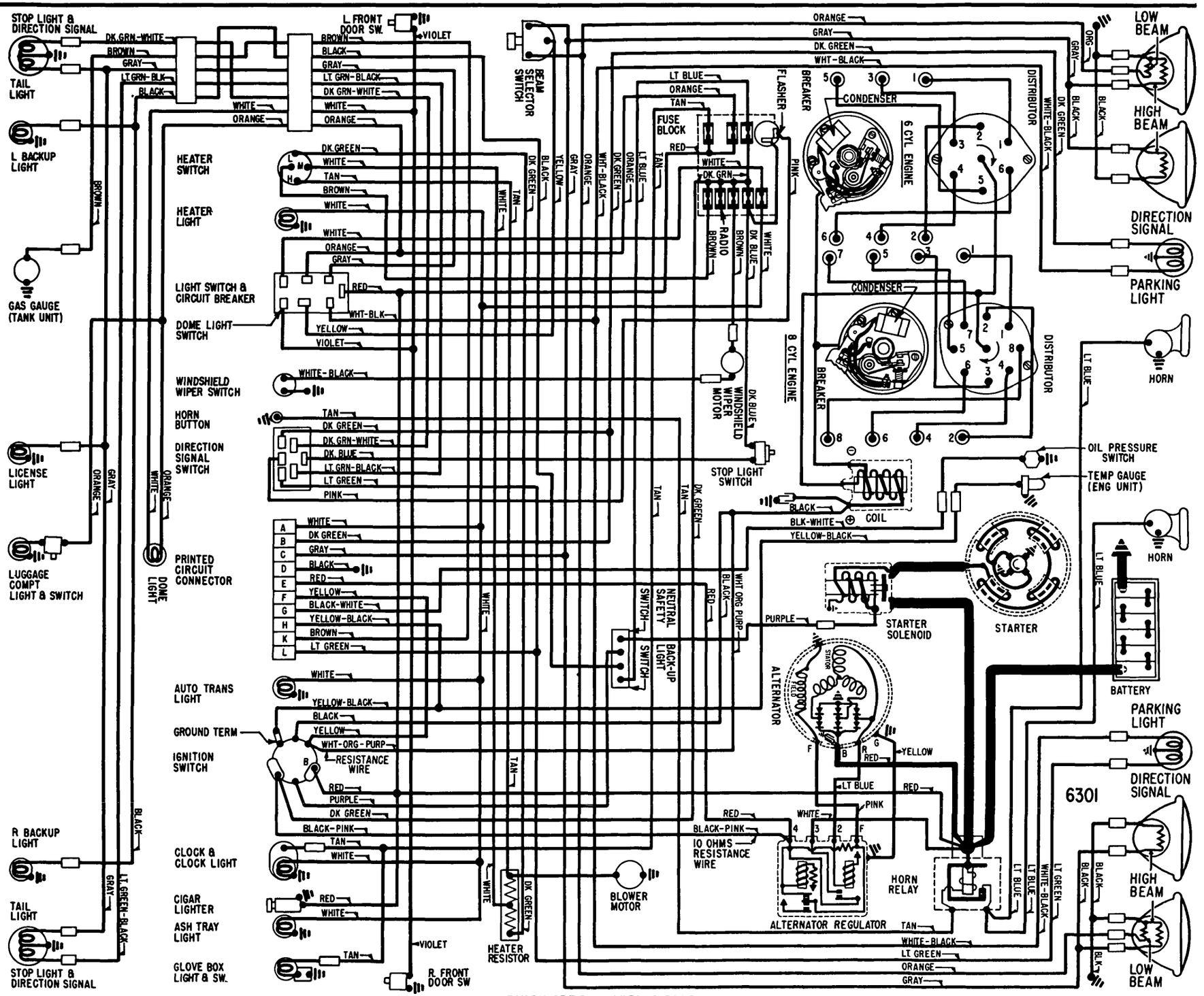
STOP LIGHT SWITCH

Located in brake master cylinder. Replace when necessary.

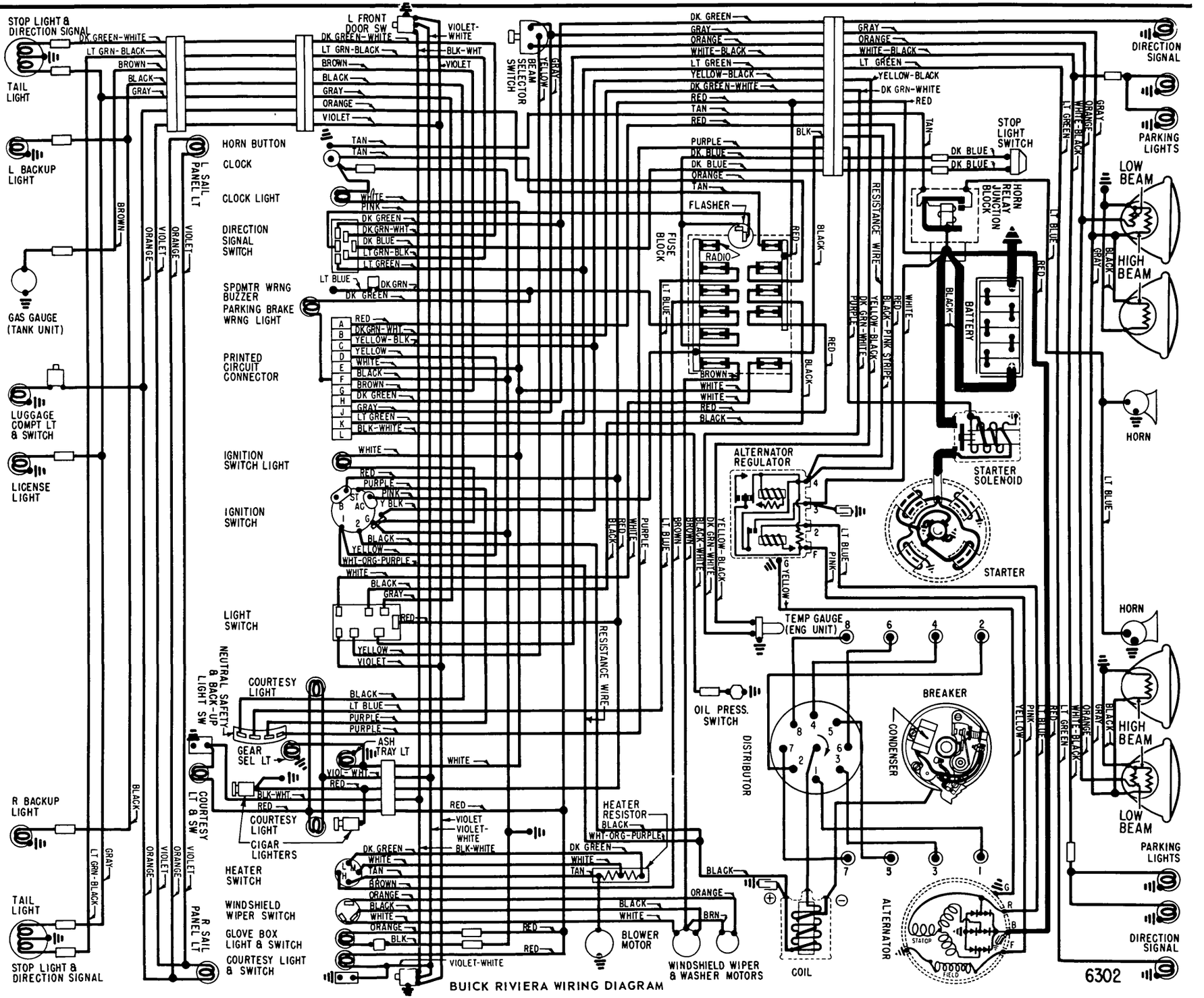
TURN SIGNAL FLASHER

Located on fuse block under left side of instrument panel.

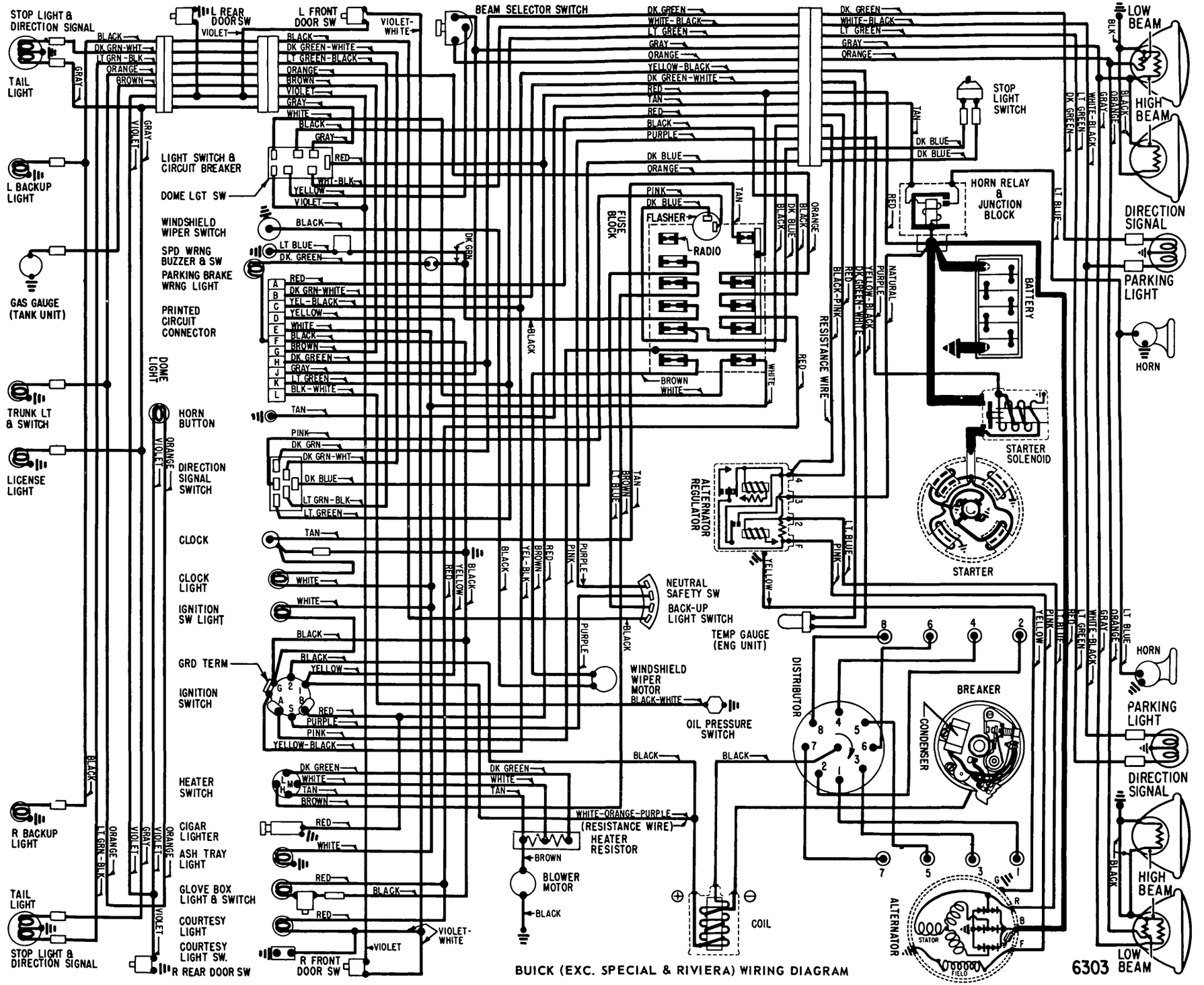
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



BUICK SPECIAL WIRING DIAGRAM



BUICK RIVIERA WIRING DIAGRAM



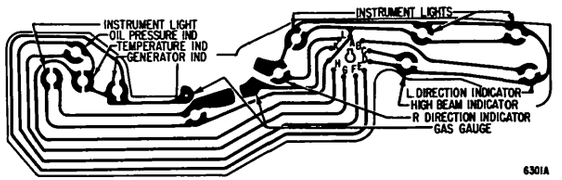
BUICK (EXC. SPECIAL & RIVIERA) WIRING DIAGRAM

BELT ADJUSTMENT SPECIFICATIONS

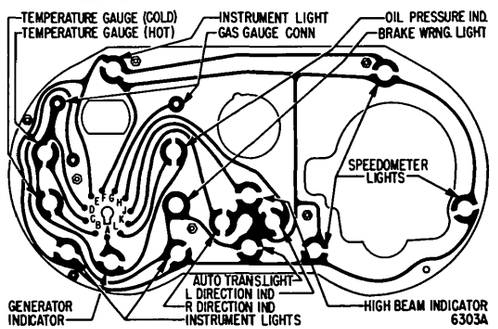
Belt Tension Gauge Tool J-7316 should read as follows:

Belt	401", 425" V8	198" V6, 215" V8
Generator	70	60
Power Strg. Pump	100	80
Air Cond. Compressor	90	72

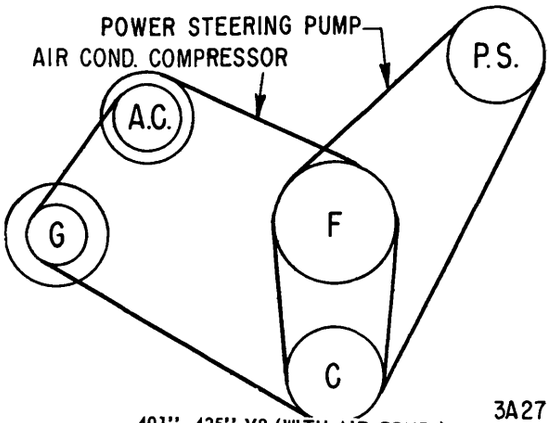
See illustrations.



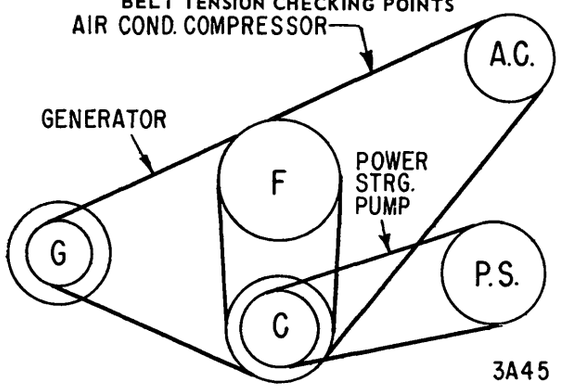
BUICK SPECIAL PRINTED CIRCUIT



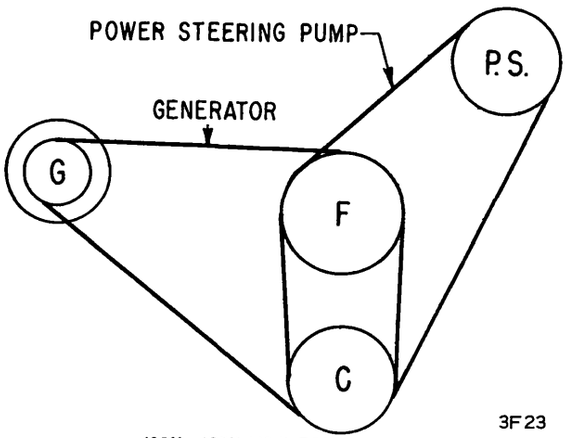
BUICK (EX. SPECIAL) PRINTED CIRCUIT



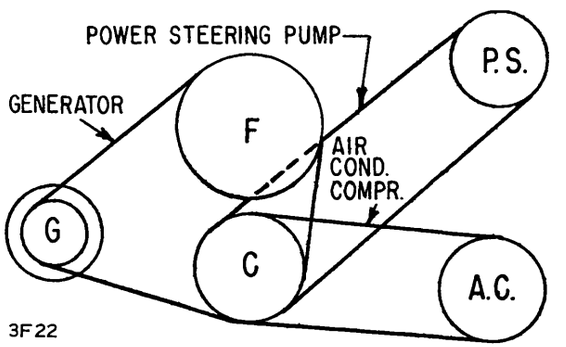
401", 425" V8 (WITH AIR COND.) BELT TENSION CHECKING POINTS



215" ALUMINUM V8 BELT TENSION CHECKING POINTS



401", 425" V8 (LESS AIR COND.) BELT TENSION CHECKING POINTS



V6 BELT TENSION CHECKING POINTS

ENGINE

GENERAL SPECIFICATIONS

Engin	HP at RPM	Compr: Ratio	Bore	Stroke	Displacement
198" V6	135 at 4600	8.8-1	3.625"	3.200"	198 cu. ins.
215" Al. V8 (2-Bbl.)	155 at 4600	9.0-1	3.500"	2.800"	215 cu. ins.
(4-Bbl.)	200 at 5000	11.0-1	3.500"	2.800"	215 cu. ins.
401" V8 (2-Bbl.)	① 280 at 4400	② 10.25-1	4.1875"	3.640"	401 cu. ins.
(4-Bbl.)	325 at 4400	10.25-1	4.1875"	3.640"	401 cu. ins.
425" V8	340 at 4400	10 25-1	4 3125"	3 640"	425 cu ins

① - 265 at 4400 RPM on Regular Gas Option. ② - 9.0-1 on Regular Gas Option.

ALUMINUM ENGINE CAUTIONS

Extreme caution must be used when working with aluminum engines to prevent damage by scratching, nicking, or scoring *NOTE the following:*

1) Do not drop or slide machined parts
2) Do not use gasket cement except as indicated under Cylinder Head Installation
3) Lubricate bolts and screws entering any aluminum part Use "Buick Special Thread Lubricant"
4) Tighten bolts and nuts to specified torque DO NOT OVERTIGHTEN Torque values are for clean, lubricated threads

ALUMINUM ENGINE THREAD REPAIR

"Heli-Coil" tools and inserts should be used when repairing damaged aluminum engine threads

ENGINE NOTES

► *RIGHT ROCKER ARM COVER NOISE OR KNOCK (EARLY 401" V8 ENGINES) CORRECTION:* Knock in right rocker arm cover (noticeable at 1200-1500 RPM) can be corrected by installation of extra gasket under rocker arm cover *NOTE - Later production engines have thicker (.200") gasket to eliminate knock.* Torque cover bolts to 3-5 ft lbs Check for oil leaks

► *REPLACEMENT CYLINDER HEAD GASKET (215" V8 ENGINES):* Special laminated head gasket furnished for replacement will correct gasket failures Clean gasket surfaces of head and block and install new gasket DO NOT use sealer, shellac, or other coatings on gasket Dip all cylinder head bolts in Perfect Seal No 980465 before installation *See Cylinder Head Installation*

► *CAMSHAFT KNOCK CORRECTION (V6 & 215" V8 ENGINES):* Can be corrected by installing spring-loaded camshaft thrust button on forward end of shaft See CAMSHAFT for installation data *This spring-loaded thrust button installed in production on later engines.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

►*MINIMUM FUEL REQUIREMENTS FOR FOREIGN TRAVEL:*

All Engines Compr. Ratio	Octane Requirement Motor Method	Research Method
7.6-1	74	83
8.75-1	85	93
8.8-1	85	93
9.0-1	85	93
10.25-1	90	99
11.0-1	90	99

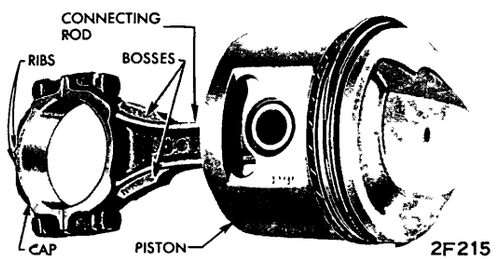
If satisfactory fuel cannot be obtained for 8.75-1 and 9.0-1 engines, install a .045" thick head gasket. To lower compression ratio of other engines, install lower compression ratio piston and pin assemblies.

OIL PAN REMOVAL

198" V6, 215" Al. V8 Engines - 1) Raise car and drain oil. Disconnect steering idler arm bracket-to-crossmember attaching bolts, then remove lower flywheel housing.

2) Remove oil pan bolts and lower pan enough to remove oil pump pipe and screen-to-cylinder block bolts.

3) Rotate crankshaft for maximum clearance of forward end of oil pan. Move front of pan to right and lower pan through opening between crossmember and steering intermediate shaft.



401", 425" V8 PISTON & ROD ASSEMBLY

TIGHTENING SPECIFICATIONS

198" V6, 215" AL. V8	Ft.Lbs.
Cylinder Head	65-70
Rocker Arm Bracket	25-30 (V8), 30-35 (V6)
Rocker Arm Cover	3-5
Intake Manifold	25-30
Water Outlet to Intake Manifold	20-25
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps(Exc.Rear)	50-55 (V8), 100-125 (V6)
Main Bearing Caps (Rear)	65-70 (V8), 100-110 (V6)
Connecting Rods	30-35
Engine Front Cover	20-25
Oil Pump Cover	10-15
Oil Pump Relief & Bypass Valve Caps	30-35
Fuel Pump to Front Cover	20-25
Water Pump to Front Cover	6-8

401", 425" V8	Ft. Lbs.
Cylinder Head	65-75
Rocker Arm Support Brackets	30-35
Rocker Arm Cover	3-5
Intake Manifold	25-30
Exhaust Manifold	10-15
Oil Pan	6-15
Main Bearing Caps	100-110
Con Rod Caps	40-45
Flywheel	50-60
Harmonic Balancer	200-220
Valve Lifter Cover	3-5
Water Manifold	25-30
Oil Pump Cover	30

PISTONS, PINS, RINGS

Engine	PISTON Clearance	PISTON PIN Piston Fit	PISTON PIN Rod Fit	RINGS Ring	RINGS End Gap	RINGS Sid Cl aranc
198" V6	①.0005-.0011"	②.0003-.0005"	③.0007-.0015"	Compr. Oil	.010-.020" .015-.035"	.003-.005" .0035-.0095"
215" Al. V8	①.0005-.0011"	②.0003-.0005"	③.0007-.0015"	Compr. Oil	.010-.020" .015-.035"	.003-.005" .0035-.0095"
401", 425" V8	④.001-.0015"	②.0001"	③.0007-.0015"	Compr. Oil	.015-.025" ⑤.015-.035"	.003-.005" .0035-.0095"

① - Measured at top of skirt. ② - Finger push fit with parts at 70°F.
③ - Press fit. *See Piston Pin Removal below.* ④ - Measured ¼" from top of piston skirt.
⑤ - .015-.055" on 425" engine.

PISTON PIN REPLACEMENT

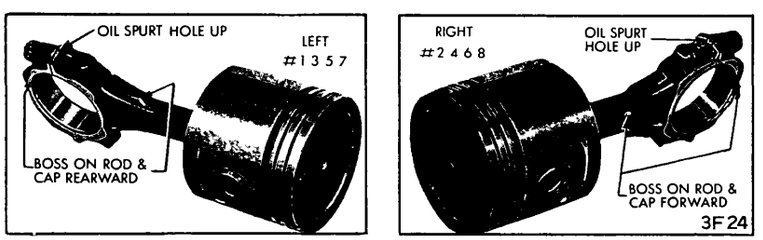
Use special tools J-8754 and J-8355 (V6 & Aluminum V8), J-6047 (Cast Iron V8).

Removal - Place support in press with full radial face up and install spring in support. Place piston assembly in press with driver inserted in pin. Press out pin.

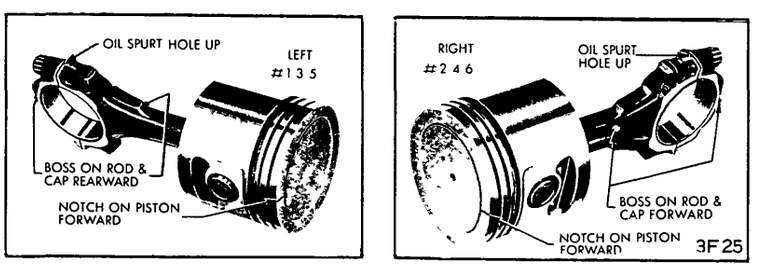
Installation - Place pilot and spring in support and position support so pilot is located in piston pin bore. Place piston assembly in press. Coat pin and connecting rod lightly with lubriplate and place driver in pin. Press pin into position (pin will bottom against pilot).

FITTING PISTONS

Measure piston at right angle to piston pin just below oil ring groove. Measure cylinder 1½-2" from top of bore. *See table for specifications.*



215" ALUMINUM V8 PISTON & ROD ASSEMBLY



198" V6 PISTON & ROD ASSEMBLY

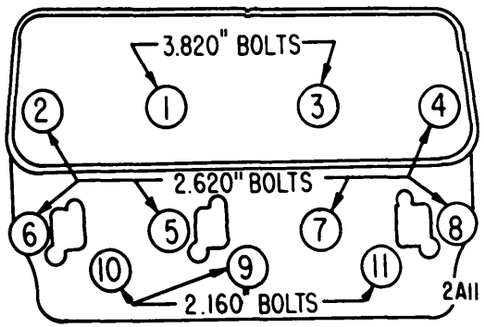
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CYLINDER HEAD REMOVAL

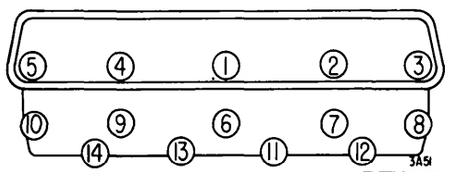
401", 425" V8 Engines - All cylinder head bolts and pushrods cannot be removed with head in place. When removing head, pull pushrods part way out and tape in place. These same pushrods must be in head before head installation.

CYLINDER HEAD INSTALLATION

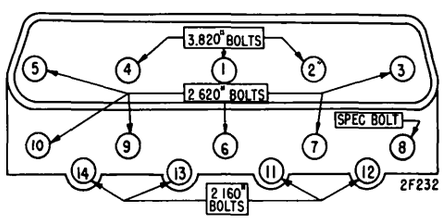
Tighten cylinder head bolts a little at a time, three times around in sequence shown in diagram. Final torque should be to specifications (see Tightening Specifications table).



V6 CYLINDER HEAD TIGHTENING SEQUENCE



401", 425" V8 CYLINDER HEAD TIGHTENING SEQUENCE



215" AL. V8 CYLINDER HEAD TIGHTENING SEQUENCE

VALVE SPRING INSTALLATION

Single spring used on all valves (198" V6, 215" Al. V8); inner and outer springs used on all valves (401" V8). Install with closed coil ends toward cylinder head.

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of valve spring retainer. *See "Valve Closed" spring length in specification table.*

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Brg.	Endplay	Journal Diam.	Clearance	③ Sideplay
198" V6	① 2.2992"	② .0005-.0021"	No. 2	.004-.008"	2.000"	② .0002-.0023"	.006-.014"
215" Al. V8	① 2.2992"	② .0005-.0021"	No. 3	.004-.008"	2.000"	② .0002-.0023"	.006-.014"
401" V8	① 2.498-2.499"	② .0005-.0021"	No. 3	.004-.008"	2.249-2.250"	② .0002-.0023"	.005-.012"

① - Out-of-round limit .003". ② - Wear limit .003". ③ - Total both rods.

CRANKSHAFT REAR OIL SEAL INSTALLATION

Crankshaft must be removed to replace fabric seal in crankcase. Place new seal in groove in cap and force down with hammer handle until seal projects above groove not more than 1/16". Cut ends of seal flush with cap surface. Replace seal in crankcase in same manner. Neoprene seals are placed in sides of bearing caps. These seals are slightly longer than grooves in cap; **do not cut seals to length.** Lubricate seals and install in cap with upper ends protruding about 1/16". After cap installed, force seals up into cap with blunt instrument to provide seal at parting line between cap and case.

TIMING CHAIN COVER REMOVAL

198" V6, 215" AL. V8 - Remove radiator, fan, pulley and belts. Remove crankshaft pulley and reinforcement, and harmonic balancer. On power steering cars, remove pump bracket bolts and move pump out of way. On all cars remove fuel pump, generator and brackets. Remove distributor cap (pull spark plug wires off rocker arm cover brackets) and swing cap and wires out of way. Disconnect distributor primary wire and remove distributor (Note position of rotor for reinstallation). Loosen and slide thermostat bypass front hose clamp rearward. Remove attaching bolts and remove cover assembly and gasket.

401", 425" V8 - Remove radiator core, shroud, fan belt, fan and pulley. Remove vibration damper. Remove all attaching bolts. *NOTE - Do not remove water pump from chain cover.* Remove cover and manifold carefully, to avoid damage to lower crankcase gasket.

FRONT OIL SEAL REPLACEMENT

198" V6, 215" AL. V8 - Use a punch to drive out old seal and shedder from front to rear of cover. To install, coil new packing around opening so ends are at top. Drive in shedder with punch. Stake shedder in place at least three places. Use hammer handle to size packing until balancer hub can be inserted through opening.

401", 425" V8 - After removing braided fabric packing and pressing steel shedder out of chain cover, work new packing into shedder. Drive shedder into recess in cover with installer J-5250-1. Push packing expander J-5250-2 through seal to expand packing into place and size opening for crankshaft. Apply a thin coat of vaseline to packing.

VALVES

Engine & Valve	Head Diam.	Seat Angle	Seat Width	Stem Diameter Top	Stem Diameter Bottom	Stem Clearance Top	Stem Clearance Bottom	Valve Lift
198" V6 Int.	1.500"	45°	1/16-5/64"	.3412"	.3407"	.0005-.0025"	.001-.003"	.385"
Exh.	1.3125"	45°	1/16-5/64"	.3407"	.3402"	.001-.003"	.0015-.0035"	.385"
215" Al. V8 Int.	1.500"	45°	1/16-5/64"	.3412"	.3407"	.0005-.0025"	.001-.003"	①
Exh.	1.3125"	45°	1/16-5/64"	.3407"	.3402"	.001-.003"	.0015-.0035"	①
401", 425" V8 Int.	1.875"	45°	② 3/64-5/64"	.373"	.3715"	.001-.003"	.002-.004"	③ .439"
Exh.	1.500"	45°	② 3/64-5/64"	.372"	.3705"	.0015-.0035"	.0025-.0045"	③ .441"

① - .383" with 2-Bbl.; .401" with 4-Bbl. ② - 1/16" average. ③ - .431" on 425" Engine.

VALVE SPRINGS & LIFTERS

Engine	VALVE SPRINGS Inner Spring (Pressure) Valve Closed	Inner Spring (Pressure) Valve Open	Outer Spring (Pressure) Valve Closed	Outer Spring (Pressure) Valve Open	LIFTERS Diameter	LIFTERS Clearance
198" V6	None	None	64 at 1.640"	168 at 1.260"	.8422-.8427"	.0015-.003"
215" Al. V8	None	None	64 at 1.640"	168 at 1.260"	.8422-.8427"	.0015-.003"
401" V8	23-28 at 1.69"	73-79 at 1.16"	39½-44½ at 1.60"	93-99 at 1.16"	.8422-.8427"	.0015-.003"
425" V8	23-28 at 1.69"	73-79 at 1.250"	146 at 1.60"	101 at 1.16"	.8422-.8427"	.0015-.003"

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE GUIDES

Pressed in head (V8); integral with head (V6). If valve stem to guide clearance excessive (see table), service as follows:

198" V6 Engine - Ream guides to .004" Oversize and install .004" Oversize valve.

215" Al. V8 Engine - Drive old guide out from combustion chamber side with Tool J-267. Lubricate and install new guide from top of head using Tool J-8813. Guide is correctly positioned when tool bottoms. After installation, finish ream new guides.

401", 425" V8 Engines - Drive guide from combustion chamber side with Tool J-269. Place valve guide aligner Tool J-5240-2 over valve guide hole in head, insert valve guide (either end down), and use installer Tool J-5240-1 and hammer to drive new guide down into head until shoulder on installer bottoms on top of aligner. Finish ream new guides with Tool J-129-3.

VALVE STEM INSTALLED HEIGHT

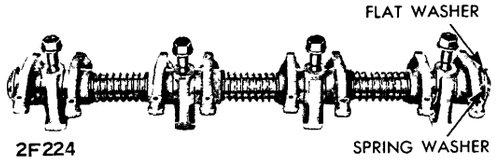
Height of valve stem tip above spring seat on head should be 1.825" (V6 & 215" V8), 1.540" (401" & 425" V8). If height raised more than .050" above this figure by valve grinding, reduce stem height by grinding end of valve stem or replace valve.

►*ROCKER ARM COVER GASKET OIL LEAK CORRECTION:* Gasket adhesive becomes pliable when engine warms. To correct, install new rubber composition gasket as follows: Apply thin coat of Buick Epoxy Adhesive, Group 0.423, Part No. 1360016, or equivalent to gasket surface around each end to about 2" in from ends. Also apply adhesive at the center on each side. Install gasket and cover and torque mounting screws to specifications.

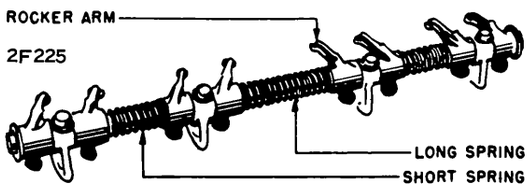
ROCKER ARM ASSEMBLY

198" V6, 215" AL. V8 Engines - Assemble springs, rocker arms and brackets as shown in diagram. *NOTE - Two types of rocker arms are used, and valve ends of rocker arms slant away from brackets.* Install spring washer, flat washer, and cotter pin on each end of shaft in order. Install bolts with plain washers through brackets and shaft so notch in one end of shaft is up and at front (right hand shaft) up and at rear (left hand shaft). *NOTE* - Vent pipe oil baffle is mounted under rear bolts on right rocker arm and shaft assembly.

401", 425" V8 Engines - *See illustration for parts location.* Install longer spring at center of shaft and install rocker arm with offset (slant) toward center of shaft (two types of rocker arms used). Turn shaft so notch in one end of shaft is upward or toward top of bracket and install bolt through bracket and shaft to maintain this position.



V6, AL. V8 ROCKER ARM ASSEMBLY



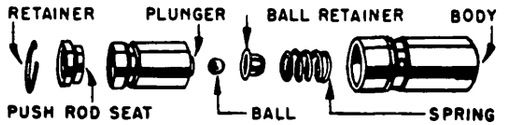
401", 425" V8 ROCKER ARM ASSEMBLY

HYDRAULIC LIFTER SERVICE

If lifter or parts damaged, replace entire assembly.

Leakdown Rate - Using Hydraulic Lifter Test Fluid (Kent-Moore J-5268) with test fixture J-5790 (198" V6, 215" AL. V8), J-5095 (401", 425" V8), test lifter as follows: Place lifter (top side up) in sleeve. Lifter must be covered by fluid during test. Remove all air from lifter (operate lifter plunger). Operate lifter plunger an additional 10 strokes and if even 1 stroke shows weak resistance replace check ball and repeat operation. Next, remove weight arm to allow lifter plunger to raise to its retainer, then lower weight arm to rest on ram roller. As pointer starts moving upward, start rotating fluid cup by turning handle once every two seconds. Leakdown rate (time between marks on scale) must be between 12 and 60 seconds. A doubtful lifter should be checked three or four times before replacing.

Installation - Oil assembly. Lifter should drop of its own weight into bore.



HYDRAULIC VALVE LIFTER (ALL) 2F226

CAMSHAFT

Engine	Journal Diameters 1	2	3	4	5	℄ Bearing Clearance
V6	1.755-1.756"	1.725-1.726"	1.695-1.696"	1.665-1.666"	.....	.0005-.0035"
V8 (All)	1.785-1.786"	1.755-1.756"	1.725-1.726"	1.695-1.696"	1.665-1.666"	.0005-.0035"

℄ - Wear limit .0015-.004".

VALVE TIMING

Engine	Intak Open (BTDC)	Intak Close (ALDC)	Exhaust Open (BLDC)	Exhaust Close (ATDC)
198" V6	18°	82°	62°	38°
215" Al. V8 (2-Bbl.)	29°	71°	67°	33°
(4-Bbl.)	30°	75°	68°	37°
401" V8	28°	87°	76°	46°
425" V8	29°	81°	71°	48°

CAMSHAFT BEARING REPLACEMENT

Bearings must be line-reamed after installation and should not be replaced if serviceable. Polish camshaft journals and remove burrs from bearings. Clearance should be within limits of .0015-.004".

CAMSHAFT END THRUST

V6 & 215" V8 Engines - Thrust is to the rear and is taken by sprocket hub. Later production engines have spring-loaded thrust button assembled on camshaft bolt. *See Thrust Button installation data.*

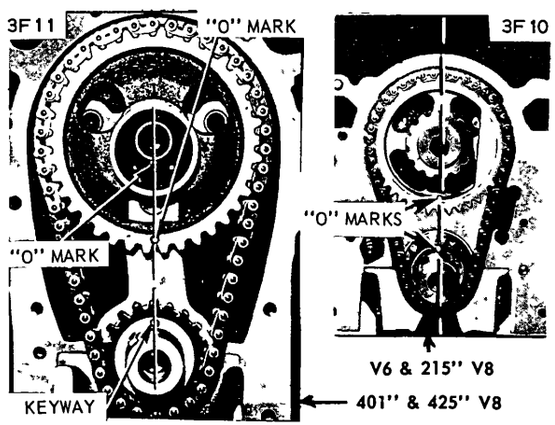
401" & 425" V8 Engines - Thrust is to the rear and is taken by sprocket hub.

CAMSHAFT THRUST BUTTON INSTALLATION

V6 & 215" V8 Engines - Thrust button can be installed on early engines to correct camshaft knock as follows: Remove timing chain cover. Remove camshaft retaining bolt and washer, replace this washer with special washer furnished in thrust button kit (washer has slot for spring tang). Install special washer and retaining bolt, tighten bolt to specifications. Install spring over head of bolt with tang on spring in washer slot, position thrust button on spring with formed end of spring engaging groove in button, reinstall cover.

TIMING CHAIN DAMPER (V6 ENGINE)

Damper used on each span of chain between sprockets (damper on slack side of chain is spring-loaded). Dampers need not be removed for timing chain removal and installation if spring-loaded damper is held away from chain.



VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Oil Pressure (401" V8 Eng.) - 40 psi at 1600 RPM.

Oil Pressure (V6 & Al. V8 Engs.) - 33 psi at 2400 RPM.

Oil Pressure (425" V8 Eng.) - 40 lbs. at 2400 RPM.

Pressure Regulator Valve - Located in oil pump cover (V6 & Al. V8 Engs.); in oil pump body (401" V8). Not adjustable.

ENGINE OILING SYSTEM

V6 & 215" V8 Engines

See *illustration.* Gear oil pump located in timing chain cover, draws oil through screen and pipe assembly (or over top of screen if clogged) and a drilled passage in crankcase connecting, to drilled passage in timing chain cover. All oil is discharged from pump to cover assembly. Spring loaded relief valve (in cover) limits oil pressure to a maximum of 33 lbs. per square inch. A bypass valve (in cover) opens when filter becomes clogged (4½-5 lbs. pressure difference between filter inlet and outlet) to bypass unfiltered oil directly to oil galleries in engine. Oil from filter (mounted on oil pump cover) supplies oil through oil pump cover and drilled passages in crankcase to two main oil galleries that run full length of the crankcase.

Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

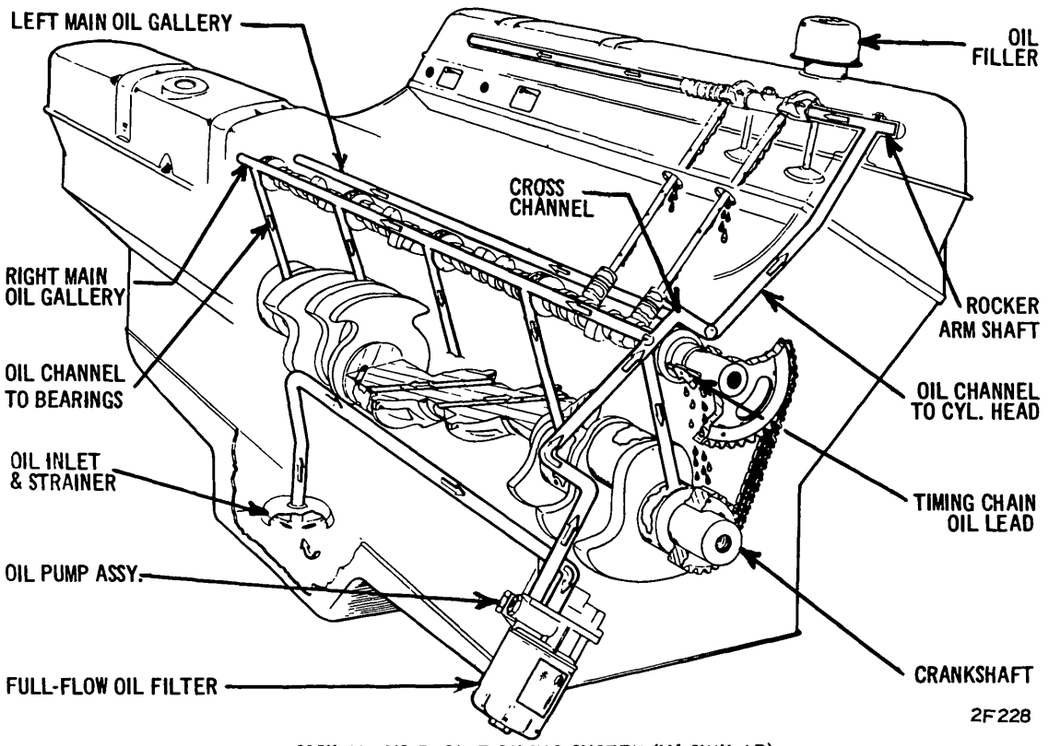
Connecting Rod & Pistons - Main bearings supply oil through drilled passages in crankshaft to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through small notch in connecting rod bearing parting surface that registers with hole in crankshaft every revolution. Piston pins are lubricated by splash.

Timing Chain & Sprockets - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.

Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries.

Rocker Arms, Valves and Pushrods - These items receive oil from main oil galleries through drilled holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) to hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil through hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.

ENGINE OILING



215" AL. V8 ENGINE OILING SYSTEM (V6 SIMILAR)

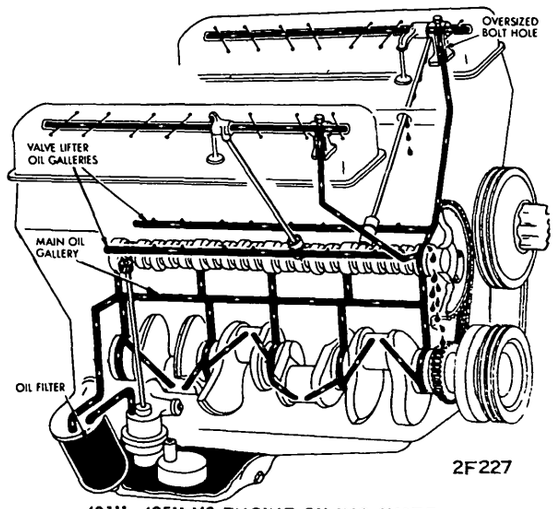
401" & 425" V8 Engines

See *illustration.* Gear type oil pump inside crankcase (at rear end) draws oil from crankcase sump through screen (or over top of screen if clogged) and delivers it through oil passages in pump body and crankcase to full flow filter. By-pass ball type valve in filter base opens to by-pass filter element when clogged or when difference in oil pressure between inlet and outlet ports is 4½-5½ lbs. Oil from filter passes into main oil gallery (full length of crankcase below camshaft) and through drilled passages in crankcase at full pressure to all crankshaft and camshaft bearings, where it is distributed to all moving parts of engine.

Crankshaft, Connecting Rods & Pistons - Holes drilled in crankshaft carry oil from main bearings to connecting rod bearings. Pistons and cylinder walls are lubricated by oil forced through squirt hole in parting surface of connecting rod that registers with hole in crankshaft at each revolution of crankshaft. Pistons are lubricated by splash.

Camshaft, Sprockets, Lifters - Oil from front camshaft bearing, flows down front face of crankcase to drop on sprocket that transfers it to chain. Oil holes in

(Continued)



401", 425" V8 ENGINE OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

crankcase and camshaft front bearing align with groove in camshaft bearing journal which meters flow of oil from main gallery to valve lifter oil galleries in each bank of cylinders. The full length of cylinder bank oil gallery cuts into lower sides of all valve lifter guide holes to supply low pressure oil to each lifter.

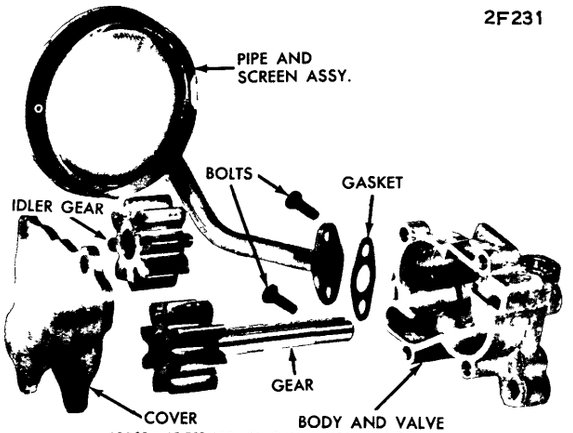
Rocker Arms, Valves & Pushrods - These items receive low pressure oil from valve lifter gallery through connecting passages drilled in front end of cylinder block and head. Oil passage in cylinder head ends in a counterbored recess surrounding front rocker arm shaft bracket bolt. Oversize bolt hole in bracket permits oil to flow into hollow rocker arm shaft (plugged at each end). Holes in rocker arm shaft allow oil to flow to each rocker arm. Oil is metered to pushrod ball seat and to valve stem through drilled holes in rocker arm. Excess oil drains off and returns to oil pan through pushrod opening in cylinder head and block.

OIL PUMP INSTALLATION

CAUTION - Because pump will not prime itself with air in cavity, remove gears and fill gear pocket with petrolatum, then force gears into cavity.

198" V6, 215" AL. V8 Engines - Lubricate relief valve before installation and tighten relief valve and bypass valve caps to specifications (see Tightening Specifications table). Place straightedge across gears; clearance between gasket surface of chain cover and straightedge should be .0018-.0058". If less, check timing chain cover for wear. Install gasket and tighten cover-to-timing chain cover bolts to specifications.

►*V6 OIL PUMP CAUTION:* DO NOT remove bypass valve (staked in place).

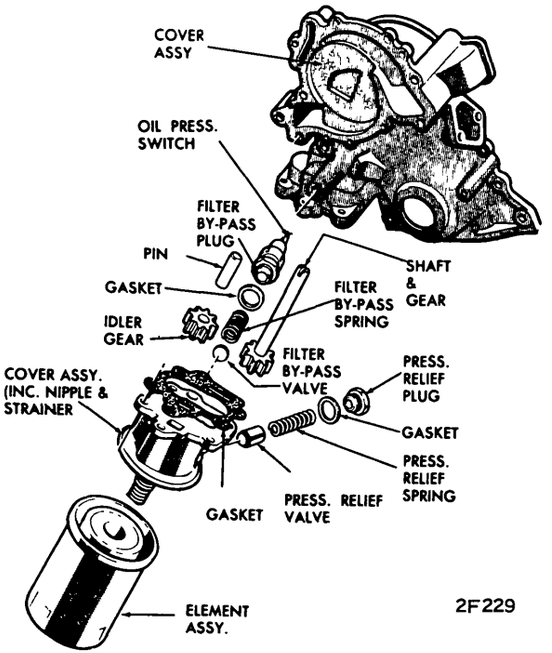


401", 425" V8 ENGINE OIL PUMP

►*OIL PUMP COVER INSTALLATION CAUTION (Buick Special Police Cars):* Spacer must be installed between oil pump cover gasket and spacer gasket. Cover must be installed with switch away from alternator.

401", 425" V8 Engines - Install gear, shaft, and idler assembly into pump body with chamfered end of idler gear teeth away (inward) from cover. Using straightedge across pump body, check clearance between gears and straightedge. Clearance should be .0005-.005". To install, first pack pump (see Caution above), then install cover and bolts. Torque to specifications.

NOTE - If pump shaft tends to bind as bolts are tightened, tap body with mallet to free shaft. Shaft must be free of bind when bolts are tight.



V6, ALUMINUM V8 ENGINE OIL PUMP

ENGINE COOLING

Thermostat (V6 & Al. V8 Engs.) - Located in forward (outlet) end of intake manifold. Pellet type. Opens at 167-172°F.

Thermostat (401" V8 Eng.) - Located in water manifold above pump. Pellet type. Opens at 167-172°F.

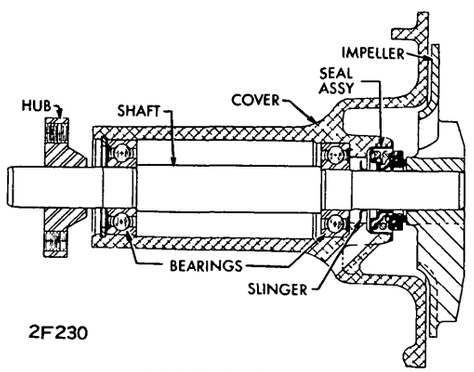
Thermostat (425" V8 Eng.) - Located in water manifold above pump. Pellet type. Opens at 180°F.

Pressure Valve - 15 lb. radiator filler cap .

WATER PUMP

Pump shaft bearing is a shrink fit in the aluminum housing. Housing, shaft and bearing, and hub are serviced as an assembly. Check pump bearings for roughness and endplay and replace assembly if bearings not serviceable. Pump seal can be replaced as follows:

Seal Replacement - Support impeller and shaft on anvil to prevent shock load on bearings, crack impeller in several places with a chisel and remove it from shaft. Use punch inserted through vent hole to drive old seal and sleeve out of housing. Clean pump housing carefully *(CAUTION - Do not use solvent which might destroy bearing lubricant).* Press new seal assembly in housing using a piece of thick wall tubing of correct diameter. Coat face of carbon washer and impeller hub with rust preventive oil (Seco or equivalent), support hub end of shaft and press new impeller on shaft until clearance between impeller and pump housing is .025-.050" (V6 & 215" V8), .035-.040" (401" & 425" V8).



WATER PUMP (ALL)

TORQUE SENSITIVE FAN CLUTCH (AIR CONDITIONED CARS)

401" & 425" Engines - Fan is driven through a temperature sensitive fan clutch assembly. Flow of silicone governing fan speed is controlled by an adjustable temperature sensitive coil. At low temperatures, fan speed is limited to 800-1200 RPM. At air temperature of 80°F, the temperature sensitive coil opens a port allowing increased flow of silicone which allows maximum fan speed of 2100 RPM. Clutch is serviced as an assembly.

Adjustment - Normal setting of temperature sensitive coil is with coil end in center slot of tab. Adjust by bending tab just enough to move coil end to left hand slot (colder cut-in), or right hand slot (hotter cut-in). Bend tab back after making adjustment.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Model	Series
Special (Standard)	4000
Special (Deluxe)	4100
Skylark	4300
Le Sabre	4400
Invicta	4635
Wildcat	4600
Riviera	4747
Electra 225	4800

SERIAL NUMBER

Embossed on plate attached to left, front hinge pillar. Also located on top surface of engine crankcase just forward of right cylinder head (Buick Special and Skylark), just forward of valve lifter cover on left side (Others).

① ② ③ ④
1 J 1 001001

① - Designates model. **1** 4100 V8. **A** 4000 V6. **0** 4000 V8. **B** 4100 V6. **3** 4300. **4** 4400. **6** 4600. **7** 4700. **8** 4800.
② - Model year. **J** 1963.
③ - Assembly plant. **1** Flint. **2** Southgate. **3** Linden. **4** Kansas City. **5** Wilmington. **6** Atlanta. **8** Arlington.
④ - Beginning vehicle number at each plant.

MODEL IDENTIFICATION

PRODUCTION CODE NUMBER

V6 Engine

Located on front of crankcase below left cylinder head gasket. Not used for licensing.

V8 Engines

Located adjacent to vehicle identification number (see "Serial Number" above). Upside down when viewed from front of engine. Not used for licensing.

① ② ③
J L 235

① - Model year. **J** 1963.
② - Engine identification. *See below.*
③ - Production number.

CAPACITIES

	198" V6	215" Al. V8	401" & 425" V8
Water ①	12 qts.	13½ qts.	18½ qts.
Crankcase ②	4 qts.	4 qts.	4 qts.
Fuel	16 gal.	16 gal.	20 gal.
Manual Trans.	2¼ pts.	③	④
Auto. Trans.	12 pts.	12 pts.	24 pts.
Rear Axle	2 pts.	2 pts.	4½ pts.

① - Includes heater. ② - Add 1 qt. with filter change.
③ - 3-Speed 2¼ pts.; 4-Speed 2½ pts.
④ - 3-Speed 3½ pts.; 4-Speed 2½ pts.

Engin Identification

L - Standard V6 Engine.
Z - Export V6 Engine .
M - Std. 215" Al. V8.
P - Export 215" V8.
N - High Compr. 215" V8.
R - Standard 401" V8 (2-Bbl.)
S - Reg. Gas Opt. 401"V8.
T - Std. 401" V8 (4-Bbl.)
U - Export 401"V8 Engine.
JW - Optional 425" Engine.

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace every Oil Change
Air Cleaner (Except Riviera)	Clean every 12,000 miles
(Riviera)	Replace every 12,000 miles
Breather Cap	Clean and reoil every 12,000 miles
Fuel Filter (V6)	Clean every 12,000 miles
(Al. V8 2-Bbl.)	Clean every 12,000 miles
(Al. V8 4-Bbl.)	Replace every 12,000 miles
(401", 425" V8)	Clean every 24,000 miles

① - Clean or replace more often if necessary.

AIR CLEANER CLEANING CAUTION

Remove element from mesh support, wash in kerosene, and squeeze out. DO NOT WRING ELEMENT. Wrap in dry, clean cloth and gently squeeze out solvent. Reoil element, squeeze out excess (element should just be damp with oil) and reinstall with edges of element over support.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

COMPRESSION PRESSURE

All at cranking speed (throttle open)..... 165-185 psi
All at 1000 RPM..... 212-230 psi

Maximum variation between cylinders less than 20 psi.

VALVE TAPPET CLEARANCE

All ..... Hydraulic

SPARK PLUGS

Gap (All) ..... .035"
Torque (All) ..... 25 ft. lbs.

Spark Plug Type

All Engines ..... AC 44

AM/FM RADIO CAR NOTE: AC Type R44 plugs used on first cars and may improve radio performance in fringe reception areas.

DISTRIBUTOR

Point Gap (All)..... .016" (Correct when Cam Angle 30°)
Cam Angle ..... 28-32° (set to 30°)
Condenser Capacity ..... .18-.23mfd
Breaker Arm Spring Tension ..... 19-23 ozs.

IGNITION TIMING

Set at 480 RPM with vacuum line disconnected and opening taped.

All .....5° BTDC

HOT (SLOW) IDLE RPM

All, in "D", Air Cond. ON 480

NOTE - Observe the following when setting idle speed:
1) Disconnect parking brake vacuum hose at diaphragm and connect vacuum gauge to this hose (gauge will register when selector lever in "D").
2) Loosen front and rear throttle valve rod locknuts at carburetor throttle lever trunnion.
3) Hold idle compensator valve closed during adjustment.
4) Idle Air Bypass type carburetor. Both the idle air, and idle mixture screws must be adjusted.

TUNE-UP SPECIFICATIONS

COLD (FAST) IDLE RPM

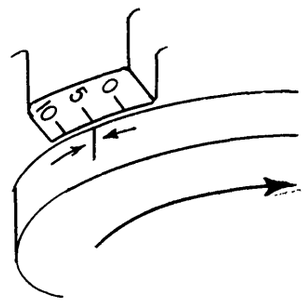
All (Idle Screw on Second Step of Cam)..... 1700-1750
With selector lever in neutral.

AUTOMATIC CHOKE SETTING

All ..... 1 Rich

FUEL PUMP PRESSURE & VOLUME

Pressure (All) at Cranking Speed ..... 5½-6½ psi
Volume (All) 1 pint minimum in 17 strokes at cranking speed.



3A85

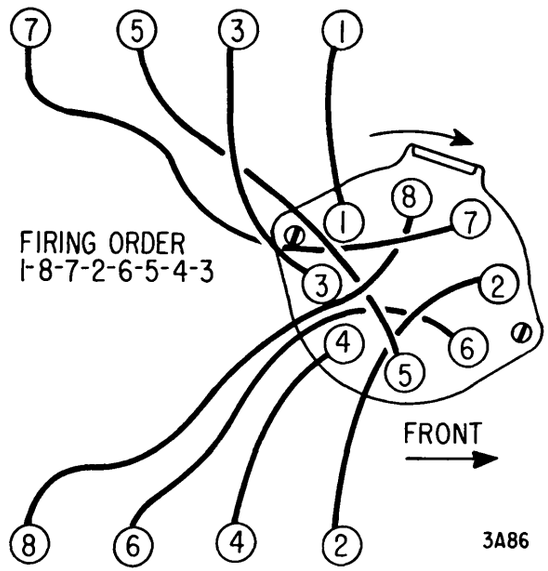
IGNITION TIMING MARKS

MANIFOLD HEAT CONTROL VALVE

Automatic thermostatic type located between left exhaust manifold and pipe. Check for free operation every 6 months. To remove, disconnect exhaust pipe from both exhaust manifolds.

CRANKCASE VENTILATION VALVE

Remove and clean valve at every oil change (6000 miles) *Valve cannot be disassembled.* To clean, insert a .080-.090" wire (shank end of 3/32" drill) into threaded end of valve to clean inside orifice. Then immerse valve in cleaning solvent and blow dry.



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FIRING ORDER

TUNE-UP NOTES

► *1963 CARTER CARBURETOR INSTALLATION CAUTION & ENGINE FAILURE TO IDLE NOTE:* Two 1/8" diameter holes (idle spoil ports) have been drilled through carburetor flange into idle system to prevent engine idling if stainless steel shim is omitted between carburetor and intake manifold. Failure to install this shim will result in damage to carburetor because of exhaust gas corrosion. Failure to idle properly indicates shim not installed.

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1111032

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-1.5	400	Start	8-10
2.5-4	600	11.25	13¼-15¼
5-7	1400		
7-9	2000		

For engine RPM and degrees, multiply by 2.

IGNITION COIL

	Ohms at 80°F
Primary Resistance	1.81-1.95
Secondary Resistance	7200-9500
Resistance Wire (in Wiring Harness)	1.3-1.35

Current Draw 1.25 amps. with engine running.

CARBURETOR

CARBURETOR SPECIFICATIONS

Carburetor	Float Level	Float Drop	Choke Setting
Rochester 4GC			
7023030 Pri.	① 1 3/8"	② 1 1/2"	1 Rich
Sec.	① 1 3/8"	② 1 15/16"	
7023031 Pri.	① 1 3/8"	② 1 1/2"	1 Rich
Sec.	① 1 3/8"	② 1 15/16"	
Carter AFB 3480S, 81S	③	④ 15/16"±1/16"	1 Rich

① - Use a "T" scale. Heel measurement, from surface of gasket to top of float at heel. Next make Float Toe measurement: 19/32" primary, 3/8" secondary from surface of gasket to center of dimple at float toe

② - Use a "T" scale. From surface of gasket to center of dimple at float toe with power piston fully extended.
③ - 3/8"±1/64" with solid seat (T109-80) 21/64'±1/64" with resilient seat (T109-294) from surface of gasket to top of floats at outer end.
④ - From surface of gasket to top of floats at outer end.

MANIFOLD FUEL DISTRIBUTION

Carburetor right barrels feed cylinders 2-3-5-8; left barrels feed cylinders 1-4-6-7.

ACCELERATING PUMP SETTING

	Seasonal Setting
Rochester	None
Carter	Upper Hole (Normal)
	Other Holes (Special Conditions)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

THROTTLE LINKAGE ADJUSTMENT (THROTTLE VALVE ROD ONLY)

NOTE - The following adjustment may be made when the throttle valve rod only was disengaged (as for carburetor removal) and all other parts of the linkage have not been disturbed

With engine running and clearance at throttle return check, loosen both throttle valve rod locknuts Make sure carburetor is at hot idle position Push end of throttle valve rod to rear of car so transmission throttle lever is against stop in transmission, and hold rod in position Turn front locknut against trunnion until all slack taken up, then tighten nut 3 full turns Tighten rear nut Stop engine

THROTTLE LINKAGE ADJUSTMENT (COMPLETE ADJUSTMENT)

1) Remove clip from carburetor throttle rod trunnion, then remove trunnion from relay bracket lever (at front of dash).

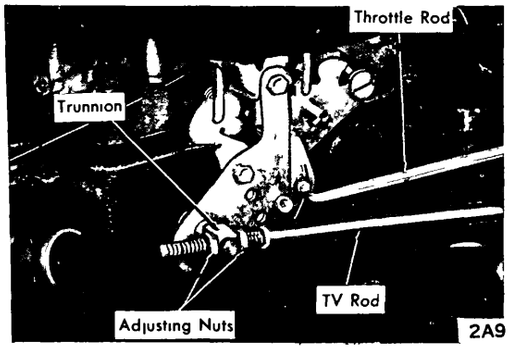
2) Place ¼" drill shank through gauging hole in relay lever and dash relay bracket. With engine running set throttle lever to Hot Idle position (Air Cond. turned OFF).

3) Adjust carburetor throttle rod trunnion for free entry into dash relay lever, then install trunnion and clip.

4) Push end of transmission throttle valve rod toward rear of car to position it against its stop. Bring front jam nut on throttle valve rod against trunnion to remove slack. **Tight n nut 3 full turns.** Tighten rear jam nut.

ACCELERATOR PEDAL HEIGHT ADJUSTMENT

Remove cotter pin from trunnion on inner side of pedal arm and remove trunnion from arm. Adjust trunnion up or down as required to obtain wide open throttle with pedal fully depressed.



THROTTLE LINKAGE ADJUSTMENT

IDLE SPEED-UP CONTROL ADJUSTMENT

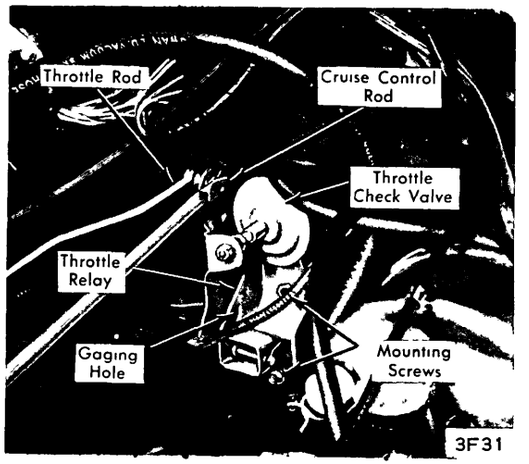
Air Conditioned Cars - 1) With engine at normal operating temperature, turn air conditioner ON and place selector lever in Neutral.

2) Adjust idle speed to 900-950 RPM by loosening locknut on diaphragm shaft and turning nut to obtain specified RPM. Tighten locknut.

BELT ADJUSTMENT

With Belt Tension Gauge Tool J-7316 applied midway between pulleys, tension should read as follows:

Belt	New	Used
Alternator	100	70
Power Steering Pump	100	70
Air Cond. Compressor	100	70



THROTTLE RETURN CHECK & THROTTLE RELAY LEVER

THROTTLE RETURN CHECK ADJUSTMENT

1) With engine idling (be sure throttle check plunger does not contact throttle relay lever), open throttle wide momentarily to allow manifold vacuum to drop and throttle check plunger to come out.

2) Let throttle snap shut and note delay caused by throttle check. If engine races, throttle check plunger is too long. If engine stalls, plunger is too short.

3) Adjust plunger screw as necessary for proper operation. *NOTE* - With engine running, there should be approximately .190" clearance between throttle check plunger and relay.

ELECTRICAL

BATTERY

12 Volt, 70 Amp. Hr. (20 hr. rate)

Battery Ground - Negative to frame.
Engin Gr und - Rear of each cylinder head to cowl.

STARTER

D lco-Remy 1107799

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Ⓒ - Includes solenoid.
Brush Spring Tensi n - 35 ozs. minimum.

ALTERNATOR

Delco-R my No.	Volts	Amperes	Alt. RPM
1100624	14 0	28	2000
	14 0	40	5000
1100617	14 0	32	2000
	14 0	50	5000

ALTERNATOR REGULATOR

Delco-Remy 1119512

Field Relay

Air Gap - 015" with contacts just touching
Point Gap - 030"
Closing Voltage - 1.5-2 7 volts

Voltage Regulator

Air Gap - 067" with lower contacts just touching
Point Gap - 014" with lower contacts just touching
Setting - 13 5-14 4 volts (upper contacts), 1-.3 volts lower (Lower contacts) at 125°F ambient temperature

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located under instrument panel to left of steering column.

IN-LINE FUSES

Generator Tell-Tale located in right dustshield. Cruise Control located in Cruise Control Brake Switch. Guide-Matic located at amplifier unit.

CIRCUIT BREAKERS

40 Ampere - Convertible top, power windows, power seat Used in place of 25 amp horn fuse Mounted on fuse panel

20 Ampere - Headlights, Instrument lights, Cornering lights, Parking lights, Ash Tray lights located on headlight switch.

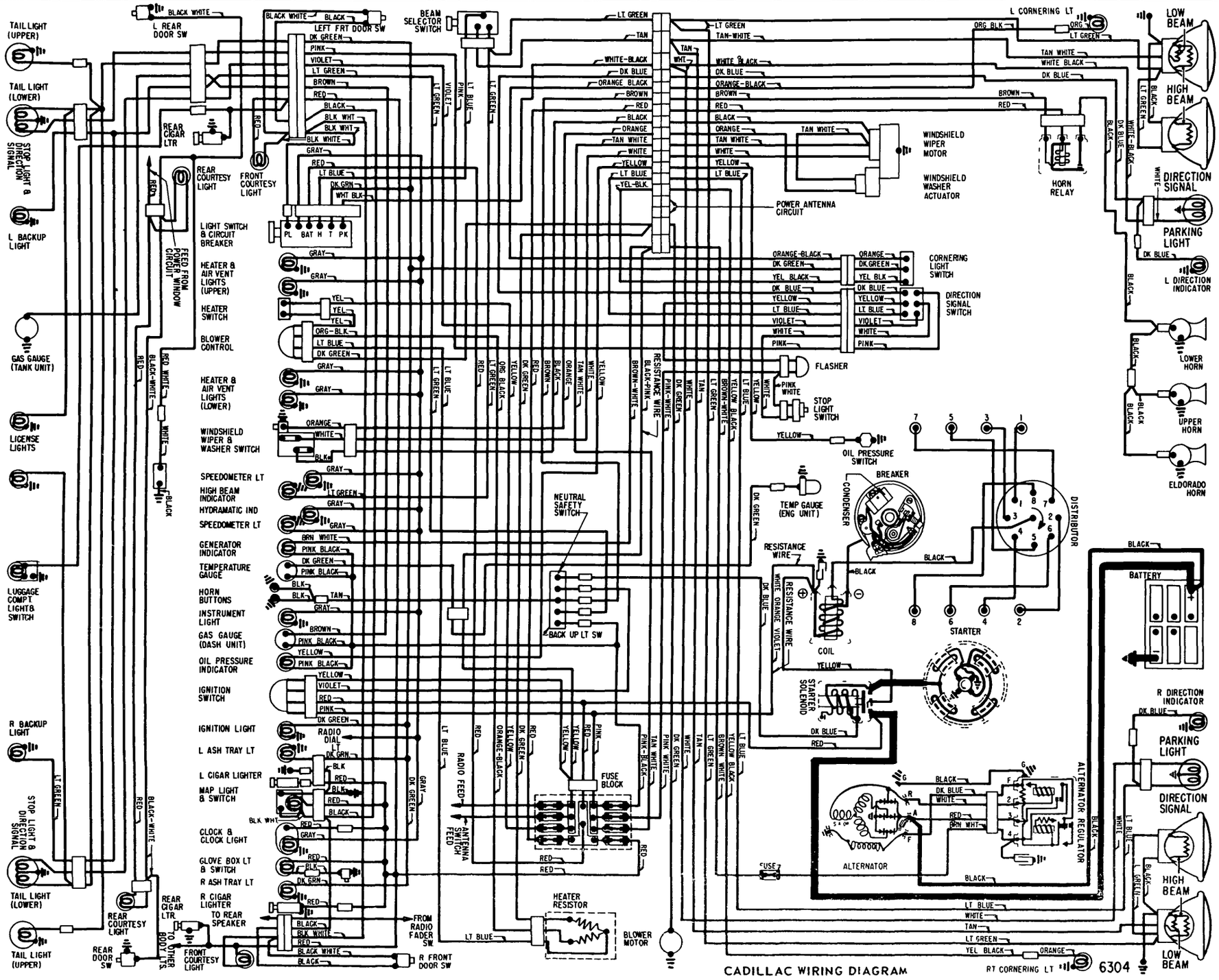
SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Unit consists of Neutral Safety Switch, Back-up Light Switch, and Parking Brake Vacuum Release, and is located on steering column under instrument panel

(Continued)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes


TAIL LIGHT (UPPER)
TAIL LIGHT (LOWER)
STOP LIGHT & DIRECTION SIGNAL
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
LICENSE LIGHTS
LUGGAGE COMPT LIGHT & SWITCH
R BACKUP LIGHT
STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT (LOWER)
TAIL LIGHT (UPPER)
L REAR DOOR SW
REAR CIGAR LTR
REAR COURTESY LIGHT
REAR COURTESY LIGHT
REAR CIGAR LTR
REAR DOOR SW
FRONT COURTESY LIGHT
FRONT COURTESY LIGHT
TO OTHER BODY LTS.
LEFT FRT DOOR SW
FEED FROM POWER WINDOW CIRCUIT
LIGHT SWITCH & CIRCUIT BREAKER
HEATER & AIR VENT LIGHTS (UPPER)
HEATER SWITCH
BLOWER CONTROL
HEATER & AIR VENT LIGHTS (LOWER)
WINDSHIELD WIPER & WASHER SWITCH
SPEEDOMETER LT
HIGH BEAM INDICATOR
HYDRAMATIC IND
SPEEDOMETER LT
GENERATOR INDICATOR
TEMPERATURE GAUGE
HORN BUTTONS
INSTRUMENT LIGHT
GAS GAUGE (DASH UNIT)
OIL PRESSURE INDICATOR
IGNITION SWITCH
IGNITION LIGHT
L ASH TRAY LT
L CIGAR LIGHTER
MAP LIGHT & SWITCH
CLOCK & CLOCK LIGHT
GLOVE BOX LT & SWITCH
R ASH TRAY LT
R CIGAR LIGHTER
TO REAR SPEAKER
RADIO DIAL LT
BEAM SELECTOR SWITCH
NEUTRAL SAFETY SWITCH
BACK UP LT SW
RADIO FEED
ANTENNA SW FEED
FUSE BLOCK
HEATER RESISTOR
BLOWER MOTOR
FROM RADIO FADER SW
R FRONT DOOR SW
WINDSHIELD WIPER MOTOR
WINDSHIELD WASHER ACTUATOR
POWER ANTENNA CIRCUIT
HORN RELAY
L CORNERING LT
CORNERING LIGHT SWITCH
DIRECTION SIGNAL SWITCH
FLASHER
STOP LIGHT SWITCH
OIL PRESSURE SWITCH
TEMP GAUGE (ENG UNIT)
CONDENSER
BREAKER
DISTRIBUTOR
RESISTANCE WIRE
COIL
STARTER
STARTER SOLENOID
BATTERY
ALTERNATOR
ALTERNATOR REGULATOR
FUSE
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
L DIRECTION INDICATOR
LOWER HORN
UPPER HORN
ELDORADO HORN
R DIRECTION INDICATOR
PARKING LIGHT
DIRECTION SIGNAL
HIGH BEAM
LOW BEAM
RT CORNERING LT
CADILLAC WIRING DIAGRAM
6304

Starter should operate only when selector lever is in "N" or "P" To adjust switch, loosen switch mounting screws, place selector lever in "N", and insert a 090- 094" pin (No 90 drill) in adjusting hole in switch cover Rotate switch counterclockwise until slider block inside switch bears against pin Tighten mounting screws and remove pin

STOP LIGHT SWITCH

Mounted on brake pedal support bracket under instrument panel To adjust, loosen switch mounting nut and adjust switch position so stop lights are on when brake pedal is depressed ½"

LIGHTING SWITCH REMOVAL

With instrument panel upper cover removed (see below), disconnect wiring from switch Depress spring-loaded knob and rod release button on bottom of switch and pull out knob and rod assembly With a 7/32" Allen wrench, remove knob and sleeve assembly, then remove switch and escutcheon assembly

IGNITION SWITCH REMOVAL

Ignition switch may be removed after steering column lower cover removed (see below)

CRUISE CONTROL SELECTOR REMOVAL

With upper instrument panel cover removed (see below), disconnect feed wire at control selector assembly Disconnect bowden cable from power unit regulator (under hood) Attach a 5' length of wire or heavy string to end of cable at power unit, and pull cable through cowl grommet from inside car with the selector assembly Remove string *NOTE - When installing, make sure cable not bent or kinked Do not connect cable to power unit until after selector assembly installed and secured in position*

INSTRUMENT PANEL BULB REPLACEMENT

All instrument cluster bulbs are accessible from under dash after steering column lower cover removed (see below)

FUEL & TEMPERATURE GAUGE REMOVAL

Remove upper instrument panel cover (see below), scribe mark radio speaker position, then move speaker to one side Disconnect wire terminal and bulb retainer assembly Remove radio dial light Remove gauges

INSTRUMENT CLUSTER & SPEEDOMETER

NOTE - Removal procedures below are the sequence of operation for cluster and/or speedometer removal

1) Upper Instrument Panel Cover - Disconnect battery, and remove right and left windshield garnish moldings Remove Cruise Control 'on-off" button (press fit), then remove control escutcheon Remove screws holding upper panel cover to lower panel (3 screws above instrument cluster assembly, 2 screws at inside top of glove box) Raise upper panel cover enough to disconnect map light and Guide-Matic connectors Pull cover rearward to disengage 4 hooks at front of cover then remove cover *NOTE - When installing, remove end cover from upper cover to install Cruise Control selector properly*

2) Steering Column Lower Cover - Remove the 4 screws which attach the upper end of the lower cover *NOTE - Larger screw at upper end of cover has 8 points and must be removed with a ¼" eight point socket to prevent damage to screw head* Disconnect convertible top wiring connector from top control switch (if equipped) Remove the 5 screws holding lower end of cover, then remove cover

3) Instrument Cluster - Remove radio speaker Disconnect speedometer and odometer cables Remove ignition switch light bulb socket Remove instrument cluster mounting screws and all other cluster bulb sockets Remove cluster assembly

4) Speedometer - Remove cluster lens and retainer from cluster casing Remove shift indicator and dial from cluster Remove speedometer

ENGINE

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
All	325 at 4800	10.5-1	4 00"	3.875"	390 cu. ins.

►*1963 ENGINE DIPSTICK TUBE INSTALLATION NOTE* - To insure correct oil level reading after installing a new dipstick tube, tube must be bent ½" away from bearing cap at a point 2¾" from bottom of tube

►*OIL PAN GASKET INSTALLATION CAUTION* To prevent oil leaks, special oil pan gasket installation procedures **must be used** as detailed under 'Oil Pan Installation below

ENGINE SPECIFICATION MARKS

Following marks indicate variations in engine specifications

1) Suffixes to engine unit number (located on rear part of crankcase behind intake manifold) as follows "L C " indicates Low Compression specifications * indicates 010" oversize pistons as standard

2) Identification letters stamped on valve lifter compartment cover rail next to lower inside edge of cylinder head indicate piston and cylinder bore size Letters are in groups of two for adjacent cylinders midway between the cylinders Letters are "A" through "M" (less "F", "G", "I") Sizes range from 4 0000-4 0002" to 4 0018-4 0020" (cylinder size), and 3 9995-3 9997" to 4 0013-4 0015" (piston size) in steps of 0002" Double letters ("AA", "BB") indicate cylinder bore 010" over the diameter indicated by a single letter

ENGINE REMOVAL

NOTE - Engine may be removed without removing transmission Observe the following points when removing engine

1) Remove radiator (unnecessary to disturb air conditioning condenser) Disconnect air conditioning compressor and move to one side (unnecessary to disconnect lines or purge system) Remove fan blade assembly, pulley, and all belts Disconnect power steering pump and move aside (unnecessary to disconnect hoses) Remove starter

2) Support transmission at front end

3) Raise engine with a 3-point suspension as follows Use adapter plates or eye bolts at the 2 center cylinder head bolts in lower row on each head Attach a chain or hoist to water outlet pipe *NOTE - Chain at water outlet pipe must be as tight as possible to prevent engine from tilting forward*

4) Remove engine by lifting upward and pushing forward to disengage all dowels and studs Use extreme care to prevent damage to flex plate

TIGHTENING SPECIFICATIONS

Bolt, Nut, or Screw	Ft. Lbs.
Cylinder Head	75
Intake Manifold (Screws)	30
(Nuts)	25
Exhaust Manifold	60
Oil Pan-to-Block (Screws & Nuts)	10
Oil Pan-to-Flywheel Housing Upper Plate	15
Main Bearing Caps	95
Connecting Rod Caps	40
Crankshaft Pulley	18
Camshaft Sprocket	18
Valve Chamber Cover	**25 Inch Lbs.**
Rocker Arm Cover	① **28 Inch Lbs.**
Water Outlet Pipe	20
Thermostat Housing	10
Oil Pump Cover	5
Oil Filter Adapter-to-Bracket	15
Oil Filter Support Bracket-to-Front Cover	10
Fuel Pump	15
Distributor Clamp Nut	18
Water Pump	②
Front Cover	②
Flex Plate-to-Crankshaft	75
Flex Plate-to-Flywheel	18
Flywheel Housing Plate (Upper & Lower)	15
Flywheel Housing-to-Block	48
Engine Front Mount-to-Engine Block	30
Engine Front Mount-to-Frame	90

① - Retorque after engine at normal operating temperature

② - Various bolt sizes and torques *See Separate Illustrations*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CYLINDER HEAD REMOVAL

Observe the following:

1) On Air Cond. cars, right rocker arm assembly must be removed with cylinder head because of interference between rear rocker arm mounting bolt and blower motor and inlet assembly. If desired, blower motor and inlet assembly may be disconnected from cowl and moved aside to provide clearance.

2) Remove cylinder heads with exhaust manifold attached.

CYLINDER HEAD INSTALLATION

Tighten all bolts finger tight. Starting from center row and working outward and toward each end, tighten cylinder head cap screws to 75 ft. lbs.

OIL PAN REMOVAL

1) Disconnect battery positive cable and drain oil.

2) Disconnect wires from starter solenoid and remove starter assembly from flywheel housing.

3) Remove exhaust manifold pipe from manifolds, remove heat control valve, and swing exhaust pipe out of way.

4) Remove idler arm support mounting screws from frame side member and lower support.

5) Remove capscrew holding transmission rear cooler pipe clamp to upper flywheel cover plate. Remove nut holding front cooler pipe clamp to right front oil pan locating stud and remove clamp from stud.

6) Remove upper flywheel cover plate-to-flywheel housing and oil pan attaching screws and nuts and remove cover plate.

7) Remove oil pan-to-cylinder block and engine front cover attaching screws and nuts and remove oil pan.

OIL PAN INSTALLATION

CAUTION - Carefully observe special gasket installation procedures below to prevent oil leaks. Procedures supersede previous recommendations.

1) Cement gasket to both sides of oil pan.

2) Install pan end seals on ends of pan by pulling locating tangs on seal through locating holes in pan. Be sure seals are firmly positioned with ends of each seal properly located in cut-out notches in side gaskets.

3) Using rubber cement, seal all 4 corner notch openings.

4) Clean notches in cylinder block where ends of oil pan rear end seal fit, and fill this cavity with Transmission Cooler Hose Cement, No. 1098993.

5) Install oil pan by reversing removal procedure.

PISTONS, PINS, RINGS

Engine	PISTON Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
All	①② .0003-.0008"	② .00005-.00015"	⑤ Press Fit	Compr. Oil	③ .013-.032" ③ .015-.061"	.0022-.0035" ④

① - Measured at top of skirt. ② - Parts at 70°F. ③ - Measured in 4.00" cylinder bore.
④ - None, 3-piece side sealing type. ⑤ - See *"Piston Pin Replacement"* for procedures and tools.

FITTING PISTONS

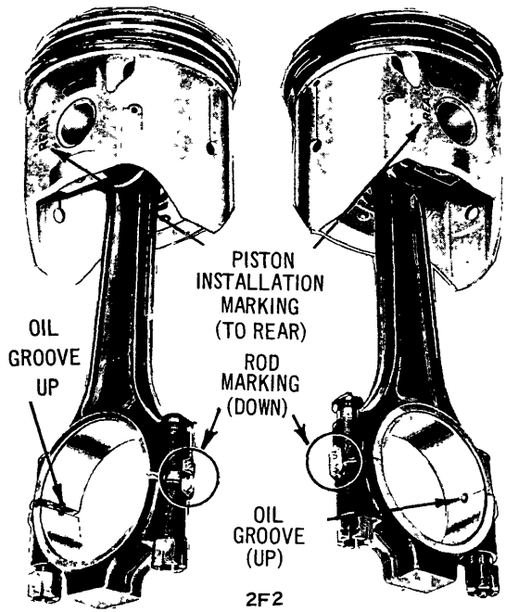
Measure pistons 3/16" below upper cross slot and 1/4" to either side of vertical slot. Measure cylinders 1 1/8" from top of bore, crosswise to cylinder block.

PISTON PIN REPLACEMENT

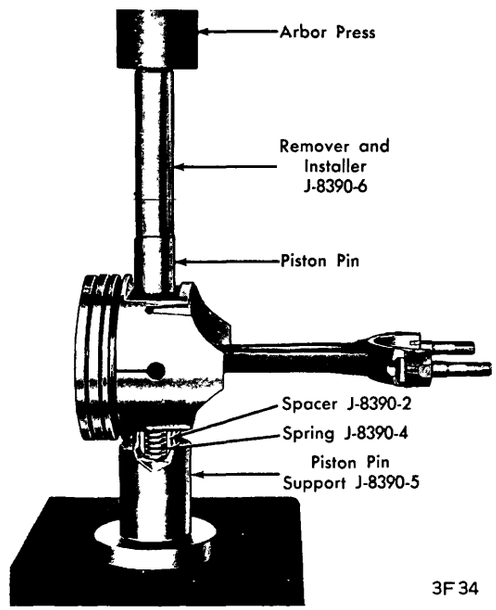
Use Tool Set J-8390 to remove and install piston pins as shown in illustrations. When removing, place piston on support with "Rear" mark upward. *TOOL NOTE - New tool parts, No. 5 & 6 are necessary for 1963 pistons.* For proper assembly of piston and rod, see "Piston & Rod Installation" illustration.

RING INSTALLATION

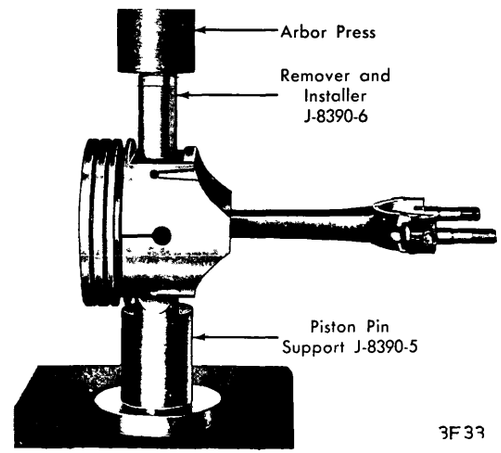
Chamfered inner corner of each compression ring must be toward top of piston.



RIGHT (2-4-6-8) LEFT (1-3-5-7)
PISTON & ROD INSTALLATION



PISTON PIN INSTALLATION



PISTON PIN REMOVAL

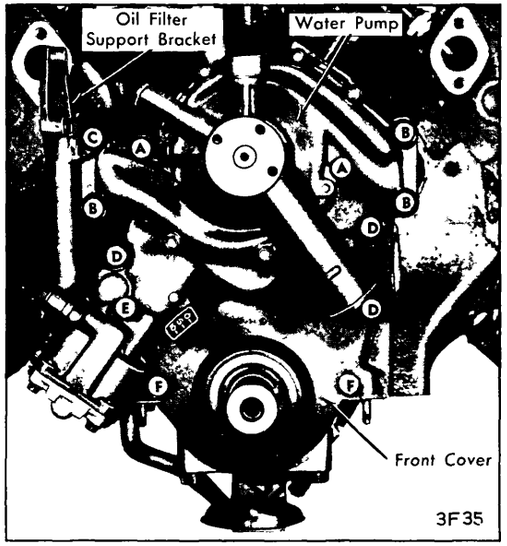
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MAIN BEARING INTERCHANGEABILITY

Original main bearing inserts are of different materials. Do not interchange bearing halves made of different material.

THRUST BEARING ALIGNMENT

Align thrust bearing surfaces after new bearing installed as follows: Install bearing cap screws finger tight, then tap crankshaft fore and aft to limit of its travel several times (tap on counterweight only). Tighten bearing cap screws to specified torque.



Key	Size	Torque
A	5/16-18x3-1/4	10 foot-pounds
B	3/8-16x3-5/8	15 foot-pounds
C	3/8-16x3-7/8	15 foot-pounds
D	5/16-18x2-1/8	10 foot-pounds
E	5/16-18x2-1/2	10 foot-pounds
F	5/16-18x1	10 foot-pounds

ENGINE FRONT COVER ATTACHING BOLT LOCATIONS & TORQUE SPECIFICATIONS

VIBRATION DAMPER REPLACEMENT

Vibration damper is a press fit on crankshaft. Remove and install with suitable pullers (front end of crankshaft has threaded hole under cork plug for puller installation). Use air pressure to hold a piston on its compression stroke to prevent crankshaft turning. *CAUTION - To prevent damper from seizing to crankshaft, lubricate bore of damper with hypoid lubricant before installation.*

ENGINE FRONT COVER

1) Remove radiator, oil pan, fan blade assembly, distributor, and fuel pump.
2) Reposition the following units in the engine compartment without disconnecting lines and hoses: Air Conditioning Compressor, Power Steering Pump, Alternator.
3) Lower the stabilizer bar from the frame.
4) Remove vibration damper. Remove oil filter assembly from support bracket, and remove water outlet pipe from cylinder heads Disconnect fuel filter from bracket on oil filler tube.
5) Remove front cover.
To install, reverse removal procedure and tighten attaching screws as shown in illustration (various size screws and torques). *CAUTION - Before installing oil filter assembly, fill oil passages in filter support bracket with oil so oil pump will prime itself when engine started.*

FRONT COVER OIL SEAL REPLACEMENT

Remove old seal with pliers. Install seal with Support, J-21150-2 (chamfered edge on inside bore of tool up), and Installer, J-21150-1.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

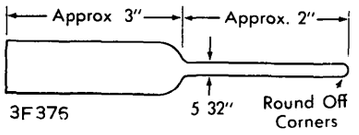
	MAIN BEARINGS				CONNECTING RODS		
Engine	Journal Diam.	Clearance	Thrust Brg.	Endplay	Journal Diam.	Clearance	① Sideplay
All	3.00"	② .0008-.0029"	No. 3	③ .001-.007"	④ 2.2488-2.2493"	⑤ .0005-.0021"	.008-.014"

① - Total both rods. ② - Wear limit .0045". ③ - Wear limit .010". ④ - Out-of-round limit .00025"
⑤ - Wear limit .0035".

REAR MAIN BEARING OIL SEAL REPLACEMENT

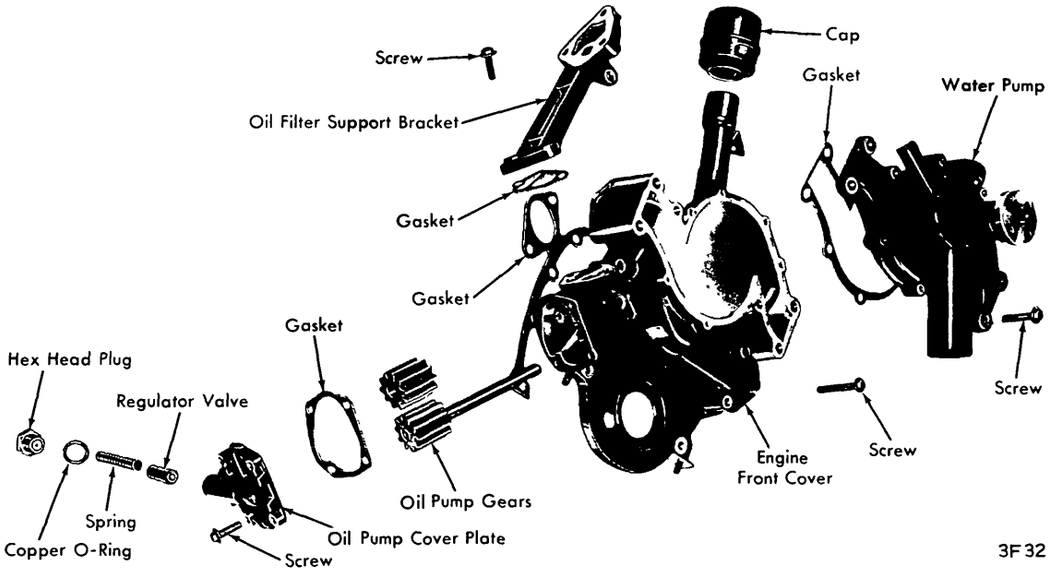
CAUTION - **1)** Seal halves are pre-lubricated with a film of wax. Do not damage this film. **2)** Do not use silicone on seal when installing or seal will leak. For easier installation, use Lubriplate. **3)** Do not press on lips of seal during installation. **4)** Use a tool made of shim stock to dimensions shown in illustration as a "shoe horn" in block and bearing cap to prevent outer diameter of seal from scraping against sharp edges as seal is installed.

Upper Half - Slide seal into cylinder block with lip facing forward, rotate seal into position, and be sure seal protrudes evenly on both sides.



CADILLAC OIL SEAL INSTALLING TOOL

Lower Half - Install seal in bearing cap with lip facing forward, and with one end of seal over ridge and flush with split line. Seal must protrude evenly on both sides. Apply .010" thick film of rubber cement to mating surfaces of block and cap. *NOTE - Keep rubber cement off seal.* Install bearing cap.



ENGINE FRONT COVER (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVES							
Engine & Valve	Head Diameter	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
All Intake	1.875"	44°	45°	℄ 1/16"	.3415-.3425"	ℭ .0005-.0025"	.450"
Exhaust	1.50"	44°	45°	℄ 1/16"	.3415-.3420"	ℭ .0010-.0025"	.450"

℄ - Normal. Cars driven at high speeds 1/16-3/32"; at low speeds in city, 3/64-1/16". ℭ - Wear limit .005".

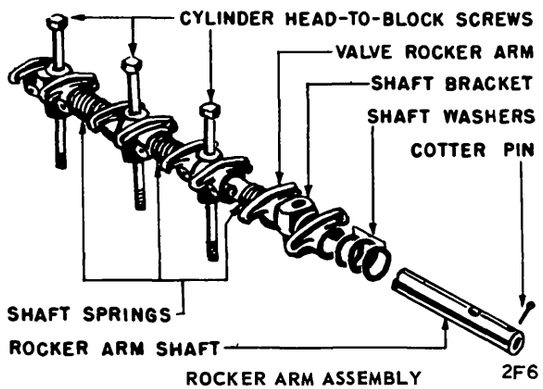
VALVE SPRINGS & LIFTERS				
	SPRINGS			LIFTERS
	Pressure (Lbs.)			
Engine	Valve Closed	Valve Open	Free Length	Clearance
All	60-65 at 1.946"	155-165 at 1.496	2.250"	.0005-.0020"

VALVE STEM-TO-GUIDE CLEARANCE

If hole gauge not available, use .005" brass shim 1/16" wide in valve guide bore. Tip of shim should extend toward pushrod side of head and no more than 1/4" into guide. If valve stem will enter guide, clearance is excessive.

ROCKER ARM SHAFT WEAR CHECK

Measure rocker arm shaft diameter in center of rocker arm wear pattern. If this diameter more than .003" smaller than shaft diameter in an adjacent, unworn section, replace shaft.



ROCKER ARM ASSEMBLY

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open (BTDC)	Close (ALDC)	Open (BLDC)	Close (ATDC)
All	39°	105°	85°	59°

VALVE STEM SEALS

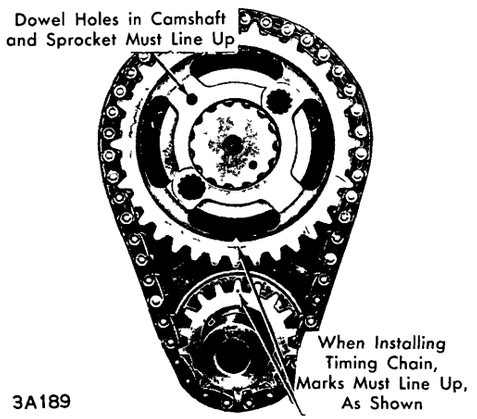
"O" ring type installed in lower groove of valve stem on all valves. To install seal, place spring retainer over valve stem and spring, compress spring, install seal in lower groove, install valve keepers, release spring. Check oil seal for leakage with suction cup on retainer.

VALVE GUIDES

Pressed in head from combustion chamber side. To remove, drive out guide from combustion chamber side with Valve Stem Guide Remover Tool J-3062. To install guide, position Driver Tool J-3066-2 through Gauging Block Tool J-6535. Slide guide on installer pilot (lubricate outer surface of guide) and be sure longest chamfer end of guide enters bore first from combustion chamber side. Drive guide into head until shoulder on installer contacts plate on cylinder head.

VALVE SPRING INSTALLATION

Place spring over valve stem with closed coil end against cylinder head.



VALVE TIMING MARKS

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. *See "Valve Closed" spring length in specification table.*

HYDRAULIC LIFTER LEAKDOWN RATE CHECK (ON ENGINE)

Use Leakdown Rate Tester J-3074 to check for faulty lifters without disassembling engine. This tool uses a feeler gauge between rocker arm and valve stem which causes valve spring pressure to force oil out of lifters. When lifter has leaked down enough for valve to seat, a spring on tool which is compressed against valve spring retainer, ejects feeler gauge. Lifters which leak down quickest (pop out tool fastest) are faulty. Check lifters in the following order: *NOTE - Insert tool quickly to avoid unnecessary leakdown.*

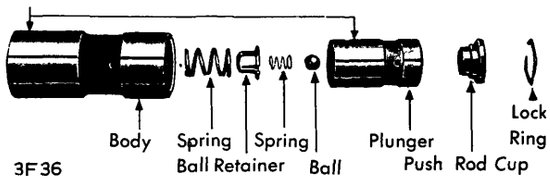
1) With No. 1 piston at firing position, check:

No. 1 Exhaust	No. 7 Exhaust
No. 1 Intake	No. 2 Exhaust
No. 3 Intake	No. 4 Intake
No. 3 Exhaust	No. 8 Intake
No. 5 Intake	No. 8 Exhaust

2) With No. 6 piston at firing position, check:

No. 5 Exhaust	No. 4 Exhaust
No. 7 Intake	No. 6 Exhaust
No. 2 Intake	No. 6 Intake

Plunger And Body Are Fitted Pairs And Must Not Be Mismated.



HYDRAULIC VALVE LIFTER (EXPLODED)

CAMSHAFT			
Engine	Clearance	Wear Limit	Cam Lift
All	.001-.0022"	.004"	.273"

CAMSHAFT REMOVAL

Camshaft may be removed with engine installed in car. *See "General Motors Air Conditioning" in Miscellaneous Section for air conditioning condenser removal.*

CAMSHAFT BEARING REPLACEMENT

Camshaft bearings may be replaced with engine installed in car after removal of camshaft, transmission, and crankshaft. *NOTE - If Replacer Tool J-3063 is available, No. 5 bearing may be removed without removing rear welch plug.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE OILING

Oil Pressure - 30-35 lbs. at 30 MPH. Average pressure at idle is 10 lbs.

OIL PUMP

Located in engine front cover. Engine front cover must be removed for oil pump servicing. To remove pump, remove cover plate and gears. Pressure regulator valve located in oil pump cover, and is not adjustable.

Oil Pump Specifications

Gear Backlash	.008-.012"
Gear Shaft-to-Bore Clearance	.0010-.0025"
	wear limit .005"
Gear-to-Body Clearance	.003-.005"
	wear limit .005"
Gear Endplay	.001-.004"
	wear limit .006"
Press. Reg. Valve-to-Bore Clearance	.0020-.0035"
	wear limit .005"
Press. Reg. Valve Spring	
Free Length	2.77-2.89"
Pressure	6 1/4-6 3/4 lbs. at 1 7/16"

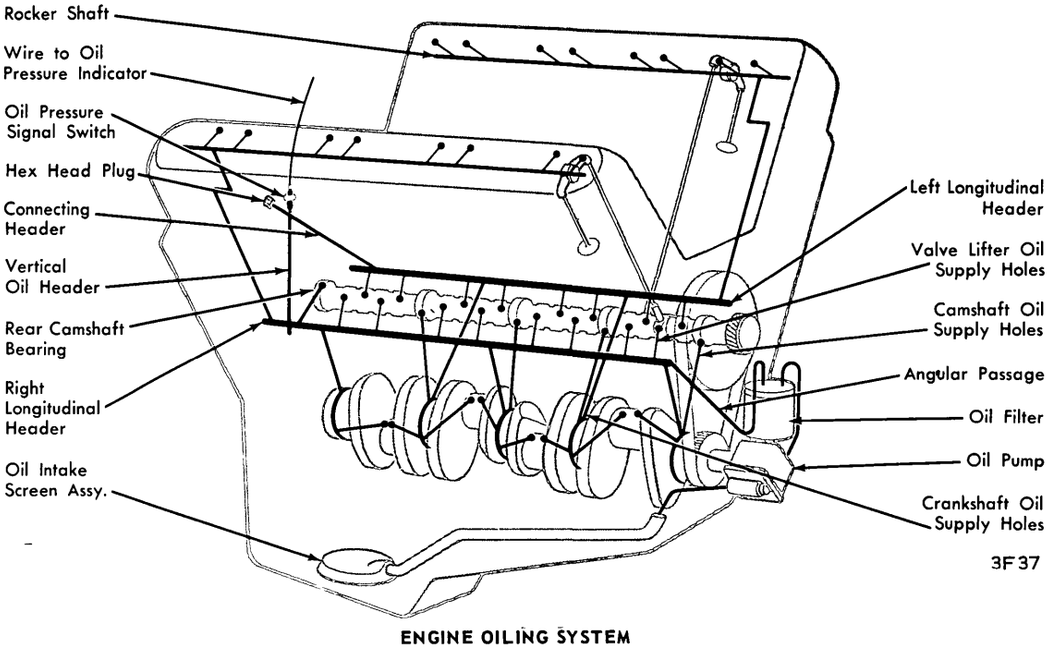
ENGINE OILING SYSTEM

Refer to "Engine Oiling System" illustration. The right longitudinal header is fed directly from the full-flow oil filter and oil pump. The left longitudinal header is fed from vertical oil header at rear of right longitudinal header and a connecting header. Upper end of vertical header contains oil pressure sending switch and upper end of connecting header is closed by a hex head plug.

Crankshaft, Connecting Rods & Pistons - Nos. 1,3,5 main bearings are lubricated from right longitudinal header. Nos. 2 & 4 main bearings are lubricated from left longitudinal header. Connecting rod bearings are lubricated through drilled holes in crankshaft from adjacent main bearing. Groove in connecting rod bearing cap provides lubrication for cylinder walls, pistons, and piston pin.

Camshaft Bearings & Lifters - All camshaft bearings except No. 5 (rear) are lubricated through passages in block from same main bearing oil lead. No. 5 bearing is lubricated directly from right longitudinal header. Each valve lifter is supplied with oil through individual passages from longitudinal header. Drain hole at right rear of valve lifter compartment returns oil to crankcase.

Rocker Arms, Valves & Pushrods - Oil is supplied to rocker arm shaft on right bank from rear end of right longitudinal header through a vertical branch in cylinder block and head. The left rocker arm shaft is supplied through a vertical branch in cylinder block and head at front end of left longitudinal header. Rocker arm shafts are plugged at each end. One hole in bottom of rocker arm shaft intersects a 45° groove and supplies oil evenly under loaded area of each rocker arm. The other hole is mismatched with an angular passage in the arm and meters oil to the pushrod end of the arm for lubrication of the pushrod surface in the arm. From this point oil flows down to the opposite end of the arm for valve tip lubrication.



ENGINE OILING SYSTEM

ENGINE COOLING

THERMOSTAT

Located in water outlet pipe. Starts to open 172-177°F. Fully open 198°F.

PRESSURE VALVE

Radiator filler cap. 13½-16½ lb. type.

FLUID FAN CLUTCH

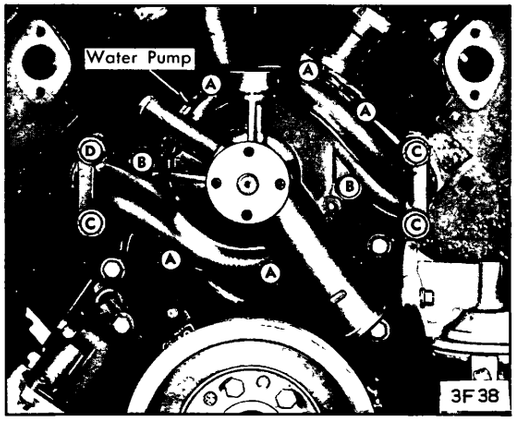
Thermostatically controlled type. Fan fully engaged when car speed is above 70 MPH. Not adjustable. Service by replacement only.

WATER PUMP

Mounted on engine front cover. All service is by replacement only as pump cannot be overhauled.

Removal -Remove water pump after oil filter and support bracket, and water outlet pipe are removed (unnecessary to remove radiator).

Installation - Reverse removal procedure and observe the different screw sizes and torque specifications as shown in illustration.



Key	Size	Torque
A	1/4-20x1-1/4	5 foot-pounds
B	5/16-18x3-1/4	10 foot-pounds
C	3/8-16x3-5/8	15 foot-pounds
D	3/8-16x3-7/8	15 foot-pounds

WATER PUMP ATTACHING BOLT LOCATIONS & TORQUE SPECIFICATIONS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MODEL IDENTIFICATION

Series Designation

Series	Body Style	Body Code
62	Sedan DeVille (4 Window)	B
62	Sedan DeVille (4 Window Park Avenue)	D
62	Eldorado	E
62	Convertible Coupe	F
62	Sixty-Two Coupe	G
62	Coupe DeVille	J
62	Sixty-Two Sedan (6 Window)	K
62	Sedan DeVille (6 Window)	L
60	Fleetwood Sixty Special	M
62	Sixty-Two Sedan (4 Window)	N
75	Fleetwood "75" Sedan	R
75	Fleetwood "75" Limousine	S
68	Commercial Chassis	Z

ENGINE SERIAL NUMBER

Located on left side of cylinder block between welch plugs above edge of oil pan and on upper left-hand side of No. 1 crossmember just forward of radiator.

① ② ③
63 L 000001

① - Model year. 1963.
② - Body style. *See Series Designation below.*
③ - Beginning Engine Serial Number.

ENGINE UNIT NUMBER

*Located on rear portion of crankcase behind intake manifold. Not used for licensing. NOTE - "L.C." suffix indicates low compression specifications. Mark * indicates .010" Oversize pistons as standard.*

① ②
36X 000001

① - Indicates Model Series. *See Below.*
② - Starting engine number (numerical sequence).

Series	Prefix No.
All Except 68, 75 (Less Air Cond.)	36X
68, 75 (Less Air Cond.)	37X
All Except 68, 75 (With Air Cond.)	36K
68, 75 (With Air Cond.)	37K

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace element every 6000 miles
Air Cleaner	Replace element every 30,000 miles
Breather Cap	Clean and reoil at every Oil Change
Fuel Filter	Replace every 6 months

① - Clean or replace more often if conditions warrant.

OIL FILTER INSTALLATION

1) Before installing oil filter assembly, fill oil passages in filter support bracket with engine oil so oil pump will prime itself when engine started.

2) Screw filter onto stud of filter base **by hand** until gasket touches filter base, then tighten an additional 2/3 turn. DO NOT overtighten.

CAPACITIES

	Refill Capacity
Water (Exc. 75 Ser.)	① 17¼ qts.
(75 Series)	① 19¾ qts.
Crankcase	② 4 qts.
Fuel	③ 26 gal.
Transmission	④ 18 pts.
Rear Axle	5 pts.

① - Includes heater. Add 1 qt. with Air Cond.
② - Add 1 qt. with filter change.
③ - 21 gal. on Park Avenue and Commercial Chassis.
④ - Includes converter.

CRANKCASE CAPACITY CAUTION (EARLY 1963 CARS): To prevent foaming or excessive oil consumption, oil level should be checked only before engine is started or 10-15 minutes after engine stopped and oil should be added only when level reaches "Add One Quart" mark on dipstick. On early 1963 cars, if oil level is more than 3/16" above or below "Full" mark after exactly 4 qts. of oil installed in an empty crankcase, grind off old full mark and remark dipstick with a file or chisel.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

COMPRESSION PRESSURE

4 & 6 Cylinder Engines ..... 130 psi

At cranking speed with throttle wide open; maximum variation between cylinders 20 psi.

VALVE TAPPET CLEARANCE

4 & 6 Cylinder Engines ..... Hydraulic

LIFTER ADJUSTMENT (ENGINE RUNNING)

With engine warm and idling, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops This is "Zero Lash" Now turn nut an additional 1/4-turn and wait until engine runs smoothly Continue to turn nut down in 1/4-turn increments until nut has been turned down 1 full turn from "Zero Lash" *CAUTION - Make adjustment slowly so lifter will adjust itself and prevent engine damage*

SPARK PLUGS

Gap (4 & 6 Cylinder Engines) ..... .035" (.033-.038")
Torque (4 & 6 Cylinder Engines) ..... 25 ft. lbs.

Spark Plug Type

4 & 6 Cylinder Engines (Standard) ..... AC 46N
(Colder) ..... AC 44N

DISTRIBUTOR

► *CAM ANGLE SETTING CAUTION:* Cam angle must be set with distributor on engine

Point Gap (4 & 6 Cyl. Engs.) .019" (New); .016" (Used)
Cam Angle (4 & 6 Cyl. Engs.) ..... 31-34°
Breaker Arm Spring Tension (All) ..... 19-23 ozs
Condenser Capacity (4 & 6 Cyl. Engs.) ..... .18-.25 mfd.

HOT (SLOW) IDLE RPM

4 & 6 Cylinder Engines (Synchro-mesh) 500
(Auto. Trans. in Drive) 500

IDLE SPEED-UP CONTROL ADJUSTMENT (CHEVY II AIR CONDITIONED CARS)

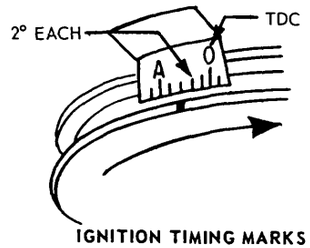
Idle control unit is used on all air conditioned cars Adjust unit after making correct idle speed adjustment With air conditioning OFF, turn idle control adjustment bolt to obtain .01" clearance between bolt head and throttle tang After warming engine, turn air conditioning ON, then turn adjustment bolt again to obtain correct idle speed

IGNITION TIMING

Set at 500 RPM with vacuum line disconnected.

4 Cyl. Eng. ..... 4° BTDC (Range 4-10° BTDC)
6 Cyl. Eng. (Chevy II) ..... 8° BTDC (Range 8-12° BTDC)
(Chevrolet) .. 4° BTDC (Range 2-8° BTDC)

TUNE-UP SPECIFICATIONS



3A137

IGNITION TIMING MARKS

FUEL PUMP PRESSURE & VOLUME

Pressure (4 & 6 Cylinder Engines) ..... 3½-4½ psi
Volume (4 & 6 Cylinder Engines) 1 pt. in 30-45 seconds.

MANIFOLD HEAT CONTROL

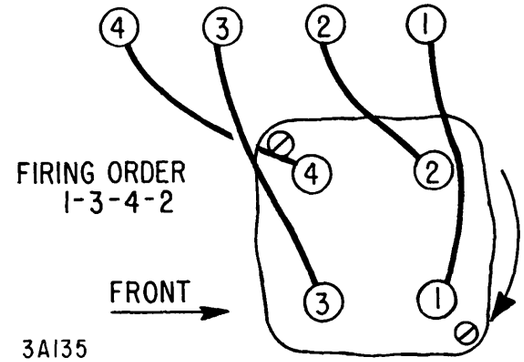
Automatic thermostatic type with counterweight in exhaust manifold outlet Valve must operate freely

CRANKCASE VENTILATION VALVE

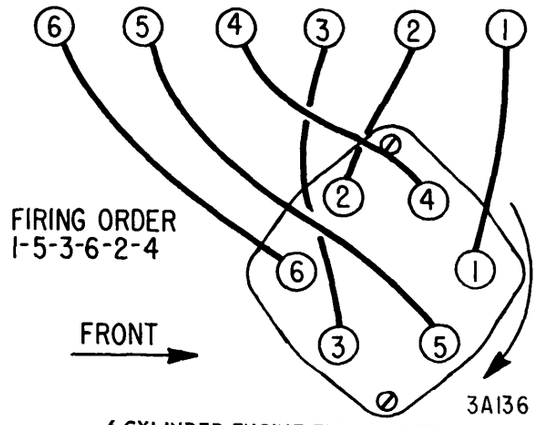
Check for proper operation at every oil change and replace valve when necessary To test valve, remove valve from rocker arm cover (leave hose attached), plug valve end, and read RPM change A change of less than 50 RPM indicates a defective valve (replace valve)

TUNE-UP NOTES

► *SIX CYL ENGINE PART THROTTLE SURGE CORRECTION (EARLY CARS).* On carburetors date coded before "A3A", this condition can be corrected by installing new Main Metering Jets Carburetors date coded "A3A" or later have these new jets. *See "Rochester Single Barrel B, BC, BV Carburetors" in Carburetion Section*



4 CYLINDER ENGINE FIRING ORDER



6 CYLINDER ENGINE FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110280

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	450	0	5-7
4-6	600	11 5	11-13 5
6 5-8 5	750		
14-16	1500		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110292

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum "of Hg
5-2 5	400	0	5-7
6-8	750	11 5	11-13 5
9 5-11 5	1300		
13-15	1850		

For engine degrees and RPM, multiply by 2

Delco-Remy 1110293

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	375	0	5-7
5-7	700	11 5	11-13 5
12-14	1150		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms
Primary Resistance	1 45-1 63
Secondary Resistance	5600-6900
Resistor (Pink wire in harness)	1 8 at 80°F

Current Draw 1 9 amps idling, 4 0 amps stopped

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

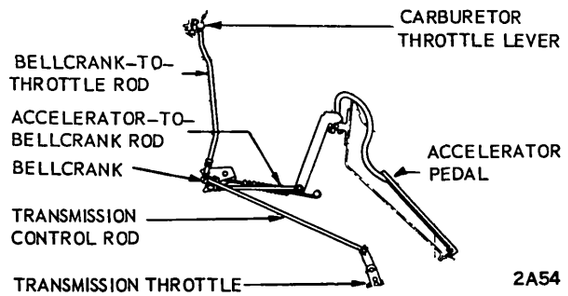
CARBURETOR

Carbur t r	Fl at L v l	Fl at Dr p
Carter YF		
3402S, 3379S	①3/8"	②1 3/16"
Rochester BV		
7023000, 7023003	③1 9/32"	④1 3/4"
7023105, 7023108	③1 9/32"	④1 3/4"

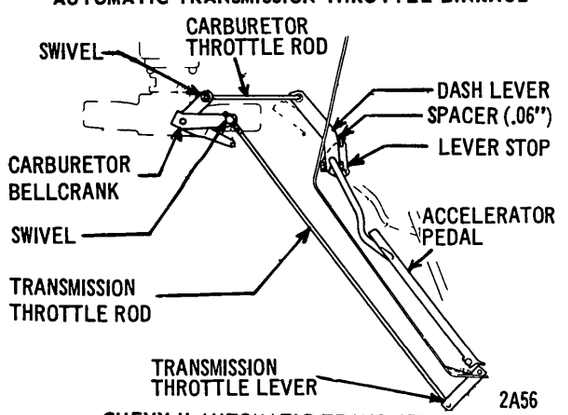
① - Measured at outer end of float (less gasket).
② - Measured at top outer end of float (less gasket).
③ - Air horn inverted, gasket in place, measure from gasket to top of float.
④ - Air horn upright, gasket in place, measure from gasket to bottom of float

THROTTLE LINKAGE ADJUSTMENT

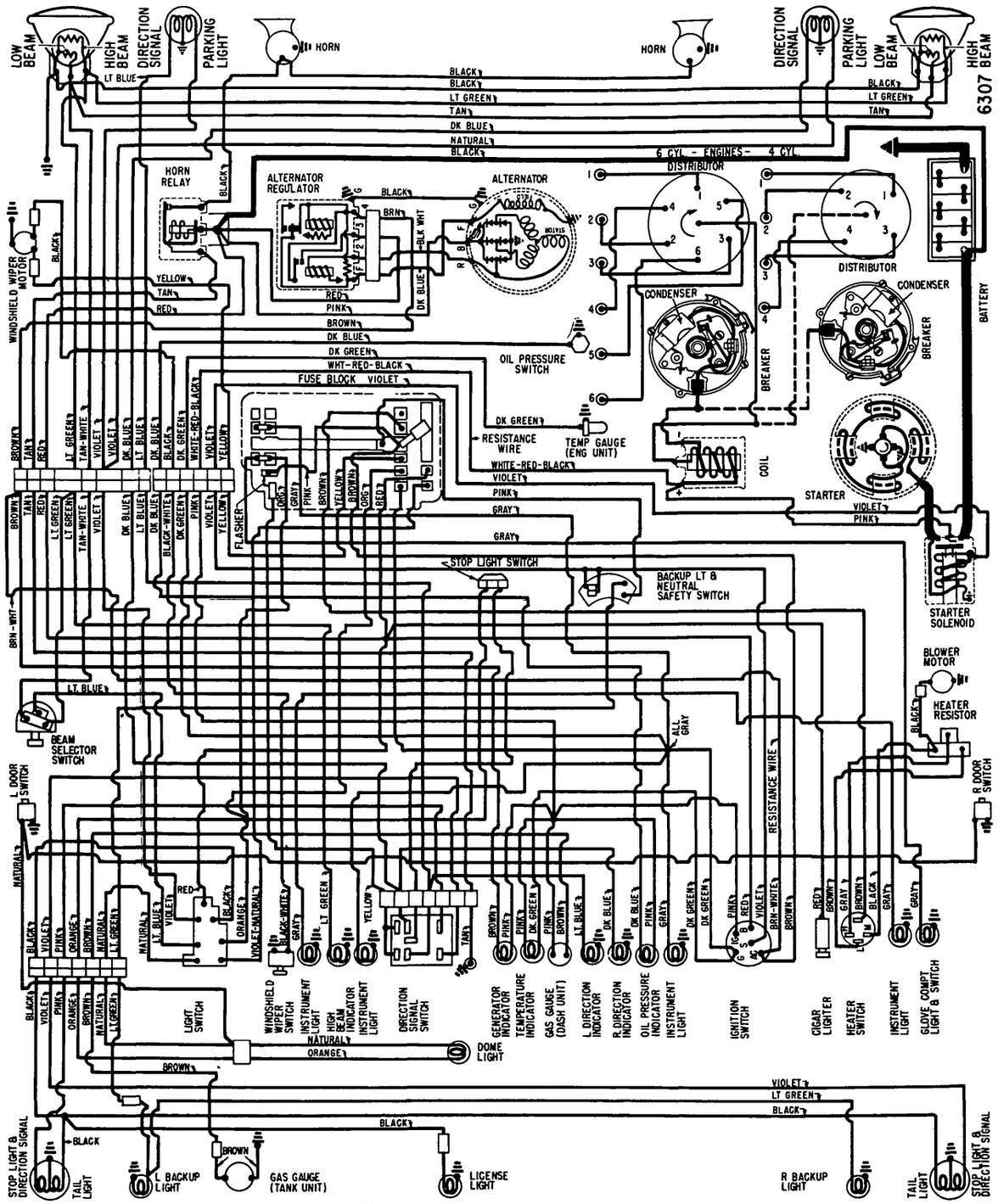
Automatic Transmission Cars - 1) Disconnect throttle valve rod at bellcrank. Hold carburetor throttle valve in wide open position, pull throttle rod forward (to position pedal at floor mat) and adjust swivel to just enter hole in bellcrank lever.
2) Connect swivel to bellcrank lever and install cotter pin.
3) Hold throttle rod in full throttle position, push transmission throttle valve rod to full detent and adjust swivel on rod to just enter hole on throttle bellcrank.
4) Connect throttle valve rod swivel at bellcrank.



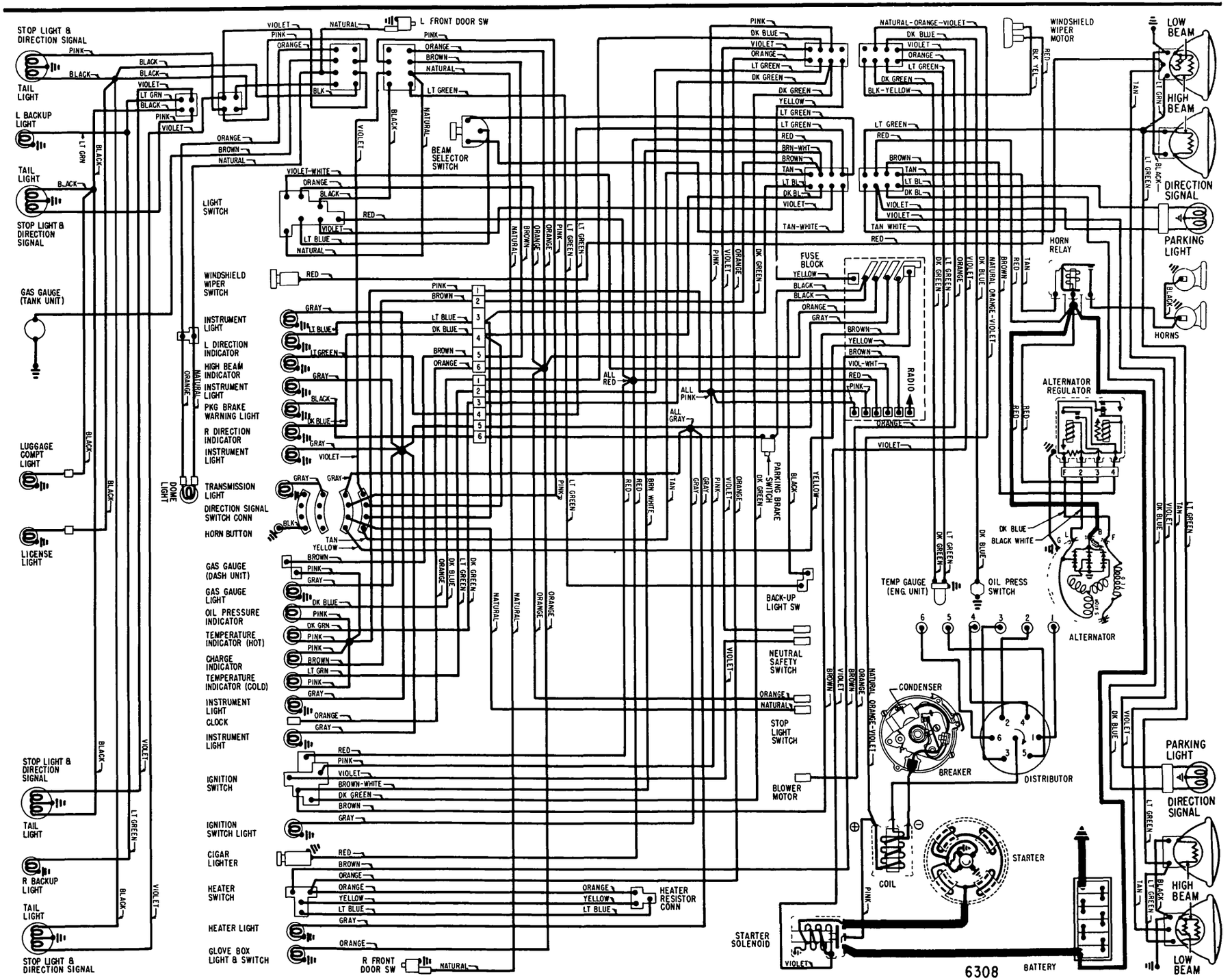
CHEVROLET 6 CYL. (EXC. CHEVY II)
AUTOMATIC TRANSMISSION THROTTLE LINKAGE



CHEVY II AUTOMATIC TRANSMISSION THROTTLE LINKAGE



CHEVY II 4 & 6 CYL. WIRING DIAGRAM



CHEVROLET 6 CYL. WIRING DIAGRAM

ELECTRICAL

BATTERY

12 Volt, 44 Amp. Hr. (20 Hr. Rate)

Battery Ground - Negative to cylinder head.
Engine Ground - Rear of cylinder head to firewall.

STARTER

Delco-Remy 1107259, 1107260

Torque	RPM	Volts	ℂ Amperes
0 ft. lbs.	6200-9400	10.6	49-76
	Lock	4.3	270-310

ℂ - Includes Solenoid.
Brush Spring Tension - 35 ozs (1107260); 40 ozs. (1107259).

ALTERNATOR

Delco-Remy No.	Volts	Amps.	Alt. RPM
1100628	14 0	25	2000
		35	5000
1100629	14.0	28	2000
		40	5000
1100630	14.0	21	2000
		30	5000
1100633	14 0	32	2000
		50	5000
1117765	14.0	18	1100
		62	6500

ALTERNATOR REGULATOR

Delco-Remy 9000595 (1117765 Alternator), 1119512 (Other Alternators).

Field Relay

Point Gap - 030 ' (1119512), 027" (9000595).
Air Gap - 015"
Closing Voltage - 2 3-3 7 volts (9000595); 1 5-2 7 volts (1119512)

Voltage Regulator

Setting - 13 5-14 4 volts at 125°F (1119512); 13.2-14 2 volts at 125°F (9000595)
Air Gap - 067" (1119512); 075" (9000595).

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located under dash panel.

IN-LINE FUSE

Overdrive fuse in wiring harness on engine side of dash.

CIRCUIT BREAKERS

40 Ampere - Hydraulic top motor.
15 Ampere - Headlights, high beam indicator, parking lights. Integral with headlight switch.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Steering Column Mounted Selector Lever - Located on steering column mast jacket under instrument panel. To adjust, place selector lever in Neutral and loosen screws securing switch retainer. While holding ignition switch in start position, adjust position of neutral safety switch until engine starts cranking. Hold switch in this position and tighten retaining screws. Check adjustment by placing selector lever in Neutral and Park positions and cranking engine.
Floor Mounted Selector Lever - Located on left side of transmission case and linked to transmission manual control lever. To adjust, vary length of bell-crank-to-switch control rod. A swivel is provided at one end of rod for adjustment.

DIRECTION SIGNAL FLASHER LOCATION

On fuse block located on left side of firewall in drivers compartment *NOTE* - Flasher on Chevrolet Impala and Nomad Station Wagon is "3 bulb type" (all others are "2 bulb type").

STOP LIGHT SWITCH ADJUSTMENT

Switch located under dash in contact with brake pedal. To adjust, position switch so light operates when pedal depressed 5/8" from fully released position.

LIGHTING SWITCH REMOVAL

Pull control knob to ON position. Depress switch shaft retainer button on switch. Remove knob and shaft assembly. Remove retaining ferrule and escutcheon, then remove switch assembly. Disconnect multiple connector. *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch.

INSTRUMENT CLUSTER CONSOLE REMOVAL

On Chevy II cars, loosen upper retaining clamp and slide upper mast jacket upward, then loosen lower clamp and drop mast jacket and steering wheel down. On all cars disconnect speedometer cable and remove console-to-instrument panel screws. Lean console forward onto mast jacket. Remove individual instruments as required. Remove console as a unit by unsnapping all wire connectors. *CAUTION* - When installing, be sure to attach single ground washer on one of the nine console attaching screws.

SPEEDOMETER CLUSTER REMOVAL

Remove instrument cluster console (see above), then disconnect electrical connectors and attaching screws. Remove speedometer.

BELT ADJUSTMENT

SPECIFICATIONS

70-80 lbs. using strand tension gauge Tool J-7316. To adjust, move generator or idler pulley.

ENGINE

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compression Ratio	Bore	Stroke	Displacement
4 Cyl. (Chevy II)	90 at 4000	8.5-1	3.875"	3.25"	153 cu. ins.
6 Cyl. (Chevy II)	120 at 4400	8.5-1	3.563"	3.25"	194 cu. ins.
6 Cyl. (Chevrolet)	140 at 4400	8.5-1	3.875"	3.25"	230 cu. ins.

ENGINE REMOVAL

Chevy II - Engine and transmission must be removed as a unit as follows:
1) Drain all systems, and disconnect hoses, wires, and linkages Remove radiator.
2) Remove exhaust pipe.
3) On Auto. Trans. cars, remove transmission oil filler tube and plug opening.
4) Disconnect clutch cross shaft bracket at frame, and disconnect clutch pushrod, spring, and pedal linkage.
5) Secure engine (attach hoist to cylinder head bolt holes)
6) Remove drive shaft by removing universal joint U-bolts. Plug end of transmission extension housing.
7) Disconnect steering linkage idler arm bracket from right side rail and lower linkage.
8) Disconnect speedometer cable and transmission control rod linkage lower ends.
9) Loosen engine front mount bolts and lift engine slightly, then remove front mount bolts, nuts, washers
10) Remove transmission crossmember and free transmission rear mounting. *CAUTION - Unless sufficient weight has been removed from crossmember, transmission extension or crossmember may suddenly swing down.*
11) Remove engine and transmission as a unit.

Chevrolet 6 Cyl. - Remove engine and transmission as a unit as follows:
1) Drain all systems, and disconnect all wires, hoses, and linkages. Remove radiator and fan blades.
2) Drain transmission if propeller shaft opening plug not available Remove propeller shaft and plug opening.
3) Disconnect clutch linkage, speedometer cable, clutch linkage at cross shaft (Synchro-mesh Trans.).
4) Remove clutch cross shaft engine bracket
5) Attach lifting device, remove front mount through bolts, raise engine slightly (take weight off front mounts), then remove rear mount bolts.
6) Remove engine and transmission as a unit

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CYLINDER HEAD INSTALLATION

Coat cylinder head bolts with sealing compound and tighten to specifications in sequence shown in diagram

OIL PAN REMOVAL

Chevy II - 1) Drain crankcase, disconnect battery, remove starter.

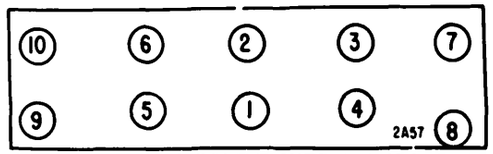
2) Disconnect steering idler arm bracket at right frame side rail and swing steering linkage down for clearance. On 6 Cyl. cars remove front crossmember (let stabilizer bar hang down while removing crossmember on station wagons).

3) On all cars remove oil pan attaching bolts and remove oil pan. *NOTE* - When installing oil pan, install screws into timing gear cover last as they are installed at an angle and holes will line up after other oil pan bolts are installed.

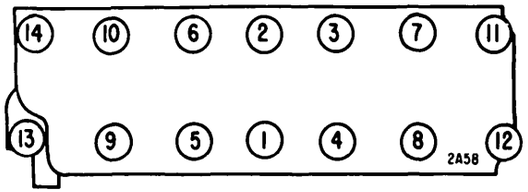
TIGHTENING SPECIFICATIONS

CHEVY II	Ft. Lbs.
Cylinder Head	90-95
Manifold (2 Center) Clamp Bolts	25-30
Manifold (Outer) Clamp Bolts	15-20
Int Man to Exh Man Nuts	15-30
Oil Pan (Size 1/4"-20)	6 1/2-7 1/2
(Size 5/16" - 18)	12 1/2-15
Main Bearing Caps	45-55
Flywheel	50-65
Fan Blade to Hub	5-6
Crankshaft Pulley to Hub (4 Cyl)	15-20
Connecting Rod Caps	30-35
Camshaft Thrust Plate	6-7 1/2
Rocker Arm Cover	3-4
Engine Front Cover	6 1/2-7 1/2
Water Pump	13-17
Water Outlet	18-23
Thermostat Housing to Cyl Head	25-30
Oil Pump	9-11
Oil Pump Cover to Body	5-6
Oil Filter	*Hand Tight*
Clutch Housing Cover Plate	6 1/2-7 1/2
Clutch Housing to Crankcase	28-38

CHEVROLET 6 CYLINDER	Ft. Lbs.
Cylinder Head	90-95
Intake Manifold	25-35
Exhaust Manifold (Two center bolts)	25-30
(Others)	15-20
Oil Pan (Corner bolts)	12 1/2-15
(Other screws)	6-7 1/2
Main Bearing Caps	100-110
Flywheel	55-65
Crankshaft Pulley	15-20
Connecting Rod Caps	35-45
Rocker Arm Support Bracket	25-30
Rocker Arm Cover	*20-25 Inch Lbs*
Engine Front Cover	6-7 1/2
Water Pump	25-35
Oil Pump Cover	6-9
Clutch Housing	45-55



4 CYLINDER HEAD BOLT TIGHTENING SEQUENCE



6 CYLINDER HEAD BOLT TIGHTENING SEQUENCE

Chevrolet 6 Cylinder with Synchro-mesh - 1) Drain radiator and oil pan.
2) Disconnect gas tank line at fuel pump and radiator hoses at radiator.
3) Remove clutch housing-to-engine block bolt.
4) Raise engine and rotate crankshaft to align distributor rotor between Nos. 3 and 5 plug wires (No. 6 crankthrow part way up).
5) Remove starter assembly and flywheel front cover plate.
6) Remove front mount through-bolts. *CAUTION* - DO NOT REMOVE or loosen rear mount.
7) Install Tool J-6978 onto harmonic balancer (use as crankshaft extension for jacking engine).
8) Jack engine as high as possible with left side of clutch housing flange riding in body tunnel and right side just clearing tunnel and riding against firewall. *NOTE* - Engine will raise at necessary angle to remove pan
9) Remove engine front mount frame bracket on right side and remove oil filter.
10) Remove oil pan screws and lower pan to frame. *NOTE - Oil pan gaskets can be replaced if desired at this point.*
11) Remove oil pump, then remove oil pan by sliding and rotating front of pan to right of engine, then rearward, down, and out at an angle to left corner (rear) of engine.

Chevrolet 6 Cylinder with Powerglide - 1) Drain radiator and crankcase, then remove gas tank line at fuel pump and hoses at radiator.
2) Remove clutch housing-to-engine block bolt above dowel pin on each side.
3) Rotate crankshaft to place distributor rotor between Nos. 3 and 5 plug wires (No. 1 crankthrow part way up).
4) Raise vehicle and remove converter cover pan and starter assembly.
5) Remove front mount through bolts. *CAUTION* - DO NOT REMOVE or loosen rear mount bolts.
6) Disconnect transmission modulator line at modulator (so line not crimped in tunnel).
7) Install Tool J-6978 onto harmonic balancer (used as crankshaft extension for jacking engine).
8) Raise engine as high as possible with rocker arm cover resting on firewall. *NOTE* - Vacuum modulator line will be snug, not crimped, in tunnel and accelerator linkage should be free.
9) Remove oil pan screws and lower pan to frame.
10) Remove oil pump and screen assembly, then remove pan downward and rearward. Oil pan front seal curvature should straddle front main bearing cap then rear of oil pan will clear flywheel.

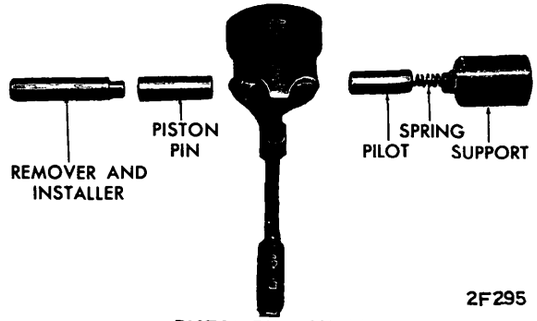
PISTONS, PINS, RINGS

Engine	℄ PISTON Clearance	PISTON PIN ℗ Piston Fit	PISTON PIN Rod Fit	PISTON RINGS Ring	End Gap	Side Clearance
4 Cyl.	.0006-.0010"	.00015-.00025"	Press Fit	Compr. Oil	.010-.020" .015-.055"	0020- 0035 Snug
6 Cyl.	.0006-.0010"	.00015-.00025"	Press Fit	Compr. Oil	.010-.020" .015-.055"	.0020-.0035" Snug

℄ - Measure 2.44" from top of piston ℗ - Wear limit .0011".

PISTON PIN REMOVAL & INSTALLATION

Removal - Install pilot of Tool J-9510 on piston pin Install piston and rod assembly on support and place assembly in an arbor press Press pin out of rod **Installation** - Using Tool J-9510 (see illustration) position rod in piston so that flange or heavy side of rod (at bearing end) will be to front of piston (cast depression in top of piston head) Install pin on installer and pilot spring and pilot in support Install piston and rod on support (indexing pilot through piston and rod) Using an arbor press, start pin into piston and press on installer until pin pilot bottoms Check pin for freedom of movement in piston bore



PISTON PIN ASSEMBLY

FITTING PISTONS

Use .0015" x ½" ribbon feeler (part of Tool J-5513). With piston and cylinder clean and dry, insert feeler and inverted piston into cylinder until center of piston pin is flush with top of cylinder block, with feeler 90° from piston pin hole. Pull required to withdraw feeler should be 7-18 lbs.

PISTON & ROD INSTALLATION

Cast depression in piston head towards front of engine. Oil hole in rod towards camshaft (flange or heavy side of rod must face front of engine).

VALVE SPRING INSTALLED HEIGHT

Installed Height - If height greater than 1 23/32" (measured from top of spring seat in head to top of valve spring shield) install 1/16" spacer under spring at spring seat. *CAUTION* - Installed height must not be less than 1 21/32".

VALVE GUIDES

Integral with cylinder head. For oversize valve stem, ream to next oversize with Tool Set J-7049.

VALVE STEM SEALS

"O" Ring type used on all valves. Installed in lowest groove on upper part of stem below locks and against cap.

ROCKER ARM STUD REPLACEMENT

Damaged rocker arm studs may be replaced with standard size studs. Loose studs should be replaced with .003" or .013" Oversize studs after reaming stud holes with Tool J-5715 (.003"), Tool J-6036 (.013"). Remove old stud with Tool J-5802 (with installing nut and flat washer). Ream hole if necessary, then coat press-fit area of stud with hypoid axle grease. Install new stud with Tool J-6880. Tool should bottom on head.

HYDRAULIC LIFTER SERVICE

If lifter parts found defective, replace lifter. Fill lifter with SAE 10 oil before installation. *NOTE - It is not necessary to remove ball check valve from plunger for cleaning.*

HYDRAULIC LIFTER ADJUSTMENT (AT ENGINE OVERHAUL)

Use distributor rotor position for determining when lifter is on base circle of cam. With rotor pointing to No. 1 cylinder (points open), turn adjusting screw down until all lash is removed (check pushrod side-play). Turn screw down an additional 1 full turn and tighten locknut. Repeat on other valve for that cylinder. Continue to adjust valves for each cylinder using firing order sequence. *NOTE - If lifters are noisy, see "Lifter Adjustment (Engine Running)" under TUNE-UP.*

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	① Journal Diam.	Clearance	Thrust Brg.	② Endplay	① Journal Diam.	Clearance	Sideplay
4 Cyl.	2.2978-2.2988"	.0008-.0034"	No. 5	.002-.006"	1.999-2.000"	.0007-.0027"	.008-.014"
6 Cyl.	2.2978-2.2988"	.0008-.0034"	No. 7	.002-.006"	1.999-2.000"	.0007-.0027"	.008-.014"

① - Out-of-round and taper limit .001". ② - .009" wear limit.

REAR MAIN BEARING OIL SEAL

Can be replaced with crankshaft in engine. *NOTE - Always replace upper and lower seal as a unit.* Drain crankcase and remove oil pan. Remove oil seal from groove, prying from bottom (with small screwdriver). Clean crankshaft surface and install well lubricated seal in bearing cap groove (keep oil off parting line surface) and gradually push until seal is rolled into place (use hammer handle). To replace upper half of seal, use a small hammer and brass pin punch to tap one end of seal until it protrudes enough to be removed with pliers. Install new seal by rolling seal into groove. *NOTE - Lip of seal faces front of engine.* Install bearing cap and torque cap bolts to specifications.

CRANKSHAFT PULLEY (4 CYL.)

Removal - Remove radiator core and shroud as a unit. Remove belt and pulley. Install suitable puller tool on hub using two 3/8" x 2" and one 5/16" x 2" bolts. **Installation** - Coat hub seal contact area with engine oil, position hub on crankshaft (key aligned) and drive hub onto shaft with Tool J-5590 (or suitable tool) until hub bottoms against crankshaft gear. *NOTE - Crankshaft extends through hub and tool must be used to ensure seating hub properly on shaft.* Install pulley and tighten mounting bolts securely.

HARMONIC BALANCER (6 CYL.)

Removal - Remove radiator and belt. Remove balancer with suitable puller (use tapped holes in balancer face).

Installation - Coat balancer hub seal contact area with engine oil, assemble Tool J-8792 on balancer (see Tool Note below), position balancer on crankshaft (key aligned) and drive balancer onto shaft until it bottoms against crankshaft gear. Remove tool.

TOOL J-8792 NOTE - This tool also used on V8 engines (different set-up) and must be used exactly as follows for use on 6 Cyl. Engines: Thread Driver into Clamp on deep finger side of clamp (side marked V8), insert pilot in end of driver on opposite side of clamp with smaller end in toward clamp, secure pilot with machine screw. Install tool assembly on balancer with shallow fingers of clamp engaging pulley rim on balancer.

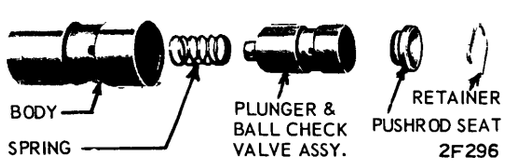
FRONT OIL SEAL INSTALLATION

Remove crankshaft pulley (4 Cyl.), harmonic balancer (6 Cyl.). See above. Drain oil and remove pan. Remove timing gear cover and gasket. Pry oil seal out of cover from front with large screwdriver. Install new seal with lip (open side of seal) toward inside of cover and drive or press seal into place with Tool J-0995 (cover removed), or Tool J-8340 (cover in place).

VALVES

Engine & Valve		Head Diam.	Face Angle	Seat Angle	Seat Width	① Stem Diameter	Stem Clearance	④ Valve Lift
4 Cyl.	Intake	1.715-1.725"	45°	46°	1/32-1/16"	.3410-.3417"	.0010-.0027"	.3973"
	Exhaust	1.495-.1.505"	45°	46°	1/16-3/32"	.3410-.3417"	③.0015-.0032"	.3973"
6 Cyl. Engs. Chevy II	Intake	1.715-1.725"	45°	46°	1/32-1/16"	.3410-.3417"	.0010-.0027"	.3350"
	Exhaust	1.495-1.505"	45°	46°	1/16-3/32"	.3410-.3417"	③.0015-.0032"	.3350"
Chevrolet	Intake	1.715-1.725"	45°	46°	1/32-1/16"	.3410-.3417"	.0010-.0027"	.3350"
	Exhaust	1.495-1.505"	45°	46°	1/16-3/32"	.3410-.3417"	.0015-.0032"	.3350"

① - Standard size. ③ - Measured at center. ④ - Measured at valve stem.



HYDRAULIC VALVE LIFTER

VALVE SPRINGS & LIFTERS

Engine	Valve Spring Pressure (Lbs.)		Free Length
	Valve Closed	Valve Open	
4 Cyl.	① 84-92 at 1.66"	① 166-176 at 1.33"	2.03"
6 Cyl.	84-92 at 1.66"	166-176 at 1.33"	2.03"

① - Includes damper.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT

CAMSHAFT			
Engin	℄J urnal Diam ter	Endplay	Cam Lobe Lift
All	1.8687-1.8692"	.001-.005"	.1914"

℄ - Out-of-round limit .001".

CAMSHAFT REMOVAL

Drain crankcase and radiator. Remove radiator and grille. Remove rocker arm cover, rocker arm shaft assembly, coil, valve side cover, pushrods, and lifters. When removing distributor, note position of rotor. Remove vibration damper (6 Cyl., see above), crankshaft pulley (4 Cyl., see above). Remove oil pan and engine front cover (see above). Remove camshaft thrust plate screws and remove camshaft and gear. *CAUTION - Support shaft to prevent bearing damage.*

CAMSHAFT ENDPLAY

Taken by thrustplate between camshaft sprocket and camshaft gear.

CAMSHAFT LOBE LIFT CHECK

1) Remove valve rocker cover, gaskets, rocker arms and balls.
2) Attach Tool J-8520 to stud, then position clamp and indicator with ball socket adapter of Tool J-8520 to pushrod. *NOTE* - Pushrod must be in lifter socket.
3) Rotate crankshaft slowly in direction of rotation until lifter is on heel of cam lobe. At this point, Pushrod will be at lowest position.
4) Set dial indicator to zero, then rotate crankshaft slowly or attach an auxiliary starter switch and "bump" engine over until pushrod is in fully raised position. *NOTE - Ground primary wire on coil before cranking.*
5) Total lift on indicator should be .1914". To check reading for accuracy, continue to rotate engine until dial indicator reads zero.

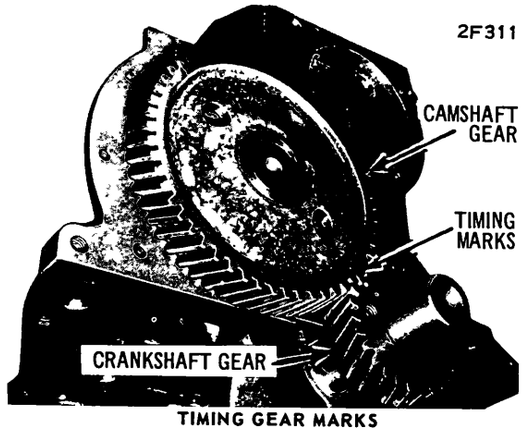
CAMSHAFT BEARING REPLACEMENT

Use suitable tools for removal and installation and note the following:
Front Bearing - Front bearing must be driven approximately 1/8" behind front of cylinder block to uncover oil hole to timing gear oil nozzle.
Rear Bearing - Rear bearing installed position is flush with inner edge of rear cam bearing bore in block.

TIMING GEAR SERVICE

Gears are press fit on camshaft and crankshaft. Use suitable tools for removal and installation.
Camshaft Gear Removal - Use support sleeve in back of gear and press shaft out of gear. *CAUTION* - Thrust plate must be positioned so no damage will result (by woodruff key in shaft) while shaft is being pressed out of gear.
Camshaft Gear Installation - Support shaft directly back of front bearing journal and install gear spacer ring and thrust plate. Install woodruff key in shaft keyway. Press camshaft gear onto shaft until it bottoms against gear spacer ring. End clearance of thrust plate should be .001-.005". Install camshaft assembly in block. Line-up gear teeth (see illustration), then push camshaft into position. Install camshaft thrust plate-to-block screws and tighten securely. Gear runout should not exceed .004" (camshaft), .003" (crankshaft). Backlash between timing gear teeth should be .004-.006". *CAUTION* - Press on hub only when installing gear.

VALVE TIMING				
	INTAKE		EXHAUST	
Engine	Open BTDC	Close ALDC	Open BLDC	Close ATDC
4 Cyl.	33°30'	86°30'	73°	47°
6 Cyl.	34°	86°	68°	52°



TIMING GEAR MARKS

ENGINE OILING

ENGINE OILING SYSTEM

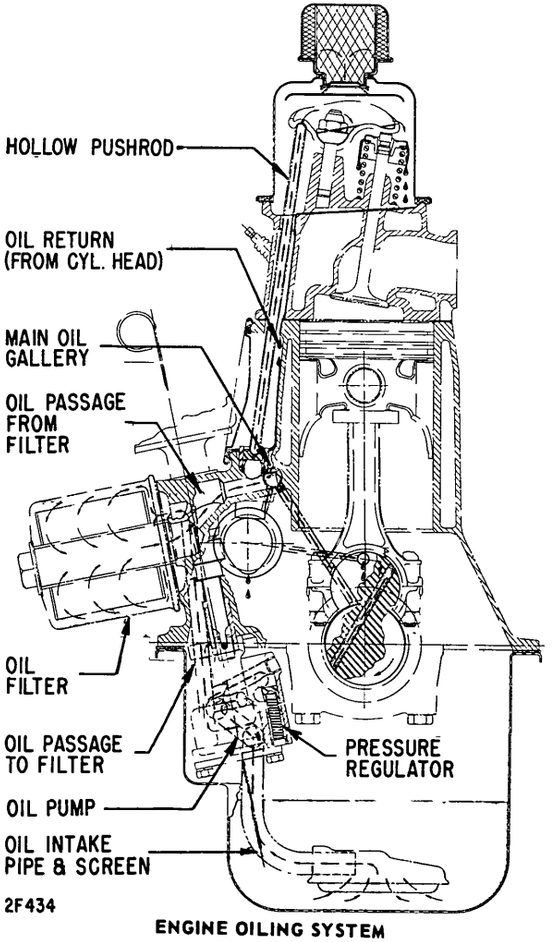
Oil pump mounted on right lower flange of crankcase in oil pan draws oil from pan through a floating screen and delivers oil through passage in pump body and crankcase to full flow filter on right side of engine. Oil flows from filter to main oil gallery in block and is distributed as detailed below. Pressure regulator valve is located in oil pump and a bypass valve is located in filter base.

Crankshaft & Camshaft Bearings - Each main and camshaft bearing is fed oil by a passage extending through crankcase webs from main oil gallery.

Connecting Rods & Pistons - Oil is delivered from each main bearing to adjacent connecting rod bearing through drilled passages in crankshaft. A hole in connecting rod sprays oil onto cylinder walls for piston and pin lubrication, when holes in rod and journal index. Oil hole in rod is towards camshaft side of engine.

Valve Lifters - Main oil gallery intersects lifter bores and lifters are supplied with oil directly from gallery. Lifter has metering valve directly below hole in pushrod seat to permit oil to pass into hollow pushrod.
Rocker Arms & Valve Stems - Oil passes up through hollow pushrods to a hole in upper end of pushrods that matches hole in rocker arm. Oil sprayed from this hole and across rocker arm lubricates valve stem tip. Oil in rocker arm chamber drains down through pushrod holes to valve lifter chamber, then returns to crankcase through drain holes.
Timing Gears - Lubricated by oil flow from nozzle pressed in front face of block above crankshaft gear. Oil is fed to nozzle through cross-passage from front camshaft bearing.
Distributor Drive Gear - Lubricated by oil drainage from valve lifter compartment (drain hole directs oil onto gears).

Normal Oil Pressure - 30-45 psi at 1500 RPM.
Pressure Regulator Valve - Located in oil pump body. Not adjustable.



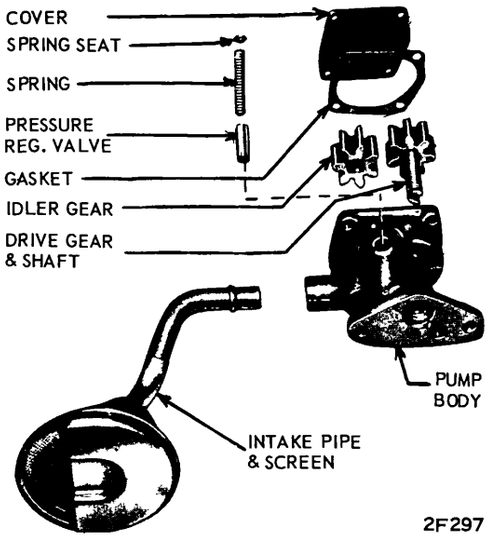
ENGINE OILING SYSTEM

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PUMP

Removal & Disassembly - Remove oil pan (see above). Disassemble pump and inspect parts for wear. Replace entire unit if parts worn or defective.

Reassembly & Installation - Reverse removal procedure. *CAUTION* - Do not use gasket on pump mounting flange.



ENGINE OIL PUMP

DISTRIBUTOR DRIVE SHAFT LOWER BEARING

Bushing pressed into lower side of cylinder block (with or without thrust washer at upper end) and serves as lower bearing for distributor shaft (inside diameter), and as pilot for oil pump shaft (outside diameter). Replace bushing (and thrust washer) when distributor shaft-to-bushing clearance exceeds .0035".

Removal - Use Tool J-9534 and slide hammer to remove bearing. Drive out thrust washer with suitable drift.

Installation - Drive new thrust washer into place with Tool J-9535. Using Tool J-9535 with driver-bolt in driver handle, install driver into new bushing from large inside diameter. Drive bushing into position. *NOTE - Proper position of bushing is determined when tool bottoms against cylinder block.* Withdraw tool from bushing. If bushing seizes on installer arbor, remove tool with slide hammer. Bushing will not be damaged and tool is designed for this purpose.

FILTERS & CLEANERS

	① Service Intervals
Oil Filter	Replace every 6000 miles
Air Cleaner	Clean every 12,000 miles
Breather Cap	Clean and re-oil every oil change
Fuel Filter	Replace if carburetor floods

① - Replace or clean more often if necessary

MODEL IDENTIFICATION

Chevrolet

Model No.	Car Series	Car Model
1111	Biscayne	2-Door Sedan
1169	Biscayne	4-Door Sedan
1135	Biscayne	4-Door Sta. Wgn.
1511	Bel Aire	2-Door Sedan
1569	Bel Aire	4-Door Sedan
1535	Bel Aire	4-Door Sta. Wgn. (6 Pass.)
1545	Bel Aire	4-Door Sta. Wgn. (9 Pass.)
1769	Impala	4-Door Sedan
1747	Impala	2-Door Sport Coupe
1739	Impala	4-Door Sport Sedan
1767	Impala	2-Door Convertible
1735	Impala	4-Door Sta. Wgn. (6 Pass.)
1745	Impala	4-Door Sta. Wgn. (9 Pass.)

Chevy II

Model No. 4 Cyl.	Model No. 6 Cyl.	Car Series	Car Model
111	211	100 Standard	2-Door Sedan
169	269	100 Standard	4-Door Sedan
135	235	100 Standard	4-Door Sta. Wgn.
311	411	300 Deluxe	2-Door Sedan
369	469	300 Deluxe	4-Door Sedan
345	445	300 Deluxe	4-Door Sta. Wgn.
	449	Nova 400	4-Door Sedan
	437	Nova 400	2-Door Spt. Cpe.
	467	Nova 400	2-Door Convert.
	435	Nova 400	4-Door Sta. Wgn.

SERIAL NUMBER

Located on left front body hinge pillar.

① ② ③ ④
3 1511 J 100001

① - Model year, 1963.
② - Car series and model. *See above.*
③ - Assembly plant designation. *See below.*
④ - Beginning number at each plant.

Assembly Plant Designation

A Atlanta	K Kansas City	R Arlington
B Baltimore	L Los Angeles	S St. Louis
F Flint	N Norwood	T Tarrytown
G Framingham	O Oakland	W Willow Run
J Janesville	P GM Truck	

ENGINE NUMBER

Stamped on pad right side of engin at r ar of distributor.

① ② ③ ④
F 12 10 B

① - Engine plant. F Flint, T Tonawanda.
② - Month built. 12 December.
③ - Day built. 10 tenth day.
④ - Engine type. *See below.*

Engine Code Designation

E	4 Cyl. Eng. with Synchro-mesh Transmission.
EB	4 Cyl. Eng. with Synchro-mesh and H.D. Clutch.
EG	4 Cyl. Eng. with Powerglide.
H	6 Cyl. Eng. with Synchro-mesh Transmission.
HB	6 Cyl. Eng. with Synchro-mesh and H.D. Clutch.
HF	6 Cyl. Eng. with Powerglide.
A	6 Cyl. Eng. with Synchro-mesh Transmission.
AE	6 Cyl. Eng. with Synchro-mesh and H.D. Clutch.
B	6 Cyl. Eng. with Powerglide.

CAPACITIES

	Chevy II 4 Cy.	Chevy II 6 Cyl.	Chevrolet 6 Cyl.
Water ①	9 qts.	12 qts.	12 qts.
Crankcase	② 3½ qts.	③ 4 qts.	③ 4 qts.
Manual Trans. ④	2 pts.	2 pts.	2 pts.
Auto. Trans. ⑤	15 pts.	15 pts.	17.7 pts.
Rear Axle	4 pts.	4 pts.	4 pts.

① - Includes heater. ② - 4 qts. with filter change.
③ - 5 qts. with filter change.
④ - Add 1 pt. for Overdrive. ⑤ - Includes converter.

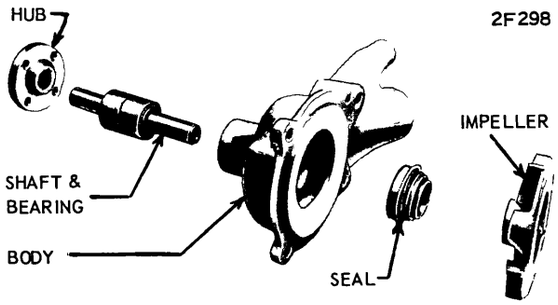
ENGINE COOLING

Thermostat - Pellet type (170°F) located in cylinder head water outlet.

Pressure Valve - 13 psi radiator filler cap.

WATER PUMP

See illustration for arrangement of parts. Use suitable drivers and supports when overhauling water pump. Mark position of hub on shaft before disassembling pump so hub can be reinstalled in same position. Observe the following when reassembling pump: Seal outer flange must bottom against pump body. Press hub on shaft to same mark made at disassembly or use special Hub Locating Gauge J-9583. Press impeller on shaft so there is .010-.035" clearance between impeller vanes and pump body.



ENGINE WATER PUMP

TUNE-UP SPECIFICATIONS

ENGINE IDENTIFICATION

Engines may be identified by suffix letters following engine number stamped on pad at top front of right cylinder bank directly forward of right rocker cover as follows:

Letter Suffix	Engine Displacement	Horsepower
CB,CD,CL,D,DK	283"	195
R,RA,S,SA,RC,SC	327"	250
RB,RK,SB,SG,RD,SD	327"	300
RE	327"	340
RF	327"	360
QA	409"	400
QB	409"	425
QC,QG	409"	340

COMPRESSION PRESSURE

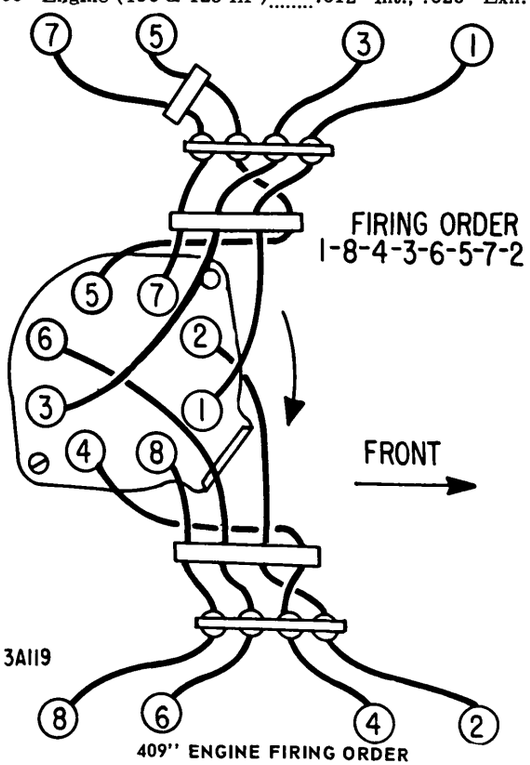
With plugs removed and throttle wide open.

283" Engine	150 psi
327" Engine (250 & 300 HP)	160 psi
327" Engine (340 & 360 HP)	150 psi
409" Engine	150 psi

Maximum variation between cylinders 20 psi (except Corvette); 15 psi (Corvette).

VALVE TAPPET CLEARANCE

283" Engine	Hydraulic
327" Engine (250 & 300 HP)	Hydraulic
327" Engine (340 & 360 HP)	.008" Int.; .018" Exh.
409" Engine (340 HP)	Hydraulic
409" Engine (400 & 425 HP)	.012" Int.; .020" Exh.



409" ENGINE FIRING ORDER

LIFTER ADJUSTMENT (ENGINE RUNNING)

With engine warm and idling, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops. This is "Zero Lash". Now turn nut an additional ¼-turn and wait until engine runs smoothly, continue to turn nut down in ¼-turn increments until nut has been turned down **1 full turn** from "Zero Lash". *CAUTION - Make adjustment slowly so lifter will adjust itself and prevent engine damage.*

SPARK PLUGS

Gap (All)	.035"
Torque (All)	20-25 ft. lbs.

Spark Plug Type

283" Engine	(Standard)	AC 45
	(Colder)	AC44
327" Engine	(Standard)	AC 44
	(Colder)	AC 43
	(Hotter)	AC 45
409" Engine	(Standard)	AC C43N
	(Colder)	AC C42N
	(Hotter)	AC C44N

DISTRIBUTOR

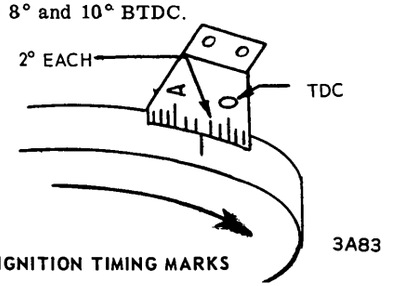
Point Gap (All)	.019" (new); .016" (used)
Cam Angle (All)	28-32° (30° preferred)
Breaker Arm Spring Tension (All)	19-23 ozs.
Condenser Capacity (All)	.18- 25 mfd.

IGNITION TIMING

Set at idle with vacuum line disconnected.

283" Engine	4° BTDC (Range 4-8° BTDC)
327" Engine (250 HP)	4° BTDC (Range 4-10° BTDC)
327" Engine (300 HP)	8° BTDC (Range 6-12° BTDC)
327" Engine (340 & 360 HP)	10° BTDC
409" Engine (340 HP)	①6° BTDC
409" Engine (400 & 425 HP)	12° BTDC

① - Supersedes 8° and 10° BTDC.



IGNITION TIMING MARKS

HOT (SLOW) IDLE RPM

Engine	①Synchro-mesh	②Auto. Trans.
283" Engine	475	450
327" Engine (250 & 300 HP)	475	450
327" Engine (340 HP)	750	
327" Engine (360 HP)	850	
409" Engine (340 HP)	500	475
409" Engine (400 & 425 HP)	750	

① - In Neutral. ② - In Drive.

COLD (FAST) IDLE RPM

Rochester Carburetors..Correct when Hot (Slow) Idle set.
Carter Carburetors 1750

AUTOMATIC CHOKE SETTING

Engine	Synchro-mesh	Auto. Trans.
283"	1 Lean	Centered
327" (250 HP except Corvette)	Centered	Centered
327" (300 HP except Corvette)	1 Lean	Centered
327" (250 HP Corvette)	Centered	Centered
327" (300 HP Corvette)	1 Lean	1 Lean
327" (340 HP Corvette)	1 Lean	
409" (340 HP)	Centered	Centered
409" (400 HP)	2 Lean	
409" (425 HP)	2 Rich	

FUEL PUMP PRESSURE

283" & 327" Engines	5¼-6½ lbs
409" Engine	7¼-8½ lbs.

FUEL PUMP VOLUME

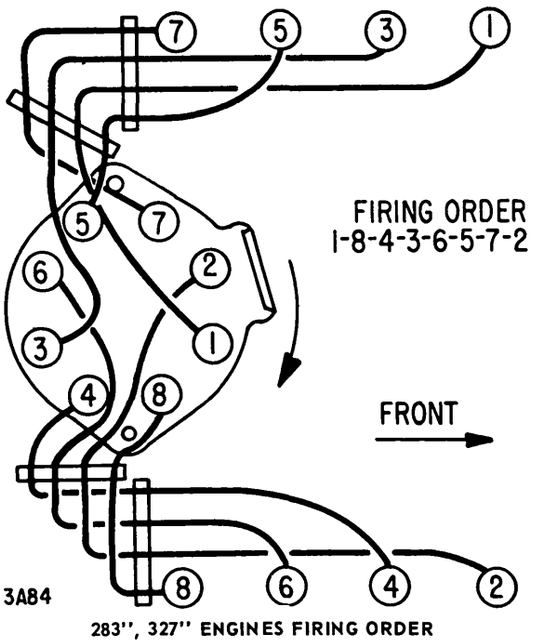
All Engines . . . . 1 Pt. in 30-45 seconds.

MANIFOLD HEAT CONTROL

Heat control valve and thermostatic coil assembly located between right exhaust manifold and crossover pipe (single exhaust), exhaust pipe (dual exhaust). Not used on fuel injection Corvette. If valve sticks, free up with GM Manifold Heat Control Valve Solvent or equivalent

CRANKCASE VENTILATION VALVE

Check operation of valve at every oil change and replace when necessary. *CAUTION - Do not change valves from one size engine to another.* To test valve, disconnect hose at valve on carburetor base, block valve opening and note engine RPM change. A drop of less than 50 RPM indicates a defective valve.



283", 327" ENGINES FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1111015

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	450	Start	7-9
2 5-4 5	600	8	15-16
9-11	1200		
14-16	2000		

For engine degrees and RPM, multiply by 2

Delco-Remy 1111016, 22, 23, 24

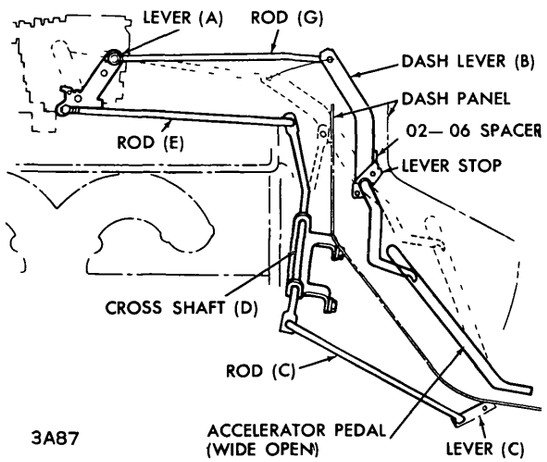
Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	425	Start	7-9
4 5-6 5	800	8	15-16
8-10	1600		
11-13	2300		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms
Primary Resistance (Delco-Remy 1115115).....	1.28-1.42
(Delco-Remy 1115107).....	1.03-1.13
(Delco-Remy 1115091).....	1.02-1.13
Secondary Resistance (1115115).....	7200-9500
(1115107,1115091).....	8000-10500
Ballast Resistor (Corvette).....	1.4-1.62
Resistor In Wiring Harness (exc. Corvette).....	1.8

Current Draw 1.8 amps. idling, 4.0 amps. stopped.



CHEVROLET AUTOMATIC TRANSMISSION THROTTLE LINKAGE

CARBURETOR

CORVETTE FUEL INJECTION: *See "Rochester Fuel Injection" in CARBURETION SECTION*

CARBURETOR SPECIFICATIONS

Carburetor	Float Level	Float Drop	Choke Setting
Rochester			
2GC 7023007	① 3/4"	② 1 29/32"	1 Lean
7023008,18	① 3/4"	② 1 29/32"	Centered
4GC 7023006,12	③	② 2 1/4"	Centered
7020023,24	④	⑤	Centered
Carter			
WCFB 3500S,01S	⑦	⑧	Centered
AFB 3460S ⑨	⑥	② 23/32"	Centered
3461S ⑨	⑥	② 23/32"	1 Lean
3499S ⑨	⑥	② 23/32"	2 Lean
3361S,62S ⑨	⑥	② 23/32"	2 Rich

① - With air horn inverted, gasket in place, measure from gasket to lower (sharp) edge of float seam at outer end

② - With air horn upright, gasket in place, measure from gasket to lowest point of float

③ - 1 17/32" (primary), 1 19/32" (secondary) with air horn inverted, gasket in place, measured from gasket to highest point of float

④ - With air horn inverted, gasket in place, measure from gasket to highest point on float heel (1 1/2" primary, 1 5/16" secondary), Float Toe measurement made between gasket and center of dimple on side of float at toe end (13/16" primary, 1/2" secondary)

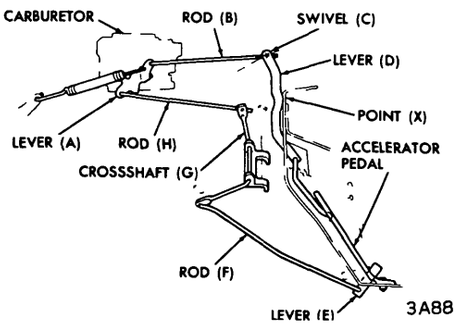
⑤ - 1 1/2" (primary), 1 1/8" (secondary) with air horn upright, gasket in place, measured from gasket to center of dimple on side of float at toe end

⑥ - 7/32" (solid seat), 3/16" (resilient seat) All ± 1/64" measured with air horn inverted, gasket in place, needle valve seated, from top of float at outer end to air horn gasket

⑦ - **Primary:** 7/32" (solid seat, Gauge T109-283), 3/16" (resilient seat, Gauge T109-222) **Secondary:** 9/32" (solid seat, Gauge T109-284), 1/4" (resilient seat, Gauge T109-223)

⑧ - 2" ± 1/16" (primary and secondary) with air horn upright, gasket removed, measured from bowl cover to lowest point of floats

⑨ - Primary and Secondary Floats



CORVETTE AUTOMATIC TRANSMISSION THROTTLE LINKAGE

MANIFOLD FUEL DISTRIBUTION

Carburetor left barrels feed cylinders 1,4,6,7; right barrels feed cylinders 2,3,5,8.

THROTTLE LINKAGE ADJUSTMENT

283", 327" (Exc. Corvette), 409" (Exc. Dual AFB) Automatic Transmission - 1) *See illustration.* With rod "C" in place, thread end of rod "E" half way through swivel and install other end in lever "A".

2) With lever "A" in wide open position, move cross shaft assembly "D" forward against its stop. Adjust swivel on rod "E" until it freely enters cross-shaft assembly "D". Fix swivel in cross-shaft.

3) Check adjustment by placing linkage in idle position and returning to wide open position. Push downward on lever "C" and note if rod "E" deflects. If rod deflects or lever "A" will not reach wide open position, repeat above adjustment.

4) Depress accelerator pedal until lever "B" contacts .02-.06" spacer. Rotate lever "A" to wide open, then adjust swivel in rod "G" for free entry into lever "A" and install rod into lever.

Corvette Automatic Transmission - 1) *See illustration.* Place lever "A" in wide open position and pull rod "H" forward against its stop. Adjust swivel on rod "H" for free entry into lever "A". Readjust swivel 3 turns (lengthens rod). Secure rod in lever "A".

2) With carpet removed, depress accelerator pedal so lever "D" contacts point "X" on toe panel. With pedal depressed, and lever "A" rotated to wide open, adjust swivel on rod "B" for free entry into lever "D". Rotate swivel 2 additional turns toward carburetor.

3) To check adjustment, place linkage in idle position, return to wide open (rotate lever "A") then push down on lever "E". If rod "H" deflects or lever "A" will not reach wide open, repeat above adjustment.

409" (with Dual AFB Carbs.) Synchro-mesh Transmission - 1) Remove carpet, air cleaner, and both throttle pull-back springs. Disconnect front carburetor rod at rear carburetor.

2) With throttle at wide open (rear carburetor), accelerator pedal should be ½-¾" from toe board (measure at middle of pedal).

3) To adjust, disconnect accelerator rod at carburetor and adjust swivel so it freely enters hole in carburetor throttle lever. Connect and secure accelerator rod with retainer clip.

4) With both carburetors at wide open throttle, the front carburetor throttle rod trunnion eye should slide freely over accelerator rod pin.

5) To adjust, loosen trunnion locknut and adjust trunnion and tighten locknut while holding front throttle rod hex head at front carburetor.

6) If linkage properly adjusted, front carburetor will begin to open when rear carburetor is at about half-throttle.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ELECTRICAL

BATTERY

12 Volt

Battery Capacity

Engin	Amp. Hrs. (20 Hr.)
283"	44
327" & 409"	61

Batt ry Ground - Negative to engine.
Engin Ground - Engine to cowl.

STARTER

Delco-Remy 1107237

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	6200-9400	10 6	49-76
	Lock	4 3	270-310

Delco-R my 1107242,233,274

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	3600-5100	10 6	65-100
	Lock	3 5	300-360

Delco-R my 1107286,289

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	3800-6200	10 6	70-105
	Lock	3 0	480-540

Ⓒ - Includes Solenoid
Brush Spring T nsion - 35 ozs (all)

ALTERNATOR

Delc -R my No.	Volts	Amperes	Alt. RPM
1100628	14 0	25	2000
		35	5000
1100629	14 0	28	2000
		40	5000
1100633	14 0	32	2000
		50	5000
1117765	14 0	18	1100
		62	6500

ALTERNATOR REGULATOR

Delco-R my 9000595 (1117765 Alt.), 1119512 (Others).

Field Relay

Closing Voltage - 2 3-3 5 volts (9000595), 1 5-2 7 volts (1119512)
Air Gap - 015"
Contact Gap - 030" (1119512), 027" (9000595)

V ltage Regulator

Setting (1119512) - 13 5-14 4 volts at 125°F operating on upper contacts, 1- 5 volt operating on lower contacts
Setting (9000595) - 13 2-14 2 volts at 125°F
C ntact Gap (1119512) - 014" (upper contacts) with lower contacts just closed
Air Gap (1119512) - 067" with lower contacts just touching
Air Gap (9000595) - 075"

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located under dash panel.

IN-LINE FUSE

Overdrive fuse in wiring harness of engine side of dash. Headlamp motor switch on Corvette.

CIRCUIT BREAKERS

40 Ampere - Hydraulic top motor.
15 Ampere - Headlights, high beam indicator, parking lights. Integral with headlight switch.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Steering Column Mounted Selector Lever - With selector lever in Neutral, loosen screws securing neutral safety switch retainer to steering column (just below dash). While holding ignition switch in "Start", adjust position of switch until engine cranks. Hold switch in this position and tighten retainer screws. Engine should crank in Neutral and Park.
Floor Mounted Selector Lever - Vary length of bell-crank-to-switch control rod. A swivel is provided at one end for adjustment.

LIGHTING SWITCH REMOVAL

Pull control knob to ON position Depress switch shaft retainer button on switch Remove knob and shaft assembly Remove retaining ferrule and escutcheon, then remove switch assembly Disconnect multiple connector *NOTE* - Use screwdriver inserted in side of switch to pry plug from switch

DIRECTION SIGNAL FLASHER LOCATION

On fuse block located on left side of firewall in drivers compartment *NOTE* - Flasher on Chevrolet Impala and Nomad Station Wagon is "3 bulb type" (all others are "2 bulb type")

STOP LIGHT SWITCH ADJUSTMENT

Switch located under dash in contact with brake pedal To adjust, position switch so light operates when pedal depressed 5/8" from fully released position

INSTRUMENT CLUSTER CONSOLE REMOVAL

Chevrolet (except Corvette) - Disconnect speedometer cable and remove console-to-instrument panel screws Lean console forward onto mast jacket Remove individual instruments as required Remove console as a unit by unsnapping all wire connectors *CAUTION* - When installing, be sure to attach single ground washer on one of nine console attaching screws

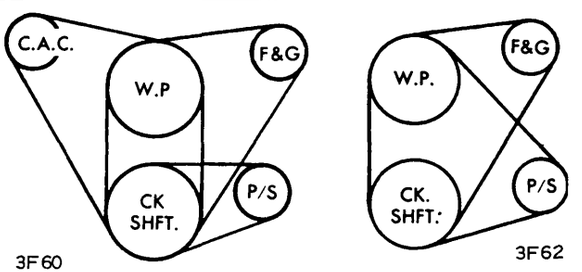
Corv tte - 1) Remove mast jacket assembly Disconnect tachometer drive cable at distributor
2) Disconnect cowl vent control cable brackets and headlamp panel control switch from cluster
3) Remove lighting switch (see above)
4) Remove ignition switch, then disconnect ignition switch lamp support at instrument panel
5) Disconnect parking brake lever support bracket at cowl crossmember
6) Disconnect oil pressure line at gauge, then remove lead wires from ammeter, wiper switch, cigar lighter Disconnect trip odometer at mast jacket support
7) Remove instrument cluster-to-dash retaining screws and pull cluster assembly slightly forward and remove speedometer cable, tachometer cable, cluster ground wire, fuel gauge lead wires and indicator and cluster illuminating lamps

SPEEDOMETER REMOVAL

Instrument cluster console must be removed (see above) Disconnect any electrical connectors and remove attaching screws Remove speedometer

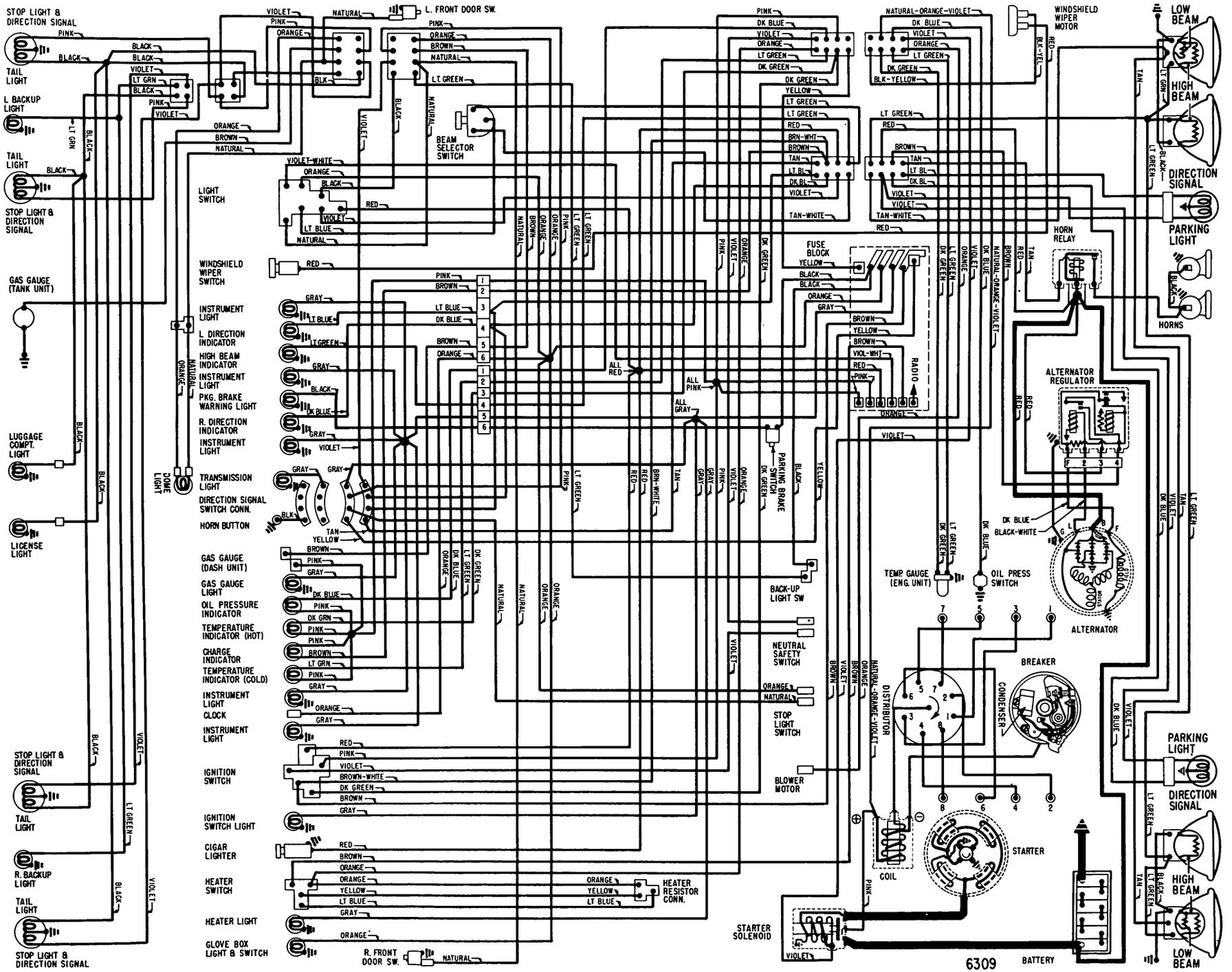
BELT ADJUSTMENT

70-80 lbs. midway between water pump and generator pulleys. Measure with a Strand Tension Gauge.

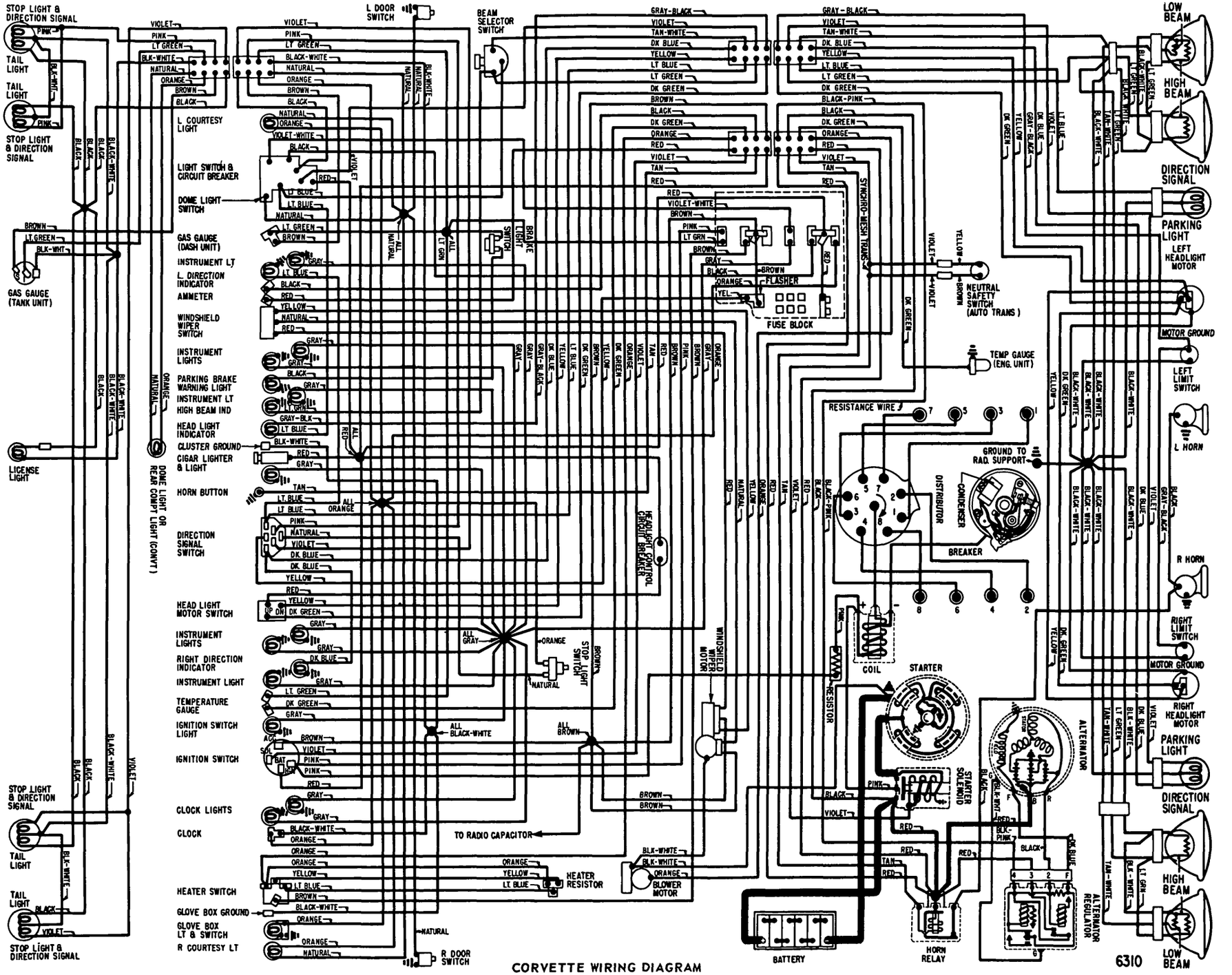


ENGINE DRIVE BELTS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



CHEVROLET V8 WIRING DIAGRAM



CORVETTE WIRING DIAGRAM

ENGINE

GENERAL SPECIFICATIONS

Engine & Carburetion	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
283" (2GC)	195 at 4800	9.25-1	3.875"	3.00"	283 cu. ins.
327" (WCFB or 4GC)	250 at 4400	10.5-1	4.00"	3.25"	327 cu. ins.
(AFB)	300 at 5000	10.5-1	4.00"	3.25"	327 cu. ins.
(AFB, Special Cam)	340 at 5000	11.25-1	4.00"	3.25"	327 cu. ins.
(Fuel Injection)	360 at 6000	11.25-1	4.00"	3.25"	327 cu. ins.
409" (4GC)	340 at 5000	10.0-1	4 5/16"	3.5"	409 cu. ins.
(One AFB)	400 at 5800	11.0-1	4 5/16"	3.5"	409 cu. ins.
(Two AFB)	425 at 6000	11.0-1	4 5/16"	3.5"	409 cu. ins.

ENGINE REMOVAL (Except CORVETTE & 409" ENGINE)

1) Drain systems and remove hood.
2) Remove radiator (on Auto. Trans. cars, disconnect and plug cooler lines).
3) Remove battery, all wires, air cleaner and filter.
4) Disconnect fuel and vacuum lines.
5) Remove exhaust pipe to manifold bolts. Disconnect carburetor control rods at bellcrank, clutch control bellcrank, and transmission rods.
6) Remove automatic transmission filler tube (plug opening). Disconnect speedometer cable, propeller shaft, and remove overdrive solenoid.
7) Remove exhaust crossover pipe and manifold heat control valve.
8) Install hoist, disconnect clutch idler shaft bracket, raise engine slightly and remove all engine and transmission mounting bolts. Remove engine and transmission as a unit.

ENGINE REMOVAL (CORVETTE & 409" ENGINE)

1) Drain systems, remove hood, air cleaner (cover carburetor) and remove air cond. compressor from engine mounting (tie to fender near battery).

TIGHTENING SPECIFICATIONS

Bolt or Nut	283", 327" - Ft. Lbs.	409"
Cylinder Head	60-70	60-70
Intake Manifold	25-35	25-35
Exhaust Manifold	ℂ 15-20	ℂ 15-20
Oil Pan (ends)	10-15	10-15
(side)	6-8	6-8
Main Bearing Caps	60-70	95-105
Flywheel to Crankshaft	60-70	55-65
Crankshaft Pulley	15-20	15-20
Connecting Rod Caps	30-35	35-45
Camshaft Sprocket	15-20	15-25
Rocker Arm Cover (Inch Lbs.)	20-25	20-25
Engine Front Cover	6-8	6-8
Water Pump	25-35	25-35
Oil Pump	② 45-50	45-50
Oil Pump Cover	6-8	6-8
Oil Filter	20-25	20-30
Clutch Housing	25-35	25-30

ℂ - Tighten two center bolts to 25-30 ft. lbs.
② - 60-70 ft. lbs. on Corvette.

2) Disconnect all cables, wires, straps, leads, lines, hoses and linkages (throttle control rod at pedal bellcrank).
3) Remove fan and pulley assembly, radiator and shroud as an assembly.
4) Remove power steering pump mount bolts and swing pump into opening behind left headlight (or disconnect pump lines and plug ends).
5) Remove distributor cap and cover distributor.
6) Disconnect power brake pedal pushrod at brake cylinder pushrod pin, then dismount unit and move to side against fender. *CAUTION* - Fluid line may be damaged if unit pushed downward or twisted.
7) Raise vehicle and place on jack stands.
8) Remove rocker arm covers and install hoist. Remove clutch cross shaft (frame bracket end first, then slide it off engine ball stud).
9) Disconnect exhaust pipes at manifold flange.
10) Remove fuel pump then front mount through bolts.
11) Disconnect transmission TV rod at bellcrank (Powerglide); place floor jack under transmission.
12) Remove converter underpan (Powerglide), flywheel cover bolts (Synchro-mesh). Remove clutch housing-to-engine bolts. Install holding bracket on converter (Powerglide).
13) Move engine upward and forward alternately (also raise transmission jack) to slide engine from clutch gear shaft, then raise and guide engine from vehicle.

OIL PAN REMOVAL

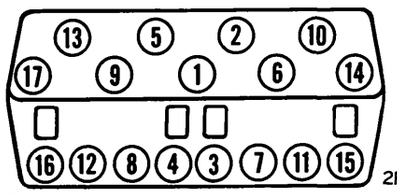
283" & 327" Engines (Except Corvette) - 1) Raise front of vehicle, drain crankcase and radiator, and disconnect hoses at radiator and battery ground strap at engine.
2) Disconnect clutch pedal pushrod at clutch pedal control, and disconnect intermediate lever and shaft.
3) Remove clutch pedal control, intermediate lever and shaft assembly at frame mounting bracket (leave shaft assembly attached to engine).
4) Remove carburetor feed pipe at fuel pump and remove pump. Remove accelerator control rod from its lever.
5) Remove power brake vacuum hose at manifold, and remove power steering pump.
6) Remove transmission lower control rods at shift levers.
7) Remove exhaust pipe flange-to-exhaust manifold nuts and gasket. Lower exhaust pipe and muffler assembly.
8) Remove oil filter. Remove starter.
9) Loosen transmission mounting bolts. Remove nut, washer and long bolt from each front mounting.
10) Turn crankshaft so harmonic balancer keyway slot is at bottom of engine (indexes crankshaft counterweights so baffle in oil pan will clear).
11) Raise engine about 3" (may be raised from below at harmonic balancer) so oil pan will clear frame crossmember. *CAUTION - Raise engine until transmission housing contacts underbody to pan. Be sure fan blade and shroud clear as required.*
12) Remove oil pan bolts then tilt pan as required for removal.

Corvette - 1) Disconnect cables at battery. Raise vehicle and drain oil.
2) Remove starter and flywheel (or converter) underpan.
3) On 340 and 360 Horsepower engines, disconnect steering linkage idler at frame and lower the linkage (for clearance of pan to bearing cap mounted oil baffle plate).
4) Remove oil pan screws and remove pan.

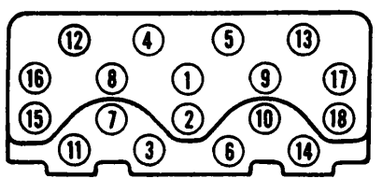
409" Engine - 1) Remove engine from vehicle.
2) Remove starter, then remove oil pan.

CYLINDER HEAD INSTALLATION

283" & 327" Engines - Use a good head gasket paste on steel head gaskets, install gasket and head on dowel pins in block, coat all cylinder head bolt threads with suitable oil and water thread sealing compound (G.M. Perfect Seal or equivalent), tighten all bolts finger tight (*CAUTION - Intermediate length bolts used in Nos. 14 & 17 positions*). Torque all bolts evenly, a little at a time, in sequence shown in diagram to correct torque listed. Retorque cylinder head bolts after engine warmed up.
409" Engine - Same as for other engines except that two head gaskets used with each cylinder head.



2F512
283", 327" CYLINDER HEAD TIGHTENING SEQUENCE



2F524
409" CYLINDER HEAD TIGHTENING SEQUENCE

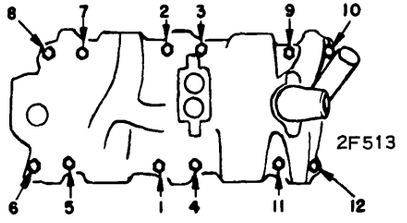
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

INTAKE MANIFOLD INSTALLATION

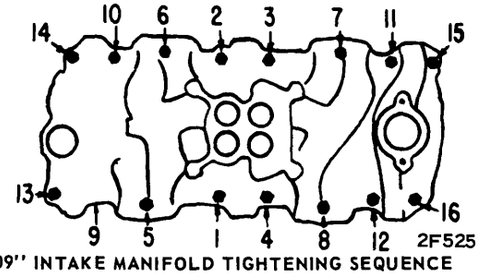
Install end seals on block On 283" and 327" engines, ridges on seals must engage edge of block with tabs extending outward Install side gaskets on cylinder heads using sealing compound around water passages Install manifold being careful not to displace gaskets and seals (See 283" & 327" Engine Tool Note below), tighten manifold bolts evenly in sequence shown in diagram to correct torque as listed

►*283" & 327" ENGINE MANIFOLD INSTALLING TOOL*

A wooden dowel can be installed in distributor mounting hole to guide manifold straight down on block which will prevent displacing of end seals and gaskets Fabricate this dowel from 1 5/16" round stock, 3 3/4" long, with 3/4" section at lower end reduced to 1 7/32" diameter (to fit distributor mounting hole) and upper end tapered to 1 1/8" (to engage mounting hole in manifold) Remove dowel after manifold installed



283", 327" INTAKE MANIFOLD TIGHTENING SEQUENCE



409" INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTONS ①	PISTON PINS		PISTON RINGS		
	① Clearance	② Piston Fit	Rod Fit	Ring	End Gap	Side Clearance
283"	0006- 0010 '	00015- 00025"	③	Compr Oil	010- 020" 015- 055"	
327" (250,300 HP)	0006- 0010"	00015- 00025"	③	Compr Oil	013- 023" 015- 055"	
327" (340,360 HP)	0028- 0035'	00045- 00055"	③	Compr Oil	013- 023' 015- 055"	
409" (340 HP)	0006- 0010"	00025- 00035'	③	Compr Oil	015- 025" 015- 055"	
409" (400,425 HP)	0030- 0036"	00045- 00055"	③	Compr Oil	015- 025" 015- 055"	

① - Measured at center of piston skirt ② - Wear limit 001" ③ - Press Fit *See "Piston Pin Removal"*

PISTON PIN REPLACEMENT

See Illustrations Use Tool J-9510 (283", 327" Engines), Tool J-6994-5 (409" Engine) When installing pin, press pin into piston until pilot bottoms in support

FITTING PISTONS

Use piston fitting scale (J-5513 or similar) with 1/2" wide feeler stock of correct thickness (see table below) inserted between piston and cylinder wall 90° from pin boss Pull to withdraw feeler should be within limits indicated in table

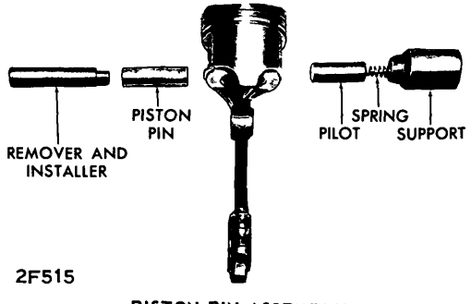
Engine	Feeler Thickness	Lbs.Pull
283"	0015"	4-6
327" (250 & 300 HP)	0015"	7-17
327" (340 & 360 HP)	004"	11-18
409"	004"	7-17

PISTON & ROD INSTALLATION

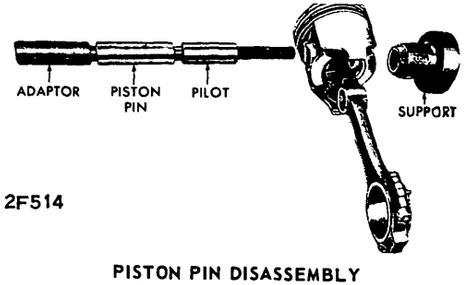
283" & 327" Engs. - Rods are numbered Install rod so that flange or heavy side of rod at bearing end will be toward FRONT of piston (marked by notch in piston head and "F" mark on piston strut) on Nos 1,3,5,7 Flange of rod at bearing end must face to REAR of piston head on Nos 2,4,6,8 Install piston and rod assembly with notch in piston head and "F' mark on piston strut to front of engine (Oil holes in rods will face center of engine)

409" 340 HP Engine - Pistons have valve reliefs on head and offset pin bore and are stamped "L" or "R" on strut designating cylinder bank in which used Pistons of same configuration are paired (symmetrically opposite) and stamped numbers on head denote this pairing 1,8, 5,2, 6,3, 7,4 Arrow on piston head must point toward front of engine Rods are installed in piston in same manner as on other engines See 283" & 327" Engine data above

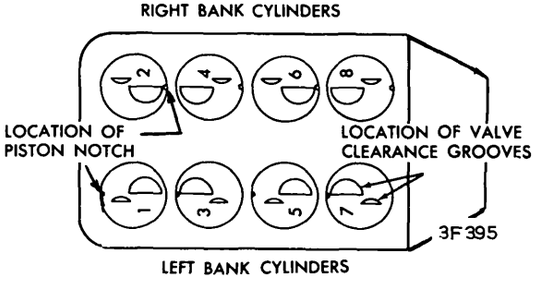
409" 400 & 425 HP Engines - Pistons have valve reliefs on head but piston pin bore is not offset Two types of pistons used **1)** Cyl 1, 4, 5, 8, **2)** Cyl 2, 3, 6, 7 When correctly installed in engine, notch on rim of piston head will be toward rear of engine (Right Bank), front of engine (Left Bank) *See Illustration* Rods are installed in piston in same manner as on other engines (see 283" & 327" Engine data above)



PISTON PIN ASSEMBLY



PISTON PIN DISASSEMBLY



409" HIGH COMPRESSION ENGINE PISTON INSTALLATION

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

REAR MAIN BEARING OIL SEAL

Remove oil pan then proceed as follows

Cap Seal - Remove bearing cap and pry out old seal with screwdriver Lubricate new seal (except parting surface) and roll seal into place without damaging bead of seal with seal tangs

Block Seal - Use small drift to start seal out until it can be removed with pliers Lubricate new seal (except parting surface) and gradually push seal in with hammer handle until seal rolls into place DO NOT CUT seal with seal retainer tang when installing

HARMONIC BALANCER

Removal (All Engines) - Remove battery, fan belt, fan and pulley Remove radiator and fan shroud Remove pulley bolts from balancer and remove crankshaft pulley Install Puller Tool J-6978, using bolts in tapped holes in balancer face Remove balancer

Installation (Chevrolet except Corvette) - Coat seal contact area of balancer hub with engine oil, assemble special Balancer Installer Tool J-8792 (see TOOL NOTE below) on balancer with fingers hooked over balancer rim and tighten threaded driver finger tight *CAUTION - This is necessary to prevent balancer pulling apart* Start balancer on crankshaft with keyway aligned with key in shaft Use soft hammer to drive balancer in place until it bottoms on shoulder on shaft (or spacer installed on shaft on 409" Engines)

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Brg.	Endplay	Journal Diam.	Clearance	② Sideplay
283"	2 2978-2 2988"	0008- 0034"	No 5①	002- 006"	1 999-2 000"	0007- 0028"	008- 014"
327"	2 2978-2 2988"	0008- 0034"	No 5①	002- 006"	1 999-2 000"	0007- 0028"	008- 014"
409"	(1-4) 2 4980-2 4990" (5) 2 4977-2 4987"	0009- 0025" 0018- 0034"	No 5	004- 012"	2 1988-2 1998"	0009- 0030"	015- 021"

① - Wear limit 009" ② - Total both rods

TOOL NOTE - Tool No J-8792 also used on Chevy II 6 Cyl Engines (different set-up) and must be assembled exactly as follows for use on V8 Engines

1) Thread driver in clamp on shallow finger side (opposite side from V8 mark on clamp)
2) Insert pilot in end of driver on opposite side of clamp with large end in toward clamp
3) Secure pilot with machine screw
4) Install tool assembly on balancer with deep fingers of clamp engaging balancer rim

Installation (Corvette) - Coat front cover seal area on balancer with engine oil Position balancer on crankshaft (keyway aligned) On 250 & 300 HP Engines, drive balancer on crankshaft with Tool J-5590 until it bottoms on crankshaft gear On 340 & 360 HP Engines, pull balancer on using suitable length bolt and spacers in threaded crankshaft *NOTE - On 340 & 360 HP Engines, a spacer is located between balancer hub and crankshaft shoulder for belt alignment*

FRONT COVER OIL SEAL INSTALLATION

Chevrolet (except Corvette) - Remove radiator, harmonic balancer, and water pump Remove front cover Pry out old seal with screwdriver Install new seal so open end of seal is to inside of cover and drive it into position with Tool J-996

Corvette - Remove hood, radiator, and harmonic balancer With cover still on engine, pry out old seal with screwdriver (do not damage seal surface on crankshaft) Install new seal so open end of seal is to inside of cover and drive it into position with Tool J-8340

VALVES

Engine & Valve		Head Diam.	Face Angle	Seat Angle	Seat Width	① Stem Diameter	Clearance	② Valve Lift
283"	Int.	1 715-1 725"	45°	46°	1/32-1/16"	3410- 3417"	0010- 0027"	3987"
	Exh.	1 495-1 505"	45°	46°	1/16-3/32"	3410- 3417'	0016- 0033"	3987"
327"(250 HP)	Int.	1 715-1 725"	45°	46°	③ 1/32-1/16"	3410- 3417"	0010- 0027"	3987"
	Exh.	1 495-1.505"	45°	46°	④ 1/16-3/32"	3410- 3417"	0016- 0033"	3987"
327" (300 HP)	Int.	1 935-1 945"	45°	46°	③ 1/32-1/16"	3410- 3417"	0010- 0027'	3987"
	Exh.	1 495-1 505"	45°	46°	④ 1/16-3/32"	3410- 3417"	0016- 0033"	3987"
327" (340,360 HP)	Int.	1 935-1 945"	45°	46°	1/16"	3410- 3417"	0010- 0027"	3937"
	Exh.	1 495-1 505"	45°	46°	3/32"	3410- 3417"	0016- 0033"	3997"
409"(340 HP)	Int.	2 065-2 070"	45°	46°	1/32-1/16"	3715- 3722"	0010- 0027"	4001"
	Exh.	1 715-1 725"	45°	46°	1/16-3/32"	3710- 3717"	0025- 0042"	4119"
409" (400,425 HP)	Int.	2 185-2 195"	45°	46°	1/32-1/16	3715- 3722"	0010- 0027"	5068"
	Exh.	1 715-1 725"	45°	46°	1/16-3/32"	3710- 3717"	0025- 0042"	5185"

① - Standard size ② - Measured at valve stem ③ - 1/16" on Corvette ④ - 3/32" on Corvette

ROCKER ARM STUD REPLACEMENT

Removal - Remove old stud by placing Spacer Tool J-5802-1 over stud, adding flat washer and nut and turning nut down to remove stud

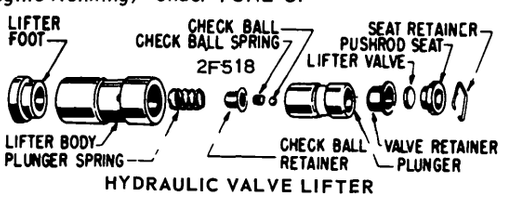
Installation - Ream stud hole for correct size stud using Reamer J-5715 for 003" Oversize or J-6036 for 013" Oversize stud Coat press fit part of stud with hypoid lubricant and use Tool J-6880 to install stud in head Tool should bottom on head

HYDRAULIC LIFTER ADJUSTMENT (AT ENGINE OVERHAUL)

With No 1 cylinder at TDC firing position, adjust Exhaust Valves 1-3-4-8 and Intake Valves 1-2-5-7 as follows

1) Back off rocker arm stud adjusting nut until there is play in pushrod, then tighten nut until pushrod-to-rocker arm clearance is just removed
2) Tighten nut an additional 1 turn (places lifter plunger in center of its travel)
3) Crank engine 1 complete revolution so No 6 cylinder is at TDC firing position and adjust Exhaust Valves 2-5-6-7 and Intake Valves 3-4-6-8 in same manner

NOTE - If lifters are noisy, see "Lifter Adjustment (Engine Running)" under TUNE-UP



HYDRAULIC VALVE LIFTER

VALVE GUIDES

Integral with cylinder head Ream to next oversize and install valve with oversize stem if valve stem clearance excessive *(see Valves Table).*

VALVE STEM OIL SEAL

"O" ring type used Set valve spring and damper in place with closed coil end of spring against cylinder head Install shield on spring Place rotator (if used) in position and install cap Compress spring and install oil seal in lower groove of stem Install valve locks and release spring Locks should seat in upper groove on stem

HYDRAULIC VALVE LIFTER

Replace if any parts worn or damaged When installing, fill lifter with engine oil, work plunger up and down, then refill with oil

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE SPRING INSTALLED HEIGHT

1 23/32" measured from spring seat (or top of shim) to top of valve spring shield. If specifications exceeded, install a 1/16" spacer under spring to bring within limits. *CAUTION* - Never shim spring to give installed height of less than 1 21/32".

CAMSHAFT

Engin	①Journal Diameter	Cam Lobe Lift Intake	Exhaust
283"	1.8687-1.8692"	.2658"	.2658"
327"(250,300 HP)	1.8687-1.8692"	.2658"	.2658"
327"(340,360 HP)	1.8687-1.8692"	.2625"	.2665"
409" (340 HP)	1.8687-1.8692"	.2288"	.2354"
409"(400,425 HP)	1.8687-1.8692"	.2896"	.2963"

① - Out-of-round limit .001".

CHECKING CAMSHAFT LOBE LIFT

Remove rocker arms and balls. Attach Tool J-8520 to adapter or stud and adjust dial indicator to seat in pushrod cup. *NOTE - Be sure pushrod is seated in lifter socket.* Rotate crankshaft slowly until lifter is on heel of cam lobe (pushrod will be in lowest position). Zero dial indicator and slowly "bump" engine over until pushrod is in fully raised position. *CAUTION - Ground primary wire on coil, when cranking engine.* Compare total lift on dial indicator with specifications (*see Camshaft Table*). Continue to rotate engine until indicator reads Zero (checks accuracy of dial indicator).

CAMSHAFT REMOVAL

All Engines - Camshaft can be removed with engine in vehicle by first removing radiator, grille, intake manifold, front cover, etc. Remove camshaft and gear assembly by pulling out through front of block. *NOTE* - Support shaft so as not to damage camshaft bearings.

ENGINE OILING

Normal Oil Pressure - 40 psi at 2000 RPM (Exc. 409" & Corvette); 50 psi at 2000 RPM (409" Eng. & Corvette).
Pressure Regulator Valve - In oil pump body. Not adjustable.

ENGINE OILING SYSTEM

Description (283", 327" Engines) - Positive pressure lubrication provided to all main, camshaft, and connecting rod bearings and to all valve lifters and rocker arms. Three horizontal oil galleries located in "V" at center of engine and distribute oil under pressure to all parts. *See illustration.*
Valve Lifters - Oil passage from rear camshaft bearing supplies oil to lifter galleries. Both mechanical and hydraulic lifters intersect the gallery. Recess in mechanical lifter permits oil to pass into lower end of pushrod. A larger passage in rear camshaft bearing permits more oil pressure for lubrication of hydraulic lifters. Hydraulic lifters contain an inertial valve which opens permitting oil to pass to hollow pushrods.
Rocker Arms and Valve Stems - Oil passes up through hollow pushrods to a hole in upper end that matches hole in rocker arm. Oil sprayed out this hole and across rocker arm lubricates valve stem tip.

VALVE SPRINGS & LIFTERS

Engine	SPRINGS Pressure (Lbs.) Valve Closed	Valve Open	Free Length	LIFTERS Diameter	Clearance
283"	①78-86 at 1.660"	①170-180 at 1.260"	2.08"		
327"	②78-86 at 1.660"	②170-180 at 1.260"	2.08"		
409" (340 HP)	③84-92 at 1.660"	④166-176 at 1.330"	2.03"		
(400,425 HP)	①130-138 at 1.68"	①273-285 at 1.290"	2.06"		

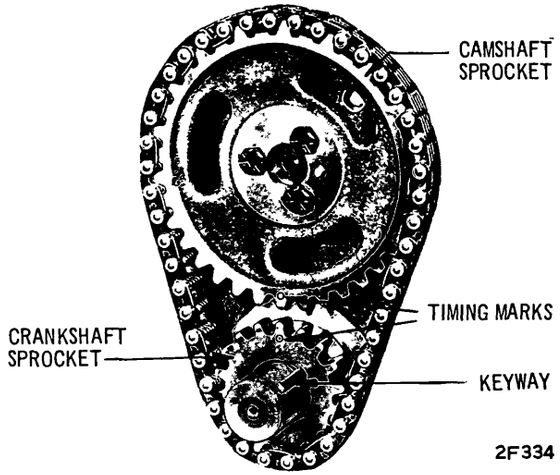
① - Includes damper. ② - Damper 5-10 lbs. ③ - Inner spring 20-24 lbs. at 1.488"
④ - Inner spring 55-61 lbs. at 1.106".

CAMSHAFT BEARING INSTALLATION

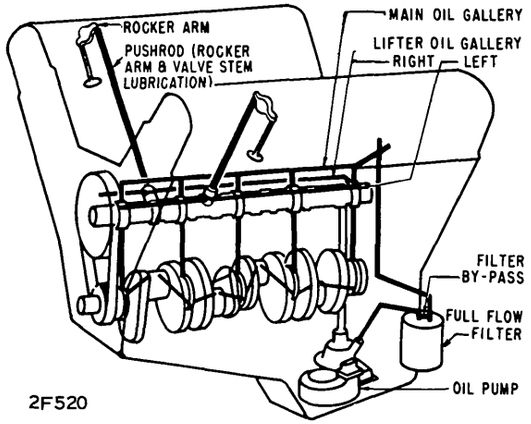
All Engines - Install front bearing first. This bearing will act as guide for Installer tool and center the No. 2 and 3 bearings being pulled into place. *CAUTION - Use care when installing rear bearing due to smaller size of oil pressure holes in rear bearing.* When installing end plug, install flush to 1/32" deep to maintain level surface on rear of cylinder block.

VALVE TIMING

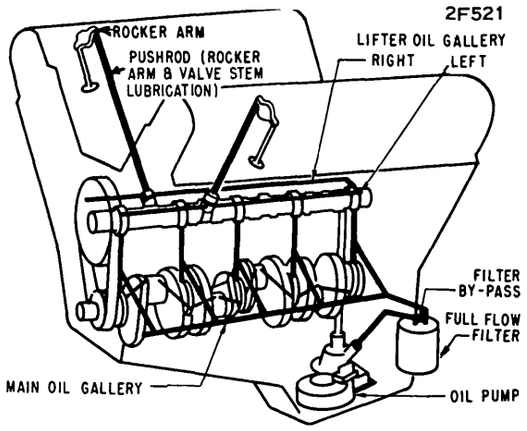
Engine	INTAKE Open (BTDC)	Close (ALDC)	EXHAUST Open (BLDC)	Close (ATDC)
283"	32°30'	87°30'	74°30'	45°30'
327"(250,300 HP)	32°30'	87°30'	74°30'	45°30'
327"(340,360 HP)	35°	72°	76°	31°
409" (340 HP)	38°30'	93°30'	88°30'	51°30'
409"(400,425 HP)	110°	154°	193°	143°



VALVE TIMING MARKS



283", 327" ENGINES OILING SYSTEM



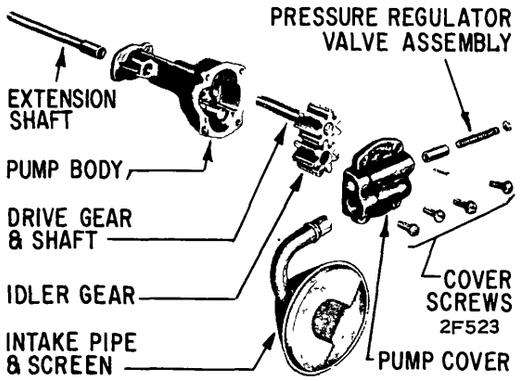
409" ENGINE OILING SYSTEM

Description (409" Engine) - Engine lubrication system same as 283", 327" Engines except as follows: Oil pump delivers oil through passage in rear main bearing cap to filter mounting pad at left side of engine. Passage from filter pad leads to horizontal main oil gallery running full length of engine. Oil from main gallery delivered through diagonal passages to vertical passages leading up to camshaft and down to crankshaft bearings. *See illustration.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE OIL PUMP ASSEMBLY

Assemble drive gear and shaft in body, install idler gear (smooth side to cover). Install pickup screen and pipe on cover (if removed) but DO NOT twist or collapse suction tube. Install cover and tighten screws to specifications (shaft must turn freely). Assemble collar end of extension shaft assembly over pump drive shaft. Assemble pump and extension shaft to rear main bearing cap. Align slot in extension shaft, install rear main bearing cap bolt and tighten to specifications. *NOTE* - Bottom of screen must be parallel to pan rails.



ENGINE OIL PUMP (ALL)

ENGINE COOLING

Thermostat - Pellet type located in intake manifold water outlet. Opens at 177-183°F (Exc. Corvette), 167-172°F (Corvette).

Pressure Valve - 13 psi radiator filler cap.

WATER PUMP SERVICING

Disassembly - Remove back plate and gasket. Support hub in press and press shaft out of hub (use 1/2" x 2" pin). Support pump in press (use blocks under pump body) and press shaft and impeller out of pump. *CAUTION - Apply pressure to outer race of bearing only.* Place Tool J-5855 in press, support impeller on seal surface, press shaft out using 1/2" x 2" pin.

Reassembly - **1)** Install shaft and bearing assembly in pump body from front side (283", 327" Engines), from rear side (409" Engine). Install until bearing is flush with front of pump body. *CAUTION* - Apply pressure only on outer race of bearing.

2) Coat outer diameter of new seal with sealer and press on outer flange with Tool J-5590 until seal bottoms with outer flange against pump body.

3) Press hub onto shaft to original position.

4) Support pump on hub and install impeller. *NOTE* - Vane to pump body clearance should be .010-.035"

5) Install cover and gasket, tightening screws diagonally.

AIR CONDITIONING FLUID FAN

Silicone fluid in clutch assembly limits maximum fan speed to 3200 RPM. Temperature sensing modulator device limits fan speed to 1000 RPM until temperature reaches 140°F, then fan speed increases to 3200 RPM.

FILTERS & CLEANERS

	℃ Service Interval
Oil Filter	Replace every 6000 miles
Air Cleaner (Paper Element)	Replace when necessary
(Polyurethane)	Clean element every 12,000 miles
Breather Cap	Clean and re-oil at Oil Change
Fuel Filter (in Carb. Inlet)	Replace when necessary
(Fuel Bowl Type)	Replace every 12,000 miles
(In-line Filter)	Replace every 12,000 miles

℃ - Replace or clean more often if necessary.

AIR CLEANER CLEANING CAUTIONS

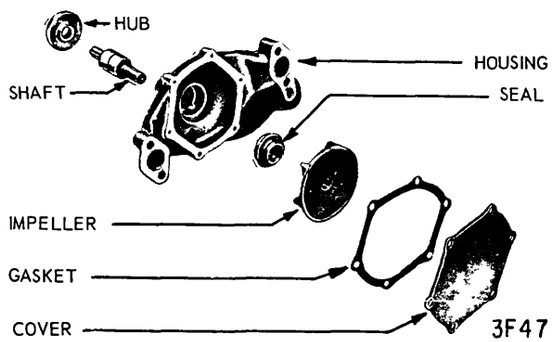
Paper Element Type - Not serviceable. Replace if dirty or damaged.

Polyurethane Type - Remove element from support screen and clean in suitable solvent (kerosene, etc.) Squeeze out all solvent, soak in engine oil, then squeeze out excess oil in clean, dry cloth.

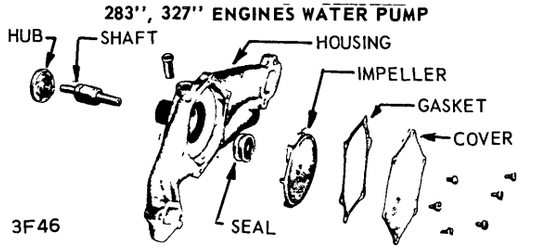
CAPACITIES

Engine	283",327"	409"	Corvette
Water	18½ qts.	18½ qts.	16½ qts.
Crankcase ℃	4 qts.	5 qts.	② 4 qts.
Fuel ③	20 gal.	20 gal.	20 gal.
3-Speed Trans. ④	2 pts.	2 pts.	2 pts.
Auto. Trans. ⑤	3 pts.	3 pts.	3 pts.
Rear Axle	4 pts.	4 pts.	4 pts.

℃ - Add 1 qt. with filter change.
② - 5 qts. on 340 & 360 Horsepower Corvettes; add 1 qt. with filter change.
③ - 19 gals. on station wagons.
④ - 2.5 pts. on 4-Speed; 3 pts on Overdrive models.
⑤ - Transmission case only.



283", 327" ENGINES WATER PUMP



409" ENGINE WATER PUMP

MODEL IDENTIFICATION

Model Number	Car Series	Car Model
0867	Corvette	2-Door Convertible
0837	Corvette	2-Door Sport Coupe
1211	Biscayne	2-Door Sedan
1235	Biscayne	4-Door Sta. Wgn. (6 Pass.)
1269	Biscayne	4-Door Sedan
1611	Bel Aire	2-Door Sedan
1635	Bel Aire	4-Door Sta.Wgn. (6 Pass.)
1645	Bel Aire	4-Door Sta.Wgn. (9 Pass.)
1669	Bel Aire	4-Door Sedan
1835	Impala	4-Door Sta.Wgn.(6 Pass.)
1839	Impala	4-Door Sport Sedan
1845	Impala	4-Door Sta.Wgn.(9 Pass.)
1847	Impala	2-Door Sport Coupe
1867	Impala	2-Door Convertible
1869	Impala	4-Door Sedan

SERIAL NUMBER

Located on plate on left front body hinge pillar (Except Corvette); on rear side of right pillar brace under glove box (Corvette).

℃ ② ③ ④
3 1611 J 100001

℃ - Model year. **3** 1963.
② - Model identification. *See above.*
③ - Assembly Plant. *See below.*
④ - Beginning serial number at each plant (Chevrolet and Corvette separate).

Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**R** - Arlington
B - Baltimore	**L** - Los Angeles	**S** - St. Louis
F - Flint	**N** - Norwood	**T** - Tarrytown
G - Framingham	**O** - Oakland	**W** - Willow Run
J - Janesville		

ENGINE NUMBER

Located on pad just forward of right cylinder head.

℃ ② ③
F 1210 D

℃ - Engine plant. **F** Flint. **T** Tonawanda.
② - Month and Day built. **1210** is December 10th.
③ - Engine, transmission, special equipment code letter. *See below.*

Engine Code Suffix Letters

Letter Suffix	Engine Displacement	Horsepower
CB, CD, CL, D, DK	283"	195
R, RA, S, SA, RC, SC	327"	250
RB, RK, SB, SG, RD, SD	327"	300
RE	327"	340
RF	327"	360
QA	409"	400
QB	409"	425
QC, QG	409"	340

► *For Tune-Up Data on mod ls with 235" & 261" 6 Cyl Engines, s e 1962 Final Data*

ENGINE IDENTIFICATION

Identified by suffix letters of 'Engine Production Code Number' stamped on right side of engine at rear of distributor (4 & 6 Cyl) just forward of right hand cylinder head (V8) as follows

Engine	ℂ First Suffix Letter
153' 4 Cyl	F
235" 6 Cyl	J
261' 6 Cyl	L
230" 6 Cyl	N
292" 6 Cyl	P
283" V8	M

ℂ - Second suffix letter indicates transmission and accessory options or model application

COMPRESSION PRESSURE

At cranking speed, all plugs removed, throttle wide open Maximum variation between cylinders 20 lbs

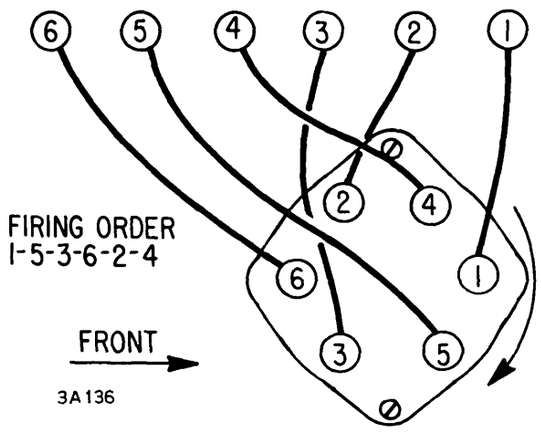
153 ' 4 Cyl	130 lbs
230 ' 292" 6 Cyl	130 lbs
283" V8	140 lbs

VALVE TAPPET CLEARANCE

153' 4 Cyl	Hydraulic
230 292' 6 Cyl	Hydraulic
283' V8	Hydraulic

HYDRAULIC LIFTER ADJUSTMENT (WITH ENGINE RUNNING)

With engine at normal operating temperature and running at idle speed, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops This is "zero lash" position Now turn nut an additional ½-turn and wait until engine runs smoothly Continue to turn nut down in ¼-turn increments until nut has been turned down 1 full turn from "zero lash" position *CAUTION - Make adjustment slowly so lifter will adjust itself and prevent engine damage*



6 CYLINDER 230" & 292" ENGINES FIRING ORDER

TUNE-UP SPECIFICATIONS

SPARK PLUGS

Gap (All)	035'
Torque (All)	20-25 ft lbs

Spark Plug Type

153' 4 Cyl 230' 6 Cyl	AC 46N
292' 6 Cyl	AC C42N
283' V8	AC 44

DISTRIBUTOR

153" 4 Cyl., 230", 292" 6 Cyl

Point Gap & Cam Angle must be adjusted with distributor on engine because of single bearing design of distributor

Point Gap (All)	.019' New 016" Used
Cam Angle (All)	31-34° (33° preferred)
Condenser Capacity (All)	18- 25 mfd
Breaker Arm Spring Tension	19-23 ozs

283" V8

Gap	016' (30° Cam Angle)
Cam Angle	30°±2°
Condenser Capacity	18- 25 mfd
Breaker Arm Spring Tension	19-23 ozs

IGNITION TIMING

Set timing with engine at idle speed, and with distrib utor vacuum line disconnected and plugged Degrees given are BTDC

153' 4 Cyl	4°
230 ' 292' 6 Cyl	4°
283 ' V8	4°

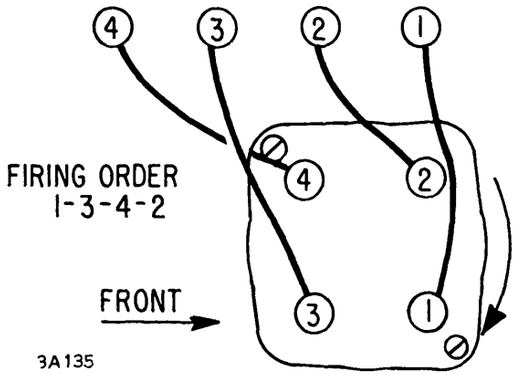
IGNITION TIMING (P SERIES)

On P Series (Forward Control & Step-Van), to avoid injury and for ease in setting ignition timing, special procedure required as follows

Use timing tab on oil pan front rail (to left of engine centerline for 4 Cyl to right of engine centerline for 6 Cyl) *Do not use timing tab on right side of front cover* Connect timing light to **No 2** spark plug wire Two men required, with man underneath truck holding timing light and directing man on top to rotate distributor as required

HOT (SLOW) IDLE RPM

Synchro-mesh (All Engines)	450-500
Powerglide in ' D" (All Engines)	450-500



4 CYLINDER ENGINE FIRING ORDER

FAST IDLE RPM

No adjustment Fast idle speed will be correct when hot (slow) idle correctly set

FUEL PUMP PRESSURE & VOLUME

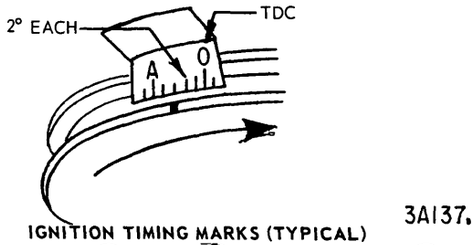
Pressure (153" 4-Cyl)	3½-4½ lbs at 450-1000 RPM
(230", 292" 6 Cyl)	3½-4½ lbs at 450-1000 RPM
(283" V8)	5¼-6½ lbs at 450-1000 RPM
Volume (All)	1 Pint in 30-45 Seconds

MANIFOLD HEAT CONTROL VALVE

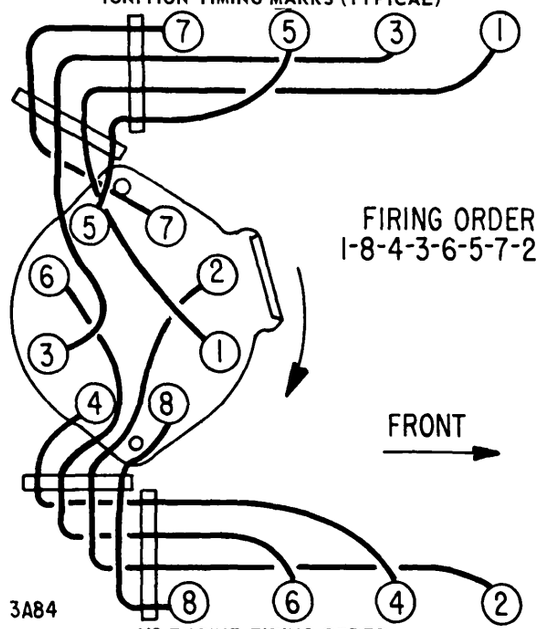
Automatic thermostatic type with counterweight in ex-exhaust manifold Valve must operate freely

CLOSED CRANKCASE VENTILATION

Check operation of valve at regular tune-up intervals as follows Connect tachometer and vacuum gauge as for idle speed and mixture adjustment With engine at idle speed remove valve from rocker cover (4 & 6 Cyl) disconnect hose at valve on carburetor base (V8) Block open end of valve and note engine speed change If engine speed drops less than 50 RPM, valve is faulty and should be replaced



IGNITION TIMING MARKS (TYPICAL) 3A137.



V8 ENGINE FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110280

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	450	Start	5-7
4-6	600	11½	11-13½
6½-8½	750		
14-16	1500		

For engine degrees & RPM, multiply by 2

Delco-Remy 1110292

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
½-2½	400	Start	5-7
6-8	750	11½	11-13½
9½-11½	1300		
13 15	1850		

For engine degrees & RPM, multiply by 2

Delco-Remy 1110302

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
½ 2½	400	Start	6-8
6-8	750	11½	15-17¼
9½-11½	1300		
13-15	1850		

For engine degrees & RPM, multiply by 2

Delco-Remy 1111015

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum ' of Hg
0-2	450	Start	7-9
2½-4½	600	8	15-16
9-11	1200		
14-16	2000		

For engine degrees & RPM, multiply by 2

IGNITION COIL

Delco-Remy 1116166 & 171

Primary Resistance (Ohms)	1 45-1 63
Secondary Resistance (Ohms)	5600-6900
Primary Resistance Wire (Ohms)	1 8 at 80°F
Current Draw (Amps)	1 9 idling, 4 0 stopped

Delco-Remy 1115083

Primary Resistance (Ohms)	1 28-1 42
Secondary Resistance (Ohms)	7200-9500
Primary Resistance Wire (Ohms)	1 8 at 80°F
Current Draw (Amps)	1 9 idling, 4 0 stopped

CARBURETOR

CARBURETOR SPECIFICATIONS

Carburetor	Float Level	Float Drop
Carter YF 3379S,3402S	① 3/8"	② 1 3/16"
Rochester B 7023011, 13	③ 1 9/32"	④ 1 3/4'
7023017, 21	③ 1 9/32"	④ 1 3/4"
2G 7023009, 10	⑤ 3/4"	④ 1 29/32"

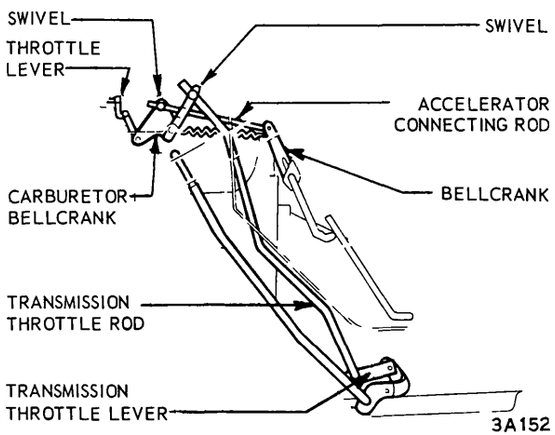
① - With solid seat Measured from bowl cover to top of float at outer end with air horn inverted and gasket removed

② - With air horn upright, gasket removed, measure from bowl cover to outer end of float

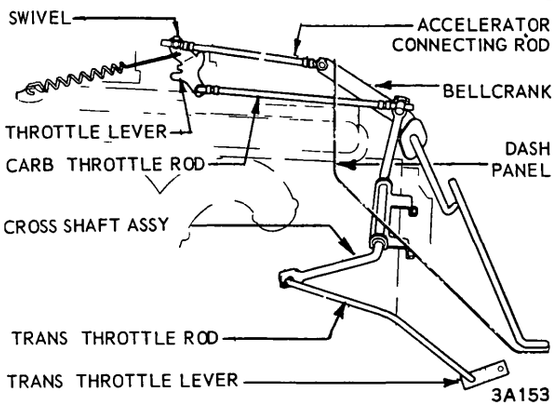
③ - Air horn inverted, gasket in place measure from gasket to top of float

④ - Air horn upright, gasket in place, measure from gasket to bottom of float

⑤ - Air horn inverted, gasket in place, measure from gasket to lower (sharp) edge of float seam



C10 & 20 SERIES 6 CYL. POWERGLIDE THROTTLE LINKAGE



C10 & 20 SERIES V8 POWERGLIDE THROTTLE LINKAGE

MANIFOLD FUEL DISTRIBUTION (V8)

Carburetor right barrel feeds cylinders 2,3,5,8 Carburetor left barrel feeds cylinders 1,4,6,7

ACCELERATING PUMP

Carter "YF", Rochester "B" & "2G" - No seasonal adjustment

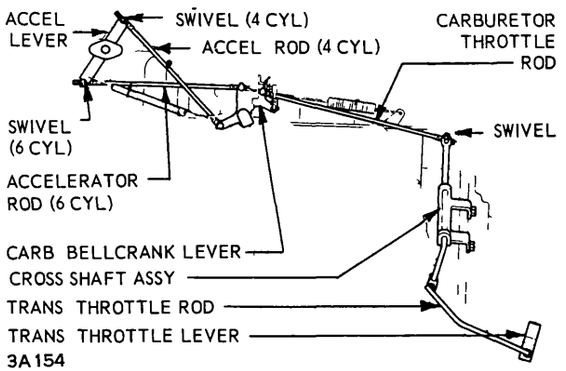
THROTTLE LINKAGE ADJUSTMENT

POWERGLIDE TRANS. TRUCKS

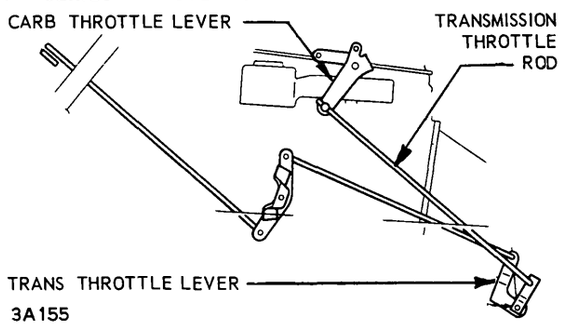
C-10 & 20 Series 6 Cyl. - 1) Disconnect transmission throttle rod from carburetor bellcrank lever Place carburetor throttle lever in wide open throttle position, push down on transmission throttle rod so transmission throttle lever is against internal stop in transmission, and adjust swivel on upper end of transmission throttle rod for free entry into carburetor bellcrank lever Check adjustment by returning linkage to idle position, then to wide open throttle position Push downward on transmission throttle lever If transmission throttle rod deflects repeat adjustment

2) Disconnect accelerator connecting rod from carburetor bellcrank lever Depress accelerator pedal to within 10 ' of toe pan, rotate carburetor bellcrank lever to wide open throttle position, and adjust swivel

(Continued)



P10 SERIES 4 & 6 CYL. POWERGLIDE THROTTLE LINKAGE



P20 & 30 SERIES 6 CYL. POWERGLIDE THROTTLE LINKAGE

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

on accelerator connecting rod for free entry into carburetor bellcrank lever. Release, then depress accelerator pedal. Carburetor throttle lever must reach wide open position. If not, repeat adjustment.

C-10 & 20 S ries V8 - 1) Disconnect transmission-to-cross shaft lever rod at carburetor throttle lever. Place carburetor in wide open throttle position, pull transmission-to-cross shaft lever rod forward until stopped by transmission internal stop, then turn rod in swivel so rod freely enters carburetor throttle lever. To check adjustment, place linkage in idle position, then return to wide open throttle. Push downward on transmission throttle lever. If linkage deflects, or carburetor throttle lever is not at wide open position, repeat adjustment.

2) Disconnect accelerator connecting rod from carburetor throttle lever, depress accelerator pedal to within .10" of toe pan, and rotate carburetor throttle lever to wide open position. Adjust swivel on accelerator connecting rod for free entry into carburetor throttle lever. Recheck adjustment and make sure that carburetor throttle lever reaches wide open position.

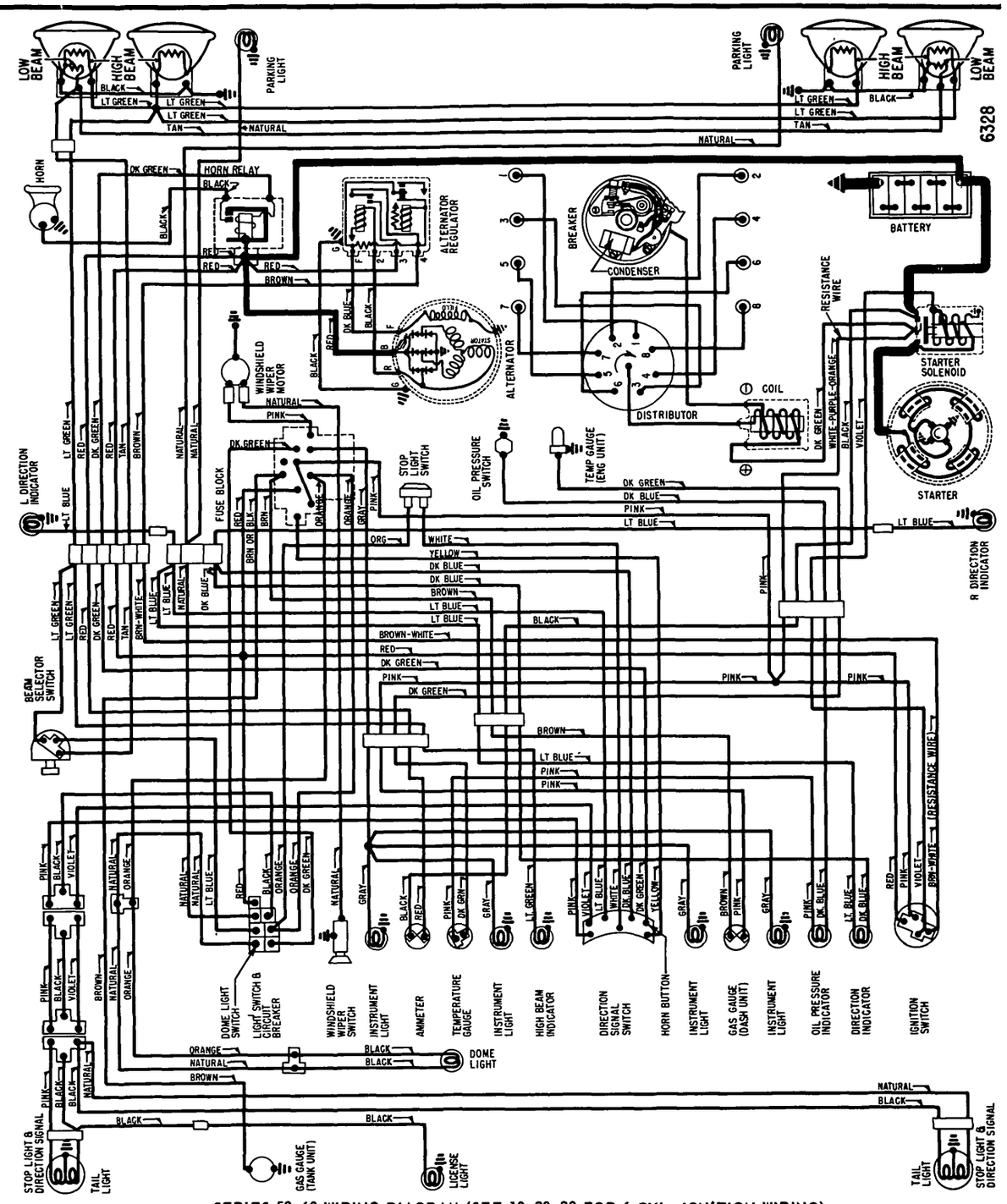
P-10 Series 4 or 6 Cyl. - 1) Disconnect transmission-to-cross shaft lever rod at carburetor bellcrank lever, place carburetor in wide open position, pull transmission-to- cross shaft lever rod forward until stopped by transmission internal stop, then turn rod in swivel for free entry into the carburetor bellcrank lever. To check adjustment place linkage in idle position, then return to wide open throttle. Push downward on transmission throttle lever. If linkage deflects, or carburetor throttle lever is not at wide open position, repeat adjustment. 2) Disconnect accelerator connecting rod from accelerator lever, depress accelerator pedal fully, rotate carburetor bellcrank lever to wide open throttle position, and adjust swivel on accelerator connecting rod for free entry into accelerator lever. Release, then depress accelerator pedal and check that carburetor throttle lever is at wide open position. If not, repeat adjustment.

P-20 & 30 Seri s 6 Cyl. - Disconnect transmission throttle rod from carburetor throttle lever. With carburetor throttle lever in wide open position, and with transmission throttle lever rotated counterclockwise against transmission internal stop, adjust swivel on transmission throttle rod for free entry into throttle lever, then shorten rod 1 full turn of swivel. To check adjustment, place linkage at idle position, then return to wide open throttle. If transmission throttle lever can still be rotated counterclockwise (not on internal stop), shorten transmission throttle rod an additional 1 full turn of swivel .

BELT ADJUSTMENT

Fan & Power Steering Belts .....①75 lbs. ±5 lbs.
Air Cond. Compressor Belt ..... ② 1/2-3/4" deflection

① - Using Belt Tension Gauge.
② - Under 15 lbs. load.



SERIES 50, 60 WIRING DIAGRAM (SEE 10, 20, 30 FOR 6 CYL. IGNITION WIRING)

ELECTRICAL

BATTERY

12 Volt Type.

Engine	Capacity Amp. Hrs. (20 Hr.)
153" & 230" 6 Cyl	53
292" 6 Cyl	61
283" V8	53

Battery Ground - Negative, to cylinder head
Engine Ground - To frame or dash panel

STARTER

Delco-Remy 1107237, 273

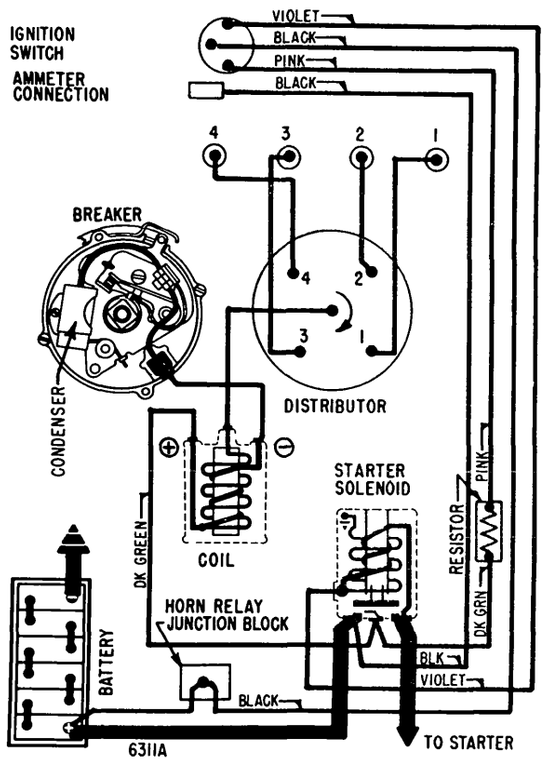
Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	6200-9400	10.6	49-76
	Lock	4.3	270-310

Ⓒ - Includes Solenoid
Brush Spring Tension - 35 ozs. minimum

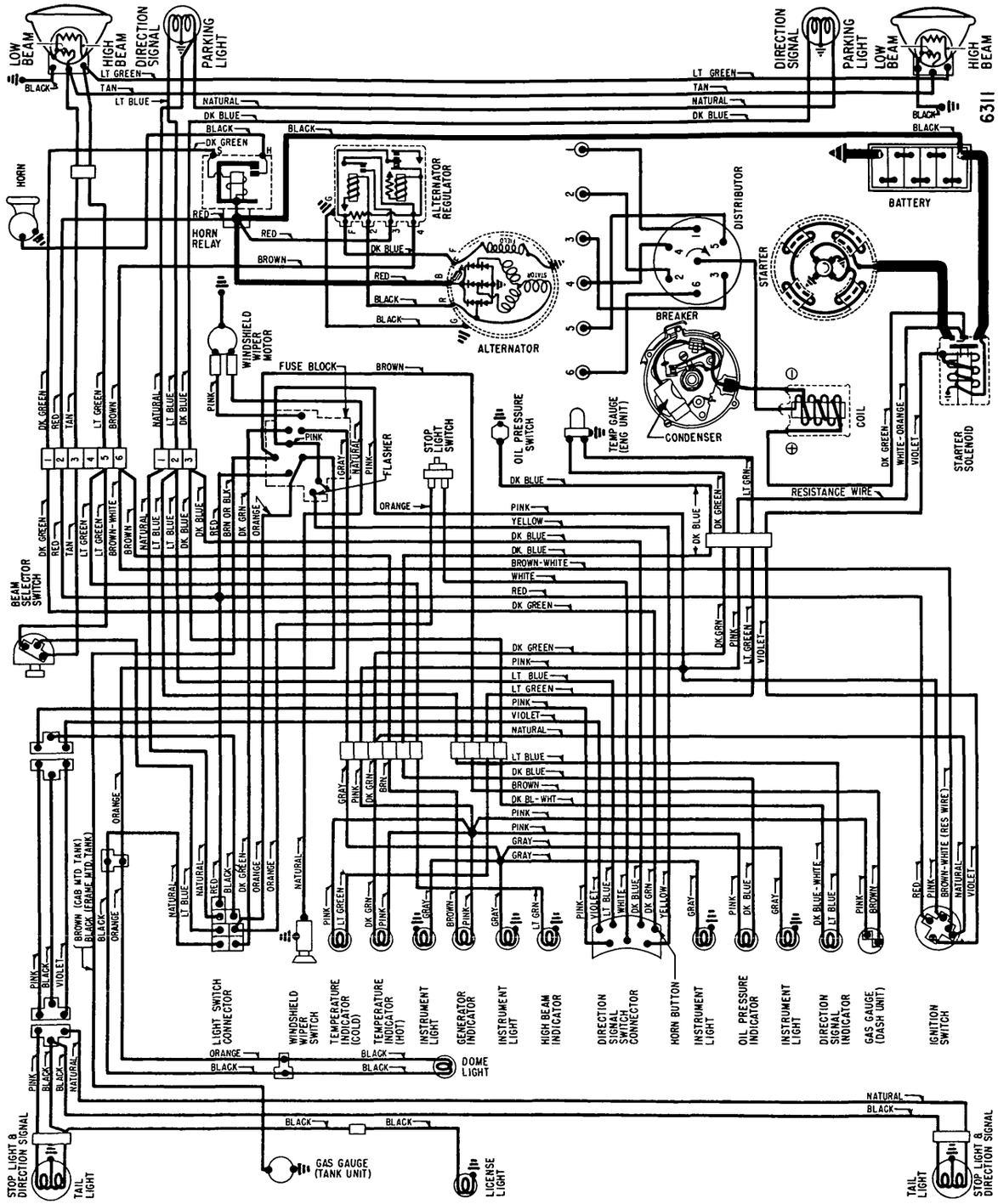
Delco-Remy 1107242, 274

Torque	RPM	Volts	Ⓒ Amperes
0 ft lbs	3600-5100	10.6	65-100
	Lock	3.5	300-360

Ⓒ - Includes Solenoid
Brush Spring Tension - 35 ozs minimum



4 CYL. (P-10) IGNITION WIRING



SERIES 10, 20, 30 WIRING DIAGRAM (SEE 50, 60 FOR V8 IGNITION WIRING)

ELECTRICAL (C ntinued)

ALTERNATOR

D lco-Remy No.	Rated Output
1100628	37 Amps
1100629	42 Amps
1100633	52 Amps.
1117765	62 Amps.

T st Specifications

Delco-Remy No.	Volts	Amperes	Alternator RPM
1100628	14 0	25	2000
		35	5000
1100629	14 0	28	2000
		40	5000
1100633	14 0	32	2000
		50	5000
1117765 ℂ	14 0	18	1100
		62	6500

ℂ - If checked without regulator, output should be 5-10% higher than specified

ALTERNATOR REGULATOR

Delco-R my 9000595 (1117765 Alt.), 1119512 (Others)

Field Relay

Closing Voltage - 1 5-2 7 volts (1119512), 2 3-3.5 volts (9000595).
Contact Gap - 030" (1119512), 027" (9000595)
Air Gap - 015" (All)

Voltage Regulator

Voltage Setting (1119512) - 13.5-14.4 volts at 125°F operating on upper contacts. 1-.4 volt lower operating on lower contacts.
Voltage Setting (9000595) - 13.2-14.2 volts at 125°F
Contact Gap (1119512) - .014" (upper contacts) with lower contacts just closed.
Air Gap (1119512) - .067" with lower contacts just touching.
Air Gap (9000595) - .075"

FUSES & CIRCUIT BREAKERS

Headlight Circuit - 15 amp. circuit breaker integral with headlight switch
2-Speed Rear Axle (Eaton) - 10 amp circuit breaker in engine compartment.
Ammeter - 3AGC fuse in holder at engine harness bulkhead connector in engine compartment.
Other Circuits - Fuse block beneath dash panel on left side.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Powerglide Trans. Trucks - With selector lever in "N", loosen switch attaching screws, hold ignition switch in "Start" position and adjust position of switch until engine begins cranking. Hold switch in this position and tighten attaching screws. Check adjustment for engine cranking in "N" and "P". Engine must not start in any other position.

STOP LIGHT SWITCH

Located on brake pedal support bracket. Adjust switch so stop lights go on at 5/8" pedal pad travel.

HEADLIGHT SWITCH REMOVAL

With switch in ON position, depress switch shaft retainer button on top of switch and remove knob and shaft Remove switch ferrule retaining nut, then remove switch by pulling downward from rear of instrument panel.

TURN SIGNAL FLASHER

Located at fuse block beneath dash panel on left side.

INSTRUMENT CLUSTER & SPEEDOMETER

All instruments may be serviced after cluster removed from instrument panel. To remove cluster, disconnect all wiring, cables, hoses, and pipes from back of cluster Remove cluster housing-to-dash panel attaching screws, then remove cluster from front of panel.

ENGINE

►*For Engine Data on models with 235" & 261" 6 Cyl. Engines, see 1962 Final Data.*

ENGINE IDENTIFICATION

See "Engine Code Suffix Letters" under MODEL IDENTIFICATION.

ENGINE REMOVAL

4 & 6 Cylinder Engin s

All (Except Step Van) - *NOTE - On Synchro-mesh trucks, remove transmission before removing engine. On Powerglide trucks, leave transmission and converter in vehicle (support transmission and tie converter in place).* Drain cooling system and crankcase Remove hood. Remove air cleaner. Disconnect all lines, hoses, pipes, and linkages from engine Remove radiator and shroud, and fan. On Low Cab Forward models, remove front end sheet metal. On all models, disconnect power steering pump and lay to one side (unnecessary to disconnect hoses). Remove rocker covers and clutch cross shaft Disconnect engine from front and rear mounts (and from converter and housing on Powerglide models), then remove engine.
Step Van - Remove engine box (remove accelerator pedal), driver's seat, and floor panel between stepwells Disconnect all lines, hoses, pipes, and linkages from engine Remove battery and clutch cross shaft. Support engine, remove transmission, then remove engine through door.

GENERAL SPECIFICATIONS

Engine	ℂHP at RPM	Compr. Ratio	Bore	Stroke	Displacement
153" 4 Cyl.	75 at 4000	8.5-1	3 7/8"	3 1/4"	153 cu. ins
230" 6 Cyl	② 120 at 3600	8.5-1	3 7/8"	3 1/4"	230 cu. ins.
292" 6 Cyl.	147 at 3600	8.0-1	3 7/8"	4 1/8"	292 cu. ins.
283" V8	145 at 4200	8.5-1	3 7/8"	3"	283 cu. ins.

ℂ - Certified Net Horsepower. Stamped on truck rating plate. ② - 100 at 3200 RPM with economy carburetor option.

V8 Engines

Remove transmission, drain cooling system and crankcase Remove air cleaner, radiator, and shroud Disconnect all lines, hoses, pipes, and linkages from engine. Disconnect power steering pump and lay to one side (unnecessary to disconnect hoses) Remove rocker covers. Remove fan, spacer, and pulley Disconnect engine from mounts and remove engine

OIL PAN REMOVAL

153" 4 Cyl., 230", 292" 6 Cyl. (Except Series C10, 20, 30 with 292" 6 Cyl.) - Raise and support truck, then drain crankcase. On Powerglide models, disconnect battery cables and remove starter. Remove oil pan bolts and remove oil pan.

Series C10, 20, 30 with 292" 6 Cyl. - Raise and support truck, drain crankcase, and remove starter on Powerglide models Disconnect engine front mounts. Remove radiator Raise engine and place a short piece of 2 x 4 wood block between front mounts and frame brackets Remove oil pan bolts and pan.
283" V8 - Raise and support truck, drain crankcase, remove dipstick and tube. Remove oil pan bolts and pan

CYLINDER HEAD INSTALLATION

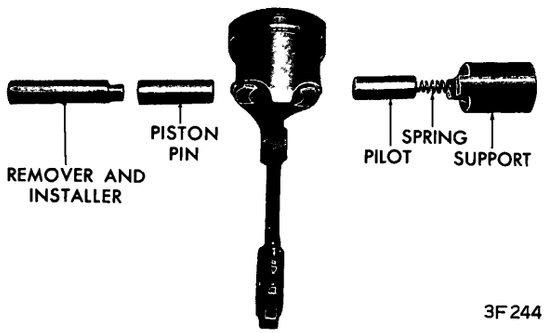
Coat cylinder head gasket with a good grade of sealer, and also use sealer on threads of all cylinder head bolts. Tighten cylinder head bolts a little at a time in sequence shown in diagram to correct torque specifications.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

INTAKE MANIFOLD INSTALLATION

4 & 6 Cyl. Engines - Torque center clamp bolts to 25-30 ft lbs , and end bolts to 15-20 ft lbs

283" V8 Engines - Tabs on rear end seal must face to outside of engine Use sealing compound around water passages on cylinder head gaskets Install a pilot in distributor mounting hole in block so manifold will be correctly aligned and to avoid pushing end seals out of place Tighten manifold attaching bolts to correct torque in sequence shown in diagram



PISTON PIN INSTALLATION

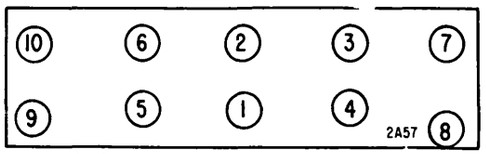
PISTON PIN REPLACEMENT

All piston pins are a press fit in connecting rod Use Tool Set J-9510 for removal and installation Remove pin using tool support and pilot Install pin as shown in illustration, using an arbor press

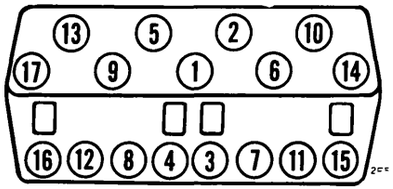
TIGHTENING SPECIFICATIONS

Application	153" 4 Cyl. 230",292" 6 Cyl.	283" V8
Cylinder Head	90-95	60-70
Int & Exh Manifold Center Bolts	25-30	①
End Bolts	15-20	①
Oil Pan Side Bolts	6-8	6-8
End Bolts	9-12	9-12
Main Bearing Caps	60-70	60-70
Connecting Rod Caps	35-45	30-35
Flywheel	55-65	55-65
Crankshaft Pulley	15-20	15-20
Camshaft Sprocket		15-20
Camshaft Thrust Plate	6-8	
Rocker Arm Cover	2-4	2-4
Engine Front Cover	6-8	6-8
Water Pump	13-17	25-35
Oil Pump	9-11	60-70
Oil Filter Bolt		20-25
Flywheel Housing	25-35	25-35

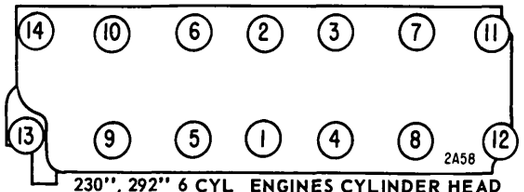
① - Intake Manifold· 25-35 ft lbs , Exhaust Manifold - Center Bolts 25-35 ft lbs , End Bolts 15-20 ft lbs



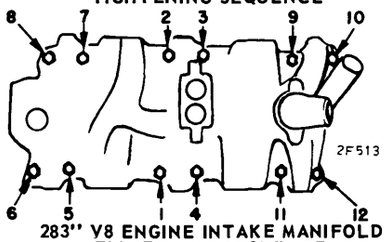
4 CYL ENGINE CYLINDER HEAD TIGHTENING SEQUENCE



283" V8 ENGINE CYLINDER HEAD TIGHTENING SEQUENCE



230", 292" 6 CYL ENGINES CYLINDER HEAD TIGHTENING SEQUENCE



283" V8 ENGINE INTAKE MANIFOLD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTONS Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
153' 4 Cyl	0005- 0011'	① 00015- 00025'	②	Comp 1 & 2 Oil	③ 010- 020' 015- 055'	0020- 0035'
230' 6 Cyl	0005- 0011'	① 00015- 00025'	②	Comp 1 & 2 Oil	③ 010- 020' 015- 055"	0020- 0035"
292' 6 Cyl	0014- 0020"	① 00025- 00035'	②	Comp 1 & 2 Oil	③ 010- 020' 015- 055'	0020- 0035'
283" V8	0005- 0011'	① 00015- 00025'	②	Comp 1 & 2 Oil	③ 010- 020' 015- 055'	

① - Wear limit 001' ② - Press fit *See "Piston Pin Replacement"* ③ - Wear limit 03125"

PISTON & ROD INSTALLATION

153" 4 Cyl., 230", 292" 6 Cyl. - Install pistons and rods in engine so cast depressions in piston head are to front of engine and oil hole in connecting rod is to camshaft side of engine

283" V8 - Install rod on piston so that flange or heavy side of rod at bearing end will be toward front of piston (marked by cast depression in piston head and 'F' mark on piston strut) on pistons 1, 3, 5, 7, and flange on rod to rear of piston on pistons 2 4,6,8 Install piston and rod assembly into cylinder bore with cast depression and "F" mark on piston strut to front of cylinder block Numbers on rods and bearing caps must be on same side Oil hole in connecting rod will then be toward center of engine

FITTING PISTONS

153" 4 Cyl., 230", 292" 6 Cyl. - With piston and cylinder clean and dry, insert 0015' x ½' ribbon feeler and inverted piston into cylinder until center of piston pin is flush with top of cylinder block, with feeler 90° from piston pin hole Pull required to withdraw feeler should be 7-18 lbs

283" V8 - Using same procedure as listed above for 153' 4 Cyl , & 230', 292" 6 Cyl , pull to withdraw feeler should be 4-6 lbs

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS Journal Diam.	Clearance	Thrust Bearing	Endplay	CONNECTING RODS Journal Diam.	Clearance	Sideplay
153" 4 Cyl	2 2978-2 2988"	①	Rear	002- 006"	1 999-2 000"	0007- 0028"	008- 014"
230" 6 Cyl	2 2983-2 2993"	①	Rear	002- 006"	1 999-2 000"	0007- 0028"	008- 014"
292" 6 Cyl	2 2983-2 2993"	0008- 0024"	Rear	002- 006"	1 999-2 000"	0007- 0028"	008- 014"
283" V8	2 2978-2 2988"	0008- 0024"	Rear	002- 006"	1 999-2 000"	0007- 0028"	008- 014"

① - 0008- 0024" (Rear), 0003- 0019" (Others)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MAIN BEARING REPLACEMENT

Bearing inserts with oil holes are the upper halves of bearings. Install bearing caps with arrow on cap pointing to front of engine.

THRUST BEARING ALIGNMENT

With all main bearing cap bolts (except rear cap) tightened to specified torque, tighten rear cap bolts to 10-12 ft. lbs. Tap crankshaft to rear, then to front to align cap and bearing, then tighten cap bolts to specifications.

REAR MAIN OIL SEAL REPLACEMENT

Both upper and lower halves of seal may be replaced without removing crankshaft. Both halves of seal must be replaced as a unit. Sealing lip of seal must be well lubricated with engine oil before installation. *Keep oil off seal parting line surface as it is glue treated.*

CRANKSHAFT PULLEY INSTALLATION (4 CYL.)

Pulley is press fit on crankshaft. Use Puller J-6978 or equivalent to remove. To install, use Tool J-5590. Crankshaft extends slightly through pulley hub and a hollow tool is necessary to install pulley completely into bottomed position. *NOTE - To properly position timing mark, the two 3/8" and one 5/16" holes must be matched on hub.*

VIBRATION DAMPER REPLACEMENT (6CYL. & V8)

Damper is press fit on crankshaft. Puller J-6978 is available for this operation.

ENGINE FRONT COVER REPLACEMENT

Front cover may be removed after radiator, pulley, and vibration damper are removed. Use a suitable alignment tool to center cover when installing to prevent damage to seal and to seat seal properly.

FRONT COVER OIL SEAL REPLACEMENT

1) Front Cover Installed - After vibration damper or pulley removed, pry seal out with large screwdriver, being careful not to damage crankshaft. Install seal with open end (lip) of seal toward inside of cover, and drive into position with Tool J-8340.

2) Front Cover Removed - Pry out old seal with screwdriver. Install new seal with open end (lip) of seal toward inside of cover and drive into place with Tool J-0995 (4 & 6 Cyl.), J-996 (V8).

VALVE SPRING INSTALLED HEIGHT

Installed height of valve spring from spring seat (or shim) on cylinder head to top of valve spring shield should not be greater than maximum shown in table below. If height greater, install 1/16" shim under spring at cylinder head to bring height within limits. *Installed height must not be less than minimum specified.*

Valve Spring Height Specifications

Engine	Installed Height
153" 4 Cyl.	1 21/32-1 23/32"
230", 292" 6 Cyl.	1 21/32-1 23/32"
283" V8	1 21/32-1 45/64"

VALVE GUIDE SERVICING

153" 4 Cyl., 230", 292" 6 Cyl. - Valves with oversize stems are furnished for intake and exhaust valves in .003", .015", .030" oversizes. Use the 3/8" diameter reamers from Reamer Set J-7049 (J-7049-7 Std., J-7049-4 .003" oversize, J-7049-5 .015" oversize, & J-7049-6 .030" oversize) as necessary.

283" V8 - Valves furnished with .003", .015", .030" oversize stems. If clearance excessive, use Reamer Set J-5830 to ream valve guide holes for next oversize valve as necessary.

ROCKER ARM STUD REPLACEMENT

Studs with damaged threads may be replaced with standard size studs. Loose studs should be replaced with .003" or .013" oversize studs after reaming stud holes with Tool J-5715 (.003"), J-6036 (.013"). Remove old stud by placing Tool J-5802 over stud, installing nut and flat washer and removing stud by turning nut. Ream hole for oversize if necessary, then coat press-fit part of stud with hypoid axle lubricant. Install new stud using Tool J-6880. Tool should bottom on head (stud will be installed to correct height).

VALVES

Engine	Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diam.	Stem Clearance	Valve Lift
153" 4 Cyl.	Intake	1.715-1.725"	45°	46°	1/16-3/32"	.3410-.3417"	.0010-.0027"	.3970"
	Exhaust	1.495-1.505"	45°	46°	1/16-3/32"	.3410-.3417"	.0015-.0032"	.3970"
230" 6 Cyl.	Intake	1.715-1.725"	45°	46°	1/16-3/32"	.3410-.3417"	.0010-.0027"	.3349"
	Exhaust	1.495-1.505"	45°	46°	1/16-3/32"	.3410-.3417"	.0015-.0032"	.3349"
292" 6 Cyl.	Intake	.....	45°	46°	1/16-3/32"	.3410-.3417"	.0010-.0027"	.4000"
	Exhaust	.....	46°	46°	1/16-3/32"	.3410-.3417"	.0015-.0032"	.4000"
283" V8	Intake	1.715-1.725"	45°	46°	1/16-3/32"	.3410-.3417"	.0010-.0027"	.3987"
	Exhaust	1.495-1.505"	45°	46°	1/16-3/32"	.3410-.3417"	.0015-.0032"	.3987"

VALVE SPRINGS & LIFTERS

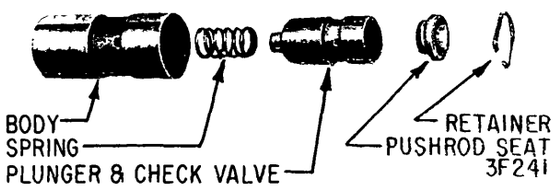
Engine	SPRINGS			LIFTERS	
	Free Length	Pressure (Lbs.) Valve Closed	Pressure (Lbs.) Valve Open	Diameter	Clearance
153" 4 Cyl.	2.08"	78-86 at 1.66"	170-180 at 1.26"	.....	.....
230" 6 Cyl.	2.03"	84-92 at 1.66"	166-176 at 1.33"	.....	.....
292" 6 Cyl.	2.08"	78-86 at 1.66"	170-180 at 1.26"	.....	.....
283" V8	2.08"	78-86 at 1.66"	170-180 at 1.26"	.....	.....

VALVE STEM SEALS

Used on all valves on all engines. Seal must be flat (not twisted) in groove.

HYDRAULIC LIFTERS

See illustration for arrangement of parts. Unnecessary to remove ball check valve from plunger when cleaning.



HYDRAULIC VALVE LIFTER (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT END THRUST

153" 4 Cyl., 230", 292" 6 Cyl. - Controlled by thrust plate between camshaft gear and cylinder block.

283" V8 - Camshaft rear thrust taken by camshaft sprocket riding on front face of cylinder block.

CHECKING CAM LOBE LIFT

Check with dial indicator to specifications listed in Camshaft Table.

CAMSHAFT REPLACEMENT

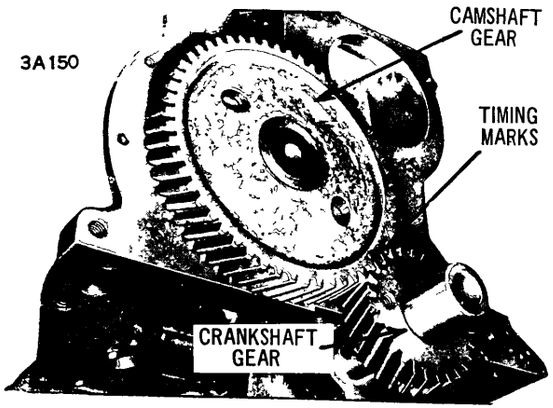
Camshaft may be removed after radiator, grille, front end sheet metal (on appropriate models), and other necessary parts are removed. When installing a new camshaft, one 16 oz. can of "E.O.S". (Engine Oil Supplement, No. 3755788) should be added to crankcase and 2 or 3 ozs. of oil supplement poured directly on camshaft. Molybdenum Disulphide ("Molykote" or equivalent) should be applied to the foot of each valve lifter. The oil supplement may be left in engine until next regular oil change.

CAMSHAFT BEARING REPLACEMENT

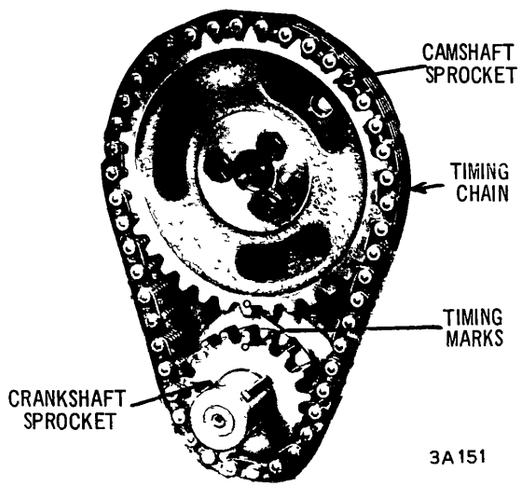
Engine must be removed from truck and at least partially disassembled to replace camshaft bearings. Make sure all bearing oil holes are perfectly aligned with holes in block. On 4 & 6 Cyl. Engines, No. 1 bearing must be installed 1/8" below front face of cylinder block to uncover oil hole for timing gear oil nozzle. Also, rear bearing must be installed flush with inner edge of rear cam bearing bore in block.

CAMSHAFT

Engine	Journal Diameter	Bearing Clearance	Camshaft Endplay	Cam Lobe Lift
153" 4 Cyl	1.8687-1.8692"	.0015-.0035"	.001-.005"	Int. & Exh. .227"
230" 6 Cyl.	1.8687-1.8692"	.0015-.0035"	.001-.005"	Int. & Exh. .1914"
292" 6 Cyl.	1.8687-1.8692"	.0015-.0035"	.001-.005"	Int. & Exh. .228"
283" V8	1.8687-1.8692"	.0015-.0035"	.....	Int. & Exh. .2658"



4 CYL. & 230", 292" 6 CYL. VALVE TIMING MARKS



V8 283" VALVE TIMING MARKS

ENGINE OILING

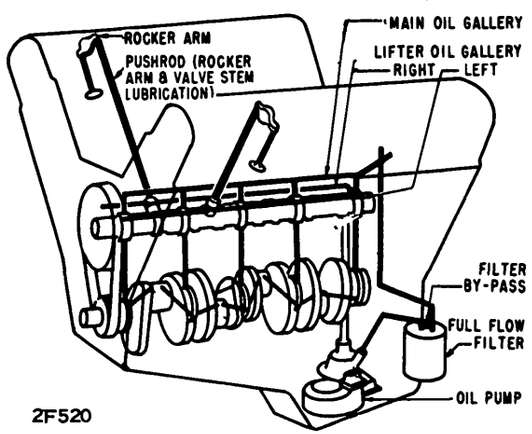
Normal Oil Pressure - 35 lbs. (153" 4 Cyl., 230", 292" 6 Cyl.), 45 lbs. (283" V8) at 2000 RPM.
Pressure Regulator Valve - In pump body, not adjustable.

ENGINE OILING SYSTEM

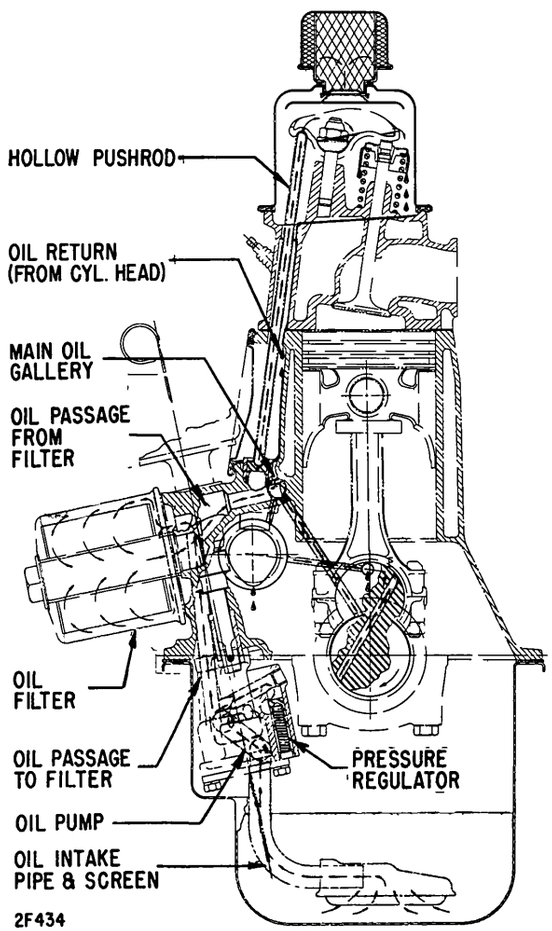
4 & 6 Cyl. Engines
Refer to illustration and note the following:
Timing Gears - Lubricated by oil flow from nozzle pressed in front face of block above crankshaft gear. Oil is fed to nozzle through cross-passage from front camshaft bearing.
Distributor Drive Gear - Lubricated by oil drainage from valve lifter compartment (drain hole directs oil onto gears).
Oil Filter - Full-flow type mounted on right side of engine. Bypass valve located in filter base.

283" V8 Engine
Refer to illustration and note the following:
Valve Lifters - Oil passage from rear camshaft bearing

(Continued)



283" V8 ENGINE OILING SYSTEM



4 CYL. & 6 CYL. ENGINES OILING SYSTEM

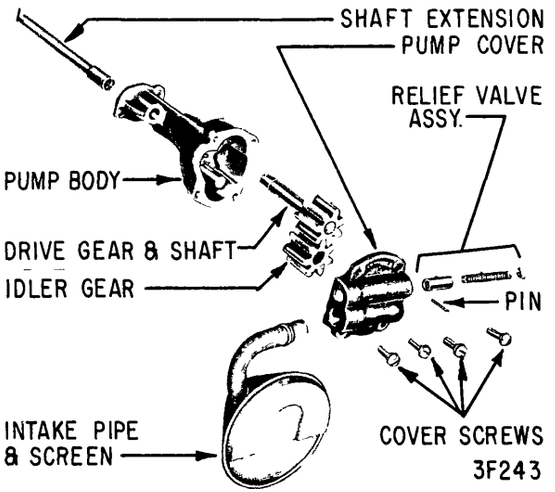
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

supplies oil to lifter oil galleries. All lifters intersect the gallery. Lifters contain an inertia valve which opens permitting oil to pass to hollow pushrods.

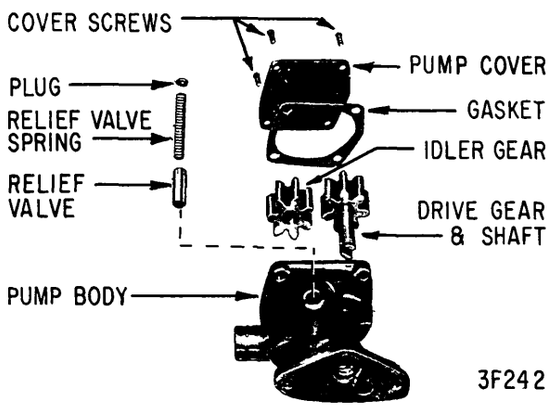
Oil Filter - Full-flow type mounted on left side of crankcase. Bypass valve located between filter and mounting pad.

OIL PUMP

See illustrations for arrangement of parts. Gear type pump mounted inside crankcase (4 & 6 Cyl.), on rear main bearing cap (283" V8). Inspect all parts for excessive wear or damage. Cover attaching screw torque is 6-9 ft. lbs.



V8 ENGINE OIL PUMP (EXPLODED)



4 & 6 CYL. ENGINES OIL PUMP (EXPLODED)

DISTRIBUTOR DRIVE SHAFT LOWER BEARING (4 & 6 CYL. ENGINES)

Bushing pressed into lower side of cylinder block (with or without thrust washer at upper end) and serves as lower bearing for distributor shaft (inside diameter), and as pilot for oil pump shaft (outside diameter). Replace bushing (and thrust washer) when distributor shaft-to-bushing clearance exceeds .0035".

Removal - Use Tool J-9534 and slide hammer to remove bearing. Drive out thrust washer with suitable drift.

Installation - Drive new thrust washer into place with Tool J-9535. Using Tool J-9535 with driver-bolt in driver handle, install driver into new bushing from large inside diameter. Drive bushing into position. *NOTE - Proper position of bushing is determined when tool bottoms against cylinder block.* Withdraw tool from bushing. If bushing seizes on installer arbor, remove tool with slide hammer. Bushing will not be damaged, and tool is designed for this purpose.

ENGINE COOLING

Pressure Valve - Radiator filler cap. 7 lb. or 13 lb. type, depending on truck model, engine, transmission, and other components.

Thermostat - 170° or 180° type used.

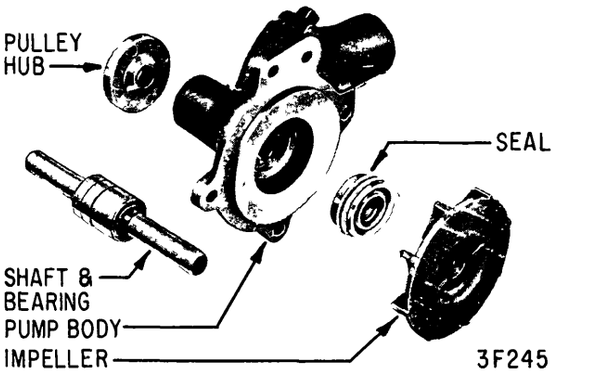
WATER PUMP

See illustrations for arrangement of parts. Be sure to use suitable drivers and supports when overhauling water pumps. Mark position of hub on shaft before disassembling pump so hub can be installed in same position. When reassembling pump, observe the following: Seal outer flange must bottom against pump body. Press hub on shaft to same mark made at disassembly, or use special Hub Locating Gauge as listed in table below. Press impeller on shaft so there is .010-.035" clearance between impeller vanes and pump body.

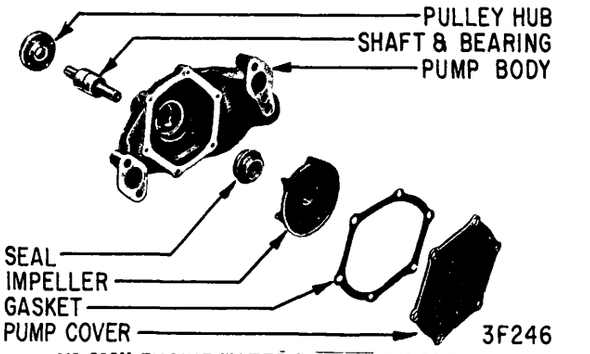
Pulley Hub Locating Gauge

Engine	Gauge No.
153" 4 Cyl.	J-9583
230" 6 Cyl.	J-9583
292" 6 Cyl.	J-21193
283" V8	Ⓒ J-9648

Ⓒ - Measured to step on end of gauge.



4 CYL. ENGINE WATER PUMP (EXPLODED) - 6 CYL. SIMILAR



V8 283" ENGINE WATER PUMP (EXPLODED)

CAPACITIES

Crankcase (Quarts) Ⓒ	Capacity
153" 4 Cyl.	4
230" 6 Cyl.	5
292" 6 Cyl.	6
283" V8 (Series 10-30)	5
(Series 50)	6

Transmission (Pints)	
Synchro-mesh 3-Speed (Chevrolet)	2
(Borg-Warner)	2¾
4-Speed (Chevrolet)	6¼
Powerglide (Quarts)	Refill 4½
	② Dry 10½

Ⓒ - Includes Filter. Filter Capacity: ½ qt. (4 Cyl.), 1 qt. (Others). 2 qt. type optional on 292" 6 Cyl.
② - Includes Torque Converter.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MODEL IDENTIFICATION

Body Type	Rating	Series
Conventional Cab, Panel, Cowl only	½-2 Ton	C10,20,30,50,60
Low Cab Forward	1½-2 Ton	L50,60
Forward Control & Step Van	½-1 Ton	P10,20,30
4-Wheel Drive Panel	½-¾ Ton	K10,20
Tilt Cab	2 Ton	T60
School Bus	1½-2 Ton	S50,60

SERIAL NUMBER

Stamped on a plate attached to left front body hinge pillar (except Flat Face Cowl), on left side of dash (Flat Face Cowl). Number includes following identification data:

① ② ③ ④ ⑤
S 3 C383 T 100001

① - **S** indicates 1-Ton model with ¾-Ton Special rating plate; or 2-Ton model with 1½-Ton Special rating plate. **H** indicates Heavy Duty 2-Ton model.
② - Model Year. **3** 1963.
③ - Series Designation. **C383** a model of C30 Series.
④ - Assembly Plant. *See listing below.*
⑤ - Beginning vehicle number at each assembly plant.

Assembly Plant Designation

A - Atlanta	**K** - Kansas City	**S** - St. Louis
B - Baltimore	**L** - Los Angeles	**T** - Tarrytown
F - Flint	**N** - Norwood	**W** - Willow Run
G - Framingham	**O** - Oakland	
J - Janesville	**R** - Arlington	

ENGINE NUMBER

"Engine Production Code Number" stamped on right side of engine at rear of distributor (4 & 6 Cyl.), just forward of right hand cylinder head (V8). Number includes following identification data:

① ② ③ ④
F 12 10 N

① - Engine Assembly Plant. **F** Flint. **T** Tonawanda.
② - Month of Manufacture. **12** December.
③ - Day of Manufacture. **10** Tenth.
④ - Engine Type. *See listing below.*

Engine Code Suffix Letters

Engine	①First Suffix Letter
153" 4 Cyl.	F
235" 6 Cyl.	J
261" 6 Cyl.	L
230" 6 Cyl.	N
292" 6 Cyl.	P
283" V8	M

① - Second suffix letter indicates transmission and accessory options, or model application.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter (1 Qt. Type)	Replace Each Oil Change
(2 Qt. Type)	Replace 8,000
Carb. Air Cleaner	
Polyurethane Type	Clean 6,000
Oil Bath Type	Clean As Required
Front Axle Air Vent (4-Wheel Drive)	Clean 1,000
Transfer Case Air Vent (4-Wheel Drive)	Clean 1,000
Air Compressor	Clean 5,000
Fuel Filters	Replace 5,000

SERVICING AIR CLEANERS

Polyurethane Types - Clean element in kerosene, squeeze dry, then dip in engine oil and squeeze to remove excess oil. Wrap element in a clean, dry cloth and squeeze out remaining oil. *Do not shake or wring element.*

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

ENGINE IDENTIFICATION

Identified by suffix letters of "Engine Production Code Number" stamped on top of engine block just forward of generator-oil filter adapter as follows:

Engin	Suffix Letters
Standard ①	YC, YL, Z, ZD, V, W
Monza P.G. ②	ZH
Hi Perf. ③	YN, YM, ZF, ZG
Spyder ④	YR

① - Trade Name: Turbo-Air.
② - Monza Series with Powerglide.
③ - Trade Name: Super Turbo-Air.
④ - Trade Name: Supercharged Spyder.

AIR CONDITIONED ENGINE ACCESS

For access to engine for tune-up and other engine service on air conditioned cars without disconnecting refrigerant lines or purging system, use the following procedure:

1) Remove compressor mounting bracket pivot bolt nut and compressor-to-adjusting bracket attaching parts. Remove compressor belt. Disconnect wiring from compressor. Remove triangular bracket from front of compressor. Work mounting bracket pivot bolt forward until threaded end of bolt is out of compressor rear mounting boss. Reposition compressor in engine compartment.
2) Remove compressor belt, then remove condenser and shroud assembly-to-bracket attaching screws. Carefully lift assembly from engine and rotate toward right rear of car as far as refrigerant lines will permit.

COMPRESSION PRESSURE

At cranking speed, all plugs removed, throttle wide open. Maximum variation between cylinders 20 psi.

All ..... 130 psi

VACUUM READING

All ..... 14-18" at idle

VALVE TAPPET CLEARANCE

All ..... Hydraulic

HYDRAULIC LIFTER ADJUSTMENT (WITH ENGINE RUNNING)

With engine at normal operating temperature and running at idle speed, back off rocker arm stud adjusting nut until rocker arm starts to clatter against valve stem, then turn nut down until clatter just stops. This is "zero lash" position. Now turn nut an additional ¼-turn and wait until engine runs smoothly. Continue to turn nut down in ¼-turn increments until nut has been turned down 1 full turn from "zero lash" position. *CAUTION - Make adjustment slowly so lifter will adjust its If and prevent engine damage.*

SPARK PLUGS

Gap (All)	.035"
Torque (All)	20-25 ft. lbs.

Spark Plug Type

Std. Engine	AC 46FF
Monza P.G. & Hi Perf.	AC 44FF
Spyder (Std.)	AC 44FF
(Competition)	AC 42FF

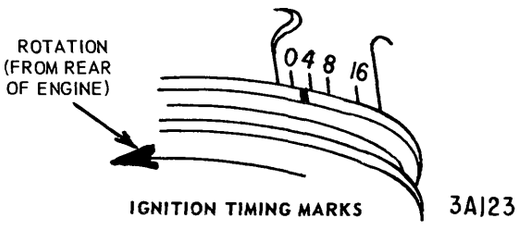
DISTRIBUTOR

Point Gap (All)	.019" New, .016"Used
Cam Angle (All)	31-34° (33° Preferred)
Breaker Spring Tension (All)	19-23 ozs.
Condenser Capacity (All)	.18-.25 mfd

IGNITION TIMING

Set timing with engine at idle speed, and with distributor vacuum line disconnected (except on Spyder). Degrees given are BTDC except as noted.

Engine or Trans.	Standard Setting	Allowable Range
S.M. Trans. (Exc. Hi Perf. Eng.)	4°	4-10°
Auto. Trans. (All Engines)	13°	13-18°
Hi Perf. Engine	13°	13-18°
Spyder Engine	24°	NONF



IGNITION TIMING MARKS 3A123

HOT (SLOW) IDLE RPM

Synchro-mesh (Std Engine) ①	500
(Hi Perf. Engine) ①	600
(Spyder Engine)	850
Powerglide (in "D") ①	500

① - After setting idle speed on Air Cond. cars, adjust Idle Speed-up Control.

IDLE SPEED-UP CONTROL ADJUSTMENT (AIR CONDITIONED CARS)

After idle speed correctly set (air conditioner OFF), turn idle control adjusting bolt to obtain .01" clearance between bolt head and throttle tang. Bring engine to normal operating temperature, turn air conditioner ON, and turn adjusting bolt again to obtain specified idle speed

FAST IDLE RPM

Rochester "H" Carb.	See text
Carter "YH" Carb.	Not specified

AUTOMATIC CHOKE SETTING

Rochester "H" Carb.	See text
Carter "YH" Carb.	1 Lean

FUEL PUMP PRESSURE & VOLUME

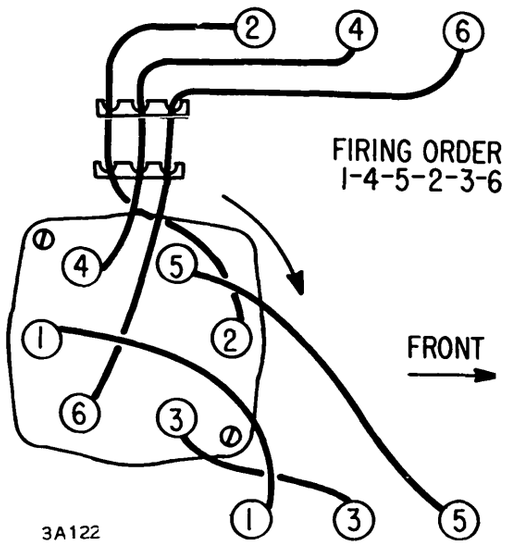
Pressure	4-5 lbs. at Idle to 1000 RPM
Volume	1 Pint in 30-45 Seconds

MANIFOLD HEAT CONTROL VALVE

None used.

CLOSED CRANKCASE VENTILATION

Check operation of valve at every oil change as follows: Connect tachometer and vacuum gauge as for idle speed and mixture adjustment. With engine at idle speed, disconnect ventilation hose at air cleaner side of valve, block opening of valve and note engine speed change. If engine speed drops less than 50 RPM, valve is faulty and should be replaced.



CORVAIR FIRING ORDER

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110294

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr Degrees	Vacuum " of Hg
0-2	400	Start	5-7
7-9	1050	11 5	14-16.25
15-17	1800		

For engine degrees & RPM, multiply by 2.

Delco-Remy 1110295

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	800	Start	6-8
5-7	1270	11.5	15-17.25
11-13	1850		

For engine degrees & RPM, multiply by 2.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Delco-R my 1110296

M chanical Advanc		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	425	Start	5-7
2-4	600	11 5	14-16 25
6-8	1375		
11-13	2400		

For engine degrees & RPM, multiply by 2.

Delco-Remy 1110297

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	925	Start	6-8
3-5	1300	11 5	15-17 25
6-8	1675		
9-11	2050		

For engine degrees & RPM, multiply by 2.

Delco-Remy 1110298

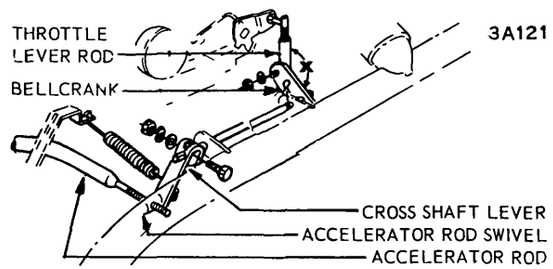
Mechanical Advance		① Automatic Retard	
Distr Degrees	Distr RPM	Distr ④ Degrees	Pressure Lbs
0-2	2000	Start	② 2-3
5-7	2250	4	③ 4 2-4 75

① - This is a retard of the timing point
② - At 2500 Engine RPM ③ - At 2750 Engine RPM
④ - Plus or Minus one degree
For engine degrees & RPM, multiply by 2

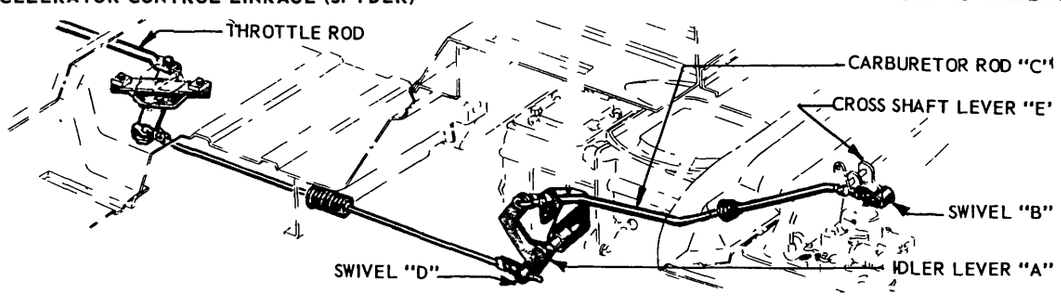
IGNITION COIL

Delco-Remy 1115087, 091

Primary Resistance (Ohms)	1 28-1.42
Secondary Resistance (Ohms)	7200-9500
Primary Resistance Wire (Ohms)	1.8
Current Draw (Amps)	1 8 idling, 4 0 stopped



ACCELERATOR CONTROL LINKAGE (SPYDER)



ACCELERATOR CONTROL LINKAGE (EXCEPT SPYDER)

CARBURETOR

CARBURETOR SPECIFICATIONS			
Carburetor	Float Level	Float Drop	Choke Setting
Carter YH 3311S	5/8"	2 3/8"	1 Lean
Rochester H 7023100, 101, 102	① 1 3/16"	② 1 3/4"	③

① - Air horn inverted, gasket in place, measure from gasket to top of float
② - Air horn upright, gasket in place, measure from gasket to bottom of float at toe end
③ - *See "Carburetor Synchronization & Adjustments" below.*

ACCELERATING PUMP

Rochester "H" & Carter "YH" - No seasonal adjustment

ACCELERATOR LINKAGE ADJUSTMENT

Passenger Cars (Except Spyder) - *Refer to illustration, and proceed as follows:* Remove mudguard over idler lever "A" on transmission, then disconnect swivel "D" from lever "A". Disconnect swivel "B" from left carburetor cross shaft lever "E". Pull rod "C" to wide open throttle (through detent on Powerglide and against stop on Synchro-mesh) and turn lever "E" to wide open throttle position (carburetor throttle lever against the stop). Adjust swivel "B" to align with hole in lever "E", then lengthen rod "C" by backing off swivel 5 full turns. Position accelerator pedal by placing a block of wood 1" thick (Synchro-mesh). 1½" thick (Powerglide) between pedal and floor mat. Hold lever "A" in wide open throttle position and turn swivel "D" to align with hole in lever "A". Install mudguard. This procedure provides proper clearance between accelerator pedal and floor mat at wide open throttle. *PROCEDURE NOTE - After above adjustment completed, proceed with carburetor synchronization, idle speed and mixture, and other adjustments as listed below.*

Spyder - With engine at normal operating temperature (or with air cleaner removed to block choke valve open), proceed as follows: Disconnect accelerator rod swivel from cross shaft lever and make sure throttle lever is against idle speed screw. Angle between throttle lever rod and bellcrank should be 126°. Adjust by changing length of throttle lever rod. Pull accelerator rod rearward against bellcrank stop on transmission, then rotate cross shaft lever to full throttle position (carburetor throttle lever against stop boss on flange). Adjust accelerator rod swivel so it just enters hole in cross shaft lever, then connect swivel to lever and install retaining clips. *NOTE - Swiv l pin sh uld be just short of cross shaft lever h l rather than just past, or linkage will be bent.* Move linkage from idle to full throttle and check that carburetor throttle lever operates correctly with no bind

Corvair "95" Trucks - *NOTE - Make carburetor cross shaft linkage adjustment as d tailed below, then proceed as follows:* Place a 3/4" spacer between floor mat and upper end of accelerator pedal and block pedal against spacer. Rotate carburetor cross shaft lever for wide open throttle position, then unsnap accelerator cable adjustment rod clip and rotate adjusting rod to remove all slack from cable. Install clip. Return accelerator pedal and carburetor cross shaft to idle position and disconnect return spring from accelerator pedal lever. Clearance between accelerator lever and cable shield with lever arm held up to remove freeplay should be 1/8". Adjust by moving shield in desired direction, then tighten mounting screws. Install pedal return spring (cable shield should not act as a pedal lever stop) Cable in engine compartment should now have some slack at idle to allow engine to return to idle speed. *PROCEDURE NOTE - On Pow rglid models, proceed with "Thr ttl Valv Linkag Adjustment" below. On Synchro-m sh mod ls, proceed with idle speed and mixture, and th r adjustments as detailed below.*

Throttle Valve Linkage Adjustm nt - After accelerator control linkage adjustment correctly made (see above), disconnect throttle valve rod at carburetor cross shaft lever and rotate cross shaft to wide open throttle position. Pull throttle valve rod so throttle valve is through the detent and adjust swivel on rod to just enter hole in cross shaft lever, then lengthen rod 5 full turns and connect to lever. *Proceed with idl speed and mixture, and other adjustm nts as d tailed below.*

CARBURETOR SYNCHRONIZATION & ADJUSTMENTS (EXCEPT SPYDER)

PROCEDURE NOTE - Make acc l rator and throttl valve linkage adjustments (s abov), th n mak following adjustments exactly in th order list d.

Synchronization (Cross Shaft Adjustm nt) - Make following adjustments on each carburetor in sequence with both throttle rods disconnected at cross shaft, choke control rods disconnected at choke levers, and engine off: Back off idle speed screw from throttle lever and open choke valve so throttle lever does not ride fast idle cam. Insert a .003" feeler gauge between idle speed screw and throttle lever, turn screw in until it just contacts gauge, and then 1½ additional turns to

(Continued)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

set throttle valve. Turn idle mixture screw out 1½ turns from a lightly seated position. Connect right carburetor throttle rod to cross shaft lever. On left carburetor, rotate cross shaft (with accelerator rod) so right carburetor throttle valve is completely closed. Adjust throttle rod in swivel so rod freely enters hole on cross shaft lever, then shorten rod 1 full turn and connect to lever. *NOTE - It may be necessary to hold choke valve open so fast idle cam is clear of throttle lever.*

Preliminary Idle Mixture & Speed Adjustment - Bring engine to normal operating temperature, make sure ignition timing is correct, connect a vacuum gauge to adapter on vacuum balance tube, and a tachometer to engine. Adjust idle speed screw on each carburetor as close to 500 RPM (Powerglide in "D"), 600 RPM (Hi Perf. Engine with Synchro-mesh) as possible. Adjust idle mixture screws for highest steady vacuum.

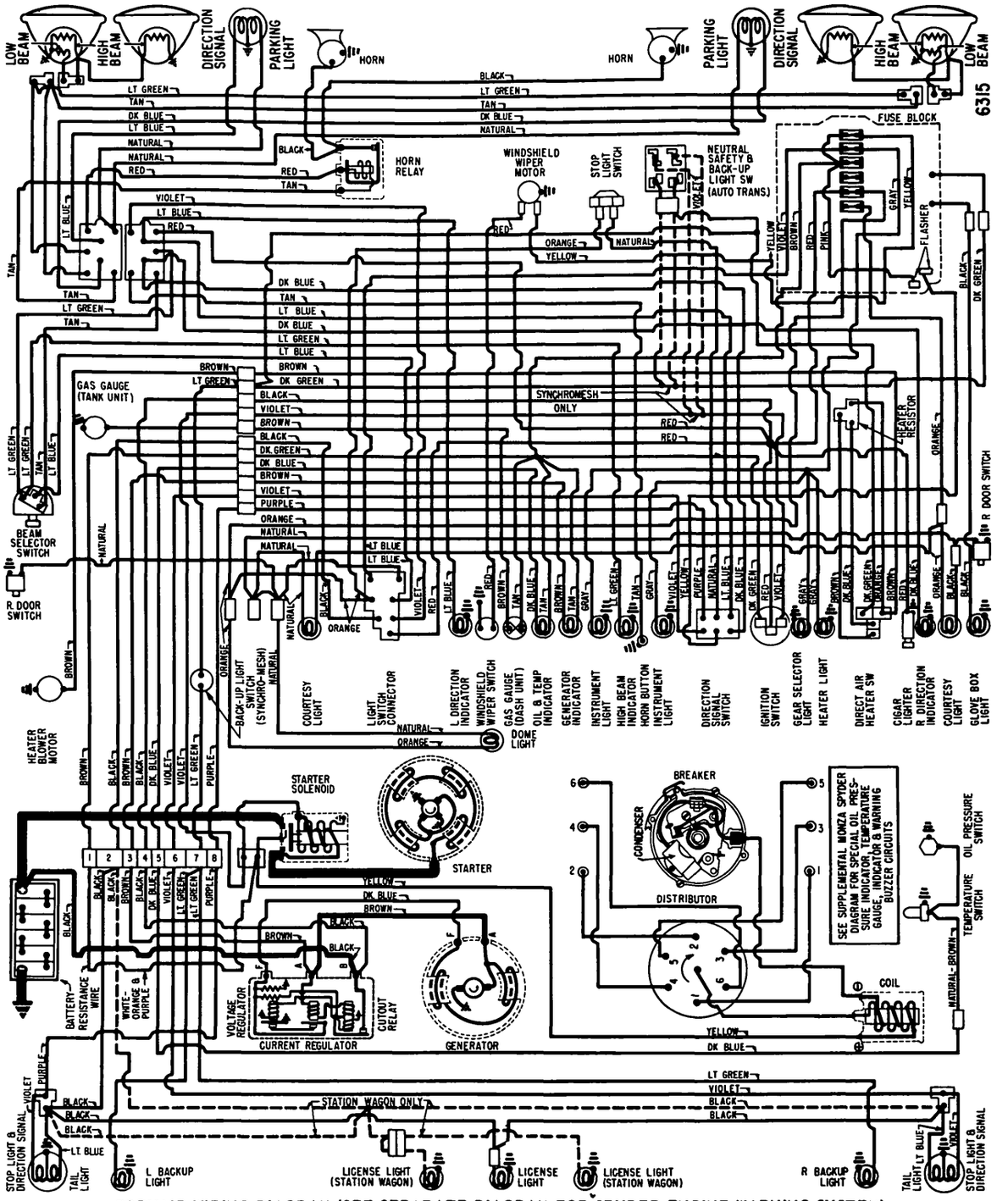
Vacuum Balance Check - Remove choke diaphragm hose from each carburetor base adapter and connect equally calibrated vacuum gauges to each adapter. *CAUTION - Do not turn tubing in carburetor body.* With engine running at idle speed, note difference in vacuum at each carburetur. If difference 1" or less, carburetors are synchronized. If difference more than 1", adjust left carburetor throttle rod 1 turn (up to increase left carburetor vacuum, down to decrease vacuum). *Adjust by disconnecting rod at cross shaft and rotating in swivel. NOTE - Higher vacuum reading preferred on right carburetor (spark advance side). CAUTION - Move cross shaft by grasping accelerator rod only or geometry and synchronization will be upset. Remove gauges and replace choke diaphragm hoses.*

Final Idle Mixture & Speed Adjustment - *Make sure air cleaners are installed.* Connect vacuum gauge to vacuum balance tube adapter and adjust idle speed and mixture screws on each carburetor for highest steady vacuum reading between 14-18". *NOTE - On Air Conditioned cars, adjust Idle Speed-up Control next (see "Tune-Up Specifications").*

Fast Idle - *Make this adjustment after idle speed correctly set.* Stop engine and place throttle lever on second highest step of fast idle cam. Bend tang on throttle lever to obtain .078" clearance between idle speed screw and throttle lever. Recheck idle speed.

Choke Vacuum Diaphragm - With diaphragm arm squarely against diaphragm, clearance between lower edge of choke valve and wall of air horn should be .160-.175". Disconnect and bend diaphragm link to adjust. *NOTE - Throttle lever fast idle tang should rest on second highest step fast idle cam. Bend outer choke shaft lever tang to adjust.*

Choke Rod Adjustment - Stop engine and disconnect choke control rod at choke shaft lever. With choke valve held closed, pull control rod up against stop in thermostat bracket and adjust control rod until it freely enters hole in choke shaft lever, then lengthen rod 2 full turns. *CAUTION - Turn rod in vertical portion only, do not crank at offset part.* Check choke position after engine at operating temperature. Choke valve should be open and fast idle cam clear of throttle lever.



CORVAIR WIRING DIAGRAM (SEE SEPARATE DIAGRAM FOR SPYDER ENGINE WARNING SYSTEM)

ELECTRICAL

BATTERY

12 Volt

Battery Ground - Negative. to body and generator.
Engine Ground - Left and right sides of engine to body.

STARTER

Delco-Remy 1108306, 307

Torque	RPM	Volts	① Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

① - Includes Solenoid.
Brush Spring Tension - 35 ozs. minimum.

STARTER REMOVAL

NOTE - Following procedure is recommended as easiest method of removal and installation. Disconnect battery and raise and support car. Disconnect rear throttle control rod from transmission bellcrank, and from carburetor cross shaft. Disconnect starter solenoid wires (use ¼" drive midget socket set). With a 3/8" drive, 9/16" shallow socket on a 9" extension with ratchet, remove **upper** starter mounting bolt. Then remove lower bolt. Pull starter forward and remove from engine compartment.

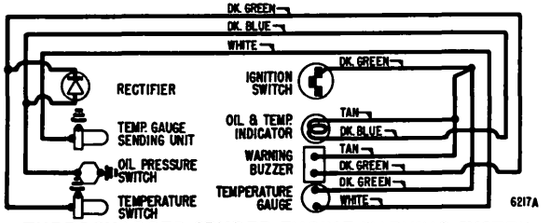
GENERATOR

Delco-Remy No.	Amperes	Volts	Gen. RPM
1102226, 227	30	14.0	2240
1105135	35	14.0	1730

Field Current - 1.69-1.79 amps. (1102226, 227) 2.73-3.0 amps. (1105135) at 12 volts and 80° F.
Brush Spring Tension - 28 ozs.

GENERATOR INSTALLATION

CAUTION - If preload on generator exists, end frame will break. To prevent this condition, use following installation procedure exactly. Tighten generator-to-adapter bolts to 15-22 ft. lbs. and loosely assemble mounting bracket-to-generator bolt and nut (at commutator end of generator). Bracket must be able to move. Tighten generator bracket-to-cylinder head bolts finger tight. Now tighten bracket bolt at commutator end of generator to 8-11 ft. lbs. Tighten front bracket-to-cylinder head bolt to 15-22 ft. lbs. and rear bolt to same torque.



TURBOCHARGED SPYDER ENGINE WARNING SYSTEM

GENERATOR REGULATOR

Delco-Remy 1119001E (30 Amp.), 1119604 (35 Amp.)

Cutout Relay

Cuts In - 11.8-13.5 volts (1119001E), 11.8-13.0 volts (1119604).
Contact Gap - .020".
Air Gap - .020" with contacts just closed.

Voltage Regulator

Setting (1119001E) - 13.8-14.7 volts at 125°F.
Setting (1119604) - 13.8-14.6 volts at 125°F operating on upper contacts, .1-.3 volt lower operating on lower contacts.
Contact Gap (1119604) - .016" (upper contacts) with lower contacts just touching.
Air Gap - .075" (1119001E), .080" (1119604) with armature pressed down to point where contacts just touch.

Current Regulator

Setting - 27.0-31.0 amps. (1119001E), 31.0-35.5 amps. (1119604) at 125°F ambient temperature.
Air Gap - .075" with armature pressed down to point where contacts just touch.

FUSES & CIRCUIT BREAKERS

Headlight Circuit - 15 amp. circuit breaker integral with headlight switch.
Air Conditioner Circuit - Two 15 amp. fuses in gray wires near ignition switch.
Other Circuits - Fuse block beneath dash panel.

BELT ADJUSTMENT

Blower Belt ..... ② 3/8-7/16" deflection or ① 75±5 lbs.
Air Cond. Belt ..... ③ 1/2-3/4" deflection

① - Using a tension gauge.
② - With moderate thumb pressure.
③ - Under 15 lb. load.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Loosen two switch mounting screws and place transmission selector lever in "N" position. Turn ignition switch to "Start" position, then move neutral switch fore and aft until engine begins to crank. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N"

STOP LIGHT SWITCH

Located under instrument panel. Adjust switch in mounting bracket so electrical contact is made when brake pedal depressed ½-¾" from fully released position.

TURN SIGNAL FLASHER

Located on fuse block beneath instrument panel.

LIGHTING SWITCH

To remove switch, disconnect battery ground cable and pull switch to ON position. Depress switch shaft retaining button (top of switch under instrument panel) and remove shaft and knob. Remove switch retaining ferrule and bezel and remove switch.

INSTRUMENT CLUSTER

Passenger Cars - *NOTE - On Spyder mod ls, instrument cluster must be removed for access to individual instruments. On other models, individual bulb sockets and fuel gauge may be removed without removing cluster.* Disconnect battery ground cable and disconnect connectors from back of cluster. Pull wiring harness out of retaining clips on cluster. Disconnect speedometer cable. Remove lighting switch (see above). Remove cigarlighter attaching nut from behind panel and remove lighter. Lower the mast jacket and steering wheel, or remove steering wheel. Remove the 11 instrument panel attaching screws (2 screws attach from rear), and remove cluster, instrument center panel and seal by pulling straight out and turning slightly to clear transmission range selector.
Greenbrier & Trucks - Disconnect battery ground cable. On Powerglide trucks, remove "C" clip holding transmission cable assembly to transmission control assembly. Remove cable assembly attaching nut from control support arm. Move selector lever to "Low". On all trucks, remove speedometer cable and cluster attaching screws. Remove cluster from instrument panel, disconnect cluster wiring and remove from truck. *NOTE - When installing, Powerglide selector lever must be in full DOWN position.*

ENGINE

ENGINE IDENTIFICATION

See "Engine Code Suffix Letters" under MODEL IDENTIFICATION.

CYLINDER & BEARING NUMBERING

All reference to engine and components is to position installed in car. FRONT of engine is flywheel end toward front of car, REAR of engine is accessory drive end toward rear of car. Crankshaft and camshaft bearings are numbered from rear of car (No. 1 bearing is at accessory drive end of engine). *Engine rotation, viewed from rear of car, is counterclockwise.*

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Str ke	Displacement
Standard ①	80 at 4400	8.0-1	3.4375"	2.60"	145 cu. ins.
Monza P.G. ②	84 at 4400	9.0-1	3.4375"	2.60"	145 cu. ins.
Hi Perf. ③	102 at 4400	9.0-1	3.4375"	2.60"	145 cu. ins.
Spyder ④	150 at 4400	8.0-1	3.4375"	2.60"	145 cu. ins.

① - Trade Name: Turbo-Air. ② - Monza Series with Powerglide.
③ - Trade Name: Super Turbo-Air. ④ - Trade Name: Supercharged Spyder.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE (Continued)

ENGINE DESCRIPTION

6 Cyl., horizontally opposed, overhead valve, air-cooled aluminum engine of same design used previously. Cylinders are individual cast iron type with integral cooling fins. The crankcase is vertically divided into halves through the centerline of crankshaft and camshaft. Crankcase must be separated for service on either crankshaft or camshaft. Camshaft journals ride directly on machined base metal of crankcase and bearing inserts are not used. Camshaft exhaust valve lobes are twice the width of intake lobes and actuate a pair of exhaust valve lifters.

ALUMINUM ENGINE SERVICING

Extreme caution must be observed when working on aluminum engines to prevent damage by scratching, nicking, or scoring. Carefully note the following:

1) Do not drop or slide machined surfaces on bench or floor.
2) Do not use gasket cement unless specifically indicated.
3) Lubricate all bolts or screws entering an aluminum part with Permatex No. 404 Anti-Seize Compound (or equivalent) to prevent thread seizure and damage.
4) Tighten bolts and nuts to the specified torque. DO NOT OVERTIGHTEN. Torque values are for clean lubricated threads.

ALUMINUM THREAD REPAIR

A thread repair kit, Part No. 3780960, is available for repairing stripped or damaged threads in aluminum parts.

POWER TRAIN

POWER TRAIN REMOVAL

Complete assembly (engine, transmission, rear axle) must be removed from car as a unit. To separate transaxle from engine, see "Corvair Transaxle" in Transmission Section. On Spyder (Supercharged), first remove supercharger and carburetor assembly, and disconnect manifold pressure tube at manifold and thread through front shield as engine is raised or lowered. Proceed as follows:

Passenger Cars

1) Remove spare tire (coupe & sedan), engine access cover (station wagon). Remove carburetor air cleaners. Disconnect air heater return air hose. Remove engine-to-body front seal retainer. Disconnect left carburetor return spring and throttle rod at cross shaft. Disconnect main choke cable at firewall.
2) Make the following electrical disconnections: Battery positive terminal cable, generator ground strap and leads to voltage regulator, ignition leads from starter motor harness connector, right and left engine-to-body ground straps, coil and oil and temperature switch wires.
3) Raise car on hoist and remove battery cable and ignition leads from starter solenoid. Remove engine rear grille and skid plate, rear and side seal engine retainers. Disconnect parking brake spring from cross-member. Pull choke cable forward to clear front engine mount. Disconnect accelerator control rods at idler lever and push lever-to-carburetor rod into engine compartment. Disconnect fuel line and speedometer cable. Disconnect air heater flexible hoses from engine. Disconnect gasoline heater fuel line.
4) Remove axle shafts (see Rear Axle Section), and pull universal joints from differential carrier.
5) On Synchro-mesh cars, disconnect shift tube coupling at transmission shifter shaft, then loosen coupling clamp nut and push shift tube coupling into tube until clear of engine front mount. Disconnect clutch return spring and clutch pull rod. Remove clutch cross shaft from front mount. Unfasten clutch cable sheath clamp from engine front mount and drop clutch cable and cross shaft clear of power train. Remove back-up light switch from 4-speed transmission housing (switch is below normal oil level).
6) On Powerglide cars, disconnect transmission shift cable from transmission case. Rotate transmission

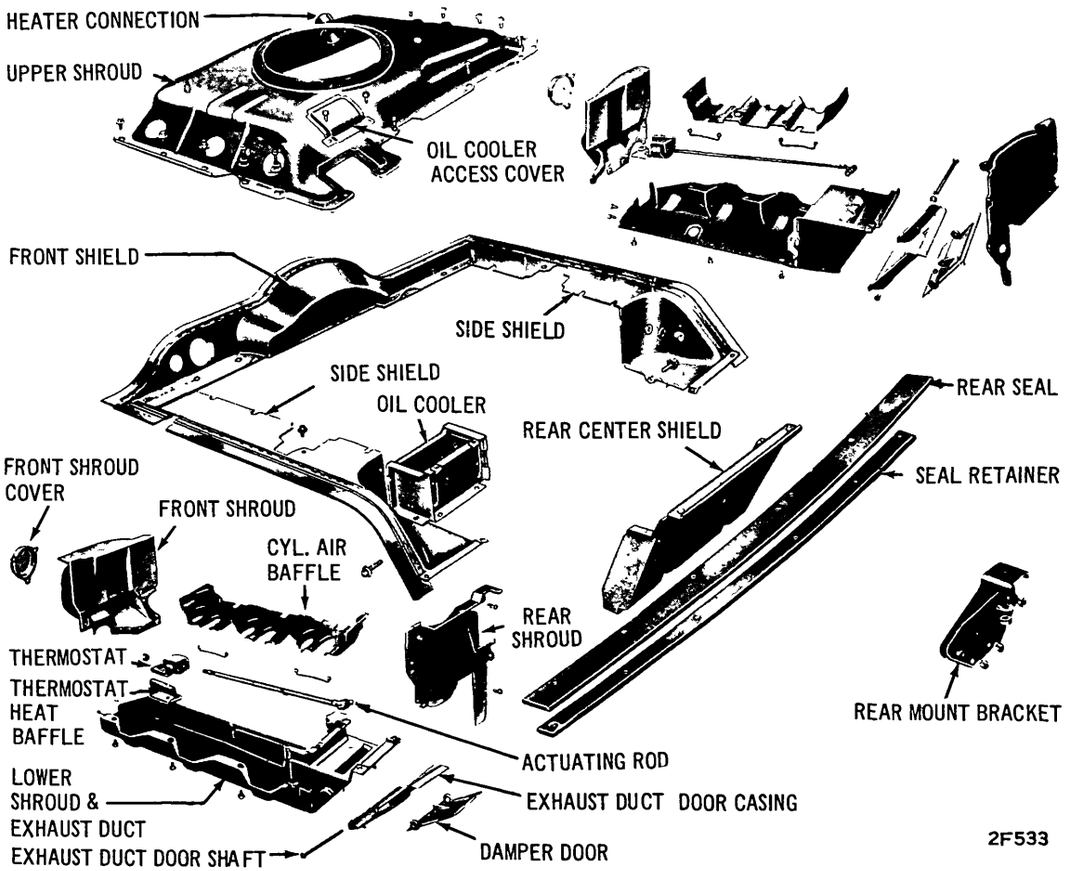
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ENGINE NOTES

► *CAMSHAFT REPLACEMENT NOTE:* When camshaft is being replaced, manufacturer recommends that a 16 oz. can of Engine Oil Supplement, No. 3755788, be added to crankcase (pour 2 or 3 ozs. directly on camshaft if possible). Also, apply molybdenum disulphide ("Molykote" or equivalent) to foot of each valve lifter when camshaft installed (especially important on high performance engines).

► *TURBOCHARGED ENGINE NON-INTERCHANGEABILITY:* Because of specially designed parts in this engine, DO NOT remove supercharger and attempt to install on another engine.

► *1960-63 EXHAUST VALVE REPLACEMENT RECOMMENDATIONS:* On Pass. Cars, where exhaust valve life is unsatisfactory, manufacturer recommends that exhaust valves (and keys) furnished for Turbocharged engines be installed on all engines. On Trucks, use 1963 stellite exhaust valves with rotators for service replacement on 1961-62 engines to increase valve life.



CORVAIR ENGINE SHROUDING (TYPICAL)

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throttle valve lever fully counterclockwise and remove cable from transmission case. Remove transmission filler tube (use a container to catch oil).

7) Position a hydraulic transmission jack stand under engine assembly, using Tool J-7894 (adapter), and lock tool in place with attached locking knob and additional bolt and nut. Remove cotter pins and castellated nuts from front engine mount (at transmission) and from rear engine mount *NOTE* - If front mounting bracket and shims are removed from transmission, the same amount of shims removed must be replaced Rear "toe-in" will be affected if shims are changed Lower power train gradually and watch for possible interference at rear mount and left rear lower control arm. Remove exhaust pipe and muffler assembly.

Trucks

Procedure is same as for passenger cars except as noted below:

On Synchro-mesh trucks, disconnect clutch return spring at clutch housing and at pull rod idler lever. Remove clutch cable retainer from engine front mount, then remove pull rod clevis, idler lever and cable clevis. On Powerglide trucks, disconnect transmission oil cooler lines at transmission.

ENGINE SERVICE

CRANKCASE & CYLINDER HEAD STUD REPLACEMENT

Coat stud threads with anti-seize compound (see "Service Cautions" above), and install into cylinder head or crankcase with special detail of Tool J-8354 to projected length as follows: *NOTE - Measure projected length from shoulder of tool (installed on stud) to surface of crankcase or cylinder head.*

CYLINDER STUD TORQUE NOTE - Maximum torque should be 30 ft lbs., minimum torque 10 ft. lbs. If under 10 ft. lbs , install either .003" or .006" oversize studs as necessary

Stud	Projected Length	Tool Detail
Carb. Mounting (Outboard)	4 3/16"	2
Carb. Mounting (Inboard)	1 5/8"	2
Exhaust Manifold	31/32"	3
Cylinder (Long - Upper)	8 9/32"	1
Cylinder (Short - Lower)	7 9/16"	1
Rear Housing Mounting	4 9/16"	3
Distributor Holding	1 1/8"	

EXHAUST MANIFOLD SLEEVE REPLACEMENT

CAUTION - Remove sleeves from cylinder head only if absolutely necessary. Remove sleeves by turning gradually with a pipe wrench **Do not** pry or tap sleeves to remove. To install, coat new sleeves with anti-seize compound (see above) Insert sleeves into dry ice for about 10 minutes and at same time heat cylinder head to 200°F (do not use open flame). Remove sleeves from dry ice and tap into cylinder head bores making sure sleeves are true with bores. *NOTE - Replacement sleeves furnished Std., 002", & .010" Oversize.*

TIGHTENING SPECIFICATIONS

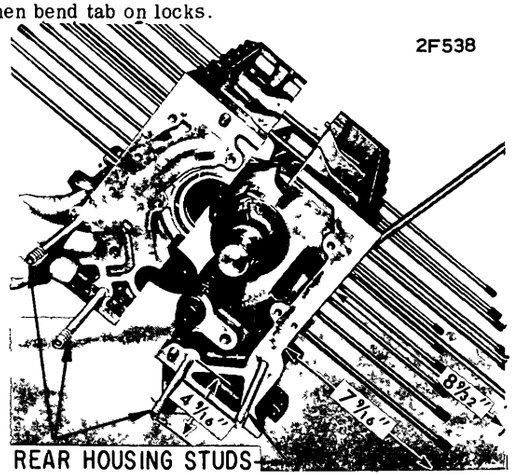
►*TIGHTENING CAUTION: Due to use of aluminum crankcase, rear housing, cylinder heads, and other parts, bolt and stud torques must be held as close as possible to specifications in table below to avoid overstress of base metal parts and stripped threads.*

	Inch-Lbs.	Ft. Lbs.
Cylinder Head		ℂ 35
Exhaust Manifold		23-27
Rocker Arm Stud		ℂ 35
Rocker Arm Stud Nut	55-125	
Rocker Arm Cover	30-50	
Oil Pan	40-60	
Oil Cooler		8-12
Oil Cooler Adapter		7-13
Oil Cooler Shroud	60-80	
Oil Pump Cover	60-80	
Oil Filter & Gen. Adapter		7-13
Connecting Rod Caps		20-26
Crankcase Rear Housing		7-13
Crankcase Halves (7/16")		42-48
Crankcase Halves (5/16")		7-13
Crankcase Cover		7-13
Drive Flange or Flywheel		20-26
Flywheel Housing		20-30
Engine Rear Mount Bolt		50-60
Engine Rear Mount Bracket Nut		40-50
Engine Front Insulator-to-Frame		25-35
Engine Front Mount Bracket-to-Trans.		20-30
Engine Front Insulator-to-Bracket		60-80
Engine Rear Shrouds	60-80	
Skid Plate-to-Rear Housing		20-30
Clutch Cover		15-20

ℂ - Supersedes previous 27-33 ft lbs

EXHAUST MANIFOLD INSTALLATION

Place manifold on sleeve gaskets, tap manifold lightly to insure alignment with gaskets, then firmly seat manifold with a soft hammer Install manifold clamps and french locks Torque attaching nuts to 23-27 ft. lbs , then bend tab on locks.



CRANKCASE STUD DIMENSIONS

ENGINE MOUNTS

Front Mount Removal - Remove clutch lever control cable cross shaft ball stud at front mount bracket, or Powerglide control cable Support engine and remove insulator-to-bracket nuts Remove shift rod coupling from transmission shift rod Lower engine about 2" so front engine bracket clears mount stud Disconnect parking brake cable from mounting bracket. Remove front mount and insulator *CAUTION - Shims between transmission and mounting bracket control rear wheel toe-in and must be replaced in original positions.*

Rear Mount Removal - Support engine and remove rear center shield Remove bracket-to-skid plate nuts, lower engine and remove engine-to-bracket mount assembly

CRANKCASE COVER, BLOWER & BLOWER BEARING REMOVAL

1) Disconnect battery ground strap, accelerator and fuel lines, then remove oil level gauge and carburetor air cleaners and supports Remove spare tire Remove carburetor vacuum balance tube and retaining strap at engine upper shroud assembly and front shield

2) Remove pulley belt and distributor wire harness, then remove carburetor cross shaft and choke cable assembly from carburetors Disconnect generator brace and swivel it away from upper shroud Remove engine upper shroud

3) Remove four retaining bolts from blower pulley and remove pulley and blower from bearing hub assembly Remove crankcase cover and blower bearing assembly as a unit Remove crankcase-to-crankcase vent gasket and crankcase vent

Blower Bearing Replacement - Use hypoid lubricant on bearing shaft and press bearing on crankcase cover so distance from crankcase cover gasket rail to top surface of large diameter of hub assembly is 4 15/32-4 31/64"

OIL COOLER REMOVAL

Remove all screws retaining cooler to engine shrouds, shields and cylinder head, then remove oil cooler access hole cover and remove long oil cooler mounting bolt.

OIL PAN REMOVAL

Drain crankcase and remove oil pan retaining bolts Remove pan

CYLINDER HEAD

Removal - *When removing right hand cylinder head, disconnect coil, oil pressure and cylinder head temperature sending unit wires in addition to following procedure*

1) Drain crankcase and disconnect battery cables from battery and generator. Disconnect radio ground strap. Remove air cleaner, accelerator return spring and air cleaner support. Disconnect accelerator rod from carburetor and remove cross shaft retainer at shaft support. Disconnect cross shaft support from carburetor. Disconnect fuel line and choke cable from carburetor. Remove carburetor and long (outboard) carburetor mounting stud from manifold. Disconnect vacuum balance tube from intake manifold.

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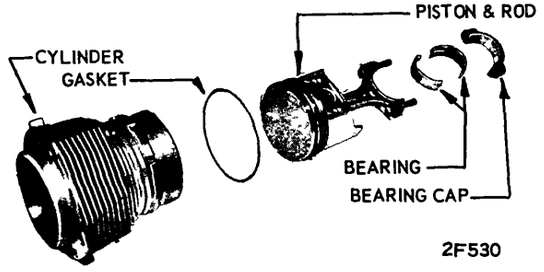
2) Disconnect generator mounting bracket and swivel bracket up and away from engine upper shroud. Remove spark plugs. Remove engine side shield. Remove oil cooler.

3) Raise car on a hoist and attach Tool J-7894 (adapter) to underside of engine. Remove both engine side seal retainers and rear seal retainers. Remove engine rear center shield and seal assembly. Remove lower engine shroud and exhaust duct, then remove exhaust pipe-to-manifold nuts and remove exhaust manifold. Remove engine rear mounting nut and washer from below body rear mounting bracket.

4) Remove valve rocker cover (catch oil draining from cylinder head), then remove rocker arms, pushrods, rocker arm studs and pushrod guides. Remove "O" rings from cylinder head and from bottom of pushrod drain tubes, then remove drain tubes.

5) Remove cylinder head nuts and flat washers, then carefully lower engine assembly approximately 3" to clear cylinder head carburetor flange. Remove cylinder head from crankcase studs.

► *CAUTION - Do not rotate crankshaft with cylinder head removed unless holding fixtures are installed on studs to hold cylinder in place. ½" O.D. steel tubes 4¼" long should be installed on one long stud and ½" O.D. steel tubes 3½" long should be installed on one diagonally opposite short stud of each cylinder. See illustration.*

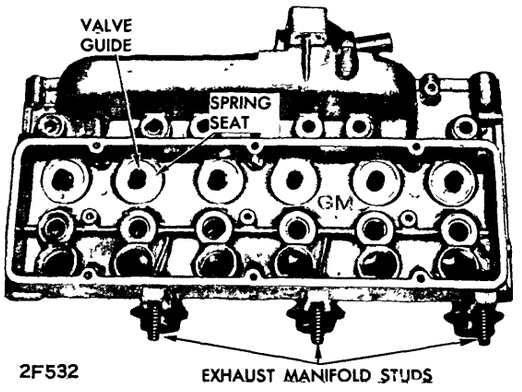


PISTON & CYLINDER ASSEMBLY (EXPLODED)

CYLINDER REMOVAL

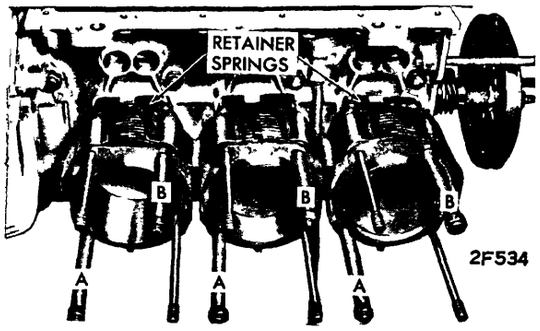
NOTE - The cylinders can be removed with the engine in the car. Remove the cylinder heads and install holding fixtures (see above). Remove crankcase cover and blower assembly (see above). Remove cylinder air baffles (secured by retainer spring clips at base of cylinder). Turn crankshaft and remove connecting rod caps. Remove cylinder holding fixture and remove cylinder, piston and rod as an assembly. *NOTE - If desired, cylinder can be removed without removing piston and connecting rod. In this case, use Tool J-8356 to compress piston rings when installing cylinder.*

Installation - Install new copper gasket over cylinder pilot and install cylinder into crankcase. Reverse removal procedure.

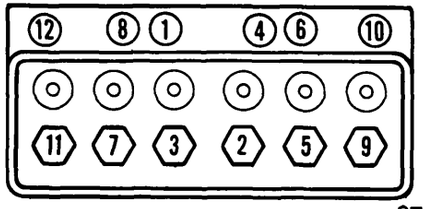


CORVAIR CYLINDER HEAD

Installation - To install head, reverse removal procedure and note the following: Use anti-seize compound such as Permatex No. 404 or its equivalent on the threads of all bolts, studs and capscrews entering aluminum parts. Tighten cylinder head retaining nuts and rocker arm stud nuts (rocker arm studs have internal threads at lower end that thread over cylinder head studs and act as cylinder head nuts) to 27-33 ft. lbs. in the sequence shown in diagram.



CYLINDER HOLDING FIXTURES

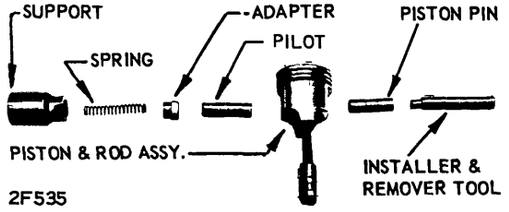


CYLINDER HEAD TIGHTENING SEQUENCE

PISTONS, PINS, RINGS

Engine	PISTONS Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
All	① .0011-.0015"	.00015-.00025"	②	Comp. 1 Comp. 2 Oil	.010-.020" .010-.020" .010-.020"	.0012-.0032" .0012-.0032" .002-.0035"

① - Measured 2.20" from top of cylinder bore. ② - Press Fit. *See "Replacing Pins".*



PISTON PIN INSTALLATION

REPLACING PISTON PINS

Use Tool Set J-6994 & Pilot J-8355-4 to remove and install piston pin in piston and connecting rod (see illustration). When installing, press pin in until pilot of tool bottoms on adapter and support.

INSTALLING PISTONS

Install piston with notch on top of piston toward front (flywheel end) of engine on both banks.

INSTALLING PISTON RINGS

Install rings with identification marks and inside bevel away from top of piston.

CRANKCASE & BEARINGS

FLYWHEEL HOUSING

Crankshaft Front Oil Seal Replacement - Tap out old seal, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-2221-A or suitable installer. *CAUTION - Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*

ENGINE REAR HOUSING REPLACEMENT

Observe the following points:

1) Grooved pin holding oil pump pressure regulator valve must be installed with a suitable drift.

2) Oil pump gallery plug must be flush with counterbore (use sealing compound).

3) Distributor holding stud should project 1 1/8" from distributor mounting pad on housing.

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CONNECTING ROD BEARING REPLACEMENT

Bearings can be replaced without removing engine from car. Remove crankcase cover and blower assembly (see above). Remove spark plugs. Remove connecting rod bearing caps (turn crankshaft to position rods for access to cap bolts).

CRANKSHAFT PULLEY REMOVAL

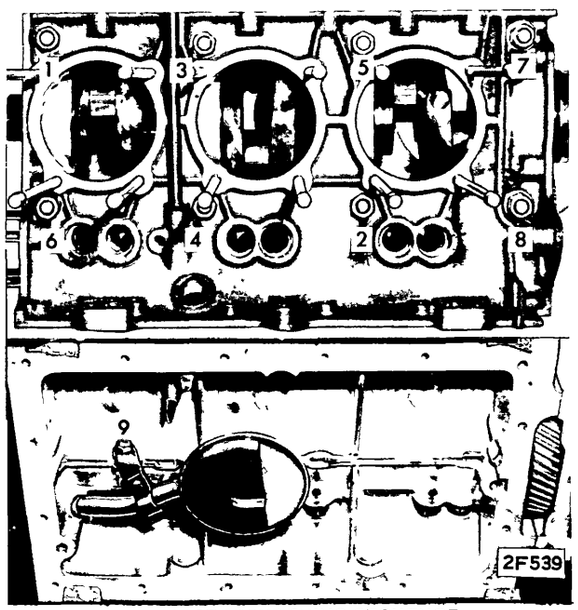
Following procedure supersedes previous recommendations. Rework Crankshaft Pulley Remover J-6978-1 by drilling two 7/16" holes through puller. Place holes 180° apart on a 2¼" circle which is concentric with screw hole in center of tool. Proceed as follows:

1) Raise and support rear of car. Loosen blower belt, remove oil filter assembly, and remove engine grille. Remove engine rear sealing strip retainer and sealing strip, then remove engine rear center shield.

2) Support rear of engine, disconnect and remove rear engine mount and remove mount bracket from engine. *NOTE - On trucks, lower rear of engine to obtain sufficient clearance.* Remove pulley attaching bolt, then remove pulley using reworked Puller J-6978-1 (see above).

CRANKSHAFT REAR OIL SEAL REPLACEMENT

Tap out old seal from rear housing, clean surface in housing and check for nicks. Coat beaded outer surface of seal with lubriplate and install with Tool J-270-6 or suitable installer. *CAUTION - Sealing lips of seal must be packed with a good grade of cup grease with a minimum melting point of 350°F.*



CRANKCASE TIGHTENING SEQUENCE

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING RODS		
Engine	Journal Diameter	Clearance	Thrust Bearing	Endplay	Journal Diam.	Clearance	Sid play
All	1 & 2 2.0978-2.0988" 3 & 4 2.0983-2.0993"	.0012-.0027" .0007-.0022"	Rear	.002-.006"	1.799-1.800"	.0007-.0027"	.005-.010"

CAMSHAFT

	Journal Diameter		Bearing	Camshaft	Cam Lobe Lift	
Engine	Nos. 1,2,3	No. 4	Clearance	Endplay	Intak	Exhaust
Standard & Monza P.G.	1.1995-1.2005"	1.4395-1.4405"	ℂ.0015-.0035"	.002-.007"	②.209"	②.229"
Hi Perf. & Spyder	1.1995-1.2005"	1.4395-1.4405"	ℂ.0015-.0035"	.002-.007"	.252"	.252"

ℂ - New. .002-.004" Used. ② - Monza P.G. with Air Cond. is .252".

SEPARATING CRANKCASE

After cylinders, rear housing, and flywheel housing are removed, loosen crankcase holding bolts. Tilt crankcase on right side at about 15° angle to prevent camshaft and crankshaft falling out. Remove holding bolts and remove crankcase left half.

ASSEMBLING CRANKCASE

See *"Main Bearing Servicing"*. Make sure split line surfaces are free of nicks and scratches. Install main bearing inserts in right half and install crankshaft. Install camshaft, guiding thrust washer into groove in crankcase and index timing marks on camshaft and crankshaft gears. Install main bearing inserts in left half and carefully install left half of crankcase to right half. Torque holding nuts to proper specifications in sequence shown in diagram. *CAUTION - Hold bolt head and tighten nuts. Do not tighten at bolt head.*

MAIN BEARING SERVICING

1) When testing bearing clearance, crankcase must be assembled without camshaft exactly as indicated under "Assembling Crankcase".

2) No. 1 (rear - thrust bearing) replacement bearings have only one flanged bearing half. Install this flanged half in **left half** of crankcase only.

3) No. 4 bearing halves are tapered (upper end .0015" thicker, and lower end .0015" thinner than corresponding halves of other bearings) to lower centerline of No. 4 bearing. No. 4 bearing halves have brown dye on edges for identification. Do not install a No. 4 bearing in No. 2 or 3 positions, nor a No. 2 or 3 bearing in No. 4 position.

CRANKSHAFT DRIVE FLANGE

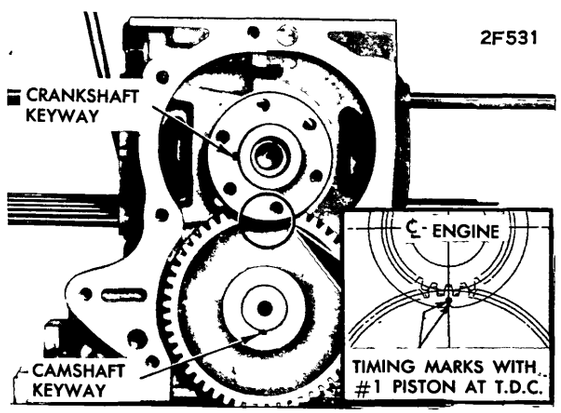
Drive flange and crankshaft timing gear are a one-piece unit with a tight press fit on crankshaft. A hydraulic press is necessary to remove and install gear and flange. To remove, use Support Plate J-358-1, Adapter Rings J-7028, and a hydraulic press. To install, support crankshaft between front crankshaft throw and front journal (support must clear thrust face of No. 6 crankpin). Install woodruff key and install crankshaft gear. Press gear on shaft with Tool J-6175 and hydraulic press.

FLYWHEEL INSTALLATION

Flywheel or flex plate-to-crankshaft gear bolts must have sealing compound applied before installation to prevent oil leakage.

CAMSHAFT SETTING

Notch in crankshaft gear flange and notch in camshaft gear can be aligned only when crankcase reassembled.



VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT GEAR REPLACEMENT

Remove gear by supporting gear with Tool J-971 and pressing out shaft with an arbor press. To install, support camshaft at back of front journal, install thrust washer and woodruff key and press gear on shaft with an arbor press (support gear with Tool J-971) until gear bottoms on thrust washer.

CAMSHAFT END THRUST

Controlled by thrust washer located between camshaft gear and front bearing. Not adjustable.

CAMSHAFT BEARING SERVICE

If clearance excessive (see table), replace either crankcase or camshaft.

TIMING GEAR REPLACEMENT

Timing gears must be replaced in matched sets only.

VALVE GUIDE SERVICING

Guides are pressed into cylinder head. If valve stem-to-guide clearance excessive (see Valve Table), valves with oversize stems may be used if guides are not cracked or worn to the extent that largest oversize valve stem cannot be installed. If guides cracked or worn excessively, guides may be replaced and valves with standard diameter stems used. *NOTE - Valve guides NOT replaceable on Turbocharged engines.* Proceed as follows:

Oversiz Valv Installation - Valves are furnished with Std., .003", and .010" oversize stems. Use Reamer Set J-5830 to ream guides. Use smallest reamer possible which will properly finish guide bore.

Valve Guid Replacement - *NOTE - Valve guides NOT replaceable on Turbocharged engines.* Replacement guides furnished .002" (replacement standard), .010", & .020" oversize (Outside Diameter). Inside diameter bored for use with valves with standard size stems. Use Remover J-21280 to drive old guide out of cylinder head from spring seat side (guide will come out combustion chamber side). If valve guide bore in head is smooth and without scoring, use .002" oversize guide. If bore damaged, ream with .010" oversize Reamer J-21282. Finished bore diameter should be .524-.525", then use .010" oversize guide. If further refinishing of guide bore necessary, use .020" oversize Reamer J-21283 and .020" oversize guide. Finished bore diameter should be .534-.535". Drive new guide in with Installer J-21281 (tapered end of guide first), from combustion chamber side, until guide is approximately 1" below top surface of valve seat insert (align groove on installer flush with top surface of valve seat insert). Finish ream guide inside diameter with Reamer J-21318. Install valve with standard diameter stem.

VALVE STEM SEALS

None used.

VALVE SPRING INSTALLATION

Spring must be installed with a hardened shim (minimum .020" - furnished .030") under it to protect aluminum cylinder head.

VALVES

Engine		Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diam.	Stem Clearance	Valv Lift
Standard & Monza P.G.	Intake	1.335-1.345"	44°	45°	1/16-3.32"	.3415-.3422"	① .0010-.0027"	③ .344"
	Exhaust	1.235-1.245"	44°	45°	1/16"	.3410-.3417"	② .0015-.0032"	③ .344"
Hi Perf. & Spyder	Intake	1.335-1.345"	45°	45°	3/32"	.3415-.3422"	① .0010-.0027"	.378"
	Exhaust	1.235-1.245"	45°	45°	1/16"	.3410-.3417"	② 0015-.0032"	.378"

① - Wear limit .001-.004". ② - Wear limit .002-.005" ③ - .378" on Monza Powerglide with Air Conditioning.

VALVE SPRINGS & LIFTERS

Engine	SPRINGS			LIFTERS	
	Free Length	Pressure (Lbs.) Valve Closed	Valve Open	Diameter	Clearanc
Standard	1.74"	58-64 at 1.508"	141-149 at 1.148"	.....	.....
Monza P.G.	2.08"	76-79 at 1.696"	159-169 at 1.306"	.....	.....
Hi Perf. & & Spyder	2.08"	76-79 at 1.696"	159-169 at 1.306"	.....	.....

VALVE SPRING INSTALLED HEIGHT

Check installed height of valve spring after grinding valves by measuring distance from spring seat on cylinder head to top of valve spring. If this dimension exceeds "Preferred Height" listed in table below, install additional 1/32" shim (different shims for various engines) under valve spring to bring height within limits. *Do not add shims to bring height to less than "Minimum Height" below.*

Valve Spring Height Specifications

Engine		Preferred Height	Min. Height
Std. (80 H.P.)	Intake	1 15/32"	1 7/16"
	Exhaust	1 1/2"	1 15/32"
All Others	Intake	1 11/16"	1 21/32"
	Exhaust	1 11/16"	1 21/32"

HYDRAULIC LIFTER SERVICE

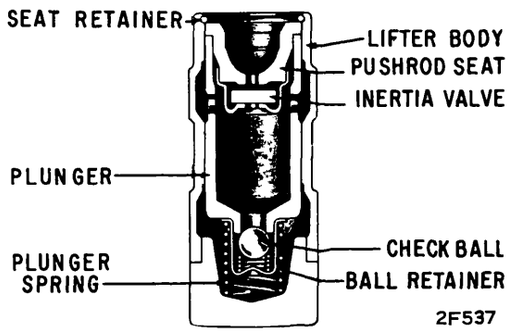
Lifters are removed from lifter bores after pushrods and drain tubes removed by means of a magnet or wire hook, and should be reinstalled in same bore from which removed. Replace entire lifter if any part damaged. Fill lifter with SAE 10 engine oil at reassembly and before installing in engine.

HYDRAULIC LIFTER ADJUSTMENT (AT ENGINE OVERHAUL)

NOTE - Make this adjustment whenever any part of valve train is disturbed (such as cylinder head or rocker arm removal). Set distributor at No. 1 firing position and crankshaft pulley notch at 0° on timing tab. Adjust No. 1, 3, 6 Intake and No. 1, 4, 5 Exhaust valves as follows: Turn rocker arm adjusting nut down until no axial movement of pushrod is felt, then turn adjusting nut 1 more turn additional. With distributor at No. 2 firing position (pulley notch at 0°), adjust No. 2,4,5 Intake and No. 2,3,6 Exhaust valves in same manner.

PUSHROD, PUSHROD GUIDE, & DRAIN TUBE INSTALLATION

Place "O" rings on each end of drain tubes and install with long end of tube toward cylinder head. Insert pushrods into drain tubes with .050" side oil hole at rocker arm end (pushrod marked with blue paint). Install pushrod guides and rocker arm studs. Install rocker arms and make valve lifter adjustment.



HYDRAULIC VALVE LIFTER (SECTIONAL)

VALVE TIMING

Engine	INTAKE Open BTDC	INTAKE Close ALDC	EXHAUST Open BLDC	EXHAUST Cl s ATDC
Standard & Monza P.G. ①	43°	93°	87°	69°
Hi Perf. & Spyder	54°	118°	95°	78°

① - Monza P.G. with Air. Cond. same as Hi Perf. & Spyder.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Oil Pressur - 40 lbs. at 2000 RPM.
Pressure Regulator Valve - In engine rear housing. Not adjustable.

LUBRICATION SYSTEM

Force feed type with oil under full pressure supplied to all crankshaft, camshaft, and connecting rod bearings, and to hydraulic valve lifters. Oil metered by lifters lubricates pushrods and rocker arms. All other parts are lubricated by oil spray. Oil pump located in engine rear housing and driven by distributor shaft which is driven by crankshaft. Pump draws oil through fixed oil screen and intake pipe in crankcase and delivers oil to full-flow type filter mounted on Filter & Generator Adapter on engine rear housing (10 lb. type bypass valve in adapter permits oil circulation through engine if filter element is clogged - see illustration). Oil is then directed through oil cooler mounted on side of engine rear housing. A 10 lb. bypass valve in adapter permits oil circulation through engine if cooler is clogged. From oil cooler oil is directed to the two main oil galleries (one on either side of camshaft) which extend entire length of crankcase. Oil is distributed through the main galleries as detailed below. *NOTE - See Engine Rear Housing and Filter & Generator Adapter illustrations for location of channels and passages in these parts and for location of bypass valves for oil filter and oil cooler.*

Crankshaft & Camshaft Bearings - Lubricated through passages in crankcase webs from main oil galleries. Individual bearings are lubricated from right or left main oil galleries as follows: **Crankshaft Bearings** - Nos. 1 & 3 (right gallery), Nos. 2 & 4 (left gallery). **Camshaft Bearings** - Nos. 1,3,4 (right gallery), No. 2 (left gallery).

Connecting Rod Bearings - Crankshaft is drilled and each connecting rod bearing is lubricated through passage from adjacent main bearing.

Pistons & Pins - Lubricated by oil spray thrown on cylinder walls from ends of connecting rod bearings.

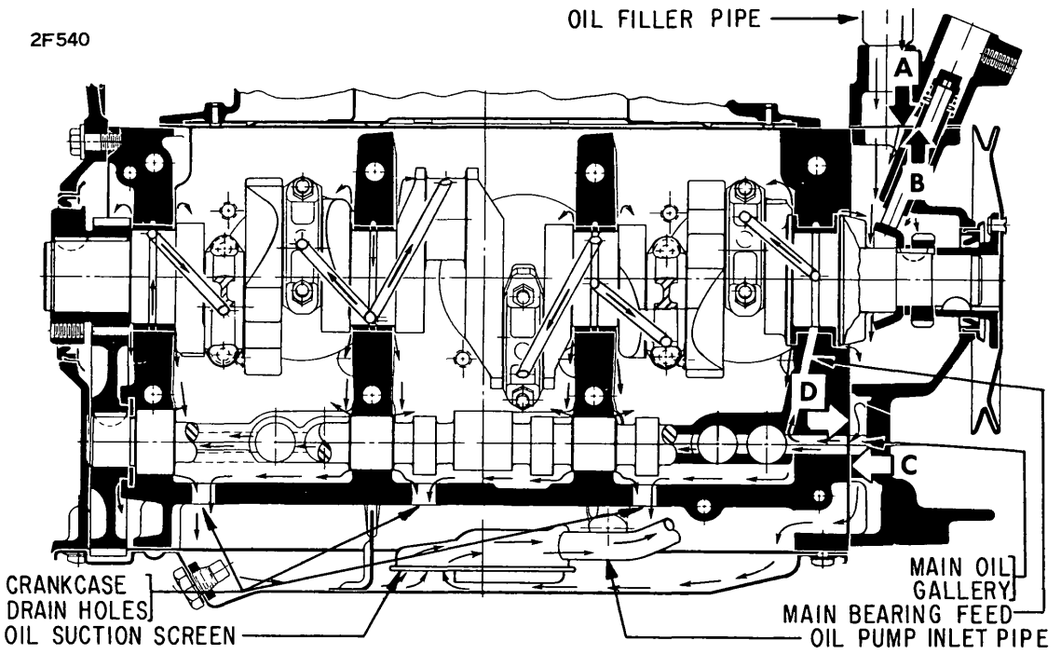
Timing Gears - Lubricated by oil spray from forward end of crankshaft and camshaft No. 1 bearings.

Fuel Pump Eccentric & Distributor Drive Gear - Lubricated through drilled orifice and pressed in nozzle in engine rear housing which directs oil on these parts (early cars), lubricated by overspray from No . 1 (rear) main bearing (later cars - orifice and nozzle omitted from rear housing).

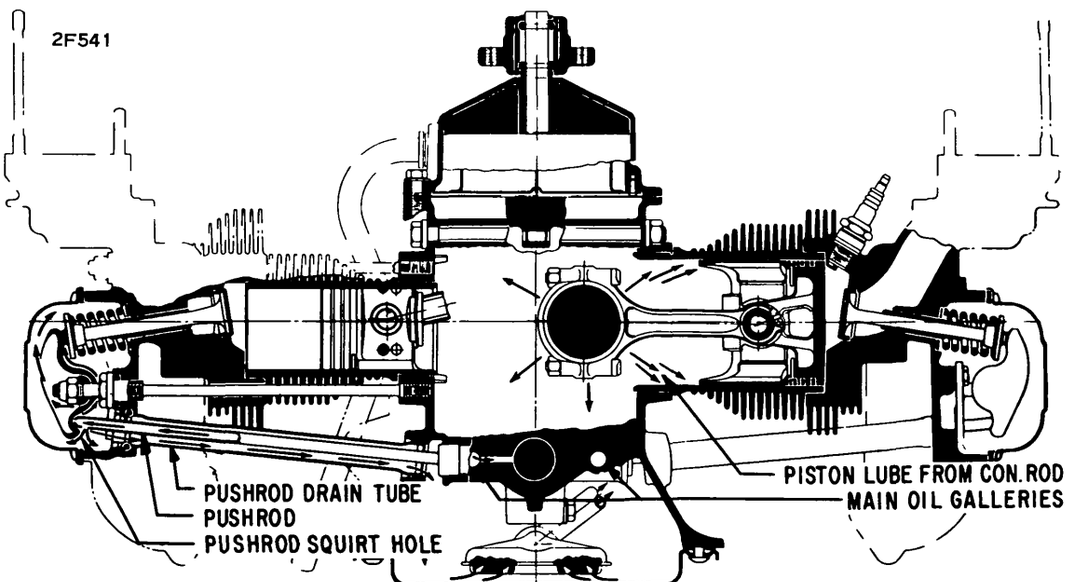
Hydraulic Valve Lifters - Main oil galleries intersect lifter bores and lifters are supplied with oil directly from these galleries.

Rocker Arms, Pushrods, & Valves - Pushrods are hollow and are supplied with oil from hydraulic lifter (inertia valve in upper end of lifter permits oil to flow through hole in end of pushrod). Upper end of pushrod has a side hole which sprays the valve chamber (lifter and pushrod rotate in operation and this oil spray is directed around valve chamber) and a through hole in the end which lubricates pushrod socket and rocker arm ball (pushrod hole registers with hole in rocker arm once during each revolution directing oil upward to the rocker arm ball). Oil in rocker arm chamber is returned to crankcase through the tubular pushrod drain tubes.

ENGINE OILING



ENGINE OILING SYSTEM (SIDE VIEW - SEE VIEWS A,B,C,D)



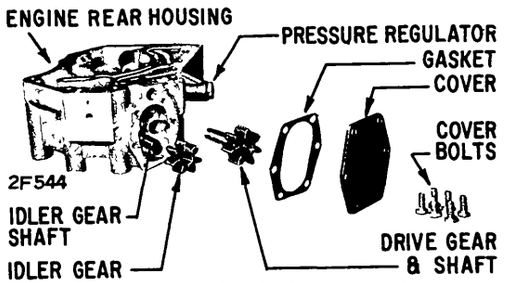
ENGINE OILING SYSTEM (CROSS SECTION)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PUMP OVERHAUL

Disassembly - Drain crankcase, remove rear grille, center shield and engine rear mount (support engine). Remove oil pump cover. Remove oil pump drive gear and shaft and idler gear from rear housing. Remove pressure regulator valve plug, gasket, spring, and valve.

Reassembly & Checking - Lubricate gears with engine oil. Install idler gear on idler shaft and make sure shaft is 010-.020" below housing gasket surface. Insert drive gear and shaft in housing. Clearance between gears and housing should be .002-.005". Gear backlash should be .002-.008". *NOTE - Oil pump gears should extend .0025-.0045" above housing gasket surface for oil pump prime. Gears of .001" oversize thickness are available.* Install oil pump gasket and cover, and pressure regulator valve assembly.



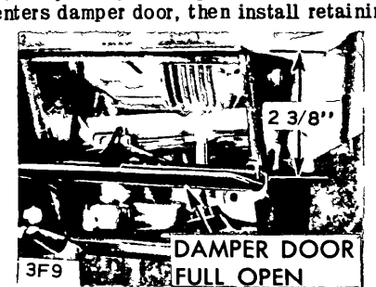
CORVAIR OIL PUMP (EXPLODED)

ENGINE COOLING

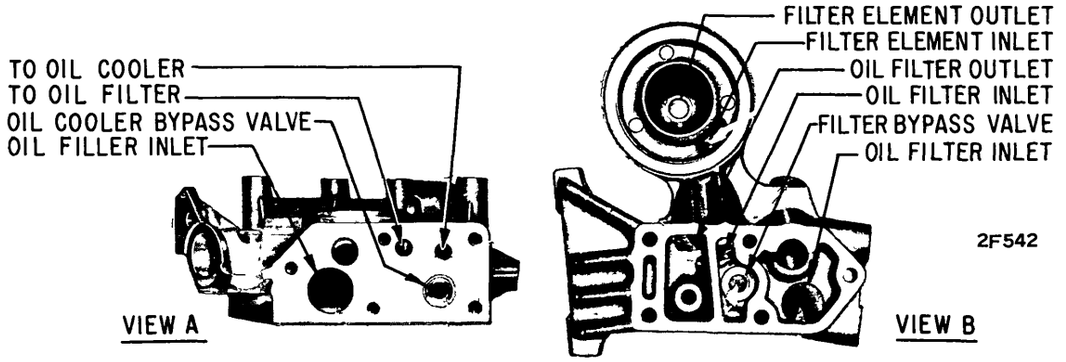
Air cooled by blower mounted on top of engine. Engine temperature regulated by a bellows type thermostat filled with butyl alcohol in each lower shroud exhaust duct. Each thermostat operates a damper door at rear of each lower exhaust duct. Exhaust damper doors restrict blower air exhaust until engine reaches operating temperature *NOTE - If thermostat fails, damper doors will remain open.*

Thermostat - Alcohol filled bellows type in each lower shroud exhaust duct. Thermostats start to open damper doors at 200-210°F (fully open 225-230°F).

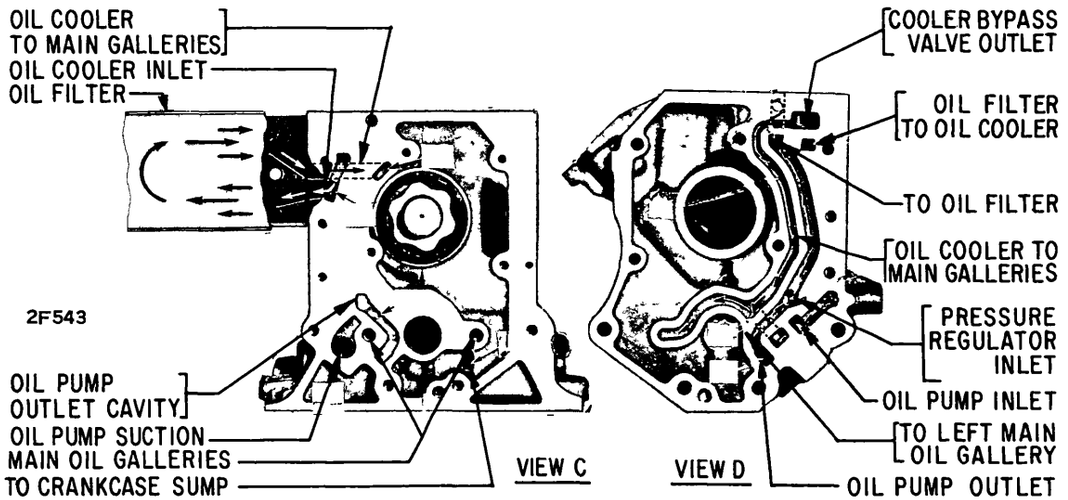
Exhaust Damper Door Adjustment - *Make this adjustment whenever a new thermostat is installed.* With exhaust damper door fully open, pull thermostat actuating rod out to maximum travel (thermostat against bellows stop). There should be 2 3/8" opening from top of damper door to top of opening (exhaust duct top edge). Adjust by turning swivel on actuating rod until it enters damper door, then install retaining clip.



EXHAUST DAMPER DOOR ADJUSTMENT



OIL FILTER-GENERATOR ADAPTER (SEE OILING SYSTEM SIDE VIEW)



ENGINE REAR HOUSING (SEE OILING SYSTEM SIDE VIEW)

ENGINE WARNING SYSTEM

►*OIL PRESSURE & TEMPERATURE SWITCHES INSTALLATION CAUTION:* Switches are grounded through threads of body. **Do not** coat threads with sealer or anti-seize compound. Torque oil pressure switch to 45-65 **inch-lbs.**, and temperature switch to 10-15 ft. lbs.

ALL MODELS (EXCEPT TURBOCHARGED SPYDER)

Oil Pressure-Temperature Indicator - Light on instrument panel comes on when ignition switch turned on but goes off during normal engine operation. If oil pressure is low, or if cylinder head temperature reaches 450°F, light will come on. Light controlled by an oil pressure switch and a disc type temperature switch on underside of right cylinder head near No. 3 cylinder.

TURBOCHARGED SPYDER

Oil Pressure-Temperature Indicator - **1)** Same system as for standard cars (see above).

2) In addition to indicator light system, a temperature gauge is installed in instrument cluster and controlled by a sending unit in **left** cylinder head. A warning buzzer to indicate excessive engine temperature is located under instrument panel. A silicon rectifier in wiring harness near warning buzzer allows light current to flow to ground through closed engine temperature switch (right head), but prevents oil pressure switch from completing buzzer circuit. *See "Monza Spyder Engine Warning System" supplementary wiring diagram for circuits.*

Manifold Pressure Gauge - A pressure gauge, calibrated in inches of mercury, located in instrument cluster and connected to intake manifold by a tube, indicates manifold pressure.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

MODEL IDENTIFICATION

Series	Body Style	Series Prefix
500 Std.	2-Door Coupe	527
700 Deluxe	2-Door Coupe	727
700 Deluxe	4-Door Sedan	769
900 Monza ①	2-Door Coupe	927
900 Monza	4-Door Sedan	969
900 Monza ①	Convertible	967
Corvair "95"	Greenbrier	R-1206
Corvair "95"	Pickup (Rampside)	R-1254
Corvair "95"	Panel (Corvan)	R-1205

① - When equipped with Turbocharged Engine, called "Monza Spyder"

SERIAL NUMBER

Stamped on plate attached to left front door lock pillar. Number carries identification data as follows:

① ② ③ ④
3 0927 T 100001

① - Year. 3 1963.

② - Body Style (Series Prefix) preceded by "O" on all models except Corvair "95". *See table above.*

③ - Assembly Plant. *See listing below.*

④ - Beginning vehicle number at each assembly plant (separate sequence for Corvair & Corvair "95").

Assembly Plant Designation

A - Atlanta	K - Kansas City	S - St. Louis
B - Baltimore	L - Los Angeles	T - Tarrytown
F - Flint	N - Norwood	W - Willow Run
G - Framingham	O - Oakland	
J - Janesville	R - Arlington	

ENGINE NUMBER

Stamped on top of cylinder block just forward of generator-oil filter adapter. Number carries identification data as follows:

① ② ③ ④
T 12 10 YC

① - Engine Assembly Plant. F Flint. T Tonawanda.
② - Month of Manufacture. 12 December.
③ - Day of Manufacture. 10 Tenth.
④ - Engine Type. *See listing below.*

Engine Code Suffix Letters

Engine Type	① Suffix Letters
Std., 80 H.P., 8.0-1	YC, YL, Z, ZD, V, W
Monza Powerglide, 84 H.P., 9.0-1	ZH
Hi Perf., 102 H.P., 9.0-1	YN, YM, ZF, ZG
Spyder Supercharged, 150 H.P., 8.0-1	YR

① - Different combinations for various transmission and accessory options.

FILTERS & CLEANERS

Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace 6,000
Air Cleaner	Clean 6,000
Engine Oil Cooler	Clean 12,000
Fuel Filter (Exc. Spyder)	Replace if Carb. Floods
(Spyder)	Replace 12,000

SERVICING AIR CLEANER

Clean element in kerosene, squeeze dry, then dip in engine oil and squeeze to remove excess oil. Wrap element in a clean, dry cloth and squeeze out remaining oil. *Do not shake or wring element.*

REPLACING OIL FILTER

Air Conditioned Cars - To prevent oil spilling into engine compartment when changing filter, remove both filter and adapter as a unit and separate filter from adapter at the bench.

CAPACITIES

Crankcase (Qts.) ①	4
Synchro-mesh 3-Speed (Pts.)	3
4-Speed (Pts.)	3¾
Powerglide (Pts.)	Refill 6
	② Dry 13
Rear Axle (Pts.)	4½

① - Add ½ quart with filter change.
② - Transmission and torque converter.
NOTE - Synchro-mesh transmission and differential carrier connected by internal passages.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

COMPRESSION PRESSURE

With throttle and choke wide open and all spark plugs removed, the lowest reading cylinder should not be less than 80 percent of the highest reading cylinder. No cylinder reading should be less than 100 lbs.

VALVE TAPPET CLEARANCE

All ..... Hydraulic

SPARK PLUG

Gap (All except Al. 215" Jetfire)	.030"
(Al. 215" Jetfire)	.025"
Torque (All except Al. 215" Jetfire)	18-34 ft. lbs.
(Al. 215" Jetfire)	12-17 ft. lbs.

Spark Plug Type

394" Eng (engine painted green)	AC45
(engine painted red)	AC44
Al. 215" Eng. (2-Bbl.)	AC44FFX
(4-Bbl. & Synchro-mesh)	AC45FF
(4-Bbl. & Auto. Trans.)	AC44FF
(Jetfire)	AC45FF

DISTRIBUTOR

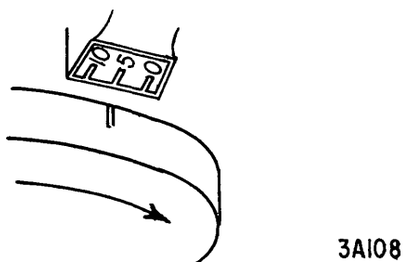
Point Gap (All)	.016" (Correct when Cam Angle 30°)
Cam Angle (All)	28-32° (Adjust to 30°)
Breaker Arm Spring Tension (All)	19-23 ozs
Condenser Capacity	.18-.23 mfd.

IGNITION TIMING

At 850 RPM with vacuum line disconnected.

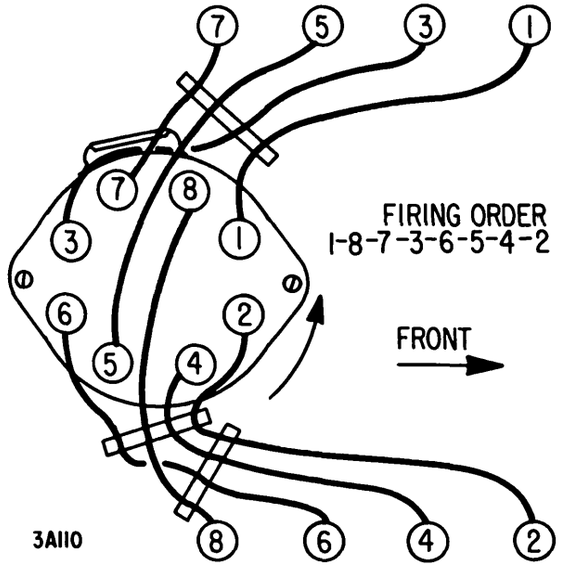
Al. 215" (2-Bbl. Carb. & Synchro-mesh)	5° BTDC
(2-Bbl. Carb. & Auto. Trans.)	7½° BTDC
(Jetfire)	10° BTDC
(4-Bbl. Carb., All Trans.)	7½° BTDC
394" (Synchro-mesh)	2½° BTDC
(Auto. Trans.)	5° BTDC

►*DETONATION NOTE:* If engine detonates at proper ignition timing (may be caused by low octane fuel or excessive carbon build-up in combustion chamber), timing should be retarded 2½° If extra high octane fuel used, timing may be advanced beyond specified setting if no detonation occurs

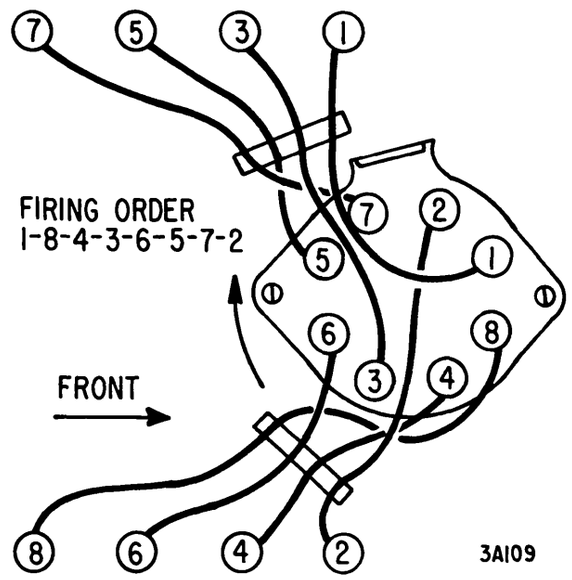


3A108

IGNITION TIMING MARKS



394" ENGINE FIRING ORDER



ALUMINUM 215" ENGINE FIRING ORDER

HOT (SLOW) IDLE RPM

With Synchro-mesh Trans. in Neutral; Auto. Trans. in Drive.

Al. 215" Engine

	Synchro-mesh	Auto. Trans.
With Air Conditioning	①550	①550
Less Air Conditioning	500	500
Jetfire	①600	①600

394" Engine

	Synchro-mesh	Auto. Trans.
With Air Conditioning	①550	①500
Less Air Conditioning	550	500

① - With factory installed Air Cond. OFF and Idle Compensator or Carb-Airator held closed. Dealer installed Air Cond. must be ON.

FAST IDLE RPM

Engine & Carburetion

Al. 215" with 4-Bbl.	① 1800
with Supercharger (Synchro-mesh)	① 2400
with Supercharger (Auto. Trans.)	② 1500
394" with 2-Bbl.	① 1900
with 4-Bbl.	① 1600

① - Fast idle screw on high step of cam.
② - Fast idle screw on second step of cam.

AUTOMATIC CHOKE SETTING

Rochester Carb. No.	Setting
2GC 7023052,53	1 Lean
7023056,58	Centered
4GC 7023050,51	Centered
7023054,55	2 Rich

FUEL PUMP PRESSURE

Al. 215" Engine	6-8 psi at 1800 RPM
394" Engine	5-6 psi at 1800 RPM

MANIFOLD HEAT CONTROL VALVE

Aluminum 215" Engine - None used Intake manifold heated by engine coolant

394" Engine - Automatic thermostatic type located on left exhaust manifold. Free-up if necessary DO NOT LUBRICATE valve shaft bearing surfaces If bushings are worn, replace entire assembly

CRANKCASE VENTILATION VALVE

Check operation periodically Remove assembly every 12,000 miles and clean To clean, blow compressed air through hoses Wash valve in kerosene, then blow air through small tubing of valve. Clean bleed hole in connector (at carburetor) with 1/16" wire or drill.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Delco-Remy 1110975

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	500	Start	5-7
5-7	1000	12.5	15¼-17
11-13	2100		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111013

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	500	Start	4-6
2 5-4 5	750	12 5	16-18
5-7	1000		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111021

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	500	Start	9-11
2 5-4 5	750	12 5	16-18
5-7	1000		

For engine degrees and RPM, multiply by 2

Delco-Remy 1111033

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	400	Start	9-11
9-11	1200	13	18-20
12-24	2000		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111034

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
0-2	500	Start	9-11
5-7	1000	12 5	18-20
11-13	2100		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms at 80° F
Primary Resistance (Exc. Jetfire)	1.28-1.42
(Jetfire)	7.5-8.6
Secondary Resistance (Exc. Jetfire)	7200-9500
(Jetfire)	7500-10000
Resistance Wire (In Harness)	1.75-1.85

Current Draw 2.0 amps. idling, 4-4.5 amps. stopped.

CARBURETOR

JETFIRE SUPERCHARGED CARBURETOR & FLUID INJECTION SYSTEM: *See CARBURETION SECTION.*

CARBURETOR SPECIFICATIONS

R chester Carb. No.	Float Level	Float Drop	Choke Setting
2GC 7023052,53	① 13/32"	② 1 3/4"	1 Lean
7023056,58	① 25/32"	② 1 29/32"	Centered
4GC 7023050,51 Pri.	③ 1 15/32"	④ 1 1/2"	Centered
Sec	③ 1 3/8"	④ 1 3/16"	.....
7023054,55 Pri	⑤ 1 7/16"	④ 1 3/8"	2 Rich
Sec.	⑤ 1 3/8"	④ 1 1/8"	.....

① - With air horn inverted, gasket in place, measure from gasket to lower (sharp) edge of float seam at outer end

② - Air horn upright, gasket in place, measure from gasket to bottom of float

③ - Air horn inverted, gasket in place, measure from gasket to top heel of float; Float Toe measurement (11/16" primary, 3/8" secondary) taken from gasket to center of dimple on side of float at toe end.

④ - Air horn upright, power piston fully extended, measure from gasket to center of dimple on side of float at toe end

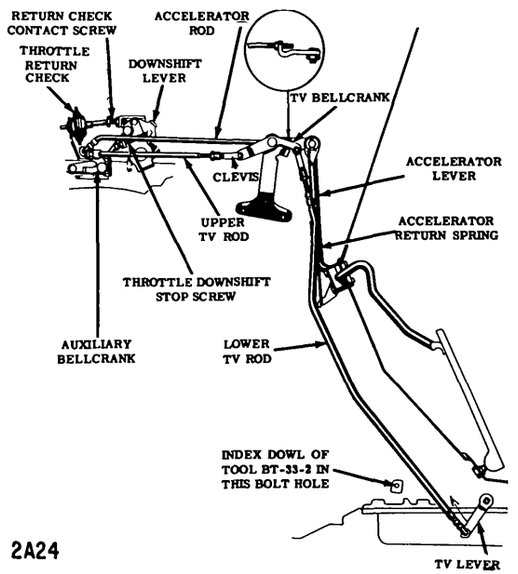
⑤ - Air horn inverted, gasket in place, measure from gasket to top of float heel; Float Toe measurement is 17/32" Primary, 3/8" Secondary) from gasket to center of dimple on side of float at toe end *Primary specification supersedes original setting of 1/2".*

MANIFOLD FUEL DISTRIBUTION

All Engin s - Carburetor right barrels feed cylinders 2-3-5-8; left barrels feed cylinders 1-4-6-7.

ACCELERATING PUMP SETTING

2GC (Al. 215" Eng.) ..... Outer Hole (Normal)
Inner Hole (Leaner)
(394" Eng.) ..... Center Hole (Normal)
Inner Hole (Leaner)
Outer Hole (Richer)
4GC (Al. 215" Eng.) ..... Outer Hole (Normal)
Inner Hole (Special conditions)
(394" Eng.) ..... Inner Hole (Normal)
Outer Hole (Special conditions)



ALUMINUM 215" ENG. AUTO. TRANS. THROTTLE LINKAGE

THROTTLE LINKAGE ADJUSTMENT

Aluminum 215" Engine (Exc pt J tfir) Aut matic Transmission - 1) Raise car and disconnect throttle valve lever on transmission, position Gauge BT-33-2 on transmission with index dowel on gauge in bolt hole on case (in boss at lower left front corner of case). Hole in lever must be centered within hole in gauge with lever held in rearward position. Bend lever as necessary with Tool BT-33-7.

2) Connect rod to transmission throttle lever, then disconnect upper end of rod from bellcrank. Disconnect rear end of upper throttle valve rod from bellcrank and hold bellcrank down at rear. Press downward on throttle valve rod (lower) and adjust clevis at upper end of rod so that clevis pin is free fit in rod and bellcrank. Connect rod.

3) Remove air cleaner, block or move throttle return check out of way, block choke valve open (2-Bbl.); block intermediate choke lever open (4-Bbl.). With fast idle cam released, back off throttle lever stopscrew so that throttle valves are completely closed.

4) On 2-Bbl. carbs., place Tool BT-6117 on machined surface of manifold and bend auxiliary bellcrank link so top of accelerator rod just touches tool.

5) On 4-Bbl. carbs., bend auxiliary bellcrank link as necessary so clearance between auxiliary bellcrank and gauging surface of carburetor throttle body is .020-.040".

6) On all carbs., adjust swivel on rear end of upper throttle valve rod so that rod is slightly short. *CAUTION - Swivel must turn fre ly on r d thr ads.* Connect rod to bellcrank.

7) Hold bellcrank against stop and turn swivel to lengthen rod until swivel turns freely and feels sloppy. Continue to lengthen rod until all play has been taken up and slight resistance is felt when turning swivel (resistance should be slight and adjustment should be

(Continued)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

repeated to point where play is taken up can be determined). Hold swivel from turning and tighten locknut

8) Loosen throttle downshift stopscrew locknut and back off stopscrew approximately 6 turns. Use accelerator lever to move throttle valves to wide open position and overtravel linkage to point of maximum transmission throttle valve lever travel. *CAUTION - Do not bend or str tch linkage.* Hold accelerator lever in this position and turn downshift stopscrew in until it just touches downshift lever tang. Turn stopscrew in an additional 1½ turns (2-Bbl.), 1½-2 turns (4-Bbl.). Tighten locknut.

9) Free choke valve. With engine at normal operating temperature, adjust slow and fast idle RPM. Adjust pedal height, then adjust throttle return check. *See below.*

Aluminum 215" (Jetfir) Engine Automatic Transmissi n - 1) Raise car and disconnect lower throttle valve rod from throttle valve lever on transmission. Position Gauge BT-33-2 on transmission with index dowel on gauge in bolt hole on case (in boss at lower left front corner of case). Hole in lever must be centered within hole in gauge with lever held in rearward position. Bend lever as necessary with Tool BT-33-7.

2) Connect rod to throttle valve lever, then disconnect upper end of rod from bellcrank. Hold rod in downward position and bellcrank down at rear. Adjust clevis on upper end of rod as necessary so clevis pin is free fit in bellcrank and rod clevis. Connect rod .

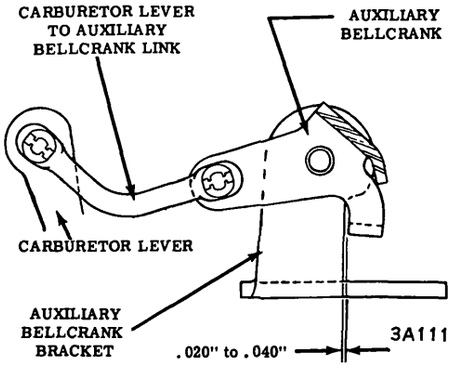
3) Remove air cleaner, disconnect upper end of carburetor rod from carburetor throttle lever, install Throttle Return Check Tool J-6342-01 on return check plunger to hold plunger out of way. Back out slow idle stopscrew and make sure fast idle screw does not contact fast idle cam (If necessary, block choke valve open with screwdriver inserted in carburetor bore).

4) Back out auxiliary bellcrank stopscrew until bellcrank contacts stop. Loosen locknut at lower end of carburetor rod adjusting sleeve, turn sleeve to shorten rod and connect upper end to front carburetor throttle lever. While holding throttle valve in closed position (press on rear carburetor throttle lever) turn adjusting sleeve to lengthen carburetor rod until rod links close and a slight load is felt on sleeve threads.

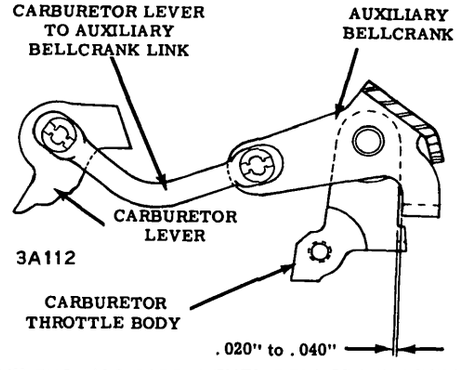
5) Shorten rod 1 turn of adjusting screw, then tighten locknut. Loosen locknut at adjusting sleeve on rear end of upper throttle valve rod (at bellcrank). Shorten rod slightly, then while holding bellcrank against its stop, lengthen rod until slight resistance is felt on adjusting sleeve threads. Tighten locknut.

6) Adjust slow and fast idle RPM. Adjust accelerator pedal height and throttle return check. *See below.*

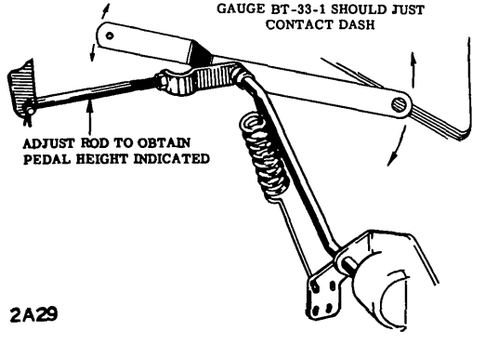
7) Loosen throttle downshift stopscrew locknut (on auxiliary bellcrank) and back off stopscrew approximately 6 turns. Use accelerator lever to move throttle valve to wide open position and overtravel the linkage to point of maximum transmission throttle lever travel. *CAUTION - D n t b nd or stretch linkage.* Hold accelerator lever in this position and turn downshift stopscrew in until it just touches downshift lever tang. Turn stopscrew in an additional 1½ turns. Tighten locknut.



394" ENG. 2GC CARB. LEVER-BELLCRANK LINKAGE



394" ENG. 4GC CARB. LEVER-BELLCRANK LINKAGE



394" ENGINE PEDAL HEIGHT

394" Engine Automatic Transmission - 1) Raise car and remove lower throttle valve relay rod from side of transmission. Place short end of Gauge BT-33-1 into manual lever shaft. Hold throttle valve lever to end of its rearward travel and adjust (by bending as required) so hole in throttle valve lever is visible within hole in gauge (not necessarily centered).

2) Lower car and make next 3 adjustments with carburetor throttle valves in closed position. To completely close throttle valves, start engine, remove air cleaner, and block intermediate choke lever (at climatic control housing) to release fast idle cam. Use Tool J-6342-01 to hold throttle return check plunger away from throttle lever. Stop engine, back out slow idle adjusting screw until carburetor throttle valves are completely closed. There should be clearance at end of fast idle screw, slow idle screw, and throttle return check plunger.

3) Adjust carburetor leve-to-auxiliary bellcrank link as necessary to obtain .020-.040" clearance as shown in illustration.

4) Upper throttle valve rod swivel must turn freely on the threads. Adjust rod slightly short and snap onto ball stud. While holding throttle valve bellcrank against its stop, lengthen rod until swivel turns freely, then feels sloppy. Continue to lengthen rod until a slight resistance is felt. Tighten locknut.

5) Make idle speed adjustment. With choke completely off, fast idle off, and carburetor throttle valves in slow idle position, make Accelerator Pedal Height & Alignment Adjustment. *See below.*

6) To adjust throttle downshift stopscrew, loosen jam nut and back out stopscrew (located in auxiliary bellcrank adjacent to carburetor throttle lever) several turns. Hold throttle lever so throttle valves are in wide open position then rotate throttle valve bellcrank counterclockwise to point of maximum transmission lever travel. *NOTE - Do not bend or str tch linkage.* Hold linkage in this position and adjust stopscrew to just touch tang on downshift lever. Allow throttle valves to close, then turn screw in 1½-2 turns and tighten jam nut.

ACCELERATOR PEDAL HEIGHT ADJUSTMENT

Aluminum 215" Engine (All) Automatic Transmissi n - 1) With choke valve wide open and fast idle screw not contacting fast idle cam, position Tool BT-33-2 on rear end of accelerator rod (engage center hole of tool with clevis pin) with dowel pin end of tool extending forward.

2) Loosen locknut and turn adjusting clevis on accelerator rod until end of gauge just touches cowl. Tighten locknut.

394" Engine Automatic Transmission - Bend left ball stud (located behind lower end of accelerator pedal) up or down as required to correct pedal alignment. Adjust accelerator rod to position rod-to-bellcrank bushing so Gauge BT-33-1 just touches dash (see illustration). Lubricate linkage pivot points.

THROTTLE RETURN CHECK ADJUSTMENT

All Engines - After making fast idle adjustment, rotate fast idle cam so fast idle screw rests on top of highest step of fast idle cam. Measure between contact screw and throttle lever contact for clearance of .020" (394" Eng. with 4-Bbl.) .040" (Al. 215" Engine with 4-Bbl.); .050" (All Engs. with 2-Bbl. & Jetfire). If necessary, adjust plunger screw, using two wrenches.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ELECTRICAL

BATTERY

12 Volt

Capacity - 44 Amp. Hr. (F-85), 70 Amp. Hr. (Others) at 20 Hour rate.
Battery Ground - Negative.
Engine Ground - Rear of right cylinder head to firewall.

STARTER

Delco-Remy 1108303

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	6750-10500	10.6	58-80
	Lock	4.0	280-320

Delco-Remy 1107776

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3800-6200	10.6	70-105
	Lock	3.0	480-540

Delco-Remy 1107266, 665

Torque	RPM	Volts	Ⓒ Amperes
0 ft. lbs.	3600-5100	10.6	65-100
	Lock	3.5	300-360

Ⓒ - Includes solenoid.
Brush Spring Tension - 35 ozs. minimum.

ALTERNATOR

Delco-Remy No.	Volts	Amperes	Alt. RPM
1100616	14.0	32	2000
		50	5000
1100624	14.0	28	2000
		40	5000
1100631	14.0	25	2000
		35	5000

ALTERNATOR REGULATOR

Delco-Remy 1119507
Field Relay

Air Gap - .015" with contacts just touching.
Point Gap - .030".
Closing Voltage - 3.8-7.2 volts.

Voltage Regulator

Air Gap - .067" with lower contacts just touching.
Point Gap - .014" with lower contacts just touching.
Setting - 13.5-14.4 volts at 125°F ambient temperature (upper contacts); .1-.3 volt lower operating on lower contacts.

Indicator Light Relay

Air Gap - .011".
Point Gap - .015".
Closing Voltage - 3.8-5.2 volts.

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

See illustration. Located to left of steering column under instrument panel.

IN-LINE FUSES

Guide-Matic headlight control in line connector near headlight switch. Cigar lighter fuse on back of lighter.

CIRCUIT BREAKERS

Headlights - Located on headlight switch.
Power Seats, Windows, Top (Exc. F-85) - All located on left hand side of cowl in engine compartment.
Power Seats, Windows, Top (F-85) - All located on fuse block.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Located on steering column mast jacket (exc. floor-mounted gearshift), inside console (floor-mounted gearshift). To adjust, loosen switch attaching screws. With selector lever in Neutral, position switch so a .090" gauge pin can be inserted through hole in switch face. Tighten attaching screws and remove pin. Check for starter operation in only Park and Neutral positions.

LIGHTING SWITCH REMOVAL

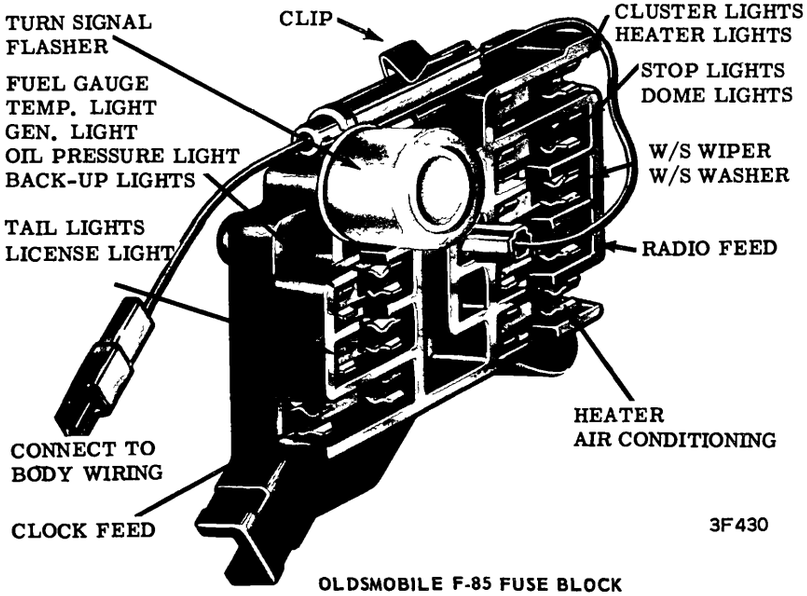
Disconnect battery positive cable. Disconnect wiring from light switch. Pull knob out to ON position, then depress spring loaded button on switch body and pull knob out of switch assembly. Remove escutcheon, then remove headlight switch from under rear of instrument panel. To install, reverse removal procedure.

TURN SIGNAL FLASHER

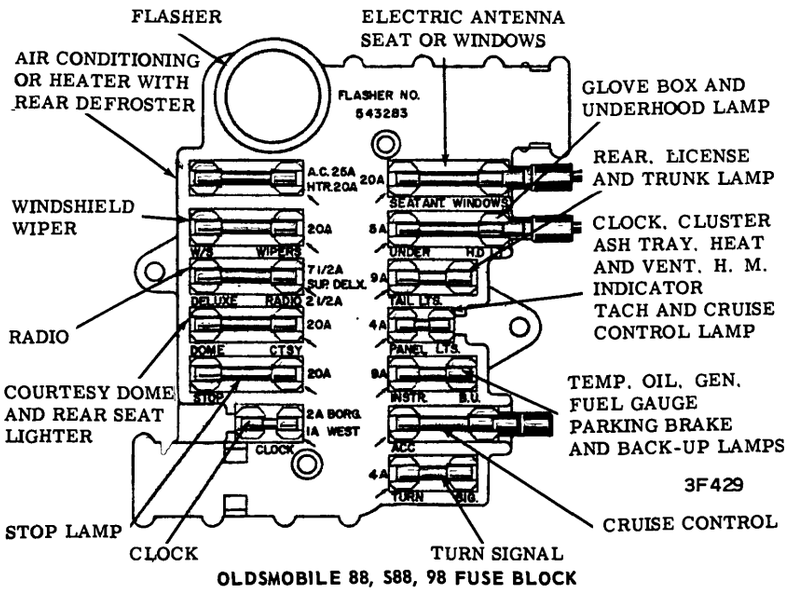
Located on Fuse Block under instrument panel on left side of car.

STOP LIGHT SWITCH ADJUSTMENT

Oldsmobile (except F-85) - Located on brake pedal bracket. To adjust, release brake pedal fully then turn adjusting screw until lights just go off. Back up adjusting screw three turns.
F-85 - Located on brake pedal bracket below dash. To adjust, loosen locking nuts and move switch in the bracket until lights operate properly.

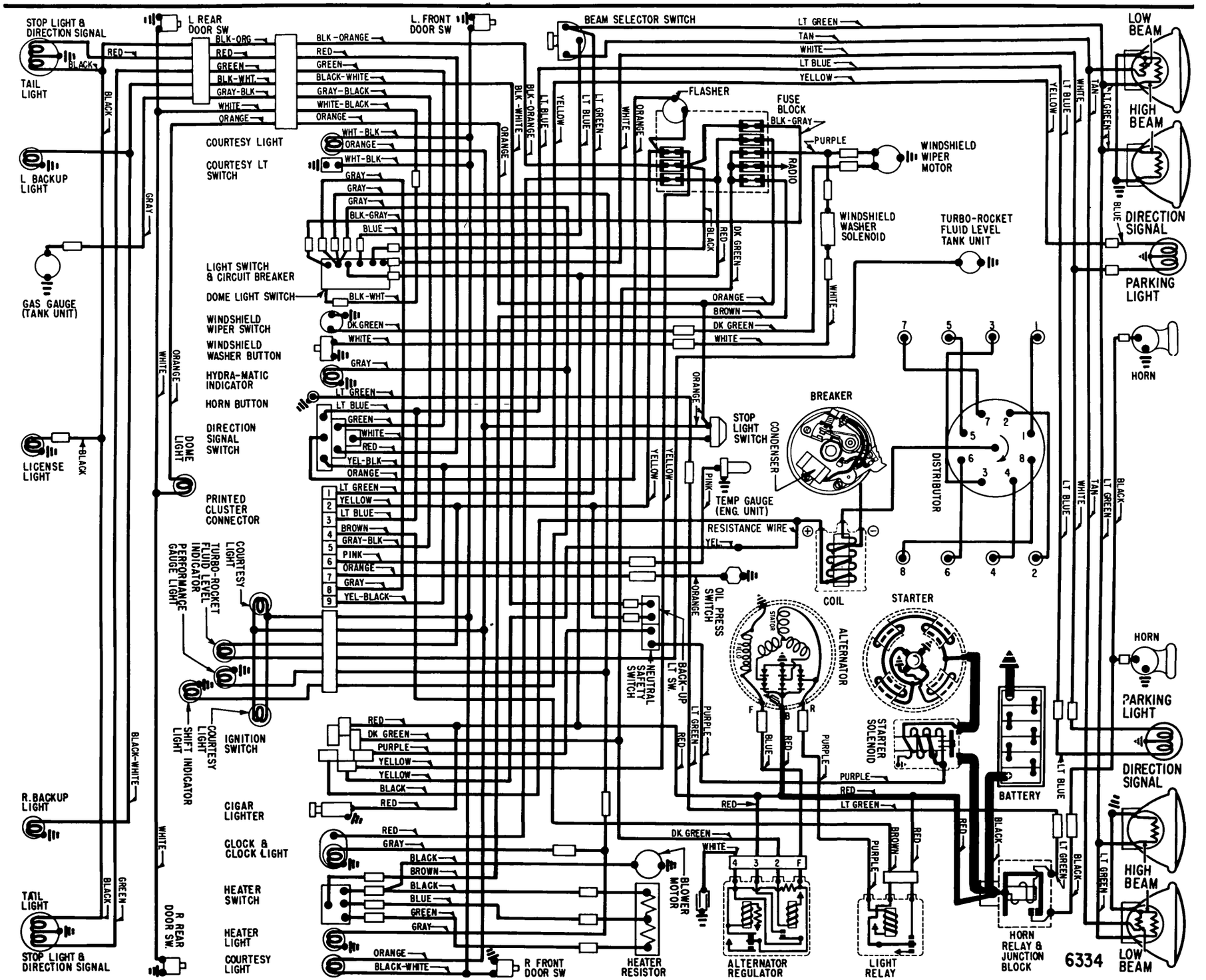


OLDSMOBILE F-85 FUSE BLOCK

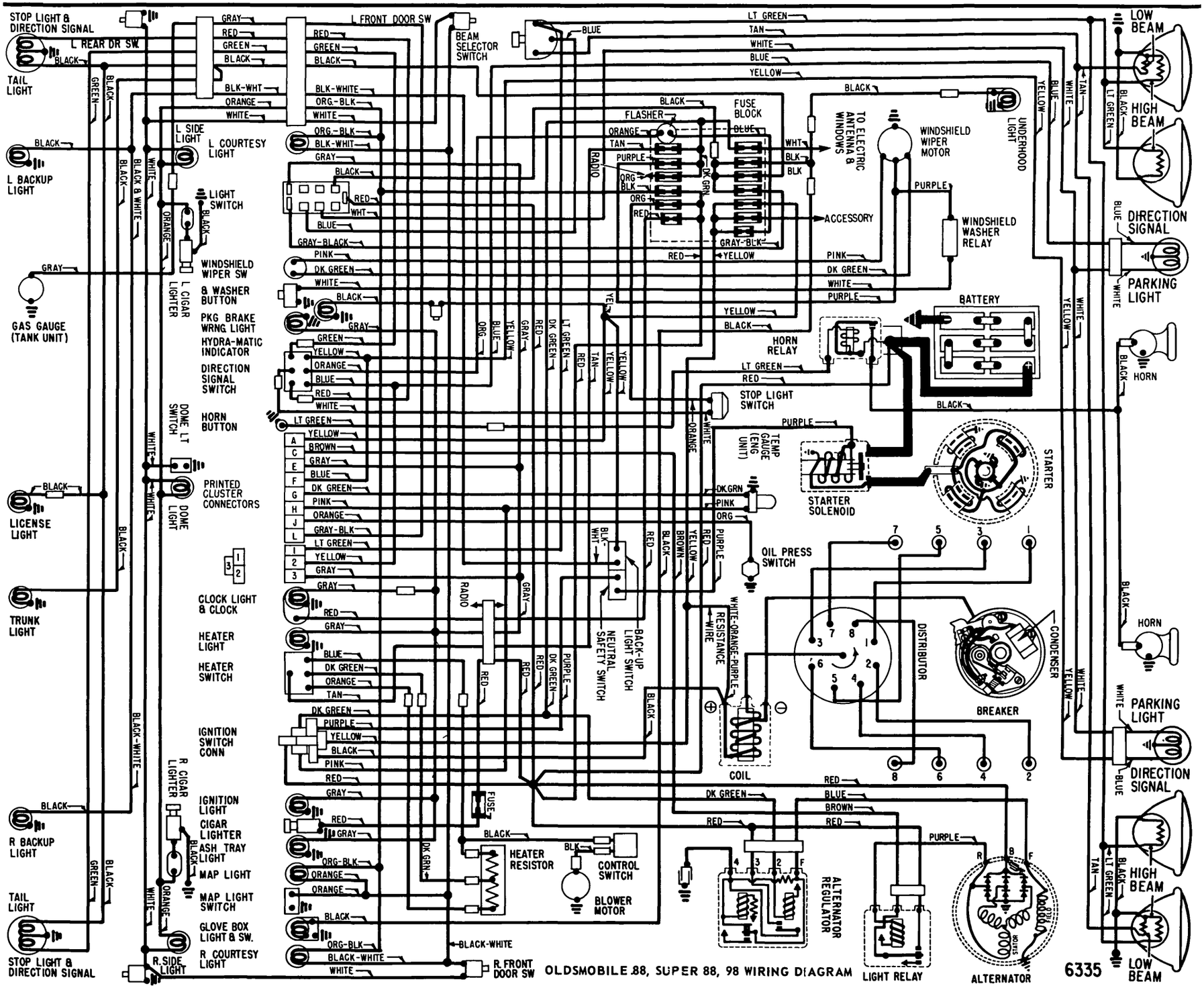


OLDSMOBILE 88, S88, 98 FUSE BLOCK

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



OLDSMOBILE F-85 WIRING DIAGRAM



OLDSMOBILE 88, SUPER 88, 98 WIRING DIAGRAM

SPEEDOMETER REMOVAL

Remove instrument cluster (see below) then remove all necessary attaching screws.

PRINTED CIRCUIT REMOVAL

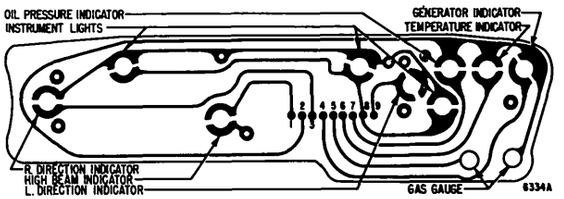
Remove instrument cluster (see below) then remove all necessary attaching screws. If equipped with safety sentinel, remove control cable from printed circuit.

BELT ADJUSTMENT

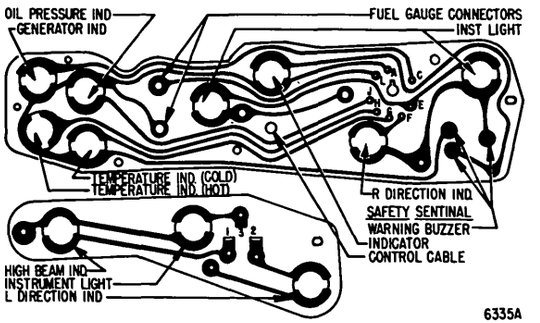
Place Tension Tool BT-33-70 on belt. Adjust belt until index groove on tool plunger aligns with notches just above pointer (will provide belt tension of 90 lbs.).

INSTRUMENT CLUSTER REMOVAL

Disconnect wiring harness or connectors, then disconnect speedometer cable. Remove instrument panel attaching nuts and screws. Remove instrument cluster from top of instrument panel (F-85), by rotating top of cluster downward (Oldsmobile except F-85).



OLDSMOBILE F-85 PRINTED CIRCUIT



OLDSMOBILE 88, 588, 98 PRINTED CIRCUIT

ENGINE

ALUMINUM ENGINE CAUTIONS

Observe extreme caution when working with aluminum engines to prevent damage by scratching, nicking, or scoring. Note the following:

1) Do not slide or drop machined surfaces.
2) Do not use gasket cement except as indicated under Cylinder Head Installation.
3) Lubricate all bolts or screws entering any aluminum parts. Use engine oil or special thread lubricant.
4) Tighten bolts and nuts to specified torque. DO NOT OVERTIGHTEN. Torque values are for clean, lubricated threads.

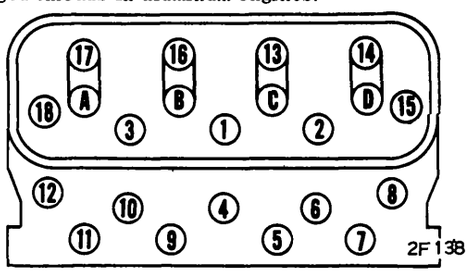
ALUMINUM ENGINE THREAD REPAIR

Use "Heli-Coil" tools and inserts when repairing damaged threads in aluminum engines.

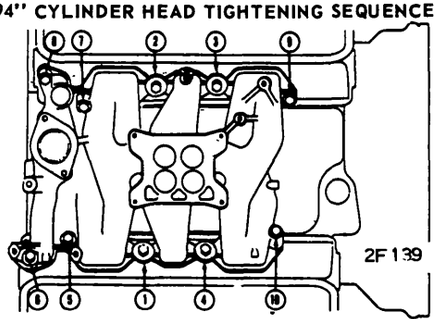
GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
Al. 215" (2-Bbl.)	155 at 4800	③ 8.75-1	3.500"	2.8"	215 cu. ins.
(4-Bbl.) ①	195 at 4800	④ 10.75-1	3.500"	2.8"	215 cu. ins.
(4-Bbl.) ②	185 at 4800	④ 10.25-1	3.500"	2.8"	215 cu. ins.
(Jetfire)	215 at 4600	10.25-1	3.500"	2.8"	215 cu. ins.
394" (2-Bbl. Std.)	280 at 4400	⑦ 10.25-1	4.125"	3.688"	394 cu. ins.
(2-Bbl. Reg. Gas)	260 at 4400	8.75-1	4.125"	3.688"	394 cu. ins.
(4-Bbl.) ⑤	330 at 4600	⑦ 10.25-1	4.125"	3.688"	394 cu. ins.
(4-Bbl.) ⑥	345 at 4800	10.50-1	4.125"	3.688"	394 cu. ins.

① - With automatic transmission. ② - With synchro-mesh transmission. ③ - 8.25-1 Export.
④ - 8.5-1 Export. ⑤ - Except Starfire & Custom 98. ⑥ - Starfire & Custom 98 only. ⑦ - 8.3-1 Export.



394" CYLINDER HEAD TIGHTENING SEQUENCE



394" INTAKE MANIFOLD TIGHTENING SEQUENCE

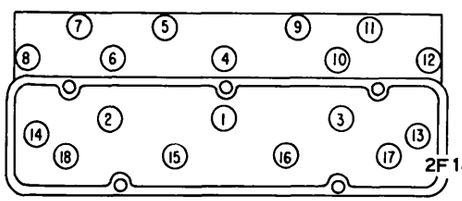
OIL PAN REMOVAL

Aluminum 215" Engine - Remove dipstick, hoist car and drain oil. Disconnect idler arm from relay rod and remove cover on front of lower flywheel housing and remove pan bolts. *NOTE* - Position crankshaft so so counterweights do not interfere with pan removal.

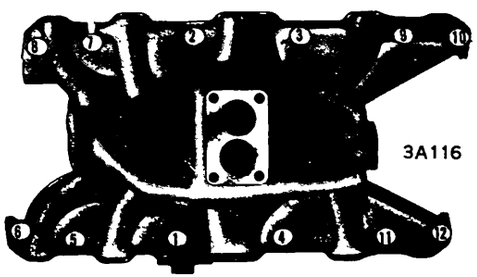
394" Engine - Position No. 1 piston at bottom of stroke (moves No. 1 and No. 2 crankshaft counterweights out of way). Disconnect battery cable. On cars with single exhaust system, remove exhaust crossover pipe. Disconnect idler arm support from frame. Remove attaching bolts and move starter out of way. Remove 2 engine front mount attaching nuts and raise engine with Tool J-8568. Drain oil, then remove pan. *NOTE* - Holes provided in frame crossmember for access to front oil pan bolts.

CYLINDER HEAD REMOVAL (ALUMINUM ENGINE)

Right Cylinder Head - Remove all head bolts except rear rocker arm shaft bracket bolt. Then LOOSEN rear rocker arm shaft bracket bolt and raise shaft assembly from head and remove all pushrods except No. 16. Raise No. 16 to within 1" of blower case and tape to rocker shaft. Lift head, rocker shaft assembly, and exhaust manifold off dowel pins and remove as a unit by angling it forward to clear blower case.



ALUMINUM 215" CYLINDER HEAD TIGHTENING SEQUENCE



ALUMINUM 215" INTAKE MANIFOLD TIGHTENING SEQUENCE

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

L ft Cylinder Head - Remove power steering bolt (if equipped), then remove power steering pump bracket-to-cylinder head bolts. Remove rocker arm shaft assembly and pushrods. Remove cylinder head bolts and remove cylinder head with exhaust manifold attached.

CYLINDER HEAD INSTALLATION

394" Engine - Apply Gasket Sealer to both sides of gasket and install. Apply C.P. Sealer to head bolts, then install center and lower row of bolts finger tight. Install pushrods and rocker arm shaft assemblies. Tighten rocker arm shaft bracket and cylinder head bolts in sequence shown in diagram to specifications. Torque lettered bolts to 14-22 ft. lbs.

Aluminum 215" Engine - Head gaskets should be coated on both sides with P.O.B. No. 4 Sealer or equivalent. Likewise, coat cylinder head bolts and torque to specifications in sequence shown in diagram.

INTAKE MANIFOLD INSTALLATION

394" Engine - Apply Permatex No. 3 Sealer or equivalent to both sides of graphite coated metal gaskets. Dip manifold bolts in C.P. No. 9 Sealer, install bolts and nuts and torque to specifications in sequence shown diagram.

Aluminum 215" Engine - Coat both sides of gasket with P.O.B. No. 3 Sealer and install. Install end seals and clamps, then lubricate clamp bolts with engine oil and install. Torque to specifications. *NOTE - When tightening clamp bolts, intake gasket must be positioned so manifold-to-head bolt holes will be open.* After positioning intake manifold on engine and connecting thermostatic bypass hose to water pump, coat intake manifold bolts with engine oil and install. Torque bolts to specifications in sequence shown in diagram.

PISTONS, PINS, RINGS

Engine	PISTON	PINS		RINGS		
	① Clearance	Piston Fit	Rod Fit	Ring	End Gap	Side Clearanc
Al. 215"	.0005-.0011"	② .0003-.0005"	③ .0007-.0013"	Compr. Oil	.010-.020" .015-.055"	.003-.005" .0005-.0055"
394"	.0075-.00125"	② .0003-.0005"	② .0003-.0005"	Compr. Oil	.013-.023" .015-.055"	.001-.004" .0005-.007"

① - Measured at thrust surface. ② - Loose fit. ③ - Press fit. *See Piston Pin Installation.*

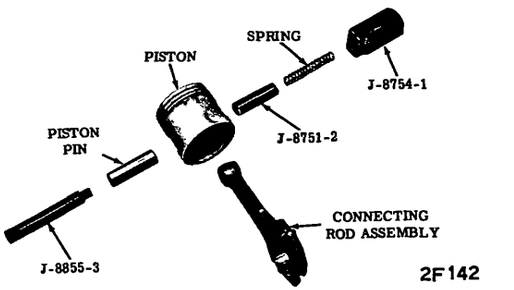
FITTING PISTON

Use a .0015" x ½" x 12" ribbon feeler gauge between inverted piston (pin and rings removed) and cylinder wall at right angle to piston pin position. Pull to withdraw feeler should be 3-8 lbs. (Aluminum 215" Eng.), 3-12 lbs. (394" Eng.).

PISTON PIN INSTALLATION

Aluminum 215" Engine - Using tools J-8751,54,55, place spring and guide stop in main body of support. Place piston on this tool with letter "F" up. Place connecting rod in piston (see illustration). Coat pin with engine oil and press into piston and rod until it contacts guide stop (automatically centers pin in piston).

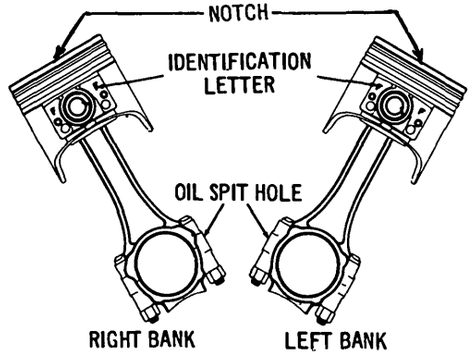
394" Engine - Pin is light hand press fit and is retained by lock ring at each end. Hone piston pin hole for correct fit of standard or oversize (.001" & .003") pins. With high limit .0005" clearance, clean unoiled pin should slide through pin hole of own weight. With low limit .0003" clearance, pin should hold own weight.



ALUMINUM 215" ENGINE PISTON PIN ASSEMBLY

PISTON & ROD INSTALLATION

All Engines - Install piston on same numbered connecting rod with "F" and notch in head towards front of engine. Install connecting rod with oil spit hole towards center of engine. Install rod caps with bearing index notches in rod and cap on same side. *See illustration.*



PISTON & ROD ASSEMBLY (TYPICAL)

TIGHTENING SPECIFICATIONS

394" ENGINE

	Ft. Lbs.		Ft. Lbs.
Cylinder Head	60-80	Water Outlet to Manifold	22-26
Intake Manifold	22-34	Oil Pump Cover	5-8
Exhaust Manifold	19-25	Oil Pump to Bearing Cap	24-34
Oil Pan	10-18	Oil Filter Assembly to Block	28-38
Main Bearing Caps (except Rear)	90-120	Oil Filter to Housing Base	15-17
Main Bearing Caps (Rear)	130-160	Oil Pressure Switch	10-15
Flywheel	85-95	Oil Pressure Regulator Nut	30-40
Crankshaft Pulley	100 min.	Oil Pump Intake Pipe & Screen	4-7
Con Rod Caps	32-42	Engine Front Mount to Front Cover	40-60
Camshaft Sprocket & Fuel Pump Eccentric	14-22	Engine Front Mount to Frame Nuts	45-50
Rocker Arm Support Brackets	14-22	Engine Rear Mount to Flywheel Housing	50-60
Rocker Arm Cover	4-7	Engine Rear Mount to Crossmember	40-56
Engine Front Cover	24-40	Flywheel Lower Housing Cover Bolts	4-7
Water Pump to Front Cover (3/8" bolt)	25-35	Flywheel Lower Housing to Block	50-55
(1/4" bolt)	5-8	Transmission Mounting	50-55

ALUMINUM 215" ENGINE

	Ft. Lbs.		Ft. Lbs.
Cylinder Head	45-55	Engine Front Cover	20-25
Intake Manifold	25-30	Filter to Front Cover	30-35
Intake Manifold Gasket Clamp (5/16")	10-15	Oil Pump Cover	10-15
Exhaust Manifold	18-24	Oil Pump Screen to Block	10-15
Carburetor to Intake Manifold	14-17	Fuel Pump to Front Cover	34-40
Oil Pan	6-15	Water Pump to Front Cover (1/4" bolts)	6-8
Main Bearing Caps	65-70	(5/16" bolts)	20-25
Crankshaft Balancer	140-160	Engine Front Mount to Block	50-55
Con Rod Caps	30-35	Engine Front Mount to Crossbar Nuts	55-65
Rocker Arm Bracket	45-55	Engine Rear Mount to Transmission	30-40
Rocker Arm Cover	3-5	Engine Rear Mount to Cross Support	20-34

Se Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CRANKSHAFT ASSEMBLY REPLACEMENT (ALUMINUM ENGINE)

Crankshaft, balancer, and flywheel are balanced individually in production and complete assembly is then balanced by installation of unstaked pins in holes provided around rim of flywheel and balancer. *NOTE* - Flywheel is balanced individually in production by installation of staked pins in above holes. When replacing balancer or flywheel, maintain crankshaft assembly balance by transferring balance pins (unstaked) to new unit as follows:

Balancer - If no pins used on old balancer, install new balancer as is. If balance pins found on old balancer, transfer these pins (unstaked) to corresponding position on new balancer.

Flywh l - If no balance pins (unstaked) found on old flywheel, install new flywheel as is. If balance pins (unstaked) found on old flywheel, transfer pins to corresponding position on new flywheel. *NOTE* - If the presence of a staked pin on new flywheel prevents transfer of balance pin, place pin in nearest corresponding hole.

CRANKSHAFT REAR OIL SEAL

394" Engin - Asbestos covered wiper seal installed in rear groove in bearing cap and block (oil slinger operates in front groove). Whenever crankshaft removed, install a new seal coated with graphite grease in engine block.

Oil Seal Installation - Crankshaft must be removed to replace upper half of seal. Place seal in groove in cap or block by hand, then drive tightly into groove by tapping Tool 23-18 with hammer. Seal is bottomed in cap or block when tool is seated; the undercut area of tool will pass over seal, when tool moved across cap or block. Hold tool tightly against seated seal and cut seal flush with parting line between upper and lower bearing. *NOTE - Ends of seal must be cut clean and seal must fill groove entirely.* After bearing cap installed, wipe cement No. 557621 in grooves in block on both sides of bearing cap and press two cork seals into place in grooves.

Aluminum 215" Engine - Crankshaft must be removed to replace seal in block. Install seal into bearing cap, packing by hand Hammer seal into place with Tool J-8807. To check if seal is fully seated, slide tool away from seal, then slide tool against seal. If undercut area of tool slides over seal, seal is fully seated. Rotate tool before cutting off excess seal packing. Cut seal 1/16" from bearing surface. Taper end of seal to a point (pack fibers toward center, away from edges). Rotate tool to cut seal between notch and handle. Install two side bearing cap seals, leaving seals extended on each side. Coat back of insert with light film of oil and install in bearing cap. To install cap bolts, apply lubricant Part No. 980131 to bolts then torque to specifications. Do not trim ends of side seals.

CRANKSHAFT, MAIN BEARINGS, CONNECTING ROD

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Brg.	Endplay	Journal Diam.	Clearance	③ Sideplay
Al. 215"	① 2.298-2.299"	② .0008-.0024"	No. 3	.004-.008"	① 1.999-2.000"	① .0002-.0022"	.006-.014"
394"	① 2.9990-3.000"	②⑤	No. 5	.004-.008"	①④	① .0005-.0026"	.002-.011"

① - Out-of-round limits .0015". ② - .0035" wear limit. ③ - Total both rods.

④ - 2.4988-2.4998" (Std. size); 2.4893-2.4988" (Engs. with "X" on left front face of block).

⑤ - .0005" (Nos. 1,2); .0008-.0024" (Nos. 3,4); .0020-.0034" (No. 5). Wear limit .0035" (Nos. 1,2,3,4); .0045" (No. 5). *NOTE* - Replace both bearing halves as a set.

ENGINE FRONT COVER REMOVAL & INSTALLATION

394" Engine - Removal - Drain cooling system and disconnect lower radiator hose and heater hose from front cover. Disconnect generator link at generator and remove front engine mount-to-crossmember nuts. Raise engine to clear bolts of crossmember, then insert wood block between each exhaust manifold and upper control arm and allow engine to rest on blocks. Remove oil pan, radiator, fan blades and pulley, then remove crankshaft pulley. Remove distributor cap and rotate engine until rotor points to front of engine. Remove fuel pump assembly. Remove front cover attaching screws and front cover assembly.

Installation - Reverse removal procedures and tighten belts to gauge line on Tool 33-70. *NOTE* - Use a new front oil seal and coat fuel pump rocker arm pad with lubricant No. 567196. Front cover bolts should be dipped in No. 557622 Sealer and torqued to specifications. One side of fuel and vacuum pump gasket should be coated with Sealer No. 557622.

Aluminum 215" Engine - Removal - Drain cooling system and remove all hoses. Disconnect oil pressure switch wire. Remove crankshaft balancer, fan, pulleys, distributor cap, vacuum hose, generator and mounting bracket. Remove fuel pump. Remove oil pan. Remove cover bolts and cover.

Installation - Reverse removal procedures and note the following:

1) Remove oil pump cover and pack petrolatum around pump gears (insures oil pump prime).
2) Install new front cover gasket using P.O.B. No. 2 Sealer on gasket.
3) Apply engine oil to cover bolts and torque to specifications.

FRONT COVER OIL SEAL REPLACEMENT

394" Engine - Front cover oil seal can be replaced without removing radiator or crankshaft pulley key as follows:

Removal - Remove crankshaft pulley and thread Pilot Bolt J-7583-3 into crankshaft. Thread Tool J-7583-1 into oil seal and then tighten Forcing Screw J-7583-2 until seal is free from front cover.

Installation - Coat outer diameter of seal with No. 557622 Sealer and lips of seal with Special Lubricant No. 567196. Position seal in front cover. Place Installer J-7584-1 over seal and thread Forcing Screw J-7584-3 into crankshaft until installer contacts front front cover.

Aluminum 215" Engine - Removal - Remove front cover. Lay cover flat on bench and remove seal retainer with a drift.

Installation - Assemble seal in retainer. Support front cover on wood block, then apply P.O.B. Sealer No. 4 to outside of seal retainer. Place seal and retainer in cover with seal joint towards top of cover and install with Tool J-8753 until seated. Stake retainer securely. Place Tool J-8753-2 in seal and push tool, a little at a time, from both sides until tool goes through seal.

VALVES

Engine & Valve	Head Diameter	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valv Lift
Al. 215" Int.	1.517-1.527"	45°	.037-.075"	.3427-.3432"	.0010-.0025"	.384"
Exh.	1.348-1.358"	45°	.037-.075"	① .3422-.3427"	② .0015-.0030"	.384"
394" Int.	1.870-1.880"	45°	.037-.075"	.3427-.3432"	.0011-.0025"	③
Exh.	1.557-1.567"	45°	.037-.075"	.3940-.3945"	.0015-.0030"	.435"

① - Measured at top. .3412-.3417" when measured at bottom.

② - Measured at top. .0025-.0040" when measured at bottom.

③ - .428" (2-Bbl. 88); .435" (All 4-Bbl. exc. Starfire & Custom 98); .444" (Starfire & Custom 98).

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE GUIDES

Aluminum 215" Engine - Pressed in head. To replace, drive old guide out from combustion chamber side with Tool BT-68-5A. Place valve guide into cylinder head with outside beveled end up. Place Installer Tool BT-68-5B over new guide and drive in until tool contacts cylinder head. *NOTE - Inside bore of guides is grooved. Exhaust guide has grooves full length of bore and Intake guide has grooves to within ½" of bottom. Intake guides must be installed with grooves up.*

394" Engine - Pressed in head. To replace, drive out out guide from combustion chamber side with Tool J-3062. To install, lay Gauge Washer J-5158-3 on valve spring seat and install guide into cylinder head (grooved end of guide up) by driving on Tool J-5158-2 until tool seats against washer. Guide should now extend 25/32" above face of valve spring seat.

VALVE STEM SEALS

Cup type used on all valves. Install with cupped side down toward cylinder head.

ROCKER ARM

Aluminum 215" Engine - *See illustration.*
394" Engine - *See illustration and note the following:* One bracket is attached to shaft by anchor pin. When necessary to remove this bracket, insert drift through oil passage and drive out pin. To replace, drive pin in flush with bracket. Rocker arm shaft oil ports must face down. If rocker shaft plug has been removed, drive in new plug until outer shoulder is 9/32" into end of shaft.

HYDRAULIC LIFTERS

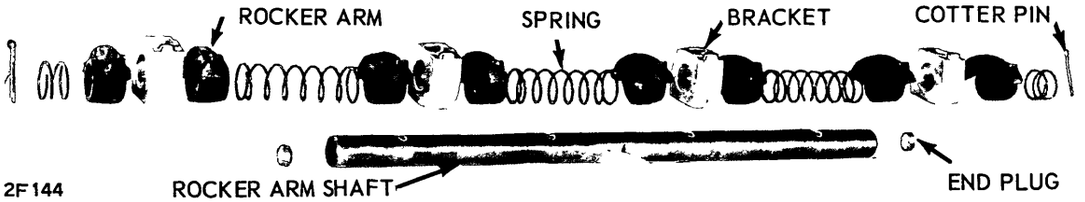
Inspection - Check all parts for nicks, burrs, or scoring. *NOTE - Ball, ball check retainer, springs, pushrod seat and snap ring are interchangeable or can be replaced individually.* Body and plunger are selective fits and are not interchangeable. *CAUTION - Do not replace lifter when a slight gap appears or lifter shows leakage where foot is welded to body unless leak-down not within specifications.* Place straightedge across lifter foot. If light appears under straightedge, lifter should be replaced and camshaft lobe checked for wear. Wear at camshaft cam center is normal, but wear across entire width of cam base circle requires camshaft replacement.

Leak-down Test - Lifter must be assembled while submerged in test fluid. Proceed as follows:

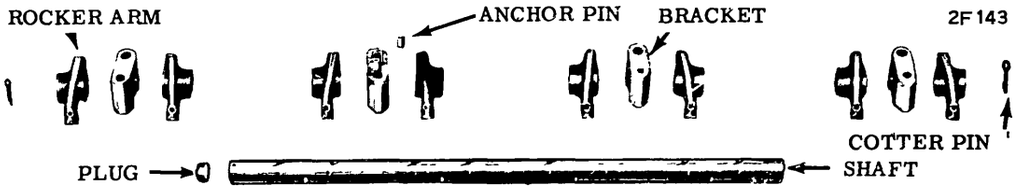
1) Install Adapter 105-2 in reservoir of Tester BT-60, then fill reservoir with Hydraulic Lifter Test Fluid BT-59 to ½" of top of reservoir.

2) Assemble ball check, spring and retainer into plunger with flange pressed tight against bottom of recess in plunger.

3) Install spring over ball check retainer. Hold plunger with spring up and insert into lifter body (to prevent cocking spring). Place assembly in tester cup, then position pushrod seat into plunger. Position ¼" steel test ball on pushrod seat and lower tester ram until it contacts steel ball. *NOTE - Allow ram to move downward by its own weight until air bubbles disappear.* Repeat several times until all air is expelled from lifter. *CAUTION - DO NOT attempt to expel air from lifter by pumping arm.*



ALUMINUM 215" ENGINE ROCKER ARM ASSEMBLY



394" ENGINE ROCKER ARM ASSEMBLY

4) After air removed, allow ram to bleed down lifter to expose ring groove and install retaining ring.

5) Adjust ram screw so it contacts steel ball in pushrod seat when pointer is at start line. Raise ram and start test by resting arm on steel ball.

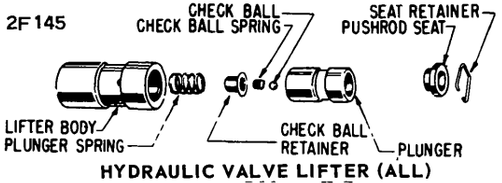
6) Rotate reservoir one revolution every two seconds, and time indicator from start to stop line. Allowable leak-down time is shown in table below. *NOTE* - If lifter within specifications, place in service without removing test fluid.

Lifter Leak-d wn Rate

Engine	Used Lifters	New Lift rs
394"	12-90 seconds	20-90 seconds
Aluminum 215"	8-40 seconds	12-40 seconds

Lifter Identification

394" Engine - Standard size, .001" and .010" Oversize lifters are used. Note size when replacing. Lifters identified as follows: "1" (.001" o/s), "10" (.010" o/s), or no marks (Standard size) marked on lifter body and on rail under rocker arm cover.



HYDRAULIC VALVE LIFTER (ALL)

VALVE SPRINGS & LIFTERS

Engine	SPRINGS			LIFTERS	
	Pressure (Lbs.)		Free Length	Diamet r	Cl arance
	Valve Closed	Valve Open			
Al. 215"	70-80 at 1.750"	160-175 at 1.350"	2.150"	.8422-.8427"	.0008-.0023"
394"	85-95 at 1.837"	175-189 at 1.437"	2.25"	.9210-.9215"	.0005-.0020"

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. *See "Valve Closed" spring length in specification table.*

VALVE SPRING INSTALLATION

Install oil deflector over valve stem (cupped side down), then position spring over stem with large diameter against head. Install spring retainers and valve stem keys. Key should seat properly in groove on stem.

See Pages 2 to 13 for complete Car Model General Ind xes and Equipment Indexes

CAMSHAFT

Engin	JOURNAL DIAMETERS 1	2	3	4	5	BEARING Clearance
Al. 215"	1.785-1.786"	1.755-1.756"	1.725-1.726"	1.695-1.696"	1.665-1.666"	①
394"	1.9977-1.9985"	1.9977-1.9985"	1.9977-1.9985"	1.9977-1.9985"	1.9977-1.9985"	.0010-.0033"

① - .0005-.0025" (No. 1); .0005-.0035" (Nos. 2,3,4,5).

CAMSHAFT REMOVAL

Remove grille and radiator. Remove valve lifters, distributor, engine front cover, rocker arm assembly, fuel pump eccentric, camshaft sprocket and timing chain. Slide camshaft carefully out front of engine.

CAMSHAFT BEARING REPLACEMENT

394" Engin - Use Tool Set J-4476 and note the following: DO NOT replace bearings individually (replace as a set). DO NOT remove or disturb camshaft plug at rear of block.

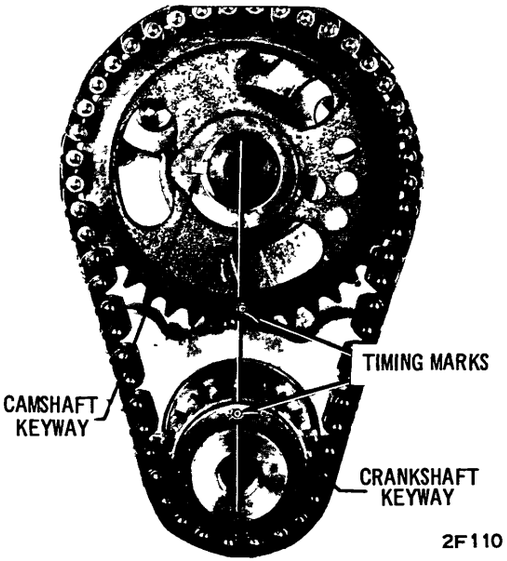
Aluminum 215" Engin - Bearings must be replaced in complete sets. Remove bearings in numerical order, drive them rearward out of their bores (except No. 5). To remove No. 5 bearing, drill a 3/16" hole in block (do not drill through the bearing) and with a small drift, dent the bearing enough to allow removal out of front of bore. Install No. 5 bearing first, then install all others opposite of removal sequence (align all oil passages). Position bearings in block as follows: No. 5 bearing - 18 7/32", No. 4 - 13 13/32", No. 3 - 9 11/64", No. 2 - 4 15/16", No. 1 - 1/8" from front face of block.

VALVE TIMING

Engine	Intake Open (BTDC)	Intake Close (ALDC)	Exhaust Open (BLDC)	Exhaust Close (ATDC)
Al. 215"	22°	58°	60°	20°
394" 2-Bbl.	14°	50°	54°	16°
4-Bbl. ①	11°	59°	59°	25°
4-Bbl. ②	21°	77°	60°	20°

① - Except Starfire & Custom 98.

② - Starfire & Custom 98 only.



VALVE TIMING MARKS (TYPICAL)

ENGINE OILING

Oil Pr ssur (394" Eng.) - 35-45 psi at 50 MPH.
Oil Pr ssur (Al. 215" Eng.) - 30 psi at 2400 RPM.
Pr ssur R gulat r Valv - Located in oil pump cover. Not adjustable.

ENGINE OILING SYSTEM

215" Aluminum Engin

S e illustration. Oil pump and filter located in engine front cover. Oil from filter flows through passages in front cover to right and left main oil galleries extending full length of crankcase. Pressure regulator valve is located in pump cover and there is also a bypass valve which opens when pressure differential across filter reaches 4½-5 lbs. Oil distribution is conventional except as follows:

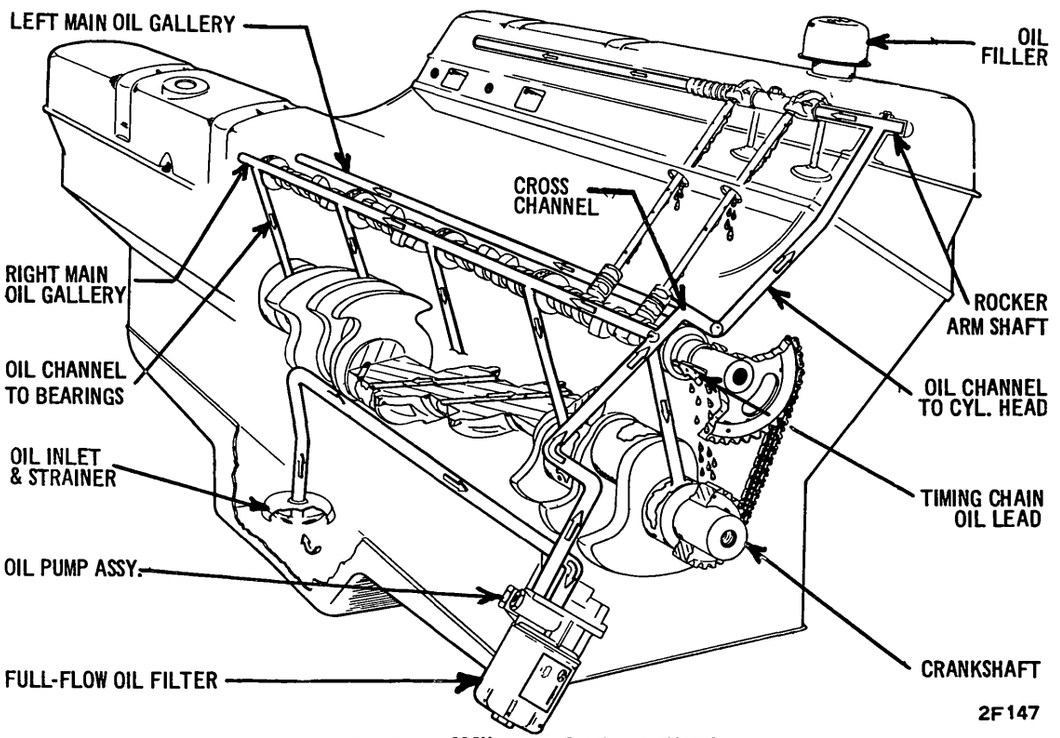
Crankshaft & Camshaft - Both crankshaft and camshaft are supplied oil through drilled passages in crankcase, from right main oil gallery.

Timing Chain & Spr ck ts - Drilled holes in camshaft connect front camshaft bearing to key slot in front of camshaft. Oil flows from camshaft journal into keyslot over woodruff key in space between key and camshaft sprocket and fuel pump eccentric. A relief in forward end of fuel pump eccentric allows oil to escape between eccentric and camshaft distributor gear. Oil strikes distributor gear once each camshaft revolution, supplying lubrication to timing chain and sprockets.

Hydraulic Lifters - Full pressure lubrication is supplied hydraulic lifters from cutouts in lifter bores in main oil galleries.

R ck r Arms, Valv s and Pushr ds - These items receive oil from main oil galleries through drilled

(C ntinued)



ALUMINUM 215" ENGINE OILING SYSTEM

See Pages 2 t 13 for complete Car Model General Indexes and Equipment Indexes

holes in front of cylinder block and head, leading up from forward end of corresponding main oil gallery. Hole in head ends beneath front rocker arm shaft bracket. A notch cast in base of bracket allows oil to flow up inside bracket (between bracket and bolt) to hollow rocker arm shaft (plugged at both ends). Each rocker arm receives oil through hole in underside of shaft. Grooves in arm provide lubrication to bearing surfaces. Oil is metered to pushrod seat and valve stem through holes drilled in rocker arm. Excess oil returns to oil pan through passages in cylinder head and block.

394" Engine

See illustration. Oil pump mounted on rear main bearing cap in crankcase with full flow filter on right side of crankcase. *NOTE* - If filter not used, a cover with a channeled oil passage is installed on filter pad to provide oil circulation. Oil from filter flows through passages at rear of block to rear end of right main oil gallery and through "V" passage at front of engine to left main oil gallery. Oil distribution is conventional except as follows:

Crankshaft & Camshaft Bearings - Rear crankshaft and camshaft bearings are lubricated by a vertical passage intersecting the horizontal cross passage from the oil filter (see above). **Other** crankshaft and camshaft bearings are lubricated by a "V" shaped oil passage in each crankcase web leading down from the right main oil gallery to the crankshaft bearing and then up to the camshaft bearing (additional passage at front crankshaft bearing supplies oil to left main oil gallery).

Valve Lifters - Each lifter supplied with oil through short passage leading upward from main gallery at point directly below lifter.

Rocker Arms, Pushrods & Valves - Hollow rocker arm shafts are supplied with oil through passage in block leading from No. 2 camshaft bearing (left bank), No. 4 camshaft bearing (right bank), and connecting passage in head which registers with drilled oil passage in rocker shaft bracket (see Note below). Rocker arm is drilled to provide lubrication for pushrod socket and valve tip. Oil return holes are provided on lower side of heads.

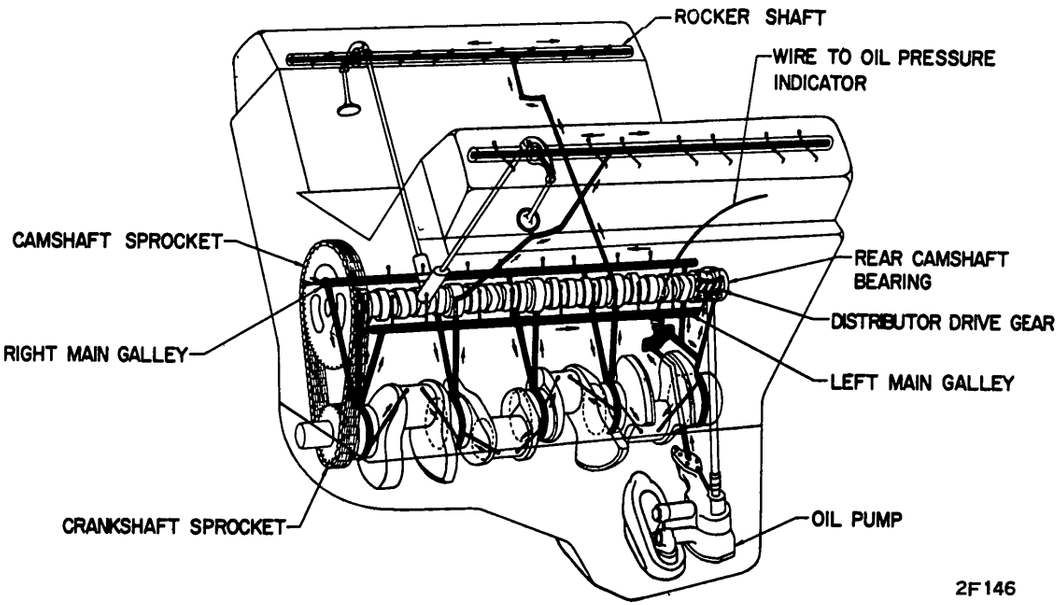
ROCKER SHAFT BRACKET NOTE - Rocker shaft bracket with drilled oil lead has anchor pin which locates shaft properly so that oil hole in bracket and shaft line up (pin is driven in flush with top of bracket). This bracket is No. 2 (left bank), No. 3 (right bank).

Distributor Drive Gear - Lubricated from drilled hole in plug at rear end of left main oil gallery.

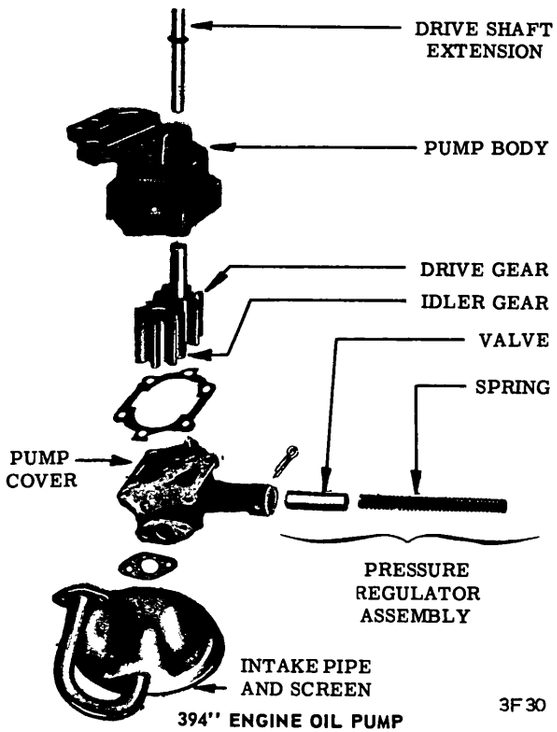
Timing Chain & Sprockets, Fuel Pump Lever & Eccentric - Lubricated from drilled hole in hexagonal headed plug which closes front end of right main oil gallery.

OIL PUMP SERVICING

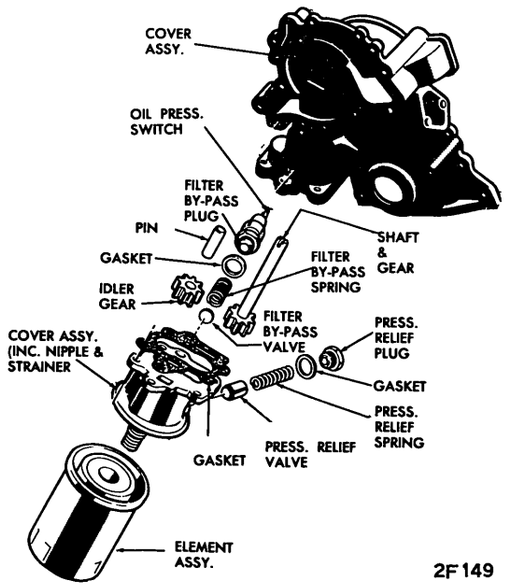
394" Engine - *NOTE* - Do not remove washers from drive shaft extension. Drive shaft extension and washers must be serviced as a unit.



394" ENGINE OILING SYSTEM



394" ENGINE OIL PUMP



ALUMINUM 215" ENGINE OIL PUMP

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Installation - Reverse disassembly procedure and tighten cover screw to specifications. Tighten pressure regulator nut. Install intake pipe and screen assembly with screen facing away from pump mounting pad then tighten screws. Assemble drive shaft extension so end nearest washers is inserted into oil pump drive shaft. Other end of shaft should mate with distributor drive gear in block. Position pump on bearing cap and tighten bolts to specifications.

Aluminum 215" Engin - *See illustration and note the following:* When installing pump, fill gear pocket with petrolatum and force it into every cavity and between gear teeth. Pump will not prime itself with air in cavity.

ENGINE COOLING

Thermostat - 170°, located in water outlet on intake manifold.

Pressure Valve - 15 psi radiator filler cap.

WATER PUMP

Pumps are serviced as an assembly. Install pumps as follows:

Aluminum 215" Engine - Apply thin coat of gasket cement to pump housing, position gasket on housing, then install pump assembly in front cover. Lubricate 1/4" bolts with engine oil, apply sealer to 5/16" bolts. Torque to specifications.

394" Engine - Install water pump assembly on front cover with a new gasket. Dip 1/4" bolts in lubricant, No. 980131, before installing; use sealer on 3/8" bolts (these bolts enter cylinder block), torque all bolts to specifications.

FLUID FAN DRIVE

Used on F-85 Jetfire and all Air Conditioned cars. Thermostatically controlled clutch limits maximum fan speed to 1500 RPM when air temperature below 135°F. and allows increased fan speed of 2000 RPM maximum at temperatures above 160°F. Serviced as an assembly.

MODEL IDENTIFICATION

Car Model	Car Series
F-85 (Standard)	3000
F-85 (Deluxe)	3100
Dynamic 88	3200
Super 88	3500
Starfire	3600
98 (Standard)	3800
98 (Custom)	3947

SERIAL NUMBER

Located on plate attached to left front door pillar.

① ② ③ ④
63 0 M 01001

① - Model year, 1963.

② - Car series. 0 3000. 1 3100. 2 3200. 5 3500. 6 3600. 8 3800. 9 3900.

③ - Assembly plant. M Lansing. A Atlanta. K Kansas City. L Linden. C South Gate. W Wilmington. T Arlington.

④ - Beginning vehicle number at each plant.

ENGINE UNIT NUMBER

Stamped on left cylinder head (Exc. F-85); stamped on front of right cylinder head (F-85).

① ② ③
S 200001 –

① - S All F-85 models. H 3200 Series (exc. 4-Bbl.). J 3200, 3500, 3600, 3800, 3900 Series (4-Bbl.).

② - Starting unit number at each plant: 200001 (F-85), 001001 (Others).

③ - No suffix letter indicates Std. Eng. (All models); E,H Export models. G Hi-Comp. F-85. T Turbocharged F-85. L Domestic low compression. S 10.5-1 compr. ratio.

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace every Oil Change
Air Cleaner (Non-Disposable)	Clean every 12,000 miles
(Disposable)	Replace every 18,000 miles
Breather Cap (Exc. F-85)	Clean every 12,000 miles
Choke Air Inlet Filter (F-85)	Clean every 12,000 miles
Fuel Filter (In Bowl)	Replace if necessary

① - Clean or replace more often if necessary.

CAPACITIES

	Al. 215" Eng.	394" Eng.
Water (Less Air Cond.) ①	12 qts.	20¼ qts.
(With Air Cond.) ①	12½ qts.	22 qts.
Crankcase ②	4 qts.	4 qts.
Fuel	16 gal.	21 gal.
Manual Trans. (3-Spd.)	2 pts.	2½ pts.
(4-Spd.)	2½ pts.	
Auto. Trans. ③	7 qts.	9 qts.
Rear Axle ④	2.1 pts.	5.58 pts.

① - Includes heater. ② - Add 1 qt. with filter change.
③ - Includes converter. ④ - Dry capacity.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

TRANSISTORIZED IGNITION: *Se "Delco-Remy Transistorized Ignition" in ELECTRICAL SECTION.*

COMPRESSION PRESSURE

Tempest (Std. 4 Cyl) ..... 140-150 psi
Tempest (Exc. Std. 4 Cyl.) ..... 155-165 psi
Pontiac (Economy Eng. with Synchro-mesh) ..140-150 psi
Pontiac (Others) ..... 155-165 psi

All at 155-165 RPM. Lowest cylinder must not be less than 80% of highest cylinder.

VALVE TAPPET CLEARANCE

All ..... Hydraulic

SPARK PLUGS

Gap (All) ..... .035" (033-.038")
Torque (All) ..... 15-25 ft. lbs.

Spark Plug Type

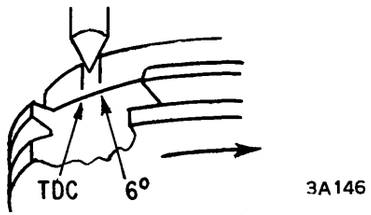
All (Except below) ..... AC 45S
Pontiac High Speed Driving ..... AC 43S

DISTRIBUTOR

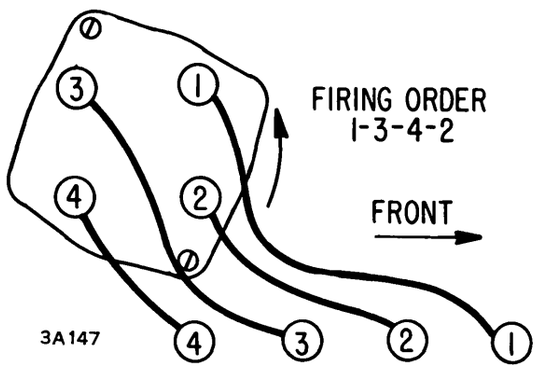
Point Gap ..... .019" (New), .016" (Used)
Cam Angle (Exc. 4 Cyl.) ..... 28-32° (Set to 30°)
(4 Cyl.) ..... 31-34° (Set to 33°)
Breaker Arm Spring Tension (All) ..... 19-23 ozs
Condenser Capacity ..... 18-.23 mfd

IGNITION TIMING

With vacuum line disconnected and opening taped closed.
All Engines ..... 6° BTDC



IGNITION TIMING MARKS



TEMPEST 4 CYL. FIRING ORDER

HOT (SLOW) IDLE RPM

	Without Air Cond.	Air Cond. Cars
Tempest		
4 Cyl (S M)	680-700	680-700
(A T) ①	580-600	630-650
(A T) ②	580-600	580-600
V8 2-Bbl (S M.)	580-600	640-660
(A T)	480-500	540-560
V8 4-Bbl (S M.)	580-600	640-660
(A T)	540-560	640-660
Pontiac		
389" (All)	480-500	540-560
421"	640-660	690-710

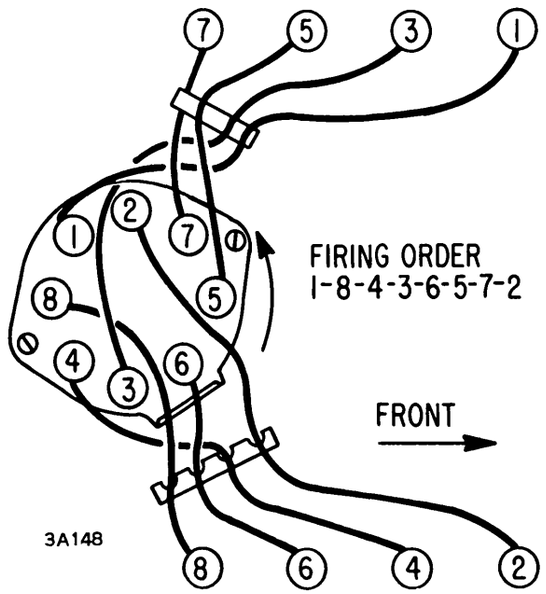
(S M.) - Synchro-mesh (A.T) - Auto Trans.
① - 1-Bbl. Carburetor. ② - 4-Bbl Carburetor.

In Neutral (Synchro-mesh), in Drive (Auto. Trans.), with Hot Idle Compensator closed, and air conditioning turned OFF.

COLD (FAST IDLE) RPM

Separate Fast Idle Adjustment required only on cars with 4-Bbl. carburetors. Set with fast idle screw on high step of fast idle cam.

Engine	Fast Idle RPM
4 Cyl	2800 (Synchro-mesh), 3000 (Auto.Trans.)
Tempest V8	2200
Pontiac (389")	2200
(421")	2500



PONTIAC & TEMPEST V8 ENGINES FIRING ORDER

IDLE SPEED-UP SETTING (4 CYL. AIR COND. CARS)

Carburetor	Idling RPM
1 Bbl	620-640
4 Bbl	580-600

With Air Conditioning ON, Auto. Trans. in DRIVE, carburetor hot idle compensator open or closed. ADJUSTMENT NOTE: Speed up control is a special Throttle Return Check with solenoid operated vacuum control valve *See THROTTLE LINKAGE for adjustment data.*

AUTOMATIC CHOKE SETTING

Rochester (All BC, 2GC, 4GC) Centered
Carter (All AFB) 1 Rich

FUEL PUMP PRESSURE

4 Cyl. Engine ..... 4-5 3/8 psi at 1000 RPM
All V8 Engines ..... 5 1/4-6 3/4 psi at 1000 RPM

MANIFOLD HEAT CONTROL VALVE

Located in outlet of exhaust manifold (4 Cyl), mounted in right bank manifold (all V8) Check every 6000 miles for free operation Lubricate with graphite in alcohol if sticky.

CRANKCASE VENTILATION VALVE

Replace valve assembly every 12,000 miles. Assembly should be replaced if pinching off hose from valve causes an engine idle speed reduction of less than 35 RPM (4 Cyl), less than 15 RPM (all V8)

TUNE-UP NOTES

► *TRANSISTORIZED IGNITION CAUTIONS:* To prevent damage to output transistor in control unit, be sure never to disconnect the following while cranking engine: Not more than 4 secondary leads (at spark plugs or distributor cap). Coil secondary cable (between coil and distributor cap). *NOTE* - When performing a compression test or any test where the engine is to be cranked without starting engine, ALWAYS DISCONNECT COIL PRIMARY LEAD

► *TEMPEST V8 WITH AUTO. TRANS. (EARLY) LOADING EXCESSIVELY ON RESTART CORRECTION:* Remove choke coil cover and choke baffle, then rotate fast idle cam so screw is on high step of cam. Rotate choke piston lever counterclockwise as far as possible (choke should be fully closed). If choke piston is not extending out of cylinder .060-.080", bend choke intermediate rod as necessary to obtain desired measurement.

► *PONTIAC ENGINE LOADING AT IDLE AFTER COLD START (CARTER 3300SA & 3326SA CARBURETORS):* Correct by installing new type Choke Piston Carburetors identified by letter "A" in lower left corner of identification tag have this new piston installed *See "Carter AFB 4-Barrel Carburetor" In Carburetion Section.*

► *PONTIAC & TEMPEST POOR THROTTLE RETURN CORRECTION (CARTER AFB CARBURETORS):* May be caused by misaligned or burred throttle valves or binding throttle valve shaft. *See "Carter AFB 4-Barrel Carburetor" in Carburetion Section.*

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

D lc -Remy 1110284

M chanical Advanc		Vacuum Advance	
Distr Degrees	Distr RPM	Distr. Degrees	Vacuum " of Hg
0-2	625	Start	6-8
9-11	1300	10	13-15
12-14	2200		

For engine d grees and RPM, multiply by 2.

D lc -R my 1110286

M chanical Advanc		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
.5-2.5	525	Start	6-8
6-8	875	8	14.5-15.75
9.5-11.5	1400		
13-15	1950		

For engine degr s and RPM, multiply by 2.

D lc -R my 1110300

M chanical Advanc		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
5-2.5	450	Start	6-8
7-9	1000	10	13-15
10-12	2300		

For ngine degre s and RPM, multiply by 2.

D lco-R my 1110301

M chanical Advanc		Vacuum Advanc	
Distr Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	525	Start	6-8
9-11	1250	10	13-15
12-14	2050		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110996 & 1111046

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	400	Start	8-10
4-6	750	10	14.75-16.75
7-9	1000		
8-10	1450		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1110997

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	450	Start	6-8
6-8	1050	10.5	13-15
9-11	1800		

For engine degrees and RPM, multiply by 2.

D lc -R my 1111020

M chanical Advanc		Vacuum Advanc	
Distr Degrees	Distr RPM	Distr. Degrees	Vacuum " of Hg
0-2	400	Start	7-9
8-10	1000	8	15-16
9.5-11.5	1600		
11-13	2200		

For engine degrees and RPM, multiply by 2.

Delco-Remy 1111039

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	400	Start	8-10
8.5-10.5	1000	10	14.75-16.75
11-13	2300		

For engine degrees and RPM, multiply by 2.

IGNITION COIL

	Ohms at 75° F
Primary Resistance (Tempest 4 Cyl.)	1.46-1.63
(Tempest V8)	1.77-2.05
(Pontiac V8)	1.81-1.95
Secondary Resistance (Tempest 4 Cyl.)	5600-6900
(Tempest V8)	6500-9500
(Pontiac V8)	7200-9500
Resistance Wire (4 Cyl.)	1.80
(All V8)	1.32

Current Draw (4 Cyl.) 2.8 amps. idling, 3.5 amps.
Current Draw (Pontiac V8) 2.1 amps. idling, 3.4 amps.

CARBURETOR

CARBURETOR SPECIFICATIONS

Carbur t r	Fl at L vel	Float Drop	Choke Setting
Rochester B 7023067	③ 1 9/32"	④ 1 3/4"	Manual
Rochester BC 7023068	③ 1 9/32"	④ 1 3/4"	Centered
Rochester 2GC			
7023060,61	②⑤ 5/8"	④ 1 3/4"	Centered
7023062,71	②⑤ 5/8"	④ 1 3/4"	Centered
7023063,64	②⑤ 11/16"	④ 1 3/4"	Centered
7023066	②⑤ 11/16"	④ 1 3/4"	Centered
7013063	⑤ 23/32"	④ 1 3/4"	Centered
7023065,73	⑤ 23/32"	④ 1 3/4"	Centered
7023075,77	⑤ 23/32"	④ 1 3/4"	Centered
7023078,79	⑤ 23/32"	④ 1 3/4"	Centered
7023161,62	⑤ 23/32"	④ 1 3/4"	Centered
Rochester 4GC 7023069,70	③⑨ 1 11/32"	⑥⑨ 1 1/4"	Centered
Carter AFB			
3479S	⑩	⑦ 23/32"	1 Rich
3545S,SA,74S	⑩	⑦ 23/32"	1 Rich
3300SA,3326SA	①⑥ 21/64"	⑦ 23/32"	1 Rich
3502S,3477S	①⑥ 21/64"	①⑦ 23/32"	1 Rich

① - ±1/32". ② - ±1/16"
③ - Air horn inverted, gasket in place, measure from gasket surface to top of floats.

④ - Air horn upright, float hanging free, measure from gasket surface to lowest point on float.

⑤ - Air horn inverted, gasket in place, needle seated, measure between lower (sharp) edge of float seam at toe end to gasket.

⑥ - Air horn inverted, gasket in place, needle seated, measure between gasket surface and top of floats at outer end.

⑦ - Air horn upright, float hanging freely, measure between gasket surface and top of float at toe end.

⑧ - From gasket to center of dimple on side of float toe.

⑨ - Float toe measurement 9/16" from gasket surface to dimple on side of float with air horn inverted.

⑩ - 21/64" (solid seat), 5/16" (resilient seat) ± 1/64" measured between top of floats (at outer end) and air horn gasket.

ACCELERATING PUMP SETTING

Carburetor	Seasonal Setting
Rochester	
B,BC	none
2GC	none
4GC	No. 1 Hole (Normal)
	Nos. 2,3,4,5 Hole (Progressively leaner)
Carter AFB	Center Hole (Normal)

MANIFOLD FUEL DISTRIBUTION

Tempest 4 Cyl. Eng. (4-Bbl.) - Left barrels feed cylinders 1-4; right barrels feed cylinders 2-3.
All V8 Engines - Le ft barrels feed cylinders 1-4-6-7; right barrels feed cylinders 2-3-5-8.

THROTTLE LINKAGE ADJUSTMENT

ROCHESTER TRIPLE 2-BARREL CARB. THROTTLE LINKAGE ADJUSTMENTS: See "Rochester Triple 2-Bbl. Carburetor" in Carburetion Section.

Pontiac (Exc. Tempest) Auto. Trans. - 1) Remove air cleaner and loosen both nuts at transmission throttle control rod trunnion.

2) Adjust engine idle speed (see TUNE-UP), then shut off engine and install linkage adjustment pin J-7687 through holes in throttle control lever and bracket. *NOTE* - On carburetors with throttle return check, before installing pin, remove throttle return check or install Tool J-6342-01 over return check so there will be no interference with adjustment.

3) With throttle valves fully closed, loosen locknut and adjust length of transmission throttle control rod so gauge pin in hole is free. Leave pin installed and tighten locknut.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

4) Push throttle control rod to transmission (TV upper rod) downward slightly until outer throttle lever is felt to touch end of travel *CAUTION - Lever must not touch trunnion now.* Tighten trunnion locknuts finger tight, then shorten TV upper rod by backing off lower trunnion nut 3½ turns (Roto Hydra-Matic), 4½ turns (Super Hydra-Matic) Tighten upper nut

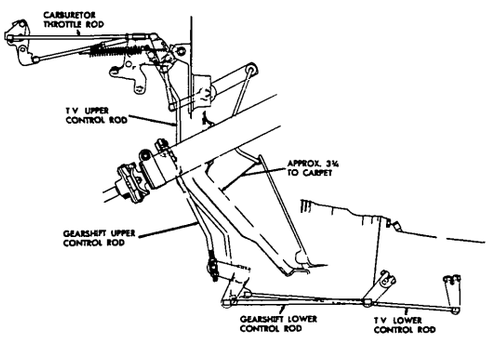
5) Loosen locknut on carburetor throttle rod, then adjust to obtain 3¾" clearance from under side of attaching boss on pedal to body toe pan (carpet installed)

6) Tighten locknut on carburetor throttle rod securely.

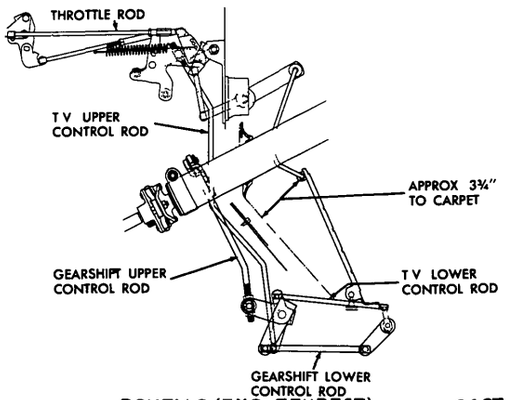
7) Road test car and tailor adjustment as required by shortening or lengthening TV upper rod ½ turn at a time to obtain best shift feel

THROTTLE RETURN CHECK ADJUSTMENT

With hot idle and mixture adjustments correct, place transmission in Neutral. With engine running, disconnect vacuum hose from throttle return check and plug hose. To adjust, hold sleeve next to diaphragm from turning, adjust contact screw for speed of 1175 RPM (4 Cyl with BC carburetor), 1050 RPM (other engines)



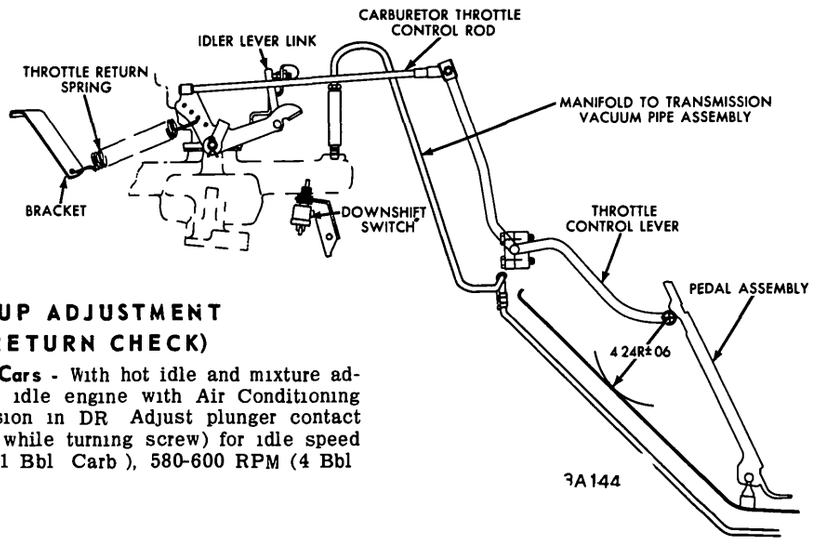
PONTIAC (EXC. TEMPEST) 2A36
ROTO HYDRA-MATIC THROTTLE LINKAGE



PONTIAC (EXC. TEMPEST) 2A37
SUPER HYDRA-MATIC THROTTLE LINKAGE

IDLE SPEED UP ADJUSTMENT (THROTTLE RETURN CHECK)

4 Cyl. Air Cond. Cars - With hot idle and mixture adjustments correct, idle engine with Air Conditioning ON and transmission in DR Adjust plunger contact screw (hold stem while turning screw) for idle speed of 620-640 RPM (1 Bbl Carb), 580-600 RPM (4 Bbl Carb)



TEMPEST AUTO. TRANS. THROTTLE LINKAGE

PEDAL HEIGHT ADJUSTMENT

Tempest - Adjust carburetor throttle control rod for clearance of 4 24" ± 06" as shown in illustration.

Pontiac (Exc. Tempest) - *See THROTTLE LINKAGE ADJUSTMENT*

DOWNSHIFT SWITCH ADJUSTMENT

Tempest - Check and adjust pedal height *See above.* With throttle in wide open position, use adjusting nuts to position downshift switch to obtain a clearance of 030- 100" between lever extension and threaded body of switch

ELECTRICAL

BATTERY

12 Volt

Capacity	
Tempest	**Amp. Hr. (20 Hr.)**
Reg. Fuel Engines	44
Premium Fuel Engines	53
Pontiac	
Reg. Fuel Engines	53
Premium Fuel Engines	61

Batt ry Ground - Negative
Engin Ground - Each side of engine

STARTER

Delco-Remy 1107781

Torque	RPM	Volts	Amperes
0 ft lbs	3800-6200	10 6	70-105
	Lock	3 0	480-540

D lc -R my 1107791, 270

Torque	RPM	Volts	ℂ Amperes
0 ft. lbs.	3600-5100	10 6	65-100
	Lock	3 5	300-360

Delco-Remy 1107796

Torque	RPM	Volts	ℂ Amperes
0 ft. lbs.	6200-9400	10 6	49-76
	Lock	4 3	270-320

ℂ - Includes solenoid

ALTERNATOR

► *1100648 ALTERNATOR CAUTION:* This alternator has lower field resistance and MUST be used with Transistor Regulator No 1116365 *If us d with r gular Doubl Contact Regulator, higher field curr nt will caus burnt r gulator contacts.*

Se Pages 2 to 13 for complete Car Model General Indexes and Equipment Ind xes

ELECTRICAL (Continued)

Delco-Remy Alternator Specifications

Delco-Remy No.	Amps.	Volts	Alt. RPM
1100632, 37	25	14.0	2000
	35	14.0	5000
1100634, 36, 51	25	14.0	2000
	40	14.0	5000
1100621, 48 ①	32	14.0	2000
	50	14.0	5000
1117765 ②	18 ③	14.0	1100
	62 ③	14.0	6500

① - Use with Transistor Regulator 1116365.
② - Use with Transistorized Regulator 9000567.
③ - 5-10% higher if tested without regulator.

Field Current - 2.8-3.2 amps. (1100648), 3.7-4.4 amps (1117765), 1.9-2.3 amps. (All Others), at 12 volts and 80°F

ALTERNATOR REGULATOR

►*RADIO EQUIPPED CARS (EARLY) REGULATOR NOTE:* Remove capacitor from voltage regulator on cars built before Nov. 2, 1962. Capacitors have been eliminated in production after this date.

►*1117365 REGULATOR CAUTION:* This Transistor type regulator MUST be used with Alternator No. 1100648 (Double Contact Regulators will not handle larger field current of this alternator without burning).

Delco-Remy 1119511 (Double Contact)

Air Gap - .067" with lower contacts just touching.
Point Gap - .015" with lower contacts just touching.
Setting - 13.5-14.4 volts (upper contacts) .1-.3 volts lower (lower contacts) at 125°F ambient temperature.

Delco-Remy 1116365 (Transistor)

Setting - 13.4-14.1 volts at 125°F ambient temperature (at "O" position of adjusting screw).

Delco-Remy 9000567 (Transistorized)

Voltage Regulator and Field Relay units.

Voltage Regulator

Air Gap - .075" with contacts just touching.
Setting - 13.2-14.2 volts at ambient temperature of 125°F.

Field Relay

Air Gap - .014" with contacts just touching.
Contact Gap - .027".
Closing Voltage - 5.0-9.5 volts.

FUSES & CIRCUIT BREAKERS

FUSE BLOCK

Located on passenger side of dash, left side of car.

CIRCUIT BREAKER

Integral with headlight switch, protects lighting circuit.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Tempest - Located on rear of gearshift control and indicator light assembly. Engine should crank with selector lever in Neutral. To adjust, loosen 2 switch mounting screws and reposition switch as necessary.
Pontiac (Exc. Tempest & Console Models) - Located on steering column. Engine should crank with selector lever in Park or Neutral. No adjustment provided.
Pontiac (Console Models) - Located under console. Engine should crank in Park or Neutral. To adjust, loosen 2 switch attaching screws and reposition switch as necessary.

LIGHT SWITCH REMOVAL

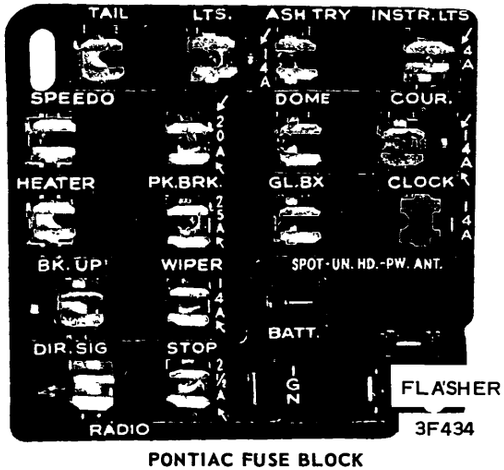
Disconnect battery cable. Pull switch knob to ON position, then push latch button on bottom of switch assembly and pull switch knob assembly out. Unscrew ferrule and remove switch assembly.

STOP LIGHT SWITCH ADJUSTMENT

Located on bracket adjacent to brake pedal arm. To adjust, position switch and bracket so light operates only when pedal depressed.

SPEEDOMETER REMOVAL

Pontiac (except Tempest) - Disconnect Safeguard control cable and remove cluster (see below). Remove face plate and lens by unsnapping from housing. Remove screws on back of cluster at speedometer cable fitting. Remove speedometer and instruments carefully. *NOTE - If equipped with Safeguard speedometer, disconnect ground wire at clip terminal and wire retaining clip. Note routing of wires before removing ground wire.* Remove two numeral plate screws, then remove speedometer head assembly.



PONTIAC FUSE BLOCK

Tempest - Remove instrument cluster (see below). Remove speedometer head retaining screws, then remove screws retaining speedometer to head assembly.

INSTRUMENT CLUSTER REMOVAL

Pontiac (except Tempest) - Disconnect battery and remove center duct assembly (cars with Circ-L-Aire). Disconnect cluster wire at chassis wiring harness connection. Remove nuts and lockwashers. Disconnect speedometer cable. Remove wire connector from ammeter terminals and other wire connections from back side of cluster. Push cluster toward front of car and remove assembly.
Tempest - Disconnect battery and remove left duct (Air Cond. cars). Remove retaining nuts and speedometer cable. Pull cluster and housing out from instrument panel opening and remove bulbs and wiring.

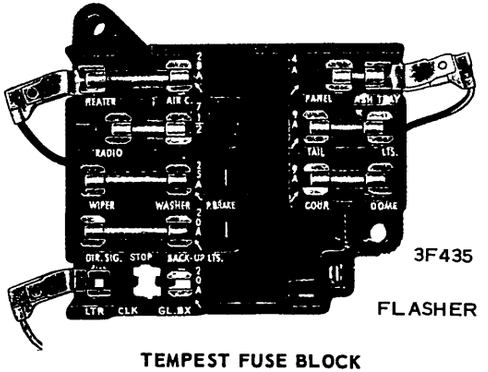
TURN SIGNAL FLASHER

Located on fuse block under instrument panel on left side of car

BELT ADJUSTMENT

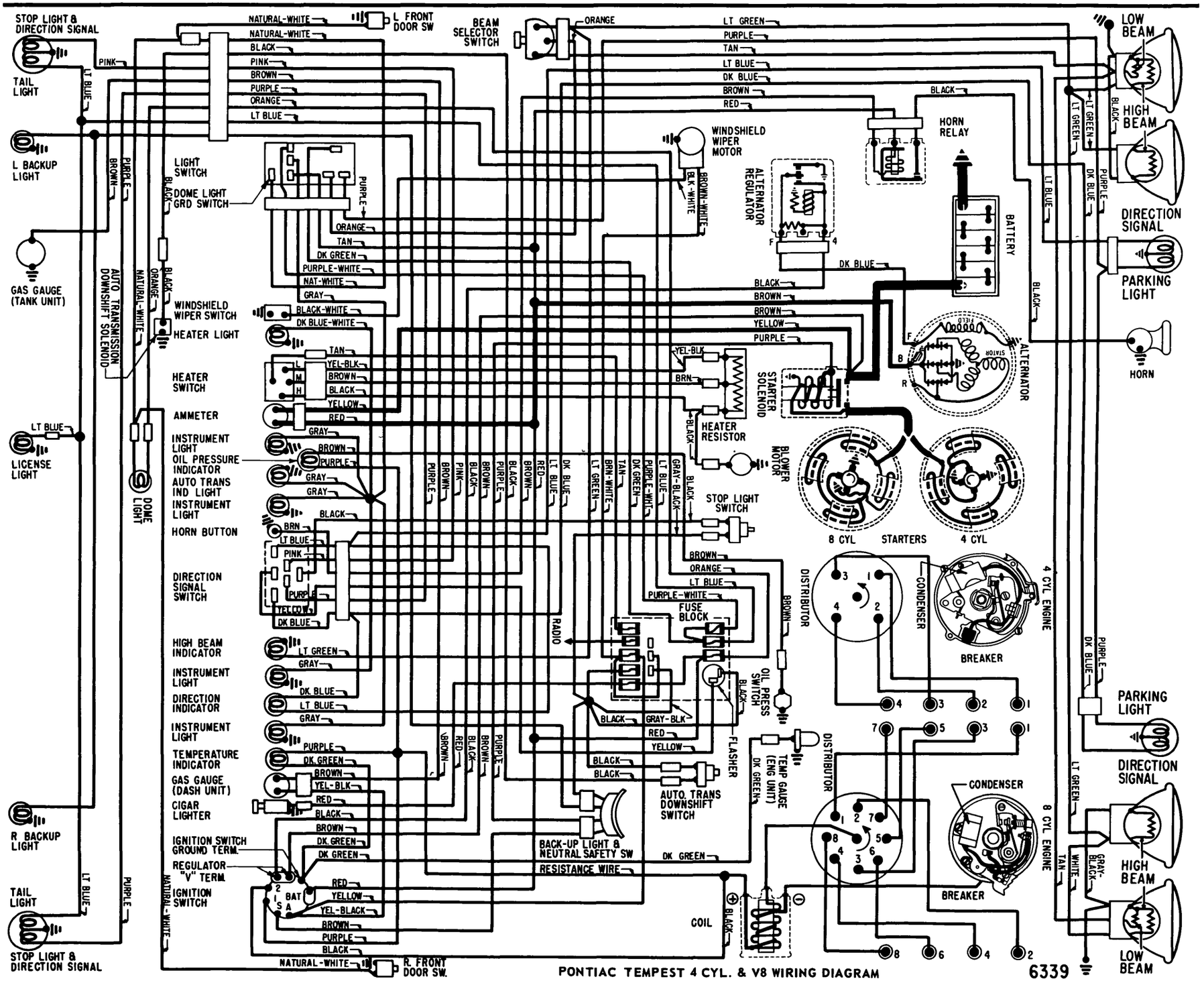
Belt	Burroughs Gauge
Alternator & Water Pump	70-75
Power Steering (Tempest)	70-75
(Pontiac)	100-105
Air Cond. (Tempest 4 Cyl.)	70-75
(Tempest V8 & Pontiac) ①	100-105
(Tempest V8 & Pontiac) ②	110-115

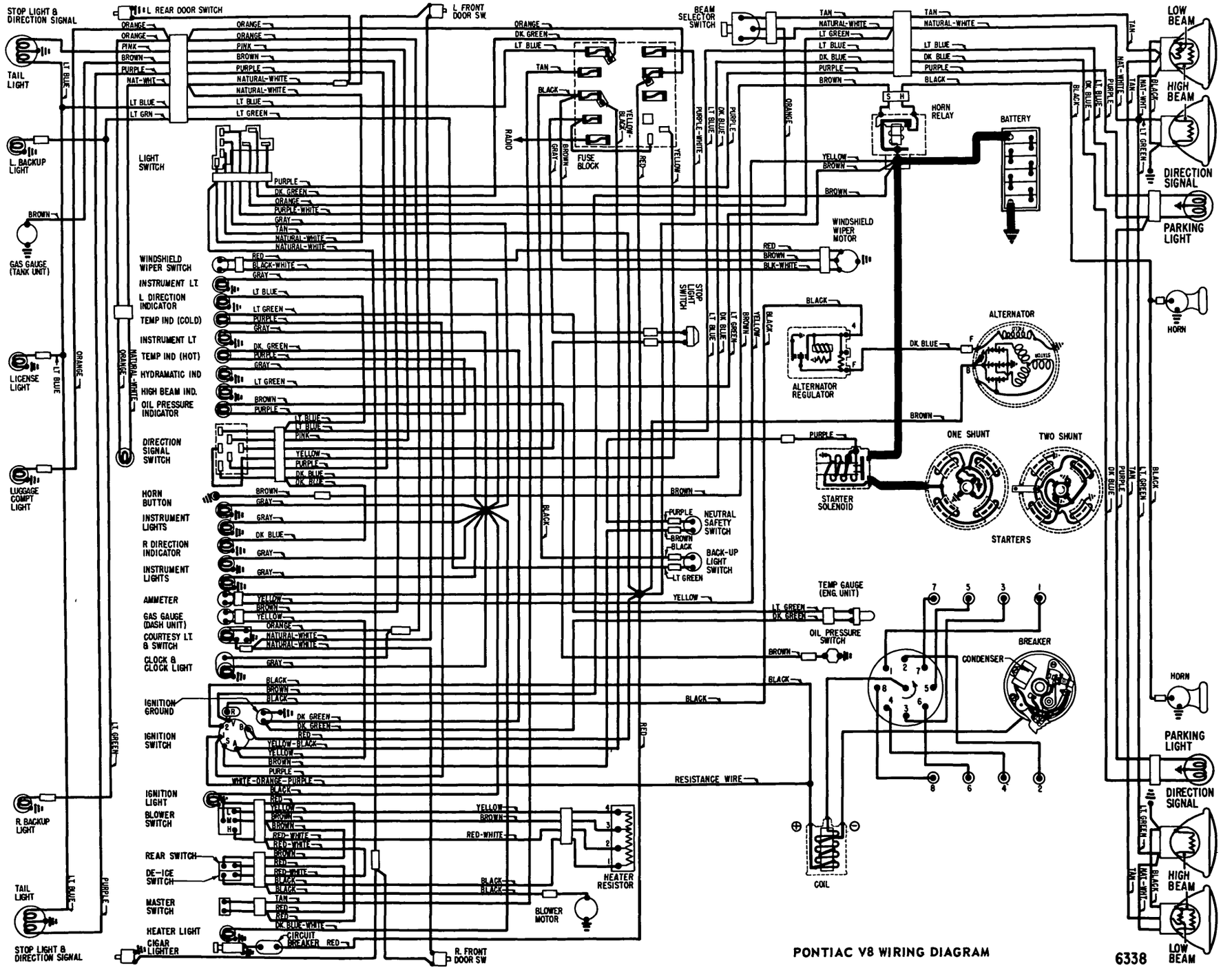
① - First type Rayon cord belt.
② - Later type premium cord belt. Adjust NEW belt to 150-155 lbs. Burroughs Gauge reading. Readjust if reading less than 110 lbs. *NOTE* - This belt has embossed part number (9772059 or 9772317).



TEMPEST FUSE BLOCK

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes


STOP LIGHT & DIRECTION SIGNAL
TAIL LIGHT
L BACKUP LIGHT
GAS GAUGE (TANK UNIT)
LICENSE LIGHT
R BACKUP LIGHT
TAIL LIGHT
STOP LIGHT & DIRECTION SIGNAL
L FRONT DOOR SW
BEAM SELECTOR SWITCH
LIGHT SWITCH
DOME LIGHT GRD SWITCH
WINDSHIELD WIPER SWITCH
HEATER LIGHT
HEATER SWITCH
AMMETER
INSTRUMENT LIGHT
OIL PRESSURE INDICATOR
AUTO TRANS IND LIGHT
INSTRUMENT LIGHT
HORN BUTTON
DIRECTION SIGNAL SWITCH
HIGH BEAM INDICATOR
INSTRUMENT LIGHT
DIRECTION INDICATOR
INSTRUMENT LIGHT
TEMPERATURE INDICATOR
GAS GAUGE (DASH UNIT)
CIGAR LIGHTER
IGNITION SWITCH GROUND TERM.
REGULATOR "V" TERM.
IGNITION SWITCH
AUTO TRANSMISSION DOWNSHIFT SOLENOID
DOME LIGHT
R. FRONT DOOR SW.
WINDSHIELD WIPER MOTOR
ALTERNATOR REGULATOR
HORN RELAY
BATTERY
ALTERNATOR
STARTER SOLENOID
HEATER RESISTOR
BLOWER MOTOR
STOP LIGHT SWITCH
8 CYL
STARTERS
4 CYL
DISTRIBUTOR
CONDENSER
BREAKER
4 CYL ENGINE
8 CYL ENGINE
FUSE BLOCK
RADIO
OIL PRESS SWITCH
FLASHER
TEMP GAUGE (ENG UNIT)
AUTO. TRANS DOWNSHIFT SWITCH
BACK-UP LIGHT & NEUTRAL SAFETY SW
RESISTANCE WIRE
COIL
LOW BEAM
HIGH BEAM
DIRECTION SIGNAL
PARKING LIGHT
HORN
PONTIAC TEMPEST 4 CYL. & V8 WIRING DIAGRAM
6339



PONTIAC V8 WIRING DIAGRAM

6338

ENGINE

ENGINE IDENTIFICATION

Special Engine Code Letter - Engine code (79Y 89Z etc) is stamped directly below engine number on machined pad on front of right hand cylinder bank These codes are used in the engine specifications to designate special engine specifications

Engine Compression Ratio - Different compression ratios obtained by special cylinder heads with same pistons Compression ratio can be identified by cast number on head near center exhaust port between exhaust manifold attaching flange and lower center head bolt as listed below *This identification number is NOT a part number*

Cylinder Head Identification No.

Pontiac Engines		Tempest Engines	
Engine & Ratio	Number	Engine & Ratio	Number
389" 8 6-1	543796	4 Cyl 8 6-1	543796
389" 10 25-1	543797	4 Cyl 10 25-1	543797
401" 10 75-1	9770716	V8 8 6-1	543796
401" 11 0-1	9771980	V8 10 25-1	548232

ENGINE REMOVAL

Pontiac (except Tempest) - Engine can be removed with or without transmission Following includes engine removal with transmission

1) Drain systems and remove hood Disconnect all wires, pipes, linkages, hoses, cooler lines Remove carburetor crankcase vent pipe, radiator, fan, battery, and cables

2) On Pwr Strg cars, remove pump belt and pump from mounting bracket and secure out of way

3) Disconnect exhaust pipe from crossover pipe, and disconnect gearshift linkages

TIGHTENING SPECIFICATIONS

	Ft. Lbs.
Cylinder Head	85-100
Intake Manifold	30-45
Exhaust Manifold	20-35
Oil Pan	8 15
Main Bearing Cap (Rear)	110-130
(Others)	90-110
Con Rod Caps	40-46
Flywheel	85-100
Vibration Damper	130-190
Crankshaft Pulley	130-190
Camshaft Sprocket	30-45
Rocker Arm Cover	*45-80 in lbs*
Pushrod Cover	*25-70 in lbs*
Engine Front Cover	20 35
Water Pump	10-25
Oil Pump to Block	20 35
Oil Pump Cover	10-20
Oil Pump Pressure Reg Spring Cap	8-18
Oil Filter	20 35
Clutch Housing	40-60
Transmission to Clutch Housing (Pontiac)	45-60
(Tempest)	35-40

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
195' (Standard 1-Bbl)	115 at 4000⑥	8 6-1	4 06"	3 75'	195 cu ins
(Spec Camshaft & 1-Bbl)	①	10 25-1	4 06"	3 75"	195 cu ins
(4-Bbl)	166 at 4800	10 25-1	4 06"	3 75"	195 cu ins
326" (2 Bbl)	260 at 4800	10 25-1	3 72'	3 75'	326 cu ins
(4 Bbl)	280 at 4800	10 25 1	3 72"	3 75"	326 cu ins
389' (Std 2-Bbl)②	215 at 3600	8 6-1	4 06"	3 75"	389 cu ins
(Std 2-Bbl) ③	230 at 4000	8 6-1	4 06"	3 75'	389 cu ins
(Std 4-Bbl)	235 at 3600	8 6-1	4 06"	3 75"	389 cu ins
(Optl 4-Bbl)	303 at 4600	10 25-1	4 06"	3 75"	389 cu ins
(Optl 2-Bbl)④	267 at 4200	10 25-1	4 06'	3 75'	389 cu ins
(Optl 2-Bbl)⑤	283 at 4400	10 25-1	4 06 '	3 75"	389 cu ins
(Triple Carbs)	313 at 4600	10 25-1	4 06"	3 75"	389 cu ins
421" (4 Bbl)	320	10 25-1	4 06"	3 75"	389 cu ins
(4 Bbl)	353 at 5000	10 75-1	4 3/32"	4"	421 cu ins
(Triple Carbs)	370 at 5200	10 75-1	4 3/32"	4'	421 cu ins

① - 120 at 3800 RPM (Synchro-mesh), 140 at 4400 RPM (Auto Trans)
② - Synchro-mesh Trans ③ - Auto Trans ④ - Catalina
⑤ - Starchief ⑥ - 110 HP (Export)

4) On synchro-mesh cars, disconnect clutch fork linkage and remove clutch countershaft bracket from flywheel housing

5) Remove propeller shaft assembly Raise engine slightly

6) Remove front and rear insulator mounting screws Disconnect cooler lines at timing cover

7) On automatic transmission cars place jack under transmission and remove frame crossmember *CAUTION - Without jack for support, transmission will swing down when crossmember removed*

8) Hoist engine and transmission out of chassis

Tempest - 1) Remove hood, drain and remove radiator

2) Disconnect hoses and all accessible wires

3) Disconnect fuel line at pump, then disconnect vacuum modulator line (auto trans cars)

4) Disconnect battery remove front fender cross brace, fan and pulley Disconnect all linkages

5) Disconnect exhaust pipe at manifold Place wooden block at rear of engine to prevent damage to distributor if engine should rock to rear

6) Disconnect propeller shaft and torque tube from rear of engine

7) Disconnect engine support at crossmember, raise engine and move it forward to clear firewall and heater

OIL PAN REMOVAL

Tempest - 1) Drain crankcase Remove exhaust crossover pipe

2) Support engine and remove front crossmember assembly

3) Remove flywheel housing front shield and lower cover

4) Remove oil pan bolts and remove pan

Pontiac (Exc Tempest) - 1) Drain radiator and crank case Remove hood and air cleaner Disconnect battery negative lead Disconnect radiator hoses

2) Remove upper radiator support and fan guard Remove coil retaining bolts and move coil out of way

3) Remove crossover and exhaust pipe-to-exhaust manifold retaining bolts Remove 2 idler arm-to-frame retaining bolts and lower idler arm and tie rod

4) Remove engine front mount bolts Remove 2 starter-to-clutch housing retaining bolts and lower starter

5) Remove oil pan-to-block retaining bolts and oil pan to-timing chain cover retaining bolts Remove lower cover from clutch housing

6) Hook chain fall under front of intake manifold and lift front of engine as high as possible

7) Remove flywheel cover from clutch housing Remove oil pan from block and let drop

8) Move crankshaft to No 1 position Hold crossover pipe and tie rod down then remove oil pan

CYLINDER HEAD INSTALLATION

3 sizes of cylinder head bolts used When installed properly, all will project equally from their bosses Tighten bolts evenly to specifications

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

PISTON & ROD INSTALLATION

V8 Engines - Notch on piston head (arrow on 421" Engines) should point toward front of engine (all cylinders). Identification bosses on side of connecting rod (see illustration) should point toward front of engine (Right Bank), toward rear of engine (Left Bank).

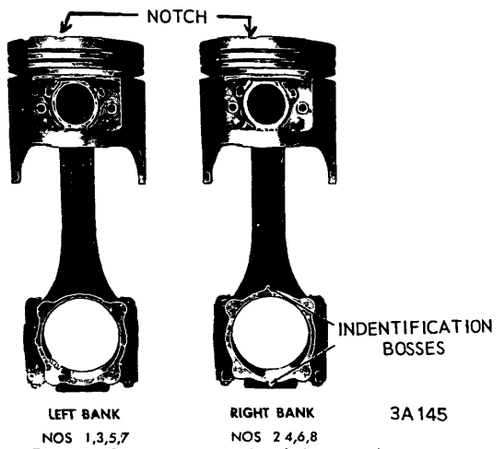
4 Cylinder Engine - Identification bosses on rod to rear of engine. Notched side of piston head must face to front of engine.

FITTING PISTON

Measure diameter of bore at its smallest diameter. Measure piston skirt perpendicular to piston pin boss (pin removed) and at center of skirt (Exc. 421" Eng.), top of skirt (421" Eng.).

PISTON PIN INSTALLATION

See illustrations and note the following:
Use Tool J-6901 for removal and installation of piston pins. To install, place plunger and spring in tool support (use correct support and pilot plunger for piston type). Place plunger in piston pin bore. Position on press. Coat pin and rod lightly with graphite lubricant and insert pin. Press pin in until it bottoms against plunger. Piston must turn freely on pin. *Pin must not move under 1500 lb. minimum load after assembly.*



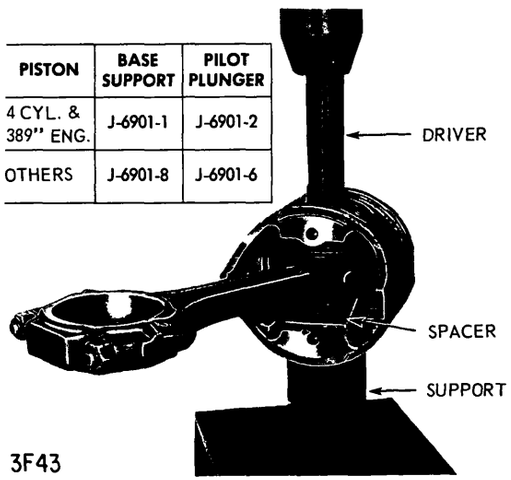
PISTON & ROD ASSEMBLY (TYPICAL)

PISTONS, PINS, RINGS

Engine	PISTONS	PISTON PINS		PISTON RINGS		
	① Clearance	Piston Fit	Rod Fit	Ring	End Gap	Side Clearance
All	③ .0007-.0013"	.0003-.0005"	②	Compr. (1)	.016-.026"	.0015-.0030"
				(2)	.013-.025"	.0015-.0035"
				Oil	.015-.055"	.0005-.0055"

① - See *FITTING PISTONS below.* ② - .0008-.0016" interference fit. See *PISTON PIN REMOVAL below.*
③ - .003-.0036" on 421" HO Engines.

PISTON	BASE SUPPORT	PILOT PLUNGER
4 CYL. & 389" ENG.	J-6901-1	J-6901-2
OTHERS	J-6901-8	J-6901-6

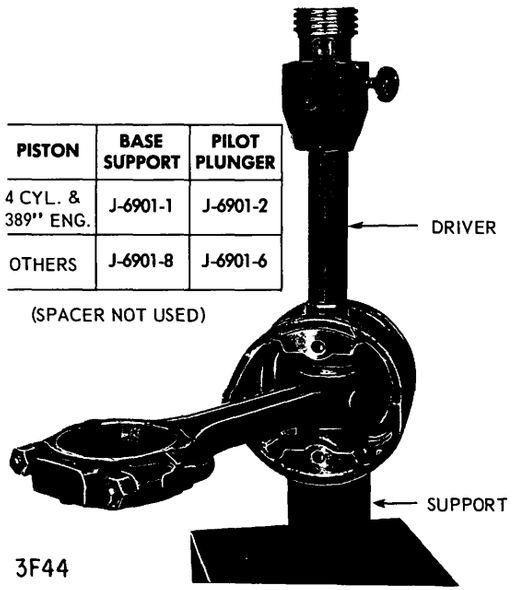


PISTON PIN REMOVAL

Oversize Pin Installation - .001" and .003" Oversize pins can be installed. Connecting rod can be honed to fit **but must be .0008-.0016" smaller than pin.**

PISTON	BASE SUPPORT	PILOT PLUNGER
4 CYL. & 389" ENG.	J-6901-1	J-6901-2
OTHERS	J-6901-8	J-6901-6

(SPACER NOT USED)



PISTON PIN INSTALLATION

REAR MAIN BEARING OIL SEAL REMOVAL

Pontiac (except Tempest) - Drain oil, remove pan, oil pump and oil pump drive shaft. Remove oil baffle and cylinder block-to-oil baffle tube. Remove rear main bearing cap and rear center main bearing cap. Loosen remaining bearing caps enough to allow crankshaft to be moved away from block about ½". Remove upper half of rear main bearing oil seal. Remove oil seal and bearing shell from bearing cap.

Tempest - Drain oil. Disconnect propeller shaft and torque tube from rear of engine. Support engine and remove front crossmember assembly. Remove oil pan, oil baffle, and cylinder block-to-oil baffle tube. Remove rear center main bearing cap and upper half of rear center main bearing shell. Remove rear main bearing cap and loosen remaining bearing caps enough to allow crankshaft to be lowered about ½" at rear. Remove upper half of rear main bearing oil seal. Remove oil seal and bearing shell from rear main bearing cap.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam.	Clearance	Thrust Brg.	Endplay	Journal Diam.	Clearance	Sideplay
All	① 3.000"	.0005-.002"	Rear Center	.0035-.0085"	2.2492-2.2502"	.0005-.0025"	②

① - 3.250" on 421" Engine. ② - .0035-.0085" (Tempest Std. Eng.); .006-.011" total both rods (All except Tempest Std. Eng.).

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

REAR MAIN BEARING OIL SEAL INSTALLATION

Install seal in cap, compress with suitable tool and trim one end flush with cap. Rotate seal in cap and recompress slightly to eliminate bumps caused by seal retention slots in cap. Remove seal from cap and insert into block (insert end which was flush with cap first) by slipping it up over crankshaft into seal cavity in block. Install rear center main bearing cap (pull crankshaft into place against seal) and bearing shell and torque to specifications. Trim both ends of seal flush with block. Install new seal in cap (as above) and trim flush with cap. Install cap with shell and torque to specifications. Remove rear main bearing cap again and inspect split line to be certain none of seal material is compressed between cap and block. Apply a bead of sealer about 1/16" in diameter to mating surface of cap extending from packing seal groove outward to groove for oil pan cork rear gasket. Install rear main bearing cap and torque to specifications.

ENGINE FRONT COVER

►*FRONT COVER PRODUCTION CHANGE & REPLACEMENT CAUTION:* Beginning Engine No. 390797 (Tempest), 451447 (Pontiac), a new aluminum Front Cover and Water Pump were used. These parts can be identified by larger water pump assembly and larger pump mounting hole in cover. An inserted Internal Housing and Divider must be used in the cover behind the pump.

Removal - Drain radiator and cylinder block, loosen alternator adjusting bolts (remove alternator brackets on Tempest), remove fan and pulley, disconnect radiator hoses, remove fuel pump, remove harmonic balancer. Remove bolts attaching oil pan to cover. Remove cover bolts from block and intake manifold (manifold bolt is a draw bolt on Tempest), remove the cover.

Installation - Thoroughly clean gasket surfaces on block and cover, inspect oil pan gasket and replace if damaged. Use new "O" ring seal in water passage in intake manifold (Pontiac only). Install and tighten cover to block and intake manifold bolts first, then install oil pan screws. Tighten to correct torque specifications.

FRONT COVER OIL SEAL

To replace seal, remove fan and accessory drive belts. Remove harmonic balancer. Remove seal by prying out of bore with pry bar. Install new seal with seal lip facing rear of engine (use Seal Installer Tool J-21147).

VALVE STEM OIL SEALS

"O" ring type used on all valves. Install in second groove (from end) of valve stem.

VALVE GUIDES

Integral with cylinder head. Ream to next oversize when installing valves with oversize stems.

VALVES

Camshaft ①	Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	② Stem Diameter	Stem Clearance	Valve Lift
H③	Intake	1.88"	29°	30°	.048-.070"	.3407-.3414"	.0021-.0038"	.33"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.33"
J③	Intake	1.88"	29°	30°	.048-.070"	.3407-.3414"	.0021-.0038"	.40"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.40"
E④	Intake	1.88"	29°	30°	.048-.070"	.3407-.3414"	.0021-.0038"	.37"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.37"
A⑤	Intake	1.88"	29°	30°	.045-.071"	.3407-.3414"	.0021-.0038"	.33"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.33"
B⑤	Intake	1.88"	29°	30°	.045-.071"	.3407-.3414"	.0021-.0038"	.37"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.37"
C⑤	Intake	1.88"	29°	30°	.045-.071"	.3407-.3414"	.0021-.0038"	.40"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.40"
D⑤	Intake	1.92"	29°	30°	.045-.071"	.3407-.3414"	.0021-.0038"	.40"
	Exhaust	1.60"	44°	45°	.048-.070"	.3402-.3409"	.0026-.0043"	.40"

① - *Refer to CAMSHAFT USAGE CHART.* ② - Standard size. ③ - 4 Cylinder Engine.
④ - Tempest V8. ⑤ - Pontiac (Except Tempest) V8 Engine.

VALVE STEM LENGTH CHECK

Position rocker arm on stud and hold in place using Tool J-8927. Slip valve into place and hold against valve seat. Insert Gauge Tool J-8928 through pushrod hole and seat snugly in pushrod seat of rocker arm. With all parts seated, step end of gauge should be flush with gasket face of head (see NOTE below), but should not project past step on gauge. If gauge projects too far (stem too long) grind tip of stem as necessary. *CAUTION* - When grinding stem tip, be careful not to overheat it (could soften hardened stem and cause rapid wear).

NOTE - Undercut cylinder head requires a straightedge at this point. Clamp straightedge on lower inboard side of head (flush with bottom of head). Use this point for reference.

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer. *See "Valve Closed" spring length in specification table.*

ROCKER ARM STUD REPLACEMENT

Use .003" Oversize stud only when original stud is found to be loose in head. Use Standard sizes for replacement when original stud threads are damaged.

Stud Removal - Remove cylinder head. With rocker arm removed, file two slots, 3/32-1/8" deep, on opposite sides of rocker arm stud. Top of slots should be

(Continued)

VALVE SPRINGS & LIFTERS

Camshaft ①	SPRINGS Pressure (Lbs.) Spring	Closed	Open	LIFTERS Diameter	Clearance
H③	Single	83 at 1.52"	174 at 1.19"	.8422-.8427"	.0013-.0028"
J③	Inner	27 at 1.47"	65 at 1.07"	.8422-.8427"	.0013-.0028"
	Outer	60 at 1.52"	113 at 1.12"		
E④	Inner	27 at 1.47"	62 at 1.10"	.8422-.8427"	.0013-.0028"
	Outer	60 at 1.52"	109 at 1.15"		
A⑤	Single	80 at 1.53"	171 at 1.20"	.8424-.8427"	.0013-.0028"
B⑤	Inner	26 at 1.48"	61 at 1.11"	.8424-.8427"	.0013-.0028"
	Outer	58 at 1.53"	107 at 1.16"		
C⑤	Inner	26 at 1.48"	64 at 1.08"	.8424-.8427"	.0013-.0028"
	Outer	60 at 1.52"	114 at 1.12"		
D⑤	Inner	32 at 1.48"	96 at 1.08"	.8424-.8427"	.0013-.0028"
	Outer	62 at 1.52"	131 at 1.12"		

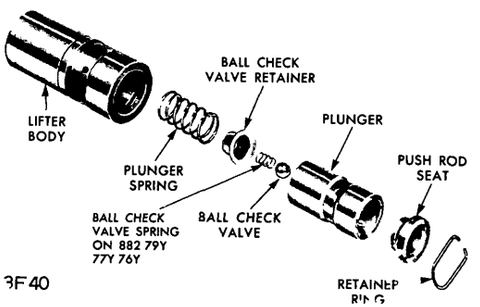
① - *See CAMSHAFT USAGE CHART.* ② - Tempest 4 Cylinder Engine.
③ - Tempest V8 Engine. ④ - Pontiac (Except Tempest) V8 Engine.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

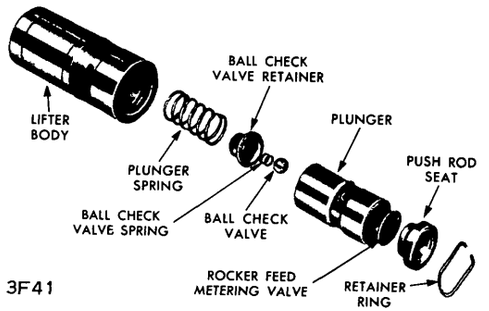
1/4-3/8' below thread travel Place washer at bottom of stud Position stud remover J-8934 on rocker arm stud and tighten screws with 5/32" Allen Wrench Place spacer over stud remover Thread 7/8' standard nut on remover and turn nut until stud is removed Remove plugs from cylinder head oil gallery and clean out deposits from cylinder head (head must be right side up so foreign material will not lodge around studs) **Stud Installation** - Position rocker arm on new stud and place installer on stud in place of rocker arm ball Press stud into head (using a 2-ton press) until it is installed about halfway (7/16') Position valve train gauge J-8928 in pushrod hole so it seats in rocker arm With valve seated, slowly press rocker arm stud into cylinder head until gauge projects about midway between end of gauge and step with respect to gasket surface of cylinder head *NOTE - It will be necessary to clamp a straightedge along edge of cylinder head (und rcut head) to simulate this gasket surface*

HYDRAULIC VALVE LIFTER TESTING

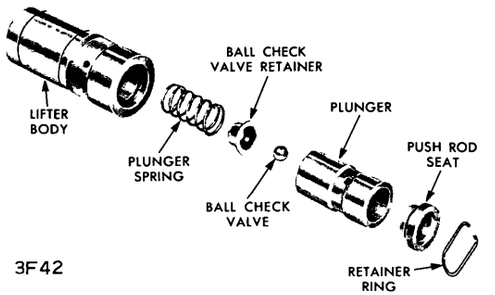
Fill tester cup of Tool J-5790 to about 1" from top with special testing fluid Swing weight arm out of way raise ram and position lifter into boss of cup Place 7/32" steel ball in pushrod seat of lifter and lower ram onto ball Adjust ram (with weight arm clear of ram) so pointer is positioned on set line (marked "S") Tighten jam nut to maintain setting Operate lifter through full plunger travel to displace air in lifter with tester fluid Continue pumping weight arm for several strokes after resistance is felt *NOTE - If noticeably weak resistance felt during any one of last few strokes of hard pumping, replace ball in lifter and repeat test* Raise weight arm to allow plunger spring to fully expand Lower arm onto ram and commence turning crank slowly (1 revolution every 2 seconds) Time indicator travel from lower line (first line above "S") to line marked 125" or 1/8" while still rotating cup Lifter is satisfactory if rate is between 12 and 60 seconds Check a questionable lifter 3-4 times before discarding



TEMPEST HYDRAULIC VALVE LIFTER



PONTIAC 421" ENGINE HYDRAULIC VALVE LIFTER



PONTIAC (EXC 421" ENGINE) HYDRAULIC VALVE LIFTER

CAMSHAFT			
Engine	Journal Diam.	Brg Clearance	Endplay
All	1 8987-1 8997"	0015- 0030"	003- 007"

CAMSHAFT USAGE CHART

Camshaft Identification No.	① Engine Code
Tempest	
H (537995)	76Y, 77Y, 78Y, 79Y, 82Z
	83Z, 85Z, 86Z, 88Z, 89Z
J (539099)	84Z, 87Z
E (537441)	68X, 70X, 71X, 590, 600, 690
Pontiac	
A (518111)	01A, 02B, 03B, 04B
B (519640)	15H, 17H, 20L, 21L, 23H, 40R, 41R
C (524009)	22B, 34J, 43N
D (529472)	05A, 06B, 07B, 16K, 18K, 266, 35M
	36P, 37M, 38P, 39N, 44M, 45P, 48N
L (9970543)	08B, 11B, 25G, 28G, 47Q, 50Q

① - See Engine Identification

VALVE TIMING				
	INTAKE		EXHAUST	
Camshaft ①	Open (BTDC)	Close (ALDC)	Open (BLDC)	Close (ATDC)
H②	14°	58°	48°	24°
J②	30°	63°	77°	25°
E③	22°	67°	72°	25°
A④	14°	58°	48°	24°
B④	22°	67°	63°	27°
D④	30°	63°	77°	25°
L④	33°	79°	90°	32°

① - See *CAMSHAFT USAGE CHART*
② - Tempest 4 Cylinder Engine
③ - Tempest V8 Engine
④ - Pontiac (Except Tempest) V8 Engine

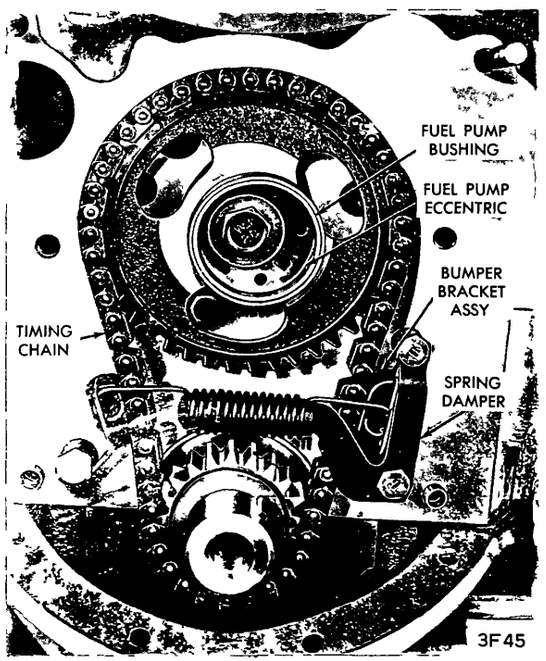
CAMSHAFT REMOVAL (ENGINE IN CAR)

Tempest - Remove radiator grille lower panel, grille, and hood latch as an assembly Remove front bumper assembly, drain and remove radiator Engine now accessible for camshaft removal

Pontiac (except Tempest) - Remove radiator and hood latch bracket When pulling camshaft out from front of block, it may be necessary to raise engine slightly for camshaft clearance between grille and hood catch support plate

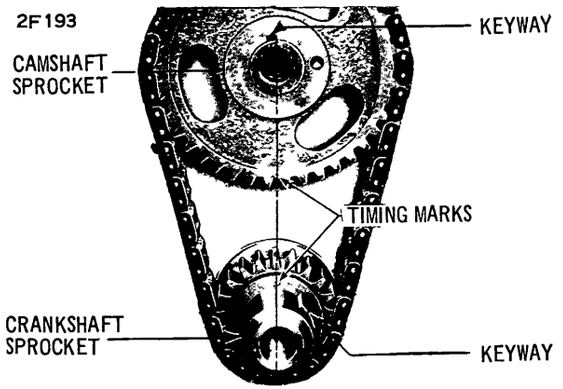
TIMING CHAIN TENSIONER REMOVAL (4 CYLINDER TEMPEST)

Right bumper must be removed first DO NOT remove spring by twisting or stretching spring *See illustration*



4 CYL TIMING CHAIN TENSIONER

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



VALVE TIMING MARKS

ENGINE OILING

Oil Pressure - 30-40 psi at 2600 RPM
Pressure Regulator Valve - In oil pump body. Not adjustable

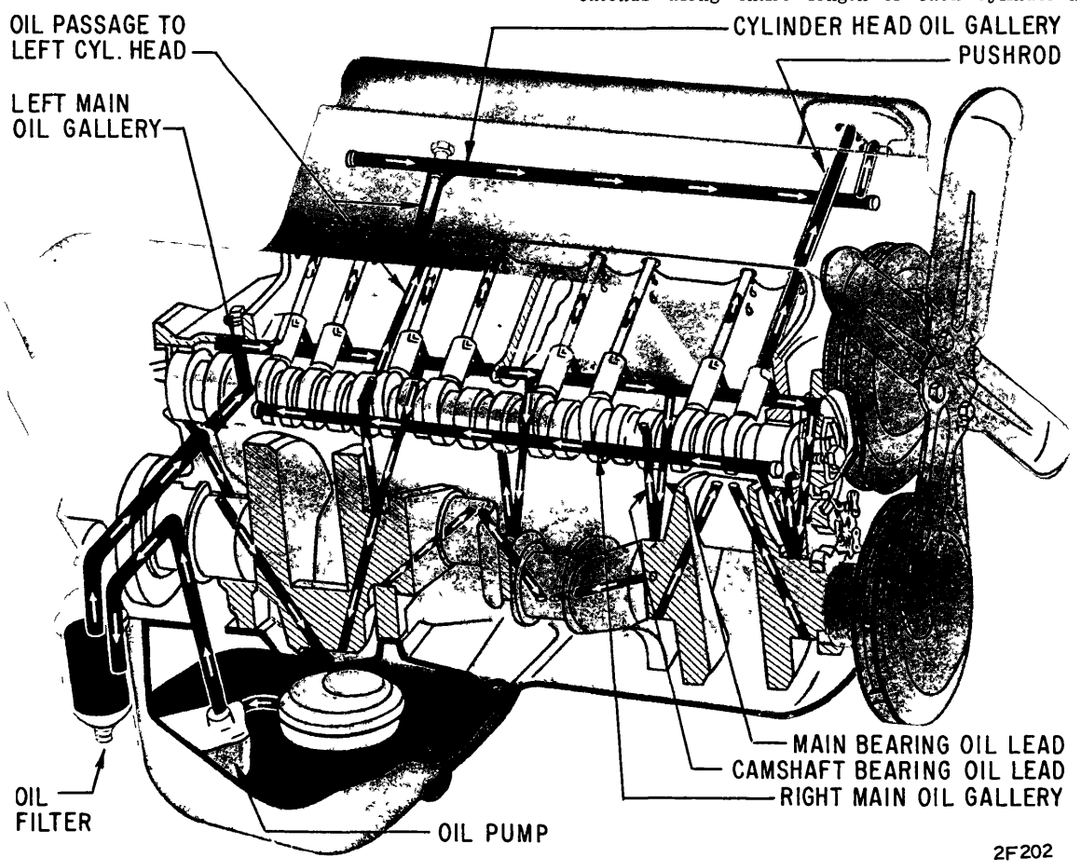
ENGINE OILING SYSTEM

4 Cylinder Engine - Engine design and oiling system similar to V8 except for absence of left bank.
V8 Engines - Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings, and to hydraulic valve lifters. Metered oil is supplied to pushrod seats, rocker arms, timing chain and sprockets, and distributor drive gear. All other parts are lubricated by oil spray.
NOTE - Pushrods are filled with oil directly through small hole in top of lifter for lubrication of upper and lower pushrod seats. Vertical passages in block at No. 2 camshaft bearing (for right bank), and No 4 camshaft bearing (for left bank) extend up through engine block and matching passages in head (passage in head is around one cylinder head bolt with grooved channel in lower face of head to connect with hole in block) to connect with cylinder head oil gallery which extends along entire length of each cylinder head

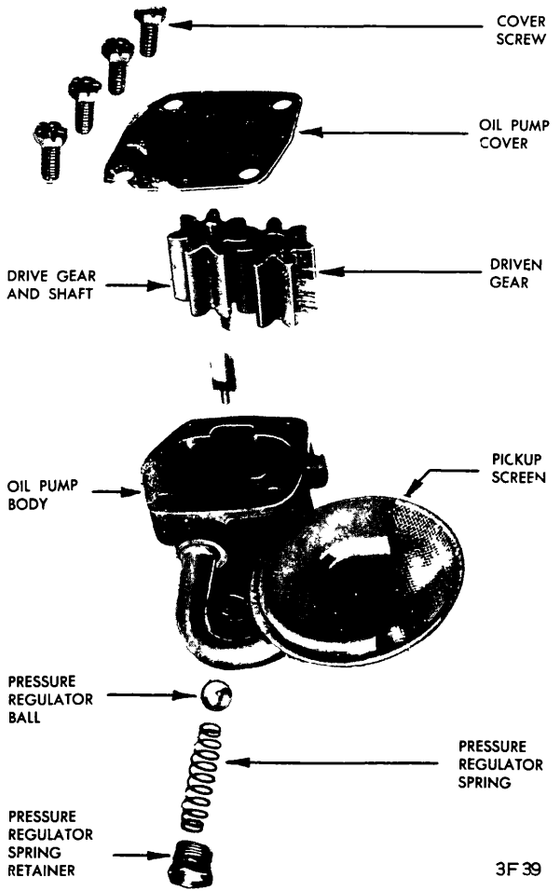
This oil is metered by camshaft bearing and is fed intermittently by oil holes lining up. Rocker arm studs (pressed in head) extend down into this cylinder head oil gallery and have drilled oil passage with side hole at rocker arm ball seat through which oil flows to lubricate ball seat and up through grooves in ball to fill channel section of arm.

OIL PUMP ASSEMBLY

Install drive and driven gears. Install cover and torque bolts to specifications Turn drive shaft by hand to insure it turns freely. Install pressure regulator ball, spring, and retainer (use new gasket on retainer). *CAUTION - DO NOT try to change oil pressure by varying length of pressure regulator spring.* To install pump, position drive shaft into distributor and oil pump drive gears. Place oil pump on block indexing drive shaft with pump drive gear shaft. Install attaching screws and lockwashers. *NOTE* - Removal and installation of pump does not disturb distributor timing.



V8 ENGINE OILING SYSTEM (4 CYL. ENGINE SIMILAR)



ENGINE OIL PUMP
(SCREEN & TUBE ASSEMBLY STAKED IN PLACE)

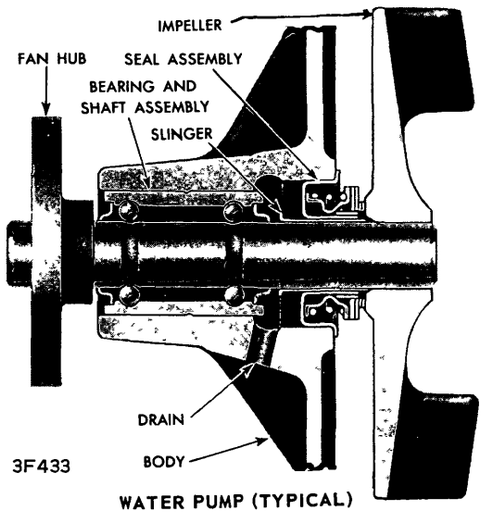
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE COOLING

Thermostat - Pellet type located in water outlet passage of intake manifold. Opens 180°F.
Pressure Valve - Radiator filler cap. 14-17 psi (Pontiac Exc. Tempest); 15 psi (Tempest).

WATER PUMP

Two types used. *See "Engine Front Cover" for production change.* Pump is serviced as an assembly.



WATER PUMP (TYPICAL)

MODEL IDENTIFICATION

Car Model	Series
Tempest	2100
Le Mans	2200
Catalina	2300
Star Chief	2600
Bonneville	2800
Grand Prix	2957

SERIAL NUMBER

Stamped on plate attached to left front door hinge pillar.

① ② ③ ④
3 63 P 1001

① - Model series. **3** 2300. **1** 2100. **2** 2200. **6** 2600. **8** 2800. **9** 2957.
② - Model year. **63** 1963.
③ - Assembly plant. **P** Pontiac. **S** South Gate. **W** Wilmington. **K** Kansas City. **L** Linden. **D** Doraville. **A** Arlington.
④ - Beginning vehicle number for each prefix combination.

ENGINE NUMBER

Located on machined pad on front of right hand bank. Production engine number also located on this pad. Letter code (79Y, 89Z etc.) stamped directly under production engine number. Letter code designates special engine combinations and will be used for purposes of engine identification where necessary.

CAPACITIES

	Tempest	Pontiac
Water ①	②	19.5 qts.
Crankcase ③	4 qts.	4 qts.
Fuel	20 gal.	④ 25 gal.
Manual Trans.		
Std. 3-Speed	3 pts.	1.8 pts.
H.D. 3-Speed		2.8 pts.
4-Speed	3.75 pts.	2.5 pts.
Auto. Trans.	⑤	⑥
Rear Axle	3.3 pts.	5.75 pts.

① - Includes heater.
② - 12.6 qts. (4 Cyl.); 20.5 qts. (V8).
③ - Add 1 qt. with filter change.
④ - 19 gals. on station wagons.
⑤ - 17 pts. (4 Cyl.), 19.7 pts. (V8) after overhaul.
⑥ - 17 pts. (Roto Hydra-Matic), 21 pts. (Super Hydra-Matic) after overhaul.

FILTERS & CLEANERS

	① Service Interval
Oil Filter	Replace at Oil Change
Air Cleaner (Std.)	Clean and reoil every 6000 miles
(H.D. Foam)	Clean and reoil every 12,000 miles
(H.D. Paper)	Clean or replace every 12,000 miles
Breather Cap	Clean and reoil every 12,000 miles
Fuel Filter (Cartridge Type)	Replace every 12,000 miles

① - Clean or replace more often if necessary.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE DESIGNATION

In the following data, engines will be designated as indicated in table below

Engine	Designation
4 Cyl "F" Head (134 cu ins,)	F4-134
4 Cyl "L" Head (134 cu ins)	L4-134
6 Cyl "L" Head (226 cu ins)	L6-226
6 Cyl 'Overhead Cam" (230 cu ins)	OHC-6

COMPRESSION PRESSURE

F4-134	120-130 lbs
L4-134	90-110 lbs
L6-226	125-140 lbs
OHC-6	145-155 lbs

All cylinders must be equal within 10 lbs (15 lbs on OHC-6)

VACUUM READING

F4-134 L4-134	18-21 ' at idle
L6-226	18 21 ' at idle
OHC-6	16 18 ' at idle

VALVE TAPPET CLEARANCE

Engine	Intake	Exhaust
F4-134 (Cold)	018	016'
L4-134 (Cold)	016"	016'
L6-226 (Cold)	014'	014'
OHC-6 (Hot or Cold) ℂ②	008 '	ℂ② 008"

ℂ - With cam lobe nose in 6 o'clock position

② - *On cars below the following listed serial nos , set clearance to 010" Intake, 012" Exhaust*

58177-10329	54078-03-10003	55278-12759
54277-10064	54278-10062	55378-10078
54377-10007	54378-10062	55478-10001
54077-03-10001	55178-10114	55578 10001
54178-13180	55178-16-10002	

SPARK PLUGS

Gap (All)	030'
Torque (F4-134 L4-134)	25-33 ft lbs
(L6-226 OHC-6)	20-30 ft lbs

Spark Plug Type

F4-134 L4-134	Autolite A7 or Champion J8
L6-226	Autolite A7 or Champion J8
OHC-6	Champion L7

DISTRIBUTOR

Point Gap (All)	020"
Cam Angle (All 4 Cyl)	39-45°
(All 6 Cyl)	36-42°
Breaker Arm Spring Tension (All)	17-22 ozs
Condenser Cap (IAY-4401)	25- 28 mfd
(IAT 4404 4411, 4416)	21- 25 mfd
(IAT-4404A 4405)	18- 28 mfd

IGNITION TIMING

Set timing with distributor vacuum line disconnected and plugged

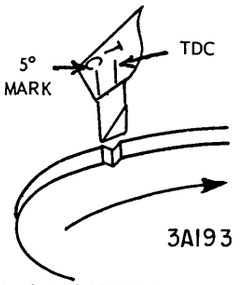
All Engines	5° BTDC

HOT (SLOW) IDLE RPM

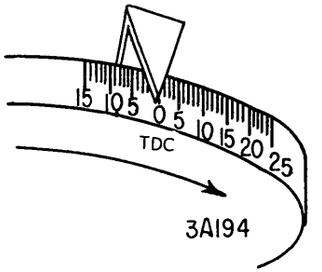
F4-134	ℂ 600
L4-134	600
L6-226	550
OHC-6	ℂ 590-600

ℂ - In "N" (Neutral) on automatic transmission

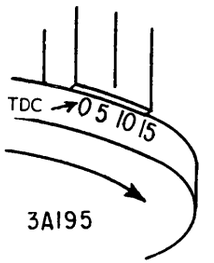
TUNE-UP SPECIFICATIONS



4 CYL (ALL) IGNITION TIMING MARKS



L6-226 IGNITION TIMING MARKS



OHC-6 IGNITION TIMING MARKS

FAST IDLE RPM

Carter "YF" & Holley 2-Bbl - Fast idle will be correct when hot (slow) idle correctly set

AUTOMATIC CHOKE SETTING

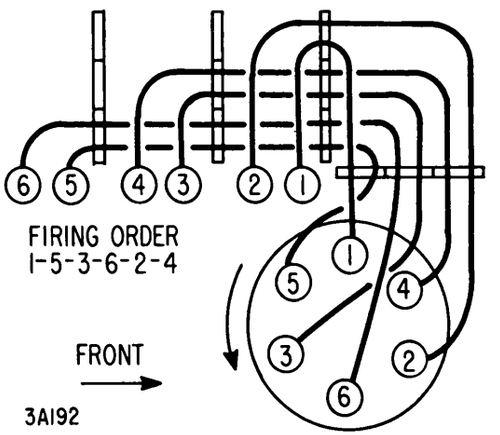
Holley 2640A (OHC-6 Engine)	Centered

FUEL PUMP PRESSURE & VOLUME

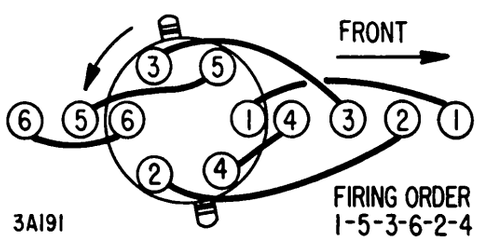
Pressure (All 4 Cyl)	2½-3¾ lbs at 1800 RPM
(All 6 Cyl)	3½-5½ lbs at idle speed
Volume (All)	1 quart within 1 minute at idle speed

POSITIVE CRANKCASE VENTILATION

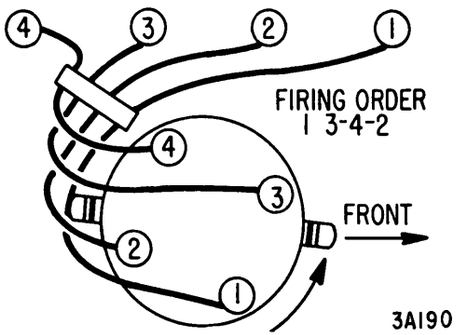
Valve and system should be cleaned at every engine tune up



OHC-6 FIRING ORDER



L6-226 FIRING ORDER



F4-134 FIRING ORDER (L4-134 SIMILAR)

TUNE-UP NOTES

►*OHC-6 ENGINE MISS OR BEING IMPOSSIBLE TO SET IGNITION TIMING CORRECTION* May be caused by oil pump rotor being restricted and causing pump shaft gear to slip on shaft To correct replace gear and shaft assembly (No 930828) *Do not replace gear only*

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Prestolite IAT-4404

Mechanical Advance		Vacuum Advanc	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum ' of Hg
Start	325	Start	10
1	450	1	11
6 5	1200	3	13
8	1475	4	14
9	1675	5	15

For engine degrees & RPM, multiply by 2

Prestolite IAT-4404A

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	300	Start	10
1	375	1	11
4	600	3	13
6	1175	4	14
7 5	1700	5	15

For engine degrees & RPM, multiply by 2

IGNITION (C ntinued)

Pr st lite IAT-4405, IAY-4401

No Vacuum Advance used on IAY-4401.

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	300	Start	5 1/8
1	425	1	6 5/8
6	1050	3	9 5/8
10	1575	5	12 1/2
11	1700	6	14

For engine degrees & RPM, multiply by 2.

Prestolit IAT-4411, 4416

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
Start	400	Start	5
1	460	1	6
7.5	900	4	8¾
14	1325	6	10½
15	1400	7.5	12

For engine degrees & RPM, multiply by 2.

IGNITION COIL

Current Draw - 2.8-2.9 amps. at 12.5 volts stopped or idling.

Ballast Resistor - Used on Gladiator & Wagoneer and mounted on right side of firewall Not bypassed during cranking.

CARBURETOR

CARBURETOR SPECIFICATIONS

Carburetor No.	Float L v l	Float Drop	Choke Setting
Carter "YF"			
938SD,951SA	①②5/16"	③	④
2392SA	①②9/32"	③	④
2467S	①②9/32"	1 1/4"	④
3200S	①②5/16"	③	④
Holley 2-Bbl.			
2415-A	⑤	③	④
2640-A	⑤	③	Centered

① - Solid inlet valve seat.
② - Set to ½" if spring-loaded needle valve and resilient type inlet valve seat is used.
③ - Not required. ④ - Manual choke.
⑤ - Fuel should be level with sight plug opening ±1/16".

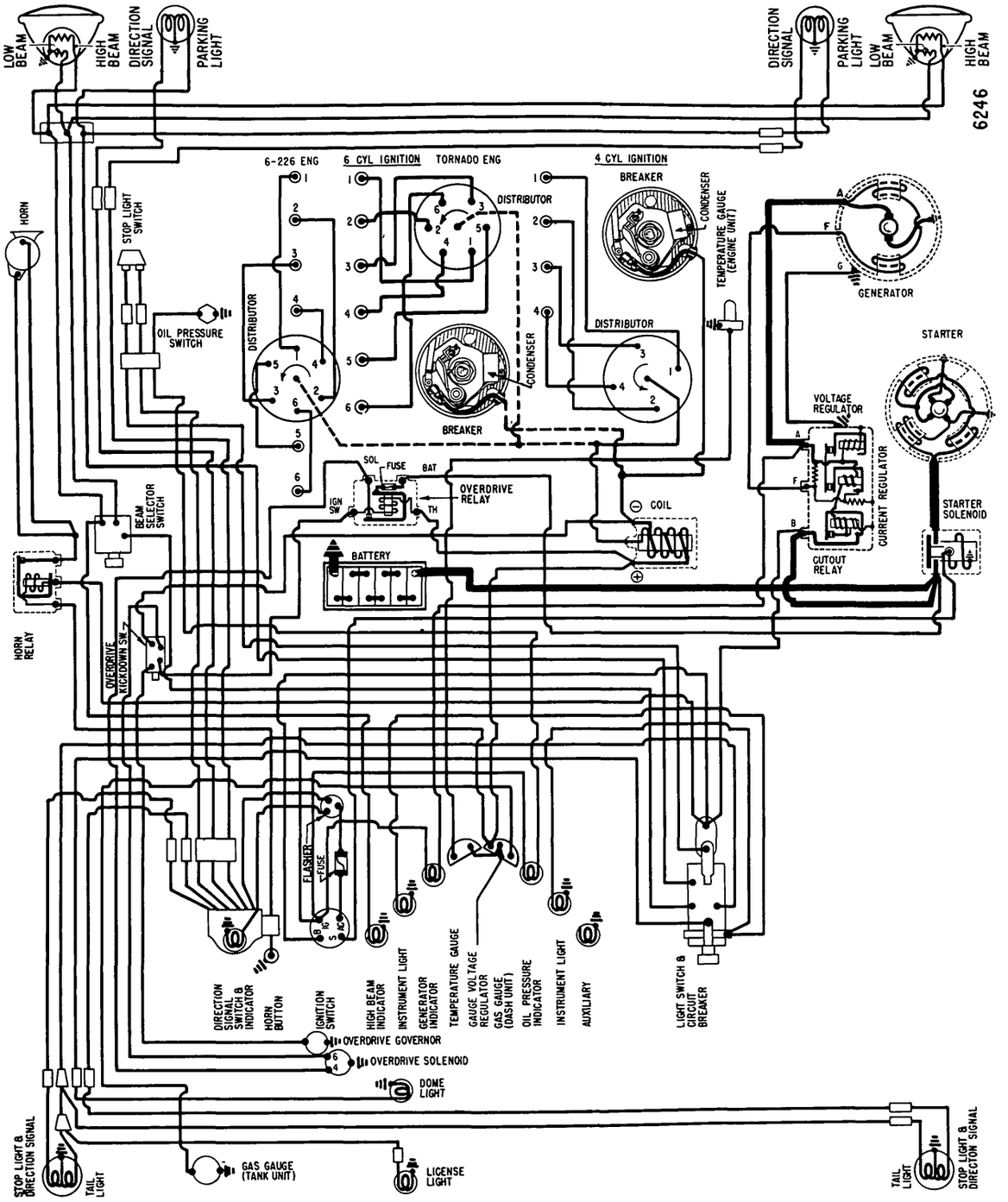
ACCELERATING PUMP

Carter "YF" - No seasonal adjustment.

Holley 2-Bbl. - Pump cam screw in No. 1 hole in cam (minimum stroke - normal, summer), No. 2 hole (maximum stroke - winter).

THROTTLE LINKAGE ADJUSTMENT

Auto. Trans. Mod ls - Transmission shift points controlled by vacuum solenoid unit on transmission case.



JEEP UTILITY MODELS WIRING DIAGRAM

ELECTRICAL

BATTERY

12-Volt Type.

Battery Make & Capacity - Autolite 11-HS. 9 plate, 50 ampere hour capacity (20 hour rate).

Battery Ground - Negative.

Engine Ground - Engine front support bracket to frame.

STARTER

Prestolite MDU-7003, 7003A, 7004

Torque	RPM	Volts	Amperes
0 ft. lbs.	5300	10.0	50
6.2 ft. lbs.	Lock	4.0	295

Brush Spring Tension - 32-48 ozs.

Prestolite MDY-7021

Torque	RPM	Volts	Amperes
0 ft. lbs.	4200	10.0	60
9.0 ft. lbs.	Lock	4.0	405

Brush Spring Tension - 32-40 ozs.

GENERATOR

Prestolite GJP-7402A, 7402B

Amperes	Volts	Gen. RPM
16	15.0	1750
35	15.0	2600 max.

Brush Spring Tension - 18-36 ozs.

Field Current - 1.6-1.7 amps. at 10 volts & 70°F.

GENERATOR REGULATOR

Prestolite VBO-4201E, 4201E-4A

Cutout Relay

Cuts In - 12.4-13.3 volts.
Cuts Out - 3-5 amps. discharge current after a charge of 7 amperes.
Contact Gap - .015" minimum.

Air Gap - .025-.027" with contacts open (check at hinge end of core).

Voltage Regulator

Setting - 14.2-14.8 volts at 80°F and charging at 7 amperes or with .25 ohm resistor in charging line.
Air Gap - .048-.052" with contacts just opening.

Current Regulator

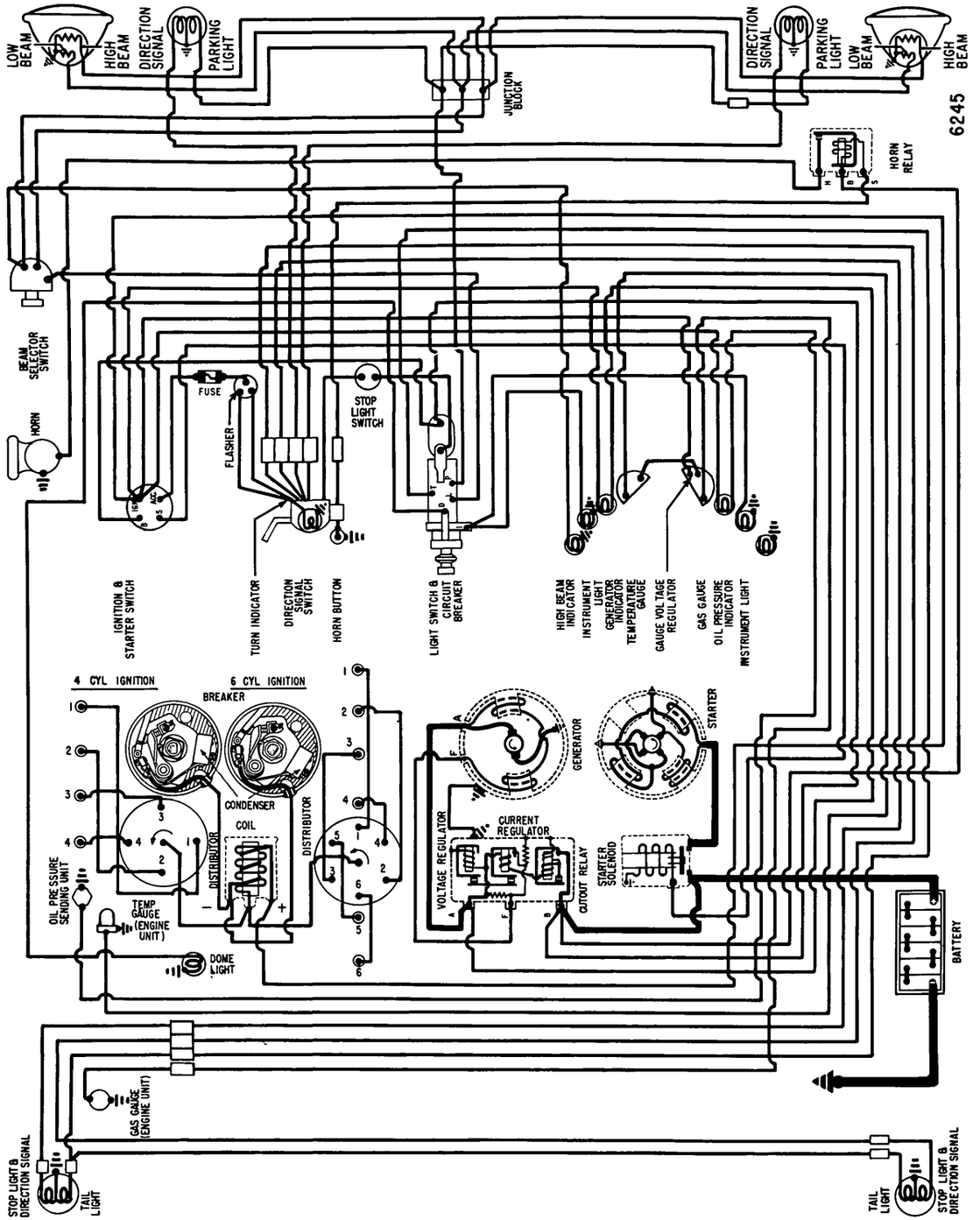
"Temperature Compensated" type. Set to following specifications at 70°F.

Test A	- Operating Amperes -	Test B
44 amps. max.		35 (33-37) amps.

Test A - After 15 minutes operation charging at 7 amps.

Test B - After additional 15 minutes operation with current regulator operating and load applied to hold voltage down to 13.6-13.8 volts.

Air Gap - .048-.052" with contacts just touching.



JEEP FORWARD CONTROL MODELS WIRING DIAGRAM

ELECTRICAL (C ntinu d)

ALTERNATOR

PRESTOLITE

ALB-5003, 5004

Amperes	Volts	Temp.	Alt. RPM
10 min.	13.0	70°F	750
58 min.	14.2	70°F	3000

ALE-5004, 5005, 5007

Amperes	Volts	Temp.	Alt. RPM
10 min.	13.0	70°F	1050
38 min.	14.2	70°F	4200

MOTOROLA

M t rola No. A12NW525. *For testing, see "Motorola Alternators & Regulators" in Electrical Section.*

ALTERNATOR REGULATOR

PRESTOLITE

VBV-6201A. Contains a circuit breaker relay and a voltage regulator.
VBY-6201C.

MOTOROLA

Transistor type. Permanently sealed, no adjustments. *For testing, see "Motorola Alternators & Regulators" in Electrical Section.*

FUSES & CIRCUIT BREAKERS

Circuit Br ak r - On main lighting switch. Protects all circuits except those listed under "Fuses".

Fuses - In-line fuses for each of the following units: Direction Signal, Heater, Radio, Overdrive, Back-up Light, Clock, Parking Brake Warning, 4-Wheel Drive Indicator.

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

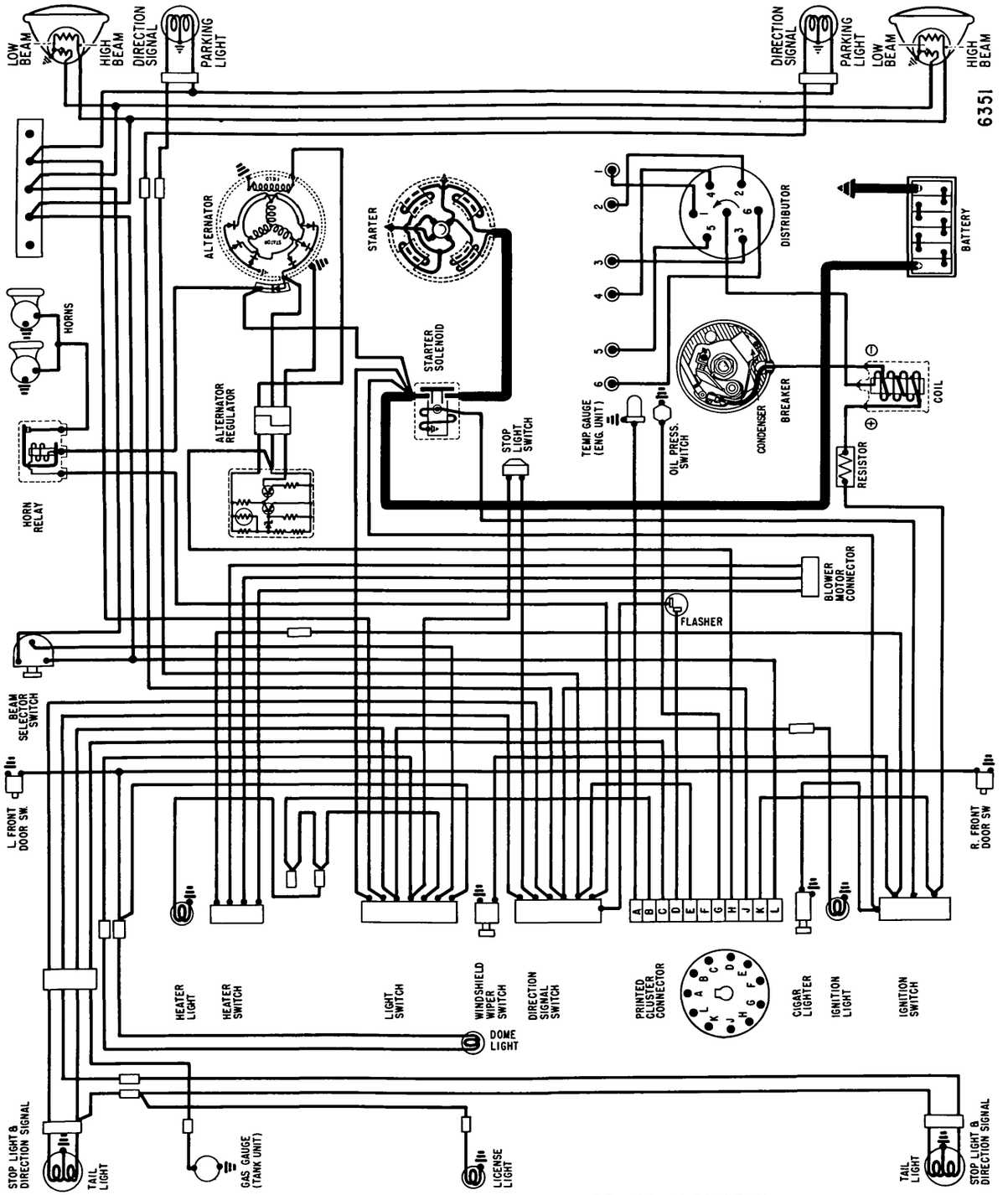
Switch located on shift lever (Fleetvan), on steering column (Gladiator & Wagoneer). To adjust, loosen switch attaching screws and place selector lever in "N" (Neutral). Move switch as necessary so starter will operate with selector lever in "N" only, then tighten attaching screws.

STOP LIGHT SWITCH

Located on brake master cylinder. No adjustment.

HEADLIGHT SWITCH REMOVAL

Loosen setscrew on side of control knob and remove knob. Remove retaining nut and remove switch from instrument panel.



JEEP SERIES J GLADIATOR & WAGONEER WIRING DIAGRAM

ELECTRICAL (C ntinu d)

SPEEDOMETER & INSTRUMENT CLUSTER

FC-150 & FC-170 - To remove speedometer and instrument cluster, remove instrument panel as follows: Remove screws holding steering column to instrument panel skirt (2 at hinge pillar, 4 at instrument panel front flange, 1 at right end of skirt). Remove screws from top front edge of instrument panel, then remove the screw holding right front flange of panel lower right extension. Loosen right nut on steering column clamp. Remove radio control knobs and remove both mounting screws from top of instrument panel. Lift instrument panel for clearance for cluster removal. Disconnect speedometer cable and gauge wires, snap out lamp bulb sockets, then remove 4 stud nuts holding instrument cluster to panel. Remove cluster. To install, reverse removal procedure.

TRANSFER CASE INDICATOR LIGHT SWITCH (GLADIATOR & WAGONEER)

Switch located on transfer case and actuated by raised lands on transfer case shift rod. To check and adjust, proceed as follows: Loosen switch in its mounting and attach a test light to switch terminals. Move shift rod in transfer case until poppet ball is fully seated in detent position corresponding to indicator light being checked. Turn switch in or out until test light lights, then move shift rod until poppet ball is free of detent position. If test light does not go out, adjust switch in or out until light does go out. Test light should go on and off as poppet ball is moved in and out of detent position. Tighten switch locknut.

BELT ADJUSTMENT

Belt	©D flecti n
Alternator, Generator, Fan, Water Pump	1/2"
Power Steering	3/16"

© - Under strong thumb pressure midway between pulleys.

ENGINE

ENGINE NUMBER SUFFIX LETTERS

Suffix letters after engine serial number indicate undersize main and connecting rod bearings and/or oversize bore and pistons as follows:

All 4 Cyl. & OHC-6 - A .010" undersize main and rod bearings. **B** .010" oversize bore and pistons. **AB** combinations of both **A** and **B**.

L6-226 - A .010" undersize main and rod bearings. **N** .020" oversize bore and pistons. **AN** combination of both **A** and **N**.

ENGINE NOTES

► *OHC-6 ENGINE FRONT ENGINE PLATE OIL LEAK CORRECTION:* May be caused by interference between cylinder block and riveted end of chain tensioner lower pin, thus preventing engine plate from being tightened flush against block-to-plate gasket. To correct, grind or drill a dimple on block to accommodate pin. *DO NOT grind pin.*

► *OHC-6 ENGINE CYLINDER HEAD & INTAKE MANIFOLD GASKET INSTALLATION CAUTIONS:* Gaskets for cylinder head and intake manifold will overlap manifold port and block water passage openings. These overlappings are specially designed for maximum engine efficiency and cooling. *DO NOT alter gaskets in any way or engine operation and parts life will be seriously affected.*

► *OHC-6 ENGINE COOLANT LEAK CORRECTION:* If coolant leaks at lower intake manifold attaching stud, remove stud, coat threads with sealer, and reinstall stud.

► *FUEL PUMP LINKAGE LUBRICATION CAUTION:* Be sure to coat all linkage parts (camshaft eccentric, pushrod, fuel pump arm) whenever linkage parts are being serviced.

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Str ke	Displacem nt
F4-134	72 at 4000	7.4-1	3 1/8"	4 3/8"	134.2 cu. ins.
L4-134	60 at 4000	6.48-1	3 1/8"	4 3/8"	134.2 cu. ins.
L6-226	105 at 3600	©6.86-1	3 5/16"	4 3/8"	226.2 cu. ins.
OHC-6	140 at 4000	8.5-1	3 11/32"	4 3/8"	230 cu. ins.

© - 7.3-1 optional.

ENGINE REMOVAL

FC-150 - *NOTE - Engine, transmission, and transfer case are removed as a unit as follows:* Disconnect battery, drain oil and water, and remove engine housing. Remove carburetor and air cleaner, surge tank, oil filter and bracket, and upper accelerator control bellcrank. Disconnect all lines, hoses, and wires from engine. Disconnect exhaust pipe at manifold. Raise and support truck. Remove exhaust pipe and extension, and clutch control cross shaft. Disconnect hand brake control parts from lever, and transmission and transfer case shift rods. Remove front and rear propeller shafts. Remove fan belt, raise generator bracket out of way, disconnect spark plug cables and remove cables and bracket, remove rocker arm cover, then disconnect engine front mounts from engine. Attach a suitable lifting fixture and sling to engine and attach to a crane or A-frame inside of cab. Disconnect engine rear support (frame crossmember) from frame side rails, then lower engine to floor. Pull or raise truck away from engine.

FC-170 - *NOTE - Engine, transmission, and transfer case are removed as a unit as follows:* Loosen spring clips on front axle and slide axle as far forward as hydraulic brake hose will permit. Drain oil and water, remove seats, engine cover, radiator access cover, carburetor and air cleaner (and air cleaner bracket), distributor, oil filler tube, oil filter and bracket. Disconnect all hoses, lines, wires, and linkage from engine. Remove generator housing, generator and bracket, idler pulley and bracket, fan, and belt. Disconnect and swing radiator brace out of way. Remove fuel line between fuel pump and carburetor. Disconnect exhaust pipe at manifold, and transfer case and transmission shift rods. Disconnect clutch linkage and remove cross shaft and bracket. Disconnect hand brake control parts and remove lever bracket from crossmember. Disconnect propeller shafts at transfer case and tie to frame side rail. Attach a suitable lifting fixture and sling to engine and attach to a crane or A-frame inside of cab. Disconnect engine front mounts, engine rear support (frame crossmember) from frame side rails, then lower engine to floor, guiding it to left and rear. Pull or raise truck away from engine.

Utility Models - Drain cooling system. Remove hood, fan, radiator, and shroud. Disconnect battery and disconnect all wires, hoses, lines, and linkage from engine. Remove air cleaner. Disconnect clutch linkage and exhaust pipe at manifold. Attach a suitable lifting fixture to head bolts, then disconnect clutch housing from engine. Remove engine by raising and moving forward.

Fleetvan - *NOTE - Engine, torque converter, and transmission are removed as a unit as follows:* Drain cooling system, crankcase, torque converter, and transmission. Remove air cleaner, and radiator and heater hoses. Remove transmission cover panel, transmission side cover panel, dash lower center panel, and brake pedal cover plate. Remove exhaust pipe from muffler and manifold. Disconnect all lines, wires, hoses, and linkage from engine and transmission. Remove shift linkage cable support from transmission. With parking brake "off", remove brake cable support bracket from crossmember. Disconnect propeller shaft and tie out of way. Install cable and lifting crane around torque converter mounting flange, and place a floor jack (with suitable wood block) under engine. Disconnect rear crossmember from frame, and disconnect engine front mounts from frame. Move truck forward (or engine rearward) about 4" and remove front mounts from engine. Lower engine and transmission to floor, then raise truck away from engine.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PAN GASKET REPLACEMENT (ALL 6 CYL.)

NOTE - Following procedure is recommended to replace oil pan gasket with engine installed in truck and without removing engine front filler block Cut 1¼" from front end of two new oil pan gaskets and fabricate suitable dowels as shown in illustration Pull ends of both front and rear filler block seals out of filler blocks as shown, then install dowels in front oil pan attaching bolt holes Install new gasket on top of old gasket and cut through both gaskets 3/32" from edge of filler block (5/16" from edge of nearest gasket hole) *NOTE - Cut must be made so end of filler block rubber seal will cover the splice* Repeat procedure for both sides of oil pan, then remove and discard old gasket Install new gaskets with non-hardening sealer, making sure new gasket butts against ends of old gasket at front filler block Install oil pan, being careful not to dislodge gaskets and tighten attaching screws finger tight Torque all screws to correct torque, starting from center screws and working toward filler blocks and alternating from side to side

CYLINDER HEAD REPLACEMENT

All Except OHC-6 Engine - Use no gasket sealer On 4 Cyl , do not overlook bolt under carburetor On L6-226, distributor adapter may have to be removed to

TIGHTENING SPECIFICATIONS

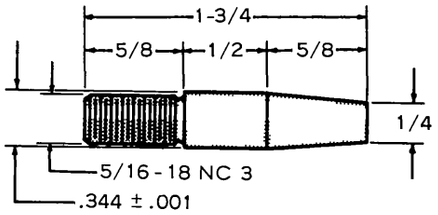
"F" HEAD & "L" HEAD ENGINES

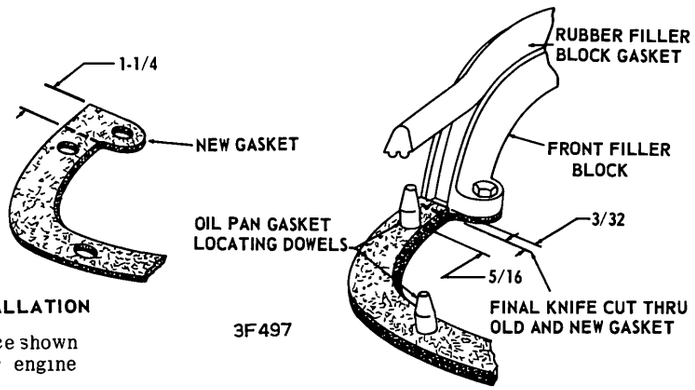
	4 Cyl. Ft. Lbs.	6 Cyl.
Cylinder Head	60-70	35-45
Int & Exh Manifolds	29-35	30-35
Oil Pan	9-14	12-15
Main Bearing Caps	65-75	85-95
Crankshaft Counterweight Bolt	60-70	
Flywheel	35-40	35-40
Vibration Damper		100-130
Connecting Rod Caps	35-40	40-45
Piston Pin Clamp Bolt	35-40	
Camshaft Sprocket	30-40	35-40
Rocker Arm Support Bracket	30-35	
Valve Chamber Cover		7-10
Engine Front Cover		12-15
Water Pump	12-17	15-20
Oil Pump		30-35

OHC-6 ENGINE

	Ft. Lbs.
Cylinder Head	75-80
Cam Bearing Deck Stud Nuts	15-20
Exhaust Manifold	35-40
Intake Manifold	15-20
Oil Pan	12-15
Filler Block-to-Cylinder Block	12-15
Main Bearing Caps	85-95
Connecting Rod Caps	40-45
Vibration Damper	100-130
Water Pump	12-15

ENGINE (C ntinu d)



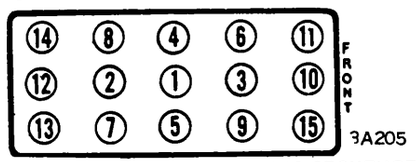


6 CYLINDER (ALL) OIL PAN GASKET INSTALLATION

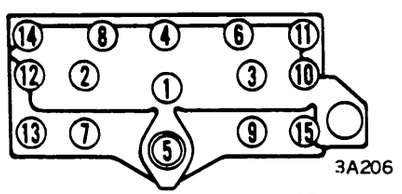
torque bolt near it Tighten all bolts in sequence shown in diagrams to correct torque Retighten after engine at normal operating temperature

OHC-6 Engine - Removal - *NOTE - Procedure is for head removal without removing timing chain or engine front cover.* Remove hood and windshield wiper motor Remove rocker arm cover, install Camshaft Sprocket Replacer Tool W-268 on rocker arm cover studs Install hood of tool in camshaft sprocket, tighten nut to relieve tension on camshaft Remove capscrew, lockwasher, flat washer, and fuel pump eccentric from camshaft sprocket, pull forward on sprocket to free from pilot on camshaft Release tension on removal tool by backing off tool nut and allow chain and sprocket to rest on bosses on timing chain cover *CAUTION - Do not slack off on chain (which would allow it to disengage from crankshaft sprocket), do not attempt to remove sprocket from chain (valve timing will be changed), and do not try to crank engine with sprocket and chain resting on timing chain cover (will cause severe damage)* Remove lubrication tube from cylinder head and block, then remove cylinder head bolts Remove cylinder head **by lifting straight up with an overhead chain fall.** *CAUTION - Do not remove head without the use of an overhead chain fall.*

Installation - *NOTE - Following procedures supersede all previous recommendations* Make sure head bolt holes in block are drilled 1 25" deep and tapped to 1 09" Coat both sides of new gasket with Perfect Seal Sealing Compound, No 935611, and install gasket on cylinder block Using an overhead chain fall, lower cylinder head assembly until it is **suspended** ¼" above gasket and install suitable guide pins through cylinder head and into block at No 12 & 14 bolt hole locations *CAUTION - Cylinder head must be SUSPENDED above block It must not rest on any spacers placed between head and gasket Do not install guide pins until head assembly is suspended ¼" above block, and do not use guide pins in any other bolt holes than No 12 & 14* Carefully lower cylinder head on top of gasket and install head bolts (except at guide pin locations) and tighten snugly according to sequence shown in diagram Replace guide pins with head bolts and tighten all bolts in proper sequence to correct torque Retighten to same torque after engine at normal operating temperature, and again after 500 and 1000 miles of operation



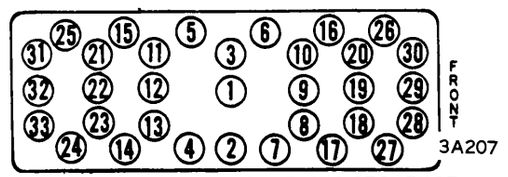
L4-134 CYLINDER HEAD TIGHTENING SEQUENCE



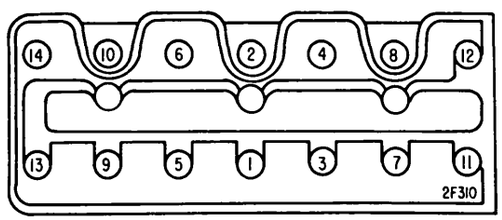
F4-134 CYLINDER HEAD TIGHTENING SEQUENCE

MANIFOLD INSTALLATION (OHC-6)

To insure proper sealing and prevent cracking or breaking of manifold flanges, there must be no bind between manifold studs and stud holes, and stud nuts must be tightened uniformly as follows Tighten all nuts snugly, then work from center outward, and alternately from side to side, and tighten nuts to correct torque



L6-226 CYLINDER HEAD TIGHTENING SEQUENCE



OHC-6 CYLINDER HEAD TIGHTENING SEQUENCE

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

FITTING PISTONS & CHECKING CLEARANCE

With 003" (All 4 Cyl), 004" (All 6 Cyl used pistons), 0015" (All 6 Cyl new pistons) ribbon feeler inserted between inverted piston and cylinder wall on thrust side, pull required to withdraw feeler should be 5 to 10 lbs

PISTON & ROD INSTALLATION

All 4 Cyl. - "T" slot of piston should be to valve (left) side of engine, and short side of connecting rod bearing toward nearest main bearing or to front of engine on Nos 1 & 3, to rear of engine on Nos 2 & 4 Oil spray hole in lower end of rod must be toward right of engine (away from camshaft) on all rods

L6-226 - Slot in piston skirt must be to left side of engine (away from camshaft) Rod bearings are offset with narrow side of rod toward nearest main bearing (Nos 1,3,5 forward, Nos 2,4,6 rearward) Oil spray hole in lower end of rod must be toward camshaft

OHC-6 - "F" mark on piston must be to front of engine Oil spurt hole in connecting rod must face exhaust side of cylinder block

MAIN BEARING REPLACEMENT (4 CYL.)

Engine must be removed from vehicle for bearing replacement as bearings are "doweled" in crankcase and crankshaft must be removed to replace bearings Make sure oil holes in bearings line up with oil holes in crankcase, and that bearings fit snugly on dowel pins in crankcase and bearing caps Install bearing cap evenly to avoid bending dowels Bent dowels will cause misalignment of bearing cap and rapid bearing wear Replace any bent dowels

BEARING CAP IDENTIFICATION - Cylinder block center crankshaft bearing web and bearing caps marked with daub of paint to indicate that caps are to be used with that block only *Do not use caps with any other color than shown on web*

REAR BEARING OIL SEAL REPLACEMENT (4 CYL.)

Upper & Lower Seal - *NOTE - Upper and lower halves of seal can be replaced without removing crankshaft* Neoprene seal with steel back Upper half of seal can be removed by using a suitable piece of strap steel (hack saw blade) Rotate upper half of seal around shaft with strap until opposite end protrudes far enough to grasp and remove To install, coat both parts of seal with grease and install upper half by rotating it around crankshaft until it is in position with ends even at the cylinder block Coat both ends of lower seal with Permatex before installing to insure good seal with upper half

Cap Seal - Bearing cap sealed by cylindrical rubber packing strips inserted in holes between cap and case When installing bearing cap, coat upper face lightly with sealing compound, and insert new packing strips after cap is in place Packing strips should protrude ¼" to provide proper compression when oil pan is installed and should not be cut off

CRANKSHAFT END THRUST (4CYL.)

Taken by thrust washer between crankshaft gear and front bearing Endplay controlled by shims between thrust washer and shoulder on crankshaft Thrust washer must be installed with inner beveled edge toward front bearing

PISTONS, PINS, RINGS

Engine	PISTONS Clearance	PINS Piston Fit	PINS Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearanc
All 4 Cyl	①	0001- 0003"	②	Comp 1 Comp 2 Oil	007- 017" 007- 017" 007- 017"	002- 004" 0015- 0035" 001- 0025"
L6-226	①	0002"	0004- 0008 '	Comp 1 Comp 2 Oil 3 Oil 4	008- 016" 008- 016" 008- 016" 008- 016"	002- 004" 003- 007" 006- 010" 006- 010"
OHC-6	①	0002"	0004- 0008"	Comp 1 Comp 2 Oil	010- 020 ' 010- 020" 015- 055"	002- 004" 003- 007" Snug

① - Selective feeler fit *See "Fitting Pistons"* ② - Locked In Rod

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS Journal Diam.	MAIN BEARINGS Clearance	MAIN BEARINGS Thrust Bearing	MAIN BEARINGS Endplay	CONNECTING RODS Journal Diam.	CONNECTING RODS Clearance	CONNECTING RODS Sid play
All 4 Cyl	2 333-2 334"	0003- 0029"	Front	004- 006"	1 9375-1 9383"	0003- 0025"	004- 010"
L6-226	2 374-2 375"	0008- 0028"	Rear	003- 007"	2 063"	0007- 0025"	006- 011"
OHC-6	2 375-2 376"	0005- 0025"	Rear	003- 007"	2 0619-2 0627"	0006- 0025"	004- 010"

CRANKSHAFT FILLER BLOCK SERVICING (6 CYL,)

L6-226 Engine - Front - Remove by taking out mounting screws and timing gear cover screws which enter the filler block When installing filler block, first install oil pan side gaskets, then install filler block (use Permatex), and install new end gasket on block

Rear (Lower) - Remove by taking out mounting screws Remove and discard old seal Install new seal in same manner as detailed below for Rear Upper Guard Install lower filler block **after** upper filler block guard has been installed

Rear (Upper Guard) - Guard is seated in groove in crankcase and can be rotated out without disturbing crankshaft after lower filler block removed Remove and discard old gasket or seal, clean out seal groove, and install new seal by flattening seal slightly and using a rod to seat seal in groove by rolling from ends toward center Seal ends must extend slightly above flat surface of guard Do not use shellac or sealing compound in groove *CAUTION - Oil seal in both upper guard and lower filler block must be centered with crankshaft If necessary, seal can be built up using 1/32" thick gasket material, 3/16" wide, as shims shellacked to groove in block or guard behind seal*

OHC-6 Engine - Lower (Front & Rear) - Remove 2 socket head machine screws attaching rear filler block to cylinder block Remove oil pan seal, filler block, gasket inserts, and lower rear seal Remove front filler block-to-cylinder block attaching bolts and remove filler block Discard seals and oil pan gaskets Replace front and rear bearing oil seals Cement filler blocks for a distance of 2" from each end (also coat oil pan seals for a distance of 2" from each end), then install oil pan seals Ends of pan seals should be 1/16" below top of filler block Allow cement to dry before installing filler block

Upper (Rear) - Guard is seated in groove in crankcase and can be rotated out without disturbing crankshaft after lower filler block removed Remove and discard old seal, clean out seal groove, then install new seal Do not use sealing compound in groove

ENGINE FRONT COVER REMOVAL

OHC-6 Engine - Remove hose from front cover water port Remove front cover-to-engine front cover plate attaching bolts, nuts and washers Remove cover, lifting eye, and gasket Slide oil slinger and oil pump drive gear from crankshaft

ENGINE FRONT COVER OIL SEAL

4 Cyl. Engines - Cover has double metal baffle and spring-loaded leather seal which contacts polished surface of crankshaft pulley hub When installing seal, make certain that seal lip is inward (to rear of engine)

L6-226 Engine - Drive out old seal using Driver KF-44 Place cover with opening flange on flat surface Coat outer edge of new seal with sealing compound, place seal in opening with seal lip to rear and drive seal into place

OHC-6 Engine - With timing chain cover installed, apply thin coating of sealing compound on outer edge of seal and position seal in opening so that seal lip faces toward inside of cover Drive seal into place using Oil Seal Installing Tool W-269

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE TAPPET ADJUSTMENT (L6-226)

Adjust valves as indicated in table below. With valves in fully raised position (camshaft rotated as necessary), other valves will be on low side of cam in position for tappet adjustment.

Valves Fully Raised	Valves To Be Adjusted
Nos. 1 & 3	Nos. 10 & 12
Nos. 8 & 9	Nos 4 & 5
Nos. 2 & 6	Nos. 7 & 11
Nos 10 & 12	Nos. 1 & 3
Nos 4 & 5	Nos. 8 & 9
Nos 7 & 11.	Nos. 2 & 6

ROCKER ARM COVER & GUIDE INSTALLATION (OHC-6 ENGINE)

Rocker Arm Guide - When installing rocker arm guide, make sure that all rocker arms are aligned correctly and that all tabs of guide fit into rocker arm cavities. This will prevent misalignment of rocker arm and forcing of guide through rocker arm cover.

Rocker Arm Cover - 1) Oil seal washers must have minimum thickness of .222". Replace if necessary. Make sure rocker arm cover distortion at bottom edge does not exceed .020" at any point.

2) Install gasket into cover **without sealer,** install oil seal washers on cover studs, then place cover in position. Install a flat washer on rear stud, and spark plug cable brackets on front three studs (flat washers unnecessary). Install crown nuts and torque to 6-8 ft. lbs. *NOTE - Correct torque of crown nuts is important to prevent distortion and oil leaks.*

ROCKER ARM REPLACEMENT (F4-134)

Removal - Lock rocker arms, shaft, brackets, and springs together as a unit by removing cover studs in front and rear rocker arm shaft brackets and installing 5/16"-24 setscrews in front and rear brackets in same manner setscrews are installed in center brackets Remove nuts on bracket studs and lift entire assembly off studs as a unit.

Installation - Check pushrods, straighten or replace any that are bent. Place pushrods in holes in head and block, being sure that they are properly seated in intake valve tappets. Place rocker arm assembly on its studs, seat intake valve adjusting screws in tops of pushrods before installing nuts on bracket studs Torque nuts to specifications. Remove extra setscrews from front and rear rocker arm shaft brackets, install cover studs in front and rear brackets with short end of stud down.

ROCKER ARM STUD REPLACEMENT (OHC-6)

Position cam bearing support deck on an arbor press and position the support of Rocker Arm Stud Remover & Installer W-266 under defective stud. Position tool guide on top of stud with chamfered end up. Place driver in guide so end rests on top of stud. Press on end of driver to dislodge stud Remove stud. Invert cam bearing support deck on arbor press and install support of tool under deck and aligned with hole for stud. Place new stud in hole in bearing deck (thread end first). Position tool guide on knurled end of stud with chamfered end down Press stud into place until it seats firmly.

VALVE GUIDE SERVICING

F4-134 - Use Tool W-238 to remove and install guides. Drive exhaust guide down into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block, and new intake guide flush with bottom of valve guide bore in cylinder head.

L4-134 - Use Tool W-238 to remove and install guides. Drive guides into valve compartment to remove. Drive new exhaust guide to 1" below surface of cylinder block, and new intake guide to 1 5/16" below surface of cylinder block.

L6-226 - Use Tool KF-27 to remove and install guides. Place guide with tapered end of guide toward top in position in guide bore and drive to correct position of 1 7/32" below top face of cylinder block. Ream new guides to inside diameter of 3422-.3432".

OHC-6 - Use Tool W-265 to press old guide out bottom of head and to press new guide in from top of head. Use a spacing stop to limit distance guide can be installed. Properly positioned, top of valve guide will be .45" above machined surface of cylinder head. After installation, ream guide to .342-.343".

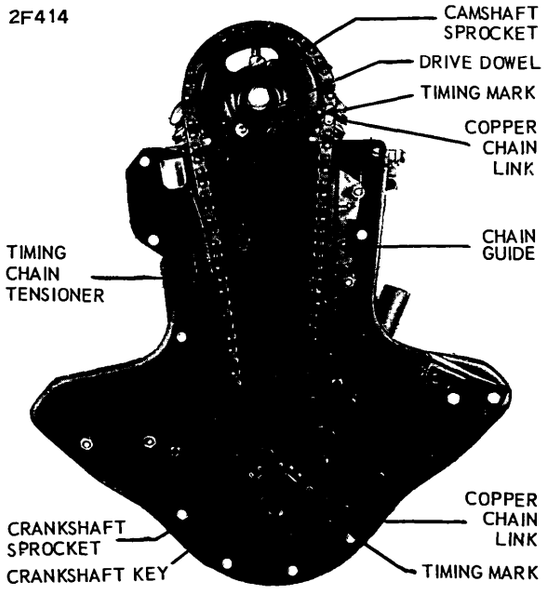
VALVES

Engine		Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diam.	Stem Clearance	Valv Lift
F4-134	Intake	2"	45°	45°	3/32-1/8"	.3733-.3738"	.0007-.0022"	.260"
	Exhaust	1.47"	45°	45°	3/32-1/8"	.371-.372"	.0025-.0045"	.351"
L4-134	Intake	1.531"	45°	45°	3/32-1/8"	373"	0007-.0022"	.351"
	Exhaust	1.47"	45°	45°	3/32-1/8"	.371-.372"	.0025-.0045"	351"
L6-226	Intake	1.52"	30°	30°	5/64-3/32"	.3402-.3410"	.0012-.0030"	.284"
	Exhaust	1.328"	45°	45°	3/32-7/64"	.3382-.3390"	.0032-.0050"	.284"
OHC-6	Intake	1.89"	45°	45°	5/64-3/32"	.3400-.3410"	.001-.003"	.. ..
	Exhaust	1.613"	45°	45°	5/64-3/32"	.3385-.3395"	.0025-.0045"	.....

VALVE SPRINGS & LIFTERS

Engine	SPRINGS			LIFTERS	
		Pressure (Lbs.)			
	Free Length	Valve Closed	Valve Open	Diameter	Clearance
F4-134	Intake 1.97"	73 at 1.66"	153 at 1.40"	6240-.6245"	.0005-.002"
	Exhaust 2.50"	53 at 2.11"	120 at 1.75"	.6240-.6245"	.0005-.002"
L4-134	All 2.50"	53 at 2.109"	120 at 1.75"	.6240-.6245"	.0005-.002"
L6-226	All 1.97"	51 at 1.672"	107 at 1.312"	6855-.6860"	Ⓒ
OHC-6	All 1 55"	62 at 1.26"	148 at .885"	None Used	

Ⓒ - Selective fit with slight drag.



OHC-6 VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CAMSHAFT REMOVAL

4 Cyl. Engines - Drain radiator and cylinder block, remove radiator and grille, cylinder head, manifold, valves, and valve springs Remove oil pump oil pan, crankshaft pulley (use puller), fan drive belts and fan assembly Remove timing gear cover, camshaft gear and thrust plate and spacer Block up all valve lifters (can be tied up with string to manifold studs) Remove camshaft through front of engine

L6-226 Engine - Drain cooling system and remove radiator, vibration damper, engine front cover, timing chain and gears Remove fuel pump, cylinder head, oil pan and oil pump Remove valve chamber cover, valves and springs Hold valve lifters in fully up position Remove camshaft thrust plate and carefully withdraw camshaft from engine

OHC-6 Engine - With cylinder head removed, lift rocker arm guide off mounting studs on camshaft support deck, turn rocker arms parallel to camshaft (rotate camshaft to release tension on rocker arms, turn arms off cams as tension is relieved) Remove nuts and lockwashers attaching retainer to front of support deck, remove retainer, pull camshaft forward and out of support deck bearing bores *INSTALLATION CAUTION* - If 030" thick shim installed between cam bearing deck casting and camshaft thrust plate, shim must be reinstalled after camshaft servicing To determine if the engine has this shim, measure between centerline of base holes to thrust plate surface If measurement is 810", no shim required If measurement is 780" a thrust plate shim, No 932076, is required

CAMSHAFT SUPPORT DECK REMOVAL (OHC-6)

After camshaft removed, remove three nuts, lockwashers, and Plain washers attaching deck to cylinder head, then lift support deck off head

CAMSHAFT BEARINGS

4 Cyl. Engines Front Bearing - Bearing is staked in place to prevent rotation with oil hole in bushing aligned with oil hole in crankcase

OHC-6 Engine - Camshaft operates directly in bearing bores in camshaft support deck Check support deck and bearing bores for cracks, visible wear, or scoring Check bearing bore and camshaft journal diameters with micrometer Replace support deck or camshaft if bearing clearance more than 004" (see table below)

Bearing	Support Deck Bore	Camshaft Journal
No 1	1 9995-2,0005"	1 9965-1 9975"
No 2	1 8745-1 8755"	1 8715-1,8725"
No 3	1 7495-1 7505"	1 7465-1 7475"
No 4	1 3745-1 3755"	1 3715-1 3725"

CAMSHAFT END THRUST

All 4 Cyl. - Taken by thrust plate behind camshaft gear Endplay controlled by spacer between camshaft gear and shoulder on shaft Endplay can be increased by installing shim between spacer and shaft, or decreased by dressing off spacer Inner beveled edge of spacer must be toward crankcase

L6-226 - Taken by thrust plate on front of engine (between front bearing journal and hub of sprocket) Not adjustable If endplay excessive replace thrust plate

OHC-6 - Taken by thrust plate between camshaft sprocket and cam bearing deck Not adjustable

CAMSHAFT

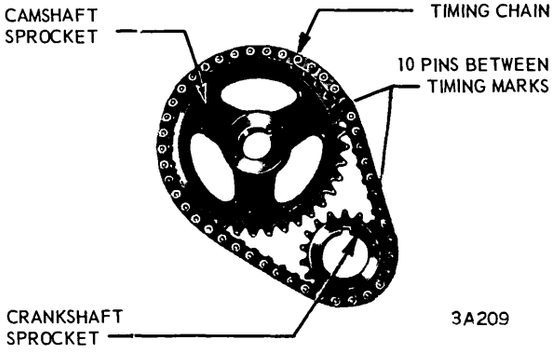
Engine	Journal Diameter No. 1	Journal Diameter No. 2	Journal Diameter No. 3	Journal Diameter No. 4	Bearing Clearance	Camshaft Endplay
All 4 Cyl	2 1855-2 1860"	2 1215-2 1225"	2 0590-2 0600"	1 6225-1 6230"	001- 0025"	004- 007"
L6-226	1 8725-1 8735'	1 8095-1 8105"	1 7472-1 7485"	1 2475-1 2485"	001- 003"	003- 007"
OHC-6	1 9965-1 9975"	1 8715-1 8725"	1 7465-1 7475"	1 3715-1 3725"	004" max	007- 018"

TIMING CHAIN REMOVAL (OHC-6)

Remove timing chain cover Install Sprocket Replacer W-268 on rocker arm cover studs of cam bearing support deck Install the hook of this tool in sprocket and tighten nut to relieve tension on camshaft Remove capscrew, lockwasher and flat washer and fuel pump eccentric from sprocket Pull forward on camshaft to remove from pilot Release tool hook, then slide timing chain sprocket to remove from crankshaft Remove chain tensioner pin Remove blade assembly and tensioner spring from lower tensioner mounting stud Remove chain guide bracket-to-front engine plate attaching capscrews, washers and nuts Remove chain guide bracket To install, reverse removal procedure and check valve timing

TIMING CHAIN TENSIONER (OHC-6)

Tensioning device compensates for normal wear and stretch If rubber facing of tensioner contact face is worn, replace tensioner Timing chain should be replaced if distance between chain sides at narrowest point is less than 3 38" with tensioner in place



L6-226 VALVE TIMING MARKS

VALVE TIMING

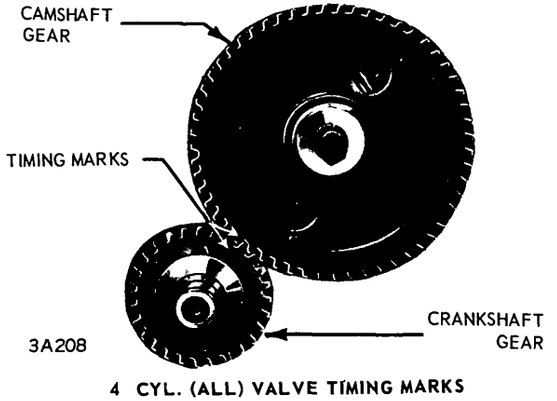
Engine	INTAKE Open BTDC	INTAKE Close ALDC	EXHAUST Open BLDC	EXHAUST Clos ATDC
All 4 Cyl	9°	50°	47°	12°
L6-226	2°	42°	42°	8°
OHC-6	15°	55°	55°	15°

CHECKING VALVE TIMING

All 4 Cyl. - Set tappet clearance of No 1 intake valve at 026" Turn crankshaft until No 1 piston is approaching top dead center on exhaust stroke, stop with piston 9° BTDC (estimate this point by noting distance between "TC" and 5° marks on timing pointer) Rocker arm should be just tight against No 1 intake valve stem Reset tappet clearance to correct running specification

L6-226 - Set tappet clearance of No 1 intake and exhaust valves at 0175" Turn crankshaft until No 1 piston is approaching top dead center and all clearance is taken up between lifter and No 1 intake valve stem Timing indicator should indicate 2° BTDC plus or minus 2° Turn crankshaft slightly past top dead center to check exhaust valve closing point Timing indicator should indicate 8° ATDC plus or minus 2° with valve just seated Reset tappet clearance to correct running specification

OHC-6 - *See Valve Timing Marks Illustration*



4 CYL. (ALL) VALVE TIMING MARKS

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

Normal Oil Pressure - As follows:

Engine	Pressure	Engine RPM
All 4 Cyl.	35 lbs.	2000
L6-226	35 lbs.	1700
OHC-6	50 lbs.	2000

Pressure Regulator Valve - In oil pump body (All 4 Cyl. & OHC-6), right side of cylinder block below valve chamber cover (L6-226). Not adjustable.

ENGINE OILING SYSTEM

4 Cyl. Engines - "L" head and "F" head engines have similar oiling systems with the exception of cylinder head valve mechanism oiling (pushrods, rocker arms, valve tips) used on "F" head engines only. *See illustration and note the following:*

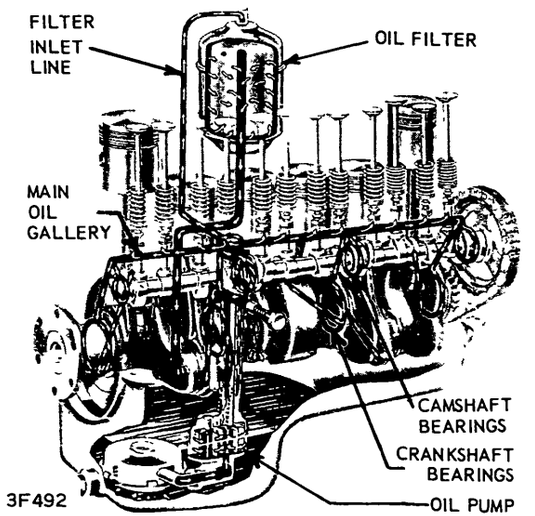
Valve Lifters - Lubricated from oil reservoir trough cast in crankcase which is filled by oil spray from connecting rod bearings. Lifter guides are drilled to permit oil flow from trough to lifter bore (lifters have oil groove at center for uniform lubrication of lifter bore).

Oil Filter - Partial flow type mounted on bracket on engine. Filter inlet is from main oil gallery.

L6-226 Engine - *See illustration and note the following:*

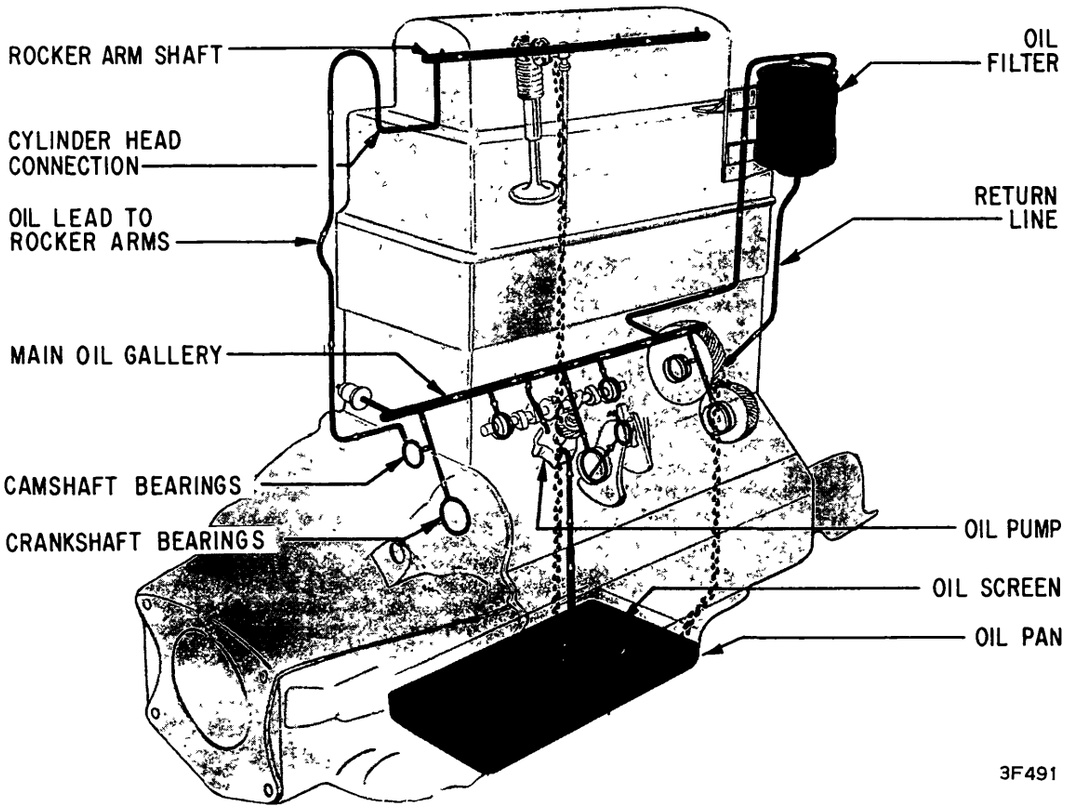
Crankshaft Bearings - No. 3 crankshaft bearing is lubricated directly from pump outlet cross passage.

Valve Lifters - Lubricated directly from main oil gallery through cross passage drilled through each lifter boss. Oil holes extend completely through lifter bosses and first two groups (Cyls. 1, 2, 3, 4) are shielded by sheet metal oil shields held in place by spring clips on underside of shield. No shield is used on rear group (Cyls. 5 & 6).



L6-226 ENGINE OILING SYSTEM

ENGINE OILING



4 CYL. "F" HEAD ENGINE OILING SYSTEM ("L" HEAD SIMILAR)

Oil Filter - Partial flow type mounted on bracket on left side of engine. Filter inlet is from main oil gallery.

OHC-6 Engine - *Refer to illustration.* Force feed type with oil supplied under full pressure to all crankshaft, connecting rod, and camshaft bearings. All other parts are lubricated by oil spray. Double rotor type oil pump, driven by helical gear on crankshaft, draws oil through fixed intake screen, and delivers oil to full flow filter through passages in block. Oil flow from filter is through passage in block to main oil gallery which extends along left side of block. Oil is distributed from main oil gallery as follows:

Crankshaft Bearings - Each main bearing supplied with oil from main oil gallery through angle passage in crankcase web extending down from main oil gallery to main bearing bore.

Camshaft Bearings - Drilled passages in support deck provide lubrication to camshaft bearings. Oil passage to rear camshaft bearing also provides oil under pressure to fill oil passages in camshaft to keep cams lubricated.

Camshaft Bearing Support Deck - A ¼" steel tube is inserted in this passage to conduct oil to front of support deck and to prevent oil drain-back when engine is idle. Oil enters this tube by way of external tube at rear of block which connects oil passage in block to oil passage in cylinder head.

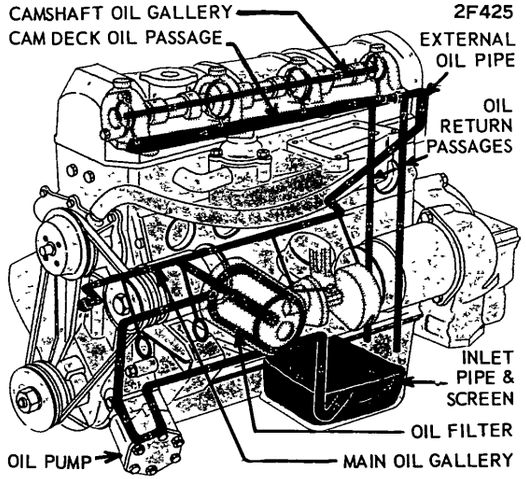
Connecting Rod Bearings - Oil passages in crankshaft mate with oil grooves in main bearings and these passages conduct oil to the connecting rod bearings.

Pistons & Pins - Lubricated by oil spray thrown on cylinder wall from spurt hole in connecting rod when this hole lines up with oil hole in crankpin.

Timing Gears - A passage in block conducts oil to a fitting at front of block which provides a stream of oil to timing chain, sprockets, and oil pump drive gear at front end of crankshaft.

Oil Filter - Full flow type mounted externally on left side of cylinder block. All oil supplied by oil pump passes through filter, then through passage to main oil gallery in block. Relief valve located in pump body.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



OHC-6 ENGINE OILING SYSTEM

OIL PUMP

4 Cyl. Engines - Removal - Rotate engine until distributor rotor points to No. 1 firing position and timing mark on flywheel or vibration damper is directly under pointer. *CAUTION - Do not rotate crankshaft with oil pump removed.* Remove pump mounting bolts and pull pump out as far as possible. Place a short jack between front suspension support and front lower edge of block and push engine to right until pump is free (loosen engine support bolts for more movement if necessary).

Overhaul - *Refer to illustration for arrangement of parts.* Before disassembling pump, check pump shaft for wear at pump drive gear. If sideplay exceeds .010", replace entire pump. Outer rotor-to-body clearance should not exceed .012". Cover must be flat within .001". Rotors must be of equal thickness within .001". Clearance between rotors should be .010". Install pump drive gear on shaft so clearance between gear and pump body is .003-.010"

Installation - Check to see that timing marks on flywheel or vibration damper are directly under pointer and distributor rotor is pointed toward No. 1 firing position. Insert pump in block with pump gear positioned so that it will engage camshaft gear and the distributor shaft drive key without moving distributor rotor. Installation can be made only in one position without moving distributor rotor as slot in drive gear and key on distributor shaft is machined off-center.

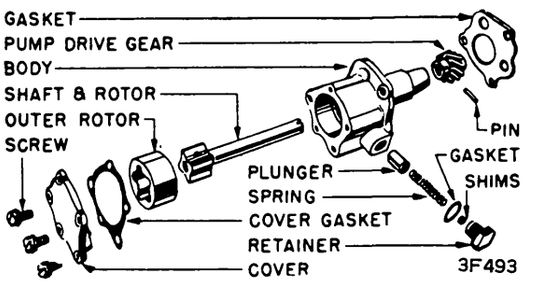
L6-226 Engine - *See illustration for arrangement of parts.* Observe the following specifications: If there is more than .005" clearance between pump body and ends of lower drive gear teeth, replace pump body bushing and ream to .500-.501". *CAUTION - Pump bushing in block must be tight and installed flush with bottom of cylinder block. Loose or improperly installed bushing may restrict main oil gallery.* Pump shaft diameter should be .4990-.4985". End of lower drive gear should be .001-.004" beyond gasket seat on pump body. There should be .002-.004" clearance between underside of upper drive gear and upper end of pump body (controlled by pressing lower drive gear on shaft until this clearance obtained).

ENGINE OILING (C ntinued)

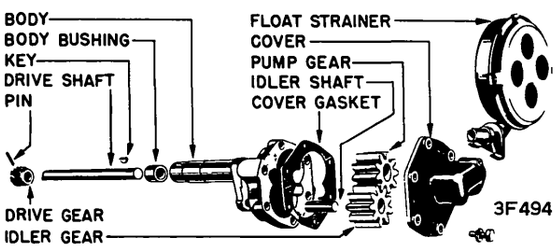
Installation - Set No. 1 piston at TDC. Insert distributor main drive shaft from top of block. Install pump with pump drive shaft tongue engaging slot in lower end of distributor main drive shaft and in such a position that when installed, slot in upper end of distributor main drive shaft will be approximately parallel to side of block (slot pointing fore-and-aft). Install lockwasher, tighten mounting nut, and remove distributor shaft for cylinder head installation.

OHC-6 Engine - Removal - Remove three nuts and lockwashers. Pull straight out to remove pump.

Inspection - Clean and check pump for cracks or leaks. Check drive gear for worn teeth, cracks, etc. Replace gear if damaged. Mount dial indicator on oil pump to check for endplay. Move pump shaft to its extremes and check for total endplay. If this exceeds .005", replace pump. *CAUTION - Drive gear is press fit on oil pump shaft and must be removed and replaced with an arbor press.* Correct axial positioning of the gear on shaft as follows: Outside end of gear hub must be 7 1/32" from mounting face of pump. Centerline of face of gear teeth should coincide with bottom of distributor shaft slot in end of oil pump shaft.

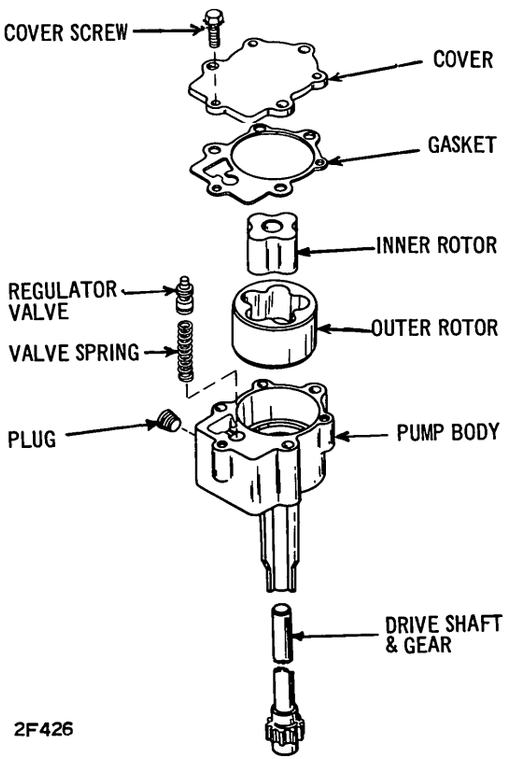


4 CYL. (ALL) ENGINE OIL PUMP



L6-226 ENGINE OIL PUMP

Installation - Oil pump is driven from crankshaft by means of a helical gear. Distributor is driven by the oil pump by means of a tongue on end of distributor shaft engaging slot on end of oil pump shaft. Tongue and slot are machined off-center so they can be meshed in only one position. To install, rotate crankshaft until pointer on timing chain cover is aligned with "O" timing mark on vibration damper. Install oil pump mounting gasket and position oil pump on studs on timing chain cover. Do not engage distributor drive gear worm. Insert long bladed screwdriver in distributor shaft opening on opposite side of block and engage slot in oil pump shaft. Turn shaft so that slot is positioned at roughly the 4 and 10 o'clock position with narrow side of shaft up. Remove screwdriver and, looking down distributor shaft hole with a flashlight, recheck position of oil pump shaft slot. Replace screwdriver and, while turning screwdriver counterclockwise to guide oil pump shaft gear into engagement with camshaft gear, press against oil pump to force it into position. Remove screwdriver and recheck position of slot. If correctly installed, slot will be in roughly the 3 and 9 o'clock position with narrow side of shaft still on top. If slot out of position, remove pump assembly and repeat operation. Secure pump with three nuts and lockwashers.



OHC-6 OIL PUMP (EXPLODED)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE COOLING

Pressure Valve - 7 lb., 9 lb., or 13 lb. radiator filler cap.

Thermostat - Standard - starts to open at 165°F. High Temperature - starts to open at 180°F.

WATER PUMP

4 Cyl. Engin s - Disassembly - Use Puller W-116 and pull impeller off shaft, lift out bakelite seal washer. Remove gearing lock ring from slot in bearing hub on pump housing, support pump housing in arbor press, press shaft and bearing assembly out of pump housing toward forward end. To remove fan pulley from shaft, use any suitable puller. Do not attempt to remove bearing from shaft (shaft and bearing serviced as an assembly only).

Servicing - If rear face of pump housing is not smooth and flat, resurface with special Tool C-551 or install new pump body.

Reassembly - Install shaft and bearing assembly in pump housing (long end of shaft to rear) so that outer end of bearing is flush with front end of housing. Install seal assembly in impeller (dip seal parts in brake fluid before installing), press impeller on shaft until end of shaft is flush with face of impeller hub. Press fan pulley on forward end of shaft until end of shaft is flush with face of pulley. Check location of locking ring groove in bearing with respect to slot in housing, align groove and slot, install bearing locking wire.

L6-226 Engin - Disassembly - Remove fan and pulley from pulley hub. Remove pump cover and gasket. With Puller KF-29 and adapter, KF-113, remove impeller from shaft. Remove bearing retainer ring from slot in housing and press shaft assembly out front of housing. Press or drive seal assembly from pump body.

R assembly - Press seal assembly carefully into pump housing. Apply oil or graphite to face of carbon seal washer. Press pump shaft and bearing assembly into oump housing just far enough to insert retaining ring. Insert ring. Press impeller on until flush with shaft end. Check impeller position to be sure it clears cover.

Pull y Hub Installati n - Press hub on shaft so fan mounting face is 5 7/32" from rear face of rear cover plate. Install cover gasket and cover.

OHC-6 Engin - *Pump is serviced as an assembly only. No overhaul is recommended.*

MODEL IDENTIFICATION

Mod l	Series Symbol
Jeep Utility	54
Utility Station Wagon	58
4WD Truck	55
Jeep Dispatcher	56
Universal Jeep	57
Fleetvan	62
FC-150 Forward Control	65
FC-170 Forward Control	61
Wagoneer (J-100 Series) 2-Wheel Drive	13
4-Wheel Drive	14
Gladiator (J-200, 300 Series) 120"WB	24
126" WB	34

SERIAL NUMBER

Stamped on a plate attached in various locations, depending on vehicle model.

All (Except Gladiator & Wagoneer)

① ② ③ ④ ⑤ ⑥
54 5 4 8 13 10001

① - Series Symbol. See *table above.*
② - Body Style Code.
③ - Engine Type. 3 L4-134. 4 F4-134. 6 L6-226. 7 OHC-6.
④ - Indicates 2 or 4-Wheel Drive.
⑤ - Indicates FC-170 with Dual Rear Wheels. Not used on other models.
⑥ - Factory Unit Production Number.

Gladiator & Wagoneer

① ② ③ ④
24 06 A 10001

① - Series Symbol. See *table above.*
② - Body Style. See *table below.*
③ - GVW code for Gladiator. See *table below.*
④ - Factory Unit Production Number.

Body Style Table

Body Style	Style Code
Truck, Cab & Chassis	06
2-Door Station Wagon	12
Panel Delivery	13
4-Door Station Wagon	14

GVW Rating Code Table (Gladiator)

Rating (Lbs.)	Code	Rating (Lbs.)	Code
5,600	A	8,600	① D
6,600	B	5,000	E
7,600	C	4,000	F

① - Dual Rear Wheels.

ENGINE NUMBER

4 Cyl. Engines - Stamped on top of water pump boss at front of engine.

L6-226 Engine - Stamped on boss on left front corner of cylinder block above generator.

OHC-6 Engine - Stamped on lower right front of cylinder block just behind ignition coil.

ENGINE NUMBER SUFFIX LETTERS - Indicate oversize cylinder bores, etc. See ENGINE.

CAPACITIES

Crankcase (Quarts) All 4-Cyl.	① 4
All 6 Cyl.	① 5
Cooling System (Quarts)	
Jeep & Dispatcher	② 11
FC-150	② 10
FC-170	② 11
Utility 4 Cyl.	② 11
6 Cyl.	②③ 12
Gladiator & Wagoneer	② 11

① - Add 1 quart with filter change.
② - Add 1 quart with heater.
③ - 11 quarts if OHC-6 engine used.

FILTERS & CLEANERS

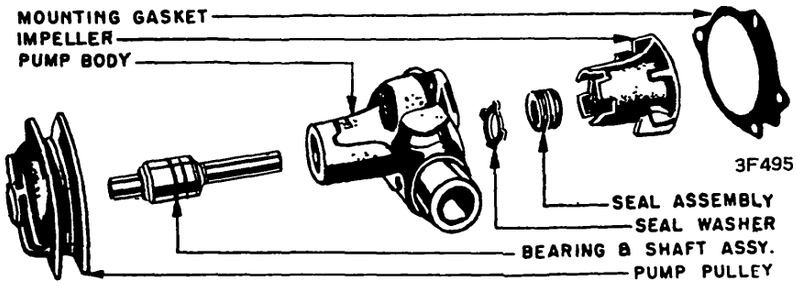
Filter or Cleaner	Service Interval (Miles)
Air Cleaner (Oil Bath or Oil Wetted)	①
Air Cleaner (Dry Type)	Clean 6,000; Replace 30,000 ②
Oil Filter	Replace 6,000

① - 1,000 to 6,000 miles depending on type of service and operating conditions.
② - Or every 5 cleanings.

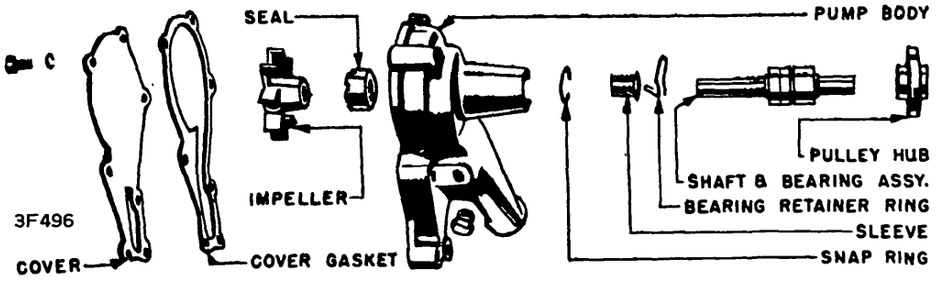
CLEANING DRY TYPE AIR CLEANER

Remove cartridge and wash with water and detergent only. *Do not oil cartridge.*

► *OHC-6 ENGINE OIL FILTER LEAK CORRECTION:* May be caused by interference between outer circumference of oil filter base and raised portion of cylinder block. To correct, grind or file cylinder block as necessary. *CAUTION - Do not remove more metal than necessary or block will be weakened at pressurized oil passage locations.*



4 CYLINDER (ALL) WATER PUMP (EXPLODED)



L6-226 WATER PUMP (EXPLODED)

TUNE-UP SPECIFICATIONS

COMPRESSION PRESSURE

All 140-160 lbs at 150 RPM
Maximum variation between cylinders 10 lbs

VALVE TAPPET CLEARANCE

All (Cold) .025-.027" Int & Exh
(Hot) .023-.025" Int & Exh

SPARK PLUGS

Gap .033-.038"
Torque 30 ft lbs

Spark Plug Type

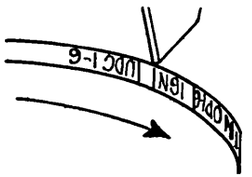
All Champion H-14Y

DISTRIBUTOR

Point Gap .017-.022"
Cam Angle 37-41°
Breaker Arm Spring Tension 17-22 ozs
Condenser Capacity .18-.23 mfd

IGNITION TIMING

Set timing with distributor vacuum line disconnected
All 2° BTDC at 600 RPM



3A162

IGNITION TIMING MARKS

HOT (SLOW) IDLE RPM

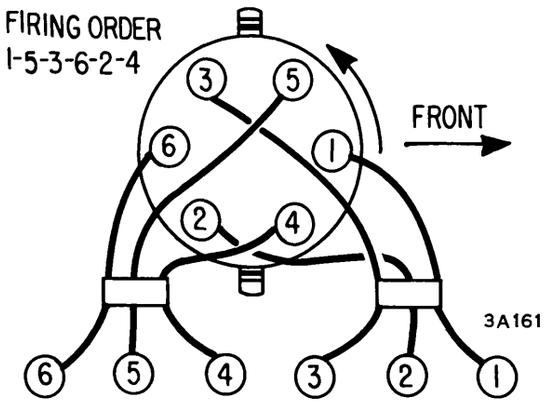
All Trans (In Neutral) 550

FAST IDLE RPM

Carter AS & RBS Carbs - Fast idle speed will be correct when hot (slow) idle correctly set

AUTOMATIC CHOKE SETTING

Carter AS 3186S Centered
RBS 3538S *See Tune-Up Notes*
RBS 3653S Centered



3A161

FIRING ORDER

FUEL PUMP PRESSURE

All 3½-5 lbs at 30 MPH

MANIFOLD HEAT CONTROL VALVE

Thermostatic type in exhaust manifold Valve must be free (use Metalclene to free sticking shaft)

CLOSED CRANKCASE VENTILATION SYSTEM

Clean system every 10 000 miles or sooner if needed especially under cold weather driving conditions

TUNE-UP NOTES

►*HARD COLD STARTING & POOR ACCELERATION PERFORMANCE CORRECTION (Cars before Engine No S-273119 with Carter RBS 3538S Carb)* Check the following points

1) Loose or Missing Diaphragm Chamber Cover - Install Repair Kit No 1560178 following instructions in kit

2) Rough Accelerating Pump B re - Remove air cleaner and note pump discharge when throttle opened half way Discharge should be a steady stream If spurts or dribbles noted, replace carburetor

3) Automatic Choke Setting - Set choke setting 1 Notch Rich (change from Centered setting)

Carburetors on later engines (date cod d L2 or later or with blue dot on bowl cover) have these changes See Production Change Note under Carburetor

IGNITION

►*DISTRIBUTOR REMOVAL CAUTION* Turn crankshaft to No 1 Cyl TDC position before removing distributor (necessary to provide clearance and prevent damage to Nos 3 & 4 piston skirts)

DISTRIBUTOR ADVANCE SPECIFICATIONS

Prestolite IAT-4403B

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	300	Start	7
2	400	4¼	11
4	500	8	13
8	700		
12	900		

For engine degrees & RPM, multiply by 2

IGNITION COIL

Ignition Current 4.0 amps idling
Primary Resistance Wire 2.1-2.2 ohms

CARBURETOR

Carburetor No.	Float Level	Float Drop	Choke Setting
Carter "AS" 3186S	5/16"		Centered
Carter "RBS" 3537S,3538S	15/32"		ℂ
3563S	15/32"		Centered

ℂ - **Centered** (Carbs date coded before L2), **1 Notch Rich** (Carbs date coded L2 and later, and earlier carburetors to correct Hard Cold Starting & Poor Acceleration complaints)

►*1963 CARTER RBS 3538S PRODUCTION CHANGE (Carbs date coded L2 and later used beginning Engine No S-273119)* Carburetors have improved method of retaining diaphragm chamber cover burnished pump cylinder, and 1 Notch Rich choke setting *See "Hard Cold Starting & Poor Acceleration Correction" above*

ACCELERATING PUMP

Cart r "AS" & "RBS" - No seasonal adjustment

THROTTLE LINKAGE ADJUSTMENT

►*1963 AUTO TRANS THROTTLE LINKAGE BIND (STICKING IN KICKDOWN POSITION) CORRECTION* To correct this condition replace outer throttle control lever (Part No 1559139), and place the wave washer on top of throttle control lever on transmission to prevent rod interference with transmission case

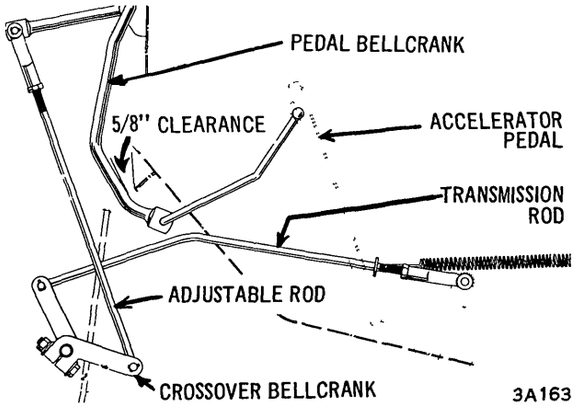
Auto. Trans Cars - With engine at normal operating temperature and running, and off fast idle, proceed as follows

1) On right side of engine disconnect adjustable crossover bellcrank-to-carburetor rod from carburetor and adjust engine idle speed to 550 RPM in "P" or "N" position Attach bellcrank-to-carburetor rod to carburetor throttle lever and place a .010" feeler gauge between crossover bellcrank stop lever and the stop Lengthen bellcrank-to-carburetor rod until feeler gauge can just be removed freely, then lock adjustable end locknut on rod

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

2) On left side of engine adjust length of rod between accelerator pedal bellcrank and crossover bellcrank so there is 5/8" clearance between rib on floor pan and accelerator pedal bellcrank arm *CAUTION - This adjustment must be accurate to prevent engine race on hard brake application or improper kickdown operation.*

3) Install pressure gauge on transmission (takeoff is near bottom flange of case at rear), and adjust length of rod from crossover bellcrank to transmission throttle lever for 85-95 lbs. pressure at 1000 RPM in "D" with brakes applied and wheels locked.



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

ELECTRICAL

BATTERY

12 Volt, 50 Ampere Hour.

Battery Ground - Negative.
Engine Ground - At right front engine support bracket.

STARTER

Prestolite MDU-7005, 7025, 7026

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55
11 ft. lbs.	Lock	6.0	425

Brush Spring Tension - 31-47 ozs.

ALTERNATOR

Prestolite ALK-5001

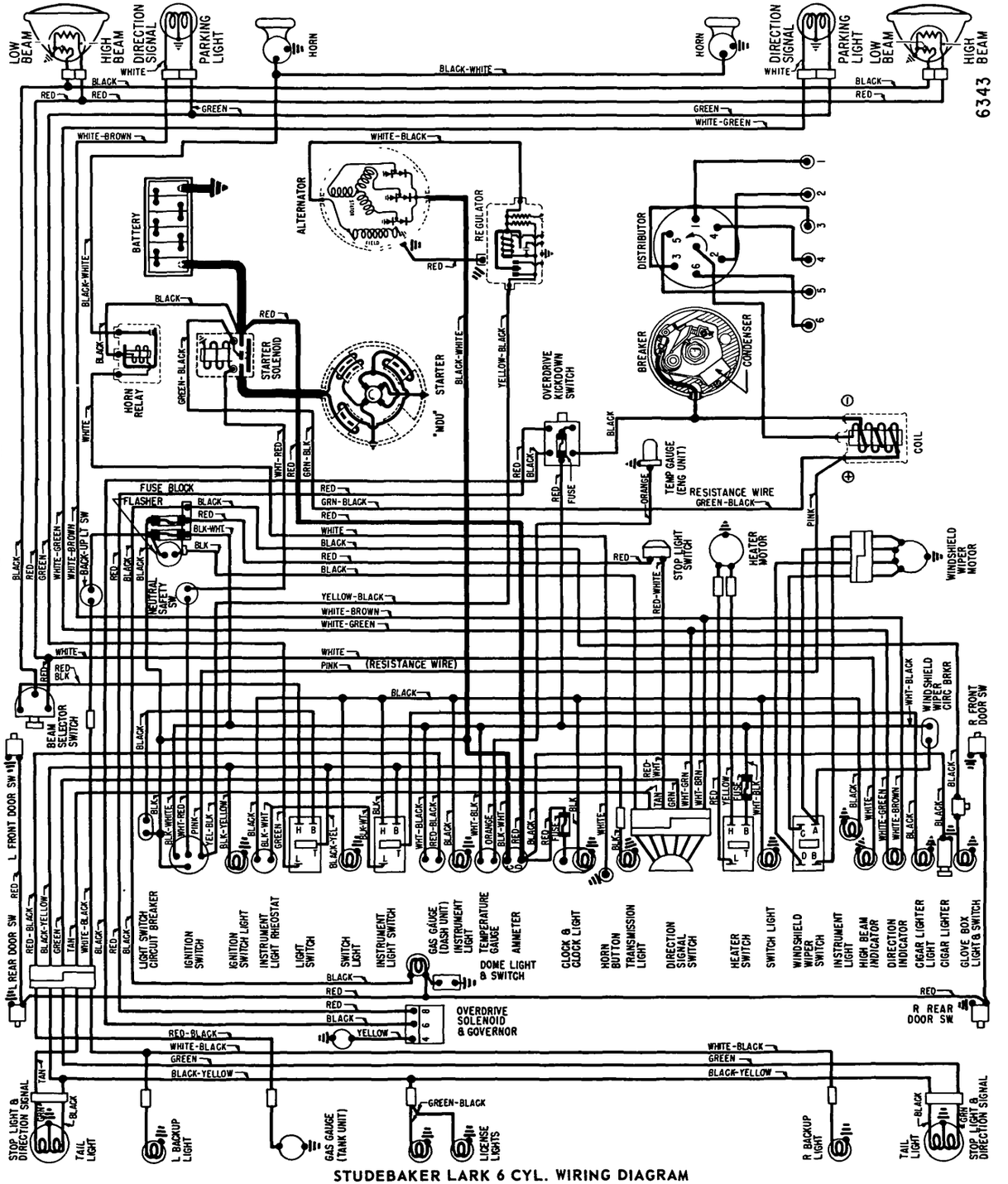
Amperes	Volts	Temp.	Alt. RPM
35	14.2	70°F	ℂ 4200

ℂ - 1700-1750 Engine RPM.

ALTERNATOR REGULATOR

Prestolite VBT-6201A

Single unit type containing a double contact voltage regulator Regulator not adjustable. Service by replacement only.



STUDEBAKER LARK 6 CYL. WIRING DIAGRAM

ELECTRICAL (C ntinued)

FUSES & CIRCUIT BREAKERS

CIRCUIT BREAKERS

Headlights - In lighting switch
Windshield Wiper - In wiper switch
Tailgate Window - On left front fender apron

FUSE BLOCK

Located on back of instrument panel on lower left side

IN-LINE FUSES

Clock & Radio fuses in lines back of instrument panel
NOTE - Heater fuse mounted on Heater Switch, Over drive fuse on Kickdown Switch

SWITCHES, GAUGES, & SPEEDOMETER

NEUTRAL SAFETY SWITCH

Switch located on steering column Place selector lever in "N", then loosen switch mounting bracket attaching screws Align pin hole in switch lever with hole in switch body Hold switch in position or use a pin to maintain alignment and tighten mounting screws Check operation Starter should operate with selector lever in 'N" or "P ' only

HEADLIGHT, HEATER, WINDSHIELD WIPER SWITCH REMOVAL

1) Remove fresh air control bracket and fuse block retainer screws Loosen heater control cable bracket
2) Remove access hole cover from lower part of instrument panel (two cross-head screws)
3) Loosen switch lower retainer screw (work through access hole) remove switch upper retainer screw from behind instrument panel
4) Slide switch up and out, disconnect switch wires

STOP LIGHT SWITCH LOCATION

Hydraulic In front brake line fitting on inner side of left frame side member just forward of steering gear (Without Power Brakes) on brake master cylinder on firewall (Power Brakes)

TURN SIGNAL FLASHER

On fuse block on back of instrument panel on lower left side

SPEEDOMETER REMOVAL

Disconnect drive cable at speedometer head remove four light bulb and socket assemblies (press-in type), remove retainer nuts and brackets withdraw speedometer from panel

INSTRUMENT REMOVAL

Instrument case (Fuel Gauge, Temperature Gauge, Oil Pressure Gauge, Ammeter) is removed as an assembly as follows
1) Disconnect oil pressure gauge pipe at gauge
2) Remove fresh air control bracket and fuse block retainer screws Remove two instrument case retainer nuts and brackets
3) Withdraw instrument case from panel, remove two press-in type light bulb and socket assemblies disconnect wires
4) For access to individual gauges, pry up retainer tabs to free bezel, remove bezel glass glass retainer, and dial face assembly

BELT ADJUSTMENT

Use a spring scale on belt midway between pulleys Adjust belt tension so specified lbs pull on scale will lift belt proper distance (see table below)

Belt Adjustment Specifications

Belt	Lbs. Pull	D flection
Alternator	10	1/4"
Power Steering	4	3/16-1/4"
Air Conditioning	20	1/2"

ENGINE

ENGINE REMOVAL

1) Remove hood, radiator battery and air cleaner Drain crankcase
2) Disconnect all lines, wires, cables and hoses from engine
3) Disconnect accelerator pedal bellcrank to cross over bellcrank rod
4) Disconnect exhaust pipe at manifold, disconnect U-clamp at clutch or converter housing lower the exhaust pipe for clearance
5) Remove lower stud nuts from engine front mount insulators and disconnect ground strap at right front mount bracket
6) Remove starter
7) Disconnect right tie rod, remove shaft from steering bellcrank and move bellcrank out of the way for pan clearance
8) Remove left front and left rear cylinder head bolts (Nos 15 & 20) install lifting eyebolts in these locations, attach hoist, raise engine slightly to remove weight from front mounts
9) On Auto Trans Cars, disconnect accelerator bellcrank to transmission rod, remove converter housing lower plate, disconnect torque converter from converter drive plate
10) On all models, remove clutch or converter housing to engine bolts, drive out two clutch housing dowel pins
11) Raise engine slightly and move it forward until clutch clears drive shaft splines lift engine out

GENERAL SPECIFICATIONS

Engine	HP at RPM	Compr. Ratio	Bore	Stroke	Displacem nt
All	112 at 4500	ℂ 8 25-1	3"	4"	170 cu ins

ℂ - 7 0-1 Export

TIGHTENING SPECIFICATIONS

ENGINE TORQUES

	Ft. Lbs.
Cylinder Head	46-50
Intake & Exhaust Manifold	25-30
Oil Pan	13-17
Rocker Shaft Bracket	13-17
Rocker Arm Cover	ℂ 20 In Lbs
Valve Side Cover	3½
Main Bearing Caps	85-95
Connecting Rod Caps	28-32
Piston Pin Clamp Bolt	20-25
Vibration Dampener	130-140
Flywheel	33-35
Camshaft Gear	20-22
Camshaft Thrust Plate	13-17
Engine Front Cover	13-17
Oil Pump	13-17
Water Pump	13-17

	Ft. Lbs.
Clutch Housing (To Block)	28-32
(To Engine Plate)	13-17
(Dowel Bolt Nut)	28-32
Converter Housing (Auto Trans)	40-45
Converter Drive Plate	23-28
Transmission Mtg (Synchro-mesh)	60-70

ℂ - Torque 3 times in succession, rear nut last

ENGINE MOUNTING TORQUES

	Ft. Lbs.
Front Mount Stud Nuts	20-25
Rear Mount Bolts (S-M exc Taxi)	70-80
(S-M Taxicab)	30-35
Rear Mount Cage Bolt (S-M)	30-35
Rear Mount Bolt (Auto Trans)	45-50
Rear Mount Screw (Auto Trans)	45-50

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

OIL PAN

Removal - Remove dipstick and drain crankcase. Disconnect tie rods and reach rod from steering bellcrank, remove retaining pinch bolt and remove bellcrank from shaft. Remove oil pan screws and remove pan.

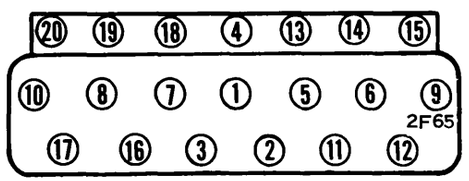
Installation - Front filler block must be removed for installation of oil pan side gaskets. Install oil pan as follows:

1) Take out filler block screws and carefully separate filler block from front cover gasket. *NOTE* - If gasket damaged, cut away exposed portion of gasket and install similar part of new cover gasket.
2) Apply Permatex sealer to pan mounting flanges and install pan side gaskets.
3) Place filler block in position and install one upper filler block screw. Press filler block upward to compress pan gaskets and install opposite upper screw. Install remaining screws and tighten all screws finger tight. AFTER oil pan screws are tightened, torque all filler block screws to correct specifications.
4) Install pan end gaskets. Install pan and torque pan capscrews to specifications.

CYLINDER HEAD

Removal - Remove rocker arm assembly (center row of head bolts retain rocker arm brackets), and remove manifolds, then remove head.

Installation - Use dowel studs in head bolt holes Nos. 1, 15, 17 to position gasket and head. Coat both sides of head gasket lightly with Perfect Seal or equivalent, install gasket and head. Dip head bolts in engine oil, tighten two outer rows of bolts finger tight. Install rocker arm assembly and tighten head bolts fingertight, then tighten bracket bolts alternately to pull rocker arm assembly down evenly. Partially tighten all head bolts in sequence shown, then torque all bolts in same sequence to specifications, finally torque rocker arm bracket bolts to specifications.



CYLINDER HEAD TIGHTENING SEQUENCE

MANIFOLD ASSEMBLY

Manifolds serviced separately but should be installed as an assembly (if manifolds separated, install four bolts finger tight with nuts on top of intake manifold, tighten bolts securely **after** manifold installed on head). Install manifold assembly with clamps positioned so that two points engage intake manifold flange (triangular clamps), use plain washer under nut, torque all nuts evenly from center outward to torque specifications.

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance	Piston Fit	Rod Fit	Ring	End Gap	Side Clearance
All	①	.0001-.0003"	②	Comp. Oil	.007-.017" .007-.017"	.002-.005" .0015-.004"

① - Selective feeler fit. *See "Fitting Pistons".* ② - Locked in rod by tapered pin and locknut.

PISTON PIN

Removal - Tool J-1293C can be used to mount piston assembly in vise (tool mandrel extends through pin with retaining nut on outer end). Remove locknut and star washer from clampscrew, install nut on opposite end of screw and tighten nut to withdraw tapered clampscrew.

Installation - Assemble piston and rod (solid side of piston on numbered side of rod), install clampscrew with flat surface engaging flat on piston pin, install star washer and locknut on clampscrew and tighten snugly, use brass drift and hammer to seat clampscrew in rod, tighten locknut to correct torque specification. *CAUTION - Thus procedure important since half-thread on clampscrew will not permit nut to seat clampscrew properly*

INSTALLING PISTON RINGS

Top compression ring has step at the inside which must be installed upward. Second compression ring has step at outside which must be installed downward. Inner and outer oil ring end gaps must not meet at the same point.

PISTON & ROD INSTALLATION

Assemble piston on pin so "T" slot of piston is on side opposite oil hole in lower end of rod. Insert tapered end of clamp screw toward heavy boss on rod. With "T" slot of piston away from camshaft side, oil squirt hole and number will be to right on odd numbered rods, to left on even numbered rods. Odd numbered rods and even numbered rods cannot be interchanged.

FITTING PISTONS

Use a .002" x 1" x 12" feeler gauge inserted on camshaft side of cylinder. Insert inverted piston in cylinder bore with slotted side away from camshaft and bottom edge of piston 1" below top edge of bore. Pull required to withdraw feeler should be 7-12 lbs.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING RODS		
	Journal Diameter	Clearance	Thrust Bearing	Endplay	Journal Diameter	Clearance	Sideplay
All	3.0623-3.0628"	.0005-.0021"	No. 1	.003-.006"	1.81175-1.81275"	.0005-.002"	.005-.009"

CRANKSHAFT END THRUST

Crankshaft end thrust taken by thrust washer between front main bearing and crankshaft gear, and controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.

CRANKSHAFT REAR OIL SEAL

Brummer (molded rubber) seals used in block and bearing cap. Bearing cap seal has integral cross seals and cork filler blocks are used between sides of cap and block. When installing seal, thoroughly clean seal channel in block and cap by swabbing with alcohol or solvent and drying with air.

Upper Seal - Loosen Nos. 2 & 3 intermediate bearing cap bolts approximately 2 turns for clearance, use screwdriver or similar tool to blunt sharp edge of flange at rear of block to prevent scuffing inside edge of seal, apply Lubriplate to sealing lip of seal, insert seal with inner lip toward front of engine, roll seal in place between crankshaft and block to point ¼" past face of block, then rotate seal back flush with block (this will relieve internal stresses).

Lower Seal - Install seal on bearing cap flange (inner lip toward front of engine), fully seat cross seals in cap grooves, trim outer ends of cross seals flush with cap edges. Apply Lubriplate or engine oil to sealing lip, install bearing cap and tighten all caps to correct torque specification. Install new cork filler block seal between bearing cap and block on each side.

ENGINE FRONT COVER

Removal - Remove radiator, fan, vibration dampener, and crankshaft pulley (Puller J-8111 and crankshaft thread protector HM-925-12). Remove cover.

Installation - Leave cover screws loose until after crankshaft pulley installed (hub will center cover), then torque cover screws to correct specification.

FRONT COVER OIL SEAL

Use crankshaft pulley hub to seat new felt oil seal in cover. Lubricate seal with engine oil.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE GUIDE SERVICING

Use Tool No. J-9265 to drive guide out of cylinder head from combustion chamber side. Coat outside of new guide with white lead, then start chamfered end into head from combustion chamber side *(CAUTION - Different guides used - intake guides are longer).* Install driver through correct hole of installing plate (plate marked "Intake" and "Exhaust" and should be placed across head with correct mark up). Drive guide in until driver bottoms on installing plate.

VALVE LIFTER REPLACEMENT

Lifters should slide into place of own weight. If .001" oversize lifter does not correct excessive clearance, ream lifter bore using Reamer 1352-5TB (L.O.Beard Tool Company) which will provide correct clearance for .005" oversize lifter.

VALVE STEM SEALS

Used on all valves. Install seal over guide with cupped side of seal toward top of valve guide.

VALVE SPRING INSTALLED HEIGHT

Measured from spring seat on cylinder head to underside of spring retainer. *See "Valve Closed" spring length in specification table.*

VALVE SPRING INSTALLATION

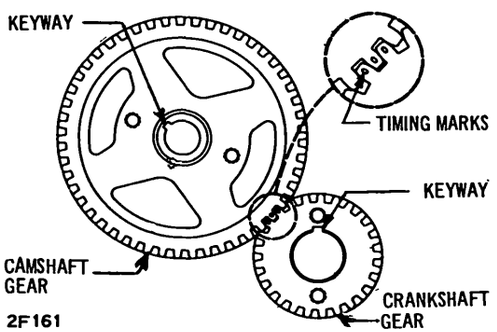
Install cup type damper on closed coil end of spring and install spring with damper end down toward cylinder head.

ROCKER ARM ASSEMBLY

See illustration for assembly of parts. End support brackets are special type and flat on end of shaft must be toward front of engine. Cylinder head bolts are installed through brackets. *See CYLINDER HEAD for installation of rocker arm assembly.*

TAPPET CLEARANCE ADJUSTING SCREW

Self-locking type screws must have minimum turning torque of 30 In. Lbs. with screw fully engaged in rocker arm. Replace screws if torque below minimum.



VALVE TIMING MARKS

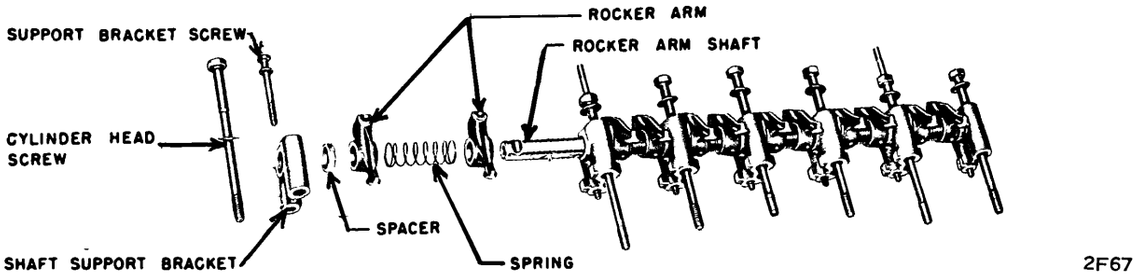
VALVES

Engine		Head Diam.	Face Angle	S at Angle	Seat Width	Stem Diam.	Stem Clearance	Valv Lift
All	Intake	1.593"	45°	45°	1/16-3/32"	.3415"	.0015-.0035"	.359"
	Exhaust	1.406"	45°	45°	1/16-3/32"	.3415"	.0015-.0035"	.359"

VALVE SPRINGS & LIFTERS

Engine	SPRINGS			LIFTERS	
	Free Length	Pressure (Lbs.)			
		Valve Closed	Valve Open	Diameter	Clearance
All	.....	45-55 at 2.031"	105-115 at 1.671"	.....	℄

℄ - Lifter should just slide into place by its own weight.



6 CYL. ENGINE ROCKER ARM ASSEMBLY

CAMSHAFT

Engine	Journal Diameter				Bearing Clearance	Camshaft Endplay
	No. 1	No. 2	No. 3	No. 4		
All	1.7475-1.7480"	1.7162-1.7170"	1.6857-1.6865"	1.6232-1.6240"	℄	.003-.006"

℄ - **No. 1** - .0007-.0022". **Nos. 2,3,4** - .0010-.0027"

VALVE TIMING

Engine	INTAKE		EXHAUST	
	Open BTDC	Close ALDC	Open BLDC	Close ATDC
All	15°	50°36'	55°36'	10°

CHECKING VALVE TIMING

Adjust No. 1 intake valve to .030". Rotate engine until No. 6 piston is on the compression stroke and the IN-OP 1-6 marking on vibration damper is several inches from pointer. Then, while moving pushrod up and down, continue to rotate crankshaft until no up and down movement can be felt. When there is no clearance, No. 1 intake valve begins to open, and IN-OP 1-6 mark on damper should be directly below pointer.

TIMING GEAR REPLACEMENT

Backlash should be .001-.003". Replace both gears if backlash excessive. Use pullers (J-8111) to remove gears, pusher set (J-4704-A with camshaft adapter HM-861-P or crankshaft adapter HM-861-S) to install new gears. *See Valve Timing Marks illustration.*

CAMSHAFT REMOVAL

Camshaft can be removed in usual manner with engine in car (except Convertible) after grille, radiator, and fan removed. Remove camshaft gear to provide clearance for camshaft removal. See OIL PUMP for removal of pump driveshaft and gear. *NOTE* - If camshaft bearings being replaced, remove engine from car.

CAMSHAFT END THRUST

Camshaft end thrust taken by thrust plate on front face of engine block behind camshaft gear, and controlled by spacer on camshaft between gear hub and front bearing journal. Adjust endplay by replacing thrust plate or spacer. When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting plate.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

N rmal Oil Pr ssur - 30-50 lbs. at 40 MPH (30 lbs. minimum at 2000 RPM).

Pressur Regulat r Valve - Under plug on lower right front corner of engine (remove engine front cover bolt for access). *NOTE* - Timing gears are lubricated by oil discharge from valve (small bleed hole in plunger provides gear lubrication when valve closed). Remove and clean valve yearly or more often.

►*HIGH OIL PRESSURE GAUGE READING CORRECTION (GAUGE FITTING LOCATION CHANGE):* On cars before Serial No. 63S-21015, if oil pressure gauge reads high, relocate pressure take-off point from right to left side of engine for more accurate reading as detailed below. *Cars after above serial number have this relocated pressure pipe.*

1) Remove **upp r** oil line plug located in front of distributor in engine block.
2) Disconnect oil pressure gauge line at right side of engine, remove special fitting from block, install pipe plug in this hole.
3) Install special fitting in hole on left side of block from which pipe plug removed. Fitting outlet must point upward.
4) Reroute oil pressure line to left side of car (under brake master cylinder and along left fender apron), connect flexible oil line to the special fitting.
5) Make certain oil line enters grommet in firewall squarely (not at an angle), use suitable clip to attach line to horizontal surface of fender apron (line must not be in direct contact with apron), reposition oil line ground strap. Flexible oil line must have a slight loop to allow for engine movement.

ENGINE OILING SYSTEM

Force feed type with full-flow filter. See illustration and note the following:

R cker Arms, Pushrods & Valves - Vertical oil gallery at center of block connects valve lifter oil gallery to passage in cylinder head. Oil flows through cylinder head passage, around relieved cylinder head bolt in center rocker arm shaft bracket, and through hole drilled in bracket to hollow rocker arm shaft. Rocker arms are drilled for pushrod lubrication.

Timing Gears - Lubricated by oil return from pressure regulator valve (channel formed by groove in front face of block behind engine front plate directs oil to gears). Small bleed hole in valve plunger provides lubrication for gears at low speeds when pressure regulator valve closed.

Oil Filt r - Full-flow type. Intake and outlet passages and bypass valve (to allow oil flow to engine if filter clogged) are located in filter base (no external oil lines).

OIL PUMP

NOTE - Pump must be disassembled for removal. If driveshaft and gear being removed (for replacement or camshaft removal), turn crankshaft to No. 1 Cyl. TDC position *(CAUTION - This is necessary to provide clearance and prevent damage to Nos. 3 & 4 pistons),* remove distributor, remove oil pan, then proceed as follows:

Removal - Take out mounting screws, remove pump body, idler gear, and mounting gasket. Remove drive gear and Woodruff key, take out "C" washer in shaft groove. Push shaft inward and remove shaft and gear from inside engine. Shaft and gear can be separated by pressing out pin and pressing shaft out of gear.

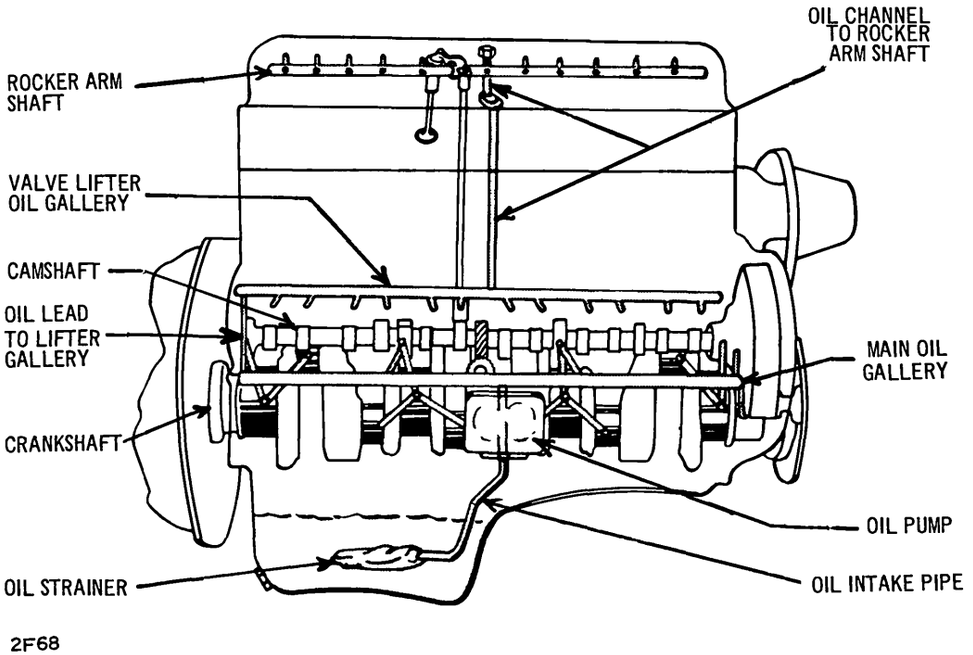
Overhaul - Check all parts for wear and replace gears and body if clearances excessive.

Pump Gear Endplay - With gears installed in pump body, gears should be from .001" longer to .006" shorter than mounting face of body (to provide correct .0014-.009" end clearance with .004-.005" thick gasket). Replace gears if more than .006" shorter than body.

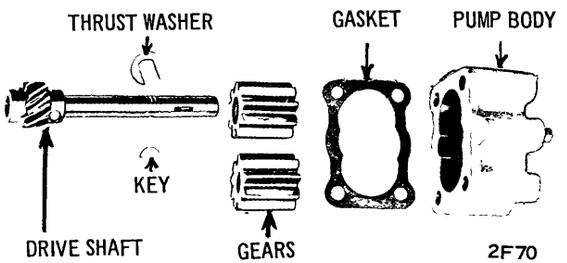
Gear Clearance in Body - Install gear on idler shaft in pump body, place .006" feeler between gear and side of body. Gear should be locked tight (indicating total clearance of .011"). If gear rotates, replace pump body.

Installation - With crankshaft at No. 1 Cyl. TDC position, insert driveshaft and gear from inside engine, turn shaft so that keyway is down toward oil pan, mesh gears fully, keyway should then point toward rear of engine (when distributor installed rotor should be at No. 1 terminal in cap). Dip all parts in engine oil and reassemble pump. Torque pump mounting bolts to specifications, check the pump for binding by rocking pump shaft, then turn crankshaft one full revolution and repeat bind check. If pump binds, reposition housing by tapping with mallet. With pump turning freely, remove pipe plug and prime pump by filling housing with engine oil.

ENGINE OILING



6 CYLINDER ENGINE OILING SYSTEM -FULL FLOW SYSTEM



6 CYLINDER ENGINE OIL PUMP

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE COOLING

Pressure Valve - 13 lb. radiator filler cap.
Thermostat - 170° type. Starts to open at 167-172°F.

WATER PUMP

Use suitable support plates and press tools when disassembling and reassembling pump. Install parts to following specifications:
Shaft & Bearing Assembly - 2.719-2.7324" from hub end of bearing to machined mounting face of pump housing.
Fan Hub - 4 13/32" from outer face of hub to machined mounting face of pump housing.
Impeller - .015-.031" clearance between impeller and pump housing.

VISCOUS FAN DRIVE

Limits maximum fan speed to approximately 2550 RPM. Replace as an assembly (sealed unit). Special 5-blade fan assembly serviced separately.

FILTERS & CLEANERS

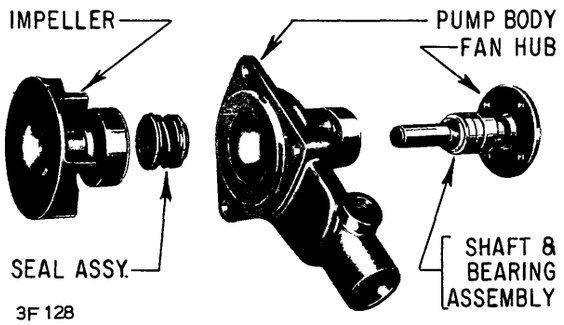
Filter or Cleaner	Service Interval (Miles)
Oil Filter	Replace 4,000
Air Cleaner (Paper Type)	Clean 4,000; Replace 20,000
Oil Filler Cap Filter	Clean 1,000
Heater Air Filter	Clean 5,000
Fuel Pump Filter	Replace 10,000

SERVICING AIR CLEANER

Paper Element Type - Shake element clean. Do not use compressed air or solvents.

REPLACING OIL FILTER

Disposable Type - Screw element onto base by hand until gasket is seated, then tighten an additional ½-turn. *Do not overtighten. Tighten by hand only.*



ENGINE WATER PUMP

CAPACITIES

Crankcase (Qts.) ①	5
Cooling System (Qts,) ②	11
Transmission	
3-Speed Synchro-mesh (Except Taxi) Pts.	2.3
(Taxi) Pts.	3.5
Overdrive (Pts.)	3.15
Automatic (Std.) Pts.	18
(Taxi, Police, Heavy Duty) Pts.	.19
Rear Axle (Std.) Pts.	2.5
(Taxi, Police, Heavy Duty) Pts.	3
Fuel Tank (Gal.)	18

① - Add 1 quart with filter change.
② - Add 1 quart with heater.

MODEL IDENTIFICATION

SERIAL NUMBER

Stamped on a plate attached to left front door hinge pillar post.

Starting Serial Number - 63S-1001 (South Bend), 63SC-1001 (Canada).

ENGINE NUMBER

Stamped on machined pad at upper left front of cylinder block.

Starting Engine Number - S-261201 (South Bend), SC-29701 (Canada).

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

TUNE-UP SPECIFICATIONS

ENGINE IDENTIFICATION

Engines may be identified by Engine Number Prefix Letter (Engine Number is stamped on machined pad at upper left front of cylinder block) and other engine characteristics listed below Specifications are listed by Displacement & Compression Ratio

Trade Name	Engine No. Prefix	Trade Name	Prefix
Thunderbolt I	V	Avanti Ⓒ	R
Thunderbolt II	P	Avanti Ⓔ	RS
Jet Thrust	JT	Special Equip Ⓔ	R3
Super Jet Thrust Ⓔ	JTS		

Engine Trade Name	Displ.	Compr.	Carburetor
Thunderbolt I	259"	Ⓒ 8 25-1	2 or 4-Bbl
Thunderbolt II	289"	Ⓒ 8 25-1	2 or 4-Bbl
Jet Thrust Ⓒ	289"	10 25-1	4-Bbl
Super Jet Thrust Ⓔ	289"	9 0-1	4-Bbl
Avanti Ⓒ	289"	10 25-1	4-Bbl
Avanti Ⓔ	289"	9 0-1	4-Bbl
Special Equip Ⓔ	304 5"	9 75-1	4-Bbl

Ⓒ - Non-supercharged Ⓔ - Supercharged Engine
Ⓒ - 8 5-1 Compression Ratio optional

COMPRESSION PRESSURE

259",289" (8 25-1 ratio)	140-160 lbs at 150 RPM
289" (9 0-1 ratio)	160-170 lbs at 150 RPM
289" (10 25-1 ratio)	185-195 lbs at 150 RPM

Maximum variation between cylinders 10 lbs

VALVE TAPPET CLEARANCE

259",289"(8 25-1 Ratio) Cold	025- 027"
Hot	023- 025"
289" (10 25 & 9 0-1 Ratio) Hot	025- 027"
304 5" (9 75-1 Ratio) Cold	025- 027"
Hot	023- 025"

SPARK PLUGS

Gap (H-9Y, H-10Y, H-12Y, H-14Y	033- 038"
(J-61Y, J-79)	Ⓒ 018- 023"
Torque (All)	25-30 ft lbs

Ⓒ - Side gap type Measure between side ground electrode and side of center electrode

Spark Plug Type

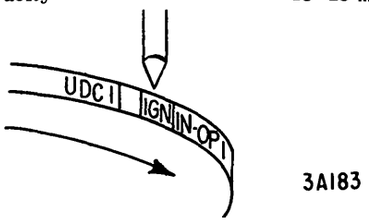
259", 289"(8.25-1 Ratio)	Champion H-14Y
289" (10 25 & 9 0-1) Normal	Champion J-12Y
Sustained High Speed	Champion J-10Y Ⓒ
Competition	Champion J-61Y or J-79
304 5" (9 75-1) Normal	Champion J 10Y Ⓒ
Competition	Champion J-61Y or J-79

Ⓒ - Supersedes Champion J-9Y

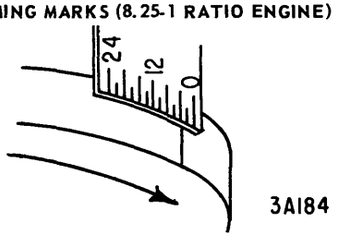
DISTRIBUTOR

(259", 289" 8.25-1 Ratio Engines)

Point Gap	014- 019"
Cam Angle	21-37°
Breaker Arm Spring Tension	17-22 ozs
Condenser Capacity	18- 28 mfd



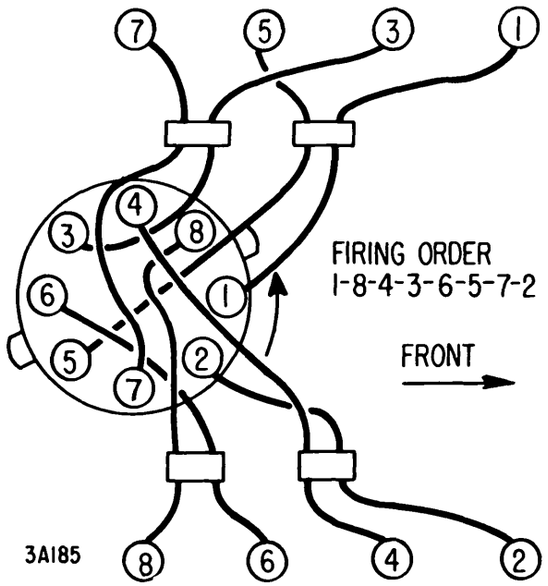
IGNITION TIMING MARKS (8.25-1 RATIO ENGINE)



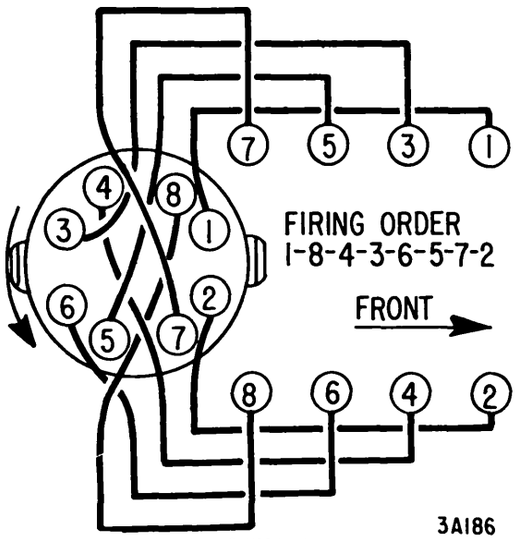
IGNITION TIMING MARKS (10.25 & 9.0-1 RATIO)

IGNITION EMISSION SHIELDING (AVANTI)

Distributor, coil, spark plugs, and ignition wiring shrouded by metal shielding All parts of shielding must be grounded to each other and to the engine, with all retaining screws and nuts tight



V8 FIRING ORDER (EXCEPT AVANTI)



AVANTI V8 FIRING ORDER

TUNE-UP NOTES

►*HARD STARTING & POOR WARM-UP IN COLD WEATHER (AVANTI & JET-THRUST ENGINE CARS):* Check for installation of production change modifications and use special settings as follows:

1) Starting Bypass Circuit & New Type Points - Wire must be installed between starter solenoid "IGN" terminal and coil "+" terminal (to bypass resistor for starting) New type Breaker Points, Studebaker No 1560473, must be used and set to specifications listed below (points may be identified by length of 1" between centerlines of pivot post and contacts - superseding 1¼" type)

2) Spark Plug Gaps - Set to 030"

3) Carburetor Choke Valve Drilling - Valve should have 4 1/8" holes on upper side *See Carter AFB Carburetor in Carburetion Section*

4) Fast Idle Setting - Change throttle valve fast idle clearance to 040" (from 022")

5) Automatic Choke Setting - Change choke setting to 1 Notch Lean (from Centered) *If car lopes or overchoking noted after starting, set choke 2 Notches Lean*

6) Engine Idle Speed - Set at 650-700 RPM

►*SPECIAL EQUIPMENT 304 5" ENGINE IGNITION NOTE:* Ignition system is Prestolite Transigniter Model 201 *See "Prestolite Transistorized Ignition" in Electrical Section*

►*FLAT SPOT OR ROUGHNESS ON ACCELERATION ABOVE 1500 RPM (SUPERCHARGED AVANTI & JET-THRUST ENGINES)* Caused by sudden opening of secondary auxiliary throttle valves Correct by modifying carburetor *See "Carter AFB 4-Barrel Carburetor" in Carburetion Section*

©(289" 10 25 & 9 0-1 Ratio Engines)

Point Gap	019"
Cam Angle (Each set of points)	22-26°
(Both sets together)	32-36°
Breaker Arm Spring	21 25 ozs
Condenser Capacity	18- 28 mfd

© - With revised breaker point set (1" breaker arm) See *Hard Starting Correction above*

(304 5" Eng. - Transistorized Ign.)

Point Gap	011 016"
Cam Angle	36-42°
Breaker Arm Spring Tension	21-25 ozs

IGNITION TIMING

Set timing with distributor vacuum line disconnected

259", 289" (8 25-1 Ratio)	4° BTDC at 550 RPM
289" (10 25-1 Ratio)	4° BTDC at 650 RPM
289" (9 0-1 Ratio)	24° BTDC at 1600 RPM
304 5" (9 75 1 Ratio)	26° BTDC at 4000 RPM

HOT (SLOW) IDLE RPM

259" 289" (8 25-1 Ratio)	©550 RPM
289" (10 25 & 9 0-1 Ratio)	©650 RPM
304 5" (9 75-1 Ratio)	

© - With automatic transmission in "N"

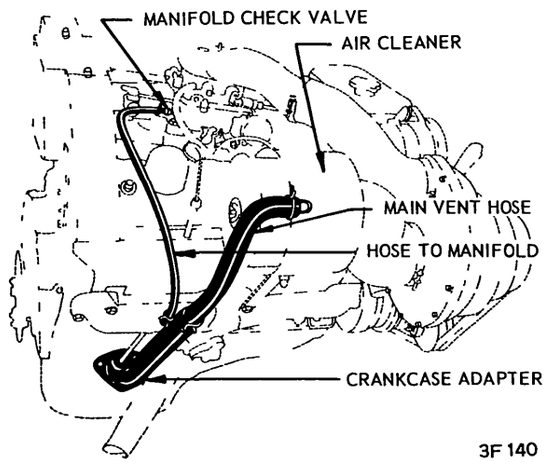
FAST IDLE RPM

Stromberg WW & Carter AFB Carbs - With fast idle screw aligned with index mark on fast idle cam, adjust screw to obtain desired engine RPM

AUTOMATIC CHOKE SETTING

Stromberg WW6-130	Centered
Carter AFB 3540S	Centered
3506S, 3507S	©Centered
3588S 3589S	©Centered

© - *See Hard Starting in Cold Weather Correction above*



SUPERCHARGED ENGINE CRANKCASE VENTILATING SYSTEM

TUNE-UP SPECIFICATIONS (Continued)

FUEL PUMP PRESSURE & VOLUME

Pressure (8 25-1 Ratio)	3½-5 lbs at 30 MPH
(9 0-1 & 10 25-1 Ratios)	©5½-7 lbs at 1000 RPM
Volume (9 0-1 & 10 25-1 Ratios)	1 pt in 15 seconds max at idle

© - With air pressure line disconnected on Supercharged models

MANIFOLD HEAT CONTROL VALVE

Automatic thermostatic type located in right bank exhaust manifold outlet With outer end of coil free from anchor and valve closed (counterweight forward) hooked end of coil should be 90° clockwise from anchor pin at 70°F

CLOSED CRANKCASE VENTILATION SYSTEM

Blow out hoses and clean valve (valve cannot be disassembled) every 10 000 miles or more often, particularly during cold weather operation Two systems used

Non-supercharged Engines - Valve located in line to manifold (Stromberg Carburetors) screwed in carburetor throttle body (Carter Carburetors)

Supercharged Engines - Simple check valve located in manifold fitting ("Y" hose with main line connected to air cleaner) Check valve must close when manifold pressurized (manifold line effective only at low speeds with low suction in air cleaner)

IGNITION

DISTRIBUTOR ADVANCE SPECIFICATIONS

Prestolite IBP-4108

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	300	Start	8
3	400	1	8 5/8
6	650	4	10 1/2
9	900	7	12 3/8
12	1130	8	13

For engine degrees & RPM, multiply by 2

Prestolite IBS-4012

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	400	Start	7-9
3	500	3	9-10¾
6	600	6	11 12¾
8	675	9 Max	13
10	1000		

For engine degrees & RPM, multiply by 2

Prestolite IBS-4012A

Mechanical Advance		Vacuum Advance	
Distr Degrees	Distr RPM	Distr Degrees	Vacuum " of Hg
Start	300	Start	7-9
3	400	3	9-10¾
6	500	6	11-12¾
9	600	9 Max	13

For engine degrees & RPM multiply by 2

Prestolite IBB-4110

Mechanical Advance		Vacuum Advance
Distr Degrees	Distr RPM	
Start	300	
2	800	NONE
7	2000	

IGNITION COIL

Prestolite 200567 (259", 289" 8.25-1 Ratio)
200674 (289" 10.25 & 9.0-1 Ratio)
200826 (304.5" Eng. - Transistorized Ign.)

Ignition Current (200567)	3 8 amps idling
(200674)	4 amps idling
(200826)	4 5-5 amps idling
	10 amps stopped
Resistance Wire (259", 289" 8 25-1)	1 8 ohms

Resistor (Others) - Mounted externally on coil

CARBURETOR

CARBURETOR SPECIFICATIONS

Carburetor No	Float Level	Float Drop	Choke Setting
Stromberg WW 6-130	©3/16"		Centered
Carter AFB			
3540S	②9/32"	②23/32"	Centered
3506S,3507S	②3/8"	②23/32"	③Centered
3588S,3589S	②3/8"	②23/32"	③Centered

© - To top of float at center
② - To top of float in line with first indentation on side of float at free end
③ *See Hard Starting in Cold Weather under Tune-Up for special settings*

ACCELERATING PUMP

Stromberg WW6-130	Center Hole
Carter AFB 3506S,3507S,3540S	Center Hole
3588S, 3589S	Center Hole

CHECKING SUPERCHARGER OIL LEVEL

Check every 1000 miles Maintain oil level between punch marks on dipstick Add fluid through dipstick tube *Do not overfill*

THROTTLE LINKAGE ADJUSTMENT

Auto. Trans. Cars - With engine at normal operating temperature, choke valve wide open and throttle return check operating correctly, proceed as follows

(Continued)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

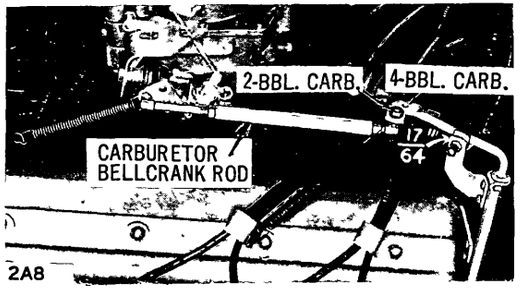
CARBURETOR (C ntinu d)

1) Adjust engine to correct idle speed with transmission in "N". Set stop on bellcrank (at rear of engine) to provide a 17/64" gap between bellcrank pads (use a 17/64" drill as a gauge). After stop is adjusted, hold in this position.

2) Make sure that carburetor-to-bellcrank rod ball joint is in inner hole of bellcrank pad on cars with 2-barrel carburetor, and in outer hole on cars with 4-barrel carburetor. In both cases, ball joint must be on underneath side of bellcrank lever.

3) Adjust carburetor-to-bellcrank rod until idle speed screw on carburetor throttle lever just begins to leave its stop.

4) Stop engine and remove 1/8" pipe plug near throttle lever on side of transmission and install a pressure gauge. Place selector lever in "D" position and run engine at 1000 RPM (1400 RPM on Avanti) with rear wheels held stationary. Adjust length of main bellcrank-to-transmission throttle valve outer lever rod to obtain 80-85 lbs. pressure on gauge (95-100 lbs. on Taxi). Stop engine, remove gauge, and install plug.



AUTOMATIC TRANSMISSION THROTTLE LINKAGE

THROTTLE RETURN CHECK

Stromberg Carb. - Loosen throttle return check assembly screw locknut and adjust return check in bracket until plunger just breaks contact with tab on outer lever. Mark position of check assembly relative to bracket, then turn check assembly 1¾-2 turns toward lever. Tighten locknut.

Carter Carb. - With fast idle screw on second step of fast idle cam, adjust throttle return check plunger screw until it just contacts pad on primary throttle shaft. Tighten locknut.

ELECTRICAL

BATTERY

12 Volt.

Capacity

Model	Amps. Hrs. (20 Hr.)
All except Avanti (Std.)	50
Avanti	60
With 304.5" Engine	60

Battery Ground - Negative.
Engine Ground - Front engine support bracket to frame.

STARTER

►*STARTER PRODUCTION CHANGE:* Prestolite "MDU" (3 coil) starters used on first cars, "MDY" (4 coil) type used on later cars. These "MDY" starters provide better cranking performance in cold weather

Prestolite MDU-7025,7026

Torque	RPM	Volts	Amperes
0 ft. lbs.	5200	10.0	55
11 ft. lbs.	Lock	6.0	425

Brush Spring Tension - 31-47 ozs.

Prestolite "MDY"

Torque	RPM	Volts	Amperes
0 ft. lbs.	4200	10 0	60
9 ft lbs.	Lock	4.0	405

Brush Spring Tension - 31-47 ozs. (MDU), 32-40 ozs. (MDY)

ALTERNATOR

Prestolite Alternator	Amps.	Volts	Temp.	Alt. RPM
ALK-5001	35	14.2	70°F	℄4200
ALE-5003	38-42	14.0-14.4	70°F	℄4200

℄ - 1700-1750 Engine RPM.

ALTERNATOR REGULATOR

Prestolite VBT-6201A, VBV-6221A

VBT-6201A - Single unit type with double contact voltage regulator. Regulator not adjustable. Service by replacement only

VBV-6221A - Contains a circuit breaker relay and a relay and a voltage regulator. Regulator not adjustable. Service by replacement only

BELT ADJUSTMENT

Use a spring scale on belt midway between pulleys. Adjust belt tension so specified lbs. pull on scale will lift belt proper distance (see table below).

Belt Adjustment Specifications

Belt	Lbs. Pull	Deflection
Alternator	10	1/4"
Power Steering	4	3/16-1/4"
Air Conditioning	20	1/2"

FUSES & CIRCUIT BREAKERS

LARK, CRUISER, HAWK

CIRCUIT BREAKERS

Lighting - In Light Switch (at switch on Hawk).
Windshield Wiper - In wiper switch
Tailgate Window (Power) - On left front fender apron.
Cigar Lighter - On back of lighter socket.

FUSE BLOCK

On back of instrument panel on lower left side. Two fuses: 1) Direction Signal & Back-up Lights, 2) Dome & Stop Lights

OTHER FUSES

Clock & Radio - In-line fuses back of instrument panel. Heater - On heater switch. Overdrive - On kick-down switch.

AVANTI

Fuse block on left inner cowl panel above kick pad. See *illustration.*

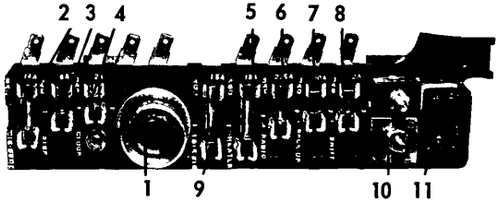
1 - Direction Signal Flasher.

CIRCUIT BREAKERS

10 - Windshield Wiper. **11** - Lighting.

FUSES

2 - Cigar Lighter, Dome, Map Lights.
3 - Stop Light. **4** - Clock.
5 - Heater. **6** - Radio.
7 - Back-up Light. **9** - Direction Signal.
8 - Trans Indicator & Console Light.



AVANTI FUSE BLOCK

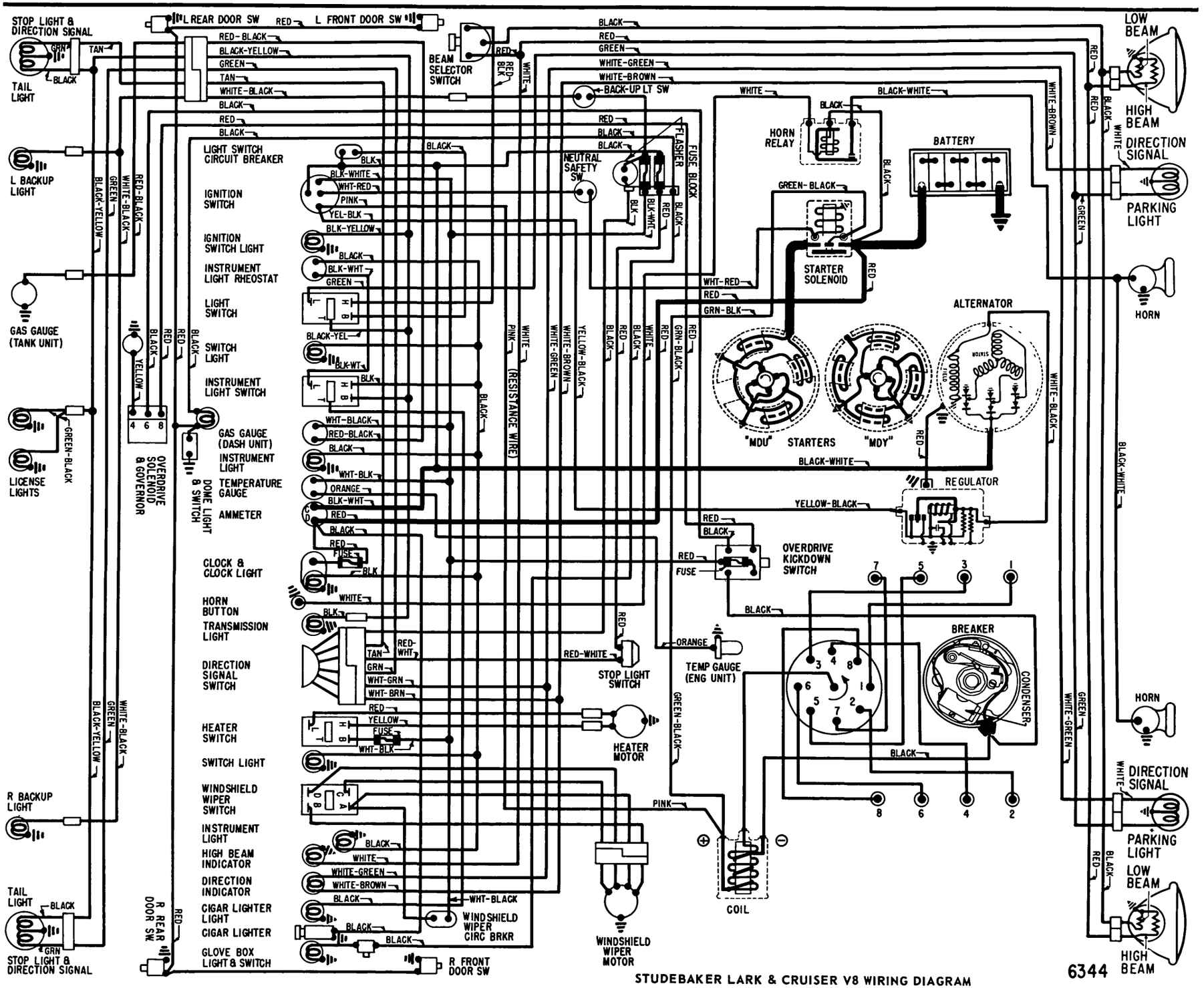
SWITCHES, GAUGES, & SPEEDOMETER

LARK & CRUISER

NEUTRAL SAFETY SWITCH

Switch located on steering column (column mounted gearshift lever), on bracket attached to retainer plate at side of transmission (floor mounted gearshift lever). Place selector lever in "N", then loosen switch mounting bracket attaching screws. Align pin hole in switch lever with hole in switch body on gearshift mounted type. On floor mounted type, align pin hole in switch lever with hole in mounting bracket. Now hold switch in position or use a pin to maintain alignment and tighten mounting screws. Check operation. Starter should operate with selector lever in "N" or "P" only.

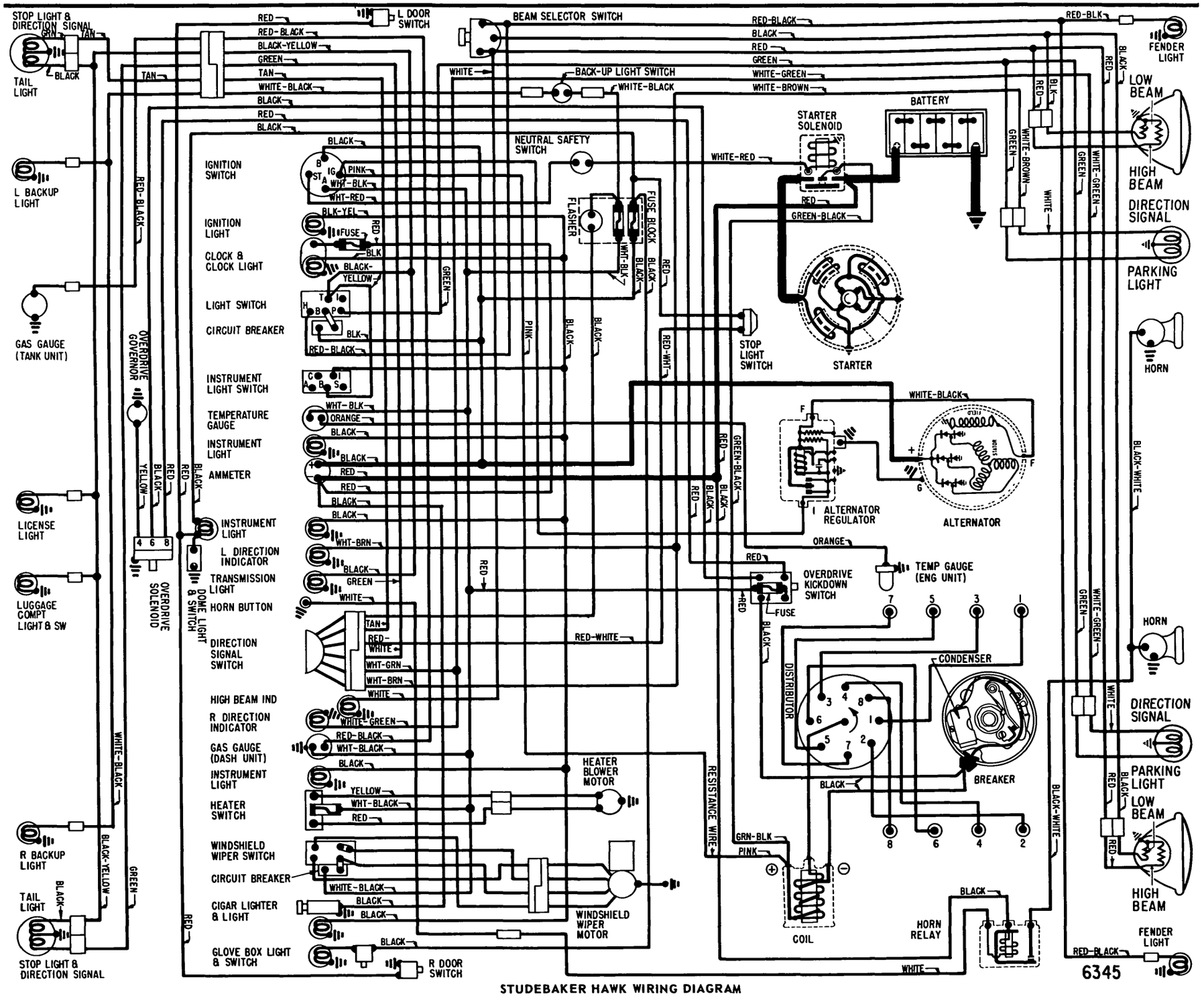
See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



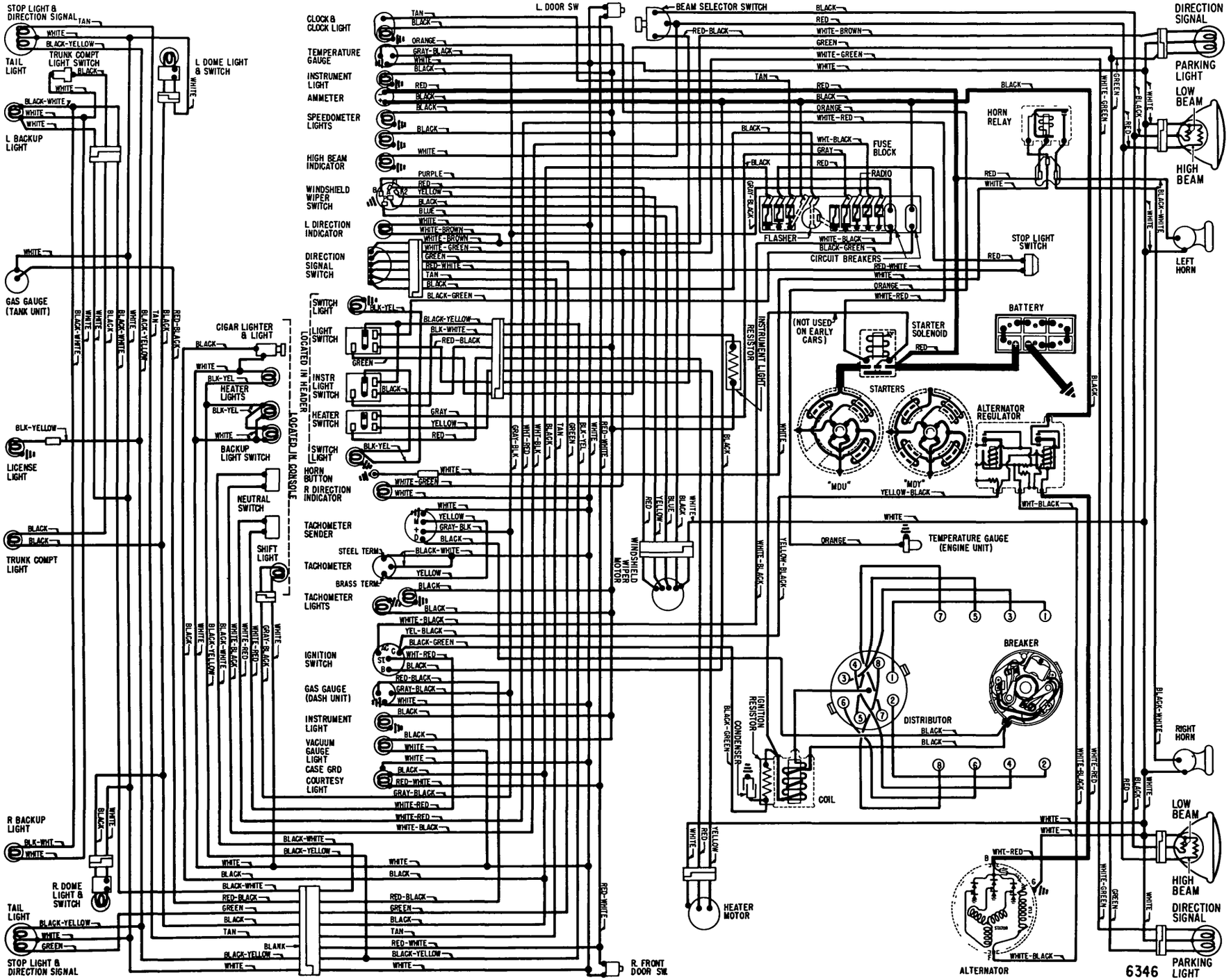
STUDEBAKER LARK & CRUISER V8 WIRING DIAGRAM

6344

Studebaker V8 & Avanti 1963



STUDEBAKER HAWK WIRING DIAGRAM



STUDEBAKER AVANTI WIRING DIAGRAM

ELECTRICAL (C ntinu d)

HEADLIGHT, HEATER, WINDSHIELD WIPER SWITCH REMOVAL

1) Remove fresh air control bracket and fuse block retainer screws. Loosen heater control cable bracket.
2) Remove access hole cover from lower part of instrument panel (two cross-head screws).
3) Loosen switch lower retainer screw (work through access hole), remove switch upper retainer screw from behind instrument panel.
4) Slide switch up and out, disconnect switch wires.

STOP LIGHT SWITCH LOCATION

Hydraulic. In front brake line fitting on inner side of of left frame side member just forward of steering gear (Without Power Brakes), on brake master cylinder on firewall (Power Brakes).

TURN SIGNAL FLASHER

On fuse block on back of instrument panel on lower left side.

SPEEDOMETER REMOVAL

Disconnect drive cable at speedometer head, remove four light bulb and socket assemblies (press-in type), remove retainer nuts and brackets, withdraw speedometer from panel.

INSTRUMENT REMOVAL

Instrument case (Fuel Gauge, Temperature Gauge, Oil Pressure Gauge, Ammeter) is removed as an assembly as follows:

1) Disconnect oil pressure gauge pipe at gauge.
2) Remove fresh air control bracket and fuse block retainer screws. Remove two instrument case retainer nuts and brackets.
3) Withdraw instrument case from panel, remove two press-in type light bulb and socket assemblies, disconnect wires.
4) For access to individual gauges, pry up retainer tabs to free bezel, remove bezel, glass, glass retainer, and dial face assembly.

HAWK

NEUTRAL SAFETY SWITCH

See Lark & Cruiser (above).

HEADLIGHT, INSTRUMENT, WINDSHIELD WIPER, HEATER SWITCH REMOVAL

Remove nut on switch stem, push switch back through instrument panel, disconnect wiring.

STOP LIGHT SWITCH LOCATION

Hydraulic. In front brake line fitting on inner side of left frame side member just forward of steering gear.

TURN SIGNAL FLASHER

On fuse block on back of instrument panel on lower left side.

SPEEDOMETER REMOVAL

Disconnect drive cable at speedometer head, remove light bulb and socket assemblies, remove retaining nuts and bracket, withdraw speedometer from panel.

GAUGE REMOVAL

Gauges can be removed individually through face of instrument panel after wires or pipes disconnected, and stud nuts removed.

AVANTI

NEUTRAL SAFETY SWITCH

See Lark & Cruiser (above).

SWITCH PANEL & SWITCH REMOVAL

Take out two screws and remove nameplate and gasket from header switch panel. Remove two screws retaining switch panel on header, pull panel down and away from header. Remove individual switches by disconnecting wires and taking out two screws attaching switch to panel.

STOP LIGHT SWITCH LOCATION

Hydraulic type. On master cylinder on firewall.

TURN SIGNAL FLASHER

On fuse block on left inner cowl panel above kick pad.

SPEEDOMETER & TACHOMETER REMOVAL

Disconnect speedometer cable or tachometer wires. Disconnect ground wire from mounting stud (speedometer), remove light bulb anf socket assemblies. Remove retaining clamp stud nuts and retainer, pull unit out of panel toward steering wheel.

GAUGE REMOVAL

Gauges can be removed individually through face of instrument panel after wires or pipes disconnected, bulb and socket assemblies removed, and mounting stud nuts and insulating grommets removed.

ENGINE

►*ENGINE IDENTIFICATION: See MODEL IDENTIFICATION for Engine Number Prefixes.*

GENERAL SPECIFICATIONS

Engine ①	HP at RPM	Compr. Ratio	Bore	Stroke	Displacement
Thunderbolt I 2-Bbl.	180 at 4500	① 8.25-1	3 9/16"	3 1/4"	259.2 cu. ins.
4-Bbl.	195 at 4500	① 8.25-1	3 9/16"	3 1/4"	259.2 cu. ins.
Thunderbolt II 2-Bbl.	210 at 4500	① 8.25-1	3 9/16"	3 5/8"	289 cu. ins.
4-Bbl.	225 at 4500	① 8.25-1	3 9/16"	3 5/8"	289 cu. ins.
Jet Thrust 4-Bbl. ②③	.....	10.25-1	3 9/16"	3 5/8"	289 cu. ins.
Super Jet Thrust 4-Bbl. ②④	.....	9.0-1	3 9/16"	3 5/8"	289 cu. ins.
Avanti ③	.....	10.25-1	3 9/16"	3 5/8"	289 cu. ins.
Avanti ④	.....	9.0-1	3 9/16"	3 5/8"	289 cu. ins.
Special Equipment ④	⑤305 at 5200	9.75-1	3 21/32"	3 5/8"	304.5 cu. ins.

① - 8.5-1 Optional.
② - Optional except Avanti.
③ - Non-supercharged Engine.
④ - Supercharged Engine.
⑤ - With 6 lbs. manifold pressure.

OIL PAN

Removal - Remove oil level dipstick and adapter tube by removing head bolt retaining tube bracket. On engines with crankcase vent hose connection at oil pan, remove hoses from adapter, take out exhaust manifold bolt retaining adapter, and adapter-to-oil pan screws, remove adapter assembly. Remove starter. On Hawk, swing front wheels to right to move steering bellcrank out of the way. On other models, disconnect tie rods and reach rod from steering bellcrank, remove retaining pinch bolt and remove bellcrank from shaft. Remove oil pan screws and remove pan.

Installation - Front filler block must be removed for installation of oil pan side gaskets. Install pan as follows:

1) Take out filler block screws and carefully separate filler block from front cover gasket.

NOTE - If gasket damaged, cut away exposed portion of gasket and install similar part of new cover gasket.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE (C ntinu d)

2) Apply Perfect Seal or equivalent sealer to pan mounting flanges and install pan side gaskets
3) Apply sealer to filler block screw threads, place filler block in position and install one upper filler block screw Press filler block upward to compress pan gaskets and install opposite upper screw Install remaining screws and tighten all screws finger tight AFTER oil pan screws are tightened, torque all filler block screws to correct specifications
4) Install pan end gaskets, install pan and torque pan capscrews to specifications Install other parts

ENGINE REMOVAL

Lark, Cruiser, Hawk - If old cylinder block to be reinstalled, engine can be removed without disturbing clutch housing and transmission If new block being installed, remove transmission and then remove engine and clutch housing as an assembly (clutch housing must be aligned to new block)
1) On Air Conditioned cars, remove compressor mounting bracket and compressor as an assembly **without disconnecting refrigerant lines,** position compressor in **upright** position on right fender (to prevent oil leaking into compressor chamber above pistons)
2) On Power Steering cars, disconnect power steering pump from engine and place on one side out of the way
3) Remove hood, battery, upper air deflector, and fan shroud On Lark and Cruiser, remove radiator and water manifold On Hawk, remove fan blade assembly (not necessary to remove radiator or water manifold)
4) Disconnect all lines, wires, cables, and hoses from engine Remove starter
5) On cars with single exhaust pipe, remove Crossover pipe and exhaust connection section On other cars, disconnect exhaust pipes at manifolds
6) On Lark and Cruiser, disconnect tie rods, remove steering bellcrank and shaft assembly and move it out of the way for pan clearance On Hawk, turn front wheels to right for bellcrank clearance
7) Remove air cleaner (on supercharged engines, remove supercharger-to-carburetor air hose and air horn adapter) Disconnect all ignition wiring and remove distributor Disconnect accelerator rod at bellcrank
8) On Auto Trans Cars, disconnect transmission rod at bellcrank Remove converter housing lower plate and disconnect torque converter from converter drive plate (if converter housing not being removed)
9) Remove upper stud nuts from engine front mount insulators, disconnect ground strap at right front support bracket
10) Install lifting sling under intake manifold, attach hoist, raise engine slightly to remove weight from engine mounts
11) If clutch housing being removed with engine, disconnect propeller shaft and remove transmission, disconnect and move clutch operating shaft out of the way On Auto Trans cars, take out capscrews to free rear engine mounts from converter housing
12) If clutch housing not being removed, remove clutch or converter housing-to-engine bolts
13) Push engine forward to disengage clutch housing dowel pins and until clutch clears drive shaft splines, then lift engine out

Avanti - Remove transmission, then remove engine and clutch or converter housing as an assembly following same procedure as for Lark and Cruiser (above) with the following exceptions 1) Remove carburetor and all ignition shielding 2) Not necessary to remove water manifold 3) Not necessary to remove steering bellcrank (turn front wheels to right to move bellcrank out of the way)

CYLINDER HEAD

Removal - Heads are removed in usual manner after the following steps have been performed On Air Conditioned cars, remove compressor and mounting bracket as an assembly **without disconnecting refrigerant lines** and position compressor **upright** on right fender (to prevent oil leaking into compressor chamber above pistons) On Avanti, remove shielding from around distributor and spark plugs (for access to cables) Loosen all water manifold bolts and remove bolts from head being removed Remove rocker arm assembly (center head bolts retain rocker arm brackets), remove pushrods

Installation - Use Perfect Seal or equivalent on head gasket, make certain that oil leads are open (oil feed hole at one end of head, hollow dowel hole at opposite end), install gasket and head, with new water manifold gasket cemented to head Oil cylinder head bolts and install bolts fingertight (short bolts in outer rows, medium length bolts in center row) Install rocker arm assembly and tighten head bolts in brackets fingertight, then tighten bracket bolts alternately to pull rocker arm assembly down evenly Torque all head bolts in sequence shown to correct specifications, then torque rocker arm bracket bolts to specifications Tighten all water manifold bolts

TIGHTENING SPECIFICATIONS

ENGINE TORQUES	Ft. Lbs.
Cylinder Head	55-65
Intake Manifold	26-30
Exhaust Manifold	25-30
Oil Pan	13-17
Rocker Shaft Bracket	13-17
Rocker Arm Cover	*19-21 In Lbs*
Valve Lifter Cover	ℂ *24-30 In Lbs*
Main Bearing Caps	85-95
Connecting Rod Caps	52-54
Piston Pin Clamp Bolt	20-25
Vibration Dampener	130-140
Pulley Nuts or Screws	13-17
Flywheel	33-35
Camshaft Gear	20-25
Camshaft Thrust Plate	13-17
Engine Front Cover	13-17
Oil Pump	13-17
Water Pump	10-14
Water Manifold	13-17
Clutch Housing (to Block)	28-32
Converter Housing (Auto Trans)	40-45
Converter Drive Plate	23-28

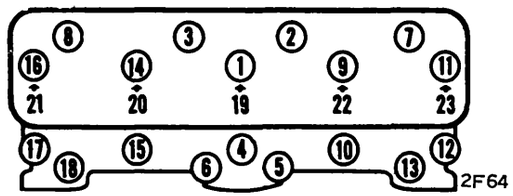
ℂ - Torque three times

ENGINE MOUNTING TORQUES	Ft. Lbs.
Front Support Insulator Bolt Nuts	20-25
Front Support Bracket Bolt Nuts	25-30
Rear Support (Synchro-mesh)	
Insulator-to-Clutch Housing Screws	70-80
Insulator-to-Crossmember Bolts	30-35
Rear Support (Auto Trans)	
Insulator-to-Cnvtr Housing Screws	45-50
Insulator-to-Crossmember Stud Nuts	45-50

PISTONS, PINS, RINGS

Engine	PISTONS Clearance	PISTON PIN Piston Fit	PISTON PIN Rod Fit	RINGS Ring	RINGS End Gap	RINGS Side Clearance
259", 289" (8 25-1)	ℂ	0001- 0003"	ℭ	Comp (1 & 2)	008- 016"	002- 005"
				Oil	015- 055"	Snug
289" (10 25 & 9 0-1)	ℂ	0001- 0003"	ℭ	Comp (1)	012 020"	0025- 004"
				Comp (2)	008- 016"	0025- 004"
				Oil	015- 055"	Snug
304 5"	ℂ	0001- 0003"	③	Comp (1 & 2)	030"	0025- 004"
				Oil	015- 055"	Snug

ℂ - Selective feeler fit *See "Fitting Pistons"*
ℭ - Locked in rod by tapered pin and locknut
③ - Locked in rod by tapered pin and locknut or press fit in rod

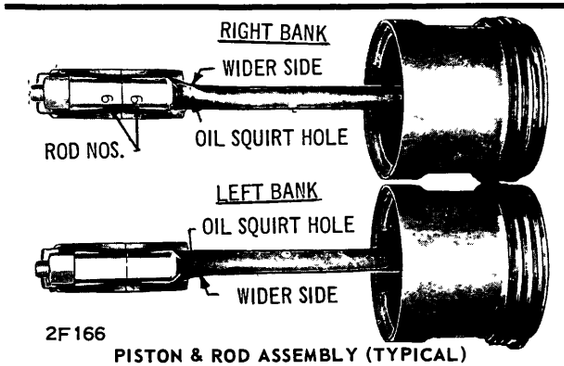


CYLINDER HEAD TIGHTENING SEQUENCE

FITTING PISTONS

Except 304.5" (9.75-1) Engine - Use a 002" x 1" x 12" feeler gauge inserted on camshaft side of cylinder Insert inverted piston in cylinder bore with slotted side away from camshaft and bottom edge of piston 1' below top edge of bore Pull required to withdraw feeler should be 7-12 lbs

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



PISTON & ROD ASSEMBLY (TYPICAL)

INSTALLING PISTON RINGS

Install compression rings with chamfered side of ring upward.

PISTON PIN

R moval - Tool J-1293C can be used to mount piston assembly in vise (tool mandrel extends through pin with retaining nut on outer end). Remove locknut and star washer from clampscrew, install nut on opposite end of screw and tighten nut to withdraw the tapered clampscrew.

Installati n - Assemble pistcn and rod (see Piston & Rod Installation), insert clampscrew from oil squirt hole side of rod and install star washer and locknut on tapered end of screw (nuts will face left side of engine on all rods when installed in engine). Torque locknuts to correct specification.

PISTON & ROD INSTALLATION

Install piston on rod so solid side of piston is on same side as oil hole in bearing bore. Install pistons and rods into cylinder block with notch in piston head to front of engine and numbers on rods and bearing caps together and installed in same numbered cylinder with numbers downward and oil squirt hole toward right side of engine on all rods. Wider side of rod will be toward rear (Right Bank), toward front (Left Bank).

VIBRATION DAMPER & PULLEY ASSEMBLY

Remove radiator and fan shroud. Then proceed as follows:

259", 289" (8.25-1 Engines) - Pulleys and damper are bolted on pulley hub pressed on crankshaft. Disassemble parts after removing nuts on pulley hub bolts. One bolt hole is offset to insure correct assembly (offset bolt hole in line with timing marks on damper and marked by reference line on pulley spacers). Use suitable puller and pusher to remove and install hub (Puller Set J-8111 and Pusher Set J-4704-A). Install damper with identification mark "6H" toward radiator, torque bolt nuts and crankshaft bolt to specifications. *NOTE* - Cars with Air Conditioning or Power Steering have extra pulley and spacer and use longer hub bolts.

289" (10.25 & 9.0-1 Engines) - Pulleys are bolted to damper which is pressed on crankshaft. Use suitable puller and pusher to remove and install damper after pulleys are removed (Puller J-8305 and Pusher Set J-4704-A). Torque pulley capscrews and crankshaft bolt to specifications.

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

	MAIN BEARINGS				CONNECTING RODS		
Engine	Journal Diameter	Clearance	Thrust Bearing	Endplay	Journal Diameter	Clearance	Sideplay
259". 289" (8.25-1)	2.4995-2.5000"	ℂ.0005-.0025"	No. 1	.003-.006"	1.99925-2.00025"	.00025-.00275"	.008-.013"
289" (10.25 & 9.0-1)	2.4995-2.5000"	.0008-.0033"	No. 1	.003-.006"	1.99925-2.00025"	.00025-.00275"	.008-.013"
304.5"	2.4995-2.5000"	.0018-.0043"	No. 1	.003-.006"	1.99825-1.99925"	.00125-.00375"	.008-.013"

ℂ - Taxicab & Police: Nos. 1 & 5 - .0006-.0027", Nos. 2,3,4 - .0003-.0028".

CRANKSHAFT REAR OIL SEAL

Brummer (molded rubber) seals used in block and bearing cap. Bearing cap seal has integral cross seals and cork filler blocks are used between sides of cap and block. When installing seals, thoroughly clean seal channel in block and cap by swabbing with alcohol or solvent and drying with air.

Upper Seal - Loosen all intermediate bearing cap bolts approximately 2 turns for clearance, use screwdriver or similar tool to blunt sharp edge of flange at rear of block to prevent scuffing inside edge of seal, apply Lubriplate to sealing lip of seal, insert seal with inner lip toward front of engine, roll seal in place between crankshaft and block to point ¼" past face of block, then rotate seal back flush with block (this will relieve internal stresses).

Lower Seal - Install seal on bearing cap flange (inner lip toward front of engine), fully seat cross seals in cap grooves, trim outer ends of cross seals flush with cap edges. Apply Lubriplate or engine oil to sealing lip, install bearing cap and tighten all caps to correct torque specification. Install new cork filler block seal between bearing cap and block on each side.

CRANKSHAFT END THRUST

Crankshaft end thrust taken by thrust washer between front main bearing and crankshaft gear, and controlled by shims between thrust washer and main bearing journal. These shims furnished .003", .005", .007" thick.

ENGINE FRONT COVER

Removal - Remove radiator, fan shroud, fan, water manifold, and fuel pump. Remove vibration damper and pulleys (see above). Remove cover.

Installation - Leave cover screws loose until after pulley hub or vibration damper installed (will center cover), then torque cover screws to specifications.

FRONT COVER OIL SEAL

DO NOT remove four self-tapping screws retaining seal retaining plate. Use pointed tool to remove old felt seal, clean seal recess, install new felt seal in recess and use damper or pulley hub to seat and center seal. Lubricate seal with engine oil.

VALVES

Engine	Head Diameter	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
259",289" Int.	1 21/32"	45°	45°	1/16-3/32"	.3437"	.0015-.0035"	ℂ.3594"
(All) Exh.	1 17/32"	45°	45°	1/16-3/32"	.3437"	.0015-.0035"	ℂ.3594"
304.5" Int.	1 7/8"	45°	45°	1/16-3/32"	.3437"	.0015-.0035"	.406"
Exh.	1 5/8"	45°	45°	1/16-3/32"	.3437"	.0015-.0035"	.406"

ℂ - .400" on 289" (10.25 & 9.0-1 Ratio) Engines.

VALVE GUIDE SERVICING

Use Tool J-4673 to drive old guides out from combustion chamber side. Coat outside of new guide lightly with white lead, insert chamfered end of guide into head from combustion chamber side *(CAUTION - Different guides used - intake guide is longer)*, install driver through correct hole of installing plate (plate marked "Intake" and "Exhaust" and should be placed across head with correct mark up), drive guide in until driver bottoms on installing plate.

VALVE STEM SEALS

Used on all valves. "Umbrella" type. Install seals with cupped side down toward top of valve guide.

VALVE LIFTER REPLACEMENT

Lifters should slide into place of own weight. If .001" oversize lifter does not correct excessive clearance, ream lifter bore using Reamer 1352-STB (L.O. Beard Tool Company) which will provide correct clearance for .005" oversize lifter.

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

VALVE SPRING INSTALLATION

Install cup type damper on closed coil end of spring (damper fingers must contact spring coils), install spring with damper end down toward cylinder head

VALVE SPRING INSTALLED HEIGHT

Measure from spring seat on head to underside of spring retainer *See "Valve Closed" spring length in specification table*

ROCKER ARM ASSEMBLY

See illustration for assembly of parts Flat on end of shaft should be at rear of engine (Right Bank), front of engine (Left Bank) When installing assembly tighten head bolts finger tight, then tighten bracket bolts evenly to draw rocker arm assembly down on head, tighten two inner head bolts first, and end bolts last, to correct torque, then torque bracket bolts to correct specifications

Rocker Arm Clearance 0005- 0025"
Spacer Spring Tension 9½-10½ lbs min.at 2 1/32"

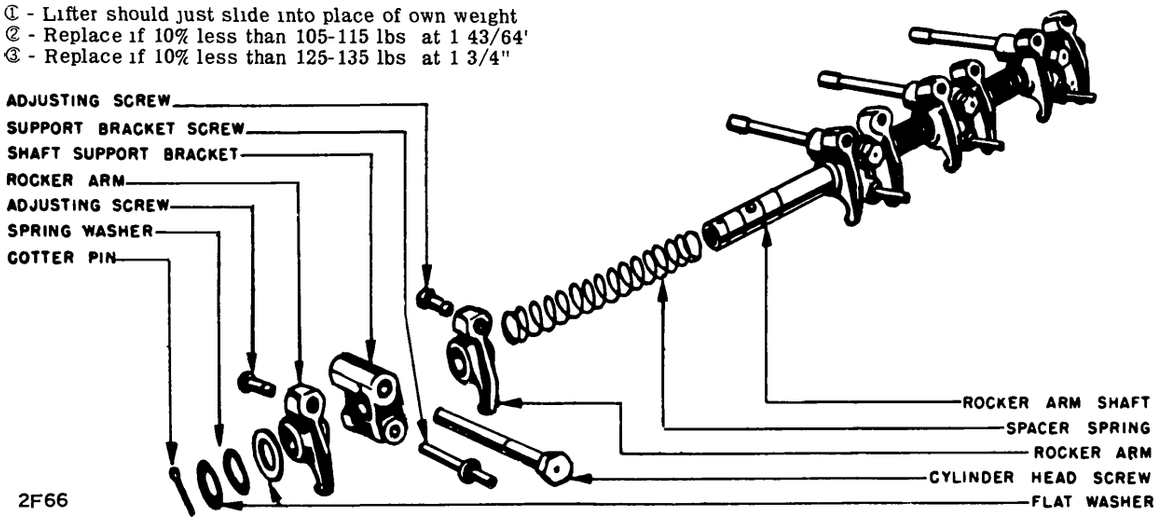
TAPPET CLEARANCE ADJUSTING SCREW

Self-locking type screws must have minimum turning torque of 30 In Lbs with screw fully engaged in rocker arm Replace screws if torque below minimum

VALVE SPRINGS & LIFTERS

Engine	SPRINGS Free Length	SPRINGS Pressure (Lbs) Valve Closed	SPRINGS Pressure (Lbs) Valve Open	LIFTERS Diam t r	LIFTERS Cl arance
8 25-1 Ratio		45-55 at 2 031'	② 105-115 at 1 671		①
9 0-1 & 10 25-1 Ratios		67-75 at 2 031'	③ 148-160 at 1 631"		①
9 75-1 Ratio		67-83 at 2 031"	150 172 at 1 63 1"		①

① - Lifter should just slide into place of own weight
② - Replace if 10% less than 105-115 lbs at 1 43/64'
③ - Replace if 10% less than 125-135 lbs at 1 3/4"



ROCKER ARM ASSEMBLY

CAMSHAFT

Engine	Bearing Diameter No. 1	No. 2	No. 3	No. 4	No. 5
All	1 86975-1 87075"	1 85375-1 85475"	1 83875-1 83975"	1 82275-1 82375"	1 24475-1 24575"

Bearing Clearance	Camshaft Endplay
No 1 00075- 00225"	003- 006"
Others 001- 00275"	

CAMSHAFT REMOVAL

Engine must be removed from car Camshaft can then be removed in usual manner

CAMSHAFT BEARING REPLACEMENT

Suitable arbors must be used to install bearings Align all oil holes and install front bearing with oil groove toward front of block

CAMSHAFT END THRUST

Camshaft end thrust taken by thrust plate on front face of engine block behind camshaft gear, and controlled by spacer on camshaft between gear hub and front bearing journal Adjust endplay by replacing thrust plate or spacer When installing thrust plate, tighten capscrews evenly and alternately to avoid distorting plate

CAMSHAFT TOOL NOTE Aluminum camshaft gear used on 289" (10 25 & 9 0-1 Ratio) and special tools required as follows

Gear Puller Set
259", 289" (8 25-1 Ratio) J-8111
289" (10 25 & 9 0-1 Ratio) J-8305

Gear Installer Pusher S t
All J-4704-A (Camshaft), J-4704 (Crankshaft)

TIMING GEAR REPLACEMENT

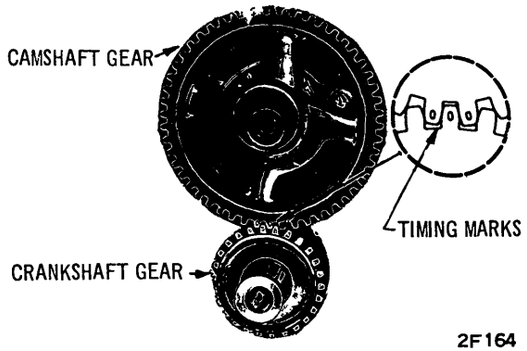
Backlash should be 001- 003" Use suitable pullers and pushers to remove and install gears (see Tool Note below) Thrust plate oil grooves must face camshaft gear and one tang of lockplate must engage camshaft gear keyway with opposite tang engaging fuel fuel pump cam *See Valve Timing Marks illustration*

VALVE TIMING

Engine	INTAKE Open BTDC	INTAKE Cl s ALDC	EXHAUST Open BLDC	EXHAUST Close ATDC
8 25-1 Ratio	11°	54°36'	51°36'	14°
9 0-1& 10 25-1 Ratios	17°	63°	56°	24°
9 75-1Ratio ①	28°	80°	80°	28°

① - Additional camshaft timings optional

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes



VALVE TIMING MARKS

CHECKING VALVE TIMING

Set tappet clearance of No. 1 intake valve at .030". Turn crankshaft until No. 6 piston is on compression stroke and the IN-OP 1-6, or index mark, on vibration damper is several inches from pointer. Then, while moving pushrod up and down, continue to rotate crankshaft until no up and down movement can be felt. When there is no clearance, No. 1 intake valve begins to open and IN-OP 1 mark on the damper should be directly below the pointer (259", 289" 8.25-1 Ratio), index mark on damper should be between 14° and 20° marks on pointer (289" 10.25 & 9.0-1 Ratio engines).

ENGINE OILING

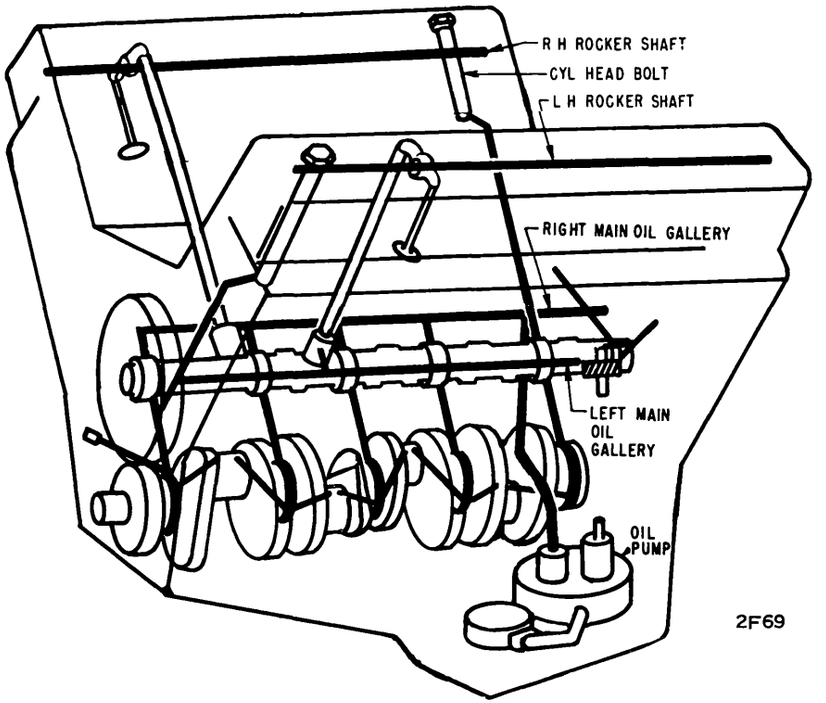
Normal Oil Pressure - 30-50 lbs. (30 lbs. min.) at 2000 RPM.

Pressure Regulator Valve - Under plug at right front of engine slightly above crankcase flange. *NOTE* - Timing gears lubricated by oil discharge from valve (small bleed hole in plunger provides lubrication when valve closed). Remove and clean valve yearly or more often

ENGINE OILING SYSTEM

Force feed type with full-flow filter. See illustration and note the following:

Rocker Arms, Pushrods & Valves - Vertical oil passages in block from rear of right main oil gallery (for right bank), front of left main oil gallery (for left bank) extend up to matching passages in heads Oil flows through cylinder head passages, around relieved cylinder head bolt in rear rocker shaft bracket (right bank head), front rocker shaft bracket (left bank head) and through holes drilled in bracket into hollow rocker arm shaft. Rocker arms and adjusting screws are drilled for pushrod seat lubrication. Surplus oil from rocker arm chamber is returned to crankcase through return passage (hollow dowel) at rear of block.



ENGINE OILING SYSTEM

Distributor Gear - Rear camshaft bearing is lubricated through separate passage from right main oil gallery and passage at rear of this bearing supplies oil to distributor drive gear.

Valve Lifters - Lubricated by cross-passages from main oil galleries. Surplus oil in lifter chamber returns to crankcase through drain hole.

Timing Gears - Camshaft gear thrust face is lubricated by oil from front camshaft bearing (Bearing and thrust plate are grooved to distribute oil on thrust face). Gears are lubricated by oil return from pressure regulator valve through passage in front of block (small bleed hole in valve plunger provides lubrication at low speeds when valve closed).

Oil Filter - Full-flow type. Intake and outlet passages and bypass valve (To allow oil flow if filter clogged) are located in filter base.

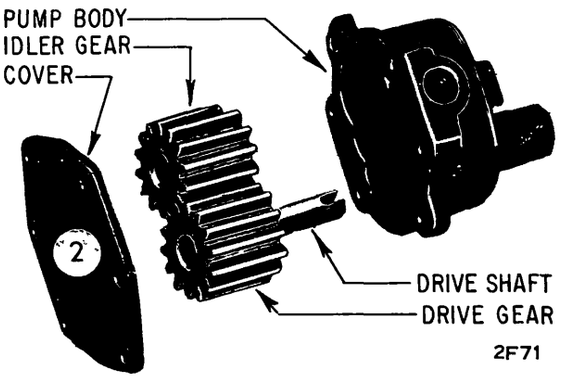
OIL PUMP

Removal - Pump mounted on rear main bearing cap. Accessible after oil pan removed.

Overhaul - Check all parts for wear and replace gears and pump body if clearances excessive. When assembling pump, tighten oil pipe and strainer assembly to 30 ft. lbs. with bottom of strainer parallel with pump cover.

Pump Gear Endplay - .007" maximum. Install gears, place straightedge across face of pump body, use feeler to check clearance between straightedge and face of gears.

Gear Clearance in Body - .010" (total). Check by placing .005" feeler between gear teeth and body at each side of pump. Gears should be locked. If gears rotate, replace body.



ENGINE OIL PUMP

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

ENGINE COOLING

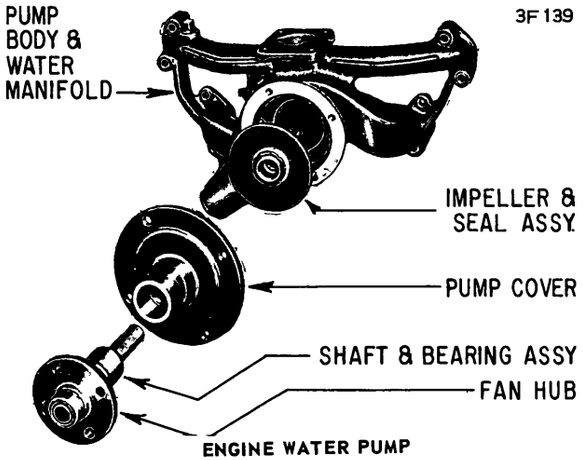
Pr ssur Valv - 12-15 lbs. Radiator filler cap.
Thermostat - 170° type Std (starts to open 167-172°F), 160° (starts to open 157-162°F) and 180° (starts to open 177-182°F) Optl.

WATER PUMP

Use suitable support plates and press tools when disassembling snd reassembling pump. Install parts to following specifications:
Shaft & Bearing Assembly - 1.625-1 640" from hub end of bearing to machined mounting face of pump housing
Fan Hub - 2 33/64" from front face of hub to machined mounting face of pump housing.
Impeller - .934- 938" (15/16") from machined edge of impeller blade to machined mounting face of pump housing.

VISCOUS FAN DRIVE

Limits fan speed to approximately 2550 RPM Replace as an assembly (sealed unit). Fan blade assembly serviced separately



ENGINE WATER PUMP

MODEL IDENTIFICATION

SERIAL NUMBER

Lark, Cruiser, Hawk - Stamped on a plate attached to left front door hinge pillar post.
Avanti - Stamped on a plate attached to top of right frame side member ahead of front body hold-down bracket.

Starting Serial Numbers

Model	South Bend	Canada
Lark, Cruiser, Hawk	63V-1001	63VC-1001
Avanti	63R-1001	

ENGINE NUMBER

Stamped on machined pad at upper left front of cylinder block

Starting Engine Numbers

Engine or Model ①	Starting Number
Thunderbolt I	V-1001
Thunderbolt II	P-1001
Jet Thrust	JT-1001
Super Jet Thrust (Supercharged)	JTS-1001
Avanti (Not Supercharged)	R-1001
Avanti (Supercharged)	RS-1001

① - *See "Engine Identification" under TUNE-UP, or "General Specifications" under ENGINE for further identification.*

FILTERS & CLEANERS

Filter or Cleaner	Servic Interval (Miles)
Oil Filter	Replace 4,000
Air Cleaner	Clean 4,000; Replace 20,000
Oil Filler Cap	Clean 1,000
Heater Air Filter	Clean 5,000
Fuel Filters	Replace 10,000

SERVICING AIR CLEANER

Paper Element Type - Shake element clean Do not use compressed air or solvents.

REPLACING OIL FILTER

Screw filter element onto base by hand until gasket is seated, then tighten an additional ½-turn *Do not over-tighten. Tighten by hand only.*

CAPACITIES

Crankcase (All 259", 289") Qts	① 5
(304 5" Engine) Qts	①⑤ 6
Cooling System (Qts)	② 17
Supercharger	③ 8 ozs.
Transmission	
3-Speed Synchro-mesh (Except Taxi) Pts.	3 8
(Taxi) Pts.	2 8
Overdrive (Pts)	4. 06
4-Speed Synchro-mesh (Pts)	2. 5
Automatic (Std) Pts	18
(Taxi, Police, Heavy Duty) Pts.	19
Rear Axle (Sta Wgn , Taxi, Hawk, Avanti) Pts	3.0
(Others) Pts.	2.5
Fuel Tank (Except Avanti) Gal	18
(Avanti) Gal	④ 21

① - Add 1 qt with filter change
② - Add 1 qt. with heater
③ - Automatic Transmission Fluid Type "A",Suffix "A".
④ - 26 5 gal. optional with 304 5" special engine.
⑤ - 7-10 qts. (optional Oil Cooler)

See Pages 2 to 13 for complete Car Model General Indexes and Equipment Indexes

CARTER AFB 4-BARREL CARBURETORS

BUICK — Cart r N .
401" Engine 3503S,SA
425" Engine (Auto. Trans.) 3578S
425" Engine (Synchro-mesh) 3579S

CADILLAC
Without Air Conditioning 3480S
With Air Conditioning 3481S

CHEVROLET & CORVETTE
327" Engine (Synchro-mesh) 3461S
327" Engine (Auto. Trans.) 3460S
409" Engine (400 HP) 3499S
409" Engine (425 HP) .....(Front) 3361S, (Rear) 3362S

CHRYSLER, DODGE & PLYMOUTH
383" Engine ① 3437S,SB
413" Engine ① 3478S,SA
413" Engine ① 3256S
383" & 426" Engines ② 3397S
383", 413" & 426" Engines ② 3559S
383" Engine ③ (Front) 3258S; (Rear) 3259S
413" Engine ④ (Two) 3505S,SA
426" Engine ④ (Two) 3447S,SA

LINCOLN CONTINENTAL
Without Air Conditioning 3521S
With Air Conditioning 3522S

PONTIAC TEMPEST
326" Engine (Synchro-mesh) 3477S
326" Engine (Auto. Trans) 3502S

PONTIAC
389" Eng. (3-Spd. Auto. Trans.) 3326SA
389" Eng. (4-Spd. Auto. Trans.) 3300SA
389" Eng. (Synchro-mesh) 3479S
421" Eng. (Synchro-mesh) 3574S
421" Eng. (Auto. Trans.) 3545S,SA

STUDEBAKER (EXC. AVANTI)
259" Eng. (Thunderbolt I) 3540S
289" Eng. (Thunderbolt II) 3540S
289" Eng. (Jet-Thrust) 3589S,SA
289" Eng. (Super Jet-Thrust) 3588S

STUDEBAKER AVANTI
289" Eng. (Jet-Thrust) 3506S
289" Eng. (Super Jet-Thrust) 3507S

① - Small bore carburetor
② - Large bore carburetor
③ - Runner manifold
④ - Ram manifold

►CHANGES, CAUTIONS, CORRECTIONS

DODGE & PLYMOUTH HIGH PERFORMANCE ENGINE IDLE SPEED NOTE - Adjust idle speed to 700-800 RPM (all models)

►*1962-63 BUICK CLOGGED CHOKE HEAT PIPES AND OIL IN CHOKE THERMOSTAT HOUSING CORRECTION:* Clean heat pipe and thermostat housing with a suitable cleaner, then replace right hand side rocker arm cover gasket. Make sure that no obstructions remain in pipe or housing.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed ① Engine RPM Hot	Idle Speed ① Engine RPM Fast	Off Eng. Fast Idle Setting ①	Idle Mix. Setting (14)	Float Setting ① Float Level	Float Setting ① Float Drop	Accel. Pump Travel ①	Choke Setting	Unloader Setting ①
3256S	500 ②③	1775-1825	.020"	1-2	7/32" (18)	3/4"	7/16" (15)	2 Rich	3/8"
3300SA (13)	480-500 ④⑤	2200	.026"	¼-2¼	21/64" (19)	23/32"	31/64" (15)	1 Rich	5/32"
3326SA (13)	480-500 ④⑤	2200	.026"	¼-2¼	21/64" (19)	23/32"	31/64" (15)	1 Rich	5/32"
3361S	750	....	..	1½-2	7/32" (20)	3/4"	1/2"	.....	.....
3362S	750	1750	.015"	1½-2	7/32" (20)	3/4"	1/2"	2 Rich	1/4"
3437S,SB	500 ②③	2100	.020"	1½	7/32" (18)	3/4"	7/16" (15)	Index	3/8"
3447S,SA	700 ③⑨	1400 (12)	.	1-2	9/32" (18)	23/32"	7/16" (15)		
3460S	450 ④	1750	.015"	1/8-1½	7/32" (20)	3/4"	1/2"	(17)	1/4"
3461S	475	1750	.015"	1/8-1½	7/32" (20)	3/4"	1/2"	1 Lean	1/4"
3477S (13)	580-600 (24)	2200	.....	1	21/64" (19)	23/32"	5/16" (15)	1 Rich	5/32"
3478S,SA	500 ②③	2100	.020"	1-2	7/32" (18)	3/4"	7/16" (15)	Index	3/8"
3479S (13)	480-500 ⑤	2200	.026"	¼-2¼	21/64" (19)	23/32"	31/64" (15)	1 Rich	5/32"
3480S (13)	480 ④	1700-1750 (10)	.022" (10)	1-3½	3/8" (21)	15/16"	15/32" (16)	1 Rich	5/16"
3481S (13)	480 ②④	1700-1750 (10)	.022" (10)	1-3½	3/8" (21)	15/16"	15/32" (16)	1 Rich	5/16"
3499S	750	1750	.015"	1½-2	7/32" (20)	3/4"	1/2"	2 Lean	1/4"
3502S (13)	540-560 ④⑥	2200	.....	1	21/64" (19)	23/32"	5/16" (15)	1 Rich	5/32"
3503S,SA	475 ④ ⑧	625 (11)	.....	¼-1¾	7/32" (20)	3/4"	7/16" (15)	Index	3/16"
3505S,SA (13)	700 ③⑨	1400 (12)	.....	1-2	9/32" (18)	23/32"	7/16" (15)	.....	.....
3506S	650 (23)	.....	.022"	.....	3/8" (18)	23/32"	29/64" (15)	Index	5/32"
3507S	650 (23)	.....	.022"	.....	3/8" (18)	23/32"	29/64" (15)	Index	5/32"
3521S (13)	450-475 ④⑥	675-700 ④ (11)	.026"	1½-2½	3/16" (22)	23/32"	17/32" (16)	Index	1/8"
3522S (13)	450-475 ④⑥	675-700 ④ (11)	.026"	1½-2½	3/16" (22)	23/32"	17/32" (16)	Index	1/8"
3540S	550 (23)	.....	.040-.044"	.....	9/32" (18)	23/32"	27/64" (15)	Index	5/32"
3545S,SA (13)	640-660 ⑧ (25)	2500	.026"	¼-2¼	21/64" (19)	23/32"	31/64" (15)	1 Rich	5/32"
3559S	700-800				7/32" (20)	23/32'	33/64"		5/32"
3574S (13)	640-660 (25)	2500	.026"	¼-2¼	21/64" (19)	23/32"	31/64" (15)	1 Rich	5/32"
3578S	475 ⑧	625 (11)	.030"	¼-1¾	7/32" (20)	3/4"	7/16" (15)	Index	3/16"
3579S	475 ⑧	625 (11)	.030"	¼-1¾	7/32" (20)	3/4"	7/16" (15)	Index	7/32"
3588S	650 (23)	....	.022"	.....	3/8" (18)	23/32"	27/64" (15)	Index	5/32"
3589S,SA	650 (23)	..	.022"	..	3/8" (18)	23/32"	27/64" (15)	Index	7/32"

① - See procedure below.
② - Air conditioner ON.
③ - Headlights ON.
④ - Auto. Trans. in "D" (Drive).
⑤ - 540-560 RPM with air conditioner OFF.
⑥ - Air conditioner OFF.
⑦ - 450 RPM with Auto. Trans. in "D" (Drive).
⑧ - 525 RPM with air conditioner OFF.
⑨ - 500 RPM with air conditioner ON.
(10) - Fast idle screw on second step of fast idle cam (against shoulder of highest step).
(11) - Fast idle screw on low step of cam.
(12) - Special procedure required. See below.
(13) - Idle Air Bypass System (use idle air screw for speed adjustment).
(14) - Initial setting. Turns open from a lightly seated position.
(15) - Connector rod in center hole of pump lever.
(16) - Connector rod in upper hole of pump lever
(17) - Index (Exc. Corvette); 1 Lean (Corvette).
(18) - Resilient needle valve seat.
(19) - Solid needle valve seat. If resilient type seat is used, adjust float level to 5/16".
(20) - Solid needle valve seat. If resilient type seat is used, adjust float level to 3/16"
(21) - Solid needle valve seat. If resilient type seat is used, adjust float level to 21/64".
(22) - Solid needle valve seat. If resilient type seat is used, adjust float level to 5/32".
(23) - Auto. Trans. in "N" (Neutral).
(24) - 640-660 RPM with Air Conditioner OFF.
(25) - 690-710 with Air Conditioner OFF .

CARTER AFB 4-BARREL CARBURETORS (C nt.)

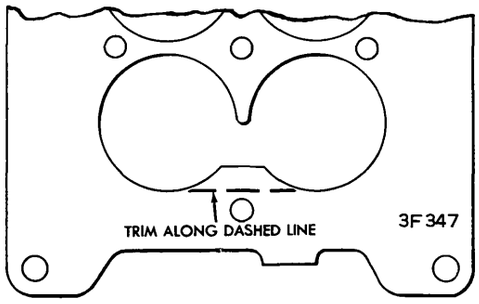
►*1963 CHRYSLER, DODGE, PLYMOUTH HARD COLD WEATHER STARTING CORRECTION.* This condition may be caused by choke vacuum piston sticking To correct, remove air cleaner and squirt a suitable carburetor cleaner through piston link opening while operating choke valve to flush out gum formation

►*1963 CHRYSLER, DODGE, PLYMOUTH HARD COLD STARTING CORRECTION:* If this condition is caused by insufficient choke application or by over choking it may be due to a binding condition To check, unsnap choke rod connector clip when engine is at normal operating temperature If any binding or resistance is encountered when removing choke rod from hole in arm on choke shaft, improper alignment is indicated To correct, remove choke assembly from engine and allow to cool, then disassemble (being careful to note shape and position of all parts for reassembly in original position) Correct bend at lower end of rod to exactly 90.° (use a square) Reassemble choke, making sure that all parts move freely (do not lubricate), and are located in original position When installing unit, make sure choke coil housing does not contact sides of well in manifold Check operation during engine warm-up

►*1963 LINCOLN ENGINE STALLING OR STUMBLE (ON COLD DRIVE-AWAY) CORRECTION·* On early cars (before Oct 22, 1962), install carburetor spacer, Part No C3VY-9A589-B and spacer gaskets, Part No C3VY-9447-B to correct the condition *NOTE - If the new gaskets are used with an early design carburetor spacer, modify the gasket as shown in illustration.*

►*1963 PONTIAC 3300SA & 3326SA CARBURETOR CHOKE PISTON PRODUCTION CHANGE TO PREVENT LOADING AT IDLE AFTER COLD START* Carburetors with the later type choke piston are identified by letter "A" in lower left corner of carburetor identification tag To correct a similar condition on earlier carburetors (without letter "A" on tag), install choke piston, Carter Part No 160-234

►*1963 PONTIAC & PONTIAC TEMPEST POOR THROTTLE RETURN CORRECTION:* This condition may be misaligned primary throttle valves, burr on edge of throttle valve, or by a binding primary throttle valve shaft To free a binding shaft, open and close throttle valves several times and gently tap ends of throttle shaft with valves closed

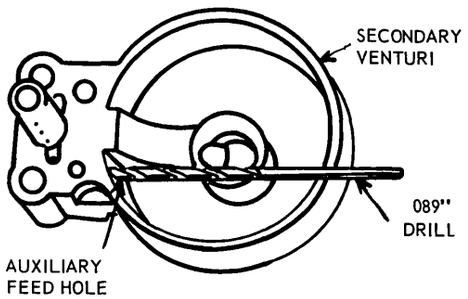


LINCOLN CARBURETOR GASKET MODIFICATION

►*1963 STUDEBAKER AVANTI, JET THRUST & SUPER JET THRUST ENGINE HARD STARTING & POOR WARM-UP IN COLD WEATHER:* Check for installation of production change modifications and use special settings (see "Studebaker V8" Car Model pages) Check carburetor choke valve for four 1/8" holes drilled (in evenly spaced formation) in short upper side of valve midway between choke valve shaft and upper edge of valve If choke valve is not drilled, remove carburetor from engine and drill the holes as described above Use care to prevent metal chips from entering carburetor assembly Adjust fast idle throttle valve clearance, automatic choke setting and engine idle speed to proper specifications (see below)

►*1963 STUDEBAKER & AVANTI SUPERCHARGED ENGINE LEAN CONDITION OR FLAT SPOT CORRECTION.* This condition which occurs when throttle is fully opened at engine speeds above 1500 RPM may be caused by the sudden opening of secondary auxiliary throttle valves, causing a lean condition To correct, remove carburetor from engine, then remove step-up rods and check the number on rods If they are Carter No 16-220, replace them with Carter No 16-263 Remove thermostatic valve assembly and the secondary venturi clusters Increase size of auxiliary feed hole (initial discharge port) located in the bore of each cluster, to 089" (see illustration for location of feed hole) Remove auxiliary throttle shaft and weight assembly and replace it with a new assembly, Carter Part No 3-1228S Check and adjust carburetor as indicated (see "Adjustment" below)

►*1963 STUDEBAKER & AVANTI (WITH JET THRUST ENGINE) LOPING OR OVER-CHOKING DURING WARM-UP CORRECTION:* Set the choke one or two notches lean as required, from the index mark



STUDEBAKER AUXILIARY FEED HOLE ENLARGEMENT

DESCRIPTION

Four barrel downdraft type similar to design of carburetors used on corresponding previous models

ADJUSTMENT

CADILLAC IDLE SPEED ADJUSTING NOTE. Parking brake cannot be applied with transmission selector lever in "D" (Drive) position unless vacuum release is disconnected Disconnect parking brake vacuum hose at diaphragm and connect vacuum gauge to this hose Loosen transmission throttle valve rod locknuts at carburetor throttle lever trunnion

CHRYSLER, DODGE & PLYMOUTH IDLE SPEED ADJUSTING NOTE Turn headlights ON On models with automatic transmission (Exc 413" Eng with Ram Manifold), loosen carburetor throttle rod locknut in sliding link so stop in transmission will not interfere with carburetor throttle lever After adjusting idle speed, move throttle rod to rear against stop and tighten locknut

Idle Speed & Mixture

One Carburetor Engine - *NOTE - On carburetors with Idle Compensator, compensator valve must b held closed while adjusting idle speed. On carburetors with Idle Air Bypass system, turning the idle air bypass screw (to adjust engine idle speed) will change idle mixture setting. Readjust idle mixture setting after engine idle speed adjustment has been completed.* If an initial adjustment is required for engine warm-up, turn both idle mixture screws in until lightly seated, then back screws out the number of turns indicated in specification table On carburetors with conventional idle speed screw, turn screw in sufficiently to slightly open throttle valves On carburetors with Idle Air Bypass system, turn idle screw outward 1½-3½ turns from a lightly seated position With engine at normal operating temperature, choke valve wide open and fast idle inoperative, proceed as follows Connect vacuum gauge and tachometer, then adjust idle speed to correct engine RPM (see specifications) with throttle stopscrew (or Idle Air Bypass screw) Adjust each idle mixture screw for smooth idle at highest vacuum reading and engine RPM Recheck, and if necessary, reset the idle speed, then readjust idle mixture *NOTE - On carburetors with Idle Air Bypass system always readjust idle mixture after changing setting of idle air screw.* On automatic transmission cars, check and adjust throttle linkage (see car model pages)

Two Carburetor Engine (Ram Manifold) - Disconnect carburetor interconnecting linkage at each carburetor *NOTE - If an initial adjustment is required for engine warm-up, set idle mixture screws on both carburetors 1-2 turns open from a lightly seated position and set idle air bypass screws (one on each carburetor) 2 turns open from a lightly seated position.* With engine at normal operating temperature, connect a tachometer to engine and adjust idle speed to correct engine RPM (see specifications) by turning idle air bypass screw equally on each carburetor Adjust idle mixture screws on each carburetor for maximum engine RPM, then repeat idle mixture screw adjustment *NOTE - If idle speed exceeds specifications by 50 RPM during adjustment, readjust idle air bypass screws to obtain original engine RPM.* Before attaching rod at each carburetor, check and adjust throttle valve linkage on automatic transmission cars (see car model pages) Recheck and readjust carburetor synchronization after a five mile or more road test

Two Carburetor Engine (Runner Manifold - Dodge & Plymouth) - Disconnect interconnecting linkage at rear carburetor throttle lever then start engine and run at idle speed (off fast idle) *NOTE - If an initial adjustment is required to start engine, turn idle mixture screws 1 2 turns open and idle bypass screws 1 turn open from a lightly seated position* Adjust engine idle

(Continued)

CARTER AFB 4-BARREL CARBURETORS (C nt.)

speed to 700-800 RPM by turning idle bypass screw equally on each carburetor. Adjust idle mixture screws on front carburetor for maximum engine RPM, then repeat on rear carburetor. Readjust front carburetor if necessary. Readjust idle air bypass screws as necessary to maintain correct engine RPM. *NOTE - Before attaching interconnecting rod at rear carburetor (on Automatic Transmission cars), check and adjust throttle linkage so that idle position is not disturbed.*

Tw Carbur t r Engin (Chevrolet 409" Engine) - *NOTE - If an initial adjustment is required for engine warm-up, set idl mixture screws on rear carburetor ¾ turn open from a lightly seated position, then back idl speed screw off so it is just touching throttle lever. Turn the idle speed screw in 1½-2 turns.* With engine at normal operating temperature, air cleaner assembly removed, connect tachometer and vacuum gauge to engine. Adjust both idle speed screws equally to obtain correct engine idle speed (see specifications). Adjust idle mixture screws separately on each carburetor to obtain highest vacuum and engine RPM. *NOTE - Readjust idle speed screws equally to maintain correct idle sp ed while adjusting idle mixture screws.* Repeat the above adjustment. See car model pages for throttle linkage adjustment.

Fast Idle (On Engine)

On Carbur t r Engine - With engine at normal operating temperature and hot idle speed properly adjusted, rotate fast idle cam so that fast idle adjusting screw is in alignment with index mark on fast idle cam (except Buick, Lincoln & Cadillac); on low step of cam (Buick); on low step of cam and with transmission in "Drive" (Lincoln); on second step of cam (Cadillac). On all models, operate engine and adjust fast idle screw to obtain correct engine RPM (see specifications).

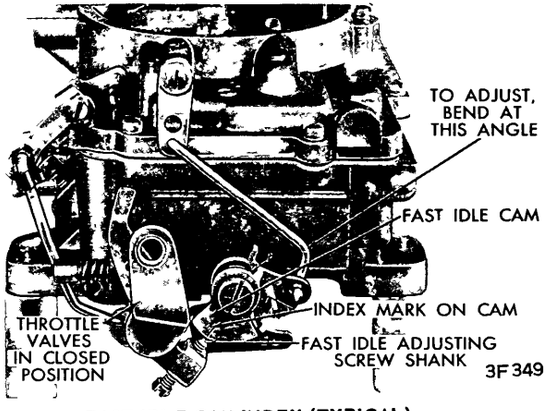
Tw Carbur tor Engine (Ram Manifold) - With engine at normal operating temperature and at normal (hot) idle speed (Air conditioner compressor OFF, if so equipped), remove air cleaners and disconnect each throttle rod at bellcrank on intake manifold. Open throttle valves of left carburetor and rotate fast idle cam to align fast idle screw with index mark on cam. *NOTE - Right carburetor should remain at normal (hot) idle position.* Adjust fast idle screw on left carburetor to obtain correct engine RPM (see specifications). Open throttle valves slightly and allow engine to return to normal (hot) idle speed. Repeat above procedure on right hand carburetor (left hand carburetor at normal idle speed). *NOTE - Each carburetor must have identical fast idle speeds. There is no specification for engine RPM with both carburetors set simultaneously at fast idle position.*

Two Carburetor Engine (Chevrolet 409" Engine) - Fast idle speed adjustment is made on rear carburetor only. Use same procedure as for "One Carburetor Engine" above. See specifications for fast idle speed.

Fast Idle Cam Index

All Mod ls (Exc. Cadillac, Linc ln, P ntiac) - With choke valve closed, fast idle screw should align with index mark on fast idle cam. To adjust, bend fast idle connector rod. *NOTE - If necessary, b nd stop lug on fast idl cam.*

Cadillac - With choke valve tightly closed and lug on valve outer choke shaft lever contacting stop on inner choke shaft lever, align center of fast idle screw with index mark on cam by bending fast idle connector rod.



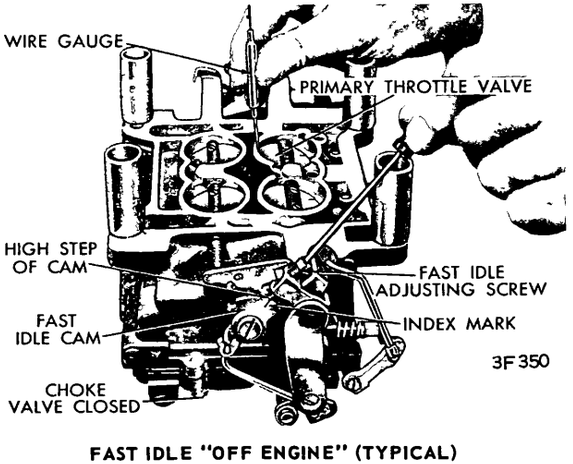
FAST IDLE CAM INDEX (TYPICAL)

Lincoln - With slight clearance between lug on fast idle cam and stop on flange casting, and inner countershaft lever contacting lug on outer countershaft lever, align index mark on cam with adjusting screw. To adjust, bend fast idle connector rod. *NOTE - It may be necessary to bend stop lug on fast idle cam.*

Pontiac & Tempest - With choke valve tightly closed, and trip lever and cam arm in alignment, align center of fast idle screw with index mark on cam by bending fast idle connector rod.

Fast Idle (Off Engine)

With choke valve closed and fast idle screw aligned with index mark on fast idle cam, adjust fast idle screw to obtain specified clearance between lower edge of throttle valve and wall of carburetor (see specifications).



FAST IDLE "OFF ENGINE" (TYPICAL)

Anti-Stall Dashpot

See CARBURETOR on car model pages for adjustment procedure.

Idle Speed-Up Control

See CARBURETOR on car model pages for adjustment procedure.

Float Level

NOTE - Before making float adjustment, make sure floats are parallel to outer edge of air horn casting. Remove as much clearance as possible between arms of float lever and support lugs on air horn. Arms should be parallel to inner surfaces of supports and float arm should operate freely without excess clearance on hinge pin.

FLOAT SETTING CAUTION (CARBURETORS WITH RESILIENT INLET VALVE SEAT) - When bending float lever to adjust height, do not allow lever to contact inlet needle valve as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle.

Adjust both primary and secondary floats to same height. With air horn inverted, bowl cover gasket in place and needle valve seated, measure distance from top of float at outer end to air horn gasket with proper gauge (see specifications). Adjust by bending float arm. *NOTE - On all Pontiac models, float level measurement must be made in line with center of float indentation at outer end of float.*

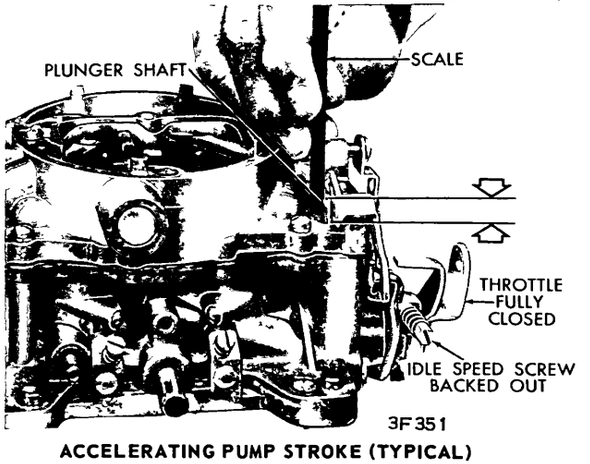
Float Drop

With bowl cover held in upright position so that floats hang down at lower end of travel, measure distance from outer (free) end of float to bowl cover gasket. Distance should be as indicated in specifications. To adjust, bend float stop tabs on float bracket.

Accelerating Pump

NOTE - This is a pump stroke (travel) adjustment and not a seasonal setting. On all models with provision for seasonal setting, make certain that pump connector rod is engaged in correct hole of pump arm (see specifications).

(Continued)



ACCELERATING PUMP STROKE (TYPICAL)

CARTER AFB 4-BARREL CARBURETORS (C nt.)

Back out throttle stopscrew (if so equipped) so that throttle valves are fully seated, then use a scale to measure distance from top surface of bowl cover to top of pump plunger stem (see specifications). If distance is not correct, adjust by bending connector rod at lower angle.

Automatic Choke

Integral Type - *NOTE - Adjust choke after Choke Piston Linkage has been adjusted.* Adjust automatic choke thermostatic spring housing by loosening cover screws and rotating cover as required (see specifications).

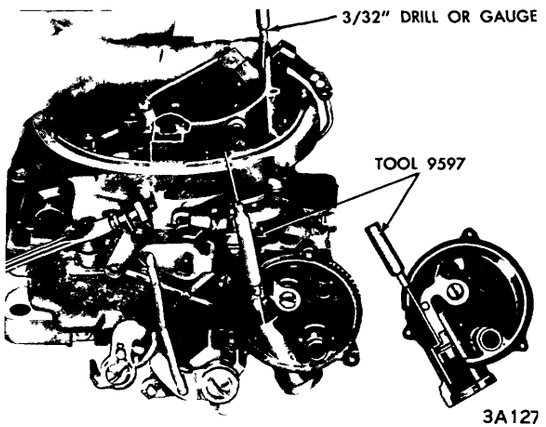
Well Type - See specifications above. *CAUTION - This unit is serviced as a complete assembly. Do not attempt to repair unit or change the adjustment.*

Choke Piston Linkage

NOTE - This adjustment is made on carburetors with "Integral Type" choke assemblies. Remove cover and coil assembly, then proceed as follows:

Buick, Chevrolet & Lincoln - Bend .026" wire gauge (T109-189) at a 90° angle approximately 1/8" from end, then open choke valve and insert wire gauge so that bent portion is between top of slot in choke piston cylinder and bottom of slot in piston (see illustration). Hold wire gauge in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. Clearance between top of choke valve and wall of air horn should be as indicated in table below. To adjust, bend choke connector rod (exc. Chevrolet 409" Eng.); loosen choke control shaft clamp lever screw and rotate lever on shaft, then tighten screw (Chevrolet 409" Eng.).

Cadillac & Pontiac - With choke valve closed, choke piston should be flush to 1/16" below top surface of piston housing. To adjust, bend choke connector rod. *NOTE - Choke valve should be held closed by applying pressure to piston lever in piston housing.*



CHOKE PISTON LINKAGE (TYPICAL)

Choke Piston Linkage Setting

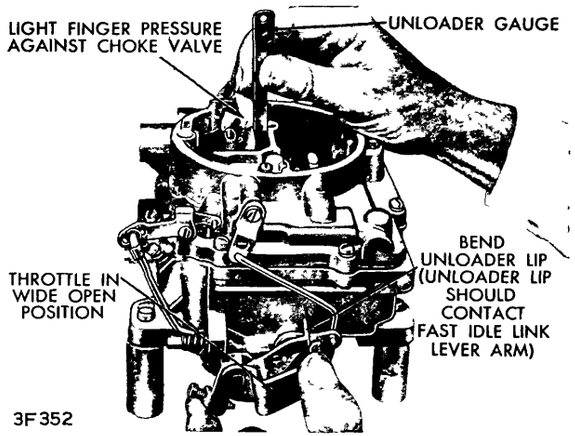
Carburetor	Piston Clearance
3362S	.090"
3460S, 3461S	.070"
3480S, 3481S	.120"
3499S	.190"
3503S, SA	3/32"
3521S, 3522S	3/32"
3578S, 3579S	3/32"
3506S, 3507S	.062"
3540S, 3588S, 3589S, SA	.045"

Unloader

After fast idle cam index adjustment is completed, rotate primary throttle valves to wide open position and check choke valve opening between upper edge of choke valve and wall of air horn. Clearance should be as indicated in specifications. To adjust, bend unloader lip on primary throttle lever.

Auxiliary Throttle Valves

Velocity type valves. No adjustment required. *NOTE - Auxiliary throttle valves not used on all models.*



UNLOADER (TYPICAL)

Secondary Throttle Lockout

All Models (Exc. Chrysler with Ram Manifold) - Open throttle valves slightly to clear fast idle cam, then open and close choke valve manually. Lockout tang on secondary throttle lever should freely engage notch in lockout dog. To adjust, bend tang on secondary throttle lever. *NOTE - Make additional adjustment on cars indicated below.*

Cadillac - Hold lockout dog tight against stop on flange. With secondary throttle valves slightly open, clearance between secondary throttle lever and lockout arm should be .026". To adjust, bend arm at slot on lockout dog.

Secondary Throttle Lever

NOTE - This adjustment is required to insure correct action of primary and secondary throttle valves.

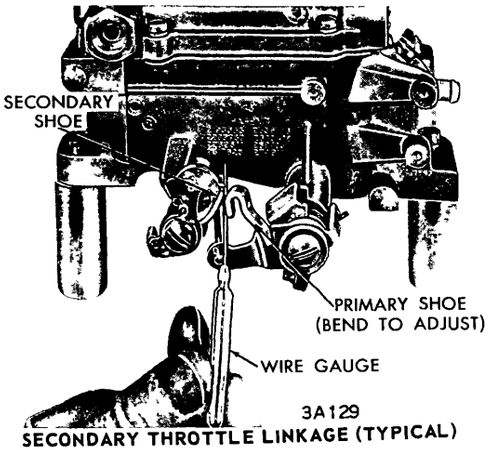
Block choke valve wide open, then open throttle valves until clearance between lower edge of primary throttle valves and bore on side opposite idle ports is as specified in table below. Secondary throttle valves should just start to open at this point. To adjust, bend throttle operating rod. *NOTE - Secondary throttle valves will be a few degrees from wide open when primary valves are wide open (Cadillac, Buick & Chevrolet); are past wide open (Chrysler 3505S & Pontiac). On all other models, primary and secondary throttle valves will be vertical at wide open throttle. On all models, if necessary, bend stop lug on secondary throttle lever to prevent secondary throttle valves from going past wide open.* With primary and secondary throttle valves tightly closed, there should be .010-.030" clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.

Secondary Throttle Lever Setting

Car Model	Primary Throttle Opening
Buick	23/64"
Cadillac	23/64"
Chevrolet	15/32"
Chrysler (Ram Manifold)	29/64"
Chrysler (exc. Ram Manifold)	3/8"
Dodge & Plymouth	3/8"
Lincoln	29/64"
Pontiac	7/16"
Pontiac Tempest	7/16"
Studebaker (All Models)	7/16"

OVERHAUL

See 1958 Final Data, Page 240, or later Manual edition for overhaul procedure.



SECONDARY THROTTLE LINKAGE (TYPICAL)

Carter Carburetor Gauges

Adjustment	Dimension	Carter Tool No.
Float Level & Unloader	1/8"	T109-36
Float Level & Unloader	5/32"	T109-154
Float Level & Unloader	3/16"	T109-28
Float Level & Unloader	7/32"	T109-106
Float Level & Unloader	1/4"	T109-31
Float Level & Unloader	9/32"	T109-126
Float Level & Unloader	5/16"	T109-107
Float Level & Unloader	21/64"	T109-294
Float Level & Unloader	3/8"	T109-80
Wire Gauge	.015" & .018"	T109-44
Wire Gauge	.020" & .030"	T109-29
Wire Gauge	.023" & .026"	T109-189
Wire Gauge	.067" & .080"	T109-234

CARTER WCFB 4-BARREL CARBURETORS

CHEVROLET 327" ENGINE	Carter No.
Pass. Cars & Corvette (Auto. Trans.)	3500S
Pass Cars & Corvette (Synchro-mesh)	3501S

DESCRIPTION

4-barrel downdraft type of same design as used on previous models Velocity type auxiliary throttle valves are controlled by counterweight on shaft and are not operated by linkage. These auxiliary throttle valves are locked out when choke is operating.

ADJUSTMENTS

Idle Speed & Mixture

With engine at normal operating temperature, connect a vacuum gauge and a tachometer to engine and adjust idle speed to correct engine RPM (see "Specification Table"). Adjust each idle mixture screw for highest engine RPM and vacuum reading, then readjust engine idle speed to correct RPM.

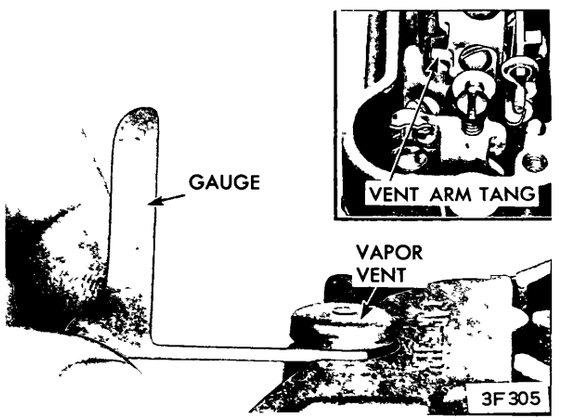
Accelerating Pump

NOTE - This is a linkage adjustment and not a seasonal change specification.

Remove dust cover and place pump connector link in correct hole of pump shaft lever (see "Specification Table"), then back out idle speed adjustment screw With a straightedge across top of dust cover boss at pump arm, flat on top of pump arm should be parallel to straightedge. To adjust, bend connector rod at lower angle.

Metering Rod

Back out throttle lever stopscrew so throttle valves are fully seated in bores, then loosen metering rod arm clampscrew. With metering rods in place, press down on vacumeter link until metering rods bottom in carburetor body casting. Hold rods in downward position (throttle valves fully seated), then rotate metering rod arm until finger on arm contacts lip of vacumeter link. Hold in position and tighten clampscrew.



BOWL VAPOR VENT ADJUSTMENT

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed (Eng.RPM)	Initial Idle Mixture ②	Fast Idle (Off Eng.) ③	Float Level		Bowl Vent	Unloader	Choke Piston	Accel. Pump	Auto. Choke
				Primary	Secondary					
3500S	450 ①	½-2¼	020"	3/16" ④	1/4" ⑤	3/32"	3/16"	.060"	Outer	Centered
3501S	475	½-2¼	020"	3/16" ④	1/4" ⑤	3/32"	3/16"	035"	Outer	Centered

① - Transmission in "D" (Drive).
② - Turns open from a lightly seated position.
③ - "On Engine" fast idle adjustment not required.
④ - With resilient needle seat. Set to 7/32" with solid needle seat.
⑤ - With resilient needle seat. Set to 9/32" with solid needle seat.

Bowl Vapor Vent

NOTE - This adjustment should be made after completing pump and metering rod adjustments. With dust cover and gasket installed, back out throttle lever stopscrew so that throttle valves are seated in bores, then measure distance between lower edge of vent and well in dust cover. This measurement should be as indicated in "Specification Table". To adjust, bend vapor vent arm as required.

Unloader

With throttle valves held in wide open position, the distance between upper edge of choke valve and inner wall of air horn should be as indicated in "Specification Table" To adjust, bend unloader lip on throttle shaft lever

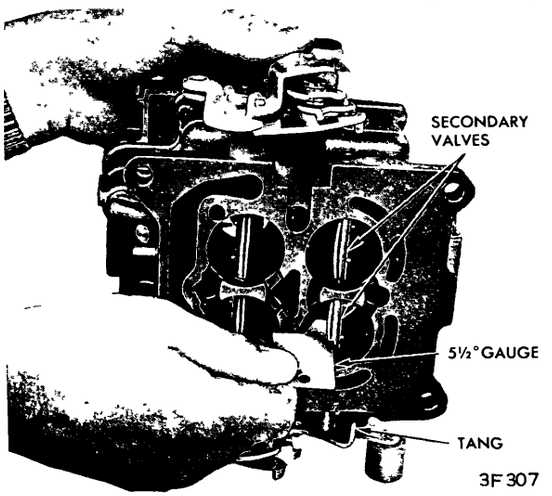
Secondary Throttle Lever

Block choke valve wide open and back throttle stopscrew out so primary throttle valves are seated in bores. With primary valves open 7/32", secondary valves should just start to open. To adjust, bend throttle operating rod. *NOTE - Secondary valves will be a few degrees from wide open when primary valves are wide open.* With primary and secondary valves tightly closed, there should be .017-.022" clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary throttle lever

Auxiliary Throttle Lockout

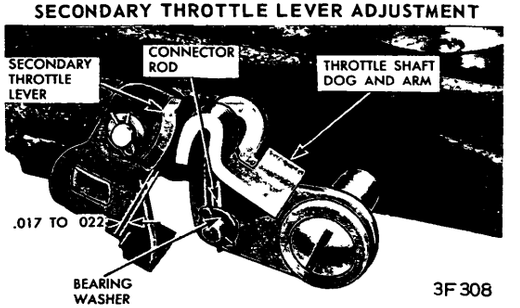
Crack throttle valves and manually open and close choke valve. Tang on lockout arm should freely engage in notch of auxiliary throttle shaft dog To adjust, bend tang on lockout arm.

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UNLOADER ADJUSTMENT

SECONDARY THROTTLE LEVER ADJUSTMENT

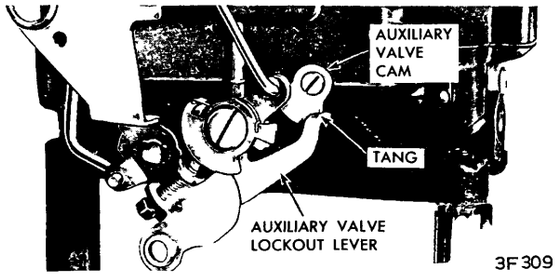


SECONDARY THROTTLE LEVER CLEARANCE

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Automatic Choke

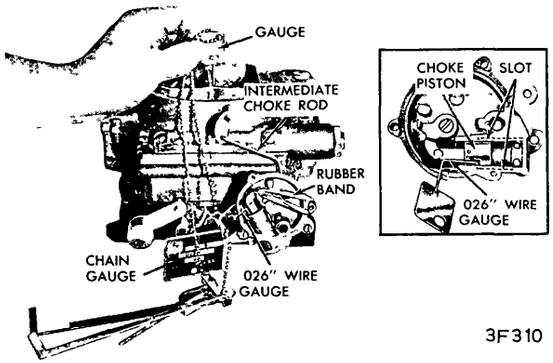
Loosen choke cover retaining screws and rotate cover assembly so index mark on cover aligns with correct mark on housing. See "Specification Table".



AUXILIARY THROTTLE LOCKOUT ADJUSTMENT

Choke Piston Lever

Bend a .026" wire gauge at a 90° angle approximately 1/8" from its end, then remove choke cover assembly, gasket, and baffle. Block throttle valve about half open so fast idle cam does not touch its adjusting screw, then open choke valve and insert the wire gauge so that bent part is between top of slot in choke piston cylinder and bottom of slot in piston. Hold wire in position and close choke valve by pressing on piston lever in choke housing until resistance is felt. Clearance between top of choke valve and wall of air horn should be as indicated in "Specification Table". To adjust, bend choke connector rod.



CHOKE PISTON LEVER ADJUSTMENT

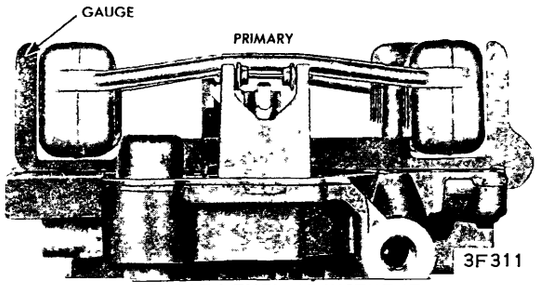
Float Level

NOTE - Primary and secondary floats must be checked and adjusted separately and both float level and float drop must be checked for each assembly.

FLOAT LEVEL SETTING NOTE - When bending float lever to adjust height on carburetors with resilient type inlet valve seats, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting. Check float level with weight of float only resting on needle. Float level setting specifications are different for carburetors with resilient type inlet valve seats (see "Specification Table").

Lateral Adjustment- With bowl cover assembly inverted, gasket removed and float resting on seated needle, place float gauge (see "Specification Table") directly under center of floats with notched portion of gauge fitted over edge of casting. Sides of floats should just clear vertical uprights of gauge. Bend float arms to adjust.

Vertical Adjustment - With bowl gasket removed, install proper gauge (see "Specification Table") on bowl cover under center of floats. Both floats should just clear horizontal section of gauge. To adjust, bend float arms.



FLOAT LEVEL ADJUSTMENT

Float Drop

With bowl cover held in upright position, bowl cover gasket removed, measure distance between free end of floats and bowl cover. Distance should be as indicated in "Specification Table". To adjust, bend stop tabs on float brackets.

Fast Idle (Off Engine)

Loosen choke lever clamp screw on choke shaft and insert a wire gauge of correct thickness (see "Specification Table") between lip of fast idle cam and boss of throttle body casting. Hold choke valve tightly closed and pull choke shaft lever upward to eliminate all slack, then tighten clamp screw

Fast Idle (On Engine)

No adjustment required. Fast idle speed will be correct when normal idle speed is properly adjusted.

OVERHAUL

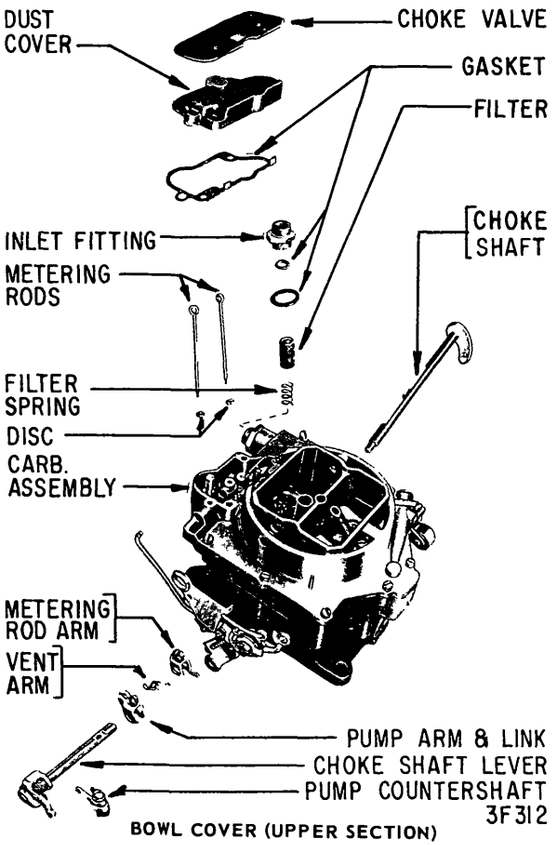
Disassembly

Bowl Cover (Upper Section) - Remove inlet nut and gasket, then remove filter inlet well in primary side of carburetor (do not remove fuel from bowl). Disconnect choke connector rod and intermediate choke rod at choke valve shaft levers, then disconnect throttle rod from lever on pump countershaft. Remove metering rod dust cover, then remove vapor vent arm. Loosen, but do not remove screws securing pump operating arm and metering rod arm to countershaft and pull countershaft out of bowl cover. Remove metering rod arm from well. Push connecting link out of pump shaft and remove arm and link. Rotate each metering rod one-half turn and remove from hanger (do not lose rod discs). If further disassembly is required, remove choke valve screws, choke valve, and choke shaft.

Bowl Cover (Lower Section) - Remove bowl cover, then remove primary and secondary float assemblies. *NOTE - Mark both floats for installation in same location.* Remove primary and secondary float needles, seats and gaskets (keeping each group of parts separated to prevent intermixing parts). Remove pump plunger assembly from bowl cover and return spring from main body and place plunger in gasoline or kerosene. Rotate vacuum piston 90° to disconnect from vacuum piston link and remove link, then remove bowl cover gasket.

Main Body (Fuel Bowl) - Remove the vacuum piston spring. Drain the fuel bowl. Remove the pump jet cluster and gasket, then invert the carburetor and remove small brass pump discharge needle. Remove pump inlet ball retainer and check ball from bottom of pump cylinder well by prying the retainer sideways with a 5/16" six point socket. Remove both primary metering

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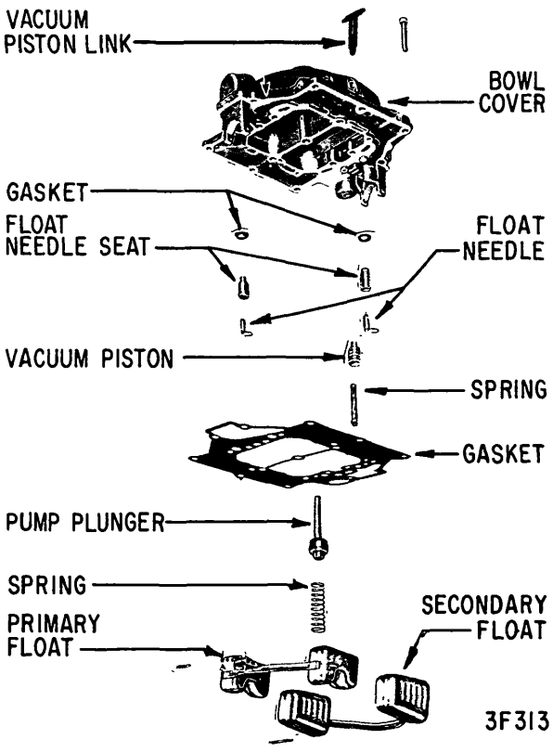


BOWL COVER (UPPER SECTION)

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

rod jets (on pump side of carburetor), then remove both secondary main jets. DO NOT mix metering rod jets and secondary main jets (openings are different size). *NOTE - Low speed jets are installed at slight angle (do not remove). Anti-percolator plugs and bushings, and main discharge nozzles are pressed in and should not be removed.* Separate throttle flange from main body and remove gasket. If necessary to remove auxiliary throttle valves, file off staked ends of screws, then remove screws and valves and pull out shaft.

Throttle Body - Remove idle mixture screws, throttle lever stop screw, washer and spring. *NOTE* - Further disassembly not required except to replace parts. If necessary, proceed as follows: Remove fast idle cam retaining screw, fast idle cam assembly and lockout arm. Remove primary to secondary connector rod pin, springs and washers, then remove rod. Remove primary throttle levers, then unhook secondary throttle return spring. File off staked ends of throttle valve retaining screws and remove throttle valves and throttle shafts. Remove choke cover, gasket and baffle plate. Remove choke housing mounting screws and housing. Remove "O" ring seal from vacuum opening of housing mounting boss. Remove choke piston lever screw and disassemble piston and levers.



BOWL COVER (LOWER SECTION)

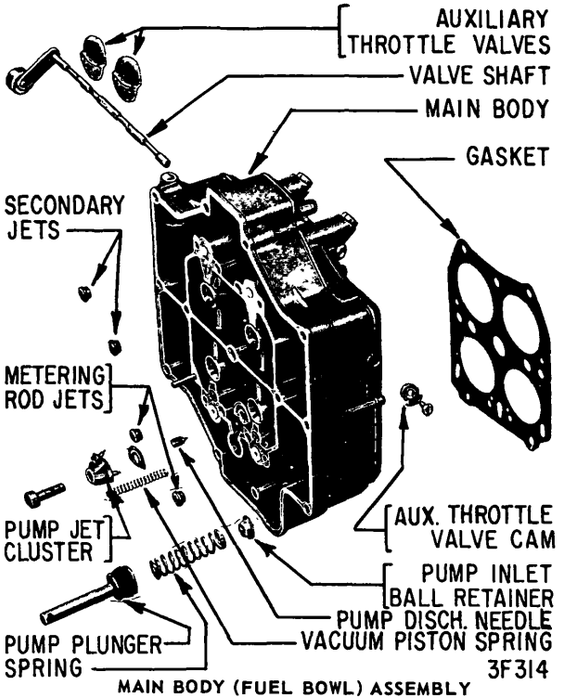
Cleaning & Inspection

Wash all parts in carburetor cleaning solvent except pump plunger assembly, thermostatic coil and cover assembly, and choke housing gasket (clean these parts in gasoline). Clean and blow out all passages with compressed air, then remove all gum and carbon deposits. Make certain all calibrated restrictions are clean but DO NOT use drills to clean these passages. Inspect floats for dents and leaks. Check choke and throttle shafts for excessive wear, inspect pump plunger leather and replace plunger if cracked or creased. See that choke piston operates freely in cylinder. If there is carbon or dirt in slots of piston and cylinder, remove welch plug in housing and clean, then install a new welch plug, making sure that it is tight.

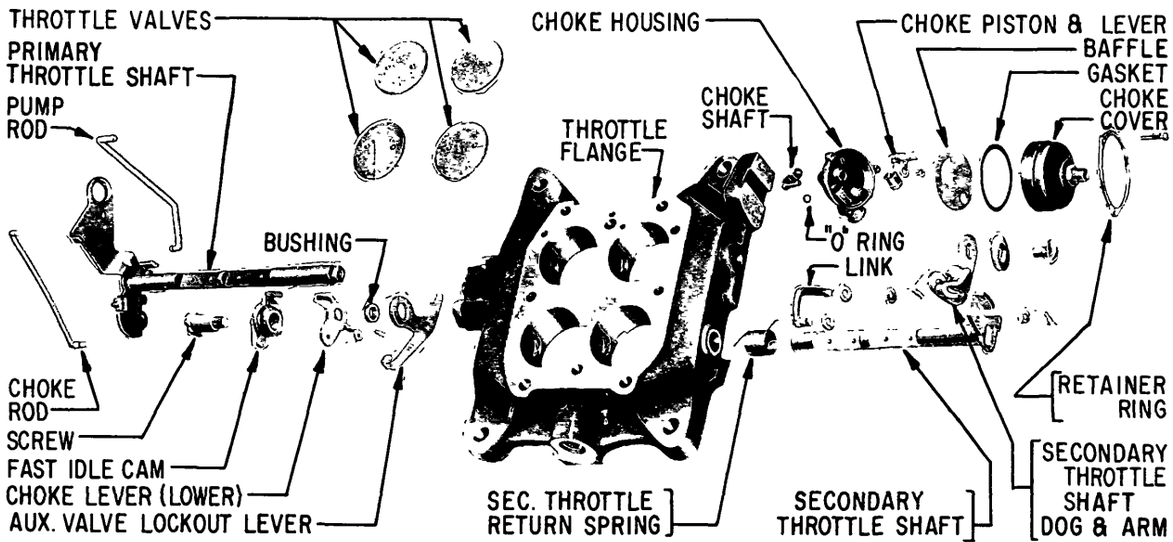
Reassembly

Use all new gaskets. Install all parts by reversing disassembly procedure and note the following:

Throttle Valves - Use new screws when installing valves. Install throttle valves as follows. Before tightening screws, shift valves to provide closest possible fit in barrel in closed position (short end of auxiliary valves should have a good bearing on stop bosses), then tighten screws securely and stake ends lightly. *CAUTION - Support shaft on steel block while staking screws.* Install retaining washer on end of primary shaft with prongs outward, then press washer in on shaft just far enough to obtain a snug fit without endplay in shaft.



MAIN BODY (FUEL BOWL) ASSEMBLY



THROTTLE BODY (FLANGE) ASSEMBLY

CARTER AFB 4-BARREL CARBURETORS

Carter Carb. No.		Metering Jet Size	No.	Step-Up Rod No.	Venturi Assembly Low Spd. Jet	Part No. ①	②	Pump Jet Assy. Size	No.
3256S	Pri	089"	120-252	16-160	032"	58-556S	58-557S	031"	48-258S
	Sec	065"	120-226			58-232S	58-233S		
3300SA	Pri	0935"	120-166	16-126	033"			028"	48-270S
	Sec	0785"	120-194						
3326SA	Pri	0935"	120-166	16-126	033"			028"	48-270S
	Sec	0785"	120-194						
3437S	Pri	089"	120-194	16-217	035"			031"	48-258S
	Sec	0689"	120-228						
3437SB	Pri	089"	120-252	16-217	035"			031"	48-258S
	Sec	0689"	120-228						
3447S	Pri	098"	120-163	16-51	035"			028"	48-270S
	Sec	082"	120-158						
3447SA	Pri	098"	120-163	16-51	035"			028"	48-270S
	Sec	082"	120-158						
3460S	Pri	104"	120-161	16-204	035"			028"	48-264S
	Sec	0635"	120-176						
3461S	Pri	104"	120-161	16-205	035"			028"	48-264S
	Sec	070"	120-222						
3477S	Pri	0935"	120-166	16-260	038"			028"	48-270S
	Sec	081"	120-233						
3478S	Pri	089"	120-252	16-217	035"			031"	48-258S
	Sec	0689"	120-228						
3478SA	Pri	089"	120-252	16-217	035"			031"	48 258S
	Sec	0689"	120-228						
3479S	Pri	0935"	120-166	16-122	038"			028"	48-270S
	Sec	076"	120-177						
3480S	Pri	098"	120-163	16-226	032"	58-612	58-613	028"	48-270S
	Sec	082"	120-158			58-270	58-271		
3481S	Pri	098"	120-163	16-226	032"	58-612	58-613	028"	48-270S
	Sec	082"	120-158			58-270	58-271		
3499S	Pri	1015"	120-162	16-202	040"			028"	48-264S
	Sec	0846"	120-257						
3502S	Pri	0935"	120-166	16-260	035"			028"	48-270S
	Sec	0785"	120-194						
3503S	Pri	092"	120-256	16-219	035"			028"	48-264S
	Sec	082"	120-158						
3503SA	Pri	092"	120-256	16-219	035"			028"	48-264S
	Sec	082"	120-158						
3505S	Pri	089"	120-159	16-118	035"			028"	48-270S
	Sec	082"	120-158						
3505SA	Pri	089"	120-159	16-118	035"			028"	48-270S
	Sec	082"	120-158						
3506S	Pri	089"	120-159	16-99	035"			028"	48-270S
	Sec	076"	120-177						
3507S	Pri	1015"	120-162	16-263	033"			028"	48-270S
	Sec	089"	120-159						
3521S	Pri	0945"	120-164	16-225	033"			033"	48-255S
	Sec	086"	120-165						
3522S	Pri	0945"	120-164	16-225	033"			033"	48-255S
	Sec	086"	120-165						
3540S	Pri	089"	120-159	16-240S	035"			025"	48-269S
	Sec	057"	120-193						
3545S	Pri	0935"	120-166	16-126	038"			028"	48-270S
	Sec								
3545SA	Pri	091"	120-155	16-126	038"			028"	48-270S
	Sec	081"	120-233						
3559S	Pri	1015"	120-162	16-211	040"	58-607S	58-608S	028"	48-264S
	Sec	098"	120-163			58-151S	58-152S		
3574S	Pri	0935"	120-166	16-122	038"			028"	48-270S
	Sec	076"	120-177						
3578S	Pri	092"	120-256	16-232	031"			028"	48-264S
	Sec	089"	120-159						
3579S	Pri	092"	120-256	16-250	031"			028"	48-264S
	Sec	086"	120-165						
3588S	Pri	1015"	120-162	16-263	033"			028"	48-270S
	Sec	089"	120-159						
3589S	Pri	089"	120-159	16-99	035"			028"	48-270S
	Sec	076"	120-177						
3589SA	Pri	089"	120-159	16-99	035"			028"	48-270S
	Sec	076"	120-159						

① - Choke side of carburetor ② - Pump side of carburetor

CARTER WCFB 4-BARREL CARBURETORS

Carter Carb. No.		Metering Jet Size	No.	Metering Rods Std.	Metering Rods Lean	Low Speed Jet Size	No.	Pump Jet Size	No.
3500S	Pri	086"	120-165	75-1586		028"		024"	48-288S
	Sec	070"	120-222						
3501S	Pri	086"	120-165	75-1586		028"		024"	48-288S
	Sec	070"	120-222						

CARTER WCD 2-BARREL CARBURETORS

RAMBLER	Carter No.
Classic 6 Cyl. (E-Stick)	3434S
Classic 6 Cyl (Exc E-Stick)	3535S

DESCRIPTION

Dual downdraft carburetors of same design as used on previous models. Carburetors used with "E-Stick" clutch are equipped with a dashpot to control closing of throttle valves

ADJUSTMENT

Idle Speed & Mixture

With engine at normal operating temperature, choke valve wide open and fast idle inoperative, adjust throttle stopscrew for correct engine speed (see "Specification Table"). Adjust both idle mixture screws equally for smooth idle speed at highest engine RPM. Turn screws out for richer mixture.

Accelerating Pump

With pump connector link installed in outer hole (long stroke) of pump arm (under dust cover on bowl cover), back off throttle stopscrew so that throttle valves are fully closed. Place a straightedge across dust cover boss directly above pump arm. Flat on pump arm should be parallel to straightedge. To adjust, bend throttle connector rod at upper angle .

Metering Rods

NOTE - Check and adjust metering rods after Accelerating Pump adjustment is completed. With throttle stopscrew backed off and throttle valves fully closed, loosen metering rod arm clampscrew (on countershaft under dust cover on bowl cover). Press down on vacumeter link until both metering rods just bottom in carburetor casting, then rotate metering rod arm until finger on arm contacts lip on vacumeter link and tighten clampscrew. *CAUTION - Do not disturb arm position*

Float Level

FLOAT LEVEL SETTING CAUTION - When bending float level to adjust height on carburetors with resilient inlet valve seat, do not allow float lever to contact needle as seat can be compressed enough to cause a false setting. Float level specifications are different for carburetors with resilient inlet valve seats. See "Specification Table".

With bowl cover and float assembly removed from carburetor, invert assembly, remove cover gasket and install correct gauge (see "Specification Table") on cover directly below floats. Top of each float should just clear horizontal portion of gauge. To adjust, bend float arms so that both floats are uniform height. *LATERAL ADJUSTMENT NOTE - Sides of floats should barely touch vertical uprights of float gauge so as not to hang up in fuel bowl when floats are installed. Bend float arms as necessary.*

Float Drop

With bowl cover held in upright position, distance between top of float at center and bowl cover should be as indicated in "Specification Table" To adjust, bend stop tab on float bracket.

Fast Idle (Off Engine)

NOTE - Two adjustments are required as follows:

Fast Idle Cam Clearance - Loosen choke lever clampscrew on choke valve shaft, then insert a gauge of proper thickness (see "Specification Table") between lip on fast idle cam and boss on flange casting. Hold choke valve tightly closed and remove all slack from linkage by pressing choke lever toward closed position, then tighten choke lever clampscrew.

Fast Idle (Initial Setting) - With choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening (clearance between edge of valve and carburetor bore on side opposite idle ports) is as indicated in "Specification Table".

Fast Idle (On Car)

With engine at normal operating temperature and fast idle screw on high step of fast idle cam, adjust fast idle screw to obtain the correct engine speed (see "Specification Table").

Unloader

Hold throttle valves wide open and check clearance between edge of choke valve and air horn wall. Clearance should be as indicated in "Specification Table". To adjust, bend unloader lip on throttle valve lever.

Automatic Choke

Loosen choke cover attaching screws and rotate cover to align index mark on cover with proper graduation on choke housing See "Specification Table"

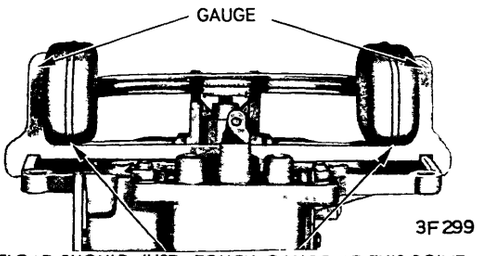
OVERHAUL

See "Carter WCD Carburetor" in "Carburetion Section" of Manual.

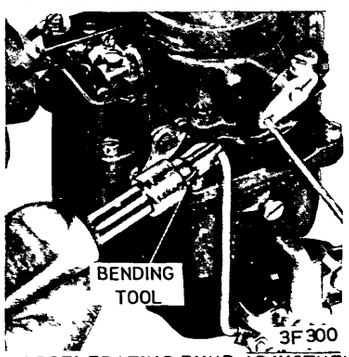
CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Hot Idle Speed (Eng. RPM)	Initial Idle Mix. Screw ①	Fast Idle Speed ② (Eng. RPM)	Fast Idle Initial Setting	Fast Idle Cam Clearance	Float Level ③	Float Drop	Unloader Setting	Auto. Choke
3434S	550	½-2	1800	.020"	.010"	1/8" ④	5/8"	3/16"	Centered
3535S	500	½-2	1800	.020"	.010"	1/8" ④	5/8"	3/16"	Centered

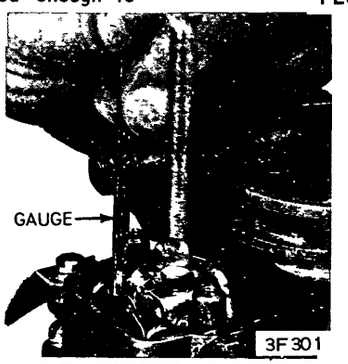
① - Turns open from a lightly seated position.
② - Fast idle screw on high step of cam.
③ - With resilient seat. Adjust to 5/32" with solid seat.
④ - Carter Gauge No. T109-36 (1/8"); T109-196 (5/32").



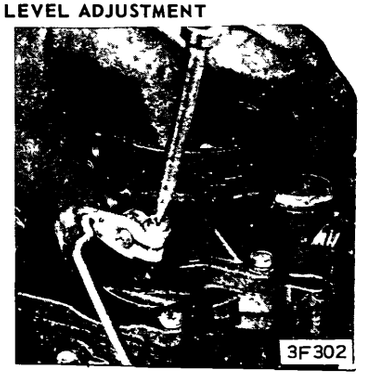
FLOAT SHOULD JUST TOUCH GAUGE AT THIS POINT
FLOAT LEVEL ADJUSTMENT



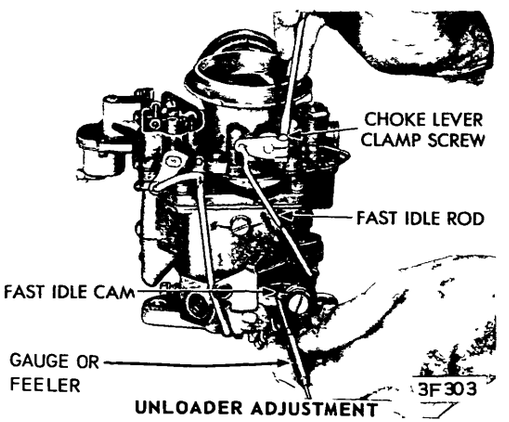
ACCELERATING PUMP ADJUSTMENT



METERING ROD ADJUSTMENT



FAST IDLE CAM ADJUSTMENT



UNLOADER ADJUSTMENT

CARTER BBD 2-BARREL CARBURETORS

CHRYSLER 300 — ① Carter No.
383" Eng. 3476S

DODGE CUSTOM 880
383" Eng. (All Trans.) 3476S

DODGE POLARA & PLYMOUTH V8
318" Eng. (Synchro-mesh) 3472S
318" Eng. (Auto. Trans.) 3473S
361" & 383" Eng. (All Trans.) 3475S

① - Carburetor number stamped on tag attached to air horn cover screw.

►CHANGES, CAUTIONS, CORRECTIONS

►*HARD COLD ENGINE STARTING CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove air cleaner and squirt carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke to clean out gum formation.

►*1963 383" ENG. RICHNESS DURING WARM-UP CORRECTION:* This condition which may occur on cars driven at continuous high speeds in warm climates is caused by distortion of choke thermostatic coil. To correct, install a new thermostatic coil, Part No. 2463159.

DESCRIPTION

Two barrel downdraft type with separate "Well Type" automatic choke. Carburetor design is similar to previous models.

►*CARBURETOR RECONDITIONING NOTE: After reconditioning, the following adjustments must be made in the order indicated before proceeding with other adjustments.*

318" Engine Carburetors - "Accelerating Pump & Bowl Vent"; "Fast Idle Cam Index"; "Unloader".

361" & 383" Engine Carburetors - "Accelerating Pump"; "Fast Idle Cam Index"; "Unloader"; "Bowl Vent".

ADJUSTMENT

Idle Speed & Mixture

On automatic transmission cars, loosen nut in sliding link of carburetor-to-bellcrank so stop in transmission will not interfere with movement of carburetor throttle lever. Adjust idle speed to correct engine RPM (see specifications) with choke valve wide open and fast idle screw not contacting fast idle cam. Adjust idle mixture screw to obtain highest engine RPM, then turn idle mixture screw inward (leaner) until speed starts to drop. Turn screw in opposite direction (richer) just far enough to recover the lost engine speed. *NOTE - This procedure assures idle mixture being set to leanest possible mixture for smooth idle.* Move sliding link to rear against stop and tighten locknut.

Fast Idle Speed

With engine at normal operating temperature and running, align fast idle screw with index mark on fast idle cam, then turn fast idle screw as necessary to obtain correct engine speed (see specifications).

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed (Eng. RPM) Hot ①	Idle Speed (Eng. RPM) Fast ②	Initial Idle Mixture ③	Float Level ②	Bowl Vent ②	Unloader Setting ②	Choke Setting ②	Accel. Pump Travel ②
3472S	500	1400	1	1/4"	1/16"	1/4"	Index	.....
3473S	500	1400	1	1/4"	1/16"	1/4"	Index	.....
3475S	500	1400	3/4	1/4"	1/16"	1/4"	2 Rich	1"±1/64"
3476S	500	1400	3/4	1/4"	1/16"	1/4"	2 Rich	1"±1/64"

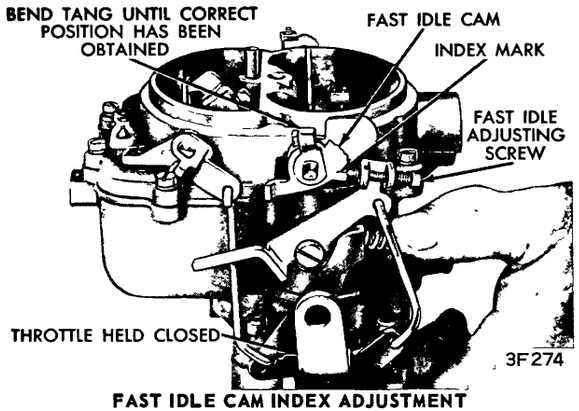
① - All models, with headlights turned ON. Air Conditioning ON (if so equipped).
② - See procedure below. ③ - Turns open from a lightly seated position.

Fast Idle Cam Index

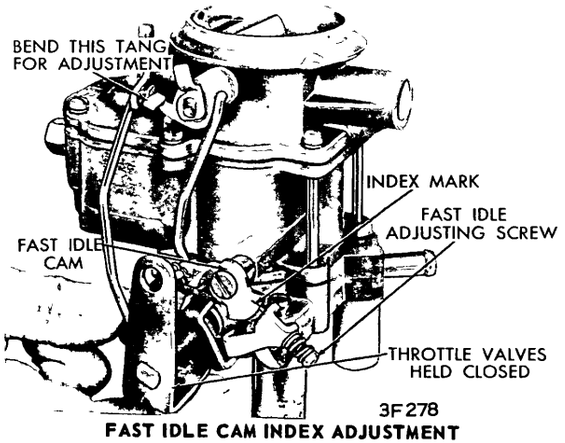
Open throttle valve and hold choke in fully closed position, then close throttle valve. Index mark on cam (see illustrations) should be aligned with center of fast idle adjusting screw. To adjust, bend tang on choke shaft lever.

Unloader

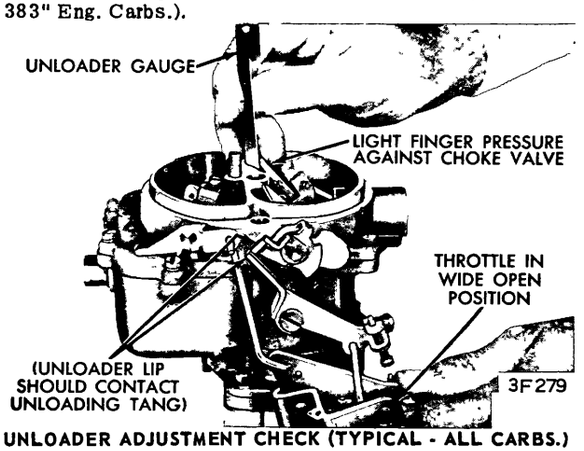
Hold throttle valves in wide open position and insert a drill of proper size (see specifications) between upper edge of choke valve and wall of air horn (see illustrations). If no drag is felt, or if too much drag is apparent, adjust as follows: Bend tang on throttle lever (318" Eng. Carbs.); on fast idle lever (361" & 383" Eng. Carbs.).



FAST IDLE CAM INDEX ADJUSTMENT (361" & 383" ENG. CARBS.)



FAST IDLE CAM INDEX ADJUSTMENT (318" ENG. CARBS.)

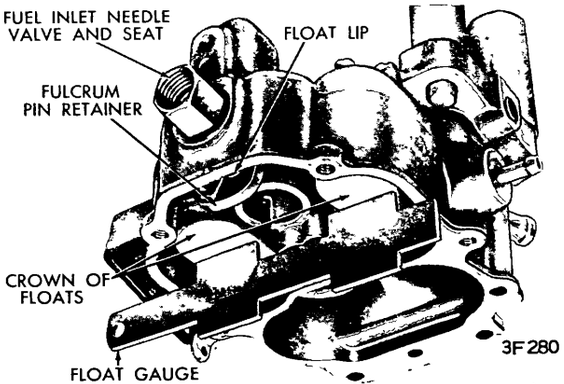


UNLOADER ADJUSTMENT CHECK (TYPICAL - ALL CARBS.)

Float Level

With carburetor off engine, remove fuel bowl cover and invert carburetor main body so that weight of float only is holding needle valve against seat (hold fingers against fulcrum pin retainer to fully seat pin). Use the correct gauge or a scale (see specifications) and measure distance between surface of fuel bowl and

(Continued)



FLOAT LEVEL ADJUSTMENT (TYPICAL - ALL CARBS.)

CARTER BBD 2-BARREL CARBURETORS (Cont.)

crown of each float at center. To adjust, bend lip of float lever. *CAUTION - When bending float lip, do not allow lip to push against needle valve which is rubber tipped.*

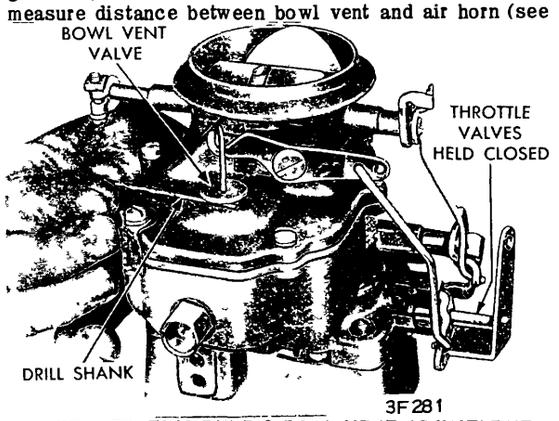
Automatic Choke

See specifications (above). *CAUTION - This unit is serviced as a complete assembly. Do not attempt to r pair unit or change the adjustment.*

Accelerating Pump & Bowl Vent

318" Eng. Carb. - *NOTE - Three holes are provided in throttl lev r and three grooves in pump plunger shaft for seasonal pump s tting as indicated below.* With throttle stopscrew backed off and throttle valves fully closed, place connector rod in center hole of throttle lever and bowl vent clip on pump plunger in center groove (see illustration). Close throttle valve and measure distance between bowl vent and air horn (see specifications). To adjust, bend operating rod at lower angle.

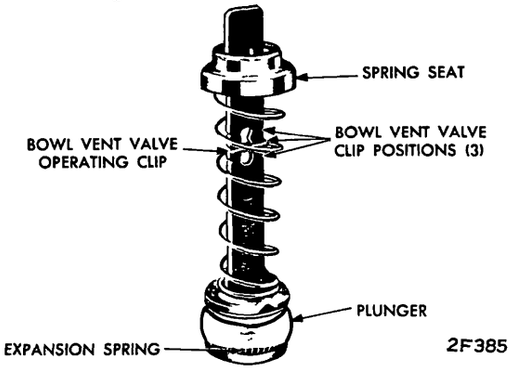
Pump Seasonal S tting - Standard setting is with pump connector rod engaged in center hole of throttle lever. *NOTE - Outer hole of throttle lever provides greater discharge; inner hole provides less. Whenever connector rod is moved, a corresponding change must be made in vent clip on pump plunger as follows: Center hole (center groove of plunger); inner hole (upper groove of plunger); outer hole (lower groove of plunger).*



ACCELERATING PUMP & BOWL VENT ADJUSTME NT (318" ENG. CARBS.)

Accelerating Pump

361" & 383" Eng. Carbs. - *NOTE - Three holes are provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as indicated below.* Back off idle speed adjusting screw and open choke valve so throttle valves can be completely closed. With pump connector rod installed in center hole of throttle lever and throttle valve tightly closed distance between air horn and end of plunger shaft should be as indicated in specifications (see illustration). To adjust pump travel, bend pump connector rod at lower angle.



ACCELERATING PUMP PLUNGER ASSEMBLY (318" ENG. CARBS.)

Pump Seasonal S tting - Standard setting is with pump connector rod engaged in center hole of throttle lever. *NOTE - Out r hole of throttl l v r provid s greater discharge; inner hole provides less. Whenev r connector rod is moved, bowl vapor vent must be r - adjusted.*

Bowl Vent

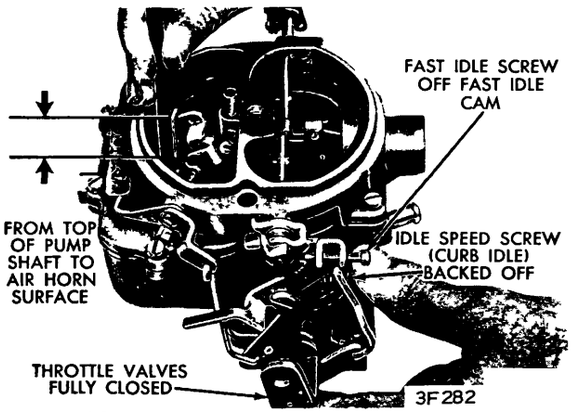
361" & 383" Eng. Carbs. - With throttle valves held closed, clearance between bowl vent valve and air horn should be as indicated in specifications. To adjust, bend short tang on vent valve operating lever.

OVERHAUL

See 1959 Final Data, Page 269, or later Manual edition.

CARBURETOR ADJUSTMENT GAUGES

Adjustment	Dimension	Carter Tool N.
Float Level	1/4"	T109-282
Unloader	1/4"	T109-31
Bowl Vent	1/16"	Drill



ACCELERATING PUMP TRAVEL ADJUSTMENT (361" & 383" ENG. CARBS.)

CARTER BBS SINGLE BARREL CARBURETORS

DODGE DART & PLYMOUTH VALIANT — ℄ Carter No.

170" Eng. (Synchro-mesh)	3462S
170" Eng. (Auto. Trans.)	3463S
170" Eng Taxi (All Trans) Early	3287S
170" Eng Taxi (All Trans) Late	3287SA
170" Eng Fleet (Synchro-me sh)	3590S
225" Eng. (Synchro-mesh)	3464S
225" Eng. (Auto. Trans.)	3465S

DODGE SIX & PLYMOUTH SIX

170" Eng. Taxi (All Trans.)	3236S
225" Eng. (Synchro-mesh)	3466S
225" Eng. (Auto. Trans.)	3468S
225" Eng. Taxi (All Trans.)	3236S

℄ - Carburetor number stamped on tag attached to air horn cover screw.

►CHANGES, CAUTIONS, CORRECTIONS

►*HARD COLD ENGINE STARTING CORRECTION:* Hard starting may be caused by choke piston sticking To correct, remove air cleaner and squirt carburetor cleaner, lacquer thinner, or alcohol through piston link opening while operating choke to clean out gum formation

DESCRIPTION

Single barrel downdraft type with separate "Well Type" automatic choke. Carburetor design is similar to previous models. Choke lever assemblies used on 170" Eng. carburetors have a "spring staged" feature which reduces choke valve closing torque when engine is cranked at temperatures below zero, resulting in better starting mixtures at both low and moderate temperatures.

ADJUSTMENT

ADJUSTMENT NOTE: All adjustments, except "Float Level" can be made with carburetor installed on ngine.

CARBURETOR RECONDITIONING NOTE: After r - conditioning, adjust "Accelerating Pump & Bowl Vent" and "Fast Idle Index" in this order (see below), befor proceeding with other adjustments.

Idle Speed & Mixture

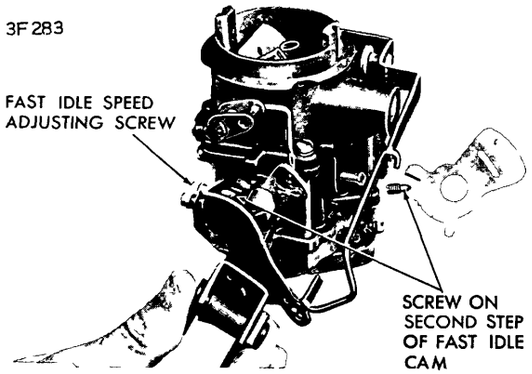
On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank. Adjust idle speed to correct engine RPM (see specifications) with choke valve wide open and fast idle screw not contacting fast idle cam. Adjust idle mixture screw to obtain highest engine RPM, then turn idle mixture screw inward (leaner) until speed starts to drop. Turn screw in opposite direction (richer) just far enough to recover the lost engine speed. *NOTE - This procedur assures idle mixture being set to lean st possibl mixture for smooth idle.* Reconnect ball joint at bellcrank.

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CARTER BBS SINGLE BARREL CARBURETORS (C nt.)

Fast Idle Speed

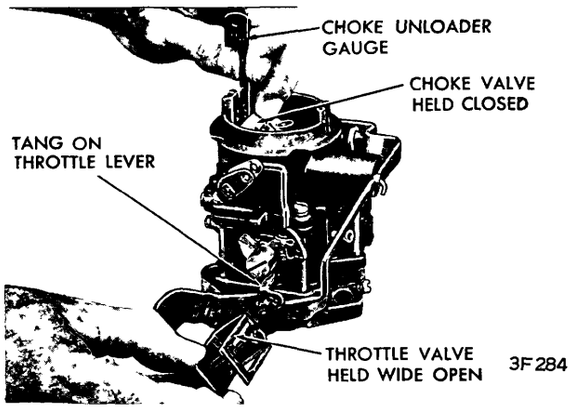
With engine running and at normal operating temperature, open throttle slightly and rotate fast idle cam so fast idle screw is in contact with second step of fast idle cam (see illustration). Release throttle, then turn fast idle screw to obtain correct fast idle speed (see specifications).



FAST IDLE SPEED ADJUSTMENT

Unloader

Hold throttle in wide open position and insert a drill of proper size (see specifications) between upper edge of choke valve and wall of air horn (see illustration). If no drag is felt, or if too much drag is apparent, bend unloader tang on throttle lever to obtain correct clearance.



UNLOADER ADJUSTMENT CHECK

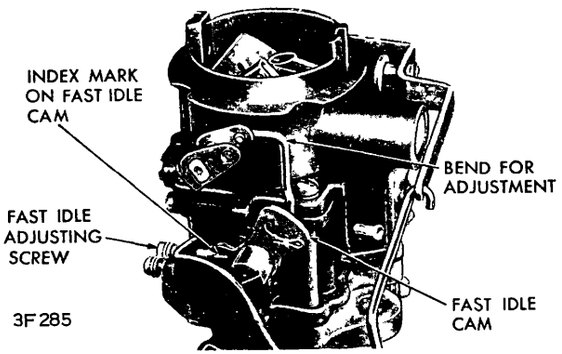
Fast Idle Cam Index

Open throttle valve and hold choke in fully closed position, then close throttle valve. Index mark on cam (see illustration) should be aligned with center of fast idle adjusting screw. To adjust, bend fast idle connector rod at angle. Make final fast idle adjustment with carburetor installed on engine *(see "Fast Idl Sp d" abov).*

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed (Eng. RPM) Hot ①	Fast ②	Initial Idle Mixture ③	Float Level ②	Bowl Vent ②	Unloader Setting ②	Chok S tting ②	Spring Staged Chok ②
3236S	550	④	1	9/32"	.060"	3/16"	4 Rich	.....
3287S,SA	550	1400	1	9/32"	.060"	3/16"	4 Rich	.010-.020"
3462S	550	1500	1	7/32"	.060"	3/16"	4 Rich	.010-.020"
3463S	550	1500	1	7/32"	.060"	3/16"	4 Rich	.010-.020"
3464S	550	1500	1	7/32"	.060"	3/16"	4 Rich	.....
3465S	550	1500	1	7/32"	.060"	3/16"	4 Rich	.....
3466S	550	1400	1	7/32"	060"	3/16"	4 Rich	
3468S	550	1500	1	7/32"	060"	3/16"	4 Rich	
3590S	550	1400	1	7/32"	060"	3/16"	4 Rich	010- 020"

① - All Models, with headlights turned ON. Air Conditioning ON (if so equipped). ② - See procedure below.
③ - Turns open from a lightly seated position. ④ - 1300 RPM (Synchro-mesh); 1400 RPM (Auto. Trans.).



FAST IDLE CAM INDEX ADJUSTMENT

Automatic Choke

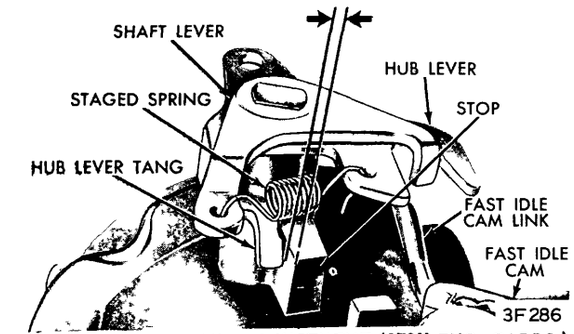
See specifications (above). *CAUTION - This unit is serviced as a complete assembly. Do not attempt to repair unit or change the adjustment.*

Spring Staged Choke

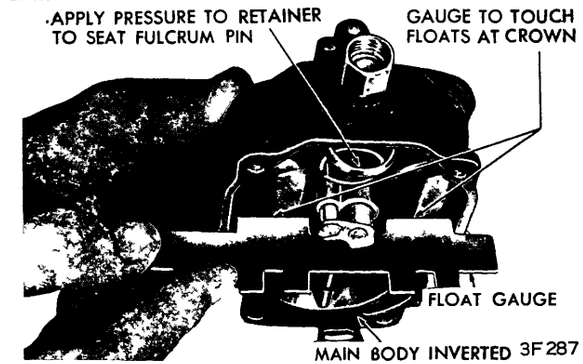
170" Engine Carbs - *NOTE - This unit not used on other carburetors.* With fast idle cam index properly adjusted, check adjustment of spring staged choke assembly as follows: Hold choke valve closed, then measure clearance between choke tang and boss on air horn (see illustration). If clearance is not within limits (see specifications), bend fast idle link slightly as necessary.

Float Level

With carburetor off engine, remove fuel bowl cover and invert carburetor main body so that weight of float only is holding needle valve against seat (hold finger against pin retainer to fully seat fulcrum pin). Use gauge or drill of proper size (see the specifications) and measure distance between surface of fuel bowl and crown of each float at center. To adjust, bend lip of float lever. *CAUTION - Do not adjust float s tting without r moving float from carburetor. R silient tip of n edl valve can be compressed sufficiently to caus a false setting.*



SPRING STAGED CHOKE ADJUSTMENT (170" ENG. CARBS.)



FLOAT LEVEL ADJUSTMENT

Accelerating Pump & B wl Vent

NOTE - Three holes are provided in throttle lever for pump connector rod engag ment to allow s asonal pump setting as indicated below. With throttle stop-screw backed off and throttle valve fully closed, place connector rod in center hole (Exc. 3287S); inner hole (3287S) of throttle lever and plunger pin in center groove (Exc. 3287S); in upper groove (3287S). *See illustration.* Close throttle valve and measure distance between bowl vent and air horn *(se illustration).* To adjust, bend pump operating rod at lower angle.

CARTER BBS SINGLE BARREL CARBURETORS (C nt.)

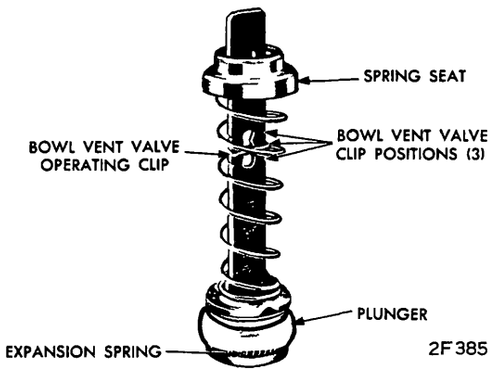
Pump S asonal Setting - Standard setting is with pump connector rod engaged in center hole (Exc 3287S SA), inner hole (3287S,SA) of throttle lever *NOTE - Outer hole of throttle lever provides greater discharg , inner hole less Whenever connector rod is moved, a corresponding change must be made in pin on pump plunger as follows Center hole (center groove of plunger), inner hole (upper groove of plunger), outer hol (lower groove of plunger)*

CARBURETOR ADJUSTMENT GAUGES

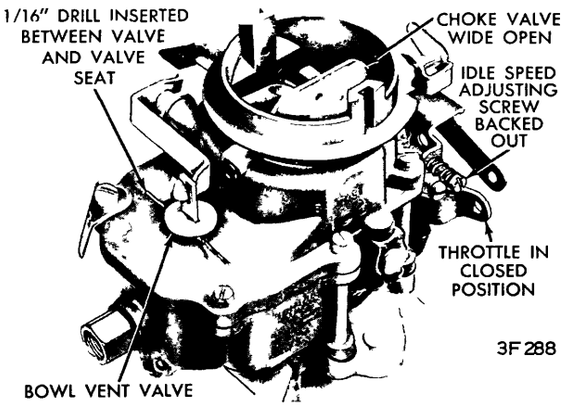
Adjustm nt	Dimension	Carter Tool No.
Float Level	7/32" & 9/32"	T109-239
Unloader	3/16"	T109-28
Bowl Vent	1/16"	Drill

OVERHAUL

S e 1960 Final Data, Page 277, or later Manual edition.



ACCELERATING PUMP PLUNGER ASSEMBLY



BOWL VENT ADJUSTMENT

CARTER SINGLE & DUAL BARREL CARBURETOR JET SPECIFICATIONS

Carter Carb. No.	Model	Standard Metering Rod Part No.	Standard Metering Jet Size	Standard Metering Jet Part No.	Main Vent Tube Size	Main Vent Tube Part No	Venturi Assembly Part No.	Low Speed Jet Size	Low Speed Jet Part No	Pump Jet Size	Pump Jet Part No.	Idle Tube Size	Idle Tube Part No.	Venturi Cover Screw Part No	Venturi Cover Screw Idle Air Bleed	Venturi Cover Screw Idle Re-stricti n
938SD	YF	75-1500	0935"	120-166				028"	11-163S	031"						
951SA	YF	① 75-1500	0935"	120-166				028"	11-163S	031"						
2392SA	YF	③ 75-708	096"	120-160				031"	11-160S	025"						
2467S	YF	② 75-1279	098"	120-163				028 '	11-163S	028"						
3186S	AS	⑨ 75-1542	0935"	120-166				0292"		026"						
3236S	BBS	75-1208	⑩	120-209S	0354"	145-91		028"		0275"	48-194	028"	123-76S		0629"	0512"
3287S	BBS	75-1208	⑩	120-209S												
3379S	YF	75-1608	096"	120-160				026"	11-239S	0225"						
3402S	YF	75-1609	096"	120-160				026"	11-239S	025"						
3434S	WCD	75-1619	089"	120-159				028"		033"						
3462S	BBS	75-1594	⑦	120-264S				028"		0275"	48-194				061"	0571"
3463S	BBS	75-1594	⑥	120-263S				0315"		0275"	48-194				0629"	052"
3464S	BBS	75-1594	⑤	120-263S				033"		0275"	48-194				0629"	052"
3465S	BBS	75-1615	⑤	120-263S				0315"		0275"	48-194				0629"	052"
3466S	BBS	75-1594	⑤	120-263S				033"		0275"	48-194				0629"	052"
3468S	BBS	75-1615	⑤	120-263S				0315"		0275"	48-194				0629"	052"
3472S	BBD	75-1616	⑥	120-213S			58-127S	0255"		0275"	48-194			101-526	059"	059"
3473S	BBD	75-1617	⑥	120-213S			58-127S	0255"		0275"	48-194			101-526	059"	059"
3475S	BBD	75-1599	④	120-250S			58-426S	0295"		0275"	48-194			101-450	040"	051"
3476S	BBD	75-1599	④	120-250S			58-426S	0295"		0275"	48-194			101-450	040"	051"
3487S	RBS	16-215						0292"		0292"					052"	052"
3498S	RBS	16-215						0292"		0292"					052"	052"
3535S	WCD	75-1619	089"	120-159				028"		033"						
3536S	AS	75-1620	1065"	120-171				033"		032"						
3538S	RBS	16-258	057"	120-278S				033"		0255"					0452"	052"
3653S	RBS	16-264S	052"	120-282S				033"		028"					052"	0492"

① - 1 Size Lean 75-808 1 Size Rich 75-913
② - 1 Size Lean 75-1339 2 Sizes Lean 75-1340
③ - 1 Size Lean 75-720
④ - 1 Size Lean 120-251S 2 Sizes Lean 120-259S
⑤ - 1 Size Lean 120-267S 2 Sizes Lean 120-268S
⑥ - 1 Size Lean 120-212S 2 Sizes Lean 120-209S
⑦ - 1 Size Lean 120-265S 2 Sizes Lean 120-266S
⑥ - 1 Size Lean 120-267S 2 Sizes Lean 120-268S
⑨ - 1 Size Lean 75-1543S 2 Sizes Lean 75-1544S
⑩ - 1 Size Lean 120-211S 2 Sizes Lean 120-210S

CARTER AS SINGLE BARREL CARBURETORS

	Carter No.
CHECKER SUPERBA	
Overhead Valve Engine	3290S
RAMBLER	
Classic Six, Auto Trans.	3536S
STUDEBAKER	
Lark 6 (Taxi)	3186S

DESCRIPTION

Single barrel downdraft type with automatic choke

ADJUSTMENT

Idle Speed & Mixture

With engine at normal operating temperature and idle speed adjusted to specified engine RPM, turn idle mixture screw to obtain highest steady manifold vacuum and maximum idle speed Readjust engine idle speed

Float Level

NOTE - "Split Type" float, used in Checker Superba carburetors. "Single Type" float used in all other carburetors.

FLOAT SETTING NOTE - Resilient type inlet valve seats used in some carburetors. When bending float lever to adjust height on carburetors with resilient type floats, do not allow float lever to contact inlet needle as seat can be compressed enough to cause a false setting

"Split Type" Floats - Remove bowl cover gasket and float pin retainer, then check each float separately while holding lip of float arm against seated needle. *CAUTION - Float pin must be at bottom of guide slots.* Distance from top of float at free end to top of gasket surface on bowl should be as indicated in "Specification Table". Adjust by bending lip on float arm. Install float pin retainer, then invert carburetor so that both floats rest against seated needle. Clearance between overlapping tangs on float levers should be .010-.015". Adjust by bending long tang on left hand float. Recheck float level.

"Single Type" Floats (Resilient Needle Seat) - With body gasket removed, invert bowl assembly while holding float pin lever retainer in place so weight of float only is resting on needle. Distance from top of float at free end to top of gasket surface on bowl should be as indicated in "Specification Table". To adjust, remove float lever pin retainer and install float holding tool, T-109-389 and bend float lip as necessary. *NOTE-Tool T109-389 prevents needle from pushing against resilient needle valve seat.* After adjustment, remove tool and install lever pin retainer, then recheck float setting.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed (Eng. RPM) ①	Initial Idle Mixture ③	Fast Idle (Off Eng.)	Float Level	Unloader	Auto. Choke
3186S	550	½-2	065"	5/16"	3/16"	1 Lean
3290S	500	½-1¾	030"	1/4" ⑤	9/64"	1 Rich
3536S	400 ②	¼-1½	.037"	3/32" ④	1/8"	Centered

① - Auto Trans in "N" (Neutral)
② - Air Conditioner turned ON.
③ - Turns open from a lightly seated position
④ - Resilient type needle seat.
⑤ - Solid type needle seat

"Single Type" Floats (Solid Needle Seat) - With gasket removed, invert bowl assembly and measure distance from top of float at free end to gasket surface on bowl This distance should be as indicated in "Specification Table" To adjust, bend float lip.

Accelerating Pump

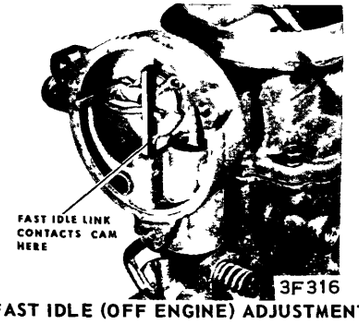
Top of pump arm that engages slot in pump shaft must be parallel to top surface of bowl cover with throttle in wide open position. Adjust by bending pump arm up or down as necessary

Metering Rod

With throttle wide open, metering rod should just bottom in carburetor casting To adjust, bend metering rod arm. When metering rod is properly adjusted, some movement can be noted around eye of metering rod retainer clip when throttle is moved slightly from wide open position. If rod is too low, it will tend to push metering rod retainer clip up. If rod is too high, it will be possible to push rod down.

Fast Idle (Off Engine)

NOTE - Fast idle speed will be correct after "Fast Idle (Off Engine)" adjustment is complete. There is no "Fast Idle (On Engine)" adjustment required. Remove thermostatic coil housing, gasket and baffle plate, then crack throttle valve and hold choke valve closed to rotate fast idle cam to fast idle position Close throttle, then measure distance between edge of throttle valve and bore on side opposite idle ports. This distance should be as indicated in "Specification Table" To adjust, bend choke connector rod at lower angle



FAST IDLE (OFF ENGINE) ADJUSTMENT

Unloader

Hold throttle valve wide open and close choke valve without forcing it Clearance between upper edge of choke valve and inner wall of air horn should be as indicated in "Specification Table" To adjust, bend choke shaft unloader arm



UNLOADER ADJUSTMENT

Automatic Choke

Loosen cover retaining screws and rotate cover to align index with proper calibration on housing. See "Specification Table"

OVERHAUL

See 1962 Final Data, Page 250 for complete overhaul procedures.

CARTER YF SINGLE BARREL CARBURETORS

	Carter No.
CHEVY II	
4 Cyl. (Synchro-mesh)	3379S
4 Cyl. (Auto. Trans.)	3402S
CHEVROLET TRUCK	
4 Cyl. Parcel Delivery (Synchro-mesh)	3379S
4 Cyl. Parcel Delivery (Auto. Trans.)	3402S
JEEP	
4 Cyl. "L" Head Jeep Dispatcher	2392SA
4 Cyl. "F" Head Universal Jeep	938SD
4 Cyl. "F" Head 4x2, 4x4, 4WD	951SA
4 Cyl. "F" Head Fleetvan (Post Office)	3200S
4 Cyl. "F" Head Fleetvan (Others)	938SD
4 Cyl. "F" Head Forward Control	938SD
6 Cyl. "L" Head All Models	2467S

DESCRIPTION

Single barrel downdraft type with manual choke control. Same design as previous models.

ADJUSTMENT

Idle Speed & Mixture

NOTE - If idle mixture adjustment required to warm-up engine, turn idle mixture screw out (see specifications) from a lightly seated position.

With engine at normal operating temperature, choke valve wide open and fast idle inoperative, adjust throttle stopscrew for correct engine idle speed (see specifications). Adjust idle mixture screw for smoothest engine operation, highest vacuum and highest RPM. Recheck idle speed.

Float Level

Invert air horn and float cover assembly, allowing float to hang free. Distance from top of float to gasket surface on cover (gasket removed) should be as indicated in specifications. To adjust, bend lip that contacts inlet needle valve (do not bend float arm). If resilient type needle valve seat is used, do not allow float lip to contact needle valve when adjusting as seat can be compressed and cause a false setting.

WILLYS CARBURETOR FLOAT SETTING NOTE: A "spring loaded" intake needle valve is used on all models. Do not compress this spring when checking float level.

CHEVY II CARBURETOR FLOAT SETTING NOTE: If a resilient type inlet needle valve seat is used to replace the solid seat, adjust float level to 7/16".

Float Drop

NOTE - This adjustment not required on all carburetors. See specifications.

With bowl cover assembly held in upright position, distance between outer end of float and bowl cover should be as indicated in specifications. To adjust, bend stop tabs on float arm.

Accelerating Pump

NOTE - This adjustment is not required on Willys 4-Cyl. Eng. carburetors.

Make this adjustment before adjusting metering rod. Check the adjustment each time carburetor is assembled. With throttle valve seated in bore, press down on upper end of diaphragm shaft until it reaches bottom position and hold in this position. Metering rod arm should now contact pump lifter link at center end nearest the springs. To adjust, bend pump connector link at its lower angle. *CAUTION - Bending connector rod at another place will cause pump lifter link to bind.*

Metering Rod

With throttle valve seated in bore, press down on upper end of diaphragm shaft until diaphragm bottoms in vacuum chamber and hold in this position. Metering rod should touch bottom of metering rod well, and metering rod arm should contact lifter link at outer end nearest springs and at supporting lug. To adjust, bend lip of metering rod arm to which metering rod is attached.

Idle Vent

NOTE - This adjustment required on Chevy II & Chevrolet Truck carburetors only.

After completing accelerating pump and metering rod adjustment, seat throttle valve in bore. Clearance between idle vent valve and inside of bowl cover should be as indicated in specifications. To adjust, turn screw in vent valve.

Fast Idle

With choke valve held in wide open position, lip of fast idle arm should contact boss on body casting. To adjust, bend choke connector link at offset.

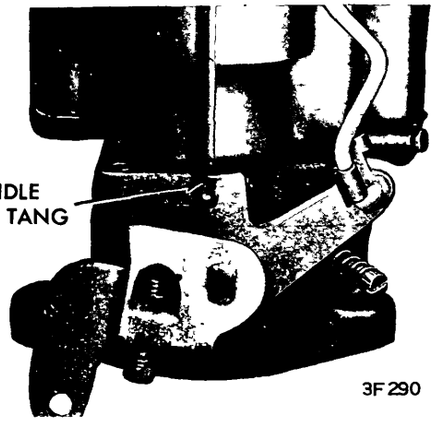
Manual Choke

With air cleaner removed, pull choke knob on instrument panel out 1/8". Loosen choke cable clamp at carburetor bracket and adjust cable through clip until choke valve is wide open, then tighten cable clamp at carburetor bracket. Check choke operation for full closed and full open positions. Install air cleaner.

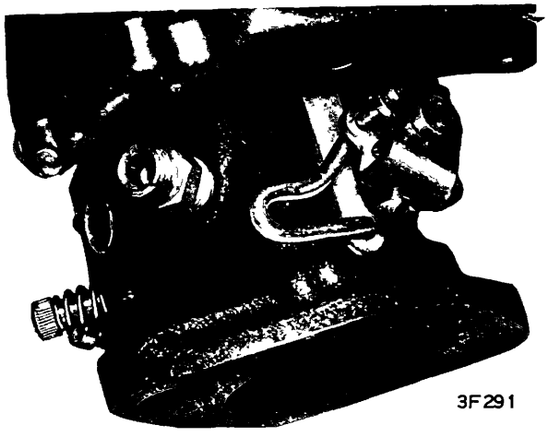
CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Spd. Eng. RPM Hot	Initial Idle Mix. Screw ①⑤	Float Setting ① Level	Float Setting ① Drop
938SD	600	¾-1¾	5/16" ⑥⑦	⑧
951SA	600	¾-1¾	5/16" ⑥⑦	⑧
2392SA	600	½-2	9/32" ⑥⑦	⑧
2467S	550	1-2½	9/32" ⑥⑦	1 1/4"
3200S	600 ②	¾-1¾	5/16" ⑥⑦	⑧
3379S	500	⅛-2½	3/8" ⑥	1 3/16"
3402S	500 ③④	⅛-2½	3/8" ⑥	1 3/16"

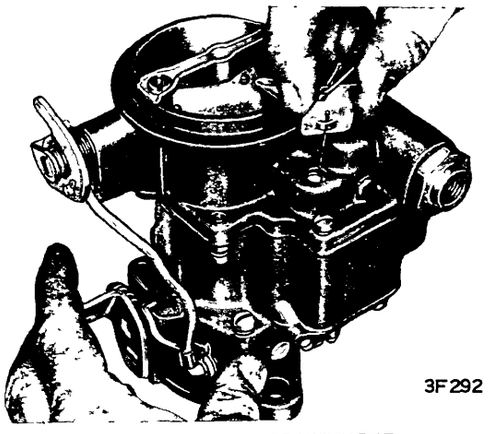
① - See procedure below.
② - Auto. Trans. in "N" (Neutral).
③ - Auto. Trans. in "D" (Drive).
④ - Truck idle speed 450-500 RPM.
⑤ - Turns open from a lightly seated position.
⑥ - Solid inlet valve seat.
⑦ - Set to ½" if spring loaded needle valve and resilient type inlet valve seat is used.
⑧ - Float drop setting not required.



FAST IDLE ADJUSTMENT



ACCELERATING PUMP ADJUSTMENT



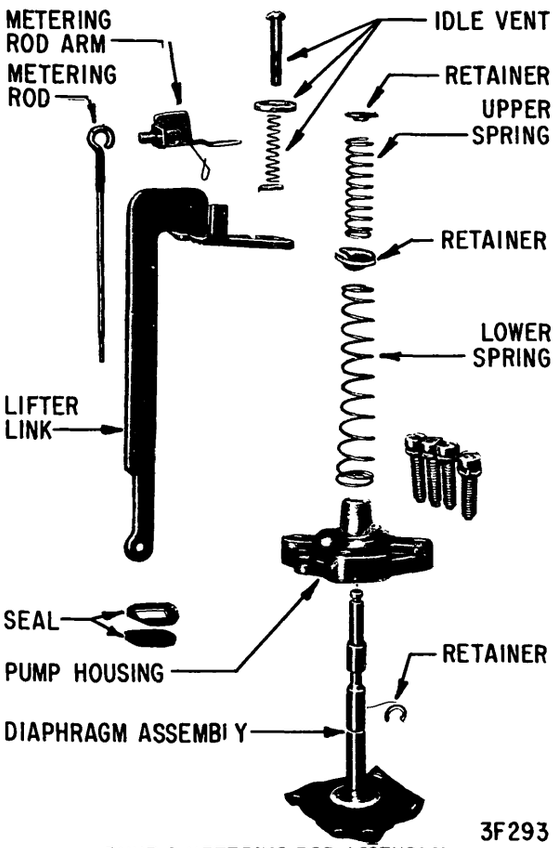
IDLE VENT ADJUSTMENT

CARTER YF SINGLE BARREL CARBURETORS (C nt.)

OVERHAUL

Disassembly

1) Remove fast idle connector rod, then remove inlet filter nut, filter, spring and gaskets from fuel inlet housing.
2) Remove bowl cover from main body and place cover upside down on a flat surface. Remove hinge pin, float and float needle, then remove needle seat.
3) Hold finger over pump discharge passage on main body (to retain discharge needle) and operate pump plunger a few times to check operation of diaphragm, ball check, needle, and passage restriction.
4) Empty gas from fuel bowl of main body and remove pump discharge needle. Loosen throttle shaft pump arm lock screw and remove arm and pump connector link, then remove diaphragm housing screws and lift out entire pump, metering rod, and idle vent assembly.
5) Remove metering rod from arm, then compress upper pump springs and remove retainer, springs, metering rod arm, and pump lifter link assembly. If necessary, remove idle vent screw assembly from lifter link. Compress lower spring and remove spring retainer, then remove lower spring.



PUMP & METERING ROD ASSEMBLY

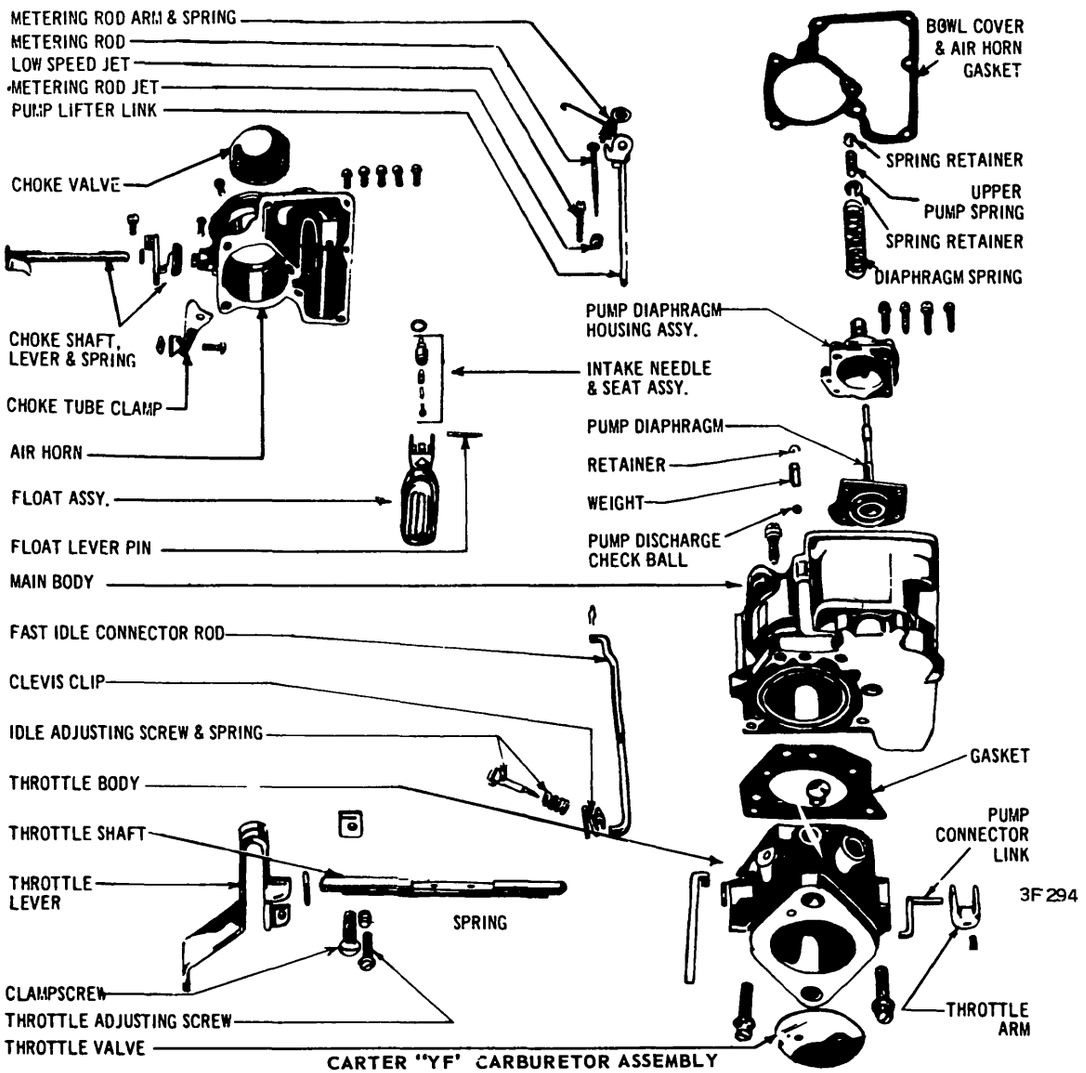
6) Remove pump housing screws from housing and diaphragm, then remove diaphragm shaft retaining ring and slide diaphragm assembly out of housing. Remove main metering jet and low speed (idle) jet. *CAUTION - Do not remove pressed-in parts.*
7) Remove idle mixture screw and remaining body-flange attaching screws and remove body and gasket from throttle flange. *NOTE - Do not remove throttle valve and shaft unless to correct a binding condition or install new parts.*
8) If necessary to remove throttle valve and shaft, file staked ends of throttle valve screws flush with throttle shaft. Remove screws and throttle plate, then slide shaft out of flange and remove fast idle arm.
9) Remove choke valve, if necessary, in same manner as for throttle valve. To remove choke cam lever, pry off retaining ring, then slide lever and spring from mounting boss.

Cleaning & Inspection

Wash all parts in carburetor cleaning solution. *CAUTION - Do not immerse diaphragm assembly, pump check disc, or seals in solution.* Inspect all parts for wear or damage and replace if necessary. Blow out all passages with air.

Reassembly

Reverse disassembly procedure and note the following: Install new gaskets. Install throttle valve with lettering toward manifold side of flange and part number opposite idle port. Make sure pump connector link and pump lifter link do not bind in any throttle position. If necessary, loosen lock screw and adjust slightly.



CARTER "YF" CARBURETOR ASSEMBLY

CARTER YH HORIZONTAL CARBURETORS

CORVAIR — **Carter Carb. No.**

1963 Monza (Supercharged Engine) — 3311S

DESCRIPTION

Single barrel, side draft (horizontal) type with diaphragm operated metering rod (vacuum and mechanically controlled by action of accelerator pump assembly). An automatic choke assembly is used on all models. Heated fresh clean air is drawn from carburetor air cleaner through choke heat passages in turbine housing-to-exhaust pipe attaching flange, then into choke housing for automatic choke control.

SUPERCHARGER NOTE - See "Corvair Supercharger" in 1962 Final Data, Page 256.

ADJUSTMENTS

Idle Speed & Mixture

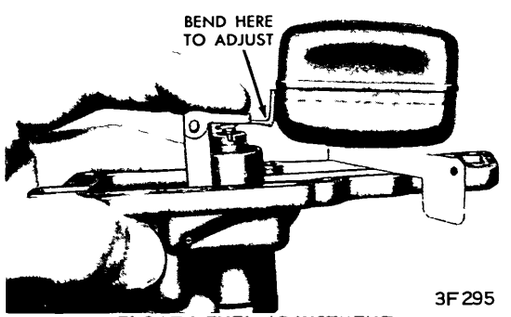
With engine at correct idle speed (see "Specification Table"), adjust idle mixture screw to obtain highest vacuum. Readjust idle speed and repeat idle mixture adjustment.

Throttle Return Check

With engine at normal operating temperature and correct idle speed (choke valve fully open and fast idle not operating), measure distance between throttle valve lever and return check valve bolt. This distance should be as indicated in "Specification Table". To adjust, hold wrench on flat of diaphragm stem and turn self-locking nut as necessary.

Float Level

Invert bowl cover and measure distance between float at center and gasket surface of bowl cover (gasket removed). Distance should be as indicated in "Specification Table". To adjust, bend float arm.



FLOAT LEVEL ADJUSTMENT

Float Drop

Hold bowl cover upright so float is hanging free. Distance between gasket surface (gasket removed) and float seam at free end should be as indicated in "Specification Table". To adjust, bend tang at hinge end of float.

Automatic Choke

Loosen choke coil housing retaining screws and rotate cover to align index mark on cover with proper graduation on housing See "Specification Table"

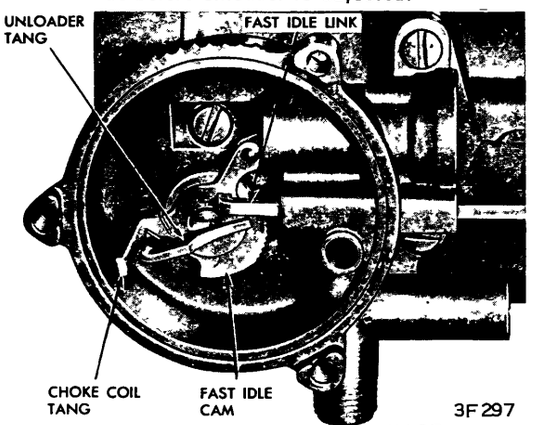
CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed Eng. RPM	Initial Idle Mix. Screw Ⓒ	Float Level	Float Drop	Auto. Choke	Off Engine Fast Idle	Unloader	Metering Rod Gauge No.	Throttle Return Check
3311S	850	3/4	5/8"	2 3/8"	1 Rich	030"	7/16"	T109-104	.030"

Ⓒ - Turns open from a lightly seated position.

Fast Idle (Off Engine)

NOTE- Fast idle adjustment (on engine) is not required. Hold choke valve tightly closed and close throttle valve as far as it will go (fast idle link on high step of fast idle cam). Clearance between throttle valve and bore on side opposite idle port should be as indicated in "Specification Table". To adjust, bend fast idle connector link. *NOTE - Fast idle adjustment must be made before unloader is adjusted.*



CHOKE HOUSING & FAST IDLE LINKAGE

Unloader

With fast idle properly adjusted, open throttle to wide open position while holding tension on choke valve. Distance between edge of choke valve on side opposite vent tube should be as indicated in "Specification Table". To adjust, bend unloader tang on fast idle cam.

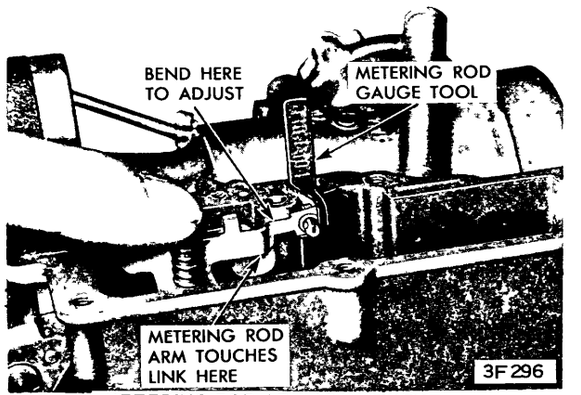
Metering Rod

With throttle valve held tightly closed, remove metering rod and install correct metering rod gauge (see "Specification Table") in metering jet. Push down on pump diaphragm rod until metering rod arm just touches lifter link At this point metering rod arm pin should just contact top gauging surface of tool To adjust, bend metering rod arm at undercut portion. Remove gauge and reinstall metering rod.

OVERHAUL

Disassembly

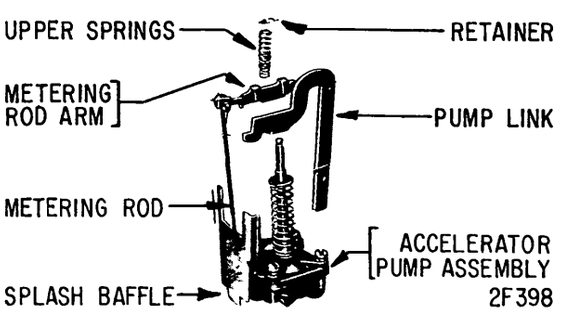
Remove inlet screen, then remove bowl cover. Remove float and float needle and seat. Remove bowl cover gasket and tip carburetor and remove pump discharge needle valve. Loosen pump lever screw from throttle shaft and slide lever off shaft and link. Depress small



METERING ROD ARM ADJUSTMENT

spring on pump with a screwdriver and remove spring seat and spring, then lift metering rod arm and rod from pump rod and metering jet. Raise pump arm enough to remove link, and remove pump arm. Remove diaphragm pump assembly, splash deflector plate and metering jet. Remove choke link clip and choke link, then remove choke housing cover, gasket and baffle plate, and slide choke lever out of housing. Remove throttle body flange assembly from carburetor main body, then remove idle speed screw and spring from throttle body. *NOTE - Do not remove choke valve, choke piston, or throttle valve unless shaft and piston are binding or if parts must be replaced.* File staked ends of throttle plate and choke plate screws level with shaft, then remove screws and plates. Remove throttle shaft by sliding out of throttle body. Rotate choke shaft until piston comes out of bore, then slide shaft assembly from main body. Remove choke housing and discard vacuum passage "O" ring.

(Continued)



ACCELERATOR PUMP & LINKAGE

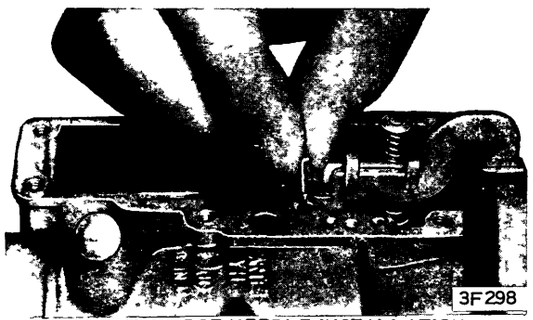
CARTER YH HORIZONTAL CARBURETORS (C nt.)

Inspection

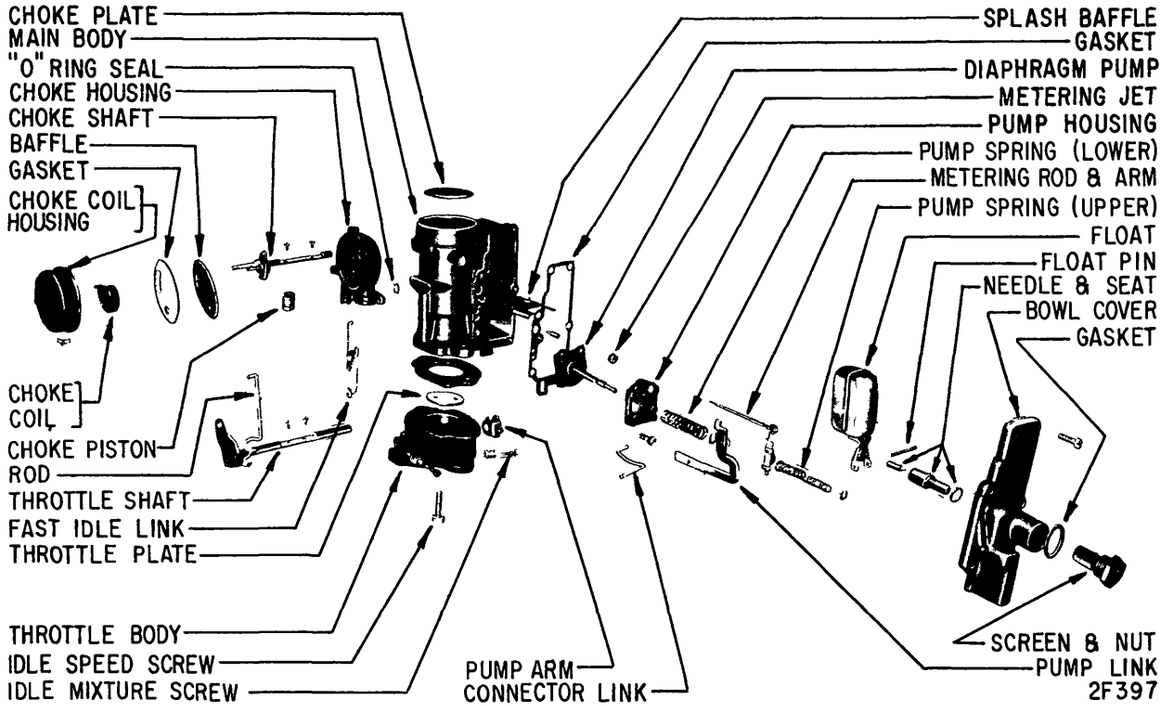
Wash all parts except choke coil housing assembly in cleaning solution. Remove all carbon from throttle body bore and blow out all passages with air. If choke piston is not free in housing bore, remove welch plug from housing and clean cylinder bore with fine sandpaper if necessary Install a new welch plug so it is air tight Inspect all parts for wear or damage and replace if necessary.

Reassembly

If throttle shaft assembly was removed, slide shaft into throttle body and position throttle plate on flat of shaft with numbered side to shaft, then install screws loosely. Center throttle plate on shaft and in throttle bore, then tighten screws and peen securely. If choke shaft was removed, install a new "0" ring seal and position choke housing on air horn. Tighten attaching screws just snug. Slide choke shaft into air horn part way, then install piston to shaft and position shaft by rotating while installing piston into cylinder bore. Tighten choke housing screws securely. Position choke plate on flat of shaft so identification numbers are on air cleaner side, then complete installation in same manner as for throttle plate. Install throttle body on main body and tighten attaching screws securely (use a new gasket). Install diaphragm assembly in diaphragm housing, then install lower spring and retainer. Install metering jet (no gasket), then install



PUMP DISCHARGE NEEDLE INSTALLATION



CARTER "YH" CARBURETOR ASSEMBLY

diaphragm housing screws and thread them in two or three turns to hold diaphragm in alignment and install diaphragm assembly in carburetor bowl. Tighten attaching screws securely. Install splash shield between metering rod jet and pump housing, then install metering rod onto rod arm, hook spring, and install clip. Place pump lifter link in guide opening and insert throttle lever connector link onto pump lifter link (connector must be installed before lifter link assembly is completely in position) then place lifter arm down over pump rod. Place metering rod in jet with arm over pump rod and lifter arm, then place upper springs over pump rod. Compress springs with a screwdriver and install retainer. Install throttle shaft pump lever over throttle shaft and pump link, then tighten retaining screw. Adjust metering rod (see above). Install float needle seat, needle valve, and float assembly in bowl cover (float hinge pin shoulder to outboard side of of bowl), and adjust float level and drop. Install pump discharge needle, then install bowl cover (and a new gasket) and tighten cover screws. Install fast idle link into choke housing and hook unloader projection over tang on fast idle cam assembly. Install choke link connector link to throttle lever keyed hole, then to choke link with a clip. Adjust fast idle (see above), then adjust unloader. Install choke baffle plate, gasket, choke coil housing, retainer clips and screws. Adjust automatic choke (see above).

CARTER RBS SINGLE BARREL CARBURETORS

RAMBLER AMERICAN ("L" Head Engine)	Carter No.
Exc. "E-Stick"	3487S
"E-Stick"	3498S

STUDEBAKER	Carter No.
Lark 6 Cyl. (Exc. Taxi) Ⓒ	3538S
Lark 6 Cyl. (Exc. Taxi) Ⓒ	3653S
Lark 6 Cyl. (Taxi)	3537S

Ⓒ - Used in partial production.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 RAMBLER CARBURETOR STEP-UP DIAPHRAGM COVER RETAINER PRODUCTION CHANGE & SERVICE INSTALLATION NOTE:* Carburetors with date code K-2 or later (stamped on carburetor flange) have a new method of retaining the step-up rod diaphragm cover. On carburetors prior to date code K-2, install a split wire ring, Part No. 3204528 and conical washer, Part No. 3204529 as outlined under "Overhaul" below. The above parts are also included in Overhaul Kit, Part No. 3204290.

►*1963 STUDEBAKER CARBURETOR NO. 3538S (WITHOUT BLUE DOT ON CARBURETOR BOWL COVER) LOOSE, LEAKING, OR MISSING DIAPHRAGM CHAMBER COVER CORRECTION:* Install Repair Kit, Part No. 1560178, following the installation procedures included with repair kit. The above carburetors will have a code date prior to L-2 stamped on carburetor flange. Later carburetors (after code date L-2) and all carburetors having a blue dot on bowl cover were revised in production.

►*1963 STUDEBAKER HARD STARTING WITH COLD ENGINE CORRECTION (Early Carburetors with Code Date Prior to "L-2"):* Set automatic choke to 1 Point Rich instead of Centered (On Index).

DESCRIPTION

Single barrel, concentric bowl type with a vacuum diaphragm controlled step-up. Carburetor assembly consists of a single aluminum casting with a pressed steel bowl.

ADJUSTMENT

Idl Speed & Mixture

With engine at normal operating temperature, adjust throttle stopscrew to obtain correct engine RPM, then adjust idle mixture screw for highest steady vacuum, maximum idle speed, and smoothest engine operation. If necessary, readjust engine idle speed.

Float Level

With carburetor assembly inverted (bowl and bowl gasket removed) and with weight of float only resting on inlet needle, measure distance from machined surface of casting to top of "bump" at each end of float (see illustration and specifications). To adjust, remove float from carburetor and bend bracket at narrow portion. *NOTE - If adjustment is made with float in carburetor do not allow any pressure to be placed on resilient inlet needle seat.*

Step-Up Rod

This adjustment is required whenever step-up rod is removed from diaphragm assembly. Invert carburetor and press in lower end of step-up rod until upper end of diaphragm assembly touches retainer (resistance will be felt at this point, then continue to press rod inward until tip of rod extends .040" outward from lower surface of jet. Install step-up rod spring.

Accelerating Pump

NOTE - This adjustment must be made each time carburetor is disassembled and must be made before fast idle and unloader adjustment. Back out idle speed screw and hold choke valve wide open so throttle valve seats in bore. Turn pump adjusting nut to obtain proper clearance (see specification table) between washer on pump plunger and boss on bowl cover.

Fast Idle

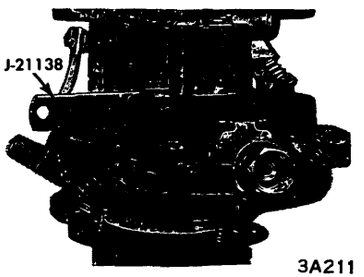
Rotate fast idle cam and align index mark on cam with center of tang on throttle lever. Clearance between throttle valve and carburetor bore on idle port side should be as indicated in specification table. To adjust, bend tang on throttle lever. With choke valve closed and fast idle connector rod against end of slot in cam (see illustration), index mark on cam should align with tang on throttle lever. To adjust, bend connector rod at offset portion.

(Continued)

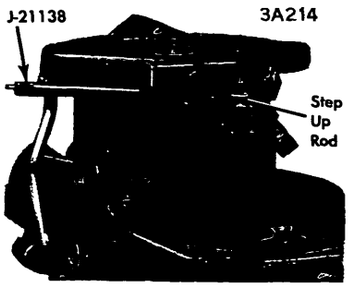
CARBURETOR ADJUSTMENT SPECIFICATIONS

Carter Carb. No.	Idle Speed Eng. RPM	Initial Idle Mix. Screw	Float Level ②	Pump & Bowl Vent ②	Auto. Choke ②	Unloader ②	Off Engine Fast Idle ②	Step-Up Rod ②	Dashpot ②
3487S	550 Ⓒ	¼-1½ ③	15/32"	1/16"	Index	7/64"	.035"	.040"	3/32-1/8"
3498S	550	¼-1½	15/32"	1/16"	Index	7/64"	.035"	.040"	3/32-1/8"
3538S	550	¼-1½	15/32"	1/16"	④	5/32"	.052"	.040"	.....
3653S	550	¼-1½	15/32"	1/16"	Index	5/32"	.052"	.040"	.....

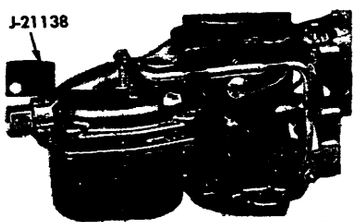
Ⓒ - Synchro-mesh Trans. 500 RPM Auto. Trans. & All Air Cond. Models.
② - See procedure below.
③ - Turns open from a lightly seated position.
④ - 1 Point Rich, carburetors stamped L-2 or later. Centered (On Index), earlier carburetors. *NOTE - Code date ("L-2") stamped on carburetor mounting flange.*



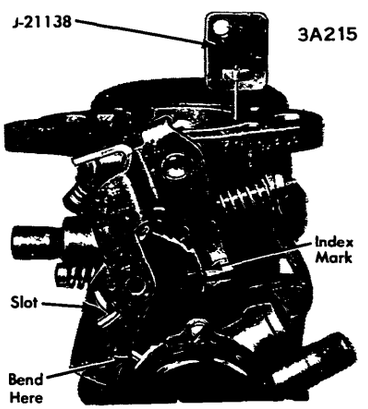
FLOAT ADJUSTMENT



STEP-UP ROD ADJUSTMENT



PUMP ADJUSTMENT



FAST IDLE ADJUSTMENT

CARTER RBS SINGLE BARREL CARBURETORS (C nt.)

Unloader

With throttle valve wide open, clearance between upper edge of choke valve and wall of air horn should be as indicated in table. To adjust, bend tang on throttle lever (see illustration).

Dash Pot

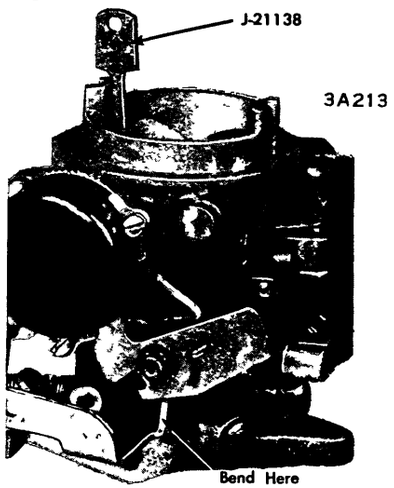
Close throttle valve by backing off idle speed screw, then depress dashpot diaphragm stem fully. Obtain proper clearance between end of stem and throttle lever by turning dashpot in or out. See illustration. Tighten locknut securely.

OVERHAUL

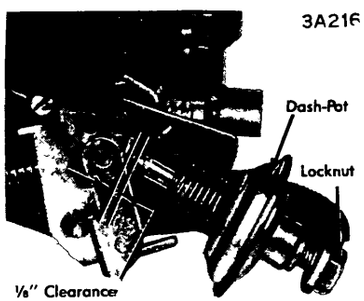
Disassembly

1) Remove pump adjusting nut, then push plunger down and remove spring and washer. Remove pump plunger shaft retainer, then remove pump arm retainer and arm, upper plunger spring and washer.

2) Remove fast idle cam and disengage cam from connector rod. Remove thermostatic coil housing and gasket. *NOTE - Do not remove choke valve unless it is necessary for cleaning or repair.* To remove choke, remove choke piston lever and slide piston out of cylinder, then disconnect choke piston link (wire). Spread fork of choke lever with a screwdriver and slide from shaft. Remove choke valve screws and valve, and slide shaft out of air horn.



UNLOADER ADJUSTMENT



DASHPOT ADJUSTMENT

3) Remove bowl and gasket, then remove float pin attaching screws, float, pin, and needle and seat assembly. Remove step-up rod retainer spring. Press pump plunger shaft down as far as it will go, then hold in place and tap upper end of shaft with a light hammer. *NOTE - Catch plunger, spring, intake ball retainer, and ball and seat as they are driven out at lower end of cylinder.*

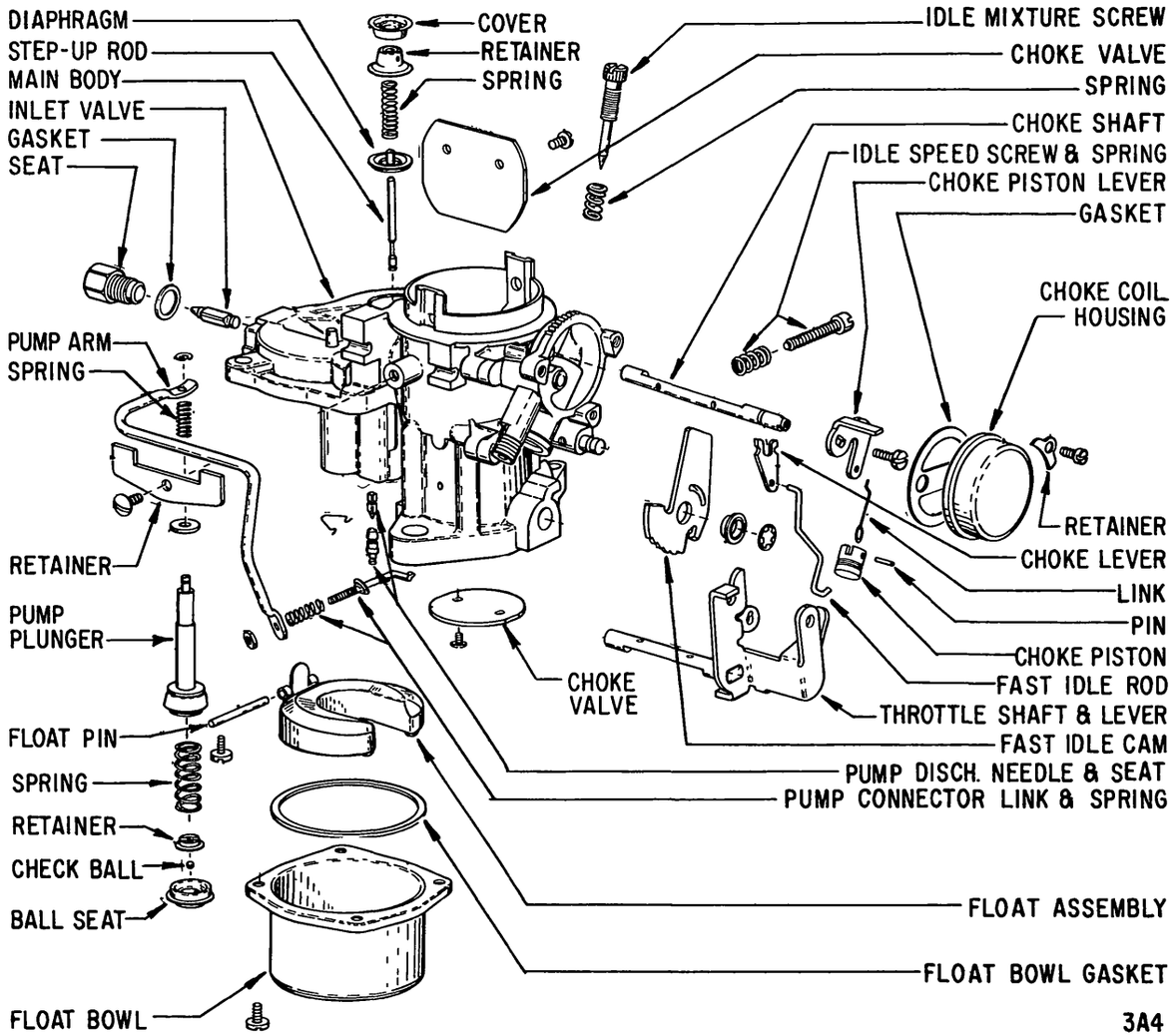
4) If it is necessary to remove pump discharge check needle seat from bottom of casting, use suitable tool (see "Carburetor Tools" below). To remove diaphragm cover and diaphragm assembly, remove the cover by piercing with a sharp tool and pry from casting. *NOTE - A split ring and washer located above cover will come out of casting with the cover. If the carburetor does not have a split ring and washer above cover, make sure that the repair kit being used contains these parts (see "Changes, Cautions, Corrections" above).* Remove lower retainer, spring, diaphragm assembly and step-up rod.

5) If necessary to remove throttle valve, file upset end of attaching screws, then remove screws, valve, and slide shaft and lever assembly out of casting. Remove idle mixture screw and idle speed screw.

Cleaning & Inspection

Clean casting and parts in a suitable cleaning solution. *NOTE - Do not immerse diaphragm, seat,*

(Continued)



CARTER RBS (SINGLE BARREL) CARBURETOR

CARTER RBS SINGLE BARREL CARBURETORS (C nt.)

plunger, or float in cleaning solution. If diaphragm assembly has not be n removed, do not immerse casting in cl aning solution. Blow out all passages with air and remove all gum and carbon from carburetor bore. Inspect all parts for damage and replace as necessary.

Reassembly

1) Invert carburetor casting and install pump plunger, spring, ball retainer, ball and check ball seat. Press check ball seat down into position and place tool (see "Carburetor Tools" below) over end of seat. Tap tool lightly with a hammer until seat is pressed tightly into position. *NOTE - Make sure tool contacts outer surface of ball check seat.*

2) If pump discharge needle and seat were removed, insert needle in passage with point of needle toward seat, and install seat by driving into place (tap on protruding lip of seat) until it is just flush with lower edge of casting.

3) Place a new diaphragm assembly on top of cavity (clip end for step-up rod downward), then place brim of hat-shaped retainer (without spring) against diaphragm and use it as a tool to press diaphragm and its gasket firmly against gasket ledge in casting. Remove hat-shaped retainer and examine diaphragm for even assembly, making sure diaphragm stem is near vertical position. Install spring in cupped-shaped plate on top of diaphragm, then install hat-shaped retainer (brim down) on top of spring. Position diaphragm cover in casting and use special tool (see "Carburetor Tools" below) and tap cover into place with a hammer until cover is tightly in position. Place split wire ring inside diaphragm cover and place conical washer over ring (small end of cone upward). Place a 7/16" socket attached to a suitable extension over inside diameter of washer and tap with a hammer until conical washer is flat. *CAUTION - Do not use a smaller tool which will enter cover or strike center portion of cover any time conical washer is being installed. Do not drive washer beyond the flat position.* Install step-up rod in place, making sure end of rod is in hollow end of stem of diaphragm.

4) If throttle shaft assembly was removed, attach connector link and insert shaft into position, then install valve with new attaching screws (do not tighten screws). *NOTE - Trade mark on valve should extend toward idle port when viewed from manifold flange side.* Tap valve lightly with screwdriver to seat valve in bore, then hold valve in position and tighten attaching screws. Upset ends of attaching screws.

5) Install upper pump washer and spring, then install washer and pump delayer spring on connecting link. Install pump arm, making sure connector link extends through hole in lower end of arm, and upper end of arm is over pump plunger. Install rod retainer, then install adjusting nut on connector link and retainer clip on plunger shaft.

6) If choke was completely disassembled, install choke valve and shaft. Center valve in bore by tapping with a screwdriver and install attaching screws. Attach fast idle connector rod to choke lever and install choke lever on shaft. Crimp forked ends of lever with pliers to secure in place. Attach fast idle cam to lower end of connector rod and install fast idle cam, washer, and retainer. Assemble choke piston and link (wire) to choke piston lever. Slide piston into cylinder, then position lever on end of shaft and secure with attaching screw. Install choke housing gasket, thermostatic coil housing, and secure in position.

7) Invert carburetor and install fuel intake needle and seal, then insert float pin into float bracket and install in carburetor. Secure float pin with attaching screws.

Carburetor Tools

J-8249 (Rambler) & J-2152-1 (Studebaker) - Use to remove pump discharge check needle seat.
J-21202(Rambler) & J-21252-2 (Studebaker) - Use to install pump discharge check needle seat.
J-21202 (Rambler) & J-21252-7 (Studebaker) - Use to seat diaphragm cover in casting.

PAXTON SUPERCHARGER

Studebaker & Avanti (1963)
(With Supercharg d J t-Thrust Engine)

DESCRIPTION

Supercharger system consists of a belt driven centrifugal, fixed ratio, single-stage unit combined with a sealed Carter AFB 4-Barrel carburetor and a special fuel pump that utilizes supercharger pressure to increase fuel pressure as required. Air pressure is boosted a maximum of 5 psi, to provide a denser air-fuel mixture to combustion chambers. An internal oil sump which holds 8 ounches of Automatic Transmission Fluid Type "A" (Suffix "A") supplies the self contained lubrication system. A bayonet type oil gauge marked "Safe Operating" level and "Add Oil" level is located in bearing housing assembly. Periodic service adjustments are not required.

REMOVAL & INSTALLATION

REMOVAL - Push belt tensioning arm toward center of engine and remove drive belts, then remove inlet hose. Remove discharge hose at supercharger. Disconnect fuel pump air hose at supercharger, then disconnect supercharger from mounting bracket. *NOTE - Hold supercharger in normal operating position and remove unit from engine.*

INSTALLATION - Reverse removal procedure. *CAUTION - Do not operate supercharger above idle speed when supercharger discharge hose is disconnected from carburetor air horn adapter.*

OVERHAUL

DISASSEMBLY - **1)** Drain lubricant and place unit in Holding Fixture J-6689, then remove cover from scroll housing. Install Impeller Holding Tool J-6684 and remove impeller capscrew and washer, then remove tool.

2) Insert Impeller Puller Tool J-6690 and turn until impeller is lifted off shaft. Turn supercharger over so pulley side is upward and position dowel pins on face of scroll in holes of holding tool. Hold pulley hub from turning and remove pulley screws and washers.

3) Remove pulley from shaft and remove drive key and front seal washer. Scribe an index mark on scroll housing and bearing housing for reassembly in original position, then remove bearing housing-to-scroll housing capscrews. Remove bearing housing by twisting it free of scroll housing. *CAUTION - Do not use any kind of tool to pry housings apart.*

4) Pry air hole cover from scroll, then tap pulley end of input shaft with a rubber hammer and drive input shaft assembly out of bearing housing. To remove input shaft seal, press seal into housing. Remove two "O" ring seals from grooves in bearing housing.

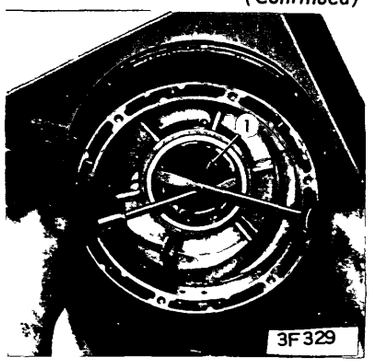
5) Use Puller Plate J-1298, Collets J-6729, Center Button J-6686 and Puller J-8305 and pull front bearing and input shaft seal spacer from input shaft. Remove oil pump screen retainer and screen, plunger spring retainer screw, plunger spring and plunger from oil pump body. Slide pump body from input shaft. Remove ball driver from shaft.

6) Remove race load assembly from scroll housing, then use a suitable punch to tap ball race out of race load assembly being careful not to lose race lockpin. Use a lint free cloth and lift five drive balls of planetary system from ball race and output shaft in the scroll housing, then remove output shaft. Remove two oil seal rings from output shaft. Insert Anvil Tool

(Continued)


TOOL J-6684


TOOL J-6690



TOOL J-6687 (1)

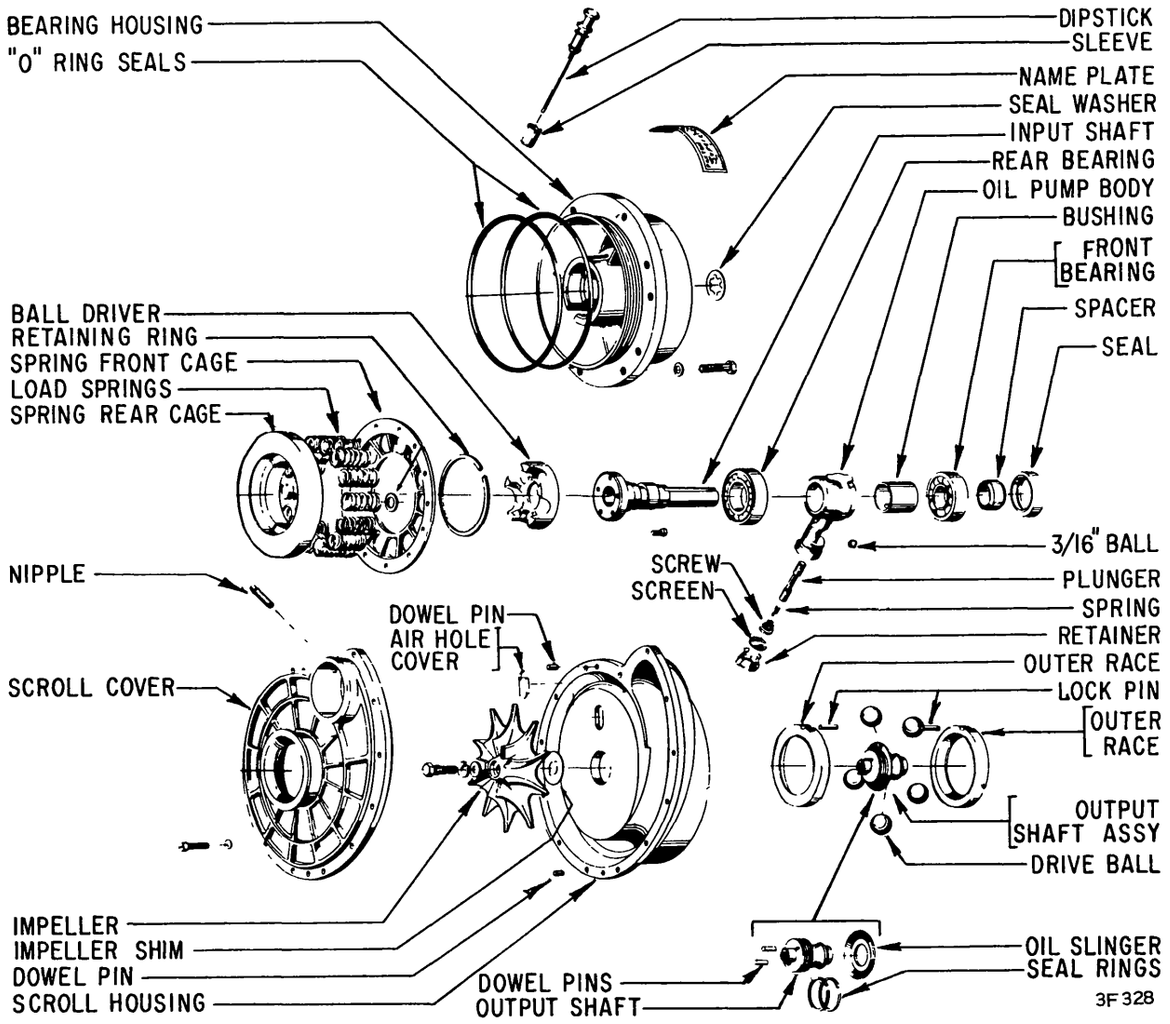
PAXTON SUPERCHARGER (Continued)

J-6687 into output shaft base in scroll housing. Use two large screw drivers, pry against anvil and ball race and remove race. Do not lose ball race lock pin.

INSPECTION - *CAUTION - DO NOT handle steel parts (balls, races, or ball race portion of output shaft) with bare hands. This would result in rusting and oxidation and would require installation of new parts. Keep steel parts submerged in clean oil after removal.*
1) Inspect bearings for roughness and bushings for score marks. Check impeller wheel for chipping, deep surface scratches or gouging. Inspect shafts for gouging.
2) Inspect housing for cracks. Install new rubber seals. Replace drive balls, if ball shows any sign of surface abrasion or pits, regardless of size. Oil all moving parts with Automatic Transmission Fluid Type "A" (Suffix "A") as they are assembled.

REASSEMBLY - **1)** Install race lock pin in side of ball race housing, then place ball race in position in scroll housing over lockpin and tap lightly into place. Install oil seal rings in first and third grooves of output shaft with chamfer on top ring toward impeller end of shaft. Position rings so gaps are 180° apart, then install oil slinger.
2) Insert output shaft (with dowel pins down) into center bore of scroll housing, being careful not to break rings. Install five drive balls around output shaft. *CAUTION - Drive balls, output shaft and ball races are serviced as a matched set. Do not install less than complete set.*

3) Install race lockpin in recess in inside of race load assembly, then place ball race in position in housing and tap lightly into position. Install race load assembly over drive balls in scroll housing and install drive ball retainer on end of input shaft. Tighten screws to 30 inch lbs. Use Tool J-6688 and press the large ball bearing onto input shaft until it seats against shaft shoulder. *NOTE - Lettering on bearing must face away from oil pump.*
4) Slide oil pump body onto input shaft with offset on pump intake away from drive ball retainer. Use Tool J-6688 and press small ball bearing in place on input shaft. *NOTE - Lettering on bearing should be upward, away from oil pump.* Install oil pump plunger with solid end of plunger toward input shaft. Install spring in bore of plunger, then install spring plug screw, pump screen and retainer.
5) Press input shaft seal into place inside bearing housing with lip of seal facing rearward or toward impeller. Install "O" ring seals in groove of bearing housing shoulder. *NOTE - Do not install "O" ring in center groove.* Fill bore of oil pump (through screen) with Automatic Transmission Fluid "A" (Suffix "A"). Hold pump body and rotate shaft until oil can be seen pulsating under screen (indicating oil pump is operating).
6) Install shaft seal spacer over pulley end of input shaft, then install input shaft assembly in bearing housing. Note the alignment marks made at disassembly and install bearing housing on scroll housing. Install attaching capscrews evenly and tighten to 100 inch lbs. Place front seal washer over input shaft, then slide drive key in keyway of shaft and install pulley (with counterbore down) onto shaft. Tighten pulley attaching screw to 200 inch lbs.
7) Invert unit (pulley down) into holding fixture. Install air hole cover with open end of cover away from output shaft, and tap lightly into position. Install two dowel pins in output shaft.
8) Measure distance between face of diffuser section (flat surface of scroll housing) and face of output shaft. Add .012" ± .004" to this measurement (this will be total thickness of shim pack required for proper clearance of impeller). *NOTE* - Shims are furnished in thicknesses of .026-.028"; .030-.032"; .034-.036"; .038-.040"; .042-.044"; .019-.021"; .006-.007".
9) Place selected shim pack on output shaft over shaft dowels, then install impeller. Use impeller holding tool and install center impeller capscrew and washers, and tighten to 200 inch lbs. Use a feeler gauge and check clearance between impeller and face of scroll housing at several points around impeller. Clearance should be .012" ± .004". If necessary, add or remove shims to obtain proper clearance.
10) Install scroll cover on housing and tighten capscrews securely, then rotate input shaft to make sure impeller is not dragging against housing or cover and that unit is not binding internally. Fill oil sump with 8 ounces of Automatic Transmission Fluid Type "A" (Suffix "A"), then rapidly turn input shaft pulley to prime oil pump.



PAXTON SUPERCHARGER

CRUISE CONTROL & AUTOMATIC SPEED CONTROL

Cadillac (1963)
Ch vr let (1963)
Chrysl r & Imperial (1963)
Linc ln (1963)
M rcury (1963)
Oldsm bil (1963)
P ntiac (1963)

DESCRIPTION

This control unit is governed directly by car speed and acts as a speed warning device and as an automatic speed control. A calibrated control unit in drivers compartment allows selection of a desired operating speed. When used as a speed warning device the selector is set at desired position and when car reaches the selected speed a reaction pressure of 5-7 lbs. is felt at accelerator pedal. Selected speed may be exceeded by overcoming the pressure and depressing the accelerator. When used as an automatic speed control, procedure is the same as for speed warning, except that when pre-selected speed is reached, the automatic unit is placed in operation by depressing a button or moving a lever (depending on car model). Pre-selected speed will be maintained without foot pressure on accelerator pedal until brake pedal is depressed (also clutch pedal on some cars), turning ignition switch to OFF position, or on some car models, moving selector or control switch to OFF position. Accelerator control will then return to manual control and it will be necessary to repeat the above procedure to again place control unit in operation.

ADJUSTMENT

Control Cable

Rotate selector dial or knob counterclockwise (to low speed position) as far as it will go without forcing, then loosen screw on dust shield (retains cable in bottom of dust shield) and pull cable out of dust shield, making certain that ferrule at end of cable is free in bottom of dust shield. Reinsert ferrule in dust shield, pushing in lightly on control cable until it stops. *CAUTION - Do not force cable beyond this point.* Again try to rotate selector dial or knob **counterclockwise**, to make sure it is at low setting. Carefully tighten screw on dust shield, being sure not to change cable position when tightening setscrew.

Linkage

With throttle linkage properly adjusted (see Car Model pages) and engine running at slow idle speed, remove cotter pin from accelerator linkage and pull linkage from exterior arm of speed control unit. Insert gauge sleeve, Tool J-7652 (Cadillac, Chevrolet, Oldsmobile, Pontiac); C-3844 (Chrysler & Imperial) over gauge bolt (see illustration). *NOTE - If gauge tool is not available, use a piece of 5/16" copper tubing, 2" long.* Adjust swivel on throttle linkage until it aligns with and freely enters hole in exterior arm, then replace linkage and cotter pin and remove gauge pin.

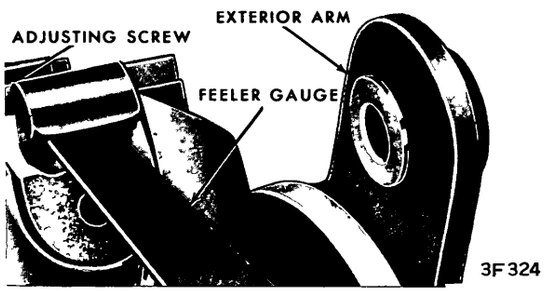
Locking Arm Latch

NOTE - There are two sets of electrical grounding points that operate Cruise Control motor in forward and reverse direction. One grounding point on motor side of magnet controls acceleration, while the other grounding point on locking arm side of magnet controls deceleration. Adjust locking arm latch BEFORE adjusting grounding points.

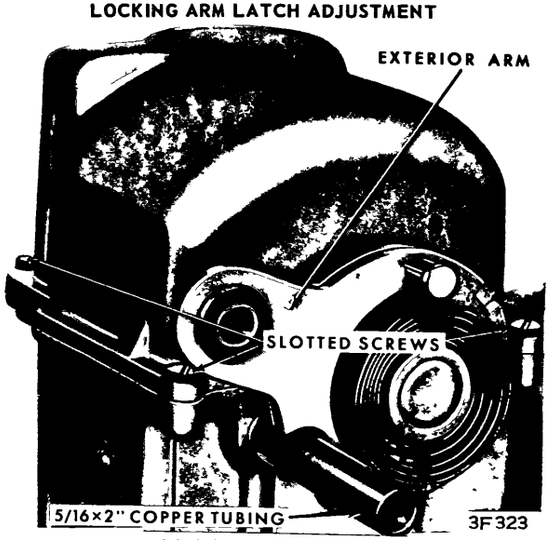
Disconnect electrical connector at front of power unit and accelerator linkage rod from exterior arm. Remove speed control cover, then move locking arm up against magnet and press down on armature plate to latch the unit (simulating automatic control). Use a feeler gauge to measure gap between locking arm and latch on armature plate (see illustration) Clearance should be .001-.006". If not within limits, adjust gap by turning adjusting screw.

Point Gap

CAUTION - These points are operative when backened and pitted; however, any build-up on points should be removed. When filing points use a cloth to catch filings. Disconnect drive cable at base of power unit, then move contact arm against either grounding point and use a feeler gauge to measure the full gap between contact arm and other point. This gap should be .090" ± .010". If not within limits, bend either grounding point on magnet assembly as necessary to obtain correct gap. Insert gauge sleeve (see "Linkage" adjustment) over gauge bolt, then turn ignition switch on and move contact arm against ground point on locking arm side. When magnet assembly is in low position, disconnect plug from terminal block while still holding contact arm against point. *CAUTION - Do not use a screwdriver to turn drive screw.* Turn governor weights until they are parallel with drive screw, then place Governor Weight Wedge, J-8547 (Cadillac, Chevrolet, Lincoln, Oldsmobile, Pontiac); C-3842 (Chrysler & Imperial) between governor weights, pressing down on wedge until weights are held out of their stop position. Use a feeler gauge to measure gap between contact arm and either grounding point on magnet assembly. This gap should be approximately one-half of the full gap measurement (see above). If gap is not within limits, contact arm is not centered properly. To adjust, loosen screw on actuator clamp and rotate actuator until contact arm is centered between grounding points on magnet assembly, then tighten clampscrew and recheck gap. Remove locking arm gauge and governor weight wedge. Turn drive screw to move magnet all the way toward motor side of housing to avoid any contact between contact arm and grounding point on motor side of magnet (this is to prevent preloading of governor spring by the contact arm before adjusting compressor rod). Hold housing in an upright position, and install ball socket on compressor rod, then turn ball socket until compressor cap on compressor rod just rests on governor spring without exerting pressure against spring. **Loosen ball socket one complete turn and tighten locknut.** *NOTE - This will provide correct low speed calibration for the power unit.* Install cover, making certain that rubber seal and felt seal are properly seated in grooves of cover and housing. Tighten cover screws.



LOCKING ARM LATCH ADJUSTMENT

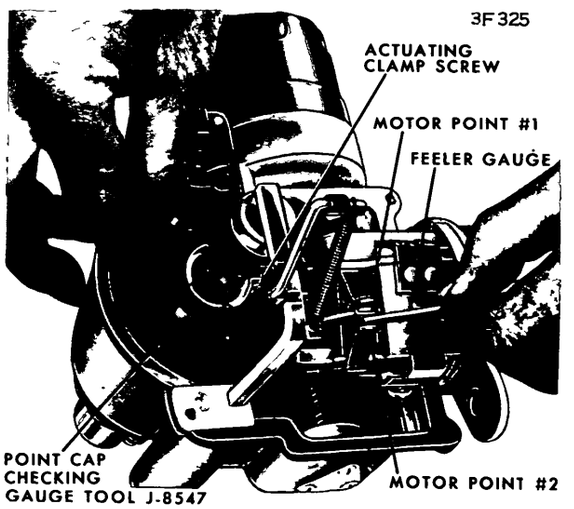


LINKAGE ADJUSTMENT

Limit Switch

Points of limit switch which are mounted on the terminal block (inside power unit), must be together until magnet assembly reaches the wide open throttle position. At this time there should be at least .025" clearance between the points. Adjust as necessary.

(Continued)



POINT GAP ADJUSTMENT

CRUISE CONTROL & AUTOMATIC SPEED CONTROL (C nt.)

Pedal Release Switch

Connect a test lamp to brake pedal release switch (located adjacent to brake pedal lever) and adjust switch so switch circuit is opened during first ¼" travel of brake pedal. *NOTE - On some models with synchro-mesh transmission, a similar switch is also mounted adjacent to clutch pedal lever. Adjust this switch in same manner as for brake pedal switch.*

REMOVAL & INSTALLATION

Power Unit

NOTE - When a faulty power unit is removed, the car can be driven with the speedometer operating by removing the power unit cables from speedometer and transmission, and installing a standard speedometer cable and housing assembly between transmission and speedometer.

Removal - Disconnect electrical connection at power unit, then remove dust shield from housing and slide dust shield down cable and slip ball end of Bowden cable out of socket. Disconnect accelerator linkage from exterior arm on power unit, then remove two bolts securing power unit to mounting bracket and remove power unit, leaving mounting bracket attached to car.

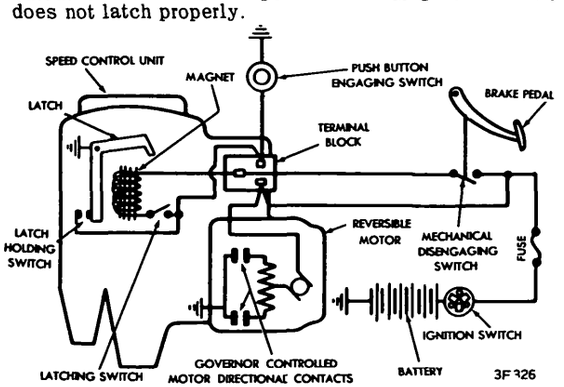
Installation - Reverse removal procedure and adjust linkage and control cable.

TROUBLE SHOOTING & DIAGNOSIS

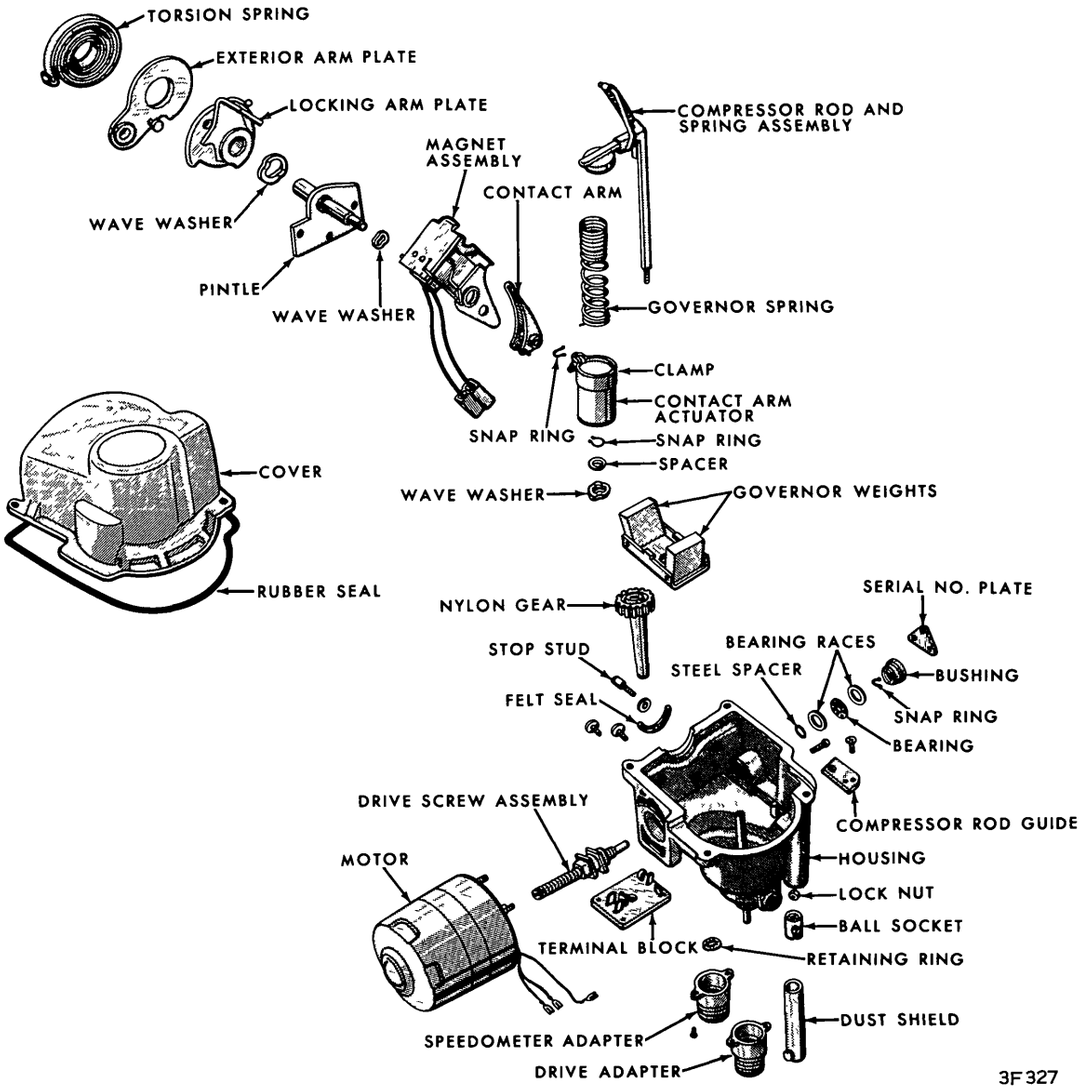
Blowing Fuses - Short or ground in wiring circuit. Improper linkage adjustment. Defective motor. Locked drive screw.

No Cruise Control Response - Accelerator linkage broken or disconnected. Blown fuse. Loose connections or broken wires.

No Automatic Control When Using Selector Switch - Driver riding brake pedal or driver does not hold accelerator against back pressure when depressing selector button. No current at No. 2 terminal on power unit. Loose or disconnected ground wire between selector control and No. 3 terminal on power unit. Inoperative cutout switch on brake pedal lever. Magnet assembly does not latch properly.



CRUISE CONTROL WIRING DIAGRAM (TYPICAL)



CRUISE CONTROL POWER UNIT ASSEMBLY

Constant Pressure on Accelerator Pedal Regardless of Dial Setting - Blown fuse. No current at No. 1 terminal on power unit. Control cable improperly adjusted or defective. Inoperative motor or locked drive screw.

Automatic Control Engages At Selected Speed Without Using Selector Switch - Continuous ground in ground circuit or switch.

Automatic Control Remains Engaged When Brake Pedal is T uch d - Inoperative cutout switch on brake pedal lever.

Unit Does N t Remain In perative in Th "OFF"P siti n (Cadillac) - Limit switch in power unit not properly adjusted.

Pulsating Accelerator Pedal - Speedometer cable or drive cable kinked or lack of lubrication. Improper accelerator linkage adjustment.

Carburetor Does Not Return T N rmal Idl - Improper carburetor or accelerator linkage adjustment. Weak throttle return spring.

Unit Does Not Control At S l ct d Sp d - Improper control cable adjustment. Selected dial or knob not installed properly.

Sp edometer D s N t R gister r Unit D s N t Op rat - Speedometer drive gear in transmission defective. Broken drive cable from transmission to power unit. Damaged drive gear or nylon gear in power unit.

ELECTRO-CRUISE AUTOMATIC SPEED CONTROL (BUICK)

Buick, S ries 4400,4600,4700,4800 (1963)

DESCRIPTION

Electronic-pneumatic system used for controlling and regulating car speed at any point between 30 and 90 MPH. This system compares a measurement of car speed with the selected speed to maintain the selected speed under varying road conditions and over a wide range of road loads. The system consists of a power unit, mounted on cowl in engine compartment and connected to throttle linkage through a bead chain; an amplifier and relay control assembly mounted under dash on instrument panel mounting bracket; a speed transducer which is integral with the speedometer; an engagement switch and "Cruise" lamp assembly, mounted on top edge of instrument cluster assembly; and a release switch located on brake pedal arm bracket.

OPERATION

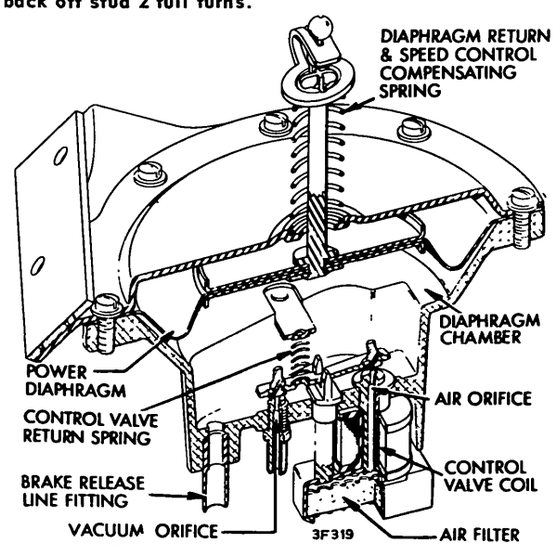
Electrical signals from the speed transducer operates a vacuum switch which ports engine vacuum to power unit. Through constant signals from transducer, the power unit assumes its proper position to control the throttle opening. The electronic amplifier, engagement switch and brake release switch are the auxiliary units to engage and disengage the speed control.

ADJUSTMENT

CAUTION - Do not lubricate power unit bead chain or its pulley.

Power Unit Bead Chain

Disconnect bead chain from thread stud on throttle rod bracket, then adjust engine hot idle speed to specifications (See "Car Model" pages) and turn engine off. Attach bead chain to throttle rod bracket and set carburetor at hot idle position. *There should be a slight amount of slack in bead chain.* To adjust chain tightness, loosen jam nut on threaded stud on throttle rod bracket and rotate stud until chain is just taut, **then back off stud 2 full turns.**



ELECTRO-CRUISE POWER UNIT

Brake Release Switch

Disconnect wiring connector from brake release switch, then connect an ohmmeter or test lamp across terminals of switch. *NOTE - Cruise lamp in engagement switch may be used as a test lamp by unplugging connector to the speed transducer in speedometer and leaving release switch wiring connector on switch. Turn ignition switch on and press cruise engagement lever which will cause cruise light to be on.* Loosen screws retaining switch to brake pedal support, then position switch to open circuit within ¼" brake pedal travel. When brake pedal is at released position the circuit must be closed for Electro-Cruise unit to operate. Tighten adjusting screw and recheck adjustment of switch by depressing brake pedal several times with test lamp or ohmmeter connected. Readjust as necessary and connect wiring connector .

TROUBLE SHOOTING & DIAGNOSIS

No Action When Lever is Pushed - Disconnected electrical connections or open wiring. Blown fuses. Brake release switch not properly adjusted. Vacuum leakage. Power unit coil open. Defective transistor amplifier.

"Cruise" Lamp Comes On When Lever is Pushed And No Car Response - Harness to speedometer unplugged or loose. Defective speed transducer. Defective transistor amplifier. Defective relay.

"Electro-Cruise" Remains Engaged When Brake is Touched - Brake release switch not adjusted properly. Shorted brake release switch. Shorted wire harness.

Blows Fuses - Shorted wiring. Shorted relay, cruise lamp, or power unit coil. Shorted transistor amplifier.

Engine Races As Soon As Car is Started When Engage Lever is Not Pushed In - Shorted wire harness. Shorted engage switch. Shorted relay. Vacuum orifice leak in power unit. Stuck accelerator linkage.

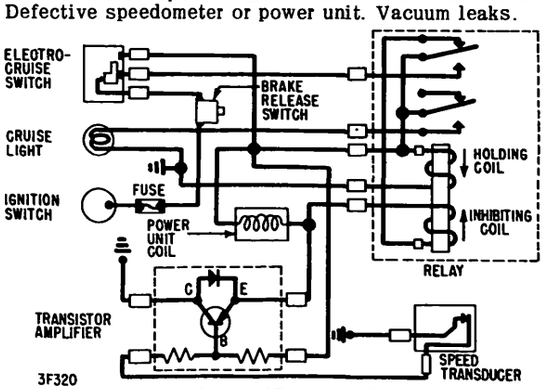
"Electro-Cruise" Will Not Lock In After Set Speed is Attained - Relay or engage switch is defective.

Car Continues Accelerating Past Set Speed - Wire harness shorted. Shorted speedometer. Relay or transistor amplifier is defective.

Automatically Locks in "Cruise" When Car Goes Over Bump - Relay assembly is defective.

Drops Out of "Cruise" Control When Car Goes Over Bump - Relay is defective. Loose electrical connections. Brake release switch not adjusted properly.

Erratic Cruise Speed - Loose electrical connections. Defective speedometer or power unit. Vacuum leaks.



ELECTRO-CRUISE WIRING DIAGRAM

Slow Response - Check for vacuum leakage.

Hunts At Slow Speed - Defective speedometer. Check bead chain adjustment. Accelerator linkage is too stiff. Vacuum leakage. Brakes dragging.

Does Not Engage When Engage Lever is Pulled Out - Wire harness shorted. Engage switch shorted. Relay is defective.

"Cruise" Lamp Does Not Light - Burned out lamp bulb. Relay is defective. Disconnected electrical connections or broken wiring.

Engine Will Not Idle At Slow Speed When Electro-Cruise is Not Engaged - Check for vacuum leakage. Check bead chain adjustment.

Speed Setting Pointer and Speedometer Needle Do Not Coincide in Speed When in Cruise - Throttle linkage is stiff. Check for vacuum leakage. Speedometer out of calibration. Kink in speedometer cable.

OVERHAUL

Speedometer

Speedometer assembly should be serviced only by an authorized repair station.

Power Unit

Removal - Disconnect bead chain at threaded stud on throttle rod bracket, then remove wiring harness connector from power unit coil. Remove engine vacuum and brake release switch lines from power unit and remove power unit from cowl.

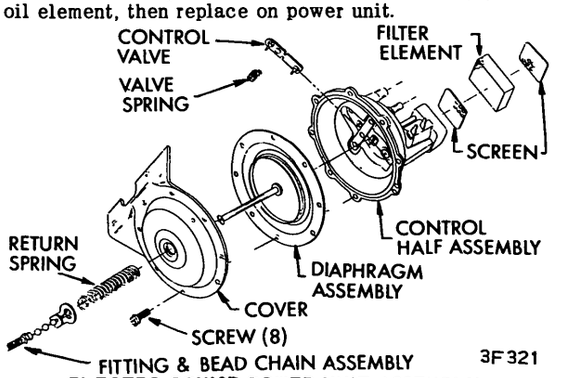
Disassembly - Depress diaphragm return spring and remove bead chain from shaft (turn fitting 90° and slip off shaft). Remove capscrews holding power unit to its mounting bracket, then remove control valve return spring by depressing with a knife blade and pushing sideways. Remove control valve and the air filter from

Inspection - Wash power unit in a good detergent, then examine diaphragm for cracks and pin holes. Replace if necessary. Check control valve pads and sealing surface for dirt, chips, or burrs. Clean or replace filter.

Reassembly - Reverse disassembly procedure and note the following: When the light capscrews are placed back on the mounting bracket, tighten opposite sets of screws one at a time and repeat this procedure until all are tight.

Installation - Reverse removal procedure, then adjust bead chain and check unit for vacuum leakage.

AIR FILTER MAINTENANCE NOTE - Every 6,000 miles, remove air filter and outer screen by bending back the four tabs. Clean screen and element in a suitable cleaner. Squeeze cleaner out of element (do not oil element, then replace on power unit.



ELECTRO-CRUISE POWER UNIT ASSEMBLY

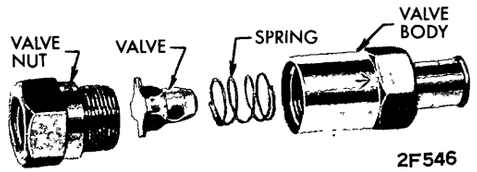
CLOSED CRANKCASE VENTILATION SYSTEMS (ALL CAR MODELS)

Description

Closed crankcase ventilation systems utilize vacuum in intake manifold to remove unburned gases from engine crankcase and return them to the combustion chambers to be burned. This unit which consists of a check valve, hose, and carburetor adapter or carburetor connection, replaces the conventional crankcase ventilator tube.

Operation

The crankcase vent valve automatically meters flow of gases so that normal operation of engine is not disturbed. Under high vacuum conditions such as at idle speed or during deceleration, the valve is held closed and only small amounts of gases are allowed to pass through a metered orifice and into intake manifold. During periods of low vacuum in intake manifold, a spring holds the valve open and larger amounts of gases pass through to intake manifold. Fuel vapor is prevented from entering crankcase by the vent valve which is held closed by any reverse air flow.



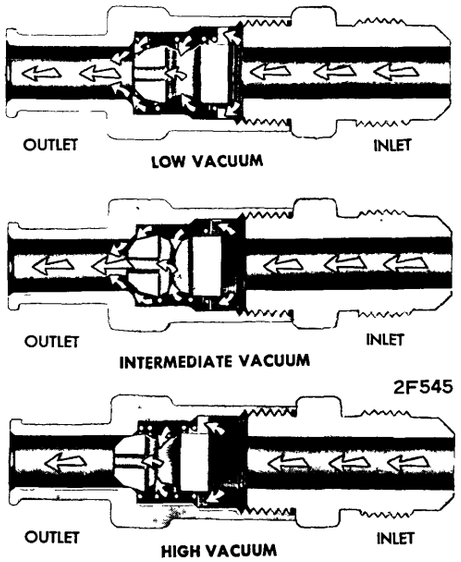
CRANKCASE VENT VALVE ASSEMBLY (TYPICAL)

Testing

See "Crankcase Ventilator Valve" on individual car model pages for testing procedures.

Servicing

See table below for servicing intervals. *NOTE - Indicated intervals are for normal operation. If car is operated under low temperature conditions; in "stop and go" service, or in dusty areas, ventilating system should be cleaned or serviced more frequently. A clogged system will result in erratic idle speed, stalling at low speed, or stumble on acceleration.* Remove ventilator hose from connections and blow out with air (replace hose if necessary). Remove crankcase vent valve. If the vent valve is "crimped" type, it cannot be disassembled for cleaning and service. Replace the valve assembly. If the valve is one that can be disassembled, unscrew connector and remove check valve and spring. Clean all parts in carburetor cleaner and blow dry with air. Clean out metering orifice using a suitable size drill to remove varnish and carbon accumulation. *CAUTION - Do not enlarge metering hole.* Inspect all parts for damage or excessive wear and replace valve if necessary. Install spring on valve until spring is properly seated in groove in valve, then place valve and spring in valve body and install connector. *CAUTION - Do not stretch or distort valve spring.* On all ventilating systems, clean crankcase and intake manifold (or carburetor) connections. Clean crankcase filler cap in solvent and blow dry with air. If necessary, install a new oil filler cap. Reinstall ventilating system.



CRANKCASE VENT VALVE OPERATION

Ⓣ Maximum Servicing Intervals

Car	Mileage
Buick & Buick Special	⑤⑦ 6,000 miles
Cadillac	②⑩ 6,000 miles
Chevy II	②③
Chevrolet Pass. Cars	②③
Chevrolet Trucks	②③
Chrysler	8,000 miles
Corvair	②③
Corvette	②③
Comet	6,000 miles
Dodge & Dart	8,000 miles
Fairlane	6,000 miles
Falcon	6,000 miles
Ford Pass. Cars	6,000 miles
Ford Trucks	6,000 miles
Lincoln	6,000 miles
Mercury	6,000 miles
Meteor	6,000 miles
Pontiac	②⑤ 12,000 miles
Pontiac Tempest	②⑤ 12,000 miles
Plymouth & Valiant	8,000 miles
Rambler	② 8,000 miles
Studebaker (Exc. Jet Thrust Engs.)	10,000 miles
Thunderbird	6,000 miles
Jeep	⑥

Ⓣ - If car is operated in cold temperature, "stop & go" service or in dusty areas, clean system more frequently.
② - Vent valve cannot be disassembled. Replace unit.
③ - Every 6,000 miles or 6 months.
⑩ - Service at time of engine oil change.
⑤ - Every 12,000 miles or 12 months.
⑥ - At each tune-up, overhaul, or as required.
⑦ - Test every 6,000 miles or 60 days. Replace when necessary.

OLDSMOBILE

Description

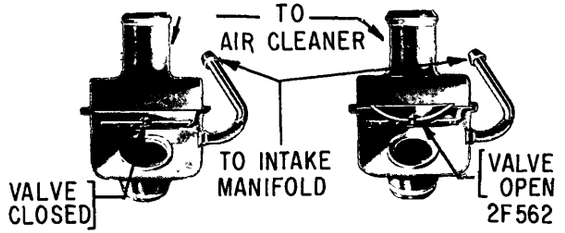
Vacuum diaphragm type ventilator check valve located on left hand rocker arm cover controls flow of crankcase vapors between crankcase breather cap and intake manifold and air cleaner.

Operation

At idle, and low engine RPM, crankcase vapors are drawn into intake manifold from crankcase side of diaphragm valve (valve is closed) through a small tube connected to carburetor throttle body. At higher engine RPM, air flow through carburetor air cleaner snorkel opens diaphragm valve allowing major portion of crankcase vapors to be drawn through large tube into air cleaner. Orifices in breather cap assembly control this flow.

Servicing

Every 12,000 miles, remove hoses and blow out with air. Remove diaphragm check valve assembly and clean in kerosene. *NOTE - Diaphragm check valve cannot be disassembled.* Install valve and hoses.



OLDSMOBILE POSITIVE CRANKCASE VENT VALVE

STUDEBAKER (WITH JET-THRUST ENGINE)

Description

The crankcase is ventilated by air entering through the oil filler caps on rocker arm covers and flowing out through the adapter tube in oil pan into carburetor air cleaner and carburetor. Oil filler caps have metered holes to allow a controlled amount of fresh air to circulate through the crankcase. At higher engine speeds the main flow of air is carried from engine crankcase through a hose to carburetor air cleaner, while at idle and slower engine speeds the air flow is through the small hose on the "Y" connection of main adapter tube to check valve at base of carburetor. A check valve permits air to enter the intake manifold when manifold is not pressurized. When the manifold becomes pressurized, the check valve seats and prevents blow-back of pressure to engine crankcase.

Servicing

Every 10,000 miles (more frequently if necessary), remove and clean check valve and hose. DO NOT attempt to disassemble check valve. Wash check valve in a suitable carburetor cleaner and blow dry with air. If valve cannot be properly cleaned, replace valve.

FORD 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

FORD & MERCURY	① Ford Part No.
221" Eng. (Synchro-mesh)	C30F-9510-C
221" Eng. (Auto. Trans.)	C30F-9510-D
260" Eng (Synchro-mesh)	C3OF-9510-E
260" Eng (Auto Trans)	C3OF-9510-F
260" Eng (Synchro-mesh)	C3DF-9510-E,G
260" Eng (Auto Trans)	C3DF-9510-F H
289" Eng (Synchro-mesh)	C3AF-9510-AK
289" Eng (Auto Trans)	C3AF-9510-AL
352" Eng. (Synchro-mesh)	C3AF-9510-E
352" Eng. (Auto. Trans.)	C3AF-9510-F
390" Eng. (Synchro-mesh)	C3MF-9510-A
390" Eng .(Auto. Trans.)	C3MF-9510-B

FORD TRUCKS	① Ford Part No.
292" Eng. Light Duty (Synchro-mesh)	C3TF-9510-H
292" Eng. Light Duty (Auto. Trans.)	C3TF-9510-J
292" Eng.Medium Duty (S.M. or A.T.)	C3TF-9510-K

4-BARREL CARBURETORS

FORD & MERCURY	① Ford Part No.
289" Eng.	C3OF-9510-AB
390" Eng. (Synchro-mesh)	C3AF-9510-N
390" Eng. (Auto. Trans.)	C3AF-9510-R
390" Eng. Police (Synchro-mesh)	C3AF-9510-S
390" Eng. Police (Auto. Trans.)	C3AF-9510-T

THUNDERBIRD	① Ford Part No.
390" Eng. (Auto. Trans.) Early	C2SF-9510-B
390" Eng. (Auto. Trans.) Later	C3SF-9510-A

① - Part number prefix and suffix stamped on fuel bowl.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 V8 PASS. CAR & TRUCK CARBURETOR MAIN METERING JET SIZE "TAILORING" TO CORRECT FOR RICHNESS OR LEANNESS:* A one size rich or leaner jet may be installed in place of the standard jet for better performance, depending on the particular condition *NOTE - Make sure any factors contributing to a rich or lean condition have been eliminated before changing jets.*

►*1958-63 V8 ENGINE STUMBLE & HESITATION (ON ACCELERATION) CORRECTION:* Install cavity filler, Part No C3OZ-9F565-A,in accelerator pump cavity (if not so equipped). This filler decreases pump cavity and improves pump response and rate of delivery *NOTE - The filler has b en used intermittently in production on late 1962 and early 1963 models.*

►*1963 ENGINE STALLING CORRECTION:* This condition may be caused by engine coolant tag being drawn into air cleaner opening To correct, shorten tag wire and relocate tag

►*HESITATION ON ACCELERATION CORRECTION (EARLY CARS):* This condition may be caused by improperly seated (staked) accelerator pump check balls. To correct, imbed check ball into seat with a suitable drift and hammer. Strike ball lightly but firmly enough to assure adequate forming of seat to provide a mating surface for ball Make sure ball is free in seat before reassembling carburetor.

CARBURETOR ADJUSTMENT SPECIFICATIONS

	Idle Speed (Eng. RPM) Hot①	Idle Speed (Eng. RPM) Fast	Initial Fast Idle	Initial Idle Mixture②	Initial Float Setting	Fuel Level	Automatic Choke Setting③	Choke Valve Pulldown
C2SF-9510-B	475-500	1500	.018"	1-1½	21/32±1/64"	29/32"±1/32"	2 Lean	5/32"
C3AF-9510-E	575-600	1200	.028"	1-1½	21/32±1/64"	29/32"±1/32"	Index	3/16"
C3AF-9510-F	475-500	1500	.028"	1-1½	21/32"±1/64"	29/32"±1/32"	2 Lean	5/32"
C3AF-9510-N	575-600	1200	.018"	1-1½	47/64"±1/64"	63/64"±1/32"	Index	3/16"
C3AF-9510-R	475-500	1500	.018"	1-1½	47/64"±1/64"	63/64"±1/32"	2 Lean	5/32"
C3AF-9510-S	575-600	1200	.018"	1-1½	47/64"±1/64"	63/64"±1/32"	2 Lean	3/16"
C3AF-9510-T	550-575	1200	.018"	1-1½	47/64"±1/64"	63/64"±1/32"	2 Lean	5/32"
C3DF-9510-E,G	575-600	1300	021'	1-1½	1/2"±1/64"	3/4"±1/32"	4 Lean	1/8"
C3DF-9510-F,H	475-500	1600	021"	1-1½	1/2"±1/64"	3/4"±1/32"	4 Lean	1/8"
C3MF-9510-A	575-600	1200	.018"	1-1½	21/32"±1/64"	29/32"±1/32"	2 Lean	3/16"
C3MF-9510-B	475-500	1500	.018"	1-1½	21/32"±1/64"	29/32"±1/32"	2 Lean	5/32"
C30F-9510-C	575-600	1300	.017"	1-1½	21/32"±1/64"	7/8"±1/32"	4 Lean	7/64"
C30F-9510-D	475-500	1600	.017"	1-1½	21/32"±1/64"	7/8±1/32"	4 Lean	7/64"
C30F-9510-E	575-600	1300	.020"	1-1½	21/32"±1/64"	29/32"±1/32"	4 Lean	1/8"
C30F-9510-F	475-500	1600	.020"	1-1½	21/32"±1/64"	29/32"±1/32"	4 Lean	7/64"
C3OF-9510-AB	575-600							
C3AF-9510-AK	575-600	1400	021"	1-1½	5/8"±1/64"	7/8"±1/32"	4 Lean	1/8"
C3AF-9510-AL	475-500	1600	021"	1-1½	5/8"±1/64"	7/8"±1/32"	4 Lean	1/8"
C3SF-9510-A	475-500	1500	.018"	1-1½	47/64"±1/64"	63/64"±1/32"	2 Lean	5/32"
C3TF-9510-H	500-550	1900	.020"	1-1½	21/32"±1/64"	29/32"±1/64"	.....	.....
C3TF-9510-J	475-525	1900	.020"	1-1½	21/32"±1/64"	29/32"±1/64"	.....	.....
C3TF-9510-K	④	1900	.020"	1-1½	21/32"±1/64"	29/32"±1/64"	.....	.....

① - Automatic transmission in "D" (Drive).
② - Turns open from a lightly seated position.
③ - Maximum variation is 2 points from initial setting.
④ - 500-550 RPM (S.M. Trans.) 475-525 RPM (Auto. Trans.)

DESCRIPTION

Downdraft types with automatic choke (manual choke used on truck models). Secondary throttle valves are operated by a vacuum diaphragm and connected through linkage to primary throttle to insure positive closing.

ADJUSTMENT (ON ENGINE)

Idle Mixture & Idle Speed

Bring engine to normal operating temperature. *NOTE - On Air Conditioned cars, operate engine for 20 minutes before setting engine idle speed.* Adjust engine idle speed to correct engine RPM (Automatic Transmission in "D") as indicated in specifications. *NOTE - On Ford Trucks with automatic transmission, adjust engine speed slightly above idle speed specification with transmission in "N", then check idle speed with transmission in "D". Repeat procedure as necessary to obtain correct idle speed.* With idle speed properly adjusted, turn idle mixture screws inward until engine runs rough from a lean mixture, then turn idle screws outward until engine begins to roll from rich mixture. Finally turn screws in until engine runs smoothly. *NOTE - Each of the idle mixture screws should be turned approximately th sam distanc . Always favor a slightly rich mixtur .* Readjust idle speed as necessary.

Fast Idle

Automatic Choke Carbs. - Rotate fast idle cam and place fast idle speed screw on next to highest step of cam (against shoulder of highest step), then adjust fast idle screw to obtain specified engine RPM (see specifications).

Manual Choke Carbs. - With engine at normal operating temperature, pull choke cam and lever to a full choke position, then rotate fast idle adjusting screw to obtain specified engine RPM (see specifications).

Accelerating Pump Stroke

NOTE - Pump over-travel lever has four holes (No. 1 hole nearest throttle shaft and No. 4 hole furthest from throttle shaft). Accelerating pump plunger lever has two holes.

221" & 260" Engines - Accelerating pump operating rod must be installed in No. 4 hole (furthest from throttle shaft) for all operating conditions. Install opposite end of pump rod in inner hole (nearest pump plunger) of pump plunger lever.

(Continued)

FORD 2 & 4-BARREL CARBURETORS (Cont.)

292", 352" & 390" Engines - Install pump operating rod in proper hole of over-travel lever as indicated below for various operating conditions. No. 1 hole (above 80°F); No. 2 hole (40°F to 80°F); No. 3 hole (below 40°F); No. 4 hole (below - 15°F). *NOTE - For 5000 ft. altitude operation, place rod in No. 1 hole to suit operating condition.* Install opposite end of pump rod in inner hole (nearest pump plunger) of pump plunger lever.

Fuel Level

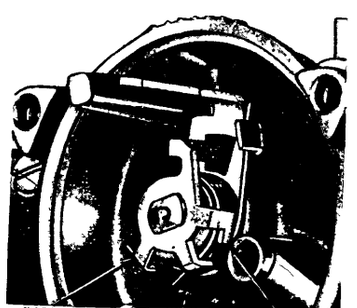
NOTE - Float setting (on bench) should be used as a guide only. Check and adjust fuel level as follows: With engine at normal operating temperature, air horn and gasket removed from carburetor, temporarily install air horn gasket in position on carburetor main body and start engine. Allow engine to idle a few minutes, then remove air horn gasket. With engine idling, measure vertical distance from top machined surface of main body to level of fuel in fuel bowl. *NOTE - Make this measurement at least ¼" from any vertical surface.* If fuel level is not within specifications (see table), stop engine and bend float tab contacting fuel inlet valve as necessary. Restart engine and check fuel level after each float tab adjustment. *CAUTION - Allow fuel to stabilize by running engine at idle speed for approximately 3 minutes after each adjustment until specified level is obtained.*

Automatic Choke

Loosen thermostatic coil housing clamp screws and align index mark on coil housing with proper mark on choke housing (see specifications).

Torsion Spring

NOTE - After a cold start at low temperatures, if engine stumbles or hesitates (caused by lean mixture) or if engine runs rough (caused by rich mixture), change torsion spring tension as follows: Remove thermostatic spring housing and place short tang of spring in left prong to increase tension and correct leanness. Place tang of spring in right prong to decrease tension and correct for richness. *NOTE - Normal position of spring tang is in center prong .*



CHOKE TORSION SPRING ADJUSTMENT

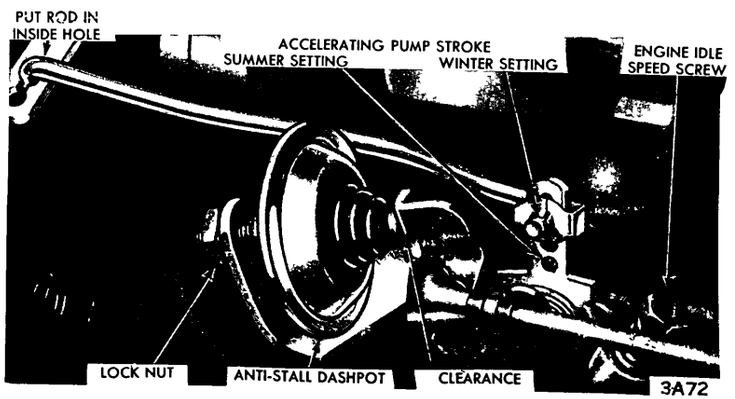
Choke Valve Pulldown

Automatic Choke Carbs. - Turn choke coil housing 90° counterclockwise to position choke linkage in fully closed choke position, then press choke valve toward open position until resistance is felt. *CAUTION - Do not use force or tang on lever in choke housing will be bent.* Clearance between edge of choke valve and vertical wall of air horn should be as indicated in specifications table. To adjust clearance, loosen setscrew on choke plate operating lever clevis with a 1/16" Allen wrench and move choke plate operating lever up or down as necessary to obtain correct clearance. Recheck fast idle-to-stop clearance and adjust if necessary .

Manual Choke Carbs. - This adjustment must be made with carburetor "Off Engine" (see below).



FLOAT LEVEL ADJUSTMENT



ADJUSTMENT LOCATIONS (ALL MODELS)

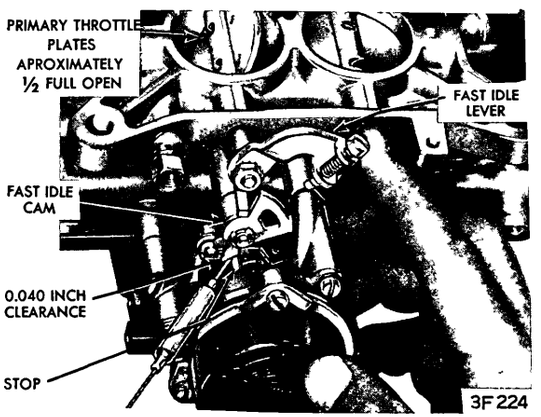
Anti-Stall Dashpot

With carburetor hot or slow idle speed correctly adjusted, hold throttle valve closed. Clearance between dashpot plunger and throttle lever with dashpot plunger fully depressed should be .060-.090". Adjust by loosening locknut and turning dashpot in bracket.

ADJUSTMENT (OFF ENGINE)

Float Level

CAUTION - Fuel inlet needle valve is "Viton" tipped. Do not place excessive force on needle as damage will result. With air horn removed, raise float so needle valve is seated, then check distance between gasket surface of main body and top of float at a point 1/8" from free end of float and 5/16" in from side of float adjacent to inside wall of fuel bowl should be as indicated in specifications. To adjust, bend tab on float arm. *NOTE - Secondary float setting on 4-Barrel carburetors is same as primary float.*



FAST IDLE CAM & BELLCRANK LEVER ADJUSTMENT

Fast Idle Cam & Lever

Open throttle valves (primary throttle valve on 4-Barrel carburetors) so fast idle adjusting screw will not interfere with fast idle cam when bellcrank is rotated, then hold choke valve in closed position by turning choke housing shaft to left (counterclockwise). Clearance between cast stop on back of choke housing and edge of fast idle cam should be .050" (221" & 260" Engs.); .040" (352" & 390" Engs.). To adjust, loosen bellcrank lever screw and turn bellcrank lever as necessary to obtain correct clearance. *NOTE - To maintain proper vertical alignment between bellcrank lever and fast idle cam, bellcrank lever must be positioned against "E" clip retainer on choke housing shaft.*

(Continued)

FORD 2 & 4-BARREL CARBURETORS (C nt.)

Fast Idl

Automatic Ch ke Carbs. - With fast idle screw resting on lower step of fast idle cam and against shoulder of highest step, turn fast idle adjusting screw until clearance between throttle valve and carburetor bore on side onposite idle ports is within specifications (see table).

Manual Ch k Carbs - Close throttle valve and pull choke cam and lever to full choke nosition, then turn fast idle adjusting screw in until gauge or drill of proper thickness (see specifications) can be inserted between throttle valve and carburetor bore on side opposite idle ports.

Choke Valve Pulldown

Manual Choke Carbs. - Close throttle valves, then pull choke cam and lever to full choke position. Turn choke pulldown rod adjusting nut down until a gauge or drill of proper size (see specifications) can be inserted between long side of choke valve and wall of air horn (against tension of pulldown rod spring).

OVERHAUL

S 1958 Final Data, Page 269, or lat r Manual Edi - tion and note the following

Automatic Choke Housing

Removal & Disassembly - Remove choke shield, fast idle cam retainer, thermostatic spring housing, clamp and gasket. Remove choke housing and gasket, then remove choke housing lever retaining nut, spacer and lever. Loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft. Remove fast idle cam pickup rod from fast idle cam and bellcrank lever. Remove retainer from choke housing shaft and slide assembly out of choke housing. Remove spacer, lever, and torsion spring from shaft.

FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

CARB. NO.	Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No. ©	Pump Nozzle Part No.
C2SF-9510-B Pri	4-Bbl	054"	C1AE-9533-A	052"	C1AZ-9533-L	050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0AZ-9577-A
Sec		062"	C1AE-9533-D	060'	C1AZ-9533-S	058"	C1AZ-9533-U	B8AZ-9A523-F		
C3AF-9510-E	2-Bbl	057"	C1AZ-9533-E	055"	C1AE-9533-B	053"	C1AZ-9533-H	C1AZ-9A523-C	C0AE-9A565 E	C0AZ-9577-A
C3AF-9510-F	2-Bbl	056"	C1AZ-9533 D	054"	C1AE-9533-A	052"	C1AZ-9533-L	C1AZ-9A523-C	C0AE-9A565-E	C0AZ-9577-A
C3AF-9510-N Pri	4-Bbl	056"	C1AZ-9533-D	054"	C1AE-9533-A	052"	C1AZ-9533-L	C2AZ-9A523-A	C0AZ-9A565-A	C0AZ-9577-A
Sec		063"	C1AE-9533-C	061"	C1AZ-9533-R	059"	C1AZ-9533-T	B8AZ-9A523-F		
C3AF-9510-R Pri	4 Bbl	054"	C1AE-9533-A	052"	C1AZ-9533-L	050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0A Z-9577-A
Sec		062"	C1AE-9533 D	060"	C1AZ-9533-S	058"	C1AZ-9533-U	B8AZ-9A523-F		
C3AF-9510-S Pri	4-Bbl	056"	C1AZ-9533-D	054"	C1AE-9533-A	052"	C1AZ-9533-L	C2AZ-9A523-A	C0AZ-9A565-A	C0AZ-9577-A
Sec		063"	C1AZ-9533-C	061"	C1AZ-9533-R	059"	C1AZ-9533-T	B8AZ-9A523-F		
C3AF-9510-T Pri	4-Bbl	054"	C1AE-9533-A	052"	C1AZ-9533-L	050"	C1AZ-9533-N	C1AZ-9A523-E	C0AE-9A565-A	C0AZ-9577-A
Sec		062"	C1AE-9533-D	060"	C1AZ-9533-S	058"	C1AZ-9533-U	B8AZ-9A523-F		
C3DF-9510-E	2-Bbl	046"	C1AZ-9533-B	044"	C1AZ-9533-F	042"	C2OZ-9533-C	C3AZ-9A523-A	C3AZ-9A565-B	C0AZ-9577-A
C3DF-9510-F	2-Bbl	045"	C1AZ-9533-K	043"	C1AZ-9533-J	041"	C2OZ 9533	C3AZ-9A523-A	C3AZ-9A565-B	C0AZ-9577-A
C3DF-9510-G	2-Bbl	045"	C1AZ-9533-K	043"	C1AZ-9533-J	041"	C2OZ-9533-B	C3DZ-9A523-A	C3AZ-9A565-B	C0AZ-9577-A
C3DF-9510-H	2-Bbl	046"	C1AZ-9533-B	044"	C1AZ-9533-F	042"	C2OZ-9533-C	C3DZ-9A523-A	C3AZ-9A565-B	C0AZ-9577-A
C3MF-9510-A	2-Bbl	060"	C1AZ-9533-S	058"	C1AZ-9533-U	056"	C1AZ-9533-D	C3MY-9A523-A	C0AE-9A565-E	C0AZ-9577-A
C3MF-9510-B	2-Bbl	058"	C1AZ-9533-U	056"	C1AZ 9533-D	054"	C1AE-9533-A	C3MY-9A523-B	C0AE-9A565-E	C0AZ-9577-A
C3OF-9510-C	2-Bbl	045"	C1AZ 9533-K	043"	C1AZ-9533-J	041"	C2OZ-9533-B	C2OZ-9A523-D	C3AZ-9A565-B	C0AZ-9577-A
C3OF-9510-D	2-Bbl	044"	C1AZ-9533-F	042"	C2OZ-9533-C	040"	C2OZ-9533-K	C2OZ-9A523-E	C3AZ-9A565-B	C0AZ-9577-A
C3OF-9510-E	2-Bbl	046"	C1AZ-9533-B	044"	C1AZ-9533-F	042"	C2OZ-9533-C	C3AZ-9A523-A	C3AZ-9A565-B	C9AZ-9577-A
C3OF-9510-F	2-Bbl	045"	C1AZ-9533-K	043"	C1AZ-9533-J	041"	C2OZ-9533-B	C3AZ-9A523-A	C3AZ-9A565-B	C0AZ-9577-A
C3OF-9510-AB Pri	4-Bbl	054"	C1AE-9533-A					C3AZ-9A523-A	C0AE-9A565-A	C0AZ-9577-A
Sec		064"	C3OZ-9533-C					B8AZ-9A523-F		
C3AF-9510-AK	2-Bbl	048"	C1AZ-9533-A	046"	C1AZ-9533-B	044"	C1AZ-9533-F	C3AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C3AF-9510-AL	2-Bbl	047"	C1AZ-9533-G	045"	C1AZ-9533-K	043"	C1AZ-9533-J	C3AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C3TF-9510-H	2-BBl	048"	C1AZ-9533-A	046"	C1AZ-9533-B	044"	C1AZ-9533-F	C1AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C3TF-9510-J	2-Bbl	048"	C1AZ-9533-A	046"	C1AZ-9533-B	044"	C1AZ-9533-F	C1AZ-9A523-B	C0AE-9A565-D	C0AZ-9577-A
C3TF-9510-K	2-Bbl									

© - 0-5000 ft altitude Economizer assembly (5000-10,000 ft & 10,000-15,000 ft assemblies available for some carburetor models)

FORD SINGLE BARREL CARBURETORS

COMET & FALCON (6 CYL. ENG.)
FORD PASS. CARS & MERCURY (6 CYL. ENG.)

	ℂ Ford Part No.
144" Eng. S.M. Trans. (Man. Choke)	C3DF-9510-A
144" Eng. Auto. Trans. (Man. Choke)	C3DF-9510-B
144" Eng. S.M. Trans. (Auto. Choke)	C3GF-9510-A
144" Eng. Auto. Trans.(Auto. Choke)	C3GF-9510-B
170" Eng S.M. Trans (Man Choke)	C3GF-9510-C
170" Eng Auto Trans. (Man Choke)	C3GF-9510-D
170" Eng. S .M. Trans. (Man.Choke)	C3OF-9510-A
170" Eng. Auto. Trans. (Man.Choke)	C3OF-9510-B
170" Eng. S.M. Trans. (Auto. Choke)	C3YF-9510-A
170" Eng. Auto. Trans .(Auto. Choke)	C3YF-9510-B
200" Eng Auto Trans (Man Choke)	C3OF-9510-AA
223" Eng. S.M. Trans. (Man. Choke)	C3AF-9510-A
223" Eng. Auto. Trans. (Man. Choke)	C3AF-9510-B
223" Eng. S.M. Trans. (Man. Choke)	C3AF-9510-C
223" Eng. Auto. Trans. (Man. Choke)	C3AF-9510-D
223" Eng. S M Trans (Man Choke)	C3AF-9510-Y
223" Eng Auto Trans (Man Choke)	C3AF-9510-Z

FORD & ECONOLINE TRUCKS (6 CYL. ENG.)

144" Eng. S.M. Trans. (Man.Choke)	C3UF-9510-A
170" Eng. S.M. Trans. (Man. Choke)	C3UF-9510-B
223" Eng. S.M. Trans. (Man. Choke)	C3TF-9510-A
223" Eng. Auto. Trans. (Man. Choke)	C3TF-9510-B
223" Eng. Par. Del.S.M. Trans	C3TF-9510-C
223" Eng. Par. Del. Auto. Trans	C3TF-9510-D
262" Eng. (Man. Choke)	C3TF-9510-E

ℂ - Part number prefix & suffix stamped on edge of mounting flange.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 144", 170" & 223" ENGINE SLOW RETURN TO IDLE SPEED CORRECTION:* Reduce the number of turns inward on dashpot adjusting screw to 2 turns (normal setting is 3¼-3¾ turns in from initial contact)

►*1963 144" & 170" ENGINE FAILURE TO IDLE DOWN TO NORMAL IDLE SPEED CORRECTION:* This condition may be caused by a restriction in idle passage To correct, remove air horn and clean idle passage

►*1963 144", 170" & 223" ENGINE ROUGH IDLE, POOR PERFORMANCE & FUEL ECONOMY CORRECTION: See "Tune-Up" on Car Model pages.*

►*1963 FALCON 144" ENGINE CARBURETOR JET PRODUCTION CHANGE (FOR IMPROVED FUEL ECONOMY):* One size leaner jets (stamped 52F) used on later carburetors with yellow or green paint on code tag If a lean condition is encountered, install a one size richer jet (stamped 53F)

►*1963 6 CYL. ENGINE (WITH MANUAL CHOKE) HARD STARTING CORRECTION:* This condition may be caused by excessive length of choke control wire interfering with pull-down rod or choke shaft lever To correct, shorten length of choke wire, making sure that choke wire housing extends ¼-½" beyond the clamp

►*HESITATION ON ACCELERATION CORRECTION (EARLY CARS):* This condition may be caused by improperly seated (staked) accelerator pump check balls To correct, imbed check ball into seat with a suitable drift and hammer Strike ball lightly but firmly to assure forming of a seat to provide a mating surface for check ball Make certain ball is free on seat before reassembling carburetor

►*1963 ECONOLINE TRUCK (144" & 170" ENGINE) SURGING OR HESITATION CORRECTION:* These conditions which occur at part throttle steady speed or wide open throttle, caused by an excessively lean fuel mixture, may be corrected by installing a main metering jet one number size larger and by installing four additional calibrating shims, Part No 375910-S, on the power valve rod (see illustration) *CAUTION - Total number of shims on power valve rod must not exceed eight (8)*

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carb. No.	Hot Idle Speed ℂ Eng. RPM	Initial Idle Mixture ℃	Float Setting	Automatic Choke Setting	Choke Valve Pulldown	Acc I. Pump L v r	Fast Idl (Off Engin) S tting
C3DF-9510-A	500-525	3-4	1"	.....	3/8"	3/16"	.....
C3DF-9510-B	500-525	3-4	1"	.....	3/8"	3/16"	.....
C3GF-9510-A	500-525	3-4	1"	Centered	9/64"	3/16"	.024"
C3GF-9510-B	500-525	3-4	1"	Centered	1/8"	3/16"	.024"
C3GF-9510-C	500-525	3-4	1"		3/8"	3/16"	
C3GF-9510-D	500-525	3-4	1"	.....	3/8"	3/16"	
C3OF-9510-A	500-525	3-4	1"		3/8"	3/16"	
C3OF-9510-B	500-525	3-4	1"		3/8"	3/16"	
C3OF-9510-AA	500-525	3-4	1"		3/8"	3/16"	
C3YF-9510-A	500-525	3-4	1"	Centered	9/64"	3/16"	.024"
C3YF-9510-B	500-525	3-4	1"	Centered	1/8"	3/16"	.024"
C3AF-9510-A	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3AF-9510-B	475-500	4-5	1"	.....	5/16"	3/16"	.....
C3AF-9510-C	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3AF-9510-D	475-500	4-5	1"	.....	5/16"	3/16"	.....
C3AF-9510-Y	500-525	4 5	1"		3/8"	3/16"	
C3AF-9510-Z	475-500	4-5	1"		3/8"	3/16"	
C3UF-9510-A	550-575	3-4	1"	.....	3/8"	3/16"	.....
C3UF-9510-B	550-575	3-4	1"	.....	3/8"	3/16"	.....
C3TF-9510-A	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3TF-9510-B	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3TF-9510-C	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3TF-9510-D	500-525	4-5	1"	.....	5/16"	3/16"	.....
C3TF-9510-E	500-525	4-5	1"	.....	5/16"	3/16"	.....

ℂ - Automatic transmission in "D" (Drive).

℃ - Turns open from a lightly seated position.

DESCRIPTION

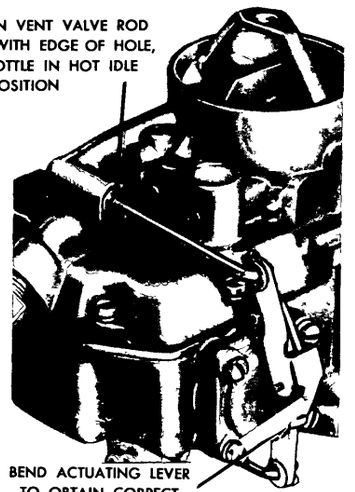
Single barrel down-draft type with automatic or manual choke assembly. Carburetors used on automatic transmission cars have an integral diaphragm type dashpot assembly built into carburetor fuel bowl.

ADJUSTMENT (ON ENGINE)

►*ADJUSTMENT NOTE - All of the following adjustments except "Idle Speed & Mixture" can be performed with carburetor "Off Engine".*

Idle Mixture & Idl Speed

With engine at normal operating temperature, adjust idle speed to correct engine RPM (see specifications), then turn idle mixture screw in until engine runs rough from lean mixture. Turn idle mixture screw outward until engine begins to roll from rich mixture. Finally turn screw inward until engine runs smoothly. *NOTE - Favor a slightly rich mixture.* Readjust engine idle speed if necessary.



VENT VALVE ADJUSTMENT

(Continued)

FORD SINGLE BARREL CARBURETORS (C nt.)

Fast Idle Speed

Manual Ch k Carbs. - Fast idle speed will be correct when Hot Idle Speed is properly adjusted.
Aut matic Ch k Carburetors - *NOTE - This adjustm nt must b mad with carburetor "Off Engine"*

Vent Valve

With carburetor throttle linkage in hot idle position, groove in vent valve rod should be even with open end of vent valve rod retainer. To adjust, bend arm on vent valve rod actuating lever (see illustration).

Automatic Choke

Loosen thermostatic coil housing retaining screws and rotate coil housing for correct setting (see specifications)

Anti-Stall Dashpot

Place throttle valve in normal (hot) idle position, then turn dashpot adjusting screw (see illustration) until it just contacts plunger, then turn adjusting screw in an additional 3¼-3¾ turns (2 turns to correct slow return - see Slow Return to Idle Speed Correction).

Accelerating Pump Lever

Insert roll pin in lower hole ("HI") position in pump lever (see illustration), then position a drill or gauge (see specifications for proper size) between roll pin and cover. Bend pump actuating rod as necessary for correct clearance. For operation in ambient temperatures of less than 50°F, place roll pin "HI" hole of lever. For temperature of 50°F and above, or for altitudes above 5000 ft., place roll pin in "LO" hole of lever. *NOTE - Roll pin must be in "HI" hole of lever when pump lever is checked for clearance.*

Choke Valve Pulldown

Automatic Choke Carbs. - *NOTE - This adjustment must be made with carburetor "Off Engine" after "Fast Idle Speed" is adjusted (see below).*
Manual Choke Carbs. - With choke valve linkage in full choke position, clearance between choke valve and wall of air horn should be as indicated in specifications. To adjust, turn choke pulldown rod nut to just contact swivel on cam lever while holding choke valve closed against a drill or gauge of proper thickness (see specifications).

Float Level

Invert upper body assembly and measure distance from gasket surface to crown of float (highest point). Distance should be as indicated in specifications (see illustration). To adjust, bend float arm tab. *CAUTION - Do not apply pressure on fuel inlet needle valve. Viton tip of valve may be damaged and caus a false setting.*

ADJUSTMENT (OFF ENGINE)

Fast Idle (Initial Setting)

Insert a gauge pin or drill of correct size (see specifications) between throttle valve and side of throttle bore (see illustration), then turn fast idle screw in until it just contacts fast idle cam.

Choke Linkage (Pulldown)

Automatic Choke - *NOTE - Make this adjustm nt after idle speed is adjusted (see above).* Insert a gauge pin or drill of correct size (see specifications) between choke valve and wall of air horn, then close valve on drill or gauge and hold it securely. Close throttle until fast idle screw touches fast idle cam and adjust plastic nut to just contact swivel on choke lever assembly.

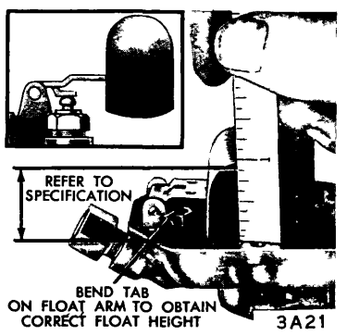
OVERHAUL

Disassembly

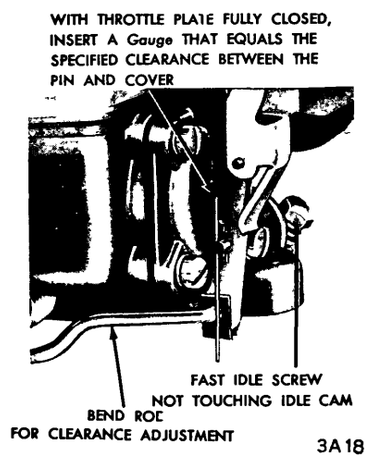
1) On automatic choke carburetors, disconnect choke control rod at choke shaft and pulldown rod at throttle lever. Remove thermostatic coil housing and gasket, then remove choke control lever and spring. Slide choke shaft out of coil housing. Remove choke control rod from lever and remove choke pulldown rod adjusting nut from rod. Slide rod out of swivel.

2) On manual choke carburetors, depress tangs on fast idle cam lever retainer and remove retainer from stud, then remove fast idle cam lever and rod assembly. Move lever and rod assembly clockwise and remove it from choke shaft lever. Remove rod adjusting nut and

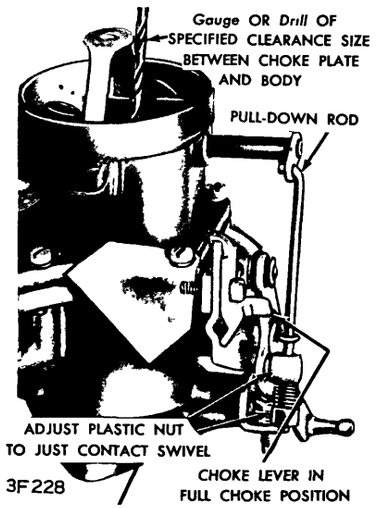
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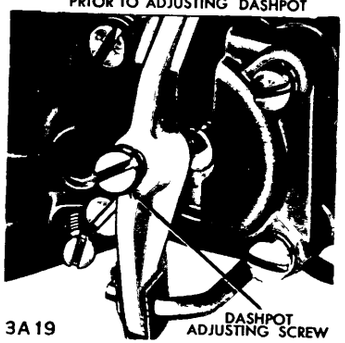
FLOAT LEVEL ADJUSTMENT



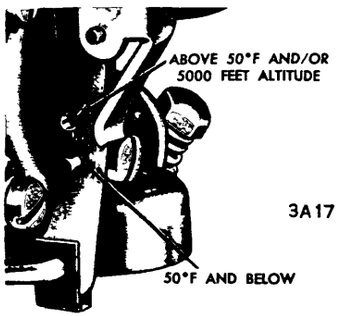
ACCELERATING PUMP ADJUSTMENT



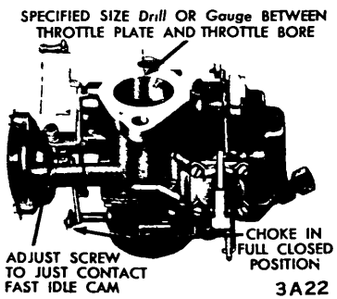
MANUAL CHOKE ADJUSTMENT



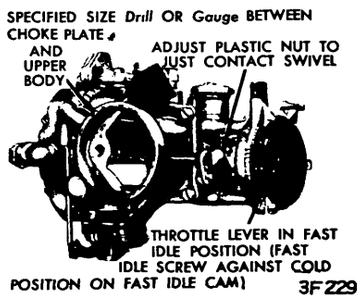
ANTI-STALL DASHPOT ADJUSTMENT



ACCELERATING PUMP LEVER SEASONAL ADJUSTMENT



AUTOMATIC CHOKE FAST IDLE ADJUSTMENT



AUTOMATIC CHOKE LINKAGE ADJUSTMENT

FORD SINGLE BARREL CARBURETORS (C nt.)

spring from rod and slide rod out of swivel. Remove fast idle cam stud and choke cable bracket assembly.

3) Proceed as follows for all carburetors: Remove fuel vent rod bushing, rod, and return spring. Remove screws and separate upper body from lower body, then invert lower body assembly and allow accelerating pump discharge weight and ball check, inlet ball check, and dashpot ball check to fall into hand.

4) Remove float retaining pin and float assembly, needle valve and seat. Remove main jet, then remove inlet fitting and strainer. Remove retaining roll pins securing air cleaner bracket to air horn. *NOTE - Use pliers and rotate roll pins in a direction that will coil the pins to a smaller diameter.* Pull air cleaner bracket out of channels.

5) If necessary to remove choke valve and shaft, lightly scribe choke valve along shaft so that choke valve can be installed in same position during installation. Remove valve attaching screws and remove valve from top of air horn by sliding plate out of shaft. Remove shaft from air horn.

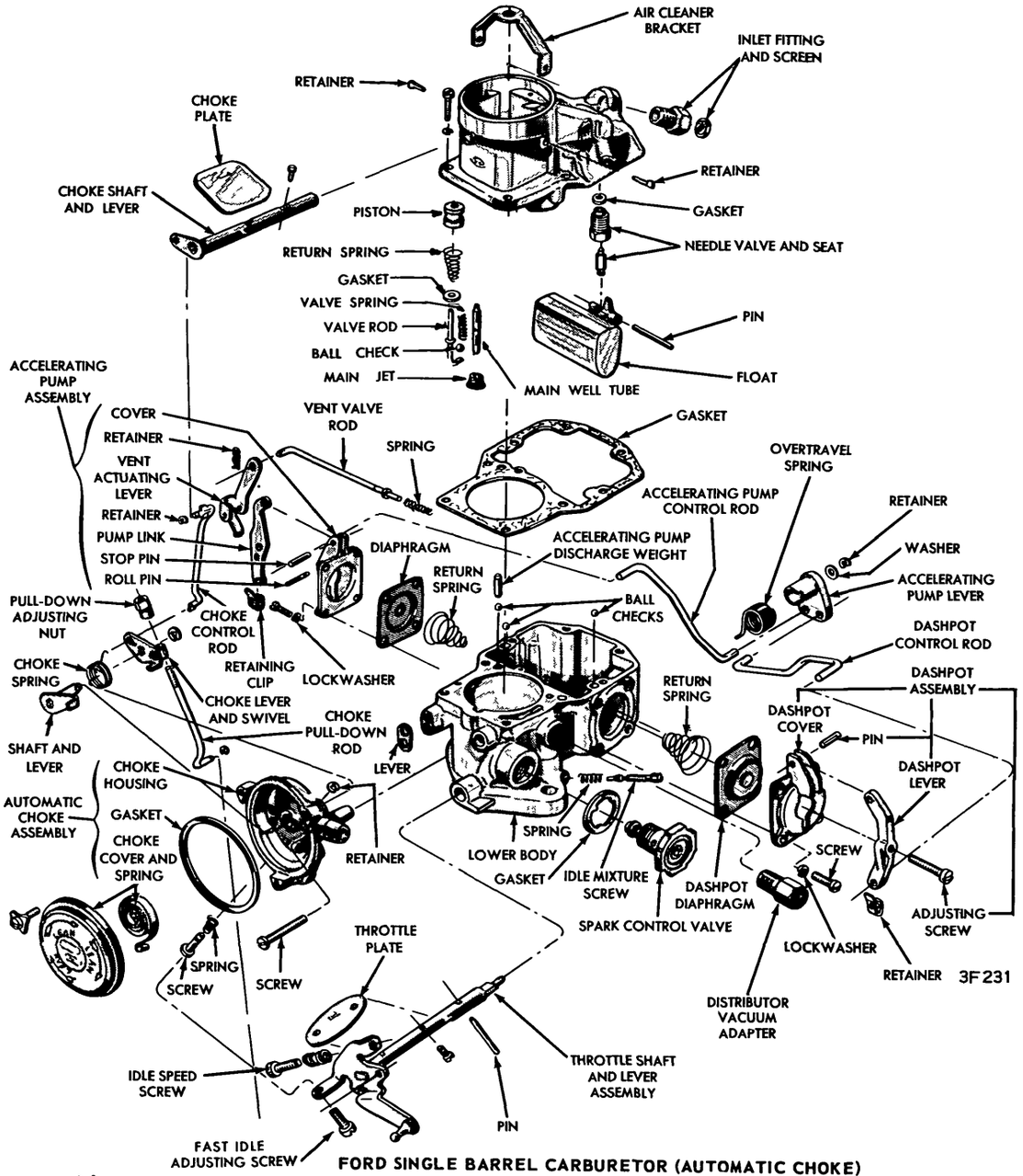
6) Remove accelerating pump lever and overtravel spring from throttle shaft. Remove accelerating pump cover screws and remove cover assembly. If necessary, separate pump diaphragm and spring from cover or body. Depress tab on pump lever and rod retaining clip and slide rod out of lever. Remove clip from lever. If necessary, remove fuel vent rod actuating lever-to-cover retaining pin and the accelerating pump lever-to-cover retaining pin. Remove lever and rod from cover.

7) If carburetor is equipped with a dashpot, remove dashpot cover assembly, and if necessary, remove diaphragm and spring from cover or body. Disconnect rod from dashpot lever. If necessary, remove lever-to-cover pin and remove lever from cover. Remove vacuum outlet adapter. If carburetor is equipped with a spark valve, remove valve and gasket.

8) Remove idle mixture adjusting screw. If necessary to remove throttle valve and shaft, scribe a light line along valve shaft so throttle valve can be installed in same position, then remove valve retaining screws and slide valve out of shaft. *NOTE - Retaining screws are staked to shaft. If necessary, file off flared end of screws.* Remove overtravel spring tension pin from throttle shaft and slide shaft out of body.

Cleaning & Inspection

Wash all parts except accelerating pump diaphragm, power valve diaphragm, and dashpot assembly in a suitable carburetor cleaner and rinse in kerosene, then blow dry with air. Blow out all passages. Check all parts for burrs, wear, or damage and replace as necessary. Check power valve for free movement of piston and rod assembly. *CAUTION - P w r valv is not s rviceabl . Do n t remove shims for cleaning or v r-haul op rati ns.* Inspect Viton tipped needle valve for grooving or damage.



FORD SINGLE BARREL CARBURETOR (AUTOMATIC CHOKE)

Reassembly

1) If choke valve and shaft were removed, install shaft assembly and insert choke valve into its original position with valve indention facing upward and toward pump side of carburetor. Install valve retaining screws but do not tighten. Check operation of choke valve for freeness by moving plate from closed to open position. If valve and shaft is free, tighten valve retaining screws while holding valve in fully closed position. Support shaft and valve on a wood block to prevent bending shaft, then stake valve retaining screws.

(Continued)

FORD SINGLE BARREL CARBURETORS (Cont.)

2) Install fuel inlet screen and adapter, then install main jet in main fuel well. Install needle valve seat and gasket, and insert needle valve. Position float assembly in carburetor body and install float hinge pin. Adjust float setting (see "Adjustment"). Install air cleaner bracket in air horn channels and insert retaining pins.

3) If throttle valve and shaft were removed, install shaft in body with lever on shaft located opposite fuel bowl. Insert throttle valve through slot in shaft with valve indentation facing bottom of body and pointing toward accelerator pump. Install valve retaining screws but do not tighten. Align scribed mark on valve with shaft, then snug screws down, but not too tight. Rotate throttle shaft while lightly tapping throttle valve within bore. Check for free rotation of shaft. Hold carburetor body up to light (little or no light should show between throttle valve and body). With valve properly located, hold valve closed and tighten retaining screws. Stake ends of screws in same manner as for choke valve (see above).

4) Install distributor vacuum outlet fitting. If rod and lever were removed from accelerating pump cover, position top hole of lever between top bracket holes in cover, then install retaining roll pin. Position vent rod lever over pump cover bracket. Line up hole in lever with holes in bracket and install retaining roll pin. Install roll pin in "HI" (lower) lever stop hole.

5) Position small diameter end of diaphragm spring into boss in accelerating pump chamber, then position diaphragm assembly in pump cover and line up the holes. Position cover and diaphragm assembly over return spring and onto body. Install cover screws finger tight. Push diaphragm assembly inward and fully tighten retaining screws. Position pump actuating rod clip over hole in pump lever, with tab side of clip toward carburetor barrel. Depress tab and insert short end of rod through lever and clip. Adjust accelerating pump (see "Adjustment" above).

6) If carburetor is equipped with a dashpot, position dashpot lever in bracket and install retaining roll pin, then install adjusting screw. Position small diameter of diaphragm spring into boss in dashpot chamber and line up holes. Position cover and diaphragm assembly over return spring and onto body. Install cover retaining screws finger tight, then push diaphragm assembly inward and tighten retaining screws. Position dashpot actuating rod retaining clip over hole in dashpot lever, then depress tab and insert short end of rod through lever and clip. Adjust dashpot (see "Adjustment" above).

7) Place overtravel lever on accelerating pump lever and hook tang of spring on lever. Position overtravel spring and lever onto throttle shaft and insert pump actuating rod and dashpot actuating rod into the two holes in lever. Install washer and retainer ring. Install overtravel tension retaining pin in throttle shaft, then pull arm of overtravel spring over retaining pin to apply spring tension to overtravel lever.

8) If carburetor is equipped with a spark valve, install gasket and spark valve into carburetor body and tighten securely. Install idle mixture adjusting screw and turn it in until it is lightly seated, then back screw off correct number of turns (see "Specifications").

9) Place ball check and accelerator pump weight into pump outlet passage, then install a ball check into pump inlet passage. Install a ball check into dashpot inlet passage (if so equipped). Install gasket on lower body (word "Top" on gasket facing upward), then install upper body and retaining screws.

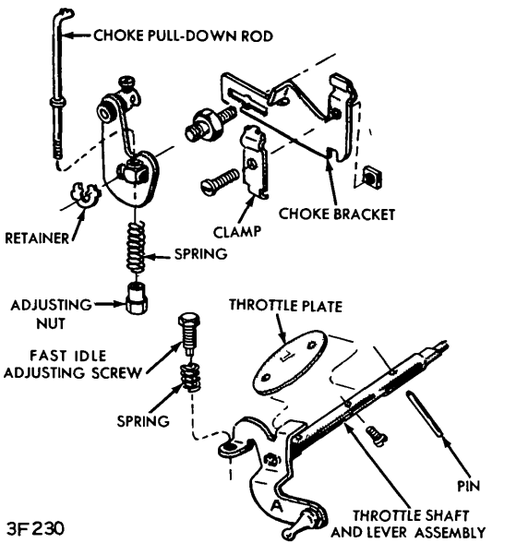
10) Insert fuel vent valve return spring into vent passage in upper body, then install vent valve rod retaining ring onto rod. Insert piston end of vent rod valve into passage and tap retaining ring into vent hole. Position vent valve retaining clip over hole in actuating lever, with tab side of clip toward air horn, then connect rod to lever. Adjust vent valve (see "Adjustment" above), after carburetor is completely assembled.

11) On manual choke carburetors, position choke cable bracket onto lower body and install stud. Insert threaded end of choke shaft to cam lever rod through cam lever swivel. Install spring and adjusting nut onto rod. Position rod end into keyhole in choke shaft lever, then insert rod and turn it counterclockwise. Position cam lever assembly over stud and install retainer.

12) On automatic choke carburetors, insert thermostatic choke shaft assembly into choke housing, then position shaft assembly with arm of lever toward bimetal spring side of housing. While facing cam side of choke housing, position choke shaft spring over bushing hub with hook of spring on right side of cam finger. Position choke control lever onto shaft with short tang of lever on left side of cam finger and spring tang on left side of short lever tang. Install lever retaining screw.

13) Insert threaded end of choke pulldown rod through swivel (from bottom) and install retainer. Position short end of choke rod into keyhole in choke housing choke lever. Insert choke assembly retaining screws into choke housing, then position gasket and choke housing onto lower body. Start retaining screws into body, then insert end of choke pulldown rod into throttle lever and install retainer. Check position of gasket and tighten retaining screws.

14) Position thermostatic spring cover and gasket on housing, making sure loop end of thermostatic coil spring is on choke lever. *NOTE - Spring must wind clockwise toward center when viewed from chok housing side of carburetor.* Align index mark with proper mark on choke housing (see "Adjustment" above). Secure cover to housing with retaining screws.



MANUAL CHOKE ASSEMBLY

FORD SINGLE BARREL CARBURETOR JET SPECIFICATIONS

Ford Carb. No.	Main Metering Jet					
	Standard		1 Size Lean		2 Sizes Lean	
	Size	Part No.	Size	Part No.	Size	Part No.
C3AF-9510-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C	059"	C3OZ-9533-B
C3AF-9510-B	063"	C3AZ-9533-B	061"	C3TZ-9533-C	059"	C3OZ-9533-B
C3AF-9510-C	062"	C3AZ-9533-A	061"	C3TZ-9533-C	059"	C3OZ-9533-B
C3AF-9510-D	062"	C3AZ-9533-A	061"	C3TZ-9533-C	059"	C3OZ-9533-B
C3AF-9510-Y	066"	C3TZ-9533-E	064"	C3AZ-9533-C	062"	C3AZ-9533-A
C3AF-9510-Z	065"	C3TZ-9533-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C
C3DF-9510-A	052"	C3UZ-9533-A	050"	C3UZ-9533-C	048"	C3UZ-9533-D
C3DF-9510-B	052"	C3UZ-9533-A	050"	C3UZ-9533-C	.048"	C3UZ-9533-D

Ford Carb. No.	Main Metering Jet					
	Standard		1 Size Lean		2 Sizes Lean	
	Size	Part No.	Size	Part No.	Size	Part No.
C3OF-9510-A	059"	C3OZ-9533-B	057"	C3OZ-9533-A	055"	C3UZ-9533-B
C3OF-9510-B	057"	C3OZ-9533-A	055"	C3UZ-9533-B	053"	C3DZ-9533-A
C3OF-9510-AA	063"	C3AZ-9533-B	061"	C3TZ-9533-C	059"	C3OZ-9533-B
C3TF-9510-A	065"	C3TZ-9533-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C
C3TF-9510-B	065"	C3TZ-9533-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C
C3TF-9510-C	065"	C3TZ-9533-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C
C3TF-9510-D	065"	C3TZ-9533-A	063"	C3AZ-9533-B	061"	C3TZ-9533-C
C3TF-9510-E	069"	C3TZ-9533-B	067"	C3TZ-9533-D	065"	C3TZ-9533-A
C3UF-9510-A	052"	C3UZ-9533-A	050"	C3UZ-9533-C	048"	C3UZ-9533-D
C3UF-9510-B	057"	C3OZ-9533-A	055"	C3UZ-9533-B	053"	C3DZ-9533-A

HOLLEY SINGLE BARREL MODEL 1909 CARBURETORS

RAMBLER	ℂ Holley No.
American (Without "E-Stick") Early	2555
American (Without "E-Stick") Late	2555-1
American (Without "E-Stick") Later	2555-2
American (With "E-Stick") Early	2556
American (With "E-Stick") Late	2556-1
Classic Six (Without "E-Stick") Early	2387
Classic Six (Without "E-Stick") Late	2387-1
Classic Six (Without "E-Stick") Later	2387-1*
Classic Six (With "E-Stick") Early	2557
Classic Six (With "E-Stick") Late	2557-1
Classic Six (With "E-Stick") Later	2557-1*

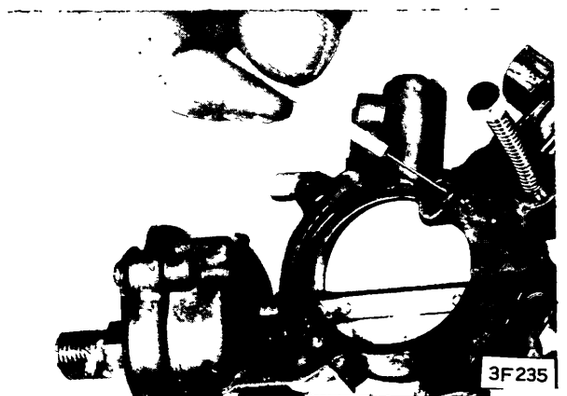
ℂ - Holley Part Number and American Motors Part Number are stamped on fuel bowl. *NOTE - The complete Holley Part Number (Example: R-2555-1A) may not appear on carburetor. The "R" indicates carburetor and the "A" indicates assembly.* Suffix figure "1" etc., indicates modifications. If an asterisk (*) is used, further modification is indicated.

►CHANGES, CAUTIONS, CORRECTIONS

► *1963 AMERICAN (OHV ENGINE) CONSTANT THROTTLE SURGE & ACCELERATION STUMBLE CORRECTION: Corrections are different for early and later cars as follows:*

Cars Before Sequence No. E-40006 - Install carburetor, Holley Part No. R-2387-1A which is the later production carburetor used on Classic Six models.

Cars After Sequence No. E-40005 - Install carburetor kit, American Motors No. 3204569 which contains one No. 60 Main Jet, a .028" Drill, and a Fuel Bowl Gasket. Remove carburetor bowl cover (not necessary to remove carburetor from engine), then remove original No. 58 Main Jet and install jet from kit. Use the No. 70 (.028") drill and enlarge idle feed restriction, see illustration. *CAUTION - Use care when drilling (rotate drill by hand using drill shank as a handle) and blow out any chips.* Adjust dry float setting to 27/64".



ENLARGING IDLE FEED RESTRICTION

CARBURETOR ADJUSTMENT SPECIFICATIONS								
Holley Carb. No.	Idle Speed (On Engine) Hot ℂ	Idle Speed (On Engine) Fast ②	Fast Idle (Off Engine) Setting ②	Initial Idle Mixture ③	Float Level ②	Choke Setting	Unl ader Setting ②	Dashpot Setting ②
2387	550	1800	.038"	0-2¾"	5/16"	1 Lean	9/32"	.....
2387-1	550	1800	.038"	0-2¾	27/64"	Centered	9/32"	.....
2387-1*	550	1800	.038"	0-2¾	5/16"	Centered	9/32"	.....
2555	550	1800	.038"	0-2¾	5/16"	Centered	9/32"	.....
2555-1	550	1800	.038"	0-2¾	27/64"	Centered	9/32"	.....
2555-2	550	1800	.038"	0-2¾	27/64"	Centered	9/32"	.....
2556	550	1800	.038"	0-2¾	5/16"	Centered	9/32"	9/64"
2556-1	550	1800	.038"	0-2¾	27/64"	Centered	9/32"	9/64"
2557	550	1800	.038"	0-2¾	5/16"	1 Lean	9/32"	9/64"
2557-1	550	1800	.038"	0-2¾	27/64"	Centered	9/32"	9/64"
2557-1*	550	1800	.038"	0-2¾	5/16"	Centered	9/32"	9/64"

ℂ - 500 RPM on Air Cond. Cars. ② - See "Adjustment" below. ③ - Turns open from a lightly seated position.

DESCRIPTION

Single barrel downdraft type with automatic choke. This carburetor consists of two main sub-assemblies (air horn and main body) with throttle body assembly integral with main body. The float is made of plastic material and the fuel inlet needle valve is tipped with "Viton". Accelerating pump is plunger type.

ADJUSTMENT

Idle Speed & Mixture

With engine at normal operating temperature, adjust engine idle speed to specification (see above), then adjust idle mixture screw to provide highest steady manifold vacuum and smoothest running at maximum idle speed. Readjust engine idle speed if necessary, after idle mixture adjustment.

Fast Idle Speed

On Engine - With engine at normal operating temperature and fast idle screw on highest step of fast idle cam, adjust fast idle screw to obtain correct engine RPM (see specifications).

Off Engine - With fast idle screw on high step of fast idle cam, turn screw to obtain correct clearance (see specifications) between throttle valve and bore of carburetor on side opposite idle ports.

Float Level

Invert air horn and measure distance between top of float and machined surface of air horn at a point ¼" from free end of float. To adjust, bend tab of float that contacts fuel inlet needle valve. *CAUTION - Do not place any pressure, other than w ight f float, on inlet needle valve. Tip of ne dle valv is "Vit n" material and damage or a fals setting would result.*

Unloader

Clearance between choke valve and wall of air horn should be as indicated in specifications with throttle valve in wide open position and unloader tab on throttle lever contacting fast idle cam. To adjust, bend tab on throttle lever.

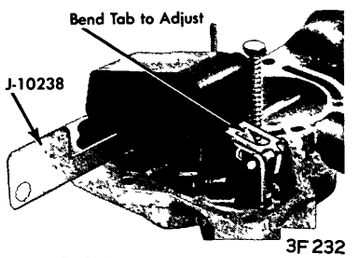
Dashpot

With engine "hot" idle properly adjusted, depress dashpot plunger stem until it bottoms. Clearance between plunger stem and throttle lever should be as indicated in specifications. To adjust, loosen locknut and turn dashpot as necessary to obtain proper clearance.

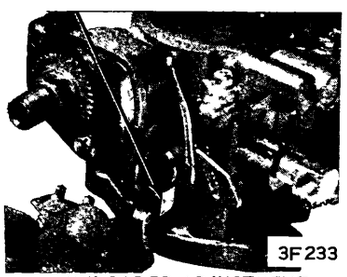
Automatic Choke

Rotate thermostatic coil cover so mark on cover is aligned with proper mark on housing (see specifi- specifications). *CAUTION - Do not adjust ch k more than two graduations from sp cified s tting*

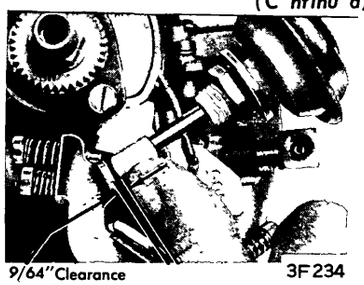
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FLOAT LEVEL ADJUSTMENT



UNLOADER ADJUSTMENT



DASHPOT ADJUSTMENT

HOLLEY SINGLE BARREL MODEL 1909 CARBURETORS (Continued)

OVERHAUL

Disass mbly

1) Remove carburetor air cleaner bail, then remove fuel inlet fitting, and the dashpot bracket screw (if so equipped). Remove fast idle cam retainer screw and slide choke operating rod from choke shaft.

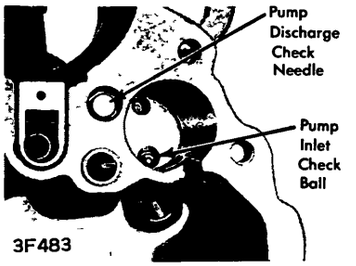
2) Remove choke thermostatic coil assembly, clamp and gaskets from air horn, then remove air horn screws and separate air horn from main body. Remove float assembly and air horn gasket, then remove fuel inlet needle (needle is held in position with a staked washer).

3) Remove power piston assembly with a suitable tool (J-10235). Invert main body and allow accelerator pump discharge needle to drop out. Remove nut and lock washer from end of throttle shaft, then remove accelerator pump lever and link (note proper position of link and lever for installation in the same position). Remove accelerator pump rod and stem assembly from main body and separate the pump assembly.

4) Invert main body and allow pump inlet check ball to fall out. Remove baffle plate from inside fuel bowl and remove main jet. Remove power valve assembly with a suitable tool (J-10185). Remove idle mixture screw and spring. *NOTE - Removal of choke and throttle plates and shafts is not recommended. If necessary to remove, staked ends must be filed off the screws.*

Cleaning & Inspection

Clean all metal parts in a suitable carburetor cleaner and rinse as directed, then blow dry with air. Inspect



ACCELERATOR PUMP CHECK VALVES

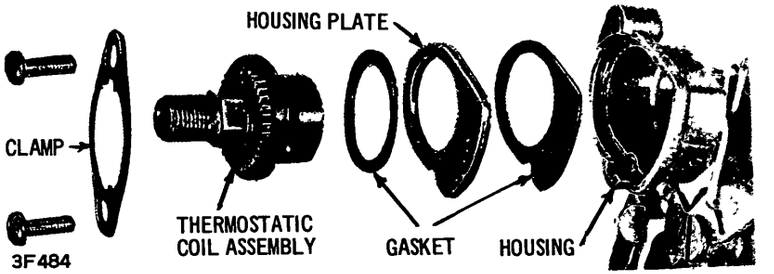
all parts for wear, damage, nicks and burrs. Replace parts as required. *CAUTION - Do not clean passages with a drill, wire, or similar tool as the passage may be distorted. Do not use a buffing wheel, wire brush, file or other sharp instrument to remove carbon deposits.*

Reassembly

1) Install power valve assembly with same tool used for removal, then install main jet. Slide fuel baffle into fuel bowl and install accelerator pump inlet ball check into pump cavity (see illustration).

2) Assemble accelerator pump rod and stem assembly, then slide pump assembly into pump cavity in main body (make sure pump cup is not damaged or wrinkled during installation). Depress accelerator rod fully into main body, then insert pump link into outer hole of pump operating lever and install lever on throttle shaft Install lockwasher and tighten securely.

3) Install accelerator pump discharge needle into passage in main body (see illustration). Install idle mixture screw and spring, and turn needle in until it seats lightly, then back off one turn.



AUTOMATIC CHOKE ASSEMBLY

4) Install power valve piston assembly into air horn with a suitable tool (J-10236) and tap tool lightly with a hammer. Stake power valve assembly into air horn using a suitable tool (J-10237). Install fuel inlet needle valve and retainer washer and stake the retainer in place with a suitable tool (J-10240).

5) Position float assembly on air horn and install float hinge pin, then adjust float level (see above). Remove float and hinge assembly and install body gasket on air horn, then reinstall float assembly. Install air horn on main body and tighten attaching screws.

6) Insert fast idle cam rod into choke shaft lever and into fast idle cam and tighten cam shoulder screw. Install choke thermostat cover, adapter plate and gaskets. Insert clamp and tighten screws. Adjust choke to specifications (see above). Install dashpot and bracket (if so equipped).

7) Install fuel inlet fitting and distributor vacuum spark fitting, then install carburetor air cleaner ball.

HOLLEY SINGLE BARREL CARBURETOR JET SPECIFICATIONS

HOLLEY (RAMBLER) CARBURETORS

Holley Carb. No.	Carb. Model	Metering Jet Standard Size	Metering Jet Standard Part No.	Pwr. Valve Piston Assy. Part No.	Pwr. Valve Restriction Size	Choke Coil & Cover Part No.
2387	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-188A
2387-1	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-193A
2387-1*	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-193A
2555	1909DC	.058"	22R-40-58	25R-322A	.036"	47R-188A
2555-1	1909DC	.058"	22R-40-58	25R-322A	.036"	47R-190A
2555-2	1909DC	.058"	22R-40-58	25R-322A	.036"	47R-190A
2556	1909DC	.058"	22R-40-58	25R-322A	.036"	47R-188A
2556-1	1909DC	.058"	22R-40-58	25R-322A	.036"	47R-190A
2557	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-188A
2557-1	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-193A
2557-1*	1909DC	.063"	22R-40-63	25R-322A	.036"	47R-193A

HOLLEY (CHRYSLER CORP.) CARBURETORS

Holley Carb. No.	Carb. Model	Metering Jet Standard Size	Metering Jet Standard Part No.	Metering Jet 1 Size Lean Size	Metering Jet 1 Size Lean Part No.	Metering Jet 2 Sizes Lean Size	Metering Jet 2 Sizes Lean Part No.
2533A	1920	.053"	22R-40-53	.....	.....	.....	.....
2534A	1920	.058"	22R-40-58	.....	.....	.....	.....
2535A	1920	.057"	22R-40-57	.056"	22R-40-56	.055"	22R-40-55
2536A	1920	.056"	22R-40-56	.055"	22R-40-55	.054"	22R-40-54
2537A	1920	.057"	22R-40-57	.056"	22R-40-56	.055"	22R-40-55
2538A	1920	.056"	22R-40-56	.055"	22R-40-55	.054"	22R-40-54

HOLLEY SINGLE BARREL MODEL 1920 CARBURETORS

DODGE DART & PLYMOUTH VALIANT ① **Holley No.**
170" Eng. (Synchro-mesh) 2533A
170" Eng. (Auto. Trans.) 2534A
225" Eng. (Synchro-mesh) 2535A
225" Eng. (Auto. Trans.) 2536A

DODGE SIX & PLYMOUTH SIX
225" Eng. (Synchro-mesh) 2537A
225" Eng. (Auto. Trans.) 2538A

① - Holley Part Number is stamped on fuel bowl.
NOTE - The complete Holley Part Number (Example R-2533-A) may not appear on carburetor. The "R" indicates carburetor and the "A" indicates assembly. A suffix figure "1" etc., indicates modifications.

DESCRIPTION

Single barrel downdraft type consisting of a single casting (air horn, main body, and throttle body are integral). A separate fuel bowl cover is used to enclose the float assembly. Power valve (economizer) and accelerating pump assemblies are diaphragm type. Choke lever assemblies used on 170" Eng. carburetors have a "spring staged" feature which reduces choke valve closing torque when engine is cranked at temperatures below zero, resulting in better starting mixtures at both low and moderate temperatures.

ADJUSTMENT

"ON ENGINE" ADJUSTMENT NOTE: Engine must be at normal operating temperature when making adjustments. When adjusting idle speed, headlights must be ON. If car is equipped with air conditioning, turn air conditioner ON.
CARBURETOR RECONDITIONING NOTE: After reconditioning, check and adjust "Fast Idle Cam Index" (see below) before proceeding with other adjustments.

Idle Speed & Mixture

On automatic transmission cars, unsnap the ball joint connection at accelerator shaft bellcrank. Adjust idle speed to correct engine RPM (see specifications) with choke valve wide open and fast idle adjusting screw not contacting cam. Adjust idle mixture screw to obtain highest engine RPM, then turn idle mixture screw inward (leaner) until speed starts to drop. Turn screw in opposite direction (richer) just enough to recover the lost engine speed. *NOTE - This procedure assures idle mixture being set to leanest mixture possible for smooth idle.* Readjust idle speed screw if necessary, to obtain correct engine idle speed.

Fast Idle Speed

Open throttle slightly and turn fast idle cam so fast idle screw contacts second step of fast idle cam, then release throttle. Adjust fast idle screw to obtain correct engine RPM (see specifications).

Fuel Level

With engine running and car on a level floor, remove economizer diaphragm assembly and measure fuel level through opening (see illustration). Measurement should be as indicated in specifications. If measurement is not correct, readjust float level (see below).

CARBURETOR ADJUSTMENT SPECIFICATIONS

Holley Carb. No.	Hot Idle Speed (Engine RPM) Synchro-mesh	Hot Idle Speed (Engine RPM) Automatic	Fast Idle (Engine RPM) Speed	Initial Idle Mixture ③	Float Level Gauge No. ②	Fuel Level Setting ②	Choke Setting ②	Bowl Vent ②	Spring Staged Choke ②
2533A	550 ①		1500	1	C-3903	11/16"	2 Rich	1/16"	1/16"
2534A		550 ①	1500	1	C-3903	11/16"	2 Rich	1/16"	1/16"
2535A	550 ①		1500	1	C-3903	11/16"	2 Rich	1/16"	.....
2536A		550 ①	1500	1	C-3903	11/16"	2 Rich	1/16"	.....
2537A	550 ①		1500	1	C-3903	11/16"	2 Rich	1/16"	.....
2538A		550 ①	1500	1	C-3903	11/16"	2 Rich	1/16"	.....

① - Headlights ON and Air Cond. ON. Auto. Trans. in "N" (Neutral).
② - See "Adjustment" below.
③ - Turns open from a lightly seated position.

Float Level

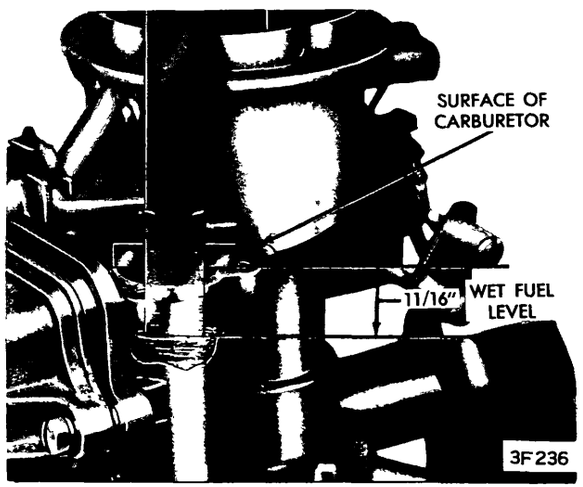
With carburetor off engine, remove fuel bowl cover and invert carburetor. Install Float Level Gauge (see specifications) as shown in illustration. Float should just contact "touch" leg of gauge. Reverse gauge and check "no touch" leg. Float should just clear gauge. To adjust, bend tab on float which touches head of fuel inlet needle valve. *CAUTION - Do not allow float tab to contact head of inlet needle valve while adjusting float level.*

Bowl Vent

With throttle valve at curb idle, it should be possible to insert a drill of proper size (see illustration and specifications) between bowl vent and seat. To adjust, bend tab on operating arm until correct clearance is obtained. *CAUTION - Be sure vent rod does not bind in guide after adjusting.*

Unloader

Unloader will be properly adjusted when fast idle cam is properly indexed (see below).

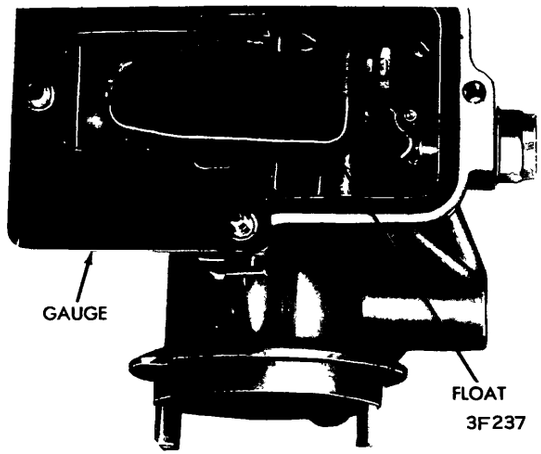


FUEL LEVEL CHECK

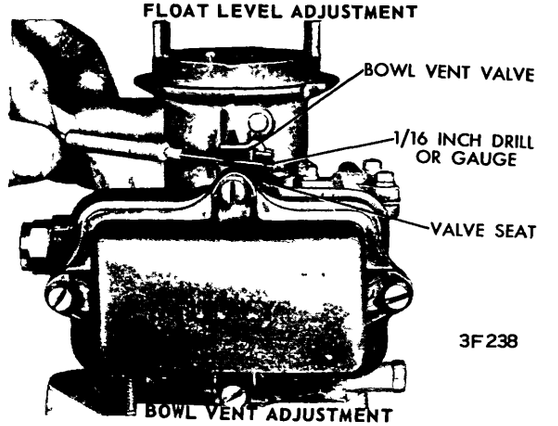
Fast Idle Cam Index

Open throttle valve and hold choke valve in fully closed position, then close throttle valve. Index mark on cam should be centered on end of fast idle adjusting screw (see illustration). To adjust, bend fast idle connector link at the angle as necessary to center mark on screw.

(Continued)



FLOAT LEVEL ADJUSTMENT



BOWL VENT ADJUSTMENT

HOLLEY SINGLE BARREL 1920 CARBURETORS (Cont.)

Automatic Choke

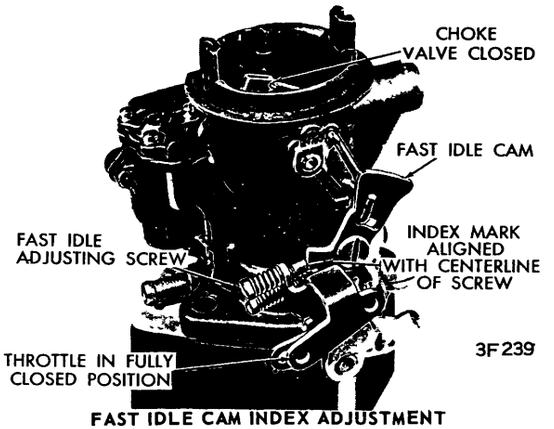
See specifications (above). *CAUTION - This unit is serviced as a complete assembly. Do not attempt to repair or change the adjustment.*

Spring Staged Choke Unit

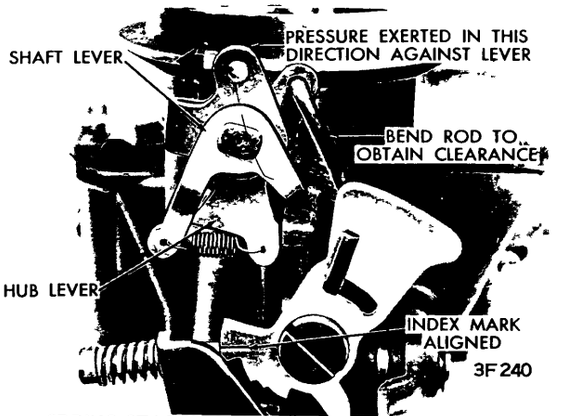
170" Engine Carbs. - *NOTE - This unit is not used on other carburetors.* With fast idle cam index properly adjusted, check adjustment of spring staged choke unit as follows: Press against choke lever firmly (see illustration), then measure clearance between hub lever and shaft lever. If clearance is not as specified (see specifications), bend choke link slightly as required.

OVERHAUL

See 1962 Final Data, Page 272 for overhaul procedures.



FAST IDLE CAM INDEX ADJUSTMENT



SPRING STAGED CHOKE UNIT ADJUSTMENT

HOLLEY (RAMBLER) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carburetor No.		Model	Type	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Choke Coil Housing Part No.
R-1957-1A	Pri.	4100	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	47R-116R
	Sec.	.....	.....	.035"	22R-40-35	34R-1942A	25R-237A-85	.....	.....
R-2415-A		2300	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-21	47R-114A
R-2442-A		2300	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-24	47R-114A
R-2463-A		2300	2-Bbl.	.050"	22R-40-50	34R-3174A	25R-237A-85	21R-572-28	47R-114A
R-2464-A	Pri.	4150	4-Bbl.	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	47R-116A
	Sec.	.....	.....	.035"	22R-40-35	34R-1942A	25R-237A-85	.....	.....
R-2640-A		2300	2-Bbl.	.055"	22R-40-55	34R-3540A	25R-237A-50	21R-572-21	47R-116A

HOLLEY (FORD) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Carburetor No.		Type	Standard Main Metering Jet Size	Standard Main Metering Jet Part No.	5,000-10,000 Ft. Alt. Main Metering Jet Size	5,000-10,000 Ft. Alt. Main Metering Jet Part No.	10,000-15,000 Ft. Alt. Main Metering Jet Size	10,000-15,000 Ft. Alt. Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.
C1AE-9510-AM	Pri.	4-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	B9LE-9A511-A	B8AZ-9A565-A	B8A-9577-A
	Sec.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
C1AE-9510-AU		2-Bbl.	.066"	8MB-9533-B	.....	.....	.....	.....	C1AZ-9A511-B	B8AZ-9A565-A	B8A-9577-B
C1AE-9510-AV		2-Bbl.	.061"	B4Q-9533-A	.....	.....	.....	.....	C1AZ-9A511-B	B8AZ-9A565-A	B8A-9577-B
C2AE-9510-CB	Pri.	4-Bbl.	.062"	1GA-9533-B	.....	.....	.....	.....	C0AE-9A511-A	B8LY-9A565-A	B8A-9577-B
	Sec.	.....	.....	.....	.....	.....	.....	.....	C0AZ-9A513-A	.....	.....
C2SE-9510-A		2-Bbl.	.057"	26H-9533	.....	.....	.....	.....	C2SZ-9A511-A	B8AZ-9A565-A	B8A-9577-B
C2SE-9510-B		2-Bbl.	.060"	1GA-9533-C	.....	.....	.....	.....	C2SZ-9A511-B	.....	B8A-9577-B
C2SE-9510-E		2-Bbl.	.060"	1GA-9533-C	.....	.....	.....	.....	C2SZ-9A511-B	.....	B8A-9577-B
C3AE-9510-A	Pri.	4-Bbl.	.064"	1GA-9533-A	.....	.....	.....	.....	B9LE-9A511-A	B8AZ-9A565-A	B8A-9577-A
	Sec.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
C3AE-9510-B	Pri.	4-Bbl.	.067"	B4C-9533-A	.....	.....	.....	.....	C3AZ-9A511-A	B8AZ-9A565-A	B8A-9577-A
	Sec.	.....	.077"	C3AZ-9533-D	.....	.....	.....	.....	C3AZ-9A513-A	.....	.....
C3AE-9510-C	Pri.	4-Bbl.	.062"	1GA-9533-B	.....	.....	.....	.....	C0AE-9A511-A	B8LY-9A565-A	B8A-9577-A
	Sec.	.....	.....	.....	.....	.....	.....	.....	C0AZ-9A513-A	.....	.....
C3TE-9510-F	Pri.	4-Bbl.	.052"	86H-9533	.050"	78-9533-A	.048"	78-9533-B	C1TZ-9A511-G	B8TZ-9A565-A	B8A-9577-A
	Sec.	.....	.058"	78-9533-F	.056"	78-9533-E	.054"	06H-9533	B9TE-9A513-A	.....	.....

HOLLEY 2 & 4-BARREL CARBURETORS

TRIPLE 2-BARREL CARBURETORS

FORD & MERCURY		Ford Part No.
406" Eng.	(Center)	C1AE-9510-AV
406" Eng.	(Front & Rear)	C1AE-9510-AU
THUNDERBIRD		
390" Eng.	(Center)	C2SE-9510-A
390" Eng.	(Front)	C2SE-9510-E
390" Eng.	(Rear)	C2SE-9510-B

2-BARREL CARBURETORS

RAMBLER AMBASSADOR	③ Holley No.
Synchro-mesh & Overdrive	Model 2300, No. 2442
Auto. Trans.	Model 2300, No. 2463
JEEP	③ Holley No.
6 Cyl. (OHC Eng) ①	Model 2300, No. 2415-A
6 Cyl. (OHC Eng.) ②	Model 2300 No 2640

4-BARREL CARBURETORS

FORD & MERCURY		Ford Part No.
406" Eng. (Early)		C1AE-9510-AM
406" Eng. (Late)		C3AE-9510-A
427" Eng.		C3AE-9510-B
406" Eng	(Front & Rear)	C2AE-9510-CB
427" Eng. (Early)	(Front & Rear)	C2AE-9510-CB
427" Eng. (Late)	(Front & Rear)	C3AE-9510-C

FORD TRUCK	Ford Part No.
292" Eng. (Heavy Duty)	C3TE-9510-F
RAMBLER AMBASSADOR	③ Holley No.
Synchro-mesh & Overdrive	Model 4150, No. 1957-1
Auto. Trans.	Model 4150, No. 2464

① - Manual choke carburetor
② - Automatic choke carburetor
③ - Holley Part Number is stamped on fuel bowl
NOTE - The complete Holley Part Number (Example R-2442-A) may not appear on carburetor. The "R" indicates carburetor and the "A" indicates assembly. A suffix figure "1" etc., indicates modifications.

DESCRIPTION

2 & 4-Barrel downdraft carburetors with either automatic or manual type choke. Carburetor design is same as previous models.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carb. No. ①②	Idle Speed (Eng. RPM) Hot	Idle Speed (Eng. RPM) Fast	Fast Idle (Off Engine) Setting	Initial Idle Mixture ⑩	Automatic Choke Setting	Unloader Setting
C1AE-9510-AM	675-700	1800	.008"⑧	1-1½	Index	.....
C1AE-9510-AU	.....	.....	.....	¾-1¼	.....	.....
C1AE-9510-AV	675-700	1800	.008"⑧	1-1½	Index	.....
C2AE-9510-CB	750	1800	008"⑧	1-1½	⑪	
C2SE-9510-A	575-600⑦	1800	.008"⑧	1-1½	Index	.....
C2SE-9510-B	.....	.....	.....	¾-1¼	.....	.....
C2SE-9510-E	.....	.....	.....	¾-1¼	.....	.....
C3AE-9510-A	675-700	1800	.008"⑧	1-1½	Index	.....
C3AE-9510-B	675-700	1800	008"⑧	1-1½	Index	
C3AE-9510-C	750	1800	008"⑧	1-1½	⑪	
C3TE-9510-F	525-575⑦	.....	.010-.015"⑧	1-1½	.....	.....
Holley 1957-1	500	1600-1800	.025"⑨	1	1 Lean	3/16"
Holley 2415	590-600④	⑥	.....	½	.....	.....
Holley 2442	500	1600-1800	.024"⑨	1	Index	3/16"
Holley 2463	475④⑤	1600-1800	.024"⑨	1	Index	3/16"
Holley 2464	475④⑤	1600-1800	.025"⑨	1	1 Lean	3/16"
Holley 2640	590-600④	⑥	025"⑨	½	Index	3/16"

① - Ford Motor Co Part No. except where indicated.
② - Part No. on choke plate flange or on main body
③ - Automatic Transmission in "D" (Drive).
④ - Automatic Transmission in "N" (Neutral)
⑤ - 500 RPM on Air Cond cars with compressor ON.
⑥ - Fast idle correct when hot idle properly adjusted
⑦ - 475-525 RPM automatic transmission in "D" (Drive).
⑧ - Clearance between fast idle cam and fast idle screw.
⑨ - Clearance between throttle valve & throttle bore wall.
⑩ - Turns open from a lightly seated position
⑪ - Index (Front Carburetor), 90° from index (Rear Carburetor)

ADJUSTMENT

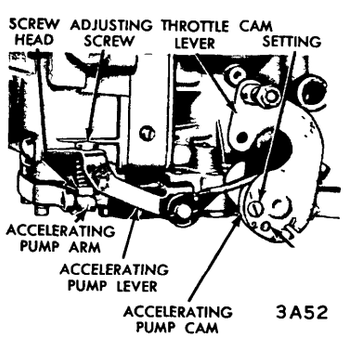
Idle Mixture

One Carb. - With engine at normal operating temperature and transmission selector lever in "N" (Neutral), turn both idle mixture screws in until engine runs rough from a lean mixture, then turn screws out until engine rolls from a rich mixture Finally turn screws in just enough for smooth idling at highest RPM and highest vacuum Reset engine idle speed to correct RPM (see "Specification Table").

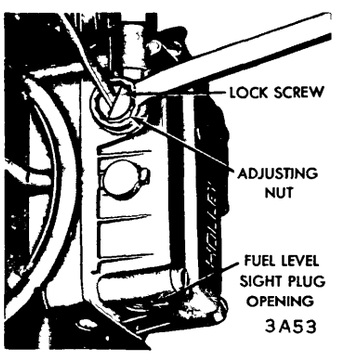
Two Carbs. - With engine at normal operating temperature and transmission selector lever in "N" (Neutral), adjust idle speed to 750 RPM (turn throttle stopscrew on each carburetor equally and alternately) Adjust each idle mixture screw (front carburetor first, rear carburetor last) by turning screw in until engine runs rough from a lean mixture, then turn screw out until engine runs rough from a rich mixture Finally turn screw in just enough for smooth operation (will provide a slightly rich mixture) *NOTE - Final setting of adjusting screws must be equal within 1/8 turn.* Readjust engine idle speed to correct RPM (see "Specification Table").

Triple Carbs. - Adjust each carburetor separately in the same manner as for "One Carb " and "Two Carb " models (above) Start with center carburetor, followed by front carburetor, then rear carburetor.

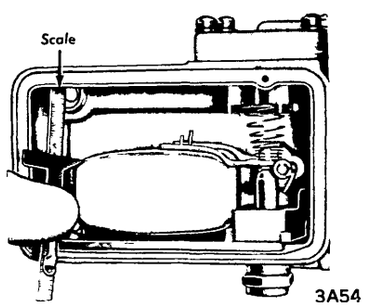
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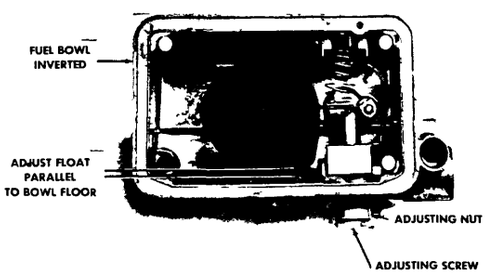
ADJUSTMENT POINTS (ALL CARBURETORS)



FUEL LEVEL ADJUSTMENT (ALL MODELS)



FLOAT LEVEL ADJUSTMENT (EXCEPT RAMBLER & JEEP)



FLOAT LEVEL ADJUSTMENT (RAMBLER & JEEP)

HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

Idle Speed (Initial)

Two Barrel Carbs. - Turn throttle stopscrew on each carburetor in 3 full turns from point where throttle valves are tightly closed. Make final adjustment on engine with engine at normal operating temperature.

Three Barrel Carbs. - With throttle stopscrews on front and rear carburetors backed off to allow throttle valves to seat in throttle bores, turn stopscrews in until they just contact throttle shaft arm, then turn in one full turn additional. Make final adjustment on center carburetor only, with engine at normal operating temperature.

Synchronizing Linkage

Two Barrel Carbs. - 1) Disconnect inter-connecting linkage at front and rear carburetors and at bellcrank lever. Disconnect accelerator rod at left side bellcrank lever (on manifold).

2) Adjust primary carburetor rod to a length of 4 3/16" (from center of hole to center of bent end), then install rod on bellcrank lever and upper stud of front carburetor lever. Move bellcrank lever so front carburetor throttle valves are in wide open position and hold in this position.

3) Install slotted end of secondary carburetor throttle rod on rear carburetor throttle lever, then move lever to wide open position and adjust rod so that hole in rod engages stud on bellcrank lever freely, and connect rod.

4) Move left side of bellcrank assembly (on manifold) so that throttle valves on both carburetors are wide open. *CAUTION - Accelerator lever must be engaged between pin and pad of accelerator pedal.* Have someone press accelerator pedal to floor and hold pedal in this position. Accelerator rod pin should engage bellcrank lever. Adjust as necessary.

Triple Carbs. - 1) Insert a 1/8" diameter gauge pin in gauging hole (see illustration) in bellcrank lever and bracket on left side of engine near distributor (at anti-stall dashpot if so equipped) to lock lever in closed throttle position.

2) Disconnect throttle rods at both front and rear carburetor throttle levers, then disconnect center carburetor throttle rod at bellcrank lever. Adjust length of front carburetor throttle rod so that with rod installed, throttle lever of front carburetor will be completely closed when center carburetor throttle lever is closed against idle speed adjusting screw stop (normal idle position).

3) Adjust rear carburetor in same manner, then install front and rear throttle rods to throttle levers and tighten locknuts.

4) With center carburetor throttle lever against idle stop, adjust throttle rod so trunnion will just engage in hole in bellcrank lever, then install rod retainer clip. Remove gauge pin and adjust anti-stall dashpot as required.

Idle Speed (Final)

IDLE SPEED SETTING NOTE (TWO CARBS. & TRIPLE CARBS.) - Idle speed adjustment is made on center carburetor only (Triple Carbs.). On Two Carb. models, adjust stopscrew on each carburetor equally and alternately.

With engine at normal operating temperature, fast idle screw backed off so it does not touch fast idle cam, choke valve wide open, and transmission in neutral (Synchro-mesh); in proper range (Auto. Trans. - See Specification Table), adjust engine speed to correct RPM (See Specification Table).

TRIPLE CARB. IDLE SPEED NOTE - If engine will not idle at specified RPM, readjust front and rear carburetors (see "Idle Speed, Initial" above).

Accelerating Pump

Override Adjustment - Hold throttle valves wide open and depress pump arm fully. Distance between pump lever adjusting screw head and pump arm should be .015". Turn adjusting screw as necessary.

Pump Stroke (Exc. Rambler) - *NOTE - This is a seasonal adjustment.*

Normal (Summer) Setting - Install pump cam screw in No. 1 hole in cam (for minimum stroke).

Winter Setting - Install pump cam screw in No. 2 hole in cam (for maximum setting).

Pump Stroke (Rambler) - Install pump cam screw in No. 2 hole for all normal driving. Use No. 1 hole for leaner pump discharge.

Bowl Vent

Rambler - With throttle valves fully closed, distance between top of fuel bowl and vent button should be .050-.070". To adjust, bend vent arm at accelerating pump lever. *CAUTION - Do not bend vent valve rod.*

Ford & Mercury - No adjustment required.

Float Level (On Bench)

NOTE - This is a preliminary adjustment only. After carburetor is installed on engine, fuel level must be checked and adjusted (see "Fuel Level").

Ford, Mercury, Thunderbird & Ford Truck - With fuel bowl inverted, distance between bottom of float and floor of fuel bowl should be 7/8" (primary float); ¾" (secondary float). To adjust, loosen lock screw on needle and seat assembly and rotate adjusting screw. See illustration.

Rambler & Willys - With fuel bowl inverted, top of float must be parallel with top of fuel bowl (see illustration). To adjust, loosen lock screw on needle and seat assembly and rotate adjusting screw.

Fuel Level

With car on a level floor, bring engine to normal operating temperature, then remove air cleaner and stop engine. Remove sight plug in end of fuel bowl (use container to catch fuel). Fuel level within bowl should be at lower edge of sight plug hole (±1/16"). To adjust, proceed as follows:

Fuel Level Too High - With engine stopped, loosen lockscrew on top of fuel bowl just enough to allow rotation of nut underneath. *CAUTION - Do not unlock lockscrew or attempt to adjust fuel level with engine running.* Turn adjusting screw ½ turn clockwise to lower fuel level below specifications. Tighten lockscrew, then run engine to stabilize fuel level. Check fuel level at sight plug hole. If level is not below specified level, repeat above step. With fuel level below specified level, turn adjusting nut in increments of 1/6 turn until correct fuel level is obtained. *NOTE - 1/6 turn of adjusting nut will change fuel level at sight plug opening 3/64".*

Fuel Level Too Low - Proceed as for "Fuel Level Too High" except that it will not be necessary to initially decrease fuel level below specifications.

Unloader

Rambler - With throttle valves in wide open position, distance from top of choke valve to wall of air horn should be as indicated in "Specification Table".

Fast Idle (Off Engine)

Rambler - With choke valve fully closed and fast idle adjusting screw on high step of fast idle cam, the clearance between throttle valve and bore on side opposite idle ports should be as indicated in "Specification Table". To adjust, turn fast idle adjusting screw.

Ford Pass. Cars & Mercury with 4-Bbl. Carbs. - With fast idle cam in slow idle position (bottom step of cam contacting fast idle screw), turn fast idle screw until it just touches lowest step of cam, then back off screw ¼ turn (.005-.008" clearance between cam and fast idle screw).

Fast Idle (On Engine)

Ford Pass. Cars & Mercury with 4-Bbl. Carbs. - With fast idle screw on top step of fast idle cam, engine at normal operating temperature, adjust fast idle screw (front carburetor only with Two Carbs. Center carburetor only with Triple Carbs.) to obtain correct fast idle speed (see "Specification Table").

Ford Trucks with 4-Bbl. Carbs. - With engine at normal operating temperature and "hot" idle speed adjusted, place primary throttle valves in closed position and check clearance between fast idle cam and head of fast idle screw. Clearance should be .010-.015". If clearance not correct, remove governor housing and insert a .060" gauge (wire rod) into hole in end of fast idle screw fitting to prevent it turning, then turn fast idle screw as necessary for desired clearance. *NOTE - ¼ turn of screw will change clearance approximately .008".*

Rambler - With engine at normal operating temperature, place fast idle screw on high step of fast idle cam and adjust engine speed to specifications (see "Specification Table").

Jeep - Fast Idle will be properly adjusted when engine hot idle speed is adjusted.

Automatic Choke

All Models (Exc. Ford Trucks & Jeep) - Loosen choke cover retaining screws and rotate cover to align index mark on cover with correct mark on choke housing as indicated in "Specification Table".

OVERHAUL

See 1958 Final Data, Page 274, or later Manual edition and note the following:

Balance Tube

Ford Truck (4-Bbl. Carbs.) - Install balance tube "O" rings and washers so balance tube extends equally from faces of primary and secondary metering bodies.

ROCHESTER 4GC 4-BARREL CARBURETORS

	Rochester No.
BUICK (EXC. SPECIAL)	
Series 4400,4600,4700,4800 (Early)	7023040
Series 4400,4600,4700,4800 (Late)	7023143
BUICK SPECIAL	
Auto. Trans.	7023044
Synchro-mesh	7023045
CADILLAC	
All Series (Without Air Cond.)	7023030
All Series (With Air Cond.)	7023031
CHEVROLET PASS. CARS	
327" Eng. (Without Air Cond.)	7023006
327" Eng. (With Air Cond.)	7023012
409" Eng. (Auto. Trans.)	7020024
409" Eng. (Synchro-mesh)	7020023
OLDSMOBILE (EXC. F-85)	
Super 88 & 98 (Without Air Cond.)	7023050
Super 88 & 98 (With Air Cond.)	7023051
OLDSMOBILE F-85	
Auto. Trans.	7023054
Synchro-mesh	7023055
PONTIAC TEMPEST	
4-Cyl. (Auto. Trans.)	7023070
4-Cyl. (Synchro-mesh)	7023069

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK SPECIAL HESITATION ON ACCELERATION CORRECTION:* If accelerator pump system is not defective, trouble may be due to incorrect pump stroke setting ("Pump Rod Position") which depends on average daytime temperature, and is a seasonal setting. *See "Accelerating Pump Adjustment" below.*

►*1963 BUICK SPECIAL HESITATION DURING WARM-UP CORRECTION (CARBURETORS BEFORE "B" STAMPED ON CODE TAG):* Install Flat Spot Package, Part No. 7026678. *CAUTION - Ignore instructions found in package.*

Automatic Transmission Cars - Replace .046" primary main metering jets with .048" jets. Adjust choke piston exactly flush with end of its cylinder. Press .125" restriction bushing in choke housing inlet **flush** with casting. Adjust choke setting to "Index". After installing all parts in package, install new "B" carburetor code tag Check to make sure accelerating pump rod is in proper hole of arm (see "Accelerating Pump Adjustment" below). Adjust idle speed and mixture.

Synchro-mesh Transmission Cars - Install .048" primary main metering jets found in package. DO NOT install the .125" restriction bushing in choke housing inlet. DO NOT change any carburetor adjustment. Install new "B" carburetor code tag. Check to make sure accelerating pump rod is in proper hole of arm (see "Accelerating Pump Adjustment" below). Adjust idle speed and mixture.

DESCRIPTION

4-Barrel downdraft types with automatic choke. Carburetor design is similar to previous carburetor models.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Rochester Carb. No.	Hot Idle Speed (Engine RPM) ℃ S.M. Trans.	Hot Idle Speed (Engine RPM) ℃ Auto. Trans.	Fast Idle ℃ Eng. RPM	Float Level Setting ℃ Pri.	Float Level Setting ℃ Sec.	Float Drop Setting ℃ Pri.	Float Drop Setting ℃ S c.	Float To Setting ℃ Pri.	Float To Setting ℃ Sec.
7020023	500	.	(11)	1½"	1 5/16"	1 1/2"	1 1/8"	13/16"	1/2"
7020024		475 ②	(11)	1½"	1 5/16"	1 1/2"	1 1/8"	13/16"	1/2"
7023006	475	450 ②	(11)	1 17/32"	1 19/32"	2 1/4"	2 1/4"	. . .	. . .
7023012	475	450 ②	(11)	1 17/32"	1 19/32"	2 1/4"	2 1/4"		
7023030		480 ②	1700-1750 (10)	1 3/8"	1 3/8"	1 1/2"	1 5/16"	19/32"	3/8"
7023031		480 ②	1700-1750 (10)	1 3/8"	1 3/8"	1 1/2"	1 5/16"	19/32"	3/8"
7023040	475 ⑥	475 ②⑥	625 ⑨	1 11/32"	1 3/8"	1 7/16"	1 1/4"	9/16"	3/8"
7023044	. . . . .	500 ②⑤	625 ⑨	1 11/32"	1 3/8"	1 9/16"	1 9/32"	9/16"	3/8"
7023045	500 ⑤		625 ⑨	1 11/32"	1 3/8"	1 9/16"	1 9/32"	9/16"	3/8"
7023050	550	500 ②	1600 (12)	1 15/32"	1 3/8"	1 1/2"	1 3/16"	11/16"	3/8"
7023051	550 ℃	500 ②℃	1600 (12)	1 15/16"	1 3/8"	1 1/2"	1 3/16"	11/16"	3/8"
7023054		500 ②⑤	1500 (10)	1 7/16"	1 3/8"	1 3/8"	1 1/8"	17/32"	3/8"
7023055	550 ℃		2400 (12)	1 7/16"	1 3/8"	1 3/8"	1 1/8"	17/32"	3/8"
7023069	680-700 ℃		2800 (12)	1 11/32"	1 11/32"	1 1/4"	1 1/4"	9/16"	9/16"
7023070	.	580-600 ②℃	3000 (12)	1 11/32"	1 11/32"	1 1/4"	1 1/4"	9/16"	9/16"
7023143	475 ⑥	450 ②	625 ⑨	1 11/32"	1 3/8"	1 7/16"	1 1/4"	9/16"	3/8"

℃ - See procedures below.
② - Auto. Trans. in "D" (Drive).
③ - Auto. Trans. in "N" (Neutral)
④ - Air Conditioner ON
⑤ - 550 RPM with Air Conditioner OFF.
⑥ - 525 RPM with Air Conditioner OFF
℃ - Air Conditioner OFF.
⑨ - Fast idle screw on low step of fast idle cam.
⑩ - Fast idle screw on second highest step of cam, against shoulder of top step.
⑪ - Fast idle will be correct when hot (slow) idle speed is properly adjusted.
⑫ - Fast idle screw on high step of cam.

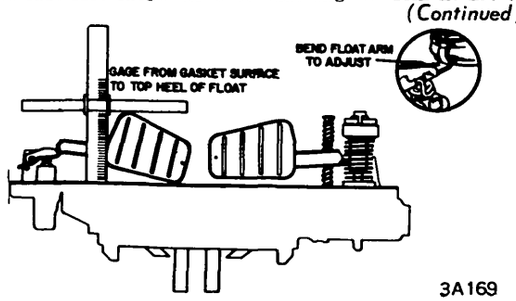
ADJUSTMENT

Idle Speed & Mixture

IDLE SETTING CAUTION (CARS WITH IDLE COMPENSATOR) - Make sure that idle compensator is closed when adjusting idle speed. If necessary idle compensator valve can be closed with a pencil. After idle speed is adjusted, press down on idle compensator valve to see if speed is affected. If speed drops, readjust idle speed, being sure that idle compensator valve is closed.

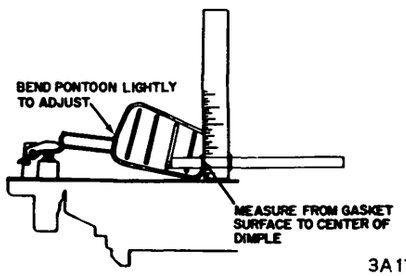
Buick, Buick Special, Chevrolet, Oldsmobile & Oldsmobile F-85 - If preliminary adjustment required to warm-up engine, set both idle mixture screws 1½ turns open from a lightly seated position. With engine at normal operating temperature (choke valve wide open and fast idle inoperative so that engine idles at hot or

(Continued)



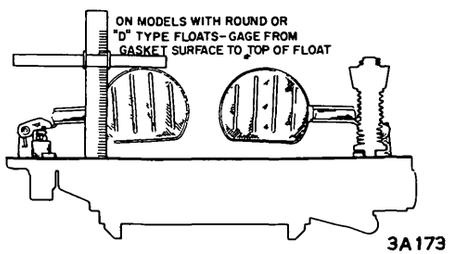
3A169

FLOAT LEVEL ADJUSTMENT (EXC. CHEV. 327" ENG.)



3A170

FLOAT "TOE" ADJUSTMENT (EXC. CHEV. 327" ENG.)



3A173

FLOAT LEVEL ADJUSTMENT (CHEV. 327" ENG.)

ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

slow idle speed) set throttle stopscrew for correct idle speed as indicated in "Specification Table" Adjust both primary idle mixture screws equally so that engine idles smoothly and RPM is at maximum (see special notes below)

BUICK NOTE - Turn each adjusting screw in until engine begins to lag or run unevenly from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough to provide smoothest operation Adjust both screws alike

CHEVROLET NOTE - Turn adjusting screw in to lean mixture until ngine is moderately rough (slight vacuum and RPM drop), then turn screw out ¼ turn to enrich mixture Adjust both screws alike

OLDSMOBILE NOTE - After adjusting idle mixture screws (above) for smoothest idle with highest RPM, turn each adjusting screw out ¼ turn (vacuum and RPM will drop slightly)

Cadillac & Pontiac Tempest (4-Cyl. Engine) - On Cadillac, disconnect parking brake vacuum diaphragm line at diaphragm then connect vacuum gauge to line On all cars, with engine at normal operating temperature, transmission in "N" (Neutral), choke valve fully open and carburetor on slow idle speed (throttle valves fully closed), connect a tachometer to engine On Cadillac, loosen front and rear throttle valve jam nuts at carburetor throttle lever trunnion On all cars place transmission in "D" (Drive), then adjust engine to correct idle speed as indicated in "Specification Table", using the idle air bypass screw (idle speed adjusting screw on throttle body) Turn one idle mixture screw until highest engine RPM and highest vacuum are obtained at the same time then repeat this operation with other idle mixture screw Check and reset engine idle speed Repeat idle mixture adjustment until turning the idle mixture screws will not increase engine speed and where the smoothest idle is produced *CAUTION - Idle mixture screws must be adjusted last and must always be readjusted when th idle speed screw setting is changed*

Anti-Stall Dashpot & Throttle Return Check

See "Throttle Linkage Adjustment" under CARBURETOR On car model pages

Float Level (Pri. & Sec.)

All Models (Exc. Chevrolet 327" Eng.) - *NOTE - Two adjustments ("heel" and "toe") required on each float as follows*

Float Heel - With air horn inverted and air horn gasket in place, check height of each float at "heel" (see illustration) Distance should be as indicated in specification table To adjust bend float at point shown in illustration

Float Toe - With air horn inverted and gasket in place, measure distance from gasket to center of dimple at float toe Distance should be as indicated in specification table To adjust, bend toe of float pontoon while holding float arm at point shown in illustration *NOTE - Always recheck "float heel" if toe adjustment is required*

CARBURETOR ADJUSTMENT SPECIFICATIONS

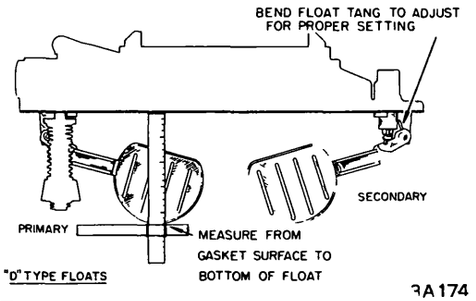
Rochester Carb. No.	Auto Choke Setting	Unloader Setting	Pump Rod Setting	Pump Rod Position	Idle Vent Setting	Choke Rod Setting	Initial Fast Idle Setting
7020023	Index	130"	1"	Outer Hole	29/32"	070"	
7020024	Index	130"	1"	Outer Hole	29/32"	070"	
7023006	Index	230"	1 1/16"	Outer Hole	31/32"	055"	
7023012	Index	230"	1 1/16"	Outer Hole	31/32"	055"	
7023030	1 Rich	130"	27/32"		(13)	040"	
7023031	1 Rich	130"	27/32"		(13)	040"	
7023040	Index	130"	1 1/64"	Center Hole		050"	035"
7023044	Index	130"	61/64"	Center Hole		045"	030"
7023045	Index	130"	61/64"	Center Hole		045"	030"
7023050	Index	120"	1"	Inner Hole	29/32"	050"	025"
7023051	Index	120"	1"	Inner Hole	29/32"	050"	025"
7023054	Index	190"	1"	Outer Hole	29/32"	050"	025"
7023055	Index	190"	1"	Outer Hole	29/32"	050"	025"
7023069	Index	150"	15/16"	(14)	27/32"	030"	030"
7023070	Index	150"	15/16"	(14)	27/32"	030"	030"
7023143	Index	130"	1 1/64"	Center Hole		050"	035"

(13) - With fast idle speed adjusted Place fast idle screw on high step of cam Vent valve should just be closed Bend tang on pump lever

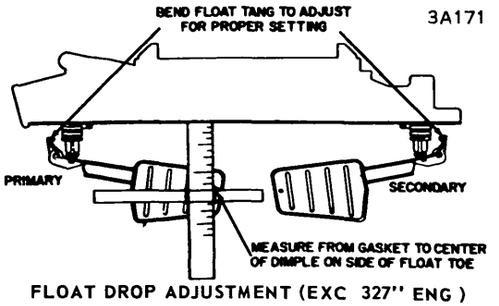
(14) - There are five holes in pump arm (Inner hole is No 1) Normal setting is with rod in No 3 (Center) hole Install in other holes to provide satisfactory performance Adjust idle vent after moving pump rod from one hole to the other

Chevrolet 327" Engine - Invert air horn (gasket in place) and measure distance from gasket surface to top of float (see illustration) Distance should be as indicated in specification table To adjust bend float arm at rear of float assembly

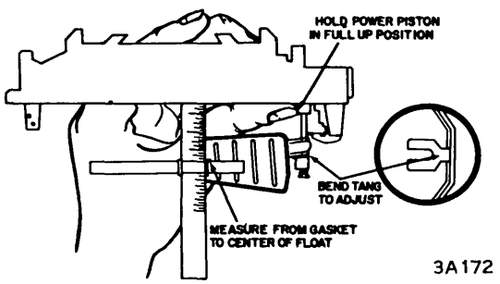
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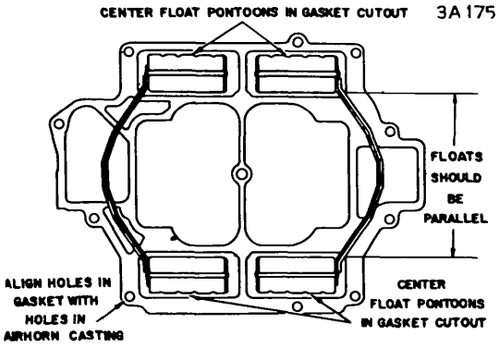
FLOAT DROP ADJUSTMENT (CHEV 327" ENG)



FLOAT DROP ADJUSTMENT (EXC 327" ENG)



VACUUM ASSIST SPRING ADJUSTMENT



FLOAT ALIGNMENT

ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

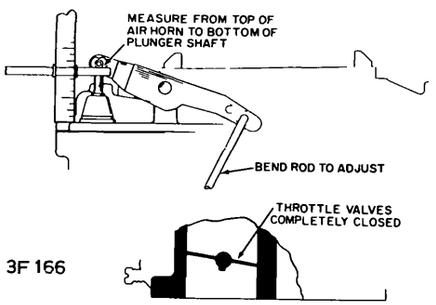
Float Drop (Pri. & Sec.)

All Models (Exc. Chevrolet 327" Eng.) -Hold air horn upright (power piston extended), then measure distance from gasket to center of dimple on toe of float (see illustration) Distance should be as indicated in specif ication table To adjust, bend tang at rear float hanger **Chevrolet 327" Engine** - Hold air horn upright and measure distance from gasket surface to bottom of float, with float hanging free Distance should be as indicated in specification table To adjust, bend float tang

Vacuum Assist Spring (Pri. Float)

NOTE - This adjustment required on Cadillac, Chevrolet (409" Engine) and Oldsmobile (Exc F-85) Not required on other carburetors

Hold air horn upright and level (see illustration), then hold power piston in full upward position Jounce pontoon slightly to make sure cup retainer on vacuum assist spring is not binding on upper power piston stem Measure distance from gasket to center of dimple at toe of float pontoon Distance should be 1 3/32" (Cadillac), 1 7/32" (Chevrolet 409" Eng), 1 1/16" (Oldsmobile, Exc F-85) To adjust, bend tang at center of float arms as indicated



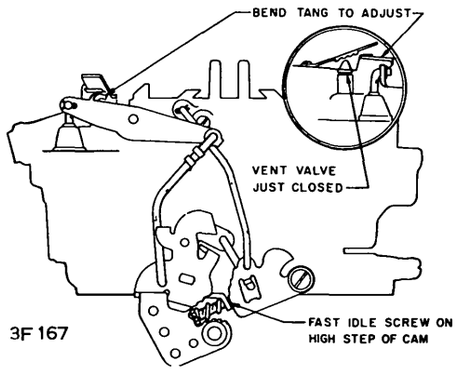
PUMP ROD ADJUSTMENT

Float Alignment

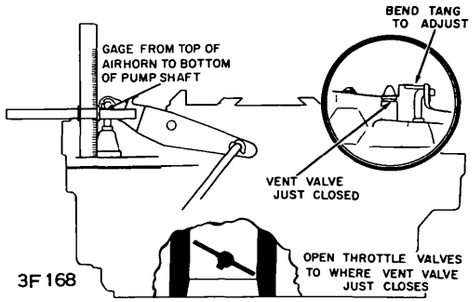
Align floats so they are parallel, then align screw holes in gasket with screw holes in air horn Make sure pontoons are centered in cut-out sections of gasket and that sides of pontoons are parallel with adjacent edges of gasket

Accelerating Pump

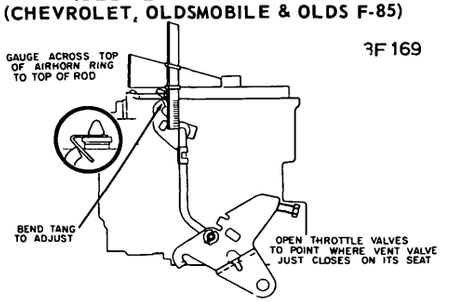
► *1963 BUICK SPECIAL HESITATION ON ACCELERATION CORRECTION: If accelerator .pump system is not defective, trouble may be due to incorrect pump stroke setting ("Pump Rod Position") which depends on average daytime temperature as follows Below 0°F (place rod in INNER hole), 0° to 60°F (place rod in CENTER hole), Above 60° (place rod in OUTER hole) For checking and adjusting, place rod in CENTER hole After adjustment is completed, replace rod in proper hole.*



IDLE VENT ADJUSTMENT (CADILLAC)



IDLE VENT ADJUSTMENT (CHEVROLET, OLDSMOBILE & OLDS F-85)

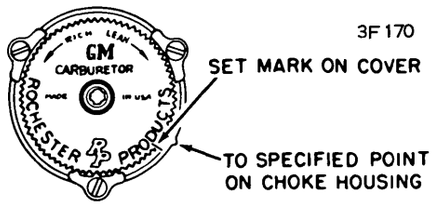


IDLE VENT ADJUSTMENT (PONTIAC TEMPEST)

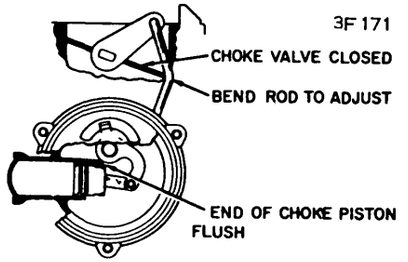
Back out slow idle speed and fast idle speed screws until throttle valves are completely closed Make sure pump rod is connected in proper hole of arm as indicated in "Specification Table" Hold throttle valves in closed position and use gauge or scale to check pump adjustment *NOTE - If a gauge is used, place it on top of air horn next to pump plunger* End of pump shaft should slide freely into hole in gauge marked "Pump" If a scale is used, measure distance from top of air horn casting to bottom of pump plunger shaft If height is not correct, adjust by bending pump rod

Atmospheric Idle Vent

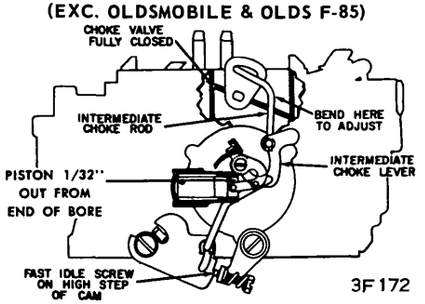
Cadillac - *NOTE - Make fast idle speed adjustment before adjusting idle vent* With fast idle screw on high step of fast idle cam, vent valve should just be closed



AUTOMATIC CHOKE ADJUSTMENT



INTERMEDIATE CHOKE ROD ADJUSTMENT (EXC. OLDSMOBILE & OLDS F-85)



INTERMEDIATE CHOKE ROD ADJUSTMENT (OLDSMOBILE & OLDS F-85)

To adjust, bend tang on pump lever

Chevrolet, Oldsmobile & Pontiac T mpest (All Mod ls) - *NOTE - Idle vent not used on Buick models* Open throttle valve to point where vent valve is just closed, then hold in this position Distance from top of air horn to bottom of pump plunger shaft (Exc Pontiac Tempest), to top of plunger shaft (Pontiac Tempest) should be as indicated in "Specification Table" To adjust, bend tang on pump lever

Automatic Choke

Loosen three retaining screws and rotate thermostat cover until index mark is in alignment with correct calibrated mark on housing as indicated in "Specification Table" Tighten cover retaining screws *NOTE - "Centered" point on housing is indicated by a raised section on housing casting*

Intermediate Choke Rod

NOTE - Intermediate choke rod connects lever on chok valve shaft to choke l ver on automatic choke housing

All Models (Exc. Oldsmobile & Olds F-85) - Hold choke valve completely closed and bend intermediate

(Continued)

ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

choke rod as necessary so choke piston is flush with end of choke piston bore or sleeve. *See illustration.*

Oldsmobile & Olds F-85 - With fast idle properly adjusted, place fast idle screw on high step of fast idle cam and raise intermediate choke lever to its full up position Make sure all lash is removed from rods in slots Choke piston should be flush with end of choke piston bore when choke valve is fully closed To adjust, bend intermediate choke rod as necessary to correctly position piston *See illustration.*

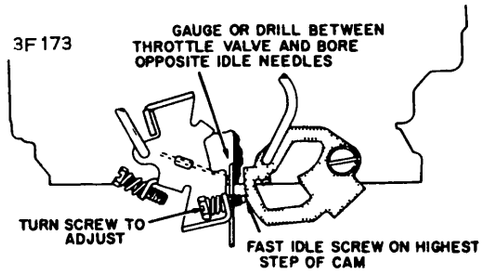
Fast Idle Setting

NOTE - Chevrolet fast idle setting will be correct when "slow idle" speed and choke rod adjustments have been made. On other models, the "On Engine" fast idle adjustment must be made after carburetor is installed to insure proper warm-up performance.

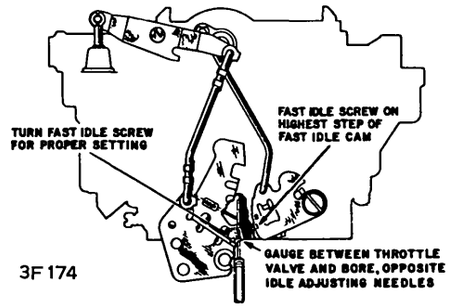
"Off Engine" Adjustment - Turn fast idle screw against high step of fast idle cam until throttle opening or clearance between edge of throttle valve and bore on side opposite idle mixture adjusting screws is correct as indicated in "Specification Table".

"On Engine" Adjustment - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of fast idle cam (Exc Buick & Buick Special); on low step of cam (Buick & Buick Special). Start engine and adjust fast idle speed for correct engine RPM as shown in "Specification Table"

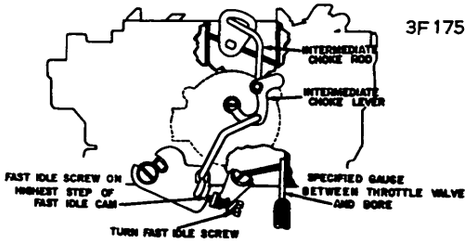
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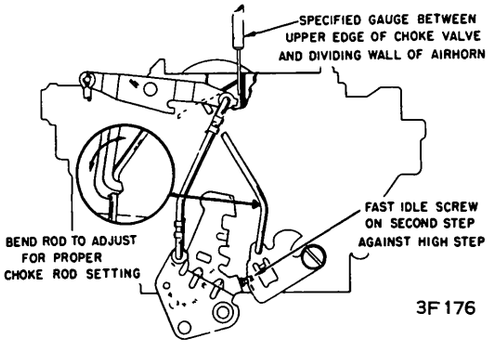
FAST IDLE ADJUSTMENT
(BUICK, BUICK SPECIAL & PONTIAC TEMPEST)



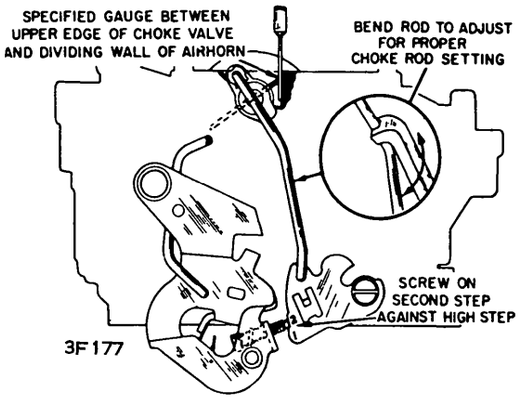
FAST IDLE ADJUSTMENT (CADILLAC)



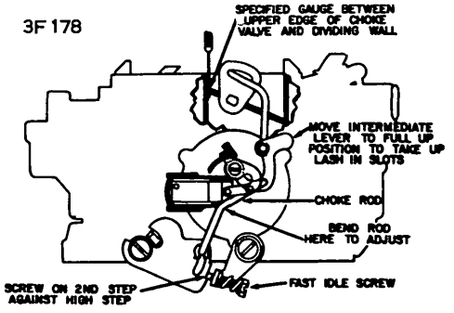
FAST IDLE ADJUSTMENT (OLDSMOBILE & OLDS F-85)



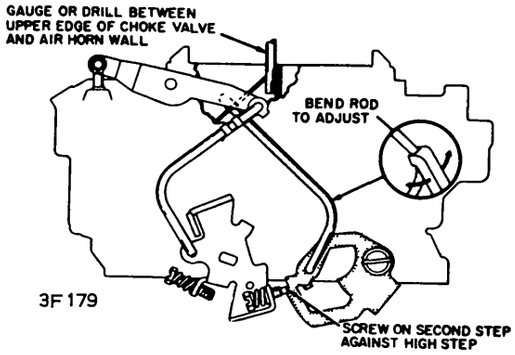
CHOKE ROD ADJUSTMENT (CADILLAC)



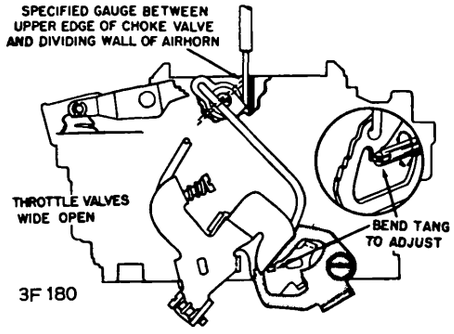
CHOKE ROD ADJUSTMENT (CHEVROLET)



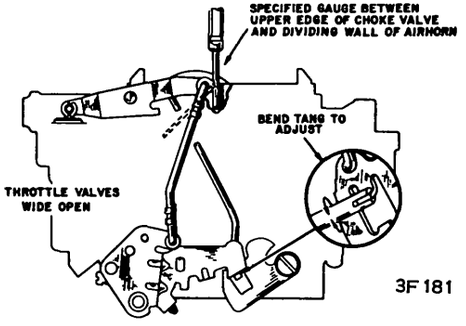
CHOKE ROD ADJUSTMENT (OLDSMOBILE & OLDS F-85)



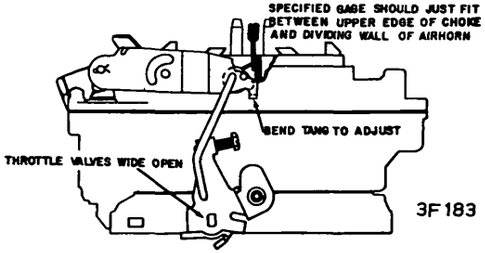
CHOKE ROD ADJUSTMENT
(BUICK, BUICK SPECIAL & PONTIAC TEMPEST)



UNLOADER ADJUSTMENT
(BUICK, BUICK SPECIAL & PONTIAC TEMPEST)



UNLOADER ADJUSTMENT (CADILLAC)



UNLOADER ADJUSTMENT (OLDSMOBILE & OLDS F-85)

ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

Choke Rod

NOTE - On all carburetors except Oldsmobile & Olds F-85, the choke rod connects choke valve shaft to fast idle cam. On Oldsmobile & Olds F-85 carbu- r tors, the rod connects intermediate choke lever to fast idle cam.

Rotate choke valve and fast idle cam until fast idle screw (slow idle screw on Chevrolet) is in contact with SECOND step of fast idle cam and against shoulder of highest step of fast idle cam. On Oldsmobile & Olds F-85, raise the intermediate choke lever to full up position making sure that intermediate rod and choke rod are at upper limit of travel in slots and that all lash is removed. On all models, bend choke rod to obtain specified clearance between choke valve and dividing wall of air horn (see "Specification Table").

Unloader

With throttle valves wide open, clearance betweer upper edge of choke valve and dividing wall of air horn should be as indicated in "Specification Table". To adjust, bend tang on fast idle cam. *See illus- tration.*

Secondary Throttle Lockout

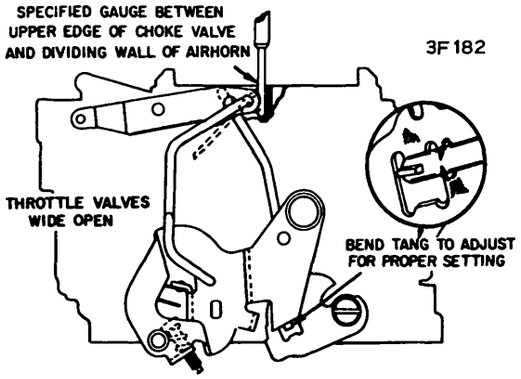
Close choke valve fully so that lockout lever tang is engaged in slot of fast idle cam. Measure clearance between side of lockout lever tang and edge of slot in cam *(see illustration).* Clearance should be .015" (all models). Adjust by bending tang on fast idle cam.

Secondary Throttle Contour

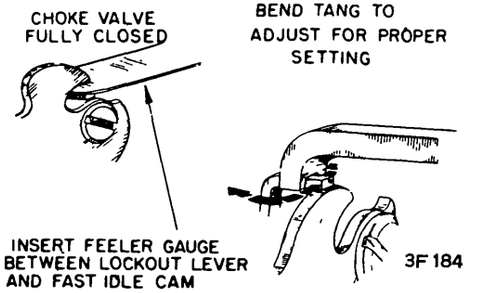
Open choke valve fully so that tang on lockout lever is positioned over contoured section of fast idle cam *(see illustration).* Measure clearance between tang edge of fast idle cam with a feeler gauge. If clearance is not .030" (Buick, Buick Special, Oldsmobile, Olds F-85 & Pontiac Tempest); .015" (Cadillac & Chev- rolet), adjust by bending tang up or down.

OVERHAUL

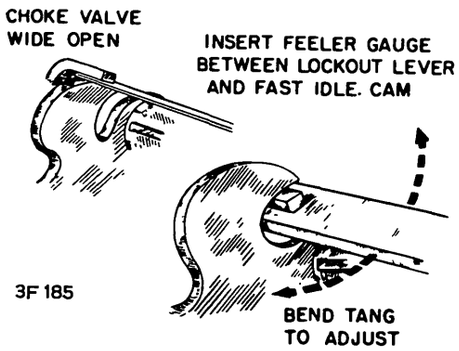
See 1958 Final Data, Page 279, or later Manual editions for complete overhaul procedure.



UNLOADER ADJUSTMENT (CHEVROLET)



SECONDARY LOCKOUT ADJUSTMENT



SECONDARY CONTOUR ADJUSTMENT

ROCHESTER 2G & 2GC 2-BARREL CARBURETORS

	Rochester No.
BUICK (EXC. SPECIAL)	
Auto Trans (Without Air Cond)	2GC 7023042
Auto Trans (Air Cond)	2GC 7023043
Synchro-mesh	2GC 7023041
BUICK SPECIAL	
V8 Auto Trans (Early)	2GC 7023046
V8 Auto Trans (Late)	2GC 7023142
V8 Synchro-mesh	2GC 7023047
V6 Auto Trans	2GC 7023048
V6 Synchro-mesh	2GC 7023049
CHECKER	
Superba & Marathon (Early)	2GC 7023096
Superba & Marathon (Late)	2GC 7023086
CHEVROLET PASS. CARS (283" ENG.)	
Synchro-mesh	2GC 7023007
Auto Trans (Without Air Cond)	2GC 7023008
Auto Trans (Air Cond)	2GC 7023018
CHEVROLET TRUCKS	
283 ' Eng (Std)	2G 7023010
283 ' Eng (Velocity Governor)	2G 7023009
327' Eng (Vacuum Governor)	2G 7020109
OLDSMOBILE (EXC. F-85)	
Series 88 (Without Air Cond)	2GC 7023052
Series 88 (Air Cond)	2GC 7023053
OLDSMOBILE F-85	
Auto Trans	2GC 7023056
Synchro-mesh	2GC 7023058
PONTIAC (389" ENG.)	
Std Eng Auto Trans (Without Air Cond)	2GC 7023060
Std Eng Auto Trans (Air Cond)	2GC 7023061
All Engs (Synchro-mesh)	2GC 7023066
Econ Eng Auto Trans (Without Air Cond)	2GC 7023063
Econ Eng Auto Trans (Air Cond)	2GC 7023064
PONTIAC TEMPEST (326" ENG.)	
Auto Trans	2GC 7023062
Synchro-mesh	2GC 7023071

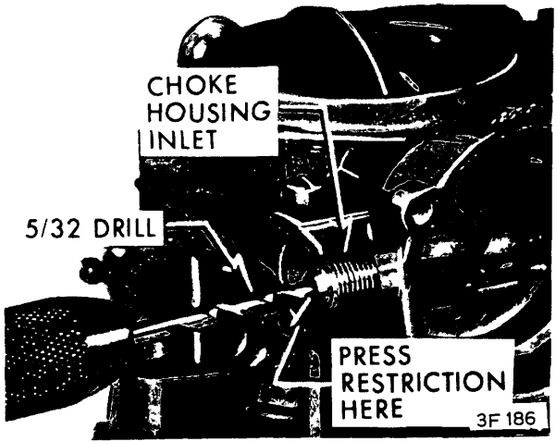
►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK SPECIAL V6 ENGINE FLAT SPOT DURING WARM-UP CORRECTION (CARBURETORS BEFORE CHANGE LETTER "A" OR "B" ON CODE TAG).* Modify carburetors as follows *NOTE - Ignore instructions found in package*

Automatic Transmissi n Cars - Install Flat Spot Package, Part No 1396331 as follows On carburetors before change letter "A" on code tag install new choke baffle which will hold choke on slightly longer On carburetors before change letter "B" on code tag, install new cluster assembly After installing the above parts, install the "B" code tag found in package If the exhaust manifold valve thermostat spring does not have a 1/8" "notch" in hook end, install the new type spring which will provide more heat to carburetor

Synchro-mesh Transmission Cars - Install Flat Spot Package, Part No 1396332 as follows· On carburetors before change letter "A" on code tag, install new cluster assembly, then install the "A" code tag from package If the exhaust manifold valve thermostat spring does not have a 1/8" "notch" in hook end, install the new type spring which will provide more heat to carburetor Increase accelerating pump stroke by bending pump rod as required to obtain a 7/8" setting

►*1963 BUICK SPECIAL V8 ENGINE WITH AUTO TRANS FLAT SPOT DURING WARM-UP CORRECTION (CARBURETOR NO 7023046)* Install Flat Spot Package, Part No 7026697 *NOTE - Ignore instructions found in package* Replace 046" main metering jets with 047" jets and replace venturi cluster assembly Remove and discard choke piston and link, and fast idle cam Drill through choke housing inlet into choke housing using a 5/32" drill Blow out all chips, then press in 078" restriction flush with casting Install the new choke piston and link from package, then install choke housing cover and set at INDEX Install air horn on carburetor and install new fast idle cam from package Adjust choke rod and fast idle cam (see "Choke Rod Adjustment" below) After installing all parts from package install new part number (7023142) code tag Adjust idle speed and mixture



DRILLING CHOKE HOUSING INLET

►*1963 PONTIAC TEMPEST (EARLY CARS) EXCESSIVE RICHNESS (LOADING) AFTER STARTING WARM ENGINE* On early automatic transmission cars excessive loading on restart after a short stop can be corrected as follows Remove choke coil cover and choke baffle then rotate fast idle cam so screw is on high step of cam Rotate choke piston lever counterclockwise as far as possible (choke should be fully closed) If choke piston is not extending out of cylinder 060- 080' bend choke intermediate rod as necessary to obtain this measurement

DESCRIPTION

2-Barrel downdraft types with manual choke (2G), automatic choke (2GC) Carburetor design is similar to previous carburetor models

ADJUSTMENT

Idle Speed & Mixture

IDLE SETTING CAUTIONS (CARS WITH IDLE COMPENSATOR) - Make sure that idle compensator is closed when adjusting idle speed If necessary, idle compensator valve can be held closed with a pencil. After idle speed is adjusted, press down on idle compensator valve to see if speed is affected If speed drops, readjust idle speed, being sure that idle compensator valve is closed

All Models - If preliminary adjustment required to warm engine, turn both idle mixture screws in until lightly seated then turn each screw out 1½ turns Operate engine until normal operating temperature is reached with choke valve wide open and fast idle inoperative Connect tachometer and vacuum gauge to engine, then adjust throttle stopscrew for correct engine idle speed (see "Specification Table") Adjust each idle mixture screw for smoothest idle performance with highest vacuum and engine RPM *See Special notes below*

CAUTION - On cars with Idle Compensator, make sure valve is closed when adjusting idle speed

CHEVROLET NOTE - Idle mixture adjustment can be made by leaning the mixture (turn screws in) for a moderately rough idle and slight vacuum and RPM loss, and then richening the mixture by turning screws out ¼ turn

OLDSMOBILE NOTE - After adjusting both idle mixture screws for highest manifold vacuum and engine RPM turn each screw out ¼ turn for slightly richer mixture Recheck idle mixture and idle speed after air cleaner installed

Carb-Airator Adjustment (Cars so Equipped) - *NOTE - Make sure Carb-Airator valve closes when engine is started after normal idle speed adjustment (70°F)* If in extreme hot temperatures (95° outside temperature) engine idle is rough and erratic or stalling occurs tighten the temperature screw (upper screw on Carb-Airator) one turn and road test *CAUTION - Do not upset normal idle and do not overtighten temperature screw* If engine idles too fast under extreme hot conditions tighten the air screw (lower screw on Carb-Airator)

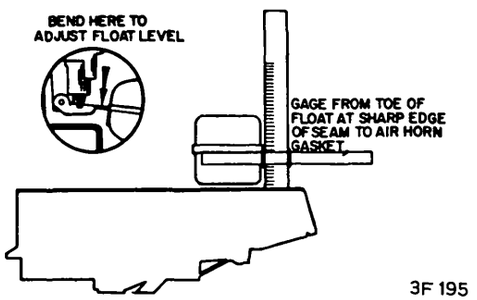
Throttle Linkage

See CARBURETOR on Car Model pages

Float Level

With air horn inverted and gasket in place, distance from air horn gasket to lower (sharp) edge of float seam at outer end should be as indicated in specifications To adjust bend float arm at rear

(Continued)

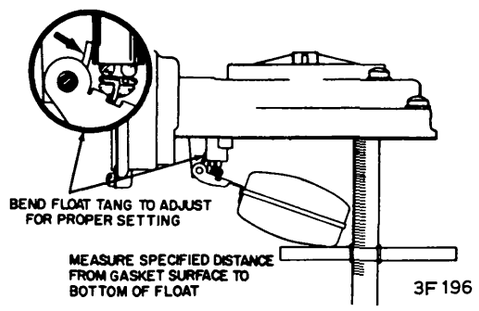


FLOAT LEVEL ADJUSTMENT

ROCHESTER 2G & 2GC 2-BARREL CARBURETORS (Cont.)

Float Drop

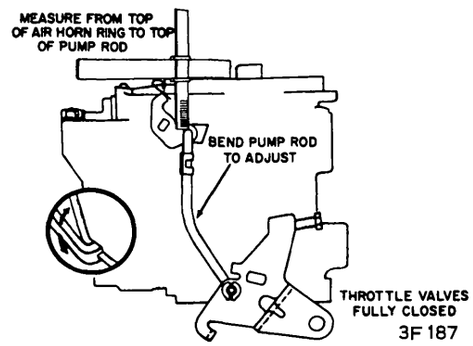
Hold air horn assembly upright (gasket in place) and measure distance from gasket to bottom of float pontoon (see illustration) Distance should be as indicated in specifications To adjust, bend tang on float



FLOAT DROP ADJUSTMENT

Accelerating Pump

NOTE - If there are two holes in pump shaft lever, place pump connector rod in OUTER hole (furthest from pump shaft) With throttle stopscrew (and fast idle screw is so equipped) backed out so that the throttle valves are completely closed, measure distance from top of air horn ring to top of connector rod, using a scale or combination gauge (see "Specification Table") To adjust, bend pump connector rod



ACCELERATING PUMP ADJUSTMENT

Idle Vent

NOTE - Idle vent is not used on all carburetor models
Adjust after accelerating pump rod has been adjusted Set "T" scale to proper dimension (see "Specification Table") and place scale in position shown in illustration Slowly open throttle valves to the point where rubber vent valve just closes on seat Lower edge of gauge leg should just touch top of pump rod To adjust, bend tang on pump lever

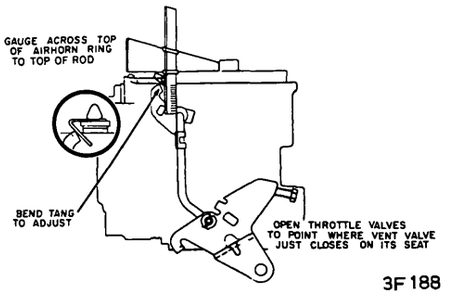
CARBURETOR ADJUSTMENT SPECIFICATIONS

Rochester Carb. No.	Hot Idle Speed (Eng. RPM) Synchro-mesh	Hot Idle Speed (Eng. RPM) Auto Trans.	Float Setting ① Level	Float Setting ① Drop	Choke Setting	Choke Rod Setting ①	Unloader Setting ①	Accl. Pump Rod Setting ①	Idle Vent ①
7020109	475	450②	3/4"	1 29/32'				1 1/8"	1"
7023007	450-500		3/4"	1 29/32"	Index	090"	360'	1 1/8"	1"
7023008		450-500②	3/4"	1 29/32'	1 Lean	090'	360'	1 1/8'	1"
7023009	475	450②	3/4"	1 29/32"				1 1/8"	
7023010	475	450②	3/4'	1 29/32'				1 1/8"	
7023018		450-500②	3/4'	1 29/32'	1 Lean	090'	360"	1 1/8'	1"
7023041	475		21/32'	1 29/32'	Index	095'	260"	1 7/16"	
7023042		475④	21/32'	1 29/32'	Index	095'	260'	1 7/16"	
7023043		475④⑤	21/32'	1 29/32'	Index	095	260"	1 7/16"	
7023046		500②③	21/32'	1 29/32'	Index	052"	157"	1 3/32"'	
7023047	500③		21/32'	1 29/32'	Index	052'	157"	1 3/32"'	
7023048		550②③	21/32'	1 29/32'	1 Rich	055'	175"	3/4"	
7023049	550③		21/32"	1 29/32'	Index	055'	175"	3/4"	
7023052	550	500②	13/32"	1 3/4'	1 Lean	150'	150'	1 7/16"	1 11/32'
7023053	550③	500②③	13/32'	1 3/4'	1 Lean	150"	150"	1 7/16'	1 11/32'
7023056	550	500②	25/32'	1 29/32'	Index	080"	260'	1 3/16'	
7023058	600⑥	600②⑥	25/32"	1 29/32"	Index	080"	260'	1 3/16"	
7023060		480-500②	5/8"	1 3/4'	Index	080"	160"	1 11/32'	1 9/32'
7023061		480-500②⑥	5/8'	1 3/4"	Index	080"	160"	1 11/32"	1 9/32
7023062		480-500②⑦	5/8'	1 3/4'	Index	055- 056'	160'	1 11/32'	1 9/32
7023063		480-500②	11/16'	1 3/4'	Index	055'	160'	1 1/8'	1 3/32"
7023064		480-500②⑥	11/16"	1 3/4'	Index	055"	160'	1 1/8'	1 3/32"
7023066	480-500		11/16'	1 3/4"	Index	055"	160"	1 1/8'	1 3/32"
7023071	480-500⑦		5/8"	1 3/4'	Index	080"	160"	1 11/32"	1 9/32'
7023086	375	425②	5/8"	1 29/32'	Index	050"	160"	1 11/32'	
7023096	375	425②	5/8'	1 29/32'	Index	050"	160"	1 11/32'	
7023142		500②③	21/32"	1 29/32"	Index	052"	157"	1 3/32"	

① - See procedure below
② - Auto Trans in 'D' (Drive)
③ - 550 RPM with air conditioner OFF
④ - Auto Trans in "N" (Neutral)
⑤ - 525 RPM with air conditioner OFF
⑥ - With air conditioner OFF
⑦ - 540-560 RPM with air conditioner OFF

Intermediate Choke Rod (Choke Piston)

NOTE - This adjustment is not required on carburetors having automatic choke housing attached directly to air horn assembly



IDLE VENT ADJUSTMENT

Buick (Exc. Special), Pontiac & Pontiac Temp st - With choke thermostat cover, coil assembly and inner baffle plate removed, hold choke valve completely closed and bend intermediate choke rod so that end of choke piston is 1/32" out of end of the choke piston bore (Buick), flush with end of choke piston bore (Pontiac & Pontiac Tempest)

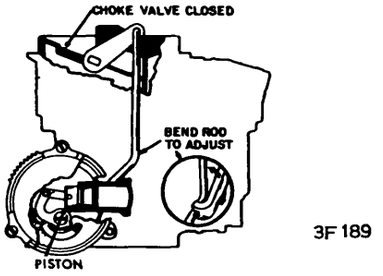
Oldsmobile (Exc. F-85) - *NOTE - There are three holes in upper choke lever Make the following adjustment with intermediate choke rod connected in CENTER hole See note below for "Tailoring" choke setting*
With choke thermostat cover, coil assembly and inner baffle removed, open throttle valve and hold choke valve completely closed by pushing up on intermediate choke lever Bend intermediate choke rod so the first "V" groove of piston is flush with end of choke piston bore

OLDSMOBILE (EXC F-85) CHOKE SETTING "TAILORING" FOR CLIMATIC & TEMPERATURE CONDITIONS - Moving intermediate chok rod to next OUTER

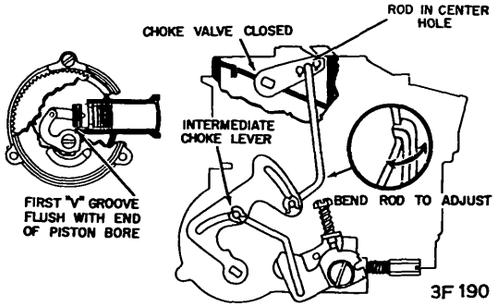
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ROCHESTER 2G & 2GC 2-BARREL CARBURETORS (C nt.)

hole (away from choke shaft) will provide richer mixture during warm-up for acceleration and load. Moving intermediate rod to next INNER hole will provide leaner mixture under same operating conditions.



INTERMEDIATE CHOKE ROD ADJUSTMENT (EXCEPT OLDSMOBILE)



INTERMEDIATE CHOKE ROD ADJUSTMENT (OLDSMOBILE, EXC. F-85)

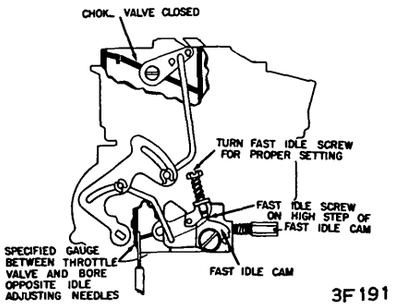
Automatic Choke (2GC Carbs.)

Loosen three retaining screws and rotate thermostat cover until index mark is in alignment with correct calibrated mark on housing as indicated in "Specification Table". Tighten cover retaining screws. *NOTE - "C ntered" point on housing is indicated by a raised section on housing casting.*

Fast Idl (2GC Carbs.)

NOTE - A separate fast idle adjustment is not required, except n cars indicated below, as fast idle speed is properly s t when hot (or slow) idle speed is adjusted (with ch k rod in proper adjustment).

Oldsm bile (Exc. F-85) - As a preliminary adjustment (with carburetor off engine), close choke valve and place fast idle screw on high step of fast idle cam. Adjust fast idle screw for a throttle valve opening of .030" measured between edge of valve and carburetor bore on side opposite idle mixture adjusting screws. Make final adjustment on engine as follows: Connect tachometer, place transmission selector l ver in "N" (Neutral) position, then rotate fast idle cam so fast

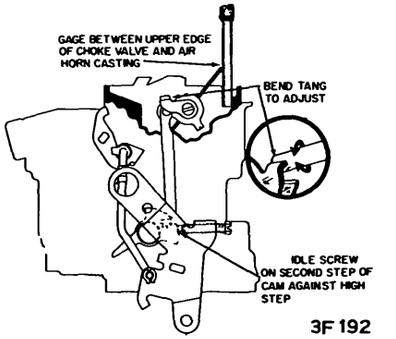


FAST IDLE ADJUSTMENT (OLDSMOBILE, EXC. F-85)

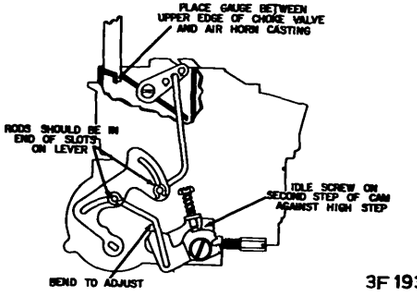
idle screw is on high step of cam. With engine at normal operating temperature, adjust fast idle screw to obtain an engine speed of 1900 RPM. *NOTE - For sub-zero operation, set fast idle speed to 2200 RPM.*

Choke Rod (2GC Carbs.)

All Models (Exc. Oldsmobile) - Turn idle speed screw to normal idle position (1½ turns), then place idle speed screw on second step of fast idle cam and against shoulder of high step. Distance between upper edge of choke valve and wall of air horn should be as indicated in "Specification Table". To adjust, bend counterweight tang.



CHOKE ROD ADJUSTMENT (EXCEPT OLDSMOBILE)



CHOKE ROD ADJUSTMENT (OLDSMOBILE, EXC. F-85)

Oldsm bil (Exc. F-85) - Place fast idle screw on second step of fast idle cam and against shoulder of high step. *NOTE - Make sure int rmediat ch k rod and choke rod are in the ends of slots in intermediate choke lever by pushing upward on lever.* Distance between upper edge of choke valve and wall of air horn should be as indicated in "Specification Table". To adjust, bend choke rod.

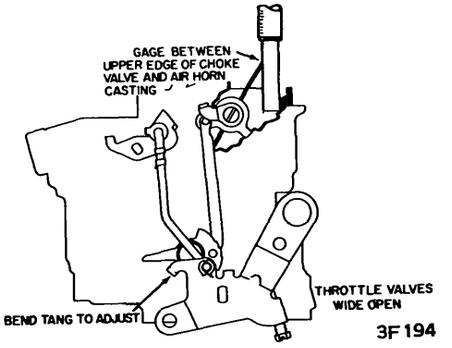
Unloader (2GC Carbs.)

With throttle valve held wide open, distance between upper edge of choke valve and wall of air horn should be as indicated in "Specification Table". To adjust bend tang on throttle lever.

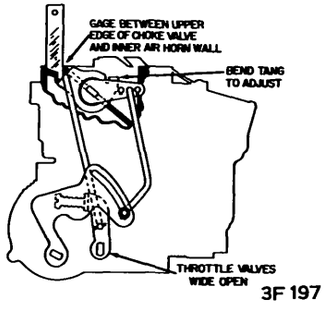
PONTIAC UNLOADER CHECKING NOTE - It is recommended that the throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in drivers seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. The above procedure will eliminate all variances in floor mat, linkage, or pedal location.

OVERHAUL

See 1960 Final Data, Page 301, or later Manual edition.



UNLOADER ADJUSTMENT (EXCEPT OLDSMOBILE)



UNLOADER ADJUSTMENT (OLDSMOBILE, EXC. F-85)

ROCHESTER B, BC, BV SINGLE BARREL CARBURETORS

	Rochester No.
CHEVY II	
6 Cyl. (Synchro-mesh)	BV 7023105
6 Cyl. (Auto. Trans.)	BV 7023108
CHEVROLET PASS. CARS	
6 Cyl. (Synchro-mesh) Std.	BV 7023003
6 Cyl. (Auto. Trans.) Std.	BV 7023000
6 Cyl. (Synchro-mesh) Economy	BV 7023005
6 Cyl. (Auto. Trans.) Economy	BV 7023004
CHEVROLET TRUCKS	
6 Cyl. 230" Eng. (Parcel Del.)	B 7023011
6 Cyl. 230" Eng. (Std.)	B 7023017
6 Cyl. 230" Eng. (Economy)	B 7023021
6 Cyl. 292" Eng. (Std.)	B 7023013
PONTIAC TEMPEST	
4 Cyl. (Synchro-mesh)	B 7023067
4 Cyl. (Auto. Trans.)	BC 7023068

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 (EARLY) CHEVROLET & CHEVY II SIX CYLINDER ENGINE PART THROTTLE SURGE CORRECTION: NOTE - Carburetors having a date code of "A-3C" ("A" indicates January; "3" indicates 1963; "C" indicates third change made in carburetor) or later have the following changes made in production.* Install main metering jet, Part No. 7002959 (Carb. No. 7002300); 7002660 (Carb. No. 7023003); 7002659 (Carb. No. 7023108); 7002660 (Carb. No. 7023105), to replace original jets.

FUEL STRAINER NOTE - Strainer screen (under fuel inlet fitting nut) can be removed for cleaning. Replace filter every 15,000 miles or sooner if needed.

DESCRIPTION

Single barrel downdraft types with manual choke (Model B); integral automatic choke (Model BC); separate automatic choke (Model BV). Carburetor design is similar to previous carburetor models. *NOTE - The Model B carburetor used on the Pontiac Tempest has an adjustable positive idle stop (eccentric washer)*

ADJUSTMENTS

Idle Mixture & Speed

If a preliminary setting is required to warm up engine, turn idle mixture screw in until lightly seated, then back screw out 1½ turns (Chev. Pass. & Pontiac Tempest); 2 turns (Chevy II); 1½-2½ turns (Chev. Truck). Start engine and allow to idle until normal operating temperature is reached, then adjust as follows:

Idl Mixtur - With engine at normal operating temperature and idling at correct speed (see "Specification Table"), turn idle mixtur adjusting screw in or out until smoothest engine performanc is obtained. Recheck idle speed.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Rochester Carb. No.	Hot Idle Speed (Eng. RPM)		Float Setting ①		Idle Vent ①	Vacuum Break ①	Ch k Rod ①	Unl ad r Setting ①	Aut . Ch k
	Synchro-mesh	Auto. Trans.	Level	Drop					
7023000	.....	450-500 ②	1 9/32"	1 3/4"	.050"	.160"	.060"	.350"	⑤
7023003	450-500	.....	1 9/32"	1 3/4"	.050"	.160"	.060"	.230"	⑤
7023004	.....	450-500 ②	1 9/32"	1 3/4"	.050"	.160"	.060"	.230"	⑤
7023005	450-500	.....	1 9/32"	1 3/4"	.050"	.160"	.060"	.230"	⑤
7023011	500	500 ②	1 9/32"	1 3/4"	.050"	.....	.....	.....	.....
7023013	500	500 ②	1 9/32"	1 3/4"	.050"	.....	.....	.....	.....
7023017	500	500 ②	1 9/32"	1 3/4"	.050"	.....	.....	.....	.....
7023021	500	500 ②	1 9/32"	1 3/4"	.050"	.....	.....	.....	.....
7023067	680-700 ③	.....	1 9/32"	1 3/4"	.....	.....			.....
7023068	.....	580-600 ②④	1 9/32"	1 3/4"	.....	.....	.080"	.160"	Index
7023105	500	.....	1 9/32"	1 3/4"	.050"	.160"	.060"	.350"	⑤
7023108	.....	500 ②	1 9/32"	1 3/4"	.050"	.160"	.060"	.350"	⑤

① - See procedure below.
② - Auto. Trans. in "D" (Drive).
③ - 680-700 RPM Air Conditioner OFF.
④ - 630-650 RPM Air Conditioner OFF.
⑤ - See "BV" automatic choke adjustment below.

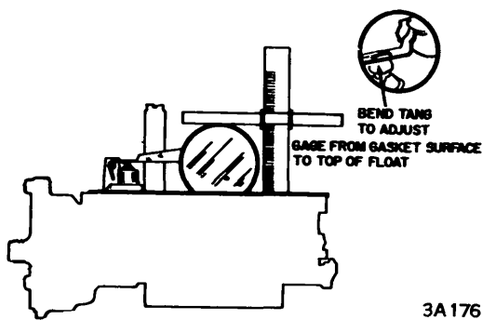
Idle Speed - With engine at normal operation temperature, adjust throttle stopscrew for correct idle speed (see "Specification Table"). *CAUTION - On "BC" & "BV" carburetors, stopscrew must be resting on lowest step of fast idle cam.*

Throttle Return Check

If carburetor is equipped with a throttle return check, see CARBURETOR on Car Model pages.

Float Level

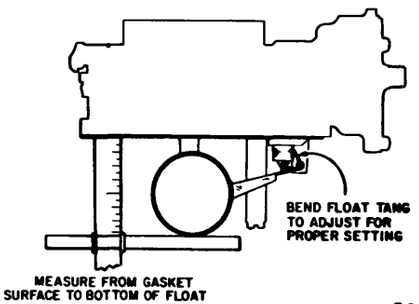
Invert air horn (gasket in place), and measure distance from air horn gasket to top of each float (see illustration). Distance should be as indicated in specifications. To adjust, bend float arm tang contacting inlet needle. *NOTE - Align floats so they are parallel and centered in air horn gasket cutout. Recheck float level if adjustment required.*



FLOAT LEVEL ADJUSTMENT

Float Drop

Hold air horn assembly upright with floats hanging free, then measure distance from surface of air horn gasket to bottom of float (see illustration). Distance should be as indicated in specifications.



FLOAT DROP ADJUSTMENT

Idle Stop Eccentric

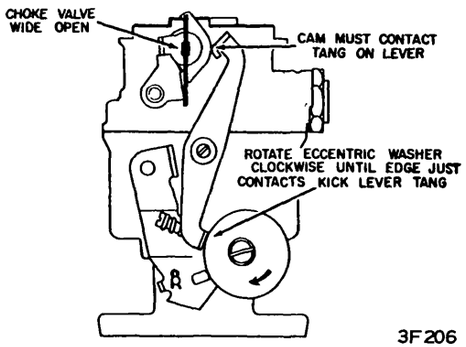
Pontiac Tempest (Manual Ch k Carb.) - *NOTE - It is not necessary to adjust the "Positive Idle Stop Eccentric" unless eccentric b com s loos or is r moved.* With choke valve wide open, rotate eccentric washer to a position where a clearance of .001-.006" is maintained between upper end of "kick-lever" and the "kick-cam". Secure eccentric washer in place with screw.

Fast Idle

"BC" & "BV" Carbs. - Fast idle speed is automatically set when hor or slow idle speed and choke rod are properly adjusted.

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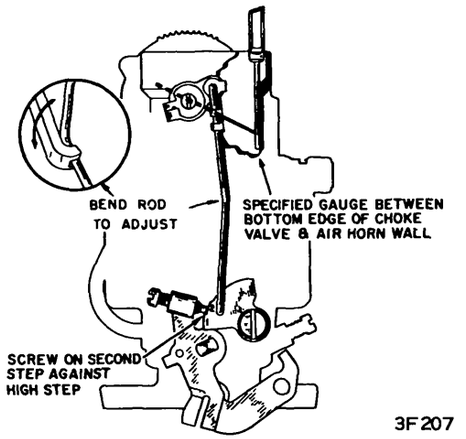
ROCHESTER B, BC, BV SINGLE BARREL CARBURETORS (C nt.)



IDLE STOP ECCENTRIC ADJUSTMENT

Chok Rod

"BC" & "BV" Carbs. - With idle screw on second step of fast idle cam and against highest step, bend choke rod as necessary to obtain proper clearance between lower edge of choke valve and wall of air horn. See specifications.



CHOKE ROD ADJUSTMENT

Unloader

"BC" & "BV" Carbs. - With throttle valve wide open, clearance between lower edge of choke valve and wall of air horn should be as indicated in "Specification Table". To adjust, bend unloader tang on throttle lever.

Idle Vent

All M d ls (Exc. P ntiac T mp st) - With idle speed properly adjusted and screw on low step of cam, idle vent valve should be open as specified (see specifications). To adjust, turn valve on top of air horn.

Vacuum Break

"BV" Carbs. - *NOTE - This adjustment not required on other carburetor models.* Push vacuum break diaphragm plunger in until seated, making sure that choke valve is closed so that connecting rod is at end of slot. Hold in this position and adjust rod so that clearance between lower edge of choke valve and wall of air horn is as indicated in specifications. Bend connector rod as indicated in illustration.

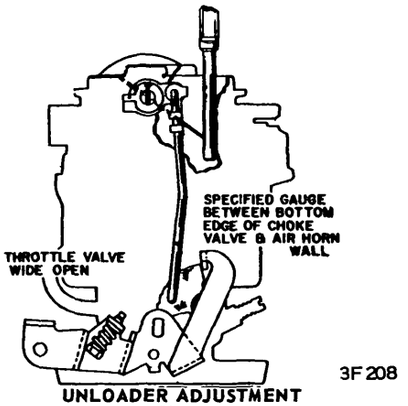
Automatic Choke

Integral Type ("BC" Carbs.) - Loosen three retaining screws and rotate thermostat cover until index mark is in alignment with correct calibrated mark on housing as indicated in "Specification Table". Tighten cover retaining screws. *NOTE - "Centered" point on housing is indicated by a raised section on housing casting.*

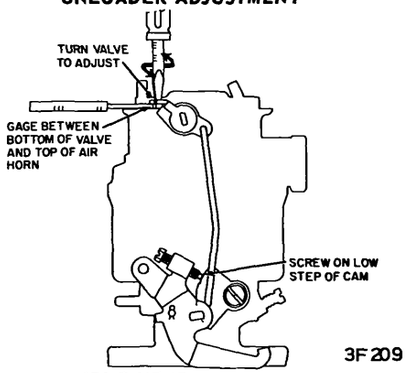
Separate Type ("BV" Carbs.) - With automatic choke rod disconnected from carburetor choke lever, hold choke valve closed and pull automatic choke rod up against stop in thermostat housing while checking and adjusting rod length as follows:

"Index" Setting - Bottom edge of automatic choke rod end should align with top edge of hole in the choke lever (equivalent to one rod diameter above hole).

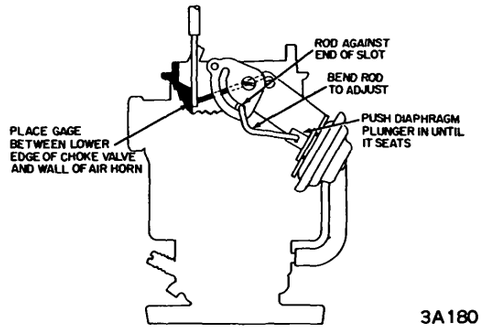
Leaner Setting - Bend automatic choke rod in area of offset to decrease rod effective length. At the maximum allowable lean setting, at least the upper quarter of rod end should overlap top edge of lever hole.



UNLOADER ADJUSTMENT

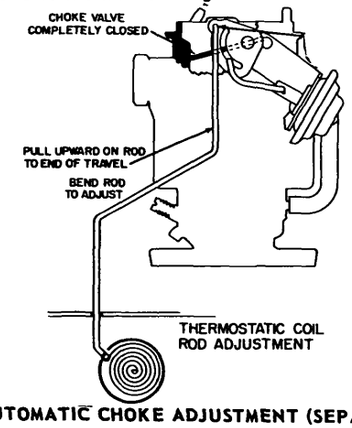


IDLE VENT ADJUSTMENT



VACUUM BREAK ADJUSTMENT

Richer Setting - To adjust for a choke setting equivalent to "2" notches rich, bend automatic choke rod in area of offset to increase rod effective length to bring rod end two diameters above hole in choke lever. *NOTE - After making any change in choke setting (rod length), check for free operation as interference may exist at manifold end of rod. If a lean adjustment is made, make sure that it is possible for choke valv to close at the new setting.*



AUTOMATIC CHOKE ADJUSTMENT (SEPARATE TYPE)

OVERHAUL

See 1961 Final Data, Page 261 and note the following:

Heat Suction Tube

If tightening of loose seal with Tool BT-45 does not correct leakage, install new seal as follows: With carburetor fully assembled, loosen throttle body-to-bowl casting screws, then insert flared end of heat suction tube into hole in throttle body and tap seal lightly into position with Tool BT-45. Rotate tube while tapping to insure starting uniformly into throttle body. Tighten coupling nut at upper end of tube finger tight, using new packing on tube. Use a light hammer and Tool BT-45 to spread seal securely in throttle body (rotate tool to secure uniform spreading of seal). Loosen coupling nut at upper end of tube and check tube tightness in throttle body (tube should not turn). Tighten coupling nut securely, then tighten throttle body-to-bowl casting screws. Check seal for leaks after carburetor is installed on engine.

ROCHESTER H SINGLE BARREL CORVAIR CARBURETOR

Car Model	Rochester No.
Corvair, All Models (Synchro-mesh)	7023101
Corvair, All Models (Auto. Trans.)	7023100
Corvair Pass. Cars (High Performance)	7023102

DESCRIPTION

Single barrel downdraft type with automatic choke, fast idle and unloader. The automatic choke assembly consists of a thermostatic coil assembly mounted to lower side of engine cylinder head and linked directly to carburetor choke valve shaft. A vacuum break diaphragm mounted on carburetor air horn replaces the conventional choke vacuum piston.

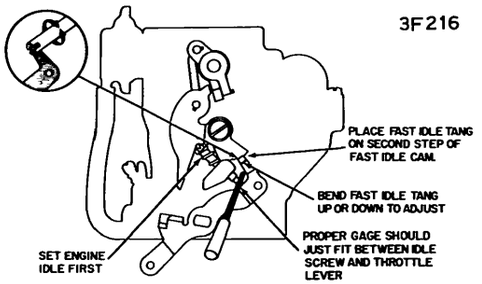
ADJUSTMENTS

Final Adjustment

Make all final adjustments with carburetor installed on engine.

Synchronization, Idle Speed & Mixture - *See CARBURETOR on Car Model pages for complete procedure.*

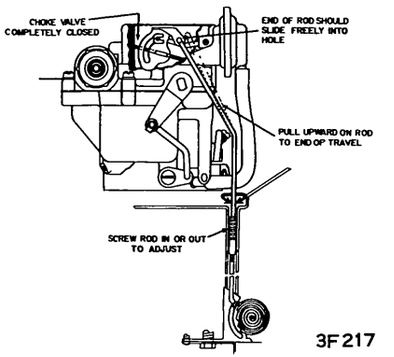
Fast Idle - *NOTE - Make this adjustment after final idle mixture and speed adjustment is completed.*



FAST IDLE ADJUSTMENT

Stop engine and place throttle lever on second highest step of fast idle cam. Bend tang on throttle lever to obtain .078" clearance between idle speed screw and throttle lever. Recheck idle speed.

Automatic Choke Rod Adjustment - Stop engine and disconnect automatic choke control rod at choke shaft lever. With choke valve held closed, pull control rod up against stop in thermostat bracket and adjust control rod until it freely enters hole in choke shaft lever, **then lengthen rod 2 full turns.** *CAUTION - Turn rod in vertical portion. Do not "crank" rod at offset part.* Check choke position after engine is at normal operating temperature. Choke valve should be open and fast idle cam clear of throttle lever.

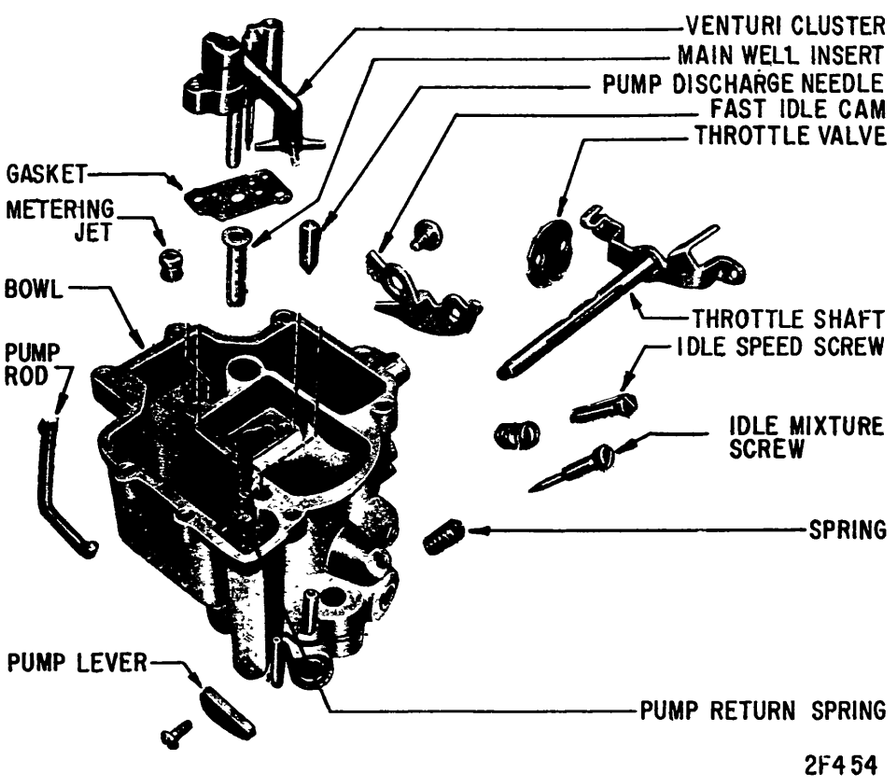


AUTOMATIC CHOKE ROD ADJUSTMENT

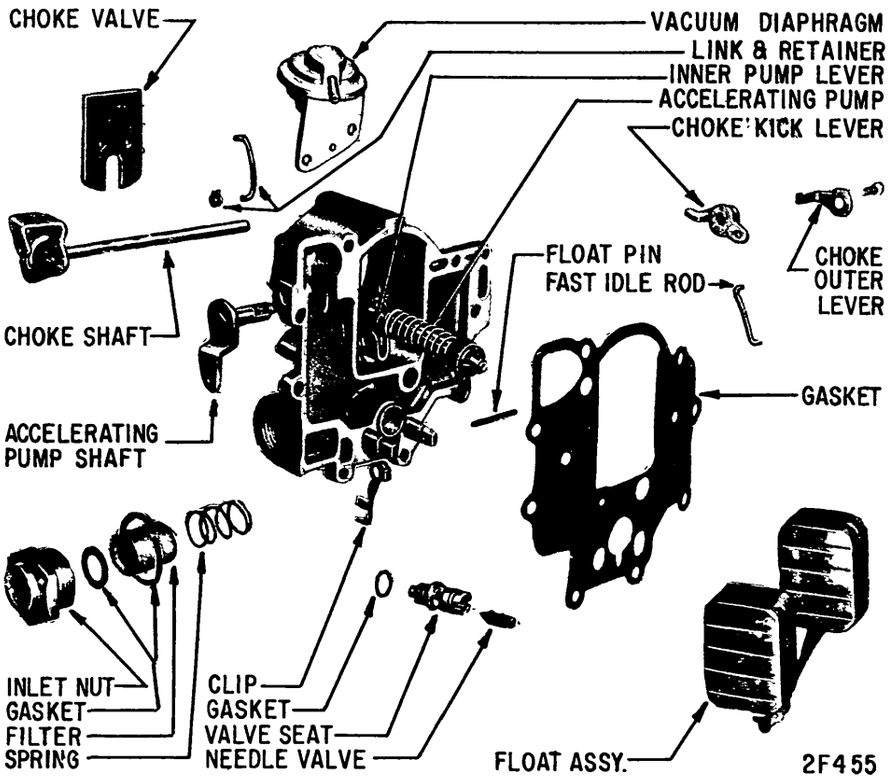
Initial Adjustment Carburetor Off Engin

Idle Speed - Back out idle speed screw, then open choke valve so throttle lever does not touch fast idle cam. Place a .003" feeler gauge between idle speed screw and throttle lever, then turn idle speed screw in until it just touches feeler gauge. Turn idle speed screw in an additional 1½ turns.

(Continu d)



ROCHESTER "H" CARBURETOR BOWL ASSEMBLY

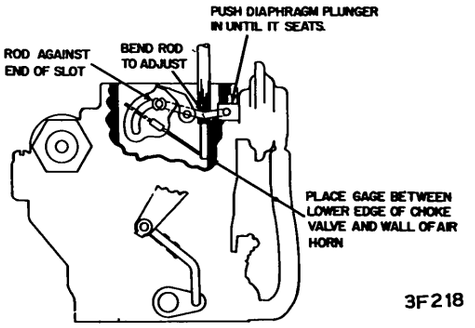


ROCHESTER "H" CARBURETOR COVER ASSEMBLY

ROCHESTER H SINGLE BARREL CORVAIR CARBURETOR (Cont.)

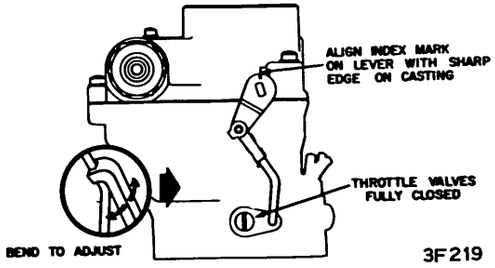
Idl Mixtur - Turn idle mixture screw out 1½ turns from a lightly seated position.

Vacuum Br ak Diaphragm - Hold diaphragm arm in against diaphragm and measure clearance between lower edge of choke valve and air horn wall. Clearance should be .160-.175". To adjust, bend diaphragm link. *NOTE - Throttle lever fast idle tang should rest on second st p f fast idle cam when making this adjustm nt. If n c ssary, bend outer choke shaft lev r tang.*



VACUUM BREAK DIAPHRAGM ADJUSTMENT

Pump Rod - Back out idle speed screw until throttle valve is completely closed, then bend pump rod as necessary to align ind x mark on upper pump lever with sharp edge on air horn casting. *NOTE - On cars with Powerglide (with two holes in lower pump lever), adjustment should be made with rod in outer hole. After adjustment is completed, move rod to inner hole f l ver for proper operation.*

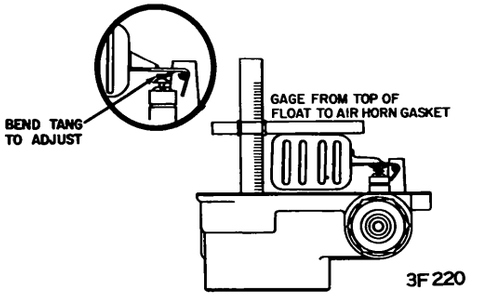


PUMP ROD ADJUSTMENT

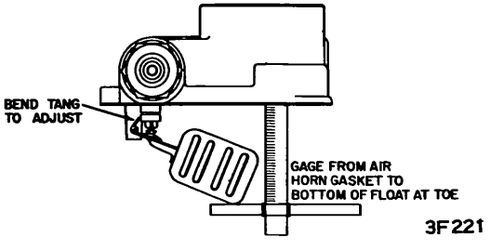
Fl at L vel - 1 13/64" (Gauge BT-174) between air horn gasket and top surface of float with air horn inverted. Floats must be parallel with air horn. To adjust, bend tang at rear of floats.

Float Drop - With air horn assembly held upright and floats hanging free, distance from gasket to bottom of float at lowest point should be 1¾" (Gauge BT-174). To adjust, bend tang at end of float hinge arm.

Choke Rod - With fast idle tang on second step of cam next to highest step, close choke valve so trip lever on choke shaft just contacts choke tang on plastic lever and collar assembly. Clearance between lower edge of choke valve and inner wall of air horn should should be .161" (BT-194). Bend Tang on trip lever.



FLOAT LEVEL ADJUSTMENT



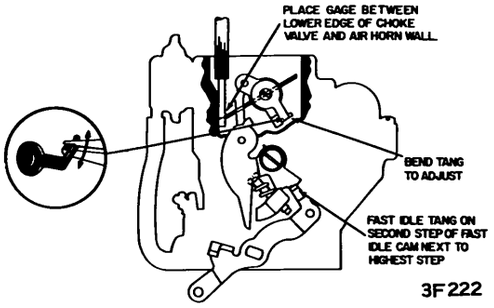
FLOAT DROP ADJUSTMENT

Unloader - Hold throttle valve wide open (accelerator pedal depressed to floor) and measure clearance between lower edge of choke valve and inner wall of air horn. Clearance should be .250". To adjust, bend unloader tang on throttle lever.

OVERHAUL

Disassembly

Disconnect accelerating pump rod from accelerating pump lever, then remove fuel filter element and spring. Remove choke trip lever attaching screw and levers from choke shaft. Remove vacuum diaphragm assembly by rotating the assembly to align notch and free it from

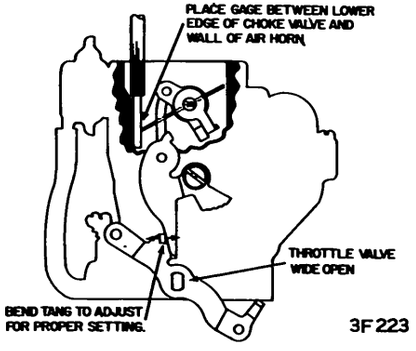


CHOKE ROD ADJUSTMENT

link. Remove float assembly and float needle, seat and gasket. Remove clip from accelerator pump and remove pump, then remove clip, shaft and lever. Remove screws from venturi cluster and lift out cluster, gasket and main well insert. Remove pump discharge valve, idle mixture adjusting needle and main metering jet.

Reassembly

Install the throttle shaft and valve, then carefully centering and seating valve in shaft end bore. Tighten screws securely. Install venturi cluster and gasket and install screws and lockwashers. Install accelerator pump assembly and pump return spring, then install pump discharge needle. Install choke valve, choke kick lever and outer lever cam. Tighten choke valve screws securely. Make sure choke shaft assembly rotates freely without binding. Install float needle valve seat and needle valve, then install a new air horn gasket and install float assembly. Adjust float level and float drop (see above), then install air horn assembly on bowl and install screws and lockwashers in their original positions. Replace filter return spring, filter gasket, gasket and inlet nut. Install pump rod.



UNLOADER ADJUSTMENT

ROCHESTER TRIPLE CARBURETORS

PONTIAC (389" ENG.) Synchro-mesh Cars	Rochester Carb. No.
Front	7013063
Center	7023075
Rear	7013065
Automatic Transmission Cars	
Front	7013063
Center (3-Spd. Roto Hydra-Matic)	7023073
Center (4-Spd. Super Hydra-Matic)	7023077
Rear	7013065

PONTIAC (421" ENG.) Synchro-mesh Cars	Rochester Carb. No.
Front	7023078
Center	7023161
Rear	7023079
Automatic Transmission Cars	
Front	7023078
Center	7023162
Rear	7023079

DESCRIPTION

Two-barrel downdraft types of same design as previous carburetor models. The center carburetor contains all conventional systems. Front and rear carburetors contain only the float, pump, and main metering systems.

ADJUSTMENT

Idle Speed & Mixture

Center Carb. Only - *NOTE - Front and rear carburetor throttle valves must be completely closed.* With engine at normal operating temperature, choke valve fully open and fast idle inoperative, place automatic transmission in "D" (Drive). Adjust idle speed to correct engine RPM (see specifications), then turn one idle mixture screw to obtain highest vacuum and engine speed. Repeat adjustment with other idle mixture screw. Readjust engine idle speed to specification, then readjust idle mixture screws to obtain highest vacuum and engine speed with smoothest engine operation. Adjust idle speed, if necessary.

IDLE SPEED ADJUSTMENT NOTE (Carburetors with Idle Compensator): This valve must be closed when idle speed is adjusted. Press in on button located in idle compensator cover plate to hold valve closed during idle speed adjustment.

Float Level

Invert float bowl cover and measure distance between cover gasket and sharp edge of float seam (at free end of float). If measurement is not within limits (see specifications), adjust by bending float arm near hinge

Float Drop

Hold bowl cover upright with float hanging down at bottom of travel. Distance from lower face of cover gasket to bottom of float at free end should be within specifications. To adjust, bend float tang on rear of float arm.

Accelerating Pump

NOTE - This is a linkag adjustment and not a seasonal setting, and is required n all three carburetors.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carburetor	Idle Speed② (Eng.RPM)	Initial Idle Mix. Screw④	Float Level ①	Float Drop ①	Choke Setting	Choke Rod①	Accel. Pump ①	Idl Vent	Vacuum Switch①	Unl ad r①
Center	③	1½	23/32"⑤	1¾"Min.	Index	.056"	1 1/8"⑥	1 1/32"⑦	1 3/32"	.143-.183"
Front & Rear	.....	.....	23/32"⑤	1¾"Min.	.....	.....	55/64"⑥	.....	.....	.....

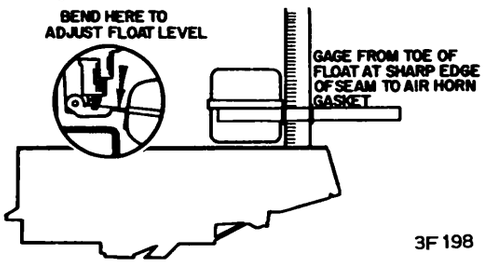
① - See procedure below.
② - Auto. Trans. in "D" (Drive).
④ - Turns open from a lightly seated position.
⑤ - ± 1/16". ⑥ - ± 1/32". ⑦ - ± 1/64"

③- **389" Engine** - 480-500 RPM (Auto. Trans. in "D" range). 540-560 RPM (Air Conditioned Cars with Air Cond. OFF).
421" Engine - 640-660 RPM (Auto. Trans. in "D" range). 690-710 RPM (Air Conditioned Cars, with Air Cond. OFF).

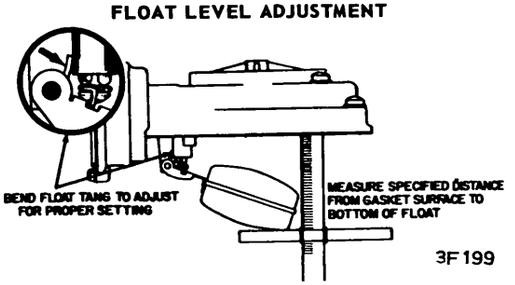
With throttle valves completely closed (back off throttle stopscrew on center carburetor), measure distance from top of air horn to top of pump connector rod. If not within specifications, adjust by bending pump connector rod.

Idle Vent

Center Carb. Only - *NOTE - Make this adjustment after accelerating pump rod has been adjusted.* Slowly open throttle valves to point where idle vent just closes, then hold throttle in this position and measure distance between top of air horn and top of pump rod. If measurement is not within specifications, bend vent valve actuating tang on pump lever up or down as necessary.



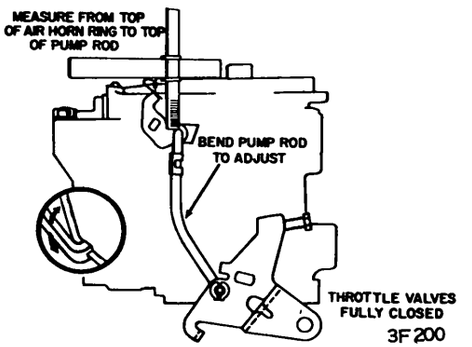
FLOAT LEVEL ADJUSTMENT



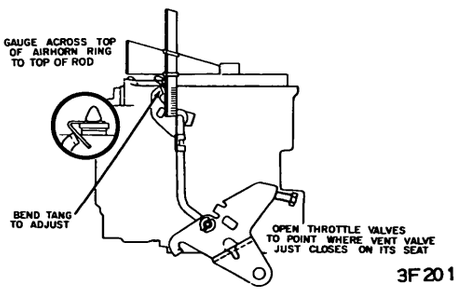
FLOAT DROP ADJUSTMENT

Vacuum Switch

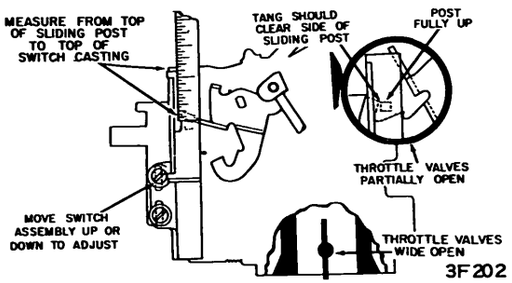
With throttle valves wide open, measure distance between top of switch housing to top of sliding switch post. If not within specifications, loosen two switch retaining screws holding switch on bracket, then move switch up or down as necessary. Check adjustment by opening and closing throttle valves with sliding switch post in upward position. Inside edge of vacuum switch closing tang must clear side of switch post. *(C ntinued)*



PUMP ROD ADJUSTMENT



IDLE VENT VALVE ADJUSTMENT



VACUUM SWITCH ADJUSTMENT

ROCHESTER TRIPLE CARBURETORS (C ntinu d)

Automatic Choke

C nt r Carb. Only - Adjust by loosening choke cover retaining screws and rotating thermostatic coil assembly to correct mark (see specifications). *NOTE - With this setting, choke valve should be lightly closed at 75°F.*

Fast Idle

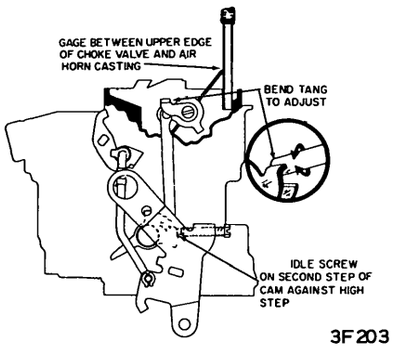
Fast idle speed will be correct after "Slow Idle" speed and choke rod adjustments have been completed.

Choke Rod

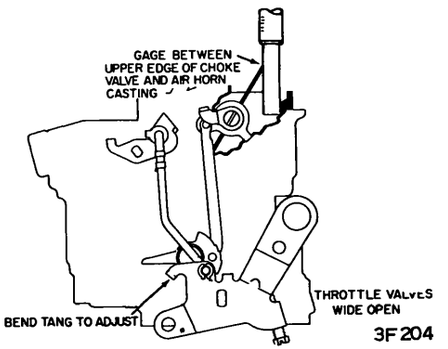
C nt r Carb. Only - Place idle speed screw on second step of fast idle cam next to high step. With choke trip lever in contact with choke counterweight lever, clearance between upper edge of choke valve and air horn wall should be as indicated in specifications. To adjust, bend tang on choke counterweight lever.

Unl ader

With throttle valves held wide open, clearance between upper edge of choke valve and air horn wall should be as indicated in specifications. To adjust, bend tang on throttle lever to provide proper clearance.
NOTE - For unloader adjustment, it is recommended that throttle valves be opened by depressing accelerator pedal to floor by someone in drivers seat to simulate actual driving conditions.



CHOKE ROD ADJUSTMENT



UNLOADER ADJUSTMENT

Throttle Actuating R d

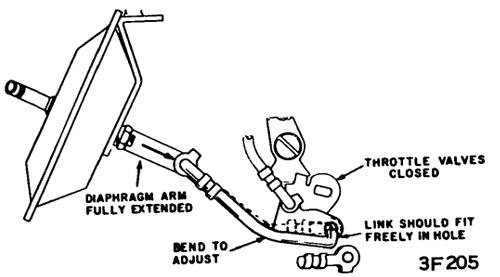
Fr nt-t -R ar Carbs. - Disconnect throttle rod at rear carburetor throttle lever. With front and rear carburetor throttle valves completely closed, throttle rod should center in slot in throttle lever. Adjust by bending rod at existing bend, then connect rod.

Vacuum Diaphragm Link

With throttle valves closed and arm on vacuum diaphragm in fully extended position, bend vacuum unit actuating link so that it just fits into hole in throttle lever.

OVERHAUL

See 1960 Final Data, Page 301, or later Manual edition for overhaul procedures.



VACUUM DIAPHRAGM LINK ADJUSTMENT

ROCHESTER FUEL INJECTION

C rvett (1963)

DESCRIPTION

Fuel injection system design is similar to previous models except for the following changes.

Intak Manifold - Two-piece design without internal bulkheads.

Air Met r - A new warm air choke system similar to design of conventional carburetor choke systems.

Throttl Shaft - Horizontal shaft replaces former vertical shaft assembly. Related throttle linkage is new.

ADJUSTMENT (ON ENGINE)

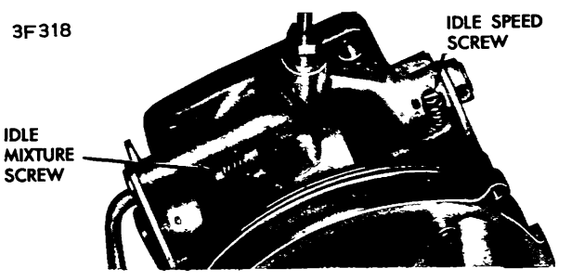
►*ADJUSTMENT NOTE: All "On Engine" adjustments must be mad with engine at normal operating temperature.*

Idle Speed & Mixtur

With idle mixture screw turned 1½ turns out from a fully closed position (initial setting), start engine and adjust idle speed screw to obtain an engine speed of 800-850 RPM. Adjust idle mixture screw to obtain best engine idle characteristics, then readjust engine idle speed to 800-850 RPM if necessary.

Fast Idle Speed

2200 RPM (engine hot). *NOTE - Before adjusting fast idle speed, check to make sure there is clearance between fast idle screw and edge of fast idle cam when cam is in "off" position. If necessary, bend connecting rod to provide a small amount of clearance (see illustration).* With engine off, crack throttle valve and manually position cold enrichment valve to its closed position. Release throttle valve, allowing fast idle screw to be positioned on fast idle cam, then release cold enrichment valve and start engine. Adjust fast idle screw to obtain 2200 RPM (engine hot).



IDLE SPEED & MIXTURE SCREWS

Cold Enrichment (Choke)

3 Notches Lean. Loosen retaining screws and rotate thermostatic coil spring cover on housing.

(Continued)



FAST IDLE SPEED ADJUSTMENT

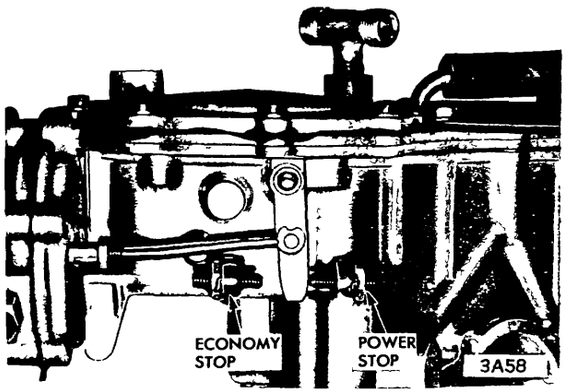
ROCHESTER FUEL INJECTION (Continued)

Ratio Lever Stops

Manometer Installation - Install Tool J-7090 in same manner as for 1962 models. *See 1962 Final Data, Page 274.*

Economy Stop - .08"Hg.±.1" Hg. With engine at normal operating temperature, Tool J-7090 installed, check to see that unit is operating on economy stop. ***NOTE - If engine will not start with cranking signal valve line disconnected, reconnect line during initial starting procedure.*** Increase engine speed until a reading of 0.5" is obtained in water manometer, then hold engine at this speed (use fast idle screw and cam). Record reading on mercury manometer, then return engine to a lower speed and repeat the above procedure. Take three readings, the average of which should be within specifications (see above). To adjust, rotate "Economy Stop" setscrew on Fuel Meter (see illustration) as necessary to obtain correct reading.

Power Stop - 1.2" Hg. ± .1" Hg. With manometer connected as for "Economy Stop" (above), disconnect and plug vacuum line going to enrichment diaphragm (this will cause unit to operate on "Power Stop" only). ***NOTE - Prolonged operation on "Power Stop" will cause spark plug fouling.*** Take three mercury manometer readings in same manner as for "Economy Stop" (above). Average of the three readings should be within specifications. To adjust, rotate "Power Stop" setscrew on Fuel Meter (see illustration) as necessary to obtain correct reading.



ECONOMY & POWER STOPS

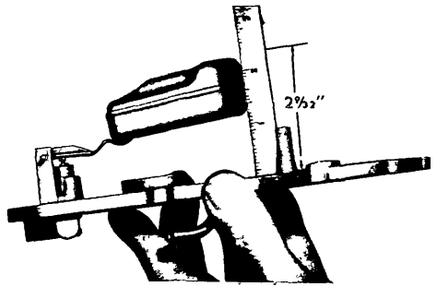
ADJUSTMENT (OFF ENGINE)

Float Level

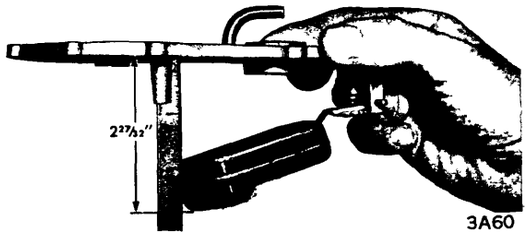
2 9/32" with Fuel Meter cover inverted (see illustration). To adjust, bend float arm.

Float Drop

2 27/32" with Fuel Meter cover held upright and float assembly hanging free (see illustration). To adjust, bend tang on float arm.



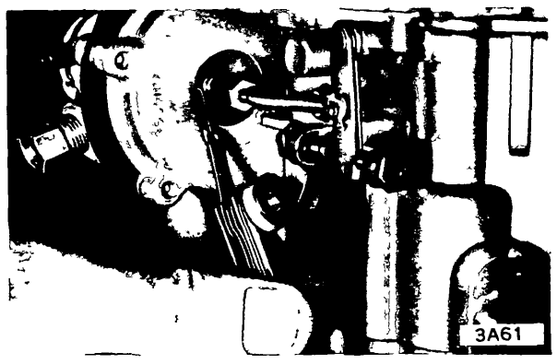
FLOAT LEVEL ADJUSTMENT



FLOAT DROP ADJUSTMENT

Enrichment Diaphragm

.040" minimum clearance between diaphragm and diaphragm housing (see illustration). To adjust, change rod length as necessary. *CAUTION - Hold shaft securely while loosening locknut.*



ENRICHMENT DIAPHRAGM CLEARANCE

TROUBLE SHOOTING & DIAGNOSIS

Fails To Start

No fuel in fuel meter (check fuel supply and engine fuel pump). No fuel at nozzles (check for broken fuel meter pump drive cable). No vacuum signal at main control diaphragm (check for leaking or ruptured main control diaphragm, defective cranking signal valve, or broken main control diaphragm linkage).

Difficult Starting

Improper cold starting procedure (check fast idle cam setting and operation; check for choke valve stuck open) Improper hot starting or unloading procedure (use wide open throttle when starting; check for defective cranking signal valve or cold enrichment housing; check for vacuum leaks at main control diaphragm or signal line).

No Idle

NOTE - High speed operation not affected - Idle adjusting screws out of phase *(see "Adjustments" above).* Idle speed too low and (or) distributor advance incorrect (adjust idle speed, check distributor, check air meter throttle valve clearance). Idle fuel screw turned all the way out (check for dirty air meter passages, vacuum or air leaks, or defective main diaphragm). Idle fuel screw turned all the way in (check vent tubes and nozzles for plugged condition, check nozzle-to-insulator gaskets for defects). No idle boost signal (check for defective cranking signal valve; check for plugged main control diaphragm vent tube, check for sticking spill plunger, check for main diaphragm shrinkage).

Rough Idle

NOTE - High speed operation not affected - Idle adjusting screws out of phase *(see "Adjustments" above).* Excessive fuel at idle (purge system by accelerating a few times to clear manifold, check for defective cranking signal valve, check for plugged nozzles and nozzle vent tubes, check main diaphragm vent tube for obstruction, check engine valve lash setting).

Erratic Idle Speed

NOTE - High speed operation not affected - Engine idle speed fails to return to same speed each time throttle is operated (check for sticking throttle valve shaft at air meter bushings or for linkage binding, check for sticking spill plunger or choke valve).

Poor Acceleration

NOTE - Idle and wide open throttle operation not affected - Unit will take throttle when applied slowly (check for defective fuel meter pump drive cable or pump drive shaft, check for dirty signal tube, check for interference between enrichment housing and diaphragm, check for improper "Power Stop" setting, check for sticking spill plunger).

Poor Performance

Hesitation or flat spot (check for defective main control diaphragm or vacuum leaks, faulty spill plunger operation; check for incorrect "Economy Stop" setting). Surging at steady engine speed (check for plugged nozzles or nozzle vent tubes; check for incorrect "Economy Stop" setting; check for faulty integral siphon breaker operation; check for plugged main control diaphragm vent tube). Wide open throttle engine missing (check fuel meter pump drive cable and drive shaft for out of square condition; check engine fuel pump; check for dirty air cleaner or fuel filter; check for defective spark plugs). Excessive fuel consumption (check for defective cranking signal valve or cold enrichment housing valve sticking; check for open electric choke coil; check for fuel leakage or faulty integral siphon breaker operation; check for fouled plugs).

OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM

Olds F-85 J tfir (1963)

DESCRIPTION

Carburetor and fluid injection system is same design as used on previous models. *See 1962 Final Data, Pag 282.*

ADJUSTMENT

NOTE - Adjustments are not required on turbo-charger or fluid inj ction systems.

Throttle Linkage & Return Check

Se CARBURETOR on Car Model page.

Idle Sp ed & Mixture

Idl Mixtur - For initial adjustment, turn idle mixture screw out approximately 1½ turns from a lightly seated position. After engine is brought to normal operating temperature, adjust idle mixture screw for highest manifold vacuum and engine RPM, then turn screw out ¼ turn for a slightly richer mixture.

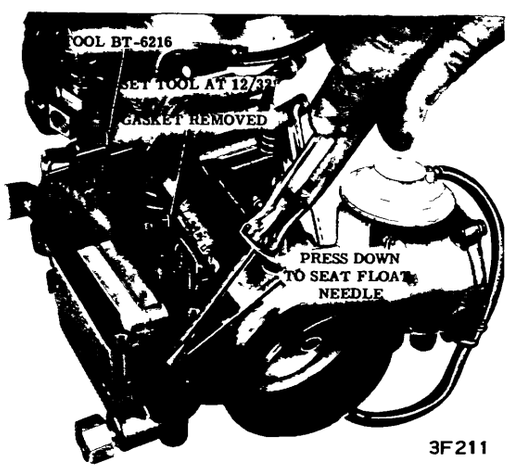
Idl Sp d - 600 RPM (Air Conditioner OFF). Automatic transmission in "D" (Drive).

Fast Idl - Aut . Trans. - 1500 RPM with fast idle screw on second step of fast idle cam.

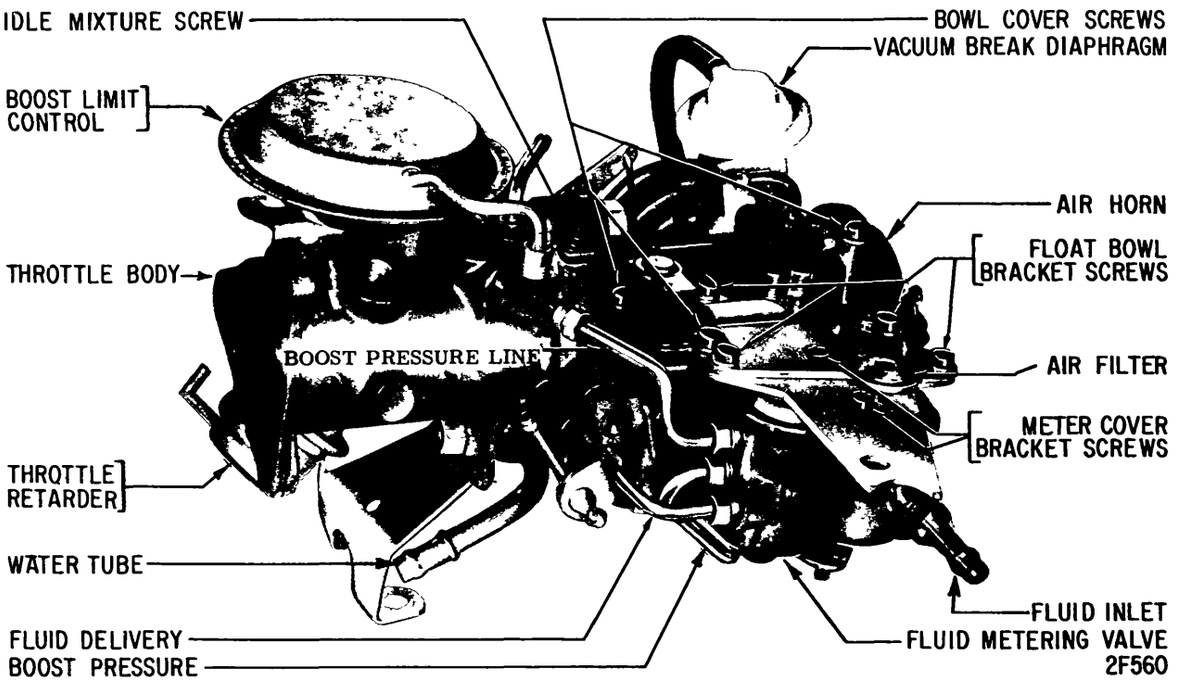
Synchr -m sh - 2400 RPM with fast idle screw on high step of fast idle cam.

Float Level

12/32" measured from machined surface of bowl flange (gasket removed and carburetor upright) to top of float at end opposite fuel inlet with float needle seated by pressing downward at rear of float arm. *NOTE - If Gaug BT-62-16 is us d, top corner of float should just touch gaug .* To adjust, bend float pontoon at float arm. Check to make sure that float is centered in bowl and is not rubbing side walls.



FLOAT LEVEL ADJUSTMENT



CARBURETOR & FLUID METERING VALVE ASSEMBLY

Float Drop

Float drop adjustment is not required on this carburetor.

Vacuum Break

5/32" clearance (use gauge or drill) between edge of choke valve and inner wall of air horn with diaphragm seated. To adjust, bend tang on linkage. Make sure that when diaphragm is rele ased, choke valve closes completely. *NOTE - If a second method of adjustment is required, linkage may be bent slightly.*

Choke Rod

.140-.160" clearance between edge of choke valve and inner wall of air horn with fast idle screw on second step of fast idle cam and against highest step. To adjust, bend choke rod (rod between fast idle cam and choke shaft lever) at center angle.

Unloader

.308-.348" clearance between edge of choke valve and inner wall of air horn with throttle valve wide open. To adjust, bend t ang at fast idle cam.

Thr ttle R tard Unit

With throttle valve wide open and throttle retard plunger fully extended, connecting rod must freely enter hole in throttle lever. To adjust, bend rod at center angle.

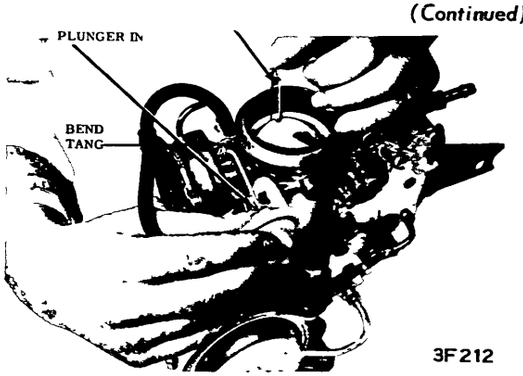
Automatic Choke

Loosen three retaining screws and rotate thermostat cover until index mark is in alignment with "Centered" mark on housing. Tighten cover retaining screws. *NOT E - "Centered" point on housing is indicated by a raised section on housing casting.*

Manual Choke

Pointer Adjustment - Loosen pointer screw, then with throttle held open to prevent weight of fast idle cam from affecting the adjustment, rotate pointer counter-

(Continued)



VACUUM BREAK ADJUSTMENT

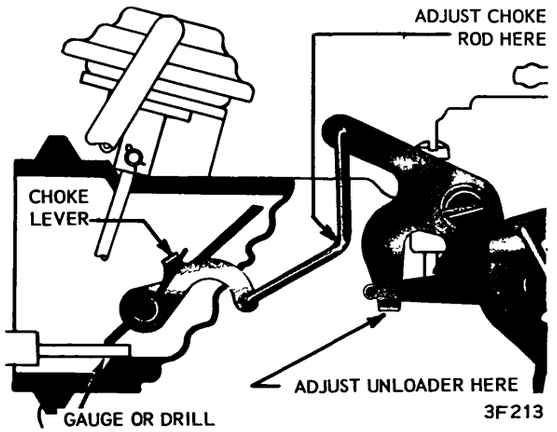
OLDSMOBILE F-85 JETFIRE CARBURETOR & FLUID INJECTION SYSTEM (Cont.)

clockwise, then clockwise until choke valve just closes. Continue rotating clockwise three notches, then tighten pointer screw.

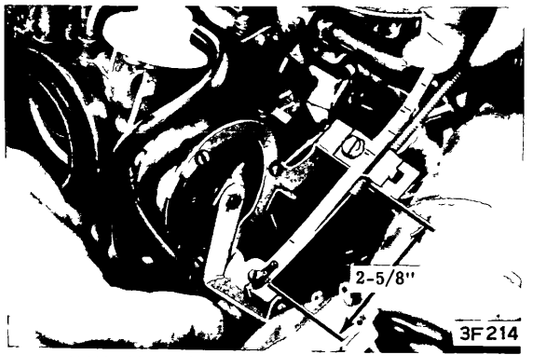
Cable Adjustment - With choke cable wire setscrew loosened and choke knob pushed all the way in, adjust choke wire so that distance between choke valve lever and edge of cable conduit clamp is 2 5/8". Tighten cable setscrew and bend end of wire so it cannot contact adjacent hoses

TESTING & TROUBLE SHOOTING

See 1962 Final Data, Page 283 for "Testing", "Trouble Shooting & Diagnosis"



CHOKE ROD & UNLOADER ADJUSTMENTS



MANUAL CHOKE CABLE ADJUSTMENT

REMOVAL & INSTALLATION

Fluid Tank

Removal - Loosen fluid filter clamp and lift filter up from mounting bracket, then disconnect and clamp fluid supply hose at fluid metering valve. Lower hose and filter to underside of car, then release clamp and drain fluid into a clean container. Disconnect gauge wire and remaining hoses at tank. Remove attaching bolts and nuts at each side of tank and remove tank.

Installation - Reverse removal procedure, then fill tank and check for leakage.

Check & Relief Valve

Removal - Disconnect hoses and remove coil, valve assembly, and nylon gasket. Lift connector, large washer, and "O" ring from intake manifold.

Installation - Reverse removal procedure and tighten valve to 12-18 ft. lbs.

Fluid Metering Valv

Rem val - *NOTE - It is not necessary to remove carburetor.* Remove metering valve bracket-to-cowl screws, then remove three copper tubes, being careful not to damage rubber gaskets, and then remove valve assembly.

Installati on - Connect the three copper tubes, middle tube first, making sure that all tubes are in line with holes before tightening. Install valve bracket-to-bowl attaching screws.

Carburetor

Removal - *NOTE - If engine is warm, releas pressur in cooling system by loosening radiator cap.* Remove hood, then remove air cleaner. Disconnect steel line from filter-to-carburetor inlet at carburetor, and compressor housing-to-throttle body water hoses at throttle b dy. Disconnect line from turbo-charger-to-bottom of float bowl at tee on bottom of float bowl, then disconnect carburetor rod. Disconnect choke cable if so equipped. Disconnect turbo-rocket fluid supply hose from metering valve, then disconnect check valve-to-throttle body hose. Disconnect crankcase ventilation valve-to-throttle body hose, then remove carburetor lower mounting bracket bolts. Remove nuts attaching carburetor-to-turbo-charger. Remove remaining water hose and remove carburetor.

Installation - Reverse removal procedure and note the following: Install a new gasket between carburetor and turbo-charger. Tighten carburetor-to-turbo-charger attaching nuts to 9-12 ft. lbs. Oil mounting bracket-to-intake manifold bolts with engine oil and tighten to 20-25 ft. lbs.

OVERHAUL

See 1962 Final Data, Page 282 for compl t v rhaul procedures.

OLDSMOBILE F-85 JETFIRE SUPERCHARGER

Olds F-85 Jetfire (1963)

DESCRIPTION

Exhaust driven turbo-supercharger assembly consisting of the following units:

Turbine & Compressor - Turbine wheel and compressor wheel are mounted on a common shaft (turbine wheel is welded to shaft and compressor wheel is pressed onto shaft and retained with a nut). The turbine wheel and compressor impeller are enclosed in separate housings and the balanced shaft is supported in the center housing by two floating bushings which are lubricated by engine oil pumped through housing and drained back to right hand rocker arm cover.

C ntroller Assembly - The poppet type valve located in turbine housing is operated by the controller. When engine is first started the bypass valve is closed, causing increased engine RPM (and increased exhaust) to turn turbine at a greater speed. The bypass valve controls the amount of exhaust pressure used to turn turbine and compressor, thereby controlling engine power output and speed of turbo-charger. The controller unit bolted to compressor housing, with two passages to compressor housing, senses compressor inlet and outlet pressures. When pressure differential is enough to overcome controller spring (within controller), controller opens bypass valve to divert exhaust gases from turbine wheel. The controller limits the pressure the turbo-charger will deliver to engine to 5-6 p.s.i.

Lubrication

Periodic lubrication, other than changing engine oil at specified periods, is not required.

REMOVAL & INSTALLATION

CAUTION - Clean as much dirt as possible off unit and carburetor. Cover oil inlet and outlet ports with plastic plugs to prevent dirt entering unit.

Turbo-Charger

Removal - Remove carburetor (see "Oldsmobile F-85 Jetfire Carburetor & Fluid Injection System" in this section), then remove turbo-charger exhaust inlet pipe by disconnecting at upper and lower flanges. *CAUTION - Install Tool BT-6219 at turbo-charg r and manifold opening (or cover op nings with tape).* Disconnect turbo-charger exhaust outlet pipe at upper flange, then drain coolant below level of turbo-charger. Disconnect oil feed line at center housing and disconnect oil return line. Disconnect compressor water inlet hose at compressor housing. *NOTE - D not close compressor housing wat r hand shut- ff valv .* Remove turbo-charger-to-intake manifold attaching nuts and remove turbo-charger.

Installation - *NOTE - Before installing Turbo-Charger, inspect intake manifold flange s al. If n cessary, s al can be replaced by removing sock t head scr ws r - taining turbo-charger-to-intak manifold flange. Aft r seal is installed, tighten sock t head scr ws t 14-17 ft. lbs.* Install turbo-charger by reversing removal procedure. Tighten turbo-charger-to-intake manifold nuts to 25-30 ft. lbs. Install new oil return line flange gaskets and tighten bolts to 10-15 ft. lbs. Tighten nuts at turbo-charger exhaust pipe connections to 10-18 ft. lbs.

Controller Assembly

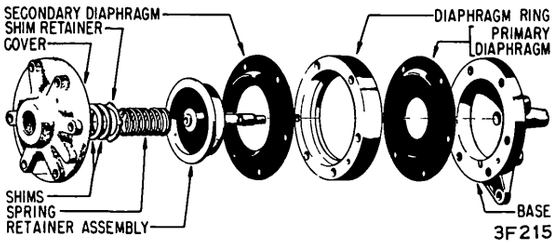
Rem val - *NOTE - Controller can be removed for*

(C ntinued)

OLDSMOBILE F-85 JETFIRE SUPERCHARGER (Cont.)

service without removing turbo-charger. Cut and remove safety wire, then loosen bolt at top of controller and nut at bottom mounting ear (remove carburetor rod to gain access to bottom nut) Slide cover on shaft toward controller and remove roll pin from bypass valve end of controller tube Remove bolt and nut attaching controller to turbo-charger, then hold throttle valve wide open and remove controller Remove sensing port "O" rings Remove shaft cover and remaining roll pin, then remove controller tube

Installation - Install two new sensing port "O" rings, then install connector tube and secure in place with the roll pin installed through tube and controller stem. Slide shaft cover, safety wire end first, over connector tube, then pull out bypass valve and position connector tube over valve stem Temporarily install a cotter pin through connector tube and bypass valve Position controller on turbine housing and install lock washers, bolt and nut, and tighten to 8-9 ft lbs Remove cotter pin and install the roll pin, then install a new safety wire Connect carburetor rod (if removed)



SUPERCHARGER CONTROLLER ASSEMBLY

Bypass Valv

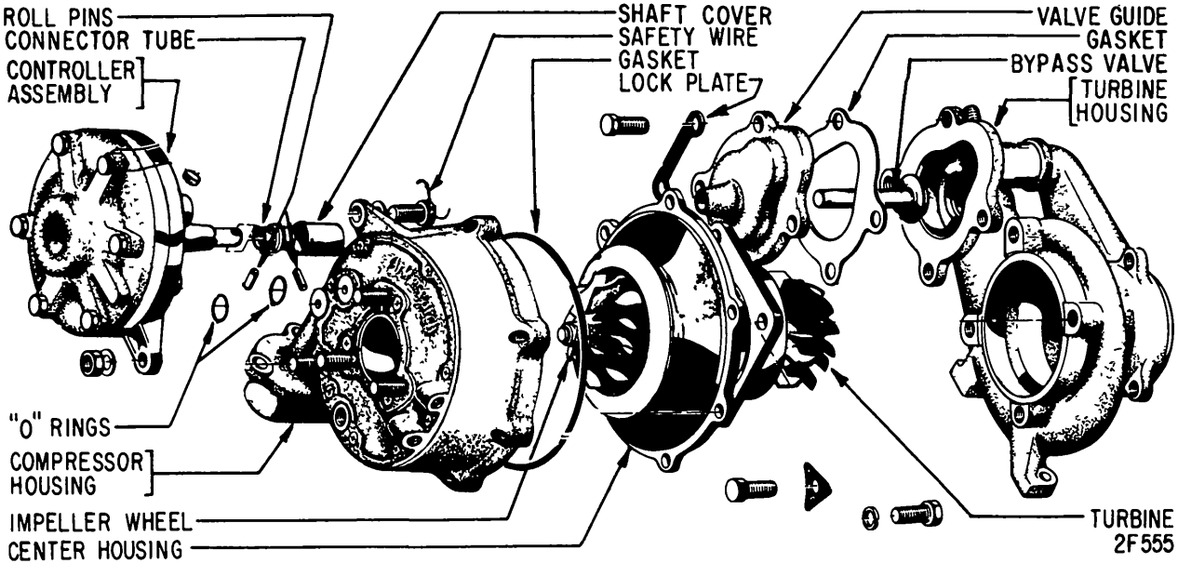
Rem val - *NOTE - Bypass valve can be removed for service without removing turbo-charger.* With controller assembly removed, straighten lock tabs at bypass valve guide bolts and remove bolts, guide, gasket and valve

Installation - Install valve in valve guide, then position a new gasket and install guide assembly on turbine housing Install guide lock plates and valve guide bolts and tighten bolts to 8-9 ft lbs.

OVERHAUL

Turbo Charger

Disass mbly - Remove controller and bypass valve. Scribe a line across compressor and center housing, then remove compressor housing-to-center housing bolts. Tap compressor housing lightly and separate both housings, then remove gasket. Remove housing cover and gasket from compressor housing (11 countersunk screws). Inspect housing and cover for cracks or indications of leakage. Scribe a line across center housing and turbine housing, then straighten lock-tabs on center housing-to-turbine housing bolts and remove bolts and lockplates. Carefully separate the two housings. *NOTE - C nt r housing and rotating ass mbly is s rviced nly as a c ampl t unit.*



OLDS F-85 JETFIRE SUPERCHARGER ASSEMBLY

Cleaning & Inspection - Before cleaning, inspect parts for burning, rubbing or other damage. Soak all parts EXCEPT CENTER HOUSING ASSEMBLY in clean carburetor solvent. After soaking, use a stiff bristle brush to remove all dirt, then dry parts with clean air. Inspect all parts for damage, corrosion, deterioration and wear. Threads must not be nicked, stripped, or crossed. Turbine wheel must not show signs of rubbing, and the vanes must not be eroded to a feather edge. *NOTE - A slight build-up of carbon will not affect operation.* Compressor impeller must not show signs of rubbing and must be completely free of dirt and other foreign material. Housings must not show signs of having been in contact with rotating parts. Oil, air and water passages must be clean and free of any obstruction. Rotating assembly must rotate without any signs of roughness. A slight drag due to spring loaded carbon seal is normal. Heat shield must not rub turbine wheel.

Controller Assembly

Disassembly - Scribe a line on edge of the controller then remove four of the six cover bolts and loosen the two remaining bolts about 1/8". *CAUTION - Cover is under spring tension.* Apply air pressure (15-20 p.s.i.) to pressure port first, then to vacuum port to free diaphragms. Remove remaining bolts while holding cover and spring compressed, then remove cover and spring. Remove shim retainer and shims from spring seat. *NOTE - Count number of shims. If spring is to be replaced, discard shims and retainer. Service springs are calibrated to be used without shims and retainer. Service springs are identified by a blue stripe.* Separate controller base, diaphragm and diaphragm ring, then remove diaphragm retainer, diaphragms and ring. Remove ring from retainer by slipping over stem end of retainer. Remove diaphragms from stem side of retainer.

Reassembly - Install turbo-charger turbine housing on center housing with scribe marks aligned, then install lockplates and bolts and tighten to 8-9 ft. lbs. *NOTE - Check for turbine clearance by pushing shaft towards turbine housing while rotating shaft. Ther should not be any contact between wheel and housing.* Install compressor housing-to-center housing gasket, then position center housing on compressor housing with scribe marks aligned. Install attaching bolts and tighten to 8-10 ft. lbs. Install compressor housing-to-cover gasket, then install cover and tighten attaching screws to 25-30 inch pounds. *NOTE - Check compressor impeller-to-housing clearance by pushing on turbine end of shaft while rotating shaft. There should not be any contact between compressor impeller and housing.* Install bypass valve and controller (see below).

Reassembly - Install the secondary diaphragm on the retainer assembly with raised ring on diaphragm toward retainer. Make sure diaphragm is firmly seated into groove of retainer. Install diaphragm ring over retainer with relieved side of ring toward secondary diaphragm. Install primary diaphragm into groove of retainer with raised ring of diaphragm toward retainer, then align pressure passage holes and bolt holes of diaphragms and diaphragm ring. Install two guide pins (use 1/4" x 3" U.S.S. bolts) in controller base, then install retainer assembly with diaphragms and diaphragm ring over guide pins with all holes aligned. Clamp retainer stem in a soft jawed vise so controller base is upward, then install shims and retainer in cover. Install spring in position on retainer assembly and position controller cover over guide pins. Compress spring with controller cover and install two opposite bolts finger tight. Remove guide pins and install remaining bolts. With diaphragms centered in the assembly and with 1/8" of diaphragms exposed all the way around, tighten bolts alternately to 40-50 inch pounds.

ROCHESTER SINGLE, DUAL & 4-BARREL CARBURETORS JET SPECIFICATIONS

Carb. N.	Model	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Cluster	Main Well Support	Power Valve	Power Piston & Spring	Pump Assembly	Float Needle & Seat
7013063	2G	066"	7008666	7013381				7019159	7013787
7013065	2G	066"	7008666	7013381				7019159	7013787
7020023 Pri.	4GC	062"	7008662	7025844		7011989	7011947	7012417	7012907
Sec.		.081"	7008681	7013463					7012906
7020024 Pri.	4GC	063"	7008663	7025490		7011989	7011947	7012417	7012907
Sec.		.081"	7008681	7013463					7012906
7020109	2G	053"	7002653	7021473		7010918	7006323	7019162	7012524
7023000	BV	058"	7002958		7025542	7025463	7010002	7022528	7002359
7023003	BV	058"	7002658		7025543	7025463	7010002	7022528	7002359
7023004	BV	043"	7002643		7025544	7025463	7010002	7022528	7002359
7023005	BV	.044"	7002644		7025545	7025463	7010002	7022528	7002359
7023006 Pri.	4GC	057"	7002657	7024692		7011989	7009718	7000208	7012144
Sec.		067"	7008667	7013662					7012144
7023007	2GC	.058"	7002658	7025689		7006331	7006323	7019162	7012524
7023008	2GC	056"	7002656	7013640		7006331	7009718	7019164	7012524
7023009	2G	.054"	7002654	7025688		7010918	7006323	7019162	7012524
7023010	2G	054"	7002654	7025688		7010918	7006323	7019162	7012524
7023011	B	057"	7002657		7025673	7025554	7025580	7022528	7023559
7023012 Pri.	4GC	057"	7002657	7024692		7011989	7009718	7000208	7012144
Sec.		.067"	7008667	7013662					7012144
7023013	B	070"	7008670		7025529	7025554	7010002	7022528	7023559
7023017	B	.057"	7002657		7025526	7025554	7010002	7022528	7023559
7023018	2GC	056"	7002656	7013640		7006331	7009718	7019164	7012524
7023021	B	042"	7002642		7025527	7025554	7025580	7022528	7012559
7023030 Pri.	4GC	056"	7002656	7025713		7010918	7011947	7016986	7012144
Sec.		.075"	7008675	7025715					7012144
7023031 Pri.	4GC	.056"	7008656	7025713		7010918	7011947	7016986	7012144
Sec.		.075"	7008675	7025715					7012144
7023040 Pri.	4GC	053"	7002653	7025780		7010918	7025738	7012417	7012907
Sec.		076"	7008676	7013463					7012906
7023041	2GC	.061"	7008661	7025793		7011989	7006323	7016475	7019218
7023042	2GC	.059"	7002659	7025781		7011989	7006323	7016475	7019218
7023043	2GC	.060"	7002660	7024508		7011989	7006323	7016475	7019218
7023044 Pri.	4GC	046"	7002646	7025687		7010918	7025738	7020246	7012906
Sec.		.054"	7002654						7012906
7023045 Pri.	4GC	.047"	7002647	7025696		7010918	7025738	7020246	7012906
Sec.		054"	7002654						7012906
7023046	2GC	.046"	7002946	7025752		7006331	7006323	7015871	7012524
7023047	2GC	.048"	7002948	7025700		7006331	7006323	7015871	7012524
7023048	2GC	.044"	7002644	② 7025773		7004659	7009718	7019368	7012524
7023049	2GC	.044"	7002644	② 7025779		7004659	7009718	7019368	7012524
7023050 Pri.	4GC	.054"	7002654	7021214		7011994	7011947	7022992	7012207
Sec.		.084"	7008684	7013475					7012144
7023051 Pri.	4GC	054"	7002654	7021214		7011994	7011947	7022992	7012207
Sec.		084"	7008684	7013475					7012144
7023052	2GC	063"	7008663	7021516		7011989	7006323	7017776	7019932
7023053	2GC	064"	7008664	7016267		7011989	7006323	7017776	7019932

① - .048" Main Metering jets used on carburetors having change code letter "B" stamped on code tag. *See "Rochester 4GC Carburetors" for additional details.*

② - Different Venturi Cluster used on carburetors having change code letter "A" or "B" stamped on code tag. *See "Rochester 2G & 2GC Carburetors" for additional details*

ROCHESTER SINGLE, DUAL & 4-BARREL CARBURETORS JET SPECIFICATIONS

Carb. No.	Model	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Cluster	Main Well Support	Power Valve	Power Piston & Spring	Pump Assembly	Float Needle & Seat
7023054 Pri.	4GC	.043"	7002643	7020323	.....	7011989	7025738	7022978	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144
7023055 Pri.	4GC	.043"	7002643	7020323	.....	7011989	7025738	7022978	7012207
Sec.		.060"	7008660	7020320	.....	.....	.....	.....	7012144
7023056	2GC	.047"	7002947	7021625	.....	7006331	7006323	7019162	7021991
7023058	2GC	.047"	7002947	7021632	.....	7006331	7006323	7019162	7021991
7023060	2GC	.064"	7008664	7024437	.....	7011989	7012266	7020584	30 - 13
7023061	2GC	.063"	7008663	7024439	.....	7011989	7012266	7020584	30 - 13
7023062	2GC	.066"	7008666	7024951	.....	7011989	7012266	7017776	30 - 13
7023063	2GC	.060"	7008660	7020457	.....	7011989	7006011	7020585	30 - 13
7023064	2GC	.060"	7008660	7020457	.....	7011989	7006011	7020585	30 - 13
7023066	2GC	.061"	7008661	7019588	.....	7011989	7006011	7019518	30 - 13
7023067	B	.058"	7002658	.....	7025710	7025463	7010002	7022851	7002359
7023068	BC	.057"	7002657	.....	7025734	7025463	7010002	7022851	7002359
7023069 Pri.	4GC	.049"	7002649	7025428	.....	7011944	7010332	7022888	7012144
Sec.		.085"	7008685	7021628	.....	.....	.....	.....	7012144
7023070 Pri.	4GC	.046"	7002646	7025385	.....	7011989	7010332	7022888	7012144
Sec.		.085"	7008685	7025521	.....	.....	.....	.....	7012144
7023071	2GC	.065"	7008665	7025536	.....	7011989	7012266	7017776	30 - 13
7023073	2GC	.062"	7008662	7019746	.....	7011989	7006011	7019518	7012602
7023075	2GC	.062"	7008662	7025857	.....	7017950	7011478	7019518	7012602
7023077	2GC	.062"	7008662	7019746	.....	7011989	7006011	7019518	7012602
7023078	2G	.073"	7008673	7013381	.....	.....	.....	7020584	7013787
7023079	2G	.073"	7008673	7013381	.....	.....	.....	7020584	7013787
7023086	2GC	.047"	7002947	7025557	.....	7006331	7006323	7015871	7012524
7023096	2GC	.050"	7002950	7019575	.....	7006331	7006323	7015871	7012524
7023100	H	.048"	7002648	7025858	.....	.....	.....	7024746	7015789
7023101	H	.050"	7002650	7025677	.....	.....	.....	7024746	7015789
7023102	H	.049"	7002649	7021654	.....	.....	.....	7024746	7015789
7023105	BV	.058"	7002658	.....	7025546	7025463	7010002	7022528	7002359
7023108	BV	.057"	7002657	.....	7025547	7025463	7010002	7022528	7002359
7023142	2GC	.047"	7002947	7026691	.....	7006331	7006323	7015871	7012524
7023143 Pri.	4GC	.052"	7002652	7025780	.....	7010918	7025738	7012417	7012907
Sec.		.080"	7008680	7025920	.....	.....	.....	.....	7012906
7023161	2GC	.064"	7008664	7025714	.....	7017950	7011478	7019518	7012602
7023162	2GC	.061"	7008661	7025718	.....	7011989	7006011	7019518	7012602

STROMBERG WWC 2-BARREL (CHRYSLER & DODGE) CARBURETORS

CHRYSLER & DODGE	Stromberg Code No.
Chrysler Newport 361" Eng. Early	WWC 3-221
Chrysler Newport 361" Eng. Late	WWC 3-221A
Dodge Custom 880 361" Early	WWC 3-221
Dodge Custom 880 361" Eng. Late	WWC 3-221A

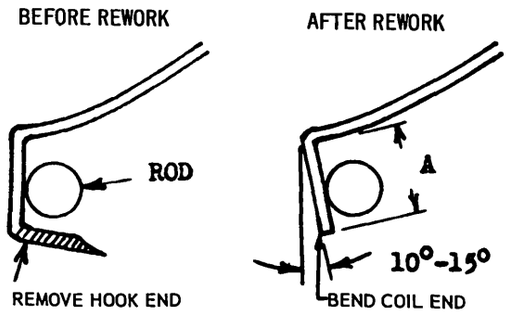
►CHANGES, CAUTIONS, CORRECTIONS

►*HARD COLD WEATHER STARTING CORRECTION:* Hard starting may be caused by choke piston sticking. To correct, remove air cleaner and squirt carburetor cleaner, lacquer thinner or alcohol through piston link opening while operating choke to clean out gum formation.

►*1963 361" ENGINE HARD STARTING & SLOW WARM-UP CORRECTION:* Remove choke unit and note position of index mark on indexing disc. If choke is indexed two notches lean, reindex to 1 notch rich.

►*1963 CHRYSLER & DODGE (361" ENG.) STALLING AFTER COLD START CORRECTION & CARBURETOR PRODUCTION CHANGE:* Stromberg WWC 3-221 has been replaced in production with WWC 3-221A to correct the above condition. To rework WWC 3-221, proceed as follows: Remove choke vacuum piston assembly from air horn and increase the size of bleed holes (4 holes) in piston, using a No. 54 drill. Adjust choke vacuum piston (see "Adjustments" below) so a 7/64" drill will fit between choke valve and air horn wall. Install a welch plug and seal cylinder, then adjust hot idle and fast idle speeds to specifications.

►*1963 361" ENGINE HARD STARTING (DUE TO CHOKE NOT OPERATING PROPERLY):* This condition which may occur intermittently could be caused by choke thermostat coil catching on cast surface of choke pocket. To check if coil is caught, a "twanging" noise will be heard when choke assembly is unbolted and removed from choke well. To correct, mark location of index mark on disc, then loosen choke coil adjusting locknut and rotate coil so free end of coil hangs down. Grind away the outer bend (see illustration), keeping contact face of coil as long as possible. Bend contact face of coil 10-15° toward choke rod, being careful not to distort coils of thermostat. Remove any sharp edges caused by grinding, then turn index disc until notch is opposite the 1 notch rich mark and tighten locknut.



CHOKE COIL REWORK

CARBURETOR ADJUSTMENT SPECIFICATIONS										
Stromberg Code No.	H t Idl Speed (Eng. RPM)	Initial Idle Mixture③	Fast Idle (Eng. RPM)	Fast Idle Cam Index	Float Level Setting	Unloader Setting	Bowl Vent	Acc l. Pump Trav l	Ch k Pist n Setting	Aut . Ch k Setting
WWC 3-221	500①②	1 1/2	1400	1/4"	1/8"	15/16"	5/64"	7/16"	.170"	1 Rich
WWC3-221A	500①②	1 1/2	1400	1/4"	1/8"	15/64"	5/64"	7/16"	7/64"	1 Rich

① - Auto. Trans. in "N" (Neutral).
② - All models with headlights turned ON.
③ - Turns open from a lightly seated position.

DESCRIPTION

2-barrel downdraft type of same design as previous carburetors.

ADJUSTMENT

Idle Mixture & Speed

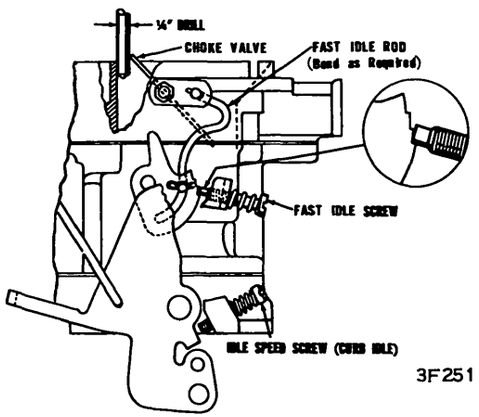
Adjust idle speed to specifications with engine at normal operating temperature, then turn both idle mixture screws in equally until engine begins to run rough. Turn both idle mixture screws out until engine rolls from rich mixture. Now turn both screws in to a point about halfway between these two points where smoothest idle is obtained. *NOTE - Both idle mixture screws must be turned equally.* Readjust idle speed to specifications.

Fast Idle (On Car)

With engine at normal operating temperature and fast idle screw on top step of fast idle cam, adjust fast idle screw to obtain correct engine speed (see "Specification Table").

Fast Idle (Off Car) & Cam Position

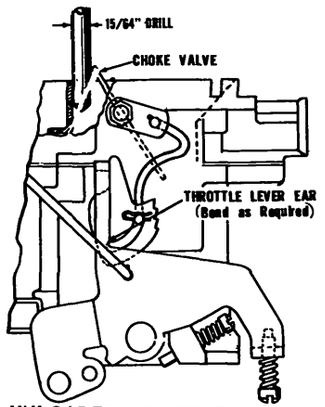
Back throttle stopscrew out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw out so it can be positioned on **second step** of cam (against top step), **and turn fast idle screw in 3½ turns.** Distance between edge of choke valve and air horn should be as indicated in "Specification Table". To adjust, bend fast idle rod at upper angle.



FAST IDLE CAM POSITION

Unloader

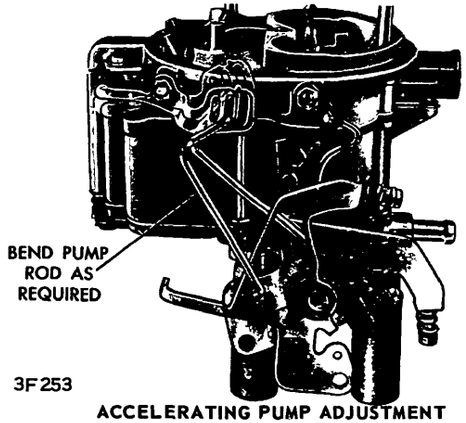
With choke valve held lightly closed, open throttle valves to wide open position. Clearance between top edge of choke valve and wall of air horn should be 15/64" (use 15/64" drill to measure). To adjust, bend tang (long narrow extension) on throttle lever. Make sure throttle valves fully open and close when choke valve is wide open.



UNLOADER ADJUSTMENT

Accelerating Pump

With throttle valves fully closed, pump travel from fully closed to fully open positions should be as indicated in "Specification Table", measured at small raised boss near connecting rod end of pump lever. To adjust, bend pump rod at right angle bend. *NOTE - Pump rod must be installed in center slot of pump arm.*

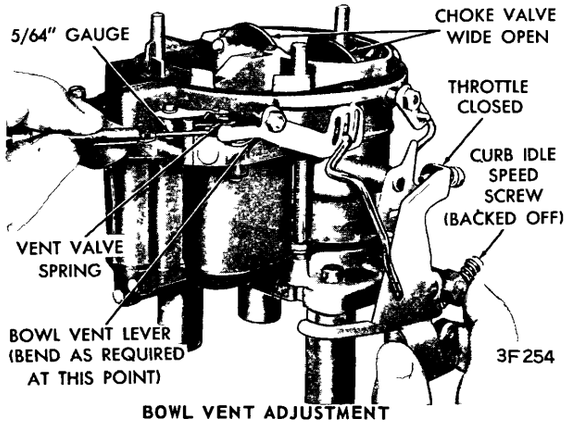


ACCELERATING PUMP ADJUSTMENT

STROMBERG WWC 2-BARREL (CHRYSLER & DODGE) (C ntinu d)

Bowl Vent

With idle speed screw backed out, hold throttle valves in closed position and choke valve wide open Opening of vent valve at center of hole with rubber valve hanging free should be as indicated in "Specification Table" To adjust, bend bowl vent lever (extension of accelerating pump lever) *CAUTION - Make sure that vent valve is not distorted and that it properly seals the bowl vent hole when throttle valve is open.*



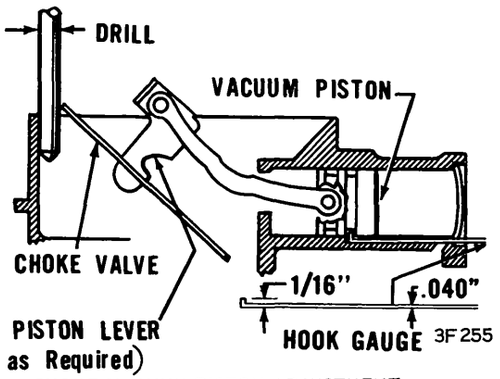
BOWL VENT ADJUSTMENT

Choke Vacuum Piston

Remove welch plug from choke piston cylinder and insert a hook gauge (036" to 040" diameter) into slot in piston wall Rotate hook end so that it engages end groove in piston Apply a light closing pressure against choke valve so that hook gauge is gripped between groove in piston and end of slot With choke piston in this position, clearance between choke valve and air horn should be as indicated in "Specification Table" To adjust, bend bracket on choke valve

Float Level

With float installed in float bowl and lip of float held against inlet needle, distance from top of float at center to top of float bowl (gasket removed) should be as indicated in "Specification Table" . To adjust, bend lip of float



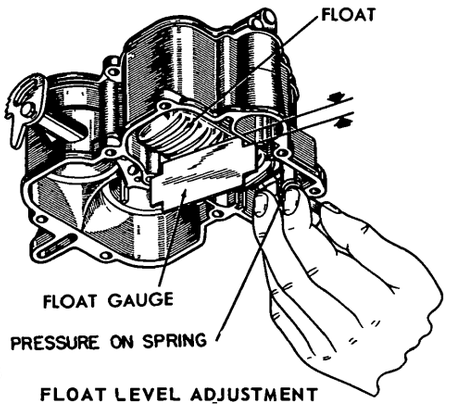
CHOKE VACUUM PISTON ADJUSTMENT

Automatic Choke

Cross-over type, mounted in well in intake manifold Do not change setting

OVERHAUL

See 1960 Final Data, Page 310, or later Manual edition, for complete overhaul procedure.



FLOAT LEVEL ADJUSTMENT

STROMBERG WW 2-BARREL (DODGE & PLYMOUTH) CARBURETORS

DODGE DART & PLYMOUTH	Stromberg Code No.
318" Eng (Synchro-mesh) Early	WW 3-222
318" Eng (Synchro-mesh) Late	WW 3-222A
318" Eng (Auto. Trans) Early	WW 3-223
318" Eng. (Auto Trans) Late	WW 3-223A

►CHANGES, CAUTIONS, CORRECTIONS

►*HARD COLD WEATHER STARTING CORRECTION:* Hard starting may be caused by choke piston sticking To correct, remove air cleaner and squirt carburetor cleaner, lacquer thinner or alcohol through piston link opening while operating choke to clean out gum formation.

DESCRIPTION

2-barrel downdraft type of same design used on previous models Automatic choke is "Cross-Over" type mounted in a well in intake manifold and connected to choke shaft lever by linkage.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Stromberg Code No.	Hot Idle Speed (Eng. RPM)	Initial Idle Mixture③	Fast Idle (Eng. RPM)	Fast Idle Cam Index	Float Level Setting	Unloader Setting	Bowl Vent	Accel. Pump Travel	Choke Piston Setting	Auto. Choke Setting
WW3-222	500	1¼	1400	13/64"	7/32"	15/64"	5/64"		3/8"	Centered
WW3-222A	500	1¼	1400	13/64"	7/32"	15/64"	5/64"		3/8"	Centered
WW3-223	500 ①②	1¼	1400	13/64"	7/32"	15/64"	5/64"		19/64"	Centered
WW3-223A	500 ①②	1¼	1400	13/64"	7/32"	15/64"	5/64"		19/64"	Centered

① - Auto Trans. in "N" (Neutral)
② - All models with headlights turned ON.
③ - Turns open from a lightly seated position

ADJUSTMENT

Idle Mixture & Speed

Adjust idle speed to specifications with engine at normal operating temperature, then turn both idle mixture screws in until engine begins to run rough Turn both idle mixture screws out until engine rolls from rich mixture Now turn both screws in to a point about halfway between these two points where smoothest idle is obtained *NOTE - Both idle mixture screws must be turned equally*. Readjust idle speed to specifications.

Fast Idle (On Car)

With engine at normal operating temperature and fast idle screw contacting top step of fast idle cam, adjust engine speed to specifications (see "Specification Table" above)

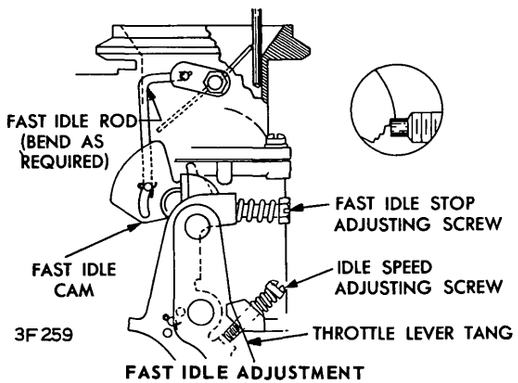
Fast Idle (Off Car) & Cam Position

Back throttle stopscrew out far enough to clear throttle lever tang when throttle valves are closed, then hold throttle valves in closed position. Turn fast idle screw

(Continued)

STROMBERG WW 2-BARREL (DODGE & PLYMOUTH) (C ntinu d)

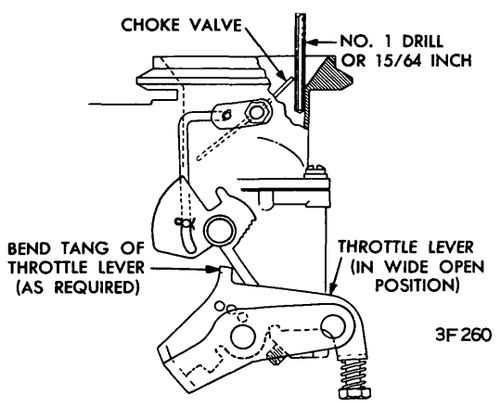
in so it can be positioned on **second step** (against top step), and **turn fast idle screw in 7 turns.** Distance between edge of choke valve and air horn wall should be 13/64". To adjust, bend fast idle rod at upper end.



FAST IDLE ADJUSTMENT

Unloader

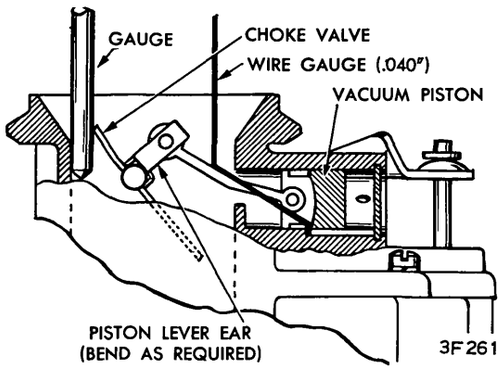
Close choke valve lightly and fully open throttle valves. Clearance between choke valve and wall of air horn should be 15/64". To adjust, bend tang on throttle lever.



UNLOADER ADJUSTMENT

Choke Vacuum Piston

Bend a .040" wire gauge so it will engage slot at bottom of choke vacuum piston cylinder, then with gauge in place, lightly close choke valve until inner end of piston grips gauge at end of slot. Measure choke valve opening or clearance between upper edge of choke valve and air horn wall Clearance should be as indicated in "Specification Table". To adjust, bend ear on piston lever.



CHOKE PISTON ADJUSTMENT

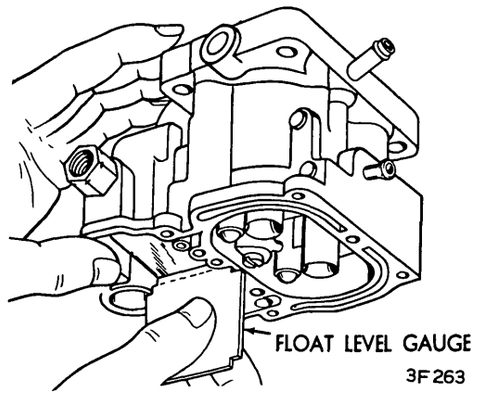
Accelerating Pump & Idle Vent

NOTE - This is a combination adjustment. Accelerating pump travel is automatically set when bowl vent is properly adjusted. Back off idle adjusting screw and open choke valve so that when throttle valves are closed, fast idle screw will not contact cam. Place pump rod in center hole in throttle lever and pump vent clip (located on pump stem under bowl vent valve) in center notch. With throttle valves closed tightly, clearance between bowl vent seat and bowl vent should be as indicated in "Specification Table". To adjust, bend pump rod at lower angle

ACCELERATING PUMP ADJUSTMENT NOTE - If pump rod is moved to either the short or long stroke position, a corresponding change must be made in location of bowl vent clip, and the amount of lift of bowl vent rechecked and adjusted.

Float Level

NOTE - Fuel inlet needle is tipped with synthetic rubber. Weight of float only should force needle against the seat. Invert float bowl and check distance between surface of fuel bowl (gasket removed) and top of float at center. This measurement should be as indicated in "Specification Table". To adjust, hold float at bottom of bowl and bend tang on float as necessary. *CAUTION - When bending float tang, do not allow tang to push against needle. When float is correctly set, float tang should be perpendicular to needle or slanted not more than 10° away from needle.*



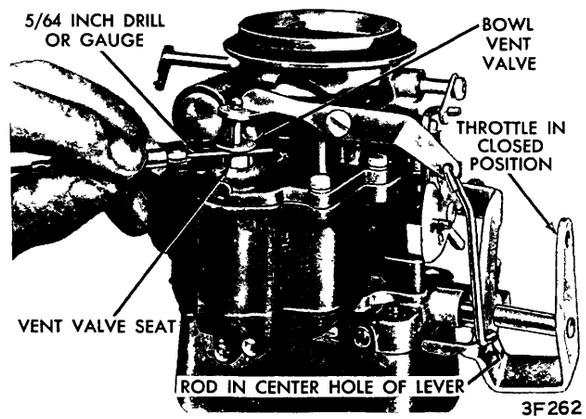
FLOAT LEVEL ADJUSTMENT

Automatic Choke

Cross-over type mounted in well in intake manifold. Do not change setting

OVERHAUL

See 1958 Final Data, Page 294, or later Manual edition for complete overhaul procedures



BOWL VENT & ACCEL. PUMP ADJUSTMENT

STROMBERG WW 2-BARREL (STUDEBAKER) CARBURETORS

STUDEBAKER V8 Engine — **Stromberg Code No.** WW 6-130

DESCRIPTION

2-barrel downdraft type similar to previous models Automatic choke housing is mounted on throttle body and connected to choke shaft lever by linkage

ADJUSTMENT

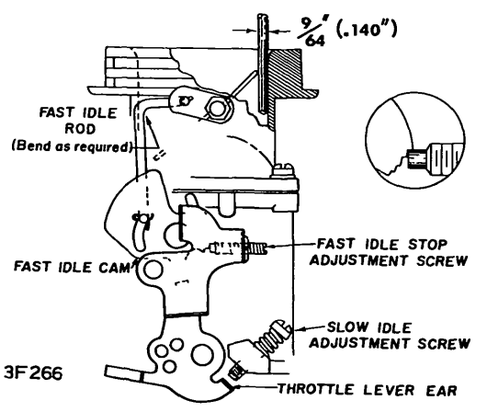
Adjust idle speed to specifications with engine at normal operating temperature then turn both idle mixture screws in until engine begins to run rough Turn both screws out until engine rolls from rich mixture Now turn both screws in to a point about halfway between the above two points where smoothest idle is obtained *NOTE - Both idle mixture screws must be turned equally* Readjust idle speed to specifications

Accelerating Pump

No seasonal adjustment Three holes are provided in throttle lever for pump connector rod engagement
C nt r H l - Normal operating conditions
Upp r H l - Shorter stroke, less fuel discharge
Low r H l - Longer stroke, more fuel discharge

Float L vel

NOTE - Fu l inlet needle is tipped with synthetic rubb r Weight of float only should force needle against the seat Invert float bowl and check distance between surface of fuel bowl (gasket removed) and top of float at center This measurement should be as indicated in "Specification Table" To adjust, hold float at bottom of bowl and bend tang on float lever as necessary *CAUTION - When bending float tang, do not allow tang to push against n edl*



FAST IDLE CAM ADJUSTMENT

CARBURETOR ADJUSTMENT SPECIFICATIONS

Stromberg Code No.	Hot Idle Speed (Eng. RPM)	Initial Idle Mixture③	Fast Idle (Eng. RPM)	Fast Idle Cam Index	Float Level Setting	Unloader Setting	Bowl Vent	Accel. Pump Travel	Choke Piston Setting	Auto. Chok Setting
WW6-130	550①	1¼"		9/64"	3/16"	196"			228"	Index

Fast Idle (Off Engine)

With choke valve closed and high step of fast idle cam touching fast idle screw, adjust fast idle screw so that a 030" gauge wire can be inserted freely between throttle valve and throttle body on idle port side

Fast Idle (On Car)

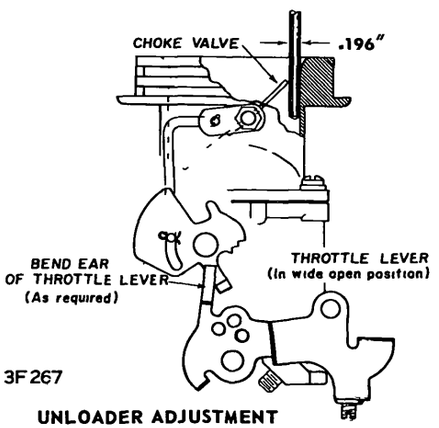
With fast idle screw aligned with index mark on fast idle cam, adjust screw to obtain desired engine RPM

Fast Idle Cam

Place fast idle screw on highest step of fast idle cam, then close choke valve until fast idle rod contacts upper end of slot in fast idle cam With choke valve in this position, clearance between top edge of choke valve and air horn wall should be as indicated in "Specification Table" To adjust, bend fast idle rod

Unloader

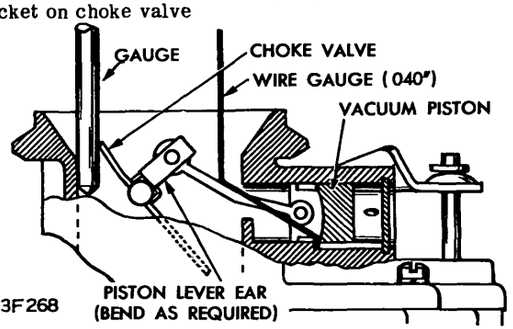
To check setting, hold choke valve closed lightly, then open throttle valves to wide open position so throttle lever stop rests against throttle body stop Clearance between choke valve and wall of air horn should be as indicated in "Specification Table" To adjust, bend ear on throttle lever



UNLOADER ADJUSTMENT

Choke Vacuum Piston

Open choke valve and place end of 040" wire gauge in inner end of choke piston housing slot *NOTE - Bend wir as n c ssary t ins rt into chok piston housing from within air horn* Close choke valve until end of wire gauge is gripped between skirt end of vacuum piston and end of slot Clearance between top edge of choke valve and air horn wall should be as indicated in "Specification Table" To adjust, bend piston lever bracket on choke valve



CHOKE VACUUM PISTON ADJUSTMENT

Choke Spring Operating Lever

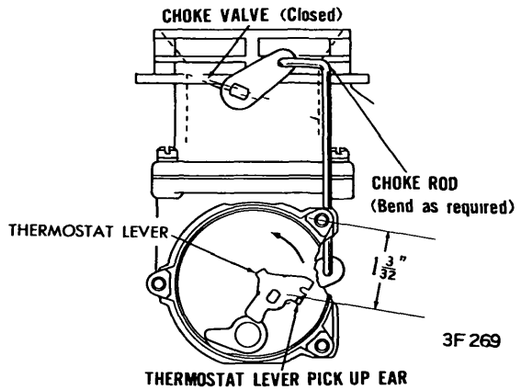
With thermostatic coil cover assembly removed, and with choke valve closed, distance between top of tang on thermostat lever and center of screw hole directly above lever should be as indicated in "Specification Table" To adjust, bend rod connecting thermostat lever to lever on choke shaft

Automatic Choke

Loosen cover screws and rotate cover as necessary to align index mark on cover with correct mark on housing See "Specification Table" for correct setting

OVERHAUL

See 1962 Fi nal Data, Page 294 for complete overhaul procedures



THERMOSTATIC SPRING OPERATING LEVER ADJUSTMENT

STROMBERG WA SINGLE BARREL CARBURETORS

DODGE, PLYMOUTH VALIANT	① Stromberg No.
170" & 225" 6 Cyl. Engs. (Early)	WA 3-219
170" & 225" 6 Cyl. Engs (Late)	WA 3-219A

① - Carb. number stamped adjacent to fuel inlet fitting.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 DODGE & PLYMOUTH HARD STARTING, STUMBLING (REPEATED STOPPING AFTER STARTING) CORRECTION:* May be caused by choke coil hanging in choke pocket. To check, allow engine to cool, then open throttle and note choke valve position. If choke valve closes partly or fully, it is operating properly If choke valve does not close at all, yet moves freely by hand, choke is caught in pocket. Correct by replacing choke unit with Part No. 2463271 which is identified by "57" (or "53" and a dot of yellow paint) stamped on housing

►*HARD COLD ENGINE STARTING CORRECTION:* Hard starting may be caused by choke piston sticking To correct, remove air cleaner and squirt carburetor cleaner, lacquer thinner or alcohol through piston link opening while operating choke to clean out gum formation

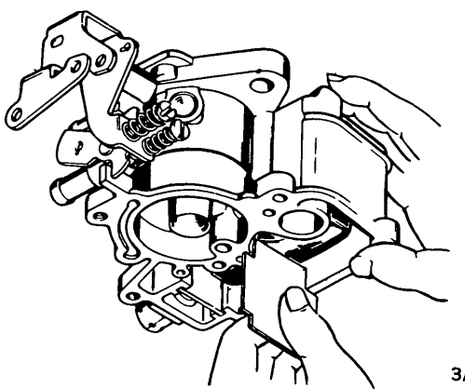
DESCRIPTION

Single barrel down-draft type with separate "well type" automatic choke. Carburetor assembly consists of two sub-assemblies (air horn and main body). Throttle body assembly is integral with main body.

ADJUSTMENT (ON ENGINE)

Idle Mixture & Idle Speed

Adjust idle mixture to leanest mixture possible with a smooth idle. On automatic transmission cars, unsnap ball joint connection at accelerator shaft bellcrank. After idle speed is adjusted, screw ball joint connector up or down until ball will exactly mate with socket. On all models, turn headlights on high beam to compensate for alternator load.



3A9

FLOAT LEVEL ADJUSTMENT

CARBURETOR ADJUSTMENT SPECIFICATIONS

Carb. No.	Idl Spe d (Eng. RPM) Hot	Idl Spe d (Eng. RPM) Fast	Initial Idle Mixture ①	Float Setting	Float Gauge No.	Choke Setting	Fast Idle Cam Index	B wl V nt	Unl ad r S tting	Vacuum Kick Setting
WA 3-219, A	550②	1400③	3/4-1	11/32"	④ 73725	2 Rich	19/64"	.060"	③11/32"	⑤ .2280"

① - Turns open from a lightly seated position. ② - Headlights on High Beam. Air Cond. ON.
③ - Fast idle screw on second stop of fast idle cam. ④ - Stromberg No. ⑤ - Use suitable size drill.

Fast Idle Speed

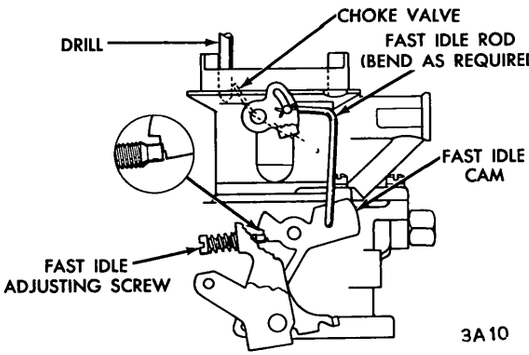
Adjust fast idle with fast idle speed screw on second step of fast idle cam (see illustration).

ADJUSTMENT (OFF ENGINE)

Float Level

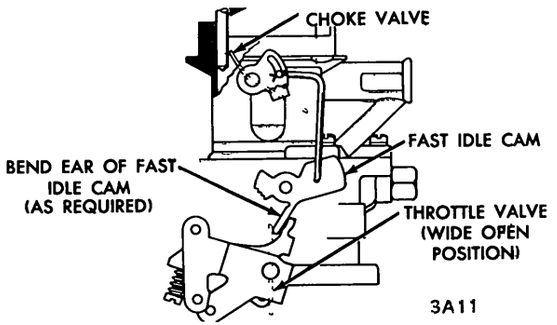
With air horn and gasket removed, invert main body so that weight of float only is forcing needle against seat. Distance from flange surface of fuel bowl to top of float at center should be as indicated in specification table. To adjust, hold float at bottom of bowl, then bend float lip toward or away from needle with Tool 73605. ***CAUTION - When bending float lip, do not allow lip to push against needle. Needle is rubber tipped and would cause a false setting.***

►***ADJUSTMENT NOTE: The following adjustments must be made in the sequence indicated.***



3A10

FAST IDLE SPEED & CAM INDEX ADJUSTMENT



3A11

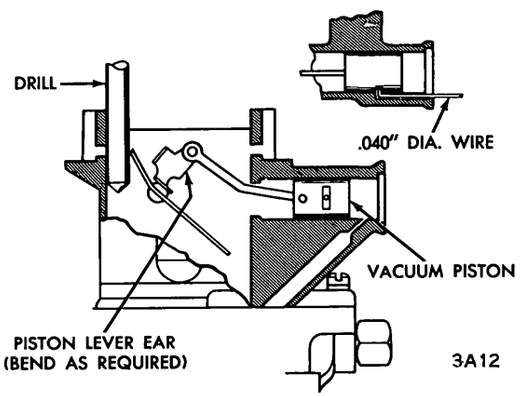
UNLOADER ADJUSTMENT

Fast Idle Speed & Cam Index

Turn idle speed screw out so it clears tang on throttle lever when throttle valve is closed, then hold throttle valve in closed position and turn fast idle screw out until fast idle cam can be positioned as indicated in illustration. Turn fast idle screw in until it just touches second step of fast idle cam, then turn in **4 turns**. Hold fast idle screw in this position and move choke valve with a light pressure toward closed position. With fast idle rod at lower end of slot in choke shaft lever, clearance between choke valve and wall of air horn should be as indicated in specifications. To adjust, bend fast idle rod (see illustration.

Unloader

Hold choke valve lightly closed and open throttle valve fully. Choke valve should open sufficiently to allow a drill (see specifications for proper size) to be inserted between choke valve and wall of air horn. To adjust, bend ear on fast idle cam (see illustration).



3A12

CHOKE PISTON ADJUSTMENT

Choke Piston (Vacuum Kick)

Insert bent end of a .040" diameter wire (see illustration) into slot on side of piston bore. Apply a light closing pressure on choke valve, then with wire held in place between piston and slot, clearance between choke valve and wall of air horn should be as indicated in specifications. To adjust, bend ear on choke piston lever. Install a new welsh plug.

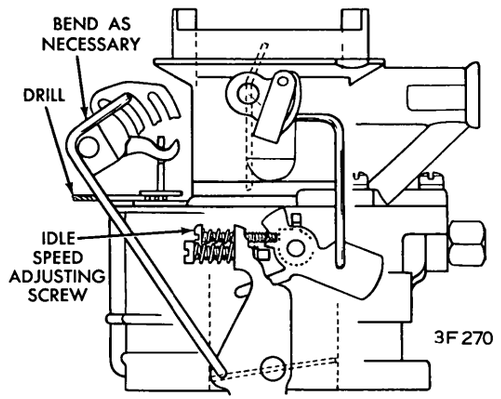
B wlVent (Accelerator Pump)

NOTE - Acc l rator pump trav l will be automatically adjusted when bowl v nt is properly adjust d. Back off idle speed adjusting screw, then pen ch ke valve so

(C ntinued)

STROMBERG WA SINGLE BARREL CARBURETORS (Cont.)

fast idle screw does not contact cam. With pump rod in center (medium stroke) slot in throttle lever, and bowl hairpin clip on pump stem in center groove, close throttle valve tightly. Clearance between bowl vent and vent seat should be as indicated in specifications. To adjust, bend accelerator pump rod (see illustration). *CAUTION - If pump rod is moved to either short or long stroke position, a corresponding change must be made in location of bowl vent hairpin clip on pump stem. Clearance between bowl vent and vent seat must also be reset and adjusted.*



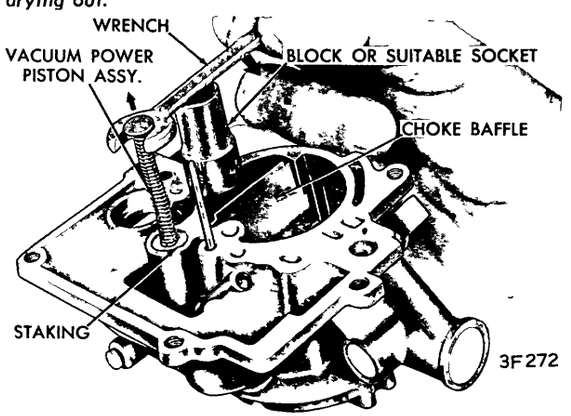
BOWL VENT (PUMP) ADJUSTMENT

OVERHAUL

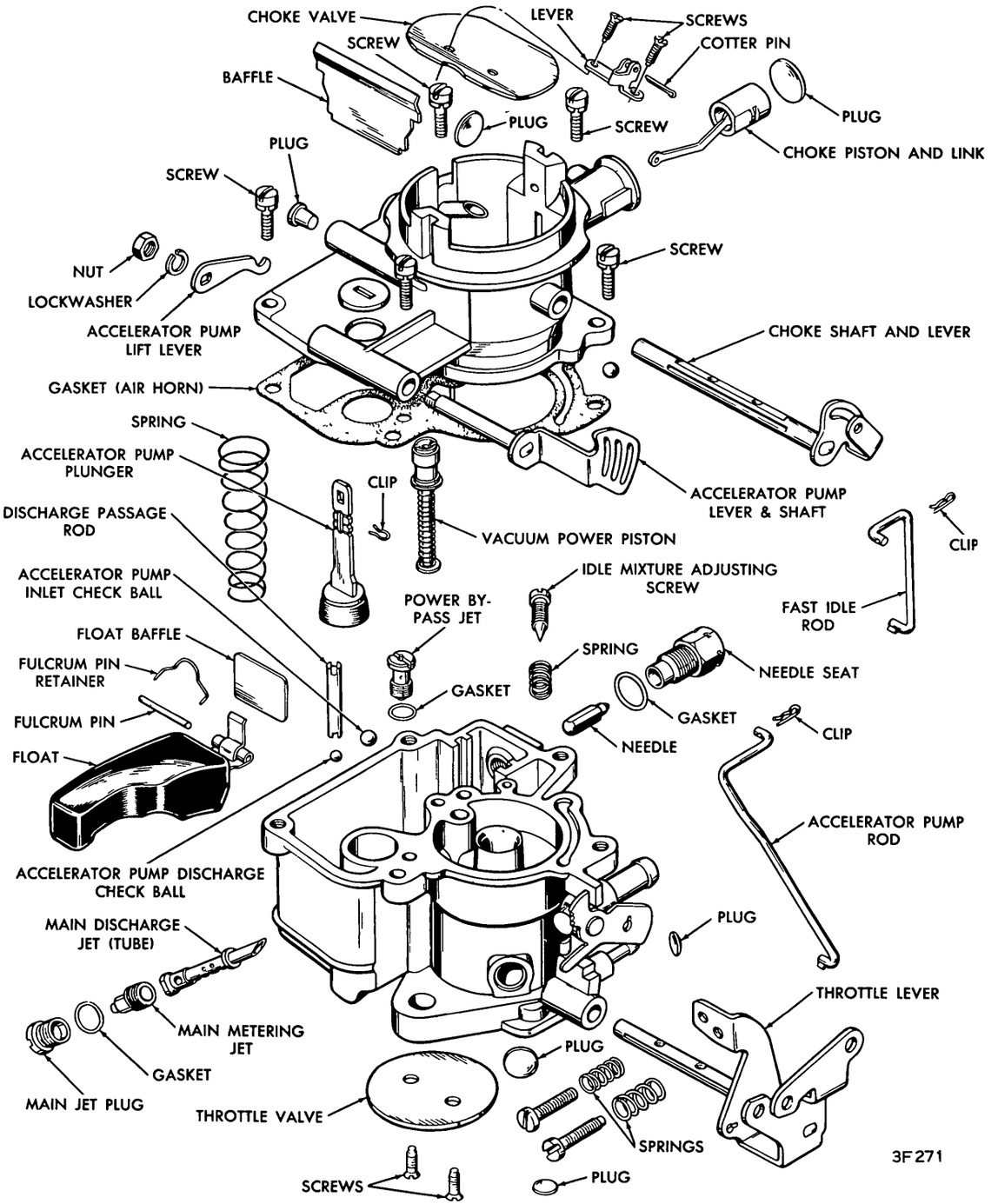
Disassembly

1) Disengage pump rod from slot in pump lever and from throttle lever, then remove fast idle rod from pump lever and fast idle cam. Remove air horn assembly. *CAUTION - Be careful not to damage idle orifice tube. This tube is pressed into place and must not be removed.*

2) Remove pump lift lever from pump shaft and remove accelerator pump assembly and vent valve. *NOTE - Place pump plunger in gasoline to prevent leather drying out.*



POWER PISTON REMOVAL



STROMBERG "WA" CARBURETOR

STROMBERG WA SINGLE BARREL CARBURETORS (C nt.)

3) Remove vacuum power piston from air horn by prying it out as indicated in illustration. *NOTE - This assembly is staked in place. Be careful when removing it.* Pierce choke piston cylinder welch plug and pry it out, then disconnect choke piston link from bracket on choke valve and slide piston out of cylinder.

4) Invert carburetor main body and allow accelerator pump inlet and discharge check balls and discharge channel rod to drop out. Do not lose these parts. Remove fuel inlet needle valve seat and gasket, then remove float baffle. Use a small screwdriver and pry out float fulcrum pin retaining spring (prevent spring from flying out), then remove float and pin assembly.

5) Remove power bypass jet and gasket. Invert carburetor main body and remove main jet plug with Tool 73598 and Tool 73609. Remove main jet with Tool 73606. Remove main discharge jet (or tube) with Tool 73608. *NOTE - Tool 73608 has a tapered right hand thread and should be screwed into jet. Threads formed in jet during removal will not damage jet.* Remove idle mixture adjusting screw and spring.

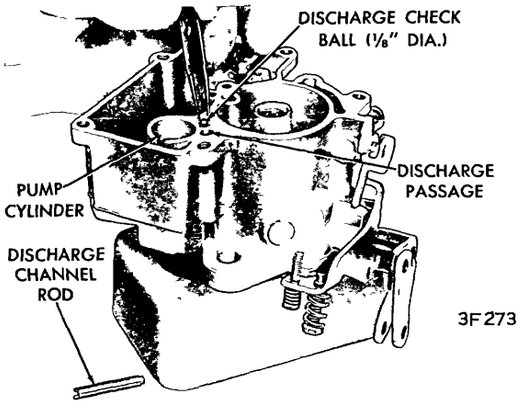
6) *NOTE - Do not remove throttle valve and shaft unless a new shaft is to be installed.* Mark valve so it can be installed in original position, then remove valve attaching screws and slide valve out of shaft. *NOTE - Screws are staked in position. Use care when removing so as not to break screws in shaft.* Slide throttle shaft out of main body.

Inspection

Wash all metal parts in a suitable carburetor cleaner and blow dry with air. Blow out all passages and jets with air pressure. Do not clean jets with a wire or drill. Inspect all parts for wear or damage and replace as necessary.

Reassembly

1) If throttle valve and shaft were removed, install new shaft in main body and slide throttle valve down into position, aligning marks made at disassembly. Install new screws but do not tighten. Hold valve in place by pressing on high side of valve, then tap valve lightly with a screwdriver to seat in throttle bore.



PUMP DISCHARGE CHECK INSTALLATION

Hold valve firmly in place and tighten screws. Stake screws in place by squeezing with pliers.

2) Install idle mixture screw and spring in carburetor, then turn screw in until it is lightly seated. Back out idle mixture screw for initial adjustment (see specifications).

3) Place main discharge jet (tube) firmly on Tool 73608 and position in main body so diagonal cut end is facing opposite side of small venturi. *NOTE - This jet must be seated firmly in main body.* Insert main metering jet in body over discharge jet (tube) and tighten securely with Tool 73606. Install a new copper gasket in main jet plug opening, then install plug and tighten securely.

4) Install float pin through float hinge and install float assembly in float bowl. Assemble fuel inlet needle valve, seat and gasket, then insert in position in main body and tighten securely. Install float pin retaining spring in position and force under lip of boss to keep pin in position. Adjust float lever (see "Adjustment" above).

5) Install pump inlet check ball (3/16" Dia.) at bottom of pump cylinder, then install pump discharge ball check (1/8" Dia.) in orifice next to pump cylinder. Install discharge channel rod over check ball. Install power bypass jet in fuel bowl, using a new gasket, and tighten securely.

6) *NOTE - Check accelerator pump as follows:* Install pump plunger in cylinder, then pour clean gasoline into fuel bowl. Work plunger up and down to expel air, then remove channel rod from discharge passage. Use a clean brass rod and press down firmly on discharge ball check. Raise pump plunger and press downward. No fuel should be emitted from either inlet or discharge passage. If leakage is indicated, clean passage, then place a piece of drill rod on ball and rap sharply with a hammer to form a new seat. Install a new check ball. Pour gasoline out of carburetor and remove pump plunger, then reinstall channel rod.

7) Clean choke cylinder sealing surface, then slide piston into cylinder. Engage link with bracket on choke valve and install cotter pin. *NOTE - Do not install welsh plug until final adjustment is made.*

8) Insert bowl vent valve clip in center groove of pump plunger stem, then install compression spring. Slide accelerator pump shaft and lever into position in air horn, then slide pump plunger stem and spring through air horn. Install vent valve over stem and engage with pump lift lever. Install locknut and washer.

9) Install vacuum power piston and plunger in air horn, then lock in position by prick punching on retainer rim. Compress piston plunger to make sure no binding exists. Install a new air horn gasket and install air horn on main body. *NOTE* - Be sure pump leather does not curl or fold back as plunger is inserted in cylinder. Install air horn retaining screws. Install fast idle rod in fast idle cam and in slotted hole in choke lever, securing rod in lever with a clip.

10) Install accelerator pump rod in throttle lever and engage other end in center slot of pump lever. Secure rod in lever with clip. Make all "Off Engine" adjustments (see above) and install a new welch plug in choke piston cylinder.

STROMBERG SINGLE & DUAL BARREL CARBURETOR JET SPECIFICATIONS

Carb. No.	Model	Standard Metering Jet Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power Jet (Two Stage) Size
3-219	WA	.063"	.061"	.059"	2-No. 67
3-219A	WA	.063"	.061"	.059"	2-No. 63
3-221	WWC	.061"	.059"	.057"	.028" & .055"
3-221A	WWC	.061"	.059"	.057"	.028" & .055"
3-222	WW	.055"	.053"	.057"	.028" & .041"

Carb. No.	Model	Standard Metering Jet Size	1 Size Lean Metering Jet Size	2 Sizes Lean Metering Jet Size	Power Jet (Two Stage) Size
3-222A	WW	.055"	.053"	.051"	.028" & .041"
3-223	WW	.054"	.053"	.051"	.031" & .045"
3-223A	WW	.054"	.052"	.050"	.031" & .045"
6-130	WW	.056"	.054"	.052"	.053" & .056"

CHRYSLER CORP. ALTERNATORS

Alternator No.	Rated Output	Regulator No.
2098835	25 amps	2098300
2098830	35 amps	2098300
2098840	40 amps	2098300

►CHANGES, CAUTIONS, CORRECTIONS

BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BATTERY BOOSTER TO START ENGINE

CAUTION - Reversed polarity or excessive voltage will result in extensive damage to alternator system. *NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Negative battery terminal must be connected to **ground.** Positive terminal must be connected to starter lead. *DO NOT REVERSE BATTERY LEADS.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

Description

Main alternator components are the two end housings, stator, rotor and rectifiers. Housings are vented at both ends and around the circumference and are held together by three through bolts. The rotor consists of a field coil encased between two six-fingered overlapping sections which are the pole pieces, and produces a 12 pole magnetic field. Ends of field coil are connected to slip rings and the battery is connected to field windings through brushes and the slip rings. The rotor shaft is supported at drive end by ball bearings and at the opposite end by a roller bearing. Both bearings are pre-lubricated. Three silicone diode rectifiers having negative polarity are pressed into the end housing, and three similar diodes having positive polarity are pressed into a die-cast aluminum sink. Alternator output is controlled by a voltage regulator.

Specifications

Performance Data (Cold - 70°F)

Alternator	Amperes	Volts	Eng. RPM
2098835	26.0 ± 3	15.0	1250
2098830	34.5 ± 3	15.0	1250
2098840	39.0 ± 3	15.0	1250

Rotation - Clockwise at drive end.
Field Coil Draw - 2.38-2.75 amps maximum at 12 volts, with alternator rotor turned manually.
Capacitor Capacity - .50 microfarad ± 20%.

TROUBLE SHOOTING & DIAGNOSIS

Alternator Does Not Charge

Blown fusible wire in regulator. Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

Low Output or Low Battery

High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

Low or Unsteady Charging Rate

Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

Excessive Charging Rate

Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator windings open. Rectifier open.

Regulator Contacts Oxidized

Regulator setting too high or rotor field coil winding shorted.

Regulator Contact Points Stuck

Poor ground connection between alternator and regulator. Open resistor element.

Alternator Noisy

Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

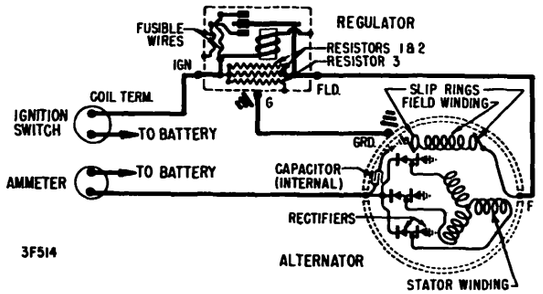
TESTING (ALTERNATOR IN CAR)

NOTE - Following tests are with battery fully charged and with engine at normal operating temperature.

►*CAUTION - DO NOT ground field circuit between alternator and voltage regulator as regulator will be damaged.*

Field Circuit Resistance

With ignition wire at coil side of ballast resistor disconnected, connect a voltmeter as shown in illustration, then, with no lights or accessories turned on, turn ignition switch ON and turn voltmeter selector switch to low voltage scale. Voltage should not exceed .55 volt. If reading is greater, high resistance in field circuit between battery and regulator field terminal is indicated. If resistance is high, move negative voltmeter lead to each connection along the circuit toward battery. A sudden drop in voltage indicates a loose or corroded terminal or connection between that and the last point tested. *NOTE - Excessive resistance in regulator wiring circuit will cause fluctuation in the ammeter.*



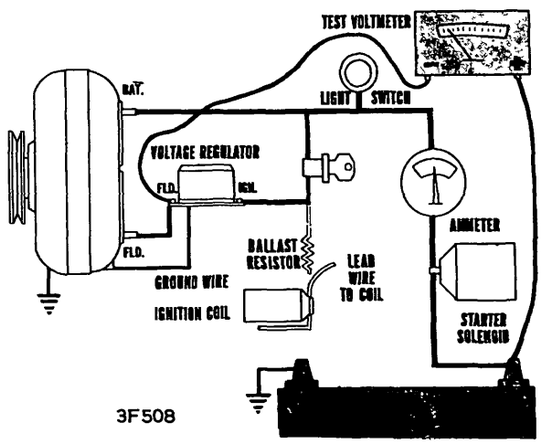
ALTERNATOR & REGULATOR CIRCUIT DIAGRAM

Charging Circuit Resistance

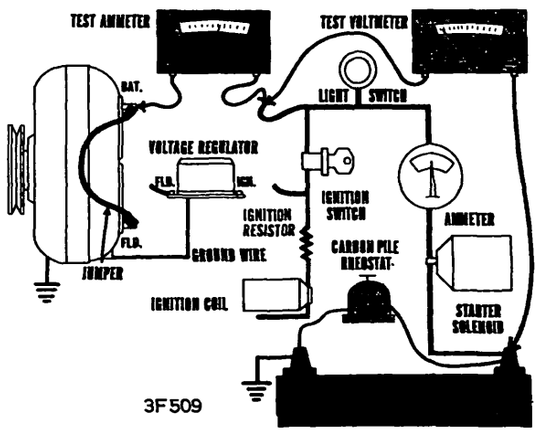
NOTE - Before making test connections, disconnect battery ground cable at battery negative post to avoid accidental shorting of charging or field circuits.

Disconnect lead at alternator "BAT" terminal and connect a 0-50 ampere scale D.C. ammeter in series between "BAT" terminal and "BAT" lead which was disconnected from the terminal (see illustration). Connect positive lead of D.C. voltmeter to the "BAT" lead and connect negative voltmeter lead to battery positive terminal. Disconnect field lead at alternator

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FIELD CIRCUIT RESISTANCE TEST



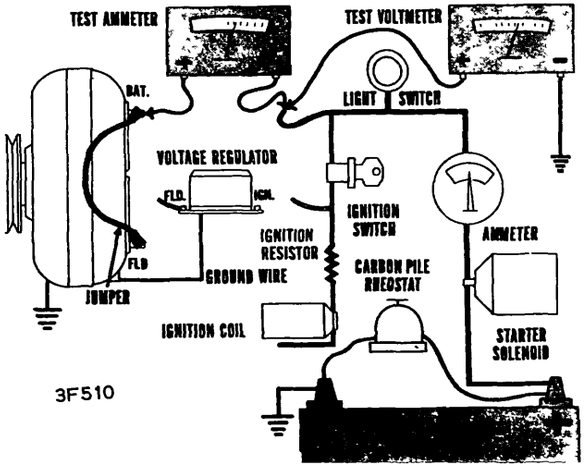
CHARGING CIRCUIT RESISTANCE TEST

CHRYSLER CORP ALTERNATOR (Cont.)

"FLD" terminal and the ignition lead at regulator "IGN" terminal, then connect a special jumper between the alternator "FLD" terminal and alternator "BAT" terminal. Reconnect battery ground at battery. Connect a "Battery-Starter" tester (with variable carbon pile) to battery terminals, then start and operate engine at a speed to obtain 10 amperes flowing in circuit. Note the voltmeter reading which should not exceed .3 volt. If a higher voltage drop is indicated, inspect, clean and tighten all connections in charging circuit. *NOTE - If necessary, test voltage drop at each connection to locate connection with excessive resistance.* Before disconnecting test equipment, disconnect battery ground cable.

Current Output

With test connections made as for "Charging Circuit Resistance", disconnect voltmeter negative lead from positive terminal of battery and reconnect to ground (see illustration). Connect a tachometer to engine, then start engine and operate at 1250 RPM. Adjust carbon pile to obtain a reading of 15 volts on test voltmeter and note reading on ammeter. Current output should be within specifications (see "Performance Data" above). *NOTE - If output is slightly less (5-7 amps) than specified, it may be an indication of possible "open" rectifier or other alternator internal problem. If output is considerably lower, it may be an indication of a possible "shorted" rectifier or other alternator internal problem. Remove alternator and "bench test" before disassembly*



CURRENT OUTPUT TEST
(ALTERNATOR ON BENCH)

Field Coil Draw

Connect positive lead of test ammeter to positive terminal of fully charged battery. Connect a jumper wire to negative terminal of battery, and ground it to alternator end shield. Connect test ammeter negative lead to field terminal of alternator. Slowly rotate alternator rotor by hand and note ammeter reading. Coil draw should be 2.3 amps to 2.7 amps at 12 volts. *NOTE - A low coil draw is an indication of high resistance in field coil circuit (brushes, slip rings, or rotor coil). A higher rotor coil draw indicates a possible shorted coil or a grounded rotor.*

Internal Field Circuit (Testing for Ground)

Remove ground brush and touch one test probe from a 110 volt test lamp to alternator insulated brush terminal and the other test probe to the end shield. If rotor assembly or insulated brush is not grounded, lamp will not light. If lamp lights, remove insulated brush assembly (noting how parts are assembled) and separate the end shields by removing the through bolts. Again test by placing one of the test probes to a slip ring and the other to the end shield. If lamp lights, rotor assembly is grounded and should be replaced. If lamp does not light after removing insulated brush and separating end shields, the cause of the ground (at first ground test) was grounded insulated brush. Install insulated brush holder, terminal, insulated washer, shake proof washer and screw. *NOTE - If the parts were not assembled in this order or if the wrong screw was used, this could be the cause of the ground condition.*

Rectifier (Diode) Test

NOTE - Rectifiers may be tested with a test lamp or with Tester C-3829 as follows:

Test Lamp Method - Disassemble alternator and separate wires at "Y" connector of stator. Use a test lamp with a No. 67 (4 cp) bulb and a 12 volt battery. Test each rectifier in turn as follows: Touch outer case of rectifier with one probe and wire in center of rectifier with other probe. Reverse the probes, moving the probe from outer case to rectifier wire and the probe at rectifier wire to outer case. If lamp lights in **one** direction, the rectifier is good. If lamp **does not** light in either direction, the rectifier is open. If lamp lights in **both** directions, the rectifier is shorted.

Tester Tool C-3829 Method - Remove alternator brushes and through bolts and separate rectifier end housing and stator from drive end housing and rotor.

Positive Rectifiers - With stator assembly on an insulated surface, connect test lead clip to alternator "BAT" terminal and plug tool into 110 volt A.C. power supply. Touch probe to **bare wire** connection of each rectifier. *CAUTION - DO NOT break sealing around rectifier lead wire or on inner end of rectifier (will accelerat corrosion).*

N gativ R ctifi r - Connect test tool lead clip to rectifier end housing and touch bare wire connection of each rectifier with probe.

T st R sults - Good rectifiers will produce a reading of 1¾ amps or more and will be approximately the same for the three rectifiers tested. If two rectifiers are good and one is shorted, the reading on the good rectifiers will be low and the shorted one will be zero (with bad rectifier disconnected, reading on other two will be satisfactory). If one rectifier is open, its reading will be approximately 1 amp and the other two rectifiers will show a satisfactory reading. Positive and negative rectifiers will read on opposite side of scale on tool.

Stator Test

Test stator for grounds with a 110 volt test lamp. *Insulate stator from end housing.* With one probe of test lamp on stator pole frame, touch each of the stator leads with other probe. If lamp lights, stator windings are grounded. To test windings for continuity, touch one lamp probe to **all thr** stator leads at "Y" connection and other probe to each of the three stator leads (disconnected from rectifiers). If lamp does not light at each of the three rectifier leads, stator winding is open.

OVERHAUL

Disassembly

ALTERNATOR BEARING LUBRICATION & REPLACEMENT CAUTION - Alternator front and rear bearings are lubricated for life. If bearings become dry, install new bearings. DO NOT attempt to lubricate. Install new bearings with shield toward rotor.

Remove insulated brush holder retaining screw, flat washer, nylon washer, and the field terminal, then carefully lift the plastic brush holder (with spring and brush assembly) from the end housing. Remove retaining screw from ground brush holder, then lift clip, spring and brush assembly from end housing. Remove through bolts and pry between stator and drive end housing with a thin blade screwdriver. *CAUTION - Stator is laminated, do not burr stator or end housing.* Carefully separate drive end housing, pulley and rotor assembly from stator and rectifier housing assembly. Remove three nuts and washers and while supporting the end frame, tap rotor shaft with a plastic hammer and separate rotor and end housing. To remove drive end bearing from rotor shaft, use Tool C-3615 and adapters C-3375. *CAUTION - Make sure low r nd of adapters are equally spaced under the bearing and that tool sleeve is bottomed on bearing.* Remove DC output terminal nuts and washers, terminal screw (and inside capacitor, if so equipped). If necessary, heat sink and insulator can be removed. To remove rectifiers from heat sink or end housing, cut rectifier wire at point of crimp, then support rectifier housing on Tool C-3771. *NOTE - This tool is cutaway and slott d to fit over wires and around boss s in housing.* Make sure that bore of tool completely surrounds rectifier, then press rectifier out of housing with Tool SP-3380. To remove roller bearing in end housing, support housing with Tool SP-3925, then press bearing out with Tool C-3770.

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CHRYSLER CORP ALTERNATOR (Cont.)

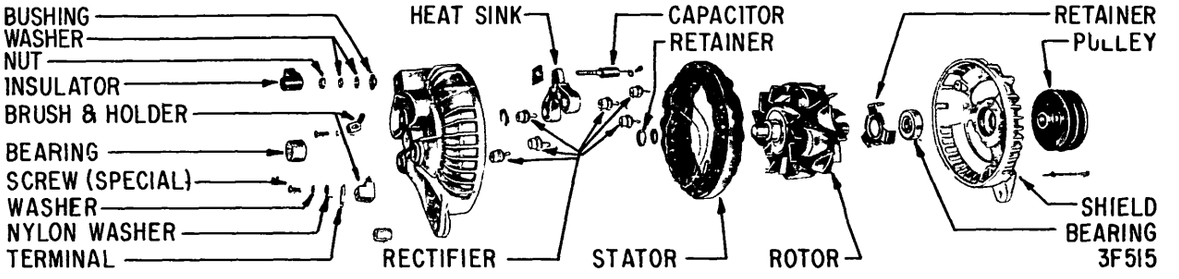
Slip Ring Replacement

Cut through rotor grease retainer with a chisel and remove retainer and insulator, then unsolder field coil leads at solder lugs. Cut through copper of both slip rings at points 180° apart, with a chisel, then break insulator and remove old ring. Clean ends of field coil lead wires. Tin one end of a bare 18 gauge wire (3" long) which will be used as a guide, then lap tinned end of guide wire over field coil lead-to-insulated ring and solder the two wires together. Position a new slip ring over guide wire and rotor shaft so wire will lay in slip ring groove (groove in slip ring must be in line with insulated brush field lead to provide room for the lead without damaging it). Place installing tool, C-3900 over rotor shaft with the guide wire protruding from slot in tool. Position rotor, slip ring and tool assembly in an arbor press, then pull on guide wire to guide insulated field lead into slip ring groove. While guiding insulated field lead through the groove, press slip ring on shaft. When slip ring is bottomed on rotor fan, end of field lead should be visible at solder lug. Unsolder guide wire from slip ring lead, then press field lead into the solder lug and and solder lug with rosin core solder. *CAUTION - Be sure solder bead does not extend beyond surface of plastic material.* Coil ground brush ring field lead around solder lug and solder with rosin core solder. Test slip rings for ground with a 110 volt test lamp by touching one probe to rotor pole shoe and other probe to slip rings Test lamp should not light. If lamp lights, slip rings are grounded (possibly due to grounding insulated field lead when installing slip ring). If rotor is not grounded, lightly clean with "00" sand paper and assemble alternator. Install new insulator and grease shield with Tool C-3921.

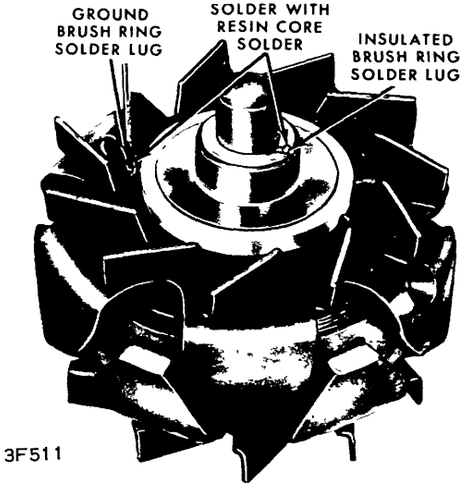
Reassembly

NOTE - Make sure the correct rectifier is being installed. Identifying part numbers are stamped on case of rectifier and the rectifiers are also identified by paint marks. Red for positive and black for negative.

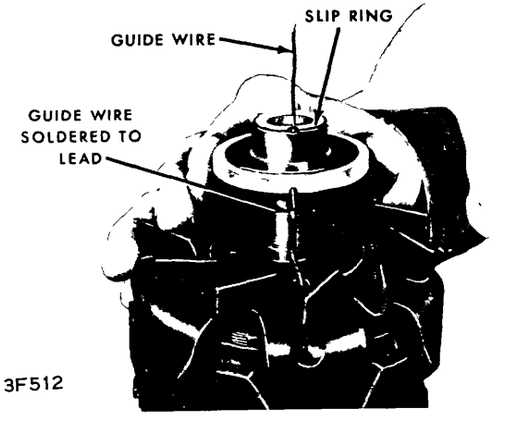
Support heat sink or rectifier end shield on installer adapter SP-3820 of Tool C-3928, then carefully apply pressure with screw until installer tool, rectifier, rectifier and shield or heat sink are in alignment. With rectifier started squarely in the casting, slowly apply pressure with screw of tool until collar of rectifier bottoms against casting. *NOTE - Make sure that installer support adapter fits squarely around inner boss of rectifier and that pressure is applied to outer rim of rectifier. DO NOT use a hammer to start rectifier in its bore. Damage to silicon wafer will result if rectifier is handled roughly.* If stator leads were disconnected, clean leads and bend rectifier wire loop snugly around stator lead and solder with a rosin core solder. *NOTE - Hold rectifier lead wire with pliers just below joint while sold ring (pliers will absorb heat from soldering and protect rectifier).* After soldering, push stator leads down into slots cast into end shield and cement in position with MoPar Cement, Part No. 2299314 (to prevent interference with rotor fan). Test each replacement rectifier to make sure rectifier was not damaged by soldering or pressing operations. Support end shield on Tool C-3925 so that notch in support tool will clear raised section of heat sink and press bearing into position with Tool SP-3381. *NOTE - New bearings are pre-lubricated and additional lubrication is not required.* Insert drive end bearing in shield and install bearing retainer plate. Position bearing and shield on rotor shaft and, while supporting base of rotor shaft, press bearing and shield into position with an arbor press and Tool C-3769. *NOTE - Make sure bearing is installed squarely. Bearing must be pressed on shaft until it contacts shoulder on shaft.* Install pulley on rotor shaft (support rotor so that all pressing force is on pulley hub and rotor shaft), then press into position with an arbor press. *CAUTION - Do not use a force greater than 6,800 lbs.* Pulley should just contact bearing inner race. Make sure heat sink insulator is in place (alternator capacitor is mounted internally), then install capacitor stud through heat sink and end shield, and install insulating washers, lockwashers and lock nuts, then make sure heat sink and insulator are in position and tighten lock nut. Position stator on rectifier end shield, then position rotor end shield assembly on stator and rectifier end shield. Align through bolt holes in stator, rectifier end shield and drive end shield, then compress stator and both end shields by hand and install through bolts, washers and nuts. Install insulated brush in rectifier end and place the bronze terminal on plastic holder with tab of terminal in recess in plastic holder. Place nylon washer on bronze terminal and install lockwasher and attaching screws. Install ground brush and attaching screw. Rotate pulley slowly by hand to be sure that rotor fans do not hit rectifiers, capacitor lead, and stator connections.



CHRYSLER CORP. ALTERNATOR ASSEMBLY



SOLDERING POINTS (SLIP RING INSTALLATION)



ALIGNING SLIP RING WITH GUIDE & FIELD WIRE

CHRYSLER CORP. ALTERNATOR REGULATOR

VOLTAGE REGULATOR

Car Model	Chrysler Part No.
All Models	2098300

►*EXCESSIVE AMMETER FLUCTUATION CORRECTION:* This condition usually indicated by excessive ammeter pointer flutter, headlight flicker and heater blower motor speed variations at steady engine speeds, and may be caused by high resistance in field circuit to alternator or voltage regulator improperly set For proper diagnosis and correction, proceed as follows· Run engine at various steady speeds with heavy electrical load (headlights and accessories on) to determine degree of fluctuation. Stop engine, disconnect lead at "IGN" terminal of regulator and install a jumper wire from "IGN" terminal to positive terminal of battery. Operate engine at 1250 RPM and observe flutter

1) If ammeter is normal, trouble is corrosion or other high resistance in field circuit connectors Clean and tighten all connections. *NOTE* - On cars with 7½ ampere fuse in circuit, clean fuse and holder terminals and tape fuse holder to prevent dirt and moisture entry.

2) If jumper wire did not correct the trouble or if ammeter fluctuation is excessive regardless of engine speed or electrical load, remove voltage regulator from car and solder a piece of copper wire between 38 ohm resistor terminal connected to "IGN" terminal of regulator and regulator base. *CAUTION* - Use only rosin core solder and be sure regulator base is heated enough for proper metal fusion.

3) Install regulator and adjust according to procedures and specifications below

►*REGULATOR 2098300 FUSIBLE WIRE REPLACEMENT NOTE:* To replace fusible wire, proceed as follows Cut blown wire from connection at rivet in regulator base (do not unsolder as voltage coil wire may be damaged), and unwind wire from regulator contact bracket Use rosin core solder only, tin one end of Fusible Wire No 2275242 and hold wire in recess in rivet against old fuse wire Put a drop of solder on wires When cool, pull fusible wire up and wrap around contact bracket and solder wire to bracket to be sure of a good connection

Description

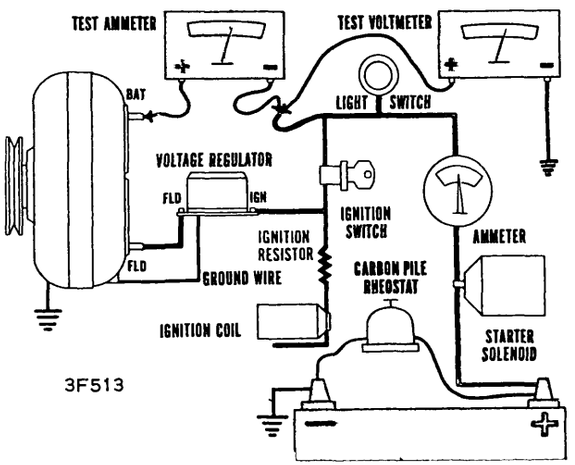
Field control type Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature Upper stationary contact bracket is connected to "IGN" terminal by a fusible wire, and lower stationary contact bracket is connected to ground by another fusible wire Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows

Upper Contact Operation (Low Speed & High Load) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current

Lower Contact Operation (High Speed & Low Load) - Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open), and limiting field current

Checking Regulator

Upper Contact Test - Connect a test ammeter, voltmeter, and carbon pile rheostat as shown in illustration *NOTE - Connections are the same as for "Current Output Test" (see "Testing - Alternator on Car" above), except that field lead is connected at alternator "FLD" terminal and the regulator ignition terminal lead is connected to ignition terminal* Start and operate engine at 1250 RPM, then adjust carbon pile rheostat to obtain a 15 amp output as indicated on test ammeter *NOTE - No current reading on test ammeter would indicate either a low set regulator or a blow fuse wire inside voltage regulator between upper stationary contact and "IGN" terminal* Operate engine for 15 minutes with a 15 amp load at 1250 RPM to stabilize system, then check ambient temperature at regulator Check test voltmeter With a 15 amp load, voltmeter reading should be within specifications at the indicated ambient temperature (see "Voltage Setting - Ambient Temperature" below) If upper contact voltage setting is not within specifications, adjust voltage setting (see below)



VOLTAGE REGULATOR TEST

Lower Contact Test - Increase engine speed to 2200 RPM and change the carbon pile rheostat to decrease current load to 7 amps output Voltage should **increase** and the amperage should **decrease.** *NOTE - There will be a slightly higher voltage at engine speeds above 2200 RPM (increased voltage must not exceed specifications by more than 7 volt at any temp rature range)*

AMBIENT TEMPERATURE NOTE - The ambient temperature is the temperature registered on a reliable thermometer positioned ¼" from regulator cover

Voltage Setting - Ambient Temperature

Temp. (°F)	Voltage	Temp. (°F)	V ltage
47°	13 8-14 4	117°	13 5-14 1
70°	13 7-14 3	140°	13 4-14
93°	13 6-14 2	163°	13 3-14 9

Adjustment

Upper Contact Voltage Setting - Adjust as necessary by bending regulator lower spring hanger down to **increase** voltage setting, up to **decrease** voltage setting Use an insulated tool to bend spring hanger *NOTE - Regulator must be installed, correctly connected and retested after each adjustment of lower spring hanger*

Lower Contact Voltage Setting - If voltage regulator lower contact setting is outside the 2- 7 volt setting limits, adjust lower contact point gap If lower contact gap is correct and voltage regulator setting is still not within specifications, adjust the air gap

Contact Point Gap - 014' ± 002" To adjust, bend lower stationary contact bracket, making sure points are in alignment

Air Gap - 048- 052" (nominal setting) To adjust, connect a dry cell test lamp in series with "IGN" and "FLD" terminals of voltage regulator, then insert a 048" wire gauge between regulator armature and core of voltage coil next to stop pin on spring hanger side Press down on armature (not on contact reed) until armature contacts wire gauge The upper contacts should just open and the test lamp should be dim Insert a 052" wire gauge between armature and voltage coil core next to stop pin on spring hanger side Press down on armature until it contacts wire gauge Upper contacts should remain closed and test lamp should remain bright If an adjustment is required to obtain the difference between upper contact voltage and lower contact voltage of 2 to 7 volt, adjust the air gap by loosening stationary contact bracket screw and moving bracket up or down as necessary to obtain proper air gap setting as follows If difference is above 7 volt reduce air gap to a minimum of 045" (contacts open, test light dim) 048" contacts closed (test light bright) If difference is below 2 volt, increase air gap to maximum of 052" (contacts open test light dim), 055" (contacts closed, test light bright) Make sure air gap is checked with stationary contact bracket attaching screw fully tightened

DELCO-REMY DELCOTRON (1-D, 2-D, 3-D, 4-D SERIES)

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING OR USING A BOOSTER BATTERY TO START ENGINE CAUTIONS: R v rs d polarity or excessive voltage will result in xt nsiv damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE:*

Batt ry Installati n - Alternator polarity determines which battery terminal is grounded. For negative polarity alternators, **n gativ** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or r ctifi rs will b damag d.*

Charging Batt ry - If a "Fast Charger" is used, both car battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

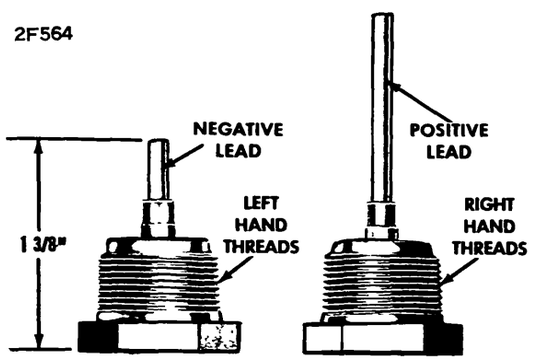
B st r Batt ry (Us d To Start Engine) - Booster battery must be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

►*ALTERNATOR CIRCUIT NOTE:* Alternators may be either "A" or "B" circuit type. On "B" circuit types, ground brush is grounded directly to end housing and "F2" terminal position (if provided) is not used. *NOTE - Both slip rings are insulated from rotor shaft.*

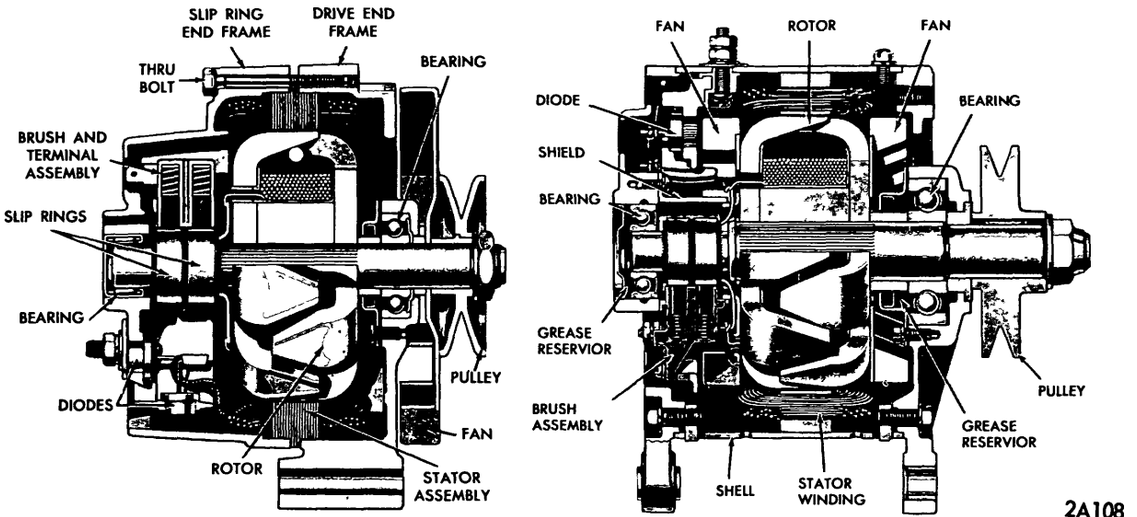
DESCRIPTION: Conventional three-phase, self-rectifying type alternators. Alternators are of various series depending on design differences (regardless of part number series). Each series may be different in construction to the extent of having heavy duty or long-life components. All series, except 3-D Series, have a single field winding wound on rotor shaft and encased between two multi-fingered overlapping iron pole pieces assembled on rotor shaft. Field winding (all Series) is connected to two slip rings assembled on, but insulated from, rotor shaft.

LUBRICATION: No periodic lubrication required. At time of overhaul, if bearings reusable (except slip ring end needle-roller bearings), pack grease reservoir ¼-½ full with Delco-Remy Lubricant, No. 1948791, and also pack bearings with same lubricant. *NOTE - R place b arings if lubricant supply exhausted. DO NOT att mpt t r lubricate or reuse needle-roller type b aring.*

2F564

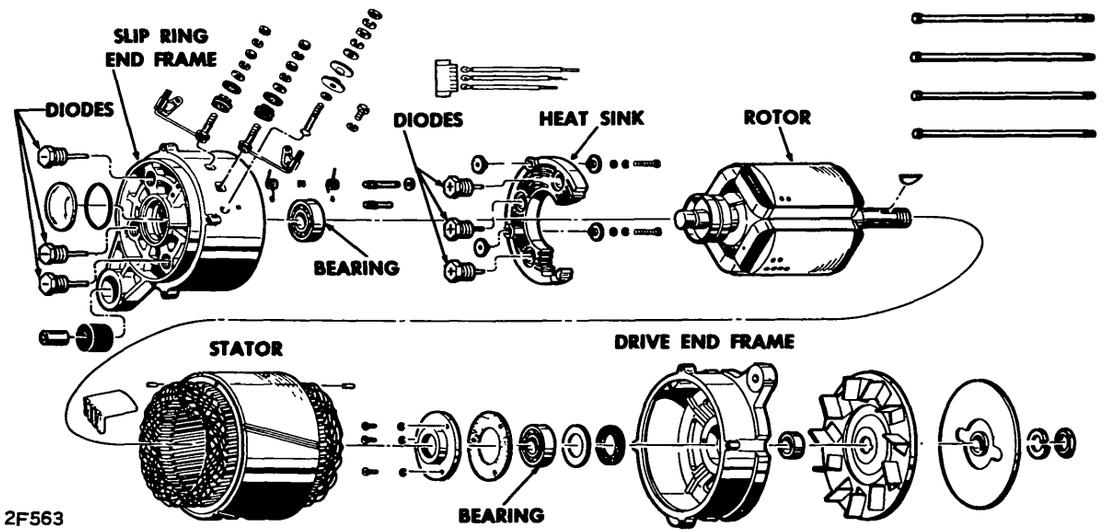


THREADED TYPE DIODE IDENTIFICATION



1-D SERIES 2-D SERIES 2A108

DELCO-REMY "DELCOTRON" ALTERNATORS



2F563

DELCO-REMY "DELCOTRON" ALTERNATOR (3-D SERIES)

OUTPUT TEST

►*CAUTION: 1) Do not short across or ground any of the terminals on alternator or regulator.*

2) Do not polarize alternator as it is not required and doing so will damage entire system.

3) D n t p rat alt rnator n p n circuit. Mak sure all c nn cti ns are s cure and tight.

4) B for making t st c nnections, ignition switch must b ff.

OUTPUT TEST: Connect an ammeter in series at alternator "BAT" terminal, and a voltmeter from alternator "BAT" terminal to ground. Connect alternator field directly to battery (regulator out of circuit) with a jumper wire. Turn on switch and slowly increase alternator speed and check for rated output *(see Car Model Pages for specifications). CAUTION - L ad battery (carbon pile rheostat or turn headlights and other accessories on) to prevent high v ltag . Do not all w alternator v ltage to exceed voltag setting f r gulator.*

OVERHAUL

See 1962 Final Data, Pag 300.

DELCO-REMY DOUBLE CONTACT ALTERNATOR REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTIONS: Reverse polarity or excessive voltage will result in extensive damage to alternator system. Observe all cautions as detailed on appropriate alternator data pages.*

►*CIRCUIT TYPE NOTE:* These units are "B" circuit type (field winding grounded at alternator).

DESCRIPTION: Regulators are conventional design. Four different types containing a double contact voltage regulator alone or in combination with a field relay or an indicator light relay, are used as follows:

Type 1 - Identified by conventional lug-type terminals. Units may contain voltage regulator, field relay, and indicator light relay. If used on applications where an ammeter is used instead of an indicator light, regulator will contain a voltage regulator and field relay only.

Type 2 - Identified by blade type terminals to fit matching car wiring harness connector. Unit contains a voltage regulator and a field relay. This type used in circuits with an indicator light but a separate indicator light relay is not used. Indicator light circuit is such that closing of field relay contacts causes indicator light to go out.

Type 3 - Identified by blade type terminals to fit matching car wiring harness connector. Unit contains a voltage regulator and a field relay. Used in circuits with either an ammeter or an indicator light. When used with indicator light, a separate double contact indicator light relay is also used.

Type 4 - Identified by blade type terminals to fit matching car wiring harness connector. Unit contains a voltage regulator only; has three terminals and is used in circuits with an ammeter.

TESTING & TROUBLE SHOOTING

See 1962 Final Data, Page 302.

Open Resistor: Type 2 - *NOTE - Test is not applicable to other types.* Connect a voltmeter from No. 4 terminal of wiring harness (regulator disconnected) to regulator base (ground). Turn ignition switch to "ACC" position. If voltmeter reading is zero, resistor on "ACC" terminal of ignition switch is open. *NOTE - Resistor may be a separate unit or a resistance wire.* Resistance value is 10 ohms; wattage is 6.25 watts minimum.

Field Relay: Type 1 - Connect voltmeter from regulator "F" terminal to ground. Turn on ignition switch (do not start engine). Voltmeter should read battery voltage. If reading zero, see *"Checking & Adjusting"*

Type 2 - If indicator light functions normally, field relay is operating normally. If indicator light does not go out when alternator operating, determine if field relay or alternator is faulty as follows: With regulator in circuit, connect a voltmeter from No. 2 terminal to ground. Run alternator at moderate speed and note voltmeter reading. If reading 5 volts or above and indicator light does not go out, relay is faulty. If voltmeter reading is below 5 volts, alternator is faulty.

Type 3 - With regulator in circuit, connect a voltmeter from "F" terminal to ground. Turn switch to "IGN" and note voltmeter. Reading should be battery voltage. If reading is zero, line between switch and regulator No. 2 terminal is open, or field relay is faulty.

High Circuit Resistance: Type 1 - *NOTE - Test is not applicable to other types.* Connect the voltmeter from battery positive terminal to alternator "F" terminal. Turn on ignition switch (do not start engine). If voltmeter reading exceeds .3 volt, there is excessive line resistance. After terminals and connections tightened and cleaned, if voltage reading still exceeds .3 volt, clean all regulator contact points. If reading still more than .3 volt, check alternator field by removing lead from regulator field terminal and connecting an ammeter in series with alternator field winding. Field coil draw must be within specifications.

Alternator Output: All Types - Connect an ammeter in series at alternator "BAT" terminal, and a voltmeter from alternator "BAT" terminal to ground. Connect alternator field directly to battery (regulator out of circuit) with a jumper wire. Turn on ignition switch and slowly increase alternator speed and check for rated output. *CAUTION - Load battery (carbon pile rheostat or turn on headlights and other accessories) to prevent high voltage. Do not allow alternator voltage to exceed voltage setting of regulator.*

OVERCHARGED BATTERY: Check for shorted battery cell, high circuit resistance (see "Undercharged Battery" above), or high voltage regulator setting.

►*VOLTAGE SETTING TAILORING NOTE:* If no circuit defects are found during all of the above tests and battery remains constantly over, or undercharged, voltage regulator setting may be raised or lowered .3 volt to compensate for various operating conditions.

ADJUSTMENT

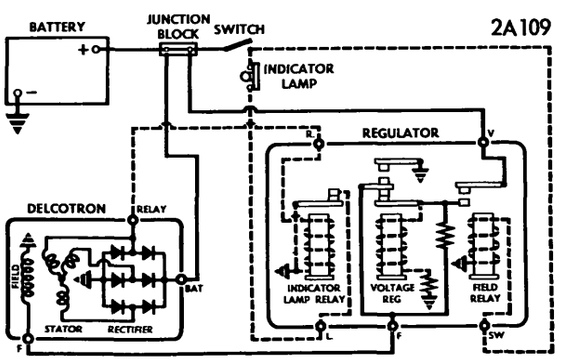
►*CAUTION: Observe all cautions listed under "Testing & Trouble Shooting" above.*

VOLTAGE REGULATOR

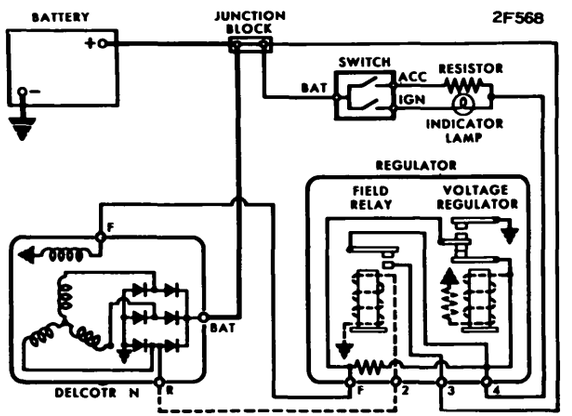
Contact Gap: Measure upper contact gap with lower contacts just touching. To adjust, bend upper contact arm. *Do not bend hinge.*

Air Gap: Measure gap between armature and core with lower contacts just touching. To adjust, turn nylon nut on contact support (Types 2, 3 & 4). To adjust Type 1, loosen contact support bracket screw 1/8-1/4 turn, insert screwdriver into slot in contact support and into molded insulator. Raise screwdriver handle to increase air gap, lower handle to decrease gap. Tighten contact support bracket screw.

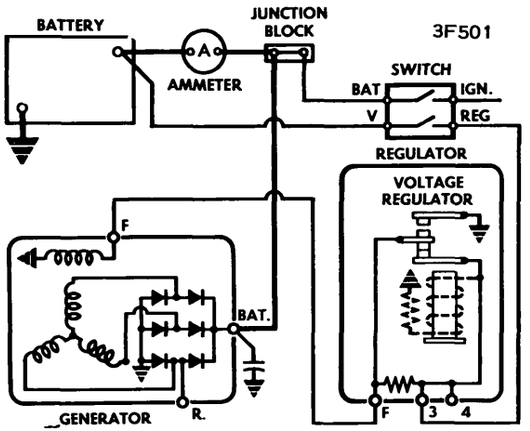
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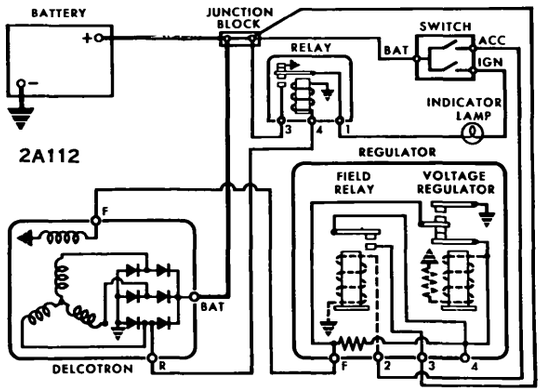
TYPE 1 REGULATOR CIRCUIT DIAGRAM



TYPE 2 REGULATOR CIRCUIT DIAGRAM



TYPE 4 REGULATOR CIRCUIT DIAGRAM



TYPE 3 REGULATOR CIRCUIT DIAGRAM
(WITH INDICATOR LIGHT & SEPARATE RELAY)

DELCO-REMY DOUBLE CONTACT ALTERNATOR REGULATORS (C ntinued)

►*NORMALIZING THE REGULATOR:* Before checking or adjusting voltage regulator, bring regulator to operating temperature of 125°F by connecting a ¼ ohm fixed resistor and an ammeter in series with battery and alternator "BAT" terminal, and operating alternator for 15 minutes at approximately 3500 RPM (1500 Engine RPM) with 10 amperes or less output, with the regulator cover in place, until regulator heated and stabilized. Accessories and lights must be turned off. After warm-up completed, cycle alternator by stopping and restarting.

Voltage S tting: T st M t r Connections - Leave ammeter and ¼ ohm resistor connected as described under "Normalizing The Regulator" above. Connect a carbon pile rheostat across battery. Make other test connections as follows:

Typ 1 - Connect a 25 ohm, 25 watt variable resistor in series with field winding at regulator "F" terminal. Disconnect lead from regulator "V" terminal. Connect a voltmeter from "V" terminal to regulator base (ground), and a jumper wire from "V" terminal to alternator "BAT" terminal.

Types 2, 3 & 4 - Maintain connections at No 2 & 4 terminals (No 4 not used on Types 3 & 4) Connect a 25 ohm, 25 watt variable resistor in series at "F" terminal. Disconnect No. 3 terminal lead from wiring harness connector and connect a jumper lead from No. 3 adapter wire to alternator "BAT" terminal, and a voltmeter from No. 3 adapter wire to regulator base (ground).

Cycling - To cycle alternator during testing, proceed as follows: Turn variable resistor in field circuit to full resistance position. Momentarily disconnect and reconnect jumper lead from "V" terminal (Type 1), lead at No. 4 terminal on wiring harness connector (Type 2), jumper lead at alternator "BAT" terminal. (Types 3 & 4) *CAUTION - Do not disconnect leads with variable resistance in "no resistance" position.*

Checking Proc dur - 1) Bring engine speed to 2500 RPM (approximately 6000 Alternator RPM) and note voltage reading which should be as specified in table below. Regulator should be operating on upper contacts. *NOTE - Best m thod of determining which contacts ar in us is t us earphones to note the transfer. If r gulator will not operate on upper contacts, partially recharg batt ry.* Adjust voltage within specifications for ambient temperature (see table below) by turning adjusting screw to adjust armature spring tensior Cycle alternator (see above), recheck and readjust upper contact setting.

2) To check operation on lower contacts, operate engine at 2500 RPM (approximately 6000 Alternator RPM), and slowly turn variable resistance into the circuit until regulator operates on lower contacts, and note voltage which should be .1-.3 volt lower than when operating on upper contacts. *NOTE - If turning resistance into circuit does not make regulator operate on lower contacts, turn variable resistance out, load battery (carbon pile or turn headlights on), then adjust variable resistor for lower contact operation.* To increase difference in voltage between upper and lower contacts, increase armature air gap slightly; to decrease difference, decrease air gap slightly. *NOTE - This adjustment can be made with regulator operating. If necessary to make adjustment, recheck voltage setting of both sets of contacts.*

►*VOLTAGE SETTING TAILORING NOTE:* If battery consistently over- or undercharged after voltage regulator properly set and all other checks indicate no circuit defects, voltage regulator setting may be raised or lowered .3 volt to compensate for various underhood temperatures and other operating conditions. Allow reasonable length of time to check performance. Proper setting is obtained when battery remains fully charged with minimum use of water.

Voltage Regulator Specifications

Regulator Model	Air Gap	Contact Gap	Voltage Setting
1119500,2,3,5,8	Ⓒ	016"	Chart No 1
1119511	Ⓒ	015"	Chart No 1
1119506,7,12	Ⓒ	014"	Chart No 1
1119513, 14, 15	Ⓒ	014"	Chart No 1

Ⓒ - Adjust air gap (see above) ONLY when necessary to obtain specified difference between voltage settings of upper and lower contacts **After bench repair only,** set air gap to approximately 067" Final air gap must be whatever is required to obtain specified difference in voltage between upper and lower sets of contacts

Voltage Setting - Ambient Temperature (Chart No. 1)

Temp.	Ⓒ Setting	Temp.	Ⓒ Setting
65°F	13.9-15.0	145°F	13.4-14.2
85°F	13.8-14.8	165°F	13.2-14:0
105°F	13.7-14.6	185°F	13.1-13.9
125°F	13 5-14 4		

Ⓒ - Operating on upper contacts 1 4 volts lower when operating on lower contacts.

FIELD RELAY

Air Gap: Check air gap between armature and core with contacts just touching. To adjust, carefully bend flat contact support spring.

Contact Gap: Type 1 - Normally not adjusted. If air gap and closing voltage within specifications, relay will operate satisfactorily even if contact gap not exactly as specified.

Typ 2 & 3 - Adjust by bending armature stop.

Closing Voltage: Test Meter Connections - Make meter connections as follows:

Type 1 - Connect a 50-75 ohm variable resistor in series at "SW" regulator terminal. Connect a voltmeter from "SW" terminal to regulator base (ground).

Type 2 & 3 - Connect voltmeter from regulator base to regulator No. 2 terminal. Connect a 50-75 ohm variable resistor from regulator No. 2 terminal to wiring harness connector No. 3 terminal. *Other leads from regulator t wiring harness must be disconnected.*

Checking Procedure - Turn all resistance into circuit, turn on ignition switch, then slowly decrease resistance and note closing voltage of relay. If not as specified, adjust by bending armature heel iron as necessary.

Field Relay Specificati ns

Regulator Model	Air Gap	Contact Gap	Closing Voltag
1119500	.015"		6.5-8.5 volts
1119502	.015"		6.5-8.5 volts
1119503	.015"		6.5-8.5 volts
1119505	.015"		6 5-8 5 volts
1119506	.015"	.030"	1.5-2 7 volts
1119507	.015"	.030"	3 8-7.2 volts
1119508	015"	015"	6 5-8.5 volts
1119512	015"	030"	1 5-2 7 volts
1119513	015"	030"	3 8-7 2 volts
1119514	015"	030"	3 8-7 2 volts
1119515	015"	030"	1.5-2 7 volts

INDICATOR LIGHT RELAY

Air Gap: Measure air gap with contacts just touching (integral type - Type 1), with upper contacts closed (separate type - Type 3). To adjust, bend upper contact support.

Contact Gap (Separate Relay): Measure upper contact gap with lower contacts just touching.

Voltage Setting: *NOTE - On integral type relays, setting is contact opening voltage. On separate type relays, setting is lower contact closing voltage.* Connect a voltmeter from regulator "R" or No. 4 (Center) terminal to regulator base (ground). Connect a 50-75 ohm variable resistor in series with this same terminal and the battery. With all resistance turned into circuit, slowly decrease resistance and note opening (or closing) voltage. If not correct, adjust by bending armature heel iron.

Indicator Light Relay Specifications

(Integral Type)

Regulator No.	Air Gap	Opening Voltag
1119502, 3, 8	010" Min	3 4-4 8

(Separate Type)

Relay Model	Air Gap	Contact Gap	Closing Voltage	Sealing Voltag
1115823	.011"	.015"	3.8-5.2	5.7 max.

DELCO-REMY TRANSISTORIZED ALTERNATOR REGULATORS ("B" CIRCUIT TYPE)

►CHANGES. CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, CHARGING, & BOOSTER BATTERY CAUTIONS: Observe the cautions for battery installation, battery charging, and using a booster battery as detailed at beginning of appropriate alternator data pages.*

CIRCUIT TYPE NOTE: These units are "B" circuit type (field winding grounded at alternator). For "A" circuit type (field winding grounded at regulator), see 1961 Final Data, Page 283.

DESCRIPTION: Transistorized type with two diodes. Transistor works with a conventiona! type voltage regulator unit to limit alternator voltage to pre-set value. Diodes prevent damage from possible transient voltages in system. Assembly also contains a field relay for control of alternator field (also controls light on Reg. No. 9000595). When an indicator light is used on instrument panel, a separate indicator light relay is used (except with Reg. No 9000595) for control of this system.

TESTING & TROUBLE SHOOTING

►*CAUTION: 1) Do not short across or ground any of the terminals on alternator or regulator.*
2) Do not polarize alternator as it is not required and doing so will damage entire system.
3) Do not operate alternator on open circuit. Make sure all connections are secure and tight.
4) Before making test meter connections, Ignition switch must be off.

INDICATOR LIGHT RELAY CHECK (Units With Separate Light Relay): If indicator light stays on with alternator operating, connect a voltmeter from indicator light "R" terminal and note voltage with alternator operating. If voltage is above 11-11 6 volts, relay is faulty.

INDICATOR LAMP CIRCUIT CHECK (Units With Light Controlled Through Field Relay): If lamp does not light, turn ignition switch to "IGN" position, but do not start engine. Momentarily (for not more than 10 seconds) connect a jumper lead from "L" terminal of harness connector (to regulator). If lamp does not come on, check for burned bulb, or an open in wiring between battery and jumper lead. If lamp comes on, connect the jumper between "F" and "L" terminals of adapter. If the lamp comes on again, the circuit is open in the regulator If it does not come on, there is an open in the field lead between regulator and alternator or in alternator field. If the lamp does not go out with generator in operation, see "Undercharged Battery" below. Also, if lamp fails to go out when ignition switch is turned off, the alternator probably has a shorted diode in the heat sink.

UNDERCHARGED BATTERY: Drive belt loose or battery defective. Alternator faulty, high circuit resistance, low voltage regulator setting, field relay faulty or open transistor, faulty diodes.

Alt rnat r Output: Connect an ammeter in circuit at alternator "BAT" terminal and voltmeter from alternator "BAT" terminal to ground. Remove lead from regulator "F" terminal and connect to regulator "V" terminal. Slowly increase alternator speed and check for rated output. *CAUTION - Load battery (carbon pil rheostat or turn on headlights and other accessories) to prevent high voltage. Do not allow alternator voltage to exceed voltage setting of regulator.*

High Circuit Resistance: Connect a voltmeter from battery insulated terminal to regulator "V" terminal. Turn on ignition switch (do not start engine) and note voltage drop. If voltage drop exceeds .3 volt, high circuit resistance is indicated.

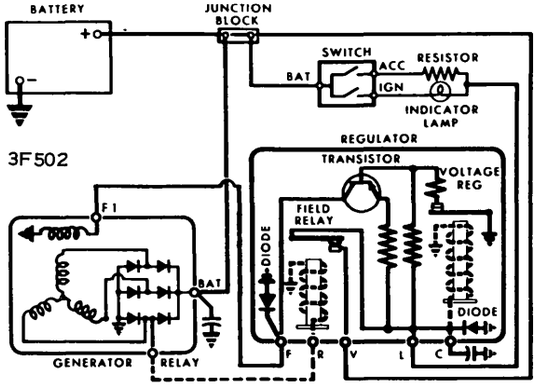
Low Voltage Regulator Setting: Connect a voltmeter from regulator "F" terminal to regulator base (ground). Turn on ignition switch (do not start engine). If voltmeter reads 9 volts (Exc Reg. No 9000595); 8 volts (Reg No. 9000595) or above, voltage regulator setting is too low If reading is below the above voltages, field relay contacts are not closed, or resistor and transistor are burned out.

Diodes Faulty: Disconnect "F" and "V" leads from regulator, remove cover, and unsolder both diode leads. Connect an ohmmeter from diode case to diode lead and note reading. Reverse ohmmeter connections and note reading. If both readings less than 2 ohms, diode is faulty. If both readings are very high (infinite), diode is faulty. A good diode will give one low reading and one high reading. Check other diode in same manner. *CAUTION - Use ohmmeter with 1½-volt cell and use lowest range scale. When replacing diode, limit solder time to minimum as high heat will damage diode.*

OVERCHARGED BATTERY: Make all tests as listed under "Undercharged Battery" above, and check for shorted transistor as follows:

Transistor Shorted: Connect a voltmeter from regulator "F" terminal to ground. Remove regulator cover, turn on ignition switch, and hold voltage regulator contacts open. If voltage reading above 9 volts, transistor is shorted and must be replaced. *NOTE - Replace transistor by removing attaching screws and unsoldering connections directly above transistor. Limit soldering time to minimum as high heat will damage transistor.*

►*VOLTAGE SETTING TAILORING NOTE:* If no circuit defects are found during all of the above tests and battery remains constantly over- or undercharged, voltage regulator setting may be raised or lowered .3 volt to compensate for various operating conditions.



REGULATOR CIRCUIT WIRING DIAGRAM
(COMBINATION FIELD & LIGHT RELAY)

ADJUSTMENT

►*CAUTION: Obs rv all cautions listed und r "T sting & Trouble Shooting" above.*

FIELD RELAY

Air Gap: Check air gap between armature and core with contacts just touching. To adjust, carefully bend flat contact support spring.

Contact Gap: Normally not adjusted. If air gap and closing voltage within specifications, relay will operate satisfactorily even if contact gap not exactly as specified.

Closing Voltage: Connect a 50 ohm variable resistor in series from ignition switch to regulator "SW" terminal. Connect a voltmeter from regulator "SW" terminal to regulator base (ground). Turn all resistance into circuit, turn on ignition switch, and slowly decrease resistance and note relay closing voltage. If not as specified, adjust by bending armature heel iron as necessary.

Field Relay Sp cifications

Regulator Model	Air Gap	Contact Gap	Closing Voltag
9000558 566 ..	014"	. 027"	5-9.5 volts
9000567, 574	014"	027 '	5-9.5 volts
9000595	015"	.027"	2 3-3.5 volts

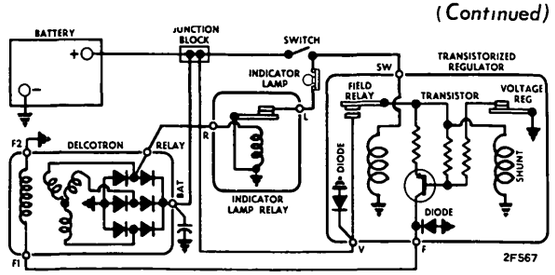
VOLTAGE REGULATOR

Air Gap: Measure air gap with armature pressed down to point where contacts just touch. To adjust, move upper contact support bracket as necessary.

Voltage Setting: 1) Connect an ammeter in ignition switch lead at alternator "BAT" terminal. Disconnect lead at regulator "V" terminal and connect a jumper wire from "V" terminal to alternator "BAT" terminal. Connect a voltmeter from regulator "V" terminal to regulator base (ground). Place a carbon pile rheostat across battery.

2) Bring regulator to ambient temperature of 125°F by operating alternator at 3000 RPM for 15 minutes with 3-10 amperes output, with regulator cover in place. After warm-up completed, cycle alternator by turning off switch, stopping alternator, and temporarily disconnecting jumper lead at regulator "V" terminal. Reconnect jumper lead, operate alternator at 3000 RPM

(Continued)



REGULATOR CIRCUIT WIRING DIAGRAM
(SEPARATE LIGHT RELAY)

DELCO-REMY TRANSISTORIZED ALTERNATOR REGULATORS ("B" CIRCUIT TYPE) Cont.

and note voltage reading. If not within specifications listed below, adjust by turning adjusting screw to adjust armature spring tension. Recycle, recheck, and readjust if necessary. *NOTE - Always make final adjustment by turning adjusting screw clockwise. If alternator voltage drops below 3 amperes minimum, load battery with carbon pile rheostat or turn on headlights and other accessories to obtain 3-10 amperes alternator output.*

Voltage Regulator Specifications

Regulator	Air Gap	Voltage Setting
9000558	075"	Chart No. 1
9000566	075"	Chart No. 1
9000567	075"	Chart No. 1
9000574	.075"	①② 13.5-14.5
9000595	075"	Chart No. 1

① - This is a flat compensated regulator; therefore adjust voltage to specified setting regardless of temperature

② - Adjust voltage to 14.0 volts

Voltage Setting - Ambient Temperature (Chart No. 1)

Temp.	Setting	Temp.	Setting
65°F	13.6-14.5	125°F	13.2-14.2
85°F	13.4-14.5	145°F	13-14
105°F	13.3-14.3	165°F	12.8-13.8

►*VOLTAGE SETTING TAILORING NOTE:* If battery consistently over or undercharged after voltage regulator properly set and all other checks indicate no circuit defects, voltage regulator setting may be raised or lowered .3 volt to compensate for various underhood temperatures and other operating conditions. Allow reasonable length of time to check performance. Proper setting is obtained when battery remains fully charged with minimum use of water.

DELCO-REMY TRANSISTOR ALTERNATOR REGULATORS

BATTERY INSTALLATION, CHARGING, & BOOSTER BATTERY CAUTIONS - Observe cautions for battery installation, battery charging, and using a booster battery as detailed at beginning of appropriate alternator data pages.

Description

This externally adjusted transistor regulator contains two transistors and five diodes to control the alternator field current and limit alternator voltage to a preset value. There are no moving parts in this unit and it cannot be disassembled for service.

Testing

CAUTION - Do not short between or ground any of the terminals on the alternator. DO NOT attempt to polarize the alternator.

BATTERY NOTE - Battery specific gravity must be 1.220 or above before checks are made as outlined below.

Battery Undercharged - 1) Connect an ammeter in circuit at alternator "BAT" terminal, then connect a voltmeter from "BAT" terminal of alternator to ground.

2) Disconnect wiring harness connector from alternator "F" terminal and connect a jumper lead from alternator "F" terminal to alternator "BAT" terminal.

3) Operate alternator at specified RPM (see car model page) and turn on the necessary accessories to obtain specified voltage. *CAUTION - Make sure there is sufficient load on the system so that high voltages are avoided.* If current output is low, remove and check alternator.

NOTE - If alternator failure was caused by a defective stator or diodes, the paired alternator may be installed back in car and no further checks are needed. If alternator failure was caused by a defective field winding, the repaired alternator may be installed back on car, and the following steps must be made to locate possible damage to transistor regulator.

4) If current output is within specifications. Remove jumper lead and reconnect wiring harness connector to alternator "F" terminal, then turn ignition switch on, but do not start engine.

5) Connect voltmeter positive lead to battery positive terminal and negative lead prod into regulator connector body to make connection at the regulator. Record the voltage drop.

6) Connect voltmeter to negative terminal of battery and ground positive lead at regulator. Record the voltage drop. If the addition of both voltage readings is greater than 3 volt, check ignition switch for poor contacts and system wiring for high resistance.

7) If total voltage is less than 3 volt, connect voltmeter positive lead to regulator terminal and voltmeter negative lead to generator "F" terminal. Slide voltmeter lead prods into connector body terminals to make connections. If the voltage is 9 volt or less, replace the regulator (regulator transistor is shorted). If voltage is 2.0 volts or greater, replace the regulator (regulator transistor is open). If the voltage is between 9 and 2.0 volts, proceed as follows:

8) Operate engine at approximately 1500 RPM for 10 minutes with headlight lower beam on, then with engine running, record voltage reading from regulator positive terminal to ground. Slide voltmeter lead prod into regulator connector body **black** lead terminal to make connection. Compare reading with specification table (below). If not within specifications, replace regulator.

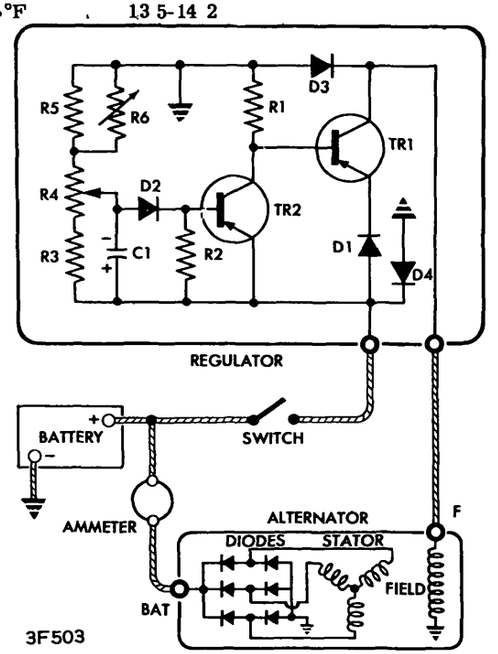
9) If voltage reading is within specifications (at proper ambient temperature), charging system is satisfactory, and only an adjustment is required to compensate for an undercharged or overcharged battery.

Adjustment

Remove pipe plug on regulator and insert a small screwdriver into slot and turn counterclockwise for an undercharged battery one or two notches to increase setting. For an overcharged battery, turn clockwise one or two turns to decrease setting. *NOTE - For each notch moved, voltage setting will be changed by .3 volt. Check for an improved battery condition over a service period of reasonable length.*

Voltage Setting (Ambient Temperature)

Temp.	Setting	Temp.	Setting
65°F	13.6-14.5	125°F	13.4-14.1
85°F	13.7-14.4	145°F	13.3-14
105°F	13.5-14.2		



TRANSISTOR REGULATOR CIRCUIT DIAGRAM

FORD MOTOR CO. ALTERNATORS & REGULATORS

DESCRIPTION

Alternator

Three phase, self-rectifying type using three negative and three positive rectifying diodes. Initial field excitation is provided through the charge indicator light which is shunted with a 15 ohm resistor to supply starting field current if charge indicator light burns out.

Regulator

Consists of a relay for field excitation which closes when voltage supplied by neutral terminal of alternator is sufficient to operate relay armature. A double contact voltage regulator which is temperature compensated, controls amount of current supplied to rotating field. With upper contacts closed, full system voltage is supplied to field, and with lower contacts closed, zero current flows to field. A 10.5 ohm resistor reduces field current when armature floats between contacts.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 INTERMITTENT, LOW, OR NO OUTPUT CORRECTION:* This condition may be caused by excessive charging circuit resistance. Check for open or loose connection at multiple connectors, located on engine side of firewall. Loose or open connection at instrument panel cluster charge indicator feed wire terminal, located behind top center of instrument cluster. Poor connection at alternator or regulator terminals.

SERVICE PRECAUTIONS - When testing or servicing alternator or regulator, take the following precautions to avoid damage to components:

Battery - Do not reverse battery connections. Negative terminal must be connected to ground. When charging battery, cables must be disconnected from battery before connecting charger. *DO NOT use charger as a booster for starting engine.* If a booster battery is used to start engine, negative cable of booster battery must be connected to car battery negative terminal.

Alternator - DO NOT ground field circuit between alternator and regulator or operate alternator on an open circuit with field winding energized. DO NOT ground output terminal or attempt to polarize alternator. Polarization is not required.

Regulator - Turn ignition switch off when working on regulator. Use care to prevent a short circuit between voltage regulator relay and regulator base when working on regulator. Use an insulated tool when making adjustments.

TESTING ALTERNATOR

ADJUSTMENT NOTE - All of the following tests (except diodes) are made with a Sun VAT-20-B test set. If equivalent tester is used, follow manufacturers instructions.

Output

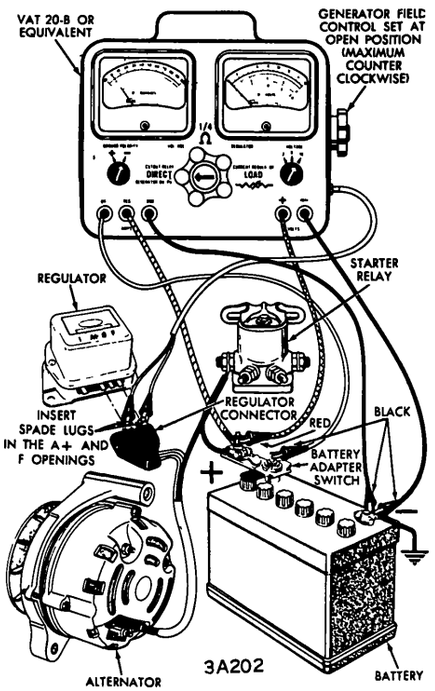
Connect tester as shown in diagram, making sure that Generator Field Control on tester is OPEN. Close battery adapter switch, then start engine and open battery adapter switch (all electrical accessories turned off). Increase engine speed to exactly 2900 RPM. *NOTE - Do not exceed this speed.* Adjust Generator Field Control for a voltage reading of exactly 15 volts. Note ammeter reading and add 5 amps to this reading to obtain total alternator output which should be same as alternator rated output (30 amps or 40 amps). *CAUTION - Make the above test in shortest time possible and do not exceed 2900 engine RPM.* If unable to obtain maximum output it may be due to a fully charged battery. If so, make the following test: Turn Generator Field Control to OPEN position, then rotate tester control knob to LOAD position. Maintain 2900 engine RPM. Adjust Generator Field Control and LOAD control, maintaining a 15 volt maximum reading on voltmeter, until Generator Field Control is at its maximum clockwise position. Readjust LOAD control until voltmeter reads exactly 15 volts. Note ammeter reading and add 5 amps to this reading to obtain total alternator output. *NOTE - An output of 2-5 amps below specifications indicates an open rectifier diode.*

Diodes

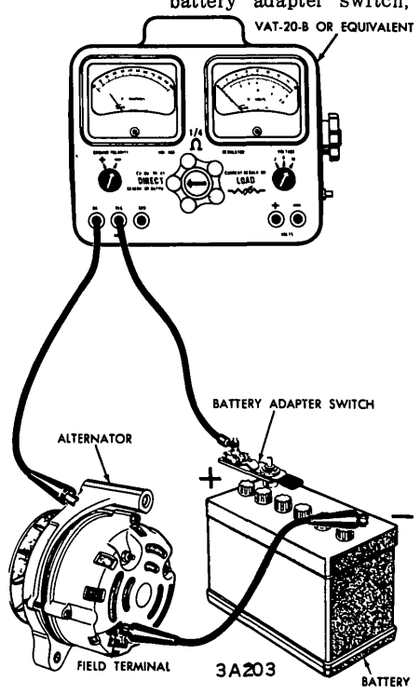
Positive Diodes - Using a Sun Rectifier Diode Tester, connect clip to alternator output terminal, then contact each diode lead with tester probe, making sure that probe penetrates varnish at diode terminal. Ammeter reading should be 2 amps or more.

Negative Diodes - Connect clip of tester to alternator frame, then check each negative diode in same manner as for positive diodes. Ammeter reading should be 2 amps or more.

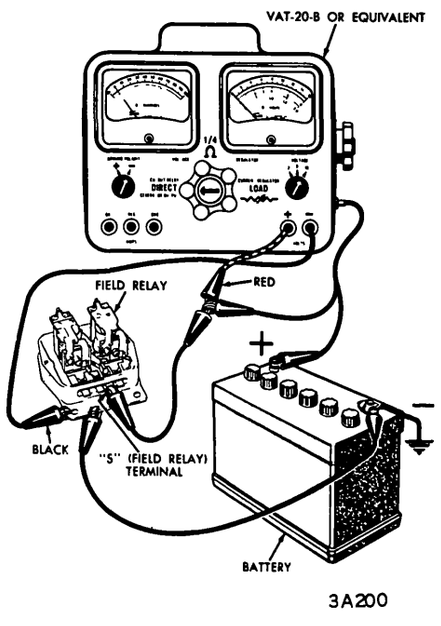
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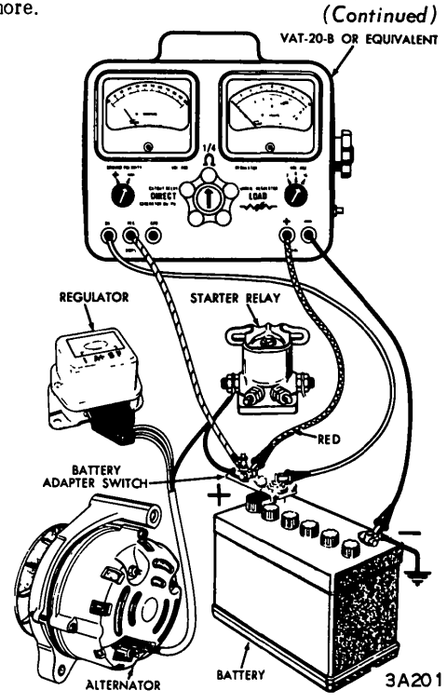
ALTERNATOR OUTPUT TEST



FIELD OPEN OR SHORT CIRCUIT TEST



FIELD RELAY TEST



VOLTAGE LIMITER TEST

FORD MOTOR CO. ALTERNATORS & REGULATORS (C ntinued)

Field Open or Short Circuit

Connect tester as shown in "Field Open or Short" diagram. Normal current flow should be 2.9-3.1 amps (40 amp alternator); 2.3-2.6 amps (30 amp alternator). Little or no current flow indicates high resistance or an open circuit; or brushes may not be making proper contact with slip rings. A high current flow indicates shorted or grounded turns in windings. If brushes are not at fault, entire rotor must be replaced.

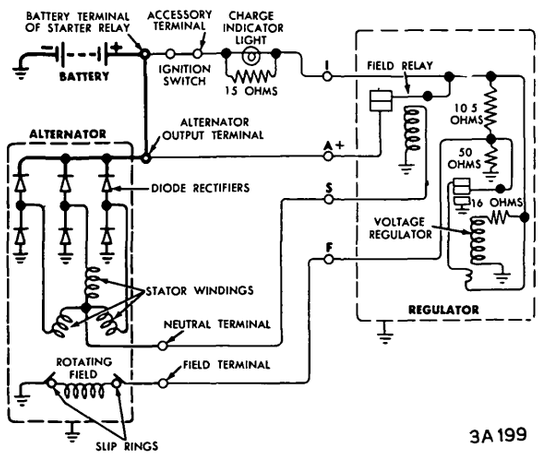
Field Relay Supply

NOTE - This test indicates that sufficient voltage is available and that wiring is in good condition. Remove connector plug from regulator, then remove regulator cover and reinstall connector plug. Connect negative voltmeter lead to ground, then start engine and operate it at 400-500 RPM. Connect positive voltmeter lead to a small screwdriver and touch screwdriver to the center rivet at front of regulator. *CAUTION - Be careful to touch only the rivet or rivet terminal so as not to short this point to ground or to other terminals.* Voltmeter should indicate at least 6 volts, and field relay contacts should be closed.

TESTING REGULATOR

Field Relay

Remove regulator cover, then connect tester as indicated in "Field Relay Test" Diagram. Slowly rotate field resistance control clockwise from the OFF position until field relay contacts close. Note voltmeter reading at the moment contacts close (this is relay closing voltage and should be 3-4 volts). If relay closes immediately, even with field resistance close to OFF position, use a 6 volt battery for this test. If field relay closing voltage is not within limits, bend spring arm (at lower end of spring) down to increase voltage and upward to decrease closing voltage.



ALTERNATOR & REGULATOR CIRCUIT DIAGRAM

Voltage Limiter

NOTE - For testing, lower stage (armature vibrating on lower contact) regulation is used. Calibration tests must be made with regulator cover in place and with regulator at normal operating temperature (temperature after 20 minutes operation on car with a 10 ampere load). Connect tester as indicated in "Voltage Limiter Test" diagram, then turn off all accessories and lights. Close battery adapter switch, start engine, then open adapter switch. Attach a suitable thermometer to regulator cover and operate engine at 2000 RPM for 5 minutes. Turn master control on tester to DIRECT position. If ammeter indicates more than 10 amps, stop engine and charge battery. With battery fully charged and regulator stabilized, rotate control on tester to VOLTAGE REG. position. The ammeter should indicate less than 2 amps. Cycle the regulator as follows: Stop engine, close adapter switch start engine, and open adapter switch. Allow battery to normalize for a short time, then check voltmeter reading and temperature. Voltage should be within limits indicated in table below for the specified temperature. If regulator is not within limits, make adjustments as outlined in "Voltage Limiter Adjustment" below. *NOTE - After each adjustment, be sure to cycle regulator before each reading. Reading must be made with cover in place .*

Voltage Specifications (Ambient Temperature)

Voltage	Temp. °F	Voltage	Temp. °F
14.3-15.1	50°	13.8-14.6	125°
14.1-14.9	75°	13.6-14.4	150°
13.9-14.7	100°	13.5-14.3	175°

Field Relay

Cut-in (Closing Voltage) - 3.0-4.0 volts. To adjust, bend spring arm (at lower end of coil spring) down to increase voltage and upward to decrease voltage.

Point Gap - .015-.022". Loosen lockscrew ¼ turn and insert a screwdriver in adjustment slot above screw to move stop up or down.

Air Gap - .022-.030". Loosen center lockscrew ¼ turn and insert a screwdriver in adjustment slot below screw to move contact bracket up or down.

ADJUSTMENT

Voltage Limiter

Voltage Setting - Adjust by bending spring arm (at lower end of spring) downward to increase voltage, upward to decrease voltage.

Point Gap (Lower Contacts) - .010-.015" with upper contacts closed. To adjust, loosen lockscrew ¼ turn and insert a screwdriver in adjustment slot above screw to move stop up or down.

Air Gap - .045-.052" with upper contacts closed. To adjust, loosen center lockscrew ¼ turn and insert a screwdriver in adjustment slot below screw to move contact bracket up or down.

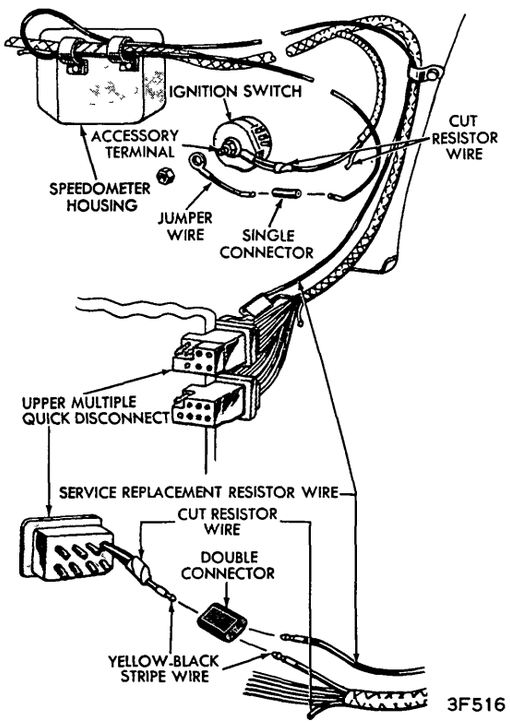
OVERHAUL (ALTERNATOR)

1963 FORD GALAXIE & MERCURY MONTEREY CHARGING SYSTEM RESISTOR WIRE REPLACEMENT - Use Service Replacement Resistor Wire, Part No. C3AZ-10A665-C (Ford Galaxie); C3MY-10A665-A (Mercury Monterey). Disconnect battery ground cable, then fabricate a jumper wire from No. 14 gauge wire (approximately 3" long) with a bullet terminal on one end and an eyelet terminal at the other. Solder terminals securely and proceed as follows:

1) At accessory terminal on ignition switch where black resistor wire and black with green stripe wire are attached to same eyelet terminal, cut the black resistor wire close to terminal and tape the cut end next to terminal. Shorten the defective black resistor wire by cutting it where it emerges from wiring harness under instrument panel.

2) Connect eyelet terminal of jumper wire to ignition switch accessory terminal. At the upper multiple quick disconnect at dash panel where black resistor wire and yellow with black stripe wire terminate together, cut black resistor wire close to disconnect and tape the cut end next to disconnect Cut black resistor wire where it emerges from harness near disconnect, then cut yellow with black stripe wire midway between disconnect and where it emerges from harness. Solder a bullet connector to each cut end of yellow with black wire

(Continued)



REPLACEMENT RESISTOR WIRE INSTALLATION

FORD MOTOR CO. ALTERNATORS & REGULATORS (C ntinued)

3) Use a double connector and connect one end of yellow with black stripe wire to one end of double connector. Connect the other end of yellow with black stripe wire and one end of service replacement resistor wire to other end of the double connector. Use a single connector and connect other end of service replacement resistor wire to jumper wire at ignition switch.

4) Route and tape tie service replacement resistor wire to wiring harness, then connect battery cable to battery.

► *CAUTION - DO NOT splice or replace resistor wire with any other wire other than service replacement resistor wire. DO NOT coil or fold surplus resistor wire as excessive heat will be generated.*

Disassembly

1) Mark both end housings for reference at reassembly, then reach through ventilation slot, raise both brushes off slip rings, and install a short length of 1/8" rod through hole in rear end housing to hold brushes off slip rings.

2) Remove housing through bolts and separate front housing and rotor from stator and rear housing. *NOTE - Make sure brushes do not contact greasy rotor shaft.* Remove nuts from rear housing-to-rectifier mounting studs, and remove rear housing. Remove two spacer sleeves from rectifier plate studs.

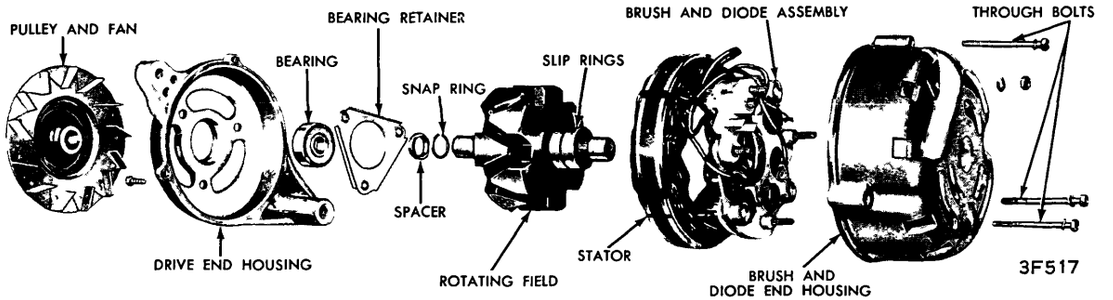
3) Press bearing from rear housing using an arbor press and a suitable tool. Remove terminal spacer block assembly from studs and unsolder neutral wire from spacer block neutral terminal. If brushes are being replaced, straighten field brush terminal blade locking tabs with pliers and remove blade from spacer block. Remove brushes and holder from the assembly.

4) If either diode plate is being replaced, carefully unsolder leads from diodes (use a 100 watt soldering iron only) and leave soldering iron in contact with diode terminals only long enough to remove wires. *NOTE - Attach needle nose pliers to diode leads adjacent to soldering point, using rubber bands around plier handles. Pliers will act as a temporary heat sink to prevent damage to diodes .* Remove three insulated diode plate screws and insulators, and separate diode plates.

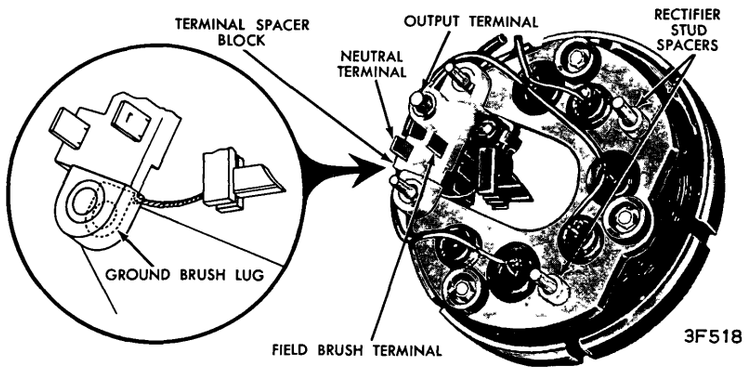
5) Remove drive pulley using a suitable puller, then remove the three screws holding front bearing retainer, and remove front housing. If bearing is being replaced, use a bearing puller and pull bearing from rotor shaft. Remove bearing retainer and spacer. *NOTE - It will not be necessary to remove stop ring unless it has been damaged.*

Cleaning & Inspection

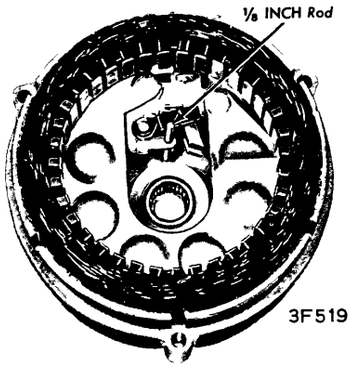
Use a clean cloth and wipe rotor, stator, diode rectifier assemblies, and bearings. DO NOT clean these parts in solvent. Wash all other parts in solvent and blow dry with air. Check bearings for wear, roughness and for noisy operation. Replace as necessary. Check housings for cracks and stripped threads. Replace pulley if more than ¼" of shaft will enter bore with light pressure. Check all wire leads and solder connections. Check slip rings for damaged insulation. Check slip rings for runout. If slip rings have more than .0005" runout, take a light cut (minimum diameter limit is 1.2") from face of rings to true them up. Replace any parts that are burned or cracked. Replace brushes that are worn to less than .350" in length. If brush springs do not have 7-12 ounces tension, replace springs.



FORD MOTOR CO. ALTERNATOR ASSEMBLY



TERMINAL SPACER BLOCK INSTALLATION



RETRACTING BRUSHES FOR DISASSEMBLY

Reassembly

1) If stop ring on drive shaft was broken, install a new stop ring (push ring on shaft and into groove. DO NOT open ring with snap ring pliers). Position front bearing spacer on drive shaft against stop ring, and position bearing retainer on shaft with flat surface of retainer outward. Exert pressure on bearing inner race and press bearing on shaft until it contacts spacer.

2) Place front housing over shaft, with bearing positioned in front housing cavity, then install bearing retainer mounting screws. Press pulley on shaft until hub touches inner race of front bearing.

3) If a new diode plate is being installed, mount the two plates together so they are insulated from each other (insulating spacer between plates and cupped insulator under screw head). Solder wire leads to diodes using same method used for unsoldering (see "Disassembly" above).

4) Insert new field brush terminal blade into slot in terminal spacer block with the brush pig-tail extending toward brush holder pivots. Install brush holders and brush spring to terminal block, then position brushes in brush holder. Solder neutral wire to neutral terminal, then position terminal spacer block assembly on rectifier plate mounting studs, with ground brush lug over mounting stud farthest from output terminal. Place spacers on rectifier mounting studs farthest from terminal block.

5) Place rear end housing over rectifier plate and stator assembly and mount rectifier plate to housing. Retract brushes and insert a short length of 1/8" rod through hole in rear housing to hold brushes in retracted position. Wipe rear bearing surface of rotor shaft clean, then position rear housing and stator assembly over rotor and align marks made at disassembly. Install housing through bolts and remove brush retracting rod.

MOTOROLA ALTERNATORS & REGULATORS

ALTERNATOR

DESCRIPTION

Three phase, self-rectifying type, using six diodes for rectification and a single isolation diode for operation of charge indicator lamp and to automatically connect voltage regulator to alternator and battery when alternator is operating. This isolation diode also eliminates electrical leakage over alternator insulators so that maximum leakage is less than one milliampere when car is not in use. Initial field excitation is supplied to alternator through the indicator light when ignition switch is turned on. When alternator charge equals battery voltage, voltage potential across isolation diode is low and lamp does not light indicating that alternator is charging In case of indicator light failure, defective light, socket, or wire, a 75 ohm resistor in parallel with light supplies initial field excitation current.

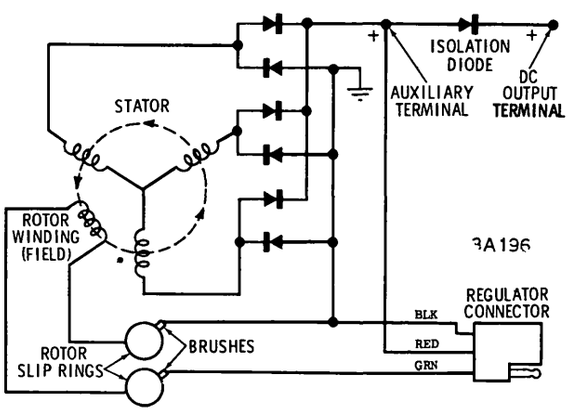
SERVICE CAUTIONS - To prevent damage to alternator and regulator, note the following: Do not short "Field" terminal of alternator to ground; disconnect voltage regulator when alternator is operating; or disconnect load (output lead) from alternator while alternator is operating. Do not remove alternator from car without first disconnecting negative battery terminal. If battery must be removed, disconnect negative cable first. If a battery is being installed, negative terminal must be connected to ground. **Reverse polarity will destroy alternator diodes.**

BATTERY CHARGING CAUTION - When charging battery in car, disconnect POSITIVE battery terminal.

TESTING (ON CAR)

Output

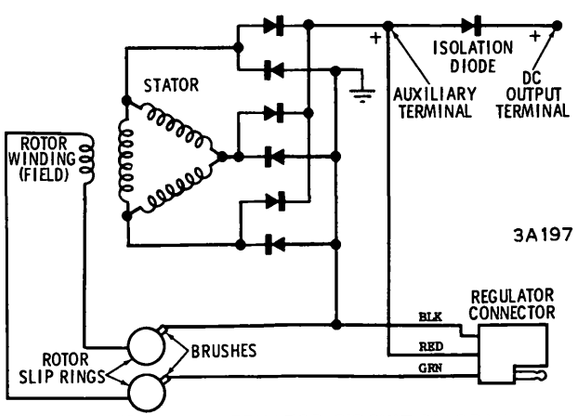
With engine off, disconnect output cable from alternator and connect an ammeter (0-60 amperes) in series with output terminal and cable (positive terminal of ammeter connected to output terminal of alternator). Connect a carbon pile load to negative side of ammeter and negative battery terminal, then connect a voltmeter to alternator output terminal and negative battery terminal (positive terminal of voltmeter connected to output terminal of alternator). Start engine and run for 15 minutes to stabilize temperature, then slowly increase load with carbon pile and increase engine speed until rated current output is reached. Output voltage should be 13 volts minimum, 15 volts maximum at rated output current. If voltage exceeds 15 volts, replace or check voltage regulator (see "Motorola Transistorized Alternator Regulator"). If rated output cannot be reached at high engine speeds, check fan belt tension. *NOTE - Remove carbon pile load immediately after engine is stopped.* If current output is below normal and output terminal voltage exceeds 13 volts, replace isolation diode with a known good diode. If rated output cannot be reached, or output terminal voltage is below 13 volts, test alternator (see below).



30 & 40 AMP ALTERNATOR CIRCUIT DIAGRAM

Alternator Test

CAUTION - Do not disconnect alternator field terminal wire while alternator is operating. With engine off, connect ammeter, voltmeter and carbon pile as for "Output Test" (see above), then disconnect field terminal wire and connect a 40 ohm, 3 amp. rheostat from output terminal to field terminal. Set field resistor at maximum resistance, then start engine and note voltage at output terminal. **This voltage must not exceed 15 volts. Increase load with carbon pile to reduce voltage if necessary.** Increase load with carbon pile and decrease field resistance with rheostat while maintaining less than 15 volts at output terminal. Continue to decrease field resistance while increasing output load until there is no resistance in field circuit. *NOTE - With no resistance in field circuit, maximum field current is being applied to field coil.* If rated current output is obtained with at least 13 volts but less than 15 volts at output terminal, alternator is operating properly. *CAUTION - Do not exceed rated current output of alternator by increasing load on alternator.* If rated output cannot be obtained, check brush assembly for poor connections, broken, excessively worn, or sticky brushes. *NOTE - If alternator operates properly with field rheostat connected in circuit but would not operate with field rheostat out of the circuit (with field terminal wire connected), check 75 ohm resistance wire for continuity or replace with a known good resistor. If resistor wir was open and indicator lamp burned out, alternator would not operate.*



45 AMP ALTERNATOR CIRCUIT DIAGRAM

Isolation Diode

NOTE - If battery is being discharged with ignition switch and all accessories off, isolation diode may be shorted.

With regulator connected to alternator, measure voltage appearing at auxiliary terminal. This voltage should not exceed .1 volt with ignition switch and all accessories turned off. If voltage exceeds .1 volt, excessive leakage through isolation diode is indicated and diode should be replaced.

Specifications

Alternator No. ①	② Rated Output
A12NX451	30 amps
A12NX550	40 amps
A12NX600	45 amps

① - Alternators used as original equipment may have a slightly different model number, however, the three suffix digits will be the same as indicated in table.
② - At 15 volts Acceptable minimum output at 75°F alternator temperature should not exceed 5 amps less than rated output

Charging Circuit

Voltage drop should not exceed .3 volt between output terminal of alternator and positive battery terminal with a 10 ampere load on alternator .

TESTING (ON BENCH)

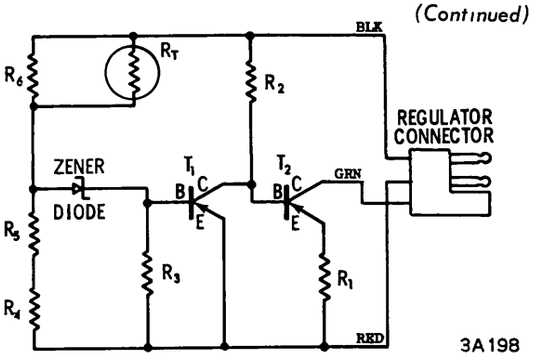
Rotor (Field Coil) Test

Connect a test lead to ground terminal of alternator and to negative post of a fully charged battery, then connect negative lead of test ammeter to alternator field terminal Connect positive lead of test ammeter to a 40 ohm, 3 amp rheostat and set rheostat at maximum resistance Connect a test lead between positive post of battery and remaining open terminal of rheostat Test rotor as follows:

1) Slowly reduce resistance of rheostat to zero With fully charged battery applied to field coil, the field current should be as indicated in table Turn rotor by hand while making the test *NOTE - A slight fluctuation of current meter (.2 amps) is normal.*

2) If field current is not within limits, inspect brushes and slip rings for excessive dirt, sticky or broken

(Continued)



REGULATOR CIRCUIT DIAGRAM

MOTOROLA ALTERNATORS & REGULATORS (C ntinu d)

brushes and bad connections Check brush assemblies for shorts and continuity (see below).

3) Re-install repaired or a known good brush assembly and repeat the test If field current is above maximum shown in table, it indicates that field coil is either shorted to rotor or field coil has shorted turns.

4) If field current is zero, it indicates that the field coil or coil to slip ring connection is open. If field current is considerably less than specifications, it indicates a poor coil to slip ring connection (high resistance) or poor brush to slip ring connection.

Field Current Draw

Alternator Model	Field Current
A12NX415	1.2-1.7 amps
A12NX550	1.8-2.4 amps
A12NX600	1.8-2.4 amps

Brush Assembly Insulation Test

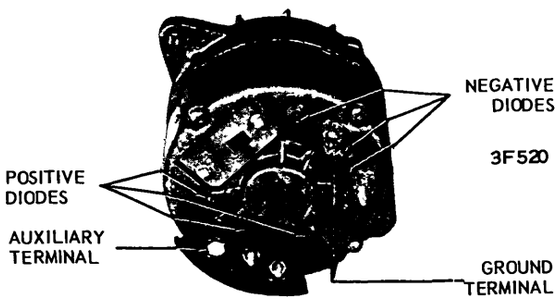
Insulation Test - Connect an ohmmeter or a test lamp (12 or 120 volt) to field terminal and to bracket. Resistance should be high (infinite) or test lamp should not light. If resistance is low or test lamp lights, brush assembly is shorted and must be replaced

Continuity Test - Connect an ohmmeter to field terminal and brush (use an alligator clip for good contact to brush). Resistance reading should be zero. Move brush and lead wire to make sure that brush lead wire connections are not intermittent. Resistance reading should not vary when brush and lead wire are moved around. Connect ohmmeter to bracket and grounded brush. Resistance reading should be zero. Repeat same test on brush lead wire as indicated above.

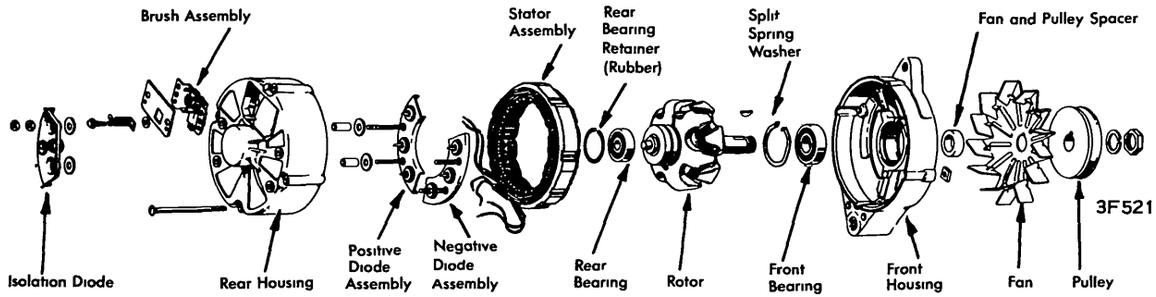
Rectifier Diode Test (With Test Lamp)

NOTE - A test lamp will not indicate an open condition unless all three diodes of either assembly are open. A shorted diode can be detected with test lamp method. If available, an "in-circuit" diode tester should be used, following instructions of the manufacturer.

Connect a 12 volt D.C. test lamp probe (do not use a 120 volt test lamp) to negative diode terminals and to ground terminal, then reverse the test probes. The lamp should light in one direction and not in other direction. If test lamp lights in both directions, one or more of the rectifier diodes of the assembly being tested is



DIODE TEST POINTS



MOTOROLA ALTERNATOR ASSEMBLY

shorted. If test lamp does not light in either direction, all three diodes in the assembly are open Recheck diodes individually after disassembly *NOTE - A shorted stator coil to core would appear as a shorted rectifier diode assembly. Also check stator for shorts after disassembly.* To check positive diodes, repeat the above test (for negative diodes) at positive diode terminals, except that ground lead of test lamp should be connected to "auxiliary terminal" (see illustration).

OVERHAUL

Disassembly

1) Remove pulley from rotor shaft *NOTE* - If pulley is a "friction fit" use a suitable puller. If pulley is a "slip fit" with a woodruff key and threaded shaft, support alternator and strike end of shaft with a wooden mallet

2) Remove two self tapping screws and brush holder cover, then pull brush assembly straight out, sufficiently to clear locating pins, then remove brush assembly Remove isolation diode assembly and remove the four through bolts and nuts. Insert a small screwdriver in stator slots between stator and front housing *NOTE - Do not insert screwdriver blade deeper than 1/16" to avoid damaging stator winding.* Pry at several points around stator and remove rotor and front housing as an assembly.

3) Remove rear bearing with a suitable puller. Use long nose pliers and compress ears of split ring washer which retains front bearing, and lift washer to free it from its seated position (do not remove washer until after front housing has been removed)

4) With split ring washer out of retaining groove, tap front end of rotor shaft on a block of wood to remove front cover. If necessary, use a suitable puller to remove front housing from rotor shaft. Remove front bearing from rotor shaft with a suitable puller.

5) Remove remaining locknuts and insulating washers from rear housing and remove stator and diodes as an assembly. *NOTE - Do not unsolder stator-to-diode wire junctions. Avoid bending stator wires at junction.*

Rectifier Diode Assembly Replacement

In soldering and unsoldering leads from diodes, grasp diode lead with pliers between the diode and stator lead to be removed (this will give better heat dissipation and protect the diode). Do not exert excessive stress on diode lead. Make a note of diode assembly to stator connections and make certain that replacement diode assembly connections are the same *NOTE - Positive diode assembly has red printing and the negative has black printing. DO NOT INTERCHANGE.*

Reassembly

1) Install diode assembly and stator in rear housing and secure in position with locknuts and washers. *NOTE* - The positive diode assembly must be insulated from rear housing Be sure that all insulating washers and sleeves are installed in their proper position. Dress diode wires against rear housing.

2) Clean bearing and inside of bearing hub of front housing, then support front housing and use a suitable tool to drive or press front bearing into position in housing Insert split ring washer into hub of front housing and use a suitable tool to seat washer into groove in housing. *NOTE - Split ring washer must be installed before installing rotor assembly.*

3) If rotor shaft is equipped with a keyed pulley, install pulley and woodruff key, then install nut and tighten securely. If shaft has a "friction fit" pulley, support slip ring end of rotor with suitable tool that fits shoulder of rotor shaft (do not apply pressure to end of rotor shaft), then use a press and press pulley into position until it is properly seated on pulley spacer .

4) Support front housing assembly in an arbor press with pulley downward, then use a suitable tool that fits inner race of bearing and press bearing on until it is seated against shoulder of rotor shaft

5) Make certain that rear bearing retainer is properly seated in rear housing hub and that diode wires are properly dressed so that rotor will not rub on wires. Assemble front and rear housing assemblies (hand pressure should seat rear bearing into rear housing) Align stator slots with rear housing through bolt holes, then align front housing through bolt holes with rear housing bolt holes. Install through bolts and tighten evenly to 25-30 ft. lbs.

6) Before mounting isolation diode, make sure that positive rectifier diode plate has been properly insulated from housing *NOTE - On 40 and 45 amp. alternators, the isolation diode is mounted to one of the positiv rectifi r diod studs, and one f the negativ r ctifi r diod studs. The isolation diod must b insulated from negative diode stud.*

(Continued)

MOTOROLA ALTERNATORS & REGULATORS (C ntinu d)

REGULATOR

DESCRIPTION

Transistorized type voltage regulator which requires no adjustment This unit is sealed at the factory and should be replaced if defective

Voltage Regulat r

NOTE - Make sure alternator is operating properly before testing voltage regulator.

Connect ammeter, voltmeter and carbon pile in same manner as for alternator test (see "Motorola Alternator"), then start engine and increase load with carbon pile, and increase speed, if necessary, to obtain 10 amp output current Operate engine for 15 minutes to stabilize temperature, then check ambient temperature of regulator by placing a thermometer 1" away from regulator case Output terminal voltage must be within limits indicated in table, at specified ambient temperature If voltage is not within limits, replace regulator and repeat test Increase load with carbon pile and engine speed until rated current output is reached Voltage at terminal should be at least 13 volts but should not exceed maximum limits indicated in table.

Voltage Sp cifications
(Ambient Temperature)

Ambient Temp ratur °F	Output Voltage ℄ Minimum	Maximum
0°	14 60	15 40
20°	14 45	15 25
40°	14 26	15 08
60°	14. 13	14 92
75°	14 00	14.80
80°	13 95	14 75
100°	13 80	14.60
120°	13 65	14.45
140°	13 60	14. 28
160°	13 30	14 13

℄ - With 10 amp load.

PRESTOLITE ALTERNATORS & REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installati n - Alternator polarity (see above) determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or rectifi rs will be damaged.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

B st r Batt ry (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

ALTERNATOR

DESCRIPTION: Main alternator components are the stator, rotor, slip ring end housing, drive end housing and rectifiers (diodes). Alternator voltage is controlled by varying the field current through a double contact voltage regulator unit. Because the rectifiers permit current flow in only one direction, no current can flow from battery to alternator and no circuit breaker (cutout relay) is needed. The self-limiting current characteristics of the alternator eliminate the need for a current regulator.

Stator - Consists of a laminated iron core with three phase windings electrically 120° apart wound in slots around inside circumference. A pair of leads are connected to each of the three points of the windings and one of each pair of leads connects to a negative rectifier and one to a positive rectifier.

Rotor - Consists of a single field coil encased between two four-fingered overlapping iron sections assembled on a shaft. The two ends of field coil are connected to two slip rings insulated from each other and the shaft. Battery is connected to field coil through brushes and the slip rings.

R ctifiers - Six silicone diode rectifiers are pressed into heat sinks in slip ring end housing. Three rectifiers have negative polarity and their heat sink is grounded to end housing. The other three rectifiers have positive polarity and their heat sink is insulated from end housing and connected to alternator output terminal.

SPECIFICATIONS

Performance Data - Cold (70° F)

Alternator No.	Amperes	Volts	Alt. RPM
ALB-5001	58 min	14 2	3000
ALB-5002	58 min	14.2	3000
ALB-5003	58 min	14 2	3000
ALB-5004	58 min	14 2	3000
ALC-5001	42 min	14 2	4200
ALD-5001	38 min	14.2	4200
ALE-5001..	38 min.	14.2	4200
ALE-5002	38 min	14 2	4200
ALE-5003	38 min	14 2	4200
ALE-5004	38 min.	14 2	4200
ALE-5005	38 min	14 2	4200
ALE-5006	38 min	14.2	4200
ALE-5006A	38 min	14.2	4200
ALE-5101S-1	38 min	14 2	4200
ALE-5102S	38 min	14 2	4200
ALE-5201S	38 min	14 2	4200
ALE-5202	38 min	14.2	4200
ALE-5203	38 min	14.2	4200
ALK-5001	32 min	14 2	3700
ALK-5101	32 min	14.2	3700

Rotation - Clockwise at drive end.

Rated Output - 35 amps (ALK); 40 amps (ALD & ALE); 45 amps (ALC); 60 amps (ALB).

Field Coil Draw - 2 38-2 63 amps (ALB); 2 32-2 43 amps (ALC); 2 34-2 42 amps (ALD), 2 33-2 44 amps (ALE), 2 23-2 43 amps (ALK) All at 10 0 volts and 70°F

TROUBLE SHOOTING & DIAGNOSIS

ALTERNATOR DOES NOT CHARGE: Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

LOW OR UNSTEADY CHARGING RATE: Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

LOW OUTPUT & LOW BATTERY: High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

EXCESSIVE CHARGING RATE: Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator winding open. Rectifier open.

REGULATOR CONTACTS OXIDIZED: Regulator setting too high or air gap incorrect. Rotor field coil winding shorted.

REGULATOR CONTACTS BURNED: Regulator setting too high. Rotor field coil winding shorted.

REGULATOR COIL WINDING BURNED: Regulator setting too high.

ALTERNATOR NOISY: Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

TESTING

►*CAUTION: 1) Do not ground field circuit between alt r nator and voltage regulator as regulator will be damaged.*

2) Do not ground alternator output terminal or alternator and circuit will be damaged (no circuit break r used and battery applied to output terminal at all times).

3) Do not operate alternator on open circuit with field winding energized.

4) Do not polarize alternator as it is not required and doing so will damage entire system.

5) Before making test connections, ignition switch must be off and battery ground cable disconnected.

ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

Charging Circuit Resistance: 1) Connect an ammeter in series between alternator output terminal and charging circuit lead with lead disconnected from terminal. Connect a voltmeter across charging circuit (negative lead of voltmeter to positive terminal of battery and positive lead of voltmeter to alternator output terminal lead). Disconnect lead from regulator field terminal and from alternator field terminal. Connect a jumper wire between alternator field and output terminals. Connect battery ground cable and adjust engine speed and electrical load to obtain 10 amperes in charging circuit. Voltmeter reading should not exceed .3 volt. If more, inspect, clean, and tighten all connections.

2) With same conditions as above, connect voltmeter from negative (grounded) battery terminal to alternator frame, and then from alternator frame to regulator base.

(Continued)

PRESTOLITE ALTERNATORS & REGULATORS (C ntinu d)

With 10 amperes in charging circuit, voltage reading in either case should not exceed .04 volt. If more, correct high resistance ground connections.

Current Output: Leave ammeter and jumper wire connected as in "Charging Circuit Resistance" above. Connect voltmeter with negative lead to ground at alternator frame and positive lead to alternator output terminal. Connect a carbon pile rheostat across battery and a tachometer to engine. Adjust engine speed so alternator is turning at specified RPM (see "Performance Data" above), and rheostat to obtain 14 2 volts on voltmeter Current output shown on test ammeter should be within specifications (see "Performance Data" above) A slightly low reading may mean an open rectifier and a considerably lower reading may mean a shorted rectifier

ALTERNATOR OFF CAR: Field Coil Draw (Te sting For Shorted Rotor) - Connect an ammeter and a rheostat in series between outer slip ring and battery. Connect other battery terminal to inner slip ring. Connect a voltmeter lead to each slip ring. With rheostat, adjust voltage to 10 volts and read field current draw on ammeter. If higher than specifications (see above) rotor field coil winding is shorted.

R tor Test (For Grounds): Make test with a 110-volt test bulb with one probe on a slip ring and other probe on rotor core. If bulb lights, rotor winding is grounded.

Stat r Test: Test for shorted windings with an internal-external growler. Test for grounds with a 110-volt test bulb and test probes. *Make both tests with stator leads disconnected from rectifiers.*

R ctifier (Diode) Test: *Make initial test without disconnecting stator leads from rectifiers. This will eliminate need for complete disassembly. To find which rectifier is bad, stator leads must be disconnected and each rectifier tested individually.* Use a No. 57 test bulb in series with a 12-volt battery and test probes. Touch one test probe to rectifier heat sink and other probe to a rectifier lead in same heat sink. Reverse the probes. If lamp lights in **one** direction, rectifier is good. If lamp **does not** light in either direction, rectifier is open. If lamp lights in **both** directions, rectifier is shorted.

►*RECTIFIER TESTING TOOL NOTE: Diode Testing Tool C-3829 is available for testing rectifiers without disconnecting stator leads.*

OVERHAUL

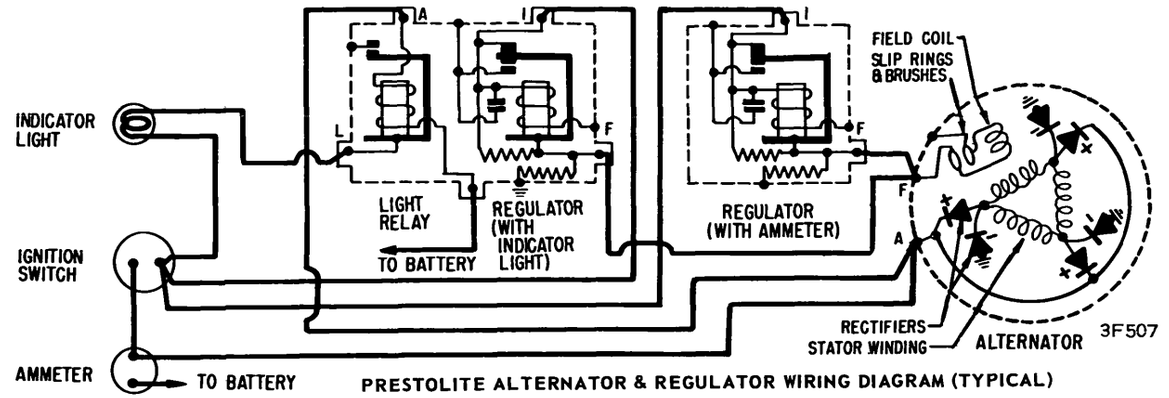
See "Autolite Alternator & Regulator" on Page 273 of the 1961 Final Data.

REGULATOR

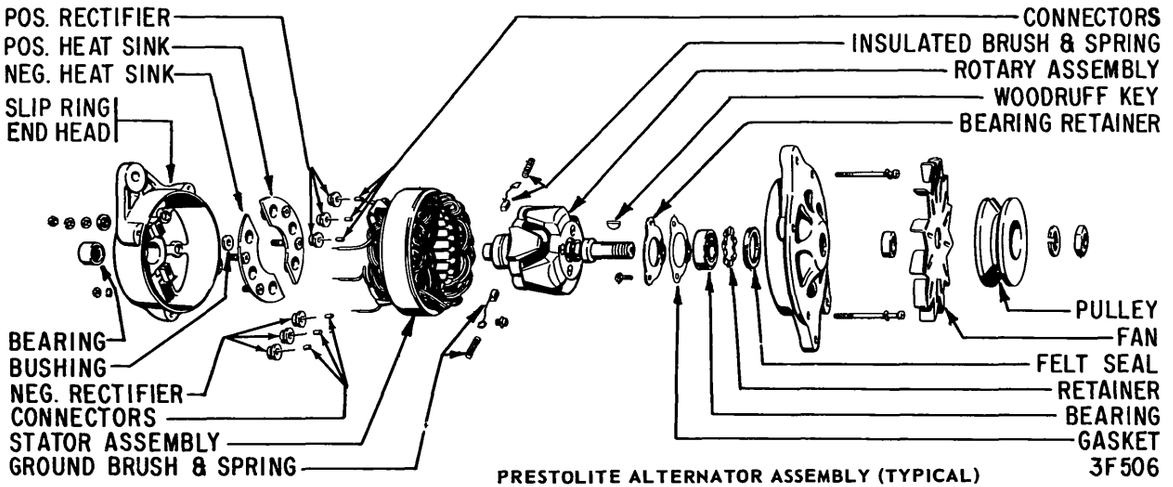
("VBS", "VBT" & "VBV")

DESCRIPTION: Regulator - Field control type. Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature. Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows:

Upper Contact Operati n (Low Speed & High L ad) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current.



PRESTOLITE ALTERNATOR & REGULATOR WIRING DIAGRAM (TYPICAL)



PRESTOLITE ALTERNATOR ASSEMBLY (TYPICAL)

Lower Contact Operation (High Speed & Low Load) - Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open).

Circuit Breaker (VBV Regulators): This unit which is located at battery terminal end of regulator assembly, has a built in polarity sensing feature that prevents damage to alternator, circuit wiring and components of charging system should a battery of incorrect ground polarity be installed. The circuit breaker provides a means of energizing alternator rotor windings (upper contacts closed) as well as completing a circuit between alternator and battery (lower contacts closed)

VBV REGULATOR NOTE - On some model regulators, a condenser is connected between "A" terminal and frame of circuit breaker Condenser capacity .1 mfd

Indicator Light Relay: On cars with a charge indicator light in place of an ammeter a relay is used to operate the light Relay has a single heavy winding in series with charging circuit with a movable contact on an armature and a grounded stationary contact Relay contacts are in series with indicator light which is connected to battery through ignition switch. With ignition switch on, light is grounded through contacts and lights up When alternator is charging, current flow through relay winding pulls armature down, opening the contacts so that light goes out.

CHECKING & ADJUSTING (ON CAR): Regulat r - *See "Autolite Alternator & Regulator" on Page 273 of 1961 Final Data, and note the following:*

Ⓒ Voltage Setting - Ambient Temp.

Temp. (°F)	Voltage	Temp. (°F)	V ltag
50°	14.3	110°	13 9
70°	14.2	130°	13 8
90°	14.05	150°	13.65

Ⓒ - Applies to all regulators except VBV-6201AX, -1, -3; VBV-6201CX, -3, EX; VBV-6211AX, 1; VBV-6221AX, -1 These regulators are special, low setting regulators for engines having a constant speed. The voltage setting should be 13 7 volts at 70°F

Circuit Breaker (VBV Regulat rs)

Contact Gap - .017- 022" **Armature Gap** - .025- 027"

Pull-in Voltage - 8.0-9.0 volts.

NOTE - Circuit breaker releases at 13.0-13.5 volts after 14.0 volts on "A" terminal.

CORVETTE RETRACTABLE HEADLIGHTS

C rv tt (1963)

DESCRIPTION

Headlights are mounted on retractable panels operated by a reversible motor and reduction gear for each side. Control is by a manual control switch on instrument panel just below main lighting switch. A warning light on instrument panel grounded to two micro-switches at headlight linkage flashes whenever headlights are on but not fully opened and locked into position.

OPERATION

Headlights and other exterior lights are turned on and off in the usual manner from the main lighting switch. When headlight motor switch on instrument panel is actuated, motor and reduction gear assemblies turn headlight panels up or down as required. If headlights turned on before panels are opened, warning light flashes, then when up cycle is completed, linkage opens micro-switches (normally grounded) to open circuit to warning light and light goes out, indicating that headlights are up and locked. *For electrical circuits, see Wiring Diagram on Chevrolet V8 & Car- v tte Car Mod l Pag s.*

EMERGENCY OPERATION

If motor or wiring damaged, headlights may be raised manually by raising hood, reaching under body panel, and turning hand wheel attached to armature shaft of each motor. Wheel is located on same side of motor as electrical wiring connector.

TROUBLE SHOOTING & DIAGNOSIS

The following list is for headlight panel and motor circuit only. Us c nv ntional diagnosis procedures for other headlight troubles.

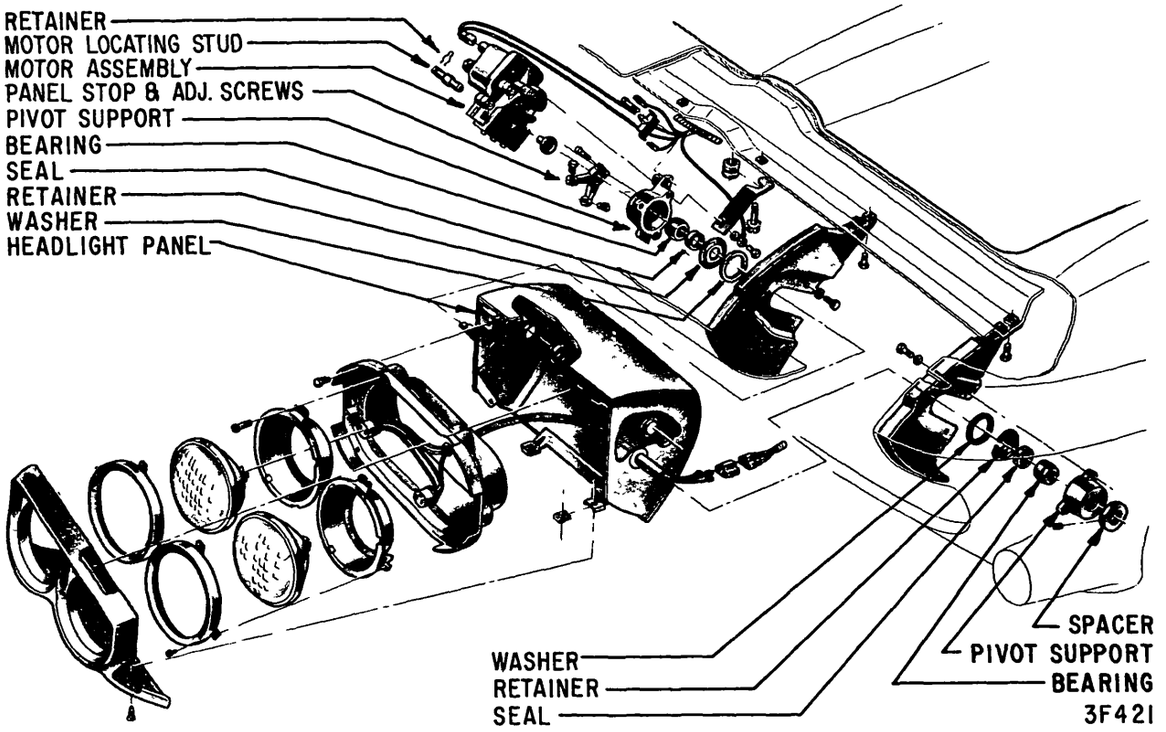
B th Headlights Will Not Operate in One Direction - Control switch faulty; Wiring connections loose at switch or motors; Open circuit between switch and motors.

B th H adlights Completely Inoperative - Control switch faulty or not grounded; Circuit breaker open; Loose connections at circuit breaker or control switch.

One H adlight Op rat s in One Direction Only - Motor faulty or not grounded; Mechanical binding condition.

B th H adlights Op rat Slowly - Low battery; Control switch has high resistance; High resistance in circuit or loose connections.

On H adlight Op rates Slowly - Control switch faulty; Wiring connections loose; Mechanical binding condition.



CORVETTE HEADLIGHT, PANEL, AND MOTOR ASSEMBLY (EXPLODED)

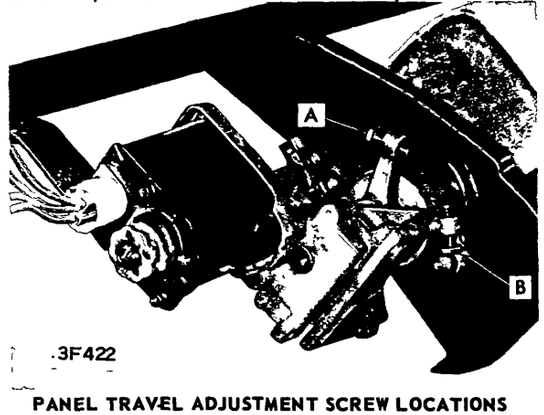
Both Headlights Operate Intermittently - Circuit breaker trips repeatedly because of short; Wiring connections loose at switch, circuit breaker, or ground.

One Headlight Operates Intermittently - Motor circuit breaker faulty; Wiring connections loose.

ADJUSTMENT

Panel Travel Adjustment

NOTE - Each panel operates independently of the other. Adjustment must be made at each panel.



PANEL TRAVEL ADJUSTMENT SCREW LOCATIONS

Open Position - Turn adjusting screw "A" (see illustration) so mounting face of panel is within 2° of vertical with panel fully opened. Tighten locknut.

Closed Position - Turn adjusting screw "B" (see illustration) so headlight panel is flush with upper body panel in fully closed position. Tighten locknut.

Headlight Alignment

Headlights are aimed and adjusted in the usual manner.

REMOVAL & INSTALLATION

Sealed Beam Replacement

Bulb units are replaced in the usual manner. Retaining ring has a retaining spring which is removed and replaced with long-nosed pliers.

Headlight Panel

Removal - Remove hood, open headlights, and disconnect battery. Remove headlight bezel and remove sealed beam housing unit as an assembly. Remove motor from panel pivot shaft (see below). Remove panel stop from panel inboard pivot shaft, then disconnect micro-switch wires. Remove panel retaining bolt access hole plugs from inside of panel, then rotate panel and remove retaining bolts. Slide supports from end of panel

(C ntinued)

CORVETTE RETRACTABLE HEADLIGHTS (Continued)

pivot shaft. Remove bearing, felt seal, retainer, and and washer from inboard pivot shaft. Remove panel by alternately disengaging pivots from retaining slots and pulling unit forward through body opening. Loosen Allen screw in spacer and remove spacer, bearing, felt seal, retainer, and washer.

Installation - 1) On outboard pivot shaft, install washer, retainer, felt seal, bearing, and spacer (do not tighten spacer). Install panel in body opening and index panel pivot shafts in retaining slots, then install support retaining bolts loosely. Install washer, retainer, felt seal, bearing, and support on inboard pivot shaft, and install support retaining bolts loosely. Check panel horizontal alignment, making sure there is no panel-to-body contact, position spacer snugly against bearing, and tighten spacer screw to 30-50 inch-lbs. Install stop on panel inboard shaft so stop rests against bearing, making sure index mark on stop is aligned with flat on pivot shaft. Install stop lock bolt and tighten to 45-60 inch-lbs. *NOTE - Do not over-tighten lock bolt, and do not change panel horizontal alignment.*

2) Tighten pivot support bolts snugly (but loose enough so panel can be moved by hand), close panel, and align with body so all surfaces are flush. With panel in closed position, tighten forward outboard support bolt to 100-140 inch-lbs. (access through opening between hood and body), then rotate panel for access to remaining support bolts and tighten to 100-140 inch-lbs. Connect wiring to micro-switch, install sealed beam housing unit and connect wiring. Install motor (see below) connect battery, adjust panel travel (see above), and aim headlights. Install headlight bezel and hood.

Motor Replacement

Removal - Disconnect battery and motor wiring. Turn motor hand wheel until gear seems to turn freely (turn wheel in one direction until definite drag is felt, then turn wheel in opposite direction 6 complete turns). *NOTE - Wheel must be turned as indicated so drive gear is not loaded and so motor can be separated from panel pivot shaft.* Remove retainer from groove in motor locating stud, remove motor-to-support retaining screw, and remove motor.

Installation - Rotate motor and headlight panel as necessary to align motor slot with headlight panel pivot shaft, and install motor on shaft so bracket is aligned with locating stud. *NOTE - If necessary, turn motor hand wheel for alignment of motor with shaft.* Slide motor on shaft until motor seats against shaft shoulder, then install retainer in groove on locating stud. Install motor-to-support retaining screw (make sure ground wire is installed between screw head and bracket), connect motor wiring and battery.

DELCO-REMY TRANSISTORIZED IGNITION

Pontiac (1963)

►*TRANSISTORIZED IGNITION CAUTION:* To prevent damage to output transistor in control unit, be sure that not more than 4 secondary leads (at spark plugs or distributor cap) are disconnected while cranking the engine. Do not disconnect coil secondary cable (between distributor cap and coil). *NOTE* - When performing a compression test or any test where the engine is to be cranked without starting engine, ALWAYS DISCONNECT COIL PRIMARY LEAD.

DESCRIPTION

This ignition system consists of a specially designed distributor, control unit, and a special coil. Other units in system are conventional design. In the distributor, an iron timer core, which replaces the conventional breaker cam, rotates inside a magnetic pickup assembly, which replaces the conventional breaker plate, contact point set, and condenser assembly. To provide vacuum and centrifugal advance, the magnetic pickup assembly is rotated by a vacuum control unit, while the timer core is made to rotate about the distributor shaft by conventional advance weights.

OPERATION

With ignition switch turned on, engine not running, current from battery flows through ballast resistor to control unit. Current then flows through transistors TR-1 and TR-2, resistors R-1, R-2, and R-3, and the coil primary winding and ballast resistor to ground. *NOTE - Full current flows through coil primary winding, and condenser C-1 is charged with positive voltage towards transistor TR-2.* When engine is running, vanes on rotating iron core in distributor line up with internal teeth on pole piece, establishing a magnetic path through center of pickup coil, and inducing a voltage in pickup coil. This voltage causes transistor TR-3 to conduct, resulting in current flow as follows: Charged condenser C-1 causes transistor TR-2 to turn off which causes transistor TR-1 to turn off, interrupting the circuit to ignition coil primary winding. The high voltage required to fire spark plug is induced in coil secondary winding.

PERIODIC SERVICE

None required. At time of engine overhaul, lubricate upper distributor bushing by removing plastic seal and adding SAE 20 engine oil to packing in cavity. Install a new plastic seal.

TESTING & TROUBLE SHOOTING

Distributor

Pick-Up Coil - Separate harness connector and connect an ohmmeter across the coil. Resistance of coil should be 550-650 ohms. If reading is infinite, coil is open, and if reading is low, coil is shorted. To check coil for grounds, connect ohmmeter from either coil lead to distributor housing. The reading should be infinite. If not, coil is grounded.

Distributor Advance Specifications - *NOTE - Distributor centrifugal and vacuum advance may be tested on a testing machine or synchroscope designed to test this type distributor as recommended by testing machine manufacturer.*

Delco-Remy 1111027

Mechanical Advance		Vacuum Advance	
Distr. Degrees	Distr. RPM	Distr. Degrees	Vacuum " of Hg
0-2	425	Start	8-10
7-9	1000	10 (Max.)	15-17
9-11	1600		

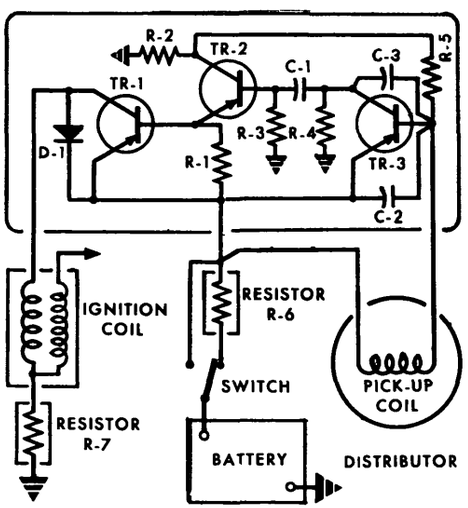
For engine RPM and degrees, multiply by 2.

Ignition Coil

Primary - Connect an ohmmeter across two primary terminals. An infinite reading indicates primary is open.

Secondary - Connect an ohmmeter from high tension center tower to either primary terminal. *NOTE - To obtain a reliable reading, a scale on the ohmmeter having the 20,000 ohm value within, or nearly within, the middle third of the scale must be used.* If reading is infinite, secondary coil winding is open.

ENGINE SURGE NOTE - This condition may be due to the two distributor leads being reversed in harness connector body, or may be due to an intermittent open circuit in distributor pick-up coil. When properly assembled, distributor white lead should be on long slot side of connector body.



PONTIAC TRANSISTORIZED IGNITION CIRCUIT

FORD TRANSISTORIZED IGNITION

F rd, 427" Eng. (1963)
M rcury, 427" Eng. (1963)

►*REMOTE STARTING SWITCH CONNECTING CAUTION* When connecting a "remote" type starting switch in order to turn engine over from under the hood, use the following procedure to prevent damage to ignition system Place jumper wire between "S" terminal of starter switch or starter solenoid and the battery, with the ignition switch "off" **and the brown coil lead disc nnect d fr m th solenoid.** *DO NOT attempt to turn the engine over by using the ignition key, when ignition coil high voltage lead is removed and the brown wire is connected to solenoid*

Description

This transistorized ignition system consists of the following components

Ignition C il - This is a specially designed coil having a primary circuit which draws a normal maximum of 12 amps to provide high plug voltage at high speeds.

Transist r - The transistor, which is connected between battery and coil, acts as a heavy duty switch to make and break the coil primary circuit A resistor, connected between distributor and transistor, limits transistor control and point current to 0 5 amps

Amplifier Assembly - This unit is located under car instrument panel to protect it from engine heat

R sist r Bl ck Ass mbly - This assembly, which is enclosed in a fibre cover, contains a ceramic ballast resistor block, a tachometer connector block, and a cold start relay This unit is mounted on a plate in engine compartment

Tach meter Bl ck - This unit is used to connect a tachometer or dwell meter into the ignition circuit *CAUTION - Do not connect a tachometer or dwell meter into ignition circuit at any other point*

C ld Start Relay - The relay contacts in this unit are normally closed and are connected into the ignition circuit only during the start cycle When starter relay is closed, cold start relay is actuated and opens its contacts If during starting, the available voltage drops below 10 5 volts, relay contacts close, bypassing the 0 33 ohm resistor in ballast resistor block, applying full available voltage to system

Trouble Shooting & Diagnosis

NOTE - Do not use any other testing procedures or conventional short cuts than those listed below

Checking For Trouble Source - Remove coil high tension lead from distributor cap, then hold lead ⅛" from cylinder head With ignition switch on, crank engine and check for a spark *NOTE - To crank engine, run a jumper wire from positive terminal of battery to "S" terminal of relay (after disconnecting red and blue lead at relay)* If spark is good, trouble is in secondary (high voltage circuit) If there is no spark or a weak spark, the trouble is in primary (low voltage circuit)

Secondary Circuit - Trouble may be caused by improperly adjusted spark plugs, defective high voltage wiring, or high voltage leakage across the coil, distributor cap, or rotor

Primary Circuit - Trouble may be caused by defective primary wiring, improperly set or defective distributor points, defective amplifier, coil, or ballast resistor

Testing

Secondary Circuits - Use the same procedures that are normally used for a conventional ignition system *DO NOT test coil on a coil tester as results will be inconclusive due to very low coil primary inductance Substitute a known good coil and perform primary cir-*

Primary Circuit - 1) *NOTE - Do not use any other testing procedures or conventional short cuts than those listed below* Remove cover from resistor block assembly **and disconnect cold start relay.** Connect a dwell meter to tachometer block so black lead of meter is connected to black terminal (blue lead), and the red lead of meter is connected to red terminal (red-white lead) Turn ignition switch on and crank engine, noting dwell meter reading If dwell is 0°, distributor points are contaminated or are not closing Wire from distributor through the 8 ohm resistor to the amplifier, is defective If dwell is 0° to 45°, transistor and the primary circuit are operating properly (trouble could be in secondary circuit)

2) If dwell is 45°, there is no power from ignition switch, distributor points are not opening, or amplifier assembly is defective To determine which of these three items are causing the trouble, proceed as follows

3) Disconnect distributor lead at bullet connector, and crank the engine If dwell meter indicates 0° dwell, the distributor points are not opening If dwell is 45°, the amplifier is not operating properly or there is no power from the ignition switch

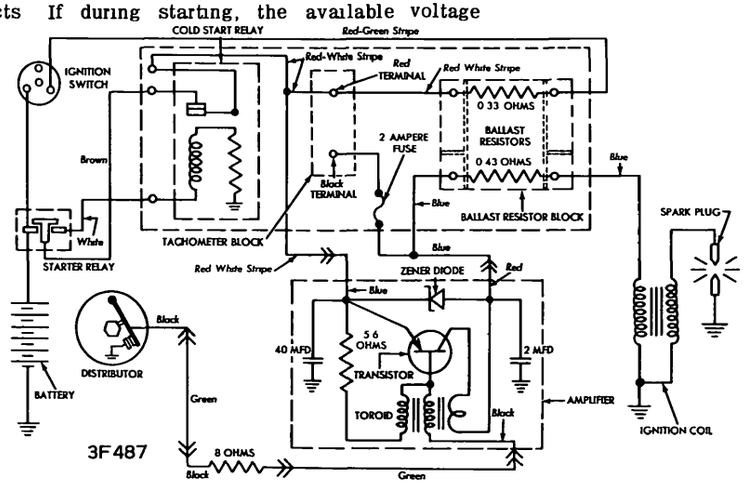
4) Use a voltmeter or test light to determine if the transistor (amplifier assembly) is at fault Connect voltmeter to red-green lead of ballast resistor, and to ground, then crank the engine If a steady indication of voltage is obtained, the trouble is in the amplifier Absence of any voltage indication on the voltmeter shows there is an open circuit, or no power between ignition switch and amplifier (ballast resistor could be defective Install new resistor and repeat test

5) If the above test indicates a defective amplifier, replace it with a known good amplifier and proceed as follows Connect distributor high tension lead at bullet connector, then with cold start relay disconnected and dwell meter connected to tach block, crank engine and note the dwell A dwell of 0° to 45° indicates satisfactory ignition (original amplifier was at fault) If the dwell is still 45°, the wiring from the amplifier through ballast resistor to the coil is defective

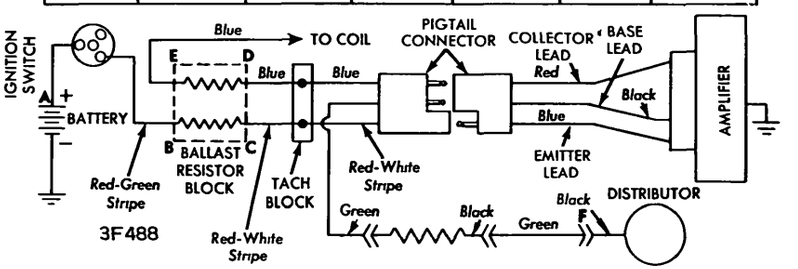
Operating Voltages & Currents - *NOTE - Early production amplifiers have a red "collector" lead and a blue "emitter" lead Later amplifiers have a blue "collector" lead and a red "emitter" lead The "emitter" lead is the one closest to black "base" lead* To check operating voltages and currents, disconnect brown lead from cold start relay and connect a voltmeter to test points (indicated alphabetically in "Ignition System Testing Diagram") and to ground *Do not connect a voltmeter to point "F"* Connect an ammeter in series at indicated points See "Voltage & Current Test Specifications" *Be sure battery is fully charged*

VOLTAGE & CURRENT TEST SPECIFICATIONS

TEST POINT	Cranking rpm		700 rpm		1500 rpm	
	Volts	Amperes	Volts	Amperes	Volts	Amperes
A	10 4	—	13 2	—	13 8	—
B	9 5	4 4	12 0	5 5	13 5	5 4
C	8 0	4 4	10 0	5 5	11 0	5 4
D	4 0	4 0	4 5	5 0	4 0	4 8
E	2 0	4 0	2 0	5 0	1 0	4 8
F	—	0 4	—	0.5	—	0 6



TRANSISTOR IGNITION SYSTEM DIAGRAM



IGNITION SYSTEM TESTING DIAGRAM

PRESTOLITE TRANSIGNITER IGNITION

Stud bak r, High P rformance Eng. (1963)

Description

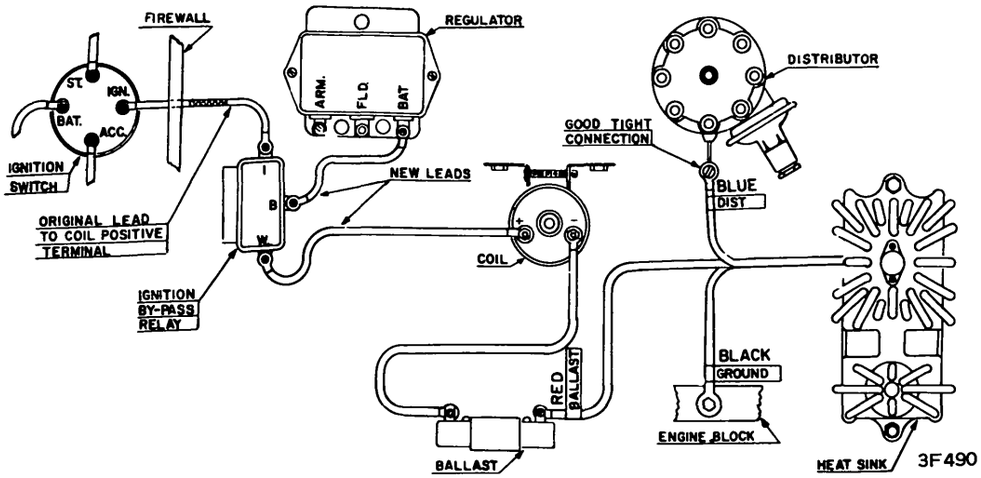
This assembly is used on 12 volt, negative ground battery systems only, and consists of a special relay, ignition coil, a heat sink (containing all of the electrical components and transistor), and a special ballast resistor. A conventional type distributor (with condenser removed) is used.

Testing

Relay (12 Volt Systems) - Connect a voltmeter or No. 57 test light from relay "W" terminal to ground. Turn ignition switch on. Voltmeter should indicate full battery voltage, or test light should be bright. If not, check for faulty wiring or defective relay.

Voltmeter - Connect a voltmeter to heat sink terminal at ballast resistor, then turn ignition switch on. Open and close distributor contacts by hand. With the contacts closed, voltmeter should indicate approximately 2 volts. With contacts held open, voltmeter should indicate full battery voltage.

Light Bulb Test - Connect a No. 57 test light to ignition coil positive (+) terminal and to ground. Turn ignition switch on. Test light should be bright. If light is dim, check for high resistance connections. If light does not glow at all, there is an open circuit somewhere between coil and battery; or the relay is defective. Disconnect light bulb at coil positive terminal and connect it to negative terminal, then open distributor contacts. Test light should be bright; if not, coil has an open primary winding. Connect test light to heat sink terminal of ballast resistor and ground, then open distributor contacts. The test light should be bright. With contacts closed, light should be dim. *NOTE - If test light does not glow at all, the ballast is open. If light is dim with contacts open, the heat sink is defective. If light is bright with contacts closed, heat sink is defective.*



PRESTOLITE TRANSIGNITER SCHEMATIC (TYPICAL)

Trouble Shooting

Engine Cranks But Will Not Start - Check wiring for loose or poorly connected wires. Check relay operation. Distributor contacts are dirty.

Engine Idles Rough or Stalls - Battery not fully charged. Distributor cap is carbon tracked. Distributor contacts are dirty.

High Speed or Rapid Acc lerati n Miss - Loose heat sink ground connections. Spark plugs in poor condition. High tension wires are faulty. Battery not fully charged. Distributor cap is carbon tracked.

MOTOROLA TRANSISTOR IGNITION

Description

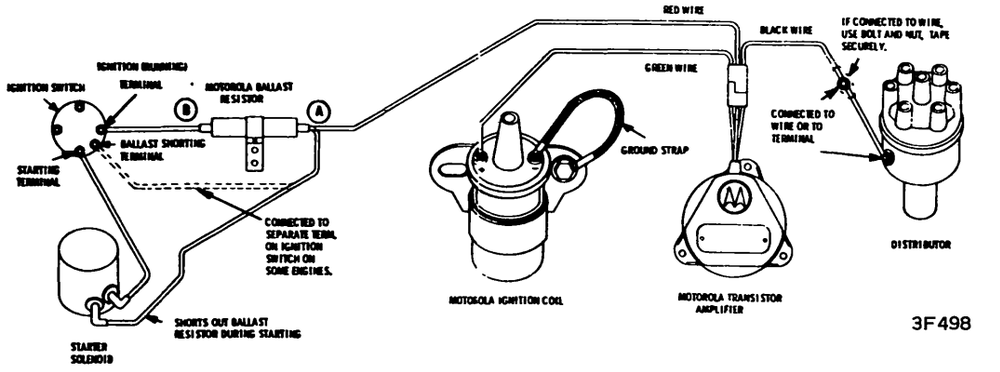
A sealed amplifier unit containing two transistors and two Zener diodes provides a uniform high voltage at all engine speeds. Other components of the system are a special coil and a special ballast resistor. A conventional distributor (with condenser removed) is used with this system.

Testing (Negative Ground Systems)

1) Connect positive lead of voltmeter to positive (+) terminal of battery and negative voltmeter lead to ballast resistor (starter side). With all accessories turned off, turn ignition switch on. With distributor points closed, voltage should be less than 1.5 volts. A higher voltage reading indicates excessive resistance in the circuit from battery through ignition switch to ballast resistor. Isolate and correct this condition.

2) Connect negative lead of voltmeter to ground, then with ignition switch on and distributor points open, the voltage from ballast resistor (starter side) and from ballast resistor (amplifier side) should be the same. If voltage is present at starter side of resistor and there is no voltage at amplifier side (and resistor is cool), then the resistor is open and should be replaced. If the voltage is less at amplifier side than at starter side, with distributor points open, disconnect transistor ignition amplifier at the three prong molded connector. *CAUTION - Whenever disconnecting ignition amplifier plug or any other wires in circuit, turn ignition switch OFF.* Repeat the above test. If voltage is now the same at both sides of ballast resistor, replace transistor amplifier.

COIL TESTING NOTE - The special coil can be tested in a conventional manner. However, since the resistance of the primary of this special coil is less than that of a conventional coil, results obtained from test will not be the same. Compare results of commercial testing equipment reading with a known good coil. Coil resistance is .15-.35 ohms (Primary), 7800-9500 ohms (Secondary).



MOTOROLA TRANSISTOR IGNITION SYSTEM SCHEMATIC

BENDIX DIAPHRAGM TYPE (VACUUM SUSPENDED) POWER BRAKE UNIT

Cadillac (1963)①
Ch vrolet Pass. Cars (1963)①
Chevr l t Trucks (1963)①②
Chevy II (1963)①
Chrysl r & Imperial (1963)③④
D dge & Dart (1963)③
Plym uth (1963)③
P ntiac & T mp st (1963)①
Rambl r (1963)
Studebak r (1963)⑤
Valiant (1963)③

① - "Delco-Moraine Vacuum Suspended Type" also used.
② - "Multi-Vac" and "Midland-Ross Hy-Power" types also used.
③ - "Midland-Ross Diaphragm" type also used.
④ - For Chrysler 300J, see "Midland-Ross (Chrysler 300J) Power Brake Unit".
⑤ - With Disc Brakes, "Bendix Tandem Diaphragm" or "Studebaker Hydrovac" types used.

►CHANGES, CAUTIONS, CORRECTIONS

► *1963 DODGE 880 SERIES IMPROPER BRAKE PEDAL RETURN CORRECTION (EARLY CARS):* May be caused by high friction at power unit pushrod pedal pivot hole. To correct, remove any burrs from pushrod cross bolt bearing diameter, and file slightly the side faces of pushrod eye. Reassemble parts and make sure there is side movement at cross bolt. *CAUTION - D not try to corr ct condition by loosening cross bolt nut or bolt failure will result.*

DESCRIPTION

"Vacuum Suspended", disc reaction, diaphragm type power brake unit. Vacuum power chamber consists of a front and rear shell, vacuum power diaphragm, diaphragm return spring and a hydraulic pushrod. The mechanically actuated control, integral with vacuum power diaphragm, controls degree of brake application or release depending on pressure applied to valve operating rod through brake linkage. Control valve assembly consists of a single poppet valve with both atmospheric port and and vacuum port.

LUBRICATION & SERVICE

No lubrication required. At time of overhaul, clean or replace air cleaner filter as required. If filter cleaned, wash in cleaning solvent and let dry before reinstalling.

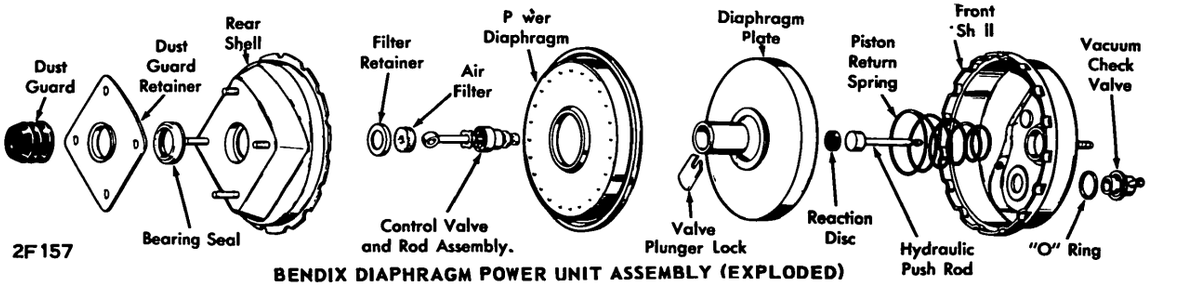
REMOVAL & INSTALLATION

Rem val

Disconnect vacuum line from power unit and hydraulic lines from master cylinder. Disconnect power unit pushrod from brake pedal assembly. Remove power unit-to-firewall attaching bolts and remove power unit and master cylinder as an assembly.

Installation

Reverse removal procedure, then adjust pedal height as follows: Adjust pedal height to specifications listed in table below. On Chevrolet Cars & Trucks, measurement is from floor carpet at toe pan to top of pedal pad. On Pontiac & Tempest, measurement is from floor mat to bottom of pedal pad.



BENDIX DIAPHRAGM POWER UNIT ASSEMBLY (EXPLODED)

Pedal Height Specifications

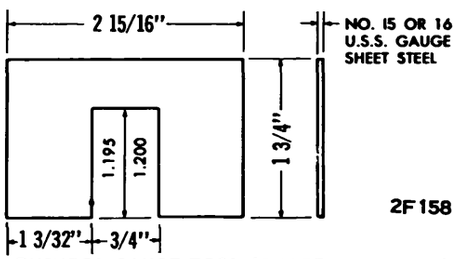
Car Model	Pedal Height
Chevrolet Cars	
Biscayne & Bel Air	4 7/8"
Impala	4 5/8"
Chevrolet Trucks	①8"
Pontiac (Except Tempest)	3 1/8-3 3/8"
Pontiac Tempest	3 1/16-3 5/16"

① - Total Pedal Travel.

OVERHAUL

Disassembly

1) Remove master cylinder from power unit, then remove master cylinder filter, piston seal assembly and master cylinder pushrod from front shell. Remove rubber boot and retainer plate from rear shell. If equipped, remove air valve pushrod linkage and mounting bracket. Remove filter retainer from diaphragm plate extension, then remove air filter. *CAUTION - Use extreme care when removing air filter retainer so that plastic diaphragm plate is not chipped. Pry at several places around retainer until freed.* Scribe mark both shells for mating at reassembly. Use Holding Fixture J-9576-1 and Bar Wrench J-9504 and separate shells. *CAUTION - Use care when separating shells so that diaphragm spring pressure does not cause rear shell to fly off.* Remove power piston from rear shell and remove separating tools.



PUSHROD GAUGE TOOL (EXCEPT RAMBLER) (RAMBLER SIMILAR)

2) Disassemble power piston as follows: Remove diaphragm from diaphragm hub. Hold diaphragm plate with pushrod in horizontal position, depress pushrod slightly (about 1/16"), and rotate piston so air valve lock will fall out. Remove air valve pushrod assembly. Remove reaction disc from diaphragm plate bore (use pushrod or suitable tool to push disc from seat). *D not chip diaphragm plate.*

3) Remove rear shell bearing seal with a punch or thin screwdriver. *CAUTION - Remove seal only if a new one is available. DO NOT reuse seal if it has been removed.* Remove vacuum check valve and grommet.

Cleaning & Inspection

Use "Declene" or brake fluid to clean all metal, plastic and rubber parts. Blow out all passages, orifices, and valve holes with clean, dry air, and air dry all parts. Slight rust on inside of housing can be polished with crocus cloth or fine emery cloth. There should be no cuts, nicks or distortion of any rubber part. If in doubt about the condition of a part, replace the part.

Reassembly

1) Install vacuum check valve grommet (beveled edge on inside), then install check valve. Install Holding Fixture J-9576-1 on front shell. Install new rear shell bearing seal with Installer J-9540 (tool will bottom against shell when seal properly installed).

2) Assemble power piston as follows: Lubricate outer diameter of diaphragm plate and extension, valve and plunger bearing surfaces, and outer edge of valve poppet. Install valve and rod into diaphragm plate extension. Depress pushrod slightly and install air valve lock (lock must index and retain air valve). Install rolling diaphragm in diaphragm plate hub groove. Lubricate reaction disc and install disc (use master cylinder pushrod to seat disc in diaphragm plate bore). *NOTE - If disc not fully s at d, pushrod height will be incorr ct.*

(Continu d)

BENDIX DIAPHRAGM TYPE (VACUUM SUSPENDED) POWER BRAKE UNIT (Continued)

3) Lubricate inside of bearing seal and diaphragm bead contact surface of rear shell. Install power piston return spring, and power piston, then lock shells together with Bar Wrench J-9504. Install air cleaner filter and retainer. Install boot retainer and rubber boot. If equipped, install air valve linkage and mounting bracket. *NOTE - On tempest, distance from end of air valv pushrod to face of rear shell must be 12¾". Adjust as necessary and tighten locknut to 60-120 inch-lbs.* Lubricate hydraulic pushrod lightly and install pushrod into center bore of power piston until fully seated against reaction disc. Install seal and master cylinder filter (press seal into front shell until bottomed in shell recess). Make master cylinder pushrod adjustment (see below). Install master cylinder.

Pushrod Adjustment

NOTE - No periodic adjustment of pushrod height is necessary. Check pushrod height if unit disassembled, if any major parts replaced, or if adjusting screw length is changed. Place Pushrod Gauge J-9571 (Rambler), J-7723-01 (Others) over end of pushrod with legs of gauge resting on face of power unit. Pushrod should just touch gauge at center. To adjust, hold pushrod at serrated end with pliers and turn adjusting screw. *NOTE- If gauge not available, a suitable gauge can be made according to dimensions shown in illustration.* Pushrod height should be 1.195-1.200" (General Motors Cars, and Studebaker).

BENDIX HYDRAULIC (DISC) REACTION POWER BRAKE UNIT

Lincoln Continental (1963)
Oldsmobile 88, S88, 98 (1963)©

© - "Moraine Hydraulic (Diaphragm) Reaction Power Unit" also used.

DESCRIPTION

Similar in design to units used on previous models. A plastic type piston plate is used and service procedures for this type plate are different than for die-cast plate.

OPERATION

See 1959 Final Data, Page 316, or later Manual edition.

REMOVAL & INSTALLATION

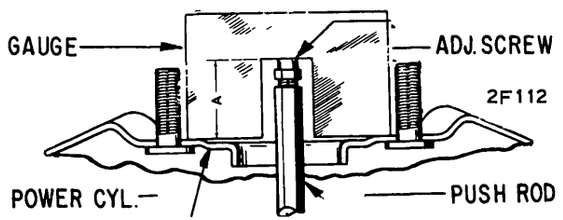
Disconnect hydraulic and vacuum lines from power unit and from master cylinder. Disconnect power unit pushrod from brake pedal assembly. Remove power unit-to-cowl attaching bolts and remove power unit and master cylinder assembly. *NOTE - Master cylinder may be removed without removing power unit if desired.*

OVERHAUL

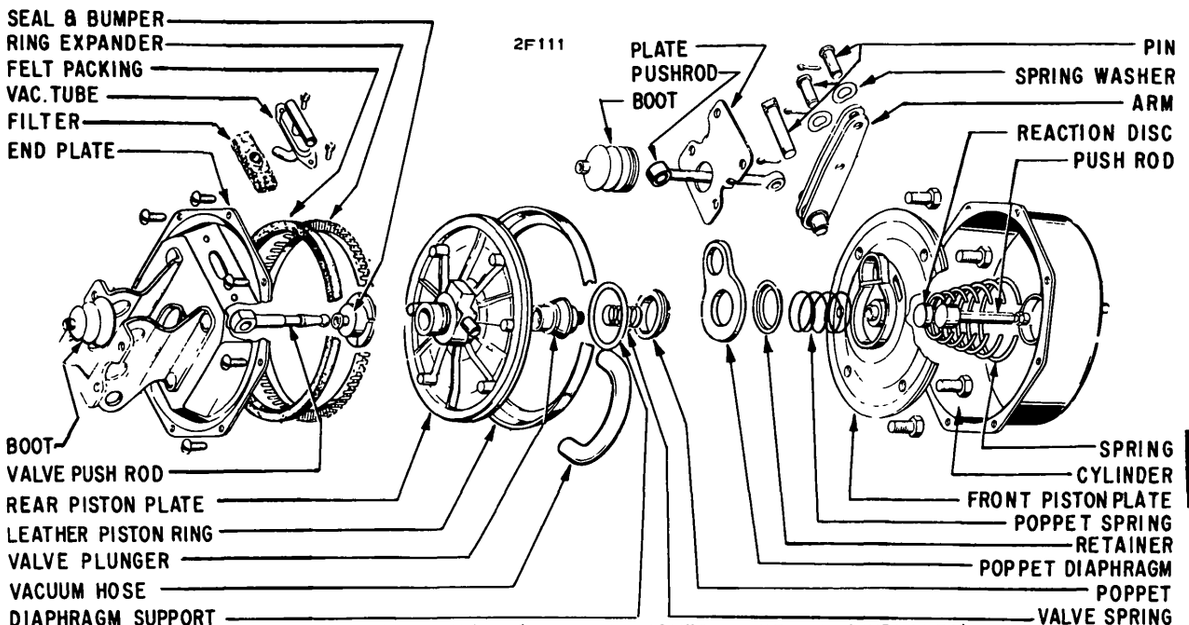
See 1959 Final Data, Page 316, or later Manual edition, and note the following:

Disassembly

Vacuum Power Piston (Plastic Type) - Remove piston felt and expander ring from piston assembly, then lift rod seal and bumper boot from rear piston plate and slide off eye end of operating rod. Remove capscrews from front piston plate, separate front and rear piston plates, and remove leather packing. Remove poppet spring, valve, return spring, retainer, poppet diaphragms, poppet, poppet spacer, and plunger and rod assembly. *NOTE - Do not separate valve operating rod from valve plunger unless replacement of valve rod or plunger is necessary.* If valve rod or plunger must be replaced, hold assembly with valve plunger down and inject alcohol into cavity around valve rod to wet rubber lock in valve plunger, then drive or pry valve plunger off valve rod. Use care not to damage plunger if it is to be reused. Remove rubber reaction disc from front piston plate if necessary. *CAUTION - When cleaning, use only alcohol on parts containing rubber or plastic.*



PUSHROD ADJUSTING GAUGE INSTALLATION



BENDIX HYDRAULIC (DISC) REACTION POWER BRAKE UNIT (EXPLODED)

Reassembly

Vacuum Power Piston (Plastic Type) - Position plunger and rod assembly into rear piston plate, and install rod seal and bumper boot. Position spacer washer into cavity inside rear piston plate, then assemble poppet through poppet diaphragm, and install poppet spring retainer on end of poppet. Position leather packing on rear piston plate, then install poppet spring and valve return spring on plunger and poppet reaction plate. Position and align front piston plate against rear piston plate, and secure in position with capscrews. Soak piston felt in shock absorber fluid, then insert felt in expander ring, and position expander and felt in groove around rear piston plate with expander teeth up.

Pushrod Adjustment

Self-locking screw on end of pushrod is set to correct height on original assembly and adjustment is not required unless adjustment is changed, or unless a major part of power unit or master cylinder is replaced. If necessary, adjust as follows:
With pushrod seated against reaction disc, measure distance from mounting face of power cylinder to end of pushrod adjusting screw. Distance should be 1.175-1.180" (Lincoln Continental), 1.195-1.200" (Oldsmobile). *NOTE - On Oldsmobile, Gauge J-7723-01 is available and may be used if desired. With gauge legs resting on face of power unit, pushrod should just touch gauge at center.* Make any adjustment, if necessary, by turning adjusting screw.

MORAINE HYDRAULIC (DIAPHRAGM) REACTION BRAKE POWER UNIT

Buick, Except Special (1963)
Oldsmobile 88, S88, 98 (1963)Ⓒ

Ⓒ - "Bendix Hydraulic (Disc) Reaction Power Brake Unit" also used

DESCRIPTION

Design is similar to previous models except that master cylinder position (pushrod length) is adjusted by means of a self-locking screw on end of pushrod On Buick models, an additional reaction disc is used between master cylinder piston reaction plate and reaction levers

REMOVAL & INSTALLATION

Disconnect hydraulic line (and stop light switch wires) from master cylinder and vacuum line from power unit Disconnect pushrod from brake pedal Remove nuts attaching power unit to firewall and remove unit *NOTE - If desired, master cylinder can be removed from power unit without removing power unit* To install, reverse removal procedure

OVERHAUL

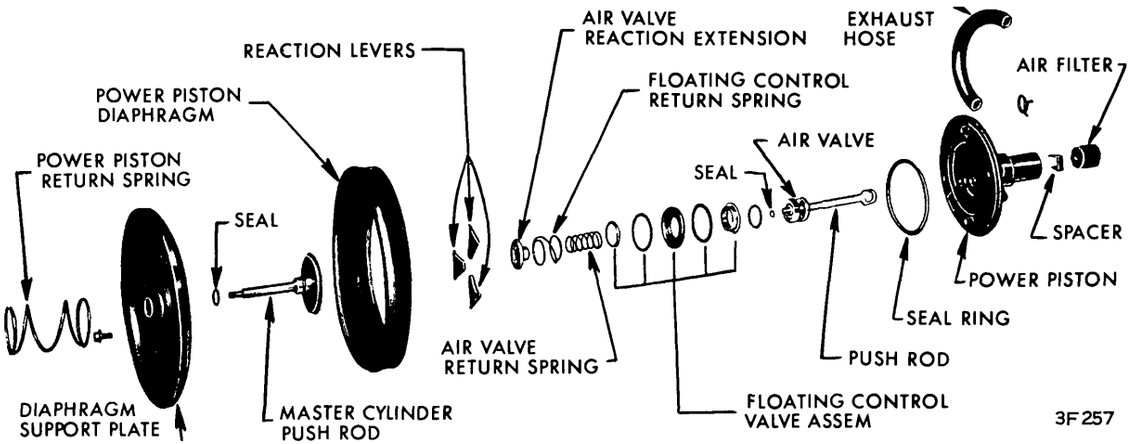
Disassembly

1) With master cylinder clamped in a vise, clean outside of unit, then scribe mark front and rear housings With suitable wrenches or Separator Bar, turn rear housing counterclockwise to separate housings *NOTE - Do not apply pressure on plastic power piston tube* Remove return spring from front housing *NOTE - Unnecessary to remove master cylinder from front housing unless required* From rear housing remove vacuum hose or tube, rubber boot, silencer, air filter, rubber bearing, then separate power piston assembly from rear housing

2) Remove master cylinder pushrod, diaphragm, and support plate from power piston Separate diaphragm and support plate Remove master cylinder pushrod from support plate, and remove "O" ring from pushrod

3) Remove "O" ring and reaction levers from power piston Remove air valve and operating rod from floating valve side of power piston, then remove extension from air valve Remove air valve return spring, floating control valve return spring, and floating control valve assembly *NOTE - Air valve cannot be removed from operating rod* Remove "O" rings from air valve

4) To disassemble floating control valve, remove retainer ring from under lip of reaction diaphragm, then remove diaphragm and support plate from control valve hub *NOTE - Diaphragm support (back-up) plate may have remained in power piston*



POWER PISTON ASSEMBLY (EXPLODED)

Cleaning & Inspection

Thoroughly clean all parts in diacetone alcohol or clean brake fluid Inspect all parts for nicks, damage, rust, or other deterioration Replace as necessary It is possible to smooth out small imperfections and clean light rust or abrasion with steel wool or crocus cloth Replace all rubber parts

Reassembly

Lightly lubricate all rubber parts, the reaction levers, and the part of air valve which slides in power piston with Silicone Grease, No 567196 (supplied in Overhaul Kit) before installation

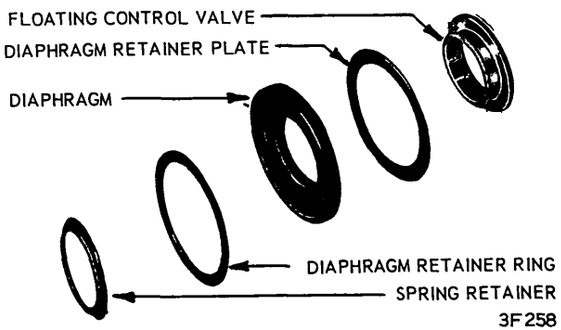
1) Assemble control valve as follows Install diaphragm into groove on flange of valve with flat side toward valve face, then insert diaphragm retaining ring under lip of diaphragm

2) Install new "O" rings on air valve and air valve extension Install floating control valve over air valve so rubber face of control valve rests on seat on air valve Install control valve spring and retainer over hub of control valve, then place air valve return spring inside floating control valve spring (air valve spring should rest on air valve) Install air valve extension over spring and air valve and lock in position by turning

3) Install control valve diaphragm support (back-up) plate in power piston Install control valve-air valve assembly into piston *Make sure diaphragm is not distorted, and that air valve is firmly seated in pow r piston* Install reaction levers into power piston, then install "O" ring seal Install vacuum diaphragm over power piston with stop buttons down, diaphragm folded over into normal operating shape, and inner bead of diaphragm in outer groove of power piston Insert pushrod (adjusting screw end first) into support plate from side opposite flange Install support plate on power piston (make sure reaction levers do not jump out of seats) and install attaching screws Install vacuum hose on power piston *NOTE - Turn hose clamp outward so it nearly contacts power piston to prevent clamp striking rear housing and preventing full piston return.* Install return spring in front housing and position front housing over rear housing and power piston assembly, inserting pushrod into master cylinder Turn power piston so free end of vacuum hose is in line with master cylinder filler cap and hold piston down while fitting diaphragm bead into recess in rim of front housing

4) Install rubber bearing into rear housing Install vacuum hose on tube in rear housing and insert piston

(Continued)



FLOATING CONTROL VALVE ASSY. (EXPLODED)

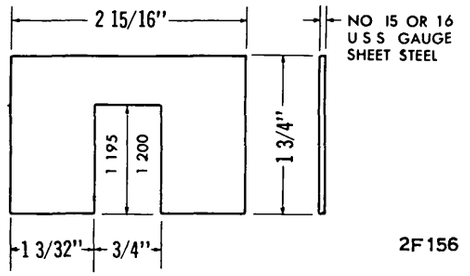
MORAINE (DIAPHRAGM) REACTION POWER BRAKE UNIT (C nt.)

tube through piston bearing With exhaust pipe on rear housing slightly counterclockwise of master cylinder filler cap, install and lock rear housing to front housing, making sure scribe marks are aligned and exhaust tube is in line with filler cap *CAUTION - Make sure diaphragm remains in recess in front housing and is not pinched into housing slots.* Install air filter, silencer, and pushrod boot

Pushrod Adjustment

NOTE - This adjustment necessary only if a major part of unit, such as master cylinder or piston, either housing, power piston, or pushrod is replaced; or when unit disassembled; or if pushrod adjusting screw position is changed.

With master cylinder removed, place Gauge J-21183 (Buick), J-7723-01 (Oldsmobile) over end of pushrod with legs of gauge resting on face of power unit Pushrod should just touch gauge at center (legs of gauge are permitted to be .020" from face of power unit on Oldsmobile) To adjust, turn self-locking adjusting screw as required *NOTE - If gauges are not available, a suitable gauge can be made according to dimensions shown in illustration.* Pushrod height should be 1 195-1.200"



PUSHROD GAUGE TOOL

DELCO-MORAINE VACUUM SUSPENDED BRAKE POWER UNIT

Cadillac, All Series (1963) ℂ
Chevrolet Pass. Cars (1963) ℂ
Chevy II (1963) ℂ
Corvette (1963)
Chevrolet Trucks (1963) ℂ ℭ
Pontiac, Except Tempest (1963) ℂ

ℂ - "Bendix Power Brake Unit Diaphragm (Vacuum Suspended) Type" also used
ℭ - "Midland-Ross Hy-Power" and "Multi-Vac Single Diaphragm" types also used

DESCRIPTION

Vacuum suspended, folding diaphragm type consisting of a vacuum power cylinder which contains the power piston assembly and piston return spring Control and reaction valve assemblies are located in the power piston assembly Control valve assembly consists of an air valve and floating control valve assembly. Reaction assembly consists of a hydraulic piston reaction plate and a series of reaction levers. Power unit hydraulic pushrod is provided with an adjusting screw to insure correct relationship between vacuum piston and master cylinder hydraulic piston

LUBRICATION & SERVICE

No lubrication required At time of overhaul, clean or replace air cleaner filter as required If filter cleaned, wash in cleaning solvent and let dry before reinstalling

REMOVAL & INSTALLATION

Removal

Disconnect vacuum line from power unit and hydraulic lines from master cylinder Disconnect power unit pushrod from brake pedal assembly. Remove power unit-to-firewall attaching bolts and remove power unit and master cylinder as an assembly.

Installation

Reverse removal procedure, then adjust pedal height as follows: Adjust pedal height to specifications listed in table below On Chevrolet Cars & Trucks, and Corvette, measurement is from floor carpet at toe pan to top of pedal pad On Pontiac, measurement is from floor mat to bottom of pedal pad

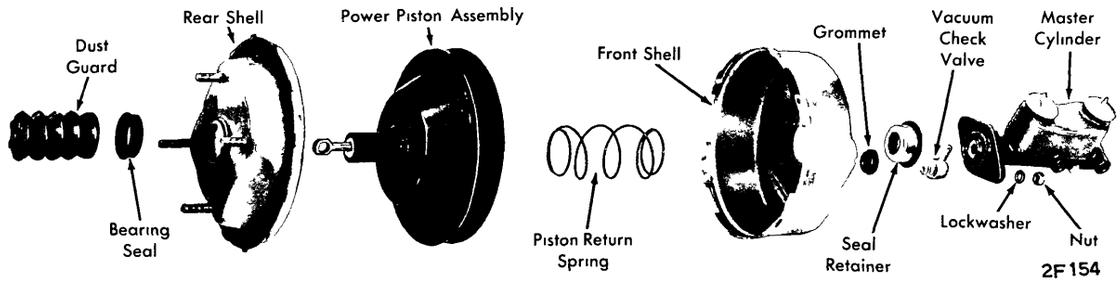
OVERHAUL

See 1962 Final Data, Page 313 for Disassembly, Cleaning & Inspection, Reassembly, and Pushrod Adjustment procedures.

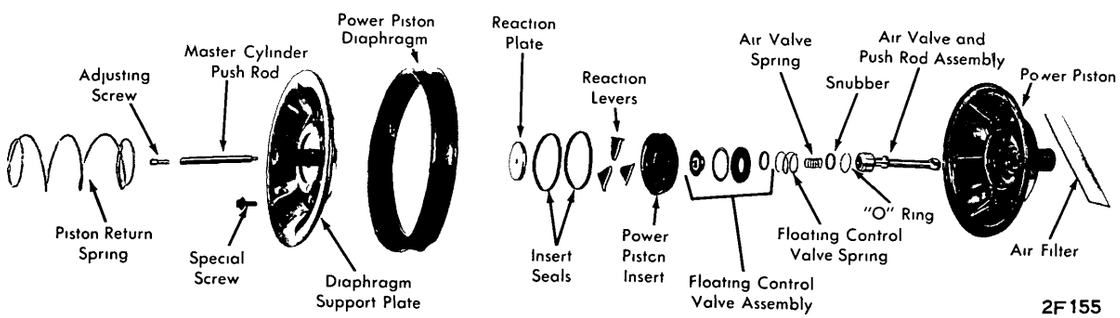
Pedal Height Specifications

Car Model	Pedal Height
Chevrolet Cars	
Biscayne & Bel Air	4 7/8"
Impala	4 5/8"
Corvette	4 5/8"
Chevrolet Trucks	ℂ 8"
Pontiac	3 1/8-3 3/8"

ℂ - Total Pedal Travel



DELCO-MORAINE POWER UNIT ASSEMBLY (EXPLODED)



DELCO-MORAINE POWER PISTON ASSEMBLY (EXPLODED)

MIDLAND-ROSS HY-POWER CHEVROLET TRUCK POWER BRAKE

Ch vr l t Truck (1963)©

© - "Bendix Power Brake Unit Diaphragm (Vacuum Suspended)", "Delco-Moraine Vacuum Suspended Power Unit", and "Multi-Vac Power Unit" types also used.

DESCRIPTION

Remote type vacuum power brake booster unit containing a vacuum power chamber, hydraulic slave cylinder, and vacuum control valve.

OVERHAUL

Disassembly

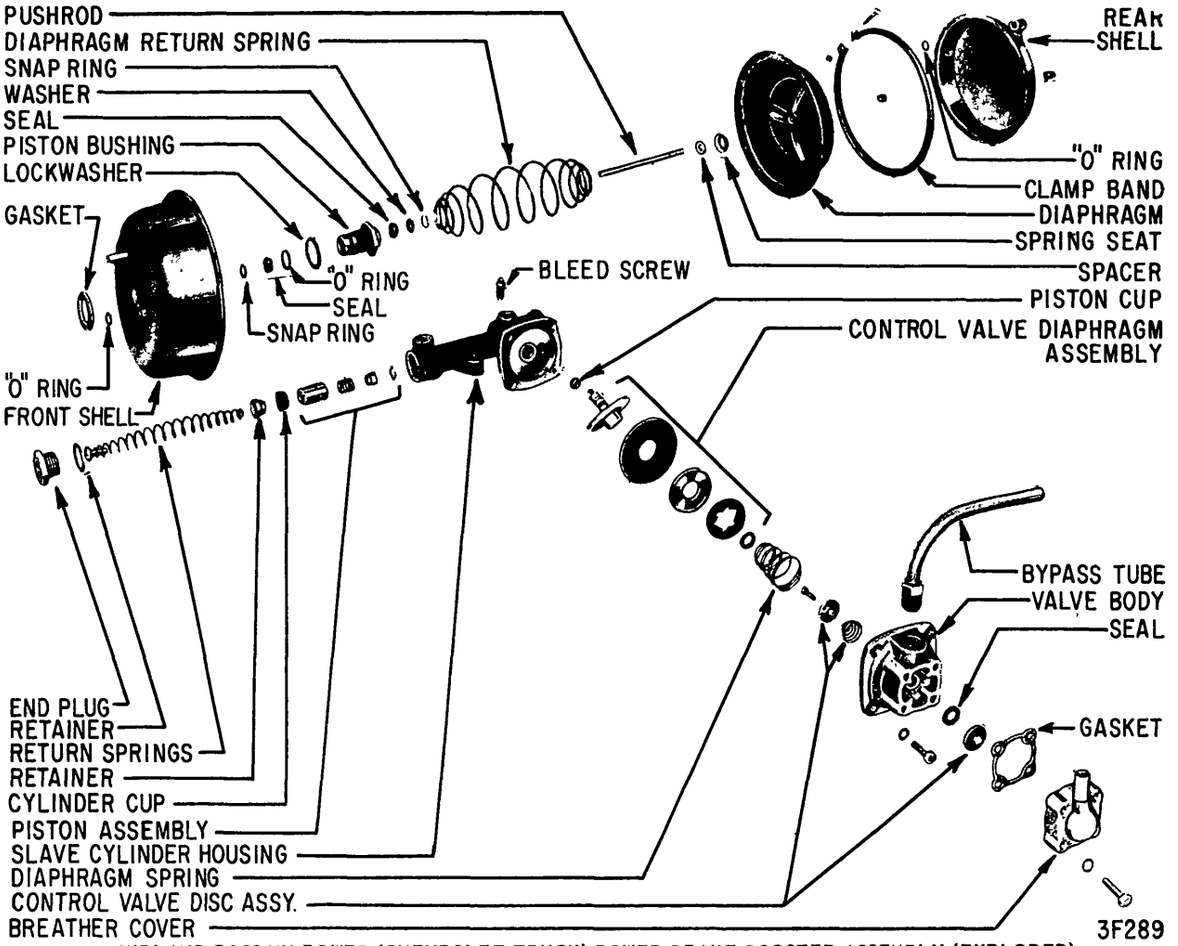
1) Remove slave cylinder end plug, copper gasket, piston springs, and retainer. Scribe mark vacuum chamber shells and control valve body and slave cylinder housing. Remove bypass tube and seal, then remove clamp band, rear shell, diaphragm and pressure plate assembly, and diaphragm return spring. Remove pushrod bushing to disconnect front shell from slave cylinder, then remove gasket and seals.
2) Remove control valve cover and body, then disassemble valve disc and spring. Remove control valve diaphragm return spring, control valve plunger and diaphragm assembly from slave cylinder housing. Push slave cylinder piston and piston cup from front end of slave cylinder housing.

Cleaning & Inspection

1) Clean and inspect all parts thoroughly. If either vacuum chamber shell dented, they should be replaced. Replace all worn or damaged parts. Replace pushrod if rough or damaged (must be perfectly smooth - do not grind end). Replace control valve disc assembly if any part damaged.
2) Disassemble slave cylinder piston assembly for cleaning and to insure proper operation of check valve. Assembly need not be replaced unless definite hydraulic leak evident before overhaul. If leak present, replace entire piston assembly, rubber cup, and control piston cup.
3) Later type slave cylinder housings have control valve bore straight through with an end plug for cleaning purposes. Early type front shells have piston guide bushing welded to shell with no tube for slave cylinder vacuum port connection. Only later type parts furnished for service and both slave cylinder housing and front shell must be used together.

Reassembly

1) Reassemble control valve diaphragm assembly (use new diaphragm). *Diaphragm bead must face away from piston cup.* Install seal in valve body, then install control valve disc assembly into valve body with small end of spring resting on lower half of disc assembly. Install diaphragm spring into valve body with small coil of spring resting on diaphragm assembly. Install control valve body on slave cylinder housing (align scribe marks), make sure spring and diaphragm are seated properly, then tighten screws securely and install breather cover.
2) Install "O" ring, tube, and gasket on slave cylinder housing. Install seals on pushrod guide bushing (lip of seal toward slave cylinder end), then install "O" ring and lockwasher on bushing. Coat seals with brake fluid, install pushrod bushing from inside of vacuum chamber front shell and install front shell to slave cylinder housing, tightening pushrod bushing to 60-80 ft. lbs. torque.
3) Put sealing compound on pushrod threads, install diaphragm and plate on pushrod, then install pushrod-diaphragm assembly and diaphragm return spring into pushrod guide bushing, install seal and tighten locknut. Loosely install bypass tube in control valve cover, then install rear shell to front shell and diaphragm, guiding into position with bypass tube. Install clamp band and tighten securely. Secure bypass tube to valve body and rear shell.
4) Insert slave cylinder piston assembly into housing with open end of piston facing toward vacuum chamber. Install slave cylinder cup with lip facing open end of housing, then install spring retainer. Insert return spring retainer over end of return springs, install springs and retainer into housing, install gasket on end plug, and install end plug and tighten securely.



MIDLAND-ROSS HY-POWER (CHEVROLET TRUCK) POWER BRAKE BOOSTER ASSEMBLY (EXPLODED)

MIDLAND ROSS DIAPHRAGM TYPE BRAKE POWER UNIT

Chrysler & Imperial (1963) ℂ
Dodge & Dart (1963) ℂ
Ford Fairlane & Galaxie (1963)
Ford Trucks (1963) ℭ
Mercury Meteor & Monterey (1963)
Plymouth (1963) ℂ
Thunderbird (1963)
Valiant (1963) ℂ

ℂ - "Bendix Diaphragm Type (Vacuum Suspended)" also used. On Chrysler 300J, Midland-Ross Remote type used.
ℭ - "Hydrovac (Piston Type)", "Hydrovac (Diaphragm Type)", and "Midland (Remote Type)" also used.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 DODGE 880 SERIES IMPROPER BRAKE PEDAL RETURN CORRECTION (EARLY CARS):* May be caused by high friction at power unit pushrod pedal pivot hole. To correct, remove any burrs from pushrod cross bolt bearing diameter, and file slightly the side faces of pushrod eye. Reassemble parts and make sure there is side movement at cross bolt. *CAUTION - Do not try to correct condition by loosening cross bolt nut or bolt failure will result.*

DESCRIPTION

Self-contained vacuum suspended, diaphragm type brake power booster unit mounted on firewall, with hydraulic master cylinder mounted on forward end of booster unit. Actuating control piston is mechanically linked to brake pedal linkage by an actuating rod. Unit is of same basic design and operation as previous models except that on Ford Motor Co. models an atmospheric valve return spring has been added between atmospheric valve and reaction load ring. On Ford Trucks, there is a diaphragm return spring in front shell between front shell and diaphragm assembly.

REMOVAL & INSTALLATION

NOTE - To avoid bleeding brake system at installation, master cylinder may be disconnected from booster unit without removing hydraulic line (support master cylinder properly). With engine stopped, apply brakes several times to balance booster internal pressure. Disconnect vacuum hoses from unit, then disconnect pedal linkage from booster pushrod. Disconnect booster from firewall and remove. To install, reverse removal procedure and adjust brake pedal height or freeplay as indicated below.

Brake Pedal Adjustment

Fairlane & Meteor - Turn eccentric bolt at brake pedal pushrod so brake pedal is 1 7/16" above accelerator pedal.

Ford Trucks - Turn eccentric bolt at power unit pushrod so there is 3/16-3/8" brake pedal free travel.

OVERHAUL

Disassembly

1) Remove master cylinder (if removed with power unit), air filter cover and hub, and air filter from booster body. Remove vacuum manifold, gaskets, and vacuum check valve from booster body. Disconnect valve operating rod from lever (remove retaining clip and pivot pin). Remove brackets from end plate, and rubber boot from valve operating rod.

2) Remove "C" ring holding rear seal adapter assembly to end plate. Scribe mark booster body and end plate for reassembly, then remove retaining screws or clamp band, rap end plate with a soft hammer, and separate end plate and booster body. Remove diaphragm return spring if equipped. Push lip of bellows into vacuum chamber, then remove bellows, control valve, and diaphragm as an assembly. Remove outer "O" ring from control valve hub.

3) Remove large bellows retaining ring, bellows, bellows retainer, and support ring from diaphragm and from bellows. Remove pushrod assembly, reaction lever and ring assembly, and rubber reaction ring from control valve hub. Remove both plastic plunger guides from control valve plunger, then remove retainer holding reaction load ring and atmospheric valve on control valve hub. Slide reaction load ring, return spring, and atmospheric valve from control valve hub. Slide plunger and rear seal adapter from rear of control valve hub, then remove hub outer "O" ring from front side of diaphragm.

4) Remove hub rear seal adapter from valve plunger and remove seal from adapter. Remove "O" rings, seal, and fibre gaskets from plunger. *NOTE - On Chrysler Corp. models, plunger and valve operating rod assembly serviced as a complete unit and should not be disassembled further. On Ford Motor Co. models, pull valve operating rod from valve plunger only if valve or plunger is to be replaced. If parts are separated, new rubber bumper and spring washer must be installed on operating rod to retain it properly in the valve.*

Cleaning & Inspection

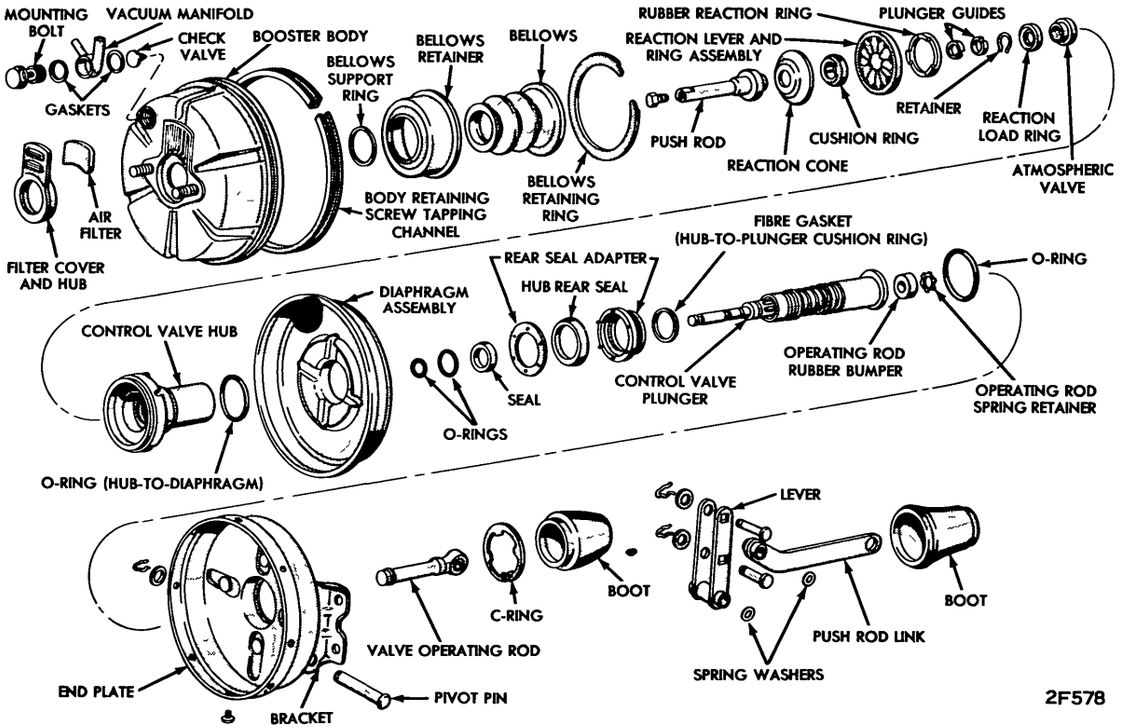
Clean all metal parts in solvent. Clean rubber parts in alcohol only. Just before reassembly, re-wash all metal parts coming in contact with hydraulic brake fluid in clean alcohol. Blow dirt and cleaning solvent from recesses and passages with compressed air. Use all parts furnished in repair kit and discard all old rubber parts. Replace any parts that are worn or damaged. If inside of booster body is rusted or corroded, polish with steel wool or emery cloth. If booster body scored, it should be replaced.

Reassembly

1) If operating rod and plunger were separated, install new rubber bumper and spring retainer on rod, then push rod firmly into plunger until rod bottoms. Install fibre gaskets, plunger seal and "O" rings on plunger assembly. Install valve hub rear seal in adapter with sealing lip of seal toward rear of valve. Slide adapter assembly onto plunger with small diameter end of hub to rear.

2) Install control valve hub outer "O" ring, then install

(Continued)



MIDLAND-ROSS DIAPHRAGM TYPE POWER BRAKE UNIT (EXPLODED)

(FORD MOTOR CO. CARS SHOWN - FORD TRUCK & CHRYSLER CORP. SIMILAR)

MIDLAND ROSS DIAPHRAGM TYPE POWER BRAKE UNIT (C nt.)

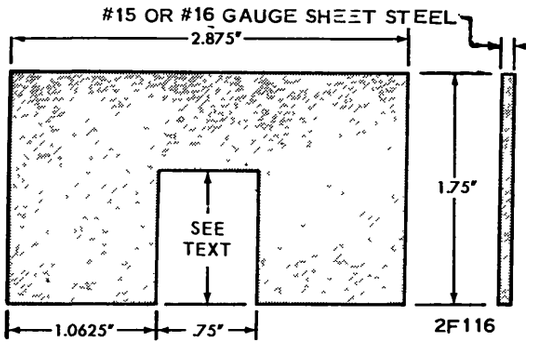
plunger and seal adapter and hub on diaphragm (hold hub on front side of diaphragm, insert plunger assembly into hub from rear side of diaphragm). Install atmospheric valve, return spring, and reaction load ring on plunger and hub, compress valve spring, and install load ring retainer in groove of plunger. Install both plastic plunger guides in plunger grooves. Install rubber reaction ring in valve hub so ring locating knob indexes in notch in hub with ring tips toward front. Assemble reaction lever and ring and install assembly in valve hub. Install reaction cone and cushion ring on pushrod and secure with retainer, then install pushrod assembly on valve hub so plunger indexes in rod. Assemble bellows, retainer, and support ring (ring should be on middle fold of bellows). Place bellows assembly on diaphragm and secure with retaining ring (ring must be fully seated).

3) If unit equipped with self-tapping screws to hold assembly together, move booster body retaining screw tapping channel just enough for a new surface for self-tapping screws. Install diaphragm return spring (if equipped), diaphragm, control valve parts, and bellows as an assembly in booster body. *CAUTION - Lip of diaphragm must be evenly positioned on retaining radius of booster body.* Pull front lip of bellows through body and place lip around outer groove of body. Install "O" ring in front of endplate and install plate on body. Align scribe marks, compress assemblies, and fasten together. Install large "C" ring on rear seal adapter at rear of end plate. *NOTE - Make pushrod adjustment (see below) next.*

4) Install valve operating rod rubber boot, air filter parts, and other external linkage and brackets. Install master cylinder if removed with booster assembly. Install vacuum manifold and check valve (if equipped).

Pushrod Adjustment

Place a gauge made to the dimensions shown in illustration against master cylinder mounting surface of booster body. Pushrod adjusting screw should just touch inner edge of slot in gauge. If gauge not used, distance from master cylinder mounting surface on booster body to end of pushrod adjusting screw should be .995-1.005" (Ford & Mercury Cars & Thunderbird), .700-.710" (Ford Trucks).



PUSHROD GAUGE TOOL

MIDLAND ROSS (CHRYSLER 300J) POWER BRAKE UNIT

Chrysl r 300J (1963)

DESCRIPTION

Remote type vacuum suspended power brake booster, slave cylinder, and control valve assembly mounted under left front fender behind headlight housing. Residual pressure check valve is integral with booster slave cylinder. An in-line check valve is used in the vacuum line.

REMOVAL & INSTALLATION

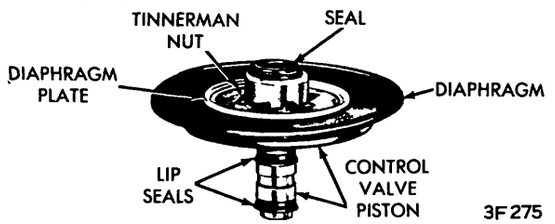
Disconnect hydraulic, vacuum, and air lines from booster unit. Disconnect slave cylinder-to-bracket attaching screws and remove booster unit. Remove filter assembly from inner side of fender side shield. To install, reverse removal procedure and bleed brakes.

OVERHAUL

Disassembly

1) Remove bypass tube, scribe mark front and rear housings and clamp band, then remove clamp band and front housing from rear housing. Remove power piston assembly from front housing. Remove diaphragm return spring by bending tabs back. Remove pushrod locknut and remove pushrod from diaphragm hub.

2) Scribe mark control valve cover and slave cylinder housing, remove snap ring and breather cap assembly from cover, then remove control valve cover. Compress air check valve spring, remove "O" ring from check valve poppet, and remove poppet and spring. Remove control valve assembly from housing by grasping hub and rotating. Remove Tinnerman nut, diaphragm plate, and diaphragm from piston assembly. Remove rubber seal from piston hub, then remove outer lip seal on spool part of piston- *NOTE - The other seal cannot be removed and is serviced as an assembly with spool and flange sections of piston.*



CONTROL VALVE ASSEMBLY

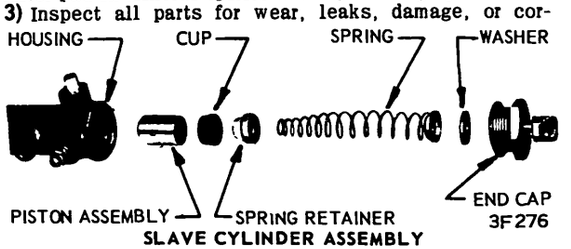
3) Remove end cap and copper washer from slave cylinder, then remove rubber washer inside end cap. Remove piston return spring and residual check valve. Remove pushrod guide bushing and separate front housing and slave cylinder housing. Remove thick spacer washer and lockwasher. Remove "O" ring from rolled tube protruding from back of control valve housing, and remove gasket sealing housing and vacuum chamber front housing. Remove ."O" ring from guide bushing, then remove snap ring, flat washer, and lip seal from front of guide bushing, and snap ring and lip seal from rear of bushing. Remove slave cylinder piston, cup, and spring retainer from slave cylinder housing. Remove bleeder screws. Disassemble air cleaner unit.

Cleaning & Inspection

1) *The following parts are serviced as an assembly only:* Spool and flange sections of control valve piston. Residual check valve. Slave cylinder piston assembly. *NOTE - Slave cylinder piston body has a loose fitting plug, return spring and snap ring, and may be disassembled for cleaning only (remove snap ring).*

2) Wash all parts in alcohol and dry thoroughly. Replace all rubber parts and gaskets, and copper washer between end cap and slave cylinder housing. Clean air filter pad in mineral spirits and dry thoroughly.

3) Inspect all parts for wear, leaks, damage, or corrosion and replace as necessary. Test check valve in vacuum line and replace as necessary.



SLAVE CYLINDER ASSEMBLY

Reassembly

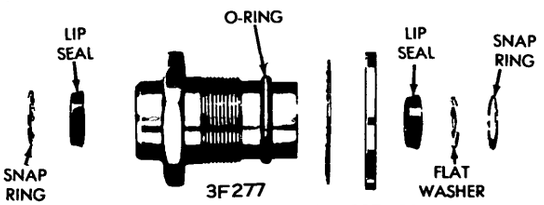
1) Reassemble piston guide nut assembly. Lip seal on small (front) end must have lip facing out, and lip seal on large (rear) end must have lip facing in. Insert new rubber seal in end cap and install end cap and copper washer on slave cylinder housing. Install tube elbow in end cap and bleeder screws in slave cylinder housing.

2) Install new seal in outer groove of control valve piston spool. Install control valve diaphragm over hub of piston flange (welt at I.D. of diaphragm next to piston flange). Install diaphragm plate and Tinnerman nut. Install new seal in hub of piston flange.

3) Install control valve assembly into housing using a rotating motion, then install air check valve spring and poppet (use new "O" ring on poppet). Install control valve cover, breather cap and retaining ring.

4) Install diaphragm assembly on pushrod and tighten locknut. Install diaphragm return spring under clips on diaphragm plate (large loop of spring next to plate). Use new bypass tube grommet in rear housing, then install diaphragm and pushrod assembly into rear housing. Install free end of pushrod in guide bushing bore, then use a rotating motion and slide pushrod in until end of pushrod bottoms against slave cylinder piston plug and small end coil of return spring seats around hub of guide bushing. Close both housing halves together until scribe marks are aligned, then install clamp band. Install bypass tube.

5) Reassemble air cleaner unit.



PISTON GUIDE NUT ASSEMBLY

STUDEBAKER HYDROVAC POWER BRAKE UNIT

Studebaker Hawk (1963) ℂ

ℂ - With Disc Brakes

DESCRIPTION

Vacuum-hydraulic power brake booster with single piston and having a control valve with a single poppet Control valve operated by a double cup hydraulic piston through the diaphragm assembly

MAINTENANCE

Air Cleaner

Integral type in end of control valve housing Clean every 1000 miles or sooner under severe dust conditions After washing element in cleaning solvent, dry thoroughly, and saturate with light engine oil

Lubrication

Every 20,000 miles (or yearly) inject 1 oz of Power Brake Cylinder Oil into unit through plug in end of vacuum cylinder shell *CAUTION - Lubricate unit only after permanently installed on car or handling of unit will cause oil to flow into hydraulic cylinder and cause damage*

REMOVAL & INSTALLATION

Disconnect hydraulic and vacuum lines and stop light switch wires from unit Remove power unit-to-bracket attaching bolts and remove unit To install, reverse removal procedure

OVERHAUL

Disassembly

1) Scribe mark control valve housing and end plate, and end plate and vacuum cylinder shell Loosen hydraulic cylinder check nut, then remove vacuum tube and grommet Remove control valve assembly, spring, and diaphragm from end plate Disassemble and remove check valve from end plate

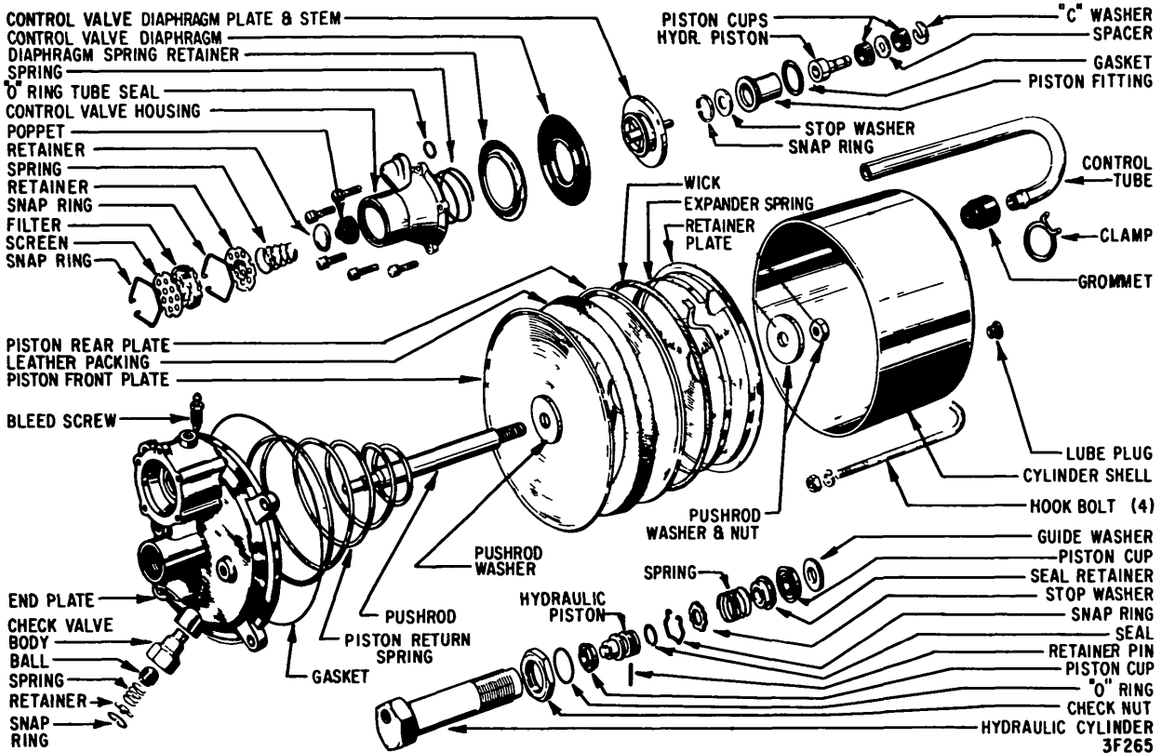
2) Remove air cleaner and poppet parts from control valve housing by removing snap ring From other side of housing remove control tube seal "O" ring Remove spring retainer and diaphragm from diaphragm plate and stem

3) Remove hook bolts holding end plate and vacuum cylinder shell together, and separate the parts Remove hydraulic cylinder from end plate, hold piston return spring compressed, and remove hydraulic piston from pushrod by removing retainer ring and pin Release spring and separate the parts Remove control valve hydraulic piston parts from end plate after removing snap ring Remove piston cups from hydraulic pistons Remove stationary seal parts from end plate after removing snap ring Remove pushrod "O" ring seal and bleed screw

4) Disassemble vacuum piston by removing pushrod retaining nut and lifting all parts from pushrod

Cleaning & Inspection

Clean air cleaner with solvent, metal parts in suitable parts cleaner, and rubber parts in alcohol Vacuum cylinder bore may be polished with steel wool or crocus cloth Replace any worn damaged, or pitted parts If control valve poppet seat is damaged, replace control valve body Special Hydrovac Repair Kit should be used when overhauling unit Use **all** the parts furnished in kit



STUDEBAKER HYDROVAC POWER BRAKE UNIT (EXPLODED)

Reassembly

1) Inside Assembly Ring 73664 placed flat on work bench install front piston plate (concave side down), leather packing, and rear piston plate (concave edge down) Cut wick to required length, saturate in Vacuum Cylinder Oil, and coil the wick against inside lip of leather packing Install expander spring with barbs up and engage notched end of spring with hook near opposite end of spring Install retainer plate on piston parts with cutout on plate over loop of spring Install washer on threaded end of pushrod, then install piston parts on pushrod (assembly ring still in place), install washer and nut and tighten securely *Do not remove assembly ring until piston and end plate are installed into vacuum cylinder*

2) Install pushrod "O" ring in end plate groove, then install stationary seal parts as follows Install guide washer (chamfered side against end plate), seal cup with lip toward hydraulic cylinder, seal retainer (shoulder end next to cup), and seal retainer spring Install stop washer against spring and install snap ring in inner groove Install "O" ring seal in outer groove Install bleed screw

3) Reassemble control valve hydraulic piston parts Dip piston cups in brake fluid before installing on piston and install cups with lips toward inside of end plate Install piston assembly and stop washer into end plate and secure with snap ring

4) Install hydraulic piston cup on piston with lip of cup toward small diameter end of piston Install vacuum piston return spring over pushrod with small end of spring next to piston Install end plate over pushrod, compress spring, and install hydraulic piston on pushrod and secure with pin and snap ring Install hydraulic cylinder into end plate hand tight

5) Install gasket in end plate groove, dip vacuum cylinder packing in Vacuum Cylinder Oil (allow time for excess to drain), wipe inside of cylinder shell lightly with same oil, and install vacuum piston and end plate assembly into cylinder shell and install and tighten hook bolts alternately until tight

6) Assemble control valve diaphragm over flange of plate and stem, then install retainer plate over shoulder diaphragm Install poppet bearing ring in groove of poppet, install poppet valve spring and retainer Install snap ring in housing inner groove Install air cleaner element parts, then install control tube "O" ring in control valve housing

7) Install diaphragm assembly into end plate, then install valve spring Align scribe marks and install control valve housing to end plate and tighten attaching screws Reassemble check valve and install into end plate Install control tube and lubrication plug Align hydraulic cylinder so outlet in tube is at top and aligned with bleed screw Tighten cylinder check nut

MULTI-VAC POWER BRAKE UNIT

Ch vr l t Trucks (1963)©

© - "Bendix Power Brake Unit Diaphragm (Vacuum Suspended)", "Delco-Moraine Vacuum Suspended Power Unit", and "Midland-Ross Hy-Power" types also used.

DESCRIPTION

Self-contained vacuum-hydraulic power brake unit consisting of a vacuum power chamber, hydraulic slave cylinder, and vacuum control valve. 11" and 12¾" types used. 11" type has no residual pressure check valve and must be used with a master cylinder having a residual pressure check valve with a .030" orifice. Both 11" and 12¾" types are similar in design and any differences will be noted under "Overhaul" as necessary.

OVERHAUL

Disassembly

1) Scribe mark front and rear shells, clamp slave cylinder in vise, and remove control tube and hose from control valve housing. Remove clamp ring holding front and rear shells and remove rear shell. Turn back outer rim of diaphragm (to expose wrench flats on pushrod) and loosen pushrod retaining nut on outside of diaphragm. Remove nut, washer, diaphragm, plate, washer, and return spring from front shell. Remove front shell from slave cylinder, then remove gasket.
2) Scribe mark control valve and slave cylinder housing, then remove control valve housing and spring. Remove washer, diaphragm, and washer from valve piston. Remove cups (one cup only on 12¾" type) from valve piston. From control valve housing remove retaining ring, plate and gasket; and pry off poppet retainer, remove poppet and stem, and poppet spring from housing.
3) Push slave cylinder pushrod to end of its stroke and remove snap ring and washer, then remove pushrod and piston and remove "O" ring, pushrod bearing, cup, and retainer from pushrod assembly. Remove end plug, gasket (and bleed screw if equipped) from slave cylinder housing.
4) Disassemble slave cylinder piston as follows: Remove snap ring from groove in piston and remove retainer pin to separate piston and pushrod. Remove cup (2 cups on 12¾" type) from piston. Pull seal from end of pushrod. On 12¾" type, remove lock ring, check valve seat, check valve, and ball retainer spring. Disassemble check valve by removing retaining ring, washer, spring, and ball.

Cleaning & Inspection

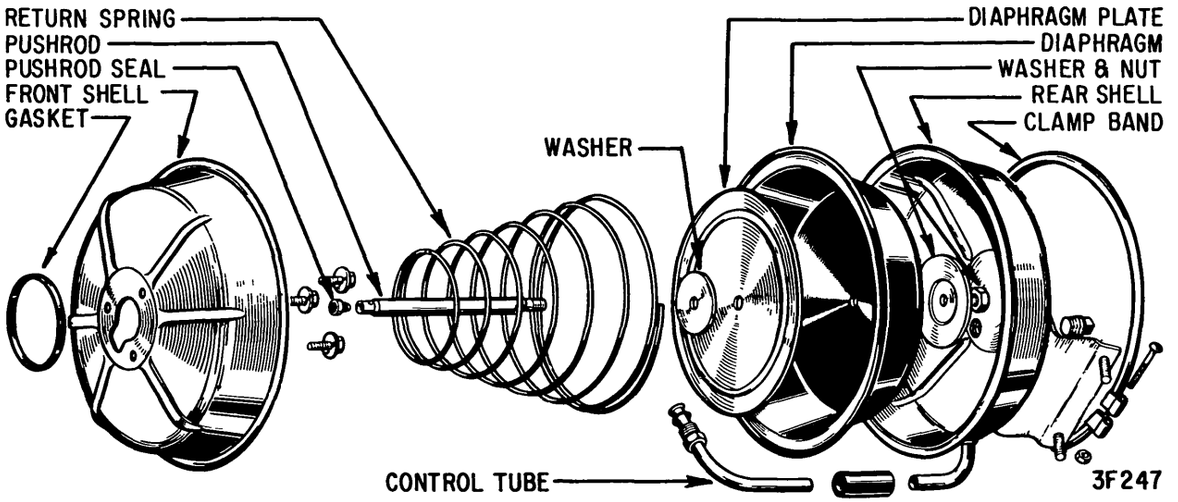
Thoroughly clean and inspect all parts. Replace as necessary. If control valve housing valve seat is damaged, replace housing. Multi-Vac Repair Kits are available and are recommended when overhauling these units.

Reassembly

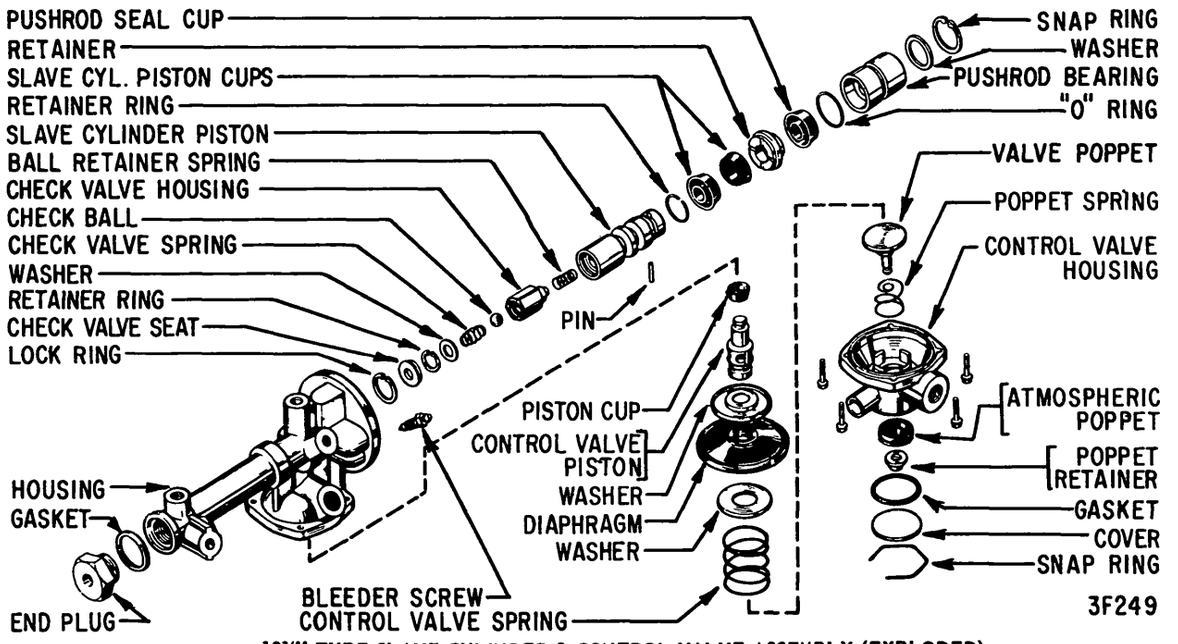
1) Install new seal in pushrod as follows: Place new seal with rubber faced side down on a clean wood block. With pushrod directly above seal and held vertically (threaded end up), strike end of pushrod with soft hammer to seat seal in pushrod.
2) Dip piston cups in brake fluid. On 11" type, install cup on piston with lip toward end plug end of housing. On 12¾" type, install cups back-to-back. On 12¾" type, assemble check valve ball, spring, washer, and snap ring in check valve body, then assemble check valve, check valve seat into piston and secure with lock ring. On both types, insert seal end of pushrod in piston, install retainer pin and secure with lock ring (ring must be seated in piston groove).
3) Install seal retainer, pushrod seal cup, and pushrod bearing on pushrod, install "O" ring seal in outer groove of bearing, and install piston and pushrod assembly into slave cylinder housing. Install support washer and lock ring. Install housing end plug and gasket (and bleed screw if equipped).

4) Reassemble control valve housing by installing poppet return spring, valve poppet and stem, and valve seal into valve housing, snap poppet retainer over valve stem, and install cover gasket, cover, and snap ring.

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VACUUM POWER CHAMBER ASSEMBLY (EXPLODED)

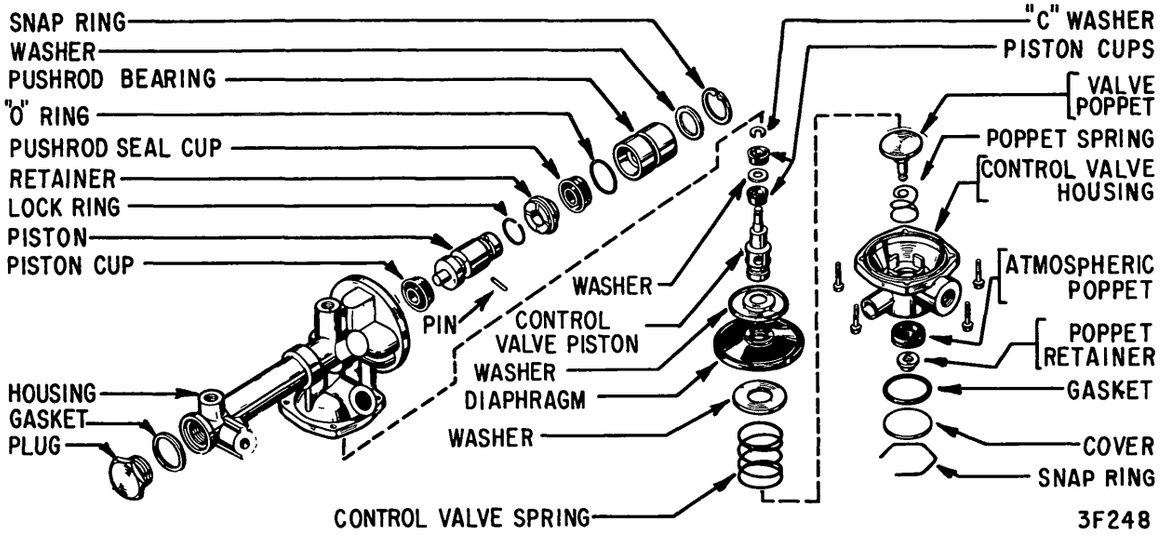


12¾" TYPE SLAVE CYLINDER & CONTROL VALVE ASSEMBLY (EXPLODED)

MULTI-VAC POWER BRAKE UNIT (Continu d)

5) Install cups on control valve piston with lips of cups toward small diameter end of piston, then hold cups in place with "C" washer. Install diaphragm retainer and diaphragm, seating diaphragm in piston groove. Install control valve piston into bore of housing and install spring retainer, spring, and housing cover and tighten screws securely.

6) Install front shell to slave cylinder housing, making sure cutout in shell is aligned with porting on housing. Tighten screws securely. Pull pushrod out to end of its travel and temporarily plug slave cylinder outlet with a 5/16" (Inverted Flange) tube seat plug. With small diameter end of return spring on front shell, install washer on pushrod, diaphragm plate on spring (concave side down), diaphragm on plate (lip down), and washer. Compress parts and install retaining nut on pushrod end, tighten securely, and remove tube seat plug. Install rear shell, aligning scribe marks made at disassembly, and make sure bead of diaphragm is seated in outer flanges of front and rear shells. Install clamp band with band opening 45° to left of vertical centerline of unit. Tap band lightly with soft hammer when tightening bolt to seat band. Install tube and hose on valve housing and connect to rear shell tube.



11" TYPE SLAVE CYLINDER & CONTROL VALVE ASSEMBLY (EXPLODED)

BENDIX TANDEM DIAPHRAGM POWER BRAKE UNIT

Studebaker Avanti, Lark & Cruiser ℂ
ℂ - With Disc Brakes.

DESCRIPTION

Vacuum-hydraulic power brake assembly with tandem vacuum diaphragms. This unit is a "vacuum suspended" type and does not require a vacuum reservoir. The vacuum power chamber consists of a front and rear shell, center plate, front and rear diaphragm, hydraulic pushrod and a vacuum diaphragm return spring. The hydraulic master cylinder is connected directly to vacuum chamber.

REMOVAL & INSTALLATION

Removal

Procedure below is for removal of power unit, master cylinder, mounting brackets, and power levers as an assembly. Disconnect pushrod from brake pedal by removing shoulder bolt, then remove nylon bushings from pushrod. Disconnect hydraulic and vacuum lines, and stop light switch wires. Remove bolts holding unit to firewall and to suspended pedal bracket and remove complete assembly.

Installation

1) Attach assembly to firewall and suspend pedal bracket with capscrews and lockwashers. Connect hydraulic and vacuum lines, and stop light switch wires. Install nylon bushings in eye of pushrod and connect pushrod to brake pedal with the special eccentric shoulder bolt.

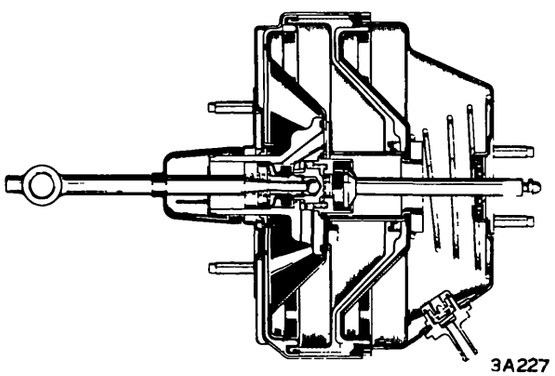
2) Adjust pedal height as follows: On Synchro-mesh cars, rotate shoulder bolt until brake pedal is at same height as clutch pedal (released position). On Auto. Trans. cars, rotate shoulder bolt so there is 7/8-1" clearance between brake pedal arm and tab on suspended pedal bracket. Hold bolt head and tighten locknut securely.

ADJUSTMENT

Pushrod Adjustment

NOTE - No adjustment required under normal service conditions. Check and reset adjustment pushrod replaced or transferred from one unit to another.

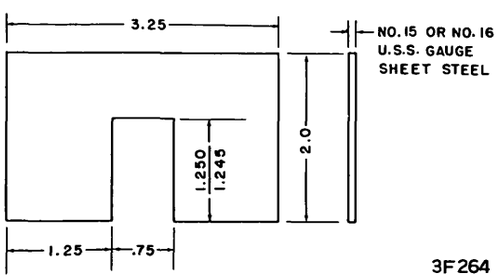
With master cylinder removed and pushrod firmly bottomed in diaphragm plate, measure distance from end of pushrod adjusting screw to master cylinder mounting face of power unit. Distance should be 1.245-1.250". Use micrometer or height gauge made locally as shown in illustration. To adjust, turn adjusting screw in or out as required.



BENDIX TANDEM DIAPHRAGM POWER BRAKE UNIT (SECTIONAL VIEW)

OVERHAUL

Power unit is serviced as a complete assembly only.



PUSHROD ADJUSTMENT GAUGE TOOL

BENDIX HYDRAULIC SINGLE ANCHOR HYDRAULIC TYPE

D dg Dart (1963) ℂ
Valiant (1963) ℂ
J ep With Dual R ar Wheels (1963) ℂ

ℂ - Early Cars Later Cars use "Bendix Automatic Adjuster Hydraulic Type"
ℂ - Other models use "Bendix (Lockheed) Self-Centering" type

DESCRIPTION

Single anchor, without eccentric, hydraulic type Fixed anchor pins are used on all models and are not adjustable

ADJUSTMENT

Minor Wear Adjustment

Remove adjusting hole cover on backing plate and turn adjusting star wheel to expand shoes until shoes have a slight drag on brake drum (Dart & Valiant), until shoes are tight against drum (Jeep) Now back off adjusting star wheel 10-12 notches (Dart & Valiant), until drum turns freely (Jeep)

Parking Brake Adjustment

Dart & Valiant - With parking brake lever fully released, loosen cable adjusting nut so cables are slack, then tighten adjusting nut so there is a slight drag at each rear wheel Loosen nut until both wheels are free, then back off nut **2 full turns.** Apply parking brake several times, then release and check that there is no drag

Jeep - Fully release hand brake lever, check linkage for freedom from bind Rotate brake drum so one pair of three sets of holes are over adjusting screws Use tool or screwdriver to rotate each adjusting screw away from drive shaft until shoes are snug against drum, then back off each screw 7 notches for running clearance

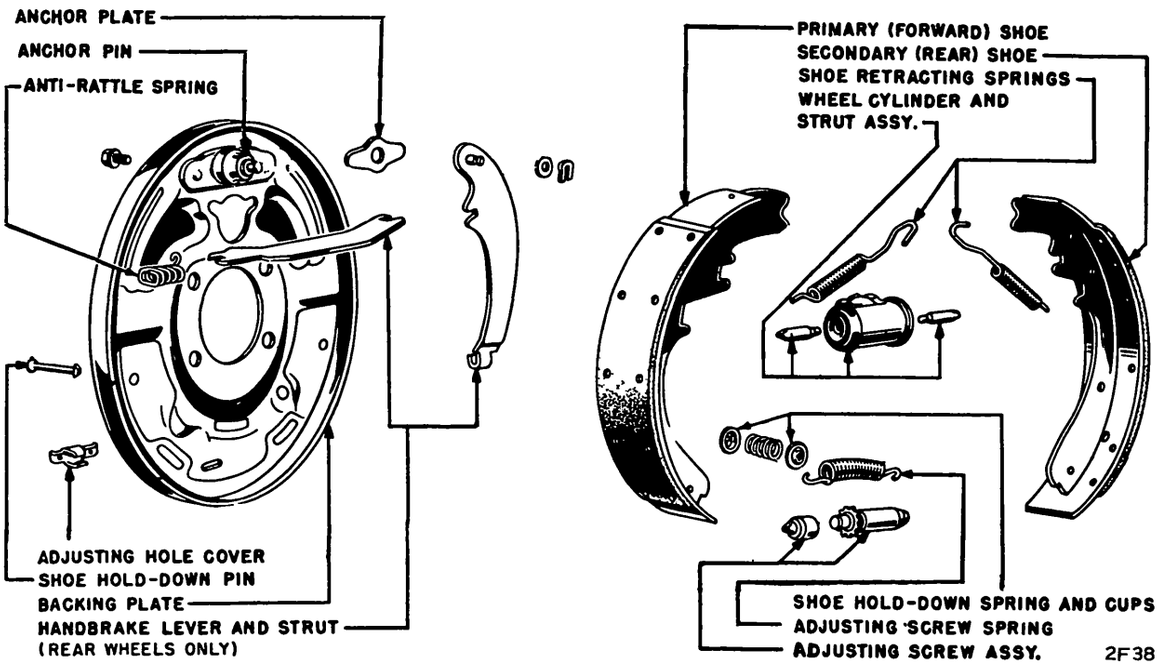
Brake Pedal Adjustment

Dart & Plym uth - No adjustment Freeplay controlled by stop built into master cylinder

Jeep - Pedal free travel should be ½" Adjust by turning master cylinder pushrod in or out as necessary

MASTER CYLINDER

Jeep - On Forward Control models, master cylinder is located under instrument panel in front of steering column and is accessible through hole on panel to right of speedometer



BENDIX HYDRAULIC SINGLE ANCHOR BRAKE ASSEMBLY (EXPLODED)

1963 HYDRAULIC BRAKE LINING SPECIFICATIONS

Car Model	Width		Front - Length - Rear				Thickness	
	Front	Rear	Primary	Secondary	Primary	Secondary	Front	Rear
Dart & Valiant	2 1/4"ℂ	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
Jeep	2"	2 1/2"	11 1/2"	13"	12 67"	13 94"	238"	238"

ℂ - 2½" on Secondary

1963 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter		Wheel Cyl. Diam.		Master Cyl.	% Braking Power	
	Front	Rear	Front	Rear	Diameter	Front	Rear
Dart & Valiant	9"	9"	1"	13/16"	1"	60	40
Jeep	12"	13"	1 1/8"	1 1/4"	1 1/8"	50	50

TRANS. MOUNTED PARKING BRAKE

Car	Drum Diam.	Length - Lining - Width		Thickness
Jeep	8"	8 1/8"ℂ	1 3/4"	211"

ℂ - Each Shoe

SERVICING

For bleeding system and overhauling of wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual

CHEVROLET-BENDIX HYDRAULIC

Chevrolet Trucks, Series 10,20,30 (1963) Front & Rear
Chevrolet Trucks, Series 50,60 (1963) Front Only ℂ

ℂ - For Rear Brakes, see "Chevrolet Truck Twinplex" in this section

DESCRIPTION

Duo-Servo, single anchor, hydraulic type without eccentric adjustment

ADJUSTMENT

Minor Wear Adjustment

With wheels clear of floor, relieve tension on parking brake cables Remove adjusting hole covers from brake backing plates and expand shoes by turning adjusting screw with Tool J-4707 or J-9485 or screwdriver until a light uniform drag is felt on brake drum (move outer end of tool toward center of wheel to expand shoes) Now turn adjusting screw in opposite direction 12 notches (Series 10), not more than 7 notches (Series 20,30,50,60) to relieve brake drag Replace adjusting hole covers, reconnect and adjust parking brake

Anchor Pin Adjustment

NOTE - This adjustment required on rear brakes of P & C 30 Series only when reassembling brake mechanism All other anchor pins are "fixed" type

With brakes assembled and drums installed, loosen anchor pin nut and then retighten nut ¼-turn beyond "finger tight" position Insert adjusting tool into backing plate slot and expand shoes against drum while tapping backing plate with a soft hammer When adjusting screw is tight and hard to turn, tap backing plate a few more times to position anchor pin, and tighten anchor pin nut to 150-175 ft lbs Adjust brakes

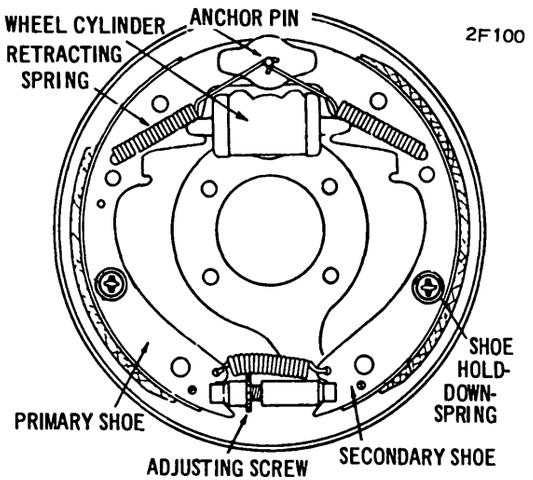
Parking Brake Adjustment

Rear Wheel Type - With parking brake fully released, adjust front cable clevis at equalizer lever so there is 1 38" ± 06" from end of cable threaded rod to center of clevis pin hole With equalizer pull-back spring installed, adjust front cable at clevis so there is ¼" clearance between rear of equalizer lever and rear of slot in frame Tighten locknuts Now pull hand brake lever 4 notches from fully released position and pull rear brake cables as far as possible out of their conduits Adjust clevis at each cable so there is 1/75" ± 06" (C Series) 2 44" ± 06" (K Series) from end of threaded rod to center of clevis pin hole, then tighten locknuts Fully apply parking brakes and adjust cables as necessary so there is an equal heavy drag at both rear wheels

1963 HYDRAULIC BRAKE & LINING SPECIFICATIONS

Chev. Truck Model	Drum Diameter		Wheel Cyl. Diam.		Master Cyl. Diameter	Brak Lining Width	
	Front	Rear	Front	Rear		Fr nt	Rear
Series C, P-10	10 96"	11 00"	1 125"	1 00"	1 125"	2 0"	2 0"
K-10	10 94"	11 00"	1 125"	1 00"	1 125"	2 0"	2 0"
C-20	11 11"	11 15"	1 125"	1 13"	1 125"	2 75"	2 75"
C-30	11 11"	12 96"	1 125"	1 25"	1 125"	2 75"	2 5"
P-20	11 96"	11 96"	1 125"	1 13"	1 125"	2 0"	2 0"
P-30	11 96"	12 96	1 125"	1 25"	1 125"	2 0"	2 5"
K-20	12 13"	12 00"	1 125"	1 13"	1 125"	2 0"	2 0"
C,L,S-50,60	13 96"		88"		1 125"	2 5"	

Propeller Shaft (Band) Type - Adjust clevis on brake pull rod so distance from end of rod to center line of clevis pin hole is 1 7/16" Place the hand brake lever in fully released notch of ratchet sector Loosen locknut on brake pull rod to brake cam (leave loose) Set brake cam rest flat on upper brake band bracket Back off adjusting nuts at lower end of spring, and adjusting nut at top of adjusting bolt (bolt joins lower part of band to bracket) *CAUTION - Do not remove nuts, loosen only* Remove lock wire from anchor screw Adjust anchor screw until there is 010- 015" clearance between lining and drum at anchor screw Tighten adjusting bolt (bolt without spring) until there is 020" clearance between drum and lower end of brake band Tighten locknut Tighten adjusting nut at lower end of spring until there is 020" clearance between drum and upper end of brake band Tighten locknut Adjust brake pull rod so clevis pin can be installed while brake cam rests flat on upper brake band bracket Install cotter pin in clevis pin of brake pull rod and tighten locknut on brake pull rod Install lock wire on anchor screw Recheck all points of lining for correct clearances



CHEVROLET-BENDIX FRONT BRAKE ASSEMBLY

Propeller Shaft (Shoe) Type - *See "Chevrolet Twinplex Brakes" in this section*

Brake Pedal Adjustm nt

With Eccentric Bolt Type Adjustm nt - Rotate eccentric bolt located where master cylinder pushrod connects to brake pedal to obtain a free pedal travel of 1/8" measured at center of brake pedal pad Tighten eccentric bolt nut to 40-50 ft lbs *NOTE - Adjust stop light switch so there is electrical contact at approximately 13/16" pedal travel*

With Threaded Rod Type Adjustment - Adjust pushrod so that pedal free travel measured at center of pedal pad is 1/8" Tighten pushrod locknut to 17-23 ft lbs *NOTE - Adjust stop light switch so there is electrical contact at approximately 13/16" pedal travel*

SERVICING

For bleeding system and overhauling wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual

WAGNER AUTOMATIC ADJUSTER (PRIMARY SHOE ACTUATION)

Stud bak r, Exc pt Avanti (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 EXCESSIVE PEDAL TRAVEL & HIGH PEDAL EFFORT CORRECTION:* On cars without power brakes, this condition may be improved by removing brake pedal return spring and installing longer brake pedal-to-master cylinder pushrod, No. 1561592; then adjust brake pedal stopscrew for 1/4-3/8" clearance from pedal with pedal in released position. *NOTE - Pedal return spring liminated in production during March, 1963; and l nger pushr d used in production beginning Serial No. 63S-34067 & 63V-33581.*

DESCRIPTION

Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies similar in design to Wagner (Lockheed) Self-Centering Brakes and incorporating an automatic adjuster to maintain proper lining-to-drum clearance. The automatic adjuster uses movement of the front (primary) shoe during brake applications in forward direction to turn brake adjusting star wheel a small amount as determined by lining wear. The automatic adjuster consists of an adjusting lever, a lever crank on primary shoe, and two adjusting wire links.

ADJUSTMENT

Brake Shoe Adjustment

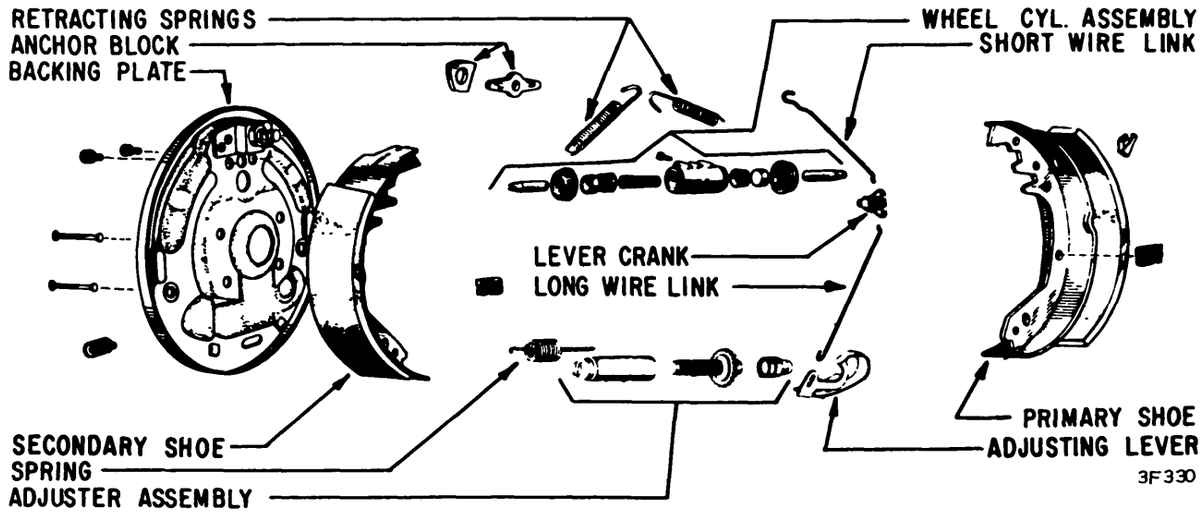
Adjustment not normally required, but if a manual adjustment is necessary (after installation of new lining or shoes), proceed as follows: Remove adjusting hole cover from backing plate and rotate adjusting star wheel with screwdriver until there is a heavy drag on brake while rotating wheel and tire. Now insert a small bent screwdriver or similar tool by star wheel and carefully disengage actuating lever from star wheel. *CAUTION - Move lev r only amount necessary to disengage from contact with star wheel.* While holding actuating lever disengaged, back off star wheel until there is no drag and wheel turns freely. Release adjusting lever. Lever tang must reengage star wheel (check by trying to rotate star wheel). Replace adjusting hole cover, then apply brakes several times while car is moving forward.

Parking Brake Adjustment

With rear wheels off ground and parking brake handle set 4 notches from fully released position, loosen locknut at rear cable equalizer under transmission and tighten adjusting nut so there is no slack in cables and there is a heavy drag at rear wheels. Tighten nuts securely, release the handle and check that no drag exists.

Brake Pedal Adjustment

Turn adjustable pedal stop on pedal bracket so pedal free travel is 1/4-3/8" measured at pedal pad before pressure stroke starts.



WAGNER AUTOMATIC ADJUSTER BRAKE ASSEMBLY (PRIMARY SHOE ACTUATION)
RIGHT FRONT SHOWN - OTHERS SIMILAR

OVERHAUL

Brake Shoe Replacement

Reassembly - 1) Apply lubriplate to wear surface of backing plate. Install anchor block on anchor pin with curved side of block and arrow toward primary shoe side. Install parking brake lever and retaining clip to secondary shoe, then attach cable to lever. Place shoes on backing plate, aligning shoes with wheel cylinder pushrod slots. Install parking brake link, then install anti-rattle spring on primary shoe side of parking brake link. Install shoe hold-down pins and retaining clips. **2)** Install adjuster lever on primary shoe web (slot in lever must engage completely with slot in shoe web).

NOTE - Adjuster levers are painted blue for right side, red for left side. DO NOT INTERCHANGE. Install star wheel and adjust so approximately 3/16" of threads are exposed between star wheel and star wheel nut. *CAUTION - If star wheels are interchanged between sides of car, brake shoes will retract instead of expand. Right hand threads go on right brakes, left left threads on left brakes. Make sure star wheel is installed over adjusting hole in backing plate.* Install blue spring at lower end of shoe webs (long hook end in small hole of primary shoe **under** shoe web; and short hook end in small hole of secondary shoe web). Spring should not interfere with either adjusting lever or star wheel.

(Continued)

1963 HYDRAULIC BRAKE SPECIFICATIONS

Studebaker Model	Drum Diameter		Wheel Cyl. Diam.		Master Cyl. Diameter	% Braking Power	
	Front	Rear	Front	Rear		Front	Rear
6 Cyl. ℂ	10"	9"	1.000"	.812"	1.0"	62	38
V8 ℂ	11"	10"	1.062"	.875"	1.0"	62	38

ℂ - Except Police & Taxi. ℂ - Including all Police & Taxi.

1963 BRAKE LINING SPECIFICATIONS

Studebaker Model	Width		Front - Length - Rear				Thickness	
	Front	Rear	Primary	Secondary	Primary	Secondary	Front	Rear
6 Cyl. ℂ	2"	2"	8 15/32"	10 53/64"	7 9/16"	9 3/4"	3/16" ℂ	3/16"
V8 ℂ	2½"	2"	9 21/64"	11 57/64"	8 15/32"	10 27/32"	3/16" ℂ	3/16"
Taxi & Police	2½"	2"	11 1/2"	11 1/2"	10 7/16"	10 7/16"	7/32"	3/16"

ℂ - Except Police & Taxi. ℂ - 1/4" Secondary ℂ - 7/32" Secondary.

WAGNER AUTOMATIC ADJUSTER (PRIMARY SHOE ACTUATION) (Continued)

3) Install wing plate on anchor pin (over anchor block). Install shoe return springs (green for 10" & 11" brakes, black for 9" brakes) with long hook end flat against wing plate. Install lever crank into primary shoe web (in small hole **below** cross link slot). *NOTE - Cranks are marked "L" and "R" for identification. Lever must rotate freely on hexagon head screw.* Install short (upper) wire link as follows: Insert "S" shaped offset end into lever crank hole closest to hexagon head, then snap hook end of link in top groove of anchor pin. Install long (lower) wire link as follows: Insert "S" shaped end into lever crank, then lift adjusting lever up to hook link into slot of adjusting lever. Adjusting lever should now engage star wheel teeth at centerline of star wheel assembly ±1/16". *NOTE - Green wire links used on 11" brakes, red links on 10" brakes, and black links on 9" brakes.* Install wheel and drum, then make brake shoe adjustment (see above)

SERVICING

For bleeding brake system and ov rhaul of master cylinder, see "Bendix & Moraine Dual Piston Brak Master Cylinders" in this section.

TROUBLE SHOOTING

See "Hydraulic Brake Troubl Shooting" in Brake Section of Manual.

WAGNER AUTOMATIC ADJUSTER (SECONDARY SHOE ACTUATION)

Rambler Classic Six, Series 6310 (1963)

DESCRIPTION

Hydraulic, self-centering, self-energizing, and self-adjusting type similar in design and operation to units used on previous models. Automatic adjuster uses movement of rear (secondary) shoe during reverse brake applications to turn brake adjusting star wheel a small amount as determined by lining wear.

ADJUSTMENT

Brake Shoe Adjustment

NOTE - Make following adjustment whenever brakes overhauled, or whenever necessary in service. This adjustment is not a normal service operation. With 3/16-1/4" of star wheel threads exposed during installation procedure, install drum and rotate star wheel toward axle until wheel is in locked position. Back off star wheel at least 15-20 notches. *CAUTION - DO NOT insert a tool past star wheel to lift or pry adjusting lever off star wheel teeth.*

Parking Brake Adjustment

Set brake lever on first notch from fully released position and tighten cable at equalizer until rear wheels are locked in forward rotation Release foot lever and make sure wheels rotate without drag.

Brake Pedal Adjustment

Rotate master cylinder eccentric attaching bolt for maximum pedal height. On cars without power brakes, there should be clearance between brake pedal and pedal bumper when pedal in released position (bend pedal bumper bracket as necessary).

OVERHAUL

Brake Shoe Replacement

Automatic Adjuster Removal - Remove long wire link from adjuster lever and lever crank, then remove upper (short) wire link. Remove star wheel spring, star wheel, and adjusting lever. Unscrew lever crank from secondary shoe

Brake Unit Assembly - Place shoes on backing plate and secure with hold down pin and clip Install adjuster lever on secondary shoe web (slot in lever must engage completely with slot in shoe web) *NOTE - Adjuster l vers ar painted r d for right sid , blue for left side. DO NOT INTERCHANGE.* Install star wheel and adjust so approximately 3/16-1/4" of threads are exposed between star wheel and star wheel nut. *CAUTION - Make sure star wheel is installed over adjusting hole in backing plate. If star wheels are interchanged between sides of car, brake shoes will retract instead of expand.* Install spring at lower end of shoe webs (long hook end in small hole of secondary shoe **under** shoe web; short hook end in small hole of primary shoe web). Spring should not interfere with either adjusting lever or star wheel Install anchor block with arrow pointing in direction of drum forward rotation. Install guide plate over anchor pin and install shoe return spring (lock hook end flat against guide plate) Install lever crank into secondary shoe web *NOTE - Cranks are marked "L" and "R" for identification. Lever must rotate freely on hexagon head screw.* Install short (upper) wire link as follows: Insert "S" shape offset end into lever crank hole closest to hexagon head, then snap hook end of link in top groove of anchor pin Install long (lower) wire link as follows: Insert "S" shaped end into lever crank, then lift adjuster lever up to hook link into slot of adjusting lever. Adjusting lever should now engage star wheel teeth at centerline of star wheel assembly ± 1/16". Install wheel and drum, then make brake shoe adjustment (see above).

SERVICING

For bleeding brake system and overhaul of master cylinder, see "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.

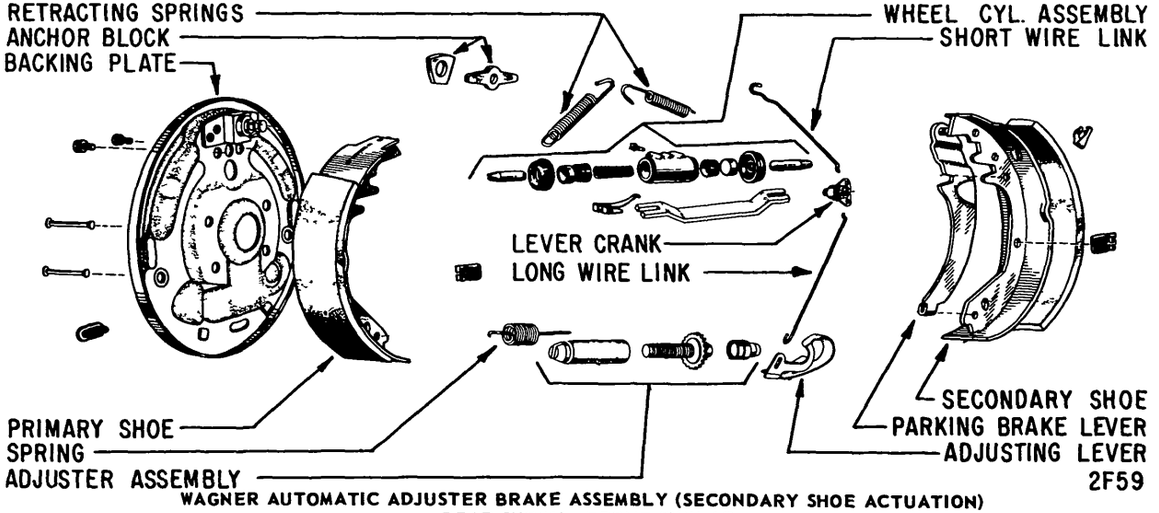
TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.

1963 RAMBLER BRAKE SPECIFICATIONS

Drum Diameter	9" Front & Rear
Wheel Cyl Diameter	1 1/8" Front, 15/16" Rear
Master Cylinder Diameter	1"
% Braking Power	65 7% Front, 34 3% Rear
Lining Width	2 1/4" Front ℄, 2" Rear
Lining Length (Pri)	7 5/8" Front & Rear
(Sec)	9 53/64" Front, 9 31/32" Rear
Lining Thickness	3/16" Front & Rear

℄ - Primary Shoe 2½" Secondary Shoe.



WAGNER AUTOMATIC ADJUSTER BRAKE ASSEMBLY (SECONDARY SHOE ACTUATION)
REAR SHOWN - FRONT SIMILAR

BENDIX (LOCKHEED) SELF-CENTERING

Studebak r (1963) Rear Only ℂ
Jeep, All M dels (1963) ℂ

ℂ - Front brakes are "Bendix Disc" type.
ℂ - For models with Dual Rear Wheels, see "Bendix Hydraulic Single Anchor Brakes" in this section.

DESCRIPTION

Self-Centering hydraulic type with non-adjustable anchor ramps for each shoe. An eccentric adjusting cam is used for brake shoe adjustment.
JEEP FORWARD CONTROL MASTER CYLINDER - Master cylinder mounted on inside front panel of cab, just underneath instrument panel. Access to filler plug is through hole cover on panel to right of speedometer.

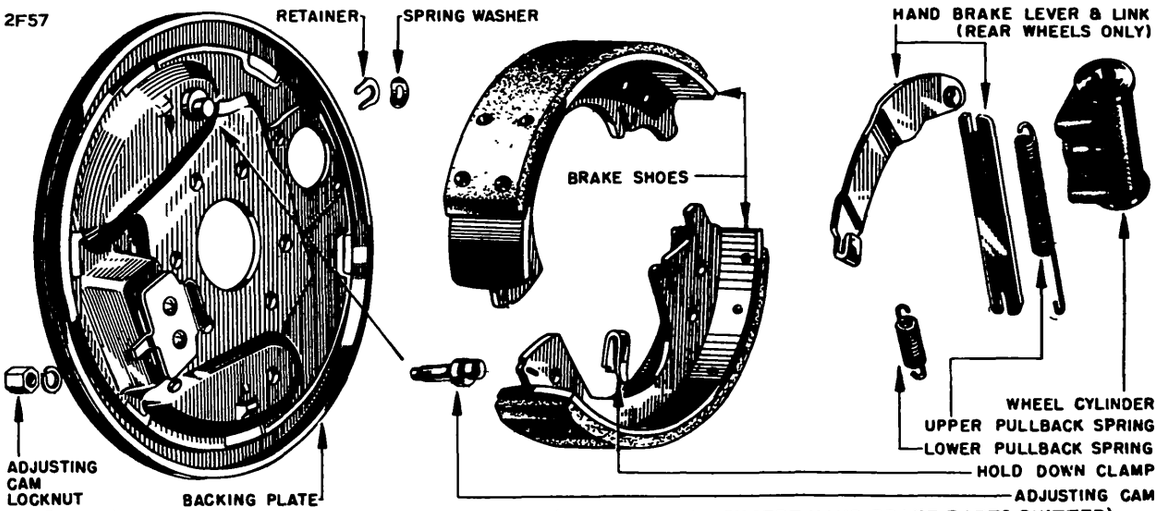
ADJUSTMENT

Minor W ar & New Lining Adjustment

NOTE - Brake shoes must be "centralized" by several hard brake applications before adjusting. While rotating wheel forward for front shoe, rearward for rear shoe, adjust eccentric for each brake shoe in turn by turning eccentric up and out until brake shoe strikes drum and there is a light drag, then back eccentric off until wheel turns freely without drag

Parking Brak Adjustment

Studebaker - With rear wheels off ground and parking brake handle set 4 notches from fully released position, loosen locknut at rear cable equalizer under transmission and tighten adjusting nut so there is no slack in cables and there is a heavy drag at rear wheels. Tighten nuts securely, release the handle and check that no drag exists.
Jeep (Rear Wheel Type) - Pull hand lever out 3 notches from fully released position, loosen front nut on connecting link between intermediate lever on frame crossmember and rear cable equalizer, tighten rear nut on link until slight drag noted at each rear wheel, then tighten front nut to lock adjustment. Release hand lever and check for freedom from drag.
Je p (Prop ller Shaft Type) - Fully release hand brake lever, check linkage for freedom from bind. Rotate brake drum so one pair of three sets of holes are over adjusting screws. Use tool or screwdriver to rotate each adjusting screw away from drive shaft until shoes are snug against drum, then back off each screw 7 notches for running clearance.
Jeep (Op rator Adjustable Hand Brake Lever) - 1) Adjusting knob on hand brake lever handle compensates for lining wear or for unusual holding conditions. With lever in "off" position, turn adjusting knob clockwise while applying and releasing handle every ¼-turn of knob until definite "snap over center" action takes place *CAUTION - Over adjustment causes hard hand lever action but does not increase brake efficiency. For major adjustment, proceed as follows:*
2) With adjusting knob turned fully counterclockwise, place handle in "on" position. Tighten parking brake cables at equalizer adjusting nut until slight drag is felt at rear wheels Tighten locknut. Release control handle. Rear wheels should be free. Turn adjusting knob clockwise for desired tension



BENDIX (LOCKHEED) SELF-CENTERING REAR BRAKE (FRONT SIMILAR EXCEPT HAND BRAKE PARTS OMITTED)

Brake Pedal Adjustment

Studebaker - Lark, Cruiser, Hawk - Turn adjustable pedal stop on pedal bracket so pedal free travel is 1/4-3/8" measured at pedal pad before pressure stroke starts.
Avanti - Adjust brake pedal-to-power unit pushrod eccentric shoulder bolt so brake pedal is same height as clutch pedal (Synchro-mesh Cars), so there is 7/8-1" clearance pedal arm and tab of pedal bracket (Auto Trans Cars).
Jeep - Pedal free travel should be 1/2" Adjust by turning master cylinder pushrod in or out as necessary

SERVICING

For bleeding system and overhauling wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual.

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.

JEEP PROP. SHAFT PARKING BRAKE				
Model	Drum Diam.	Length - Lining -	Width	Thickness
All	8"	8 1/8" ℂ	1 3/4"	211"

ℂ - Each Shoe.

1963 BRAKE LINING SPECIFICATIONS

Car Model	Width		Front - Length - Rear				Thickness	
	Front	Rear	Primary	Secondary	Primary	Secondary	Front	Rear
Studebaker		2"			12 2"	10"		.180"
Jeep								
DJ-3A & FJ-3	ℂ 2"	ℂ 2"	9.875"	7 688"	9 875"	7 688"	.214"	.214"
CJ-3B, 5 & 6	1¾"	1¾"	10 219"	6.609"	10 219"	6 609"	.211"	.211"
Utility & Truck	2"	2"	12 250"	10 03"	12 250"	10.03"	.212"	.212"
FC-150 & 170	2"	2"	12.250"	10 03"	12 250"	10 03"	212"	.212"

ℂ - Primary Secondary is 1¾"

1963 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter		Wheel Cyl. Diam.		Master Cyl.	% Braking Power	
	Front	Rear	Front	Rear	Diameter	Front	Rear
Studebaker	.	11"		750"	1.125"	62	38
Jeep							
DJ-3A & FJ-3	9"	9"	1.125"	.812"	1"	65	35
CJ-3B, 5 & 6	9"	9"	1 000"	750"	1"	65	35
Utility & Truck	11"	11'	1.125"	1 000"	1"	57	43
FC-150 & 170	11"	11"	1 125"	ℂ 875"	1"	57	43

ℂ - FC-170 is 1.000"

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE

Chrysler & Imperial (1963)
Comet (1963)
Dodge & Dart (1963)Ⓒ
Ford Fairlane (1963)
Ford Falcon (1963)
Ford Galaxie (1963)
Mercury Meteor (1963)
Mercury Monterey (1963)
Lincoln Continental (1963)
Plymouth (1963)
Rambler American (1963)
Rambler Classic V8 (1963)Ⓒ
Rambler Ambassador (1963)
Thunderbird (1963)
Valiant (1963)Ⓒ

Ⓒ - On Dart & Valiant "Bendix Hydraulic Single Anchor" type used on early cars

Ⓒ - 6 Cyl uses "Wagner Automatic Adjuster (Secondary Shoe Actuation)" type

►CHANGES, CAUTIONS, CORRECTIONS

► *1963 IMPERIAL BRAKE SHOE USAGE & REPLACEMENT NOTE* Imperial brake shoes are heavy duty type having 10 welds and "950" stamped on shoe web DO NOT use any other type shoe for replacement (shoes on Chrysler models have 9 welds and no identification number) Manufacturer recommends that only new shoe and lining assemblies be used for service replacement

DESCRIPTION

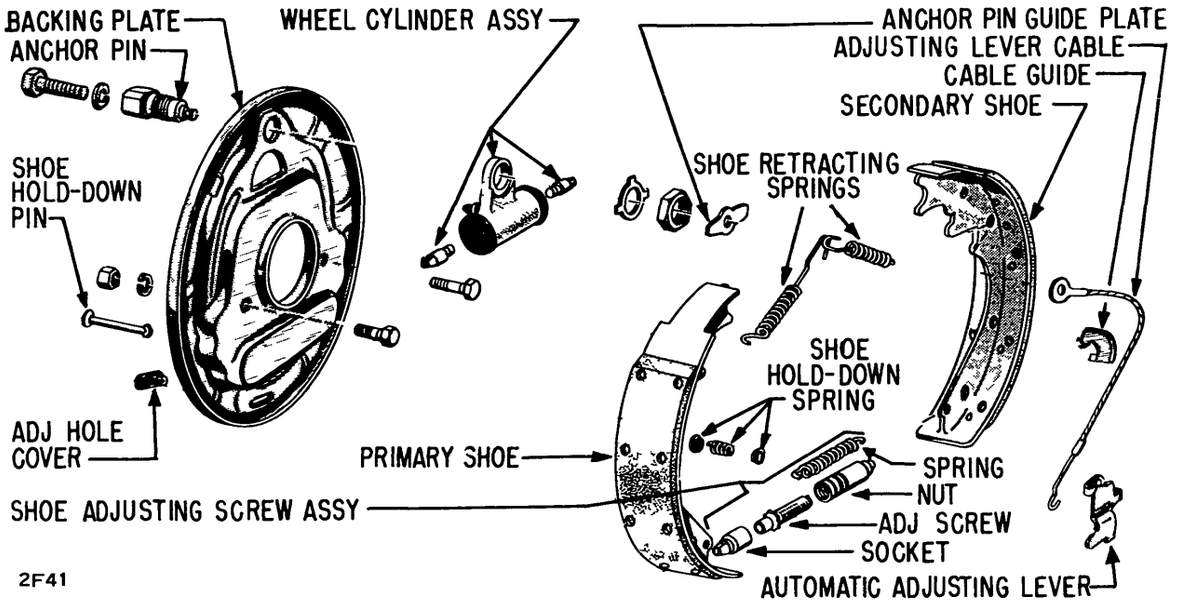
Bendix Single Anchor (Without Eccentric) type brakes incorporating an automatic adjuster mechanism using movement of rear (secondary) shoe during reverse brake application to turn brake adjusting screw a small amount and maintain proper lining-to-drum clearance Adjuster mechanism consists of a steel cable with a hook and anchor fitting permanently attached a cable guide, adjusting lever, adjusting screw pivot nut, socket and spring Anchor pins on all brakes are fixed and not adjustable

ADJUSTMENT

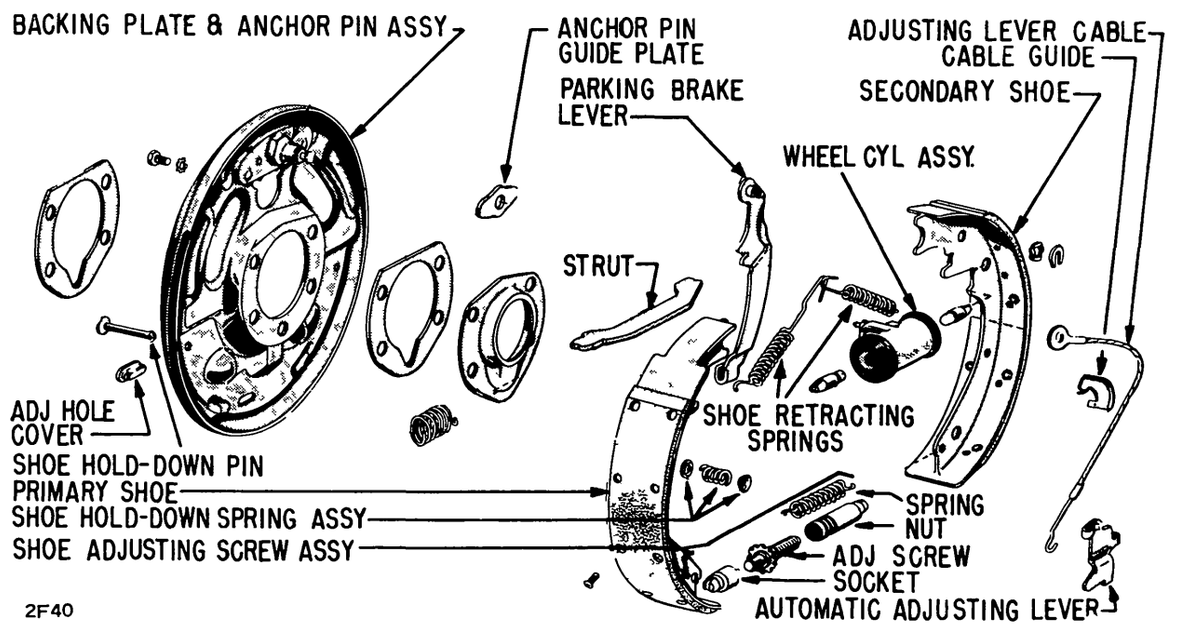
Brake Shoe Adjustment

Following adjustment is made after brake shoes or lining replaced or if the number of reverse brake applications is insufficient to actuate automatic adjusters

(Continued)



FORD MOTOR CO REAR BRAKE ASSEMBLY (OTHERS SIMILAR)



FORD MOTOR CO FRONT BRAKE ASSEMBLY
(ANCHOR PIN & WHEEL CYLINDER ON OTHERS SIMILAR TO REAR BRAKE)

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE (Cont.)

Chrysler Corp. Models - Remove adjusting hole covers from backing plates. Insert an adjusting wrench (C-3784) into star wheel and tighten brake until wheel turns with slight drag. Hold adjusting lever away from star wheel (ice pick or other suitable tool) and back off star wheel 12 notches (provides necessary .012" clearance). Wheel should turn without drag. *Adjustment must be equal on all wheels.*

Ford Motor Co. Models - Raise car and disconnect parking brake cables. Remove access hole cover plate from backing plate and turn adjusting screw upward with Tool 2018 or screwdriver to expand shoes against drum until a slight drag is felt. Remove brake drum. Hold adjusting lever away from adjusting screw and back off adjusting screw ¾-turn with fingers. *NOTE - If screw cannot be turned with fingers, screw must be freed or adjusting lever will not turn screw.* Install wheel and drum, then back car in reverse and make 5 or 6 brake applications to complete adjustment.

Rambler - Lengthen adjusting screw to expose 3/8" of adjusting screw threads, then install drum. Drive car cautiously in reverse, making 10 brake applications before road testing. Make sure pedal height is correct (see below).

Parking Brake Adjustment

Chrysler Corp. Models - With parking brake lever fully released, loosen cable adjusting nut so there is slack in rear cables, and make sure rear brakes are properly adjusted. *NOTE - If cables are new, pull down firmly on unshrouded part of cable to seat cable fittings in brackets.* Tighten cable adjusting nut until wheels are hard to turn, then release cable until wheels rotate freely without drag, **then back nut off 2 full turns.** Apply parking brake several times then release and see that there is no drag.

Falcon, Comet, Fairlane, Meteor - Pull release handle 3 notches from fully released position. Turn front nut on equalizer several turns forward, then turn rear nut forward until cables prevent forward rotation of rear wheels. Tighten front nut against equalizer. Release the handle.

Ford Galaxie & Thunderbird - With parking brake cables fully released, loosen locknut on equalizer rod and turn adjusting nut several turns forward. Turn locknut forward against equalizer until cables are just tight enough to remove slack. *CAUTION - Excessive tightening of cables may pull brake shoes off anchors.* Tighten both nuts against equalizer. Remove all slack from cable between parking brake pedal and equalizer lever without moving equalizer lever.

Mercury Monterey - Release parking brake pedal, raise car, then loosen parking brake cable at equalizer lever. Depress parking brake pedal 1¾" from fully released position. Adjust front and rear cables until a slight drag is felt when turning rear wheels. *NOTE - The adjustment should be evenly divided between the two cables to maintain proper equalizer lever action.* Equalizer lever will be properly positioned when distance from rear cable clevis pin on equalizer bar to rear face of crossmember (to which parking brake bracket is attached) is 5½", with parking brake pedal fully released. Tighten locknut on equalizer rod, then release

(Continued)

1963 BRAKE SIZE APPLICATION

Car Model	Brake Size
Chrysler Corp	
Chrysler & Imperial	11"
Dodge 880	11"
Dodge Dart	9"
Dodge (Except 880) Std	10"
Police & Hvy. Dty.	11"
Plymouth Std	10"
Police & Heavy Duty	11"
Valiant	9"
Ford Motor Co	
Falcon & Comet 6 Cyl.	9"
V8	10"
Fairlane & Meteor 6 Cyl & V8	10"
Galaxie & Monterey	11"
Thunderbird	11"
Lincoln Continental	11"
American Motors	
Rambler American	9"
Rambler Classic V8 & Ambassador V8	10"

1963 HYDRAULIC BRAKE SPECIFICATIONS

Car Model & Brake Size	Drum Diameter		Wheel Cyl. Diam.		Mast. Cyl.	% Braking Pwr	
	Front	Rear	Front	Rear	Diameter	Front	Rear
Chrysler Corp. 9"	9"	9"	1"	13/16"	1"	60	40
10"	10"	10"	1 1/8"	15/16"	1"	60	40
11"	11"	11"	1 1/8"	15/16"	1"	60	40
Ford Motor Co 9"	9"	9"	1 1/16"	13/16" ①	1"		
10"	10"	10"	1 1/8"	29/32"	1"		
11"	②	②	1 3/32"	15/16"	1" ③		
Rambler 9"	9"	9"	1"	13/16"	1"	60.2	39 8
10"	10"	10"	1 1/8"	7/8"	1"	62 4	37.6

① - 7/8" On Station Wagons.
② - For Galaxie & Monterey: 11.030" (11.090" rebore limit)
For T-Bird & Lincoln: 11.090" (11.150" rebore limit)
③ - 7/8" On T-Bird & Lincoln.

1963 HYDRAULIC BRAKE LINING SPECIFICATIONS

Car Model & Brake Size	Width		Front - Length - Rear				Thickness	
	Front	Rear	Primary	Secondary	Primary	Secondary	Front	Rear
Chrysler Corp. 9"	2 1/4" ①	2"	7 5/8"	9 5/8"	7 5/8"	9 5/8"	3/16"	3/16"
10"	2 1/2"	2 1/2"	8 1/2"	11"	8 1/2"	11"	3/16"	3/16"
11" ②,	3"	3" ③	12 1/8"	12 1/8"	12 1/8"	12 1/8"	3/16"	3/16"
11" ④	3"	2 1/2"	9 1/4"	12 1/8"	9 1/4"	12 1/8"	3/16"	3/16"
Ford Motor Co. 9"	2 1/4"	1 1/2" ⑤						
10" ⑥	2 1/4"	1 3/4"	8.43"	10.84"	8.43"	10.84"		
10" ⑦	2 1/2"	2"	9 70"	11.04"	9 70"	11.04"		
10" ⑧	2 1/2"	2 1/2"	8.43"	10 84"	8 43"	10.84"		
11" ⑨	2 1/2" ⑩	2 1/2"	9.34"	12.12"	9.34"	12.12"		
11" ⑪	3"	3"	9.39"	12 21"	9 39"	12.21"	320"	.320"
Rambler 9"	2"	2"	7 62"	9 82"	7 62"	9.82"	3/16"	3/16"
10"	2 1/2"	1 3/4"	8.90"	11.06"	8.46"	10.88"	3/16"	3/16"

① - 2 1/2" Secondary. ② - Chrysler, Imperial, Dodge 880 (Except Police & Heavy Duty).
③ - 2 1/2" on Newport (Except Station Wagon) & Dodge 880.
④ - All Optional and Police & Heavy Duty brakes
⑤ - 2 1/4" on Station Wagon ⑥ - Std. Pass. Cars. ⑦ - Police & Taxi.
⑧ - Station Wagon ⑨ - Galaxie & Monterey. ⑩ - 3" on Station Wagon, Police & Taxi.
⑪ - Thunderbird & Lincoln Continental.

BENDIX AUTOMATIC ADJUSTER HYDRAULIC TYPE (Cont.)

parking brake and check to make sure that shoes return to fully released position. Depress parking brake pedal 2". Under normal conditions, this should hold car satisfactorily.

Lincoln Continental - Fully release parking brake and raise car. Loosen cable at equalizer lever, then depress parking brake pedal 1¾" from normal released position. Adjust cable until there is a slight drag at rear wheels. Tighten equalizer rod locknut. Release brake and make sure brake shoes return to fully released position. Depress parking brake 2". Car should be held satisfactorily under normal conditions.

Rambler (Hand Operated Type) - Pull handle from fully released position to 5th notch and tighten cable at equalizer until rear wheels are locked in forward rotation. Release handle and make sure wheels rotate without drag.

Rambler (Foot Operated Type) - Set brake lever on first notch from fully released position and tighten cable at equalizer until rear wheels are locked in forward rotation. Release foot lever and make sure wheels rotate without drag.

Brake Pedal Adjustment

Chrysler Corp. Models - No adjustment. Pedal freeplay controlled by stop built into master cylinder,

Ford Motor Co. Models - Pedal freeplay is not adjustable.

Rambler - Rotate master cylinder eccentric attaching bolt for maximum pedal height. On cars without power brakes, there should be clearance between brake pedal and pedal bumper when pedal in released position (bend pedal bumper bracket as necessary).

OVERHAUL

Brake Shoe & Adjuster Replacement

Install brake shoes on backing plate with hold-down spring pin, springs and cups. Install parking brake link and spring. Connect parking brake cable. Install shoe guide plate on anchor pin. Place cable anchor over anchor pin with crimped side toward backing plate. Install primary and secondary shoe to anchor springs. *CAUTION - Be sure that cable end is not cocked or binding on anchor pin.* Install cable guide on secondary shoe web with flanged hole fitted in hole in web. Thread cable through guide groove, not between guide and shoe web. Turn adjusting screw in to limit of threads then back off ½-turn. *CAUTION - Adjusting screws are marked "L" and "R" and must be installed as marked.* Install adjusting socket on screw, place assembly between shoe ends with adjusting screw nearest secondary shoe. Hook cable hook into hole in adjusting lever from backing plate side. Place pivot hook into large hole in secondary shoe web. Place hooked end of adjuster spring into large hole in primary shoe web and loop end of spring to adjuster lever. Check action of adjuster by pulling cable toward secondary shoe to lift lever past tooth. Spring will pull lever to original position (when cable released) advancing screw one tooth. Lever should contact adjusting wheel 3/16"±1/32" above centerline of screw. Cable guide groove should be flat against web. Pivot hook surfaces should be square with body of lever. Adjusting screw must be seated properly in shoe web.

SERVICING

Chrysler Corp. & Ford Motor Co. Models - *For bleeding ing system and overhauling wh l and mast r cylinders, see "Hydraulic Brake Servicing" in Brak S ction f Manual.*

Rambler - *For bleeding syst m and ov rhauling mast r cylinder, see "Bendix & Morain Dual Piston Brake Master Cylinders" in this section.*

TROUBLE SHOOTING

See "Hydraulic Brake Troubl Shooting" in Brake Section of Manual.

BENDIX & MORAINE DUAL PISTON BRAKE MASTER CYLINDERS

Cadillac, All Series (1963)
Corvette, Spec. Equip. (1963) ℄
Rambler, All Series (1963)
Studebaker, Except Avanti (1963)

℄ - With Heavy Duty 11.2" Drums and Metallic Lining.

DESCRIPTION

Dual piston master cylinder assemblies similar in design and operation to previous models. Bendix units used on Rambler and Studebaker models have a check valve in each outlet port on master cylinder body.

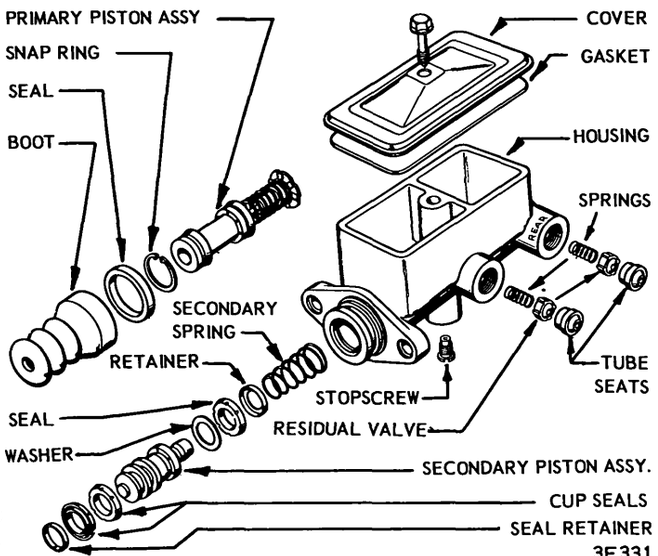
BLEEDING BRAKES

Manufacturers recommend use of pressure bleeding quipment whenever possible.

Bendix Unit

Cadillac - Bleed front wheels (front reservoir) first after installing a solid filler cap on rear reservoir, then reverse procedure.

Rambler & Stud bak r - Bleed system in usual manner using suitable adapter in place of master cylinder cap.



BENDIX (RAMBLER & STUDEBAKER) DUAL PISTON MASTER CYLINDER ASSEMBLY

(FOR CADILLAC UNITS, SEE 1962 FINAL DATA, PAGE 318)

Moraine Unit

Cadillac - Bleed front reservoir and front wheels first, then rear wheels and rear reservoir in usual manner.

OVERHAUL

Overhaul procedures are similar to singl piston typ master cylinders except the following:

Bendix (Cadillac) - If secondary piston has been disassembled during overhaul, piston must be assembled and adjusted exactly as follows: Coat piston cups with brake fluid and install cups on spring end of secondary piston with cups back-to-back. Install cup retainer on outer cup. Stand piston on end opposite cups and install spring and spring retainer. Install spring adjusting screw into retainer and start screw into piston. Tighten screw until distance from end of spring retainer to surface that protector washer seats against is 3 35/64". *CAUTION - Spring adjustm nt must be correct or too much pedal trav l b for brak s apply (piston covering inl t port) will occur if scr w adjusted too far; or piston will cover comp nsating p rt in mast r cylind r if scr w not adjust d far nough.*

B ndix (Rambl r & Stud bak r) - Primary piston serviced as an assembly only (with cups and spring). *Do not disass mble.*

BENDIX DISC BRAKES

Studebaker (1963) ©

© - Front Wheels Only. Rear wheels use "Bendix (Lockheed) Self-Centering" type.

DESCRIPTION

Disc brake wheel unit consists of a rotating disc and two rectangular friction pads, actuated by hydraulic wheel cylinders which are supported by a caliper type bridge. Inner surface of rotating disc is protected by a dust shield while outer surface is protected by the wheel. The caliper type bridge containing the two wheel cylinders is secured to an adapter bracket attached to steering knuckle. Friction pads clip to wheel cylinder pistons and are held in position in caliper bridge by a retainer plate and clip. Wheel cylinders for each wheel are connected in series by a pipe assembly.

ADJUSTMENT

Adjustments in service are not required.

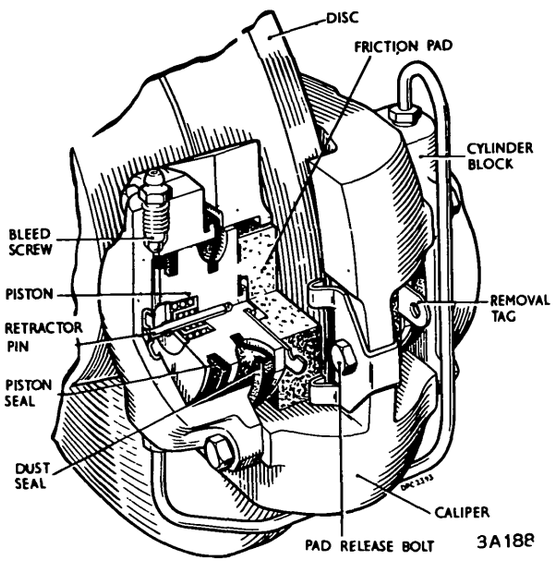
SERVICING

Bleeding Brak s

A bleed screw on each wheel unit allows system to be bled in a conventional manner, preferably with a pressure type bleeder.

Fricti n Pads

Cl aranc - Remove wheel and insert a feeler gauge between friction pad and rotating disc. Clearance should be .004" (minimum). *NOTE - If car was stopped by a brake application just before checking clearance, it is considered normal if there is no clearance and brakes tend to drag. Rotation of disc is a factor in causing friction pads to move away from the disc.*



BENDIX DISC BRAKE ASSEMBLY

Maximum Wear - Replace pads when pad thickness is reduced to .250". *CAUTION - All four pads (two in each wheel assembly) must be replaced whenever any pad replacement is required.*

Pad Replacement - Remove wheel, then remove bolt, nut, and lockwasher from pad retaining clip. Use a wire hook or a pair of pliers to pull on pad tab and remove pad. Clean backing plate, dust seal, and surrounding area. To install pad, slide forked end of Tool J-21172 between rotating disc and piston (flat side of tool towards face of disc and with pivot stud of tool inserted in retainer clip bolt hole). Attach a bleeder hose to bleed screw, then loosen bleed screw. Use tool pivot stud as a fulcrum and apply force on handle to slide piston into wheel cylinder, then tighten bleeder screw and remove tool. Slide new friction pad assembly into position with pad securing plate engaging button of wheel cylinder piston. Repeat operation for opposite friction pad. Replace retainer clip and secure in place. *NOTE - If brake pedal is spongy, bleed brake system.* Replace wheel and depress brake pedal several times to properly seat friction pads.

REMOVAL & INSTALLATION

Caliper Unit

Removal - Remove wheel and tire. Remove hydraulic pipe from caliper, then remove capscrews and lockwashers holding caliper unit to steering knuckle adapter bracket. Remove caliper. *CAUTION - Observe the number and EXACT LOCATION of shims between caliper and adapter bracket for installation. These shims center caliper around the disc.*

Installation - *Shims for adjusting clearance and alignment of caliper to disc are available in .010", .013", .016", .019" and .022" thicknesses.* Make sure that shims between caliper and adapter bracket are installed in exact original position, then install caliper unit on adapter bracket with hydraulic inlet facing down and slightly forward. Install capscrews and lockwashers and tighten securely. Check installation as follows: Faces of rotating disc should be centered in caliper with not more than .008" difference between sides. Machined surface inside caliper should be parallel to disc within .002". Connect hydraulic line, check master cylinder fluid level, and bleed brakes as necessary. Depress brake pedal several times to seat friction pads properly and to actuate automatic adjusters

Hub & Disc Assembly

NOTE - Hub and disc assembly serviced as a complete unit. Replace disc if scored, distorted, warped, or worn to minimum thickness of .330".

R m val - Disconnect caliper unit from disc and lift off (unnecessary to disconnect hydraulic line), noting shim pack location. Remove grease retainer cap, bearing adjusting nut, washer and outer cone and roller assembly. Pull hub and disc assembly off steering knuckle.

Instqllation - Lubricate inner hub bearing, make sure inner grease seal not damaged, and install hub and disc assembly on steering knuckle. Install outer bearing cone and roller, washers, and adjusting nut. Tighten adjusting nut until there is no freeplay, then back nut off to first slot in nut which aligns with hole i n spindle, and install cotter pin. Install grease retainer cap. Install caliper and check alignment (see above).

OVERHAUL

Caliper Unit

Disassembly - **1)** Thoroughly clean unit and clamp in vise at mounting boss. Remove hydraulic pipe, then remove nut, lockwasher, and bolt to free friction pad retainer clip. Remove friction pads with wire hook in hole of pad removal tab. Remove each piston block assembly from caliper bridge.
2) On outside piston block, remove outer lip of dust seal from block groove. Remove piston from block using hydraulic hand pump or air pressure. Remove bleed screw and bleed screw ball check.
3) On inside piston block, install bleed screw and ball into one of the hydraulic openings and use hydraulic or air pressure to remove piston .
4)On both pistons, pull seal from piston groove and discard seal Pull dust seal off over small end of piston and discard.

Cleaning & Inspection - Clean all metal parts with Bendix Metalclene or suitable solvent and use compressed air to clean and dry grooves and passages. If cylinder bore damaged or worn excessively, replace piston and cylinder assembly.

Reassembly - **1)** Lubricate all rubber parts with brake fluid Place dust seal into piston groove (both pistons) with cup side of seal facing piston side of assembly. Roll outer edge of dust seal toward piston flange. Install piston seal into piston groove
2) Coat inside surface of a piston block with brake fluid, place on arbor press bed with opening up, then place piston assembly (small end down) into block, aligning retractor pin into hole in piston and with edge of piston seal aligned with edge of block bore. Carefully press piston into block to bottom of bore, making sure piston seal is not damaged. Repeat for other cylinder. Roll and seat dust seal into groove on face of piston block
3) Install retainer plates into grooves of caliper (with tab ends out) Install piston block assemblies to caliper and tighten bolts securely. Install hydraulic pipe, making sure that pipe will not interfere with wheell Install bleed screw ball check and bleed screw. Install friction pads, retainer clips, bolts, lockwashers, and nuts.

DELCO-MORAINE AUTOMATIC ADJUSTER HYDRAULIC TYPE

Buick & Buick Special, All Series (1963)
Cadillac, All Series (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Corvette (1963)
Corvair Cars & Trucks (1963)
Oldsmobile & F-85, All Series (1963)
Pontiac & Tempest, All Series (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*BRAKE DRUM REPLACEMENT NOTE:* Various smooth surface, finned, and aluminum type drums used in production on various car models. Be sure to use same type as original drum for service replacement to prevent uneven braking and other problems.

►*BRAKE ADJUSTING SCREW LUBRICANT NOTE:* Manufacturers recommend use of Special Lubricant, No. 5450032, for adjusting screw and brake backing plate to prevent gumming and freezing of parts.

►*CHEVROLET METALLIC LINING SERVICE NOTES & CAUTIONS:* Observe the following:

Brake Drums - Drums must be specially honed to 20 micro-inch finish for use with metallic linings. Do not use metallic linings for replacement with standard drums which have not been honed as specified.

Brake Lining Wear Limit - Each segment of metallic lining has top layer of metallic braking material and bottom layer is a metal backing pad. Both layers are similar in appearance. To avoid mistakes in determining actual **lining** thickness, replace brake shoes whenever **combined** thickness of lining **and** backing pad in any one area is 3/32" or less.

Seating New Linings - After brakes properly adjusted, make 6 to 8 stops from 30 MPH with moderate pedal pressure (aids seating and eliminates tendency to dive). Then make 6 to 8 complete stops from maximum legal highway speed at approximately 1 mile intervals.

►*1963 TEMPEST REAR BRAKE DRUM REMOVAL NOTE:* Rear brake drums may be difficult to remove if car raised at rear jack lift points because suspension is in full rebound and axle shaft pivots in different direction than control arm causing bind between brake shoes and drum. To remove drum easily, lift car at rear control arm.

DESCRIPTION

Hydraulic single anchor type brake (without eccentric) with Bendix type shoes. Brake shoe anchor pins are fixed in backing plate and require no adjustment (except Pontiac front wheels). Moraine automatic adjusting mechanism consists of a link, actuating lever, pawl, and pawl return spring. Adjusting mechanism is mounted on secondary shoe (except Corvette with special large high performance brakes, where actuator is on primary shoe and override spring eliminated).

OPERATION

CORVETTE NOTE - Special large high performance option brakes have adjuster mounted on primary shoe and brake adjustments take place during forward brake application. The following description of operation applies for these brakes except that for "secondary", read "primary".

All Models - The adjusters operate only when brakes are applied as car is moving in reverse. The link which holds top of actuating lever stationary, forces actuating lever to pivot on secondary shoe. This pivoting action forces pawl downward against end of a tooth on the star wheel adjusting screw. If lining-to-drum clearances are correct, the downward movement will stop before star wheel is turned. If clearances are too wide, the secondary shoe will move outward and the pawl will move downward far enough to turn star wheel one notch and take up the adjustment.

ADJUSTMENT

Brake Shoe Adjustment

Adjustment should be required only after shoe relining or replacement, or when length of star wheel has been changed.

Buick (All Models) - Remove adjusting hole cover and install a suitable tool through hole to move self-adjuster actuator lever off adjusting screw. Use a suitable tool to turn adjusting screw and expand brake shoes until wheel can just be turned by hand. Make sure drag is equal at all wheels. Back off adjusting screw at each wheel 30 notches. *NOTE - If shoes still drag slightly on drum, back off adjusting screw 1 or 2 additional notches.*

Cadillac - Tighten brake shoe adjusting star wheel until brake drum can just be rotated forward with a two-foot bar placed between wheel mounting studs. Disengage adjuster pawl from star wheel with a hooked tool and back off star wheel 40 notches using a suitable brake adjuster tool. Install wheels and lower car, then drive car alternately forward and backward, applying brakes moderately in each direction until pedal travel does not exceed 1 7/8" on an approximate 30 lbs. brake pedal application.

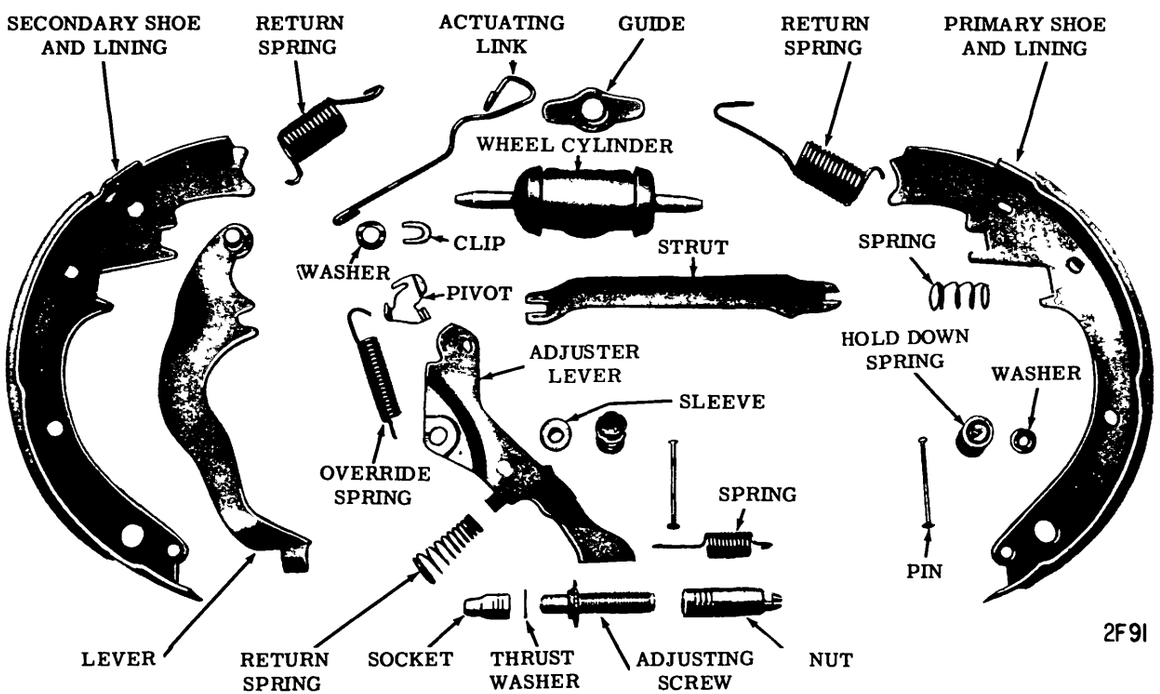
Chevrolet, Chevy II, Corvette, Corvair - With brake drums removed, turn star wheel until drum slides over brake shoes with a slight drag, then turn adjusting star wheel 1¼ turns to retract the shoes. Install drum and wheel, then make final adjustment by making numerous forward and reverse stops with a firm pedal effort until satisfactory brake pedal height is obtained.

Oldsmobile (All Models) - With brake drum removed, position Gauge BT-6211 (Except F-85), J-21177 (F-85) over brake linings *NOTE - On Gauge J-21177, it will first be necessary to place drum end of gauge in drum to measure inside diameter, then tighten clamp screw.* Rotate gauge slightly around shoes to insure gauge contacting linings at largest diameter, then adjust brake shoes until gauge is a snug fit on linings at point of largest diameter. *If necessary to back off brake shoe adjustment, hold adjuster lever away from star wheel.*

Pontiac (Except Tempest) - *NOTE - Adjustment procedures for front and rear wheels are different as follows:*

Front Wheels - Proper lining-to-drum gap is .015"± .005" measured with a feeler gauge inserted through slot in brake drum between secondary (long) lining

(Continued)



DELCO-MORAINE AUTOMATIC ADJUSTER BRAKE ASSEMBLY (REAR SHOWN-FRONT SIMILAR)

DELCO-MORAINE AUTOMATIC ADJUSTER HYDRAULIC TYPE (C nt.)

and drum while primary (short) lining is against drum. *NOTE - On integral hub and drum assemblies which have no feeler gauge slots, substitute conventional type drum of same diam ter having slots.* Proper gap is required at both ends of secondary lining. A 5-10 lbs. drag on a .015" feeler during initial withdrawal from full lining width insures holding primary shoe against drum. Change clearance at adjusting screw end of lining by turning star wheel on adjusting screw (hold adjusting lever away from star wheel). Change clearance at adjustable anchor pin end of lining by rotating anchor pin. *NOTE - Recheck adjustment after making any large change at star wheel or anchor pin* Tighten anchor pin locknut to 60-90 ft. lbs. torque.

R ar Wheels - *NOTE - Rear wheel brakes have a fix d anchor pin (not adjustable).* Turn adjusting star wheel to provide a 14-40 lbs. drag on outer diameter of drum, then back adjusting star wheel off 30 notches. Make sure brake drum is free of drag.

P ntiac T mp st - Raise car (suspension in full rebound on rear), and loosen parking brake cable or disconnect anchor from side of torque tube. Turn adjusting star wheel to provide a drag of 5-8 lbs. on outer diameter of tire. *NOTE - Insert a small screwdriver through adjusting slot in backing plate and hold automatic adjuster lever away from star wheel.* Back off star wheel 22 notches (front wheels), 26 notches (rear wheels with shock absorbers fully extended). *NOTE - If hoist supports r ar suspension near ends of control arms and prev nts rear wheels from hanging down, back brak adjusting star wheel off 30 notches instead of 26 notches.*

Parking Brake Adjustment

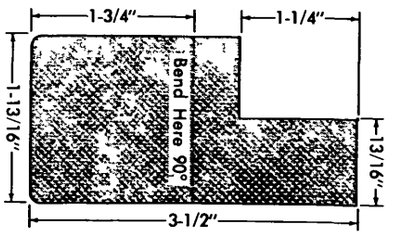
Buick (Exc pt Sp cial) - *Make parking brake adjustment wh n v r cabl s disconnected, or if cables are str tched, or wh nev r s rvice brake pedal has good r s rve but parking brak pedal depresses more than 8 ratchet clicks.* With parking brake assembly fully released, there should be 3/8" distance from rear face of parking brake idler lever to end of its slot in the frame. Adjust front cable clevis to correct. Depress parking brake pedal **xactly 2 ratchet clicks.** Tighten rear cable adjusting nut to obtain a heavy two-hand drag at rear wheels. Release parking brake lever and check rear wheels for free rotation in either direction.

Buick Sp cial - *Make parking brake adjustment whenver cabl s disconnected, or if cables are stretched, or wh nev r servic brak pedal has good reserve but parking brak l ver pulls out more than 15 ratchet clicks.* Pull out parking brake lever exactly 8 ratchet clicks. Hold threaded end of intermediate parking brake cable (to prevent twisting of cable) and tighten adjusting nut until left rear wheel can just be turned backward using both hands. Release parking brake lever and pull out exactly 3 ratchet clicks. Both rear wheels must turn freely in either direction.

Cadillac - *NOTE - Make a gauge tool from 3/16" flat steel stock as shown in illustration.* With service brakes properly adjusted, lubricate parking brake linkage and check for free movement of cables in conduit and equalizer. Check rear relay lever spring and replace if necessary. With parking brake mechanism in fully released position, insert 13/16" part of gauge tool in gap between relay lever and end of slot in frame. Gauge must fit in slot with clearance of less than 5/16". If necessary, adjust front cable by aligning one of the three clevis holes with one of the two relay lever holes. Back off equalizer nut so relay lever can be moved forward to insert 1 13/16" end of gauge into frame slot. *NOTE - There must be slack in rear cables when 1 13/16" end of gauge is in place.* Tighten equalizer nut to obtain a near lock-up drag on rear wheels when wheels are turned by hand in forward direction. Remove gauge. Parking brake pedal should now travel 1¾-2¾" with approximately 50 lbs. pressure on pedal.

Chevrolet Pass. Cars - With parking brake pedal depressed to 1st notch, adjust front cable so parking brake idler lever is 1"±¼" forward of rear edge of bracket on frame. Now adjust rear cable so there is a moderate drag at rear wheels. Release brake pedal and see that there is no drag.

Chevy II - With parking brake lever pulled up 1 notch from fully released position, loosen equalizer forward check nut and tighten rear nut for a moderate drag on rear wheels. Tighten check nuts and release the lever. Wheels should rotate without drag.



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CADILLAC PARKING BRAKE GAUGE TOOL

Corvette - Unhook pull back spring at equalizer lever on frame side rail and loosen forward locknut at rear cable clevis. Set parking brake lever at 4 notches from fully released position, then tighten clevis rear nut so there is 16 lbs. ±2 lbs. cable strand tension on front cable. Tighten forward locknut against clevis and install pull-back spring. Release brake lever.

Corvair (All) - Raise rear of car and pull parking brake lever up 4 notches from fully released position. Loosen forward check nut on equalizer and tighten the rear nut until a heavy drag is felt at rear wheels Tighten check nuts securely. Release brake lever and check that there is no drag.

Oldsmobile (All) - With parking brake lever fully released, tighten equalizer adjusting nut until a heavy drag is felt at rear brakes, then loosen equalizer adjusting nut 10 turns (88, S88, 98), 9 turns (F-85) and tighten locknut.

Pontiac (Except Tempest) - Apply parking brake slightly and check equalization by turning rear wheels by hand. Loosen adjusting screw of tightest brake if not equal. If more than a few notches movement are required for equalization, loosen clamp screws on spreader and pull downward on the tight side of cable. This should equalize cable. Tighten spreader clamp screws while parking brake lever is still in applied position. When lever fully released, wheels should turn freely with cable pulled down by gripping cable midway between conduit and guide on frame. When adjusting rear end of front cable for close adjustment for tension, be sure to turn clevis on or off cable end but do not twist cable Coarse adjustment is secured by selecting the correct hole in spreader.

Pontiac Tempest - Parking brake cable is properly adjusted when a 30 lb. pull downward on cable 49" from front of torque tube places cable 2¼" below bottom of torque tube with parking brake lever fully released. Adjust cable at equalizer for proper tension, then tighten locknut to 5-10 ft. lbs. Make sure cable slides freely in equalizer and that rear wheels turn freely.

1963 HYDRAULIC BRAKE SPECIFICATIONS

Car Model	Drum Diameter		Wheel Cyl. Diam.		Master Cyl.	% Braking Power	
	Front	Rear	Front	Rear	Diameter	Front	Rear
Buick	12"	12"	1 1/8"	1"	1"	56	44
Buick Special	9½"	9½"	1"	7/8"	1"	57	43
Cadillac 60, 62	12"	12"	1 3/16"	1"	1"	59	41
75, CC	12"	12"	1 3/16"	① 1 1/8"	1"	⑥ 52.8	⑥ 47.2
Chevrolet Pass.	11"	11"	1 3/16"	1"	② 1"	58.5	41.5
Chevy II	9"	9"	1"	1"	② 1"	56.7	43.3
Corvette	11"	11"	1 3/16"	1"	② 1"	58.5	41.5
Corvair Cars	9"	9"	③ 7/8"	④ 15/16"	② 1"	46	54
Trucks	11"	11"	1 1/8"	1"	1"	50	50
Oldsmobile 88,S88,98	11"	11"	1 1/8"	1"	1"	56	44
F-85	9½"	9½"	1"	7/8"	⑤ 1"	57	43
Pontiac	11"	11"	1 3/16"	1"	1"	58.5	41.5
Tempest	9"	9"	1 1/16"	15/16"	1"	56.3	43.7

① - 1" on Series 75. ② - 7/8" with Metallic (Segment) type lining.
③ - 15/16" with Metallic (Segment) type lining.
④ - 1" with Metallic (Segment) type lining. ⑤ - 1 1/8" with Power Brakes.
⑥ - 59% Front, 41% Rear on Series 75.

DELCO-MORAINE AUTOMATIC ADJUSTER HYDRAULIC TYPE (C nt.)

Brake Pedal Adjustment

Adjustment procedures are listed below only where applicable. Cars not listed either have no adjustment or require a pedal height adjustment as part of power brake unit installation (see individual power brake unit pages for these models).

Chevrolet, Chevy II, Corvair, Corvette - Adjust pushrod or clevis at brake pedal so pedal freeplay, measured at brake pedal pad, is 1/16-1/4" (Except Corvette), 1/8-3/8" (Corvette).

Oldsmobile 88, S88, 98 - *Adjustment is for cars without power brakes.* Pedal height should be 8"±1/8" from top of pedal pad to floor pan (carpet turned back). To adjust, loosen locknut and adjust stopscrew located on underside of brake pedal support. Make pedal freeplay adjustment as follows: Push master cylinder pushrod until it contacts hydraulic piston, then turn pushrod so clevis pin can freely be installed into brake pedal. Shorten pushrod one full turn for proper freeplay. Tighten locknut and connect pushrod to brake pedal.

Oldsmobile F-85 - *Adjustment is for cars without power brakes. For power brake cars, see 1962 Final Data, Page 311.* On Synchro-mesh cars, adjust brake pedal so it is same height as clutch pedal. Pedal free travel should be 3/16" (adjustable at pushrod). On Hydra-matic cars, total pedal height should be 6 3/8-6 5/8" from top of pedal pad to floor pan (adjustable at push-rod clevis).

Pontiac & Tempest - Pedal height should be 6 1/8-6 3/8" (Pontiac), 4 1/2" + 1/4" -0" (Tempest) from top of pedal pad to floor mat. Adjust at pedal pushrod. *Pedal height may be varied for personal requirements but do not lower more than necessary (Pontiac), to less than 3 1/2" (Tempest).*

OVERHAUL

Brake Shoe Replacement

Removal - *CAUTION - Note position and color of brake assembly springs for reinstallation in exactly the same locations.* Disconnect parking brake cables at rear wheels. Disconnect primary and secondary brake shoe retracting springs, and remove shoe hold-down cups, springs, pins, and sleeve. Remove pawl return spring, pawl and actuating lever. Disengage shoes from wheel cylinder and rotate shoes until link disengages from shoe plate (front), or anchor (rear).

1963 BRAKE LINING SPECIFICATIONS (CONVENTIONAL TYPE)

Car Model	Width		Front - Length - Rear				Thickness	
	Front	Rear	Primary	Secondary	Primary	Secondary	Front	Rear
Buick	2¼"	2"	10.040"	12.959"	10.040"	12.959"	.265"	.220"
Buick Special	2"	1¾"	7.523"	9.793"	7.523"	9.793"	.196"	.196"
Cadillac 60, 62	2½"	2½"	11.52"	12.98"	11.52"	12.98"	.254"	.254"
75, CC	2½"	2½"	12.98"	12.98"	12.98"	12.98"	.274"	.274"
Chevrolet Pass.	2¾"	2"	9.34"	11.75"	9.34"	11.75"	.168"	.168"
Chevy II	2¼"	1¾"	8.62"	9.40"	8.62"	9.40"	.16"	.16"
Corvette	2¾"	2"	9.34"	11.75"	9.34"	11.75"	.168"	.168"
Corvair Cars	1¾"	1¾"	8.62"	9.40"	8.62"	9.40"	.16"	.16"
Trucks	2"	2"	9.34"	11.75"	9.34"	11.75"	.168"	.168"
Oldsmobile 88,S88,98	2½"	2"	9 3/8"	12 1/32"	9 3/8"	12 1/32"	7/32"	7/32"
F-85	2"	1¾"	7.52"	9.79"	7.52"	9.79"	①	①
Pontiac	2½"	2"	9.29"	11.94"	9.29"	11.94"	.22"	.22"
Tempest	1¾"	1¾"	9.31"	9.31"	9.31"	9.31"	.222"	.222"

① - 1/4" Primary, 5/16" Secondary.

1963 BRAKE LINING SPECIFICATIONS (METALLIC SEGMENT TYPE)

Car Model	Width (Each Segment)		Length (Each Segment)		Thickness (All)		No. of Segments	
	Front	Rear	Front	Rear	Primary	Secondary	Primary	Secondary
Chevrolet Pass.	1.37"	1.00"	1.64"	2.00"	.175"	.295"	6	②
Corvette	1.37"	1.00"	1.64"	2.00"	①.175"	①.295"	6	②
Chevy II	1.12"	.87"	1.64"	1.64"	.175"	.295"	6	10
Corvair Cars	.87"	.87"	1.64"	1.64"	.175"	.295"	6	10

① - Special Hi Perf Option (Primary Shoe Actuation): .205" Pri., .325" Sec.

② - 12 Front, 10 Rear.

Installation - Place shoes on backing plate and install connecting spring and star wheel assemblies. *CAUTION - Do not interchange star wheel assemblies between sides of car or shoes will retract instead of expand. Right hand threads are for left side of car; left hand threads are for right side of car.* Install parking brake parts on rear brake. Install link actuating lever, pawl spring, pawl, and shoe hold-down springs and other parts. *NOTE - When installing actuator wire link, place link over anchor pin stud first, then fasten to actuator assembly by holding adjuster assembly in full down position.* Install retracting spring. Install brake drums. Make wheel bearing, service, and parking brake adjustments.

SERVICING

Cadillac - *For bleeding system and overhauling master cylinder, see "Bendix & Moraine Dual Piston Brake Master Cylinders" in this section.*

All Others - *For bleeding system and overhauling wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.

CHEVROLET TRUCK TWINPLEX

Chevrolet Trucks, Series 50, 60 (1963) Rear Only ℂ
ℂ - For Front Brakes, see "Chevrolet-Bendix Hydraulic" in this section.

DESCRIPTION

Two cylinder, four anchor type (each shoe anchored at each end and linked to wheel cylinder at each end). Brakes are radially self-centering.

ADJUSTMENT

Each shoe has one adjustment (adjusting screw at adjustable anchor end). Adjustment is same for both wear and for new or relined shoe clearance.

Brake Pedal Adjustment

See "Chevrolet-Bendix Hydraulic" for date.

Brake Shoe Adjustment

Jack up both rear wheels, remove adjusting hole covers from backing plates (two holes at each wheel - one for each shoe). Use Tool J-4707 or screwdriver inserted through rear (lower shoe) adjusting hole and turn adjusting screw up (move outer end of tool toward center of wheel) until light brake drag is felt on wheel, then back off adjusting screw 3 notches for correct running clearance. Adjust upper shoe similarly by inserting tool through front adjusting hole.

Parking (Hand Brake) Adjustment

Parking brake is independent type mounted on propeller shaft at rear of transmission.

1½ & 2 Ton - Fully release brake lever. Loosen locknut on outer shoe adjusting screw then tighten to secure a clearance of .010-.015" measured at point directly above screw. Tighten locknut. Loosen locknut on link between hand brake lever and shoe actuating lever. Tighten adjusting nut on link to secure a clearance of .010-.015" between shoe and drum. Tighten locknut.

Tilt Cab Over-Center Lever Adjustment - Turn lever adjusting knob counterclockwise to bottom position. Attach brake cable to lever assembly. With lever in "brake off" position, adjust brakes for proper clearance and remove slack from cables by adjusting clevis at transmission. Pull lever to "brake on" position. If definite "snap-over-center" not felt, turn adjusting knob clockwise as necessary. Oil all moving parts.

1963 CHEVROLET TRUCK TWINPLEX BRAKE & LINING SPECIFICATIONS						
Rear Drum Diameter	Wheel Cyl. Diameter	Master Cyl. Diameter	Lining Thickness	Lining Width	% Braking Power	
					Front	Rear
14.96"	1.5"	ℂ 1.125"	.375"	4"	30	70

ℂ - 1.3" on T60 Models.

BLEEDING BRAKE SYSTEM

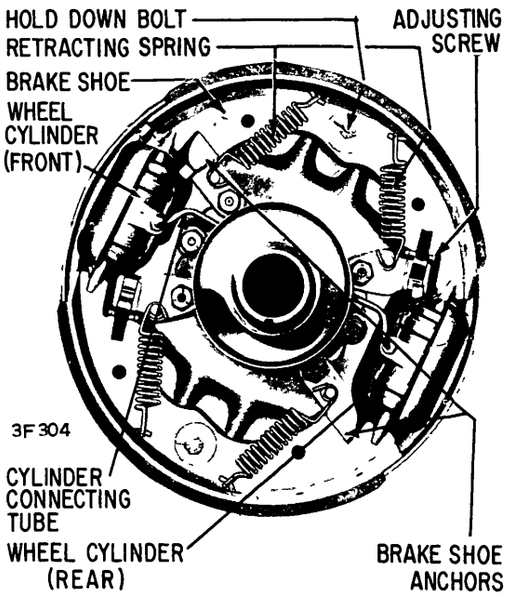
Back off adjusting screw all the way on upper shoes of both rear wheels. Bleed brakes in the following sequence:

a) Power booster slave cylinder.
b) Power booster control valve.
c) Right front wheel.
d) Left front wheel.
e) Right rear wheel, front cylinder.
f) Left rear wheel, front cylinder.

Adjust upper shoe on each rear wheel with pressure tank still connected. Depress brake pedal hard several times to centralize shoes.

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.



CHEVROLET TWINPLEX BRAKE ASSEMBLY

FORD-BENDIX HYDRAULIC

Falcon & Econoline Trucks (1963)
Ford Trucks, F & P-100 (1963) Front & Rear
Ford Trucks, F-350, P-400 (1963) Rear Only ℂ

ℂ - "Ford Truck Bendix Uni-Servo" type used on Front.

CAUTIONS

► *WHEEL CYLINDER HONING CAUTION:* Front wheel cylinders having orificed baffle **cannot** be honed. If honing required, replace cylinder. *Use care when bleeding system so no air is trapped by orificed baffle.*

DESCRIPTION

Duo-Servo, single anchor, hydraulic type without eccentric. Anchor pins are fixed and are not adjustable.

ADJUSTMENT

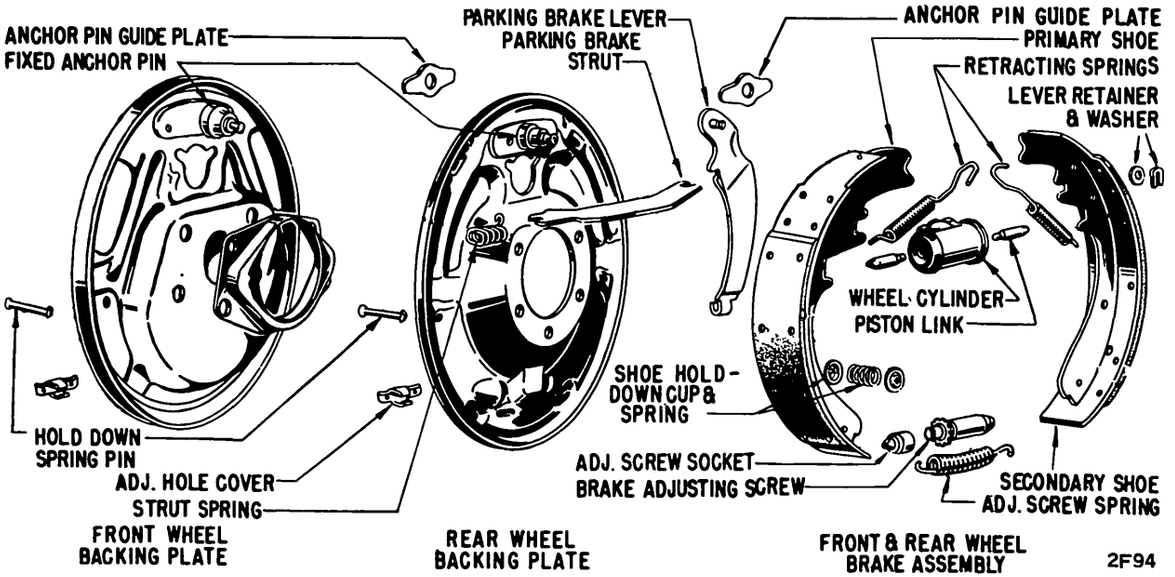
Minor Wear Adjustment

Remove adjusting hole cover and turn adjusting screw until the shoes drag against brake drum, then back off adjusting screw 10-12 notches so wheel turns freely.

Parking Brake Adjustment

Econoline - Pull release handle 1 notch from fully released position. Turn front nut on equalizer forward several turns, then turn rear nut forward until there

(Continued)



FORD-BENDIX HYDRAULIC BRAKE ASSEMBLY (TYPICAL) (REAR SHOWN - FRONT SIMILAR)

FORD-BENDIX HYDRAULIC (Cont.)

is a medium drag at rear wheels Tighten front nut against equalizer Release the handle

Ford Trucks - With parking brake handle fully released, turn nut on front of equalizer several turns forward Turn rear nut forward until cables are just tight enough to remove all slack Tighten front nut against equalizer *NOTE - For propeller shaft mounted parking brakes, see "Ford Truck Self-Centering Brakes" in this section*

Brake Pedal Adjustment

Total freeplay should be 1/4-7/16" (Econoline), 3/16"-3/8" (Ford Trucks) before pushrod touches master cylinder piston Adjustable at master cylinder pushrod

MASTER CYLINDER

P Series - Remove fender apron for access, and turn front wheels all the way to the left when removing

Econoline - Remove as follows: Remove forward splash shield and disconnect brake pedal return spring Remove pushrod eccentric bolt Remove snap ring from brake pedal pivot pin Remove brake pipe outlet fitting bolt and washers (outlet fitting will be disconnected from master cylinder) Remove mounting bolts and remove master cylinder (swing down and remove from brake pedal pivot pin)

SERVICING

For bleeding system and overhauling of wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual

BRAKE SPECIFICATIONS

ECONOLINE

Drum Diameter	10" front & rear
Wheel Cyl Diameter	1 125" front, 8125" rear
Master Cylinder Diameter	1"
Lining Width	2 50" front, 1 75" rear

FORD TRUCKS

See "Ford Truck Self-Centering Brakes" data in this section

FORD TRUCK BENDIX UNI-SERVO

Ford Trucks, F-250, P-350 (1963) Front & Rear
Ford Trucks, F-350, P-400 (1963) Front Only ℂ
Ford Trucks, F-500, 600; B-500, 600; P-500; C-550, 600; N-500, 600 (1963) Front Only ℂ

ℂ - "Ford Bendix Hydraulic" type used on Rear
ℂ - "Ford Truck Self-Centering" type used on Rear

DESCRIPTION

Bendix "Uni-Servo" single anchor, hydraulic type with single-acting wheel cylinder mounted on the backing plate and actuating the primary shoe through a strut (no direct connection to secondary shoe) Brake shoes are conventional Bendix type

ADJUSTMENT

Make adjustments with brake drums at normal temperature and with wheels either jacked up or contacting road (if wheels on road so they cannot be checked for drag, make this check by striking drum with a hammer - sound will be deadened if shoes contacting drum)

Minor Adjustment

Remove adjustment hole cover from brake carrier plate Rotate adjusting screw with a suitable tool until shoe begins to drag then back off shoe 10-12 notches until drum can be turned without drag

Major Adjustment

Rotate drum until feeler slot is at lower end of secondary (rear) shoe then insert a 010" thick feeler gauge between brake shoe and drum Rotate drum and feeler gauge up along secondary shoe until feeler is wedged between secondary shoe and drum Turn adjusting screw (star wheel) to expand shoes until a heavy drag is felt against drum, then back off adjusting screw just enough to give clearance of 010" between shoe and drum at a point 1½" from each end of secondary shoe *NOTE - This clearance will give operating clearance for both primary and secondary shoes* When this clearance cannot be obtained, anchor pin must be adjusted

Anchor Pin Adjustment

Loosen anchor pin nut just enough so anchor pin can be moved up or down (by tapping with soft hammer) centering shoes in drum and providing the 010" clearance between secondary shoe and drum at a point 1½" from each end of secondary shoe Tighten anchor pin nut to 80-100 ft lbs Check other brake assembly

Brake Pedal Adjustment

Brake pedal free travel should not be less than 3/16 nor more than 3/8" before pushrod touches master cylinder piston Adjustable at master cylinder pushrod

Parking Brake Adjustment

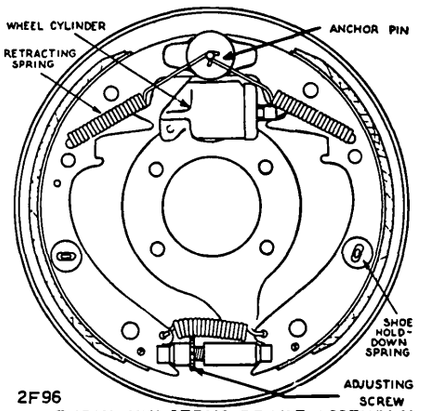
Rear Wheel Type - *See "Ford Bendix Hydraulic" in this section*

Propeller Shaft Type - *See "Ford Truck Self-Centering" in this section*

MASTER CYLINDER

C Series - Access to master cylinder is under floor plate

P Series - Remove fender apron for access, and turn front wheels all the way to the left when removing



BENDIX UNI-SERVO BRAKE ASSEMBLY

BRAKE SPECIFICATIONS

See "Brake Specifications Table" in "Ford Truck Self-Centering" data in this section

SERVICING

For bleeding system and overhauling of wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting' in Brake Section of Manual

FORD TRUCK SELF-CENTERING

Ford Trucks F-500, 600; B-500, 600; P-500; C-550, 600; N-500, 600 (1963) Rear Only ℂ

ℂ - "Ford Bendix Uni-Servo" type used on Front

DESCRIPTION

Two cylinder two shoe four anchor type hydraulic brakes Each shoe is anchored at each end and linked to wheel cylinder at each end so that all shoes are self-energizing for both forward and reverse action All shoes are radially self-centering

ADJUSTMENT

Minor Wear Adjustment

With wheels raised, remove adjusting slot covers Turn rear (secondary shoe) adjusting screw until brake shoe drags against drum Back off adjusting screw so drum rotates freely Depress brake pedal to center the shoes then back off adjusting screw one additional notch Repeat procedure for primary (front) shoe

Brake Pedal Adjustment

Brake pedal free travel should not be less than 3/16' nor more than 3/8" before pushrod touches master cylinder piston Adjustable at master cylinder pushrod

Parking Brake Adjustment

Propeller Shaft (External Band) Type - On cable controlled type, move parking brake lever to fully released position On rod type linkage, set lever at first notch Flat part of adjusting rod cam must rest on brake band bracket If cam not flat with bracket, remove clevis pin from upper part of cam then adjust clevis rod as necessary Install clevis pin and cotter pin Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise to obtain 010" clearance between brake lining and brake drum at anchor bracket Loosen locknut on adjusting screw for lower half of brake band, adjust screw to obtain 010" clearance between lining

(Continued)

FORD TRUCK SELF-CENTERING (C ntinu d)

and drum at lower half of band Tighten locknut Turn upper band adjusting nut for same 010" clearance Be sure to install lock wire in anchor adjusting screw

Prop ll r Shaft (Int rnal Shoe - 9" Diam) Type - With parking brake lever fully released, remove linkage adjusting clevis pin Lengthen adjusting link by turning clevis until shoes seat against drum with clevis pin installed Remove clevis pin and shorten linkage to obtain 010" clearance between shoes and drum measured at all points around drum with clevis pin installed Install clevis retaining cotter pin

Pr pell r Shaft (Internal Shoe - 12" Diam.) Type - Remove pin from adjusting rod clevis, loosen nut on adjusting rod, and turn clevis so there is 1/4-3/8" freeplay on brake operating lever Tighten clevis nuts and install clevis pin

OVERHAUL

Brake Shoe Replacement

Disassembly - 1) Unequal Length Retracting Springs - Clamp boots against cylinder, note location of retracting springs and remove with Tool 2035-N Remove brake shoe guide bolt lock wire, nut, washer, and bolt from both shoes, then remove shoes from carrier plate

2) Equal Length Retracting Springs - Clamp boots against cylinder and remove retracting springs with Tool 2035-N Remove brake shoe guide bolt cotter pin, nut, wasner, and bolt from both shoes, then remove shoes from carrier plate

Reassembly - 1) Un qual Length Retracting Springs - Position adjusting wheel slide adjusting screw through anchor pin support and index adjusting wheel tab in slot on adjusting screw Install and tighten adjusting wheel lock Place brake shoes in anchor pin slot on support bracket and engage other end of shoe in cylinder link Install shoe guide bolt, washer, and nut Tighten nut finger tight, then back off 1 full turn and install lock wire Install retracting springs with Tool 2035-N making sure springs are installed in original locations

2) Equal Length R tracting Springs - Thread adjusting screws and wheel into anchor pin support and install adjusting wheel lock Thread adjusting wheel into support so shoe will rest against wheel end Install brake shoe over both retracting spring anchor pins, insert ends in cylinder links and install shoe guide bolt, washer and nut Tighten nut finger tight, then back off 1 full turn and install cotter pin Install retracting springs with Tool 2035-N

SERVICING

For bleeding brake system and overhauling wheel and master cylinders, see "Hydraulic Brake Servicing" in Brake Section of Manual and note the following.

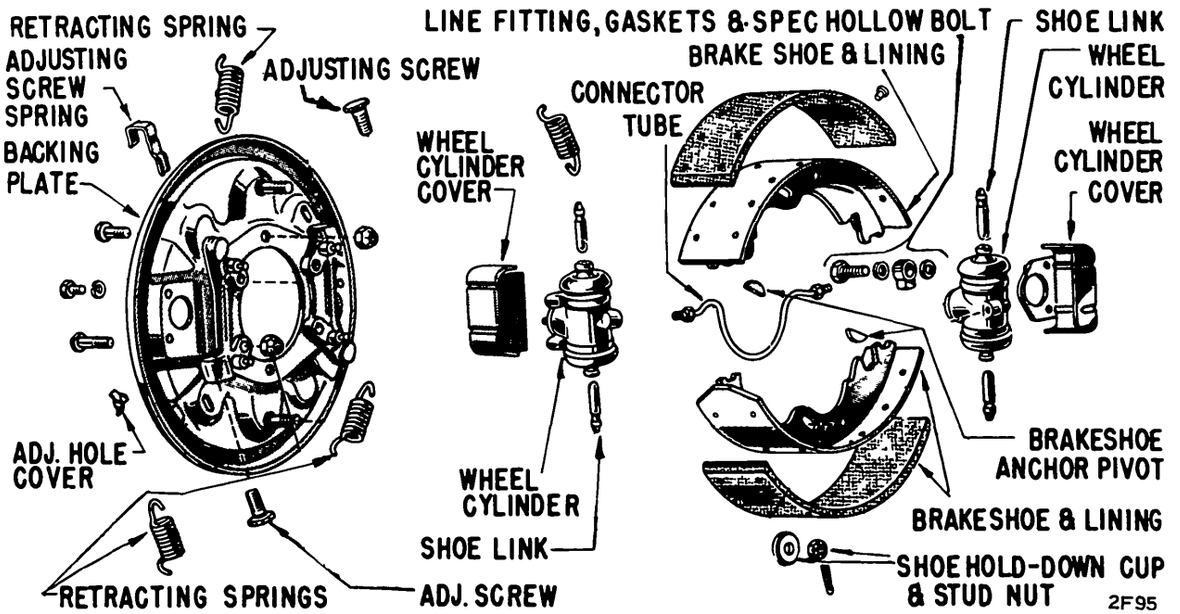
Bl eding - Bleed **top** wheel cylinder first, then lower cylinder If power unit used, unit must be bled before wheel cylinders with engine off and no vacuum in power unit system

TROUBLE SHOOTING

See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual

FORD TRUCK BRAKE SPECIFICATIONS

Truck Model		Brake Drum Diameter (Inches)		Brake Lining Dimensions (Inches)						Brake Cylinder Bore Diameter (Inches)	Brake Master Cylinder Piston Diameter (Inches)
				Length		Width		Thickness			
		Normal	Maximum Oversize	Pri-mary	Second-ary	Pri-mary	Second-ary	Pri-mary	Second-ary		
F-100	Front	11	11 060	10 65	11 91	2	2	0 187	0 250	1 1/16	1 1/16
	Rear	11	11 060	10 65	11 91	1¾	1¾	0 187	0 250	⅞	
F-250	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 250	1⅛	
F 350	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
P 350 (Spicer 60)	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	
P 350 (Timken B 140 rear axle), P 400	Front	12⅛	12 185	13 09	13 09	2	2	0 250	0 300	1⅛	1¼
	Rear	13	13 060	12 71	13 95	2½	2½	0 250	0 250	1¼	
F 500, B 500 N 500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	15/16	1¼
	Rear	15	15 060	15 31	15 31	4	4	0 375	0 375	1½	
P-500	Front	13	13 060	12 68	13 95	2¼	2¼	0 250	0 250	15/16	1¼
	Rear	14⅛	14 185	14 42	14 42	3½	3½	0 375	0 375	1½	
F B 600 (max) N 600* N 6000**	Front	14	14 060	13 66	15 03	2½	2½	0 250	0 250	1	1¼
	Rear	15	15 090	15 31	15 31	4½	4½	0 500	0 500	1½	
C 600 (7000 lb front axle) N 600**, N 6000**	Front	16	16 060	16 75	16 75	2½	2½	0 250	0 250	1¼	1¼
	Rear	15	15 090	15 31	15 31	4	4	0 375	0 375	1½	



FORD TRUCK SELF-CENTERING BRAKE ASSEMBLY (EXPLODED)

BORG & BECK

Ch vr l t Truck	M d l	C v r N .	Disc N .
292" 6 Cyl.	11A9	361483	382860
	12A59	361563	383191
Chrysler			
All	10.5A8WW	361594	383342
Dodge & Dart, Plymouth & Valiant			
6 Cyl.	9A7	361574	383045
	9A7	361577	383081
	10A5	361576	383082
	10A5	361545	383082
V8	10¼A8WW	361505	383044
	10 5A8WW	361506	383269
	10 5A8WW	361594	383342
Pontiac & Tempest ①			
Pontiac Heavy Duty	10.5A9W	361595	383109
	10 5A8WH	361640	②
Tempest 4 Cyl H D	9 5B	361613	383406
	10A5WW	361612	383405
Rambler			
6 Cyl "L" Head	8.5A7	361578	383268
OHV	8.5A7	361619	383268
Heavy Duty	8 5A7	361621	383268
Fleet	9A7	361494	382828
V8 Std	10.5A6	361442	383036
Heavy Duty	10 5A6	361449	383036
Studebaker			
6 Cyl. Std	8.5A7	361586	③ 383292
Police	9A7	926	383183
Taxi	10 5A8	361559	383182
V8 Std.	10A7	361555	382650
Police & Taxi	10 5A8	361560	383182
Hawk Std.	10.5A8	361560	383182
Hawk 4-Bbl	10.5A8WW	361614	④ 383403
Hawk Spec Equip.	10.5A8WW	361610	383387
Avanti 3-Speed	10.5A8WW	361614	383403
Avanti 4-Speed	10 5A8WW	361610	383387
Jeep			
FC-170 Std.	10A9	361601	381806
Optional	10.5A8	361502	382931
Heavy Duty	10A7	361477	381806
Wagoneer 2x4	9A7	361599	383189
4x4 Std.	10A7	360982	381806
4x4 Optl.	10.5A9	361636	383500
Gladiator	10.5A9	361636	383322

① - Std. clutch is Own Diaphragm Spring type.
② - No. 383472 (389" Eng), No. 383109 (421" Eng.).
③ - No 383291 with Overdrive.
④ - No. 383402 with 4-speed transmission.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 PONTIAC CLUTCH CHATTER WHEN PEDAL DEPRESSED TO FLOOR CORRECTION:* Caused by release bearing forcing release fingers against clutch disc. To correct, limit downward travel of clutch pedal by installing Pedal Stop, No 537929, on toe pan under pedal arm. *CAUTION - Do not try to correct condition by increasing pedal free travel.*

►*1963 RAMBLER CLASSIC & AMBASSADOR HIGH CLUTCH PEDAL CORRECTION:* Install new Clutch Pedal Stop Bracket, No. 3169442, and Pedal Stop Kit, No. 3204792. New pedal stops have elongated holes for pedal height adjustment (see "Pedal Adjustment" below for procedures and specifications). Also install Anchor, No 3145919, at right hand lower jacket tube support plate mounting bolt (angle section to bottom); and Spring, No 3123558, over pedal over-center spring and attached to anchor Spring and anchor will help retain pedal in fully released position

DESCRIPTION

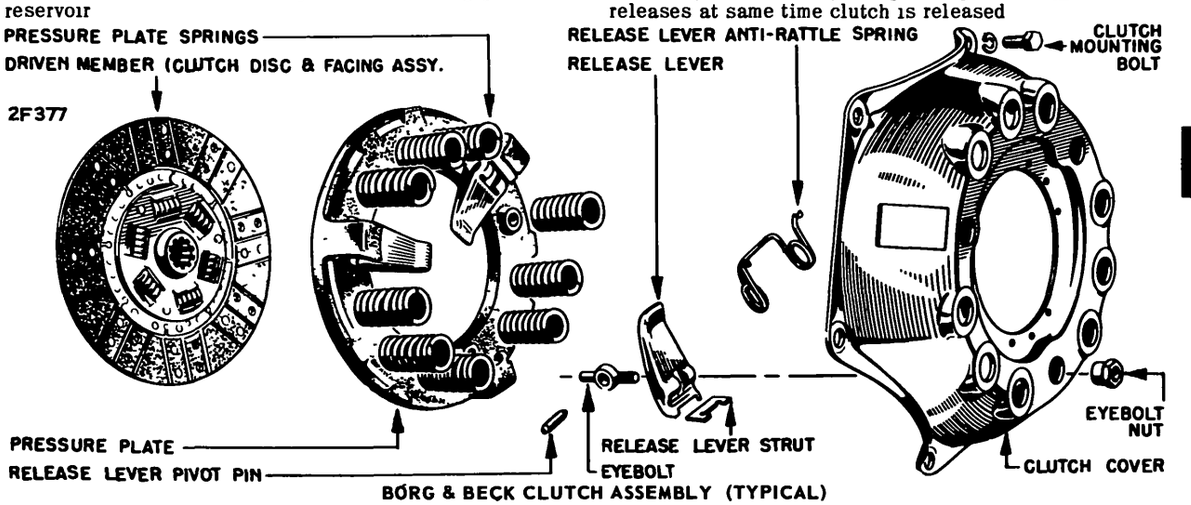
Single plate, dry disc type. Release levers, mounted on bolts piloted in pressure plate and retained in clutch cover, actuate clutch struts which provide "knife-edge" action Semi-centrifugal type clutches ("W", "WW", "WH" suffix in model number) have three roller assemblies in grooves in pressure plate directly under clutch cover Centrifugal action on these rollers increases the pressure plate load as the engine speed increases

CLUTCH PEDAL ADJUSTMENT

Chevrolet Truck

Mechanical Linkage - Free travel should be ⅜-1". To adjust, remove pedal return spring and back off pedal pushrod lower locknut (at swivel end) about ½" Hold pushrod so pedal is against bumper stop, and hold cross shaft lever so throw-out bearing is against clutch fingers Adjust pushrod upper locknut so there is 3/16-1/4" clearance between this locknut and upper edge of swivel Release pushrod and cross shaft lever, tighten lower locknut to lock swivel against upper locknut, and install return spring.

Hydraulic Linkage - Free Travel - Adjust pushrod so there is free travel between master cylinder pushrod and piston This will amount to 1/8" free travel measured at centerline of pedal pad, just before pushrod contacts piston and will insure piston uncovering port in reservoir



BORG & BECK CLUTCH ASSEMBLY (TYPICAL)

Total Travel - Adjust clutch pedal bumper so clutch pedal pad (fully released) is even with brake pedal, then disconnect return spring Push slave cylinder pushrod forward as far as possible and pull clutch fork rearward until all slack is removed at throw-out bearing, then turn adjusting nut behind slave cylinder pushrod fulcrum ("V" block) to obtain 5/32" clearance between fulcrum pivot and clutch fork (use shank of 5/32" drill).

Chrysler Corp. Cars

Adjust self-locking nut on clutch fork rod to provide 5/32" free movement at fork-to-pushrod pin This will provide correct 1" pedal freeplay

Pontiac & Tempest

Pedal free travel should be about 1" Disconnect return (or anti-rattle) spring. Loosen trunnion locknuts and move pushrod and clutch fork rearward until release bearing lightly contacts release fingers Turn rear nut up to the trunnion, then shorten pushrod 7 full turns and tighten both nuts Install spring

Rambler

Pedal freeplay should be 1/2" (5/8" maximum) Adjust by changing length of throw-out lever-to-inner release idler lever assembly link Lengthen link to reduce freeplay. *NOTE - On cars with adjustable pedal stop bracket, adjust pedal height to 6" measured from bottom of clutch pedal to bare toe board at right angle.*

Studebaker

NOTE - Brake pedal must be properly adjusted before making clutch pedal adjustments. With brake pedal properly adjusted, turn clutch pedal stopscrew so that the clutch pedal is at the same height as brake pedal. *NOTE - On power brake cars, adjust so clutch pedal height is 6¼-6½" from top of pedal pad to floor mat.* Turn adjusting nut on clutch over-center spring so spring length is 10", then adjust clutch pedal-to-bellcrank rod so there is ½" clearance between top end of bellcrank and body flange on front side of firewall Now turn clutch operating rod adjusting nuts as necessary for ½-1" pedal free travel measured at pedal pad *HILL HOLDER NOTE* - Check setting whenever clutch pedal adjusted and adjust operating rod so hill holder releases at same time clutch is released

Jeep

FC-170 - ½" pedal freeplay To adjust, change cable length so pedal has ½" free movement from fully engaged position before resistance is felt

Gladiator & Wagoneer - Pedal Adjustment - Turn adjusting screw on clutch pedal support so master cylinder pushrod just contacts piston when piston is at full rear position.

(Continued)

BORG & BECK (Cont.)

Pedal Fr eplay - Disconnect clutch fork return spring, push slave cylinder pushrod forward so piston is fully forward, hold in position, and move clutch lever until release bearing touches clutch fingers Turn pushrod adjusting nut until connecting pin enters clutch lever, then back off nut 2 or 3 turns for release bearing free-play Connect return spring

CLUTCH REMOVAL

Chevrolet Trucks

Remove transmission, then disconnect slave cylinder at clutch fork and remove throw-out bearing from fork Press fork away from ball mounting (use screwdriver), or remove ball stud from rear of clutch housing. *NOTE - Pry r tainer out of fork with small screwdriver.* Install Pilot Tool J-5824 to support assembly. Loosen clutch attaching bolts gradually to release spring tension, then remove tool and remove clutch assembly After installation, bleed clutch hydraulic line at clutch slave cylinder bleed holes in same manner as for brake system bleeding.

Chrysler Corp. Cars

Remove transmission. Pull out release bearing and sleeve Mark cover and flywheel for reassembly. Loosen clutch attaching bolts in succession a few turns at a time to release spring tension, then remove clutch assembly.

Pontiac

Disconnect battery, remove transmission and propeller shaft, and clutch release bearing Disconnect clutch linkage and remove starter. Remove front flywheel housing shield and flywheel housing. Mark pressure plate and flywheel for reinstallation, loosen cover attaching bolts alternately and gradually to relieve tension, and remove clutch.

T mp st

Disconnect stabilizer bar from frame side rail, disconnect exhaust pipe, and disconnect front of torque tube from clutch housing (*s e "T mpest Propeller Shaft & Torque Tube" in R ar Axl Section*). Disconnect clutch rod from clutch fork, and linkage link from clutch housing. Remove starter Remove clutch housing assembly Mark flywheel and clutch for reassembly, then remove clutch assembly from flywheel.

Rambler

Remove transmission, disconnect linkage, and remove clutch housing and pan Mark flywheel and clutch for reassembly and take out clutch fork. Remove clutch attaching bolts and remove clutch assembly.

Studebaker

Disconnect battery On 6 Cyl , remove oil level gauge and tube, and disconnect starter and tie out of way (unnecessary to disconnect cables) On V8, remove starter completely Remove clutch operating shaft and transmission Disconnect engine rear support from crossmember and raise engine sufficiently to take weight off crossmember Remove crossmember (and clutch housing cover plate on V8 cars) Remove clutch housing Mark flywheel and clutch for reassembly, remove attaching bolts, and remove clutch assembly.

Clutch Spring Specification Table

Cover No.	Springs (No. & Color)	Lbs. Pressure
926	9 - Lavender	145-155 at 1 1/2"
360982	9 - Light Green	170-180 at 1 11/16"
361442	6 - No Color	150-160 at 1 11/16"
	6 - Light Green	170-180 at 1 11/16"
361449	3 - Dark Blue	183-197 at 1 11/16"
	9 - Light Green	170-180 at 1 11/16"
361477	6 - Red or No Color	189-201 at 1 1/2"
361483	6 - Tan	155-165 at 1 1/2"
	6 - Red or No Color	189-201 at 1 1/2"
361494	6 - White	239-251 at 1 1/2"
361502	3 - Orange	165-175 at 1 1/2"
	6 - Red or No Color	189-201 at 1 1/2"
361505	9 - Red or No Color	189-201 at 1 1/2"
361506	3 - White	239-251 at 1 1/2"
	6 - Red or No Color	189-201 at 1 1/2"
361545	3 - Tan	155-165 at 1 1/2"
	6 - Lavender	145-155 at 1 1/2"
361555	3 - No Color	150-160 at 1 11/16"
	6 - Pink	209-225 at 1 11/16"
361559	6 - Red or No Color	189-201 at 1 1/2"
361560	3 - Lavender	145-155 at 1 1/2"
	6 - Red or No Color	189-201 at 1 1/2"
361563	3 - Red or No Color	189-201 at 1 1/2"
	9 - Lavender	145-155 at 1 1/2"
361574	3 - White	239-251 at 1 1/2"
	3 - Red or No Color	189-201 at 1 1/2"
361576	9 - White	239-251 at 1 1/2"
361577	3 - Red or No Color	189-201 at 1 1/2"
	6 - Orange	165-175 at 1 1/2"
361578	6 - Red or No Color	189-201 at 1 1/2"
361586	3 - Red or No Color	189-201 at 1 1/2"
	3 - Orange	165-175 at 1 1/2"
361594	6 - White	239-251 at 1 1/2"
	6 - Tan	155-165 at 1 1/2"
361595	3 - Yellow	135-145 at 1 1/2"
	9 - Red or No Color	189-201 at 1 1/2"
361599	3 - Tan	155-165 at 1 1/2"
	6 - Red or No Color	189-201 at 1 1/2"
361601	9 - Red or No Color	189-201 at 1 1/2"
361610	3 - Tan	155-165 at 1 1/2"
	9 - Lavender	145-155 at 1 1/2"
361612	3 - Red or No Color	189-201 at 1 1/2"
	6 - Orange	165-175 at 1 1/2"
361614	3 - Red or No Color	189-201 at 1 1/2"
	6 - Tan	155-165 at 1 1/2"
361619	6 - Black	223-237 at 1 1/2"
361621	6 - White	239-251 at 1 1/2"
361636	3 - Red or No Color	189-201 at 1 1/2"
	6 - Tan	155-165 at 1 1/2"
361640	6 - Red or No Color	189-201 at 1 1/2"
	6 - White	239-251 at 1 1/2"

Jeep

FC-170 - Remove transmission and transfer case. Remove flywheel housing pan from bottom of housing Mark pressure plate and flywheel for reinstallation. Loosen attaching screws evenly to release spring pressure and to prevent distortion of bracket, then remove clutch.

OVERHAUL

Mark all parts before dismantling clutch and reassemble in same position to maintain clutch balance Replace grooved, checked or warped pressure plates. Replace springs when pressure plate discolored from heat *PONTIAC & TEMPEST NOTE* - Car manufacturer does not recommend overhaul of clutch assembly.

Disassembly

Place clutch on fixture or arbor press (support pressure plate under release levers), place block across cover resting on spring bosses, compress cover slightly, remove metal staking in adjusting nuts by running hacksaw blade through slot, remove nuts Release pressure slowly and remove cover and springs. Remove release levers by grasping lever and eyebolt between thumb and forefinger, so that inner end of lever and upper end of eyebolt are pressed together, lift strut over ridge in end of lever (press lower end back against lug), lift lever and eyebolt out.

Reassembly

Place pressure plate on fixture or arbor press supporting plate under release lever lugs Install lever, eyebolt, and strut assemblies by reversing removal procedure. On semi-centrifugal models, install roller assemblies in pressure plate grooves. Install clutch springs on pressure plate Install anti-rattle springs on release levers in cover. Place cover on pressure plate. Make certain that springs are seated in cover recesses and anti-rattle springs in place on release levers Compress cover slowly and guide eyebolts through holes in cover If assembly made in fixture, use clamps to clamp cover flange to plate at mounting holes Install eyebolt nuts and turn nuts down flush with head of bolt. Compress and release clutch several times to seat all working parts, then adjust release lever heights.

Clutch Springs

Note spring color and install in same relative position (groups of two different springs used on some clutch models) Springs should check with "Clutch Spring Specification Table" Replace springs if weak or burned or if clutch has been subjected to excessive heat.

Release Lever Adjustment (Using Gauge Plate)

Install clutch on flywheel in car, or on dummy flywheel on bench, with Borg & Beck Gauge Plate installed in place of regular driven member *CAUTION - Machined lands on gauge plate should be directly und r release levers.* Depress each lever several times to seat all parts, then place straightedge or sheet metal height gauge on gauge plate boss directly above release lever and adjust lever height until lever tip contacts lower edge of height gauge ("flush" setting)

(Continued)

BORG & BECK (Cont.)

Release Lever Adjustment (With Borg-Warner Universal Fixtures UF-300 or 400)

Special lands must be installed on fixture under pressure plate lugs Set adjusting arm on adjusting sleeve so that height of lower side arm above bottom of sleeve is correct for each model (see table) Install indicating plate on levers Adjust each lever so that it just contacts indicating plate or adjusting arm, lock lever adjusting nuts by peening nut against notches in eyebolt.

Release Lever Setting (Borg-Warner Fixtures UF-300 & UF-400)

Cover Assembly	① Lever Height	Cover Assembly	① Lever Height	Cover Assembly	① Lever Height	Cover Assembly	① Lever Height
926	2 3/16"	361494	2 3/8"	361559	2 3/8"	361599	2 3/16"
360982	2 3/16"	361502	2 7/32"	361560	2 3/8"	361601	2 1/16"
361442	2 5/32"	361505	2 3/16"	361563	② 2 9/32"	361610	2 1/8"
361449	2 5/32"	361506	2 3/16"	361574	2 3/16"	361612	2"
361477	2 1/16"	361545	② 2 1/4"	361576	② 2 1/4"	361614	2 1/16"
361483	2 9/32"	361555	2 1/16"	361577	2 3/16"	361619	2 5/32"
				361578	2 5/32"	361621	2 5/32"
				361586	2 5/32"	361636	2 1/4"
				361594	②③ 2 9/32"	361640	2 3/16"
				361595	② 2 5/32"		

① - Using three 3J Lands, and one 3X Indicating Plate.
② - Also use three 3B Spider Post
③ - 3X Indicating Plate not used.

Rambler American, Series 6301 (1963)
Rambler Classic Six, Series 6310 (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 "NO DRIVE" DURING COLD WEATHER & PREMATURE SERVO WEAR CORRECTION:* Caused by road wash entering servo body through atmospheric vent and freezing servo piston in released position. Also, mud, dirt, and dust can enter servo and cause premature wear To correct, install Servo Vent Shield, No 3171701, between rear cover of servo and servo mounting bracket with slot in shield facing downward. Hold shield in position with servo self-adjuster

►*STARTING CAR BY TOWING NOTE:* To start car by towing, proceed as follows: With "Tow Start" handle all the way in, place shift lever in 2nd gear, pull overdrive handle all the way out, and turn on ignition switch When speed reaches 10 MPH, pull "Tow Start" handle all the way out and hold in position Clutch will now be engaged As soon as engine starts, push "Tow Start" handle all the way in and move shift lever to neutral position *"Tow Start" handle must be pushed all the way in at all times when driving the car.*

►*PARKING CAR IN GEAR NOTE:* Use REVERSE gear ONLY as follows: With ignition off, place transmission in reverse gear and pull "Tow Start" handle all the way out and turn handle ¼-turn clockwise to lock in position. Clutch will now be engaged. *"Tow Start" handle must be pushed all the way in at all times when driving the car.*

►*CLUTCH DISC STICKING TO FLYWHEEL OR PRESSURE PLATE NOTE:* Higher asbestos yarn content of clutch facings may induce sticking to flywheel if clutch left in engaged condition for any length of time. If car parked for 48 hours or more, use parking brake instead of "Tow Start" handle to hold car.

►*CONTROL VALVE BODY REMOVAL NOTE & CAUTION:* If wheelhouse inner panel interferes with valve body removal, proceed as follows: Remove both lower capscrews and loosen top capscrew Pull oil pump and valve body from engine approximately ¼" and rotate pump and valve body clockwise (to front of car) until capscrew and valve body can be removed from pump *CAUTION - On "L" head engines, do not pull oil pump more than ¼" from engine or distributor shaft will disengag from drive gear and put engine out of time.* When installing valve body, torque capscrews to 13-15 ft lbs. Overtightening will distort valve body.

RAMBLER "E" STICK AUTOMATIC CLUTCH

DESCRIPTION

Fully automatic clutch operating mechanism using engine oil pressure to apply the clutch and which eliminates the need for a clutch pedal on cars with synchro-mesh transmission (with or without overdrive)

Clutch - Single plate, dry disc type of conventional design but with clutch pressure plate springs eliminated and release levers arranged to engage driven plate to flywheel instead of releasing it (clutch is disengaged at rest or in neutral) Ball type clutch throw-out bearing rotates constantly when car is moving in gear A retracting spring attached to outer end of throw-out lever holds clutch disengaged until applied by engine oil pressure

Oil Pump - Gear type with larger gears for increased oil capacity Engine oil pressure relief valve specification is increased to 55-60 lbs at 2200 RPM, and an additional minimum lube pressure relief valve is installed in control valve body to insure that engine oil pressure requirements are met before oil is diverted for clutch operation This valve opens at 10 lbs.

Control Mechanism - Consists of a control valve body mounted on engine oil pump and serving as the pump cover, a vacuum modulator diaphragm and a vacuum dump diaphragm connected in series with each other and to intake manifold, an air valve solenoid in dump diaphragm line, and a neutral safety switch on steering column.

Servo - Conventional hydraulic power cylinder with a piston and seal, and piston rod contacting clutch throw-out lever. Hydraulic pressure in servo pushes piston rod against throw-out lever to engage clutch A check valve with a metered orifice in line between servo and control valve body permits a large amount of oil under high pressure to enter servo for fast partial clutch engagement. Remaining oil needed for full engagement enters servo at a slower rate to insure smooth clutch engagement and operation

Manual Control - A "Tow Start" handle on instrument panel connected by an adjustable cable linkage to throw-out lever is provided for manual engagement of clutch

OPERATION

In Neutral At Idle Sp d - With gear shift lever in neutral, neutral safety switch contacts are closed, energizing air valve solenoid which pulls in to open vacuum line from intake manifold to dump diaphragm Combined vacuum in dump and modulating diaphragms (modulating diaphragm connected directly to intake manifold) plus atmospheric pressure on underside of modulating diaphragm pulls springs in both diaphragms up to hold pressure regulator valve open so there is no oil flow from engine oil pump to servo, and clutch is disengaged.

In Gear At Idle Speed - When transmission is placed in gear, neutral safety switch contacts open to release air valve solenoid which shuts off vacuum supply to dump diaphragm. Atmospheric pressure in dump diaphragm lets full diaphragm spring pressure close pressure regulator valve. *NOTE - Spring-loaded ball check in regulator valve maintains a 7 lb. minimum pressure in valve body and servo. This pressure is just enough to overcome slightly the clutch retracting spring tension and produce a slight drag on clutch to take up drive line backlash and to initiate coasting engagement for engine braking.* With regulator valve closed, servo pressure will be regulated by main orifice from oil pump discharge side until servo oil pressure begins to overcome dump diaphragm spring pressure (17 lbs. approximately).

In Gear At Road Load - As servo oil pressure under load increases, dump diaphragm spring pressure is not sufficient to hold regulator valve closed. But at the same time, engine manifold vacuum is dropping off because of increased engine speed. When vacuum drops, modulating diaphragm spring pressure is allowed to combine with dump diaphragm spring pressure to hold pressure regulator valve closed. This combined pressure is approximately 45 lbs. and is sufficient to keep clutch engaged.

ADJUSTMENT

Anti-Stall Dashpot

Carter Carbs. - Turn idle speed screw out so throttle valve is tightly closed, fully depress dashpot plunger, turn dashpot in or out to obtain 1/8" clearance between end of plunger and throttle lever Tighten locknut

Holley Carbs. - With engine idling at normal operating temperature, depress dashpot plunger fully, and turn adjusting screw on throttle lever to obtain a clearance of 9/64" between adjusting screw and dashpot plunger,

Neutral Safety & Actuator Cam Stop

Adjust neutral safety switch so contact roller is at a light contact against actuator cam, then move switch in

(Continued)

RAMBLER "E" STICK AUTOMATIC CLUTCH (Cont.)

mounting bracket so there is the same amount of gear shift lever movement when coming out of 2nd gear as there is when coming out of 3rd gear before neutral switch "clicks". Place gear shift lever in high gear and adjust actuator cam stop nut (upper nut at small end of spring) to take up approximately ½ of lever free movement (will center slot in 2nd and 3rd operating lever over selector key to remove any tension).

Throw-Out Lever

NOTE - Following adjustment procedure supersedes previous instructions to prevent clutch from slipping. This adjustment is n cessary only when a new clutch driven plat is install d. Under normal conditions, slack is tak n up by servo self-adjuster assembly. With parking brake firmly set, engine at 550 RPM, and transmission in Neutral, loosen locknut on throw-out lever adjusting screw. Turn adjusting nut so throw-out lever moves to rear of car, then continue to move lever until a slight transmission gear clash occurs when moving shift lever slowly toward 1st gear (do not engage in gear). Now back off adjusting screw 1½-turns and tighten locknut.

"Tow Start" Cable

After throw-out lever adjusted (see above), loosen locknut on "Tow Start" cable and turn adjusting sleeve so pivot clears throw-out lever by 1/8", then tighten locknut.

TROUBLE SHOOTING & DIAGNOSIS

TROUBLE SHOOTING NOT E - When diagnosing clutch troubles, check for the usual clutch malfunctions such as bent or distorted driven and pressure plates, worn or oil soaked facings, misalignment, etc., in addition to the following special points.

Exc ssiv Slip - Low servo oil pressure; Throw-out lever improperly adjusted or improperly installed; Engine oil level low; Air valve solenoid faulty; Diaphragm pushrod stuck in valve and diaphragm assembly; Diaphragm vent plugged; Minimum lube pressure valve stuck partially open.

Excessiv Cr p - Engine idle speed too high; Clutch retracting spring too light or broken; Servo oil pressure too high; Retractor straps broken.

N Clutch R l as - Diaphragm cover bent or damaged; Vacuum line leak; Control valve stuck in valve body; Neutral safety switch faulty or not adjusted properly; Wiring to air valve solenoid faulty; Air valve solenoid faulty; Throw-out lever or "Tow Start" cable improperly adjusted; Servo piston binding; Diaphragm pushrod sticking; Servo body air vent plugged; Diaphragm leak in diaphragm assembly.

Engin Ov rsp eds When Clutch Engages - Throw-out lever improperly adjusted; Servo piston binding; Servo air vent plugged; Oil regulator valve not seating.

N Clutch Engagem nt - Neutral safety switch faulty or improperly adjusted; Air valve solenoid or wiring faulty; Minimum lube pressure valve stuck; Servo piston binding; Dump diaphragm spring broken; Pressure regulator valve stuck open; Engine oil level low.

Exc ssiv G ar Clash On Engag m nt (1st r R vers) - Throw-out lever improperly adjusted; Engine idle speed not correct.

TESTING

Stall Test

Method 1) is preferred method, but method 2) may be used if necessary.

1) Bring engine to normal operating temperature and install an electric tachometer. Drive car on level ground in 3rd gear at 10 MPH. Move throttle to wide open position (apply brakes to hold at 10 MPH), and note tachometer reading. Engine speed should be 975-1125 RPM.

2) Bring engine to normal operating temperature and install an electric tachometer. Set parking brake and place transmission in 3rd gear. Apply brakes and open throttle fully. Engine speed should settle to 975-1125 RPM. *CAUTION - DO NOT hold throttle open for more than 2 seconds and DO NOT repeat this test until ½ hour has elapsed.*

Test Conclustions - If engine RPM is higher than specified, refer to "Excessive Slip" under TROUBLE SHOOTING above for possible causes. If engine RPM is lower than specified, engine is not developing full power or servo oil pressure is too high.

Oil Pressure Test

Bring engine to normal operating temperature and install pressure gauge at one of the pipe plugs on engine oil gallery. Place transmission in neutral and set engine speed to 550 RPM. Remove vacuum hose at intake manifold and plug **manifold** opening (do not plug loose end of hose). Install an electric tachometer. Oil pressure should be 27-32 lbs. at 1100 RPM. If not within limits, make sure pressure regulator valve cap is in place and not plugged, and that valve moves freely in valve body bore. Make sure that valve body-to-oil pump gasket thickness is within .011-.013". Replace engine oil pump or valve body and diaphragm assembly as necessary.

Air Valve Solenoid

Remove solenoid from mounting bracket, disconnect vacuum hoses, but leave wiring connected. *NOTE - If solenoid has 3 openings in "T" connection, plug center opening to make test.* Place transmission in neutral. With ignition off, solenoid is not energized, and you should not be able to blow through port "V". This checks vacuum part of solenoid in closed position. Now turn ignition on. Solenoid should be energized and you should be a ble to blow through port "V". This checks vacuum valve in open position. With ignition on, and solenoid energized, close port "D" with a finger. You should not be able to blow through port "V". This checks atmospheric end of valve for proper seating. Replace air solenoid valve if any of above conditions not met.

Servo & Check Valve

Engage clutch manually with "Tow Start" handle. Move servo pushrod back and forth to check for binding. If oil leaks at rear of servo, check servo piston seal and cylinder bore. If oil leaks at front of servo, check hose clamp and servo gasket.

CLUTCH OVERHAUL

Removal

Remove transmission flywheel housing lower cover, and disconnect retracting spring and "Tow Start" cable from throw-out lever. Remove clutch. *NOTE - Mark cover, pressure plate and flywheel for reassembly in same positions.*

Disassembly

Clutch may be disassembled by removing the three pressure plate attaching screws.

Inspection

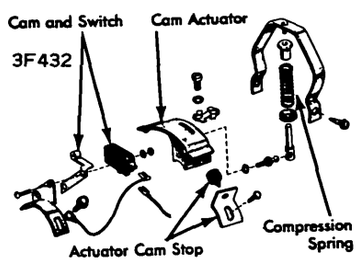
NOTE - If driven plate replaced, new servo self-adjuster must also be installed. Inspect all parts for wear, damage, distortion, etc. Replace parts as necessary. Replace cover if any drive straps are broken. *CAUTION - Do not wash release bearing in gasoline or or any solvent. Unnecessary and impossible to lubricate bearing as it is packed for life.*

Reassembly

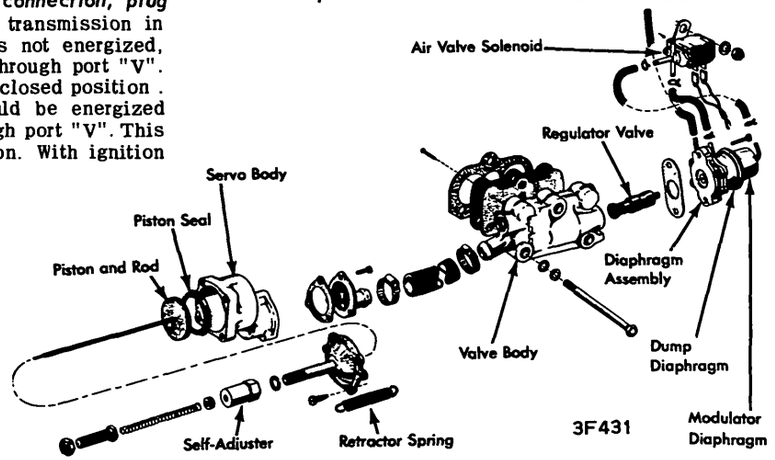
Reverse disassembly procedure and apply small amount of lubriplate to release lever fulcrums.

Installation

Reverse removal procedure and use Aligning Tool J-1625 or J-5442 to insure correct clutch alignment. *NOTE - Before removing aligning tool, attach "T w Start" cable and pull handle all the way out to hold clutch in place to aid transmission installation.*



NEUTRAL SAFETY SWITCH & ACTUATOR CAM ASSEMBLY



"E-STICK" CONTROL MECHANISM (EXPLODED)

CHEVROLET & PONTIAC (OWN)

Chevrolet Pass. Cars (1963)
Chevy II (1963)
Corvair Cars & Trucks (1963)
Corvette (1963)
Chevrolet Trucks (1963)
Pontiac (1963)
Tempest (1963)

DESCRIPTION

Single plate dry disc type with a diaphragm spring replacing conventional clutch release springs and release levers. Diaphragm spring is shaped like a dished washer, with inner rim slotted to form many release fingers, and is pivoted on inner and outer pivot rings mounted in clutch cover. Most models have straight release fingers, however some models have 6 or all of the release fingers bent upward to provide centrifugal action for increased clutch pressure at higher speeds. Models having 6 fingers bent upwards also have weights on these 6 fingers.

CLUTCH LINKAGE ADJUSTMENT

Chevrolet Pass Cars - Free travel should be 7/8-1 1/8". To adjust, remove pedal return spring and back off pedal pushrod lower locknut (at swivel end) about 1/2". Hold pushrod so pedal is against bumper stop, and hold cross shaft lever so throw-out bearing is against clutch fingers. Adjust pushrod upper locknut so there is 3/16-1/4" clearance between this locknut and upper edge of swivel. Release pushrod and cross shaft lever, tighten lower locknut to lock swivel against upper locknut, and install return spring.

Chevy II - Free travel should be ⅜-1" measured at pedal pad. To adjust, loosen locknut on clutch fork pushrod and shorten or lengthen pushrod as necessary, then tighten locknut. Recheck pedal free travel. *NOTE - 1/8" clearance between pushrod and pushrod seat in clutch fork will give proper pedal free travel.*

Corvair Pass. Cars - **1)** Pedal free travel should be ¾". Attach return spring to clutch lever control cable cross shaft outboard lever lower hole. *NOTE - Clutch fork pull rod must be disconnected from cross shaft lever.*

2) Adjust clevis swivel until outboard lever on clutch lever control cable cross shaft has a clearance of 1/8" to 3/4".

3) Hold pull rod to remove all slack at bearing (throw-out bearing touching release fingers), and align swivel with upper hole of outboard lever, then back off swivel 3 complete turns, assemble swivel to lever, and install clip.

Corvair Trucks & Greenbrier - **1)** Pedal free travel should be ¾". Disconnect rear clutch return spring. *NOTE - Front spring must be in operation to hold pedal bumper in contact with toe-board.*

2) Remove retainer clip, clevis pin and washer from clutch control idler lever and remove rear cable clevis.

3) Let idler lever hang free to furnish guide for correct line of action of cable clevis.

4) Pull cable clevis rearward to remove all slack forward of this point, then pull clutch fork pull rod until all slack is taken up at clutch fork.

5) With cable clevis and pull rod in this position, adjust pull rod clevis to align holes in both clevises.

6) With pull rod clevis position established, unscrew clevis 3½-turns (lengthen rod 5/32"). Tighten jam nut.

7) Line up holes in cable clevis, pull rod clevis, and clutch fork pull rod idler lever and insert clevis pin and retainer clip. Install return spring.

Chevrolet Trucks - Mechanical Linkage - Free travel should be ⅜-1". Adjust in same manner as for Pass. Cars (above).

Hydraulic Linkage Free Travel - Adjust pushrod so there is free travel between master cylinder pushrod and piston. This will amount to 1/8" free travel measured at centerline of pedal pad, just before pushrod contacts piston and will insure piston uncovering port in reservoir.

Hydraulic Linkage Total Travel - Adjust clutch pedal bumper so clutch pedal pad (fully released) is even with brake pedal, then disconnect return spring. Push slave cylinder pushrod forward as far as possible and pull clutch fork rearward until all slack is removed at throwout bearing, then turn adjusting nut behind slave cylinder pushrod fulcrum ("V" block) to obtain 5/32" clearance between fulcrum pivot and clutch fork (use shank of 5/32" drill).

Corvette - Free travel should be ⅜-1" (normal pedal), 5/8-3/4" ("Fast" pedal). Adjust in same manner as for Pass. Cars (above). *NOTE - Pedal total travel should be 6½" (normal pedal), 5" ("fast" pedal); and can be increased by trimming bumper pad, and decreased by adjusting pedal free travel.*

Pontiac & Tempest - Pedal free travel should be about 1" Disconnect return (or anti-rattle) spring. Loosen trunnion locknuts and move pushrod and clutch fork rearward until release bearing lightly contacts release fingers. Turn rear nut up to the trunnion, then shorten pushrod 7 full turns and tighten both nuts. Install spring.

CLUTCH REMOVAL

Chevrolet Pass. Cars - Remove transmission. Remove clutch throw-out bearing from fork, then remove clutch fork tension spring from fork. Remove clutch fork by forcing it forward and toward center of car. Install Pilot Tool J-5824 to support clutch assembly. Loosen clutch attaching bolts one at a time until tension of spring is released, then remove pilot tool. Remove clutch assembly. When installing, align "X" mark on cover and flywheel.

Chevy II - Remove transmission. Disconnect return spring from clutch fork and remove throw-out bearing from fork. Remove clutch housing (cover plate will hang from starter gear housing). Remove clutch fork from ball stud and dust boot. Support clutch assembly with Pilot Tool J-5824, then remove clutch assembly by loosening attaching bolts a little at a time until all spring tension is relieved. *INSTALLATION NOTE - Extended end of hub with damper springs must be installed toward flywheel.*

Corvair - Engine must be removed from car and transaxle assembly separated from engine in order to remove clutch. *See Corvair Car Mod l Pages, and "Corvair Transaxle" in Transmission Section.*

Corvette - Remove transmission, disconnect pushrod and spring, and remove flywheel housing. Install Pilot Tool J-5824 to support clutch, then loosen clutch attaching bolts a little at a time until all tension is relieved. Remove clutch. When installing, align "X" mark on cover and flywheel.

Chevrolet Trucks - Remove transmission, then disconnect slave cylinder at clutch fork and remove throw-out bearing from fork. Press fork away from ball mounting (use screwdriver), or remove ball stud from rear of clutch housing. *NOTE - Pry rtainr out of frk with small screwdriver.* Install Pilot Tool J-5824 to support assembly. Loosen clutch attaching bolts gradually to release spring tension, then remove tool and remove clutch assembly. After installation, bleed clutch hydraulic line at clutch slave cylinder bleed holes in same manner as for brake system bleeding.

Pontiac - Disconnect battery, remove transmission and propeller shaft, and clutch release bearing. Disconnect clutch linkage and remove starter. Remove front flywheel housing shield and flywheel housing. Mark pressure plate and flywheel for reinstallation, loosen cover attaching bolts alternately and gradually to relieve tension, and remove clutch.

Tempest - Disconnect stabilizer bar from frame side rail, disconnect exhaust pipe, and disconnect front of torque tube from clutch housing *(see "Tmpst Propeller Shaft & Torque Tube" in Rear Axle Section).* Disconnect clutch rod from clutch fork, and linkage link from clutch housing. Remove starter. Remove clutch housing assembly. Mark flywheel and clutch for reassembly, then remove clutch assembly from flywheel.

CLUTCH OVERHAUL

1) Remove three drive strap-to-pressure plate bolts and retracting springs, then remove pressure plate from cover. *NOTE - When disassembling, not position of grooves on edge of pressure plate and cover for reassembly to maintain balance.*

2) Inspect spring, rings, and cover for excessive wear or damage. If any defect found, replace clutch assembly.

AUBURN

Dodge & Dart 6 Cyl. (1963) Ⓒ
Plymouth 6 Cyl. (1963) Ⓒ
Valiant (1963) Ⓒ
Jeep 4 & 6 Cyl. (1963) Ⓔ

Ⓒ - Borg & Beck clutch also used
Ⓔ - 3 spring and 6-spring types used Rockford and Borg & Beck clutches also used

Description

Single plate, dry disc type of same design used on corresponding previous models

Clutch Pedal Adjustment

Chrysler Corp. Cars - Adjust self-locking nut on clutch fork rod to provide 5/32" free movement at fork-to-pushrod pin This will provide correct 1" pedal freeplay.

Jeep-Universal Jeep & Dispatcher - 1½" pedal freeplay. To adjust freeplay, loosen yoke locknut on cable between throw-out lever and cross shaft lever and turn yoke as required

Utility 4 Cyl. - 1" pedal freeplay To adjust, loosen control rod locknut and screw adjusting nut (on threaded connection between clutch control lever and control tube lever) in or out Tighten locknut

Utility 6 Cyl. - 1" pedal freeplay. To adjust, loosen locknuts on pedal adjusting rod. Turn nuts forward to increase, or backward to decrease freeplay Tighten both locknuts against trunnion (without changing adjustment).

FC-150 & FC-170 - ½" pedal freeplay. To adjust, change cable length so pedal has ½" free movement from fully engaged position before resistance is felt

Gladiator & Wagoneer - Pedal Adjustment - Turn adjusting screw on clutch pedal support so master cylinder pushrod just contacts piston when piston is at full rear position

Pedal Free play - Disconnect clutch fork return spring, push slave cylinder pushrod forward so piston is fully forward, hold in position, and move clutch lever until release bearing touches clutch fingers Turn pushrod adjusting nut until connecting pin enters clutch lever, then back off nut 2 or 3 turns for release bearing freeplay. Connect return spring.

Clutch Removal

Chrysler Corp. Cars - Remove transmission. Pull out release bearing and sleeve Mark cover and flywheel for reassembly Loosen clutch attaching bolts in succession a few turns at a time to release spring tension, then remove clutch assembly

Jeep - Universal Jeep & Dispatcher - Remove transmission, transfer case, and engine (labor will be saved if engine is removed without bell housing), then remove clutch from engine

FC-150 & FC-170 - Remove transmission and transfer case On FC-150, remove bell housing from engine On FC-170, remove flywheel housing pan from bottom of housing On all models, mark pressure plate and flywheel for reinstallation Loosen attaching screws evenly to release spring pressure and prevent distortion of bracket, then remove clutch

Utility - On models with split bell housing, disconnect both front and rear propeller shafts and pull transmission to rear sufficiently to clear transmission drive shaft from clutch, then remove bottom pan from bell housing Mark both pressure plate and flywheel for reassembly, loosen pressure plate-to-flywheel screws evenly in sequence a little at a time to prevent distortion of clutch bracket, and remove clutch

Clutch Overhaul

See 1959 Final Data, Page 332, or later Manual edition and note the following:

Tools - Use Tool C-585A (Chrysler Corp.), C-585C (Jeep)

Release Lever Setting Spacer - No 43 (Chrysler Corp.), No 17 (Jeep).

Clutch Springs - Use correct springs (see table below). Replace all springs that are burned or do not meet specifications.

Clutch Spring Specifications

Car Model	No. & Color	Lbs. Pressure
Chrysler Corp		
170" Engine	3 Black	196 at 1 84"
225" Engine	3 Red	236 at 1.81"
Jeep		
Jeep Std ,FC-150 & 170	3	220-230 at 1 9/16"
Jeep Optl	3	160-176 at 1 13/16"
FC-150 Optl.	3	238-264 at 1 13/16"
Utility 4 Cyl. Std.	3	220-230 at 1 9/16"
Optl	3	160-176 at 1 13/16"
Utility 6 Cyl. Ⓒ Std.	3	220-230 at 1 9/16"
Optl	3	239-264 at 1 13/16"
OHC-6 Engine Std	3	253-281 at 1 13/16"
Optl.	6	152-168 at 1 1/2"

Ⓒ - "L" Head Engine.

LONG MODEL 8½

Comet 6 Cyl. (1963)
Econoline Trucks (1963)
Falcon Cars & Trucks 6 Cyl. (1963)
Fairlane 6 Cyl. (1963) Ⓒ
Meteor 6 Cyl. (1963) Ⓒ

Ⓒ - Standard clutch. Heavy duty clutch is Long CF (semi-centrifugal). *See "Long CF & NC Clutches" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1962-63 FAIRLANE & METEOR CLUTCH PEDAL DOES NOT RETURN FULLY CORRECTION:* If all other adjustments are correct, pedal assist spring may not be passing over-center as required. To correct, elongate retainer hole in spring retainer bracket ½" toward bottom of bracket (on centerline of hole as positioned in car), and install an additional locknut on spring retainer

Description

Single plate, dry disc type of same design used on previous models.

Clutch Pedal Adjustment

Comet & Falcon - Assist Spring Adjustment - Adjust retainer in link so distance from inside radius of spring hook to front face of link is 1 3/16"

Total Travel - Move bumper and bracket as required to secure 6-6½" of travel Make this adjustment before making freeplay adjustment

Freeplay - Loosen pedal-to-equalizer rod nuts and move equalizer bar as required to obtain 7/8-1 1/8" movement of pedal from fully released position until release fingers contact release bearing, then tighten nuts against trunnion without altering adjustment

Econoline - Loosen nut on turnbuckle on release rod and rotate turnbuckle to obtain freeplay or travel of 7/8-1 1/8" measured from fully released position until release fingers contact release bearing Tighten nut *NOTE - When freeplay is correct, total travel will be correct (6-6½").*

Fairlane & Meteor - Disconnect interlock shift rod at interlock shift lever, then measure total travel of clutch pedal *NOTE - Measure distance from steering wheel to clutch pedal with pedal fully released, then again with pedal fully depressed.* If travel not within 6 5/8-6 7/8", move clutch pedal bumper and bracket up or down as necessary *CAUTION - Always check and adjust total travel before checking free travel.* With clutch pedal against its bumper (fully released) distance between assist spring eye centers should be 10". Adjust spring retainer hook length as necessary. With engine idling, depress clutch pedal just enough to take up free travel and note reading on tape (distance between steering wheel and clutch pedal) Difference between this reading and reading with pedal released should be 15/16-1 1/16" If not within specifications, adjust clutch pedal-to-equalizer rod To increase free travel, loosen rearward adjusting nut and tighten forward nut. To reduce free travel, loosen forward nut and tighten rearward nut. Tighten both nuts against trunnion after adjustment With transmission in neutral and interlock pawl snugly engaged, connect interlock rod As a final check, measure pedal free travel with transmission in neutral and engine running at 3000 RPM. If free travel at this speed is not ½", readjust clutch pedal-to-equalizer rod as necessary *CAUTION - Free travel must be exactly as specified.*

►*FAIRLANE & METEOR INTERLOCK LINKAGE NOTE:* If interlock shift linkage does not operate correctly, or if disturbed during clutch linkage and height adjustment, adjustment must be made on interlock linkage *See "Ford & Mercury 3-Speed Synchro-mesh Transmission" in 1962 Final Data, Page 415.*

Removal & Installation

All Models - Remove transmission, then remove starter motor and dust seal. Disconnect retracting spring, then disconnect pedal from equalizer rod at equalizer bar Remove release bearing and hub. Remove flywheel housing and inspection or dust cover. Remove clutch assembly from flywheel

Overhaul

CAUTION - Parts are not furnished and manufacturer recommends that clutch not be disassembled. Replace pressure plate and cover assembly if release levers do not operate freely or if lever heights not equal.

Release Lever Checking - Assemble pressure plate and cover assembly on flywheel with a .250" shim installed in place of regular driven member Use depth gauge or dial indicator to measure height of inner end of each release lever. All levers must be equal within 031" If lever variation greater than 031", replace pressure plate and cover assembly

LONG "CF" & "NC"
CLUTCH COVER ASSEMBLY

BUICK	Long Model	Long Assy. No.
LeSabre, Invicta	11CF	266716
Special	9½CF	260154
OLDSMOBILE		
F-85	9½CF	260154
88	10CF	260225
88,98.Police,Taxi	11CF	260174
	Long Model & Assy. No.	**Ford & Mercury No.**
FORD MOTOR CO. CARS		
170" Eng H D	9½CF 260245	① C20Z-7653-A
223" Eng Std	9½CF 260294	② C1AZ-7653-A
H D	11NC 260186	③ C1AA-7653-F
221",260" Eng.Std	10CF 260251	④ C2OZ-7653-D
H D	10½CF 260259	⑤ C2OZ-7653-B
289' Eng Std.	10½CF 260259	⑤ C2OZ-7653-B
H.D.	10½CF 260344	③ C3OZ-7653-A
352" Engine	11CF 260296	⑥ C1AZ-7653-E
390",406" Engines	11CF 260298	⑦ C2AZ-7653-A
427" Engine	11½CF	⑧ C3AZ-7653-A
	11½CF	⑧⑨ C3AZ-7653-C
		C3AZ-7653-D
FORD TRUCKS		
223" Engine	10CF L5222	⑩ B6A-7653-B
	10½CF 267371	B6C-7653-A
223",262" Engines	11CF-260162	C0TT-7653-A
262",292" Engines	11½CF 260093	C2TZ-7653-B
	12CF 260263	C2TZ-7655-D

① - Green & Orange on Cover, Yellow on Pressure Plate.
② - Black on Cover, White on Pressure Plate
③ - Bronze ④ - Gray
⑤ - Pink ink on Cover, White on Pressure Plate.
⑥ - Pink & Orange on Cover, Aluminum on Pressure Plate
⑦ - Yellow & Green on Cover, Purple on Pressure Plate
⑧ - White on Cover, White & Bronze on Pressure Plate
⑨ - Used with Special Flywheel, No. C3AZ-6375-F.
⑩ - Yellow on Cover, Black on Pressure Plate.

►CHANGES, CAUTIONS, CORRECTIONS

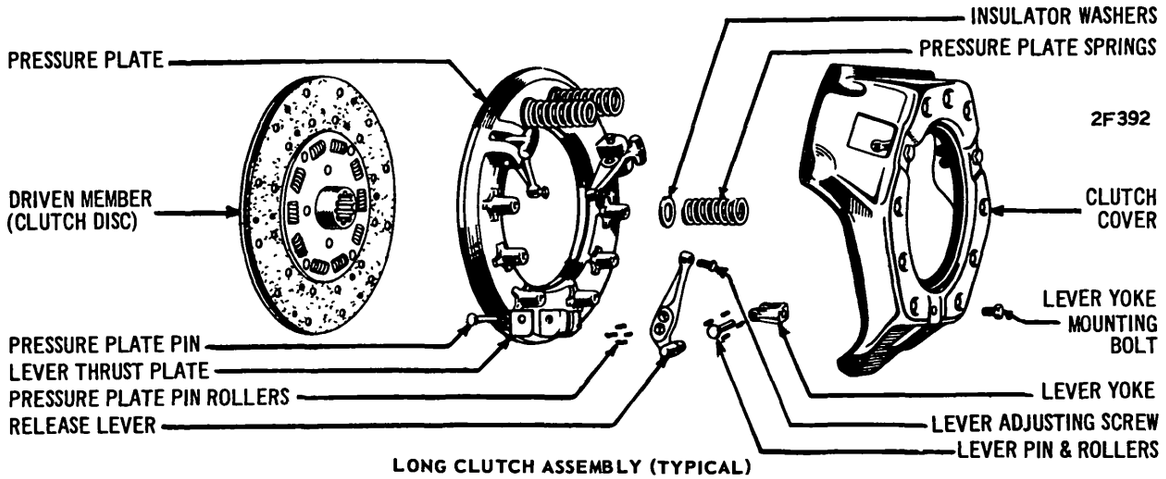
►*1963 BUICK LESABRE CLUTCH BINDING CORRECTION:* May be caused by insufficient lubrication at end of clutch release shaft opposite nylon bushings. To correct, remove clutch, disassemble, and lubricate release shaft

►*1962-63 FAIRLANE & METEOR CLUTCH PEDAL DOES NOT RETURN FULLY CORRECTION:* If all other adjustments are correct, pedal assist spring may not be passing over-center as required. To correct, elongate retainer hole in spring retainer bracket ½" toward bottom of bra cket (on centerline of hole as positioned in car), and install an additional locknut on spring retainer

►*1963 GALAXIE & MONTEREY 427" ENGINE CLUTCH RELEASE SPRING & EQUALIZER INTERFERENCE CORRECTION:* On cars before March 11, 1963, drill a ¼" hole in crossmember 2 75" from existing release spring attaching hole (toward centerline of crossmember) and install spring in the new hole.

DESCRIPTION

Single plate, dry disc type Model CF is semi-centrifugal type Model NC is not centrifugal.



LONG CLUTCH ASSEMBLY (TYPICAL)

LINKAGE & PEDAL ADJUSTMENTS

Buick & Buick Special

Pedal free travel should be 7/8-1" To adjust, pull outer end of clutch fork rearward until throw-out bearing contacts clutch release levers Free movement at outer end of clutch fork should be 3/16". Remove clevis pin from rear of clutch release rod and rotate rod as necessary for proper clutch fork free movement Install clevis pin and check pedal free travel.

Ford Motor Co. Cars

Disconnect interlock shift rod at interlock shift lever, then measure total travel of clutch pedal. *NOTE - Measure distance from steering wheel to clutch pedal with pedal fully released, then again with pedal fully depressed.* If travel not within 6 5/8-6 7/8", move clutch pedal bumper and bracket up or down as necessary *CAUTION - Always check and adjust total travel before checking free travel.* With clutch pedal against its bumper (fully released), distance between assist spring eye centers should be 10". Adjust spring retainer hook length as necessary. With engine idling, depress clutch pedal just enough to take up free travel and note reading on tape (distance between steering wheel and clutch pedal). Difference between this reading and reading with pedal released should be 15/16-1 1/16". If not within specifications, adjust clutch pedal-to-equalizer rod To increase free travel, loosen rearward adjusting nut and tighten forward nut. To reduce free travel, loosen forward nut and tighten rearward nut. Tighten both nuts against trunnion after adjustment. With transmission in neutral and interlock pawl snugly engaged, connect interlock rod. As a final check, measure pedal free travel with transmission in neutral and engine running at 3000 RPM. If free travel at this speed is not ½-1", readjust clutch pedal-to-equalizer rod as necessary *CAUTION - Free travel must be exactly as specified.*

►*INTERLOCK LINKAGE NOTE:* If interlock shift linkage does not operate correctly, or if disturbed during clutch linkage and height adjustment, adjustment must be made on interlock linkage *Se "Ford & Mercury 3-Speed Synchro-mesh Transmission" in 1962 Final Data, Page 415.*

Ford Trucks

F & B Series - Pedal total travel should be 8 1/16-8 5/16". Adjust pedal stop as necessary. Pedal free travel should be 1 3/8-1 1/2". To adjust, back off jam nut on release pushrod and turn spherical nut as necessary- There should be 1/4" clearance between spherical nut and release lever *NOTE - Mak adjustment with retracting spring in plac* . Tighten jam nut.
C Series - Initial pedal free travel before master cylinder pushrod contacts piston should be 5/32-1/4" Adjust eccentric bolt and pedal stop as necessary Disconnect retracting spring and push slave cylinder pushrod as far to front of truck as possible, then pull release lever to rear of truck until release bearing touches pressure plate release fingers. Clearance between slave cylinder pushrod spherical nut and release lever should be 1/4". Loosen jam nut and turn spherical nut as needed. Final free travel should be approximately 2".
P Series - Initial pedal free travel should be 1/16-1/4". Adjust master cylinder pushrod extension as necessary (with pedal retracting spring attached). Now disconnect retracting spring and adjust clearance between slave cylinder pushrod spherical nut and clutch release lever to 1/4" by loosening jam nut and turning spherical nut. Final free travel should be approximately 2".

Oldsmobile

F-85 - Pedal height should be approximately 6½". Pedal free travel should be 7/8-1". To adjust free travel, disconnect clutch lower control rod from release yoke and turn rod in or out of trunnion nut as necessary (bellcrank in horizontal position). Reconnect control rod and check free travel.
88, S88, 98 - Adjust clutch pedal bumper to obtain pedal height of 7 15/16" from top of pedal pad to floor pan (carpet turned back). *NOTE - There must be clearance between clutch releas b llcrank and its stop when adjusting pedal height.* Disconnect pedal bellcrank-to-release bellcrank rod at pedal bellcrank, then move spherical nut on release bellcrank rod forward until clutch release yoke is free. Move pedal

(Continued)

LONG "CF" & "NC" (C nt.)

bellcrank to raised position and adjust connecting rod until holes in clevis and bellcrank are aligned, then shorten rod 3 turns and install in pedal bellcrank Make sure there is 1/32' clearance between release bellcrank and its stop, then turn spherical nut on release bellcrank rod to obtain 1-1½" pedal free travel

CLUTCH REMOVAL

Buick

Special - Remove transmission, then remove flywheel lower housing and throw-out bearing Disconnect release rod from fork and unhook fork boot from flywheel housing opening Free release fork from ball stud (push inward on fork) and remove fork from bottom of housing Mark all clutch parts and flywheel for reassembly and remove clutch assembly *NOTE - Install metal spacers (¼" nuts) between release levers and inner dg of cover to aid removal and installation*
LeSabre, Invicta - Remove transmission and clutch equalizer shaft Disconnect return spring, then remove ball stud from release shaft Remove release lever and seal, and nylon bushing Remove socket head capscrew from release shaft, then remove other screw, and pull release shaft out about 3" Slide release yoke and throw-out bearing from release shaft and remove shaft Mark all clutch parts and flywheel for reassembly and remove clutch assembly *NOTE - Install metal spacers (¼" nuts) between release levers and inner dg of cover to aid removal and installation*

Ford Motor Cars

Remove transmission, then remove starter motor and dust seal Disconnect retracting spring, then disconnect pedal from equalizer rod at equalizer bar Remove release bearing and hub Remove flywheel housing and inspection or dust cover Remove clutch assembly.

Ford Trucks

Remove retracting spring and pushrod at release lever Remove slave cylinder attaching bolts Remove transmission Remove dust cover from clutch housing and remove release bearing and hub from lever Mark pressure plate and cover assembly and flywheel for reinstallation in same position Loosen cover bolts uniformly to relieve spring tension, then remove clutch assembly through opening in bottom of clutch housing

Oldsmobile

F-85 - Remove transmission, lower flywheel housing, and release bearing Mark flywheel and clutch cover for reassembly, then remove clutch assembly
88, S88, 98 - Remove transmission, transmission bearing retainer sleeve, and right and left lower flywheel housing bolts Disconnect adjustable rod at yoke Support rear of engine, then remove rear frame crossmember Remove clutch housing and release yoke from flywheel housing Mark flywheel and clutch cover for reassembly, then remove clutch assembly

OVERHAUL

NOTE - Car manufacturers do not recommend clutch cover and pressure plate assembly overhaul If release lever height not within specifications, or if levers not equal within 031" of each other in height, or if levers do not operate freely with out bind, and cannot be adjusted, replace the assembly Mark all parts for disassembly and reassemble in same relative positions

Disassembly

Place clutch on fixture (supporting pressure plate on special lands under lugs) or on arbor press Compress cover plate slightly, take out assembly screws (lever yoke mounting screws) on cover, release pressure on cover plate slowly, then lift off plate Note if washers are used on yokes under assembly screws (these washers must be reinstalled if old pressure plate used again) See below for replacing release levers

Reassembly

Place pressure plate on fixture or arbor press Assemble pressure springs, locator washers or insulator washers on plate Place washers on lever yokes (if used) Place cover plate in position (lining up marks made before disassembly), compress cover slowly, guiding lever weights through holes in cover and lining up yokes under cover plate holes See that pressure springs are seated, insert cover screws in yokes, using lockwasher under screw head, then tighten screws securely Compress and release clutch several times (using weight on release levers) to seat all parts Adjust release lever heights

Clutch Springs

Pressure springs should agree with specifications listed in table below

Clutch Spring Specifications

Cover Assy.	Springs (No. & Color)	Lbs. Pressure
L5222	9 - Buff (Bronze)	137-147 at 1 747"
260093	12 - Purple	140-150 at 1 677"
260154	6 - Aluminum	200-210 at 1 751"
260162	9 - Pea Green	170-180 at 1 762"
260174	9 - Aluminum	200-210 at 1 751"
260186	3 - Pea Green	170-180 at 1 762"
	6 - Brown & White	154-164 at 1 736"
260225	4 - Buff (Bronze)	137-147 at 1 747"
	5 - Pea Green	170-180 at 1 762"
260245	6 - Aluminum	200-210 at 1 751"
260251	9 - Buff (Bronze)	137-147 at 1 747"
260259	9 - Buff (Bronze)	137-147 at 1 747"
260263	12 - Pink	150-160 at 1 562"
260294	6 - Aluminum	200-210 at 1 751"
260296	9 - Pea Green	170-180 at 1 762"
266716	9 - Aluminum	200-210 at 1 751"
267371	9 - Buff (Bronze)	137-147 at 1 747"

Release Lever Installation

Mount lever yoke on release lever, fasten by inserting flat-sided lever pin (flat side out or toward cover), and roller (place roller on flat side of pin) Insert lever in pressure plate lug, use roller pin sawed off to length of lever width as a guide and insert needle bearings Insert roller pin, pushing guide pin out, lock both lever pins with cotter pins Thread release lever adjusting screws into ends of levers, turning screws down completely

Release Lever Adjustment (Using Borg-Warner Fixture UF-300 & UF-400)

Place special lands on fixture under pressure plate lugs, assemble lever adjusting arm and sleeve, setting bottom of adjusting arm the correct distance as shown in table below, above bottom of sleeve and lock the adjusting arm with the thumbscrew Swing arm over each release lever in turn, back off adjusting screw on lever tip until rounded screw head just contacts arm, lock screws by inverting clutch so screw head is supported and stake or peen lever into adjusting screw slot Do not disturb lever yoke screws when making this adjustment

Lever Height & Adjusting Tool Table

Cover Assy.	Lever Height	① Tool No.
L5222	1 13/16"	One 3D Ring
260093	2 1/8"	Three 3B Spider Post
260162	2 7/32"	None
260174	1 7/8"	None
260186	2 3/8"	One 3X Ind Plate
260225	1 13/16"	One 3D Ring
260245	2 5/16"	One 3X Ind Plate
260251	1 13/16"	One 3D Ring
260259	1 13/16"	One 3D Ring
260263	2 11/32"	None
260294	2 5/16"	One 3X Ind Plate
260344	1 13/16"	One 3D Ring
266716	2 21/32"	② Six 3K5 Height Sleeve
267371	2 1/4"	③

① - In addition to Three 3J Lands (All Models)
② - Under Cover Edge
③ - Six 3K4 Height Sleeves, 3 Pieces of ½"x4¼" Steel Bridging Slots, and One 3X Indicating Plate

Release Lever Adjustment (Without Fixture)

Buick - 1) On a spare flywheel install Adjusting Gauge J-1036 and install clutch on flywheel over gauge so release levers are directly above machined bosses of gauge *NOTE - Gauge thickness at bosses is 295", and height of gauge at hub is 2 1/16"* Install Support J-1013 on hub of adjusting gauge and a dial indicator on support, and zero the indicator With indicator stem bearing on inner end of each release lever in turn, note reading *NOTE - Indicator hand must turn on revolution and read ±.031"* If release lever heights not equal within 031" of each other, adjust as follows: 2) Make sure release lever yoke bolts are tightened to 25 ft lbs Turn each lever adjusting screw up or down as required to obtain "zero" dial indicator reading Remove clutch from flywheel, invert so adjusting screw head is supported and stake or peen lever into adjusting screw slot
Ford Motor Co. (All Models) - Assemble pressure plate and cover assembly on flywheel with a 250" shim installed in place of regular driven member Use depth gauge or dial indicator to measure height of inner end of each release lever All levers must be equal within 031" If lever variation greater than 031", replace pressure plate and cover assembly
Oldsmobile 88, S88, 98 - Install special lever setting Gauge J-1048 on flywheel in place of driven member Mount pressure plate assembly on flywheel, tightening screws one or two turns at a time to prevent distortion of cover Lay short straightedge across center boss of gauge as a guide for positioning levers Bearing surfaces of all lever adjusting screws should be from 000- 062" below level of gauge center boss, and each lever should be within 031" of the other two levers If levers more than 030" out of plane, or do not lie within 000- 062" below center boss, adjust levers as directed under Adjustment With Fixture above

CHRYSLER CORP. (EXCEPT DART & VALIANT) HYPOID

Chrysler & Imperial (1963)
Dodge, Except Dart (1963)℄
Plymouth (1963)℄

℄ - For Dart & Valiant models, see "Dart & Valiant Hypoid" in this section.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 AXLE SHAFT BEARING SEAL PRODUCTION CHANGE, USAGE, & 1962 REPLACEMENT NOTE:* Additional foam gasket, No. 2070933, installed in production on axle shaft for improved bearing sealing. Gaskets are installed one on each side of adjusting shim pack. If no shim pack used due to tolerance stack-up, use one gasket at that end of housing On 1962 & early 1963 cars, install additional 2 gaskets (one on each side) whenever axle shaft bearings removed.

DESCRIPTION

Semi-floating, hypoid gear type with Hotchkiss drive Differential case is "cage" type

AXLE RATIO & IDENTIFICATION

Identification

Axle ratio identification number stamped on identification pad at bottom of carrier housing. "Sure-Grip" differential identified by letter "S" stamped on this pad and by a lubrication caution tag attached to a carrier housing bolt.

Axle Ratio

Both conventional and "Sure-Grip" differentials are available with same ratios. Following ratios are available:

2 76 (47-17)	3.55 (39-11)	4.56 (41-9)
2.93 (41-14)	3.58 (43-12)	4.89 (44-9)
3 15 (41-13)	3.73 (41-11)	5.12 (41-8)
3.23 (42-13)	3 91 (43-11)	5.38 (43-8)
3.31 (43-13)	4 10 (41-10)	5 57 (39-7)
3 42 (41-12)	4.30 (43-10)	5 83 (35-6)
		6 17 (37-6)

SPECIFICATIONS

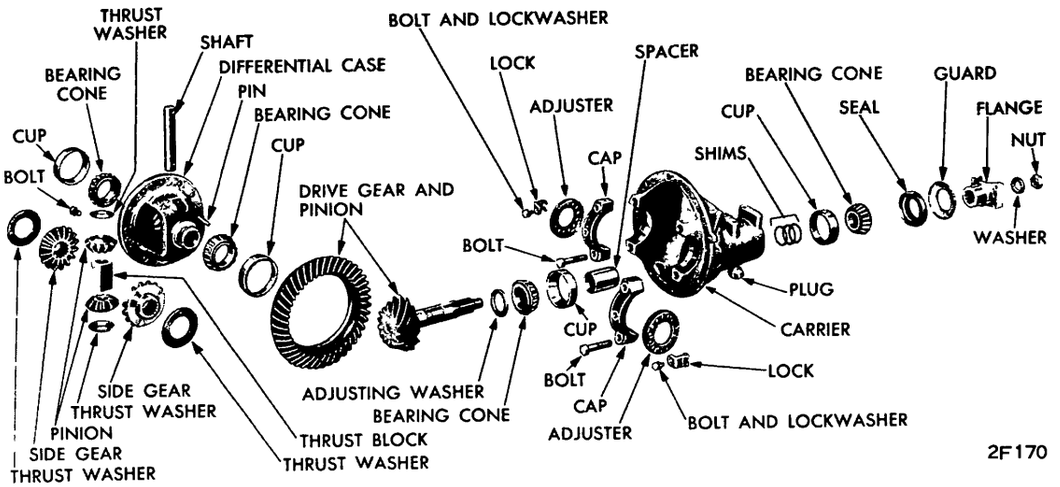
Axle Shaft Endplay	.013- 023"
Diff. Side Gear Clearance ℄	.001-.012"
Pinion Bearing Preload (New Brgs.)	℗ 20-30 Inch-Lbs.
(Used Brgs)	℗ 0-15 Inch-Lbs
Ring Gear & Pinion Backlash	006-.008"
Side Bearing Preload	See Text
Axle Shaft Nuts	145 Ft. Lbs. Min.
Ring Gear Attaching Bolts	60 Ft. Lbs.
Diff Bearing Cap Bolts	85-90 Ft. Lbs
Diff. Brg. Adjuster Lock Screws	15-20 Ft. Lbs.
Companion Flange Nut	240 Ft. Lbs. Min.
Diff. Carrier Attaching Bolts	45 Ft Lbs.

℄ - Between gear and differential case.
℗ - Turning torque.

AXLE SHAFT

Replacement

Remove hub and drum with Tool C-845 *CAUTION - Do not r move drums by hammering on end of axle shaft as damage to bearings and differential thrust block will result.* Use Tool C-745 to protect axle outer seal Pull shaft with Puller C-499 *NOTE - Use of "knock-off" type remover will damage differential thrust block.* Remove axle shaft bearings with Puller C-293-13, inner oil seals with Puller C-637, and brake dust shield outer seal with Driver C-3565. To install, reverse removal procedure and use a foam gasket, No. 2070933, on each side of axle endplay shim pack. Adjust axle shaft endplay.



CHRYSLER CORP. (EXCEPT DART & VALIANT) HYPOID REAR AXLE ASSEMBLY (EXPLODED)

Endplay Adjustment

8¼" Ring Gear - Push both axle shafts in toward center as far as possible. Now push one shaft in as far as it will go Measure the distance the opposite shaft bearing cup is pushed out of axle housing If distance less than .040", no shims needed on that side If distance more than .040", subtract 040" from distance and add shims equal to this result to side just measured, then install brake support plate and a gasket on each side of shim pack. Now push opposite shaft and bearing cup in as far as possible. Add .016" to distance bearing cup is out of housing and add shims to this total to the side being measured. Install brake support plate and a gasket on each side of shim pack. Total axle shaft endplay should be as listed in "Specifications". If not within specifications, change shims as necessary **on side assembled last.**

8¾" Ring Gear - Install shims totaling 040" at one end of axle housing (shims available in 005", .0125", .015", .030" thicknesses). Install axle shaft, bearing, and cup, then, using Tool C-413, drive bearing cup into axle housing until tool bottoms on shims (not on housing flange). Install brake support plate. Install other axle shaft with bearing until inner end of shaft contacts axle shaft thrust block Lightly tap end of axle shaft with a fibre mallet to insure shaft is contacting the thrust block (opposite shaft will be forced away from thrust block to its full travel). Install bearing cup carefully until no axle shaft endplay exists without preloading the bearing (rotate shaft during bearing installation to check against preload) At this point bearing cup will protrude beyond face of axle housing flange Hold Tool C-413 firmly against bearing cup and measure the distance between end of tool and housing flange with a feeler gauge. To obtain correct endplay (see "Specifications"), add .013" shims to the above measurement *NOTE - Hold endplay to high limit rather than low limit.* Compare shim pack thickness on both sides and, if difference exceeds .020", divide the difference to center axle shafts and thrust block Install shim packs with foam gasket on each side and install cups until tool bottoms on shim pack. Install seals and brake support plates. *Axle shaft key must be flush with outboard end of hub.*

REMOVAL & INSTALLATION

Differential Carrier

Remove axle shafts and disconnect rear universal joint, then drop propeller shaft. Remove lubricant with suction gun Remove carrier attaching nuts and remove carrier

OVERHAUL

Disassembly

Before disassembly, remove any endplay in differential side bearings and check ring gear runout (back face of ring gear) through several complete revolutions If runout exceeds .005", check differential case ring gear mounting flange runout after ring gear removed by installing case with bearing cups in carrier, installing bearing caps with bolts tightened lightly, and screwing in adjusters If runout more than 003", replace differential case Note that ring gear attaching screws have left hand threads, turn clockwise to loosen. Differential shaft lock pin on 8¾" gear units can be removed and installed from back side of case only as pin hole is reamed only part way through case. Be sure to use suitable pullers and support plates when disassembling carrier and differential assemblies.

(Continued)

CHRYSLER CORP. (EXCEPT DART & VALIANT) HYPOID (Cont.)

Cleaning & Inspection

Clean and inspect carefully all parts for wear, distortion or damage Replace as necessary. Differential thrust block is usually damaged if "knock off" type axle shaft remover is used Ring gear and drive pinion must be replaced in matched sets only

Reassembly & Adjustments

Differ ntial Ass mbly - With thrust washer on each side gear, install gears in case, then insert each pinion and thrust washer exactly 180° opposite each other so pinion shaft holes in gears and thrust washer are aligned Now rotate side gears 90° so pinion shaft holes in case are exactly aligned with pinion and thrust washer holes Working from lock pin hole side of case, install slotted part of pinion shaft through case, conical thrust washer and just through one pinion gear Install thrust block between pinions with ground sides facing side gears Push pinion shaft in until lock pin hole in shaft is aligned with hole in case, then install lock pin Install ring gear on case flange, start bolts, tap gear on flange, and tighten bolts alternately to specifications Install side bearings on case hubs (taper away from ring gear)

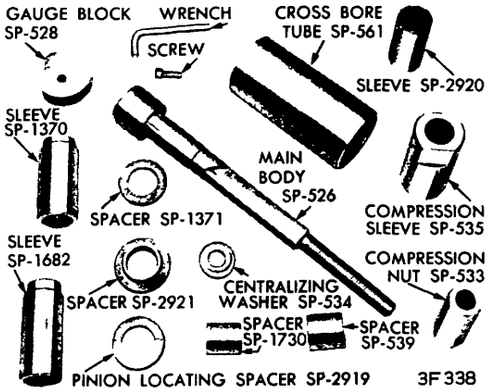
Pinion B aring Preload & Mesh Adjustment - *NOTE - On units with pinion bearing spacer, make preload adjustment first, then mesh adjustment On units without pinion bearing spacer, make mesh adjustment first, then set pinion bearing preload Procedures following are with use of Tool Set C-758 (units with spacer), C-758-D-3 (units without spacer)*

With Pinion B aring Spacer - **1)** Install pinion bearing cups in carrier, then install Spacer SP-3639 (8¼" drive gear), SP-2919 (8¾" drive gear), rear bearing over Main Body SP-526, and insert into carrier Install front bearing Compression Sleeve SP-535, Centralizing Washer SP-534, and Nut SP-533 Tighten nut and rotate tool to seat bearings

2) With tool installed in carrier, remove main screw nut centralizing washer, compression sleeve, and front bearing Install pinion bearing spacer (large bore next to rear bearing) Install Sleeve SP-1730 in front bearing (sleeve flush with rear of bearing), original preload shims over sleeve, then slide sleeve, bearing, and shims over main screw until shims are against spacer Install compression sleeve (square end out), centralizing washer, and main screw nut Turn carrier so nut is up

3) Tighten tool nut to 240 ft lbs and make a complete revolution of assembly while tightening Now rotate assembly several turns in both directions to seat bearings, then recheck torque (may have lessened while bearings aligned)

4) *NOTE - Correct bearing preload reading can be obtained only with carrier nose up* Install an inch-lb torque wrench on tool nut with wrench handle floating, and read torque while wrench is moving through at least one full revolution Reading should be as specified



PINION DEPTH TOOL SET C-758
(SET C-758-D-3 SIMILAR)

(see "Specifications") and should be uniform during full rotations If preload more than specified, use thicker shim under front bearing If less than specified, use thinner shim (Shims furnished in 010", 012", 014", 016", 018" thicknesses) *Do not remove tool*

5) With carrier nose down, install Gauge Block SP-528 (or SP-3250) on end of tool main body (flat part of spacer should face differential bearing pedestals) and offset or large part of spacer toward center of carrier Install Cross Bore Tube (Arbor) SP-561 on differential bearing pedestals, install bearing caps with 002" feeler between cap and arbor and tighten cap bolts securely Choose a gauge washer which will fit between gauge block and arbor Fit must be similar to pull of a feeler gauge that is, snug but not too tight

6) To select proper pinion depth adjusting washer, note mark on end of pinion If mark is minus (-), **add** that amount to thickness of gauge washer selected above If marking is plus (+) **subtract** that amount After proper pinion depth adjusting washer selected, remove tools bearings, and shims from carrier, then make final bearing assembly

Without Pinion Bearing Spacer - **1)** Install Spacer SP-2921 on tool Main Body SP-526 followed by Spacer SP-1730 then install rear bearing over SP-1730 and against SP-2921 Install assembly into carrier, then install front bearing Install tool spacer tool thrust washer, and tool nut on tool shaft, and tighten nut to 25-50 ft lbs Turn tool several revolutions to seat bearings, then check bearing preload which should be 25-50 inch-lbs (for checking pinion depth only)

2) With carrier nose down install Gauge Block SP-528 (or SP-3250) on end of tool main body (flat part of spacer should face differential bearing pedestals) and offset, or large part, of spacer toward center of carrier Install Cross Bore Tube (Arbor) SP-561 on differential bearing pedestals, install bearing caps with 002" feeler between cap and arbor and tighten cap bolts to 10 ft lbs Choose a gauge washer which will fit between gauge block and arbor Fit must be similar to pull of a feeler gauge, that is snug but not too tight

3) To select proper pinion depth adjusting washer, note mark on end of pinion If mark is minus (-), **add** that amount to thickness of gauge washer selected above If marking is plus (+), **subtract** that amount

4) After proper pinion depth adjusting washer selected, disassemble tool from carrier and install spacer just selected between S pacer SP-2921 and rear bearing Install Spacer SP-1730 and preload shims originally used, then insert assembly into carrier Install front bearing, tool spacer, tool thrust washer, and tool nut Tighten nut to 240 ft lbs , then turn tool through several revolutions to seat bearings and recheck torque (may have lessened while bearings aligned) Turn carrier nose up *CAUTION - Correct bearing preload reading can be obtained only with carrier nose up*

5) Install an inch-lb torque wrench on tool nut with wrench handle floating, and read torque while wrench is moving through at least one full revolution Reading should be as specified (see "Specifications"), and should be uniform during full rotations If preload more than specified, use thicker shim under front bearing If less than specified, use thinner shim After proper preload shims selected remove tools bearings and shims from carrier, then make final bearing assembly

Pinion Shaft & Bearing Installation - On pinion shaft install pinion depth adjusting washer (chamfer facing pinion gear) rear bearing, bearing spacer (if equipped) and preload shim pack Lubricate bearings install front bearing in carrier, then install pinion assembly Coat seal bore in carrier with sealer then install seal (lip facing front bearing) with Tool C-3656 until tool bottoms on front bearing *Front face of seal must project 3/32" beyond front face of carrier housing* Install companion flange (Tool C-496 or DD-999) and tighten nut to specifications Rotate assembly several turns in both directions to align bearings then recheck torque (may have lessened while bearings aligned)

Carrier Assembly - Install differential side bearing cups on side bearings then place differential assembly into carrier Install bearing caps and tighten bolts finger tight Install bearing adjusters by hand *NOTE Do not apply high pressure at this time Just square bearing cups with bearings by turning adjusters in until endplay eliminated with some ring gear and pinion backlash* Face each bearing in turn and tighten **left hand** bolt on each bearing cap to specifications

Backlash & Side Bearing Preload Adjustment - **1)** Check backlash at four equally spaced points on ring gear to determine minimum clearance, then mark ring gear at point of minimum clearance *CAUTION - Do not rotate ring gear until adjustments completed* Turn both adjusters equally in same direction until backlash is 0005- 0015" *NOTE - Turn adjusters clockwise only, and do not back off* Install adjuster lock on bearing at back side of ring gear

2) Turn bearing adjuster on tooth side of ring gear inwards 1 notch at a time (a notch is a lock hole) until backlash is as specified (see "Specifications") At this point backlash and side bearing preload will be correct Tighten remaining two bearing cap bolts to specifications install remaining adjuster lock and tighten capscrew to specifications

DART & VALIANT HYPOID

Dodge Dart (1963)
Valiant (1963)

DESCRIPTION

Semi-floating, hypoid gear type with differential carrier integral with rear axle housing

AXLE RATIO & IDENTIFICATION

Identification

Axle ratio identification number stamped on identification pad at bottom of carrier housing

Axle Ratio

The following ratios are available: 2 93-1 (41-14); 3.23-1 (42-13); and 3 55-1 (39-11)

REMOVAL & INSTALLATION

Axle Shaft & Bearing

Remove wheel and drum. Disconnect brake line at wheel cylinder Work through axle shaft flange to remove retainer nuts and use Puller C-3725 to pull axle shaft and rear brake assembly Carefully remove brake assembly from axle shaft without damaging seal contact area Remove seal from housing. Use Puller C-3725 and Adapter C-3926 to remove bearing from axle shaft (when necessary to replace bearing) *NOTE - Remove bearing only if necessary. Bearing is made unfit for for reuse during removal.*

Rear Axle Assembly

Raise car and support body at front of rear springs Block brake pedal up. Remove rear wheels and disconnect hydraulic flex line Disconnect parking brake cable at transmission, and propeller shaft at yoke. Remove spring U-bolts and shock absorbers. Remove rear axle assembly

OVERHAUL

See 1960 Final Data, Page 358, or later Manual edition and note the following:

Specifications

Observ the specifications and torques listed below:

Side Bearing Preload Spread	.003- 006"
Ring Gear & Pinion Backlash	.004-.007"
Pinion Bearing Preload	ℂ 15-25 Inch-Lbs.
Ring Gear & Case Runout	.005" Max.
Axle Shaft Retainer Nuts	35 Ft. Lbs
Ring Gear Attaching Bolts	55 Ft Lbs.
Differential Side Bearing Bolts	40 Ft. Lbs
Companion Flange Nut	240 Ft. Lbs. Min.
Carrier Housing Cover Bolts	20 Ft. Lbs.
Propeller Shaft Bolts (Front)	,32 Ft. Lbs.
(Rear)	15 Ft. Lbs.
Rear Spring U-Bolt Nuts	. 45 Ft. Lbs. Max.

ℂ - Turning torque.

Procedures

Observe reassembly procedures in the following order: Assemble differential case and lay aside, then install pinion bearings and make pinion depth and pinion bearing preload adjustments *NOTE - Initial pinion bearing preload when setting pinion depth should be 15-25 inch-lbs. of turning torque.* Now make differential side bearing preload and ring gear and pinion backlash adjustments as follows:

Side Bearing Preload & Backlash Adjustment

Following procedures supersede previous recommendations for both 1962 and 1963 cars for more accurate and faster assembly.

1) Install differential (with bearings) and a .254" preload spacer on left side into carrier. Make sure assembly properly seated DO NOT install bearing caps. Install a preload spacer on right side so there will be some endplay. Push differential to left, and insert equal thickness feeler gauges between preload spacer and casting on right side at each bearing cap bolt location When both sets of gauges produce a hard drag, rotate differential several times in each direction to seat bearings. After bearings seated, increase each feeler gauge thickness to give zero endplay Install left bearing cap and tighten bolts firmly to maintain alignment.

2) Determine total thickness of feeler gauge and trial spacer on right side. Measure ring gear backlash. Using "Preload Spacer Table" below, select proper spacers right and left sides as follows: Add or subtract as indicated, according to measured backlash, from the 254" left spacer and from the total of right spacer and feeler gauge. The result will be the correct thickness spacer for each side. *NOTE - If backlash measured above is more than .020" (maximum table figur), increase left spacer thickness from .254" to a thickn ss great enough to reduce backlash within table limits*

Preload Spac r Tabl

Backlash	Spacer Change Left	Right	Backlash	Spac r Change Left	Right
.020"	+.026"	- 016"	010"	+.012"	-.002"
.019"	+.024"	- 014"	009"	+ 010"	-.000"
018"	+ 022"	- 012"	008"	+ 008"	+.002"
017"	+.022"	- 012"	007"	+.008"	+.002"
016"	+ 020"	- 010"	.006"	+.006"	+.004"
.015"	+ 020"	-.010"	005"	+.004"	+.006"
014"	+ 018"	-.008"	004"	+.002"	+.008"
013"	+ 016"	-.006"	003"	+ 002"	+.008"
012"	+.014"	-.004"	002"	000"	+.010"
011"	+ 014"	-.004"	.001"	.000"	+.012"

3) Spread carrier housing with Spreader Tool C-3721 *NOTE - Use dial indicator to measure spread. Do not spread housing more than .020".* Remove differential and reinstall with correct preload spacers, remove spreader and dial indicator, install bearing caps and tighten cap bolts to specified torque

4) Measure ring gear backlash at four equally spaced points on ring gear, then locate dial indicator at point of minimum backlash and do not move ring gear until adjustment completed. If backlash not within specifications, change preload spacer thickness on both sides. *CAUTION - A change in on spac r must be compensated by an equal change in other spacer. Total thickness of both spacers must be the same after backlash adjustment as it was before.* Make a gear tooth pattern test, then install case cover and tighten screws to specifications

FORD & MERCURY "DEEP-OFFSET" HYPOID

Falcon V8 (1963)ℂ
Fairlane (1963)
Galaxie (1963)
Ford Econoline Trucks (1963)ℭ
Ford F & P-100 Trucks (1963)ℭ
Comet V8 (1963)ℂ
Meteor (1963)
Monterey (1963)
Thunderbird (1963)

ℂ - *For 6 Cyl. mod ls, s "C m t, Falcon, Econolin Hypoid" in this s ction.*
ℭ - This separate carrier type may be found on some models.
ℭ - Spicer Model 44 used with Equa-Lock Differential.

►CHANGES, CAUTIONS, CORRECTIONS

►*RING GEAR & PINION INSTALLATION CAUTION:* Some ring gear and pinion assemblies may be of the "non-hunting" type (pinion gear teeth mesh with the same ring gear teeth). It is important that marked tooth on pinion gear be meshed with marked tooth on ring gear if marks are found on assembly

►*1963 REAR AXLE TORQUE SPECIFICATION CHANGE NOTE:* Some rear axle torque specifications have been revised. See "Torque Specifications" below for latest torques. *Do not exceed maximum limits or threads may be stripped.*

►*1961-63 DRIVELINE NOISE & VIBRATION OR AXLE START-UP "GROAN" CORRECTION:* May be corrected by installing torsional damper type companion flange

►*1962-63 GALAXIE & MONTEREY PROPELLER SHAFT-TO-FLOOR PAN INTERFERENCE CORRECTION:* Make sure proper pinion nose bumper is installed and that there is a 150" shim (washer) under bumper and locknut.

DESCRIPTION

Banjo type housing, semi-floating hypoid gear type with "deep-offset" straddle mounted drive pinion, separate differential carrier, and Hotchkiss drive

AXLE RATIO & IDENTIFICATION

Identification

Ratio code stamped under AXLE on car patent plate Ratio also stamped on a tag under a carrier attaching bolt

(Continued)

FORD & MERCURY "DEEP-OFFSET" HYPOID (C nt.)

Axl Ratios

Standard Rati s - The followmg standard ratios are available:

Axl Rati s	Ratio Code
3 00 (39-13)	1 or A
3 22②	10
3 25 (39-12)	4 or D
3 50 (35-10)	5 or E
3 70 (37-10)②	11
3 80 (38-10)	7 or G
3 89 (35-9)	12②, 8 or H
4 11 (37-9)	13②, 9 or I

① - Number indicates Conventional Differential, letter indicates Equa-Lock Differential ② - Truck

High Performanc Ratios - The following special high performance axle ratios are available

3 40 (34-10)	4 71 (33-7)	5 43 (38-7)
4 29 (30-7)	4 86 (34-7)	5 67 (34-6)
4 57 (32-7)	5 14 (36-7)	5 83 (35-6)

AXLE SHAFT

Axle Shaft Removal

Remove wheel and tire assembly, then remove brake drum Work through hole in axle shaft flange to remove wheel bearing retainer nuts Pull axle shaft with suitable adapter and a slide hammer Install one backing plate nut to hold plate in position

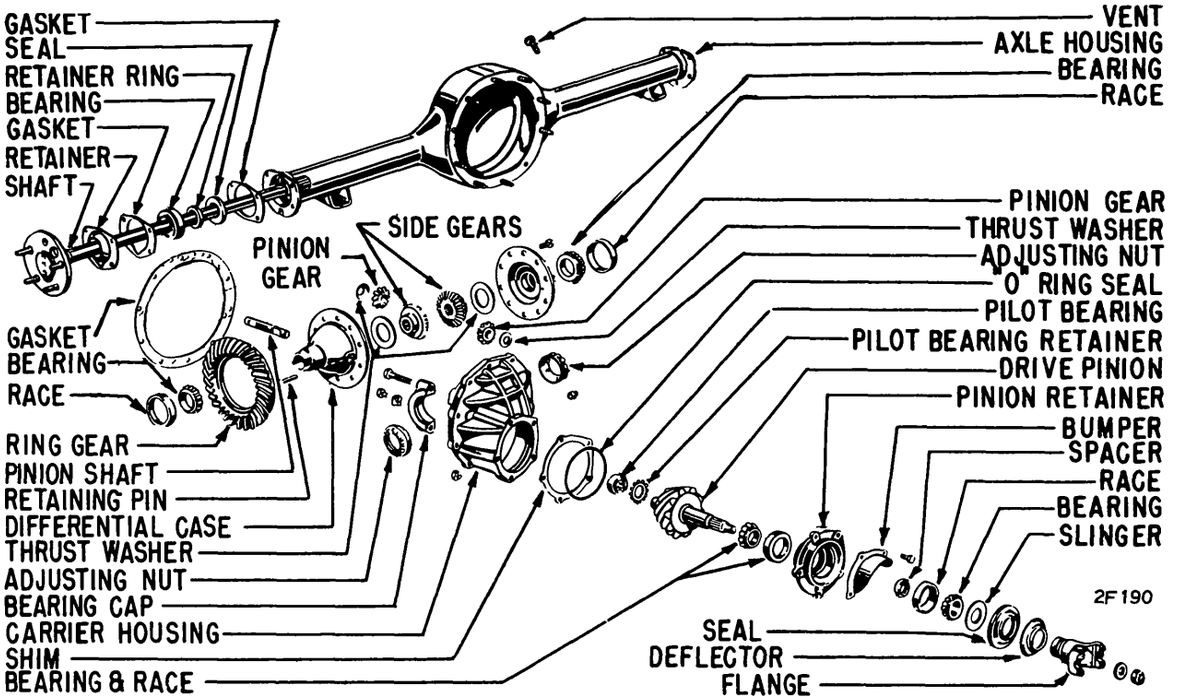
Bearing & Seal Replacement

TOOL NOTE - Tool Set T60K-1225-A is available When servicing axle shaft and bearing, use suitable pullers, adapters, supports, and other tools which will properly remove and install parts without distortion or damage Nick bearing retainer with a chisel to loosen it for removal from shaft Remove bearing by pressing or pulling it from shaft Install bearing and retainer with same tools used for removal *CAUTION - Bearing must seat firmly on axle shaft retainer Do not press bearing and retainer on shaft at the same time* Remove seal with suitable tool which will grip inside of seal Install seal with suitable tool which will bear around outside diameter of seal Use oil resistant sealer on outside of new seal

REMOVAL & INSTALLATION

Companion Flange or Seal

Remove pinion bumper bracket and disconnect propeller shaft Mark pinion nut, pinion shaft, and companion flange for proper installation and alignment Remove pinion nut, flat washer, companion flange, and pinion seal Coat outer edge of new seal with oil-resistant sealer after soaking seal in SAE 10W engine oil for ½-hour Install seal squarely into carrier, then re-install companion flange, washer, and pinion nut Keep all parts aligned with marks made at disassembly, and tighten pinion nut until marks are aligned *CAUTION - Check pinion bearing preload before installing propeller shaft If not as listed under "Specifications", new preload spacer may have to be installed*



FORD MOTOR CO. "DEEP-OFFSET" HYPOID REAR AXLE ASSEMBLY (EXPLODED)

Differential Carrier

Remove propeller shaft and both axle shafts Place a pan under axle to catch lubricant, remove carrier attaching bolts, and remove carrier To install, reverse removal procedure and tighten carrier attaching bolts to 30-40 ft lbs

SPECIFICATIONS

Adjustment Specifications

Ring Gear Backlash -	Falcon, Comet	008- 012"
	Fairlane, Meteor	008- 012"
	Galaxie, Monterey	004- 009"
	T-Bird, Trucks	004- 009"
Diff Side Bearing Preload		2½-3 Notches Tight
Pinion Depth Setting		① 020" Nominal Shim
Pinion Nut Torque		175 Ft Lbs

① - Shims furnished from 010" to 029" thick in 001" increments

Pinion Bearing Preload

Seal No. B8A-4676-B (Leather)	Inch-Lbs.
New Bearings	17-27
Used Bearings	8-12
Seal No. C2AZ-4676-A (Rubber & Felt)	**Inch-Lbs.**
New Bearings, New Seal	22-32
New Bearings, Used Seal	16-26
Used Bearings, New Seal	13-17
Used Bearings, Used Seal	8-12

Torque Specifications

Item	Ft. Lbs.
Ring Gear Bolts	① 65-80
Diff Bearing Cap Bolts	
Falcon, Comet, Fairlane, Meteor②	① 55-70
Galaxie, T-Bird, Monterey, Trucks③	① 70-85
Diff Bearing Adjuster Locknuts	① 12-25
Pinion Retainer Screws	① 30-45
Carrier Attaching Bolts	30-40

① - Supersedes previous specifications
② - Except 289" 4-Bbl Engine
③ - Including 289" 4-Bbl Engine

OVERHAUL

TOOL NOTE - Special tool sets are available for servicing rear axle assemblies Be sure to use suitable pullers, adapters, supports, and other tools which will properly remove and install axle parts without distortion or damage

Disassembly

1) Mark differential bearing caps for reassembly, then remove caps, adjusting nut locks, and adjusting nuts Remove differential assembly from carrier Remove side bearings from case with suitable puller Remove ring gear attaching bolts and tap ring gear from case **2)** On 2-pinion differential assemblies, drive out differential pinion shaft retaining pin and separate the case Drive out pinion shaft with a brass drift and remove side gears, washers, and pinions

(Continued)

FORD & MERCURY "DEEP-OFFSET" HYPOID (Cont.)

3) On 4 pinion differential assemblies drive out the three differential pinion shaft retainers with a drift and separate case Drive out long pinion shaft from end opposite retainer hole Remove the two short pinion shafts, driving each from center outward Lift out center block and remove gears and thrust washers
4) Remove pinion shaft nut companion flange, seal and slinger from carrier, then remove pinion shaft and bearing retainer Note thickness of shim between bearing retainer and housing Remove pilot bearing and retainer from housing with suitable driver Press pinion front and rear bearings from pinion shaft Press bearing cups from bearing retainer with suitable tool *NOTE - Replace pinion bearing cups only if worn or damaged*

Reassembly & Adjustment

NOTE - Lubricate all parts with rear axle lubricant during assembly procedures
1) On 2-pinion differential assemblies install a side gear and thrust washer in differential case bore then drive pinion shaft into case just far enough to hold a pinion thrust washer and pinion gear Install the other pinion gear and washer and drive pinion shaft into final position Make sure pinion shaft retainer holes are aligned Install other side gear and washer, install case cover and retainer pin Make sure differential gears rotate freely Install ring gear and tighten bolts to specifications Install side bearings with suitable tool
2) On 4-pinion differential assemblies place a thrust washer and side geaf in differential case bore Install four thrust washers and place pinion gears on side gear Align washers and pinion gears with pinion shaft holes in case Install center block so the four small diameter holes are aligned with holes in pinion gears and case Use brass drift to drive in the two short pinion shafts from outside of case *NOTE - Align shaft retainer holes as each shaft is driven into place* Drive long pinion shaft into place from retainer hole end of case (align shaft retainer hole with that in case) Place second side gear and thrust washer on top of the four pinion gears, then install case cover so that the three shaft retainer holes in cover align with their corresponding holes in case Install the three shaft retainer pins with a drift A pinion or axle shaft can be inserted in the side gear spline to check for free movement of gears Install ring gear and tighten bolts to specifications Install side bearings with suitable tool

OIL SCOOP NOTE - On units with a sheet metal oil scoop on differential case, be sure oil holes in scoop and feed holes in case are aligned during reassembly

SHIM THICKNESS TABLE

New Pinion Marking	Old Pinion Marking								
	−4	−3	−2	−1	0	+1	+2	+3	+4
+4	+0 008	+0 007	+0 006	+0 005	+0 004	+0 003	+0 002	+0 001	0
+3	+0 007	+0 006	+0 005	+0 004	+0 003	+0 002	+0 001	0	−0 001
+2	+0 006	+0 005	+0 004	+0 003	+0 002	+0 001	0	−0 001	−0 002
+1	+0 005	+0 004	+0 003	+0 002	+0 001	0	−0 001	−0 002	−0 003
0	+0 004	+0 003	+0 002	+0 001	0	−0 001	−0 002	−0 003	−0 004
−1	+0 003	+0 002	+0 001	0	−0 001	−0 002	−0 003	−0 004	−0 005
−2	+0 002	+0 001	0	−0 001	−0 002	−0 003	−0 004	−0,005	−0 006
−3	+0 001	0	−0 001	−0 002	−0 003	−0 004	−0 005	−0 006	−0 007
−4	0	−0 001	−0 002	−0 003	−0 004	−0 005	−0 006	−0 007	−0 008

3) Install new pinion bearing cups in bearing retainer, making sure cups are fully seated (if 0015" feeler can be inserted between cup and bottom of bore cup is not seated correctly) Install pilot bearing into carrier housing until bearing bottoms in bore Install **new** pilot bearing retainer with concave (lip) side up Press rear pinion bearing onto pinion shaft

4) Determine pinion depth shim thickness as follows If same ring gear pinion and carrier housing being reused use same shim pack as originally installed If new ring and pinion gear set being installed, measure thickness of original shim note markings on both old and new pinions then refer to "Shim Thickness Table" to determine change to be made to **original** shim pack If original shim pack lost or new carrier housing being installed, use nominal 020" shim and use shim table to determine necessary changes

5) Install **new** collapsible pinion preload spacer on pinion shaft then install bearing retainer, and front bearing Press front bearing into position being careful not to crush spacer Install "O" ring in pinion retainer groove, install selected depth shim on carrier housing, then install pinion and pinion retainer and tighten bolts to specifications Put slinger on pinion shaft, coat outside edge of new seal with sealer (soak seal in SAE 10W engine oil for ½-hour before installation), and install seal in bearing retainer Install companion flange, washer, and pinion nut Tighten pinion nut to correct torque while rotating pinion to seat bearings, until proper pinion bearing preload is obtained (see "Specifications")

6) Place cups on differential side bearings and set differential case in carrier Slide the assembly along bores until a slight amount of backlash is felt between gear teeth Set adjusting nuts in bores so nuts just contact bearing cups (each cup should be engaging approximately the same number of threads) Carefully position bearing caps on carrier, matching the marks made at disassembly Install bearing cap bolts and tighten alternately to correct torque, then loosen and retighten to 20 ft lbs
7) Loosen adjusting nut on pinion gear (right hand) side until it is away from cup Tighten nut on ring gear (left hand) side until ring gear is just forced into pinion with no backlash (recheck right hand nut to make sure it is still loose) Tighten right hand nut 2 notches beyond the position where it first contacts bearing cup Rotate ring gear several revolutions in each direction while bearings are loaded to seat bearings *CAUTION - This step is very important to insure proper seating of bearings* Again loosen right hand nut to release the preload If there is any backlash between gears tighten left hand nut just enough to remove this backlash Carefully tighten right hand nut until it just contacts bearing cup, and continue to tighten to specifications (see above)
8) Install dial indicator on carrier so contact tip of indicator bears against face of a gear tooth on outer diameter of ring gear Measure backlash at several positions on ring gear If measurements vary more than 003", there is excessive runout in gear or mounting If backlash not correct (see "Specifications"), loosen one adjusting nut and tighten opposite nut an equal amount to move ring gear away from or toward pinion *NOTE - When moving the adjusting nuts, the final movement should always be made in a tightening direction For example, if nut must be loosened one notch, loosen the nut two notches and tighten it one notch*
9) As a final step to make sure adjustments and assembly are correct, make a gear tooth contact pattern check, and make any adjustments in pinion depth shim or gear backlash as necessary

COMET, FALCON & FORD ECONOLINE (6 CYL.) HYPOID

C m t 6 Cyl. (1963)①
Falc n 6 Cyl. Cars & Trucks (1963)①
F rd Ec n line Trucks (1963)②

① - *For rear axl used on V8 models, see "Ford & M rcury Deep-Offs t Hyp id" in this section.*
② - Some trucks may have "separate carrier" type rear axle assembly *For data, see "Ford & Mercury D ep-Offs t Hypoid" in this section*

►CHANGES, CAUTIONS, CORRECTIONS

►*RING GEAR & PINION INSTALLATION CAUTION:* Some ring gear and pinion assemblies may be of the "non-hunting" type (pinion gear teeth mesh with the same ring gear teeth) It is important that marked tooth on pinion gear be meshed with marked tooth on ring gear if marks are found on assembly

►*1963 REAR AXLE TORQUE SPECIFICATION CHANGE NOTE:* Some rear axle torque specifications have been revised See "Torque Specifications" below for latest torques *Do not xc d maximum limits or threads may be stripp d.*

DESCRIPTION

Semi-floating, hypoid gear type with an integral type housing and Hotchkiss drive. Design is same as used on previous models

AXLE RATIO & IDENTIFICATION

Identification

Ratio code stamped under AXLE on car patent plate, and may also be stamped on a tag under a housing cover bolt .

Axle Ratios

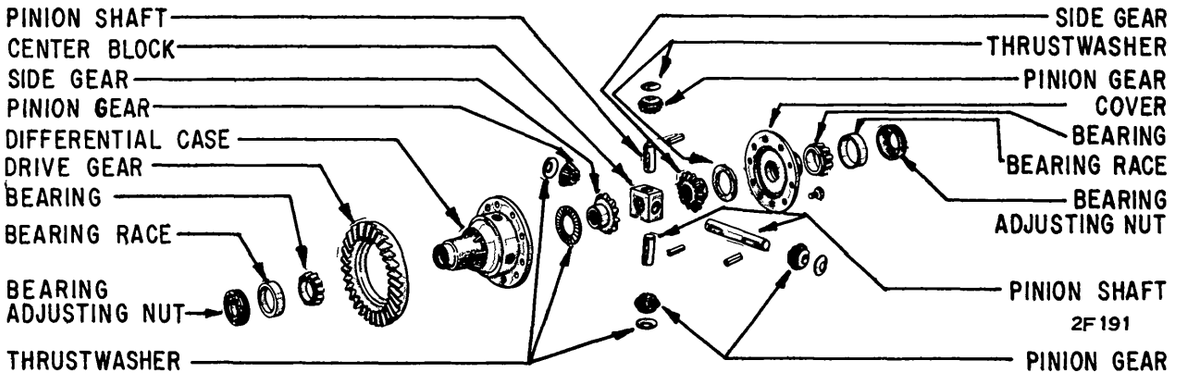
Axl Rati		① Ratio Code
Comet & Falcon	3 10 (31-10)	2
	3 20 (32-10)	3
	3 50 (35-10)	5
	4 00 (36-9)	9
Econoline	3 50 (35-10)	01
	4 00 (36-9)	02
	3 80	03
	4.50	04

① - Stamped on vehicle patent plate under AXLE

AXLE SHAFT

Axle Shaft Removal

Remove wheel assembly from brake drum, then back off rear brake shoe adjustments Remove brake drum-to-axle shaft flange nuts and remove drum. Disconnect wheel bearing retainer (work through hole in axle shaft flange), and remove axle shaft from housing with a suitable sliding hammer type puller. *Us car not t dislodg brake backing plate (use a nut to hold plate in position aft r shaft r moved).* To install, reverse removal procedure and tighten bearing retainer nuts to 30-35 ft. lbs



FORD ECONOLINE TRUCK DIFFERENTIAL CASE (EXPLODED)
(COMET & FALCON SIMILAR)

Bearing & Seal Replacement

Remove seal from axle housing with a suitable puller To remove bearing from shaft, nick bearing retainer deeply with a chisel, using care not to damage shaft, and remove retainer Press bearing from axle shaft using an arbor press and a suitable tool to hold and support bearing. When installing seal in axle housing, coat outside edges of new seal with sealing compound, then install seal in housing with Tool 1177-B (Comet), T62P-1177-A (Falcon), T61E-1190-B1 (Econoline) making sure sealing lips are inward and that seal is seated against shoulder in housing Install outer bearing race on shaft, then press new bearing on shaft, seating it firmly against shoulder Press a new bearing inner retainer on shaft, seating it firmly against bearing *CAUTION - Do not try to press bearing and inner retainer on shaft at the same time.*

REMOVAL & INSTALLATION

Axle Housing Assembly

Raise vehicle and support on underbody, then loosen housing cover and drain lubricant. Disconnect drive shaft at pinion flange and shock absorbers at axle housing Remove both axle shafts (see above) Remove hydraulic brake "T" connection from housing (do not open system), then remove brake line from retainer clip on housing Remove both brake backing plates from housing and tie out of way, being careful not to damage brake lines or cables Support axle housing on a jack, then remove spring plates and "U" bolts Remove axle assembly from under car To install, reverse removal procedure

OVERHAUL

See 1960 Final Data, Page 352, or later Manual edition, and note the following:

Torque Specifications

Item	Ft. Lbs.
Housing Cover Bolts	10-17
Differential Bearing Capscrews	① 40-55
Differential Bearing Adjuster Locknuts	① 12-25
Ring Gear Attaching Bolts	① 40-55

① - Supersedes previous specifications

Adjustment Specifications

Ring Gear & Pinion Backlash - 006- 010" (Comet & Falcon), 008- 012" (Econoline)
Pinion Depth Setting - Nominal pinion depth setting is 018" (018" shim required). Shims furnished from 008" to 024" thick
Differential Bearing Preload - 2-3 notches tight (Falcon & Econoline), 1-2 notches tight (Comet with Light Carrier), 1-1½ notches tight (Comet with Heavy Carrier)
Drive Pinion Seal Installation - Soak new seal in SAE 10W engine oil for ½-hour before installation.
Pinion Bearing Preload - Minimum torque on pinion flange nut should be 140 ft lbs to obtain pinion bearing preload as listed in table below:

Pinion Bearing Preload Specifications

Comet & Falcon	Inch-Lbs.
New Bearings	17-27
Used Bearings	6-12
Econoline	**Inch-Lbs.**
New Bearings, New Seal	22-32
New Bearings, Used Seal	16-26
Used Bearings, New Seal	13-17
Used Bearings, Used Seal	8-12

2-Piece Differential Case

Disassembly - Use a suitable puller and remove differential side bearings, then remove bolts attaching drive gear to case Press drive gear from case or tap off with hammer On passenger cars, drive out single pinion shaft retainer and separate 2-piece differential case . Drive out pinion shaft with a brass drift and remove gears and thrust washers. On Trucks, drive out the three pinion shaft retainers and separate differential case With a brass drift, drive out long pinion shaft (drive from end opposite retainer hole), then remove two short pinion shafts (use a brass drift and drive from center outward) Lift out center block, then remove gears and thrust washers.
Reassembly - *Lubricate all parts with rear axle lubricant as th y are assembled.* 1) On passenger cars, place a thrust washer and side gear in differential case bore Drive pinion shaft into case with a soft

(C ntinued)

COMET, FALCON & FORD ECONOLINE (6 CYL.) HYPOID (C nt.)

hammer far enough to support a pinion thrust washer and pinion gear, then install thrust washer and slide pinion gear onto shaft and mesh with side gear Place second pinion gear and thrust washer in position, and drive pinion shaft all the way into position *NOTE - Be sure to align the shaft retainer holes as shaft is being driven in* Place second side gear on top of two pinion gears then position thrust washer and install differential cover so shaft retainer hole in cover is aligned with hole in case

2) On truck models, place a thrust washer and side gear in differential case bore Install four pinion thrust washers, and place pinion gears on side cover, then align washers and pinion gears with pinion shaft holes in case Install center block so that four small diameter holes in block are aligned with holes in pinion gears and with holes in case Use a brass drift and drive the two short Pinion shafts into center block, being sure to align shaft retainer holes as each shaft is driven into place Drive long pinion shaft into place from retainer hole end of case, being sure to align retainer hole with hole in case Place second side gear and thrust washer on top of the four pinion gears and install differential case cover so that the three shaft retainer holes are aligned with holes in case

3) On all models, install shaft retainer pins with a drift (one on passenger cars and three on truck models) *NOTE - A pinion or axle shaft spline can be inserted in side gear spline to check for free rotation of differ ntial gears* Place drive gear on case and tighten bolts to specifications

FORD TRUCK "BANJO HOUSING" HYPOID

F, B, N, P-500, 600; C550, 600 (1963)

DESCRIPTION

Full-floating, hypoid gear type with Hotchkiss drive Differential carrier is multiple casting type having a separate drive pinion carrier

AXLE RATIO & IDENTIFICATION

Identification

Ratio code stamped under AXLE on truck patent plate On Timken axles, ratio (and model information) stamped on serial number plate on right rear face of axle housing above brake line On Eaton axles ratio (and carrier assembly number) stamped on pad on top surface of carrier housing

Axle Ratios

Truck Model	Axle Model	℄ Code	Ratio
F,B,N,P-500	Timken C-100	30	5 29
		32	6 20
		34	6 80
F,B,N,P-500,C-550	Timken D-100	41	5 83
		42	6 20
		44	6 80
C-600	Timken F-104	52	6 20
		54	6 80
F,B,N,C-600	Timken F-106	62	6 20
		64	6 80
		66	7 20
F,B,N C-600	Eaton 1614-15	73	6 50
		75	7 17

℄ - Stamped on truck patent plate under AXLE

REMOVAL & INSTALLATION

Axle Shaft

Remove axle shaft stud nuts and lockwashers Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels Pull axle shaft from housing To install, place gasket in position on housing and install axle shaft Install tapered dowels, lockwashers and nuts on studs Tighten nuts to 50-70 ft lbs

Differential Carrier

Remove axle shafts (see above), disconnect drive shaft at rear joint flange Support carrier assembly and remove carrier attaching bolts Tighten puller screws (if provided) to loosen carrier from housing Remove carrier

WHEEL BEARINGS

Adjustment

Remove axle shafts (see above) Torque adjusting nut to 50-80 ft lbs while rotating wheel in both directions When bearing rollers are firmly seated, back off adjusting nut 3/8-turn and install lockwasher *If adjusting nut has a locking dowel, dowel must enter lockwasher hole closest to dowel If lockwasher has tabs, bend a tab over adjusting nut* Torque locknut to 100-150 ft lbs Wheel must still rotate freely and with 001-010" endplay Bend a lockwasher tab over locknut (if equipped) then install axle shaft

OVERHAUL

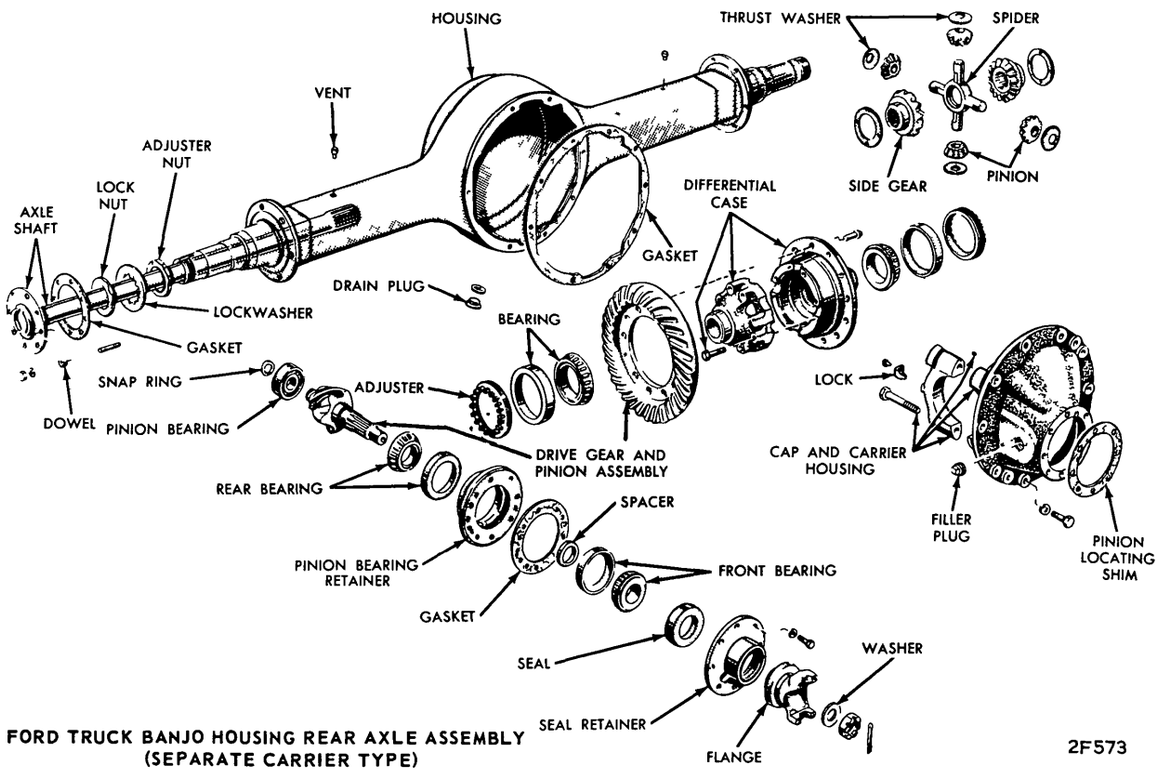
See 1956 Final Data, Page 337, or later Manual editions, and note the following

Ring Gear & Pinion Backlash - 006- 012" (Timken), 008- 015" (Eaton)

Differential Bearing Preload Adjustment - 2 notches (Timken), 1½-2 notches (Eaton) tight from zero end-play position

Pinion Bearing Preload - 5-15 inch-lbs (Timken), 15-35 inch-lbs (Eaton)

Pinion Shaft Nut Torque - 300-400 ft lbs (Timken), 325-450 ft lbs (Eaton)



FORD TRUCK BANJO HOUSING REAR AXLE ASSEMBLY (SEPARATE CARRIER TYPE)

2F573

FORD TRUCK "INTEGRAL HOUSING" HYPOID

F-100 With P w r-L ck Diff r ntial (1963) ℂ
F-250, 350; P-350. 400 (1963)

ℂ - *For Conventional Axle, see "Ford Motor Co Deep-Offset Hypoid" in this section*

DESCRIPTION

Spicer Models 44, 60, and 70 Full-floating hypoid gear type with Hotchkiss drive This axle does not have a separate carrier assembly

AXLE RATIO & IDENTIFICATION

Identification

Ratio code stamped under AXLE on truck patent plate Ring gear and pinion tooth combination stamped on ratio tag on axle housing cover Power-Lock differential has lubrication caution tag attached to a cover bolt

Axle Ratios

Truck Mod l	Spicer Model	ℂ Code	Ratio
F-100, 250	44	② A1	3 73 (41-11)
		② A2	3 92 (47-12)
F-250, P-350	60	05	4.10
		24	4 56 (41-9)
		26	4 88 (39 -8)
		② B4	4 56 (41-9)
		② B6	4 88 (39-8)
F-350; P-350,400	70	22	4 88 (39-8)
		23	5 13 (41-8)
		29	5 87 (47-8)

ℂ - Stamped on truck patent plate under AXLE

② - Power-Lock Differential

REMOVAL & INSTALLATION

Axle Shaft & Bearing

Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing Remove axle shaft stud nuts Loosen dowels by striking drift at center of flange and remove dowels and axle shaft Remove seal assembly from studs and wiper from housing tube (if so equipped) Remove locknut lockwasher and adjusting nut Place wheel type jack under wheel and relieve load on bearings Remove outer bearing cone and pull wheel off axle Use hard wood block to drive outer bearing cone and inner seal out of hub If bearing cups to be replaced, drive them out with a drift Use Tool T53T-1239-A and Detail 17 to replace cups *NOTE - Pack bearing grease on both sides of each cup* Place each bearing cone and roller assembly into wheel hub, then install new inner seal with Tool T53T-1175-D (F-250,P-350), T53T-1175-B (F-350) Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal Install outer bearing cone and adjusting nut Torque adjusting nut to 50-80 ft lbs while rotating wheel in both directions, then back off nut 3/8-turn and install lockwasher *NOTE - When adjusting nut has locking dowel, dowel must enter lockwasher hole closest to dowel Wh n quipped with tabs, run locknut against lockwasher and bend tab over nut* Torque locknut to 100-150 ft lbs Wheel should rotate freely with 001- 010" endplay Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets as removed), then install axle shaft

Rear Axle Assembly

Loosen wheel stud nuts and axle shaft nuts Disconnect rear shock absorbers from spring seat caps Raise rear end of truck frame to remove weight from springs and place stands under frame Disconnect hydraulic line at frame, parking brake cable (if so equipped) at equalizer, and remove cables from support brackets Disconnect drive shaft at universal joint and remove nuts from "U" bolts and remove spring seat caps Roll axle from truck and drain lubricant

OVERHAUL

See 1957 Final Data, Page 324, or later Manual editions, and note the following:

Ring Gear & Pinion Backlash - 008- 013" (Model 44 & 60), 005- 010" (Model 70) and must not vary more than 002" (Model 44 & 60), 003" (Model 70) between positions checked

Pinion Depth Setting - After pinion is installed in housing and preload is within limits, check depth setting (actual assembly dimension) with Depth Gauge, using small disc for Model 44 and large discs for Model 60 and 70 Place dial indicator on high step Nominal setting is 2 625" (Model 44), 3 125" (Model 60 & 70)

SPECIAL REAR AXLE TOOLS

TOOL	AXLE MODEL	
	44	60 & 70
Housing Spreader	4000-A	4000-A (Altered)
Diff Bearing Remover	OTC-1001 With 1001-1B, 1011, and Adapter	T56L-400-A
Diff Bearing Replacer	T57L-4221-A2	T53T-4221-C
Pinion Flange Holder	T57T-4851-B	T57L-4851-A
Pinion Flange Remover	T56L-4851-C	T56L-4851-C
Pinion Flange Seal and Outer Bearing Cone Remover	T58L-101-A with T50T-100-A	T58L-101-A with T50T-100-A
Pinion Inner Bearing Cone Pemover	OTC-951	T56T-4630-C (4 55 1 Ratio) T56T-4630-A (4 88 1 Ratio)
Pinion Inner Bearing Cone Replacer	T53T-4621-B	T53T-4621-C
Pinion Inner and Outer Bearing Cup Remover	OTC-960	OTC-960
Pinion Inner and Outer Bearing Cup Replacer	T53T-1239-A with A6 Adapter and T56T-4616-A2	T53T-1239-A with T56T-4616-A (Details 1 & 2)
Pinion and Flange Installer	4858-B	T53T-4851-B-2 with T56T-4851-A
Pinion Depth Gauge	T56T-4020-A	T56T-4020-A
Pinion Flange Seal Replacer	T55P-4676-A	T56T-4676-A

Pini n B aring Pr load Shim Pack - When original shim pack is lost or questionable, use a 065" shim pack for trial build-up

Pinion Flange Nut Torque - 200-220 ft lbs (Model 44 & 60), 250-270 ft lbs (Model 70)

FORD TRUCK 2-SPEED

F, B, N, P-500, 600; C-550, 600 (1963)

DESCRIPTION

Two-speed planetary differential assembly with either a spiral bevel or hypoid ring gear and pinion Spiral bevel pinion shaft is piloted at rear by a roller bearing Shift control is electrically operated

AXLE RATIO & IDENTIFICATION

Identification

Ratio code stamped under AXLE on truck patent plate Axle ratio also stamped on top of carrier housing below carrier assembly number

Axle Ratios

Truck Model	Axle Model	ℂ Code	Rati
F,B N P-500,C-550	Eaton 1350	D1	5 83/8 11
F,B,C-600	Eaton 13800	E1	5 83/8 11
		E2	6 33/8 81
F,N,C-600	Eaton 13802	F1	5 83/8 11
		F2	6 33/8 81
F,B,N,C-600	Eaton 16802, 03	G3	6 50/9 04

ℂ - Stamped on truck patent plate under AXLE

AXLE SHAFT & BEARING

Replacement

Loosen axle shaft stud nuts, then raise truck and place jacks under rear axle housing Remove axle shaft stud nuts Loosen dowels by striking drift at center of flange and remove dowels and axle shaft Remove seal assembly from studs and wiper from housing (if so equipped) Remove locknut, lock washer and adjusting nut Place wheel type jack under wheels and relieve load on bearings Remove outer bearing cone and pull wheel off axle Use hard wood block to drive outer bearing cone and inner seal out of hub If bearing cups are to be replaced, drive them out with a drift Use Tool T53T-1239-A and Detail 17 to replace cups *NOTE - Pack bearing grease on both sides of each cup* Place each bearing and roller assembly into wheel hub, then install new inner seal with Tool T54T-1175-E (F,B,N,C-600) Adjust wheel jack height so wheel will be installed straight on housing without damage to inner seal Install outer bearing cone and adjusting nut Torque adjusting nut to 50-80 ft lbs while rotating wheel in both directions, then back off nut 3/8-turn and install lockwasher *NOTE - When adjusting nut has locking dowel, dowel must enter lockwasher hole closest to dowel When equipped with tabs, run locknut against lockwasher and bend tab over nut* Torque locknut to 100-150 ft lbs Wheel should rotate freely with 001- 010" endplay Reinstall wiper in tube, seal assembly and gaskets on axle shaft flange studs (same number of gaskets as removed) Install axle shaft

OVERHAUL

See Rear Axle Section of Manual for overhaul procedures

BUICK (EXCEPT SPECIAL) HYPOID

Buick LeSabre, Invicta, Electra, Riviera (1963)

DESCRIPTION

Semi-floating, hypoid gear type with drive from axle housing through one upper and two lower control arms

AXLE RATIO & IDENTIFICATION

Identification

Ratio number stamped on bottom of axle housing The numbers one above the other indicate axle ratio, for example: 3 over 2 is 3 23-1, 2 over 78 is 2 78-1 Positive Traction axle identified by a cross in a circle on bottom of differential carrier flange, and by a lubrication caution tag on filler plug

Axle Ratios

The following ratios are available 2 78 (39-14), 3 23 (42-14), 3 42 (41-12), 3 90 (43-11)

SPECIFICATIONS

Pinion Bearing Preload	℄ 15-35 Inch-Lbs
Ring Gear & Pinion Backlash	007- 009"
Diff Side Bearing Preload	See Text
Ring Gear Attaching Bolts	65-75 Ft Lbs
Pinion Shaft Locknut	200-300 Ft Lbs
Differential Bearing Supports	40-50 Ft Lbs
Diff Carrier Attaching Bolts	45-55 Ft Lbs
Brake Assy & Brg Retainer	40-55 Ft Lbs
Brake Drum & Wheel-to-Axle Shaft	65-85 Ft Lbs

℄ - Turning torque Includes drag of new seal

AXLE SHAFT & BEARING

Axle Shaft

Removal - Raise and support car and remove wheel and brake drum Remove wheel bearing retainer attaching nuts (leave bolts in plate to retain brake assembly) Remove axle shaft with Puller J-6176 and slide hammer, being careful not to damage oil seal

Installation - To avoid damage to shaft oil seal coat axle shaft lightly with rear axle lubricant from sealing surface to 6" inboard before installation Reverse removal procedure and tighten bolts to specifications

Wheel Bearing

Removal - Notch bearing retaining ring with chisel in 3 or 4 places and slip retainer from shaft (do not nick axle shaft) Press bearing from axle shaft with Remover J-6525 and suitable press Remove retainer

Installation - Install retainer plate on shaft, then press new bearing and retaining ring against axle shaft shoulder with Installer J-9739 and suitable press Install retainer gasket

Axle Shaft Oil Seal

Removal - Use expander type puller (J-6199) inserted behind seal in axle housing to pull seal out

Installation - Use Installer J-9740 and drive seal straight into housing until tool bottoms against wheel bearing shoulder

REMOVAL & INSTALLATION

Differential Carrier

Raise and support car and mark rear universal joint and companion flange for reinstallation Disconnect rear universal joint and push propeller shaft as far forward as possible, then wire in place Remove axle shafts Remove carrier-to-housing attaching bolts and remove carrier To install reverse removal procedure

OVERHAUL

Disassembly

Differential Case - *Check backlash before disassembly* Remove differential pedestal clamp bolts and tap a wedge into each pedestal slot Pull differential bearing supports from pedestals (Expander Type Puller Set J-9744 is available), then spread pedestals (Spreader Tool J-6185) just enough to free differential case and remove case from carrier *CAUTION - Do not spread pedestal bore slots or pedestals any more than necessary or pedestals will be permanently sprung* Remove ring gear by tapping (do not pry) Drive out differential pinion axle spring pin and pinion axle, then remove side gears pinions, and washers If necessary, pull differential side bearing outer race (Expander Type Puller Set J-6552 is available)

Carrier - *Check pinion bearing preload and pinion depth before disassembly* Remove pinion nut (use suitable holder on pinion flange), then pull pinion flange from pinion Remove pinion "O" ring seal and remove pinion from carrier Remove rear bearing from pinion with suitable puller Remove oil seal and front pinion bearing from carrier Remove front and rear pinion bearing outer races from carrier using a drift in the slots provided

Reassembly

Pinion Bearing Installation & Preload Adjustment - 1) Install front and rear bearing races into carrier using suitable tools so races are driven in squarely and seat against shoulders in carrier Install original pinion depth shim (for starting adjustment) on pinion, and press rear pinion bearing on pinion Install original

(Continued)

LINCOLN CONTINENTAL HYPOID

Lincoln Continental (1963)

DESCRIPTION

Semi-floating, hypoid gear type with integral carrier housing and Hotchkiss drive Design is same as previous models

AXLE RATIO & IDENTIFICATION

Ratio code number or letter stamped under AXLE on car patent plate Ratio also stamped on tag attached to a housing cover bolt Directed Power differential also identified by additional tag on housing cover Axle ratio is 2 89-1 Code is 1 (Conventional) or A (Directed Power)

SERVICING

See 1959 Final Data, Page 337, or later Manual edition for Removal & Installation, Axle Shaft Servicing, and Axle Overhaul procedures and note the following

Axle Assembly Removal

Raise and support car, then drain lubricant by loosening housing cover bolts Mark drive shaft, universal joints, slip yoke, and companion flange for reinstallation in original position to maintain drive line balance Remove two "U" bolts at rear universal joint and slide drive shaft forward to remove shaft Cover output shaft with Tool 7657-J to prevent oil leakage from transmission Remove wheels, brake drums, wheel bearing retainer nuts, and pull axle shafts and bearings Disconnect rear shock absorbers, then remove brake line-to-axle clips and bolt holding junction block to axle housing Remove parking brake cable retainers from "U" bolts, then remove backing plates and brake lines (wire to body) Remove axle "U" bolt nuts, bolts and spring insulator retainers Remove axle housing assembly

Specifications

Ring Gear Backlash	003- 008"
Pinion Bearing Preload (Inch Lbs)	
Old Bearing (With Seal)	12-16
New Bearing (With Seal)	22-24
Old Bearing (Without Seal)	8-12
New Bearing (Without Seal)	18-20

Tools

1961-63 Lincoln Continental Tool Numbers

Tool Application	Tool Number
Oil Seal Remover	1175-AE
Axle Shaft Bearing Remover	1225-DA
Differential Housing Spreader	4000-C
Pinion Depth Gauge	4020-B
Pinion Depth Gauge Block	4020-BA
Pinion Shaft Drive Nut	4201
Backlash & Runout Gauge	4201-C
Differential Assembly Bench Mount	4205-B
Axle Housing (Dummy) Bearings	4205-C
Pinion Tension Scale	4209-C
Differential Side Bearing Remover	4221-C
Differential Bearing Cones Remover	4222-H
Axle Shaft Remover	4235-C
Wheel Bearing Seal Installer	4245-B
Pinion Front Bearing Cup Installer	4616
Pinion Bearing Installer	4621-A
Pinion Rear Bearing Remover	4621-BA
Pinion Rear Bearing Cup Installer	4628
Pinion Front Bearing Cup Remover	4628-B
Pinion Rear Bearing Cup Remover	4628-D
Pinion Shaft Oil Seal Installer	4676
Companion Flange Holder	4851-K
Companion Flange & Pinion Brg Installer	4858-B
Companion Flange Remover	4858-D
Pinion Flange Nut Wrench	4858-G
Companion Flange Dust Shield Installer	4859

BUICK (EXCEPT SPECIAL) HYPOID (C nt.)

bearing preload shims (for starting adjustment) on pinion, hold pinion in position in carrier, then install and tap front bearing in place Install "O" ring Coat outside of new pinion seal with sealing compound and install seal

2) Put wheel bearing grease between oil seal lips, and a thin film of grease on pinion flange seal surface Tap pinion flange on pinion, install washer and nut, and torque pinion nut to 250 ft lbs while holding flange from turning Rotate pinion several times to seat bearings Check pinion bearing preload while turning pinion slowly with an inch-lb torque wrench on pinion nut If preload not within specifications add or remove preload shims behind front pinion bearing as necessary (adding shims increases preload)

Pini n Depth Adjustm nt - *NOTE - Following procedure is detailed with use of Pinion Setting Gauge Set J-5647*

1) With all gauge parts clean and dry, install discs on indicator gauge, and contact button on dial indicator stem Install dial indicator on indicator gauge and place assembly on master gauge so center on indicator gauge engages hole corre sponding to indicator pad "B" Zero dial indicator on indicator pad "B"

2) Wedge pedestal slots open just far enough so tool adapters will slip in Turn pinion so black tooth between matching number and pinion setting marks on pinion is slightly counterclockwise of top center (about 11 o'clock) *NOTE - Black marked tooth used for locating and gauging during production and should be used for gauging in service* Install indicator gauge in carrier with pins centered in pedestal bores, install long adapter through bore farthest from pinion, and short adapter through other bore Indicator gauge center must be engaged in center of pinion, and dial indicator contact button must have a good contact with pinion gauging tooth

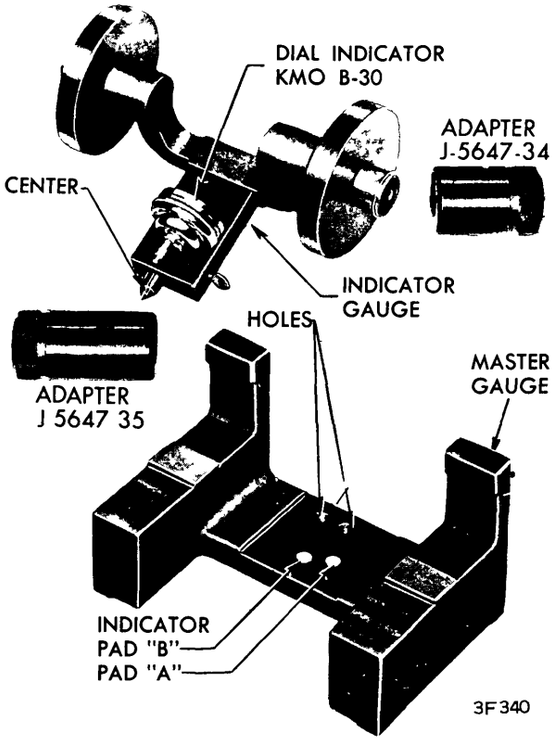
3) Push gauge yoke firmly down toward pinion and note indicator reading *NOTE - This reading indicates only the variation from the "nominal" setting of gauging face of this pinion* Recheck dial indicator on master gauge to make sure zero setting not changed in handling Dial indicator reading should be within 0015" of pinion setting marked on pinion If not as specified, adjust as follows

4) Remove pinion from carrier and press rear bearing from pinion Remove shim from pinion and measure accurately Increase or decrease shim thickness as required for proper depth setting as follows

+ Marked Pini ns - If dial indicator reads **less** than pinion markings, **d cr as** shim pack by the differences between gauge reading and pinion marking If gauge reads **more** than pinion markings, **increase** shim pack similarly

– Marked Pini ns - If dial indicator reads **less** than pinion marking, **incr as** shim pack by the difference between gauge reading and pinion marking If gauge reads **more** than pinion marking, **d cr as** shim pack similarly

5) Pinion depth shims are furnished in thicknesses from 040" to 070" by thousandths *CAUTION - If pinion depth shim pack thickness changed, pinion bearing preload shim pack thickness must also be changed THE SAME AMOUNT, for example, if depth shim thickness increased, preload shim thickness must also be increased*



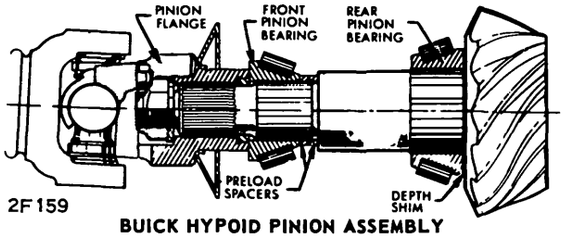
PINION SETTING GAUGE SET J-5647

6) Reinstall pinion bearings and pinion assembly into carrier using correct preload and depth shim packs, install pinion flange and nut Tighten nut to 250 ft lbs and recheck pinion bearing preload. Recheck pinion depth setting Setting for new pinion must be within 0015" of setting marked on pinion Setting for used pinion should be within 0015" of original setting (as checked before disassembly)

Differential Case - Install side bearing outer races into case, then install side gears, pinions, and washers into case in same position as originally installed Install pinion axle and pinion axle spring pin (pin must be flush with case) Install ring gear, tighten bolts alternately to 35 ft lbs , then to specified torque *Do not use lockwashers or substitute bolts*

Backlash & Side Bearing Preload Adjustment - **1)** Install differential case into carrier (use wedges in pedestal slots), install side bearings, then insert Support Tools J-9743 through pedestal bores into bearing inner races Tools must be seated and tight enough so they can just be moved by twisting Rotate differential several times to seat bearings, then push assembly to one side to obtain 008" backlash

2) Check backlash at several places around ring gear Backlash must not vary more than 003" around gear Move differential in carrier to obtain correct backlash



BUICK HYPOID PINION ASSEMBLY

(maintain original backlash as measured before disassembly if original gear set reinstalled)

3) Bearing preload shims furnished from 040" to 082" thickness by two thousandths and must be used singly Insert the thickest shim possible between each bearing and bearing pedestal, then use a shim 002" thicker than this shim for installation for proper side bearing preload Insert shims, install bearing supports, and tighten pedestal clamp bolts and nuts to specifications Recheck backlash

BUICK SPECIAL & OLDSMOBILE F-85 HYPOID

Buick Special, All Series (1963)
Oldsmobile F-85, All Series (1963)

DESCRIPTION

Semi-floating, hypoid gear type, with drive from axle housing through two upper and two lower control arms

AXLE RATIO & IDENTIFICATION

Identification

Letter prefix of axle ratio code number stamped on right side of axle housing cover near axle shaft tube Letter indicates axle ratio, number indicates day axle was built Positive Traction or Anti-Spin axle identified by a cross in a circle on bottom of differential carrier flange, and by a lubrication caution tag on filler plug

Axle Ratios

The following ratios are available

Ratio	Code	Ratio	Cod
3 08 (40-13)	A	2 78 (39-14)	D
3 23 (42-13)	B	3 90 (39-10)	F
3 36 (37-11)	C	4 30 (43-10)	G

AXLE SHAFT

Axle Shaft Replacement

Remove wheel and drum, disconnect bearing retainer from backing plate and pull retainer off bolts, then reinstall one or two bolts to hold backing plate in position Remove axle shaft with suitable puller and slide hammer, using care not to damage oil seal To install, reverse removal procedure

Axle Shaft Bearing Replacement

Remove bearing from axle shaft only if bearing is to be replaced Use suitable support plate to press bearing from shaft When installing, bearing must seat on shoulder on axle shaft

OVERHAUL

See 1961 Final Data, Page 325

CORVETTE & CHEVROLET ½ TON TRUCK HYPOID

Corvette (1963)
Chevrolet ½-Ton Truck (1963)

DESCRIPTION

Semi-floating, hypoid gear type with 2-pinion differential and integral housing. Torque arm type drive used on Corvette. Hotchkiss drive used on Chevrolet truck.

AXLE RATIO & IDENTIFICATION

Production code number stamped on bottom of differential carrier housing just forward of housing cover. Letter prefix of code number is axle ratio code as follows:

Axle Ratio	Corvette	Code Prefix
3.08-1		CZ
3 36-1		CA, CB
3.55-1		CC
3.70-1		CD, CX
4.11-1		CE
4.56-1		CF
	Chevrolet Truck	
3.07-1		WB, WF
3.73-1		WA, WC, WE, WG, WL, WM
4.11-1		WD, WH, WK

REMOVAL & INSTALLATION

Corvette Wheel Spindle & Bearings

Bearing Endplay Inspection - With rear wheels free to turn, disconnect axle shaft flange from wheel spindle, mark camber adjusting cam and bolt in relation to bracket, then loosen camber bolt until strut rods are forced outboard (provides clearance to drop axle shaft). Install dial indicator on torque arm inboard surface with pointer on spindle end, then move spindle axially in and out and note dial indicator reading If endplay not within .001- 007", bearings must be adjusted

Wh l Spindl - Removal - Remove wheel and tire, spindle nut cotter pin, spindle nut and washer, and pull spindle drive flange from spindle. Remove brake drum and pull spindle out of support Pry out seals and remove bearings. Remove shim and bearing spacer from spindle support

Disassembly - Remove bearing cups from spindle support using suitable plate and a press. Install bearing cups with Installer J-7817 and a driver handle. To remove spindle support from torque arm, proceed as follows: Disconnect brake line, remove brake support plate and hang on frame. Disconnect shock absorber at lower end (may be necessary to support spring end), then remove cotter pin and nut from strut rod mounting shaft, pull out shaft, and drop strut rod. Remove spindle support.

Installation & Bearing Adjustment - Pack bearings and assemble spindle, seals, bearings, bearing spacer, and shim into spindle support. *NOTE - If original bearings reused, use original shim. If new bearings installed, use .145" shim for initial adjustment.* Check bearing endplay as indicated above If not within 001-.007", adjust shim thickness as necessary Shims furnished from .097" to 145" thick in 006" increments Complete the reassembly

Axle Shaft Replacement

Corvette - Disconnect shaft inboard trunnion from side gear yoke, then disconnect shaft flange from spindle drive flange Pry shaft out of outboard drive flange pilot and remove outboard end first To install, reverse removal procedure, rotating side gear yokes so trunnion seats are phased 90° apart Tighten shaft flange-to-spindle flange pilot bolts to 70-90 ft lbs , and U-bolt nuts to 14-18 ft. lbs.

Chevrolet Truck - Remove wheel, tire, and brake drum Drain axle lubricant and remove housing cover Remove differential pinion shaft lock screw and pinion shaft, then push axle shaft to center of truck and remove "C" lock from differential (button) end of shaft Remove axle shaft from housing. To install, reverse removal procedure.

Bearing & Seal Replacem nt - *NOTE - Bearing is roller type installed in axle housing (no inner race used).* Remove and install bearing, seal, and retainer with suitable tools (Remover J-8119, Installer J-21051) Pack new bearing with high melting point grease, and pack new seal cavity with same grease

Companion Flange & Seal R placement

Corvette - **1)** With rear wheels hanging freely, put a ½" thick block between carrier upper surface and body floor (prevents carrier from twisting upward), then disconnect carrier front mounting bracket from frame and swing bracket down and to rear. Remove propeller shaft. Mark pinion nut and pinion for reassembly, and remove pinion nut, counting number of turns of nut Remove companion flange and pry oil seal from carrier

2) Put sealing compound on outside of new seal and install squarely into carrier so there is 1/8" gap between seal flange and carrier Install companion flange and pinion nut. Tighten nut same number of turns as when removed until marks on nut and pinion are aligned to insure maintaining correct pinion bearing preload. Install propeller shaft and connect carrier front support bracket

Chevrolet Truck - **1)** Position truck so one rear wheel is locked, then disconnect propeller shaft from rear axle and tie out of way. Check pinion bearing preload through several revolutions and record reading. Hold companion flange from turning, mark flange and pinion shaft for reassembly, and remove pinion nut and flange . Pry seal out of carrier

2) Pack seal lip cavity with lithium-base extreme pressure lubricant and install seal squarely into carrier until clearance between carrier and seal flange is 146" ± 046" with seal seated on shoulder in carrier. Install companion flange, washer, and n w pinion nut. Tighten nut until endplay removed, then tighten in small increments while checking pinion bearing preload, until preload is same as noted before removal. Connect propeller shaft

Axle Assembly Removal

Corvette - *NOTE - Housing cover furnished as an assembly with axle housing. Unnecessary to remove cover from car to service rear axle. For cover replacement, see Rear Suspension Crossm mber Replacement in "Corvette Rear Suspension" in Suspension & Wheel Alignment Section.* Raise car, support at frame slightly forward of torque arm pivots, and remove wheels and tires Raise each end of spring with jack until spring is nearly flat, then wrap a heavy chain securely around crossmember and chain. *CAUTION - Do not use rope, wire, or cable.* Lower the jack so spring end link bolts are free, remove bolts, then remove chain and let spring ends hang freely *Use extreme care during this operation* Disconnect axle shafts at axle assembly, remove axle front support bracket, and remove propeller shaft Mark camber cam and bolt location on strut rod bracket, loosen bolts, then disconnect bracket from carrier Remove cam bolts and swing strut rods out of way. Disconnect cover from axle assembly Remove

(Continued)

CHEVROLET PASS. CAR & CHEVY II HYPOID

Chevrolet Pass. Cars (1963)
Chevy II (1963)

DESCRIPTION

Semi-floating, hypoid gear type with separate carrier and Hotchkiss drive Design same as previous models.

AXLE SHAFT

Axle Ratio & Identification

See 1962 Final Data, Page 343.

Removal & Installation

See 1962 Final Data, Page 343 and note the following:
Axle Shaft Bearing - Removal - With axle shaft removed, remove bearing retaining ring by splitting with chisel, being careful not to nick axle shaft. *Do not use heat.* Use Press Plate J-5741 between bearing and retainer plate, then press shaft from bearing (tool resting on press bed).

Installation - Install retainer plate on axle shaft, and position bearing on shaft with seal toward splines. Seat bearing in Installer J-6661 and press shaft into bearing until bearing inner race contacts shaft shoulder. Install bearing retaining ring on shaft and press ring against bearing (chamfered side of ring against bearing).

Axle Shaft Bearing Seal - Removal - With bearing removed from shaft, pry out old seal with screwdriver being careful not to damage bearing

Installation - Clean old grease from bearing If bearing not previously noisy and not damaged, repack with wheel bearing grease *CAUTION - Fill bearing cavity only about 40% full of grease (about 1½ teaspoons). Too much grease will cause bearing failure.* With new seal squarely in bearing, press seal into place until rim of seal case is flush with top surface of bearing outer race

OVERHAUL

See 1962 Final Data, Page 343.

CORVETTE & CHEVROLET ½ TON TRUCK HYPOID (C nt.)

axle mounting bolts, pull axle part way out of cover, drop nose to clear crossmember, and remove. *CAUTION - Do not nick cover mounting face or leaks will result.* To install, reverse removal procedure.

Chevrolet Truck - Support truck at frame side rails, remove rear wheels, support axle assembly to relieve spring and tie rod tension, and disconnect propeller shaft Remove axle U-bolt nuts and let control arms and shock absorbers hang freely Remove spacer from axle housing if equipped. Disconnect brake hoses at housing, remove brake drums, and disconnect parking brake cable at lever and flange plate. Remove axle assembly from truck To install, reverse removal procedure, tighten U-bolt nuts to 220-320 ft lbs , and tie rod nut to 110-150 ft lbs.

OVERHAUL

DISASSEMBLY

Corvette

Remove side gear yoke snap rings and remove yokes Mark differential bearing caps, remove caps, then remove differential from housing. Remove side bearing shims and mark for reassembly. Remove companion flange nut, flange, and seal, then remove pinion shaft and rear bearing Remove front pinion bearing. Remove side gear yoke seals from housing, then tap yoke bearings out Disassemble differential by removing pinion pin lock screw, pinion pin, pinions, and side gears *Remove ring gear only if gear set replaced or side bearings replaced.* Remove pinion bearing cups from housing with a suitable tool Press pinion shaft out of rear bearing and note size of depth shim pack

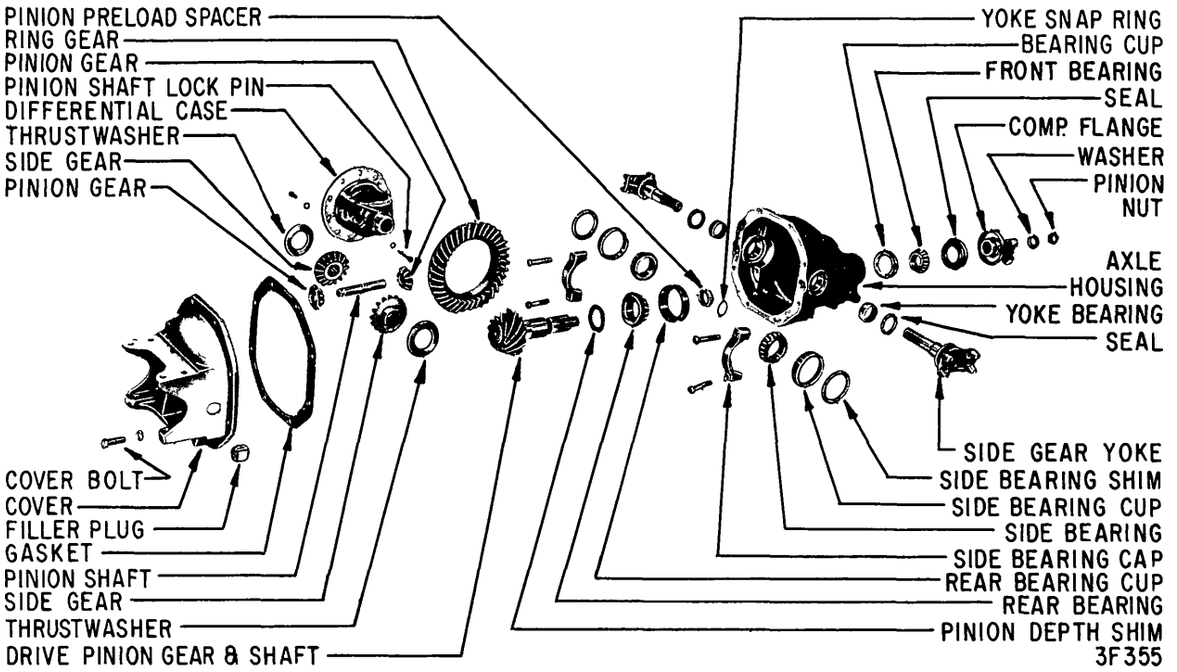
Chevrolet Truck

Remove housing cover, pinion shaft lock screw, pinion shaft, and push axle shafts inward Remove "C" locks from shafts, and remove axle shafts. Remove differential pinions and side gears. Mark side bearing caps, remove caps, and pry differential case from housing. Remove bearing cups and shims and place with correct bearing cap Remove pinion nut, companion flange, and seal, then remove pinion shaft and front bearing. Remove pinion bearing cups from housing with suitable drift Press pinion shaft out of rear bearing and note size of depth shim pack.

REASSEMBLY

Pinion Shaft & Bearings

Pini n Depth Adjustment - If original ring gear, pinion, and pinion bearings being installed, use original shim pack and complete installation in the usual manner If new parts installed, proceed as follows: Install bearing cups squarely against housing shoulders Lubricate bearings, install in housing, and assemble Tool Set J-6266 as shown in illustration. Tighten tool clamp screw until 20 inch-lbs. torque is required to rotate bearings Barrel plunger must rest on lowest step of rear bearing gauge plate. With barrel plunger away from gauge plate, zero the dial indicator, then move plunger across gauge plate and note reading Subtract indicator reading from mark on pinion (45 or .045"). The difference is shim thickness required. Shims furnished 021", .024", 027", .030", .033", .036" thick. Use shim closest to difference obtained. Remove tools, install shim on pinion, and press bearing into place on pinion



CORVETTE REAR AXLE ASSEMBLY EXPLODED (CHEVROLET TRUCK SIMILAR)

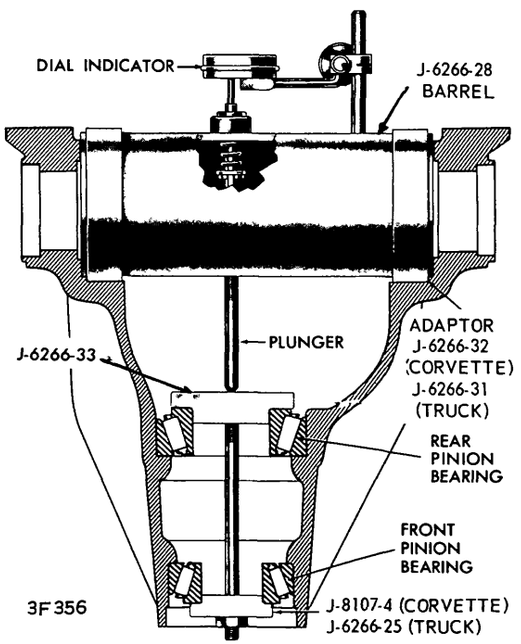
Pinion Bearing Preload Adjustment - Install pinion shaft and bearings into carrier, using a new pinion bearing spacer between bearings Install seal, companion flange, and nut as indicated under "Companion Flange & Seal Replacement" above, tighten nut to remove endplay, then continue to tighten in small increments until proper bearing preload is obtained (check while tightening nut with an inch-lb torque wrench). Pinion bearing preload should be as listed in table below. *CAUTION - Do not back nut off to obtain proper preload. Also, pinion seal flange must not touch housing, and companion flange deflector and oil seal flange must not touch each other.*

① Pinion Bearing Preload (Inch-Lbs.)

Model	New Bearings	Used Bearings
Corvette	② 15-25	③ 5-15
Chev Truck	20-25	. 5-15

① - With torque wrench on pinion nut
② - With spring scale on holding tool notch: 1 lb , 14 oz. to 3 lbs., 2 oz.
③ - With spring scale on holding tool notch: 10 oz to 1 lb. 14 oz.

(Continued)



PINION DEPTH TOOL SET J-6266 INSTALLATION

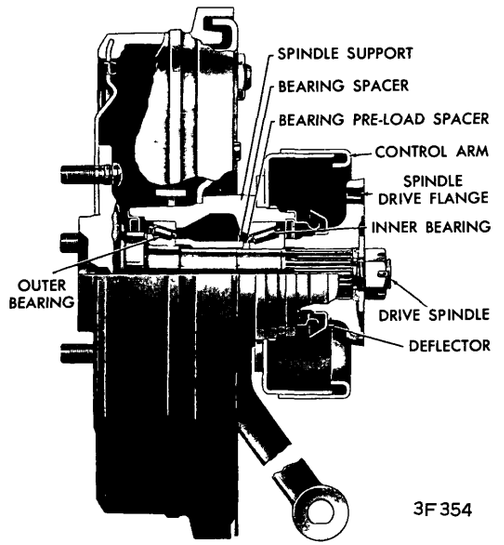
CORVETTE & CHEVROLET ½ TON TRUCK HYPOID (C nt.)

Differential

Case & Bearing Assembly - Remove and install side bearings with suitable pullers and installers. It may be necessary to chamfer the O.D. of the installing tool to fit bearing inner race. Make sure ring gear is installed squarely (use guide pins if necessary), and tighten bolts evenly and alternately to 40-60 ft. lbs. Install side gears and pinions into case, install pinion shaft and lock screw.

Side Gear Yoke Bearings & Seals (Corvette) - Use Installer J-9773 to install side gear yoke bearings into carrier until bearings are fully seated. Install new seal with Installer J-9774.

Side Bearing Preload - Corvette - Install differential assembly into housing. Install an .080" shim behind each side bearing outer cup, install dial indicator on ring gear mounting flange and measure endplay. Note reading and add .008-.010" for proper bearing preload. Indicator reading + .008-.010" + the two .080" shims will equal correct total shim pack for correct bearing preload. Divide shim pack equally between each side and install into housing. Install bearing caps (do not tighten to final torque).



CORVETTE REAR WHEEL SPINDLE & BEARING ASSEMBLY

Chevrolet Truck - Install differential assembly into housing. If original bearings and differential case are used, use shim pack .002" thicker (each side) than original shim pack. If new parts being installed, determine correct preload as follows: Select two shims whose total thickness will permit a feeler gauge at least .010" thick to be inserted between shim and cup and install these shims between right bearing cup and carrier cup seat. Loosely install left bearing cap. With left bearing cup and differential case against left cup seat, measure distance between right side shims and cup seat. Add .010" to total of both shims feeler gauge thickness. This is total shim pack necessary for correct bearing preload. Divide shims equally between each side and install into position. Install bearing caps and torque alternately and evenly to 50-60 ft. lbs.

Backlash & Final Assembly - Check backlash with dial indicator at four locations around ring gear. Variation should not exceed .001". If backlash not within .003-.010" (.005-.008" preferred), adjust side bearing shims as necessary. *CAUTION - Total shim pack must not be changed. If a shim is moved from one side, the same thickness shim must be added to other side, etc.* After adjustments completed, tighten Corvette side bearing cap bolts to 50-60 ft. lbs. Make a tooth contact pattern test and make any necessary corrections. Install side gear yokes and snap rings (Corvette), install rear axle shafts and "C" locks (Chevrolet Truck).

CORVETTE POSITRACTION DIFFERENTIAL

Corvette (1963)

DESCRIPTION

Two-pinion, multiple clutch disc type differential assembly. Clutch disc and plate packs are located between side gear and case at each side of differential, and are held in place by retainer plates and springs.

REMOVAL & INSTALLATION

For carrier and differential case removal and installation, and for side bearing preload and backlash adjustments, see "Corvette and Chevrolet ½-Ton Truck Hypoid" in this section.

OVERHAUL

Disassembly

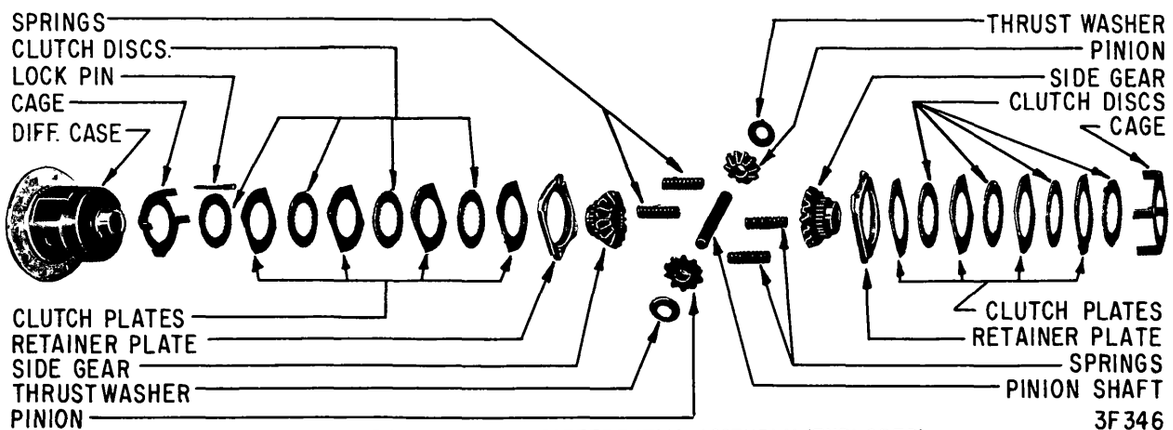
With ring gear removed, compress retainer separating springs with a suitable compressor tool and remove. Remove pinion shaft lock pin and shaft. Remove pinions by rotating side gear with yoke, then pry clutch pack away from pinion until pinion drops out. Remove pinion thrust washers, clutch packs, and side gears. Pry clutch pack cage out of differential case.

Inspection

Clean all parts. Check pinions, thrust washers, and side gears for wear or damage and replace as necessary. If clutch pack shows excessive wear or shows evidence of overheating, replace as a unit.

Reassembly

Install clutch pack cages into case with side tabs up and flat sides parallel with flat sides of case. Install spring retainer plate over side gears, then install clutch pack on top of plate as follows: Install a clutch plate first, then a clutch disc, until assembly is complete, ending with a clutch disc. Clutch discs must index with teeth of side gear. Install clutch packs and side gears into case, install pinions and thrust washers. Install pinion shaft and shaft retaining pin. Compress clutch springs and install into spring seats in retainer plates. Install ring gear.



CORVETTE POSITRACTION DIFFERENTIAL ASSEMBLY (EXPLODED)

OLDSMOBILE (EXCEPT F-85) HYPOID

Oldsm bile 88, S88, 98, Starfire (1963)

DESCRIPTION

Semi-floating, hypoid gear type, with drive from axle housing to rear suspension upper and lower control arms

AXLE RATIO & IDENTIFICATION

Identification

Axle ratio code number stamped on lower right side of differential carrier flange. "L" in addition to code number indicates "Anti-Spin" differential.

Axle Ratios

The following ratios are available:

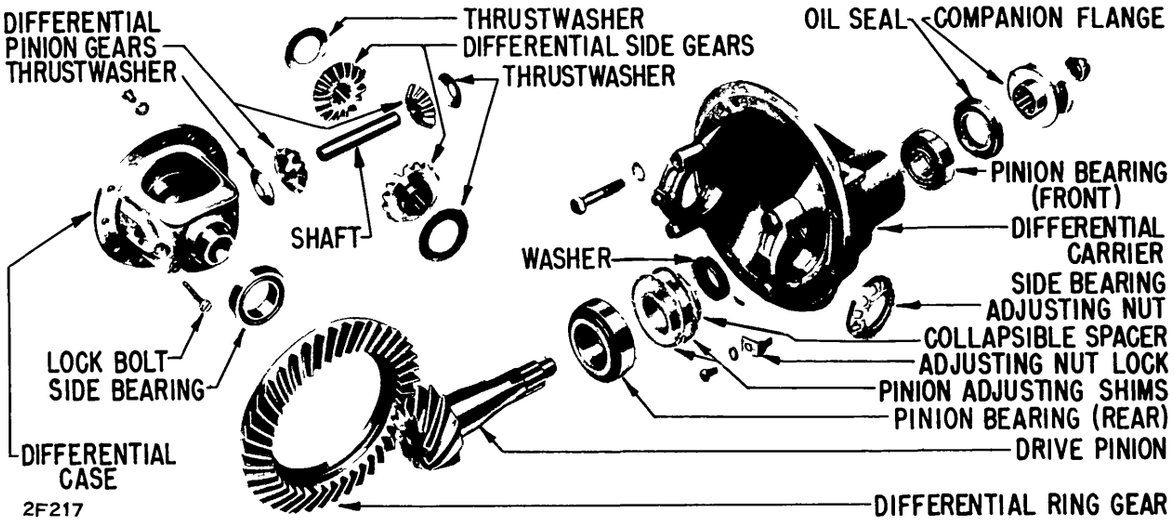
Ratio	① Cod	Ratio	① Code
2 69 (43-16)	2	3.42 (41-12)	8
2 56 (41-16)	3	3.23 (42-13)	9
2 87 (43-15)	7	3.08 (40-13)	0

① - "L" in addition to code number indicates "Anti-Spin" differential

AXLE SHAFT

Axle Shaft Removal

Remove wheel and drum Loosen backing plate nuts and loosen bearing retainer (do not move backing plate or brake line may be damaged) Pull shaft and bearing with Puller J-942 *Do not let shaft drag on oil seal.* Replace one nut to hold backing plate in place.



OLDSMOBILE & PONTIAC REAR AXLE ASSEMBLY (TYPICAL)

Wheel Bearing & Oil Seal

See 1957 Final Data, Page 326 or later Manual edition.

OVERHAUL

For Pinion Shaft Oil Seal Replacement, and Rear Axle Overhaul, see 1957 Final Data, Page 326 or later Manual edition, and note the following:

Pinion Bearing Preload - 24-32 inch-lbs (new bearings), 10-15 inch-lbs (used bearings)

Side Bearing Preload - 2-3 notches tight

Ring Gear Backlash & Side Bearing Adjustment - If backlash not within 005- 009", adjust to 007- 008" (preferred setting)

PONTIAC HYPOID

Pontiac, Except Temp st (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 DIFFERENTIAL CARRIER PARTS REPLACEMENT CAUTION:* Some early 1963 cars have 1962 differential assemblies installed. Be sure to determine which unit is used when replacing parts. 1963 units have smaller pinion bearing outside diameter, different pinion seal, and carrier casting number (535200 for 1962, 543317 for 1963) which is stamped on flange right side

DESCRIPTION

Semi-floating, hypoid gear type with modified Hotchkiss drive through axle housing to rear suspension upper and lower control arms.

AXLE RATIO & IDENTIFICATION

Axle Rati	①② Code	③ Color
2.56 (41-16)	3	Gray
2.69 (43-16)	2	Red
2 87 (43-15)	7	Orange
3 08 (40-13)	0	Yellow
3.23 (42-13)	9	Brown
3.42 (41-12)	8	White
3 64 (40-11)	6	Blue
3.90 (39-10)	4	No Color

① - Stamped on lower right side of differential carrier flange. Safe-T-Track differentials have letter "L" additional Super Duty axle assemblies have letter "P" additional.

② - Safe-T-Track units also have identification tag on a carrier attaching bolt

③ - Color code on end of axle shaft Safe-T-Track differentials have additional color Green. Super Duty axle assemblies have additional color Black

AXLE SHAFT

Axle Shaft Replacement

Raise car and remove wheel. Clean dirt from end of housing to protect wheel bearing, then remove brake drum. Remove bearing outer retainer bolt nuts. Use Puller J-942-1 if necessary to remove axle shaft, using care not to dislodge brake backing plate. To install, reverse removal procedure and tighten self-locking bearing retainer nuts to 30-45 ft lbs.

Wheel Bearing & Oil Seal

With axle shaft removed, remove oil seal from axle housing with Tool J-943 To remove bearing from shaft, install axle shaft in Tool J-947-P so tool engages outer race of bearing and ring encloses bearing, then press bearing and retainer from shaft with an arbor press To install bearing, install outer bearing retainer on shaft, then install bearing on shaft with Tool J-947-P (tool should bear only on inner race), and an arbor press. Press a new bearing inner retainer ring in place against bearing with same tool *CAUTION - Do not press bearing and inner retainer on in one operation as edge radius of retainer will climb over corner of bearing inner race and force grease seals into balls.* To install seal in housing, coat new seal lip with oil and coat outside of seal with suitable sealer, then install seal with Tool J-5818.

OVERHAUL

See 1957 Final Data, Page 328, or later Manual edition and note the following:

Companion Flange & Seal

Removal - Disconnect propeller shaft, make aligning marks on pinion shaft and pinion nut, then install an inch-lb. torque wrench on pinion nut and note pinion bearing preload while turning pinion through several revolutions. Hold companion flange, remove pinion nut, then pull companion flange with Puller J-6295 Pry seal from carrier.

(Continued)

PONTIAC HYPOID (C nt.)

Installation - Coat lip of seal with engine oil and outside of seal with suitable sealer. Tap seal into position (Installer J-5395) Install companion flange and pinion nut. While checking pinion bearing preload, tighten pinion nut so preload is same as noted before removal. If original preload was less than 10 inch-lbs., tighten nut so preload is 10-12 inch-lbs. (Old seal), 12-15 inch-lbs. (new seal) Connect propeller shaft

Carrier Oil Gallery Plug

Plug located at forward end of differential carrier housing lower reinforcing web Replace as follows: Remove companion flange (see above), then thread a ½" bottom tap into plug until plug starts to turn Remove plug by turning tap and pulling at same time To install, apply a light coat of sealer to hole in carrier and to plug, then install plug, making sure it does not enter the drain hole *CAUTION - Do not try to drill a hole in plug for removal as shavings will fall into drain hole.*

Ring Gear Backlash

Backlash should be ,005- 009" Tighten bearing cap bolts to 65-85 ft. lbs.

Tooth Contact Pattern

As a final step after assembly and adjustments completed, make a tooth contact pattern test and make any backlash or pinion depth adjustments as necessary

RAMBLER HYPOID

Rambler, All Series (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 AMERICAN "CLUNK" OR "RUMBLE" NOISE CORRECTION:* Noise occurs on severe forward brake application or rapid acceleration in reverse and is caused by interference between rear universal joint yokes To correct, install Rear Axle Housing Alignment Shim Set. No. 3204512, consisting of two 1½° tapered shims, between rear springs and spring seats. Install shims with thick part to front of car. Shims will raise pinion shaft (reduce universal joint angle)

DESCRIPTION

Semi-floating, hypoid gear type with differential carrier integral with rear axle housing. Hotchkiss drive used on American, torque tube drive used on Classic & Ambassador.

AXLE RATIO & IDENTIFICATION

Identification

Both conventional and "Twin-Grip" type axles identified by a tag attached to a housing cover bolt

Axle Ratios

The following axle ratios are available in both conventional and "Twin-Grip" differentials:

2.87 (43-15)	3.31 (43-13)	3.78 (34-9)
3.15 (41-13)	3.54 (39-11)	4 11 (37-9)
		4.10 (41-10)

AXLE SHAFT

Axle Shaft Replacement

Removal - *CAUTION - Hub and axle shaft are serrated to mate and fit together and are marked to insure correct reassembly whenever hub removed.* Pull hub with Puller J-1644 or J-736 Disconnect brake line and cable Remove brake support plate, oil seal, and shims. Use Puller J-2498 to remove shaft from housing. *NOTE - Use of "knock-off" type puller will damage axle shaft bearings or differential thrust block.*

Installation - Reverse removal procedure and tighten axle shaft nut to 250 ft lbs torque *CAUTION - Marks on outer face of hub and end of axle shaft must be aligned to insure proper mating of serrations.* Adjust axle shaft endplay

►*REPLACEMENT HUB & AXLE SHAFT CAUTION:* New hubs are not serrated and serrations will be cut in hub when assembled on axle shaft New hub may be installed on old shaft if serrations in shaft are in good condition, but an old hub must NOT be installed on a new shaft as serrations will not match Tighten axle shaft nut to 250 ft lbs. and check distance from outside face of hub to end of taper on shaft (hub overhang on threaded part of shaft) This distance must be 3/16". Punch mark new hub in line with mark on shaft.

Axle Shaft Endplay Adjustment

Hit each axle shaft with lead hammer to seat bearing cups against support plate, then check shaft endplay. If not within specifications (see "Specifications"), add or remove shims **on left side only** as necessary There should be 1/16" minimum clearance between differential thrust block and pinion shaft

REMOVAL & INSTALLATION

Rear Axle Assembly

American - Drain lubricant, raise car and support rear of body Remove wheels, then remove hubs Disconnect hand brake cables at brakes. Use Wrench J-4486 to remove propeller shaft coupling nut Disconnect rear shock absorbers, rear brake line at bracket on floor pan and rear springs from body- Remove axle and springs as an assembly and remove springs To install, reverse removal procedure and note the following: Install propeller shaft coupling so distance from front face of rear axle housing to center of universal joint yoke is 4 3/16", and tighten coupling nut to 300 ft. lbs.

Classic & Ambassador - Remove cover and drain lubricant Raise car and support at rear of body Disconnect parking brake at equalizer and cable housing at torque tube bracket Disconnect torque tube from transmission, brake hose at bracket on body pan, shock absorbers at brackets, stabilizer bar at axle tube *NOTE - Rear springs held in position in seats by car weight and shock absorber travel limits.* Roll axle from chassis and disconnect truss rods, torque tube, and propeller shaft from axle "Slip" or "Union" type couplings used which can be slipped off pinion shaft To install, reverse removal procedure.

OVERHAUL

See 1958 Final Data, Page 329, or later Manual editions and note the following:

Specifications

Observe the following specifications and torque values:

Axle Shaft Endplay	Ⓒ 004- 008"
Pinion Bearing Preload (6 Cyl)	12-14 Inch-Lbs.
(V8)	15-18 Inch-Lbs
Ring Gear & Pinion Backlash	Ⓒ 002-.006"
Diff Side Bearing Preload	004-.008"
Ring Gear Attaching Bolt (6 Cyl)	45-50 Ft Lbs.
(V 8)	35-45 Ft. Lbs
Diff Side Bearing Cap Bolts (6 Cyl)	55-60 Ft Lbs.
(V8)	105-110 Ft. Lbs.
Pinion Nut (6 Cyl)	90-100 Ft. Lbs
(V8)	125-150 Ft Lbs
Hub-to-Axle Shaft	250 Ft Lbs
Prop Shaft Coupling Nut (American)	300 Ft. Lbs.

Ⓒ - .006" preferred. Shims on **l ft** side only.
Ⓒ - 004" preferred

Tools

Following tools are available for rear axle overhaul:

1963 Rambler Rear Axle Tools

Pinion Setting	**6 Cyl. - To I N . -**	**V8**
Bearing Preload Checking	J-8715	J-8715
Depth Checking Set	J-5223-02	J-5223-0 2
Pinion Bearings		
Rear Bearing Cup Remover	J-9349	J-9350
Rear Bearing Cup Installer	J-7818	J-2533
Rear Bearing Race Installer	J-2995	J-2995
Front Bearing Cup Remover	J-9351	J-9352
Front Bearing Cup Installer	J-7817	J-2531
Oil Seal Protector	Ⓒ J-9347	
Oil Seal Installer	Ⓒ J-9348	
Differential Side Bearings		
Side Bearing Remover	J-2497-01	J-2497-01
Side Bearing Installer	ⒸⒸ J-2100	ⓓ J-2104-01

Ⓒ - American Only Ⓒ - Or J-5364.
Ⓒ - And Driver Handle J-8092 or J-8592
ⓓ - Or J-2646

SPICER HYPOID

Ch ck r, All M d ls (1963)
Stud baker, All M d ls (1963)
J p, All M d ls (1963)

DESCRIPTION

Hypoid gear type with semi-floating axles on Models 27, 44, and 53 Full-floating axles used on Model 70 Model 70 axle differential case is "split" type and has four differential pinions

AXLE RATIO & IDENTIFICATION

Identification

Axle model number cast in web on axle housing Axle ratio stamped on metal tag attached to a housing cover bolt Power-Lock differential identified by "45" or "T" on a second metal tag attached to a housing cover bolt, and also by a lubrication caution tag attached to filler plug

Axle Ratios

The following axle ratios are available:

Studebaker

2 53-1	3 54-1	4 27-1
2 76-1	3 73-1	4 55-1
2 87-1	3 92-1	4 56-1
3 07-1	4 09-1	4 89-1
3 31-1	4 1-1	5 38-1

Jeep

3 73 (41-11)	4 27 (47-11)	4 89 (44-9)
4 09 (45-11)	4 56 (41-9)	5 38 (43-8)
4 10 (41-10)	4 88 (39-8)	

AXLE SHAFT

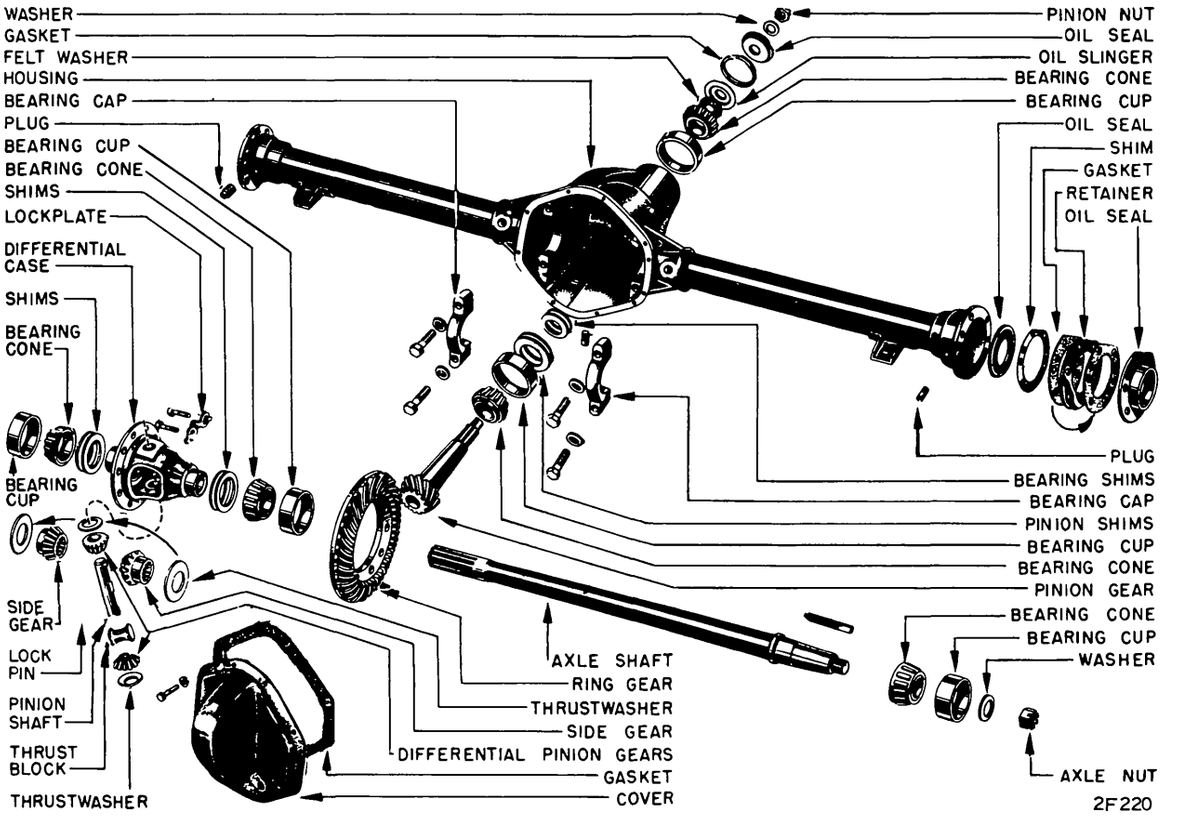
Axle Shaft Removal

Stud bak r - Remove wheel and hub using Puller J-1644-A Remove backing plate retaining bolts and remove outer washer, retainer, reinforcing plate and felt washer (discard this washer) Free hand brake cable from equalizer and frame guides and disconnect hydraulic brake line at wheel cylinder Pull backing plate out over end of axle shaft and tie up out of way Remove endplay adjusting shims (save for reinstallation), and use Puller J-7935 with Hammer J-2619 to remove axle shaft

Je p - Jack up wheel and remove hub cap and axle shaft nut Use Puller C-319 to remove wheel hub Remove screws holding brake dust shield, grease and bearing retainers, and brake assembly Remove wheel shield and retainer Pull axle shaft out but do not lose adjusting shims

Endplay Adjustment Semi-Floating Axles

Total endplay for both axle shafts should be 001- 006" (Studebaker), 003- 007" (Jeep) Endplay is controlled by shims located between brake backing plate and axle housing flange Adjust endplay to proper specifications by adding or removing shims *NOTE - Adjusting shims may be found on one side only or on both sides*



SPICER HYPOID REAR AXLE ASSEMBLY (EXPLODED)

Wheel Bearing Adjustment Full-Floating Axles

Bend lip of nut lockwasher so locknut and lockwasher can be moved, then raise wheel so it can be rotated While rotating wheel, tighten adjusting nut (Tool DD-1241) until wheel binds, then back off nut about 1/6-turn or more if necessary until wheel rotates freely without side shake Replace lockwasher and locknut and bend over lockwasher lip If adjustment still satisfactory, install axle shaft

Oil Seal Replacement

On Studebaker, use Oil Retainer Remover J-943 to remove seal On Jeep, pry old seal out of housing To install seal, soak in oil for 10 minutes, then coat outer diameter with sealer and tap seal into bore with Tool J-8092 & J-270-13 (Studebaker), W-186 (Jeep)

OVERHAUL

See 1959 Final Data, Page 341, or later Manual edition, and note the following:

Studebaker

Pinion D pth S tting (M d l 27 Axle) - This dimension should be 2 094"± 0015"

Model 27 Axle Tools

Tool Name	Tool Numb r
Rear Pinion Bearing Replacer	J-8671
Differential Side Bearing Replacer	J-8668
Front Pinion Bearing Replacer	J 8672
Rear Pinion Bearing Puller	J 8669
Differential Side Bearing Puller	Ⓒ J-8670

Ⓒ - With Adapter J-8670-2

Jeep

Model 27 Axle Tools

Tool Name	Tool Numb r
Axle Shaft Oil Seal Driver	W-263
Pinion Front Bearing Driver	W-264
Pinion Rear Bearing Sleeve Installer	W-262
Differential Case Bearing Cone Driver	C-3716

Pinion Depth Tool W-99-B Usage

Axle Model	Gauge Bl ck
27	H
44	E
53	F
70	Ⓒ A

Ⓒ - Plus Spacer W-99-19 between pinion and indicator bracket

POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE WITH BELLEVILLE SPRINGS)

Buick & Buick Special (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Chrysler & Imperial (1963)
Dodge & Dodge 880 (1963)
Ford F-100 & 250 Trucks (1963)
Lincoln Continental (1963)
Oldsmobile 88, S88, 98, F-85 (1963)
Plymouth (1963)
Pontiac (1963)
Rambler V8 (1963) ℂ
Studebaker (1963)
Jeep (1963)

ℂ - *For Rambler 6 Cyl , see 1959 Final Data, Page 340 or later Manual edition*

DESCRIPTION

This assembly replaces conventional differential assembly and consists of a multiple disc type clutch pack with Belleville type plates located between each side gear and differential housing

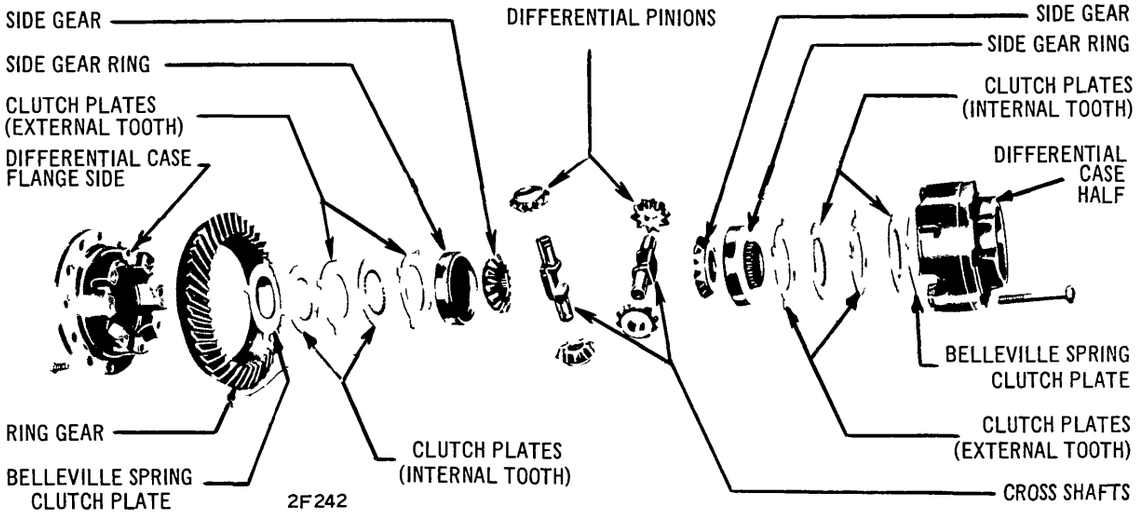
AXLE RATIO & IDENTIFICATION

See appropriate Conventional Rear Axle data for each car model

LUBRICATION

To insure proper operation of unit and to prevent differential chatter, some manufacturers recommend that only the special lubricants listed below be used in Power-Lock axle assemblies

Buick & Buick Special - Special Lubricant, Part No 531536 Any other lubricant must conform to Buick Specification No 723
Chevrolet & Chevy II - Positraction Lubricant, G M No 3755205
Chrysler Corp. Cars - Sure-Grip Lubricant, No 1879414
Lincoln Continental - Special Lubricant, Part No COLY-19A508-B
Oldsmobile - Special Lubricant, Part No 531536
Pontiac - Multi-Purpose Hypoid Gear Lubricant
Rambler - American Motors "Twin-Grip" Lubricant
Studebaker - Studebaker "Twin Traction" Lubricant, No SP-50136
Jeep - Jeep Powr-Lok Differential Oil, Part No 94557



POWER-LOCK DIFFERENTIAL ASSEMBLY WITH BELLEVILLE SPRINGS (EXPLODED)

REMOVAL & INSTALLATION

Differential or Axle Assembly

See appropriate Conventional Rear Axle data for each car model

OVERHAUL

Procedures below are for Power-Lock Differential assembly only For other axle components and for specifications and checking, see appropriate Conventional Rear Axle Data for each car model .

Disassembly

Remove ring gear from case if either ring gear or case are to be replaced Remove differential bearing outer race from case if bearing is to be replaced Scribe mark both case halves for proper alignment at reassembly, and note cross shaft markings for proper reassembly Remove bolts holding assembly together and separate case halves Remove case cover half cross shaft, pinions, side gear, side gear ring, clutch plates and discs Remove same parts from flange half of case *NOTE - Keep parts for each case half together*

►*DISASSEMBLY CAUTION: Note exact sequence, position, and number of plates and discs in each clutch pack so that parts may be reassembled in identical arrangement "Belleville" (dished) typ plate and/or disc must have convex side away from center of differential*

Cleaning & Inspection

Clean and dry all parts Inspect for worn, pitted, or scored parts and replace as necessary *NOTE - Case halves must be replaced in pairs only* Replace clutch packs if any clutch disc or plate worn, cracked, or distorted

Reassembly

Install ring gear and new differential bearing outer race if these parts were removed On flange half of case, install clutch pack on side gear, install side gear ring in case half, then install side gear and clutch pack into case Install pinion gear and cross shafts (beveled sides of cross shafts must match ramps on case) Install other side gear, clutch pack, and retaining ring, aligning clutch plate lugs with slots in case Place other case half on assembly with scribe marks in alignment, then install assembly bolts and torque to 35-45 ft lbs (60-70 ft lbs on Model 60 & 70 axles) Check that metal-to-metal contact exists between pinion cross shafts and case "V" ramps If more than .002" clearance exists, clutch pack may have to be replaced

CHEVROLET TRUCK (EXCEPT ½ TON) HYPOID

Ch vr l t Truck, ¾, 1, 1½, 2-Ton (1963)

DESCRIPTION

Full-floatıng, hypoıd gear type, wıth straddle mounted pınıon shaft Desıgn ıs same as previous models

AXLE RATIO & IDENTIFICATION

Axle Ratio	℄ Serial No. Prefix
3 90-1	MG
4 57-1	MH,MJ,MP MQ,MM,MV,MX,MZ,MK
5 14-1	ML,MN,MR,MS,PA,PB,PL,PN,PC,PK,PM
5 83-1	PT
6 17-1	PS RP,RU
7 20-1	RB,RD,RF,RG,RH,RJ,RQ,RV,RX

℄ - Serıal number stamped on forward upper surface of dıfferentıal carrıer housıng

REMOVAL & INSTALLATION

Axle Shaft

5200 & 7200 Lb. Axle - Remove axle shaft flange-to-wheel hub bolts and lockwashers, and ınstall two ½"-13 bolts ın specıal threaded holes ın flange (between regular mountıng screw holes), then turn these screws up evenly to loosen shaft Remove shaft *CAUTION - Thoroughly clean all lubrıcant from axle shaft flange and end of wheel hub before ınstallıng axle shaft Grease at thıs poınt wıll cause loosenıng of axle shaft flange capscrews* To ınstall, reverse removal procedure and tıghten flange-to-hub bolts to 85-95 ft lbs

11,000 & 15,000 Lb. Axle - Remove hub cap and thread Remover J-1436-1 ınto tapped hole on axle shaft flange Install slıde hammer and remove shaft To ınstall, reverse removal procedure, and tap flange splınes ınto engagement wıth wheel hub splınes (ıf necessary, rotate wheel slıghtly to alıgn splınes on shaft wıth both wheel hub and dıfferentıal sıde gear splınes) Tıghten hub cap bolts to 11-18 ft lbs

17,000 lb. Axle - Remove flange to-hub retaınıng nuts, strıke center of flange wıth lead hammer to loosen flange and dowels, remove dowels from studs, and remove axle shaft To ınstall, reverse removal procedure, makıng sure shaft splınes are alıgned wıth dıfferentıal sıde gear and flange holes ındex wıth hub studs Tıghten stud nuts to 80-100 ft lbs *NOTE - There must be clearance between shaft flange and face of stud nuts No clearance ındıcates worn studs, dowels, or flange holes*

Differential Carrier

Draın lubrıcant, remove axle shafts, and dısconnect and tıe propeller shaft out of way Support carrıer, remove attachıng bolts, and roll carrıer from truck To ınstall, reverse removal procedure and tıghten carrıer attachıng bolts to 80-100 ft lbs

WHEEL BEARING ADJUSTMENT

Wıth axle shaft removed and wheel free to turn, remove nut lock and adjustıng locknut Turn ınner adjustıng nut to specıfıcatıons lısted below usıng tool lısted, then back nut off 1/8-turn to alıgn nearest slot wıth short tang on nut lock Install nut lock so tang engages adjustıng nut Make sure wheel turns freely, ınstall locknut and tıghten to specıfıcatıons lısted, then bend a tang of nut lock over locknut

Wheel Bearing Adjustment Specifications

Axle	Adjusting Nut Torque(Ft.Lbs.)	Tool	Locknut Torque (Ft. Lbs.)
5200,7200 lb	50-60	J-2222	175
11,000 lb	75-100	J-0870	250 mın
15,000 lb	75-100	J-5670	250 mın
17,000 lb	65	J-7341	135

OVERHAUL

See 1960 Fınal Data, Page 350 or later Manual edıtıon, and note the followıng:

Pinion Bearing - Pınıon bearıng on all models except 15,000 and 17,000 lb unıts ıs a double row ball bearıng No bearıng spacer ıs used Removal and ınstallatıon procedures are the same as for roller bearıngs

Pinion Installation & Depth Adjustment - All models use pınıon depth shıms between pınıon front bearıng and bearıng seat ın housıng Follow procedures for ¾ & 1-ton models for pınıon ınstallatıon and depth checkıng and adjustment

4-Wheel Drive Front Axles

CHEVROLET TRUCK (4-WHEEL DRIVE)

Ch vrolet ½ & ¾-Ton Trucks, 4-Wheel Drıve (1963)

DESCRIPTION

Spıcer Model 44-5F Full-floatıng, ıntegral housıng, hypoıd gear type wıth yoke and trunnıon type axle shaft unıversal joınts Dıfferentıal assembly ıs sımılar to dıfferentıal assembly used ın Spıcer 44 rear axle

AXLE RATIO & IDENTIFICATION

Axle ratıo stamped on draın boss on left sıde of case The followıng ratıos are avaılable 3 73-1 (½-Ton), 4 55-1 (¾-Ton)

AXLE SHAFT

Removal

Support truck wıth front wheel free Place draın pan under wheel and remove hub grease cap Remove axle shaft snap rıng and remove drıve shaft as follows On K10 models, pull splıned drıve flange from shaft and hub and remove spacer from hub On K20 models, remove stud nuts and washers, remove drıve flange and gasket On all models, remove gearıng locknut and lock rıng and remove adjustıng nut Remove wheel, hub and drum as an assembly Remove bolts and lockwashers holdıng brake flange plate and spındle to steerıng knuckle Remove flange plate from steerıng knuckle and support the plate so brake hose wıll not be damaged Slıde spındle from shaft and remove axle shaft and joınt assembly

Wheel Bearing Adjustment

Adjust bearıngs by tıghtenıng nut usıng "T" handle wrench (12" long on each sıde) Rotate drum and tıghten snugly Loosen nut 45° and assemble lockwasher by loosenıng nut to nearest hole, then assemble outer nut Tıghten nut to 40 ft lbs

STEERING KNUCKLE

Removal

Wıth axle shaft assembly removed (see above), dısconnect steerıng connectıng rod from steerıng arm, then dısconnect tıe rod from steerıng knuckle Remove 2-pıece seal retaıner from knuckle Remove felt seal rubber seal, and seal rıng from knuckle (let these pıeces hang on axle housıng so they can be kept ın proper order) Remove upper and lower bearıng retaıners and shıms from knuckle Remove steerıng knuckle from axle housıng, then remove bearıng cones from axle housıng

Bearing Cup Replacement - If new bearıngs ınstalled, remove cups from axle housıng, then press new cups fırmly to bottom of counterbore

Seal Replacement - If new seals and retaıner beıng ınstalled, hang them on axle housıng ın same order as old parts (felt seal ınboard, rubber seal then seal rıng outboard)

Installation & Adjustment

Install bearıng cones ın axle housıng cups, then ınstall steerıng knuckle and bearıng retaıners Use same number and sıze shıms as removed and tıghten bearıng retaıner bolts or nuts to 25 ft lbs Check bearıng preload as follows On 44-5F models, steerıng knuckle should turn wıth 11-20 lbs pull (sprıng scale ın tıe rod hole) Adjust by changıng shıms at upper bearıng On 44-5HDF models, knuckle should turn wıth 15-35 lbs torque (torque wrench on upper bearıng retaıner nut) Adjust by changıng shıms at lower bearıng *NOTE - Upper bearıng shım pack must be maıntaıned at .060" thıckness* On all models, ınstall seal rıng, rubber seal and felt seal agaınst ınboard face of steerıng knuckle, then ınstall 2-pıece retaıner Connect steerıng connectıng rod and tıe rod Install axle shaft assembly and make wheel bearıng adjustment (see above)

AXLE ASSEMBLY

Removal

Dısassemble propeller shaft from front axle dıfferentıal Raıse front end of truck to remove weıght from sprıngs and support truck on stands placed behınd front sprıngs Dısconnect connectıng rod from steerıng arm and brake hoses from frame fıttıngs, shock absorbers from axle brackets and dısconnect U-bolts from axle Roll front axle from under truck

DIFFERENTIAL

Overhaul

See 1959 Fınal Data, Page 341, or later Manual edıtıon and note the followıng·

Pinion Bearing Preload - Wıth pınıon depth adjustment properly determıned, and pınıon shaft correctly ınstalled wıth pınıon flange nut tıghtened to 200-220 ft lbs , pınıon shaft turnıng torque should be 10-20 ınch-lbs Adjust pınıon bearıng preload by addıng or removıng shıms behınd outer bearıng cone

FORD TRUCK (4-WHEEL DRIVE)

F rd Truck F-100 & 250 4-Wh l Driv (1963)

DESCRIPTION

Spicer Models 44-6F & 44-6HDF. Full-floating, hypoid gear type with Spicer "Cross Type" universal joints. Differential assembly is similar to differential assembly used in Spicer Model 44 rear axle.

AXLE RATIO & IDENTIFICATION

Ratio code is last digit stamped under AXLE on truck patent plate. Ring gear and pinion tooth combination stamped on ratio tag on axle housing cover.

Axle Ratio	℄ Code
3.92-1 (47-12)	A
4.56-1 (50-11) Standard	B
4.56-1 (50-11) Heavy Duty	D

℄ - Stamped under AXLE on truck patent plate.

REMOVAL & INSTALLATION

Axle Shaft

Removal - Remove hub grease cap, hub retaining snap ring, slide driving hub from between axle shaft and wheel hub and remove driving hub spacer. Remove locknut, washer and wheel bearing adjusting nut from spindle and remove wheel, hub and drum assembly (outer bearing will also come out). Remove inner bearing Remove oil baffle from brake carrier plate Remove brake carrier plate and spindle from spindle arm (unnecessary to disconnect brake line). Support carrier plate. Remove axle shaft assembly

Installation & Wheel Bearing Adjustment - Install axle shaft assembly. Install spindle and brake carrier plate on spindle arm, tighten retaining screws and install oil baffle. Install wheel inner bearing on spindle, driving hub spacer, and wheel outer bearing and adjusting nut While rotating wheel forward and rearward, tighten bearing adjusting nut with Tool T59T-1197-A until bearings are firmly seated and then back off adjusting nut 1/8 turn (45°). Install lockwasher on spindle (locking dowel on adjusting nut must enter lockwasher hole most closely aligned with dowel) Torque locknut to 40 ft. lbs. Install driving hub, snap ring and grease cup. Fill spindle arm with proper lubricant.

Spindle Arm

Removal - With axle shaft removed (see above), disconnect steering drag link from spindle arm and spindle connecting rod at both spindle arms. Remove 2-piece seal retainer from spindle arm, felt, rubber and steel rings from spindle arm (place on axle housing). Remove upper and lower spindle arm bearing caps and shims and remove spindle arm. Remove upper and lower spindle bearings with Tool T58L-101-A inserted in bearing and Puller Tool T50T-100-A

Installation - Make sure felt and rubber seals and steel retainer are placed on axle housing in same order as removed (felt seal toward center of truck, then rubber seal and steel retainer). Install upper and lower spindle spindle bearing cups in axle housing with Handle T-53L-200-A and Driver T57P-4625-A and place bearing in cups (retain lower bearing with wheel bearing grease). Install spindle arm on axle housing and install upper and lower bearing caps (use old shims for a trial pack) .Torque bearing cap bolts and stud nuts to 25 ft lbs Check the bearing preload by rotating spindle arm with an **inch-p und** torque wrench installed on one of the bearing cap bolt heads. Turning torque should be 50-70 inch-pounds. Adjust shim pack at bearing caps to obtain correct preload. Install steel retainer, rubber and felt seals and 2-piece retainer. Connect spindle connecting rod and drag link.

Axle Housing Assembly

Removal - Raise truck so front axle hangs freely. Remove axles and spindle arms (see above). Disconnect shock absorbers at lower end and front drive shaft at pinion flange. Support axle and remove spring clip (U-bolt) nuts and spring seats Remove axle assembly.

OVERHAUL

Procedures and specifications are the same as for Spicer Model 44 rear axle *See "Ford Truck Int gral Housing Hypoid" in this section*

JEEP, UTILITY & FORWARD CONTROL (4-WHEEL DRIVE)

J ep, All With 4-Wheel Drive Front Axle and Leaf Springs (1963)℄

℄ - *For Rear Axle, see "Spicer Hypoid" in this section.*

DESCRIPTION

Spicer Models 25, 27AF, 44-1F, and 44F. Full-floating, integral housing, hypoid gear type with "Spicer Cardan Cross", "Bendix", or "Rzeppa" constant velocity universal joints. Differential assembly is similar to differential assembly used in rear axle.

AXLE RATIO & IDENTIFICATION

Axle model number cast into a web on axle housing. Axle ratio stamped on metal tag attached to a housing cover bolt. Power-Lock differential identified by "T" on cover ratio tag and by a lubrication caution tag on filler plug.

Axle Ratios

8.73 (41-11)	4.27 (47-11)	5.38 (43-8)
4.10 (41-10)	4.89 (44-9)	5.89 (53-9)

AXLE SHAFT

Axle Shaft & U-Joint Removal

Remove wheel, hub cap, axle shaft nut and washer. Take out drive flange capscrews and remove flange with puller. Bend lip of bearing adjusting nut lockwasher out, remove locknut, lockwasher, adjusting nut, and bearing locking washer. Remove wheel hub and bearing assembly. *CAUTION - Us care n t to damag il seal.* Disconnect brake tube, take out mounting screws on backing plate, remove backing plate and wheel spindle. Pull axle shaft and universal joint assembly out of housing. To install, reverse removal procedure and adjust front wheel bearings and bleed brakes after installation completed.

Wheel Bearing Adjustment

Tighten inner adjusting nut until there is a slight drag on the bearings as the hub is turned, then back off nut 1/6-turn and install locking washer and nut. Tighten locknut securely and bend lockwasher over the locknut.

STEERING KNUCKLE

Disassembly

First remove hub and brake drum assembly, wheel bearings, axle shaft and universal joint assembly, wheel spindle, and steering tie rod socket. Remove screws holding oil seal retainer halves, remove screws retaining upper and lower bearing caps. Withdraw bearing cap and stub shaft assemblies. *CAUTION - Do not lose bearing adjusting shims under top bearing cap.* Lift steering knuckle off axle housing. If necessary to remove bearing cups from axle housing, use special driver, Tool W-138. Wash all parts in cleaning solution and inspect bearings for wear, scores, or cracks.

Reassembly & Bearing Adjustment

Reverse disassembly procedure and note the following: Install one each .003", .005", .010", .030" shims at the top bearing only. *NOTE - A shim pack of .058" thickn ss is add d at bottom face of kingpin boss on st ring knuckl s at production. Maintain this shim pack at bottom and make adjustments at the top only.* Install bearing caps, lockwashers, and screws and tighten securely. Check preload on bearings by hooking a spring scale in hole in knuckle arm for tie rod socket. Take a reading when knuckle has just started its sweep Kingpin bearing preload should be 12-16 lbs. with seal and axle shaft removed Remove or add shims to secure this preload A washer may be added between end of cap and bearing when removal of all shims does not correct preload.

Oil Seal Assembly

Before installing oil seal felt, make a diagonal cut across top side of felt so it may be slipped over axle. Install assembly as follows: Split oil seal, backing ring assembly, oil seal felt and the two seal retainer plate halves. Install eight retaining screws.

AXLE ASSEMBLY

Removal

Support front of truck securely with a chain hoist, remove front wheels. Disconnect front shock absorbers, front brake line (at frame connection), and steering linkage at idler lever on frame front crossmember. Disconnect propeller shaft by removing universal joint "U" bolts at axle end of shaft. Place support jacks under axle housing so that springs are relieved of weight, remove nuts on spring center clip "U" bolts, remove bolts at rear end of springs and lower springs. Remove axle assembly from below.

OVERHAUL

See 1959 Final Data, Page 341, or later Manual edition.

BUICK & OLDSMOBILE PROPELLER SHAFT ALIGNMENT

Buick (1963)
Buick Special (1963)
Oldsmobile (1963)
Oldsmobile F-85 (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK RIVIERA ACCELERATION SHUDDER CORRECTION* To reduce acceleration shudder, universal joint angle settings have been revised See below for latest specifications

►*PROPELLER SHAFT HANDLING CAUTIONS: To prevent damage to constant velocity universal joint center metal ball when removing shaft assembly from car or when handling the assembly after it is removed, care must be used to support shaft on both sides of constant velocity joint if shaft is moved horizontally Do not allow one end of shaft to hang free or allow universal joint to bend at a sharp angle Shaft assembly may be carried in a vertical position without damage to constant velocity universal joint*

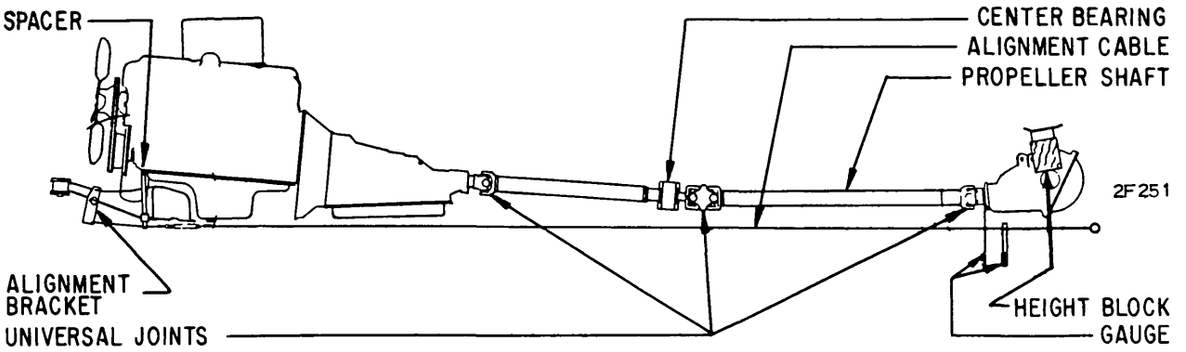
DESCRIPTION

Measurement of rear universal joint angle for correct propeller shaft alignment is accomplished by the use of a spring-loaded steel cable stretched between front of chassis and rear axle carrier, on centerline of propeller shaft When rear universal joint angle is adjusted correctly, the steel cable will clear underside of pinion flange by a definite amount

CHECKING & ADJUSTING

Buick (Except Special)

All (Exc pt Riviera) - Use Alignment Set, J-8973 as follows Raise rear of car body and install Rear Tubular Spacers, J-8973-19, with upper end over head of rear compression bumper mounting bolt (each side of car) and with lower ends of spacers resting on axle housing, then lower car body onto spacers (place weight in truck if necessary so body rests firmly on tubes) Remove nut from differential carrier mounting stud on each side of lowest stud Install two special flat washers over studs, then install Bracket J-8973-16 with bent edge toward front and slot to right, using original stud nuts Attach hook of Bracket J-8973-15 over center of front frame crossmember, then with shallow slot of Engine Height Plate J-8973-14 down, place wide upper end against flange of engine oil pan being certain plate rests on flat part of pan flange With cable in lower notch of height plate, pull cable tight and hook through a slot in rear bracket so one of the stops is to rear of bracket Measure perpendicular distance from machined surface immediately in front of rear pinion flange slinger to top of cable Distance should be 3 1/4" ± 1/32" on 4400 & 4600 Series, 3 3/8" ± 1/32" on 4800 Series If not within specifications, adjust length of rear upper control arm as necessary (install adjusting bolt through set of holes that most nearly coincide) Tighten bolts to 60 ft lbs and recheck measurement



PROPELLER SHAFT ALIGNMENT GAUGE TOOL INSTALLATION

Riviera - Using Alignment Set J-8973 installed as detailed above, check distance from top of tool cable to the following **three** points· 1) Machined surface immediately in front of rear pinion flange slinger Distance should be 6 5/32" ± 1/32" Adjust by changing length of rear upper control arm 2) Bottom of front propeller shaft just forward of center bearing between bearing and damper rings Distance should be 5 19/32" ± 1/32" Adjust by changing shim thickness under center bearing support 3) Lower surface of front propeller shaft yoke shaft immediately to rear of transmission rear bearing retainer Distance should be 3 1/2" ± 1/32" Adjust by adding or removing shims between transmission and rear mount

Buick Special

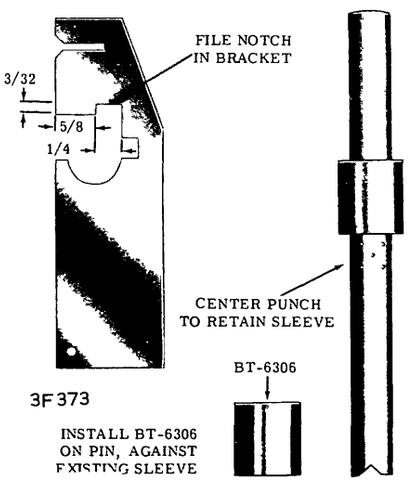
Use Alignment Set J-8973 as follows. Raise rear of car body and install Spacer Blocks J-8973-20 (Station Wagon), J-8973-21 (Sedans) so slots straddle rubber bumpers Hold spacer block up against bumper mounting straps and allow car to settle until axle housing tubes contact blocks Remove differential cover bolt on each side of lowest bolt, then using these two bolts, attach Rear Bracket J-8973-16 so slotted part of bracket is vertical Tighten bolts securely Engage Front Attaching Bracket J-8973-13 in front crossmember assembly using hole immediately to rear of front mount Hook slot of bracket into rear of hole Install Engine Height Plate J-8973-14 so upper end bears against oil pan between the two oil pan rear bolts Install cable in notch of height plate, pull cable tight and hook into rear bracket so one of stops on cable is to rear of bracket slot Measure perpendicular distance from top of cable to machined surface immediately in front of slinger on pinion rear flange Distance should be 3 3/16" ± 1/32" If not within specifications, add or remove shims between lower control arm forward mounting brackets and underbody side rail *Shims must be added or removed equally on both sides of car*

Oldsmobile 88, S88, 98

Use Tool BT-30-1 and BT-30-2 modified as shown in illustration Connect cable at front frame crossmember, see diagram Install rear bracket on the two lower right studs on differential carrier Hook cable in upper hole on rear bracket, then install spacer between cable and bottom of front engine mount Install wood blocks between rear axle housing and rubber bumpers Install hold-down clamps around axle housing (lower hook end should point toward front end of car) Install upper hook into 3/4" hole in frame immediately above axle housing Adjust turnbuckles on clamps until wood blocks fit snugly between axle housing and rubber bumpers Position height gauge between cable and differential (see diagram), and check alignment If cable is not within limits of gauge notch, correct nose angle by changing length of lower suspension arm

Oldsmobile F-85

Use Alignment Tool BT-30-2 and install on car in the same manner as for Buick Special (above), including special spacer block between axle housing tubes and rubber bumpers With indicator of tool set placed against differential pinion companion flange, cable must be in correct notch of gauge To adjust, add or remove shims from front of rear lower suspension arm *NOTE - The same number of shims must be added or removed on both sides of car A 1/8" shim will change differential nose angle approximately 1/16"*



OLDSMOBILE TOOL BT-30 MODIFICATION

CHRYSLER CORP. PROPELLER SHAFT ALIGNMENT

Chrysler & Imperial (1963)
Dodge & 880 (1963)
Plymouth (1963)
Valiant (1963)

ADJUSTMENT

Car weight must be on wheels (use drive-on type hoist or platform), fuel tank must be full, and there must be no extra weight in trunk

Using Spirit Level Protractor

1) Remove rebound plate and bumper from top of differential carrier housing Place spirit level protractor on machined surfaces of rebound plate bosses. Level bubble and note reading *NOTE - Carrier housing should incline downward slightly. To adjust, install a tapered shim between rear spring and seat on axle housing with thick end toward rear of car.* Recheck angle.
2) Place protractor on underside of propeller shaft near rear universal joint Center bubble and note reading **Add** this reading and pinion angle reading (above). Total should be 1-3°. Add or remove shims as above (between rear spring and seat on axle housing) to obtain this angle. Install rebound plate and bumper.

Using Gauge J-6845

NOTE - Check shaft indexing by unscrewing cap seal retainer. "O" mark on splined yoke should line up with keyway in shaft. With car level and weight of car on the wheels, remove differential carrier rebound bumper plate. Remove shims from both rear axle control strut frame brackets (Imperial only) Place Gauge J-6845 on machined pads of differential carrier and center the bubble *NOTE - Level of gauge must be on same side of propeller shaft each time gauge is used.* Place gauge on rear propeller shaft near rear universal joint Entire bubble should be within three graduations from center of gauge If edge of bubble is ahead of the third graduation, change rear axle pinion angle as follows: Install 2° tapered shims between both rear springs and axle housing pads with thick edge of shim toward **front** of car Tighten spring U-bolt nuts and install shims behind control strut brackets so space is filled (Imperial only). Tighten brackets Install differential carrier rebound bumper plate.

Center Bearing Height (Imperial)

Install Gauge Adapter part of Tool J-6845 on front propeller shaft near front universal joint Place gauge of tool on rear propeller shaft at rear universal joint and adjust gauge to center bubble Attach gauge to pins on adapter. For each graduation leading edge of bubble is **forward** of center, **add** one shim under center bearing housing bracket For each graduation trailing edge of bubble is to **rear** of center **remove** one shim from under center bearing bracket

CHEVROLET (PASS. CAR) PROPELLER SHAFT ALIGNMENT

Chevrolet Pass. Cars (1963)

CHECKING & ALIGNMENT

Front shaft angle "A", rear shaft angle "B", pinion shaft angle "C", and frame riding height "D" must be with n limits as shown in table below *NOTE* - When car driven continuously at maximum load conditions, angle "B" may be increased approximately ¼-½° (in negative direction).
Angle "A" - Is relation of engine angle to front propeller shaft angle Place protractor on rocker arm cover for engine angle, up against front propeller shaft for front shaft angle *NOTE* - DO NOT lean on front fender when taking engine angle
Angle "B" - Is relation of front and rear propeller shaft angles To determine rear propeller shaft angle, place protractor up against rear propeller shaft
Angle "C" - Is relation of rear propeller shaft angle to pinion shaft angle. To determine pinion shaft angle, rotate rear universal joint to bring machined surface down parallel with floor and place protractor on this surface
Riding Height "D" - Is distance from top of axle housing to frame kick-up. This measurement must be equal within ¼" on each side of car.
NOTE - Support car on tires, ramp, or twin post hoist (not on frame hoist) when making angle checks.

Determining Angles

Angles "A", "B", "C" are the result of subtracting rearmost of the two angles from preceding one (example - Engine angle minus front propeller shaft angle), except when second angle is "up at rear" (higher at rear of protractor than at front), the second angle should be added to first one

Correcting Angles

Std. Procedure - **1)** When angle "A" is not correct, change number of shims under transmission support Adding shims reduces angle, removing shims increases angle
2) When angle "C" is incorrect, change number of shims at upper arm attaching point. Adding shims reduces angle, removing shims increases angle *NOTE - Correcting angles "A" and "C" should automatically correct angle "B".*
Optional Procedure - For correcting angles "A" and "C", loosen or remove frame center bearing support bolts (under center section) and insert transmission shims between frame section and the support inside drive shaft tunnel. *CAUTION - Always recheck angles "A" and "B".*

VIBRATION NOTE - If objectionable vibration exists when joint angles are within specifications, readjust angle toward opposite limit (high toward low or low toward high limit)

Angles & Height Specifications

Angle "A"	**Angle "B"**
Pos 2½-3° ①	② Neg 1-1½°
Angle "C"	**H ight "D"**
Pos 2¾-3⅛° ③	6 1/4" ± 3/8"

① - Pos 2¾° desired. ② - Neg 1¼° desired
③ - Pos. 3° desired

LINCOLN CONTINENTAL PROPELLER SHAFT ALIGNMENT

Lincoln Continental (1963)

PROPELLER SHAFT ANGLE

Vibration or "shudder" upon fast acceleration, or when coasting using engine as a brake, may be caused by either rear axle being loose in springs or by excessive pr r shaft angle. Propeller shaft angle is the result of Pinion Nose Angle in relation to Riding Height with "U" bolt nuts tight

ADJUSTMENT

Pinion Nose Angle - Place vehicle on known level surface that will allow access to rear axle pinion nose Drill a small hole in common protractor at exact center of base (0°) line, and insert a line through hole with a light weight attached for bob Place base of protractor vertically against front face of pinion housing and read where line crosses scale
Riding Height - Place vehicle on smooth level floor Inflate tires to 24 lbs with full fuel tank and all loading removed from passenger and luggage compartment Push rear bumper down (at center) 1" and release slowly. Measure distance from top center of axle housing to top of frame kick-up at rear of bumper bracket Raise center of bumper 1" and release slowly and again measure distance Average of two readings is true riding height Riding height should be 7 2-8 5" with 8" normal

Riding Height	**① Pinion Nos Angle**
6 inches	4° Down
7 inches	3½° Down
8 inches	3° Down
9 inches	2½° Down

① - Tolerance ±¼°

Check Pinion Nose Angle with Riding Height as shown in table above When Nose Angle does not correspond with Riding Height, remove rear axle "U" bolt nuts and install appropriate wedges(½, 1, & 1½°) between each spring insulator upper retainer and axle housing mounting pad, with no more than one wedge to be used on a side Install "U' bolts and torque to 50-60 ft lbs *NOTE - Be sure lower insulator retainer contacts upper retainer.*

STUDEBAKER PROPELLER SHAFT ALIGNMENT

Studebaker, All Models (1963)

ALIGNMENT CHECK & ADJUSTMENT

Raise rear wheels off floor and put transmission in neutral. Clean propeller shaft with sandpaper. With dial indicator, measure runout of propeller shaft at front, center, and rear, while turning shaft slowly by hand. *NOTE - Make measurements about 1½" back from weld joint.* Maximum runout should be .010" at front or rear and .015" at center. If not within limits, check flanges of transmission and differential. Measure shaft runout at end nearest flange and mark flange at highest runout. Disconnect universal joint, rotate flange 180° and reassemble. Check runout again. If high side of runout is still on same side, flange is faulty. If rotating flanges does not correct runout, replace shaft and/or flange.

ANGLE CHECK & ADJUSTMENT

Checking

Check angles with level gauge or protractor. *NOTE - Manufacturer recommends use of Special Protractor Gauge J-7181.* Raise car on drive-on type hoist with weight on wheels and frame level. Bounce body up and down several times to normalize spring position and DO NOT DISTURB this position when taking angle checks.

Front Universal Joint Angle - Place gauge against clean surface of propeller shaft near front universal joint, so pendulum or pointer is free to swing. Move protractor scale so pointer is set at 90° mark. Remove gauge (do not disturb setting) and place it on clean bottom surface of starter housing. When pointer comes to rest, read degrees indicated from 90° mark. This reading is front universal joint angle and should be 4-5°.

Rear Universal Joint Angle - Proceed as for Front Universal Joint Angle check except in second operation, place adjusted gauge vertically against forward edge of differential housing in back of universal joint. *CAUTION - Gauge must not contact pinion bearing oil seal.* When pointer comes to rest, read degrees indicated from the 180° mark. This reading is rear universal joint angle and should be 4½-5½°. *NOTE - For best results, there should be approximately ½° greater angle at rear than at front.*

Adjustment

To change **front** universal joint angle, add or remove shims or spacer washers at engine rear support insulators. To change **rear** universal joint angle, add or remove wedge type caster shims at axle pad and rear springs.

PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE

Pontiac Tempest (1963)

DESCRIPTION

Flexible type propeller shaft enclosed within a rigid torque tube and ball bearing assembly. Rubber insulator assemblies, pressed on ball bearings, support bearings in torque tube.

TORQUE TUBE & PROPELLER SHAFT

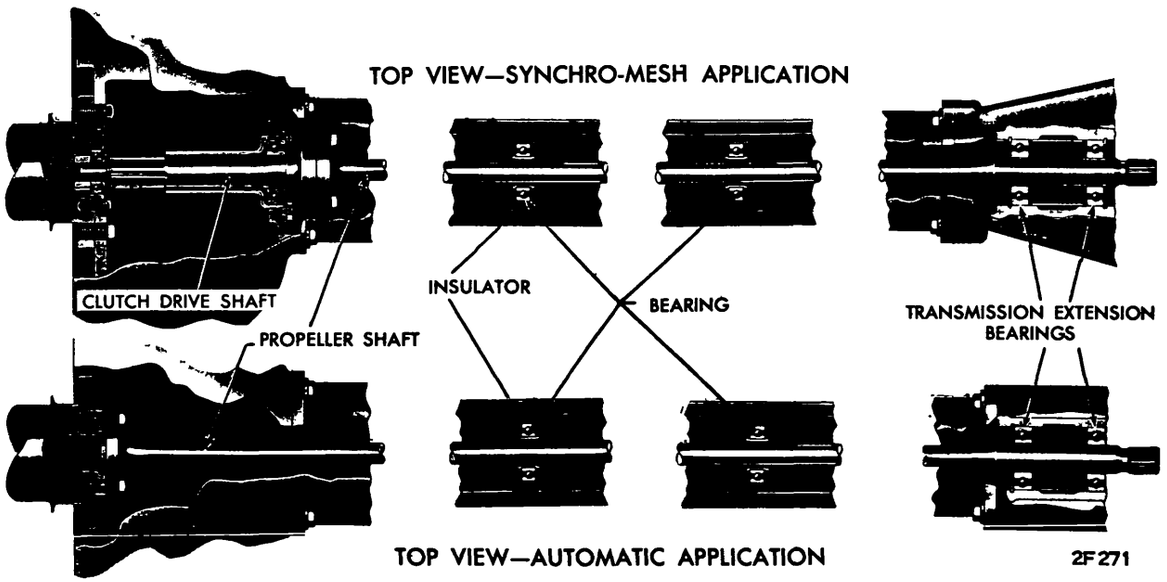
Removal

Synchro-mesh Trans. (All Engines) - Remove parking brake cable from torque tube, then remove complete exhaust system (break at engine and slide system off). Remove gearshift housing, and flywheel housing bottom cover. Remove torque tube access cover. Remove bolts from propeller shaft flange and place a piece of rag or rubber hose between propeller shaft and torque tube to prevent damage to coating on shaft, then disconnect torque tube from flywheel housing. Support torque tube and pry away and down from housing. Put a 2" square wood block between transmission extension and car floor to position transmission for reassembly. Remove torque tube-to-transmission bolts. *CAUTION - Torque tube and propeller shaft are now held in place only by bearings in transmission extension and must be supported to prevent bearing or shaft damage.* Remove torque tube and shaft as an assembly by pulling on propeller shaft flange. *CAUTION - Pull propeller shaft straight out of transmission so that shaft will not bind in transmission or transmission extension.* Place assembly on a bench and pull propeller shaft out of torque tube. *CAUTION - DO NOT damage coating on propeller shaft.*

Automatic Trans. (4 Cyl.) - Remove parking brake cable and vacuum line from torque tube, then remove stabilizer bar. Remove exhaust system (break at engine and slide system off). Remove flywheel bottom cover, then disconnect propeller shaft from flywheel. Back bolts holding torque tube to flywheel housing out about half-way. Place a rag or rubber hose between propeller shaft and torque tube to prevent damage to coating on shaft, then pry propeller shaft flange to rear sufficiently for pilot to clear recess in flywheel. Disconnect torque tube from flywheel housing and put a 2" square wood block between transmission extension and car floor to position transmission for reassembly. Remove torque tube-to-transmission bolts. *CAUTION - Torque tube and propeller shaft are now held in place only by bearings in transmission extension and must be supported to prevent damage to bearing or shaft.* Remove shaft and torque tube assembly by pulling on shaft flange. *CAUTION - Pull shaft straight out of transmission so shaft will not bind in transmission or extension.* Place assembly on a bench and pull propeller shaft out of torque tube. *CAUTION - DO NOT damage coating on propeller shaft.*

Automatic Trans. (V8) - With car supported under body side rails (rear wheels hanging freely), drain transmission and remove filler tube. Remove rear wheels and brake drums. Disconnect axle shaft bearing retainer from brake backing plate, and pull axle shafts outward far enough to remove universal joints from differential and carrier assembly (do not drag splines on lip of oil seal). *NOTE - Cover universal joint splines for protection.* Disconnect speedometer cable,

(Continued)



PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE ASSEMBLIES

PONTIAC TEMPEST PROPELLER SHAFT & TORQUE TUBE (C nt.)

transmission control cable, downshift electrical connector, retaining clip, vacuum modulator line, and parking lock control cable from transmission Remove parking brake cable from torque tube, and disconnect exhaust system from rear tail pipe hanger Remove flywheel bottom cover Disconnect propeller shaft flange from flywheel Place a rag or rubber hose between propeller shaft and torque tube to prevent damage to coating on shaft Support torque tube and transaxle separately, then disconnect torque tube from flywheel housing Remove axle support crossmember-to-insulator bolts and disconnect rear lower control arms from differential housing Remove axle support crossmember from transaxle by lowering transaxle slightly (for access to attaching bolts) Lower transaxle until top of torque converter clears fuel tank, then pull rearward until propeller shaft comes out of flywheel housing Remove torque tube-to-transmission bolts *CAUTION - Torque tube and propeller shaft are now held in place only by bearings in transmission extension and must be supported to prevent bearing or shaft damage* Remove shaft and torque tube assembly by pulling on shaft flange *CAUTION - Pull shaft straight out of transmission so shaft will not bind in transmission or extension* Place assembly on a bench and pull propeller shaft out of torque tube *CAUTION - DO NOT damage coating on propeller shaft*

Installation

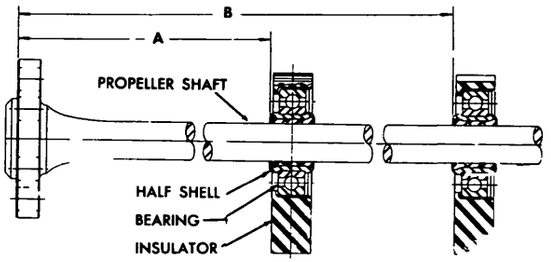
Synchro-mesh Trans. (All Engines) - With propeller shaft installed in torque tube, place rag or rubber hose between shaft and tube to protect shaft Coat spline with axle oil and install shaft into extension seal *CAUTION DO NOT let shaft rest on seal* Engage spline into transmission and journal diameter into transmission extension bearings (do not damage journal surface) *CAUTION - Check spline alignment into transmission extension, and if absolutely necessary, tap front flange lightly with a soft rubber hammer Be sure splines are completely engaged in transmission* Tighten torque tube-to-transmission extension bolts to 30-45 ft lbs , then remove wood block from between transmission and car floor Tighten torque tube-to-flywheel housing bolts finger tight, then tighten propeller shaft-to-clutch drive shaft bolts finger tight Remove rag or rubber protector Tighten propeller shaft flange bolts and torque tube-to-flywheel bolts to 30-45 ft lbs Install torque tube access cover and tighten bolts to 40-80 inch-pounds Install gearshift housing and exhaust system

Automatic Trans. (4 Cyl.) - Installation procedure is same as for synchro-mesh cars (above) Install stabilizer bar before installing exhaust system, then install parking brake cable and vacuum line

Automatic Trans. (V8) - Place a rag or rubber hose between propeller shaft and torque tube to protect shaft coating, support torque tube, and attach to flywheel housing, tightening bolts to 30-45 ft lbs Remove rag Install propeller shaft on flywheel and tighten bolts to 30-45 ft lbs Install support crossmember on transaxle and tighten bolts to 40-55 ft lbs Coat shaft spline with axle oil and install shaft into extension seal *CAUTION - DO NOT let shaft rest on seal* Engage spline into transmission and journal diameter into transmission extension bearings (do not damage journal surface) *CAUTION - Check spline alignment into transmission extension, and if absolutely necessary, tap front flange lightly with a soft rubber hammer Be sure splines are completely engaged in transmission* Connect torque tube to transmission extension and tighten the bolts to 30-45 ft lbs Install transaxle support crossmember to rear crossmember and tighten bolts to 40-55 ft lbs Connect control arms to differential housing and tighten pivot bolts to 100-125 ft lbs Install transmission control cable, downshift electrical connector, retaining clip, speedometer cable, vacuum modulator line, and parking lock control cable Install axle shaft universal joint splines into differential (do not damage side cover oil seals) Connect parking brake cable to torque tube, and exhaust system to rear tail pipe hanger Install axle bearing retainer and tighten nuts to 30-45 ft lbs Install wheels and brake drums, flywheel housing bottom cover, fill transmission, and lower car

USAGE	DIM A	DIM B
21 AUTO TRANS	27 21/32	54 13/32
22 AUTO TRANS	27 21/32	54 13/32
3 SPEED S M T	20 29/32	47 21/32
4 SPEED S M T	20 29/32	47 21/32

3F375



CENTER BEARING LOCATING DIMENSIONS

PROPELLER SHAFT BEARINGS

Removal

Use Tool Set J-9528, Parts 3 & 4, to pull bearing off half-shell, then remove half-shells from propeller shaft Support insulator with J-7022 or suitable tool and press bearing from insulator using a socket

Installation

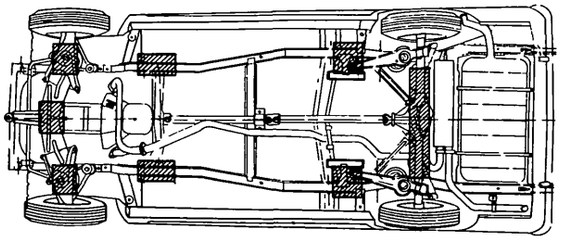
Place half-shells on shaft at dimensions indicated in illustration and clamp in position with Tool Set J-9528, Parts 1 & 2 Place bearing and insulator on shaft between arrows on tool parts 1 & 2, install tool part 4 on shaft and install bolts through tool parts 1 & 2 and into tool part 3 Tighten bolts evenly so tool does not cock and tighten until tool is completely closed (this will locate bearing on half-shell) Remove tool from shaft and inspect for centering (nibs on each side of I D) Also make sure shells are not cocked or edge damaged (will cause rubber-to-metal bond failure)

BUICK & BUICK SPECIAL

Jacking & Hoisting: All Cars - *CAUTION - When lifting at lower control arm, lifting pad must not contact steering arm or linkage or damage will result.*

Buick Special - Jack or lift car at points shown in illustration.

Buick - Jack car at spring seat on front lower control arms or center of front crossmember (front), and along entire length of rear axle housing (rear). Lift car at front frame side rails just forward of body floor pan (front), and rear of frame side rails at lower control arm front pivot (rear).



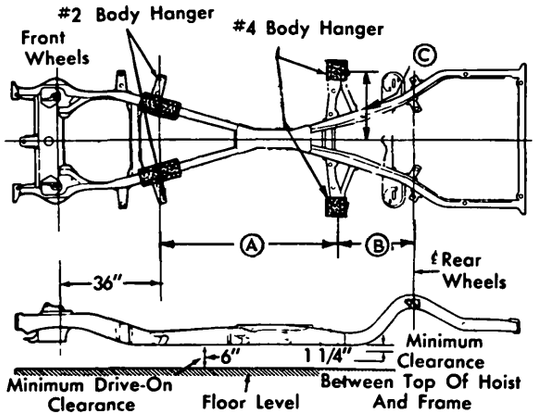
BUICK (SPECIAL) FRAME CONTACT POINTS 2A88

CADILLAC

Hoisting: Hoisting equipment that engages suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipe and mufflers. When using a frame contact type hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration. Take care to prevent hoist adapters contacting any part of the No. 2 body hanger. Hoist contact at rear should be at outer ends of No. 4 body mounting brackets. In no case should rear contacts be less than 32½" apart. *CAUTION - Hoist should not contact rear lower control link front mounting bracket. DO NOT lift Series 75 or Commercial Chassis cars on frame contact hoist as severe stress and misalignment will result due to length of frame and car.*

Cadillac Frame Dimensions

Series	Dimension A	Dimension B	Dimension C
60 & 62	64.50"	29.50"	16.25"



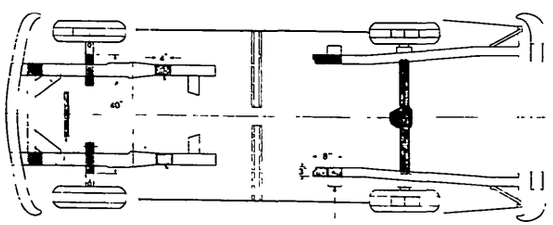
CADILLAC FRAME CONTACT POINTS 2A89

CHEVY II

Jacking (Bumper Jack): Locate bumper jack under bumper at point of attachment to support. *See diagram.*

Jacking (Floor Jack): Floor jack can be located under lower control arms, rear axle housing, forward ends of rear frame members, both ends of front frame members and front crossmember (located just forward of oil pan). *See diagram.*

Hoisting (Frame Contact Hoist): Position hoist so contact is made at forward end of rear frame members and rear ends of front frame members. *See diagram.*

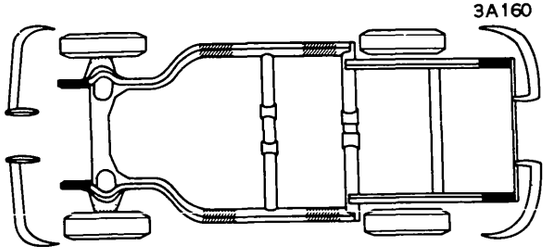


CHEVY II FRAME CONTACT POINTS 2A87

CHEVROLET CARS & CORVETTE

Hoisting: Equipment engaging suspension, axle, or wheels is preferred. With this type equipment, use caution to prevent damage to shock absorber mounts, exhaust pipes and mufflers. When using a frame contact hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration.

3A160



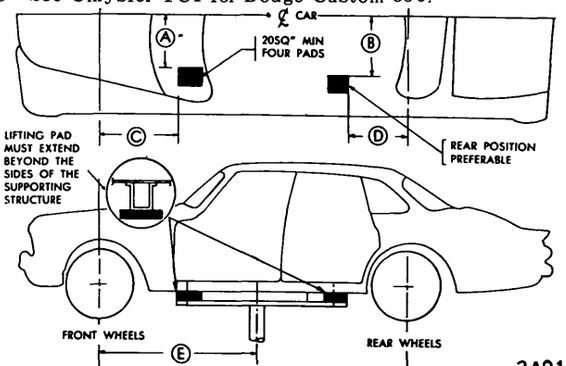
CORVETTE FRAME CONTACT POINTS

CHRYSLER, DODGE, DODGE DART, LANCER, PLYMOUTH, VALIANT

Hoisting (Frame Contact Hoist): This type hoist must be equipped with proper adapters so car will be supported in correct places as shown in illustration, and to specifications listed below.

	A	B	C	D	E
Chrysler TC1, 2	16.50"	17.25"	24"	22"	54"
Chrysler TC3	16.50"	17.25"	28"	22"	53"
Dodge ℂ	16"	17.50"	26.5"	20"	53"
Dart	14:20"	16.20"	20.3"	23.7"	48"
Plymouth	16"	17.50"	26.5"	20"	53"
Valiant	14.20"	16.20"	20.3"	23.7"	48"

ℂ - See Chrysler TC1 for Dodge Custom 880.



CHRYSLER, DODGE, DART, PLYMOUTH & VALIANT FRAME CONTACT POINTS (TYPICAL) 2A91

CHEVROLET TRUCKS

Jacking: Following list of jacking points will assist wheel and tire assembly changes with vertical type emergency jacks supplied with trucks.

Front

10, 20, 30 Models - Lower arm pivot or torsion bar socket.

40 Models - Frame side rail ahead of steering gear or idler support.

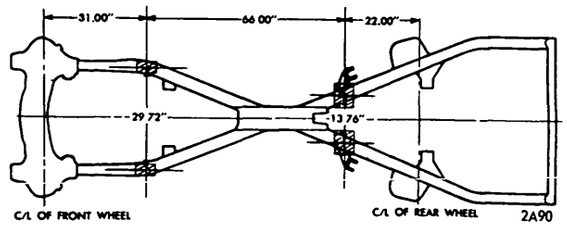
50, 60 Models - Frame side rail behind front crossmember. Use hardwood block between front crossmember and upper control arm to reduce jack travel.

Rear

10, 20, 30 Models - Axle housing.

40 Models - Spring, ahead or behind axle.

50, 60 Models - Spring, in front of axle housing.



CHEVROLET FRAME CONTACT POINTS 2A90

COMET, FALCON, FAIRLANE, METEOR & THUNDERBIRD

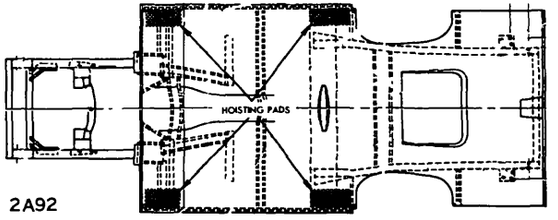
Jacking (Exc. Thunderbird): Either side of car may be raised at front by jack contact at lower control arm strut connection. Either side of car may be raised by jack contact on front crossmember, or on crossmember to which stabilizer is connected. Either side of rear end of car may be raised by jack contact on rear crossmember.

Jacking (Thunderbird): Either side of car may be raised at front by jack contact at either lower control arm. *CAUTION - Make sure jack saddle is large enough to accommodate control arm securely.* Either side of front end may be raised by jack contact on front crossmember or on crossmember to which stabilizer is connected. Either side of rear end may be raised by jack contact on rear crossmember.

Hoisting: Check all drive-on type hoists for possible interference with car underbody. Modify hoist and approach ramps as necessary to provide clearance.

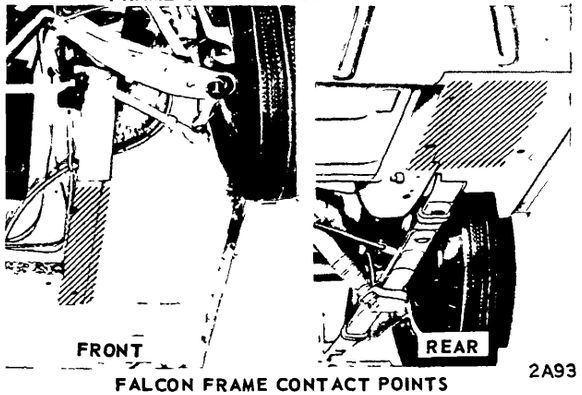
Rail & Fork Lift (Twin Post) Hoists - Front adapters or hoist plates must be carefully positioned to contact lower suspension arms and must be large enough to cover entire spring seat area. Rear adapters or forks must be positioned under rear axle (forks must not contact axle at points more than 1" outboard from circumference welds near differential housing). *CAUTION* - Raise car slowly and make certain that rear shock absorbers are not damaged.

Frame Contact Hoist (All Models) - Frame contact hoist adapters are necessary to lift car. Hoist adapters should cover at least 12 square inches (Comet, Falcon, Fairlane & Meteor); 24 square inches (Thunderbird) of underbody area shown in illustration.



2A92

FAIRLANE, METEOR & THUNDERBIRD FRAME CONTACT POINTS (TYPICAL)



2A93

FALCON FRAME CONTACT POINTS

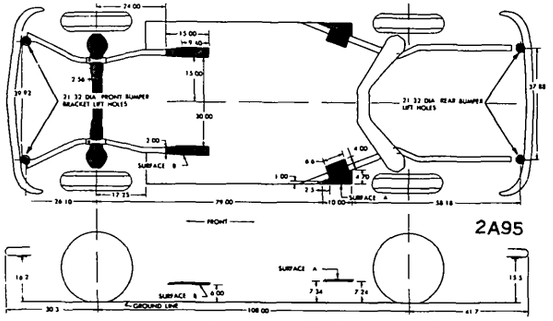
CORVAIR CARS & TRUCKS

SEDANS, STATION WAGONS, GREENBRIER, TRUCKS

Jacking: Sedans & Station Wagons - Jack at lifting areas shown in illustration. *CAUTION* - Jack tab must catch outer body flange to prevent jack sliding too far under car.

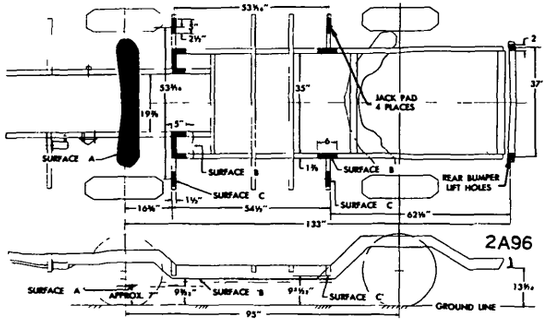
Greenbrier & Trucks - Use jack pads between front and rear wheels as shown in illustration. Pin on load rest of jack must engage in hole in jack pad.

Hoisting (Frame Contact Hoist): All Models - Hoist must contact shaded lifting areas shown in illustrations.



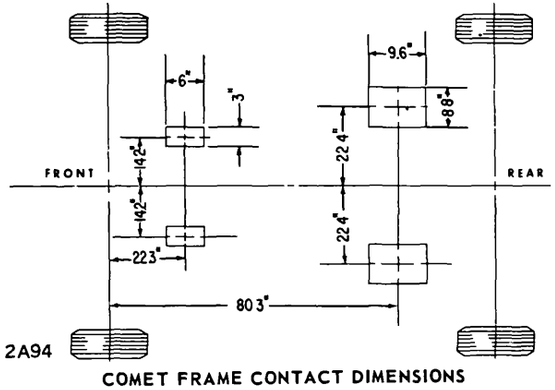
2A95

CORVAIR (SEDANS & STATION WAGONS)



2A96

CORVAIR (GREENBRIER & TRUCKS)

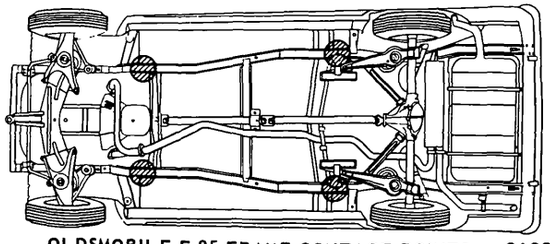


2A94

COMET FRAME CONTACT DIMENSIONS

OLDSMOBILE F-85

Hoisting (Fram Contact Hoist): Place contact pads of hoist at circled lifting points shown in illustration. Lift arms must not interfere with hand brake intermediate lever.

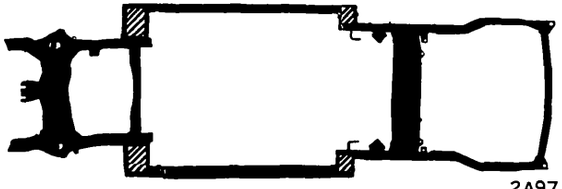


OLDSMOBILE F-85 FRAME CONTACT POINTS 2A98

OLDSMOBILE

Jacking: Support car at suspension points only. Do not support car at extreme ends of frame or at center of frame side rails.

Hoisting (Frame Contact Hoist): Lift car at shaded areas shown in illustration.



2A97

OLDSMOBILE FRAME CONTACT POINTS

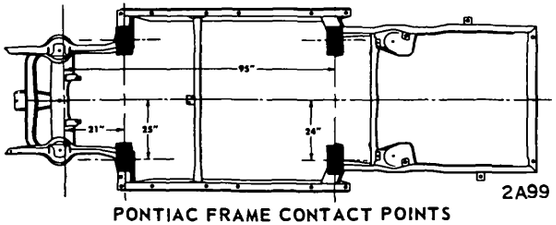
PONTIAC TEMPEST

Lifting: Lift car at any accessible point on frame side rail, at front crossmember, or front or rear lower control arms. *CAUTION* - 1) Avoid rear shock absorber brackets. 2) DO NOT lift at bumpers, torque tube, axle shafts, transaxle or engine. 3) Torque tube and exhaust system are lower than frame side rails and adapters must be used to provide clearance.

Towing: Tow **only** at front or rear crossmembers. DO NOT tow by bumpers, axle shafts, or steering linkage.

PONTIAC

Hoisting (Frame Contact Hoist): Lifting pads must be positioned at shaded areas shown in illustration to prevent damage to other parts. Ground clearance is 7½" front, 6" rear.



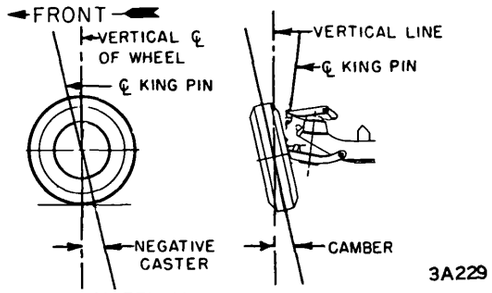
2A99

PONTIAC FRAME CONTACT POINTS

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT

WHEEL ALIGNMENT NOTE - Before checking and adjusting wheel alignment, car must be at normal curb weight with the items listed below properly checked and adjusted Also make sure that looseness in front suspension components not excessive

Trim H ight - Must be within limits specified for both front and rear *See Individual Car Model Suspension Data in this section*
Tir Inflati n - Tires must be at correct pressure *See Data below*
Wheel Bearings - Must be properly adjusted *See "Front Wheel Bearing Adjustment" in this section.*



WHEEL ALIGNMENT ANGLES

① - Pos 2° preferred
② - Preferred - 0° Right, Pos ¼° Left
③ - Pos 1° preferred
④ - Pos ½° preferred
⑤ - Pos ¼° preferred
⑥ - Both sides equal within ½° maximum
⑦ - 4-Wheel Drive Models 7½°(3000 lb axle), 8°(3500 lb axle) C Series 5½°
⑧ - Pos 3° (F-100,250,P-100,400,C-550,600), Pos 3½° (N-500,600), 4½° (P-350), 4° (All Others)
⑨ - 4-Wheel Drive Pos 1½°
⑩ - Both sides equal within ⅜°
⑪ - Pos 1/3° desired
⑫ - **Right Wh el** - Pos 1/8° to Neg 3/8°, 0° preferred **L ft Wh l** - Pos 3/8° to Neg 1/8°, Neg 1/4° preferred
⑬ - **Manual Ste ring** - 3/16" to 1/4", **Power Steering** - 1/16" to 1/8"
⑭ - Adjust left side ½° greater than right side
⑮ - 0° preferred
⑯ - Adjust left side ¼° greater than right side
⑰ - Except panel 4½° panel
⑱ - 1½° preferred
⑲ - Solid axle
⑳ - Independent suspension, Series J
㉑ - At 50' Camber

WHEEL ALIGNMENT SPECIFICATIONS

R - Right L - Left Man. - Manual Steering Pwr. - Power Steering	Steering Axis Inclination	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	T -Out On Turns	
					Inner	Outer
AMERICAN MOTORS						
American	8°	**Man.** 0 ± ¼ **Pwr.** Pos 1½ to 2 ①	Pos ¼ to Neg ¼ ②	1/16 to 3/16	20°	18°
Others	6° 11'	**Man.** 0 ± ¼ **Pwr.** Pos ½ to 1 ③	Pos ¼ to Neg ¼ ②	1/16 to 3/16	20°	17°46'
CHRYSLER CORP.						
All Models	5½° to 7½°	**Man.** 0 to Neg 1 **Pwr.** Pos ¼ to 1¼	**R** 0 to Pos ½ ⑪ **L** Pos ¼ to ¾ ⑤	1/8 ± 1/32	20°	17°±1°
FORD MOTOR CO.						
Comet & Falcon		0 to Pos 1 ⑥	0 to Pos 1 ⑥	1/4 to 5/16	20¾°	20°
Fairlane & Meteor	7°15'	Neg ½ to Pos ½	0 to Pos 1	3/16 to 25/64	23½°	20°
Galaxie & Monterey		Neg ½ to Pos ½	Pos ¼ to 1 ⑥	1/8 to 1/4	24¼°	20°
Thunderbird		Neg ¾ to Neg 2¼	0 to Pos ¾	1/8 to 1/4	20½°	20°
Lincoln	7° @ ¾° Camber	Neg ¾ to Neg 2¼ ⑥	0 to Pos ¾ ⑤⑥	1/8 to 1/4	20°	17°48'
Ford Truck						
Econoline	7½°	Pos 5° ± ¾°	Pos 3/8 ± 1/4	3/32 ± 1/32	21½°	20°
Others	4° ⑦	⑧	Pos 1 ⑨	1/16 to 3/16		
GENERAL MOTORS						
Buick Special	7½°	Neg 2 ± ½ ⑩	Neg ¼ to 1 ⑩	7/32 to 5/16	23°40'	20°
Buick (Exc Spec)	9°52' ㉑	Neg ½ ± 1 ⑩	Pos 1 to Neg ½ ⑩ ⑭	7/32 to 5/16	22°5'	20°
Cadillac	6°	Neg ½ to 1½ ⑥	⑫	3/16 to 1/4	22°11'	20°
Chevrolet Cars	7⅛° ± ½°	0 ± ½	Pos ½ ± ½	1/16 to 3/16	20°	18°
Chevy II	7⅛° ± ½°	Pos 1 ± ½ ⑥	Pos ½ ± ½ ⑥	3/16 to 5/16	20°	18½°
Corvair (Front)						
Pass Cars	7° ± ½°	Pos 2 + 0 - ½	Pos ½ ± ½	1/4 to 3/8	20°	18½°
Greenbriar & Trks	4° ⑰	Pos 1¼ ± ¼	Neg ¼ ± ¼	1/16 to 3/16	23°	20°
Corvair (Rear)						
Pass Cars			Pos 1 ± ½	1/8 to 3/8		
Greenbriar & Trks			Pos 2 ± ½	1/16 to 3/16		
Corvette (Front)	7° ± ½°	Pos 1¾ ± ½	Pos ¾ ± ½	3/16 to 5/16	20°	17°
Corvette (Rear)			Neg 1/3 ± 1/2	0 to 1/8		
Chevrolet Trucks						
Series C-10,P-10		Pos 2°27'	Pos 0°15'	3/16		
Series C-20,C-30		Pos 2°20'	Pos 0°15'	3/16		
Series 50,60	7°12'	Pos 3°45'	Pos 1°30'	1/8 to 3/16	20°	17½°
Series P-20,P-30	7°30'	Pos 2	Pos 1°30' ± 15'	1/4 to 5/16	23° ± ½°	20°
Oldsmobile						
88,S88,98	11°	Neg ¾ to 1¾	Neg ¼ to Pos ¾ ⑥	0 to 1/16	Man 23° Pwr. 24°	20° 20°
F-85	7°30'	Neg ¾ to 1¾	Neg 3/8 to Pos 3/8 ⑥	0 to 1/8	23°	20°
Pontiac						
Tempest (Front)	6°50'	Neg 1°40' ± 30'	Pos 0°8' ± 30' ⑯	0 to 1/8	20°	18-19°
Tempest (Rear)				1/16 to 3/16		
Others	4°50'	Neg 1½ ± ½	Pos ¼ ± ½ ⑯	0 to 1/8	20°	18-19°
STUDEBAKER						
All (Exc Avanti)	6°	Pos ¾ to Neg ¾ ⑮	0 to Pos 1 ⑭	⑬	20°	17-18°
Avanti	6°	Pos ¼ to Neg 1¼ ⑥	0 to Pos 1 ⑭	⑬	20°	17-18°
JEEP						
2-Wheel Drive	7½°	Pos 3	Pos 1 ⑱	3/64 to 3/32	21°45'	20°
4-Wheel Drive ⑲	7½°	Pos 3	Pos 1½	3/64 to 3/32	20°	20°
4-Wheel Drive ⑳	7½°	Pos 3¾ to Pos 4¾	Pos 1 to Pos 1¼	3/64 to 3/32		----

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT

AMERICAN MOTORS

RAMBLER AMERICAN

Caster and camber adjustments are made by installing or removing shims between lower control arm mounting pivot bar and mounting bracket on under-body *NOTE - Lower control arm pivot bar brace must be loosened before making caster and camber adjustments When installing, tighten bolts to 70-80 ft lbs*

Tire Inflation (Cold)

24 lbs front and rear

Caster

Adjust caster by increasing or decreasing the thickness of shims at either front or rear mounting bolts as necessary

Camber

Adjust camber by increasing or decreasing the thickness of shims equally at both front and rear mounting bolts as necessary

RAMBLER CLASSIC & AMBASSADOR

Caster and camber adjustments are made by turning upper control arm mounting bolts which are provided with eccentric washers After adjustment, tighten eccentric bolt nuts to 50-55 ft lbs

Tire Inflation (Cold)

Tire Size	Front Pressure (Lbs.)	Rear
6 50, 6 70, 7 50	24	24
8 00	22	20
Captive Air ①	29	29
Captive Air ②	24	24

① - Inner Chamber ② - Outer Chamber

Caster

Loosen attaching bolt nut and turn either front or rear eccentric bolt as necessary for correct caster

Camber

Loosen attaching bolt nut and turn both front and rear eccentric bolts equally to obtain correct camber

CHRYSLER CORP.

ALL MODELS

Caster and camber adjustments are made by rotating eccentric cam assemblies at inner end of upper control arm front and rear legs *NOTE - On all models, except Chrysler, access holes to lower upper control arm cam bolt nuts have been provided in fender side shields Front access hole is covered by a splash shield.*

Tire Inflation (Cold)

Car Model	Pressure (Lbs.) Front	Rear
Imperial & Chrysler 300J	24	24
Chrysler Others (Except Sta Wagon)	24	22
Chrysler Station Wagon	22	① 24
Dodge Dart 6 Cyl (Except Sta Wagon)	24	22
Dodge Dart V8 (Except Sta Wagon)	24	22
Dodge Dart Station Wagon (Except 880)	24	② 26
Dodge Custom 880 Station Wagon	22	① 24
Plymouth 6 Cyl (Except Sta Wagon)	24	22
Plymouth V8 (Except Sta Wagon)	24	22
Plymouth Station Wagon	24	② 26
Valiant	24	24

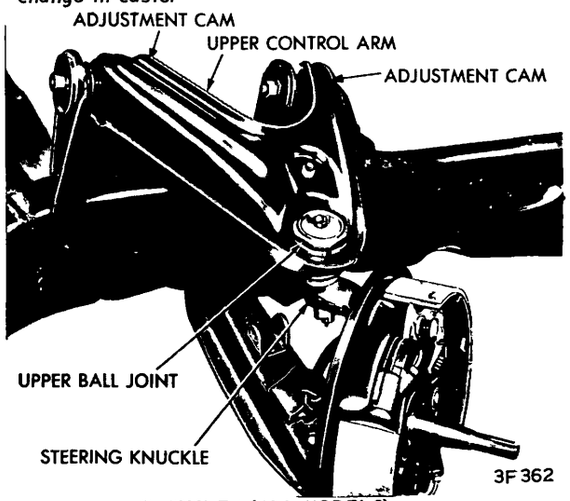
① - With station wagon fully loaded increase cold pressure to 28 lbs
② - With station wagon fully loaded, increase cold pressure to 30 lbs

Caster

Adjust by turning **one** eccentric bolt at a time as necessary to obtain correct setting *NOTE - Turning both eccentric bolts in opposite directions affects caster with a minimum amount of change in camber*

Camber

Adjust camber by turning both eccentric bolts equally in same direction as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts equally in same direction affects camber with a minimum amount of change in caster*



CHRYSLER (ALL MODELS)
CASTER & CAMBER ADJUSTING CAMS

FORD MOTOR CO.

FALCON, COMET, GALAXIE & MONTEREY

Caster and camber adjustments are made by adding or removing the shims from between upper control arm inner shaft and frame member at shaft mounting bolt locations After adjustments are completed, tighten control arm inner shaft mounting bolts to 65-90 ft lbs (Falcon & Comet), 65-85 ft lbs (Galaxie & Monterey)

Tire Inflation (Cold)

Car Model	Pressure (Lbs.) ① Front	① Rear
Falcon & Comet		
Sedans	24	24
Station Wagon (Pass Load)	22	28
(Pass & Cargo)	24	28
(Snow Tires)	22	30
Ranchero	24	30
Galaxie & Monterey	24	② 24

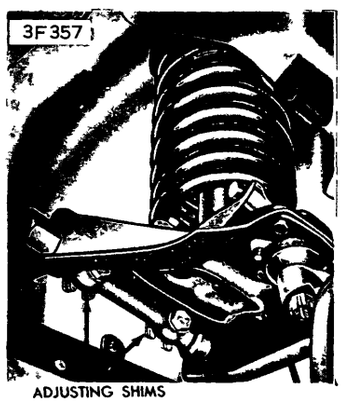
① - Add 4 lbs for heavy loads or high speed driving
② - 28 lbs for station wagon

Caster

Remove or install shims at either front or rear mounting bolt Removal of shims at front bolt or installation of shims at rear bolt will move ball joint forward Removal of shims at rear bolt or installation of shims at front bolt will move ball joint to rear A 1/32" (Falcon & Comet), 1/16" (Galaxie & Monterey) shim change at either bolt will change caster 1/2°

Camber

Remove or install shims of equal thickness at both bolts The removal of shims will move upper ball joint inward Installation of shims will move ball joint outward A 1/16" shim change at both bolts will change camber 1/3° (Falcon & Comet), 1/4° (Galaxie & Monterey) *NOTE - Total shim pack thickness should not exceed 9/16" (Falcon & Comet), 5/8" (Galaxie & Monterey)*



FALCON & COMET
CASTER & CAMBER ADJUSTING SHIMS

FAIRLANE

► *1962-63 FAIRLANE ALIGNMENT SPECIFICATION PRODUCTION CHANGE & SERVICE NOTE· For improved handling, caster, camber, and toe-in specifications changed on later cars as indicated in Specifications Table New specifications supersede all previous specifications for all 1962 and early 1963 cars*
Caster and camber adjustments are made by moving upper control arm assembly in or out in elongated bolt holes The control of this movement **requires** use of Tool 62F-3000-A

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Continu d)

Tire Inflation (Cold)

24 lbs. front and rear. Add 4-6 lbs. for high speed driving or heavy loads.

PRELIMINARY PROCEDURE NOTE - Before making wheel alignment, make sure lower arm assembly is forced outboard by loosening pivot bolt, and using a pry bar. With the full weight of car on suspension, torque pivot bolt to 100-120 ft. lbs. while prying arm outboard.

RECOMMENDED SPECIAL TOOLS (MADE LOCALLY) - For easier and more positive wheel alignment, the following tool fabrication and installation procedure is recommended.

1) Cut five bars from 1/4" or 5/16" stock, 1 1/4" or 1 1/2" wide, to lengths of 4 3/4", 4 7/8", 5" 5 1/8" and 5 1/4". Weld or braze a flat washer to one end of each bar.

2) Fabricate a hook from an 11" length of 3/8" diameter rod.

3) Select one fabricated bar closest to being 1/8" longer than distance measured between top of side rail sheet metal and under lip of upper control arm spring pocket.

4) Install selected bar between upper arm and side rail after raising upper arm far enough for clearance. To raise upper arm, put hook of rod on lip of body side rail, place pry bar through hook rod eye and under suspension lower arm, then pull down on bar.

TOOL 62F-3000-A INSTALLATION - Do not install tool from underneath car. For proper installation, face outside of wheel and reach behind each end of wheel under fender with each half of tool. Turn both tool adjusting screws until tool is snug **between** upper control arm and lower corners of front suspension housing. Loosen upper arm inner shaft retaining bolts several turns until bolts are 3/16-1/4" away from top face of shaft boss, then lift up on front end of car. A sharp crack will usually be heard when upper arm inner shaft serrations separate from sheet metal. *These serrations must be free in order to effect an adjustment.* If serrations not free, loosen bolts more, strike bolt heads a sharp blow, and use a long pry bar to loosen caged nut serrations. Adjust caster first and loosen or tighten tool screws not more than two complete turns alternately to avoid collapsing sheet metal. Approximately 4 complete screw turns will change a reading 1°. Allow approximately + 1/8° on caster and camber readings to compensate for torque of cross shaft retaining bolts. After adjustments are completed, tighten upper control arm attaching bolts to 125-150 ft. lbs.

Caster

To increase positive caster or decrease negative caster, turn front screw on tool clockwise or rear screw counterclockwise. To decrease positive caster or increase negative caster, turn front screw on tool counterclockwise or rear screw clockwise. If tool tends to become loose, turn car wheels 20° outboard, then back through 0-20° inboard, then return to 0° (straight ahead). If tool is not now tight, the serrations or nuts or cross shaft are not free. Loosen cross shaft retaining bolts a little more, raise up front of car, then tap bolt heads to make sure serrations are loose.

Camber

To increase positive camber or decrease negative camber, turn front and rear screws clockwise an equal number of turns. To decrease positive camber or increase negative camber, turn front and rear screws counterclockwise an equal number of turns .

METEOR

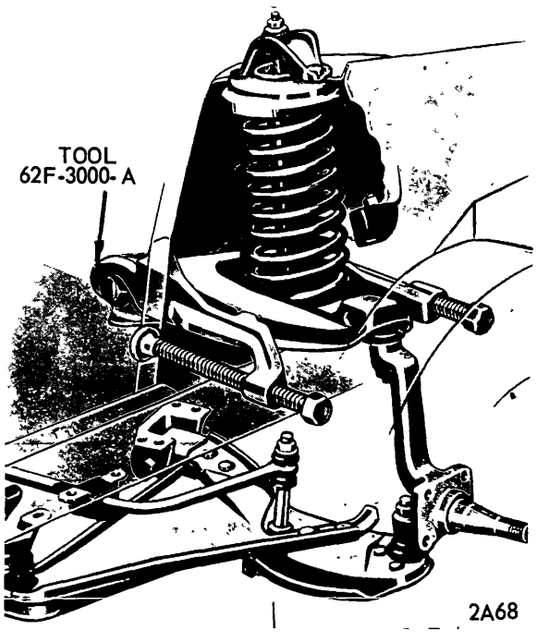
Caster and camber adjustments are made by moving upper suspension arm shaft in or out in elongated bolt holes. The control of this movement **requires** use of Tool 62F-3000-1.

Tire Inflation (Cold)

24 lbs. front and rear. Add 4-6 lbs. for high speed driving or heavy loads.

ALIGNMENT TOOL MODIFICATION - If fender shield will not permit Tool 3000-1 to be installed properly for wheel aligning, modify tool by removing adjusting screw from tool and grinding length of threaded end of tool to 3/4" minimum.

TOOL 3000-1 INSTALLATION - Loosen upper suspension arm shaft retaining bolts several turns, then lift up on front end of car. A sharp crack will usually be heard when upper arm shaft serrations separate from sheet metal. *These serrations must be free in order to effect an adjustment.* If serrations not free, loosen bolts more, strike bolt heads a sharp blow, and use a pry bar to loosen caged nut serrations. Hook tool ends over upper suspension arm shaft bushings making sure clamp on rear tool does not make contact with brake line. *NOTE - If car raised to loosen upper arm shaft, loosen tools or remove them.* After adjustments are completed, tighten upper suspension arm shaft retaining bolts to 150-160 ft. lbs.



MERCURY METEOR WHEEL ALIGNMENT TOOL
(SIMILAR TO FORD FAIRLANE)

Caster

To increase positive caster or decrease negative caster, turn front screw on tool clockwise or rear screw counterclockwise. To decrease positive caster or increase negative caster, turn front screw on tool counterclockwise or rear screw clockwise. A movement of approximately 1/16" at either front or rear bolt location will change caster 1/2°.

Camber

To increase positive camber or decrease negative camber, turn front and rear screws of tool clockwise an equal number of turns. To decrease positive camber or increase negative camber, turn front and rear screws counterclockwise an equal number of turns . A movement of approximately 1/16" of entire shaft will change the camber 1/4°.

THUNDERBIRD

Caster adjustment is made by repositioning the strut on lower control arm. End of strut and surface on lower control arm are serrated and mounting holes in strut are elongated. Camber adjustment is made by adding or removing shims between pivot bracket of lower control arm and mounting bracket on underbody in engine compartment. After adjustments are completed, tighten strut-to-lower control arm nuts to 85-115 ft. lbs. Tighten shim retaining nut securely.

Tire Inflation (Cold)

24 lbs. front and rear.

Caster

Loosen nuts and bolts attaching strut to lower control arm and lift strut so serrations are free of serrations on lower control arm. To decrease caster, lengthen distance between strut forward mount and side of control arm. To increase caster, shorten distance between strut forward mount and side of control arm.

Camber

To move lower ball joint inward, remove shims between mounting and pivot brackets. To move ball joint outward, install shims between mounting and pivot bracket. A 1/16" change in shim thickness will change camber angle 1/3°. *NOTE - Total shim thickness should not exceed 11/16".*

LINCOLN

Caster and camber adjustments are made by moving the serrated upper control arm inner shaft assembly in elongated slots in front suspension crossmember bracket. When adjustments are completed, tighten upper control arm inner shaft-to-crossmember bracket attaching bolts to 100-125 ft. lbs.

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (C ntinu d)

Tire Inflation (Cold)

24 lbs. front and rear.

Caster

Loosen bolts securing upper control arm shaft to bracket, then with aid of a pry bar, move control arm assembly at **either of the two bolt locations** as necessary Inboard movement of front bolt or outboard movement of rear bolt will change caster in negative direction. Outboard movement of front bolt or inboard movement of rear bolt will change caster in positive direction *NOTE - A movement of 3/32" at either front or rear bolt location will change caster 1/2°.*

Camber

Inboard movement of control arm shaft **equally at front and rear bolts** will change camber in negative direction Outboard movement of upper control arm shaft equally at front and rear bolts will change camber in positive direction *NOTE - A movement of 3/64" of entire shaft will change camber 1/4°.*

GENERAL MOTORS

BUICK (EXCEPT SPECIAL)

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and brackets on frame

Tire Inflation (Cold)

24 lbs front and rear (28 lbs. rear on station wagons) *For temperatures below freezing, add 2 lbs.*

ALIGNMENT HEIGHT TOOL MODIFICATION - Difficulty is encountered when installing the front alignment Tool J-8973-23, so the short lip of this tool should be cut off 1/4" It is necessary to raise front of car with a jack to install this tool.

TOOL INSTALLATION - To maintain correct alignment height while checking camber and caster, install an Alignment Height Tool, J-8973-23, at each side of car between frame and front lower control arm, locating tool between coil spring and rebound bumper with long lip at upper end of tool pointing outboard Install an Alignment Height Tool, J-9873-19, at each side of car between frame and rear axle housing, locating top of tool over rear attaching bolt of rear axle housing bumper Lower end of tool must rest on axle housing Weight of car will hold tools in position

CASTER & CAMBER ADJUSTING NOTE - Do not exceed a thickness of 500" in any one shim pack After adjustments are completed, tighten upper control arm mounting bolt nuts to 90-110 ft lbs

Caster

To **increase** caster, increase amount of shims at front bolt and decrease by an equal amount at rear bolt To **decrease** caster, decrease amount of shims at front bolt and increase by an equal amount at rear bolt

Camber

To **increase** camber, remove an equal amount of shims at front and rear bolt. To **decrease** camber, add an equal amount of shims at front and rear bolt *NOTE - To increase camber and caster simultaneously, remove shims at rear bolt only. To decrease camber and caster simultaneously, add shims at rear bolt only.*

BUICK SPECIAL

Caster and camber adjustments are made by adding or removing shims between upper control arm inner shaft and brackets on frame.

Tire Inflation (Cold)

22 lbs. front and rear (26 lbs rear on station wagons). *For temperatures below freezing, add 2 lbs.*

ALIGNMENT HEIGHT TOOL INSTALLATION - Correct alignment height must be maintained while checking camber and caster. Install an Alignment Height Tool J-8973-22 at each side of car between frame and front lower control arm, locating tool between coil spring and rebound bumper with long lip at upper end of tool pointing outboard Raise rear of car slightly and place Spacer Block J-8973-20 (station wagon), or J-9873-21 (all others), at each rear wheel, positioning cutout in block over rubber bumper with bottom of block resting on axle housing Weight of car will hold tools in position.

CASTER & CAMBER ADJUSTING NOTE - Do not exceed a thickness of 380" in any one shim pack After adjustments are completed, tighten upper control arm mounting bolt nuts to 60-85 ft lbs

Caster

Adding shims at front bolt location will change caster toward negative *NOTE - This will also change camber toward negative.* Adding shims at rear location will change caster toward positive *NOTE - This will also change camber toward negative.*

Camber

Adding equal amounts of shims at both front and rear bolts will change camber toward negative *NOTE - Caster will not be changed.*

CADILLAC

Caster adjustment is made by turning locknuts on forward ends of tie-struts at front frame crossmember *NOTE - To gain access to locknuts, it is necessary to remove air deflector at bottom of radiator* Camber adjustment is made at the camber eccentric located in steering knuckle upper support Upper spherical joint stud fits through camber eccentric and knuckle Turning the camber eccentric repositions upper spherical joint stud

Tire Inflation (Cold)

Series	Front Pressure (Lbs.)	Rear
60 & 62	24	24
75	28	28
Commercial Chassis	24	32

Caster

NOTE - Before adjusting caster, loosen tie-struts at lower suspension arms to allow tie-strut to center itself and thus prevent damage to bushings and premature wear at frame front crossmember. To provide more negative caster, lengthen tie-struts by loosening front locknuts and tightening rear locknuts. To provide more positive caster, shorten tie-struts by loosening rear locknuts and tightening front locknuts. One turn of locknuts results in approximately ½° change in caster. After proper adjustments have been made, tighten tie-strut mounting bolt nuts at lower arms to 35 ft. lbs., and front locknuts to 35 ft lbs. *NOTE - When tightening front locknut, hold rear nut securely to prevent changing caster setting.*

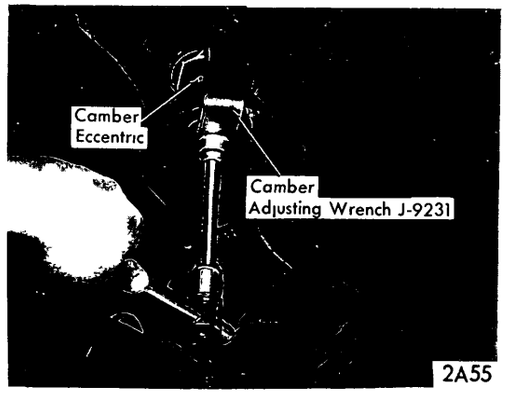
Camber

Loosen locknut on spherical joint stud one turn and tap bottom of stud with soft mallet to free chamber eccentric in knuckle *NOTE - If eccentric will not break free, make certain that locknut is loose, then insert a plain nut halfway on end of stud and insert a 7/16" diameter steel rod, approximately 20" long, inside plain nut and resting on stud. Tap rod with a heavy hammer to loosen eccentric.* Use Camber Adjusting Wrench, Tool J-9231, and turn camber eccentric to obtain correct setting *NOTE - Left wheel must have ¼°-½° more positive camber than right wheel to compensate for crowned roads.* Final position of ball joint should be in the rear position of camber eccentric in order to keep steering arm angle correct After adjustments are completed, tighten spherical joint stud nut to 60 ft. lbs.

TOE-IN ADJUSTMENT NOTE - Before checking toe-in make sure drag link height is correct *See "Steering Linkage" in Steering Section.*

CHEVROLET PASSENGER CARS

Camber and caster adjustments are made by adding or removing shims between upper control arm inner shaft and bracket on frame.



CADILLAC CAMBER ADJUSTING TOOL

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (C ntinu d)

Tire Inflati n (Cold)

24 lbs front and rear (28 lbs rear on station wagons)
NOTE - For improved station wagon handling under heavy loads, decrease front pressure 2 lbs. and increase rear pressure 2 lbs.

Cast r

To decrease positive caster, add shims at front attaching bolt or remove shims from rear attaching bolt. A 1/32" shim at one bolt will change caster 1/4°.

Camber

To decrease positive camber, add shims at both front and rear attaching bolts A 1/32" shim will change camber 1/6° After adjustments are completed, tighten upper control arm inner shaft attaching bolts to 45-55 ft lbs.



CHEVROLET CASTER & CAMBER ADJUSTING SHIMS

CHEVROLET TRUCKS 10, 20, 30 SERIES

On coil spring models, caster and camber adjustments are made by adding or removing shims between upper control arm shaft and mounting bracket attached to suspension crossmember Concave and convex spacers with flat opposite sides are used to allow a positive cross-shaft-to-bracket attachment regardless of the number of shims used
On "I" beam axles, camber is not adjustable, and caster is adjusted by use of tapered shims between axle spring seat and spring

Tire Inflation (Cold)

Inflation pressure for truck tires will vary according to tire size and payload Inflation of front tires should not exceed pressure or rear tires in any case.

Caster

To **incr ase** caster, increase amount of shims at front bolt and decrease by an equal amount at rear bolt To **d cr as** caster, decrease amount of shims at front bolt and increase by an equal amount at rear bolt.

Camber

To **decrease** camber, remove an equal amount of shims at front and rear bolt To **incr as** camber, add an equal amount of shims at front and rear bolt

CHEVY II

Caster adjustments are made by lengthening or shortening the lower control arm strut at front underbody connection Camber adjustments are made by rotating eccentrically mounted washers located on lower control arm inner pivot bolt

Tire Inflation (Cold)

24 lbs front and rear (28 lbs. rear on station wagons)
NOTE - For improved station wagon handling under heavy loads, decrease front pressure 2 lbs. and increase rear pressure 2 lbs.

Caster

Turn the two nuts at front end of lower control arm strut as necessary Shortening the strut rod increases caster Lengthening the rod decreases caster When adjustment is completed, tighten inside nut to 70-90 ft. lbs., and outside nut to 50-70 ft lbs.

Camber

Loosen lower control arm pivot bolts and rotate cams on pivot as necessary to move control arm in or out for correct camber When adjustment is completed, tighten pivot bolt nut to 55-70 ft lbs.

CORVAIR (FRONT WHEELS)

Caster adjustments are made by lengthening or shortening lower control arm strut in the 500, 700, and 900 series, while in the 1200 series caster adjustment is made by adding or removing shims between upper control arm inner shaft and mounting bracket at either front or rear mounting bolts. Camber adjustments on all models are made by adding or removing shims between upper control arm inner shaft and mounting bracket equally at front and rear mounting bolts.

Tire Inflation (Cold)

Car Model	Tire	Lbs. Pressure Front	Rear
Car	6.50	15	26
	7.00	15	28
Truck	4 Ply SP	24	30
	6 Ply SP	24	34
	6 Ply Ⓒ	24	45
	8 Ply Ⓒ	24	60

Ⓒ - Lt Truck Type.

Caster

Series 500, 700, 900 - Adjust caster by turning nuts at rear of strut rod Lengthening rod increases caster Shortening rod decreases caster. *NOTE - Because of manufacturing tolerances, it is possible to run out of threads on strut rod or cause front spring to be cocked in its seat and rub spring tower. Only when this happens is it permissible to shim unevenly at upper control control arm.* If shims are changed, check camber

Series 1200 - To obtain correct caster loosen upper control arm support shaft-to-crossmember bolts and add or remove shims at either front or rear bolt. *NOTE - To adjust right side, direct air heater front duct must be removed for acc ss to upp r control arm shaft attaching bolts.*

Camber

All Series - To adjust camber, loosen the upper support shaft-to-crossmember bolts, and add or remove shims **equally**, as required, at both front and rear of shaft. *NOTE - It may be necessary to remove wheel to secure these bolts.* Adding shims will decrease positive camber A 1/32" shim change will move camber 1/6°

(REAR WHEELS)

Caster

Series 500, 700, 900 - Pos 1½° - 2° at curb height.
Series 1200 - Neg. 1° ±½° at curb height
NOTE - These specifications are reference dimensions only, in that no provision for adjustment of this item is provided.

Camber

Series 500, 700, 900 - Pos ½° ± ½°at curb height
Series 1200 - Pos 1½° ± ½° at curb height
NOTE - Neither caster or camber of rear wheels is adjustable in either series, and specifications ar reference dimensions only. If camber is not within limits, either the crossmember is out of alignment, has become distorted due to collision, or control arm is bent

Toe-In

Series 500, 700, 900 - 1/8-3/8"
Series 1200 - 1/16-3/16".
NOTE - If drive-on equipment is used, reverse car and back into position. Toe-in (overall) will be read as toe-out (readings taken from rear of tires rather than front). To adjust, add or remove shims equally from each side of front edge of transmission case, with engine rear support loosened. *CAUTION - Shims must be added or removed equally, from each sid . DO NOT attempt to adjust one wheel at a time.* A shim added to each side will decrease toe-in. Removal of shim from each side will increase toe-in. *NOTE - Because of manufacturing tolerance and parts "stack-up", it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust th wheel with toe-out as close as possible to specifications, but not letting opposite wheel go out of specifications. If for example, one wheel toes-out by ¼", then opposite wheel must toe-in enough to give overall specified toe-in.*

CORVETTE (FRONT WHEELS)

Caster and camber adjustments are made by adding or removing shims between upper pivot shaft and frame side rail support bracket.

Tire Inflation (Cold)

24 lbs front and rear. *NOTE - For sustained high speed driving, inflate to 36 lbs. front and rear.*

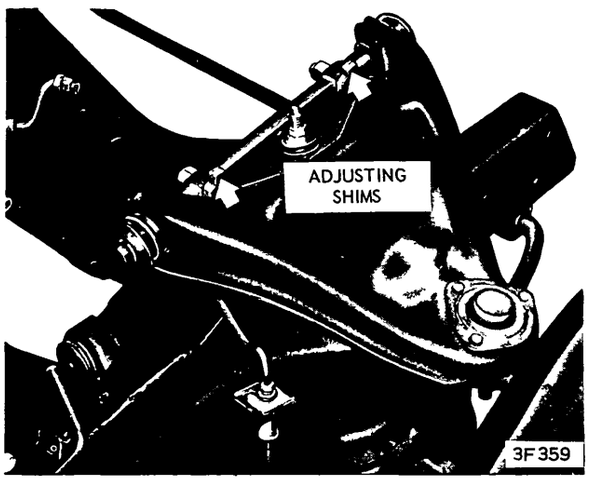
WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (C ntinu d)

Caster

To adjust caster, loosen front and rear bolts of upper control arm support shaft and add or remove shims from either bolt as required. Adding shims at the front bolt or removing shims at rear bolt will decrease positive caster. A 1/32" shim will change caster 1/4°.

Camber

To adjust camber, add or remove shims at both front and rear bolts of upper control arm support shaft A 1/32" shim will vary camber 1/6°. After adjustments are completed, tighten upper control arm support shaft bolts to 65-75 ft. lbs.



CORVETTE CASTER & CAMBER ADJUSTING SHIMS

CORVETTE (REAR WHEELS)

Camber

Camber adjustments made by turning cam type through-bolts which ride within channels on strut rod bracket. To change camber setting, loosen locknut on cam bolt, turn the cam to desired camber, then torque locknut to 55-70 ft. lbs.

Toe-In

Rear wheel toe-in angle is adjusted through use of variable thickness shims inserted between torque arm and frame side member web at forward pivoting joint. Shims are slotted to slide over bushing pivot bolt on either side. To adjust toe-in, loosen pivot bolt, shim outboard gap as necessary to obtain solid stack-up between outer end of torque arm bushing and inner wall of frame side member, and when adding shims to inner side of control arm do not use thicker shim than necessary or force insertion of shim as this may cause toe-in setting to change. After shims are securely installed, tighten pivot bolt to 40-60 ft. lbs.

OLDSMOBILE 88, SUPER 88, 98, & F-85

Camber and caster adjustments are made by removing or adding shims between upper control arm inner shaft and bracket on frame After adjustments are completed, tighten upper control arm attaching bolts to 85-110 ft. lbs. on Series 88,S88 & 98, and 60-85 ft lbs. for F-85 Series. *NOTE - To gain access to pivot shaft bolts, loosen top and rear fasteners on fender filler plate aprons.*

Tire Inflation (Cold)

Car Model	Front	Lbs. Pressure	Rear
F-85 Coupe & Sedan	① 22		① 22
Station Wagon	① 22		② 24
Convertible	24		22
Jetfire	24		22
88, S88, Starfire	② 24		22
98	① 22		22
88, S88 Station Wagon	② 24		③ 24

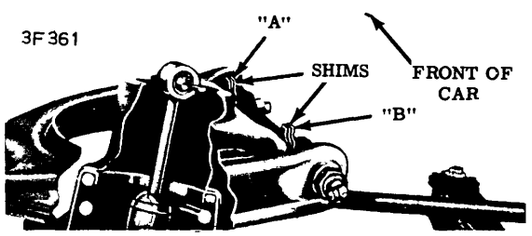
① - 24 lbs. for air conditioned cars
② - 22 lbs for 6.50X14, 8.50X14 and 9.00X14 tires.
③ - Add 4 lbs for carrying heavy load, and to improve steering

Caster

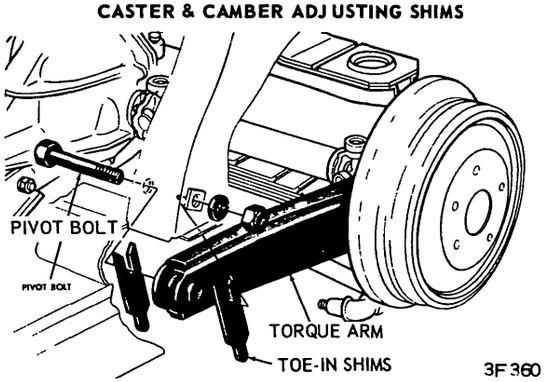
To decrease positive caster (increase negative caster), add shims at front bolt To increase positive caster (decrease negative caster), remove shims at front bolt Removal or installation of .020" shim will change caster 5/16°.

Camber

To increase positive camber, remove shims at both front and rear bolts. To decrease positive camber, add shims at both front and rear bolts. Removal or installation of 020" shim at both bolts with change camber 1/8°.



OLDSMOBILE (ALL MODELS)
CASTER & CAMBER ADJUSTING SHIMS



CORVETTE REAR SUSPENSION TOE-IN SHIMS

PONTIAC (EXCEPT TEMPEST)

Caster and camber adjustments are made by removing or adding shims between upper control arm inner shaft and bracket on frame After adjustments are completed, tighten upper control arm attaching bolt nuts to 70-90 ft lbs.

Tire Inflation (Cold)

Tire & Model	① Fr nt	Lbs. Pressure	Rear
All 8.00x14	22		22
8 50x14 Station Wagon	20		24
All Others	20		20

① - Add 2 lbs for air conditioned cars.

Caster

To adjust caster, raise car to remove weight from front wheel, and loosen control arm shaft-to-frame bolts. To decrease the positive caster add shims to front bolt To increase positive caster remove shims from front bolt A .030" shim change will change caster 0°23'.

Camber

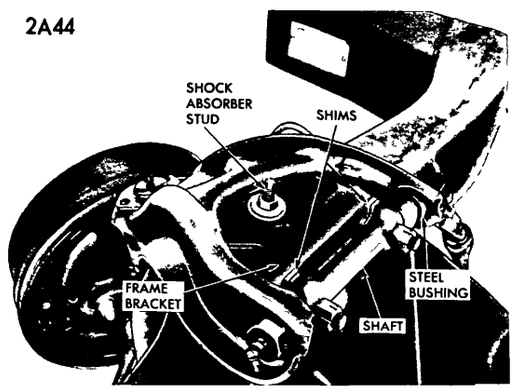
To increase camber, remove shims from both front and rear bolts. To decrease camber, add shims to both front and rear bolts A .030" shim change at both front and rear bolts will change camber approximately 1/6°

NOTE - Adding or removing an equal amount of shims at both front and rear bolts will change camber without changing caster.

PONTIAC TEMPEST (FRONT WHEELS)

Caster adjustment is made by adjusting length of strut rod Camber is adjusted by adding or removing shims equally at front and rear bolts of upper control arm inner shaft mounts. *NOTE - Shims between upper*

(Continued)



PONTIAC (EXCEPT TEMPEST)
CASTER & CAMBER SHIM LOCATION

WHEEL ALIGNMENT SPECIFICATIONS & ADJUSTMENT (Continu d)

control arm inner shaft and frame brackets at front and rear bolts must be of equal thickness After adjustments are completed, tighten bolts 55-70 ft lbs

Tire Inflation (Cold)

Tire & M d l	Front	Lbs. Pr ssure	Rear
All 6 00x15	22		22
6 50x15, 4-Cyl Eng	20		20
V8 Eng	22		20
ℂWagon, 4-Cyl Eng	22		26
Wagon, V8 Eng	22		26

ℂ - Includes Air Conditioning
NOTE - Except ℂ, add 2 lbs to front for air conditioned cars

Camber

Make camb r adjustment before adjusting caster To adjust camber, loosen upper support shaft-to-crossmember bolts, add shims equally to both front and rear attaching bolts to decrease positive camber, remove shims equally from both bolts to increase positive camber *NOTE - Shim packs at front and rear bolts must be of equal thickness Adding or removing an qual amount of shims at both front and rear bolts will change camber without changing caster* After adjustments are completed it may be necessary to remove wheel to retighten these attaching bolts

Caster

To increase caster, lengthen strut rod by loosening nut at rear of rod and turning inside nut to obtain adjustment To decrease caster, shorten strut by loosening inside nut and tightening nut at rear of rod After either adjustment, tighten other nut to 70-85 ft lbs and bend overlocking tab on two sides of nut

PONTIAC TEMPEST (REAR WHEELS)

Toe-In

Toe-in adjustment (unlike 1962 models) is made by adding or removing shims at control arm to body side rail front attaching point *NOTE - Do not add or remove shims at control arm bracket upper bolt at differential Any shims located there are for manufacturing purposes only and should not be changed* To set toe-in, loosen engine mount bolts, loosen three control arm bracket-to-body attachment bolts and adjust toe-in of each wheel to 1/16"-3/16" **by adding or r m ving shims at c ntrol arm brack t attachm nt point to body sid rail.** *NOTE - If driv -on type of equipment is used, reverse car and back it into position Toe-in (overall) will be read as toe-out when car is backwards (readings taken from rear of tires rather than front)* After adjustment is made tighten two control arm bracket-to-body bolts at front attachment points to 40-55 ft lbs *NOTE - Make sure bracket is towards center of car as far as it will go before tightening Both bracket holes are elongated for this reason* Tighten upper bracket bolt and engine mount bolts to 40-55 ft lbs

STUDEBAKER CORP.

ALL MODELS

Caster and camber adjustments are made by rotating upper control arm outer pin at steering knuckle

Tire Inflation (Cold)

Tire & Model	Front	Lbs. Pressure	Rear
5 90x15 (Except Station Wagon)	24		20
5 90x15 (Station Wagon)	26		26
6 40x15 (Except Station Wagon and Taxicab)	24		20
6 40x15 (Station Wagon)	24		24
6 40x15 (Taxicab)	24		22
6 70x15 (Except Station Wagon)ℂ	24		20
6 70x15 (Station Wagon)	24		24
6 70x15 Captive-Air Tire	24		22



STUDEBAKER CAMBER & CASTER ADJUSTMENT

NOTE - If normal loads exceed weight of four passengers, inflate 4 ply tires to 26 lbs front & rear, and 30 lbs if 6-ply tires are used
ℂ - Avanti For sustained high speed driving inflate to 30 lbs front & rear

Caster

NOTE - Adjust caster before making camber adjustment To adjust caster, loosen king pin pinch bolt, and remove lubrication fitting from rear bushing at upper control arm outer pin Insert an Allen wrench into pin (through lubrication fitting hole) and turn pin in full turns until proper caster is obtained *NOTE - A full turn of pin will change caster ½°.*

Camber

After adjusting caster, adjust camber by the same means turning the upper control arm outer pin with an Allen wrench until desired camber setting is obtained *NOTE - Entire range of adjustment is obtained by ½ turn of outer pin Additional camber change is obtained by rotating upper control arm* **inner** *shaft one-half turn, increasing or decreasing camber by approximately 1¼°*

KAISER JEEP CORP.

JEEP GLADIATOR & WAGONEER

Caster of each wheel is adjusted by turning strut tube between end of axle and frame side-member Camber is adjusted by means of slotted attaching holes in control arms

Tire Inflation (Cold)

Tire Size	Lbs. Pressure Front	Rear
6 70x15 (4 Ply)	24	26
7 10x15 (4 Ply)	24	26
7 60x15 (4 Ply)	24	28
7 50x15 (6 Ply)	30	45
7 00x15 (6 Ply)	30	45

Caster

To adjust caster, loosen locknuts at each end of strut tube, and turn (rotate) tube until specified caster is obtained After adjustment is made, tighten locknuts and recheck caster

Camber

To adjust camber, loosen control arm-to-ball joint bolts, adjust camber to specifications, and retighten bolts

WHEEL BEARING ADJUSTMENT

AMERICAN MOTORS

RAMBLER (ALL MODELS)

Rotate front hub and tighten spindle nut to 20 25 ft lbs then back off nut 1/6 turn and install cotter pin

CHRYSLER CORP.

ALL MODELS

Rotate wheel and tighten wheel bearing adjusting nut to 90 inch-lbs (Chrysler, Imperial, Dodge, Plymouth), 70 inch-lbs (Valiant) Place nut lock on nut with one pair of slots in line with cotter pin hole, then back off lock and adjusting nut to next slot Install cotter pin

FORD MOTOR CO.

ALL MODELS EXCEPT FORD & ECONOLINE TRUCKS

Rotate wheel and tighten spindle nut to torque listed in table below for each car model Install nut lock with castellations aligned with cotter pin hole, then back off spindle nut and nut lock to next castellation (next 2 castellations for Comet & Falcon), and install cotter pin

Ford Motor Co. Wheel Bearing Nut Torque

Car Model	Torque
Comet, Falcon, Meteor	12-15 ft lbs
Fairlane, Galaxie, Monterey	15-20 ft lbs
Thunderbird, Lincoln Continental	15-20 ft lbs

FORD TRUCKS (EXCEPT ECONOLINE)

Rotate wheel and tighten adjusting nut to 50-80 ft lbs , then back off adjusting nut at least one but not more than two castellations Lock adjusting nut in this position with a cotter pin

FORD ECONOLINE TRUCKS

Rotate wheel and tighten adjusting nut to 12-15 ft lbs , then back off adjusting nut at least one castellation but not more than two castellations Loosen nut if necessary to align cotter pin hole with nearest slot in nut, and install cotter pin

GENERAL MOTORS

BUICK AND BUICK SPECIAL

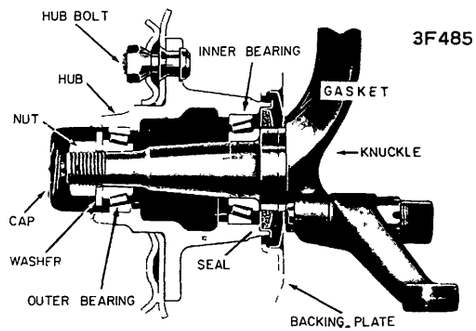
Rotate wheel and tighten spindle nut to 19 ft lbs , then back off nut and retorque to 11 ft lbs while rotating wheel If cotter pin hole in spindle does not line up with slot in nut, back off nut 1/12 turn (Buick), 1/6-3/12 turn (Special) and install cotter pin

CADILLAC

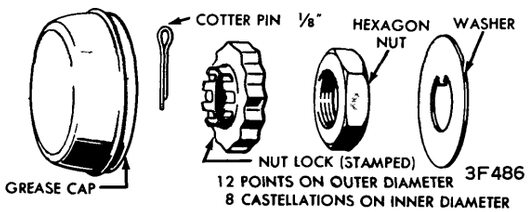
Rotate wheel and tighten adjusting nut to 30 ft lbs , then back off nut 1/4 turn and install cotter pin *NOTE - If cotter pin cannot be installed in either of the two spindle holes, loosen adjusting nut and back off as necessary*

CHEVROLET, CHEVY II, CORVAIR

Rotate wheel and tighten spindle nut to 15 ft lbs or 180 inch-lbs (Chevrolet & Corvair Trucks), and 100 inch-lbs (Chevy II & Corvair Cars), then back off adjusting nut 1 flat (1/6 turn) and install cotter pin If slot and cotter pin hole do not line up, back off nut an additional 1/2 flat or less as necessary *NOTE - Wheel bearings should have no preload and 000- 007" (000- 004" Chevy II) endplay when properly adjusted*



FRONT WHEEL BEARINGS (TYPICAL)



CHRYSLER & FORD ADJUSTING NUT LOCK

CORVETTE

Rotate wheel and tighten spindle nut to 15 ft lbs , then back off nut one flat and insert cotter pin If slot and cotter pin hole do not align, back off spindle nut 1/2 flat or less, to insert cotter pin *NOTE - Wheel bearings should have no preload and 000- 007" end movement when properly adjusted*

OLDSMOBILE 88, S88, 98

While revolving wheel at least 3 times speed of nut rotation, tighten adjusting nut to 23-25 ft lbs Back off nut 1/2 turn and retighten to 15-17 ft lbs If keyway in wheel spindle and a slot in nut line up, back off nut one notch If keyway in wheel spindle and a slot do not line up, back off nut to nearest slot, and install cotter pin

PONTIAC & TEMPEST

Rotate wheel and tighten nut to 10-12 ft lbs , then back off nut 1 flat (1/6 turn) and install cotter pin If holes do not line up, back off adjusting nut to nearest hole Final adjustment should be 1-1 1/2 flats backed off- Nut should be finger loose, with 001- 010" bearing endplay

KAISER JEEP CORP.

JEEP

Rotate wheel slowly and tighten the adjusting nut until a slight braking effect on the turning wheel is noticed Back off adjusting nut to nearest cotter pin hole and install pin

STUDEBAKER CORP.

ALL MODELS

Rotate wheel to make sure all bearing surfaces are in contact, and at the same time tighten wheel bearing nut until wheel binds on bearings Back off nut to next castellation or as necessary for wheel to turn freely, and install cotter pin

BALL JOINT CHECKING

FACTORY RECOMMENDED METHOD

Buick & Buick Special

Lower Joint - Raise car and support lower control arm as far outboard as possible to allow access to lower ball joint grease fitting. *NOTE - Support must be far enough outboard on lower control arm to raise upper control arm away from upper rubber bumper.* Clean lower ball joint and remove grease fitting, then compress Gauge F-21240 and thread captive nut on gauge into grease fitting hole. Release movable arm of gauge so pin contacts ball inside the joint. Lift or pry wheel and knuckle assembly to take up slack in lower joint. Raise and lower the wheel and knuckle assembly several times to note lower ball joint minimum and maximum endplay. Subtract minimum from maximum reading to obtain ball joint endplay in thousandths of an inch. If endplay exceeds .070" (Buick Special); .100" (Buick, Exc. Special), replace ball joint.

Upper Ball Joint - Support car in same manner as for lower ball joint check (see above), then hold bottom of tire stationary and push top of tire in and out. If there is any perceptible movement in the upper ball joint, replace the joint.

Cadillac

Lower Ball Joint - Check the amount of freeplay as the joint is worked vertically in its socket. If freeplay exceeds 1/16", replace the joint.

Upper Ball Joint - Use a regular joint stud nut and a second nut as a lockwasher, then turn joint in its socket with a torque wrench. Torque should be 2-4 ft. lbs. If greater, replace joint.

Chevrolet Pass. Cars & Trucks, Corvair & Corvette

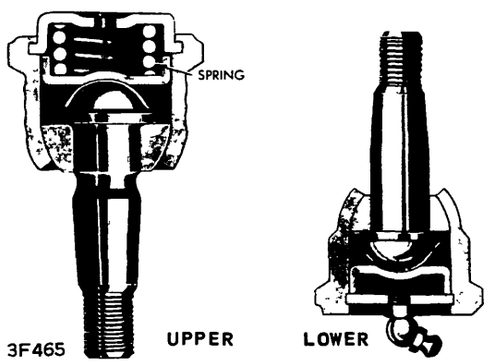
Upper Ball Joint - Raise car and support on frame to allow front suspension to hang free, then remove wheel assembly. Support lower control arm on a jack stand and disconnect upper ball stud from steering knuckle. Reinstall stud nut on ball stud and check rotating torque which should be 2-6 ft. lbs. (Exc. Trucks); 5-10 ft. lbs. (Trucks). If torque is not within limits, replace ball stud. *NOTE - If excessive wear is indicated in upper ball joint, both upper and lower ball joints should be replaced.*

Lower Ball Joint - With weight of car on wheels, use a micrometer or caliper and measure distance from top of lubrication fitting to bottom of ball stud and record the dimension. Raise car and support at outer end of each support arm so that wheels are hanging free. Again measure distance from top of grease fitting to bottom and record the dimension. If difference in dimension on either side is greater than 3/32", replace both lower ball joints.

Chevy II

Upper Ball Joint - *NOTE - The upper ball joint is a loose fit when not connected to steering knuckle.* With weight of car on front wheels, install special support tool (see "Chevy II Front Suspension" in this section for tool details), then raise car and allow wheels to hang free. Measure distance from top of ball stud to top of control arm. Place adjustable jack stand under tire and raise slightly to take up ball joint looseness. Again measure distance from ball stud to top of control arm. If the difference in measurements exceeds 3/32", the ball joint should be replaced.

Lower Ball Joint - Install special support tool (see above), then disconnect lower ball stud from steering knuckle. Assemble nut to ball stud and check rotating torque with a torque wrench. If reading is not within limits of 4-6 ft. lbs. replace ball joint.



TYPICAL BALL JOINT ASSEMBLIES

(SPRING SUPPORTED ON LOWER ARM)

Chrysler, Imperial, Dodge Dart, Plymouth & Valiant

Lower Ball Joint - Raise front of car at lower control arms so wheels are hanging free. *NOTE - Lower control arms must be supported sufficiently outboard so that rebound bumper is not compressed.* Remove ball joint plug and screw the thread fitting of Tool C-3911 into ball joint plug hole until it is firmly seated. Raise and lower wheel with a pry bar and note freeplay indicated on scale of gauge. If freeplay exceeds .050" (indicated by five minor increments on gauge scale), replace ball joint.

Ford Motor Company All Models

Refer to "Alternate Method" of checking ball joints as indicated below.

Oldsmobile & Olds F-85

Upper Ball Joint - Disconnect upper ball joint from steering knuckle, then install a nut on ball joint stud. Use an inch pound torque wrench and rotate stud in a clockwise direction and note the torque wrench reading. If reading is not within limits of 10-60 in. pounds (Oldsmobile); 2-30 in. pounds (Olds F-85), replace ball joint.

Lower Ball Joint - Raise car and support on jackstands placed under frame side rails at each side so front wheels hang free. Place a dial indicator at lower vertical edge of wheel against rim. With one hand at top and the other at bottom of wheel assembly, moderately rock wheel at top and bottom. If movement is greater than 1/16", the lower ball joint should be replaced.

Pontiac & Pontiac Tempest

Upper Ball Joint - Disconnect upper ball stud from steering knuckle, then install nut so it is snug against ball joint and rotate stud with a torque wrench. If torque is not within limits of ½-6 ft. lbs., replace the ball joint.

Lower Ball Joint - Raise car and support with jackstands placed under lower control arm. Measure endplay of lower ball joint. Maximum endplay should be .060" (used ball joint). *NOTE* - A new ball joint should have a maximum endplay of .035" (Exc. Tempest); .020" (Tempest). Replace joint if endplay is greater than the above maximum limit.

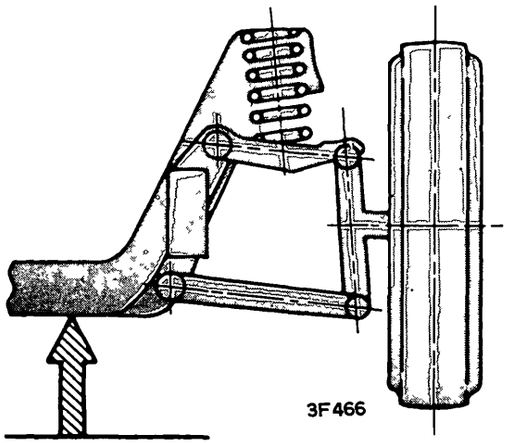
ALTERNATE METHOD

NOTE - There are two general types of suspensions, one type with spring or torsion bar attached to lower control arm, and the other with spring attached to upper control arm. Check axial play by moving wheel up and down. Check radial play by rocking wheel at top and bottom.

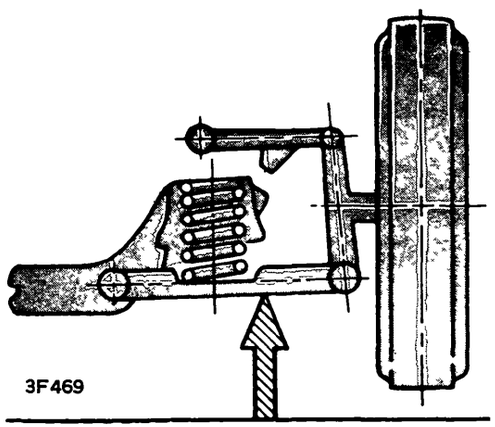
Spring on Lower Control Arm

Upper Ball Joint - Replace ball joint if there is any perceptible looseness at joint.

Lower Ball Joint (Radial Play) - If radial play exceeds .250" measured at bottom of tire on side wall, replace the ball joint.



JACKING LOCATION



JACKING LOCATION

BALL JOINT CHECKING (C nt.)

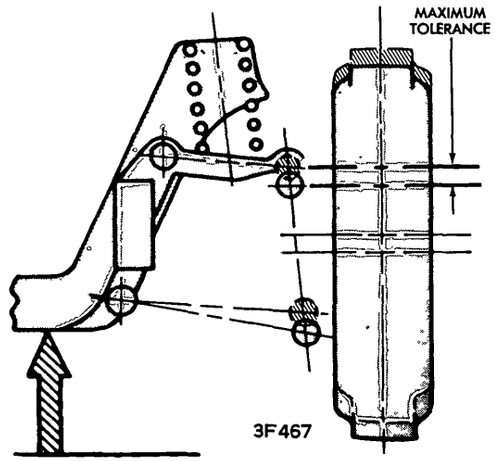
Spring on Upper Control Arm

Upper Ball Joint (Radial Play) - If radial play exceeds .250" measured at top of tire on side wall, replace the ball joint.

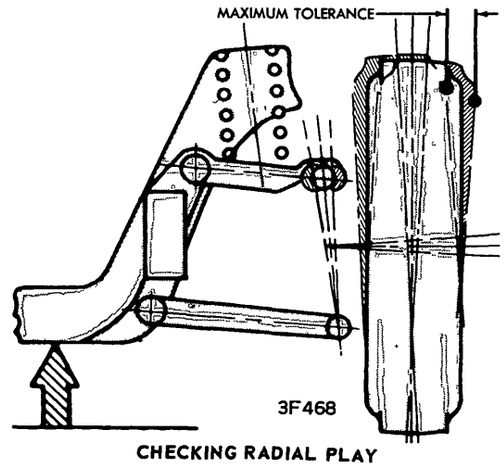
Lower Ball Joint - Replace ball joint if there is any perceptible looseness at joint.

Upper Ball Joint (Axial Play) - If axial play between upper control arm and spindle exceeds specifications (see table below), replace the upper ball joint.

SPRING SUPPORTED ON UPPER ARM

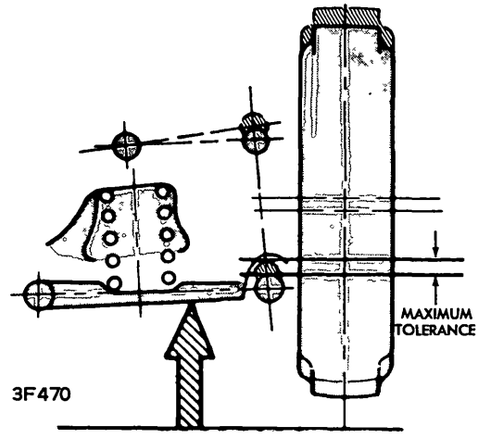


CHECKING AXIAL PLAY

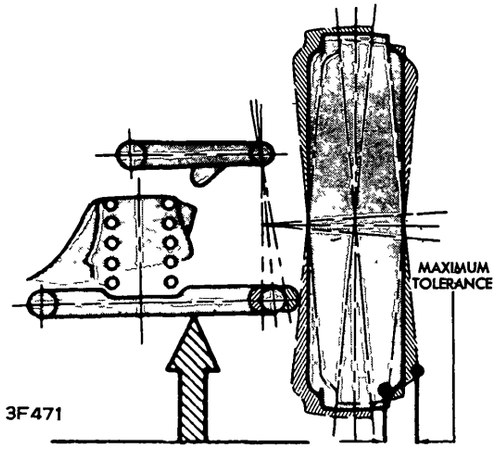


CHECKING RADIAL PLAY

SPRING SUPPORTED ON LOWER ARM



CHECKING AXIAL PLAY



CHECKING RADIAL PLAY

Axial Play Specificati n

Car Model	Tolerance	Car M d l	T l ranc
Buick (Exc.Spec.)	.100"	Ford	Zero
Buick Special	.080"	Lincoln	.200"
Cadillac	.062"	Mercury	Zero
Chevrolet Pass.	.093"	Meteor	Zero
Chevy II	.093"	Oldsmobile	.125"
Chrysler	.050"	Oldsmobile F-85	.090"
Comet	Zero	Plymouth	.050"
Corvair	.093"	Pontiac	.060"
Corvette	.093"	Rambler	Ⓒ
Dodge	.050"	Tempest	.093"
Fairlane	Zero	Thunderbird	.200"
Falcon	Zero	Valiant	.050"

Ⓒ - Upper ball joint not used.

BUICK (EXCEPT SPECIAL) FRONT SUSPENSION

Buick (Exc pt Special) 1963

DESCRIPTION

"Ball-Joint" independent type suspension similar to that used on previous models, except ball joints are pressed (were threaded) into upper and lower control arms

ADJUSTMENT

Cast r & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section*
Front Wh l Bearing - *See "Wheel Bearing Adjustment" in this section*
Riding Height - Before checking riding height, make sure that trunk is empty, fuel tank is full, and there is no bind in suspension system by bouncing both ends of car up and down several times, slowly releasing car to permit it to assume normal position At front of car riding height is measured between upper surface of lower crossmember and spring housing on crossmember (see table below for **revised** 1963 specifications) To adjust low side of car, install shim (Group 7 425) between upper end of spring and frame *NOTE - If more than two shims are required, replace spring* At rear of car, riding height is measured from axle housing to axle rebound bumper at front mounting bolt location To adjust low side of car (or to prevent "bottoming"), install spring insulators (Group 7 545) divided between upper and lower ends of spring *NOTE - If more than three insulators are required, replace spring*

1963 Buick Riding Heights

Car M del	Front Height	Rear Height
Series 4400, 4600, 4800	5 23"	℄ 7 25"
4700	4 85"	6 42"

℄ - Station Wagon rear height is 7 00"

REMOVAL & INSTALLATION

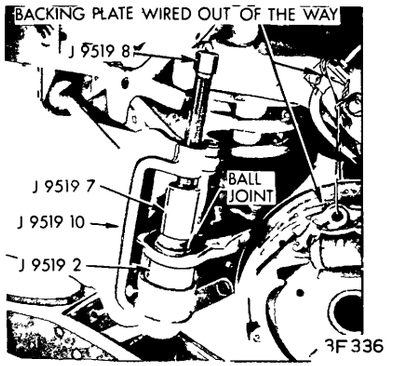
See 1962 Final Data, Page 369, and note as follows

► *UPPER & LOWER BALL JOINT REPLACEMENT NOTE* Upper ball joint and control arm are serviced as a unit, while lower ball joint may be installed or removed from the lower control arm as a separate part DO NOT ATTEMPT TO REMOVE BALL JOINT FROM UPPER CONTROL ARM

► *BALL JOINT CHECKING See Front Suspension Ball Joint Checking in this section*

Lower Ball Joint

Removal - With car raised and supported by jack stands under frame side rails, remove wheel, hub and drum assembly, and brake backing plate Wire brake backing plate out of way Place a floor jack under lower control arm as far outboard on arm as possible, leaving approximately ½' clearance between jack and control arm



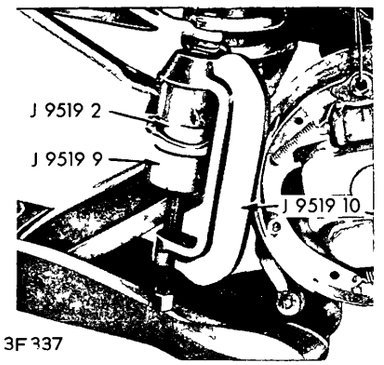
REMOVING BALL JOINT

Remove ball joint cotter pin, loosen nut two turns but do not remove nut, then tap steering knuckle with a brass drift to loosen ball joint stud After stud breaks loose, use a jack to raise control arm to relieve spring tension, then remove stud nut and seal, and move knuckle away Install Lower Ball Joint Remover and Installer Tool J-9519-10 upright, and with J-9519-7 on top and J-9519-2 on bottom of lower ball joint (see illustration), tighten tool until ball joint is forced out of lower control arm *CAUTION - Ball joint may pop out suddenly*
Installation - Position ball joint, minus dust shield, in lower control arm with Tool J-9519-10 installed and J-9519-2 on top and J-9519-9 on bottom of lower ball joint (see illustration) Tighten tool until ball joint is fully seated in lower control arm With ball joint stud turned so cotter key hole is fore and aft, install dust shield, position stud in knuckle, install nut and tighten to 65 ft lbs Insert cotter pin and lubricate joint

Steering Knuckle

Removal - Loosen lower ball joint from steering knuckle (see above) but do not remove nut from ball joint stud Loosen upper ball joint stud nut two turns and with a brass drift, tap steering knuckle in area of stud on both upper and lower ball joints to separate studs from knuckle Stud nuts that were loosened still hold upper and lower control arms to knuckle *CAUTION - Be sure lower control arm is supported by a jack on its outer end to prevent downward travel of lower control arm when removing ball joint nut* If necessary, raise lower control arm slightly with jack to remove force of knuckle against nut, then remove nut raise knuckle off stud, remove nut from upper ball joint stud and remove steering knuckle

Installation - Wipe upper ball joint stud clean position it in knuckle with cotter key hole fore and aft, seat with a sharp hammer blow, torque nut to 50 ft lbs and install cotter pin Wipe lower ball joint stud clean, position it in lower end of knuckle with dust shield installed, torque nut to 65 ft lbs and install cotter pin



INSTALLING BALL JOINT

Upper Control Arm

Installation - Torque of upper control arm shaft-to-bracket nuts is 100 ft lbs

BUICK (EXCEPT SPECIAL) REAR SUSPENSION

Buick (Except Special) 1963

►CHANGES, CAUTIONS, CORRECTIONS

► *CLICKING NOISE CORRECTION* To correct for clicking noise occuring when changing direction or accelerating, tighten six rear control arm-to-frame mounting nuts and bolts to 90 ft lbs , or tighten three vernier adjustment nuts and bolts on rear upper control arm above 60 ft lbs recommended torque

DESCRIPTION

Coil spring, three link type suspension similar to that used on previous models, except that lower spring seat is no longer used as such, but is sometimes used as a shim on the left side only, when needed in production due to spring height tolerances

ADJUSTMENT

Riding Height - *See "Riding Height" under "Front Suspension" section*

REMOVAL & INSTALLATION

See 1961 Final Data, Page 349, and note the following
Coil Spring Installation - When installing rear coil spring, be sure to prevent spring end from noisily rubbing on inner edge of lower control arm by rotating it to locate bottom spring end to hang over one side or the other of lower control arm ¼-¾" *NOTE - Lower spring seat is no longer used except as a shim (on left side only) when needed in production due to spring height tolerances*

Lower Control Arm - Torque front and rear bushing bolts to 75 ft lbs

BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION

DESCRIPTION

"Ball-Joint" independent type suspension similar to that used on previous models, except ball joints are pressed (were threaded) into upper and lower control arms.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

Riding Height - Before checking riding height, make sure trunk is empty and fuel tank is full. Normalize position of springs by working bumper up and down and then release it slowly. Buick Special riding height is measured from a point immediately behind front rivet of compression bumper on lower control arm to lowest point of spring housing. Oldsmobile F-85 front riding height is measured from lower side of gauge hole in lower control arm to metal surface of spring upper housing. Rear riding height is measured from top of rear axle housing tube to base (Buick), face (Oldsmobile) of rebound bumper on car underbody. *NOTE - No adjustment of riding height is provided.*

1963 Buick Special & Oldsmobile F-85 Riding Heights

Car Model	Front	Rear
Buick Special	4.40"	6.65"
Station Wagon	4.40"	5.94"
Oldsmobile F-85	6.25 ±.25"	4.75 ±.25"
Station Wagon	6.25 ±.25"	4.18 ±.25"

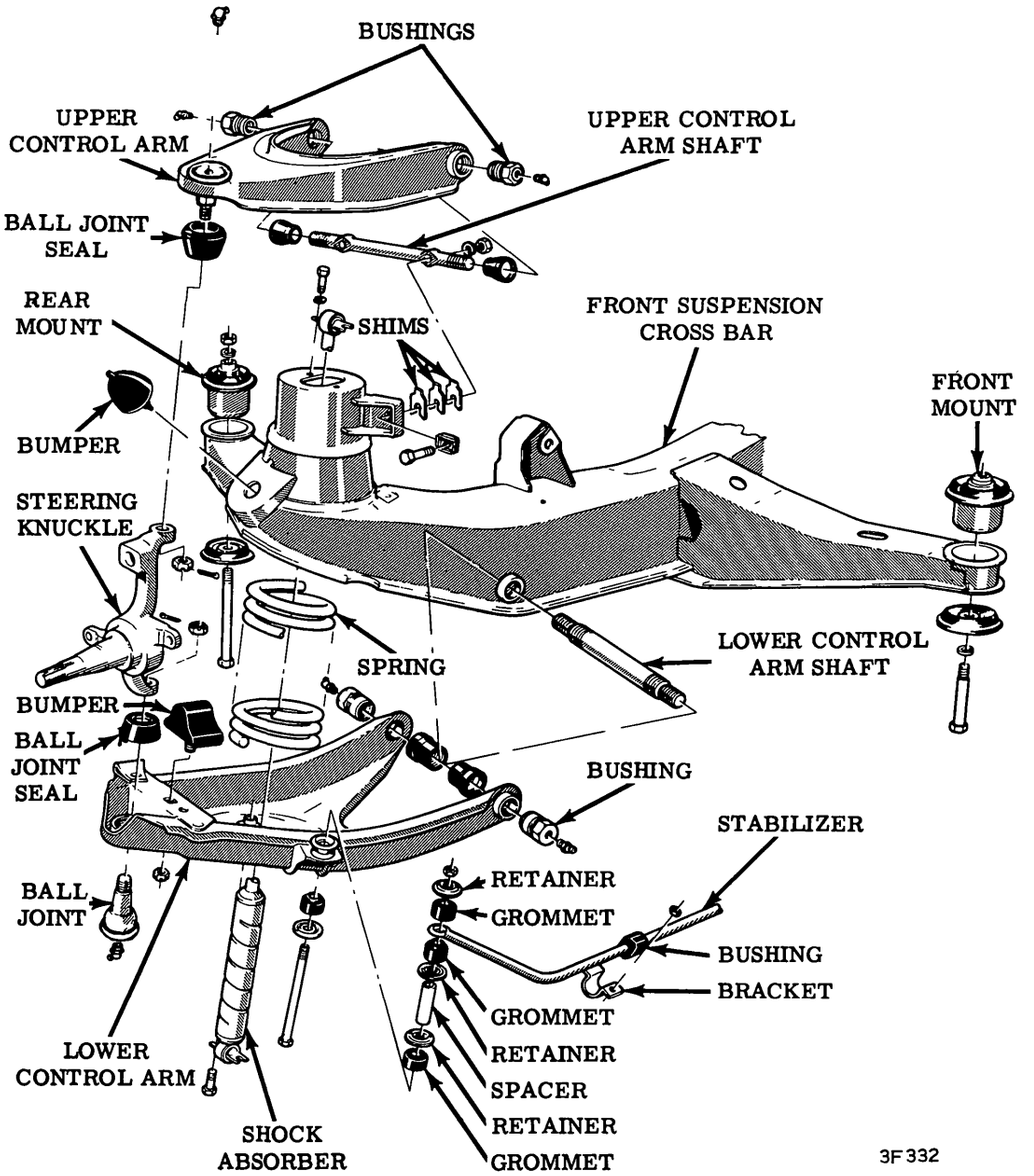
REMOVAL & INSTALLATION

See 1962 Final Data, Page 371, and note the following:

►*1963 UPPER & LOWER BALL JOINT REPLACEMENT NOTE:* Upper ball joint and control arm are serviced as a unit, while lower ball joint may be installed or removed from the lower control arm as a separate part DO NOT ATTEMPT TO REMOVE BALL JOINT FROM UPPER CONTROL ARM.

►*1961, 1962, 1963 LOWER BALL JOINT REPLACEMENT KIT:* Part No 1396309 (lower ball joint, seal, grease fitting, and ball stud nut) may be used to replace earlier "threaded" ball joints. Endplay reduced limits of .000"- 020" and a 008" oversize ball joint housing insures adequate retention and increased durability.

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*



BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION ASSEMBLY

Lower Ball Joint

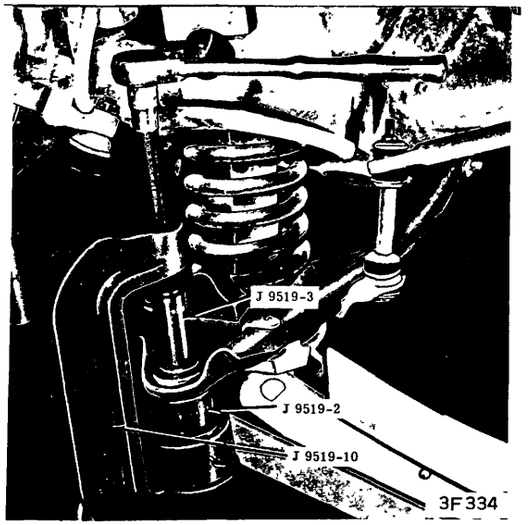
Removal - For both model cars, with car raised and supported by jack stands under frame side rails, remove wheel, hub and drum assembly, and brake backing plate. Wire brake backing plate out of way. Remove ball joint cotter pin, loosen nut two turns but do not

(Continued)

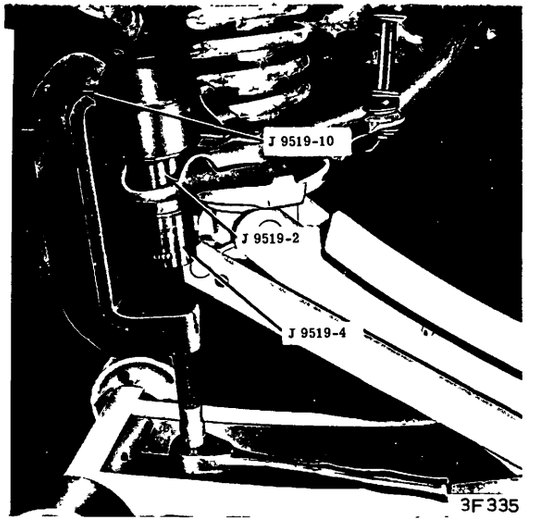
BUICK SPECIAL & OLDSMOBILE F-85 FRONT SUSPENSION (C nt.)

remove nut, then tap steering knuckle with a brass drift to loosen ball joint stud. After stud breaks loose, use a jack to raise control arm to relieve spring tension, then remove stud nut and seal, and move knuckle away. Install Lower Ball Joint Remover and Installer Tool J-9519-10 upright with J-9519-3 on top and J-9519-2 on bottom of lower ball joint (see illustration). Tighten tool until ball joint is forced out of lower control arm. *CAUTION - Ball joint may pop out suddenly.*

Installati n - For both model cars, position ball joint minus dust shield, in lower control arm with Tool J-9519-10 installed with J-9519-2 on top and J-9519-3 on bottom of lower ball joint (see illustration). Tighten tool until ball joint is fully seated in lower control arm. With ball joint stud turned so cotter key hole is fore and aft, install dust shield, position stud in knuckle, install nut and tighten to 50 ft. lbs. (Buick Special); 35-60 ft. lbs. (Oldsmobile F-85). Insert cotter pin and lubricate joint.



REMOVING BALL JOINT



INSTALLING BALL JOINT

BUICK SPECIAL & OLDSMOBILE F-85 REAR SUSPENSION

Buick Special (1963)
Oldsm bile F-85 (1963)

DESCRIPTION

Coil spring, four link type suspension, similar to that used on previous models, with two lower control arms mounted between outer ends of rear axle housing and car underbody, and two upper control arms mounted angularly between rear axle differential housing and car underbody.

ADJUSTMENT

Riding Height - *See "Riding Height" under "Front Suspension" section.*

Rear Universal Joint Angle - *NOTE - Whenever rear lower control arms are replaced, check and adjust rear universal joint angle. See "Propeller Shafts" in "Rear Axle" section.*

REMOVAL & INSTALLATION

See 1961 Final Data, Page 352, and note the following:

Upper Control Arm

Installation - Right and left upper control arms are interchangeable, however, best clearance is obtained when the two manufacturing tabs on side of arms are facing outboard. Torque control arm attaching bolts for both models to 45-60 ft. lbs.

Lower Control Arm

Removal - Oldsmobile F-85 bushings and lower control arm are replaced as a unit, while Buick Special bushings are replaceable as separate parts (removed and installed through one side of arm only).

Installation - Torque control arm attaching bolts for both models to 45-60 ft. lbs.

CADILLAC FRONT SUSPENSION

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 LOWER CONTROL ARM TIE-STRUT BUSHING FAILURE CORRECTION* On early model 1963 cars, excessive wear of tie-strut bushing may occur due to severe or repeated stop-and-go driving To increase service life of this bushing, weld bushing cup, Part No 1481655 to rear of number one crossmember *NOTE - Cars beginning with approximate Eng No 124300 have this bushing cup factory installed* To reduce tie-strut bushing replacement on 1961-62 cars, bushing cup may be installed

►*1963 REDUCED AXIAL MOVEMENT OF LOWER BALL JOINTS.* On all 1963 model cars, beginning with Eng No 102481, the axial movement of front suspension ball joints has been reduced from 000- 030" to 000- 020" as a means of reducing premature ball joint replacement *NOTE - Vertical freeplay in ball joint should exceed 1/16" before replacement is made* To clean ball joints, use a clean cloth, **never use solvent.**

DESCRIPTION

"Ball-Joint" type suspension similar to that used on previous models

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section*

Riding Height - Before checking riding height, make sure that trunk is empty and fuel tank is full Normalize position of springs by working bumper up and down and release slowly, permitting car to assume normal position At the front of car, riding height is measured from top of rear flange on lower control arm to center of hole on frame side rail *NOTE - This hole (rivet in 1962), is nearly on centerline of front coil spring When measuring, hold rule vertical, seating it on lowest part of support arm flange, directly below hole* Standing height should be equal on both sides of car within 3/8" (see table below for **revised** 1963 specifications) To adjust low side of car, add one shim at top of spring seat inside frame tower *NOTE - No more than ONE shim should be used on each side* At rear of car, riding height is measured between top of rear axle housing to lower underside surface of frame Rear standing height should be equal within 1/2" on both sides of car (see table below) To adjust low side of car, add one shim at top of spring seat inside tower

1963 Cadillac Riding Heights

Car Model	Front Height	Rear Height
Series 60, 62	7 3/8"-8 1/4"	5 13/16"-6 9/16"
75	7 7/8"-8 5/8"	6 5/8"-7 3/8"
Commercial	7 7/8"-8 5/8"	4 1/4"-5"

REMOVAL & INSTALLATION

See 1962 Final Data, Page 373, except as follows

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section*

Front Stabilizer

Removal - Disconnect stabilizer at lower control arm, then remove brackets and stabilizer from frame

Installation - Reverse removal procedure and tighten bracket-to-frame bolts to 20 ft lbs Tighten link nut to end of threads

Lower Control Arm Tie-Strut

Removal - Raise front of car and place jack stands under frame side rails, then remove air deflector covering inner end of tie-strut Disconnect stabilizer link from lower arm Remove locknut, bushing retainer, and bushing from forward end of tie-strut Remove two bolts securing tie-strut to lower suspension arm and remove strut Remove rear locknut from tie-strut **if necessary.** *NOTE - If replacing only bushings, do not distrub rear locknut on tie-strut, otherwise it will be necessary to readjust caster and camber*

Installation - *NOTE - If rear locknut was previously removed, install a new locknut (¾" thick) on threaded end of tie-strut, and run nut ¾" from end of thread* Install rear bushing retainer on tie-strut with concave side against nut Insert metal spacer part way through flat side of rear bushing and install bushing and spacer on tie-strut Install threaded end of tie-strut through frame front crossmember, making certain flat side of bushing is flush with frame Position end of tie-strut on lower suspension arm and install two attaching bolts and nuts **loosely.** Install front bushing on tie-strut (ribbed face toward frame), and slide bushing against frame crossmember Place front bushing retainer on tie-strut with convex side against bushing Start new locknut (5/8" thick) on threaded end of tie-strut Connect stabilizer link to lower suspension arm, being certain grommets and retainers are properly installed Lower car, and with car weight on all four wheels, position front bushing on metal bushing on metal spacer and tighten locknut on front end of tie-strut to 35 ft lbs Tighten tie-strut to lower arm attaching bolt nuts to 35 ft lbs *NOTE - If rear locknut was disturbed during removal or installation, adjust caster and camber*

Upper Control Arm Ball Joint Seal

Removal - Raise front of car and place jack stands under lower suspension arms so that shock absorber lower mounts rest on jack stands Remove wheel and tire assembly and locknut and special flat washer from ball joint stud Scribe a mark on camber eccentric and steering knuckle to aid alignment for installation Remove joint from knuckle by installing a standard nut part way on stud, inserting a 7/16" rod (round end) inside nut, then striking rod with a heavy hammer until joint is free Remove standard nut Raise up on upper arm and remove ball joint Remove camber eccentric from joint stud, using puller J-8990 After wiping seal surface clean, remove garter spring and seal Inspect ball pivot for looseness or binding *NOTE - Joint should turn in its socket at 2-4 ft lbs If damaged or worn, replace joint and arm as an assembly* Pry out service plug from ball joint cover and discard See lubrication note below

Lubrication of Upper and Lower Ball Joints - Using Repacking Gun, J-9280 (red label), repack joint through plug hole, forcing lubricant into joint until enough comes through to flush out any moisture and foreign material Wipe off surplus, but allow sufficient lubricant to fill void around joint stud

Installation - Install new service plug in ball joint cover Using a new seal, turn seal inside out, place nylon ring inside seal just over bottom hole *NOTE - Flat nylon washer (replaced 1961 snap ring) on all 1962 front suspension upper arm ball joint seals, is being replaced by a flanged nylon retainer ring, starting with Eng No 103163 Flanged ring protects against direct contact between seal and camber eccentric* With some lubricant around hole in seal, clean groove in joint housing and install seal on joint stud, making certain large groove diameter of seal engages in recess (circular groove) around joint housing Allow air to enter seal by momentarily prying large lip of seal away from joint housing with a small screwdriver Slide small end of seal toward threaded end of stud and install new garter spring on seal using Garter Spring Installer, J-9148

CAUTION - Make sure spring secures lip of seal in recess all around joint housing Install camber eccentric and align marks on eccentric and steering knuckle Install a standard nut on ball joint stud and tighten until eccentric locks in knuckle, then remove standard nut, and install special flat washer and locknut, tightening to 60 ft lbs Check camber and adjust if necessary

CADILLAC REAR SUSPENSION

DESCRIPTION

Four link, coil spring type similar to design used on previous models

ADJUSTMENT

Riding Height - *See "Riding Height" under "Front Suspension" section*

REMOVAL & INSTALLATION

See 1961 Final Data, Page 356, and note the following:

Control Arm Attaching Bolts - With car at standing height, tighten front and rear control arm bolts to 60 ft lbs

CHEVY II FRONT SUSPENSION

Chevy II (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 UPPER CONTROL ARM BALL JOINT SEAL FAILURE:* Ball joint seal valve which releases excess grease during lubrication, may cause failure of ball joint if inoperative due to hardened grease or undersize relief valve hole Check valve openings and if necessary open with any 1/16" diameter rod.

DESCRIPTION

Ball joint independent type suspension, with shock absorbers mounted within front coil springs, similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*
Riding Height - *See 1962 Final Data, Page 378.*

REMOVAL & INSTALLATION

See 1962 Final Data, Page 378, and note th following:

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*

►*1963 CONTROL ARM BALL JOINTS:* New extended lubrication interval type ball joints may be identified by large rubber boot on stud end of joint. Lubrication interval is 6,000 miles or 6 months, whichever comes first.

CHEVROLET PASS. CAR FRONT SUSPENSION

Chevrolet Pass. Car (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 UPPER CONTROL ARM BALL JOINT SEAL FAILURE:* Ball joint seal valve which releases excess grease during lubrication, may cause failure of ball joint if inoperative due to hardened grease or undersize relief valve hole. Check valve openings and if necessary open with any 1/16" diameter rod.

DESCRIPTION

Ball joint independent type suspension, with coil springs and direct acting shock absorbers, similar in design to previous models.

ADJUSTMENT

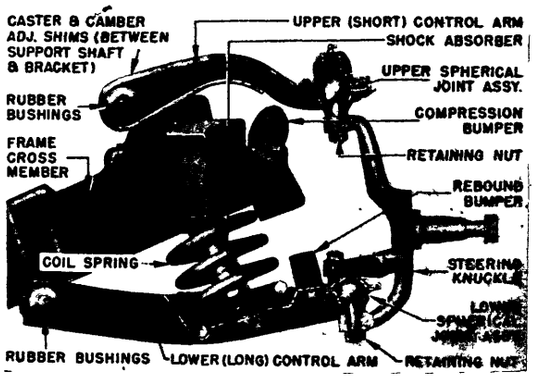
Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*
Riding Height - *See 1962 Final Data, Page 375.*

REMOVAL & INSTALLATION

See 1962 Final Data, Page 375, and note the following:

►*1963 CONTROL ARM BALL JOINTS:* New extended lubrication interval type ball joints may be identified by large rubber boot on stud end of joint. Lubrication interval is 6,000 miles or 6 months, whichever comes first.

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*



CHEVROLET FRONT SUSPENSION 2F348

CHEVROLET PASS. CAR REAR SUSPENSION

Chevrolet Pass. Car (1963)

DESCRIPTION

Rear suspension is similar in design to previous models, using a three-link, coil spring suspension. Linkage consists of two lower control arms and a single upper control arm. Forward ends of lower control arms are attached to brackets on frame side rails and rear ends are attached to brackets on rear axle housing. The upper control arm is now connected to rear axle housing at right hand side on top of axle tubes and to bracket on frame right side rail. A tie rod is attached to frame left side rail and to right hand side of rear axle housing. Rubber bushings are used at both ends of control arms for connection to frame and rear axle housing. Coil springs are mounted with lower end seated on lower control arm and upper end seated in tower bracket welded to frame side member.

ADJUSTMENT

Riding Height - *See "Riding Height" under "Front Suspension".*
Rear Universal Joint Angle - *NOTE - Whenever rear lower control arms are replaced, check and adjust rear universal joint angle. See "Propeller Shafts" in "Rear Axle" section.*

REMOVAL & INSTALLATION

Shock Absorbers

Removal - Remove lower attaching bolt, lockwasher and spacer, then remove upper two attaching nuts, bolts and washers. Pull shock absorber off of lower anchor pin.
Installation - Assemble two-piece bushing into eye on shock absorber, then install spacer, lockwasher and nut (do not tighten) Install and tighten upper bolts, flat washers, lockwashers, and nuts, then tighten lower attaching nut.

Shock Absorber Lower Anchor Pin

Removal - Remove rear coil spring (see below), or support rear suspension lower control arm. Remove shock absorber from lower mounting, then remove anchor pin nut and lockwasher. Install Tool J-7063, and sliding hammer J-2619, and drive pin out of rear suspension lower control arm. *NOTE* - It may be necessary to put a horizontal load on lower control arm rear bushing to keep it from flexing.
Installation - Use chalk and mark flat spot location on anchor pin threads and on corresponding flat on lower control arm bracket. *NOTE - It is advisabl to r mov rear wheel to aid in alignment of these two chalk marks.* Install Tool J-7063 to anchor pin and enter into lower control arm. Attach sliding hammer, Tool J-2619 and drive into place, keeping the two chalk marks aligned. Install shock absorber on lower mounting, then install anchor pin attaching lockwasher and nut.

Rear Coil Springs

Removal - Place car on hoist or jack stand, and remove rear shock absorbers from lower mounting pins, remove "U" bolts from rear universal joint, and separate propeller shaft from rear axle, resting shaft on top of companion flange. Loosen pivot bolt retaining nuts at both sides of front and rear pivot of lower control arms, front and rear pivots of upper control arm, and both ends of rear axle tie rod. With car supported so that rear axle hangs free, observe position of right spring in relation to brake line, and pry spring out of lower seat, if necessary, to avoid damaging brake line while lowering rear suspension during spring removal. Remove rear spring.
Installation - Position coil springs in seats, making sure upper end of coils index with "step" in spring upper seat. *CAUTION - To avoid damag to brak lin when axle is raised, position lower end of right hand*

(Continued)

CHEVROLET (PASS. CAR) REAR SUSPENSION (C nt.)

spring slightly off bottom seat. Raise axle just enough to allow lower coil of right hand spring to clear brake line, then pry spring to proper position on lower seat. Install universal joint on rear axle. Raise axle until weight of car is supported normally. Install shock absorbers on lower anchor pins and tighten all pivot bolt retaining nuts loosened previously.

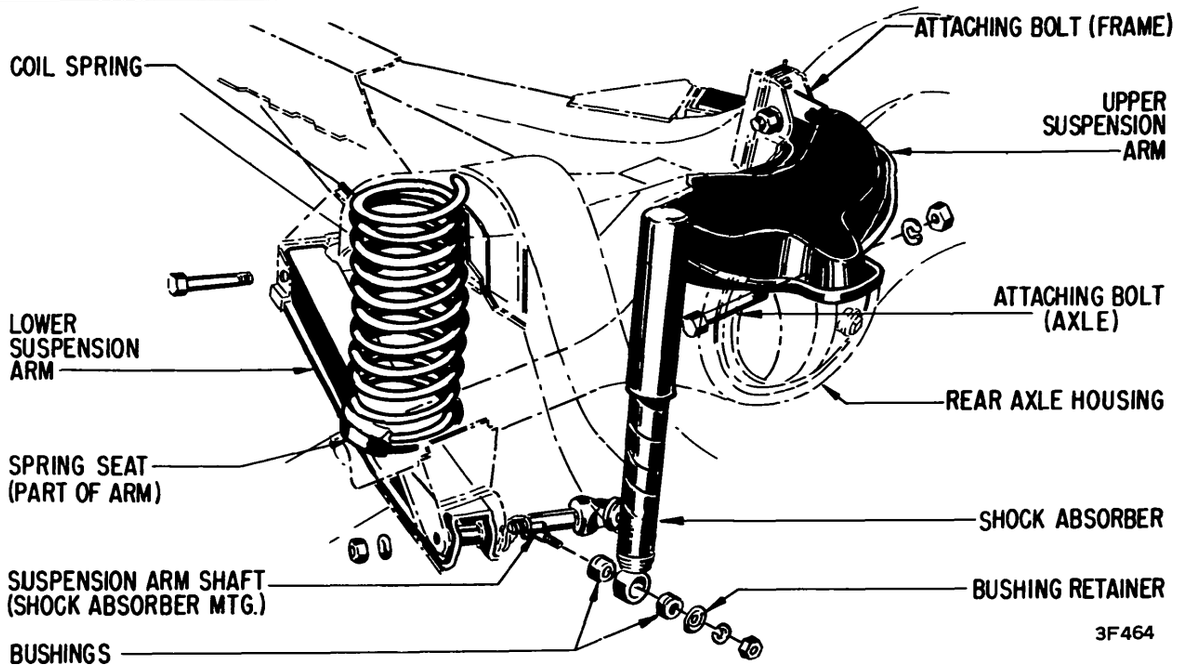
Upper Control Arm & Bushings

Removal - Raise car on a hoist that will support rear axle housing or wheels, then remove rear pivot bushing bolt at rear axle housing. *NOTE - Rear axle must be supported in such a way as to prevent axle housing from rotating about the lower control arm rear pivot, and to also relieve load on pivot bushings.* Remove bolts, lockwashers, and nuts securing upper control arm bracket to frame bracket or crossmember. *CAUTION - Note number of shims removed as these control driveline angles.* Remove arm from car.

Removal of Bushings - Remove bolt, nut and washer attaching upper control arm to bracket and separate control arm from bracket. With control arm bushing centered over Tool J-7574-4 and Tool J-7574-3 in place and with arm resting horizontally by supporting at opposite end, press or tap bushing from arm using Tool J-7574-1 and Tool J-7079-2 (Driver Handle). Repeat procedure for opposite end of control arm.

Installation of Bushings - Turn arm to opposite side (bushing can only be installed from one direction), center bushing hole over support Tool J-7574-4 and install Tool J-7574-3 between flanges at hole location. *NOTE - Tool J-7574-3 will prevent overcompression of arm during overtravel.* Fix Tool J-7574-2 on driver handle, then start bushing into hole and press or tap in place. Check to see that no interference or cocking takes place. Flange of bushing must be seated on arm. Repeat procedure for opposite end of arm.

Installation - Tap front of upper control arm into control arm bracket, then install bolt, lockwasher and nut, but do not tighten. Set control arm (with front bracket installed) on axle housing bracket and tap into place. Install bolt (head of bolt must be toward outboard side), lockwasher and locknut, but do not tighten. Align forward end of upper control arm bracket with frame bracket or crossmember, then install two lower bolts through control arm bracket and frame bracket or crossmember. *CAUTION - Make sure shims removed at disassembly are reinstalled in original locations.* Install both nuts and lockwashers. Install upper bolt and flat washer from front of bracket, then install lockwasher and nut. Tighten the three bracket bolt nuts to 60-80 ft. lbs. *NOTE - If a new control arm was installed, check driveline angles (see "Propeller Shafts" in "Rear Axle" section).* Lower car to floor, then bounce rear of car several times to settle bushings. Tighten upper control arm nuts to 80-90 ft. lbs.



CHEVROLET PASS. CAR REAR SUSPENSION ASSEMBLY

Lower Control Arm & Bushings

Removal - Place car on hoist and support frame side rails. Remove shock absorbers, then remove wheels and rear springs. Remove shock absorber lower anchor pin (see above). If both rear suspension control arms are to be removed, support rear axle housing to prevent its moving or falling from hoist or jack. Remove parking brake cable hold down clip, then remove attaching nut, bolt, and lockwasher on forward end of control arm and remove arm.

Removal of Bushings - To remove front bushing, center control arm and bushing over Tool J-7574-4 with Tool J-7574-3 in place. With arm resting horizontally and supported at opposite end, press or tap bushing from arm using Tool J-7574-5 and driver handle. *NOTE - Be sure to place the removed end of bushing with the flange.* To remove rear bushing, repeat above operation for opposite end using Tool J-7574-1 in place of Tool J-7574-5.

Installation of Bushings - To install front bushing, fix Tool J-7574-6 onto driver handle, then start bushing into hole and press or tap in place. Check to see that there is no interference or cocking. Flange of bushing must seat against arm. To install rear bushing, repeat above operation using Tool J-7574-2 in place of Tool J-7574-6.

Installation - Install forward end of control arm, but do not tighten bolt. Swing control arm into place and install shock absorber lower anchor pin *(see "Shock Absorber Lower Anchor Pin" Installation above),* but do not tighten attaching bolt. Install wheel, then install coil springs (see above). Install shock absorbers and check drive line angles *(see "Propeller Shafts" in "Rear Axle" section).* Lower car to floor and bounce it several times to settle bushings, then tighten all attaching nuts.

Rear Suspension Tie Rod & Bushings

Removal - Remove nut, washer and bolt from left hand side and washer from stud on right side that secures tie rod to brackets. Remove tie rod. To remove bushings, center tie rod over Tool J-7877-2 and with tie rod supported horizontally, press or drive bushing from rod, using Tool J-7877-1 and J-7079-2.

Installation - To install bushings, reverse above procedure, using Tool J-7877-3 in place of J-7877-1 to press or drive in bushing. *NOTE - Tool J-7877-2 should bottom on rod when bushing is fully seated.* Mount tie rod to right hand stud, then install nut and special washer but do not tighten. Install bolt, lockwasher and nut to left hand bracket but do not tighten. Lower car to floor and bounce rear end several times, then tighten nuts to 55-70 ft. lbs.

CHEVROLET TRUCK FRONT SUSPENSION

Ch vr l t Truck (1963)

DESCRIPTION

New design ball joint independent type suspension with tapered coil springs between upper and lower control arms. Double acting shock absorbers, located at rear of control arms, are stud-mounted to a frame bracket at top and clevis-mounted to lower control arm bracket at the bottom. Ball joints are pressed into control arms and arms pivot on steel threaded bushings. Caster and camber shims are located between concave-convex spacers and upper control arm bracket on frame.

ADJUSTMENT

Cast r & Camb r - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Fr nt Wh el B aring - *See "Wheel Bearing Adjustment" in this section.*

REMOVAL & INSTALLATION

► *BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this section.*

Sh ck Absorber

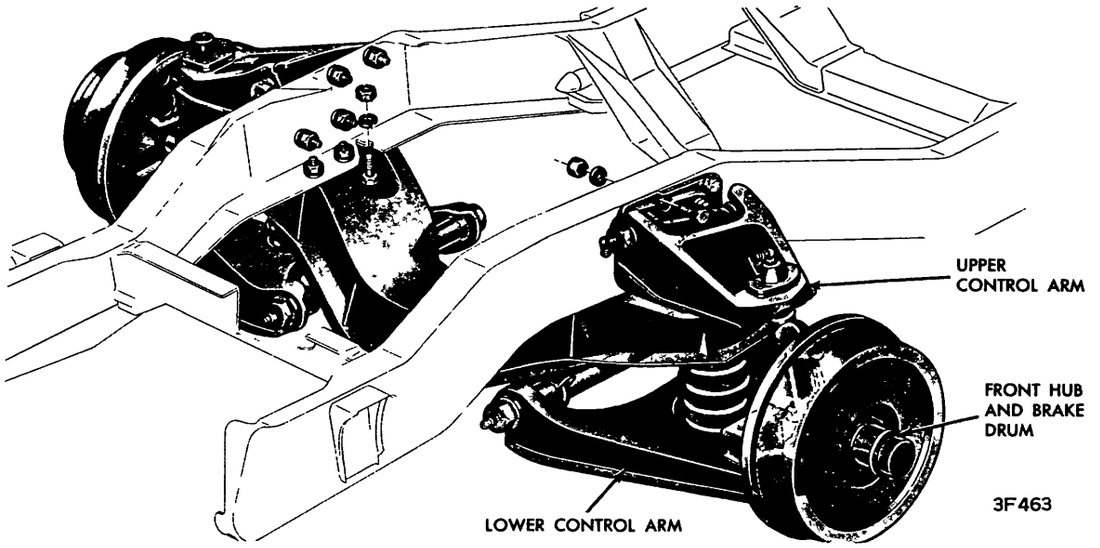
R m val - After removing upper and lower nuts and eye bolt, remove shock absorber, then remove any burrs formed by lockwashers on control arm and frame. *NOTE - If rubber bushings are defective, replace shock absorber assembly.*
Installati n - Reverse removal procedure and torque upper nut to 130-150 ft. lbs. and lower nut to 55-75 ft. lbs.

Stabilizer

R m val - With truck raised and link bolt disconnected at upper nut, withdraw upper grommet retainer and grommet, then slide link bolt, remaining grommets, and spacer out of bracket. Remove frame brackets and drop stabilizer bar from under frame.
Installati n - With stabilizer in position on frame, install frame brackets over bushings. *NOTE - Center of stabilizer must line up with centerline of vehicle within 3/8" to prevent interference with steering gear.* Install link bolts, spacer and grommets to stabilizer, then torque link bolt nut to 9-12 ft. lbs. (threads should bottom out) and tighten frame brackets to 15-24 ft. lbs

Coil Spring

R m val - Raise truck and support on frame to allow control arm to swing free. Disconnect lower end of shock absorber and loosen lower ball joint stud nut. While supporting steering knuckle boss, rap boss sharply with hammer to loosen ball stud. Use Tool J-6874 and components to compress coil spring enough to clear spring tower, then remove lower ball joint stud nut. With lower ball stud free of steering knuckle, swing lower control arm down, release spring tension and remove spring.
Installati n - *NOTE - Install c il spring with small coil end up.* Reverse removal procedure and note the following: Torque lower ball joint stud to 100-135 ft. lbs. While releasing spring tension, guide spring into seat with drift.



CHEVROLET TRUCK FRONT SUSPENSION

Lower Control Arm, Ball Joint & Bushings

Removal - With coil spring removed from arm (see above), disconnect control arm from crossmember. Make remover/installer tools of heavy pipe or tubing in dimensions of 2 1/2" diameter X4", 2" X 2 7/8", 3" X 1/2", 1 3/4" X 2 3/4". With arm off car, place arm over remover support tool and press out ball joint with appropriate remover tool.
Bushing Removal - With grease fittings removed from bushing outer end, unscrew bushings from control arm.

Bushing Installation - Slide new seal on each end of shaft and insert shaft into control arm. Start new bushings on shaft and into control arm, adjusting shaft until it is centered in arm, then turn bushings in and torque to 200-220 ft. lbs. (with spacer); 125-140 ft. lbs. (without spacer).
Installation - Invert control arm and place on installer support tool at ball joint area, then press new ball joint assembly into arm until it is fully seated and square with arm. Position arm assembly in tube type brackets located on crossmember and notice specially designed rivet in forward position has a head on bottom side which serves as a guide pin to locate pivot shaft in proper position. Install "U" bolts and torque to 30-40 ft. lbs. Install spring and complete installation as described above.

Upper Control Arm, Ball Joint & Bushings

Removal - Raise truck, and with lower control arm assembly supported by adjustable jack, remove wheel and hub assembly. Use Tool J-6874 and components to compress coil spring, then disconnect upper ball joint stud and raise upper arm to clear steering knuckle. Disconnect control arm shaft studs to crossmember bracket and withdraw control arm assembly. *NOTE - Tape shims and concave-convex spacers together just as they were removed.* With arm off truck, center punch ball joint rivet heads, then drill and punch out rivets to remove ball joint.
Bushing Removal - With grease fitting removed from ends of bushings, unscrew bushings from shaft and control arm. Remove shaft and seals.
Bushing Installation - Slide new seal on each end of shaft and insert shaft into control arm. Start new bushings on shaft and into control arm, adjusting shaft until it is centered in arm, then turn bushings in and torque to 140-160 ft. lbs. (with spacer); 80-100 ft. lbs. (without spacer). Check shaft for free rotation.
Installation - Install service ball joint assembly in arm using special hardened bolts only, torquing bolts to 40-50 ft. lbs. Place control arm in position on bracket and loosely install nuts. Before tightening nuts, insert caster-camber shims and concave-convex spacers in the same order as when removed. Torque nuts to 70-90 ft. lbs. Insert ball joint stud into steering knuckle and torque nut to 60-75 ft. lbs. Remove spring compressor tool and support from under lower control arm, then install hub and wheel assembly and lower truck.

Crossmember

Removal - With both coil springs removed (see above), support engine and remove front engine mount center bolt. Separate main brake feeder line from crossmember tee and remove bolts retaining crossmember hangers to frame side rails. Remove bolts securing crossmember to frame side rail lower flange and lower assembly from truck.
Installation - Jack crossmember into position under frame and install frame side rail lower flange mounting bolts. Install bolts securing crossmember hanger to frame and torque nuts to 60-80 ft. lbs. Position engine on front mount and install mounting bolt and torque to 40-50 ft. lbs. Install coil springs (see above) and connect front brake main feeder line. Bleed brakes and check front end alignment .

CHEVROLET TRUCK REAR SUSPENSION

Chevrolet Trucks (1963)

DESCRIPTION

New design two-link coil spring type suspension. Rear of control arms attach to axle housing tubes by a single "U" bolt, while front ends attach to rear crossmember frame brackets by a single pivot bolt. Shock Absorbers, located forward of axle housing, are attached at top to rear crossmember brackets and at bottom to brackets held to axle by control arm "U" bolts. A tie rod is mounted parallel to axle housing and bracket supported at axle housing and frame.

REMOVAL & INSTALLATION

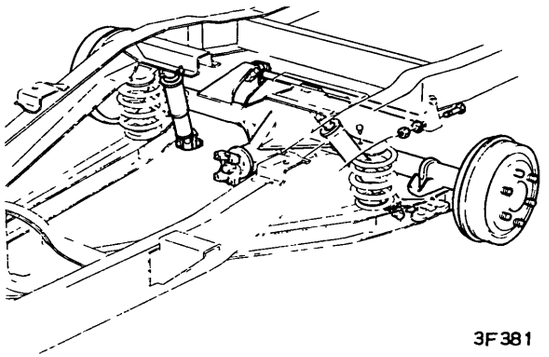
Tie Rod & Bushings

Removal - Remove nuts and bolts from each end of rod and remove rod. *NOTE - Minor defects in rod may be corrected by bending, however, a badly bent rod should be replaced.*

Removal of Bushings - Using Tool J-7079-2, position end of rod over a suitable tube-type support and press bushing from rod.

Installation of Bushings - Reverse removal procedure, using Tool J-8518.

Installation - With rod ends aligned in mounting brackets with a drift, insert pivot bolts and install nuts finger tight, then let weight of unloaded vehicle rest on suspension and torque pivot nuts to 110-150 ft. lbs.



CHEVROLET TRUCK REAR SUSPENSION

Control Arm & Bushings

Removal - Jack up frame to remove load from spring, and remove spring clamp bolt from underside of control arm. Remove "U" bolt nuts and separate shock absorber bracket from control arm and arm from "U" bolts. Lower rear of arm, disconnect parking brake lever at clip on bracket attachment, remove pivot bolt and remove arm from truck.

Bushing Removal - With Tool J-8448-3 in fork of control arm, astride bushing, and Tool J-5888-3 underneath bushing, place Tool J-8448-2 on top (in bushing hole), and press bushing from arm with Tool J-7079-2

Bushing Installati n - Support control arm as in removing procedure, with new bushing flanged side up, then press bushing in with Tools J-8448-1 and J-7079-2.

Installation - With bushed end of control arm positioned in pivot yoke, align holes with drift, insert pivot bolt and turn nut on bolt finger tight. Position clamp inside coil spring so that it seats freely on spring end without any hang-up, then raise control arm to spring, pass bolt with flat washer installed up through arm and clamp. *NOTE - Coil end should be in-line with clamp bolt straight across arm and notch of clamp should be within 30° in from coil end.* Install lockwasher and torque nut to 40-50 ft. lbs With arm adjacent to axle, pass "U" bolt over axle and through holes in arm. Place shock absorber bracket on ends of "U" bolt, install nuts and torque to 220-320 ft. lbs. Lower truck, and with full weight of unloaded vehicle on front and rear suspension, torque control arm pivot bolts to 125-165 ft. lbs.

Coil Spring

Removal - Remove shock absorber bolt from mounting bracket at control arm, then jack up frame so spring is not under tension. Remove upper and lower clamps from spring by backing out lower bolt from underside of control arm, and upper bolt from inside spring. Lower control arm to allow removal of spring.

Installation - Position spring clamp inside coil spring (as described above) and loosely install clamp bolt, washer and nut. Position upper clamp inside spring and install bolt, washer, and torque nut to 45-55 ft. lbs. Connect and torque shock absorber-to-control arm bracket to 110-150 ft. lbs Torque spring lower clamp bolt to 40-50 ft. lbs., then remove jack.

CORVETTE FRONT SUSPENSION

Corvette (1963)

DESCRIPTION

New design "Ball joint" independent type suspension, with shock absorbers mounted within front coil springs and springs mounted between lower control arms and front suspension crossmember. Upper and lower control arm pivot shafts are bolted to a fixed suspension crossmember with shims provided between upper pivot shaft and crossmember for caster and camber adjustments. A front mounted stabilizer bar is linked to lower control arms.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

Riding Height - With car at curb weight, position car on a level floor, then bounce front of car several times and allow to settle. Measure distance from floor to center of front inner pivot of lower control arm and record measurement. Measure distance from floor to lower face of front steering knuckle boss for "ball joint" (on same side of car) and record measurement. Difference between these two measurements should be 3 5/8" ± 1/2". Measure opposite side. Differences should not exceed 1/2" between right and left sides of car.

REMOVAL & INSTALLATION

► *BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking in this section.*

Shock Absorber

Removal - With car raised, remove nut at top and two bolts at bottom of shock absorber (hold upper stem from turning), then remove shock absorber from bottom of control arm.

Installation - Place lower cushion on stem and insert shock absorber up through lower control arm into hole in crossmember. Place upper cushion, retainer and nut on shock absorber upper stem, tightening nut to 15-25 ft. lbs. Install lower mounting bolts to control arm and tighten to 8-11 ft. lbs.

Stabilizer Bar

Removal - With car raised, at both sides of car remove nut at top of link bolt, retainer, bushing, and remove link bolt. At both sides of car, remove two nuts attaching stabilizer bracket to frame and remove stabilizer bar.

Installati n - Reverse removal procedure, lower car to floor and bounce and rock front end several times to settle bushings, then retighten stabilizer link bolts and bracket-to-frame bolts to 9-12 ft. lbs.

Coil Spring

Removal - With car raised and supported by frame so control arms swing free, remove wheel and tire assembly, stabilizer bar and shock absorber (see above). Loosen lower ball joint-to-steering knuckle nut, and two lower control arm cross shaft bushing bolts. Place Tool J-6874-1 across top of sixth coil, then loosely secure Tool J-6874-2 to upper shoe with attaching capscrews and lock washers. Upper shoe "V" notch and lower shoe raised land should contact spring. Insert Tool J-6874 up through center of spring and attach to upper and lower shoe assembly. With spacers under shock absorber mounting hole and against bottom of lower control arm, install special bearing washer and Tool J-6874-5 against spacer with large washer against bearing, then feed screw up through large washer bearing and spacer and thread into Tool J-6874 and tighten snugly With shoe assembly centered on spring and screw tightened until a very slight compression is placed on spring, firmly tighten down two capscrews securing upper and lower shoes to lock these shoes to spring. Turn head of screw until spring is compressed just enough to clear spring tower, then remove lower ball joint-to-steering knuckle nut. *NOTE - If needed, assist spring out of spring tower with pry bar.* Disconnect lower ball joint from spring knuckle and lower control arm with compressed spring. Immed-

(Continued)

CORVETTE FRONT SUSPENSION (C ntinued)

iately release compression on spring by backing off long screw, release spring and tool and withdraw spring. **Installation** - Position spring with small coil end up, and place Tool J-6874-1 across top of sixth coil, then loosely secure Tool J-6874-2 to upper shoe with attaching capscrews and lockwashers. Upper shoe "V" notch and lower shoe raised land should contact spring. Insert Tool J-6874 up through center of spring and attach to upper and lower shoe assembly with bolt and nut. With spring in its seat on lower control arm, position spacers centrally under shock absorber mounting hole and against bottom of lower control arm. Install bearing, washer and Tool J-6874-5 with bearing against spacer and washer against bearing. Feed screws up through large washer, bearing and spacer and thread into yoke rod, then tighten snugly but do not draw down yet. Center shoe assembly on spring and tighten log screw until a very slight compression is on spring, then firmly tighten down two capscrews securing upper and lower shoes, locking shoes to coil spring. Turn head of screw until spring is compressed just enough to clear spring tower. *NOTE - If needed, assist spring into tower with a pry bar.* Install lower ball joint into steering knuckle and secure with attaching nut, then release compression on spring and also use a drift to guide coil spring into its proper seat. End of coils must be 3/8" from coil stops in spring seat. Tighten lower ball joint-to-steering knuckle nut and lock with cotter key. Install shock absorber, stabilizer bar, wheel and tire assembly and lower car to floor. Tighten two lower control cross shaft bushing bolts to 45-55 ft. lbs.

Upper Ball Joints

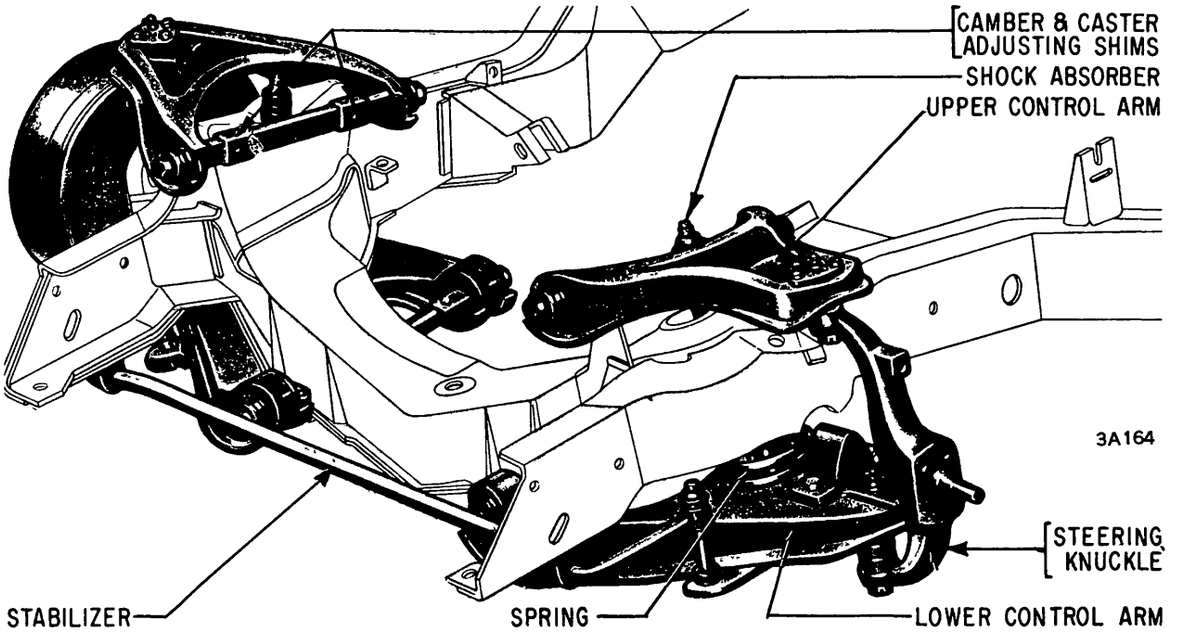
Rem val - With car raised and supported by frame so control arms swing free, disconnect stabilizer link from lower control arm and upper ball stud from steering knuckle, to allow knuckle and wheel hub assembly to hang free. Grind or cut off rivets securing ball joint assembly to control arm and remove ball joint.

Installation - Place ball joint assembly on arm and assemble with special bolts furnished in kit, tightening bolts to 15-25 ft. lbs. *NOTE - Drill out rivet holes in control arm to diameter specified in kit.* Raise lower control arm and insert upper ball stud into steering knuckle, then install ball stud nut and tighten to 42-47 ft. lbs. Insert cotter pin, then connect stabilizer link to lower control arm bracket and tighten to 9-12 ft. lbs.

Lower Ball Joints

R m val - With car raised, support lower control arm on stand and disconnect lower ball stud from steering knuckle, then raise knuckle and wheel hub assembly out of way. *NOTE - Spring removal not neeced if jackstands firmly support lower control arm after ball stud is disconn cted.* Grind or cut off rivets securing ball joint assembly to control arm and remove ball joint.

Installation - With new ball joint on arm, install special bolts and nuts furnished in service kit and tighten to 15-25 ft. lbs. *NOTE - Drill out rivet holes in control arm to diameter specified in kit.* Raise arm and insert ball stud into steering knuckle, install ball stud nut and tighten to 60-94 ft. lbs. Insert cotter pin.



CORVETTE FRONT SUSPENSION

Lower Control Arm & Bushings

Removal - With coil spring removed (see above), remove two front cross shaft-to-frame attaching bolts and rear frame attaching nut, then remove lower control arm.

Bushing Removal - Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" x 20 capscrew (furnished with Tool J-5888) to bottom of threads in one end of cross shaft. With control arm in arbor press on Tool J-5888-3, press on capscrew until bushing is removed. *NOTE - Be sure bushing flange does not contact support.* Repeat for other bushing.

Bushing Installation - With cross shaft in control arm and Tool J-7052-1 in position, place control arm on Tool J-5888-3, and hand start bushing into control arm and over end of cross shaft. *NOTE - End of shaft with two bolt holes should be toward front of control arm.* Install Tool J-7052-5 over bushing, being certain three-piece spacer is not overlapping bushing holes in control arm. Press bushing into control arm until flange contacts control arm, then invert arm in press and repeat same process on other bushing. *NOTE - After installation, cross shaft should be free enough to be rotated by hand.* Install collar, lockwasher and capscrew in each end of cross shaft. DO NOT TIGHTEN.

Installation - With control arm in place, attach in place with three lockwashers and special washers under rear bolt, bolts, and anchor nuts, then install coil spring (see above), and lower car to floor. Tighten cross shaft bushing bolts to 45-55 ft. lbs.

Upper Control Arm & Bushings

Removal - With car raised and supported at outer end of lower control arm, remove wheel and tire assembly, then remove nut from upper control arm ball stud and remove ball stud from steering knuckle. Remove two nuts retaining upper control arm shaft to front crossmember, and note number of shims at each bolt, then remove control arm.

Bushing Removal - Remove capscrews, lockwashers and collars from both ends of cross shaft, then install a 3/8" x 24 capscrew (furnished with Tool J-5888) in one end of cross shaft. Support control arm in arbor press on Tool J-5888-3 and press out bushing. *NOTE - B sure flange of bushing does not contact support.* Invert control arm and repeat process on other bushing. Remove capscrew from cross shaft.

Bushing Installation - With control arm in arbor press and Tool J-7052-2 in place, press in one bushing while arm is supported by Tool J-5888-3. Install cross shaft in arm, invert in press, and press in second bushing. *NOTE - Cross shaft should be free enough to be rotat d by hand.* Install collar, lockwasher and capscrew in ends of cross shaft. DO NOT TIGHTEN.

Installation - With control arm in place and attaching studs in position, install two nuts and bolts retaining upper control arm shaft to front crossmember and install same number of shims as removed at each bolt. With new seal on joint stud, install stud through knuckle, install nut, tighten securely, and install cotter pin. Install wheel and tire assembly, lower car to floor, bounce front end several times, and tighten bushing collar bolts to 35-40 ft. lbs.

CORVETTE REAR SUSPENSION

C rv tt (1963)

DESCRIPTION

New design, with a transverse multi-leaf spring mounted on a fixed differential carrier, and each wheel mounted by a three-link independent suspension composed of a wheel drive shaft, a camber control strut rod, and a trailing wheel spindle support arm that acts like a radius arm.

ADJUSTMENT

Camber & Toe-In - *See "Wheel Alignment Specifications and Adjustment" in this section.*

REMOVAL & INSTALLATION

Shock Absorber

Removal - With car raised, disconnect shock absorber upper mounting bolt and lower nut, sliding shock upper eye out of frame bracket and pulling lower eye off strut rod mounting shaft.

Installation - Reverse above procedure, tightening upper nut to 40-60 ft. lbs. and lower nut to 50-60 ft. lbs.

Strut Rod & Bushings

Removal - With car raised, disconnect shock absorber lower eye from strut rod shaft, remove strut rod shaft nut, and withdraw shaft by pulling toward front of car. *NOTE - Mark relative position of camber adjusting cam and bracket, so they may be reassembled in same location.* Loosen camber bolt and remove four bolts securing strut rod bracket-to-carrier and lower bracket. Remove cam bolt nut and cam and bolt assembly, then pull strut down out of bracket and remove bushing caps.

Bushing Removal - With strut rod bushing centered over Tool J-7877-2 and strut rod supported horizontally, press or drive bushing from rod, using Tools J-7877-1 and J-7079-2.

Bushing Installation - With strut rod end centered over Tool J-7877-2, press or drive bushing to bottom on strut rod using Tool J-7877-3.

Installati on - With bushing caps over inboard bushing, slide rod into bracket, install cam and bolt assembly, and adjust cam to line up with mark on bracket. Tighten but do not torque nut. Raise bracket and assemble to carrier lower mounting surface, torque bolts to 15-22 ft. lbs. Raise outboard end of strut rod into spindle support fork and insert strut rod shaft into fork so that flat on shaft lines up with corresponding flat in spindle fork, then place shock absorber lower eye and bushing over strut shaft, tightening nut to 50-60 ft. lbs. Lower car to floor, torque camber nut to 55-70 ft. lbs. and strut rod shaft nut to 80 ft. lbs. Check wheel camber.

Spring

Removal - Raise car and support on frame slightly forward of torque control arm pivot points, then remove wheels. With a jack under spring at link bolt, raise spring until it is nearly flat, then wrap 1/4" or 5/16" chain with grab hook around suspension crossmember and spring. Hook chain securely with grab hook and secure chain to spring with "C" clamp to prevent slipping. *CAUTION - Do not use rope, wire, cable or anything but chain to retain spring.* Lower jack to free and remove link bolt, then raise jack and spring end and remove chain when it is loose. Lower jack until spring end tension is released, then repeat all of the above procedure for the other end of spring. Remove four bolts securing spring center clamp plate and drop spring, sliding it out from under car.

Installation - With spring on carrier cover mounting surface, index center bolt head with hole in cover, place center clamp plate in position and install four attaching bolts, tightening bolts to 55-75 ft. lbs. Raise spring outer end with jack until spring nearly flat, then secure with chain as described above. Lower jack, align torque control arm with spring end and insert link bolt, cushions and retainers. Tighten nut on link bolt until cotter pin hole is visible and insert pin. Raise spring end with jack under link bolt and remove chain and "C" clamp when loose. Lower jack, making sure cushions remain indexed in retainers, then remove jack and repeat above procedure for other spring end.

Torque Control Arm & Bushings

Removal - Disconnect spring on side that torque arm is to be removed (see Spring Removal above). With shock absorber lower eye removed from strut rod shaft, disconnect and remove strut rod shaft, swinging strut rod down, then remove four bolts securing axle drive shaft to spindle flange and disconnect drive shaft. *NOTE - It may be necessary to force torque arm outboard to provide clearance to drop drive shaft.* Disconnect brake hose from torque arm and disconnect parking brake cable. Loosen torque arm pivot bolt and remove toe-in shims. Tape shims together and identify for correct reinstallation, then withdraw pivot bolt and pull torque arm out of frame.

Bushing Removal - With torque arm off car, drill out flared end of bushing retainer, remove retainer plate and tap retainer out of bushing. Remove bushings by spreading them apart with a chisel and tap out of arm. *NOTE - If bushing diameters are severely rusted in torque arm, and arm tends to spread during removal, clamp arm in a "C" clamp to prevent spreading.*

Bushing Installation - Hand start bushings in arm, then press into place using Tool J-7055-1. With special plate over flared portion of new bushing retainer, insert retainer into bushing. Place fabricated back-up plate (see illustration) on flared end of bushing retainer and assemble Tool J-8111-23 to plate with two 1/2" bolts 5" long. Be sure threaded hole in J-8111-23 is centered over unflared end of bushing retainer and that chamfered retainer plate is centered over retainer tube. Lightly oil pointed end of J-8880-5 screw and thread into J-8111-23 until pointed end contacts bushing retainer. Continue threading J-8111-23 until retainer is flared.

Installation - With torque arm in frame opening, insert pivot bolt and assemble. Place toe-in shims in original position on both sides of torque arm, then tighten pivot bolt but do not torque. Raise axle drive shaft into position and install to drive flange, then torque bolts to 25-35 ft. lbs. With strut rod in position, insert strut rod shaft so that flat lines up with flat in spindle support fork, then install and tighten nut to 80 ft. lbs. Install shock absorber lower eye, tighten nut to 50-60 ft. lbs., then connect spring (see Spring Installation above). Install wheel, lower car, and tighten torque arm

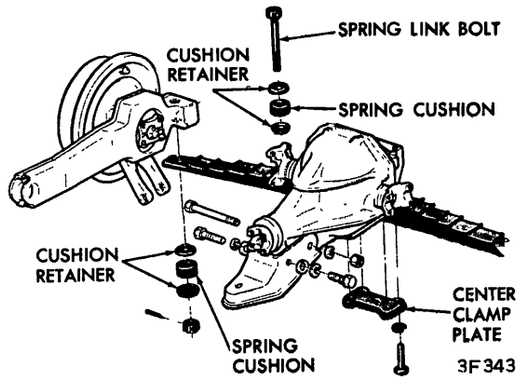
Suspension Crossmemb r & Isolation Mount

R m val - With rear spring removed (see above), remove differential Carrier *(see "Corvette & Chevrol t ½-Ton Truck Hypoid" in Rear Axle s ction),* and with crossmember supported, remove bolts securing crossmember isolation mounts to frame.

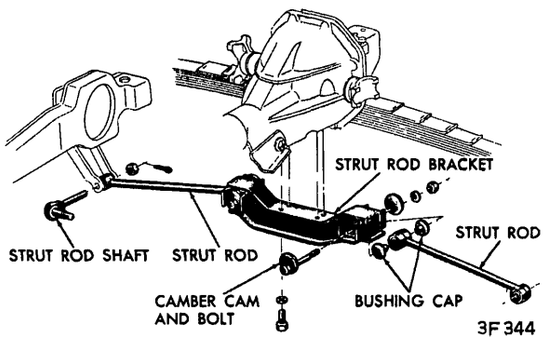
Isolation Mount Removal - With suspension crossmember off car, remove bolts securing carrier cover to crossmember, and bend back isolation mount tabs. Place crossmember on a suitable support and press mount out of arm using a piece of suitable size pipe or tubing on outer shell or inner insert.

Isolation Mount Installati n - With mount in position on crossmember, compress outer sleeve and press mount into place until it is fully and squarely seated, then bend over locking tabs.

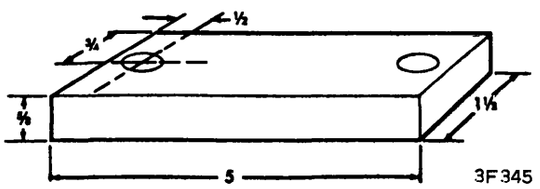
Installa tion - Install carrier cover to crossmember and torque bolts to 25-35 ft. lbs. Raise crossmember into position and install mounting bolts to torque of 20-30 ft. lbs. Install differential carrier assembly *(see "Corvette & Chevrolet ½-Ton Truck Hyp id" in R ar Axle section),* then install wheels and lower car.



CORVETTE REAR SPRING INSTALLATION



CORVETTE STRUT ROD ASSEMBLIES



FLARING TOOL BACK-UP PLATE

CORVAIR FRONT SUSPENSION

C rvair, All Models (1963)

►*CORVAIR 95 BALL JOINT STUD REPLACEMENT*

NOTE: If upper control arm ball stud replacement unit, Part No. 3813205, has ¼" diameter attaching holes in flange, drill holes to 5/16" diameter. Special 5/16" diameter bolts furnished in unit must be used to attach ball stud assembly.

DESCRIPTION

Ball joint type independent front suspension with a ball and socket joint connecting upper and lower control arms to steering knuckles. Coil springs are mounted between lower control arm and tower in front crossmember. Shock absorbers are mounted within coil springs on lower control arm and connected at top to tower in front crossmember. On 500, 700, and 900 Series, a strut rod is connected between outer ends of lower control arms and brackets that trail back from front crossmember. On these models, caster adjustment is made with this strut rod. On 1200 Series (including Greenbriar), the lower control arm is of different design and caster is adjusted by shimming upper control arm

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*

Fr nt Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

Riding Height - With car at curb load (full gas tank, and spare tire, no passengers), position car on a level floor, then bounce and rock car several times and allow to settle Measure heights as follows:

Front End - Measure from center of lower control arm pivot bolt to floor If distance not as shown and equal within ½" on both sides of car, replace springs

Rear End - Measure distance from bottom of rocker panel 29" ahead of rear wheel center line to floor (Pass Cars), from center of rear suspension control arm pivot bolt to floor (1200 Series). If distance not as shown and equal within ½" on both sides, replace springs.

CAUTION - Springs do not have flat ends and shims must not be used.

Riding Height

Mdl	Front	Rear
Pass Cars	12" ± ½"	9" ± ½"
Greenbrier & Trucks	12" ± ½"	14 5/16" ± ½"

REMOVAL & INSTALLATION

See 1960 Final Data, Pag 376, or later Manual edition, and n te th f llowing:

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*

1963 Ball J int Stud Tightening Torques

Model	Upper	Lower
Pass. Cars	30-40 ft. lbs.	30-40 ft. lbs
Greenbrier & Trucks	42-47 ft. lbs.	60-94 ft lbs

Coil Spring (Series 1200)

Removal - Take out the upper rebound bumper, then place car on a hoist, raising and supporting the car on jack stands so front control arm hangs free. *NOTE - Position stands so c ntrol arms may b raised or lowered with a floor jack.* Remove shock absorber, then position a piece of 2" x 4" lumber, 16¼" long between top of upper control arm and behind reinforcing channel above wheel. Make sure upper corner of this wood support is placed behind reinforcing channel toward inside of car. Place a floor jack under lower control arm and raise until wood support is forced firmly against channel. Disconnect lower control arm ball joint stud from steering knuckle, then raise lower control arm and free stud from knuckle boss. Swing wheel out far enough to clear lower arm, and block or wire in this position. Carefully lower jack supporting control arm until spring is decompressed and remove spring.

Installation - Seat coil spring in tower with its end in contact with step in spring seat, then swing lower control arm up as far as possible and seat spring in control arm. Place floor jack under lower control arm and raise until ball joint stud may be placed into steering knuckle boss (make sure dust cap is in position on ball stud). When stud will enter hole in knuckle, lower jack and install stud nut. Tighten to 60-94 ft. lbs. and continue to tighten until cotter pin holes are lined up and install cotter pin. Raise lower control arm and install upper rebound bumper in proper hole, then to seat it in position, slowly lower the control arm until upper arm presses point of bumper through hole in spring tower.

Lower Control Arm (Series 1200)

Removal - Remove coil spring (see above), and disconnect lower control arm inner shaft from crossmember

Disassembly - Remove bolt, lockwasher and collar from each end of cross shaft, then thread a 7/16" - 20 capscrew (furnished with Tool J-5888) to bottom of the threads in one end of cross shaft. Support control arm in an arbor press on Tool J-5888-3, being careful not to allow bushing flange to contact support, then press on capscrew until bushing is free of control arm. Repeat this operation to remove bushing from opposite end of shaft.

Reassembly - Install cross shaft in control arm and position Tool J-7052-1, then support control arm with Tool J-5888-3 and hand start bushing into control arm and over end of cross shaft *NOTE - End of cross shaft with two bolt holes must be toward front of control arm.* Install Tool J-7052-5 so three-piece spacer does not overlap bushing holes in control arm, then press bushing into control arm until flange contacts arm. Repeat procedure for bushing at opposite end of cross shaft. Install collar, lockwasher and capscrew in each end of shaft but DO NOT TIGHTEN.

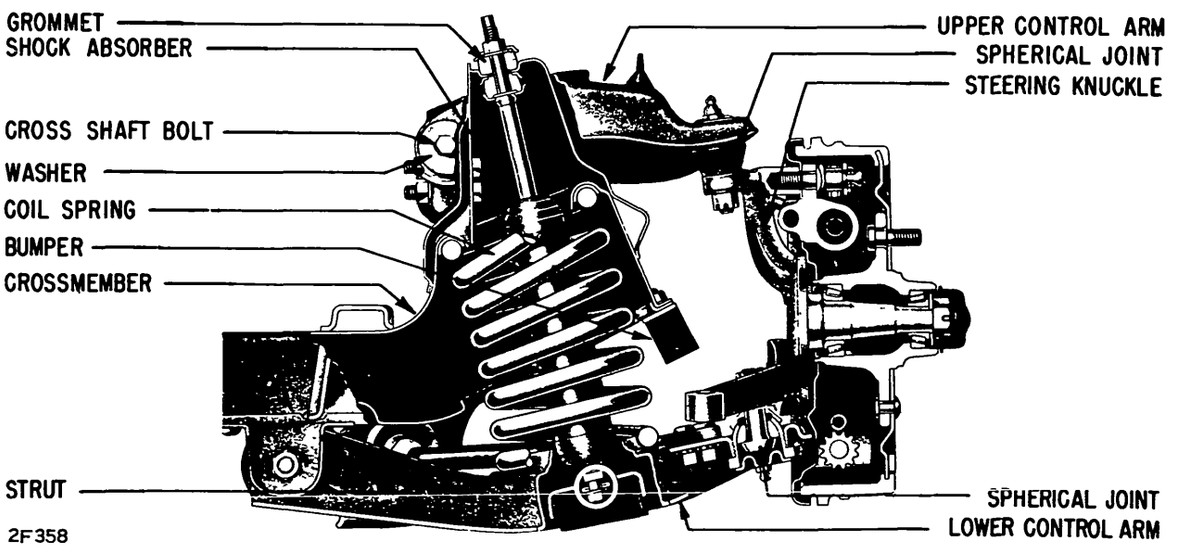
Installation - Install control arm on crossmember and attach with lockwashers, bolts and anchor nuts. Install coil spring, then with car weight on wheels, tighten cross shaft bushing bolts to 45-55 ft lbs.

Upper Control Arm (Series 1200)

Removal - Raise and support car under outer end of lower control arm, then remove wheel assembly. Disconnect and remove ball joint stud from steering knuckle with Tool J-6627 (pitman arm puller), then wire hub, drum and steering knuckle in position to prevent damage to brake hose Remove nuts retaining upper control arm to crossmember, noting number and thickness of shims found at each bolt, and remove control arm.

Disassembly - Remove capscrews, lockwashers and collars from both ends of cross shaft, then install a 3/8" - 24 capscrew (furnished with Tool J-5888) in one end of shaft Support control arm in an arbor press on Tool J-5888-3, being sure that flange of bushing does not contact support, then press bushing out of arm, repeat this procedure for opposite bushing

(Continued)



CORVAIR SERIES 500, 700, 900 FRONT SUSPENSION ASSEMBLY

CORVAIR FRONT SUSPENSION (Continu d)

Reassembly - Install control arm in press with Tool J-7052-2 in place between legs of control arm and press in bushing. Install cross shaft in arms and invert assembly in press, and press in second bushing. *NOTE - Cross shaft should be free enough to turn by hand.* Install collar, lockwasher and capscrew in each end of cross shaft, but DO NOT TIGHTEN.
Installation - Reverse removal procedure and lower car to floor. Bounce front end to centralize bushings, then with weight of car on wheels, tighten bushing capscrews to 35-40 ft. lbs.

Ball Joints (Upper & Lower)

Removal - With coil spring removed and control arms hanging free, remove lube fitting from joint, then mark center of rivet heads with a center punch and drill through head with a ¼" drill. Cut off heads with a chisel and remove balance of rivets with a punch. Remove ball joint.
Installation - On upper control arms, ream rivet holes out to 21/64". Position new ball joint assembly on control arm and install special bolts through mounting holes and tighten nuts securely. *CAUTION - Use only the bolts (specially hardened) furnished with ball joint assembly.* Complete installation by reversing removal procedure.

Front Suspension Crossmember

Removal - Remove steering relay rod from car, then remove bolts retaining idler arm to frame. Disconnect brake main cylinder line and rear brake feed line from junction block at top center of cross member. Use a suitable jack under crossmember and remove the four bolts holding crossmember to underbody, then remove crossmember.
Installation - Reverse removal procedure and note the following: Tighten crossmember mounting bolts to 100-110 ft. lbs., and idler arm-to-frame nuts to 13-22 ft. lbs.

CORVAIR REAR SUSPENSION

Corvair, All Models (1963)

DESCRIPTION

Independently sprung with individual single control arm on each side of car. Coil type rear springs are mounted between control arm and frame crossmember. Shock absorbers are mounted within coil springs.

ADJUSTMENT

Toe-In - *See "Wheel Alignment Specifications & Adjustment".*
Riding Height - *See "Riding Height" under "Front Suspension".*
Camber - *See "Camber" under "Front Suspension"*

REMOVAL & INSTALLATION

See 1960 Annual Data, Page 377, or later Manual edition.

DODGE, DART, PLYMOUTH & VALIANT FRONT SUSPENSION

Dodge & Dart (1963) ℂ
Plymouth (1963)
Valiant (1963)

ℂ - Except Dodge Custom 880. For this model, see "Chrysler, Imperial, & Dodge Custom 880" in this section.

DESCRIPTION

Ball joint independent type suspension with torsion bars, similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*
Riding Height - With car at curb weight and positioned on a level floor, bounce front of car several times and allow to settle. *NOTE - Checking Gauge No. C-3895 or C-3914 is available for checking riding height.* Measure front riding height from height adjusting lever directly below center of lower control arm inner pivot to floor, and from lowest point of steering knuckle arm to floor on same side. The difference between these two measurements should be as listed in table below. The difference from one side of car to other should not exceed 1/8". To adjust riding height, turn adjusting bolt at front of torsion bar as necessary. After adjusting, bounce car and recheck height on both sides.

1963 Front Suspension Riding Height Limits

Car Model	ℂ Height Difference
Valiant & Dart (Std. Susp.) ②	2 1/8" 1/8"
Plymouth & Dodge (Std. Susp.) ②	1 3/4"±1/8"
Valiant & Dart (Heavy Duty Susp.)	2 3/8"±1/8"
Plymouth & Dodge (Heavy Duty Susp.)	2 1/8"±1/8"

ℂ - Maximum variation between sides of car 1/8".
② - Including all Suburban models.

REMOVAL & INSTALLATION

See 1962 Final Data, Page 385.

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*

CHRYSLER, IMPERIAL, DODGE 880 FRONT SUSPENSION

Chrysler & Imperial (1963)
Dodge Custom 880 (1963) ℂ

ℂ - For other Dodge & Dart models, see "Dodge, Dart, Plymouth, Valiant Torsion-Aire" in this section.

DESCRIPTION

Torsion bar independent type suspension system similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*
Riding Height - With car at curb weight and positioned on a level floor, bounce front of car several times and allow to settle. Measure the distance from lowest point of one lower control arm bushing housing to the floor, and distance from flat portion on bottom of lower ball joint (same side of car) to the floor. *NOTE - Under car weight, bushing will always be higher.* A difference between these two distances on one side of car should be as given in table below. If difference between two sides of car is less than 1/8" and is within limits specified, riding height is correct. If difference is more than 1/8", adjust riding height by turning torsion bar adjusting bolt (at rear end of torsion bar) "in" to increase height, and "out" to decrease height. *NOTE - Use a torque wrench to make this adjustment, and if torque required to turn torsion bar adjusting bolt "in" exceeds 200 ft. lbs., replace torsion bar adjusting bolt.* After adjustment, bounce car and recheck measurements on both sides. After final adjustment, check wheel alignment and headlight adjustment.

►*HEIGHT CHECKING GAUGE NOTE:* Height and Level Gauge Tools C-3608 or C-3895 are available for checking front suspension height.

Front Suspension Height Limits

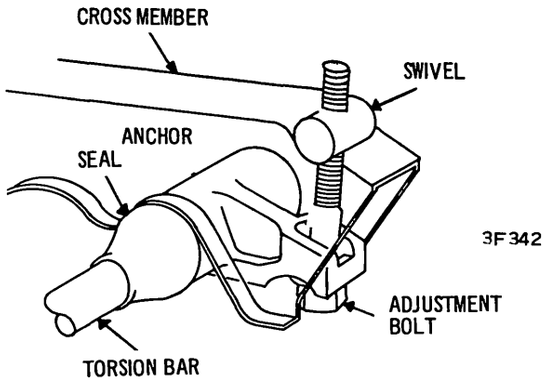
Car Model	ℂ Height Difference
Imperial	2"±1/8"
Chrysler (Ex. Sta. Wgn. & 300J)	2"±1/8"
Station Wagon	2 3/8"±1/8"
300J	1 3/4"±1/8"
Dodge Custom 880 (Ex. Sta. Wgn.)	2"±1/8"
Station Wagon	2 3/8"±1/8"

ℂ - Maximum variation between sides of car 1/8"

REMOVAL & INSTALLATION

See 1957 Final Data, Page 341, or later Manual editions.

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*



TORSION BAR ADJUSTMENT BOLT

COMET & FALCON FRONT SUSPENSION

Ford Falcon (1963)
Mercury Comet (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 HIGH RIDING HEIGHT CORRECTION:* High riding height caused by improperly seated coil springs may be corrected by reseating springs.

►*1963 FRONT WHEEL BEARING CONTAMINATION:* Water or contaminants entering front wheel bearings due to brake backing plate not being in complete contact with spindle flange, may be corrected by applying sealer (Part No. B5A-19554-A or 8A-19554-B) around outer edges of spindle flange.

►*1963 LOWER SUSPENSION ARM STRUT ADJUSTMENTS AFFECT CASTER:* To maintain caster adjustment and prescribed strut length of 17 5/8" (1961-62), or 16 15/16" (1963 models), as measured between front face of rear adjusting nut and center of lower arm front attaching bolt, loosen both nuts securing strut to frame body member and adjust as necessary. After adjusting, tighten rear nuts to 45-60 ft. lbs., and recheck strut length.

DESCRIPTION

Ball joint independent type suspension, with shock absorbers mounted within front coil springs, similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

Riding Height (Comet) - **Front** - With car at curb weight and on a flat floor, push front bumper down 1" and release slowly. Measure distance from flat surface of upper control arm midway between ball joint rivets to bottom surface of spring tower on centerline of rebound bumper. Raise front bumper up 1" and take measurement again. The average of the two measurements is front riding height and should be as indicated in table below. If not within limits, proceed as follows: If less than specified by not more than ¾", install shims on top of front springs. If less than minimum specification, replace springs.

Rear - Proceed as for front height measurement (above), and measure the distance between top of axle housing tube and bottom of frame side member about ½" forward of axle bumper bracket flange. If average height is less than minimum specification (see table below) by 5/8" or more, replace springs.

NOTE - Difference between right and left sides of car must not be more than 1" (must not be less than minimum height specified).

1963 Comet Front Riding Height Specifications

Body Type	Normal	Minimum	Maximum
Sedans 6 Cyl.	6 1/2"	5 7/8"	7 11/32"
(Air Cond.)	6 13/32"	5 25/32"	7 1/4"
Sedans V8	6 11/32"	5 23/32"	7 3/16"
(Air Cond.)	6 9/32"	5 21/32"	7 1/8"
Hardtop 6 Cyl.	6 19/32"	6 1/4"	7 13/32"
(Air Cond.)	6 15/32"	6 5/32"	7 5/16"
Hardtop V8	6 13/32"	6 3/16"	7 1/4"
(Air Cond.)	6 11/32"	6"	7 5/32"
Convertible 6 Cyl.	6 7/16"	6 3/32"	7 1/4"
(Air Cond.)	6 3/8"	6 1/32"	7 3/16"
Convertible V8	6 3/8"	6 1/16"	7 7/32"
(Air Cond.)	6 13/32"	6 1/16"	7 7/32"
Wagons 6 Cyl.	6 7/32"	5 29/32"	7 1/16"
(Air Cond.)	6 5/32"	5 13/16"	7"
Wagons V8	6 3/32"	5 3/4"	6 15/16"
(Air Cond.)	6 1/32"	5 11/16"	6 7/8"

1963 Comet Rear Riding Height Specifications

Body Type	Normal	Minimum	Maximum
Sedans	6 5/16"	5 11/16"	7 1/16"
Hardtop	6 5/16"	5 11/16"	7 1/16"
Convertible	5 7/8"	5 1/4"	6 5/8"
Wagons	6 19/32"	5 31/32"	7 11/32"

REMOVAL & INSTALLATION

See 1960 Final Data, Page 374, or later Manual edition, and note the following:

►*BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this section.*

Coil Spring

Removal - Raise car and remove wheel assembly and shock absorber. *CAUTION - Install a safety stand under front end of underbody.* For Comet model cars, install Tool 5310-B through top of coil spring, into shock absorber lower mounting holes. Compress spring sufficiently for removal clearance, then remove spring seat retaining nuts and remove spring and tool assembly from underneath car. For Falcon model cars, install Tool T63P-5310-A through top of coil spring, while from underneath car, place tool lower plate under third spring coil from the bottom. While keeping tool and spring from turning (with wrench in tool lower plate), compress spring sufficiently for removal clearance and remove tool and spring from underneath car.

Installation - To replace dismounted spring, measure compressed spring height in tool, then place tool nut in vise and remove nut by rotating the spring by hand. Install tool in new spring, then with tool nut in a vise, rotate spring until previously measured spring height is attained. To install spring on car, reverse "Removal" procedure.

FORD FAIRLANE & MERCURY METEOR FRONT SUSPENSION

Ford Fairlan (1963)
Mercury Meteor (1963)

DESCRIPTION

Ball joint type independent suspension with shock absorbers mounted within front coil springs, similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*
Riding Height - *See 1962 Final Data, Page 387.*

REMOVAL & INSTALLATION

See 1962 Final Data, Page 387, and note the following:

►*BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this section.*

Coil Spring

Removal - With car raised, remove wheel assembly and shock absorber, then install safety stand at front end of underbody and lower car until upper control arm is horizontal. Install Tool 5310-C into top of coil spring and insert lower part of tool into lowest open coil of spring. Compress coil spring with tool, raise car to allow upper arm to tilt downward, and remove tool and coil spring assembly from underneath car. For Fairlane model cars, repeat the above but install Tool T63P-5310-A into top of coil spring, while from underneath car, place tool lower plate under third spring coil from the bottom. While keeping tool and spring from turning (with wrench in tool lower plate), compress spring sufficiently for removal clearance and remove tool and spring from underneath car.

Installation - If spring is to be replaced, chalk two alignment marks on narrow side of spring upper seat. Align first mark with center line of caged nut, and second mark 3/4" from the first and in alignment with tip end of bottom coil. Reverse removal procedure and note the following: Position upper seat and insulator assembly on spring so that mark made earlier is aligned with end of bottom coil. *NOTE - If a new seat is being installed, scribe a line at centerline of caged nut on narrow side of seat. Position seat on spring so line in caged nut is aligned with bottom coil. Scribe a second line 3/4" clockwise from first line, then turns at counterclockwise until second line is aligned with tip end of bottom coil.* Install tool and compress spring. Install tool and spring assembly in spring housing with end of bottom coil bearing against punched end of recess in spring lower seat. Secure spring upper seat to top of spring housing with two bolts and washers (this will hold spring in correct position while it is being released). Release spring tension, then remove two temporary holding bolts from top of spring housing and remove tool. Install shock absorber and wheel assembly.

FORD GALAXIE & MERCURY MONTEREY FRONT SUSPENSION

Ford Galaxie (1963)
Mercury Monterey (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 "ANTI-HARSH" OVERSIZE BEARING INSTALLATION:* To eliminate stripped threads in front crossmember when reinstalling original lower control arm front bushing, an oversized bushing (Part No. C3AZ-3069-C, identified by red paint on hex head) is available. To maintain same shim thickness as prior to bushing removal, a 118" shim (Part No. C3AZ-3054-A) and a .030" shim (Part No C3AZ-3054-B) are available for inserting between bushing hex head and crossmember To reinstall an oversized bushing, it is necessary to tack arc weld bushing hex head, bonding bushing, shims, and crossmember.

DESCRIPTION

Ball joint independent type suspension similar in design to previous models except that front lower control arms are now connected to frame crossmember at front of arm by a "anti-harsh crank" shaft.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

REMOVAL & INSTALLATION

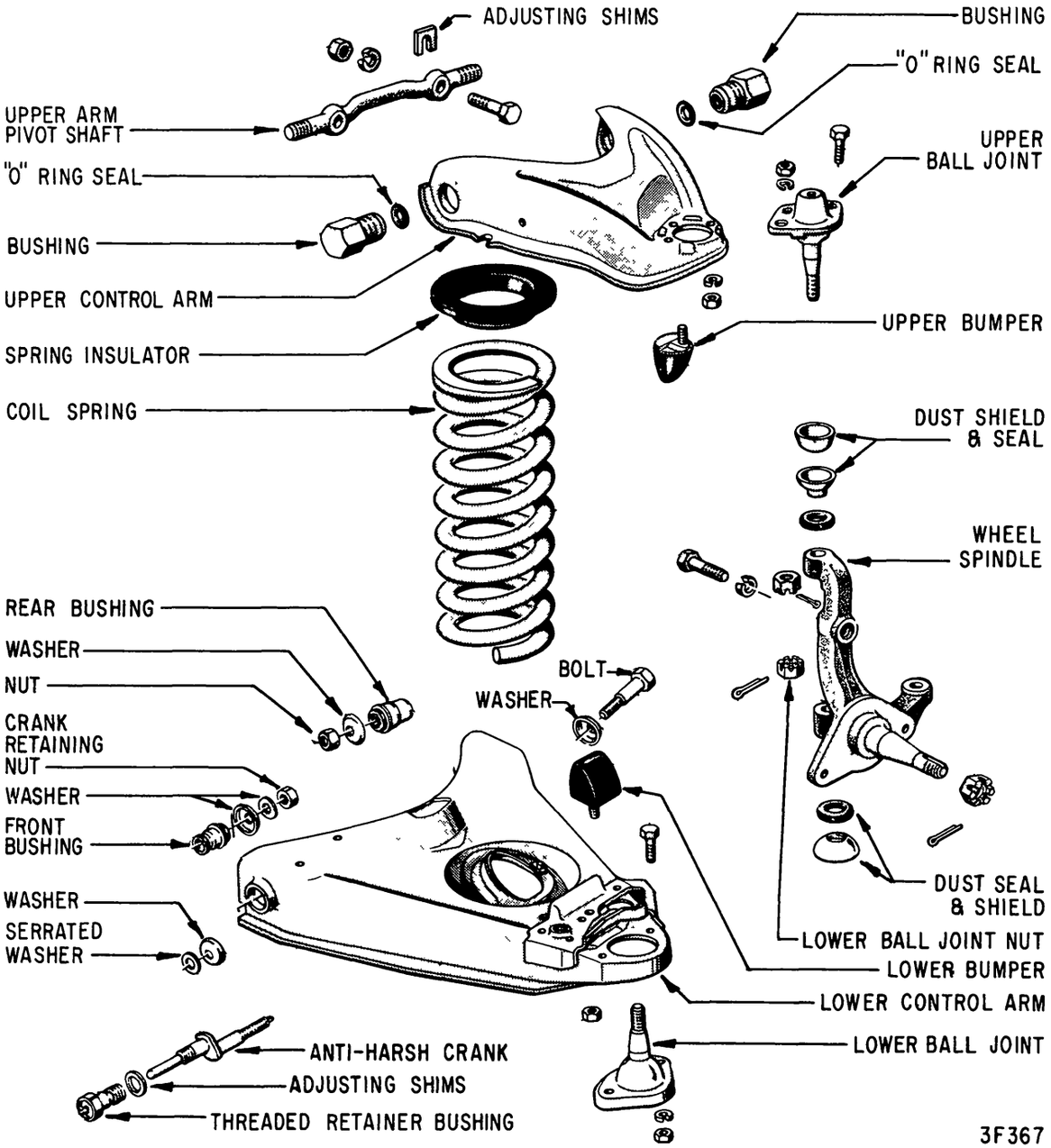
►*BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this section.*

Shock Absorber & Bushings

Removal - Raise car and place stands under both lower control arms, making sure shock absorbers remain accessible for servicing Remove upper mounting nut, lower bolts, and remove shock absorber through hole in lower control arm
Removal of Bushings - Using an arbor press, remove bushings using Tool T57P-18201-A1 and T57P-18201-A5
Installation of Bushings - Using an arbor press, install bushings using Tools T57P-18201-A1, A4, and A5 Lubricate bushing with a vegetable soap solution and install on shock absorber with one quick drive of press ram.
Installation - Extend shock absorber shaft and install by reversing removal procedure. Torque upper nut to 15 ft. lbs. and bottom bolts to 12-20 ft lbs.

Coil Spring & Lower Control Arm

Removal - Raise car and support side rails with stands just back of lower control arms. Remove wheel, hub, drum and shock absorber Disconnect stabilizer from lower arm and remove brake backing plate With lower ball joint stud nut loosened two turns, place spreader Tool (Ford, T57P-3006-A or Mercury 3006-B) between ball joint studs and turn tool hex head while tapping side of spindle with a hammer When ball joint is popped loose against nut, remove tool and jack up outer end of lower arm until ball joint stud nut can be removed. Lower jack and remove spring. Remove rear retaining bolt and nut attaching rear of control arm to frame, then remove front threaded retainer bushing and shims from frame and anti-harsh crank shaft.



FORD GALAXIE & MERCURY MONTEREY FRONT SUSPENSION ASSEMBLY

Remove arm from car and crank retaining nut and crank from arm
Rem val of Bushings - *NOTE - Replace both front and rear lower arm bushings, if either is worn or damaged.* Using an arbor press, remove front bushings with Tool T63P-3044-A and tool parts, D-1, D-5 and D-3 To remove Galaxie rear bushings, use Tools T54P-3044-A13 and T57P-3044-A. To remove Monterey rear bushings, use Tools 3069J and 3069H
Installation of Bushings - Using an arbor press, install front bushings using Tool T63P-3044-A and tool parts

FORD GALAXIE & MERCURY MONTEREY FRONT SUSPENSION (C nt.)

D-1, D-4 and D-2 To install Galaxie rear bushings, use Tools T54P-3044-A7 and T57P-3044-A To install Monterey rear bushings, use Tools 3069E and 3069H

Installation - Place serrated washer over inner end of anti-harsh crank with serrated side of washer toward crank throw Position anti-harsh crank through rubber bushing at front end of replacement arm, install crank retaining washer and nut and torque to 40-60 ft lbs Position lower control arm and crank assembly to mounting holes in frame crossmembers, install rear retaining bolt, washers, and torque nut to 36-46 ft lbs With a piece of .140" shim between crank throw and crossmember, install threaded retainer bushing through the frame crossmember with internal threads of bushing engaging threads of crank, then turn bushing until it contacts shim The distance between head of retainer bushing and crossmember represents required shim thickness that must be installed on bushing Position bushing and shims to frame and turn internal threads of bushing onto anti-harsh crank but do not torque With insulator and/or shim taped to top of spring, position spring top in upper suspension arm spring pocket and spring bottom in lower arm spring pocket If necessary, Tool 5310-A is available for partially compressing spring With spring in position and a jack under outer end of lower arm, raise arm, connect lower ball joint to wheel spindle and torque lower arm front threaded retainer bushing to 160-240 ft lbs *NOTE - Support arm with jack and place anti-harsh crank throw in a vertical position when tightening front threaded retainer bushing* Install brake backing plate, stabilizer, shock absorber, drum, hub and wheel

Upper Control Arm

Removal - Raise car and place a stand under lower control arm Remove wheel and hub, then loosen upper ball joint stud two turns but do not remove nut Place a box wrench over lower end of ball joint remover, Tool T57P-3006-A (Ford), then install tool between upper and lower ball joints, making sure tool seats firmly against ends of both studs and not against stud nuts Turn wrench until tool places studs under tension, then tap spindle near upper stud with a hammer to loosen stud in spindle *(Do not loosen stud in spindle with tool pressure only)* If both arms are being removed, loosen lower stud in same manner as upper stud Remove nut from upper stud and remove stud from spindle Support spindle to prevent damage to brake hose Remove nuts from retaining bolts on upper arm inner inner shaft, using Tool T58P-3047-A While removing upper arm from mounting bracket, note and measure total shim thickness at each inner shaft bolt **Do not use solvent to clean ball joints .**

Removal of Bushings - With upper control arm shaft removed from car, hold shaft in a vise and turn bushing off shaft and out of control arm *NOTE - Replace both front and rear bushings if either is worn or damaged or if replacing inner shaft*

Installation of Bushings - Install a new "O" ring seal in each bushing, then coat inside of each bushing with a small amount of multi-purpose lubricant (coat outer threads also) *CAUTION - An excessive amount of lubricant inside bushing will force the "O" ring out of place when bushing is installed* Insert inner shaft in upper control arm, making sure that "bow" in shaft is upward, then install Tool T54P-3044-A (Ford), Tool 3082-A (Mercury) With tool inserted between arms of upper control arm to properly locate arms the correct distance apart, place tool in a vise and thread bushing on each end of shaft, then turn bushings in until hex heads bottom on upper arm *NOTE - New upper arms are not threaded Bushings are self-tapping type* Tighten bushing to 160-190 ft lbs Remove assembly from vise and remove tool, then check to see that shaft rotates with moderate effort If shaft binds, check for misalignment

Installation - Position upper arm on frame mounting bracket and install but do not tighten nuts and keystone-type lock washers on two inner shaft retaining bolts Install adjusting shims on both bolts between inner shaft and frame bracket, making sure shim thickness is same as removed during disassembly Using Tool T58P-3047-A, torque inner shaft retaining nuts to an indicated 50 ft lbs , making sure wrench and tool stay in line while tightening If not using this special tool, torque retaining nuts to 65-85 ft lbs Position upper ball joint stud in top of wheel spindle and torque stud nut to 28-35 ft lbs , continuing to turn nut until cotter pin may be inserted Install hub and wheel, and lower car

LINCOLN CONTINENTAL FRONT SUSPENSION

Linc ln C ntinental (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962-63 REPLACEMENT OF FRONT SHOCK ABSORBERS* When servicing front shock absorbers of Lincoln Continental Sedans and Convertibles built before Sept 17, 1962, replace each unit with heavy duty shock absorber, Part No C2VY-18124-B

DESCRIPTION

Ball joint independent type suspension similar in design to previous models

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section*

Riding Height - With car at curb weight and positioned on a level floor, bounce front of car several times and allow to settle Measure front riding height of 5 2-6 2" between top of drag strut and inside of No 2 crossmember next to forward edge of bumper striking pad If riding height not within limits, shim or replace spring Measure rear riding height from top of axle housing to underbody at rear of rebound bumper bracket rear attaching bolt Rear riding height limits of 7 0-8 8" are corrected by replacing springs For front or rear riding height, the difference between each side of car should not be more than .5"

REMOVAL & INSTALLATION

See 1961 Final Data, Page 367

►*BALL JOINT CHECKING See "Front Suspension Ball Joint Checking" in this section.*

STUDEBAKER FRONT SUSPENSION

Stud bak r, All Models (1963)
Avanti (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*LOW FRONT END RIDING HEIGHT CORRECTION:* If front riding height too low due to accessories or optional equipment, front spring spacers may be installed at one or both ends of front spring Table below indicates amount a single spacer will raise front of car (if two spacers used, double specification)

Front End H ight Spacer Specifications

Spac r N .	Thickn ss	℄ Raises Car Approx.
526830	3/16"	5/16"
436420	3/8"	5/8"
436417	1/2"	13/16"

℄ - If one spacer only is installed

DESCRIPTION

Independent coil spring type of same design used on previous models

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section*

REMOVAL & INSTALLATION

See 1957 Final Data, Page 351, or later Manual editions, and note the following:

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section*

Upper Control Arm

Removal of Bushings (Threaded Steel Type) - With control arm in vise, turn and remove threaded steel bushings from inner shaft Shift shaft as far as possible to one side, move opposite end of shaft out of control arm end and remove shaft and seals from control arm, then remove grease seals

Installation of Bushings (Threaded Steel Type) - Place grease seals on inner shaft and insert one end of shaft into control arm, then bring other end into position and insert into control arm Spread inner ends of control arm .015" with Spreader Tool J-3957-7 & 8 at inner ends of arm Turn hexagon of tool until hand tight, then tighten an additional two flats which will spread arms desired .015" Centralize inner shaft between ends of control arm and install bushings securely Shaft must be free to turn

THUNDERBIRD FRONT SUSPENSION

Ford Thunderbird (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1962-63 LOOSE OR RATTLING FRONT SUSPENSION DRAG STRUT CORRECTION* To correct looseness or rattling of front suspension drag struts, replace attaching bolts (Part No 373880-S2) and nuts (Part No 33850-S), then recheck caster, camber and toe-in

DESCRIPTION

Ball joint independent type suspension similar in design to previous models except that new design upper control arm is grooved to seat coil spring, and lower end of shock absorber mounts to a three stud bracket on arm by a single bolt

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section*

REMOVAL & INSTALLATION

►*BALL JOINT CHECKING See "Front Suspension Ball Joint Checking" in this section*

Shock Absorber

Removal - Raise front of car, position a safety stand under lower suspension arm, then lower car slightly From underneath car, disconnect shock absorber lower mounting bracket from upper arm by removing three nuts and washers, then open hood and remove three shock absorber upper mounting plate retaining nuts and two bolts attaching plate to dash panel brace Remove shock absorber, mounting plate and lower bracket as an assembly Remove shock absorber upper retaining nut, and lower nut and bolt
Installation - Install bumper and shield, and insulator on shock absorber upper mounting stud Assemble upper mounting plate, then outer insulator, washer and retaining nut to mounting stud Position shock absorber and upper mounting plate assembly through top of spring housing so that three lower mounting studs enter holes in upper control arm Install two bolts that attach mounting plate to dash panel brace, and install three mounting plate retaining nuts Remove safety stands and lower car

Coil Spring & Upper Control Arm

Removal - Raise front of car, position a safety stand under lower suspension arm, then lower car slightly Remove shock absorber (see above), then install spring removal tool T63P-5310-A Slide tool bearing and upper plate over shaft screw against shaft nut Insert tool assembly through upper opening in spring housing so that shaft screw goes through top of coil spring with tool under plate holes going over studs Underneath car place tool lower plate under fourth coil from bottom of spring securing plate to coil by installing tool retainer to groove in shaft screw With a flex-handle wrench in lower plate drive hole to prevent tool and spring from turning, compress spring by turning tool shaft nut clockwise Loosen upper ball joint stud nut but do not remove Place a box wrench over lower end of tool T57P-3006-A and position tool between upper and lower ball joint studs Tool should seat firmly against ends of both studs and not against lower stud nut Turn wrench until both studs are under tension, then loosen upper stud from spindle by tapping spindle near upper stud with a hammer *Do not loosen stud with tool pressure alone* Remove upper ball joint stud nut and pull upper arm free of spindle Remove two nuts that retain upper arm inner shaft to chassis and remove arm from car Remove bolt that retains clip and brake line to chassis, move brake line out of way, then fully release spring tension by turning tool shaft nut counterclockwise *NOTE - Be sure to hold lower plate of tool with 1/2" square drive flex-handle wrench so that tool will not turn or snap loose during spring release* Remove spring tool, then remove spring from car

Removal of Bushings - *NOTE - Replace both upper arm bushings if either is worn or damaged, or if replacing inner shaft* Position upper arm inner shaft in a vise, then unscrew bushings from shaft and arm Remove assembly from vise and separate inner shaft from arm

Installation of Bushings - With shaft in arm, apply grease to new bushings and install bushings loosely on shaft and arm *NOTE - Turn bushings so shaft is centered in control arm (centerline of shaft attaching bolts holes should be 1 85" ± 02" from side of arm)* Fabricate a 9½" spacer from ¾" diameter pipe or metal and (with arm and inner shaft assembly in vise) position spacer parallel with inner shaft, forcing spacer between flanges of upper arm If spacer cannot be forced between arm flanges due to excessive distortion, replace upper arm assembly With spacer positioned in arm, torque bushings to 15-25 ft lbs Move arm on shaft to be sure no binding exists, then remove spacer

Installation - Tape rubber insulators to ends of spring and install spring in its housing at underside of car Assemble spring tool T63P-5310-A to car and spring (see above) and compress spring making sure lower plate of tool does not turn Install bolt retaining brake line and clip to chassis Position upper arm to spring upper bore and install and torque upper ball joint stud nut With upper arm in position, install arm inner shaft-to-chassis retaining nuts but do not tighten Partially release coil spring tension while prying lower coil so that it will seat in groove of upper arm Prevent tool lower plate from turning Torque upper arm inner shaft-to-chassis retaining nuts and release spring completely, then remove tool *CAUTION - Prevent tool lower plate from turning during spring release* Lower car slightly to compress spring and install shock absorber (see above)

Lower Control Arm

Removal - Raise and support car under chassis then remove wheel, hub, and drum assembly Remove brake backing plate and wire up out of way Disconnect stabilizer and strut from lower control arm, then disconnect lower ball joint from spindle (see "Wheel Spindle") Remove lower control arm pivot bracket retaining nut and shim retaining nut, then remove lower control arm Place lower control arm assembly in a vise and remove pivot bolt Separate pivot bracket from lower arm
Installation - Assemble pivot bracket to lower control arm and install pivot bolt Tighten pivot bolt nut snug but do not tighten until control arm is installed on car Complete installation by reversing removal procedure, then adjust front end alignment

Wheel Spindle

Removal - Raise front of car and support under chassis, then remove wheel, hub, and drum Remove brake backing plate from spindle and wire up out of way Disconnect tie rod end from spindle and then loosen both upper and lower ball joint stud nuts, but do not remove Position a box wrench over lower end of Tool T57P-3006-A and position tool so each end contacts a ball joint stud *CAUTION - Tool should seat firmly against ends of both studs, not against stud nut* Turn wrench until tool places studs under tension, then loosen studs in spindle by tapping spindle near studs with a hammer Do not loosen studs in spindle with tool pressure alone Remove stud nuts and spindle from both studs
Installation - Position wheel spindle on upper and lower ball joints and install stud nuts and tighten to 60-80 ft lbs Continue to tighten nuts until cotter pin holes line up with slots, then install cotter pins Complete installation by reversing removal procedures

Upper & Lower Ball Joints

Removal - With control arm removed from car, remove ball joint retaining nuts and bolts, or if ball joint is riveted to arm, drill a 1/8" hole completely through each rivet Drill off rivet heads through pilot hole with a 3/8" drill Drive all rivets out of holes and remove ball joints
Installation - Clean end of arm and remove all burrs from hole edges Install ball joints on arms using only specified bolts, nuts, and washers *NOTE - Do not try to rivet ball joints to arm* Torque ball joint retaining nuts and bolts to 60-80 ft lbs and lubricate ball joints

OLDSMOBILE (EXCEPT F-85) FRONT SUSPENSION

Oldsmobile (Except F-85) (1963)

DESCRIPTION

Ball joint type suspension with shock absorbers mounted within front coil springs, similar in design to previous models, except new design lower control arm now has replaceable inner pivot shaft bushings and ball joint is pressed in arm. Upper control arm, shaft, and bushing assembly continues to be furnished only as a complete unit, and ball joint is riveted to arm.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*

Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

Riding Height - With car at curb weight, position car on a level floor, then bounce front of car several times and allow to settle. Measure front riding height from underside of front spring lower seat to underside of upper seat (see table below). To measure, insert a 1/8" welding rod in drain hole of lower spring seat (inboard side of spring) and push rod up to contact underside of upper spring seat. Mark rod, then remove and measure distance rod was inserted. To adjust, replace spring. Measure rear riding height from top of axle housing to frame (see below). Remove rear axle bumper for checking.

1963 Riding Heights

Model	Front	Rear
Series 36 & 39	11 11/16-12 1/8"	5 1/2-6 1/4"
Fiesta Sta.Wag	11 11/16-12 1/8"	5 1/4-6"
Others	11 7/8-12 5/16"	6-6 3/4"

REMOVAL & INSTALLATION

See 1961 Final Data, Page 369, and note the following:

►*BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this section.*

►*UPPER CONTROL ARM INNER SHAFT BUSHING NOTE:* Upper control arm bushings are not replaceable. Control arm and bushing assemblies are furnished only as a complete unit, including control arm pivot shaft. If necessary, tighten upper control arm shaft-to-bushing screws to 35-45 ft. lbs. Lower control arm shaft bushings may be replaced as indicated below.

Lower Control Arm Shaft Bushings

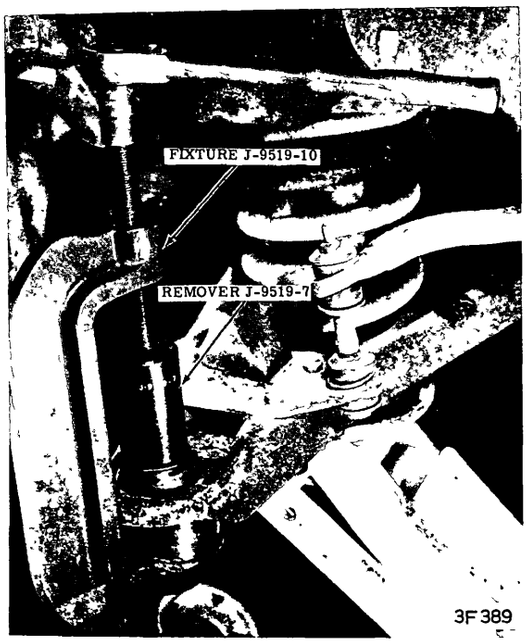
Removal of Bushings - With control arm removed from car and placed on a arbor press, use Press Plate BT-6309-1 and Bushing Remover J-9516 to press bushing out of control arm as far as possible. Repeat on other bushing. Finish pressing bushing from arm by using spacer tool BT-6309-2 on pivot shaft between ears of shaft and end of bushing, and J-9616.

Installation of Bushings - Use Tools J-9481 and BT-6309-1 to install bushings, then torque pivot shaft bolts to 50-60 ft. lbs.

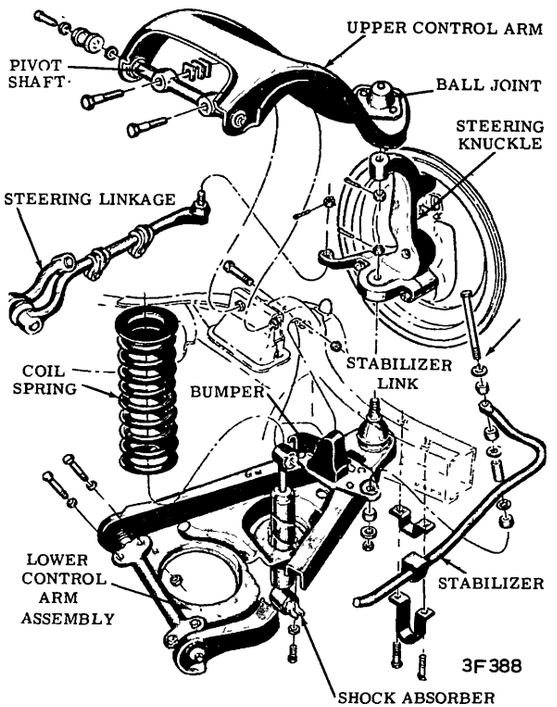
Lower Control Arm Ball Joint & Seals

Removal - Raise front of car, support outboard end of lower control arm with floor stand and remove wheel assembly. Disconnect lower ball joint from steering knuckle using Tool J-8806. Block steering knuckle, backing plate and hub and drum assembly away from lower arm to obtain accessibility. For Inland joints, drive seal retaining ring from ball joint and discard seal assembly. For Saginaw joints, pry garter spring from bottom of seal, then remove and discard seal and garter spring. Press ball joint from control arm using Fixture J-9519-10 and Remover J-9519-7 (see illustration).

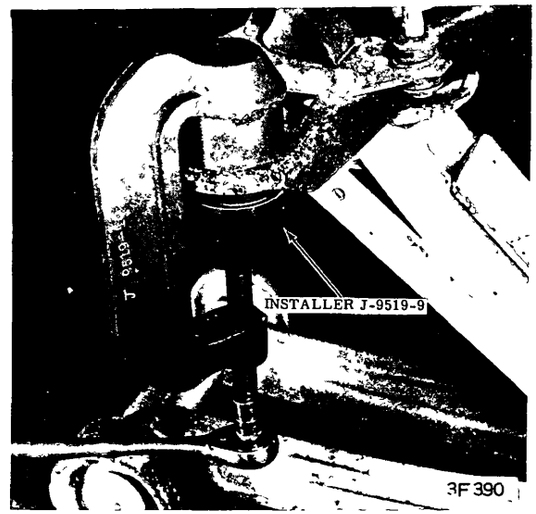
Installation - New ball joint is pressed in with Tools J-9519-10 and J-9519-9. Apply a thin film of grease on outside of new seal and on saw-tooth part of seal that fits around ball stud. On Saginaw joints, stretch garter spring around Tool J-6119 (stretch no more than necessary), then slide tool over seal, roll garter spring off tool and into seal groove. On Inland joints, place seal inside of Seal Installing Tool J-8761, and drive seal onto ball joint making sure seal is not cocked. Reassemble suspension and torque ball joint stud nut to 70 ft. lbs. *NOTE - A screwdriver slot is provided in lower ball joint stud as a means of preventing stud from turning when tightening ball joint nut.*



REMOVING LOWER BALL JOINT



1963 OLDSMOBILE (EXCEPT F-85) FRONT SUSPENSION



INSTALLING LOWER BALL JOINT

OLDSMOBILE (EXCEPT F-85) REAR SUSPENSION

Oldsmobile (Except F-85) (1963)

DESCRIPTION

Coil spring type with two upper and two lower control arms. Upper control arms are connected to rear axle housing adjacent to differential carrier and to bracket on frame side rail. Lower control arms are connected between outer ends of rear axle housing and bracket on frame side rail. Lower control arms are adjustable for length and control the differential nose angle.

ADJUSTMENT

Riding Height - *See "Riding Height" under "Front Suspension" section.*

REMOVAL & INSTALLATION

► *SHOCK ABSORBER INSTALLATION NOTE:* Tighten upper pivot bolt and nut to 45-55 ft. lbs., and lower stud nut to 30-46 ft. lbs.

Coil Spring

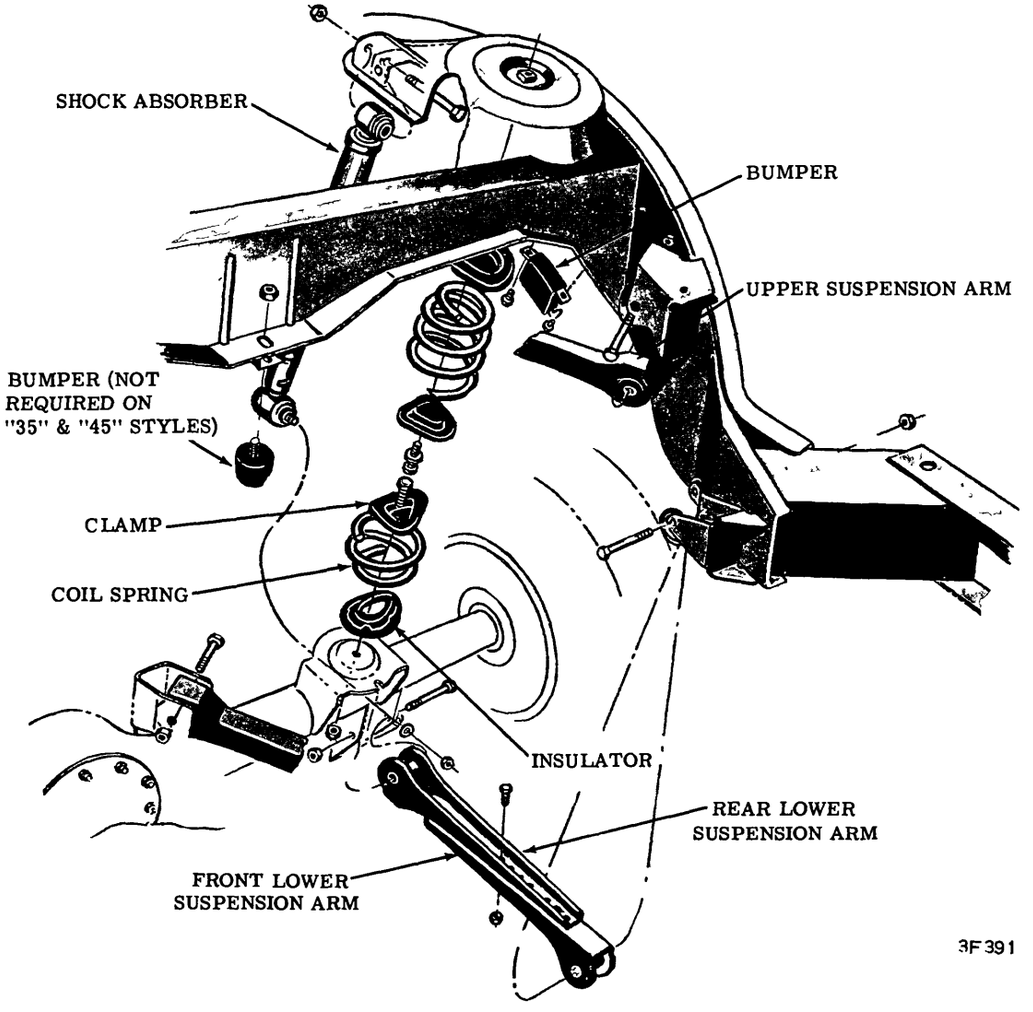
Removal - Raise rear of car and disconnect shock absorber from axle housing, then disconnect parking brake cable clamp at frame and loosen suspension arms at frame and axle. Support frame, then remove upper and lower spring mounting bolts, washers, insulators and clamps. Remove coil spring and two remaining insulators. *NOTE* - Spring will be under slight compression.

Installation - Place upper insulator snugly in end of spring coil. Place spring with insulator against upper seat and install clamp but do not tighten upper attaching bolt. *NOTE* - Locate clamp so it nests in insulator (tang in notch), then torque mounting bolt to 35-45 ft. lbs. Place lower end of spring on axle housing pad, then raise axle housing to compress spring to normal carrying height. Install Spring Holding Tool BT-6102 at front of spring, then lower axle housing and place other spring insulator in spring coil. Raise axle housing and install lower clamp. With lower clamp nesting in insulator, torque lower mounting bolt to 35-45 ft lbs. Remove Tool BT-6102. Connect shock absorbers and tighten suspension arm bolts to 70-90 ft. lbs. with car weight on rear spring. Place parking brake cable at locating marks and tighten cable clamps.

Control Arms

Removal - *CAUTION - Upper and lower control arm bushings cannot be serviced or replaced in the field. Bushings and control arms are available only in complete assemblies.* Raise and support rear axle housing, then support frame at side rails. Disconnect support arms at rear axle housing and frame side rails and remove control arms.

Installation - *CAUTION - When installing a new lower control arm, the same corresponding holes should be aligned as in the riginal arm.* Install upper arm and the lower arm front section with open side of channel facing downward. Lower control arms are stamped "Front" and "Rear" for proper installation. DO NOT tighten attaching bolts until car is at normal height on floor, then tighten attaching bolts to 70-90 ft. lbs.



OLDSMOBILE (EXCEPT F-85) REAR SUSPENSION

PONTIAC (EXCEPT TEMPEST) REAR SUSPENSION

Pontiac (Except Tempest) (1963)

DESCRIPTION

Coil spring type independent suspension similar in design to previous models, except for trunnion-type upper mounting of rear shock absorber.

ADJUSTMENT

Riding Height - *See "Front Suspension" in this section.*

REMOVAL & INSTALLATION

See 1961 Final Data, Page 372, and note th following:

Control Arms

Installation - Four upper and lower control arm pivot bolts are torqued to 100-125 ft. lbs.

Shock Absorber

Removal - Remove two nuts, bolts and lockwashers at upper end of shock absorber, then remove self-locking nut from lower end and remove shock absorber.

Installation - Reverse removal procedure, tightening upper bolts to 15-25 ft. lbs., and lower self-locking nut to 70-85 ft. lbs.

PONTIAC (EXCEPT TEMPEST) FRONT SUSPENSION

P ntiac (Exc pt T mp st) (1963)

DESCRIPTION

Ball joint independent type suspension, with shock absorbers mounted within front coil springs similar in design to previous models, except pressed-in rubber bushings at inner ends of upper control arms replace threaded steel bushings

ADJUSTMENT

Cast r & Camber - *Se "Wheel Alignment Specifications and Adjustment" in this section*
Fr nt Wh l B aring - *See "Wheel Bearing Adjustment" in this s ction*
Riding H ight - With car at curb weight and positioned on a level floor, bounce front of car several times and allow to settle Front riding height of 3 5/8" ± 1/8" is measured from top of lower control arm to underside of frame directly behind centerline of spring Rear riding height of 9 3/4" ± 1/8" is measured from top of axle housing to top of spring seat at a point approximately 1 1/2" outward from rubber bumper on frame

REMOVAL & INSTALLATION

See 1962 Final Data, Pag 382, and n ote the following:
► *BALL JOINT CHECKING: See "Front Suspension Ball Joint Checking" in this s ction*

C il Spring

Installati n - Upon assembly of front coil spring, torque bolts which attach inner ends of control arm to frame front crossmembers to 70-90 ft lbs Torque steering arm-to-knuckle nut to 50-70 ft lbs

Upper Control Arm & Bushings

Removal - With jack under lower control arm raise and remove wheel, then remove ball stud from steering knuckle using Tool J-6627 Disconnect control arm shaft to frame and remove arm and shaft assembly

Bushing Removal - With nuts and retainers removed from pivot shaft enus, remove shaft from control arm by removing bushings with an arbor press and Tool J-8917 as a support

Bushing Installation - Place Tool J-7167 in position and expand until distance between outer faces of arm is 8 31/32", then place pivot shaft with insert bushings on ends of shaft, in control arm Press bushings on control arm with arbor using large sockets for installers Install retainers and nuts on ends of shaft finger tight Rotate shaft to line up frame mounting holes to approximate installation position, then torque shaft nuts to 70-90 ft lbs

Installation - Position control arm and shaft on frame crossmember and install two bolts with self-locking nuts, tightening nuts to 75-90 ft lbs Connect upper ball stud to steering knuckle, tightening stud nut to 55-70 ft lbs Lubricate ball stud (using extended interval lubricant), replace wheel, lower car, and check front wheel alignment

Lower Control Arm & Bushings

Removal - Raise and support car with jack placed under front crossmember, then remove wheel and shock absorber, and disconnect lower end of stabilizer link from lower control arm Disconnect steering linkage from knuckle Install spring compressor Tool J-7592 as follows Locate one compressor plate in one of the upper coils of spring so that ramp faces down against coil, then locate other plate in one of the lower coils with ramp facing up *NOTE - Plates must parallel centerline of spring with holes in plate properly aligned* Place retainer J-7592, cup side up, over threaded end of rod J-7592-5, followed by bearing, then start long nut, J-7592-3 on rod Insert rod, hex end first, up through both plates, then slide retainer J-7592-4, cup side down, over end of hex rod and secure with "C" clip, seating clip down in retainer While holding upper end of rod, turn nut at lower end and compress spring Press lower control arm stud from steering knuckle with Tool J-6627 Swing steering knuckle out and lower control arm, coil spring will drop from its seat in frame side member Disconnect inner ends of lower control arm by removing nuts and withdrawing two special 9/16" bolts

Bushing Removal - With control arm off car, utilize an an arbor press and rest arm on remover Tool J-7022-1, with spacer J-7022-7 around rear bushing With sleeve J-7022-3 between control arm and arbor, press rear bushing from arm To remove front bushing, rest arm on remover Tool J-9584-1, with spacer J-9584-3 around bushing, then with sleeve J-8481-2 between control arm and arbor, press bushing from arm
Bushing Installation - Press in new rear bushing using Tool J-7022-2 on outside face of control arm rear bushing location, with J-7022-7 around bushing, and J-7022-3 on inside face of control arm between arm and arbor table Press in new front bushing using Tool J-9584-4 on outside face of control arm front bushing location, with J-9584-3 around bushing, and J-8481-2 on inside face of control arm between arm and arbor table
Installation - Reverse removal procedure and tighten lower ball stud nut to 55-70 ft lbs , and control arm to frame bolts to 100-125 ft lbs

PONTIAC TEMPEST FRONT SUSPENSION

P ntiac T mpest (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 LOWER CONTROL ARM BALL JOINT & STEERING KNUCKLE REPLACEMENT NOTE:* If lower ball joint assembly is replaced because of a broken or bent stud, or loose stud nut, it is necessary to also install a new type steering knuckle in 1961-62 model cars to prevent the possibility of a repeat failure

►*1963 V-8 MODEL STRUT ROD, SLEEVE & STEERING LINKAGE SHOCK ABSORBER PRODUCTION CHANGE NOTE:* New type strut rod bushing and sleeve, factory installed on V-8 model cars with standard steering, requires a steering linkage shock absorber be installed for front end stabilization

DESCRIPTION

Ball joint independent type suspension, with shock absorbers mounted within front coil springs, similar in design to previous models.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section*

Front Wheel Bearings - *See "Wheel Bearing Adjustment" in this section*

Riding Height - *See "Riding Height" in 1962 Final Data, Page 383*

REMOVAL & INSTALLATION

See 1962 Final Data, Page 383, and note the following.
►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section*

►*LOWER CONTROL ARM BALL STUD REPLACEMENT NOTE:* On 1961 model cars, replacement ball stud (5677213) assembly is press fit into lower control arm rather than self-threading as was original stud, and and it is not necessary to remove roughness or burrs resulting from threaded stud installation as these will insure tight retention of new ball joint Use ball stud installation procedure given for 1962-63 model cars

1963 Pontiac Tempest Front Suspension Torque Table

Location of Bolt or Nut	Ft. Lbs. Torque
Shock Absorber	
Lower Bolts	15-25
Upper Bolt	60-120
Ball Joint Studs	
Lower and Upper	70-85
Upper Control Arm	
Cross Shaft Nuts	40-60
Bolts	55-70
Ball Joint Nuts	10-12
Lower Control Arm	
Pivot Bolt	75-90
Strut Rod	
Front Nuts	60-75
Rear Nut	70-85
Stabilizer Bar	
Body Rail Bolts	20-35
Strut Rod Clamp Nuts	20-30
Crossmember	
Attaching Bolts	70-85
Engine Mount Bolts	30-45
Tie Rod End Nuts	55-70

PONTIAC TEMPEST FRONT SUSPENSION (Cont.)

Strut Rod Bushing & Sleeve

Removal - A new strut rod bushing (544558) and sleeve (544559) are factory installed on all Tempest V-8 model cars starting December 3, 1962, to provide softer ride. To remove bushing and sleeve, remove nuts securing rod to lower control arm, then remove nut and bushing from rear end of strut rod. Withdraw strut rod from crossmember bracket, remove bushing, spacer and nut from rod. Studs in rod are replaceable by driving them in and out.

Installation - Install forward nut onto rod and position it about 1" from front end of threads, then install spacer and rubber bushing with three equally spaced ribs. *CAUTION - Do not interchange ribbed and smooth surfaced bushings.* Set strut rod in place in crossmember bracket and install remaining bushing and nut, then snug up rear nut. Install rod to lower control arm and tighten nuts to 60-75 ft. lbs. Lower car to floor, adjust caster, then tighten nut at rear of strut to 70-85 ft. lbs.

Steering Linkage Shock Absorber

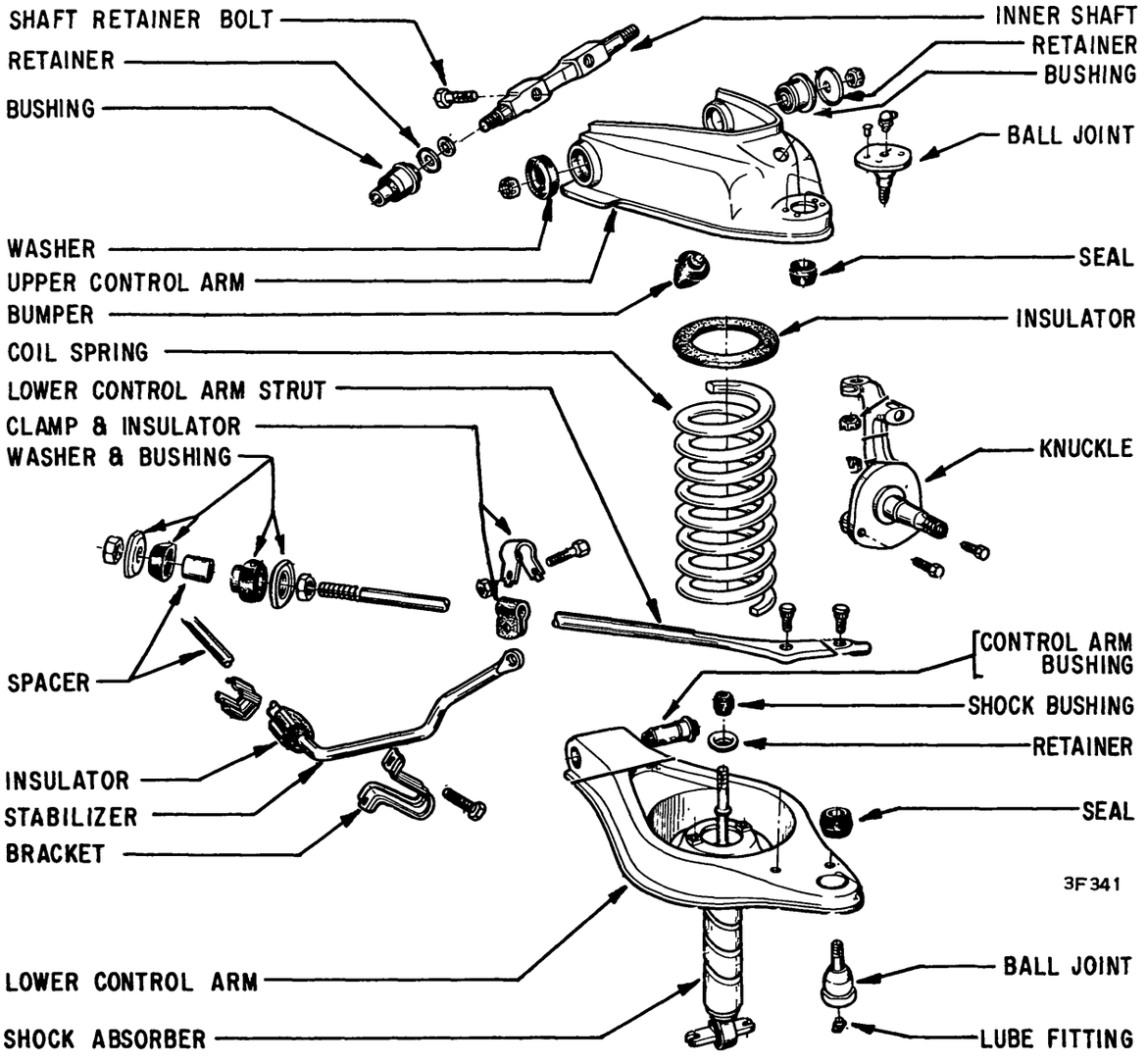
Removal - Remove U-clamp-to-steering connecting rod nuts, and remove nut from side rail bracket end of shock absorber shaft. Remove shock absorber and U-clamp bracket from car. Stud connecting U-clamp bracket to shaft of shock absorber may be removed while the assembly is on or off the car.

Installation - Install retainer washer and bushing on threaded end of shock absorber piston rod. Install piston rod through hole in body side rail mounting bracket, then place remaining bushing and retainer on end of rod and secure with nut tightened to 60-120 in. lbs. Install stud at opposite end of shock absorber in connecting rod attachment bracket, then tighten stud nut finger tight. With shock fully extended and then moved back approximately 1/4", and wheels in full right turn position, install U-clamp bracket on steering linkage rod, tightening U-clamp nuts to 60-75 in. lbs., then tighten piston rod stud-to-bracket nut to 70-85 ft. lbs. *NOTE - U-clamp bracket should be attached to steering linkage rod at an approximate 33½° from the horizontal, with the stud side of bracket on top.* Check clearance and alignment of shock through full left and right turns, and if interference at pitman arm occurs, adjust angle of linkage bracket to provide clearance.

Steering Knuckle

Removal - With hub and drum assembly removed, and lower control arm supported, remove bolts attaching backing plate to steering knuckle and arm. Secure backing plate to bumper hanger with suitable wire. Remove upper and lower ball studs from knuckle with Tool J-6627.

Installation - *NOTE - If lower ball joints replaced due to broken or bent stud or loose stud nut, a new design steering knuckle must be used (545403 for 1961-62 cars, and 544169 for 1963 models).* Install upper and lower ball studs through steering knuckle and tighten nuts to 70 ft. lbs. *NOTE - Do not back off nut when aligning holes to install cott r pins. Turn in a tight ning direction only.* Secure backing plate to knuckle and steering arm, tightening two lower bolts to 45-65 ft. lbs. and upper bolt to 80-110 ft. lbs. Install hub and drum assembly.



PONTIAC TEMPEST FRONT SUSPENSION ASSEMBLY

PONTIAC TEMPEST REAR SUSPENSION

P ntiac T mpest (1963)

DESCRIPTION

Swing axle independent type suspension includes new "L" shaped lower arms forming lower seats for rear coil springs, and suspension crossmember forming upper seats. Angled shock absorbers operate outside spring coils and rear axle shafts are attached to differential with universal joints, having a splined yoke that extends into side gears of differential case.

ADJUSTMENT

To -In - *See "Wheel Alignment Specifications & Adjustment".*

Riding H ight - *See "Riding Height" in 1962 Final Data, Page 377.*

REMOVAL & INSTALLATION

See 1960 Final Data, Page 377, or later Manual edition, and note the following:

Shock Absorber

Rem val - With jack stands or hoist under car side rails, just forward of rear wheel openings, raise car so wheels hang free and a floor jack can be placed under tire. Raise tire, remove upper and lower attaching nuts, and remove shock absorber.

Installati n - Install shock absorber by reversing above procedure and torque attaching nuts to 70-85 ft. lbs.

Coil Springs

R m val - Raise car with jack stands or hoist at body side rails. Support control arms to place slight load on coil springs. Disconnect shock absorber at lower support and, for right spring removal only, disconnect exhaust system. Remove wheel and brake drum. *NOTE - To eliminat xc ssiv prying of brake drum, give added support to rear control arm.* Line up hole in axle shaft flange with four nuts retaining backing plate to lower control arm and remove nuts. Remove support from control arms, remove nuts and lock tabs that secure universal joint U-bolts, and remove parking brake strut. Pull axle shaft outward to separate yoke from U-bolts. Mark each coil spring with its spring seat, and remove spring by lowering control arm.

Installati n - Place spring into crossmember spring tower and pry into place in lower control arm. If same spring is used, be sure that index marks line up. Install axle shaft through backing plate and install U-bolts. Line up holes in axle bearing flange plate with studs on end of control arm and push axle shaft inward until yoke fully engages U-bolts. Install U-bolt, nuts and lock tabs, and torque to 14-20 ft. lbs. Install brake backing plate nuts through hole in axle shaft flange and torque to 30-45 ft. lbs. Install parking brake strut. Support control arms and connect shock absorbers, torque nuts to 70-85 ft. lbs. Connect exhaust system (right spring removal only), install brake drum, and wheel.

Low r Contr l Arm & Bushings

Removal - With shock absorber and coil spring removed as outlined above, remove bolt, lockwasher and flat spacer securing yoke to axle shaft and remove universal joint yoke with Tool J-8614. Withdraw axle shaft. Disconnect brake line at backing plate and remove plate and shock absorber support from lower control arm studs. Disconnect brake line support bracket from control arm, three bolts, lockwashers and flat washers securing control arm support bracket to body side rail and remove shims. Disconnect control arm at support bracket on differential and remove control arm.

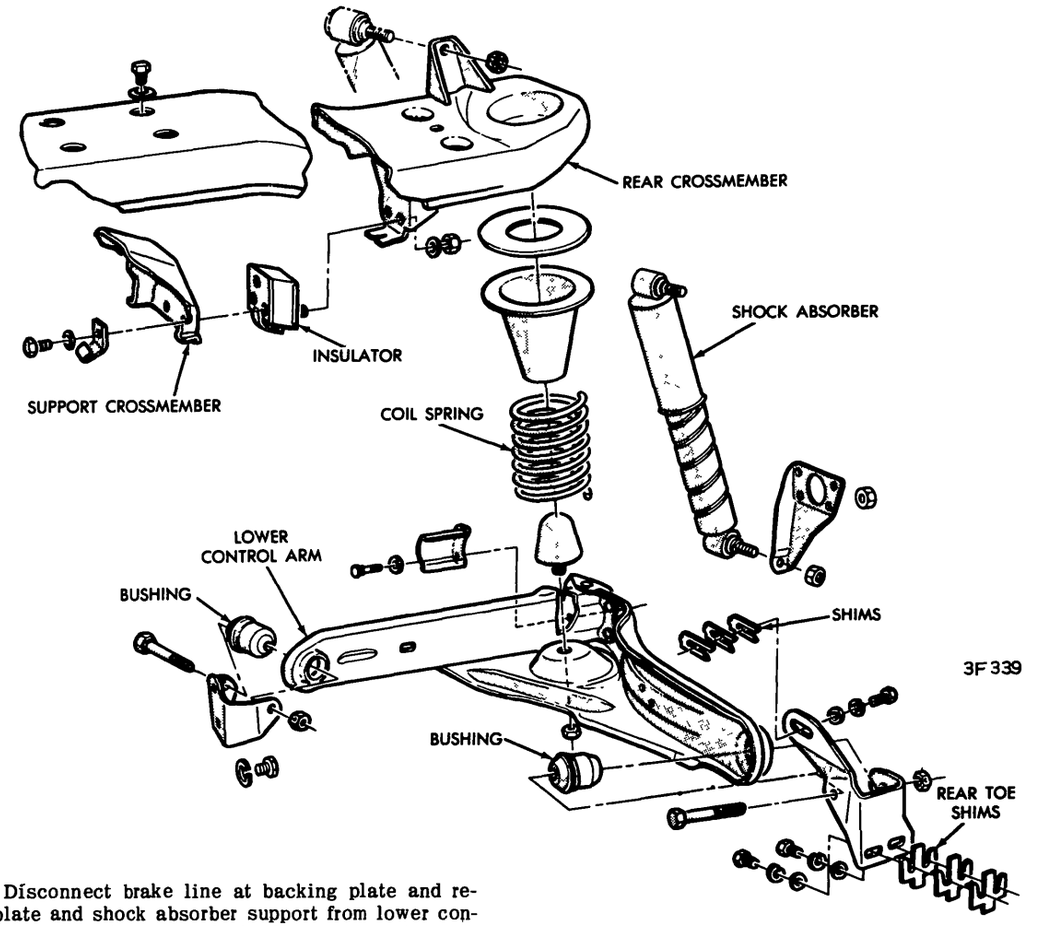
Removal of Bushing - Rest arm on support J-21027-2, and place Remover Tool J-21027-3 between control arm and arbor. Press out bushing. Remove other bushing from arm in same manner.

Installation of Bushing - Install new bushing in control arm by reversing above procedure, using Tool J-21027-2 for support and Tool J-21027-1 as installer. Press in bushing and repeat procedure for other bushing in arm.

Installation - Install control arm by reversing above procedure and bleed brakes. See table below for torques.

1963 Rear Suspension Tightening Torques

L cati n f B lts r Nuts	Ft. Lbs.
Control Arm Trans-Axle Bracket	100-125
Support Bracket to Side Rail	40-55
Yoke to Axle Shaft	20-35
Crossmember to Body	60-80



REAR COIL SPRING SUSPENSION

Rear Suspension Crossmember

Removal - Raise car, remove shock absorbers, coil springs and control arms (see above), and support transaxle with a separate jack stand. Disconnect parking brake cable at rear equalizer and speedometer cable at transaxle. Disconnect downshift electrical connector, parking lock control cable, shift control cable, and modulator vacuum line on automatic transmission cars, or shift control tube on synchro-mesh models. Remove two bolts on each side, connecting crossmember to body, and lower crossmember and transaxle away from car. *CAUTION - Be sure transaxl and crossmember ar supported prior to low ring.* Remove crossmember by removing six transaxle support crossmember to insulator bolts.

Installati n - Install by reversing above procedure and torque according to table under "Lower Control Arm Installation."

RAMBLER FRONT SUSPENSION

Rambler American (1963)
Rambler Classic Six & Eight (1963)
Rambler Ambassador Eight (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*CAR LEVELING NOTE:* Spacer (Part No. 3204474), for Series 10, 20, 80 cars (1950-55), and Series 01 cars (1958-63), and spacer (Part No. 3202359) for Series 10, 20, 80 cars (1956-63), are available to assist in leveling a car that leans at right or left front corner. Install spacer on spring seat with spring cushion and spring resting on spacer. *CAUTION - If two spacers are used, install one spacer on upper spring seat and one on lower spring seat.* Adding one spacer (Part No. 3204474) will raise affected corner 3/8"; one spacer (Part No. 3202359) will raise an affected corner approximately 1/2".

DESCRIPTION

Basic design (independent linked type) is similar to that used on previous models. Upper control arms are connected to steering knuckles by trunnion assemblies. On Rambler American, the upper trunnion assembly is integral with front spring lower support. On other models, coil spring lower support is threaded on upper trunnion. Lower control arms of Rambler American attach to steering knuckles by lower trunnion assemblies, while other models (1962-63) use a single lower control arm and strut rod, attached to steering knuckle by a ball joint stud assembly.

ADJUSTMENT

Caster & Camber - *See "Wheel Alignment Specifications and Adjustment" in this section.*
Front Wheel Bearing - *See "Wheel Bearing Adjustment" in this section.*

REMOVAL & INSTALLATION

See 1958 Final Data, page 355, or later Manual editions, except for Series 10, 80 (1962-63) lower control arm assembly as follows:

►*BALL JOINT CHECKING: See Front Suspension Ball Joint Checking in this section.*

Lower Control Arm

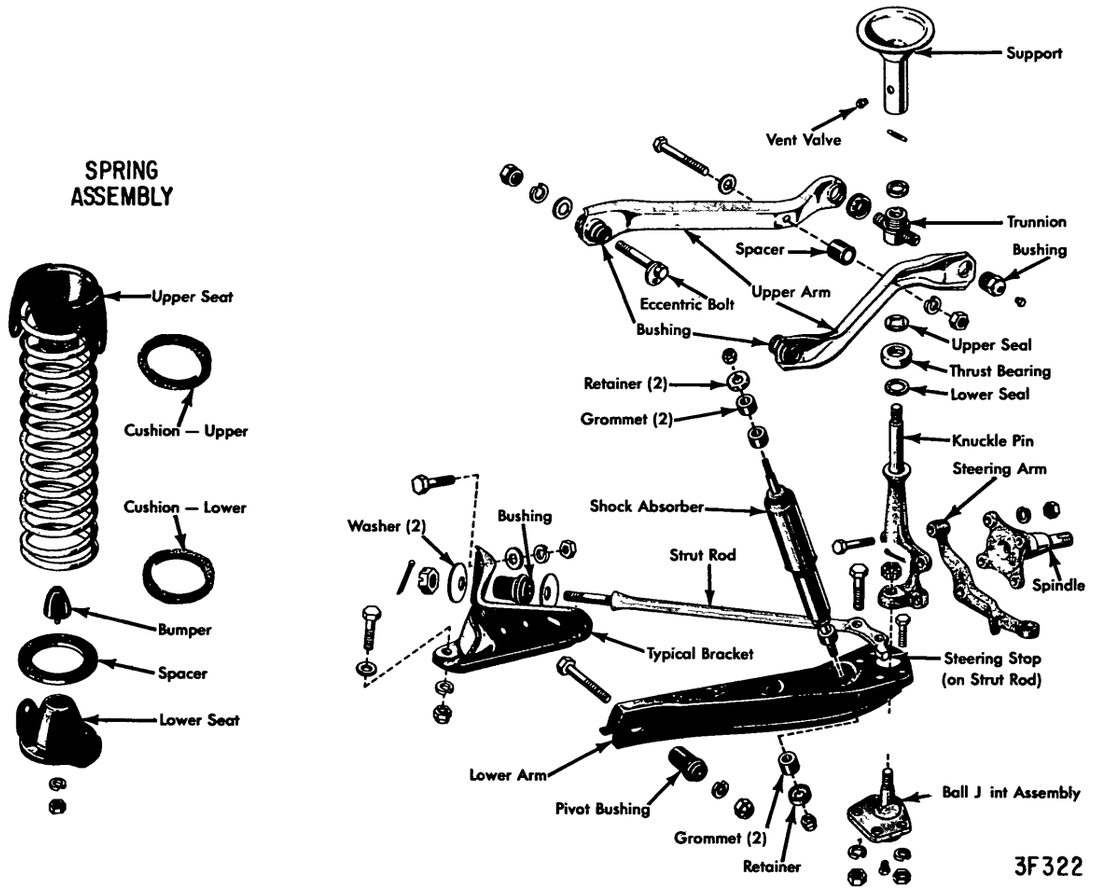
Lower control arms are attached to removable crossmember at pivot ends and outer ends are attached to the steering knuckle pin with a ball joint stud assembly. Remove front spring for service on lower control arm or attaching parts.

Series 10,80	Pivot Bolt Nuts	Crossmember Stud Nuts
1962	50-60 ft. lbs.	70-80 ft. lbs.
1963	55-65 ft. lbs.	50-60 ft. lbs.

OVERHAUL

Lower Control Arm Pivot Bushing

The pivot bushing is pressed into control arm as a tight press fit, and when removed or installed should not be turned or twisted. To remove bushing from arm, place arm in vise with a 13/16" socket on one side, and backing tool (Pitman Arm Puller J-5566-03 for 1962 cars; J-5566-04 for 1963 cars) on opposite side. In a similar manner, a new bushing may be installed using the same body of the Pitman Arm Puller and a 1 1/16" socket. Press bushing into control arm a distance of 61/64", as measured from inner edge of outer lip to inside surface of opposite side of control arm. *NOTE - Place a punch of suitable size in bottom open end of lower control arm to keep arm from distorting. Also, grind opening in Pitman Arm Pulley body slightly larger, if necessary, to fit over shoulder on control arm.*



RAMBLER CLASSIC & AMBASSADOR FRONT SUSPENSION ASSEMBLY

Lower Control Arm Ball Joint Assembly

To replace ball joint assembly, drill out two rivets that attach assembly to lower control arm, and remove two strut rod mounting bolts. Then remove steering knuckle arm and stud nut, and remove ball assembly from knuckle pin with Ball Joint Remover J-9656. When installing new assembly, replace rivets that were removed with two bolts, lockwashers and nuts. Lubricate assembly at 33,000 miles or 3 years, by removing plug at bottom and using manual gun and hose, Tool No. J-9670, with Lithium Base Cartridge Lubricant. *NOTE - On early 1962 cars, remove rubber plugs in bottom of ball joint units and tap the hole for a ¼"-28 metal plug.*

Lower Control Arm Strut Rod

Strut rods are fastened at lower control arm ends with two bolts and nuts, and at mounting bracket in a rubber bushing. Upon assembly, torque strut rod-to-cushion nut and strut-to-lower control arm bolt nuts 60-70 ft. lbs. To remove rubber bushing from bracket, break tack welds, then place a 3/32" or 1/8" punch on metal end of bushing and drive out. To install a new bushing place 1 3/4" socket on shoulder of bushing and drive into place, then tack weld in place.

Steering Knuckle Pin

1962-63 cars have steering knuckle pin with a tapered seat (threaded in 1961 models) at lower end to receive lower control arm ball joint assembly.

STEERING LINKAGE

►*POWER STEERING LINKAGE NOTE:* Linkage on these cars is essentially the same as linkage for manual steering cars.

AMERICAN MOTORS

Rambler (All Series)

Linkage - Consists of relay rod connected between pitman arm and steering idler arm with tie rod on left side connected between pitman arm and steering arm. On right side, tie rod is connected between idler arm and steering arm. Ball and socket joints are adjustable on Series 01 (American), and not adjustable on Series 10 & 80 (Classic & Ambassador).

Ball & Socket Joint Adjustment - On idler arm side, tighten adjusting plug until solid contact made, then back out to first cotter pin hole (no more than 3/8-turn, no less than 1/8-turn). On pitman arm side, tighten adjusting plug until solid contact made, then back out 3/4-turn and install cotter pin in holes nearest this position.

CHRYSLER CORP.

Chrysler, Imperial, Dodge, Dart, Plymouth & Valiant

Linkage - Consists of idler arm bracketed to right frame side member and connected to right end of drag link. Pitman arm is connected to left end of drag link. Individual tie rods, connected to drag link near its center, have sleeve adjustment for toe-in.

Idler Arm Bushing Replacement - Idler arm with bushing is serviced only as an assembly. When bushing is worn, replace complete assembly.

FORD MOTOR CO.

Comet, Falcon, Fairlane, Ford Pass. Cars, Lincoln, Mercury, Meteor & Thunderbird

Consists of steering (pitman) arm-to-idler arm rod which transmits motion from steering gear through steering arm attached to left end of steering arm-to-idler arm rod, then to front wheels through the tie rods. Tie rods have adjustable sleeves on outer ends for toe-in adjustment. An idler arm is attached to underside of underbody.

Tie Rod End Replacement – *NOTE – Idler (intermediate) rod ends are not replaceable. Complete rod assembly should be replaced when rod ends are worn.* Remove nut from ball end stud, then place a support behind arm near stud and tap with a soft hammer to drive it out of arm. *CAUTION – DO NOT use a wedge type ball stud separator because of special design of ball stud seals.*

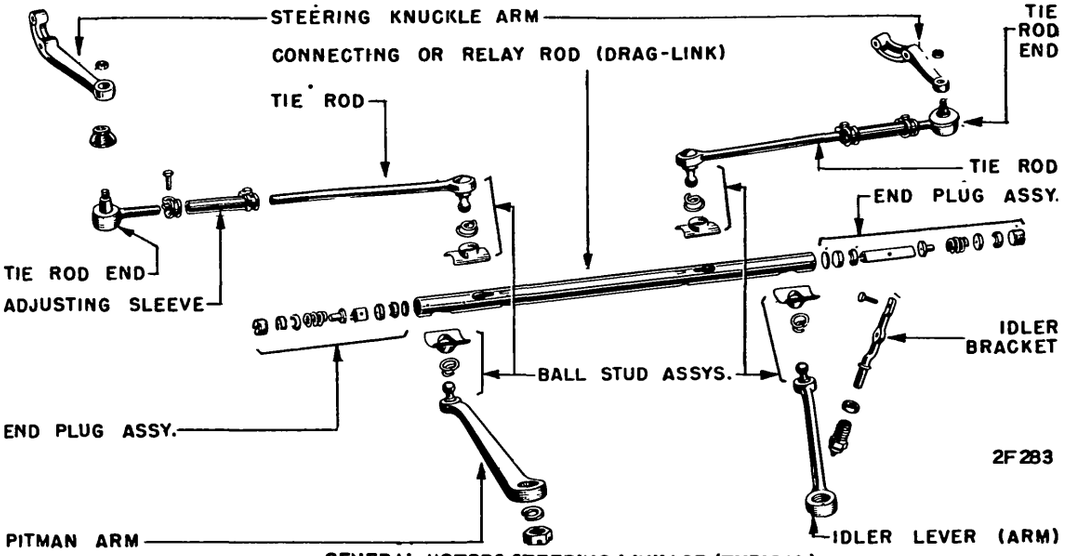
Idler Arm & Bushing Replacement - *NOTE - If one bushing is worn, both bushings must be replaced.* Replace bushings with Tool Set T61P-3355-A or 3355 (or suitable puller). *CAUTION - Replace idler arm bracket if threads are worn or bracket is bent. DO NOT attempt to straighten a bent idler arm bracket.*

Ford Trucks

Linkage consists of connecting rod between front wheels. Rod has adjustable features at both ends. The spindle arm attached to connecting rod at left end is in turn attached to a one-piece drag link with manual adjustment features at both ends. Rear of drag link is attached to sector shaft arm.

"C" SERIES FORD TRUCK NOTE - These trucks have a single adjustable type drag link. To adjust, center steering wheel, then adjust drag link for a length of 39 1/8" ± 1/16". Tighten clamp bolt to 35-45 ft. lbs. *NOTE - Greater offset in curved drag link must be toward front of truck for proper tire clearance. Rear clamp opening must face right side of truck, and front clamp opening must face left side of truck.*

Drag Link Adjustment - Remove cotter pins from each end of drag link. Tighten each drag link plug until drag link ball springs are fully compressed. Back off each plug to first cotter pin hole, then install new cotter pins.



GENERAL MOTORS STEERING LINKAGE (TYPICAL)

GENERAL MOTORS

Buick (Exc. Special)

Linkage - Parallelogram type linkage consisting of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each wheel. Adjustable sleeves at end of each tie rod for toe-in adjustment. No intermediate rod end plug adjustment is provided.

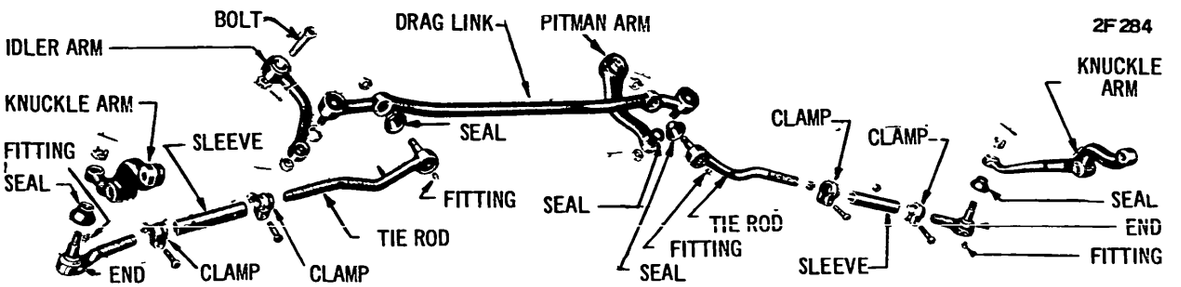
Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 2 15/16–3 1/16".

Buick Special

Linkage - Consists of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each front wheel. Adjustable sleeves at end of each tie rod for toe-in adjustment. Intermediate rod end plug adjustment provided at both pitman arm and idler lever ends of intermediate rod on both manual and power steering cars.

Idler Lever & Support Adjustment – In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 7/16".

Intermediate Rod End Plug Adjustment – Adjust plugs on both pitman arm and idler lever ends of intermediate rod as follows: Turn end plug up tight, then back off plug ¼–¾ turn (½ turn preferred) and install cotter pin.



CHRYSLER CORP. STEERING LINKAGE

STEERING LINKAGE (C nt.)

Cadillac

Linkage - Consists of a drag link between steering gear pitman arm and idler lever mounted on right hand frame side rail, and individual tie rods between drag link and each wheel. Adjustable sleeves at outer ends of tie rods for toe-in adjustment. No adjustment plugs are provided at drag link ends as the drag link is attached to idler and pitman arms by spherical pivots.

Drag Link Height Adjustment – Place a straight bar across two adjustable jacks directly below drag link. Adjust height of jacks so distance from top of bar to centerline of lower control arm pivot bolts is equal on both sides (adjust jacks so distance is an even number of inches). Measure distance from top of bar to lower edge of drag link on both sides using a combination square and level with bubble centered in level. *CAUTION – Do not reposition bar or move car.* Difference in measurement between 1st measurement (top of bar to centerline of lower control arm pivot bolts) and 2nd measurement (top of bar to lower edge of drag link) should be 2 15/16"±1/16" and equal at both inner pivot points within 1/16". If idler arm end of drag link not within limits, loosen idler arm support mounting screws and move support. If proper adjustment still not obtainable, remove and bend idler arm slightly. If pitman arm end of drag link not within limits, loosen steering gear mounting bolts and move gear. If proper adjustment still not obtainable, remove and bend pitman arm slightly. *CAUTION – Bend pitman and idler arms off the car and cold.*

Chevrolet Pass. Cars & Corvette

Consists of steering relay rod between pitman arm and idler arm. Pitman arm connected to relay rod by an adjustable ball and socket joint (Exc. Corvette). Individual adjustable tie rods are installed between relay rod and each front wheel.

Relay Rod Ball Joint Adjustment – Remove cotter pin from end of relay rod and tighten end plug until springs are compressed and plug bottoms. Back off end plug ¾ turn plus amount necessary to insert cotter pin, then insert pin.

Chevy II

Consists of steering relay rod between pitman arm and idler arm. Pitman arm is connected to relay rod by an adjustable ball and socket joint. Individual adjustable tie rods are installed between relay rod and each front wheel.

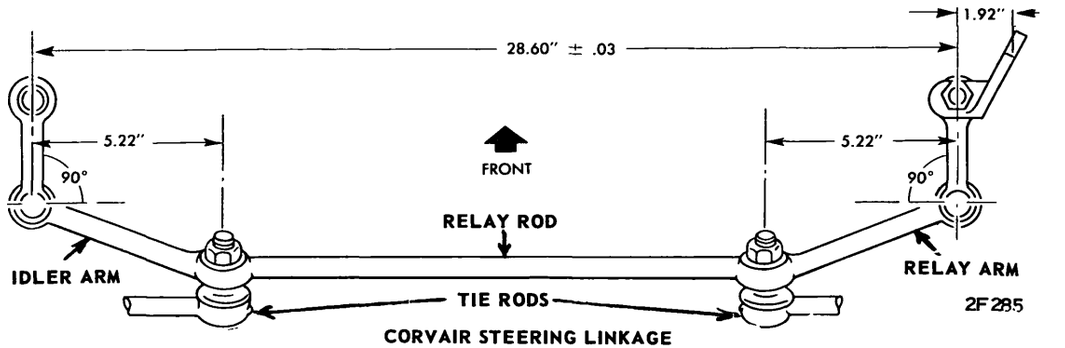
Relay Rod Ball Joint Adjustment - Remove cotter pin from end of relay rod and tighten end plug until springs are compressed and plug bottoms. Back off end plug ¾-turn plus amount necessary to insert cotter pin, then insert cotter pin.

Chevrolet Trucks (Series 10-30)

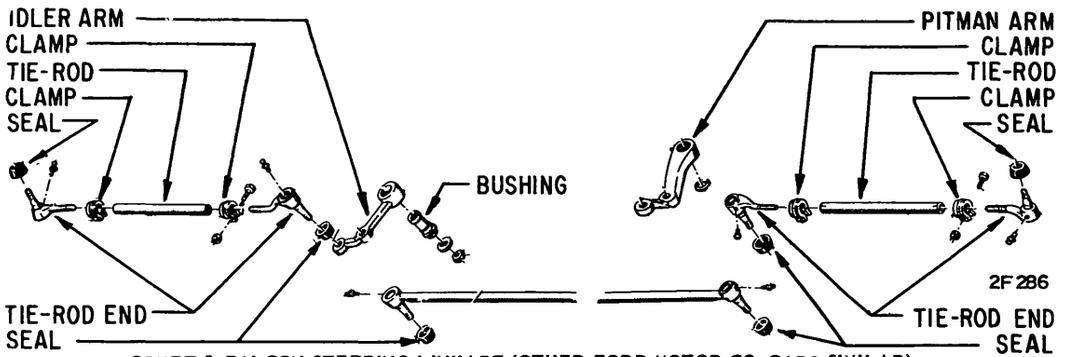
Consists of two tie rod assemblies connected between pitman arm and wheel on left hand side and between idler arm and wheel on right hand side. A relay rod is connected between pitman arm and idler arm.

C rvair

Linkage - Consists of a relay rod connected between pitman arm and steering idler arm located on right hand side of frame. Tie rods are connected between relay rod and each front wheel. Bushing on pitman arm end of relay rod is replaceable.



CORVAIR STEERING LINKAGE



COMET & FALCON STEERING LINKAGE (OTHER FORD MOTOR CO. CARS SIMILAR)

Oldsmobile (Exc. F-85)

Linkage - Consists of steering relay rod between pitman arm and idler arm bracketed to right hand frame side rail. Individual adjustable tie rod ends are attached to center portion of steering relay rod and are provided with adjustable sleeves for toe-in adjustment.

Oldsmobile F-85

Linkage - Consists of steering relay rod between pitman arm and idler arm which is bracketed to right hand frame side rail. Individual adjustable tie rods are attached to relay rod and are provided with adjustable sleeves for toe-in adjustment.

Relay Rod End Plug Adjustment – Thread plugs into relay rod until tight, then back off ¼–¾ turn and install cotter pin with head to front of car.

Idler Arm & Support Adjustment – Thread idler arm support with seal into bushing until distance from upper face of idler arm to shoulder of support is ½". *NOTE – Idler arm must be able to rotate 90° in each direction from straight ahead position.*

Pontiac & Pontiac Tempest

Linkage - Consists of steering connecting rod between pitman arm and idler arm located on bracket on right hand frame side rail. Individual tie rods between steering connecting rod and each front wheel are provided with adjustable sleeves for toe-in adjustment.

Idler Lever & Support Adjustm nt – With lever and support off car, thread idler support into bushing until distance between upper face of idler arm and shoulder at thread end of idler support is 11/16".

KAISER JEEP CORP.

Jeep (Exc. "J" Series)

Linkage - Bellcrank on frame front crossmember linked to each front wheel by adjustable tie rods and to steering gear pitman arm by a steering connecting rod (drag link).

Connecting Rod End Plug Adjustment – On idler arm end of connecting rod, screw plug in firmly against ball, then back off ½ turn (except FC–150), 1/8–1/4 turn (FC–150), and install cotter pin. On pitman arm end, screw plug in firmly against ball, then back off 1 full turn (except FC–150), 1/8–1/4 turn (FC–150) and install cotter pin.

STUDEBAKER CORP.

Studebaker Lark, Hawk & Avanti

Linkage - Consists of two adjustable tie rods attached to bellcrank mounted at center of frame crossmember. Bellcrank is attached to steering gear pitman arm by a reach rod (drag link).

B llcrank B aring Adjustm nt – Insert shims between lower thrust washer and shaft until there is no end-play. Shaft should turn freely in bearings. Lock nut securely with cotter pin.

STEERING WHEEL, HORN BUTTON, DIRECTIONAL SIGNAL SWITCH REMOVAL

AMERICAN MOTORS

Horn Button Removal & Installation

Rambler American - Pry horn button from center of steering wheel. *NOTE* - The horn ring can be removed after removal of steering wheel. To install, reverse removal procedure.

Rambler Classic & Ambassador - Rotate horn button or horn ring approximately ¼ turn counterclockwise and remove from steering wheel. To install, reverse removal procedure.

Steering Wheel Removal & Installation

Rambler (All Models) - With horn button removed, install a suitable wheel puller (J-5290 for Rambler American and J-21232 for Rambler Classic and Ambassador) and pull wheel from steering shaft. To install, reverse removal procedure and tighten steering wheel nut securely.

Directional Signal Switch Removal & Installation

Rambler (All Models) - With steering wheel removed, remove upper spring and cone bushing from steering tube and disconnect directional signal and horn wires. Move directional signal lever to right turn position and remove the two attaching nuts. Push the two capscrews down into gearshift housing and remove directional signal housing from steering tube. To install, insert the two square headed capscrews in holes of directional signal housing and start the nuts on the capscrews. Install directional signal housing, guiding the directional signal and horn wires down through gearshift housing and jacket tube, and align the heads of the two capscrews with slots in upper end of jacket tube. Hold down on the two capscrews and maintain a light downward pressure on housing while tightening the nuts. Tighten one nut two or three turns and then tighten the other the same amount. Repeat until both are tight. Do not over-tighten. Install steering wheel and connect directional signal and horn wires.

CHRYSLER CORP.

Horn Button Removal & Installation

Dodge Dart & Plymouth Valiant - Disconnect battery at negative terminal, then pry cap off horn button. Disconnect horn wire at switch, then remove three screws and insulators attaching horn ring and horn switch to steering column and remove ring and switch. Install by reversing removal procedure.

Chrysler, Dodge & Plymouth (Exc. Imperial, Dart & Valiant) - Disconnect battery at negative terminal, then remove horn button by turning it ¼ turn counterclockwise. On models having a horn ring, remove the two attaching screws from underside of steering wheel. Disconnect horn wire at switch, then remove the three screws and insulators attaching horn ring and horn switch to steering column. Remove horn ring and switch. Install by reversing removal procedure.

Imperial - Disconnect battery at negative terminal, then remove the two screws from underside of steering wheel and remove horn actuator and steering wheel cover. Disconnect horn wire at switch; then remove the four screws and insulators and remove switch. Remove horn switch mounting plate. Install by reversing removal procedure.

Steering Wheel Removal & Installation

All Models - Remove horn button and switch assemblies (see above), then loosen steering shaft nut (do not remove). Install Puller C-3428 and loosen wheel on shaft, then remove nut and wheel. To install, reverse removal procedure and tighten nut to 24 ft. lbs. (Chrysler, Dodge Custom 880, Plymouth & Valiant); 40 ft. lbs. (Chrysler Imperial, Dodge & Dodge Dart).

Directional Signal Switch Removal & Installation

All Models (Exc. Imperial) - Remove steering wheel (see above), then remove direction signal lever from switch and disconnect direction switch wiring at steering column jacket tube below instrument panel. *NOTE - Attach a piece of string or fine wire to direction switch wiring before removing switch from steering column. When switch is removed, leave string or wire in steering column jacket tube to aid in replacement of wiring.* Disconnect direction switch from steering column and remove from top of column. To install, reverse removal procedure and use the string or fine wire to pull switch wire down through column jacket.

Imperial - Remove directional switch lever, then remove steering column lower cover. Disconnect switch wires at connector and remove switch. To install, reverse removal procedure.

FORD MOTOR CO.

Horn Button Removal & Installation

All Models - Disconnect horn button wire at connector under instrument panel, then depress horn button (or steering wheel hub cap) and rotate it counterclockwise for removal. On some models, upper horn contact can be removed. *NOTE - Complete horn contact assemblies can be removed after steering wheel and (or) direction signal assembly are removed (see below).* To install, reverse removal procedure.

Steering Wheel Removal & Installation

All Models - With horn button (or steering wheel hub cap) removed, install a suitable steering wheel puller (Ford & Mercury Tool Nos. 3600AA, 3600N), and pull steering wheel from shaft. To install, reverse removal procedure.

Direction Signal Removal & Installation

Comet & Falcon - With horn button and steering wheel removed, remove direction signal lever, then remove direction signal switch retaining screws and pull switch away from steering column flange. Remove flange retaining nuts and remove indicator switch, column flange, sleeve, and wiring assembly. To install, reverse removal procedure.

Fairlane, Galaxie, Meteor, Monterey & Thunderbird - Remove steering wheel and disconnect direction signal lever. Remove switch mounting bracket screws and remove switch and bracket from steering column. Remove conical tension spring, then remove switch actuating lever.

Lincoln Continental - Remove steering wheel, then remove instrument panel center plate below steering column. Unscrew direction signal lever from steering column. Remove lower left instrument panel cover and disconnect turn signal wires at connector. Remove two screws and remove access plate from bottom side of steering column, then pull switch wires through plate opening. Lift up on selector dial hood and remove hood. Remove selector lamp socket from column, then remove lens, shroud and pointer from column, and slide shroud down toward base of column. Use an offset screwdriver and remove screw attaching wire clamp to tube. Remove switch attaching screws and remove switch. To install, reverse removal procedure.

GENERAL MOTORS

Horn Button Removal & Installation

Buick 4400, 4600, 4700, 4800 - Remove two screws from lower side of actuating bar (steering wheel spoke), then remove cap and four clutch head screws from actuating bar and remove bar. To install, reverse removal procedure.

Buick Special 4000, 4100, 4300 - *NOTE - Remove deluxe steering wheel horn button assembly in same manner as for standard Buick models.* On standard steering wheels, insert a screwdriver through hole in cap and loosen retaining screw, then remove cap. Reverse removal procedure to install.

Cadillac - Pry cap from steering wheel and horn control shroud, then disconnect horn contact wire from top of steering shaft. Remove upper steering shaft nut and lift horn shroud and switch assembly from wheel. To install, reverse removal procedure and tighten steering shaft nut to 50 ft. lbs.

Chevrolet Pass. Cars & Trucks - On all models except Bel Air and Impala, pry horn button out of steering wheel. On Bel Air and Impala, remove two screws from back side of steering wheel spoke and remove the horn button. To install, reverse removal procedure.

Oldsmobile (All Models) - Carefully pry cap and ornament assembly from center of steering wheel. To remove shroud and horn button assemblies on deluxe type steering wheel, remove steering wheel (see below), then remove screws attaching shroud to wheel and remove shroud. Remove switches from shroud. To install, reverse removal procedure.

(Continued)

STEERING WHEEL, HORN BUTTON, DIRECTIONAL SIGNAL SWITCH REMOVAL (Continued)

Pontiac (Exc. Tempest) - On standard steering wheel, pry horn button from steering wheel hub. On deluxe steering wheel, rotate horn button cap clockwise to remove. To remove horn ring, remove steering shaft nut and lift ring out. To install, reverse removal procedure. Tighten steering wheel nut to 20-35 ft. lbs.
Pontiac Tempest - On standard and deluxe wheels, pry horn button from steering wheel hub. On custom steering wheel, twist ornament to remove. To remove horn ring on deluxe and custom steering wheels, remove steering shaft nut and remove ring. To install, reverse removal procedure and tighten steering shaft nut to 20-35 ft. lbs. and stake nut in place.

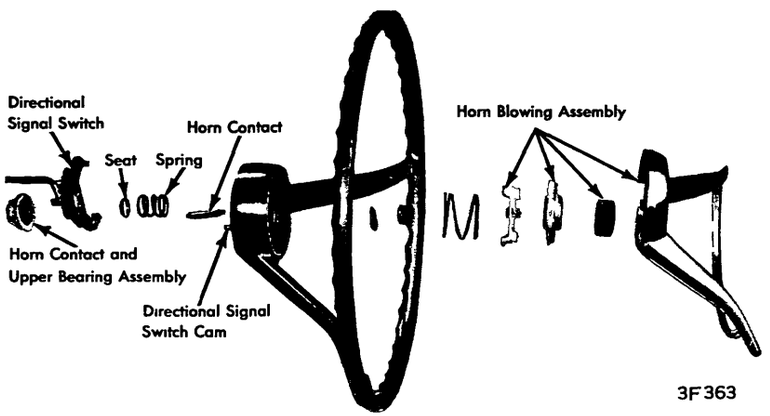
Steering Wheel Removal & Installation

Buick & Buick Special - Disconnect horn wire at mast jacket, then remove horn button assembly (see above). On steering wheels with actuator bar, remove springs and ground plate from steering wheel. Loosen steering shaft nut (do not remove), then install Puller J-3274 and pull wheel up to nut. If wheel is exceedingly tight, place a moderate strain on puller and tap end of puller screw to break hub loose from shaft. Remove steering wheel. To install, reverse removal procedure and note the following: Align mark on wheel hub with mark on shaft for correct alignment. Tighten steering shaft nut to 20-35 ft. lbs.
Cadillac - Remove horn shroud and switch assembly from steering wheel (see above), then scribe a line on wheel hub and on end of shaft for installation of wheel in original location. Install Puller J-1859-02 and use two 5/16"-18 bolts 3½" long, with flat washers, and pull wheel from shaft. To install, reverse removal procedure, aligning scribe marks made at removal. Tighten steering shaft nut to 50 ft. lbs.
Chevrolet Pass. Cars & Trucks - On all models, remove horn button assembly (see above). On steering wheels with horn ring, remove three screws from horn ring adapter and remove adapter, insulator and spacer. Remove steering shaft nut, then install Puller J-2927 and pull wheel from shaft. To install wheel, reverse removal procedures and note the following: On all models except Chevy II, Corvair & Chevrolet Trucks, loosen spring stop clamp which is located at lower end of mast jacket just above steering shaft coupling. After wheel is completely installed, place a .010-.020" shim between coils of spring located above spring stop clamp, then compress spring so it is solid. Tighten spring stop clamp in this position and remove shims.
Oldsmobile & Olds F-85 - Disconnect horn wire from harness, then remove horn button assembly. Remove steering shaft nut and install Puller BT-61-9 and remove wheel. To install, align marks on steering wheel hub and steering shaft and install wheel. Tighten steering shaft nut to 25 ft. lbs. and stake to steering shaft.
Pontiac (Exc. Tempest) - Remove horn button (see above). On standard steering wheel, remove three screws, insulator and horn button retainer, then remove contact ring, pivot contact, spring and insulator. Remove steering shaft nut and remove contact plate. On deluxe steering wheel, remove steering shaft nut, then pull horn ring and contact assembly from steering gear shaft. Remove pivot contact, spring and insulator from steering wheel hub. On all models, install Puller J-3044 and pull wheel from shaft. Remove coil spring and seat from steering shaft. To install, reverse removal procedure and tighten nut to 20-35 ft. lbs.
Pontiac Tempest - On standard and deluxe steering wheels, remove horn button by prying out of wheel hub, then remove steering shaft nut and spacer bushing. Remove horn ring or receiver cup, then remove pivot ring (deluxe wheel) and belleville spring. Remove contact assembly and pull steering wheel from shaft with Puller J-3044-01. On custom steering wheel, twist and remove steering wheel ornament, then remove steering shaft nut. Pull horn ring and contact assembly from steering column upper bearing, then pull wheel from shaft with Puller J-3044. To install, reverse removal procedure and note the following: Make sure wheel is positioned in straight ahead position or marks on wheel hub and on shaft are in alignment. Install steering shaft nut and tighten to 20-35 ft. lbs.

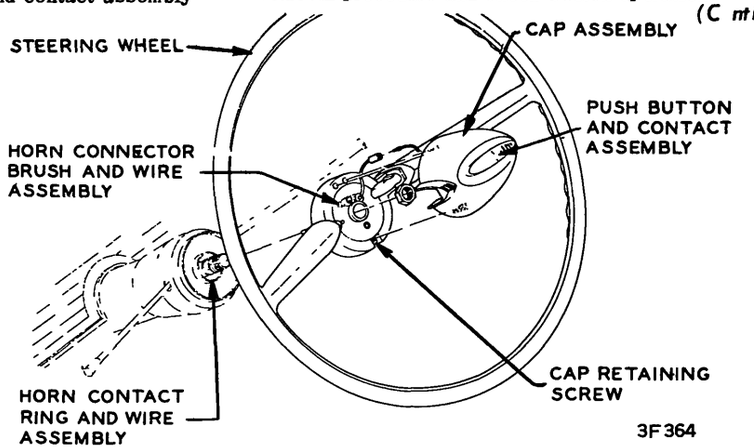
Directional Signal Actuator Removal & Installation

Buick & Buick Special - Remove steering wheel (see above), then unplug horn wire from connector located near wire hole in mast jacket. Attach a length of wire to horn wire terminal (to be used to feed horn contact wire back through mast jacket at reassembly). Remove directional signal operating lever, then remove directional switch on mast jacket. Remove spring pin and spring from lower end of actuator rod and pull rod out of actuator. Remove three Phillips head screws retaining actuator to plate and lift actuator off of mast jacket. Remove cover from actuator. To install actuator assembly, reverse removal procedure and note the following: If spring pin was bent during removal, it may be difficult to install in actuator rod. After installation, adjust directional signal switch.
Directional Signal Switch Adjustment - With directional signal control lever in center detent, loosen switch mounting screws and move switch sideways on jacket until operating pin projecting from switch is centered, then tighten mounting screws and check operation in each position.
Cadillac - Remove steering column lower cover, transmission shift indicator and holder, then disconnect directional switch wires at connector under dash. Remove steering wheel and directional signal cancelling cam wheel spacer. Lower column and remove directional switch harness protector from steering column jacket by removing two attaching screws. Remove three screws retaining directional signal housing to steering column assembly and remove directional signal housing and switch assembly. To install, reverse removal procedure and check switch operation.

(Continued)



TYPICAL AMERICAN MOTORS STEERING WHEEL, HORN BUTTON & DIRECTIONAL SIGNAL SWITCH ASSEMBLY



BUICK SPECIAL (STANDARD) STEERING WHEEL, HORN BUTTON & CAP ASSEMBLY

STEERING WHEEL, HORN BUTTON, DIRECTIONAL SIGNAL SWITCH REMOVAL (Continued)

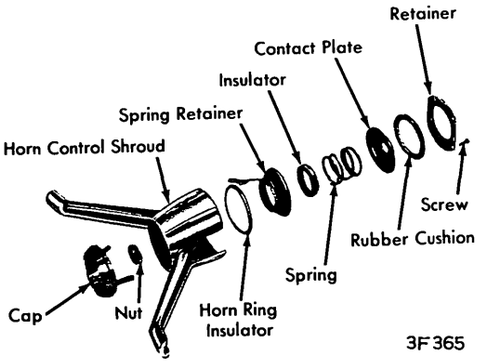
Chevr let Pass. Cars & Trucks (Except Corvair & C rv tte) - Remove steering wheel (see above), then remove lever arm attaching screw and lever from cancelling assembly. Remove three screws attaching switch assembly to switch housing, then disconnect switch wiring connector from chassis wiring harness connector and disengage from harness retaining clips. Remove directional signal assembly and upper horn bearing from housing. To install, reverse removal procedure.

C rvair & C rv tte - Remove steering wheel (see above) and horn bushing assembly, then remove three directional signal housing retaining screws. Disconnect Bowden cable retaining clips and remove directional signal switch from mast jacket. Withdraw directional signal housing and Bowden cable.

Oldsm bil (Exc. Olds F-85) - Remove steering wheel and turn signal lever (see above), then insert a screwdriver (round shank) through turn signal lever hole in housing and pry housing from bearing retainer. Remove the cancel spring and pivot pin with wave washer from lever plate. Depress detent spring to disengage it from upper bearing retainer, then separate lever plate, detent spring, detent roller and detent balls from upper bearing retainer. To install, reverse removal procedure and note the following: Lubricate all frictional areas with Lithium Soap Grease. Press housing over upper bearing retainer so that it just snaps over ring of bearing retainer flange.

Olds F-85 - Remove steering wheel assembly (see above), horn contact, turn signal actuator plate, and upper bearing. Remove three Phillips head screws from actuator retainer anchor plate, then lift actuator assembly off mast jacket. Install by reversing removal procedure.

P ntiac (Exc. T mp st) - With steering wheel assembly removed (see above), disconnect horn cable from terminal, then remove wire connectors from directional signal switch assembly (on mast jacket) and remove switch assembly and horn wire retainer. Hold actuator rod anti-rattle coil spring and bearing plate and remove hair-spring type actuator lever from lower end of actuator rod. *NOTE - Stuff a rag into opening below actuator rod t prevent loss of actuator spring.* Remove anti-rattle spring and bearing plate from actuator rod, then pull actuator rod from top end of steering column. Remove horn connector assembly and horn wire from end of upper bearing support plate. Remove the screws retaining actuator housing and remove housing. *NOTE - Actuator can be removed from housing by removing control lever and pressing out shield.* To install, reverse removal procedure and note the following: Attach a stiff wire to end of horn wire and snake wire through outer slots of bearing support lock plate and retainer plate, then between steering column housing and shifter tube, bringing wire out proper opening in housing. *NOTE - Directional signal switch must be properly centered on steering column. Make sure there is no tension on actuator rod when switch screws are tightened.* Tighten actuator housing attaching screws and switch attaching screws to 10-35 inch pounds.



CADILLAC HORN CONTACT ASSEMBLY

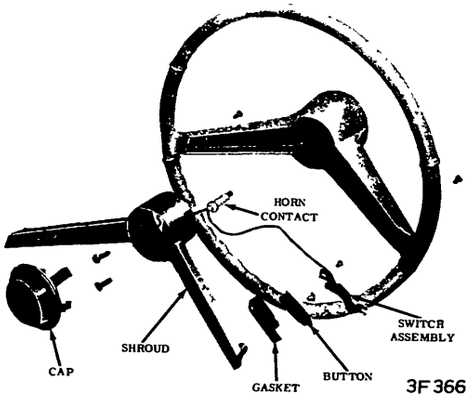
Pontiac Tempest - Remove steering wheel and disconnect horn wire lead and directional signal connector. Rotate directional signal housing on steering column jacket and remove housing from jacket. To install, reverse removal procedure, positioning housing so there is 7/64" clearance between housing and steering wheel hub. If necessary, adjust steering column jacket up or down to provide proper clearance between steering wheel and housing.

STUDEBAKER CORP.

Horn Button Removal & Installation

Studebaker (Exc. Avanti) - Remove horn button by prying it out of center of steering wheel. To remove horn switch, disconnect horn button wire at switch, then remove retaining screws and insulators and remove switch. To install, reverse removal procedure.

Studebaker Avanti - Remove steering wheel center ornament by turning it 1/3 turn counterclockwise, then remove retainer screws and retainer. Remove steering wheel and place it upside down, then mark position of directional signal cancelling ring and remove ring from wheel hub. Remove three switch contact plate retaining screws and insulating washers and lift switch plate, nylon spacers and the spring from wheel hub. To install, reverse removal procedure.



OLDSMOBILE HORN CONTACT ASSEMBLY (DELUXE WHEEL)

Steering Wheel Removal & Installation

Studebaker (Exc. Avanti) - With horn button removed, remove horn ring retaining screws and insulators, then remove steering wheel nut. Remove steering wheel from shaft using a suitable puller (J-5473). To install, reverse removal procedure and tighten steering wheel nut to 23-27 ft. lbs.

Studebaker Avanti - Remove center ornament and retainer. Remove steering wheel nut and pull wheel from shaft using a suitable puller (J-5473-02). To install, align index mark on top of steering post shaft and install wheel. Install retaining nut and tighten to 25-30 ft. lbs. Install center ornament.

Directional Signal Switch Removal & Installation

Studebaker (Exc. Avanti) - With steering wheel removed, remove directional signal lever retaining screw and remove lever from bracket. Disconnect directional signal wires and horn wire from wiring harness at connector under dash. Remove upper bracket and pull directional signal and horn wires up through jacket. Remove directional switch retaining screws in upper bracket and remove switch (including horn contact roller assembly). Install by reversing removal procedure.

Studebaker Avanti - With steering wheel removed, remove directional signal switch lever retaining screw and lever. Remove horn brush and directional signal switch plate retaining screws, then disconnect horn wire and directional signal wires at lower connector. Lift brush plate and signal plate from steering wheel hub and pull wires up out of jacket. Install by reversing removal procedure.

BENDIX LINKAGE TYPE POWER STEERING

Checker (1963)
Comet V8 (1963)
Falcon V8 (1963)
Ford Fairlane & Galaxie (1963)
Jeep, J Series (1963)
Mercury Meteor & Monterey (1963)
Studebaker (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 COMET & FALCON V8 EXCESSIVE STEERING EFFORT & RAPID STEERING WHEEL RETURN CORRECTION:* This condition can be corrected on cars built before June 17, 1963 by installing a new idler arm and bushing, Part No C3DZ-3352-G Cars built after the above date have the new arm and bushing installed in production

Description

"Linkage Type" with control valve assembly and power cylinder built into steering linkage or attached to it A "Reaction Limiting Valve" is incorporated into main control valve assembly on some models This valve assembly limits amount of effort required to turn steering wheel when parking or when making a sharp turn at low speed.

Lubrication

Check fluid level in reservoir every 6,000 miles (Exc. Checker & Studebaker); 5,000 miles (Checker & Studebaker) Start engine and turn wheels right and left a few times, then shut engine off Add Automatic Transmission Fluid Type "A" (Suffix "A"), to bring fluid level up to following specifications:

Checker - Bring level to within 1" of top.

Studebaker - Maintain fluid level ¼" below lowest point of reservoir opening flange with front wheels in straight ahead position.

Other Models (Exc. Air Cond. Cars) - Maintain level at "F" mark on dipstick

Other Models (Air Cond. Cars) - Maintain level ¼" from top (Exc Comet & Falcon); 1" from top (Comet & Falcon)

TESTING

Turning Effort

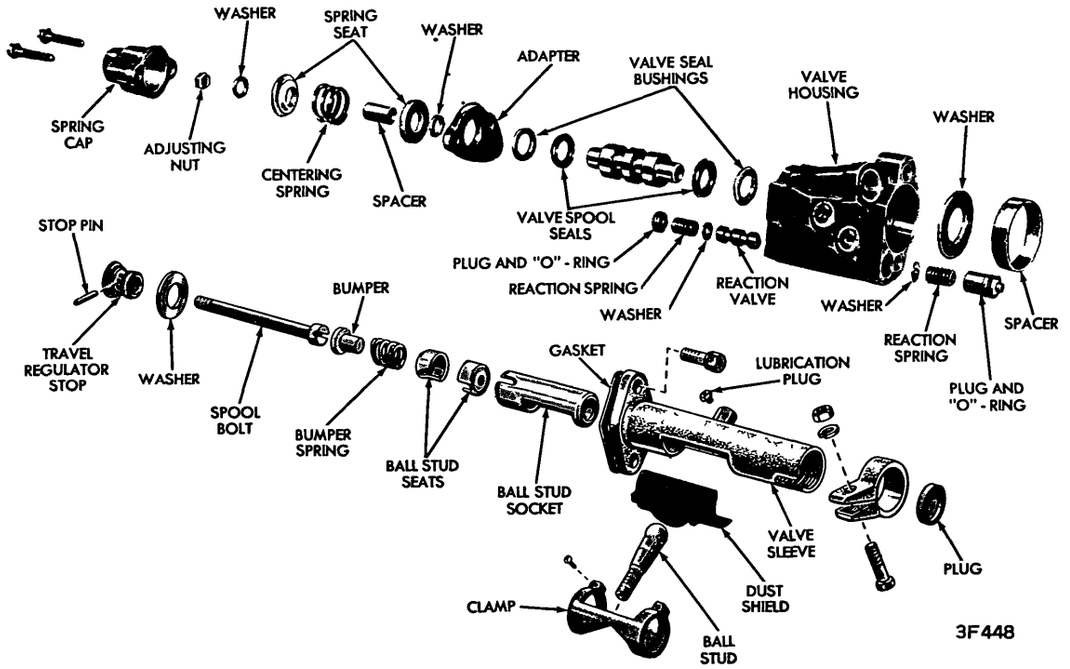
With wheels properly aligned and tire pressure correct, place car on dry concrete, set parking brake, then proceed as follows: With engine at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to steering wheel rim and measure pull required to turn wheel at least one full turn in both directions Pull should be about equal in both directions as indicated in table below

Turning Effort Specifications

Car Model	Scale Reading
Comet & Falcon	4 Lbs. Approx.
Fairlane & Meteor	4½ lbs. Approx.
Galaxie & Monterey	4 lbs. Approx
Studebaker	11 lbs Max

Pump Pressur

Install a suitable pressure gauge between pump hose and pump outlet with gauge between pump and shutoff valve of gauge Run engine at idle speed (with shutoff valve open) for two minutes to normalize oil temperature Turn wheels all the way to right and left, noting pressure reading on gauge when wheels are against stops. *CAUTION - Do not hold wheel against stop for more than 30 seconds.* Fluid pressure with wheels against stops should be as listed in table below. Close gauge valve and check pressure If pressure is less than minimum, pump is faulty If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder If pressure is within limits and steering gear does not function properly, trouble is in control valve or power cylinder



BENDIX POWER STEERING CONTROL VALVE ASSEMBLY (TYPICAL)

Pump Pressure Specifications

Car Model	Pump Pressure
Comet & Falcon	750-900 lbs
Fairlane & Meteor	750-900 lbs.
Galaxie 6 Cyl.	700-900 lbs.
Galaxie & Monterey Other V8	950-1100 lbs.
Studebaker	850 lbs
Checker	700-900 lbs.

ADJUSTMENT

Pump Belt

See "Belt Adjustment" on individual car model pages.

Control Valve Centering Spring Adjustment

Remove two centering spring cap attaching screws and lockwashers and remove cap Tighten adjusting nut securely, then back it off ¼ turn. Install centering spring cap and tighten screws securely

Speed-Up Control Adjustment

See "Carburetor" on individual car model pages.

TROUBLE SHOOTING

Binding Or Poor Recovery

Check pitman arm ball stud in control valve sleeve which may be rubbing against the sleeve slot If this is the case, the roll pin may be missing Check idler arm bushings Check all steering gear adjustments Check operation of control valve and for interference between sector shaft arm and dust shield. Check control valve travel regulator stop adjustment. Check for damaged control valve sleeve and socket tube

Hard Steering

Check to see that pump drive belt is properly tightened and that pump pressure is correct. If pump pressure is within specifications, check control valve spool centering spring adjustment Check control valve spool for free movement and repair as necessary.

Excessive Freeplay

Check steering gear worm and roller mesh adjustment Check for excessive clearance between steering arm ball stud and ball stud seats. If ball stud is loose in seat, adjust control valve travel regulator stop Check control valve centering spring adjustment

Noisy Pump

Check pump belt tension. Noise may also result if correct hose is not used

Steering Chatter

A loose pump belt can cause chatter against the wheel stops during an extremely sharp turn Check belt

(Continu d)

BENDIX LINKAGE TYPE POWER STEERING (Cont.)

tension. Check for looseness in idler arm connection, and check idler arm bushings. Check power cylinder rod insulators for looseness.

Loss Of Power Assist

Check for damaged or broken hoses. Check pump pressure (see above). Disconnect power cylinder piston rod from idler arm bracket and operate piston by hand to check for resistance of movement. If piston moves freely with little or no resistance, internal parts of power piston are damaged. Replace cylinder. Check adjustment of valve spool centering spring. Check operation of control valve check valve.

REMOVAL & INSTALLATION

Control Valve

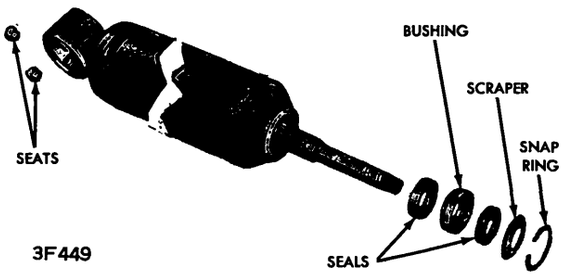
Comet & Falcon (Removal) - Disconnect lines at valve and allow to drain, then remove clamp securing valve-to-power cylinder lines. Remove bolts securing control valve to steering rod, then remove nut securing valve to pitman arm. Use Tool 3290-B to press ball stud out of pitman arm.

Installation - Place the stud in a straight vertical position, then measure from center of stud (parallel to bolt mounting surface), to center of first bolt hole (see illustration). This distance should be 4 1/4-4 3/8" (4 5/16"). If not within these limits, adjust by loosening valve sleeve clamp and turning bracket which attaches valve to steering arm rod. Complete the installation by reversing removal procedures.

Ford Galaxie, Fairlane, Mercury Monterey, Meteor (Removal) - Disconnect fluid line fittings at control valve, and drain fluid from lines. Turn front wheels to left and right several times to force all fluid from system, then loosen clamping nut and bolt at right-hand end of sleeve. Remove roll pin from steering arm-to-idler arm rod through slot in the sleeve, then loosen control valve ball stud nut. Use Tool 3290-B to press stud out of sector shaft arm. Turn front wheels fully to left and unthread control valve from steering arm-to-idler arm rod.

Installation - Thread valve onto steering arm-to-idler arm rod until about four threads are still visible on rod, then position ball stud in sector shaft arm. Measure distance between center of grease plug in sleeve and center of stud at inner end of left hand spindle connecting rod (see illustrations). The distance should be 4 3/16" (Fairlane & Meteor), 11 15/16" (Ford Galaxie & Mercury Monterey). If necessary to adjust, disconnect ball stud from sector shaft and turn valve on steering arm-to-idler arm rod to increase or decrease distance. Align hole in steering arm-to-idler arm rod with slot near the end of valve sleeve. Install roll pin in rod hole and tighten valve sleeve clamp bolt. Complete installation by reversing removal procedures.

Stud back r (Removal) - Disconnect hoses at pump body, pump reservoir, and power cylinder. Drain fluid from hoses, then remove hose retaining clips. Disconnect reach rod from steering bellcrank, then remove pitman arm from steering gear shaft with Puller J-5664. Remove control valve, reach rod, and hoses from car as an assembly. *NOTE - B for removing valve ass mbly from reach rod, clean assembly to remove dirt and grease from valve body, then loosen clamp on actuator sleeve and screw valve assembly off reach rod, counting the turns required to unscrew valve from reach rod. Record the number of turns for use at installation to maintain proper reach rod length.*



POWER CYLINDER SEAL ASSEMBLY (TYPICAL)

Installation - Reverse removal procedure and note the following: Screw control valve assembly into reach rod the same number of turns as noted at time of removal. Set front wheels in straight ahead position and center steering wheel so gear is on "high" point, then slip pitman arm on steering gear shaft, aligning marks on arm and shaft. Check and adjust length of reach rod so reach rod ball stud will slip into the bellcrank without moving wheels from straight ahead position. *NOTE - If adjustment is necessary, the valve assembly unit must be removed from car.* With actuator sleeve clamp loose, rotate reach rod clockwise until reach rod ball stud bottoms. In a like manner, rotate valve assembly clockwise until pitman arm stud bottoms in actuator sleeve window, then tighten actuator sleeve clamp securely. Rotate locked reach rod and valve assembly counterclockwise until ball stud is located in center of actuator window.

Power Cylinder

Removal - Disconnect hoses from power cylinder and fasten open ends of hoses in a raised position to prevent fluid draining out. Move front wheels to right and left several times to force all fluid from cylinder. Disconnect piston rod from idler arm bracket, but do not remove at this time. Remove locknut holding cylinder on mounting stud in steering arm-to-idler arm bracket and remove outer washer, bushing, and cylinder from stud. Remove inner bushing, and washer from stud, and pull inner insulator and washer from piston rod.

Inspection - Clean exterior of cylinder and piston rod. Inspect cylinder and rod for damage or wear and check for leakage. If parts are damaged or piston is leaking internally, replace the entire power cylinder assembly. Inspect mounting bushings and insulators for wear or damage and replace as necessary.

Seal Replacement - Except for cylinder seal and hose seat replacement, the power cylinder should be replaced as a complete assembly if faulty. To install seal, proceed as follows: Clamp cylinder in a vise and remove snap ring from end of cylinder, being careful not to distort or crack the cylinder. Pull piston rod out as far as it will go, then apply compressed air to other end of cylinder to blow out the seals. Lubricate a new inner seal with automatic transmission fluid, then place seal, bushing, outer seal, and scraper on piston rod. Push piston all the way in, then using a deep socket slightly smaller than cylinder opening, tap parts into cylinder and replace snap ring. Replace hose seats in same manner as for control valve (see above).

Installation - Reverse removal procedure and tighten bolts to specifications.

OVERHAUL

Control Valve

Disassembly - **1)** Clean exterior of unit, then remove centering spring cap from valve body. *CAUTION - When holding control valve, use a soft jawed vise, and clamp the valve only around the sleeve flange to prevent damage to unit.*

2) Remove nut from end of valve spool bolt and remove washers, spacer, centering spring, adapter, and bushing from bolt and valve housing. Remove bolts holding valve housing and sleeve together and separate housing from sleeve, then remove plug from sleeve.

3) Push valve spool out of centering spring end of valve housing and remove seal from spool. Remove spacer, bushing, and seal from sleeve end of valve housing. Drive the stop pin out of travel regulator stop with a punch. *NOTE - Pull head of valve spool tightly against travel regulator stop before driving pin out of stop.*

4) Turn travel regulator stop counterclockwise in sleeve to remove the stop. Remove valve spool bolt, spacer, and rubber washer from travel regulator stop, and remove rubber boot and clamp from valve sleeve.

5) Slide the bumper, spring, and ball stud seat out of valve sleeve, and remove ball stud socket from sleeve. After removing return port hose seat, remove return port relief valve. Remove spring plug and "O" ring, then remove reaction limiting valve (if so equipped).

Inspection - Wash all parts in solvent and blow dry with air or use a lint free cloth to dry parts. Inspect valve seals and bushings for wear or damage, and replace as necessary. Inspect valve housing and spool carefully for burrs or scoring. Remove any burrs with crocus cloth. *NOTE - Do not round off sharp edges of spool with crocus cloth.* If spool or inside of housing is badly scored, replace complete valve assembly. With housing completely dry, insert valve into housing. The spool should fall freely of its own weight in housing. Inspect mating surfaces of ball stud and socket and the valve sleeve for wear or damage. Remove minor burrs and scores with crocus cloth. Check fit of socket in sleeve.

Tube Seat Replacement - If hose seat is worn or damaged, tap the existing hole in seat with a starting tap of suitable size, then place a nut and large flat washer on a bolt (same size as tap). Insert bolt in tube seat and use the nut as a puller to remove seat. Place a new hose seat in port and thread a bolt of suitable size into the port. Tighten bolt enough to bottom seat in port.

Reassembly - **1)** Coat all parts with automatic transmission fluid before installing. If unit is equipped with a reaction limiting valve, install valve, spring, and plug.

2) Insert one of the ball stud seats (flat end first) into ball stud socket, then insert threaded end of ball stud

(Continued)

BENDIX LINKAGE TYPE POWER STEERING (C nt.)

into socket Place socket into control valve sleeve so threaded end of ball stud can be pulled out through slot in sleeve. Place other ball stud seat, spring, and bumper in the socket, then install and securely tighten travel regulator stop and valve spool bolt *NOTE - Make sure lubrication fitting is tight and does not bind on ball stud socket.*

3) Insert valve spool in housing so that large end of spool will be at centering spring end of housing Rotate spool while inserting it in housing Move spool toward centering spring end of housing, then place small seal, bushing, and spacer in sleeve end of housing Press valve spool against inner lip of seal and, at same time, guide lip of seal over spool with a small screwdriver *NOTE - Do not nick or scratch seal or spool.* Place seal end of bushing on a flat surface so that seal, bushing, and spacer are at bottom end, then push down on valve spool until it stops

4) Carefully install spool seal and bushing in centering spring end of housing around large end of spool Press spool against inner lip of seal and guide lip over spool with a small screwdriver. *NOTE - Do not nick or scratch seal or spool.* Slide spool back and forth in housing and check for free movement.

5) Place valve sleeve on housing so that ball stud is on same side of housing as ports for the two power cylinder hoses, then install two bolts in sleeve and tighten to specifications (see below) Place adapter on centering spring end of housing and install bushing, washers, spacers, and centering spring on valve spool bolt Compress spring and install nut Tighten nut securely, then loosen it not more than ¼ turn

6) Move ball stud back and forth in sleeve slot to check spool for free movement. *NOTE - The spool should travel approximately .060" in each direction from center.* Install centering spring cap on housing and tighten attaching bolts to specifications Install nut on ball stud so that valve can be positioned in a vise with the vise clamping the nut and holding valve securely, then push forward on cap end of valve to check valve spool for free movement Turn valve around in vise, and push forward and check for free movement

Tightening Specifications (Exc. Studebaker)

Location	Ft. Lbs. Torque
Power Cyl to Steering Rod (Galaxie & Monterey)	50-60
Power Cyl to Steering Rod (Others)	35-47
Spindle Connecting Rod Adjusting Nut	16-21
Control Valve Clamp Nut	15-20
Cylinder Mounting Bracket to Frame Nuts	35-43
Cylinder Piston to Bracket Nut	18-24
Hose Insulator Bracket to Frame Bolt	12-15
Spring Cap to Valve Housing Bolts	4-6½

Tightening Specifications (Stud baker)

Location	Ft. Lbs. Torque
Sleeve to Housing Bolts	(Inch Lbs) 140-170
Cylinder to Frame Stud Nut	45-50

POWER STEERING PUMP

Eaton Roller Type - *See 1958 Final Data, Page 398, or later Manual edition.*

MONROE LINKAGE TYPE POWER STEERING

Rambler, All Series (1963)

Description

Linkage type of same design used on previous models

Lubrication

Check fluid level in reservoir every 4,000 miles. Fluid level should be maintained at a point half way up filler neck (6 Cyl. Models); 1" below top of reservoir (V8 Models) Use Automatic Transmission Fluid Type "A" (Suffix "A").

Bleeding System

With front wheels raised off floor, make several power operated turns from stop to stop. Do not hold steering wheel at maximum turn position for any length of time. Recheck fluid level in reservoir.

ADJUSTMENT

Valve Spool Centering

NOTE - This adjustment is preset at the factory and is not ordinarily required in service.

Turn piston rod end plug OUT and turn pitman arm end plug IN the SAME amount (approximately ½ turn at a time) to correct for hard turn to **left**; easy turn to **right**; poor recovery from **right** turn; or car wanders to **right**. Turn piston rod end plug IN and turn pitman arm end plug OUT the SAME amount (approximately ½ turn at a time) to correct for hard turn to **right**; easy turn to **left**; poor recovery from **left** turn; or car wanders to **left**. After final adjustment, tighten end plugs to 50 ft. lbs.

TROUBLE SHOOTING

See 1959 Final Data, Page 390, or later Manual edition.

OVERHAUL

S 1959 Final Data, Page 390, or later Manual edition.

POWER STEERING PUMP

American & Classic

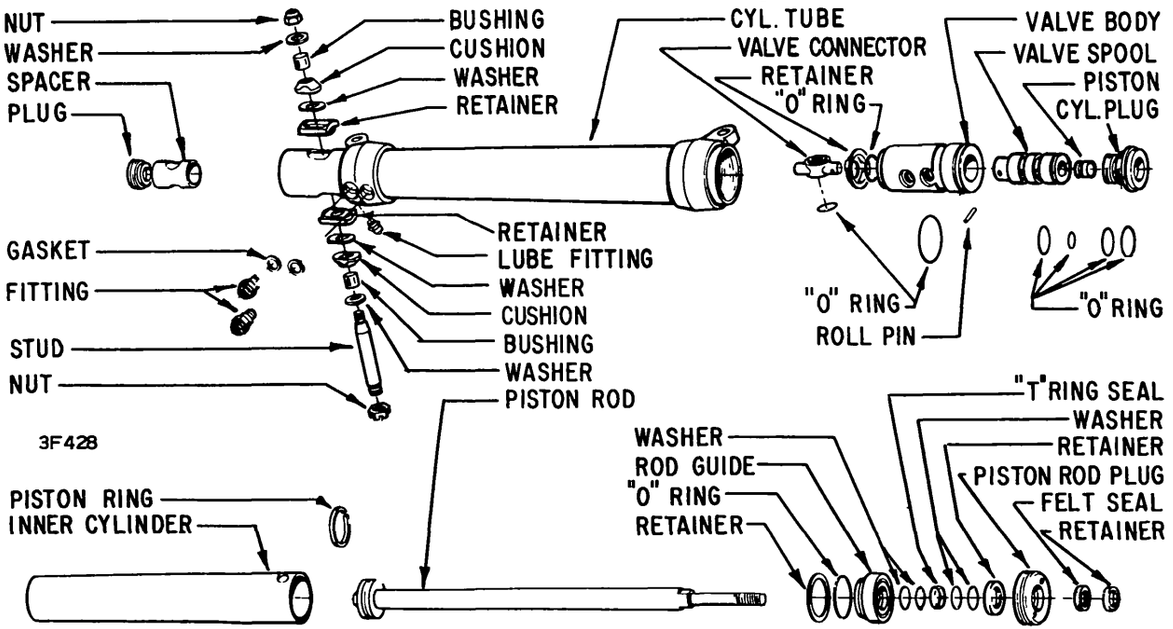
Slipper Type - *See 1960 Final Data, Page 403, or later Manual edition.*

Ambassador

Eaton Roller Type - *See 1958 Final Data, Page 398, or later Manual edition.*

PRESSURE TEST

With correct fluid level in reservoir, install oil pressure gauge J-5548-A in main oil line at control valve assembly, then start engine and bring oil to normal operating temperature. Turn wheels against curbing or other obstacle and hold tension on wheel. Oil pressure should be 800-900 lbs (Eaton Roller Type Pump); 850-950 lbs. (Slipper Type Pump) Turn wheel in opposite direction and note pressure. If there is a variation between right and left turn, internal leakage is indicated If pressure is low, stop engine and disconnect cylinder and valve assembly from gauge and cap pressure line. Restart engine and note pressure If pressure is low (belt tension correct), trouble exists in pump. *CAUTION - Do not hold wheels at maximum pressure longer than is necessary to obtain a steady pressure reading.*



MONROE POWER STEERING CONTROL VALVE & CYLINDER ASSEMBLY

CHEVROLET & PONTIAC LINKAGE TYPE POWER STEERING

Ch vr l t Pass. Cars (1963)
Ch vy II (1963)
P ntiac T mp st (1963)

DESCRIPTION

Linkage type with power cylinder mounted between steering relay rod and bracket on frame side rail. Control valve assembly is mounted on left side relay rod and is operated by pitman arm acting on spool valve assembly. The control valve assembly is adjustable to provide greater uniformity of operation and faster response. Power steering pump is mounted on engine and is driven by a belt from crankshaft pulley.

ADJUSTMENT

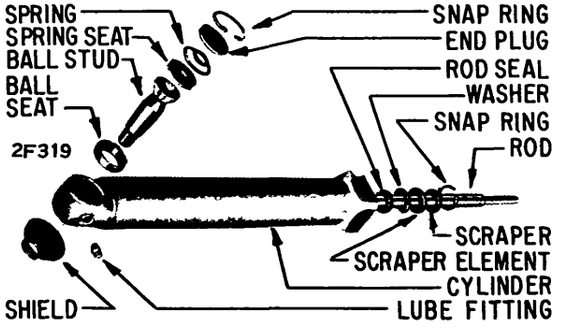
Pump Belt

See "B lt Adjustm nt" on individual car model pages.

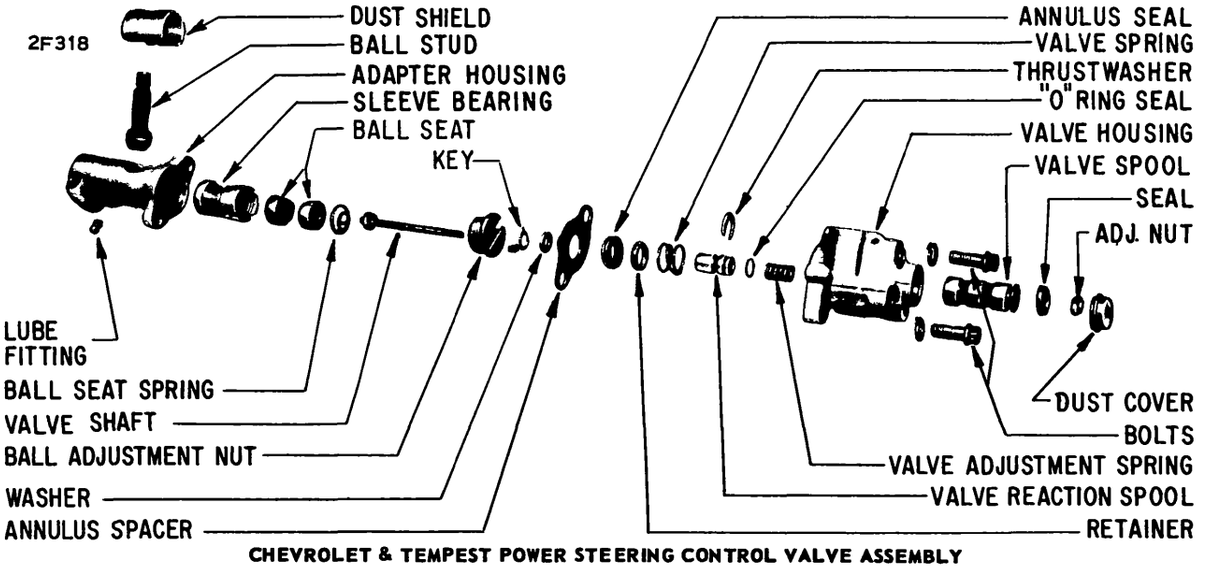
Control Valve Balancing

NOTE - If a hard steering effort is required (in one directi n), balance contr l valve as follows:

Balancing - With car on a hoist, engine running, and power cylinder rod disconnected from car frame bracket, piston rod will be either fully retracted or fully extended (if control valve is out of balance). If piston remains retracted, turn adjusting nut clockwise until piston rod begins to move outward, then turn nut counterclockwise until nut begins to move in. Now turn nut to exactly one-half the rotation needed to change direction of piston rod movement. If rod remains extended, reverse the procedure. *CAUTION - Do not turn nut back and forth more than is abs lutely necessary to balance valv .* With valve properly balanced, it should be possible to move rod in and out manually. Stop engine and connect cylinder rod to frame bracket, then restart engine. If front wheels (still on hoist) do not turn in either direction from center, the valve is properly balanced. Install dust cap.



POWER CYLINDER ASSEMBLY



CHEVROLET & TEMPEST POWER STEERING CONTROL VALVE ASSEMBLY

LUBRICATION

Checking Fluid Level

With oil at normal operating temperature, check fluid level on dipstick. Fill to indicated level with Automatic Transmission Fluid.

Bleeding Hydraulic System

Fill reservoir to proper level and let oil remain undisturbed for at least two minutes, then start engine and run at idle speed for two minutes. Add oil if necessary, then raise front of car so wheels are off ground. Increase engine speed to 1500 RPM (Chevrolet); 1000 RPM (Pontiac), and turn wheels to full right and full left, contacting stops lightly. Lower car and turn wheels right and left on ground. Check oil level and refill as necessary. Continue this procedure as long as

TESTING

Fluid Pressure

Install a suitable pressure gauge (Tool J-5176) between pump and pressure line at pump. With gauge valve open and engine at idle speed, turn wheels against stops a few times to bring power steering fluid to 150-170°F. With wheels against stops, pressure should not be less than that specified in table below. If pressure is less, slowly close valve and check for pressure increase. Pressure will increase if pump is in good condition. If pressure does not increase with valve closed, pump is faulty. *CAUTION - Do not hold gauge valve closed for more than 15 seconds.* After removing gauge, bleed hydraulic system.

Fluid Pressure Specifications

Car Model	ℂ Pump Pressur
Chevrolet Pass. Cars	870-1000 lbs.
Chevy II	870-1000 lbs.
Pontiac Tempest	ℭ 775 lbs.

ℂ - Engine at idle speed and hydraulic fluid at 150-170°F.
ℭ - Minimum pressure.

REMOVAL, INSTALLATION & OVERHAUL

See 1960 Final Data, Page 398, or later Manual edition.

POWER STEERING PUMP

Saginaw Vane Type (Integral Reservoir) - *See 1961 Final Data, Page 390, or later Manual edition.*

FORD TRUCK LINKAGE TYPE POWER STEERING

Ford Trucks, Except Tilt Cab Models (1963)①
Ford Trucks, Tilt Cab Models (1963)②

① - Power cylinder used.
② - Booster (rack & piston) cylinder used.

►CHANGES, CAUTIONS, CORRECTIONS

►*EXCESSIVE STEERING EFFORT AT LOW TEMPERATURE CORRECTION ("C" SERIES TRUCKS):* Disconnect pitman arm from steering drag link and reduce the mesh preload to zero (*see "Gemmer Worm & Roller" manual steering gear*). Measure worm preload at steering wheel with a suitable scale and then adjust mesh preload to a scale reading of 2 25-4 50 lbs above worm preload. Check pitman arm to make sure there is no lash.

Description

Linkage type with control valve assembly connected directly to steering gear pitman arm. On Tilt Cab Models, the operating cylinder is a "rack & piston" booster type cylinder connected between pitman arm and wheel spindle. On the other models, the hydraulic power cylinder is anchored to left side of front axle with the piston rod connected to center of spindle connecting rod. The only basic differences between the two units is in the construction of the operating cylinders.

Lubrication

Check fluid level in reservoir every 4,000 miles (On highway); 500 miles (Off highway). Fluid should be at "F" mark on dipstick or within 1" of top of reservoir. Check fluid at normal operating temperature. Use only Automatic Transmission Fluid Type "A" (Suffix "A").

Bleeding System

With fluid at normal operating temperature and engine idling at 1000 RPM, turn steering wheel to full right and left several times.

ADJUSTMENT

Pump Belt

Belt deflection should be ¼" midway between pulleys. Tighten belt adjusting bolt to 30-35 ft. lbs.

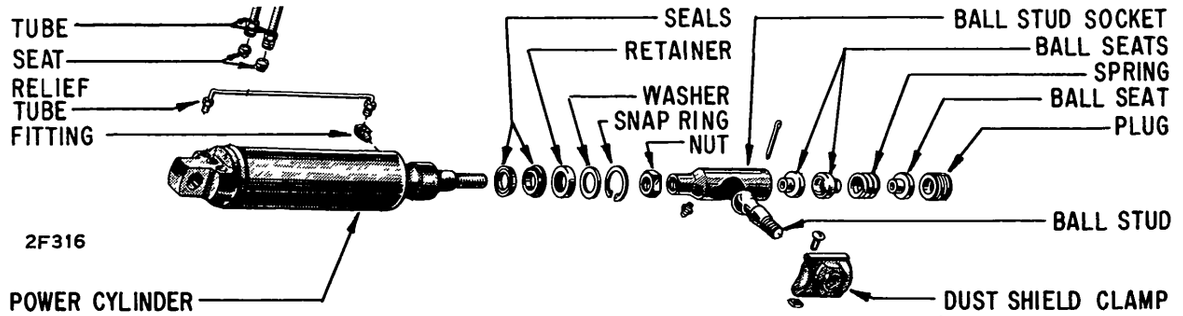
TESTING

Turning Effort

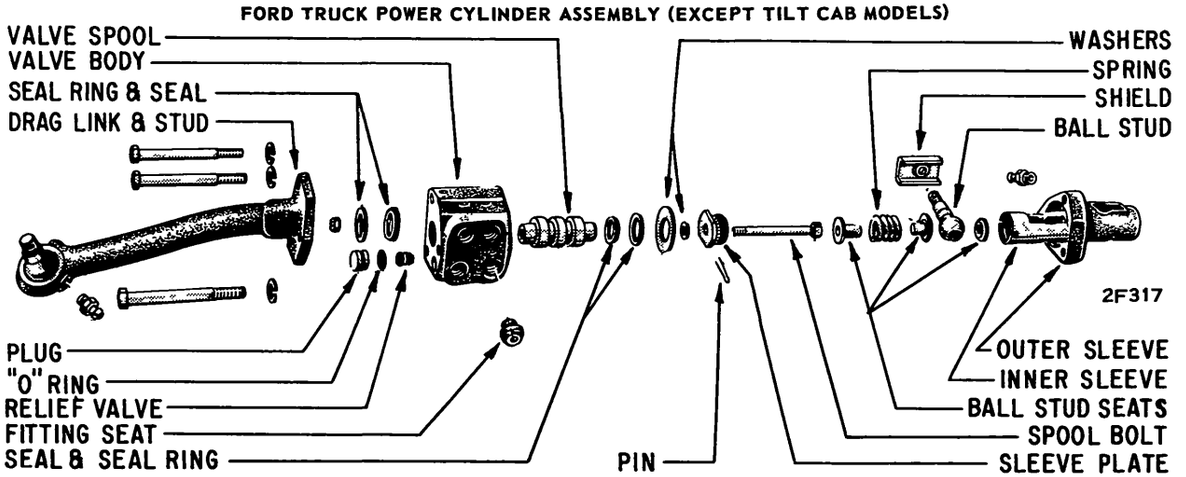
With front wheels properly aligned and tire pressure correct, set brakes, then proceed as follows: Bring fluid to normal operating temperature by turning wheels to right and left several times. Hook a spring scale to rim of steering wheel and measure pull required to turn wheel at least one complete turn in both directions. Pull should be 35-65 lbs. depending on size of truck.

Pump Pr ssure

Install a suitable pressure gauge between pump hose and pump outlet with gauge between pump and shut-off valve. Run engine at idle speed (with shut-off valve open) for two minutes to normalize oil temperature. With wheels in straight ahead position, pressure should be no higher than 700 lbs. with engine at 900 RPM. If pressure is higher, check for faulty pump or control valve. Increase engine speed to 3000 RPM and slowly close shut-off valve of gauge. Pressure should be about 1150 lbs. when shut-off valve is fully closed. *NOTE - Do not leave shut-off valve closed for more than 15 seconds.* If the pressure is less, then the pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and power steering is not satisfactory, trouble is in control valve or power cylinder.



FORD TRUCK POWER CYLINDER ASSEMBLY (EXCEPT TILT CAB MODELS)



FORD TRUCK POWER STEERING CONTROL VALVE ASSEMBLY (TILT CAB MODELS)

TROUBLE SHOOTING

See 1959 Final Data, Page 391, or later Manual edition.

REMOVAL & INSTALLATION

P wer Steering Pump

Remove as much fluid as possible through reservoir filler opening. Disconnect pressure hose from pump and return line from cooler and tie hoses to prevent fluid loss. *NOTE - It is easier on Tilt Cab models to disconnect hoses after pump is removed from mounting bracket.* Loosen adjusting bracket bolt and pivot bolt and remove pump belt. Remove pump attaching screws and remove pump and reservoir as an assembly. To install, reverse removal procedure.

Control Valve

Except Tilt Cab Models - Drain reservoir, disconnect hoses from control valve, then disconnect ball studs and piston mounting bolts. Remove control valve. To install, reverse removal procedure.

Tilt Cab Models - Remove hoses from valve, then disconnect studs from idler arm and sector shaft arm. Remove control valve and drag link. To install, reverse removal procedure.

OVERHAUL

See 1959 Final Data, Page 391, or later Manual dition.

POWER STEERING PUMP

Eat n R II r Typ - *See 1958 Final Data, Page 398, or later Manual edition.*

CHRYSLER CORP. CONSTANT CONTROL POWER STEERING

Chrysler & Imperial (1963)
Dodge & Dodge Dart (1963)
Plymouth (1963)
Valiant (1963)

Description

Design and operation are similar to previous models except for the addition of a new seal at outer end of sector shaft.

Lubrication

Check fluid level in reservoir every 6 months. Fluid level should be at bottom of filler neck when fluid is cold, and should be about half way up filler neck when fluid is hot. **Use Mopar Power Steering Fluid, Part No. 2084329.** DO NOT OVERFILL.

Bleeding System

All air can be expelled from unit by turning steering wheel several times from full right to full left and back again.

TESTING

Hydraulic Pressure

Disconnect steering gear pressure hose at pump and connect test hose C-3388 with proper adapters between pump and gauge C-3309-B with shut-off valve between gauge and steering gear. With engine idling at 500 RPM and oil at normal operating temperature (150°-170°F., checked with thermometer in reservoir), pressure should be less than 100 lbs. Increase engine speed to 1000 RPM and slowly close shut-off valve. Pump pressure should be as indicated in table below. *CAUTION - Do not hold valve closed for more than a few seconds.* If pressure is in excess of maximum, relief valve is faulty or pump has wrong relief valve. If pressure less than minimum, relief valve or pump is defective.

Power Steering Pump Pressure

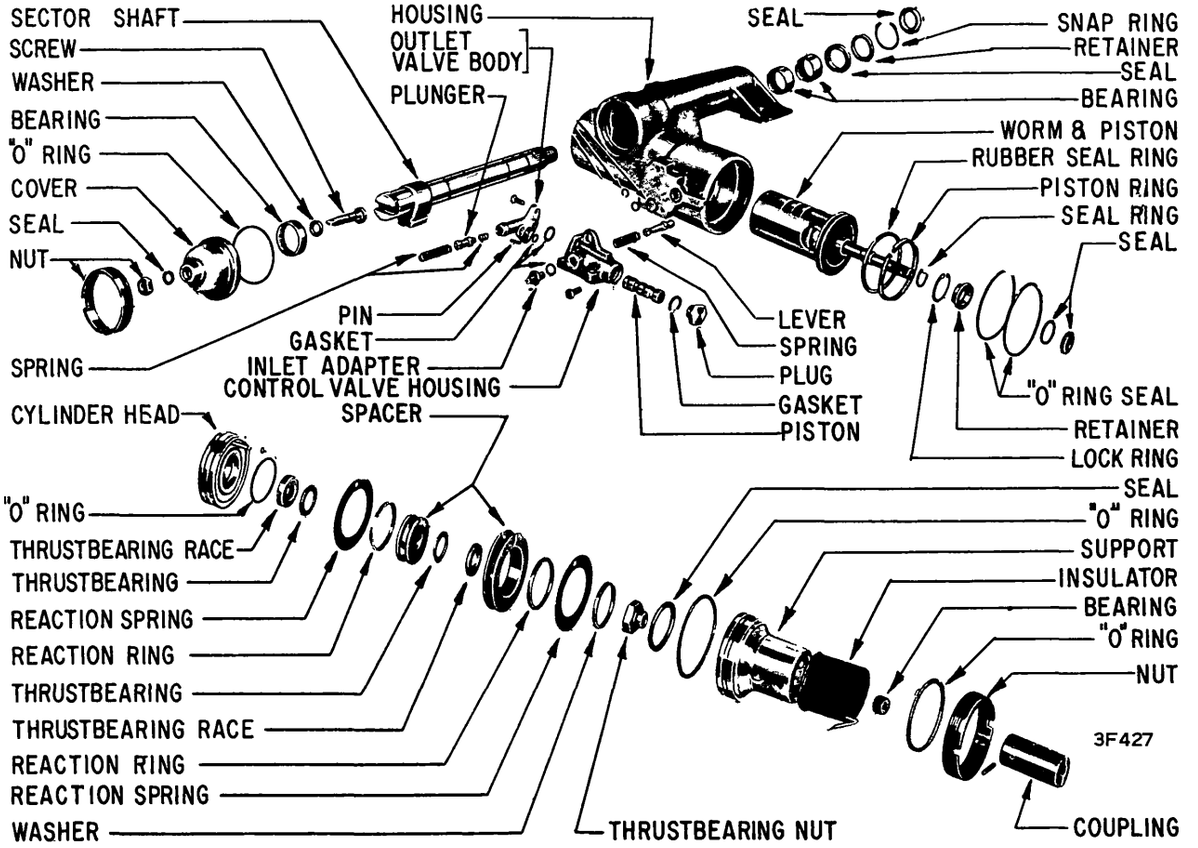
Car Model	Lbs. Pressure
Imperial	1150-1300
Chrysler & Dodge 880	1000-1100
Dodge Dart	650-750
Dodge & Plymouth	850-950
Valiant	650-750

ADJUSTMENT

Gear Shaft Preload

NOTE - This adjustment can be made with the steering gear installed in car.

1) With gear cross shaft in center position, loosen adjusting screw locknut ½ turn and tighten adjusting screw until backlash just disappears. Tighten adjusting screw 1¼ turns from this position and while holding adjusting screw, tighten the locknut. *NOTE - This is a temporary adjustment to insure that piston rack and teeth on sector are in full alignment.* Operate steering gear manually for a minimum of 180° from center in each direction (measured at worm shaft).



CHRYSLER CORP. "CONSTANT CONTROL" POWER STEERING (TYPICAL)

2) Start engine and run at idle speed, then with hydraulic power to steering gear unit and with gear shaft on center (±2°), readjust gear shaft backlash as follows: Loosen locknut and back off adjusting screw until backlash is evident, then retighten adjusting screw until backlash just disappears. Continue to tighten 3/8 to 1/2 turn from this position and tighten the locknut to 50 ft. lbs. while retaining the setting.

Control Valve

NOTE - This adjustment is made with steering gear assembly on the bench (connected to power steering pump and car with suitable hoses). Bleed system and fill reservoir.

1) With gear shaft properly adjusted (see above), turn worm shaft at least one full turn off center, then measure the torque required to turn worm shaft through center position at approximately 2 RPM. This torque should not exceed 25 ft. lbs. in either direction or vary more than 5 ft. lbs. from right to left.

2) To adjust torque, slightly loosen valve body attaching screws and gently tap on back pressure valve body attaching screws to move valve body up on steering housing or tap on end of plug to move valve body down on housing. *NOTE - If torque is greater to the right, move control valve body DOWN. If torque is greater to the left, move valve body UP.* After adjusting, tighten valve body attaching screws to 15 ft. lbs.

Check For Binding

1) After overhaul, with steering gear unit off car, place unit near the full turn position in either direction, then install a torque wrench on steering gear cross shaft. Hold steering gear worm shaft and turn cross shaft with torque wrench until 50 ft. lbs. torque is obtained. Release worm shaft and maintain a constant steady pull on cross shaft (turning cross shaft slowly). If the torque does not drop to 25 ft. lbs. maximum as the piston passes through center position, check for excessive internal drag, binding valve lever, binding valve spool, or cross shaft adjustment too tight.

2) With unit under power, but no load, the torque required to rotate worm shaft through an included angle of 180° (90° either side of center) should be 6-9 inch pounds.

Pump Belt

See individual car model pages for complete details.

(Continued)

CHRYSLER CORP. CONSTANT CONTROL POWER STEERING (Cont.)

TROUBLE SHOOTING

See 1958 Final Data, Page 387, or later Manual edition.

REMOVAL & INSTALLATION

Steering Wheel & Horn Button

See separate "Steering Wheel, Horn Button & Direction Signal Removal" in this section.

Steering Gear

Chrysler, Imperial & Dodge 880 - Remove steering wheel (see above), direction switch and column cover. Remove direction signal switch and wiring from steering shaft. Remove retainer snap ring from groove in steering tube at top of bearing with Tool C-3229. Remove jacket tube shield for access to column tube clamp and remove screw attaching steering jacket tube clamp at instrument panel and remove clamp. Raise carpet and move rubber grommet up on jacket column, then remove screws attaching rubber dust boot to firewall. On Imperial, remove floor inspection panel. Loosen jacket tube clamp at steering gear housing. Remove cotter key and nut at drag link and disconnect link from steering arm, then remove steering arm nut and washer at steering gear shaft. Slide Tool C-3646 up on steering arm and place shoe of puller behind steering arm and pull steering arm from gear shaft. *CAUTION - Do not remove steering arm by prying with a lever or striking with a hammer.* Disconnect hydraulic brake line at master cylinder and brake tee and remove line, then disconnect pressure and return hoses at steering gear (fasten ends of hoses above reservoir oil level and cap all openings). Slide jacket tube up and off steering gear through driver's compartment, then remove jacket tube upper spring and retainer. Remove steering shaft coupling pin, two plastic inserts, horn ground strap, rubber insulator and upper steering tube. Remove gear housing-to-frame bolts, washers, and alignment wedge. Slide steering gear upwards and toward rear of car and at the same time raise lower end of gear and remove gear from engine compartment (Chrysler), from driver's compartment (Imperial).

Installation - Reverse removal procedures and note the following: Make sure there is at least 1/16" clearance between bottom face of jacket tube clamp and column support spanner nut. With steering gear completely installed (gear assembly-to-frame bolts not tightened), tighten front upper and lower gear housing-to-frame attaching bolts to 20 ft. lbs. Install wedge over rear bolt between housing and frame so that tapered surfaces match, tapping it lightly into place, then tighten all three gear attaching bolts to 50 ft. lbs.

Dodge & Dodge Dart - Remove pitman arm with a suitable puller, then disconnect hydraulic lines from steering gear valve (cap all openings). Remove bolts attaching steering gear to frame, then remove the bolt coupling clamp at upper end of steering worm shaft. Support steering gear and tap coupling assembly upward with a mallet until it is free of worm shaft splines, then lift gear assembly through engine compartment (6 Cyl.); from underneath car (V8 Eng.). *NOTE - On 318" Eng. models it is necessary to remove starter motor.*

Installation - Reverse removal procedure and note the following: Place steering wheel for straight ahead position and steering gear in the center "high" spot. Tighten steering gear attaching bolts to 50 ft. lbs. Tighten pitman arm nut to 150 ft. lbs.

Plymouth & Valiant - Disconnect ground cable from battery, then remove steering column coupling to worm shaft clamp bolt. Loosen jacket tube clamp screw at instrument panel, then tap coupling assembly upward and lift steering column end jacket assembly up and off end of worm shaft. *NOTE - Tie jacket tube to protect it against damage during steering gear removal.* Disconnect hydraulic hoses from steering gear valve (cap all openings), then raise car and remove pitman arm from cross shaft using a suitable puller. Remove steering gear attaching bolts and remove steering gear through engine compartment (6 Cyl.); from underneath car (V8 Eng.). *NOTE - On 318" Eng. models it is necessary to remov starter motor.*

Installation - Reverse removal procedure and note the following: Place steering wheel for straight ahead position and steering gear in the center "high" spot. Tighten steering gear attaching bolts to 50 ft. lbs, and coupling clamp bolt to 30 ft. lbs. *NOTE - Position steering jacket assembly so st ering shaft is centered at midpoint of up and down travel (a 3/16" gauge hole is provided in steering column shaft). When the dimension from top of coupling to centerline of gauge hole is 13/16", the coupling is centered in its travel.* Tighten pitman arm nut to 150 ft. lbs.

OVERHAUL

See 1958 Final Data, Page 387, or later Manual edition and note the following:

Power Train

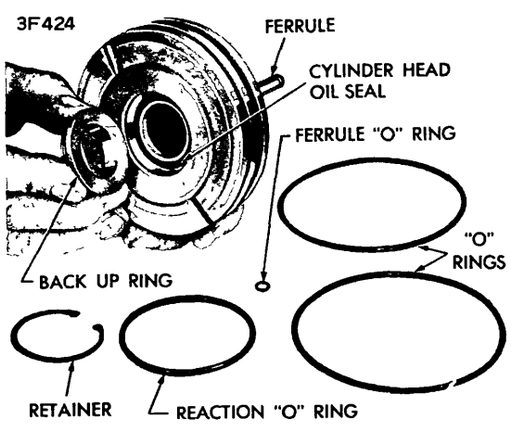
Reassembly - *NOTE - Discard all "O" rings and s als, using new ones lubricated with petrolatum wh n reassembling.*

1) If power piston ring was removed, slide a new piston ring into place in piston groove, then place piston and ring assembly in Tool C-3676 with lower part of piston and ring resting on land of tool .Press down on piston to bottom ring in groove, forcing open ends of ring out for ease in locking ring. Ring should be positioned with ring hooks in line with ball guide.

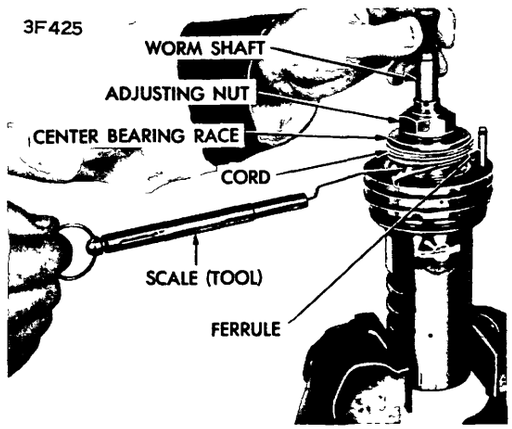
2) Place piston assembly in a vertical position (worm shaft upward) in a soft jawed vise. Inspect oil passages in ferrule of cylinder head for obstruction and the lands for burrs, then install "O" rings in grooves on cylinder head. Install cylinder head oil seal, back-up ring and retainer, making sure retainer is seated in groove. Install lower reaction seal in cylinder head groove. *NOTE - The small "O" ring for ferrule groove should be installed after worm shaft b aring preload has been established; otherwise, the ring will be damaged by reaction springs and center bearing spacer.*

3) Slide cylinder head assembly (ferrule up) on worm shaft and test worm shaft seal ring to make sure gap is

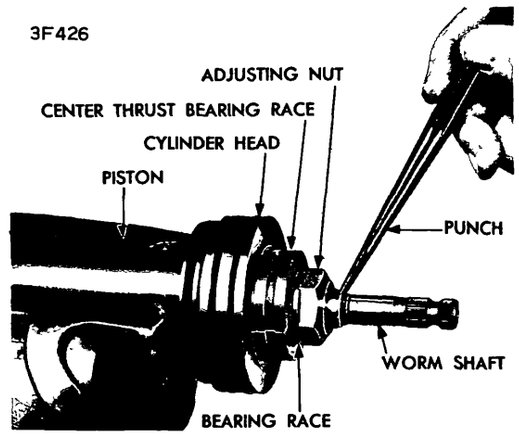
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CYLINDER HEAD OIL SEALS



MEASURING CENTER BEARING PRELOAD



STAKING ADJUSTING NUT

CHRYSLER CORP. CONSTANT CONTROL POWER STEERING (Cont.)

closed to avoid damaging the ring as cylinder head moves against piston flange Lubricate with steering gear fluid and install lower thrust bearing race (thick), lower thrust bearing, lower reaction spring (with small hole over ferrule), lower reaction ring (flange up so ring protrudes through reaction spring and contacts reaction "O" ring in cylinder head), center bearing race, upper thrust bearing, upper thrust bearing race (thin) Start thrust bearing adjusting nut

4) Turn worm shaft counterclockwise one-half turn and hold in this position with splined nut (Tool C-3637) and socket wrench, then tighten the adjusting nut to 50 ft lbs to prestretch worm shaft threads *NOTE - If worm shaft is turned more than one half turn, cylinder head oil seal retainer will clear oil seal on the worm shaft Always position the worm shaft oil seal ring before bottoming the cylinder head against piston top flange to avoid damaging the oil seal*

5) Loosen adjusting nut and place several rounds of cord around center bearing race Make a loop in one end of cord and hook loop to a distributor breaker arm spring scale Retighten worm bearing adjusting nut while pulling on distributor scale to rotate bearing race If adjusting nut is tightened properly, the reading on scale should be 8-16 ounces (12 ounces preferred while turning) Stake upper part of worm shaft adjusting nut into knurled edge of shaft *NOTE - Place a support under the adjusting nut when staking nut* Hold a ¼" flat end punch on center line of worm shaft end at a slight angle to nut flange and strike punch a sharp blow with a hammer, then recheck bearing preload *NOTE - If adjusting nut moved during staking, correct by striking nut a glancing blow in direction required to regain proper preload*

6) After rechecking for proper preload, stake the nut at three more locations 90° apart around upper part of nut To test total staking tighten nut to 20 ft lbs in either direction If nut does not move, staking is satisfactory Recheck preload adjustment to make sure adjustment has not changed

7) Position center bearing spacer assembly over center bearing race, engaging dowel pin on center bearing spacer in slot in race and slot in center spacer entered over the cylinder head ferrule *NOTE - This will align valve pivot lever hole in center bearing race with valve pivot lever hole in center bearing spacer assembly* Install upper reaction pressure spring over reaction ring with cylinder head ferrule through hole in reaction spring Install worm balancing ring (without flange) inside upper reaction ring Lubricate ferrule "O" ring with petrolatum and install it in groove on cylinder ferrule

8) If oil seal was removed from worm shaft support, install a new seal with Tool C-3650, driving seal in (lip upward) until tool bottoms on support Lubricate and install reaction seal ring in groove in face of worm shaft support with flat side of seal out, then install "O" ring in groove on support Slide worm shaft support and arbor, Tool C-3929 over worm shaft, carefully engaging cylinder head ferrule and "O" ring, making sure reaction rings enter circular groove in support With support properly positioned, remove tool arbor Align parts on power train so valve pivot lever hole in center of bearing spacer assembly is 90° counterclockwise from piston rack teeth Complete the reassembly of steering gear as indicated in 1958 Final Data, or later Manual edition

Tightening Specifications

Steering Valve End Plug - 25 ft lbs
Valve Body Attaching Bolts - 10-15 ft lbs

POWER STEERING PUMP

Chrysler, Dodge, Plymouth, Valiant "Slipper" Type - *See 1960 Final Data, Page 403, or later Manual edition*

SAGINAW ROTARY VALVE POWER STEERING

Buick (1963)
Buick Special (1963)
Cadillac (1963)
Chevrolet Truck (1963)
Oldsmobile (1963)
Oldsmobile F-85 (1963)
Pontiac (Exc. T mpest) (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK (EXC SPECIAL) STEERING GEAR NOISE ON A TURN CORRECTION* This noise, which sounds like a dry or defective idler arm or ball stud, may be caused by the steering gear housing contacting the car frame If lower end of housing is contacting frame side rail, install a 15/32" I D x 1 1/8" O D x 1/8" thick flat washer between gear housing and frame at each of the three attaching bolt locations Tighten attaching bolts to 70 ft lbs

►*1963 CADILLAC POWER STEERING PUMP MOAN CORRECTION* On early cars (before Eng No 137944), a moaning noise in the pump which is noticeable at approximately 900 RPM or 20-25 MPH, can be corrected by installing a new type pressure hose, Part No 5692602 Later cars have the new hose installed during production

Description

All M d ls (Exc. Ch v. Truck) - Same design as previous models.

Ch vr l t Truck - The control valve assembly of this linkage type power steering unit is located directly on the steering gear and is similar to the control valve assembly used on cars with "integral" type power steering Service procedures for control valve are the same as for other models For steering gear overhaul procedures *see "Saginaw Ball Bearing Worm & Nut" on Page 397, 1962 Final*

Lubrication

Check fluid level in power steering pump reservoir every 1000 miles (Chevrolet Truck), every spring and fall (Cadillac), every 6000 miles (Buick, Oldsmobile & Pontiac) Steering gear and fluid must be at normal operating temperature If necessary, add automatic transmission fluid to bring level to proper mark on reservoir filler neck If steering gear and fluid are cold, bring fluid level to lower end of filler neck *NOTE - On Chevrolet trucks, also check lubricant level in gear box and add "Multi-Purpose" lubricant as necessary*

CHECKING & ADJUSTMENT (ON CAR)

Pump Belt

See individual car model pages for power steering pump belt adjustment procedure

STEERING GEAR ADJUSTMENT NOTE - Disconnect pitman arm at intermediate arm or drag link (Buick Special, Cadillac, Oldsmobile F-85 & Pontiac) Remove pitman arm from shaft (Buick, Exc Special, Oldsmobile, Exc F-85), then proceed as follows

Buick & Buick Special

NOTE - Thrust bearing preload and ball nut preload can be adjusted only with steering gear removed from car

Thrust Bearing Preload (Checking) - Turn steering wheel to full right or left position, then attach an inch pound torque wrench to steering wheel retaining nut The torque required to turn wheel steadily for 1/8 turn of steering wheel from either full right or full left position should be 2 11 inch pounds (this is the combined preload at thrust bearing and drag at the valve assembly) *NOTE - Torqu wrench reading should be close to minimum specificati n on a gear that has been in use On a new gear, the reading will be higher*

Adjustment (With Gear Out of Car) - Loosen adjuster plug locknut and back off adjuster plug approximately 1/8 turn Install an inch pound torque wrench on stub shaft and turn shaft to 1/2 turn from either full right or full left position Slowly rotate wrench in an arc 60° in both directions several times and record highest reading (this is valve drag) Tighten adjuster plug until thrust b-aring preload is 1-3 inch pounds greater than valve drag reading Total valve drag and thrust bearing preload should not exceed 11 inch pounds

Worm & Ball Preload (Checking) - Turn steering wheel ½-¾ turn off "high point" (center position of gear) *NOTE - It is not necessary to back off pitman shaft lash adjuster to check ball preload when gear is positioned as indicated* Check torque required to turn wheel This reading should be 1-5 inch pounds higher than reading obtained for "Thrust Bearing Preload" above If this reading is not within specifications it will be necessary to remove and disassemble the gear and install larger or small balls in rack *See "Overhaul" below.*

Pitman Shaft Endplay (Checking & Adjustment) - Turn steering wheel through "high point" (center position of gear) The reading should be 4-8 inch pounds higher than reading obtained for "Worm & Ball Preload" above To adjust, loosen lash adjuster locknut and turn lash adjuster as necessary

Cadillac

NOTE - Thrust bearing preload and pitman shaft endplay adjustm nts can b made with st ring g ar installed in car

Thrust B aring Pr l ad (Ch cking) - Attach a spring scale to rim of steering wheel and pull at right angle to

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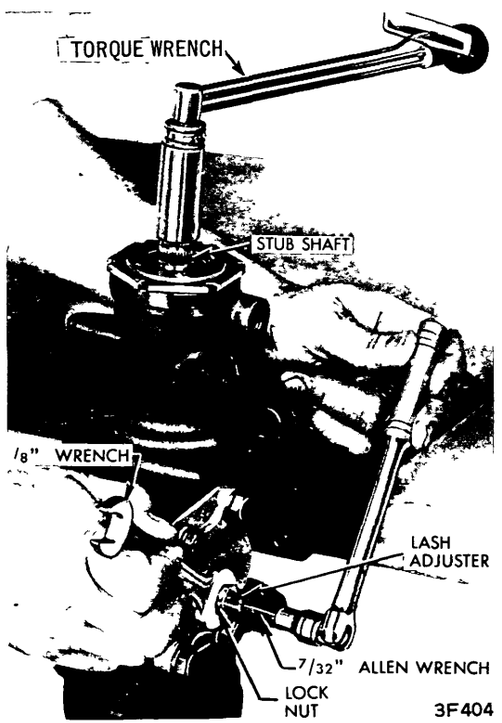
SAGINAW ROTARY VALVE POWER STEERING (C nt.)

wheel with steering gear two turns off the "high point" (center position of gear). The force required to pull wheel through an arc not exceeding 1" should be 4-12 ounces.

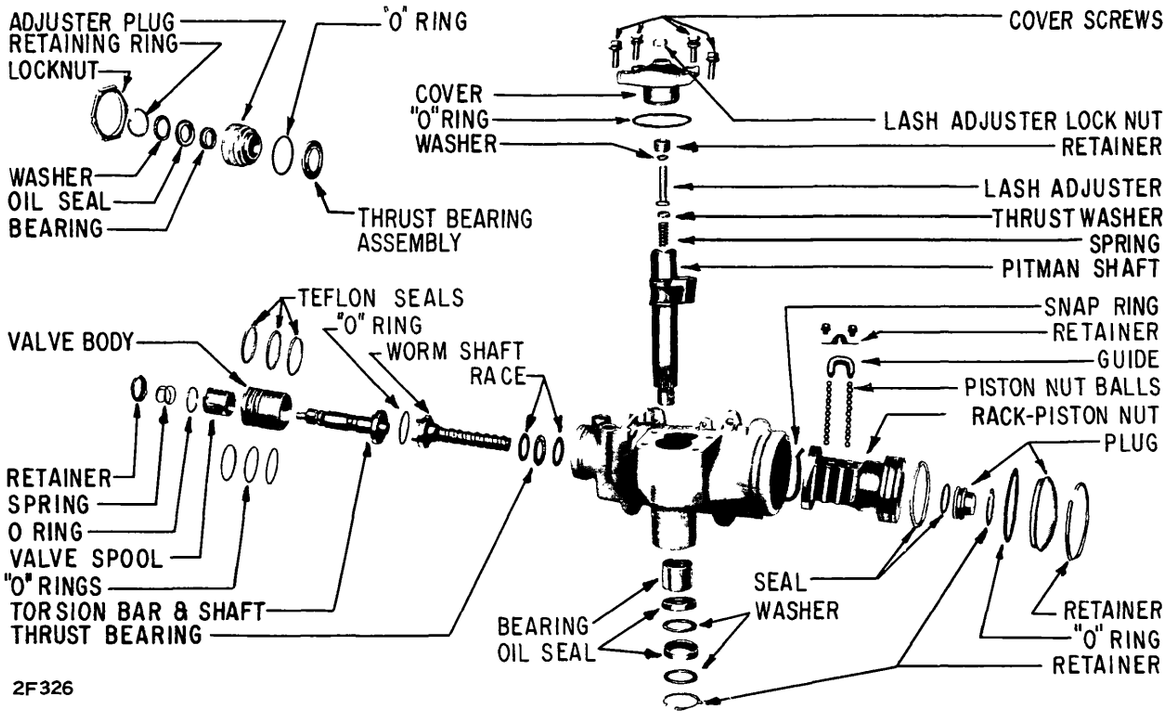
Adjustment - Back out adjuster plug 1/8 turn and recheck (record this reading). Tighten adjuster plug to obtain 2-6 ounces greater scale reading than that obtained with adjuster plug backed out and tighten locknut.

Worm & Ball Preload (Checking) - Turn steering wheel 1/2 turn off center position and measure pull required to move steering wheel at this position. This reading should be 2-8 ounces greater than that obtained for "Thrust Bearing Preload". If preload is incorrect it will be necessary to disassemble steering gear and replace worm shaft balls. See "Overhaul" below.

Pitman Shaft Endplay (Checking & Adjustment) - With wheel "on center", measure pull required to turn wheel through an arc not exceeding 3". This reading should be 8-20 ounces greater than that obtained for "Worm & Ball Preload", but should not exceed 36 ounces total scale reading. *NOTE - On new steering gears the total pull may be as high as 40 ounces, however, after approximately 100 miles of operation, seating of seals and ball bearings will bring the gear within specifications.* To adjust, loosen locknut and turn adjusting screw to obtain an "on center" preload of 16-18 ounces greater than that obtained for "Worm & Ball Preload" but still not more than 36 ounces total scale reading.



PITMAN SHAFT ENDPLAY ADJUSTMENT



SAGINAW ROTARY VALVE POWER STEERING GEAR ASSEMBLY (EXPLODED)

Chevrolet Truck

NOTE - The following adjustments are to be made with steering gear off vehicle.

Thrust Bearing Preload (Checking & Adjustment) - Install an inch pound torque wrench on stub shaft, then loosen adjuster plug slightly and check torque required to turn shaft from either full right or full left position and record this reading (valve assembly drag). Tighten adjuster plug to obtain a reading of 1-3 inch pounds greater than that obtained with adjuster plug slightly loose.

Pitman Shaft Endplay (Checking & Adjustment) - With steering gear on "high point" (center position of gear), rotate shaft through an arc of 20° and adjust lash adjuster screw to obtain a torque reading of 4-8 inch pounds greater than that obtained for "Thrust Bearing Preload" (total of valve assembly drag and bearing preload). *NOTE - The total reading with all adjustments completed, should not exceed 16 inch pounds.*

Oldsmobile & Olds F-85

NOTE - Pitman shaft endplay is the only adjustment that can be made with steering gear installed on car.

Pitman Shaft Endplay (Checking & Adjustment) - Install an inch pound torque wrench on steering gear nut, then loosen pitman shaft adjusting screw locknut and turn adjusting screw out to the limit of its travel. With steering gear on "high point" (center position of gear), check the combined thrust bearing and ball preload by turning steering shaft through the center of travel and record the highest reading. Tighten pitman shaft adjusting screw until the torque wrench reading is 4-8 inch pounds (Exc. F-85); 3-6 inch pounds (F-85) higher than the previous reading on steering shaft *NOTE* - The total over-center preload should not exceed 16 inch pounds (Exc. F-85); 14 inch pounds (F-85). Hold pitman shaft adjusting screw and tighten the locknut. Recheck the adjustment

Thrust Bearing Preload and Worm and Ball Nut Preload (Checking & Adjustment) - See "Overhaul" below.

Pontiac

NOTE - Thrust bearing preload and pitman shaft endplay adjustments can be made with steering gear installed in car.

Thrust Bearing Preload (Ch cking) - With an inch pound torque wrench installed on steering wheel retaining nut and steering wheel turned one full turn off "high point" (center position of gear), check the torque required to turn wheel to right and to left. Total both readings and take one-half of this total as average torque. If torque is not within limits of 3-5 inch pounds, adjust as follows:

Adjustment - Loosen adjuster plug locknut and turn adjuster plug to obtain correct adjustment.

(Continued)

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

W rm & Ball Pr load (Checking) - Turn steering wheel 1/2 turn oft center position and measure torque required to move steering wheel This torque should be 1/2-5 inch pounds greater than that obtained for "Thrust Bearing Preload" above If preload is incorrect it will be necessary to disassemble steering gear and replace worm shaft balls See "Overhaul" below

Pitman Shaft Endplay (Checking & Adjusting) - With wheel on 'high point" (center position of gear), check torque required to move steering wheel through a slight arc This reading should be 4-8 inch pounds greater than that obtained for "Worm & Ball Preload" but should not exceed 18 inch pounds To adjust, loosen pitman shaft gear lash adjuster locknut and use a 7/32 Allen wrench to turn adjuster Tighten locknut to 20-30 ft lbs *NOTE - The final adjustment should be made in a clockwise or downward direction*

TESTING

Pump Pressure

Install a suitable pressure gauge between pump and pressure line at pump, then with gauge valve open and engine at idle speed, turn wheels against stops to bring fluid to operating temperature With wheels against stops, pressure should not be less than specified in table below If pressure is below specifications, slowly close valve and check for pressure increase Pressure will increase if pump is in good condition If pressure does not increase with valve closed, pump is faulty *CAUTION - Do not hold gauge valve closed for more than 15 seconds* After removing gauge, bleed hydraulic system

Pump Pressure Specifications

Car Model	Minimum Pump Pressure
Buick	1000 lbs
Buick Special	750 lbs
Cadillac	1100 lbs
Chevrolet Trucks	950 lbs
Oldsmobile (Exc F-85)	1100 lbs
Oldsmobile F-85	800 lbs
Pontiac	900 lbs

Bleeding Hydraulic System

Fill reservoir to proper level and let oil remain undisturbed for at least two minutes, then run engine at idle speed for a very short time and add necessary oil to maintain proper level in reservoir Raise front wheels off floor, increase engine speed to approximately 1500 RPM and turn wheels to full right and left, contacting stops lightly Lower car to floor and turn wheels right and left Check oil level and refill as necessary Continue this procedure as long as necessary to bleed all air from system

TROUBLE SHOOTING

See 1959 Final Data, Page 379, or later Manual edition for trouble shooting procedures

REMOVAL & INSTALLATION

St ering Whe i & Horn Button

See separate "Steering Wheel, Horn Button & Directional Signal Removal" in this section

Steering Gear

Buick (Exc. Sp cial) - Removal - Disconnect hydraulic lines from steering gear and elevate ends higher than pump reservoir Remove lower coupling flange pinch bolts, then remove pitman arm from steering shaft Remove steering gear attaching bolts and remove steering gear

Installation - Reverse removal procedure and tighten steering gear attaching bolts to 70 ft lbs , coupling pinch bolt to 20-35 ft lbs and pitman arm nut to 100 ft lbs

Buick Special - Removal - *NOTE - Pitman arm cannot be removed or installed with steering gear installed on crossmember If pitman arm is to be removed from gear, loosen pitman arm nut before disconnecting gear from crossmember When installing pitman arm, do not tighten nut until gear is installed on crossmember* Remove lower coupling clamp bolt, then loosen clamp retaining mast jacket to floor pan cover and 'U" bolt retaining jacket to instrument panel Pull mast jacket assembly up far enough so lower coupling can be removed from worm shaft Raise car and disconnect pitman arm from intermediate shaft, then loosen pitman arm nut (Tool J-8987) Remove steering gear-to-crossmember attaching bolts and remove gear assembly from car *NOTE - Do not remove pitman arm nut or pitman arm unless pitman shaft assembly or seal is to be replaced*

Installation - Reverse removal procedure and note the following Tighten gear-to-crossmember bolts to 55 ft lbs and pitman arm nut to 165 ft lbs Tighten ball stud nut to 45 ft lbs and tighten to nearest slot then install cotter pin Tighten coupling pinch bolt to 30 ft lbs and make sure there is at least 1/16" clearance between coupling and adjuster plug *NOTE - Mast jacket must be positioned so that lower coupling pins are extending through steering shaft flange 1/16-1/8"*

Cadillac - Removal - Disconnect hoses at pump and cap all openings Raise car and disconnect pitman arm from shaft using a suitable puller (Tool J-9172) Remove screw holding flexible coupling to upper steering shaft, then remove steering gear-to-frame side rail and remove gear assembly from car

Installation - Reverse removal procedure and tighten steering gear attaching bolts to 45 ft lbs , coupling screw to 30 ft lbs , and pitman arm nut to 115 ft lbs

Chevrolet Truck - Removal - Disconnect steering shaft from lower coupling, then remove hoses from valve Remove pitman arm, using a suitable puller, and remove steering gear from frame side rail

Installation - Reverse removal procedure

Oldsmobile (Exc. F-85) - Removal - Remove coupling flange hub bolt, then disconnect hoses from pump and cap all openings Raise car and remove pitman arm from shaft using a suitable puller (Tool J-5504-B) Remove steering gear-to-frame attaching bolts, then permit lower shaft to slide free of coupling flange and remove the gear with hoses attached

Installation - Reverse removal procedure and note the following Before installing gear, coat gear mounting pads with fibre grease and make sure alignment pin enters hole in frame side rail as gear is installed Tighten coupling flange bolt to 20-25 ft lbs , making sure there is 040" clearance between coupling hub and steering gear upper seal Tighten steering gear-to-frame bolts to 60-80 ft lbs and pitman shaft nut to 90-120 ft lbs

Oldsmobile F-85 - R moval - Remove coupling flange attaching nuts and lockwashers, then disconnect hoses from pump and gear and cap all openings Disconnect horn wire from harness and remove steering wheel *(see separate "Steering Wheel, Horn Button & Directional Signal Removal" in this section)* Pull horn contact plate up out of recess in actuator assembly enough to provide clearance for removal of upper bearing-to-actuator retaining clip Use a small screwdriver and pry clip out of actuator housing, then pull steering shaft up out of steering column and block the shaft up about 2" Raise car and disconnect pitman arm from relay rod, then remove steering gear-to-front suspension crossmember and remove steering gear

Installation - Reverse removal procedure and note the following Coat steering gear mounting pads with fibre lubricant and tighten attaching nuts to 45-60 ft lbs Tighten pitman arm nut to 150-180 ft lbs

Pontiac - Removal - Disconnect pressure and return hoses from housing, then disconnect pitman arm from shaft using a suitable puller (Tool J-5504) Scribe a mark on steering shaft worm and worm shaft flange and disconnect gear lower flange from steering shaft Remove gear housing-to-frame bolts noting number and location of gear-to-frame shims (if any), and remove steering gear

Installation - Reverse removal procedure and note the following Install any shims that were removed in their original positions between housing and frame Tighten gear-to frame bolts to 70-90 ft lbs , and pitman shaft nut to 110-140 ft lbs Tighten flange attaching bolts to 10-20 ft lbs

OVERHAUL

See 1959 Final Data, Page 379, or later Manual edition and note the following.

Adjuster Plug

Removal - Loosen and remove adjuster plug locknut, then remove adjuster plug with a suitable spanner wrench (Tool J-7624)

Disassembly - Remove thrust bearing retainer with screwdriver, being careful not to score needle bearing bore, and discard retainer Remove thrust bearing spacer, thrust bearing, and thrust bearing races Remove adjuster plug "O" ring and discard, then stud shaft seal retaining snap ring On Chevrolet Truck, remove seal back-up washer On other cars, remove and discard dust shield On all models, remove stub shaft seal by prying it out with a screwdriver Discard seal Inspect needle bearing in adjuster plug, and if rollers are broken or pitted, remove needle bearing from adjuster plug by pressing from thrust bearing end using Bearing & Seal Remover,Tool J-6221(Buick & Cadillac), J-5254 (Oldsmobile), J-5188 (Pontiac), J-8524-2 & J-7079-2 (Chevrolet Truck) Discard the bearing

Inspection - Inspect thrust bearing spacer for cracks, then inspect thrust bearing rollers for wear, pitting, scoring or cracking If any of these conditions are found, replace both thrust bearing races and check thrust bearing spacer Inspect thrust bearing races for wear, pitting, scoring, cracking, or brinelling Replace if necessary

(Continued)

SAGINAW ROTARY VALVE POWER STEERING (Cont.)

Reassembly - Install needle bearing by pressing from thrust end of adjuster plug against identification end of bearing (use same tool used for removal). *NOTE - End of bearing must be flush with bottom surface of stub shaft seal bore.* Lubricate stub shaft seal with automatic transmission fluid, then on Chevrolet Trucks, install seal and back-up washer. On other models, install seal with spring in seal toward adjuster plug. *NOTE - Use Tool J-8524-1 (Chev. Truck), J-5188 (Buick, Cadillac, Pontiac), J-5254 (Oldsmobile) to install seal far enough in plug to provide clearance for retaining ring (Chev. Truck), dust seal and retaining ring (Other models).* On Chevrolet Truck, install retaining ring. On other models, install dust shield with lip upward in plug, then install retaining ring. Lubricate "O" ring seal with petroleum jelly and install on adjuster plug. Assemble large diameter thrust bearing race, thrust bearing, small thrust race, and thrust bearing spacer on adjusting plug. Press bearing retainer into needle bearing bore with a brass or wooden dowell *NOTE - Radial position of dimples is not important.*

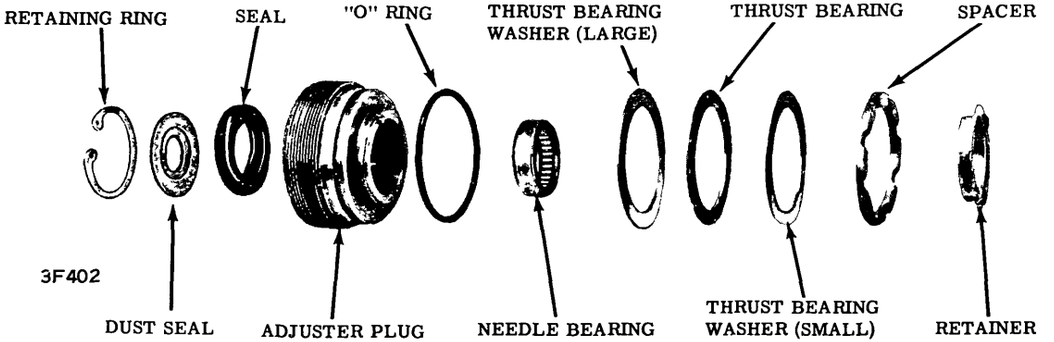
Installation - Install adjuster plug in end of housing just far enough to make certain that all parts are properly seated in gear housing. Back adjuster plug off 1/8 turn and measure valve assembly drag using a torque wrench, then adjust thrust bearing preload (see "Adjustment" above). Complete the installation by reversing removal procedure.

Valve Assembly

Chevrolet Trucks - Overhaul procedures are the same as for other models with power steering except that free length of valve spool spring .760-.790". The control valve housing forms steering gear top cover, and can be removed by removing attaching bolts. *For steering gear overhaul, see "Saginaw Ball Bearing Worm & Nut" (Manual Steering Gear).*

RACK PISTON REMOVAL NOTE - Some models have a snap ring in upper end of piston bore in housing. Do not remove this snap ring during disassembly.

RACK PISTON END PLUG REMOVAL NOTE - This plug may take on a permanent set as it is tightened to 50 ft. lbs. torque. Plug could break if not handled carefully. To remove, rap plug with a plastic or rawhide mallet to unseat threads.



ADJUSTER PLUG ASSEMBLY (TYPICAL)

POWER CYLINDER (CHEVROLET TRUCK)

Disassembly

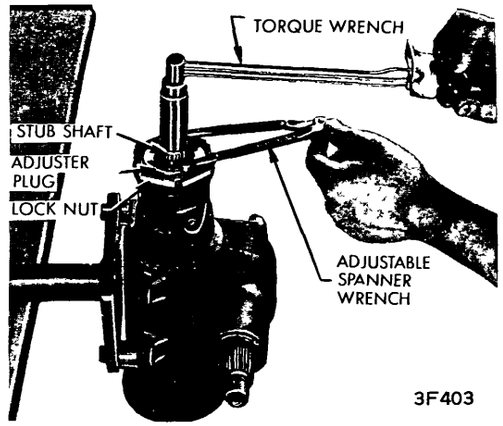
NOTE - The only repair to make in the field on the power cylinder is to replace piston rod seals. Before removing piston rod seal parts from rod end of power cylinder, clean the exposed portion of seal cavity with clean solvent. Remove snap ring, then to dislodge scraper, washer, dust seal, seal back-up washer and "U" cup seal, use air pressure applied to cylinder port (right hand port looking down) while closing off the left hand port. Remove seal parts from rod.

Inspection

Clean all parts in solvent and dry with compressed air. *NOTE - Do not use waste to wipe off spool or inside bore of valve housing.* Protect spool edges and bore of valve housing from damage during disassembly and reassembly. Inspect parts for nicks, burrs, and excessive wear. Check cylinder scraper washer for fit on piston rod. Clearance should be .001-.0035". Replace if worn.

Reassembly

Assemble open side of "U" cup seal over the rod and into bearing cavity, then install seal back-up washer, dust seal (open side out away from seal cavity), and scraper washer. Slide parts in place and lock in position on rod with snap ring.



THRUST BEARING PRELOAD ADJUSTMENT

POWER STEERING PUMP

Saginaw Vane Type (Integral Reservoir) - *See 1961 Final Data, Page 390, or later Manual edition.*

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING

Lincoln Continental (1963)
Ford Thunderbird (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 POWER LOSS ON RETURN FROM RIGHT OR LEFT TURN CORRECTION:* This condition may be caused by dirt or metal chips imbedded in outer diameter of the power piston teflon seal. To correct, disassemble and clean all parts and replace the teflon power piston seal.

Description

Piston type hydraulic power assist unit having a torsion bar operated control valve combined with a ball nut and worm steering gear enclosed in a single housing. Hydraulic fluid under pressure is supplied to steering gear by a positive displacement pump. Design and operation are similar to previous models.

Lubrication

Check fluid level in reservoir every 6000 miles. Fluid should be at "F" mark on dipstick .Use only Automatic Transmission Fluid Type "A" (Suffix "A").

Bleeding System

If air is in system due to low oil level in pump reservoir, or to disassembly of gear, fill pump reservoir, start engine and turn on windshield wipers. Turn steering wheel through its entire travel three or four times to allow air to escape. Recheck fluid level and add fluid as required. *CAUTION - Do not hold wheels against their stops when bleeding system.*

TESTING

Hydraulic Pressure

Connect a pressure gauge with a hand shut-off valve in pressure line between pump and steering gear (pressure gauge must be between pump and shut-off valve). With shut-off valve fully open, allow steering fluid to come to operating temperature (cycle gear from stop to stop), then note gauge reading with wheels at full left and full right positions. Pressure should be 950-1100 lbs. (Thunderbird), 1120-1250 lbs. (Lincoln). If pressure is less than minimum, close gauge valve and note reading. *CAUTION - Do not leave valve closed for more than 15 seconds.* If pressure is still less than minimum, pump is faulty. If pressure increases, steering gear is at fault.

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LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING (Cont.)

ADJUSTMENT

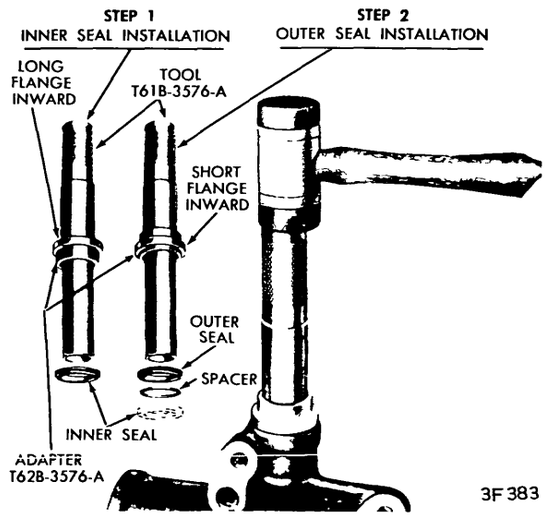
Pump B lt

Lincoln C ntin ntal - No adjustment. Pump is mounted on engine front cover and driven by engine crankshaft. **Thunderbird** - Use a suitable belt tension gauge and adjust pump mounting bracket for 120-150 lbs. (new belt); 90-120 lbs. (used belt) tension. *NOTE - A used belt is one that has been operated for 15 minutes or longer.*

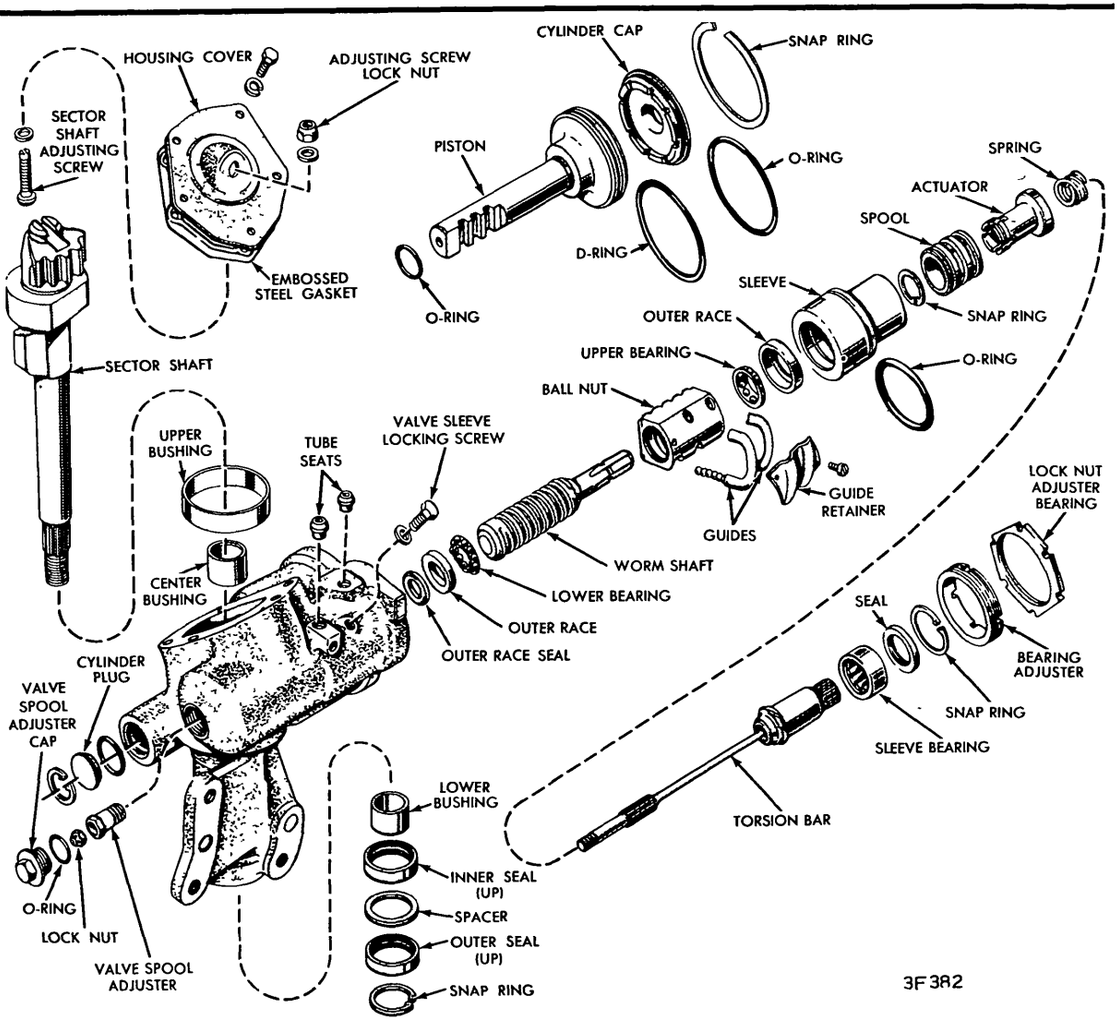
Worm B aring Prel ad & S ctor Mesh

Linc ln Continental - **1)** Disconnect pitman arm from sector shaft and drain fluid from steering gear housing and from reservoir. *NOTE - Fluid in system will cause incorrect readings.* Remove steering wheel and horn ring, then lock two nuts on steering shaft and install an inch pound torque wrench to upper nut. Turn shaft to either stop, back off ¼ turn and measure torque required to keep shaft turning at a constant rate for one complete turn This is worm bearing preload and should be 5-8 inch pounds To adjust, loosen worm bearing adjuster locknut and turn adjuster as necessary. *NOTE - Always make final adjustment in tightening direction.*

2) Turn steering shaft so ball nut and sector are centered (approximately 2 turns from either stop), then note torque required to turn shaft through center position. Torque should be 8-10 inch pounds greater than for worm bearing preload (above) To adjust, loosen sector shaft adjusting screw locknut and turn adjusting screw as necessary.



SECTOR SHAFT OIL SEAL REMOVAL & INSTALLATION TOOLS



1963 LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING GEAR ASSEMBLY

Thunderbird - **1)** Drain fluid from reservoir and steering gear, then remove pitman arm from sector shaft and steering wheel from steering shaft. Install an inch pound torque wrench on steering shaft and measure torque required to move steering shaft approximately 20° from one of the stop positions. If torque is not within limits of 6-8 inch pounds, loosen adjuster locknut and turn bearing adjuster to obtain proper reading. Tighten adjuster locknut and recheck preload.

2) Turn steering shaft to right or left hand stop, then back off 1¾ turns to place steering gear in center position. Rotate steering gear to left hand stop, then using the torque wrench. back off at a constant rate and read the torque at the exact center of steering gear travel. Rotate gear to right hand stop and take a reading in the opposite direction *NOTE - If two slightly different readings are obtained, the larger should be recorded as the "on-center" meshload.* If total "on-center" meshload is not within limits of 15-17 inch pounds, loosen sector adjuster locknut and turn adjuster screw for proper adjustment. Tighten locknut and recheck meshload.

Valve Spool Centering

All Models - **1)** Place steering gear on a bench near fender and insert a 3/8" drive, 3" extension into flexible coupling and retain with setscrew (Lincoln) On Thunderbird, install an 11/16" 12 point socket on input shaft. Remove adjuster cap and install a 7/16" midget socket and a 9/16" offset box wrench on adjuster. Connect a pressure gauge between pressure line from pump and inlet port of steering gear. On

(Continued)

LINCOLN & THUNDERBIRD "TORSION BAR" POWER STEERING (Cont.)

Lincoln, disconnect return line from windshield wiper control valve lower connection and attach line to outlet side of gear On Thunderbird, disconnect power steering hose insulator retainer and connect the return hose from pump reservoir to outlet port of gear assembly On all models, make sure shut-off valve on gauge is fully open

2) Start engine and bring gear housing to operating temperature (cycle from stop to stop), then check and add fluid as necessary With the torque wrench on input shaft, rotate gear to left hand stop, adding sufficient torque to torque wrench to simultaneously obtain a reading of 300 lbs on pressure gauge Repeat this operation on right hand side The torque required to obtain a gauge reading of 300 lbs in both directions should not differ more than 3 lbs To adjust loosen adjuster locknut and turn the adjuster in direction of low reading *NOTE - Only a slight movement of adjuster is required to move the valve spool* After adjusting, recheck the torque in both directions

TROUBLE SHOOTING

See 1958 Final Data, Page 390, or later Manual edition

REMOVAL & INSTALLATION

Steering Wheel & Horn Button

See separate "Steering Wheel, Horn Button & Direction Signal Removal" in this section

Steering Gear

Linc In Contin ntal - Disconnect hoses from steering gear and tie hoses higher than reservoir Raise car and remove transmission linkage splash shield Remove left exhaust manifold-to resonator pipe, then remove pitman arm from sector shaft Remove transmission linkage rods from equalizer shaft and force shaft outward Loosen setscrews locking flexible coupling to steering shaft Remove steering gear attaching bolts and remove steering gear To install, reverse removal procedure and make sure sector shaft is centered in gear Tighten steering gear attaching bolts to 35-50 ft lbs , and pitman arm attaching nut to 100-130 ft lbs

Thunderbird - Disconnect lines from steering gear and plug all openings Remove flexible coupling retaining bolt and disconnect ground wires Raise car and remove left body strut bar, then remove pitman arm, using a suitable puller Remove steering gear attaching bolts and pull gear from steering column shaft coupling Remove lower front insulator and remove gear from car To install, reverse removal procedure and note the following Place gear in position, then install lower front insulator Tighten gear mounting bolts to 35-50 ft lbs and pitman arm nut to 110-150 ft lbs

OVERHAUL

See 1958 Final Data, Page 390, or later Manual edition and note the following

1) Two sector shaft seals and a spacer are used Remove and install as follows

R moval - Remove sector shaft oil seal retaining snap ring, then remove outer seal spacer and inner seal

Installation - Position inner sector shaft seal in housing with rubber seal lip facing inward Seat seal in housing with proper tool (see illustration) *NOTE - Long flange of the adapter should press against seal* Install metal spacer against inner seal, then position outer sector shaft seal with sealing lip facing inward against spacer Seat the seal in position with proper tool (see illustration) *NOTE Short flange of adapter should press against outer seal* Install seal retaining snap ring If outer seal has blocked off snap ring retaining groove in casting, tap tool and adapter against snap ring so that snap ring will seat in groove

2) When installing torsion bar sleeve bearing in sleeve, bearing must be pressed in so there is 095- 105" clearance between upper surface of bearing and seal seat surface of sleeve

HYDRAULIC PUMP

Lincoln Continental

See 1960 Final Data, Page 404, or later Manual edition and note the following

Pump Pressure - 1120-1250 lbs

Thunderbird

See 1958 Final Data, Page 398, or later Manual edition and note the following

Pump Pressure - 950-1100 lbs

G.M. TILT WHEEL STEERING COLUMN

Buick, Exc. Special (1963)
Cadillac (1963)
Chevrolet Belair & Impala (1963)
Oldsmobile, Exc. F-85 (1963)
Pontiac, Exc. Tempest (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK TILT WHEEL NOT LOCKING SECURELY (IN DOWNWARD POSITIONS) CORRECTION* This condition is due to the actuator lever being too long and interfering with the action of the return spring To correct, grind off 1/8" from threaded portion of lever, then re-chamfer end of lever and clean the threads When completed, threads on end of lever should be approximately 300" long

►*1963 "CHUCKLE" IN TILT WHEEL ASSEMBLY CORRECTION (ALL CARS):* Loosen clamp bolt on upper flange of flexible coupling and pull steering shaft down to take up any axial play Push upper coupling flange down towards firewall by hand and tighten clamp bolt to 25-35 ft lbs *NOTE - If the condition is not corrected by taking up all play in flexible coupling, the trouble is most likely in the spherical joint Correct as outlined below for "Noise Correction"*

►*1963 PONTIAC TILT WHEEL ASSEMBLY NOISE CORRECTION* Disassemble steering shaft assembly (see "Disassembly" below) to point where upper shaft is disconnected from lower shaft, then remove sphere from upper shaft Add shims (furnished in Service Kit No 5679661) in 005" increments as necessary to assure snug fit of spherical joint in yoke *NOTE - Average shim thickness required is 015" Add only enough shims to take out looseness Retention fingers of yoke must move freely over centering sphere* Reassemble steering shaft and column (see "Reassembly" below)

DESCRIPTION

This assembly consists of an upper and lower steering shaft with a universal joint between them providing six different angles (seven on some models) at which the steering wheel can be positioned A release lever to left of steering column allows selection of the desired angle

ADJUSTMENT

Directional Signal Switch

With turn signal lever in neutral position and steering wheel in full down position, insert a 060" locating pin through holes in bracket and switch carrier with switch carrier in neutral position Tighten control cable clamp and remove pin

DISASSEMBLY

Turn Signal & Neutral Safety Switch Removal

Remove attaching screws from mast jacket and disconnect Bowden cable by loosening clamp and removing gripper washer from switch pin, then remove directional signal switch If car is equipped with neutral safety switch and (or) back-up light switch, remove switch, then remove switch lever from shift tube

Actuator Housing Removal

1) Remove steering wheel (see separate "Steering Wheel, Horn Button & Directional Signal Removal" in this section), then with steering column in centered position, remove directional signal lever and tilt wheel release lever

2) On Buick and Pontiac, pry out horn contact from actuator On all models, install remover, Tool J-21347 (Chevrolet), J-21180 (Buick, Oldsmobile & Pontiac) inside cover, then with two sliding hammers attached to tool, alternately tap with each hammer and remove cover On Chevrolet, remove mast jacket trim cover attaching screws and slide cover forward on mast jacket On Chevrolet and Oldsmobile, pry horn contact out of actuator and remove contact and wire assembly

3) Remove upper shaft snap ring with snap ring pliers, then remove washer, collapsible spacer, rubber washer, retainer, bearing seat, inner race and bearing *NOTE - Discard collapsible spacer It must not be re-used*

4) Remove turn signal actuator yoke and detent spring, then pull actuator yoke from housing Install tilt lever and lift up so the column will go to full up position, then unhook upper ends of the two tilt return springs

(Continued)

G.M. TILT WHEEL STEERING COLUMN (Continu d)

by inserting a small bladed screwdriver through upper coil and lifting upward.

5) To remove the two pivot pins, use Tool J-21179 as follows: Position tool between locating bosses on the support assembly and thread tool screw into pivot pin. Hold the screw and turn nut to remove pin. *CAUTION - Do not allow puller screw to bottom in pivot pins.*

6) Lift the tilt lever to disengage lock shoes from support locking pins and remove actuator assembly. Remove tilt return springs, then lift lower bearing from upper steering shaft, making sure that bearing does not catch on snap ring groove.

Actuator Housing Disassembly

Use a suitable support to back up the inboard side of pivot pin boss in housing, then drive upper and lower lock shoe pivot pins from housing with a 1/8" punch. Remove lock shoes and springs by pushing upper end of lock shoe through openings in actuator housing. *NOTE - The upper shoe may be identified by rubber bumper installed on it.* Remove turn signal switch control cable from turn signal bellcrank by removing retaining screw at top of housing and disconnecting from bellcrank. Remove cable through top of actuator housing.

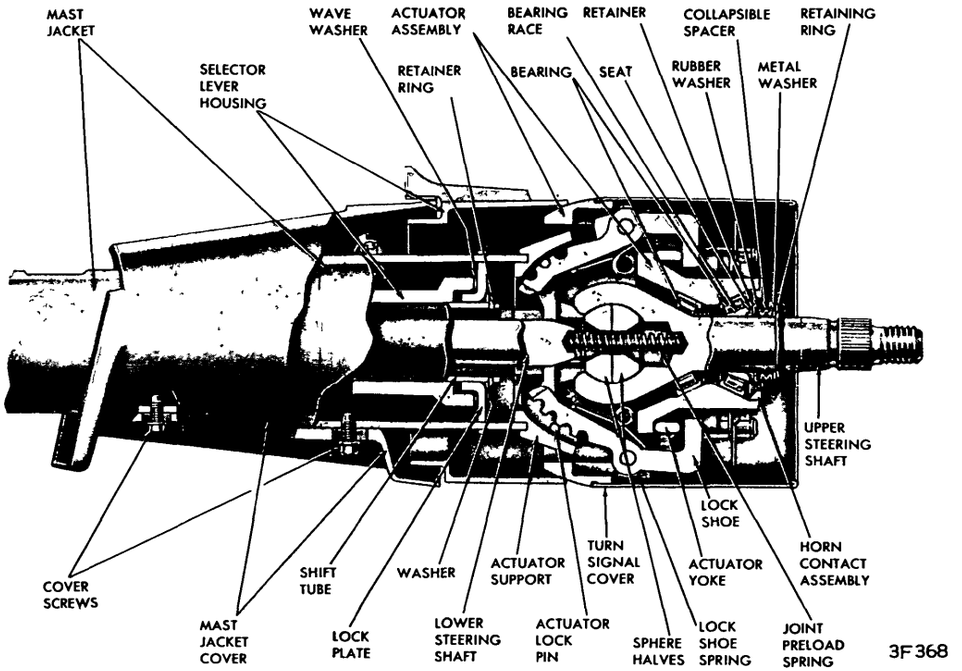
Steering Shaft Disassembly

Remove steering shaft coupling assembly flange at lower end of steering shaft, then pull steering shaft assembly out of mast jacket. Clamp steering shaft in a brass jawed vise and move the upper shaft fully from centerline of lower shaft. Use two narrow bladed screwdrivers through coils of the spring and compress spring enough to remove the upper end from the upper seat. Move upper shaft to opposite side and allow the spring to snap out of opening between shaft and sphere, then remove spring. Turn upper shaft 90° from centerline of lower shaft and remove upper shaft and sphere from lower shaft.

Shifter Tube & Shifter Bowl R moval (If so Equipped)

All M dels (Exc. Chevr let) - Remove four support screws and lift support from mast jacket, then remove shift tube retainer ring and washer from top of shift tube. Remove shift tube bearing retainer from lower end of mast jacket, then use two slide hammers and Tool J-21180 to pull shift tube from lower end of mast jacket. Remove lock plate, wave washer and shifter bowl from upper end of mast jacket. *NOTE - It may be necessary to slide bowl toward shift lever to remove lock plate.* Drive shift lever pivot pin from bowl, then remove shift lever and spring. Remove anti-rattle grommet from shift lever.

Chevrolet - Remove four screws and remove support from upper end of mast jacket, then remove shift tube retaining ring and washer from top of shift tube. Remove shift tube bearing retainer from lower end of mast jacket. Remove the shift tube downward through the column as follows: Support mast jacket on the edge of a wood block and drive against inner end of lower shift lever with a hammer and metal rod. *CAUTION - Be careful not to bend or distort shift lever.* Remove lock plate, wave washer and selector lever support housing from upper end of mast jacket. If necessary, remove selector lever pin, selector lever and spring.



CHEVROLET TILT WHEEL STEERING COLUMN (OTHERS ARE SIMILAR)

REASSEMBLY

REASSEMBLY NOTE: When assembling steering column, apply a thin coating of lithium base lubricant to all friction parts.

Shifter Tube & Shifter Bowl Installation (If so Equipped)

All Models (Exc. Chevrolet) - Install anti-rattle grommet on shift lever, then place shift lever spring and lever in bowl and install pin. Place shifter bowl on mast jacket with shift lever on right side of column, then insert shift tube and felt dust seal assembly into lower end of mast jacket. Guide shift tube into shifter bowl aligning the key in bowl with keyway in tube. Hold shifter bowl and tap lower end of shift tube until upper end of tube is flush with inner portion of shifter bowl. Position lower mast jacket bushing flange against lower end of mast jacket, aligning slots in bushing with holes in mast jacket, and install retaining ring. Place wave washer on lower side of the lock plate and retain with lubricant, then slide lock plate into position through opening in mast jacket. Align lock plate and wave washer with end of shift tube, then tap lower end of tube to fully seat it in jacket. Install thrust washer and retaining ring on upper end of shift tube. Install support on upper end of mast jacket with long leg aligned with notch in low side of lock plate, then install support attaching screws. Tighten the two larger (left) screws first to 20-25 inch pounds, then tighten the two right hand screws.

Chevrolet - Install selector lever spring, lever and retaining pin, then loosely install mast jacket cover and slide the dash panel seal assembly over lower end of mast jacket. Install selector lever support housing on mast jacket, place wave washer over mast jacket and slide the lock plate into position so tang on locking plate engages slot in mast jacket. Slide shift tube assembly (felt seal in place) into mast jacket from lower end, then with shift tube properly lined up with keyway in support housing, tap shift tube into place. Install washer and retainer. Install tilt actuator support on upper end of mast jacket and tighten the two larger (left) screws first, to 30-40 inch pounds. Tighten right hand screws.

Steering Shaft Reassembly

Apply lubricant to centering spheres and steering shaft sockets and place spheres in upper shaft socket. Turn the spheres so lower shaft may be installed over the grooves. *NOTE - The locating mark on end of upper shaft should be on same side as flat on lower shaft.* Insert joint pre-load spring through spheres into lower shaft, then while using upper shaft to hold spring in place, carefully feed the spring into upper shaft joint with a narrow bladed screwdriver. Install steering shaft assembly into upper end of mast jacket. At the lower end of mast jacket, install lower bearing assembly, being careful not to damage bearing as it passes over splines on shaft.

Actuator Housing Reassembly

Install lock shoe return springs on upper and lower lock shoes in the following manner: *NOTE - The upper lock shoe is identified by the rubber bumper.* Place actuator housing on bench with lower side upward and turn signal and tilt lever openings on the right hand

(Continued)

G.M. TILT WHEEL STEERING COLUMN (C ntinu d)

side. Install upper shoe in upper housing opening by pushing on rubber bumper and the end of shoe. Turn housing around and insert lower shoe in same manner as for upper shoe. Install pivot pins in actuator and through lock shoes making certain that pins are centered. From top of actuator housing, install turn signal switch control cables on plastic bellcrank with the cable loops facing toward center of actuator, then install cable bracket screw. Install horn contact wire through keyway in actuator housing (do not install contact at this time). Install upper shaft lower bearing with rollers downward, then install the lower ends of the two return springs on support spring anchors. *NOTE - Loops on upper ends of springs must have opening toward top of column.* Install the tilt lever in actuator.

Actuator Housing Installation

1) Raise tilt lever up slightly to prevent lock shoes from engaging the pins, then install actuator assembly over steering shaft while guiding turn signal cable and horn wire through the shift bowl. Align actuator assembly pivot pin holes with holes in support assembly, then install pivot pins using a brass drift to fully seat the pins. *NOTE - Steering shaft may have to be raised slightly to have lock shoes clear the socket.*

2) Raise tilt lever and lift upper steering column to full "up" position, then install upper ends of the two tilt return springs with Tool J-21181. *CAUTION - Do not use old springs if they show any indication of distortion.*

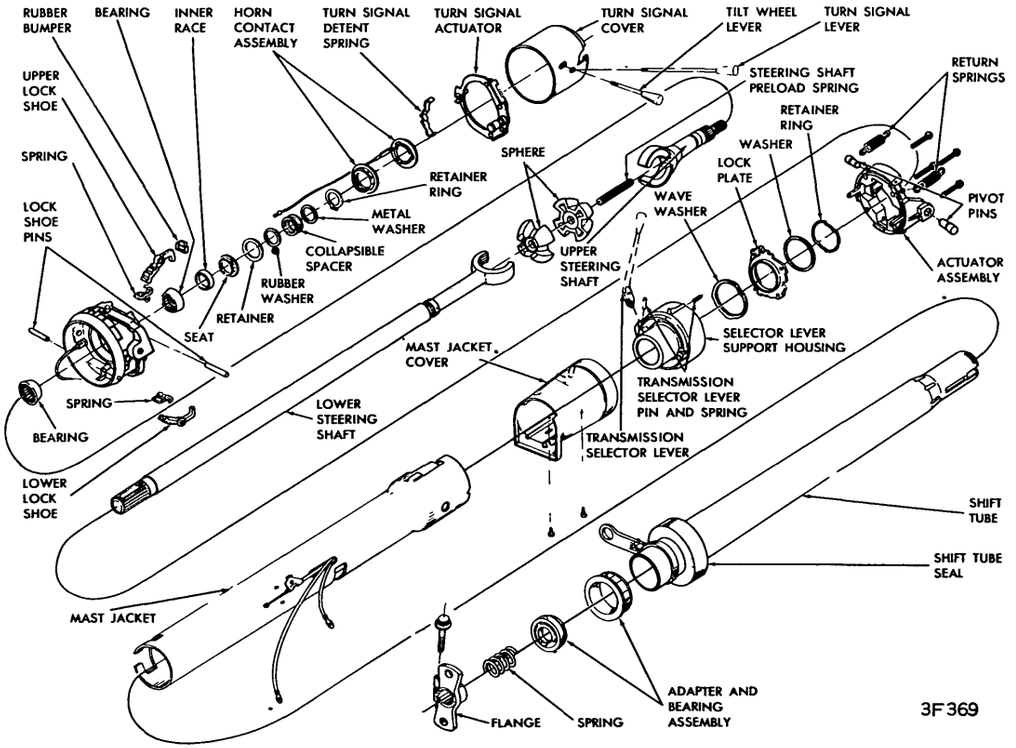
3) Install turn signal actuator yoke making sure that ball socket engages bellcrank ball, then install detent spring. Install upper bearing with rollers facing upward, inner race, bearing seat (flanged portion up), retainer (dish facing up), rubber washer, a new collapsible spacer and washer. *NOTE - When installing these parts on shaft make sure that they do not hang up on snap ring groove.*

4) Install snap ring over shaft and against collapsible spacer, then place Tool J-21179 over steering shaft with window in tool in line with snap ring opening. Install steering wheel nut and turn down until upper edge of the window in Tool J-21179 is in line with upper edge of snap ring groove (this will compress the spacer and preload upper shaft bearings). Remove steering wheel nut and tool, then make sure that snap ring is seating firmly in groove.

5) After checking steering shaft torque (see below), complete the reassembly by reversing disassembly procedure.

Checking Steering Shaft Torque

Install steering wheel nut on upper shaft, then use a socket wrench and an inch pound torque wrench and check the torque required to turn steering shaft in each tilt wheel position. *NOTE - Steering shaft must not be connected to steering gear when checking turning torque.* Torque should be 35-45 inch ounces (exc Oldsmobile); 2½ inch pounds (Oldsmobile). *NOTE - On Pontiac models, the torque in center position should be 25 inch ounces.* If torque is too low, repeat step "4" above. If torque is too high, spacer has been been collapsed too far and must be replaced.



TILT WHEEL STEERING COLUMN ASSEMBLY (TYPICAL)

SAGINAW BALL BEARING WORM & NUT STEERING GEAR

Buick & Buick Special (1963)
Checker Superba & Marathon (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Chevrolet Trucks (1963)
Comet (1963)
Corvair Cars & Trucks (1963)
Corvette (1963)
Dodge & Dodge Dart (1963) ①
Falcon Cars & Trucks (1963)
Ford Fairlane & Galaxie (1963)
Ford Econoline Trucks (1963)
Ford F-100 & F-250 Trucks (1963) ②
Mercury Meteor & Monterey (1963)
Oldsmobile & Oldsmobile F-85 (1963)
Plymouth (1963)
Pontiac & Pontiac Tempest (1963)
Rambler (Exc. American) (1963) ③
Studebaker (Exc. Hawk & Avanti) (1963) ④
Valiant (1963)

① - Except Dodge Custom 880. *For this model, see "Gemmer Worm & Roller" in this section.*
② - Except 4-Wheel Drive models. *For these models, see "Gemmer Worm & Roller" in this section.*
③ - Except American. *For this model, see "Gemmer Worm & Roller" in this section.*
④ - Except Hawk & Avanti. *For these models, see "Ross Model SL-54" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 COMET & FALCON V8 EXCESSIVE STEERING EFFORT & RAPID STEERING WHEEL RETURN CORRECTION:* On cars built prior to June 1963, this condition may be due to a high friction and torque wind-up of steering idler arm bushing. To correct, install a new idler arm and bushing, Part No. C3DZ-3352-G.

Description

Recirculating ball nut type. Nut mounted on worm and driven through steel balls which circulate in helical grooves in both worm and nut. Return guides attached to nut serve to recirculate the two sets of balls through grooves. Gear teeth on nut mesh with sector teeth on cross shaft so that cross shaft (and steering gear pitman arm) rotate as steering wheel is turned, causing nut to move up and down. *(Continued)*

SAGINAW BALL BEARING WORM & NUT STEERING GEAR (C nt.)

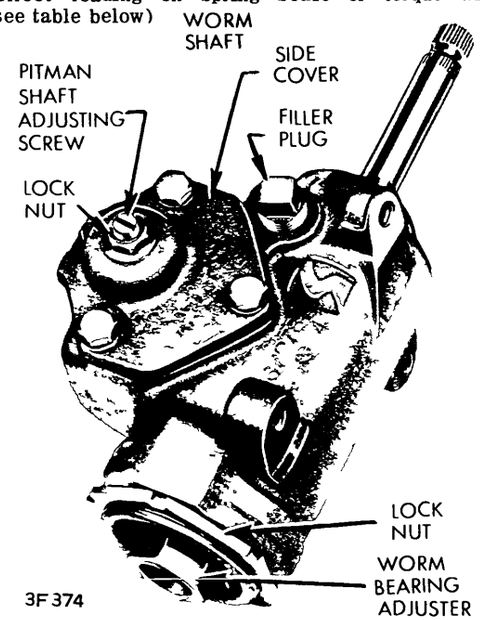
ADJUSTMENT

Steering G ar Alignment

Before any adjustments are made to steering gear, check for binding at frame bracket mounting bolts and at instrument panel bracket or flexible coupling Disconnect relay rod from pitman arm and check tightness of pitman arm nut, then back off pitman shaft adjusting screw just enough to obtain a slight backlash between ball nut and pitman shaft Steering shaft should turn through full range in both directions without binding or hard pull and be free of any rough spots Binding indicates misaligned steering gear on mountings or coupling Rough spots indicate damaged bearings or parts Hard pull indicates excessive preload adjustment

Worm Bearing Preload (All Models)

With relay rod disconnected from pitman arm and pitman arm properly tightened on steering gear pitman shaft, loosen pitman shaft adjusting screw to obtain a slight backlash between ball nut and pitman shaft Loosen worm thrust bearing adjuster locknut at upper or lower end of worm shaft (depending on car model) and turn adjuster until a slight load is felt (with steering wheel at extreme right or left position), then tighten locknut Install a spring scale at right angle to steering wheel spoke or install an inch-pound torque wrench on steering shaft (see "Worm Bearing Setting" table below for proper method to use in checking preload on a specific car model) Note spring scale or torque wrench reading required to keep steering wheel moving (when off the high point) Rotate adjusting nut as necessary to obtain correct reading on spring scale or torque wrench (see table below)



STEERING GEAR ADJUSTMENT LOCATIONS (TYPICAL)

Pinion Shaft Endplay (Gear Mesh)

With bearing preload adjustment completed (see above), check effort required to pull steering wheel through center (high spot) of gear If turning effort is not within specifications (see table below), turn pitman shaft adjusting screw clockwise to increase turning effort and counterclockwise to decrease turning effort With locknut tightened, recheck turning effort and adjust as necessary

PITMAN SHAFT ENDPLAY ADJUSTMENT NOTE - This is a "push-pull" type adjustment and controls pitman shaft endplay as well as gear mesh

REMOVAL & INSTALLATION

Steering Wheel, Horn Button & Directional Signal

See separate "Steering Wheel, Horn Button & Directional Signal Removal" data in this section

WORM BEARING SETTING

Car Model	Preload Setting
Buick & Buick Special	① 2-7
Chevrolet Pass Cars	② 3/8-5/8
Chevy II (Manual Steering)	②③ 1/2-7/8
(Power Steering)	②④ 1/2-3/4
Chevrolet Trucks, Series 10,20,30	② 1-1 1/2
Series 40,50,60	② 1 1/2-2
Comet	① 3-6
Corvair Cars (On Bench)	① 2-6
(On Car)	② 7/16-11/16
Corvair Trucks	① 1/2-3/4
Corvette	② 3/8-3/4
Dodge & Dodge Dart (On Car)	①⑤ 1 1/2-4 1/2
(On Bench)	①⑤ 1 1/8-4 1/2
Falcon (Manual Steering)	① 3-6
(Power Steering)	① 3-4
Ford Galaxie (Manual Steering)	① 2-7
(Power Steering)	① 3 1/2-5
Ford Fairlane (Manual Steering)	① 4-7
(Power Steering)	① 2-4
Ford Trucks & Econoline	① 3-6
Mercury Meteor (Manual Steering)	① 3-7
(Power Steering)	① 2 6
Mercury Monterey (Manual Steering)	① 2-7
(Power Steering)	① 3-5 1/2
Oldsmobile (Exc F-85)	① 5-9
Oldsmobile F-85	① 4-7
Plymouth (On Car)	①⑤ 1 1/2-4 1/2
(On Bench)	①⑤ 1 1/8-4 1/2
Pontiac (Exc Tempest)	① 6-10
Pontiac Tempest (Manual Steering)	① 6-10
(Power Steering)	① 1 1/2-5 1/2
Rambler	② 1/2-3/4
Studebaker	① 2 1/4-6 3/4
Valiant (On Car)	①⑤ 1 1/2-4 1/2
(On Bench)	①⑤ 1 1/8-4 1/2

① - Inch-pounds With torque wrench on steering shaft
② - Pounds pull With spring scale installed on steering wheel at right angle to spoke
③ - Combined preload and backlash settings must not exceed 1¾ lbs
④ - Combined preload and backlash settings must not exceed 1¼ lbs
⑤ - Use Torque Wrench C-3380

Corvette - Remove steering coupling lower pinch bolt from worm shaft, then raise car and remove pitman arm nut Remove pitman arm with Puller J-5504 Remove steering gear to frame bolts and remove steering gear

Falcon V8 - Same as for 6 cyl cars except that the following additional steps should be performed Remove left bank ignition wires from spark plugs and lay them out of the way Disconnect inlet pipe at left hand manifold and remove left hand exhaust manifold

OVERHAUL

See 1962 Final Data, Page 399 for complete overhaul procedure

PITMAN SHAFT ENDPLAY SETTING

Car Model	Backlash Setting
Buick & Buick Special	①③
Chevrolet Pass Cars	② 7/8-1 1/2
Chevy II (Manual Steering)	②④ 1/2-1 1/4
(Power Steering)	②⑤ 3/8-7/8
Chevrolet Trucks (Series 10,20,30)	② 7/8-1 1/2
(Series 50,60)	② 2 3/4-3 1/4
Comet	① 8-13
Corvair Cars (On Car)	② 1 1/8-1 1/2
(On Bench)	① 7-12
Corvair Trucks	② 1-1 1/2
Corvette	② 7/8-1 1/2
Dodge & Dodge Dart (On Car)	①⑥ 8 1/4-11 1/4
(On Bench)	①⑥ 7 7/8-11 1/4
Falcon (Manual Steering)	① 8-13
(Power Steering)	① 8-9
Ford Fairlane (Manual Steering)	① 9-14
(Power Steering)	① 5-9
Ford Galaxie (Manual Steering)	① 9-15
(Power Steering)	① 8-13
Ford Trucks & Econoline	① 8 13
Mercury Meteor (Manual Steering)	① 9-15
(Power Steering)	① 4-10
Mercury Monterey (Manual Steering)	① 9-15
(Power Steering)	① 8-13
Oldsmobile (Exc F-85)	② 1 1/2-2
Oldsmobile F-85	② 7/8-1 1/2
Plymouth (On Car)	①⑥ 8 1/4-11 1/4
(On Bench)	①⑥ 7 7/8-11 1/4
Pontiac (Exc Tempest)	①⑦
Pontiac Tempest (Manual Steering)	①⑧
(Power Steering)	①⑨
Rambler	② 1-1 3/4
Studebaker	① 8-9
Valiant (On Car)	①⑥ 8 1/4-11 1/4
(On Bench)	①⑥ 7 7/8-11 1/4

① - Inch pounds With torque wrench on steering shaft
② - Pounds pull With spring scale installed on steering wheel at right angle to spoke
③ - 4-8 lbs greater than worm bearing preload Total overcenter pull not to exceed 13 inch pounds
④ - Combined preload and backlash settings must not exceed 1¾ lbs
⑤ - Combined preload and backlash settings must not exceed 1¼ lbs
⑥ - Use Torque Wrench C-3380
⑦ - Worm bearing preload plus 2-6 inch pounds
⑧ - Worm bearing preload plus 2-6 inch pounds Total overcenter pull not to exceed 17 inch pounds
⑨ - Worm bearing preload plus 3-7 inch pounds Total overcenter pull not to exceed 11 inch pounds

FORD & MERCURY MOVABLE STEERING COLUMN

Ford Galaxie (1963)
Mercury Monterey (1963)

Description

A pivot bracket and flexible coupling at lower end of steering column and shaft allows lateral movement of steering column assembly which is supported at upper end on a latching mechanism.

Operation

With transmission selector lever in "Park" position, the steering column may be swung approximately 9" toward center of car. Transmission selector lever cannot be moved from "Park" position until steering column is swung outboard into driving position. With selector lever in any other position than "Park", the steering column is locked in driving position.

ADJUSTMENT

Park Stop Position

Loosen locknut and turn "Park" position stop outward (away from column) as far as it will go, then swing column to "Park" position. With column in this position, adjust the stop against column so that the column, and shroud, and the latch cam do not interfere with any other part of the car.

Drive Position Stop

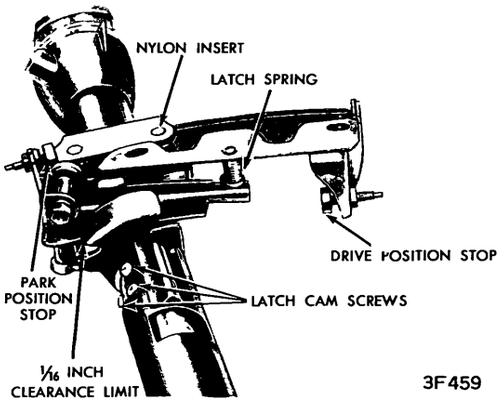
Loosen locknut and turn "Drive" position stop away from column as far as it will go, then swing column into "Drive" position so it is locked in place. Adjust stop so that it is snug against the column. Move selector lever to "Park" and swing column inboard, then turn "Drive" position stop ½ turn more toward the column and tighten locknut. Move column back to "Drive" position. The latch should contact middle of the sloped surface (latch plate) on the column.

Latch Cam

Loosen screws attaching latch cam to shift tube, then move latch cam in its slotted holes so that upper edge of cam slot is not more than 1/16" from upper edge of latch (with column in any swing position, not locked in drive). Tighten locknut on cam setscrew.

Latch Cam Setscrew

Adjust lock cam setscrew so that it will lift latch clear of latch plate when selector lever is moved into ' Park" position.



"PARK" POSITION

Nylon Wedge Setscrews

NOTE - This adjustment is made when nylon wedges are replaced. Tighten setscrews into wedges so they are just snug. From this position, tighten three more turns, then back out 1½ turns.

OVERHAUL

Upper Bearing Replacement

Remove upper steering shaft-to-flex joint clamp bolt, and disconnect turn signal and horn wires. Remove steering wheel, turn signal lever, and turn signal switch plate from steering column tube hub. Remove snap ring above column upper bearing and pull steering shaft upward to work bearing from shaft. To install, transfer rubber (outer) to new bearing, and position bearing assembly over steering shaft and install upper snap ring. Complete the installation by reversing removal procedure.

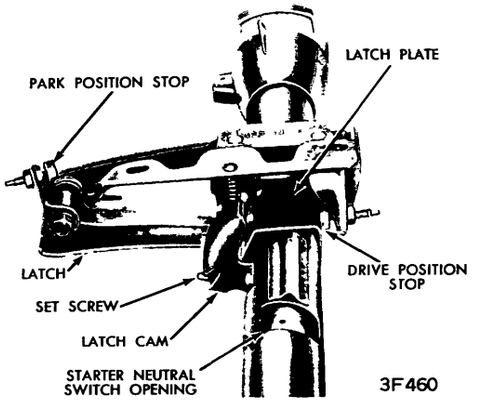
TROUBLE SHOOTING & DIAGNOSIS

Binding, Rough, or Rasping Column Movement

Latch cam rubbing latch. Nylon shipping guide not removed at assembly. Shroud is rubbing. Nylon inserts broken or missing. Latch rubbing on top of column. Mounting bracket rubbing on track. Setscrew rubbing on latch. Not properly lubricated.

Hard Column Movement

Not properly lubricated. Nylon wedges bound up. Nylon shipping guide not removed. Mounting bracket rubbing on guide.



"DRIVE" POSITION

Possible Shift Into Reverse (With Column Out of Driving Position)

Latch cam-to-latch clearance is too great. Manual shift linkage not properly adjusted.

Poor Shifting Into Or Out Of "Park"

Manual shift linkage not properly adjusted. Driving position stop is not properly adjusted.

Lateral Looseness In Column When Locked

Driving position stop improperly adjusted. Track-to-instrument panel mounting bolts loose.

Vertical Looseness In Column When Locked

Track bracket-to-steering column bolts loose. Track-to-instrument panel mounting bolts loose. Nylon wedges not seated properly.

Interference With Air Conditioning Unit

Park position stop improperly adjusted.

Column Will Not Shift Into "Park" Position

Latch cam setscrew improperly adjusted.

THUNDERBIRD MOVABLE STEERING WHEEL

Description

This unit consists of a lateral movement mechanism at the instrument panel and a flexible joint at the steering gear which allows steering wheel to be moved toward center of car.

Operation

With steering column in driving position and transmission selector lever in any position other than "Park", column is locked to brake pedal support assembly by a pawl type lever controlled by transmission selector tube. Two coil springs assist pressure from selector tube and provide positive engagement of pawl in lock plate. When selector lever is moved to "Park" position, latch tube bracket fastened to selector tube disengages pawl from locking plate. Steering column assembly can now be moved about 10" to the right. When column is moved inboard, transmission cannot be shifted. When column is moved back to driving position, pawl engages locking plate. Transmission can now be shifted.

ADJUSTMENT

Track-to-Column Bracket

Track notched edge must be centered under bracket notch for full distance of track travel. To adjust, loosen track-to-pedal support bolts.

Slide Tension

Adjust friction between track and steering column bracket by loosening or tightening nuts on cam type friction adjustment bolts. *NOTE - Both bolts must be adjusted equally.*

Lock Plate

Adjust engagement of pawl in lock plate by loosening plate mounting bolts and adjust cam bolt and screws so lock pin clears bottom of lock plate by no more than 1/32" for the full travel. Pawl must be fully engaged in lock plate when column is locked.

Stops

With selector lever out of "Park" position and nylon button of detent spring in its track center notch, position stop bracket against bumper. Pawl pin must be engaged fully and also clear corner of notch as pin enters or leaves. There should be no lateral movement of column as pawl pin engages or disengages. *NOTE - On Air Conditioned cars, spring projects to left of its attaching bolt and left notch in track is used. If right shroud hits, adjust right hand stop.*

TROUBLE SHOOTING & DIAGNOSIS

Binding, Rough or Rasping Column Movement

Track-to-column bracket misaligned. Lock plate rubbing pawl.

Transmission Shift Into Reverse With Column at Extreme Right

Lock plate out of adjustment.

Poor Shift Into or Out of "Park"

Left stop out of adjustment. Lock pawl binding in pivot bushing

Lateral Looseness In Column When Locked

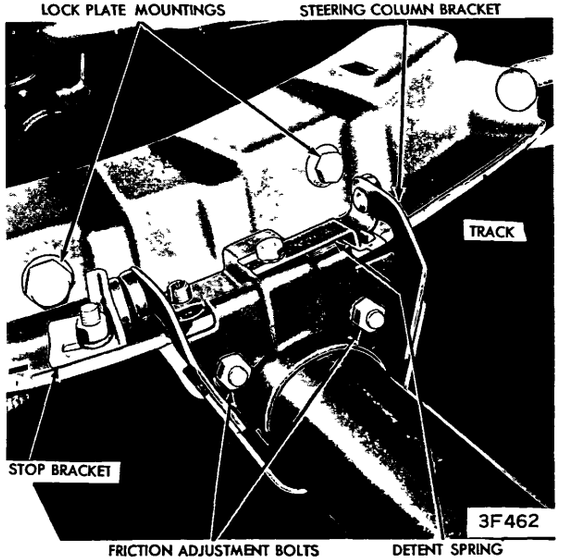
Lock pawl arm loose in pivot bushing. Pivot bracket loose at steering gear.

Vertical Looseness in Column When Locked

Loose track or braces. Pivot bracket loose at steering gear. Slide tension out of adjustment.

Right Shroud Hits Air Conditioning Unit

Right stop bolt on track out of adjustment.



MOVABLE STEERING COLUMN MOUNTING ASSEMBLY

GEMMER WORM & ROLLER STEERING GEAR

Chrysler (1963)
Dodge Custom 880 (1963)①
Ford Trucks (Exc. 2-Whl. Dr. F-100 & F-250) (1963)②
Ford Trucks, 4-Whl. Dr. F-100 & F-250 (1963)
Rambler American (1963)③

① - For other Dodge models, see "Saginaw Ball Bearing Worm & Nut".
② - For F-100 & F-250, see "Saginaw Ball Bearing Worm & Nut".
③ - For Rambler Classic & Ambassador, see "Saginaw Ball Bearing Worm & Nut".

Description

Similar in design to units used on previous models. Roller shaft adjusting screw is secured in end of roller shaft with a snap ring on some models. Chrysler Corp. cars have a flexible coupling between steering gear worm shaft and steering tube.

Adjustment

See 1962 Final, Page 394 for adjustment procedures and specifications and note the following:
Cross Shaft Roller & Worm Mesh (Chrysler & Dodg) - Disconnect pitman arm from drag link then rotate steering wheel to mid-position and check for backlash by moving pitman arm back and forth. If backlash exists, loosen roller shaft adjustment screw and tighten screw enough to eliminate freeplay. *CAUTION - Be sure roller shaft and worm do not bind.* Recheck the backlash. Tighten adjusting screw locknut while holding adjusting screw from turning, then connect pitman arm. *NOTE - If steering gear is off the car, a torque of 9-13½ inch pounds should be required to rotate steering shaft through the center position (high point). Adjust torque load by turning adjusting screw in or out as required.*

Steering Wheel, Horn Button & Directional Signal

Removal & Installation - *See separate "Steering Wheel, Horn Button & Directional Signal Removal" data in this section.*

Removal & Installation

See 1962 Final, Page 395 for removal and installation procedures.

Overhaul

See 1962 Final, Page 396.

ROSS SL-54 SINGLE LEVER STEERING GEAR

Studebaker Avanti & Hawk (1963)
Jeep, J-Series (1963)

Description

Cam and single lever type with cam follower mounted in roller bearings on inner side of cam lever and engaged in grooves of cam (worm gear shaft) On Studebaker Avanti, a flexible coupling connects worm shaft to steering shaft On Studebaker Hawk, the worm shaft is integral with steering shaft

ADJUSTMENT

NOTE - Two adjustments are required and they must be made in the proper sequence as indicated

Steering Shaft Endplay

Avanti & Jeep - Loosen cam lever adjusting screw locknut and back off the adjusting screw Remove steering wheel and replace shaft nut, then use an inch pound torque wrench and socket to measure the amount of torque required to turn steering shaft If torque is not within limits of 2-4 inch pounds (Avanti), 1-5 inch pounds (Jeep), see "Adjustment" below

Hawk - Loosen cam lever adjusting screw locknut and back off the adjusting screw Attach a light spring scale (calibrated in ounces) to rim of steering wheel at the spoke A steady pull of 4-7 ounces (tangent to rim of steering wheel) should be required to turn steering gear smoothly If not within limits, see "Adjustment" below

Adjustment - Remove steering gear top cover attaching screws and lift the cover, then add or remove shims to secure proper torque reading (shims must be split before removal or installation) Torque is increased by removing shims and decreased by installing shims

Cam Lever Clearance

All Models - With steering shaft endplay adjustment completed, place steering shaft in center position (exactly half way between full right and full left), then measure the turning torque or pounds pull required to turn shaft through center (high spot) of travel *NOTE - Use the same method of measuring as used for "Steering Shaft Endplay" above* On Avanti, the torque should be 6¼-8½ inch pounds On Hawk models with manual steering, the scale reading should be 12-20 ounces (12-16 ounces with power steering) On Jeep models with manual steering, the torque should be 12 inch pounds (7 inch pounds with power steering) To adjust, turn cam lever adjusting screw as required to obtain correct reading

REMOVAL & INSTALLATION

Removal

Avanti - Disconnect battery and remove power brake assembly, then remove starter solenoid from fender apron and the radio emission shielding from in front of left bank spark plugs If car has a manual transmission, disconnect upper and lower rods from clutch pedal bellcrank and remove bellcrank from frame Remove starter motor, then remove the pitman arm Remove steering gear to frame mounting bolts then disconnect steering column flange and pull gear forward to disengage lower flange from upper flange Turn steering gear assembly so post flange end of gear is upward and forward and is clear of top of frame Turn the assembly clockwise so the end of cam lever shaft will pass between rear end of exhaust manifold and the upper shaft flange as the assembly is lifted out of engine compartment

Hawk - Disconnect and remove battery and disconnect horn switch wire at connector Disconnect battery cable at starter switch Remove distributor cap, then remove left front engine support cushion stud nut and raise left front of engine approximately 1½" Remove steering wheel and jacket assembly Remove reach rod from pitman arm, then remove steering gear housing attaching bolts Roll gear over so it is upside down and remove the assembly through engine compartment

Installation

All Models - Reverse removal procedure and tighten steering gear mounting bolts to 25-30 ft lbs *NOTE - Make sure that any spacers or shims found between steering gear and frame bracket are installed in their original positions Check the alignment of steering gear* On Avanti, tighten pitman arm nut to 100-125 ft lbs

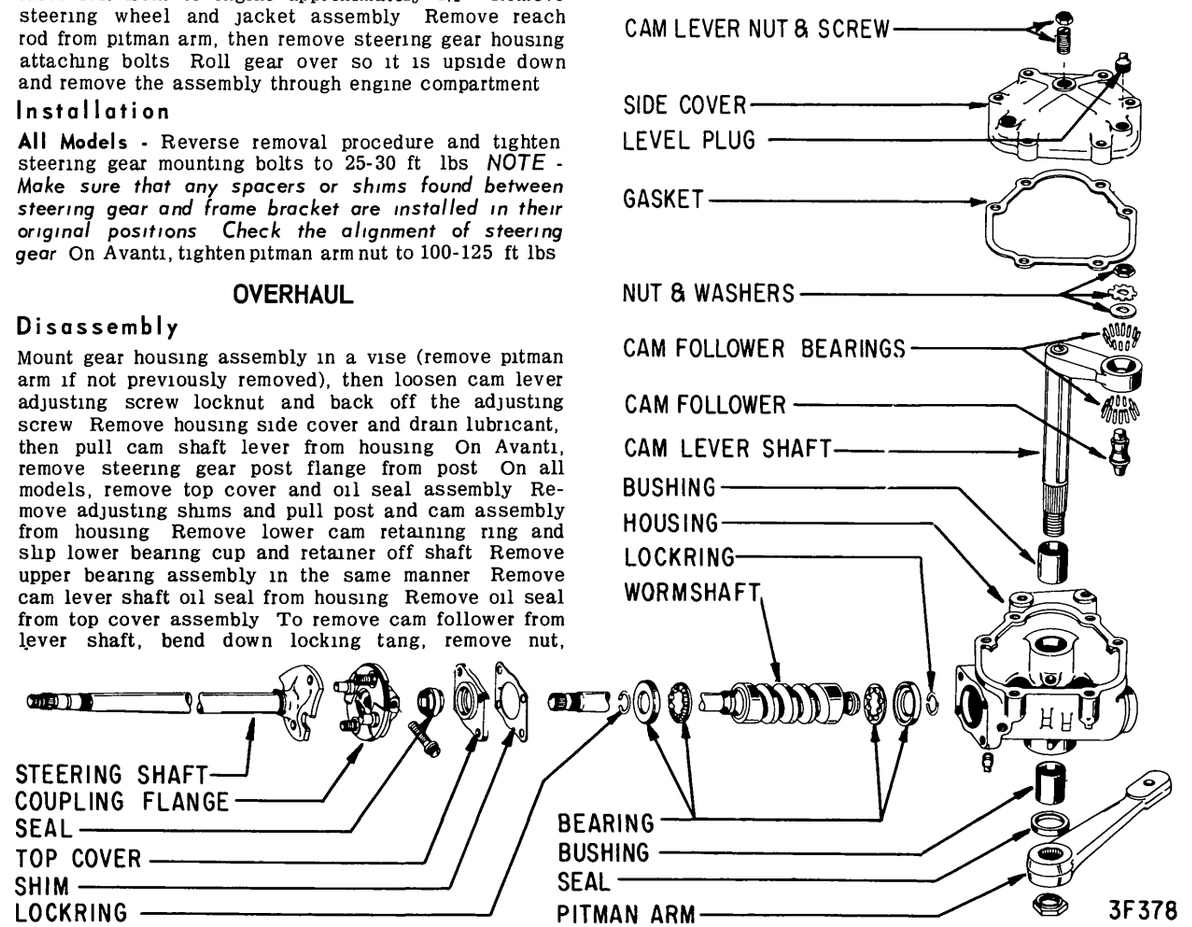
OVERHAUL

Disassembly

Mount gear housing assembly in a vise (remove pitman arm if not previously removed), then loosen cam lever adjusting screw locknut and back off the adjusting screw Remove housing side cover and drain lubricant, then pull cam shaft lever from housing On Avanti, remove steering gear post flange from post On all models, remove top cover and oil seal assembly Remove adjusting shims and pull post and cam assembly from housing Remove lower cam retaining ring and slip lower bearing cup and retainer off shaft Remove upper bearing assembly in the same manner Remove cam lever shaft oil seal from housing Remove oil seal from top cover assembly To remove cam follower from lever shaft, bend down locking tang, remove nut, lockwasher and retainer, and slip bearings and stud out of shaft If necessary to remove cam lever shaft bushings, use a suitable arbor press and press inner and outer bushings from housing

Reassembly

Reverse disassembly procedure and note the following After installing cam follower on lever, hold cam follower and tighten the nut to eliminate all play, then back nut off slightly so cam follower can be turned by hand Use an inch pound torque wrench and socket and check the amount of torque required to turn cam follower If not within limits of 1-3 inch pounds, adjust the nut as required After reassembly, place gear housing in the approximate installed position in the vise and fill with recommended lubricant Adjust steering shaft endplay and cam lever clearance (see "Adjustment" above)



ROSS SL-54 SINGLE LEVER STEERING GEAR

BUICK, CHEVROLET TRUCK & PONTIAC 3-SPEED SYNCHRO-MESH

Buick, Exc. Special (1963)
Ch vrolet Trucks, ½,¾, 1-Ton (1963) Heavy Duty
Pontiac (1963) S N t .

1963 PONTIAC TRANSMISSION NOTE - This transmission is standard equipment on Star Chief, Bonneville (Exc Safari), Grand Prix Models, heavy duty chassis, taxicabs and police cars

Description

Warner three-speed, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse) Side opening case with transmission shift levers integral with side cover assembly

Removal & Installation

Se 1962 Final Data, Page 411 ("Chevrolet & Pontiac 3-Speed Synchro-mesh") and note the following·

R moval (Buick) - Drain transmission, then mark propeller shaft and front companion flange (for installation in original position) Disconnect propeller shaft from front flange and slide propeller shaft as far rearward as possible Disconnect speedometer cable and shift rods at transmission, then loosen three exhaust pipe joints so transmission and engine can be lowered slightly Remove bolts attaching transmission mounting pad to transmission support, leaving mounting pad bolted to transmission Use a wood block and jack up engine until transmission mounting pad clears support, then remove transmission support and lower jack so transmission clears underbody Remove upper left and lower right transmission to flywheel housing attaching bolts and install suitable guide pins (Tool J-1126) Remove remaining attaching bolts and slide transmission back until drive gear shaft is clear of housing, then lower transmission from car

Installation (Buick) - Reverse removal procedure and note the following Lightly coat splines on end of main drive gear with lubriolate for a distance of 1" Fill groove in inner surface of throw-out bearing with wheel bearing grease

Shift Linkage Adjustment

See 1962 Final Data, Page 413 ("Chevrolet & Pontiac 3-Speed Synchro-mesh") and note the following·

Buick - *NOTE - The shift linkage adjustment on this car is very critical and the following procedure should be followed closely to prevent first-reverse sliding gear remaining partially engaged with countergear when a first-second shift is made* Loosen shift rod adjusting clamps at transmission end of rods, then place first-reverse shift lever in neutral and second-third shift lever into second gear (lower end of lever fully forward) Place manual control lever on steering column in second-third range, then move control lever toward instrument panel until top of knob is 3½" from lower edge of instrument panel nose pad Tighten second-third adjusting clamp on transmission end of control rod to 10-12 ft lbs *NOTE - Over-tightening will cause hard shifting and binding* Move second-third transmission shift lever into neutral position, then move manual control lever on steering column to obtain a good cross-over position with control lever in neutral cross-over Move manual control lever from first-reverse to second-third position several times until no interference is felt Hold manual control lever at first-reverse end of cross-over, then move the first-reverse shift rod up and down to determine free movement Set shift rod in middle of free movement range and tighten first-reverse adjusting clamp nut to 10-12 ft lbs *NOTE - Over-tightening will cause hard shifting and binding* After completing adjustment, operate car in first gear coast, then depress clutch and listen for gear engagement noise Slowly move control lever toward neutral cross-over (clutch disengaged) and listen for engagement noise to stop If linkage is properly adjusted, engagement noise should stop just before neutral cross-over is reached

Pontiac - *NOTE - An interlock pawl, connected to clutch pedal linkage, prevents transmission from jumping out of first or reverse and also assures full engagement of first and reverse gears Shifting into or out of reverse is prevented until clutch pedal is fully depressed*

Interlock Pawl Adjustment - With transmission shift linkage properly adjusted, place first-reverse lever on transmission in neutral position and adjust interlock pawl rod at forward end until pawl bottoms on first-reverse lever pin Tighten nut to 5-10 ft lbs

Overhaul

See 1958 Final Data, Page 406 ("Chevrolet & Pontiac 3-Speed Synchro-mesh")

CHEVROLET & PONTIAC 3-SPEED SYNCHRO-MESH

Chevy II (1963)
Chevrolet Pass. Cars (1963)
Corvette (1963)
Chevrolet Trucks ½, ¾-Ton (1963) Light Duty
Pontiac Catalina & Safari (1963)

Description

Three speed, constant mesh, synchro-mesh (2nd & high), sliding gear (low & reverse) of same design as used on previous models On Pontiac, a new interlock pawl is installed on transmission side cover to assure full engagement of first and reverse gears and to prevent transmission from jumping out of first or reverse gear during hard acceleration The pawl is connected to clutch linkage to prevent shifting into or out of reverse until clutch pedal is fully depressed

Removal & Installation

See 1962 Final Data, Page 411 ("Chevrolet & Pontiac 3-Speed Synchro-mesh")

Shift Linkage Adjustment

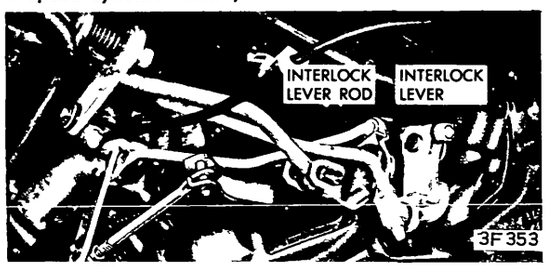
See 1962 Final Data, Page 411 ("Chevrolet & Pontiac 3-Speed Synchro-mesh") and note the following:

Pontiac - *NOTE - An interlock pawl, connected to clutch pedal linkage prevents transmission from jumping out of first or reverse and also assures full engagement of first and reverse gears. Shifting into or out of reverse is prevented until clutch pedal is fully depressed*

Interlock Pawl Adjustment - With transmission shift linkage properly adjusted, place first-reverse lever on transmission in neutral position and adjust interlock pawl rod at forward end until pawl bottoms on first-reverse lever pin Tighten nut to 5-10 ft lbs

Overhaul

See 1962 Final Data, Page 411 ("Chevrolet & Pontiac 3-Speed Synchro-mesh").



PONTIAC GEARSHIFT INTERLOCK

CHEVROLET TRUCK 4-SPEED SYNCHRO-MESH

Chevrolet Trucks ½, ¾, 1, 1½ Ton (1963)

Description

Four speed, constant mesh, synchro-mesh (second, third & fourth), sliding gear (low & reverse), of same design used on previous models

Removal Of Transmission

Removal - Drain lubricant, then remove parking brake lever *NOTE - Not necessary to remove parking brake lever on Series 10 trucks* Remove propeller shaft Slide open end of Tool J-8109 over shift lever and engage lugs of tool in open slot of retainer, then press down on tool and turn it to left to disengage lugs on retainer and remove shift lever Remove screws and slide steering column jacket grommet up jacket, then remove accelerator pedal and floor mat Remove transmission cover On Forward Control models, remove front and rear floor pans On all models, remove speedometer cable at transmission Remove two upper transmission attaching bolts and install guide pins, J-1126, then remove flywheel lower pan and lower transmission attaching bolts Slide transmission back on guide pins until clear of clutch assembly and remove transmission

Overhaul

See "Chevrolet Truck 4-Speed Helical Gear (Synchro-mesh)" in Transmission Section of Manual and note the following.

Third Gear Mainshaft Bearing Installation - To insure proper initial lubrication when installing third gear mainshaft bearing, it is important to place grease on that area of mainshaft on which the bushing will be placed

Design Changes - A needle bearing replaces the roller bearing and spacer at front countergear position New design ball bearings are used at clutch gear, mainshaft rear bearing, and rear countergear positions A spline lock feature is used for third and fourth gear clutch assembly A new disc shaped magnetic chip collector is bonded to inside of transmission case

Countergear Front Bearing Installation Note - This bearing cannot be installed with Tool J-994 Install bearing flush with front of transmission case by tapping or pressing on steel plate or other flat surfaced tool positioned to cover entire front face of bearing assembly If bearing that is intended to be re-used is removed from case, it should be tapped out of case using a tool that will provide full circle contact on rim of bearing assembly rear face Bearing will be damaged if not removed as directed

CHRYSLER CORP 3-SPEED SYNCHRO-MESH

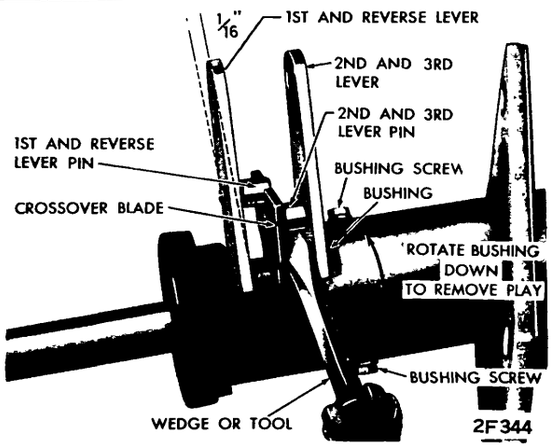
Chrysler, Dodge, Plymouth, Valiant (1963)
NOTE - Light duty transmissions are standard equipment on 6 cylinder models. Heavy duty transmissions are standard equipment on all V8 models and optional equipment on 6 cylinder models.

Description

Three-speed synchro-mesh of same design used on previous models. Taxi models (if so equipped) have a special interlock assembly that prevents shifting into low or reverse without fully depressing clutch.

Shift Linkage Adjustment

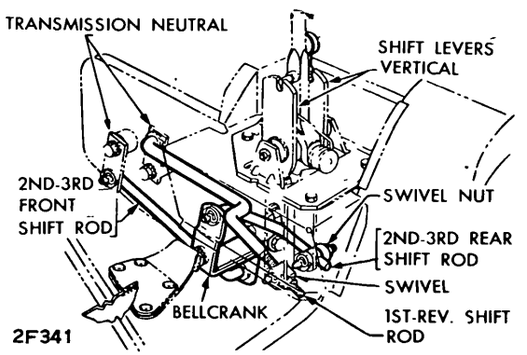
Steering Column Shift - With 2nd-3rd control rod disconnected from lever on end of steering column and 1st-reverse control rod disconnected from lever on transmission, position both levers on transmission in neutral. *CAUTION - Make sure neutral detent balls are properly engaged.* Check axial freedom of shift levers in steering column. If outer end of levers move axially more than 1/16", loosen the two upper bushing screws and rotate plastic bushing (downward) until all freeplay of levers is removed, then tighten bushing screws securely. Install a wedge or suitable tool between crossover blade and 2nd-3rd lever so that crossover blade is engaged with both lever crossover pins. Adjust swivel on end of 2nd-3rd control rod until stub shaft of swivel enters hole in steering column lever, then secure swivel to lever and tighten locknut to 70 inch pounds. *NOTE - During the above adjustment 2nd-3rd shift control rod should also be adjusted to position selector lever at steering wheel so it is 5° (116" wheelbase cars); 10° (106" wheelbase cars) above horizontal with transmission in neutral.* Slide clamp and swivel (on end of 1st-reverse rod) until swivel stub enters hole in transmission lever and secure in position. Determine mid-backlash position in linkage and tighten clamp bolt to 100 inch pounds. Remove positioning wedge or tool from crossover blade and lever, then move selector lever through all positions to check adjustment and crossover smoothness.



STEERING COLUMN SHIFT ASSEMBLY

Floor Shift (Exc. Chrysler 300J) - Remove screws holding upper boot and retainer to floor pan and slide boot up on gearshift lever. Disconnect shift rods at lower end of shift assembly levers, then place shift levers on transmission in neutral position. With crossover pin in shift control lever engaged in 2nd-3rd lever, the gap from crossover pin to 1st-reverse lever should not exceed .055". Clip crossover pin tool over 2nd-3rd end of crossover pin so that pin engages both shift levers. *NOTE - A suitable wedge can be used at same location to engage crossover pin in both levers if clip tool is not available.* With shift levers on shift assembly vertical and shift levers on transmission in neutral position, adjust swivel on end of 1st-reverse shift rod so it freely enters hole in shift lever. Repeat this procedure for 2nd-3rd shift lever - to-bellcrank rod. When adjustment completed, tighten swivel nut to 20 inch pounds, then remove crossover pin or wedge. Replace upper boot and check shift in all positions.

Floor Shift (Chrysler 300J) - Loosen lever assembly pivot bolt and screw, then install a ¼" rod through the two lever aligning holes and bracket slot provided in shift assembly. Pre-set length of 1st-reverse shift rod to obtain the proper hand lever position (5-6" from front of knob to closest point on instrument panel with transmission in neutral). Install 1st-reverse rod by rotating lever assembly in the adjusting slot until 1st-reverse lever hole lines up with the pre-set rod length, then tighten lever assembly pivot bolt and screw. Adjust length of 2nd-3rd rod to match the lever holes and install rod and remove locking pin. Place shift lever in 3rd gear, then adjust lever stopscrew (at forward side of shift assembly housing) to provide a clearance of .020-.040" between end of stopscrew and shift lever. Place shift lever in 2nd gear and repeat the adjustment between stopscrew (at rear side of shift assembly housing) and shift lever. Lock stopscrews in place and check shift operation in all gears.



FLOOR MOUNTED GEARSHIFT ASSEMBLY (EXC. 300J)

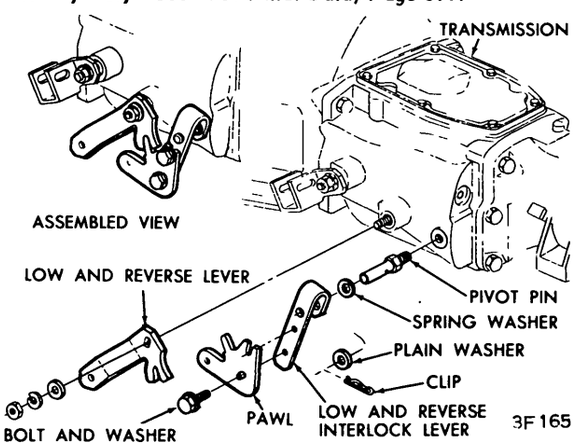
Interlock Adjustment (Taxi)

Pawl Adjustment - With transmission in neutral and pawl-to-pawl lever attaching bolts loose, rotate pawl forward into FULL engagement with 1st-Rev. lever pawl slot. Position pawl to provide equal clearance with pawl slot on both sides of pawl, then tighten pawl bolts to 200 inch pounds.

Linkage Adjustment - With clutch linkage adjusted, make sure clutch pedal is in fully returned position, then shift transmission into neutral. Install interlock rod with anti-rattle washer and clips leaving the sliding adjustment bolt loose. Rotate pawl lever forward to bottom the pawl in transmission 1st-Rev. lever pawl slot, then tighten sliding clamp bolt to 100 inch pounds. *CAUTION - Do not pull interlock rod backwards against fork pull back spring load during this adjustment.* With engine not running, shift transmission in normal manner with clutch disengaged, from neutral to first, and from neutral to reverse, engaging the clutch when in gear. If operation is not normal, readjust pawl linkage. Disengage clutch and shift transmission half-way between neutral and first. Let the clutch out. When properly adjusted, the interlock should allow clutch pedal to return to about 5" from fully returned position.

Overhaul

Light Duty - *See 1960 Final Data, Page 407 or later Manual edition.*
Heavy Duty - *See 1961 Final Data, Page 399.*



INTERLOCK ASSEMBLY (TAXI)

COMET & FALCON (6 CYL.) 4-SPEED SYNCHRO-MESH

Comet 6 Cyl. Models (1963)
Falcon 6 Cyl. Models (1963)

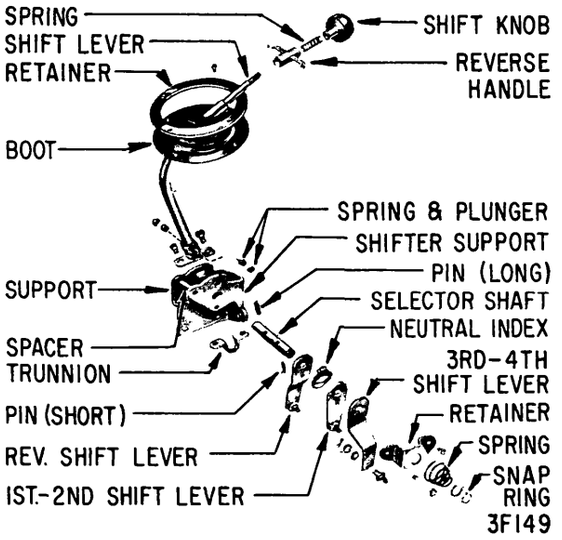
DESCRIPTION

Four-speed fully synchronized type with all forward speed gears in constant mesh. Transmission shift lever and linkage are mounted on transmission extension housing with selector lever entering driver's compartment through a hole in floor pan. A finger operated release lever is provided on selector lever to prevent accidental shift into reverse gear.

ADJUSTMENT

Shift Linkage

With transmission in neutral position, insert a ¼" rod into the alignment hole in outer lever and through holes in other two levers (see illustration). *NOTE - If rod will not enter, check for bent connecting rods.* To adjust, loosen connecting rod retainer locknuts on end of each shift lever and position levers so rod will enter alignment holes. *NOTE - Make sure levers are in neutral and that reverse shifter lever is in neutral detent.* Check for smooth cross-over operation and for engagement of detents.



SHIFT LEVER ASSEMBLY

REMOVAL & INSTALLATION

Transmission Removal

Remove screws attaching retaining ring and boot to floor pan, then raise boot and ring on shift lever and disconnect shift lever from linkage assembly by removing capscrews at lower end of shift lever. Raise car and disconnect cable from starter, then remove starter. Drain transmission lubricant and disconnect driveshaft at pinion flange, then pull driveshaft off transmission shaft. Remove backup lamp switch from shift control linkage bracket, then remove clip from equalizer bar at clutch release rod and remove rod. Remove linkage return spring from release lever, then disconnect parking brake front cable from equalizer bar and speedometer cable from extension housing. Support engine with a jack and remove two bolts attaching rear mount spring to extension housing. Raise rear of engine and remove transmission support crossmember from underbody. Support transmission and remove bolts attaching flywheel housing to engine. Remove housing cover. Move transmission and clutch housing assembly toward rear until transmission input shaft splines are clear of clutch housing.

Transmission Installation

Reverse removal procedure and tighten all bolts and nuts to specifications (see "Tightening Specifications" below).

OVERHAUL

Disassembly

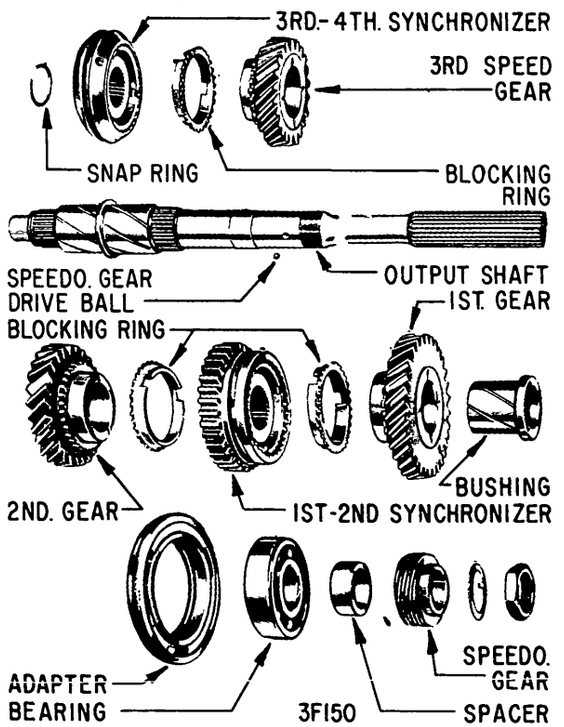
1) Disconnect shift rods from shift levers, then remove bolts attaching shift selector assembly to housing. Insert a screwdriver (grind notch in end of blade) through hole in clutch release lever and unhook retainer that secures clutch release lever to retainer bracket (see illustration), then remove flywheel housing from transmission.

2) Remove shift cover from transmission and remove input gear bearing retainer. Disconnect and remove extension housing from transmission. Drive countershaft toward rear of case until it is just clear of front wall of case, then use a "dummy" shaft and push countershaft out until "dummy" shaft and countergear drop out of position.

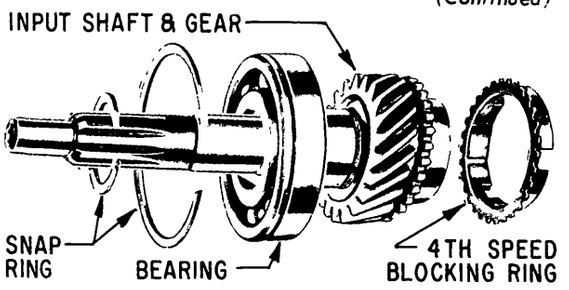
3) Remove output shaft assembly from rear of case and input gear and bearing from front of case. Lift countergear assembly out through cover opening of case. *NOTE - Smallest diameter thrust washer will be found between rear of gear and case and the larger diameter steel and bronze washers at front.* Thread a 5/16"-24 bolt into rear end of reverse idler gear shaft and pull shaft using a suitable puller, then remove idler gear. If necessary to remove input shaft bearing from shaft, use a suitable support plate and an arbor press to press shaft out of bearing.

4) Remove output shaft nut and lock, then remove speedometer drive gear, drive ball and spacer. Support output shaft assembly on front face of second speed gear in an arbor press and press output shaft out of gear train. Remove snap ring from in front of 3-4 synchro-

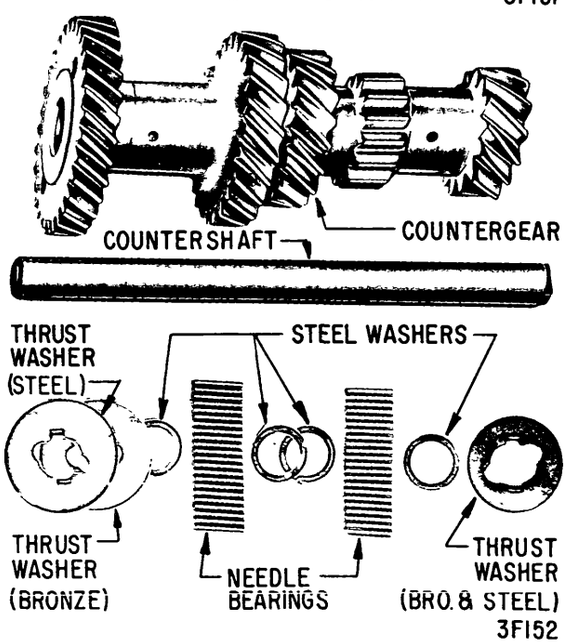
(Continued)



OUTPUT SHAFT ASSEMBLY



INPUT GEAR & BEARING ASSEMBLY 3F151



3F152

COUNTERGEAR ASSEMBLY

COMET & FALCON (6 CYL.) 4-SPEED SYNCHRO-MESH (C nt.)

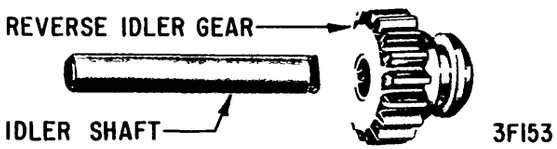
nizer on output shaft, then press third gear and 3-4 synchronizer off shaft.

5) Before disassembling synchronizer, scribe an alignment mark across hub and sleeve to insure reassembly in original position. Remove front and rear insert springs from both synchronizer assemblies, then slide sleeves off hubs. Remove hub inserts.

Inspection

Wash all parts thoroughly, then inspect transmission case for cracks, wear, damaged bearing bores, or damaged threads. Remove all small nicks or burrs from case machined surfaces. Check all parts for wear, chipped or broken teeth, and damage. Replace all damaged or worn parts.

Countershaft Gear Endplay Check - Temporarily install countergear and "dummy" shaft assembly in transmission with thrust washers in proper position. Check endplay between thrust washers and transmission case with a feeler gauge. Endplay should be .008-.022". If endplay is excessive, replace thrust washers.



REVERSE IDLER ASSEMBLY

Reassembly

1) Place long inserts into slots in 1-2 synchronizer hub and slide combination sleeve and reverse gear over it making sure that scribe marks on hub and sleeve are aligned. Snap insert springs into place with tab on each spring set into underside of an insert. Position short inserts into slots in 3-4 synchronizer hub and slide clutch sleeve over it making sure that scribe marks are aligned, then install insert springs in same manner as for 1-2 synchronizer.

2) Place second gear on rear of output shaft with clutch teeth and tapered synchronizer end toward rear. Install a blocking ring with clutch teeth toward front. Install first and second synchronizer and reverse gear assembly on rear of output shaft with shift fork groove toward rear. *NOTE - Be sure second speed blocking ring is not cocked on gear and that the three index slots align with synchronizer inserts.*

3) Install first speed blocking ring with clutch teeth toward rear and with slots engaging synchronizer inserts. Slide first gear and sleeve onto output shaft with taper and clutch teeth toward front (bushing shoulder toward rear). Assemble output shaft ball bearing into recess in bearing adapter, then position adapter and bearing on rear of output shaft with adapter forward. Hold first gear and sleeve forward and place assembly in a press with supports against bearing inner race. Press shaft through until bearing is firmly seated against first gear bushing.

4) Place spacer, speedometer gear drive ball, speedometer gear (shoulder to rear), and nut on output shaft. Tighten nut securely, then lock in place with lock tabs. Place third speed gear on front of output shaft with clutch teeth toward front and install blocking ring on gear. Install 3-4 synchronizer with wide thrust surface of hub toward rear. Align blocking ring slots with synchronizer inserts. *NOTE - Hub-to-shaft spline fit may require a slight press to assemble.* Install snap ring in its groove on front of output shaft.

5) Install "dummy" shaft in countershaft gear, then drop a steel washer over shaft and into gear. Coat each needle bearing with grease and install 22 of them into gear. Lay another steel washer on ends of needles and install proper thrust washers. Repeat this operation at other end of countershaft gear. Position countershaft gear in case with the two thrust washers at front.

6) Press input bearing onto input shaft with outer race snap ring toward front, then install snap rings on bearing outer race and on output shaft. Install 17 roller bearings in bore of input shaft, holding them in position with grease, then install input shaft assembly in case front bore. Place fourth gear blocking ring on rear of input shaft with clutch teeth forward.

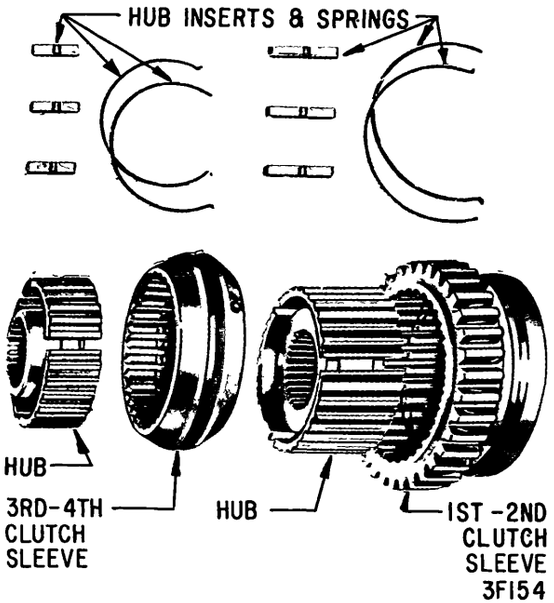
7) Enter output shaft assembly through rear of case and guide front pilot into input shaft counterbore and bearings. *NOTE - Be sure fourth gear synchronizer blocking ring slots index with inserts on 3-4 synchronizer assembly.* Raise countershaft gear assembly and thrust washers until countershaft can be inserted from rear of case into gear and bearings. Push countershaft through, displacing the "dummy" shaft until it contacts front of case. Position flat on rear of shaft horizontally so it aligns with slot in extension housing, then tap shaft into place.

8) Install reverse idler gear with fork groove toward rear and idler shaft flat in a horizontal position and parallel with countershaft flat. Install a new gasket on rear of case using a non-drying sealer, then install extension housing. Align dowel in housing with hole in rear bearing adapter, and tighten bolts. *NOTE - If two long and two short bolts reus d, install long bolts in upper right and lower left holes.*

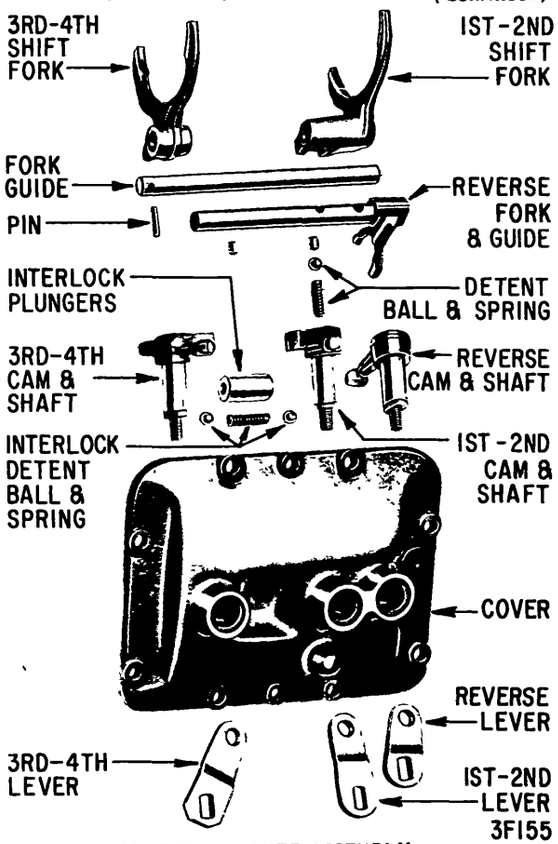
9) Install new bearing retainer gasket, using a sealer, then install retainer, with drain slot facing downward. Tighten bolts to 12-15 ft. lbs. *NOTE - If a new seal was required in retainer, remove with Tool T58L-101-A and a sliding hammer.* Tap new seal into position with a hammer.

10) Place 1-2 and 3-4 synchronizers in neutral and reverse idler gear in reverse (forward) position. Set reverse shift lever in position, then install a new shift cover gasket on case, using sealer. Install shift cover and attaching bolts (dip bolts in sealing compound before installation) and tighten to 10-13 ft. lbs.

11) Install flywheel housing, using sealer on attaching bolts, and tighten them to 32-36 ft. lbs. Install clutch release bearing on release lever, then position lever through housing (from inside housing) and clip lever retainer on its hook using the same notched screwdriver used for removal. Install shift selector assembly on housing and connect shift rods, then adjust shift linkage (see "Adjustment" above). *(Continued)*



SYNCHRONIZER ASSEMBLY



GEARSHIFT COVER ASSEMBLY

COMET & FALCON (6 CYL.) 4-SPEED SYNCHRO-MESH (Cont.)

Disassembly (Shift Cover)

Remove levers from cams and shafts, then remove roll pin from upper fork shaft and remove forks and shafts. Remove reverse cam and shaft, then rotate reverse fork and shaft assembly to disengage detent ball and remove fork and shaft. *NOTE - Hold cloth over shaft cover boss nearest to fork to catch detent ball and spring when shaft clears boss hole.* Remove other cam assemblies while holding a cloth to catch detent balls. Push interlock sleeve, spring and remaining ball out of cover. Remove interlock pins from reverse fork and shaft bosses in cover. If seals need replacing, remove them with a screwdriver.

Reassembly (Shift Cover)

Install 1-2 and 3-4-to-reverse interlock pins in holes in reverse fork and shaft bosses, then install 3-4 shift cam in cover. Install 1-2-to-3-4 cam interlock sleeve, ball, spring and another ball. Hold 3-4 cam in neutral position with the 1-2 ball depressed while 1-2 cam is installed in cover. Install levers and tighten retaining nuts to specifications (see below). Check clearance between interlock, detent sleeve and 1-2 and 3-4 shift cams (in and between all shift positions). Clearance should be .0005" to .010". *NOTE - Service sleeves are available to compensate for wear.* With 1-2 and 3-4 shift cams in neutral position and the 1-2 and 3-4-to-reverse interlock pin resting on cams, install reverse shaft detent spring and ball and reverse fork and shaft. Install reverse shift cam through cover and into aligned fork and shaft. Install reverse cam operating lever (leave nut and washer loose). Position 1-2 and 3-4 forks onto shift cams and install fork shaft. Align shaft hole with the one in cover and install lock pin. Check all shift positions for freedom of movement and interlock action.

Disassembly (Gear Selector)

Remove snap ring from end of selector shaft and remove washer and spring, then disconnect selector levers and bracket from shaft. Drive short selector lever pin from shaft, then drive out long selector pin and remove trunnion and shaft. If necessary to remove studs from selector levers, remove cotter pins, washers and studs.

Reassembly (Gear Selector)

Reverse disassembly procedure.

Tightening Specifications

Extension Housing Bolts (7/16"-14)	12-20 ft. lbs.
Extension Housing Bolts (3/8"-16)	23-28 ft. lbs.
Input Shaft Bearing Retainer Bolts	12-15 ft. lbs.
Transmission to Flywheel Housing Bolts	32-36 ft. lbs.
Transmission Cover Bolts	10-13 ft. lbs.
Rear Support to Extension Housing Bolt	18-24 ft. lbs.
Universal Joint U-Bolt Nut	7-10 ft. lbs.
Shift Levers to Cam & Shaft Lock Nuts	12-15 ft. lbs.

COMET & FALCON (6 CYL.) 3-SPEED SYNCHRO-MESH

Comet (1963)
Falcon (1963)

Description

Three speed, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type of same design used on previous models.

Removal & Installation

Removal - Remove propeller shaft, then disconnect speedometer cable and gearshift rods at transmission. Remove extension housing-to-support bolt. Place a jack under flywheel housing and raise rear of engine slightly, then remove transmission mounting bolts and install two guide pins in lower holes. Remove transmission by sliding to rear to clear input shaft and guide pins. *NOTE - To prevent oil leakage after removal of propeller shaft, install Tool T60K-7657-A (Falcon), 7657-G (Comet). Tool must be removed before transmission can be removed from car.*

Installation - Reverse removal procedure.

Overhaul

See 1960 Final Data, Page 406 or later Manual edition.

FORD MOTOR CO. FULLY SYNCHRONIZED 3-SPEED SYNCHRO-MESH

Comet & Falcon V8 (1963)
Falcon Station Bus (1963)
Falcon Club Wagon (1963)
Fairlane & Meteor (1963)
Ford Galaxie (1963)
Mercury Monterey (1963)
Ford Truck F-100, F-250 & P-350 (1963)
Econoline (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 TRANSMISSION INPUT SHAFT NEEDLE BEARING INSTALLATION CAUTION:* When installing needle bearings in input shaft, use a minimum amount of grease to retain bearings in position during installation to prevent clogging input shaft lube holes. If excessive grease is used, lubricant flow to bearings will be restricted.

Description

Three-speed, fully synchronized type, with all gears except reverse gear in constant mesh. Forward speed gears are all helical-cut. Reverse gears are spur-cut.

Removal & Installation

Fairlane, Meteor, Galaxie & Monterey

Removal - Drain transmission and remove propeller shaft, then disconnect speedometer cable and shift rods at transmission. On cars with overdrive, disconnect overdrive wires and control cable. Disconnect parking brake cable and support engine with a jack, then remove engine rear support and crossmember as a unit. Remove transmission-to-flywheel housing attaching bolts and install two guide pins in lower bolt holes. Move transmission to rear to clear clutch assembly and remove from car.

Installation - Reverse removal procedure and refer to "Tightening Torque Table".

Ford Truck

Removal - Drain lubricant, disconnect speedometer cable, propeller shaft, and gearshift linkage at transmission. On propeller shaft type parking brake, disconnect cable clevis at cam and remove cable conduit clamp. On models with overdrive transmission, disconnect wires and control cable at transmission. On 4-Wheel drive models, remove transfer case shift lever bracket from transmission. On all models, remove transmission attaching bolts and install guide studs, then pull transmission rearward to clear clutch assembly, and remove transmission.

Installation - Reverse removal procedure and refer to "Tightening Torque Table".

Econoline Truck

Removal - Drain transmission and remove propeller shaft, then disconnect speedometer cable and shift rods at transmission. Support engine with a jack and remove rear support anchor bolt and nut, then lower engine to clear support. Remove transmission attaching bolts and move transmission rearward to clear clutch assembly, and remove from truck.

Disassembly

1) Drain transmission, then remove transmission cover and gasket, extension housing and gasket, and front bearing retainer and gasket. *NOTE - On Econoline Trucks, remove companion flange from transmission output shaft before removing extension housing.*
2) Remove lubricant filler plug from right side of case, then work through plug opening and drive roll pin out of case and countershaft with a small punch. Hold countershaft gear with a hook and push countershaft out of case toward rear with a suitable dummy shaft (Tool T63-P-7111-B) until countershaft gear can be lowered to bottom of case.
3) Remove input shaft and gear from front of case (Except 352" & 390" Eng. transmissions). *NOTE - On 352" & 390" Eng. transmissions, move input shaft forward until gear contacts case, then remove large outer snap ring. Input shaft will be removed after output shaft assembly is removed.*
4) Remove snap ring securing speedometer gear to shaft (snap ring not used on Econoline Trucks), then slide gear off output shaft and remove gear lock ball. Remove output shaft bearing snap ring, then remove bearing using tool shown in illustration.
5) Place both shift levers in neutral position, then remove setscrew retaining detent springs and plugs in case and remove these parts (see illustration). Remove 1st-Rev. shift fork setscrew and slide shift rail out through rear of case. Rotate shift fork upward and re-

(Continued)

FORD MOTOR CO.
FULLY SYNCHRONIZED 3-SPEED
(Continued)

move. Remove 2nd-3rd shift fork setscrew and rotate shift rail 90° with a pair of pliers. *CAUTION - Do not damage rail surface with pliers.* Lift interlock plug from detent bore with a magnet and tap inner end of 2nd-3rd shift rail to drive expansion plug from front of case. Remove shift rail from case, then remove remaining detent plug and spring from detent bore. Remove 2nd-3rd shift fork from case.

6) Lift output shaft assembly out through top of case. On 352" & 390" Eng. transmissions, push input shaft and gear into case until bearing is free of bore, then remove assembly from case.

7) Drive reverse idler gear shaft out through rear of case with a drift punch, then remove idler gear and thrust washers from case. Remove countershaft gear from case, being careful not to allow dummy shaft and needle bearings to fall out of gear. Remove countershaft retaining pin from bottom of case.

8) Remove outer shaft levers from shift shafts, then slide both shift shafts out of case (discard "O" rings).

9) Remove snap ring from front of output shaft and slide synchronizer and second speed gear off shaft. Remove the next snap ring and tabbed thrust washer from output shaft and slide off 1st gear and blocking ring. Remove the third snap ring from output shaft and slide off reverse gear and sleeve.

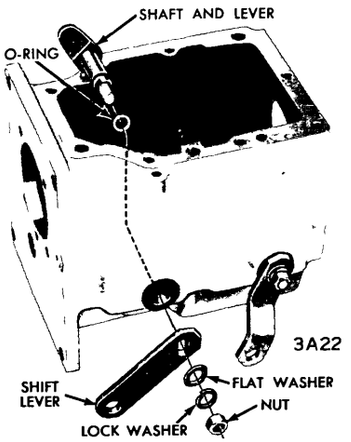
10) Remove dummy shaft from countergear and remove 50 roller bearings and two retainer washers from countergear. If input shaft bearing is to be replaced, remove and install with tools shown in illustration. Disassemble synchronizer units (see illustrations).

Inspection

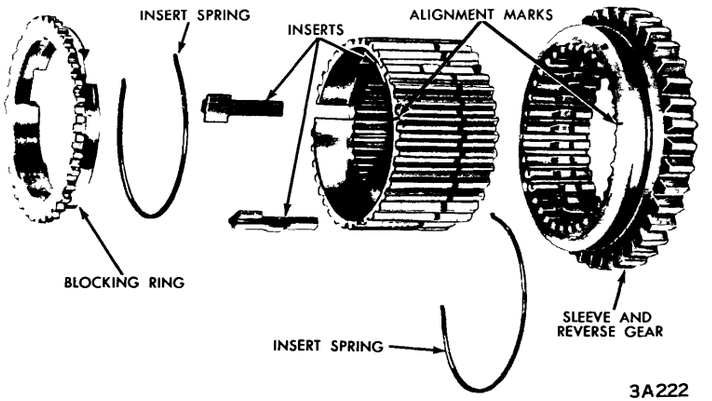
Wash all parts in cleaning solvent and dry with air. Dip bearings in transmission lubricant after they have been dried, then wrap in clean lint-free cloth until ready for installation. Inspect transmission case for cracks, wear, damaged bearing bores, or damaged threads. Remove all small nicks or burrs from front of case. Check all other parts for wear, chipped or broken teeth, and damage. Replace parts as necessary.

Countershaft Gear Endplay Check - Install dummy shaft in gear, then install 25 needle bearings and a retainer washer at each end of gear (retain in position with grease). Install countershaft gear assembly, thrust washers, and countershaft in case, then turn transmission case in a vertical position. Check clearance between upper thrust washer and surface of gear. Clearance should be .004-.018". If clearance is excessive, install new thrust washers as required. Remove countershaft with the dummy shaft and allow countershaft gear to remain in case.

Reverse Idler Gear Endplay Check - Clearance should be .004-.018". Check in same manner as for countershaft gear (above). If clearance is excessive, replace thrust washers. *NOTE - Thrust washer with flat side must be at web end and spur gear must be toward rear of case.*



SHIFT LEVER ASSEMBLIES



1ST & REV. SYNCHRONIZER ASSEMBLY

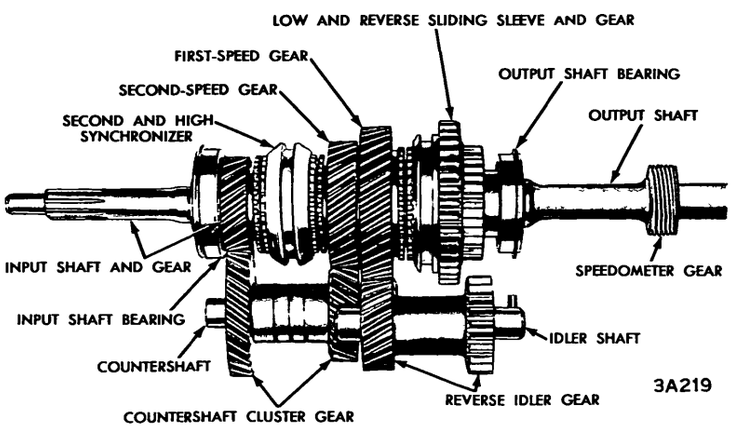
Reassembly

1) If countershaft gear was not installed in case for endplay check, apply grease to both ends of bore in gear and install 25 needle bearings and retainer washer at each end, with dummy shaft inserted in countergear. Install thrust washers at each end of gear and install countergear assembly in transmission case. Allow assembly to rest on bottom of case.

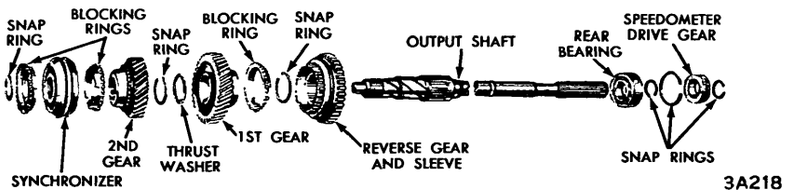
2) Install insert spring in groove of 1st-Rev. synchronizer hub, making sure that spring covers all insert locations, then start hub in sleeve, aligning index marks. Position three inserts in hub so that small end is over spring and shoulder is on inside of hub. Slide sleeve and reverse gear onto hub until detent is engaged, then install second insert spring in front of hub to hold inserts against hub.

3) Install an insert spring in groove of 2nd-3rd synchronizer hub so all three insert locations are covered,

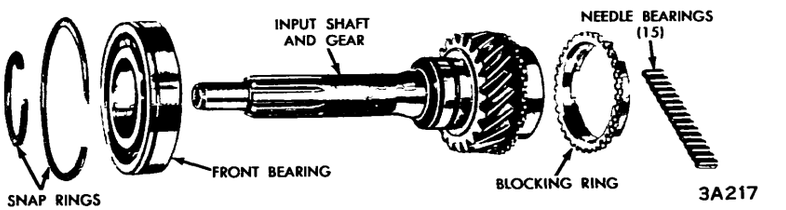
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TRANSMISSION GEAR TRAIN



OUTPUT SHAFT ASSEMBLY



INPUT SHAFT ASSEMBLY

FORD MOTOR CO. FULLY SYNCHRONIZED 3-SPEED (C ntinued)

then start hub into sleeve, aligning index marks. Place three inserts on top of retaining spring and push assembly together. Install remaining insert spring so spring ends cover same slots as the other spring (do not stagger springs). Place a synchronizer blocker ring in each end of synchronizer sleeve.

4) Lubricate output shaft with transmission lubricant and slide 1st-Rev. synchronizer assembly onto output shaft with teeth end of gear facing toward rear of shaft. Install snap ring. Coat tapered machined surface on 1st gear with grease and place blocker ring on greased surface. Slide 1st gear onto output shaft with blocker ring toward rear of shaft (rotate gear as necessary to engage three notches in blocker ring with synchronizer inserts), then install thrust washer and snap ring.

5) Coat tapered machined surface of 2nd gear with grease and slide blocker ring onto it, then slide 2nd gear with blocker ring and 2nd-3rd synchronizer onto output shaft. *NOTE - Tapered machined surface of 2nd gear must be toward front of case, and notches in blocker ring must engage synchronizer inserts.* Secure in position with snap ring.

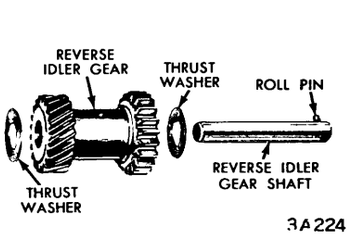
6) Install new "O" ring seal on each shift shaft, then lubricate with transmission fluid and install shafts in case. Install outer shift levers. Coat bore of input shaft and gear with grease and install 15 needle bearings in bore.

7) On 352" & 390" Eng. transmissions, install input shaft and gear assembly through top of case, then work through rear opening in case, tap input shaft and gear assembly into case with a drift until gear contacts case. *NOTE - Make sure none of the needle bearings drop out.* On all models, position output shaft assembly in case.

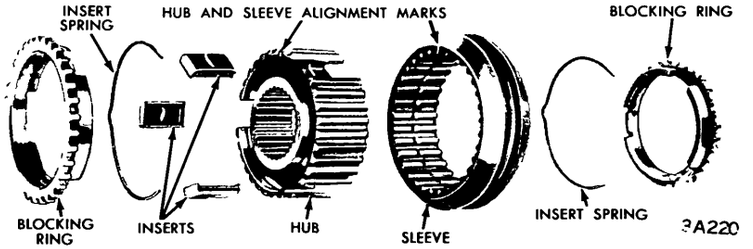
8) Place a detent plug spring and plug in case, then place 2nd-3rd speed shift fork in synchronizer groove. Rotate fork into position and install 2nd-3rd speed shift rail (it will be necessary to depress detent plug to enter rail in bore). Move rail inward until detent plug engages center notch (neutral), then secure fork to rail with setscrew. Install interlock plug in case (top of plug will be slightly lower than surface of 1st-Rev. shift rail bore if 2nd-3rd shift rail is in neutral position). Install 1st-Rev. shift fork in groove of synchronizer, then rotate fork into position and install 1st-Rev. shift fork rail until center (neutral) notch is aligned with detent bore. Secure fork to rail with setscrew. Install remaining detent plug and spring, then install and tighten setscrew until head is flush with case. Install expansion plug in case.

9) On all models (Exc. 352" & 390" Eng. transmissions), install input shaft and gear in front of case, then install bearing retainer and gasket (oil return groove in in retainer at bottom). Install attaching screws and tighten to 19-25 ft. lbs.

10) On 352" & 390" Eng. transmissions, install large snap ring on input shaft bearing and carefully work shaft and gear onto front of output shaft until snap ring is seated against case. *CAUTION - Make sure needle bearings in input shaft do not fall out and that notches in blocker ring engage inserts in synchronizer.* Install bearing retainer and gasket (oil return groove in retainer at bottom), then install attaching screws and tighten to 19-25 ft. lbs.



REVERSE IDLER GEAR ASSEMBLY



2ND & 3RD SYNCHRONIZER ASSEMBLY

11) On all models, install large snap ring on rear bearing, then place bearing on shaft with snap ring end toward rear. Press bearing into place with tool shown in illustration. Secure bearing to shaft with snap ring. Hold speedometer drive gear lock ball in detent and slide speedometer gear onto shaft. Secure in place with snap ring (except Econoline Truck).

12) Place transmission in vertical position, then work through drain hole in bottom of case, align bore of countergear and thrust washers with bores in case, using a screwdriver. Insert countershaft into transmission case from rear and push dummy shaft out of countershaft gear. *CAUTION - Before countershaft is completely inserted, make sure that hole for roll pin is aligned with hole in case.* Install roll pin in case and countershaft, working through lubricant filler hole in case.

13) Install filler and drain plugs (magnetic drain plug in bottom). Install extension housing and gasket (coat gasket with sealer). Dip threads of attaching bolts in sealer before installing, and tighten to 42-50 ft. lbs. With transmission in gear, fill with lubricant while rotating gear assembly. Coat new cover gasket with sealer, then install cover and tighten screws to 14-19 ft. lbs.

Extension Housing Bushing & Seal Replacement - Bushing and seal should be replaced with extension housing attached to transmission case.

Removal (Bushing & Seal) - Remove bushing and seal in a single operation using Tool T52L-7000-GAE or 7000-G.

Removal (Seal Only) - Use Tool 1175-AB and a suitable sliding hammer.

Installation (Bushing) - Use Tool T57P-7697-B or 7657-G.

Installation (Seal Only) - Use Tool T57L-7657-A or 7657-D.

FORD TRUCK 3-SPEED SYNCHRO-MESH

Ford Trucks (1963)

Description

Transmission is same design as used on corresponding previous models.

Removal Of Transmission

Drain transmission, then disconnect speedometer cable, propeller shaft, and gearshift linkage at transmission. On propeller shaft type parking brake, disconnect cable clevis at cam and remove cable conduit clamp. On models with overdrive transmission, disconnect wires and control cable at transmission. On 4-wheel drive models, remove transfer case shift lever bracket from transmission. On all models, remove transmission attaching bolts and install guide studs, then pull transmission rearward until input shaft clears clutch assembly and remove transmission.

Overhaul

See "Ford Truck 3-Speed Light & Medium Duty" in Transmission Section of Manual.

FORD TRUCK 4-SPEED SYNCHRO-MESH

Ford Trucks (1963)

Description

Transmission is same design as used on corresponding previous models.

Removal Of Transmission

On all models, except Tilt Cab, remove floor mat and accelerator pedal, then remove transmission cover plate. Disconnect parking brake and remove gearshift housing. On Tilt Cab models, disconnect parking brake rod at transmission and remove rear cross shaft housing. On all models, disconnect drive shaft and speedometer cable, then remove two upper transmission attaching bolts and secure jack to transmission. Remove remaining transmission attaching bolts and slide transmission rearward to clear clutch assembly and remove from truck.

Overhaul

See "Ford Truck 4-Speed (Synchro-mesh)" in Transmission Section of Manual.

OLDSMOBILE (EXC. F-85) 3-SPEED SYNCHRO-MESH

Oldsmobile, Exc. F-85 (1963)

Description

Same design transmission as used on previous models.

Shift Linkage Adjustment

NOTE - Two adjustments required as follows:

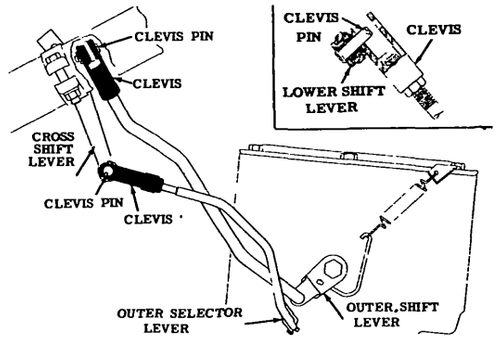
Shift Lever - Place outer lever on transmission in second gear position (outer lever forward, inner lever to rear), then disconnect shift rod from steering column lower shift lever at clevis. Hold steering column lower shift lever upward against its stop in mast jacket, then install clevis pin through lower shift lever from bottom side and adjust clevis so it slides freely over pin. Shorten shift rod by turning clevis **5½ turns.** Install clevis pin and cotter pin, and tighten clevis locknut.

Cross Shift Linkage - Disconnect cross shift rod from steering column cross shift lever. With transmission selector lever on transmission against its stop (rearward), adjust upper clevis so that clevis pin will easily enter hole in cross shift lever at lower end of steering column. Remove clevis pin and lengthen rod by turning clevis 5 turns. *NOTE* - This should bring selector lever at steering wheel to within 3 15/16" ± 1/4" of steering wheel (see illustration). Install clevis pin and cotter pin, then tighten clevis locknut.

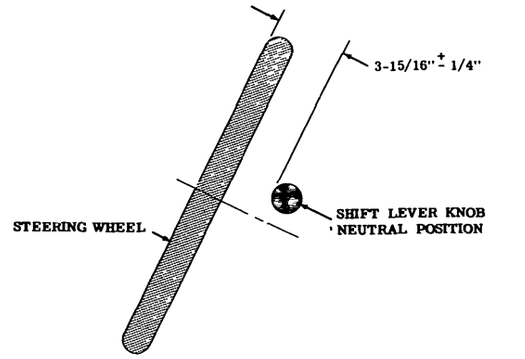
Removal & Installation

Removal - Drain transmission and disconnect control rods and speedometer cable at transmission. Remove propeller shaft, then remove four transmission-to-clutch housing bolts and slide transmission rearward until main shaft clears clutch housing. Remove transmission from under car.

Installation - Reverse removal procedure and note the following: Apply a light coat of lubricant to pilot on main drive gear. Tighten transmission-to-clutch housing bolts to 60-70 ft. lbs.



SHIFT LINKAGE ADJUSTMENT



CROSS SHIFT ADJUSTMENT

Overhaul

See 1957 Final Data, Page 369, or later Manual edition.

BUICK SPECIAL & OLDSMOBILE F-85 3-SPEED SYNCHRO-MESH

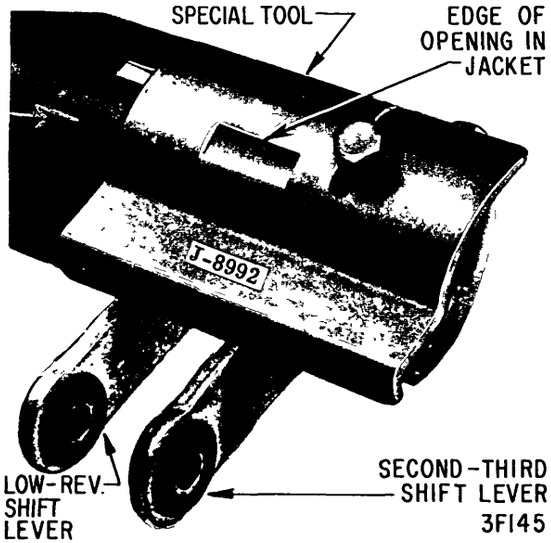
Buick Special (1963)
Oldsmobile F-85 (1963)

Description

Warner T-86 three speed, constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Top opening, with transmission shift levers and shafts mounted in side of case.

Shift Linkage Adjustment

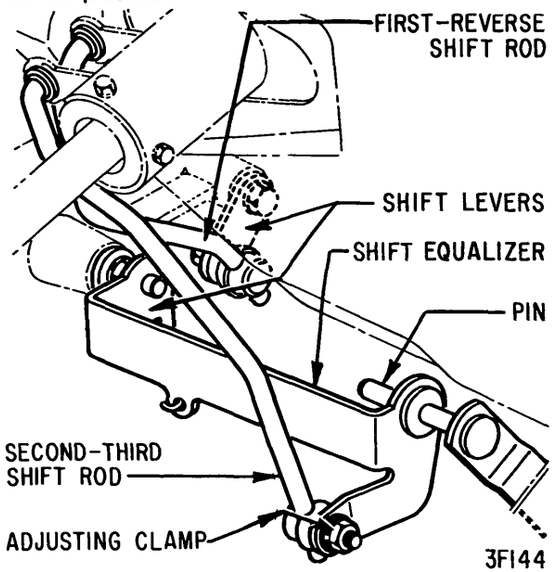
NOTE - Make sure shift equalizer is aligned and not binding. The equalizer pin welded to underbody side rail should go through outboard side of shift equalizer at right angles and should be located in center of hole in equalizer (rubber washer). If necessary to align pin, bend bracket as required. CAUTION - Use to care to avoid breaking the weld. With transmission in neutral, loosen shift rod adjusting clamps (see illustration). Loosen lever retainer ring bolt at lower end of steering column and install Tool J-8992 on mast jacket, then position second and third shift lever against tool and tighten adjustment clamp at equalizer to 10-12 ft. lbs. (do not over-tighten). Move first and reverse shift rod until a good cross-over point is obtained (lift control lever at steering wheel location several times until no interference is felt when moving lever from second-third to first-reverse neutral position). *NOTE - When lever is in first-reverse position it should spring down to second-third neutral position when released.* Hold lever midway in cross-over position and tighten adjusting clamp at equalizer. Recheck for smooth cross-over.



SHIFT LINKAGE ADJUSTING TOOL

Overhaul

See 1961 Final Data, Page 395 for overhaul and service procedure.



TRANSMISSION SHIFT LINKAGE

WARNER 3-SPEED SYNCHRO-MESH

Car & M del	Transmissi n Mod l
Checker Superba	T-90
Rambler Amerıcan	T-96
Rambler Classic (Std)	T-96
Rambler Classıc (Hvy Duty)	T-86
Rambler Ambassador	T-89
Studebaker Avanti	T-86
Studebaker 6 Cyl (Exc Taxi)	T-96
Studebaker 6 Cyl. (Taxi)	T-90
Studebaker V8 (Exc Taxi)	T-86
Studebaker V8 (Taxi)	T-89
Jeep 4-Wheel Drive (Std)	T-90
Jeep 4 Cyl 2-Wheel Drive (Exc Fleetvan)	T-96
Jeep 4-Wheel Drive (Hvy Duty)	T-89
Jeep 6 Cyl 2-Wheel Drive	T-86
Jeep Fleetvan	T-90

NOTE - Transmission model number is cast in side of transmission case.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 RAMBLER TRANSMISSION LUBRICATION NOTE: Automatic Transmission Fluid Type "A" (Suffix "A") is recommended for synchro-mesh transmission lubrication.*

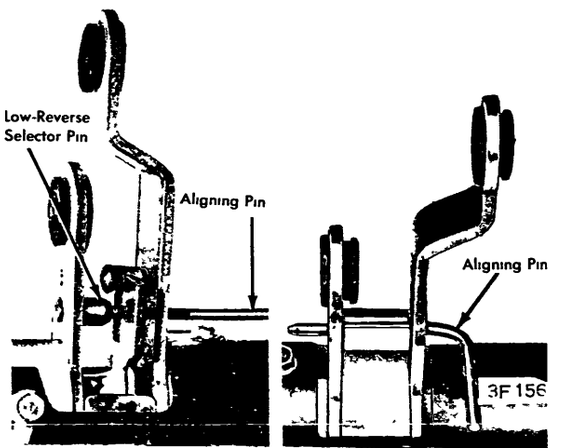
Description

Transmissions are same design as used on corresponding previous models

Shift Linkage Adjustment

Rambl r - *"Ainsworth" and "Douglas" type shift systems used in production. Adjustment procedures are different.*

"**Ainsworth**" **Type** - *NOTE - Shift levers are actuated by a shift gate slot which engages a pin on shaft lever.* Disconnect shift rods from levers at lower end of steering column, then insert a 3/16" rod through hole in lever retaining bracket into holes in upper lever and in pin of lower lever Adjust trunnions on gearshift rods so they enter freely into operating levers (shift levers on transmission in neutral position) Connect shift rods to levers and tighten trunnion locknuts Remove aligning rod and check shift lever operation in all positions .

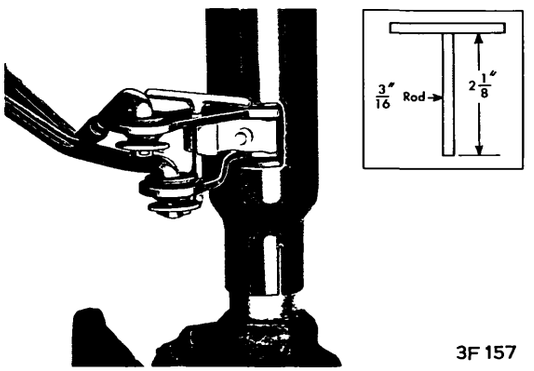


"AINSWORTH" TYPE "DOUGLAS" TYPE

RAMBLER SHIFT LEVER ALIGNMENT

"**Douglas**" **Type** - *NOTE - Shift levers are actuated by lugs on shifter tube engaging in slots in levers.* Disconnect rods from levers at lower end of steering column, then insert a ¼" rod through lever spacer and operating levers Adjust trunnions on gear shift rods so they freely enter into levers (shift levers on transmission in neutral position). Reconnect rods and tighten locknuts, then remove aligning pin and check gear shift in all positions .

Studebaker (Exc. Avanti) - Disconnect shift rods at levers on transmission and place transmission levers in neutral position Align shift levers at lower end of steering column and insert a 3/16" rod through levers and spacer Adjust length of each shift rod so clevis pin hole aligns with hole in transmission shift lever, **then shorten reverse rod 2 full turns.** Connect shift rods to levers on transmission and remove aligning rod from levers at lower end of steering column. Check operation of gearshift in all positions *NOTE - If resistance is felt at cross-over point when shifting from low to second, shorten low-reverse rod an additional one or two turns.*



STUDEBAKER SHIFT LEVER ALIGNMENT

Studebaker Avanti (Floor Shift) - Remove console mounting plate cover from around shift lever so that notches in top of levers are visible. Loosen locknuts of control rod swivel at transmission shift levers and place transmission shift levers in neutral position. Install gauge block (see illustration) with thicker portion of block in the upper notches of control levers. With block in position and transmission shift levers in neutral, tighten the swivel locknuts being careful not to move levers on transmission out of neutral position. Remove gauge block and check for proper shifting.

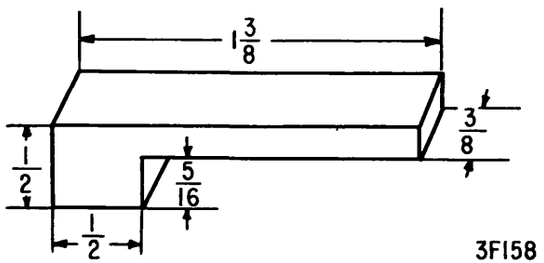
Jeep (2-Wheel Drive Models) - Place shift levers in neutral position and disconnect both control rods at transmission levers. On all models except those with 6-226 engines, install a ¼" rod through aligning holes in steering column levers. On 6-226 engine models, position Tool W-259 on slot and insert a 3/16" rod through steering column shift levers and index rod in slot at top of gauge On all cars, adjust steering column end of shift rods so that lower ends will enter transmission levers freely If shift pin strikes edge of slot in lever clutches, disconnect low-reverse rod at transmission (rear lever) and lengthen or shorten rod slightly so pin will engage both slots freely

Jeep (Forward Control Models) - With gearshift levers in neutral, loosen jam nut at rear end of remote control rods, then remove rods from transmission shift levers Make sure levers on transmission are in neutral position, then adjust length of rods so they easily slip into holes in transmission shift levers Replace cotter pins and tighten jam nuts and check for smooth operation

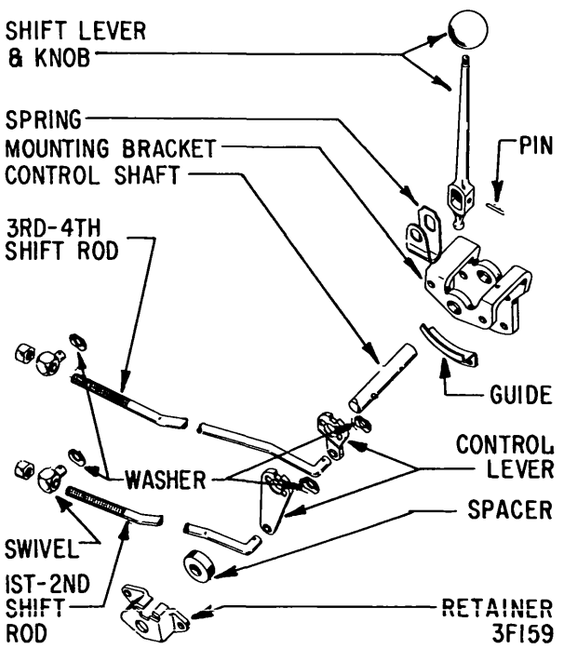
Removal & Installation

Removal (Rambler) - *NOTE - Engines in Rambler Classic and Ambassador models must be supported before removal of transmission assembly.* On Rambler American, Disconnect rear spring front brackets from

(Continued)



AVANTI FLOOR SHIFT ALIGNMENT BLOCK



AVANTI FLOOR SHIFT ASSEMBLY (3-SPEED)

WARNER 3-SPEED SYNCHRO-MESH (Continu d)

floor pan, brake hose bracket, and brake cable at equalizer. On other models, disconnect brake tube bracket from floor pan, parking brake cable at equalizer, and cable housing at torque tube bracket, then disconnect torque tube from transmission. On all models, disconnect shock absorbers at lower mounting and move rear axle assembly to rear, disengaging drive line from transmission. Disconnect shift levers, speedometer cable (and overdrive cable and wires if so equipped). Remove transmission attaching bolts and install two guide pins, Tool J-1434, in upper bolt holes, then slide transmission back to clear clutch assembly.

Installation (Rambler) - Reverse removal procedure.

Removal (Studebaker, All Models) - Disconnect propeller shaft at rear joint flange and slide it out of transmission housing. Disconnect rods at transmission shift levers (Exc. Avanti), from shift assembly (Avanti). On Avanti models, remove shifter assembly mounting bracket from transmission, then push the assembly upward to provide working clearance. On all models, disconnect speedometer cable at transmission housing, then remove speedometer pinion. On all models (Exc. Avanti), remove clutch operating bracket, shaft and bearing at transmission. On all models, support transmission and remove attaching bolts, then move transmission back to clear clutch assembly and remove from car. *NOTE - On Avanti, lower front end of transmission until drive pinion clears clutch housing.*

Installation (Studebaker, All Models) - Reverse removal procedure.

Removal (Jeep 2-Wheel Drive) - Disconnect shift rods at transmission levers, and speedometer cable at transmission (and overdrive cables and wires if so equipped). Disconnect propeller shaft at front universal. Remove support at rear of overdrive and take out overdrive governor. Position jack under engine for support and remove frame crossmember with insulators attached. Back out transmission attaching screws as far as possible and yet support transmission, then pull transmission back to provide an opening between it and bell housing. Insert a long screwdriver through opening in side of bell housing and pry clutch release fork from engagement with release bearing carrier. Remove transmission attaching screws and pull transmission back to clear bell housing, then remove from car.

Installation (Jeep 2-Wheel Drive) - Reverse removal procedure.

Removal (Jeep 4-Wheel Drive) - Drain transmission and transfer case, then remove access cover from floor pan and remove gearshift housing (Exc. models with remote control). On remote control models, disconnect shift linkage at transmission. On all models, remove transfer case shift lever pivot pin, shift levers, and springs. *NOTE - If equipped with power take-off, remove shift lever plate and lever.* Disconnect propeller shafts at transfer case (disconnect end of power take-off shaft at transfer case, if so equipped). Disconnect speedometer cable at case, then disconnect hand brake cable. On Forward Control models, disconnect clutch release cable at bellcrank. On all models, place jacks under transmission and engine and remove nuts attaching rear mounting to frame crossmember, then remove transfer case snubbing rubber bolt at crossmember. Remove engine rear support crossmember, then remove transmission attaching bolts. Force transmission to right side to disengage clutch control lever tube ball joint, then lower jacks under engine and transmission and slide transmission and transfer case toward rear until clutch shaft clears bell housing.

Installation (Jeep 4-Wheel Drive) - Reverse removal procedure.

Overhaul

See 1959 Final Data, Page 398 or later Manual edition.

WARNER 4-SPEED SYNCHRO-MESH

Buick, All Models (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Corvette (1963)
Comet V8 (1963)
Dodge (1963)
Falcon V8 (1963)
Fairlane (1963)
Ford Galaxie (1963)
Mercury Monterey (1963)
Meteor (1963)
Oldsmobile F-85 (1963)
Pontiac, Exc. Tempest (1963)
Plymouth (1963)
Studebaker (1963)

► *1963 (EARLY) STUDEBAKER NOISY FLOOR SHIFT LEVER ASSEMBLY CORRECTION:* A buzz or rattle condition in this assembly can be corrected by installing a new kit containing a shift lever, pivot pin, nylon bushing and spring and spacer washer. The new kits are available under the following part numbers: 1560157 (Avanti) 1560158 (Studebaker without bucket seats); 1560159 (Studebaker with bucket seats). Later production cars will have the new kits installed during assembly.

Description

4-Speed helical gear type (except reverse), with constant mesh, synchro-mesh in all forward speeds. Sliding gear (reverse).

Removal & Installation

See 1962 Final Data, Page 419 ("Warner 4-Speed Synchro-mesh") and note the following:

Removal (Buick, Exc. Special) - Drain transmission, then mark propeller shaft and front companion flange (for reassembly in original position). Disconnect propeller shaft at front companion flange and slide propeller shaft rearward as far as possible. On Buick LeSabre, remove gearshift knob, then remove floor shift trim bezel. On all models, disconnect speedometer cable from transmission and shift control rods from transmission shifter levers. Loosen three exhaust pipe joints so transmission and engine can be lowered slightly. Remove bolts attaching transmission mounting pad to transmission support, leaving mounting pad bolted to transmission. Use a wood block and jack up engine until transmission mounting pad clears support, then remove transmission support and lower jack so transmission clears underbody. Remove upper left and lower right transmission-to-flywheel housing attaching bolts and install suitable guide pins (Tool J-1126). Remove remaining attaching bolts and slide transmission back until drive gear clears housing, then lower transmission from car.

Installation (Buick, Exc. Special) - Reverse removal procedure and note the following: Lightly coat splines on end of main drive gear with lubriplate for a distance of 1". Fill groove in inner surface of throw-out bearing with wheel bearing grease.

Removal (Buick Special, Pontiac & Oldsmobile F-85) - Drain transmission, then remove boot retainer screws and slide boot over shift lever. Disconnect speedometer cable at transmission. Disconnect shift control rods from shift levers on transmission, then remove manual shift lever and bracket assembly from extension housing. Remove complete drive line assembly and support rear of engine. On Buick Special, remove transmission mounting plate bolts and washers, then remove support-to-underbody bolts and remove transmission support. On Pontiac, remove transmission extension bracket-to-crossmember retaining nuts. On Oldsmobile F-85, disconnect intermediate exhaust pipe from cross-over pipe, then support rear of engine and remove rear mount-to-crossbar bolts and remove crossbar from side rails. On all models, remove two top transmission-to-clutch housing bolts and insert guide pins in these holes. Remove lower transmission-to-clutch housing bolts and slide transmission straight back on guide pins (on Pontiac, tilt rear of transmission upward to disengage bracket studs from crossmember support). *NOTE - On long wheelbase Pontiac models, it is necessary to remove crossmember support before removing transmission.*

Installation (Buick Special, Pontiac & Oldsmobile F-85) - Reverse removal procedure.

Removal (Chevrolet & Corvette) - Disconnect speedometer cable at transmission, then disconnect shift rods at shift levers and remove shift lever assembly from extension housing. On all models, except Corvette, remove bolts attaching center support to frame member, then remove propeller shaft and bearing assembly. On Corvette, disconnect propeller shaft at rear universal and remove it from transmission. On all models, support rear of engine and remove transmission support crossmember. Remove two top transmission-to-clutch housing bolts and install guide pins in these holes. Remove lower attaching bolts and slide transmission straight back on guide pins until shaft is clear of clutch assembly and remove transmission.

Installation (Chevrolet & Corvette) - Reverse removal procedure.

(Continued)

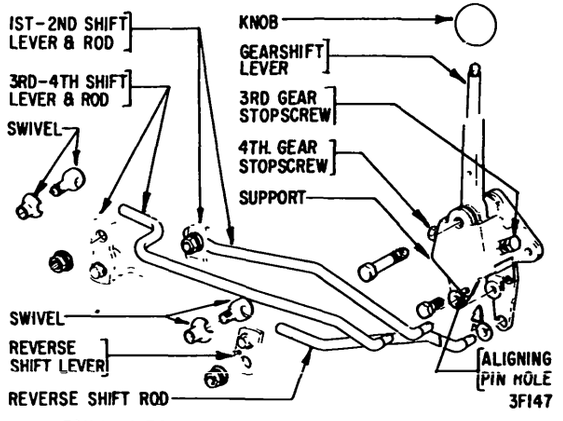
WARNER 4-SPEED SYNCHRO-MESH (Continu d)

Removal (Comet V8, Falc n Vo, Fairlane, Ford Galaxie, Mercury Monterey & Meteor) - Remove transmission gearshift lever boot retainer, then remove shift lever retaining bolts and remove lever from shift assembly. Remove propeller shaft and disconnect speedometer cable from extension Disconnect parking brake cable at equalizer bar and support engine with transmission jack. Remove bolts retaining extension housing to engine rear support, then raise rear of engine with transmission jack and remove crossmember and engine rear support as a unit. Support transmission on a jack and remove transmission-to-clutch housing bolts. Install two guide pins in lower bolt holes and slide transmission to rear until input shaft clears clutch housing. *CAUTION - Do not depress clutch pedal while transmission is removed.*

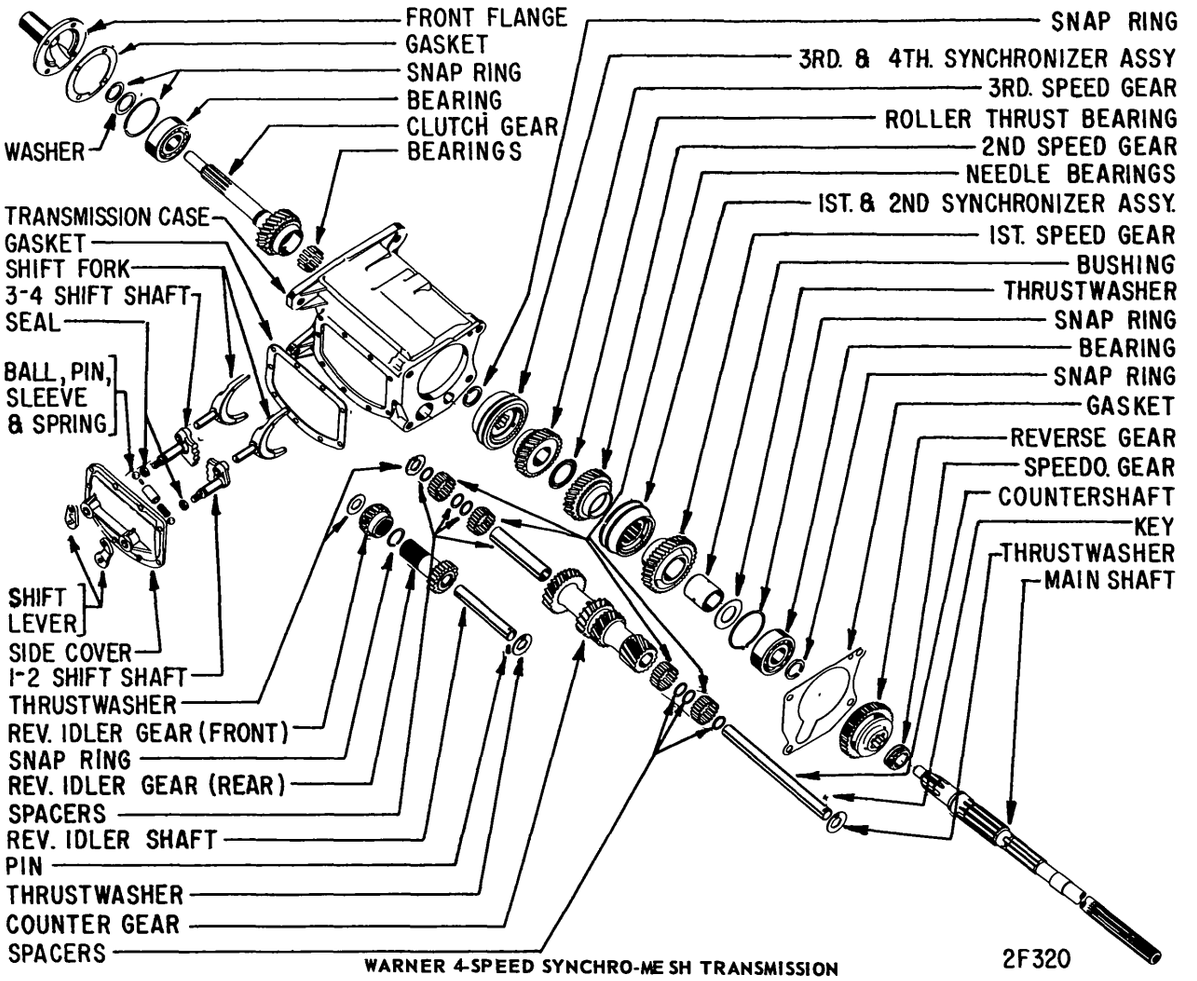
Installati n (C met V8, Falcon V8, Fairlane, Ford Galaxi , M rcury M nt rey & Meteor) - Reverse removal procedure.

Rem val (D dg & Plymouth) - Remove attaching screws and slide shift lever boot up on lever, then remove lever attaching bolts and remove lever and boot from shift housing stub lever. Drain transmission and remove propeller shaft, speedometer cable, housing and pinion. *CAUTION - Be careful not to crush housing when removing cable.* Disconnect back-up light switch leads at connector (if so equipped), and disconnect parking brake control cable. Install a suitable engine support. *NOTE - If Tool C-3806 is used, make sure hooks are properly engaged in frame side members and that support ends are up against underside of oil pan flange.* Raise engine slightly and remove engine rear crossmember. Support transmission with a suitable jack, then remove transmission attaching bolts and slide transmission toward rear until main drive pinion shaft clears clutch disc. Remove transmission from under car.

Installati n (D dg & Plymouth) - Reverse removal procedure and note the following; Place a small amount of wheel bearing lubricant around inner end of main drive pinion shaft pilot bushing in the flywheel (do not lubricate end of pinion shaft). Tighten transmission attaching bolts and crossmember attaching bolts to 50 ft. lbs.



BUICK LESABRE SHIFT LINKAGE ASSEMBLY



WARNER 4-SPEED SYNCHRO-ME SH TRANSMISSION

Removal (Studebaker) - Drain transmission, then disconnect and remove shift assembly (On Avanti, push shift assembly upward out of way to provide working clearance). On all models, except Avanti, disconnect crossmember under transmission and slide it to rear along exhaust pipes for clearance. On all models, disconnect and remove propeller shaft. Remove speedometer pinion and cable from rear extension housing, then remove transmission attaching bolts. Move transmission to rear until shaft clears clutch assembly, and remove transmission from car.

Installation (Studebaker) - Reverse removal procedure.

Overhaul

Se 1962 Final Data, Page 419 for overhaul and s rvic procedure.

Shift Linkage Adjustment

Buick LeSabre - Install guide pin, Tool J-21196 into hole in shift control (see illustration), then loosen shift rod adjuster clamps at transmission end of shift rods. Place shift levers on transmission in neutral position and tighten adjusting clamps. *CAUTION - Do not over-tighten clamps.* Remove guide pin in shift control and lever assembly, then hold shift lever in 4th gear position by resting hand on lever to remove all lash. Turn "stop" bolt on forward side of shift control until it just contacts shift lever, and tighten locknut. Repeat same procedure for 3rd gear and tighten "stop" bolt on rear side of shift control until it just contacts shift lever. Tighten locknut and check for ease of shifting.

Buick Wildcat - Loosen carpet on left side of console and install guide pin, Tool J-21196 through access hole in hole in shift control to align levers (see

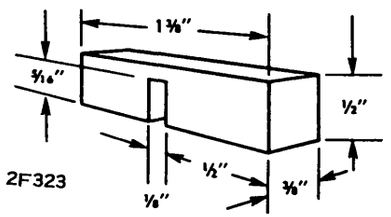
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WARNER 4-SPEED SYNCHRO-MESH (C ntinued)

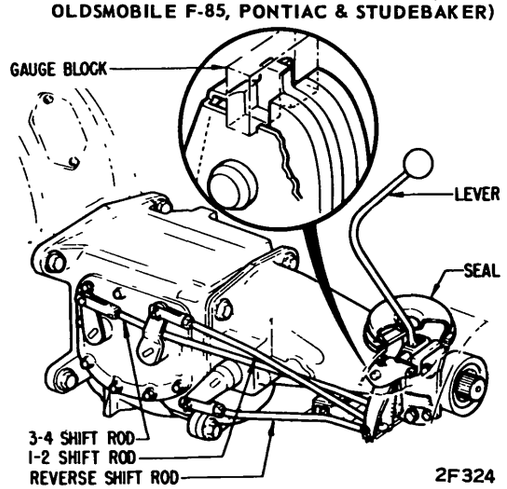
illustration). Loosen shift rod adjuster clamps at transmission end of shift rods and place levers on transmission in neutral. Tighten adjusting clamps to 10-12 ft. lbs. (do not overtighten). Remove guide pin, then install carpet and check for ease of shifting.

Buick Special, Chevrolet (All Models), Oldsmobile F-85, Pontiac & Studebaker - *NOTE - The gauge block (see illustration) will facilitate adjustment, however, the adjustment can be made by having an assistant hold manual shift lever in neutral position.* Remove transmission gearshift lever seal from floor pan, then place transmission in neutral and install gauge block (see illustration). Remove cotter pin, anti-rattle washer and clevis pin from each transmission shift lever. Make sure levers on transmission are in neutral position, then adjust threaded clevis on each shift rod to permit free entry of clevis pin into hole in transmission shift levers. Remove gauge block and reconnect clevis to each shift lever and check each shift. *NOTE - If roughness still exists, determine rod and clevis requiring further adjustment by sighting along the slot where gauge block was used. Levers in this assembly should not be out of line.*

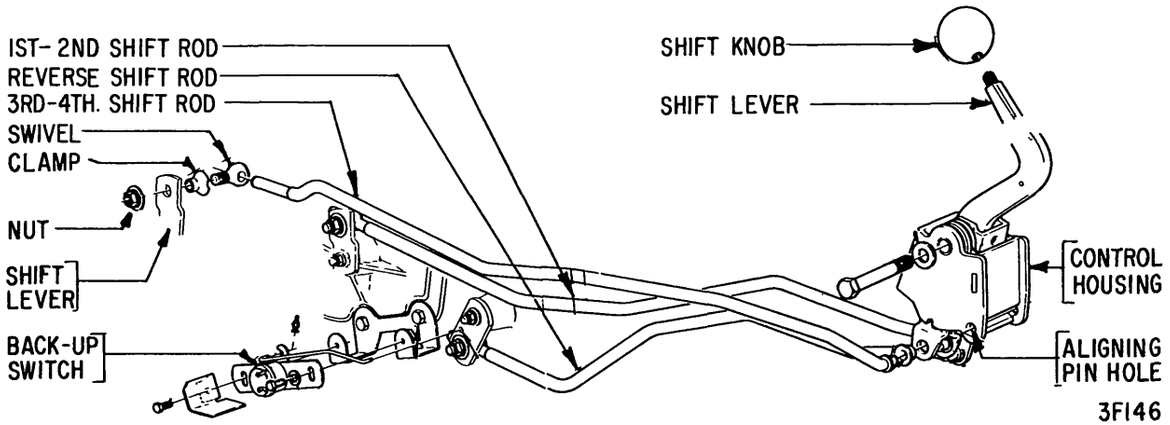
Comet, Falcon, Fairlane, Ford Galaxie, Mercury Monterey & Meteor - Place shift lever in neutral, then raise car on a hoist and insert a ¼" drill or alignment



SHIFT LINKAGE GAUGE BLOCK (BUICK SPEC., CHEVROLET, OLDSMOBILE F-85, PONTIAC & STUDEBAKER)



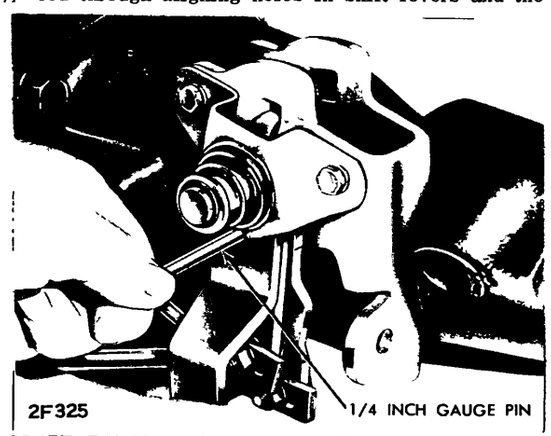
SHIFT LINKAGE ASSEMBLY (BUICK SPEC., CHEVROLET, OLDSMOBILE F-85, PONTIAC & STUDEBAKER)



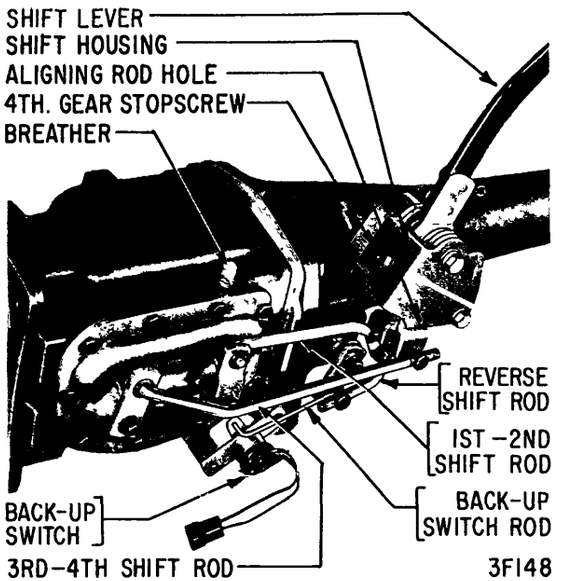
BUICK WILDCAT SHIFT LINKAGE ASSEMBLY

rod into alignment hole (located in center of shift levers on extension housing. See illustration). If rod will not enter, check for bent or bellied connecting rods. If rods are correct shape, check for loose lever locknuts at rod ends. Adjust linkage by loosening rod-retaining locknuts and moving the levers until drill or gauge rod will enter alignment holes. *NOTE - Make sure levers on transmission are in neutral position and the reverse shifter lever is in neutral detent. If there is any doubt about location of neutral position, disconnect shift rods at retaining locknuts and rotate each forward-speed shift lever through its three positions until the center (neutral) detent is positively located. Move reverse shift lever forward until positive engagement of detent is felt.* Install and tighten shift rod and locknuts. Check operation of shift for smooth cross-over.

Dodge & Plymouth - Remove shift lever boot attaching screws and slide boot up shift lever, then make sure pivot bolt is tightened securely. Disconnect adjusting swivels on shift rods from gearshift assembly. Insert a ¼" rod through aligning holes in shift levers and the slots provided in gearshift support (to hold levers in a neutral position). Make sure all levers on transmission are in their neutral position, then adjust swivels on ends of shift rods for free entry into holes in shift levers at gearshift assembly. Connect and secure swivels on shift levers and remove alignment pin. Place gearshift lever in 4th speed position, then adjust "stop" screw located on front side of gearshift support so there is .020"-.040" clearance between lever and stop. Place gearshift lever in 3rd gear position and repeat the "stop" screw adjustment on the rear stopscrew. *NOTE - Use an Allen wrench to turn adjusting "stop" screws.* Check for ease of shifting and for smoothness of cross-over.



COMET, FALCON, FAIRLANE, FORD GALAXIE, MERCURY MONTEREY & METEOR SHIFT LINKAGE ADJUSTMENT.



DODGE & PLYMOUTH SHIFT LINKAGE ASSEMBLY

WARNER 4-SPEED (JEEP) SYNCHRO-MESH

Jeep 4-Wheel Drive M d ls (1963)

Description

Four-Speed synchro-mesh (2nd, 3rd, & 4th), sliding gear (low & reverse). Low & reverse gears are spur type; others are helical type.

Removal Of Transmission

NOTE - Transmission and transfer case must be removed as an assembly.

1) Drain transmission and transfer case, then disconnect remote control rod shift linkage at transmission and transfer case. *NOTE - If equipped with power take-off, disconnect bowden wire at shift lever.*

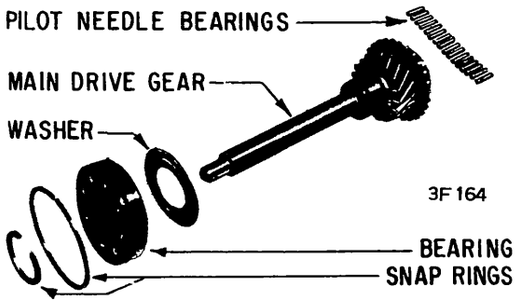
2) Disconnect front and rear propeller shafts from transfer case (if so equipped, disconnect power take-off drive shaft at transfer case end). Disconnect speedometer cable at transfer case, then disconnect hand brake cables at hand brake lever mounted on frame crossmember or at transmission brake.

3) Place jacks under transmission and engine, then remove nuts holding rear mounting to frame crossmember. Remove transfer case snubbing rubber bolt nut at crossmember. Remove bolts holding rear engine support crossmember to frame side rails and remove crossmember. Remove bolts holding transmission to bell housing.

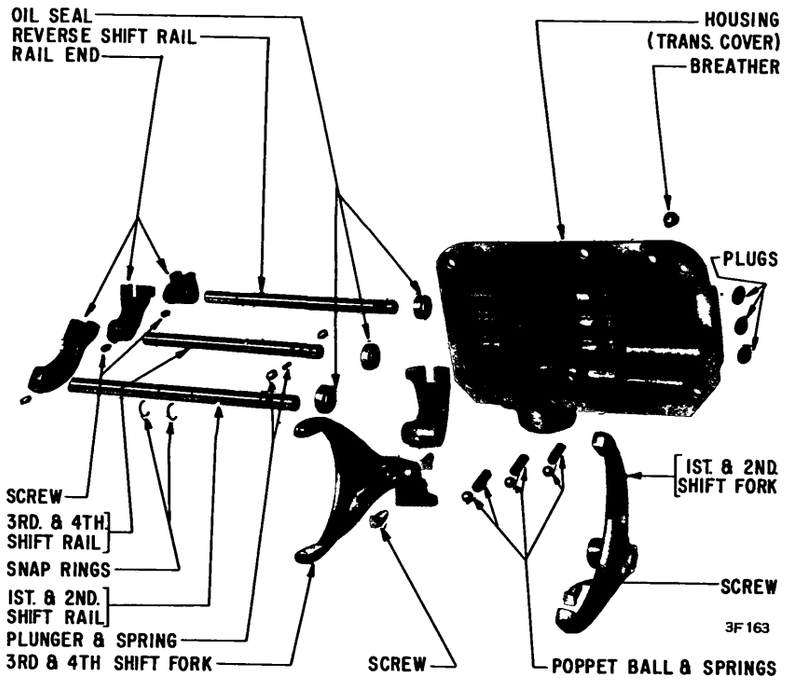
4) On FC-150 models, force transmission to right to disengage clutch control lever tube ball joint. On all models, lower jacks under engine and transmission, then slide transmission and transfer case assembly toward rear until transmission mainshaft clears bell housing. Lower jack under transmission and remove transmission and transfer case assembly from car

Overhaul

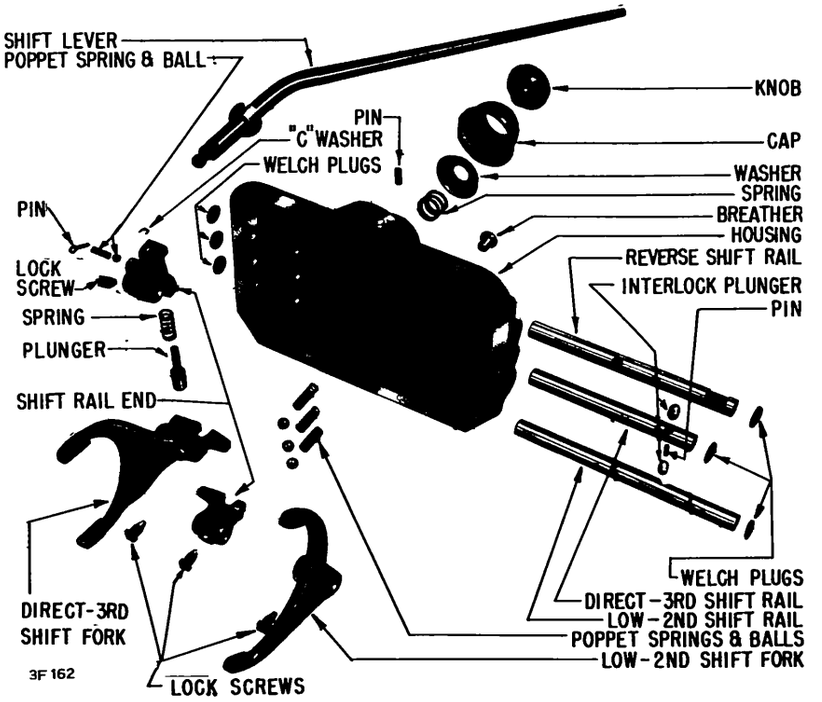
See 1962 Final Data, Page 417



MAIN DRIVE GEAR SHAFT ASSEMBLY



FORWARD CONTROL MODELS



OTHER MODELS

WARNER 4-SPEED TRANSMISSION SHIFT ASSEMBLY

RAMBLER "TWIN STICK" TRANSMISSION CONTROL

Rambler (1963)

OVERDRIVE CONTROL

DESCRIPTION

Twin-Stick overdrive control used on models with floor mounted gearshift consists of conventional electrical components (see wiring diagram), a "kickdown" button mounted in center of transmission gearshift lever, and an overdrive control lever which is mounted on console to right side of transmission gearshift lever. Overdrive unit is locked out when control lever is in forward position, and is engaged when control lever is in the rear position. The kickdown button on transmission gearshift lever replaces the accelerator pedal operated kickdown switch used in conventional systems. With car in overdrive at speeds above 28 MPH, depressing kickdown button, places overdrive in "overtake" position if accelerator pedal is partially depressed. A vacuum switch prevents overdrive going into "overtake" when car is decelerating. A relay actuated indicator light on overdrive control lever escutcheon plate lights up when in overdrive.

TROUBLE SHOOTING & DIAGNOSIS

Faulty Operation

Check the following: Blown relay fuse in solenoid circuit. On Series 10 & 80, check for blown "Heater" fuse on fuse panel (part of governor circuit). On all models, check for insufficient travel of shift rod (adjust control cable to operating lever). Loose terminals or incorrectly located connecting wires. Grounded circuits, Defective solenoid points. Dirty or sticking relay points. Insufficient travel or poor contact in kickdown switch. Excessive endplay in governor shaft. Burned contact points in governor or damaged governor cap and contacts.

Overdrive Inoperative

Check to see if overdrive control is pushed to rear limit of travel. Check to make sure that overdrive cable is adjusted to move overdrive lever firmly against stop on overdrive housing when in engaged position.

TESTING

With ignition switch on and manual overdrive control in rear position, use a test wire or 12 volt test light as follows:

1) Check 15 amp fuse in overdrive relay (Series 01); 20 amp heater fuse on fuse panel for line circuits and clean contacts.

2) Connect test leads directly from battery terminal of starter solenoid to "NO" terminal on overdrive relay. Overdrive solenoid should operate. If it does not, check for defective wire or connection at solenoid.

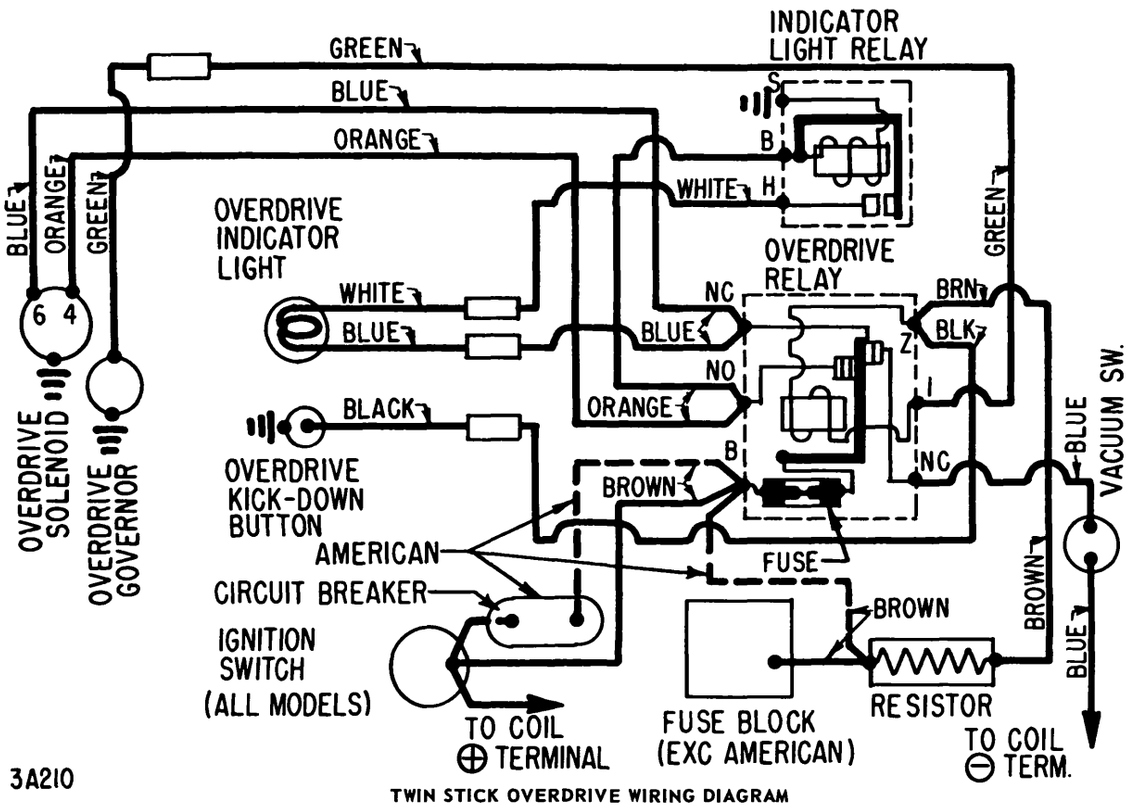
3) Connect jumper wire from No. 1 terminal of overdrive relay and to ground. If relay, resistor, and kickdown switch are operating properly, relay points will close and solenoid will operate.

4) To check for shorted pushbutton kickdown switch, remove wires from No. 2 terminal of overdrive relay, then connect a jumper wire from No. 2 terminal to "B" terminal of relay. If relay now operates, pushbutton kickdown circuit is shorted.

5) If solenoid does not operate, check for a defective resistor by connecting a jumper wire across resistor terminals.

6) Ground governor terminal. Solenoid should operate.

NOTE - If indicator light is shorted, engine will start. However, when engine is accelerated and vacuum switch closes, ignition coil will be shorted to ground through shorted indicator light.

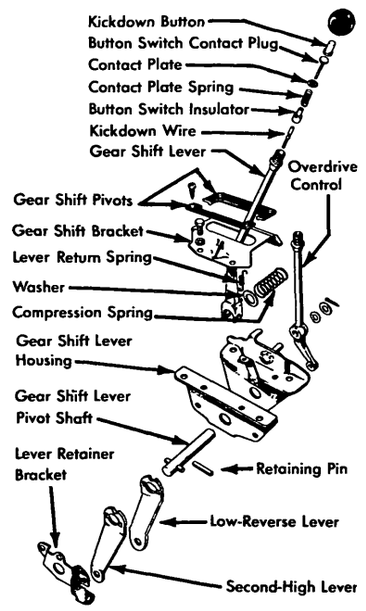


TWIN STICK OVERDRIVE WIRING DIAGRAM

GEARSHIFT CONTROL

Adjustment

Disconnect control rods at levers on transmission, then remove snap-in plug from left side of console assembly. Install a 5/16" diameter pin through snap-in plug hole, through hole in console lever retainer bracket, then through slots in selector lever and into housing bracket. *NOTE - Selector levers will now be in neutral position.* Place transmission shift levers in neutral position, then adjust trunnions on shift rods so they enter freely into holes in transmission shift levers. Install trunnion cotter pins and remove alignment rod. Check gearshift in all positions, then install snap-in plug in side of console.



SHIFT LEVER ASSEMBLY

BUICK TWIN TURBINE AUTOMATIC TRANSMISSION

Buick, Except Special (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Engine can be started by pushing. Place shift lever in "N" position until car speed reaches 15 MPH, then shift into "L" position and increase speed until engine starts.

Towing or Pushing Car

Car may be towed or pushed for short distances with selector lever in "N" position only, and at speeds less than 25 MPH. If car is to be towed an extended distance, raise rear wheels off ground or disconnect drive line.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 TWIN-TURBINE TRANSMISSION CODE NUMBER NOTE:* A code number consisting of a letter followed by a number is stamped on lower edge of reaction shaft flange directly to rear of high (left) accumulator. This number should be used as identification when ordering parts or for service procedure changes.

DESCRIPTION

Twin turbine torque converter and automatic transmission of same design as used on previous models.

LUBRICATION

Checking Fluid Level

Check fluid level every 6,000 miles. With transmission at normal operating temperature, selector lever in "P" (Park) position and with engine idling, check fluid level on dipstick. Add recommended fluid (see below) as necessary to maintain level between "ADD OIL" and "FULL" marks on dipstick. *NOTE - One pint of fluid will raise level from "ADD OIL" mark to "FULL" mark. DO NOT OVERFILL.*

Draining & Refilling

Drain & refill every 24,000 miles. *NOTE - It is not necessary to drain converter assembly.* With transmission at normal operating temperature, remove filler pipe fitting from oil pan and drain completely. *CAUTION - Do not remove accumulator caps.* Remove oil pan and screen and clean thoroughly, then reinstall using a new oil pan gasket. Install and tighten oil oil filler pipe, then pour in 3 qts. of recommended fluid (see below). With transmission selector lever in "P" (Park) and engine idling, add sufficient fluid to bring level to "FULL" mark on dipstick.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

12 qts. (after draining). *NOTE - A completely dry transmission requires an additional 1¾ pints.*

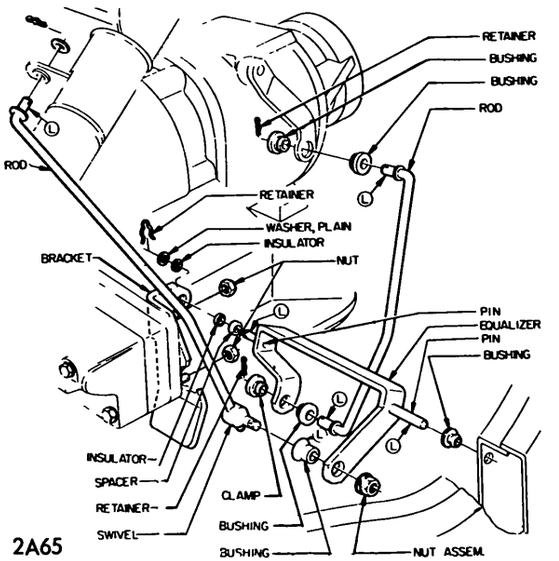
ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car MODEL pages.

Manual Shift Linkage (Steering Column)

Buick (Exc. Special) - Place transmission selector lever in "P" (Park) position, then raise car and loosen clamp nut at lower end of upper shift rod. Move manual lever on transmission to make sure it is in "Park" detent, then tighten clamp nut. To check adjustment, distance from "Drive" detent to "Drive" stop should be approximately equal to distance from "Low" detent to "Low" stop. *NOTE - If pointer does not line up with "D" on dial with transmission manual lever in "Drive" detent, remove steering column lower housing, then either loosen dial pointer setscrew or carefully bend pointer to line it up with "D" on dial. Tighten setscrew.*



MANUAL SHIFT LINKAGE

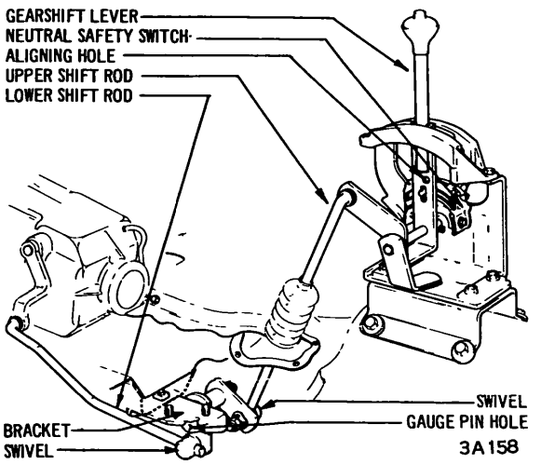
Manual Shift Linkage (Floor Mounted)

Wildcat - Loosen upper and lower shift rod swivel clamp nuts at bellcrank levers (see illustration), then place gearshift lever in "P" (Park) position. Move control lever on transmission to "P" (Park) detent. Align gauge pin hole in bellcrank bracket and hole in lower shift rod bellcrank lever using a punch or a pin. Tighten nuts on adjusting swivel clamps on upper and lower rods to 10-15 ft. lbs. Check shift in all ranges. **Riviera** - Loosen upper shift rod swivel clamp nut at bellcrank lever (see illustration), then place gearshift lever in "P" (Park) position. Move control lever on transmission to "P" (Park) detent, then tighten nut on adjusting swivel clamp to 10-15 ft. lbs. Check shift in all ranges.

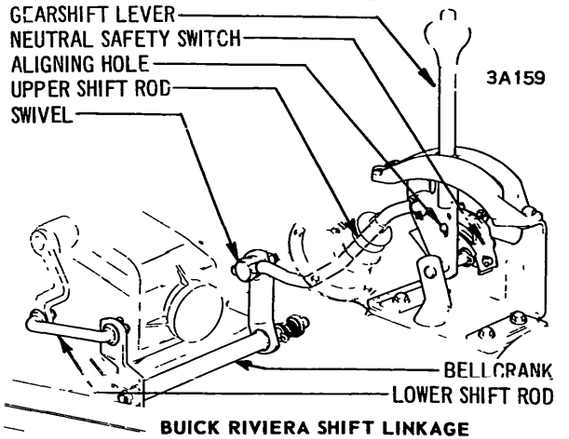
Neutral Safety Switch

Steering Column Mounted Shift Lever - Mounted on steering column under cowl. Starter should operate in "N" (Neutral) and "P" (Park) only. To adjust, place selector lever in "N" (Neutral) and insert a 3/32" drill through gauging hole in operating lever and in switch body. *CAUTION - Do not allow lever to move out of position.* If drill will not enter holes or is not in line with steering column, loosen switch mounting screws and move switch for proper alignment. Tighten screws and check operation of starter in "N" or "P".

Floor Mounted Shift Lever - Mounted on lower end of shift lever in shift lever bracket. To adjust, loosen switch mounting screws, then hold gearshift lever against neutral stop. Align holes in switch and in lower end of gearshift lever (see illustration) using a punch or a pin. Tighten switch mounting screws. Check operation of starter which should operate only when gearshift lever is in "N" or "P". *(Continued)*



BUICK WILDCAT SHIFT LINKAGE



BUICK RIVIERA SHIFT LINKAGE

Band Adjustment

NOTE - Bands cann t b adjust d with transmission installed in car. Adjustment is required only at time of overhaul.

Low & Reverse Band - Remove band adjusting cover, then loosen locknut and turn adjusting screw clockwise until considerable resistance is felt indicating that band is in full contact with drum (Low) or ring gear (Reverse). Back off screw until just a trace of freeplay can be felt by prying up on locknut with a screwdriver. From that point, back off screw **6 full turns** and tighten locknut finger tight. Note position of adjusting screw slot, then tighten locknut to 20-25 ft. lbs. Remove torque wrench and check to make sure that adjusting screw did not turn. Install band adjusting cover with a new gasket.

TESTING

Hydraulic Control Pressures

Make following tests with transmission at normal operating temperature and with fluid level at "FULL" mark on dipstick. Make sure manual linkage is properly adjusted.

Support rear of car solidly with wheels off floor so that transmission can be operated. Connect a suitable pressure gauge (J-2575) and make tests as follows:

Front Oil Pump - Connect pressure gauge at pipe plug opening on left side of transmission case. Run engine at 500 RPM and check pressure with selector lever in "L", "D" & "R" ranges. Repeat test at 1000 RPM and at 1800 RPM in "L" & "D" only. See table below for correct pressures. Low or erratic pump pressure indicates air leakage in suction lines, improper pressure regulator valve action, or excessive pump clearances.

Front Oil Pump Pressures

	Selector Lever		
Engine RPM	**Low**	**Drive**	**Reverse**
500 RPM	120 lbs.	90 lbs.	120 lbs.
1000 RPM	180 lbs.	90 lbs.	
1800 RPM	180 lbs.	90 lbs.	

High & Low Accumulator - Connect pressure gauge at pipe plug opening on top of accumulator body (**High** - left side of car); (**Low** - right side of car). Place selector lever in "D" range (High Accumulator Test); "L" (Low Accumulator Test). Run engine and check pressure at speeds indicated in table below. Low accumulator pressure may be caused by leakage past accumulator body gasket. If accumulator pressure is more than 10 lbs. lower than front pump pressure, check for leakage between accumulator and multiple disc clutch and for restricted or plugged metering orifice in accumulator dump valve.

Accumulator Pressures

	Selector Lever	
Engine RPM	**Low**	**Drive**
500 RPM	115 lbs.	80 lbs.
1000 RPM	175 lbs.	85 lbs.
1800 RPM	175 lbs.	85 lbs.

Stator - Connect pressure gauge at pipe plug opening on left end of reaction shaft flange. Test pressure in "D" range at 500 RPM, 1000 RPM, 1800 RPM. Minimum pressures should be as follows:

Stat r Pr ssur

Engin RPM	S l ct r L v r in Driv
500 RPM	10 lbs.
1000 RPM	65 lbs.
1800 RPM	75 lbs.

TROUBLE SHOOTING & DIAGNOSIS

►*EXCESSIVE DYNAFLOW WHINE CORRECTION: (This condition is usually the result of excessive clearance between input shaft and bearing in the reaction shaft).* **If transmission is to be disassembled to correct whine, perform the following:**

1) Remove converter cover, twin turbine assembly, and sun gear, then mount dial indicator on end of input shaft with indicator button contacting reaction shaft. Position indicator button 90° to left of top center (facing end of shaft) then move input shaft away from and toward indicator while noting the gauge reading. Repeat this check at 45° to left of top center. If dial reading exceeds .005", excessive clearance exists between input shaft and bearing in reaction flange.

2) Before replacing bearing, remove reaction flange assembly and input shaft and observe the following: (a) Inspect bearing surface on input shaft. If surface appears abnormally rough or scored, replace input shaft; if not, polish journal area with crocus cloth. (b) Inspect the two oil seal rings toward rear of input shaft and the mating surface in the reaction shaft for scoring or other damage. If reaction shaft or input shaft shows evidence of scoring or other damage, replace worn or damaged parts.

3) If inspection reveals that condition of reaction shaft and input shaft are satisfactory, replace only the input shaft bearing (see Overhaul data).

4) If input shaft, reaction flange, or the bearing requires replacement, it will be necessary to replace the converter sun gear and planet pinions. *NOTE* **- When installing reaction flange service bushing, be sure the assembly is supported on rear end of reaction shaft to prevent distortion of aluminum reaction flange.**

Car Will Not Move

1) With selector in any Range (rear wheels free). If car will not move for 1-8 minutes after standing over night - Check front pump oil pressure (see Testing) after allowing car to stand for several hours. If zero pressure noted, check pump for excessive clearances allowing pump to lose its prime. Check alignment of bell housing and converter primary pump hub.

►*CAUTION: If this condition found, inspect Clutch and Bands for excessive wear due to slippage caused by low oil pressure.*

If car will not move after extended operation in Reverse - Check for air leaks in pump suction line (at rear oil pump gaskets), or excessive clearance in front pump (at pump gears and covers). Check alignment of bell housing and converter primary pump hub.

2) With selector in any Range (rear wheels locked). Parking lock engaged. Broken parts in transmission or rear axle. Parking brake applied.

3) With sel ctor in Driv Range. Check front oil pump pressure and High Accumulator pressure. If OK, check for sticking Low Band Anchor Piston, remove and inspect Clutch for worn or sticking clutch plates, leaking clutch seal rings. If High Accumulator pressure pressure low, also check rear pump Check Valve for correct installation and proper seating, check for leaks at accumulator body gasket, reaction flange gasket, clutch piston outer seal and clutch ball check valve, and leaks at sealing rings on reaction shaft flange and low drum.

4) With selector in Revers Rang . Check reverse band for displaced operating strut caused by too loose adjustment, improper installation, or broken band anchor (indicated by free up and down movement of band operating lever). If band assembly OK (no free movement of lever), check servo operation by running engine and shifting into Reverse. Remove Valve & Servo Body and check for reverse servo piston seal leaks.

Excessive Slippage

1) In all Speed Ranges. Low oil level. Incorrect manual control linkage adjustment. Air leak in oil pump suction pipe at oil screen sealing ring. Low front oil pump pressure caused by wear or excessive clearances in in pump. Leaks at front pump cover or reaction shaft flange, pressure regulator valve. Valve & Servo Body gasket. Pressure regulator valve defective.

2) In Drive Range. Incorrect manual control linkage adjustment. If High Accumulator pr ssure low, check for leak at accumulator body gasket; if gasket OK, check for leaking clutch sealing rings, sticking clutch piston, worn or sticking clutch plates.

3) In Low Range. Incorrect manual control linkage adjustment. Incorrect low band adjustment. Low band and drum worn or scored. If Low Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, remove Valve & Servo Body and check for gasket leaks or leaks at low servo piston seal.

4) In Reverse Range. Incorrect manual control linkage adjustment. Reverse band out of adjustment, st rut out of place, or anchor broken. If front oil pump pressure low, remove Valve & Servo Body and check for gasket leaks and leaking reverse servo piston seal.

Car Creeps

1) Creeps forward with s lect r in N utral. Incorrect manual control linkage adjustment. Sticking low servo piston (check by removing low band adjustment cover), Sticking clutch caused by warped, binding, or incorrectly assembled clutch plat s (not stacked properly with "dish" in same direction).

If Car Creeps only when ngin acc l rat d to 2500 RPM - Check clutch vent ball checks in clutch piston and reaction shaft flange.

2) Creeps forward with sel ct r in R v rs r backward with selector in Low. Incorrect manual control linkage adjustment.

Shifts Are Rough

1) Low-to-Drive Shift. Incorrect Low Band adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket and for dump valve or accumulator piston sticking down (top land of piston should be visible through top port in body). Sticking low band anchor piston (remove Valve & Servo Body to check), or incorrect piston location (see piston shimming data in Valve & Servo Body Reassembly). Valve & Servo Body gasket leaks. Clutch plates worn or binding.

Excessive Chatter Or Clunk

►*CAUTION: Slight "clunk" when shifting into Low or Reverse is normal, and slight chatter when car starting to move in reverse (disappearing as soon as car in motion) is also normal.*

1) In Low & Reverse Range. Incorrect Low or Reverse Band adjustment. Engine and transmission mountings loose or incorrectly adjusted, thrust pad at transmission mounting broken (see Engine Mountings in Buick Special Data). Clutch plates warped, sticking, or incorrectly assembled (not stacked properly with "dish" in same direction). Reverse ring gear bushing worn. Planet pinion needle bearing rough.

Noise In Transmission

►*CAUTION: Hum or low whine in Neutral or Parking is normal (due to free rotation of all planetary gears) and slight hum in Low and Reverse may be expected.*

1) Buzzing Noise. Low oil level. Front pump check valve hanging up on edge of gasket between valve and servo bodies. If noise noticed in Parking or Neutral, pressure regulator valve clearance in body may be excessive or orifice in valve land oversize (correct by replacing valve and body).

2) Clicking Noise. If noticed in all ranges, may be caused by foreign material in converter. If noticed only when car in motion, may be caused by parking lock pawl contacting ratchet wheel due to incorrect manual control linkage adjustment.

3) Abnormal Hum or Whine (see Caution above). If noted in all ranges, may be caused by worn parts or excessive front pump clearances (front pump noise will increase in Low and decrease at car speeds above 45 MPH. in Direct Drive). Check front pump for excessive clearances by testing for low pump pressure. If noise noted in all ranges except Direct Drive, may be caused by trouble in planetary gears (gears locked out in Direct Drive).

4) Squealing or Screeching following installation of Front Oil Pump. Pump driving gear installed backward.

►*CAUTION: Above conditions must be corrected WITHOUT FURTHER OPERATION OF TRANSMISSION or severe damage will result.*

TRANSMISSION REMOVAL & INSTALLATION

Removal

Remove transmission in the usual manner and note the following:

1) If transmission is being removed to correct clutch or band troubles, cooler and lines must be flushed with air and oil to remove residue.

2) When disconnecting propeller shaft at rear companion flange, mark flange and shaft so parts can be reassembled in same position. Support shaft to prevent damage to center joint. Support transmission with suitable transmission jack, then remove center bearing support bolts and slide propeller shaft rearward to disengage it from transmission.

3) Remove transmission support crossmember. *NOTE - If shims are used between support and frame side rails, note number of shims and their locations as they may be reinstalled in same position.*

Installation

Reverse removal procedure and note the following: Turn flywheel so one converter bolt is straight up. Tighten all bolts and nuts to specifications (see "Tightening Specifications" below).

TRANSMISSION OVERHAUL

See 1960 Final Data, Page 414, or later Manual edition and note the following:

Rear Bearing Retainer

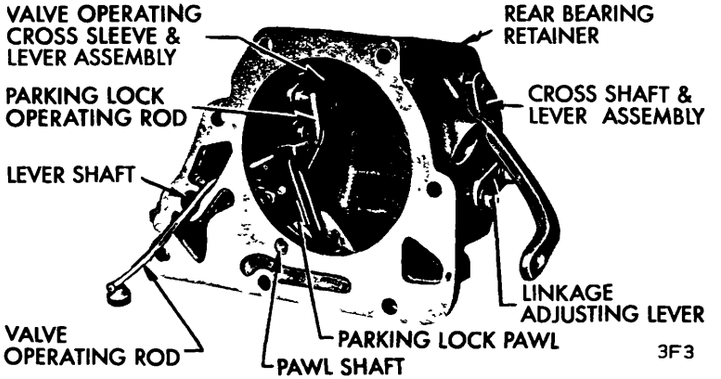
NOTE - Rear Bearing Retainer, Rear Bushing, Parking Lock and Speedometer Drive Gear can be removed with transmission in car by removing oil pan and disconnecting propeller shaft.

Removal - Disconnect valve operating rod (if not previously done), then remove retainer-to-case bolts, retainer and gasket. Remove speedometer gear and ratchet wheel retaining ring and remove speedometer drive gear, shims and spacer.

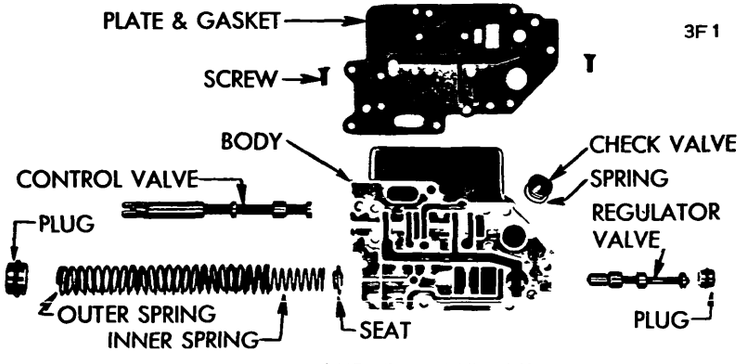
Disassembly - Remove spring from detent roller lever and support, then remove nut at adjusting lever. Pull roller lever and support assembly into bearing retainer and remove. *NOTE - Inspect "O" ring on support shaft and replace it damaged.* Remove cotter pin and clip from valve operating rod. *NOTE - If valve operating rod does not have a hole for installation of cotter pin, install later type valve operating rod and parking lock operating rod.* Thread parking lock operating rod ball stud out of lever. Thread a ¼" - 20 bolt into pawl shaft and withdraw shaft from retainer. Pull lever shaft from retainer in same manner, then remove parking lock pawl and lever assembly from retainer. Drive roll pin out of cross shaft and remove cross shaft and lever assembly and cross sleeve and lever. *NOTE - Inspect cross shaft seal and lever and replace if seal is worn or damaged. If bearing is worn so excessive freeplay exists between it and cross shaft, mark position of bearing in retainer and drive out bearing with a drift. Press a new bearing into place to same position as original bearing. Inspect output shaft bushing and if necessary, drive it out with Tools J-7273-7 and J-7013-1.*

Reassembly - If new output shaft bushing is to be installed, drive bushing into position (flush with counterbore) with Tools J-7273-7 and J-7013-1. Coat outer diameter of new seal with Permatex and install with Tool J-8864. Lubricate cross shaft seal and position it in recess over cross shaft bearing with lip inward. Hold valve operating lever and shaft in position inside retainer and slide cross shaft through bushing and seal inside valve operating lever and sleeve. Line up holes and install roll pin. Install detent roller lever and support, then assemble linkage adjusting lever on support shaft and install nut and lockwasher. Install detent spring, then assemble parking lock operating rod

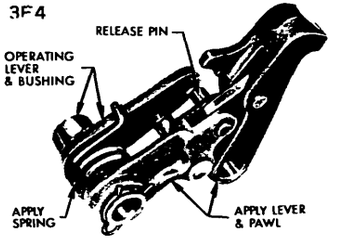
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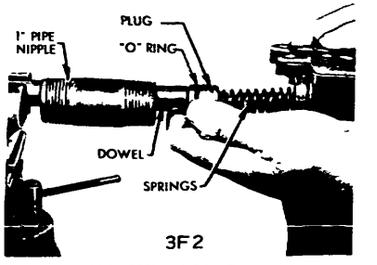
REAR BEARING RETAINER



VALVE BODY ASSEMBLY



PARKING LOCK & PAWL ASSEMBLY



VALVE BODY PLUG & SPRING INSTALLATION

to operating lever assembly using a lockwasher under ball end hex. *NOTE - Full pivoting ball end of rod must be assembled to operating lever.* Position pawl levers and rod assembly in retainer and slide pawl and lever shafts into place making sure that tapped holes are outward. Attach parking lock operating ball end to upper lever using a lockwasher under ball end hex. Assemble valve operating rod to valve operating lever with a clip and cotter pin. *NOTE - If rod does not have a cotter pin hole, replace rod with later type.*

Lube Oil Pressure Regulator

Do not remove lube oil pressure regulator valve. Use compressed air and solvent to clean valve.

Valve Body

Disassembly - Remove lower valve operating lever and linkage adjusting lever-to-upper lever shaft and remove levers. Remove safety nuts and washers from studs and lift valve body and gasket from servo body, then remove shift control valve from valve body. Remove rear pump delivery check valve and spring from servo body. Cover large pressure regulator valve plug with a wadded cloth and pull plug retaining pin out of valve body. *CAUTION - Use care when removing retaining pin as there is heavy spring pressure behind plug.* Remove two springs and spring seat. Remove small plug retainer pin, then thread a ¼"-20 capscrew into plug and remove plug from valve body. Remove pressure regulator valve. Remove valve body plate and gasket, then remove front pump delivery check valve and spring.

Reassembly (Valve Body) - Place front pump delivery check valve spring in body with large end down and place check valve on spring with ridged side up. Install valve body plate and a new gasket, making sure that check valve is seated against plate and not caught under gasket. Check oil orifice in pressure regulator valve and land to make sure it is clear, then install valve with land outward. Assemble "O" ring on small plug and install plug with tapped hole outward and install short retaining pin with shoulder of pin toward valve body plate side of body. Assemble spring seat on inner spring and install springs and seat into valve body through large plug opening. Clamp a drift or dowel in a vise and position a 1" inside diameter pipe nipple over the dowel. Position plug and "O" ring over spring ends and against dowel. Slide pipe nipple over plug so that when pressure is exerted to compress springs into valve body, plug will not slip off dowel. Push valve body toward dowel to push plug into valve body. Install long retaining pin with shoulder toward valve body plate side of valve. Install shift control valve with slotted end on same end of valve as large pressure regulator plug. Install rear pump delivery check valve in its seat in servo body, ridged face inward, and place valve spring on valve with large end up. Install a new gasket and the valve body on servo body, using care to keep pump delivery check valve spring below gasket, then install lock washers and safety nuts on two studs adjacent to control valve and tighten nuts evenly to 11-15 ft. lbs. Insert valve operating upper lever shaft through bearing in servo body, then with upper lever pointing toward reverse servo, place lower lever with linkage adjusting lever on shaft so that forked end of lower lever engages shift valve pin, then install lockwasher and nut.

Tightening Specifications

Location	Ft. Lbs.
Converter Housing to Crankcase	45-55
Converter Housing Cover	15-18
Torque Converter to Flywheel	28-32
Converter Pump to Cover	28-32
Converter Housing to Case	35-40
Converter Housing to Reaction Flange Stud	35-40
Front Oil Pump to Reaction Flange	18-22
Oil Pump Cover to Reaction Flange (3/8")	35-40
Oil Pump Cover to Reaction Flange (5/16")	20-25
Accumulator Body to Case	25-30
Accumulator Body to Flange Stud	25-30
Accumulator Body	40-50
Oil Pan to Case	10-12
Oil Pan to Reaction Flange Stud	10-12
Oil Filler Pipe to Oil Pan	30-35
Valve Body and Servo Body to Case	11-15
Valve Body to Servo Body Stud	11-15
Servo Body to Case	15-20
Valve Operating Lever Shaft	10-15
Rear Bearing Retainer to Case	25-30
Rear Oil Pump to Case	25-30
Front to Rear Planet Carrier	25-30
Band Adjusting Lock Screw	20-25
Mounting Pad to Rear Bearing Retainer	50-60
Input Shaft Retainer	30-35

Planetary Gear Set

Installation - Install reverse ring gear thrust washer and planet carrier rear thrust washer in case, then compress ends of reverse band with band installing clip J-2595, and install in case. *NOTE - When installing band, make sure that heavy side of band is in correct position so that it will attach to reverse anchor and not to strut.* Remove clip, then rotate servo band toward servo opening. Insert anchor through opening and engage with hooked end of band, then rotate band and anchor back to normal position. Hold band operating lever (with offset end) in place with strut shoulder toward inside of case and insert anchor shaft through case, anchor, and lever. *NOTE - Tapped end of shaft must be outward. If adjustment screw is not centered in servo opening, the low band operating lever has been installed by mistake.* Install reverse ring gear slipper in case, then install assembled planetary gearset.

Reaction Shaft Flange

Installation - To check endplay, assemble a suitable dial indicator support to transmission case. *NOTE - A 3/8" - 16 bolt with a .312" rod welded to head makes good arrangement.* Assemble dial indicator so plunger bears on end of output shaft. Push shaft forward with some force and rotate a few turns to squeeze grease from thrust surfaces. Set dial indicator at zero, then pull output shaft rearward and check indicator reading. If reading is more than .040", select a thicker washer for installation forward of needle thrust bearing and recheck endplay. If reading is less than .020", select a thinner washer and recheck. Endplay should be between .020" and .040".

BUICK SPECIAL AUTOMATIC TRANSMISSION

Buick Special (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

The engine cannot be started by pushing (or towing) car. If necessary, a booster battery must be used.

►*BOOSTER BATTERY CAUTION:* Connect negative (-) terminal of booster battery to negative (-) terminal of car battery. Alternator will be damaged if battery is connected improperly.

Towing Or Pushing Car

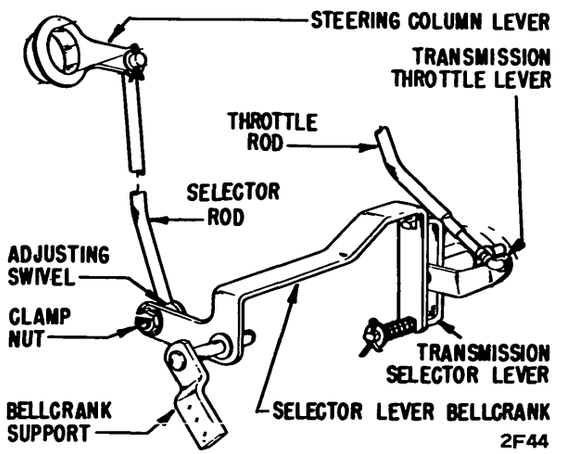
Car may be towed or pushed for short distances with selector lever in "N" position only, and at speeds less than 25 MPH. If car is to be towed an extended distance, raise rear wheels off ground or disconnect drive line.

►CHANGES, CAUTIONS, CORRECTIONS

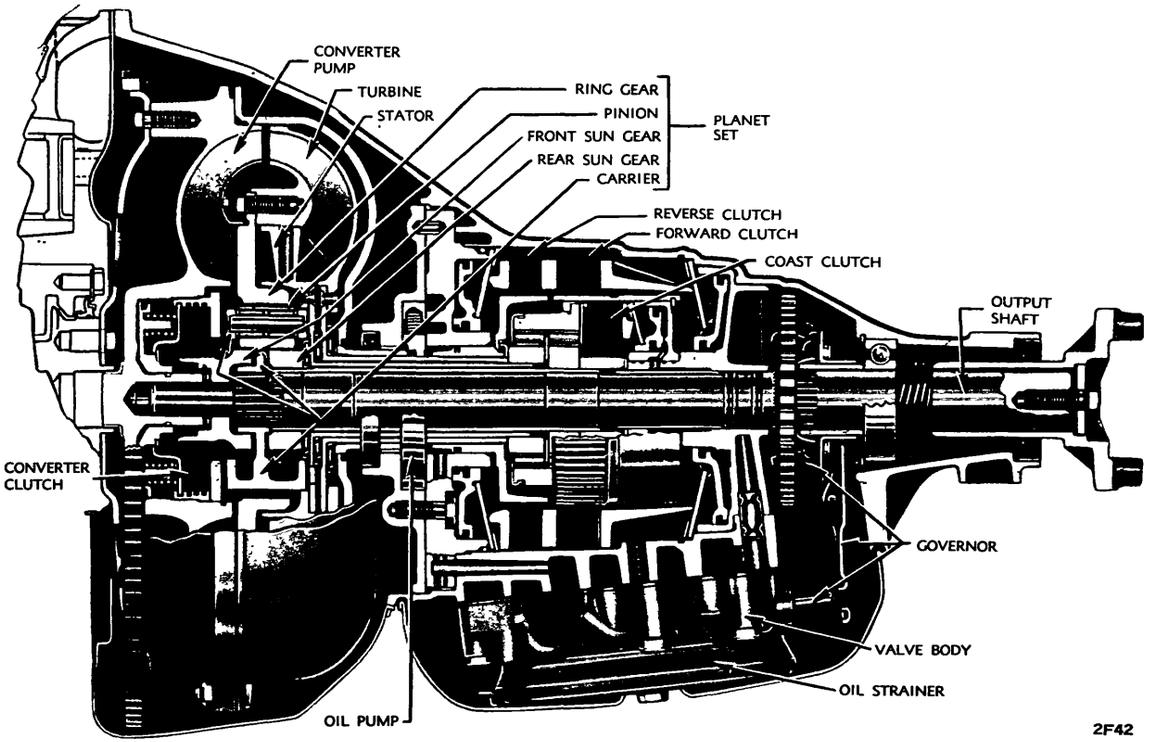
►*1963 BUICK SPECIAL AUTOMATIC TRANSMISSION CODE NUMBER NOTE:* A code number consisting of a letter followed by a number is stamped on raised surface of case, forward of oil pan on left side. This number should be used as identification when ordering parts or for service procedure changes.

►*1963 FRONT SUN GEAR-TO-CONVERTER PUMP BEARING RACE PRODUCTION CHANGE:* Beginning with Transmission Code No. K062, a new .060" thick bearing race, Part No. 1359998 is used in production to replace the previous .040" race. This new race CANNOT be used in earlier converter units. When installing this new race, it must be used next to converter pump. Additional races or spacers should be used between rear sun gear and rear sun gear bearing.

►*1963 OVERRUNNING CLUTCH ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Beginning with Transmission Code No. K300, a new clutch assembly incorporating sixteen bronze slippers on cam is being used in production and for service replacement on earlier 1963 transmissions. These new bronze slippers will prevent roller from crushing spring if roller "pop out" occurs. A Kit, Part No. 1396108 is available for installation on transmissions before Code K300. *See "Overhaul" below for clutch disassembly and reassembly procedure.*



MANUAL SELECTOR LEVER



BUICK SPECIAL AUTOMATIC TRANSMISSION

DESCRIPTION

"Dual-Path" 2-Speed automatic transmission of same design used on previous models.

LUBRICATION

Checking Fluid Level

Check fluid level every 6,000 miles. With transmission at normal operating temperature, selector lever in "P" (Park) position and with engine idling, check fluid level on dipstick. Add recommended fluid (see below) as necessary to maintain lever at "FULL" mark on dipstick. *NOTE - One pint of fluid will raise level from "ADD" mark to "FULL" mark. DO NOT OVERFILL.*

Draining & Refilling

NOTE - There is no oil pan or converter drain plug. It is recommended that oil pan be removed and cleaned, and the strainer replaced. If transmission is equipped with an oil screen, wash screen and reinstall.

Drain & refill every 24,000 miles. Remove single oil pan retaining bolt and remove oil pan, strainer (or screen). Wash oil pan and screen (install a new strainer if so equipped), then reinstall these parts. Tighten strainer or screen attaching bolts to 100 inch pounds, and oil pan bolt to 15-20 ft. lbs. Do not overtighten. Add 5 pts. of recommended fluid **before starting engine**, then start engine in "N" (Neutral). DO NOT RACE ENGINE. Immediately add oil to bring level to ½" below "FULL" mark on dipstick (approximately 8 pts. if converter is empty, none if converter full). Recheck and adjust fluid level after transmission is warm.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

12 pints (transmission and converter dry), 5 pints (converter full).

ADJUSTMENT

Throttle Linkage

See CARBURETOR in Car Mod l pags.

Manual Shift Linkage

Loosen adjusting swivel clamp nut where shift rod connects to transmission lever extension, then place

(Continued)

transmission selector lever in "Park" detent. Move selector lever at steering wheel to "P" (Park) position, then tighten swivel clamp nut.

Neutral Safety Switch

Mounted on steering column under cowl. Place selector lever in "N" (Neutral) and insert a 3/32" drill through gauging hole in operating lever and in switch body. *CAUTION - Do not allow lever to move out of position.* If drill will not enter holes or is not in line with steering column, loosen switch mounting screws and move switch for proper alignment. Tighten screws and check operation of starter in "N" & "P".

TESTING

Road Testing

With throttle and manual linkage properly adjusted and engine at normal operating temperature, accelerate from a stop with accelerator pressed just to detent. Upshift should occur smoothly at 40-45 MPH. If upshift occurs at speeds other than those specified, see "Trouble Shooting & Diagnosis" below.

TROUBLE SHOOTING & DIAGNOSIS

Growl Before Upshift

May be caused by a galled or worn front sun gear-to-converter bearing.

Governor Valve Buzz

This noise, which occurs in "D" range only, near the upshift point, can be corrected by installing Damper Tube, Part No. 1396256 in governor pressure tap in transmission case.

Upshift At Too Low Speed

Governor valve not adjusted properly or is sticking. Shift valve or shift valve regulator sticking. Throttle valve pressure too low (worn or broken springs or valve sticking).

Upshift At Too High Speed

Same as for "Upshift At Too Low Speed" except that throttle valve pressure may be too high.

Slow Engagement of Converter Clutch

Converter pressure regulator valve sticking (lowering converter pressure too slowly).

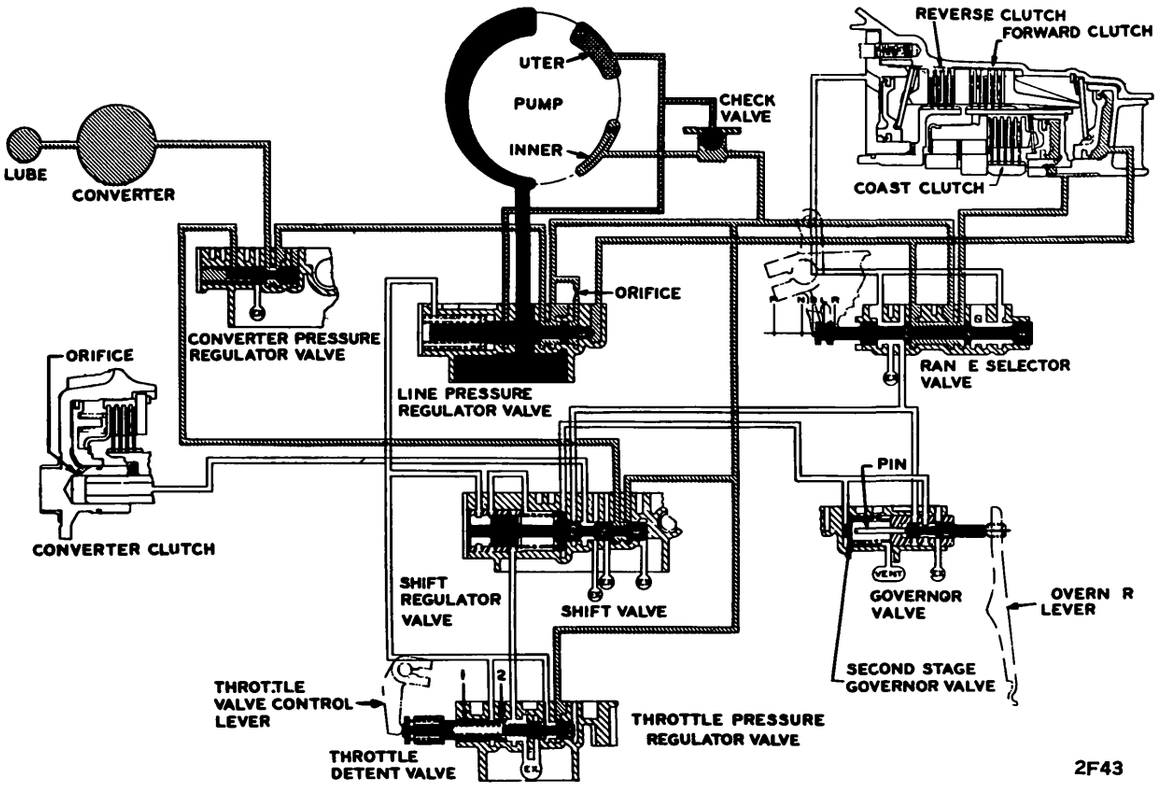
Fast Engagement of Converter Clutch

Converter charging pressure too low. Converter pressure regulator valve sticking.

REMOVAL & INSTALLATION

Removal

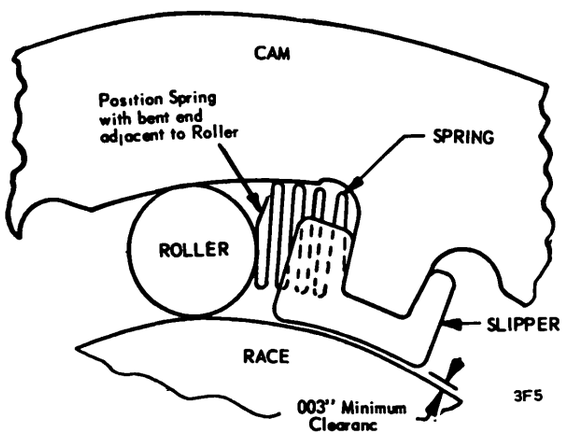
In addition to usual procedure for transmission removal, note the following: Remove engine exhaust crossover pipe assembly. Remove transmission filler pipe. Mark flywheel and converter pump for reassembly in original position and remove the three converter-to-flywheel bolts.



BUICK SPECIAL AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

Installation

Reverse removal procedure and tighten all bolts and nuts to proper torque (see "Tightening Specifications" below).



OVERRUNNING CLUTCH (LATER TYPE)

OVERHAUL

See 1961 Final Data, Pag 404 and note th f ll wing changes in overhaul procedure.

Overrunning Clutch

NOTE - This procedure appli s t transmissi ns aft r Code No. K300 and to earli r 1963 transmissions that have been modified. See "1963 Ov rrunning Clutch Assembly Production Chang & S rvic Replacem nt Note" above.

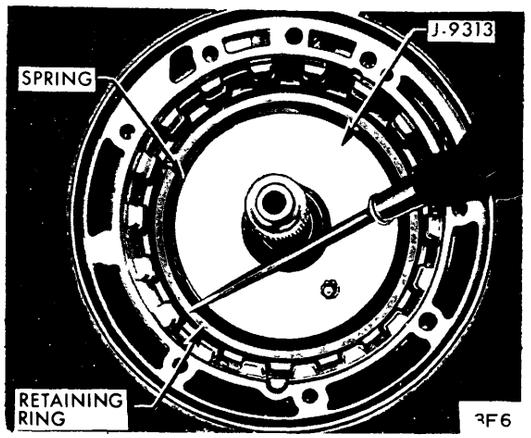
Disassembly - Remove backing plate and overrunning clutch assembly, then pull rear sun gear race and thrust washer out of cam assembly (rollers, springs, and slippers will fall out). Remove separator and stator race from cam.

Inspection - Check rollers for wear, scoring or denting. Inspect race for wear, scoring, or damage to splines. If cam must be replaced, drive out roller retainer and stake in place on new cam. If bronze slippers show signs of excessive wear or scoring, replace all sixteen slippers.

Reassembly - Place cam and roller assembly on a clean surface, then place stator race inside cam and install sixteen bronze slippers in proper direction

(Continued)

(see illustration). *NOTE - Stator race has larger splined inner diameter than the rear sun gear race. Sun gear race also has a counterbore.* Check clearance between race and slipper which should be .003" minimum. If clearance is less than .003", check for burrs and nicks which may prevent slipper from seating If there is no damage, interchange slippers on cam legs to obtain .003" minimum clearance. Assemble spring and roller by compressing spring with a small screwdriver and install roller. *NOTE - Position springs with bent end adjacent to roller and pointing outboard* (see illustration). Lubricate and install separator on stator race, then install bronze thrust washer into counterbored end of rear gear race and place race and thrust washer inside cam Install bronze slippers, springs and rollers in same manner as for stator race (above). Install cam and race assembly in coast clutch housing, rotating cam assembly so lugs on cam engage notches in coast clutch housing.



OVERRUNNING CLUTCH RETAINER RING INSTALLATION

Torque Converter & Gearset

After removal of front sun gear, needle thrust bearing and two selective fit needle bearing races, remove planet carrier retaining ring using a thin bladed screwdriver to pry ring out of groove.

Range Selector Levers

Removal - Use a 3/8" socket and 7/16" wrench to remove screw and nut attaching lever to shaft. Slide inner lever off shaft and remove, then slide outer lever and shaft out of range selector shaft. Check "O" ring and remove if worn or damaged. Use the same tools and remove screw and nut attaching range selector inner lever to shaft. Slide range selector inner lever off shaft, then remove inner lever and parking lock assembly. Check "O" ring and remove if worn or damaged. If parking lock actuator is bent or damaged, or if range selector requires replacement, pry retainer off actuator rod. To install, reverse removal procedure.

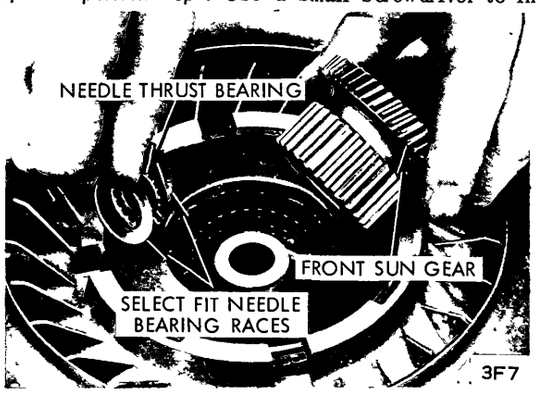
Coast & Overrunning Clutch

Installation - With transmission case in a vertical position, install forward clutch levers, then install forward clutch release spring flat on levers (inner edge of spring downward). Position spring centering tool, J-9313, over coast clutch support to rest on levers and center spring. Install spring retainer over spring and press down and outward to slightly compress spring and position retainer in groove of case. *NOTE - Retaining ring must be correctly installed.* Check to make sure ring is in groove all the way around, then remove tool. *Complete installation as outlined on Page 409 of 1961 Final Data.*

Torque Converter & Gear Set

NOTE - This procedure replaces "Step No. 9" on Page 410 of 1961 Final Data.

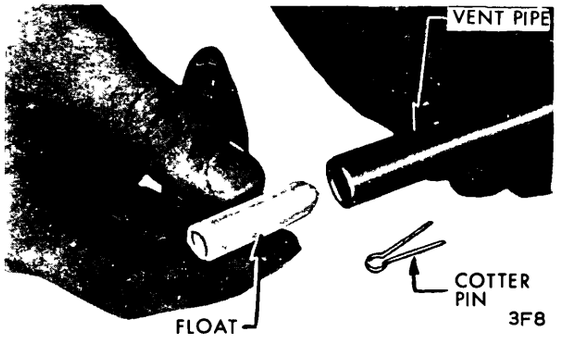
Place planet carrier over rear sun gear with tanged thrust washers inplace at front and rear. *NOTE - Deeper pocket of carrier "down" toward rear sun gear and splined portion "up".* Use a small screwdriver to install retainer ring in groove of output shaft. Assemble new converter pump oil seal to pump (do not twist square seal). Lubricate and install needle thrust bearing and two selective fit bearing races into front sun gear. Retain in place with chassis lubricant. *NOTE - The .030" bearing race must be toward sun gear.*



CONVERTER THRUST BEARING INSTALLATION

Transmission Vent

Replacement - Remove vent assembly from case by pulling straight up. To reinstall, reverse removal procedure. If necessary to remove float from vent pipe, remove cotter pin and slide float out of tube. Wipe off float and clean tube in solvent. To reassemble, install float, pointed end first, then install cotter pin.



TRANSMISSION VENT ASSEMBLY

Tightening Specifications

Location	Ft. Lbs.
Transmission to Cylinder Block	30-40
Cover Pan to Cylinder Block	8-12
Oil Pan to Transmission	15-20
Filler Pipe Clamp to Case	4-8
Speedometer Sleeve Clip to Case	4-8
Converter to Flywheel	18-25
Converter Pump to Housing	15-20
Planet Ring Gear to Turbine	25-30
Reverse Clutch Housing to Oil Pump Body	15-20
Oil Pump and Reverse Clutch Housing to Case	20-24
Valve Body to Case	6-9
Selector Inner Lever to Shaft	8-11
Throttle Valve Control Lever Clamp	8-11
Parking Lock Bracket to Case	15-20
Companion Flange to Output Shaft	45-55

CHEVROLET (ALUMINUM) POWERGLIDE

Chevrolet Pass. Cars 6 Cyl. & V8 (1963)
Chevy II, 4 & 6 Cyl. (1963)
Corvette (1963)
Chevrolet Trucks, Series 10 & 20 (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Turn off all electrical loads, then turn ignition ON and place transmission selector lever in "N" (Neutral) until a speed of 25 MPH is obtained, then place selector lever in "L" (Low) until engine starts.

Towing Or Pushing

Do not exceed speeds of 30 MPH with transmission in "N" (Neutral). If car is to be towed or pushed at speeds above 30 MPH or for long distance, disconnect drive shaft.

►CHANGES, CAUTIONS, CORRECTIONS

►*ENGINE SPEED INCREASE OR RUNAWAY AT HIGHER SPEED NOTE:* This condition which could occur during upshifts or forced downshifts may be caused by low oil level, improper band adjustment or a stuck modulator valve.

DESCRIPTION

Two speed planetary type automatic transmission of same design used on 1962 Pass. Cars with 327" engine.

LUBRICATION

Check fluid level every 1,000 miles. *NOTE - Periodic draining & refilling of transmission is not required. See "Draining & Refilling" below.*

Checking Fluid Level

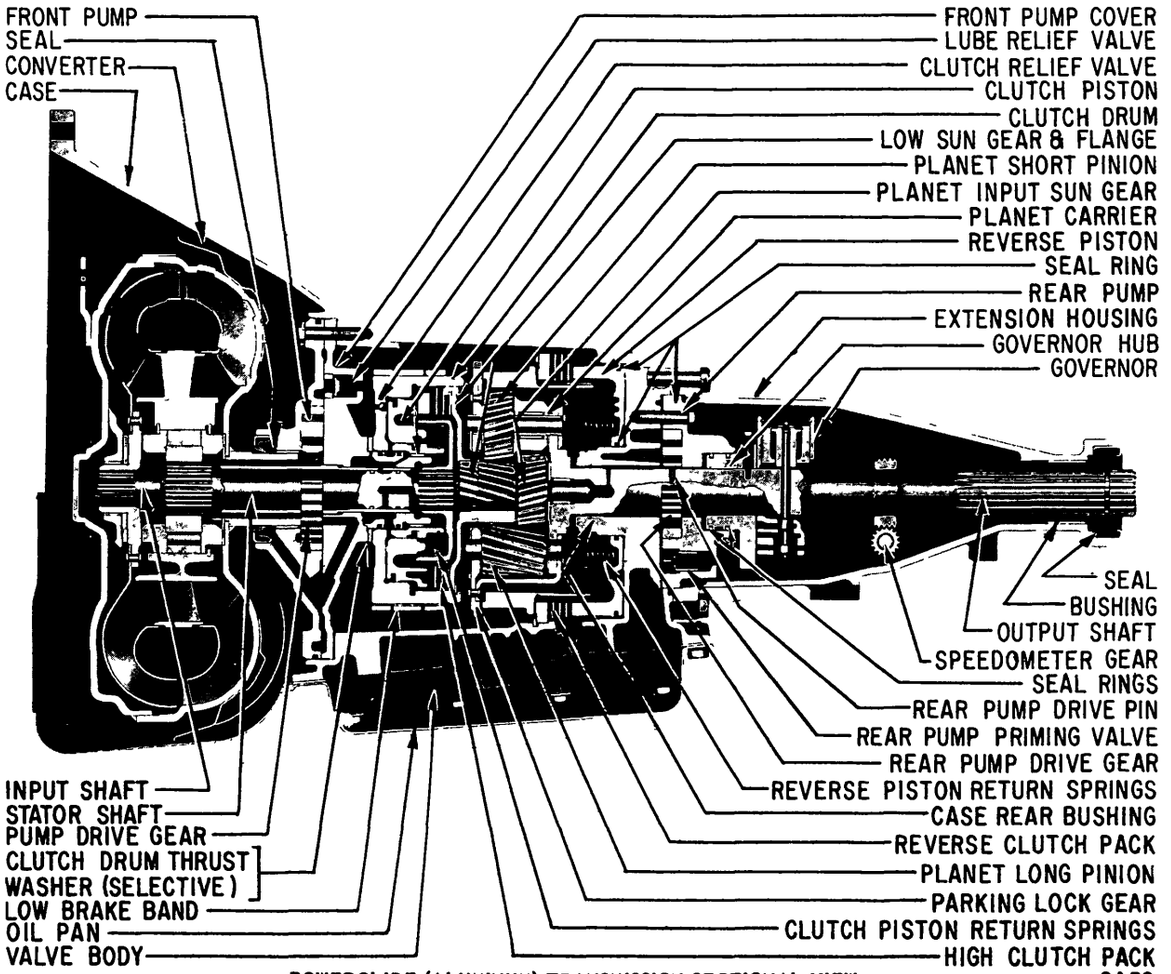
With transmission at normal operating temperature, selector lever in "N" (Neutral), fluid level should be at FULL mark on dipstick.

Draining & Refilling

NOTE - Periodic draining and refilling of transmission is not required. If necessary to remove transmission, drain and refill as follows: Loosen oil pan bolts and drop one end of pan so fluid will drain out. Allow oil to drain, then replace oil pan. To refill transmission, remove dipstick from filler tube and pour in sufficient fluid to bring level up to FULL mark on dipstick. Start engine and operate at normal idle speed with selector lever in "N" (Neutral). *NOTE - Shift transmission through all ranges with engine at idle speed, then run engine at 800-1000 RPM with transmission in "N" (neutral) until fluid warms up.* Check fluid level with engine at idle speed, transmission in "N" and add necessary fluid to bring level up to FULL mark on dipstick.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").



POWERGLIDE (ALUMINUM) TRANSMISSION SECTIONAL VIEW 2A52

Capacity

1½ qts. (Exc. Trucks); 4½ qts. (Trucks) refill after transmission oil pan removed. Total capacity including torque converter is 7½ qts. (Chevy II); 9 qts. (Chev. 6 Cyl. Pass. Cars & Corvette); 10 qts. (Chev. V8 Pass. Cars); 10½ qts. (Chev. Trucks). *NOTE - All above capacities are approximate.*

Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Shift Linkage

Steering Column Mounted Gearshift - *NOTE - To check linkage for proper adjustment, stop engine, lift up on transmission selector lever and move lever to position where transmission DRIVE detent is felt. Slowly release lever to feel if shaft lever tang freely enters lockplate. Check REVERSE range in similar manner. If tang does not enter lock plate in DRIVE and REVERSE ranges, linkage adjustment is required.* Place selector lever in "D" (Drive) range, then disconnect shift rod at its swivel attachment on lower end of mast jacket. Place shift lever on transmission in "D" (Drive) detent (first detent position clockwise from the fully counterclockwise position), then hold shift control lever on lower end of mast jacket against DRIVE stop of range selector lock plate (with control rod through swivel) and tighten clamp nut. Check transmission selector lever in all ranges.

Floor Mounted Gearshift - *NOTE - Check linkage for proper adjustment in same manner as for "Steering Column Mounted Gearshift" above.* Disconnect control rod at lower end of gearshift lever. Loosen clevis nut at bellcrank end of control rod (Corvette). On all models, place control rod bellcrank on transmission in

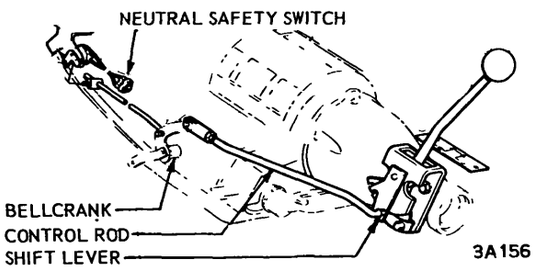
(Continued)

"P" (Park) position and place gearshift lever in "P" (Park) position, then hold in this position and adjust the control rod at clevis so the rod freely enters hole in gearshift lever. Tighten nut at clevis and connect rod to lower end of gearshift lever. Check gearshift pattern.

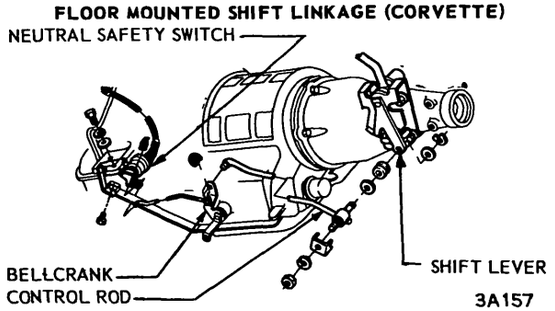
Neutral Safety Switch

St ering C lumn M unt d Gearshift - Located on steering column mast jacket under instrument panel. Place selector lever in "N" (Neutral) position and loosen screws securing switch retainer. While holding ignition key in "Start" position, adjust position of neutral safety switch until engine starts cranking. Hold switch in this position and tighten retainer screws. Check adjustment to make sure that engine starts only in "P" or "N".

Floor M unt d G arshift - Located on left side of transmission case and linked to transmission control lever. Adjust switch so engine will start only with gearshift lever in "P" or "N"



FLOOR MOUNTED SHIFT LINKAGE (CORVETTE)



FLOOR MOUNTED SHIFT LINKAGE (EXC. CORVETTE)

Low Band

NOTE - Low band adjustment is not ordinarily required in servic (adjustment is made when transmission is overhauled). Tighten low servo adjustment screw located on left side of transmission case to **40 inch pounds.** *NOTE - Input and output shafts must be rotated simultaneously t prpperly center low band on clutch drum when adjustment is being made.* Back off adjusting screw EXACTLY four complete turns and tighten locknut.

Thr ttl Valv

NOTE - No provisi n is mad for ch cking throttl valve pressur s. H wever, if operati n of transmission is such that some adjustm nt of throttl valv is indicated, pressures may b rais d or low red by adjusting th position of jam nut on throttl valv body (s "Throttle Valve Adjustment" illustration). To raise throttle valve pressure 3 lbs., back off jam nut one full turn. This increases the dimension from jam nut to throttle valve assembly stop. Tightening the jam nut one full turn lowers throttle valve pressure 3 lbs. A difference of 3 lbs. in throttle valve pressure will cause a change of approximately 2-3 MPH in wide open throttle upshift point. Small pressure adjustments can be made by partial turns of jam nut. The end of throttle valve adjusting screw has an Allen head so screw may be held stationary while jam nut is moved. *CAUTION - Use care when making this adjustment since no pressure point is provided to check throttle valve pressure.*

TESTING

Pressure Tests

CAUTION - Stall tests that allow engine vacuum to drop below 10" Hg. are not recommended.

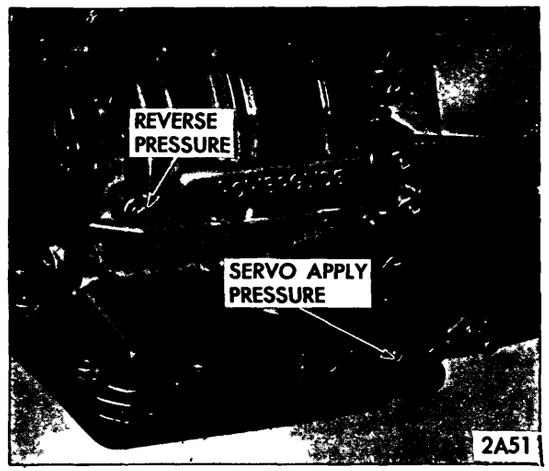
Connect pressure gauge hoses at low servo apply (main line), and reverse test points (see illustration), then run gauge lines into driving compartment by pushing aside mast jacket seal. Tie lines out of way and connect to a suitable gauge set. Test as follows:

Wide Open Throttle Upshift Pressure Test - Wide open throttle upshift should occur at 98-108 lbs. (All 4 Cyl. and 6 Cyl. engines and V8 truck engines); 95-105 lbs. (283" Pass. Car engines); 93-103 lbs. (327" Pass. Car engines) as indicated on low servo apply (main line) gauge.

Idle Pressure in "D" Range - *NOTE - In addition to pressure gauges, connect a vacuum gauge to engine intake manifold.* With parking brake applied and selector lever in "D" (Drive), low servo apply (main line) pressure should be 60-70 lbs. at 16" Hg. of vacuum and 89-99 lbs. at 10" Hg. of vacuum.

Manual "L" Range Pressure Test - Connect a tachometer to engine, then apply brake and place selector lever in "L" (low) and adjust engine speed to 1000 RPM with car stationary. Low servo apply (main line) pressure should be 126-134 lbs. (All engines). *NOTE - If pressures are not within specified range, check for one or mor of th following conditions: Partially plugg d oil suction scre n. Brok n or damaged ring in l w s rv . Pr ssur r gulator valv stuck. Leakag at valv body-to-case gasket. Leak between valve body gaskets. Leak at servo center. Front pump clearances incorrect.*

Drive Range Overrun (Coast) Pressure Test - With car coasting in "D" (Drive) range at 20-25 MPH with engine vacuum at approximately 20" Hg., low servo apply (main line) pressure should be 48-54 lbs. (all models).



THROTTLE VALVE ADJUSTMENT

PRESSURE TEST POINTS

TROUBLE SHOOTING

Engine Speed Flares

On Standstill (But Acceleration Lags) - Low band partially applied. Low oil level. Clogged oil suction screen. Improper band adjustment. Servo apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding. *NOTE - This last condition is a very rare occurrence.*

On Upshift - Low oil level. Improper band adjustment. Clogged oil screen. High clutch partially applied, blocked feed orifice. High clutch plates worn. High clutch seals leak. High clutch piston hung up. High clutch drum relief ball not seating. Vacuum modulator line plugged.

Upshifts

No Upshift - Low band not releasing because of one or more of the following malfunctions: Stuck low drive valve. Defective governor. No rear pump output because of stuck priming valve, sheared drive pin or defective pump. Throttle valve stuck or not adjusted properly. Manual valve lever not adjusted properly.

Harsh Upshifts - Incorrect throttle valve linkage adjustment. Improper low band adjustment. Vacuum modulator line broken or disconnected; diaphragm leakage; or valve stuck. Hydraulic modulator valve stuck.

(Continued)

Downshifts

Closed Throttle (Cast) Downshifts Harsh - Improper low band adjustment. High engine idle speed. Downshift timing valve not operating properly. High mainline pressure because of vacuum modulator failure or because of hydraulic modulator valve sticking. Check for pressure regulator valve sticking.

No Downshift - Sticking low-drive shift valve. Low-drive shift plug stuck. High governor pressures or low throttle valve pressure.

Clutch Failure

Burned Plates - Low band adjusting screw backed off more than specified. Improper order of clutch plate assembly. Extended operation with low oil level. Clutch drum relief valve stuck. Abnormally high speed upshifts which may be due to improper governor action or operating transmission at high speed with selector lever in "L" (Low).

No Drive In Reverse

Incorrect manual lever adjustment. Reverse clutch piston stuck. Reverse plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

Car Creeps

In Drive - Engine idle speed adjusted too high.
In Neutral - Incorrect manual lever adjustment. High clutch or low band not released.

Impr per Shift Points

Incorrectly adjusted throttle linkage or throttle valve. Governor defective. Rear pump priming valve stuck.

Unable To Push Start

Rear pump drive gear not engaged with drive pin or output shaft. Drive pin sheared off. Rear pump priming valve not sealing.

Oil Forced Out of Filler Tube

Oil level too high. Water in oil. Leakage in pump suction circuits.

Tightening Specifications

Location	Ft. Lbs.
Transmission Case to Engine	25-30
Transmission Oil Pan to Case	7-10
Transmission Extension to Case	20-30
Speedometer Gear Housing Retainer	3½-5
Servo Cover to Transmission Case Bolts	15-20
Front Pump to Transmission Case Bolts	13-17
Front Pump Cover to Body Attaching Bolts	15-20
Pinion Shaft Lock Plate Screws	2½-3
Governor Body to Hub Bolts	6-8
Governor Hub Drive Screw	6-8
Rear Pump to Transmission Case Bolts	8-11
Valve Body to Case Bolts	8-11
Suction Screen Screws	2½-3½
Lower to Upper Valve Body Bolts	8-11
Upper Valve Body Plate Bolts	3½-5
Inner Control Lever Allen Head Nuts	6-8
Parking Pawl Bracket Bolts	8-11
Oil Cooler Connections or Plugs	5-7
Pressure Test Point Plugs	5-7
Low Band Adjustment Lock Nut	13-17
Converter to Engine Bolts	15-20

SHIFT SPEEDS (MPH)

Model	Engine	Axle Ratio	Shift	Closed Throttle	To Detent	Through Detent
Chevy II	4 & 6 Cyl.	All	Up	12-16	39-45	45-51
			Down	12-15	25-30	42-48
Chev. Pass.	230" 6 Cyl.	3.08-1	Up	14-18	43-50	51-57
			Down	13-17	28-33	47-54
Chev. Pass.	283" V8	3.08-1	Up	14-18	47-54	55-62
			Down	13-17	16-22	53-59
Chev. Pass.	①327" V8	3.08-1	Up	14-16	48-58	59-65
			Down	11-15	16-19	56-61
Chev. Pass.	②327" V8	3.36-1	Up	12-15	49-60	59-66
			Down	10-15	14-17	57-62
Corvette	①327" V8	3.36-1	Up	12-15	50-62	61-68
			Down	11-14	15-18	58-65
Chev. Truck③	All	3.73-1	Up	11.8-14.6	36.1-49.1	46.8-53.4
			Down	10.6-13.6	10.6-30 9	43.2-50 1

① - Std. engine. ② - High performance engine. ③ - With 700 x 15 tires and specified axle ratio.

TRANSMISSION REMOVAL

See 1962 Final Data, Page 438 and note the following additional information.

Corvette - Remove shift lever knob and disconnect neutral safety switch wiring at quick-disconnect. Remove both exhaust pipes (exhaust manifold-to-frame crossmember).

TRANSMISSION OVERHAUL

See 1962 Final Data, Page 438 and note the following changes.

Vacuum Modulator

This unit has been changed and incorporates a plunger and dampening spring (see illustration).

Rear Pump

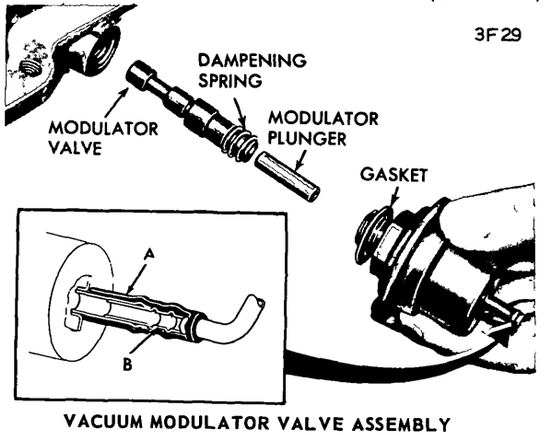
When installing **rear pump priming valv** , install retaining seat flush to .020" below surface of pump face. When properly installed, tip of valve must extend above face of pump to insure priming valve operation. When installing **downshift timing valve,** press to a height of 17/32", measured from shoulder of valve assembly to face of pump cover. If **lube relief valve** is replaced, use an "easy out" for removal. To install, tap seat in place with a soft hammer or brass drift so it is flush to .010" below surface of pump cover.

High Clutch

There are 21 return springs instead of the 24 springs used on previous models. The number of clutch drum plates have been changed on some models. Install same number of plates in the same order, as found in original assembly.

(Continued)

3F29



VACUUM MODULATOR VALVE ASSEMBLY

CORVAIR TRANSAXLE

Corvair (1963)
Corvair 1200 Series Trucks (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Place transmission selector lever in "N" (Neutral) until car reaches 25 MPH, then move selector lever to "L" until engine starts.

Towing Or Pushing Car

With transmission selector lever in "N" (Neutral), car may be towed at speeds not to exceed 30 MPH.

DESCRIPTION

The Transaxle consists of either an integral differential (rear axle) assembly and synchro-mesh transmission; or a differential (rear axle) assembly and a Powerglide automatic transmission. All assemblies are the same design used on previous models.

LUBRICATION

Checking Fluid Level

Check fluid level every 1,000 miles. With transmission at normal operating temperature, check the various units as follows:

Rear Axle & Synchro-mesh Transmission - Check fluid in differential first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential carrier, also check level in transmission. *NOTE - Fluid should be level with bottom of filler plug hole under operating conditions.*

Powerglide Transmission - Place transmission selector lever in "N" position, engine idling, and check fluid level on dipstick in filler tube at right side of engine near firewall. Add recommended fluid to bring level to "Full" mark on dipstick.

Draining & Refilling

NOTE - Draining and refilling of transmission is not recommended except at time of overhaul. Drain oil by loosening filler tube attaching nut on oil pan. Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and a suitable funnel. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark. Capacity is 6 pints (approximately) for normal refill. 13 pints (approximately) with transmission and torque converter dry.

ADJUSTMENT

Synchro-mesh Transmissions

NOTE - Before making any adjustment, lash in system must be taken up by moving shift control rod to rear.

500 & 700 Series (3 & 4-Speed Trans.) - With seat in full forward position, shift transmission to first gear, then loosen coupling clamp nut on transmission shift control rod. Adjust shift lever so distance from lever to edge of seat is ½". Test shifts in all ranges.

900 Series (3 & 4-Speed) - Shift transmission into reverse, then loosen coupling clamp nut on transmission shift control rod. Adjust shift lever so distance between center of gearshift lever housing, rearward, to center of gearshift lever knob is 2¼" (3-Speed Trans.); 3¼" (4-Speed Trans.). Tighten clamp nut and check shift in all ranges.

1200 Series (3 & 4-Speed) - Remove spring from gearshift lever shaft. Rotate gearshift control rod to left side of truck and pull out until third gear is engaged (3-Speed Trans.); fourth gear (4-Speed Trans.), then loosen control rod coupling nut. Insert a 1½" wood block between rod end and front flange of the front crossmember. Remove gauge block and tighten clamp nut, then install spring. Check shift in all ranges.

Clutch Linkage (Synchro-mesh Trans.) - *See "Chevrolet & Pontiac (Own) Clutch" in Clutch Section.*

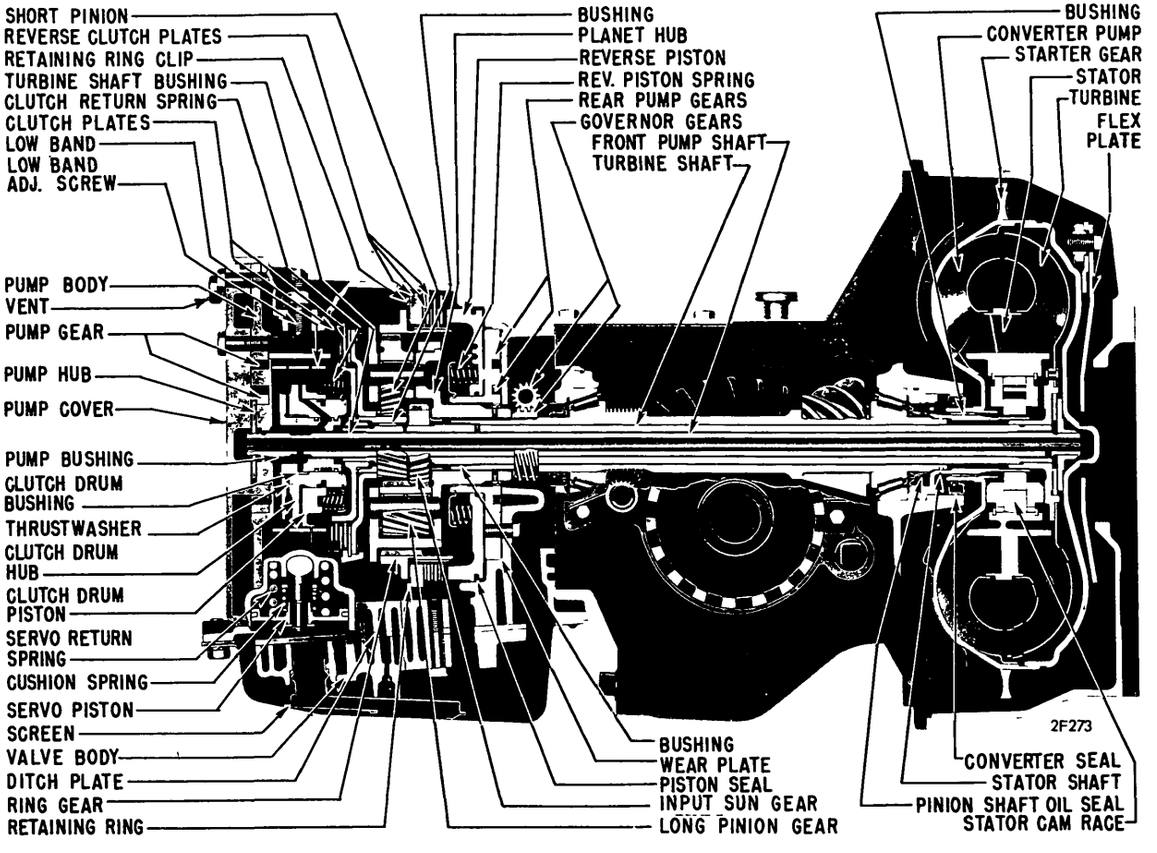
Automatic Transmission

Throttle Linkage - *See CARBURETOR on Car Model pages.*

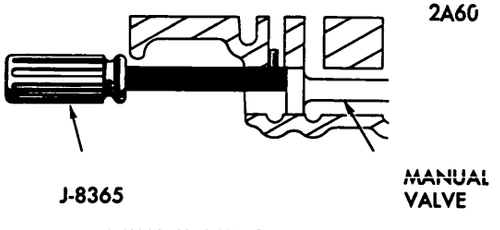
Manual Linkage - Drain transmission oil and remove oil pan. Place transmission selector lever in "D" (Drive), then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body (see illustration). With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so tool is held in horizontal position. Recheck adjustment, then install oil pan and fill transmission.

Neutral Starter Switch - Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to "Start"

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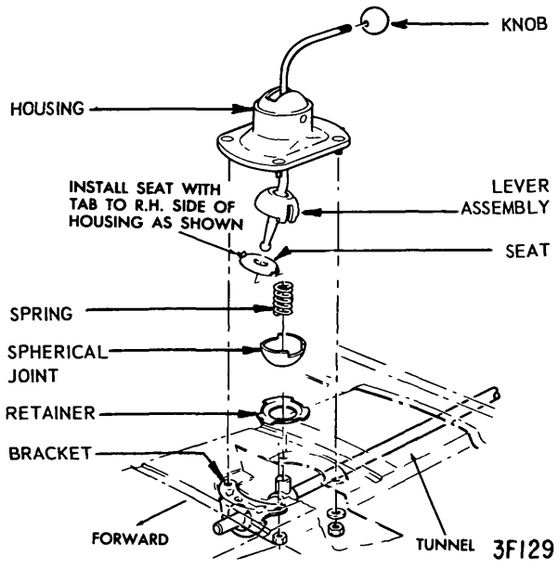
CORVAIR POWERGLIDE TRANSMISSION



MANUAL VALVE GAUGING TOOL

position, then move neutral switch fore and aft until engine cranking begins. Secure switch in that position, then check to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral).

Low Band - *NOTE - Periodic adjustment of the low band is not recommended. Access to the adjusting screw, from inside the car through parcel compartment area, has been eliminated.* To adjust (with transmission out of car), loosen lock nut and tighten square head adjusting screw to 40±5 inch pounds, **then back adjusting screw off 4 full turns exactly.** Hold adjusting screw stationary and tighten locknut



MANUAL SHIFT LEVER ASSEMBLY (EXC. 1200 SERIES)

TROUBLE SHOOTING & DIAGNOSIS (AUTOMATIC TRANSMISSION)

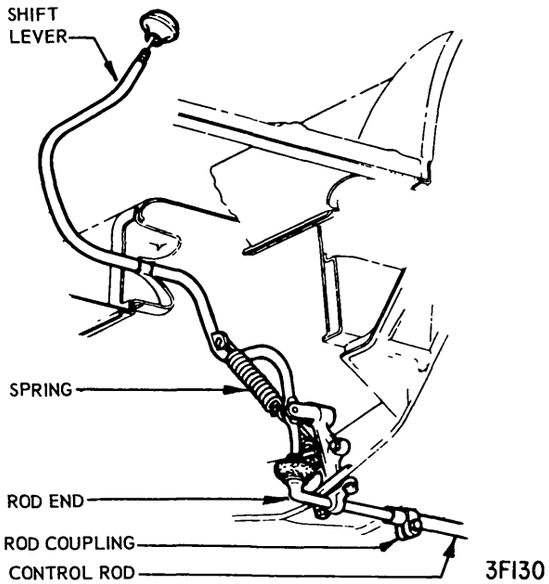
No Drive

In Any Selector Lever Position (Cannot Load Engine) - Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming valve not seating.

In Reverse - Manual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

Engine Speed Flares

On Standstill Starts But Accelerati n Lags - Low band only partially applied caused by one or more of the



MANUAL SHIFT LEVER ASSEMBLY (1200 SERIES)

following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

On Upshift - Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief valve ball not seating. Vacuum modulator hose collapsed.

No Upshift

Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.

Harsh Upshift

Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

Harsh Downshift

With Closed Throttle - Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body assembly.

Car Creeps

Excessiv ly in Drive - Engine idle speed too high.

In Neutral - Incorrect manual valve lever adjustment. High clutch or low band not released.

Oil Forced From Filler Pipe

Oil level too high. Oil pickup pipe split or not sealed, causing air to enter system.

Unable To Push Start

Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.

TESTING

NOTE - Transmission must be at normal operating temperature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.

Road Test

Road test car to determine transmission shift points as indicated below.

Transmission Shift Speeds

	MPH
UPSHIFTS:	
Minimum Throttle	10–12½
Full Throttle	41–47
Part Throttle (Detent Touch)	34–41
DOWNSHIFTS:	MPH
Closed Throttle	8–12
Full Throttle	38–44
Part Throttle (Detent Touch)	23–30
Manual Low (Inhibited)	41–46

Pressure Tests

NOTE - Pressure tests can be made by raising rear wheels 3-5" off floor on jack stands.

FRONT PUMP PRESSURE TESTING CAUTION

Front pump pressures must be obtained with engine at idle speed (16" Hg. of vacuum). A very slight increase in engine speed (even that caused by an inaccurately set engine idle speed) will allow rear pump to take over, causing front pump pressure to fall to zero. If no front pump pressure is indicated, check first for proper engine idle speed.

Front Pump - Remove plug located at 6 o'clock position in pump cover (accessible through the engine **front mount) and connect pressure gauge. With engine at idle speed(approx. 16" of vacuum), pressures should be as follows with selector lever in the indicated range: 81–98 lbs. (Reverse); 47–57 lbs. (Neutral & Drive); 71–82 lbs. (Low). Disconnect vacuum hose at balance tube, then with engine at idle speed, check pressure which should be: 140–157 lbs. (Reverse); 71–82 lbs. (Neutral, Drive & Low). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft, or missing plug from front end of front pump shaft. Moderately low front pump pressures in all ranges indicate a restricted front pump inlet. Failure of pressure to raise when vacuum hose disconnected (or high pressures with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.**

(Continued)

Rear Pump - With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D"(Drive) and accelerate engine. Front pump pressure should drop to approximately 0-5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged, or rear pump check ball is not seating.

Throttle Valve - Remove plug located at 8 o'clock position in front pump cover (access through engine front mount) and connect pressure gauge. Disconnect throttle valve rod at carburetor and vacuum hose at balance tube, then with engine at idle speed, depress accelerator to wide open position. *NOTE - By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressures should be as follows with selector lever in the indicated range: 0 lbs. (Reverse & Neutral); 52–54 lbs. (Drive); 66–77 lbs. (Low). If pressures not as specified, they can be corrected by adjusting the position of the jam nut located on end of detent valve assembly (part of throttle valve assembly inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut as necessary. To raise pressure, back off jam nut (one full turn is equal to 3 psi). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

Power Train

Remove complete engine, transmission & rear axle assembly as a unit. *See "Engine" on Car Model pages.*

Synchro-mesh Transmission

Removal - With the "Power Train" removed, support with a chain fall or suitable lift and sling, then drain transmission and differential carrier. Remove starter and the two screws securing clutch pull rod dust seal assembly, then remove pin attaching pull rod to clutch fork. Separate Transaxle from engine by removing attaching bolts securing differential carrier to clutch housing. Pull Transaxle away horizontally to prevent damage to clutch fork. Remove clutch shaft (transmission input shaft). Remove clutch fork and clutch release bearing from differential carrier. *NOTE - Fork is attached to carrier by a ball and socket and spring retainer.* Separate three-speed transmission from differential carrier by removing the four attaching bolts and disengaging transmission output shaft from splines in differential carrier.

Installation - Use a new gasket (hold in place with petrolatum), then couple transmission to differential carrier, being sure to engage splines of transmission mainshaft to internal splines of pinion in differential carrier. Secure transmission to carrier with four bolts (install two bolts on right side from transmission end and the two on left side from carrier end). Tighten bolts to 24-32 ft. lbs. Install clutch release bearing and clutch fork on differential carrier. *NOTE - Clutch release bearing slips over shaft and the fork has a spring retainer and socket which attaches to ball stud on carrier.* Install clutch shaft in Transaxle, then check distance from end of clutch release bearing shaft to end of clutch shaft. If fully engaged, the dimension should be 2 9/16"±1/32". Support Transaxle with a chain fall or other suitable lift and sling, then align attaching bolt holes in carrier and clutch housing. Pilot clutch shaft splines into clutch, then install attaching bolts and tighten securely. Connect clutch pushrod to clutch fork with pin, then position and secure clutch pushrod dust seal assembly. Install starter and fill transmission and differential carrier.

Powerglide Transmission

Removal - With "Power Train" removed, drain transmission, then disconnect modulator tube-to-carburetor balance tube hose. Remove engine front shield and remove starter. Disconnect converter from engine flex plate by removing the three attaching bolts through the access hole (at 12 o'clock position) in converter housing. Support Transaxle with a chain fall or suitable lift and sling, then remove attaching bolts and lockwashers securing differential carrier to converter housing. Pull Transaxle away from engine and remove converter assembly. Pull turbine shaft out of Transaxle assembly. Place Transaxle on a flat surface and remove screws securing governor assembly and remove governor. Remove three bolts securing transmission to carrier, then carefully pull transmission straight away from carrier to prevent pump shaft from damaging bushings in transmission and pinion shaft. Remove gasket from carrier, then remove governor gear and selective spacers from pinion shaft of carrier.

Installation - *NOTE - Before connecting Powerglide transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper size thrust washer, install a new gasket to either carrier or rear face of transmission (hold in place with petrolatum). Align carrier and transmission on a flat surface and carefully guide the pump shaft through differential carrier so as not to damage bushing in pinion, then engage splines of pinion shaft with planet carrier internal splines in transmission. Install governor, then secure the transmission-to-carrier with four bolts. Drive the two bolts from carrier side first (to minimize chance of cocking mating surfaces), then tighten bolts to 24-32 ft. lbs. Install turbine shaft, being careful not to damage its bushings as it is inserted over pump shaft splines. *NOTE - Be sure to engage the two sets of splines (forward splines engage clutch drum and the rear set engage into sun gear in planet gearset).* DO NOT tip rear of Transaxle downward after installation unless converter holding plates are used. Position Transaxle adjacent to engine on a chain fall or similar lift, then remove converter holding plates if installed. Align converter with flex plate, then pilot converter hub onto crankshaft. Align mounting holes in differential carrier and converter housing, then secure top left bolt (11 o'clock position). Install flex plate to converter bolt accessible at the "1 o'clock" position to prevent accidental turning of converter or flex plate and loss of attaching hole alignment. Drive remaining converter housing-to-differential carrier mounting bolts, then install starter. Drive the two remaining converter-to-flex plate bolts through the access hole in converter housing. Install engine front shield, then reinsert filler tube through front shield and connect it to oil pan. Connect vacuum modulator to carburetor balance tube with a short length of hose. Refill transmission (*See "Draining & Refilling" above*).

Rear Selective Thrust Washer - *NOTE - Any time repairs are made that require the separation of Powerglide transmission and differential carrier, the proper thickness of thrust washer to be used at front face of governor gear must be determined as follows:* Install dial indicator on Support J-8364 and install a 3" indicator extension. Without gasket, place support on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator tip rests on planet carrier hub. Adjust indicator as required to permit maximum indicator travel, then set dial to zero. *NOTE - Transmission must face downward when indicator is zeroed.* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero position. *NOTE - If indicator is properly positioned on support, indicator should not deflect more than .050" (one-half turn) when removed; otherwise raise or lower dial indicator on support post as required and again "zero" gauge.* Place support and dial indicator on governor gear on differential carrier pinion shaft (support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator can be counted. *NOTE - Measurement starts once the indicator needle reaches "zero".* Fully depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear.

►*NOTE: After selected spacers are installed on governor gear, recheck measurement. If spacer stack is correct, indicator reading will now be between .025-.045". If not add or remove spacers until reading is within this range.*

Thrust Spacer Chart

Indicator Reading	No. Req'd	② Spacer Thickness
.025-.046" Ⓒ	None	
.047-.062"	1	.016" ± .001"
.063-.078"	2	.032" ± .002"
.079-.094"	3	.048" ± .003"
.095-.110"	4	.064" ± .004"
.111-.126"	5	.080" ± .005"
.127-.142"	6	.096" ± .006"
.143-.155"	7	.112" ± .007"

Ⓒ - If initial indicator reading is below .025", replace thrust washer at clutch hub (front pump) with a .050" thrust washer, then repeat entire rear thrust spacer selection procedure.

② - Spacer, Part No. 6256827 (.016" thick) furnished. Use number indicated.

OVERHAUL

Differential Case

Standard Differential Case - *See 1960 Final Data, Page 433, or later Manual edition and note the following:*

Differential case has been redesigned to accommodate side gears of equal length. Because of this change, universal joint trunnions are unequal in length and the differential pinion shaft has flats on both sides to clear longer universal joint trunnions. A new "pressed on" speedometer gear replaces the former integral gear.

Differential Side Bearing Installation - Use Tool J-8359 to install side bearings on differential case and cover.

►*DRIVE PINION DEPTH SETTING NOTE (When Installing Service Replacement Drive Pinion):* Ring gear and drive pinion sets manufactured after February 1, 1961 and date coded 2-61 and later will not be

(Continued)

marked f r pinion mounting distance. On these later service replacement units, select shims using pinion code "14" as indicated in "Pinion Setting Shim Chart" under "Corvair Transaxle" in 1960 Annual Data or later Manual edition.

Positraction Differential

See 1962 Final Data, Page 448 and note the following: 1963 type units have five plates. Previous type units used seven plates.

3-Speed Synchro-mesh Trans.

See 1960 Final Data, Page 433, or later Manual edition and note the following: Transmission case is redesigned to provide piloting on differential carrier pinion front adjusting sleeve. In addition, a cast iron transmission case is used and the transmission mainshaft has been lengthened at output end.

4-Speed Synchro-mesh Trans.

See 1961 Final Data, Page 423 for overhaul procedures.

Powerglide Transmission

See 1960 Final Data, Page 433, or later Manual edition and note the following:

Line pressure regulator valve has been eliminated and facing material is no longer used on reverse clutch thick reaction ring. On 1200 series trucks, transmission oil is cooled by circulating it through a cooler located in left front wheel housing compartment. On these models, a bypass valve located in front pump body allows oil to circulate within the transmission case in the event any restrictions creating a pressure build-up of more than 15 lbs. On all models, the planet carrier assembly can be disassembled for repair as follows:

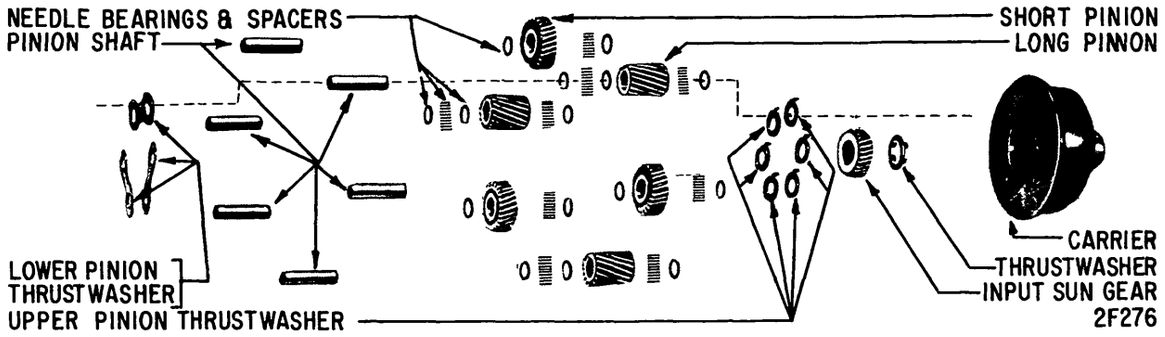
Planet Carrier - Disassembly - 1) With carrier removed from the transmission assembly, wash carrier in clean solvent, then blow out all passages and dry with air. Inspect complete unit for damage and wear. Check clearance of planet gears which should be .005-.0035". Place planet carrier assembly in a vise with splined end facing down.

2) Starting with a short planet pinion, and using a soft steel drift punch, drive on upper end of pinion shaft until shaft is driven beyond staked position and press fit area of carrier housing. Feed Tool J-9560-1 into short planet pinion from upper end, pushing planet pinion shaft ahead until tool is centered in pinion. Remove short planet pinion and lower pinion thrust washer from the assembly, then remove pinion shaft.

3) Remove Tool J-9560-1, needle bearings, and needle bearing washers from short planet pinion. *CAUTION - Do not lose any of the planet pinion needle bearings. Twenty long bearings are used with short pinion. Forty short needle bearings are used with long pinions (twenty on each end with a spacer in the middle).* Remove and disassemble remaining short planet pinions.

4) Remove input sun gear thrust washer, then by following the procedure outlined for removal of short pinions, remove the long planet pinions and upper and lower pinion thrust washers. Wash all parts in solvent and blow dry with air. Recheck all needle bearings and parts and replace as necessary. *CAUTION - If needle bearings are worn, all bearings must be replaced.*

Reassembly - 1) Use Tool J-9560-2 and assemble bearing spacer and short needle bearings (20 in each end) in a long planet pinion. *NOTE - Use cup grease to hold needle bearings in position during assembly.* Place a needle bearing washer at each end of planet pinion, then reverse position of planet carrier in vise and position the long planet pinion (with Tool J-9560-2 centered in pinion and with thrust washers at each end) in planet carrier. *NOTE - Oil groov s in thrust washers must be towards gear. Locate sh rt pini ns in carrier openings and l ng pini ns pp site cl s d portions of carrier.*



POWERGLIDE PLANET CARRIER ASSEMBLY

2) Align thrust washers with carrier holes, then select the proper pinion shaft (lubricate it with oil) and install it by tapping with a hammer, pushing Tool J-9560-2 ahead of it. Use a brass or soft steel drift punch and drive pinion shaft until lower end engages staked positions on lower face of carrier.

3) Assemble and install remaining long planet pinions in the same manner, then install input sun gear thrust washer and input sun gear. Follow the same general procedure as outlined for long pinions and assemble and install short pinions in carrier. *NOTE - Paired thrust washers are used on pinion thrust surfac t - ward flanged side of plan t carri r, from th short to the long planet pinions while th pposite thrust surface has an individual thrust wash r.*

4) Check end clearance of gears which should be .005-.035". Use a chisel or centerpunch and restake pinion shaft at four places on both ends of planet carrier.

CHRYSLER CORP. TORQUEFLITE SIX & EIGHT TRANSMISSION

Chrysler, Imperial, Dodge, Plymouth, Valiant (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Turn ignition switch on, then push the "L" (Low) button in and depress accelerator pedal slightly. After car attains a speed of 15 MPH, transmission will start engine.

Towing Or Pushing Car

Transmission Operating Properly - Car may be towed safely in "N" (Neutral) position at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be disconnected.

Transmissi n Inoperative - Tow car with rear end raised or remove the propeller shaft.

DESCRIPTION

Three speed automatic transmission of same design used on previous models.

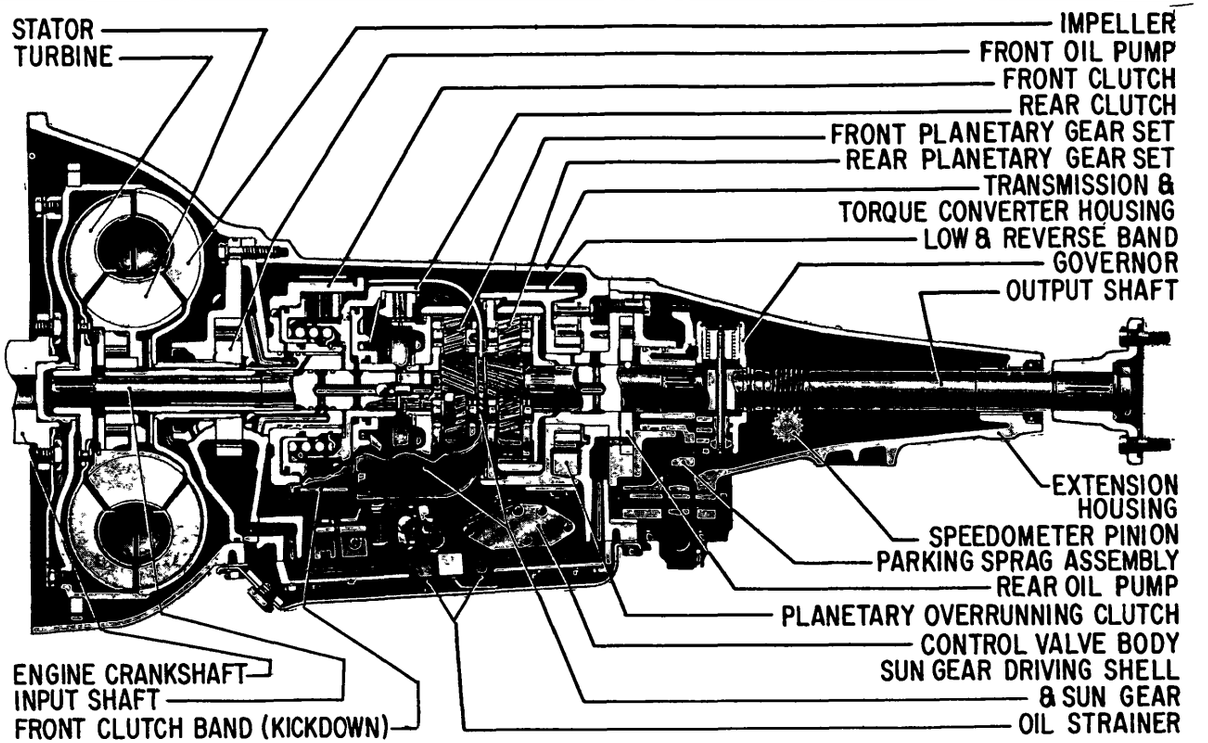
LUBRICATION

Checking Fluid Level

With transmission at normal operating temperature, parking brake applied and engine at idle speed, depress each button momentarily, ending with the "N" (Neutral) button pushed in. Fluid level should be slightly below "F" mark on dipstick (never above "F" mark). Add or remove fluid as necessary to bring to proper level. *NOTE - If necessary to check fluid level with transmission cold, fluid level should be at, or slightly below "Add One Pint" mark. Do not overfill.*

Draining & Refilling

NOTE - Not required in normal service except at time of overhaul. For police, taxicab or towing trailer service, drain and refill every 34,000 miles. For extremely severe service, drain and refill every 10,000 miles. Remove transmission drain plug (if there is no drain plug, loosen pan bolts and tap pan with a soft mallet to break it loose and allow fluid to drain). Remove converter access cover plate and converter drain plug. After draining, replace plugs and cover plate (tighten oil pan bolts if necessary). *NOTE - It is recommend d that pan and intake screen be removed and cleaned and that a new fluid filter be installed in oil cooler return line.* Pour 5 qts. of recommended fluid into transmission (TorqueFlite Six); 8 qts. (TorqueFlite 8), then start engine and allow it to idle for. at least two minutes. With brakes applied, depress each button momentarily, ending with "N" (Neutral) button depressed. Add sufficient fluid to bring level up to "Add One Pint" mark on dipstick (approximately 2½ qts. TorqueFlite Six; 1½ qts. TorqueFlite Eight). Recheck fluid level after transmission is at normal operating temperature. Level should be at "F" mark or slightly below.



TORQUEFLITE SIX TRANSMISSION SECTIONAL VIEW

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

15 pts. (TorqueFlite Six); 18½ pts. (TorqueFlite 8).

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Control Cable

1) With car raised on a hoist, have an assistant depress "R" (Reverse) button and hold it down. Remove pushbutton control cable adjustment wheel lockscrew at left side of transmission case.

2) Back adjustment wheel off cable guide (turn counterclockwise) until two or three threads are showing behind wheel on guide. *CAUTION - Check wheel for free turning on guide and remove any burrs in threads that might interfere. Lubricate threads with a few drops of transmission fluid.*

3) Hold cable guide centered in hole in transmission case and apply only enough pressure to bottom assembly at reverse detent While holding cable bottomed, rotate adjusting wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case, then install lockscrew and tighten to 40 inch lbs.

Parking Lock Cable

To check adjustment, operate parking lock lever from one end of slot in instrument panel to the other. The lever should have clearance at both ends. *NOTE - One hole in parking lock arm is slotted to permit parking lock lever adjustment.* To adjust, move lever to fully OFF position, then loosen two nuts attaching lock arm to push button housing. *NOTE - Loosen nuts just enough to free up lever arm.* Block locking lever 1/16" from OFF position end of slot, then tighten both nuts on pushbutton housing. Recheck lever travel to be sure clearance exists at both ends of travel. Have an assistant hold parking lock lever on instrument panel in OFF position, then loosen clamp bolt securing cable housing in parking pawl lever cover on bottom of transmission extension housing. Tap end of clamp bolt lightly to release its hold on cable, then gently pull outward on cable housing to its limit of travel and tighten clamp bolt to 10 inch pounds. *CAUTION - Do not use pliers or similar tool to pull outward on cable as cabl cover might be damaged.* Check adjustment by allowing car to roll slightly on a slight incline. Parking pawl should freely engage sprag with lever in ON position, and there should be no ratcheting noise with lever in OFF position.

Neutral Safety Switch

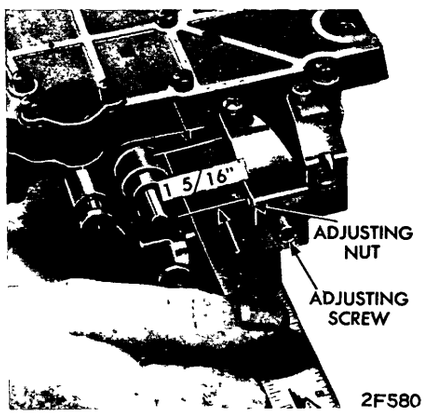
With manual control cable properly adjusted(see above), depress "N" (Neutral) pushbutton, then raise car on a hoist and drain approximately 2 qts. of fluid from transmission (see "Draining & Refilling" above). Remove neutral switch from transmission and check to see that switch operating lever is aligned in center of switch opening in case. Place cupped washer and "O" ring seal over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3 to 1/2 turn. *CAUTION - Switch must be tightened enough to prevent oil leakage. If not, add a thin washer and readjust switch.* Remove test lamp, connect wire to switch, then add fluid to bring to proper level.

Kickdown (Front) Band

NOTE - Kickdown band adjusting screw is located on left side of transmission near throttle lever shaft. Loosen locknut and back off approximately five turns, then check adjusting screw for free turning in case. Use a torque wrench and tighten band adjusting screw to 72 inch pounds. *NOTE - If special adapter, Tool C-3705 is used, tighten adjusting screw to 47-50 inch pounds.* **Back off adjusting screw the amount of turns shown in "Band Adjusting Specifications" below.** Tighten locknut to 29 ft. lbs.

Low-Reverse (Rear) Band

Remove transmission oil pan, then loosen adjusting screw locknut and back off nut approximately five turns. Check adjusting screw for free turning in lever. Use a torque wrench and tighten band adjusting screw to 72 inch pounds. *NOTE - If special adaptor, Tool C-3705 is used, tighten adjusting screw to 47-50 inch pounds.* **Back off adjusting screw the amount of turns shown in "Band Adjusting Specifications" below.** Tighten locknut to 35 ft. lbs. Install oil pan and refill transmission.



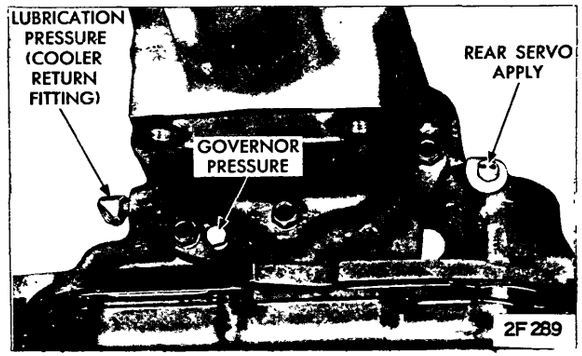
HYDRAULIC LINE PRESSURE ADJUSTMENT

Band Adjusting Specifications

Engine	Back Off Adjusting Screw Kickdown Band	Back Off Adjusting Screw Low-Reverse Band
170" 6 Cyl.	2 5/8 turns	5¼ turns
225" 6 Cyl.	2 turns	5¼ turns
All V8	2 turns	3 turns

Line Pressure

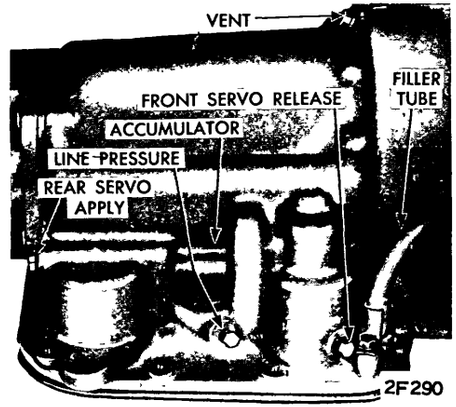
Remove valve body assembly from transmission and measure distance between manual valve and line pressure adjusting screw. This measurement must be 1 7/8" (see "Spring Retainer Location" illustration). If not, loosen spring retainer screws and reposition retainer. Adjust line pressure as follows: Adjust "Allen" type screw in end of pressure regulator spring bracket so measurement between valve body and inner edge of adjusting nut on end of spring (see "Line Pressure Adjustment" illustration) is 1 5/16". *NOTE - The above line pressure adjustment can be varied to obtain specified line pressure. One complete turn of adjusting screw changes closed throttle line pressure approximately 1 2/3 lbs. Turning screw counterclockwise increases pressure.*



PRESSURE TEST LOCATIONS (REAR)

Throttle Pressure

NOTE - Throttle Pressure cannot be tested accurately. If malfunction is evident, inspect the adjustment. Remove valve body assembly from transmission, then loosen throttle lever stopscrew locknut and back screw off approximately five turns. Insert gauge pin of Tool C-3763 between throttle lever cam and kickdown valve (see "Throttle Pressure Adjustment" illustration). By pushing on tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body. As force is being exerted to compress the spring, tighten throttle lever stopscrew finger tight against throttle lever tang with throttle lever cam touching the tool and throttle valve bottomed. *CAUTION - Be sure the adjustment is made with spring fully compressed and valve bottomed in valve body. Remove tool and tighten stopscrew locknut securely.*



PRESSURE TEST LOCATIONS (RIGHT SIDE)

TESTING

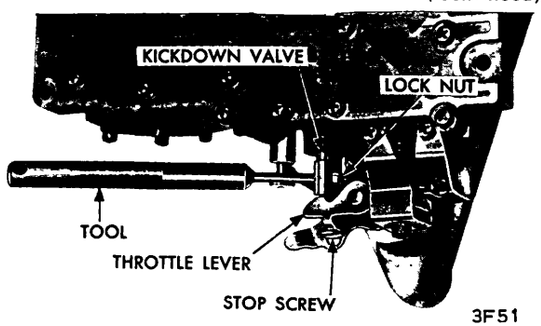
HYDRAULIC PRESSURE

NOTE - All of the following tests must be made with transmission at normal operating temperature.

Line & Front Servo Release

Install a tachometer on engine, then raise car and position tachometer so it can be read under the car. Connect two 0-100 lbs. pressure gauges to pressure take-off points at top of accumulator and at front servo release (see illustration). With transmission selector lever in "D" (Drive) position, and wheels free to turn, speed up engine slightly until transmission shifts into direct drive. Reduce engine speed slowly to 1000 RPM. Line pressure at this time should be 54-60 lbs., and front servo release pressure must not be more than 3 lbs. below line pressure. Disconnect throttle linkage from transmission throttle lever and move transmission throttle lever gradually to full throttle position. Line pressure must rise to a maximum of 90-96 lbs. just before or at kickdown into low gear. Front servo release pressure must follow the line pressure up to the kickdown point and should not be more than 3 lbs. below line pressure. If line pressure is not 54-60 lbs. at 1000 RPM, adjust pressure (see "Adjust-

(Continued)



THROTTLE PRESSURE ADJUSTMENT

ments" above). *NOTE - If front servo release pressures are less than specified, and line pressures are within limits, there is excessive leakage in front clutch or front servo circuits. Always inspect external throttle lever for looseness on valve body shaft when making pressure tests.*

Lubrication Pressure

Install a "tee" fitting between cooler return line fitting and fitting hole in transmission case at rear left side of case. Connect a 0-100 lbs. pressure gauge to "tee" fitting. At 1000 RPM with throttle lever in closed position and transmission in direct drive, pressure should be 5-15 lbs.

Rear Servo Apply

Connect a 0-300 lbs. pressure gauge to apply pressure take-off point at rear servo, then with transmission in "R" (Reverse) and engine speed at 1600 RPM, pressure should be 240-280 lbs.

Governor Pressure

Connect a suitable pressure gauge to governor pressure take-off point located on lower left side of extension housing mounting flange. Governor pressures should be within limits indicated in tables below. If pressure is not correct, governor valve or weights are sticking.

AIR PRESSURE

Front Clutch

Apply pressure to front clutch apply passage and listen for a dull thud which indicates that front clutch is operating. Hold air pressure on for a few seconds and inspect system for excessive leakage.

Rear Clutch

Apply air pressure to rear clutch apply passage and listen for a dull thud indicating rear clutch is operating. *NOTE - If a dull thud cannot be heard in clutches, hold finger tips on clutch housing and again apply air pressure. Movement of piston can be felt as clutch is applied.*

Kickdown Servo

Direct air pressure into front servo apply passage. Operation of servo is indicated by tightening of front band. Spring tension on servo piston should release the band.

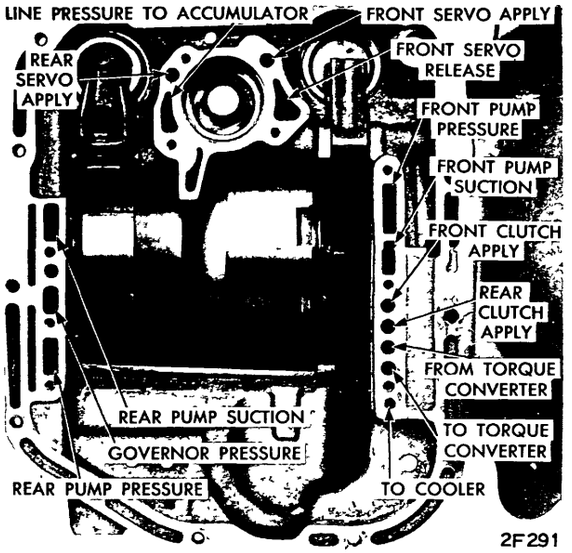
Low & Reverse Servo

Direct air pressure into rear servo apply passage. Operation of servo is indicated by tightening of rear band. Spring pressure on servo piston should release the band.

TROUBLE SHOOTING & DIAGNOSIS

Harsh Engagement

In D, 1, 2, & R - Engine idle speed too high. Hydraulic pressures not within specifications. Low-Reverse band out of adjustment. Valve body leaking or not operating properly. Accumulator sticking, broken rings, or spring. Low-Reverse servo, band or linkage not operating properly. Front and (or) rear clutch worn or faulty.



AIR PRESSURE CHECK POINTS

Delayed Engagement

In D, 1, 2, & R - Fluid level low. Control cable not correctly adjusted. Hydraulic pressures not within limits. Valve body leaking or not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos sticking or not operating. Front pump faulty. Front and (or) rear clutch worn or faulty. Worn or broken input shaft and (or) reaction shaft support seal rings. Fluid is aerated.

Runaway & Harsh Upshift

Incorrect throttle linkage adjustment. Fluid level is low. Hydraulic pressures not within specifications. Kickdown band out of adjustment. Valve body leaking or not operating properly. Governor not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos not operating or sticking. Kickdown servo, band or linkage not operating properly. Worn or faulty front clutch. Worn or broken input shaft and (or) reaction shaft support seal rings.

Harsh 3-2 Kickdown

Same as for "Runaway & Harsh Upshift" above.

No Upshift

Low fluid level. Throttle linkage not properly adjusted. kickdown band out of adjustment. Hydraulic pressures not within limits. Governor sticking. Valve body leaking or not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos sticking or not operating. Faulty rear pump. Kickdown servo, band or linkage not operating properly. Worn or faulty front clutch. Worn or broken input shaft and (or) reaction shaft support seal rings.

(Continued)

GOVERNOR PRESSURE TESTS

Model	Eng.	Axle Ratio	Governor Pressure Limits at MPH				
			15 lbs.	45 lbs.	50 lbs.	65 lbs.	75 lbs.
Valiant & Dart	170"	3.23-1	16-17	29-39	.....	.....	59-66
	170"	3.55-1	14-17	27-35	.....	.....	54-60
	225"	2.93-1	17-19	29-38	.....	.....	60-69
	225"	3.23-1	15-17	26-34	.....	.....	55-63
Dodge (Exc. Cust. 880) & Plymouth	225"	2.93-1	17-19	30-39	.....	.....	63-72
	225"	3.23-1	16-17	27-36	.....	.....	56-65
	225"	3.31-1	15-17	27-35	.....	.....	55-63
	225"	3.55-1	14-16	25-32	.....	.....	50-58
	①318" & 361"	2.76-1	18-22	.....	40-51	58-68	.....
	①318" & 361"	3.23-1	15-19	.....	34-43	50-58	.....
	②318" & 361"	2.93-1	17-21	.....	47-57	63-71	.....
	②318" & 361"	3.23-1	15-19	.....	44-52	58-66	.....
Dodge Cust. 880③	361"	2.93-1	17-22	.....	40-51	58-68	.....
Chrysler (Exc. 300J)	361" & 383"	2.93-1	17-22	.....	40-51	58-68	.....
	413"	2.93-1	18-23	.....	41-53	61-71	.....
Chrysler 300J	413"	3.23-1	18-20	.....	50-56	69-86	.....
Imperial	413"	2.93-1	19-24	.....	43-55	62-73	.....

① - Std. Eng. ② - Hi Perf. Eng. ③ - With 8.00-14 tires. (1 MPH higher with 8.50-14 tires.).

N Kickdown

Throttle linkage and (or) control cable not correctly adjusted. Kickdown band out of adjustment. Hydraulic pressures not within limits. Governor sticking. Valve body leaking or not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos sticking or not operating. Kickdown servo, band or linkage not operating properly. Overrunning clutch not holding.

No Normal Downshift

Same as for "No Kickdown" above.

Shifts Erratic

Low or aerated fluid. Throttle linkage and (or) control cable not correctly adjusted. Oil strainer clogged. Valve body leaking or not operating properly. Clutches or servos sticking or not operating properly. Faulty front and (or) rear pump. Worn or broken input shaft and (or) reaction shaft support seal rings.

Slippage

NOTE - In all cases of slippage, check for low fluid level or for aerated fluid.

In Forward Drive Positions - Throttle linkage and (or) control cable not adjusted properly. Hydraulic pressures not within limits. Valve body leaking or not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos sticking or not operating. Worn or faulty front and (or) rear clutch. Overrunning clutch not holding. Worn or broken input shaft and (or) reaction shaft support seal rings.

In Reverse Only - Control cable not correctly adjusted. Hydraulic pressures not within limits. Low-Reverse band out of adjustment. Valve body leaking or not operating properly. Front clutch or rear servo sticking or not operating. Low-Reverse servo, band or linkage not operating properly. Faulty front oil pump.

In All Positions - Hydraulic pressures too low. Valve body leaking or not operating properly. Faulty front oil pump. Clutches or servos sticking or not operating. Worn or broken input shaft and (or) reaction shaft support seal rings.

No Drive

In Any Position - Fluid level low. Hydraulic pressures low. Oil strainer clogged. Valve body leaking or not operating properly. Faulty front oil pump. Clutches or servos sticking or not operating.

In Forward Drive Positions - Hydraulic pressures low. Valve body leaking or not operating properly. Accumulator sticking, broken rings or spring. Clutches or servos sticking or not operating. Worn or faulty rear clutch. Overrunning clutch not holding. Worn or broken input shaft and (or) reaction shaft support seals.

In Reverse - Control cable not adjusted properly. Hydraulic pressures low. Low-Reverse band out of adjustment. Front clutch or rear servo sticking or not operating. Low-Reverse servo, band, or linkage not operating properly. Worn or faulty front clutch.

Drives In Neutral

Control cable not adjusted properly. Valv body leaking or not operating properly. Rear clutch inoperative.

TORQUEFLITE 6 SHIFT PATTERN TABLE (MPH)

SHIFT CONDITION	DART & VALIANT				DODGE 6 & PLYMOUTH 6		
	170" Engine		225" Engine		225" Engine		
	3.23-1 Axle	3.55-1 Axle	2.93-1 Axle	3.23-1 Axle	2.93-1 Axle	3.23-1 Axle	3.31-1 Axle
Closed Throttle 1-2 Upshift	6-11	6-10	7-13	6-12	7-13	7-12	6-12
Closed Throttle 2-3 Upshift	10-14	9-13	11-16	10-14	12-16	10-15	10-14
Wide Open Throttle 1-2 Upshift	25-41	23-36	28-40	25-36	29-41	26-37	25-36
Wide Open Throttle 2-3 Upshift	58-69	52-63	59-72	53-65	62-75	55-68	54-66
3-2 Kickdown Limit	46-62	42-56	46-63	42-57	49-66	44-60	42-58
3-1 Kickdown Limit	24-35	22-32	27-33	24-30	28-35	25-31	24-30
Close Throttle Downshift	4-10	4-9	5-12	4-10	5-12	5-11	4-11

TORQUEFLITE 8 SHIFT PATTERN TABLE (MPH)

SHIFT CONDITION	CHRYSLER			©DODGE & PLYMOUTH			
	Newport 300 New Yorker	C-300J	Imperial	Standard 2.76-1 Axle	Standard 3.23-1 Axle	Hi-P rf. 2.93-1 Axle	Hi-Perf. 3.23-1 Axl
Closed Throttle 1-2 Upshift	8-15	6-13	8-15	8-14	7-12	7-13	6-12
Closed Throttle 2-3 Upshift	13-19	12-18	14-20	13-18	11-15	12-17	11-16
Wide Open Throttle 1-2 Upshift	32-47	53-59	34-48	32-45	27-38	39-53	36-48
Wide Open Throttle 2-3 Upshift	69-83	89-101	73-85	68-80	58-68	73-83	67-76
3-2 Kickdown Limit	60-76	67-90	64-78	59-73	51-63	65-77	60-70
3-1 Kickdown Limit	30-40	27-55	32-41	30-38	25-33	27-48	24-47
Closed Throttle Downshift	5-13	5-12	5-14	5-13	4-11	5-12	4-11

©- Dodge Custom 880 is same as Chrysler Newport.

Drags Or Locks

Kickdown band out of adjustment. Low-Reverse band out of adjustment. Kickdown and (or) low-reverse servo, band, or linkage not operating properly. Front and (or) rear clutch faulty. Planetary gear sets broken or seized. Overrunning clutch worn, broken or seized.

Noise

Grating, Scraping, r Growling - Kickdown band not adjusted properly. Low-Reverse band out of adjustment. Output shaft bearing or bushing damaged. Governor support binding or broken seal rings. Front and (or) rear pump scored or binding. Front and (or) rear clutch faulty. Planetary gear sets broken or seized. Overrunning clutch worn, broken or seized.

Buzzing - Fluid level low. Pumps sucking air. Valve body not operating properly. Overrunning clutch inner race damaged.

(C ntinued)

Hard To Fill

High fluid level. Breather clogged. Oil strainer clogged. Aerated fluid.

Overheating

Fluid level low. Band adjustments too tight. Cooling system faulty. Front and (or) rear pump faulty. Insufficient clutch plate clearance in front and (or) rear clutches.

Cannot Push Start

Fluid level low. Low-Reverse band slipping. Valve body leaking or not operating properly. Rear oil pump faulty. Low-Reverse servo, band or linkage not operating properly. Worn or faulty rear clutch. Worn or broken input shaft and (or) reaction shaft support seal rings.

TORQUE CONVERTER

TORQUE CONVERTER NOTE - This is a sealed unit and cannot be disass mbled for overhaul. In the event of parts failure in transmission, the torque converter should be flushed in the following manner.

Flushing Torque Converter

With torque converter assembly removed from engine, place it in an upright position and pour two quarts of clean solvent or kerosene into converter through impeller hub. Turn and shake converter so as to swirl solvent through internal parts. *NOTE - Turning turbine and stator with transmission input and reaction shafts will help dislodge for ign material.* Position converter in its normal operating position with drain plug at lowest point, then drain solvent. Rotate turbine and stator, and shake converter while draining. Repeat the above operation at least once, or as many times as required until solvent is drained out clean. After flushing, shake and rotate converter several times with drain plug out to rem ove all solvent and dirt. Reinstall drain plug and tighten to 20 ft. lbs.

TRANSMISSION REMOVAL & INSTALLATION

TRANSMISSION AND TORQUE CONVERTER REMOVAL CAUTION - Transmission and torque converter must be removed and installed as an assembly to prevent damage to converter drive plate, front pump bushing, and oil seal. DO NOT allow weight of transmission to rest on plate during removal or installation.

Removal

1) Disconnect high tension lead from distributor (to prevent engine starting when remote control starter switch is used to turn engine), then drain converter and transmission.
2) Mark converter and drive plate for use at installation. *NOTE - Crankshaft flange bolt circle, inner and outer circle of hol s in drive plat , and the four tapped holes in front face of converter all have one hole offset so these parts will be installed in original position.*
3) Rotate engine to locate two converter-to-drive plate bolts at "5" and "7" o'clock positions and remove bolts, then rotate engine and remove remaining two bolts. *CAUTION - Do not rotate converter or drive plate by prying with a screwdriver or other tool. DO NOT engage starter if drive plate is not attached to converter with at least one bolt or if transmission case-to-engine bolts have been loosened.*
4) Disconnect negative ground cable from battery, then remove starter motor and disconnect neutral safety switch wire from switch. Remove gearshift control cable to transmission adjusting wheel lockscrew and pull gearshift cable out of case as far as possible, backing off adjusting wheel a few turns if necessary. Insert a small screwdriver above and slightly to right of cable and disengage cable adapter lockspring by pushing screwdriver handle to the right while pulling outward on cable.
5) Remove throttle link and lever assembly from transmission throttle shaft, then disconnect oil cooler lines at transmission and remove oil filler tube. Remove speedometer pinion assembly, then loosen transmission parking pawl cable clamp where cable enters cover and remove housing cover lower plug. Insert screwdriver through hole, then gently exert pressure against projecting portion of cable lock spring and withdraw lock cable.
6) Disconnect front universal joint and secure propeller shaft out of the way. *NOTE - On Chrysler Imperial, remove propeller shaft center bearing housing bolts and slide front propeller shaft rearward to disengage universal joint from flange.*
7) Remove two bolts securing extension housing to crossmember insulator, then install a suitable engine support fixture (C-3487, V8; C-3809, 6 Cyl.) and raise engine slightly. Remove crossmember attaching bolts and remove crossmember, insulator and spring assembly.
8) Attach a small "C" clamp to edge of bell housing to hold converter in place during removal of transmission, then remove bell housing retaining bolts. Carefully work transmission rearward off engine block dowels and disengage converter hub from end of crankshaft. Remove transmission and converter assembly from car. After removing "C" clamp, carefully slide converter assembly out of transmission.

Installation

Reverse removal procedure and note the following:
1) To install converter on transmission, rotate front pump rotors with Tool C-3756 (6 Cyl.); C-3881 (V8) until two small holes in handle are vertical, then carefully slide converter assembly over input shaft and reaction shaft. Make sure converter impeller shaft slots are also vertical and fully engage front pump inner rotor lugs. Inspect for full engagement by placing a straightedge across face of case. Surface of converter should be at least ½" to rear of straightedge when converter is pushed all the way into transmission. Attach a "C" clamp to edge of converter housing to hold converter in place during installation of transmission.
2) Coat converter hub hole in crankshaft with wheel bearing lubricant and rotate converter so mark on converter (made during removal) will align with mark on drive plate. *NOTE - Offs t hol s on plat ar located next to 1/8" hole in inner circl of plate. A stamped "V" mark identifies offset hole in converter front cover.*
3) After transmission is in position on engine, tighten all bolts to specifications *(see "Tightening Specifications" below).*
4) On Chrysler Imperial, place propeller shaft center bearing housing shims under housing, then install retaining bolts and tighten to 35 ft. lbs.

5) To install control cable in case, engage "R" button and hold it firmly depressed. Insert pushbutton control cable into transmission case and push inward on cable, making sure lock spring engages cable. Adjust control cable *(see "Linkage Adjustment" above).*

TRANSMISSION UNITS REMOVAL & INSTALLATION (TRANSMISSION IN CAR)

See 1962 TorqueFlite Eight Transmission in 1962 Final Data, Page 460. Procedures are the same for 1963 TorqueFlite Six and TorqueFlite Eight with the following exceptions.

Output Shaft Oil Seal

Replacement (TorqueFlite Six) - Disconnect propeller shaft and remove output shaft flange. Drive Tool C-3899 through output shaft seal to remove rubber lips from seal, then screw tapered end of Tool C-3753 into seal and remove seal. To install new seal, slide protector sleeve, Tool C-3768 over output shaft splines, then drive in seal (lip side facing inward) with Tool C-3754. Install output shaft flange and propeller shaft.
Replacement (TorqueFlite Eight) - Disconnect propeller shaft and remove output shaft flange. Screw tapered end of Tool C-748 into seal and remove seal. To install seal, drive seal into housing (lip side facing inward) with Tool C-3837. Install output shaft flange and propeller shaft.

Extension Housing

Removal - Remove speedometer drive pinion assembly, then remove output shaft flange. Drain two quarts of fluid from transmission and loosen parking cable clamp bolt where cable enters housing cover. Tap end of clamp bolt lightly to release its hold on cable, then remove housing cover lower plug. Insert screwdriver through hole, then while exerting force on projecting portion of cable lock-spring, withdraw lock cable. Remove bolts securing extension housing to crossmember insulator and raise transmission slightly with a suitable jack. Remove crossmember bolts, crossmember, insulator and spring assembly. Remove extension housing attaching bolts and tap housing with a soft mallet to break it loose from transmission, then remove housing.

Bushing Replacement (TorqueFlite Six) - Drive seal out of housing with a drift, then drive bushing out with Tool C-3755. Slide a new bushing over ground end of Tool C-3751, then drive bushing into housing, making sure that oil hole in bushing aligns with slot in housing. Install a new seal (see above).

B aring R placem nt (T rqu Flit Eight) - Pry old seal out of housing, then remove bearing snap ring and drive bearing rearward out of housing with Tool C-3275. Place a new bearing in housing and drive it into posi-

(Continu d)

tion with Tool C-3204. Install retaining snap ring, then install a new seal (see above).
Installation - Reverse removal procedure and note the following: Tighten all bolts and nuts to specifications *(see "Tightening Specifications" below)*. Check fluid level in transmission and add fluid as necessary.

TRANSMISSION UNIT REMOVAL (TRANSMISSION REMOVED)

See 1962 TorqueFlite Eight Transmission in 1962 Final Data, Page 461. Procedures are the same for 1963 TorqueFlite Six and TorqueFlite Eight with the following exceptions.

Front Pump Oil Seal

Replacement - *NOTE - Seal can be replaced without removing front pump and reaction shaft support assembly from transmission case as follows:* Remove seal with Tool C-3758 (6 Cyl.); C-3861 (V8). To install seal, place seal in opening of pump housing (lip side facing inward), then use Tool C-3757 (6 Cyl.); C-3860 (V8)and drive seal into housing until tool bottoms.

Drive Train Endplay

NOTE - Selective thrust washer for adjusting endplay is located between reaction shaft support and front clutch (TorqueFlite Eight); between input and output shafts (TorqueFlite Six). Endplay specifications are .030-.070" (TorqueFlite Eight); .022-.071" (TorqueFlite Six).

TRANSMISSION UNIT OVERHAUL

See 1962 TorqueFlite Eight Transmission in 1962 Final Data, Page 462. Procedures are the same for 1963 TorqueFlite Six and TorqueFlite Eight with the following exceptions.

Front Pump Bushing

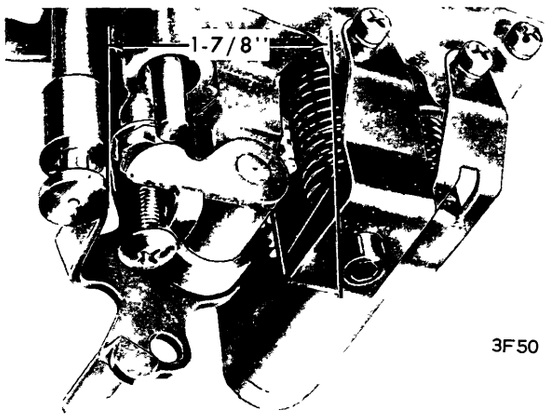
Replacement (TorqueFlite Six) - Procedures are same as for TorqueFlite Eight except that Tool SP-3551 and SP-3624 should be used for removal and installation.

Reaction Shaft Bushing

Replacement (TorqueFlite Six) - Procedures are same as for TorqueFlite Eight except that Tool SP-3631, SP-3633 and SP-1191 are used for bushing removal. Use Tool SP-3635 for bushing installation.

Front Clutch

Disassembly (TorqueFlite Six) - Same as for TorqueFlite Eight except that compressor, Tool C-3575 is used.
Retainer Bushing Replacement (TorqueFlite Six) - Same as for TorqueFlite Eight except that Tool SP-3627 and SP-3626 is used for removal and installation.
R ass mbly (T rqu Flit Six) - The number of clutch plates used vary with the engine. Install the same same number of plates and discs that were used in original assembly.



SPRING RETAINER LOCATION

Rear Clutch

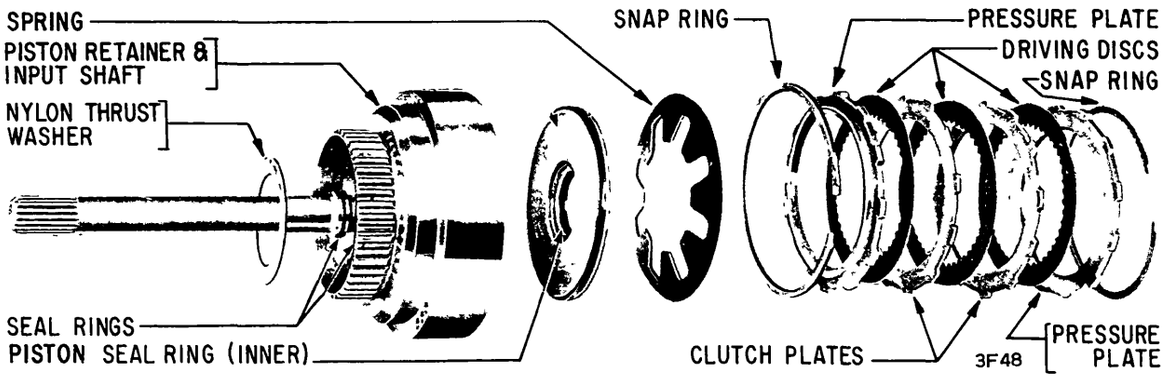
Disassembly (TorqueFlite Six) - Remove large snap ring securing pressure plate in clutch piston retainer, then remove pressure plate, clutch plates, and inner pressure plate from retainer. Install compressor, Tool C-3760 over piston spring and compress spring just enough to clear snap ring, then remove snap ring. Remove compressor and piston spring, then invert clutch retainer assembly and bump on a wood block to remove piston. Remove seal rings from piston. If necessary remove snap ring and press input shaft from piston retainer.
Reassembly (TorqueFlite Six) - Reverse disassembly procedure and note the following: Rear clutch-to-front clutch thrust washer thickness should be .043-.045". Replace if not within limits. Lubricate all parts as installed and make sure that lip of seals face toward head of clutch retainer. Inner pressure plate should be installed in retainer with raised portion of plate resting on the spring. Install clutch plates, starting with a lined plate followed by a steel plate until all plates are installed. With clutch completely assembled, clearance between pressure plate and snap ring should be .018-.036". If not within limits, install a snap ring of proper thickness.
INPUT SHAFT BUSHING REPLACEMENT NOTE (TORQUEFLITE SIX) - This bushing is not r placeable on TorqueFlite Six Transmissions.

Planetary Gear

Planetary Gear Assemblies, Sun Gear, Driving Sh ll (TorqueFlite Six) - Disassembly - Before removing these parts from output shaft, place assemblies in an upright position with rear annulus gear support pushed downward on output shaft, then measure clearance between rear annulus gear support hub and shoulder on output shaft (see illustration). Clearance should be .006-.046". Remove thrust washer from end of output shaft and slide planetary assembly off shaft. Remove snap ring and thrust washer from forward hub of front planetary gear unit, then slide front annulus gear and support off planetary gear set. Remove thrust washer from rear side of planetary gear set. If necessary, remove snap ring from front of annulus gear to separate support from annulus gear. Slide sun gear, driving shell, rear planetary assembly with low and reverse drum off output shaft. Lift sun gear and driving shell off rear planetary unit, then remove snap ring and steel washer from sun gear (rear side of driving shell). Slide sun gear out of driving shell, and remove snap ring and steel washer from opposite end of sun gear if necessary. Remove thrust washer from forward side of rear planetary assembly and remove planetary gear set from rear annulus gear to separate the support from annulus gear.

Reassembly - Install annulus support in gear and install snap ring. Position rear planetary gear assembly in rear annulus gear and place thrust washer on front side of planetary gear assembly. Insert output shaft in rear opening of rear annulus gear, then carefully work shaft through annulus gear support and planetary gear assembly, making sure shaft splines are fully engaged in splines of annulus gear support. Install steel washer and snap ring on one end of sun gear, then insert sun gear through front side of driving shell and install rear steel washer and snap ring. Carefully slide driving shell and sun gear assembly on output shaft, engaging

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TORQUEFLITE SIX REAR CLUTCH ASSEMBLY

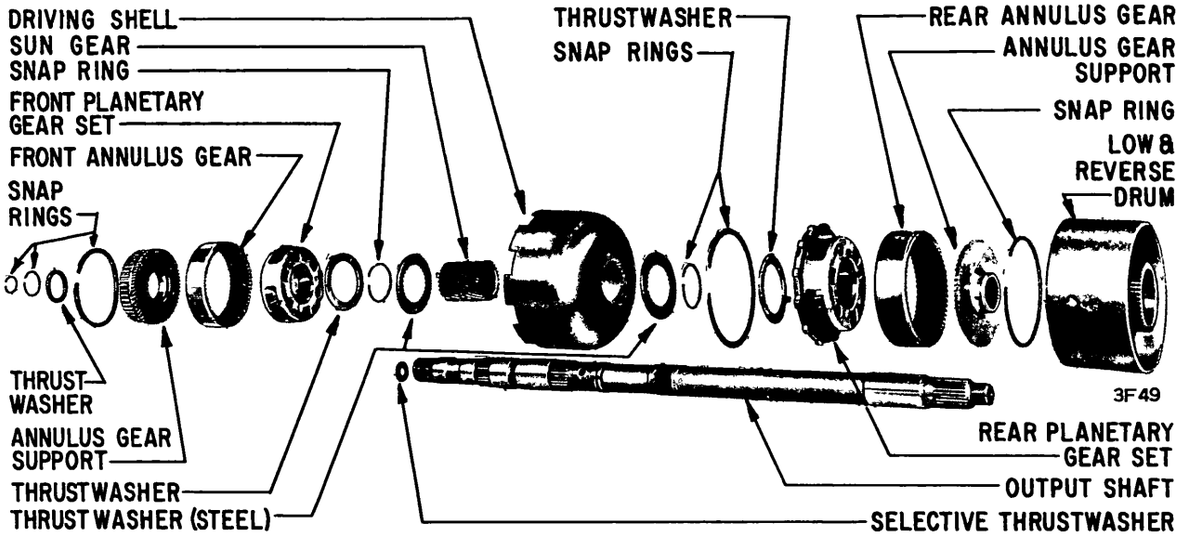
sun gear teeth with rear planetary pinion teeth. Place front annulus support in annulus gear and install snap ring. Position front planetary gear assembly in front annulus gear, then place thrust washer over planetary gear assembly hub and install snap ring. Position thrust washer on rear side of planetary gear assembly. Carefully work front planetary and annulus gear assembly on output shaft, meshing planetary pinions with sun gear teeth. With all components properly positioned, install retaining snap ring on front end of output shaft

Overrunning Clutch

Cam R plac m nt (T rqu Flite Six) - If overrunning clutch cam or spring retainer are damaged, they can be replaced with a service cam, spring retainer, and retainer bolts. To install, drive rear pump body rearward out of case with a wood block and hammer, then center punch rivets **xactly** in the center of each rivet head. Drill through each rivet head with a 3/8" drill, *being v ry car ful n t to drill into transmission case.* Chip off rivet heads with a small chisel, then drive rivets and cam from case with a blunt punch of proper size.

Tight ning Specifications

L cati n	Ft. Lbs.	Inch Lbs.
Adjusting Screw Locknut		
Kickdown Band (TorqueFlite 8)	29	
Kickdown Band (TorqueFlite 6)	25	
Reverse Band (TorqueFlite 8)	35	
Reverse Band (TorqueFlite 6)	20	
Kickdown Lever Shaft Plug		150
Cooler Line Fitting		75
Control Cable Adjusting Wheel Bolt		40
Converter Drain Plug	14	
Conv. Drive Plate to Crankshaft	55	
Conv. Drive Plate to Converter		270
Extension Housing to Transmission	24	
Extension Housing to Insulator		35
Ext. Housing Crossmember to Frame	75	
Front Oil Pump Housing to Trans.		150
Neut. Starter Switch (Initial)	60 (Max.)	
Oil Filler Tube Bracket		150
Oil Pan Bolt		150
Oil Pan Drain Plug	24	
Output Shaft Flange Nut	175	
Overrunning Clutch Cam Setscrew		40
Park Lock Cable Locking Bolt		10
Parking Sprag Cover Bolt		150
Pressure Test Take-off Plug		75
Reaction Shaft Supp. to Frt. Pump		150
Rear Oil Pump Cover Bolt		140
Transmission to Engine Bolt	25-30	
Valve Body Screw		28
Valve Body to Trans. Case Bolt		100
Speedo. Cable Clamp Screw		150



TORQUEFLITE SIX PLANETARY GEAR ASSEMBLIES

Carefully enlarge rivet holes in case with a 17/32" drill and clean out all chips and burrs. To install new unit, position cam and roller spring retainer in case and align cam bolt holes with holes in case, then thread all five retaining bolt and washer assemblies into cam a few turns. *NOTE - Belleville washer must be installed so its inner diameter is coned toward bolt head.* Tap cam firmly into position, then draw bolts down evenly and tighten to 100 inch pounds.

TRANSMISSION UNIT INSTALLATION (TRANSMISSION REMOVED)

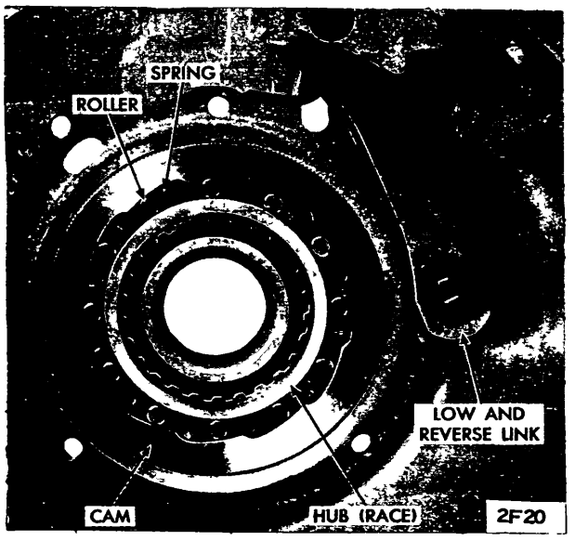
See 1962 TorqueFlite Eight Transmission in 1962 Final Data, Page 465. Procedures are the same for 1963 TorqueFlite Six and TorqueFlite Eight with the following exceptions.

Overrunning Clutch

TorqueFlite Six - Place low and reverse thrust washer inside overrunning clutch cam, then install clutch hub (race) with its undercut end (inner diameter) next to thrust washer. Install springs and rollers as shown in illustration.

Rear Oil Pump

TorqueFlite Six - Same as for TorqueFlite Eight except that aligning sleeve, Tool C-3762 is used.



OVERRUNNING CLUTCH

FORD MOTOR CO. 2-SPEED AUTOMATIC TRANSMISSION

Fordomatic

Fairlane, All Models (1963)
Falcon, All Models (1963)
Ford Pass. Cars, Exc. 390",406" & 427" Eng. (1963)

Merc-O-Matic

Comet, All Models (1963)
Mercury Meteor, All Models (1963)
Mercury Monterey, Exc. 390",406" & 427" Eng. (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Keep transmission selector lever in "N" (neutral) until car reaches a speed of 20 MPH, then move selector lever to "LO". Depress accelerator pedal to half throttle position until engine starts. *NOTE - On ice or snow where traction is not good, move selector-lever to "DR" position to crank engine.*

Towing Or Pushing Car

CAUTION - Do not tow (or push) at speed greater than 40 MPH and observe following precautions:
Transmission Operating Properly - Place transmission selector lever in "N" (Neutral) position. Car can be towed normally for distances not to exceed 15 miles. **For greater distances, use same procedure as for inoperative transmission.**
Transmission Inoperative - Tow car with rear wheels lifted off ground, or disconnect and remove propeller shaft. *NOTE - Protect rear end of transmission from entry of dirt.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 MOMENTARY CLUTCH DISENGAGEMENT & TRANSMISSION "HUNTING" CONDITION (CAR SPEED OVER 65 MPH) CORRECTION:* On early transmissions with date code "2H" stamped on transmission identification tag (this code is located on lower line of tag, following engine displacement stamp), a 3/16" high clutch piston ball check was used in place of a 1/8" ball check. To correct the above condition, install correct clutch piston assembly Part No. CODP-7A262-A (144" Eng.); C1DP-7A262-A (170" Eng.); COAP-7A262-A (221" Eng.); COAP-7A262-B (260" Eng.). Transmissions with "2H" date code that have been corrected during production are identified by an "Orange" colored tag.

►*1963 MAIN CONTROL VALVE ASSEMBLY CHANGE (PARTIAL PRODUCTION):* A compensator spring adjusting screw has been added to lower body cover plate on some transmissions. These adjusting screws are properly adjusted during production and should require no further adjustment in service unless a new regulator and (or) compensator spring is installed. *See "Overhaul" below for adjustment procedure.*

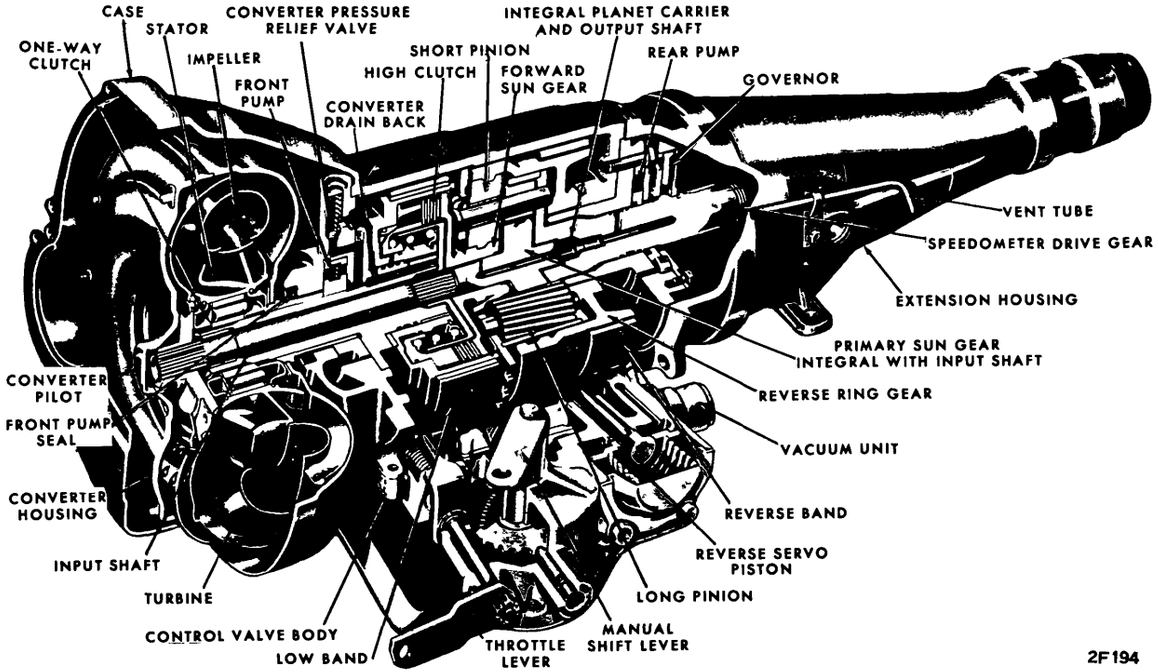
►*1963 221" & 260" ENGINE OVERSPEEDING (DURING 1-2 & 2-1 SHIFT) CORRECTION:* Check and adjust fluid level, then adjust front band **(back adjusting screw off 1½ turns instead of 2 turns).** With car stopped and engine running at idle speed, make twenty neutral-to-drive (low gear) engagements to pump all air out of servo cavity.

2) To determine if all air is removed, road test car by driving at a constant speed of 35 MPH with selector lever in "L" position, then move selector lever to "D". An upshift should occur within 1½ seconds. Repeat pumping procedure if necessary.

3) If second attempt does not exhaust all air, remove servo cover (tighten front band adjusting screw to keep strut from falling out of position), then check position of check valve in servo piston. Check valve must be in the range of 11 o'clock to 1 o'clock position and the ball must operate freely. Install servo cover and adjust front band, then again pump down front servo.

4) If transmission is equipped with an adjustable compensator, readjust idle pressure to 65-70 lbs. (see "Overhaul" below for adjustment procedure).

5) On transmissions without an adjustable compensator (or on transmissions with an adjustable compensator which were not corrected by readjusting the idle pressure), proceed as follows: Replace front servo release spring with a lighter spring, Part No. C20Z-7A003-B (one light blue stripe, 1 3/4 coils, 3.11" long, .187" wire diameter) and replace the vacuum diaphragm assembly, Part No. C1AP-7A377-B (yellow stripe around can). When installing servo spring, make sure servo piston is properly installed.



FORD MOTOR 2-SPEED AUTOMATIC TRANSMISSION

6) If the above corrections do not eliminate engine overspeeding, disassemble transmission and check for worn, damaged, or incorrect parts and for internal leakage.

►*1963 144" ENGINE TRANSMISSION CLUTCH ASSEMBLY NOTE:* Some transmissions have been equipped with an additional external splined clutch plate, Part No. B9A-77573-A and a thinner piston, Part No. C1DP-7A262-A. If necessary to replace a clutch piston in one of these assemblies, either the clutch piston, Part No. C0DP-7A262-A or C1DP-7A262-A may be used. However, when Part No. C0DP-7A-262-A is used for replacement in one of these assemblies, one B9A-77573-A external splined plates must be removed for necessary clearance.

►*1963 TRANSMISSION FILLER TUBE ATTACHING NUT TIGHTENING CAUTION (TO PREVENT CRACKED CASE):* Filler tube to case nut must not be tightened in excess of 45-55 ft. lbs.

DESCRIPTION

Same design as used on 1962 models with vacuum controlled throttle and control pressures.

Transmission Identification

Serial number prefix stamped on identification tag attached under one of the servo cover bolts. The three letter prefix ("PCM" as an example) will have an additional letter and possibly a figure indicating appli-

(Continued)

cation and detail changes Refer to transmission serial prefix for service and parts replacement

Transmission Identification

Model	Engine	Serial Prefix
Falcon & Comet.	144"	PCL-D
Comet	144"	PCL-E
Falcon & Comet	170"	PCM-E
Comet	170"	PCM-F
Fairlane & Meteor	170"	PCM-G
Fairlane & Meteor	221"	PCN-B
Fairlane & Meteor	260"	PCP-B
Galaxie	223"	PCH-B
Galaxie	260"	PCP-C
Galaxie	260"	PCP-D
Galaxie	289"	PCP-E
Galaxie	289"	PCP-F

LUBRICATION

Checking Fluid Level

Check fluid level every 6000 miles With transmission at normal operating temperature and engine at normal idle speed, shift transmission through all ranges, then place in "P" (Park) position Check fluid level on dipstick and add recommended fluid as required to bring level up to "F" (Full) mark on dipstick. *CAUTION - Do not overfill.*

Draining & Refilling

NOTE - Periodic draining and refilling not required except at time of overhaul. To fill dry transmission, install 5 qts of recommended fluid, then start engine and shift transmission through all ranges, finally placing selector lever in "P" (Park) position. Check fluid and if necessary, add enough fluid to bring level up to "F" mark. DO NOT OVERFILL. When partial drain and refill is required (due to front band adjustment or minor service) proceed as follows: To drain transmission, remove oil pan bolts and allow transmission to drain. Install oil pan and a new gasket On Falcon and Comet, add one quart of fluid, then run engine at idle speed for 2 minutes On other 2-speed transmissions, add fluid to bring level up to full mark on dipstick. On all models, run engine at fast idle speed with transmission in "N" (Neutral) until transmission is at normal operating temperature. *CAUTION - Do not race engine.* Shift selector lever through all ranges, then place selector lever in "P" (Park) and check fluid level. If necessary, add fluid to bring level up to "F" (Full) mark on dipstick.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity (Refill)

6½ qts. (Comet & Falcon); 6¼ qts. (Fairlane & Meteor); 9¼ qts. (Galaxie). *NOTE - These capacities are approximate. Check fluid level on dipstick and adjust.*

ADJUSTMENT

Throttle Linkage

See *CARBURETOR on Car Models pages.*

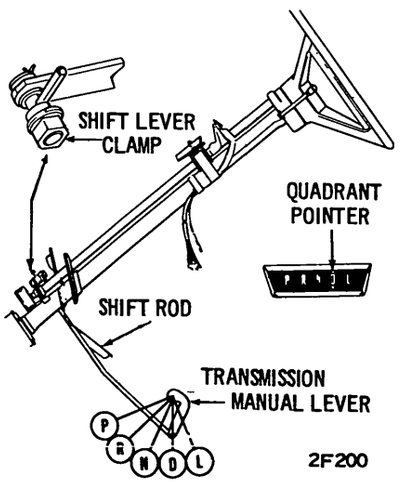
Manual Shift Linkage

Steering Column Shift - With engine stopped, loosen clamp nut at shift lever so that shift lever rod is free to slide in clamp at lower end of steering column Position selector lever so that pointer lines up with "D", then shift manual lever at transmission into corresponding detent (second from rear) Tighten clamp at shift rod on lower end of steering column and check pointer for alignment in all selector lever positions

Floor Shift - With selector lever in "N" (Neutral) position, align the step in button assembly at top of shift lever so it is flush to .030" above top of shift knob *NOTE - Make sure shift rod is tightened securely to shift lever.* Tighten setscrew in top of lock button securely. With transmission manual lever on transmission in "D" detent (third from rear) and selector lever against the "D" stop, tighten locknut on shift rod to 15-20 ft lbs

Neutral Safety Switch

Steering Column Shift - Located under instrument panel on steering column Loosen steering column-to-switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws Starter circuit should be open in all positions except "N" or "P" **Floor Shift** - Remove shift lever detent button, spring, and knob assembly from lever Remove console top chrome trim panel, then place selector lever in "N" and remove quadrant indicator assembly Remove bulb socket, being careful not to scratch quadrant cover Loosen switch attaching screws, apply service and parking brakes, then turn ignition key to start position and move switch until starter operates. Tighten switch screws and check for starting in "P" position. Check operation of back-up lights. Tape detent rod to shift lever to hold rod in position, and reassemble console and shift lever assembly.



MANUAL LINKAGE ADJUSTMENT

Front Band

Periodic adjustment not required Check band adjustment each time oil pan is removed and adjust as necessary Loosen locknut on left side of transmission case, then tighten adjusting screw with Tool T59P-77370-A or B, or Tool 7345 until tool handle snaps (breaks) over center *NOTE - These tools are preset torque wrenches which overrun when torque on screw reaches 10 ft. lbs* **Back off adjusting screw exactly two full turns.** Hold adjusting screw at this point and tighten locknut to 35-40 ft lbs

Rear Band

Periodic adjustment not required Check band adjustment each time oil pan is removed and adjust as necessary- With oil pan removed, remove screen, then loosen rear servo piston rod locknut and adjusting nut Install adjusting tool as follows: If Ford Tool T59P-77409 is used, place tool on rear servo rod so the two forks straddle band apply lever *NOTE - The inner fork must engage flat on servo piston rod. The outer fork is a ¼" spacer and must be inserted between piston rod seat and adjusting nut.* If Mercury Tool 7355-A is used, insert tool between adjusting nut and piston rod-to-actuating lever seat, with opposite end of tool resting on raised boss on control valve assembly With wrench, Ford No. T59P-77423-A or Mercury No 7355-B, tighten adjusting nut until wrench handle snaps (breaks) over center. *NOTE - These tools are preset torque wrenches which overrun when torque on nut reaches 45-50 inch pounds.* **Back off adjusting nut exactly two turns.** Hold adjusting nut at this position and tighten locknut to 15-18 ft. lbs. Remove tools from servo piston rod. Install oil pan and screen using a new gasket, then refill transmission with recommended fluid .

TESTING

Stall Test

STALL TEST NOTE - Make separate stall test in "D" (Drive), "L" (Low), and in "R" (Reverse). **With parking and service brakes applied and selector lever in "D", "L" or "R", open throttle through detent and note pressure and vacuum gauge readings and engine RPM. Vacuum should drop below 1.5" Hg. and the pressure should reach maximum limits as indicated in "Hydraulic Control Pressure Table" below. Engine speed at stall should be as indicated in "Engine Stall Speed Table."** ***CAUTION – Do not stall test for more than 5 seconds. Between tests, run engine for at least 2 minutes at 1000 RPM with transmission selector lever in "N" (Neutral) to prevent overheating.*** **If engine runs away on a stall test in "D" or "L", but is held within limits in "R", the low band is slipping. If engine runs away in "R" during a stall test, but is held within limits in "D" or "L", the reverse band is slipping.** *NOTE – Transmission "high" clutch cannot be tested since the clutch applies at road speeds above 15 MPH.*

(Continued)

ENGINE STALL SPEEDS

Engine	Low Limit–RPM–High Limit
144" 6 Cyl	1600 – 1800
170" 6 Cyl	1750 – 1950
221" V8	1600 – 1800
223" 6 Cyl	1300 – 1500
260" V8	1800 – 2000
352" V8	1550 – 1750

Air Pressure Test

Raise car on a hoist, then remove transmission oil pan and control valve assembly. Proceed as follows:

Clutch Apply - Apply pressure to front clutch passage (see illustration). A dull thud indicates that clutch is operating. Retain air pressure in passage several seconds to check for leakage.

Low & Reverse Servos - Apply pressure to "Low Band Apply" and "Reverse Band Apply" holes in case (see illustration). Band operation can be observed.

Shift Test

Shift points and low gear operation should be as indicated in "Shift Speed Table" below. *NOTE - Indicated speeds are approximate .*

Pressure Rise Test

With engine and transmission at normal operating temperature, connect a suitable pressure gauge (300 lbs.) to pressure take-off hole on left side of transmission case above shift levers, then proceed as follows:

1) During operation of engine from idle to wide open throttle (stall test), with selector lever in "D", "L" or "R", control pressure should rise as indicated in draulic Control Pressure Table."

n "D" position, if this rise does not occur, there three possible causes (throttle and compensator ssures, pump capacity, and excessive leakage). Before control valve body or transmission is removed for inspection, make the following checks.

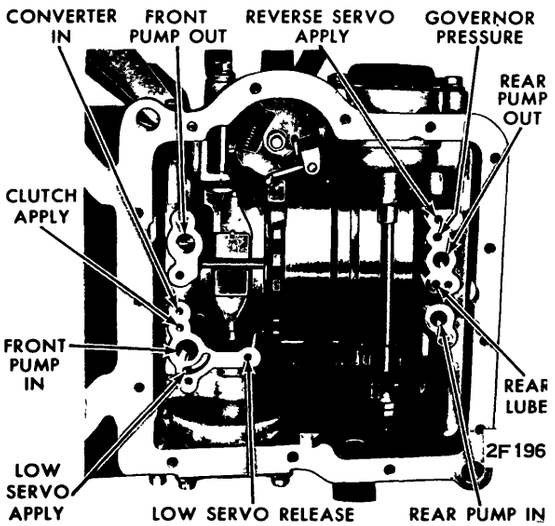
3) Install a vacuum gauge in vacuum line (preferably at diaphragm). Vacuum reading and pressure should be as indicated in control pressure table. If control pressure is low (below specifications), vacuum diaphragm and connecting lines are probably all right. If control pressure is high (above specifications), disconnect tube from rear of diaphragm unit and alternately plug and free end of tube. Engine should slow down and speed up as this is done. If engine speed does not vary, check line for leakage between diaphragm and intake manifold. Also check for restrictions in line. If vacuum line is all right, remove diaphragm unit and rod, then replace unit without the rod. Control pressure should now remain at idle specifications regardless of manifold vacuum. *CAUTION – Do not run engine under load for more than five seconds with diaphragm rod removed.* Start engine and check control pressure at engine idle speed with selector lever in "D" position. If control pressure is still too high, trouble is in transmission control system. If pressure is now within limits, diaphragm unit is not operating properly and should be replaced.

4) Check control pressure in "D", "L" and "R". If pr ssure rise is normal in any one position, throttle and compensator pressures, and pump capacity are normal. The probable cause f no pressure rise in other positions is leakage in hydraulic system ahead f manual valve.

HYDRAULIC CONTROL PRESSURE TABLE

Thr ttle P sition	Manifold Vacuum (" Hg.)	Shift L v r P siti n	CONTROL PRESSURES 144" Eng.	170" Eng.	Others
Closed	Above 15.0"	All	40-48 lbs.	46-63 lbs.	54-70 lbs.
As Required	15.0"-12.5"	"D", "L", "R"	ℭ	ℭ	ℭ
Wide Open 𝔗	Below 1.5"	"D", "L", "R"	145-170 lbs.	175-200 lbs.	170-210 lbs

𝔗 - Through detent. ℭ - Pressure starts to rise.



TRANSMISSION CASE OIL PASSAGES

TROUBLE SHOOTING & DIAGNOSIS

Harsh Shifting

Vacuum supply tube disconnected. Throttle valve sticking. Vacuum diaphragm loose in transmission case. Engine idle speed too high. Engine operation faulty, resulting in loss of vacuum.

Engine Overspeeds

During 1-2 Upshift & 2-1 Downshift - *See "Changes, Cautions, Corrections" abov .*

Harsh Initial Engag ment

Check engine idle and transmission fluid level.

Slips Or Chatters

In "D" or "L" - Check fluid level, throttle linkage, control pressure, low band adjustment. Make an air pressure check. Inspect for worn or loose engine and transmission mounts. Check operation of low servo and band. Check for leakage in low apply circuit.

In "R" - Check fluid level, throttle linkage, control pressure, reverse band adjustment. Make an air pressure check. Inspect for worn or loose engine mounts. Check operation of reverse servo . Check for leakage in reverse servo apply circuit.

(Continu d)

SHIFT SPEED SPECIFICATIONS

CAR	ENGINE	TRANS. MODEL	AXLE RATIO	SHIFT SPEEDS (RPM) 1 - 2 Upshift Minimum Throttle	1 - 2 Upshift Throttle Through Detent	2 - 1 Downshift Thr ttl Thr ugh Detent	2 - 1 Downshift Cl s d Throttl
Comet & Falcon	144"	PCL	3.50-1	13-15	44-50	42-48	6-13
			4.00-1	12-14	40-44	38-42	5-12
	170"	PCM	3.50-1	13-15	46-51	45-50	6-12
			3.20-1	14-16	51-55	50-54	7-13
Fairlane & Meteor	170"	PCM	3.20-1	14-17	51-57	50-56	7-14
			3.50-1	13-16	46-52	45-51	6-13
	221" & 260"	PCN & PCP	3.00-1	16-18	53-60	52-59	8-14
			3.25-1	14-17	49-55	48-54	7-14
Galaxie	223"	PCH	3.50-1	13-17	46-54	45-52	10-14
			3.89-1	12-16	41-48	40-47	9-13
	260"	PCP	3.50-1	13-17	46-54	45-52	10-14
			3.89-1	12-16	41-48	40-47	9-13

Momentary Lockup

During 1-2 Upshift - Check fluid level, throttle linkage, control pressure and low band adjustment. Low servo and band not operating properly. Check high clutch for malfunction. Check for possible broken low servo return spring.

S vere 2-1 Downshift

During Coastd wn - Check engine idle speed and throttle linkage. Check control valve body for malfunction. Make a control pressure test.

No Shift

N 1-2 Upshift in "D" - Check fluid level. Check fluid odor for possible burned clutch plates. Check manual linkage adjustment. Check for improperly operating governor. Check for leakage in control pressure main circuit. Check high clutch and low servo and band for improper operation.

N 2-1 F rc d D wnshift (Kickdown) - Check throttle linkage adjustment. Check control valve body for malfunction. Check for leakage in control pressure main circuit.

N 2-1 Shift During C astdown - Check for malfunction in control valve body or governor.

Delayed 1-2 Upshift

Check throttle linkage. Check for improperly operating governor. Check for leakage in control pressure main circuit.

Fluid Leakage

Fluid F rc d Out Of Fill r Tube or Vent - Check fluid for contamination by engine coolant. Transmission external vent plugged. Check fluid for aeration.

Acceleration Abnormal

Converter one-way clutch not operating properly.

Engine Will N t Push Start

Check fluid level and manual linkage adjustment. Check for malfunction in control valve body. Rear pump not operating properly. Check for leakage in control pressure main circuit.

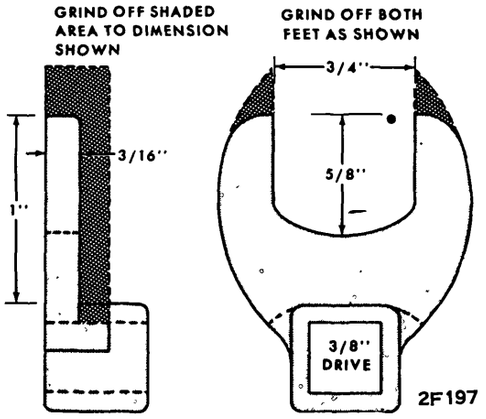
Parking Lock N t Holding

Check manual linkage adjustment. Check parking linkage.

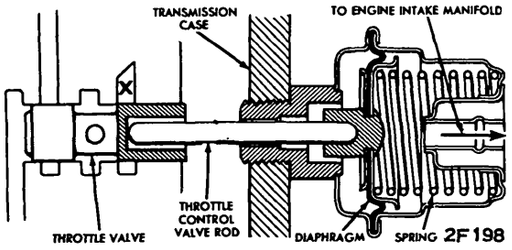
MINOR REPAIRS (TRANSMISSION IN CAR)

Vacuum Diaphragm

Rem val - To remove diaphragm assembly without removing oil pan and throttle valve body, modify a ⅜" "Crow-foot" wrench as illustrated (see "Vacuum Diaphragm Wrench") and use it on "hex" portion of diaphragm to turn diaphragm assembly out of case. *NOTE* - The diaphragm assembly can also be removed by removing oil pan, throttle valve assembly and throttle valve control rod, then insert a 3/16" Allen



VACUUM DIAPHRAGM WRENCH



TRANSMISSION CONTROL VACUUM DIAPHRAGM

wrench into end of diaphragm assembly from inside transmission case and turn diaphragm assembly out. *CAUTION - Do not apply any pressure to diaphragm housing.*

Installation - Reverse removal procedure and tighten diaphragm assembly to 15-18 ft. lbs.

Control Valve Body

Removal - Remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove six bolts attaching control valve body to transmission case, then lower control valve body and work the manual shift valve link out of manual valve.

Installation - Position control valve assembly in transmission case, then connect manual valve shift link to manual valve, and position the throttle valve lever between downshift valve and the stop plate on upper valve body. Install control valve attaching screws and tighten to 8-10 ft. lbs. Install fluid screen and oil pan, using a new gasket. Tighten attaching bolts to 10-13 ft. lbs. Install drain plug and tighten to 10-13 ft. lbs. Refill transmission with recommended fluid and adjust throttle linkage and manual linkage.

Front Servo Pist n Assembly

R m val - Remove control valve assembly, disconnect fluid filler tube from transmission case. Remove two opposing bolts from front servo cover, then install two longer bolts (5/16" - 18 x 2") and nuts to hold cover in position against servo spring tension while removing remaining servo cover bolts. Remove servo cover by slowly unscrewing nuts on long bolts until all servo spring tension is released from cover. Remove the long bolts, nuts and servo cover. *NOTE - Before removing servo cover, note position of front band actuation struts. This will aid in reassembly in case struts are dislodged.* Remove servo piston assembly and servo spring from transmission case and remove servo piston seal ring from piston.

Installation - Inspect front servo piston for nicks, burrs and a warped or bent condition. Inspect servo piston bore for burrs, wear, and scoring. Install new seal ring on servo piston and install servo piston spring and piston assembly in servo bore with air bleed hole toward top of case. Clean servo cover and mounting face and position new "O" ring seal on cover, then place servo cover on servo piston. Retain servo cover in place with the two long bolts used at disassembly (5/16" - 18 x 2"), and nuts. Pull servo cover partially into position by turn the nuts on long bolts to compress servo spring. Install regular cover attaching bolts in the open threaded holes. Remove both long bolts and nuts and install remaining two cover attaching bolts. *NOTE - Check position of front band actuating strut while tightening servo cover bolts to assure that servo piston rod enters actuating strut properly. If struts have been dislodged, loosen front servo band adjusting screw and position them correctly.* Tighten servo cover attaching bolts evenly to avoid distorting cover, then when cover is firmly seated, tighten bolts to 12-15 ft. lbs. *CAUTION - Use care when positioning "O" ring seal and servo cover to prevent future leakage.* Install main control valve assembly, then connect manual shift valve link to manual valve and position throttle lever between downshift valve and stop plate on upper valve body. Tighten control valve attaching bolts to 8-10 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install fluid screen and transmission oil pan and refill transmission. Adjust Linkage.

► *FRONT SERVO COVER GASKET REPLACEMENT:* Remove low band adjusting screw locknut and tighten adjusting screw with wrench, Tool T59P-77370-A (Ford), Tool 7345 (Mercury) until wrench overruns. Loosen cover capscrews approximately two turns each, then tighten band adjusting screw until wrench overruns. Repeat this procedure until servo cap is removed (low band strut will be seated against bottom of servo casting and will be held in place). To install cover, use two 5/16" - 18 x 1¼" hex head bolts in place of the regular bolts, then place servo cover over piston and start the two bolts. Tighten bolts snugly to bring cover into contact with piston and to position piston stem in band strut (piston stem will be back in position in cup face of band strut). Loosen band adjusting screw tw turns, then tighten servo cover capscrews approximately two turns or until they are snug (band will again be tight against drum). Repeat this procedure until cover is drawn close enough so that regular cover capscrews can be installed in rest of cover holes, then

(C ntinued)

remove the two temporary bolts and replace them with regular bolts. Continue to repeat the above procedure until cover is fully installed. Install low band adjusting screw locknut and adjust the band.

Rear Servo Piston Assembly

Removal - Disconnect accelerator pedal rod, then remove main control valve (see above). Remove rear servo cover, "O" ring seal, and servo piston spring. *CAUTION - Servo cover is spring loaded.* Remove locknut, adjusting nut, and half-ball rod seal from rear servo piston rod. Remove rear engine mount from under transmission housing, then lower extension onto frame crossmember. Remove piston rod from transmission case. Remove servo piston and seal ring from piston bore. *NOTE - Push outward on piston stem from inside transmission case or apply air pressure to reverse servo apply passage in transmission case to remove piston.* Remove seal ring from piston.

Installation - Inspect piston, stem and rod for nicks or burrs. Check rod for wear or for a bent or warped condition. Inspect piston bore, for burrs, wear and scoring. Install new seal on piston, then install piston assembly into bore in case. Push piston to bottom of bore. Install piston rod through piston, then position band operating lever and install the half-ball rod seal, adjusting nut, and locknut loosely. Raise transmission from frame crossmember and install rear engine mount. Install new "O" ring seal on servo cover, then install servo cover, maintaining pressure against cover while tightening the attaching bolts. Tighten bolts slowly and evenly until cover is firmly seated, then tighten bolts to 12-15 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install main control valve assembly, fluid screen, transmission oil pan, and drain plug. Refill transmission (see "Draining & Refilling" above). Connect accelerator rod and adjust pedal to 3½" above floor. Adjust throttle and manual linkage.

Extension & Governor

Removal - Drain transmission, then disconnect the driveshaft at rear universal and remove driveshaft. Remove bolts attaching rear engine support to transmission, then use a transmission jack and raise transmission until extension housing clears rear engine support and frame crossmember. Remove extension housing from transmission case. To remove governor, remove snap ring from output shaft and remove governor and governor drive ball. *NOTE - Replace output shaft seal if worn or damaged.*

Installation - Reverse removal procedure.

►*EXTENSION HOUSING BUSHING & SEAL REPLACEMENT NOTE: Replaceable with suitable tools. Coat seal with non-hardening compound.*

REMOVAL & INSTALLATION

Removal

NOTE - Transmission and converter are removed as an assembly.

1) Place car on a hoist, then disconnect battery and remove starter motor. On six cylinder engines, remove two "Z" bar bracket retaining bolts from top of converter housing. On all models, raise car and drain transmission (see "Draining & Refilling" above).

2) Remove dust shield from bottom of converter housing, then disconnect cooler lines if so equipped. Disconnect drive shaft at rear and remove from transmission. Disconnect manual and throttle linkage, speedometer cable, and vacuum line at transmission. Disconnect parking brake cable from rear support, then disconnect front parking brake cable from equalizer bar.

3) If so equipped, remove bolts attaching engine rear support spring to extension housing. On all models, place a transmission jack under transmission and raise it slightly to take weight off engine rear support member. On Comet & Falcon, remove bolts attaching engine rear support to underbody and move support aside. On other models, remove transmission-to-crossmember bolts, then remove crossmember-to-body bolts and remove crossmember.

4) Lower transmission and engine, then support engine with a jack stand. Remove nuts attaching converter to drive plate, and remove converter housing-to-engine block bolts. Work converter housing off engine dowel pins, and work converter pilot out of engine crankshaft. Secure converter to converter housing and lower transmission.

►*V8 ENGINE REMOVAL NOTE: On some models it may be necessary to remove part of engine exhaust system in order to remove transmission assembly.*

Installation

Reverse removal procedure and note the following. Tighten all bolts and nuts to proper torque (see *"Tightening Specifications" below*). With transmission completely installed and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least twenty times to bleed air out of low servo release cavity. Adjust manual and throttle linkage.

GALAXIE & MONTEREY

Removal

NOTE - Transmission and converter are removed as an assembly.

1) Raise car and drain transmission and converter, then disconnect drive shaft at pinion flange and remove shaft. Install extension housing seal replacer in extension housing seal (*see "Extension Housing Bushing and/or Seal Replacement" above for tool number*).

2) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable from extension housing. Disconnect oil cooler lines at transmission, then remove lines from clamp at engine block. Disconnect oil filler tube at transmission case.

3) Remove starter from converter housing and disconnect parking brake cables at the equalizer. Remove two engine rear support bolts from extension housing and remove support clamp.

4) Position a transmission jack under transmission and raise it slightly to take weight off crossmember. Support rear of engine in this position with an engine support bar or stand, then remove crossmember.

5) Remove bolts attaching converter-to-flywheel and remove converter housing-to-engine block bolts. Secure converter to transmission so it will not fall out when transmission is separated from engine, then work transmission off engine block dowel pins and toward rear until converter pilot clears crankshaft. Lower transmission and remove it from car.

Installation

Reverse removal procedure and note the following: Tighten all bolts and nuts to proper torque (see *"Tightening Specifications" below*). With transmission completely installed and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least twenty times to bleed air out of low servo release cavity. Adjust manual and throttle linkage.

TRANSMISSION OVERHAUL

See 1959 Final Data, Page 452, or later Manual editi n and note the following:

Control Valve

Disassembly - 1) Remove manual valve, then remove control pressure regulator valve spring retainer, spring, spring seat, and valve. Remove hold-down plate near compensator cut-back valve cover, then remove cover. Remove compensator cut-back valve spring and valve from lower body.

2) Remove 1-2 shift valve governor plug cover and governor plug. At opposite side of lower body, remove compensator and control pressure regulator cover plate. *CAUTION - Maintain pressur n this plat (against spring pressure) until all scr ws are removed.* R move compensator valve spacer, spring and valve. *NOTE - Temporarily install hold-down plat and scr w so that separator plate is held on upp r body.*

3) Remove orifice control valve cover plate. Remove throttle reducing valve and spring and orifice control valve spring, valve, and plug. From upper body, remove downshift valve stop plate, then remove downshift valve and spring.

4) Remove throttle valve stop plate and throttle valve from opposite end of upper body. Remove throttle boost valve retainer, plug, throttle boost valve and spring. Remove three screws and five bolts holding upper body, separator plate, and lower body together.

5) Lift upper body and separator plate from lower body, then remove rear pump check valve and spring. Remove rear pump check ball from lower body. To remove 1-2 shift valve from lower body, compress 1-2 shift valve spring in direction of throttle reducing valve, then remove spring seat with needle nose pliers. With spring seat removed, the 1-2 shift valve can be removed through throttle reducing valve hole. Remove 1-2 shift valve spring.

6) Turn upper body and separator plate over so separator plate is up, then remove hold-down plate and lift separator plate from upper body. Remove front pump check valve spring and valve from upper body. Remove orifice control bypass check ball and rear servo check ball.

Reassembly - Reverse disassembly procedure (see illustration) and note the following: Tighten valve body screws and bolts to proper torque (see *"Tightening Specifications" below*).

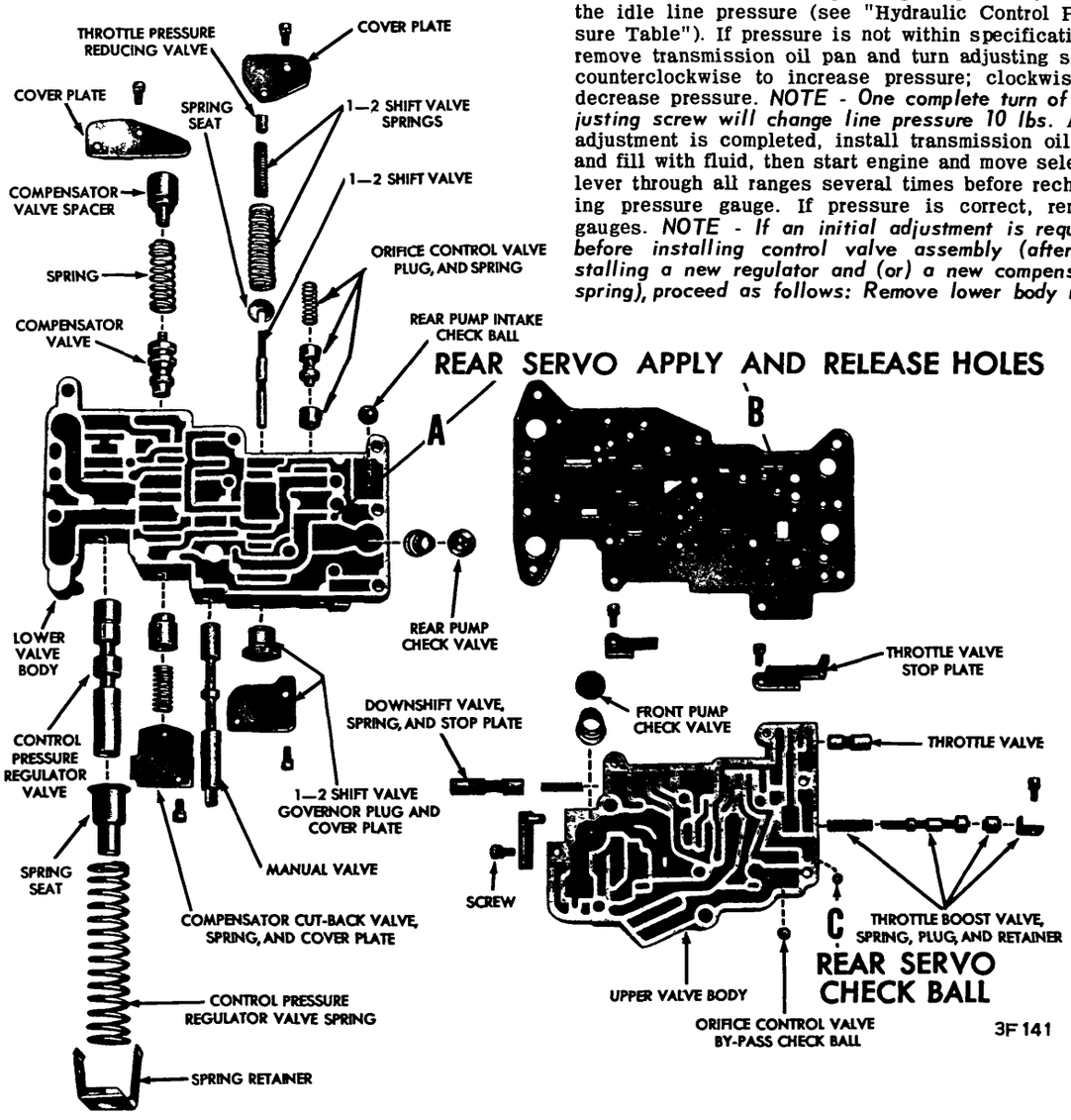
Compensator Valve Spring

NOTE - An adjusting screw is provided on some transmission control valve assemblies (lower body cover plate) to adjust the compensator valve spring. Thes screws are properly adjusted during production to provide the correct "idle line pressur " and no further ad-

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justment is required in servic unless a new regulator and (or) compensator spring is installed. DO NOT r mov adjusting screw when ov rhauling control valve assembly.

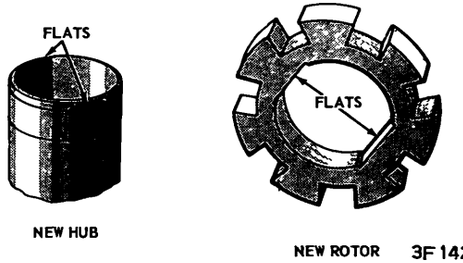
Adjustm nt - Connect pressure gauge to transmission (see "Pressure Rise Test" above), then connect a vacuum gauge to vacuum diaphragm line. *NOTE - Vacuum gauge is used to make sure that no vacuum leak exists to cause a false line pressure reading.* With transmission at normal operating temperature, record the idle line pressure (see "Hydraulic Control Pressure Table"). If pressure is not within specifications, remove transmission oil pan and turn adjusting screw counterclockwise to increase pressure; clockwise to decrease pressure. *NOTE - One complete turn of adjusting screw will change line pressure 10 lbs.* After adjustment is completed, install transmission oil pan and fill with fluid, then start engine and move selector lever through all ranges several times before rechecking pressure gauge. If pressure is correct, remove gauges. *NOTE - If an initial adjustment is required before installing control valve assembly (after installing a new regulator and (or) a new compensator spring), proceed as follows: Remove lower body right front cover plate from control valve ass mbly and turn adjusting screw until it protrudes through c v r plate approximat ly .060" (approximately 1½ turns wh n starting from a flush position).*



MAIN CONTROL VALVE ASSEMBLY

Converter & Front Pump

A new converter incorporating a front pump drive hub with two flats 180° apart instead of two drive lugs is used. Front pump rotor has been revised to match the flats on converter hub. *NOTE - The new convert r can be used for service replacement on previous transmission models which have the dual port solid slipper type pump. A new rotor having the two flats must b installed in pump when using it with the new type converter.*



CONVERTER HUB & FRONT PUMP ROTOR

Tightening Specifications

Location	Torque
Control Valve Screws (10-24)	20-30 Inch lbs.
Control Valve Bolts (¼"-20)	70-85 inch lbs.
Control Valve to Transfer Case	8-10 ft. lbs.
Gov. Body Cover	20-30 inch lbs.
Planet Gear Shaft Retainer	20-30 inch lbs.
Rear Pump Cover	50-60 inch lbs.
Oil Pan Screws	10-13 ft. lbs.
Front or Rear Servo to Case	12-15 ft. lbs.
Front Pump to Stator Support	12-17 ft. lbs.
Front Pump to Case	18-22 ft. lbs.
Rear Pump to Case	12-15 ft. lbs.
Extension Housing to Case	28-38 ft. lbs.
Manual Shaft Lever to Case	17-20 ft. lbs.
Outer Throttle Lever to Case	17-20 ft. lbs.
Rear Servo Piston Rod Seat	15-18 ft. lbs.
Front Band Lock Stop	35-40 ft. lbs.
Oil Filler Tube to Case Fitting	40-50 ft. lbs.
Diaphragm Assembly to Case	15-18 ft. lbs.
Oil Filler Tube to Case Nut	45-55 ft. lbs.
Oil Pan Drain Plug	10-15 ft. lbs.
Converter Drain Plug	20-28 ft. lbs.
Pressure Gauge Plug	10-15 ft. lbs.
Cooler Inlet or Outlet	10-15 ft. lbs.
Bypass Tube Fitting	9-12 ft. lbs.

FORD MOTOR CO. 3-SPEED AUTOMATIC TRANSMISSION

Cruise-O-Matic

Ford Galaxie (1963)
Thunderbird (1963)
Ford Trucks (1963)

Multi-Drive

Mercury Monterey (1963)

PUSHING (TO START) & TOWING

Pushing To Start Engine

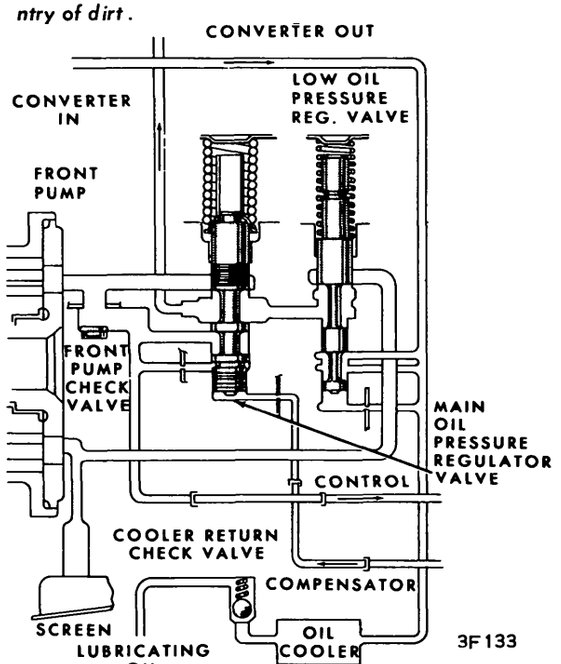
Keep transmission selector lever in "N" (Neutral) until car reaches a speed of 20 MPH, then move selector lever to "LO". Depress accelerator pedal to half throttle position until engine starts. *NOTE - On ice or snow where traction is not good, move selector lever to "DR" position to crank engine.*

Towing Or Pushing Car

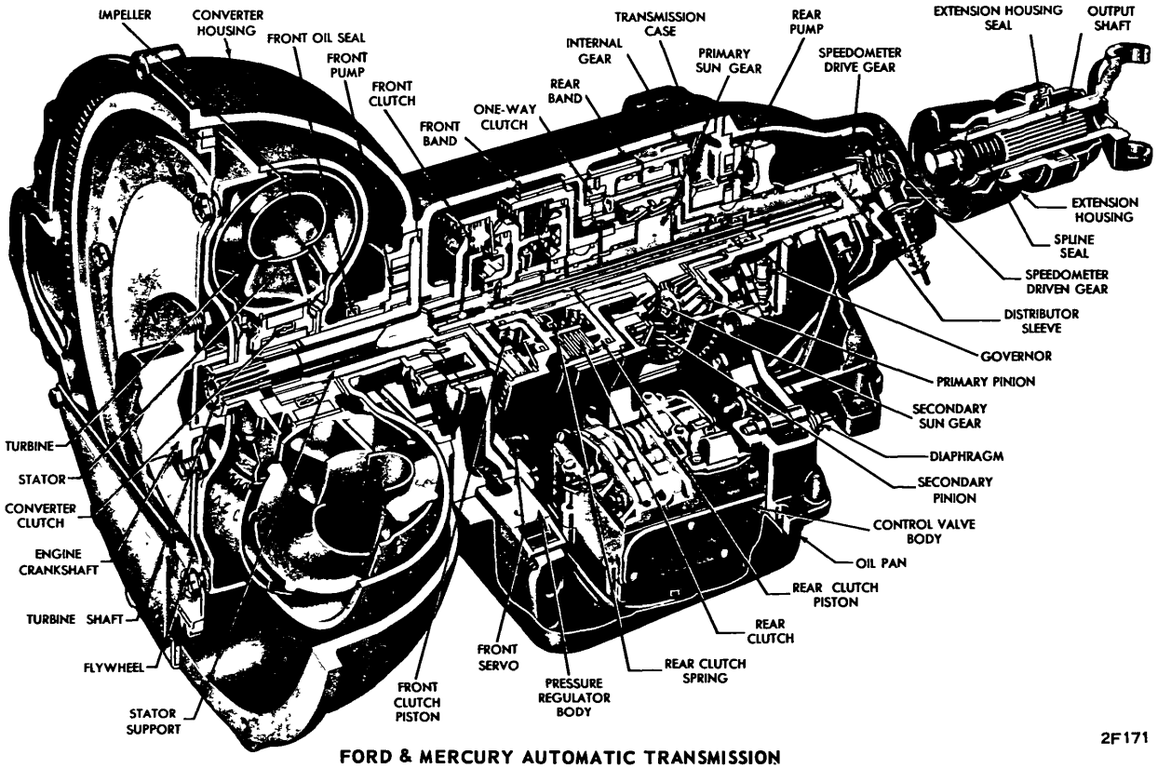
CAUTION - Do not tow (or push) at speed greater than 40 MPH and observe following precautions:

Transmission Operating Properly - Place transmission selector lever in "N" (Neutral) position. Car can be towed normally for distances not to exceed 12 miles. **For greater distances, use same procedure as for inperative transmission.**

Transmission Inoperative - Tow car with rear wheels lifted off ground, or disconnect and remove propeller shaft. *NOTE - Protect rear end of transmission from ntry of dirt.*



"SERIES" COOLING FLUID CIRCUIT DIAPHRAGM ("PCE" TRANSMISSIONS)



FORD & MERCURY AUTOMATIC TRANSMISSION

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 "PCE" TRANSMISSION (390" ENG.) PRODUCTION CHANGE FOR IMPROVED COOLING & LUBRICATION:* "Series Cooling" system replaced the former "Parallel Cooling" used on these transmissions. With "Series Cooling", lubricating oil is provided by "converter out" fluid which passes through the oil cooler, then through a cooler return check valve at rear of transmission case, and then by means of a tube to the lube passage in rear pump. Parts changes in transmission are as follows:

Input Shaft & Bushing - New input shaft bushing is equipped with "through grooves" to provide lubrication for front clutch plates (instead of "stopped grooves" used on previous "PCE" transmissions).

Front Clutch Sun Gear Assembly - Front clutch lube passage has been eliminated. In addition, the hole in gear which provided lube oil for rear clutch plates has been increased in size from 1/8" to 1/4".

Front Clutch Drum & Sun Gear Assembly - Rear clutch lube hole size is increased from 3/32" to 1/4".

Oil Pressure Regulator Assembly - Hole for lube oil is eliminated. *NOTE - This hole is cast but is not drilled through.*

Oil Pr ssur R gulator Separator Plat - This plate has been revised to remove the "low oil pressure regulator valve compensator feed" orifice, and replaced with a "converter out" feed orifice. In addition, a hole has been added to provide cooler flow regardless of low oil pressure regulator valve position.

Low Oil Pressure Regulat r Valv Spring - A new low oil pressure regulator valve spring is used.

Lubricating Oil Tube - This new tube slips into cooler return hole inside of case and into rear pump body to direct "cooler out" oil to lube passage in place of the oil cooler-to-sump tube formerly used.

Case Assembly - This assembly has been changed. *NOTE* - The new case assembly may be used to service "parallel cooling" models. A connector is required to adapt 3/8"-18 hole in case to the 1/2"-20 flare tube fitting on cooler return line.

Lube Connector Valve Ass mbly - This unit houses the cooler return oil check ball and spring. *CAUTION - This connector should be installed in case finger tight,* ***plus 1½ turns.*** *DO NOT tighten more than 2 turns. If desired, threads may be coated with a suitable sealing compound.*

►*1963 AUTOMATIC TRANSMISSION "NO PARK" CONDITION CORRECTION (EARLY CARS):* The parking pawl torsion lever rod clip may have fallen out of pin in parking pawl toggle operating lever assembly. Remove main control valve assembly and remove clip (clip may be found laying on top of main control valve). Reassemble rod to lever and install a 1/16" x 1/2" cotter pin in place of hairpin clip.

►*1963 HARSH 1-2 UPSHIFT CORRECTION "PCD" &*

(Continued)

"PCE" TRANSMISSIONS (EXC. 390" ENGINES WITH TRIPLE CARBS. & POLICE INTERCEPTOR): Install shift valve spring, Part No. C2AZ-7A288-A which will raise the 1-2 shift point sufficiently to cause the shift to occur at a slightly reduced line pressure.

DESCRIPTION

Same design as previous dual-range automatic transmissions having a vacuum controlled throttle valve (Pass. Cars); manual controlled throttle valve (Trucks).

Transmission Identification

Serial number prefix stamped on identification plate (except "PCE" models); tag ("PCE" models) attached to left side of transmission case. On all transmission models, except "PCE", an additional identification tag is fastened to one of the oil pan attaching bolts. The three letter prefix ("PCE" as an example) will have an additional letter and possibly a figure indicating application and detail changes. Refer to the transmission serial prefix for service and parts replacement.

Transmission Identification

Mdl	Engin	Serial Prefix
Ford Pass.	260"	PCT-A,B,F
Ford Pass.	289"	PCT-A,F
Ford Pass.	352"	PCD-E,G,L
Ford Pass.	390"	PCE-M,N,V,Z
Ford Pass.	390"	P.CE-AA,AB,AD,AL,AM
Thunderbird	390"	PCE-L,R,Y,AC
Ford Truck	223"	PBC-M,R
Ford Truck	223"	PAU-L,M
Ford Truck	292"	PBW-K,L,L1
Ford Truck	298"	PBY-G,H
Mercury	260"	PCT-A,B,F
Mercury	289"	PCT-A,F
Mercury	352"	PCD-E,G,L
Mercury	390"	P.CE-M,N,V,Z
Mercury	390"	PCE-AA,AB,AD,AL,AM

LUBRICATION

Checking Fluid Level

Check fluid level every 6000 miles (Pass. Cars), 4000 miles (Trucks). *NOTE - If truck is used "Off Highway", check fluid very 500 miles.* With transmission at normal operating temperature and engine at normal idle speed, shift transmission through all ranges, then place in "P" (Park) position. Check fluid level on dipstick and add recommended fluid as required to bring level up to "F" (Full) mark on dipstick. *CAUTION - Do not ov rfill.*

Draining & Refilling

NOTE - P riodic draining and refilling not required except at tim of verhaul. To fill dry transmission, install 6 qts. of recommended fluid, then start engine and shift transmission through all ranges, finally placing selector lever in "P" (Park) position. Check fluid and if necessary, add enough fluid to bring level up to "F" mark. DO NOT OVERFILL. When a partial drain and refill is required (due to front band adjustment or minor service) proceed as follows: To drain transmission, remove fluid filler tube from transmission and allow to drain, then install filler tube. *NOTE - If equipped with a filt r, install a new filt r unit.* Add 3 qts. of fluid, then run engine at slow idle for 2 minutes. Increase engine RPM to fast idle speed with transmission in "N" (Neutral) and run engine until transmission is at normal operating temperature. *CAUTION - Do not race engine.* Shift selector lever through all ranges, finally placing selector lever in "P" (Park). Check fluid level and if necessary, add fluid to bring level up to "F" (Full) mark on dipstick.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity -

10 qts. (refill). *CAUTION - These capacities are approximate. Check fluid level on dipstick and adjust.*

ADJUSTMENT

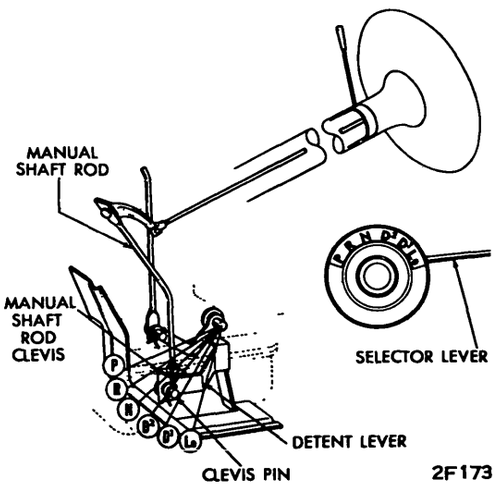
Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Shift Linkage

Ford Pass. Cars & Mercury (Steering Column Shift) - With engine stopped, loosen clamp nut at shift lever so that shift lever rod is free to slide in clamp at lower end of steering column. Position selector lever so pointer lines up with "D1", then shift manual lever at transmission into corresponding detent (second from rear). Tighten clamp at shift rod at lower end of steering column and check pointer for alignment in all selector lever positions.

Ford Pass. Cars & Mercury (Floor Shift) - With selector lever in "N" (Neutral) position, align the step on button assembly flush to .030" above top of shift knob. *NOTE - Make sure shift rod is tightened securely to shift lever.* Tighten setscrew in top of lock button securely.



MANUAL SHIFT LINKAGE

With transmission manual lever on transmission in "D1" detent (third from rear) and selector lever against the "D1" stop, tighten locknut on shift rod to 15-20 ft. lbs.

Thunderbird - With engine stopped, loosen nut at lower end of manual shift rod on transmission shift lever. Position manual shift lever so pointer is down against steering column stop in "D1" position (large green dot). Move shift lever on transmission to "D1" detent position (second from bottom), then tighten nut on shift rod and shift lever. Check pointer for alignment in all positions.

Ford Truck - With engine stopped, disconnect upper end of manual shift rod from selector lever, then position lever so pointer is down against steering column stop in "D1" position. Shift manual lever on transmission to second detent from bottom, then rotate adjusting sleeve on manual shift rod until pin can be easily inserted in lever. **Now lengthen rod by turning adjusting sleeve two full turns.** Lock adjusting sleeve in position and connect rod to selector lever. Check pointer alignment in all lever positions.

Neutral Safety Switch

Pass. Cars (Steering Column Shift) - Located under instrument panel on steering column. Loosen steering column-to-switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws. Starter circuit should be open in all positions except "N" or "P".

Pass. Cars (Floor Shift) - Remove shift lever detent button, spring, and knob assembly from lever. Remove console top chrome trim panel, then place selector lever in "N" and remove quadrant indicator assembly. Remove bulb socket, being careful not to scratch quadrant cover. Loosen switch attaching screws, apply service and parking brakes, then turn ignition key to start position and move switch until starter operates. Tighten switch screws and check for starting in "P" position. Check operation of back-up lights. Tape detent rod to shift lever to hold rod in position, and reassemble console and shift lever assembly.

Trucks - Loosen screws attaching switch to bracket on steering column, then position switch so starter circuit is closed when selector lever is in "N" or "P" positions. *NOTE - Circuit must be open in all other positions.* Tighten switch attaching screws and check operation in all lever positions.

Front Band

NOTE - Adjust bands every 18,000 miles under normal operation. For severe operation, adjust bands m re frequently. Drain fluid from transmission and remove oil pan and screen. Loosen front servo adjusting screw locknut two turns and check adjusting screw for free rotation in operating lever. Pull adjusting screw end of operating lever away from servo body and insert a .250" gauge block between servo piston and adjusting screw. Tighten adjusting screw to 10 inch pounds, **th n back off adjusting screw xactly ne full turn.** *CAUTION - Transmission will be damaged if adjusting scr w is not back d off EXACTLY ne full turn.* Hold

(Continued)

adjusting screw stationary and tighten locknut to 20-25 ft. lbs., then remove gauge block. Install oil pan and refill transmission with fluid.

FRONT & REAR BAND ADJUSTING TOOL NOTE - Special tools as indicated below are available for front and rear band adjustment: **Ford** (Front & Rear Band) - Tool T58L-7195-A. **Mercury** (Front Band) - Tool 7225-C13-B; (Rear Band) - Tool 7195-C.

Rear Band

NOTE - Adjust bands every 18,000 miles under normal operation. For severe operation, adjust bands more frequently. On all models except Thunderbird, fold back floor mat at right side of floor pan and remove access hole cover. On Thunderbird, remove console and right side heater duct floor director, then remove access hole cover. Use suitable tools (see "Front & Rear Band Adjusting Tool Note" above) and loosen adjusting screw locknut, then tighten adjusting screw to 10 foot pounds. Back off adjusting screw exactly 1½ turns. *CAUTION - Transmission will be damaged if adjusting screw is not backed off EXACTLY 1½ turns.* Hold adjusting screw stationary and tighten adjusting screw locknut to 35-40 ft. lbs.

TESTING

Stall Test

NOTE - When making stall test, never hold throttle open longer than 5 seconds. With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kickdown position), and note engine speed (see Stall Speed Table below). *CAUTION - If engine speed exceeds maximum limits in table, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows: "**D1**" - Front clutch and one-way clutch engaged in all accelerator pedal positions. "**D2**" - Front clutch and front band applied at all accelerator pedal positions. "**L**" - Front clutch and rear band applied. "**R**" - Rear clutch and rear band applied. *NOTE - Engine overspeeding is an indication of clutch or band slippage.*

ENGINE STALL SPEEDS

Engine	Engine RPM
Pass. Car 260" Eng.	1500-1700
Pass. Car 352" Eng.	1600-1800
Pass. Car 390" Eng. (Std.)	1800-2000
Pass. Car 390" Eng. (Police)	1850-2050
Truck 223" Eng.	1400-1600
Truck 292" Eng.	1520-1720

Shift Test

1) Check light throttle upshifts in "D1". Transmission should start in first gear and shift to second, then to third as speed increases (see "Shift Table").

2) While transmission is in third gear, depress accelerator pedal through detent (to floor). The transmission should shift from third to second or third to first, depending on car speed (see "Shift Table").

3) Check closed throttle downshift from third to first by coasting down from about 30 MPH in third gear. Shift should occur as shown in "Shift Speed Table". *NOTE - A 3-2-1 shift may be experienced under the above conditions.*

4) Partial throttle downshifts in "D1" may be checked by using service brakes as a load. With transmission in third gear, "D1", and car speed at about 30 MPH, depress and hold throttle about half open. At the same time, apply service brakes to point where road speed is slowly reduced. The third to second and then second to first shifts should occur as speed decreases.

5) With transmission in third gear and road speed above 28 MPH, transmission should shift to second gear when selector lever is moved from "D2" or "D1" to "L". When the same manual shift is made below about 25 MPH, the transmission should shift from second or third to first.

TRANSMISSION SHIFT SPEED TABLE

ENGINE		APPROXIMATE SHIFT SPEEDS (MPH)								MANUAL
RANGE		D1		D1 or D2		D1	D1 or D2	D1	D2	L
THROTTLE		Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	Min.
SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1 or 3-1	3-2	2-1
Ford Pass. Cars	260"	7-9	35-42	10-21	58-67	6-8	54-62	26-36	6-10	17-24
Ford Pass. Cars	352"	8-10	37-46	14-24	60-70	7-8	56-65	27-36	7-10	19-26
Ford Pass. Cars	390" ①	8-10	38-46	14-24	62-71	7-8	57-66	27-37	7-10	19-26
Ford Pass. Cars	390" ②	6-11	47-56	14-27	79-90	6-8	73-81	37-46	4-11	21-31
Thunderbird	390"	7-9	37-44	14-23	60-69	6-8	56-64	27-36	6-10	18-26
Ford Truck ③	6 & V8	5-10	22-38	7-19	35-58	3-7	31-54	14-26	3-7	10-20
Ford Truck ④	6 & V8	6-11	25-40	8-20	40-62	3-8	36-58	16-27	3-8	12-22
Mercury	260"	7-9	35-42	10-21	58-67	6-8	54-62	26-36	6-10	17-24
Mercury	352"	8-10	37-46	14-24	60-70	7-8	56-65	27-36	7-10	19-26
Mercury	390" ①	8-10	38-46	14-24	62-71	7-8	57-66	27-37	7-10	19-26
Mercury	390" ②	6-11	47-56	14-27	79-90	6-8	73-81	37-46	4-11	21-31

① - Exc. Police Interceptor. ② - Police Interceptor. ③ - Except F-250. ④ - F-250

Control Pressure Test

Pass. Cars - Attach tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet at rear of transmission case. Apply parking brake and adjust idle speed to 450-475 RPM with transmission selector lever in "D1" or "D2" position. *NOTE - If idle speed cannot be brought within limits by adjusting carburetor throttle stopscrew, check throttle and downshift linkage for binding and check vacuum diaphragm unit for leakage.* With engine at indicated idle speed and engine vacuum at 18.0" Hg. (minimum), control pressure should be as indicated in table below. If control pressure is within these limits, place selector lever in "D1" or "D2" and apply service brakes. Advance throttle until engine vacuum drops below 16-13," Hg. As vacuum gauge reading drops through this range, transmission pressures should start to rise with throttle opening until maximum control pressure for stall in "D1" or "D2" is ,obtained. *NOTE - In "P", "L" or "R", control pressure ris is not depend nt on diaphragm unit. When sel ctor l ver is shifted into th s positions and engine speed is increas d, control pr s-sure should rise immediat ly and reach maximum before engine speed reaches stall RPM.*

Trucks - Install a pressure gauge to pressure take-off tube in engine compartment (located to rear of carburetor), then install a tachometer on engine and bring engine to normal operating temperature. Adjust engine to correct idle speed, then set hand brake and place selector lever in "D1" or "D2". Check idle pressure which should be within specifications (see table below). Increase engine speed and note control pressure indicated on gauge. If pressure is not within limits, adjust throttle control rod to obtain correct pressure, then recheck idle pressure. With selector lever in one of the above positions increase engine speed to stall condition and note pressure and engine RPM which should be within specifications.

CONTROL PRESSURES

Ford Pass. Cars, Thund rbird & M rcury (Except P lic Cars)

Engine Speed	Lever P siti on	Pr ssur
Idle	N, D1, D2	57-72 lbs.
Idle	P, R, L	57-213 lbs.
Stall	D1, D2	145-170 lbs.
Stall	R, L	201-213 lbs.

Polic Cars

Engine Speed	Lev r P siti n	Pr ssur
Idle	N, D1, D2	70-95 lbs.
Idle	P, R, L	70-228 lbs.
Stall	D1, D2	170-200 lbs.
Stall	R, L	212-228 lbs.

Trucks

Engin Sp d	L v r P siti n	Pr ssur
Idle Speed	All	57-67 lbs.
1000 RPM	D1, D2	80-85 lbs.
Stall	D1, D2	152-170 lbs.
Stall	R, L	203-214 lbs.

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Air Pressure Tests

Raise car on a hoist, then remove transmission oil pan and control valve assembly. Proceed as follows:

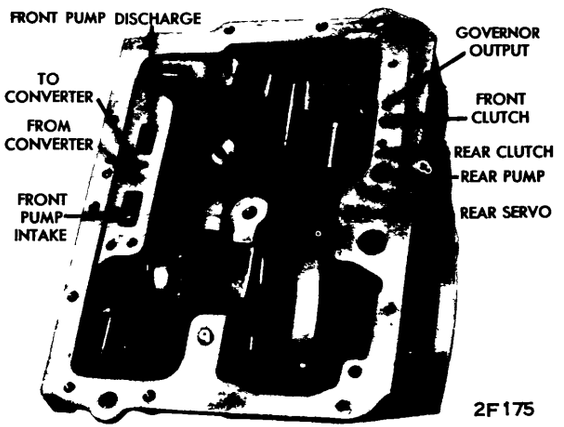
Fr nt Clutch - Apply pressure to front clutch and governor input passage (see illustration). Listen for a dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of system.

G v rn r Valve - Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

R ar Clutch - Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).

R ar Band & Serv - Apply pressure to front servo apply tube (rear tube), and observe band application.

TESTING NOTE - If servos, bands, clutches, and governor operate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of trouble.



TRANSMISSION CASE OIL PASSAGES

TROUBLE SHOOTING & DIAGNOSIS

NOTE - Check and make corrections in the sequence shown, testing operation of transmission after each correction.

Severe Engagem nt

In "L ", "Dr" r "R" Ranges - Check engine idle speed and throttle linkage adjustments. Adjust rear band. Perform a control pressure test. Remove and clean main control valve assembly and pressure regulator valve.

Upshifts Faulty

1-2, 2-3 Shift P ints L w, High, r Erratic - Check fluid level. Adjust throttle and manual linkage. Check governor operation. Perform a pressure control test. Remove and clean control valve assembly and pressure regulator valve. Remove and inspect front servo.

S v r 2-3 Shift - Adjust throttle linkage. Adjust front band. Remove and clean control valve assembly and pressure regulator valve. Remove and inspect front servo.

2-3 Upshift Engine Overspeeding - Adjust front band. Remove and clean control valve assembly.

No 1-2 or 2-3 Upshifts - Remove and inspect governor. Remove and clean control valve assembly. Rear clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

Downshifts Faulty

No Forced Downshifts - Adjust throttle linkage. Perform control pressure test. Remove and clean main control valve assembly. Check operation of inner and outer throttle levers.

Severe 3-2 or 3-1 Shifts (Closed Throttle) - Check engine idle speed and throttle linkage. Remove and clean main control valve assembly.

No 2-1 Downshift - Adjust throttle linkage. Clean main control valve assembly. Rear servo not operating properly.

No 3-1 Downshift - Adjust engine idle speed and throttle linkage. Remove and clean main control valve assembly.

Slippage Or Chatter

In 2nd Speed - Check fluid level. Adjust throttle linkage. Adjust front band. Check control pressure. Clean main control valve and pressure regulator. Front servo not operating properly. Front clutch slipping. Leakage in hydraulic system.

In 1st Speed - Check fluid level. Adjust throttle linkage. Adjust rear band. Clean main control valve and pressure regulator. Check inner and outer throttle levers. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

In Reverse - Check fluid level. Adjust throttle linkage. Adjust rear band. Check control pressure. Clean main control valve and pressure regulator. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

No Drive

In "D1" or "D2" - Adjust front band. Clean main control valve. Make an air pressure check. Front clutch slipping. Leakage in hydraulic system. Fluid distributor in output shaft faulty.

In "D1" - Adjust manual linkage. Rear pump not operating properly. Planetary one-way clutch not operating properly.

In "R" - Adjust rear band. Rear servo not operating properly. Clean main control valve. Make air pressure check. Rear clutch not operating. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

In "L" - Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Clean control valve assembly. Leakage in hydraulic circuit. Fluid distributor sleeve in output shaft faulty.

In Any Rang - Check fluid level. Adjust manual linkage. Check control pressure. Clean main control valve and pressure regulator. Make an air pressure check. Leakage in hydraulic system.

Lock-up

In "D1" & (r) "D2" - Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

In "R" - Adjust front band. Front servo not operating properly. Front clutch slipping. Check parking linkage. Leakage in hydraulic system.

In "L" - Adjust front band. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

Parking Lock Faulty

Adjust manual linkage. Check parking linkage.

Engine Will Not Push Start

Check fluid level. Adjust manual linkage. Clean main control valve and pressure regulator. Rear pump not operating. Leakage in hydraulic system.

Transmission Overheating

Oil cooler and connections faulty. Clean pressure regulator assembly. Converter one-way clutch slipping or faulty.

Engine Runaway

On Forced Downshift - Adjust front band. Clean main control valve and pressure regulator. Front servo not operating properly. Leakage in hydraulic system.

Noise

In Neutral - Clean and inspect pressure regulator. Engine rear oil seal faulty. Front clutch not releasing properly. Front pump faulty.

In 1st, 2nd or Reverse - Clean and inspect pressure regulator. Faulty planetary assembly. Front or rear clutch faulty. Front pump faulty.

In Park - Clean and inspect pressure regulator. Front pump faulty.

When Coasting In Neutral (20-30 MPH) With Engin Off - Rear Pump faulty.

REMOVAL & INSTALLATION

See 1962 Final Data, Page 478 for removal and installation procedure on all models.

TRANSMISSION OVERHAUL

See 1962 Final Data, Page 480 and note the following changes in transmission design and overhaul procedur .

Front Pump Oil Seal

A new 1/8" narrower seal is used which requires a new installing tool, T63L-77837-A.

Speedometer Gear

A nylon drive gear which is a .004-.010" shrink fit on output shaft is being used in production to replace the former steel gear. To remove and install the nylon gear, proceed as follows: Remove output shaft from transmission, then remove oil distributor tubes from

(Continued)

sleeve. Remove speedometer gear snap ring from shaft and pry oil delivery sleeve toward rear of shaft with a hammer handle. *CAUTION - Apply pressure on governor counterweight, and not against governor valve body.* Slide oil delivery sleeve toward front of transmission, then use a small hammer and brass drift, gently tap gear evenly and alternately off the shaft. To install gear, dip it in transmission fluid and place it on an illuminated 100 watt light bulb for five minutes, then turn gear over and heat other side for five minutes. Make sure lock ball is in place on shaft, then quickly slide gear into place. Install snap ring and replace output shaft.

Output Shaft Thrust Washer

"PCE" Model Transmission (390" Engine) - A new needle thrust washer is used on the output shaft which requires a counterbore in rear pump to accommodate the thrust bearing race.

Torque Converter

The torque converter has been modified to replace the sprag type clutch with a roller type clutch. Bronze and aluminum thrust washers have been replaced with aluminum coated stamped thrust washers and flat steel retainers. A new longer locking rod, Tool T63P-7092-A, is required for use with the present converter clutch checking tool.

Front Servo

The accumulator piston and related parts have been eliminated in 1963 models. Servicing remains the same as in previous models except for the eliminated parts.

Converter Housing

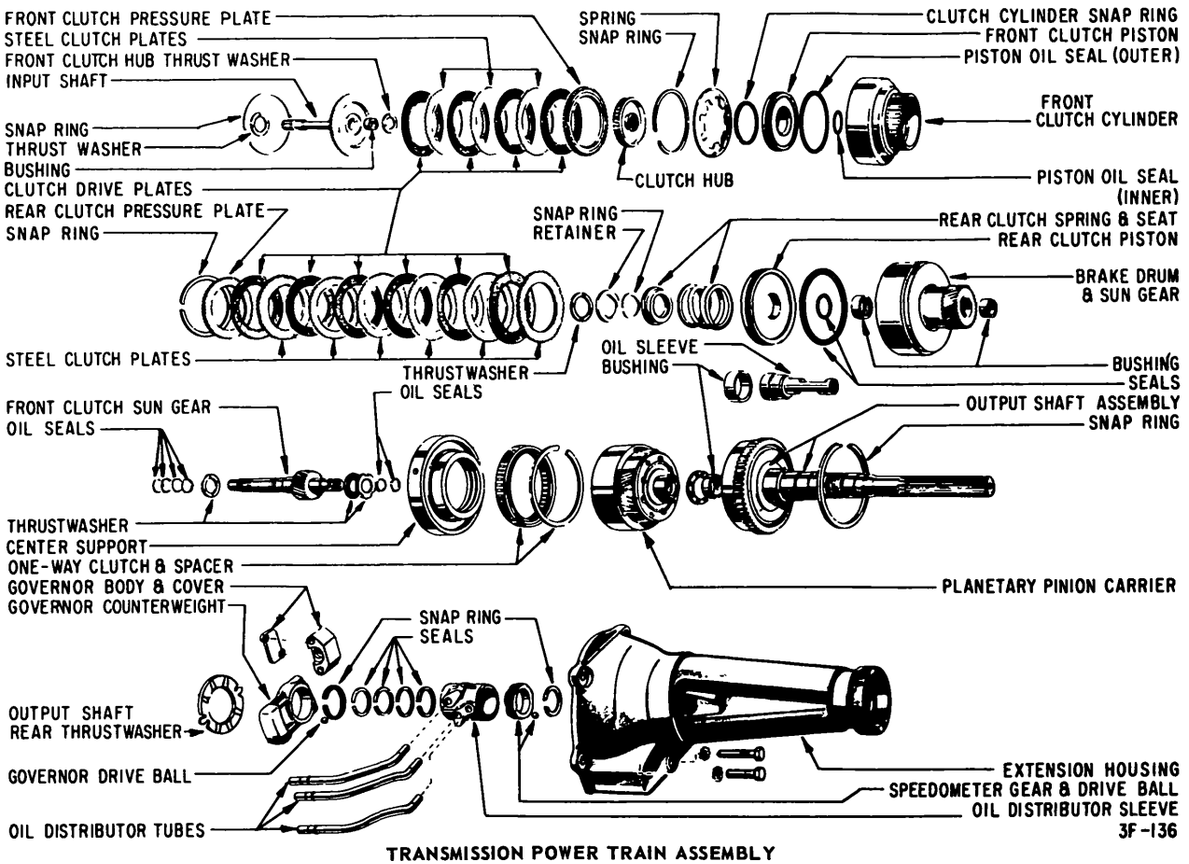
A new converter housing and converter is used to accommodate the new .075" thick engine rear cover plate. The new converter housing will have the starter pilot eliminated (piloting of starter is accomplished by the engine rear cover plate). The new converter assembly has longer flywheel mounting stud pads and a longer crankshaft pilot.

Parking Linkage

This linkage is a new design requiring different replacement procedures as follows: To replace toggle lever shaft, press it out of case after all of the parking pawl linkage has been removed. Press a new shaft into case until end of shaft is flush with case. With the shaft in position, toggle lift lever should be centered on toggle link pin, when in the applied position.

Rear Clutch Plates

"PCD" & "PCT" Model Transmissions (260" & 352" Engin s) - New material used in rear clutch drive (friction) plates allows the number of plates to be reduced from five to three (drive plates), and allows driven (coned steel) plates to be replaced with three flat steel plates. Other transmission parts that are affected with this change include front clutch cylinder, front brake drum and sun gear assembly, rear clutch pressure plate and main control assembly. When installing new plates, soak in transmission oil for fifteen minutes prior to assembly. If plates are to be reused, they must not be washed or cleaned in any solvent, but wiped clean with a lintless cloth only. *See "Rear Clutch Plates" illustration.*



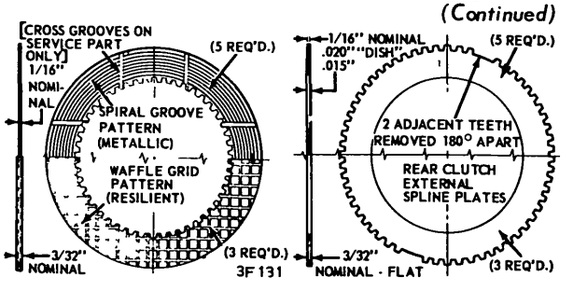
TRANSMISSION POWER TRAIN ASSEMBLY

Planetary Clutch

A new "roller" type one-way clutch has replaced the "sprag" type one-way clutch. In conjunction with this change, a new planet carrier with a "cam" type clutch race is used which also requires a new type center support. The new center support used in production is chamfered at rear of clutch race for use with the "roller" type clutch only. A new service replacement center support is not provided with a chamfer, however, it can be used with either a "sprag" or "roller" type clutch. *CAUTION - Do not us a "chamfered" support with the "sprag" type clutch.* Installation procedures for "roller" type clutch on a center support with a "chamfered" edge is different from a support with a "square" edge as follows:

Chamfered Edge Support - Install center support and rear band in case, then install primary sun gear rear thrust bearing race and bearing in planet carrier using petroleum jelly to retain them in place. Lubricate bearing surface on center support, rollers of planetary clutch, and the cam race with petroleum jelly, then install planetary clutch in carrier. Carefully position

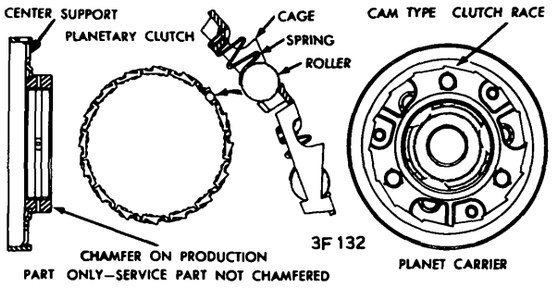
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REAR CLUTCH PLATES ("PCD" & "PCT" TRANSMISSIONS)

planet carrier on center support, then move carrier forward until clutch rollers are felt to contact bearing surface of center support While applying forward pressure on planet carrier rotate it counterclockwise (as viewed from rear) This will cause clutch rollers to roll toward the large opening end of cams in the race, compressing the springs slightly, so that roller will ride up the chamfer on planetary support and onto inner race Push planet carrier all the way forward, then check operation of planetary clutch by rotating carrier counterclockwise It should rotate with a slight drag while rotating it counterclockwise (viewed from rear) and it should lock up when attempting to rotate it in a clockwise direction

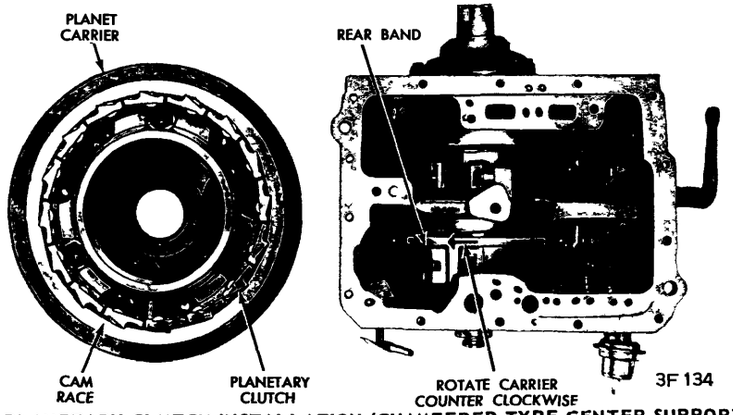
Square Edge Support - Install center support and rear band in case, then install primary sun gear thrust bearing race and bearing in planet carrier using petroleum jelly to retain them in place Lubricate bearing surface on center support, rollers of planetary clutch, and the cam race in center support with petroleum jelly Install planetary clutch on center support with the "saw teeth" of clutch cage pointing in clockwise direction as viewed from rear *CAUTION - Make sure that all rollers are in the cage* Push planet carrier forward until rollers are felt to contact surface of cam race, then while applying forward pressure on carrier, rotate it counterclockwise (viewed from rear) This will cause roller to roll toward the large opening end of cams in race, compressing the springs slightly so that rollers will enter cams *NOTE - Some of the rollers may become cocked preventing their entry into outer race Th se rollers must be positioned individually with a small screwdriver by pushing rear of rollers toward center of transmission and into cam race (keep pressure applied to carrier at all times)* After all rollers have been started into cam race, rotate the carrier counterclockwise while pushing it forward (again straighten any rollers which still may be in a cocked position preventing carrier from sliding onto support) Make sure that all springs are entered in cam race before attempting to push carrier on support Push carrier all the way forward and check operation of clutch by rotating it in a counterclockwise direction The carrier should rotate counterclockwise with a slight drag and should lockup when attempting to rotate it in a clockwise direction



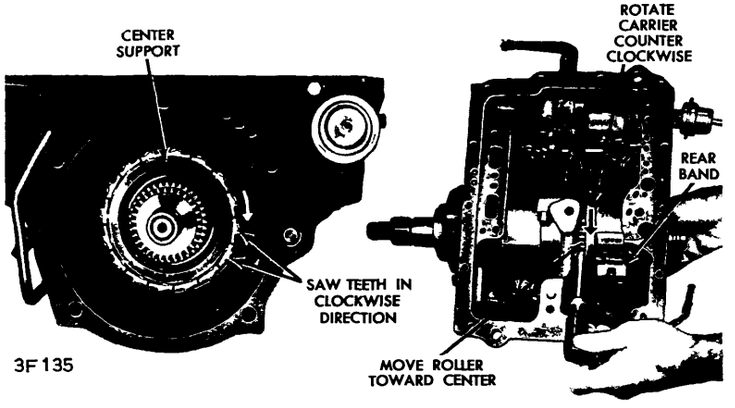
ROLLER TYPE ONE-WAY CLUTCH

Tightening Specifications

Location	Ft Lbs. Torque
Converter to Flywheel Nuts	15-28
Converter Housing to Transmission	35-45
Front Pump to Case	17-22
Front Servo to Case	30-35
Rear Servo to Case	40-50
Planetary Support to Case	20-25
Upper to Lower Valve Body Bolts	4-6
Control Valve Body to Case	8-10
Pressure Regulator to Case	17-22
Extension Housing to Case	28-38
Oil Pan Bolts	10-13
Pressure Test Plugs	7-15
Rear Band Adj Screw Locknut	35-40
Front Band Adj Screw Locknut	20-25
Manual Control Lever Nut	35-40
Downshift Lever Nut	17-20
Converter Cover Drain Plug	15-28
Converter Housing to Engine	45-50
Transmission Vent Assembly	7-10
Oil Cover Inlet & Outlet Plugs	10-15
Inhibitor Plug to Case	10-15
Vacuum Diaphragm Unit to Case	18-27
Front Pump Cover Screws	(Inch lbs) 25-35
Rear Pump Cover Screws (¼-20)	(Inch lbs) 80-90
Rear Pump Cover Screws (10-24)	(Inch lbs) 25-35
Gov Inspection Cover Screws	(Inch lbs) 50-60
Gov Valve Body to Counterweight	(Inch lbs) 50-60
Gov Valve Body Cover	(Inch lbs) 20-30
Pressure Regulator Cover	(Inch lbs) 20-30
Front Servo Release to Servo Piston	(Inch lbs) 20-30



PLANETARY CLUTCH INSTALLATION (CHAMFERED TYPE CENTER SUPPORT)



PLANETARY CLUTCH INSTALLATION (SQUARE TYPE CENTER SUPPORT)

LINCOLN AUTOMATIC TRANSMISSION

Lincoln Continental (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Place selector lever in "N" (Neutral) and obtain a speed of approximately 25 MPH. Depress accelerator and turn ignition ON, then move transmission selector lever to "L" (Low).

Towing Or Pushing Car

NOTE - Do not tow car at speeds greater than 40 MPH and observe the following precautions.

Transmission in Operating Condition- With transmission in "N" (Neutral) position, car can be towed or pushed normally for distances not to exceed 12 miles. *For greater distances, use same procedure as for inoperative transmission.*

Transmission Not In Operating Condition - Tow car with rear wheels lifted off ground or with propeller shaft removed. *CAUTION - If propeller shaft is removed, protect rear of transmission so dirt will not enter.*

DESCRIPTION

Three speed hydraulically controlled planetary transmission and torque converter of same design used on previous models.

LUBRICATION

FLUID LEVEL CAUTION - Transmission fluid level must not be allowed to drop to more than ONE PINT below normal FULL level.

Checking Fluid Level

Check fluid level every 6,000 miles. With transmission at normal operating temperature and engine at normal idle speed, shift transmission through all ranges, then place in "P" (Park) position. Check fluid level on dipstick and add recommended fluid as required to bring level up to "F" (Full) mark on dipstick. *CAUTION - Do not overfill.*

Draining & Refilling

Periodic draining and refilling is not required (only at time of service or overhaul). To fill dry transmission, install 6 qts. of recommended fluid, then start engine and shift transmission through all ranges. Place transmission selector lever in "P" (Park) position and check fluid level. If necessary, add enough fluid to bring level up to "F" (Full) mark on dipstick. *CAUTION - Do not overfill.*

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

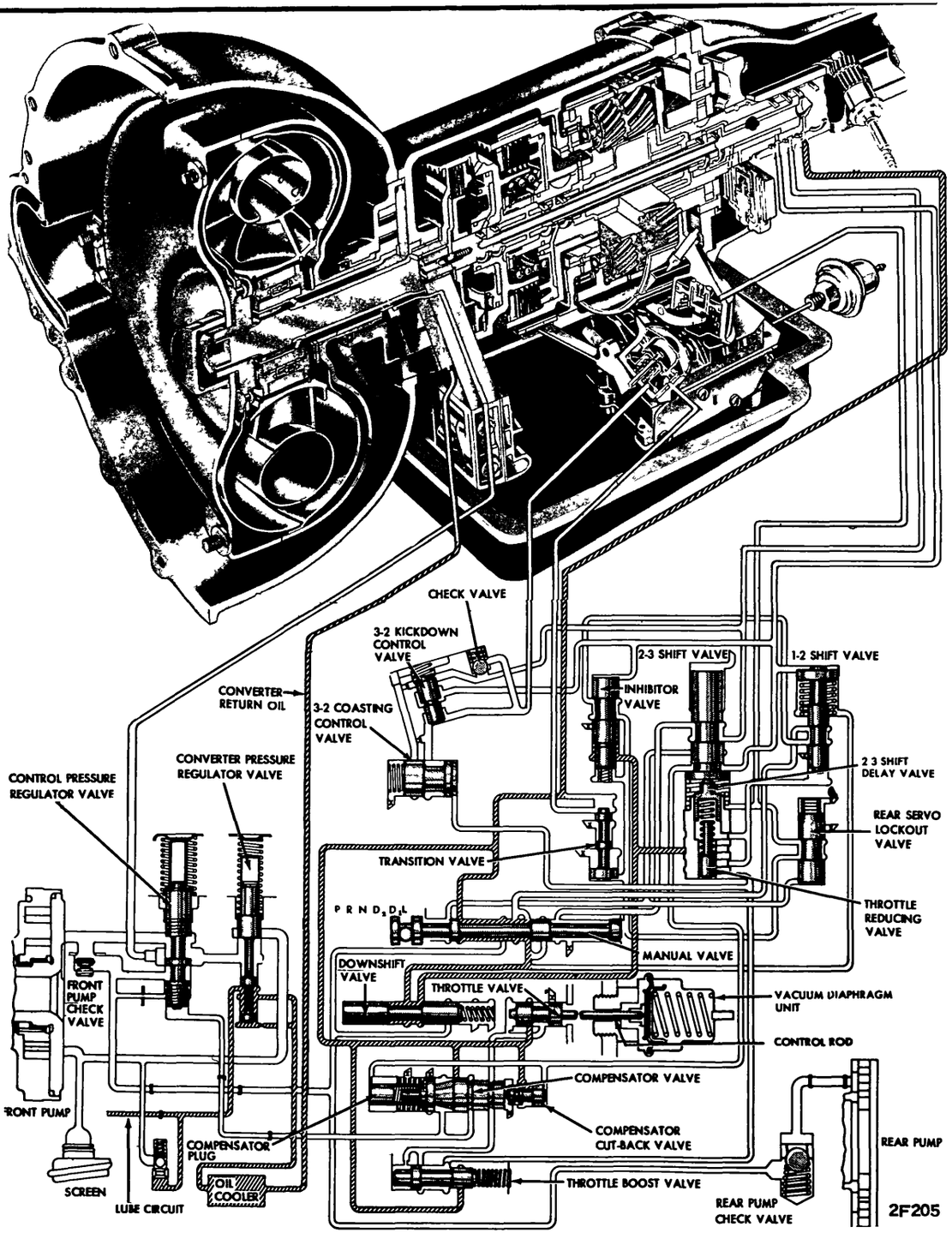
Capacity

10 qts. (approximate). *Check fluid level on dipstick and adjust as necessary.*

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Mod I page.



LINCOLN AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

Downshift Rod

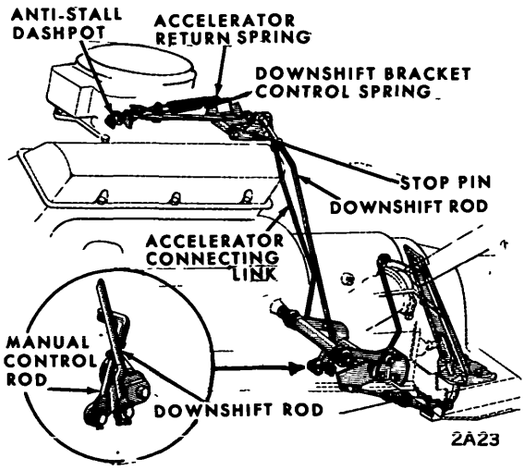
Loosen locknut on downshift rod, then disconnect rod from ballstud on bellcrank assembly and slide spring clip off end of rod. Moveable outer bracket on bellcrank must be up against stop pin on inner mounting bracket on bellcrank assembly Pull upward on rod and hold against transmission internal stop, then adjust length of rod until hole in rod is aligned with ballstud on bellcrank assembly. Lengthen downshift rod one turn and position it on ballstud and lock rod to ballstud and tighten locknut. *NOTE - Make sure bellcrank outer bracket remains against stop pin. If it is not against stop pin, lengthen rod an additional turn.*

Manual Linkage

With engine off and transmission selector lever in "D1" position against stop, raise car and remove splash shield. Disconnect adjustable link from transmission manual shift lever on transmission and make sure lever is fully engaged in second detent from bottom. Loosen locknut on adjustable link, then pull downward on link to hold selector lever against stop. Adjust rod length as necessary until hole in link aligns with stud on manual lever, then **lengthen link one-half turn additi nal.** Connect to transmission shift lever and check selector lever through all positions. *CAUTION - Do not mak a compensating adjustment in manual linkag to ov rcom misalignment of selector lever indicator or starter neutral safety switch.*

Neutral Safety Switch

Remove lower radio speaker and grille, then remove hood release handle from instrument panel. On convertible models, remove top control switch from instrument panel. On all models, remove lower left instrument panel cover and lower section of left vent. Remove wire connector from neutral safety switch, then position transmission selector lever in "D1" or "D2" range and loosen screws attach ng switch to steering column. Connect a self-po ere test lamp to lower two terminals (back-up lamp) on neutral safety switch. Position selector lever in "R" and pull switch to its furthest downward position. Slowly move switch upward until test lamp goes out. Attach test lamp lead to upper two terminals and shift selector lever to "P" or "N" position Test lamp should not go out. Tighten switch attaching screws and connect wire connector to switch, then install vent extension, lower instrument panel cover, hood release handle, and radio lower speaker and grille



LINCOLN CONTINENTAL THROTTLE LINKAGE

Front & Rear Bands

NOTE - Adjust bands every 12,000 miles under normal operation. For severe operation, adjust bands every every 6,000 miles.

Front Band - *NOTE - Front band adjustment screw is located on left side of transmission case above plug for line pressure check. It is not necessary to remove oil pan for front band adjustment.* Remove transmission linkage splash shield, then clean and oil adjusting screw threads. Loosen adjusting screw locknut, then install Tool 7345 and tighten adjusting screw until handle "breaks" over center. *CAUTION - If adjusting screw is tighter than wrench capacity (10 ft. lbs.) loosen a justing screw and readjust.* **Back off adjusting screw exactly three full turns.** Hold adjusting screw stationary and tighten locknut to 35-40 ft. lbs. *CAUTION - Damage may result to trar smission if adjusting screw is not backed off exactly three full turns. FRONT BAND ADJUSTING TOOL NOTE - Tool 7345 consists of two parts, adjusting screw locknut wrench, and adjusting screw ratchet wrench. Adjusting screw wrench is designed to be inserted through locknut wrench.*

Rear Band - *NOTE - Rear band adjusting screw is located on right side of transmission and is accessible through a hole in floor pan.* Fold back floor mat on right side and remove cover from access hole in floor pan. Clean and oil threads of adjusting screw, then loosen adjusting screw locknut with Tool 7195-C. Use T-handle of tool and tighten adjusting screw until wrench overruns. *CAUTION - If adjusting screw is tighter than wrench capacity (10 ft. lbs.), loosen adjusting screw and readjust.* **Back off adjusting screw exactly 1½ turns** and tighten locknut to 35-40 ft. lbs. *CAUTION - Damage may result to transmission if adjusting screw is not backed off exactly 1½ turns.*

TESTING

Stall Test

When making stall test, never hold throttle open longer than 5 seconds. With engine at normal operating temperature and at slow (hot) idle speed, install a tachometer on engine and apply service and parking brakes. Stall test transmission in each driving range at full throttle (do not depress accelerator through detent into kickdown position), and note engine speed, which should be 1600-1800 RPM. *CAUTION - If engine speed exceeds maximum limits, release accelerator immediately.* Clutches and bands are applied in each selector lever position as follows: "**D1**" - Front clutch and one-way clutch engaged at all accelerator pedal positions. "**D2**" - Front clutch and front band applied at all accelerator pedal positions. "**L**" - Front clutch and rear band applied. "**R**" - Rear clutch and rear band applied. *NOTE - Engin overspeeding is an indication of clutch r band slippage.*

SHIFT SPEEDS (MPH)

Range	Shift	Minimum Throttle	Full Throttle	F rc d Downshift	Manual D - Lo
D1	1-2	8-11	41-50		.
D1	2-3	12-25	68-81		
D1	3-2			63-75	
D1	3-1	7-9		21-33	
D1	2-1	.		21-33	
D2	2-3	12-25	68-81		
D2	3-2	7-12		63-75	
D1&D2	3-2				Above 19-28
D1&D2	3-1	.	.		Below 19-28

Shift Tests

Select a smooth road for tests, then make tests outlined below and refer to "Shift Speed Table" for correct speeds where shifts should occur.

1-2, 2-3 Upshift (Minimum Throttle) - Place selector lever in "D1" range, and starting from a standstill, transmission should start in first gear and upshift to second, then a higher speed, upshift to third.

2-3 Upshi mum Throttle) - Place selector lever in "D2" ra and starting from a standstill, transmission should start in second gear and upshift to third.

1-2, 2-3 Upshift (Maximum Throttle, Through Detent) - Place selector lever in "D1" range, then depress accelerator through detent and hold there. Transmission should upshift at speeds indicated. *NOTE - 2-3 Upshift with selector lever in "D2" range will occur at same speed as for "D1" range.*

3-2, 2-1 Downshift (F aced) - With transmission in third gear, depress accelerator pedal to floor (through detent). Transmission should shift from third to second, or from third to first, depending on car speed.

3-1 Downshift (Minimum Throttle) - Coasting down from approximately 30 MPH in third gear, transmission should downshift from third to first. *NOTE - A 3-2-1 downshift may be experienced under the above conditions.*

"DR" to "LO" (Manual Shift) - With car speed at approximately 50 MPH, shift selector lever from "D1" or "D2" to "LO". Transmission should shift from third to second. When car speed is reduced within range indicated in table, transmission should shift to first gear.

Control Pressure Tests

Attach a tachometer and vacuum gauge to engine, then attach a pressure gauge to control pressure outlet on side of transmission (directly below front band adjusting screw on left side of case). Apply parking brake and adjust idle speed to 450-475 RPM with transmission selector lever in "D2" position. With engine at indicated idle speed and engine vacuum above 16" Hg, and with transmission in either "D1", "D2" or "Lo", pressure should be 57-72 lbs. In "P", "N", or "R", pressure should be 57-213 lbs. If control pressures are within limits, apply service brakes and place transmission selector lever in "D1" or "D2", then increase engine speed slowly until pressure starts to rise. At this point, manifold vacuum should be 16.0" to

(Continued)

13.7" Hg. As vacuum reading passes through this range, transmission control pressure should start to rise and continue to rise with throttle opening, reaching a maximum pressure of 145-170 lbs. At maximum pressure, vacuum reading should be 1.5" Hg. *CAUTION - Do not hold transmission under stall conditions for more than five seconds.* If control pressures are not correct, erratic, or fail to rise with increased speed, see *"Trouble Shooting & Diagnosis"*.

Air Pressure Tests

NOTE - Raise car and remove transmission oil pan and control valve assembly, then proceed as follows:
Front Clutch - Apply pressure to front clutch and governor input passage (see illustration). Listen for a dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leakage in this part of system.
Governor Valve - Remove governor inspection cover, then apply air pressure to same passage as for front clutch (above). Listen for a click and also watch valve snap inward.
Rear Clutch - Apply air pressure to rear clutch oil passage (see illustration) and listen for a dull thud to indicate clutch is operating. Check for leakage in same manner as for front clutch (above).
Rear Band & Servo - Apply pressure to rear servo oil passage (see illustration) and check band application.
Front Band & Servo - Apply pressure to front servo apply hole and check band application.

TROUBLE SHOOTING & DIAGNOSIS

CONTROL PRESSURE LOW: If pressure is low at idle speed in all selector lever positions, check for excessive leakage in front oil pump, case, and control valve body. *NOTE – Control pressure in "P", "L", & "R" is regulated entirely by control pressure regulator valve and its spring.*

CONTROL PRESSURE HIGH: If control pressure is high at idle speed with transmission selector lever in "N", "D1" & "D2", trouble may be in diaphragm unit or its connecting tubes or hoses. Check engine manifold vacuum. Check diaphragm pushrod for bends and for corrosion. Install diaphragm unit with pushrod removed and recheck control pressure in "N", "D1" or "D2". If control pressure is still too high, trouble is in transmission control system. If pressure is within limits, diaphragm unit is not operating properly.

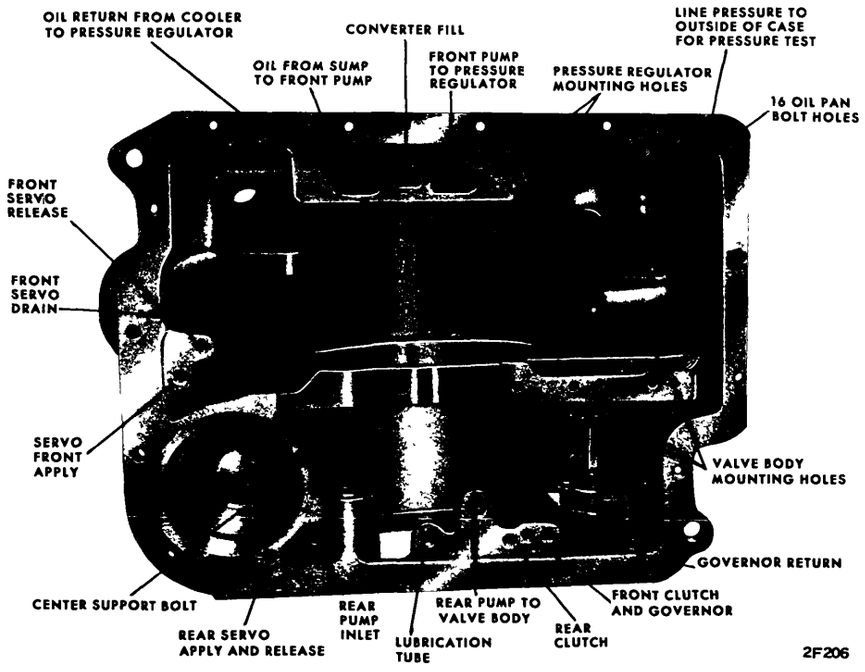
CONTROL PRESSURE DOES NOT RISE WITH THROTTLE OPENING: If control pressure does not rise in "D1" or "D2" as engine vacuum falls below 16–13.7" Hg, check transmission pressure rise capacity by shifting to "L" or "R". In these positions, maximum control pressure should be obtained at not more than engine stall RPM. If pressure rise is normal in "R" & "L", remove hose from diaphragm unit and check hose and tube. *NOTE – To check, hold thumb over end of hose and check for vacuum. If engine speeds up when hose is disconnected and slows down as thumb is held against end of hose, vacuum source is satisfactory.* If vacuum reading at end of hose is 18" Hg or greater, change diaphragm unit and recheck pressure rise with throttle opening in "D1" or "D2". If control pressure does not rise now, trouble is in transmission. Check for internal leakage in components that have pressure in them in "D1" and "D2" but do not have pressure in them in "R" or "L".

CONTROL PRESSURE IS EXTREMELY ERRATIC: If control pressure is erratic in "N", "D1" and "D2", check diaphragm unit tubes, hoses and diaphragm pushrod (see "Control Pressure High" above). If vacuum is satisfactory, replace diaphragm unit and retest control pressure. If no improvement noted, clean and inspect control valve body and pressure regulator.

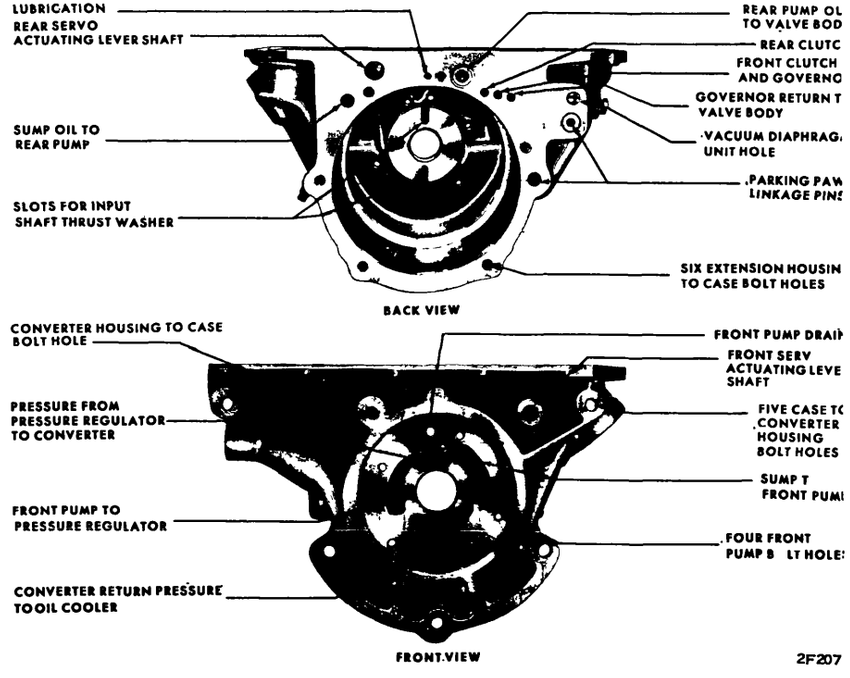
ROUGH INITIAL ENGAGEMENT: Adjust engine idle speed. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check control pressure. Adjust front and rear bands.

SHIFT POINTS INCORRECT OR NO SHIFT POINTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm unit. Check for sticking governor valve or plug. Check control pressure. Check position of valves in control valve body (Check control pressure at each detent position during road test).

ROUGH SHIFT POINTS: Check engine idle speed, throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check for sticking governor valve or plug. Check control valve body. Adjust front band. Check rear servo accumulator.



TRANSMISSION CASE PASSAGES (BOTTOM VIEW)



TRANSMISSION CASE PASSAGES (FRONT & REAR VIEWS)

SLIPPAGE DURING SHIFTS: Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check for sticking governor valve or plug. Check control valve assembly. Adjust front band. Check front servo circuit (air pressure check). Check rear clutch and circuit (air pressure check).

SLIPS (INITIAL ENGAGEMENT "D2", "D1" & "Lo": Check transmission fluid level. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control pressure. Check front clutch and circuit (air pressure check).

SLIPS (REVERSE ONLY – OR NO REVERSE): Check control pressure. Adjust rear band. Check rear servo circuit (air pressure check). Check control valve body. Check rear clutch and circuit (air pressure check). Check for turned oil distributor sleeve in output shaft.

SLIPS ("D1" LOW GEAR ONLY – OR NO DRIVE IN "D1"): Check operation of planet carrier one–way clutch. Check adjustment of manual and transmission linkage.

LOSS OF INTERMEDIATE GEAR IN "D1" & "D2": Check front band adjustment. Check front servo circuit (air pressure check). Check control valve body.

SLIPS IN REVERSE (OR IN HIGH GEAR IN "D1" & "D2"): Check rear clutch and circuit (air pressure check). Check control valve body. Check control pressure. Check for turned oil distributor sleeve in output shaft.

NO CLOSED THROTTLE DOWNSHIFTS: Check for sticking governor valve or plug. Check control pressure. Check control valve body.

NO FORCED DOWNSHIFT: Check for correct accelerator pedal height. Check throttle linkage, manifold vacuum and vacuum diaphragm. Check control valve body.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Check control pressure. Check control valve body. Check front servo circuit (air pressure check). Adjust front band. Check operation of planet carrier one–way clutch.

CAR CREEPS EXCESSIVELY (SELECTOR LEVER IN ANY DRIVING RANGE): Excessive engine idle speed.

CAR MOVES FORWARD IN NEUTRAL: Check manual and transmission linkage adjustment. Check front clutch and circuit (air pressure check).

NO DRIVE IN ANY RANGE: Check transmission fluid level. Check manual and transmission linkage adjustment. Check control pressure. Check for broken converter lugs or input shaft.

COMPLETE LOCK–UP IN ANY RANGE: Check for wrong clutch and/or band application. Check control valve body. Check operation of planet carrier one–way clutch. Check for turned oil distributor sleeve in output shaft. Check front clutch and circuit (air pressure check). Check rear clutch and circuit (air pressure check). Check for release of parking linkage.

UNABLE TO START BY PUSHING: Check transmission fluid level. Check rear pump assembly. Check for broken converter lugs or input shaft. Check front clutch and circuit (air pressure check).

PARK LINKAGE WILL NOT HOLD: Check manual and transmission linkage adjustment. Check parking linkage.

TRANSMISSION OVERHEATS: Check transmission fluid level. Check control pressure. Check for restricted or leaking oil cooler and lines. Check converter one–way clutch operation. Check front band adjustment. Check rear band adjustment.

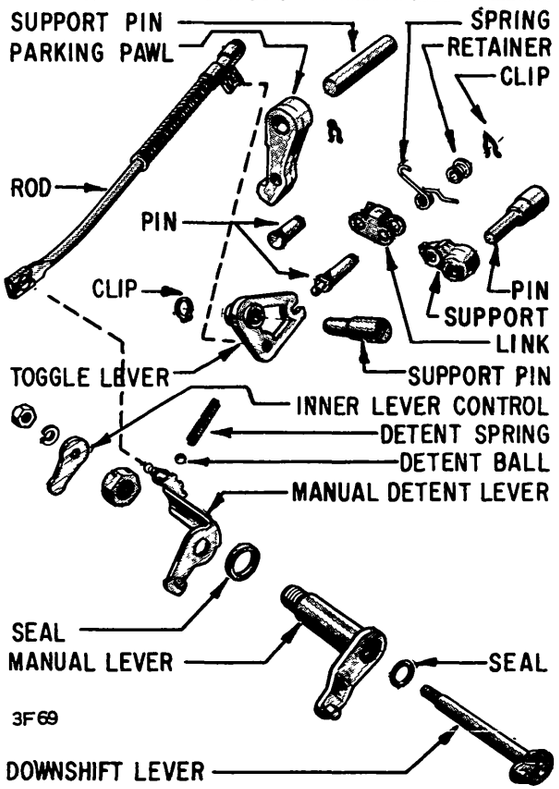
POOR ACCELERATION (MAXIMUM SPEED TOO LOW): Check transmission fluid level. Check operation of converter one–way clutch. Check engine performance.

TRANSMISSION NOISY ON COASTING 40–20 MPH: Check rear pump assembly.

MINOR REPAIRS (TRANSMISSION IN CAR)

Parking Pawl Replacement

Loosen locknut on rear band adjusting screw and tighten screw with Tool 7195-C until wrench overruns (this will hold planet carrier, front and rear clutch assemblies in place during parking pawl replacement). Raise car on a hoist and support front of transmission with a jack stand and wooden block, then drain transmission oil pan. Mark drive shaft and rear companion flange (for reassembly at same location), then remove drive shaft. Remove oil pan and screen. Remove three short tubes from main control valve that directs rear clutch, front clutch and governor return pressure to case. Remove cross member at extension housing and remove extension housing. Remove distributor sleeve snap ring and move distributor back until rear clutch, front clutch and governor return tubes are removed from case. Remove output shaft and rear pump, then remove toggle return spring from lever pin, and remove .328" diameter washer and pin. Remove parking pawl support pin with a magnet and remove parking pawl parts. To reassemble, reverse disassembly procedure using new gaskets. Adjust rear band and fill transmission case with fluid.



LINCOLN AUTO. TRANS. INTERNAL LINKAGE

Governor Replacement

Raise car and remove inspection cover from extension housing. Rotate drive shaft until governor is in line with inspection hole, then remove two governor valve body retaining bolts and governor from counterweight. *CAUTION - Do not drop any parts into extension housing.* Make sure all parts are thoroughly cleaned and that governor valve moves freely in valve body before valve body assembly is assembled to counterweight. Install governor valve assembly to counterweight so that valve body cover is faced toward rear of car, then tighten attaching bolts to 50-60 inch pounds. Install a new gasket on inspection cover and install cover.

TRANSMISSION & CONVERTER (REMOVAL & INSTALLATION)

Removal

NOTE - Transmission and converter must be removed as an assembly. One additional converter housing-to-transmission case bolt is located behind converter assembly where it is not accessible until after converter is removed.

1) Remove upper converter housing–to–engine bolts (from under hood), then install starter remote control so engine can be rotated from under car. Place transmission selector lever in "N" (Neutral), then raise car and drain transmission oil pan.

2) Remove converter access cover from front of converter housing and remove transmission linkage splash shield. Mark drive shaft and rear companion flange for installation in same position and remove drive shaft.

3) Remove parking brake equalizer bar retracting spring and disconnect parking brake cables and equalizer assembly. Disconnect transmission downshift rod and manual linkage parts at transmission levers, then disconnect vacuum line hose at vacuum diaphragm and speedometer cable at transmission.

4) Remove engine stabilizer bar from converter housing and converter–to–flywheel retaining nuts. *NOTE– As converter is rotated, remove converter drain plugs and drain converter.* Turn front wheels fully to right and remove starter motor, then disconnect oil cooler lines at transmission and at radiator and remove lines. Remove transmission filler tube and underbody reinforcing plate.

5) Position transmission jack, with Adapter Kit 7000–EG and Bracket Kit 7000–LC, under transmission and raise transmission slightly. Remove rear support crossmember and brackets from extension housing and car underbody.

6) Detach vacuum line at converter housing, then remove manual linkage equalizer assembly mounted between transmission and underbody. Remove remaining converter housing–to–engine retaining bolts and move transmissi n and converter toward rear and from under car.

Installation

Reverse removal procedure and tighten all bolts and nuts to specifications *(see "Tightening Specifications" below).*

Converter & Housing

Removal - With transmission removed from car, hold converter assembly with both hands and pull converter directly forward. *CAUTION - To prevent damage to front pump seal, do not rock converter from side to side.* Remove one bolt from inside converter housing (holding converter housing to transmission case). Remove remaining five bolts holding converter housing to transmission and remove housing.

Installation - Position converter housing on case and install five bolts and washers from outside converter housing and one self-locking bolt from inside housing. Install converter so drive lugs on converter are between lugs on front pump drive gear. *CAUTION - Do not move converter from side to side or up and down when it is being installed.*

OVERHAUL

TORQUE CONVERTER NOTE - This is a welded unit and cannot be disassembled.

Transmission

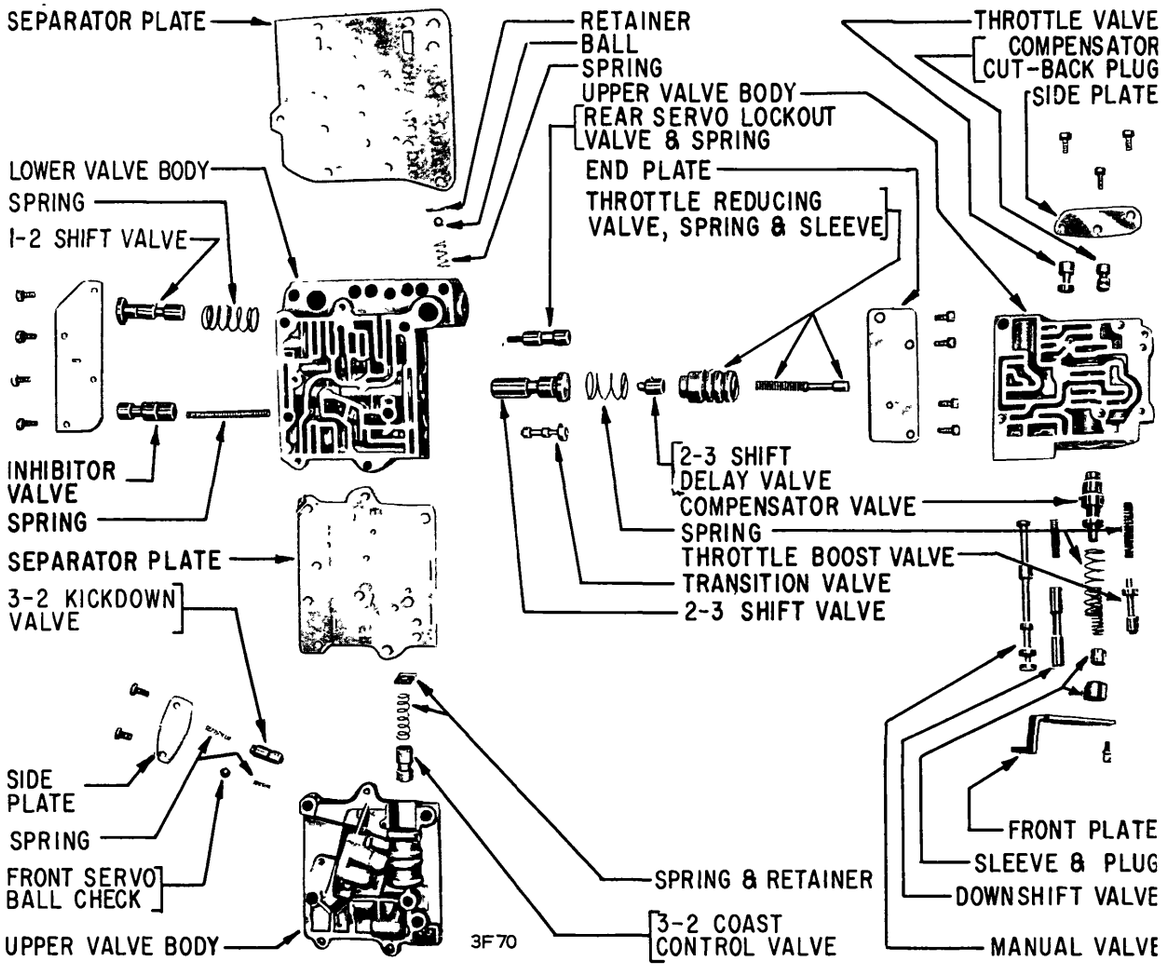
See 1961 Final Data, Page 462.

Tightening Specifications

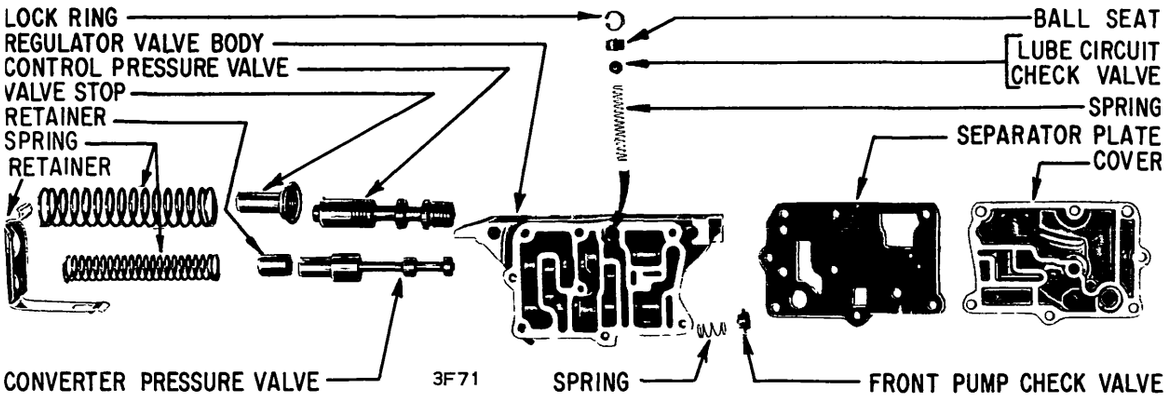
Location	① Ft. Lbs.
Band Adjustment Stop-to-Case	35-40
Case-to-Converter Housing	35-40
Converter Drain Plug	15-28
Converter Housing-to-Case	35-45
Diaphragm Assembly-to-Case	20-30
Extension Assembly-to-Case	28-38
Front Pump-to-Case	17-22
Front Servo Release Piston-to-Pin	② 20-30
Governor Body-to-Counterweight	② 50-60
Governor Cover-to-Body	② 20-30
Gov. Inspection Cover-to-Housing	② 50-60
Inner Throttle Valve Lever-to-Shaft	17-20
Control Valve Assembly Components	② 20-30
Control Valve-to-Case	8-10
Manual Control Lever-to-Shaft	35-40
Oil Pan-to-Case	10-13
Oil Pan Drain Plug	10-15
Oil Pressure Regulator Cover	② 20-30
Planetary Support-to-Case	20-25
Pressure Gauge Tap	7-15
Pressure Regulator-to-Case	17-22
Rear Oil Pump Cover-to-Body (¼"-20)	② 80-90
Rear Oil Pump Cover-to-Body (No. 10-24)	② 25-35
Stator Support-to-Pump Body	② 25-35
Upper-to-Lower Valve Body	4-6

① - Ft. lbs. except where noted.

② - Inch Pounds.



LINCOLN AUTOMATIC TRANSMISSION CONTROL VALVE



LINCOLN AUTOMATIC TRANSMISSION PRESSURE REGULATOR

3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION

Oldsmobil 88, Super 88, & 98 (1963)
Pontiac Catalina & Grand Prix (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

The engine cannot be started by pushing or towing car. If necessary, a booster battery must be used.

►*BOOSTER BATTERY CAUTION:* Connect negative (-) terminal of booster battery to negative terminal of car battery. Alternator will be damaged if battery is connected improperly.

Towing Or Pushing Car

Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with transmission. When towing at speeds above 30 MPH or if transmission is known to be out of order, disconnect propeller shaft from transmission. *CAUTION - After towing, check fluid level and if necessary, bring to proper level.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 PONTIAC "PG" & "PAH" MODEL TRANSMISSION GOVERNOR PRODUCTION CHANGE:* A new governor assembly, Part No. 8622645 is used in production beginning with transmission serial number PG-63-14580 and PAH-63-1033 to assist in eliminating the possibility of not obtaining a full-throttle 3-4 Upshift. The new governor, which reduces the full-throttle 3-4 upshift point approximately 3 MPH, should be used for service replacement on 1962-63 "PA" model transmissions.

DESCRIPTION

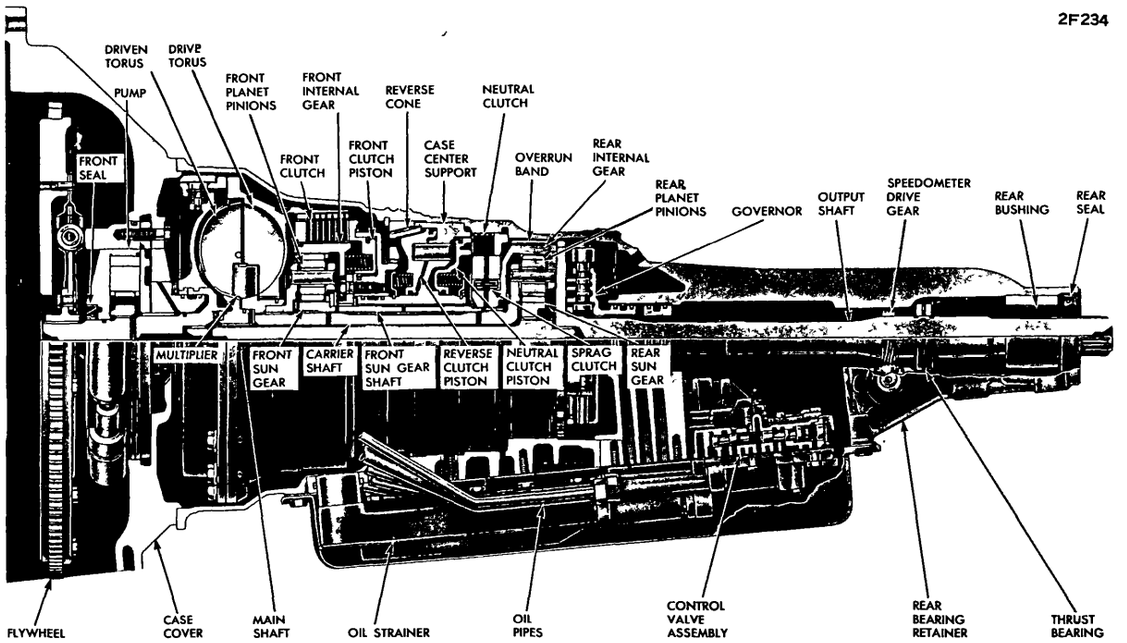
Three speed (4-Stage) "split torque" type hydraulically controlled automatic transmission of same design used on 1962 models. *For description of transmission operation, s e 1962 Final Data, Page 496.*

Transmission Identification

A serial number prefix which is stamped on a colored serial number plate attached to left side of transmission case identifies the transmission model. References in this text may be made to serial number prefix to indicate changes or differences in transmission models.

S rial Numb r Prefix & Plate Color

Serial No. Prefix	Car Make	Serial No. Plate Color
O63	Oldsmobile	Black
OC63	Oldsmobile	Aluminum
OA63	Oldsmobile	Dark Brown
OB63	Oldsmobile	Yellow
OCH63	Oldsmobile	Tan
P-63	Pontiac	Light Blue
PA-63	Pontiac	Orange
PB-63	Pontiac	Light Green
PC-63	Pontiac	Yellow (Diagonal)
PE-63	Pontiac	Yellow (or Red)
PG-63	Pontiac	Aluminum
PAH-63	Pontiac	Pink
PEH-63	Pontiac	Dark Blue



3-SPEED (4-STAGE) HYDRA-MATIC TRANSMISSION

LUBRICATION

Checking Fluid Level

Check fluid level every 4,000 miles (Oldsmobile); 6,000 miles (Pontiac). With car on a level floor, transmission at normal operating temperature, engine idling, and transmission selector lever in "P" (Park) position, check fluid level on dipstick located at right rear of engine. Add recommended fluid as necessary to bring level to FULL mark on dipstick. *NOTE - 1 pint of fluid is required to bring level from ADD mark to FULL mark.* With transmission cold, fluid level should be at ADD mark. DO NOT OVERFILL.

Draining & Refilling

Oldsmobile - Drain and refill every 24,000 miles. With transmission at normal operating temperature, remove oil filler pipe from transmission and drain fluid. Replace filler pipe and add 5 qts. of recommended fluid to transmission. then place selector lever in "P" (Park) position and start engine. Add fluid to bring level to FULL mark on dipstick. *NOTE - Recheck fluid level after transmission is warm.*

Pontiac - Drain and refill every 30,000 miles. *NOTE - Drain fluid immediately after operation before it has an opportunity to cool.* Disconnect fluid filler pipe from right side of transmission oil pan and allow transmission to drain. Remove oil pan and strainer and thoroughly clean, then install strainer using a new "O" ring seal on pump intake pipe. Install oil pan and a new gasket and tighten bolts to 12-15 ft. lbs., then connect oil filler pipe to oil pan and tighten securely. Pour 4 qts. of recommended fluid into transmission. *NOTE - If valve body removed, pour in 5 qts. If transmission overhauled, pour in 8 qts. for initial fill before starting engine.* Start engine and run at slow idle with selector lever in "P" (Park). With transmission warm and engine idling, recheck fluid level and add fluid as required to bring level to FULL mark on dipstick. DO NOT OVERFILL. Replace dipstick and turn handle 1/8 turn to lock it in filler tube.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

Oldsmobile - 5½ qts. (after drain); 6½ qts. (after pan removed); 9 qts. (after overhaul).
Pontiac - 6 qts. (after drain & pan removal); 8¾ qts. (after overhaul).

ADJUSTMENT

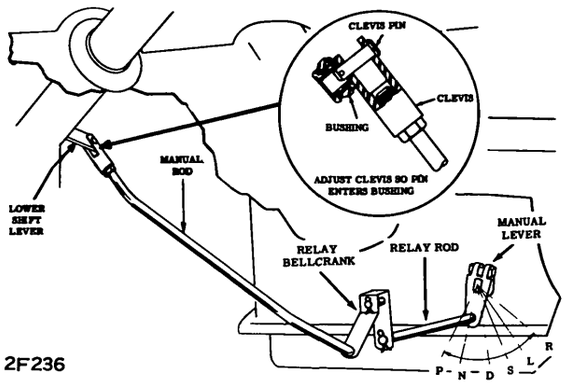
Throttle Linkage

See CARBURETOR on Car Model pages.

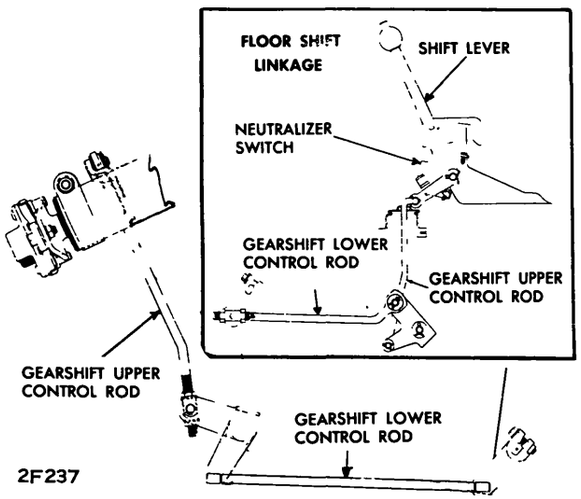
Manual Shift Linkage

Steering C lumn Shift (Oldsm bil) - Place manual lever on transmission in "N" (Neutral) detent, then disconnect manual rod from lower shift lever (on column). Hold lower shift lever (on column) upward so selector lever is positioned against stop in upper steering column *(NOTE - Do not raise lever).* Adjust manual rod end so pin will enter approximately 1/8" into lower shift lever bushing (on lower end of steering column) with selector lever against stop, **then lengthen clevis on manual rod 2½ turns.** Connect manual rod to lower shift lever (on column) and tighten clevis locknut.

Steering Column Shift (Pontiac) - Place transmission selector lever on steering column in "P" (Park) position, then back off locknuts on upper control rod trunnion (at equalizer) so they are free of trunnion. Place manual lever on transmission in "P" (Park) detent, then pull upper control rod down toward transmission as far as possible. While holding rod in this position, run trunnion upper locknut down to just contact trunnion. Run lower locknut up to contact trunnion and tighten locknuts securely. After making adjustments, check parking lock with car on an incline for positive locking.



OLDSMOBILE MANUAL SELECTOR LINKAGE (EXC. FLOOR SHIFT)



PONTIAC MANUAL SELECTOR LINKAGE

Floor Shift (Oldsmobile Star Fire) - Place selector lever in "N" (Neutral), then disconnect manual rod from manual lever on transmission. Place manual lever on transmission in "N" (Neutral) detent position. Loosen locknut on manual rod, then with selector lever held against its stop in "N" (Neutral) position and transmission manual lever in neutral detent position, adjust manual rod length for free entry into hole in transmission manual lever. **Lengthen manual rod 4 turns.** Check for alignment, then connect to transmission manual lever and install washer and cotter pin Tighten locknut on manual rod.

Floor Shift (P ntiac Grand Prix) - Place selector lever in "P" (Park) position, then loosen both trunnion nuts on gearshift lower control rod and back them away from trunnion. While holding lower control rod toward rear of car to remove slack from linkage, run rear nut up to contact trunnion. Run forward nut down to contact trunnion and lock securely in place.

Neutral Safety Switch

Oldsmobile - *NOTE - Switch is mounted on mast jacket (Exc. Starfire); inside console (Starfire).* On Starfire models, remove console control panel. On all models, loosen switch attaching screws, then with selector lever in "N" (Neutral), position switch so that a .090" gauge pin can be inserted through hole in switch arm and into hole in face of switch. Tighten switch attaching screws and remove gauge pin. Check to make sure engine will not start when selector lever is in any position other than "N" or "P". On Starfire models, install console control panel.

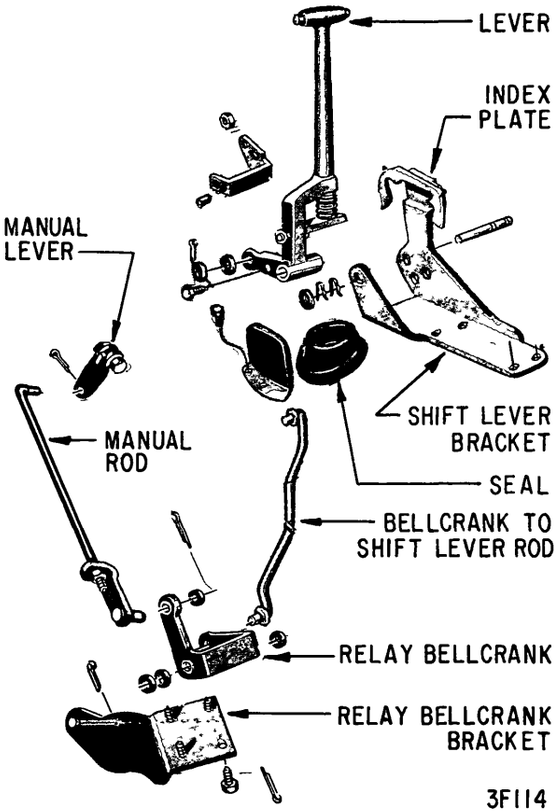
Pontiac - *NOTE - There is no adjustment for neutral safety switch on cars with steering column mounted selector lever. Neutral switch should allow engine to be started in "P" (Park) or "N" (Neutral).* On cars with floor shift, remove console compartment box, then remove console center bracket-to-floor screws. Remove four remaining screws attaching console, then remove compartment light switch, indicator bulb, courtesy light connections and shift lever knob. Lift console over shift and remove toward rear of car. Loosen two neutral safety switch attaching screws and adjust switch so engine starts only with shift lever in "N" (Neutral) or "P" (Park). Install assembly by reversing removal procedure.

TESTING

► *STALL TEST CAUTION: Do not stall test transmission under any conditions.*

Road Test

Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *NOTE - Make sure engine is operating at peak performance.* See "Shift Speed Tables" below for correct shift speeds under different operating conditions.



OLDSMOBILE MANUAL SELE CTOR LINKAGE (FLOOR SHIFT)

Shift Speed Tables (MPH)

Selector Lever	Throttle Position	2-3 Upshift	3-4 Upshift
"D Left" ①	Mininum	14-18	18-23
	Full	33-40	76-89
"D Right" ②	Minimum	14-18	
	Full	33-40	76-89
"Lo'	Minimum		
	Full		76-89

Selector Lever	Throttle Position	4-3 Downshift	3-2 D wnshift
"D Left" ①	Closed	20-15	16-13
	Full	84-68	29-25
"D Right" ②	Closed	84-72	16-13
	Full	84-72	29-25
"Lo"	Closed	84-72	52-46
	Forced	84-72	52-46

① - "D" position on floor shift models.
② - "S" position on floor shift models.

NOTE - Minimum throttle denotes a fixed throttle opening only sufficient to provide acceleration enough to accomplish each of the shifts.

Oil Pressure

With oil pressure gauge connected to the upper of the two test holes on left hand side of rear bearing retainer, check the oil pressure while on road test with selector lever in "D Right" ("S" on floor mounted shift models) position and with transmission in second speed at approximately 25 MPH. Minimum pressure should be 98.6 lbs. Maximum pressure should be 111.4 lbs. If not within specifications, check the following:

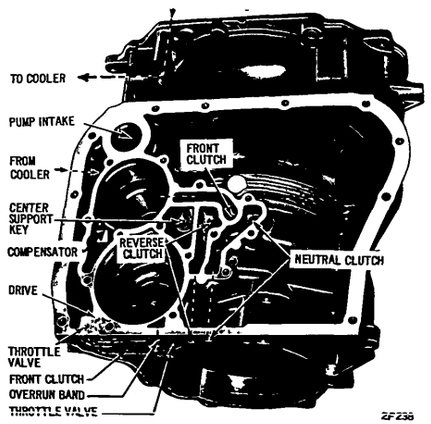
Low Oil Pressur - Oil level is too low. Booster plug is the wrong one or is stuck. Pressure regulator valve not operating properly. Strainer and "O" ring are leaking. Manual valve is misaligned with quadrant. Fluid is foaming or cavitation is occurring. Internal leakage. Stuck valve in control valve assembly. Front pump slide is stuck causing low output.

High Oil Pressure - Pressure regulator valve is stuck. Booster plug is the wrong one or is stuck. Manual valve is misaligned with quadrant. Stuck valve in control valve assembly. Front pump slide is stuck causing high output.

TROUBLE SHOOTING & DIAGNOSIS

No Upshift

"G-1" valve in governor is sticking closed or the 1-2 shift valve train in control valve assembly is sticking. *NOTE - To determine if "G-1" valve is sticking, drive car between speed of 15-20 MPH, then very carefully attempt to momentarily engage the reverse position to see if reverse blocker piston is working. If selector lever can be moved beyond "Lo" range position, reverse blocker is not operating properly, due in most cases to a stuck "G-1" valve. Replace governor assembly. When making the above test DO NOT fully engage selector lever in "R" position or leave lever in partial "R" position.*



TRANSMISSION CASE OIL PASSAGES

No Drive in "D" (or "S") Range

Check neutral clutch, sprag assembly (or race), fluid coupling, oil level and pressure, manual linkage, control valve assembly, sticking reverse cone, and for restricted passages.

Drive in "N" (Neutral)

Check operation of neutral clutch, and for manual linkage adjustment.

No Reverse

Check manual linkage adjustment, fluid level, restricted passages. Check operation of reverse cone clutch and neutral clutch.

Drive in "D Right" or "Lo" Only

Check operation of sprag assembly and neutral clutch.

Drives Forward in "R"

Check manual linkage and operation of neutral clutch.

Reverse Drive in "N"

Check operation of reverse cone clutch.

Drive in 3 & 4 Only

Check operation of reverse cone clutch.

Drive in 1, 2 & 4 Only

NOTE - This condition may be reported as a 2-3 Slip-page. Check for malfunction in control valve assembly or fluid coupling.

Drive in 1, 2, & 3 Only

Check operation of governor and for malfunction in control valve assembly.

Slipping 2-3 Shift

NOTE - This condition may be reported as "Drive in 2 or 4 Only". Check operation of front clutch or accumulator, malfunction in control valve assembly, and for accumulator body assembly not operating properly. Check throttle valve linkage adjustment and check for low oil pressure. Check for restricted 2-3 oil passages.

Slipping 3-4 Shift

Check for malfunction in fluid coupling and in control valve assembly. Front clutch not operating properly. *NOTE - If transmission is slipping in all ranges, check for low oil pressure.*

Rough 2-3 Shift

Accumulator, compensator body assembly, or front clutch not operating properly. Malfunction in control valve assembly or in fluid coupling. Throttle valve linkage not adjusted properly. Front clutch passage restricted.

Erratic Shifts

Governor assembly or control valve assembly not operating properly.

High or Low Upshifts

Throttle valve linkage not properly adjusted (if too short, upshifts will be high; if too long, upshifts will be low). Control valve assembly or governor not operating properly. Throttle valve lever bent, governor oil passage restricted. Throttle valve or line pressure not correct.

No Engine Braking

Overrun band or servo not operating.

No Part Throttle or Detent Downshift

Check throttle valve linkage adjustment and accelerator travel. Control valve assembly or governor not operating properly.

Lever Will Not Go Into "R"

Check manual linkage adjustment, operation of governor, and reverse blocker valve.

Lever Will Not Go Into "P"

Check parking linkage and adjustment of manual linkage.

TRANSMISSION REMOVAL & INSTALLATION

►*TRANSMISSION REMOVAL & INSTALLATION PROCEDURE NOTE: See Page 475 in 1961 Final Data.*

TRANSMISSION OVERHAUL

See 1961 Final Data, Page 475 and note the following changes.

Control Valve Body

NOTE - An inner and outer throttle valve spring is used on some models in place of the single spring.

Disassembly - 1) Remove channel body from valve body assembly (two screws on valve body side and thirteen screws on channel plates side), then remove neutral clutch bypass valve from cored side of channel plate. Remove front clutch bypass valve.

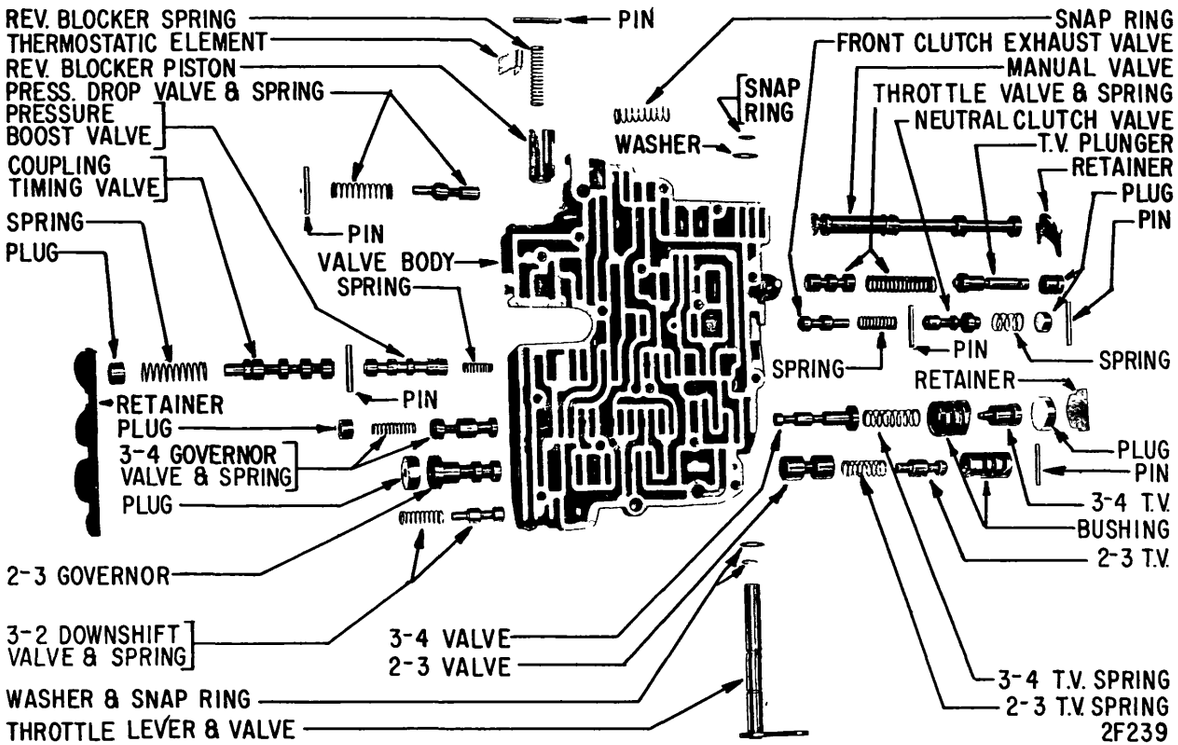
2) If necessary to remove pressure relief valve and spring, proceed as follows: Turn channel plate over to casting side and remove retaining pin. *CAUTION – Pin is under extreme pressure.* Remove pressure relief valve spring and ball. After cleaning and inspection, reassemble channel plate by installing pressure relief ball, spring and retainer, neutral clutch bypass and front clutch bypass valve, then set channel plate aside and continue with valve body disassembly.

3) Remove channel plate–to–valve body spacer and place on channel plate and check alignment of bypass valves. Remove two check balls and throttle valve thermostatic element. Remove throttle valve plunger guide retainer located in cored passage near throttle valve adjusting screw. Position control valve assembly with cored side up and throttle valve lever positioned on top right hand side.

DISASSEMBLY NOTE: Refer to valve body illustrati n and n t th foll wing:

4) Remove multiple valve plug retainer (plugs are under spring tension), then remove 2–3 downshift valve and

(Continued)



CONTROL VALVE ASSEMBLY

spring. Remove valve bore plug from adjacent bore by inserting snap ring pliers in hole in plug.

VALVE PLUG REMOVAL NOTE: Valve plugs are non-operating plugs used in valve bores. Remove and install with snap ring pliers.

5) Remove 2–3 governor valve, then remove 3–4 governor valve plug and 3–4 governor valve. Remove plug from coupling timing valve bore and remove spring and coupling timing valve. Remove pressure boost valve retaining pin from center of cored side of valve body (in coupling timing valve bore) and remove pressure boost valve.

6) From the opposite side of the valve body, remove the pin retaining 2–3 throttle valve bushing and the 2-3 throttle valve. From same bore remove 2-3 shift valve and springs. From the next bore, remove valve bore plug retainer and plug (plug is under spring tension), then remove 3–4 throttle valve, spring and bushing, and 3–4 shift valve and spring.

7) Remove retaining pin from neutral clutch valve bore, then remove plug, neutral clutch valve and spring. From the same bore, remove front clutch exhaust valve retaining pin on cored side of valve body (use a small screwdriver to relieve tension on pin for removal), then remove clutch exhaust valve spring and valve.

8) Mark throttle valve adjustment screw and **loosen exactly five turns.** Turn valve body over and remove throttle lever by removing outside "C" ring and washer, positioning shaft so that lever will clear throttle valve adjusting screw, then remove washer. Remove throttle valve plunger, guide, spring and valve.

9) If necessary, remove reverse blocker piston retaining pin, spring, and reverse blocker piston. Remove detent spring. *NOTE – Do not remove detent lever unless necessary to replace. If necessary to replace, drive pin out with a small punch. A new lever will be required at reassembly.* Remove pressure drop retaining pin, spring and valve.

Reassembly - *NOTE - All attaching screws must be tightened to 2.5-3.5 ft. lbs., and all attaching bolts to 6-8 ft. lbs.*

1) Install manual detent lever and pin, then install detent spring. Install reverse blocker piston, spring and pin. Install pressure drop valve (stem end of valve last), spring and retaining pin in top bore adjacent to detent spring.

2) Install throttle valve (round end first), spring, plunger and sleeve in throttle valve bore adjacent to manual valve bore. Place washer against "C" ring on throttle valve lever shaft, then install shaft through hole in valve body so throttle valve lever will index between plunger and throttle adjusting screw. Install washer and "C" ring securing lever assembly to valve body. Turn throttle valve adjusting screw back to original position **(exactly five turns).** Install throttle valve plunger guide retainer through cored side of valve body into annular groove in throttle valve plunger.

3) Install front clutch exhaust valve (land end first) and front clutch exhaust valve spring in bore adjacent to throttle valve bore. Install short retaining pin through cored side of valve body while compressing exhaust valve spring, then install neutral clutch valve and spring in same bore. Compress valve spring and install valve bore plug (threaded end out) and long copper retaining pin.

4) Install 3–4 valve and spring as a combination, then install 3–4 throttle valve spring into pocket of 3–4 valve. Install 3–4 throttle valve into 3–4 regulator bushing so that valve will completely enter bore of bushing. Install 3–4 throttle valve and bushing into 3–4 bore in valve body (small end of throttle valve first), then install 3–4 valve bore plug (threaded end out), and retainer.

5) Install 2–3 valve in bore adjacent to 3–4 valve trains and install 2–3 throttle valve and shift valve springs in same bore. Install 2–3 throttle valve into bushing with stem end out, then install 2–3 throttle valve and bushing into 2–3 bore (valve end first). Depress bushing and install short retaining pin from cored side of valve body.

6) In the bore adjacent to "U" shaped cutout, install pressure boost valve, using a brass rod to guide valve into bore (long land first). Install retaining pin through same bore from core face of body. Install coupling timing valve (land end first) into same bore, then install coupling timing valve spring over stem end of coupling timing valve. Install valve bore plug in valve body, compressing and partially installing multiple plug retainer. Install retainer in such a manner that only one corner of the plug is retained (this will permit installation of remaining valves).

7) Install 3–4 governor valve and spring into valve bore (flat end first), then install 3–4 valve bore plug against 3–4 governor valve, compressing plug against spring tension into bore and position retainer again so that edge of plug is secured and the adjacent bore hole is unobstructed by retainer.

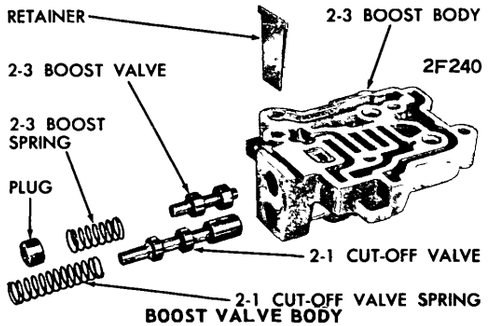
8) Install 2–3 governor valve into 2–3 shift valve bore, then install bore plug in 2–3 bore, compressing the valve against spring pressure and position multiple retainer, making sure remaining bore is unobstructed. Install 3–2 downshift valve (land end first) into remaining bore, then place 3–2 downshift spring over 3–2 downshift valve. Compress spring and secure with multiple retainer.

Rear Internal Gear & Roller Clutch

NOTE - Either a sprag type clutch or roller type clutch is used in production. For "Sprag Clutch" see 1961 Final Data, Page 483.

Roller Clutch

Disassembly - Remove roller clutch and outer race from rear internal gear, then carefully remove roller clutch assembly from outer race. Remove rollers and energizing springs from cage.



Inspection - Inspect rollers for pitting scratches, pick-up galling or flat spots Inspect springs for distortion cracks, permanent set or loss of tension Inspect outer race for pitting scratches, cracks, galling or broken ramp corners Inspect cage for bent or broken struts, broken or distorted corners or teeth

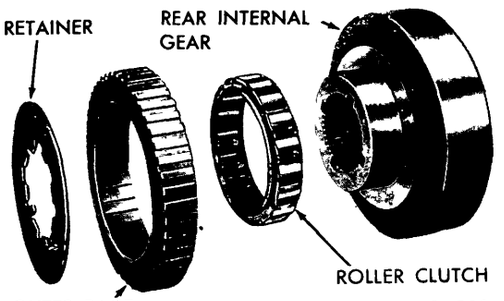
Reassembly - Install release springs on cage struts with upper tab on springs pointing in same direction as teeth or stops on race *NOTE - Be sure center spring tab snaps securely over strut to retain the spring* Install rollers into cage between springs in in such a way that the upper tab on the spring fits over rollers Carefully install roller clutch assembly into outer race so that rollers do not pop out *NOTE - Teeth or stops on cage should align with ramps in outer race* Place outer race or roller clutch assembly on bench with word "front" on roller clutch cage facing bench, then twist internal gear counterclockwise into roller clutch assembly

Front Clutch

Front clutch reassembly procedure is the same as for previous models except that the new composition drive plates which have driving lugs with bent tabs must be installed with ends of tabs facing toward clutch piston *NOTE - These new plates are used in all 1963 models and were installed in some late 1962 models When used in previous transmissions for service replacement, the original drive torus can be reused providing depth of wear in drive torus does not exceed 3/32" Make sure any burrs or sharp edges are removed from drive torus lugs before installing the new plates*

Rear Bearing Retainer

Installation - The cast iron type governor assembly used in 1963 transmissions makes it necessary that the following procedure be used when installing rear bearing retainer Position governor ring hook ends in a straight line so they can be seen as they are pushed down in the ring groove when bearing retainer is installed If necessary use petrolatum Be careful when positioning retainer over governor tower so that rings do not become unhooked or broken *NOTE - Cast iron type governors were used in some late 1962 production and may be used for service replacement on all previous models*



ROLLER TYPE ONE-WAY CLUTCH

Tightening Specifications

Location	Ft. Lbs. Torque
Valve Bodies	
Channel Plate to 3-4 Boost Body	2 5-3 5
Channel Plate to Valve Body	2 5-3 5
3-4 Boost Body to Valve Body	2 5-3 5
Compensator to Servo & Accumulator Body	2 5-3 5
Valve Body to Case	6-8
Compensator Body to Case	6-8
Rear Bearing Retainer	
Cover to Retainer	6-8
Retainer to Bushing Sleeve	12-15
Retainer to Case	20-25
Pump & Case Cover	
Oil Cooler Control Valve to Case Cover	2 5-3 5
Cover to Pump Body	6-8
Cover to Case (5/16-18)	15-18
Cover to Case (7/16-14)	30-35
Case Cover to Pump	15-18
Case Cover to Pipe	10 12
Plate to Case Cover	18-20
Torus Feed Limit Valve Plug	15-20
Pressure Regulator Plug	15-20
Front & Rear Units	
Front Internal Gear to Clutch Housing	22-27
Rear Planet Shaft to Carrier	19-23
Output Shaft to Carrier	19-23
Torus Exhaust Valve Cover to Torus Cover	24-29
Torus Cover to Drive Torus	17-20
Oil Pan to Case	12-15
Servo & Accumulator Cover to Case	6-8
Case Cover to Engine	50-55

DUAL-COUPLING (4-SPEED) HYDRA-MATIC

Cadillac (1963)
Pontiac Star Chief & Bonneville (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

The engine cannot be started by pushing (or towing) car. If necessary, a booster battery must be used.

►*BOOSTER BATTERY CAUTION:* Connect negative (−) terminal of booster battery to negative (−) terminal of car battery. Alternator will be damaged if battery is connected improperly.

Towing Or Pushing Car

Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with the transmission. When towing at speeds above 30 MPH or if transmission is known to be out of order, disconnect propeller shaft from transmission. *CAUTION - After towing, check fluid level and adjust as required.*

DESCRIPTION

Four-speed hydraulically controlled planetary type transmission of same design used on previous models.

Transmission Identification

A serial number prefix which is stamped on a colored serial number plate attached to lower left hand corner of transmission case rear face identifies the transmission model. References in this text may be made to serial number prefix to indicate changes or differences in transmission models.

Serial Number Prefix & Plate Color

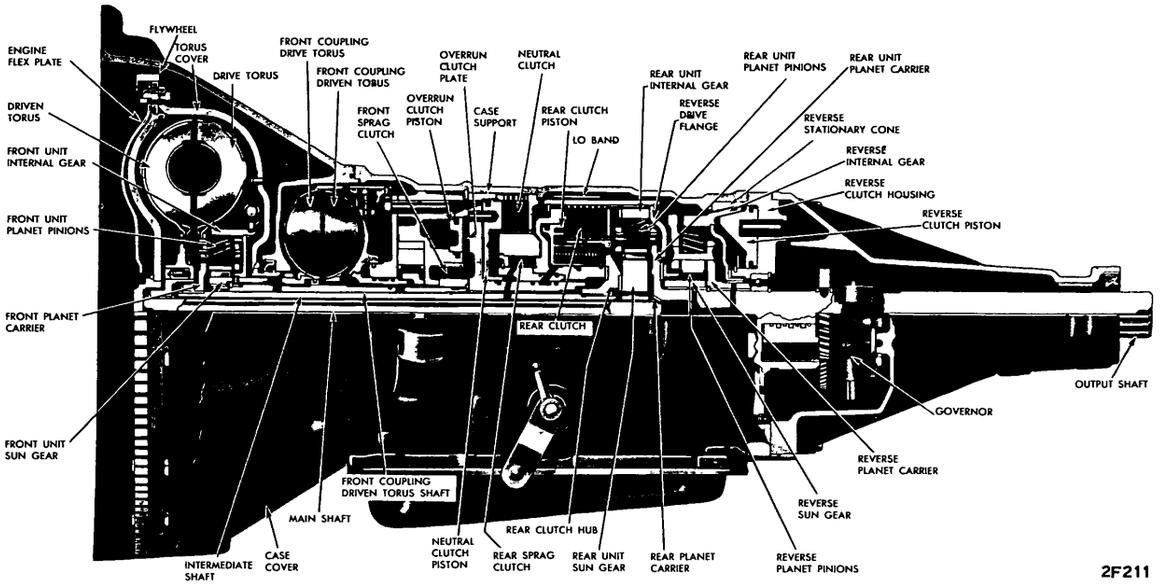
Serial No. Prefix	Car Make	Serial Number Plate Color
"C"	Cadillac	Black
"CA"	Cadillac	Orange
"PS"	Pontiac	Red
"PCS"	Pontiac	Dark Green (Diagonal)
"PAS"	Pontiac	Dark Brown
"PBS"	Pontiac	Tan
"PES"	Pontiac	Black

LUBRICATION

Checking Fluid Level

Cadillac - Check fluid level every 6,000 miles. With engine at normal operating temperature, transmission in "N" (Neutral) or "P" (Park) and engine at normal idle speed, fluid level should be at "F" mark on dipstick. *NOTE - At normal operating temperature, 1 pint of fluid is required to raise level from lower dimple on dipstick to "F" mark.*

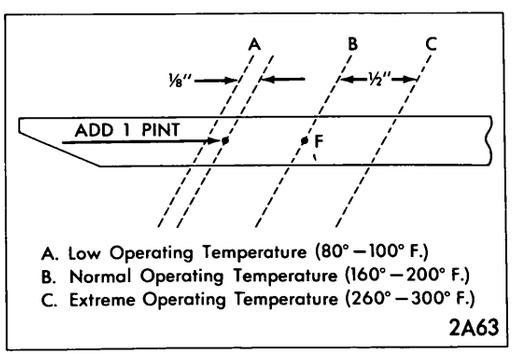
Pontiac - Check fluid level every 6,000 miles. With transmission at normal operating temperature, selector lever in "P" (Park) position and engine idling at normal idle speed, fluid level should be at "FULL" mark on dipstick. *NOTE - These transmissions are very s nsitive to fluid level. Do not overfill.*



DUAL-COUPLING (4-SPEED) HYDRA-MATIC

Draining & Refilling

Cadillac - Drain and refill every 24,000 miles (normal service); 12,000 miles (severe service). Raise car and remove cover plate from bottom of flywheel housing, then remove drain plugs from transmission oil pan and torus cover. Replace drain plugs after complete draining and install housing cover. Lower car to floor and pour 7 qts. of recommended fluid into filler tube. Run engine at 800 RPM for 1½ minutes with transmission selector lever in "P" (Park). Reduce engine RPM to normal idle speed and add 1½ to 2 qts. of fluid to bring level on dipstick to proper point. *NOTE - With new fluid between 80°-100°F, transmission fluid will be at proper level when it is indicated on dipstick between lower dimple to 1/8" below lower dimple.*



CADILLAC FLUID LEVEL RANGES (AT VARIOUS TEMPERATURES)

Pontiac - Drain and refill every 30,000 miles. With engine and transmission at normal operating temperature, remove flywheel housing bottom cover and then remove hex head pipe plug from torus cover using a six-point socket (do not use a 12-point socket) and drain coupling. Disconnect filler pipe from side of transmission oil pan and allow transmission to drain. *NOTE - It is recommended that oil pan and strainer be removed and cleaned when fluid is changed. Install a new pump intake pipe "O" ring and a new pan gasket. Tighten pan bolts to 10-13 ft. lbs.* Reinstall fluid filler pipe on oil pan, then pour 8 qts. of recommended fluid into transmission. Place selector lever in "P" (Park) position and run engine at a speed equivalent to 20 MPH for 1½ minutes, then reduce engine speed to slow idle (off high step of fast idle cam). Recheck fluid level with transmission warm and engine at normal idle speed. Do not overfill. *NOTE - Turn dipstick 1/8 turn to lock it in filler tube.*

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

Cadillac - 9 qts. (approximately). *CAUTION - Determine correct level by mark on dipstick rather than transmission capacity.*

Pontiac - 8 qts. (refill after oil pan and torus cover drained); 10 qts. (after overhaul).

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Shift Linkage

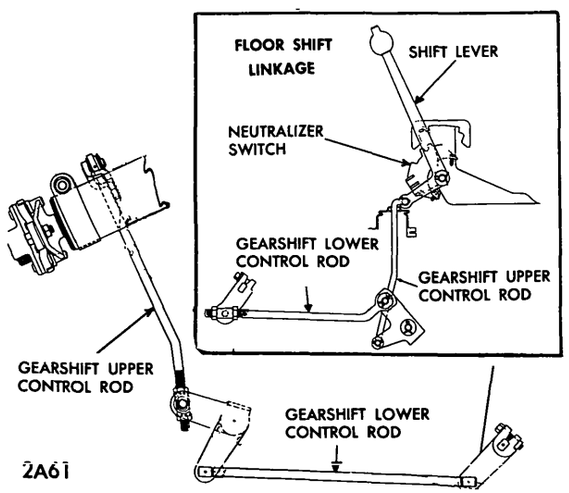
Cadillac - Remove slush deflector, then remove clevis from manual lever on transmission manual rod and place manual lever on transmission in "Dr-4" position. Place selector lever on steering column in "Dr-4" position. Adjust length of manual rod until hole in manual lever lines up with hole in clevis, **then increase length f r d n full turn.** Install clevis on manual lever and tighten locknut.

P ntiac (Ste ring C lumn Mounted Shift Lever) - Place transmission lever on steering column in "P" (Park) position, then back off the locknuts on upper control rod trunnion (at equalizer) so they are free of trunnion. Place manual lever on transmission in "P" (Park) detent, then pull upper control rod down toward transmission as far as possible. While holding rod in this position, run trunnion upper nut down to just contact trunnion. Run lower locknut up to contact trunnion and tighten both nuts securely. Check parking lock with car on a grade or ramp for positive locking. Check pointer position with selector lever in "Dr. Right". To adjust, loosen locknut above ball stud and adjust by turning rod.

P ntiac (Fl r Shift) - Place selector lever in "P" (Park) position and disconnect gearshift lower control rod at forward end. While holding gearshift lower control rod, turn adjusting nut on control rod so it fits on outer shift lever stud while lever is in its detent position, then lock adjusting nut. Check engagement of parking lock by placing car on a slight grade.

Neutral Safety Switch

Cadillac - Located on steering column under instrument panel. To adjust, loosen mounting screw on top of switch and place transmission selector lever in "N" (Neutral). Insert a .090-.094" pin (or No. 90 drill) in adjusting hole in switch cover, then rotate switch counter-clockwise until slider block inside switch bears against pin or drill. Tighten adjusting screw.



PONTIAC MANUAL SHIFT LINKAGE

NOTE - Engine should start in "P" (Park) or "N" (Neutral) only.

P ntiac (Ste ring Column M unt d Shift L v r) - There is no adjustment for neutral safety switch. Switch should allow engine to be started in "P" (Park) or "N" (Neutral).

Pontiac (Floor Shift) - Remove console attaching screws, compartment light switch, indicator bulb, courtesy light connections and shift lever knob, then lift console over shift lever. Loosen switch screws and adjust neutral safety switch so engine starts only with selector lever in "N" (Neutral) or "P" (Park).

TESTING

Road Test

Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. See "Shift Speed Tables" below for correct shift speeds.

CADILLAC (ALL SERIES)

	(Engine Speed - RPM)		
UPSHIFTS:	**1-2**	**2-3**	**3-4**
"Dr4" (Min. Throttle)	850	1380	1270
(Full Throttle)	2810	3850	4170
"Dr3" (Min. Throttle)	850	1380	4170
(Full Throttle)	2810	3850	4170
"Lo" (Min. Throttle)	850	4590	4170
(Full Throttle)	2810	4590	4170
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr4" (Min. Throttle)	630	540	470
(Full Throttle)	2485	1590	1000
"Dr3" (Min. Throttle)	2485	540	470
(Full Throttle)	2485	1590	1000
"Lo" (Min. Throttle)	2485	2560	470
(Full Throttle)	2485	2560	1000

PONTIAC (ALL MODELS)

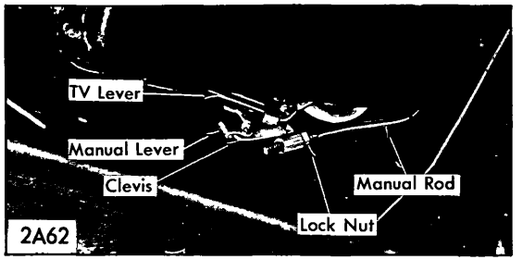
	(Car Speed - MPH)		
UPSHIFTS:	**1-2**	**2-3**	**3-4**
"Dr Left" (Min. Throttle)	5-9	11-15	21-25
(Full Throttle)	11-15	39-43	65-75
"Dr Right" (Min. Throttle)	5-9	11-15	
(Full Throttle)	11-15	39-43	74-80
"Lo" (Min. Throttle)	4-9		
(Full Throttle)	11-15	47-54	74-80
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr Left" (Closed Throttle)	ℂ 18-15	ℂ 10-6	ℂ 8-3
(Full Throttle)	② 70-33	25-14	12-3
"Dr Right" (Closed Throttle)	74-68	10-6	8-3
(Full Throttle)	② 74-28	25-14	12-3
"Lo" (Closed Throttle)	70-60	48-44	8-3
(Full Throttle)	② 70-28	48-44	12-3

ℂ - When this shift occurs, transmission will freewheel and it is not possible to observe shift with throttle closed. To check for shift, decelerate, with throttle closed, to specified speed, then accelerate to determine which speed transmission is in.

② - Forced.

Oil Pressure

Connect oil pressure gauge J-2540-A (Cadillac); J-5907 (Pontiac) to takeoff hole at bottom of reverse clutch housing using a hose and fitting. Drive car until normal operating temperature is reached, then test as follows:



CADILLAC MANUAL SHIFT LINKAGE

Zero Throttle Pressure (Pontiac) - Check pressure in all ranges. Pressure should be 50 lbs. minimum in all ranges with a maximum variation of 10 lbs. (may be higher in reverse).

Drive "Right" Pressure (Pontiac) - With transmission selector lever in "Drive Right" position and car speed at approximately 25 MPH, pressure should be 90-100 lbs. *NOTE - Pressure at any speed is constant regardless of throttle pressure as throttle valve pressure is not used to modulate line pressure.*

Drive "Left" Pressure (Pontiac) - While driving at 25 MPH, move selector lever to "Drive Left" position so that transmission will shift into 4th Speed. Oil pressure should drop to 60-70 lbs. in 4th.

Zero Throttle Pressure (Cadillac) - Above 20 MPH in fourth speed with zero throttle, oil line pressure should be 60-70 lbs.

Full Throttle Pressure (Cadillac) - In any drive range, pressure should be at least 30 lbs. more than zero throttle pressure reading (see above).

Reverse Pressure (Cadillac) - With selector lever in "R" apply foot brake and increase engine speed to half throttle. Pressure range under these conditions should be 175-200 lbs.

TROUBLE SHOOTING & DIAGNOSIS

No Upshifts Or Erratic

Governor valves stuck. Broken governor rings. Sticking valves in valve body assembly. G-2 bushing turned. Front unit internal gear bushing seized on shaft.

Misses Shifts

2nd Speed - Governor boost valve stuck. Transition valve stuck away from plate. Sticking valves in valve body assembly. Governor sticking.

3rd, or 2nd, 3rd, 4th - Transition valve sticking. Sticking valves in control valve assembly. Throttle valve adjustment too long. Rear clutch or transition valve spring faulty.

Locks Up

In 2nd & 4th - Front sprag clutch broken. Overrun clutch applied or sticking.

In 3rd r 4th - Rear sprag clutch broken. Low band not releasing.

Rough Shifts

2-3 Shift - Accumulator valve stuck or accumulator piston stuck. Accumulator gasket broken or leaking. Restricted or leaking oil passages. Broken accumulator spring. Broken or leaking piston oil seal rings. Control valve faulty or throttle valve adjusted improperly. Rear clutch pack faulty. Case passages restricted or leaking.
Upshifts Rough - Throttle linkage adjusted short. Governor valves sticking. Broken governor rings. Sticking valves in control valve assembly. Leaking or restricted main line feed to governor.

Low Upshifts

Throttle linkage adjusted too long. Governor valves sticking. Broken governor rings. Sticking valves in control valve assembly. Leaking throttle valve oil.

No Reverse

Manual linkage not adjusted correctly. Manual valve not engaged with drive pin. Reverse piston apply restricted or leaking. Low oil pressure. Overrun clutch apply leaking. Pressure regulator faulty. Neutral clutch not released. Restricted neutral clutch exhaust port or manual body.

Selector Lever

If lever cannot be moved into reverse position, check for sticking governor valves or broken governor rings. Reverse blocker piston stuck. Manual linkage interference.

Reverse Drive In "N"

Check for a sticking reverse stationary cone.

Delayed 1-2 Shift

Coupling valve sticking. Governor boost valve sticking. G-1 valve sticking. Wrong spring on coupler valve.

Slippage

In 1st & 3rd ("Dr" Range) - Front sprag clutch slipping, or broken parts in sprag assembly.
In All "Dr" Ranges - Manual linkage improperly adjusted. Neutral clutch slipping or burned. Neutral clutch apply restricted or leaking (case support or valve body). Incorrect number of neutral clutch plates. Low oil pressure. Control valve faulty. Torus members or check valve faulty. Intake pipe "O" ring damaged or missing. Pressure regulator valve stuck in pump. Pump slide stuck.
Slips in or Misses 2nd & 4th - Front unit torus cover seals leaking. Front unit torus cover exhaust valves sticking or missing. Front unit torus cover feed restriction or leak. Low oil pressure. Coupling valve sticking. Sticking valves in control valve assembly. Coupling snap ring improperly installed or missing. Limit valve faulty. Coupling passage restricted or leaking. Front unit torus vanes damaged.
In 3rd or 4th - Rear clutch unit slipping or burned. Rear unit clutch apply restricted or leaking. Incorrect number of clutch plates (rear unit). Accumulator faulty. Center support leakage at 2-3 passage. Low oil pressure. Accumulator valve stuck (3rd only).
In 3rd in "Dr" (Right) n C ast - Overrun clutch slipping or burned. Overrun clutch apply restricted or leaking. Sticking valves in control valve assembly. Overrun clutch passages restricted or leaking.
In 1st & 2nd "Lo" Range n Coast - Low servo apply restricted or leaking. Low band not anchored to case or broken. Low servo piston and rod binding in case or servo and accumulator body. Band facing worn or loose. Anchor dowel pin loose or missing in case.

No Drive in "D" Range

Manual linkage incorrectly adjusted or manual valve not engaged with drive pin. Low oil pressure (pressure regulator stuck). Front pump intake pipe improperly installed. Front sprag broken (front pump bushing or front unit drive torus shaft). Front and (or) rear sprag not properly installed. Rear sprag broken. Rear sprag outer race broken. Neutral clutch plates burned. Neutral clutch piston, control valve or front pump not operating properly.

Drive in "Lo" Range Only

Rear sprag broken. Neutral clutch not applying.

No Forced Downshifts

Control valve faulty or linkage not properly adjusted.

2-3 Runaway or 2-1-3 Shift

2-3 passage in center support restricted or leaking. Plug out of accumulator. Rear clutch burned. Valve body faulty (transition valve or case passages in 2-3 circuit).

Will Not Go Into Park

Parking linkage broken. Mechanical interference. Manual linkage or parking pawl faulty.

Starts In 2nd

Valves sticking. Governor sticking or governor boost valve stuck.

Drives Forward in "N" & "R"

Neutral clutch piston stuck in applied position.

Lunges Forward

This happens before backing up when placing selector lever in "R". G-2 plunger stuck in outward position. Restricted neutral clutch release oil supply.

TRANSMISSION REMOVAL & INSTALLATION
CADILLAC

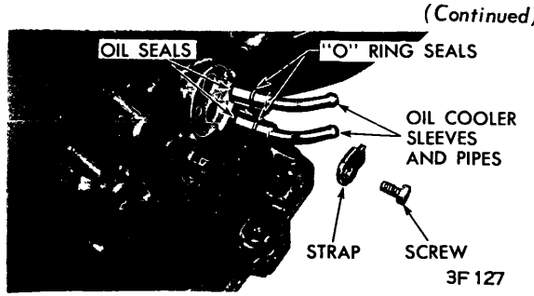
Removal

1) Disconnect battery, then raise and support car. Remove starter motor and slush deflector, then remove front and lower flywheel housing covers. Drain transmission and torus cover and remove transmission filler pipe.
2) Disconnect brake cables from parking brake relay lever, then remove retracting spring and remove relay from frame. Remove propeller shaft assembly. Remove nuts securing the two engine side supports to flywheel housing and remove side supports from frame crossmember. Remove intermediate frame crossmember below flywheel housing.
3) Disconnect speedometer cable from extension housing and throttle valve and manual control rods from levers. Remove nuts from flywheel-to-drive plate screws, then place a suitable hoist under transmission and raise it just enough to take load off rear engine support.
4) Disconnect rear motor mount at support bracket and remove shims between rear cushion and crossmember. Remove rear engine support from frame, then remove and discard oil cooler hoses from rear oil cooler lines and sleeves at lower connections. *NOTE - Cap lines and sleeves to prevent leakage.*
5) Remove flywheel housing-to-engine screws and remove transmission and flywheel housing as a unit by moving assembly toward rear, disengaging housing from locating dowels on engine. Tilt front of unit downward and lower it from car.

Installation

1) Raise transmission into position and align drive plate with four torus cover screws, and dowel holes in flywheel housing with dowels on engine. Install flywheel housing-to-engine screws and tighten to 50 ft. lbs. *NOTE - Make sure flywheel is as far forward as possible.*
2) Clean ends of cooler lines with solvent, then place new seals on each cooler sleeve tip and in one motion insert sleeve into transmission case. Avoid pulling back on sleeve once installation has been made in case. *CAUTION - If necessary to pull on sleeve, then completely remove sleeve from transmission case and reposition the seal to insure that seal is not damaged or mispositioned.* Connect cooler lines to sleeve hoses and secure with clamps. Tighten clamps to 20 inch pounds.
3) Lift engine and transmission to about one inch above normal height and install engine rear support bracket on frame. Tighten three bracket bolts on one side only (install bracket bolts on other side loosely). Lower transmission and insert shims (or shim) between rear cushion and crossmember. Position plate on bottom side of crossmember and loosely install rear cushion-to-crossmember screws. Remove transmission jack or lifting device. *CAUTION - Install the same number of shims that were removed.*
4) Install nuts attaching drive plate to flywheel and tighten to 20 ft. lbs. *NOTE - Tighten drain plugs to 7 ft. lbs. (torus cover); 40 ft. lbs. (oil pan).* Install flywheel housing front and lower covers, then install starter motor. Install filler tube in transmission with support bracket properly positioned on exhaust mani-

(Continued)



OIL COOLER SLEEVE ASSEMBLY

fold. Connect throttle valve and manual valve rods to transmission levers. Install speedometer cable and slush deflector, then tighten three remaining bolts on engine rear support bracket. Install propeller shaft assembly. Install parking brake relay and spring, then connect brake cables and adjust. Adjust throttle valve linkage and manual linkage (see "Adjustments" above).

5) Check torque of engine front cushion-to-frame nuts and make sure they are tightened to 90 ft. lbs. With rear cushion-to-frame crossmember attaching screws loose, pry transmission extension housing retainer up off crossmember to allow engine to move backward as far as possible. Scribe a line on underside of crossmember at rear edge of rectangular plate, then place a bar at rear of engine rear cushion front attaching screw and pry engine and transmission assembly as far forward as possible.

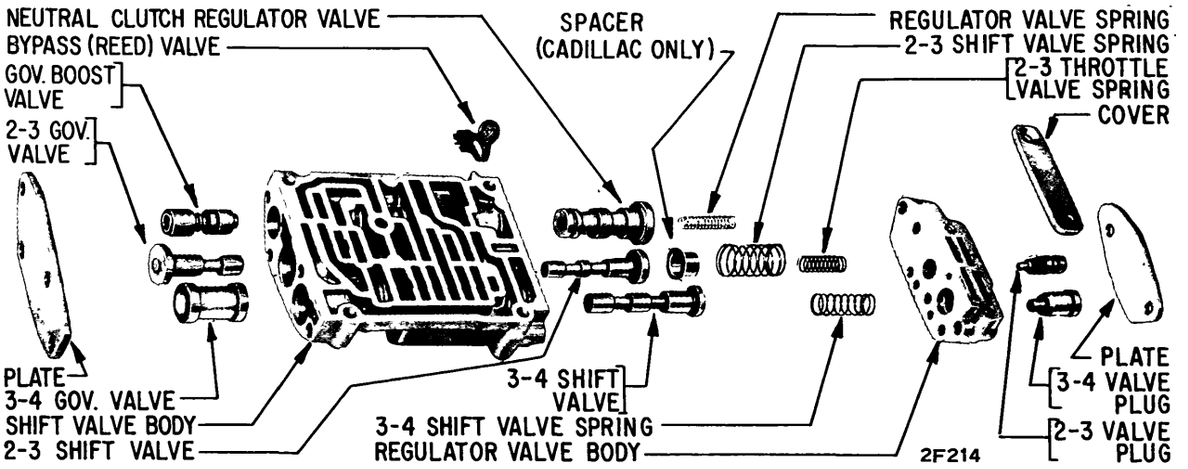
6) With engine in this position, scribe a second line on crossmember at rear of plate. Allow engine to move rearward until rear edge of plate is positioned halfway between the two scribed lines, then tighten rear cushion-to-frame attaching screws to 55 ft. lbs.

7) Install each engine side support cushion in frame slots, and loosely install flat washer, lockwasher and retaining nut. Slide each cushion support toward bell housing until cushion support just touches housing. *NOTE - Be sure that underside of cushion support bracket is flat against frame.* Scribe a reference line on frame adjacent to each bracket, then slide each bracket 1/16" inboard toward bell housing letting rubber cushion ride up bell housing. Tighten each retaining nut to 25 ft. lbs., compressing rubber cushion until bracket again lies flat on frame member. *NOTE - If either bracket is not 1/16" inboard of reference line after retaining nuts are tightened, repeat above procedure.*

8) Lower car to floor and connect battery, then install filler pipe bracket to exhaust manifold screw. Refill transmission.

Cadillac
Tightening Specifications

Location	Ft. Lbs. Torque
Valve Body Screws (10-24)	3
Valve Body Screws (¼"-20)	8
Accumulator to Case	30
Cover to Accumulator Body	8
Inner Detent Lever to Manual Shaft	6
Inner Throttle Valve Lever to Shaft	12
Detent Spring to Case	18
Oil Pan to Case	13
Oil Pan Drain Plug	40
Torus Cover Drain Plug	7
Gov. Body Cover to Gov. Driven Gear	8
Oil Pump Cover to Body	18
Oil Pump to Center Support	30
Oil Pump to Case	27
Oil Cooler Sleeves Retainer Strap Screw	18
Pressure Regulator Plug	6
Flywheel Housing to Case	50
Torus Cover to Flywheel	20
Reverse Piston Housing to Case	30
Extension Housing to Case	33
Oil Pressure Take-off Plug	7



SHIFT VALVE BODY ASSEMBLY

PONTIAC

Removal

1) Remove one battery cable and release the parking brake, then raise car and drain transmission (see "Lubrication" above). Disconnect oil cooler lines by either removing clamps and pulling hoses off or by cutting the hoses. Disconnect drive line from transmission output shaft, then remove complete drive line assembly.

2) Disconnect speedometer cable from drive gear and remove gearshift lower control rod. Remove cross shaft bracket, cross shaft lever and bushing from transmission. Remove lower end of throttle valve upper control rod (engine-to-transmission idler lever), then remove throttle valve lever control rod and throttle idler lever.

3) Remove both starter cables and remove starter and splash shield. Remove flywheel bottom cover and remove flywheel-to-flex plate attaching bolts. Position automatic transmission jack under transmission and and remove two rear support-to-frame crossmember bolts. Disconnect crossmember at each frame side rail and raise transmission so rear mount supports are clear of cross member, then rotate crossmember slightly in frame and remove parking brake return spring and cable guide rod from crossmember.

4) Remove crossmember, then lower transmission enough to remove flywheel housing-to-engine bolts. Work transmission rearward to disengage dowels from front flywheel housing and remove transmission

Installation

Reverse removal procedure (see above) and note the following: With transmission in position engaging dowels into engine and torus cover bolts into flex plate, install and tighten two flywheel housing attaching screws. *NOTE - If pilot on flywheel has entered end of crankshaft properly, flywheel and torus cover should move back and forth slightly.* Rotate flywheel to bring one flex plate mounting pad down to lowest position, then push flywheel forward slightly to seat it against crankshaft. Measure clearance between pad on flex plate and flywheel with a feeler gauge. Minimum clearance should be .015". If less, move transmission away from engine and install special spacer over flywheel pilot. Move transmission back into position and install two flywheel housing-to-engine bolts. When installing flex plate-to-flywheel attaching nuts, tighten nuts to 15 ft. lbs. using a torque wrench with extension, Tool No. J-6498.

TRANSMISSION OVERHAUL

See 1960 Final Data, Page 467, or later Manual edition and note the following:

Rear Clutch Hub-to-Rear Clutch Unit Thrust Washer - Position bronze thrust washer next to rear clutch hub, then position steel backing washer between bronze thrust washer and rear unit clutch cover with flange on backing washer toward clutch cover.

Flywheel-to-Crankshaft Spacer (Cadillac) - This spacer has been eliminated in 1963 production.

Pontiac
Tightening Specifications

Location	Ft. Lbs. Torque
Case to Pump Body	25
Control Valve Assembly	2-3
Control Valve to Case	6-8
Cooler Sleeve Strap	15-18
Cover to Accumulator	6-8
Detent Roller & Spring Bolt	15-18
Flywheel Drain Plug	6-7
Case Cover to Case	45
Governor Cover to Body	6-8
Oil Pan to Case	10-13
Oil Pressure Take-off Plug	6-7
Pressure Regulator Plug	5
Pump Cover to Body	15-18
Pump to Center Support	25
Extension Housing to Case	25
Servo to Case	25
Torus Cover to Flywyeel	15-20
Throttle Valve Pressure Take-off Plug	6-7
Throttle Valve Lever Lockscrew	10-12

OLDSMOBILE F-85 3-SPEED HYDRA-MATIC

Oldsmobile F-85 (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

The engine cannot be started by pushing (or towing) car. If necessary, a booster battery must be used.
► *BOOSTER BATTERY CAUTION:* Connect negative (−) terminal of booster battery to negative (−) terminal of car battery. Alternator will be damaged if battery is improperly connected.

Towing Or Pushing Car

Car may be towed at speeds up to 30 MPH if there is nothing wrong with transmission. When towing at speeds above 30 MPH or if transmission is known to be out of order, disconnect propeller shaft from transmission.

DESCRIPTION

"Split-Torque" type 3-Speed (4-Stage) hydraulically controlled automatic planetary transmission and torque converter (fluid coupling and torque multiplier) of same design used on previous models. For a description of transmission operation, see 1962 Final Data, Page 501.

Transmission Identification

A serial number prefix which is stamped on a colored serial number plate attached to left side of transmission case identifies the transmission model. References in this text may be made to serial number prefix to indicate changes or differences in transmission model.

Serial Number Prefix & Plate Color

Serial No. Prefix	Serial Number Plate Color
"O"	Dark Green
"OD"	Red
"OE"	Pink
"OX"	Aluminum

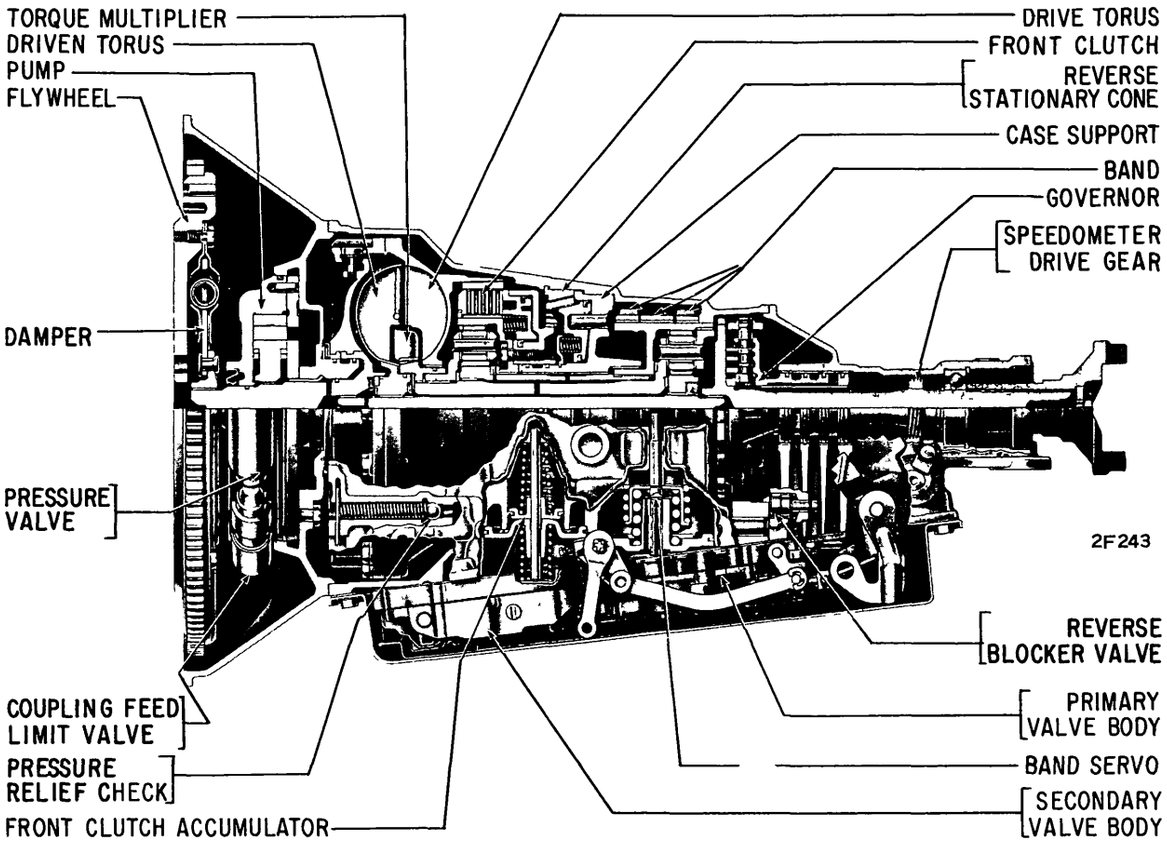
LUBRICATION

Checking Fluid Level

Check fluid level every 6,000 miles. With engine at idle speed and transmission at normal operating temperature, place transmission selector lever in "P" (Park) position. Fluid level as indicated on dipstick should be at FULL mark. Add fluid as necessary. *CAUTION - Fluid level must be maintained at FULL mark. Avoid overfilling.*

Draining & Refilling

Drain and refill every 24,000 miles. With transmission at normal operating temperature, remove oil drain plug and drain fluid. Replace filler plug and add 3½ qts. of recommended fluid to transmission. Place transmission selector lever in "P" (Park) position and start engine, then add fluid to bring level up to FULL mark on dipstick. *NOTE* - Recheck fluid level after transmission is warm.



OLDSMOBILE F-85 HYDRA-MATIC TRANSMISSION

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

4 qts. (after drain); 5 qts. (after oil pan removed); 7 qts (after overhaul).

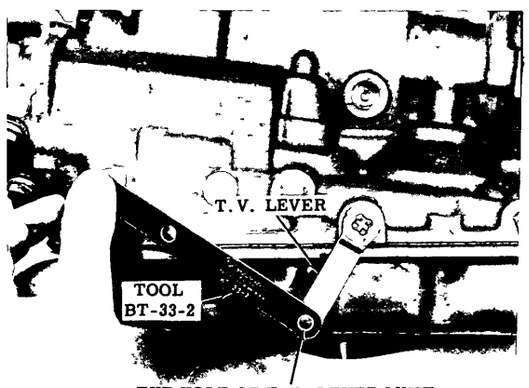
ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages.

Throttle Valve Lever

Remove throttle valve rod from lever on transmission and place pin of gauge, BT-33-2 in threaded hole in case (located in boss on left side of transmission case at forward end). If hole in lever does not align WITHIN hole in gauge, bend throttle valve as necessary with Tool BT-7 to align center of hole WITHIN gauge hole.

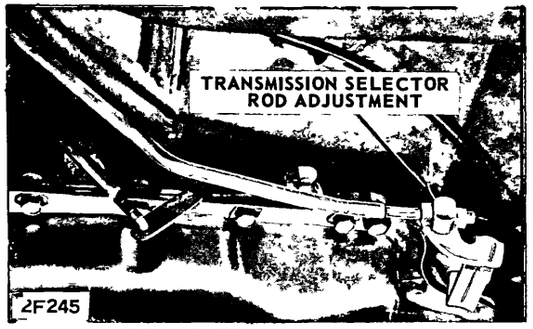


THE HOLE OF T.V. LEVER MUST FALL WITHIN THE HOLE OF THE GAUGE WHEN PROPERLY ADJUSTED

THROTTLE VALVE LEVER ADJUSTMENT

Manual Shift Linkage

Steering Column Shift - Place selector lever in "N" (Neutral) position, then loosen front and rear locknuts on rod at manual shift lever on transmission. Hold rod and transmission lever upward so selector lever at upper end of steering column is against neutral stop. Tighten locknut at rear until it just contacts swivel, **then tighten it two additional turns.** Tighten front locknut.
Floor Mounted Shift - Place selector lever in "N" (Neutral) position, then loosen both locknuts on manual shift rod at bellcrank and place manual shift lever in "N" (Neutral) detent. While holding selector lever against its stop, tighten front locknut finger tight against swivel, **then tighten it two additional turns.** Tighten rear locknut.



MANUAL SELECTOR LINKAGE

Neutral Safety Switch

Steering Column Shift - Located on steering column mast jacket. To adjust, loosen switch attaching screws, then with selector lever in "N" (Neutral), position switch so that a .090" drill can be inserted through hole in switch arm and into hole in switch face. Tighten attaching screws and remove pin. Check for starter operation in "P" (Park) and "N" (Neutral) positions only.
Floor Mounted Shift - Remove console, then adjust neutral switch in same manner as for "Steering Column Shift" above.

Band Adjustment

Adjust band every 26,000 miles. Remove oil pan and cleaner, then loosen adjusting screw locknut. Use an inch pound torque wrench and Tool J-8591 and tighten adjusting screw to 100 inch pounds, **then loosen adjusting screw 2¼ turns.** Tighten locknut to 30 ft. lbs.

Throttle Stopscrew

NOTE - This adjustment must be made whenever channel body and throttle body have been separated or when either has been replaced. Disconnect throttle valve rod from outer throttle valve lever on transmission, then insert Tool BT-33-6 between throttle valve plunger and throttle valve lever by pushing plunger into its bore and holding the lever forward. Adjust stopscrew against lever until throttle valve plunger bottoms in its bore, **then back stopscrew out only enough to permit removal of gauge.**

TESTING

Road Test

Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. See "Shift Speed Tables" below for correct shift speeds under different operating conditions. *CAUTION - Do not stall test transmission under any conditions.*
NOTE - This transmission is a 3-Speed (4-Stage) type. References (below) to "1st", "2nd" & "3rd" are transmission "speeds" (not Stages).

Shift Speed Tables (MPH)

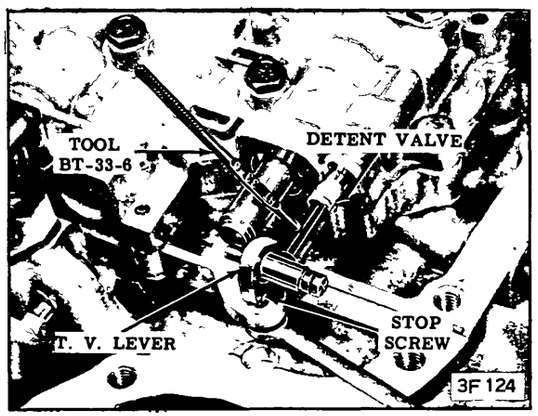
Selector Lever	Throttle Position	1-2 Upshift	2-3 Upshift
"Drive"	Minimum	12-15	17-24
	Maximum	24-30	58-65
"Super"	Minimum	12-15	60-68
	Maximum	24-30	60-68
"Lo"	Minimum	Ⓒ	Ⓟ 60-68
	Maximum	Ⓒ	Ⓟ 60-68

Ⓒ - Not possible. Ⓟ - 1-3 shift.

Selector Lever	Throttle Position	3-2 Downshift	2-1 Downshift
"Drive"	Medium	35-16	12-8
	Part	35-16	None
	Detent	58-50	24-8
"Super"	Medium	58-50	12-8
	Part	58-50	None
	Detent	58-50	22-8
"Lo"	Medium	58-50	28-22
	Part	58-50	28-22
	Detent	58-50	28-22

Oil Pressure Test

Connect a 300 lbs. pressure gauge to main line passage in case (remove plug in side of case just forward of outer throttle valve lever). With transmission at normal operating temperature, engine idling at 500 RPM and parking brake applied, pressure should be 60-125 lbs. in all transmission selector ranges, with pressure not varying more than 10 lbs. between ranges. With pressure gauge connected, operate car on road. Pressures should be as indicated in following table.



THROTTLE STOPSCREW ADJUSTMENT

Operating Pressure Test

Selector Lever Position	Shift	Ⓒ Pressure
Dr., S, L, R	1st	118-185 lbs.
S (30 MPH)	2nd	98-111 lbs.
Dr. (Zero Throttle, 30 MPH)	3rd	68-78 lbs.

Ⓒ - A drop in pressure of approximately 10 lbs. as each shift is made is normal but gauge reading should stabilize after each shift is made.
OIL PRESSURE NOTE - If oil pressures are not within specifications, check the probable causes below.
Low Oil Pressure - Low oil level. Boost plug may be stuck, or wrong plug used. Pressure regulator valve or spring may be damaged or missing. Strainer and "O" ring may be leaking or missing. Manual valve may be misaligned. Foaming or cavitation may be occurring in transmission. Check for internal leakage. Pressure drop valve in valve body assembly may be stuck. Front pump slide may be stuck, causing low output. In "Lo" range only, if pressure is low, check for a malfunctioning control valve assembly or a stuck ball check valve.
High Oil Pressure - Pressure regulator valve may be stuck, damaged, or the wrong valve is used. Boost plug may be stuck, or wrong valve used. Manual valve may be misaligned with quadrant. Valve may be stuck in control valve assembly. Front pump slide may be stuck, causing high output.

TROUBLE SHOOTING & DIAGNOSIS

NOTE - This transmission is a 3-Speed (4-Stage) type. References (below) to "1st", "2nd" & "3rd" are transmission "speeds" (not "Stages").

No Drive In "D"

Check for low oil pressure. Manual linkage out of adjustment. Sticking valve in control valve assembly. Band not applying. Check for internal leakage. Check for restricted passage with air pressure. Coupling not filling.

Missing All Shifts

Sticking governor valve. Sticking valve in control valve assembly. Clutch not applying.

Drive In 2nd & 3rd Only

Check for sticking valve in control valve assembly. Clutch locked up (too many plates).

Drive In 1st Only

Check for sticking valve in control valve assembly. Front clutch not operating properly, check for leakage and for accumulator malfunction. Check for sticking valves, broken or worn rings in governor.

Drive In 1st & 2nd Only

Check for sticking governor valve or sticking valve in control valve assembly.

Drive In 3rd Only

Check for sticking valve in governor or control valve assembly

Drive in "N"

Check for engagement of internal manual control linkage Front clutch not positioned properly Reverse cone clutch not applying properly

No Reverse

Internal manual linkage not positioned properly Check for low oil pressure Reverse cone clutch not engaging or band not releasing Check for restricted passages with air pressure

Rough 1-2 Shift

Check for improperly adjusted throttle linkage Valves sticking in control valve assembly or accumulator Coupling not emptying fast enough. Check for front clutch slippage 1-2 oil passages restricted

Rough 2-3 Shift

Band not releasing Check for sticking parts in servo

Slippage In All Ranges

Check for low oil pressure

Slippage In 1-2 Shift

NOTE - This condition may be reported as 1-3 Drive only Throttle valve linkage adjusted too long Check for low oil pressure Check for restrictions or sticking parts in accumulator Sticking valves in control valve assembly Check for band slippage Front clutch not operating properly (check for number of plates in clutch) 1-2 oil passages restricted

Slippage in 2-3 Shift

Check for sticking valves in control valve assembly Coupling is not filling fast enough or front clutch may be slipping

No Engine Braking

Check for sticking valves in control valve assembly Band slipping or servo not applying

No Downshift

NOTE - No downshift with part throttle or through detent Throttle valve linkage adjusted too long Check for sticking valves in control valve assembly Accelerator travel too short Governor G-2 valve sticking

Selector Lever

Will Not Go Into Reverse - Check for mispositioned internal manual linkage Reverse blocker valve stuck open Governor G-2 valve sticking

Will N t G Int Park - Parking linkage is broken, improperly assembled, or distorted Manual linkage is not adjusted properly

Drives Forward In "R"

Check for improperly assembled or distorted internal manual linkage

Upshift Points High

Throttle valve linkage too short (adjust linkage) Check for sticking valves in control valve assembly or governor Check for bent throttle valve lever Check for high throttle valve pressure or line pressure Check for restricted governor oil passage

Upshift Points Low

Check for same points indicated in "Upshift Points High" Throttle valve linkage too long (adjust linkage)

Hanging In 2nd

NOTE - Engine stalls when car is stopped Check for sticking valve in control valve assembly or in governor Throttle valve linkage too short (adjust linkage) Check for clutch hanging up and not releasing

TRANSMISSION REMOVAL & INSTALLATION

Removal

Install engine support, Tool J-8974, then remove oil filler tube and breather tube Disconnect propeller shaft, shift and throttle linkage, cooler lines and speedometer cable Remove exhaust pipe and transmission rear support bar then place transmission lift in position and remove transmission to engine bolts

Installation

Reverse removal procedure and note the following Lubricate threads of transmission-to-engine bolts with Lubricant, Part No 980131 and tighten bolts to 30-35 ft lbs

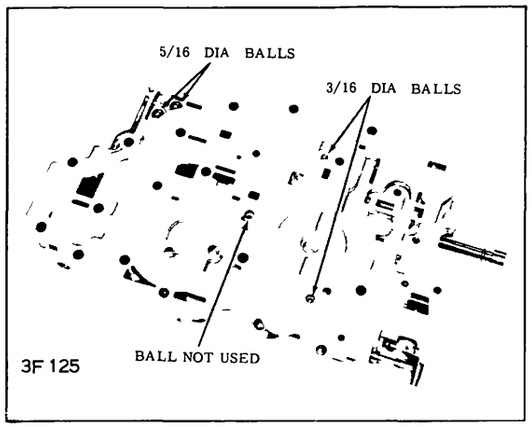
TRANSMISSION OVERHAUL

See 1961 Final Data, Page 488, and note the following changes in procedure

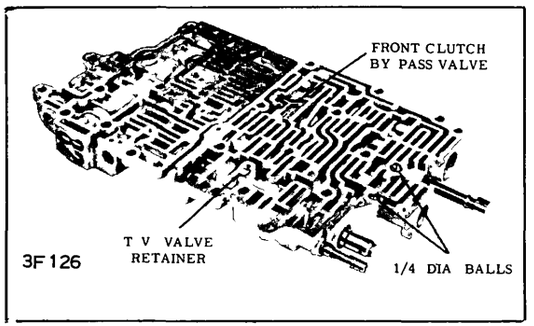
Control Valve

Disassembly (Complete Control Valve) - Remove the one secondary body-to-channel plate attaching screw (on side opposite channel plate), then place control valve assembly on a clean surface so channel plate spacer is upward Remove spacer plate attaching screws (3) and spacer, then remove check balls from channel plate (see illustration) Remove channel plate-to-valve body spacer attaching screws (4) and remove spacer Remove check balls from primary valve body (see illustration)

Primary Valve Body Disassembly - 1) Remove band apply valve bushing retainer, then remove band apply valve and bushing from throttle valve bore Remove band apply valve spring, throttle valve spring, throttle valve retainer, then remove throttle valve Remove retaining pin from 2-3 valve bore while holding 2-3 throttle valve bushing, 2-3 throttle valve and spring, and the 2-3 shift valve



CHECK BALLS (CHANNEL PLATE)



CHECK BALLS (PRIMARY VALVE BODY)

2) Remove 3–4 bore plug retainer and bore plug, then remove 3–4 throttle valve bushing and 3–4 throttle valve. Remove 3–4 throttle valve from bushing. Remove 3–4 shift valve and spring.

3) Remove bore plug retainer and bore plug from other end of 3–4 shift valve bor , then remove 3–4 shift valve spring and governor valve. Remove bore plug retaining pin and bore plug from 2–3 valve bore and remove 2–3 shift valve spring. Remove 2–3 governor valve.

4) Remove bore plug retaining pin from compensator bore while holding the bor plug, then remove compensator bore plug and secondary compensator valve and spring. Remove primary compensator valv and spring. Remove compensator limit valve retainer pin by compressing limit valve spring with a brass rod, then remove compensator limit valv and spring. ***CAUTION – Do not disturb thermostatic thr ttl valv lem nt adjusting screw.*** **Remove throttle valve element clip and element.**

Primary Valve Body Reass mbly – 1) Install compensator limit valve spring and valve, then install retaining pin by compressing limit valve spring with a brass rod.

NOTE - Some transmission m d ls use a s c nd comp nsat r valv in plac f th valv spring

2) Install primary compensator valve (land end first) and spring, then install secondary compensator spring and valve (small end first). Install compensator bor plug and retaining pin.

(Continued)

3) Install 3–4 governor valve, shift valve spring and bore plug, then install retaining pin. Install 3–4 rear shift valve spring and shift valve into other end of 3–4 shift valve bore. Install 3–4 throttle valve in the 3–4 throttle valve bushing so that it completely enters bushing, then install valve and bushing, bore plug, and retainer.

4) Install 2–3 shift valve (small end first) in 2–3 bore. Install 2–3 throttle valve spring, then install 2–3 throttle valve into 2–3 throttle valve bushing (land end first), and install 2–3 throttle valve and bushing. Install retaining pin while holding springs compressed.

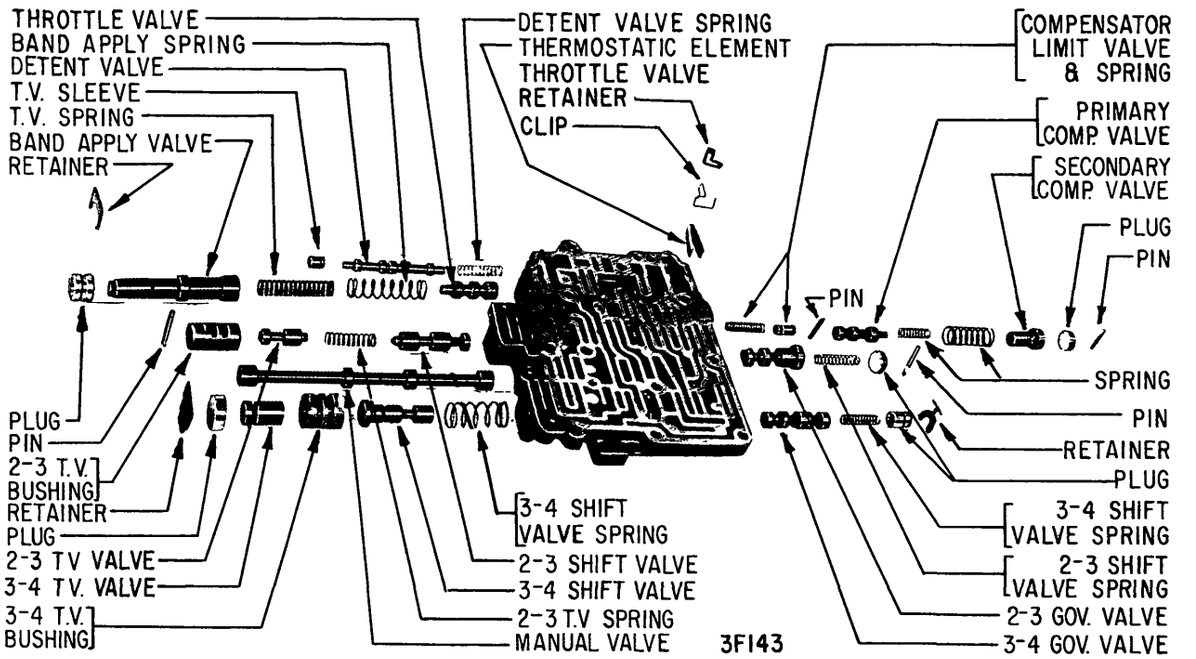
5) Install throttle valve (stem end out) in throttle valve bore. Install band apply valve spring and throttle valve spring, then install band apply valve (spring pocket first). Install band apply valve bushing on band apply valve, then install band apply valve retainer while holding valve and bushing depressed (make sure retainer fits in groove in bushing). Install throttle valve retainer with long leg reaching into valve bore and the short leg resting on the step Install throttle valve element and clip. *NOTE - Do not install manual valve and detent valve train at this time.*

Secondary Valve Body Disassembly & Reassembly – Same as for previous models except that 2–3 Boost Valve parts are now referred to as 3–4 Boost Valve parts; and the 2–1 Downshift Valve and Spring is now referred to as the 3–2 Downshift Valve and Spring. See *"Secondary Valve Body Assembly" illustration.*

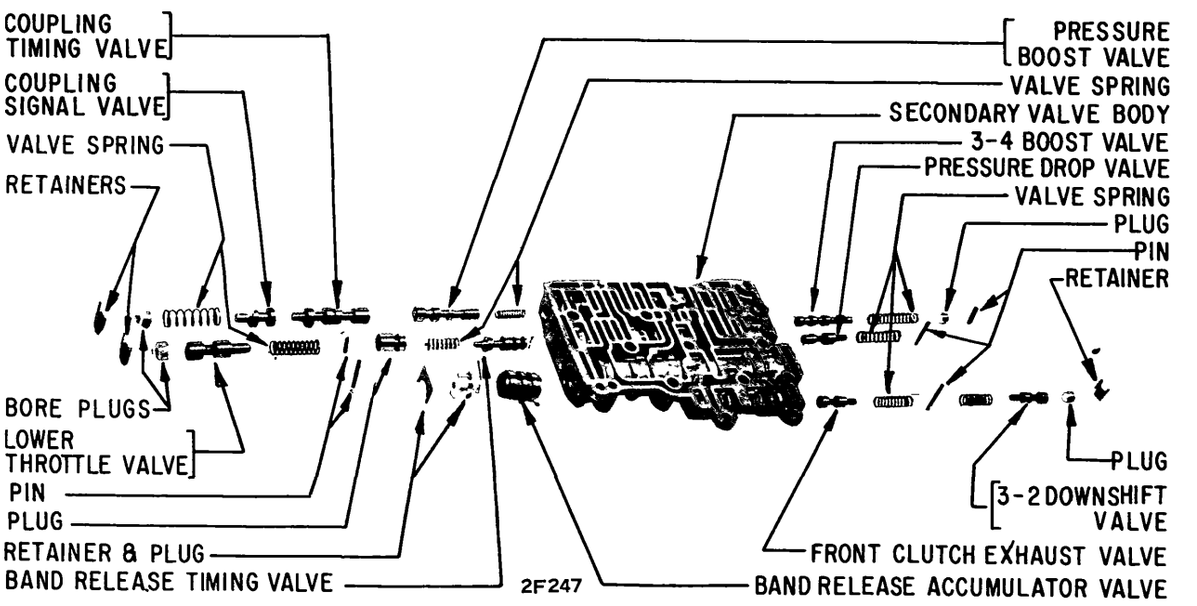
Control Valve: Reassembly (Complete Control Valve): Reverse disassembly procedure and note the following: Manual valve must be installed so that land with hole is outward. To align primary valve body to channel plate, insert a ¼" drill through one of the attaching holes, then tighten countersunk flathead screw.

Tightening Specifications

Location	Ft. Lbs. Torque
Channel Plate to Valve Body	2.5-3.5
Sec. Valve Body to Channel Plate	2.5-3.5
Pri. Valve Body to Channel Plate	2.5-3.5
Throttle Valve Lever to Shaft	5-6
Inner Man. & Det. Lever to Shaft	5-6
Valve Body to Case	6-8
Pump Cover to Pump Body	6-8
Throttle Valve Pressure Plug	6-7
Line Pressure Plug	6-7
Case Cover to Pump	15-18
Oil Pan to Case	12-15
Front Internal Gear to Housing	22-27
Output Shaft to Carrier	19-23
Torus Exh. Valve Cover to Torus Cover	19-23
Torus Cover to Drive Torus	17-20
Band Adj. Screw Locknut	18-20
Flange Assembly to Output Shaft	40-50
Rear Bearing Retainer to Case	20-25
Case Cover to Case	20-25
Oil Pan Drain Screw	35-45
Coupling Feed Limit Valve Plug	15-20
Pressure Regulator Plug	15-20



PRIMARY VALVE BODY ASSEMBLY



SECONDARY VALVE BODY ASSEMBLY

PONTIAC TEMPEST TRANSAXLE

P ntiac Temp st (1963)

PUSHING & TOWING (AUTOMATIC TRANSMISSION)

Pushing Car To Start Engine

The engine cannot be started by pushing (or towing) car. If necessary, a booster battery must be used.

►*BOOSTER BATTERY CAUTION:* Connect negative (-) terminal of booster battery to negative (-) terminal of car battery. Alternator will be damaged if battery is connected improperly.

Towing Car

With transmission selector lever in "N" (Neutral), car may be towed at speeds not to exceed 30 MPH. If transmission is not operating properly, raise rear wheels off ground to tow car.

DESCRIPTION

The transaxle assembly is similar to design used on previous models except as noted below.

Automatic Transmission (Tempestorque) - This unit has been redesigned to provide a solenoid operated "kickdown" and to eliminate the rear oil pump. Overhaul procedures are different than for pr evious models.

LUBRICATION

Checking Fluid Level

Check fluid level every 6,000 miles as follows:

Rear Axle & Synchro-mesh Transmission - With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle differential joint on left side of transmission case). If level is low in differential case, also check level in transmission housing. *NOTE - With unit at operating temperature, fluid should be level with bottom of filler plug hole.*

Automatic Transmission - With transmission at normal operating temperature and transmission selector lever in "N" (Neutral) position, engine idling, check fluid level on dipstick in filler tube located under plate in right-front of luggage compartment. If level is near the "ADD" mark, add recommended fluid to bring level to "FULL" mark on dipstick. Approximately one pint of fluid is required to raise level from "ADD" to "FULL".

Draining & Refilling

Draining & Refilling is not recommended except at time of overhaul or repair.

Rear Axle & Synchro-mesh Transmission - If necessary, drain plugs in differential carrier and in transmission can be removed to drain fluid.

Automatic Transmission - Loosen filler tube attaching nut in oil pan and allow transmission to drain (converter cannot be drained). To refill, tighten filler tube nut and add 4 pints of recommended fluid, then start engine and allow to idle 3-5 minutes in "N" (Neutral). Add necessary amount of fluid to bring level to "FULL" mark on dipstick.

Recommended Fluid

R ar Axl & Synchr -mesh Transmission - SAE 80 or SAE 90 "Multi-Purpose" gear lubricant. *CAUTION - Do not use straight mineral oil gear lubricants or lubricants containing active sulphur soaps.* Differential carrier and transmission (synchro-mesh) are connected by internal passages.

Automatic Transmission - Automatic Transmission Fluid Type "A" (Suffix "A"). Automatic transmission is sealed off from differential.

Capacity

Differential Carrier - 3.3 pts.
3-Speed Synchro-mesh Transmission - 3 pts.
4-Speed Synchro-mesh Transmission - 3.85 pts.
Automatic Transmission - 6 pts. all models (after draining). 17 pts. 4 Cyl. Eng., 19.7 pts. V8 Eng. (after overhaul with converter drained).

ADJUSTMENT

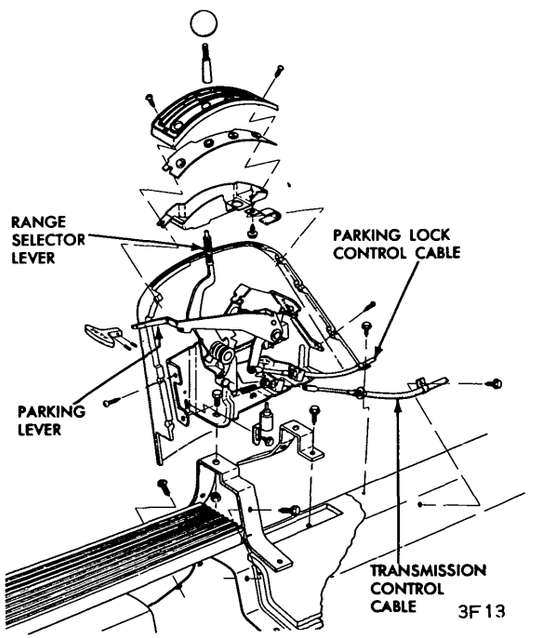
Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Linkage

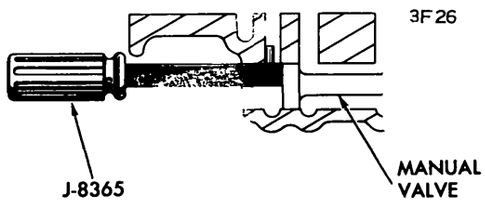
Synchro-mesh Transmission - Manual linkage adjustment not required.

Automatic Transmission - To check manual linkage adjustment, start engine and allow 2-3 minutes for fluid to warm up, then with engine at idle speed, slowly move selector lever from "N" toward "R" and note by feel the point at which reverse clutch applies. If properly adjusted, clutch should apply within band from tooth peak to full reverse detent (see illustration).

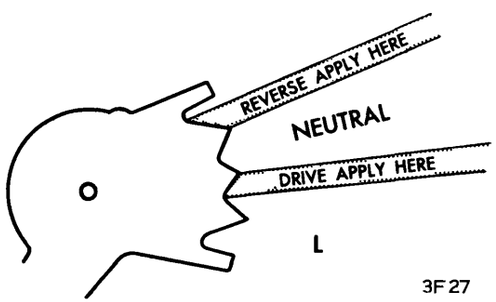


MANUAL TRANSMISSION SHIFT LEVER ASSEMBLY

Repeat the above check while moving selector lever from "N" toward "D". Low band should apply as selector lever indicator is felt to be between tooth peak separating neutral from drive and full drive detent (see illustration). To adjust, drain transmission and remove oil pan Place selector lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body (see illustration). With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission case) and push manual valve levers forward so tool is held in horizontal position, then tighten locknut. Recheck adjustment, install oil pan and refill transmission.



MANUAL VALVE ADJUSTMENT



CHECKING MANUAL SHIFT POINTS

Neutral Starter Switch

Located on rear of gearshift control and indicator assembly. Switch should turn on back-up lights in "R" (Reverse), starting with selector lever in any position other than "N" (Neutral). To adjust, loosen switch mounting screws and reposition as required.

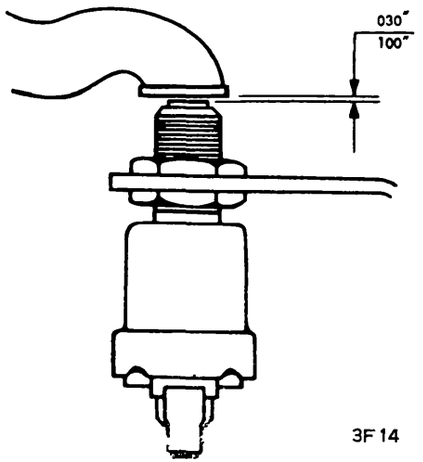
Low Band

NOTE - Periodic adjustment is not recommended, however, if necessary, adjust as follows: Lower transmission to allow access to adjusting screw, then loosen locknut and tighten adjusting screw to 40 ± 5 inch pounds. **Back ff adjusting screw exactly 4 full turns** and tighten locknut, making sure that adjusting screw does not turn.

(Continued)

Downshift Switch

With throttle linkage properly adjusted and with throttle valve in wide open position adjust switch locknuts to provide a clearance of 030- 100" between switch body and lever Tighten locknuts securely



DOWNSHIFT SWITCH ADJUSTMENT

TESTING (AUTOMATIC TRANSMISSION)

TESTING NOTE - Transmission must be at normal operating temperature, fluid level at "FULL" mark on dipstick, and manual and throttle linkage adjustments must be correct

Road Test

Road test car to determine transmission shift points as indicated in table below

Transmission Shift Speeds

UPSHIFTS	①MPH 4 Cyl.	V8
Minimum Throttle	18-22	19-23
Full Throttle	②60	②70
Part Throttle (To Detent)	35-40	28-32

① - 3 09-1 axle ratio (4-Cyl), 2 91-1 axle ratio (V8) The above speeds require revision if other axle ratios are used.
② - Approximately

Pr ssure Tests

NOTE - Pressure tests can be made by running car with wheels raised off ground on jack stands

Pressure Test P int L cati ns - Three test points having hex head plugs are located on transmission case as follows

Fr nt Pump - Front of extension housing flange

Govern r - In recess near bottom of transmission case on same side as governor assembly

Modulator - In recess near bottom of transmission case on same side as modulator assembly
NOTE To aid in connecting pressure test lines to governor and modulator test points, use a pipe extension to bring line connection out beyond edge of oil pan

Pressure Checking - With transmission at normal operating temperature fluid at proper level, and linkage properly adjusted, place transmission in "D" position and operate car as indicated in "Pressure Check Table" *NOTE - If pump pressure is not evident, check for stuck pressure regulator valve or broken or disengaged pump drive lugs Failure of pressure to rise when disconnecting the vacuum hose (or high pressure with hose connected), indicates a stuck modulator valve, defective modulator, or collapsed hose*

PRESSURE CHECKING TABLE

Pressure Point	Eng. Type	Pressure Reading (Approx.)
Governor	4 Cyl V8	23 lbs @20 MPH-54 lbs @48 MPH 23 lbs @23 MPH-54 lbs @51 MPH
Modulator	All	110 lbs @ sea level (wide open throttle with parking brake on) to 70 lbs @ 6000 ft
Pump	All	50 lbs while coasting in high, 110 lbs @ sea level (wide open throttle with parking brake on) to 90 lbs @ 6000 ft

REMOVAL & INSTALLATION

See 1962 Final Data, Page 505, and note the following changes in procedure

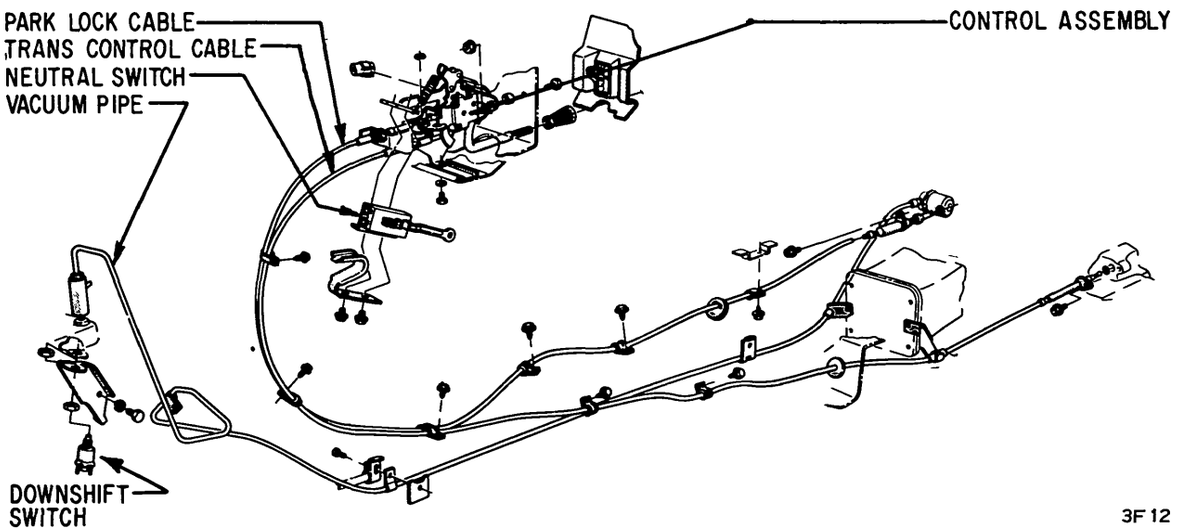
Transaxle (Complete Unit)

Removal - **1)** Raise car and support at underbody side rails, then drain transmission and differential Remove rear wheels and drums, then disconnect axle shafts and pull them outward far enough to remove universal joints from carrier assembly
2) Disconnect speedometer cable On automatic transmission cars, disconnect transmission control cable, electrical connection, retainer clips, vacuum modulator line and parking lock control cable
3) Support torque tube and transaxle separately, then disconnect torque tube from transmission *CAUTION - Propeller shaft and torque tube are now held in place only by bearings in transmission extension and must be properly supported to prevent damage*
4) Disconnect axle support crossmember from insulator, then disconnect rear lower control arms from bracket on differential housing On Synchro-mesh transmissions, disconnect shift tube from transmission Disconnect exhaust system from rear tail pipe hanger, then remove axle support crossmember from transaxle assembly (lower transaxle slightly for access to bolts)
5) Separate transaxle from torque tube and propeller shaft and pull transaxle assembly straight off shaft so shaft will not bind in transmission. Lower transaxle assembly from car
Installation - Reverse removal procedures being careful not to damage seals Tighten all bolts and nuts to specifications (see "Tightening Specifications" below)

Control Cable (Auto. Trans.)

Removal - Remove bolt securing transmission control cable housing to transmission case then disconnect

(Continued)



AUTOMATIC TRANSMISSION CONTROL & PARK CABLE ASSEMBLIES

cable at selector lever assembly. Remove cable from body clips and grommets and remove cable.
Installation - Install "O" ring seal on new cable, then locate cable in approximate position in car as shown in illustrations. Seat the "O" ring and install bolt and lock washer. Complete installation, working from rear of car forward (keep slack in cable at front of car). Adjust linkage as required (see "Manual Linkage" above).

Parking Lock Cable

Removal - Disconnect control cable from cover and pawl assembly, then disconnect cable from transmission control lever assembly. Remove cable body clips and grommets and remove cable.
Installation - Reverse removal procedure, locating cable as indicated in illustrations. Work from rear toward front of car and keep slack in cable at front of car.

Automatic Transmission

Removal (From Transaxle Assembly) - With transaxle assembly removed from car, remove converter nut assembly using a strap wrench to hold converter, then pull converter with a suitable puller. Remove speedometer driven gear, governor assembly, and turbine shaft. Remove screws retaining transmission to differential carrier and separate transmission and differential carrier.
Installation - Install a new gasket to either carrier or transmission and retain in place with petrolatum, then align carrier and transmission on a flat surface and carefully guide pump shaft through differential carrier. Install governor with a new "O" ring seal, and secure transmission to carrier with retaining screws. *NOTE - Install two screws from carrier side first to prevent cocking.* Tighten screws to specifications (see "Tightening Specifications" below). Install turbine shaft being careful to avoid damaging bushings. Install converter, converter nut and seal assembly. Tighten nut until a sudden increase in resistance is felt, then complete tightening until torque is 10-20 ft. lbs. above that required for tightening to prior sudden increase in resistance. Install modulator valve and modulator assembly and secure with clamp. Install speedometer driven gear and parking pawl assembly.
NOTE - It is no longer necessary to determine thickness of Rear Selective Thrust Washer.

OVERHAUL

3-Speed Synchro-mesh Transmission - *See 1961 Final, Page 497.*
4-Speed Synchro-mesh Transmission - *See 1962 Final, Page 508.*

AUTOMATIC TRANSMISSION UNIT REMOVAL & INSTALLATION (TRANSMISSION IN CAR)

Parking Lock Cover & Pawl

Removal - Assembly can be removed after removing cable assembly, "O" ring seal and attaching screws.
Inspection - Inspect pawl for damage or wear and check to see that actuator rollers turn freely. Replace worn or damaged parts.
Installation - Reverse removal procedure.

Extension Housing Oil Seal

Replacement - Remove torque tube and propeller shaft, then pry out old seal. Tap new seal into position using a suitable tool (J-21033), then install torque tube and propeller shaft.

Extension Housing using Front Bearing

Replacement - Remove torque tube, propeller shaft, and oil seal, then remove bearing retaining ring and remove bearing. Tap a new bearing into position with a suitable tool (J-21033) and install retaining ring. Install seal, propeller shaft and torque tube.

Modulator

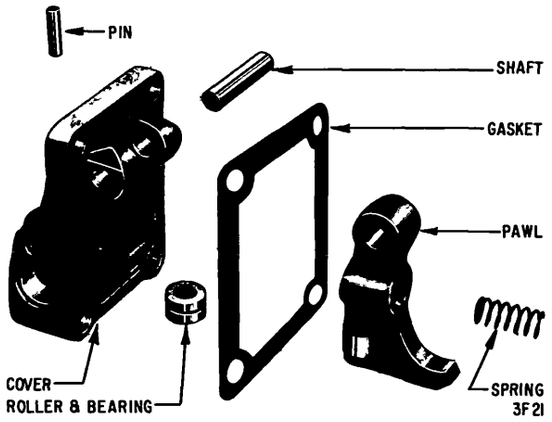
Removal - Disconnect control arm bracket, then remove vacuum hose at modulator and remove modulator retainer plate. Remove modulator and valve from case.
Inspection - Inspect valve for nicks and burrs. If these cannot be removed with a slip stone, replace valve. Check for leakage by connecting to a vacuum source. *NOTE - A leaking modulator is indicated by oil smoky exhaust and continually low transmission oil level. Replace modulator as an assembly if it is faulty.*
Installation - Install modulator valve in transmission, then place a new "O" ring seal on modulator and install modulator. Tighten retainer plate and install vacuum hose. Connect control arm bracket.

Governor

Removal - Remove speedometer driven gear, then loosen screw securing governor tab to case and pull governor from transmission.
Inspection - Inspect driven gear for damage or wear. If necessary to replace gear, drive out roll pin with a punch and pull out old gear. Drill a new hole in governor 90° from old hole, then insert new gear and reinstall roll pin. *NOTE - No other repairs are possible.*
Installation - Install a new "O" ring seal, then insert governor into transmission with a slight twist to engage gears. Install lock bolt and speedometer driven gear.

Downshift Solenoid

Replacement - Drain transmission and remove filler pipe, then remove oil pan and gasket. Disconnect solenoid lead from terminal, then remove solenoid attaching screws and remove solenoid from valve body. *NOTE - It may be necessary to remove one reinforcement plate screw for access to one solenoid attaching screw.* Install new solenoid by reversing removal procedure.



PARKING LOCK COVER & PAWL ASSEMBLY

Downshift Solenoid Connector

Replacement - With oil pan removed, disconnect solenoid lead from terminal and disconnect external lead from terminal. Compress connector assembly retaining fingers and push out assembly and seal. Install new connector assembly and seal into case (retaining fingers must spread out inside case to secure assembly), and connect internal and external leads. Install oil pan and fill transmission

Valve Body & Low Servo

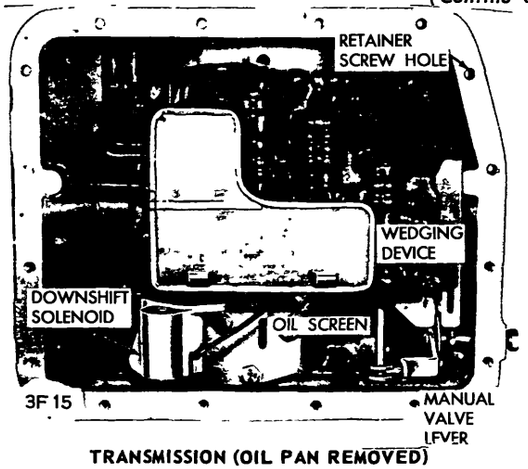
Removal - Drain transmission and remove oil pan, then remove oil screen and "O" ring seal. Loosely install a retainer (see illustration) in pan screw hole, then remove screws attaching valve body to transmission. Tap valve body lightly with a soft hammer to loosen it from its dowels, then carefully lower valve body 1/16". Rotate retainer into place so it secures servo piston and tighten with oil pan screw (this prevents piston slipping down out of its bore and loss of low band engagement). Disconnect downshift solenoid lead from terminal, then remove valve body and gasket. If necessary to remove low servo, tighten low band adjusting screw fully and remove transfer plate and reinforcement plate. Remove retainer and pull down on low servo piston shaft with a screwdriver.
Disassembly - *See "Transmission Unit Overhaul" below.*
Installation - Reverse removal procedure and tighten all screws to specifications (see "Tightening Specifications" below).

AUTOMATIC TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

Automatic Transmission

Disassembly - **1)** Remove modulator, "O" ring and modulator valve, then mount transmission assembly in a suitable holding fixture.
2) Loosen low band adjusting screw locknut and fully tighten low band adjusting screw. Remove housing attaching screws and use a soft hammer to tap off extension housing and pump assembly. Turn transmission so front end is up and loosen low band adjusting

(Continued)



TRANSMISSION (OIL PAN REMOVED)

screw and remove low band, apply strut, and reaction strut.

3) Remove clutch drum assembly using care to avoid damage to machined surfaces on front face of clutch drum. Remove planet carrier assembly, fibre washer and cupped race from ring gear, then remove ring gear from engagement with reverse clutch plates.

4) Remove reverse clutch snap ring, pressure plate, drive plates (faced) and reaction plates (steel). *NOTE - V8 transmission has a spring plate under last reaction plate.*

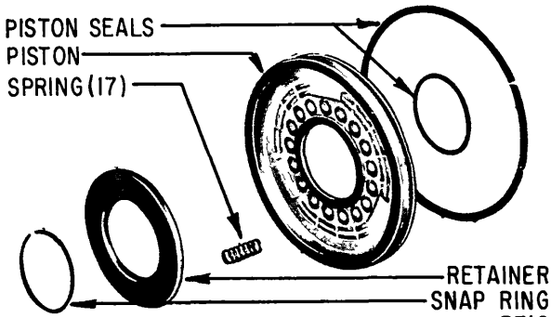
AUTOMATIC TRANSMISSION UNIT OVERHAUL (AUTOMATIC TRANSMISSION)

Reverse Piston

Removal - Compress spring retainer with a suitable tool (J-9542) until springs bottom, then remove snap ring. Carefully release pressure and remove spring retainer and return springs. To remove reverse piston, apply air pressure at reverse piston apply pressure port. Remove piston inner and outer seals.

Inspection - Wash all parts in clean solvent and blow dry with air. Check for broken return springs and make a comparative test of spring heights by standing all of springs in a row. If an appreciable difference in spring height is noted, replace springs.

Installation - Install inner and outer seal in reverse piston, then install piston in case. Position the 17 return springs in their seats on piston and install spring retainer. Compress springs with same tool used at removal, then install snap ring and remove tool



REVERSE PISTON ASSEMBLY

Clutch Drum

Disass mbly - Remove snap ring securing low sun gear and clutch flange assembly to drum, then remove low sun gear clutch flange and hub-to-flange thrust washer. Remove clutch hub, then remove nested drive and reaction plates and hub thrust washer. To remove spring retainer, compress springs with a suitable tool (J-9542) and remove snap ring, then carefully release pressure on tool and remove spring retainer and return springs. To remove clutch piston, pull upward with a twisting motion on center. Remove seal on piston and piston inner seal from hub of clutch drum.

Insp ction - Wash all parts in solvent and blow dry with air. Inspect drum brake band surface for excessive scoring or burning. Check drum bushing for scoring or damage. Check steel ball in clutch drum that acts as relief valve and make sure it is free to move in hole and that orifice leading to front of drum is open. *NOTE - If ball is loose enough to come out or not loose enough to rattle, replace clutch drum as an assembly. DO NOT attempt to restake ball.* Check fit of clutch flange in drum slots (there should be no appreciable radial play between these two parts). Check low sun gear for nicks or burrs and bushing for wear. Check clutch plates for burning, pitting or metal pick up. Check to see that faced plates are a free fit over hub and that steel plates are a free fit in clutch drum slots. Check for excessive wear on friction facing of drive plate teeth. Check condition of clutch hub splines and mating splines on faced plates.

Clutch Drum Bushing Replacement - Remove old bushing with a suitable chisel (J-8400-1), being careful not to damage bushing bore. Install bushing with a suitable tool (J-9546).

Low Sun Gear Bushing Replacement - Remove old bushing with a suitable chisel (J-8400-1),. being careful not to damage bushing bore. Install new bushing with a suitable tool (J-21094).

Reassembly - Install piston inner seal in clutch drum hub, making sure that lips are downward toward front of transmission. Install a new piston seal in clutch piston so lips of seal are toward front of transmission (clutch drum) when installed. Lubricate both seals, then install piston in clutch drum with a twisting motion. Place 24 return springs in position on clutch piston and install spring retainer. Compress springs with same tool used at disassembly and install snap ring in groove. Remove tool and install hub front thrust washer with its lip toward clutch drum. Align two dimples with notches in hub and install clutch hub. Install steel reaction plates and faced drive plates alternately, starting with a steel plate. *NOTE - V8 engine transmissions have 6 steel and 5 faced plates. 4 Cyl. engine has 4 steel and 3 faced plates.* Install hub rear thrust washer with its flange toward low sun gear, then install low sun gear and clutch flange assembly and secure with snap ring. *NOTE - Openings of retainer ring should be lined up with a clutch drum slot.* Check assembly by turning clutch hub to insure it is free to rotate.

Valve Body & Low Servo

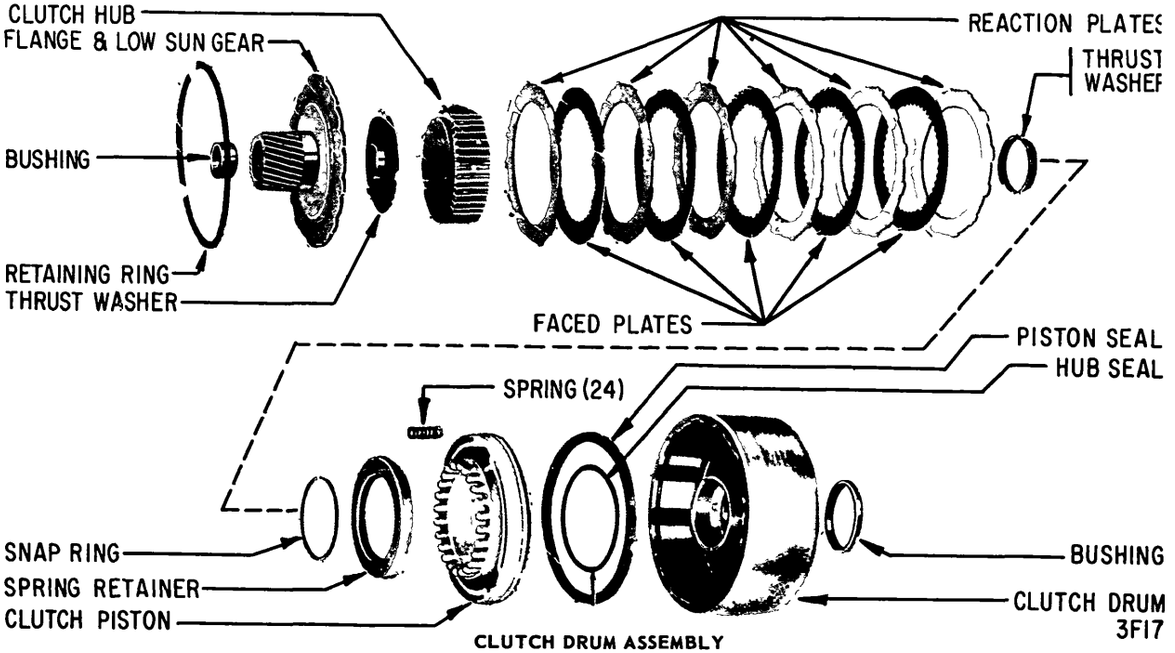
Disassembly - Remove manual valve and downshift solenoid, then remove detent valve, modulator pressure control valve and spring. Remove shift valve retaining ring, sleeve, shift control valve, spring seat, spring, and shift valve. Remove retaining ring, then remove modulator valve sleeve and valve, spring, and pressure regulator valve Remove roll pin, spring, and high speed downshift timing valve. To disassemble low servo piston, remove hairpin retainer securing piston to piston rod and remove all components.

Inspection - Valve Body - Clean all parts in solvent, then inspect all valves and their bores in valve body for burrs or other deformities that could result in valve hang-up.

Low Servo - Remove piston ring from piston and install it in low servo bore and measure ring gap which should be .002-.012". Assemble ring to piston and measure clearance between ring and one side of piston groove. Clearance should be .0005-.005".

Reassembly - Install high speed downshift timing valve into its bore (stem out) and install spring and roll pin. Install pressure regulator valve (stem out) and install spring, then assemble modulator valve (stem out) and sleeve, and install assembly into bore and secure with

(Continued)



CLUTCH DRUM ASSEMBLY

retaining ring. Install shift valve (stem out) and install spring and spring seat with raised portion of spring seat toward spring. Assemble shift control valve and sleeve with large diameter stem out, then install assembly and secure with retaining ring. Assemble modulator pressure control valve spring on stem of valve and install assembly, spring first, in valve bore. Install detent valve with beveled stem out. Use a new gasket and assemble downshift solenoid to valve body and secure with two screws, then install manual valve.

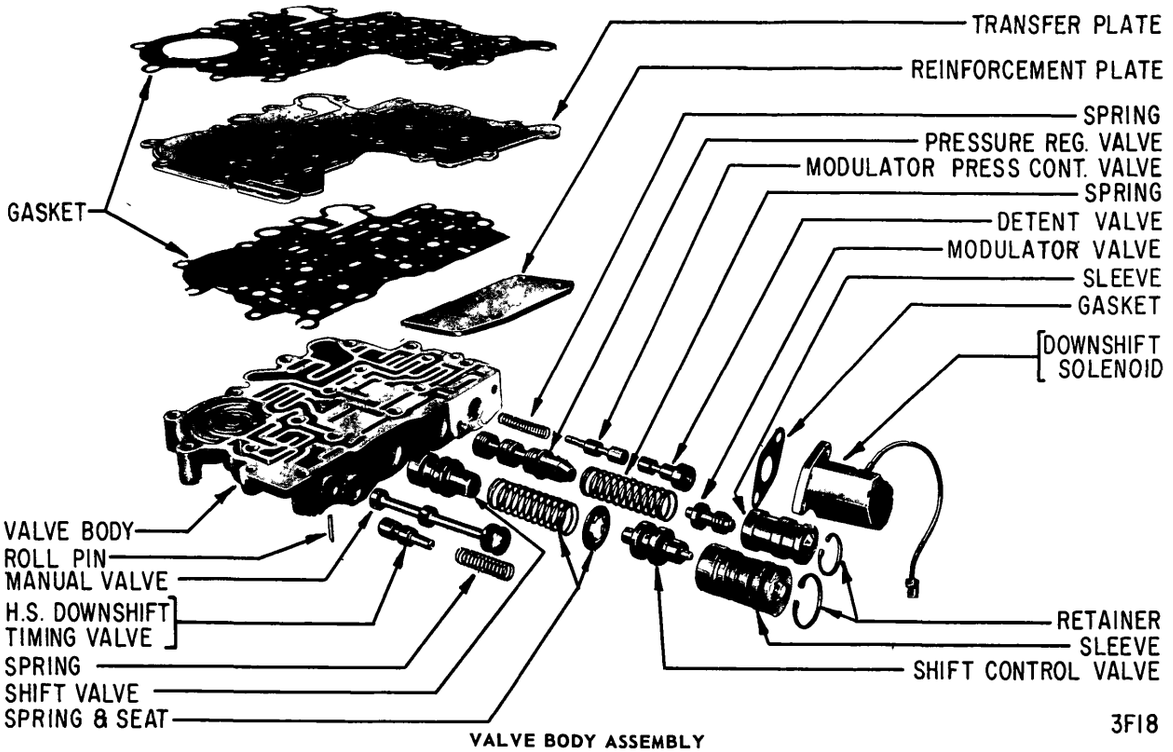
Pump & Extension Housing

Disassembly - Remove two hook-type oil sealing rings, thrust washer and shims (if present) from pump hub. *NOTE - V8 engine transmission has thrust bearing assembly instead of a thrust washer.* Remove screws and separate pump body and housing being careful not to drop gears from pump body, then remove pump shaft. Mark, but do not scar, pump gear faces to insure reassembly with same face upward, then remove gears. Remove pump shaft thrust washer and drive out pump priming valve retaining pin, then remove valve spring and valve. **Remove coast downshift timing valve from extension housing only if it is known to be defective.** Remove housing outer seal and pry out oil seal. Remove front bearing retainer ring and remove front bearing with a suitable tool (J-6292). Remove rear bearing and thrust washer by inserting a suitable tool through front of extension and driving bearing out the back.

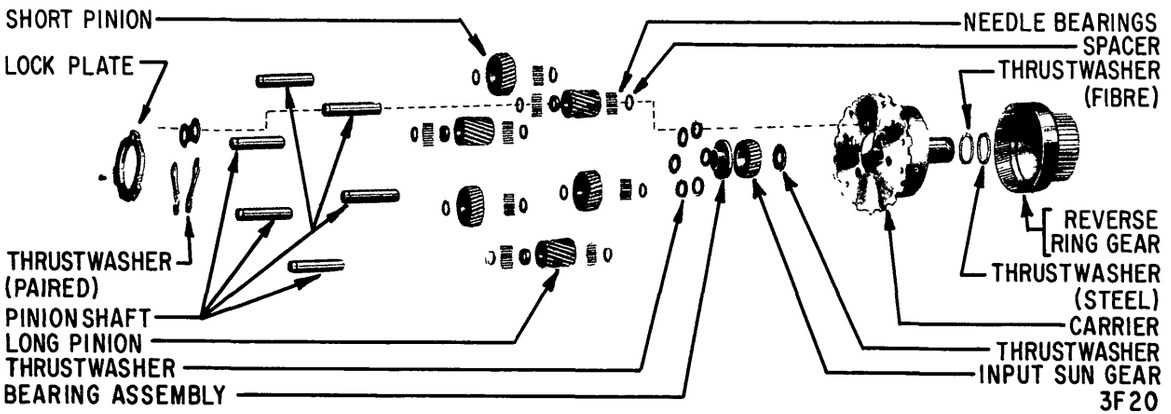
Inspection - Wash all parts in solvent and blow out all oil passages. Inspect all parts for nicks, scoring, or damage. Check oil control rings removed from pump body (install rings in operating position in bore of clutch assembly to make sure they have end clearance). If bushing in pump body is damaged, replace bushing (see below). With parts clean and dry, install pump gears and check clearances with a feeler gauge. Clearance between outer diameter of driven gear and body should be .0025-.005". Clearance between driven gear and crescent should be .0025-.005". With a scale and feeler gauge check gear end clearance which should be .0005-.0015". Inspect front and rear bearings for roughness, wear, or damage.

Pump Body Bushing Replacement - Remove old bushing with a suitable chisel (J-8400-1). Install new bushing with a suitable tool (J-21098).

Reassembly - Install pump shaft thrust washer in extension housing with grooves upward, then install caged needle bearing in extension housing with identification on outer race facing upward, using a suitable tool (J-21249) to drive bearing into position. Install front bearing with a suitable tool (J-21033), then install retaining ring. Use a soft hammer and tap new drive line seal into position. Use a suitable tool (J-21237) to install coast downshift timing valve into place so that distance from housing face to top edge of valve is 3/8". *CAUTION - Do not install valve by tapping on spring retaining fingers or the calibration will be affected.* Install pump priming valve into pump body, stem first, then install valve spring and secure with retaining pin. Install pump gears (previously marked faces upward), thrust washer and pump shaft assembly. Assemble extension housing and pump body and install 7 outer screws for preliminary alignment. Align



VALVE BODY ASSEMBLY



EXTENSION HOUSING & PUMP ASSEMBLY

housing and pump body using alignment band, Tool J-21034. then secure assembly with 5 screws and remove alignment band. Turn shaft and check for binding. Install shims as required on pump body hub, then install thrust washer or bearing assembly, engaging tang of washer in pump body notch. Install two hook type oil seal rings. *NOTE - Number of shims required on pump body is determined during transmission rear assembly (see below).* Install new outer seal ring in groove on outer diameter of extension housing.

Planet Carrier

NOTE - Before disassembling planet carrier, inspect as follows: Wash assembly in solvent and blow out all oil passages. Inspect planet pinions for nicks and toth damage, then check end play of pinions. Clearance should be .006-.030". Check input sun gear and thrust washer for damage. Inspect output shaft bearing surface and splines for damage. If wear or damage is evident, disassemble and replace parts as necessary.

(Continued)

Disassembly - Place carrier assembly in a vise with front end facing upward, then use a prick punch to mark each pinion and planet carrier for reassembly in in original position. Remove pinion shaft lock plate screws and rotate lock plate clockwise enough to remove it. Start with a short pinion and drive on front end of pinion shaft, using a soft steel drift, until shaft is beyond press fit area of front flange. Insert a "dummy" shaft (J-9538) into short planet pinion, pushing pinion shaft ahead of it until "dummy" shaft is centered in pinion and pinion shaft is removed. Remove short pinion and pinion rear thrust washer, then remove "dummy" shaft, needle bearings, and needle bearing spacers from pinion. *CAUTION - Be careful not to lose pinion needle bearings (20 in each pinion with a spacer at each end).* Remove remaining short pinions in same manner, then remove input sun gear thrust bearing race, thrust bearing, input sun gear, and rear thrust washer. Using the same procedure as for removal of short pinions, remove long pinions and 3 front (paired) thrust washers. *CAUTION - Be careful not to lose pinion needle bearings (20 in each end of each pinion, separated by a wide spacer and with a spacer at each end).*

Inspection - Wash all parts in solvent and blow dry with air, then recheck all parts for wear or damage. If needle bearings show excessive wear, replace all bearings.

Reassembly - Use "dummy" shaft and assemble needle bearing spacers and needle bearings in one of the long pinions (20 bearings at each end with wide spacer in between and a thin spacer at each end). Hold needle bearings in position with petrolatum. Position long pinion with "dummy" shaft centered in pinion and with thrust washers at each end, in planet carrier. Use a "paired" thrust washer at front and a single washer at rear, with oil grooves in both washers facing pinion. Select proper pinion shaft, as marked at disassembly, lubricate shaft and install it from front end, pushing "dummy" shaft ahead of it. Make sure that thrust washer at rear is picked up and that shaft lock plate slot is properly aligned. Use a brass drift and drive pinion shaft in until lock plate slot is flush with assembly surface. Install remaining long pinions in same manner, then install input sun gear rear thrust washer, input sun gear, front thrust bearing, and bearing race with inner diameter flange up. Install short pinions in same manner as for long pinions. *NOTE - Front (paired) thrust washer already installed with long pinion is used with adjacent short pinion.* Check end clearance of pinions which should be .006-.030". Install pinion shaft lock plate so that tangs engage slots in shaft and the three screw holes are accessible. Install pinion shaft lock plate attaching screws and tighten to 2½-3 ft. lbs.

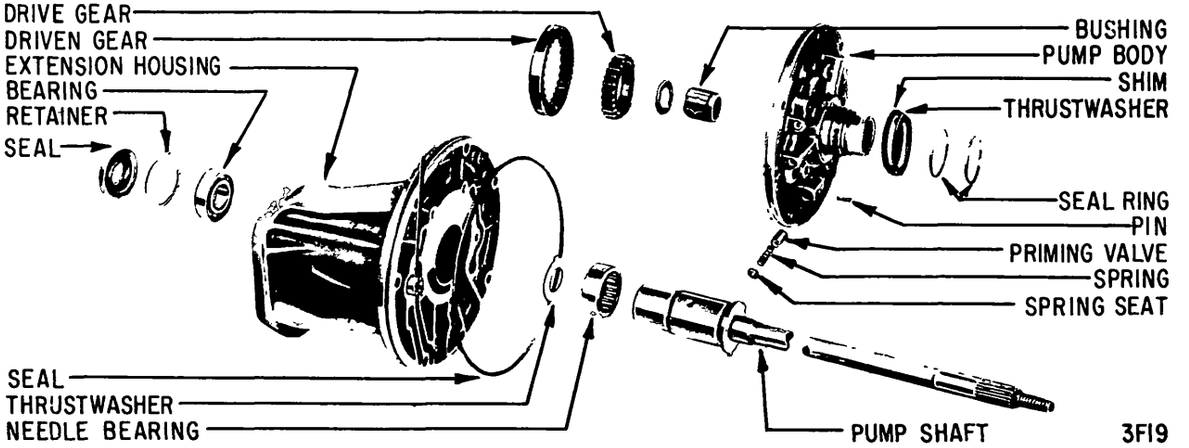
Turbine Shaft

Inspection - Inspect splined areas for wear or damage, check lubrication holes to be sure they are open. Inspect bushing for wear or damage and make sure hook type oil seal is free to rotate.

Bushing Replacement - Cut bushing out with a suitable chisel being careful not to damage bore. Install new bushing with a suitable tool (J-21095).

Converter

NOTE - Internal repairs cannot be made. Converter is welded unit.



PLANET CARRIER ASSEMBLY

Inspection - Check seams for stress or breaks and either replace converter or repair welds as required. *NOTE - If welds are repaired, keep added material to a minimum by chipping off scale and filing away excess weld to retain converter balance.* Inspect converter hub bushing for wear or damage.

Bushing Replacement - Remove old bushing with a suitable chisel being careful not to damage converter bore. Install new bushing with a suitable tool (J-21096).

AUTOMATIC TRANSMISSION UNIT INSTALLATION (TRANSMISSION OUT OF CAR)

Automatic Transmission

Reassembly - **1)** Install transmission in holding fixture with rear of case downward, then install reverse clutch spring plate (spring plate on V8 transmission only), and reaction plates (see illustration). *NOTE - Notched lug in each steel reaction plate must be installed so it is at top of groove in 4 o'clock position in case.*

2) Install pressure plate so that lug with rectangular "dimple" engages 4 o'clock case groove, then install plate snap ring. Check for correct selective reaction spacer plate running clearance as follows: Place transmission horizontally, then use feeler gauges and measure clearance between pressure plate and first faced plate. Clearance should be .025-.060". If clearance is not within limits, remove reverse clutch pack and install a thicker or thinner selective plate next to piston. *NOTE - Selective plates are available in thicknesses of .070", .102" and .134".* On V8 engine transmission, install selective plate on top of spring plate.

3) Align internal lands of reverse clutch drive plates and center them in case. Engage reverse ring gear with reverse drive plates. *NOTE - Engagement must be made by "feel" while moving drive plates laterally.* Install metal thrust washer on reverse piston hub, engaging washer "dimples" in hub notches, then install fibre washer on top of it.

4) Install planet carrier with a slight twist to engage planet pinions with reverse ring gear, then install clutch drum assembly, using a slight twist to engage low sun gear with pinions in planet carrier.

5) Install shim selector gauge, Tool J-21093 and check end clearance (see illustration). *NOTE - The measurement made with feeler gauge determines number of shims to be used on pump body hub (see "Pump & Extension Housing" under "Transmission Unit Overhaul" above).* If pin of gauge, Tool J-21093, does not rest on face of clutch drum, there is excessive end play which may be due to worn parts. If feeler gauge thickness exceeds .0485", incorrect assembly of parts is indicated and the transmission assembly should be rechecked.

Shim Specifications

Gauge Thickness	Shims Required
Flush to .0015"	3
.0015-.0175"	2
.0175-.0335"	1
.0335-.0485"	0

6) Install low band, apply strut and reaction strut, then tighten low band adjusting screw enough to prevent strut from falling out of place. Shake clutch drum slightly to center low band and linkage. Install a new pump gasket, then index and install pump and extension housing assembly. Use care to avoid breaking cast iron rings on pump body hub as they enter clutch drum bore. Tighten extension housing attaching screws (see "Tightening Specifications" below). Adjust low band (see "Adjustment" above).

Tightening Specifications

Location	Torque
Case to carrier bolts	55-75 ft. lbs.
Valve body to case bolts	100-140 in. lbs.
Pump body to extension housing	14-22 ft. lbs.
Extension housing to case	14-22 ft. lbs.
Oil pan to case bolts	35-45 in. lbs.
Modulator clamp bolt	100-132 in. lbs.
Low band locknut	20-25 ft. lbs.
Converter nut	Ⓒ 10-20 ft. lbs.

Ⓒ - Above torque required to tighten nut until sudden resistance is felt (see "Removal & Installation" above).

RAMBLER SIX AUTOMATIC TRANSMISSION

Rambler American (1963)
Rambler Classic Six (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

With selector lever in "N" (Neutral), push car until it reaches a speed of approximately 15-20 MPH, then turn ignition switch on and place selector lever in "L" (Low) until engine starts.

Towing Car

If transmission is operating properly, car may be towed for short distances with transmission selector lever in "N" (Neutral). If transmission is inoperative or if car is to be towed a long distance, raise rear wheels off ground or disconnect propeller shaft.

►CHANGES, CAUTIONS, CORRECTIONS

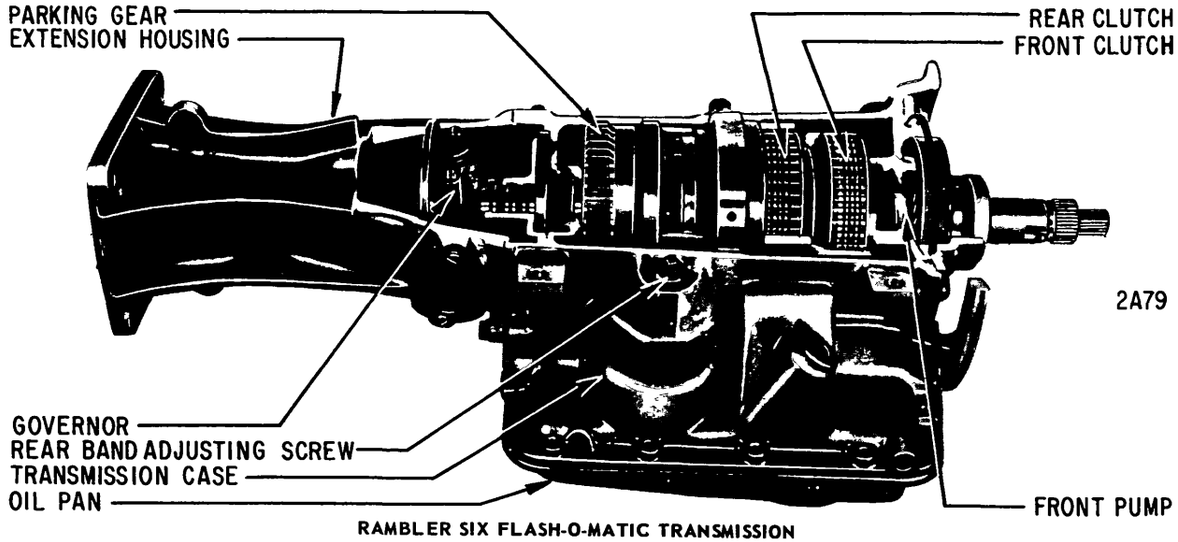
► *1962-63 RAMBLER AMERICAN & CLASSIC SIX LOSS OF DRIVE WHILE IN GEAR CORRECTION:* This condition may be due to an internal oil leak occurring at front pump suction tube and "O" ring. Correct as follows: Remove transmission oil pan, control valve assembly and oil tubes, then remove front pump suction tube and "O" ring. Install a new suction tube and "O" ring assembly, using care not to damage tubes during replacement. *NOTE - Early 1962 models used a steel tube having the "O" ring seal in groove on tube. Later models use an aluminum tube and "O" ring assembly.*

► *1962-63 TRANSMISSION OIL SCREEN INSTALLATION & PRODUCTION CHANGE:* Some late 1962 and all late 1963 transmissions were equipped with oil screen in production. To install the new screens on models not so equipped, replace original fillister head screws with pan head screws. The new screens are available under Part No. 3170355 (Rear Screen); Part No. 3170356 (Front Screen).

► *1962-63 OIL LOSS THROUGH TRANSMISSION CASE BREATHER CORRECTION:* A new breather baffle, Part No. 3170944 is being used in late 1963 production and can be used on earlier transmissions to correct oil loss. Drain two quarts of oil from transmission, then remove transmission extension housing. *NOTE - On 1963 Classic models, support transmission and engine assembly when removing extension housing and rear crossmember.* Remove speedometer drive gear and governor assembly from output shaft, then place flat side of baffle over rear pump. Cutaway portion of circumference must be located toward bottom. Equally spaced lugs on baffle will retain it in case. Reverse disassembly procedure and fill transmission with fluid.

DESCRIPTION

Three speed hydraulically controlled automatic planetary transmission of same design used on previous models. A steering column mounted range selector lever is used on all models (pushbutton type control is not used).



RAMBLER SIX FLASH-O-MATIC TRANSMISSION

LUBRICATION

Checking Fluid Level

Check fluid level every 4,000 miles. With transmission at normal operating temperature, engine at idle speed, move selector lever through all ranges momentarily and return to "N" (Neutral) position. Check fluid level on dipstick and add recommended fluid as necessary to bring level up to "F" mark on dipstick. *NOTE - Approximately 1½ pts. of fluid required to raise level from "L" mark to "F" mark on dipstick. Do not overfill.*

Draining & Refilling

NOTE - Draining & refilling is not recommended except at time of transmission overhaul. With transmission at normal operating temperature, remove oil filler tube from side of transmission oil pan and allow transmission to drain. To drain converter, remove transmission oil pan and loosen control valve body. *NOTE - Loosening control valve body provides a "bleed", allowing converter to drain.* To refill transmission and converter, install oil pan and filler tube (after tightening control valve body assembly), and pour 5 qts. of recommended fluid into filler tube. Start engine and run it with selector lever in "N" (Neutral), then pour in 4 qts. of fluid and move selector lever through all ranges, returning to "N" position. Recheck fluid level and adjust to "F" mark on dipstick.

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

9 qts. with transmission and converter dry.

ADJUSTMENT

Throttle Linkage

See CARBURETOR n Car Mod l pag s.

Manual Linkage

Place selector lever in "L" (Low), then disconnect gearshift rod trunnion from manual lever on transmission. *NOTE - Make sure manual lever on transmission is in extreme rear position.* Adjust trunnion on manual shift rod to enter freely into hole in bushing in transmission lever. Replace washer and secure with cotter pin. Check selector lever in all positions.

Neutral Safety Switch

Located on steering jacket tube under instrument panel. To adjust, loosen capscrews securing switch to jacket tube, then place transmission selector lever in "N" (Neutral). Use a 3/32" pin for alignment and insert pin in hole on face of switch, then rotate switch until pin freely enters hole in switch toggle. Tighten attaching screws and remove alignment pin. *NOTE - Tang of switch must ent r chann l on op rating shaft before securing switch to jacket.* Check to make sure engine starts in "N" or "P" only.

Front Band

With oil pan removed, loosen locknut on adjusting screw and insert a .250" gauge block (part of Tool J-5880-01) between end of adjusting screw and servo rod. Use Adapter J-9639 and an inch pound torque wrench and tighten adjusting screw to 9 inch pounds *(see "Torque Wrench Not " b low).* Tighten locknut securely and remove gauge.

Rear Band

Loosen locknut on right hand side of transmission case and install Adapter J-21111 on adjusting screw. Tighten adjusting screw to 10 ft. lbs. *(NOTE - This supers d s previous specification of 7 ft. lbs.).* Back off screw ¾ turn and tighten locknut to 30 ft. lbs. *NOTE - S "Torqu Wr nch Not " b low.*

TORQUE WRENCH NOTE (Fr nt & R ar Band Ad-

(Continu d)

justment) - The adjusting screw tightening specifications given above are for tightening torque at the adjusting screw. If the indicated adapters are used (lengthening the torque wrench), determine the proper torque wrench reading as follows: Multiply torque required at adjusting screw by length of torque wrench (center of handle to center of drive); then divide the product by length of torque wrench plus length of adapter (center of drive socket to center of driven socket) The result will be the reading required on torque wrench to obtain proper torque at adjusting screw.

TESTING

Stall Test

With engine at normal operating temperature, place transmission in "D1" position. Apply parking brake and foot brake and accelerate engine with wide open throttle to 1400 RPM. *CAUTION - Do not hold throttle open for more than 15 seconds.* If engine speed will not reach 1400 RPM, poor engine performance is indicated. An engine speed over 1400 RPM indicates transmission or converter slippage.

Road Test

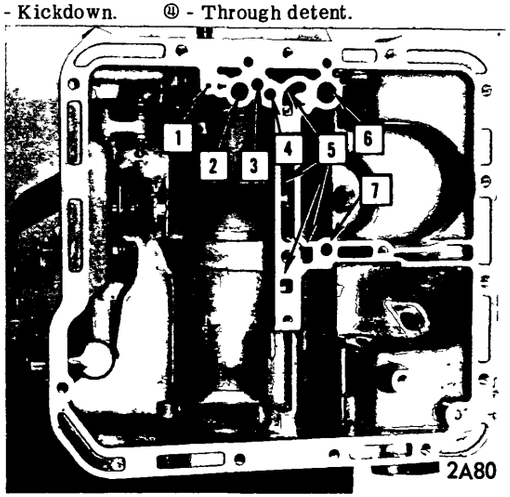
Drive car and check for upshifts and downshifts as indicated in following table.

SHIFT SPEEDS

(American)

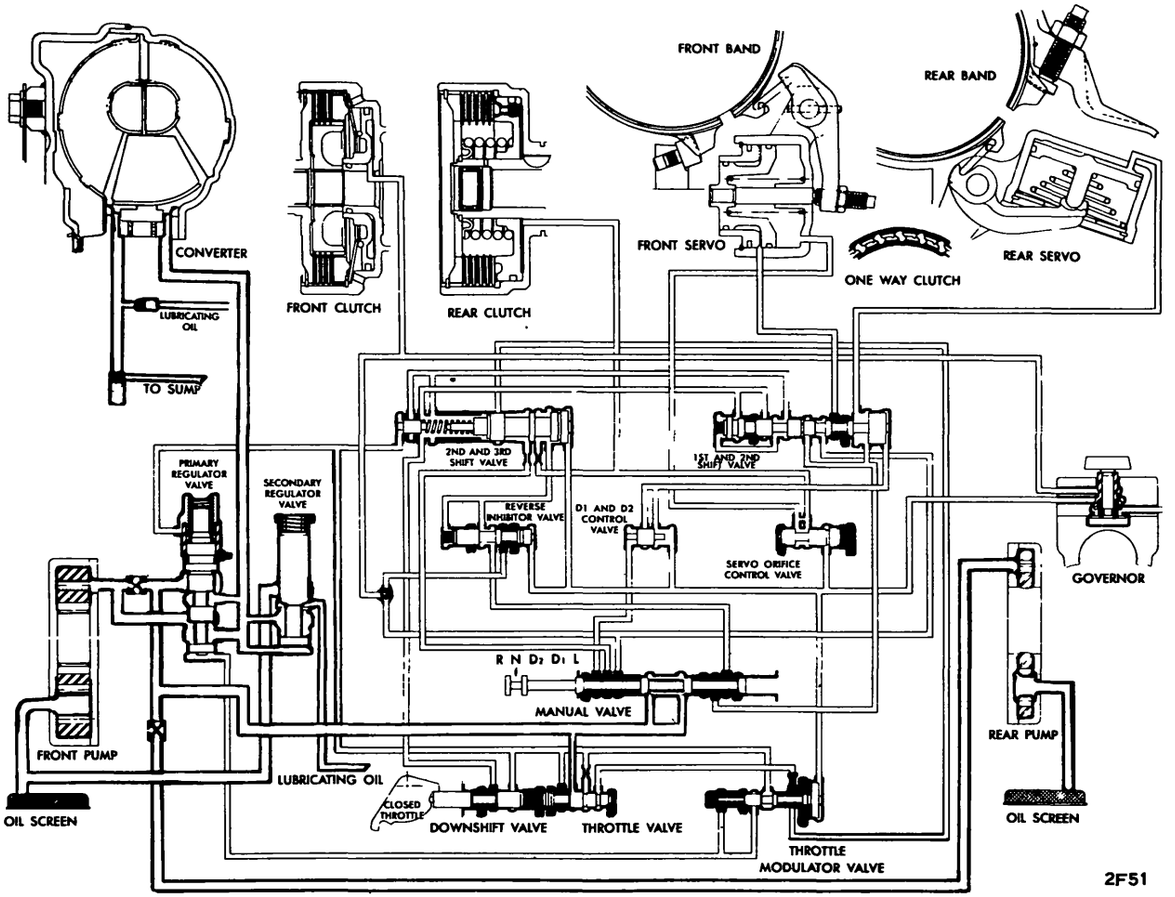
Upshift①	Light Thr ttl	Full Throttle②	Kickdown④
1-2	6-10 MPH	24-28 MPH	37-41 MPH
2-3	12-16 MPH	45-49 MPH	66-70 MPH
D wnshift	**Cl s d Thr ttle**	**Part Throttle③**	**Kickdown④**
3-1	5-9 MPH		25-29 MPH
3-2		21-25 MPH	58-62 MPH

① - Selector lever in "D1". ② - To detent.
③ - Kickdown. ④ - Through detent.



1. Control Pressure
2. Rear Pump Pressure
3. Front Clutch and Governor Feed
4. Governor
5. Lubrication
6. Rear Pump Suction
7. Rear Clutch Apply

TRANSMISSION CASE OIL PASSAGES



RAMBLER SIX AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

(Rambler Classic)

Upshift①	Light Throttle	Full Throttle②	Kickdown④
1-2	6-10 MPH	25-29 MPH	35-39 MPH
2-3	12-16 MPH	41-45 MPH	59-63 MPH
Downshift	**Closed Throttle**	**Part Throttle③**	**Kickdown④**
3-1	5-9 MPH		23-27 MPH
3-2		23-28 MPH	55-59 MPH

① - Selector lever in "D1". ② - To detent.
③ - Kickdown. ④ - Through detent.

Air Pressure Test

Front Servo - Remove front servo apply tube and apply pressure where tube enters servo body. Watch for servo operation.

Rear Servo - Remove rear servo apply tube and apply pressure where tube enters servo body. Watch for servo operation.

R ar Clutch - Remove rear clutch tube and apply pressure where tube enters hole in case. A dull thud should be heard.

Governor - To check governor, remove valve body and apply pressure to governor oil passage in case (see illustration).

Front Clutch - Remove valve body and apply pressure to front clutch and governor feed oil passage in case (see illustration). A dull thud should be heard.

Oil Pressure Test

CAUTION - Make this test only if transmission is not shifting properly after checking throttle linkage for proper adjustment. Connect a suitable pressure gauge to control pressure test point on rear of transmission case (above oil pan flange toward left side of case). With transmission fluid at 190°F, pressure should be 100 lbs. ± 10 lbs. at 1000 RPM. At idle speed of 475 RPM, pressure should be 50-62 lbs.

TROUBLE SHOOTING & DIAGNOSIS

NOTE - Before making any corrections to transmission, check and adjust fluid lev l, manual linkage and throttle linkage, then rech ck operation of transmission to determine if trouble has been improved or corrected.

Harsh Drive Engagement

Control valve assembly not tightened properly. Throttle valve sticking. Primary or secondary regulator valve sticking. Front clutch frozen or warped.

Delayed Drive Engagement

Improper idle speed. Oil tube missing or not installed properly. Seal rings missing or broken. Control valve assembly not tightened properly. Primary regulator valve sticking. Front clutch ball check missing or sticking. Failure in front or rear clutch. Converter slipping.

No "D-2" Range

Front band not adjusted properly. Oil tube missing or not installed properly. Sealing rings missing or broken. Control valve not properly tightened. Primary regulator valve sticking. Front clutch ball check missing or sticking. Front clutch failure. Front band failure or faulty servo. Input shaft broken. Front pump drive tangs broken or converter broken. Worn front pump or converter failure.

No "D-1" or "L" Range

Oil tubes missing or improperly installed. Sealing rings missing or broken. Control valve not properly tightened. Secondary regulator valve sticking. Failure in front clutch or front clutch check ball missing or sticking. Sprag clutch slipping or improperly installed. Input shaft broken. Front pump or converter failure.

No "R" Range

Oil tubes missing or improperly installed. Seal rings missing or broken. Control valve not properly tightened. Primary regulator valve sticking. Governor valve sticking or improperly installed. Reverse inhibitor valve sticking. 1-2 shift valve sticking. 2-3 shift valve sticking. Front clutch frozen or warped. Rear clutch failure, faulty piston, broken return spring or worn plates. Rear band failure or faulty servo. Input shaft or converter broken. Front pump failure.

Lock-Up Forward & Reverse

Front or rear clutch frozen or warped. Sprag clutch frozen.

No Neutral

Front clutch frozen or warped.

No 1-2 Upshift

Bands not adjusted properly. Governor valve, modulator valve or throttle valve sticking. Oil tubes missing or not properly installed. Control valve not properly tightened. 1-2 shift valve sticking. Front band slipping or servo faulty.

No 2-3 Upshift

Oil tubes missing or not properly installed. Sealing rings missing or broken. Control valve not properly tightened. Throttle valve sticking. Governor valve sticking or not properly installed. 2-3 shift valve sticking or plug missing. Failure in rear clutch. Annular piston not seating.

Low 1-2 & 2-3 Upshift

Oil tubes missing or not properly installed. Seal rings missing or broken. Control valve not tightened properly. Throttle valve sticking or not properly installed. Governor valve sticking. 2-3 shift valve plug sticking.

High 1-2 & 2-3 Upshift

In addition to corrections for "Low 1-2 & 2-3 Upshift", check for sticking modulator valve. 1-2 or 2-3 shift valve sticking, or 2-3 shift valve plug sticking.

Slipping 1-2 & 2-3 Shift

Front band not properly adjusted. Oil tubes missing or improperly installed. Sealing rings missing or broken. Control valve assembly not tightened properly. Primary regulator valve or throttle valve sticking. Governor valve sticking or improperly installed. If 1-2 shift is slipping, check for front clutch check ball sticking or missing, or faulty front servo. If 2-3 shift is slipping, check for worn or slipping rear clutch plates.

Harsh 1-2 & 2-3 Shift

Front band not properly adjusted. Control valve assembly not properly tightened. Primary regulator, throttle valve, or modulator valve sticking. Governor valve sticking or not properly installed. If 1-2 shift is harsh, check for front clutch slippage or for frozen sprag clutch. If 2-3 shift is harsh, check for warped or frozen rear clutch.

Faulty 1-2 Shift

Improper rear band adjustment. Rear clutch frozen. Sprag clutch frozen.

Faulty 2-3 Shift

Improper front band adjustment. Oil tubes missing or not properly installed. Control valve assembly bolts missing or not properly tightened.

No 2-1 Downshift

Control valve assembly not properly tightened. Throttle valve sticking. Governor valve sticking, leaking or not properly installed. D-1 & D-2 control valve sticking. 1-2 shift valve sticking.

No 3-2 Downshift

Control valve assembly not properly tightened. Throttle valve or governor valve sticking. 2-3 shift valve or plug sticking.

High 2-1 & 3-2 Downshift

Sealing rings missing or broken. Control valve assembly not properly tightened. Throttle valve, modulator valve or governor valve sticking. 2-3 shift valve or plug sticking.

Slipping 2-1 Downshift

Sprag clutch slipping or not properly installed.

Slipping 3-2 Downshift

Improper front band adjustment. Oil delivery tubes missing or not properly installed. Seal rings missing. Control valve assembly not tightened properly. Primary regulator valve, throttle valve, or governor valve sticking. Rear clutch failure. Front band slipping or faulty servo.

Harsh 3-2 Downshift

Front band not properly adjusted. Control valve assembly not tightened properly. Throttle valve sticking. Rear clutch frozen or warped.

TRANSMISSION REMOVAL & INSTALLATION

Removal

Disconnect throttle cable from carburetor throttle shaft and from cable bracket, then disconnect battery cable. Raise car and place jack stands under rear of car at body sills. Disconnect manual shift rod from transmission lever, brake tube from under floor pan, rear shocks from rear axle, and speedometer cable from transmission. Drain transmission, then proceed as follows:

Rambler American (Exc. Convertibl) - Disconnect parking brake cable, then disconnect rear spring front brackets from floor pan studs. Slide axle to rear, disconnecting front universal joint from transmission output shaft. Place a suitable lift under transmission, then remove transmission case-to-converter bolts. Make sure transmission is in alignment with converter housing, then pull transmission to rear until clear of converter, and remove from car.

Rambler American (Convertibl) - Disconnect parking brake cable, then lower rear axle to relieve spring tension and remove rear spring to axle "U" bolts. Raise rear axle enough to relieve weight of rear axle on springs and to clear spring center bolts. Slide rear axle on springs to remove universal joint from transmission output shaft. Use a suitable lift under transmission, then remove transmission case-to-converter housing bolts. Move transmission to rear to clear input shaft and converter housing, then tilt transmission front end to right side. Keep lowering front end and tilting to right side until transmission input shaft clears converter housing and rear of case clears slot in crossmember. Remove transmission from car.

Rambler Classic - Disconnect stabilizer bar from left side of rear axle, then disconnect torque tube and parking brake cable. Lower rear axle and move toward rear to separate torque tube and propeller shaft from transmission. Use a suitable lift under transmission, then support rear of engine and remove transmission case-to-converter housing bolts. Remove the two rear crossmember bolts from engine rear support to transmission insulator and disconnect crossmember from side sills. With transmission and converter housing in alignment, pull transmission assembly to rear and remove from car.

Installation

Reverse removal procedure and note the following: Position front pump drive tangs in a horizontal position, then use a thin screwdriver to position front pump external tooth drive gear lugs in a vertical position. Carefully slide transmission assembly into converter and converter housing. Do not use force. Tighten all screws, bolts, and nuts to specifications *(see "Tightening Specifications" below).*

TRANSMISSION UNIT REPLACEMENT (TRANSMISSION IN CAR)

See 1962 Final Data, Page 512, and note the following:

Parking Brake Control

All M dels (R moval) - Remove oil pan and throttle control cable from transmission case, then remove control valve assembly. Remove park lever assembly by removing retaining spring and washer on inner end of toggle hub and remove toggle lift assembly from shaft. Remove tapered pin from case with Tool J-9644 and remove parking brake control toggle hub shaft from case.

Installati n - Install "O" ring seal on parking brake toggle hub shaft, then install shaft in case and tap tapered pin into place. Install parking pawl lift assembly on shaft, aligning teeth with shift control inner lever, and install washer and retaining pin. Install control valve assembly, oil pan and gasket.

TRANSMISSION & CONVERTER ASSEMBLY REMOVAL & INSTALLATION

Removal

NOTE - On Rambler American Convertible, the transmission and converter must be removed and replaced separately.

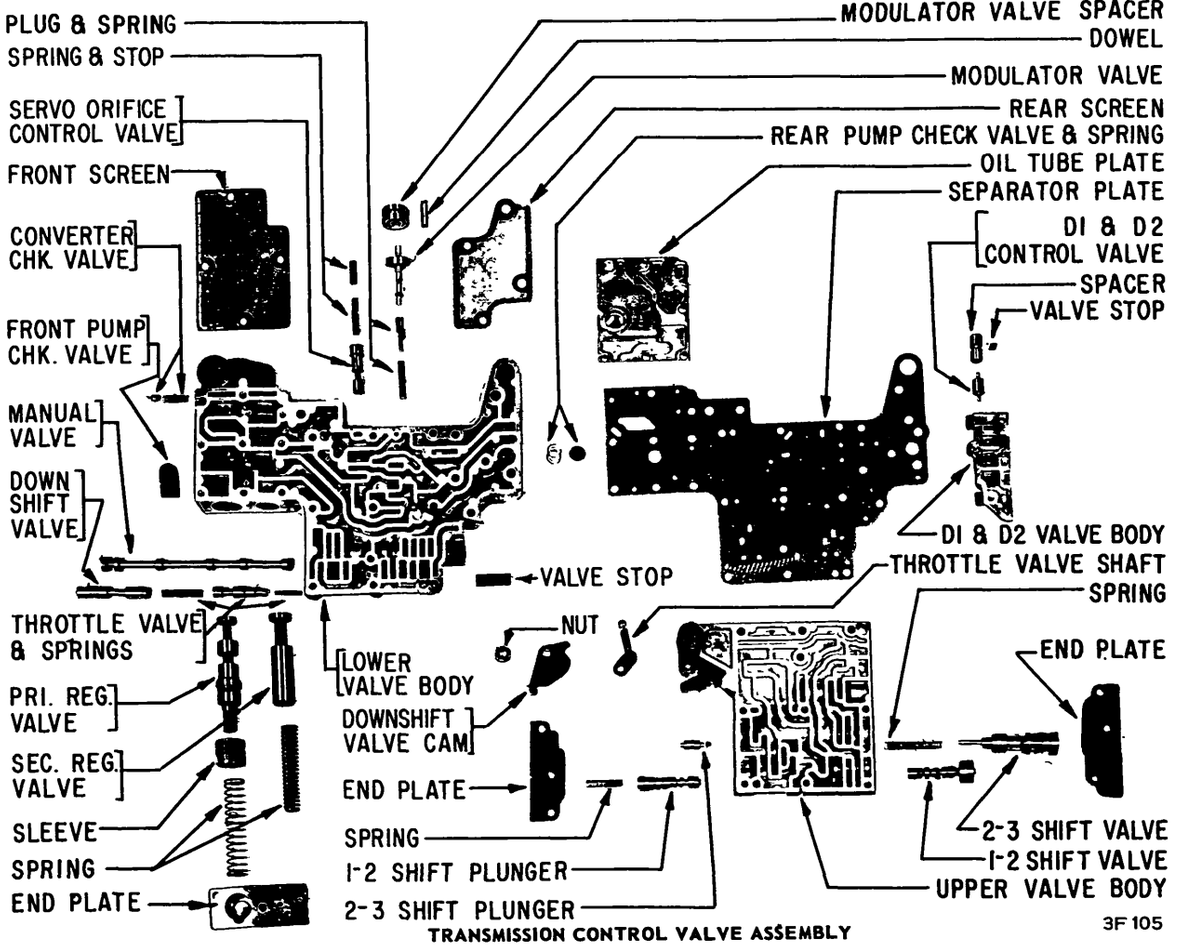
Proceed as for "Transmission Removal" (see above) to the point where transmission case-to-converter housing bolts are to be removed and note the following additional instructions:

Rambler American (Exc. Convertible) - Remove converter housing lower mud pan, then remove capscrews retaining converter to drive plate. Remove crossmember side sill bolts and lower engine and transmission assembly. *NOTE - When lowering the assembly, place a wooden board ¾" x 6" x 16" between engine oil pan and front suspension crossmember so that engine will rest on board between oil pan and crossmember.* Remove engine-to-converter housing attaching bolts, then with all parts in alignment, pull transmission and converter assembly to rear until housing and converter are clear of engine and remove from car.

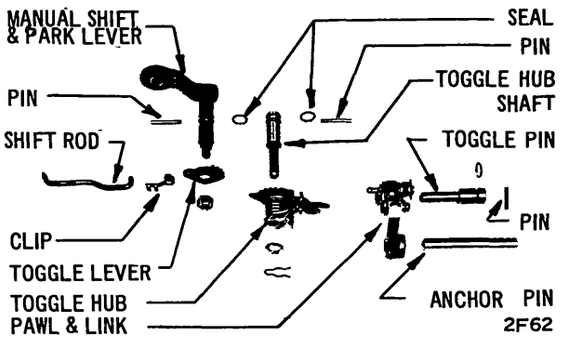
Rambler Classic - Support engine at rear, then remove starter motor. Disconnect crossmember from engine rear support transmission insulator and from side sills, then remove converter housing mud pan. Lower transmission and engine enough to clear floor pan and remove converter housing to engine bolts. Remove capscrews attaching torque converter to flex plate, then remove lower bellcrank and exhaust pipe bracket. Pull transmission and converter assembly to rear and remove from car.

Installation

Reverse removal procedure and use the two lower engine-to-converter housing bolts as dowels to guide housing into place. Tighten all bolts and nuts to specifications *(see "Tightening Specifications" below).*



TRANSMISSION CONTROL VALVE ASSEMBLY



MANUAL & PARK LINKAGE (ALL MODELS)

TRANSMISSION OVERHAUL

See 1962 Final Data, Page 513 and note the following:

Rambler Classic - Procedures outlined in 1962 Final Data, except for parking brake controls (see above), apply to 1963 models.

Tightening Specifications

Location	Torqu
Rear Extension to Case	100-120 In. Lbs.
Oil Pan to Case	100-120 In. Lbs.
Front Servo to Case	100-120 In. Lbs.
Rear Servo to Case	120-154 In. Lbs.
Frt. Pump Adapter to Housing ①	25-35 In. Lbs.
Frt. Pump Adapter to Housing ②	17-22 Ft. Lbs.
Frt. Pump Adapter to Case	120-200 In. Lbs.
Rear Pump to Case ②	55-66 In. Lbs.
Rear Pump to Case ①	20-30 In. Lbs.
Center Support to Case	120-154 In. Lbs.
Throttle Shaft Locknut	20-25 Ft. Lbs.
Manual Shaft Locknut	20-25 Ft. Lbs.
Frt. Servo Adj. Screw Locknut	20-25 Ft. Lbs.
Rear Servo Adj. Screw Locknut	25-30 Ft. Lbs.
Valve Body Bolts (10-24)	20-30 In. Lbs.
Valve Body to Case (¼"-20)	55-66 In. Lbs.
Rear Oil Screen	55-66 In. Lbs.
Gov. Valve Body to Weight	50-60 In. Lbs.
Gov. Valve Body Cover	20-30 In. Lbs.
Line Pressure Plug	4-6 Ft. Lbs.

① - 10-24 screws. ② - Exc. 10-24 screws.

RAMBLER EIGHT & CHECKER AUTOMATIC TRANSMISSION

DRIV-ER-MATIC & DUAL RANGE
Checker (1963)
FLASH-O-MATIC
Rambler Classic V8 (1963)
Rambler Ambassador V8 (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

With selector lever in "N" (Neutral), push car until it reaches a speed of approximately 15-20 MPH, then turn ignition switch on and place selector lever in "L" (Low) until engine starts.

Towing Car

If transmission is operating properly, car may be towed for short distances with transmission selector lever in "N" (Neutral). If transmission is inoperative or if car is to be towed a long distance, raise rear wheels off ground or disconnect propeller shaft.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 RAMBLER AMBASSADOR TRANSMISSION OIL SCREEN PRODUCTION CHANGE:* A new oil screen assembly, Part No. 3169500, is being used in production on later cars and may be used for service replacement on all 5880 through 6380 Series cars.

DESCRIPTION

Three speed hydraulically controlled automatic planetary transmission of same design used on previous models. A steering column mounted range selector lever is used on all models (pushbutton type selector not used on Rambler models).

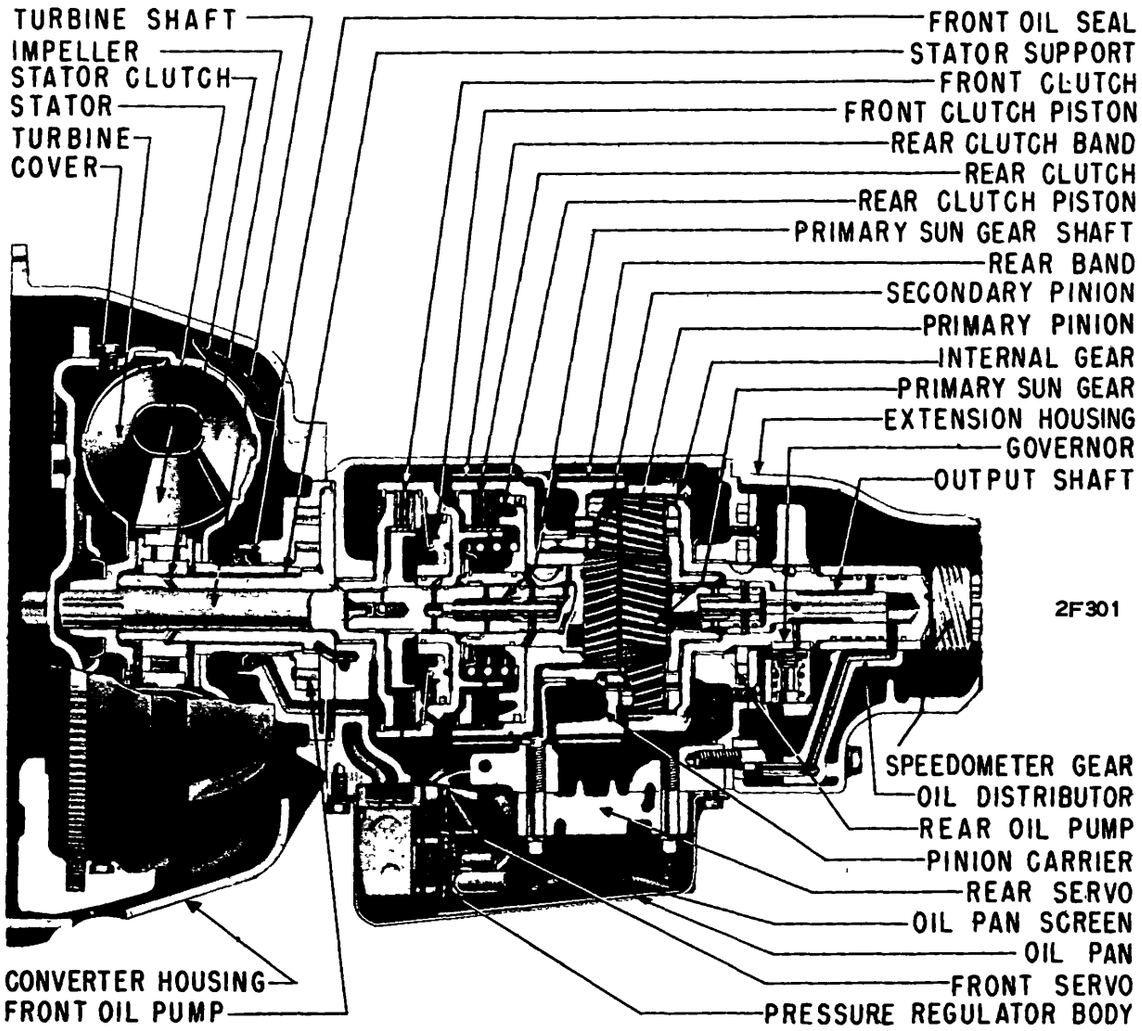
LUBRICATION

Checking Fluid Level

Check fluid level every 1,000 miles (Checker); every 4,000 miles (Rambler). With transmission at normal operating temperature, engine at idle speed, move selector lever through all ranges momentarily and return to "N" (Rambler); "D2" (Checker). Check fluid level on dipstick and add recommended fluid as necessary to bring level up to "F" mark on dipstick. *NOTE - Approximately 2 pts. of fluid are required to raise level from "L" mark on dipstick to "F" mark on dipstick. Do not overfill.*

Draining & Refilling

RAMBLER NOTE - Draining and refilling is not recommended except at time of overhaul. With transmission at normal operating temperature, remove oil filler tube from side of transmission oil pan and allow transmission to drain. To drain converter on Rambler models, remove transmission oil pan and loosen control valve body to provide a "bleed", allowing converter to drain. On Checker models, remove two drain plugs from converter (180° apart) through opening in converter housing. To refill transmission and converter, install converter drain plugs (tighten control valve body and replace oil pan), then pour 5 qts. of recommended fluid into filler tube. Start engine and run it with selector lever in "N" (Neutral), then pour in 4 qts. of fluid and move selector lever through all ranges, returning to "N". Recheck fluid level and adjust to "F" mark on dipstick. Do not overfill.



RAMBLER V8 FLASH-O-MATIC TRANSMISSION

R c mmended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

11 qts. (Rambler); 10 qts. (Checker).

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Linkage

Rambler - Place selector lever in "L" (Low) position, then disconnect gearshift rod trunnion from lever on transmission (make sure transmission lever is in extreme rear position). Adjust trunnion on gearshift rod for free entry into hole in bushing in transmission lever, then install washer and cotter pin. Check selector lever in all transmission positions. *(Continued)*

Checker - Disconnect manual shift rod from selector lever on steering column and lever on transmission Position transmission selector lever so indicator is down against stop in "D" (Drive) position then place manual lever on transmission in 'D" (Drive) detent (second from top of transmission) Adjust length of manual shift rod so it fits into ball joint on steering column and into shift lever on transmission without changing position of selector lever or manual lever on transmission Tighten ball joint nut at steering column and install washer and cotter pin at transmission lever Move selector lever through all ranges and check operation

N utral Safety Switch

Rambler - Located on steering jacket tube under instrument panel To adjust, loosen capscrews securing switch to jacket tube, then place transmission selector lever in "N" (Neutral) Use a 3/32" pin for alignment and insert pin in hole on face of switch then rotate switch until pin freely enters hole in switch toggle Tighten attaching screws and remove alignment pin *NOTE - Tang of switch must enter channel on operating shaft before securing switch to jacket* Check to make sure engine starts in "N" or "P" only

Checker - Starter circuit must be open in all positions except "N '(Neutral) To adjust loosen neutral switch-to steering column screws and position switch so starter circuit is closed when selector lever is in "N" (Neutral)

Kickdown Switch

Rambl r - Switch is located on engine side of firewall and is actuated by carburetor throttle linkage To adjust, hold accelerator pedal fully depressed, then adjust switch in bracket so plunger is depressed and switch is closed

Ch ck r - Loosen two nuts on kickdown switch (one above toeboard and the other below toeboard) and rotate upper nut to obtain a clearance of ¼" between switch and accelerator pedal when carburetor throttle valves are in wide open position

Vacuum Solenoid Unit

Rambl r - Remove pressure test plug at left front side of transmission and install the 1/8" pipe plug ex tension provided with Tool J-8773 (Vacuum Solenoid Control Adjusting Kit), then connect an oil pressure gauge to the extension Disconnect vacuum line at the vacuum solenoid unit and attach the vacuum gauge to the 'T" fitting on test line Start engine and bring to normal operating temperature with transmission in neutral At engine speed of 475 RPM transmission in neutral, turn needle valve on test line to lower vacuum reading on gauge to obtain a vacuum reading of 13 8" Hg With correct vacuum reading, oil pressure reading should be 85 lbs ± 3 lbs If oil pressure reading is not correct, loosen vacuum solenoid unit locknut and turn unit in toward case if pressure is too low, away from case if pressure is too high After making correct adjustment, cover the bleed hole provided in needle valve to stop atmospheric pressure entering the line This will bring vacuum reading on test gauge to optimum engine vacuum and the oil pressure gauge should then read 55-65 lbs With rear wheels raised off floor, place transmission in "D2" position, then cover bleed hole in needle valve Accelerate engine until transmission shifts into direct drive Pressure gauge should read 25-35 lbs *NOTE - If vacuum solenoid unit was removed for replacement or for transmission repairs, initially install unit so the measurement between back face of transmission case and front edge of vacuum solenoid unit is 23/64" Make final adjustment as indicated above*

Checker - After unit is installed on transmission case, it should be initially adjusted in or out so distance between front edge of unit and transmission case is 3/8" Remove 1/8" pipe plug from lower left corner of transmission case and install a 300 lb pressure gauge Remove fitting at rear of vacuum solenoid unit and install a vacuum gauge using a "T" fitting Install vacuum line so unit will operate and gauge will register Connect a tachometer to engine then start engine and run several minutes to bring to normal operating temperature Place selector lever in "D1" and apply parking brake and service brakes Accelerate engine until a reading of 10 5" Hg is obtained on vacuum gauge Reading on pressure gauge should be 90-105 lbs If pressure is below specifications, turn vacuum solenoid unit inward to increase pressure If above specifications, turn unit outward When correct pressure has been obtained, tighten locknut *NOTE - It is recommended that vacuum solenoid unit not be turned more than ½ turn either way from initial setting of 3/8" When making the above tests, do not operate engine more than 10 seconds at any one interval*

Front Band

With transmission oil pan and screen removed, use Tool J-5880-01 (Rambler), Tool No 7195 (Checker) and loosen adjusting screw, then insert gauge block (part of tool) between end of adjusting screw and servo piston rod Turn screw in until it overruns and remove gauge block *NOTE - It may be necessary to back adjusting screw off slightly to remove gauge block If so, be sure to tighten screw the same amount after block is removed* Tighten locknut to 20-25 ft lbs and install screen, gasket, and transmission oil pan Refill transmission *See "Torque Wrench Note" below*

Rear Band

Rambler - Loosen locknut on right hand side of transmission case and install Adapter J-21111 on adjusting screw Tighten adjusting screw to 10 ft lbs *(NOTE - This supersedes previous tightening specification of 9 ft lbs)* Back off adjusting screw 1½ turns and tighten locknut to 30 ft lbs *See "Torque Wrench Note" below*

Checker - Remove cover plate from floor pan and position Tool No 7225 on adjusting screw and loosen locknut Using "T" handle of tool, tighten adjusting screw until wrench overruns (10 ft lbs), **then back off adjusting screw 1½ turns.** Hold adjusting screw stationary and tighten locknut to 35-40 ft lbs

TORQUE WRENCH NOTE (Front & Rear Band Adjustment) - The adjusting screw tightening specifications given above are for tightening torque at the adjusting screw If the indicated adapters are used (lengthening the torque wrench), determine the proper torque wrench reading as follows Multiply torque required at adjusting screw by length of torque wrench (center of handle to center of drive), then divide the product by length of torque wrench plus length of adapter (center of drive socket to center of driven socket) The result will be the reading required on torque wrench to obtain proper torque at adjusting screw

TESTING

Stall Test

With engine at normal operating temperature, place transmission in "D1" position Apply parking brake and foot brake and accelerate engine with wide open throttle to 1600 RPM *CAUTION - Do not hold throttl open for more than 15 seconds* If engine speed will not reach 1600 RPM, poor engine performance is indicated An engine speed over 1600 RPM indicates transmission or converter slippage

Road Test

Drive car and check for upshifts and downshifts as indicated in following table

SHIFT SPEEDS

(Rambler Ambassador)
(Series 80)

Upshift	Light Throttle	Full Throttle	Kickd wn
1-2	10-14 MPH	26-30 MPH	37-41MPH
2-3	21-25 MPH	46-50 MPH	64-68 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	16-20 MPH	28-32 MPH	58-62 MPH
2-1	6-10 MPH		25-29 MPH

(Checker Superba)

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	5-8 MPH	22-30 MPH	
2-3	10-13 MPH	41-50 MPH	
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	7-11 MPH		35-49 MPH
2-1	3-7 MPH		

Air Pressure Test

With transmission in car, remove oil pan and control valve assembly (leave front servo tubes in front servo and make sure servo attaching screw tight) *NOTE - When making air pressure tests, hold a clean towel over transmission opening to prevent excessive oil spray*

Front Clutch - Apply air pressure to front clutch passage (on transmission case rear flange) Listen for a dull thud indicating clutch is operating Retain air pressure in this passage for several seconds to check for leaks in this circuit

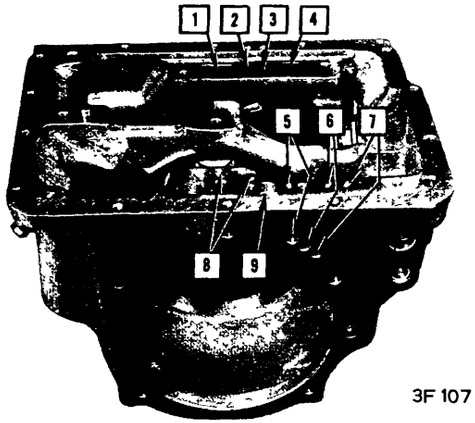
Governor Valve - Remove governor inspection hole cover and apply air pressure to front clutch passage (see above) Listen for a click and watch valve snap inward Replace inspection hole cover

Rear Clutch - Apply air pressure to rear clutch passage (on transmission case rear flange) Listen for a dull thud indicating clutch is operating Retain air pressure in this passage for several seconds to check for leaks in this circuit

(Continu d)

Front Band & Servo - Apply air pressure to front servo apply tube (rear tube) and note band application. **Rear Band & Servo** - Apply air pressure to rear clutch oil passage (on transmission case rear flange) and note band application.

TESTING NOTE; If servos, bands, clutches, and governor operate with air pressure, then the no-drive problems, erratic shift, or no-shift conditions indicate that the control valve assembly and pressure regulator assembly is the cause of the trouble. *See "Control Valve" and "Pressure Regulator Valve" below.*



3F 107

1. Front Pump Intake
2. To Converter
3. From Converter
4. Front Pump Discharge
5. Rear Clutch
6. Front Clutch
7. Governor Output
8. Rear Servo

AIR PRESSURE TEST POINTS

TROUBLE SHOOTING & DIAGNOSIS

NOTE - Before making any corrections to transmission, check and adjust fluid level, manual linkage and throttle linkage, then recheck operation of transmission to determine if trouble has been improved or corrected.

Initial Engagement Rough

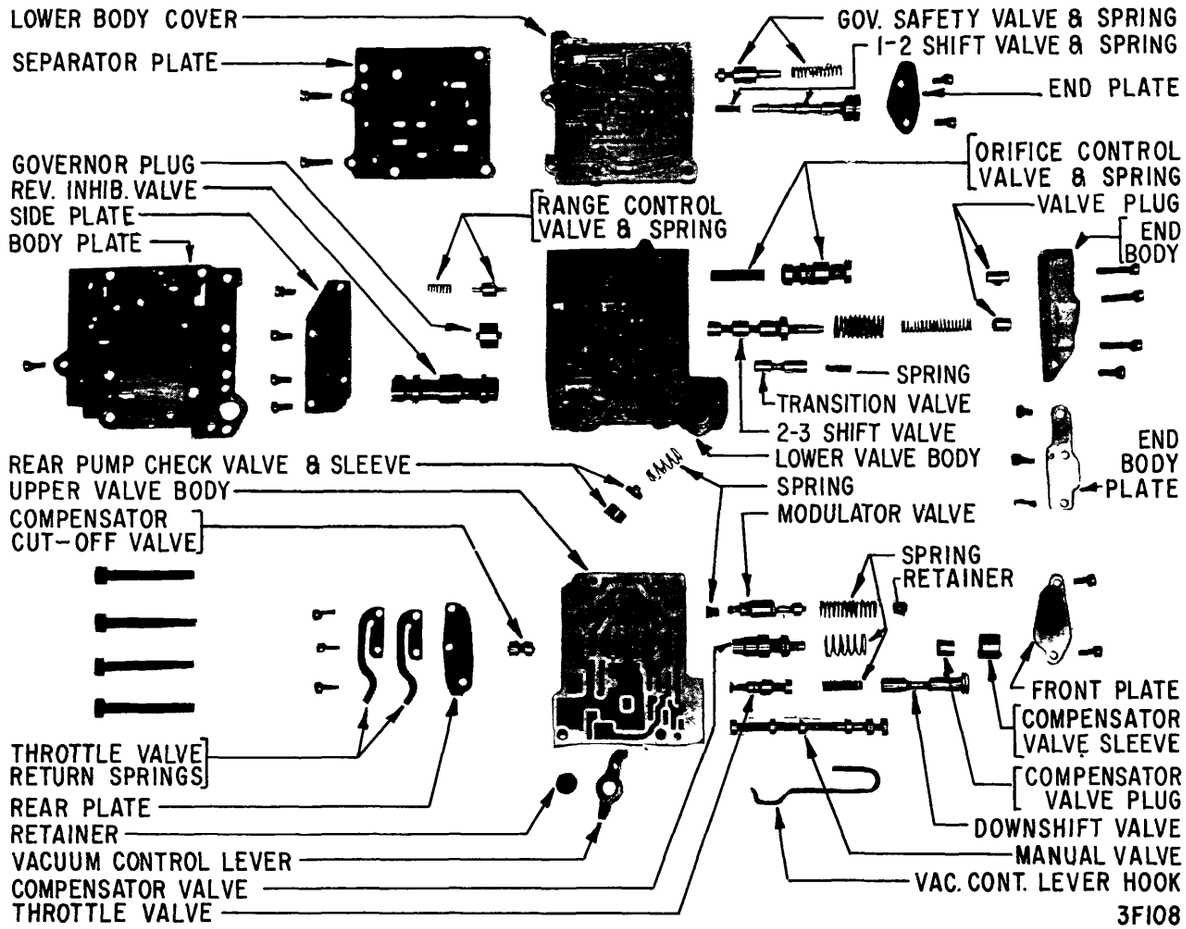
Idle speed may be too high. Control pressure may be too high caused by improper adjustment of throttle control vacuum unit. Control valve assembly or pressure regulator valve assembly may be dirty.

Initial Engagement Delayed

Fluid level may be low. Control pressure may be too low at idle speed, caused by low engine idle speed, dirty control valve or pressure regulator valve assemblies. Front pump may be worn. Fluid circuits may be leaking.

Inop rative in All Ranges

Fluid level may be low. Manual linkage may be disconnected. No control pressure, caused by inoperative front pump (check front pump and front pump drive tangs on converter). Rear band and (or) servo not operating. Converter may be slipping. *NOTE - If there is no drive in "D1" position only, check sprag clutch.*



RAMBLER V8 CONTROL VALVE ASSEMBLY

No Drive in "D" or "L" Position

Fluid level may be low. Manual linkage may be improperly adjusted. Control pressure may be low, caused by improper adjustment of vacuum control unit, or dirty control and pressure regulator assemblies. Front clutch or rear band not applying. Transition valve in control valve assembly may be sticking.

No Drive in "R" Position

Fluid level may be low. Manual linkage may be improperly adjusted. Control pressure may be low, caused by improper adjustment of vacuum control unit, or dirty control and pressure regulator assemblies. Rear clutch or rear band not applying. Transition valve in control valve assembly may be sticking. *NOTE - If there is no drive in "R" position at times from "D2" position, range control valve may be stuck. If necessary, remov and chamfer both ends of valve.*

Locks Up in "D" Position (1st Gear)

Rear clutch is applied, caused by faulty control valve assembly, dirty governor valve, or mechanical failure in rear clutch.

Locks Up in "D" Position (2nd G ar)

Rear band or sprag applied. Rear clutch may be applied.

L cks Up in "D" Position (3rd G ar)

Rear band or sprag clutch applied, caused by dirty control valve assembly or by mechanical failure. Front band .may be applied because of mechanical failure.

(Continued)

Locks Up in "R" Position

Front clutch applied, check for mechanical failure Front band applied, check for mechanical failure or for a dirty control valve assembly.

Slips in "L" Position

Fluid level may be low. Vacuum and solenoid unit may not be properly adjusted. Control pressure low, caused by a dirty control valve and pressure regulator valve assembly. Rear servo travel is limited or front clutch slips. Check for mechanical failure. Rear pump check valve stuck open.

Slips in "D" (1st Gear)

Fluid level may be low. Vacuum solenoid unit may not be properly adjusted. Control pressure low, caused by a dirty control valve and pressure regulator valve assembly. Check sprag clutch for slippage. Front clutch slipping. Rear pump check valve stuck open.

Slips in "R" Position

Fluid level may be low. Control pressure low, caused by a dirty control valve and pressure regulator valve assembly. Vacuum solenoid may not be properly adjusted. Rear servo travel limited. Rear clutch slipping. Rear pump check valve stuck open.

1-2 Upshift Rough

Vacuum solenoid unit may not be properly adjusted. Front band out of adjustment. Governor valve stuck.

1-2 Upshift Slips

Vacuum solenoid may not be properly adjusted. Front band not properly adjusted or servo piston travel is limited. Front band glazed. Governor valve stuck.

N 1-2 Upshift

Governor valve or 1-2 shift valve stuck.

1-2 Upshift Lat

Governor valve stuck or a leak in governor circuit. Control pressure too high, caused by an improperly adjusted vacuum solenoid unit or by a dirty control valve assembly. *NOTE - If 1-2 Upshift is early, check for a stuck governor valve.*

2-3 Upshift Rough

2-3 Upshift Rough

Control pressure too high, caused by an improperly adjusted vacuum solenoid unit Front band not adjusted properly. Governor valve stuck.

2-3 Upshift Slips

Control pressure too low, caused by an improperly adjusted vacuum solenoid unit. Front band not adjusted properly. Governor valve stuck. Internal leakage in transmission.

No Direct Drive or 2-3 Upshift

Governor valve stuck. 2-3 shift valve stuck. Bushing in output shaft misaligned.

2-3 Upshift Late

Governor valve stuck or leak in governor circuit Vacuum solenoid not properly adjusted. *NOTE - If 2-3 Upshift early, check for stuck governor valve.*

3-2 Downshift Rough (Clo

3-2 Downshift Rough (Closed Throttle)

Vacuum solenoid not properly adjusted. Orifice control valve stuck.

3-2 Kickdown Early

Vacuum solenoid not properly adjusted. Kickdown switch not properly adjusted. *NOTE - If there is no kickdown, check for loss of current through kickdown switch.*

No Push Start

Rear pump inoperative. Pressure regulator valve stuck.

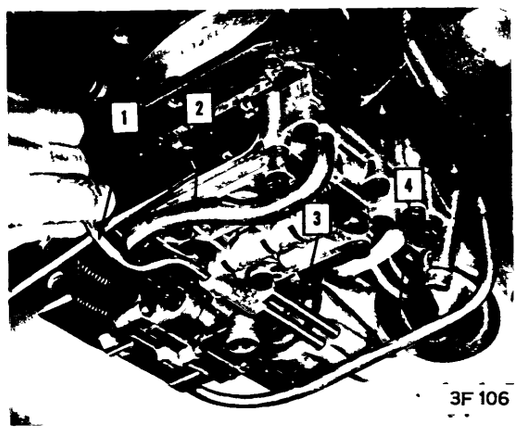
No Park Position

Manual linkage out of adjustment. Damaged internal linkage or parking pawl.

REMOVAL & INSTALLATION

See 1962 Final Data, Page 520 and note the following changes in procedure.

Rambler - A manual control rod replaces the shift cable used on previous models. Disconnect manual rod at transmission manual shift lever.



1. Compensator Tube
2. Control Pressure Tube
3. Front Servo Tubes
4. Lubrication Tube

CONTROL VALVE BODY TUBE LOCATION

TRANSMISSION OVERHAUL

CONVERTER OVERHAUL NOTE - Torque converter is a sealed assembly (case is welded together during manufacture) and cannot be disassembled for service.

Transmission Overhaul

See "Warner Automatic Transmission" in 1960 Final Data, Page 506, or later Manual edition and note th following:

Manual Linkage & Parking Pawl - Removal - To remove detent ball and spring, hold detent ball down, then move manual shaft lever toward rear of case Remove manual shaft lever nut and remove shaft from case, then remove oil seal from case. Remove torsion lever assembly by removing retaining clips from detent and torsion rod and remove rod. Remove torsion lever shaft by tapping it out of case. Tilt case or use a magnet to remove parking pawl shaft. Partially remove toggle lever shaft plug by tapping on toggle lever from inside, case, then complete removal with snap ring pliers, and remove toggle lever shaft and assembly.

Installation - Reverse removal procedure, installing a new toggle lever shaft plug and a new manual lever shaft oil seal.

Tightening Specifications

Location	Torqu
Converter to Drive Plate	23-28 Ft. Lbs.
Front Pump to Case	17-22 Ft. Lbs.
Front Servo to Case	30-35 Ft. Lbs.
Rear Servo to Case	40-45 Ft. Lbs.
Planetary Support to Case	20-25 Ft. Lbs.
Oil Distributor to Sleeve	8-10 Ft. Lbs.
Upper Valve Body to Lower Body	4-6 Ft. Lbs.
Valve Body to Case	8-10 Ft. Lbs.
Pressure Regulator to Case	17-22 Ft. Lbs.
Extension Housing to Case	28-33 Ft. Lbs.
Oil Pan to Case	10-13 Ft. Lbs.
Pressure Gauge Hole Plug	7-15 Ft. Lbs.
Oil Pan Drain Plug	20-25 Ft. Lbs.
Rear Band Adj. Screw Locknut	35-40 Ft. Lbs.
Front Band Adj. Screw Locknut	20-25 Ft. Lbs.
Detent Lever Attaching Nut	35-40 Ft. Lbs.
Front Pump Cover	25-35 In. Lbs.
Rear Pump Cover (¼")	50-60 In. Lbs.
Rear Pump Cover (10-24)	20-30 In. Lbs.
Governor Insp. Cover	50-60 In. Lbs.
Gov. Valve Body to Counterweight	50-60 In. Lbs.
Governor Valve Body Cover	20-30 In. Lbs.
Pressure Regulator Cover	20-30 In. Lbs.
Control Valve Body Screws	20-30 In. Lbs.
Control Valve Body Plug	10-14 Ft. Lbs.
Control Valve Lower Body Plug	7-15 Ft. Lbs.
Transmission Vent Assembly	7-10 Ft. Lbs.

STUDEBAKER SIX M-35 AUTOMATIC TRANSMISSION

Studebaker Lark Six (Exc. Police & Taxi) (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Move selector lever to "N" (Neutral) position. When car speed reaches 15-25 MPH, turn ignition switch on and move selector lever to "L" (Low) position.

Towing Or Pushing Car

If transmission is operating properly, car may be towed for short distances by placing selector lever in "N" (Neutral) position. If transmission is inoperative or if car is to be towed for a prolonged period, disconnect propeller shaft or tow with rear wheels off ground.

►CHANGES, CAUTIONS, CORRECTIONS

►*THROTTLE LINKAGE BINDING ON THROTTLE CONTROL LEVER ON TRANSMISSION CORRECTION (EARLY CARS):* Replace Outer Throttle Control Lever. In addition, the wave washer should be placed on top of throttle control lever on transmission to prevent rod from interfering with transmission case.

DESCRIPTION

Three speed hydraulically controlled planetary transmission with sealed torque converter assembly. Transmission case and torque converter housing are aluminum castings. The starter ring gear is welded to converter impeller housing and is not serviced separately.

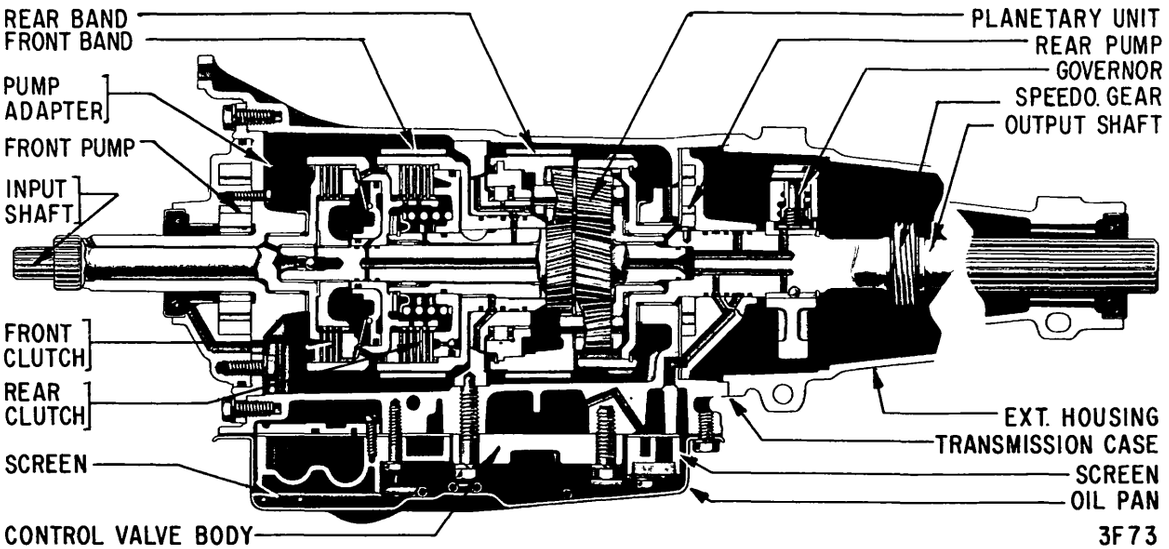
LUBRICATION

Checking Fluid Level

Check fluid level every 1,000 miles. With transmission at normal operating temperature, place selector lever in "N" or "P" position, then apply parking and foot brake and move selector lever from "P" or "N" to the "L" position and then back to "P" or "N". Check fluid level on dipstick and add necessary recommended fluid to bring fluid to "F" mark on dipstick. *NOTE - Approximately 1½ pts. of fluid is required to raise level from "L" mark on dipstick to "F" mark.*

Draining & Refilling

NOTE - Change fluid only as required. If transmission pan is removed, the drained quantity of fluid should not be reused. Replace all fluid whenever torque converter or transmission is replaced or disassembled. With transmission at normal operating temperature; remove filler tube from transmission oil pan and allow to drain. Rotate converter until drain plug is visible through hole in housing, then remove plug. Remove transmission oil pan and clean screens. Replace screens and oil pan, using a new gasket, then install filler tube. Install three quarts of recommended fluid, then start engine and place transmission selector lever in "N" (Neutral). Slowly pour in four quarts of fluid and then move selector lever through all ranges. Check fluid level and add sufficient fluid to bring level to midway between "L" and "F" marks on dipstick. Bring transmission to normal operating temperature and fill transmission to "F" mark. DO NOT OVERFILL.



STUDEBAKER SIX M-35 AUTOMATIC TRANSMISSION

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity

7½ qts. (Approximate), after draining transmission and converter.

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages.

Manual Shift Linkage

Disconnect shift lever-to-transmission manual valve lever rod (see "Manual Linkage Adjustment" illustration) at transmission lever by removing swivel assembly, then place selector lever in "R" position and place manual lever on transmission in "R" position (end of manual lever travel). Loosen locknuts and adjust shift lever-to-manual lever rod until swivel pin will slip freely into hole in manual lever. Tighten both locknuts and reinstall swivel on manual lever. Check quadrant positions against transmission detents and readjust if necessary.

Neutral Safety Switch

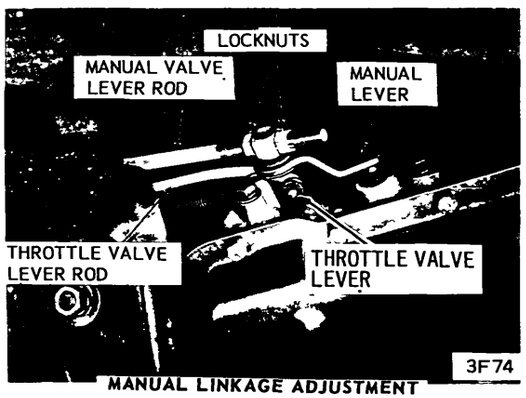
Place transmission selector lever in "N" (Neutral), then loosen switch bracket on steering column jacket. Align pin hole in switch lever with corresponding hole in switch body and install pin to maintain alignment. Tighten bracket attaching screws, then test operation of switch. Engine should start only with selector lever in "P" (Park) or "N" (Neutral) positions.

Front Band

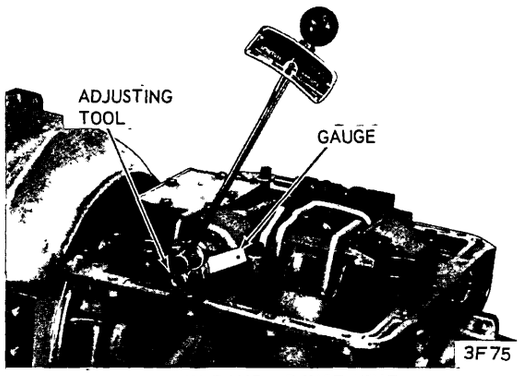
Remove transmission oil pan, then loosen front servo adjusting screw locknut two full turns. Insert a .250" gauge block between servo piston rod and adjusting screw (see "Front Band Adjustment" illustration). Place adjusting tool, J-9636, on adjusting screw and tighten to 10 inch pounds with an accurate torque wrench. Tighten locknut to 20-25 ft. lbs. and remove gauge block. Replace oil pan, using a new gasket and refill transmission.

Rear Band

Fold back floor covering on right side, then remove inspection cover and loosen rear band adjusting screw locknut. Use rear band adjusting tool, J-5883, and tighten screw until tool overruns, **th n back ff adjusting screw ¾ turn** and tighten locknut to 20-25 ft. lbs. *CAUTION - Adjusting screw must be backed off EXACTLY ¾ turn.*



MANUAL LINKAGE ADJUSTMENT



FRONT BAND ADJUSTMENT

TESTING

Road Test

NOTE - Check and adjust transmission fluid level before road testing car. Check application of bands and clutches in all driving ranges by stopping car and moving selector lever to all various positions.

1) If car does not move forward in "D" (Drive), but reverses normally, place selector lever in "L" (Low). If car now moves forward, the one-way clutch is slipping. If car does not move forward or slippage exists, front clutch is slipping.

2) If car does not move rearward in "R" (Reverse), but drives forward (in forward ranges), the rear band or rear clutch is slipping. To determine whether rear band or rear clutch is slipping, tighten rear band adjusting screw until band holds the drum mechanically. If car moves rearward, rear band was slipping. If, after tightening rear band onto drum, transmission still slips in reverse, the rear clutch is slipping.

3) If only one upshift occurs, and that shift is from first to direct, front band slippage is indicated.

4) If no upshift occurs in "D" (Drive), sticking governor or incorrect control pressure is indicated.

5) While going downhill, place selector lever in "L" (Low) at 20 MPH and close the throttle. An automatic downshift to first should occur between 9-13 MPH, and engine braking should be noticed. If car freewheels after downshifting from second, the rear band is slipping.

6) If all upshifts are high and tend to be harsh, excessively high control pressure is indicated.

7) If slippage is noted during second-to-direct upshift, or during a direct-to-second downshift, and shift speeds tend to be slow, excessively low control pressure is indicated. *NOTE - With a cold transmission, some slippag may b noted during the first or second 2-3 upshift. This is a normal condition.*

8) If kickdown position upshift speeds are low, or if kickdown downshifts are difficult to obtain, check for detent feel near wide open throttle position. If detent cannot be felt, adjust position of accelerator pedal.

9) Place selector lever in "D" (Drive) and check shift speeds. S *"Shift Sp d Tabl " below.*

Shift Sp eds

UPSHIFTS	Thr ttl	℄ Speed (MPH)
1-2	Minimum	5-8
2-3	Minimum	11-15
1-2	At Detent	24-29
2-3	At Detent	42-48
1-2	Thru Detent	34-40
2-3	Thru Detent	57-63
DOWNSHIFTS	**Throttle**	**℄ Speed (MPH)**
3-2	Thru Detent	52-59
2-1	Thru Detent	19-23
2-1	Inhibited	9-13
3-1	Closed	3-5

℄ - With 3.73-1 axle ratio.

Stall Test

Connect a tachometer to engine, then start engine and place selector lever in "D" (Drive). Apply brakes and run engine at full throttle, noting the tachometer reading. Repeat this procedure with transmission in "L" (Low) and "R" (Reverse). Stall speed should be 1450-1500 RPM. *NOTE* - A stall speed of 800-1000 RPM (engine in good operating condition), is caused by slippage in transmission. A stall speed of 1000-1450 RPM usually indicates engine problems rather than converter problems. *CAUTION - DO NOT hold stall condition for more than 10 seconds at one time, or for a total period exceeding ½ minute in any one half hour period.*

Free Running Test

With selector lever in "N" (Neutral), slowly accelerate engine. If tachometer reading readily reaches 4000 RPM before wide open throttle is obtained, release accelerator immediately. *CAUTION - Do not run engine over 4000 RPM with no load.* The result of this test indicates that converter stator is NOT stuck (it is freewheeling). If at wide open throttle, engine speed is 3900 RPM or less, a stuck stator is indicated.

Fluid Pressure Tests

NOTE - Remove 1/8" pipe plug located near flange of case at rear, below extension housing, then proceed as follows:

Idle Pressure - With engine at normal operating temperature and at idle speed, move selector lever to "D" (Drive), "L" (Low) and "R" (Reverse). Pressure should be 50-62 lbs. in all ranges. *NOTE* - If pressure is low in any one range, a fluid leak is indicated in that circuit and requires correction. If pressure is high, check and adjust throttle linkage.

Pressure Build-Up Check - Place selector lever in "D" (Drive) and apply brakes. Run engine at 1000 RPM and check pressure on gauge which should be 85-95 lbs. *NOTE - If pressure is less than specified limits, throttle valve linkage is too long. If more than specified limits, throttle valve linkage is too short.*

Stall Pressure - Apply brakes and move selector lever to "D" (Drive). Run engine at full kickdown position and check pressure gauge. Reading should be 170-200 lbs. in "D", "L" and "R".

PRESSURE TESTING NOTE - Pressur variati ns in xc ss of 10 lbs. for any giv n t st must b inv stigated further, particularly f r malfunctioning in thr ttle valv , modulator valv , or primary r sec ndary regulat r valv .

TROUBLE SHOOTING & DIAGNOSIS

Rough Initial Engagement

Idle speed is too high. Control pressure is too high.

Delayed Initial Engagement

Fluid level low. Control pressure too low at idle speed.

Inoperative In All Ranges

Fluid level low. Manual linkage disconnected. No control pressure. Rear band or servo inoperative. Converter failure. *NOTE - Check sprag clutch if there is no drive in "D1" position only.*

No Drive In "D" or "L"

Fluid level low. Manual linkage not properly adjusted. Control pressure low. Front clutch not applying. Rear band not applying. Transition valve stuck.

No Drive In Reverse

Fluid level low. Manual linkage not adjusted properly. Control pressure low. Rear clutch not applying. Rear band not applying. Transition valve stuck.

Locks Up In "D"

First Gear - Rear clutch applied.
Second Gear - Rear band or sprag clutch applied. Rear clutch applied.
Third Gear - Rear band or sprag clutch applied. Front band applied.

Locks Up In "R"

Front clutch or front band applied.

Slippage

Reverse - Fluid level low. Control pressure low. Rear servo travel limited. Rear clutch slips. Rear pump check valve stuck open.
Low - Fluid level low. Control pressure low. Rear servo travel limited. Front clutch slips. Rear pump check valve stuck open.
Drive (1st Gear) - Fluid level low.
Sprag Clutch - Front pump slips. Rear pump check valve stuck open.
1-2 Upshift - Control pressure low. Incorrect band adjustment. Governor valve stuck. Front servo piston travel limited. Front band glazed.
2-3 Upshift - Control pressure low. Front band improperly adjusted. Governor valve stuck. Internal leakage.

Rough Upshift

1-2 Shift - Control pressure too high. Bands not adjusted properly. Governor valve stuck.
2-3 Shift - Control pressure too high. Bands not adjusted properly. Governor valve stuck.

Rough Downshift

Cl s d Thr ttl - Throttle linkage not adjusted properly. Orifice control valve stuck. Engine idle speed too high.

(Continued)

No Upshift

1-2 Shift - Governor valve stuck. 1-2 shift valve stuck. **2-3 or No Direct Drive** - Governor valve stuck. 2-3 shift valve stuck. Bushing in output shaft misaligned.

Early Upshift

1-2 & 2-3 Shifts - Governor valve stuck. Control pressure low.

Late Upshift

1-2 & 2-3 Shifts - Governor valve stuck. Leak in governor circuit. Control pressure too high.

Early 3-2 Kickdown

Throttle linkage not adjusted properly.

No Kickdown

Throttle linkage not adjusted properly. Control valves sticking.

No Push Start

Rear pump inoperative. Pressure regulator valve stuck.

No Park Position

Improper manual linkage adjustment. Damaged internal linkage. Damaged park pawl.

REMOVAL & INSTALLATION

Transmission

Removal - Drain transmission and converter, then remove propeller shaft assembly. Disconnect rods from levers at transmission, then remove speedometer cable and pinion. Place a transmission cradle under transmission oil pan flange and remove transmission-to-converter bell housing capscrews. Install transmission-to-converter housing guide pins, Tool J-21254, into upper capscrew holes, then slide transmission rearward until front of transmission clears converter housing and remove transmission. *NOTE - On Station Wagons and Convertibles, position rear of transmission assembly over "X" member of frame and move assembly toward rear until front of transmission is clear of converter housing (in some cases it may be necessary to remove crossmember and lower engine for clearance).*

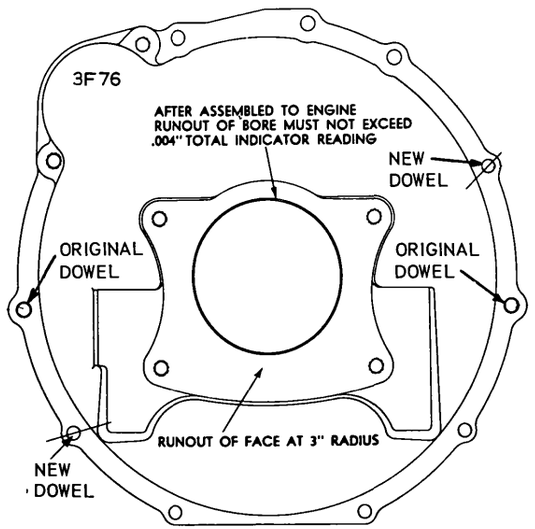
Installation - Reverse removal procedure and tighten all bolts and nuts to specifications (see "Tightening Specifications" below).

Torque Converter

Removal - Remove transmission assembly (see above); then remove starter motor. Disconnect tailpipe supports at converter housing and remove engine rear insulator stud nuts and jack up rear of engine enough to separate insulator from crossmember. Remove engine rear support crossmember. Remove converter bell housing and splash shield, being careful not to damage bell housing dowels or distort converter blower. Lower rear of engine (do not pull water outlet hose off), then remove converter drive plate-to-converter screws and remove converter.

Installation - Reverse removal procedure, using converter aligning tool, J-21257, in bore of converter housing and over pump drive fingers on converter assembly. Tighten all bolts and nuts to specifications (see "Tightening Specifications" below).

Alignment (New Converter Housing) - Install housing (converter removed) on dowels and tighten capscrews and bolts, then install clutch aligning gauge, Tool J-2045, in end of crankshaft, making sure gauge is centered and locked securely. Install dial indicator on gauge and set indicator on face of housing at a 3" radius. Turn crankshaft and check total indicator reading. If face runout exceeds .006", replace housing. Place dial indicator in the bore and turn crankshaft slowly. If bore runout exceeds .004" total reading, reposition housing and relocate dowels. To reposition dowels, enlarge the two holes to be used as new dowel positions, then ream holes to .3900-.3905" and insert original dowel bolts in the new holes (see "Housing Alignment" illustration).



CONVERTER HOUSING ALIGNMENT

TRANSMISSION UNIT REPLACEMENT (TRANSMISSION IN CAR)

Using the same procedure as for "Transmission Out of Car" (see below), the following sub-assemblies can be removed and replaced with transmission in car. Oil Pan Gasket & Screen; Control Valve Body & Pressure Regulator; Front & Rear Servos; Control Shift Inner Levers; Manual Control Shaft Seals; Parking Brake Control Shaft; Parking Pawl Assembly; Extension Housing (Exc. Sta. Wgn. & Conv.); Extension Housing Oil Seal & Bushing; Speedometer Drive Gear (Exc. Sta. Wgn. & Conv.); Governor Valve Body; Rear Pump (Exc. Sta. Wgn. & Conv.).

TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

Valve Body

Remove oil pan and screen, then remove rear servo apply tube, rear clutch tube and front servo apply and release tubes. Remove shift rod retaining clip and disengage rod from inside detent lever. Remove throttle valve shaft lever and washer, then remove valve-to-case retaining cap screws and remove valve body. Remove front pump oil pressure tube, suction tube and "O" ring, and converter "in" and "out" tubes from front pump.

Front & Rear Servos

Remove two capscrews at each servo and remove servos and struts from case.

Transmission Endplay

NOTE - Check and record transmission endplay befor proceeding with disassembly. Th endplay measurement will be required during reassembly.

Remove one front pump attaching screw and screw dial dial indicator support rod J-5864 in hole, then mount a dial indicator on support with contact on end of input shaft (see "Endplay Check" illustration). Insert a screwdriver between front clutch cylinder and case and pry cylinder to rear of transmission. Set dial indicator at zero, then insert screwdriver between large internal gear and case and pry units toward front of transmission. Record the reading obtained. Endplay should be .009-.032".

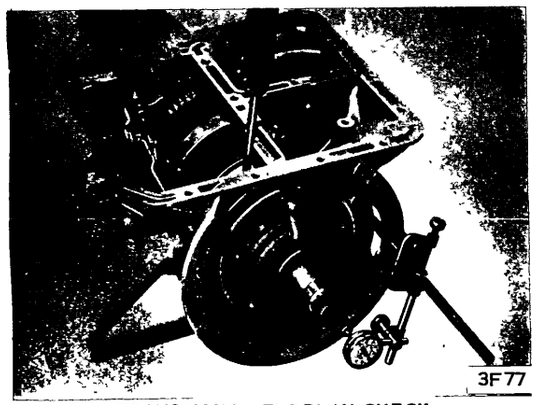
Front Pump

Remove pump attaching screws and remove pump assembly, gasket and selective washer.

Clutches & Sun Gear

Remove front and rear clutches and forward sun gear assembly out through front of case (start units out of case by inserting a screwdriver between rear clutch drum and center support). *CAUTION - Do not allow units to separate during removal.*

(Continued)



TRANSMISSION ENDPLAY CHECK

Front Band

Remove front band through front of case. *NOTE - Front and rear bands are interchangeable.*

Pinion Carrier

Remove two center support screws from outside of case, then remove center support and planet carrier assemblies through front of case. The sprag clutch is located between center support and planet carrier assemblies.

Rear Band

Remove rear band through front of case. *NOTE - Front and rear bands are interchangeable.*

Extension Housing

If rear oil seal is to be replaced, remove seal with Tools J-2619 and J-4830-02. Remove capscrews, then remove extension housing and gasket from output shaft.

Speedometer Gear

Remove speedometer gear outer snap ring, speedometer gear, ball drive and inner snap ring from output shaft.

Governor

Remove governor snap ring and slip governor assembly off shaft, then remove drive ball from recess in output shaft.

Rear Pump

Remove attaching screws and remove rear pump body, driven and drive gears from output shaft. Remove three oil rings and pump drive key from output shaft, then remove pump plate.

Output Shaft

Remove output shaft and rear thrust washer through front of case.

Internal Linkage

Position Tool J-9644 with projection of tool in top end of hole (top end of tapered pin retaining manual valve lever shaft), then tighten tool screw and force pin out of hole. Remove nut on inner end of shaft and remove manual valve lever shaft from case. Remove tapered pin holding park lever toggle shaft with Tool J-9644. Remove park lever retainer clip and washer from end of toggle shaft and remove toggle lift lever assembly and shaft. Remove parking toggle roll pin and parking toggle pin from case, then remove parking brake anchor pin. *NOTE - A magnet can be used to draw pin from case.* Remove parking brake toggle link and pawl assembly.

TRANSMISSION UNIT OVERHAUL

Front Clutch

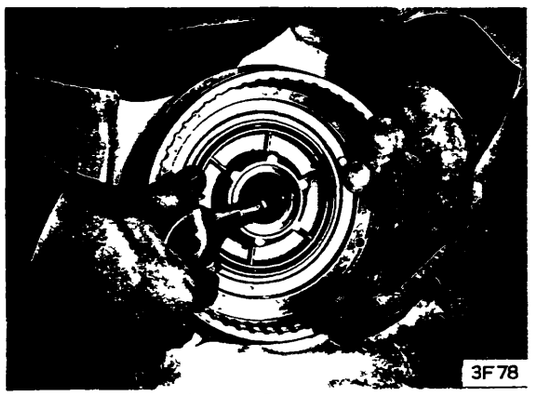
Disassembly - Separate front clutch and input shaft assembly off rear clutch and remove input shaft snap ring and input shaft. Remove fibre thrust washer, then lift out clutch hub, four lined and four steel plates from drum. Remove front clutch return spring snap ring and remove spring. Apply air pressure to inside diameter of hub at oil hole and blow piston out of bore (see illustration). Remove rubber piston seal and piston steel wear ring from piston, then remove "O" ring seal from clutch hub.

Inspection - Inspect all parts for overheating, metal pick-up, cracks or burrs on thrust surfaces, splines and serrations. Inspect clutch plates for burrs, distortion, wear and flatness. *NOTE - Lined plates must be replaced when grooves of lining are no longer visible or if plates are warped.* Inspect steel plates for burrs on serrations, distortion, and tooth wear.

Reassembly - Lubricate all parts with transmission fluid, then install "O" ring seal on clutch drum hub and a new seal on clutch piston. Install piston in clutch drum bore, pressing it down until it bottoms in bore (be careful not to damage outer piston seal). Install metal wear ring and return spring on piston (concave side of spring upward), then install return spring snap ring.

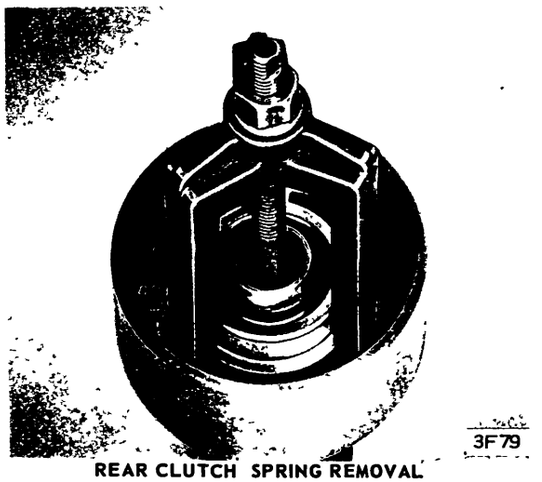
Rear Clutch & Sun Gear

Disassembly - **1)** Remove bronze and steel thrust washers from rear clutch drum, then remove two oil seal rings from sun gear shaft and lift clutch assembly upward off shaft. Remove sun gear from planet carrier. **2)** Remove locking type oil ring from rear of sun gear shaft and remove needle thrust bearings from each side of sun gear. **3)** Remove pressure plate retaining snap ring, clutch pressure plate, lined plates, and steel plates from clutch drum. Position spring compressor, Tool J-5886 and adaptor, Tool J-5886-5 over clutch spring retainer and compress spring, then remove snap ring, (see illustration). **4)** Remove compressor tool adapter, spring retainer, and spring. Apply air pressure to hole in outer diameter of clutch cylinder hub and blow out piston. Remove clutch piston seal and "O" ring seal from clutch drum hub. *NOTE* - When handling rear clutch drum, use care as needle bearings will fall out when assembly is removed from sun gear. There are thirty rollers in bearing assembly, and it is recommended that a heavy grease be used when installing roller into bearing cage.



FRONT CLUTCH PISTON REMOVAL

Inspection - Inspect all parts for burrs, scratches, worn ring grooves and broken teeth. Use an awl to check front clutch lubrication ball check valve in front end of sun gear shaft for freedom of movement. Check clutch drum for scores on band surfaces and in piston bore. Inspect ball check in piston and make sure it is free to float. Apply clean compressed air to see that ball seats tightly. Inspect lined plates for overheating, metal pick-up, and excessive wear. If grooves in plates are no longer visible, replace plate. Check steel plates for scratches, burrs and for proper coning. *NOTE - Each steel plate is coned .010-.020" (clearance at inner diameter of plate). Replace all plates that do not have proper coning. If one plate, lined or steel, requires replacement, the entire clutch pack should be replaced.* Inspect front clutch release spring for distortion.



REAR CLUTCH SPRING REMOVAL

Reassembly - **1)** Lubricate all parts with transmission fluid, then install a new clutch piston inner "O" ring seal on clutch drum hub and a new outer seal on clutch piston. Place piston in installer, Tool J-9621, and with tool on bench, tap piston down in bore of tool. Place tool in bore of clutch cylinder and using a suitable tool, tap piston into place in rear clutch drum. **2)** Install return spring, retainer and snap ring in rear drum and compress spring with Tool J-5886 and J-5886-5, then install snap ring and remove compressor tools. **3)** Starting with a steel plate, install lined and steel plates alternately, being sure to align serrations of plates with serrations in clutch drum. *NOTE - Steel plates are installed with concave side in the upward direction.* Install clutch pressure plate with smooth side downward and install retaining snap ring. **4)** Place sun gear in planet carrier with one needle thrust bearing on top side of gear and install rear clutch assembly on the shaft. *CAUTION - Be sure all needle bearings are in place in rear clutch drum.* Install two oil seal rings on forward sun gear shaft, then install steel and bronze washers on shaft. Install

(Continued)

front clutch hub on sun gear shaft, then install clutch pressure plate with smooth side upward and clutch hub with thrust face upward in clutch drum bore. 5) Starting with a lined plate, install lined and steel plates alternately, being sure to align serrations of plates with serrations in hub and drum. Coat clutch fibre washer with heavy grease and position it on clutch hub. Align serrations of clutch cover and turbine shaft with serrations in clutch drum and install cover and snap ring. Remove front and rear clutch assemblies from planet carrier, being careful not to separate the two clutch units.

Center Support

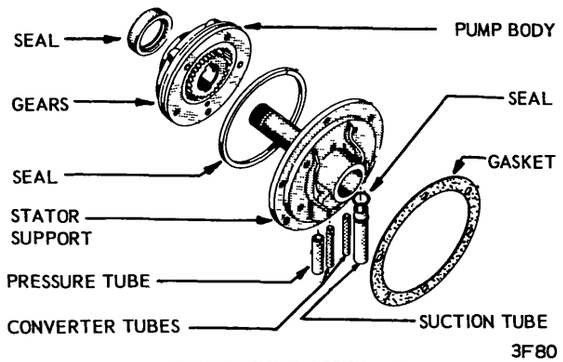
NOTE - Center support is serviced as a complete assembly. Inspect support race and bushing for scoring and excessive wear and check feed hole for obstructions.

Pinion Carrier & One-Way Clutch

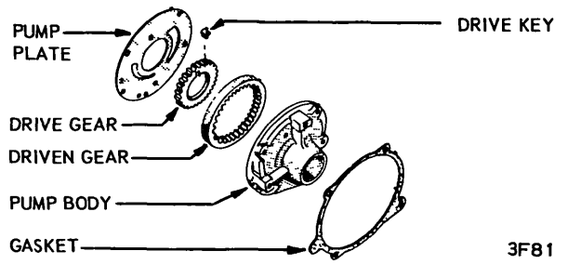
Disassembly - Slip the one-way clutch out of outer race. *NOTE - Do not remove outer race unless replacement is necessary. If required, remove snap ring in carrier and remove race.* Planetary pinions are serviced as part of pinion carrier and no further disassembly is required.

Inspection - Inspect drum surface and inner and outer bushings for scores. Rotate pinions on their shafts and check for freedom of movement and for worn or broken teeth. Pinion endplay should be .010-.020". Inspect shafts for tightness in pinion carrier.

Reassembly - Install one-way clutch with lip side of clutch case down into outer race of planet carrier assembly and brass drag strips away from pinion carrier.



FRONT PUMP ASSEMBLY



REAR PUMP ASSEMBLY

Front Pump

Disass mbly - Remove capscrews and separate front pump from pump adapter and converter support. Mark top of drive and driven gears with a crayon or pencil so they may be reinstalled in original position, then remove pump gears and "O" ring seal from body. If front pump seal is to be replaced, use a small punch and drive seal from pump body. Remove suction tube "O" ring from pump and converter adapter.

Inspection - Inspect pump body, gears, and converter support for scores and excessive wear. Check bushings and journal for scoring, wear or damage.

Reassembly - Lubricate all parts with automatic transmission fluid, then install seal (if removed) in pump with Tool J-9615. Install a new pump body-to-adapter seal on pump body, then install pump gears on body, aligning marks made at disassembly. Assemble pump body to adapter and tighten the five large screws evenly to 17-22 ft. lbs., and the small screw to 25-35 inch pounds. Check pump gears for free movement.

Rear Pump

Inspect pump body plate for excessive wear and replace plate if necessary. Inspect pump body, pump bushing, and gears for wear or scoring.

Front Servo

Disassembly - Hold pressure against servo piston and remove snap ring, then release pressure and remove servo piston, sleeve, and spring. Separate piston and sleeve and remove rubber seal from sleeve. Remove large and small rubber seal rings from piston. Drive actuating lever roll pin from servo body, then push out actuating lever shaft and remove lever.

Inspection - Inspect servo body for cracks, burrs, and obstructed fluid passages. Inspect piston bore and stem for scores. Inspect actuating lever and shaft for wear and freeness.

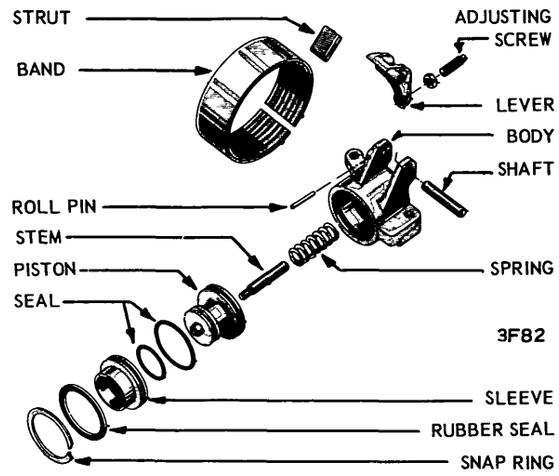
Reassembly - Lubricate all parts in transmission fluid, then install new piston and sleeve seals and assemble piston and piston sleeve together. Install servo spring in body and install servo piston and sleeve. Press sleeve into body and install snap ring, then install actuating lever, shaft, and roll pin. Apply air pressure to bore in servo and check servo for freeness of movement.

Rear Servo

Disassembly - Pull actuating lever roll pin out of body and remove actuating lever shaft and lever. Exert pressure to compress servo spring and remove snap ring, then release pressure and remove spring retainer and spring. Force air into servo pressure hole and blow out piston, then remove "O" ring seal from piston.

Inspection - Same as for front servo (above).

Reassembly - Lubricate all parts with transmission fluid, then install new "O" ring seal on piston and install piston in servo body. Install servo return spring with small end of spring against servo piston. Position spring retainer on spring, compress spring and install snap ring. Install actuating lever, shaft, and roll pin. Apply air pressure to hole and check for freeness of movement.



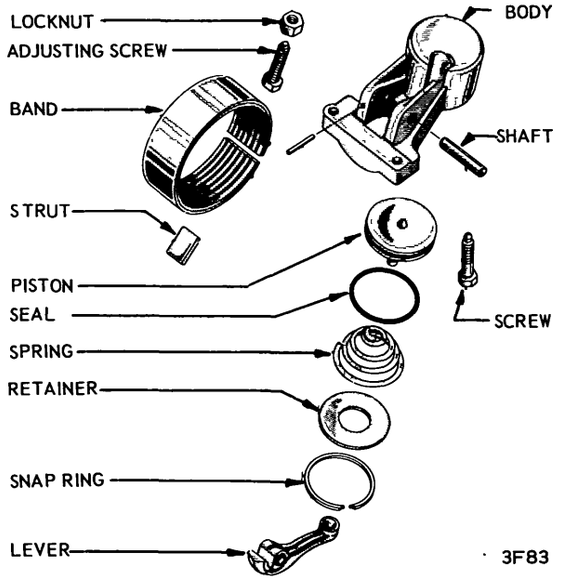
FRONT SERVO ASSEMBLY

Governor

Disassembly - Remove counterweight screws and separate valve assembly and counterweight, then remove valve body cover. Remove governor valve retainer, spring, governor valve and flyweight. *NOTE - Be careful not to lose spring wh n r moving valve retainer.*

Inspecti n - Inspect mating surfaces of governor valve assembly and counterweight for burrs and distortion.

(Continu d)



REAR SERVO ASSEMBLY

Make sure these surfaces are flat Inspect fluid passages for obstructions and governor valve for freeness of movement in valve body

Reassembly - Install flyweight governor valve and spring in governor body and install retainer Install cover on valve body and tighten screws to 20-30 inch pounds Assemble governor valve and counterweight aligning fluid passages then tighten screws to 50-60 inch pounds

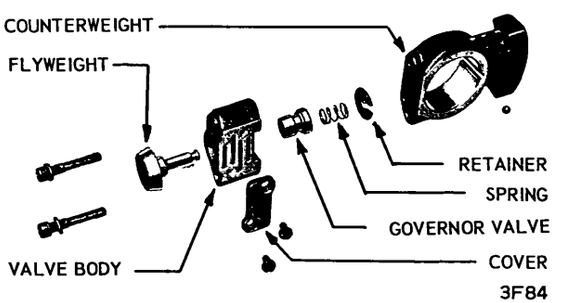
Control Valve & R gulator

NOTE - It is recommended that each valve body of the assembly be disassembled, cleaned, inspected, and reassembled one at a time to prevent possibility of accidentally interchanging springs

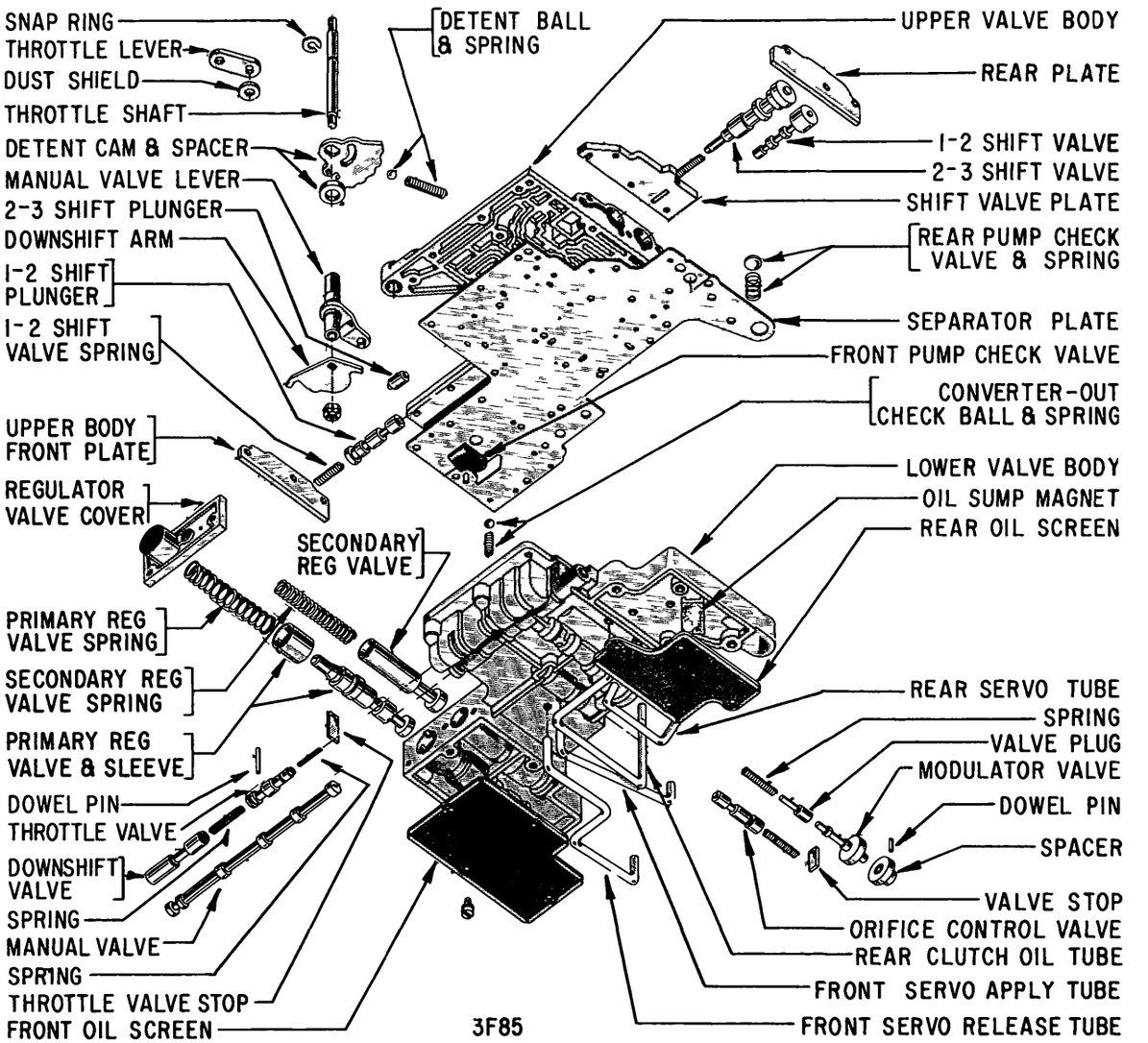
Disass mbly (Upper Valv Body) - Remove eight lower valve body-to upper valve body attaching screws (note the one longer 1 3/8' screw) Invert valve body and remove cover plate and the four 7/8" long upper valve body-to-lower valve body attaching screws then separate upper valve body and lower valve body Remove front and rear end plates *NOTE - When removing rear plate, hold pressure on plate as it is under spring pressure* Remove valves and springs (see "Valve Body Assembly" illustration) If manual valve detent lever cam, detent ball, and downshift lever are to be removed remove locknut on shaft and remove downshift cam, spacer washer and operating lever from valve body *NOTE - Be careful not to lose detent ball when removing cam (ball is under spring pressure)*

R ass mbly (Upp r Valv Body) - *NOTE - Inspect all parts before reassembly See "Valve Body Assembly Inspection" below* Reverse disassembly procedure and refer to "Valve Body Assembly' illustration for parts installation Tighten end plate attaching screws to 20-30 inch pounds

Disass mbly (L w r Valve Body) - Remove eight oil tube plate-to-lower valve body screws (note the two longer 1" screws) Remove separator plate, then remove front and rear pump check valves, converter check ball, and ball spring Remove servo orifice control valve stop, dowel pin (retaining modulator valve spacer) throttle valve stop, and throttle valve dowel pin *NOTE - Use an Alnico magnet to remove parts if necessary* Remove other valves and springs



GOVERNOR ASSEMBLY



CONTROL VALVE ASSEMBLY

in valve body Remove three screws from pressure regulator valve cover on lower valve body, then apply pressure to plate and remove plate, valves, springs and sleeve

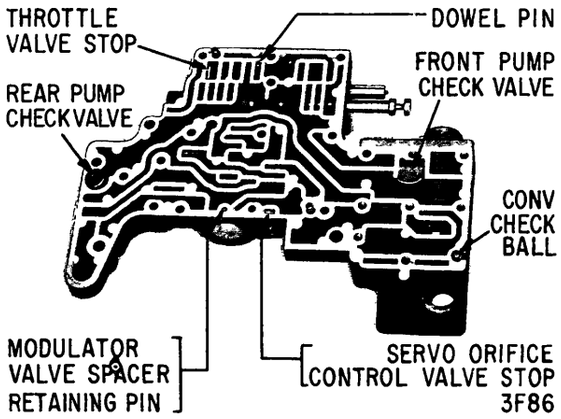
Reassembly (Lower Valve Body) - *NOTE - Inspect all parts before reassembly See "Valve Body Assembly Inspection" below* Reverse disassembly procedure, referring to "Valve Body Assembly" illustration, and note the following Check front and rear check valves for free movement after separator plate is installed on valve body Tighten all screws to 20-30 inch pounds, making sure that the two 1" long screws are installed in proper locations

Valve Body Assembly Inspection - Clean all parts in solvent and blow dry with air, then inspect all valves and bores for scores and burrs Check all fluid passages for obstructions and all mating surfaces for burrs and distortion Carefully inspect springs for distortion. *NOTE - Crocus cloth may be used to polish valves and plugs Be careful to avoid rounding sharp edges of valves or plugs* Check all valves for freedom of movement in their respective bores (valves and plugs, when dry, should fall from their own weight in their respective bores)

(Continued)

Transmission Case

Inspection - Clean case thoroughly and blow out all fluid passages then inspect for stripped threads obstructed fluid passages and cracks Inspect mating surfaces for burrs and case bushings for scores and excessive wear *NOTE - Minor burrs and scratches can be removed with crocus cloth Parts having large burrs, scratches, excessive wear, distortion, or stripped threads should be replaced*



LOWER VALVE BODY PARTS LOCATION

TRANSMISSION UNIT INSTALLATION (TRANSMISSION IN CAR)

Internal Linkage

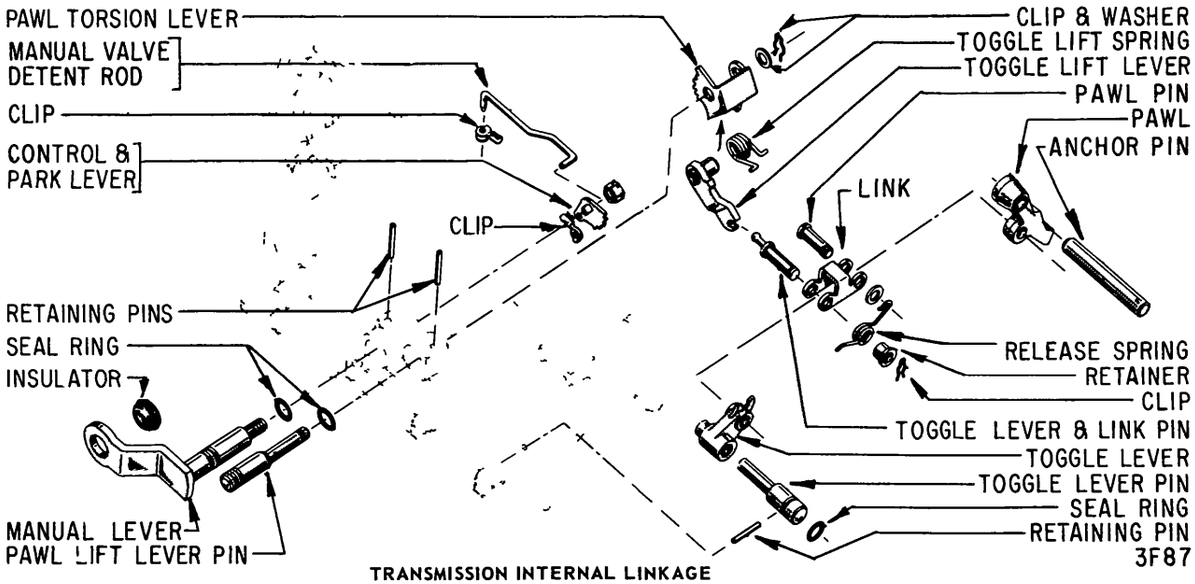
Install parking brake toggle link and pawl assembly in case and install anchor pin Install a new "O" ring oil seal on toggle pin and install pin in case and secure with a roll pin Install a new "O" ring seal on park lever shaft and install shaft in case, then secure with tapered retaining pin Install toggle lift lever assembly on park lever and secure in place with washer and retaining spring Install a new "O" ring seal on manual control lever, and using a tapered retaining pin as a stop guide to keep shaft from going past pin groove in case, install shaft in case and secure with tapered pin *NOTE - If manual control lever shaft is pushed past pin groove, the "O" ring will be damaged and require replacement* Install toggle lift lever cam and manual rod assembly on manual valve shaft and secure with nut

Output Shaft

Install output shaft end rear thrust washer in case, making sure thrust washer seats against case

Rear Pump

Install pump plate, drive pin and drive gear on output shaft, then install three oil seal rings on shaft and lubricate them with transmission fluid Install pump body and driven gear, then install screws and tighten to 55-66 inch lbs (large screws), 20-30 inch pounds (small screw)



TRANSMISSION INTERNAL LINKAGE

Governor

Install drive ball governor assembly and snap ring on output shaft *NOTE - Plate on governor valve goes toward rear*

Speedometer Gear

Install snap ring, drive ball, speedometer gear, and rear snap ring On output shaft

Extension Housing

Install housing and new gasket and tighten attaching bolts to 14-18 ft lbs (5/16" screws), 30-40 ft lbs (7/16" screws)

Rear Band

Install rear band in case with band anchor end toward rear band adjusting screw

Pinion Carrier

Reassemble planet carrier, sprag clutch, and center support, then place planetary thrust bearing race in carrier with flange of race seated in shaft hole Install planetary thrust bearing race with flat side against carrier and place bearing on race Align oil holes in center support with holes in case and install two center support screws (on outside of case) and tighten to 120-154 inch pounds

Front Band

Install band in case with band anchor toward center rib of case, then install oil seal lock ring in oil grooves on rear clutch hub and sun gear shaft assembly Install needle bearing on sun gear shaft against sun gear

Front & Rear Clutches & Sun Gear

Install front and rear clutch and sun gear assembly in case, being careful not to separate clutch assemblies or break oil seal rings

Front Pump

Install pump assembly and selective thrust washer and tighten attaching screws to 100 120 inch pounds *NOTE - After installation of front pump, recheck endplay If not within limits of 009-032", install a new thrust washer of suitable thickness to obtain proper endplay* Install oil pressure tube converter in and out tubes and oil suction tube in front pump assembly

Front & Rear Servos

Install rear servo in case and insert actuating strut in band end, then tighten servo capscrew to 120-154 inch pounds Install front servo in case and insert actuating strut in band end, then tighten servo capscrew to 100-120 inch pounds

Valve Body

Install valve body and tighten capscrews to 55-65 inch pounds, then install shift rod linkage on valve body Install rear servo apply tube, rear clutch tube, front servo apply and release tubes, being careful not to distort tubes *NOTE - Long end of front servo release tube (steel) goes into servo body Install front end of servo apply tube (aluminum) in servo (short end of tube in servo)* Adjust front and rear bands (see "Adjustment" above)

AIR PRESSURE CHECKS

NOTE - Before installing transmission in car, make the following checks to determine if clutches, bands, and servos are operating properly Use air nozzle assembly, Tool J-8124 for testing When making tests, hold a clean towel over transmission opening to prevent excessive oil spray

(Continued)

Fr nt Servo

Remove front servo apply tube and apply air pressure where tube enters body.

Rear Servo

Remove rear servo apply tube and apply air pressure where tube enters body.

Rear Clutch

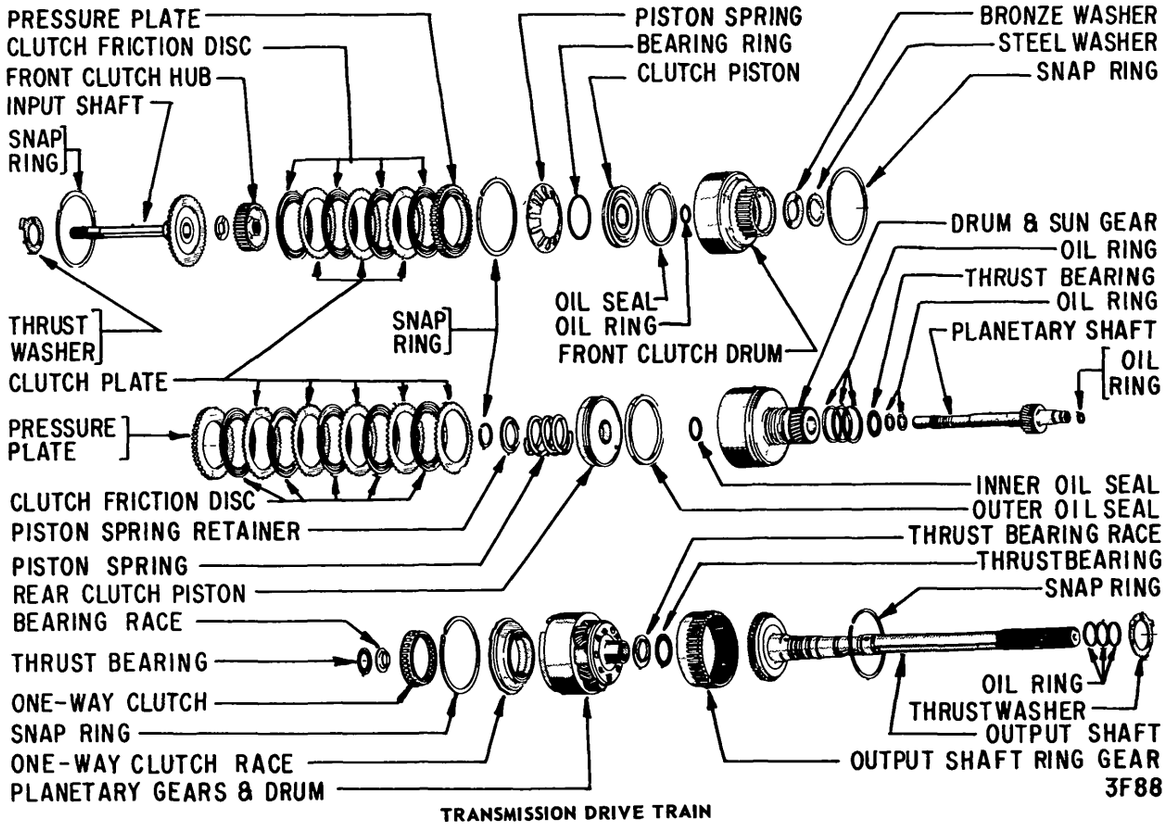
Remove rear clutch tube and apply air pressure where tube enters hole in case. A dull thud should be heard when pressure is applied.

Governor

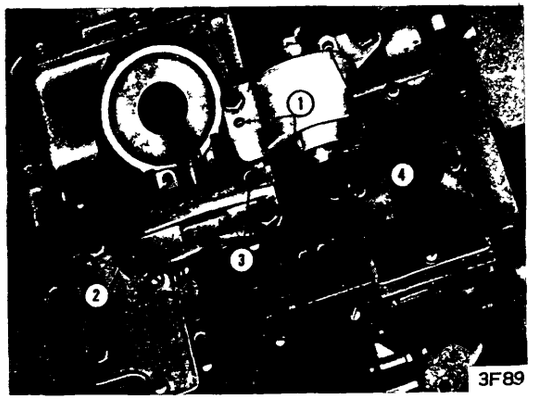
To check governor, remove valve body and apply air pressure to governor hole in case.

Front Clutch

Remove valve body and apply air pressure to front clutch and governor feed hole in case. A dull thud should be heard.



TRANSMISSION DRIVE TRAIN



1. Front servo apply tube holes
2. Rear servo apply tube holes
3. Rear clutch tube holes
4. Front servo release holes

AIR PRESSURE CHECK POINTS

Tightening Specifications

Location	Torqu
Front Band Adj. Screw Locknut	20-25 Ft. Lbs.
Rear Band Adj. Screw Locknut	25-30 Ft. Lbs.
Transmission to Converter Housing	17-22 Ft. Lbs.
Converter Housing to Engine	23-28 Ft. Lbs.
Converter to Drive Plate	23-28 Ft. Lbs.
Front Pump to Adapter (Large Screws)	17-22 Ft. Lbs.
Front Pump to Adapter (Small Screws)	25-35 In. Lbs.
Control Valve Assembly Screws (All)	20-30 In. Lbs.
Rear Pump to Case (Large Screws)	55-66 In. Lbs.
Rear Pump to Case (Small Screw)	20-30 In. Lbs.
Extension Housing to Case (5/16")	14-18 Ft. Lbs.
Extension Housing to Case (7/16")	30-40 Ft. Lbs.
Center Support to Case	120-154 In. Lbs.
Front Pump Assembly to Case	100-120 In. Lbs.
Rear Servo Capscrew	120-154 In. Lbs.
Front Servo Capscrew	100-120 In. Lbs.
Valve Body to Case	55-65 Ft. Lbs.
Oil Pan to Case	100-120 In. Lbs.

STUDEBAKER FLIGHTOMATIC & POWER-SHIFT TRANSMISSION

Studebaker Lark & Hawk V8 (1963)
Studebaker Avanti (1963)
Studebaker Six (Police & Taxi) (1963)

PUSHING (TO START) & TOWING

Pushing Car To Start Engine

Move selector lever to "N" (Neutral) position. When car speed reaches 20 MPH, turn ignition switch on and move transmission selector lever to "L" (Low) position.

Towing Or Pushing Car

Car can be towed for very short distances with selector lever in "N" (Neutral). If transmission is inoperative or if car is to be towed for a prolonged period, disconnect propeller shaft or tow with rear wheels off ground.

DESCRIPTION

Transmissions used on these models are similar to transmissions used on corresponding previous (1961-62) models. Power-Shift transmissions (floor mounted gear-shift) and Flightomatic transmissions (Police & Taxi) are water cooled by circulating transmission fluid through an oil cooler located in car radiator. The transmissions used on 170" Six Cyl. Police & Taxi models, and on Power-Shift transmissions are similar to other transmissions except that a one-way sprag clutch is used in the planetary gear train to eliminate application of rear band when transmission is operating in "D" (Drive) range. The control valve assemblies on Flightomatic (V8); Flightomatic 170" Six Cyl. Eng.; and Power-Shift transmissions are different.

TRANSMISSION IDENTIFICATION

IDENTIFICATION NOTE - Transmission model number and serial number is stamped on a plate attached to left side of transmission case at rear of throttle valve lever.

Transmission Model Application

Car Model	Transmission Model
Lark & Hawk V8 (Exc. Jet Thrust Eng.)	AS-10-5P
Lark & Hawk V8 (Jet Thrust & Super Jet Thrust)	AS-14-7A
Taxi, Police, & Hvy. Duty V8	AS-12-7A
Police & Hvy Duty 6 Cyl.	AS-24-8
Taxicab 6 Cyl.	AS-26-8
Avanti (Jet Thrust & Super Jet Thrust)	AS-2-10

OPERATION

Low Range

Selector Lever in "L" or "1" - Front clutch and rear band are applied. Power is transmitted from input shaft to primary sun gear through the locked front clutch. Primary sun gear drives primary pinion which in turn, drive secondary pinions. Secondary pinions drive the internal gear and transmission output shaft in direction of sun gear rotation (engine rotation).

Selector Lever in "D" (Flightomatic V8 & Power-Shift Transmissions) - *These transmissions do not start in Low Range (Selector Lever in "D"), however, Flightomatic V8 transmission can be "kicked down" from Intermediate Range to Low Range at low car speed (12-18 MPH maximum speed).* On Flightomatic V8, front clutch and rear band are applied and power transmission is the same as for "Selector Lever in L" above.

Selector Lever in "D" (Flightomatic 170" Six Cyl. Eng. Transmission) - Front clutch and one-way sprag clutch are applied and power transmission is the same as for Selector Lever in "L" above.

Intermediate Range

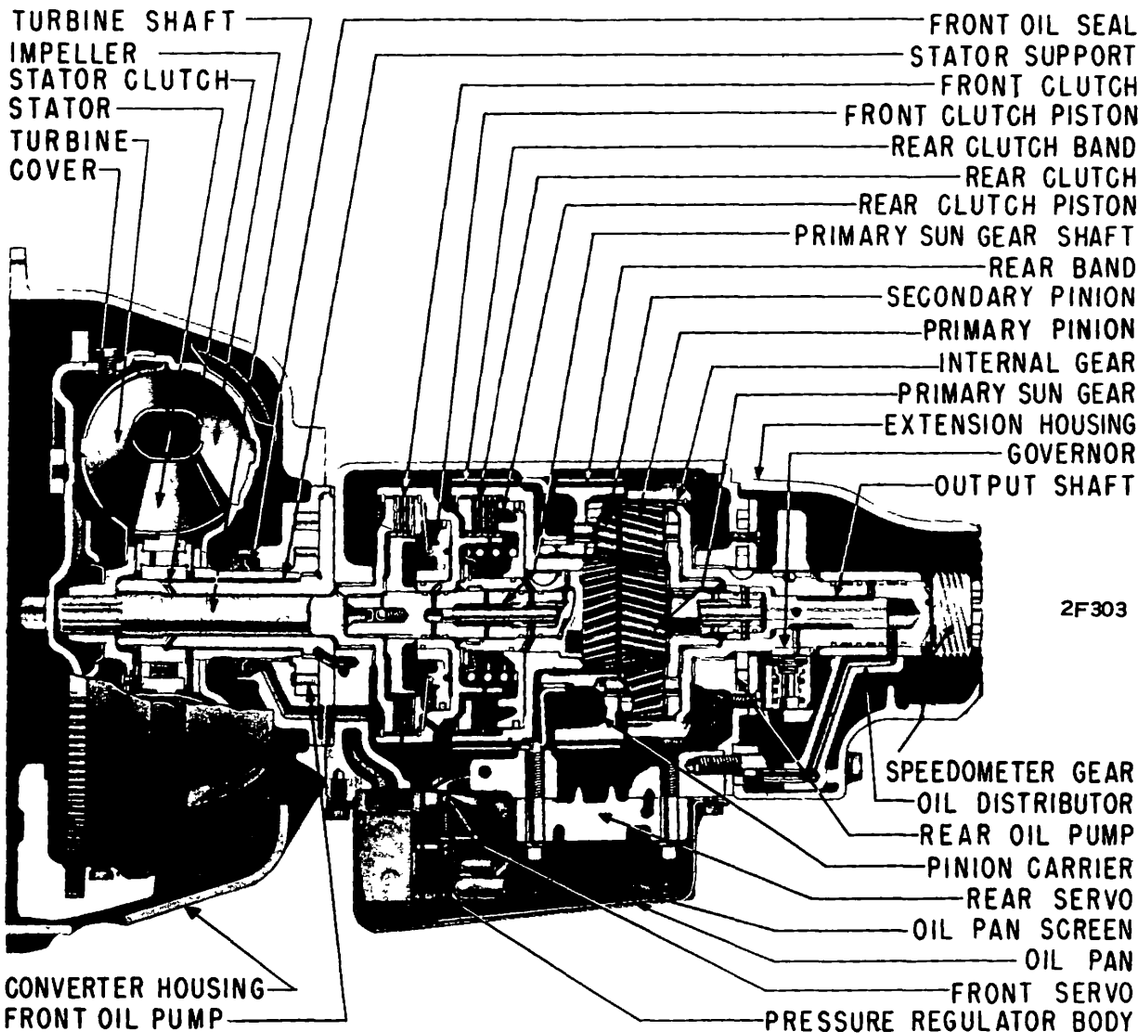
Selector Lever in "D" (All Models) - Front clutch and front band are applied. Power is transmitted to primary sun gear through locked front clutch to drive primary pinions and secondary pinion, forcing secondary pinions to "walk" around stationary secondary sun gear. The internal gear and output shaft rotate in direction of engine rotation.

Selector Lever in "2" (Power-Shift Transmission) - Front clutch and front band are applied and power transmission is the same as for "Selector Lever in D" above.

High Range

Selector Lever in "D" (All Models) - Front and rear clutches are applied, locking primary sun gear to transmission input shaft and secondary sun gear to primary

(Continued)



FLIGHTOMATIC & POWER-SHIFT TRANSMISSION

sun gear Power is transmitted through transmission unchanged in direction or ratio

Reverse Range

Selector Lever in "R" (All Models) - Rear clutch and rear band are applied Power is transmitted from input shaft to secondary sun gear through locked rear clutch, causing secondary sun gear to drive secondary pinions which turn internal gear and transmission output shaft in reverse direction (opposite engine rotation)

Park

Selector Lever in "P" (All Models) - Rear clutch is applied and no power is transmitted Internal linkage engages parking pawl with gear on internal outside of internal gear assembly

POWER-SHIFT AUTOMATIC TRANSMISSION OPERATING NOTE - This transmission provides six manually selected lever positions (five on other transmissions) The floor mounted selector lever moves easily between "N", "D", "2" and "1" positions and for safety, the pushbutton in top of lever must be partially depressed for entry into "R" position The lever may be moved from "R" to any other position (except "P") without depressing lever pushbutton Pushbutton must be fully depressed for entry into "P" position Forward drive ranges operate as follows

"D" (Drive) - Car starts in second gear at all times, with an automatic upshift to high and an automatic downshift to second gear at variable car speeds dependent on load and throttle position When in high gear, transmission can be downshifted to second gear by depressing accelerator to floor (when car speed is below 62-75 MPH)

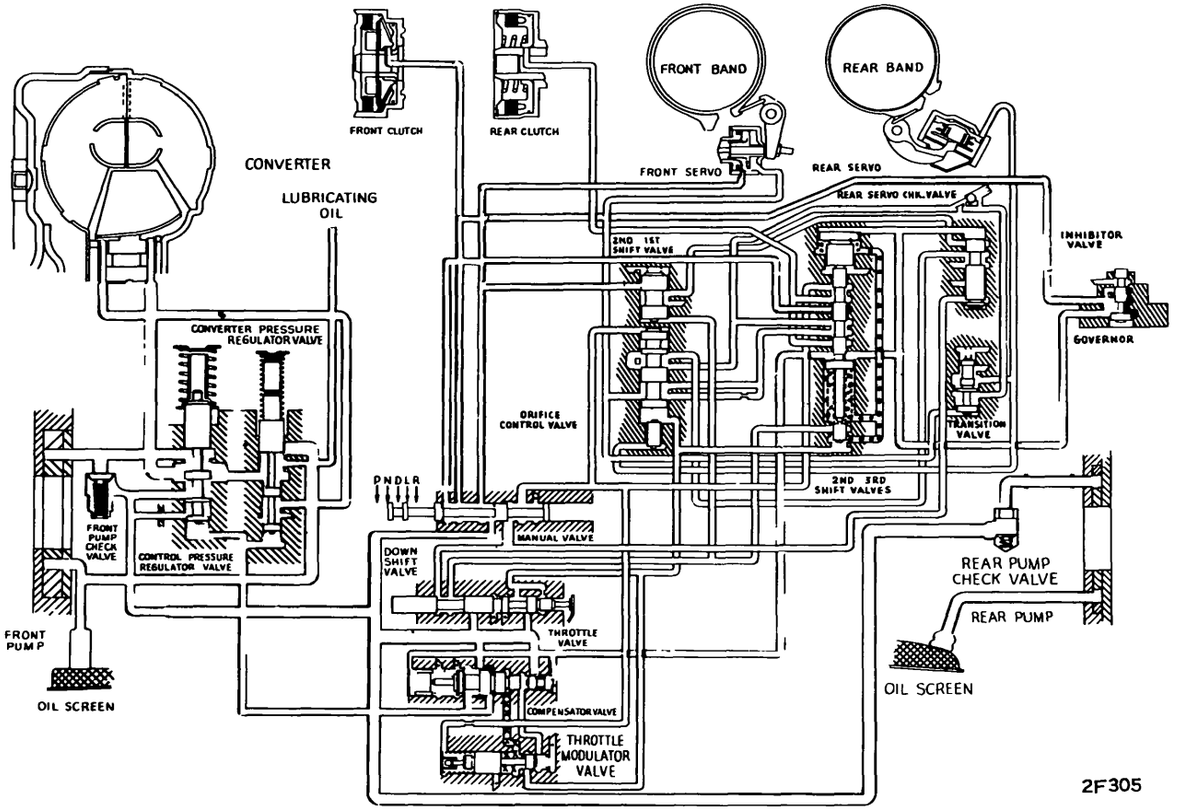
"2" (Second) - Car starts and drives in second gear with no automatic upshift or downshift If selector lever is moved from "D" to "2" at speeds above 47-57 MPH with a closed throttle, transmission will remain in high until speed drops to 47-57 MPH For extra performance, transmission can be downshifted to second gear by moving lever from "D" to "2" and depressing accelerator (when car speed is below 62-75 MPH)

"1" (First) - Car starts in first gear with no automatic upshift or downshift If lever is moved from "2" to "1" at speeds above 20-25 MPH with throttle closed, transmission will remain in second until speed drops to 20-25 MPH, then downshift into first gear If lever is moved from "D" to "1" at speeds above 25 MPH with throttle closed transmission will downshift to second, then to first at the above indicated shift points With transmission in either second or high gear, low gear may be used for extra performance by moving selector lever to "1", and depressing accelerator (when car speed is below 37-47 MPH) For maximum performance, start in "1" and manually upshift to "2", then to "D" while holding accelerator in desired performance position (it is not necessary or desirable to close throttle while upshifting) *NOTE - Do not exceed engine speed of 5,000 RPM Do not place selector lever in "R" or "P" ranges while car is moving*

LUBRICATION

Checking Fluid Level

Check fluid level every 1,000 miles With transmission at normal operating temperature, move selector lever through all ranges, then place in "D" (Drive) Check fluid level on dipstick (located under hood) and add recommended fluid as required to bring level to "F" mark on dipstick *NOTE - Approximately 1½ pts of fluid required to raise level from "L" to "F" mark on dipstick*



HYDRAULIC CIRCUIT DIAGRAM (V8 MODEL EXC. POWER-SHIFT)

Draining & Refilling

Drain and refill every 15,000 miles With transmission at normal operating temperature, remove transmission filler pipe, then rotate converter until drain plug is visible through hole in housing and remove converter drain plug *NOTE - If converter is not equipped with two drain plugs 180° apart, it will be necessary to remove oil pan and take out the converter regulator valve spring and pull out converter valve to provide a bleed for the converter After draining, replace valve and spring* If second drain plug is provided in converter, remove plug and drain Replace drain plugs and filler pipe, then pour in 3 qts of recommended fluid Start engine, transmission in "N" (Neutral) and slowly pour in 4 qts additional Move selector lever through all ranges, then recheck fluid level Add sufficient fluid to bring level to "F' mark on dipstick

Recommended Fluid

Automatic Transmission Fluid Type "A" (Suffix "A")

Capacity

9 qts (Exc Super Jet Thrust Eng , Jet Thrust Eng & Taxicab), 9½ qts (Super Jet Thrust Eng , Jet Thrust Eng , & Taxicab)

ADJUSTMENT

Throttle Linkage

See CARBURETOR on Car Model pages

Manual Linkage

On all models, disconnect selector shift lever-to-transmission manual lever rod at transmission by removing swivel assembly Place selector lever in "D" (Exc Power-Shift Transmission), in "P" (Power-Shift Transmission) then place manual lever on transmission in corresponding detent position Loosen locknut at swivel and adjust shift lever rod length until swivel pin slips freely through hole in lever Tighten locknuts against swivel and reinstall swivel assembly to lever Check operation in all positions

(Continued)

N utral Saf ty Switch

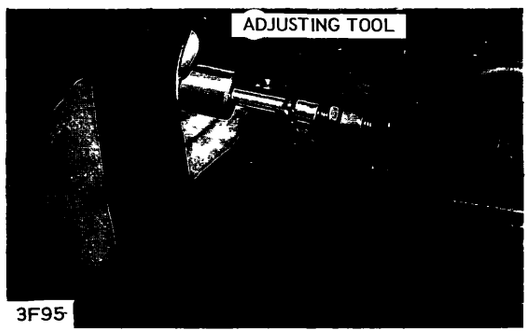
Neutral safety switch is located on steering column (Exc. Power-Shift Trans.); on bracket attached to retainer plate at side of transmission (Power-Shift Trans.) Place selector lever in "N" (Neutral), then loosen switch mounting bracket attaching screws. Align pin in switch lever with hole in switch body (Exc. Power-Shift Trans.); align pin hole in switch lever with hole in mounting bracket (Power-Shift Trans.). Hold switch in position or use a pin to maintain alignment and tighten mounting screws. Check operation. Starter should operate only with selector lever in "N" (Neutral) or "P" (Park).

Front Band

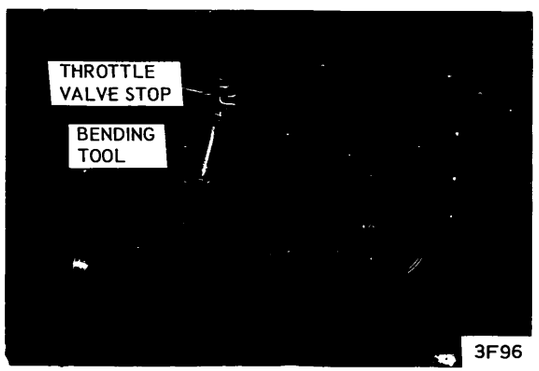
Remove transmission oil pan, gasket and screen, then loosen front servo adjusting screw two full turns. Install adjusting gauge block, Tool J-5880 (see "Front Band Adjustment" illustration), then install adjusting tool (Part of J-5880) on adjusting screw and tighten until tool overruns. **Back off adjusting screw one complete turn** and tighten locknut to 20-25 ft. lbs. Replace oil pan, gasket and screen and refill transmission to proper level.

Rear Band

Remove inspection cover in front compartment floor, then loosen adjusting screw locknut. Place rear band adjusting tool, J-5883 on adjusting screw and tighten screw until tool overruns. Back off adjusting screw EXACTLY 1½ turns and tighten locknut to 35-40 ft. lbs. *NOTE - It is very important that adjusting screw be backed off 1½ turns.*



FRONT BAND ADJUSTMENT



THROTTLE VALVE STOP ADJUSTMENT

Throttle Valve Stop

Remove oil pan and screen, then remove compensator pressure tube (see "Control Valve Tubes" illustration). Remove bellcrank-to-throttle valve lever rod from throttle valve lever. Hold throttle valve lever against throttle valve stop and measure distance from center of hole in lever to machined surface on rear of transmission case. This distance should be 4 7/32-4 5/8" . If not within specifications, bend throttle valve stop as necessary, using a suitable tool such as J-5887 (see "Throttle Valve Stop Adjustment" illustration).

TESTING

Stall Test

NOTE - Do not operate engine at high speed with selector lever in one of the drive ranges (with rear wheels held stationary) for more than 10 seconds at a time, or for a total time greater than one minute in any half hour period.

Connect tachometer to engine and place it where it can be easily read from drivers seat, then set hand brake and start engine. Place selector lever in "D" position, apply service brakes and operate engine at full throttle. Note tachometer reading. Repeat this procedure with selector lever in "L" (or "1") and "R" positions. Normal stall speeds are 1450-1550 RPM (6 Cyl. Eng.); 1550-1650 RPM (259" Eng.); 1750-1850 RPM (289" Eng. Exc. Jet Thrust & Super Jet Thrust); 2100 RPM, minimum (289" Jet Thrust & Super Jet Thrust Engs.). If stall speed is between 800-1000 RPM (if engine is normal), slippage is indicated in torque converter free wheel unit. If stall speed is greater than normal, slippage in transmission is indicated.

Free Running

With selector lever in "N", slowly accelerate engine. If tachometer reading reaches 4000 RPM before wide-open throttle is obtained, release accelerator immediately (do not run engine under no load at a speed exceeding 4000 RPM). If speed is 4000 with less than wide open throttle, converter stator is not stuck. If speed is 4000 or less with wide open throttle, it would indicate that stator is stuck.

Road Test

A thorough test should be made to determine shift speeds and performance of transmission. Initial application of bands and clutches should be checked in all driving ranges. A driving test should be made in "D" range to check shift speed chart (see "Transmission Shift Speeds" below).

NOTE - Shift points in table encompass rear axle ratios used in production. The low ratio shift speeds will be toward upper limit of each range. Higher ratios will be toward lower limit.

TRANSMISSION SHIFT SPEEDS

Minimum Throttl Upshifts (MPH)

Trans. Model No.	1-2	2-3
AS-10-5P & AS-12-7A		12-18
AS-14-7A		6-11
AS-24-8		16-19
AS-26-8		6-8
AS-2-10		15-20

Maximum Throttl Upshifts (MPH)

Trans. Model No.	1-2	2-3
AS-10-5P & AS-12-7A	34-42	63-73
AS-14-7A	38-52	78-105
AS-24-8	35-38	59-64
AS-26-8	28-32	41-46
AS-2-10		68-84

Maximum Kickd wn (MPH)

Trans. Model No.	3-2	2-1	3-1
AS-10-5P & AS-12-7A	60-70	20-26	12-18
AS-14-7A	74-98	9-20	6-13
AS-24-8	50-55	10-14	15-19
AS-26-8	34-39	6-10	10-14
AS-2-10	62-75	36-48	36-48

Inhibited & Closed Thr ttle Downshift (MPH)

Trans. Model No.	2-1 (Inhibited)	3-2 (Cl s d)
AS-10-5P & AS-12-7A	15-21	3-8
AS-14-7A	8-16	2-6
AS-24-8	15-22	7-11
AS-26-8	14-18	6-10
AS-2-10	ℂ	6-11

ℂ - 47-57 MPH (3-2 Inhibited Downshift with selector lever in "1" or "2"). 20-25 MPH (2-1 Inhibited Downshift with selector lever in "1").

Fluid Pressure

NOTE - Fluid pressure tests should be made to determine whether or not pressure regulator system is operating properly and to determine if there is fluid leakage in clutch circuits. Remove 1/8" pipe plug located near front of transmission on throttle lever side of transmission case and install a suitable pressure gauge. Make the following te sts:

Idle Pressure - With engine at idle speed and at normal operating temperature, move selector lever to all drive positions and note pressure reading on gauge. Pressures should be as indicated in table below. If pressure is below limits in one range, a fluid leak in that circuit is indicated. If pressure is high, throttle linkage should be checked and adjusted.

Pressure Regulator - Move selector lever to "D" position and apply brakes. Run engine at 1000 RPM (Exc. Jet Thrust & Super Jet Thrust Engines); 1400 RPM (Jet Thrust & Super Jet Thrust Engines). Pressures should be as indicated in table below. If pressure is less than minimum specification, valve linkage is too long. If pressure is greater, linkage is too short.

Stall Pressure - Apply all brakes and operate engine at full throttle kickdown position. Move selector lever to all drive positions. Pressures should be as indicated in table below . If pressure is not within limits, control valve assembly and pressure regulator valve assembly must be removed and cleaned.

(Continued)

Transmission Fluid Pressures (Pounds Pressure on Gauge)

Trans. Model No.	Idle Press.	Regulator Press.	Stall Pressure ℄ D,L,1,2	Stall Pressure ℄ R
AS-10-5P	50-80	80-85	130-175	170-190
AS-14-7A	59-85	80-85	132-184	184-203
AS-12-7A	59-85	90-95	132-184	184-203
AS-24-8	50-60	70-75	100-130	160 Min.
AS-26-8	50-60	70-75	100-130	160 Min.
AS-2-10	50-75	80-85	130-175	170 Min.

℄ - Selector lever in indicated range.

Air Pressure (Trans. in Car)

NOTE - With transmission oil pan and control valve assembly removed, proceed as follows:

TROUBLE SHOOTING

FLIGHTOMATIC TRANSMISSION

Roughness

Initial Engagement - Idle speed too high. Control pressure too high caused by improper throttle valve linkage adjustment or dirt in control valve assembly or regulator valve assembly.
1-2 Upshift Rough - Check and adjust throttle control linkage as control pressure may be too high. Clean and adjust bands. Governor valve may be stuck .
2-3 Upshift Rough - Check and adjust throttle control linkage as control pressure may be too high. Clean throttle control valve assembly. Adjust front band. Check for stuck governor valve.
3-2 Downshift Rough (Closed Throttle) - Adjust throttle control linkage. Orifice control valve stuck.
2-1 Downshift Rough (Closed Throttle) - Adjust throttle control linkage. Rear servo check valve may be stuck.

No Drive

No Drive in All Ranges - Check fluid level. Manual linkage may be disconnected. No control pressure which may be caused by trouble at front pump. Check rear band adjustment. Check rear servo action with air pressure. Check rear band adjustment. Inspect and clean control valve assembly. Check engine stall speed, as converter may not be operating properly.
No Drive in "D" or "L" Position - Check fluid level. Manual linkage may be disconnected. Control pressure may be low. Adjust throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Check front clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly.
No 2-3 Upshift - Governor valve or 2-3 shift valve may be stuck.
No Kickdown - Adjust throttle control linkage.

Locking Up

Locks in "D" - Rear clutch or front band may be applied. Clean control valve assemblies and governor valve assemblies. Check rear clutch and front band and servo for mechanical failures.
Locks in "D" (2nd Gear) - Check rear band and servo, and rear clutch for mechanical failure.
Locks in "D" (3rd Gear) - Front or rear band may be applied. Check bands and servo for mechanical failure. Clean control valve assembly.
Locks Up in "R" - Check front clutch and front band servo for mechanical failure. Clean control valve assembly.

Slippage

Slips in "D" or "L" - Check fluid level. Control pressure may be low. Check throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited; check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.
Slips in "R" - Check fluid level. Check and adjust throttle control linkage. Clean control valve and regulator valve assemblies. Check rear servo for limited travel. Check front clutch for mechanical failure as it may be slipping. Rear pump check valve may be stuck open.
1-2 Upshift Slipping - Check and adjust throttle control linkage as control pressure may be too high. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.
2-3 Upshift Slipping - Control pressure may be too low; adjust throttle control linkage and clean control valve assembly. Adjust front band. Check for internal leaks and for stuck governor valve.

Early-Late Shifting

1-2 & 2-3 Upshift Early - Check for stuck governor valve.
1-2 & 2-3 Upshift Late - Check for stuck governor valve or leak in governor circuit. Check and adjust throttle control linkage and clean control valve assembly.
3-2 Kickdown Early - Adjust throttle control linkage.

Cannot Push Start

Rear pump not operating. Pressure regulator valve may be stuck.

No Park Position

Adjust manual linkage. Check for damaged internal linkage or pawl.

POWER-SHIFT TRANSMISSION

Roughness

Initial Engagement - Idle speed too high. Control pressure too high caused by improper throttle valve linkage adjustment or dirt in control valve assembly or regulator valve assembly.
2-3 Upshift Rough - "D" Range - Control pressure too high caused by improper throttle valve linkage adjustment. Valves in control valve assembly sticking. Adjust front band. Governor valve sticking.
3-2 Downshift Rough (Closed Throttle) - "D" Range - Check and adjust throttle valve linkage. Valves in control valve assembly sticking. Idle speed too high.
Manual 1-2 Upshift Rough - Control pressure too high. Check and adjust throttle valve linkage. Clean and inspect pressure regulator and valve body assembly. Governor valve sticking.
Manual or Automatic 2-3 Upshift Rough - Control pressure too high. Check and adjust throttle valve linkage. Clean pressure regulator and control valve assemblies.

No Drive or Slippage

No Drive in All Ranges - Fluid level low. Manual linkage loose or disconnected. Check front pump and front pump drive tangs on converter (may be cause of no control pressure). Check engine stall speeds for possible converter failure.
No Drive or Slippage in "1", "2" & "D" - Fluid level low. Manual linkage loose. Adjust throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Front clutch will not apply properly.
No Kickdown - "D" Range - Adjust throttle control linkage.
No Drive or Slippage in "R" - Manual linkage loose. Rear band does not apply. Rear clutch inoperative. Check for stuck 1-2 shift valve.
Starts in 1st Gear in "2" Range and (or) "D" Rang and (or) Slips in "2" and 2nd Gear in "D" - Front band not applying properly. Check band adjustment. Check for mechanical failure of band or servo. Check for fluid leaks in servo circuit. Clean and inspect valve body assembly.
Manual 1-2 Upshift Slippage - Control pressure low. Check throttle valve linkage. Clean and inspect pressure regulator assembly and control valve assembly. Front band not applying properly. One-way clutch slipping.
Manual or Automatic 2-3 Upshift Slippage - Adjust throttle valve linkage. Clean and inspect pressure regulator assembly and control valve assembly. Adjust front band. Governor valve sticking. Check for internal leakage. Rear clutch slipping.
No 2-3 Upshift - "D" Range - Governor valve or 2-3 shift valve may be stuck.

Locking Up

Locks in "R" and (Or) "1" - Manual linkage loose. Rear band not properly adjusted. Check rear servo operation. Rear clutch not operating properly. Transition or 1-2 shift valve stuck.
Drives in Neutral, Locks Up in Reverse, and Engin Does Not Run Free in Park - Front clutch applied. Check clutch for mechanical failure.
Locks Up in "R" and (Or) "1" - Front band applied. Check band and servo. Clean control valve assembly.
Locks Up in "2" and "D" - One-way clutch stuck. Rear band applied. Clean and inspect control valve assembly.
Locks Up in "1", "2" and "3" - Rear clutch applied. *NOTE - Car cannot be pushed backwards in neutral if rear clutch seizes.* Clean and inspect control valve assembly.
Locks Up in "1" Only - Rear clutch or front band applied. Clean and inspect control valve assembly.
Locks Up in "2" Only or "D" Only - Rear band or rear clutch applied. Clean and inspect control valve assembly.

Early-Late Shifting

2-3 Upshift Early - Adjust throttle valve linkage. Clean and adjust pressure regulator and control valve

(Continued)

assemblies. Governor valve sticking.
2-3 Upshift Lat - Adjust throttle valve linkage. Clean and adjust pressure regulator and control valve assemblies. Governor valve sticking. Leakage in governor circuit.
3-2 Kickdown Early - "D" Range - Check and adjust throttle valve linkage.

Downshifts

Downshifts to First Gear in "2", "D" or "D" Kickdown - Check and adjust front band. Check for mechanical failure or front band or servo. Check for fluid leaks in front servo circuit. Clean and inspect control valve assembly.

Cannot Push Start

Rear pump not operative. Pressure regulator valve may be stuck.

No Park Position

Adjust manual control linkage. Check for damaged internal linkage or pawl.

AIR PRESSURE CHECKS

Make the following air pressure checks with transmission in car to determine normal operation of components. See "Air Pressure Check" illustration for location of check points. Remove transmission oil pan, screen, and control valve assembly. *NOTE - Front servo tubes should remain in front servo, and servo attaching screws must be tight.*

Front Clutch

Apply pressure to front clutch passage and listen for a dull thud, indicating clutch is operating.

Front Band & Servo

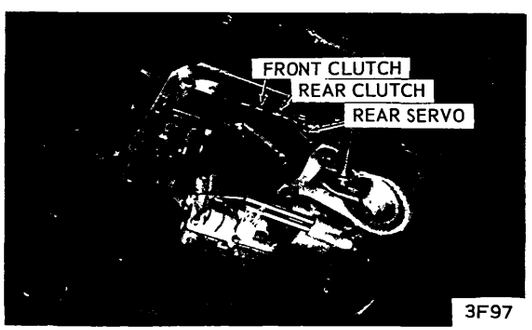
Apply air pressure to front servo apply tube and note band operation.

Rear Band & Servo

Apply air pressure to rear servo and note band application.

Governor Valve

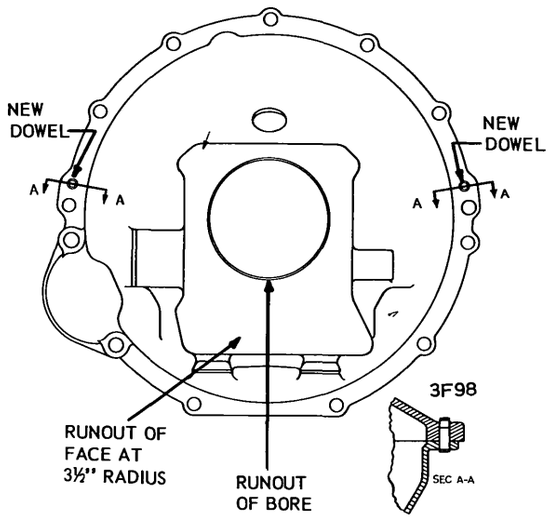
Remove governor valve inspection cover and apply air pressure to front clutch passage. Listen for a click and watch valve snap inward. If a click is not heard, the valve may be stuck.



AIR PRESSURE TEST POINTS

Rear Clutch

Apply air pressure to rear clutch passage and listen for a dull thud indicating clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this circuit.



CONVERTER HOUSING ALIGNMENT

TRANSMISSION & CONVERTER (REMOVAL & INSTALLATION)

See 1961 Final, Page 515 and note the following:

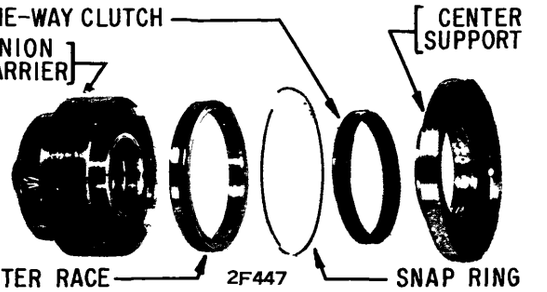
Power-Shift Transmission

Removal - Drain transmission and converter, then remove propeller shaft assembly. Disconnect shift and throttle linkage from transmission levers and remove shift lever assembly from inside the car. Remove center console left side cover and remove parking brake cable-to-body retaining clip nut, then remove clip from floor pan under car. Disconnect oil cooler lines and speedometer cable at transmission. Remove exhaust pipe from manifold, then remove rear section of exhaust pipe from front section and muffler, and remove pipe. Install a suitable transmission lift, then remove four transmission-to-converter bellhousing screws and install a guide pin, Tool J-4285 in each of the upper capscrew holes. Tilt rear of transmission upward and move assembly toward rear until converter housing is cleared, then remove from car.

Installation - Reverse removal procedure and tighten all bolts and nuts to specifications. *See "Tightening Specifications" below.*

Torqu Converter

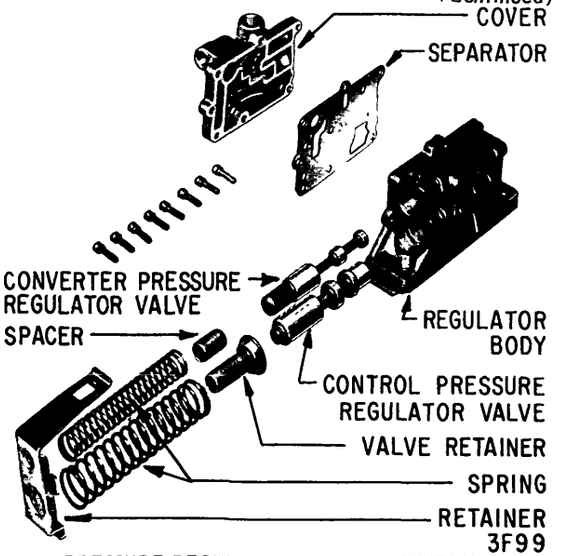
Rem val - Remove transmission, then remove rear engine insulator nuts and jack engine up enough to separate insulator from crossmember. Remove rear engine support crossmember, then remove starter motor. Remove converter housing-to-engine capscrews and remove converter housing, being careful not to damage housing or dowels or distort converter blower. If necessary, lower engine slightly to aid in removal. Remove crankshaft-to-converter drive plate screws and remove converter assembly.



ONE-WAY (SPRAG) CLUTCH (POWER-SHIFT & 6 CYL. ENG. AUTO. TRANS.)

Installation - Reverse removal procedure, using Converter Aligning Tool J-6310, and tighten all bolts and nuts to specifications. *See "Tightening Specifications" below.*
Alignment (New Converter Housing) - With torque converter removed, install housing on dowels and tighten capscrews and bolts, then install clutch aligning gauge, Tool J-2045 in end of crankshaft, making sure gauge is centered and locked securely. Install a dial indicator on gauge and set indicator on face of housing at a 3½" radius. Turn crankshaft and check total indicator reading. If face runout exceeds .006", replace housing. Place dial indicator in the bore and turn crankshaft slowly. If bore runout exceeds .004" total indicator

(Continued)



PRESSURE REGULATOR VALVE ASSEMBLY

reading, reposition housing and relocate dowels. To reposition dowels, remove housing and drive out old dowels. Assemble housing on engine and tighten capscrews only enough to hold housing in place against block. Again check runout. If not within limits, use a lead hammer and shift housing until bore runout is within limits, then tighten capscrews and recheck runout. To maintain alignment, use a 11/32" drill and drill two new dowel holes in approximate location shown in illustration. Ream holes to .376-.377", then install dowels in new holes.

OVERHAUL

Convert r

Converter assembly is welded and cannot be disassembled for servicing or overhaul.

Transmission

See "Warner Automatic Transmission" in 1960 Final Data, Page 506, or later Manual edition and note the following:

C ntrol Valve Assembly (6 Cyl. Models): Lower Valve B dy Cover - Rear Servo Check Valve and Spring not used. The only valve at this location is the 1-2 shift valve and spring.

Pinion Carrier - Pinion carrier is serviced only as an assembly and cannot be overhauled. On models with one-way sprag clutch, the sprag clutch may be removed by slipping it out of outer race, then outer race can be removed by removing snap ring. *NOTE - Do not remove outer race unless replacement is necessary.* To reassemble one-way clutch and outer race, install outer race and secure in place with snap ring. Install one-way clutch into pinion carrier and outer race assembly with flanged end of one-way clutch towards pinion carrier. Properly assembled, the brass drag strips attached to inner cage of one-way clutch will be located away from pinion carrier.

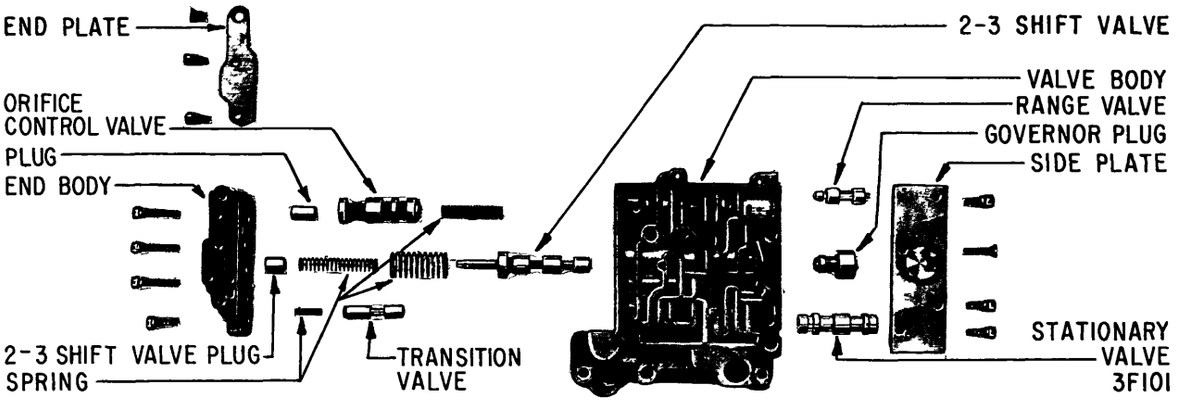
POWERSHIFT TRANSMISSION

Pressure Regulator

Disassembly - Remove valves from regulator body (see "Pressure Regulator" illustration), then remove regulator cover and separator plate.

Inspection - Clean all parts and inspect all mating surfaces, valves and valve bores for scoring, burrs and damage. Check fluid passages for obstructions and valve springs for distortion.

Reassembly - Position separator plate on cover and install cover and plate on regulator body and tighten screws to specifications (see "Tightening Specifications" below). Install valves in valve body.



CONTROL VALVE LOWER BODY ASSEMBLY

Control Valve

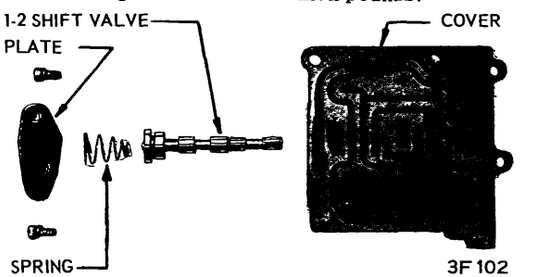
Disassembly - Upper Valve Body - Remove four lower body-to-control valve assembly attaching capscrews and lockwashers, then invert assembly and remove separator plate-to-lower valve body attaching screws. Remove upper valve body and separator plate, then remove two separator plate attaching screws and remove separator plate. Remove valves and springs (see "Upper Valve Body" illustration).

Lower Valve Body - Remove screws and washers attaching cover to lower valve body, then remove cover and separator plate. Remove valves and spring (see "Lower Valve Body" illustration).

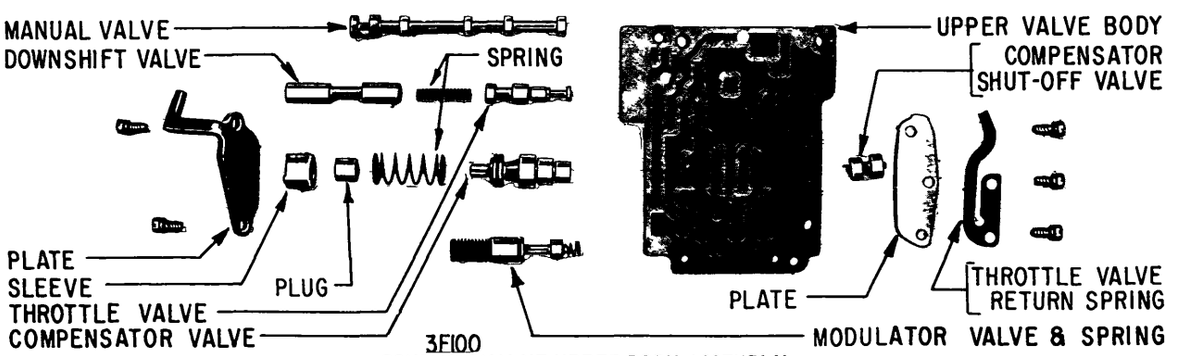
Lower Valve Body Cover - Remove valves and spring (see "Lower Valve Body Cover" illustration).

Reassembly - Upper Valve Body - Reinstall valves and springs in their respective bores (see "Upper Valve Body" illustration) and tighten front plate attaching screws to 20-30 inch pounds. *NOTE - When installing rear plate, the throttle valve must protrude from valve body to provide clearance for the stop on rear plate.* Tighten rear plate screws to 20-30 inch pounds. Position separator plate on upper valve body and tighten screws to 20-30 inch pounds.

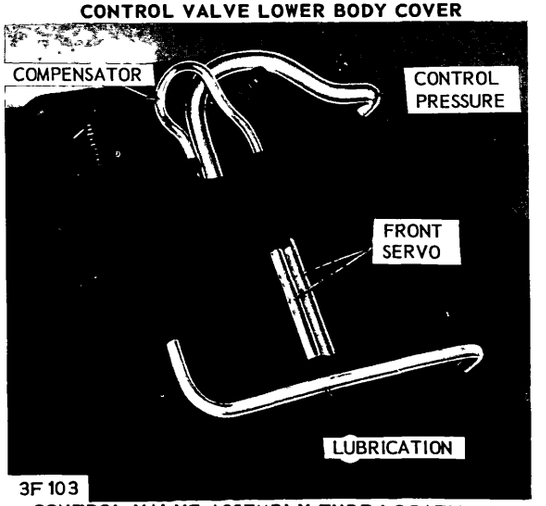
Lower Valve Body - Reinstall valves and springs in their respective bores, then tighten end body plate retaining screws, end body retaining screws, and side plate retaining screws to 20-30 inch pounds.



CONTROL VALVE LOWER BODY COVER



CONTROL VALVE UPPER BODY ASSEMBLY



CONTROL VALVE ASSEMBLY TUBE LOCATIONS

Lower Valve Body C ver - Install valve and spring in bore of cover (see "Lower Valve Body Cover" illustration), making sure that spring is not caught between body and plate, then tighten end plate retaining screws to 20-30 inch pounds.

Control Valve - Position upper valve body and separator plate on lower valve body and install retaining screw and lockwasher (do not tighten screw). Position separator plate and lower valve body cover on lower valve body and install retaining screws and lockwashers (do not tighten screws). Install four capscrews and lockwashers attaching lower valve cover to control valve assembly and tighten to 4-6 ft. lbs. Tighten all retaining screws to 20-30 inch pounds.

GEARSHIFT LINKAGE
(Power-Shift Transmission)

Removal

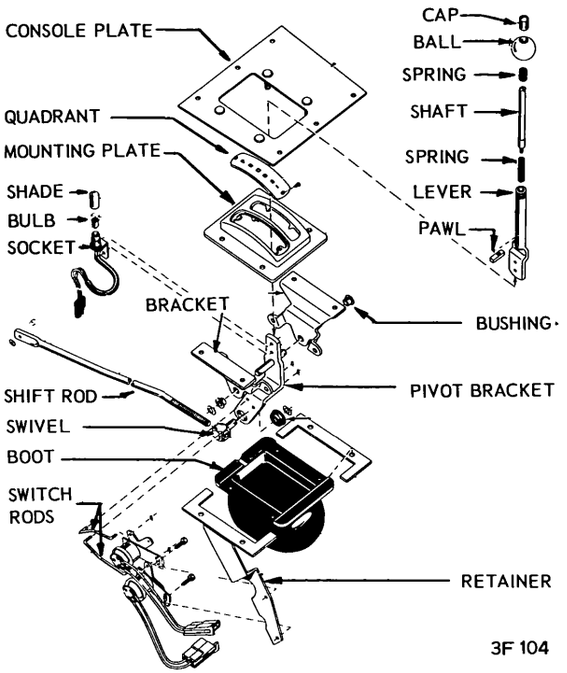
Disconnect manual valve rod from selector lever, then remove ashtray and console shift cover pad from around selector lever. Remove shift lever mechanism-to-center console retaining screws and lift shift mechanism from console. Disconnect back-up light, starter cutout switch and indicator light wires from connectors.

Disassembly

Unscrew selector lever shaft ball, then remove cap and secondary spring. Remove retainer plate nuts and the back-up and neutral switch operating rods from manual shift lever. Remove retainer plates, rubber boot, console mounting plate and selector indicator housing from mounting bracket and pivot lever assembly. Remove pivot bracket assembly bolts from bracket. Remove cotter pin, spring washer, washers and bushings and remove brackets from pivot pin in manual selector lever. Unscrew plunger shaft from pawl and remove pawl, plunger shaft and primary spring. Remove two switch operating rods from switch and remove switches from retainer plate.

Reassembly

Install back-up and neutral switch on retainer plate, then install primary spring in selector lever shaft.



GEARSHIFT LINKAGE (POWER-SHIFT TRANSMISSION)

Compress spring and insert pawl in bottom slot of selector lever with chamfer in pawl toward top. Install plunger shaft in selector lever and screw plunger shaft securely to the pawl. Install pivot bracket assembly, bushings, washers, spring washer and cotter pins. *NOTE - Spring washer is installed on left side of bracket as mounted in car.* Install console mounting plate, indicator housing, rubber boot, and retainer plate. Install switch operating rods, then install secondary spring, cap, and selector lever ball.

Installation

Connect back-up light, neutral switch and indicator wires at connectors, then install shift mechanism assembly in center console and install retaining screws. Install console shift cover pad, then connect manual shift valve-to-selector lever rod to selector lever.

Tightening Specifications

Location	Torque
Transmission to Converter Housing	40-45 Ft. Lbs.
Converter Housing to Engine	23-28 Ft. Lbs.
Converter to Drive Plate	23-28 Ft. Lbs.
Oil Pan Screws	10-13 Ft. Lbs.
Pressure Regulator to Case	17-22 Ft. Lbs.
Control Valve to Case	8-10 Ft. Lbs.
Front Servo Attaching Bolt	30-35 Ft. Lbs.
Rear Servo Attaching Bolt	40-45 Ft. Lbs.
Governor Screws	50-60 In. Lbs.
Manual Lever Shaft Nut	35-40 Ft. Lbs.
Throttle Lever Shaft Nut	17-20 Ft. Lbs.
Stator Support Attaching Screws	25-35 In. Lbs.
Rear Pump Cover Screws	50-60 In. Lbs.
Extension Housing to Case	28-30 Ft. Lbs.

AIR CONDITIONING SERVICE CAUTIONS

HANDLING FREON: Though considered the safest and best refrigerant for use in Air Conditioning systems, the following precautions must be observed to avoid serious accidents or damage to the system.

Drum: 1) Do not leave drum uncapped (metal cap furnished with drum is for protection of valve and safety plug). It should be replaced after each use of drum.
2) Do not carry drum in passenger compartment of car. Place drum in luggage compartment or, if in an open truck, cover drum to protect it from radiant sun heat. If precaution not taken, resultant increase in pressure may cause safety plug to release or drum to burst.
3) When charging system, do not subject drum to high heat. Use water no warmer than 125°F (Hot rags will suffice). *Never place drum on radiator, stove, or use torches for heating during charging.* Keep drums upright.
4) Never permit a drum to be dropped or strike another drum violently.
5) Do not fill drum completely (when filling one drum from another). Leave space above liquid for expansion.

Personal: 1) Do not discharge Freon into room with exposed flame because concentrations of this gas in contact with open flame will produce a toxic gas.
2) Do not expose eyes to liquid, *USE GLASSES OR GOGGLES. Liquid Freon will freeze anything with which it comes in contact.* If Freon should strike eyeballs, splash water to area of eye to gradually get temperature above freezing point, apply a few drops of sterile mineral oil to eyes as an irrigator. If irritation continues, wash eyes with a weak solution of boric acid. *DO NOT RUB EYES. See an eye specialist at once.*
3) Do not inhale large quantities of Freon vapor as it will act an an anesthetic.
4) If Freon comes in contact with skin, injury should be treated for frostbite.

HANDLING REFRIGERANT LINES: 1) Keep refrigerant lines dry and clean. Whenever a connection or joint is broken, clean all dirt from joint or connection.
2) Parts from stock are capped and dehydrated. Caps should only be removed just prior to installation. Lines removed from system to be used again, should be capped immediately, to prevent dirt and moisture from entering lines.
3) Lines should be free of kinks, and should be carefully stored to avoid crushing or bending.
4) Proper size wrenches should be used when tightening fittings. Always use two wrenches to prevent twisting copper tubing.
5) Tubing that is left free to vibrate will harden and crystallize the area of the tubing at flare sections so that it may become brittle and break.
6) When using paint drying lamps, ovens, steam cleaners, or other heat producing devices, avoid heating any part of system. If sufficient heat applied, pressure will increase to a point where some part of system will rupture.
7) When undercoating, use care to see that undercoating does not plug evaporator drain. Do not coat air conditioning joints and connections.
8) Keep gauge set and lines free of moisture.
9) Compressor lubricant container must not be left open longer than necessary as the special oil is moisture free and will absorb moisture from air if left uncapped.

AIR CONDITIONING LEAK TESTS

LEAK TESTING CONFINED AREAS: For leak testing confined areas, such as sections of evaporator and condenser, a torch or flame type detector must be used. Two types are available. One type uses anhydrous methyl alcohol, under pressure, for producing the testing flame. The cylinder is refillable, and must be preheated to pressurize cylinder. The other type uses propane gas, under pressure, to produce the testing flame. The cylinder is replaceable and comes already pressurized, making it unnecessary to pre-heat cylinder in order to produce testing flame. Instructions for use of the detectors are furnished with the detector.

Leak Testing: With flame adjusted, explore for leaks by moving end of hose or sampling tube around all points where a leak may be. Especially check around bottom of connections, since Freon is heavier than air and will be more apparent at bottom of fitting. Color of flame will turn to a yellow-green when a small leak is detected. Large leaks will be indicated by a change in color to bright or brilliant blue or purple. When hose or tube is moved away from leak, flame will clear to an almost colorless pale-blue or green. *CAUTION*—Do not use lighted detector in any place where combustible or explosive gases, dust or vapors may be present. Do not breathe fumes and black smoke that are produced if leak is a big one. Before leak testing, be sure car is thoroughly aired (particularly if Freon tank used or if system opened for any reason) and moved to a Freon-free area in order that false readings may be prevented.

PIN-POINTING LEAKS: There are a number of fittings and places throughout the air conditioning unit where a leak detector solution or detergent may be used to pin-point leaks. Apply solution to suspected area with swab that is attached to bottle cap. Bubbles will form, within seconds, if there is a leak.

AIR CONDITIONING TROUBLE SHOOTING

►*CAUTION: Do not disconnect refrigerant lines, replace parts, or attempt adjustments without complete instructions. See "Air Conditioning Service Cautions".*

POOR COOLING: 1) Blowers Not Operating—Fuse blown or faulty circuit breaker; switch in "Off" position; defective switch; switch resistors or blower rheostats inoperative; broken wire or loose connections; blower motor defective; blower fans or motor improperly installed.
2) Restricted Air Flow—Filters clogged; dirt or other obstructions in air ducts; evaporator fins or coils clogged or restricted with frost or ice.
3) Refrigerant Flow to Cooling Coils or Fins Incorrect—Expansion valve improperly adjusted or defective; power element or temperature bulb does not contact pressure line properly; restriction in liquid line between receiver and cooling coils or fins; power element or temperature bulb discharged; insufficient refrigerant; by-pass valve, thermostatic switch or solenoid (if so equipped) not properly set or inoperative; modulator valve (if so equipped) defective; break in any part of closed refrigeration system.
4) Refrigerant Not Condensing Properly—Air flow through condenser, restricted, high engine operating temperatures; air or excess refrigerant in system; restriction in high pressure side of compressor and condenser.
5) Clutch (If So Equipped) Does Not Engage—Defective coil or relay; clutch plate lining worn or saturated with oil causing slippage; air conditioning "On" switch defective; thermostat inoperative; clutch adjustment incorrect.
6) Compressor—Belts not adjusted properly, worn, or broken; operating above normal pressures; disconnect pulley bolts not in place; valves faulty; service valves not fully open.
7) Electrical—Loose connections or broken wires between electrical units, blown fuses or faulty circuit breakers.

TOO COLD: 1) Clutch (If So Equipped) Does Not Disengage—Thermostat inoperative; relay stuck closed; air conditioning "On" switch inoperative.
2) Blower Speed Cannot be Reduced—Defective blower switch.

VIBRATION—NOISE: 1) Blowers—Loose on shaft; striking housing; foreign material; motor bearings or mounts loose or worn.
2) Compressor—Mounting brackets loose; loose internal parts; insufficient oil; too much refrigerant.
3) Air Flow—Foreign material in air system; small slits or openings in ducts.

INCORRECT OPERATING PRESSURE: 1) Excessive Pressure on High Pressure Side—Air or excess refrigerant in system; air flow through condenser core restricted; kinks or restrictions in line on high pressure side; high engine temperature; shut-off valve on high pressure side of compressor not fully open; insufficient air flow through cooling coil; defective expansion valve or incorrect adjustment.
2) Insufficient Pressure on High Pressure Side—Shortage of refrigerant; defective expansion valve or incorrect adjustment; leaky or broken compressor valves.
3) Excessive Pressure on Low Pressure Side—Power element or temperature bulb not making correct contact with pressure line; expansion valve needle stuck open or leaking.
4) Insufficient Pressure on Low Pressure Side—Restriction in lines, shortage of refrigerant; expansion valve needle stuck shut; expansion valve not open far enough, plugged, or defective; dehydrator-filter (strainer-drier) plugged; power element or temperature bulb charge lost or line plugged; compressor valves faulty; blower fans inoperative; temperature control thermostat does not cut out; moisture or freeze-up.

GENERAL MOTORS CARS

Buick & Buick Special (1963)
Cadillac (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Corvair (1963)
Chevrolet Trucks (1963)
Oldsmobile & Oldsmobile F-85 (1963)
Pontiac & Pontiac Tempest (1963)

►CHANGES, CAUTIONS, CORRECTIONS

► *1963 BUICK MOAN OR RUMBLE NOISE CORRECTION:* May be caused by compressor suction hose vibrating. If grasping hose about 6" from rear of compressor eliminates noise, correct by installing 2 front stabilizer bar bushings on suction hose, positioning bushings on hose for best possible dampening effect.

DESCRIPTION

Conventional type air conditioning systems similar in design and operation to previous models. All units are mounted in engine compartment or on front of dash. Cadillac Series 75 has an additional evaporator and blower assembly in trunk.

LEAK TESTING & TROUBLE SHOOTING

See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning Section.

ADJUSTMENT

Compressor Belt

See "Belt Adjustment" on individual Car Model pages.

SERVICING

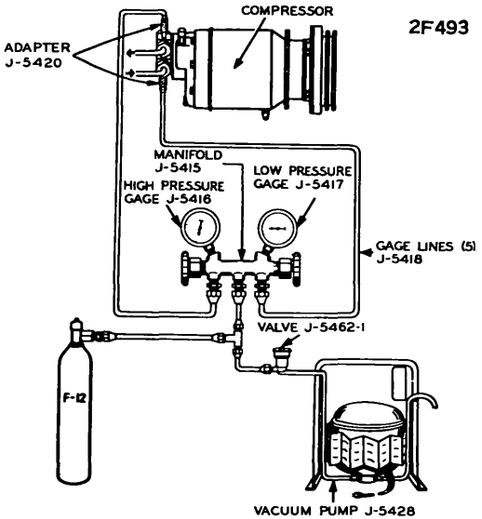
► *SERVICE CAUTION: Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

Gauge Set Installation

Connect gauge set into system (see illustration and "System Gauge Connection Note" below). *NOTE - For purging or adding oil to system, Freon tank and Vacuum Pump are not connected to center connection on manifold.* Make sure that shut-off valves on gauge set are fully closed and that shut-off valves on compressor head (cars with this type valve) are turned fully COUNTERCLOCKWISE (back seated).

SYSTEM GAUGE CONNECTION NOTE - Usual location for gauge set connections is at the compressor, however some cars may have high pressure valve at compressor muffler inlet and low pressure valve in line near air intake pipe at dash panel. On cars with suction throttle valve (freeze protection valve), a low pressure gauge valve is also located on suction throttle valve (or on a pipe attached to valve). *CAUTION - Gauge valve at suction throttle valve MUST NOT BE USED TO CHARGE SYSTEM unless there is no low pressure valve at compressor, or severe damage to suction throttle valve will result.*

SCHRADER TYPE VALVE CONNECTION CAUTION - On cars using this type valve in place of hand operated shut-off valves in refrigerant lines at compressor head, it is necessary to connect Adapters J-5420 to gauge connecting lines and to make sure that both valves on gauge set are completely closed before connecting adapters to Schrader type valves as the adapters will automatically open these valves.



GAUGE SET INSTALLATION

HAND OPERATED SHUT-OFF VALVE NOTE - These are two-way valves. When turned COUNTERCLOCKWISE (back seated), compressor is connected to refrigerant lines and line to gauge fitting is closed. This is the normal operating position. When turned CLOCKWISE (front seated), compressor is closed off from refrigerant lines and open to gauge fitting. When valves are turned to middle position, compressor is open to both refrigerant lines and to gauge fitting. In this position gauge readings can be taken with system in operation.

HIGH PRESSURE GAUGE CAUTION - Due to high operating capacity of compressor, a 600 lb. gauge must be used.

Purging The System

All (Except Cadillac, Chevrolet, Corvair) - Connect gauge set and turn hand shut-off valves (where equipped) partially clockwise. Open high pressure gauge valve so refrigerant escapes through gauge set and out the center fitting and hose. *CAUTION - DO NOT open gauge valve too much as oil and liquid refrigerant will escape. Refrigerant should escape in vapor form only.* When hissing stops, all refrigerant has been discharged from system. Close gauge high pressure valve. Leave gauge set connected in preparation for evacuating and charging.

Cadillac - Install Adapters J-5420 on high and low pressure valve fittings. Tighten adapters to depress valve cores until a **slight** hissing sound is heard. When hissing stops, system is discharged. *CAUTION - DO NOT overtighten adapters or oil and liquid refrigerant will escape. Refrigerant should escape in vapor form only.* Remove adapters as soon as system is purged.

Chevrolet & Corvair - Connect gauge set. Remove cap from gauge center connection and open high pressure gauge valve, being careful not to open it too far, and slowly discharge **vapor** through center connection. *CAUTION - Opening valve too far will cause compressor oil to be discharged with refrigerant.* When pressure is reduced below 100 lbs. on high pressure gauge, open low pressure gauge valve and continue discharging until all refrigerant has been released or pressure does not exceed 5 lbs. Close both gauge valves. Leave gauge set connected in preparation for evacuating and charging.

Evacuating The System

Without Vacuum Pump - Connect gauges as indicated in illustration, but substitute a bottle or other suitable container in place of vacuum pump (container will catch the evacuated oil so it may be measured and a like amount of clean oil replaced). *CAUTION - Be sure the fitting on discharge valve is open to compressor with no restriction from valve closure, caps, or plugs in attached line before starting engine.* Turn both high and low pressure valves on compressor clockwise to gauge position. Leave low pressure gauge valve tightly closed, carefully open high pressure gauge valve and hand shut-off valve (vacuum line valve), being careful to avoid any accidental discharge of liquid refrigerant. Discharge refrigerant, air, and any oil into bottle. Start engine and set at slow idle speed and turn air conditioner to maximum cooling position. *Maintain engine speed at slow idle at all times during evacuation.* Turn high pressure service valve to shut-off position. Operate system at slow idle for five minutes, then turn off engine and air conditioner and close hand shut-off valve immediately. If system holds 26-28" of vacuum *(see "Vacuum Note" below)* for 10 minutes, system is not leaking. If not, locate and correct leak. Close high pressure gauge valve, open low pressure gauge valve and charge system with refrigerant at cylinder pressure, then repeat evacuation as indicated above. Again close high pressure gauge valve and open low pressure gauge valve and then complete charging with correct amount of refrigerant *(see "Charging System" below).*

With Vacuum Pump - Connect gauge set, vacuum pump, and container of refrigerant as shown in illustration. Check fluid level in vacuum pump and add correct oil if necessary. Make sure dust cap on discharge side of vacuum pump has been removed. Open high and low pressure valves on gauge set. *CAUTION - Shut-off valve on vacuum pump must be closed.* Start vacuum pump and SLOWLY open shut-off valve at pump. *NOTE - If oil is blown from pump, oil must be replaced.* Operate pump to obtain approximately 28" of vacuum *(see "Vacuum Note" below)* for 10 minutes. If vacuum of 28" cannot be obtained, close valve at pump and note low pressure gauge to see if vacuum in system holds. If vacuum holds, pump or gauge may be at fault. If vacuum will not hold, charge system with refrigerant, check for leaks, and repair as necessary, then purge system. Repeat evacuation procedure and when vacuum of 28" has been obtained for 10 minutes, close valve at pump, stop pump and check vacuum to see that it will

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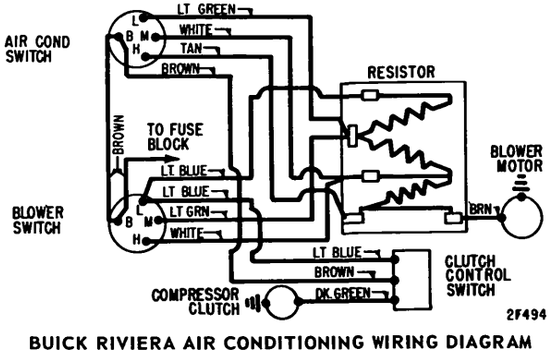
GENERAL MOTORS CARS (Cont.)

hold If vacuum holds and no leaks are apparent, open refrigerant container valve to charge system to cylinder pressure, then close valve Evacuate system again and close gauge valves The system is now ready for a complete charge

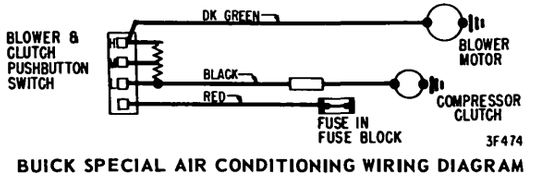
VACUUM NOTE - Vacuum specification of 28" is for sea level For each additional 1000 feet of elevation above sea level, lower vacuum specification by 1"

Charging The System

With system completely evacuated (gauge set and refrigerant tank connected), place refrigerant cylinder in a bucket of hot water (not to exceed 125°F) *CAUTION - Do not heat r frigerant cylinder above 125°F because fusible plug in cylinder valve melts at 157°F and softens at a slightly lower temperature* Place cylinder and bucket on a suitable scale and record total weight Open low pressure valve on gauge set (high pressure valve on gauge set closed) Set both high and low pressure service valves on compressor in gauge position Wearing goggles to protect eyes, fully open refrigerant cylinder valve and allow refrigerant vapor to flow into system Operate engine at slow idle speed until the correct amount of refrigerant has been charged into the system (see "Refrigerant Capacity Table" below) *NOTE - It may be necessary to reheat water in bucket to maintain required pressure* Close both valves on gauge set, close valve on cylinder and remove cylinder from bucket Operate compressor with engine running at 1600 RPM, and check general performance of air conditioner If performance satisfactory, stop engine, then firmly backseat both high and low pressure service valves on compressor Remove gauge lines and replace protective caps over gauge connections and shut-off valves Check compressor oil level (see below)



BUICK RIVIERA AIR CONDITIONING WIRING DIAGRAM



BUICK SPECIAL AIR CONDITIONING WIRING DIAGRAM

1963 Refrigerant Capacity Table

Car Model	Capacity
Buick LeSabre, Invicta, Electra	4 lbs
Riviera	3½ lbs
Special	2½ lbs
Cadillac Series 60, 62	4 lbs
Series 75	5¼ lbs
Chevrolet Cars (All Weather System)	3¾ lbs
(Cool Pack System)	3 lbs
Chevy II	2½ lbs
Corvair	5 lbs
Chevrolet Trucks	3¾ lbs
Oldsmobile Except F-85	4¼ lbs
F-85	2½ lbs
Pontiac	4¼ lbs
Tempest	3 lbs

Checking & Adding Oil

CAUTION - Use only 525 viscosity refrigeration oil See table below for system total capacities

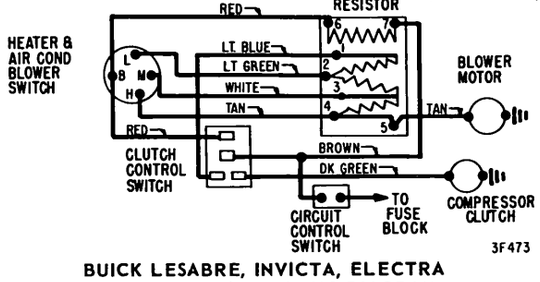
1963 System Oil Capacity

Car Model	℄ Capacity
Buick & Buick Special	10½ ozs
Cadillac Series 60, 62	10½ ozs
Series 75	13½ ozs
Chevrolet Cars, Chevy II, Corvair	11 ozs
Chevrolet Trucks	11 ozs
Oldsmobile, Except F-85	10½ ozs
F-85	10 ozs
Pontiac & Tempest	11 ozs

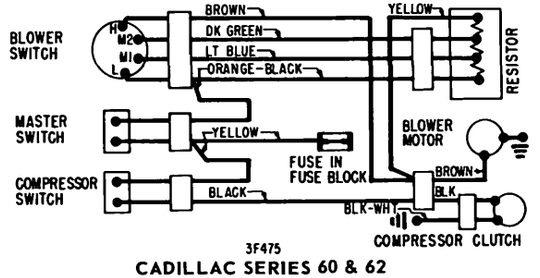
℄ - Fluid measure

1) Compressor - Ordinarily compressor oil level need not be checked unless there has been a major oil loss from a broken hose or severe leak, or due to a collision To check and determine how much oil to install, remove

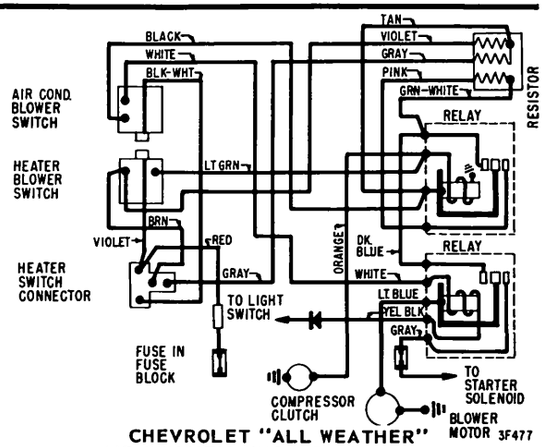
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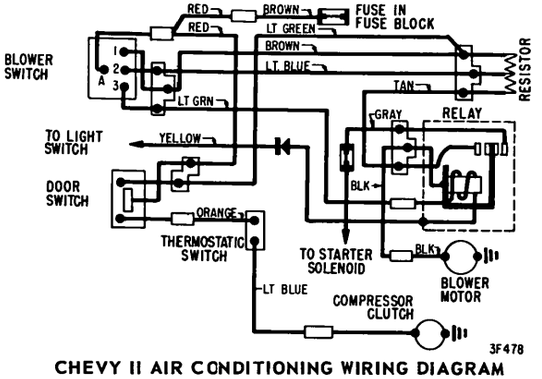
BUICK LESABRE, INVICTA, ELECTRA AIR CONDITIONING WIRING DIAGRAM



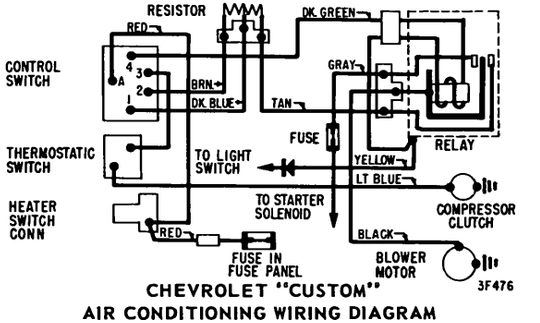
CADILLAC SERIES 60 & 62 AIR CONDITIONING WIRING DIAGRAM



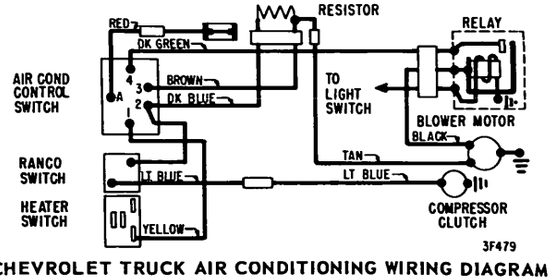
CHEVROLET "ALL WEATHER" AIR CONDITIONING WIRING DIAGRAM



CHEVY II AIR CONDITIONING WIRING DIAGRAM



CHEVROLET "CUSTOM" AIR CONDITIONING WIRING DIAGRAM



CHEVROLET TRUCK AIR CONDITIONING WIRING DIAGRAM

GENERAL MOTORS CARS (C nt.)

compressor, then drain and measure oil. If more than 4 ozs. drained, add the same amount. If less than 4 ozs drained, add 6 ozs.

2) Other Components - If a system component (evaporator, condenser, receiver-dehydrator) being replaced (no major oil loss), pour oil directly into new unit according to table below. If there has been a major oil loss, add oil according to table below plus amount for compressor as in **1)** above.

1963 System Component Oil Capacity

Component	℄ Capacity
Evaporator	3 ozs.
Condenser	1 oz.
Receiver-Dehydrator	1 oz.

℄ - Fluid measure.

REMOVAL & INSTALLATION

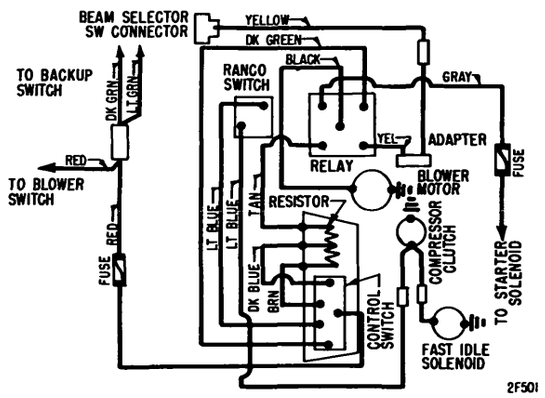
CAUTION - To prevent dirt and moisture entering air conditioning system, it is very important to cap all openings and to complete work on system as soon as possible.

COMPRESSOR REMOVAL NOTE (TO WORK ON ENGINE) - If practicable or desirable, compressor may be repositioned in engine compartment for work on engine without disconnecting refrigerant lines. Follow procedure listed below but do not discharge system or disconnect compressor hoses.

Compressor

Buick (Except Special) - Purge system, then remove valve retaining plate from rear of compressor. Cover openings in lines and compressor. Disconnect clutch coil wire, loosen bolts, and remove compressor from mounting bracket. To install, reverse removal procedure.

Buick Special (V6 Engine) - Purge system, then remove line retaining plate bolt and remove lines from rear of compressor. Disconnect clutch wire from compressor, then remove belts. Remove compressor adjustment bolts and pivot bolts, then remove compressor. To install, reverse removal procedure.



CORVAIR AIR CONDITIONING WIRING DIAGRAM

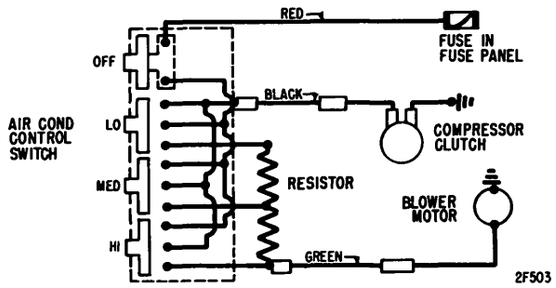
Buick Special (V8 Engine) - Discharge system and disconnect hoses from compressor. Raise car and disconnect front stabilizer bar. Disconnect compressor adapter from front bracket (or oil pump front bracket), then remove bolt holding compressor rear brace and rear head to cylinder block. Disconnect rear head from rear brace Support compressor with stabilizer bar, roll compressor over and remove adapter from front head. Remove belt from pulley, slide stabilizer bar forward and remove compressor. To install, reverse removal procedure.

Cadillac - Purge system and disconnect hoses from compressor. Disconnect clutch coil wires and remove belt from compressor. Disconnect compressor from mounting brackets and remove compressor To install, reverse removal procedure.

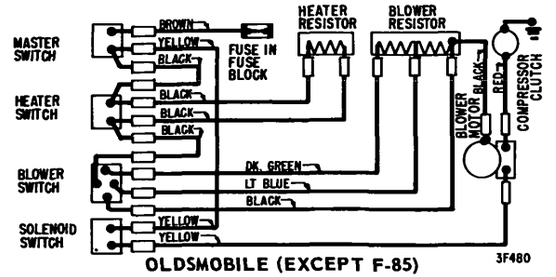
Chevrolet Pass. Cars & Trucks - Purge system, and remove hose connector from compressor. Disconnect clutch coil lead, then loosen brace and pivot bolts and remove belt. Disconnect compressor brackets from mounting bracket and remove compressor. To install, reverse removal procedure.

Chevy II - Purge system, then remove service valve connector from compressor. Disconnect clutch coil lead and remove compressor belt Disconnect compressor brackets from mounting bracket and remove compressor. To install, reverse removal procedure.

Corvair - Removal - Purge system, remove fittings block, and cap openings. Remove nut from compressor mounting bracket pivot bolt and remove compressor-to-adjusting bracket attaching parts. Remove belt. Disconnect electrical wires from compressor. Remove bolts attaching triangular bracket to front of compressor Work long pivot bolt forward until threaded end is moved out of compressor rear mounting boss. Remove compressor.



OLDSMOBILE F-85
AIR CONDITIONING WIRING DIAGRAM



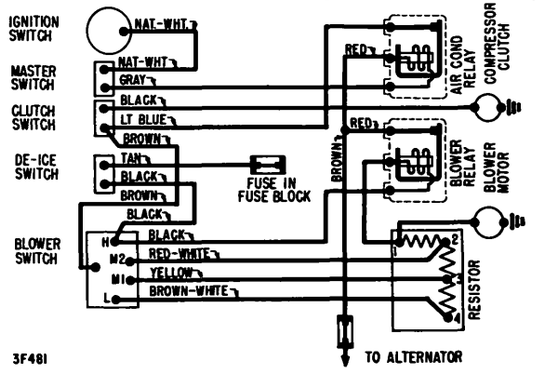
OLDSMOBILE (EXCEPT F-85)
AIR CONDITIONING WIRING DIAGRAM

Installation - Support compressor on mounting bracket and work mounting bracket pivot bolt rearward through compressor rear mounting boss Loosely install pivot bolt nut and washer. Attach triangular bracket to compressor Connect wiring, install drive belt, and compressor-to-adjusting bracket attaching parts. Adjust belt tension, then tighten pivot bolt nut to apply light pressure on rubber mounting.

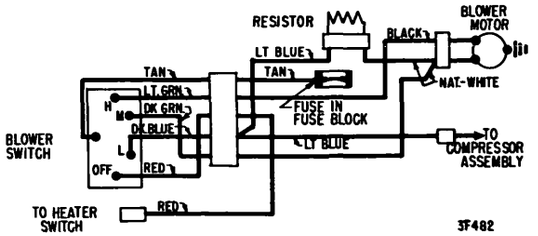
Oldsmobile (Except F-85) - Purge system, disconnect clutch coil wire, and remove belts Remove fittings connector from compressor and cap openings. Remove alternator from compressor, then remove compressor from brackets. To install, reverse removal procedure.

Oldsmobile F-85 - With Power Steering - Drain radiator and remove power steering pump pulley and belt. Remove power steering pump front and rear stud nuts. Purge system and disconnect hoses from compressor. Raise car and remove compressor front and rear pivot bolts and compressor adjusting bolts (leave front compressor bracket attached to compressor) Loosen power steering pump bracket-to-cylinder block bolt Lower car and remove compressor bracket-to-engine front cover bolts, then remove power steering pump and bracket. Disconnect compressor bracket from cylinder head, and remove compressor by rotating pulley upwards. To install, reverse removal procedure

Without Power Steering - Drain radiator, then purge system and disconnect hoses from compressor. Raise car and remove compressor front and rear pivot bolts and adjusting bolts (leave front compressor bracket attached to compressor) Loosen compressor bracket-to-cylinder block lower bolt Lower car and disconnect brackets from engine front cover and cylinder head. Remove compressor and hoses by rotating pulley upward. To install, reverse removal procedure. *(Continued)*



PONTIAC AIR CONDITIONING WIRING DIAGRAM



TEMPEST AIR CONDITIONING WIRING DIAGRAM

GENERAL MOTORS CARS (Cont.)

Pontiac & Tempest - *NOTE - Procedure below is for compressor removal to service engine (without disconnecting refrig rant lines).* Disconnect wiring from compressor, then remove drive belt. Disconnect rear brace from cylinder head, then remove compressor front plate and lower adjusting mounting bolts. Disconnect compressor rear plate from mounting bracket. Place compressor on fender. *CAUTION - Do not kink or place excessive tension on hoses.* To install, reverse removal procedure.

Condenser

Cadillac - Purge system and disconnect lines from condenser and sight glass. Remove cradle support-to-lock pilot bracket. Remove Eldorado horn. Disconnect condenser from support brackets on radiator cradle, then remove condenser and receiver-dehydrator assembly. To install, reverse removal procedure.

Chevrolet Pass. Cars - Remove hood lock catch support, catch, and horns. Purge system and disconnect lines from condenser and receiver-dehydrator. Remove condenser-to-radiator support attaching bolts and remove condenser. To install, reverse removal procedure.

Chevy II - Purge system. Remove bumper, bumper filler panel, grille, grille support, hood lock catch support and catch. Disconnect hoses from condenser and disconnect hoses from condenser baffle. Remove condenser-to-radiator support attaching bolts and remove condenser. To install, reverse removal procedure.

Corvair - *See "Engine Access Procedure Note" under TUNE-UP on Car Model pages.*

Chevrolet Truck - Purge system and remove radiator grille. Disconnect hoses from receiver-dehydrator and condenser. Disconnect upper ends of radiator support rods (if equipped). Remove power steering oil cooler from bracket in front of condenser (do not disconnect hoses). Remove condenser attaching bolts and remove condenser. To install, reverse removal procedure.

Oldsmobile F-85 - Remove fan shield, and radiator. Purge system. Disconnect lines from condenser and remove condenser attaching bolts. Remove condenser. To install, reverse removal procedure.

Pontiac & Tempest - Purge system, then remove front fender cross brace and fan shield. Remove hoses from condenser. Remove condenser attaching bolts and remove condenser. To install, reverse removal procedure.

CHRYSLER CORP. CARS

Chrysler & Imperial (1963)
Dodge, 880, & Dart (1963)
Plymouth (1963)
Valiant (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 DODGE (EXCEPT 880 & DART) & PLYMOUTH AIR CONDITIONING CONTROL CIRCUIT PRODUCTION CHANGE:* Later cars have new type Pushbutton Vacuum Switch and magnetic clutch control relay has been eliminated. *See wiring diagrams for details.*

►*COMPRESSOR REPLACEMENT CAUTION:* When replacing compressor assembly, turn crankshaft by hand at least two complete revolutions to clear oil accumulation from compressor head before clutch is energized to avoid damaging compressor reed valves.

►*ANTI-FREEZE PROTECTION CAUTION:* Engine cooling system must be protected to a temperature of +15°F for summer operation to prevent heater core from freezing (not applicable to models with "Cool Aire" type system).

DESCRIPTION

Chrysler, Imperial, Dodge, Plymouth - A combination air conditioning and heating unit, dash mounted, and operated by pushbuttons. An additional evaporator, located in truck (on roof at rear on station wagons), is optional.

Dart & Valiant - Cooling type air conditioner with separate heater. Evaporator and blower assembly mounted on floor under instrument panel. Unit has no additional air ducts and controls are integral with unit.

SERVICE CAUTIONS

Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.

LEAK TESTING & TROUBLE SHOOTING

See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning Section.

SERVICING

Compressor Belt

See "Belt Adjustment" on Car Model Pages.

Gauge Set C-3740 Installation

NOTE - Use Modification Kit C-3741 to convert previous Gauge Set C-3627 for use on present system.

1) Connect Evaporator Suction Gauge (left side of gauge manifold) to compressor suction service port. When adapter installed and tightened, stem of valve opens service port valve.

2) Connect Discharge Pressure Gauge (center of gauge manifold) to compressor discharge service port. Needle valve below the gauge is used to dampen out gauge needle oscillations.

3) Connect Compressor Inlet Gauge (right side of gauge manifold) to compressor inlet service port by special adapter. This gauge and evaporator suction gauge must be accurately calibrated with both needles at "O" before making tests. This gauge has no passage to gauge manifold and is used when checking Evaporator Pressure Regulator Valve (except Dart & Valiant).

4) Center Manifold Outlet with long hose is used for discharging, evacuating, and charging the system. When making Compressor Capacity Test, remove hose and install special cap over connection.

Discharging The System

With gauge set manifold attached and long hose attached to center manifold outlet, open gauge set manifold needle valve and close both of the gauge set gauge valves. Adjust engine speed to 1250 RPM, turn blower on "High", move temperature control to "off", and push "fresh cool" button. Allow system to operate at full capacity for at least 15 minutes to force compressor oil to crankcase. Open discharge (right hand) gauge valve a small amount, allowing refrigerant vapor to discharge slowly. *CAUTION - Do not allow system to discharge rapidly or compressor oil will be drawn out.* Continue discharging system until pressure registers zero. Open left hand valve to release any vapor trapped at the suction side of system.

Sweep-Test Charge

This charge is used to pressurize system to make a leak test, and also is used to dry system by sweeping out trapped moisture. Close both gauge set manifold valves and open gauge set needle valve. Attach free end of long hose at center manifold outlet to refrigerant dispensing manifold and attach a single can (15 oz.) of Refrigernat 12 to dispensing manifold. Place refrigerant in 125°F pan of water. Operate engine at 1250 RPM with car windows open, blower on high, and "fresh cool" button pushed in. Slowly open left hand gauge valve to meter refrigerant into system. When full can has been metered into system, close valve and refrigerant manifold valve. *NOTE - Make complete leak test if system has been opened for repair or replacement to make sure system is sealed or when system has accidentally lost its charge.* To remove sweep-test charge, remove refrigerant can and dispensing manifold and discharge system in the usual manner (see above).

Evacuating The System

NOTE - After air conditioning system has been open to the atmosphere, it is absolutely essential that the system be evacuated and swept with refrigerant to remove all air and moisture. With gauge set manifold connected and long test hose from center manifold outlet connected to vacuum pump, open both gauge set manifold valves and needle valve. Start vacuum pump and operate until evaporator suction gauge registers at least 26" of vacuum, then continue to operate pump for at least 5 minutes while gauge registers 26-28" of vacuum. Close both gauge valves, turn off vacuum pump, and disconnect from system. System is now ready for charging. *NOTE - Failure to maintain at least 26" of vacuum indicates leak in system or faulty vacuum pump.*

Charging The System

NOTE - See "Refrigerant Capacity Table" below. Refrigerant furnished in 15 oz. cans or in bulk. Special dispensing manifold permits 3 cans (45 ozs.) to be charged into system at one time (this is normal charge on most systems). With gauge set manifold attached to compressor, attach long hose from center manifold outlet to refrigerant dispensing manifold. Turn dispensing manifold valves fully open (counterclockwise), remove caps, and attach refrigerant cans to manifold. Close dispensing manifold valves (clockwise) to puncture cans, then open valves (counterclockwise). Slightly loosen hose at gauge set manifold to purge air, then tighten securely. Place refrigerant in 125°F water.

(Continued)

CHRYSLER CORP. CARS (Cont.)

With engine at 1250 RPM, car windows open, blower on high, and "fresh cool" button pushed in, charge system through suction side by slowly opening left hand gauge set valve Adjust valve to maintain 50 lbs maximum charging pressure When system fully charged, close gauge set valves and dispensing manifold valves, and remove gauge set manifold

Refrigerant Capacity Table

Model	Capacity
Chrysler, Imperial, Dodge, 880, Plymouth	
Single Unit (Front Only)	① 2 5/8-2 7/8 lbs
Dual Unit (Front & Rear)	② 3 5/8-3 7/8 lbs
Dart & Valiant	③ 2 1/4 lbs

① - 42-46 ozs ② - 58-62 ozs ③ - 36 ozs

REMOVAL & INSTALLATION

Compressor

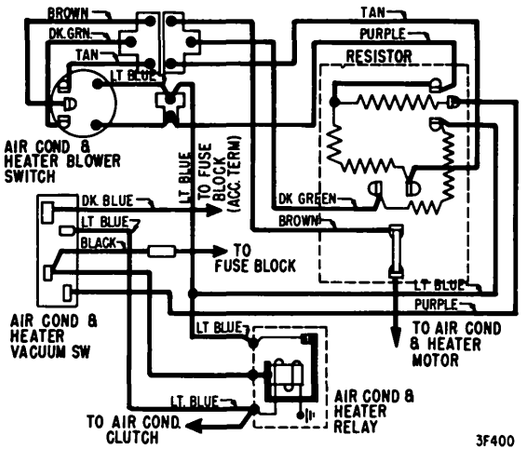
Discharge the system Measure and record oil level so that replaced or repaired unit will have the same oil level *NOTE - If level not known, adjust level to 2" when installing* Remove suction and discharge lines, being sure to cap or plug all lines as soon as disconnected to keep dirt and moisture out of system Disconnect magnetic clutch wires, and remove compressor belts Remove compressor attaching bolts and remove compressor To install, reverse removal procedure

Magnetic Clutch

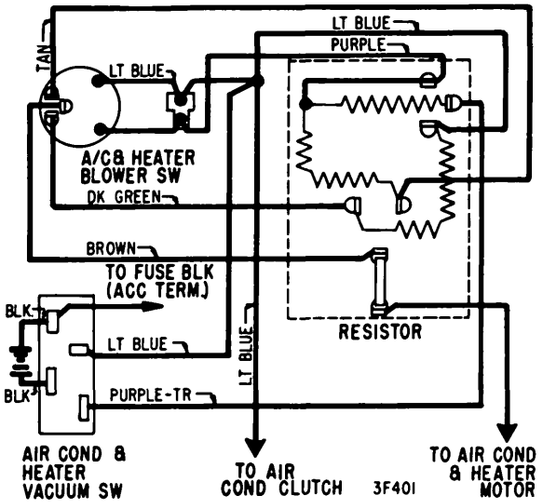
NOTE - Unnecessary to remove compressor to replace magnetic clutch

Removal - Remove belts and disconnect field coil wire Remove locking bolt and washer from crankshaft at front center of clutch and insert a 5/8"-11x2½" capscrew into threaded part of hub and shoe assembly Tighten this screw until clutch is removed Remove field coil assembly mounting screws and remove assembly

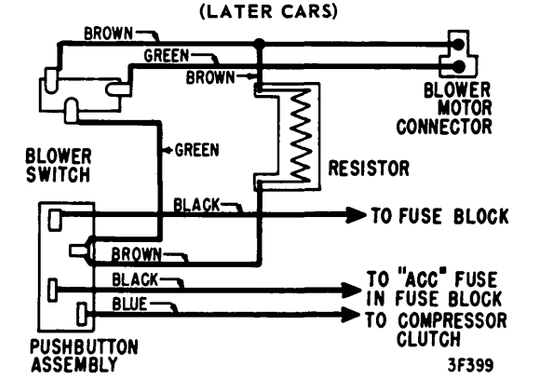
Installation - Install field assembly on base of compressor bearing housing, making sure coil is placed so lead wire points up and can be routed between compressor cylinder heads Tighten mounting screws to 17 inch-lbs Install woodruff key clutch on crankshaft Install washer and **new** self-locking nut and tighten to 20 ft lbs Install field lead wire and belts



DODGE (EXCEPT 880 & DART) & PLYMOUTH AIR CONDITIONING CONTROL WIRING DIAGRAM (EARLY CARS)



DODGE (EXCEPT 880 & DART) & PLYMOUTH AIR CONDITIONING CONTROL WIRING DIAGRAM (LATER CARS)



CHRYSLER, IMPERIAL, & DODGE 880 AIR CONDITIONING CONTROL WIRING DIAGRAM

OVERHAUL

Magnetic Clutch

Testing - To test coil for open or short circuit, use an ammeter in series with fully charged battery and coil lead Current draw at 12 volts should be 2 5-2 9 amperes

Disassembly - Remove small snap ring from drive hub Use Puller C-3787 to remove drive hub from bearing Remove bearing snap ring from pulley assembly Press bearing from pulley using arbor press and suitable drivers *NOTE - New bearing must be used each time clutch is disassembled*

Reassembly - Reverse disassembly procedure *NOTE - Pulley assembly and hub assembly are mated parts and must not be replaced separately*

FORD MOTOR CO. CARS

Ford Falcon, Fairlane, & Galaxie (1963)
Mercury Comet, Meteor, & Monterey (1963)
Lincoln Continental (1963)
Thunderbird (1963)

DESCRIPTION

Conventional design air conditioning system similar to previous models Two types system used Larger (Select Aire) type has evaporator used in conjunction with conventional heater system to allow use of both fresh and recirculated air for cooling Smaller "hang-on" (Polar Aire) type uses recirculated air only, and evaporator and air ducts are a self-contained unit

ADJUSTMENT

Compressor Belt

S "B It Adjustment" n individual Car Mod l pag s

Control Adjustments

See 1962 Final Data, Page 541

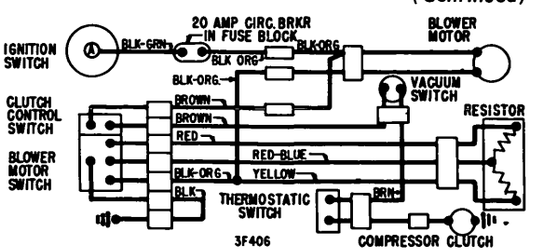
SERVICING

See 1962 Final Data, Page 542, and note the following

Compressor Oil Level

Operate engine at 1500 RPM with compressor running, for 15 minutes, then turn off engine and isolate compressor Remove oil filler plug from compressor and insert a flattened 1/8" diameter rod in oil filler hole until it bottoms *NOTE - On some compressors, it may be necessary to bend rod slightly or rotate crankshaft by hand so dip rod will reach to bottom of compressor* Oil level on rod should be as indicated in

(Continued)



THUNDERBIRD AIR CONDITIONING WIRING DIAGRAM

(FOR OTHER CARS, SEE 1962 FINAL DATA, PAGES 541 & 542)

FORD MOTOR CO. CARS (Cont.)

table below Add refrigerant compressor oil as necessary *NOTE - If oil level too high, withdraw oil as necessary.* Replace filler plug, evacuate and cut compressor back into air conditioning system

Compressor Oil Level
(York Compressor)

Mounting	① Initial Charge Depth	Minimum Depth
Vertical	1"	7/8"
Horizontal	1 1/4"	3/4"

(Tecumseh Compressor)

Mounting	② Initial Charge Depth	Minimum Depth
Vertical	1 5/16"	7/8"
Horizontal	1 9/16"	7/8"

① - Initial oil charge 10 ozs
② - Initial oil charge 11 ozs.

REMOVAL & INSTALLATION

See 1962 Final Data, Page 543.

STUDEBAKER

Studebaker, All Models (1963)

DESCRIPTION

Design and operation is similar to previous 1961-62 models Sight glass is integral part of expansion valve and is located on right side of evaporator

LEAK TESTING & TROUBLE SHOOTING

See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning Section.

ADJUSTMENT

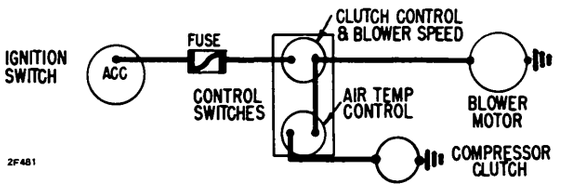
Compressor Belt

Loosen idler pulley retaining nut and move pulley as required to tighten belt so a pull of 20 lbs will deflect belt ½" with spring scale located midway between compressor pulley and idler pulley (6 Cyl.), between compressor pulley and fan pulley (V8).

SERVICING

SERVICE NOTE - All service operations except for removal and installation of compressor for engine repairs should be performed by a competent refrigerant service man.

Refrigerant Capacity - 3 lbs.



STUDEBAKER AIR CONDITIONING CONTROL WIRING DIAGRAM

Compressor Removal (When Necessary to Disconnect Hoses) - Remove caps and close the upper and lower service valves on compressor, then remove capscrews securing the two valves to compressor. Place tape over openings in compressor and valves. Remove compressor from engine compartment. *CAUTION - Keep compressor in horizontal position.*

Installation - Reverse removal procedure and install new valve-to-compressor gasket. Secure both valves in position before opening valves. *NOTE - Before installing compressor belt, turn compressor over a few times by hand to discharge any oil that may have collected on top of piston.*

RAMBLER

Rambler, All Series (1963)

DESCRIPTION

Similar in design and operation to previous models with a manually operated temperature control thermostat **Temperature Control Thermostat (Manually Operated Type)** - Located on left side of instrument panel over control console provides a temperature control range and a continuous operation feature. Control has variable temperature range of 32-58°F. When knob is turned clockwise through detent (click) position, system will run continuously in cold range of 32°F. *CAUTION - Do not use continuous operation position in high humidity areas as evaporator coil will freeze up and result in loss of cooling.*

LEAK TESTING & TROUBLE SHOOTING

See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning Section.

SERVICING

See 1960 Final Data, Page 539, or later Manual edition and note the following:

Compressor Belt

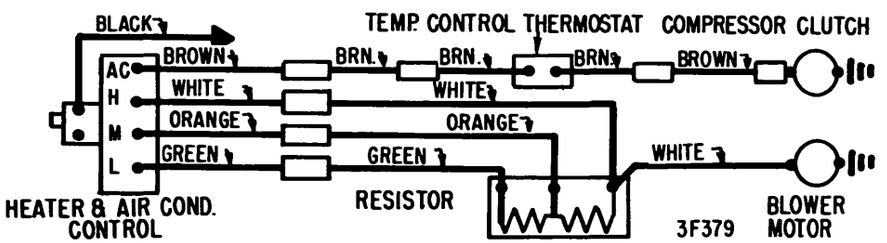
Use a strand tension gauge and place gauge between longest span between pulleys and move idler pulley or power steering pump in adjusting slots to obtain a reading of 70-80 lbs. (used belt), 110-120 lbs. (new belt).

Compressor Oil Level

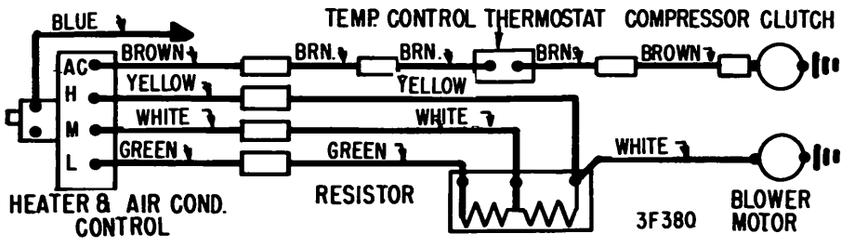
Initial capacity is 7 oz. of 280-300 Saybolt refrigeration oil. Check level with compressor in normal operating position Hold a fabricated dipstick as vertical as possible and at lowest possible point through oil check plug (at rear of crankcase near pump cover plate on York type; at center on right side on Tecumseh type). Oil depth should be 3/4".

Freon Capacity

2 3/4 lbs. with 6 c.c. of methanol on all models.



RAMBLER AMERICAN AIR CONDITIONER CONTROL WIRING DIAGRAM



RAMBLER CLASSIC & AMBASSADOR AIR CONDITIONER CONTROL WIRING DIAGRAM

GENERAL MOTORS CARS

Buick & Buick Special (1963)
Cadillac (1963)
Chevrolet Pass. Cars (1963)
Chevy II (1963)
Corvette (1963)
Oldsmobile & F-85 (1963)
Pontiac & Tempest (1963)

DESCRIPTION

Door Windows

Window regulators individually powered by reversible electric motors in each door which are geared directly to regulator assembly. On some models, front ventilator windows are also power operated. On Cadillac, rear ventilator windows power operated also. Two-way switches on each door and a master control switch on left front door control window operation.

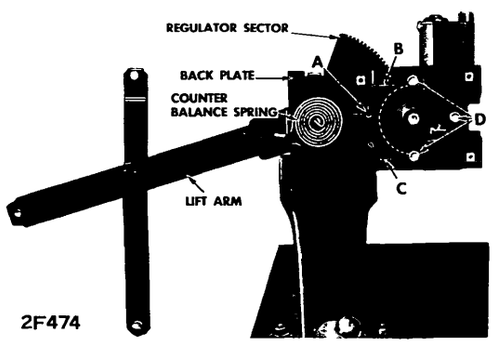
Tailgate Window

Dropping type window in tailgate operated by a reversible electric motor in tailgate. Control is by a switch on instrument panel. Tailgates which are hinged at the bottom have a lock switch in center of tailgate outer panel. Three-seat station wagons have additional passenger control switch at rear of rear quarter inner panel trim.

OLDSMOBILE NOTE - On all electrically controlled windows, a control relay wired to power source and to ignition switch prevents window operation until ignition switch is in ON or ACC positions.

TAILGATE EMERGENCY OPENING

If tailgates hinged at bottom cannot be opened because of inoperative window, proceed as follows: Remove tailgate follower board, then remove inner cover panel by removing attaching screws and pulling cover upwards to disengage from under lower retainer. Remove panel access hole covers and window lower sash channel cams and manually lower window into tailgate. *NOTE - If window fully raised, remove regulator attaching screws and lower window and regulator enough to remove lower sash channel cam attaching screws.*



FRONT DOOR REGULATOR ASSEMBLY

TROUBLE SHOOTING & DIAGNOSIS

Door & Quarter Windows

All Windows Inoperative - Power feed circuit faulty. Check feed wires, feed circuit breaker, and control relay (if equipped).

One Window Inoperative From Both Switches - Faulty circuit wiring; both switches faulty; motor defective; mechanical bind or failure in linkage.

One Window Inoperative From One Switch Only - The other switch or wiring from that switch is defective.

Tailgate Window

Window Inoperative From All Switches - Power feed circuit or control relay defective. Safety switch faulty or motor not grounded. Motor faulty. Mechanical bind or failure in linkage.

Window Inoperative From One Switch Only - Circuits to or from affected switch are defective. Affected switch is faulty. If both instrument panel and rear quarter switches are inoperative, check for faulty control relay.

Window Cannot Be Raised From Any Switch - Up cycle feed wire defective. Motor faulty.

REGULATOR REMOVAL & INSTALLATION

CAUTION - Do not operate regulator motor after window assembly is disengaged from regulator. Operation with load removed will damage motor.

Front Doors

Buick Special & Oldsmobile F-85 - Sedan & Station Wagon - Remove door trim panel and detach water deflector. On 2-door models, remove inner panel cam attaching bolts, slide cam rearward to disengage nylon roller of regulator balance arm, then remove cam through access hole. On all models, raise window and tape securely in "up" position. Remove control assembly and ventilator division channel lower adjusting stud and nut. Remove regulator attaching screws, disconnect wiring, and remove regulator and motor assembly. To install, reverse removal procedure.

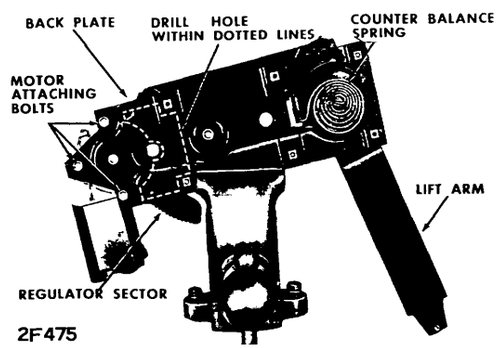
Hardtop & Convertible - Remove door trim panel and detach water deflector. Remove ventilator division channel lower adjusting stud and nut, ventilator casting-to-frame attaching screws, and remove casting. Remove ventilator attaching screws and remove ventilator. Remove inner panel cam attaching bolts, slide cam rearward to disengage nylon roller of regulator balance arm, then remove cam through access hole. Remove window uptravel stop and glass run channel outer strip assembly. Raise window until lower sash channel cam is visible above inner and outer panels, slide window forward, and remove from door. Remove regulator attaching screws, disconnect wiring, and remove regulator and motor assembly. To install, reverse removal procedure.

Buick Riviera - *NOTE - Door has r movable outer panel and it is unnecessary to remove inner trim panel and arm rest assembly.* Remove door outer panel and prop window in fully raised position. Remove window lower sash channel cam, disconnect wiring from motor, and remove regulator attaching bolts. Slide regulator forward to disengage balance arm roller from inner panel cam and remove regulator and motor assembly. To install, reverse removal procedure.

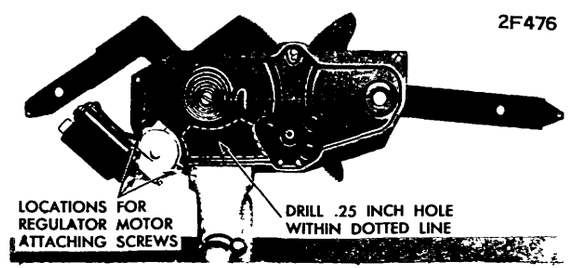
Corvette - Remove door trim panel and access covers. Remove door frame reveal molding. Remove ventilator window lower mounting nut and push stud through inner panel. On hardtop, remove ventilator regulator mounting plate, window drive pin retaining screw, then remove regulator from drive pin. Pry upper glass run channel out of door a little, tilt ventilator to rear, and remove. On convertible, remove ventilator mounting screws and nut and remove ventilator. On all models, position window so sash retaining nuts can be removed, lower window about ¾ of its travel, then pull up out of door. Disconnect motor wiring, remove regulator attaching screws, remove lower guide rail-to-door panel screws, then remove regulator and motor assembly. To install, reverse removal procedure.

All Others - Lower door window, then remove door trim panel assembly and detach inner panel water deflector. Disconnect wiring harness feed wires from regulator motor at connector. Remove ventilator division channel lower adjusting stud and nut. On hardtop and convertible models, remove door ventilator assembly (see below). Disconnect lower sash channel cam from sash channel and remove cam. On hardtop and convertible models, remove window front and rear stops and remove window. On other models, prop window in "up" position. On all models, remove regulator assembly attaching screws, disengage regulator balance arm from inner panel cam, then remove regulator and motor assembly. To install, reverse removal procedure.

(Continued)



REAR DOOR AND QUARTER WINDOW REGULATOR ASSEMBLY



TAIL GATE REGULATOR ASSEMBLY

GENERAL MOTORS CARS (Cont.)

Front Door Ventilators

Hardtops & Convertible (Except Buick Riviera) - *NOTE - Regulator and motor assembly can be removed after door trim panel and water deflector removed. Procedure below is for complete ventilator assembly removal (for door regulator removal).* Remove door trim panel assembly and detach inner panel water deflector. Lower door window and remove ventilator-to-door outer panel return flange attaching screw. Break cement bond holding front door hinge pillar sealing strip (at belt) to ventilator assembly (at front of ventilator). Remove ventilator division channel lower adjusting stud and nut. On electrically operated types, disconnect motor and regulator assembly from vent frame and remove motor and regulator assembly through large access hole. Loosen ventilator frame adjusting stud nut and remove ventilator attaching bolts. Lift ventilator assembly upward and rearward, and remove from door. To install, reverse removal procedure.

Buick Riviera - *NOTE - Door has removable outer panel and it is unnecessary to remove inner trim panel and arm rest assembly.* Raise door window and remove door outer panel. Remove ventilator assembly as follows: Remove ventilator lower frame adjusting stud nut (at door hinge pillar panel), then disconnect ventilator division channel from adjusting plate at bottom of door. Disconnect ventilator from inner panel, and disconnect motor wiring. Tilt lower part of division channel to rear to disengage adjusting stud from door hinge pillar panel, then remove ventilator assembly. Regulator and motor assembly may now be removed from ventilator at the bench.

Sedan, Station Wagon, Limousine - Raise door window and remove door trim panel assembly, then detach inner panel water deflector. Disconnect ventilator regulator motor wires at connector. Remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage the ventilator regulator shaft from tee shaft and remove regulator and motor assembly through door access hole. To install, reverse removal procedure.

Rear Doors

All Models - Lower door window and remove door trim panel assembly and detach inner panel water deflector. Remove door window lower sash channel cam and raise window and prop in "up" position. Disconnect wiring harness from motor at connector. On hardtop models, loosen rear guide cam upper attaching screws and remove lower adjusting stud and nut (to permit regulator removal). Remove regulator attaching screws, disengage balance arm from inner panel cam and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Rear Door Ventilator

Cadillac - Raise door window, remove door trim panel assembly, and detach inner panel water deflector to expose large door access hole. Disconnect wiring harness from ventilator motor connector. Remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage regulator from tee shaft and remove regulator and motor assembly. To install, reverse removal procedure.

Rear Quarter Window (Except Buick Special & Oldsmobile F-85)

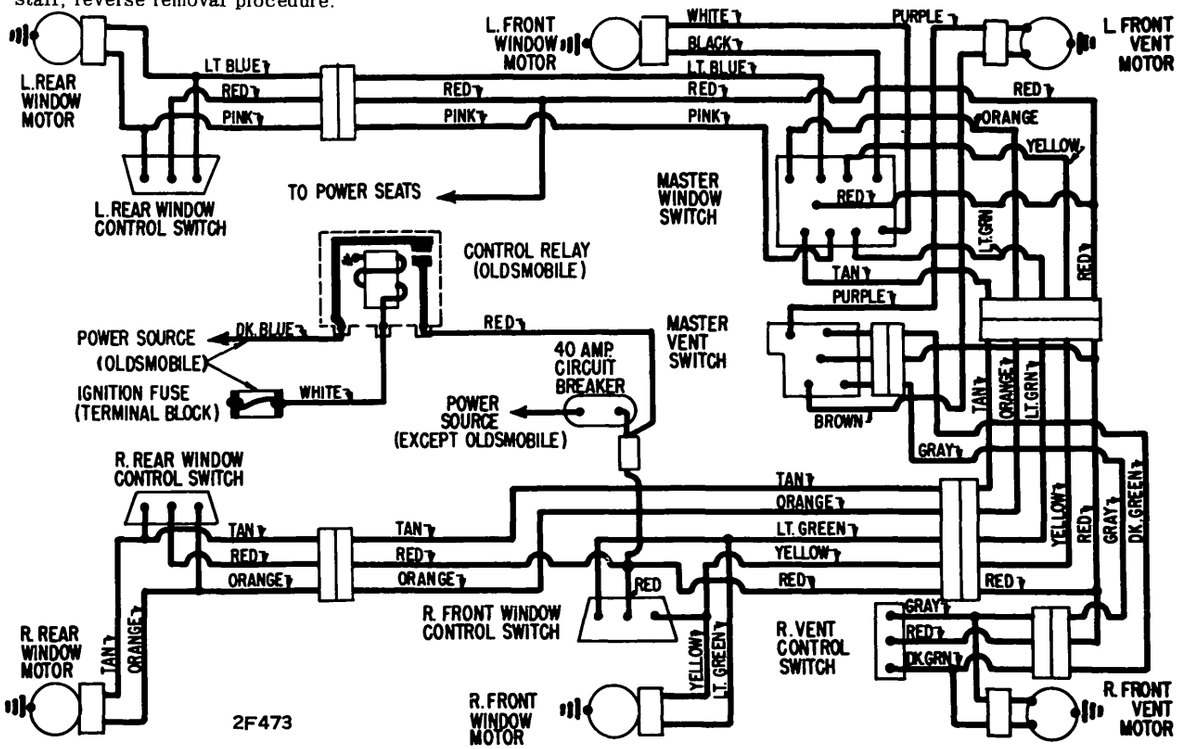
Sedan - Lower window and remove rear quarter trim assembly, then remove access hole cover from inner panel. Remove front guide upper attaching screw and glass run channel attaching screw. Disconnect wiring from motor at connector. Remove regulator attaching screws, disengage regulator arm roller from lower sash channel cam and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Hardtop (Except Buick Electra & Riviera, Cadillac, & Oldsmobile 98) - Remove rear seat cushion and back assembly, rear quarter trim and arm rest, and inner panel access hole cover. Disconnect wiring from motor at connector. Remove rear guide attaching screws, disengage rear guide from roller on lower sash channel and remove guide. Place window half-way down and remove lower sash channel cam attaching screws. Remove cam and front guide adjusting stud nuts. Disengage front guide adjusting studs from stud holes in inner panel, then disengage front guide from rollers on window. Remove window by lifting upward and inward. Remove regulator attaching screws and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Buick Electra, Cadillac & Oldsmobile 98 - Remove rear seat cushion and back, arm rest and trim panel, and inner panel access hole cover. Disconnect wiring from motor at connector. Remove rear guide. Place window half-way down and remove lower sash channel cam attaching screws, detach cam from regulator arm roller and remove cam. Scribe mark position of lower stop on front guide for reassembly, loosen lower stop attaching screw and slide stop to bottom of guide. Lower window so lower roller on sash channel frame runs out of front guide channel at bottom, then lift window upward and inboard to disengage upper roller on sash channel from rear channel on front guide. Remove window assembly. Remove regulator attaching screws and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Buick Riviera - Remove rear quarter trim and inner panel access hole cover. Put window about half-way down and remove male wedge plate through inner panel access hole. Disconnect wiring from regulator motor. Remove rear guide attaching screws and remove guide. Remove lower sash channel cam attaching screws, disengage cam from roller on regulator lift arm, then remove cam. Lower window completely. Loosen front guide upper adjusting stud nuts, remove center and lower adjusting stud nuts, then move front guide down as far as possible. Lift window upward and inboard to

(Continued)



G.M. (EXCEPT CADILLAC) WINDOW CONTROL WIRING DIAGRAM

GENERAL MOTORS CARS (Cont.)

disengage rollers from front guide, then remove window (front edge first). Remove regulator attaching screws, then remove motor and regulator assembly through access hole. To install, reverse removal procedure.

Convertible - Remove rear seat cushion and back, top compartment side trim panel and rear quarter trim assembly. Remove inner panel access hole cover, then operate window to full "up" position and prop in place. Disconnect feed wire plug from motor, then remove regulator attaching screws. Disengage regulator lift arm roller from lower sash channel cam and remove regulator assembly through access hole. To install, reverse removal procedure

Rear Quarter Window (Buick Special & Oldsmobile F-85)

Sedan - Remove rear quarter trim panel, inner panel access hole cover, and inner sealing strip. With window up, remove window rear guide, then lower window enough to tilt rearward and disengage regulator lift arm roller from lower sash channel. Lift window upward and rearward to disengage lower sash channel roller from front guide, then remove window assembly. Disconnect wiring from motor at connector, remove front guide upper attaching bolt and regulator attaching bolts, then remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Hardtop - Remove trim panel and large inner panel access hole cover. With window almost completely down, remove lower sash channel-to-lower support assembly attaching screws. Bring window half-way up, disengage from lower support assembly, and remove window. Remove window rear guide and front guide adjusting stud nuts so front guide and lower support assembly can be disengaged from inner panel. Disengage regulator lift arm roller from lower support cam. Disconnect wiring from motor at connector, remove regulator attaching bolts, and remove regulator and motor assembly. To install, reverse removal procedure.

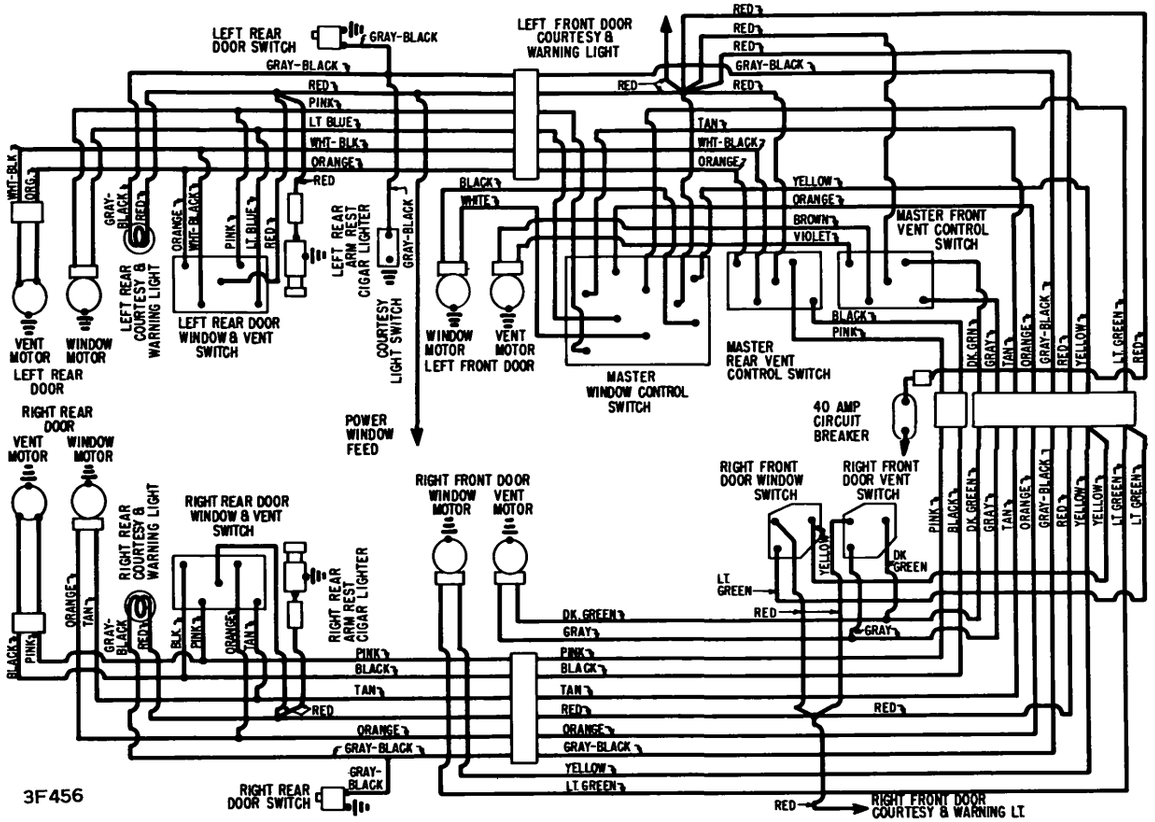
Convertible - *Procedure is same as for other car models (see above).*

Tailgate Window

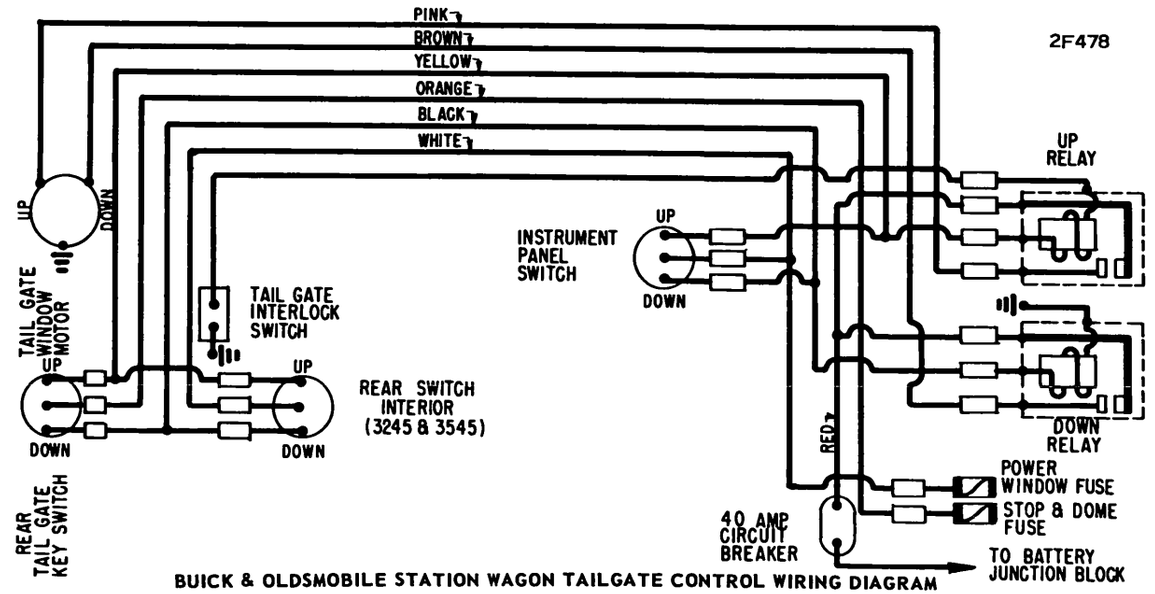
Types Hinged At Bottom - Remove skid strips, inner cover finish moldings, and tailgate inner cover panel. Remove water deflector, and inner panel access hole cover. Lower window until lower sash right and left cam attaching bolts are accessible, remove bolts, disengage cams from lower sash channel, and pull window from tailgate. Detach lock remote control right connecting rod from remote control, disconnect wiring harness from motor, remove regulator attaching screws, and remove regulator and motor assembly through access hole. To install, reverse removal procedure.

Types Hinged At Top - Remove right and left stationary windows as follows: Lower dropping window, remove all garnish moldings, then disengage rubber channel filler strip from stationary window rubber channel (pull strip inboard). Remove dropping window upper

(Continued)



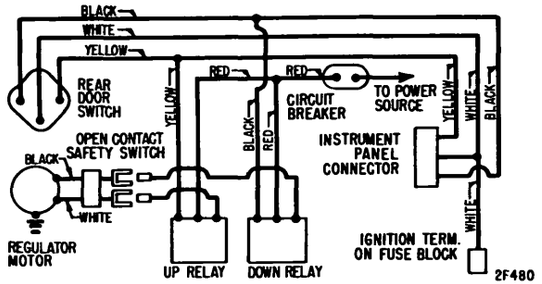
CADILLAC WINDOW CONTROL WIRING DIAGRAM



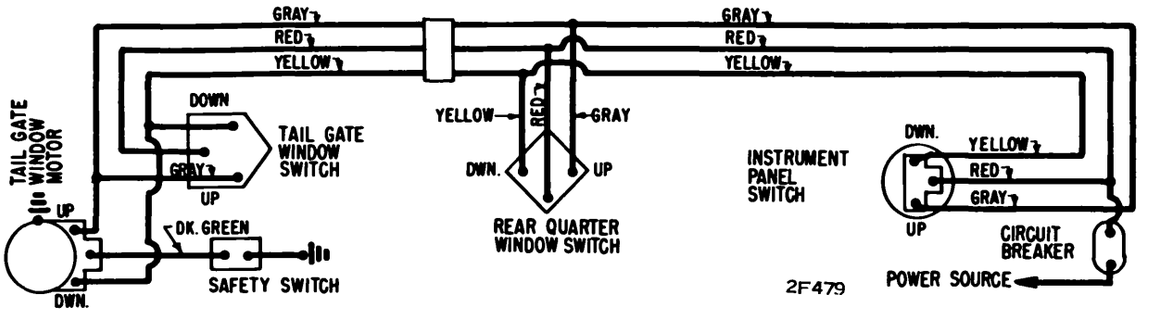
BUICK & OLDSMOBILE STATION WAGON TAILGATE CONTROL WIRING DIAGRAM

GENERAL MOTORS CARS (Cont.)

glass run channel attaching screws and remove glass run channel. Remove division post attaching screws and both division posts. Remove glass by pushing inward. Remove dropping window as follows: Remove tailgate inner cover panel, then operate window to lower it about 1". Move window to right side to disengage regulator rollers from lower sash channel cams, then lift window and remove from body. Disconnect wiring from regulator motor, remove lock inside handle



BUICK SPECIAL, OLDSMOBILE F-85, PONTIAC TEMPEST STATION WAGON TAILGATE CONTROL WIRING DIAGRAM



CHEVROLET, CHEVY II, PONTIAC STATION WAGON TAILGATE CONTROL WIRING DIAGRAM

remote control attaching screws, disconnect remote control from connecting rod and remove remote control. Disconnect remote control support plate and disengage inner panel cam from regulator arm roller, then remove support plate. Remove regulator attaching screws, and remove regulator and motor assembly. To install, reverse removal procedure.

REGULATOR MOTOR REMOVAL

Clamp regulator and motor assembly securely in a vise, then drill a ¼" hole through back plate at the location indicated in illustrations. *NOTE - Drill the ¼" hole in front door window regulators at either "A", "B", or "C" (see illustration), depending on position of lift arm. On other regulator assemblies, drill the hole within the area outlined by dotted lines in illustration. Do not locate hole less than ½" from edge of back plate or sector.* Insert a 3/16" bolt through hole in back plate and sector and install a nut but do not tighten. Remove motor attaching bolts and remove motor assembly from regulator. Clean all chips from regulator and motor pinion gear after drilling. To install, reverse removal procedure. *CAUTION - Be sure to remove temporary nut and bolt from regulator before installing in car.*

CHRYSLER CORP. CARS

Chrysler & Imperial (1963)
Dodge & 880 (1963)Ⓒ
Plymouth (1963)
Valiant (1963)Ⓒ

Ⓒ - Station Wagon tailgate window only on Dart & Valiant.

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 ELECTRIC WINDOW WIRING PRODUCTION CHANGE & MODIFICATION NOTE:* On later cars, a relay is used in control circuit to permit window operation only with ignition "on". Relay may be bypassed as follows:

All (Except Dart & Valiant) - All leads from single stud terminal block (under left cowl trim panel) transferred to load side of circuit breaker (load side is stud on breaker without male blade terminal).

Dart & Valiant - Both red wires at relay removed from relay and spliced together.

DESCRIPTION

Door Windows - Each door window operated by an electric motor and controlled by individual door switches with master control on left front door. On Imperial, front door vent windows also electrically operated. An optional safety switch may also be found on left front door which permits window operation from master control panel only.

Tailgate Window - Electrically operated window controlled by a key operated switch in exterior locking handle, and by a switch on instrument panel. On 3-seat suburbans, an additional roof rail switch provided for passenger control of window. Optional "Child Guard" control for 3-seat surburbans consists of an up relay, a down relay, and a vacuum switch in one of the rear doors. Vacuum switch controls roof rail switch. When rear door is locked, vacuum switch is open, roof switch is not grounded, and is inoperative. However, window can be controlled from lock or instrument panel switches in the usual manner.

TROUBLE SHOOTING & DIAGNOSIS

Window Operates From Individual Door Switch Only - Master switch faulty. Wiring harness broken.

All Windows Inoperative From All Switches - Circuit breaker, or feed to circuit breaker faulty. Control relay faulty.

One Window Inoperative From All Switches - Circuit breaker faulty. Both master switch and individual door switch faulty. Gear box jammed. Coupling between motor and gear box broken. Motor burned out. Short in wiring.

Window Operates In One Direction Only - Wiring faulty. Motor burned out.

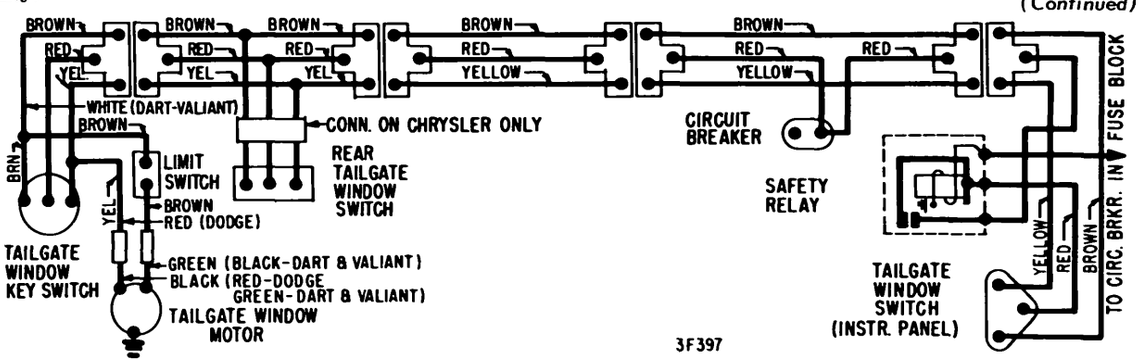
Circuit Breaker "Clicks" But Window Inoperative - Feed wiring shorted. Switch faulty.

REMOVAL & INSTALLATION

Window Regulator & Motor

Removal - Disconnect battery and remove garnish molding, then remove door trim panel and disconnect

(Continued)

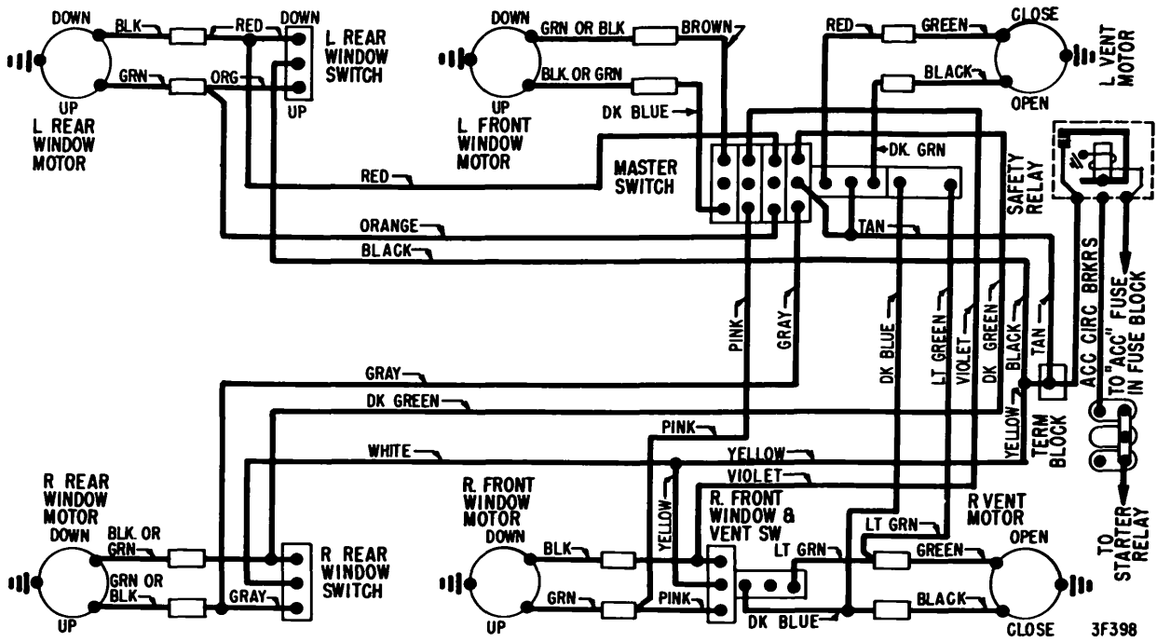


SUBURBAN TAILGATE WIRING (TYPICAL)

CHRYSLER CORP. CARS (Cont.)

wires from switch Remove clips from regulator pins holding lower glass channel Raise glass manually, then remove regulator attaching screws, pivot guide retaining pin and remove motor and regulator through opening in door If necessary to replace gear box, first remove regulator counter-balance spring *NOTE - The gear box is replaced only as a complete assembly and is permanently lubricated*

Installation - Place regulator and motor through door opening and insert pivot arm pin into guide Install regulator screws finger tight, but DO NOT TIGHTEN at this time Remove window prop and lower glass, then insert control arms into glass channel, using a leather washer on each side of channel and secure with a clip Connect wires to motor and connect battery, then operate window several times and stop glass halfway Tighten regulator screws Check operation as follows Connect an ammeter into circuit and operate window Ammeter reading should be constant at approximately 14 amps (all models except rear doors of 4-door hardtop models), 20 amps (4-door hardtop models) If ammeter reading fluctuates, there is a bind in glass or linkage Adjust glass down stop so window is flush with garnish molding Install trim panel, garnish molding, and other parts



CHRYSLER CORP ELECTRIC WINDOW WIRING DIAGRAM

FORD MOTOR CO. TAIL GATE WINDOW

Ford Falcon, Fairlane, Galaxie Station Wagon (1963)
Mercury Comet, Meteor, Monterey Station Wagon (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*SAFETY RELAY BYPASS NOTE*. If desired, safety relay (on dash panel in engine compartment, or on right radiator support) which permits window operation only with ignition switch ON, may be bypassed as follows Disconnect lead from relay "A" terminal and connect to relay "B" terminal Disconnect wire from relay "F" terminal, bend back, and tape to wiring harness

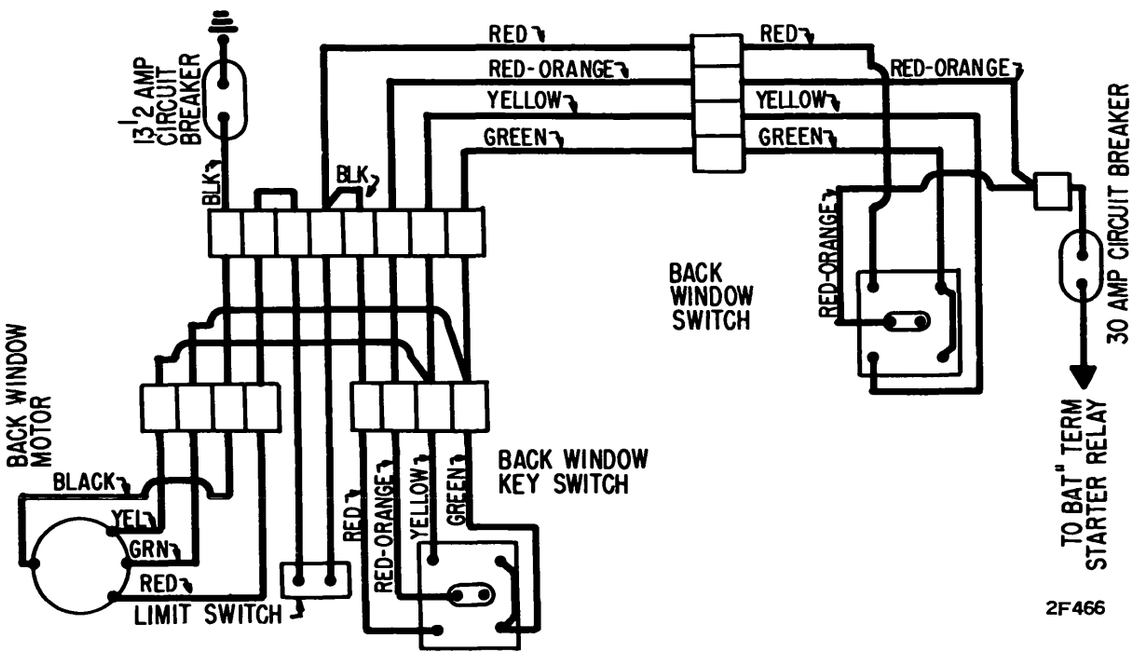
DESCRIPTION

Electrically controlled station wagon tailgate window operated by a reversible electric motor and a window regulator mechanism in tailgate Control is through a key operated lock switch on upper center of tailgate outer panel, and a toggle or push-pull switch on left front door or instrument panel for driver control A limit switch located at right side of tailgate pillar post prevents operation of window when tailgate is open

EMERGENCY MANUAL OPENING

If Window Fully Raised

Remove trim panel retaining screws, trip lock handle to relieve pressure, then remove trim panel by pulling up and forward to slide it out of lower retainer Remove water shield and access hole cover from inner panel Remove regulator arm roller retaining pins and disengage rollers from regulator arms Push window into full down position and open tailgate *(Continued)*



COMET, METEOR, MONTEREY STATION WAGON TAILGATE WINDOW WIRING DIAGRAM

FORD MOTOR CO. TAIL GATE WINDOW (C ntinu d)

If Window Partially Raised

Remove quarter window rear garnish moldings, and quarter window outside rear moldings. Remove tailgate window glass upper side run retaining screws. Open tailgate and window as an assembly by removing upper runs simultaneously.

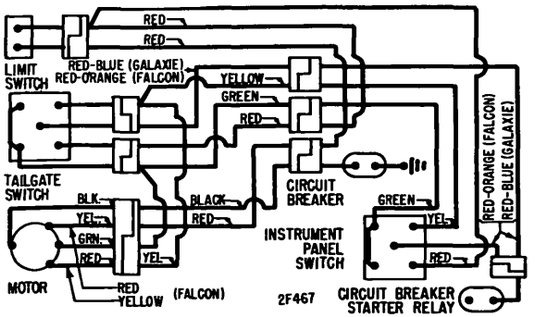
TROUBLE SHOOTING & DIAGNOSIS

CAUTION - When testing circuits with tailgate lowered and limit switch h ld closed, operate circuit only momentarily. Continuous operation of window in horizontal position will damage motor.

Wind w Will N t Op rat Through Either Switch Circuit - Check control circuit for continuity. Check feed and ground circuit breakers, and safety relay. Check all wiring for continuity. Motor armature or field coil windings may be faulty. Limit switch or wiring may be defective (down cycle).

Wind w Op rates Thr ugh One Switch Only - The other switch is defective. Wiring from other switch faulty.

Wind w Op rat s In On Direction Only - Check for continuity of wiring for the inoperative cycle. Check relay or circuit breaker. Check for faulty limit switch or motor.



FALCON, FAIRLANE, GALAXIE STATION WAGON
TAILGATE WINDOW WIRING DIAGRAM

REMOVAL & INSTALLATION

Window

Lower tailgate, disconnect hinge supports at tailgate, remove trim panel and water shield. Remove retainers from window channel rollers and disconnect regulator arms from rollers. Remove window.

Motor

Remove window (see above), disconnect wiring from motor, and remove motor-to-regulator attaching nuts. Remove motor.

Regulator

NOTE - Motor and regulator may be removed as an assembly if desired. Remove window (see above), disconnect motor wiring at motor, and remove regulator attaching nuts. Remove regulator and motor assembly.

Limit Switch

Lower tailgate. If switch not visible, remove access cover behind tail light or trim panel and water shield as necessary. Remove limit switch attaching screws and remove switch.

Lock Switch

Switch can be removed after window, motor, and regulater are removed.

FORD MOTOR CO. WINDOWS

F rd Galaxi (1963)
Mercury M nter y (1963)
Thund rbird (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*SAFETY RELAY BYPASS NOTE:* If desired, safety relay (on dash panel in engine compartment) which permits window operation only with ignition switch ON, may be bypassed as follows: Disconnect lead from relay "A" terminal and connect to relay "B" terminal. Disconnect wire from relay "F" terminal, bend back, and tape to wiring harness.

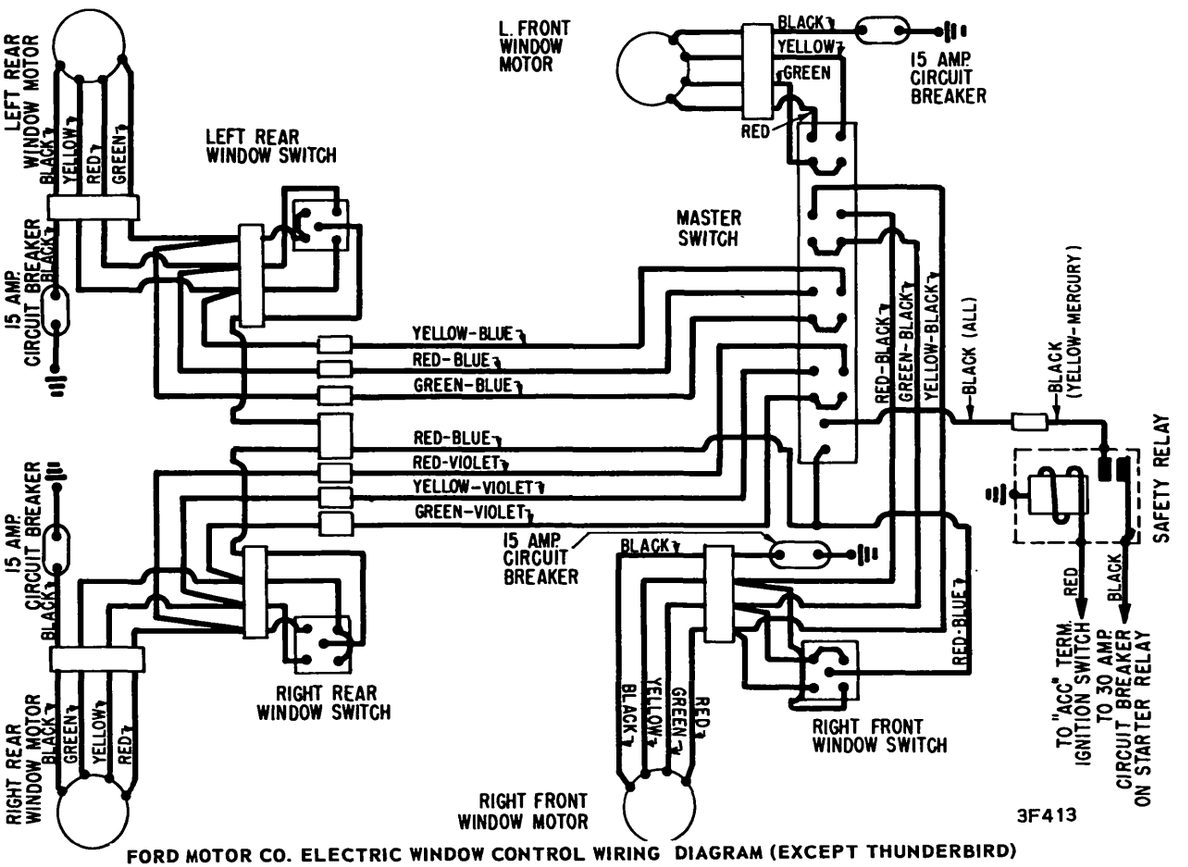
DESCRIPTION

Electrically controlled windows operated by a reversible type motor combined with each individual window regulator assembly. Individual switches located near each window for separate control, and a master control switch on left front door to control all windows. A lock-out switch on master control switch enables windows to be operated only by the driver of the car. On Mercury Monterey, vertical rear window controlled by individual switch on instrument panel. On all windows, a safety relay on dash panel in engine compartment prevents window operation except when ignition switch is in ON or ACC positions. *NOTE - For electrically op rated stati n wagon tailgate window, see "Ford Motor Co. Tailgate Window" in this section.*

TROUBLE SHOOTING & DIAGNOSIS

All Windows Will N t Operate In Either Direction - Trouble will be in main feed circuit breaker, safety relay, ignition switch, or lock-out switch; or any of appropriate control wiring. Test for current at various parts of control circuit with a voltmeter or jumper wire.

(Continued)



FORD MOTOR CO. ELECTRIC WINDOW CONTROL WIRING DIAGRAM (EXCEPT THUNDERBIRD)

FORD MOTOR CO. WINDOWS (Continu d)

One Window Will Not Operate In Either Directi n Through Either Switch Circuit - If motor runs freely, it is loose and pulled away from coupling. Check for defective motor circuit breaker, faulty wiring from switches to motor (or faulty switch feed wire), motor armature or field windings faulty.

One Window Operates In One Direction Through Either Switch - Check for faulty switch or faulty wiring between switch and motor. Check for faulty motor field coil.

Window Operates In Both Directions Through One Switch Only - Check for defective switch or faulty wiring between switch and motor.

Window Operates Opposite To Switch - Check for improperly mounted switch or reversed wiring.

Window Operates Sluggishly - Check regulator and window runs for binding. Check for frayed insulation on wires which may cause partial ground. Check that paint does not insulate ground wires or ground circuit breakers. Check for loose connections or corrosion causing high resistance. Check motor current draw with an ammeter. Normal current draw during operation should not exceed 20 amperes. Current draw with mechanism against a stop should be 30-50 amperes. If current draw excessive, replace motor. Motor no-load current draw should not exceed 14 amperes at 12 volts.

REMOVAL & INSTALLATION

Motor

Ford & Thunderbird - Remove door trim panel, disconnect wires, remove motor mounting nuts and motor brace. Pull motor free of rubber coupling and remove motor.

Mercury - Front Doors - Disconnect battery, remove door trim panel and trim water shield. Disconnect motor wires, and remove motor bracket attaching screw. Disconnect motor and coupling from regulator assembly, then remove motor.

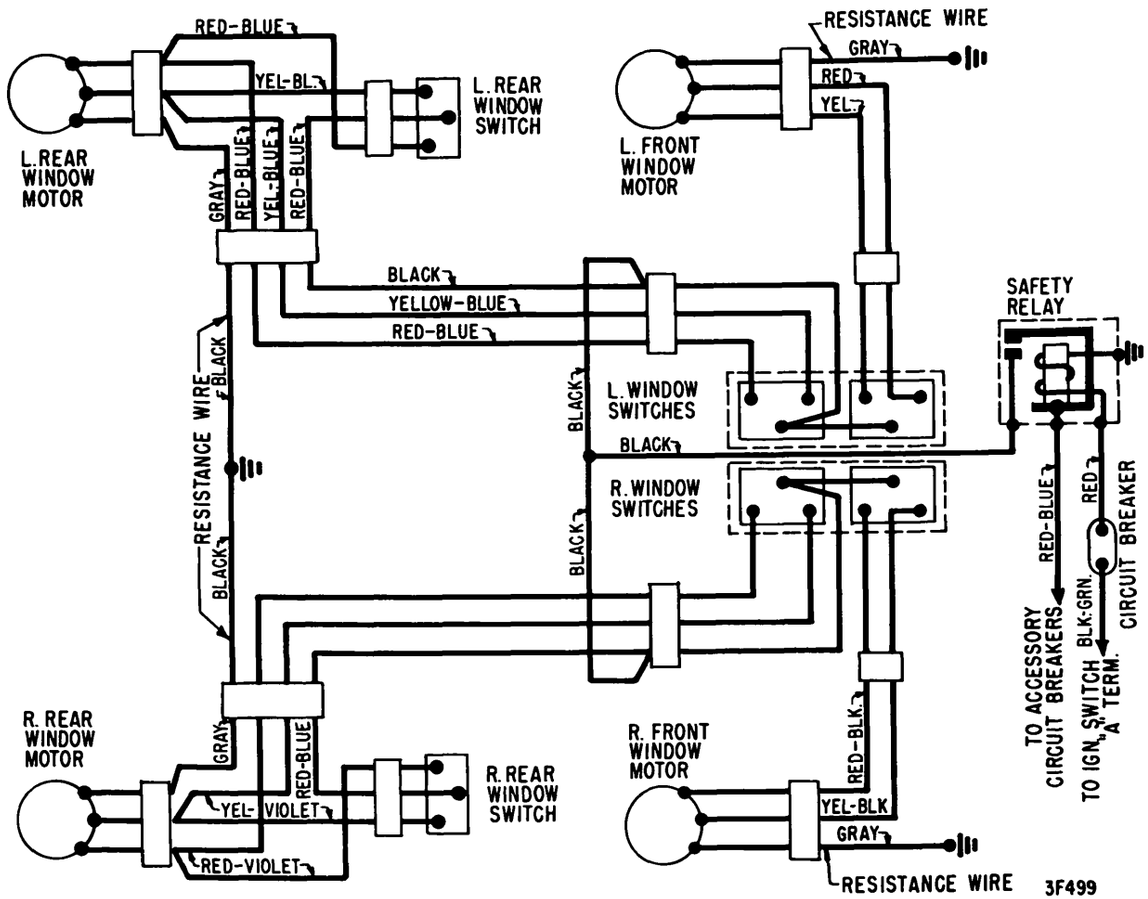
Rear Doors, Quarter, or Back Window - Motor removed with regulator as an assembly. See *"Regulator Removal" below.*

Window Regulator

REGULATOR ARM TENSION SPRING REPLACEMENT NOTE - Spring can be replaced after regulator removed. Regulator arm must be at point of maximum upward travel to reduce amount of spring tension to be overcome.

Front Door - Ford - Remove door trim panel and loosen water shield. On 2-door and 4-door hardtop models, disconnect regulator at arm and plate. On other 4-door models, disconnect regulator from glass channel roller. Secure glass by hand in raised position. On 4-door models (except hardtop), disconnect front run bracket from inner panel to provide access. On all models, remove regulator retaining screws and remove regulator. To install, reverse removal procedure.

M rcury - *NOTE - Procedur is for r moval of regulator and motor as an assembly.* Disconnect battery, remove door trim panel and trim water shield. Remove window lower stop. Disconnect motor wires. With wire hook, remove retainers from window rollers and separate regulator arm pivots from rollers. Secure window in fully raised position. Remove regulator assembly attaching screws and remove regulator and motor assembly.



THUNDERBIRD ELECTRIC WINDOW CONTROL WIRING DIAGRAM

Thunderbird - Remove door trim panel and loosen water shield. Block window in fully raised position, and remove regulator arm from plate assembly. *NOTE - If arm and plate assembly are to be removed, lower window and disconnect arms from the two glass roller assemblies, then remove arm and plate.* Remove regulator assembly retaining screws and remove regulator. To install, reverse removal procedure.

Rear Door - Ford - Remove door trim panel and loosen water shield. Lower glass about halfway and disconnect regulator arms, then support glass in fully raised position. Remove regulator retaining screws, slide equali zer arm out of bracket or guide, then remove regulator. To install, reverse removal procedure.

M rcury - With window fully raised, disconnect battery, remove door trim panel and trim water shield. On 4-door hardtop, remove window upper stop. On all models, disconnect motor wires, and remove retainers from window rollers with a wire hook. Separate regulator arms from rollers and prop window up. On 4-door hardtop, remove center guide assembly. On all models, remove regulator and motor bracket mounting screws. Slide equalizer arm out of bracket and remove regulator and motor as an assembly. To install, reverse removal procedure.

Rear Quarter - Ford - Remove rear seat cushion and back, remove trim panel and pull water shield away from access holes. Lower window, disconnect regulator from glass channel rollers, and support window in fully raised position. Remove regulator retaining screws, slide regulator arm out of equalizer bracket, and remove regulator. To install, reverse removal procedure.

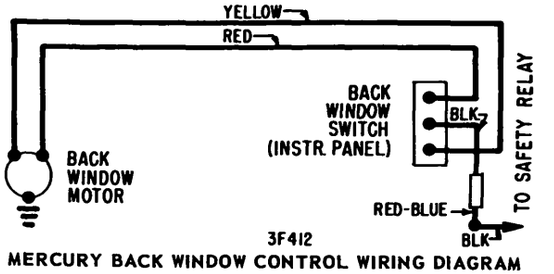
Mercury - Remove rear seat cushion, back and trim panel. Lower window, remove retainer clips from window rollers, separate regulator arms from rollers, then remove rollers. Secure window in fully raised position. Remove motor from regulator. Disconnect regulator from quarter panel, slide equalizer arm out of equalizer arm bracket and remove regulator assembly. To install, reverse removal procedure.

(Continued)

FORD MOTOR CO. WINDOWS (Continu d)

Thunderbird - Remove quarter trim panel and water shield Remove window upper stop. Disconnect regulator arms from glass channel. Lower glass, lift glass from front guide, then remove glass assembly. Remove regulator retaining bolts, slide regulator equalizer arm roller out of bracket, and remove regulator. To install, reverse removal procedure.

Back Wind w - M rcury - Remove seat cushion and back, and both window division bar moldings. Remove lower garnish molding. Remove seat back support, and inner weatherstrip. Remove cover from rear window housing. Disconnect window side channel from one side of housing, then remove hairpin clip from each roller in glass channel. Press regulator arms to rear to free from rollers, lift side channel off studs, then let window slide to lower end of channels. Remove window. Disconnect motor wires from harness in luggage compartment. Disconnect regulator from housing, then slide regulator arm and roller out of equalizer bracket. Turn motor shaft coupling manually until regulator gear is free of pinion, disconnect motor from regulator and from shaft coupling. Remove motor and regulator. To install, reverse removal procedure, installing regulator to motor and pinion in approximate position for fully raised window



MERCURY BACK WINDOW CONTROL WIRING DIAGRAM

LINCOLN CONTINENTAL WINDOWS

Linc ln C ntin ntal (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*SAFETY RELAY BYPASS NOTE:* If desired, safety relay (under instrument panel on right side on early cars, on engine side of firewall on later cars) which permits window operation only with ignition switch ON, may be bypassed as follows: Disconnect lead from relay "A" terminal and connect to relay "B" terminal. Disconnect wire from relay "F" terminal, bend back, and tape to wiring harness.

►*1963 AUTOMATIC REAR WINDOW CIRCUIT WIRING PRODUCTION CHANGE FOR IMPROVED PERFORMANCE:* To prevent door open warning light being lighted when doors are closed, automatic window lowering circuit was revised approximately June 3, 1963. Operation of window remains the same. *See Wiring Diagrams for details.*

DESCRIPTION

Sedan - Conventional electric window control similar in design and operation to previous models. Series wound type motors used with no armature lead from control switch to motor. Front door ventilator windows are also electrically controlled and are built into the circuit.

C nv rtibl - Front door and ventilator windows are same as conventional sedan windows (see above). Rear windows are automatic type and are built around conventional system. Automatic system consists of additional switches and relays which automatically lower rear door window approximately 6" when door is opened, hold window in position, then return window to fully raised position when door is closed. Window can be operated in the usual manner from either switch except that it cannot be raised manually after it has lowered automatically. *See "Manual Operation Note" b low.*

OPERATION (AUTOMATIC TYPE)

►*MANUAL OPERATION & CUT-OFF SWITCH FUNCTION NOTE:* **1)** If window has been lowered more than 7" before door is opened, cut-off switch is actuated (contacts open) and relay circuit is disconnected so no automatic window operation will take place.

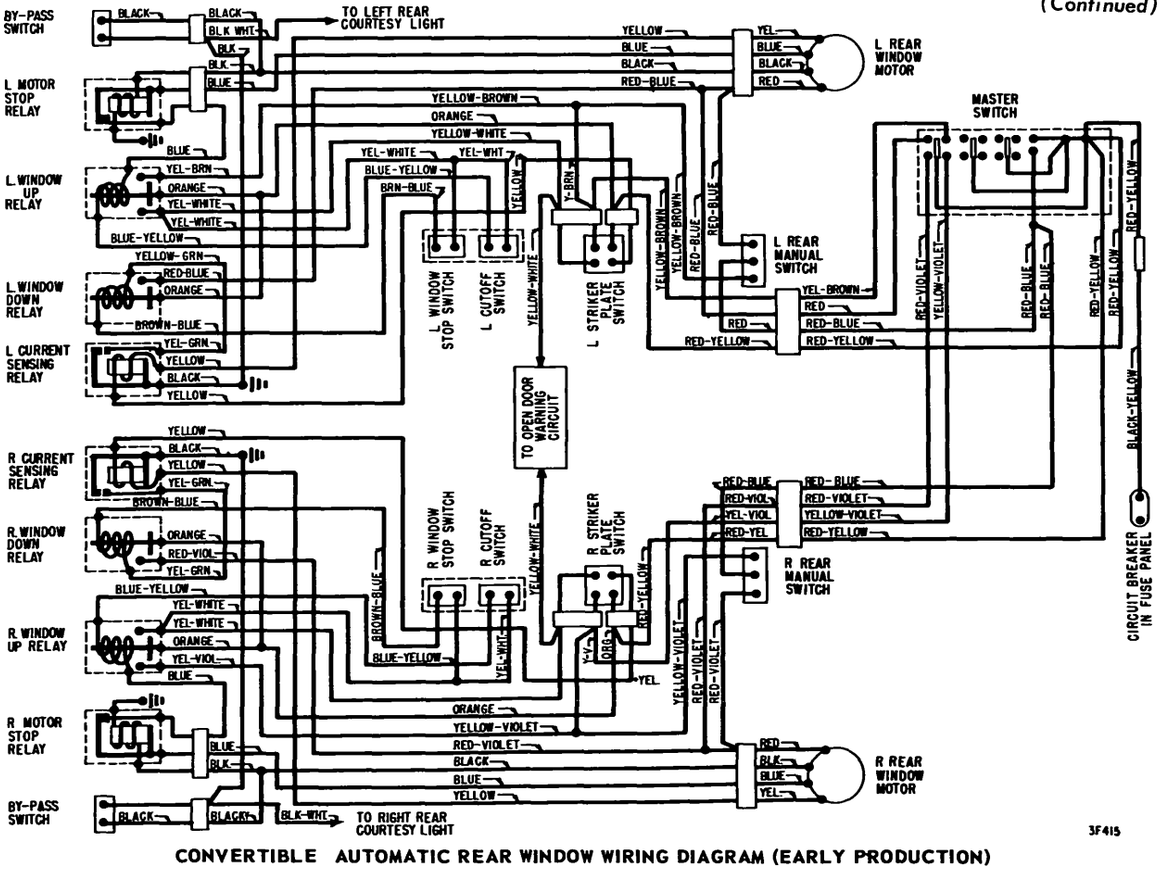
2) When window has been lowered automatically and door is open, motor up field can be completed only through No. 2 contacts of door striker plate switch when door is closed. Therefore window cannot be raised manually from either master or door switch.

3) With door open and window lowered automatically, either switch can be operated to lower window completely. However cut-off switch contacts will be opened and window will not raise automatically when door is closed. Window must be raised with either master or door switch after door is closed to reset circuit for automatic operation.

Window Down Cycle

1) When door inside handle or outside pushbutton is moved to open door, door striker plate switch upper

(Continued)



CONVERTIBLE AUTOMATIC REAR WINDOW WIRING DIAGRAM (EARLY PRODUCTION)

LINCOLN CONTINENTAL WINDOWS (C ntinu d)

contacts are closed. Up-travel field circuit of motor is opened, feed circuit to control winding of down-travel relay is closed, and also feed circuit to control winding of up-relay is closed. Current flows through striker plate switch, window stop switch, down relay windings and through current sensing relay contacts to ground. Motor is energized and window is lowered.

2) When window has lowered approximately 6", window stop switch is actuated (contacts opened) to open down relay circuit and stop downward movement of window.

Window Up Cycle

1) The up relay is already energized from the beginning of the down cycle. Current flows through striker plate switch, to window cut-off switch, to up relay winding, to stop relay winding, to ground. Up relay contacts are closed and remain closed until door is closed and window is fully raised, however window will not raise until door is closed because striker plate switch position with door open keeps motor up field feed circuit open. Thus a "lock-in" circuit is made (with up relay contacts closed) which continues to energize up relay coil after door is closed. In the "lock-in" circuit current flows through up relay contacts, cut-off switch, up relay coil, stop relay contacts, to bypass switch to ground.

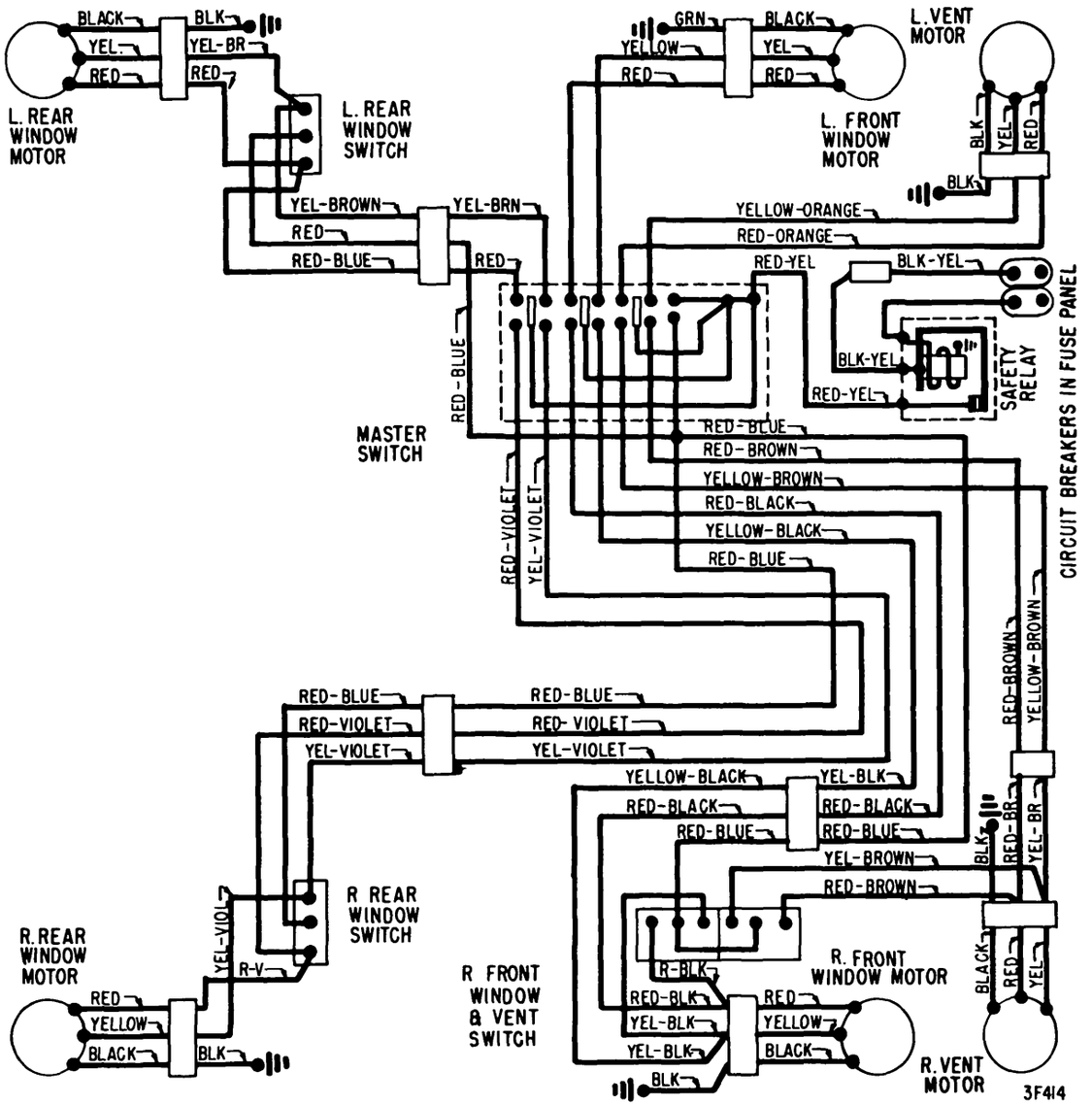
2) When door is closed, striker plate switch lower contacts close and complete the circuit from up relay contacts, through winding of current sensing relay, to up field of motor. Motor operates and closes window. *NOTE - Current sensing relay in down relay circuit prevents feed-back through down relay so that both up and down fields of motor cannot be energized at the same time.*

3) About ¼" before window is fully raised, bypass switch is actuated (contacts open). *NOTE - Bypass switch circuit prevents stop relay from cutting out if motor needs more than the normal operating current before window is fully raised.* Stop relay coil now carries full motor current. When window upward movement stops, motor stalls, and stall current opens stop relay contacts. Ground circuit of up relay windings is then opened and entire up circuit becomes inactive.

ELECTRICAL COMPONENTS & LOCATIONS (AUTOMATIC WINDOWS)

The following list of electrical components and their locations will aid in testing and in trouble shooting.

20 Ampere Circuit Breaker - On fuse panel at right end of glove box.
Motor - Lower inner door panel.
Window Stop & Cut-Off Switches - Single unit on switch plate inside door panel above door lock.
Bypass Switch - Inside door panel at top of door on window up-stop bracket.
Striker Plate Switch - On door latch striker plate.
Curr nt Sensing R lay - Relay panel behind rear seat.
St p R lay - Relay panel behind rear seat.
Up R lay - Relay panel behind rear seat.
D wn R lay - Relay panel behind rear seat.



LINCOLN CONTINENTAL CONVENTIONAL WINDOW WIRING DIAGRAM (INCLUDING VENT WINDOWS)

TROUBLE SHOOTING & DIAGNOSIS

Conventional Windows

Bypass the switches and relays as necessary when making tests. Use a continuity light for checking circuits.

On Wind w Op rates In On Dir ction Only Thr ugh Eith r Switch - Motor field or field circuit wiring open or shorted.

Window Operates In Both Dir cti ns Thr ugh On Switch Only - Switch defective or open wiring.
One Window Totally Inoperativ - Motor armature and/or field windings, or circuit wiring open or shorted. Motor circuit breaker improperly grounded or faulty.
All Wind ws T tally In perativ - 20 ampere main feed circuit breaker or main feed wiring defective.

(Continued)

LINCOLN CONTINENTAL WINDOWS (Continued)

Vent Windows

Use a voltmeter or test lamp for making tests. Check circuits and wiring in the usual manner.

On Wind w Op rat s In One Direction Only Through Eith r Switch - One motor field winding has an open or short circuit.
Window Op rat s Thr ugh One Switch Only - Defective switch or open wiring.
On Wind w In p rativ - If window will not operate in either direction from either switch, check for open circuits or faulty motor.
B th Wind ws In p rativ - Feed circuit breaker faulty.

Automatic Windows

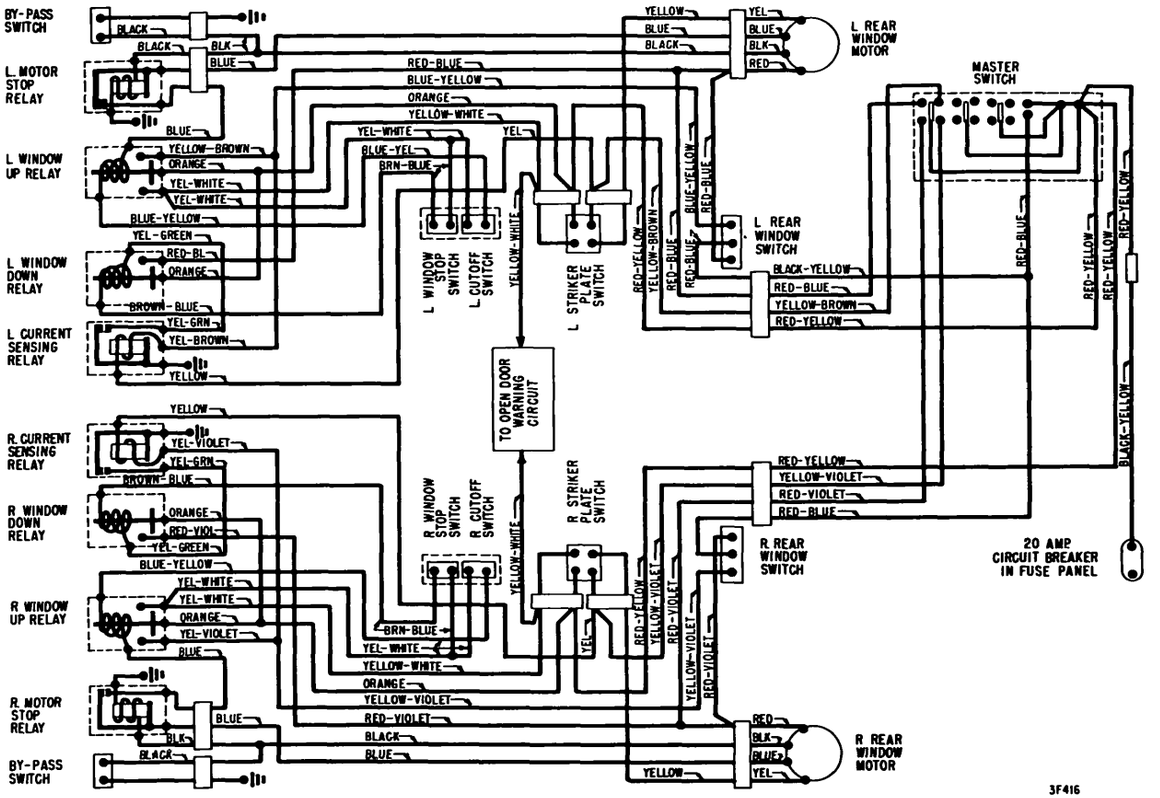
NOTE - Sinc automatic window circuit is built around conv ntional lectric window system, make sure that c nv ntional part of syst m is in proper operating condition befor ch cking automatic window circuits. Us th following guid f r automatic window checks.
Wind w Will N t G D wn - Check the following: 20 ampere circuit breaker, striker plate switch, down relay, window stop switch, motor down field winding, current sensing relay.
Wind w C ntinu s All Th Way Down - Spring on stop switch actuator lever broken; Stop Switch faulty; Down relay faulty.

Wind w Will N t R turn To Up Position - Check the following: 20 ampere circuit breaker, up relay, motor up field winding, cut-off switch, striker plate switch.
Wind w Cl s s But M t r Continues To Operate - Stop relay faulty or bypass switch improperly adjusted or shorted contacts.
Wind w Rais s Part Way Only After Door Closed - By-pass switch faulty. Motor stalled due to tight window channels.

ADJUSTMENT

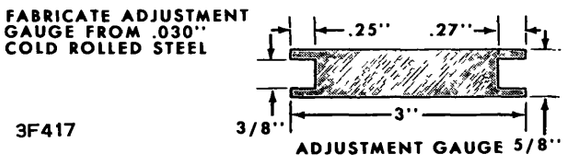
Automatic Wind w Switches

Bypass Switch - With window fully lowered, open door, remove trim panel, disconnect battery and switch leads. Mark window up stop position and remove stop and bypass switch as an assembly. Adjust switch so threaded part of switch is flush with lower surface of window stop bracket. *NOTE - Threaded part must not protrud b yond brack t.* Reinstall switch and window stop.



CONVERTIBLE AUTOMATIC REAR WINDOW WIRING DIAGRAM (LATER PRODUCTION)

Striker Plate Switch - *Make a gauge as shown in illustration.* With window in full down position, switch should click when plunger depressed with .25" end of gauge, but should **not** click when depressed with .27" end of gauge. Adjust switch as necessary by loosening locknut and turning switch retaining nut. *One full turn of retaining nut will change operating point of switch plunger 1/32".* Tighten locknut and check window operation. Window should start downward movement when door is open 1/8"±1/64".
Cut-Off & Stop Switches - No adjustment. Switches molded into a single sealed unit, and are serviced as an assembly only. *NOTE - When replacing switch s, short screw must be used to attach lower part f assembly to mounting plate.*



STRIKER PLATE SWITCH ADJUSTMENT GAUGE

RAMBLER WINDOWS

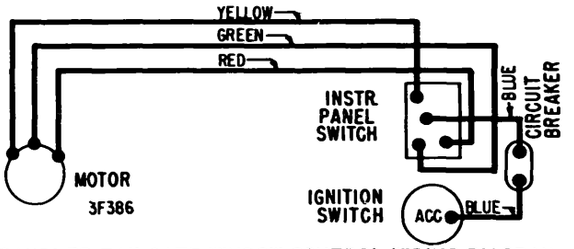
Rambl r, Exc pt American (1963)

DESCRIPTION

D r Wind ws - Window regulators are individually powered by electric motor in each door. Motors are controlled by individual switches on each door panel and a master switch mounted on left front door panel. All switches are retained to trim panel by spring type retaining clips at top and bottom. A 30 ampere circuit breaker mounted under instrument panel protects wiring harness and a 15 ampere circuit breaker is used to protect each motor.

Tailgate Window - Used on both vertically and horizontally hinged tailgates. Window regulator operated by electric motor in tailgate and controlled by switch on instrument panel, and also by a key lock switch on horizontally hinged tailgate. Horizontally hinged tailgate also has plunger type safety switch mounted at rear edge of cargo compartment floor on left side of spare wheel cover. This switch prevents window operation when tailgate is open. Circuit breakers mounted on left side of foot brake bracket used as follows: One 25 ampere circuit breaker for vertically hinged tailgate. Two 25 ampere circuit breakers for horizontally hinged tailgate.

(Continued)



RAMBLER TAILGATE WINDOW CONTROL WIRING DIAGRAM (VERTICALLY HINGED TYPE)

RAMBLER WINDOWS (Cont.)

REMOVAL & INSTALLATION

NOTE - Regulator and motor must be removed together
Front Door Window Regulator - With ignition off, remove door trim panel. *NOTE - Do not remove window switch from trim panel, nor disconnect switch wiring .* Raise window to within 4" from top (if regulator inoperative, turn rubber coupling on shaft between motor and transmission counterclockwise while raising glass by hand). Hold glass in raised position. Disconnect glass bottom channel from slide channel and slide off regulator arm roller. Disconnect remote control and lower to bottom of door. Remove ventilator division channel adjusting nut, lockwasher, and stud. Disconnect motor circuit breaker. Disconnect regulator from door and lower toward hinge, lift regulator arm to outside of remote control, then lower arm and move regulator toward door outer panel under end of ventilator division channel. Move assembly to large access hole, disconnect motor wires and remove.

Rear Door Window Regulator - Raise window to within 2" of top of frame (if regulator inoperative, remove switch from trim panel and disconnect wiring). Remove door trim panel and ash tray mounting panel. Turn rubber coupling on shaft between motor and transmission counterclockwise to raise glass while pulling glass by hand, then prop glass in up position. Remove retainer from quadrant plate and link assembly stud (releases regulator arm from stud on link). Pry top part of quadrant link up to raise glass and relieve all pressure on stud. Disconnect motor wires, and disconnect regulator assembly from door. Move assembly so regulator arm and quadrant come out of large access hole at top of door, then remove assembly through this hole.

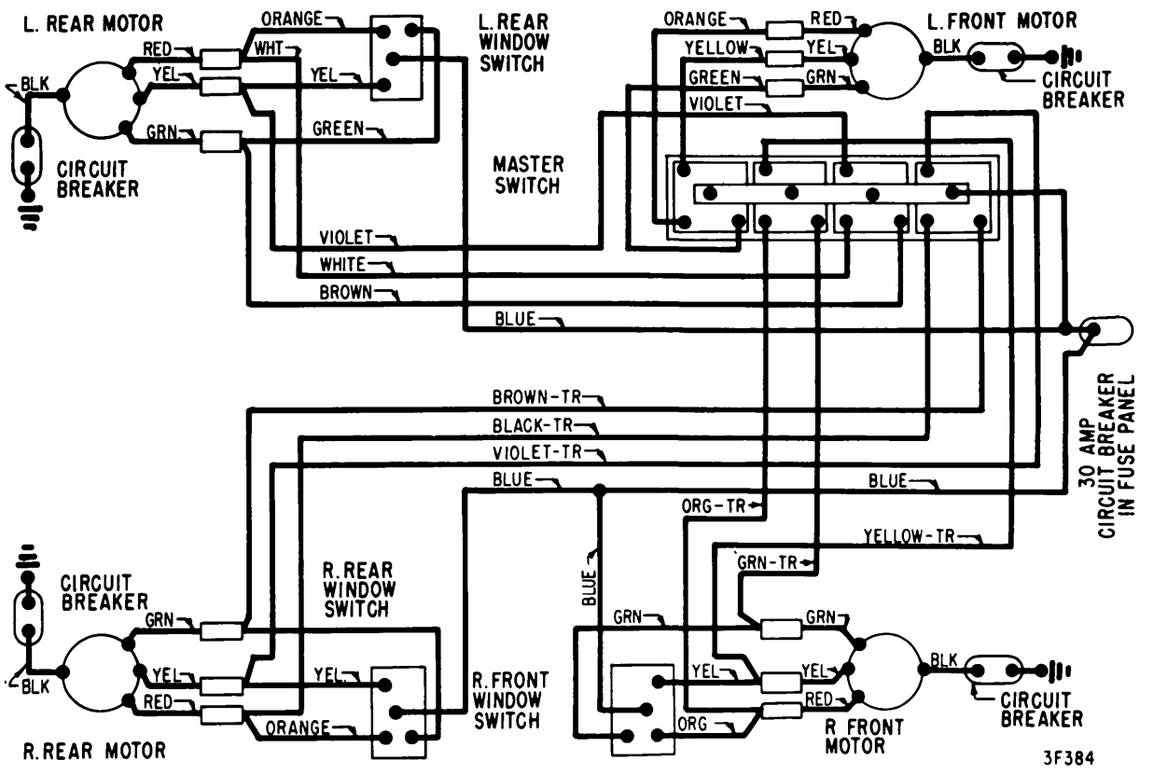
Tailgate Window Regulator - *NOTE - On horizontally hinged type, if window is stuck in raised position, proceed as follows: Remove cargo compartment rug and spare tire. Remove access hole cover panel screws as far down as possible, then cut this panel across at top of spare tire compartment opening and remove. Reach through opening and remove screws holding glass bottom slide channels (hold glass up), then push regulator arms toward tailgate outer panel and lower glass into tailgate. Open and lower tailgate.* Remove lock latch release handle and all screws holding inner panel to outer panel. Remove inner panel. Disconnect slide section from glass bottom channel, then remove slide section from regulator arms. Remove glass on horizontally hinged type. On vertically hinged type, tie glass to top of door frame. Remove regulator and motor assembly.

Door Switch - Insert putty knife or similar tool at top of switch between switch housing and mounting plate and depress retaining spring by pushing downward on both springs at top and bottom. Tilt switch away from panel at top and insert putty knife at retainer locations. Tag each wire and mark terminals for proper reassembly, then remove switch.

Tailgate Instrument Panel Switch - Reach under instrument panel and press both spring clips at switch. Push switch from panel.

Tailgate Safety Switch - Used on horizontally hinged type only. Switch mounted at rear edge of cargo compartment floor on left side of spare wheel cover. Can be removed after spare tire cover and jack removed.

Tailgate Key Lock & Switch - Accessible after tailgate regulator and motor assembly removed.



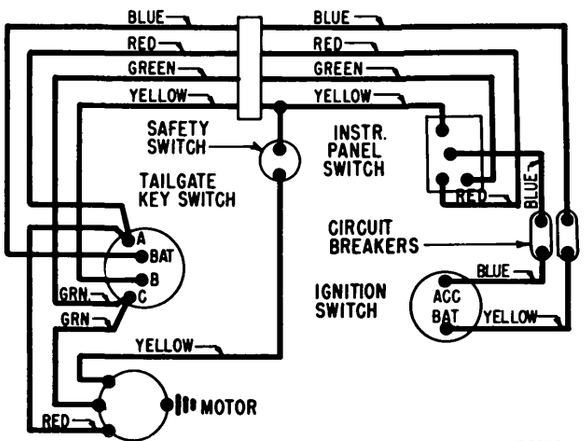
RAMBLER ELECTRIC DOOR WINDOW CONTROL WIRING DIAGRAM

TROUBLE SHOOTING

All Windows Fail To Operate In Either Direction or Operate Slowly - Battery low or dead. Circuit breaker faulty. Battery ground loose, or terminal in control circuit loose or corroded.

Windows Operate Intermittently - Loose wires on circuit breaker or switches, or circuit breaker faulty.

One Window Fails To Operate - Loose or broken connections at dash circuit breaker and switch in door. Bypass the switch and check the motor separately.



RAMBLER TAILGATE WINDOW CONTROL WIRING DIAGRAM (HORIZONTALLY HINGED TYPE)

STUDEBAKER TAIL GATE WINDOW

Stud baker (1963)ℂ

ℂ - Station Wagons with sliding roof panel.

DESCRIPTION

Electrically operated tailgate window controlled by switch on instrument panel and by key operated switch in tailgate. Window will operate only with ignition on.

SERVICING

Operation With Ignition Off

To avoid burning distributor points when operating electric window during servicing, use the following ignition bypass procedure: Connect a jumper wire between rear (M) and center (B) terminals of window lift relay (on left front fender apron). Window may now be operated with ignition switch off.

REMOVAL & INSTALLATION

Regulator & Motor

Lower tailgate and remove access hole covers. Remove window opening weather seals and remove window assembly. Remove regulator retaining nuts and washers, disconnect wiring from motor, and remove regulator and motor assembly. To install, reverse removal procedure, making sure wires are connected to proper terminals.

Tailgate Lock Assembly

Disconnect battery, lower tailgate and remove access hole covers. Remove tailgate window. Disconnect motor wiring, then disconnect regulator and motor assembly and move out of way. Remove switch lock attaching nuts and remove from tailgate. To install, reverse removal procedure.

BUICK, OLDSMOBILE, PONTIAC VACUUM TRUNK LOCK

Buick, Except Sp cial (1963)
Oldsmobile (1963)
Pontiac (1963)

DESCRIPTION & OPERATION

Vacuum operated trunk unlocking device consists of control lever in glove box, vacuum reserve tank in engine compartment, and vacuum power unit in trunk lock mechanism. Vacuum reserve tank vacuum supply line located either at intake manifold, or in "T" fitting in distributor vacuum advan ce line near carburetor. A check valve in tank prevents vacuum loss when intake manifold vacuum drops. If vacuum unit fails, trunk can be unlocked with key in the usual manner.

►*TRUNK LOCK & DISTRIBUTOR CAUTION:* On units where vacuum supply line is in distributor vacuum advance line, engine must be run above idle speed to restore vacuum to supply tank as there is no distributor vacuum advance at idle speed. Also, make sure that vacuum line from "T" fitting to reserve tank is in good condition and that there are no leaks at fittings or distributor vacuum advance will fail to operate.

REMOVAL & INSTALLATION

Trunk L ck Cylinder

Disengage tab on lock anchor plate from lock cylinder retainer. Pull slotted retainer toward right side of body to disengage retainer from lock cylinder, then remove lock cylinder and gasket from rear end panel. To install, reverse removal procedure.

Vacuum R l as Unit

With lock cylinder removed (see above), remove vacuum release unit attaching screws. Disengage unit from trunk lock, disconnect vacuum hose, and remove unit. To install, reverse removal procedure.

CADILLAC VACUUM TRUNK LOCK

Cadillac (1963)

DESCRIPTION

Vacuum operated trunk lid locking system used with a rotary bolt type lock. Vacuum release unit is attached to lock, and vacuum storage tank is located on cowl under hood. A vacuum switch located in glove compartment controls unit. A mechanical type lid closing unit is used in conjunction with vacuum lid lock to reduce effort required to close trunk lid.

OPERATION

Vacuum System - Operating vacuum switch in glove compartment introduces vacuum to vacuum unit which then pulls the lock to unlock the trunk lid. Trunk can be unlocked and opened with a key in the usual manner. **Mechanical Closing Unit** - When trunk lid is lowered manually and lid lock engages striker, mechanical closing unit pulls lid to closed position. A hydraulic cylinder attached to a bellcrank at right trunk lid hinge and to closing unit by a cable acts as a safety feature to slow action of closing unit. When lid is lowered and lock latches to striker, but before mechanical closing unit is tripped, hydraulic piston extends to full out position. As lid is lowered to actuate mechanical closing unit, piston compresses fluid in cylinder to retard closing action of spring.

ADJUSTMENT

1) To actuate mechanical pull-down unit, trunk lid lock must properly engage striker arm and depress detent lever of pull-down unit. Check engagement by lowering trunk lid and visually checking lock and striker alignment. Make lateral adjustment at lock attaching screws, and vertical adjustment at pull-down unit attaching screws.

2) *NOTE - Cable tension must be properly adjusted for proper operation of pull-down unit. If cable too tight, pull-down unit will not return to full up position and "cock". If cable too loos , pull-down ffort in unit is l ssened and trunk lid will b misaligned (too high). Adjust cabl as follows:* To increase tension, place hydraulic cylinder end of cable in upper slot on lower end of cylinder. If more tension required, loosen cable adjusting bracket attaching screw and adjust bracket downward to increase cable travel. To decrease cable tension, place hydraulic cylinder end of cable in lower slot on hydraulic cylinder. For finer adjustment, move cable attaching bracket upward. *CAUTION - Point of contact between toggle and detent lever must be lubricated with Lubriplate to avoid excessive effort required to trip (unlock) pull-down unit.*

REMOVAL & INSTALLATION

Vacuum Release Unit

Remove lid lock cover panel and lid lock cylinder assembly. Remove vacuum unit attaching screws, disconnect vacuum line and remove unit. To install, reverse removal procedure.

Lid Lock

Remove lid lock cylinder assembly and vacuum release unit (see above). Remove lid lock attaching screws and remove lid lock. To install, reverse removal procedure.

Mechanical Pull-Down Unit

Remove pull-down unit cover panel, depress striker slightly to relieve tension on cable, then disengage clip holding cable to pull-down unit control arm. Disconnect clip holding cable conduit to cable adjusting bracket, then disengage cable and conduit from pull-down unit. Remove warning light switch attaching screw and remove switch from pull-down unit. Scribe mark position of pull-down unit to aid installation, then remove attaching screws and remove pull-down unit. install, reverse removal procedure.

Pull-Down Unit Cable

Pull clip from cable at lower end of hydraulic cylinder, then disengage cable from slot in cylinder. Disengage cable conduit retaining clip from support on wheelhouse and remove cable and conduit from support. Repeat procedure at other end of cable, then remove cable. To install, reverse removal procedure.

Hydraulic Cylinder

Remove cable from lower end of cylinder (see above). Lift cylinder to disengage upper end from shoulder of shaft on link assembly, then remove hydraulic cylinder. To install, reverse removal procedure.

CHRYSLER IMPERIAL ELECTRIC DOOR LOCK

Imperial (1963)

DESCRIPTION & OPERATION

Operated by a push-pull double acting solenoid, attached by a connecting rod to door lock actuating lever in each door. A single pole double throw switch is mounted on each front door. Switches control the lock and unlock relays which actuate solenoids. Doors may be locked electrically by depressing either switch. Lift switch to unlock. Doors may be locked and unlocked mechanically in the usual manner.

SOLENOID

Removal

Remove door trim panel and disconnect lock connecting rod at solenoid. Disconnect wires and remove solenoid.

Installation

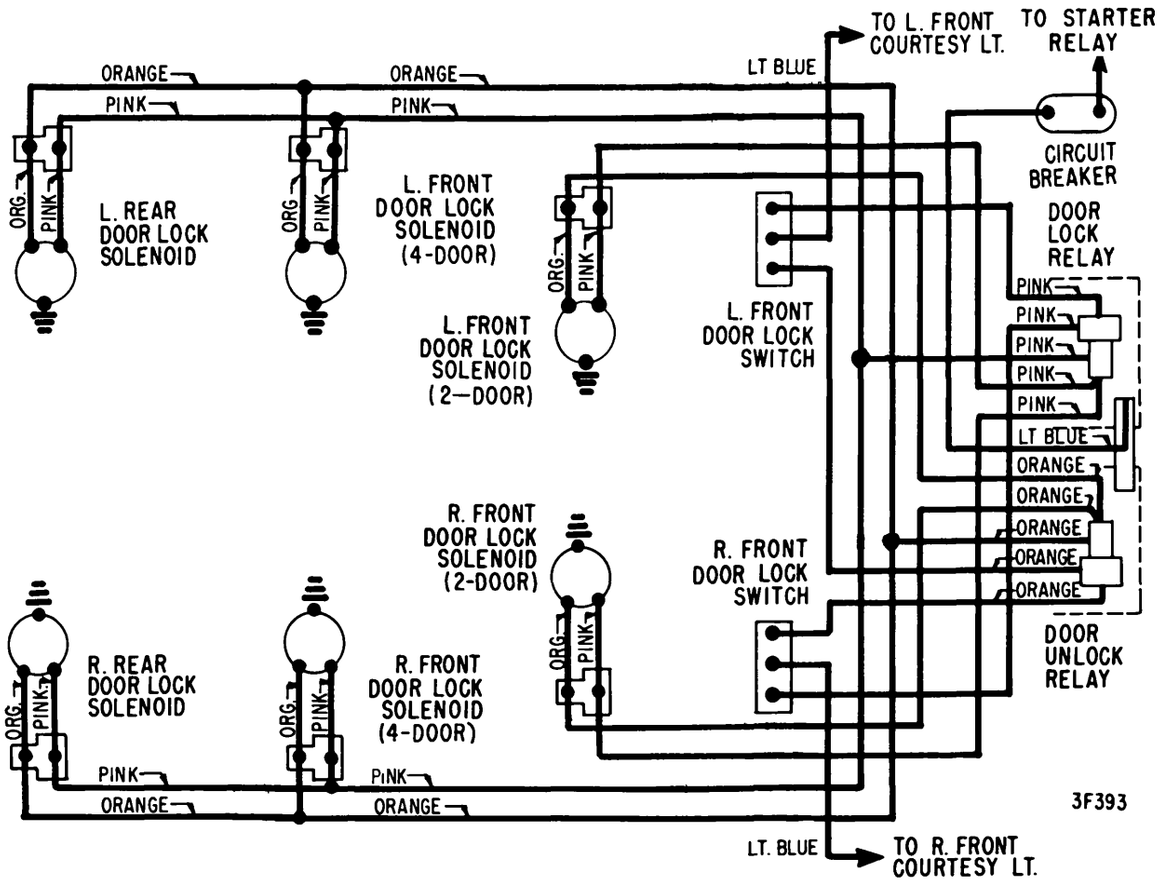
Attach solenoid to door and connect wires. Tighten mounting screws finger tight, then connect lock connecting rod to solenoid. Adjust solenoid by moving up or down in slotted holes so solenoid will push and pull lever far enough to lock and unlock door. Tighten mounting screws securely and install trim panel.

LINCOLN CONTINENTAL VACUUM DOOR LOCK

Lincoln Continental (1963)

DESCRIPTION & SERVICING

Vacuum lock system similar in design and operation to 1961-62 models. Rear door warning light system is same as late production 1961 models (light flashes or glows only when a rear door is open or not completely closed). *For Wiring and Vacuum Diagrams, Removal and Installation, Testing and Trouble Shooting, see Page 520 in 1961 Final Data.*



CHRYSLER IMPERIAL ELECTRIC DOOR LOCK WIRING DIAGRAM

LINCOLN CONTINENTAL VACUUM TRUNK LOCK

Lincoln Continental 4-Door Sedan (1963)

►CHANGES, CAUTIONS, CORRECTIONS

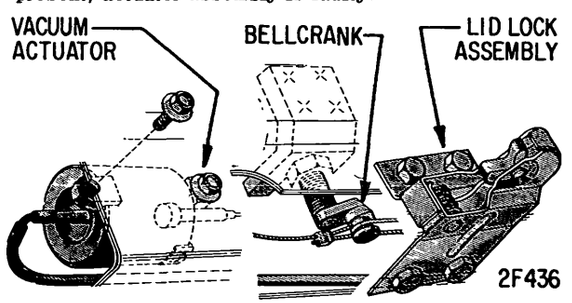
►*1963 INOPERATIVE TRUNK LOCK CONTROL CORRECTION:* May be caused by too much slack in lock control actuating wire which cancels part of cycling action of vacuum cylinder. To correct, remove lock assembly from trunk inner panel (to expose wire loop) and shorten actuating wire about 1". Install lock and check operation.

DESCRIPTION

Vacuum operated system consisting of a control valve assembly (switch) located in glove compartment, and a door lock actuator assembly (vacuum motor) located on luggage compartment back panel. Vacuum source for system is from vacuum door lock system through a tee connection at door lock vacuum distributor supply line. Trunk lid can also be unlocked in the usual manner with a key.

TROUBLE SHOOTING

CAUTION - DO NOT apply air pressure to system or serious damage to vacuum actuator will result. If system inoperative, proceed as follows: With engine running, listen for any obvious air leaks. Disconnect left hand hose from control valve in glove compartment and touch a finger to hose end. If vacuum not present, trouble is at source from door lock system. If vacuum present, reconnect hose. Disconnect right hand hose from control valve. If vacuum not present at hose, control valve is faulty. If vacuum present, reconnect hose. Unlock trunk lid with key and disconnect hose at actuator. Have a helper operate control valve and touch a finger to end of hose. If vacuum not present, hose from control valve to actuator is faulty. If vacuum present, actuator assembly is faulty.



LINCOLN CONTINENTAL VACUUM TRUNK RELEASE MECHANISM

BUICK & CADILLAC VACUUM DOOR LOCK

Buick (1963)
Cadillac (1963)

DESCRIPTION & OPERATION

Consists of vacuum storage tank, vacuum lock remote control valve assembly, selector valve, and actuator assemblies.

Vacuum Tank - Attached to front of power brake mounting support on left side of body. Connected by hose to engine manifold with check valve in the line. A minimum of three complete cycles of operation (lock and unlock) is available immediately after engine has been shut off.

R m t Contr l Valv - Attached with screws below right hand defroster duct. Supplies vacuum from tank to lock actuators when selector valve is actuated.

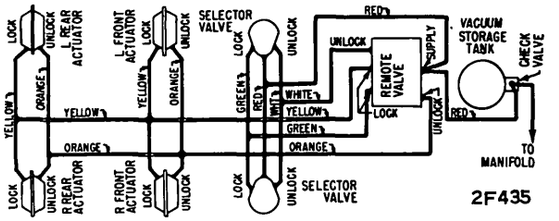
S l ct r Valv - Located on each front door trim assembly.

Actuat r Ass mbli s - Located in each door are double acting vacuum diaphragms with vacuum supplied to each side. Diaphragm moves a linkage or bellcrank connected to locking lever of lock.

NOTE - All Vacuum hos s and corresponding actuator ports ar color coded. S diagram.

TROUBLE SHOOTING

Syst m Inoperativ - Hoses crossed at vacuum supply tank; vacuum supply hose pinched at remote control valve; door valve supply hose pinched at remote control valve; vacuum supply hose disconnected at tank, remote valve or engine; remote valve diaphragm leaking.



BUICK & CADILLAC
VACUUM DOOR LOCK CONTROL DIAPHRAGM

All Doors Can Be Locked But Not Unlocked - Main supply hose crossed with lock supply hose at remote control valve, unlock selector hose or supply hose disconnected at remote valve.

All Doors Can Be Unlocked But Not Locked - Main supply hose crossed with unlock hose on remote control valve, lock selector hose or supply hose disconnected at remote valve.

Moving Either Door Valve to Unlock or Lock Produces the Opposite Action of All Locks - Door lock selector valve hoses (small) crossed at remote control valve, actuator supply hoses (large) crossed at remote valve.

Moving One of Door Valves to Lock or Unlock Produces the Opposite Action of the Lock - Valve selector hoses crossed at one door valve, door selector valve reversed in trim assembly.

System Will Not Lock From Door Valve or System Will Not Unlock From One Door Valve - Lock or unlock selector valve hose pinched or disconnected from affected door valve.

L ck M v m nt n Any D r N t Synchr niz d with Oth r Doors - Hoses crossed at affected door lock actuator.

One Door Lock Lags Behind Other When Locked r Unlocked - Lock or linkage binding.

System Inoperative From One Door Valve - Vacuum supply hose pinched or disconnected at affected door valve.

One Door Lock Will Not Lock or Unlock - Actuator hoses pinched or disconnected.

System Will Not Hold Vacuum for 48 Hours - Leak at remote control valve, any two door locks, storage tank and check valve, any part of harness connections.

Locks Inoperative with Front Door Closed, But Operative with Door Open - Door valve vacuum supply hose pinched at front body hinge pillar on side affected.

TESTING

For leaks not severe enough to be heard, use a suitable water testing device made from a quart jar and flexible tubing. I.D. of tube connected to remote control valve should be 7/32", and I.D. of tube connected to storage tank should be 5/32". Install tester hose not protruding into the water on bottom of check valve on tank. Install hose with end in the water to hose leading to remote control valve. After pressures in system normalized, a bubble will appear in water every 15 seconds or faster if there is an appreciable leak in system. Isolate system in usual manner by pinching hoses when making tests.

1963 Power Top Controls

HYDRO-LECTRIC TYPE

Buick & Buick Sp cial (1963)
Cadillac (1963)
Ch vr l t Pass. Cars (1963)
Ch vy II (1963)
C rvair (1963)
Chrysl r & Imp rial (1963)
D dg & Dart (1963)
F rd Falc n, Fairlan , Galaxie (1963)
M rcury C m t, M t r, M nterey (1963)
Oldsm bil & Oldsm bil F-85 (1963)
Plym uth (1963)
P ntiac & P ntiac T mp st (1963)
Rambl r Am rican (1963)
Stud bak r Lark (1963)
Valiant (1963)

DESCRIPTION

Similar in design and operation to models previously used. System is a sealed unit and is not vented to the atmosphere, making it unnecessary to replace hydraulic fluid periodically. System is "self-air bleeding".

HYDRAULIC SYSTEM

Checking Fluid Level

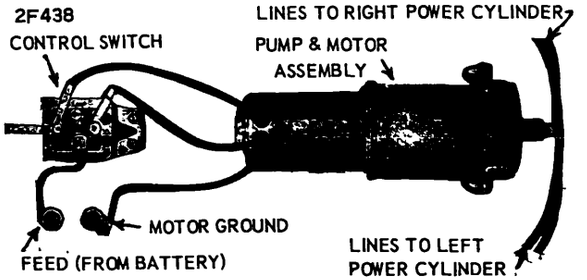
With top in raised position, disconnect positive or negative battery cable. Remove pump and motor shield, in rear compartment, and place absorbent material below reservoir. Remove filler plug from reservoir. On motor and pump assemblies installed horizontally, fluid should be at lower edge of filler cap hole. If fluid low, add hydraulic fluid Delco No. 11 (GM Hydraulic Brake Fluid Super No. 11).

Replacing Fluid After Repairs

Cylinders and hydraulic system contains more fluid than one filling of reservoir will supply. Check reservoir frequently during refilling of system. Air in system will automatically bleed out with a few operations of top.

Checking Hydraulic Pressures

Remove motor and pump assembly. Install plug in one port and pressure gauge in port to be checked. Actuate motor with an applied terminal voltage of 9.5-11.0 volts. Gauge should show a pressure as specified below. Check pressure in other port. *NOTE - A difference in pressure readings may exist between pressure port for top of cylinders and port for bottom of cylinders. This condition is acceptable if both readings are within limits specified.* If pressure not within specified limits, unit is defective and should be repaired or replaced.



PUMP, MOTOR & SWITCH ASSEMBLY

Hydraulic Pressure - 340-380 lbs. (General Motors Cars), 240-280 lbs. (Rambler & Studebaker).

Lift Cylinder Operation Checks

Remove rear seat cushion and folding top compartment side panel assembly. Operate folding top control switch and observe lift cylinders during up and down cycles for these conditions:

1) If movement of cylinder rods is not coordinated or sluggish when motor is actuated, check hydraulic hoses from the motor and pump to cylinders for kinks.
2) If one cylinder rod moves slower than other, cylinder with slow moving rod is defective and should be replaced.
3) If both cylinder rods move slowly, or do not move at all, check pressure of pump (see above).

Motor & Pump Assembly

Se "P wer Op rated T p M tor & Pump (R tor Type)" in Misc llaneous S cti n of Manual.

THUNDERBIRD ELECTRIC TOP CONTROL

Ford Thunderbird (1963)

DESCRIPTION & OPERATION

See "Ford Thunderbird Top Control" on Page 530 in 1960 Final Data or later Manual edition and note the following:

Relays - Deck solenoid power relay and top solenoid power relay are not used. *See 1963 Wiring Diagram for details.*

EMERGENCY MANUAL OPERATION

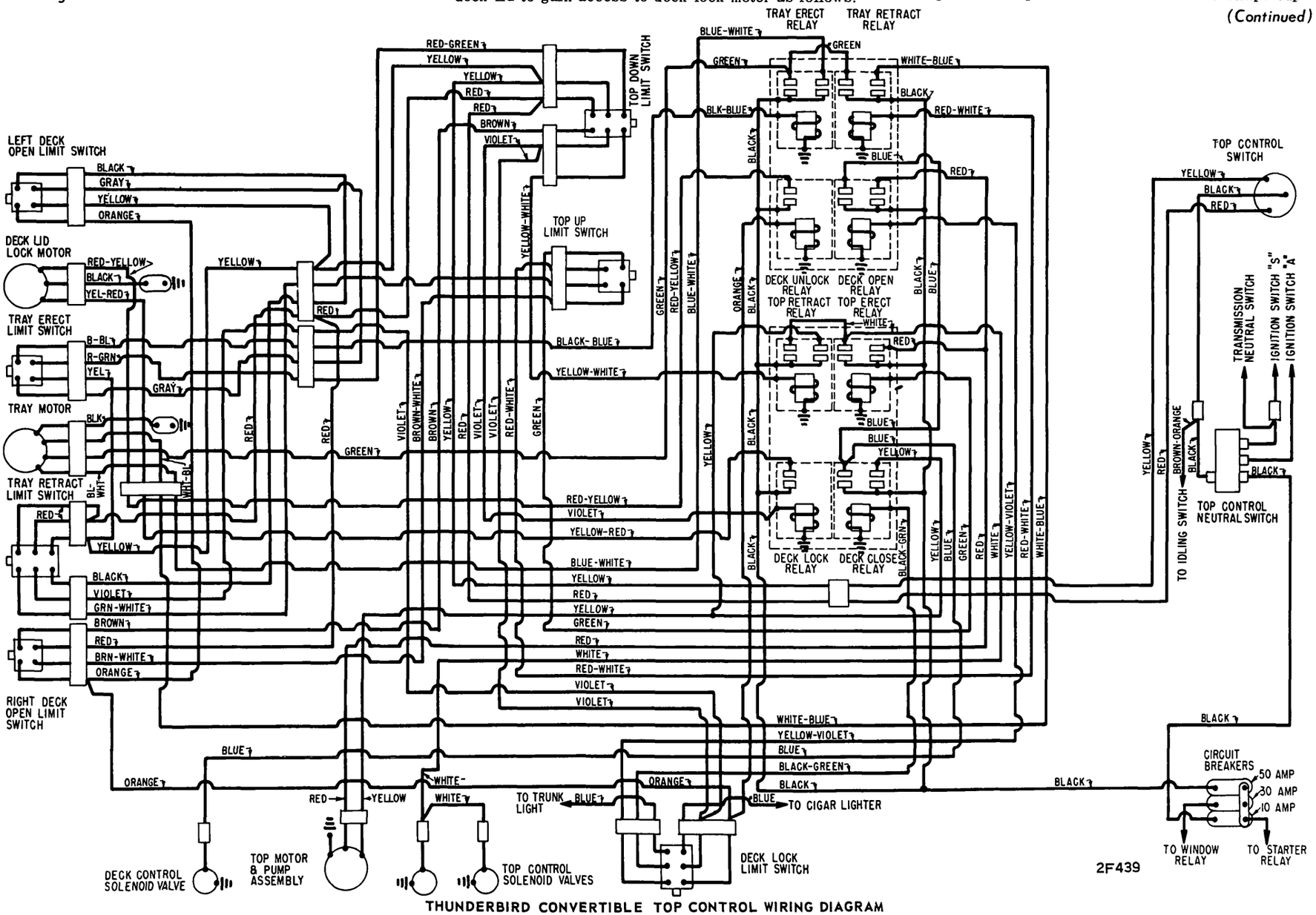
Unlocking Deck Lid

If deck lock motor fails to operate, manually unlock deck lid to gain access to deck lock motor as follows: Place floor jack under frame rear crossmember and raise car approximately 10". Remove each deck lid lock retaining screws (underside of each wheelhouse). Lift front edge of deck lid about 1" and operate top control switch to complete opening of deck lid.

Opening Deck Lid

Unlock deck lid by operating top control switch or by using the above procedure. Loosen the two straps sup-

(Continued)



THUNDERBIRD CONVERTIBLE TOP CONTROL WIRING DIAGRAM

THUNDERBIRD ELECTRIC TOP CONTROL (C nt.)

porting the fuel tank and lower tank approximately 1" DO NOT remove straps or tank From beneath lower back panel, remove both deck cylinder retaining screws from each side Complete opening of desk lid If deck lid locks have been released from wheelhousings the nut and housing portion of locks will remain attached to deck lid.

Erecting Top

It may be necessary to erect top manually if: Electric-hydraulic motor fails; there is an open circuit in motor feed; the top solenoid valves fail; there is an open circuit in the feed line, a top cylinder or linkage fails Unlock and open deck lid Energize both top solenoid valves using suitable jumper wires and 12-volt source If either valve is inoperative, disconnect hydraulic lines connected to valves so that there will be no hydraulic block in top cylinders, then manually erect top

TROUBLE SHOOTING & DIAGNOSIS

TESTING NOTE - Usual cause of top malfunction is a defective or improperly adjusted switch. Make switch checks before making further tests.

Supply Circuit Test

Use a continuity light between ground and various points in supply circuit. With ignition switch in ON or ACC position and selector lever in N or P, check the following in sequence: Circuit breakers, neutral switch relay, actuator switch, and relay power bus bar

Switch Circuit Test

Check switch for improper adjustment by depressing switch stem. Check for electrical failure by bypassing switch with jumper wire directly at switch contact terminals or wire connectors *NOTE - Continuity light cannot b us d to test switch circuits as current draw required by light will not allow relay coils to energiz* . To bypass switch circuit, connect jumper wire between relay bus bar and relay coil terminal. If motor or solenoid operates, check switch circuit for defects If audible "click" of relay is heard, switch circuit troubles are indicated If motor or solenoid fails to operate and relay operates, check for defective motor, solenoid, or respective circuits

Motor & Solenoid Test

Use a 12-volt power source and jumper wire directly to motor or solenoid, or bypass motor ground circuit breaker to isolate trouble

Unit & Operation Test

Use a 100 ampere scale ammeter between main feed 50 ampere circuit breaker on starter relay and motor supply lead (black wire) supplying control relay bus bars If a switch is improperly adjusted so it closes the relay circuit for any cycle but still does not open the cycle just finishing, or if switch is faulty, ammeter reading will indicate the trouble *See "Electrical Test Sp cifications" below*

ADJUSTMENT

Top Down Switch

Place switch in midpoint of adjustment slots, then lower top to full down position. Adjust switch as necessary to delay or advance deck lid closing operation.

Deck Closed Switch

Use Tool T61B-15780-A Pull apart the switch quick disconnect and attach a continuity test light to wires that go to bottom set of contact terminals Press tool firmly into the locknut and adjust switch upward until the test light attached to bottom set of contacts just goes on, then tighten switch mounting screws and remove tool.

Deck Closed Switch Actuator

Use Tool T61B-15780-A. Position tool over lock screw, press tool firmly against lock screw shoulder Pivot tool to line up with switch actuator. Bend actuator until it touches raised portion of tool If operation of deck lid disclosed that deck lid pops up when opening, the switch actuator may be bent very slightly away from deck lid.

Top Up Switch

Raise top to full up position. Place 060" shim between end of switch shaft and roof hinge arm Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shim

Tray Erect Switch

Extend package tray on the deck lid to end of its travel Place 060" shim between end of switch shaft and switch actuator on the tray support arm Adjust switch firmly to the end of its travel against the shim Tighten switch mounting screws and remove shim

Tray Retract Switch

Retract the package tray on the deck lid to the end of its design travel Place 100" shim between end of switch shaft and the switch actuator on tray support arm Adjust switch firmly to the end of its travel against shim Tighten switch mounting screws and remove shim

Deck Open Switches

Both right and left deck open switches are adjusted in same manner Raise deck lid to full open position, place 060" shim between end of switch shaft and actuator Adjust actuator so that the switch shaft is fully depressed Tighten actuator mounting screws and remove shim

Deck Lock Adjustment

NOTE - F r ad quate s al, d ck lock scr w ass mbly must be adjusted to engage properly with the lock nut assembly.

Deck Lock Screw Assembly - Loosen two nuts retaining lock screw assembly to deck lid and adjust the assembly fore and aft to align with lock nut assembly

Deck Lock Nut Housing Support - Loosen two screws retaining lock nut housing support to quarter panel and adjust support side to align with lock screw

Deck Lock Nut Set Screw - Loosen set screw retaining the lock nut in housing assembly and turn lock nut in or out to the required position. The Tool T57P-53510-A may be used to turn lock nut as necessary *CAUTION* - DO NOT attempt any trial locking of deck unless set screw is properly tightened

Deck Lock Nut Housing Height - The foot of the lock nut housing assembly may be adjusted up or down from the wheelhouse to insure the correct positioning of the "O" ring The "O" ring should be centrally located in housing support

1963 ELECTRICAL TEST SPECIFICATIONS

Operation	Maximum Amperage Draw	① Amper s
Deck Lid Unlock		.20
Deck Lid Open		63
Package Tray Extend		30
Package Tray Fold		20
Top Erect or Retract		65
Deck Lid Close		60
Deck Lid Lock		22

① - Battery must be 11 5-12 5 volts for these tests

Unit	Electrical Unit Current Draw	② Amper s
Pump Motor	(Normal)	54-60
	(Bypassing)	42-50
Tray Motor	(Normal)	10-32
	(No Load)	14-18
	(Stalled)	45-58
Lock Motor	(Normal)	16-20
	(No Load)	12-15
	(Stalled)	32-40
Solenoids	(Each)	10

② - With 100 ampere scale ammeter between 50 amp circuit breaker and relay feed wire.

Hydraulic Checks

NOTE - Faulty hydraulic system operation can be caused by lack of fluid, leaks, air in system, obstructions or kinks in hoses, or faulty operation of cylinder or pump

Fluid Level - Retract top, remove filler plug and check fluid level (bottom edge of filler hole) If low, check for leaks, adding heavy duty brake fluid as necessary

Lift Cylinder Operation - Operate top control switch and observe operation of lift cylinders If movement of piston rod is sluggish or uneven, check hoses from pump to cylinders for kinks If one piston rod moves more slowly than the other, the cylinder with the slower rod is defective and should be replaced If both rods move slowly or not at all, disassemble and repair pump

LINCOLN CONTINENTAL ELECTRIC TOP CONTROL

Lincoln Continental (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 TOP CONTROL RELAY NOISE CORRECTION:* If noise occurs when shifting transmission through Neutral, relay may be vibrating on its mounting. To correct, replace relay (use No. C3VY-14512-D) and install a sound absorption pad between relay and its mounting surface.

►*1963 TOP OPERATES INTERMITTENTLY OR NOT AT ALL CORRECTION:* May be caused by mold flash on push-on relay wiring connectors at relay panel (right quarter panel area). Remove any mold flash to provide a good, clean electrical connection and make sure that connector is completely assembled on relay terminals.

DESCRIPTION

Completely automatic power top mechanism which is the same as latest 1961 production with all of the production changes included.

OPERATION

Same as latest 1961 production with all of the production changes included. *See 1961 Final Data, Page 530.*

EMERGENCY MANUAL OPERATION

See 1961 Final Data, Page 532, and note the following: **Manually Opening Deck Lid (Control Circuit Inoperative)** - If top control circuit inoperative, bypass control circuit components to open deck lid as follows: Remove rear seat back and remove multiple plug from deck unlock relay. Make a three-ended jumper wire and energize deck unlock motor directly through multiple plug. *NOTE - If motor does not operate, unlock deck lid manually.* If deck lid will not operate through top control switch, remove multiple plug from deck open relay and energize deck motor and pump assembly directly through multiple plug. *NOTE - If motor inoperative, open deck lid manually.*

ELECTRICAL COMPONENTS & LOCATIONS

See 1961 Final Data, Page 532, and note the following: **Top Control Neutral Relay** - Located on horn relay mounting plate behind right cowl panel.
50 Ampere Power Circuit Breaker - Located on horn relay mounting plate behind right cowl panel.
10 Ampere Control Circuit Breaker - Located in fuse box.

TESTING & TROUBLE SHOOTING

See 1961 Final Data, Pag 532.

WIRING DIAGRAM

See 1961 Final Data, Page 531.

SWITCH ADJUSTMENTS

Deck Lock Limit Switch

With a test lamp attached to the two top terminals of switch, adjust switch so test lamp is lighted when deck lock screws contact deck lock nuts but goes out after lock screws engage lock nuts by one or two threads.

Top Down Limit Switch

With top retracted and a test light attached to upper terminals of switch, adjust switch against pivot arm until test light goes out, then tighten mounting screws.

Back Panel Erect Limit Switch

With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully open. With test light attached to two upper terminals of switch and back panel fully open, move switch against actuator until plunger is depressed and test light goes out. Tighten mounting screws.

Back Panel Retract Limit Switch

With top erected, deck lid raised, and back panel partially open, loosen switch mounting screws so switch plunger is not depressed when back panel fully folded. Attach test light to top terminals of switch. Fold back panel until rubber pads on underside of deck lid are compressed and back panel motor stalls. Move switch against actuator until plunger is depressed and test light goes out, then tighten mounting screws.

Top Lock Limit Switch

With top erected, but unlocked, remove access cover in No. 1 bow and move switch so plunger will not be compressed when top is locked. Operate top motor until top locks and motor stalls, then release control switch. With a test light attached to red wire terminals of switch, adjust switch against actuator until switch plunger is fully depressed and test light is on, then tighten mounting screws.

Top Unlock Limit Switch

With top erected and No. 1 bow access cover removed, raise deck lid and back panel until top just starts to unlock. Loosen switch so plunger will not be depressed when top is unlocked. Insert a .060" shim between switch plunger and actuator then unlock top fully until lock arm is firmly seated to rubber stop. With a test light attached to yellow and brown wire terminals of switch, adjust switch plunger against actuator until light goes out and plunger is fully depressed. Remove shim and tighten mounting screws. *CAUTION - Lock linkage stop must be adjusted so switch actuat r will not hit switch body.*

Top Up Limit Switch/Top Lock Limit Switch No. 1

With No. 1 bow access cover removed and switch loosened, raise top until No. 1 bow rests firmly on windshield header and lock hooks are aligned with hook pockets. Attach a test light to yellow and red wire terminals of switch and adjust switch forward until test light comes on, then tighten mounting screws.

Top Up Limit Switch (In Main Pivot Casting)

With top up and locked to windshield header and with deck lid open, attach a test light to red wire terminals of switch and adjust switch plunger against top linkage until test light goes out, then tighten mounting screws.

Deck Open Limit Switches No. 1 & 2

With deck lid partially open, move switches so they will not be activated when deck lid fully open. Attach a test light to yellow wire terminals of switch and move deck lid to fully opened position. Adjust switches against actuators until test light goes out, then tighten mounting screws.

Top Lock Cut-Off Switch

With deck lid fully raised and back panel completely folded under so it contacts rubber pads, place a .060" shim between switch plunger and actuator. Attach a test light to red and orange wire terminals of switch. Adjust switch until plunger is fully depressed and test light is out. Remove shim and tighten mounting screws.

HYDRAULIC SYSTEM

Checking Fluid Level

Loosen filler plug in end of reservoir. Start engine and run at fast idle while cycling top three times to bleed air from system. With top erected and deck lid open, remove filler plug. If fluid does not run out of opening, add heavy duty brake fluid so fluid is level with edge of filler plug hole. Install filler plug.

G.M. 2-WAY SEAT CONTROL

Buick (1963)
Cadillac (1963)
Oldsmobile 88, S88, 98 (1963)

DESCRIPTION

Consists of a single motor located at right front of seat bottom frame which actuates a jackscrew and gearnut at each side of seat. Gearnuts connected by a drive cable, and control switch is located at seat side panel (left side on full-width type seat). On models with bucket type seats, two adjuster units are used, one for each seat.

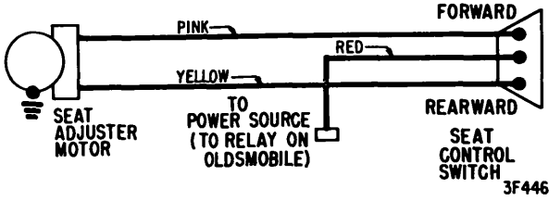
TESTING & TROUBLE SHOOTING

Motor Does Not Operate In Either Direction - Check wiring for open or short circuit. Check for faulty switch by bypassing switch. Check motor operation with a jumper wire from power source to one motor terminal, then check other terminal. If motor inoperative, repair or replace as necessary.
Motor Operates In One Direction Only - Faulty control switch. Motor feed wires or motor faulty (check motor as indicated above).

REMOVAL & INSTALLATION

Front Seat Assembly

Removal - Disconnect control switch wire harness from feed wire harness and detach switch harness from floor pan. Turn back carpet, remove seat adjuster-to-floor pan attaching bolts and remove assembly.
Installation - Reverse removal procedure. *NOTE* - Adjusters must be parallel and "in phase" with each other. If "out of phase" (one adjuster reaches limit of its travel before the other), proceed as follows: Actuate



G-M. 2-WAY SEAT ADJUSTER WIRING DIAGRAM

seat until one adjuster reaches limit of its travel in one direction. Disconnect drive cable and operate seat in same direction until other adjuster reaches limit of its travel. Connect cable and check operation.

Seat Adjuster

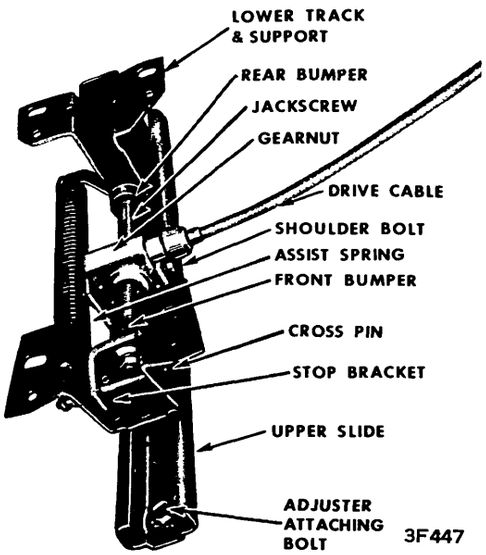
Remove seat assembly and detach drive cable from adjuster being removed. Remove adjuster-to-seat bottom frame bolts and remove adjuster. To install, reverse removal procedure.

Gearnut & Jackscrew

Remove seat assembly and detach drive cable from gearnut and jackscrew being serviced. With a clutch type screwdriver, remove shoulder bolts holding gearnut to upper slide part of adjuster. Remove retainer holding stop bracket crosspin to adjuster front pedestal and remove crosspin. Remove gearnut and jackscrew assembly. To install, reverse removal procedure. *NOTE - When installing new gearnut only, remove cotter pin, washers, and rubber bumper from rear of jackscrew. To replace jackscrew, remove parts from front end of jackscrew also.*

Adjuster Plastic Shoes

Remove front seat assembly and the adjuster being serviced. Remove shoulder bolts with a clutch type screwdriver. Slide lower track and support base part of adjuster (with gearnut and jackscrew) forward until it



G.M. 2-WAY SEAT ADJUSTER ASSEMBLY

disengages from upper slide assembly. Remove plastic shoes from slots in lower track. To install, reverse removal procedure, making sure groove in plastic shoe fits into track with thin part of shoe protruding above track surface.

Actuator Motor

Disconnect drive cable and switch wire harness from motor. Remove bolts holding motor support bracket to weld nuts at front of seat bottom frame and remove motor and bracket. When installing a new motor, transfer ground wire and support bracket from old motor to new one. To install, reverse removal procedure.

G.M. 4-WAY SEAT CONTROL

Buick & Buick Special (1963)
Cadillac (1963)
Oldsmobile & F-85 (1963)
Pontiac & Tempest (1963)

DESCRIPTION & OPERATION

Consists of a 12-volt reversible type shunt wound motor with integral circuit breaker, and control relay mounted either on motor case or on seat track. Motor is installed at left side of seat assembly and energized by toggle-type switch in seat side panel (left side on full-width type seat). On models with bucket type seats, two separate units are used, one for each seat (if both seats so equipped). Operating mechanism consists of a transmission assembly which includes two solenoids and drive cables leading to seat adjusters. One solenoid controls rear vertical seat movement, and other solenoid controls horizontal movement. When control switch is actuated, motor and one solenoid energized simultaneously, then solenoid plunger engages driving gear dog. Driving gear rotates drive cables and operates both adjusters. When adjusters reach limit of their travel, drive cables stop turning and torque is absorbed by rubber coupler between motor and transmission. When control switch is released (contacts open), a return spring brings solenoid plunger to original position and disengages it from driving gear dog.

TROUBLE SHOOTING & DIAGNOSIS

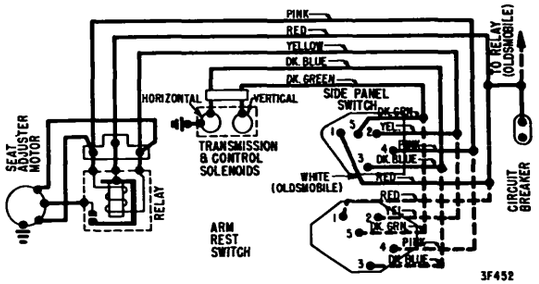
Motor Inoperative - Wiring between power source and switch or motor faulty. Motor relay faulty. Motor, control switch, or circuit breaker faulty.
Motor Operates But Seat Does Not Move - Short or open circuit between switch and affected solenoid. Solenoid faulty. Control switch faulty.

Motor Operates In One Direction Only - Short or open circuit between motor relay and control switch. Motor field coil faulty. Control switch faulty.

TESTING

Feed Circuit

At Motor Relay - Remove connector from motor relay, insert one test light lead into relay power feed connector slot on harness and ground other tester lead. If test light does not come on, feed circuit is either open or shorted.
At Control Switch - Connect one test light lead to switch block feed terminal and ground other lead to body metal. If test light does not come on, feed circuit to switch is either open or shorted. *(Continued)*



G.M. 4-WAY SEAT ADJUSTER WIRING DIAGRAM

G.M. 4-WAY SEAT CONTROL (Continued)

Control Switch

Substitute known good switch or use a 3-way jumper wire connected to switch block to produce desired seat movement. Connect two pieces of 12 gauge wire together and insert joined section into feed location in switch block. Insert other ends into a field and a solenoid location (see wiring diagram for switch block numbering) as follows:

1) To raise seat, jumper in 1, 2, 5.
2) To lower seat, jumper in 1, 4, 5.
3) To move seat forward, jumper in 1, 3, 4.
4) To move seat rearward, jumper in 1, 2, 3.

Motor Relay

Disconnect wiring to motor at relay. Connect a jumper wire to one relay motor field feed studs, and ground other end of wire. Connect one test light lead to motor armature feed stud on relay and ground other lead. Energize field stud which is not grounded, using a jumper wire. *CAUTION - Do not energize grounded side.* If test light does not come on, relay is faulty.

Motor

Disconnect field leads from motor and connect a jumper wire from battery positive post to one field lead and to armature wire. If motor does not operate, repair or replace as necessary.

Solenoid

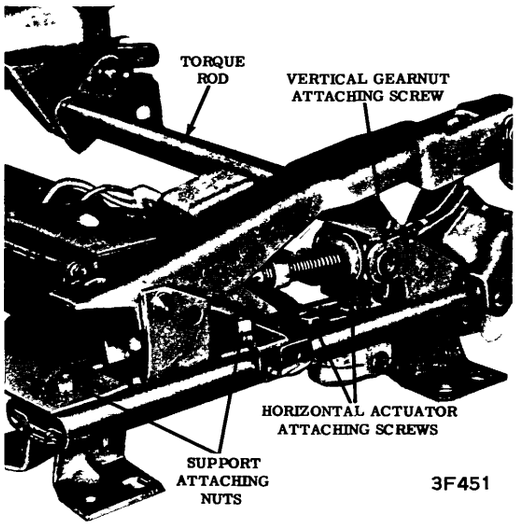
Make sure solenoid ground strap properly connected. Connect one end of jumper wire to battery positive post and other end of wire to solenoid lead. *CAUTION - Do not energize solenoid for more than 1 minute.* Use control switch to operate solenoid being checked. If adjusters do not move and are in good condition, solenoid is faulty. *NOTE - If solenoid good, "click" will be heard when solenoid plunger operates.*

REMOVAL & INSTALLATION

Seat Assembly

Removal - Turn back carpet. Operate seat as necessary for access to front and rear adjuster-to-floor pan attaching bolts. Remove attaching bolts, disconnect wiring, and remove seat.

Installation - Reverse removal procedure, make sure ground strap is properly attached under an attaching bolt, and be sure adjusters are "in phase" with each other as follows: If adjusters "out of phase" (one adjuster reaches limit of its travel before the other), actuate seat forward until one adjuster is fully forward, disconnect drive cable, and operate seat forward until other adjuster is fully forward, then connect cable. Repeat for vertical movement, operating seat upward.



G.M. 4-WAY SEAT ADJUSTER ASSEMBLY (BUCKET SEAT)

Adjuster Assembly

With seat assembly removed, disconnect drive cables, remove adjuster-to-seat bottom frame attaching bolts, and remove adjuster. To install, reverse removal procedure and make sure adjusters are "in phase" with each other (see Seat Assembly Installation above).

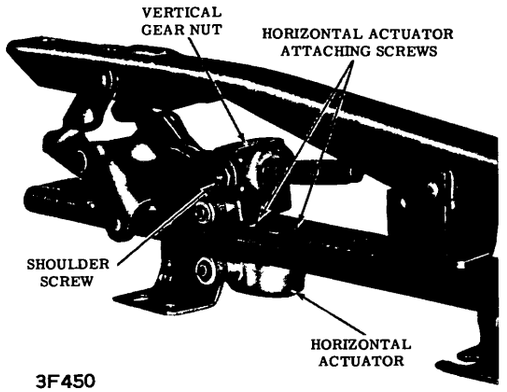
Adjuster Gearnut

With seat assembly removed, remove vertical gearnut drive cable from opposite nut, then use a clutch-type screwdriver to remove shoulder screws holding linkage to vertical gearnut. Remove jackscrew down stop from jackscrew. Use a portable power source to actuate vertical gearnut until disengaged from jackscrew, then disconnect drive cable from gearnut. *NOTE - If necessary, manually raise or lower upper rear part of adjuster for clearance.* To install, reverse removal procedure.

Horizontal Actuator

Full Width Seat - Remove adjuster vertical gearnut, remove screws holding horizontal actuator from adjuster lower track, and remove actuator. To install, reverse removal procedure and note the following: Adjust actuator so drive gear is fully engaged with teeth on lower channel. When actuator attaching screws are tightened, there must be no free movement between upper and lower channels.

Bucket Seat - With seat removed, use a clutch-type screwdriver to remove shoulder screws holding linkage to vertical gearnut, then actuate vertical gearnut until it is against jackscrew down stop (use portable power source). Disconnect drive cable from actuator, remove screws holding actuator to adjuster lower track, and remove actuator. To install, reverse removal procedure and note the following: Adjust actuator so drive gear is fully engaged with teeth on lower channel. When actuator attaching screws are tightened, there must be no free movement between upper and lower channels.



G.M. 4-WAY SEAT ADJUSTER ASSEMBLY (FULL WIDTH SEAT)

Adjuster Jackscrew

Remove adjuster vertical gearnut (see above), then remove adjuster-to-seat bottom frame attaching bolts on side affected. Remove jackscrew-to-adjuster linkage attaching rivet and remove jackscrew. To install, reverse removal procedure, and use new rivet, No. 5715154.

Motor

With seat assembly removed, disconnect wiring harness from motor, disconnect motor support from seat bottom frame (full width seats only), disconnect motor from support and remove. To install, reverse removal procedure.

Adjuster Cables

With seat assembly removed, detach both cables from seat adjuster. Disconnect cable endplate from transmission and remove cables. To remove cable from endplate, remove knock-out plug. To install, reverse removal procedure.

Adjuster Transmission

With seat assembly removed, disconnect wiring and endplates from transmission. Remove transmission attaching bolts, disconnect transmission from rubber coupler, and remove transmission. To install, reverse removal procedure.

Torque Tube (Bucket Seats)

With seat assembly removed, remove adjuster-to-seat bottom frame attaching bolts, and nuts holding motor and transmission support to inboard adjuster. Disengage adjuster from support and torque tube and remove adjuster. Disengage torque tube from opposite adjuster and remove torque tube. To install, reverse removal procedure.

G.M. 6-WAY SEAT CONTROL

Buick (1963)
Cadillac (1963)
Ch vr l t Pass. Cars (1963)
Oldsm bil (1963)
P ntiac (1963)

DESCRIPTION

Six-way seat control consists of a single 12-volt reversible shunt wound motor, a transmission assembly with three solenoids, and seven drive cables to actuate transmission and seat adjusters. Control switch consists of three units for horizontal, vertical, and tilt movement, and is located either in seat left side panel or left front door arm rest.

OPERATION

When a control switch button is actuated, motor and one solenoid are energized at the same time. Solenoid plunger engages large gears with a driving gear. Driving gear rotates large gears which turn drive cables and operate both adjusters. When switch released (contacts opened) a spring returns solenoid plunger to original position and disengages large gears from driving gear.

TROUBLE SHOOTING & DIAGNOSIS

M t r In p rativ - Circuit between power source and switch and motor faulty; Motor relay, motor, control switch, or circuit breaker faulty.
M t r Op rat s In B th Directions But Adjusters Not Actuat d - Wiring between switch and solenoid faulty; Solenoid or control switch faulty.
M t r Op rat s In On Direction Only - Wiring between motor relay and control switch faulty; Motor field coil faulty; Control switch faulty.

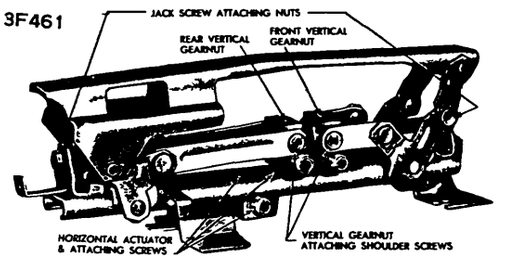
TESTING

Feed Circuit

At Mot r R lay - Remove connector from motor relay, insert one test light lead into relay power feed connector slot on harness and ground other tester lead. If test light does not come on, feed circuit is either open or shorted.
At C ntr l Switch - Connect one test light lead to switch block feed terminal and ground other lead to body metal. If test light does not come on, feed circuit to switch is either open or shorted.

Control Switch

Substitute known good switch or use a 3-way jumper wire connected to switch block to produce desired seat movement. Connect two pieces of 12 gauge wire together and insert joined section into feed location in switch block. Insert other ends into a field and a solenoid location (see wiring diagram for switch block numbering) as follows:



G.M. 6-WAY SEAT ADJUSTER ASSEMBLY

With Switch in Seat Side Panel -
1) To raise front edge, jumper in 1, 6, 5.
2) To lower front edge, jumper in 1, 3, 5.
3) To raise rear edge, jumper in 1, 6, 4.
4) To lower rear edge, jumper in 1, 3, 4.
5) To move seat forward, jumper in 1, 6, 2.
6) To move seat rearward, jumper in 1, 3, 2.

With Switch In Door Arm Rest -
1) To raise front edge, jumper in 1, 3, 5.
2) To lower front edge, jumper in 1, 6, 5.
3) To raise rear edge, jumper in 1, 3, 4.
4) To lower rear edge, jumper in 1, 6, 4.
5) To move seat forward, jumper in 1, 3, 2.
6) To move seat rearward, jumper in 1, 6, 2.

Motor Relay

Disconnect wiring to motor at relay. Connect a jumper wire to one relay motor field feed stud, and ground other end of wire. Connect one test light lead to motor armature feed stud on relay and ground other lead. Energize field stud which is not grounded, using a jumper wire. *CAUTION - Do not energize grounded side.* If test light does not come on, relay is faulty.

Motor

Disconnect field leads from motor and connect a jumper wire from battery positive post to one field lead and to armature wire. If motor does not operate, repair or replace as necessary.

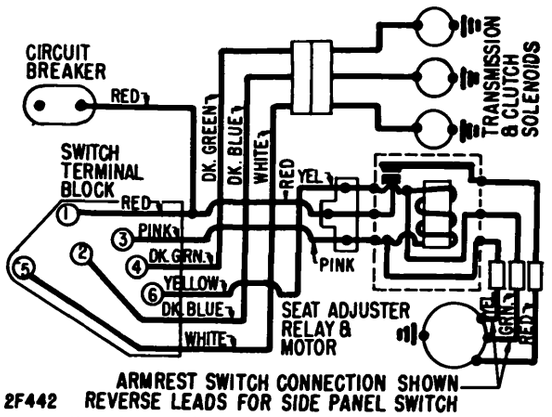
Solenoid

Make sure solenoid ground strap properly connected. Connect one end of jumper wire to battery positive post and other end of wire to solenoid lead. *CAUTION - Do not energize solenoid for more than 1 minute.* Use control switch to operate solenoid being checked. If adjusters do not move and are in good condition, solenoid is faulty. *NOTE - If solenoid good, "click" will be heard when solenoid plunger operates.*

REMOVAL & INSTALLATION

Seat Assembly

Disconnect wiring, turn back carpet, remove adjuster track covers, then remove adjuster-to-floor pan attaching bolts on both sides. Remove seat assembly. To install, reverse removal procedure, making sure ground wire is securely attached under a right adjuster-to-floor pan attaching bolt.



ARMREST SWITCH CONNECTION SHOWN
2F442 REVERSE LEADS FOR SIDE PANEL SWITCH
G.M. 6-WAY SEAT CONTROL WIRING DIAGRAM

Adjuster Assembly

Removal - With seat assembly removed, detach drive cables from adjuster, remove adjuster-to-seat bottom frame attaching bolts, and remove adjuster.
Installation - Reverse removal procedure. Black cable attaches to horizontal actuator, yellow cable to front vertical gearnut, and blue cable to rear vertical gearnut. Make sure adjusters are parallel and "in phase" with each other as follows: If adjusters "out of phase" (one adjuster reaches limit of its travel before the other), actuate seat forward until one adjuster is fully forward, disconnect drive cable, and operate seat forward until other adjuster is fully forward, then connect cable. Repeat for vertical movement, operating seat upward.

Vertical Jackscrew Gearnuts & Springs

With seat assembly and appropriate adjuster removed, use clutch-type screwdriver in drive cable slot in rear vertical gearnut to actuate gearnut rearward. Actuate front vertical gearnut rearward to release tension from front assist spring. Remove jackscrew front attaching nut. Lift front of jackscrew to disengage from support and remove front assist spring and silencer. Actuate front and rear gearnuts forward to relieve tension on rear assist spring, then remove rear nut from jackscrew. Disengage rear of jackscrew from support and remove jackscrew with gearnuts and spring. Remove rear assist spring, silencer, and vertical gearnuts from jackscrew. To install, reverse removal procedure and note the following: Jackscrew must be installed with unthreaded shoulder at rear of adjuster and with gearnuts installed. Rear vertical gearnut with larger cable attachment must be installed to rear, and gearnut with smaller cable attachment to front. Both vertical gearnuts must have cable attachment at bottom of adjuster inner side.

(Continued)

G.M. 6-WAY SEAT CONTROL (Continu d)

Horizontal Actuator And Upper & Lower Channels

With seat and adjuster removed, disconnect horizontal actuator from adjuster and remove. Slide adjuster lower channel from upper channel, and remove plastic shoes from lower channel track. To install, reverse removal procedure and note the following: Horizontal actuator must be installed so drive gear is fully engaged with teeth on lower channel. When actuator screws are tightened, there should be no free movement between upper and lower channels.

Motor & Motor Drive Cable

With seat assembly removed, disconnect motor from seat frame, move motor to left to disengage drive cable, then remove motor. Remove cable by removing endplate from transmission. To install, reverse removal procedure.

Horizontal & Vertical Drive Cables

With seat assembly removed, disconnect cables from seat adjuster. Remove transmission endplate and remove cables. To install, reverse removal procedure.

Transmission Assembly

With seat assembly removed, disconnect wiring from transmission, remove cable endplates from transmission, remove transmission attaching bolts and remove transmission. To install, reverse removal procedure.

LINCOLN & MERCURY SEAT CONTROL

Lincoln Continental (1963)
Mercury Monterey (1963)

DESCRIPTION

The 6-Way Seat Adjuster provides horizontal, vertical, and tilting adjustments. Seat is driven by a single motor through a transmission and six flexible drive cables encased in housings. Control switches are mounted on left seat side shield. Front switch controls vertical movement or tilt of front part of seat. Rear switch controls vertical movement or tilt of rear part of seat. Center switch controls both horizontal and vertical movement. Switches control operation of the three solenoids through relays (except horizontal movement, which is controlled directly by switch). See *Wiring Diagram.*

TROUBLE SHOOTING

Motor Operates But Seat Does Not Move - Shaft or coupling between motor and transmission faulty; Solenoid not engaging transmission; Solenoid relay not engaging solenoid.
Motor Inoperative - Circuit breaker faulty; Motor relay faulty; Control switch faulty; Motor faulty; Wiring broken or loose.
Seat Will Not Move In One Direction - Appropriate solenoid inoperative; Transmission binding; Control switch faulty; Flexible drive cable broken.

REMOVAL & INSTALLATION

Seat

Disconnect battery and remove nut and washer from front end of each seat actuator. Remove capscrew and lockwasher from rear of each seat actuator. Disconnect motor mounting bracket from floor pan. Disconnect main wiring harness from lead to circuit breaker. Remove seat and regulator from car, then remove seat from actuator. To install, reverse removal procedure.

Motor Replacement

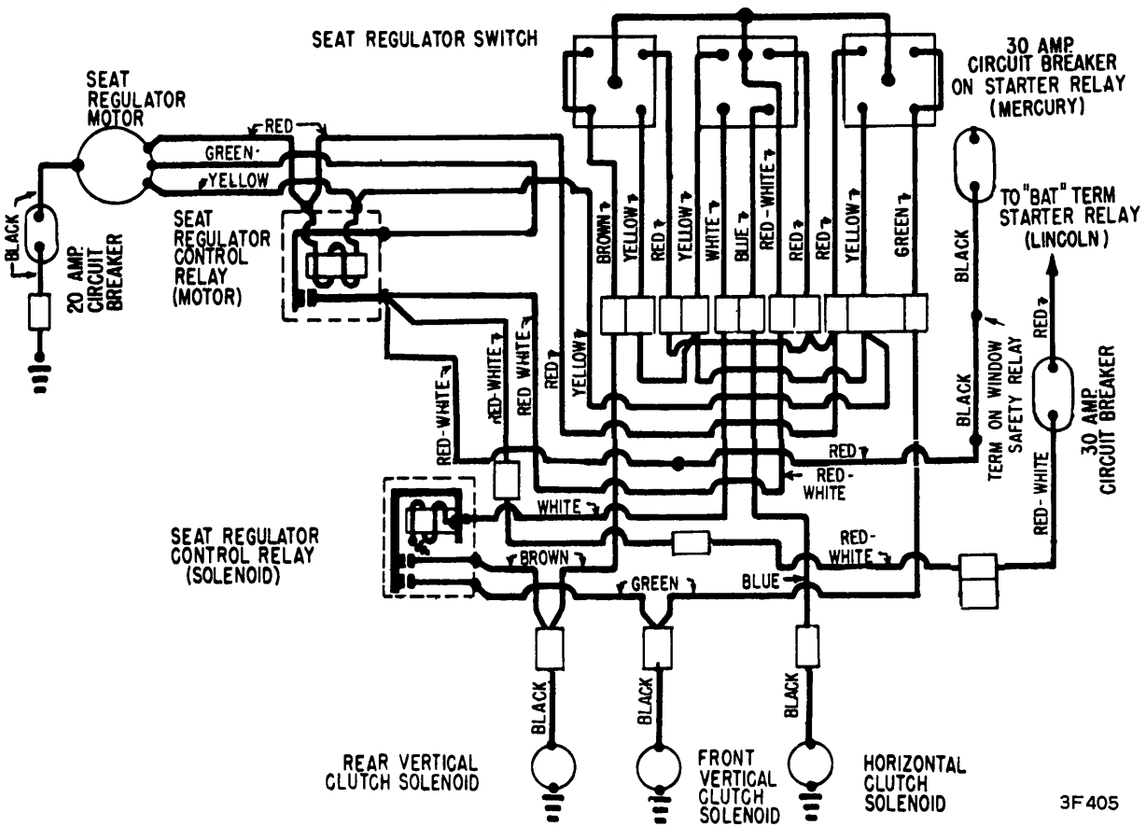
With seat and regulator assembly removed, disconnect motor leads from connectors, and disconnect motor from mounting bracket. Slide motor out of shaft coupling and off bracket. To install, reverse removal procedure.

Relay Replacement

With seat and regulator assembly removed, disconnect wiring connector from seat regulator relay and from motor control relay. Remove screws holding relays to mounting bracket and remove relays. To install, reverse removal procedure, making sure motor control relay is toward driver's side of seat.

Transmission Replacement

With seat and regulator assembly removed, disconnect wiring from solenoids on transmission. Remove cable housing retainer from each end of transmission, then separate cables and housings from transmission. Disconnect transmission from mounting bracket and remove. To install, reverse removal procedure, making sure solenoid wires are properly connected *(s Wiring Diagram).*



LINCOLN CONTINENTAL & MERCURY MONTEREY 6-WAY SEAT CONTROL WIRING DIAGRAM

G.M. 1 & 2-SPEED WINDSHIELD WIPER & WASHER

Buick L Sabr , Invicta, Electra (1963) ℂ
Buick Sp cial (1963)
Chevr let Pass. Cars (1963) ℂ
Chevy II (1963)
C rvair Cars & Trucks (1963)
Chevr l t Trucks (1963)
Oldsm bil 88 (1963) ℂ
Oldsm bil F-85 (1963) ②
P ntiac (1963) ℂ
Temp st (1963)

ℂ - 2-Speed Wiper is "Round Motor" type *See "G M Two & Three Speed Electric Wiper & Washer (Round Motor)" in this section*
② - On F-85 Deluxe 2-Door Hardtop (Series 3147), 2-Speed wiper is "Round Motor" type *See "G M Two & Three-Speed Electric Wiper & Washer (Round Motor)" in this section*

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 PONTIAC INOPERATIVE WIPERS NOTE* If back-up lights are also inoperative and fuse is blown (both wipers and back-up lights on same circuit), check for short circuit or broken wiring at back-up lights (between rear bumper and body)

WIPER

DESCRIPTION

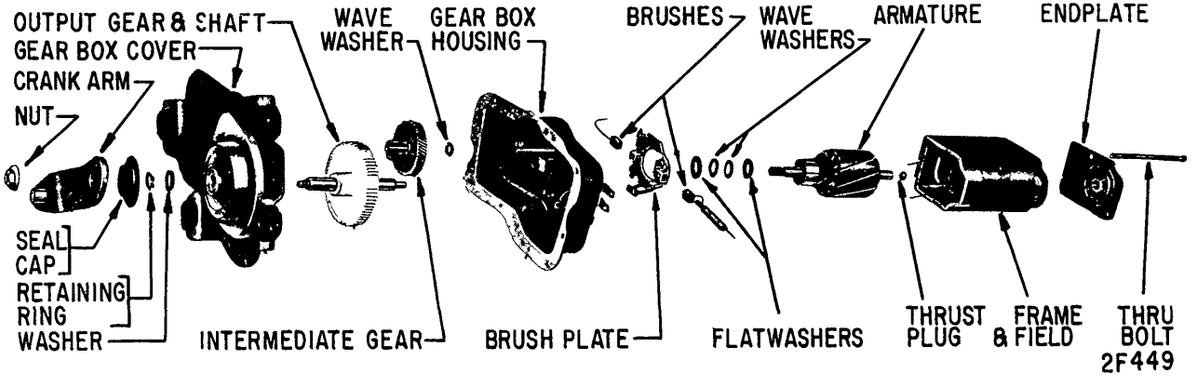
Single speed motor is a rectangular shaped shunt wound type motor similar to previous models Two-speed motor is also rectangular shaped and is compound wound (series and shunt field) Gear train consists of a helical gear at end of armature shaft which drives an intermediate gear and pinion assembly Pinion drives output gear and shaft, and crank arm, attached to output gear shaft, drives wiper transmissions through connecting link arms No internal circuit breaker in motor is used Circuit protection for wipers is through a fuse on fuse block *See individual Car Model Wiring Diagram on Car Model Pages*

TESTING & TROUBLE SHOOTING

1-SPEED

On Car

Wiper Inoperative - Check fuse, check for proper wiring harness terminal connections ground strap at wiper properly connected, dash switch mounted securely Disconnect wiring harness from wiper and check for voltage at harness terminals No voltage indicates faulty car wiring *CAUTION - DO NOT connect a hot line to No 1 wiper terminal* Connect 12 volts to No 2 wiper terminal and a jumper wire from No 1 terminal to ground If wiper operates, dash switch or wiring is faulty If wiper does not operate, disconnect transmission from crank arm If wiper operates, linkage or transmission is faulty If wiper does not operate, remove wiper and check as described under "Off Car" below
Wip r Will Not Shut Off - If wiper shuts off with wiring at dash switch disconnected, dash switch is faulty If wiper operates with dash switch wiring disconnected, connect 12 volts to wiper No 2 terminal *CAUTION - DO NOT connect any jumper wire to No 1 terminal* If wiper shuts off correctly, lead between No 1 terminal and dash switch is grounded If wiper does not shut off, remove wiper and check as described under "Off Car" below
Wiper Operates Intermittently - Check for loose ground strap, dash switch mounting, or loose connection
Blades Fail To Return To Park Position - Check for dirty or broken park switch (remove wiper from car to check)



WINDSHIELD WIPER MOTOR & DRIVE ASSEMBLY (EXPLODED)

Off Car

Wiper Inoperative - Connect a battery and ammeter to No 2 wiper terminal and a jumper wire from No 1 terminal to ground If current draw 0 amps , check solder connection at terminal board, or disassemble motor (if necessary) and check all splice connections If current draw 1-1 5 amps , disassemble motor and check for open armature, sticking brushes, improperly positioned brush springs or faulty brush pigtail connections at splice joints If current draw 10-12 amps , check for open shunt field circuit, or broken gear
Wiper Runs Slow, Vibrates, and Current Draw Approximately 7-9 Amperes - Check for gear train binding, or shorted armature
Wiper Shuts Off Before Crank Arm Reaches Park Positi an - If crank arm stops rotating as soon as jumper wire is disconnected from wiper No 1 terminal, check for dirty, broken, or bent park switch contacts *NOTE - When crank arm reaches park p sition, crank arm index grooves will line up approximately with ridges on gear box c over*
Wiper Will Not Shut Off - If crank arm does not stop in park position when jumper wire removed from wiper No 1 terminal, check that park switch contacts are opening, and that there is no ground in internal motor lead to No 1 terminal

2-SPEED

On Car

Wiper In perative - Check wiring harness, wiper ground strap, and dash switch for proper connections and mounting Check fuse Check for voltage at wiper No 2 terminal To bypass switch, disconnect wiring at motor and connect a jumper wire from No 1 & 3 terminals to ground, and a 12-volt source to No 2 terminal If wiper does not operate, disconnect transmissions from crank arm and operate If wiper still does not operate, remove from car and test as indicated under "Off Car" below
Wiper Will Not Shut Off - *NOTE - Wiper must operate in low speed during parking cycle* Determine whether wiper has both speeds, low speed only, or high speed only, then operate wiper by bypassing switch as detailed under "Wiper Inoperative" above If wiper operates correctly and had both speeds, lead to switch from No 1 terminal is grounded If wiper had low speed only, lead to switch from No 3 terminal is grounded If wiper had high speed only, lead to switch from No 3 terminal is open If wiper still does not operate, remove from car and check as indicated under "Off Car" below
Wiper Operates In Low Speed Only and Shuts Off With Dash Switch In High Position - Reverse harness leads connecting to wiper No 1 & 3 terminals
Blades Do Not Return To Park With Wiper Off - Wiper ground strap may not be connected properly, or park switch contacts may be dirty, bent, or broken
Wiper Speed Normal In Low, But Too Fast In High - Terminal board resistor may be open (remove from car to check)
Wiper Operates Intermittently - Loose wiper ground strap or dash switch mounting

Off Car

NOTE - Use ammeter of reading of 30 amperes minimum in feed wire circuit
Wiper Inoperative - Connect an ammeter and battery to No 2 terminal, and a jumper wire from No 1 & 3 terminals to ground (wiper will operate at low speed) If ammeter reading is 0, check for loose splice joints, or loose solder connection at No 2 terminal If reading 1-1 5 amps check for sticking brushes, open armature, or loose splice joint If reading 11 0 amps , check for broken gear or other stalling condition
Wiper Will Not Shut Off - If wiper had both speeds, park switch contacts may not be opening, or internal motor lead to No 1 terminal is grounded If wiper had low speed only, shunt field coil may be grounded, or internal wiper lead to No 3 terminal is grounded If wiper had high speed only, shunt field is open or internal lead to No 3 terminal is open

(Continued)

G.M. 1 & 2-SPEED WINDSHIELD WIPER & WASHER (Cont.)

Wiper Operates Intermittently - Check for sticking brushes, loose splice joints, or other loose connections.

REMOVAL & INSTALLATION

Transmission

Remove arm and blade assemblies. Remove air intake grille and washer nozzles if equipped. Remove retaining clips holding crank arms to drive arms. Remove transmission attaching screws, and remove transmission. To install, reverse removal procedure.

Motor

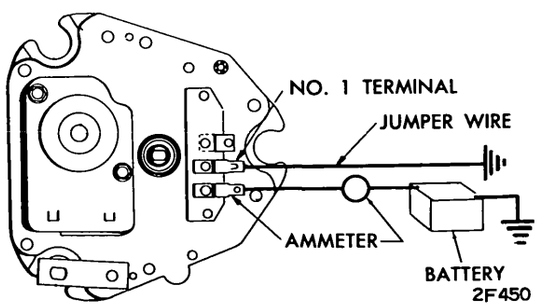
NOTE - On some cars, motor is mounted under air intake grille. On other cars, motor is mounted on engine side of firewall and connected to transmission arm on inside of car. Remove air intake grille if necessary. Remove hoses and wiring from motor, then disconnect motor crank from transmission arm. Remove motor attaching screws and remove motor (and w asher pump). To install, reverse removal procedure.

OVERHAUL

Gear Box

Disassembly - If equipped with washer pump, remove pump from wiper. Remove pump drive gear if required by wedging off shaft with two screwdrivers. Loosen crank arm retaining nut, then remove seal cap, retaining ring and endplay washers. Drill out gear box cover rivets and remove cover. *CAUTION - Mark ground strap location for reassembly.* Remove output gear and shaft assembly, then slide intermediate gear and pinion assembly off shaft. Remove terminal board and park switch by unsoldering motor leads from terminals and drilling out rivets holding terminal board and park switch ground strap to plate.

Reassembly - *NOTE - Service kit is available which contains necessary screws, nuts, and washers to replace rivets removed at disassembly.* Reverse disassembly procedure and make sure cover is located properly over locating dowel pins . Be sure to install ground strap. Install crank arm on output shaft so identification marks line up with marks in cover. Clamp crank in vise before tightening retaining nut.



SINGLE SPEED WIPER TEST CONNECTIONS

Wiper M tor

Disassembly - After gear box disassembled (see above), remove through bolts, tap motor frame lightly, and remove motor from mounting plate. Release brush spring tension and slide armature and endplate from motor frame. Pull endplate from armature. *NOTE - Some models have a thrust plug between armature shaft and endplate.* Remove endplay adjusting washers (note arrangement for proper installation).

Reassembly - Reverse disassembly procedure. Lubricate armature shaft bushings with light machine oil. *CAUTION - Armature endplay is automatically controlled by proper installation of endplay adjusting washers. Install washers with concave side of washers toward each other.*

1963 Wiper Specifications

	1-Speed	2-Speed
Current Draw (Amps.)		
No Load	3.0 max.	3.6 max.
Dry Windshield	3.5 max.	4.5 max.
Stall	11.0 max.	12.0 max.
Shunt Field Resistor		24 ohms
Crank Arm Speed (RPM - No Load)		
Low Speed	43 min.	34 min.
High Speed		65 min.

WASHER

DESCRIPTION

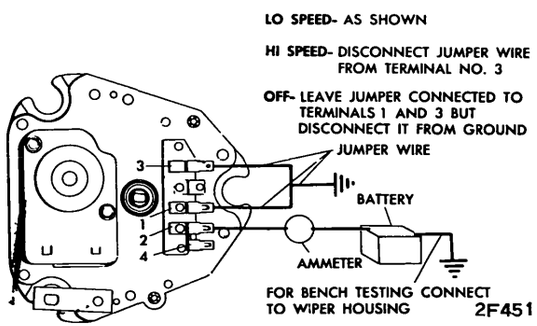
Positive displacement, bellows type pump mounted on shaft of wiper output gear. Starting and completion of a wash cycle is accomplished electrically and mechanically by a relay assembly and ratchet wheel arrangement. Washer is controlled by a dash switch washer button which mechanically turns on wipers when washer button is depressed.

TESTING & TROUBLE SHOOTING

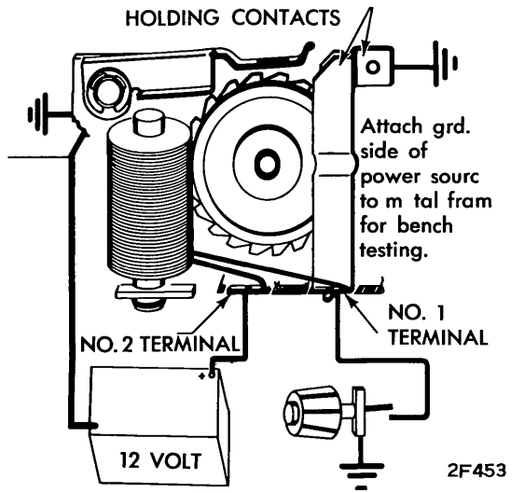
On Car

Washer Inoperative - **1)** Check the following: Sufficient water solution in jar; hoses undamaged and connections tight; screen in jar cover hose not plugged; electrical connections tight; nozzle not plugged.

2) If washer inoperative after items listed above are checked, start **wiper motor only,** then push washer button and listen for "click" of washer relay. If no



TWO SPEED WIPER TEST CONNECTIONS



WASHER PUMP TEST CONNECTIONS

"click" heard, check for voltage at washer No. 2 terminal. No voltage indicates faulty wiring. If "click" is heard, proceed to **4)** below.

3) If voltage correct in **2)** above, connect a jumper wire from washer No. 1 terminal to ground and turn on wiper. If washer relay "clicks" and pump operates correctly, dash switch is faulty, or there is an open circuit between pump and switch. If no "click" heard, relay coil is open.

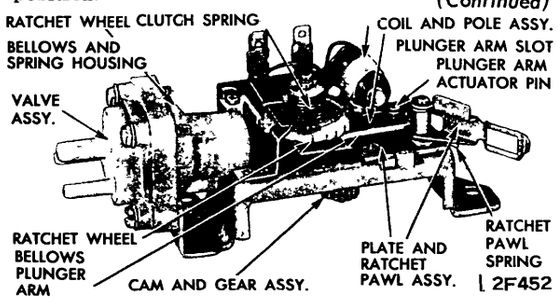
4) If relay "click" was heard in **2)** above, listen for soft clicking of pump ratchet wheel rotating. If soft click not heard, pump is faulty. If soft click is heard and pump does not operate, valve assembly is faulty.

Off Car

Washer Inoperative - **1)** Remove pump cover and connect a battery to washer No. 2 terminal and to ground. Connect a jumper wire from washer No. 1 terminal to ground. Turn ratchet pawl so holding contacts are closed. Pawl should be pulled toward relay pole and engage ratchet teeth. If not, relay coil is open.

2) If relay and ratchet pawl operate correctly in **1)** above, manually rotate three-lobe cam 1 lobe clockwise (looking at cam). Relay holding contacts should close and pump plunger arm should be released from lock-out position.

(Continued)



WASHER PUMP & DRIVE ASSEMBLY

G.M. 1 & 2-SPEED WINDSHIELD WIPER & WASHER (C nt.)

3) Disconnect jumper wire from No. 1 terminal. Relay coil should remain energized and hold ratchet pawl against ratchet wheel. If not, holding contacts are dirty.
4) If pump operated properly in 3) above, manually rotate three-lobe cam until ratchet wheel has turned 360° or 21 teeth. At this point holding contacts should be opened by "hump" on wheel and pump plunger arm should be in lock-out position.
Valv Ass mbly Ch cking - Attach a hose to intake (large) pipe. You should be able to blow through pipe, but not draw through it. Attach a hose to each exhaust (small) pipe. You should be able to draw through each pipe but not blow through them. If any valve allows air to pass in both directions, valve assembly is faulty.

OVERHAUL

Relay

Remove washer pump cover and unsolder coil leads from terminals. Remove coil retainer clip and remove coil assembly from mounting bracket. To install, reverse removal procedure.

Ratchet Pawl

Remove washer pump cover and disengage spring from ratchet pawl. Remove "E" ring and slide pawl from shaft. To install, reverse removal procedure, and make sure spring is properly assembled before replacing pump cover.

Valve Assembly

Remove valve assembly-to-bellows housing attaching screws and remove valve. *CAUTION - If necessary car fully pry bellows lip ut of valv body groov .* To install, reverse removal procedure and make sure bellows lip is in valve body groove.

Bellows

Remove valve body (see above), then manually operate pump to release pump from lock-out position. Hold bellows plunger arm from moving, push in on bottom of bellows with thumb and twist bellows 90°. Bellows and bellows spring should be released. To install, reverse removal procedure.

1963 Washer Pump Specifications

Number of Squirts - 12 (at full pressure).
Pressure - 11-15 lbs.
Coil Resistance - 20 ohms.

G.M. 2 & 3-SPEED WINDSHIELD WIPER & WASHER

Buick, Except Sp cial (1963)
Cadillac (1963)
Ch vr l t Pass. Cars (1963)
Corvett (1963)
Oldsm bil 88,S88,98 (1963)
Oldsm bil F-85 D lux 2-Door Hardtop (1963)
P ntiac (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 BUICK WIPER LINKAGE MALFUNCTION CORRECTIONS:* 1) If link broken at center bracket bellcrank, usual cause is linkage misalignment. Pin in reversing arm must be perpendicular to *DO NOT bend b llcrank to liminate interference*. To correct, install new right hand drive link and housing, retainer, and bellcrank and bracket assembly.
►*1963 BUICK RIVIERA INOPERATIVE WIPER CORRECTION:* May be caused by water corrosion of motor contacts. Water enters engine compartment at triangular opening between inner fender skirt and frame just ahead of No. 1 body mount bracket. To correct, install Deflector Package, No. 1396398, over this opening. Also, seal weld flange seam between inner and outer fender skirts near wiper motor with plastic body sealer.
►*1963 PONTIAC INOPERATIVE WIPERS NOTE:* If back-up lights are also inoperative and fuse is blown (both wipers and back-up lights are on same circuit), check for short circuit or broken wiring at back-up lights (between rear bumper and body).

WIPER

DESCRIPTION

Two or three-speed electric wiper consisting of a compound wound motor and a gear box section containing gear mechanism with relay control which operates wiper transmissions through link and crank arm arrangement. Wiper blade operation is either tandem or overlapping system. On three-speed (Cadillac) type, "Medium" speed is obtained by connecting 13 ohm resistor in dash switch in parallel with resistor in motor shunt field circuit.

ADJUSTMENT

Wiper Blades

On "Overlap" type systems, proceed as follows: Set motor in parked position. Adjust right and arm assembly on transmission shaft so blade is parallel to windshield and rubber of blade is on surface of windshield molding. Install left blade and arm assembly on transmission shaft so blade slants downward and so outboard end of blade rubber just touches top of windshield molding.

TROUBLE SHOOTING & DIAGNOSIS

Wiper Inoperative - Car wiring (feed circuit) faulty; Wiper ground strap loose or disconnected; Dash switch faulty or not grounded to instrument panel; Latching mechanism binding; Relay control faulty; Motor faulty.
Wiper Will Not Shut Off - Latching mechanism binding; Relay control switch faulty.
Wiper Operates Too Fast in "High But Has Normal Speed in "Low" - Loose connection between motor and terminal board; Terminal board resistor open; Motor shunt field open.
Wiper Has Low Speed Only - Dash switch faulty; Lead between dash switch and terminal board grounded; Motor internal leads grounded.
Wiper Has High Speed Only - Dash switch faulty; Lead between dash switch and terminal board is open.

TESTING

On Car

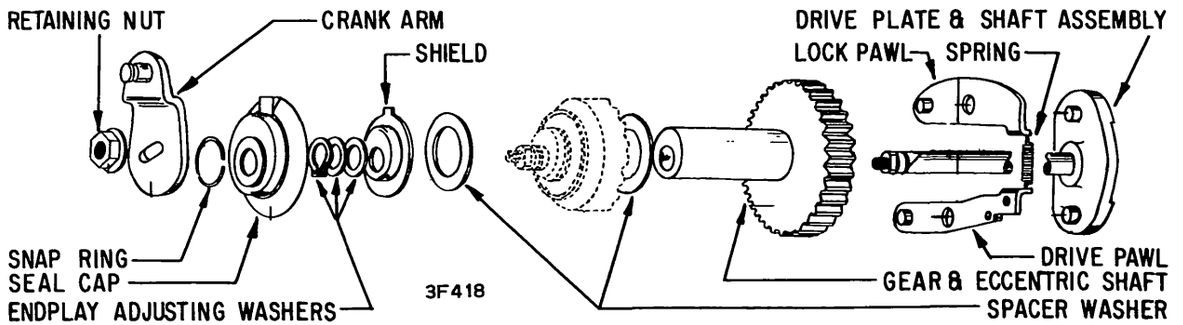
Wiring - Make sure all wiring is properly connected and that wiper ground strap is securely fastened. Turn ignition switch on and check for 12 volts at No. 2 (center) terminal of wiper. Also check for 12 volts at lead to washer pump.

Switch - 1) Make sure switch is mounted tightly for proper ground connection. Operate wiper independently of switch as follows: Connect 12 volts to No. 2 terminal and jumper wire from No. 1 terminal to ground. Wiper should operate in "High". To check "Low" operation, connect additional jumper wire from No. 3 terminal to ground. If operation not correct, switch is faulty.

2) Determine if washer pump or switch is faulty by bypassing washer switch as follows: With wiper operating independently of wiper switch, connect 12 volts to either washer terminal, and jumper wire from other terminal to ground. If operation not correct, washer switch is faulty.

Linkage - Disconnect drive links from crank arm and manually operate each transmission to check for binding or damaged linkage.

(Continu d)



WINDSHIELD WIPER GEAR BOX ASSEMBLY (EXPLODED)

G.M. 2 & 3-SPEED WINDSHIELD WIPER & WASHER (C nt.)

Off Car

Relay Control & Latch Mechanism - 1) Manually operate relay armature to check for binding or hanging-up condition. Connect battery positive post to No. 2 terminal and negative post to housing. Check for 12 volts at terminal to which green lead is attached. No voltage indicates open circuit breaker or broken leads. If voltage present, connect jumper wire from No. 1 terminal to housing. If relay armature does not pull in, relay coil is open or weak.
2) With battery and jumper wire connected as in 1) above, check for 12 volts at switch terminal yellow lead. If relay pulls in properly but no voltage reading obtained, relay switch is faulty. Disconnect jumper wire from No. 1 terminal. Relay armature should move away from coil pole. *NOTE - If gear mechanism in full park position, disconnect coil spring between drive and lock pawls to release pressure of drive pawl switch actuator against switch tab.* No voltage at switch terminal yellow lead indicates faulty relay switch. Now manually push switch stop tab toward relay coil. If voltage reading obtained, switch is faulty.
Motor - 1) With motor disassembled (field coil left in housing), check armature, case, brushes and springs, solder connections, and circuit breaker in the usual manner.
2) Check motor field as follows: Connect ohmmeter between relay switch yellow lead and field lead brush holder. No reading indicates open series field. Connect ohmmeter between yellow lead and motor black lead. No reading indicates open shunt field. Disconnect yellow lead from relay switch, be sure steel case and ground strap are not touching housing, and use a test light to check between yellow lead and field laminations. If lamp lights, field is grounded.

Motor Bench Test

To test motor operation on bench, make sure brass ground strap is connected to wiper housing, then proceed as follows: For "Low" speed, connect battery to No. 2 terminal, ground housing, and connect jumper wires from No. 1 & 3 terminals to ground. For "High" speed, disconnect No. 3 terminal jumper wire. To stop, disconnect both No. 1 & 3 jumper wires.

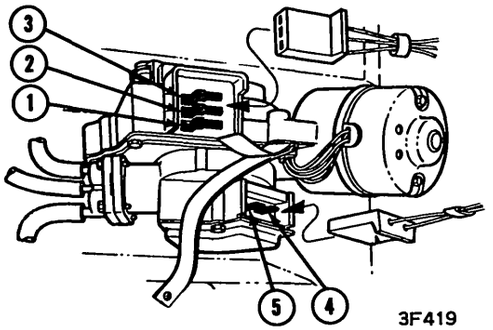
REMOVAL & INSTALLATION

Transmission

Remove arm and blade assemblies. Remove air intake grille and washer nozzles. Remove retaining clips holding crank arms to drive arms. Remove transmission attaching screws, and remove transmission. To install, reverse removal procedure.

Motor

NOTE - Motor may be mounted under air intake grille, on engine side of firewall at center, or at extreme left side of firewall where left fender meets the body. Remove air intake grille and left hood hinge if necessary. Remove hoses and wiring from motor, then disconnect motor crank from transmission arm (on some models connected on inside of car under dash, or under left kick pad). Remove motor attaching screws and remove motor and washer pump assembly. To install, reverse removal procedure.



WINDSHIELD WIPER WIRING TERMINALS

OVERHAUL

Motor

Disassembly - Remove through bolts and armature endplay adjusting screw. Strike case lightly to loosen from housing and motor field. Push against armature shaft through adjusting screw hole to back off case, use a suitable tool to hold brushes away from armature, then pull armature from case. Remove felt washer, thrust plate, and rubber thrust disc from case bearing. Remove thrust ball in armature shaft by dissolving retaining grease in solvent. Cut field leads extending through case, and at brush holder. Scribe mark housing and field, and carefully press field assembly from housing.

Reassembly - Splice field leads to housing and brush leads, align field assembly to housing, and press field into housing until field bottoms against machined ridge. Install thrust ball into armature shaft and retain with high melting point grease, then install rubber thrust disc, thrust plate, and felt washer. Hold armature in assembled position in case, then start armature worm shaft through field and housing assembly until shaft starts to mesh with worm gear. *NOTE - Rotate armature slightly if necessary.* Align case holes with housing holes, being careful not to pinch any wires, then push case on to field until case butts against housing. Install through bolts. Install armature endplay adjusting screw, tighten until finger tight, then back off 1/4-turn and tighten locknut.

Relay Control & Latch Mechanism

Disassembly - Disconnect gear box cover or washer pump from gear box. Disconnect coil spring, remove "E" ring, and lift latch and follower assembly from pivot pin and relay armature. Remove stop assembly retaining screw, move stop assembly to one side, and remove relay control assembly and unsolder leads.
Reassembly - Solder wiper leads to relay control switch, and relay coil lead to terminal board, then reverse disassembly procedure.

Drive Gear Mechanism

Disassembly - Remove crank arm retaining nut, crank arm, rubber seal, retaining ring, endplay washers, and shield and spacer washer. Remove gear box cover or washer pump, then disconnect coil spring, remove "E" ring, and lift latch and follower assembly from pivot pin and relay armature. Remove stop assembly retaining screw. Remove gear mechanism from gear box and slide spacer washer off eccentric shaft. Slide drive plate and shaft from gear assembly, remove lock and drive pawls, and remove coil spring.
Reassembly - Reverse disassembly procedure and adjust the number of endplay washers between seal cap and shield to obtain .006" (except Pontiac), .005" (Pontiac) gear assembly endplay.

1963 Wiper Specifications

Current Draw (No Load)	3-4.5 amps.
(Wet Windshield)	3.5-5 amps.
Blade Wipes Per Minute (Low Speed)	35-45
(High Speed)	70-85

WASHER

DESCRIPTION

Positive displacement, bellows type pump mounted on wiper gear box and controlled by a dash switch washer button.

OPERATION

When wiper operates normally, washer pump is held in idling position by a relay mechanism in washer assembly housing. When washer button on instrument panel is pushed, relay circuit is closed, actuating pump which starts to pump water. At same time, wiper dash control switch is automatically turned to "Low" position. *NOTE - If wiper was turned on before button pushed, wiper will continue to operate at speed originally selected.* Washer pump continues through one complete cycle (mechanically controlled), pumping a pre-determined amount of water on to windshield. At end of cycle, pump shuts off automatically. Wipers must then be turned off manually.

TESTING & TROUBLE SHOOTING

On Car

Washer Inoperative - 1) Check the following: Sufficient water solution in jar; hoses undamaged and connections tight; screen in jar cover hose not plugged; electrical connections tight; nozzle not plugged.

(Continued)

G.M. 2 & 3-SPEED WINDSHIELD WIPER & WASHER (Cont.)

2) If washer inoperative after items listed above are checked, start **wiper m tor only,** then push washer button and listen for "click" of washer relay. If no "click" heard, check for voltage at washer No. 2 terminal. No voltage indicates faulty wiring. If "click" is heard, proceed to **4)** below.

3) If voltage correct in **2)** above, connect a jumper wire from washer No. 1 terminal to ground and turn on wiper. If washer relay "clicks" and pump operates correctly, dash switch is faulty, or there is an open circuit between pump and switch. If no "click" heard, relay coil is open.

4) If relay "click" was heard in **2)** above, listen for soft clicking of pump ratchet wheel rotating. If soft click not heard, pump is faulty. If soft click is heard and pump does not operate, valve assembly is faulty. **Wash r Pumps C ntinu usly When Wiper Operate s** - Disconnect pump wiring. If pump stops, wiring or switch is faulty. If pump does not shut off, remove for "Off Car" checks (below).

Off Car

Wash r In p rativ - Connect 12-volt battery to one washer terminal and ground other terminal. Manually rotate rotor cam and check if relay armature pulls in. If relay does not pull in, relay coil is open or solder connections are poor. If relay pulled in, manually rotate rotor cam counterclockwise (looking at motor) through complete cycle (360° or 21 teeth). At this point holding contacts should be opened by "hump" on wheel and pump plunger arm should be in lock-out position. Check for binds or any other type of malfunction.

Valve Assembly Checking - Attach a hose to intake (large) pipe. You should be able to blow through pipe, but not draw through it. Attach a hose to each exhaust (small) pipe. You should be able to draw through each pipe but not blow through them. If any valve allows air to pass in both directions, valve assembly is faulty.

OVERHAUL

Relay Terminal Board

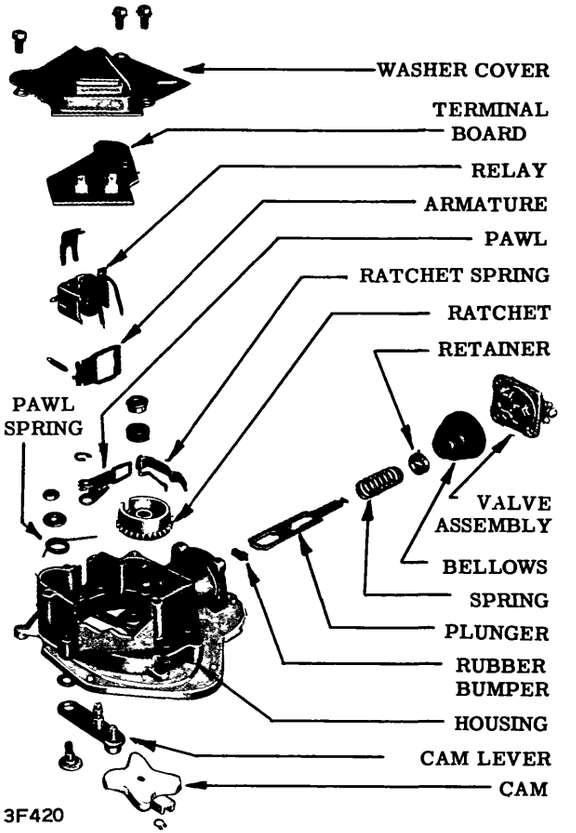
Remove terminal board cover, slide spring clip from relay mounting stud, then rotate nylon rotor cam to free ratchet pawl from relay armature. Lift out terminal board. *NOTE - Save terminal insulator for reassembly.* To install, reverse removal procedure and manually rotate pump cam through a complete cycle (ratchet rotated 21 teeth) to check pump operation.

Valve Assembly

Remove screws holding valve assembly to housing and pry bellows lip out of valve body. Remove valve. To install, reverse removal procedure.

Bellows

Remove valve assembly. If pump in idling position, push relay armature toward relay coil so wire stop spring engages armature, then turn rotor cam until pumping action takes place. Bellows will now extend part way out of housing. Put a small block of wood between cam lever arm and housing. Push bottom of bellows in and turn bellows 90°. Bellows should be released from pumping arm. To install, reverse removal procedure.



WINDSHIELD WASHER ASSEMBLY (EXPLODED)

RAMBLER ELECTRIC WINDSHIELD WIPER

Rambl r, Exc pt Am rican (1963)

DESCRIPTION

Electrically operated windshield wiper controlled by a variable rheostat type switch on instrument panel, thus providing many wiper blade speeds. Drive is through a link and crank arm arrangement.

REMOVAL & INSTALLATION

Wip r Arm - Lift arm against spring tension and slide cap away from serrated pivot shaft with screwdriver. To install, reverse removal procedure and note that motor should be in park position and that right blade should rest above left blade.

Wip r M t r - Remove wiper arms and blades, and pivot shaft hexagon nuts, washers, and spacers. Remove cowl vent air intake cover-to-cowl top screws. Slide right side of cover forward to disengage spring clip, then lift cover off pivot shafts and remove. Slide link retainer clip off motor arm stud (accessible through cowl top opening). Disconnect control cable and wiring from motor. Remove motor attaching screws and remove motor.

Pivot Shaft & Link - Remove wiper arms and blades, and pivot shaft hexagon nuts, washers, and spacers. Remove cowl vent air intake cover-to-cowl top screws. Slide right side of cover forward to disengage spring clip, then lift cover off pivot shafts and remove. Slide link retainer clip off motor arm stud (accessible through cowl top opening). Remove pivot shaft attaching screws and remove pivot shaft and link assemblies as a unit.

ADJUSTMENT

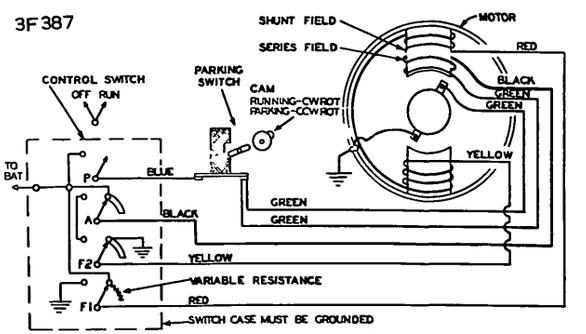
Parking Angle & Position - Crank should park pointing inward 7½°±½° after passing a line parallel to motor centerline. Adjust by turning switch plate, then make final adjustment after installation by moving wiper arm at pivot as necessary, using a wet windshield.

SPECIFICATIONS

Fi ld C il Draw - 1.8-2.0 amps. at 12 volts & 70°F (shunt winding).

No Load Draw - 3.0 amps. max. at 14 volts & 70°F (full field).

Armature Endplay - .005" max. To adjust, turn screw at drive end of armature shaft. Replace screw if nylon lock is worn so screw will not h old setting.



RAMBLER ELECTRIC WINDSHIELD WIPERS WIRING DIAGRAM

CHRYSLER CORP. ELECTRIC WINDSHIELD WIPER

Chrysler & Imperial (1963)
Dodge & 880 (1963)
Plymouth (1963)
Valiant (1963)

DESCRIPTION

Single and variable speed types used. Circuit breaker is built into wiper switch on single speed type, and attached to "B" terminal of switch on variable speed type. Variable speed type has "Off Glass" parking feature accomplished by reversing of motor and use of parking cams at pivot pins of intermediate crank arm. Variable speed type also has bar resistance plate in wiper switch (rheostat type control) to provide many wiper speeds.

TROUBLE SHOOTING & DIAGNOSIS

Wiper Operates Slowly - Linkage binding. High resistance in motor or ground connection. Control switch faulty.
Wiper Inoperative - Linkage binding. Motor faulty. Control switch faulty. Wiring open or grounded.
Motor Will Not Park - Parking spring in parking switch plate bent too low and not breaking contact. Motor switch contact points dirty or worn.
Blades Will Not Park Properly - Link spring broken or not releasing. Link spring trip not engaging stop on linkage.
Blades Slap Windshield Mouldings - Wiper arm improperly adjusted. Motor lever or other drive parts loose.
Blades Chatter - Arm twisted (holds blade at wrong angle to glass). Wrong type blade used. Wax on glass.

TESTING

Wiper Switch (1-Speed)

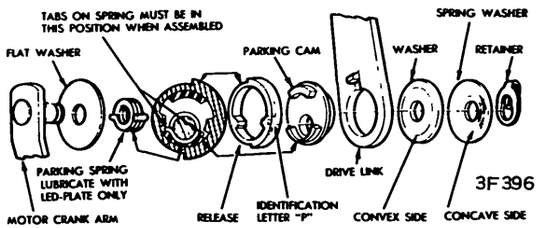
Remove switch from instrument panel. Connect a test light between switch "B" terminal and battery negative post. Connect battery positive post to switch "P" terminal. Light should be lighted with switch in either "on" or "off" positions. If light does not light, circuit breaker is faulty. Now connect battery positive post to switch "R" terminal. Light should go on when switch turned "on" and go out when switch turned "off".

Wiper Switch (Variable Speed)

Remove switch from instrument panel. Connect battery positive post to switch case and to "F1" switch terminal. Connect a test lamp between battery negative post and switch "B" terminal. Lamp should light when switch turned "on" and gradually dim when switch rotated clockwise. Lamp should go out when switch turned "off".

Single - Speed Motor Bench Test

Connect battery negative terminal to motor ground strap, then connect black and blue wires to battery positive terminal. Motor should run. Remove black wire from battery (leave blue wire connected). Motor should park,



DART & VALIANT PARKING MECHANISM (OTHERS SIMILAR)

Variable Speed Motor Bench Test

1) Connect yellow wire to motor ground strap, then connect battery negative terminal to motor ground strap. Connect red and black wires to battery positive post. Motor should operate in wipe direction.
2) Connect yellow and blue wires to battery positive post, and connect red wire to ground strap. Connect battery negative post and ground strap. Momentarily touch black wire to yellow and blue wires. Motor should park.

ADJUSTMENT

Wiper Blade Park Position

Wiper blades should park in a ½ cycle of wiper motor operation. If blades do not park in ½ cycle, make one or more of the following corrections:
1) Motor Park Switch Adjustment - Adjust timing of motor park switch to provide motor shut-off at lowest point of wiper blade travel under both wet and dry glass conditions.
2) Wiper Pivot Adjustment - Loosen blade arms at pivots and place blades 1" above windshield moulding (single speed), against windshield moulding (variable speed), and tighten pivot attaching nuts.
3) Park Mechanism Assembly - Parking spring release and parking cam may be improperly assembled. It is possible to assemble these parts improperly and system will operate normally except for parking operation. Make sure parts are assembled correctly (see illustration).

Armature Endplay

Turn endplay adjusting screw in until it bottoms and back out ¼-turn.

REMOVAL & INSTALLATION

Wiper Motor

Chrysler & Dodge 880 - Remove glove box door and glove box. Disconnect motor bracket from cowl panel and from instrument panel brace. Disconnect wiring from motor. Disconnect links at pivot cranks (remove clips by lifting top tab and sliding sideways out of engagement with groove in pivot crank pin). Remove spacer washer and link from pivot crank. Slide motor and link assembly to left so right hand link clears glove box opening, then remove assembly. *Do not bend links.* To install, reverse removal procedure and adjust blades.
Imperial - Disconnect battery. Disconnect upper and lower mouldings at center of instrument panel and slip mouldings out from behind passenger assist handle. Loosen heater bezel-to-instrument cluster attaching screws (do not remove bezel). Remove speaker grille, and radio speaker and mounting plate. Remove glove box. Disconnect wiper links at pivots. Remove panel support bracket from wiper motor mounting bracket. Disconnect motor wiring, then disconnect motor bracket from cowl panel. Remove motor (with both links attached) out through glove box opening. To install, reverse removal procedure.
Dodge (Except 880 & Dart) & Plymouth - Remove radio speaker and grille (on padded dash models, remove padding to remove grille). Disconnect wiper motor bracket from cowl panel and instrument panel brace, then disconnect wiring. Disconnect links at pivot cranks (remove clips by lifting top tabs and sliding sideways out of engagement with groove in pivot crank pin). Tip motor and bracket on its side and remove left link. Remove right defroster tube, and pencil brace between instrument panel reinforcement and motor mounting. Remove motor and bracket through speaker opening. To install, reverse removal procedure.
Dart & Valiant - Disconnect wiper link at motor (note position of follower cam on variable speed type), then disconnect motor wires. Remove motor bracket-to-cowl panel attaching nuts and pull motor and bracket assembly down and out from beneath instrument panel. To install, reverse removal procedure.

OVERHAUL

Disassembly (1-Speed)

Disassemble wiper links from motor crank arm being careful to note exact position and sequence of all parts for correct reassembly. Remove switch plate, then remove motor crank nut, washers, and motor crank arm, being careful to note exact position and sequence of washers for reassembly. Remove nylon gear after noting it position. Remove endplate through bolts and remove endplate. Remove armature.

Disassembly (Variable Speed)

Remove switch plate and cover plate. Remove crank arm nut. washers, crank arm, and gear, and note exact position and location of parts for reassembly. Remove endplate through bolts and pull out endplate being careful not to break brush holder lead wire. Remove armature.

Inspection & Repair (All)

Clean, inspect, and test motor parts in the usual manner for electric motors. Commutator may be refaced and mica undercut in the usual manner if necessary.

Reassembly (All)

Reverse disassembly procedure and note the following: Be sure gear teeth are covered with long fibre grease. On single speed type, after armature, nylon gear and crank arm are installed, index contact plate on nylon gear with slot pointing in same direction as motor crank arm. On variable speed type, install contact follower with open cam pointing in same direction as motor crank arm. Reassemble wiper links in same order as they were originally assembled (see illustration).

FORD MOTOR CO. ELECTRIC WINDSHIELD WIPER

Ford Falcon, Fairlane, Galaxie (1963)
Mercury Comet, Meteor, Monterey (1963)
Ford & Econoline Trucks (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 COMET WIPER LINKAGE NOISE CORRECTION:* Make sure there is a spring washer, No. 374669-S2, installed between motor drive arm and swivel bearing end of right wiper mounting arm; between right wiper mounting arm and swivel bearing end of left wiper mounting arm.

►*1963 FALCON & COMET WIPER WILL NOT SHUT OFF OR PARK PROPERLY CORRECTION:* May be caused by control switch shaft binding on switch retaining nut. To correct, remove switch retaining nut and enlarge guide hole to ¼"; also remove burr at "D" hole in switch mounting bracket.

►*1963 COMET & FALCON 1-SPEED WIPER INTERMITTENT OPERATION CORRECTION:* On units **without** windshield washer, may be caused by improperly connected wiring. Inspect single wire connectors at firewall and make sure both white wires are connected together.

►*1963 2-SPEED WIPER JAMMED IN "PARK" CORRECTION & WIRING PRODUCTION CHANGE:* May be due to open in low speed (red wire) circuit; or faulty low speed position in control switch. To correct, install new nylon input gear, No. C2AZ-17A479-B, as it will have been damaged, then check wiring continuity and correct or replace control switch as necessary. Then cut green wire at motor connector and splice into red wire at same connector. *NOTE - This splice made in production on later cars and will make wipers inoperative if low speed (red wire) circuit is open, but will prevent jamming in "Park".*

►*1963 GALAXIE & MONTEREY WIPER FAILURE CORRECTION (1 OR 2-SPEED):* May be caused by water entering gear box or motor due to excessive wear on lip of wiper mounting bracket seal gasket. To correct, replace motor and install new gasket as follows: Insert gasket tangs into mounting bracket opening and snap into place. Apply Lubriplate generously to seal gasket cavity (side of seal facing motor housing) and install motor.

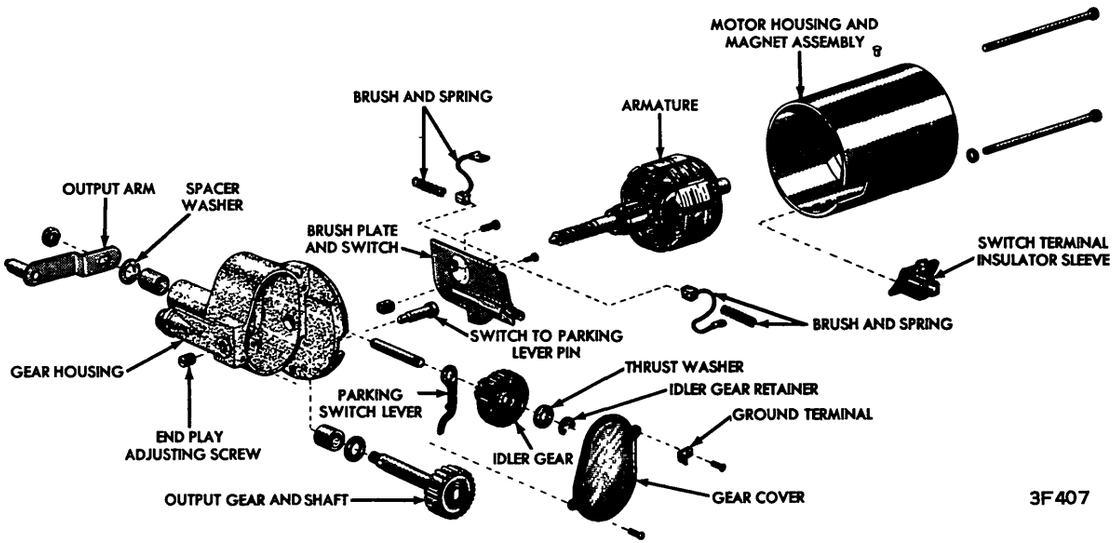
►*1963 1-SPEED WIPER MOTOR THUMPING NOISE CORRECTION:* Caused by excessive motor armature shaft endplay. To correct, install new type spring-loaded armature shaft setscrew, No. C3AZ-17A549-A, as detailed under "Single Speed Motor Reassembly" below.

DESCRIPTION

Single or two-speed electric type motors used to drive wiper arm and blade assemblies through link and crank arm arrangement. Design is similar to that used on previous models.

TROUBLE SHOOTING & DIAGNOSIS

Disconnect linkage at motor and make sure there is no bind or misalignment of linkage. Check all wiring for continuity in the usual manner and repair or replace parts as necessary.



SINGLE-SPEED WIPER MOTOR & GEAR ASSEMBLY (EXPLODED)

ADJUSTMENT

Wiper Blade Park Position

Install wiper arms on pivot shafts so blades lie flat against lower edge of windshield. On 1-speed type, park position adjustment is made during assembly after overhaul.

REMOVAL & INSTALLATION

Wiper Motor

On Galaxie & Monterey with Air Conditioning, remove glove box, radio and speaker, and speaker grille. Disconnect wiper drive links from wiper drive shaft, and disconnect wiring from motor. Remove motor attaching bolts and remove motor. To install, reverse removal procedure.

OVERHAUL

1-Speed Type

Disassembly - Remove ground terminal and gear cover, then remove idler gear retainer, thrust washer, and idler gear. Remove motor through bolts, motor housing, switch terminal insulator sleeve, and armature. *NOTE - Do not pound on motor housing magnet assembly or ceramic magnets will be damaged.* Remove armature endplay adjusting setscrew. Mark output arm in respect to output shaft for reassembly, then remove output arm retaining nut, flat washer, output gear and shaft assembly, thrust washer, and parking switch lever. Remove brushes and brush springs. Remove brush plate and switch assembly, then remove switch contact-to-parking lever pin from housing.

Cleaning & Inspection - Clean and dry all parts. Check armature electrically in the usual manner. Check thrust ball for pitting or discoloration due to high heat. Output gear must not be loose on output shaft, and cam surface should not be worn. If motor housing magnet assembly has cracked magnet, or if thrust button is hollowed out greater than 1/32" diameter, replace housing assembly. If brushes 5/16" long or less, replace them. Check brush plate assembly for cracks. Brush holders must be securely fastened to plate. Check contact points for burning or pitting. Replace all defective parts.

Reassembly - **1)** Install parking switch lever on idler gear shaft with cam rider pointing toward gear housing output shaft hole (lever must bottom against casting). Use a light film of Sun Prestige grease on output gear teeth and shaft bearing surface, install thrust washer on shaft, and insert shaft in bearing (parking switch lever must be clear of cam and gear assembly).

2) Install spacer washer on shaft, place output arm on shaft, aligning marks made at disassembly, then install mounting nut. Install brushes and springs in brush holder, hold brushes retracted, then push insulated brush connector on switch terminall Install switch contact-to-parking lever pin in gear housing, install brush plate assembly, and tighten mounting screws.

3) Adjust switch contact points by turning adjusting screw clockwise until inner points just open, then back off adjusting screw (counterclockwise) 1½-turns (parking lever must be riding on lower part of output gear cam). Insert .030" feeler gauge between center and outer contact points and bend outer arm as necessary for .030" gap.

4) Put grease on ball bearing in end of armature shaft, and install armature into housing and remove brush retracting wires. Install terminal insulating sleeve, motor housing and magnet assembly, and through bolts to gear box assembly. Put sealer at area where terminal insulator sleeve seats against motor and gear housings. Put grease on worm gear and idler gear, and install idler gear, thrust washer, and retainer.

5) On models without spring-loaded armature endplay adjusting screw, install screw and adjust armature endplay to .003". On models with spring-loaded adjust-

(Continued)

FORD MOTOR CO. ELECTRIC WINDSHIELD WIPER (C nt.)

ing screw, install screw as follows: Use Sun Prestige grease generously on end of setscrew, install locknut on setscrew and install setscrew into housing. Insert a .030" feeler gauge between setscrew and armature shaft end and tighten setscrew until spring-loaded pin just seats against feeler gauge, then continue to turn setscrew until pin is fully depressed in setscrew and setscrew just touches feeler gauge. *CAUTION - Do not force setscrew or pin may be damaged.* Tighten locknut to 15 inch-lbs. and remove feeler gauge. To check, hold worm gear and move armature shaft back and forth. Spring-loaded pin in setscrew should maintain pressure against shaft regardless of movement.

6) Generously grease end of armature shaft, install gear housing cover and ground terminal.

2-Speed Type

TESTING NOTE - To test unit operation on the bench, refer to illustration for test connections.

Disassembly - Remove gear housing cover plate and gasket. Remove output shaft retainer and spacer washer, then remove crankpin bearing retainer and remove spacer washer and cam return spring assembly. Remove arm and link assembly, and crankpin bearing cam. Remove input gear retainer and outer spacer shim, and remove input gear and inner spacer shim. Remove wiper arm lever nut and lockwasher. Remove wiper arm lever and spacer, and output shaft and gear assembly from housing. Tap output shaft out of gear with soft hammer if necessary. *NOTE - Do not disassemble motor.*

Reassembly - **1)** Make sure motor cover is fastened securely, then turn armature endplay adjusting screw so there is .000-.005" shaft endplay (measure with feeler gauge between adjusting screw and armature shaft). Install input gear shim on gear shaft and install in gear housing. Endplay should be .005-.010". To adjust, add or remove shims under input gear retainer, then install retainer. Install output gear on output shaft, making sure gear is bottomed on shaft.

2) Install output shaft and gear into housing with gear teeth facing motor. Install 1 spacer washer on outside end of output shaft, then install wiper arm lever with linkage studs facing away from and above shaft. Install lever lockwasher and nut. Install bearing cam on crankpin (small diameter part of cam facing out). Install arm and link assembly on bearing cam. When arm is placed on shaft, gears must be meshed and the link (riveted to arm) must be installed to output shaft at same time. Gear is properly indexed when bottom tooth of arm and gear segment mesh with bottom valley of output shaft gear.

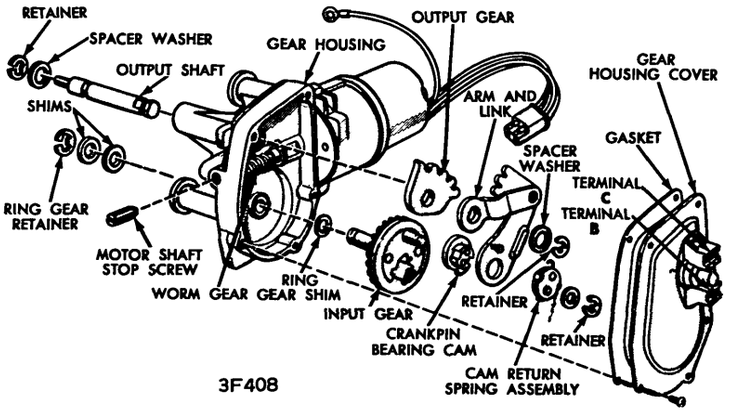
3) Install output shaft spacer washer and retainer. Output shaft endplay should be .005-.010". To adjust, add or remove spacer washers under shaft retainer. Install cam return spring assembly. Install bearing spacer and retainer. *NOTE - If retainer cannot be installed, one or more coils of spring clutch are out of place.* If bearing has too much endplay on crankpin, projection of bearing may ride out of semi-circular slot in endplate. Add spacer washers under retainer if necessary.

4) Apply a generous amount of Sun Prestige No. 41 grease to all moving parts, and install gear housing cover plate. Test motor operation on bench (see illustration for connections). *CAUTION - When testing motor on bench, do not get fingers between wiper lever and case, or inside the gear housing.*

TESTING CONNECTIONS
PARK
B TERMINAL TO VOLTAGE SOURCE
C TERMINAL TO *Blue* AND *Red*
Yellow TO *White Black* TO GROUND

TO OPERATE AT HIGH SPEED
Yellow TO VOLTAGE SOURCE
Blue TO *White Black* TO GROUND
B AND **C** TERMINALS
AND *Red* NO CONNECTION

TO OPERATE AT LOW SPEED
Red AND *Yellow* TO VOLTAGE SOURCE
Blue TO *White Black* TO GROUND
B AND **C** TERMINALS NO CONNECTION



TWO-SPEED WIPER GEAR BOX ASSEMBLY (EXPLODED)

LINCOLN & THUNDERBIRD HYDRAULIC WINDSHIELD WIPER

Ford Thunderbird (1963)
Lincoln Continental (1963)

DESCRIPTION

Wipers - Windshield wiper motor hydraulically operated by power steering return line fluid. A pressure regulator valve integral with wiper motor controls wiper speed. Wiper arms are link driven in tandem from an auxiliary drive assembly above wiper motor through a pivot assembly for each wiper arm and blade assembly.

Washer - An electric pump with a reservoir is mounted on fender apron and controlled by washer switch mounted on windshield wiper control on instrument panel.

OPERATION

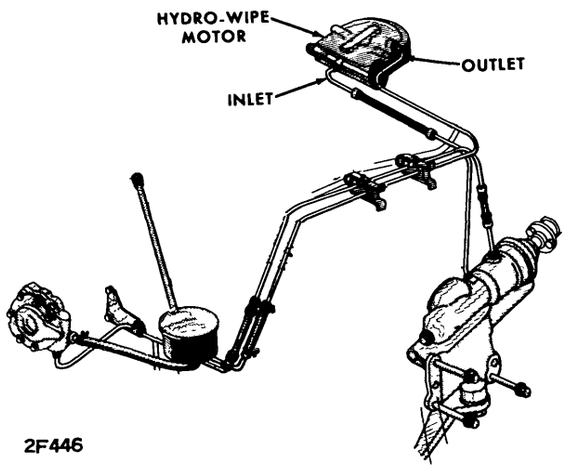
Wipers - When not in operation some hydraulic fluid is directed to wiper motor to be available to operate hydrostatic coupler in regulator valve when wipers turned on. Rest of fluid bypasses wiper motor and returns to power steering pump reservoir. When wipers turned on, control cable from instrument panel control opens throttle valve in wiper motor allowing control fluid to operate hydrostatic coupler in pressure regulator valve. Coupler decreases bypass port opening in regulator valve and allows greater fluid pressure to flow to wiper motor. Wiper motor then drives wiper arms. The construction of the regulator valve allows throttle valve to control wiper motor speed.

Washer - When washer button is pressed, electric pump is energized and pumps fluid from reservoir through the pump to the washer nozzles and against windshield. At the same time washer button is pressed, engine vacuum through washer switch actuates wiper motor throttle valve to start wiper operation. Pump will continue to pump fluid against windshield until washer button released. After washer button released, windshield wipers will continue to operate at medium speed for eight cycles until vacuum is bled from wiper vacuum control line at washer control valve. An adjusting screw at washer control valve regulates number of cycles wiper will operate after washer button released.

TROUBLE SHOOTING

If power steering pump is operating properly but wipers do not, check control cable for proper operation and wiper arms for binding. Check for dirt in control valve (remove and clean as necessary). If these items operate correctly, but wiper still does not, replace pressure regulator and motor assembly.

(Continued)



LINCOLN CONTINENTAL & THUNDERBIRD HYDRAULIC CONTROL WINDSHIELD WIPER

LINCOLN & THUNDERBIRD HYDRAULIC WINDSHIELD WIPER (C nt.)

REMOVAL & INSTALLATION

Thunderbird

Wiper M t r - Remove radio speaker and grille. Disconnect antenna at radio. Remove wiper arm and blade assemblies, pivot shaft nuts, and bezels. Remove cowl top panel with antenna. Disconnect both pivot shaft links at wiper motor, and remove carburetor air cleaner. Disconnect inlet line at wiper motor, then remove fitting from motor. Remove inlet line seal plate and seal from dash panel. Disconnect motor from mounting bracket, disconnect outlet line and control cable from motor, then remove motor. To install, reverse removal procedure.

Lincoln Continental

Pivot Shaft & Housing - Remove wiper arms and blades and cowl top ventilation grille and screen. On right side, disconnect drive arm from pivot shaft. On left side, disconnect drive arm from pivot shaft and from auxiliary drive. Remove pivot shaft retaining screws and nuts and remove pivot shaft and housing. To install, reverse removal procedure.

Wiper Motor - Remove washer coordinator hose, and oil return, feed, and control lines from motor. Disconnect control cable at motor. Disconnect motor from auxiliary drive and remove motor. To install, reverse removal procedure *and bleed power steering lines.*

Auxiliary Drive - Remove wiper arms and blades, ventilation grille and screen, and both washer nozzles. Disconnect pivot shaft drive arm from auxiliary drive. Remove attaching screws and remove auxiliary drive assembly. To install, reverse removal procedure.

ADJUSTMENT

Control Cable

Adjust control cable so control knob on instrument panel moves valve control lever on motor from off to full on.

STUDEBAKER ELECTRIC WINDSHIELD WIPER

Stud bak r, All M dels (1963)

►CHANGES, CAUTIONS, CORRECTIONS

►*1963 AVANTI WIPER FAILURE TO RETURN TO PARK POSITION CORRECTION:* May be caused by wiper switch not properly grounded. To correct, remove switch knob and escutcheon and make sure that raised nibs in instrument panel face are not covered by applique material.

►*1963 AVANTI ABNORMAL WIPER DRIVE ROUGHNESS, BLADE OVERTRAVEL, LOCKING, OR FIBREGLASS PANEL FAILURE AT RIGHT DRIVER MOUNT CORRECTION: May be due to improper location of wiper motor in relation to right driver. This dimension is extremely important. See "Driver & Control Arm Installation" and "Wiper Motor Installation" below.*

DESCRIPTION

Two-speed electric type windshield wiper with drive to wiper blades through link and crank arm arrangement.

ADJUSTMENT

Wiper Blade Park P sition

If wiper blades do not park correctly at end of stroke, adjust contact plate on motor drive assembly (or lever on plate) to left or right as necessary.

Wiper Arm Tension

Hook a spring scale under wiper arm at point where connected to blade. Pull away from windshield at right angle until blade is just off glass. Jiggle wiper arm with free hand until arm reaches free rest position. Scale reading should be 7½-8½ ozs. If below 7½ ozs., oil tension spring and arm pivot rivet. If tension does not increase, replace arm. If reading above 8½ ozs., bend outer section of arm slightly. If correct pressure cannot be obtained by bending, replace arm.

TESTING

Wiper blade speed should be 80-90 sweeps per minute (low speed), 132-135 sweeps per minute (high speed) on wet windshield (or with paper boot on blade). If wiper speed slow, check for fully charged battery and good electrical connection. Wiper arm tension may be too high (see "Adjustment" above). Links and drivers may be binding. If speed not within limits with main link disconnected from motor, motor is faulty.

TROUBLE SHOOTING

Wipers Inoperative - Loose connections, incorrect wiring at control switch, faulty control switch. Linkage misaligned or binding. Wiring between motor switch plate and control switch open or grounded.

Wiper Operates Sluggishly - High resistance in motor. Linkage misaligned or binding. Wiring connections faulty.

Wiper Does Not Park Properly - Motor switch plate improperly adjusted. Control switch wiring incorrectly installed. Motor switch plate contacts pitted or corroded.

Blades Slap Moulding & Park High on Glass - Spring trip assembled incorrectly.

REMOVAL & INSTALLATION

Wiper Motor

Lark, Cruiser, Hawk - Removal - Remove air intake grille from cowl air intake chamber. Disconnect motor wiring at connector, then remove motor retaining bolts and support bracket. Disconnect motor lever pivot from drive arm and remove motor.

Installation - Reverse removal procedure.

Avanti - Removal - Disconnect wiring from motor at connector. Disconnect crank arm from motor shaft, remove motor retaining bolts and remove motor.

Installation - *CAUTION - Location of motor in relation to right driver must be measured and adjusted accurately for proper wiper operation.* Reverse removal procedure and tighten motor attaching bolts loosely. Using a tram gauge, measure the true straight-line distance from center of right wiper drive shaft (arm and blade assembly removed) to the depression in center of motor gear box. This distance must be 18 1/32" to 18 5/32". *CAUTION - This distance must be accurate and measured correctly.* Move motor as necessary and tighten attaching bolts securely. *NOTE - It may be necessary to elongate mounting screw holes in dash panel and also dash panel center hole.*

Driver & Connecting Arm

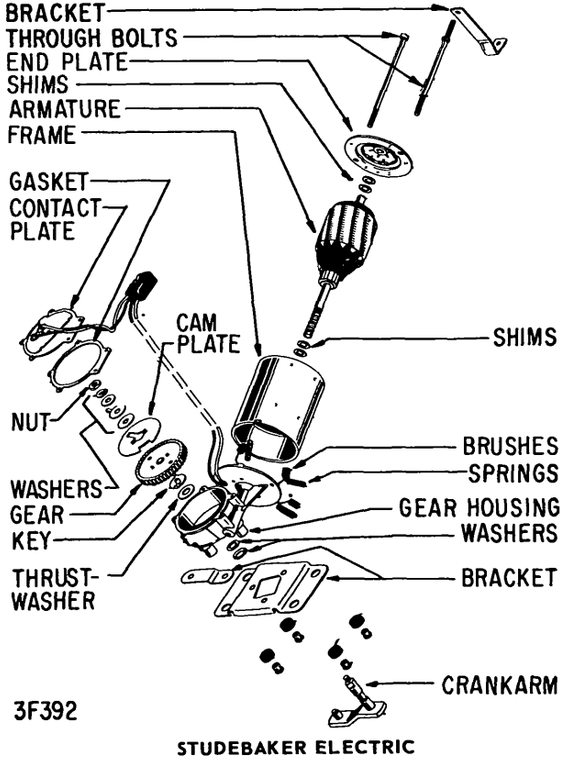
Lark, Cruiser, Hawk - Remove arm and blade assemblies and air intake grille panel. Disconnect left driver link from right driver arm. Disconnect right driver link from motor shaft crank arm. Remove driver shaft retaining nut, metal washer, and seal washer. Remove driver. To install, reverse removal procedure.

Avanti - Removal - With wiper in park position, remove arm and blade assemblies. Remove driver shaft retaining nuts, washers, and sealer gaskets. Disconnect crank arm from motor drive shaft, then remove drivers and connecting arms.

Installation - Reverse removal procedure, making absolutely certain that the distance between centers of each driver shaft is 20 47/64".

Motor Crank Arm

When assembling motor crank arm and drive arm together, "L" on trip lever must face upward.



STUDEBAKER ELECTRIC WINDSHIELD WIPER MOTOR & DRIVE ASSEMBLY

AMERICAN MOTORS

Rambler

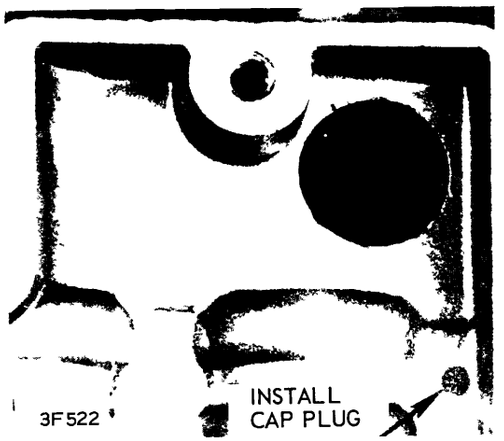
►*1962-63 RAMBLER SIX & V8 AUTOMATIC TRANSMISSION REAR BAND ADJUSTMENT SPECIFICATION CHANGE:* Loosen locknut on right hand side of transmission case and install Adapter J-21111 on adjusting screw, then tighten adjusting screw to 10 ft lbs (all models) *NOTE - This supersedes previous specification of 7 ft lbs (6 Cyl), 9 ft lbs (V8)* Back off screw ¾ turn (6 Cyl), 1½ turns (V8) and tighten locknut to 30 ft lbs

►*1950-55 10 SERIES & 1958-63 AMERICAN FRONT SPRING SPACER (TO CORRECT LEANING):* An aluminum front spring spacer, Part No 3204474, is available for installation on front spring seat to assist in leveling the car Install spacer on spring seat with cushion and spring resting on spacer One ¼" spacer will raise affected corner approximately 3/8" and two spacers will raise corner about ¾" *NOTE - If two spacers are required on a spring, place one spacer on upper spring seat and the other on lower spring seat*

►*1962 AMERICAN "E-STICK" CLUTCH CHATTER CORRECTION:* The clutch chatter condition which is apparent upon initial engagement can be corrected by installing a new clutch driven plate Part No 3167005 When this new plate is used to replace the original equipment plate, Part No 3163651, the servo check valve (see illustration on Page 334 of 1962 Final Data) must be removed from front part of servo

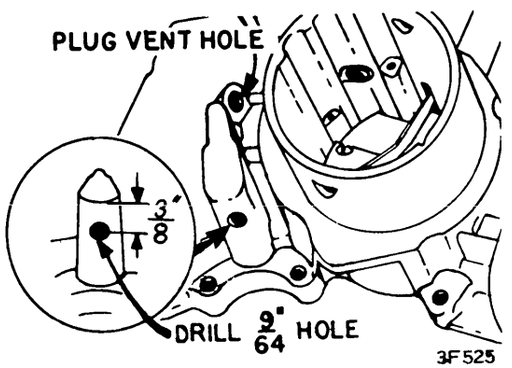
►*1962 RAMBLER AMERICAN & SERIES 10 CAST IRON ENGINE OIL PAN LEAKAGE CORRECTION* On early engines not having the revised oil pan (identified by a daub of red paint located below the seal area at rear of oil pan), the ends of the oil pan (cork) gasket may not contact rear main bearing cap side seals, resulting in oil seepage past the gasket and side seals It is recommended that a bead of Permatex No 1 be applied the width of main bearing cap at corner areas of pan gasket surface of cylinder block and rear main bearing cap *NOTE - Do not cement rear seal to oil pan as seal will not properly compress during installation of pan*

►*1962-63 AMERICAN & SERIES 10 AUTOMATIC TRANSMISSION LOSS OF DRIVE WHILE IN GEAR CORRECTION:* This condition which may occur after the front pump suction pipe and 'O' ring have been replaced can be corrected by installing a special cup plug Part No 3204940 in the valve body "converter out" check ball passage lower relief hole Remove oil pan and front oil screen, then start the cap plug in ball check passage lower relief hole (see illustration), using a 3/32" pin punch Tap plug flush using a 3/16" punch Stake plug in position with a center punch *NOTE - If hole is partially covered due to casting variations, it will be necessary to remove and disassemble the valve body to the extent of removing the separator plate Remove converter check ball and spring and install the plug from ball and spring side (not necessary to stake in place)*



CHECK BALL PASSAGE RELIEF HOLE REWORK (1962-63 RAMBLER AMERICAN & SERIES 10)

►*1963 RAMBLER AMERICAN & SERIES 10 (WITH HOLLEY 1909 CARBS) ENGINE ROUGH IDLE, DYING, & SURGE AT LOW SPEED CORRECTION.* These conditions may be caused by dirt entering carburetor through the bowl vent To correct, install Kit, Part No 3205160 as follows With carburetor on engine remove bowl cover and clean foreign material from fuel bowl Clean idle feed restriction by inserting a 028" drill, then blow out passage with air Drill a 9/64" hole in accelerator pump tower (see illustration) and remove all drill chips Insert a plug into original bowl vent passage from inside, then install new fuel inlet fitting and screen assembly Check dry float setting then assemble carburetor and install air cleaner



HOLLEY MODEL 1909 CARBURETOR REWORK

CHRYSLER CORP.

Chrysler & Imperial
Dodge, Dart & Lancer
Plymouth & Valiant

►*1960-62 6 CYL ENGINE DISTRIBUTOR REMOVAL (IF SEIZED IN BLOCK).* If distributor cannot be easily removed by normal methods, apply a good manifold heat control valve solvent to penetrate corrosion If this procedure does not loosen distributor, chill distributor body with carbon dioxide from a fire extinguisher When installing distributor, install "O" ring, Part No 2095740 at top of distributor body pilot if not already present Coat body pilot with lubricant

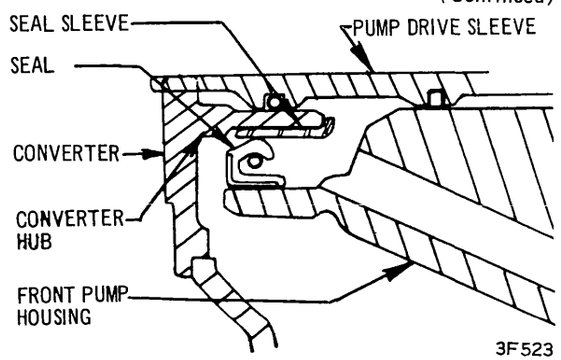
►*1960-63 6 CYL ENGINE OIL PRESSURE RELIEF VALVE NOTE (CARS USED FOR HEAVY SERVICE - POLICE, FLEET & TAXICAB).* It is recommended that the oil pump relief plunger be removed and cleaned once a year just prior to cold weather Remove oil pressure relief valve plug and lift out spring and plunger, then use a suitable carburetor cleaner to remove all residue and varnish Remove scratches, nicks, burrs, and polish plunger with crocus cloth Start engine after installation and check for leakage

►*1962 DART & VALIANT REAR AXLE ADJUSTMENT PROCEDURE CHANGE* *See "Dart & Valiant Hypoid" on Page 351*

►*1962 (EXCEPT DART & VALIANT) AXLE SHAFT BEARING SEAL REPLACEMENT NOTE* *See "Chrysler Corp (Except Dart & Valiant Hypoid) on Page 349*

►*1954-60 POWERFLITE & 1957-61 TORQUEFLITE CONVERTER HUB DAMAGE NOTE* A new Sleeve & Seal Package, Part No 2421277 is available for field installation to avoid replacement of torque converter, if torque converter hub only has become damaged To install the new parts, proceed as follows Clean torque converter hub then coat outer diameter of hub with MoPar "Perfect Seal" Part No 1057794 Start seal

(Continued)



POWERFLITE & TORQUEFLITE TRANSMISSION CONVERTER HUB SLEEVE & SEAL REPLACEMENT

Latest Changes & Recommended Corrections

FOR PREVIOUS MODELS & 1963 MODELS

CHRYSLER CORP. (C nt.)

sleeve onto hub by hand and use a suitable driver (flat surface against sleeve end) and drive sleeve onto hub until curled end of sleeve bottoms against end of torque converter hub Wipe off all sealing compound and wash sleeve with solvent Remove old seal from transmission front pump housing and apply a very thin coat of "Perfect Seal" to outer 38" of housing bore Drive new front pump seal into housing with a suitable tool (C-3278) until seal is flush with front edge of housing *CAUTION - The new seal and sleeve are designed to be used together Do not use one part without th other*

► *1963 DODGE, DART, PLYMOUTH & VALIANT "GROANING" WHILE DEPRESSING THE CLUTCH (SYNCHRO-MESH TRANSMISSION) CORRECTION.* This condition is caused by interference at corners of clutch release fork To correct, grind off corners of the "L" shaped clutch fork pivot at point of interference

► *1960-62 DODGE, LANCER, PLYMOUTH & VALIANT 6 CYL ENGINE HARD STARTING (DURING WET WEATHER) CORRECTION* A new distributor cap, Part No 2448273 (includes rotor and spark plug cables) has been released for service replacement to correct the above condition The new cap has wider inserts, revised tower heights and the new rotor has been redesigned

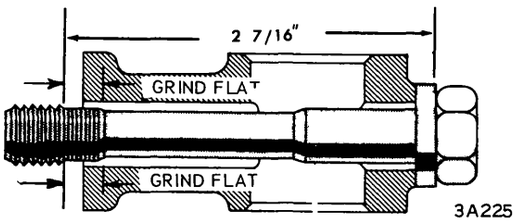
► *1960-62 DODGE, LANCER, PLYMOUTH & VALIANT 6 CYL ENG SPARK PLUG FOULING CORRECTION:* Install Champion N14Y spark plugs which have a more compatible heat range for normal engine operation *NOTE - Use spark plug gaskets in addition to the aluminum tubes Install new tube seals, Part No 1947708, each time spark plugs are removed*

FORD MOTOR CO.

Comet, Falcon, Fairlane
Galaxie, Monterey, Meteor
Lincoln, Thunderbird

► *1960-62 FORD, MERCURY, COMET & FALCON EXCESSIVE TEMPERATURE INDICATED ON INSTRUMENT PANEL GAUGE CORRECTION·* This may be due to an incorrect temperature sensing device in engine cylinder head The correct unit is identified by the numeral "250" stamped on hexagon wrench fitting

► *1960-61 COMET & FALCON ROCKER ARM SHAFT NOISE CORRECTION & PRODUCTION CHANGE.* Remove No 6 (rear) rocker arm support bolt and grind a flat to root diameter of bolt threads (see illustration) on opposite side of bolt, then clean all metal particles from bolt Centers of flat surfaces on bolt must be 180° apart *NOTE - Cars built after Feb 28, 1961 (Comet), May 1, 1961 (Falcon) have a revised rear rocker arm support and it is not necessary to rework support bolt as indicated above* Remove left rear cylinder head bolt then crank engine (do not start) for 30 seconds or until normal oil flow is noted from head bolt hole **If normal oil flow is obtained,** install a newly designed left rear cylinder head bolt, Part No C1GY-6065-A and tighten bolt to 75 ft lbs (do not tighten remainder of cylinder head bolts) Install reworked support bolt and tighten reworked bolt and remaining rocker shaft support bolts to 30-35 ft lbs Adjust valve lash and make sure there is adequate lubrication to entire rocker shaft assembly **If normal oil flow was not obtained** from head bolt hole (when engine was cranked), remove cylinder head, then insert a cleaning rod (use 1/8" welding rod of suitable length) into oil outlet at top face of block, down through hole in camshaft rear bearing, and into camshaft groove Turn engine over with starter for several seconds, then remove rod and continue cranking engine until oil flows from outlet hole in top of block Remove oil pressure sending unit and blow out the oil passage Install sending unit, using sealing compound Reinstall cylinder head, using a newly designed bolt, Part No C1GY-6065-A in left rear bolt hole only Disassemble rocker arm assembly and replace any parts that show wear and galling, then assemble rocker arm and shaft assembly and tighten support bolts to 30-35 ft lbs *NOTE - If available, install a complete rocker arm support, Part No C1DE-6531-A in place of reworking the No 6 rocker arm support bolt as outlined above*

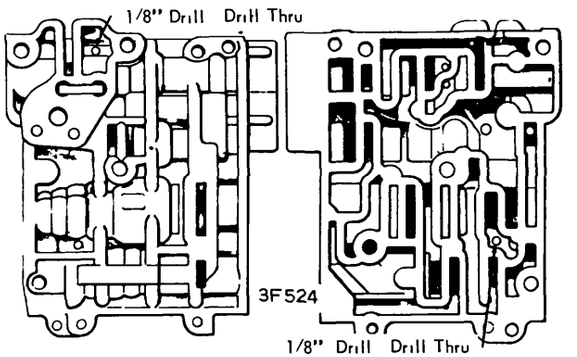


COMET & FALCON
ROCKER ARM SHAFT SUPPORT BOLT REWORK

► *1960-62 FORD MOTOR 144" & 170" ENG & 1961-62 FORD MOTOR 223" & 262" 6 CYL ENG LOSS OF OIL PRESSURE CORRECTION·* Distributor shaft socket and oil pump intermediate shaft may be worn sufficiently to prevent positive engagement of drive surfaces Correct by installing new type distributor shaft and intermediate shaft *NOTE - The above correction for the 223" & 262" Eng applies only to engines equipped with rotor type oil pump*

► *1960-62 144" & 170" ENGINE OIL PUMP DRIVE FAILURE CORRECTION* On engines built before May 28, 1962, if oil pump drive failures are encountered install a new distributor shaft, Part No C2DZ-12175-B, which is longer The new shaft also has the hex hole drilled deeper and is cross drilled at the annular groove for lubrication of oil pump intermediate shaft A new oil pump intermediate shaft (C0DZ-6A618-A, 1960 models), or C1DE-6A618-A 1961-62 models) should also be installed *NOTE - Before installing the oil pump on 1961-62 engines, insp ct pump for missing or improperly installed rotor bore cup plug (which could permit intermediate shaft to drop lower than normal operating position and result in partial engagement) To check, note length of wear pattern on old intermediate shaft If pattern is less than 5/16", install a new oil pump drive rotor and shaft assembly* Lubricate intermediate shaft hex socket with a small amount of rear axle lubricant

► *1961 TO EARLY 1963 AUTOMATIC TRANSMISSION (3-SPEED) HARSH REVERSE ENGAGEMENT CORRECTION & MAIN VALVE BODY PRODUCTION CHANGE.* On cars built before Feb 1, 1963 (see table below for transmission models), a kit is available to rework the main control valve assembly to correct the above condition Later cars have been changed in production In addition to installing the parts included in the kit, it is necessary to drill two holes in upper valve body (see illustrations below) Remove upper valve body from lower body assembly, then remove and discard control valve body separator plate, throttle valve body, throttle valve body separator plate and the three throttle valve body to upper valve body screws Completely disassemble upper valve body, then drill two 1/8' holes as shown in illustration *NOTE - Do not center punch to start hole Start hole by turning drill by hand* Clean all chips and burrs from valve body Install new throttle valve and throttle valve retainer (plug) Assemble throttle valve body to upper valve using the new separator plate and screws Assemble upper valve body, then assemble upper valve body to lower valve body using a new separator plate



1961-63 AUTOMATIC TRANSMISSION (3 SPEED)
MAIN VALVE BODY REWORK

Kit Part No.	Year	Transmission M d l
C3AZ-7D239-A	1961-63	PCC
C3AZ-7D239-A	1961-63	PCD (Exc PCD D-1 & PCD-F,1)
C3AZ-7D239-A	1961-63	PCE-B-E-G-S-M-U-Z-AD-AF-AG
C3AZ-7D239-B	1961-63	PCE-H-N-V-AA-AB
C3AZ-7D239-C	1962	PCD D-1, PCD-F,1

► *1962 FAIRLANE & METEOR FRONT WHEEL ALIGNMENT SPECIFICATION CHANGE* Adjust front wheel alignment to specifications shown for 1963 models

See Page 374

►*1962 THUNDERBIRD (WITH TRIPLE CARBURETORS) 3-SPEED AUTOMATIC TRANSMISSION HARSH UPSHIFT CORRECTION.* This condition can be improved by installing Kit Part No C3SZ-7D245 (includes shift valve spring, inner and outer compensator valve springs and a governor body assembly) All parts must be installed together *CAUTION - Do not install this kit on cars used for drag racing, or premature failure will occur*

►*1963 "PCE" 3-SPEED AUTOMATIC TRANSMISSION (EXC 390" ENGINES WITH TRIPLE CARBS & POLICE INTERCEPTOR) HARSH 1-2 UPSHIFT CORRECTION* In addition to installing a new type 1-2 shift valve spring (as shown on 1963 Ford Motor Co 3-Speed Automatic Transmission pages), greater improvement can be made by installing a new main control valve assembly, Part No C3SZ-7A100-D *NOTE - This new control valve assembly can also be installed on 1962 Thunderbird 390" Engs with 4-Bbl Carbs, however, the original 1962 manual valve must be installed in the new control valve assembly*

GENERAL MOTORS

Buick

►*1961-62 BUICK SPECIAL FRONT SUSPENSION LOWER BALL JOINT REPLACEMENT* Earlier 'threaded" type ball joints can be replaced by the later "pressed-in" type ball joints *See "Buick Special & Oldsmobile F-85 Front Suspension" on Page 385*

►*1962 BUICK SPECIAL V6 & V8 ENGINE VALVE TIMING NOTE* - Refer to illustrations on 1963 Buick Car Pages for correct location of 1962 timing marks

►*1962 BUICK SPECIAL PROPELLER SHAFT CONSTANT VELOCITY JOINT BALL SEAT "UNSEATING" CORRECTION (4-SPEED SYNCHRO-MESH TRANSMISSION CARS)* This condition which may occur under sudden high torque application can be corrected by installing Repair Kits 5678340 and 5677032

►*LATE 1962 & EARLY 1963 BUICK SPECIAL 4-SPEED SYNCHRO-MESH TRANSMISSION OUTPUT SHAFT COMPANION FLANGE REMOVAL & INSTALLATION CAUTION:* A thin flat washer, which may be found between output shaft and companion flange dust seal on some cars, MUST be reinstalled before companion flange is reinstalled Failure to reinstall this washer on cars so equipped will cause distortion of companion flange and interference with extension case bushing

Cadillac

►*LATE 1962 & ALL 1963 CADILLAC CARTER CARBURETOR INSTALLATION CAUTION & FAILURE OF ENGINE TO IDLE NOTE:* Two 1/8" diameter holes holes (idle spoil ports) have been drilled through carburetor flange into idle system on some 1962 cars and all 1963 cars to prevent engine idling if stainless steel shim is omitted between carburetor and intake manifold Failure to install this shim will result in damage to carburetor because of exhaust gas corrosion Failure to idle properly indicates shim not installed

Chevrolet

►*1961-62 CHEVY II & CHEVROLET PASS CAR REAR AXLE SHAFT BEARING & SEAL REPLACEMENT PROCEDURE CHANGE: Use the procedure outlined for 1963 models* *See Page 359*

►*1962 CHEVROLET 409" V8 ENGINE NCTE:* All procedures and specifications for the 1963 409" Engine apply to the 1962 model *See "Chevrolet V8" in this edition*

►*1955 & LATER CHEVROLET 235" & 261" 6 CYL ENGINE REAR BEARING SEAL REPLACEMENT:* A new lip-type synthetic rubber seal molded over a steel core, replaces the former wick-type seal To install, remove old seal and clean out grooves Remove any imperfections on crankshaft sealing area with crocus cloth or a fine stone Dip seals in engine oil, then insert upper seal in engine block, with lip of seal toward front of engine and rotate seal into groove (similar to main bearing installation) Install lower seal in bearing cap with lip of seal to front of engine

Pontiac

►*1962 3-SPEED (4-STAGE) HYDRA-MATIC GOVERNOR PRODUCTION CHANGE* Later production transmissions have been equipped with a cast iron governor assembly to eliminate governor ring wear Dimensional changes make it necessary that care be taken when assembling rear bearing retainer over governor assembly to prevent breaking a governor ring Position governor ring hook ends in a straight line so they can be observed as they are pushed down in ring groove Make sure they do not become unhooked or broken A gasket is not required when installing a cast iron governor on current or past model transmissions

►*1962 PONTIAC "PA' MODEL TRANSMISSION GOVERNOR REPLACEMENT NOTE* A new governor assembly, Part No 8622645 should be used for replacement to assist in eliminating the possibility of not obtaining a full throttle 3-4 Upshift

►*1961-62 PONTIAC 4-SPEED SYNCHRO-MESH GEAR REPLACEMENT CAUTION* Two ratios were used in production requiring the use of different replacement gear packages For identification, count the number of teeth on 1st speed gear of counter gear assembly 2 54 ratio 1st gear has 30 teeth on counter gear, and the 2 20 ratio has 28 teeth on counter gear *DO NOT interchange parts*

►*1962 PONTIAC (EXC TEMPEST) AUTOMATIC TRANSMISSION REFILL NOTE:* Transmission refill capacities have been revised and are now the same as for 1963 models *See "Automatic Transmission Servicing" in this edition*

►*1961-63 PONTIAC TEMPEST FRONT TIRE RUBBING (ON TURNS) CORRECTION* To correct, drive a Wheel Stop Sleeve, Part No 9770659 on forward ends of right and left hand lower control arm strut

KAISER JEEP CORP.

►*1963 & EARLIER JEEP OHC 6 CYL ENG OIL FILTER LEAKAGE CORRECTION* If leakage is caused by improper seating of filter on mounting pad, check for interference between filter base and raised portion of cylinder block at oil filter location If necessary, grind off enough material to allow proper seating of filter *DO NOT grind off an excessive amount of material*

►*1963 & EARLIER JEEP OHC 6 CYL ENG ROCKER ARM COVER & GUIDE INSTALLATION NOTE. Previous installation procedures are superseded by the following*

Rocker Arm Guide - When installing rocker arm guide make sure that all rocker arms are aligned correctly and that all tabs of guide fit into rocker arm cavities This will prevent misalignment of rocker arm and forcing of guide through rocker arm cover

Rocker Arm Cover - Oil seal washers must have minimum thickness of 222" Replace if necessary Make sure rocker arm cover distortion at bottom edge does not exceed 020" at any point Install gasket into cover **without sealer,** install oil seal washers on cover studs, then place cover in position Install a flat washer on rear stud, and spark plug cable brackets on front three studs (flat washers not necessary) Install crown nuts and tighten to 6-8 ft lbs *NOTE - Correct torque of crown nuts is important to prevent distortion and oil leaks*

STUDEBAKER CORP.

Studebaker

►*1961-63 STUDEBAKER AUTOMATIC TRANSMISSION (EXCEPT M-35) DELAYED REVERSE OPERATION CORRECTION:* This condition which may occur when manual selector lever is moved from "D" or "L" to "R" with engine at idle and with transmission at normal operating temperature, may be caused by sticking front clutch friction discs To determine if this is the cause, adjust transmission pressure to correct specifications and make sure fluid level is as specified then proceed as follows When selector lever is moved from "P" or "N" to "R", no abnormal delay in reverse should be noted When selector lever is moved between "D", "L" and "R", engine idle speed will remain the same, even during delay reverse period Move selector lever from "D" or "L" to "N" A gear whine of a few seconds may be heard If the above conditions exist and there is an abnormal delay in reverse, replace front clutch friction discs with new friction discs, Part No 1542734

►*1961-62 6 CYL ENGINE BURNED EXHAUST VALVE REPLACEMENT NOTE* Whenever one or more burned exhaust valves are found, replace ALL exhaust valves with heavy duty type, Part No 1552346

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AS (1-Bbl.) 1562
WA1 (1-Bbl.) 1564
WE (1-Bbl.) 1560
YF (1-Bbl.) 1567
YH Horizontal (1-Bbl.) 1570
WCD (2-Bbl.) 1552
WGD (2-Bbl.) 1555
AFB (4-Bbl.) 1957-58 1529
AFB (4-Bbl.) 1959-60 1542
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B&B Downdraft 1576
BBD (2-Bbl.) 1954-58 1586
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BBD (2-Bbl.) 1954-55 1594
BBD (2-Bbl.) 1956-58 1595
BBD (2-Bbl.) 1959-60 1596
BBS (1-Bbl.) 1954-56 1584
BBS (1-Bbl.) 1957-60 1585

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"Visi-Flo" 1959-60 1624
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Dual Concentric (2-Bbl.) 1640
Centri-Flo (2-Bbl.) 1638
Centri-Quad (4-Bbl.) 1954 1628
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WW (Buick) 1959-60 1707
WW (1954 Dodge) 1700
WW (1955-58 Dodge) 1703
WW (1957-58 DeSoto & Plymouth) 1703
WW (1959-60 Dodge & Plymouth) 1707
WW (Studebaker) 1954-58 1712
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	Stromberg AAVB	1694
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1955-56	Carter WCFB	1509
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1955-56	Holley Centri-Quad	1631
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1954-60	Carter YF	1567
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1954-60	Carter YF	1567
1954	Carter WGD	1555
1954-56	Carter WCD	1552

1955-58 CADILLAC (CARTER & ROCHESTER) CARBURETORS

CARTER 4-BARREL WCFB

1955 (Exc. Eld rad Eng.)	Carter No.
Early (Exc Air Cond)	2185S
Later (Exc Air Cond)	2266S
Latest (Exc Air Cond)	2354S
Early (Air Cond)	2186S
Later (Air Cond)	2267S
Latest (Air Cond)	2355S
Replacement Carburetor	①2255S
1956 (Exc. Eldorad Eng.)	
Early (Exc Air Cond)	2333S, SA
Late (Exc Air Cond)	2543S
Early (Air Cond)	2334S, SA
Late (Air Cond)	2544S
Replacement Carburetor	①②2370SA
Replacement Carburetor	①③ 2545S
1956 Eldorad Engin (Tw Carbs.)	
Exc Air Cond	(Front) 2371S, (Rear) 2372S
Air Cond	(Front) 2373S, (Rear) 2372S
Replacement Carburetor	④ 2371S
1957 Eldorado Engin (Two Carbs)	
Farly (Exc Air Cond)	(Front) 2582S, (Rear) 2583S
Late (Exc Air Cond)	(Front) 2690S, (Rear) 2691S
Early (Air Cond)	(Front) 2584S, (Rear) 2583S
Late (Air Cond)	(Front) 2692S, (Rear) 2691S
Replacement Carburetor (Farly)	⑤ 2582S
Replacement Carburetor (Late)	⑥ 2690S

CARTER 4-BARREL AFB⑦

1957 (Exc. Eld rad Eng.)	Carter No.
Exc Air Cond	2479S
Air Cond	2480S
Replacement Carburetor	⑧2479S
1958 (Exc. Eld rado Eng)	
Early (Exc Air Cond)	2696S
Late (Exc Air Cond)	2862S
Early (Air Cond)	2697S
Late (Air Cond)	2802S
Later (Air Cond)	2863S

ROCHESTER 4-BARREL 4GC⑦

1955 (Exc. Eld rad Eng.)	Rochester No.
Early (Exc Air Cond)	7006655
Late (Exc Air Cond)	7007970
Later (Exc Air Cond)	7009070
Early (Air Cond)	7006656
Late (Air Cond)	7007971
Later (Air Cond)	7009071
1955 Eld rad Engine (Tw Carbs.)	
Front (Exc Air Cond)	7007240
Rear (Exc Air Cond)	7007942
Front (Air Cond)	7007240
R ar (Air Cond)	7007241
1956 (Exc. Eld rad Eng.)	
Early (Exc Air Cond.)	7008750
Late (Exc Air Cond)	7009750
Early (Air Cond)	7008751
Late (Air Cond)	7009751

ROCHESTER 4-BARREL 4GC⑦

1957 (Exc. Eld rad Eng.)	
Early (Exc Air Cond)	7010100
Late (Exc Air Cond)	7012000
Early (Air Cond)	7010101
Late (Air Cond)	7012001
Replacement Carburetor (Early)	7015701
Replacement Carburetor (Late)	7015757
1958 (Exc. Eldorado Eng.)	
Early (Exc Air Cond)	7012010
Late (Exc Air Cond)	7012910
Early (Air Cond)	7012011
Late (Air Cond)	7012811
Replacement Carburetor	7015801

① - When installing on air conditioned cars, install Unitized Package, Carter No 202-44U

② - Replaces Carburetor Nos 2333S, SA, 2334S, SA

③ - Replaces Carburetor Nos 2543S, 2544S

④ - Replaces Carburetor Nos 2372S, 2373S When used on air conditioned cars (front carb), install Unitized Package, Carter No 202-100U

⑤ - Replaces Carburetor Nos 2583S, 2584S When used on air conditioned cars (front carb), install Unitized Package, Carter No 202-111U

⑥ - Replaces Carburetor Nos 2691S, 2692S When used on air conditioned cars (front carb), install Unitized Package, Carter No 202-111U

⑦ - Both Carter & Rochester Carburetors used on 1957-58 cars with single carburetor after 1957 Eng No 101833

⑧- When used on air conditioned cars, install Unitized Package, Carter No 202-114U

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 CARTER & ROCHESTER CARBURETOR PRODUCTION CHANGE.* "Later" 1955 carburetors listed above were used after approximately the first 3000 cars These carburetors have larger Secondary Throttle Bore, Secondary Main Venturi, and Secondary Metering Jets

►*1955 CADILLAC "OFF-IDLE LEANNESS" AT 20-30 MPH DURING LIGHT ACCELERATION (Rochester Carburetors before Engine No. 44710)·* May be accompanied by slight vibration and is caused by insufficient fuel during initial action of accelerating pump Correct by installing new parts listed below. *NOTE–Carburetors marked "A-5" on brass tag (Engine No. 34110 to 44710) have later type Pump Plunger Assy. and Power Valve Piston Assy. Carburetors marked "B5X" (used beginning Eng. No. 44710) have latest type parts and do not require modification.*

Late Type Carburetor Parts

Carburetor Type:	Single 4GC	Eldorado (Two 4GC)
Pump Plunger Assy	7000208	7007807
Power Valve Piston Assy	7000204	-
Primary Venturi Cluster	7008768	7008770

►*1954-55 CADILLAC CARBURETOR "ICING" CORRECTION:* This condition generally noted after consistent high speed driving with outside temperature of 32-65°F and high relative humidity. Causes loss of power and high fuel consumption and may result in stalling Icing can be prevented by installing Sheet Metal Baffle No. 1463839 on radiator support tie bar to reduce gap between tie bar and radiator upper tank and prevent outside cold air entering engine compartment. Edge of baffle must be 1/8" from radiator upper tank and must not pinch wiring harness. *NOTE–This baffl installed in production on later 1955 cars.*

►*1955 CADILLAC "FLAT-SPOT or SHUDDER" at 20-40 MPH ON PART THROTTLE ACCELERATION·* May be caused by over-rich Idle Mixture Setting and Idle Adjustments must be made exactly as detailed below. *ROCHESTER CARBURETOR NOTE–See "Off-Idle Leanness Correction" above also.*

►*1955 CADILLAC HIGH IDLE SPEED (First Cars)* May be caused by loose or improperly positioned throttle valves or improperly adjusted secondary throttle linkage causing throttle valves to remain slightly open. Check throttle valve position and linkage adjustment.

►*1955 CADILLAC ROUGH IDLE OR DETONATION* May be caused by vacuum advance ports in carburetor being too low, causing distributor vacuum advance mechanism to operate and provide too much advance at idling speeds. Check for this condition by connecting a vacuum gauge at the vacuum advance line fitting on the carburetor If gauge reading is over 5" with engine idling, ports are incorrectly located Correct by replacing carburetor throttle body

►*1956 FLAT SPOT & SHUDDER CORRECTION (Eldorado Engines with Carter Carburetors before Engine No 014141)* Install Accelerator Pump Jet Housing, Cadillac Part No 7002451 The later type housings have larger bores and longer jets which reduce flat spots and shudder The later type housing is installed in production after the above engine number

►*1956 FLAT SPOT CORRECTION (Eldorado Eng with Carter Carburetors before Engine No 044963 without Air Condition, or No 044986 with Air Conditioning)* Install all parts furnished in special kit, Cadillac No 3630751, as detailed below *NOTE* - Later carburetors with **black** tag have these parts installed in production and modification is not required

1) Carburetor Parts Changes–Install new Metering Rods, Vacumeter (vacuum piston) Springs, and Primary Jet Clusters furnished in kit

2) Carburetor Setting Changes–Secondary Throttle Shaft Torsion Spring should be wound up one additional turn This will assure better idle stability

3) Transmission Changes–Accumulator Inner Spring (furnished in kit) must be installed inside original accumulator outer spring (under accumulator piston in Servo & Accumulator Body) on transmissions prior to Transmission No 56-5239 This spring is required due to increased engine torque when carburetor changes are made (above) and will change Throttle Valve adjustment from 18 flats to 24 flats *NOTE*–Do not install this accumulator inner spring on transmissions after No 56-5239

►*1956 FULL THROTTLE LEANNESS OR SURGE CORRECTION (Cars with Carter Carburetors)* This condition may be caused by air leaking around metering rod dust cover and can be corrected by filing down the

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CADILLAC CARBURETORS (C nt.)

heavy flashing at both ends of cover until cover is level and will seat properly It may also be necessary to file edge of cover at air horn to prevent interference at this point

►*1956 ENGINE STALLING CORRECTION (Cars with Carter Carburetors)* This stalling condition is noticeable when a hard right or left hand turn is made at zero throttle opening and is caused by air leakage between air horn and bowl gasket Correct by installing an extra bowl gasket and securely tightening air horn-to-bowl screws Readjust float level, metering rods and choke

►*1956 IMPROVED PERFORMANCE & ELIMINATION OF ACCELERATION (Cars with Carter Carburetors, except Eldorado Engines)* A kit, Cadillac Part No 1467454 consisting of late model metering rods and vacumatic spring is available for service replacement on cars before Engine No 080810 In the event a late model throttle body, Carter Part No 1-1436S (same as used on 2543S, 2544S, 2545S) is installed on earlier carburetors, the new kit should also be installed *NOTE* - It will not be necessary to install the throttle stop adjusting screw

►*1956 JET & IDLE ADJUSTING SCREW PRODUCTION CHANGE (Cars with Carter Carburetors, except Eldorado)* To improve idle stability, new Primary & Secondary Metering Rod Jets, Carter Nos 120-163 & 120-185 are being used in production beginning with Engine No 113864 The diameter of the idle adjusting screw has also been changed

►*1956 IMPROPER AUTOMATIC CHOKE OPERATION NOTE (All Models)* Oil leakage at rear of right hand rocker arm cover may affect stroke operation. If oil is indicated in choke housing, the choke housing should be removed and cleaned and the rocker arm cover gasket should be replaced

►*1956 ENGINE STUMBLE CORRECTION (Cars with Carter Carburetors)* Loss of power after a sharp left turn may be caused by fuel leakage from carburetor bowl into the choke vacuum passage To correct, install a brass standpipe, Carter No 145-142, tapping it into the choke vacuum passage in carburetor body

►*1956 THROTTLE LEVER ADJUSTING SCREW CHANGE (Cars with Carter Carburetors, except Eldorado Engine)* Beginning with Engine No 126955, the throttle lever adjusting screw has been eliminated A 3/16" hole in each secondary venturi skirt will provide increased air for the idle by-pass system

►*1956 FLAT SPOT CORRECTION (Cars with Rochester Carburetors)* On carburetors with original **brass** tag new Primary Metering Jet, No 7002651 can be installed to correct this condition *NOTE* - Later carburetors with **black** or **red** tag have this new jet installed in production

►*1957 ROCHESTER FLOAT ADJUSTMENT PROCEDURE CHANGE: See "Adjustments (Rochester)" below.*

►*1957 ROCHESTER FLOAT DROP SPECIFICATION CHANGE:* Adjust float drop on both primary and secondary floats to 1 13/16"±1/32". This supersedes previous setting of 1 7/8".

►*1957 ROCHESTER CARBURETOR FLOODING CORRECTION:* Perform the following operations as outlined.

1) Install the new type filter element, Part No. 854467 (dyed red for identification), and replace the rubber center gasket with the later type gasket, Part No. 854475 which has a cotton reinforcement. The later type gasket is identified by its square shape. On cars without air conditioning rotate the complete filter downward 30° below horizontal to allow dirt to settle in the glass bowl.

2) On early cars with carburetor Nos. 7010100 & 7010101 and on later cars with carburetor Nos. 7012000 & 7012001 not having the letter "A" stamped on brass identification tag, install a new float needle valve and seat assembly, Part No. 7012144. This later valve is made of a harder material and the seat width contacting the needle has been reduced from .010" to .005".

3) On cars before Eng. No. 075598 enlarge the 3/32" holes in the primary and secondary sides of the float bowl that feed fuel into the balance channel between the bowls, to 3/16". The bowl casting should be removed for this operation. Carburetors having this change made in production are identified by the letter "C" stamped on the identification tag.

4) Adjust floats, using the new procedures. *See "Adjustments" below.*

►*1957 ROCHESTER STALLING OR HARD STARTING WHEN HOT CORRECTION:* Adjust idle speed and mixture using a vacuum gauge and a tachometer to obtain peak vacuum and RPM at the same time, and adjust the mixture screws midway between "Rich" and "Lean" limits. Make sure that throttle return check is correctly adjusted. To avoid flooding the manifold, the accelerpedal should be held only part way down and it should not be pumped. A new vented throttle body-to-bowl gasket, Part No. 7011979 has been released for service replacement (installed in production in carburetors having the letter "C" stamped on identification tag) to reduce the cranking time when engine is hot. The new gasket permits external vapor venting of the throttle bores while parked.

►*1957 ROCHESTER STALLING OR HARD STARTING WHEN COLD CORRECTION:* Install a new choke piston, Part No. 7010522 which has a deeper slot than the earlier type piston. Carburetors having the later type piston are identified by the letter "D", or later, stamped on the identification tag. In cases of cold stalling at closed throttle, check the intermediate choke rod adjustment *(see "Intermediate Choke Rod Adjustment" below).* In cases of hard starting, or in cold stalling when throttle is opened, set the choke thermostat two notches rich and reset the fast idle speed to 1500 RPM on high step of fast idle cam. *(NOTE* - This is the summer adjustment, which should be changed back to index setting and the conventional 1700 RPM adjustment for cold weather). In cases of hard starting, especially when car has been parked for several days, remove sight plugs and check fuel level. If fuel level is up, readjust choke as indicated above. If level is down, check bowl casting for leaks. If level is down only slightly, remove bowl cover and check slot in side of pump well for the specified depth of 3/8". If slot is too shallow, remove bowl and file slot to correct depth.

►*1957 ROCHESTER ENGINE "CUT-OUT" ON TURNS CORRECTION:* This condition can be corrected by drilling two additional vent holes in top of air horn as follows: Remove air horn from carburetor and drill a .125" hole in each of the "blind die-cast holes" that are identical to the existing diagonally opposite vent holes now in top of air horn. Carburetors having this change are identified by the letter "E" or later stamped on the identification tag.

►*1958 CADILLAC ROCHESTER CARBURETOR PRODUCTION CHANGE* Beginning with Engine No 045250, new carburetors, Nos 7012910 & 7012811, having new vacuum assist type primary float, are used in production Adjustment procedures for primary float setting is different as indicated below

►*1958 CADILLAC EARLY CARBURETOR PRODUCTION CHANGE & REWORK NOTE* Beginning with Engine No 057758 (Air Cond Cars), No 058491 (Others), new carburetors (2862S, 2863S) having a new fast idle cam, choke coil, and enlarged restriction entered production Earlier carburetors (2696S, 2697S, 2802S) can be modified for improved performance as follows

Fast Idle Cam - To reduce engine idle speed when a warmed-up engine has been restarted after a short cool down period, install a new fast idle cam, Carter No 181-262

Choke Coil - A new "softer" choke coil ("AD" Type), Carter No 170AD-521S should be installed Set the new coil at "index" instead of 1 notch lean as on previous type coil

Choke Restriction - Enlarge the choke restriction in bowl casting to 089" (No 43 drill) This will enable choke to come off sooner

DESCRIPTION· Four barrel downdraft types with idle air bypass system as described below *See "Carter & Rochester Carburetor Design Changes" below for differences in 1955-56 & 1957-58 carburetors*

Cadillac Idle System—Consists of SEPARATE Primary Idle Fuel System and Idle Air System (new) as described below Vapor vent passages located in throttle bores directly above the throttle valves dissipate spill-over fuel from above throttle valves and improve hot idling performance

Idle Fuel System—Primary idle fuel system is similar to previous models with Idle Mixture Adjusting Screw controlling fuel discharge through lower idle port below the throttle valves Throttle valves are COMPLETELY closed at low idle and air is admitted through Idle Air System (below) Secondary idle fuel system has been modified by elimination of closed throttle idle ports (below primary throttle valves) so that the secondary idle system does not operate during closed-throttle idling At part-throttle positions, the secondary idle system discharges fuel through the ports located **ab v** the primary throttle valves

Idle Air System—Consists of air by-pass passage (primary barrels only) through which air for closed-throttle idling is taken from above the throttle valves and discharged into the manifold below the valves through a metered (non-adjustable) orifice and an adadjustable orifice in each primary barrel An Idle Speed Screw (single screw for both barrels) controls this ad-

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CADILLAC CARBURETORS (Cont.)

justable orifice and all Idle Speed Adjustments are made by means of this screw (No throttle stopscrew used). Throttle valves are COMPLETELY closed at low idling speed.

►*CARTER & ROCHESTER CARBURETOR DESIGN CHANGES:* Design is similar to 1955-56 types except for the following:

Carter WCFB - The throttle body has been changed to lower carburetor height, and the velocity type auxiliary throttle valves have been incorporated in the bowl assembly. Primary and secondary floats are of different types and the secondary float setting has been changed.

Carter AFB - This new carburetor has the float bowl (main body assembly) cast integrally with the throttle body. Two separate float bowls are used, each of which supply fuel to both the primary and secondary sections.

Rochester - New type "Spring Balanced" float assemblies are used. New velocity type secondary auxiliary throttle valves are included which replace the former counterweighted type valves. The automatic choke has been moved from the air horn to the float bowl and is now connected to the choke valve by an intermediate choke rod. Secondary throttle actuating rod has been moved from choke housing side to throttle lever side of carburetor. The idle air adjusting screw has been moved to rear of throttle body.

ADJUSTMENTS (On Engine): *See "Off Engine Adjustments" for Carter & Rochester Carburetors below.*

Initial Idle Speed & Mixture Adjustment: If initial adjustment required to allow engine to be started and warmed up, turn Idle Air Adjusting Screw and both Idle Mixture Screws in to a lightly seated position, then back Idle Air Adjusting Screw out 3 turns. Back out both Idle Mixture Screws as indicated in table below.

Initial Idle Setting

Carburetor	Adjustment
Carter 2185S, 86S, 2255S, 66S, 67S	½-1½ turns
Carter 2354S, 55S	¾-1¾ turns
Carter 2333S, SA, 34S, SA, 70S	1¾-2¾ turns
Carter 2543S, 44S, 45S	1-2 turns
Carter 2582S, 83S, 84S, 2690S, 91S, 92S	¾-1¾ turns
Carter 2479S, 80S, 2696S, 97S	¾-2¼ turns
Carter 2802S, 62S, 63S	¾-2¼ turns
Rochester (All Carbs.)	2 turns

Idle Speed & Mixture Adjustments (Single & Dual Carburetors): With engine at normal operating temperature, transmission in "N" (Neutral), choke fully off and carburetor on "slow" idle, loosen throttle lever jam nuts at carburetor trunnion. Place transmission selector lever in either "D" (Drive) range. Adjust engine idle to correct speed (see table below), using the idle air bypass screw (idle speed adjusting screw) on throttle body. Turn one idle mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with the other screw (on the same carburetor if two carburetors are used). On cars with two carburetors, adjust idle mixture screws on the other carburetor in the same manner. Repeat the above procedure until turning mixture screws will not increase engine RPM, and the smoothest idle is obtained with the highest vacuum.

►*CARBURETOR CONTROL ROD ADJUSTMENT (Dual Carburetors):* Remove air cleaner and adjust interconnecting rod between both carburetors so that rod is free in throttle lever holes and both throttle valves are seated in their bores.

Idle Speed ℂ

Model	Engine RPM
1955 Single Carb.	② 400
1955 Dual Carbs.	② 480
1956 Single Carb.	② 420
1956 Dual Carbs.	② 490-510
1957 Single Carb.	② 420
1957 Dual Carbs.	② 520
1958 All Carbs.	③ 450

ℂ - Transmission selector lever in either "D" (Drive) range.

② - Air Conditioner turned "ON".

③ - Air Conditioner turned "OFF".

Fast Idle (Single & Dual Carburetors): With engine at normal operating temperature, transmission in "N" (Neutral), choke valve fully open and engine speed properly adjusted (see above), proceed as follows: On Rochester Carburetors, hold throttle lever closed so fast idle adjusting screw is on highest step of fast idle cam. On Carter Carburetors, hold choke rod down by pressing on end of cam trip lever. Open primary throttle valves slightly and rotate fast idle cam to its stop against spring tension, so that screw is on high step of cam. Adjust fast idle screw to obtain an engine speed of 1700 RPM (Single Carbs.), 2000 RPM (Dual Carbs.).

Throttle Check Adjustment (Single & Dual Carbs.): With engine at normal operating temperature, set parking brake and apply foot brake. Place transmission in "D" (Drive) position *(NOTE - Allow engine to idle and make certain that throttle check plunger is not in contact with screw in throttle relay lever).* Open the throttle wide momentarily to allow engine manifold vacuum to drop off and throttle check plunger to come out. Let throttle snap shut. If engine races, clearance is too small. If engine stalls, clearance is too great. Adjust screw on relay lever so that engine will not quite stall during the above procedure. *CAUTION - Do not perform the above operation too frequently as transmission may become overheated.*

►*1956 THROTTLE RETURN CHECK ADJUSTMENT CAUTION (Beginning with Engine No. 033849):* Cars built after the above engine number have a new camshaft which results in lower manifold vacuum which may cause Throttle Return Check to open throttle when vacuum is low if check valve gap is set as low as 140". Set gap on these cars to 185".

Idle Speed-up Control (Air Conditioned Cars): With engine warm and air conditioner compressor "ON", and with transmission selector lever in "N" (Neutral) position hold speed-up control stem with a wrench and adjust the hex head screw to maintain an idle speed of 900 RPM.

CADILLAC (Single Carburetor) (Rochester)

ADJUSTMENTS (Off Engine): *See "On Engine Adjustments" above. NOTE* - The following adjustments must be made in the sequence given, however, they may be classified into the following separate groups: (1) Float Level and Float Drop. (2) Accelerator Pump and Atmospheric Idle Vent *(NOTE - When group No. 2 is performed separately, the Fast Idle Adjustment must also be made.)* (3) Choke, Fast Idle, Choke Rod, Unloader, Secondary Throttle Opening, Secondary Throttle Lockout, Intermediate Choke Rod. *NOTE - When one adjustment of a group is made, the rest in the group must also be performed.*

►*FLOAT ADJUSTMENT PROCEDURE CHANGE NOTE:* Previous adjustment procedures have been superseded by the following:

Float Level (Except Primary Floats on Carburetor Nos. 7012910 & 7012811 with "Vacuum Assist" Type Primary Floats): With bowl cover removed from carburetor and inverted (with cover gasket in place), place correct gauge (see table below) so it is centered in bore of of cover and positioned over highest points of floats. Bend float arms at rear of float assembly until floats just clear top portion of gauge between gauge legs.

Float Level (Primary Floats on Carburetor Nos. 7012910 & 7012811 with "Vacuum Assist" Type Primary Floats): With bowl cover gasket in place, invert bowl cover, then install float level gauge (see table below) under heel of floats. With gauge vertical, floats should just contact gauge. To adjust, bend float arms at rear. Slide gauge under toe of float. In this position lower surface of float should just touch gauge. Lower surface of float should now be parallel to air horn surface and gauge should slide freely under floats. With gauge still under floats, hold lug on lower surface of gauge against inside of air horn casting. Floats should center in cutout section between gauge legs. If alignment required, bend float arms horizontally (directly back of floats) until floats are centered at heel and toe. Make sure floats do not rub sides of gauge legs under any conditions.

Float Level Setting

Model	Height & Gauge No. Primary	Height & Gauge No. Secondary
1955-56	1 19/32" J-5683	1 19/32" J-5683
1957	1 3/8" BT-132	1 3/8" BT-132
1958 ℂ	1 3/8" BT-132	1 3/8" BT-132
1958 ②	236" BT-148	1 3/8" BT-132

ℂ - Early carburetor without "Vacuum Assist" primary float.

② - Later carburetors with "Vacuum Assist" primary float.

Float Side Play: *(NOTE - This new adjustment replaces the final steps of the previous level adjustment).* Align the gasket with bowl cover by dropping two attaching screws through mating holes of gasket and bowl cover. Sight down on top of floats and position floats as required to center them sideways in the gasket cutouts. Sides of floats must be parallel to adjacent edges of gasket. *(NOTE* - Position floats by grasping float across diagonally opposite corners so as not to distort the sides. Be careful not to change float volume by denting or crushing). Recheck float positioning with bowl cover tilted 90° to either side, or with floats moved to left

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CADILLAC CARBURETORS (C nt.)

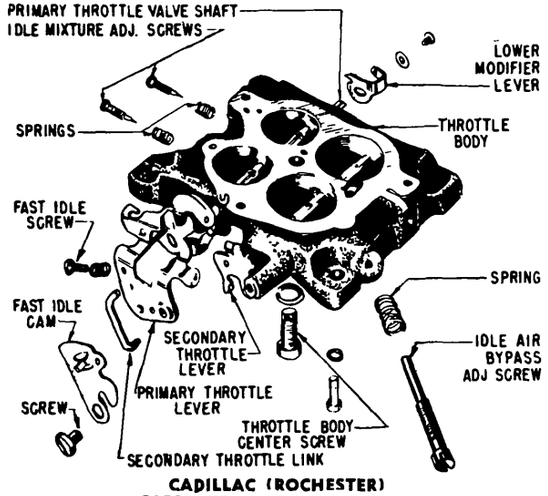
and right extreme positions. By removing power piston, each float assembly can be held at mid point of float arms to check the side play without bending the arms. If any portion of float overhangs gasket cutout, reposition float as required. If necessary, replace float assembly, hinge pin, or bowl cover to reduce sideplay of float assembly.

Fl at Tip: After float level and float sideplay have been adjusted and with bowl cover inverted, raise the gasket and sight across flat surface of casting. The lower edge of each float at the tip should be flush with this surface within 1/16". To adjust, carefully bend each float arm as required. Recheck float level after adjustment is made.

Fl at Drop: *NOTE - Float drop must be adjusted accurat ly because of the new type spring balanced floats.* With air horn upright and floats hanging freely, distance from air horn gasket to lower edge at float tip should be 2¼" (1955), 2 1/8" (1956), 1 13/16" (1957), 1 5/16" (1958). Adjust by bending float tang.

Acc lerator Pump: With fast idle screw backed out and with throttle valves held tightly closed, distance from bowl cover surface to bottom of pump plunger rod should be 63/64" (1955, exc. Eldorado), 1 1/16" (1955 Eldorado), 63/64" (1956), 29/32" (1957-58). Adjust by bending throttle connector rod at lower angle.

Atmospheric Idle Vent: With primary throttle valves closed against a .063" wire gauge (BT-79) bend idle vent tang with Tool BT-69 so that tang just touches face of valve.



CADILLAC (ROCHESTER) CARBURETOR THROTTLE BODY

Aut matic Choke: Centered (At Index). Adjust choke modifier as indicated below.

Chok Modifier: Loosen thermostat lever retaining screw. Rotate metal pointer counter-clockwise from free position until thermostat spring starts to close choke valve. Continue counter-clockwise until metal pointer lines up with index position on choke cover.

Fast Idl Adjustm nt ("Off" Engin): *(CAUTION - Make final adjustm nt "On Engin " as detail d above).* Hold choke valve tightly closed and hold throttle in closed position so that fast idle screw rests on high step of fast idle cam. Turn fast idle screw in until throttle valve opening or clearance between edge of valve and air horn is .020" (Gauge BT-67).

Choke Rod Adjustment: *(NOTE - This rod connects choke valve shaft to fast idle cam).* Position fast idle cam and primary throttle so that fast idle screw contacts second step of fast idle cam, and rests against shoulder of the highest step. Hold choke valve closed with choke trip lever in contact with choke counterweight lever. Hold linkage in this position and check choke valve opening or clearance between upper edge of choke valve and dividing wall in air horn using Gauge BT-102 (.040"). Adjust by bending choke rod.

Choke Unloader: Move throttle to wide open position and hold trip lever down in contact with choke counterweight. Check choke valve opening or clearance between upper edge of choke valve and dividing wall in air horn using Gauge BT-102 (.125"). Adjust by bending tang on fast idle cam using Tool BT-69.

Secondary Throttle Opening: With carburetor inverted, move choke valve to wide open position. Move throttle lever to wide open position and check opening of secondary throttle valves which should reach wide open position at same time as primary valves. If adjustment required, remove fast idle cam and connecting link. Check wide open stops on primary and secondary throttle shafts, and bend tangs with heavy pliers as required to obtain wide open positions. Tangs should contact stops at same instant.

Secondary Throttle Lockout: With choke valve partially closed and throttle valves fully closed, check clearance between upper edge of lockout lever tang and edge of slot in fast idle cam using a feeler gauge. Clearance should be .015". Adjust by bending tang horizontally using Tool BT-18.

Secondary Throttle Contour Clearance: With choke valve wide open, open throttle valves so tang on secondary lockout lever rides over top of fast idle cam. Measure clearance between tang and fast idle cam edge using feeler gauge. Clearance should be .015". Adjust by bending tang up or down using Tool BT-19.

Intermediate Choke Rod (1957-58 Models Only): *NOTE - This rod connects choke valve shaft to lever on automatic choke control.* Remove automatic choke cover and baffle plate. With choke valve held fully closed, bend intermediate rod as necessary so choke piston is flush to 1/32" out of choke piston sleeve.

CADILLAC (Single Carburetors) (Carter AFB)

ADJUSTMENTS (Off Engine): *See "On Engine Adjustments" above. NOTE -* The following adjustments must be made in the exact sequence given.

Float Alignment: Adjust float so it is parallel to outer edge of bowl cover casting by bending float lever. *NOTE -* Bend float lever by applying pressure to end of float with finger while supporting float lever with thumb. After aligning float, remove as much clearance as possible between arm of float lever and lugs on bowl cover. Arms of float lever should be as parallel to inner surface of lugs as possible. Be sure that floats operate freely without excessive play on hinge pin.

Float Level: With bowl cover inverted, bowl cover and gasket in place, and needle seated, there should be 5/16" clearance between top of float at outer end and bowl cover gasket. Check and adjust float level, using Gauge J-818-9. Adjust by bending float arm. Recheck float alignment after adjusting level.

Float Drop: Hold bowl cover in upright position and measure distance from top of outer end of each float to bowl cover gasket. The distance should be 3/4" (1957), 23/32" (1958). To adjust, bend stop tabs on float brackets.

Accelerator Pump: Back out fast idle screw so throttle valves are fully closed, making sure that choke is wide open. Distance from top of bowl cover to top of plunger shaft should be 15/32". Adjust by carefully bending throttle connector rod at lower angle using Tool J-1137.

Choke Piston Lever: .040" clearance (Gauge T109-193) between choke lever and stop in piston housing with choke valve held closed. To adjust, bend choke connector rod.

Choke Modifier: Place choke coil housing on index and remove lower end of connecting rod. Loosen clamp screw and rotate metal pointer until it is in line with raised pointer on coil housing. Align scribed line on lever so it is in a horizontal position and tighten clamp screw. Seat throttle valves (hold choke wide open). Reposition pointer so it is in line with raised pointer on housing. Bend connector rod at upper angle so that lower end of rod will slide freely into hole in modifier lever on primary throttle shaft.

Choke Shaft Lever: With choke valve fully closed and choke lever and arm in contact, adjust choke connector rod to align index mark on fast idle cam with fast idle screw.

Fast Idle: *(CAUTION - Make final adjustment "On Engine" as detailed above).* With choke valve tightly closed and fast idle screw centered on index mark on fast idle cam, clearance between lower edge of throttle valve and carburetor bore on side opposite idle ports should be .023". Turn fast idle screw to obtain correct clearance.

Unloader: Rotate primary throttle to full open position and insert a 9/32" drill between upper edge of choke valve and inner wall of bowl cover assembly. Choke valve should give a slight drag on gauge under finger pressure. To adjust, bend unloader lip on throttle lever using Tool J-1137.

Secondary Throttle Lever: Block choke valves wide open. With 23/64" clearance between lower edge of primary throttle valves and bores (side opposite idle ports), secondary valves should just start to open. To adjust, bend throttle operating rod. *NOTE - At wide open throttle, secondary valves will be a few degrees from wide open position.* With primary and secondary valves in tightly closed position, there should be .017-.022" (1957), .010-.030" (1958) clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever.

S c ndary Thr ttl L ck ut: Crack throttle valves and manually open and close the choke valve. Tang on

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CADILLAC CARBURETORS (C nt.)

secondary throttle lever should engage freely in notch of lockout dog. Adjust by bending tang on secondary throttle lever. With lockout dog held tight against stop on flange casting and secondary throttle valves partially open, there should be .020" clearance between tang on secondary throttle lever and lockout arm. Check this clearance using Tool J-1388. Adjust by bending arm at slot on lockout dog. *NOTE* - Fast idle cam may be removed to ease gauging and adjusting.

CADILLAC (Single & Dual Carburetors) (Carter WCFB)

ADJUSTMENTS (Off Engine): *See "On Engine Adjustm nts" abov . NOTE* - The following adjustments must be made in the sequence given, however, they may be classified into the following separate groups: (1) Float Level & Float Drop. (2) Accelerator Pump, Metering Rod, Atmospheric Idle Vent. (3) Choke Modifier, Choke Rod, Unloader, Secondary Throttle Opening, Secondary Throttle Lockout, Fast Idle. *NOTE - When one adjustment of a group is mad , th rest in the group must also be performed.*

Fl at Lev l: *NOTE - Primary and Secondary Float Settings ar diff rent. VERTICAL & HORIZONTAL adjustm nts must b made on both floats.* With bowl cover assembly removed from carburetor, **remove cover gasket** and place correct gauge (see table below) directly under center of floats with notched portion of gauge fitted over edge of cover. **Lat ral Adjustment** - Sides of float should just clear vertical uprights of gauge. Adjust by bending float arm as required. **Vertical Adjustment** - Floats should just clear horizontal portion of gauge (see table for vertical distance between tops of floats and machined surface of cover). Adjust by bending float arms up or down.

Cart r WCFB Fl at Level (1955-56)

	Ch cking Gauge	Vertical Distance
Primary (All)	①T109-232	.1/8"
Secondary (All)	②T109-222	. 3/16"

①—Cadillac No. J-5457. ②—Cadillac No. J-5458.

Cart r WCFB Float Level (1957)

Fl at	Ch cking Gauge	Vertical Distance
Primary	① T109-232	1/8"
Secondary	② T109-223	1/4"

① - Cadillac No. J- 5457. ② - Cadillac No. J-5228.

Fl at Dr p: Hold bowl cover assembly upright so floats hang down freely. Use scale to measure distance from machined lower surface of bowl cover (gasket removed) to top of floats at center. Distance should be 5/8". (Primary floats 1955-57), 1/16" (Secondary floats 1955-56). 3/4" (Secondary floats 1957).

Acc l rator Pump: Install pump connector link in **outer hole** (1955-56), **inn r hole** (1957) of pump arm with end extending toward countershaft. Seat throttle valves in carburetor bore, then remove dust cover and gasket and hold a straightedge across dust cover boss at pump arm. Flat on top of pump arm should be parallel to straightedge. Adjust by bending throttle connector rod at lower angle.

M t ring R d: *Mak this adjustm nt aft r "Acc lerator Pump Adjustm nt".* Seat throttle valves in bore of carburetor and loosen metering rod arm clamp screw. With metering rods in place, press down on vacumeter link until metering rods bottom in carburetor body casting. Hold rods in downward position, throttle valves seated, and revolve metering rod arm until finger on arm contacts lip of vacumeter link. Hold in place and tighten clamp screw.

Atmospheric Idle Vent: With throttle valve seated in bores, clearance between lower edge of vapor vent valve and dust cover should be 1/16" (Gauge T109-197). To adjust, remove dust cover, bend vapor vent arm up or down.

Automatic Choke: Set cover assembly as indicated in table (below).

Automatic Choke Setting

Model	Setting
1955 (All)	Centered (At Index)
1956 (Single Carb.)	1 Point Lean
1956 (Dual Carbs.)	Centered (At Index)
1957 (Dual Carbs.)	Centered (At Index)

Choke Modifier: Set cover assembly as indicated above. Loosen clamp screw and remove lower end of connector rod. Rotate metal pointer until it is in line with raised pointer on housing. Align scribed line on lever so it is straight up and down. Hold in place and tighten clamp screw. Seat throttle valve (hold choke valves wide open) and with pointer in line with raised pointer on coil housing, lower end of rod must slide freely into hole in throttle arm. To adjust, bend rod at upper angle. Reconnect rod.

Choke Rod: Loosen choke lever clampscrew on choke shaft. Insert a .020" (1955), .015" (1956) feeler gauge between lip of fast idle cam and boss on flange casting. On 1957 models, lip of fast idle cam should lightly contact boss of flange casting. Hold choke valve tightly closed and remove all slack from linkage by pressing choke lever toward closed position. Tighten clampscrew while holding lever in this position.

Unloader: Move throttle lever to wide open position. Check choke valve opening or clearance between upper edge of valve and inner wall of air horn using Gauge T109-39 (13/64"). Adjust by bending unloader lip on throttle lever shaft using Tool T109-41.

Secondary Throttle Lever (All Carburetors): With the choke valve wide open, move primary throttle valves to wide open position and note movement of secondary throttle valves which should reach wide open position at same time as primary valves. If no adjustment required, remove secondary throttle operating link, check wide open stops for both primary and secondary valves and adjust by bending tangs so that wide open position can be secured, connect link. Bend link using heavy pliers so that both throttle shafts contact wide open stops at the same instant. With both primary and secondary throttle valves tightly closed, measure clearance between positive closing shoes on primary and secondary levers using Tool T109-29. If clearance not .017-.022", adjust by bending shoe on primary lever.

NOTE—Secondary throttle link should be connected in inner hole (nearest throttle shaft center) on both the primary and secondary throttle shaft levers.

Secondary Throttle Lockout (All Carbs. Exc. 1956 Duals): *NOTE - See "Auxiliary Throttle Lockout (1956 Dual Carbs.)".* With choke rod properly adjusted (see above), hold choke valve tightly closed and tighten fast idle screw until there is .015" (Exc. 1957 Dual Carbs.), .010" (1957 Dual Carbs.) opening between primary throttle valves and bore of carburetor on side opposite idle ports. Lock pawl should now be in unlocked position; if not, adjust by bending tang on lock pawl. Hold primary throttle valves half way open. Open choke valve fully, then open primary throttle valves all the way. Tang on secondary throttle arm should engage in notch on lockout lever preventing secondary throttle shaft movement. With choke valve wide open, close primary throttle valves all the way. Lockout lever should fall free allowing secondary throttle valves to be open before primary throttle valves are fully open. To adjust, bend tang on secondary throttle lever to provide clearance for proper operation of lockout lever.

Auxiliary Throttle Lockout (1956 Dual Carbs.): With choke valve held fully closed, hook on lockout arms should have maximum contact with locking step on auxiliary throttle shaft. Open choke valve slowly. Auxiliary throttle valves should become unlocked and free to open just before choke valve reaches wide open position. Adjust by bending tang on choke trip lever under lockout arm using long nosed pliers.

Fast Idle: *(CAUTION - Make final adjustment "On Engine" as detailed above).* With fast idle adjusting screw on high step of fast idle cam, clearance between primary throttle valves and side of bore opposite idle ports should be .008".

OVERHAUL: *See "Carter WCFB 4-Barrel", "Carter AFB 4-Barrel" and "Rochester 4GC 4-Barrel" Carburetors.*

SERVICE PARTS: Gasket Sets - Carter No. 262 (2185S, 2186S); Carter No. 263 (2255S, 2266S, 2267S, 2354S, 2355S); Carter No. 277 (2333S, SA, 2334S, SA, 2370SA, 2371S, 2372S); Carter No. 277A (2543S, 2544S, 2545S); Carter No. 295 (2582S, 2583S, 2584S, 2690S, 2691S, 2692S), Carter No. 315 (2479S, 2480S, 2696S, 2697S, 2802S, 2862S, 2863S). Rochester No. 7009941 (7008750, 7008751, 7009750, 7009751); Rochester No. 7015851 (7010100, 7012000, 7010101, 7012001, 7015701, 7015757, 7012010, 7012910, 7012011, 7012811).
Repair Package - Carter No. 1792 (2255S, 2266S, 2354S, 2355S); Carter No. 1818 (2333S, SA, 2334S, SA, 2370SA); Carter No. 1819 (2371S, 2372S, 2373S); Carter No. 1847 (2543S, 2544S, 2545S); Carter No. 1855 (2582S, 2583S, 2584S, 2690S, 2691S, 2692S); Carter No. 1945N (2696S, 2697S, 2802S); Carter No. 1970N (2862S, 2863S). Rochester No. 7009304 (7007970, 7007971), Rochester No. 7008475 (7007240, 7007241, 7007942); Rochester No. 7009921 (7008750, 7008751, 7009750, 7009751) Rochester No. 7015831 (7010100, 7012000, 7010101, 7012001, 7015701, 7015757, 7012010, 7012910, 7012011, 7012811).

CARTER "WCFB" 4-BARREL CARBURETORS

	Carter Carburetor No.
BUICK	
1954 Series 60, 70, M/100	2082S
1955 Series 50, 60, 70 (Early)	2197S
1955 Series 50, 60, 70 (Late)	2358S
1956 Series 50, 60, 70	2347S
CADILLAC *NOTE - For 1955-58 Carter WCFB Carburetors with "Idle Air Adjustment" see "Cadillac (Carter & Rochester) Carburetors".*	
1954 Series ①	2109S
1954 Air Cond.	2110S
CHEVROLET	
1955 V8 Cars	2218S or 2351S
1955 V8 Corvette	2218S or 2351S
1956 V8 Cars (Power Pack)	2366S,SA
1956 Corvette (One Carb.)	2366S,SA
1956 Corvette	(Front) 2419S, (Rear) 2362S
1957 V8 Cars (Synchro-mesh)	2555S
1957 V8 Cars (Auto. Trans.)	2505S,SA
1957 Corvette (One Carb.) ③	2655S
1957 Corvette ③	(Front) 2626S, (Rear) 2627S
1958 283" Eng. Cars (Synchro-mesh)	2669S
1958 348" Eng. Cars (Synchro-mesh)	2657S
1958 348" Eng. Cars (Auto. Trans.)	2656S
1958 Corvette, Synchro-mesh (One Carb.)	2669S
1958 Corvette ④	(Front) 2626S, (Rear) 2627S
1958 Corvette ⑤	(Front) 2613S, (Rear) 2614S
1959-60 283" Eng. Cars (Synchro-mesh)	2818S
1959-60 348" Eng. Cars (Synchro-mesh)	2817S
1959-60 348" Eng. Cars (Auto. Trans.)	2816S
1959-60 Corvette (One Carb.)	2818S
1959-60 Corvette ④	(Front) 2613S, (Rear) 2614S
1959-60 Corvette ⑤	(Front) 2626S, (Rear) 2627S
1960 Late 283" Eng. Cars (Synchro-mesh)	3059S
1960 Late 348" Eng. Cars (Synchro-mesh)	3060S
1960 Late 348" Eng. Cars (Auto. Trans.)	3061S
CHRYSLER	
1954 V8 C63-2, C64, C66	2041S
1955 V8 C68, C69, C70	2126S
1955 V8 300	(Two) 2317S
1956 V8 C71 (Power Pack)	2367S,SA
1956 V8 C70, C72, C73	2314S,SA
1956 300B (Early)	(Two) 2317S
1956 300B (Late)	(Front) 2444S, (Rear) 2445S
1957 C75-1 Power Pack (Early) ⑥	2589S
1957 C75-2 Standard (Early) ⑥	2589S
1957 C76 Standard (Early) ⑥	2590S
1957 IM-1, 2, 4 Standard (Early) ⑥	2590S
1957 300C	(Front) 2534S, (Rear) 2535S
1958 300D	(Front) 2741S, (Rear) 2742S
DESOTO	
1955 S21	2210S
1956 S24 Fireflite	2311S,SA
1956 Adventurer (Early)	(Two) 2317S
1956 Adventurer (Late)	(Front) 2476S, (Rear) 2445S
1957 S26	2588S
1957 S25 & S27 (Power Pack)	2532S
1957 Adventurer	(Front) 2635S,(Rear) 2636S
DODGE	
1954 V8 D53-3 Royal	2191S
1955 V8 D55-1, 2, 3 (Synchro-mesh)	2253S
1955 V8 D55-1, 2, 3 (Auto. Trans.)	2181S
1956 V8 D63-1, 2, 3 (Early)	2303S,SA,SB
1956 V8 D63-1, 2, 3 (Late) ⑦	2474S
1956 V8 D63-1, 2, 3 (Late) ⑧	2432S
1956 D-500 (Standard)	2443S,SA
1956 D-500 (Power Pack)	(Front) 2476S, (Rear) 2445S
1957 V8 D67-2 (Standard)	2532S
1957 V8 Others (Power Pack) Optional	2532S
1957 D-500 Standard (Early)	2532S
1957 D-500 Standard (Late)	2622S,SA
1957 D-500-1 Standard	(Front) 2534S, (Rear) 2535S
1957 D-500 Power Pack	(Front) 2633S, (Rear) 2634S
1957 D-500 Special Police	2698S
1958 Royal	2660S
HUDSON	
1957 Hornet	2593S,SA
LINCOLN & CONTINENTAL	
1957 All Models	2404S,SA
MERCURY	
1956 All Models	2361S,SA
1957 368" Eng.	2404S,SA
NASH	
1957 V8 Ambassador	2593S,SA
OLDSMOBILE	
1954 Super 88, 98	2059S
1955 Super 88, 98	2246S
PACKARD	
1954 Series 5402 Cavalier	⑨ 2142S & 2103S
1954 Series 5406, 26, 31	2112S
1955 Clipper Deluxe & Super	2232S & 2284S
1956 Series 5660, 5670	2394S
1958 All Models	2575S
PLYMOUTH	
1955 P27 (Optional)	2253S
1956 V8 277" Eng. (Power Pack)	2725S,2302S,SA,SB
1956 Fury	2442S
1957 P31-2, 3 (Power Pack)	2530S,SA
1957 Fury	(Front) 2631S, (Rear) 2632S
1958 Fury (Early)	(Front) 2631S, (Rear) 2632S
1958 Fury (Late)	(Front) 2761S, (Rear) 2762S
PONTIAC	
1955 Synchro-mesh (Optional)	2283S
1955 Hydra-Matic (Optional)	2268S
1956 Series 56-28	2364S,SA
1956 Series 56-27 (Optional)	2364S,SA
RAMBLER	
1957 V8 (Power Pack)	2593S,SA
1957 Rebel	2593S,SA
STUDEBAKER	
1955 Commander (Synchro-mesh) Optl.	2219S,SA
1955 Commander (Auto. Trans.) Optl	2214S,SA
1955 President (Synchro-mesh)	2219S,SA
1955 President (Auto. Trans.)	2214S,SA
1955 President Deluxe	2330S
1956 President Classic & Skyhawk ⑦	2219SA,SB
1956 President Classic & Skyhawk ⑧	2214SA,SB
1956 President & Commander (Optl.) ⑦	2219SA,SB
1956 President & Commander (Optl.) ⑧	2214SA,SB
STUDEBAKER (Continued)	
1956 Goldenhawk	2394S
1957 President & Commander (Optl.) ⑦	2219SB
1957 President & Commander (Optl.) ⑧	2214SB
1958 President, Synchro-mesh (Early)	2219SB
1958 President, Auto. Trans. (Early)	2214SB
1958 President, Synchro-mesh (Late)	2574S
1958 President, Auto. Trans. (Late)	2575S
1959-60 Lark & Hawk V8 (Synchro-mesh)	2829S
1959-60 Lark & Hawk V8 (Auto. Trans.)	2830S

① - Without Air Conditioning
③ - Pass. Cars with Corvette Engine.
④ - Special camshaft and mechanical lifters.
⑤ - Std. camshaft and hydraulic lifters.
⑥ - Carter AFB Carburetors used on later models.
⑦ - Synchro-mesh transmission.
⑧ - Automatic transmission.
⑨ - Carter Carburetor No. 2103S can be used in place of 2142S.

►CHANGES, CAUTIONS, CORRECTIONS

►***1954 BUICK METERING ROD PRODUCTION CHANGE (All Series with 2082S Carburetor):*** Metering Rod No. 75-1108 used on later carburetors and supersedes No. 75-995 used on early carburetors.

►***1954 BUICK ACCELERATING PUMP PLUNGER LEATHER TURNING BACK CAUSING IMPROPER ACCELERATION & THROTTLE RESISTANCE (Early Cars with carburetors tag-dated "L3" through "C4"):*** Caused by too long pump stroke allowing leather to catch in overflow slot in pump cylinder at closed-throttle. Correct as detailed below. ***CAUTION—Unless these changes made, replacement of pump plunger will result in recurrence of trouble.***

(1) Install new Pump Plunger and READJUST PUMP STROKE (see Accelerating Pump data below).
(2) Adjust Metering Rods (see below).
(3) Remove Pump Jet Cluster Hold-down Screw and rework inner slotted end to assure full stroke of pump discharge needle. Screw has slotted projection extending 1/16" beyond end of threads. Grind off one side of projection entirely and reduce height of opposite side from 1/16" to 1/32". Reinstall screw.

►*1955 BUICK CARBURETOR CHOKE PISTON CHANGE TO IMPROVE WARM-UP PERFORMANCE (First Carburetors tag-dated "L-4" & Earlier):* If rolling, loading, or stalling noted immediately after engine started, and this is not caused by leak in Intake Manifold or vacuum lines (Windshield Wiper, Washer, or Power Brake), install new type Choke Piston furnished in Carter Unitized Pkg. No. 160-140U or Buick Kit, No. 1169567. Attach new Copp r identification tag (furnished in kit) which will indicate modification has been made. *NOTE—Carburetors tag-dated "M-4" and later have this piston installed in production.*

►*1956 BUICK METERING ROD PRODUCTION CHANGE (For Increased Fuel Economy):* In later production, a new metering rod, Carter No. 75-1235 is being used in production and can be used for service replacement. Carburetors having the later metering rod can be identified by the letter G, H, J, etc., following the carburetor number stamped on the brass tag attached to carburetor.

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►*1956 ENGINES CUTTING OUT ON LEFT HAND TURN CORRECTION* A new standpipe, Carter Part No. 145-142 may be installed into the choke vacuum passage in main body casting. The standpipe (bushing) is tapered and should be tapped lightly into place. The use of this part provides a more positive seal and prevents fuel leakage from bowl into choke vacuum passage.

►***1954 CADILLAC IDLE SPEED SETTING CAUTION ON AIR-CONDITIONED CARS:*** Idle speed setting should be adjusted seasonally (1) When air-conditioning use discontinued for winter months, (2) When air-conditioning is put into use for summer months This is necessary to compensate for compressor load when engine idling in "Dr" ***See Idling Adjustment below. CAUTION—Engine may stall during summer months, or operate at too fast an idle speed during winter months, if proper procedure not followed.***

►*1955 CHEVROLET LOADING (WHEN STARTING PARTIALLY WARM ENGINE)* Choke setting has been changed to **2 P ints L an** (superseding Centered setting) which will improve this condition

►*1955 CHEVROLET HARD STARTING (AFTER FLOODING)* May be caused by primary throttle valves not opening wide which prevents Unloader operating Check throttle linkage to make certain that primary throttle valves wide open when accelerator pedal pressed to floorboard Check Unloader setting *See ADJUSTMENTS below*

►*1955 CHEVROLET AIR CLEANER INSTALLATION CAUTION* When installing air cleaner, make certain that cutouts in gasket line up with carburetor bowl vent tubes and use care that gasket does not rotate when cleaner installed *Blocking of carburetor bowl v nts will int rf r with carburetor operation*

►*1956 CHEVROLET CORVETTE (TWO CARBS) IMPORTANT NOTE: Th PARTS CHANGES and new ADJUSTMENT PROCEDURES listed below are recommended for improved idling and low speed operation on cars quipped with C rvette Engine (with Two Carburetors)*

►*1956 CHEVROLET CORVETTE (TWO CARBS) RECOMMENDED CHANGES FOR IMPROVED IDLING & LOW SPEED OPERATION:* **Make the following changes in Carter WCFB 2419S, 2362S carburetors and adjust carburetors in accordance with revised idling adjustment procedure below**

1) Carbur t r Parts Changes - Install following new low speed jets and metering rods in BOTH carburetors On REAR carburetor only, install an idle speed screw in the tapped boss on the carburetor (Screw No 101-376, Spring No 61-291, Washer No 136-174) This screw is used to adjust engine idle speed

Carbur t r Parts Changes

	Original Part No.	New Part No.
Low Speed Jets	11-294S	11-263S
Metering Rods (Std)	75-1255	75-1356

2) Carbur t r Installati n & Flang Gask tM dificati n - Install each carburetor with TWO gaskets (1A-114 or 1A-113) which have been modified by cutting out entire center section as follows Cut along centerline between two primary barrel bores and two secondary barrel bores, cut along line ¼" out and parallel to centerline between each primary bore and adjacent secondary bore

3) Carburetor Idle Adjustment - *On both front and rear carburetors, turn Idle Air Adjusting Screw IN until just seated and LEAVE SCREW IN THIS POSITION SO THAT NO AIR IS ADMITTED THROUGH THIS PASSAGE These screws are NOT used for carburetor adjustment* Then adjust carburetors as directed under "Idle Adjustment" below using the idle speed screw on the REAR carburetor to adjust the idle speed *(NOTE - Throttle valves in FRONT carburetor remain seated at idle speed) Adjust throttle linkage as follows*

4) Throttle Linkage Adjustment - Remove carpet adjacent to accelerator pedal Remove air cleaners and throttle pull back springs on carburetors With REAR carburetor throttle valves wide open, accelerator pedal should be 3/8" from toeboard Adjust by changing length of accelerator linkage rod at rear carburetor (remove clip and turn trunnion nut on rod), then holding rear carburetor throttle valves wide open check FRONT carburetor for throttle valves being wide open and against throttle stop Adjust by turning nut on front carburetor control shaft *NOTE - With correct linkage adjustment, front carburetor throttle valves begin to open with rear carburetor at half-throttle*

►*1959 CHEVROLET STALLING WHEN COLD (Automatic Transmission Cars with 348" Engine and Single Carburetor)* Correct by changing Choke Piston Lever Adjustment setting to new specification shown in ADJUSTMENTS below This new setting used in production on later cars

►*1959 CHEVROLET STALLING AFTER COLD START (3-Speed Transmission Cars with 283" Engine and Single Carburetor)* Correct by changing Automatic Choke Setting to 1 Notch Lean Make this change ONLY to correct the above complaint

►*CHRYSLER 300B & DESOTO ADVENTURER (With Two Carburetors)* Special Idle Adjustment procedure must be followed to insure balanced operation of the two carburetors *See Chrysler & DeSoto car model data for complete procedure*

►*1955-56 DESOTO (EXCEPT ADVENTURER) ENGINE STALLING CORRECTION* Adjust slow idle speed to 500 RPM, and fast idle speed to 1200 RPM Change choke setting to 1 notch rich (1956), 2 notches lean (1955). Adjust dashpot so plunger moves 1/16" when throttle closed. Check manifold heat control for free operation. Check manifold to carburetor heat tube as follows Move asbestos cover to expose a small portion of tube, then run engine for one minute. Tube should be too hot to touch. If not, tube is cracked or loose in manifold.

►*1957 CHRYSLER C-300 STUMBLE OR STALLING CORRECTION:* Poor idle, stumble or hesitation on acceleration, stalling on stops or sudden turns conditions can be improved by making the following service corrections. Remove both carburetors from engine and disassemble each carburetor into three major sections (air horn, main body and throttle body). Remove floats and fuel inlet valves from air horn. Proceed as follows:

V nt Passage R w rk - Using a No. 42 drill (.0935"), drill holes through wall of air horn and vent passage boss into vent passage at each end of the two vent tubes (these are the vented tubes extending across and above primary and secondary bores in air horn). Holes into vent passages should be located 11/16" (primary side), 13/16" (secondary side) below top of air horn wall and aligned with centerline of vent tube at a point where vent tube is closest to inner side of air horn wall. Cut away choke housing-to-air horn gasket on rear carburetor for access to vent passage boss behind choke housing.

Idle Tube Well Enlargement - Remove main nozzle plug rivets or primary side of carburetor and remove the two primary idle tubes. Enlarge idle tube wells for their full length (into main nozzle passage), using a No. 4 drill (.209"). Idle tube wells are approximately 8° from vertical and care must be taken to prevent damaging the idle tube seat located just below threads in carburetor main body.

Main Body Pilot Bosses - File projecting pilot bosses on primary side of under side of main body to a height of 1/32". Clean carburetors thoroughly, making sure that all passages are clean and free of metal chips. Reassemble carburetors and note the following changes that must be made.

Secondary Metering Jet Change (Front Carburetor) - Install secondary metering jets, Carter No. 120-193 in **front carburetor only.** Use original jets in rear carburetor.

Metering Rod Change (Front & Rear Carburetors) - Install metering rods, Carter No. 75-1160 in **both front and rear carburetors.**

Float Setting Change - Adjust float level to 1/4" (primary floats), 5/16" (secondary floats).

Carburetor Installation - Install carburetors on engine using a new 1/8" thick flange gasket.

Idle Speed & Idle Setting Procedure Change - Close off completely the idle by-pass screws of both carburetors by turning them in until fully seated. *(NOTE - L av these screws in the closed position and adjust idl speed with the idle speed screws on the throttle l v r).* With engine at normal operating temperature, connect tachometer to engine and adjust front carburetor idle speed screw to obtain 650-700 RPM. Adjust rear carburetor idle mixture screws for best performance, then adjust front carburetor idle mixture screws for best performance. Reset front carburetor idle speed screw to obtain 650-700 RPM.

►*1957 DESOTO, DODGE & PLYMOUTH (CARS WITH TWO 4-BARREL CARBURETORS) IDLE ADJUSTMENT CHANGE NOTE* The "idle by-pass" screw formerly used for idle adjustment is no longer used and must be screwed in against its seat. *See individual car model pages for idle setting procedure.*

►*1957 CHRYSLER, DESOTO, DODGE & PLYMOUTH TWO 4-BARREL CARBURETOR PRODUCTION CHANGE:* Carburetor Nos. 2534S, 2535S, 2631S, 2632S, 2633S, 2634S, 2635S, 2636S, had a lead ball driven into hole in face of flange to seal over head of screw holding flange onto body. This lead ball must be removed

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CARTER WCFB 4-BARREL CARBURETORS (C nt.)

before flange is separated from carburetor body. On later production carburetors, the lead ball has been replaced with a copper washer (Carter No. 136-199), which should be used instead of the lead ball when servicing these carburetors.

►*1957 DESOTO ADVENTURER REAR CARBURETOR THROTTLE LEVER LOSSENESS CORRECTION:* This condition is caused by excessive side strain on throttle lever due to improper adjustment and alignment of the inter-connecting linkage rod. To correct, remove carburetor and place it on a vise so end of throttle shaft (away from lever) is firmly supported. Peen end of shaft, tapping lightly, to tighten lever. Adjust interconnecting link for freeness and alignment.

►*1957 DODGE D-500 STUMBLE & LEANNESS CORRECTION:* On early cars with WCFB 2532S carburetor, install metering rod, Carter No. 75-1251 to replace 75-1327. On later cars with WCFB 2622S carburetor, install metering rod, Carter No. 75-1251 to replace 75-1373

►*1957 LINCOLN & MERCURY ENGINE STUMBLE OR CUTTING OUT ON TURNS: This condition may be* caused by a poor seal between carburetor body and air horn. Inspect gasketed surfaces and remove any small nicks or burrs with a stone. Make sure that top surface of inner wall of bowl is in good contact with gasket. Before installing air horn, check lateral and vertical float adjustments and float drop.

►*1957 HUDSON, NASH, RAMBLER ROUGH ENGINE IDLE CORRECTION: If idle adjustments do not correct* rough idle condition, check for an air leak at front left hand corner of carburetor (with carburetor on engine) by squirting gasoline between throttle body flange and main body at this location. If an air leak exists, a drop in engine RPM will be noted. To correct, remove carburetor from engine, and with carburetor inverted (choke coil housing on left hand side) remove the upper right hand main body-to-throttle flange screw and coat threads with Permatex or other sealing compound. Replace carburetor and recheck for air leakage.

►*1957 HUDSON & NASH VAPOR LOCK OR LOW PRESSURE CORRECTION (Early Cars):* If either of these conditions exist on cars prior to Serial No. V-18114 (Nash), Y-11786 (Hudson), check the carburetor-to-fuel tank return elbow. This elbow must have a .034-.036" (No. 65 drill) restriction. If hole is larger or not drilled through, replace elbow with Part No. 3152259.

►*1956-57 LINCOLN & CONTINENTAL HARD STARTING, STALLING & BACKFIRING CORRECTION (When Caused by Defective Automatic Choke Control Heat Tube):* A new tube, Part No. ECU-9890-B having a larger center section and a larger runout radius at each end replaces the tube formerly used. When replacing intake manifold, make sure later heat tube is installed.

►*1955 PACKARD ROUGH ENGINE IDLE, POOR PERFORMANCE & POOR ECONOMY (Due to high vacuum at Distributor Advanc Unit)·* High vacuum may be caused by foreign material deposits in either primary or secondary throttle bores, or insufficient clearance of secondary throttle valves in bores. This condition makes it necessary to open primary valves too far to obtain the correct 400 RPM idle speed and results in distributor vacuum port being uncovered, causing distributor vacuum advance to operate at idle speed. The resulting too early ignition at idle speed and late timing throughout the rest of the range will not only cause a rough idle but also poor performance and poor gasoline economy. Check and correct this condition as follows·

Checking for High Vacuum—Connect vacuum gauge at distributor line fitting on carburetor. Idle engine at 400 RPM with selector lever in Drive Range. Vacuum must not exceed 5" Hg.

Correcting High Vacuum—Examine throttle bores for foreign material deposits at the throttle valves. Correct by cleaning throttle body in carburetor cleaner. If no deposits noted, reposition secondary throttle valves on shaft as follows Loosen secondary throttle valve screws, place a .002" shim ¼" wide between upper edge of valves and carburetor bore, retighten screws while holding valves in this position.

►*1956 PLYMOUTH FURY IMFROPER CHOKE ACTION CORRECTION* This condition may be caused by interference between carburetor throttle lever and dashpot mounted on intake manifold. Correct by installing three gaskets, Plymouth Part No. 1731516.

►*1956 PLYMOUTH (POWERFLITE) DASHPOT ELIMINATION.* The carburetor dashpot has been eliminated on later production cars.

►*1955 PONTIAC LOADING OR CARBURETOR FLOODING May be caused by excessive fuel pump pressure. See "Fuel Pump" under CARBURETOR on Car Model page for corrective procedure.*

►*1955 PONTIAC HARD STARTING CORRECTION (DUE TO UNSATISFACTORY UNLOADER OPERATION AFTER FLOODING.* If this condition not corrected by regular Unloader Adjustments, follow the procedure given below and install new parts as indicated.

1) Install new Throttle Flex Spring, Pontiac No 7008801, on carburetor (spring is linked between throttle shaft dog and outer throttle lever). New spring is lighter type and will reduce effort required to unload carburetor

2) Install new Engine Throttle Control Bracket Assembly, Pontiac No. 521986 This is a redesigned assembly

3) Adjust throttle control linkage (see "Throttle Linkage Adjustment (Hydra-Matic drive Cars)" under CARBURETOR on car model page) and adjust the throttle control intermediate rod as follows Push rod downward until end of accelerator pedal rod lever is felt to touch the end of its travel, shorten the intermediate rod enough to allow 1/8" clearance between end of accelerator pedal rod lever and rubber bellows assembly (3 turns of the trunnion nut). This adjustment will provide maximum allowable accelerator pedal travel

4) Inspect accelerator pedal Replace pedal if hinge pin or pedal rod holes worn oversize or out-of-round

5) Check for interference between accelerator pedal lever and throttle control dash bracket at wide open throttle position If interference noted grind 1/16' relief on dash bracket at point of contact *NOTE*—This interference will be noted particularly on cars where 4-barrel carburetor installed in the field

►*1956 PONTIAC HARD STARTING CORRECTION (With Partially Warmed-up Engine):* Change choke setting from one notch rich to center index. If hard starting is *not completely eliminated with this change,* set choke to one point lean.

►*1956 PONTIAC CARBURETOR FLOODING CORRECTION (Early Cars)·* Install fuel filter, Part No. 854345 which is a precipitation type filter having an impregnated fibre element.

►*1956 PONTIAC COLD ENGINE STALLING & WARM UP OPERATION IMPROVEMENT* On carburetors tagdated before M-5, install ALL of the following parts and change settings as follows

1) Vacumeter Spring No. 61-478, identified by a free length of approximately 1½" (supersedes 61-496).

2) Choke Piston No 160-138 (supersedes 160-110S)

3) Automatic Choke Setting—1 Point Rich (changed from Centered setting)

NOTE—Carburetors tag-dat d M-5 and later have these changes made in production

►*1956 STUDEBAKER 259' & 289" ENGINE CARBURETOR "BLOW-UP" PREVENTION NOTE·* To prevent gasoline collecting in air horn pockets in which bowl vapor vents are located (and igniting from engine backfire), drain holes must be provided through wall of choke valve chamber, on both sides of carburetor as follows Remove and disassemble air horn. With air horn inverted, locate the holes in wall of air horn at a point 3/8" from center line of choke chamber baffle (one hole on each side of baffle), and 5/32" below air horn gasket surface. Locate the other two holes in same location in wall at opposite end of baffle. Using a 1/16" (No. 53) drill, drill the holes from inside of air horn into pocket at an angle of approximately 20°. Clean all chips from air horn and reassemble.

►*1955-56 STUDEBAKER ENGINE STALLING ON SHARP LEFT TURN CORRECTION (CARS WITH CARTER WCFB 4-BARREL CARBURETORS):* Make sure that carburetor fuel level is correct and that float valve is seating properly. Check to see if air horn is sealing properly against carburetor body. This can be determined as follows: Remove air horn assembly from carburetor body and inspect gasket for the imprint of the air horn body rib around the choke passage hole and idle tube crossover passages. If no imprint is found, use a new gasket and cut out the center web (if present). If a definite imprint cannot be obtained with a single gasket, use two gaskets, Part No. 537189. Reassemble carburetor and tighten the center screws first, then tighten the outer screws.

►*1958 STUDEBAKER & PACKARD HESITATION ON ACCELERATION WITH COLD ENGINE CORRECTION* To eliminate stumbling or hesitation when accelerating rapidly with a cold engine, it is recommended that the choke piston be replaced with Carter Part No 160-117 Adjust Climatic Control so that it is set 2 notches to rich side from the index mark (standard setting is 1 notch rich)

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CARTER WCFB 4-BARREL CARBURETORS (C nt.)

►*1959 STUDEBAKER STUMBLE OR HESITATION AFTER COLD ENGINE START:* Above complaint can be corrected by installing improved Choke Piston, Carter No. 160-117 (superseding original piston No. 160-159). When installing this piston, choke operation will be improved setting the automatic choke1 or 2 Points Rich (original setting 1 Point Rich).

DESCRIPTION

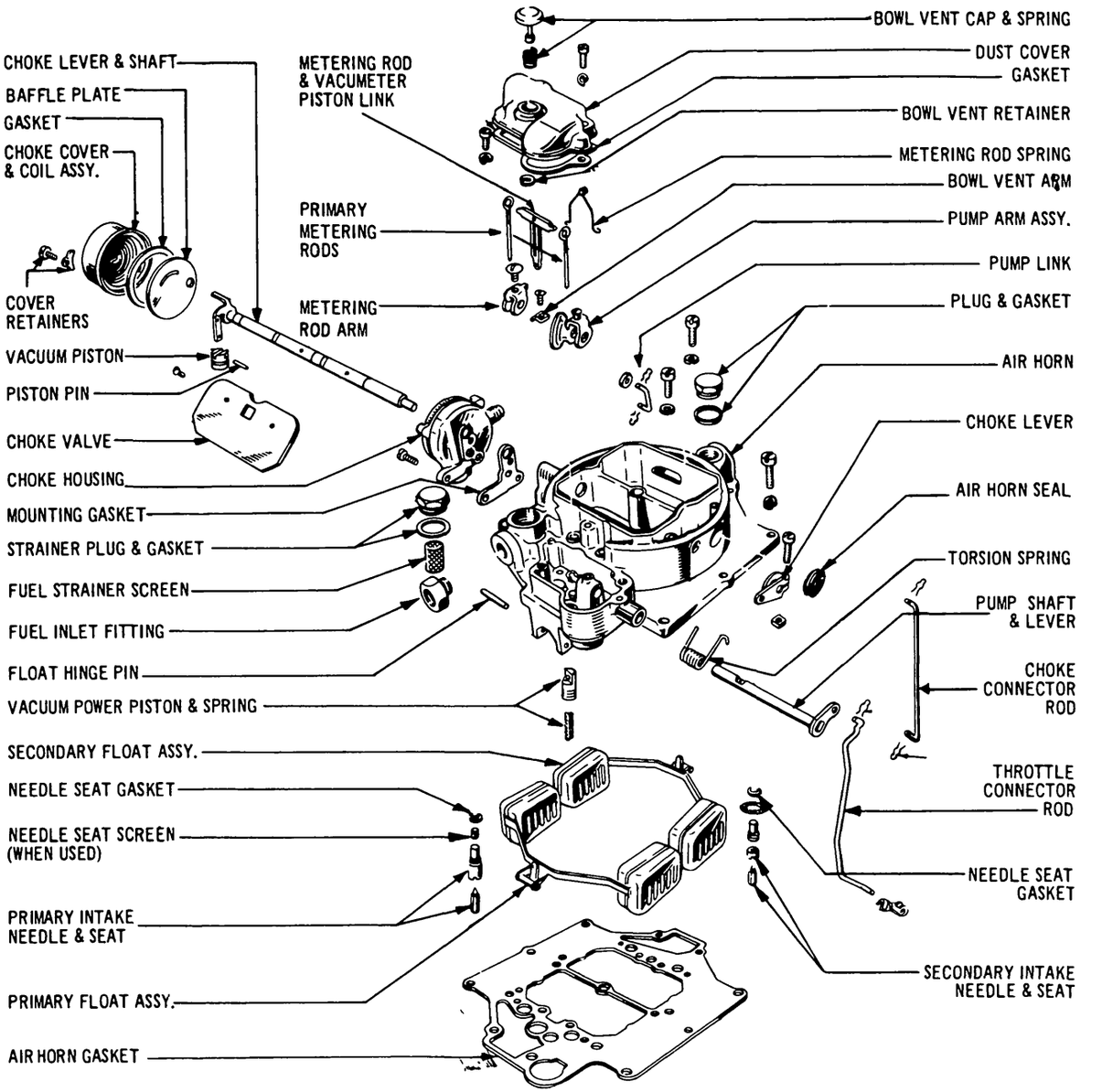
DESCRIPTION: These models are essentially double dual (two-barrel) carburetors with a conventional dual **primary** unit supplemented by a similar dual **secondary** unit for maximum engine performance. Both the primary and secondary units have separate fuel bowl and float systems, idle systems, main metering and discharge systems, and interconnected throttle valves as described below. Only the primary unit has an accelerating pump system and choke valve with an automatic choke control (the secondary throttle valves or auxiliary throttle valves are locked closed for starting and warming up and remain closed during part-throttle operation). ***See Throttle Linkage data below.***

Fuel System: A single fuel inlet is used (located on secondary side of bowl cover) with a passage in the cover leading to the fuel inlet valve for each float chamber. Each bowl has a twin float assembly controlling the fuel inlet valve. Bowls are vented to the air horn by vent tubes and have additional vent passages terminating at the air cleaner mounting flange. ***See Idle Vent data below also.***

Idling & Low Speed—Entire idle system is duplicated for both the primary and secondary sides of the carburetor except that idle mixture adjusting screws are provided only on the primary side (adjusting screw holes closed by plugs on secondary side). Fuel is discharged into each of the carburetor barrels and secondary idle system continues to function through-out the part throttle range until the secondary throttle valves also begin to open. Secondary throttle valves (auxiliary throttle valves on Buick carburetors) are locked out by the choke mechanism when the engine is cold and even when the engine is warm these valves do not begin to open until primary throttle valves are 50-60% open.

Driving Range (Less than 50-60% Throttle)—The primary throttle valves are directly connected to the accelerator pedal and open as the pedal is depressed (secondary throttle valves are linked to the primary throttle valves and remain closed until primary valves are 50-60% open). Opening of the primary throttle valves bring the main discharge nozzles into action and the primary idle systems drop out (secondary idle systems continue to operate as long as secondary throttle valves are closed). Fuel for these main nozzles is metered by primary main metering jets (these jets have the usual vacumeter type metering rods). Under conditions of low manifold vacuum (hill climbing, acceleration, etc.), the vacuum piston spring lifts the metering rods out of the metering jets and permits a greater fuel flow to the nozzles.

High Speed or Full Power (Mor than 50-60% Throttle)—At 50-60% throttle, the linkage between the primary and secondary throttle valve levers begins to open the secondary valves. These secondary valves open at a relatively greater rate so that both the primary and secondary valves reach the "wide open" position at the same time. In this range, fuel is discharged through all four carburetor barrels to provide maximum engine power. Secondary fuel is metered by secondary main metering jets and discharged through secondary main nozzles in exactly the same manner as on the primary side except that **no metering rods are used with the secondary metering jets.**



CARTER WCFB 4-BARREL CARBURETOR AIR HORN & FLOAT ASSY. (TYPICAL)

Accelerating Pump—Used only on primary side of carburetor. Pump is conventional type with pump plunger linked to primary throttle valve lever so that the additional fuel needed for acceleration is discharged through the pump jets into the primary carburetor barrels when the primary throttle valves are opened for acceleration. A relief check valve is located in the pump discharge channel to prevent excessive pressures in the pump circuit (opening of

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CARTER WCFB 4-BARREL CARBURETORS (C nt.)

check valve permits by-passing of fuel back into the bowl). Pump is effective only at car speeds below 30 MPH. (at higher speeds, pump plunger bottoms in cylinder and air is drawn through the jets from a vent passage opening into the bowl above the fuel level).

Atmospheric Idle Air Vent: *CAUTION—Several types have been used in production as follows:*

First Type (In Air Horn Casting)—Consists of a ball or disc type check valve located in the air horn casting under the dust cover and actuated by an arm on the pump countershaft. Valve is opened when throttle valves are closed to provide an external bowl vent which minimizes hot weather starting and idling difficulties due to fuel vapor formation in the fuel bowl. Vent valve closes when the throttle valves are opened. *NOTE*—On first carburetors produced after this type vent discontinued, a spacer collar was used to cover the flat area around the tapped hole in countershaft (to hold metering rod lever in correct position on countershaft).

Later Type (On Dust Cover)—Consists of a cap type valve on top of dust cover actuated by arm on pump countershaft (arm contacts lower end of valve stem and raises valve off its seat). Vent operates in same manner as first type (above).

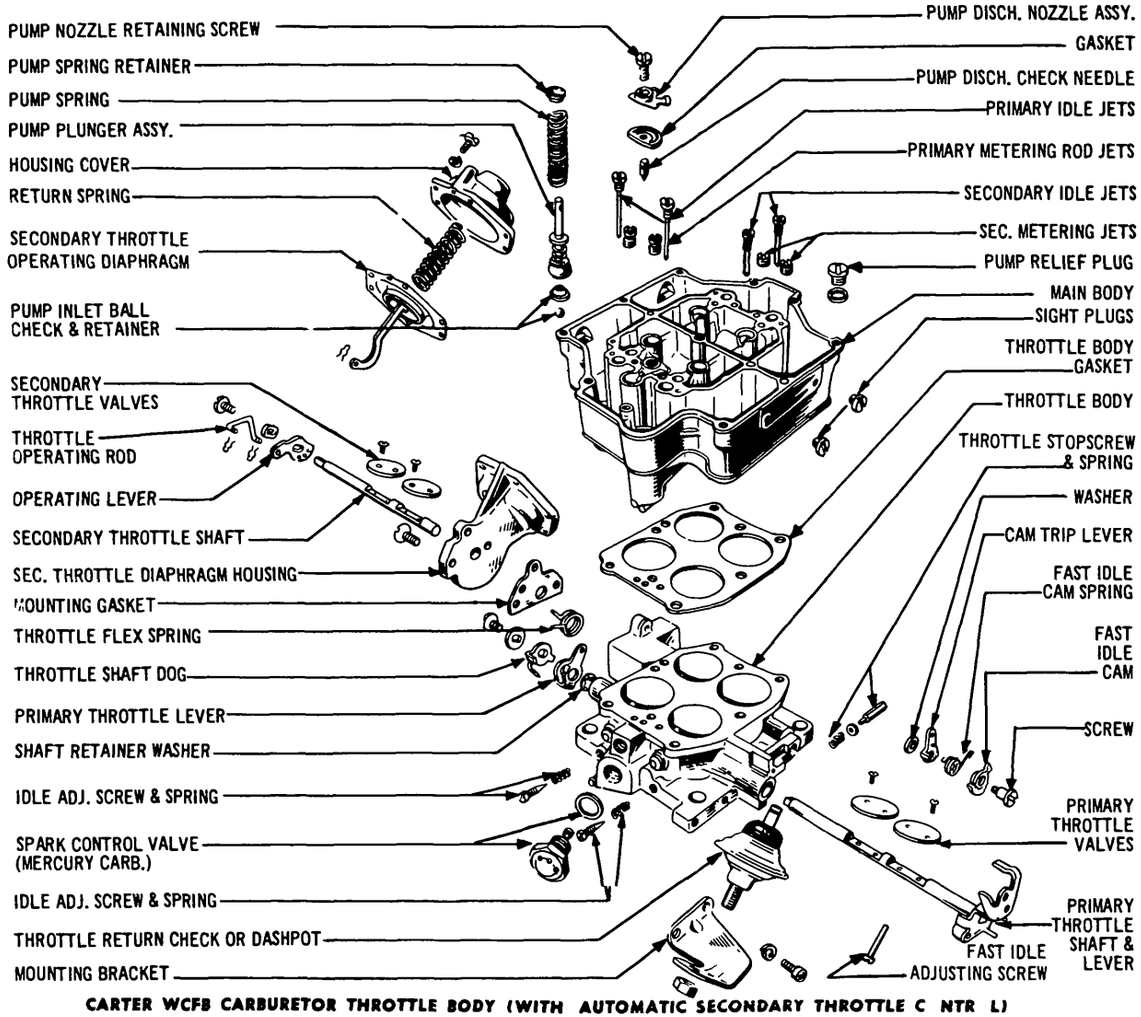
►*ADDITIONAL FEATURES NOT FOUND ON ALL CARBURETOR MODELS: Various carburetors, as indicated under "Adjustment" below, will have one or more of the following features.*

Primary & Secondary Throttle Linkage (Except Carburetors with Automatic Secondary Throttle Control): Secondary throttle valve lever is linked to a secondary actuating lever on primary throttle valve shaft with an overrun provision so that secondary valves do not begin to open until primary valves are 50-60% open. The linkage provides a more rapid opening of the secondary valves so that both the primary and secondary valves reach wide open position at the same time. This linkage must be checked and adjusted to insure this synchronized opening. *See Adjustment data.*

Automatic Secondary Throttle Control: Consists of a vacuum type control unit which opens and closes secondary throttle valves in accordance with air velocity through primary venturi (vacuum passage connected at primary venturi). Mechanical override linkage insures that secondary valves will always close with primary valves.

Auxiliary Throttle Valves: Velocity type valves located either over secondary throttle valves in main body or in throttle body. Auxiliary valve action is controlled by counterweight on shaft and valves are not operated by throttle linkage. On some carburetors, these valves are locked out when choke is operating and this lockout must be adjusted. *See Adjustment data.*

Secondary Throttle Lockout (Auxiliary Throttle Lockout on some Models): A means is provided by which the choke mechanism locks the secondary or auxiliary throttle valves closed while the choke is in operation so that no choke valve is required on secondary side of carburetor. This lockout mechanism differs on various carburetors but all types must be checked and adjusted to insure unlocking of the secondary valves for normal operation. *See Adjustment data.*



CARTER WCFB CARBURETOR THROTTLE BODY (WITH AUTOMATIC SECONDARY THROTTLE CONTROL)

Spring Loaded Primary Throttle Valves: Consists of a torsion spring on the throttle shaft between flex dog and throttle spring arm with a stop pin located on throttle shaft dog.

"Cross-Over" Type Automatic Choke: On the models using this type choke, the Thermostatic Coil Assembly is mounted in a well in the manifold and is linked to choke shaft lever by a rod (a plain cover is used on choke housing on air horn and a lever is mounted in end of choke shaft where it extends through cover). This type of automatic choke is adjusted differently.

Automatic Choke (Chevrolet 2816S, 2817S, 2818S, 3059S, 3060S, 3061S Carburetors): Automatic choke assembly is mounted on bracket on carburetor throttle body and is linked to choke valve lever by a connector rod. A special Choke Piston Rod Adjustment is required. See *Adjustments below.* On all other carburetors, automatic choke is mounted on air horn in the conventional manner.

ADJUSTMENT

►*CAUTION: Adjustments should be made in the sequence indicated below.*

CONTINUED ON NEXT PAGE

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

IDLE SETTING

Idl S tting (Except Cars with Two 4-Barrel Carburetors): With engine at normal operating temperature, automatic choke not operating (choke valve wide open), fast idle inoperative (fast idle screw on low step of fast idle cam), proceed as follows *(NOTE* - If initial adjustment required to allow engine to be started and warmed up, set both idle mixture adjusting screws as indicated in table below). Adjust idle speed adjusting screw for correct engine idle speed (see table below), then adjust each idle mixture adjusting screw (one screw for each primary barrel - two screws only) until engine idles smoothly and vacuum reading and RPM are at a maximum (use Vacuum Gauge and Tachometer) Readjust idle speed Adjust Throttle Return Check and Speed-up Control (where used) as directed on car model pages

Idle Setting (Cars with Tw 4-Barrel Carburetors): See individual car model pages for adjustment procedures and note the following·

►*1956 CHEVROLET CORVETTE RECOMMENDED CHANGE FOR IMPROVED IDLING & LOW SPEED OPERATION See 'Changes, Cautions, Corrections above for recommended changes to be made on these carburetors* Adjust carburetors as follows Adjust idle speed screw on REAR carburetor *(CAUTION - This is throttle stopscrew, NOT Idle Air Adjusting Screw which is not used for adjustments)* for correct hot or slow idle speed (see table below), then adjust both idle mixture screws on each carburetor (rear carburetor first front carburetor last) for highest vacuum reading and engine RPM with best engine idle "feel" Reset idle speed, recheck idle mixture screw setting, check and reset engine idle speed

►*1957-60 CHEVROLET CORVETTE WITH TWO CARBURETORS* Set throttle stopscrew on RFAR carburetor for correct idle speed *(NOTE - Throttle valves on FRONT carbur tor should remain closed at idle speed)* Adjust both idle mixture screws on each carburetor (rear carburetor first, front carburetor last) for best performance and engine idle "feel" Reset throttle stopscrew for correct engine RPM readjust idle mixture screws, recheck and reset engine idle speed

►***1957 CHRYSLER C-300 STUMBLE & STALLING CORRECTION: See "Chang s, Cautions, Corrections" above for idle s tting on these cars***

►*OLDSMOBILE 1955 NOTE* Manufacturer recommends that after setting idle as above (for highest vacuum reading and RPM), each screw should be turned out (Rich) ¼ turn which will provide desired idling performance Check this setting by opening throttle to 1000 RPM point and then snapping throttle closed If engine rolls from richness, turn each screw in (Lean) ⅛ turn

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Idl Mixtur Setting

Car & Carb.	Idle Screw Opening
Buick 2082S	½-1½ turns
Buick 2347S	1 1/8 turns
Buick (Others)	¾-1¾ turns
Cadillac	¾-1¾turns
Chevrolet 2505S,SA, 2555S	¾-1¾ turns
Chevrolet 2816S,17S,18S,3059S 60S,61S	½-2 turns
Chevrolet (Others)	¼-1¼ turns
Chrysler 2126S, 2367S,SA, 2589S	¾-1¾ turns
Chrysler 2317S, 2444S, 2445S	¼-1¼ turns
Chrysler 2534S, 2535S	½-1½ turns
Chrysler (Others)	1-2 turns
DeSoto 2210S, 2311S, SA	1-2 turns
DeSoto 2317S, 2445S, 2476S	¼-1¼ turns
DeSoto (Others)	½-1½ turns
Dodge 2191S	1-2 turns
Dodge 2443S, SA, 2622S, SA	¾-1¾ turns
Dodge 2445S, 2476S, 2698S	¼-1¼ turns
Dodge (Others)	1-1½ turns

Idle Mixtur Setting

Car & Carb.	Idle Screw Op ning
Hudson 2593S,SA	¾-1¾ turns
Lincoln & Continental 2404S, SA	½-1½ turns
Mercury 2361S, SA	¾-1¾ turns
Mercury 2404S, SA	½-1½ turns
Nash 2593S, SA	¾-1¾ turns
Oldsmobile	1-2 turns
Packard 985S, 2142S	1-2 turns
Packard 2084S, 2103S	1¼-2¼ turns
Packard 2394S, 2112S	¾-1¾ turns
Packard 2232S, 2284S	½-1½ turns
Plymouth 2302S, SA, SB, 2442S, 2735S	1-2 turns
Plymouth 2631S, 2632S, 2761S, 2762S	¾-1¾ turns
Plymouth (Others)	½-1½ turns
Pontiac 2364S, SA	1¼-2¼ turns
Pontiac 2268S, 2283S	¾-1¾ turns
Rambler 2593S, SA	¾-1¾ turns
Studebaker 2394S	¾-1¾ turns
Studebaker 2829S, 30S	½-1½ turns
Studebaker (Others)	½-1½ turns

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1954-56 Buick	450	② 450
1953-54 Cadillac	400	Ⓒ 400
1955-56 Chev Pass Car	450-600	② 400-450
1956 Corvette (1 Carb)	600	② 600
1956 Corvette (2 Carbs)&	600	② 600
1956 Corvette (2 Carbs)③	800-850	② 800-850
1957 Chev Pass Car	450	② 425
1957 Corvette (1 Carb)	450	② 425
1957 Corvette (2 Carbs)&	600	② 600
1957 Corvette (2 Carbs)③	800-850	② 800-850
1958 Chev Pass Car	475	② 450
1958 Corvette (1 Carb)	475	② 425
1958 Corvette (2 Carbs)&	600	② 600
1958 Corvette (2 Carbs)③	800-850	② 800-850
1959 Chev Pass Car	475	② 450
1959 Corvette (1 Carb)	475	② 450
1959 Corvette (2 Carbs)&	600	② 600
1959 Corvette (2 Carbs)③	800-850	② 800-850
1960 Chev Pass Car	475	② 450
1960 Corvette (1 Carb)	475	② 450
1960 Corvette (2 Carbs)&	600	② 600
1960 Corvette (2 Carbs)③	800-850	② 800-850
1954-55 Chrysler (Exc 300)		⑫ 475-500
1955 Chrysler 300		⑭ 700
1956 Chrysler (1 Carb)		⑫ 450-500
1956 Chrysler (2 Carbs)		⑫ 650
1957 Chrysler (1 Carb)	475-500	Ⓒ 475-500
1957 Chrysler (2 Carbs⑤)		⑫⑤ 600-650
1958 Chrysler 300D		⑭ 650-700
1955-56 DeSoto (1 Carb)	475-500	⑭ 475-500
1956 DeSoto (2 Carbs)		⑫ 600
1957 DeSoto (1 Carb)	450-500	⑭ 475-500

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1957 DeSoto (2 Carbs)	600-650	⑭ 600-650
1955 Dodge	450-500	⑫ 475-500
1956 Dodge (1 Carb)	450-500	⑭ 475-500
1956 Dodge (2 Carbs)		⑭500
1957 Dodge (D-67-2)	450-500	⑫ 475-500
1957 Dodge (Power Pack)	450-500	⑫ 475-500
1957 Dodge D-500 (1 Carb)	650	⑭650
1957 Dodge D-500 (2 Carbs)	600-650	⑭ 600-650
1957 Dodge D-500 (Sp Pol)	500-600	⑭ 500-600
1958 Dodge Royal V8	450-500	⑭ 475-500
1957 Hudson	550	⑭⑥ 425
1957 Lincoln & Continental		⑭ 475-500
1956-57 Mercury	475-500	② 425-450
1957 Nash	550	⑭⑥ 425
1952-55 Oldsmobile	425	② 400
1953-54 Packard	400-450	⑦ 375
1955 Packard	400-450	⑦ 400
1956 Packard	450-500	⑦ 450
1958 Packard	550-575	⑭ 575-600
1955-56 Plymouth	450-500	⑭ 475-500
1957 Plymouth (1 Carb)	450-500	⑭ 475-500
1957 Plymouth (2 Carbs)	600-650	⑭ 600-650
1958 Plymouth Fury	600-650	⑭ 600-650
1955 Pontiac	450-470	② 390-410
1956 Pontiac		⑭ 450-470
1957 Rambler	550	⑭⑥ 425
1955 Studebaker	500	⑭ 550-600
1956-57 Studebaker	550-600	⑭ 550-600
1958 Studebaker	550-575	⑭ 575-600
1959-60 Studebaker	550-600	Ⓒ 550-600

Ⓒ - With selector lever in either "D" (Drive) range, Air Conditioner "ON" (Summer), "OFF" (Winter)
② - With selector lever in "D" (Drive) range
③ - 800-850 RPM with special camshaft
⑭ - With selector lever in "N" (Neutral) range
⑤ - 650-750 RPM on C-300 Models with reworked carburetor *See "1957 Chrysler C-300 Stumble & Stalling C rr ction" abov*
⑥ - 475 RPM with Air Conditioner turn "ON"
⑦ - With selector lever in "H" (High) position
& - With Std Camshaft ③ - With Special Camshaft

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

►*CADILLAC IDLE SPEED SETTING PROCEDURE* Set idle speed in accordance with season as follows When air-conditioning being used (Summer months), place selector lever in "Dr," turn Air-conditioner "ON," set idle speed at 400 RPM When air-conditioning not being used (Winter months), place selector lever in "Dr," see that Air-conditioner "OFF," set idle speed at 400 RPM (it will be necessary to cut idle speed setting down from summer setting to maintain this 400 RPM idling speed)

Throttle Return Check (Dashpot) Adjustment: Used with some automatic transmissions. *See "CARBURETOR" n individual car model pages.*

Cadillac Idle Speed-up Control (Air Conditioned Cars): *See "CARBURETOR" on individual car model pages.*

Float Setting: *CAUTION - Primary & Secondary Float Assemblies must be checked and adjusted separately and both FLOAT LEVEL and FLOAT DROP must be checked for each assembly.* Remove bowl cover and float assembly from carburetor for these checks.

Float Level - Check and adjust as follows. Remove bowl cover gasket (take out float hinge pins, remove float assemblies and intake needles attached, remove gasket, reinstall floats). Invert bowl cover. Install correct gauge for each float assembly (see table below) on bowl cover under center of floats with notched ends of gauge fitted tightly against sides of bowl cover casting. Both floats should just clear horizontal section of gauge (adjust by bending float arms as required) and each float should barely touch vertical uprights on gauge (bend arms sideways for this clearance). This sideways adjustment is extremely important to prevent floats hanging up on sides of bowl casting.

"WEDGE TYPE" FLOAT CHECKING CAUTION: Float measurements (both horizontal and vertical) should be made near free end of floats

Float Setting

Primary Floats

		Height	Gauge No.
BUICK			
996S, 2053S, 2197S, 2358S		3/32"	T109-233
2082S		1/8"	T109-232
2347S		3/16"	T109-222
CADILLAC			
2005S, SA, 2072S, 2088S, 2109S		1/8"	T109-232
2110S, 2119S, SA, 2143S		1/8"	T109-232
CHEVROLET			
2218S, 2351S, 2366S, SA		1/8"	T109-232
2626S, 2627S, 2655S		1/8"	T109-232
2669S, 2656S, 2657S		1/8"	T109-232
2816S, 2817S, 2818S		5/32"	T109-236
3059S, 3060S, 3061S		5/32"	T109-236
2613S, 2614S, 2626S, 2627S		1/8"	T109-232
CHRYSLER			
2014S, 2126S, 2534S, 2535S		1/8"	T109-232
2317S		3/16"	T109-222
2314S, SA, 2367S, SA	Ⓒ	5/32"	T109-236
2589S, 2590S		5/32"	T109-236
2317S, 2444S, 2445S		7/32"	T109-283
2741S, 2742S		9/32"	T109-284

Primary Floats (Continued)

DESOTO			
2210S		1/8"	T109-232
2311S, SA	Ⓒ	5/32"	T109-236
2588S		5/32"	T109-236
2317S, 2445S, 2476S, 2532S		7/32"	T109-283
DODGE			
2191S, 2253S, 2181S		1/8"	T109-232
2432S, 2474S, 2534S, 2535S		1/8"	T109-232
2303S, SA, SB, 2660S		7/32"	T109-283
2443S, 2445S, 2476S		7/32"	T109-283
2532S, 2622S, SA, 2698S		7/32"	T109 283
HUDSON & NASH			
2593S, SA		1/8"	T109-232
LINCOLN & CONTINENTAL			
2404S, SA		1/16"	T109-293
MERCURY			
2361S		1/8"	T109-232
2404S, SA		1/16"	T109-293
OLDSMOBILE			
932S, 2059S		1/4"	T109-223
2016S, 2080S, 2059S, 2246S		3/16"	T109-222
PACKARD			
985S, 2084S, 2103S, 2142S		5/32"	T109-236
2112S, 2232S, 2284S, 2394S		1/8"	T109-232
2575S		3/16"	T109-222
PLYMOUTH			
2253S		1/8"	T109-232
2725S, 2302S,SA,SB, 2442S, 2530S, SA		7/32"	T109-283
2631S, 2632S, 2761S, 2762S		3/16"	T109-222
PONTIAC			
2268S, 2283S, 2364S		3/16"	T109-222
RAMBLER			
2593S, SA		1/8"	T109-232
STUDEBAKER			
2214S,SA,SB, 2219S,SA,SB		3/16"	T109-222
2574S, 2575S		3/16"	T109-222
2394S		1/8"	T109-232
2829S, 2830S		3/16"	T109-222

Secondary Floats

	Height	Gauge No.
BUICK		
996S, 2053S, 2197S, 2358S	3/16"	T109-222
2082S, 2347S	3/16"	T109-222
CADILLAC		
2005S,SA, 2072S, 2088S, 2109S	3/16"	T109-222
2110S, 2119S,SA, 2143S	3/16"	T109-222
CHEVROLET		
2218S, 2351S, 2366S, SA	1/4"	T109-223
2626S, 2627S, 2655S	1/4"	T109-223
2669S, 2656S, 2657S	1/4"	T109-223
2816S, 2817S, 2818S	9/32"	T109-284
3059S, 3060S, 3061S	9/32"	T109-284
2613S, 2614S, 2626S, 2627S	1/4"	T109-223

Secondary Floats (Continued)

CHRYSLER			
2041S		1/4"	T109-223
2126S, 2534S, 2535S		3/16"	T109-222
2317S, 2444S, 2445S		11/32"	T109-285
2314S, SA, 2367S, SA	Ⓑ	7/32"	T109-283
2589S, 2590S		9/32"	T109-284
2741S, 2742S		11/32"	T109-285
DE SOTO			
2210S		3/16"	T109-222
2311S, SA	Ⓑ	7/32"	T109-283
2317S, 2445S, 2476S		11/32"	T109-285
2532S, 2588S		9/32"	T109-284
DODGE			
2191S, 2253S, 2181S		3/16"	T109-222
2432S, 2474S, 2534S, 2535S		3/16"	T109-222
2445S, 2476S		11/32"	T109-285
2303S,SA,SB, 2443S,SA		9/32"	T109-284
2532S, 2622S, SA, 2698S		9/32"	T109-284
HUDSON & NASH			
2593S, SA		3/16"	T109-222
LINCOLN & CONTINENTAL			
2404S, SA		3/16"	T109-222
MERCURY			
2361S, 2404S, SA		3/16"	T109-222
OLDSMOBILE			
932S, 2059S		1/4"	T109-223
2016S, 2080S, 2246S		3/16"	T109-222
PACKARD			
985S, 2084S, 2142S, 2103S		5/32"	T109-236
2112S, 2232S, 2284S		5/32"	T109-236
2394S, 2575S		3/16"	T109-222
PLYMOUTH			
2253S		3/16"	T109-222
2725S, 2302S,SA,SB, 2530S, SA, 2442S		9/32"	T109-284
2631S, 2632S, 2761S, 2762S		11/32"	T109-285
PONTIAC			
2268S, 2283S		3/16"	T109-222
2364S		9/32"	T109-284
STUDEBAKER			
2214S, SA, SB, 2219S,SA,SB		3/16"	T109-222
2330S, 2394S, 2574S, 2575S		3/16"	T109-222
2829S, 2830S		3/16"	T109-222

Ⓒ - Supersedes previous setting of 1/8"

Ⓑ - Supersedes previous setting of 3/16".

Float Drop - *Primary & Secondary Float Drop is different on some carburetors Check and adjust all carburetors as follows* Hold bowl cover assembly upright so that floats hang down freely Use a scale to measure from machined lower surface of bowl cover (gasket removed) to top of float at center (or bottom of float at free end on carburetors noted in table) If distance not correct as shown in table below, adjust by bending stop tabs on float bracket

Float Drop Setting

	Primary	Secondary
BUICK		
996S, 2053S, 2082S	5/8"	11/16"
2197S, 2358S	19/32"	11/16"
2347S	11/16"	11/16"

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CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Fl at Dr p Setting (Continued)

CADILLAC		
2005S,SA, 2088S, 2072S	5/8"	11/16"
2119S,SA, 2109S, 2110S, 2143S	5/8"	11/16"
CHEVROLET		
2218S, 2351S, 2366S, SA	5/8"	3/4"
2505S, 2555S, 2626S, 2627S	5/8"	3/4"
2655S, 2669S, 2656S, 2657S	5/8"	3 4"
2613S 2614S	5/8"	3/4"
2816S, 2817S, 2818S	⑤2"	⑤2"
3059S, 3060S, 3061S	⑤2"	⑤2"
2613S, 2614S, 2626S, 2627S	5/8"	3/4"
CHRYSLER		
2041S, 2126S	5/8"	11/16"
2317S, 2444S, 2445S	23/32"	27/32"
2314S,SA, 2367S, SA	③21/32"	⑩23/32"
2589S, 2590S	21/32"	25/32"
2741S, 2742S	23/32"	23/32"
DESOTO		
2210S	5/8"	11/16"
2311S, SA	③21/32"	⑩23/32"
2317S, 2445S, 2476S	23/32"	27/32"
2532S	23/32"	25/32"
2588S	21/32"	25/32"
DODGE		
2191S, 2253S, 2181S	5/8"	11/16"
2432S, 2474S	5/8"	11/16"
2303S,SA,SB, 2443S,SA, 2660S	23/32"	25/32"
2445S, 2476S	23/32"	27/32"
2532S, 2622S,SA, 2698S	25/32"	25/32"
HUDSON & NASH		
2593S	5/8"	11/16"
LINCOLN & CONTINENTAL		
2404S,SA	9/16"	11 16"
MERCURY		
2361S	5/8"	11/16"
2404S,SA	9/16"	11/16"
OLDSMOBILE		
932S, 2059S	3/4"	3/4"
2016S	1/2"	1/2"
2080S, 2246S	11/16"	11/16"
PACKARD		
985S, 2084S, 2142S, 2103S, 2112S	5/8"	5/8"
2232S, 2284S, 2394S	5/8"	21/32"
2575S	11/16"	11/16"
PLYMOUTH		
2253S	5/8"	11/16"
2302S,SA,SB, 2442S, 2530S, SA	23/32"	25/32"
2631S, 2632S, 2761S, 2762S, 2725S	23/32"	27/32"
PONTIAC		
2268S, 2283S, 2634S, SA	11/16"	11/16"
RAMBLER		
2593S	5/8"	11/16"
STUDEBAKER		
2214S,SA,SB, 2219S,SA,SB, 2330S	11/16"	11/16"
2394S	5/8"	11/16"
2574S, 2575S	11/16"	11/16"
2829S, 2830S	11/16"	11/16"

③ - Supersedes previous setting of 5/8"
⑩ - Supersedes previous setting of 11/16"
⑤ - Distance to bottom of float at free end

Accelerating Pump Stroke: *This is a linkage adjustment and not a seasonal change recommendation* Check and adjust pump stroke as follows Remove dust cover on bowl cover See that pump connector link engaged in correct hole in pump arm (see table below), back off throttle stopscrew so that throttle valves are fully closed, place straightedge across top of dust cover boss at pump arm The flat on top of the pump arm should be parallel with the straightedge Adjust by bending throttle connector at lower angle using bending tool T109-213 Then check Metering Rod Adjustment

Pump Connector Setting	
BUICK	**Pump Link Engagement**
2082S, 2197S, 2358S	Outer Hole
CADILLAC	
2109S, 2110S, 2143S	Outer Hole
CHEVROLET	
2218S, 2351S, 2366S,SA	Outer Hole
2362S, 2419S	Inner Hole
2505S,SA, 2555S,2655S,2656S,2657S	Outer Hole
2613S,2614S,2626S,2627S	Inner Hole
2669S,2816S,2817S,2818S	Outer Hole
3059S,3060S,3061S	Outer Hole
CHRYSLER	
2041S, 2126S,2314S,SA, 2317S	Outer Hole
2367S,SA, 2444S,2445S	Outer Hole
2589S, 2590S, 2534S, 2535S	Center Hole
2741S, 2742S	Center Hole
DESOTO	
2210S,2311S,SA, 2317S	Outer Hole
2445S, 2476S, 2532S	Outer Hole
2588S, 2635S, 2636S	Center Hole
DODGE	
2191S, 2181S, 2253S, 2303S, SA, SB	Outer Hole
2432S, 2443S,SA, 2474S, 2445S	Outer Hole
2476S, 2532S	Outer Hole
2534S, 2535S, 2622S, SA	Center Hole
2633S, 2634S, 2660S, 2698S	Center Hole
HUDSON & NASH	
2593S,SA	Non-Adj
LINCOLN & CONTINENTAL	
2404S,SA	Non-Adj
MERCURY	
2404S,SA, 2361S,SA	Non-Adj
OLDSMOBILE	
2059S, 2246S	Outer Hole
PACKARD	
2103S,2112S,2142S,2232S,2284S	Outer Hole
2394S, 2575S	Outer Hole
PLYMOUTH	
2253S, 2302S, SA, SB, 2442S, 2725S	Outer Hole
2530S,SA, 2631S, 2632S, 2761S, 2762S	Center Hole
PONTIAC	
2268S, 2283S, 2364S,SA	Outer Hole
RAMBLER	
2593S,SA	Non-Adj
STUDEBAKER	
2214S,SA,SB, 2219S,SA,SB, 2330S,SB	Outer Hole
2394S, 2374S, 2375S	Outer Hole
2829S, 2830S	Outer Hole

►*ADJUSTMENT CAUTION* When making pump stroke adjustment (above), throttle connector link should be bent at upp r angle on the following carburetors 2082S (Early), 2181S (Early), 2253S (Early), 2302S,SA, SB (Early), 2303S, SA SB, 2317S, 2432S (Early), 2442S (Early), 2443S, SA (Farly), 2444S, 2445S, 2474S (Farly), 2476S

►*STUDEBAKER ADJUSTMENT NOTE* On carburetors with dashpots, there should be 015" clearance between countershaft arm and dashpot bracken when making pump stroke adjustment (above) If necessary, bend throttle connector rod slightly

Metering Rods (Primary Side): No gauge required for this adjustment and no metering rods are used on secondary side. With dust cover removed and primary throttle valves fully seated (as for Pump Stroke Adjustment), loosen setscrew in metering rod arm on pump countershaft just enough so that arm has slight bind on shaft, lift arm slightly, Depress metering rod link until metering rods just bottom in bowl casting, position metering rod arm so that it just contacts link, tighten arm setscrew. Then adjust Atmospheric Idle Vent (below).

ATMOSPHERIC IDLE VENT

Atmospheric Idle Vent (Bowl Vapor Vent): *NOTE - This vent not used on all carburetors* Vent is located on dustcover and operated by arm on pump countershaft within dustcover recess Check and adjust vent as follows Make certain that gasket is in place and that dustcover is tight Back out throttle stopscrew so that throttle valves are fully closed Use gauge to check clearance between lower edge of vapor vent valve and valve seat on top surface of dustcover If clearance not correct (see table below) adjust by removing dustcover and bending vapor vent arm

Vapor Vent Valve Setting	
CADILLAC	**Valve Clearance & Checking Gaug**
2109S, 2110S	1/16" T109-197
CHEVROLET	
2218S, 2351S, 2366S, SA, 2362S	1/16" T109-197
2419S, 2505S, SA, 2555S, 2655S	1/16" T109-197
2613S, 2614S, 2626S, 2627S	1/16" T109-197
2656S, 2657S, 2669S	3/32" T109-125
2816S, 2817S, 2818S	3/32" T109-125
3059S, 3060S, 3061S	3/32" T109-125
CHRYSLER	
2041S, 2126S, 2314S, SA, 2317S	1/16" T109-197
2367S, SA, 2444S, 2445S, 2589S	1/16" T109-197
2590S, 2534S, 2535S, 2741S, 2742S	1/16" T109-197
DE SOTO	
2210S, 2311S, SA 2317S, 2445S	1/16" T109-197
2476S, 2532S, 2588S, 2635S, 2636S	1/16" T109-197
DODGE	
2191S, 2303S, SA, SB, 2443S,SA	1/16" T109-197
2445S, 2476S, 2532S, 2534S, 2535S	1/16" T109-197
2622S,SA, 2633S, 2634S, 2660S, 2698S	1/16" T109-197
HUDSON & NASH	
2593S, SA	1/16" T109-197
LINCOLN & CONTINENTAL	
2404S, SA	1/16" T109-197
MERCURY	
2404S, SA, 2361S, SA	1/16" T109-197
OLDSMOBILE	
2059S, 2246S	1/16" T109-197

CONTINUED ON NEXT PAGE

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Vap r Valv V nt Setting
Valve Clearance & Checking Gauge

PACKARD	
2103S, 2112S, 2142S	3/32" T109-125
2232S, 2284S, 2394S	1/16" T109-197
PLYMOUTH	
2303S, SA, SB, 2442S 2530S, SA	1/16" T109-197
2631S, 2632S, 2761S, 2762S	1/16" T109-197
PONTIAC	
2364S, SA	1/16" T109-197
RAMBLER	
2593S, SA	1/16" T109-197
STUDEBAKER	
2394S	1/16" T109-197

AUTOMATIC CHOKE

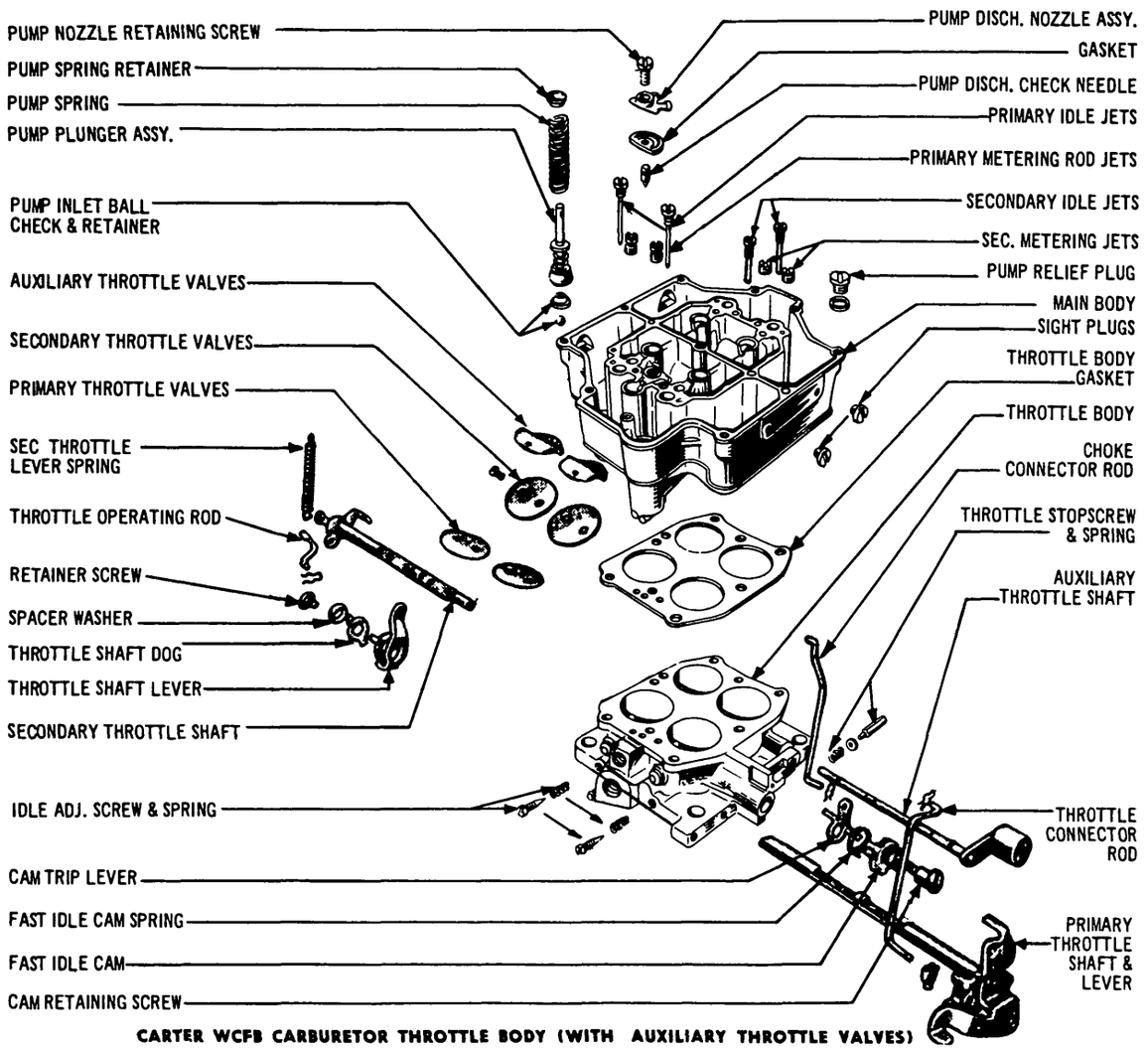
►*AUTOMATIC CHOKE NOTE: Choke Modifier is used on all Cadillac carburetors and a "Cross-Over" type choke is used on some DeSoto, Dodge & Plymouth Carburetors* Chevrolet carburetors with Automatic Choke mounted on throttle body require special Choke Piston Lever Adjustment (choke piston located in air horn) as directed below Adjust each type automatic choke as follows

Choke Setting (Except Choke Modifier & "Cross-Over" type Chokes): Adjust by loosening choke cover screws and rotating cover and coil assembly to align index mark on cover with correct mark on choke housing See table below for settings.

►*CHEVROLET ADJUSTMENT CAUTION (2816S, 17S, 18S, 3059S, 60S, 61S)* On these models with automatic choke assembly mounted on throttle body, thermostatic coil and housing assembly is reversed and should be rotated **counterclockwise** for leaner setting (clockwise on other models)

Choke Setting ("Cross-Over" Type Choke): DeSoto 2532S, Dodge 2532S, 2622S, SA, 2698S, 2660S, Plymouth 2302S, SA, SB. 2442S, 2530S - "Cross-Over" type choke is mounted in a well in manifold casting To adjust, with unit off engine, loosen mounting post locknut and turn mounting post with screwdriver until index mark on disc is centered on scale. When choke is installed on engine, lift cover disc and open and close choke valve manually to make sure connector rod clears sides of hole in housing cover If rod does not clear, replace unit (bending the rod will affect choke calibration) *See "Carter & Stromberg (Cross-Over) Automatic Choke" for complete data.*

Choke Setting (Cadillac Carbs. with Choke Modifier): Loosen choke cover retaining screws, rotate cover assembly as required (see table below for settings), then tighten cover screws to retain this setting. Disconnect choke modifier rod at lower end and rotate metal pointer and lever (to which rod is connected) counterclockwise from its free position until thermostatic coil spring picks up the choke valve lever, then continue to rotate pointer until it lines up with plastic pointer on cover Hold pointer in this position Loosen clampscrew in modifier lever, rotate lever until it points forward (away from fuel inlet) and scribed line on lever is vertical, then tighten clampscrew. Use Bending Tool J-1137 to bend modifier rod at upper angle until rod freely enters hole in primary throttle valve lever with throttle valves seated. Connect rod and install clip.



CARTER WCFB CARBURETOR THROTTLE BODY (WITH AUXILIARY THROTTLE VALVES)

Automatic Choke Setting

	Choke Setting
BUICK	
2082S, 2197S, 2358S	Centered
2347S	1 Pt Lean
CADILLAC	
2109S, 2110S	Centered
CHEVROLET	
2218S, 2351S	② 2 Pts Lean
2366S, SA, 2362S, 2505S, SA, 2555S	Centered
2614S, 2627S, 2655S, 2656S, 2657S	Centered
2669S, 2816S, 2817S, 2818S	① Centered
3059S, 3060S, 3061S	Centered
CHRYSLER	
2041S, 2126S, 2317S, 2444S, 2445S	Centered
2314S, SA, 2367S, SA	1 Pt Rich
2535S, 2589S, 2599S, 2742S	1 Pt Rich
DE SOTO	
2210S, 2317S, 2445S, 2476S, 2532S	Centered
2311S, SA, 2588S, 2636S	1 Pt Rich
DODGE	
2181S, 2253S, 2432S, 2443S, SA, 2445S	Centered
2191S	3 Pts Lean
2303S, SA, SB, 2535S, 2634S	1 Pt Rich
2474S, 2532S, 2622S, SA, 2660S, 2698S	Centered
HUDSON & NASH	
2593S, SA	Centered
LINCOLN & CONTINENTAL	
2404S, SA	Centered

① - On 2818S, set 1 Pt. Lean to correct stalling.
② - Supersedes centered setting. Will correct loading

CONTINUED ON NEXT PAGE

CARTER WCFB 4-BARREL CARBURETORS (C nt.)

Aut matic Choke Setting

	Choke Setting
MERCURY	
2361S, SA	2 Pts Rich
2404S, SA	Centered
OLDSMOBILE	
2059S, 2246S	Centered
PACKARD	
2103S, 2142S	Centered
2112S	1½ Pts Lean
2232, 2284S, 2575S	1 Pt Rich
PLYMOUTH	
2253S, 2302S,SA,SB 2442S, 2530S,SA	Centered
2632S, 2762S	1 Pt Rich
2725S	Centered
PONTIAC	
2268S, 2283S	Centered
2364S, SA	1 Pt Rich
RAMBLER	
2593S,SA	Centered
STUDEBAKER	
2214S,SA,SB, 2219S,SA,SB	1 Pt Rich
2330S, 2574S 2575S	1 Pt Rich
2394S	Centered
2829S, 2830S	**② 1 Pt. Rich**

② - On 1959 cars, set 1 or 2 Pts. Rich when installing improved choke piston to correct stumble or hesitation complaints *See Changes, Cautions, Corrections (above).*

Ch ke Piston L ver Adjustment (Chevrolet 2816S, 17S, 18S; 3059S, 60S, 61S): *Not required on other carburetors wh re automatic choke mounted on air horn and linked dir ctly to choke shaft lever* Remove automatic choke cover and coil assembly, gasket, and baffle plate for access to choke vacuum piston Modify a 028" wire gauge (Tool T109-189) by bending outer 1/8" portion of wire at 90° angle. Block throttle valves approximately half open Open choke valve and insert wire gauge in choke piston cylinder so that bent end is between top of slot in cylinder and bottom of slot in piston, close choke valve by pressing on piston lever until wire gauge is gripped and held in place *(NOTE* - A rubber band can be used to hold choke lever in this position while checking choke valve opening) Choke valve opening or clearance between top edge of valve and air horn wall should be as shown in table below Adjust by bending choke connector rod at lower angle

Chok Pist n Lever Setting

Car & Carb.	Choke Opening	Checking Gauge
Chevrolet 2816S	032"	Ⓒ
Chevrolet 2817S,3060S,3061S	080"	T109-234
Chevrolet 2818S, 3059S	3/32"	T109-125

Ⓒ - Supersedes original specification of 080" (Gauge T109-234) to correct stalling when cold *See Changes, Cautions, Corrections above*

Ch k R d Adjustm nt: *This adjustment is preliminary to checking and adjusting Fast Idle, Unloader, and Secondary Throttle Lockout* Loosen choke lever clampscrew, insert wire gauge of correct size (see table below) between tang on fast idle cam and boss on throttle body casting (hold gauge in place by pressure on choke lever) and take up all slack in linkage Hold choke valve closed and tighten clampscrew

Ch k R d Setting

	Gaug Size & N.
BUICK	
2082S, 2197S, 2347S	020" T109-29
2358S	025" T109-189
CADILLAC	
2109S, 2110S	020" T109-29
CHEVROLET	
2218S, 2351S, 2362S, 2366S, SA	020" T109-29
2505S,SA, 2555S, 2614S, 2627S	020" T109-29
2655S, 2656S, 2657S, 2669S	020" T109-29
2816S, 2817S, 2818S	020" T109-29
3059S, 3060S, 3061S	020" T109-29
CHRYSLER	
2041S, 2314S, SA, 2367S,SA	020" T109-29
2317S, 2444S, 2445S	015" T109-44
2126S, 2742S	.010" T109-200
2535, 2589S, 2590S	.020" T109-29
DE SOTO	
2210S	.010" T109-200
2311S,SA, 2532S, 2588S, 2636S	020" T109-29
2317S, 2445S, 2476S	015" T109-44
DODGE	
2181S, 2191S, 2253S, 2303S,SA,SB	.020" T109-29
2432S, 2443S,SA, 2474S, 2532S	020" T109-29
2445S, 2476S	.015" T109-44
2535S, 2622S,SA, 2634S	020" T109-29
2660S, 2698S	020" T109-29
HUDSON & NASH	
2593S, SA	.026" T109-189
LINCOLN & CONTINENTAL	
2404S,SA	Ⓒ
MERCURY	
2361S, SA, 2404S, SA	Ⓒ
OLDSMOBILE	
2059S, 2246S	.020" T109-29
PACKARD	
2103S, 2112S, 2142S	020" T109-29
2232S, 2284S, 2575S	020" T109-29
2394S	025" T109-189
PLYMOUTH	
2253S, 2302S,SA,SB, 2442S	.020" T109-29
2530S, SA, 2632S, 2725S, 2762S	020" T109-29
PONTIAC	
2268S, 2283S, 2364S,SA	020" T109-29
RAMBLER	
2593S, SA	026" T109-189
STUDEBAKER	
2214S, SA, SB, 2219S, SA, SB	.020" T109-29
2330S,SB, 2574S, 2575S	020" T109-29
2394S	025" T109-189
2829S, 2830S	020" T109-29

Ⓒ - No clearance (cam lip should lightly contact boss on flange casting)

Fast Idle Setting: This adjustment can be made with carburetor "Off Engine" (on the bench), or with carburetor "On Engine" (with engine operating)

►*CHEVROLET CORVETTE 2614S & 2627S ADJUSTMENT NOTE:* **Tang on throttle lever is used instead of a fast idle adjusting screw Adjustment is made by bending this tang**

►*CHEVROLET NOTE (2816S, 2817S, 2818S, 3059S, 3060S, 3061S)* No fast idle adjustment required on these carburetors Fast idle speed will be correct when hot or slow idle speed correctly set

►*CHRYSLER 2535S, DE SOTO 2636S, DODGE 2535S & 2634S, PLYMOUTH 2632S & 2762S ADJUSTMENT CAUTION On these models, no fast idle adjusting screw is used and fast idle should be adjusted as follows* Insert wire gauge of correct size (see table below) between primary throttle valves and carburetor wall on side opposite idle adjusting screws, move choke valve to fully closed position, bend fast idle tang on throttle lever so that throttle valves have slight drag on gauge with tang resting on high step of fast idle cam

►*OLDSMOBILE NOTE·* Manufacturer recommends that fast idle be set with carburetor on engine (see "On Engine" Adjustment below)

Fast Idle Adjustment "Off Engine"—Hold choke valve tightly closed so that fast idle cam rotated to point where high step of cam is under fast idle screw Turn fast idle screw in or out until primary throttle valve opening is correct (see table below) Measure this opening between edge of valve and carburetor wall on side opposite idle ports

Fast Idle Setting 'Off Engine"

	Gauge Size & N.
BUICK	
2082S, 2197S	018" T109-44
2347S	020" T109-29
2358S	016" T109-44
CADILLAC	
2109S, 2110S	020" T109-29
CHEVROLET	
2218S, 2351S, 2362S, 2366S,SA	015" T109-44
2505S,SA, 2555S 2655S, 2657S	015" T109-44
2614S Ⓒ, 2627S Ⓒ, 2656S	018" T109-44
CHRYSLER	
2041S, 2742S	.015" T109-44
2126S 2535S Ⓒ	018" T109-44
2314S,SA, 2367S,SA, 2589S, 2590S	012" T109-200
2317S, 2444S, 2445S	006- 010" T109-200
DE SOTO	
2210S, 2636S Ⓒ	018" T109-44
2311S,SA, 2588S	.012" T109-200
2317S, 2445S, 2476S	.006- 010" T109-200
2532S	010" T109-200
DODGE	
2181S, 2253S, 2302S,SA,SB	012" T109-200
2191S	015" T109-44
2432S, 2443S,SA, 2474S	.012" T109-200
2532S 2622S,SA, 2660S, 2698S	010" T109-200
2535S Ⓒ 2634S Ⓒ	018" T109-44
HUDSON & NASH	
2593S, SA	023" T109-189
LINCOLN & CONTINENTAL	
2404S,SA	.030" T109-29
MERCURY	
2361S,SA	.023" T109-189
2404S,SA	030" T109-29
OLDSMOBILE	
2059S, 2246S	② 015" T109-44
PACKARD	
2103S, 2142S	.020-.023" T109-29
2112S	.027-.029" T109-189
2232S, 2284S	.031" T109-29
2394S. 2575S	.023" T109-189

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CARTER WCFB 4-BARREL CARBURETORS (Cont.)

Fast Idle Setting (Continued)

PLYMOUTH	
2253S, 2442S	012" T109-200
2302S, SA, SB, 2725S	015" T109-44
2530S,SA	010" T109-200
2632S ℂ, 2762S ℂ	018" T109-44
PONTIAC	
2268S, 2283S	018" T109-44
2364S, SA	030" T109-29
RAMBLER	
2593S, SA	023" T109-189
STUDEBAKER	
2214S,SA,SB, 2219S,SA,SB, 2330S	023" T109-189
2394S,2574S,2575S,2829S,2830S	023" T109-189

ℂ - No fast idle adjusting screw *See special Adjustment Caution above.*

℗ - Manufacturer recommends that fast idle be set "On Engine" (below)

Fast Idle Adjustment "On Engine"—Engine and Transmission must be at operating temperature, shift lever in neutral, and air cleaner in place (Buick—Disconnect fast idle connector rod from trip lever so that cam may be held in "cold" position while engine running with choke valve fully open) On models listed below rotate fast idle cam so fast idle screw rests on high step of cam Adjust fast idle screw to obtain fast idle speed as indicated in table below

►*CHEVROLET CORVETTE 2614S & 2627S ADJUSTMENT NOTE:* Tang on throttle lever is used instead of a fast idle adjusting screw Adjustment is made by bending this tang

Car & Carb.	Fast Idle Speed	Engine RPM
1954 Buick		1200
1955 Buick		1800
1956 Buick		1300
1954 Cadillac		1700
1955-56 Chevrolet		1600
1956-57 Chevrolet (2362S, 2366S, SA)		1800
1957 Chevrolet (2555S)		1600
1957 Chevrolet (2669S)		1700
1957 Chevrolet (2505S,SA, 2614S, 27S, 55S)		1800
1958 Chevrolet (2657S)		1600
1958 Chevrolet (2656S)		1800
1958-60 Chevrolet (2614S, 2627S)		1800
1955-56 Chrysler		1400
1957 Chrysler (exc 300)		1350-1400
1957-58 Chrysler 300		1450-1500
1955-57 DeSoto (exc Advntr)		1350-1400
1955-57 DeSoto Advntr		1450-1500
1955-56 Dodge		1300-1350
1957-58 Dodge		1350-1400
1957 Hudson		1600-1800
1957 Lincoln		ℂ 800
1956 Mercury		ℂ 650
1957 Mercury		ℂ 800
1957 Nash		1600-1800
1954-55 Oldsmobile		1400-1500
1954-55 Packard		1500
1955-56 Plymouth		1350-1400
1957-58 Plymouth (2632S, 2762S)		1450
1955-56 Pontiac		1900
1957 Rambler		1600-1800

ℂ - With stopscrew on low step of fast idle cam

UNLOADER

Unloader *After Choke Rod adjusted (above),* rotate primary throttle valves to wide open position and hold valves in this position Check choke valve opening by inserting correct Unloader Gauge (see table below) between edge of choke valve and air horn wall With correct setting choke valve should have slight drag on gauge Adjust by using bending tool T109-41 to bend unloader tang on throttle lever as required

Unloader Setting

	Gauge Size & No.
BUICK	
2358S	3/16" T109-28
2082S, 2197S	11/64" T109-166
2347S	5/32" T109-154
CADILLAC	
2109S, 10S, 2143S	3/16" T109-28
CHEVROLET	
2218S,2351S,2362S,2366S,SA	3/16" T109-28
2505S,SA, 2555S, 2614S	3/16" T109-28
2627	1/8" T109-36
2655S, 2656S, 2657S	3/16" T109-28
2816S, 2817S, 2818S	3/16" T109-28
3059S, 3060S, 3061S	3/16" T109-28
CHRYSLER	
2041S,2126S,2314S,SA, 2317S	3/16" T109-28
2367S,SA, 2444S,2445S,2535S	3/16" T109-28
2589S, 2590S	15/64" T109-32
2742S	1/8" T109-36
DE SOTO	
2210S, 2311S,SA, 2636S	3/16" T109-28
2317S, 2445S, 2476S	11/64" T109-166
2532S, 2588S	15/64" T109-32
DODGE	
2181S, 2191S, 2253S	3/16" T109-28
2303S, SA, SB, 2443S, SA	11/64" T109-166
2432S, 2474S, 2535S, 2634S	3/16" T109-28
2445S, 2476S, 2660S	11/64" T109-166
2532S, 2622S, SA	15/64" T109-32
HUDSON & NASH	
2593S, SA	9/32" T109-126
LINCOLN & CONTINENTAL	
2404S, SA	1/8" T109-36
MERCURY	
2361S,SA, 2404S, SA	1/8" T109-36
OLDSMOBILE	
2059S, 2246S	3/16" T109-28
PACKARD	
2103S, 2112S, 2142S, 2394S	9/32" T109-126
2232S, 2284S	3/16" T109-28
2575S	9/64" T109-34
PLYMOUTH	
2253S	3/16" T109-28
2302S, SA, SB, 2442S, 2725S	11/64" T109-166
2530S, SA	15/64" T109-32
2632S, 2762S	1/8" T109-36
PONTIAC	
2268S, 2283S, 2364S, SA	1/8" T109-36
RAMBLER	
2593S, SA	9/32" T109-126
STUDEBAKER	
2214S,SA,SB, 2219S,SA,SB	9/64" T109-34
2330S, SB, 2574S, 2575S	9/64" T109-34
2394S	9/32" T109-126
2829S, 2830S	9/64" T109-34

CARTER CAR STARTER

1954-56 Buick

Checking & Adjustment: Place transmission in neutral Remove left oil filler cap (1956). Back off throttle stopscrew and make sure that fast idle cam is in slow idle position and throttle valves are fully closed On Buick Dynaflow cars, make sure dashpot is properly adjusted and is not holding throttle valves open Hold a 6" straightedge against rear face of throttle lever lower arm (1956 Buick), against choke unloader arm (other models), with scale resting on rocker cover or against carburetor body Mark rocker cover or carburetor body at edge of scale Turn on ignition and slowly open throttle until starter begins to operate, then make a second mark on rocker cover or carburetor body at this point Distance between marks should be as indicated in table below Adjust switch by changing timing shims on contact spring *See "Carter Car Starter" in Electrical Section*

Carter Car Starter Switch Setting

Car Model	Arm Travel
Buick (1952-54)	3/4-1 1/16"
Buick (1955)	9/16-15/16"
Buick (1956)	1/2-13/16"

AUXILIARY THROTTLE VALVES

Auxiliary Throttle Valves (Buick 2082S, 2197S, 2358S, 2347S;Chevrolet 2555S, 2505S,SA, 2655S, 2626S, 2627S, 2669S, 2657S, 2656S, 2362S, 2419S, 2613S, 2614S, 2626S, 2627S, 2816S, 2817S, 2818S, 2059S, 3060S, 3061S; Chrysler 2317S, 2444S, 2445S, 2534S, 2525S, 2741S, 2742S; DeSoto 2317S, 2476S, 2445S, 2532S, 2635S, 2636S; Dodge 2253S, 2181S, 2303S,SA,SB, 2474S, 2432S, 2443S,SA, 2476S, 2445S, 2532S, 2622S,SA, 2633S, 2634S, 2535S, 2698S, 2660S; Hudson, Nash & Rambler 2593S,SA; Packard 2394S, 2575S; Plymouth 2253S, 2302S,SA,SB, 2442S, 2530S,SA, 2631S, 2632S, 2725S, 2761S, 2762S; Pontiac 2364S,SA; Studebaker 2394S, 2574S, 2575S, 2829S, 2830S): Velocity type valves located directly above secondary throttle valves On some carburetors, the auxiliary throttle valves are locked out when choke is operating S *"Auxiliary Throttle Valve Adjustment" and "Auxiliary Throttle Valve Lockout Adjustment" below for carburetors in which these adjustments are required.*

Auxiliary Throttle Adjustment (Buick 2082S, 2197S, 2358S, 2347S; Chrysler 2317S, 2444S, 2445S, 2534S, 2535S; DeSoto 2317S, 2476S, 2445S, 2532S, 2635S, 2636S; Dodge 2253S, 2181S, 2303S,SA,SB, 2474S, 2432S, 2443S,SA, 2476S, 2445S, 2532S, 2622S,SA, 2534S, 2535S, 2660S, 2698S; Plymouth 2253S, 2302S, SA,SB, 2442S, 2530S,SA, 2631S, 2632S, 2725S, 2761S, 2762S) - Disconnect secondary throttle operating rod Adjust stop lug on secondary throttle lever using Bending Tool T109-214 until clearance between lower edge of auxiliary throttle valve and bore is 27/64" (Gauge T109-242) with stop lug against stop on flange.

Auxiliary Throttle Valve Lockout Adjustment (Buick 2082S. 2197S, 2358S, 2347S; Chrysler 2317S, 2445S; DeSoto 2317S, 2476S, 2445S, 2532S, 2636S; Dodge 2253S, 2181S, 2303S,SA,SB, 2474S, 2432S, 2443S,SA, 2476S, 2445S, 2532S, 2622S,SA, 2600S, 2698S; Plymouth 2253S, 2302S,SA,SB, 2442S, 2530S,SA, 2632S, 2725S, 2762S) - *NOTE - This adjustment should be made after completing fast idle adjustment.* With choke valve closed, edge of hook on lockout arm should contact auxiliary throttle lever, making maximum contact of

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CARTER WCFB 4-BARREL CARBURETORS (C nt.)

locking step on lever. Open choke valve, auxiliary valves should become unlocked a few degrees before choke reaches wide open position. Adjust by bending lockout arm.

Auxiliary Throttl Valve Lockout Adjustment (Chevr let 2816S, 2817S, 2818S, 3059S, 3060S, 3061S; Chrysl r 2535S, 2742S; Dodge 2535S, 2634S) - *NOTE - This adjustm nt should be made after fast idle and secondary thr ttl l ver adjustments have been completed.* Crack throttle valve and hold choke valves tightly closed, then close throttle. Lockout dog on auxiliary throttle shaft should freely engage in notch in lockout arm. To adjust, bend lockout dog on auxiliary throttle shaft.

SECONDARY THROTTLE LEVER & LOCKOUT

Sec ndary Throttl Op rating Lever Adjustment: *CAUTION - Adjustment procedures and settings are diff r nt n various carburetors due to type of linkage d sign used. Adjust as follows:*

Buick 2082S, 2197S, 2358S, 2347S; Chrysler 2317S, 2444S, 2445S; DeSoto 2317S, 2476S, 2445S, 2532S; Dodge 2253S, 2181S, 2303S,SA,SB, 2474S, 2432S, 2443S,SA, 2476S, 2445S, 2532S, 2622S,SA, 2698S; Plymouth 2253S, 2302S,SA,SB, 2442S, 2530S, 2631S, 2632S, 2725S, 2761S, 2762S - Stop lugs on both primary and secondary throttle levers should contact stop bosses on throttle body at the same instant that throttle valves are opened. *NOTE - At this point, secondary throttle valv s will b a few degrees from wide open position.* Adjust by bending secondary throttle operating rod at angle, using Bending Tool T109-213.

Cadillac 2109S, 2110S; Chevrolet 2218S; Chrysler 2041S; Dodge 2191S, 2660S; Oldsmobile 2059S, 2246S; Packard 2142S, 2103S, 2112S; Studebaker 2214S,SA,SB, 2219S,SA,SB - Primary and secondary throttle valves must reach wide open position at the same instant. Adjust by bending secondary throttle operating rod at upper angle, using Tool T109-213.

Chrysler 2126S; D Soto 2210S; Mercury 2361S,SA - Block choke valve in wide open position, back out throttle stopscrew so that primary throttle valves are fully closed. Hold secondary throttle valves slightly open and close primary throttle valves. Secondary throttle valves should close tightly the same instant as primary valves. Hold primary valves closed. It should not be possible to open secondary throttle valves. Adjust by bending throttle operating rod (secondary connector rod) slightly at angle bend.

Chevrol t 2351S, 2366S,SA, 2626S, 2627S, 2362S, 2418S, 2613S, 2614S; Chrysler 2534S, 2535S, 2741S, 2742S; DeS t 2635S, 2636S; Dodge 2534S, 2535S; Packard 2232S, 2284S, 2394S, 2575S; Pontiac 2283S, 2268S, 2364S,SA; Studebaker 2330S, 2394S, 2574S, 2829S, 2830S - Primary and secondary throttle valves must reach wide open position at the same instant. Adjust by bending throttle operating rod at upper angle with Bending Tool T109-213. Close primary and secondary throttle valves tightly, then check clearance between positive closing shoes on primary and secondary throttle levers. This clearance should be .017-.022" (2351S, 2366S,SA, 2626S, 2627S, 2362S, 2419S, 2613S, 2614S, 2232S, 2284S, 2283S, 2268S, 2364S,SA, 2330S, 2829S, 2830S); .008-.013" (2394S); .010-.030" (2534S, 2535S, 2741S, 2742S, 2574S, 2575S); .020" (2635S, 2636S). Adjust by bending shoe on primary lever (all carburetors except following); on secondary lever (2613S, 2614S, 2534S, 2535S, 2741S, 2742S, 2574S, 2575S).

Chevrolet 2555S, 2505S,SA, 2655S, 2669S, 2657S, 2656S, 2816S, 2817S, 2818S, 3059S, 3060S, 3061S; Hudson, Nash & Rambler 2593S,SA - Two adjustments required as follows:

1) Block choke valves wide open and back out throttle lever stopscrew so that throttle valves are fully closed. Open primary valves to a point where secondary valves just start to open. Primary throttle valve opening at this point should be 3/16"(2505S,SA, 2555S, 2656S, 2657S); 11/64" (2669S, 2593S, 2818S, 3059S); 7/32" (2816S, 2817S, 3060S, 3061S). Adjust by bending throttle operating rod. Check wide open position. Secondary valves should be a few degrees from wide open position with primary throttle valves wide open.

2) With primary and secondary throttle valves fully closed, clearance between positive closing shoes on primary and secondary throttle levers should be .017-.022" (2505S, 2555S); .010-.030" (2656S, 2657S, 2669S, 2816S, 2817S, 2818S, 3059S, 3060S, 3061S); .008-.013" (2593S). Adjust by bending shoe on primary lever (2505S,SA, 2555S, 2593S); on secondary lever (All Others).

Lincoln, Continental & Mercury 2404S,SA - Block choke valve wide open and back out throttle lever stopscrew so that primary valves seat in bores. When primary and secondary throttle valves are seated there should be a minimum clearance of .010" between lug on secondary operating lever and stop on primary throttle shaft dog. To adjust, bend lug on secondary operating lever with Tool T109-214. *NOTE - Secondary valves seat at top of bore only.*

Secondary Throttle Lockout Adjustment: *NOTE - This adjustment not required on all carburetors. See adjustment procedures following for various carburetors.*

Cadillac 2109S, 10S, 43S; Chrysler 2041S; Dodge 2191S - 1) Hold choke valve closed so high step of fast idle cam is under fast idle screw, then tighten fast idle adjusting screw until primary throttle valves open .015" (Gauge T109-44), measured between edge of throttle valve and carburetor wall on side opposite idle ports. *NOTE - Valve should have slight drag on gauge.* Lock pawl should be in unlocked position at this point. Adjust by bending tang on lock pawl using Bending Tool T109-105. 2) Hold primary throttle valves halfway open, open choke valve fully, then open primary throttle valves fully. Tang on secondary arm should engage in notch in lockout lever preventing secondary throttle shaft movement. Hold choke valve wide open and close primary throttle valves sufficiently so that lock pawl is unlocked, finally open primary throttle valves fully. Lockout lever should fall free allowing secondary throttle valves to be open before primary throttle valves are fully open. Adjust by bending tang on secondary throttle lever as required to provide clearance for correct operation of lockout lever. Readjust Fast Idle.

Chevrolet 2218S, 2351S, 2366S,SA, 2362S, 2505S, SA, 2555S, 2614S, 2626S, 2627S, 2655S, 2669S, 2656S, 2657S, 2818S, 3060S, 3061S; Chrysler 2126S, 2367S,SA, 2314S, SA, 2589S, 2590S; DeSoto 2210S, 2311S,SA, 2588S; Hudson, Nash & Rambler 2593S,SA; Packard 2232S, 2284S, 2394S, 2575S; Oldsmobile 2059S, 2246S; Studebaker 2214S,SA,SB, 2330S, 2394S, 2574S, 2575S, 2829S, 2830S - This adjustment should be made after completing fast idle and secondary throttle lever adjustment. Crack throttle valves and hold choke valve closed, then close throttle. Tang on secondary throttle lever should engage notch in lockout lever. To adjust, bend tang on secondary throttle lever. *NOTE - With choke open, lockout lever should fall free allowing secondary throttle valves to open before primary valves reach wide open position.*

Packard 2142S, 2103S, 2112S - Close choke valve tightly, open primary throttle valves fully and make certain that tang on secondary throttle lever arm is engaged in notch in lockout lever to prevent secondary throttle valves opening. Hold choke valve wide open and open primary throttle valves fully. Check to make certain that lockout lever falls free allowing secondary throttle valves to open before primary valves are fully open. Adjust as necessary by bending tang on secondary throttle lever to provide clearance for correct operation of lockout lever.

Primary Throttle Shaft Dog Adjustment (Spring Load d Primary Throttle Linkage): Chrysler 2314S,SA, 2367S, SA, 2589S, 2590S; DeSoto 2311S, SA, 2588S - With primary throttle valves wide open, adjust secondary operating rod so there is .054-.064" clearance (Gauge T109-193) between upper edge of secondary throttle valve (next to idle port) and bore of carburetor. Place 1/4" gauge (T109-31) between upper edge of primary throttle valve and bore of carburetor (next to idle port) and adjust long tang on primary throttle shaft dog (use Tool T109-214) so that inner arm of spring just contacts inner lug of secondary operating lever and secondary valves just start to open. With primary and secondary throttle valves tightly closed, there should be .005" clearance (Gauge T109-237) between outer lip on secondary operating lever and stop lug on primary throttle shaft dog. To adjust, bend outer lip on secondary operating lever, using Tool T109-214. *NOTE - Make sure that secondary operating lever operates freely and does not bind in any position.* With primary and secondary valves tightly closed, there should be .040" clearance (Gauge T109-193) between short tang on primary throttle shaft dog and outer arm of spring. Adjust by bending short tang on primary throttle shaft dog with Tool T109-214.

Lincoln & Continental 2404S,SA, Mercury 2404S,SA, 2361S - Place a .030" gauge, T109-29 (2404S,SA), .076" gauge, T109-215 (2361S) between wide open stop tang on primary throttle lever and stop on flange. Adjust upper lug of throttle shaft so that upper arm of spring lightly contacts tang of throttle operating lever. Hold

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CARTER WCFB 4-BARREL CARBURETORS (Cont.)

primary and secondary throttle valves in wide open position. Adjust lower lug of throttle shaft dog so lower arm of spring lightly contacts center web of throttle operating lever. Use Bending Tool T109-214 to adjust lugs on throttle shaft dog.

Automatic Secondary Throttle Control (Chrysler 2367S,SA, 2314S,SA, 2589S, 2590S; DeSoto 2311S,SA, 2588S; Lincoln & Continental 2404S,SA; Mercury 2361S,SA, 2404S,SA): This unit requires no adjustment. Bend operating rod as necessary to insure secondary valves closing simultaneously with primary valve. See that linkage is free and that there are no vacuum leaks between carburetor body and unit.

OVERHAUL: *CAUTION - When disassembling carburetor, keep PRIMARY and SECONDARY side parts separate so they will not be interchanged when carburetor assembled. Mark location of primary and secondary throttle connector rods in holes of throttle levers and arms for correct reassembly. Note number of turns secondary throttle return spring is "wound-up" with throttle closed.*

Disassembly: Carburetor consists of three main subassemblies (Air Horn & Bowl Cover, Bowl and Throttle Body) which can be overhauled separately.

Air Horn & Bowl Cover–Remove fuel inlet fitting, gasket, and strainer assembly. Disconnect and remove choke connector rod, accelerating pump rod, secondary throttle return spring. Remove dust cover and gasket. Remove metering rods by rotating rods off pins on vacumeter link and lifting rods out carefully. Remove pump connector link by removing pin spring, sliding upper end of link out of pump lever, and rotating link around lever. Remove vent arm (when used) by taking out vent arm screw. Loosen (do not remove) screw holding pump operating lever on pump countershaft and screw in metering rod arm, slide pump countershaft and lever assembly out, remove pump arm and metering rod arm. Take out all air horn attaching screws (inner screws will be lifted out after air horn removed), make certain that screw located within pump countershaft housing is removed, lift air horn assembly straight up (*CAUTION*–use care not to damage floats). Disassemble remaining parts from air horn as follows: Invert air horn on bench, take out float hinge pins, remove floats with intake needles and clips attached, remove needle seats and gaskets (*CAUTION*–Keep each float assembly, intake needle, and needle seat together, DO NOT mix primary and secondary side parts). Remove vacuum piston by rotating it 90° in either direction and lifting it out. Remove accelerator pump plunger assembly. Remove and discard bowl cover gasket. If automatic choke to be disassembled, proceed as follows: Remove choke lever from choke shaft, remove choke valve (file burrs from staked ends of attaching screws before removing the screws), take out attaching screws and remove thermostatic coil housing, gasket, and baffle plate. (*NOTE* - On cars with "cross-over" type choke, remove screws holding dust plate to choke piston housing and slide plate off shaft). On all carburetors, rotate choke shaft counterclockwise to disengage vacuum piston from cylinder, then withdraw choke shaft and piston assembly. Disconnect piston from link by pushing piston pin out with a piece of wire. Take out attaching screws and remove choke housing and gasket (vacuum passage rubber gasket can be removed from inner side of choke housing by rotating gasket with the blunt end of a thin wire).

►*CADILLAC CHOKE CAUTION:* Choke modifier lever can be removed from pointer shaft but DO NOT remove metal pointer or thermostatic coil from housing.

Carburetor Bowl - Invert bowl to remove pump spring and vacuum piston spring. Take out housing screw and remove pump jet housing, gasket, and pump discharge needle (needle will drop out if bowl inverted). Remove primary and secondary metering jets. *CAUTION - Keep these jets separated.* Remove pump relief valve plug and gasket. Remove pump intake ball retainer from bottom of pump cylinder, invert bowl to remove intake check valve. Remove primary and secondary low speed jets. *NOTE - Low speed jets used on both primary and secondary sides of some carburetors.* Loosen bowl to throttle body attaching screws and remove throttle body from bowl.

Throttle Body – Remove two idle adjusting screws and springs (used on primary side only). Remove four idle port rivet plugs. Remove idle stop screw and spring, and fast idle adjusting screw. On carburetors with vacuum diaphragm assembly remove hairpin clips holding throttle operating link to primary and secondary operating levers. Slide link out and away from levers (don't lose washers). Disengage throttle flex spring from tang on throttle flex dog and slide flex dog off primary shaft. Remove operating lever and flex spring. Disconnect vacuum diaphragm plunger from secondary operating lever by removing hairpin clip. Remove operating lever retaining screw and washer, the slide lever off secondary throttle shaft. Remove screws attaching vacuum diaphragm to throttle body and remove diaphragm and gasket. On all carburetors, take out fast idle mounting screw, remove all fast idle parts (fast idle cam, spring, trip lever, and lockout cam and pawl). Remove primary-to-secondary throttle connector rod, remove secondary throttle lever by loosening clamp screw and sliding lever off shaft, remove primary throttle lever screw from end of shaft, remove all lever parts from shaft. **It is recommended that throttle body not be disassembled further,** however, if it is necessary to remove throttle valves and shaft, proceed as follows: (*NOTE - Mark all throttle valves so they can be reinstalled in the proper position with the correct side of valve upward).* File burrs from staked ends of all throttle valve screws and remove screws and valves from shaft. Remove secondary throttle shaft. Remove primary throttle shaft by using a rawhide hammer to tap shaft through retaining washer. Remove auxiliary throttle valves and shaft when so equipped.

Cleaning & Inspection: Wash all parts in carburetor cleaning solvent except pump plunger assembly, thermostatic coil and housing assembly, and choke housing gasket (clean these parts in clean gasoline). Clean and blow out all passages with compressed air. Remove all gum and carbon deposits. Make certain all calibrated restrictions are clean but DO NOT use drills to clean out these passages. Inspect floats for dents and leaks. Check choke and throttle shafts for excessive wear, inspect pump plunger leather and replace plunger if cracked or creased. See that choke piston operates freely in cylinder (if carbon or dirt present in slots, remove welch plug in bottom of housing to clean slots, install NEW welch plug and make certain that it is air-tight).

Reassembly: Use all NEW gaskets. Install all parts in reverse order of disassembly procedure (above), pay particular attention to the following points.

Valve Installation - Use new screws when installing valves. Install throttle valves as follows: Before tightening screws, shift valves to provide closest possible fit in barrel in closed position (short end of auxiliary valves should have a good bearing on stop bosses), tighten screws securely and stake ends lightly (*CAUTION* - Support shaft on steel block while staking screws). Install retaining washer on end of primary shaft with prongs outward, press washer in on shaft, just far enough to obtain snug fit without endplay in shaft.

THROTTLE VALVE SETTING

	①Idle Port Opening		Vacuum Port
BUICK	**Primary**	**Secondary**	
2082S, 2197S	.057-.063"	.059-.065"	②.013-.017"
2358S	.074-.080"	.065-.071"	②.008-.014"
2347S	.092-.098"	.065-.071"	②.008-.014"
CADILLAC			
2109S, 2110S	.091-.097"	.067-.073"	③.060-.070"
2143S	.091-.097"	.067-.073"	③.060-.070"
CHEVROLET			
2218S, 2351S	.113-.119"	⑥	⑦⑦.023-.033"
2366S,SA	.113-.119"	⑥	③.028-.038"
2419S, 2362S	.065-.071"	⑥	⑧
2505S, 2555S	.113-.119"	⑥	③.028-.038"
2626S, 2627S	.113-.119"	⑥	⑧
2655S, 2669S	.113-.119"	⑥	③.028-.038"
2656S, 2657S	.113-.119"	⑥	③.038-.048"
2613S, 2614S	.113-.119"	⑥	⑧
CHRYSLER			
2041S	.091-.097"	.067-.073"	③.035-.045"
2126S	.084-.092"	.071-.077"	③.032-.042"
2317S	.116-.122"	.059-.065"	③.035-.045"
2314S,SA, 2589S	.130-.134"	.071-.077"	③.032-.042"
2367S,SA, 2590S	.130-.134"	.071-.077"	③.032-.042"
2444S, 2445S	.116-.122"	.059-.065"	③.035-.045"
2741S	.094-.100"	⑥	⑧
2742S	.094-.100"	⑥	③.006-.014"

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CARTER WCFB 4-BARREL CARBURETORS (Cont.)

THROTTLE VALVE SETTING (Continued)

	①Idle Port Opening Primary	Secondary	Vacuum Port
DESOTO			
2210S	.084-.092"	.071-.077"	③ .032-.042"
2311S,SA, 2588S	.130-.134"	.071-.077"	③ .032-.042"
2317S	.116-.122"	.059-.065"	③ .035-.045"
2445S, 2476S	.116-.122"	.059-.065"	③ .035-.045"
2532S	.092-.098"	.065-.071"	③ .022-.032"
DODGE			
2191S	.091-.097"	.067-.073"	③ .035-.045"
2181S, 2432S	.049-.055"	.059-.065"	③ .035-.045"
2253S, 2474S	.116-.122"	.059-.065"	③ .035-.045"
2443S,SA, 2532S	.092-.098"	.065-.071"	③ .022-.032"
2445S, 2476S	.116-.122"	.059-.065"	③ .035-.045"
2303S,SA,SB	.116-.122"	.059-.065"	③ .035-.045"
2622S,SA, 2698S	.082-.088"	.065-.071"	③ .022-.023"
2660S	.092-.100"	.065-.071"	③ .022-.023"
HUDSON & NASH			
2593S,SA	.130-.132"	⑥	③ .040-.046"
LINCOLN & CONTINENTAL			
2404S,SA	.125-.131"	⑥	② .020-.030"
MERCURY			
2361S,SA	.107-.113"	⑥	③ .025-.035"
2404S,SA	.125-.131"	⑥	③ .020-.030"
OLDSMOBILE			
2059S, 2246S	.113-.119"	⑥	③ .046-.056"
PACKARD			
2084S, 2103S	.122-.128"	.070-.076"	③ .052-.062"
2142S	.122-.128"	.070-.076"	③ .052-.062"
2112S	.137-.143"	.070-.076"	③ .052-.062"
2232S, 2284S	.126-.132"	⑥	③ .046-.056"
PLYMOUTH			
2253S	.116-.122"	.059-.065"	③ .035-.045"
2302S,SA,SB	.116-.122"	.059-.065"	③ .022-.032"
2442S	.092-098"	.065-.071"	③ .022-.032"
2530S,SA	.116-.122"	.059-.065"	③ .035-.045"
PONTIAC			
2283S, 2268S	.139-.145"	⑥	③ .029-.039"
2364S	.139-.145"	⑥	③ .029-.039"
RAMBLER			
2593S,SA	.130-.132"	⑥	③ .040-.046"
STUDEBAKER			
2214S,SA,SB	.113-.119"	⑥	② .000-.010"
2219S,SA,SB	.113-.119"	⑥	② .000-.010"
2330S, 2574S	.113-.119"	⑥	② .000-.010"
2575S	.113-.119"	⑥	② .000-.010"
2394S	.130-.136"	⑥	② .000-.006"

① - Port opening above top edge of throttle valve.
② - Bottom of port above top edge of valve.
③ - Top of port above top edge of valve.
④ - With .039-.041" diameter spark port.
⑤ - With 080-.082" diameter spark port.
⑥ - No secondary idle system used.
⑦ - .018-.028" on early 2218S carburetors.
⑧ - None used.
⑨ - Early carburetors.
⑩ - Later carburetors.

SERVICE PARTS: Gasket Sets - Carter Nos. 219 (894S, SA), No. 221 (932S), No. 223 (2005S,SA, 2088S), No.226 (896S), No. 229 (985S, 2084S, 2142S), No. 233 (2072S, 2103S, 2109S, 2110S, 2112S, 2119S,SA, 2143S), No. 234A (996S, 2016S, 2053S, 2080S, 2082S, 2181S, 2253S, 2302S, SA,SB, 2303S,SA,SB, 2432S, 2474S), No. 244 (No. 2041S, 2191S) No. 250 (2059S, 2246S), No. 257 (2197S), No. 260 (2330S), No. 260A (2214S,SA,SB, 2219S,SA,SB), No. 261 (2218S, 2351S), No 264 (2126S, 2210S), No. 266 (2232S, 2284S), No. 267 (2268S, 2283S), No. 269A (2317S, 2445S, 2476S), No. 270 (2361S,SA), No. 273 (2347S, 2358S), No. 279A (2364S,SA), No. 281A (2366S,SA), No. 282 (2311S, SA, 2314S,SA, 2367S,SA), No. 283 (2394S), No. 286 (2362S, 2419S), No. 288 (2442S, 2443S,SA, 2444S), No. 294 (2404S,SA), No, 296 (2505S,SA, 2555S, 2655S), No. 297 (2588S, 2589S, 2590S), No. 299 (2532S, 2622S, 2660S, 2698S), No. 301 (2593S,SA), No. 302 (2530S,SA), No. 303 (2574S, 2575S, 2829S, 2830S); No. 307 (2613S, 2614S, 2626S, 2627S), No. 309 (2631S, 2632S); No. 348 (2816S, 2817S, 3060S, 3061S); No. 347 (2818S, 3059S).

Recarburetion Kit (Repair Package) - Carter No. 1599B (894S,SA), No. 1703 (932S), No. 1717A (985S), No. 1718 (896S), No. 1730 (2016S), No. 1733 (2005S,SA, 2072S), No. 1734 (996S,SA), No. 1744 (2053S), No. 1745A (2080S), No. 1751 (2082S, 2191S), No. 1752 (2041S), No. 1756 (2059S), No. 1761 (2109S, 2110S), No. 1781 (2197S), No. 1783A (2214S,SA,SB, 2219S,SA, SB), No. 1784 (2218S), No. 1784A (2351S), No. 1786 (2126S), No. 1789 (2210S), No. 1796 (2268S), No. 1804 (2361S), No. 1806 (2253S), No. 1813 (2359S), No. 1821A (2344S,SA), No. 1822 (2347S), No. 1828 (2366S,SA), No. 1829 (2394S), No. 1832 (2314S,SA), No. 1833 (2367S, SA), No. 1834 (2311S,SA), No. 1835A (2302S,SA,SB), No. 1853 (2404S,SA), No. 1856 (2505S,SA), No. 1857 (2589S), No. 1859 (2532S), No. 1861 (2593S,SA), No. 1862 (2588S), No. 1864 (2530S,SA), No. 1865N (2574S, 2575S), No. 1969 (2590S), No. 1870 (2626S, 2627S), No. 1875 (2555S), No. 1916N (2660S), No. 1938N (2656S, 2657S), No. 5024N (2816S, 2817S, 3060S, 3061S); No. 5023N (2818S, 3059S); No. 1870 (2626S, 2627S).

1954-55 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model Year	Carb. No.	Metering Rod No. Std.	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Size Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
BUICK Series 60, 70 1954	2082S Pri.	75-1108 (3)	(4)	75-973U (5)	.0935"	120-166	(10)		#69	11-274S	#70	48-221S
	2082S Sec.				.0635"	120-176	(10)		#69	11-274S		
Series 50, 60, 70 1955	2197S Pri.	75-1147	75-1148	75-1150U	.096"	120-160	(10)		#69	11-247S	#70	48-226
	2197S Sec.				.082"	120-158	(10)		#69	11-247S		
Series 50, 60, 70 1955	2358S Pri.	75-1147	75-1148	75-1150U	.096"	120-160	(10)		.031"	11-280S	#70	48-226
	2358S Sec.				.082"	120-158	(10)					
CADILLAC All Series, Std. 1954	2109S Pri.	75-889			.0935"	120-166	(10)		#70	11-260S	#74	48-185
	2109S Sec.				.067"	120-185	(10)		#70	11-260S		
All Series, Air Cond. 1954	2110S Pri.	75-889			.0935"	120-166	(10)		#70	11-260S	#74	48-185
	2110S Sec.				.067"	120-185	(10)		#70	11-260S		
Repl. Carb. 1955	2255S Pri	75-1139			.0935"	120-166	(10)		#70	11-268S	#74	48-145
	2255S Sec.				.082"	120-158	(10)		#70	11-268S		
All Series, Std. Eng. 1955	2185S Pri	75-1139			.0935"	120-166	(10)		#70	11-268S	#74	48-145
	2185S Sec.				.082"	120-158	(10)		#70	11-268S		
All Series, Std. Eng. 1955	2266S Pri.	75-1139			.0935"	120-166	(10)		#70	11-268S	#74	48-145
	2266S Sec.				.082"	120-158	(10)		#70	11-268S		
All Series, Std. Eng. 1955	2354S Pri.	75-1139	(41)		.0935"	120-166	(10)		#70	11-268S	#74	48-185
	2354S Sec.				.082"	120-158	(10)					
All Series, Air Cond. 1955	2186S Pri.	75-1139			.0935"	120-166	(10)		#70	11-268S	#74	48-145
	2186S Sec.				.082"	120-158	(10)		#70	11-268S		
All Series, Air Cond. 1955	2267S Pri.	75-1139			.0935"	120-166	(10)		#70	11-268S	#74	48-145
	2267S Sec.				.082"	120-158	(10)		#70	11-268S		
All Series, Air Cond. 1955	2355S Pri	75-1139	(41)		.0935"	120-166	(10)		#70	11-268S	#74	48-185
	2355S Sec.				.082"	120-158	(10)					
CHEVROLET V8 Eng. (Early) 1955	2218S Pri.	75-1161	75-1214		.091"	120-155	(10)		#68	11-263S	#73	48-233S
	2218S Sec.				.0512"	120-187	(10)		#68	11-263S		
V8 Eng. (Late) 1955	2351S Pri.	75-1161			.091"	120-155	(10)		#68	11-263S	#73	48-233S
	2351S Sec.				.0512"	120-187	(10)					
CHRYSLER V8, C63, 4, 6 1954	2041 S Pri.	75-1106 (8)	75-963U (5)	75-964U (5)	.0935"	120-166	(10)		#69	11-250S	#68	48-201S
	2041 S Sec.				.0595" (9)	120-196	(10)		#69	11-250S		
C68, 69, 70 1955	2126S Pri.	75-1143	75-1178	75-1179	.0935'	120-166	(10)		#69	11-247S	#70	48-221S
	2126S Sec.				.053"	120-217	(10)		#69	11-247S		
C300 1955	2317S Pri.	75-1186			.089"	120-159	(10)		#69	11-247S	#74	48-174S
	2317S Sec.				.053"	120-217	(10)		#69	11-247S		
DESOTO S21 1955	2210S Pri.	75-1144	75-1178	75-1179	.0935"	120-166	(10)		#69	11-247S	#70	48-221S
	2210S Sec.				.053"	120-217	(10)		#69	11-247S		
DODGE V8, D-53-3 1954	2191S Pri.	75-1106	75-963U (5)	75-964U (5)	.0935"	120-166	(10)		#69	11-250S	#68	48-201S
	2191S Sec.				.0595"	120-196	(10)		#69	11-250S		
V8 Optional 1955	2181S Pri.	75-1144	75-1178	75-1179	.0935'	120-166	(10)		#69	11-247S	#70	48-221S
	2181S Sec.				.057"	120-193	(10)		#69	11-247S		
V8 Optional 1955	2253S Pri.	75-1160	75-1180	75-1181	.0935"	120-166	(10)		#69	11-247S	#74	48-174S
	2253S Sec.				.057"	120-193	(10)		#69	11-247S		
OLDSMOBILE Series 88, 98 1954	2059S Pri.	75-985			.0935"	120-166	(10)		#68	(18)	#67	48-218S
	2059S Sec.				#53	120-196	(10)					
Series 88, 98 1955	2246S Pri.	75-985			.0935"	120-166	(10)		#68	(18)	#67	48-218S
	2246S Sec.				.0595"	120-196	(10)					
PACKARD Cavalier 1954	2103S Pri.	75-942	75-987	75-988	.086"	120-165	(16)		#67	11-253S	#74	48-213S
	2103S Sec.				.073"	120-175	(16)		#70	11-252S		
Patrician 1954	2112S Pri.	75-942	75-987	75-988	.086"	120-165	(10)		#67	11-253S	#74	48-213S
	2112S Sec.				.0785"	120-194	(10)		#67	11-253S		
Cavalier 1954	2142S Pri.	75-942	75-987	75-988	.086"	120-165	(10)		#66	11-234S	#74	48-213S
	2142S Sec.				.067"	120-185	(10)		#66	11-234S		
5540 (Early) 1955	2232S Pri.	75-1163	75-1211	75-1213U	.098"	120-163	(10)		#68	11-270S	#70	48-195S
	2232S Sec.				.052"	120-218	(10)					
5540 (Later) 1955	2284S Pri.	75-1170	75-1195	75-1197U	.098"	120-163	(10)		#68	11-270S	#70	48-195S
	2284S Sec.				.055"	120-174	(10)					

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1954-55 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carb. No.	Metering Rod No. Std.	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Size Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
PLYMOUTH V8 Optional	1955	2253S Pri 2253S Sec	75-1160	75-1180	75-1181	0935' 057"	120-166 120-193	⑩ ⑩		#69 #69	11-247S 11-247S	#74	48-174S
PONTIAC Synchro-mesh	1955	2283S Pri 2283S Sec	75-1183	-		0935" 0512"	120-166 120-187	⑩ ⑩		#67	11-276S	#72	48-235S
Hydra-Matic	1955	2268S Pri 2268S Sec	75-1171	75-1203	75-1205U	.0935' 0492"	120-166 120-181	⑩ ⑩		#68	11-274S	#72	48-235S
STUDEBAKER Comm (S-M)	1955	2219S, SA Pri 2219S, SA Sec	75-1141	75-1154	75-1155U ㊲	089" 0595"	120-159 120-196	⑩ ⑩		#68 ⑱		#73	48-228S
Comm (Auto Trans)	1955	2214S, SA, Pri 2214S, SA, Sec.	75-1141	75-1154	75-1155U ㊲	089" 0595"	120-159 120-196	⑩ ⑩		#68 ⑱		#73	48-228S
Pres (S-M)	1955	2219S, SA, Pri 2219S, SA, Sec	75-1141	75-1154	75-1155U ㊲	089' 0595"	120-159 120-196	⑩ ⑩		#68 ⑱		#73	48-228S
Pres (Auto Trans)	1955	2214S, SA, Pri 2214S, SA, Sec	75-1141	75-1154	75-1155U ㊲	089" 0595'	120-159 120-196	⑩ ⑩		#68 ⑱		#73	48-228S
Pres Del	1955	2330S Pri 2330S Sec	75-1154			089" 0595'	120-159 120-196	⑩ ⑩		#68 ⑱		#73	48-228S

③—Supersedes No 75-995 used on first carburetors
④—1 Size Rich No 75-1123
⑤—Metering Rod & Jet Unit
⑧—Supersedes No. 75-941 used on first carburetors
⑨—Supersedes No 120-185
⑩—Nozzle is installed permanently DO NOT REMOVE
⑱—Installed permanently DO NOT REMOVE
㊲—75-1156U 3 size lean (rod & jet unit).
㊶—75-1201U Metering Rod & Jet Unit (for altitude use), consists of 1-61-246, 2-75-1199, 2-120-194.

1956 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Rod No. Standard	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Size Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
BUICK													
50, 60, 70	1956	2347S Pri. 2347S Sec.	75-1231	75-1235	75-1236	.0995" .086"	120-224 120-165	⑩ ⑩		#66 #66	11-288S 11-288S	#70	48-226
CADILLAC Std. Engine													
All (No A.C.)	1956	2333S, SA Pri. 2333S, SA Sec.	75-1229	75-1260U ㊷		.096" .070"	120-160 120-222	⑩ ⑩		#67 #67	11-286S 11-286S	#74	48-185
All (With A.C.)	1956	2334S, SA, Pri. 2334S, SA Sec.	75-1229	75-1260U ㊷		.096" .070"	120-160 120-222	⑩ ⑩		#67 #67	11-286S 11-286S	#74	48-185
Repl. Carb.	1956	2370S, SA Pri. 2370S, SA Sec.	75-1229	75-1260U ㊷		.096" .070"	120-160 120-222	⑩ ⑩		#67 #67	11-286S 11-286S	#74	48-185
CADILLAC Eldorado Eng.													
Front (No A.C.)	1956	2371S Pri. 2371S Sec.	75-1272 ㊸	75-1301U ㊷		.096" .059"	120-160 120-184	⑩ ⑩		#69	11-247S	#69	㊺48-253S
Front (With A.C.)	1956	2373S Pri. 2373S Sec.	75-1272 ㊸	75-1301U ㊹		.096" .059"	120-160 120-184	⑩ ⑩		#69	11-247S	#69	㊺48-253S
Rear (All)	1956	2372S Pri. 2372S Sec.	75-1272 ㊸	75-1301U ㊹		096" .059"	120-160 120-184	⑩ ⑩		#69	11-247S	#69	㊺48-253S
CHEVROLET V8													
V8 (Powerpack)	1956	2366S, SA Pri. 2366S, SA Sec.	75-1161			.091" .054"	120-155 ㊻ 120-227	⑩ ⑩		#68	11-263S	#73	48-233S
Corvette (Frt.)	1956	2419S Pri. 2419S Sec.	75-1255			.086" .051"	120-165 120-187	⑩ ⑩		#65	11-294S	#73	48-233S
Corvette (Rear)	1956	2362S Pri. 2362S Sec.	75-1255			.086" 051"	120-165 120-187	⑩ ⑩		#65	11-294S	#73	48-233S

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1956 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carburetor No.	Metering Rod No. Standard	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Size Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
CHRYSLER													
C71 (Powerpack)	1956	2367S, SA Pri.	75-1263 (47)	75-1180	75-1181	.096"	120-160	(10)		.035"	11-278S	#74	48-174S
		2367S, SA, Sec.				.055"	120-174	(10)		.035"	11-278S		
C70, 72, 73	1956	2314S, SA Pri.	75-1263 (47)	75-1180	75-1181	.096"	120-160	(10)		.035"	11-278S	#74	48-174S
		2314S, SA Sec.				.061"	120-186	(10)		.035"	11-278S		
C72-300	Early 1956	2317S Pri.	75-1186	75-1178	75-1179	.089"	120-159	(10)		.0293"	11-247S	#74	48-174S
		2317S Sec.				.053"	120-217	(10)		.0293"	11-247S		
C72-300 (Frt.)	Late 1956	2444S Pri.	75-1273			.089"	120-159	(10)		.0293"	11-247S	#74	48-174S
		2444S Sec.				.055"	120-174	(10)		.0293"	11-247S		
C72-300 (Rear)	Late 1956	2445S Pri.	75-1274			.0935"	120-166	(10)		.0293"	11-247S	#74	48-174S
		2445S Sec.				.055"	120-174	(10)		.0293"	11-247S		
DE SOTO													
S24	1956	2311S, SA Pri.	75-1210 (48)			.096"	120-160	(10)		.035"	11-278S	#74	48-178S
		2311S, SA Sec.				.0595"	120-196	(10)		.035"	11-278S		
Advntr.	Early 1956	2317S Pri.	75-1186	75-1178	75-1179	.089"	120-159	(10)		.0293"	11-247S	#74	48-174S
		2317S Sec.				.053"	120-217	(10)		.0293"	11-247S		
Advntr. (Frt.)	Late 1956	2476S Pri.	75-1273			.089"	120-159	(10)		#69	11-247S	#74	48-174S
		2476S Sec.				.055"	120-174	(10)		#69	11-247S		
Advntr. (Rear)	Late 1956	2445S Pri.	75-1274			.0935"	120-166	(10)		#69	11-247S	#74	48-174S
		2445S Sec.				.055"	120-174	(10)		#69	11-247S		
DODGE													
D-63-3	Early 1956	2303S, SA, SB Pri.	75-1251 (49)	75-1280	75-1281	.089"	120-159	(10)		.032"	(50) 11-295S	#74	48-174S
		2303S, SA, SB Sec.				.0492"	120-181	(10)		.032"	(50) 11-295S		
D-63-3	Late 1956	2432S Pri.	75-1179			.0935"	120-166	(10)		#69	11-247S	#70	48-221S
		2432S Sec.				.057"	120-193	(10)		#69	11-247S		
D-63-3	Late 1956	2474S, SA Pri.	75-1181			.0935"	120-166	(10)		#69	11-247S	#74	48-174S
		2474S, SA Sec.				.057"	120-193	(10)		#69	11-247S		
D-500	1956	2443S, SA Pri.	75-1264			.0995"	120-224	(10)		.035"	11-278S	#74	48-174S
		2443S, SA Sec.				.067"	120-185	(10)		.035"	11-278S		
D-500 Spec. (Frt.)	1956	2476S Pri.	75-1273			.089"	120-159	(10)		#69	11-274S	#74	48-174S
		2476S Sec.				.055"	120-174	(10)		#69	11-274S		
D-500 Spec. (Rear)	1956	2445S Pri.	75-1274			.0935"	120-166	(10)		#69	11-274S	#74	48-174S
		2445S Sec.				.055"	120-174			#69	11-274S		
MERCURY Mercomatic	1956	2361S, SA Pri.	75-1206	75-1253	75-1254	.0935"	120-166	(10)		#69	11-282S	#67	48-218S
		2361S, SA Sec.				.057"	(51) 120-193	(10)					
PACKARD 5660	1956	2394S Pri.	75-1241 (52)	75-1296	75-1312U (53)	.0935"	(54) 120-166	(10)		#65	11-287S	#72	48-195S
		2394S Sec.				.0635"	(55) 120-176	(10)					
PLYMOUTH P29	1956	2302S, SA, SB Pri.	75-1247 (56)	75-1178	75-1179	.089"	120-159	(10)		.031"	11-283S	#74	48-174S
		2302S, SA, SB Sec.				.053"	(57) 120-217	(10)		.031"	11-283S		
Fury	1956	2442S Pri.	75-1180	(58)		.1015"	120-162	(10)		.035"	11-278S	#74	48-174S
		2442S Sec.				.073"	120-175	(10)		.035"	11-278S		
PONTIAC V8	1956	2364S, SA Pri.	75-1240	75-1269U (59)	75-1270U (60)	.0995"	120-224	(10)		.036"	11-291S	#72	48-235S
		2364S, SA Sec.				.070"	(61) 120-222	(10)					
STUDEBAKER													
56B, 56H (Synchro-mesh)	1956	2319SA, SB, Pri.	75-1141	75-1154	75-1155U (57)	.089"	120-159	(10)		#68	(18)	#73	48-228S
		2319SA, SB Sec.				.0595"	120-196	(10)					
56B, 56H (Auto. Trans.)	1956	2314SA, SB Pri.	75-1141	75-1154	75-1155U (57)	.089"	120-159	(10)		#68	(18)	#73	48-228S
		2314SA, SB Sec.				.0595"	120-196	(10)					
56J	1956	2394S Pri.	75-1241 (62)			.0935"	120-176	(10)		#65	(63) 11-294S	#72	48-195S
		2394S Sec.			..	.0785"	120-166	(10)					

(10) — Nozzle installed permanently. **Do not remove.**
(18) — Installed permanently. **Do not remove.**
(47) — Two sizes Lean Pkg. (Metering Rod 75-1164, Metering Jet 120-174, Vacuum Piston Spring 61-230).
(47) — Supersedes No. 75-1210.
(48) — Supersedes No. 75-1143.
(49) — Supersedes No. 75-1227.
(50) — Supersedes No. 11-285S.
(51) — Supersedes No. 120-176.
(52) — Supersedes No. 75-1230.
(53) — Two Sizes Lean Pkg. (Metering Rod 75-1297 & Metering Jet 120-186).
(54) — Supersedes No. 120-165.
(55) — Supersedes No. 120-176.
(56) — Supersedes No. 75-1222.
(57) — Supersedes No. 120-181.
(58) — One Size Rich No. 75-1210.
(59) — One Size Lean Pkg. (Metering Rod 75-1267 & Metering Jet 120-228).
(60) — Two Sizes Lean Pkg. (Metering Rod 75-1268 & Metering Jet 120-185).
(61) — Supersedes No. 120-226 (2364S only).
(62) — Supersedes No. 75-1230.
(63) — Supersedes No. 11-287S.

1957 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Rod No.			Metering Rod Jet		Main Nozzle		Low Speed Jet		Pump Jet	
			Standard	1 Size Lean	2 Size Lean	Size	Part No.	Size	Part No.	Size	Part No.	Size	Part No.
CADILLAC, Eldorado Eng.													
Front, (Early)	1957	2582S,84S Pri	75-1347			.096"	120-160	(10)		.0292"	11-306S	.0292"	48-253S
		2582S,84S Sec				.055"	120-174	(10)					
Rear, All (Early)	1957	2583S Pri.	75-1347			.096"	120-160	(10)		.0292"	11-306S	.0292"	48-253S
		2583S Sec.				.055"	120-174	(10)					
Front (Late)	1957	2690S,92S Pri.	75-1347			.096"	120-160	(10)		0292"	11-306S	.0292"	48-253S
		2690S,92S Sec.				.055"	120-174	(10)					
Rear,All (Late)	1957	2691S Pri.	75-1347			.096"	120-160	(10)		.0292"	11-306S	0292"	48-253S
		2691S Sec.				055"	120-174	(10)					
CHEVROLET													
V8 (Pwr.Pk., S.M.)	1957	2555S Pri.	75-1386 (64)	75-1419	75-1420	086"	120-165	(10)		.031"	11-302S	.024"	48-233S
		2555S Sec.				076"	120-177	(10)					
V8 (Pwr.Pk.,Auto.Trans.)	1957	2505S,SA Pri.	75-1349	75-1402	75-1415U (74)	.086"	120-165	(10)		031"	11-302S	.024"	48-233S
		2505S,SA Sec.				.076"	120-177	(10)					
Corvette	1957	2655S Pri.	75-1385			086"	120-165	(10)		031"	11-302S	024"	48-233S
		2655S Sec.				.061"	120-186	(10)					
Corvette Eng. (Front)	1957	2626S Pri.	75-1350			.0935"	120-166	(10)		.031"	11-302S	024"	48-233S
		2626S Sec.				053"	120-217	(10)					
Corvette Eng. (Rear)	1957	2627S Pri.	75-1350			0935"	120-166	(10)		.031"	11-302S	024"	48-233S
		2627S Sec.				053"	120-217	(10)					
CHRYSLER													
C75-1 (Powerpack)	1957	2589S Pri.	75-1336	75-1387	75-1413	0935"	120-166	(10)		032"	11-295S	.025"	
		2589S Sec.				.061"	120-186	(10)		.032"	11-295S		
C75-2	1957	2589S Pri.	75-1336	75-1387	75-1413	.0935"	120-166	(10)		.032"	11-295S	025"	
		2589S Sec.				061"	120-186	(10)		032"	11-295S		
C76 & Imperial	1957	2590S Pri.	75-1344	75-1365	75-1336	0935"	120-166	(10)		032"	11-295S	025"	
		2590S Sec.				0635"	120-176	(10)		032"	11-295S		
DE SOTO													
S26 (Auto. Trans.)	1957	2588S Pri.	75-1365	75-1336	75-1387	.0935"	120-166	(10)		032"	11-295S	025"	
		2588S Sec.				.061"	120-186	(10)		.032"	11-295S		
S25,S27 (Powerpack)	1957	2532S Pri.	75-1327	75-1328	75-1410	0945"	120-164	(10)		035"	11-278S	0225"	48-174S
		2532S Sec.				.067"	120-185	(10)		035"	11-278S		
DODGE													
V8 (Powerpack)	1957	2532S Pri.	75-1327	75-1328	75-1410	0945"	120-164	(10)		035"	11-278S	0225"	48-174S
		2532S Sec.				067"	120-185	(10)		035"	11-278S		
D-500 (Later)	1957	2622S,SA Pri.	75-1251 (65)	75-1328		0945"	120-164	(10)		035"	11-278S (66)	0225"	48-174S
		2622S,SA Sec.				067"	120-185	(10)		035"	11-278S (66)		
D-500 (Police Car)	1957	2698S Pri.	75-1373			098"	120-163	(10)		035"	11-278S	0225"	48-174S
		2698S Sec.				082"	120-158	(10)		.035"	11-278S		
HUDSON Hornet V8	1957	2593S, SA Pri.	75-1364 (67)	75-1392	75-1393U (71)	098"	120-163	(10)		031"	11-302S	025"	48-234S
		2593S, SA Sec.				0635"	120-176	(10)					
LINCOLN All	1957	2404S, SA Pri	75-1333	75-1354	75-1362U (72)	1015"	120-162	(10)		0292"	11-282S	0292"	48-256
		2404S, SA Sec				073"	120-175	(10)					
MERCURY 368" Engine	1957	2404S, SA Pri.	75-1333	75-1354	75-1362U (72)	1015"	120-162	(10)		0292"	11-282S	0292"	48-256
		2404S, SA Sec.				073"	120-175	(10)					
NASH Ambassador V8	1957	2593S, SA Pri.	75-1364 (67)	75-1392	75-1393U (71)	098"	120-163	(10)		031"	11-302S	025"	48-234S
		2593S, SA Sec				0635"	120-176	(10)					
PLYMOUTH													
P31,2,3 Powerpack (All Transmissions)	1957	2530S, SA Pri.	75-1227 (68)	75-1280		089"	120-159	(10)		02925"	11-309S (70)	0225"	48-174S
		2530S, SA Sec				061"	120-186 (69)	(10)		02925"	11-309S (70)		

(10) Nozzle is installed permanently **Do not remove.**

(64)- Supersedes No 75-1349

(65)- Supersedes No 75-1373 on 2622S

(66)- Supersedes No 11-295S which supersedes No 11-310S

(67)- Supersedes No. 75-1330

(68)- Supersedes No 75-1251 which supersedes No 75-1324

(69) Supersedes No. 120-174.

(70) Supersedes No 11-283S.

(71)- Kit consists of 2 metering rods 75-1404, and 2 metering jets 120-196.

(72)- Kit consists of 2 metering rods 75-1355, and 2 metering jets 120-186.

(74)- Kit consists of 2 metering rods 75-1403 and 2 metering jets 120-175.

1957 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carburetor No.	Metering Rod No.			Metering Rod Jet		Main Nozzle		Low Speed Jet		Pump Jet	
			Standard	1 Size Lean	2 Size Lean	Size	Part No.	Size	Part No.	Size	Part No.	Size	Part No.
RAMBLER V8 (Powerpack	1957	2593S, SA Pri.	75-1364 (67)	75-1392	75-1393U (71)	098"	120-163		(10)	.031"	11-302S	.025"	48-234S
		2593S, SA Sec.				.0635"	120-176		(10)				
Rebel	1957	2593S, SA Pri.	75-1364 (67)	75-1392	75-1393U (71)	.098"	120-163		(10)	.031"	11-302S	.025"	48-234S
		2593S, SA Sec.				.0635"	120-176		(10)				
STUDEBAKER													
Comm. & Pres. S.M.)	1957	2219SB Pri.	75-1141	75-1154	75-1155U (73)	.089"	120-159		(10)	.031"	(18)	.024"	48-228S
		2219SB Sec.				0595"	120-196		(10)				
Auto. Trans.)	1957	2214SB Pri.	75-1141	75-1154	75-1155U (73)	089"	120-159		(10)	031"	(18)	.024"	48-228S
		2214SB Sec.				.0595"	120-196		(10)	.031"			

(10) - Nozzle is installed permanently **Do not remove**
(18) - Installed permanently **Do not remove.**
(67) - Supersedes No. 75-1330.
(71) - Kit consists of 2 metering rods 75-1404, and 2 metering jets 120-196.
(73) - Kit consists of 2 metering rods 75-1164, 2 metering jets 120-174, and 1 vacuum piston spring 61-230

1958 WCFB CARTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Rod No.			Metering Rod Jet		Main Nozzle		Low Speed Jet		Pump Jet	
			Standard	1 Size Lean	2 Sizes Lean	Size	Part No.	Size	Part No.	Size	Part No.	Size	Part No.
CHEVROLET													
283" Eng (S M)	1958	2669S Pri	75-1425 (77)	75-1434	75-1435	086"	120-165		(10)	031"	(10)	024"	48-233S
		2669S Sec				076"	120-177 (78)		(10)				
348" Eng (S M & O D)	1958	2657S Pri	75-1424 (79)	75-1432	75-1433	091"	120-155		(10)	035"	11-287S	024"	48-233S
		2657S Sec				082"	120-158		(10)				
348" Eng (Auto Trans)	1958	2656S Pri	75-1424 (79)	75-1432	75-1433	091"	120-155		(10)	035"	11-287S	024"	48-233S
		2656S Sec				082"	120-158		(10)				
Corvette (75) (Front)	1958	2626S Pri	75-1350			0935"	120-166		(10)	031"	11-302S	024"	48-233S
		2626S Sec				053"	120-217		(10)				
Corvette (75) (Rear)	1958	2627S Pri	75-1350			0935"	120-166		(10)	031"	11-302S	024"	48-233S
		2627S Sec				053"	120-217		(10)				
Corvette (76) (Front)	1958	2613S Pri	75-1374			1065"	120-171		(10)	.031"	11-302S	024"	48-233S
		2613S Sec				061"	120-186		(10)				
Corvette (76) (Rear)	1958	2614S Pri	75-1374			1065"	120-171		(10)	031"	11-302S	024"	48-233S
		2614S Sec				061"	120-186		(10)				
CHRYSLER													
300D (Front)	1958	2741S Pri	75-1160			098"	120-163		(10)	032"	11-311S	0225"	48-174S
		2741S Sec				057"	120-193		(10)				
300D (Rear)	1958	2742S Pri	75-1160			098"	120-163		(10)	032"	11-311S	0225"	48-174S
		2742 Sec				065"	120-226		(10)				
DODGE Royal . .	1958	2660S Pri	75-1409	75-1280	75-1281	0945"	120-164		(10)	032"	11-295S	028"	48-242S
		2660S Sec				067"	120-185		(10)	032"	11-295S		
PACKARD (Exc Hawk)	1958	2575S Pri	75-1345	75-1377	75-1378U (80)	089"	120-159		(10)	035"	11-294S	0225"	48-243S
		2575S Sec				061"	120-186		(10)				
STUDEBAKER													
President S M (Early)	1958	2219SB Pri	75-1141	75-1154	75-1155U (73)	089"	120-159		(10)	031"	(10)	024"	48-228S
		2219SB Sec				0595"	120-196		(10)				
President S M (Later)	1958	2574S Pri	75-1345	75-1377	75-1378U (80)	089"	120-159		(10)	035"	11-294S	0225"	48-243S
		2574S Sec				061"	120-186		(10)				
Auto Trans (Early)	1958	2214SB Pri	75-1141	75-1154	75-1155U (73)	089"	120-159		(10)	031"	(10)	024"	48-228S
		2214SB Sec				0595"	120-196		(10)				
Auto Trans (Later)	1958	2575S Pri	75-1345	75-1377	75-1378U (80)	089"	120-159		(10)	035"	11-294S	0225"	48-243S
		2575S Sec				061"	120-186		(10)				

(10) - Installed permanently. **Do not remov .**
(73) - Kit consists of 2 metering rods 75-1164, 2 metering jets 120-174, and 1 vacuum piston spring 61-230.
(75) - With standard camshaft
(76) - With racing camshaft
(77) - Supersedes 75-1421
(78) - Supersedes 120-194
(79) - Supersedes 75-1423
(80) - Kit consists of 2 metering rods 75-1380, 2 metering jets 120-184, and 1 vacuum piston spring 61-230

1959 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Rod No. Standard	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Sizes Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
CHEVROLET												
283" Eng. (S.M.)	1959	2818S Pri.	75-1421			.086"	120-165	⑩	.031"		#73	48-233S
		2818S Sec.				.0635"	120-176	⑩				
348" Eng. (S.M.)	1959	2817S Pri.	75-1443			.086"	120-165	⑩	.031"		#73	48-233S
		2817S Sec.				.070"	120-222	⑩				
348" Eng. (Auto. Trans.)	1959	2816S Pri.	75-1443			.086"	120-165	⑩	.031"		#73	48-233S
		2816S Sec.				.070"	120-222	⑩				
Corvette (Front) ⑮	1959	2626S Pri.	75-1530			.0935"	120-166	⑩	.031"	11-302S	#73	48-233S
		2626S Sec.				.053"	120-267	⑩				
Corvette (Rear) ⑮	1959	2627S Pri.	75-1530			.0935"	120-166	⑩	.031"	11-302S	#73	48-233S
		2627S Sec.				.053"	120-267	⑩				
Corvette (Front) ⑯	1959	2613S Pri.	75-1374			.1065"	120-171	⑩	.035"	11-287S	#73	48-233S
		2613S Sec.				.061"	120-166	⑩				
Corvette (Rear) ⑯	1959	2614S Pri.	75-1374			.1065"	120-171	⑩	.035"	11-287S	#73	48-233S
		2614S Sec.				.061"	120-166	⑩				
STUDEBAKER												
Lark V8 (S.M)	1959	2829S Pri.	75-1345	75-1377	⑧①	.089"	120-159	⑩	.035"	11-294S	#74	48-243S
		2829S Sec.				.0635"	120-176	⑩				
Lark V8 (Auto. Trans.)	1959	2830S Pri.	75-1345	75-1377	⑧①	.089"	120-159	⑩	.035"	11-294S	#74	48-243S
		2830S Sec.				.0635"	120-176	⑩				

⑩- Nozzle installed permanently. **Do not remove.**

⑮- With Hydraulic Lifters (Std. Camshaft).

⑯- With Mechanical Lifters (Hi-lift Camshaft)

⑧①- **2 Sizes Lean 75-1378U** (Kit consisting of 2 Metering Rods, 2 Metering Jets, 1 Vacuum Piston Spring).
3 Sizes Lean 75-1379U (Kit consisting of 2 Metering Rods, 2 Metering Jets, 1 Vacuum Piston Spring).

1960 CARTER WCFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Rod No. Standard	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Sizes Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
CHEVROLET												
283" Eng. (S.M.) Early	1960	2818S Pri.	75-1421	75-1471	75-1472	.086"	120-165	⑩	.031"		73	48-233S
		2818S Sec.				.0635"	120-176	⑩				
283" Eng. (S.M.) Late	1960	3059S Pri.	75-1421	75-1471	75-1472	.086"	120-165	⑩	.031"		73	48-233S
		3059S Sec.				.0635"	120-176	⑩				
348" Eng. (S.M.) Early	1960	2817S Pri.	75-1443	75-1469	75-1470	.086"	120-165	⑩	.031"		73	48-233S
		2817S Sec.				.070"	120-222	⑩				
348" Eng. (S.M.) Late	1960	3060S Pri.	75-1443	75-1469	75-1470	.086"	120-165	⑩	.031"		73	48-233S
		3060S Sec.				.070"	120-222	⑩				
348" Eng. (A.T.) Early	1960	2816S Pri.	75-1443	75-1469	75-1470	.086"	120-165	⑩	.031"		73	48-233S
		2816S Sec.				.070"	120-222	⑩				
348" Eng. (A.T.) Late	1960	3061S Pri.	75-1443	75-1469	75-1470	.086"	120-165	⑩	.031"		73	48-233S
		3061S Sec.				.070"	120-222	⑩				
STUDEBAKER												
Lark V8 (S.M)	1960	2829S Pri.	75-1345	75-1377	⑧①	.089"	120-159	⑩	.035"	11-294S	#74	48-243S
		2829S Sec.				.0635"	120-176	⑩				
Lark V8 (Auto. Trans.)	1960	2830S Pri.	75-1345	75-1377	⑧①	.089"	120-159	⑩	.035"	11-294S	#74	48-243S
		2830S Sec.				.0635"	120-176	⑩				

⑩ - Nozzle installed permanently. **Do not remove.**

⑧①- **2 Sizes Lean 75-1378U** (Kit consisting of 2 Metering Rods, 2 Metering Jets, 1 Vacuum Piston Spring).
3 Sizes Lean 75-1379U (Kit consisting of 2 Metering Rods, 2 Metering Jets, 1 Vacuum Piston Spring).

1957-58 CARTER AFB 4-BARREL CARBURETORS

	Carter Carb. No.
BUICK	
1957 Series 50, 60, 70	2507S
1958 Series 50, 60, 70, 700 (Early)	2676S
1958 Series 50, 60, 70, 700 (Late)	2800S
CADILLAC	
See SEPARATE "Cadillac (Carter & Rochester)" data for adjustment specifications and procedures.	
CHRYSLER & IMPERIAL ①	
1957 Windsor with Power-Pak (Late)	2686S
1957 Saratoga (Late)	2686S
1957 New Yorker (Late)	2448S
1957 Imperial (Late)	2448S
1958 Saratoga (Late)	2650S
1958 Saratoga (Later)	② 2805S
1958 Saratoga	③ 2836S
1958 New Yorker & Imperial (Late)	2651S
1958 New Yorker & Imperial (Later)	④ 2806S
DESOTO	
1958 Firesweep, Power-Pak (Early)⑤	2642S
1958 Firesweep, Power-Pak (Late)⑤	2773S
1958 Firesweep, Power-Pak (Early)⑥	2642S
1958 Firesweep, Power-Pak (Late)⑥	2823S
1958 Fireflite, Std. (Early)	2642S
1958 Fireflite, Std. (Late)	2823S
1958 Adventurer (Front) 2652S, (Rear)	2653S
DODGE	
1958 Super Red Ram & D-500⑤	2773S
1958 Super Red Ram & D-500⑥	2642S
1958 D-500 Police Special	2801S
1958 D-500 (Optional) (Front) 2652S, (Rear)	2653S
FORD	
1957 312" Engine	2441S,SA
1958 352" Engine	2640S,SA
MERCURY	
1957 312" Engine	2441S,SA
PLYMOUTH	
1958 318" Engine, Power-Pak (Early)⑤	2744S
1958 318" Engine, Power-Pak (Late)⑤	2813S
1958 318" Engine, Power-Pak (Early)⑥	2641S
1958 318" Engine, Power-Pak (Late)⑥	2812S
1958 350" Engine⑦ (Front) 2652S, (Rear)	2653S
PONTIAC	
1957	2506S
1958 (Early)⑤	2751S
1958 (Late)⑤	2768S,SA
1958 (Early⑥	2740S
1958 (Late)⑥	2767S,SA

① - Carter WCFB carburetor used in early production.
② - Replaces 2650S when used with strainer nut, Carter No. 15-58S.
③ - Used in limited production. Replace with 2805S.
④ - Replaces 2651S when used with strainer nut, Carter No. 15-58S.
⑤ - Synchro-mesh trans. ⑥ - Automatic trans.
⑦ - Golden Commando.

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 BUICK CHOKE VALVE STICKING CORRECTION (Causing Hard Starting):* This condition is caused by air cleaner interference with choke linkage which allows the choke to be held open. Correct by installing a new carburetor-to-air cleaner gasket, Part No. 1458911.

►*1957 BUICK CARBURETOR CHANGES FOR IMPROVED PERFORMANCE:* Make the following changes on carburetors bearing date codes before "B-7". On carburetors with date code "B-7" and later or with date codes having a suffix letter "X", the changes have been made in production. On carburetors having an "X" stamped or scribed adjacent to left front mounting bolt hole, indicates that the changes were made in service. Date codes are stamped on the rear portion of the throttle body flange (brass identification tags are no longer stamped with the date codes)

1) Accelerating Pump Plunger Spring Replacement (To eliminate a lean flat spot on light acceleration) - Install pump plunger and spring assembly, Carter No. 64-209S.

2) Secondary Throttle Operating Lever (To eliminate a lean or sag spot) - This condition may be experienced when engine is at normal operating temperature on one-half to seven-eights throttle acceleration. Correct by installing Secondary Throttle Operating Lever, Carter No. 53A-419, noting the following: When installing lever, secondary throttle return spring should be wound one complete turn clockwise. Make sure that the pick-up lever on primary throttle shaft contacts the loose lever at both points at the same time. If not, bend pick-up lever to obtain proper engagement. Also make sure that primary and secondary throttle valves come to wide open position at the same time. Bend throttle connecting link as necessary.

3) Automatic Choke Vacuum Piston (To eliminate a loading condition on early warm-up) - Install Automatic Choke Piston, Carter No. 160-125.

►*1957 BUICK ENGINE ROUGHNESS & INCORRECT IGNITION TIMING CORRECTION:* On cars having carburetors bearing code dates K-6, L-6, M-6 & A-7 (Stamped on rear portion of throttle body flange), this condition may be caused by distributor vacuum advance operating during engine idle. To check, operate engine at 485 RPM and disconnect vacuum spark line at throttle body. Attach a vacuum gauge to fitting on carburetor and if gauge indicates 5" or more of vacuum, the one throttle valve (primary) which operates vacuum advance unit must be replaced using Throttle Valve, Carter No. 2-208. If for any reason, production throttle valves on the above identified carburetors need replacement, and the vacuum advance operation has been satisfactory, the standard throttle valve, Carter No. 2-186 should be used.

►*1958 CADILLAC EARLY CARBURETOR PRODUCTION CHANGE & REWORK NOTE:* Beginning with Engine No. 057758 (Air.Cond.Cars), No. 058491 (Others), new carburetors (2862S, 2863S) having a new fast idle cam, choke coil, and enlarged restriction entered production. Earlier carburetors (2696S, 2697S, 2802S) can be modified for improved performance as follows:

Fast Idle Cam - To reduce engine idle speed when a warmed-up engine has been restarted after a short cool down period, install a new fast idle cam, Carter No. 181-262.

Choke Coil - A new "softer" choke coil ("AD" Type), Carter No. 170AD-521S should be installed. Set the new coil at "index" instead of 1 notch lean as on previous type coil.

Choke Restriction - Enlarge the choke restriction in bowl casting to .089" (No. 43 drill). This will enable choke to come off sooner.

►*1957 CHRYSLER CARBURETOR FLOODING CORRECTION:* This condition is caused by dirt or foreign matter lodging between fuel inlet needle and seat and can be corrected by installing a new fuel inlet needle and seat assembly, Carter No. 25-343S which has a longer standpipe than previous assemblies. When installing this new assembly, thoroughly clean carburetor and fuel filter. *NOTE* - If Carter No. 25-343S is not available, Carter No. 25-279S can be used by cutting off the standpipe section so the overall length is 1 1/16". Remove all burrs and clean thoroughly before installing.

►*1958 CHRYSLER, DESOTO, DODGE, PLYMOUTH FLOAT ADJUSTMENT CAUTION:* Two different type floats used in these carburetors. Float level specifications are different (see "Adjustment" below).

►*1958 CHRYSLER UNSATISFACTORY WARM-UP PERFORMANCE CORRECTION (Carter AFB 2650S & 2651S Carburetors):* To correct poor warm-up performance or frequent stalling during warm-up, first check and adjust Carburetor Idle Mixture and Speed, Ignition Timing, and operation of Manifold Heat Control. If condition not corrected, and if fully warmed-up engine performance satisfactory, *adjust choke linkage as directed under "Choke Piston Lever Adjustment" below.*

►*1958 CHRYSLER HESITATION & STUMBLE ON ACCELERATION (AFTER ENGINE IS WARMED UP) CORRECTION:* If correct engine tune-up and carburetor adjustment does not eliminate the condition, connect upper end of accelerator pump connector rod to inner hole in pump arm. If condition still exists, replace the power jet rods (step-up rods) using two Carter No. 16-45 rods. Clean fuel filter and filter bowl, then adjust adjust idle mixture and idle speed to specifications.

►*1958 DESOTO FIRESWEEP (2773S & 2642S CARBURETORS) HESITATION & FLAT SPOT CORRECTION:* This condition is more noticeable on acceleration at slower speed (0-40 MPH) and may be corrected by installing two .091" Primary Metering Jets, Carter Part No. 120-155 in place of the original .089" jets, Carter Part No. 120-159. In some instances it may be necessary to set accelerator pump linkage to the long stroke for cold weather operation (make this adjustment only if road test indicates that it is necessary)

►*1958 DESOTO, DODGE & PLYMOUTH V8 STALLING DURING WARM-UP CORRECTION (Cars with Carter AFB 2641S, 2642S or 2644S Carburetors):* Engine stalling after starting and when accelerating during warm-up period may be caused by choke vacuum piston opening choke valve too far and can be corrected by lengthening piston link as follows: With choke valve held tightly closed, remove and discard cotter pin at-

CONTINUED ON NEXT PAGE

1957-58 CARTER AFB 4-BARREL CARBURETORS (C nt.)

taching choke piston link to bracket on choke valve. Use a piece of straight wire .060" in diameter and 1¾" long (1/16" welding rod) to attach link by passing wire through both holes in choke valve bracket (end of wire should protrude 1/8" on other side) and threading long end of wire through hole in choke piston link. Hold wire tight against bracket and wrap end of wire behind the short end and over top of bracket.

►*1958 DODGE SECONDARY THROTTLE VALVE IMPROPER OPERATION CORRECTION:* A new throttle flex spring, Carter Part No. 61-623 is being used in production and may be used on earlier cars to improve secondary throttle valve opening. This spring is fastened on right end of primary shaft and acts as the connector between primary and secondary throttle shafts. If secondary throttle shaft is sticky or slightly bent, the new spring having a heavier action, will improve the operation.

►*1958 DESOTO & DODGE CHOKE HOUSING & SETTING PRODUCTION CHANGE (2773S):* Thermostatic coil, housing and rod assembly, Carter No. 170AX-515S replaced by No. 170AU-515S in later carburetors. Choke setting on early carburetor with 170AX-515S is 2 points rich. On later 170AU-515S, the setting is centered (on index).

►*1957 FORD & MERCURY SURGE AT 50-60 MPH (DUE TO LEANNESS) CORRFCTION:* Install the following new parts: Primary Venturi Assembly (choke side), Carter No. 58-179S. Primary Venturi Assembly (pump side), Carter No. 58-180S. Vacuum Piston Spring, Carter No. 61-259. Step-Up (Metering) Rod, Carter No. 16-28.

►*1957 FORD & MERCURY SECONDARY JET CHANGE (To correct rich mixture at high altitudes):* When installing 2-step lean step-up rods for high altitude operation (10,000-15,000 ft.), install secondary metering jet, Carter No. 120-186, which supersedes Carter No. 120-176.

►*1957 FORD & MERCURY CHOKE SETTING CHANGE:* Initial choke setting has been changed from 2 points rich to 1 point rich from index.

►*1957 FORD HARD (HOT) STARTING CORRECTION:* Install a new "resinoid" spacer, Part No. B7A-9603-D between carburetor and intake manifold to replace the former aluminum spacer. Heat transfer between manifold and carburetor will be reduced with the later type spacer.

►*1958 FORD POOR GAS MILEAGE AND ROUGH ENGINE IDLE CORRECTION:* If the above condition is caused by improper choke operation, install choke housing, Carter No. 170AD-478S. The correct setting for the new choke assembly is **2 notches lean.** Make sure that manifold heat stove and connecting line do not have a vacuum leak.

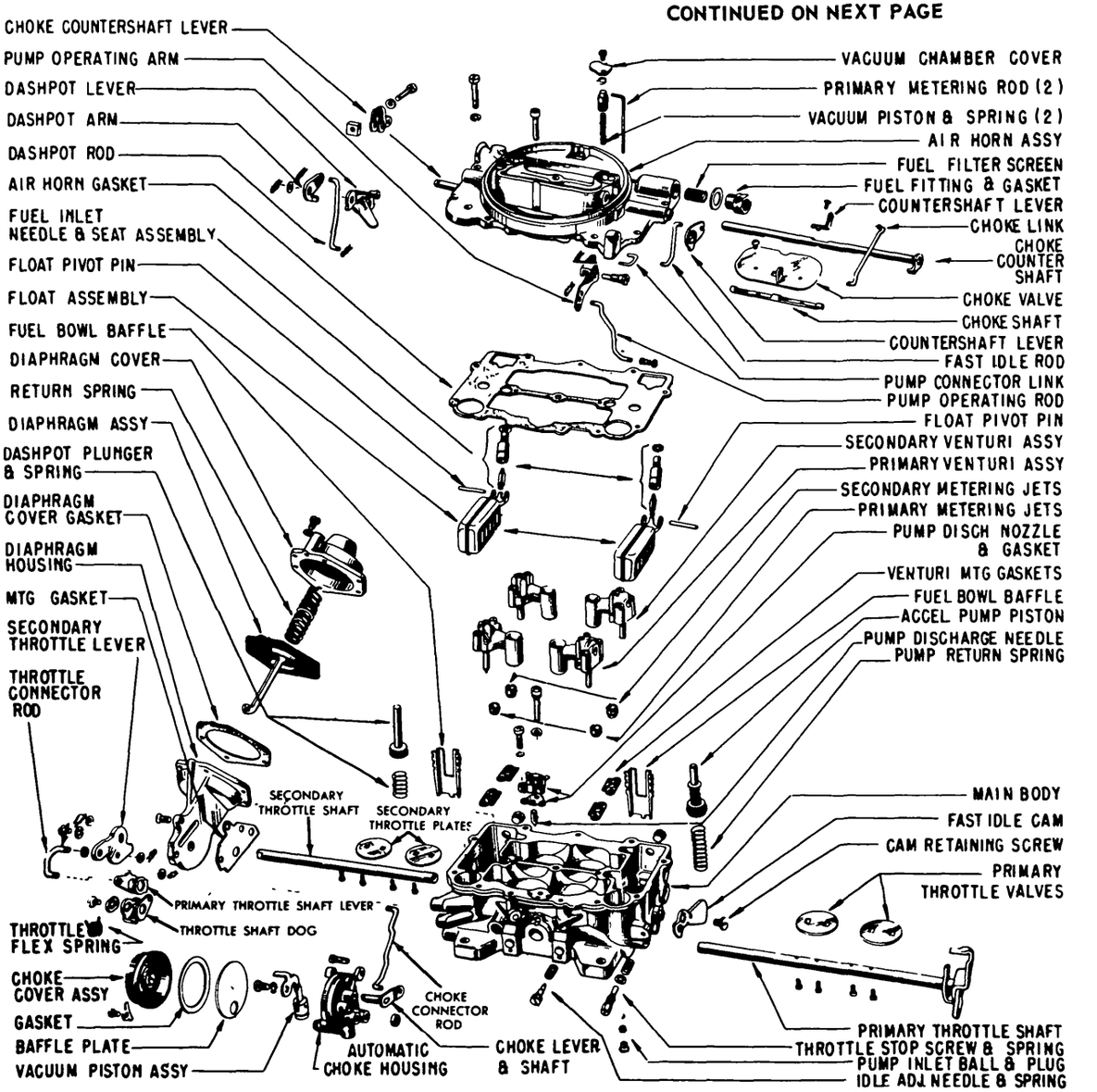
►*1958 FORD V8 HARD HOT STARTING CORRECTION (Carter 2640S,SA Carbs.):* On carburetors not vented in lower venturi (provided on early carburetors only), correct above condition by drilling external bowl vents in bowl cover as follows: Remove carburetor bowl cover, remove floats and intake needles (mark for reinstallation), dashpot linkage and gasket. Center punch hole locations on each side of bowl cover as specified below, use 9/64" drill to drill holes through **outer** wall of air horn only *(CAUTION* - Stop drilling as soon as drill breaks through into vent passage). Remove burrs, carefully clean chips from bowl cover, reassemble carburetor.

Left Side Vent Hole - Viewing bowl cover with choke housing to left, hole center should be 5/16" below edge of air cleaner mounting surface and 23/64" to **l ft** of choke countershaft center.

Right Side Vent Hole - Viewing bowl cover with choke housing to right, hole center should be 5/16" below edge of air cleaner mounting surface and 23/64" to **right** of choke countershaft center.

►*1958 PLYMOUTH CARBURETORS 2652S, 2653S, 2641S, 2744S SECONDARY THROTTLE VALVE IMPROPER*

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TYPICAL CARTER AFB 4-BARREL CARBURETOR (FORD & MERCURY)

1957-58 CARTER AFB 4-BARREL CARBURETORS (C nt.)

OPERATION CORRECTION: A new throttle flex spring, Carter Part No. 61-623, is being used in production and may be used on earlier cars to improve secondary throttle valve opening. This spring is fastened on right end of primary shaft and acts as the connector between primary and secondary throttle shafts. If secondary throttle shaft is sticky or slightly bent, the new spring having a heavier action will improve the operation.

►*1958 PLYMOUTH GOLDEN COMMANDO ENGINE INCORRECT TIMING, POOR PERFORMANCE, HARD STARTING, BACK FIRING CORRECTION (CARTER AFB 2653S CARBURETOR):* These conditions may be caused by an improperly located distributor vacuum port in carburetor. To check if vacuum port is properly located, disconnect vacuum line from carburetor and install a vacuum gauge at carburetor vacuum line fitting. With engine running atslow idle (off fast idle), the gauge should not show a reading over 6" of vacuum. If reading is over 6" of vacuum, it is possible the throttle valve (primary) is not covering the vacuum port. To correct, reposition the throttle valve to properly cover port. In some instances it may be necessary to grind blade lip, at vacuum port location, to a thickness of .030".

►*1958 PONTIAC ROUGH IDLE & STALLING (CAUSED BY BUILD-UP OF GUM IN THROTTLE BORES) CORRECTION:* Remove carburetor. *(NOTE* - Do not remove gum deposits from throttle bores). Invert carburetor and drill a 1/8" diameter hole in each **primary** throttle plate at a point approximately centered in the half of the throttle plate located adjacent to outside edge of throttle body. Remove chips and reinstall carburetor. Adjust hot idle speed to 500 RPM, then adjust throttle rod setting with gauge pin and adjust the idle mixture screws.

►*1958 PONTIAC CARBURETOR PRODUCTION CHANGE & IDLE ADJUSTMENT CAUTION:* Later carburetors, No. 2767S, SA, & 2768S, SA have an air by-pass type idle system. The conventional idle speed screw (throttle stop) has been eliminated and hot idle speed is controlled by the air screw. DO NOT install an idle speed (throttle stop) screw on these carburetors.

►*1958 PONTIAC 2767S CARBURETOR PUMP DISCHARGE PASSAGE PLUG FALLING OUT CORRECTION:* If this plug falls out it may be reinstalled without removing carburetor from engine as follows: Use a drift with a ¼" round end having a slight chamfer. *NOTE - A Carter carburetor pump plunger, with retainer and plunger shaft spring removed, can be used as a drift.* Using the drift, tap ball into passage with a light hammer until ball is 1/32" below surface of casting. Use a punch or nail set with a flat end about 1/8" in diameter and stake casting over ball at two points.

►*1958 PONTIAC PART THROTTLE SURGE CORRECTION:* Step-up rods, Pontiac Part No. 7013366, which are slightly richer, should be used to correct this surge condition if the condition cannot be eliminated by normal adjustment procedures.

►*1958 PONTIAC CARBURETOR PRODUCTION CHANGE:* Carburetors No. 2767SA & 2768SA are now being used in production. The later type carburetors have a redesigned and relocated accelerator pump intake ball check. The new ball check is a one piece assembly and is located in the float bowl instead of on the flange gasket surface of carburetor body. Early and later type ball checks are not interchangeable.

►*1958 PONTIAC AIR CONDITIONED CAR STALLING CAUTION & IDLE ADJUSTMENT NOTE:* If it has not been possible to reach 540-560 RPM (with air conditioning turned off), within the range of the by-pass idle air screw, drill .093" holes in primary throttle valve plates halfway between throttle shaft and the idle ports. *DO NOT install conventional idle speed screw on a by-pass type carburetor.*

DESCRIPTION: This carburetor is a four barrel downdraft type having the float bowl (main body assembly) cast integrally with the throttle body. The primary section contains a low speed (idle) system, high speed system, choke, accelerating pump, dashpot, and vacuumoperated metering rods. The secondary section contains only a high speed system. Two separate float bowls are used, each of which supply fuel to one primary and secondary section.

Fuel System: A single fuel inlet and passages in air horn casting direct fuel to right and left hand float bowls. Floats operate independently of each other and the float bowls are vented to the air cleaner with a connecting passage between the bowls to maintain a uniform air pressure on the fuel.

Idling & Low Speed (Conventional System) - Fuel for idling and early part-throttle operation is metered through the low speed circuit on primary side only (secondary throttle valves remain closed). With primary throttle valves closed or at idle position, fuel enters the idle wells through the main metering jets and is metered in the low speed jets. As the fuel passes the economizer, air enters the by-pass and air bleeds and the mixture is discharged at the idle discharge ports and the idle mixture adjustment screw ports in both primary throats.

Idle & Low Speed (Idle Air By-pass System) - Throttle valves are completely closed at slow idle speed and air is admitted through Idle Air System which consists of an air bypass passage (primary side only) through which air for closed throttle operation is taken from above the throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore. An Idle Speed Screw (single screw for both primary bores) controls the adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used). Throttle valves are completely closed at idle speed.

High Sp d (Primary Side)—As primary throttle valves are opened, manifold vacuum at idle ports drops, diminishing fuel-air flow through idle system. At this point, venturi vacuum is increased causing fuel to flow from the high speed nozzles, with the amount of fuel delivered being governed by throttle valve opening and the position of the main metering rods in main metering jets. The position of the main metering rods (one for each primary barrel) is controlled by manifold vacuum applied to the vacuum piston. The metering rods do not require adjustment. As the vacuum existing in primary venturi draws fuel from primary main metering jet and main well up to the high speed nozzle, the fuel passes through the main well tube and is mixed with air which enters the vent tube through the primary venturi high speed air bleed. The air-fuel mixture is then discharged from high speed nozzle into carburetor venturi. The high speed air bleed also acts as an anti-percolator vent when engine is hot.

High Speed (Secondary Sid)—Fuel for the high speed circuit of the secondary side is metered through secondary metering jets, and with secondary system supplementary at high speeds only, metering rods are not used. When secondary throttle valves are opened, fuel is drawn from secondary metering jets and wells, through the secondary venturi main well, where it is mixed with air from secondary venturi air bleed and discharged out of the secondary high speed nozzles.

►*ADDITIONAL FEATURES NOT FOUND ON ALL CARBURETOR MODELS: Various carbur tors, as indicated under "Adjustment" below, will hav one or more of the following features:*

Automatic Choke (Conventi nal Type): Carter Climatic Control with thermostatic coil.

Automatic Choke ("Cross-Ov r" Typ): Thermostatic coil assembly for this type choke is mounted in a well in the manifold and is linked to choke shaft lever by a rod (plain cover is used on choke housing on air horn and a lever is mounted on end of choke shaft where it extends through cover). Adjustment procedures for this type choke are different than for conventional automatic chokes. *See "Carter & Stromberg (Cross-Over) Automatic Choke".*

Auxiliary Throttle Valves: Velocity type auxiliary secondary throttle valves are located directly over secondary throttle valves in carburetor main body. Auxiliary throttle valve action is controlled by air velocity and by counterweights attached to valve assembly or to shaft.

Automatic Secondary Throttle C ntrol: Vacuum operated diaphragm type control unit opens and closes secondary throttle valves in accordance with air velocity through primary venturi. A mechanical override linkage insures that secondary throttle valves will always close with primary throttle valves.

Anti-Stall Dashpot: The internal anti-stall dashpot is located in carburetor fuel bowl and provides slow closing of throttle valves to idle position.

Spring Loaded Primary Thr ttl Linkag : Consists of a torsion spring on the throttle shaft between the flex dog and throttle spring arm with a stop pin located on the throttle shaft dog. Special throttle linkage adjustment required.

ADJUSTMENTS: *Make all adjustm nts as indicated b low.*

►*1958 IDLE SPEED ADJUSTMENT NOTE (DESOTO, DODGE & PLYMOUTH 2652S, 2653S, PONTIAC 2767S, 2768S):* These carburetors have a single Idle Air Bypass Screw which is used for all idle speed adjustments

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1957-58 CARTER AFB 4-BARREL CARBURETORS (C nt.)

(there is no throttle stopscrew) Turning the Idle Air Adjustment Screw outward increases engine speed and also leans the mixture supplied to engine which must be compensated for by adjustment of idle mixture screws

Initial Idl Mixtur Setting: If initial adjustment required to allow engine to be started and warmed up, open both idle mixture screws (from fully seated position) as indicated below

Initial Idle Mixture ①

Car & Carb.	Idle Screw Opening
Buick 2507S	¾-1¾ turns
Buick 2676S	1½ turns
Buick 2800S	¼-1¾ turns
Chrysler 2448S, 2650S, 2651S, 2686S	¼-1¾ turns
Chrysler 2805S, 2806S, 2836S	¼-1¾ turns
DeSoto 2642S, 2773S, 2853S	¾-2¼ turns
DeSoto 2652S, 2653S	¼-1½ turns
Dodge 2642S 2773S, 2801S	¾-1¾ turns
Dodge 2652S, 2653S	¼-1½ turns
Ford 2441S, SA	½-1½ turns
Ford 2640S,SA	¼-1¾ turns
Mercury 2441S,SA	½-1½ turns
Plymouth 2641S, 2744S, 2812S, 2813S	¼-1¾ turns
Plymouth 2652S, 2653S	¼-1½ turns
Pontiac 2506S	1-2 turns
Pontiac 2740S,2751S,2767S,SA,2768S,SA	½-2 turns

① - See "Idle Speed & Mixture Adjustment (DeSoto, Dodge & Plymouth with 2 Carbs)" below for initial idle mixture setting

Idl Sp d & Mixtur Adjustment (DeSoto, Dodge & Plym uth with Tw Carbur t rs). Open and close throttle valves several times to make sure valves seat properly, then connect tachometer and vacuum gauge For initial adjustment, adjust large idle bypass screw **one** turn off its seat on front carburetor, **one-half** turn on rear carburetor *NOTE - Th air screw is opened less on rear carburetor becaus of air admitted through the choke* Turn in each of the four idle adjusting screws (two on each carburetor) until they seat, back out ¾ turn To adjust idle speed, start engine and bring it up to normal operating temperature, then adjust idle air screws (one on each carburetor) the same amount to obtain 650 RPM with transmission in "N" (Neutral) Adjust one of the mixture screws on rear carburetor until highest vacuum reading or best engine "feel" and highest engine RPM is obtained Adjust the other mixture screws on front and rear carburetors in a similar manner Readjust idle air screws in both carburetors to set speed at 650 RPM *NOTF - Idl air screws must be turned an qual amount Adjust idl mixture screws again if the idl air scr ws ar mov d* After smooth idle is obtained, turn mixture screws 1/6 to 1/3 clockwise (to lean)

Idl Sp d & Mixture Adjustm nt (Exc pt D S t ,D dg & Plymouth with Tw Carbur t rs): With engine at normal operating temperature, choke fully off and carburetor on "slow idle" (Air Conditioner turned off), proceed as follows Place transmission lever in proper range (see "Idle Speed Setting" below) *NOTE - See "1958 Idle Speed Adjustment Note" above for carburetors having the Idle Air Bypass Adjusting Screw* Adjust engine idle speed to correct RPM using a tachometer (see "Idle Speed Setting" below) Turn one mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with the other screw Repeat this procedure until turning mixture screws will not increase engine RPM, and the smoothest idle is obtained with the highest vacuum

Idle Speed Setting

Car Model	S.M. Trans.	Auto. Trans.
1957 Buick		① 485 RPM
1958 Buick		①② 485 RPM
1957-58 Chrysler		① 500 RPM
1958 DeSoto (1 Carb)	500 RPM	① 500 RPM
1958 DeSoto (2 Carbs)	650 RPM	① 650 RPM
1958 Dodge (1 Carb)	500 RPM	① 500 RPM
1958 Dodge (2 Carbs)	650 RPM	① 650 RPM
1957 Ford	475-500 RPM	③ 425-450 RPM
1958 Ford	④	⑤
1957 Mercury	475-500 RPM	③ 425-450 RPM
1958 Plymouth (1 Carb)	450-500 RPM	① 450-500 RPM
1958 Plymouth (2 Carbs)	650 RPM	① 650 RPM
1957 Pontiac	⑥ 450-470 RPM	③⑥ 430-450 RPM
1958 Pontiac	450-470 RPM	③⑦ 480-500 RPM

① - Transmission in "N" (Neutral)
② - 550 RPM (Air Cond Cars)
③ - Transmission in "D" (Drive)
④ - 475 RPM (Engines with hydraulic valve lifters), 600 RPM (Engines with solid valve lifters)
⑤ - 450 RPM (Engines with hydraulic valve lifters), 500 RPM (Engines with solid valve lifters)
⑥ - 500-520 RPM with Air Conditioner unit turned OFF
⑦ - 540-560 RPM with Air Conditioner unit turned OFF

Accelerating Pump: Back off idle speed screw (except carburetors with Idle Air System) until throttle valves seat in bores of carburetor (make sure choke is wide open so that fast idle cam does not hold throttle valves open). Place pump operating rod in center hole (except Buick & Pontiac), in single hole (Buick & Pontiac), and measure the distance from top of bowl cover to top of plunger shaft This measurement should be 33/64" (Buick & Pontiac), 15/32" (Ford & Mercury), 7/16" (Chrysler, DeSoto, Dodge & Plymouth) To adjust, bend throttle connector rod

Metering Rods: *No adjustment required. Metering rods are not used on secondary side.*

Float Setting: Align float by sighting down side of float to determine if side of float is parallel to outer edge of horn casting. To adjust, bend float lever by applying pressure to end of float shell with fingers while supporting float lever with the thumb *(CAUTION–Apply only enough pr ssur to bend float l v r).* After aligning float, remove as much clearance as possible between arms of float lever and support lugs on air horn by bending both arms of the lever. Arms should be parallel to inner surfaces of support lugs and float must operate freely without excess clearance on hinge pin.

Fl at L v l: *NOTE - Two diff r nt typ floats ar used on some carburetors and different float settings ar required for each of the two types.* Primary and Secondary floats are set to the same height With air horn inverted, bowl cover gasket in place and needle valve seated, measure the distance between top of float at outer end and air horn gasket with proper gauge (see table below). Adjust by bending float arm.

Float Level Setting

Car & Carb.	Height	Gauge N .
Buick 2507S, 2676S, 2800S	7/32"	T109-106
Chrysler 2448S, 2686S	5/16"	T109-107
Chrysler 2650S, 2651S, 2836S	①	①
Chrysler 2805S, 2806S	①	①
DeSoto 2773S	7/32"	T109-106
DeSoto 2642S, 2653S, 2823S	①	①
DeSoto 2652S	②	②
Dodge 2773S, 2801S	7/32"	T109-106
Dodge 2642S, 2653S	①	①
Dodge 2652S	②	②
Ford 2441S,SA	5/32"	T109-154
Ford 2640S,SA	5/16"	T109-107
Mercury 2441S,SA	5/32"	T109-154
Plymouth 2812S, 2813S	7/32"	T109-106
Plymouth 2641S, 2653S	①	①
Plymouth 2652S	②	②
Plymouth 2744S	③	③
Pontiac 2506S	⑤ 17/64"	T109-238
Pontiac 2751S	④ 9/32"	T109-126
Pontiac 2740S, 2767S,SA	④⑤ 21/64"	T109-294
Pontiac 2768S,SA	④⑤ 9/32"	T109-126

① - 5/16" (Gauge T109-107) for float Part No 21-188S, identified by smooth sides 7/32" (Gauge T109-106) for float Part No 21-179S, with ribs on side
② - 3/8" (Gauge T109-80) for float Part No 21-188S, identified by smooth sides 9/32" (Gauge T109-126) for float Part No 21-179S, with ribs on side
③ - 1/4" (Gauge T109-107) for float Part No 21-188S, identified by smooth sides 7/32" (Gauge T109-106) for float Part No 21-179S, with ribs on side
④ - Gauge should be in line with center of indentation on side of float
⑤ - Plus or minus 1/64"

Float Drop - 23/32" (all carburetors) with bowl cover held in upright position and measured from outer end of float to bowl cover gasket Adjust by bending stop tabs on float bracket

Automatic Choke (Integral Type): See table below for settings. Adjust by loosening choke cover screws and rotating cover and coil assembly. Then adjust Choke Piston Lever or Choke Countershaft Linkage.

Automatic Choke (Cross-Over Type): This choke assembly is mounted in well in manifold casting. To adjust with unit off engine, loosen mounting post locknut and turn mounting post with screwdriver until index mark on disc positioned opposite correct mark on scale (see

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1957-58 CARTER AFB 4-BARREL CARBURETORS (C nt.)

table below for proper setting). When choke is installed on engine, lift cover disc and open and close choke manually to make sure connector rod clears sides of hole in housing cover. If rod does not clear, replace unit (bending the rod will affect choke calibration).

Automatic Choke Setting

Car & Carb.	Choke Setting
Buick 2507S	Centered
Buick 2676S, 2800S	1 Pt Rich
Chrysler 2448S, 2650S, 2651S, 2686S	1 Pt Rich
Chrysler 2805S, 2806S, 2836S	1 Pt Rich
DeSoto 2642S	① 2 Pts Rich
DeSoto 2773S (Early) ③	① 2 Pts Rich
DeSoto 2773S (Late) ③	① Centered
DeSoto 2823S	① Centered
DeSoto 2653S	1 Pt Rich
Dodge 2642S, 2801S	① 2 Pts Rich
Dodge 2773S (Early) ③	① 2 Pts Rich
Dodge 2773S (Late) ③	① Centered
Dodge 2653S	1 Pt Rich
Ford 2441S,SA	1 Pt Rich
Ford 2640S,SA	② 1 Pt Lean
Mercury 2441S,SA	1 Pt Rich
Plymouth 2641S, 2744S, 2813S	① 2 Pts Rich
Plymouth 2812S	① Centered
Plymouth 2653S	1 Pt Rich
Pontiac 2506S,2751S	Centered
Pontiac 2740S, 2767S,SA, 2768S,SA	1 Pt Rich

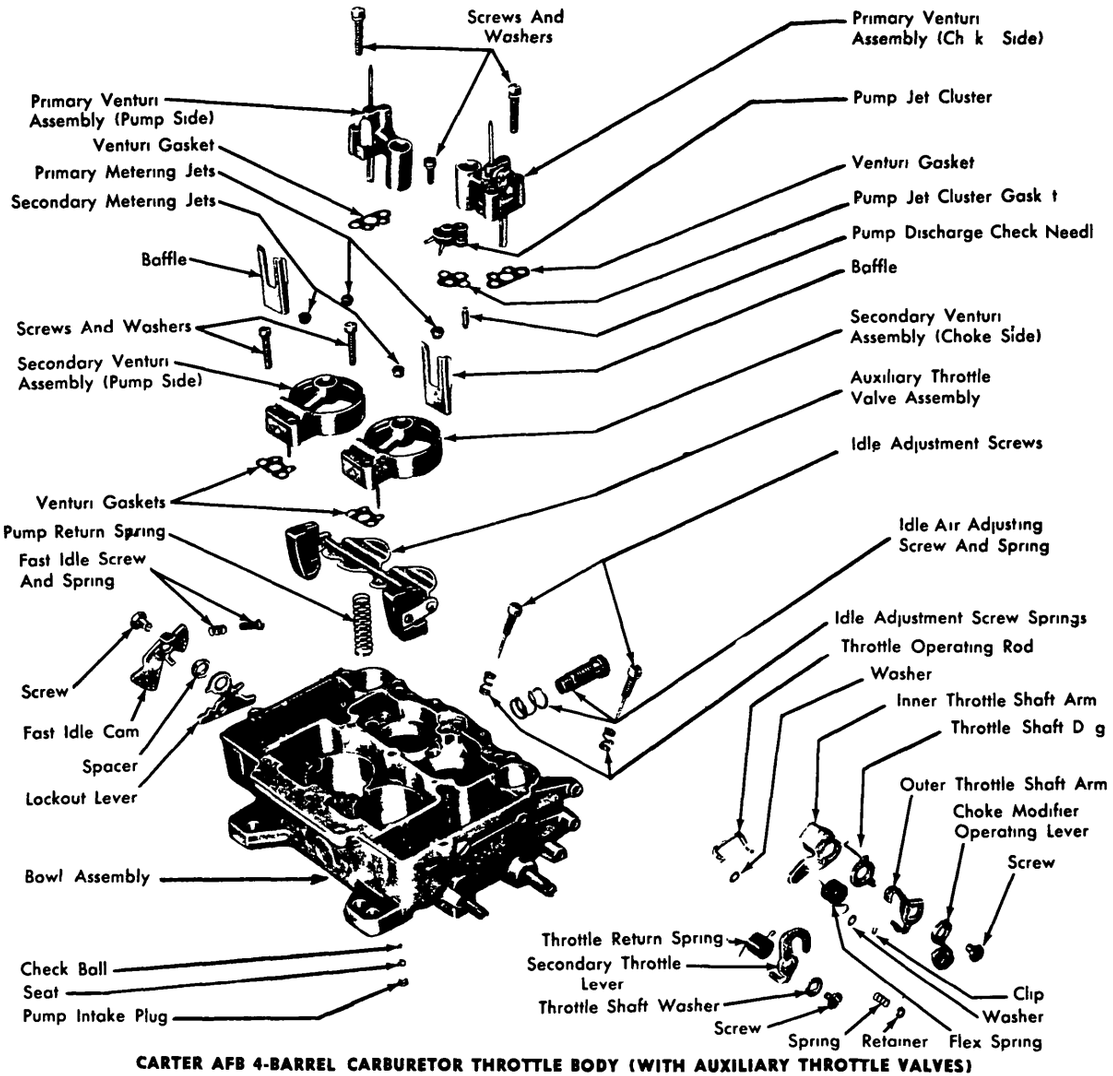
① - "Cross-Over" type choke

② - See "1958 Ford Poor Gas Mileage & Rough Engine Idle Correction" above

③ - See "1958 DeSoto & Dodge Choke Housing & Setting Production Change (2773S)" above

Choke Piston Lever Adjustment (Buick 2507S, 2676S, 2800S; Chrysler 2448S, 2560S, 2651S, 2686S, 2805S, 2806S, 2836S; DeSoto, Dodge, Plymouth 2653S; Pontiac 2506S, 2740S, 2751S, 2767S,SA, 2768S,SA): Clearance between choke lever and stop in piston housing with choke held closed should be 045" (2507S, 2676S, 2506S, 2740S, 2751S, 2767S,SA, 2768S,SA), 040" (2448S, 2650S, 2651S, 2653S, 2686S, 2805S, 2806S), 067" (2836S), 010" (2800S) To adjust, bend choke connector rod *NOTE - On Ford & Mercury, adjust choke countershaft (see below)*

Choke Piston Lever Adjustment (Chrysler, All Carbs.): The following procedure can be used in place of the above instructions to correct unsatisfactory warm-up performance (as noted above) With automatic choke retainer ring, cover, and thermostatic coil assembly removed, open throttle ¼ (remove throttle return spring), open choke valve fully Use special wire gauge (can be made up from 026" wire with short right angle bend at end) inserted in choke piston slot so that hook on end enters slot in cylinder Rotate choke lever clockwise so that wire gauge will be clamped between piston and cylinder slots with choke linkage free Choke valve opening or clearance between upper edge of choke valve and air horn wall should be 11/64" Adjust by bending choke connector rod at upper angle Reassemble automatic choke and set at one notch rich



CARTER AFB 4-BARREL CARBURETOR THROTTLE BODY (WITH AUXILIARY THROTTLE VALVES)

Choke Countershaft Linkage (Ford & Mercury): 086" (Gauge T109-215) clearance between choke lever and stop in piston housing with choke valve held closed To adjust, loosen countershaft lever clampscrew, then take endplay out of countershaft and hold choke valve tightly closed Remove slack from linkage by pressing countershaft lever towards closed position with gauge in place between choke lever and stop in piston housing

Fast Idl Linkag Adjustm nt (Buick 2507S, Ford & M rcury 2441S,SA, P ntiac 2506S, Carbur t rs with ut ind x mark n fast idl cam): 010" (Gauge T109-200) clearance between lug on outer choke shaft lever and stop on inner choke shaft lever with choke tightly closed and fast idle against stop on casting To adjust, bend fast idle connector rod

Fast Idle Linkage Adjustment (Buick 2800S, 2507S, Ford & Mercury 2441S.SA, Ford 2640S,SA, P ntiac 2506S, Carburetors with index mark n fast idl cam): With slight clearance between lug on fast idle cam and stop on flange casting, and inner choke shaft lever contacting lug on outer choke shaft lever, align mark on fast idle cam with adjusting screw To adjust, bend fast idle connector rod

Fast Idl Linkag Adjustm nt (Chrysl r 2448S, 2650S, 2651S, 2686S, 2805S, 2806S, 2836S; D Sot 2642S, 2653S, 2773S, 2823S; D dg 2642S, 2653S, 2773S,

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2801S; Plym uth 2641S, 2653S, 2744S, 2812S, 2813S; P ntiac 2740S, 2751S, 2767S,SA, 2768S,SA): With choke valve tightly closed and lug on outer choke shaft lever contacting stop on inner choke shaft lever, align center of fast idle screw with index mark on fast idle cam To adjust, bend fast idle connector rod

Fast Idl : This adjustment can be made with carburetor either on or off the car

Fast Idl Adjustm nt (Off Engine) - With choke valve tightly closed and fast idle adjusting screw on high step of fast idle cam (carburetors not having an index mark on cam), centered on index mark on fast idle cam (others), clearance between lower edge of throttle valve and carburetor bore on side opposite idle ports should be as indicated in table below Turn fast idle adjusting screw to obtain correct clearance

Fast Idl Setting (Off Engine)

Car & Carb.	Checking Gauge Size & No.
Buick 2507S	026" T109-189
Buick 2676S, 2800S	020" T109-29
Chrysler (All Carbs)	012" T109-200
DeSoto (All Carbs)	012" T109-200
Dodge (All Carbs)	012" T109-200
Ford 2441S,SA	020" T109-29
Ford 2640S,SA	026" T109-189
Mercury 2441S,SA	020" T109-29
Plymouth (All Carbs)	.012" T109-200
Pontiac 2506S, 2740S	030" T109-29
Pontiac 2767S,SA, 2768S,SA	026" T109-189
Pontiac 2751S	020" T109-29

Fast Idl Adjustm nt(On Engine) - With engine at normal operating temperature, transmission in neutral, air cleaner in place on carburetor, rotate fast idle cam so fast idle adjusting screw is on high step of fast idle cam (carburetors not having an index mark on cam), so fast idle adjusting screw is aligned with index mark on cam (others) Adjust fast idle screw to obtain an engine speed as indicated in table below

Fast Idl Setting (On Engine)

Car M d l	Fngine RPM
1957-58 Buick	1500
1957 Chrysler Windsor & Saratoga	1300-1350
1957 Chrysler New Yorker & Imperial	1450-1500
1958 Chrysler Saratoga	1375-1425
1958 Chrysler New Yorker & Imperial	1350-1400
1958 DeSoto (1 Carb)	1375-1425
1958 DeSoto Adventurer (2 Carbs)	1450
1958 Dodge (1 Carb)	1375-1425
1958 Dodge (2 Carbs)	1450
1957 Ford	1800-2000
1958 Ford	① 650
1957 Mercury	1800-2000
1958 Plymouth (1 Carb)	1375-1425
1958 Plymouth (2 Carbs)	1450
1957 Ponti ac	1900
1958 Pontiac (Early) ②	1900
1958 Pontiac (Late) ③	2200

① - With fast idle screw on low step of fast idle cam
② - With 2740S, 2751S carburetors
③ - With 2767S,SA, 2768S,S A carburetors

Unloader· After Choke Rod adjusted (see above), rotate primary throttle valves to wide open position. Use gauge indicated (see table below) to check clearance between upper edge of choke valve and wall of air horn. To adjust, bend unloader lip on primary throttle shaft lever with tool T109-214.

Unloader Setting

Car & Carb.	Checking Gauge Size & No.
Buick (All Carbs)	3/16"T109-28
Chrysler (All Carbs)	¼" T109-31
DeSoto (All Carbs exc 2652S)	¼" T109-31
Dodge (All Carbs exc 2652S)	¼" T109-31
Ford (All Carbs)	067" T109-234
Mercury (All Carbs)	067" T109-234
Plymouth (All Carbs exc 2652S)	¼" T109-31
Pontiac (All Carbs)	1/8" T109-36

Dashpot (Ford & Mercury 2441S,SA, Ford 2640S,SA): With primary throttle valves in wide open position there should be a clearance of 7/16" between top surface of bowl cover and bottom of dashpot arm lever To adjust, bend dashpot inner arm tang with Tool T109-22

Auxiliary Throttle Valves: *NOTE - Used on some carburetors* No adjustment required With carburetor level, auxiliary throttle valves must close from wide open position of their own weight

Secondary Throttle Lever Adjustment (Buick & Pontiac): Bend secondary throttle operating rod so primary and secondary throttle valves reach wide open position at the same time *NOTE - Secondary throttle valves will be a few degrees from wide open position when primary throttle valves are wide open On Buick 2800S carburet ors, upper edge of secondary valves should just contact auxiliary valves when auxiliary valves are wide open, and the wide open stop lug on secondary throttle lever should contact boss on flange to prevent secondary valves from going past wide open position. If necessary, bend stop lug* With primary and secondary throttle valves tightly closed there should be 017- 022", Gauge T109-29 (Buick 2507S, Pontiac 2506S), 010- 030", Gauge T109-29 (Buick 2676S, 2800S, Pontiac 2740S, 2751S, 2767S,SA, 2768S,SA) clearance between positive closing shoes on primary and secondary throttle levers To adjust, bend shoe on secondary lever

Secondary Throttle Lever Adjustment (Except Buick, Pontiac, Ford & Mercury): *NOTE - There is no secondary throttle lever adjustment on Ford & Mercury carburetors* Block choke valves wide open With 19/64" (Chrysler 2448S, 2686S), 23/64" (DeSoto, Dodge, Plymouth 2652S, 2653S), 3/8" (Others) clearance between lower edge of primary throttle valves and bores (side opposite idle ports), secondary valves should just start to open To adjust, bend throttle operating rod *NOTE - At wide open throttle, secondary valves will reach a full vertical position* With primary and secondary valves in tightly closed position, there should be 010- 030" (Gauge T109-29) clearance between positive closing shoes on primary and secondary throttle levers. To adjust, bend shoe on secondary lever

S c ndary Thr ttl L ck ut Adjustm nt (Exc pt F rd & M rcury Carbur t rs): Crack throttle valves and manually open and close choke valve Tang on secondary throttle lever should freely engage in notch of lockout dog To adjust, bend tang on secondary throttle lever On DeSoto Dodge & Plymouth 2653S carburetor, hold lockout dog tightly against stop on flange casting (secondary throttle valves partly open) There should be 020" (Gauge T109-29) clearance between tang on secondary throttle lever and lockout arm To adjust, bend arm at slot on lockout dog *NOTE - On this carburetor, fast idle cam may be removed to aid in gauging and adjusting*

Primary Throttle Shaft Dog (Spring Loaded Primary Throttle Linkage): Ford & Mercury - With primary throttle valves in wide open position there should be a clearance of 015", Gauge T109-44 (2441S,SA), 020", Gauge T 109-29 (2640S,SA) between edge of secondary throttle valves and bore of carburetor adjacent to primary throtvalves To adjust, bend upper tang on primary throttle shaft dog *NOTE - If clearance cannot be obtained, bend throttle operating rod slightly* With primary and secondary throttle valves in tightly closed position, there should be a clearance of 067" (Gauge T109-234) between primary throttle shaft flex spring and lower tang on primary throttle shaft dog To adjust, bend lower tang

Automatic Secondary Throttle Control (Ford & Mercury): This unit requires no adjustment. See that linkage is free and that there are no vacuum leaks between carburetor body and unit.

Buick Vacuum Starter Switch Timing Check (On Car): Back off throttle stop screw and rotate fast idle cam to slow idle position then fully close throttle valve *(CAUTION* - Make sure that dashpot does not prevent full closing of throttle) Measure distance from diaphragm flange of dashpot to near edge of dashpot arm on throttle lever With ignition turned on slowly open throttle while holding scale in position against flange of dashpot When cranking motor is energized note distance from flange of dashpot to near edge of dashpot arm Subtract the two measurements If switch is properly timed, the difference should be 3/8-11/16" (1957 Models), 13/16-1 5/16" (1958 Models) Adjust by changing timing shims located below contact spring in terminal cap

OVERHAUL· *CAUTION - When disassembling carburetor, be sure to keep PRIMARY and SECONDARY side parts separate so they will not be confused or interchang d when carburetor reassembled*

Disassembly: *NOTE - This carburetor consists of two main assemblies (Air Horn & Main Body) which can be overhauled separately Pemove air horn from main body as follows*

All Models (Except Ford & Mercury) - Disconnect choke connector rod at choke shaft lever (except models with "Cross-Over" type choke), then disconnect throttle connector rod at pump arm and fast idle connector rod at choke lever Remove air horn-to-main body attaching screws and lockwashers and remove air horn from main

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1957-58 CARTER AFB 4-BARREL CARBURETORS (Cont.)

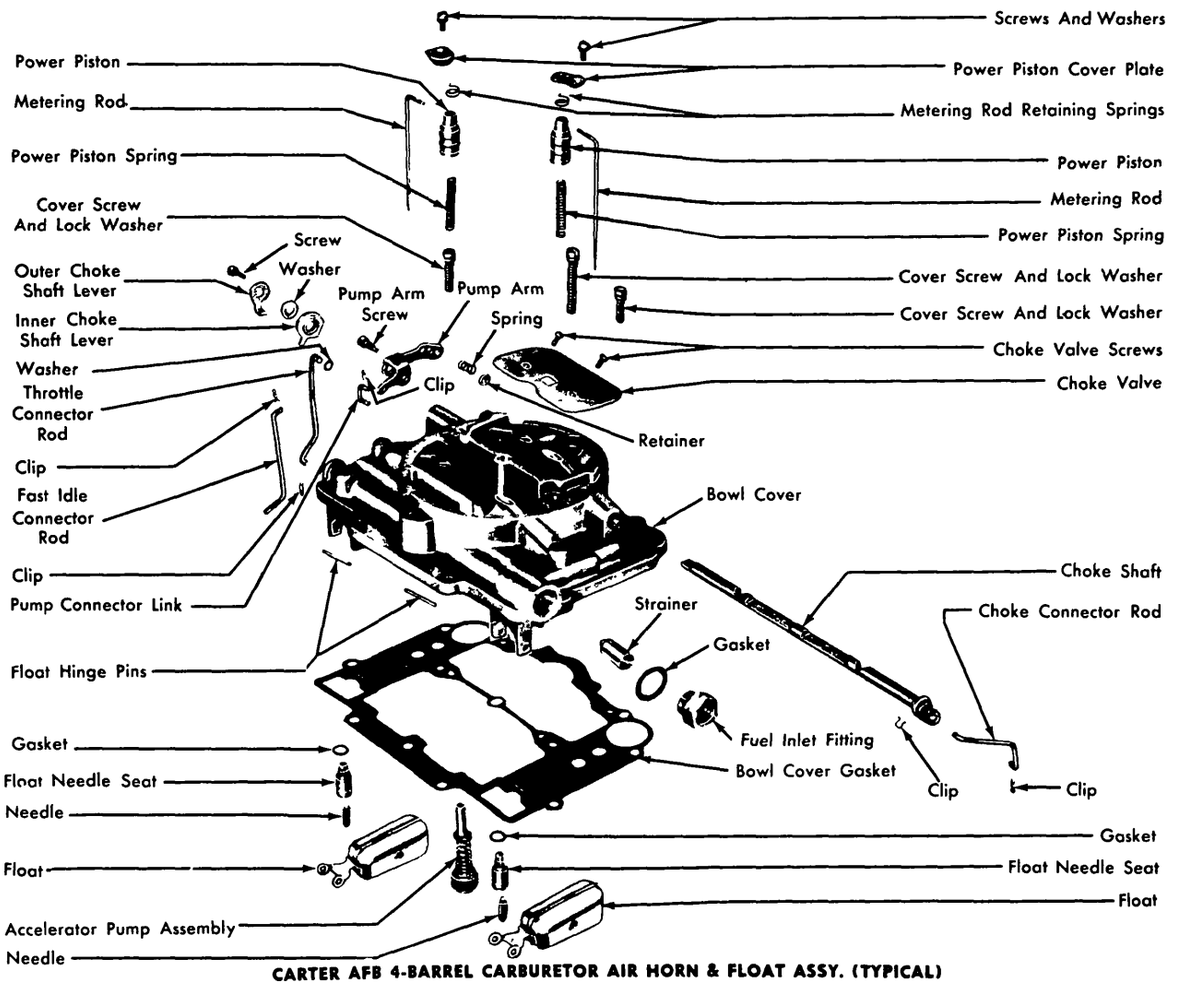
body by lifting air horn assembly straight up.

Ford & Mercury - Remove air cleaner anchor screw, then remove anti-stall dashpot arm, anti-stall dashpot operating lever, and choke countershaft lever from choke side of carburetor. On fuel inlet side, disconnect fast idle connector rod at the inside choke countershaft lever, and disconnect accelerating pump operating rod at pump arm. Remove air horn-to-main body attaching screws and remove air horn from main body.

Air Horn (Except Ford & Mercury) - Remove fuel inlet strainer nut, gasket and screen, then remove power piston cover plates. Remove two metering rods with pistons and remove springs from piston wells. Remove pump arm and link and pump plunger assembly. Remove float hinge pins, floats and float needle assemblies and gaskets. *NOTE - Keep individual float parts grouped so that same needle and seat are reassembled together.* On models with "Cross-Over" type choke, use a prick punch and pierce the welch plug in end of choke piston cylinder and remove plug. Disconnect piston link at choke lever and slide choke piston and link out of cylinder. On all models, remove inner and outer choke shaft lever and washers, then remove choke valve and choke shaft.

Air Horn (Ford & Mercury) - Remove accelerating pump plunger, metering rod and power piston assemblies, floats, fuel inlet and needle assemblies, then remove air horn gasket. Remove fuel inlet fitting, gasket and screen. Remove choke plate connector link, then slide choke plate countershaft out of air horn assembly. Remove choke plate, then slide choke shaft out of air horn.

Main Body - On cars with conventional automatic choke assembly, remove attaching screws and remove coil housing and thermostatic coil. Remove housing gasket and baffle plate. To disassemble choke, remove choke lever attaching screws and retainer washer, then remove choke piston lever and link assembly by rotating piston in bore. On Buick models, remove starter switch terminal cap, return spring guide block assembly, plunger and ball. On all cars, remove pump discharge nozzle assembly and gasket, then remove primary and secondary venturi assemblies. *CAUTION - Venturi assemblies must be marked for reassembly in the same location.* Remove two primary and two secondary metering jets and mark them for reassembly in the same location. On models having auxiliary throttle valves, remove auxiliary throttle valve assembly. On all models, remove pump return spring, idle mixture screws and spring. On Buick carburetors, if starter switch strainer is not visibly damaged or clogged, it will not have to be removed. On models having an air bypass idle system, remove the large idle air adjusting screw and spring. On all models, invert carburetor body and remove pump discharge check needle. With body inverted, remove pump intake screw plug, check ball seat, and check ball. Remove fast idle cam attaching screw and cam, then on all models except Ford & Mercury, remove spacer and lockout lever, throttle operating rod, throttle shaft washer, secondary throttle lever and spring. On Ford & Mercury, remove throttle connector rod, disconnect secondary throttle operating diaphragm lever, then remove secondary throttle operating lever. Remove secondary diaphragm housing cover, return spring and diaphragm, then remove diaphragm housing and gasket from main body. On all models, remove throttle shaft arm, throttle shaft dog and inner throttle shaft arm and flex spring from end of primary throttle shaft on choke side. *NOTE - It is not recommended that throttle body be disassembled further, however, if necessary to remove throttle valves and shafts, proceed as follows:* Mark all throttle valves so they can be reinstalled with correct side of valve upward. File burrs from staked ends of all throttle valve screws and remove screws and valves from shafts. Remove secondary throttle shaft. Remove primary throttle shaft using a rawhide hammer to tap shaft through retainer washer.



CARTER AFB 4-BARREL CARBURETOR AIR HORN & FLOAT ASSY. (TYPICAL)

Cleaning & Inspection: Clean all metal parts in carburetor cleaner and dry with compressed air. *(CAUTION - Do not wash accelerator pump plunger assembly or thermostatic coil and cover assembly in cleaning solvent).* Clean and blow out all passages with air. Remove any gum deposits in carburetor. Clean carbon out of bowl assembly heat passages. Make sure that all calibrated restrictions such as idle ports, air bleeds and vents are clean, but do not pass drills or wires through these passages. Check all shafts and their bearing bores for wear. Check each piston in its cylinder. Check for worn or damaged jets and worn holes in ends of various levers. Check accelerator pump plunger leather and replace as an assembly if leather is creased or cracked. Examine float needles and seats, and if needle is grooved replace needle and seat assembly. Check idle mixture adjusting screws for burrs, ridges, or grooves and replace screws if necessary. Check floats for dents or leaks and check hinge pin bores for burrs or wear and check pins for straightness. Clean fuel inlet screen.

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1957-58 CARTER AFB 4-BARREL CARBURETORS (Cont.)

Check fast idle cam for excessive wear on steps and replace if necessary. On models with auxiliary throttle valves, check valve assembly to make sure it is free to swing and that weights do not rub on casting. On all models, carefully check body assembly and valve assembly for wear at throttle valves and bores and between shafts and their bores. On Ford & Mercury models, check secondary throttle diaphragm housing for cracks and check dashpot plunger leather for damage or wear. Make sure intake check and discharge restriction is free of lint, gum, or other foreign matter.

Reassembly: Use all new gaskets. Install parts in reverse order of disassembly procedure(above), and note the following:

Valve Installation - Use new screws when installing valves. Install valve shafts, then install valves in their respective bores with "C" in circle toward manifold side of carburetor. Install new screws but do not tighten. Make sure the idle speed adjusting screw is backed out, then hold valves in place with fingers pressing on high side of valve. Tap valves lightly with a screwdriver to seat them in the bores and while holding in this position, tighten the screws securely. Stake screws in place by squeezing with pliers.

THROTTLE VALVE SETTING

Carb. No.	Ⓒ Idle Port Opening	Vacuum Port
2441S, SA	.187-.193"	② .040-.050"
2448S, 2686S	.142-.148"	② .026-.034"
2506S	.147-.153"	② .025-.035"
2507S	.156-.162"	④⑤
2800S	.156-.162"	④ .008-.016"
2650S, 2651S	.142-.148"	② .026-.034"
2805S, 2806S	.142-.148"	② .026-.034"
2642S, 2773S, 2823S	.142-.148"	② .026-.034"
2652S	.095-.100"	
2653S	.085-.091"	② .000-.004"
2641S, 2744S, 2801S	.142-.148"	② .026-.034"
2812S, 2813S	.142-.148"	② .026-.034"
2640S, SA	.133-.140"	② .035-.045"
2740S, 2741S	.147-.153"	② .035-.045"
2767S, SA, 2768S, SA	.120-.126"	② .003-.013"

Ⓒ - Primary side (none on secondary). Above top edge of fully closed throttle valve.
② - Top of port above top edge of fully closed throttle valve.
③ - Bottom of port above lower edge of fully closed throttle valve.
④ - Bottom of port above top edge of fully closed throttle valve.
⑤ - .000-.010" (Early with valve No. 2-186). .008-.016" (Late with Valve No. 2-211).

Ford & Mercury Secondary Throttle Operating Diaphragm Installation - Install secondary throttle diaphragm housing with a new gasket and stake the screws into indentations with a prick punch. Install secondary operating lever and attached operating rod, secondary throttle shaft washer and screw. Install secondary diaphragm and gasket in diaphragm housing. Temporarily attach diaphragm rod to secondary throttle lever pin. Install diaphragm return spring and housing cap with vacuum passage in cap indexing with vacuum passage in housing. Install six screws and lockwashers. *NOTE* - Diaphragm must be positioned so it is not under tension as the attaching screws are being tightened finger tight. Disengage diaphragm rod and securely tighten the six screws. Reinstall diaphragm rod and retain with spring retainer.

SERVICE PARTS: Gasket Sets - Carter Nos. 292 (2441S, SA, 2640S, SA; No. 293 (2740S, 2751S, 2767S,SA, 2768S, SA, 2506S); No. 304 (2507S); No. 313 (2448S, 2686S, 2650S, 2651S, 2805S, 2806S); No. 316 (2641S, 2744S, 2812S, 2813S); No. 317 (2642S, 2773S, 2823S, 2801S); No. 319 (2652S); No. 320 (2653S); No. 323 (2800S).

Recarburetion Kit (Repair Package): Carter No. 1851 (2441S,SA); No. 1852 (2506S); No. 1876 (2448S, 2686S); No. 1902 (2479S, 2480S); No. 1907N (2650S, 2651S, 2805S, 2806S); No. 1913N (2641S, 2744S, 2812S, 2813S); No. 1915N (2642S); 1923N (2640S,SA); 1935N (2740S), 1941N (2800S); No. 1946N (2767S,SA, 2768S,SA); No. 1948N (2800S, 2823S).

1957 CARTER AFB CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Part Numbers ①	Part Numbers ②	Pump Jet Assy. Size	Pump Jet Assy. Part No.
BUICK											
50,60,70	1957	2507S Pri.	.0935"	120-166	16-25	⑩	.0292"	58-158S	58-159S	.028"	48-264S
		2507S Sec.	.0748"	120-229		⑩		58-151S	58-152S		
CADILLAC											
V8 Std. Eng.	1957	2479S,80S Pri.	.098"	120-163	16-31	⑩	.032"	58-186S	58-187S	.025"	48-269S
		2479S,80S Sec.	.082"	120-158		⑩		58-196S	58-197S		
CHRYSLER											
C-75-2	1957	2686S Pri.	.089"	120-159	16-35⑦	⑩	.031"	58-192S⑤	58-193S⑥	.028"	48-264S
		2686S Sec.	.061"	120-186		⑩		58-208S	58-209S		
C-76, IM-1,2,4	1957	2448S Pri.	.089"	120-159	16-35⑦	⑩	.031"	58-192S	58-193S	.028"	48-264S
		2448S Sec.	.0649"	120-226		⑩		58-208S	58-209S		
FORD & MERCURY											
V8	1957	2441S,SA Pri.	.0935"	120-166	16-28③④	⑩	.031"	58-179S⑧	58-180S⑨	.031"	48-258S
		2441S,SA Sec.	.0635"	120-176		⑩		58-142S	58-141S		
PONTIAC											
Hydra-Matic Cars	1957	2506S Pri.	.098"	120-163	16-30⑪	⑩	.032"	58-177S	58-165S	.028"	48-255S
		2506S Sec.	.073"	120-175		⑩		58-164S	58-178S		

① - Choke side. ② - Pump side. ③ - Supersedes 16-14.
④ - 1 size lean 16-21; 2 sizes lean 16-22. Step-up rod 120-186 used with secondary jet 16-22.
⑤ - Supersedes 58-215S. ⑥ - Supersedes 58-216S. ⑦ - 1 size lean 16-39; 2 sizes lean 16-40
⑧ - Supersedes 58-170S which superseded 58-128S on 2441S with Air Horn 6-1304S which supersedes 6-1224S.
⑨ - Supersedes 58-179S which superseded 58-129S on 2441S with Air Horn 6-1304S which supersedes 6-1224S.
⑩ - Nozzle installed permanently. **Datremv.**
⑪ - 1 size lean 16-46; 2 sizes lean 16-48U (Unitized Pkg. consisting of 2 step-up rods 16-47 and 2 metering jets 120-185).

1958 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly Part Numbers ①	Venturi Assembly Part Numbers ②	Pump Jet Assy. Size	Pump Jet Assy. Part No.
BUICK											
50,60,70,700	1958	2800S Pri.	.0935"	120-166	16-49	(10)	.0465"	58-244S	58-345S	.028"	48-264S
		2800S Sec.	.0748"	120-229		(10)		58-151S	58-152S		
CADILLAC											
Std.Eng. No.A.C. (Early)	1958	2696S Pri.	.098"	120-163	16-73 (12)	(10)	.032"	58-186S	58-187S	.025"	48-269S
		2696S Sec.	.082"	120-158		(10)		58-314S (13)	58-315S (14)		
Std.Eng. No.A.C. (Later)	1958	2862S Pri.	.098"	120-163	16-77	(10)	.033"	58-344S	58-343S	.025"	48-269S
		2862S Sec.	.082"	120-158		(10)		58-314S	58-315S		
Std.Eng.W/A.C.(Early)	1958	2697S Pri.	.098"	120-163	16-73 (12)	(10)	.032"	58-186S	58-187S	.025"	48-269S
		2697S Sec.	.082"	120-158		(10)		58-314S (13)	58-315S (14)		
Std.Eng.W/A.C. (Late)	1958	2802S Pri.	.098"	120-163	16-73 (12)	(10)	.032"	58-186S	58-187S	.025"	48-269S
		2802S Sec	.082"	120-158		(10)		58-314S (13)	58-315S (14)		
Std.Eng.W/A.C.(Later)	1958	2863S Pri	.098"	120-163	16-77	(10)	.033"	58-344S	58-343S	.025"	48-269S
		2863S Sec.	.082"	120-158		(10)		58-314S	58-315S		
CHRYSLER											
LC2 (Early)	1958	2650S Pri.	.089"	120-159	16-43 (15)	(10)	.031"	58-226S	58-227S	.028"	48-264S
		2650S Sec.	.057"	120-193		(10)		58-208S	58-209S		
LC2 (Later)	1958	2805S Pri.	.089"	120-159	16-43 (15)	(10)	.031"	58-226S	58-227S	.028"	48-264S
		2805S Sec.	.057"	120-193		(10)		58-208S	58-209S		
LC3, LY1 (Early)	1958	2651S Pri.	.089"	120-159	16-43 (15)	(10)	.031"	58-226S	58-227S	.028"	48-264S
		2651S Sec.	.061"	120-186		(10)		58-208S	58-209S		
LC3, LY1 (Later)	1958	2806S Pri.	.089"	120-159	16-43 (15)	(10)	.031"	58-226S	58-227S	.028"	48-264S
		2806S Sec.	.061"	120-186		(10)		58-208S	58-209S		
DE SOTO											
LS1, LS3 (Early)	1958	2642S Pri.	.089"	120-159 (16)	16-45 (18) (19) (20)	(10)	.033"	58-256S (21)	58-257S (22)	.031"	48-258S
		2642S Sec.	.061"	120-186 (17)		(10)		58-232S	58-233S		
LS1 S.M. (Later)	1958	2773S Pri.	.091"	120-155	16-35	(10)	.035"	58-298S	58-299S	.031"	48-258S
		2773S Sec.	.061"	120-186		(10)		58-302S	58-303S		
LS1, LS3 (Later)	1958	2823S Pri.	.089"	120-159	16-70	(10)	.033"	58-256S	58-257S	.031"	48-258S
		2823S Sec.	.057"	120-193		(10)		58-232S	58-233S		
Adventurer (Front)	1958	2652S Pri.	.089"	120-159	16-40	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
		2652S Sec.	.0635"	120-176		(10)		58-221S	58-222S		
Adventurer (Rear)	1958	2653S Pri.	.089"	120-159	16-26	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
		2653S Sec.	.0492"	120-181		(10)		58-221S	58-222S		

① - Choke side. ② - Pump side.

(10) - Nozzle installed permanently. **Do not remove.**

(12) - Supersedes 16-59 which superseded 16-58.

(13) - Supersedes 58-270S. (14) - Supersedes 58-271S.

(15) - 1 size lean 16-39, 2 sizes lean 16-40.

(16) - Use 120-155 (with 16-45) to correct leanness, hesitation, flat spot.

(17) - Supersedes 120-226. (18) - Supersedes 16-50.

(19) - Use 16-70 (with 120-159) to correct leanness, hesitation, flat spot.

(20) - 1 size lean 16-35, 2 sizes lean 16-39.

(21) - Supersedes 58-236S.

(22) - Supersedes 58-237S.

(23) - Later production. Early production .028".

(24) - Supersedes 16-14.

(25) - 1 size lean 16-21, 2 sizes lean 16-22.

(26) - Supersedes 58-202S on 2640S.

(27) - Supersedes 58-203S on 2640S.

(28) - 1 size lean 16-61, 2 sizes lean 16-63U (Unitized Pkg. consisting of 2 step-up rods 16-62 and 2 metering jets 120-175).

(29) - Later production. Early production .035".

(30) - Later production. Early production .032".

(31) - 1 size lean 16-60, 2 sizes lean 16-64.

1958 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly Part Numbers (1)	Venturi Assembly Part Numbers (2)	Pump Jet Assy. Size	Pump Jet Assy. Part No.
DODGE										
350" & 361" Eng. S.M. 1958	2773S Pri.	.091"	120-155	16-35	(10)	.035"	58-298S	58-299S	.031	48-258S
	2773S Sec.	.061"	120-186		(10)		58-302S	58-303S		
350" & 361" Eng. Auto. Trans. 1958	2642S Pri.	.089"	120-159	16-45 (18)	(10)	.033"	58-256S (21)	58-257S (22)	.031"	48-258S
	2642S Sec.	.061"	120-186 (17)		(10)		58-232S	58-233S		
361" Eng. Pol. Spec. 1958	2801S Pri.	.091"	120-155	16-45 (20)	(10)	.033"	58-306S	58-307S	.028"	48-258S
	2801S Sec.	.067"	120-185		(10)		58-232S	58-233S		
361" Eng. Front 1958	2652S Pri.	.089"	120-159	16-40	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
	2652S Sec.	.0635"	120-176		(10)		58-221S	58-222S		
361" Eng. Rear 1958	2653S Pri.	.089"	120-159	16-26	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
	2653S Sec.	.0492"	120-181		(10)		58-221S	58-222S		
FORD										
352" Eng. 1958	2640S,SA Pri.	.0935"	120-166	16-28 (24) (25)	(10)	.0292"	58-242S (26)	58-243S (27)	.028"	48-270S
	2640S,SA Sec.	.059"	120-184		(10)		58-206S	58-207S		
PLYMOUTH										
318" Eng. S.M.(Early) 1958	2744S Pri.	.089"	120-159	16-35 (15)	(10)	.033"	58-256S	58-257S	.028"	48-264S
	2744S Sec.	.065"	120-226		(10)		58-254S	58-255S		
318" Eng. S.M. (Later) 1958	2813S Pri.	.089"	120-159	16-35 (15)	(10)	.033"	58-256S	58-257S	.028"	48-264S
	2813S Sec.	.065"	120-226		(10)		58-254S	58-255S		
318" Eng. Auto Trans. (Early) 1958	2641S Pri.	.089"	120-159	16-35 (15)	(10)	.031"	58-266S	58-267S	.028"	48-264S
	2641S Sec.	.057"	120-193		(10)		58-208S	58-209S		
318" Eng. Auto. Trans. (Later) 1958	2812S Pri.	.089"	120-159	16-35 (15)	(10)	.031"	58-266S	58-267S	.028"	48-264S
	2812S Sec.	.0595"	120-196		(10)		58-208S	58-209S		
350" Eng. Front 1958	2652S Pri.	.089"	120-159	16-40	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
	2652S Sec.	.0635"	120-176		(10)		58-221S	58-222S		
350" Eng. Rear 1958	2653S Pri.	.089"	120-159	16-26	(10)	.031" (23)	58-248S	58-249S	.031"	48-258S
	2653S Sec.	.0492"	120-181		(10)		58-221S	58-222S		
PONTIAC										
Synchro-mesh (Early) 1958	2751S Pri.	.098"	120-163	16-56	(10)	.042" (29)	58-274S	58-275S	.028"	48-255S
	2751S Sec.	.0748"	120-229		(10)		58-196S	58-197S		
Synchro-mesh (Later) 1958	2768S, SA Pri.	.098"	120-163	16-71	(10)	.037"	58-309S	58-311S	.031"	48-258S
	2768S, SA Sec.	.0785"	120-194		(10)		58-196S	58-197S		
Hydra-Matic (Early) 1958	2740S Pri.	.098"	120-163	16-54 (28)	(10)	.035" (30)	58-260S	58-261S	.028"	48-255S
	2740S Sec.	.0748"	120-229		(10)		58-196S	58-197S		
Hydra-Matic (Later) 1958	2767S,SA Pri.	.096"	120-160	16-72 (31)	(10)	.033"	58-296S	58-297S	.028"	48-270S
	2767S,SA Sec.	.0748"	120-229		(10)		58-196S	58-197S		

(1) - Choke side. (2) - Pump side.
(10) - Nozzle installed permanently. **Do not remove.**
(12) - Supersedes 16-59 which superseded 16-58.
(13) - Supersedes 58-270S. (14) - Supersedes 58-271S.
(15) - 1 size lean 16-39, 2 sizes lean 16-40.
(16) - Use 120-155 (with 16-45) to correct leanness, hesitation, flat spot.
(17) - Supersedes 120-226. (18) - Supersedes 16-50.
(19) - Use 16-70 (with 120-159) to correct leanness, hesitation, flat spot.
(20) - 1 size lean 16-35, 2 sizes lean 16-39.
(21) - Supersedes 58-236S.
(22) - Supersedes 58-237S.
(23) - Later production. Early production .028".
(24) - Supersedes 16-14.
(25) - 1 size lean 16-21, 2 sizes lean 16-22.
(26) - Supersedes 58-202S on 2640S.
(27) - Supersedes 58-203S on 2640S.
(28) - 1 size lean 16-61, 2 sizes lean 16-63U (Unitized Pkg. consisting of 2 step-up rods 16-62 and 2 metering jets 120-175).
(29) - Later production. Early production .035".
(30) - Later production. Early production .032".
(31) - 1 size lean 16-60, 2 sizes lean 16-64.

1959 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor	Metering Jet Size	Metering Jet Part No.	Venturi Assembly Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly Part Numbers ①	Venturi Assembly Part Numbers ②	Pump Jet Assy. Size	Pump Jet Assy. Part No.
BUICK											
4400 Power Pack	1959	2877S Pri.	.0935"	120-166	16-90	(10)	.0465"	58-244S	58-245S	.028"	48-264S
		2877S Sec.	.070"	120-222		(10)		58-151S	58-152S		
46, 47, 4800	1959	2840S Pri.	.0935"	120-166	16-82X (32)	(10)	.0465"	58-339S	58-340S	.028"	48-264S
		2840S Sec.	.070"	120-222		(10)		58-151S	58-152S		
CADILLAC											
Std. Eng. (No A.C.)	1959	2814S Pri.	.098"	120-163	16-106 (43)	(10)	032"	58-355S	58-356S	028"	48-270S
		2814S Sec.	.086"	120-165 (43)		(10)		58-270S	58-271S		
Std. Eng. (W/A.C.)	1959	2815S Pri.	.098"	120-163	16-106 (43)	(10)	.032"	58-355S	58-356S	.028"	48-270S
		2815S Sec.	.086"	120-165 (43)		(10)		58-270S	58-271S		
CHRYSLER											
MC2,MC3,LY1	1959	2797S Pri.	.089"	120-159	16-75 (35)	(10)	.033"	58-322S	58-323S	.031"	48-258S
		2797S Sec.	.067"	120-185 (36)		(10)		58-232S	58-233S		
300E (Front)	1959	2798S Pri.	.089"	120-159	16-81 (33)	(10)	031"	58-349S	58-350S	.031"	48-258S
		2798S Sec	.067"	120-185		(10)		58-221S	58-222S		
300E (Rear)	1959	2799S Pri.	.089"	120-159	16-51 (34)	(10)	.031"	58-349S	58-350S	.031"	48-258S
		2799S Sec.	.055"	120-174		(10)		58-221S	58-222S		
DESOTO & DODGE											
MS1 & MD3 (Synchro-mesh)	1959	2773S Pri.	.091"	120-155	16-35 (37)	(10)	.035"	58-298S	58-299S	.031"	48-258"
		2773S Sec.	061"	120-186		(10)		58-302S	58-303S		
MS1 & MD3 (Auto. Trans.)	1959	2787S Pri.	.089"	120-159	16-45 (20)	(10)	.033"	58-322S	58-323S	.031"	48-258S
		2787S Sec.	.057"	120-193		(10)		58-232S	58-233S		
MS3 & D-500	1959	2794S Pri.	.089"	120-159	16-45 (20)	(10)	.033"	58-322S	58-323S	.031"	48-258S
		2794S Sec.	067"	120-185		(10)		58-232S	58-233S		
Adventurer (Front) & Super D-500	1959	2790S Pri	.089"	120-159	16-40 (38)	(10)	.031"	58-324S	58-325S	.031"	48-258S
		2790S Sec.	.067"	120-185		(10)		58-221S	58-222S		
Adventurer (Rear) & Super D-500	1959	2791S Pri	.089"	120-159	16-26 (39)	(10)	.031"	58-324S	58-325S	031"	48-258S
		2791S Sec	.055"	120-174		(10)		58-221S	58-222S		
DODGE											
Police Special	1959	2854S Pri.	.091"	120-155	16-29 (40)	(10)	.033"	58-322S	58-323S	.031"	48-258S
		2854S Sec	.073"	120-175		(10)		58-232S	58-233S		
FORD THUNDERBIRD											
430" Engine	1959	2853S Pri	.0935"	120-166	16-76 (44)	(10)	.032"	58-328S	58-329S	.028"	48-255S
		2853S Sec.	.086"	120-165		(10)		58-333S	58-334S		
LINCOLN											
All	1959	2853S Pri	.0935"	120-166	16-76 (44)	(10)	.032"	58-328S	58-329S	.028"	48-255S
		2853S Sec	.086"	120-165		(10)		58-333S	58-334S		
MERCURY											
430" Engine	1959	2853S Pri.	.0935"	120-166	16-76 (44)	(10)	.032"	58-328S	58-329S	.028"	48-255S
		2853S Sec.	.086"	120-165		(10)		58-333S	58-334S		

CONTINUED ON NEXT PAGE

① - Choke side of carburetor
② - Pump side of carburetor.
(10) - Nozzle installed permanently. **Do not remove.**
(20) - 1 size lean 16-35. 2 sizes lean 16-39 Use 16-70 to correct Flat Spot or Surge on Acceleration.
(32) - Supersedes 16-82 (without "X") to correct improper throttle response.
(33) - 1 size lean 16-111 2 sizes lean 16-112
(34) - 1 size lean 16-113 2 sizes lean 16-114
(35) - Use 16-44 to correct Hesitation or Stumble on Acceleration.
(36) - Supersedes No. 120-176 (0635")
(37) - 1 size lean 16-39. 2 sizes lean 16-40
(38) - 1 size lean 16-109. 2 sizes lean 16-81.
(39) - 1 size lean 16-27. 2 sizes lean 16-110.
(40) - 1 size lean 16-25. 2 sizes lean 16-26.
(43) - Supersedes earlier type to correct Leanness at Wide Open Throttle.
(44) - 1 size lean 16-98 2 sizes lean 16-99.

1959 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly ① Part No.	Venturi Assembly ② Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
PLYMOUTH											
318" Power Pack (Auto Trans.)	1959	2812S Pri.	.089"	120-159	16-35 (37)	(10)	.031"	58-266S	58-267S	.028"	48-264S
		2812S Sec.	.0595"	120-196		(10)		58-208S	58-209S	.	
318" Power Pack (Synchro-mesh)	1959	2813S Pri.	.089"	120-159	16-35 (37)	(10)	.033"	58-256S	58-257S	.028"	48-264S
		2813S Sec.	.065"	120-226		(10)		58-254S	58-255S	.	
361" (Synchro-mesh)	1959	2855S Pri.	.091"	120-155	16-35 (37)	(10)	.033"	58-357S	58-358S	.028"	48-264S
		2855S Sec.	.067"	120-185		(10)		58-254S	58-255S		
361" (Auto. Trans.)	1959	2856S Pri	.091"	120-155	16-42 (37)	(10)	.033"	58-322S	58-323S	.028"	48-264S
		2856S Sec.	.067"	120-185		(10)		58-232S	58-233S		
PONTIAC											
Hydra-Matic	1959	2819S Pri.	.096"	120-160	16-80 (41)	(10)	.031"	58-316S	58-317S	.028"	48-270S
		2819S Sec.	.0785"	120-194		(10)		58-347S	58-348S		
Synchro-mesh	1959	2820S Pri.	.096"	120-160	16-101 (42)	(10)	.031"	58-387S	58-388S	.028"	48-270S
		2820S Sec.	.0785"	120-194		(10)		58-347S	58-348S		

① - Choke side of carburetor.
② - Pump side of carburetor.
(10) - Nozzles are installed permanently. **Do not remove.**
(37) - 1 size lean 16-39. 2 sizes lean 16-40.
(41) - 1 size lean 16-103. 2 sizes lean 16-105U (Unitized Pkg. consisting of 2 Step-up Rods 16-104 and 2 Metering Jets 120-177).
(42) - 1 size lean 16-93. 2 sizes lean 16-108U (Unitized Pkg. consisting of 2 Step-up Rods 16-107 and 2 Metering Jets 120-177)

1960 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly ① Part No.	Venturi Assembly ② Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
BUICK											
4400 Power Pack	1960	2981S Pri.	.0935"	120-243	16-123 (45)	(10)	.0465"	58-151S	58-152S	.028"	48-264S
		2981S Sec.	.073"	120-175		(10)		58-151S	58-152S	.	
4600, 4700, 4800	1960	2982S Pri.	.0935"	120-243	16-123 (46)	(10)	.0465"	58-151S	58-152S	.028"	48-264S
		2982S Sec.	.0785"	120-194		(10)		58-151S	58-152S		
CADILLAC											
Std. Eng. (No A.C.)	1960	2951S Pri.	.098"	120-163	16-151	(10)	.032"	58-492S	58-493S	.028"	48-270S
		2951S Sec.	.086"	120-165		(10)		58-270S	58-271S		
Std. Eng. (W/A.C.)	1960	2952S Pri.	.098"	120-163	16-151	(10)	.032"	58-492S	58-493S	.028"	48-270S
		2952S Sec.	.086"	120-165		(10)		58-270S	58-271S		
CHEVROLET 348" ENG.											
Special Cam (Early)	1960	2897S Pri.	.0935"	120-166	16-92	(10)	.0465"	58-244S	58-245S	.028"	48-264S
		2897S Sec.	.086"	120-165		(10)		58-151S	58-152S		
Special Cam (Late)	1960	3012S Pri.	.0935"	120-166	16-92	(10)	.0465"	58-496S	58-497S	.028"	48-264S
		3012S Sec.	.086"	120-165		(10)		58-151S	58-152S		
CHRYSLER											
Saratoga, New Yorker, Imperial	1960	2927S Pri.	.089"	120-159	16-117	(10)	.032"	58-483S	58-484S	.031"	48-258S
		2927S Sec.	.067"	120-185		(10)		58-232S	58-233S		
300F (Auto. Trans.)	1960	2903S Pri.	.089"	120-159	16-119	(10)	.035"	58-461S	58-462S	.028"	48-270S
		2903S Sec.	.0595"	120-196		(10)		58-347S	58-348S		

CONTINUED ON NEXT PAGE

① - Choke side of carburetor
② - Pump side of carburetor.
(10) - Nozzles installed permanently. D n t r m v .
(45) - 1 size lean 16-129. 2 sizes lean 16-132U (Unitized Pkg. consisting of 2 Step-Up Rods 16-130 and 2 Metering Jets 120-222).
(46) - 1 size lean 16-127. 2 sizes lean 16-131U (Unitized Pkg consisting of 2 Step-Up Rods 16-128 and 2 Metering Jets 120-177).

1960 CARTER AFB 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-Up Rod	Venturi Assembly Main Nozzle	Venturi Assembly Low Speed Jet	Venturi Assembly ① Part No.	Venturi Assembly ②	Pump Jet Assy. Size	Pump Jet Assy. Part No.
DE SOTO											
Fireflite (Power Pack)	1960	2950S Pri.	089"	120-159	16-45	(10)	.032"	58-483S	58-484S	.031"	48-258S
		2950S Sec.	.065"	120-226		(10)		58-232S	58-233S		
Adventurer (Power Pack)	1960	2968S Pri	089"	120-159	16-122	(10)	035"	58-463S	58-464S	031"	48-258S
		2968S Sec.	.070"	120-228		(10)		58-232S	58-233S		
Adventurer (Ram.Ind.)	1960	2903S Pri.	.089"	120-159	16-119	(10)	.035"	58-461S	58-462S	.028"	48-270S
		2903S Sec.	0595"	120-196		(10)		58-347S	58-348S	-	
DODGE & DODGE DART											
318" Eng. (S.M. Trans.)	1960	2948S Pri.	086"	120-165	16-43	(10)	.031"	58-391S	58-392S	.028"	48-264S
		2948S Sec.	.070"	120-228		(10)		58-221S	58-222S		
318" Eng (Auto. Trans)	1960	2991S Pri.	089"	120-159	16-120 (47)	(10)	035"	58-481S	58-482S	.028"	48-264S
		2991S Sec.	.0595"	120-196		(10)		58-208S	58-209S		
383" Eng. (Auto. Trans.)	1960	2968S Pri.	.089"	120-159	16-122	(10)	.035"	58-463S	58-464S	031"	48-258S
		2968S Sec.	.070"	120-228		(10)		58-232S	58-233S		
383" Eng. (Ram. Ind.)	1960	2903S Pri.	089"	120-159	16-119	(10)	035"	58-461S	58-462S	.028"	48-270S
		2903S Sec.	0595"	120-196		(10)		58-347S	58-348S	-	
383" Eng. (D-500)(Front)	1960	2790S Pri.	089"	120-159	16-40 (38)	(10)	031"	58-324S	58-325S	031"	48-258S
		2790S Sec.	.067"	120-185		(10)		58-221S	58-222S		
383" Eng. (D-500)(Rear)	1960	2791S Pri.	.089"	120-159	16-26 (39)	(10)	031"	58-324S	58-325S	031"	48-258S
		2791S Sec.	.055"	120-174		(10)		58-221S	58-222S		
FORD THUNDERBIRD											
430" Eng.	1960	2992S Pri.	.0935"	120-244	16-125 (48)	(10)	.032"	58-471S	58-472S	.028"	48-255S
		2992S Sec.	.082"	120-158		(10)		58-333S	58-334S		
PLYMOUTH											
318" Eng. (Power Pack)	1960	2925S Pri.	.089"	120-159	16-120	(10)	.035"	58-455S	58-456S	.028"	48-264S
		2925S Sec.	0595"	120-196		(10)		58-208S	58-209S		
361" Eng. (S.M.Trans.)	1960	2969S Pri.	089"	120-159	16-117	(10)	031"	58-439S	58-440S	031"	48-258S
		2969S Sec.	067"	120-185		(10)		58-254S	58-255S		
361" Eng (Auto. Trans.)	1960	2970S Pri.	089"	120-159	16-118	(10)	031"	58-422S	58-423S	.031"	48-258S
		2970S Sec.	.067"	120-185		(10)		58-232S	58-233S		
383" Eng (Standard)	1960	2968S Pri	089"	120-159	16-122	(10)	.035"	58-463S	58-464S	.031"	48-258S
		2968S Sec.	.070"	120-228		(10)		58-232S	58-233S		
361" & 383" (Ram Ind.)	1960	2903S Pri.	.089"	120-159	16-119	(10)	035"	58-461S	58-462S	028"	48-270S
		2903S Sec.	0595"	120-196		(10)		58-347S	58-348S		
383" Eng (Front)	1960	2790S Pri.	089"	120-159	16-40 (38)	(10)	.031"	58-324S	58-325S	031"	48-258S
		2790S Sec.	.067"	120-185		(10)		58-221S	58-222S		
383" Eng. (Rear)	1960	2791S Pri.	089"	120-159	16-26 (39)	(10)	.031"	58-324S	58-325S	031"	48-258S
		2791S Sec.	.055"	120-174		(10)		58-221S	58-222S		
PONTIAC											
Synchro-Mesh	1960	2975S Pri.	096"	120-160	16-134 (49)	(10)	.033"	58-477S	58-478S	.031"	48-258S
		2975S Sec.	0785"	120-194		(10)		58-475S	58-476S		
Auto. Trans.	1960	2976S Pri.	096"	120-160	16-126 (50)	(10)	.031"	58-316S	58-317S	031"	48-270S
		2976S Sec.	0785"	120-194		(10)		58-475S	58-476S		
Special	1960	3010S Pri.	.0935"	120-166	16-92	(10)	0465"	58-244S	58-245S	028"	48-264S
		3010S Sec.	082"	120-158		(10)		58-151S	58-152S		

(10) - Nozzles installed permanently. **Do not remove.**

(38) - 1 size lean 16-109 2 sizes lean 16-81.

(39) - 1 size lean 16-27. 2 sizes lean 16-110.

(47) - 1 size lean 16-122.

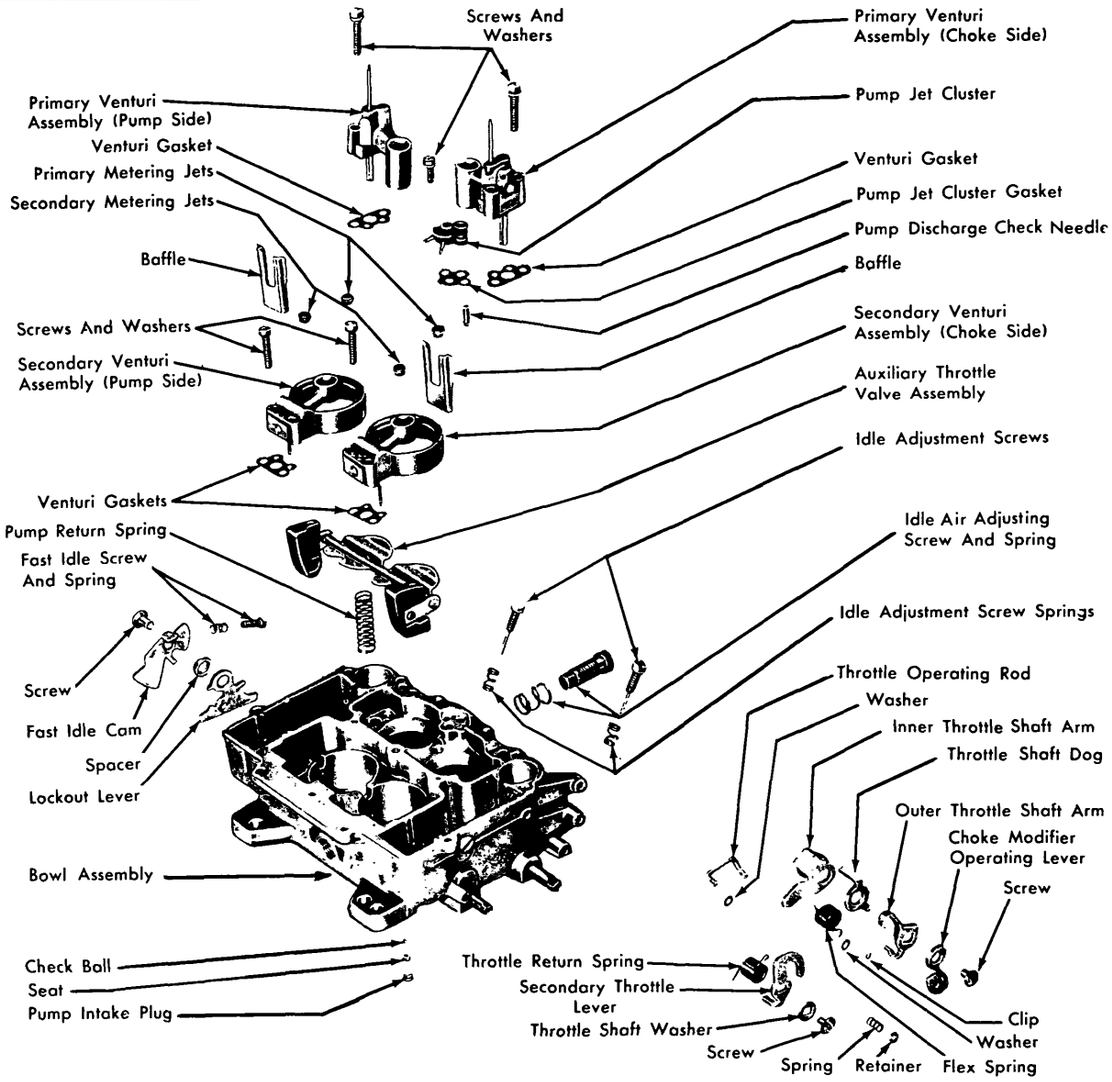
(48) - 1 size lean 16-135.

(49) - 1 size lean 16-144U (Unitized Pkg. consisting of 2 Step-Up Rods 16-143 and 2 Metering Jets 120-177)

(50) - 1 size lean 16-148U (Unitized Pkg consisting of 2 Step-Up Rods 16-147 and 2 Metering Jets 120-177)

1959-60 CARTER AFB 4-BARREL CARBURETORS

	Cart r Carb. No.
BUICK	
1959 Series 4400 (Power Pack)	2877S
1959 Series 4600,4700,4800	2840S
1960 Series 4400 (Power Pack)	2981S
1960 Series 4600,4700,4800	2982S
CADILLAC	
1959-Early 1960 All Series (Exc. Air. Cond.)	2814S
1959-Early 1960 All Series (Air Cond.)	2815S
1960 Later, All Series (Exc. Air Cond.)	2951S
1960 Later, All Series (Air Cond.)	2952S
CHEVROLET 348" ENG.	
1958 Special Cam & Mech. Lifters	2859S
1959-Early 1960 Special Cam & Mech. Lifters	2897S
1960 Late, Special Cam & Mech. Lifters	3012S
CHRYSLER	
1959 Saratoga, New Yorker, Imperial	2797S
1959 300E	(Front) 2798S, (Rear) 2799S
1960 Saratoga, New Yorker, Imperial	2927S
1960 300F (Auto. Trans.)	(2) 2903S
1960 300F (Synchro-mesh)	(2) 3084S
DESOTO	
1959 Firesweep, Power Pack (S.M. Trans.)	2773S
1959 Firesweep, Power Pack (Auto. Trans.)	2787S
1959 Fireflite (Auto. Trans.)	2794S
1959 Adventurer	(Front) 2790S, (Rear) 2791S
1960 Fireflite (Power Pack)	2950S
1960 Adventurer (Power Pack)	2968S
1960 Adventurer (Ram Induction)	(2) 2903S
DODGE & DODGE DART	
1959 Custom, 361" Eng. (S.M. Trans.)	2773S
1959 Custom, 361" Eng. (Auto. Trans.)	2787S
1959 D-500 (Auto. Trans.)	2794S
1959 Super D-500	(Front) 2790S, (Rear) 2791S
1959 Police Special	2854S
1960 318" Eng. (S.M. Trans.)	2948S
1960 318" Eng. (Auto. Trans.)	2991S
1960 383" Eng. D-500 (Police Auto. Trans.)	2968S
1960 383" Eng. (Ram Induction)	(2) 2903S
1960 383" Eng. D-500	(Front) 2790S, (Rear) 2791S
FORD THUNDERBIRD	
1959 430" Engine	2853S
1960 430" Engine	2992S
LINCOLN	
1959 All Models	2853S
MERCURY	
1959 430" Engine	2853S
PLYMOUTH	
1959 318" Eng., Power Pack (S.M. Trans.)	2813S
1959 318" Eng., Power Pack (Auto. Trans.)	2812S
1959 Golden Commando (S.M. Trans.)	2855S
1959 Golden Commando (Auto. Trans.)	2856S
1960 318" Eng., Power Pack	2925S
1960 361" Eng. (S.M. Trans.)	2969S
1960 361" Eng. (Auto. Trans.)	2970S
1960 383" Eng. (Standard)	2968S
1960 383" (Optional)	3113S
1960 361" & 383" Engs. (Ram Induction)	(2) 2903S
1960 383" Eng.	(Front) 2790S, (Rear) 2791S



CARTER AFB 4-BARREL CARBURETOR THROTTLE BODY (WITH AUXILIARY THROTTLE VALVES)

PONTIAC	
1959 S.M. Trans.	2820S
1959 Automatic Trans.	2819S
1960 Bonneville (S.M. Trans.)	2975S
1960 Bonneville (Auto. Trans.)	2976S
1960 Other Models (Auto. Trans.)	2976S
1960 Special Equipment	3010S
VALIANT	
1960 All Models (Hyper-Pack)	3083S

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 BUICK SERIES 4400 EXCESSIVE FAST IDLE SPEED CORRECTION AND CARBURETOR PRODUCTION CHANGE:* On early cars having a fast idle cam stamped "181-260", adjust fast idle speed by positioning cam so fast idle adjusting screw contacts high step of cam (engine at normal operating temperature), then adjust fast idle screw until engine speed is 1300 RPM. Later carburetors will have a fast idle cam stamped "181-271" which will provide the desired fast idle speed when engine speed is adjusted to 1500 RPM with fast idle screw on high step of fast idle cam adjacent to index mark.

►*1959 BUICK SERIES 4600, 4700, 4800 IMPPOPER THROTTLE RESPONSE CORRECTION AND CARBU-*

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1959-60 CARTER AFB 4-BARREL CARBURETORS (C nt.)

RETOR PRODUCTION CHANGE: Correct by installing new metering rods, Carter No. 16-82X and vacuum piston springs, Carter No. 61-259. Carburetors manufactured after Nov. 1958 (with date code "L8" or later) have the above changes made in production.

►*1959 BUICK 4600, 4700, 4800 ROUGH ENGINE (ON 3/4 THROTTLE ACCELERATION)CORRECTION:* This condition may be caused by insufficient bend of left primary bore baffle on carburetor plate. To correct, install a new carburetor-to-manifold plate, Buick No. 11191308 (before Engine Code No. 4F96981, later cars have the new plate). *For additional correction, see "Carter AFB Carburetor" on Buick Car Model page.*

►*1959 BUICK INOPERATIVE CHOKE MECHANISM:* On early cars, condition may be caused by foreign material or corrosion in choke housing. To correct, remove choke thermostat housing, piston, and baffle and thoroughly clean parts with water (*CAUTION* - Do not leave parts in water longer than necessary) and dry with compressed air. *NOTE* - Later cars have improved fender skirts and baffles to prevent road splash in engine compartment. These parts can be installed on early cars.

►*1960 BUICK CHOKE SETTING CHANGE (FOR IMPROVED STARTING):* Set choke thermostat 2 notches rich (supersedes previous setting of 1 notch rich). *NOTE* - Carburetors with date code "K" and later will be changed in production to the new setting.

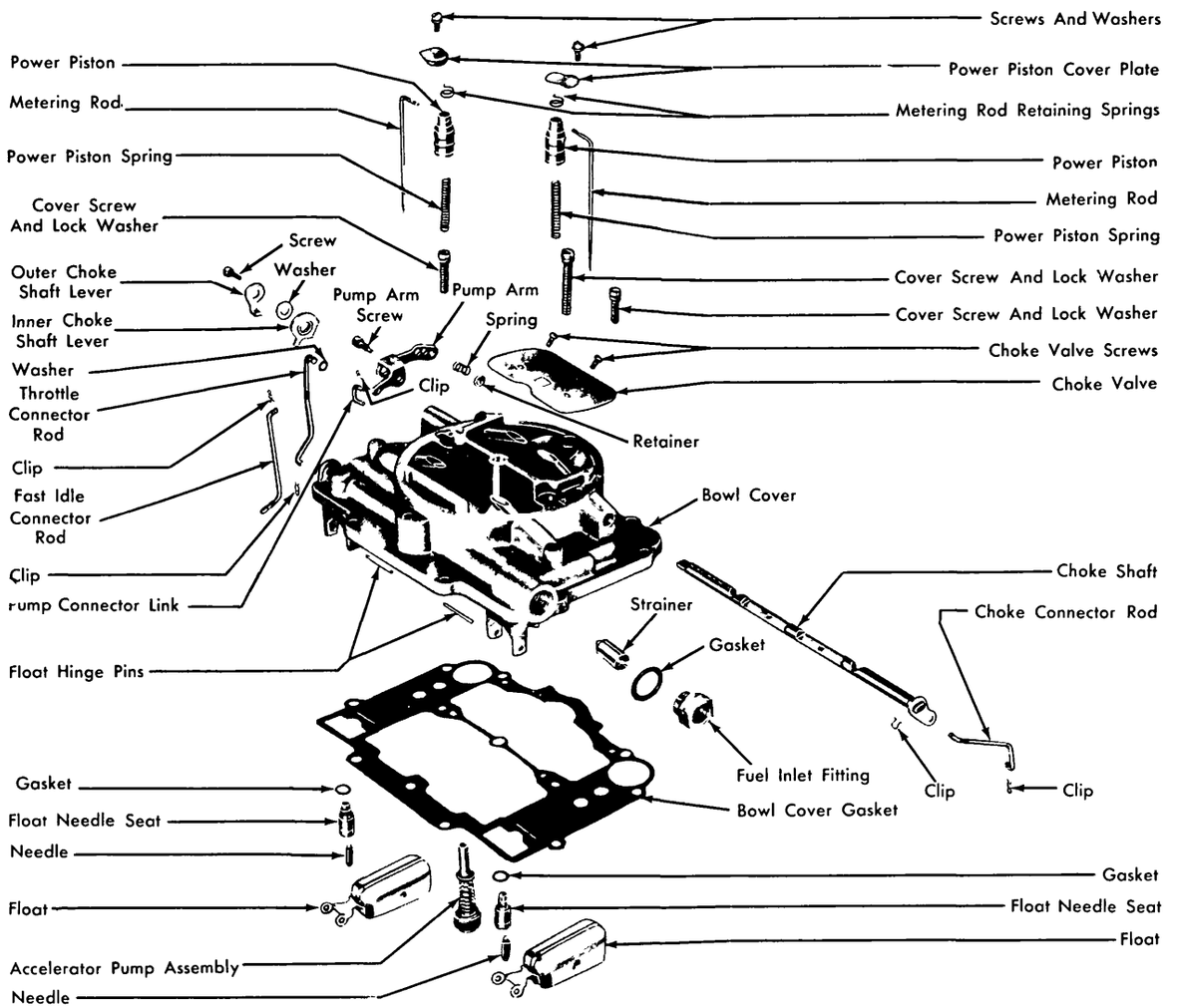
►*1960 BUICK ACCELERATOR ROD-TO-CARPET SPACING NOTE:* If unable to obtain enough adjustment for correct accelerator pedal-to-carpet spacing, the improper carburetor throttle rod is installed. Install rod, Part No. 1188324

►*1959 CADILLAC THROTTLE RETURN CHECK RATTLE (Cars before Engine No. 001180): See "Throttle Return Check Rattle Correction" under CARBURETOR on Cadillac Car Model page for installation of restriction in vacuum hose.*

►*1958-59 CHEVROLET AFB CARBURETORS:* Carter AFB carburetor used on 348" Engine with Hi-Lift Camshaft and mechanical Valve Lifters. All specifications for both 1958 and 1959 carburetors are included below.

►*1959 CHRYSLER HESITATION OR STUMBLE ON ACCELERATION WITH ENGINE AT NORMAL OPERATING TEMPERATURE (CARTER AFB 2797S CARBURETOR):* If this condition persists after engine properly tuned, manifold heat control valve and engine cooling thermostat checked for proper operation, accelerating pump connector rod installed in **inner** hole of pump rocker arm fuel filter bowl cleaned and filter element replaced (if necessary); a lean mixture is indicated and should be corrected as follows: Install new Step-up Rods (2 required), Carter No. 16-44, to replace original rods, Carter No. 16-75.

►*1959 CADILLAC LEANNESS AT WIDE OPEN THROTTLE CORRECTION (Early Cars Before Engine No. 002124):* Install Metering Rods, Carter No. 16-106 and Secondary Metering Jets, Carter No. 120-165. Later carburetor having the later metering rods and jets have the letter "A" stamped on throttle body flange beside the part number.



CARTER AFB 4-BARREL CARBURETOR AIR HORN & FLOAT ASSEMBLY (TYPICAL)

►*1959 CHRYSLER ENGINE STALLING AFTER COLD START CORRECTION (CARTER AFB 2797S CARBURETOR):* This condition may be caused by choke piston and link allowing choke valve to open too wide after a cold start. To correct, install new choke piston and link assembly, Carter No. 160-204S. *NOTE - The later type piston has no groove around outer diameter. Early piston has a groove.* Later carburetors having the new choke piston and link assembly are identified by a letter "A" stamped on flange right front corner adjacent to stamped date code and carburetor number or by spot of white paint on left front corner of flange.

►*1958-60 CHRYSLER, DESOTO, DODGE, PLYMOUTH FUEL INLET NEEDLE AND SEAT ASSEMBLY PRODUCTION CHANGE & CARBURETOR FLOODING CORRECTION:* A new needle and seat assembly, Part No. 2196207, is being used in later 1960 carburetors and may be installed on earlier carburetors to correct a flooding condition. The new needle has a "Viton" (resilient synthetic rubber) tip and the needle seat orifice has been enlarged slightly. 1960 carburetors with the new assembly are identified by the letter "B" preceding the carburetor model number.

►*1960 CHRYSLER 300F HUNTING & SURGING CORRECTION: See "Throttle Linkage Adjustment (300F & Cars with Ram Induction)" on Car Model page.*

►*1959 DESOTO FIREFLITE & DODGE CUSTOM ROYAL FLAT SPOT OR SURGE ON ACCELERATION OR AT*

CONTINUED ON NEXT PAGE

1959-60 CARTER AFB 4-BARREL CARBURETORS (C nt.)

CRUISING SPEEDS WITH ENGINE AT NORMAL OPERATING TEMPERATURE (CARTER 2794S & 2787S CARBURETORS) If this condition persists after engine tuned up with special attention to Ignition Timing and Accelerating Pump Setting, correct by installing new Step-up Rods (2 required), Carter No 16-70, to replace original rods, Carter No 16-45

►*1959 FORD, LINCOLN, MERCURY HARD COLD STARTING, STALLING, POOR COLD PERFORMANCE, & SPARK PLUG FOULING* Can be correct by revising the fast idle speed setting (600-650 RPM with fast idle screw on low step of cam) as directed under "Fast Idle Adjustment (On Engine)" Also check choke countershaft linkage for proper choke adjustment as directed under "Choke Countershaft Adjustment" below If above adjustments do not correct engine richness and loading complaints, install new choke piston as follows

Ford, Lincoln, M rcury Choke Piston Change - Install new choke piston, Carter No 160-211, to replace original piston No 160-198 New piston can be identified by brown stain in groove near bottom of piston (no mark on original piston) After installing new piston, make all choke adjustments listed under ADJUSTMENTS below *NOTE* - Carburetors date coded FKL-9BBE or later have this new piston installed in production

►*1959 LINCOLN & MERCURY LEAN CONDITION OR SURGING ON ACCELERATION* May be caused by metering rod piston sticking in bore due to dirt passing air cleaner and entering metering rod piston bore through relief vent Correct by removing metering rod and piston and thoroughly cleaning out the bore Assemble new piston on metering rod and install in carburetor *NOTE* - If one piston found sticking, examine other piston and cylinder for dirt and scuffing Examine and correct air cleaner to prevent recurrence

►*1959 LINCOLN & MERCURY HARD STARTING, ROUGH IDLE, FLOODING & POOR FUEL ECONOMY* Examine carburetor for leaking or missing Main Well Plugs (these plugs located in angle passage in center wall of carburetor to right and left of secondary throttle valves) Replace plugs, using Main Well Repair Kit No B9SZ-9B526-A, as detailed below REPLACE BOTH PLUGS IF ONE PLUG FOUND LEAKING OR MISSING *NOTE* - Carburetors date coded FKL9BBL (June 1959) and later have the new plug assemblies

R moving Main Well Plugs - Coat 1/16" drill with light grease and drill through center of plug *(CAUTION* - Use care not to strike wall inside passage) Insert self-tapping screw in drilled hole and pull plug out with pliers

Installing Main W ll Plugs - Clean counterbore in carburetor and main well passage thoroughly and blow out with air Insert coated fibre gasket into counterbore and press it in place against shoulder Insert steel expansion plug (cupped side in) on top of fibre gasket, use 250- 295" diameter flat end pin punch to flatten expansion plug and seat it in counterbore Replace second plug similarly *CAUTION - Prop r size pin punch must be used to seat plug to prevent driving plug into main well passage*

►*1959 LINCOLN & MERCURY IMPROPER RETURN TO IDLE SPEED NOTE* This condition is due to improperly adjusted carburetor rod *See 'Throttle Linkage Adjustment" on individual car model pages*

►*1959 LINCOLN & MERCURY CARBURETOR ICING OR PERCOLATING NOTE* May be caused by improperly operating air vent intake duct assembly *See "Tune-Up on individual car model pages*

►*1959 MERCURY ACCELERATOR PEDAL STICKING (NOT RETURNING TO IDLE)* May be caused by interference between carburetor control rod and fuel inlet line Correct by carefully bending fuel line out away from carburetor Check for clearance by moving control rod from closed to wide open throttle position Fuel inlet line On later cars has larger (3/4") radius at carburetor end to provide clearance

►*1959 PONTIAC ERRATIC THROTTLE RETURN ACTION* Can be corrected by changing accelerator control return spring into the second or middle hole of the dash mounted bracket to provide more positive action Later cars have the spring connected in this manner

►*1959 PONTIAC FAST IDLE CAM NOT RELEASING FULLY DURING COLD WEATHER OPERATION (Cars before Engine Production No 20345)* Can be corrected by installing new Manifold Heat Control Valve Thermostat See Manifold Heat Control under TUNE-UP in Pontiac Car Model page for details *NOTE* - This thermostat used in production on later cars and earlier engines which have been modified are marked by daub of white paint on right hand cylinder head

►*1960 PONTIAC ACCELERATION FLAT SPOT OR STUMBLE CORRECTION* May be caused by collapsed "S" link (connecting pump lever and plunger) Correct by replacing "S" link or pump plunger *NOTE - Lower end of link must point toward air horn to avoid contact with bowl casting cover*

DESCRIPTION: Four-barrel downdraft type with automatic choke Design is similar to previous Carter AFB carburetors except for the following features *For complete description, see '1957-58 Carter AFB 4-Barrel Carburetors" and note the following*

Idle Air System (Cadillac 2814S, 2815S, 2951S, 2952S; Chrysler 2798S, 2799S, 3084S; DeSoto, Dodge, Plymouth 2790S, 2791S; Dodge 2948S; Chrysler, DeSoto, Dodge & Plymouth 2903S; Plymouth 2975S, 2976S; Pontiac 2819S, 2820S, 2975S, 2976S): Throttle valves are are completely closed at low idle speed and air is admitted through Idle Air System which consists of an air bypass passage (primary side only) through which air for closed throttle operation is taken from above throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore An Idle Speed Screw (single screw for both primary bores) controls adjustable orifice and all idle speed adjustments are made with this screw (throttle stop screw not used) *NOTE - Throttl valv s are compl t ly closed at idle speed*

►*CADILLAC CHOKE MODIFIER NOTE This unit is not used on 1959-60 models*

Idl C mpensator Valv (Buick 2840S, 2877S, 2981S, 2982S; Cadillac 2814S, 2815S, 2951S, 2952S; F rd Thund rbird 2992S; P ntiac 2819S, 2975S, 2976S): This assembly is mounted between main venturi on secondary side and consists of a valve, bi-metal strip, holder and mounting bracket This unit is not adjustable and must be replaced if faulty The purpose of the compensator is to admit additional air under hot idling conditions and to prevent stalling With high air temperature in carburetor, the valve opens and allows additional air to be drawn into carburetor bores below the secondary throttle valves to offset the enrichening effect of hot idle *CAUTION - Idle compensator must be held closed while adjusting idle speed*

Cross-Over Type Automatic Choke (Chrysler, DeSot , Dodge & Plymouth Carburetors Except 2790S, 2791S, 2798S, 2799S): This type automatic choke is a separate unit mounted in a well in intake manifold (at exhaust cross-over passage) and linked to choke valve lever by a connector rod Choke vacuum piston is located in a cylinder in carburetor air horn and linked directly to choke valve *See "Carter Cross-Over Typ Automatic Choke" for complete data*

ADJUSTMENTS *Make all adjustments as indicated below*

►*IDLE SPEED ADJUSTMENT NOTE (CARS WITH IDLE AIR BY-PASS SYSTEM)* These carburetors have a single Idle Air By-pass Screw which is used for all idle speed adjustments (there is no throttle stopscrew) Turning the idle air adjustment screw outward increases engine speed but also leans out the mixture supplied to engine which must be compensated for by the adjustment of idle mixture screws

Idle Mixture & Speed Adjustment (Cars with One Carburetor) *CAUTION - On cars with Idle Compensator, the the compensator valve must be held closed while adjusting idle speed (use pencil or other instrument to hold compensator down on its seat) On cars with Idle Air System, adjusting the air adjustment screw (to adjust engine speed) will change the idle mixture setting and this should always be rechecked after an engine speed adjustment has been made* If initial adjustment required to allow engine to be warmed up, turn both idle mixture adjusting screws in until lightly seated, then back screws out the correct number of turns shown in table below Run the engine until it reaches normal operating temperature with choke valve wide open and fast idle inoperative (engine idling at hot or slow idle speed) Then proceed as follows Connect vacuum gauge and tachometer Adjust engine idle speed to correct figure shown in table below with transmission selector lever in proper rangeas indicated Make this adjustment by turning throttle stopscrew (or Idle Air Bypass Adjusting Screw on carburetors with this adjustment) Adjust each idle mixture adjusting screw in or out for smooth idling and highest vacuum reading and engine RPM *(NOTE* - On Buick, set each screw midway between points where engine runs irregularly due to lean and rich mixture) Recheck and if necessary reset idle speed, then recheck idle mixture setting *CAUTION* - On cars with Idle Air Bypass Ad-

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1959-60 CARTER AFB 4-BARREL CARBURETORS (C nt.)

justing screw, always recheck idle mixture adjustment after changing setting of idle air adjusting screw On cars with automatic transmission, check and adjust Throttle Linkage *See Throttle Linkage Adjustment under CARBURETOR on each car model page*

Idle Mixture & Speed Adjustment (Chrysler, DeSoto, Dodge & Plymouth With Two Carburetors, Except Ram Induction): These carburetors have Idle Air Bypass Screw for idle speed adjustment Before adjusting carburetor, check and adjust carburetor inter-connecting linkage *See "Throttle Linkage Adjustment" under CARBURETOR on Car Model pages* If preliminary adjustment required for engine warm-up, adjust idle mixture screws (see table below), then set idle air bypass screws (one on each carburetor) 1 turn open Connect tachometer, then operate engine until it reaches normal operating temperature (choke valve wide open and fast idle inoperative) Disconnect interconnecting rod at rear carburetor throttle lever Adjust idle speed to correct engine RPM (see table below) by turning idle air bypass screw on each carburetor equally Adjust both idle mixture screws on **front** carburetor for maximum engine RPM, then adjust both idle mixture screws on **rear** carburetor for maximum RPM, finally readjust front carburetor as necessary *CAUTION - If engine RPM increases more than 25 RPM during above adjustment, readjust idle air bypass screws for correct idle speed and repeat idle mixture adjustment Final adjustment should be made with idle mixture adjusting screws* Before connecting the interconnecting rod at rear carburetor, check and adjust transmission throttle linkage *See "Throttle Linkage Adjustment" under CARBURETOR on Car Model pages*

Idle Mixture & Speed Adjustment (Chrysler, DeSoto, Dodge & Plymouth With Ram Induction): These carburetors have Idle Air Bypass Screw for idle speed adjustment Before adjusting carburetors, check and adjust carburetor interconnecting linkage *See "Throttle Linkage Adjustment" under CARBURETOR on Car Model pages* If preliminary adjustment required for engine warm-up, adjust idle mixture screws (see table below), then set idle air bypass screws (one on each carburetor) 1 turn open Connect a tachometer, then operate engine until it reaches normal operating temperature (choke valve wide open and fast idle inoperative). Turn engine off and disconnect each carburetor throttle rod at bellcrank on manifold Start engine and turn idle mixture screws on left carburetor 1/8 turn at a time until smoothest idle is obtained Repeat this procedure on right carburetor, keeping mixture screws within 1/8 turn of each other With transmission in "N" (Neutral), air conditioner compressor ON (if so equipped), adjust idle speed to 725-750 RPM by adjusting idle air bypass screw on each carburetor equally Repeat the idle mixture and speed adjustment until a smooth idle is obtained at 725-750 RPM Connect each carburetor throttle rod at bellcrank

Car & Carb.	Idle Mixture Screw Setting Idle Screw Opening
Buick 2840S, 2877S, 2981S, 2982S	¼-1¾ turns
Cadillac 2814S, 2815S	1¼-2¾ turns
Cadillac 2951S, 2952S	1½-2 turns
Chevrolet 2859S, 2897S	¼-1¾ turns
Chevrolet 3012	½-2 turns
Chrysler 2797S	½-2 turns
Chrysler 2799S, 2927S	1-2 turns
Chrysler 2903S, 3084S	1/8-1½ turns
DeSoto 2787S	¾-2¼ turns
DeSoto 2794S, 2950S	½-2 turns
DeSoto 2968S	¼-1¾ turns
DeSoto 2903S	1/8-1½ turns
Dodge 2787S	¾-2¼ turns
Dodge 2794S, 2950S	½-2 turns
Dodge 2968S	¼-1¾ turns
Dodge 2903S	1/8-1½ turns
Ford Thunderbird 2853S	1½-2½ turns
Ford Thunderbird 2992S	½-2 turns
Lincoln & Mercury 2853S	1½-2½ turns
Plymouth 2812S, 2813S	¾-2¼ turns
Plymouth 2855S, 2856S	¼-2¼ turns
Plymouth 2790S, 2791S	½-2 turns
Plymouth 2903S	1/8-1½ turns
Plymouth 2925S	1¼-2¾ turns
Plymouth 2968S, 2969S, 2970S	¼-1¾ turns

Car Model	Idle Speed Setting Engine RPM S.M. Trans	Auto. Trans.
1959-60 Buick (Std)	485	⑨485
1959-60 Buick (Air Cond)②	550	⑨550
1959-60 Cadillac (All)③		⑤480
1959-60 Chevrolet	600	⑤600
1959 Chrysler (1 Carb)③		⑨500
1959 Chrysler (2 Carbs)③	650	⑨650
1960 Chrysler (1 Carb)③		⑨⑥⑨500
1960 Chrysler (2 Carbs)③℃	725-750	⑨725-750
1959 DeSoto (1 Carb)③	500	⑨500
1959 DeSoto (2 Carbs)③	600	⑨600
1960 DeSoto (1 Carb)③	500	⑨⑥500
1960 DeSoto (2 Carbs)③℃		⑨725-750
1959 Dodge (1 Carb)③	500	⑨⑥500
1959 Dodge (2 Carbs)③℃	550	⑨550
1960 Dodge (1 Carb)③	500	⑨⑥500
1960 Dodge (2 Carbs)③℃		⑨725-750
1960 Dodge (2 Carbs)③⑧	550	⑨550
1959 Ford T-Bird (Std)	475-500	⑤450
1959 Ford T-Bird (Air Cond)②	450-475	⑤450
1960 Ford T-Bird③	500-525	⑤450-475
1959 Lincoln③		⑤450-475
1959 Mercury	450-475	⑤450-475
1959 Plymouth③	500	⑨500
1960 Plymouth (1 Carb)③	500	⑨⑥500
1960 Plymouth (2 Carbs)③℃		⑨725-750
1960 Plymouth (2 Carbs)③⑧	550	⑨550
1959-60 Pontiac (Std)	480-500	⑤480-500
1959-60 Pontiac (Air Cond)②	540-560	⑤540-560
1960 Valiant (Hyper-Pack)	⑨700	⑨700

℃ - Throttle Stopscrew or Idle Air Adjusting Screw
② - Air Conditioner turned OFF
③ - Air Conditioner turned ON
⑨ - Transmission in "N" (Neutral) or "P" (Park)
⑤ - Transmission in "D" (Drive)
⑥ - 550 RPM for Air Conditioned cars Transmission in "D" (Drive) or "R" (Reverse) and Air Conditioner turned ON
℃ - Ram Induction Engine
⑧- Front & Rear Carburetors
⑨ - With headlights turned on if car is equipped with alternator

►*1960 CADILLAC SPEED ADJUSTMENT CAUTION:* Due to vacuum released parking brake, it is impossible to set the brake with transmission selector lever in "Dr" position unless vacuum release is disconnected Disconnect diaphragm at neutral safety switch and tape switch opening to prevent any air leakage

Anti-Stall Dashpot (Throttle Return Check) On Ford, Lincoln, Mercury, the dashpot is an integral part of the carburetor and adjustment for this unit is given below On other models, dashpot is a separate unit mounted on the carburetor or elsewhere in the throttle linkage For adjustment on these models, see *Throttle Linkage Adjustment under CARBURETOR on car model pages*

Dashpot Adjustment (Ford, Lincoln, Mercury) - Two adjustments required (1) Distance from top of plunger shaft with primary throttle valves tightly closed should be 1/8" *NOTE - Be sure dashpot lever does not contact bowl cover attaching screw* To adjust, bend flat portion of dashpot lever (2) With primary throttle valves wide open, distance from top of plunger shaft to top of bowl cover should be 7/16" To adjust, bend top lug on flat lever *NOTE Check to be sure plunger shaft does not bind in hole in bowl cover and operates freely*

Idle Speed-Up Control (Cadillac Air Conditioned Cars) This unit increases engine idling speed with air conditioning turned on and transmission selector lever in Neutral For adjustment, see *CARBURETOR on Cadillac car model page*

Metering Rods: No adjustment required. Metering rods not used on secondary side.

Float Setting: *(NOTE - Before adjusting float level and float drop, floats must be aligned as follows).* Align floats by sighting down side of float to determine if side of float is parallel to outer edge of horn casting. To adjust, bend float lever by applying pressure to end of float shell with finger while supporting float lever with thumb (CAUTION - Apply only enough pressure to bend float lever). After aligning float, remove as much clearance as possible between arms of float lever and support lugs on air horn by bending both arms of the lever. Arms should be parallel to inner surfaces of support lugs and float must operate freely without excess clearance on hinge pin.

Float Level - Both floats are set to the same height With air horn inverted, bowl cover gasket in place and needle seated, measure distance from top of float at outer end to air horn gasket with proper gauge (see table below) Adjust by bending float arm

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1959-60 CARTER AFB 4-BARREL CARBURETORS (Cont.)

Float Level Setting

Car & Carb.	① Height	Gauge No.
Buick (All)	7/32"	T109-106
Cadillac (All)	5/16"	T109-107
Chevrolet (All)	7/32"	T109-106
Chrysler 2797S, 2799S, 2927S	7/32"	T109-106
Chrysler 2798S, 2903S	9/32"	T109-126
DeSoto 2791S, 2794S	7/32"	T109-106
DeSoto 2773S, 2787S	7/32"	T109-106
DeSoto 2950S, 2968S	7/32"	T109-106
DeSoto 2790S, 2903S	9/32"	T109-126
Dodge 2773S, 2794S	7/32"	T109-106
Dodge 2787S, 2791S, 2854S	7/32"	T109-106
Dodge 2968S, 2991S	7/32"	T109-106
Dodge 2790S, 2903S	9/32"	T109-126
Dodge 2948S	5/16"	T109-107
Ford T-Bird 2853S, 2992S	3/16"	T109-28
Lincoln 2853S	3/16"	T109-28
Mercury 2853S	3/16"	T109-28
Plymouth 2812S, 2813S	7/32"	T109-106
Plymouth 2855S, 2856S	7/32"	T109-106
Plymouth 2791S, 2968S, 2970S	7/32"	T109-106
Plymouth 2903S, 2790S	9/32"	T109-126
Pontiac 2819S, 2976S	21/64"	T109-294
Pontiac 2820S	9/32"	T109-126
Pontiac 3010S	7/32"	T109-106

① - Plus or minus 1/64"

Float Drop - With bowl cover held in upright position so that floats down at lower end of travel, measure from outer (free) end of float to bowl cover gasket This dimension should be 23/32" plus or minus 1/16" for all models Specific car manufacturers recommendations are as follows

Float Drop Setting

Car & Carb	Float Drop
Buick (All)	3/4"
Cadillac (All)	13/16"
Chrysler 1959 (All)	23/32"
Chrysler 1960 (All)	3/4"
DeSoto (All)	3/4"
Dodge (All)	3/4"
Ford, Lincoln, Mercury (All)	23/32"
Plymouth 1959 (All)	23/32"
Plymouth 1960 (All)	3/4"
Pontiac (All)	23/32"

Accelerating Pump Stroke This is a pump stroke adjustment and not a seasonal setting On all models with provision for seasonal setting make certain that connector rod engaged in correct hole in pump arm as listed below Back out throttle stopscrew so that throttle valves fully seated Use scale to measure from top surface of bowl cover to top of pump plunger stem If this distance not correct as shown in table below, adjust by bending connector rod at lower angle using T109-213 bending tool

Pump Stroke Setting

Car Model	Plunger Height	Connector Rod
Buick 2940S, 2877S	33/64"	Non-Adj
Buick 2981S, 2982S	1/2"	Non-Adj
Cadillac (All)	15/32"	Inner Hole
Chrysler (Exc 2903S)	7/16"	Center Hole
Chrysler (2903S)	27/64"	Center Hole
DeSoto (Exc 2903S)	7/16"	Center Hole
DeSoto (2903S)	27/64"	Center Hole
Dodge (Exc 2903S)	7/16"	Center Hole
Dodge (2903S)	27/64"	Center Hole
Ford T-Bird (All)	① 17/32"	Inner Hole
Lincoln, Mercury	17/32"	Inner Hole
Plymouth (Exc 2903S)	7/16"	Center Hole
Plymouth 2903S	27/64"	Center Hole
Pontiac (All)	33/64"	②Non-Adj

① - Or 11/32" with connector rod in center hole
② - Pump connector link (arm-to-plunger) must be installed with offset toward arm

Automatic Choke (Cross-Over Type): This choke assembly is mounted in well in manifold casting. To adjust with unit off engine, loosen mounting post locknut and turn mounting post with screwdriver until index mark on disc positioned opposite correct mark on scale (see table below for proper setting). When choke is installed on engine, lift cover disc and open and close choke manually to make sure connector rod clears sides of hole in housing cover. If rod does not clear, replace unit (bending the rod will affect choke calibration).

Automatic Choke (Integral Type) *Adjust AFTER Choke Piston Lever Adjustment or Choke Countershaft Adjustment has been completed* Settings are shown in table below Adjust by loosening choke cover screws and rotating cover and thermostatic coil assembly

Automatic Choke Setting

Car & Carb	Choke Setting
Buick 2981S, 2982S	2 Points Rich
Cadillac 2814S, 2815S	Centered
Cadillac 2951S, 2952S	1 Point Rich
Chevrolet 28598, 2897S, 3012S	Centered
Chrysler 2797S	① Centered
Chrysler 2799S	1 Point Rich
Chrysler 2927S	①2 Points Rich
Chrysler 2903S	①1 Point Rich
DeSoto 2773S	①②
DeSoto 2787S, 2794S	①Centered
DeSoto 2791S	1 Point Rich
DeSoto 2950S, 2968S	① 2 Points Rich
DeSoto 2903S	① 1 Point Rich
Dodge 2773S	①②
Dodge 2787S, 2794S	①Centered
Dodge 2791S	1 Point Rich
Dodge 2854S, 2948S, 2991S	①Centered
Dodge 2903S	①1 Point Rich
Dodge 2968S	①2 Points Rich
Ford Thunderbird 2953S, 2992S	Centered
Lincoln & Mercury 2953S	Centered
Plymouth 2812S, 2813S	①③
Plymouth 2855S, 2856S	①Centered
Plymouth 2903S	①1 Point Rich
Plymouth 2791S	1 Point Rich
Plymouth 2925S, 2969S, 2970S	①Centered
Plymouth 2968S	①2 Points Rich
Pontiac 2819S, 2820S	1 Point Rich
Pontiac 2975S, 2976S, 3010S	Centered

① - "Cross-Over" type Automatic Choke
② - 2 Points Rich (Early 170AX-515S Choke Assy), Centered (Later 170AU-515S Choke Assy)
③ - Centered (With 170AU-516S Choke Assy), 2 Points Rich (With 170AX-516S Choke Assy)

Choke Piston Lever & Countershaft Adjustment: This adjustment requires removal of choke cover and thermostatic coil assembly, gasket and baffle plate for access to choke piston lever *NOTE - On Chrysler, DeSoto, Dodge & Plymouth 2903S & 2948S carburetors, a "Cross-Over" type choke assembly is used and the choke housing located on bowl casting of carburetor contains only a choke piston and lever assembly* Adjust as follows

1959 Buick, 1959-60 Chevrolet & Pontiac - With choke valve held tightly closed by pressure applied to choke piston lever in choke housing, measure clearance between choke piston lever and stop in housing This measurement should be 010" To adjust, bend choke connector rod

1960 Buick - Open throttle so fast idle cam does not contact adjusting screw, then close choke valve by pressing on piston lever in choke housing Top of choke piston should be flush with top of piston cylinder when choke valve is closed To adjust, bend choke connector rod

1959-60 Cadillac (All), Chrysler (2799S, 2903S), DeSoto, Dodge & Plymouth (2791S, 2903S, 2948S), 1960 Ford Thunderbird - Use a 026" wire gauge (T109-189) with 1/8" section at end of gauge bent at a 90° angle Set throttle valves one-quarter open and open choke valve wide Insert wire gauge into choke piston slot so hooked end enters slot in cylinder wall Close choke valve by pressing on choke lever until wire gauge is gripped between piston and cylinder (linkage hanging free) Check choke valve clearance between upper edge of valve and air horn This opening should be 093" (Cadillac), 5/64" (Chrysler 2799S), 1/8" (All others) Adjust by bending choke connector rod at angle

1959 Ford Thunderbird, Lincoln & Mercury - Loosen countershaft lever clampscrew, then close choke valve and hold it in this position Place 086" gauge (T109-215) between choke piston lever and stop in choke housing (take all slack out of linkage by pressing countershaft lever toward closed choke position) Hold linkage in this position and tighten clampscrew

Fast Idle Linkage: *NOTE - This adjustment must be made before checking and adjusting Fast Idle and Unloader Adjust each model as follows*

Buick 2981S, 2982S; Chrysler 2799S, 2927S; DeSoto 2950S; DeSoto, Dodge, Plymouth 2968S, Plymouth 2969S, 2970S - With choke valve closed, index mark on fast idle cam should align with adjusting screw To adjust, bend fast idle connector rod

Cadillac 2814S, 2815S, 2951S, 2952S; Chrysler 2797S; DeSoto & Dodge 2773S, 2787S, 2794S; DeSoto, Dodge, Plymouth 2791S; Dodge 2854S, 2948S, 2991S; Plymouth 2812S, 2813S, 2855S, 2856S, 2925S - With choke valve tightly closed and lug on outer choke shaft lever contacting stop on inner choke shaft lever, align center of fast idle screw with index mark on cam To adjust, bend choke fast idle connector rod

CONTINUED ON NEXT PAGE

1959-60 CARTER AFB 4-BARREL CARBURETORS (C nt.)

Buick 2840S, 2877S; Chevrolet 2859S, 2897S, 3012S; Ford Thunderbird, Lincoln & Mercury 2853S - With slight clearance between lug on fast idle cam and stop on flange casting, and inner choke shaft lever contacting lug on outer choke shaft lever, align index mark on cam with adjusting screw. To adjust, bend fast idle connector rod.

Chrysler, DeSoto, Dodge, Plymouth 2903S; Pontiac 2819S, 2820S, 2975S, 2976S - With choke valve tightly closed and trip lever and cam arm in alignment, align center of fast idle screw with index mark on cam. To adjust, bend fast idle connector rod.

Ford Thunderbird 2992S - With inner countershaft lever contacting lug on outer countershaft lever, align index mark on cam with adjusting screw. To adjust, bend fast idle connector rod.

Fast Idle Setting: *This adjustment can be made with the carburetor on the bench (Off Engine) but setting should be checked after the carburetor installed (On Engine) as follows:*

Fast Idle Adjustment (Off Engine) - Open throttle and close choke valve tightly (this will allow fast idle cam to assume fast idle position). With choke valve closed and index mark on fast idle cam in alignment with fast idle adjusting screw, turn screw in or out until throttle valve opening or clearance between lower edge of valve and carburetor wall is correct as shown in table below.

Fast Idle Setting (Off Engine)

Car & Carb.	Valve Opening	Gauge No.
Buick (All)	.020"	T109-29
Cadillac (All)	.023"	T109-189
Chevrolet 2859S, 2897S	.012"	T109-200
Chevrolet 3012S	.025"	T109-125
Chrysler 2797S	.015"	T109-44
Chrysler 2799S	.013"	
Chrysler 2927S	.020"	T109-29
Chrysler 2903S	.010"	T109-200
DeSoto 2773S, 2791S	.012"	T109-200
DeSoto 2787S, 2794S	.015"	T109-44
DeSoto 2950S, 2968S	.020"	T109-29
DeSoto 2903S	.010"	T109-200
Dodge 2773S, 2791S	.012"	T109-200
Dodge 2787S, 2794S, 2854S	.015"	T109-44
Dodge 2968S, 2991S	.020"	T109-29
Dodge 2903S, 2948S	.010"	T109-200
Ford T-Bird 2853S	.030"	T109-29
Ford T-Bird 2992S	.040"	T109-193
Lincoln & Mercury 2853S	.030"	T109-29
Plymouth 2812S, 2813S	.012"	T109-200
Plymouth 2855S, 2856S	.012"	T109-200
Plymouth 2925S, 2968S	.020"	T109-29
Plymouth 2969S, 2970S	.020"	T109-29
Pontiac (All)	.026"	T109-189

Fast Idle Adjustment (On Engine - Except Chrysler, D Soto, Dodge & Plymouth With Ram Induction) - With engine at normal operating temperature, rotate fast idle cam so that fast idle adjusting screw is on high step of cam and in alignment with index mark (Exc. Thunderbird, Lincoln, Mercury). On Thunderbird, Lincoln & Mercury, place fast idle adjusting screw on lowest (last) step of cam. On all models, operate engine and adjust fast idle screw for correct engine speed as listed below.

Fast Idle Adjustment (On Engine - Chrysler, DeSoto, Dodge, Plymouth With Ram Induction): *NOTE - Make fast idle adjustment on each carburetor individually.* With engine at normal operating temperature and idling at 725-750 RPM, transmission in "N" (Neutral) with air conditioner compressor "ON" (if so equipped). Turn compressor "OFF" (if so equipped) and remove both air cleaners. Disconnect throttle rods at bellcrank and open throttle valves of left hand carburetor far enough to allow positioning of fast idle cam to fast idle index mark. *NOTE - Right hand carburetor should remain at curb idle position.* Adjust fast idle screw to obtain an idle speed as indicated in table below. *NOTE - The indicated fast idle speed is for* **one** *carburetor with the other carburetor on slow idle speed. There is no specification for engine RPM with both carburetors simultaneously set at fast idle position.* Place left hand carburetor in slow idle position (off fast idle), then repeat the above adjusting procedure on right hand carburetor. *NOTE - It is important that both carburetors have identical idle speeds.*

Fast Idle Setting (On Engine)

Car Model	Engine RPM
1959 Buick 4400	①
1959 Buick 4600, 4700, 4800	1500
1960 Buick (All Models)	1500
1959-60 Cadillac	1700-1750
1959-60 Chevrolet	1600-1800
1959 Chrysler, DeSoto, Dodge	1400
1960 Chrysler (Exc. Ram Induction)	1775-1825
1960 Chrysler (Ram Induction)	② 1375-1425
1960 DeSoto (Exc. Ram Induction)	1775-1825
1960 DeSoto (Ram Induction)	② 1475-1525
1960 Dodge, Auto. Trans. (Exc. Ram Ind.)	1775-1825
1960 Dodge, Synchro-mesh (Exc. Ram Ind.)	1200-1300
1960 Dodge (Ram Induction)	②1475-1525
1959 Ford, Lincoln, Mercury	③ 550
1960 Ford Thunderbird	④ 625
1959 Plymouth	1400
1960 Plymouth, Auto. Trans. (Exc. Ram Ind.)	1775-1825
1960 Plymouth, Synchro-mesh (Exc. Ram Ind.)	1700-1750
1960 Plymouth (Ram Induction)	② 1525-1575
1959-60 Pontiac	2200

① - 1300 RPM (First cars with Fast Idle Cam stamped "181-260"). 1500 RPM (Later cars with Fast Idle Cam stamped "181-271").

② - Fast idle speed with one carburetor on **fast** idle and the other on **slow** idle. There is no specification for engine RPM with both carburetors simultaneously set at fast idle position.

③ - With fast idle screw on low step of cam. Adjust to 600-650 RPM to correct Hard Starting, Stalling, Poor Cold Performance, and Spark Plug Fouling. *See "Changes, Cautions, Corrections" above.*

④ - With fast idle screw on low step of cam.

Unload r: After fast idle linkage adjusted (above), rotate primary throttle valves to wide open position and check choke valve opening or clearance between upper edge of valve and air horn wall using gauge listed in table below. If clearance not correct, adjust by bending unloader lip on primary throttle lever using bending tool T109-214.

►*PONTIAC NOTE:* Manufacturer recommends that throttle valves be opened by depressing accelerator pedal (to simulate actual driving conditions and insure unloader functioning properly in service).

Unloader S tting

Car Model	Chok Op ning	Gaug No.
1959 Buick	3/16"	T109-28
1960 Buick	7/32"	T109-106
1959 Cadillac	9/32"	T109-126
1960 Cadillac	5/16"	T109-107
1959 Chevrolet	3/16"	T109-28
1960 Chevrolet (2897S)	3/16"	T109-28
1960 Chevrolet (3012S)	1/4"	T109-31
1959-60 Chrysler	1/4"	T109-31
1959-60 DeSoto & Dodge	1/4"	T109-31
1959-60 Ford T-Bird	1/8"	T109-36
1959 Lincoln & Mercury	1/8"	T109-36
1959-60 Plymouth	1/4"	T109-31
1959-60 Pontiac	5/32" ①	T109-36

① - Supersedes early 1959 specification of 1/8".

Auxiliary Throttle Valves: Velocity type valves (counterweighted free valves without linkage). No adjustment required. *NOTE - Auxiliary throttl valv s not used on all Chrysler, DeSoto, Dodge & Plymouth carbur tors.*

Secondary Throttle Lever Adjustm nt: *This adjustm nt required to insure correct action of primary and secondary throttle valves. Check and adjust each mod l as follows:*

All Model s (Except Chevrolet & P ntiac) - Block choke valve wide open. Open throttle valves until clearance between lower edge of throttle valve and throttle bore on side opposite idle port is correct as shown in table below. Secondary valves should just start to open at this point. Adjust by bending secondary throttle operating rod using Tool T109-213. Open primary valves fully. On Buick & Cadillac, secondary valves should be a few degrees from wide open with primary valves wide open. On Chrysler, DeSoto, Dodge, Plymouth 2903S, primary valves should be a few degrees past vertical and secondary valves will be a few degrees from vertical. On all other carburetors, both primary and secondary valves should be vertical in wide open position. *NOTE - On Buick carbur tors, upp r edg of secondary valve should just contact auxiliary valv when auxiliary valve is wid open. If n cessary, b nd stop lug on secondary lev r t prev nt s c ndary valves from going past wide p n.* On all models, check and adjust throttle lever closing shoes (see below).

Chevrolet 2859S, 2897S, 3012S & P ntiac 3010S - Primary and secondary valves must reach wide open position at the same time. To adjust, bend secondary operating rod. *NOTE - Secondary valv s will b a f w degrees from wide open when primary valv s ar wid open.* Upper edge of secondary valve should just contact auxiliary valve when auxiliary valve is wide open. *CAUTION - Wide open stop lug on s condary thr ttl l ver sh uld c ntact boss on flang to pr v nt s condary throttle valv fr m g ing past wid p n. If n c ssary, bend st p lug.*

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1959-60 CARTER AFB 4-BARREL CARBURETORS (Cont.)

Pontiac 2819S, 2820S, 2975S, 2976S - Primary and secondary throttle valves must reach wide open position at the same time To adjust, bend secondary operating rod *NOTE - At full throttle position secondary throttle valves will be a few degrees from wide open and primary valves will be a few degrees past wide open*

Secondary Throttle Lever Setting

Car & Carb.	Primary Throttle Opening
Buick (All)	23/64"
Cadillac (All)	23/64"
Chrysler 2797S, 2927S	3/8"
Chrysler 2799S	23/64"
Chrysler 2903S	29/64"
DeSoto 2773S, 2787S, 2794S, 2950S, 2968S	3/8"
DeSoto 2791S	23/64"
DeSoto 2903S	29/64"
Dodge 2773S, 2787S, 2794S, 2854S, 2991S, 2968S	3/8"
Dodge 2791S, 2948S	23/64"
Dodge 2903S	29/64"
Ford Thunderbird 2853S	15/32"
Ford Thunderbird 2992S	25/64"
Lincoln & Mercury 2853S	15/32"
Plymouth 2812S, 2813S, 2855S, 2856S	3/8"
Plymouth 2925S, 2969S, 2970S, 2968S	3/8"
Plymouth 2791S	23/64"
Plymouth 2903S	29/64"

Primary & Secondary Throttle Lever Closing Shoe Adjustment· With primary and secondary throttle valves closed, check clearance between positive closing shoes on throttle levers using Gauge T109-29 (.020") Clearance at closest point should be .010-.030" Adjust by bending shoe on secondary lever

Secondary Throttle Lockout Adjustment· *This adjustment not required on Ford, Lincoln, Mercury 2853S Carburetor* On all other carburetors, open throttle valve slightly to clear fast idle cam, open and close choke valve manually Lockout tang on secondary throttle lever should freely engage in notch of lockout dog Adjust by bending tang on secondary throttle lever On some carburetors, additional adjustment required as follows

Cadillac (All); Chrysler 2799S; DeSoto, Dodge & Plymouth 2791S; Dodge 2948S - Hold lockout dog tight against stop on flange With secondary throttle valves partially open, clearance between tang on secondary throttle lever and lockout arm should be .026" (Cadillac 2951S, 2952S), .020" (All Others) *NOTE - Fast idle cam may be removed to make this adjustment.*

Buick Vacuum Starter Switch Timing Check: Switch timing can be checked with carburetor on engine on Dynaflow cars only On all cars, switch can be timed with carburetor off engine as detailed below

Switch Timing (Off Engine) - Connect battery and test lamp across switch terminals so that lamp will light when switch contact is made See that choke valve is wide open and fast idle cam in hot or slow idle position Close throttle valve against ¼" drill rod inserted between lower edge of valve and carburetor wall at center Lamp should light indicating that switch contacts are closed Repeat test with 7/64" drill rod Lamp should not light If switch does not operate within above limits, adjust by adding or removing square timing shims located under contact spring Shims furnished in thicknesses of .006" and .018"

Switch Timing (On Engine - Dynaflow Cars) - Place transmission selector lever in Park and apply parking brake Back off throttle stopscrew so that throttle valves tightly closed (fast idle cam must be in hot or slow idle position) Place scale against flange on dashpot diaphragm and measure distance to nearest edge of dashpot arm on throttle lever Turn ignition on, open throttle slowly and, at point where starter is energized, again measure distance to nearest edge of dashpot lever The difference between the two measurements should be ½-¾" If switch timing not correct, adjust as for "Off Engine" timing above *NOTE* - Reset engine idle speed as directed under ADJUSTMENTS above

OVERHAUL: *CAUTION - When disassembling carburetor, be sure to keep PRIMARY and SECONDARY side parts separate so they will not be confused or interchanged when carburetor reassembled*

Disassembly: *NOTE - This carburetor consists of two main assemblies (Air Horn & Main Body) which can be overhauled separately Remove air horn from main body as follows*

All Models (Except Ford & Mercury) - Disconnect choke connector rod at choke shaft lever (except models with "Cross-Over" type choke), then disconnect throttle connector rod at pump arm and fast idle connector rod at choke lever Remove air horn-to-main body attaching screws and lockwashers and remove air horn from main body by lifting air horn assembly straight up

Ford & Mercury - Remove air cleaner anchor screw, then remove anti-stall dashpot arm, anti-stall dashpot operating lever, and choke countershaft lever from choke side of carburetor On fuel inlet side, disconnect fast idle connector rod at the inside choke countershaft lever, and disconnect accelerating pump operating rod at pump arm Remove air horn-to-main body attaching screws and remove air horn from main body

Air Horn (Except Ford & Mercury) - Remove fuel inlet strainer nut, gasket and screen, then remove power piston cover plates Remove two metering rods with pistons and remove springs from piston wells Remove pump arm and link and pump plunger assembly Remove float hinge pins, floats and float needle assemblies and gaskets *NOTE - Keep individual float parts grouped so that same needle and seat are reassembled together* On models with "Cross-Over" type choke, use a prick punch and pierce the welch plug in end of choke piston cylinder and remove plug Disconnect piston link at choke lever and slide choke piston and link out of cylinder On all models, remove inner and outer choke shaft lever and washers, then remove choke valve and choke shaft

Air Horn (Ford & Mercury) - Remove accelerating pump plunger, metering rod and power piston assemblies, floats, fuel inlet and needle assemblies, then remove air horn gasket Remove fuel inlet fitting, gasket and screen Remove choke plate connector link, then slide choke plate countershaft out of air horn assembly Remove choke plate, then slide choke shaft out of air horn

Main Body - On cars with conventional automatic choke assembly, remove attaching screws and remove coil housing and thermostatic coil Remove housing gasket and baffle plate To disassemble choke, remove choke lever attaching screws and retainer washer, then remove choke piston lever and link assembly by rotating piston in bore On Buick models, remove starter switch terminal cap, return spring guide block assembly, plunger and ball On all cars, remove pump discharge nozzle assembly and gasket, then remove primary and secondary venturi assemblies *CAUTION - Venturi assemblies must be marked for reassembly in the same location.* Remove two primary and two secondary metering jets and mark them for reassembly in the same location On models having auxiliary throttle valves, remove auxiliary throttle valve assembly On models having an idle compensator valve assembly, remove two self-tapping screws and remove compensator and gasket. On all models, remove pump return spring, idle mixture screws and spring On Buick carburetors, if starter switch strainer is not visibly damaged or clogged, it will not have to be removed On models having an idle air bypass system, remove large idle air adjusting screw and spring On all models, invert carburetor body and remove pump intake screw plug, check valve ball seat and ball Remove fast idle cam attaching screw and cam, spacer and lockout lever, throttle operating rod, throttle shaft washer, secondary throttle lever and spring Remove throttle shaft arm, throttle shaft dog and inner throttle shaft arm and flex spring from end of primary throttle shaft on choke side *NOTE - It is not recommended that throttle body be disassembled further, however, if necessary to remove throttle valves and shafts, proceed as follows* Mark all throttle valves so they can be installed with correct side of valve upward File burrs from staked ends of all throttle valve screws and remove screws and valves from shafts Remove secondary throttle shaft, then remove primary throttle valve shaft using a rawhide hammer to tap shaft through retaining washer

Cleaning & Inspection: Clean all metal parts in carburetor cleaner and dry with compressed air *(CAUTION - Do not wash accelerator pump plunger assembly or thermostatic coil and cover assembly in cleaning solvent)* Clean and blow out all passages with air Remove any gum deposits in carburetor Clean carbon out of bowl assembly heat passages Make sure that all calibrated restrictions such as idle ports, air bleeds and vents are clean, but do not pass drills or wires through these passages Check all shafts and their bearing bores for wear Check each piston in its cylinder Check for worn or damaged jets and worn holes in ends of various levers Check accelerator pump plunger leather and replace as an assembly if leather is creased or cracked Examine float needles and seats and if needle is grooved replace needle and seat assembly Check idle mixture adjusting screws for burrs, ridges or grooves and replace screws if necessary Check floats for dents or leaks and check hinge pin bores for burrs or wear and check pins for straightness Clean fuel inlet screen

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1959-60 CARTER AFB 4-BARREL CARBURETORS (Cont.)

Check fast idle cam for excessive wear on steps and replace if necessary. On models with auxiliary throttle valves, check valve assembly to make sure it is free to swing and that weights do not rub on casting. On all models, carefully check body assembly and valve assembly for wear at throttle valves and bores and between shafts and bores. On Ford, Lincoln & Mercury models, check dashpot plunger leather for damage or wear. Check to make sure intake check and discharge restriction is free of lint, gum or other foreign matter.

Reassembly: Use all new gaskets. Install parts in reverse order of disassembly procedure and note the following:

Valve Installation - Use new screws when installing valves. Install valve shafts, then install valves in their respective bores with "C" in circle toward manifold side of carburetor. Install new screws but do not tighten. Make sure idle speed adjusting screw is backed out, then hold valves in place with fingers pressing on high side of valve. Tap valves lightly with a screwdriver to seat them in the bores and while holding in this position, tighten the screws securely. Stake screws in place by squeezing with pliers.

Carb. No.	Throttle Valve Setting Idle Port Opening	Vacuum Port
2773S, 2812S, 2813S	.142-.148"	②.026-.034"
2787S	.167-.173"	②.026-.034"
2790S, 2798S	.094-.100"	②
2791S, 2799S	.085-.091"	②.012-.018"
2794S, 2797S	⑤ .167-.173"	②.026-.034"
2814S, 2815S	.123-.129"	②.010-.016"
2819S, 2820S	.115-.121"	⑥
2840S	④ .156-.162"	③.002-.010"
2853S, 2992S	.152-.158"	②.015-.025"
2854S	.142-.148"	②.026-.034"
2859S, 2897S	.156-.162"	⑥
2877S	.156-.162"	③.008-.016"
2903S	.146-.152"	
2925S, 2991S	.164-.170"	②.026-.034"
2927S, 2950S	.157-.163"	②.026-.034"
2948S	.110-.116"	②.012-.018"
2951S, 2952S	.106-.112"	②.010-.016"
2968S, 2969S, 2970S	.157-.163"	②.026-.034"
2975S	.115-.121"	⑥
2976S	.124-.130"	⑥
2981S	.156-.162"	③.008-.014"
2982S	.156-.162"	③.004-.010"
3010S, 3012S	.156-.162"	⑥

① - Primary side (none on secondary). Above top edge of fully closed throttle valve.
② - Top of port above top edge of fully closed throttle valve.
③ - Bottom of port above top edge of fully closed throttle valve.
④ - Early production. .165-.171" Late production.
⑤ - Early production. .157-.163" Late production.
⑥ - None. Spark passage open to manifold vacuum.

Service Parts

Gasket Set - Carter No. 293A (2819S, 2820S, 2975S, 2976S); No. 315 (2814S, 2815S); No. 316 (2812S, 2813S); No. 317 (2773S, 2787S, 2855S, 2856S); No. 319 (2790S, 2798S, 2948S); No. 320 (2791S, 2797S); No. 323A (2840S, 2859S, 2877S, 2981S, 2982S, 3010S, 3012S); No. 326 (2794S, 2797S, 2854S); No. 328 (2853S); No. 328A (2992S); No. 337 (2903S); No. 342 (2969S, 2970S); No. 343 (2925S, 2991S); No. 344 (2927S, 2950S, 2968S); No. 345 (2951S, 2952S).

Re-Carburetion Kits - Carter No. 1913N (2812S, 2813S); No. 1948N (2787S); No. 1955N (2794S); No. 1956N (2797S); No. 1961N (2855S); No. 1971N (2840S); No. 1972N (2819S); No. 1974N (2853S); No. 1977N (2814S, 2815S); No. 1980P (2877S); No. 1987N (3010S); No. 1992N (2925S); No. 1994N (2927S); No. 1995N (2950S); No. 1999N (2991S); No. 5003N (2992S); No. 5008N (2981S). No. 5009N (2982S); No. 5017N (2976S); No. 5019N (2951S, 2952S).

Zip-Kits - Carter No. 900-55 (2855S, 2856S); No. 900-62 (2840S, 2877S); No. 900-62A (2981S, 2982S, 3012S); No. 900-68 (2794S, 2854S); No. 900-69 (2812S, 2813S); No. 900-74A (2819S, 2820S, 2975S, 2976S); No. 900-101 (2927S, 2950S, 2968S); No. 900-104 (2925S, 2991S); No. 900-110 (2951S, 2952S).

1960 CARTER ABD DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Metering Jet Size	Metering Jet Part No.	Step-up Rod Size	Step-up Rod Part No.	Venturi Assembly Low Speed Jet	Venturi Assembly Part No.	Venturi Assembly Pump Jet
LINCOLN & MERCURY									
383" & 430" Engs. (Early)	1960	2965S	424cc	120-236S	.026"	75-1468S②	.0295"	58-417S①	.028"
383" & 430" Engs. (Late)	1960	2965SA	424cc	120-236S	.026"	75-1468S②	.0295"	58-529S	.028"

① - Use 58-529S.

② - **1 Size Lean** 75-1498U (Unitized Pkg. consisting of 2 Step-up Rods 75-1496 (.025") and 2 Metering Jets 120-246S (401cc).

2 Sizes Lean 75-1499U (Unitized Pkg. consisting of 2 Step-up Rods 75-1497 (.024") and 2 Metering Jets 120-247S (382cc).

1960 CARTER ABD 2-BARREL CARBURETORS

LINCOLN & CONTINENTAL	Cart r N .
430" Engine (Early)	ABD- 2965S
430" Engine (Late)	ABD-2965SA
MERCURY	
383" Eng. With Air Cond. (Early)	ABD- 2965S
383" Eng. With Air Cond. (Late)	ABD-2965SA
430" Engine (Early)	ABD- 2965S
430" Engine (Late)	ABD-2965SA

►CHANGES, CAUTIONS, CORRECTIONS

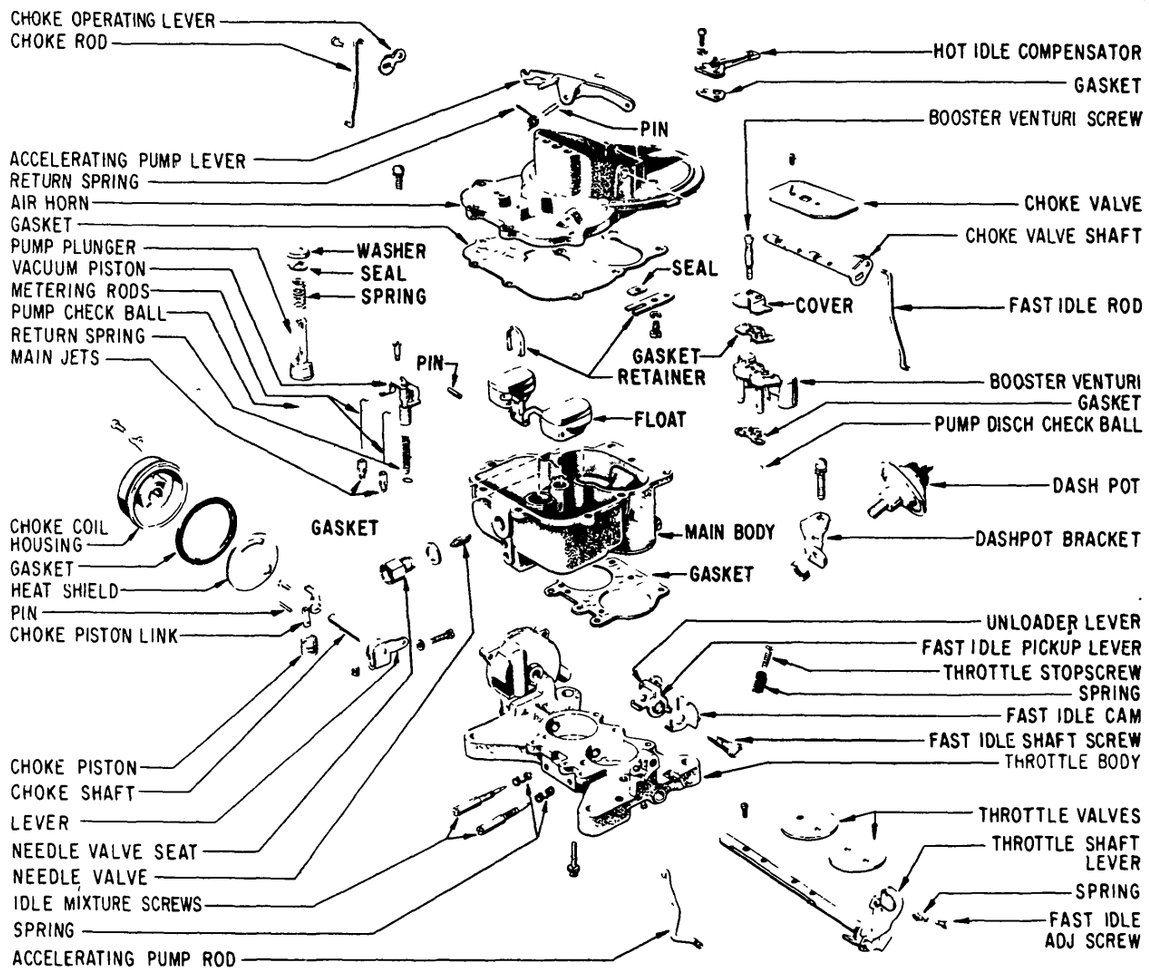
►*1960 LINCOLN & MERCURY HARD HOT STARTING CORRECTION (EARLY CARS):* This condition may be caused by poor seating of fuel inlet valve needle in needle seat and can be corrected as follows: Remove needle and seat assembly from carburetor and support seat on a hard clean surface, then use a light hammer and tap needle into its seat with ONE tap of hammer. *CAUTION - Repeated tapping or a heavy blow will ruin the seat.* Install needle and seat assembly and tighten the seat to 24-84 inch pounds. If the above procedure does not correct the condition, replace needle and seat assembly.

►*1960 LINCOLN & MERCURY SLUGGISH PERFORMANCE AND ACCELERATION CORRECTION:* If normal adjustment and tune-up procedures do not correct the condition, check for proper alignment of carburetor booster venturi within the main venturi and for foreign material or burrs in accelerator pump discharge nozzles. To check booster venturi position, measure the distance between each booster venturi and main venturi at the most rearward point (opposite side of carburetor from fuel bowl). This distance should be .255" minimum (use a ¼" drill and a .005" feeler gauge inserted between booster and main venturi). If clearance is less than .225", remove booster venturi assembly from main body and remove all parting line flash present at front vertical wall of booster casting. *CAUTION - Do not remove more metal than required to conform to contour of wall.* Install venturi assembly and position it as far forward as possible before tightening attaching screws. Recheck clearance between booster and main venturi. *NOTE - Burrs and foreign material in pump discharge nozzles may be cleaned by passing a No. 70 drill (.028") through the openings. DO NOT use a drill larger than .028".*

►*1960 LINCOLN & MERCURY ENGINE STALLING & LOADING (AFTER ONE OR TWO MILES OF OPERATION) OR FAILURE OF CHOKE VALVE TO CLOSE AT LOW TEMPERATURE CORRECTION:* May be caused by incorrect thermostatic coil spring in automatic choke assembly. To check, remove thermostatic coil housing and check spring identification letters which are stamped on outside face of square tang-end. The correct spring is identified by the letters "RA". If not correct, replace thermostatic coil housing assembly with Part No. 9848-A.

►*1960 LINCOLN & MERCURY HARD HOT STARTING CORRECTION:* If the condition exists after carburetor, choke, and linkage are properly adjusted, install Carburetor Booster Venturi Support Assembly Kit, No. COLY-9A523-A (Carter No. 58-530U), and lower float level as detailed below. Remove carburetor air horn, inlet needle and seat assembly, float assembly, float shaft retainer, booster venturi support cover, gasket, and the booster venturi support assembly and gasket. Install the new support assembly gasket, booster venturi support assembly, support cover gasket, booster support cover, and secure with two screws. *NOTE - See "Lincoln & Mercury Sluggish Performance & Acceleration Correction" above for proper alignment of booster venturi assembly in main body. Clearance between booster venturi and main venturi must not be less than .255" and equal on all sides.* Install float and float shaft assembly, then install the new needle and seat assembly. Install new float shaft retainer and baffle assembly. Lower the float level so there is ¼" clearance from top of each float (measured at center of float) to top of machined surface of main body. *NOTE - Use Tool 9550-DA to measure this distance. With float level set at ¼" (at center of float), the clearance at end furthest from pin must be 9/32".* Install carburetor air horn. Carburetor assemblies with the above revisions were used in production after April 15, 1960 and are identified by Part No. COLE-9510-G (Carter No. 2965SA).

►*2965S CARBURETOR ACCELERATING PUMP CHECK BALL PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* The accelerating pump inlet check ball has been changed from steel to aluminum in production. When servicing a carburetor with an aluminum check ball, do not stake it in place as required for steel ball. The accelerating pump outlet check ball is steel and is approximately the same size as the aluminum inlet check ball. To identify, use a magnet to determine material used.



CARTER ABD 2-BARREL CARBURETOR ASSEMBLY

DESCRIPTION: 2-Barrel downdraft type of new design. Air horn, main body, and throttle body are aluminum castings with the choke housing cast integrally with the throttle body. A hot idle compensator located on the air horn, is calibrated to open under high temperature conditions, with engine idling, preventing engine stalling or a decrease in idle speed.

ADJUSTMENTS: *NOTE - All adjustments, except float setting and fast idle throttle clearance can be mad with the carburetor installed on the engine.*

Idle Setting: 1-1½ turns open from a lightly seated position (initial setting). Final setting should be made with engine at operating temperature. Adjust mixture screws

CONTINUED ON NEXT PAGE

1960 CARTER ABD 2-BARREL CARBURETORS (Cont.)

to obtain highest vacuum reading, then turn screws out 1/8 turn.

Idl Speed: 450-475 RPM with transmission selector lever in "D" (Drive).

Fast Idle Speed: With engine at normal operating temperature, transmission selector lever in "D" (Drive) and fast idle screw on lowest (slowest) step of cam, adjust fast idle screw to obtain 600-650 RPM.

Dashpot: .060-.090" clearance between dashpot plunger and throttle operating lever with dashpot plunger held in to limit of travel and throttle valves closed. To adjust, loosen locknut and rotate dashpot in bracket.

Ch ke Setting: 1 notch lean.

Accelerating Pump: 7/16" from top of accelerator pump plunger to top of bowl cover with pump operating rod in lower hole of throttle lever. To adjust, bend operating rod at lower angle with Tool T109-213.

Ch ke Valve & Piston Lever Linkage: Bend 1/8" of end of Tool T109-189 (.026" wire gauge) at a 90° angle, then insert bent end of gauge into choke housing piston bore so that it is between bottom of slot in choke piston and top edge of vacuum slot in choke housing. Close choke valve by pressing on piston lever until it stops, then check clearance between upper edge of choke valve and air horn which should be 5/32" (Tool T109-154). To adjust, use parallel jaw pli ers and bend choke operating lever at the reduced area to obtain proper adjustment.

Unl ader: 1/8" clearance between upper edge of choke valve and wall of air horn with throttle valves wide open. To adjust, use 1/8" gauge, Tool T109-36 or a 1/8" drill to check clearance. Bend tang on choke unloader lever as required.

Fast Idle Cam: With choke valve closed, fast idle adjusting screw should rest at index mark on high step of fast idle cam. To adjust, bend fast idle cam pickup lug on choke unloader lever as required.

Throttle Valve Clearance (Fast Idle): With choke valve closed, turn fast idle screw until there is .020" clearance between throttle valve and bore on side opposite idle port. Use Tool T109-29 to check clearance,

Fl at Level: 9/32" measured at free end of float. *NOTE - This setting supersedes previous setting of ¼".* Press down on float shaft retainer and hold float and lever assembly in uppermost position against fuel inlet needle. Distance between top of float (end furthest from hinge pin) and top machined surface of main body should be 9/32" (Tool T109-239). Bend float lever arms as required to obtain proper alignment (parallel). Bend inlet needle tab as required for proper float level.

OVERHAUL: Air Horn Disassembly - Disconnect choke rod from choke housing lever, then remove accelerator pump operating rod retainer at throttle lever and unhook rod at pump operating lever. Remove fast idle cam operating rod retainers at each end and disconnect rod from fast idle cam. Remove air horn attaching screws, then remove air horn from main body. Remove fast idle cam operating rod from bottom side of air horn by slipping it through seal washer. Disconnect choke operating lever from choke valve shaft and from choke operating rod. Remove operating rod by slipping it through seal washer from bottom side of air horn. Remove accelerating pump plunger by compressing spring and slipping plunger off pump operating lever. Remove choke valve and choke shaft. Remove hot idle compensator attaching screws, compensator assembly and gasket. *NOTE - If it is necessary to replace accelerator pump operating l v r, remove retainer and return spring, then pry out tapered retainer pin with a pair of side cutters and remove lever.*

Main Body Disassembly: Remove fuel inlet fitting and needle seat with inlet needle and gasket. Remove float shaft retainer, float and lever assembly, and float shaft. Remove accelerator pump inlet check ball (invert main body and catch ball). Remove vacuum piston retainer screw and remove vacuum piston and metering rods as an assembly. Remove metering rods from vacuum piston assembly. Remove vacuum piston spring and gasket. Remove main metering jets, then remove booster venturi assembly and gasket. Remove accelerator pump discharge check ball (invert main body and catch ball).

Throttle Body Disassembly: Remove throttle body attaching screws, then separate throttle body from main body. Remove throttle body to main body gasket. Remove dashpot and bracket, then remove fast idle cam screw, cam, washer and pickup lever. Remove idle mixture adjusting screws, then remove automatic choke thermostatic coil housing, gasket and heat shield. Remove piston, lever and link assembly attaching screw and remove piston, lever and link assembly by rotating assembly 90° counterclockwise and slipping piston out of bore. Remove choke housing lever and shaft assembly. *NOTE - If necessary to remove throttle valves, mark valves in a suitable manner and scribe a line across throttle plate next to throttle shaft to insure plate alignment and installation in correct position. File off staked ends of throttle valve screws, then remove screws, throttle valves and throttle shaft.*

Throttle Body Reassembly: *NOTE - If throttle valves removed, insert throttle shaft into body and place throttle valves in their respective positions in bores and on throttle shaft, using reference marks made at disassembly for proper positioning and alignment. Install throttle valve screws but do not tighten. Back off idle adjusting screw and allow throttle valves to seat in bores. Tap plates lightly to position and at the same time hold throttle shaft in the closed position and tighten throttle valve screws. Stake screws securely, then turn idle adjusting screw back to its original position.* Install fast idle cam, washer and pickup lever, then install shaft screw. *NOTE - Pickup lever should be positioned with hole for operating rod toward the throttle bore.* Install choke housing lever and shaft assembly in choke housing, then install piston, lever and link assembly. Attach piston lever to choke shaft. *NOTE - Lever on choke housing shaft should be toward right when viewing throttle body from choke housing end.* Install idle mixture adjusting screws and turn them in until they seat lightly, then back them off 1-1½ turns for initial adjustment. Install dashpot and bracket assembly. Install throttle body and gasket on main body.

► *CARBURETOR REASSEMBLY NOTE (BOOSTER VENTURI ASSEMBLY INSTALLATION):* Booster venturi assembly must be properly positioned in bores of carburetor body and the bores in throttle body (body flange assembly) must be properly centered as follows: Loosen attaching screws holding body flange assembly to main body and position body flange assembly away from fuel bowl section of main body casting as far as possible, then tighten attaching screws. Clearance between each booster venturi and the main venturi when measured at side opposite fuel bowl should be a minimum of .255" (measured with a ¼" drill and a .005" feeler gauge). If unable to obtain clearance, remove booster venturi assembly and remove all parting line "flash" from cluster that may be present on side which is positioned next to fuel bowl.

Main Body Reassembly: Install accelerator pump discharge check ball and stake the ball lightly. *CAUTION - Check ball is steel and should not be interchanged with the aluminum inlet check ball. See "Check Ball Production Change & Service Replacem nt Caution" above.* Install booster venturi assembly and gasket, then install main metering jets. Install metering rods on vacuum piston assembly, t hen insert vacuum piston spring and gasket in piston bore and install vacuum piston assembly. *CAUTION - Make sure met r ing rods enter metering rod jets.* Tighten piston retaining screw securely. Install float shaft in float lever and install float, lever and shaft assembly. Install fuel inlet needle and seat assembly and tighten securely, then adjust float setting. Install float shaft retainer. Install accelerator inlet check ball (steel ball used on early cars and an aluminum ball used on later cars). *See "Check Ball Production Chang & Service Replacement Caution" above.*

Air Horn Reassembly: *NOTE - If accelerator pump operating lever was removed, install lever using a new retaining pin, then install lever r turn spring.* Install hot idle compensator assembly and gasket and tighten screws securely. Install accelerator pump plunger on operating lever, then install seal washer and retainer on each side of the air horn. Insert choke shaft through air horn and install choke valve. Stake choke valve screws securely. *NOTE - Install choke shaft in air horn so integral lever on shaft is on same side of air horn as accelerator pump operating lever.* Insert choke operating rod through seal washer with dogged end toward top of air horn, then insert operating rod through choke shaft lever so end of rod is toward air horn and choke lever parallels choke shaft fast idle lever. Insert fast idle cam operating lever through seal washer with the straightest length through seal and the end of the rod toward air horn. Install rod retainer. Install air horn gasket on main body, then install air horn, tightening screws evenly and securely. *CAUTION - Do not damage accelerating pump plunger when installing air horn.* Insert choke operating rod into choke shaft lever and install retainer. Insert fast idle cam operating rod into fast idle cam trip lever and install retainer. Adjust choke valve and piston lever linkage, unloader, and fast idle cam *(see "Adjustment" above).* Loop accelerator pump operating rod through pump operating lever, then insert other end of rod through bottom hole of throttle shaft lever and install retainer. Adjust accelerator pump and throttle valve clearance (fast idle). *See "Adjustment" above.* Install thermostatic choke coil heat shield, gasket and thermostatic coil housing. *NOTE - Be sure thermostatic coil engages slot in choke piston.* Install retainers and screws loosely, then rotate coil housing so index mark is at 1 notch lean. Adjust dashpot. *See "Adjustment" above.*

SERVICE PARTS: Gask t S t - Carter No. 352.
Re-Carbur ti n Kit - Carter No. 5032N.
Zip-Kit - Carter No. 900-119.

CARTER DUAL "WCD"

	Carter No.
BUICK	
1954 Series 40, 50	2081S, SA
1955 Series 40	2179S
CHRYSLER	
1954 V8 C63-1	2039SA
NASH	
1955 Statesman	2061S
1956 Statesman	2350S
PONTIAC	
1954 Six	2010S
1954 Eight (Synchro-mesh) Early	719SA
1954 Eight (Synchro-mesh) Late	720SA
1954 Eight (Auto Trans.)	2122S
RAMBLER	
1957 Six (Synchro-mesh) Powerpack	2350S
1957 Six (Auto. Trans.) Powerpack	2586S
1958 Series 10 (Synchro-mesh)	2350S
1958 Series 10 (Auto Trans.)	2586S
1959 Series 10 (Powerpack)	2887S
1960 Series 10 (Powerpack) Early	2887S
1960 Series 10 (Powerpack) Late	2887SA
WILLYS	
1954-Early 1956 (6-226 Engine)	2204S

►CHANGES, CAUTIONS, CORRECTIONS

►***1954 BUICK SERIES 40 & 50 SYNCHRO-MESH CARS LOADING UP ON ACCELERATION WITH COLD ENGINE CAUSING A STUMBLE OR BUCK (Cars with first 2081S Carburetor):*** Can be corrected by making following changes. *NOTE*—All required parts are furnished in Carter Unitized Pkg No. 170-353U

(1) Choke Coil & Cover Assembly—Remove and discard original assembly, Carter No. 170AJ73S (stamped on cover). Install NEW assembly, Carter No. 170U73S, using a new gasket and set choke for Centered (At Index) setting

(2) Chok Warm Air Passage Bushing—Remove air horn assembly and gasket. Install special Reducer Bushing (I.D. #42 Drill or 0935") in choke warm air passage which is hole in top edge of bowl cover under choke mounting location (this passage has #38 drill or .1015" metering orifice at bottom). Use a square end tool to drive bushing in flush with upper surface of bowl cover. Re-install air horn assembly using a new gasket

(3) Metering Rod—Make certain carburetor has later type No. 75-1107 Metering Rods. See Metering Rod Production Change following.

(4) Install new Identification Tag stamped 2081SA. ***NOTE—Later 2081SA carburetors do not require the above change.***

►***1954 BUICK SERIES 40 & 50 METERING ROD PRODUCTION CHANGE (Early No. 2081S Carburetors):*** First type Metering Rods, Carter No 75-994, changed to No. 75-1107 which will improve performance and correct low-speed buck (see Correction immediately above). *NOTE*—All 2081SA carburetors have this later metering rod

►***1955 BUICK 40 ROUGH IDLE ON SYNCHRO-MESH CARS (Bucking or Missing)*** · May be caused by flash in cylinder head exhaust crossover passages resulting in uneven manifold heat Remove head, examine passages and make certain that openings are at least 5/8" diameter Correct by knocking out flash with a punch and blow passages out thoroughly

►***1954-55 BUICK 40 WARM-UP PERFORMANCE IMPROVEMENT (SYNCHRO-MESH CARS) Check and correct the following*** ·

1) Check cylnder head for obstructed exhaust crossover passages (see Rough Idle Correction above)
2) Make certain that correct Carter carburetor installed On 1954 cars with first 2081S carburetor, make certain that carburetor brought up to later 2081SA specifications and that later type No 75-1107 Metering Rod installed
3) Adjust carburetor (Fuel Level, Pump Stroke, Metering Rod Setting, Idle Adjustment) ***Idle setting must not be too lean.***
4) Set Automatic Choke at 2 Points Lean (original setting was CENTERED) Choke setting may be varied on individual engines but must not exceed 3 Points Lean

►*1957-EARLY 1958 RAMBLER SERIES 10 CARBURETOR INSTALLATION & INSPECTION CAUTION (TO CORRECT FLASH-O-MATIC TRANSMISSION 1-2 SLIPPAGE OR 2-3 PILE-UP IN D1 RANGE)* Vacuum for transmission solenoid & vacuum control is supplied from carburetor passage which terminates in two ports in carburetor as follows *NOTE - Late 1958 models were changed to take the vacuum directly from intake manifold and the vacuum line connection on carburetor was plugged* 1) Vacuum port at throttle edge 2) In carburetor mounting flange at choke vacuum supply passage In correcting above transmission complaints, inspect carburetor and note the following

1) Carburetor Vacuum Ports - Check port at throttle edge for correct size (0465") and make certain passages are not restricted With throttle valves tightly closed **top** edge of this port should be flush with **bottom** edge of valve

2) Carburetor Mounting Flange & Gasket - Inspect mating surfaces of carburetor flange and manifold for unevenness burrs or chipped areas These surfaces can be cleaned up by using crocus cloth on a surface plate Inspect gasket for swelling at the vacuum port and channel area

►*1958 RAMBLER LIGHT THROTTLE ACCELERATION STUMBLE CORRECTION (At speeds below 25 MPH)* Install two metering rods, Carter Part No 75-1431 These new rods are furnished in a replacement kit Rambler Part No 3201205 Adjust new metering rods to same specifications as for previous rods See *"Adjustment" below*

DESCRIPTION: 2-barrel downdraft with automatic choke, concentric float bowl and double floats, permanently assembled main nozzles, high pressure type spring operated accelerating pump, and built-in Carter Car Starter (Buick Models only) 1957 & early 1958 Rambler carburetor, used with automatic transmission has an additional vacuum port at throttle edge for transmission control On later carburetors, the vacuum line opening is either plugged or eliminated and the vacuum line for transmission control is taken directly from intake manifold

ADJUSTMENT: With engine at normal operating temperature, choke valve open and fast idle inoperative, proceed as follows

Idle Mixtur : Adjust each mixture screw until highest vacuum is obtained with smooth engine operation at indicated idle speed

Idle Mixture Screw Setting

Car & Carb.	Idle Screw Opening
Buick 2081S, SA, 2179S	1¼-1¾ turns
Chrysler	½-1 turns
Nash 2061S, 2350S	½-1½ turns
Pontiac	1¼ turns
Pontiac 719SA, 720SA, 2122S	¾-1¾ turns
Rambler 2350S, 2386S	½-1½ turns
Rambler 2887S, 2887SA	½-2 turns
Willys 2204S	1-2 turns

Idle Speed Setting

Car Model	Synchro-mesh	Auto. Trans.
Buick	450 RPM	450 RPM
Chrysler	475-500 RPM	450-500 RPM
Nash (1955)	500-550 RPM	①450 RPM
Nash (1956)	550 RPM	①②475 RPM
Pontiac Six	520-540 RPM	① 365-385 RPM
Pontiac Eight	450-475 RPM	①③ 365-385 RPM
Rambler	550 RPM	①②475 RPM
Willys	500 RPM	

① - With selector lever in "N" (Neutral)
② - 500 RPM on air conditioned cars (air conditioner ON)
③ - 460-480 RPM on air conditioned cars

Accelerating Pump: *NOTE - Two different type accelerating pumps used as follows Type "B" used on Buick, Chrysler, Pontiac Eight, and Willys. Type "C" used on all others Adjustments are different as indicated below*

Type 'B" Accelerating Pump: Pump is high pressure delayed action type with positive throttle lever connection Pump plunger is loose on plunger stem and is positioned by spring above plunger to provide uniform pump action (compression and expansion of spring provides uniform plunger movement and pump discharge) Check and adjust as follows

►*CAUTION:* When measuring pump stroke, proceed exactly as follows (gauge reading indicates plunger shaft position rather than actual movement.

Pump Stroke Checking & Adjustment—Install pump connector link in hole of pump arm which provides correct stroke for checking (see table), back out throttle lever stopscrew so that throttle valves are tightly closed (CAUTION—See that fast idle cam does not hold throttle valves open).

►*CAUTION· Check pump stroke by either of the two following methods:*

(1) Gauge T109-117S Method—Invert gauge on edge of dust cover boss of bowl cover at pump plunger shaft (CAUTION—hold gauge vertical to insure correct reading). Turn knurled nut on gauge until gauge finger just touches upper end of plunger shaft. Number indicated on gauge should agree with "Gauge" figure in table below. Adjust by bending throttle connector rod at upper angle.

(2) Scale Method—Use a scale to measure distance from top of pump plunger shaft to top of dust cover boss on bowl cover This distance should agree with

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CARTER "WCD" (C nt.)

"Scale" figure in table. Adjust by bending throttle connector rod at upper angle.

Car & Carb.	Type "B" Pump Setting Reading Gauge	Scale	Pump Stroke
Buick (All)	29	17/64"	Long
Chrysler	29	17/64"	Long
Pontiac Eight (All)	32	20/64"	Short
Willys	33	22/64"	Long

Pump Jet Aim—Pump jets must be properly aimed so that pump discharge stream strikes venturi at correct angle To check (with air horn removed), operate pump by opening throttle with short quick stroke and note direction of pump jet stream Stream should miss outer wall of primary venturi and strike lower part of inner wall of secondary venturi To adjust, bend pump jet slightly Check both pump jets similarly.

►*CAUTION· Use extreme care not to distort jets when making adjustments.*

Type "C" Accelerating Pump: Pump is high pressure delayed action type (same as Type "B" above) but pump stroke is checked and adjusted differently as follows

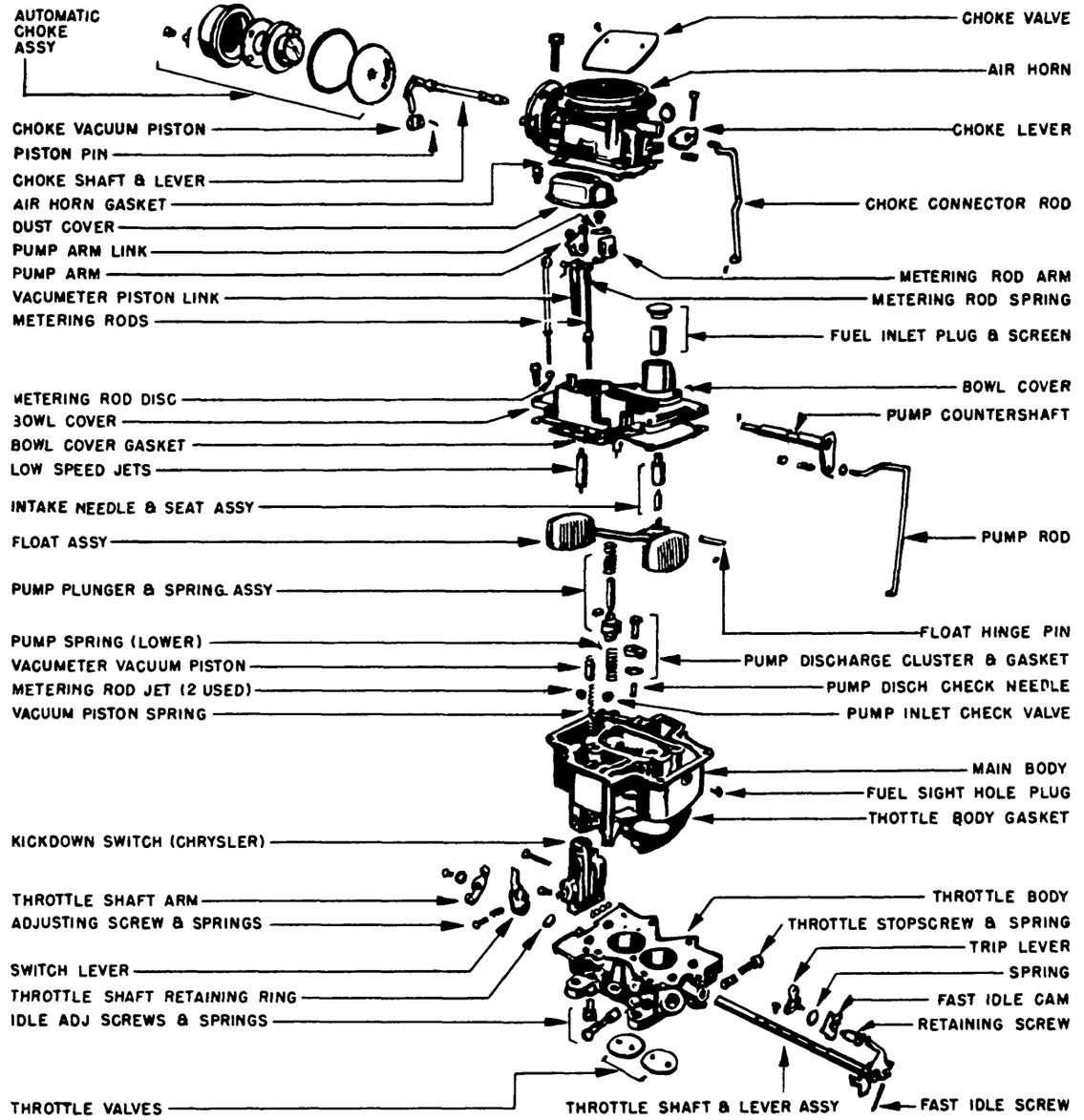
Pump Stroke Adjustment—Back out throttle stopscrew so that throttle valves seated (CAUTION—make certain fast idle screw does not hold throttle valves off seat). Remove dust cover over pump countershaft. Place straightedge across top of dust cover boss at pump arm. Flat op top of pump arm should be parallel to straightedge. Adjust by bending throttle connector rod at upper angle using bending tool T109-213.

Metering Rod: *NOTE - Special gauge T109-163 (2.940") is required to check metering rod setting on Nash 2061S & Pontiac Eight 719SA, 720SA, 2122S carburetors. Gauge not required on other carburetors. Check each type as follows*

Metering Rod Check (With Gauge)—Use special metering rod gauge (see table below). Install gauge in place of either metering rod seating gauge in metering rod jet Back out throttle lever stopscrew so that throttle valves tightly closed. Press down lightly on vacuum piston link until lug of piston link contacts lip of metering rod arm In this position, clearance between metering rod bearing and shoulder in notch or gauge should be less than 005" Adjust by bending lip of metering rod arm using bending tool T109-105 Remove gauge and reinstall metering rod

Metering Rod Check (No Gauge Required)—Check and adjust the rods as follows: Back off throttle lever stopscrew so that throttle valves tightly closed, loosen metering rod arm clampscrew (on countershaft under dust cover on bowl cover), press down on vacumeter link until both metering rods just bottom in carburetor casting, rotate metering rod arm until finger on arm contacts lip on vacumeter link, tighten clampscrew (*CAUTION*—do not disturb arm position)

Fl at L v l: *NOTE - On Nash, Rambl r & Pontiac Six, float ass mbly consists of two fl ats and auxiliary l v r. A singl float is us d on all oth r carbur tors On carburetors with two fl ats, mak sur both floats ar s t to uniform h ight.*



CARTER "WCD" DUAL CARBURETOR

Float Level Setting - With bowl cover and float assembly removed from carburetor, invert assembly, remove cover gasket, install correct gauge (see table below) on cover directly below floats with notched portions of gauge fitted over edge of cover casting. Make vertical and lateral adjustments on each float

V rtical Adjustm nt - Top of each float should just clear horizontal portion of gauge Adjust by bending float arms *CAUTION* - Adjust both floats evenly.

Lateral Adjustment - Sides of floats should barely touch vertical uprights of float gauge (necessary to prevent floats hanging up in bowl). Adjust by bending float arms

Fast Idle: *CAUTION - Two s ttings (1) and (2) r quir d.* **(1) Fast Idl Cam Cl arance** - Loosen choke lever clampscrew on choke valve shaft, insert correct gauge (see Checking Gauge (1) in table below) between lip

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CARTER "WCD" (C nt.)

on fast idle cam and boss on flange casting. Hold choke valve tightly closed and remove all slack from linkage by pressing choke lever toward closed position, tighten choke lever clampscrew.

(2) Fast Idle Screw Setting - With choke valve tightly closed, tighten fast idle adjusting screw against high step of fast idle cam until throttle valve opening or clearance between edge of valve and carburetor bore on side opposite idle ports is correct (see Checking Gauge (2) in table below).

Float Level Setting

Car & Carb.	Float Level	Gauge No.
Buick 2081S, SA	5/32"	T109-196
Buick 2179S	3/16"	T109-162
Chrysler 2039SA	11/64"	T109-205
Nash 2061S, 2350S	5/32"	T109-196
Pontiac Six 2010S	5/32"	T109-196
Pontiac Eight (All)	3/16"	T109-162
Rambler (All)	5/32"	T109-196
Willys 2204S	3/16"	T109-162

Fast Idle Setting

Car & Carb.	Settings & Gauge Nos. Setting No. 2	Setting No. 1
Buick 2081S, SA	.010" T109-29	.028" T109-189
Buick 2179S	.010" T109-29	.025" T109-189
Chrysler (All)	.040" T109-193	.017-.021" T109-44
Nash 2061S	.005" T109-237	.026" T109-189
Nash 2350S	.010" T109-200	.020" T109-29
Pontiac (All)	.040" T109-193	.026" T109-189
Rambler (All)	.010" T109-200	.020" T109-29
Willys (All)	.040" T109-193	.016"

Unl ad r Setting: Hold throttle valve wide open and check choke valve opening or clearance between edge of valve and air horn (see table below). Adjust by bending unloader lip on throttle lever with Tool T109-41.

Unl ad r Setting

Car & Carb.	Choke Opening	Gauge No.
Buick 2081S, SA	3/16"	T109-28
Buick 2179S	1/4"	T109-31
Chrysler 2039SA	7/32"	T109-106
Nash 2061S	11/64"	T109-166
Nash 2350S	3/16"	T109-28
Pontiac 2010S	9/64"	T109-34
Pontiac 719S,SA,720S,SA	1/8"	T109-36
Rambler (All)	3/16"	T109-28
Willys 2204S	1/8"	T109-36

Thr ttle Valv S tting: Check when overhauling carburetor.

Throttl Valve Setting

Car & Carb	Idl Valve Opening	Vacuum Spark Port
Buick (All)	②.057-.063"	①.010-.014"
Chrysler (All)	②.136-.140"	②.035-.041"
Nash (All)	②.117-.123"	②.033-.038"
Pontiac (All)	②.122-.128"	②.052-.058"
Rambler 2350S,2586S	②.117-.123"	②.033-.038"
Rambler 2887S, SA	②.095-.101"	②.028-.038"
Willys	②.125-.131"	②.027-.037"

① - Bottom of port above top edge of valve.
② - Top of port above top edge of valve.

Car Starter Setting: (Buick 1954) - With transmission in neutral, apply parking brake and make sure throttle linkage and dashpot correctly adjusted. Back off throttle stopscrew, disconnect throttle connector rod and rotate fast idle cam to slow idle position, then close throttle valves. Place a scale against choke unloader arm on throttle lever and make a mark on carburetor body at the 1" point on scale. Turn on ignition and open throttle slowly while holding end of scale against unloader arm. Note point at which starter drive pinion just engages flywheel. Scale should read between 1 15/16" and 2 5/16" at reference mark on carburetor (15/16" to 1 5/16" travel of arm). If switch timing too early, remove shims. If switch timing too late, add shims. *NOTE - Shims are added or removed on guide block under contact spring. Do not use less than one .018" shim or more than three .018" shims plus two .006" shims.*

Buick (1955)—Place transmission selector lever in neutral and apply parking brake. Back off throttle stop screw, rotate fast idle cam to slow idle position, fully close throttle valve. *(NOTE (Dynaflow Cars)*—Dashpot must not interfere with full closing of throttle.) Place scale against rear face of lower arm of throttle lever which contacts dashpot, with scale resting on rocker arm cover. Mark rocker arm cover at front edge of scale (throttle valve fully closed). Turn "IGN" switch ON, slowly open throttle, mark cover again at point where cranking motor is energized. Timing is correct if distance between marks on rocker arm cover is 29/32—1 7/16". Adjust by changing number of shims. Reset idle speed to 450 RPM (engine hot) and recheck adjustment of throttle linkage and dashpot.

OVERHAUL: ***NOTE—On carburetors equipped with Car Starter or Dashpot, remove these units as follows:***

Car Starter Removal (Buick Carburetors)—Disconnect and tape leads on switch terminals. Take out switch terminal cap attaching screw, hold-down clip, switch cap. Withdraw return spring, guide block and contact spring assembly, switch plunger, and ball.

Dashpot Assembly—Take out attaching screws and lift dashpot assembly off carburetor.

Disassembly: Disconnect and remove throttle connector rod, disconnect fast idle rod from choke lever. Take out screws fastening air horn, lift off air horn assembly (see Air Horn disassembly below). Take out two attaching screws in dust cover, remove dust cover and gasket. Remove fuel inlet strainer cover nut and remove strainer. Take out bowl cover attaching screws and remove bowl cover assembly *(CAUTION*—lift bowl cover straight up to avoid damaging parts on underside of cover). See Bowl Cover disassembly below. Remove spring from accelerating pump cylinder. On Chrysler carburetors, lift out vacuum piston, spring, and gasket from vacuum piston cylinder. On all other carburetors, remove the vacuum piston spring (piston pulls out with cover assembly). Unscrew and remove metering rod jets (use Tool T109-58 or wide bladed screwdriver which will engage both slots in jet). Take out attaching screw in pump discharge jet cluster, remove cluster and gasket. Remove pump relief valve plug assembly and gasket. Remove intake check valve retainer in bottom of pump cylinder, invert carburetor body and catch pump discharge check needle and intake ball as they drop out. Remove pump intake strainer (if used). Take out four screws attaching throttle body, lift off throttle body and gasket. See Throttle Body disassembly below. ***CAUTION—DO NOT attempt to remove main Discharge Nozzles (nozzles are permanently installed in body).***

Throttle Body—On Buick carburetors, see Car Starter data (above) for removal of these parts. Remove both idle adjusting screws and springs. Remove both idle port rivet plugs (use Rivet Extractor Tool T109-43). DO NOT remove throttle valves and shafts unless replacement of parts required. To remove these parts, first mark both valves (to insure re-installation in same carburetor barrel), take out attaching screws and remove valves. Take out screw on end of throttle shaft, remove lever and washer. Remove shaft retainer ring or use rawhide mallet to tap shaft out through retainer, remove shaft and lever assembly. Remove fast idle cam and trip lever mechanism.

Bowl Cover—Unhook and remove both metering rods *(CAUTION*—use care not to bend or otherwise damage the rods), do not lose metering rod discs (when used). Unhook vacuum piston from link (on Chrysler carburetors, piston is not attached to link but it will be necessary to compress link spring and retainer, remove brass pin from end of link, then remove retainer and link spring). Lift vacuum piston link out. Push float fulcrum pin out, remove float assembly, remove intake needle from float lever (types where needle clipped to float lever). Remove fuel intake needle seat and gasket. Unscrew both low speed jets (use T109-76 wrench). Remove cover gasket. Remove hairpin clip from pump connector link, remove link, remove pump plunger assembly. If pump arm countershaft requires removal (for parts replacement), loosen screws in metering rod and pump arms, take out pin spring in end of countershaft, pull countershaft and lever assembly out and at the same time lift out the metering rod arm and pump arm.

Air Horn—Remove retainer screws and retainers, remove choke housing and coil assembly, gasket, and baffle plate. Remove lever from end of choke shaft. Take out attaching screws and remove choke valve. Rotate shaft to disengage vacuum piston from cylinder, withdraw shaft and piston assembly.

►***CHRYSLER THERMOSTATIC COIL HOUSING CAUTION:*** Thermostatic coil, heat retainer plate, and housing are serviced as an assembly. Coil and heat retainer plate can be removed from housing for cleaning by hitting assembly sharply against palm of hand with coil side down.

Cleaning & Inspection: Wash all parts except thermostatic coil and housing assembly in suitable cleaning solvent. Blow out all passages and dry with air. Make certain that all gum and carbon deposits removed, particularly from carburetor barrels at throttle valves and idle ports. Inspect all parts for wear or damage.

Reassembly: Use all NEW gaskets. Install parts in reverse order of disassembly procedure and note the following important instructions:

CONTINUED ON NEXT PAGE

CARTER "WCD" (C nt.)

Throttle Valve Installation—Insert throttle shaft in throttle body, install shaft retaining ring on end of shaft with prongs outward, press ring on shaft so that it is snug fit against body without endplay in shaft. Install throttle valves with trademark ("c" in circle) on idle port side and facing downward toward manifold side, insert throttle valve screws loosely. Close throttle fully, center both valves in carburetor barrels, hold valves firmly in place while supporting screw heads on a steel block.

Pump Jet Assemblies—Use loader tool T109-122U to install pump intake check ball and retainer in pump cylinder (place ball and new retainer in small end of tool sleeve, tap sleeve to seat retainer in pump cylinder recess). Place pump discharge check needle with tapered end down in passage in main body, install pump discharge cluster with new gasket, tighten screw securely. Install pump relief valve plug and gasket.

Accelerating Pump, Metering Rod & Vacuum Piston Assembly—Install vacuum piston link in bowl cover with lip at center opening pointing toward outer side of cover *(CAUTION*—use care not to distort metering rod spring). Install piston on lower end of link on all carburetors except Chrysler (NOTE—On Chrysler, install link spring and retainer on link, compress spring and install brass pin in end of link, install vacuum piston in main body). Coat pump operating countershaft with light graphite grease and insert it through hole in bowl cover and through metering rod arm and pump arm (hold metering rod arm so that it engages opening in piston link and pump arm so that it extends over pump plunger), install pin spring in groove in end of countershaft. Center pump arm over pump plunger rod and tighten setscrew temporarily, install pump link in plunger rod and pump arm with ends of link pointing toward countershaft arm and secure with pin spring. After bowl cover installed and pump connector rod installed, adjust pump stroke (see ADJUSTMENTS). Install metering rods, inserting end of each rod through hooked end of metering rod spring and entering metering rod in metering rod jet, rotate rod eye over pin on piston link, adjust metering rods (see ADJUSTMENTS).

Automatic Choke Assembly—Install choke shaft, link, and piston assembly in air horn, rotate shaft to enter piston in cylinder. Install choke valve on shaft with trademark on valve ("c" in circle) upward, install new screws loosely, then close choke valve and tap it gently to center the valve, tighten screws securely. Check for uniform clearance at edges of valve and for free operation (valve should open of own weight from closed position). Stake screws lightly while supporting screw heads on a steel block. Install baffle plate and coil housing with a new gasket, place indicator mark on cover downward and install retainers and screws loosely, then rotate housing counter-clockwise until correct setting secured (see ADJUSTMENTS), tighten retainer screws securely.

Service Parts

Gasket Sets - Carter No. 189 (719SA, 720SA, 2122SA), No. 195A (2081S,SA) No. 231 (2010S); No. 237 (2039SA), No. 256 (2179S), No. 258 (2204S), No. 268 (2061S), No. 285 (2350S, 2586S, 2887S, SA).

Re-Carburetion Kits - Carter No. 1507N (719SA, 720SA); No. 1731N (2010S); No. 1747N (2081S, SA); No. 1748N (2039SA), No. 1750N (2122SA, No. 1780N (2179S); No. 1788N (2204S); No. 1807N (2061S); No. 1836N (2350S, 2586S, 2887S, SA).

Zip-Kits - Carter No. 900-3 (2010S); No. 900-9 (2179S); No. 900-17 (719S,SA); No. 900-34 (2081S,SA), No. 900-38 (2061S); No. 900-42 (2122SA); No. 900-50 (2204S) No. 900-73 (2350S, 2586S, 2887S, SA).

CARTER DUAL TYPE WGD

	Carter Carb. No.
BUICK	
1955 Series 40 (Late)	2292S
1956 Series 40 Synchro-mesh	2378S
1956 Series 40 Dynaflow	2400S
1957 Series 40 Synchro-mesh	2529S
1957 Series 40 Dynaflow	2536S
1958 Series 40 Synchro-mesh	2674S
1958 Series 40 Dynaflow (Early)	2675S
1958 Series 40 Dynaflow (Late)	2845S
1959 LeSabre 4400 (S M. Trans.)	2837S
1959 LeSabre 4400 (Auto. Trans.)	2838S
1960 LeSabre 4400 (S.M. Trans.)	2979S, SA
1960 LeSabre 4400 (Auto. Trans.)	2980S, SA
HUDSON	
1954 5D Super Wasp, 7D Hornet	2115S
1955-56 Hornet Six (Std)	2252S
1955-56 Hornet V8	2231S,SA
1956 Hornet Spec V8	2352S
NASH	
1955-56 Ambassador V 8	2231S,SA
1956 Ambassador Spec. V8	2352S
OLDSMOBILE	
1954 Deluxe 88	2058S
PACKARD	
1954 5400 Clipper Special	986S
1954 5401, 5411 Clipper	2102S
1956 5640	2393S
PONTIAC	
1955 V8 Synchro-mesh	2207S,SB
1955 V8 Hydra-Matic	2182S,SA,SB
Replacement Carburetor	2359S
RAMBLER	
1957 V8 Series 5720	2352S,SA
WILLYS	
1954 All (6-226 Eng)	2052S,SA

►CHANGES & CORRECTIONS

►*1957 BUICK PERFORMANCE IMPROVEMENTS (Synchro-mesh Cars with Carter 2529S Carburetor)* Parts listed below are used in later carburetors and can be installed in earlier carburetors to improve performance and correct complaints as indicated

1) Lean Part Throttle Condition at 30-40 MPH - Install parts furnished in Unitized Kit, Carter No. 75-1383U (Buick No. 1180737) as listed below. This pump spring is included in new Pump Plunger, Rod, Spring, & Retainer Assy., Carter No. 64-208S (Buick No. 1180623). This Pump Plunger Assembly will be included in revised Repair Pkgs. and supersedes previous type assembly No. 64-200S.

Carter Unitized Pkg. No. 75-1383U

Part	New No.	Superseded No.
Metering Rods	75-1371	② 75-1348
Pump Plunger Spring Ⓒ	61-601	

Ⓒ - Part of Pump Plunger Assy. No. 64-208S.
② - This rod now 1 Size Lean.

2) Loading During Warm-up Condition - Replace original Vacuum Piston in automatic choke housing with new type, Carter No. 160-122 (Buick No. 1179336), and change Automatic Choke Setting to 1 Point Lean (was 1 Point Rich). Also set Fast Idle Speed (on engine) to 1800 RPM (was 1500 RPM) as directed below. *NOTE* - Previous type Choke Vacuum Piston, Carter No. 160-157, is continued on 2536S carburetors.

►*1958 BUICK SERIES 40 (AIR COND CARS) LAG IN THROTTLE RESPONSE CORRECTION*· This condition may exist on some cars and is apparent after deceleration with closed throttle at road speeds To improve this condition, install a deflector 2½" x 3½" which should be located with its centerline on centerline of the air cleaner snorkel, and attached to fan shroud with two self tapping screws When the above change is made, also install one step lean metering rods, Carter No 75-1368, in carburetor

►*1960 BUICK EXCESS IDLE SPEED DURING WARM-UP CORRECTION:* May be caused by incorrect fast idle cam. Check to see if fast idle cam is "brass" colored. If not, install fast idle cam, Buick Part No. 1199208, synchro-mesh cars (Carter No. 181-288), Buick Part No. 1199209, automatic transmission cars (Carter No. 181-289). Carburetors date coded L-9 or later have the correct cam.

►*1960 BUICK (2979S & 2980S) CARBURETOR CHANGES FOR IMPROVED HOT WEATHER OPERATION:* Install Unitized Package, Carter No. 118-185U which consists of a new higher metering rod cover, fuel inlet needle and seat assembly, gaskets, and plugs for the external and accelerator pump vent holes. *NOTE - The installation of this kit converts carburetors 2979S & 2980S to 2979SA & 2980SA.*

►*1956 HUDSON & NASH POOR WARM-UP PRODUCTION CHANGE & CORRECTION* The following items were

CONTINUED ON NEXT PAGE

CARTER DUAL TYPE WGD (C nt.)

changed in production and are incorporated in Unitized package Carter No. 75-1271-U, Hudson-Nash No. 311-9897 for installation in earlier carburetors.

Vacuum Pist n Spring (2231S, SA before Code date M-5)- Heavier Vacuum Piston Spring No. 61-332 replaced Vacuum Piston Spring No. 61-226 to improve choke operation, on later carburetors.

M tering R ds (2231S Carbs.)- Metering Rods with .003" smaller power step used starting with Engine Serial Number P-24900.

NOTE - Before installing these parts in earlier carburetors, they should be checked for the following items

1) Choke valve must have minimum of .005" clearance between valve and air horn from full open to full closed position.

2) Choke valve shaft must be free of gum deposits, and operate freely in air horn.

3) Unloader arm must not bind on fast idle link (bend unloader arm to obtain clearance).

4) Baffle must be installed correctly with no bind and choke shaft arm must extend through small circular hole in outer revolving baffle.

5) Choke piston must be free in bore.

6) Choke heat tube must be free of any obstruction.

7) Automatic Choke must be set to specifications, plus or minus one notch.

►***WILLYS 4-WHL. DRIVE UTILITY ROUGH ROAD FLOODING & STALLING CORRECTION (Carter 2052S Carburetors):*** On Utility vehicles only (Truck & Station Wagon), this condition can be corrected by installing special SPRING-LOADED Intake Needle & Seat assembly as listed below and using special **Float Level Setting** (see Float Level). On all other models, regular SOLID Intake Needle and Seat are used.

Intake Needle & Seat Assembly

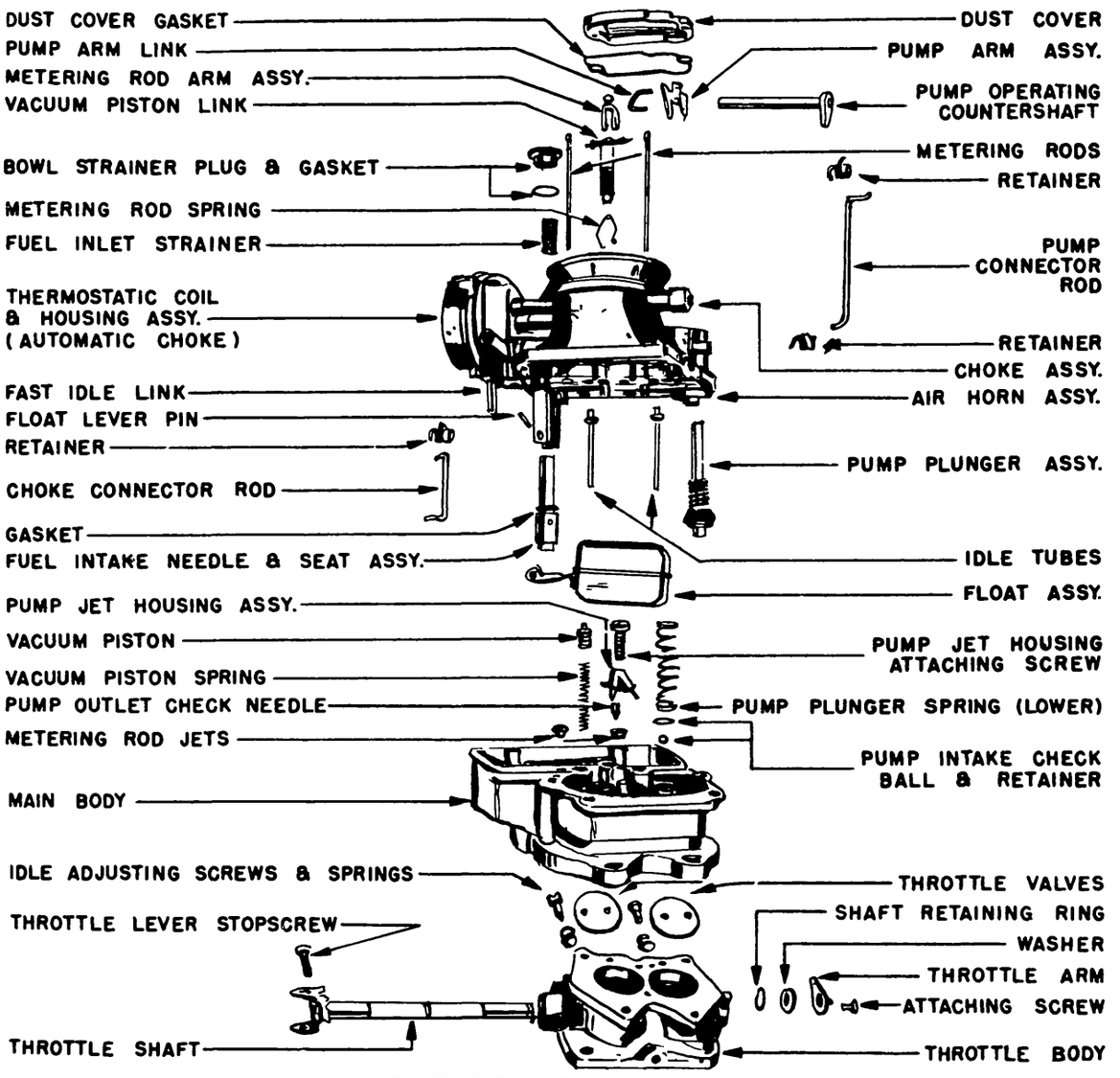
Type	Part No.	Float Level Setting
Solid (Reg. Prod)	25-196S	9/32"
Spring-loaded (spec.)	25-173S	7/32"

DESCRIPTION

DESCRIPTION: Dual downdraft type with vacuum control of metering rods (vacumeter), spring loaded piston type accelerating pump operated by throttle lever, well type non-adjustable anti-percolator, and Automatic Choke and Fast Idle

Fuel System: Consists of Idle (Low Speed) Fuel System, Main (High Speed) Fuel System, and Accelerating Fuel System which operate as follows (Idle & Main Fuel Systems duplicated for each barrel):

Idle Fuel System—Fuel for idling is taken from main nozzle well up through the Idle Tube which meters the fuel and is then mixed with air admitted through idle air bleed opening in air horn. Fuel mixture passes through restricted horizontal passage and additional air is admitted through idle passage bleed opening in air horn. Fuel mixture then flows down through passage to idle discharge ports at throttle edge. For closed throttle idling, all fuel is discharged through lower port below throttle and is controlled by the Idle Adjusting Screw (upper port serves as additional air bleed). As soon as the throttle is cracked open, additional fuel is discharged through upper port also. At higher car speeds idle system drops out and all fuel is discharged by main fuel system.



CARTER TYPE WGD CARBURETORS

Main Fuel System—Fuel enters main well through metering jet and is metered by the metering rod in this jet. Fuel then flows up through main well and is discharged through Main Discharge Nozzle located in throat of primary venturi. Anti-percolator well acts as an air bleed for the main nozzle and this air bleed action is controlled by the size and location of the anti-percolator well vents so that at high speeds practically all back bleeding of air into the system is eliminated.

Anti-Percolator Well Vents—Well is vented through pocket formed by flat on nozzle in high speed passage at inner wall of primary venturi and by restricted opening in air horn at top of well.

ADJUSTMENT & OVERHAUL

IDLING ADJUSTMENT: Adjust only with engine warmed up so that choke valve wide open and engine idling at hot or slow idle speed (Automatic Choke and Fast Idle inoperative). Set throttle stopscrew for correct idle speed, adjust both idle adjusting screws (one for each barrel) so that engine idles smoothly. Screws control fuel mixture and should be turned in for leaner mixture, out for richer mixture. See car model page for complete tune-up data.

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CARTER DUAL TYPE WGD (C nt.)

Idle Screw Setting

Car & Carb.	Idle Screw Opening
Buick 2292S, 2378S	¼-1¼ turns
Buick 2400S, 2529S, 2536S	¼-1½ turns
Buick 2674S, 2675S, 2845S	¾-2 turns
Buick 2837S, 2838S	¾-2 turns
Buick 2979S,SA, 2980S,SA	¼-2 turns
Hudson 2115S	¾-1¾ turns
Hudson 2252S	1¾-2¾ turns
Hudson 2231S,SA	½-1½ turns
Hudson 2352S	1-2 turns
Nash 2231S,SA	½-1½ turns
Nash 2352S	1-2 turns
Oldsmobile 2058S	½-2½ turns
Packard 986S, 2102S	½-1½ turns
Packard 2393S	¾-1¾ turns
Pontiac 2207S,SB	½-1½ turns
Pontiac 2182S,SA,SB	¾-1¾ turns
Rambler 2352S,SA	½-1½ turns
Willys 2052S,SA	½-1½ turns

Idle Speed Setting

Car & Carb.	Engine RPM S.M. Trans.	Auto. Trans.
1954-56 Buick	450	①②450
1957-60 Buick	③485	①③485
1954 Hudson 6	550	⑨500
1955-56 Hudson Hornet 6	⑤540-560	①②490-510
1955-56 Hudson Hornet V8	425	①②425
1956 Hudson Hornet Spec V8	550	⑥425
1955-56 Nash Amb V8	425	①②425
1956 Nash Amb Spec V8	550	⑥425
1954 Oldsmobile	425	⑨400
1954-56 Packard	450-500	⑦450-500
1955 Pontiac	450-475	①②390-410
1957 Rambler	550	⑧ 475
1954 Willys	550	425-450

① - Transmission selector lever in "N" (Neutral)
② - Compressor running on air conditioned cars
③ - 550 RPM on air conditioned cars with Air Conditioner Compressor not operating
⑨ - Transmission selector lever in "DR" (Drive)
⑤ - 575 RPM on Overdrive cars
⑥ - 450 RPM with Air Conditioner Compressor operating
⑦ - Transmission selector lever in "H"
⑧ - 500 RPM with Air Conditioner Compressor operating

DASHPOT ADJUSTMENT (Buick Dynaflow): See *Throttle Linkage Adjustment" on car model pages for dashpot adjustment*

ACCELERATING PUMP: Pump stroke should be checked and adjusted before checking metering rods *NOTE - Pump adjustment is different for various models as follows*

Adjustment (Buick, All Models; Hudson 2252S, 2231S, SA, 2352S; Nash 2231S, SA, 2352S; Oldsmobile 2058S; Packard 2393S; Pontiac 2207S, SB, 2182S, SA, SB, 2359S; Rambler 2352S, SA): Remove dust cover over pump countershaft On Buick (all carbs) and Pontiac 2359S, make certain that pump link is connected in outer (long stroke) hole of pump arm Back off throttle stopscrew so that throttle valves fully closed, then place straightedge across dust cover boss in line with pump arm Top surface of pump arm should be parallel to straightedge Adjust by bending pump rod at upper angle with Tool T109-213

Adjustment (Other Carburetors): Back off throttle lever stopscrew until throttle valves seat in bore Place universal pump gauge, T109-117S inverted on edge of dust cover boss on bowl cover. Turn knurled nut of gauge until finger on gauge touches top of plunger shaft The distance from dust cover boss to top of plunger shaft should be ½", "43" on gauge (except 767S), 15/64", "42" on gauge (767S) Adjust by bending throttle connector rod at upper angle

Metering Rods: *CAUTION - Metering rods should be adjusted after Pump Stroke Adjustment completed No gauge required* Remove dust cover, back off throttle stopscrew so that throttle valves fully closed Loosen clampscrew on metering rod arm on pump countershaft, press down on vacuum piston link until metering rods just bottom in carburetor casting Hold link and rods in this position, revolve metering rod arm until tongue on arm just contacts lip on vacuum piston link, tighten clampscrew

Float Level: Remove bowl cover and float assembly and invert assembly so that float hangs freely with needle valve closed Measure distance from face of bowl cover to top of float at center using gauge listed below Adjust by bending float arm Make certain that float operates freely and that hinge pin clearance is not excessive

Float Alignment - Make certain that side of float is parallel to edge of cover casting and that there is minimum clearance between float lever and air horn lugs Float must operate freely without binding

Float Level

Car & Carb.	Height	Gauge No.
Buick 2292S, 2378S, 2400S	1/4"	T109-31
Buick 2529S, 2536S	17/64"	T109-238
Buick 2674S, 2675S, 2845S	1/4"	T109-31
Buick 2837S, 2838S	1/4"	T109-31
Buick 2979S, 2980S	1/4"	T109-31
Hudson 2115S	3/16"	T 109-28
Hudson 2252S	9/32"	T109-126
Hudson 2231S,SA, 2352S	1/4"	T109-31
Nash 2231S,SA, 2352S	1/4"	T109-31
Oldsmobile 2058S	1/4"	T109-31
Packard 986S, 2102S	13/64"	T109-39
Packard 2393S	3/16"	T109-28
Pontiac 2207S,SB, 2182S,SA,SB	7/32"	T109-106
Pontiac 2359S	15/64"	T109-32
Rambler 2352S,SA	7/32"	T109-106
Willys 2052S,SA	①	②

① - 7/32" with Spring Loaded Intake Needle & Seat Assembly, Carter No 25-173S 9/32" with regular solid Needle & Seat Assembly, Carter No 25-196S
② - Use Gauge No T109-106 (7/32") T109-126 (9/32")

FAST IDLE: *NOTE - Fast idle adjustment is different on Buick carburetors than on other carburetors as follows*

Fast Idle Linkage Adjustment (Choke Shaft Lever Clearance): Buick (All Carbs.) - On early carburetors (without index mark on fast idle cam) there should be 020" (Gauge T109-29) clearance between lug on outer choke shaft lever and stop on inner choke shaft lever On later carburetors (with index mark on fast idle cam), a slight clearance should exist between tang on fast idle cam and stop on flange casting, and with inner choke shaft lever contacting lug on outer choke shaft lever, align index mark on fast idle cam with adjusting screw To adjust, bend lug on outer choke shaft lever

Pontiac (2359S) - *NOTE - There is no Fast Idle Throttle Valve Clearance adjustment on this carburetor* With choke valve tightly closed and inner choke shaft lever in contact with outer choke shaft lever, center of fast idle screw (throttle stopscrew) must align with index mark on fast idle cam *NOTE - There should be a slight clearance between tang on fast idle cam and stop on flange casting* To adjust, bend lug on outer choke shaft lever with Tool T109-214

Adjustment (Buick): With fast idle screw on high step of fast idle cam, clearance between lower edge of throttle valve and bore of carburetor should be as indicated in table below Adjust by turning fast idle screw

Adjustment (Except Buick): With thermostatic coil housing, gasket and baffle plate removed, crack throttle valve and hold choke valve closed, then close throttle Clearance between throttle valve and bore of carburetor (on side opposite idle ports) should be as indicated in in table below To adjust, loosen locknut on connector rod sleeve and adjust sleeve (Oldsmobile 851S,SA, 2015S), bend choke connector rod at lower angle (all others)

Fast Idle Setting

Car & Carb.	Gauge Size & No.
Buick 2292S, 2378S, 2400S	015" T109-44
Buick 2529S, 2536S, 2674S, 2675S, 2845S	.026" T109-189
Buick 2837S, 2838S, 2979S,SA, 2980S,SA	026" T109-189
Nash 2231S,SA, 2252S	.030" T109-29
Nash 2352S	023" T109-189
Oldsmobile 2059S	.020" T109-29
Packard 986S, 2102S	023" T109-189
Packard 2393S	024" T109-189
Pontiac 2182S,SA,SB, 2207S,SB	026" T109-189
Rambler 2352S,SA	023" T109-189
Willys 2052S,SA	018-023" T109-189

UNLOADER: Adjustment procedures are different as indicated below

Adjustment (Buick, All Carbs. & Pontiac 2359S): Hold choke valve lightly closed, then fully open throttle valves which will open choke valve slightly Measure choke valve opening or clearance between upper edge of valve and air horn wall (see table below)

Adjustment (Exc. Buick Carburetors & Pontiac 2359S): With thermostatic coil housing, gasket and baffle plate removed, hold throttle valves wide open and close choke valve as far as possible without forcing Clearance between top edge of choke valve and inner wall of air horn should be as indicated in table below To adjust, bend arm on choke trip lever (773S, 776S, 2115S, 999S,

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CARTER DUAL TYPE WGD (Cont.)

2052S,SA, 851S,SA, 2015S, 767S, 784S, 986S, 928S, 2102S), bend choke shaft unloader arm (2231S,SA, 2352S, 2058S, 2182S,SA,SB, 2207S,SB), bend unloader arm on choke piston lever (2393S) Use bending tool indicated below

►*BENDING TOOL NOTE (Unloader Adjustment)* Use Bending Tool T109-187 (Hudson 773S, 776S, Packard 767S) Tool T109-214 (Hudson 2115S, Oldsmobile 851S,SA, 2015S, Packard 784S, 928S, 986S, 2102S) Tool T109-105 (Hudson 2252S, 2231S, Nash 2231S, Oldsmobile 2058S) Tool T109-213 (Hornet, Nash & Rambler 2352S, Packard 2393S, Pontiac 2207S,SB, 2182S,SA,SB)

Unloader Setting

Car & Carb	Gauge Size & No
Buick 2292S, 2674S 2675S, 2845S	3/16" T109-28
Buick 2378S, 2400S	5/32" T109-154
Buick 2529S	9/64" T109-34
Buick 2536S	11/64" T109-166
Buick 2837S, 2838S	3/16" T109-28
Buick 2979S,SA, 2980S,SA	7/32" T109-106
Hudson 2115S	5/32" T109-154
Hudson 2252S	7/32" T109-106
Hudson 2231S,SA, 2352S	3/16" T109-28
Nash 2231S, SA, 2352S	3/16" T109-28
Oldsmobile 2058S	7/32" T109-106
Packard 986S, 2102S	1/8" T109-36
Packard 2393S	1/8" T109-36
Pontiac 2182S,SA,SB, 2207S,SB	5/32" T109-154
Pontiac 2359S	1/8" T109-36
Rambler 2352S	3/16" T109-28
Willys 2052S,SA	9/64" T109-34

AUTOMATIC CHOKE: Carter Climatic Control

Choke Setting

Car & Carb	Choke Setting
Buick 2292S, 2378S, 2400S, 2675S, 2845S	Centered
Buick 2529S, 2674S, 2837S	1 Pt Lean
Buick 2838S, 2979S, SA, 2980S, SA	Centered
Hudson 2252S, 2352S	Centered
Hudson 2115S	2 Pts Lean
Hudson 2231S,SA	1 Pt Rich
Nash 2231S, SA	1 Pt Rich
Nash 2352S	Centered
Oldsmobile 2058S	Centered
Packard 986S, 2102S	1 Pt Rich
Packard 2393S	2 Pts Rich
Pontiac 2207S,SB	1 Pt Rich
Pontiac 2182S,SA,SB	1 Pt Lean
Pontiac 2359S	Centered
Rambler 2352S,SA	Centered
Willys 2052S	2 Pts Rich
Willys 2052SA	Centered

THROTTLE VALVE SETTING: To check throttle valves, back off throttle stopscrew so that valves tightly closed. Check Idle Port Opening (above top edge of valve), and Vacuum Spark Port (Distance from top edge of valve to top of port) as follows:

Throttle Valve Setting

Car & Carb	Idle Port	Vacuum Port
Buick 2292S,2378S,2400S	077- 083"	⊘ 010- 016"
Buick 2529S, 2536S	087- 093"	⊘ 010- 016"
Buick 2674S, 2675S, 2845S	087- 093"	⊘ 010- 016"
Buick 2837S, 2838S	⊥ 087- 093"	⊘ 010- 016"
Buick 2979S, SA	⊥ 087- 093"	⊘ 010- 016"
Buick 2980S, SA	⊥ 134- 140"	⊘ 010- 016"
Hudson 2115S	157- 163"	⊥ 020- 030"
Hudson 2252S	112- 118"	⊥ 028"
Hudson 2231SA, 2352S	109- 115"	⊥ 018- 024"
Hudson 2231S	109- 115"	⊥ 038- 044"
Nash 2231S	109- 115"	⊥ 038- 044"
Nash 2231SA, 2352S	109- 115"	⊥ 018- 024"
Oldsmobile 2058S	109- 115"	⊥ 028"
Packard 986S, 2102S	135- 141"	⊘ 103- 105"
Packard 2393S	109- 115"	⊘ 000- 006"
Pontiac 2207S,SB	139- 145"	⊥ 040- 050"
Pontiac 2182S,SA,SB	139- 145"	⊥ 029- 039"
Rambler 2352S,SA	109- 115"	⊥ 018- 024"
Willys 2052S,SA	117- 123"	⊥ 020"

⊥ - Above top edge of valve with valve tightly closed
⊘ - Bottom of port above upper edge of valve with valve tightly closed
⊙ - Top of port above top edge of valve

CARBURETOR OVERHAUL: With carburetor removed from engine, disassemble, clean, and inspect all parts as follows:

Disassembly: Remove dust cover on bowl cover by taking out two attaching screws, disconnect fast idle connector rod and pump connector rod at both ends. Take out eight bowl cover and air horn attaching screws, lift air horn straight up and remove from main body casting (CAUTION—use extreme care not to damage float and jets installed in cover). Disassemble these parts as follows:

Air Horn & Bowl Cover—Remove float by taking out float hinge pin and unhooking intake needle pull clip, remove intake needle seat. Loosen setscrews on metering rod arm and pump arm, slide countershaft out of housing. Lift out metering rod arm, pump arm, pump plunger assembly, vacumeter piston and link, and metering rods, remove cover gasket Unscrew low speed jets (Idle Tubes). Loosen clampscrew and remove choke shaft lever, take out attaching screws and remove choke valve. Take out three attaching screws, remove automatic choke cover and thermostatic coil assembly (rotate cover counterclockwise to free coil hook), remove gasket and baffle plate. Revolve choke shaft until piston clears vacuum cylinder, remove shaft and piston assembly. Take out three self-tapping screws and remove piston housing assembly from air horn casting, lift out piston housing gasket.

Main Body Casting—Take out attaching screw and remove pump jet cluster and gasket. Invert casting and catch vacumeter spring, pump discharge needle, and lower pump spring. Remove metering jets, pump relief valve assembly, and pump intake strainer. Use tool T109-56 to remove retainer ring from bottom of pump cylinder, remove pump intake check ball (under retainer ring). Take out attaching screws and remove throttle flange assembly.

►***CAUTION—Do not attempt to remove main nozzles from body casting (permanently installed in casting).***

Throttle Flange Casting—Take out attaching screw and remove pump lever from throttle shaft, remove throttle shaft retaining ring, take out attaching screws and remove throttle valves. Slide throttle shaft and lever assembly out Remove fast idle cam assembly. Remove idle adjusting screws and springs, and idle port plugs.

Cleaning & Inspection: Wash all parts in solvent or approved carburetor cleaner, dry with air, blow out all channels and passages with compressed air Remove carbon from flange casting bore with sandpaper (CAUTION—do not use emery cloth). Examine vacuum cylinder in automatic choke housing for dirt and carbon accumulation (if necessary, remove welch plug from base of vacuum cylinder by drilling small hole in plug and using nozzle puller T109-178 to remove plug, install new plug after cleaning cylinder). Replace all worn or damaged parts. Use all new gaskets when reassembling carburetor.

Reassembly: Reassemble carburetor by reversing disassembly directions and note the following important instructions:

Throttle Valve Installation—Back off throttle lever stopscrew, install throttle valves with trademark (small "C") toward idle ports when viewed from manifold side of casting, insert screws loosely, hold valves firmly in place with fingers and tap valves lightly to centralize them in bores, hold lever end of shaft against flange casting boss, tighten valve screws securely. Then install new retaining ring on shaft.

Pump Jet Assembly—Install pump discharge needle first (insert with point downward), use new gasket under pump jet cluster, tighten retaining screw securely. Install pump relief valve assembly. Drop pump intake ball into recess in pump cylinder, use tool T109-122U to install retainer ring.

Pump Plunger & Arm Assembly—Assemble pump link on pump countershaft arm and install pin spring retainer. Insert pump plunger stem in place in bowl cover, slide lower end of link through hole in upper end of plunger stem and revolve ½ turn. When installing bowl cover and air horn, see that lower spring installed in pump cylinder, insert pump plunger, hold pump arm in place while inserting countershaft.

Float Assembly—Make certain that intake needle is attached to float arm with pull clip when installing float. Check float level before installing bowl cover and air horn on main body casting.

Metering Rod Jets—Do not use a gasket under these jets.

Metering Rod & Vacumeter Assembly—Install metering rod spring in vacuum piston link and install vacuum piston spring in cylinder in main body

CONTINUED ON NEXT PAGE

CARTER DUAL TYPE WGD (C nt.)

casting. Install vacuum piston link through slot in bowl cover with lip on link pointing toward air horn. Install vacumeter piston on link with pin extending toward air horn. When installing bowl cover and air horn on body casting guide vacumeter piston into vacuum cylinder in body casting. Hold pump arm in position and slide countershaft in through arm and support in casting, then hold metering arm in position with lip on arm extending through slot in vacumeter link and slide countershaft through arm. Install throttle connector rod and retainers. Install both metering rods (CAUTION—see that rods enter metering jets), connect metering rod spring. Check assembly for free movement by pressing down on vacumeter link.

Choke Assembly—Make certain that new gasket installed in hot air passage in air horn, install piston housing assembly (CAUTION—attaching screws are self-tapping type and must be pulled down securely but with care not to strip threads). Install choke valve shaft and piston, rotating shaft to enter piston in cylinder. See that tapered edges of choke valve seat in air horn, hold valve with fingers and tap with screwdriver to centralize valve before tightening attaching screws. Check valve for free movement (valve should open freely of own weight). When assembling automatic choke mechanism, install flat baffle plate first (with choke lever prong extending through slot in plate), then install extruded baffle plate, gasket, cover and thermostatic coil assembly.

Starter Switch (not used on all Carburetors)—Install switch strainer in recess in throttle body, install switch ball, switch plunger (notch up), guide block, and "W" shaped switch contact spring (CAUTION re-install adjusting shims under contact spring). Install switch return spring, terminal cap assembly, hold-down clip and attaching screw.

Car Starter Switch Adjustment (Carburetor Off Engine):
Buick 1955 - Connect a test lamp across switch terminals so lamp will light when switch makes contact. Block choke valve open so fast idle cam is at slow idle position, then back off throttle stopscrew to fully close throttle valve. While holding throttle valve fully closed, hold a scale against choke unloader arm of throttle lever and make a pencil mark on fuel bowl at opposite side of scale. Slowly open throttle valve while holding scale in position against unloader arm. At point where test lamp lights, make a second mark on bowl. Distance between marks on float bowl should be 15/16" to 1 5/16" if switch is correctly timed. Adjust by adding or removing shims.

Buick 1956-60 - Connect a test lamp across switch terminals so lamp will light when switch makes contact. Block choke valve open so fast idle cam is in slow idle position, then back off throttle stopscrew to fully close throttle valve. While holding carburetor in normal upright position, insert a ¼" drill between wall of throttle body and lower edge of one throttle valve at center. With valve closed against drill, the switch should make contact and light the test lamp. Remove drill and insert a 7/64" drill in same position. With valve closed against drill, switch should open so test lamp goes out. Adjust switch timing by adding or removing shims.

Car Starter Switch Adjustment (Carburetor On Engine):
Buick 1955-56 S.M. & Auto. Trans. Cars - Back off throttle stopscrew and rotate fast idle cam to slow idle position, then fully close throttle valve. *NOTE - On Dynaflow cars, make sure that dashpot will not prevent full closing of throttle valve.* Hold a scale or straightedge against rear face of lower arm of throttle lever that contacts dashpot, so scale rests on rocker arm cover. With throttle valve fully closed, make a pencil mark on rocker arm cover at front edge of scale. With ignition switch turned on, slowly open throttle while holding scale in position against throttle lever. At point where cranking motor is energized, hold throttle lever and make a second mark on rocker arm cover at front of scale. If vacuum switch is correctly timed, then distance between pencil marks on rocker arm cover will be 29/32" to 1 7/16" (1955); 3/4" to 1 1/8" (1956). Adjust switch timing by adding or removing shims under contact spring.

Buick 1957-60 Automatic Transmissi n Cars - *NOTE - On synchro-mesh cars it is n cessary to remove carburetor from engine to check start r switch timing.* Place transmission selector lever in Park and apply parking brake. Back off throttle stopscrew so that throttle valves tightly closed (fast idle cam must be in hot or slow idle position). Place a scale against flange on dashpot diaphragm and measure distance to nearest edge of dashpot arm on throttle lever. Turn ignition on and open throttle slowly. At point where starter is energized, again measure distance to nearest edge of dashpot lever. The difference between the two measurements should be 5/8" to 15/16" (1957); 1 1/16" to 1 5/8" (1958); 9/16" to 7/8" (1959-60). Adjust switch timing by adding or removing shims under contact spring.

Service Parts

Gasket Sets: Carter No. 196 (986S, 2052S,SA, 2102S, 2115S); No. 249 (2058S, 2231S,SA, 2252S, 2393S); No. 254 (2182S,SA,SB, 2207S,SB); No. 274 (2292S, 2400S, 3378S); No. 289 (2352S); No. 305 (2529S, 2536S, 2674S, 2675S, 2837S, 2838S, 2845S); No. 314 (2359S), No. 339 (2979S, SA, 2980S, SA).

Re-Carburetion Kits: Carter No. 1755N (2058S); No. 1759N (2052S,SA); No. 1765N (2102S); No. 1777N (2182S,SA,SB); No. 1778N (2207S,SA); No. 1802N (2231S,SA); No. 1823 (2292S, 2378S); No. 1824N (2400S); No. 1831N (2393S); No. 1843N (2352S,SA); No. 1867N (2529S); No. 1868N (2536S); No. 1939N (2674S); No. 1940N (2675S, 2845S); No. 1966N (2837S); No. 1967N (2838S); No. 5006N (2979S,SA); No. 5007N (2980S,SA).

Zip-Kits: Carter No. 900-7 (2292S, 2378S, 2400S); No. 900-8 (2529S); No. 900-28 (2182S,SA,SB, 2207S,SB); No. 900-37 (2536S); No. 900-41 (2231S,SA); No. 900-56 (2058S, 2674S, 2675S, 2845S); No. 900-63 (2837S, 2838S); No. 900-85 (2115S); No. 900-86 (986S, 2102S); No. 900-87 (2052S,SA); No. 900-109 (2979S,SA, 2980S,SA).

CARTER "WE"

STUDEBAKER	Carter Carburetor No.
1954 Early Champ. 15G①	989SA
1954 Later Champ. 15G②	2108S
1954 Custom Champ. 15G	2190S
1955 Champ. 16G6	2108S
1956 Champ. 56G (Early)	2108S
1956 Champ. 56G (Late)	2417S
1957 Champ. 57G	2417S
1957 Silverhawk 6	2417S
1958 Champ. 58G	2417S
1958 Silverhawk 6	2417S

①—Before Serial No. 1099741.
②—Beginning Serial No. 1099741.

DESCRIPTION: Single barrel downdraft type with Carter Climatic Control (Automatic choke), Fast Idle, Anti-percolator, and throttle lever operated Accelerating Pump.

Model 2108S - Idle system has various changes (Key-hole slot idle port, reduced size economizer, air bleed, and by-pass; shorter idle tube with larger diameter metering hole). Accelerating pump plunger is longer (not interchangeable with previous type) and stroke occurs lower in cylinder which prevents entrance of air.

Model 2190S - Same design as 2108S except that different Metering Rod used. See Jet Specifications.

Thr ttl B dy H ating—Holes provided in throttle body and intake manifold by which exhaust gases are transmitted from the exhaust manifold to the heating passages in the throttle body when the manifold heat valve is closed. This prevents possiblility of ice forming at the throttle valve during the engine warm-up period. Heating action in throttle body diminishes as the manifold heat control valve opens.

ADJUSTMENT: *S t thes carburetors to the following specifications:*

IDLING ADJUSTMENT

Idle Scr w Setting - ½-1½ turns open. Turn screw out for richer mixture. Adjust only with air cleaner in place and with engine at normal operating temperature (choke valve open, fast idle inoperative).

Idl Sp ed Setting

Car Mod l	Idle Speed
Studebaker (All Synchro-mesh)	550-600 RPM
Studebaker (All Auto. Trans.)	①550 RPM

① - Transmission selector lever in "N" or "P".

ACCELERATING PUMP SETTING

Pump Str ke S tting - Check pump travel after carburetor has been reassembled. Back off throttle stop-screw so that throttle valve tightly closed, remove dust cover. Install Pump Gauge T109-117S on bowl cover with lip of gauge extending over plunger shaft and gauge held vertically, turn nut on gauge until lip contacts top of plunger shaft, note gauge reading. Open throttle wide and again note gauge reading. Difference in two readings should be 14/64". Adjust by bending throttle connector rod at lower angle using T109-213 bending tool.

METERING ROD SETTING

Checking & Adjustment - Remove metering rod and install Metering Rod Gauge No. T109-102 (2.468") in place of the rod making certain that gauge seated in metering rod jet. With throttle stopscrew backed off so that throttle valve tightly closed, press down lightly on metering rod arm so that upper lip of arm contacts pin in pump arm. At this point, clearance between metering rod pin and shoulder of notch in gauge should be less than .005"and gauge should not contact pin Adjust by bending upper lip of metering rod arm using bending tool T109-105. *Then check and adjust lower (economy) lip as follows:-* Remove gauge,press down on metering rod arm until upper lip contacts pump arm pin. Clearance between pin and upper surface of lower lip should be 3/16" (Float Level Gauge T109-28 can be used). Adjust by bending the lower lip.

ANTI-PERCOLATOR SETTING

Checking & Adjustment - Crack throttle valve open .030" by placing large end of Gauge T109-29 between edge of valve and carburetor wall on side opposite idle port. Clearance between rocker arm lip and pump arm should be .025" (Gauge T109-189 can be used to check this clearance). Adjust by bending rocker arm using bending tool T109-105.

FLOAT LEVEL

Checking & Adjustment - Remove and invert bowl cover assembly so that float in closed position. Measure dis-distance from top of projection on bowl cover to top edge of soldered seam on float using gauge T109-80 (3/8"). Adjust by bending lip on float lever which contacts intake needle.

THROTTLE VALVE SETTING

Idle Port Opening - Top of lower idle port should be .112-.116" above upper edge of throttle valve.

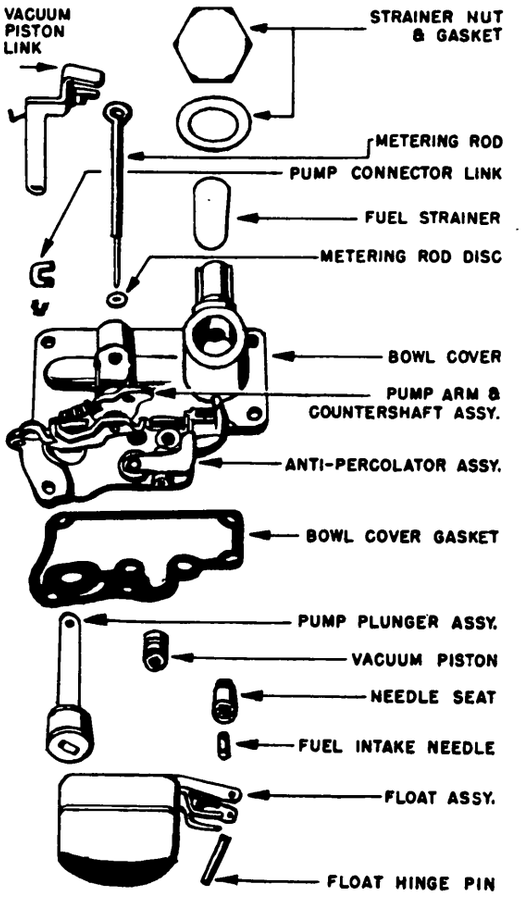
Vacuum Spark Port - Top of port should be .060-.070" above upper edge of throttle valve.

FAST IDLE SETTING

Checking & Adjustment - With thermostatic coil housing, gasket, and baffle plate removed, crack throttle valve to allow choke valve to close, close choke valve, move throttle valve toward closed position as far as possible. Check remaining throttle valve opening which should be .046" (.045" end of gauge T109-158 may be used). If opening not correct, adjust by bending choke connector rod at lower angle using bending tool T109-213. Then adjust Unloader.

UNLOADER SETTING

Ch cking & Adjustm nt - After fast idle adjustment completed, open throttle valve fully, close choke valve as far as possible without forcing. Check remaining choke valve opening using gauge T109-28 (3/16"). If opening not correct, bend arm on choke trip lever (within choke housing) using bending tool T109-214.



"WE" BOWL COVER ASSEMBLY

AUTOMATIC CHOKE SETTING

Setting (All Carburetors) ..... 1 Point Lean

Adjustment - Loosen retainer screws around rim of cover, rotate cover and thermostatic coil assembly clockwise (for leaner setting) or counter-clockwise (for richer setting).

OVERHAUL: Disassembly - Take out attaching screw and remove dust cover from bowl cover. Disconnect choke connector rod from fast idle link and throttle lever and remove rod. Take out air horn attaching screws and lift off air horn assembly, remove gasket. Disconnect throttle connector rod at throttle lever and pump operating lever, remove rod. Remove idle passage

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CARTER "WE" (C nt.)

plug and gasket from bowl cover, take out bowl cover attaching screws, lift bowl cover assembly straight up to remove it from the bowl.

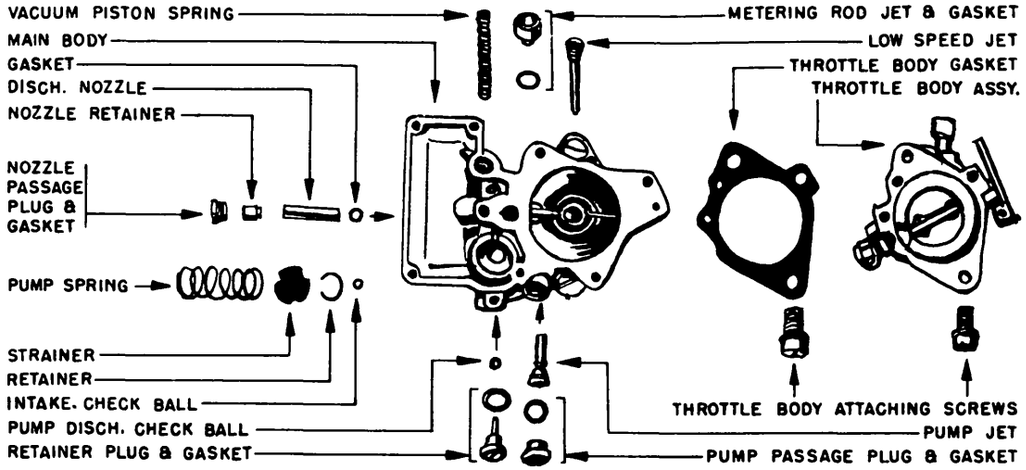
Air Horn Disassembly - Take out retainer screws, remove thermostatic coil housing and gasket. Remove baffle plate (retained by one screw), trip lever, fast idle link. Take out choke valve screws and remove choke valve. Unhook fast idle cam spring from lip on choke shaft, rotate shaft counter-clockwise until choke piston clears cylinder, withdraw shaft and lever assembly, lift fast idle cam off hub on body. Choke piston can be removed from shaft lever link by pushing out piston pin.

Bowl Cover Disassembly - Disconnect and remove pump connector link, slide pump plunger and rod assembly out, remove bowl cover gasket. Unhook vacuum piston from piston link by turning it 90°, then withdraw link and metering rod assembly from cover (*CAUTION* - do not lose metering rod disc). Unhook metering rod spring and remove metering rod from link. Remove plug and gasket at fuel inlet boss, lift out fuel strainer. Remove float lever pin, lift off float assembly and intake needle, remove needle seat and gasket using tool T109-57.

Main Body Disassembly - Lift vacuum piston spring and pump spring out. Remove pump strainer, intake check ball retainer (use tool T109-56), and check ball retainer (use tool T109-56), and check ball from pump cylinder (invert casting to drop ball out). Remove low speed jet, pump discharge passage plug and gasket, pump discharge jet, pump discharge check ball retainer plug and gasket, and discharge check ball (tilt casting to drop ball out). Remove metering rod jet and gasket using tool T109-57. Take out throttle body attaching screws, lift off throttle body and gasket. Remove main discharge nozzle passage plug (tool T109-57), nozzle retainer plug (tool T109-58) and nozzle (use Extractor tool T109-55). *CAUTION*–Make certain that nozzle gasket removed from recess in body.

Throttle Body Disassembly - Take out idle adjusting screws and spring. Do not disturb throttle valve and shaft assembly.

Cl aning & Inspection: Clean all castings and metal parts thoroughly with suitable carburetor cleaner, rinse in solvent, blow out all passages and dry with air. Make certain that all carbon and gum deposits removed. Remove all carbon deposits from heater holes in throttle body (heater holes in manifold should also be thoroughly cleaned). Inspect all parts for wear or damage.



"WE" MAIN BODY & THROTTLE BODY ASSEMBLY

Reassembly: Use all NEW gaskets. Install all parts in reverse order of disassembly procedure above and note following important points:

Main Discharge Nozzle Installation - Use new copper gasket on nozzle and make certain that flat on nozzle is upward. Tighten nozzle retainer plug and passage plug securely.

Throttle Valve Installation–If valve has been removed, use new screws when re-installing. Install valve with trademark up and on idle port side, install screws loosely, then close throttle fully and tap valve lightly to centralize it in bore, then tighten attaching screws securely. Check throttle valve location (see Throttle Valve Setting).

Idle Tube Installation–See that idle tube seats firmly against shoulder in casti ng. When installing air horn gasket, see that idle air bleed hole in gasket is aligned with passage in body casting and air horn (air bleed extends up into air horn to point above choke valve).

Accelerating Pump Assembly–Make certain that pump intake strainer is clean, install intake ball check, retainer, and strainer in pump cylinder (use Tool T109-122U to install retainer), see that pump plunger is not worn or damaged, use loading tool to install plunger in cylinder.

Pump Operating Countershaft Lubrication - Lubricate shaft with No. 3 graphite grease before assembling bowl cover parts.

Choke Valve Installation - After shaft and piston assembly installed in air horn, lock fast idle cam spring around lip of choke lever shaft. Install choke valve with trademark (small "c" in circle) upward, install new screws loosely, center valve by tapping it lightly in closed position before tightening attaching screws. Check for free operation (valve should fall open of own weight).

Thermostatic Coil & Housing Installati n - After fast idle and unloader adjustment completed, install coil housing with indicator mark approximately one-quarter turn clockwise from reference mark on body, then rotate housing counter-clockwise for correct choke setting. *CAUTION* - If housing not installed as above thermostat spring may hook up on hot air tube.

Carburetor Installation–Make certain that special slotted type flange gasket is used when installing carburetor or manifold. *CAUTION*–Metering rod vacuum piston passage terminates in hole on face of mounting flange and passage hole must not be covered by gasket.

Carburetor Adjustments - Make all adjustments listed under ADJUSTMENT above.

SERVICE PARTS

Gasket Set - Carter No. 235 (989S,SA, 2108S, 2190S, 2417S).
Repair Pkg. (With Std. Met ring R d) - Carter No. 1729 (989S,SA); No. 1746 (2108S); No. 1837 (2417S).

CARTER "AS" DOWNDRAFT

	Carter Carbur tor N .
CHECKER SUPERBA	
1959-60 Model A10	2858S
RAMBLER	
1956 (Nash & Hudson)	2349S
1957 Synchro-mesh & Overdrive (Early)	AS 2580S
1957 Synchro-mesh & Overdrive (Later)	AS 2665S
1957 Automatic Transmission (Early)	AS 2564S
1957 Automatic Transmission (Later)	AS 2664S
1958 Series 10 (S.M. & O.D.) Early	2665S
1958 Series 10 (S.M. & O.D.) Late	2749S
1958 Series 10 (Auto. Trans.) Early	2664S
1958 Series 10 (Auto. Trans.) Late	2748S
STUDEBAKER	
1959 Lark 6 Cyl.	© 2876S
1960 Lark 6 Cyl. (Early)	2934S
1960 Lark 6 Cyl. (Late)	2934SA

►CHANGES & CORRECTIONS

►*1956 CARBURETOR FLOAT PRODUCTION CHANGE.* Carburetors with date code B-6 (on brass tag) or later have split type floats See "Float Level" for adjustment of split type float carburetors.

►*1956 CARBURETOR FLOODING (Date Code Before B-6) CORRECTION·* If flooding is eliminated on early carburetors by loosening needle seat (gas line to carburetor fitting), it indicates a bind or interference between float hinge and inner end of float needle seat To correct, install needle and seat assembly, Carter No 25-313S, included in Repair Kit 1816S

►*1957 CARBURETOR INSPECTION & INSTALLATION CAUTION (TO CORRECT FLASH-O-MATIC TRANSMISSION 1-2 SLIPPAGE OR 2-3 PILE-UP IN D1 RANGE).* Vacuum for Transmission Solenoid & Vacuum Control is supplied from carburetor passage which terminates in two ports in carburetor as follows· 1) Vacuum port at throttle edge. 2) In carburetor mounting flange at choke vacuum supply passage. In correcting above transmission complaints, inspect carburetor and observe mounting cautions as follows·

1) Carbur t r Vacuum Ports - Check port at throttle edge for correct size (.0465") and make certain this passage not restricted. With throttle valve tightly closed, t p of this port should be flush with **bottom** edge of throttle valve.

2) Carbur t r M unting Flange & Gasket - Inspect mating surfaces of carburetor flange and manifold for unevenness, burrs, or chipped areas. These surfaces can be cleaned up using crocus cloth on a surface plate. Inspect gasket for swelling at the vacuum port and channel area. See installation below.

3) Carbur t r Installati n - Use new type corbestos gasket, Rambler No. 3153999. *NOTE* - If this gasket not available, No. 3108576 ro 3143932 can be used. Gasket No. 3108576 has four 3/16" holes but these holes will not affect operation.

►*1957 ENGINE SURGE AT STEADY THROTTLE (Early Cars with Carter 2580S Carburetor):* On cars with carburetors code-dated "J-6" or earlier, this condition can be corrected by installing new Metering Rod, Carter No. 75-1366S to replace original rod No. 75-1332S. This new metering rod used in production in later 2580S & 2564S carburetors. *NOTE - Metering rod setting is important and should be check d and adjusted.*

►*1957-58 CARBURETOR REPLACEMENT NOTE:* Only carburetors with transmission vacuum control port will be furnished for service. When used on Synchro-mesh, Overdrive, or later 1958 models with transmission vacuum line connected directly to intake manifold, this port will not be used. Production carburetors used with Synchro-mesh or Overdrive do not have this port.

►*1958 RAMBLER HOT HARD STARTING CORRECTION:* This condition usually occurs after 10 to 30 minutes of engine shut down. If correct carburetor adjustment does not correct the condition, install a 3/16" thick gasket, Part No. 3147641 between the carburetor gasket and manifold cover. *NOTE* - The standard corebestos gasket must be used at carburetor flange side on automatic transmission cars with vacuum control ports in base of carburetor. The new gasket will serve as a heat insulator and prevent heat being transferred to carburetor.

►*1958 RAMBLER AUTOMATIC CHOKE PRODUCTION CHANGE:* To improve choke operation, a new choke thermostatic coil and choke piston is being used in production beginning with Engine No. B-194969 (Std. & O.D. Trans.), No. B-195381 (Auto. Trans.). Carburetors having these changes may be identified by Date Code D-8 or later, stamped on the identification tag. The new choke coil, Carter No. 170AE-61S should be set on index.

►*1959 STUDEBAKER 2876S CARBURETOR PRODUCTION CHANGES FOR IMPROVED PERFORMANCE:* Carburetors identified by green colored tag incorporate the changes listed below (except Choke Vacuum Piston Change). These changes improve performance as indicated.

1) Automatic Choke Thermostatic Coil & Housing Assembly - First type, Carter No. 170AS-61S, replaced by new type, Carter No. 170AN-OOS. Choke setting is unchanged (Centered). New thermostatic coil allows choke valve to open more quickly during warmup and will improve performance.

2) Accelerating Pump Link Revision - New pump link with hardened lower end (to prevent wear at pivot pin hole) and zinc-plated, dichromated finish (to prevent scuffing and sticking) replaced former type plain link. New link may be identified by yellow-green color.

3) Idle System Change - Slotted idle port has been lengthened to improve idle air bleed action.

4) Choke Vacuum Piston - New choke piston, Carter No. 160-138, prevents stalling after cold start by retarding choke valve opening and prolonging fast idle operation during warmup. New piston has one narrow and one wide groove in side (previous type has two equal width grooves) and will be furnished for service.

►*1959 STUDEBAKER IMPROVED WARMUP PERFORMANCE: See data on new Automatic Choke Thermostatic Coil & Housing Assembly listed under Production Changes above.*

►*1959 STUDEBAKER STALLING AFTER COLD START CORRECTION:* On cars with first type carburetor, install new Automatic Choke Thermostatic Coil & Housing Assembly, and also new Choke Vacuum Piston as listed under Production Changes above.

►*1959 STUDEBAKER IMPROVED HOT ENGINE STARTING:* Excessive engine cranking time under conditions of warm engine and high temperatures may be caused by gasoline percolation through pump discharge nozzle while engine is stopped (resulting in flooded engine). Correct by installing new Accelerating Pump Plunger and new Metering Rod as listed below. Pump plunger is vented by ball check to prevent fuel percolation and metering rod has modified end to assist in venting vapor into the bowl. *Check and correct all carburetor adjustments when installing these parts.*

Engine Starting Caution - When starting a warm engine, it is recommended that the accelerator pedal be depressed one-third and held in this position while cranking the engine.

Carter 2876S Parts Change

Part	Studebaker Part N .
Accelerating Pump Plunger	1549786
Metering Rod (Std.)	1549787
Metering Rod (1 Size Lean)	1549796
Metering Rod (2 Sizes Lean)	1549797
Metering Rod (3 Sizes Lean)	1549798

►*1960 STUDEBAKER (2934S CARB.) STUMBLE ON ACCELERATION & ENGINE STOPPING AFTER COLD START CORRECTION:* Install Accelerating Improvement Kit, Studebaker Part No. 1550997 (Carter No. 64-236U) according to instructions furnished with kit. To correct stopping on cold start, install Choke Improvement Kit, Studebaker No. 1550998 (Carter No. 170-673U) according to instructions furnished with kit. *NOTE* - Installation of the above kits will convert carburetor 2934S to 2934SA.

►*1960 STUDEBAKER CARBURETOR 2934S FLAT SPOT (DURING LIGHT TO MEDIUM THROTTLE OPENING)CORRECTION:* Adjust float level to proper specifications and adjust accelerating pump jet so fuel will hit the venturi at its vertical center line at a point 1/8" below top of venturi. Make sure the accelerating pump discharge ball check is seated properly as follows: Remove ball check retainer, then place a small brass rod on top of ball check, and seat ball by striking rod sharply with a light hammer. Check accelerating pump piston spring. If spring is silver colored, replace spring with Part No. 518820 (copper color).

DESCRIPTION: Single barrel downdraft type with automatic choke and fast idle. Fuel for idle and early part throttle operation is supplied through low speed circuit. Fuel for part throttle and full throttle operation is supplied through high speed circuit. 1957 & Early 1958 Rambler carburetors used on cars with automatic transmission have additional vacuum port at throttle edge for transmission control. On later Rambler models, the vacuum line for transmission control is taken directly from intake manifold.

Low Speed Circuit - Gasoline enters idle well through metering rod and step up jets. Low speed jet measures amount of fuel for idle and early part throttle operation. Air by-pass, economizer, and idle air bleed are calibrated and break up liquid fuel mixing it with air prior to its reaching idle and idle adjusting screw ports.

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CARTER "AS" DOWNDRAFT (C nt.)

High Sp d Circuit - Position of metering rod in metering rod jet, and step up rod in step up jet, controls amount of fuel admitted to high speed nozzle *NOTE* - Metering rod is larger in diameter at its lower end As throttle is opened, metering rod moves downward and more fuel will flow through metering rod jet. Vacuum at vacuum piston controls position of step up rod Step up rod is held in down position by manifold vacuum overcoming step up piston spring tension, metering fuel around large diameter of step up rod in step up rod jet When vacuum drops, spring tension moves rod out of jet into power position. *NOTE* - There is no adjustment for step up rod. Permanently installed anti-percolating plugs or bushings and passages prevent vapor bubbles in nozzle passage and low speed well by venting vapors and relieving pressure so fuel is not pushed out nozzle

ADJUSTMENTS: Set these carburetors to the following specifications:

Idling Adjustment: Warm up engine thoroughly, so that choke valve is wide open and fast idle inoperative. See table for idle screw setting. Turn screw out for richer mixture. See car model pages for complete tune-up data.

Idle Mixture Setting

Car & Carb.	Idle Screw Setting
Checker 2858S	½-1¾ turns
Rambler 2349S	¼-1½ turns
Rambler (Others)	¼-1¼ turns
Studebaker (All)	¼-1¾ turns

Idle Speed Setting

Car & Carb.	Synchro-mesh	Auto. Trans.
Checker (All)	400 RPM.	①400 RPM
Rambler (All)	550 RPM	①②475 RPM
Studebaker (1959)	550 RPM	①550 RPM
Studebaker (1960)	550 RPM	①575-590 RPM

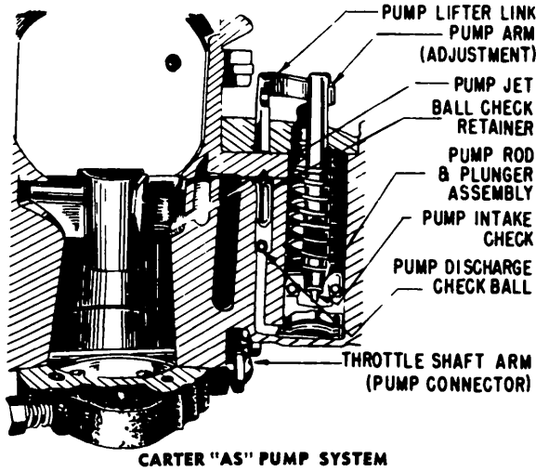
① - Automatic transmission in "N" or "P" position
② - Air conditioned cars 500 RPM with air conditioner ON

Float Level *NOTE - Split type floats used on all carburetors after 1956 code date B-6 (see Production Change above)* Remove bowl cover, gasket, and float pin retainer Check each float separately while holding lip of float arm against seated needle *CAUTION - Float pin must be at bottom of guide slots* Place gauge squarely on top of bowl edge at free end of float Ridge on top of float should just contact step on gauge Adjust by bending lip on float arm Make certain that floats clear sides of bowl Adjust by bending float arms as necessary Install float pin retainer, invert carburetor so that both floats rest against seated needle Clearance between overlapping tangs on float levers should be .010-.015" Adjust by bending long tang on left hand float Recheck float level

Float Setting

Car & Carb.	Checking Gauge	Float Setting
All Models	T109-282	1/4"

Pump Adjustment: Top of pump arm that engages slot in pump shaft must be parallel to top surface of bowl cover with throttle in wide open position Adjust by bending pump arm up or down as necessary.



CARTER "AS" PUMP SYSTEM

Metering Rod Adjustment: With throttle wide open, metering rod should just bottom in carburetor casting. To adjust bend metering rod arm. When metering rod is properly adjusted, some movement can be noted around eye of metering rod retainer clip when throttle is moved slightly from wide open position. If rod is too low, it will tend to push metering rod retainer clip up. If rod is too high, it will be possible to push rod down.

Fast Idle Adjustment: Remove thermostat coil housing, gasket and baffle plate. Crack throttle valve and hold choke valve closed to rotate fast idle cam to fast idle position. Close throttle. Measure clearance between throttle valve and bore of carburetor (side opposite idle port) using gauge listed in table below Adjust by bending choke connector rod at lower angle using bending tool T109-213

Fast Idle Speed - With correct fast idle adjustment, fast idle speed should be 1600-1800 RPM (Hot)

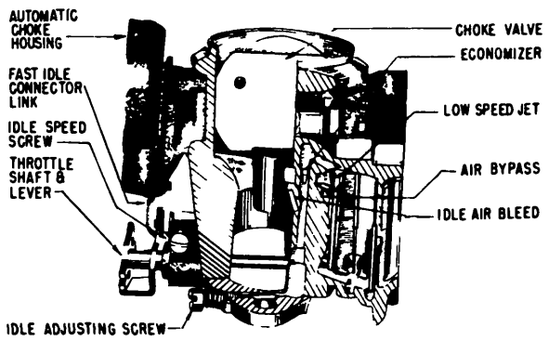
Fast Idle Setting

Car & Carb.	Checking Gauge	Throttle Opening
Checker 2858S	T109-29	.030"
Rambler 2349S	T109-158	.043"
Rambler (Others)	T109-29	.030"
Studebaker 2934S, SA	T109-234	.065"
Studebaker 2876S	T109-158	.045"

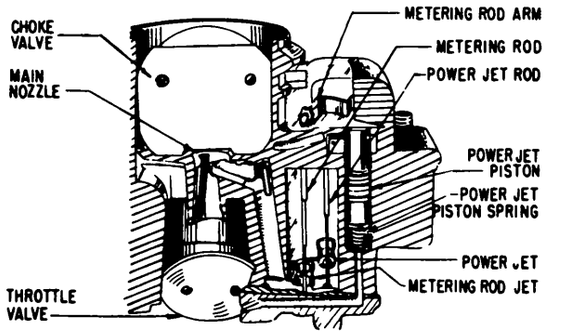
Unloader Adjustment: Hold throttle valve wide open and close choke valve without forcing it Measure clearance between upper edge of choke valve and inner wall of carburetor air horn See table below. To adjust, bend choke shaft unloader arm

Unloader Setting

Car & Carb.	Checking Gauge	Choke Opening
Checker 2858S	T109-34	9/64"
Rambler 2564S, 2580S	T109-34	9/64"
Rambler (Others)	T109-28	3/16"
Studebaker (All Models)	T109-28	3/16"



CARTER "AS" LOW SPEED SYSTEM



CARTER "AS" HIGH SPEED SYSTEM

Automatic Choke: Different setting required See below

Automatic Choke Setting

Car & Carb.	Setting
Checker 2858S	1 Point Rich
Rambler 2349S	1 Point Lean
Rambler 2564S, 2580S	2 Points Rich
Rambler 2664S, 2665S	2 Points Rich
Rambler 2748S, 2749S ①	2 Points Rich
Rambler 2748S, 2749S ②	Centered
Studebaker 2876S	Centered
Studebaker 2934S	1 Point Rich
Studebaker 2934SA	Centered

① - Cars before Engine No B-194969 (Std & O D Trans), No B-195381 (Auto Trans) having Choke Coil & Housing assembly, Carter No 170T-61S
② - Cars after Engine No B-194969 (Std & O D Trans), No B-195381 (Auto Trans) having Choke Coil & Housing Assembly, Carter No 170AE-61S

Throttle Valve Setting: *NOTE - 1957 & Early 1958 Rambler carburetors used with automatic transmission have an additional Transmission Control Vacuum Port Do not confuse with Idle Port or Vacuum Spark Port Top of Transmission Control Vacuum Port should be flush with bottom of throttle valve See Production Change above for the later 1958 Rambler cars with the vacuum line taken directly off intake manifold.*

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CARTER "AS" DOWNDRAFT (Cont.)

Carb. No.	Thrttl Valv Setting ①Idl Prt	①Vac. Spark Prt
2349S	.058-.062"	.033-.043"
2564S, 2580S	.058-.062"	.040-.050"
2664S, 2665S	.058-.062"	.040-.050"
2748S, 2749S②	.063-.067"	.040-.050"
2748S, 2749S③	.085-.089"	.040-.050"
2858S	.093-.097"	.040-.050"
2876S	.125-.129"	.056-.066"
2934S,SA	④.015-.019"	.063-.073"

① - Top of port above top edge of valve unless otherwise noted.
② - Carburetors with Date Code before D-8.
③ - Carburetors with Date Code D-8 and later.
④ - Below lower edge of throttle valve with throttle valve tightly closed.

OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Take out two dust cover retaining screws, remove dust cover and gasket. Remove step-up jet piston, rod and spring from bowl cover. Disconnect spring clip from actuating link and remove metering rod and spring clip retainer. Take out throttle shaft arm screw, remove throttle shaft arm and pin assembly. Remove choke piston link-to-throttle valve arm lever connector rod retainer and remove rod. Take out cover retaining screws and remove bowl cover and gasket. Push accelerating pump plunger toward cover and disconnect it from actuating link, remove plunger and actuating link. Remove spring from pump plunger. Take out choke cover retaining screws, remove choke cover and coil assembly, gasket, and baffle. Slip fast idle link out of housing. Remove staking from ends of choke valve screws, remove screws, lift choke valve out. Disconnect fast idle cam spring from choke shaft lever, rotate choke shaft to withdraw choke piston from cylinder, remove choke shaft, lever, and piston assembly from housing. Disconnect piston by pushing out piston pin. Remove fast idle cam and spring assembly from choke housing. Remove float lever pin retainer, remove needle valve and seat assembly, remove float and pin assembly. Separate floats by taking out the retaining pin. Remove metering rod jet, step-up jet, and low speed jet. Remove pump discharge ball retainer and check ball. Remove idle mixture adjusting screw and spring, and idle speed screw and spring,

Inspection: Thoroughly clean and inspect all carburetor parts. *CAUTION* - Take care not to damage percolator tube which extends above top surface of carburetor bowl. Replace all worn or damaged parts.

Reassembly: Use all new gaskets. Reassemble all parts in reverse order to disassembly procedure and note the following points:

Accelerating Pump Jet Aim (Studebaker) - Check pump discharge jet by filling bowl with clean gasoline and operating pump plunger with several quick full strokes. Pump jet should be parallel to choke shaft and stream should strike side of small venturi about 1/8" down from top edge. Adjust by bending pump jet tube. *CAUTION - Use care not to damage metering end of tub .*

Ass mbling Air H rn t B dy - Install body gasket on air horn. Install metering rod retainer on pump lifter link but **do not install metering rod**, insert pump lifter link through operating slot in air horn, place pump spring over pump plunger and install plunger in air horn, install fast idle link in choke piston housing. Hold pump plunger, lifter link, and gasket in position and lower air horn and bowl cover onto carburetor body.

Metering Rod Installation - Place metering rod retainer in position on actuating link. Lower metering rod into place until end of rod enters hole in retainer, push metering rod and retainer down into operating position, push retainer toward rod until retainer ears engage slot in arm on lifter link.

Carburetor Adjustments - Make all adjustments as listed above in ADJUSTMENT section.

SERVICE PARTS: Gasket Sets - Carter No. 276S (2349S, 2580S, 2664S, 2665S, 2564S, 2748S, 2749S); No. 330 (2876S); No. 330A (2934S); No. 350 (2934SA).

Re-Carburetion Kits: Carter No. 1816N (2349S); No. 1936P (2580S, 2664S, 2665S, 2564S, 2748S, 2749S); No. 1981P (2876S); No. 5005P (2934S); No. 5021N (2934SA).

Zip-Kits: Carter No. 900-30 (2349S, 2580S, 2664S, 2665S, 2564S, 2748S, 2749S); No. 900-75A (2876S); No. 900-111 (2934SA); No. 900-108A (2934S).

CARTER WA1

HUDSON	Carter Carburetor No.
1954 4D Wasp	749S
1955 Wasp (Std.)	2009SA
1956 Wasp (Hi-Torque)	2009SA
(Optional Twin H-Power) ①	
1954 4D Wasp, 5D Super Wasp	Two 2114S
1954 7D Hornet	Two 2113S
1955 Wasp	Two 2013S
1955 Hornet Six	Two 2113S
1956 Wasp (Twin H-Power)	Two 2013S
1956 Hornet 6 (Twin H-Power)	Two 2113S

① - *See CARBURETOR on car model pages for idling adjustment procedures.*

DESCRIPTION: Single barrel, downdraft type. Primary and secondary venturis are mounted in main body casting (not air horn) by two streamlined struts with nozzle directly above one strut on center-line of venturis and float bowl. Float bowl has been designed to eliminate clearance between sides of bowl and float.

ADJUSTMENT: Adjust carburetor to following specifications.

Idl Mixture: Single Carburetors - *NOTE - See CARBURETOR on car model pages for idling adjustment of "Twin Carburetors".* With engine at normal operating temperature, choke valve wide open and fast idle inoperative, set throttle stopscrew for correct idle speed, then adjust idle mixture screw for smooth idle (turn screw out for richer mixture). Recheck idle speed after adjusting mixture screw. *See "Idle Mixture Table" below for initial idle mixture screw adjustment.*

Idle Mixture

Carburetor	Idle Screw Setting
749S, 2009SA	½-1½ turns
2113S	1¼-2¼ turns
2114S, 2013S	¾-1¾ turns

Idle Speed: 550 RPM (Synchro-mesh); 575 RPM (Overdrive); 500 RPM (Hydra-Matic).

ACCELERATING PUMP: Accelerating pumps are low pressure type and are actuated by throttle lever through arm and countershaft assembly on bowl cover. Countershaft arm has three holes for pump linkage engagement to provide varied pump stroke for seasonal requirements (Hudson), single hole (Willys).

Pump Stroke Adjustment: To check the pump plunger travel, back off throttle lever stopscrew so that throttle valve closes tightly, adjust pump connector link for correct pump stroke as shown in "Pump Setting" column of table below (see Pump Adjustment above for this connector link adjustment). Install Universal Pump Stroke Gauge T109-117S on ridged portion of bowl cover so that projecting portion of gauge rests on top surface on connector link at pump shaft. Hold gauge vertical and note reading, then open throttle wide and again note reading. Difference between these two readings is pump stroke (in sixty-fourths of an inch) and should agree with 'Pump Stroke' figure in table below. To adjust, bend throttle connector rod at lower angle near throttle lever. *CAUTION*—Check metering rod adjustment (disturbed by this adjustment).

Accelerating Pump Stroke Setting

Car & Carb.	Pump Stroke	Pump Setting
Hudson (All Carbs.)	16/64"	Medium

Pump Seasonal Adjustment: Three holes are provided in pump arm on countershaft for pump link connection. Inner hole provides minimum pump stroke, lower hole medium stroke, outer hole maximum stroke (adjustment accessible by removing dust cover). See tune-up data on car model pages for settings and seasonal changes.

METERING ROD (ECONOMIZER): Metering rod and jet assembly meters all fuel for main nozzle (stepped and tapered rod is lifted out of jet as throttle is opened and provides greater fuel flow through jet to nozzle). Metering rods can be changed for special conditions. See Carter Jet Specification Table.

Vacumeter Type Note—On these types, metering rod is linked to vacuum piston stem so that rod is controlled by vacuum piston within limits determined by throttle valve opening (lug on pump arm serves as stop for lip

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CARTER WA1 (C nt.)

on piston link to prevent vacuum piston pulling metering rod down in jet beyond correct point for the particular throttle opening). These models adjusted in special manner (see below).

Metering Rod Setting

Carb.	Metering Gauge & Length
2009S	T109-102 (2.468")
2009SA	T109-241 (2.548")
All other Carbs.	T109-102 (2.468")

Metering Rod Adjustment (Vacumeter Type)—Remove metering rod (hung on pin on upper end of vacuum piston link) being careful not to lose metering rod disc Install gauge No. T109-102 (2.468") in place of metering rod making certain that gauge seats in metering rod jet and is held vertical Back off throttle stopscrew so that throttle valve tightly closed. Press down lightly on vacuum piston link at point directly over piston Clearance between pin on piston link and shoulder of notch in gauge should be less than .005" and gauge should not drag on pin Adjust by bending lip on piston link so that it contacts lug on pump arm (use special tool T109-105). Remove gauge, install metering rod and disc, connect metering rod spring

ANTI-PERCOLATOR: Saxophone Key Type. Consists of a main nozzle vent in bowl cover controlled by a leather-faced, felt-backed metal cap which opens the vent when the throttle is closed to prevent any percolating discharge from the nozzle The cap must be seated to close the vent when the throttle is opened.

Adjustment—Crack throttle open by inserting special gauge (see table below for gauge for each model) between edge of valve and carburetor wall on side opposite idle port. Bend anti-percolator rocker arm (use special tool T109-105) so clearance between rocker arm lip and pump arm .005-.015" (use feeler gauge)

Anti-Percolator Setting

Car & Carb.	Gauge No. & Throttle Opening	
Hudson (749S, 2114S)	T109-29	.020"
Hudson (2009SA)	T109-29	030"
Hudson (2013S, 2113S)	T109-44	.016"

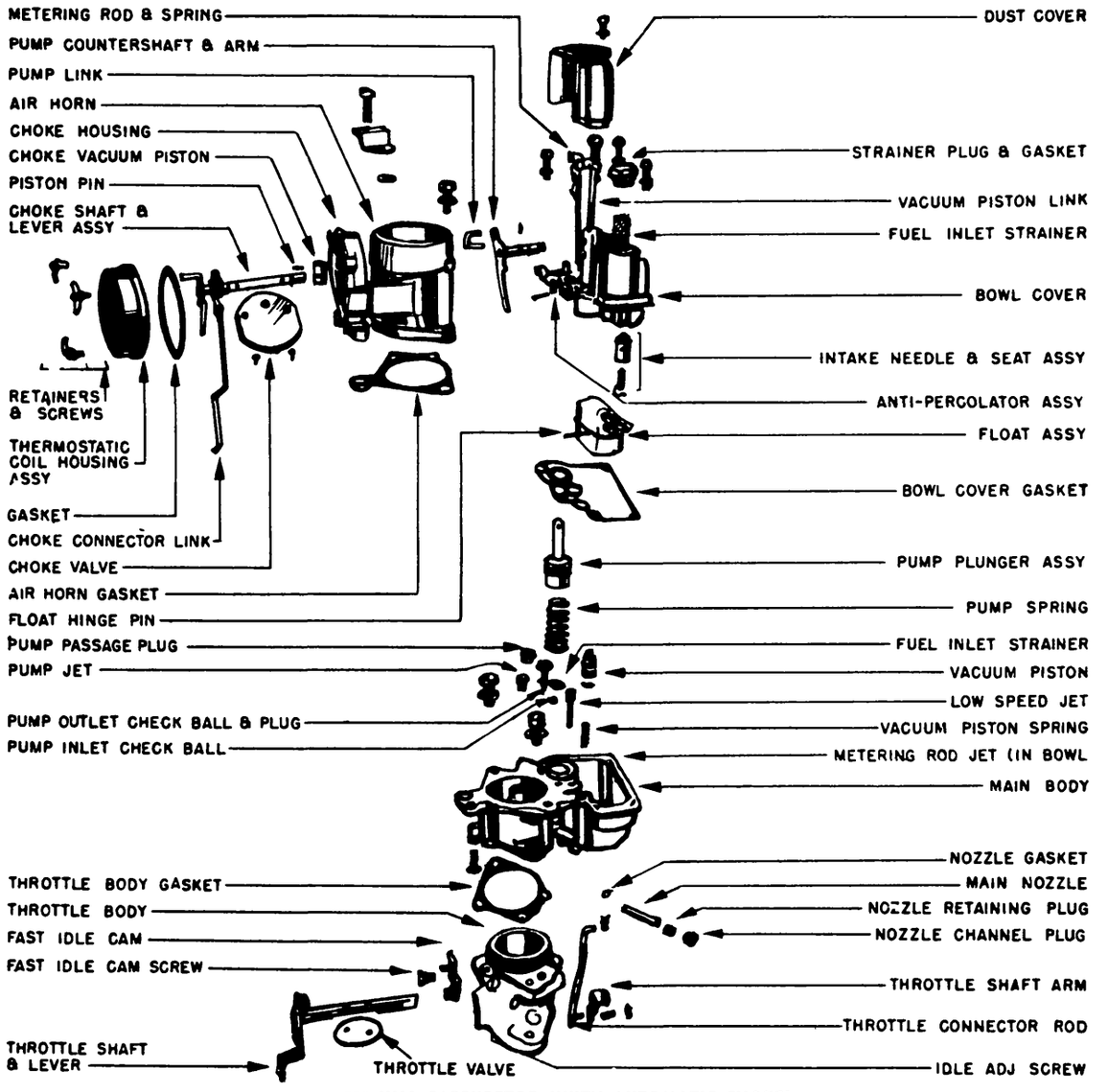
FLOAT LEVEL: To check float level, remove float bowl cover, invert cover, measure from top edge of machined projection on cover at free end of float to top of soldered seam (see table below) Adjust by bending lip of float lever.

►*CAUTION:* On cars with spring-loaded pin in intake needle, use care not to compress the spring when checking float level (invert cover assembly and allow float to rest on intake needle of own weight. Compressing spring will cause false reading and result in incorrect float setting)

Float Level Setting

Car & Carb.	Float Level
Hudson (749S, 2113S, 2114S)	1/2"
Hudson (2013S)	1/4"
Hudson (2009SA)	7/16"

Ⓓ—Change to 7/16" (Gauge T109-81) to correct hesitation or cutting out on sharp turns (see Changes & Corrections above) Set to 7/16" when carburetor converted to 2009SA.



CARTER WA1 CARBURETOR (WITH AUTOMATIC CHOKE)

Float Travel—Should be ½" (all models) To check travel, hold float bowl cover in normal position, note drop or free travel of float at free end. To adjust travel, bend the two small float stop lips at the hinge end of the float.

Float Needle Valve & Seat—Furnished only in matched sets as follows:

Car & Carb.	Fl at Inl t Valve Part N .	Intake Hol Siz No.
Hudson (749S)	25-75S	46
Hudson (2009SA, 2113S, 2114S)	25-75S	46
Hudson (2013S)	25-162S	42

THROTTLE VALVE SETTING: When installing valves, see that trademark is up and on idle port side, install screws loosely, tap valve lightly to centralize it in bore, tighten screws securely. See that throttle valve stopscrew is backed off so that valve closes tightly, check throttle valve setting as shown in table below Shims furnished .002" (2-93), 005" thick (2-94) to correct valve position

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CARTER WA1 (Cont.)

Throttle Valve Setting

Car & Carb.	Idle Port Opening	Vacuum Port Hgt.
Hudson (749S)	.136-.140"	.020"
Hudson (2113S)	.178-.182"	①.049"
Hudson (2114S)	.120-.124"	①.040"
Hudson (2009SA)	.120-.124"	.005-.015"
Hudson (2013S)	.103-.107"	①.010-.020"

① - Top of port above throttle valve (bottom of port, others).

FAST IDLE: Consists of fast idle cam pivoted directly above the throttle lever so as to serve as stop for throttle stopscrew and is linked to the choke valve. Refer to Climatic Control article in Carburetion Equipment Section for Data.

Adjustment—To check, turn fast idle cam to normal or slow idle speed position, tighten throttle lever stopscrew until it just seats against cam, rotate cam until stopscrew is against first step of cam (screw must not be on step) check clearance between lower edge of choke valve and air horn wall (use gauge). If clearance is not 1/2", Gauge T109-83 (Hudson 2013S, 2114S); 5/8", Gauge T109-85 (All others), adjust by bending fast idle link at offset using Tool T109-41.

CHOKE SETTING: Loosen housing screws and rotate housing so index mark is aligned with proper mark on casting: "Centered" at index (749S); "1 Point Lean" (Others).

UNLOADER: Consists of a cam on the throttle lever which opens the choke valve (through fast idle linkage) when throttle is held wide open to correct flooding. To check, hold throttle wide open, check clearance between lower edge of choke valve and air horn wall. See table below for correct clearance and checking gauge on each model. To adjust, bend cam on throttle lever (use Tool T109-41).

Unloader Setting

Car & Carb.	Gauge No. & Choke Valve Clearance
Hudson (749S)	T109-80 .....7/16"
Hudson (2113S, 2114S)	T109-84 .....9/16"
Hudson (2009SA, 2013S)	T109-84 .....9/16"

CARBURETOR OVERHAUL: *CAUTION—When disassembling carburetor for overhaul, note the following points:*

Disassembly: Remove dust cover attaching screw and lockwasher, remove the dust cover. Remove fast idle cam screw and fast idle cam. Take out air horn attaching screws (two screws on top, one beneath Climatic Control housing), remove air horn and gasket. Take out retainer screws, remove thermostatic coil and housing assembly, piston housing strainer. Take out choke valve screws and remove choke valve. Loosen screw on choke lever and link assembly 4 full turns, pry lip on lever away from shaft with screwdriver. Revolve choke shaft counter-clockwise to free piston from cylinder and remove assembly (*CAUTION*— Do not remove pin holding piston housing and air horn casting together—these parts line-reamed at factory and must be kept in alignment). Remove pin spring, spring retainer, and spring from throttle connector rod and remove rod. Remove pin spring and connector link from pump arm. Remove low speed passage plug and gasket assembly (located next to anti-percolator cap), Take out bowl cover screws and remove bowl cover assembly intact. Remove vacuum piston spring from cylinder in casting, disconnect piston from link by turning piston ¼ turn, remove piston link and rod from bowl cover and disassemble rod and link using care not to lose metering rod disc or damage spring. Remove float, needle and seat assembly, strainer nut and gasket, and strainer. Take out pin and remove anti-percolator cap and rocker arm assembly and spring. Remove pump plunger and rod assembly, take out strainer and check ball in lower end of pump cylinder. Remove low speed jet assembly, nozzle passage plug, nozzle retainer plug and nozzle (use Tool T109-55). *CAUTION - Make certain that small nozzle gasket removed from nozzle passage.* Remove metering rod jet and gasket assembly. Remove pump jet passage plug and pump jet. Remove pump discharge ball retainer and check ball. Remove body flange (lower casting) gaskets and insulator, idle adjusting screw and spring, and idle port rivet plug. Remove throttle shaft arm and shaft assembly, take out throttle valve screws and remove valve, shaft and lever assembly.

Servicing—Wash all parts in clean gasoline (except thermostatic coil and housing assembly and cork parts), blow out all passages with compressed air, examine metering rods and jets, replace all worn parts.

Reassembly: Use all new gaskets (see Parts List below), group all the low speed circuit, high speed circuit, float, pump, and choke circuit parts together to insure correct re-installation. Install parts in reverse order of disassembly directions given above and note following special instructions and cautions: When installing throttle valve, use new attaching screws, install valve with trademark up and on idle port side of bore, install screws loosely, tap valve lightly to centralize it in bore and then tighten attaching screws. Centralize choke valve in same manner and check operation by making certain that choke valve falls open freely of own weight. When installing nozzle, make certain that new gasket used, install nozzle with flat side up. See that low speed jet seats firmly in casting at shoulder. Check and adjust metering rod, anti-percolator setting, pump stroke, float level, fast idle and choke setting, throttle valve setting as directed above. Pack dust cover attaching screw hole in bowl cover with graphite grease before installing dust cover and attaching screw (oil or grease must not be used at any other point). Adjust carburetor when re-installed.

SERVICE PARTS: Gasket Sets - Carter No. 139S (2009SA, 2013S, 2114S); No. 198 (749S, 2113S).
Re-Carburetion Kit - Carter No. 1535 (749S); No. 1736 (2009SA); No. 1737 (2013S).

CARTER TYPE "YF"

	Carter Carburetor No.
NASH	
1954 Statesman ②	(Two) 2098S
1954 Statesman ③	(Two) 2137S
1954 Statesman ④	(Two) 2137SA
1954 Statesman ⑤	(Two) 2163S
1955 Statesman	(Two) 2258S
RAMBLER	
1954-55	2014S
1958 American (S.M. Trans.)	2014S
1958 American (Auto. Trans.)	2757S
1959-60 American (S.M. & Auto. Trans.)	2014S
WILLYS	
1954 CJ-3B Jeep	938SA
1954 4 Cyl. Exc. Jeep	951S
1954 6 Cyl. Sta. Wgn. (F-Head Eng.)	2071S
1955 Jeep	938SA
1955 Utility (4 Cyl. F-Head Eng.)	951S
1955 Sta. Wgn. (6 Cyl. F-Head Eng.)	2071S
1956 Jeep Dispatcher (4 Cyl. "L" Head)	2392S
1956 Universal Jeep (4 Cyl. "F" Head)	938SA
1956 Others (4 Cyl. "F" Head)	951S
1956 Others (6 Cyl. L6-226) Later	2467S
1957 CJ-3B, CJ-5, CJ-6	938SA
1957 Jeep Dispatcher	2392S
1957 Utility Wgns. & Trucks (4 Cyl.)	951S
1957 Utility Wgns. & Trucks (6 Cyl.)	2467S
1957 Forward Control FC-150 (4 Cyl.)	938SA
1957 Forward Control FC-170 (6 Cyl.)	2467S
1958 Jeep Dispatcher	2392S
1958 Universal Jeep	938SA,SC
1958 4x2, 4x4, 4WD (4 Cyl.)	951S
1958 Forward Control FC-150	938SA,SC
1958 6 Cyl. L6-226 (All Models)	2467S
1959 4 Cyl. "L" Hd. Jeep Dispatcher	2392S
1959 4 Cyl. "F" Hd. Universal Jeep	Ⓒ 938SA, SC
1959 4 Cyl. "F" Hd. Utility & Truck	Ⓒ 951S, SA
1959 4 Cyl. "F" Hd. FC-150	Ⓒ 938SA, SC
1959 6 Cyl. "L" Hd. All Models	2467S
1960 4 Cyl. "L" Head Jeep Dispatcher	2392S
1960 4 Cyl. "F" Head Universal Jeep	Ⓒ 938SC, SD
1960 4 Cyl. "F" Head Utility & Truck	Ⓒ 951S,SA
1960 4 Cyl. "F" Head FC-150	Ⓒ 938SC, SD
1960 6 Cyl. "L" Head, All Models	2467S

Ⓒ - See Production Change Note below.
② - First cars (Eng. No. J-1001 to J-4697).
③ - Eng. Nos. J-4697 to J-7511.
④ - Eng. Nos. J-7511 to J-11186.
⑤ - Eng. Nos. J-11186 and up.

►CHANGES & CORRECTIONS

►*NASH STATESMAN CARBURETOR ADJUSTMENT CAUTION:* Both carburetors must be synchronized for correct operation. See special Idle Adjustment procedure below.

►*NASH STATESMAN CARBURETOR FLOODING RECOMMENDED CORRECTION & PRODUCTION CHANGES:* Following changes were made in production and can be incorporated in earlier cars to eliminate flooding caused by (1) Vibration of Needle Valve, and (2) Dirt under Needle Valve.

(1) Carter 2098S, 2137S, & First 2137SA Carburetors—Flooding caused by vibration can be eliminated by installing Spring-loaded Needle Valve & Seat Assy. No. 25-239S and Float Assembly No. 21-122S, and setting float level to new specification (see Float Level below). *NOTE—Carburetor 2137SA tagdated "M3" and later have the above changes made in production.*

(2) Cars before Serial No. K-624096—Flooding caused by dirt under intake needle can be eliminated by installing Fuel Filter (Service Replacement No. 3117218) at rear carburetor (use Tee No. 3140204 and attach fuel pump line to inlet side of filter using Elbow EL-204). Cars after above serial number have filter installed in production.

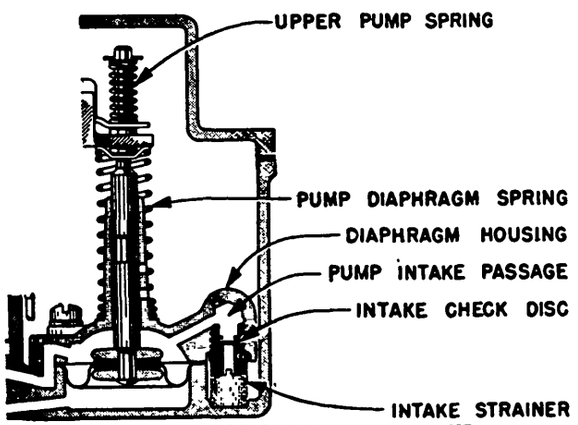
►*WILLYS CARBURETOR PRODUCTION CHANGE (YF-951S and 938SC superseded by YF-951SA and YF-938SD): Carter YF-938SD and YF-951SA have all modifications recommended for "Flat Spot & Stumble Correction" below.*

►*1960 WILLYS FLAT SPOT OR STUMBLE CORRECTION (All vehicles with Carter YF 938S, SA, SC; 951S Carburetors):* Before modifying carburetor, thoroughly tune up engine, check carburetor metering rod and float level settings, adjust engine idle speed, and make certain that cooling system thermostat is operating correctly. If flat spot or stumble persists, modify carburetor as follows:

Carter YF 938S, SA, SC; 951S Modification - Some carburetors have a .025" size accelerator pump discharge jet. When installing field fix kit in a carburetor, check size of discharge jet. If carburetor being converted has .025" jet, open to .031" by running a No. 68 drill through jet. Install parts in Carter Unitized Package No. 75-1504U (Willys No. 924161). Consists of pump discharge check needle (No. 17-18), metering rod jet (No. 120-166), and metering rod (No. 75-1500). *Upon completing conversion, mark or tag carburetor to indicate that it is either a YF 938SD or YF 951SA.*

DESCRIPTION

DESCRIPTION: Single barrel, downdraft type with diaphragm operated metering rod (vacuum and mechanically controlled), diaphragm type accelerating pump, Anti-Percolator, Fast Idle, and manually or automatically controlled choke (Climatic Control). Carburetors used on early 1958 Rambler models with automatic transmission have an additional vacuum port at throttle edge for transmission control. On later carburetors, the vacuum line opening in the side of carburetor is plugged and the vacuum line for transmission control is taken directly from intake manifold.



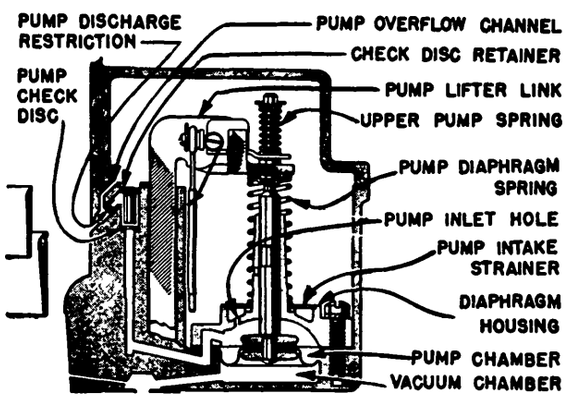
"DISC" TYPE PUMP INTAKE VALVE

ADJUSTMENT & OVERHAUL

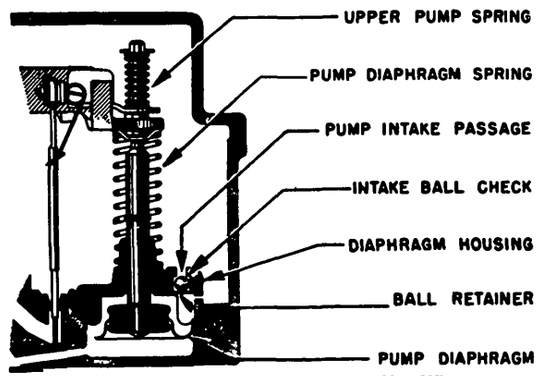
Idling Adjustment: Warm up engine thoroughly so that choke valve wide open and fast idle inoperative. Adjust throttle stopscrew for correct engine idle speed, then adjust idle mixture screw for smoothest running and highest RPM. Turn screw out for richer mixture. Recheck idle speed after adjusting mixture. *See "Idle Mixture Table" below for initial idle mixture screw adjustment.*

Car & Carb.	Idle Mixture Idle Screw Opening
Nash (All)	½-1¾ turns
Rambler (All)	½-1½ turns
Willys 938S,SA,SC,SD, 951S,SA	¾-1¾ turns
Willys 2392S	½-2 turns
Willys 2467S	1-2½turns

CONTINUED N NEXT PAGE



INTAKE PASSAGE TYPE PUMP



"BALL" TYPE PUMP INTAKE VALVE

CARTER TYPE "YF" (C nt.)

Idl Sp d

Car M d l	Engin S.M. Trans.	RPM Auto. Trans.
1954 Nash (Std.)	550	① 475
1954 Nash (Air Cond.)	② 500	①② 500
1955 Nash (Std.)	500-550	① 450
1955 Nash (Air Cond.)	② 500	①② 500
1954 Rambler (Std.)	550	① 475
1954 Rambler (Air Cond.)	② 500	①② 500
1955 Rambler (Std.)	500-550	① 450
1955 Rambler (Air Cond.)	② 500	①② 500
1958-60 Rambler American	550	① 475
1954-60 Willys 4-Cyl.	600	
1954-56 Willys 6-Cyl.	600	
1957-60 Willys 6-Cyl.	550	

① - With selector lever in "D" (Drive).
② - With Air Conditioning compressor operating.

►*1954-55 NASH STATESMAN IDLING ADJUSTMENT (Two Carburetors): See CARBURETOR on Car Model pag s.*

Accel rating Pump: Diaphragm type pump on all models, with ball check discharge valve (except 2467S), discharge needle (2467S). *CAUTION - On 2467S only, check pump adjustm nt wh nev r carburetor disassembled or pump linkag disturb d BEFORE checking and adjusting M t ring Rod.*

Pump Adjustm nt (2467S) - With idle screw backed out so that throttle valves are fully seated, press down on upper end of diaphragm shaft until it is bottomed in diaphragm housing (Tool T109-212 may be used to hold diaphragm shaft down in this position). In this position, metering rod arm should contact lifter link at outer end nearest the springs. Adjust by bending pump connector link at lower angle using bending Tool T109-213. *CAUTION - B nding link at any other point may cause binding of pump lifter link.*

M t ring R d Adjustm nt: With throttle valve seated in bore of carburetor, press down on upper end of diaphragm shaft until diaphragm bottoms in vacuum chamber. Tool T109-212 may be used to hold diaphragm shaft down while adjusting metering rod. Metering rod should contact bottom of metering rod well and metering rod arm should contact lifter link at outer end nearest the springs and at supporting lug. Adjust by bending lip of metering rod arm to which metering rod is attached.

Float S tting Adjustment: Invert air horn and float cover assembly allowing float to hang freely, then measure from top of float at free end to bowl cover (gasket removed). Adjust by bending lip which contacts intake needle (do not bend float arm).

►*CAUTION: On models with spring loaded intake n edle, do not compress this spring when checking float level (will result in false reading and incorrect float setting).*

Fl at L v l Setting

Car & Carb.	Ch cking Gaug	Fl at S tting
Nash 2098S, 2137S, SA ①	T109-80	3/8"
Nash 2098S, 2137S,SA ②	T109-31	1/4"
Nash 2137S,SA, 2163S ③	T109-31	1/4"
Nash 2258S	T109-220	5/16"
Rambler 2014S, 2757S	T109-83	1/2"
Willys 938S,SA,SC,SD; 951S,SA	T109-107	5/16"
Willys 2071S	T109-126	9/32"
Willys 2392S, 2467S	T109-126	9/32"

① - With original solid type Intake Needle & Seat No. 25-189S (or 25-257S on 2098S), & Float No. 21-1117S.
② - With special spring loaded Intake Needle & Seat No. 25-239S & Float No. 21-122S to correct flooding (see Changes & Corrections above).
③ - With production type spring loaded Needle & Seat No. 25-239S & Float No. 21-122S.

Automatic Choke: Used on Nash & Rambler. Willys carburetors have a manual choke control. Adjust by loosening cover screws and rotating cover and thermostatic coil assembly.

Automatic Choke Setting

Car Model	Choke Setting
Nash Statesman (All)	2 Pts. Lean
Rambler & Rambler American	1 Pt. Lean

Fast Idle Adjustment (Manual Choke Control): With choke valve in wide open position, check to see that lip on fast idle arm is in contact with boss on carburetor body casting. To adjust, bend fast idle arm rod at lower offset.

Fast Idle Adjustment (Automatic Choke Control): Remove thermostatic coil housing, gasket and baffle plate. Crack throttle and hold choke valve fully closed, then close throttle. With fast idle cam revolved to fast idle position, hold choke valve and throttle valve closed as far as possible. Clearance between throttle valve and bore of carburetor (side opposite idle ports should be .024", Gauge T109-189 (Nash); .054" (Rambler & Rambler American). Adjust by bending connector link at lower angle.

Unloader Adjustment (Automatic Choke Control Carbs.): *NOTE - This adjustment must be made after fast idle adjustment.* Hold throttle valve in wide open position and close choke valve as far as possible without forcing. Clearance between lower edge of choke valve and inner wall of air horn should be 29/64", Gauge T109-81 (Nash); 9/32", Gauge T109-126 (Rambler & Rambler American). Adjust by bending choke trip lever.

THROTTLE VALVE SETTING: Check when overhauling carburetor.

Throttle Valve Setting

Car & Carb.	①Idle Port	Vacuum Spark Port
Nash (2098S)	142-.146"	②.001-.009"
Nash (Exc. 2098S)	115-.119"	②.001-.009"
Rambler (2014S, 2757S)	142-.146"	②.021-.029"
Willys (938SA,SC,SD)	168-.172"	①.035-.045"
Willys (951S,SA)	168-.172"	①.035-.045"
Willys (2071S)	148-.152"	①.035-.045"
Willys 2467S	143-.147"	①.019-.029"

① - Top edge of port above top edge of throttle valve.
② - Bottom of port above top edge of throttle valve with valve tightly closed.

DISASSEMBLY: With carburetor removed from engine, proceed as follows:

1) Remove pin springs and fast idle connector rod springs, remove fast idle connector rod. Take out air horn and bowl cover attaching screws, remove choke tube clamp, lift off air horn and gasket.

2) Take out pump disc check valve retainer ring (when used), lift out retainer and pump check valve disc or pump discharge needle. Then remove throttle shaft arm assembly from end of throttle shaft (pump connector link, shaft seal spring, dust seal washer, felt dust seal). Unscrew four pump diaphragm housing attaching screws, lift out entire pump and metering rod assembly.

3) Disassemble pump by removing attaching screws, pin spring, metering rod, upper pump spring retainer, upper pump spring, metering rod arm, pump lifter link, diaphragm spring retainer, diaphragm spring, and diaphragm housing. Remove intake strainer from housing (use knife tip to lift flat type strainer out of housing recess). On carburetors with disc type intake check valve, remove valve plug assembly. On Nash carburetors, take out plug on upper side of diaphragm housing and remove discharge check valve spring and ball.

►***PUMP DIAPHRAGM CAUTION*—If old diaphragm is to be re-used, store the diaphragm in gasoline. Diaphragm will shrink and stiffen if allowed to dry out for more than one hour.**

4) Remove metering rod jet from body casting. Remove Low Speed Jet assembly.

►***CAUTION—Do not attempt to remove pressed-in parts such as Nozzle, Pump Jet and Anti-percolator Air Bleed.***

5) Take out three body flange (throttle body) attaching screws, remove throttle body from main body casting.

6) Remove idle adjustment screw and spring, idle port rivet plug, throttle lever assembly and washer, fast idle arm. Take out throttle valve attaching screws, lift valve out, remove throttle shaft, remove shaft seal by prying out seal retainer.

►***CAUTION—Do not attempt to remove vacuum passage orifice restriction which is pressed in.***

7) Remove float pin, lift out float, remove needle and seat assembly from air horn casting.

8) On carburetors with manual type choke control, take out choke valve screws, lift choke valve out, unhook choke spring, slide choke shaft out of housing. If necessary to replace choke lever assembly, pry off choke lever retainer ring (in end of shaft), remove lever assembly from shaft.

►***CAUTION—Do not attempt to remove balance vent tub .***

CLEANING & INSPECTION: Wash all parts in carburetor cleaning solution (CAUTION—do not immerse diaphragm assembly, pump check disc, or seals in the solution). Inspect all parts for wear or damage, replace if necessary. Blow out all passages with compressed air.

C NTINUED N NEXT PAGE

CARTER TYPE "YF" (C nt.)

REASSEMBLY: Use all new gaskets. Assemble by reversing the disassembly order as given above and note the following important points:

Throttle Valve Installation—Install valve with trademark (c) toward idle port when viewed from manifold side of flange. Install screws loosely, tap valve and then hold with fingers to insure it being centralized in bore, tighten screws securely.

Metering Rod Jet Installation—NO gasket used

Pump Diaphragm Assembly Installation—Before tightening attaching screws, make certain that diaphragm is flat and edges are not wrinkled, then tighten screws evenly.

Pump Linkage—Check pump linkage to make certain that it does not bind in any position. If binding noted, loosen throttle arm clampscrew and adjust throttle arm, retighten clampscrew.

Float Intake Needle & Seat Assembly—Soak new gasket in 90 proof alcohol for 15 minutes, install and let dry on needle seat before installing this part. When installing float, make certain that shoulder on float pin is on side away from carburetor bore.

Choke Valve Installation—Install the attaching screws loosely, center valve by tapping on valve lightly and hold in this position with fingers while tightening screws securely.

Fast Idle Linkage (Manual Choke Carburetors): Install connector rod with offset end upward, and with pin spring on outside.

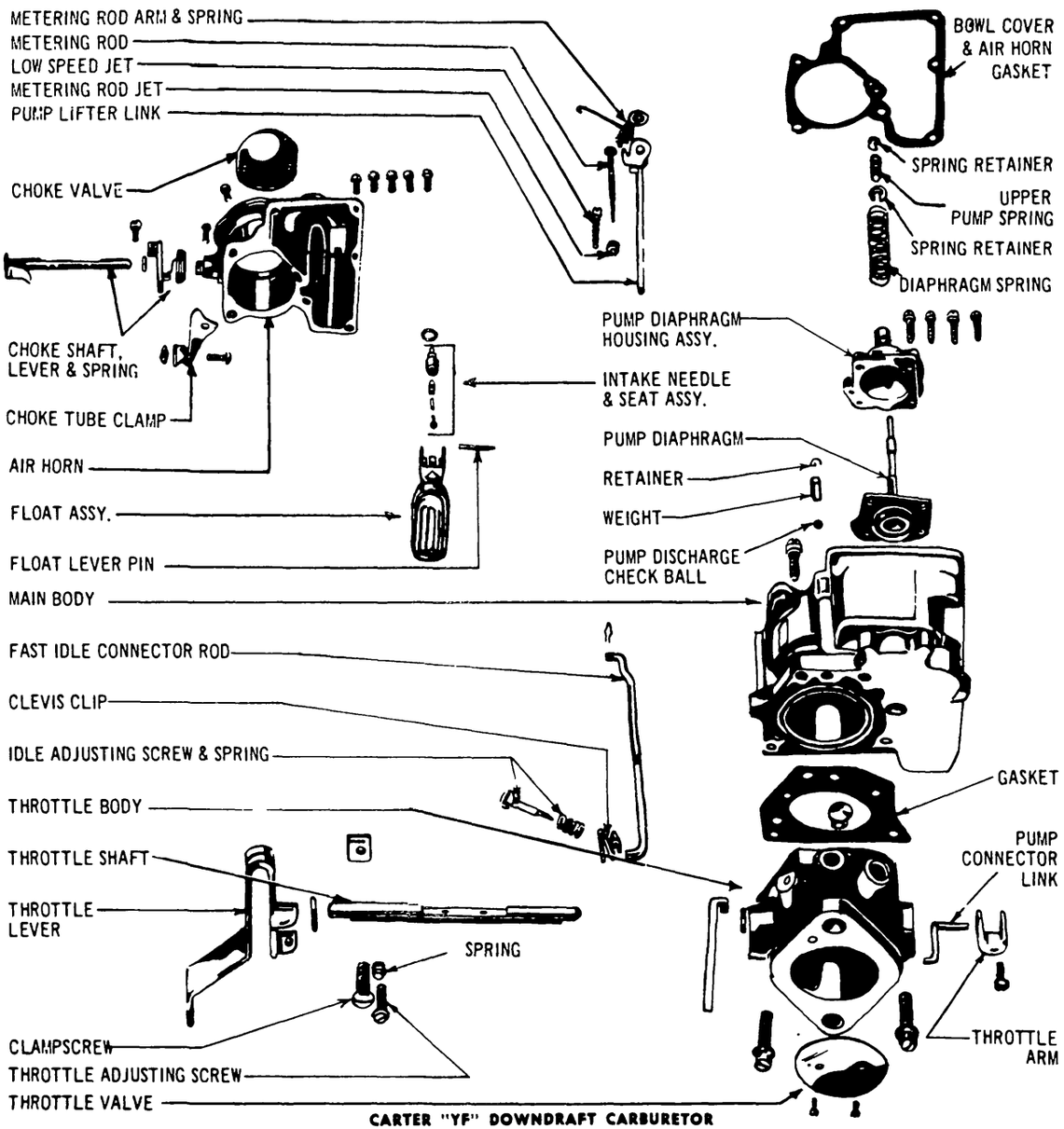
Fast Idle Linkage (Automatic Choke Carburetors): Install connector rod with angle end down toward throttle lever and open ends of rod in toward carburetor body.

►*CARBURETOR INSTALLATION CAUTION*—Special slotted type flange gasket must be used to install carburetor on engine. Diaphragm type metering rod and accelerating pump control will not function if this gasket not used.

REPAIR PARTS: Gasket Sets - Carter No. 200 (2392S); No. 206A (938SA,SC,SD, 951S,SA, 2071S); No 216 (2014S, 2098S, 2137S,SA, 2163S, 2258S, 2757S).

Re-Carburetion Kits: Carter No. 1546P (2392S); No. 1590N (2014S, 2757S); No. 1715N (2071S); No. 1760N (2163S); No. 1764S (938SA,SC,SD, 951S,SA); No. 1849P(2467S).

Zip-Kits: Carter No. 900-31A (938SA,SC,SD, 951S,SA, 2071S); No. 900-38 (2014S, 2757S); No. 900-77A (2392S); No. 900-78A (2467S).



CARTER "YF" DOWNDRAFT CARBURETOR

CARTER "YH" HORIZONTAL

	Carter Model No.
CHEVROLET	
1954 Corvette 6	Three 2066S or 2066SA
1955 Corvette 6	Three 2066SA
NASH	
1954-55 Amb. 6 Jetfire	895SA
1954-55 Amb. 6 Dual Jetfire	(Front) 973S (Rear) 974S
1956 Amb.6 Super Jetfire	2368S
1956 Amb.6 Lemans Dual Jetfire	Two 2369S
NASH-HEALEY	
1954 Models Ⓒ	973 (Front), 974S (Rear)

①—Beginning 1953 Serial No. NH-2310 (102" WB), NH-3024 (108" WB).

►CHANGES, CAUTIONS, CORRECTIONS

►*CHEVROLET CORVETTE CAUTION:* THREE carburetors used per engine with interconnected linkage. CARBURETORS MUST BE ADJUSTED AS SHOWN BELOW.

►*NASH DUAL JETFIRE & NASH-HEALY CAUTION:* TWO carburetors used per engine with interconnected throttle linkage. CARBURETORS MUST BE ADJUSTED AS SHOWN BELOW.

►*NASH DUAL JETFIRE & NASH-HEALEY 973S & 974S THERMOSTATIC COIL ASSY. & SETTING CHANGES FOR IMPROVED HOT STARTING PERFORMANCE:*

Thermostatic Coil Assy. Change: First "N" type No. 170N-250S Assy. superseded by later "P" type No. 170P-250S with DIFFERENT CHOKE SETTING. *See Choke Setting data below.*

Fast Idle & Unloader Setting Changes: *See Fast Idle & Unloader Setting data below.*

►*NASH AMBASSADOR HARD STARTING OR PERCOLATION CORRECTION (Jetfire & Dual Jetfire Models):* Following production changes were made to improve carburetor operation when hot and can be installed on earlier cars as detailed below.

Heat Deflector—Nash No. 3141499 (Jetfire starting Eng. No. A-262326), No. 3141496 (Dual Jetfire starting Serial No. R-736465) heat deflector used in production beginning with above numbers. **Installation**—Remove and discard battery heat shield. Install deflector on upper exhaust pipe clamp studs on top of present stud nuts, use check nuts No. NU-819 to retain deflector. See that deflector does not contact exhaust pipe clamps. On Overdrive Cars, mount Kick-down Switch on deflector (holes provided for attaching screws).

Insulated Fuel Line—Nash No. 3142006 Used in production beginning Engine No 262585. **Installation**—Interchange elbow fitting on front carburetor and Tee fitting on rear carburetor. Connect fuel line between fuel pump and front carburetor.

Carburetor Drain Tube & Hole—Drain tube installed in carburetor air horn drain hole beginning with Serial No R-734366 & RC-22771. Package No. 3117368 is furnished for installation on earlier cars.

Installation—Carburetor need not be removed from engine. Remove air cleaner, boot, tee, and adapter. Remove pipe plug from drain hole in bottom of air horn. Enlarge existing drain hole to 5/16" diameter (drill from below, using small ¼" electric drill), remove all metal particles from inside of air horn. Install drain tube, nut, and connection (furnished in package).

DESCRIPTION: "YH" type horizontal carburetors are similar to "YF" models with modifications as required for horizontal operation.

ADJUSTMENT: ***Make all adjustments exactly as follows:***

►***IDLING ADJUSTMENT CAUTION—Models with TWO carburetors (Nash Dual Jetfire & Nash-Healey) or THREE carburetors (Chevrolet) must be adjusted exactly as detailed below for proper synchronization and correct performance.***

Idle Setting: If initial adjustment required to start and warm up engine, set idle mixture adjusting screw (see table below). When engine at normal operating temperature so that choke valve wide open and fast idle inoperative, set throttle stop-screw for correct idling speed (see table below), adjust idle mixture screw so that engine runs smoothly (turn screw out for richer mixture, in for leaner mixture), recheck idle speed.

Idle Mixture Setting

Car & Carb.	Idle Screw Opening
Chevrolet Corvette 2066S, SA	½-1½ turns
Nash Amb. 895S, SA	½-1½ turns
Nash & Nash-Healey 973S, 74S	¾-1¾ turns
Nash 2368S, 2369S	¼-1¾ turns

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1954-55 Corvette		Ⓒ 475
1954 Nash Amb 6	① 550	②③ 475
1955 Nash Amb. 6	①500-550	②③ 450
1956 Nash Amb. 6	500	②③ 475
1952-54 Nash Dual Jetfire	550-650	② 550-650
1955 Nash Dual Jetfire	500-550	②③ 450
1956 Nash Dual Jetfire	500	②③ 475
1952-54 Nash-Healey	550-650	

①—With selector lever in "D" position
②—With selector lever in "N" position
③—No Air Conditioning. 500 RPM Air Conditioner operating. (All Trans. in Neutral)

►*NASH DUAL JETFIRE, NASH-HEALEY & CHEVROLET CORVETTE IDLE ADJUSTMENT & THROTTLE VALVE SYNCHRONIZATION:* See *"CARBURETOR" on individual car model pages.*

Accelerating Pump: No seasonal adjustment provided and pump stroke does not require adjustment.

METERING ROD SETTING

Car Model	Checking Gauge & Length
Chevrolet Corvette	T109-104 (2.312")
Nash (All Models)	T109-104 (2.312")

Metering Rod Setting: ***CAUTION—Gauge required for this setting.*** Back off throttle stopscrew so that throttle valve fully seated, remove bowl cover assembly, unhook metering rod spring from rod and **remove metering rod,** insert correct gauge in place of rod and make certain tapered end is seated in metering rod jet (hold gauge vertical to insure correct seating in jet). Press down on diaphragm shaft until metering rod arm contacts lifter link at diaphragm stem. At this point, metering rod pin should rest lightly on metering rod gauge. Adjust by bending metering rod arm at undercut point using bending tool T109-22. Make certain that metering rod arm contacts lifter **at diaphragm shaft and at outer end of lifter link.** Remove gauge and re-install metering rod. Reset idle speed.

FLOAT SETTING

Car & Carb.	Float Setting	Gauge No.
Chevrolet 2066S,SA	3/8"	T109-80
Nash 895S,SA	3/8"	T109-80
Nash 973S, 974S	7/16"	T109-81
Nash 2369S	7/16"	T109-81
Nash 2368S	5/16"	T109-107

Float Level: Remove bowl cover and float assembly and remove cover gasket. Invert cover so that float hangs freely. Check float height at highest point on float by inserting gauge between float and cover. Adjust by bending float lever.
CAUTION—Do not compress spring in intake needle which would cause incorrect setting.

Float Drop—Check by holding bowl cover assembly in upright position so that float drops to limit of travel. Distance from float seam at free end of float to underside of bowl cover should be 2". Adjust by bending stop tab on float arm.

FAST IDLE SETTING

Car & Carb.	Throttle Opening	Gauge No.
Chevrolet 2066S,SA	.020"	T109-29
Nash 895S,SA, 2368S	Ⓒ.030"	T109-29
Nash 973S, 974S	② .015"	T109-44
Nash 2369S	.018"	T109-44

Ⓒ - Supersedes .033" setting on 895S,SA.
② - Supersedes .030" setting.

Fast Idle Setting: *NOTE—Chevrolet carburetor has manual choke and fast idle adjusted differently.*

Chevrolet—Hold choke valve tightly closed, measure throttle valve opening or clearance between edge of valve and air horn wall on side opposite idle port If opening not correct (see table below), adjust by bending offset portion of choke connector link using bending tool T109-213.

Nash—Remove thermostatic coil housing gasket, and baffle plate (for access to fast idle cam located within choke housing). Open throttle valve partially (to free fast idle linkage), close choke valve fully, close throttle valve. Hold choke valve tightly closed, apply slight tension to throttle lever to remove play from linkage, check throttle valve opening (clearance between edge of valve and carburetor bore on side opposite idle port). If clearance not correct, adjust by bending throttle connector link at lower angle using tool T109-213. Check Unloader.

CONTINUED ON NEXT PAGE

CARTER "YH" (C nt.)

UNLOADER SETTING

NOTE—No Unloader used on Chevrolet 2066S, SA.

Car & Carb.	Choke Opening	Gauge No.
Nash 895S,SA, 2368S	① 1/2"	T109-83
Nash 973S, 974S, 2369S	② 5/8"	T109-85

① - Supersedes 3/16" & 1/4" settings on 895S,SA

② - Supersedes 1/2" setting on 973S, 974S

Unloader: After making fast idle adjustment (above), hold throttle valve in wide open position and close choke valve as far as possible *(CAUTION—do not* force valve beyond point where it is held open by unloader arm). Check choke valve opening (clearance between lower edge of wall and air horn wall). If clearance not correct, adjust by bending choke shaft unloader arm using tool T109-105.

CHOKE SETTING

NOTE—Choke on Chevrolet 2066S, SA is manual type.

Car & Carb.	Choke Setting
Nash 895S (Early) ①	1 Point Lean
Nash 895SA (Later) ②	1 Point Rich
Nash 973S, 974S (Early) ③	1 Point Lean
Nash 973S, 974S (Later) ④	2 Points Lean
Nash 2368S	1 Point Rich
Nash 2369S	2 Points Lean

① - With One-Piece Choke Piston, Carter No 160-35

② - With Two-Piece Choke Piston, Carter No 160-116S

③ - "N" Coil No 170N-250S See *Production Change above*

④ - "P" Coil No 170P-250S See *Production Change above*

THROTTLE VALVE SETTING: ***See OVERHAUL data for throttle valve installation.*** With valve correctly installed, Idle Port Height (top of port above top edge of valve) and Vacuum Spark Port (bottom of horizontal port above top edge of valve) with throttle valve tightly closed should be:

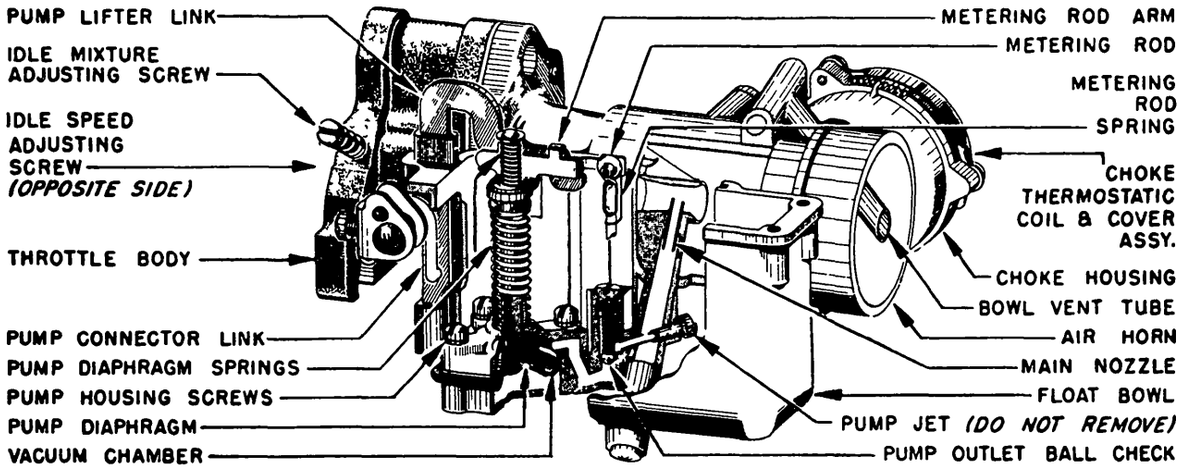
THROTTLE VALVE SETTING

Car & Carb.	⑪Idle Port	Vacuum Spark Port
Chevrolet 2066S, SA	124- 128"	⑫ 026-.036"
Chevrolet 2066SA⑬	.124- 128"	⑪.016- 026"
Nash (All)	124- 128"	⑫ 026- 036"

⑪—Top of port above top edge of valve
⑫—Bottom of port above top edge of valve
⑬—Late production carburetors.

OVERHAUL (With Carburetor removed from engine):

Disassembly: Remove bowl strainer nut and gasket, take out inlet screen. Remove bowl cover assembly (bowl cover, float, intake needle and seat). Remove choke connector rod, throttle shaft arm assembly,



CARTER "YH" HORIZONTAL CARBURETOR

and pump connector link. Take out throttle valve screws, remove valve, remove throttle shaft by carefully tapping it through shaft retaining ring. Take out attaching screws and remove body flange assembly (throttle body) and gasket Unscrew idle mixture adjusting screw and spring. Use tool T109-210 to remove idle passage rivet plug. Take out four diaphragm housing attaching screws, lift out entire diaphragm and metering rod assembly, disassemble this unit. Remove pump intake passage plug and ball check from diaphragm housing. Remove metering rod jet, pump discharge check plug, spring, ball, and low speed jet. Take out attaching screws and remove climatic control and housing assembly, remove gasket, baffle plate, and fast idle link. Take out choke valve attaching screws, remove choke valve, revolve choke shaft counter-clockwise until piston clears cylinder, remove choke shaft, fast idle cam, and piston as an assembly. Take out attaching screw and remove choke piston housing assembly and gasket. Remove all passage plugs.

►***CAUTION—DO NOT remove Nozzle, Bowl Vent, Tube, Economizer, Passage Bushings, or Pump Jet.***

Cleaning & Inspection: Wash all parts except climatic control coil and housing assembly in cleaning solution. Remove all carbon from flange bore, blow out all passages with compressed air. If choke piston is not free in cylinder, remove welch plug from bottom of housing and clean out all carbon and dirt from cylinder walls and grooves. Install NEW welch plug **air tight.** Inspect all parts for wear or damage.

Reassembly: Use all NEW gaskets. Reassemble parts by reversing order of disassembly procedure (above) and note the following points:

Throttle Valve & Shaft Installation—After throttle valve shaft installed in body, back off throttle stopscrew, install throttle valve with trademark (c in circle) toward idle port when viewed from manifold side of body, insert screws loosely, tap valve lightly to center it in bore before tightening screws. ***See Throttle Valve Setting (above).*** Install throttle centering washer (prongs outward) while pressing on shaft at lever end, press washer tight against casting (use drive end of 3/8" drive 1/2" socket to press washer in place). Check throttle shaft for free operation after centering washer installed.

Pump Diaphragm Installation—Make certain that discharge hole in diaphragm is aligned with passage in diaphragm housing, install the four attaching screws through housing holes and diaphragm so that it is held smoothly against housing. After baffle plate installed in fuel bowl, install diaphragm assembly in the bowl and tighten the attaching screws evenly. Check for free operation.

Climatic Control Installation—After choke piston housing and gasket installed on body, install choke shaft, fast idle cam, and piston assembly in air horn and check for free operation (if shaft binds loosen housing attaching screws and align housing). Install choke valve so that trademark (c in circle) is visible when valve closed, use new attaching screws, tap valve lightly before tightening screws.

SERVICE PARTS: Gasket Set - Carter No 223 or 227 (895S,SA 973S, 974S), No 248 (3066S,SA), No 284 (2368S), No 284A (2369S)

Recarburetion Kits (Repair Packag) - Carter No 1713 or 1719 (895S,SA), No 1754 (973S, 974S), No 1771 (2066S,SA), No 1830 (2368S)

CARTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Metering Rod No. Std.	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Sizes Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
BUICK													
40	1954	2081S, SA	75-1107 (1)	75-968 (2)	75-969	#43	120-159		(19)	#69	11-245S	#70	48-208S
40	1955	2179S	75-1138	75-1152	75-1153	#43	120-159		(10)	#66 (31)		#70	48-208S
40	1955	2292S	75-1187			.086"	120-165		(10)	.028"	11-181S	#72	48-236
40 Synchro-mesh	1956	2378S	75-1239	75-1245	75-1246	.086"	120-165		(10)	.028"	11-181S	#70	(51) 48-249
40 Dynaflow	1956	2400S	75-1238	75-1246	75-1234	.086"	120-165		(10)	.028"	11-181S	#70	(51) 48-249
40 Synchro-mesh	1957	2529S	75-1371 (60)	75-1348	75-1367	.090"	120-203		(10)	.0292"	11-245S	.031"	48-266
40 Dynaflow	1957	2536S	75-1346	75-1368	75-1369	.090"	120-203		(10)	.025"	11-304S	.0292"	48-252
40 Synchro-Mesh	1958	2674S	75-1422	75-1386		.090"	120-203		(10)	.0292"	11-245S	.031"	48-266
40 Dynaflow (Early)	1958	2675S	75-1346	75-1386		.090"	120-203		(10)	.026"	11-293S	.0292"	48-252
40 Dynaflow (Later)	1958	2845S	75-1346	75-1386		090"	120-203		(10)	.026"	11-293S	.0292"	48-252
4400 Synchro-mesh	1959	2837S	75-1438			.090"	120-203		(10)	0292"	11-245S	.031"	48-266
4400 Dynaflow	1959	2838S	75-1439			.090"	120-203		(10)	.026"	11-293S	.031"	48-266
4400 Synchro-mesh	1960	2979S,SA	75-1478	75-1483	75-1484	.090"	120-240		(10)	.0295"	11-319S	.031"	48-266
4400 Dynaflow	1960	2980S,SA	75-1479	75-1485	75-1486	.090"	120-240		(10)	.0295"	11-319S	.031"	48-266
CHECKER SUPERBA													
Model A10	1960	2858S	75-1384S			.1065"	120-171		(10)	.028"	11-290S	.028"	
CHEVROLET													
Corv. 6 Cyl.	1954-55	2066S,SA	75-936			.082"	120-158		(10)	#70	11-202S		
CHRYSLER													
V8 C63-1	1954	2039SA	75-933	75-934	75-935	.089"	120-159		(10)	.0295"	11-235S	.0315"	48-204S
HUDSON													
4D (19)	1954	749S	75-704	75-712	75-713	.1015"	120-15S	(11)	12-280S	#65	11-165S	#72	48-72
5D, 7D	1954	2115S	75-732	75-980	75-741	.089"	120-159		(10)	#68	11-183S	#74	48-174S
4D, 5D (20)	1954	2114S	75-956	75-977	75-978	.1015"	120-15S	(11)	12-280S	#66	11-258S	#74	48-74
7D (20)	1954	2113S	75-955	75-974	75-975	.1015"	120-15S	(11)	12-280S	#66	11-258S	#74	48-74
Hornet V8	1955	2231S	75-1166	75-1191	75-1192	089"	120-159		(10)	#69	11-238S	#72	48-234S
Wasp Std.	1955-56	2009SA	75-914	75-920	75-921 (32)	1015"	120-191S	(11)	12-280S	#65	11-206S	#68	48-87
Wasp (20)	1955-56	2013S	75-878	75-904	75-905 (17)	.096"	120-17S	(11)	12-280S	#68	11-169S	#68	48-87
Hornet 6	1955-56	2252S	75-1169	75-1193	75-1194	.086"	120-165		(10)	#67	11-211S	#70	48-157S
Hornet 6 (20)	1955-56	2113S	75-955	75-974	75-975 (34)	.1015"	120-15S	(11)	12-280S	#66	11-258S	#74	48-74
Hornet Spec. V8	1956	2352S	75-1285 (52)	75-1310	75-1311	.086"	120-165		(10)	#66	11-198S	#72	48-234S
Hornet V8	1956	2231S, SA	75-1166	75-1191	75-1192	.089"	120-159		(10)	#69	11-238S	#72	48-234S
NASH													
Stsmn (21)	1954	2098S	75-958	..	.	.102"	120-170		(10)	#71	11-161S	#69	
Stsmn (22)	1954	2137S, SA	75-992	...	.	.098"	120-163		(10)	#70 (41)	11-202S	#69	
Stsmn (23)	1954	2163S	75-1128 (14)	75-1130	75-1131	.090" (15)	120-203		(10)	#71	11-161S	#68	
Amb	1954	895SA	75-852	75-865	75-866	.098"	120-163	.086"		#70	11-202S	#68	
Amb. (24)	1954	973S, 974S	75-1127 (16)	75-894	75-895	.089"	120-159		(10)	#70	11-202S	#68	
Healey (24)	1954	973S, 974S	75-1127 (16)	75-894	75-895	.089"	120-159		(10)	#70	11-202S	#68	

(1) Supersedes 75-994 used on first 2081S carburetors
(2) 1 Size Rich No 75-1122
(10) Nozzle Installed Permanently - DO NOT REMOVE.
(11) Nozzle Assembly, Inner Nozzle No. 31 (.120"), Outer Slip Nozzle .110".
(14) Supersedes No. 75-1111
(15) Supersedes No. 120-155 (091")
(16) Supersedes No. 75-845
(17) Three Sizes Lean No. 75-906.
(19) With 232" Engine (No. 2115S with 262" Engine).
(20) Twin H-Power Cars (Two Carburetors).
(21) First Cars (Two Carburetors of Same Type).
(22) Later Cars (Two Carburetors of Same Type).
(23) Latest Cars (Two Carbs.) can be used to replace 2098S or 2137S, SA.
(24) Dual Jet Fire Engine (Two Carbs. 973S Front, 974S Rear).
(31) Was No 69 Part No 11-269S
(32) – Three Sizes Lean No. 75-922.
(34) Three Sizes Lean No. 75-976.
(41) Supersedes No. 11-163S.
(51) – Supersedes No. 48-236 (#72).
(52) – Supersedes No. 75-1265.
(60) - Supersedes 75-1348 (now 1 size lean).

CARTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Metering Rod No. Std.	Metering Rod No. 1 Size Lean	Metering Rod No. 2 Size Lean	Metering Rod Jet Size	Metering Rod Jet Part No.	Main Nozzle Size	Main Nozzle Part No.	Low Speed Jet Size	Low Speed Jet Part No.	Pump Jet Size	Pump Jet Part No.
NASH (Continued)													
Statesman	1955	2061S	75-1158			091'	120-155		(10)	#70	11-181S	#74	48-113S
Statesman (38)	1955	2258S	75-1162			090"	120-203		(10)	#70	11-163S	#68	-
Amb 6	1955	895SA	75-852	75-865	75-866	098"	120-163	086'		#70	11-202S	#68	
Amb 6 (24)	1955	973S, 974S	75-1127	75-894	75-895	089"	120-159		(10)	#70	11-202S	#68	
Amb V8	1955	2231S	75-1166	75-1191	75-1192	.089"	120-159		(10)	#69	11-238S	#72	48-234S
Statesman	1956	2350S	75-1243	75-1290	75-1291 (53)	.089"	120-159		(10)	#71	11-293S	#67	48-247S
Amb. 6	1956	2368S	75-1244	75-1294	75-1295	.089"	120-159		(10)	#69		#70	
Amb. 6 (54)	1956	2369S	75-1250			.089"	120-159		(10)	#65		#76	
Amb. Spec. V8	1956	2352S	75-1285 (52)	75-1310	75-1311	.086"	120-165		(10)	#66	11-198S	#72	48-234S
Amb. V8	1956	2231S, SA	75-1166	75-1191	75-1192	.089"	120-159		(10)	#69	11-238S	#72	48-234S
OLDSMOBILE													
88	1954	2058S	75-993			.086"	120-165		(10)	#67	11-211S	#70	48-157S
PACKARD													
5400	1954	986S	75-722	75-767	75-768	089"	120-159		(10)	#67	11-211S	#74	48-169S
5401, 11	1954	2102S	75-767	75-814	75-815	089"	120-159		(10)	#67	11-211S	#74	48-169S
5640	1956	2393S	75-1223			.086"	120-165		(10)	.032'	11-211S	#72	48-195S
PONTIAC													
6	1953-54	2010S	75-910 (20)	75-945	75-946	082"	120-158		(10)	#66	11-191S	#74	48-113S
Six	1954	2010S	75-910	75-945	75-946	.082"	120-158		(10)	#66	11-191S	#74	48-113S
Eight (25)	1954	719SA	75-664	75-683	75-684	.082"	120-65S		(10)	#68	11-183S	#74	48-143S
Eight (26)	1954	720SA	75-664	75-683	75-684	082"	120-65S		(10)	#68	11-183S	#74	48-143S
Eight (27)	1954	2122S	75-986	75-1109	75-1110	.082"	120-65S		(10)	#66	11-261S	#74	48-143S
V8 (39)	1955	2207S, SB	75-1135	75-1172	75-1173	086'	120-165		(10)	#66	11-198S	#74	48-169S
V8 (40)	1955	2182S, SA, SB	75-1136	75-1174	75-1175	086"	120-165		(10)	#70	11-199S	#74	48-169S
RAMBLER													
Rambler	1954-955	2014S	75-779	75-793	75-794	102'	120-170		(10)	#70	11-202S	#65	-
Rambler	1956	2349S	75-1319 (55)	(56)	(57)		(58)		(10)	#70	11-290S	#70	
5710	1957	2564S	75-1366S (61)	75-1389S	75-1408U (64)	1065"	120-171		(10)	.0292"	11-303S	.028"	
5710	1957	2580S	75-1366S (61)	75-1389S	75-1408U (64)	1065"	120-171		(10)	.0292"	11-303S	.028"	
5710 (Early)	1957	2350S	75-1243	75-1290	75-1291	.089"	120-159		(10)	026"	11-293S	.032"	48-247S
5710 (Later)	1957	2586S	75-1243	75-1290	75-1291	.089"	120-159		(10)	.026"	11-293S	.032"	48-247S
5710 (Auto. Trans.)	1957	2664S	75-1384S (63)	75-1389S	75-1408U (64)	.1065"	120-171		(10)	.0292"	11-303S	.028"	
5710 (Std. & O.D.)	1957	2665S	75-1384S (63)	75-1389S	75-1408U (64)	.1065"	120-171		(10)	.0292"	11-303S	.028"	
5720	1957	2352S,SA	75-1285 (62)	75-1310	75-1311	.086"	120-165		(10)	.033"	11-198S	025"	48-234S
5801 (S M & O D)	1958	2014S	75-779	75-793	75-794	102"	120-170		(10)	028"	11-202S	035"	
5801 (Auto Trans)	1958	2757S	75-779	75-793	75-794	102"	120-170		(10)	028"	11-202S	035"	
5810 (S M & O D)	1958	2665S	75-1384S	75-1389	75-1408U (64)	1065"	120-171		(10)	0292"	11-303S	028"	
5810 (S M & O D)	1958	2749S	75-1384S	75-1389S	75-1390S	1065"	120-171		(10)	.0292"	11-303S	028"	
5810 (Auto Trans)	1958	2664S	75-1384S	75-1389S	75-1408U (64)	1065"	120-171		(10)	0292"	11-303S	028"	
5810 (Auto Trans)	1958	2748S	75-1384S	75-1389S	75-1390S	1065"	120-171		(10)	0292"	11-303S	028"	
5810 Power Pack (S M)	1958	2350S	75-1243	75-1290	75-1291	089"	120-159		(10)	026"	11-293S	032"	48-247S
(Auto Trans)	1958	2586S	75-1243	75-1290	75-1291	089"	120-159		(10)	026"	11-293S	032"	48-247S
5901,6001 American	1959-60	2014S	75-779	75-793	75-794	102"	120-170	(10)		028"	11-202S	035"	
5910,6010 Power Pack	1959-60	2887S, SA	75-1431			089"	120-159	(10)		026"	11-293S	0292"	48-282S (70)

(10) Nozzle Installed Permanently - DO NOT REMOVE
(20) Supersedes No 75-873
(24) Dual Jet Fire Engine (Two Carbs 973S Front, 974S Rear)
(25) Used on first Synchro-mesh Trans. Cars
(26) Used on later Synchro-mesh Trans Cars, and some Hydra-Matic Cars
(27) Used on Hydra-Matic Cars (Except 720SA on some cars)
(38) Super Powerflyte (Two Carburetors)
(39) Synchro-mesh Trans Cars
(40) Supersedes No 75-831 (used on first 895S Carburetors)
(52) – Supersedes No. 75-1265.
(53) – Three Sizes Lean No. 75-1292.
(54) – Ambassador Dual Jet Fire (2 Carburetors).
(55) – Supersedes No. 75-1215S
(56) – One Size Lean Pkg. 75-1308U (Metering Rod 75-1304S & Power Jet Rod 16-13).
(57) – Two Sizes Lean Pkg. 75-1309U (Metering Rod 75-1305S & Power Jet Rod 16-13).
(58) – Metering Rod Jet 120-163 (.098"), & Power Jet 230-10(.076") used with Power Jet Rod 16-12
(61) - Supersedes 75-1332S. (62) - Supersedes 75-1265.
(63) - Supersedes 75-1388S. (70) - Supersedes No 48-247S
(64) - Kit consists of 1 Power Jet Rod 16-33 and 1 Metering Rod Assembly 75-1390S

CARTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Metering Rod No.			Metering Rod Jet		Main Nozzle		Low Spd. Jet		Pump Jet	
			Std.	1 Size Lean	2 Sizes Lean	Size	Part No.	Size	Part No.	Size	Part No.	Size	Part No.
STUDEBAKER													
Champ (28)	1954	989SA	75-902	75-917	75-918	.095"	120-129S	(12)	12-263	#68	11-242S	#74	48-202
Champ (31)	1954	2108S	75-902	75-917	75-918	095"	120-129S	(12)	12-263	#65	(13) 11-165S	#74	48-202
Champ (33)	1954	2190S	75-917	75-918	75-919	.095"	120-129S	(12)	12-263	#65	11-165S	#74	48-202
Champ	1955	2108S	75-902	75-917	75-918	095"	120-129S	#30	12-263	#65	11-165S	#74	48-202
Champion Early	1956	2108S	75-902	75-917	75-918	.095"	120-17S	#30	12-263	#65	11-165S	#74	48-202
Champion Late	1956	2417S	75-902	75-917	75-919	.095"	120-17S	#30	12-263	#68	11-242S	#74	48-202
Champion	1957	2417S	75-902	75-917	75-918	095"	120-17S	.1285"	12-263	.031"	11-242S	0225"	48-202
6 Cyl (Exc Econ-O-Miler)	1958	2417S	75-902	75-917	75-918	095"	120-129S	1285"	12-263	031"	11-242S	0225"	48-202
59S Lark 6	1959	2876S	75-1444S	75-1449S	75-1450S (65)	095"	120-167		(10)	033"	11-316S	0225"	
60S Lark (Early)	1960	2934S	75-1487S	75-1459S	75-1460S (71)	.0995"	120-159		(10)	033"		024"	
60S Lark (Late)	1960	2934SA	75-1509S	75-1459S	75-1460S (71)	0995"	120-159		(10)	033"		024"	
WILLYS													
Jeep	1954	938SA	75-996	75-1114		091"	120-155		(10)	#70	11-163S	#72	
4 Cyl.	1954	951S	75-806	75-808		096"	120-160		(10)	#70	11-161S	#72	
675	1954	937S	75-749	75-783	75-784	0935	120-166		(10)	#70	11-2023	#75	
685	1954	2071S	75-804	75-840		098'	120-163		(10)	#70	11-163S	#72	
6-226	1954	2052S	75-901	75-948	75-949	086'	120-165		(10)	#70	11-199S	#74	48-212S
Jeep	1955	938SA	75-996	75-1114		091	120-155		(10)	#70	11-161S (17)	#72	
4 Cyl "F" Hd	1955	951S	75-806	75-808		096	120-160		(10)	#70	11-161S	#72	
6 Cyl "L" Hd	1955	2204S	75-1129	75-1142	75-1190	086'	120-165		(10)	#68	11-183S	#72	48-171S
6 Cyl "F" Hd	1955	2071S	75-804	75-840		098'	120-163		(10)	#70	11-163S	#72	
Jeep	1956	938SA	75-996	75-1114		.091"	120-155		(10)	#70	11-163S	#68 (59)	
Jeep Disp.	1956	2392S	75-708	75-720		.096"	120-160		(10)	#68	11-160S	#72	
4 Cyl. "F" Head	1956	951S	75-806	75-808		.096"	120-160		(10)	#70	11-161S	#72	
6 Cyl. "L" Head	1956	2204S	75-1129	75-1142	75-1190	.086"	120-165		(10)	#68	11-183S	#72	48-171S
6 Cyl. "L" Head	1956	2467S	75-1279	75-1339	75-1340	.098"	120-163		(10)	#70	11-256S	#70	
Dispatcher	1957-58	2392S	75-708	75-720		096"	120-160		(10)	031"	11-160S	025"	
Universal Jeep	1957-58	938SA	75-996	75-1114	75-1400	091"	120-155		(10)	028"	11-163S	031"	
4-Wheel Drive	1957-58	951S	75-806	75-808		096"	120-160		(10)	028"	11-161S	025"	
FC-150	1957-58	938SA	75-996	75-1114	75-1400	091"	120-155		(10)	028"	11-163S	031"	
Utility 6 Cyl, FC-170	1957-58	2467S	75-1279	75-1339	75-1340	098"	120-163		(10)	028"	11-256S	028"	
Jeep Dispatcher	1959	2392S	75-708	75-720		096"	120-160		(10)	031"	11-160S	025"	
Jeep & FC-150 (Early)	1959	938SA	75-996 (69)	75-1114	75-1400	091"	120-155 (69)		(10)	028"	(66) 11-163S	031" (68)	
Jeep & FC-150 (Late)	1959	938SC	75-1436			0935"	120-166		(10)	028"	(66) 11-163S	031"	
FC-170 Fwd Contr	1959	2467S	75-1279	75-1339	75-1340	098"	120-163		(10)	028"	11-256S	028"	
Utility 4 Cyl	1959	951S	75-806	75-808	(67)	096"	120-160		(10)	028"	(66) 11-163S	025"	
Utility 6 Cyl	1959	2467S	75-1279	75-1339	75-1340	098"	120-163		(10)	028"	11-256S	028"	
Jeep Dispatcher	1960	2392S	75-708	75-720		096"	120-160		(10)	031"	11-160S	025"	
Jeep & FC-150 (Early)	1960	938SC	75-1500 (71)			0935"	120-166		(10)	028"	11-163S	031"	
Jeep & FC-150 (Late)	1960	938SD	75-1500			0935"	120-166		(10)	028"	11-163S	031"	
FC-170 Fwd Cont	1960	2467S	75-1279	75-1339	75-1340	098"	120-163		(10)	028"	11-256S	028"	
Utility 4 Cyl (Early)	1960	951S	75-1500 (73)	75-806	(67)	096"	120-166 (72)		(10)	028"	(66) 11-163S	025"	
Utility 4 Cyl (Late)	1960	951SA	75-1500	75-808	(67)	0935"	120-166		(10)	028"	11-163S	031	
Utility 6 Cyl	1960	2467S	75-1279	75-1339	75-1340	098"	120-163		(10)	028"	11-256S	028"	

(10) Nozzle Installed Permanently - DO NOT REMOVE
(12) Diameter No 30, Top hole 035", Lower hole 089'
(13) Supersedes No 11-242S
(17) Superseded by No 11-163S.
(28) First Cars Only
(31) Later Cars (Except later Custom Models).
(33) Custom Models only (later cars)
(59) — Supersedes #72 (to correct Off-idle Stumble).
(65) - 3 Sizes Lean No 75-1451S
(66) - Supersedes No 11-161S
(67) - 1 Size Rich No 75-913
(68) - Pump Jet Size 025" on early 938SA
(69) - Unitized Pkg 75-1440U will convert 938SA to 938SC Consists of Metering Rod 75-1436, Metering Jet 120-166, and Pump Discharge Check Needle 17-78
(71) - Supersedes No 75-1436
(72) - Supersedes No 120-160
(73) - Supersedes No 75-806

CARTER BBR1 CARBURETORS

STUDEBAKER	Cart r Carbur t r N .
1957 Champion Scotsman	BBR1 2724S
1958 Scotsman	2764S, ① 2724S
1958 Econ-O-Miler (Taxicab), Early	2724S
1958 Econ-O-Miler (Taxicab), Late	2808S

① - Optional

DESCRIPTION: Single barrel downdraft carburetor with manual choke control. Same design as other Carter (B&B) Downdraft carburetors with vacuum controlled step-up jet or power orifice.

ADJUSTMENTS: *Set carburetor to the following specifications.*

Idle Setting: Adjust only with engine at normal operating temperature (choke valve wide open).

Idle Mixture - ½-1½ turns open. Turn screw out for richer mixture.

Idle Speed: 550-600 RPM (Synchro-mesh, 550 RPM (Flightomatic), with selector lever in "N" or "P" position.

Accelerating Pump: Check pump stroke setting after carburetor overhaul, adjust pump for seasonal requirements as indicated.

Seasonal Setting - Three holes provided in throttle lever for pump lifter link engagement as follows

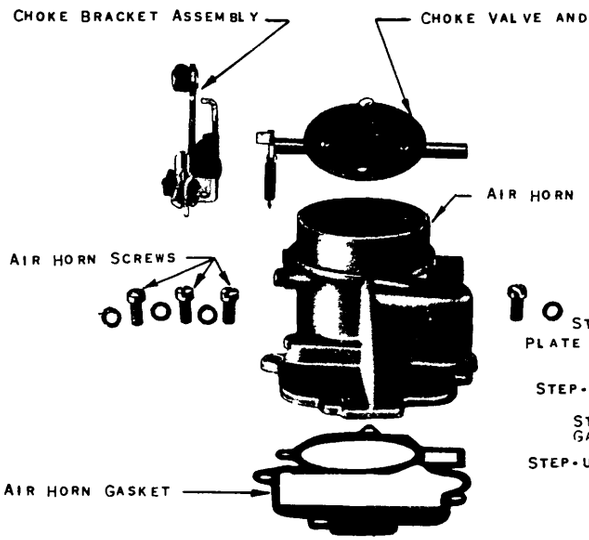
Center Hole - Normal operation (medium stroke). **Outer Hole** - Cold weather operation (long stroke). **Inner Hole** - Hot weather operation (short stroke).

Pump Stroke Setting - To check stroke, remove air horn assembly, make certain pump link is connected in center hole of throttle lever (2724S, 2764S), inner hole (2808), then back off throttle stopscrew so that throttle valve is fully closed Place pump travel gauge, T109-117S, on upper edge of body casting at pump cylinder, turn gauge until projecting finger contacts top of pump plunger shaft and note gauge reading Open throttle wide with pump plunger pressed to bottom of pump cylinder, then take second gauge reading. Difference between the two readings is pump stroke and should be "32" (32/64") for 2724S & 2764S carbs , "14" (14/64") for 2808S carb To adjust stroke, bend horizontal portion of pump link arm

Float Level: 5/64" (2724S, 2764S), 1/8" (2808S) from top of float bowl to top of float with needle valve seated To adjust, bend lip on float arm

Step-up (Power) Valve: No adjustment provided. Vacuum piston should operate freely and clearance between step-up rod and top of piston plate should be .010" minimum with piston pushed all the way down *(CAUTION* - This clearance necessary to permit spring to fully close step-up jet). Adjust clearance by bending plate slightly.

Fast Idle: No adjustment required Consists of a fast idle cam serving as a stop for the throttle lever stopscrew Fast idle cam is linked to choke valve and is rotated to fast idle position when choke valve is closed for cold starting



CARTER BBR1 CARBURETOR

Choke: Manual type Choke valve has poppet type relief valve

Throttle Valve Setting: When installing throttle valve, insert attaching screws loosely, then close valve completely and tap it lightly to centralize it in bore, tighten attaching screws securely. Check throttle valve position.

Throttle Valve Setting

Carb.	① Idle Port	Vacuum Spark Port
2724S, 2764S	133- 137"	② 007- 013"
2808S	096- 100"	③ 011- 021"

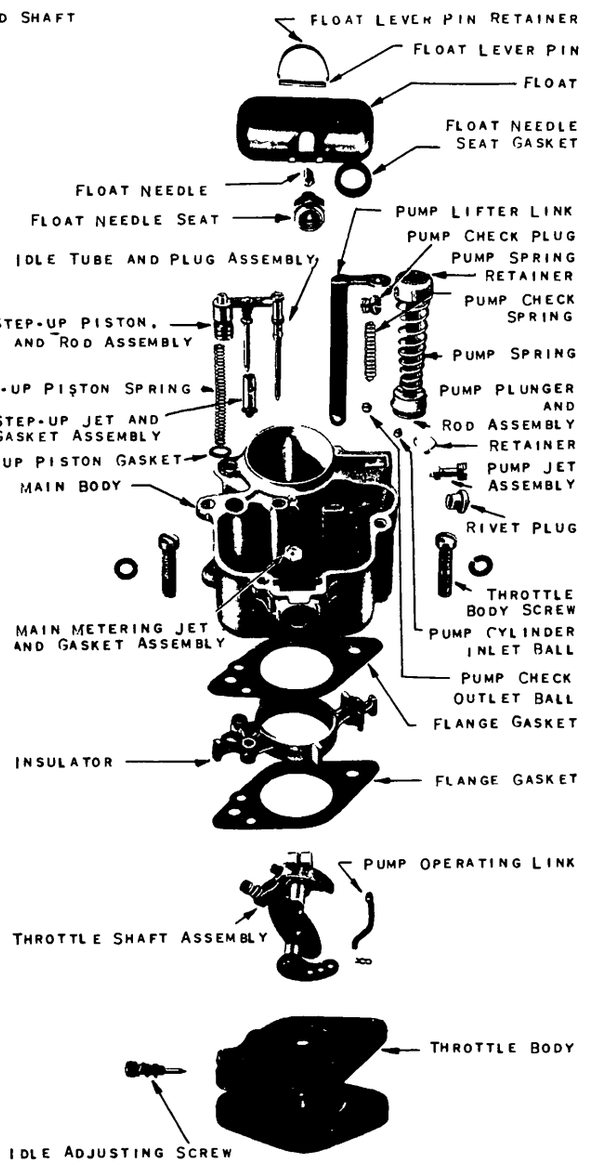
① - Top of port above top edge of valve with valve tightly closed
② - Top of port below lower edge of valve
③ - Bottom of port above top edge of valve

JET SPECIFICATIONS

Part	Size	Part No.
Main Jet (2724S, 2764S)①	②	159-59S
Main Jet (2808S) ③	⑪	159-70S
Main Vent (2724S, 2764S)	0315"	145-72
Main Vent (2808S)	0315"	145-39
Step-up Jet (2724S, 2764S)	.037"	149-43S
Step-up Jet (2808S)	026"	149-50S
Idle Tube (2724S, 2764S)	0276"	123-31S
Idle Tube (2808S)	0256"	123-57S
Pump Jet (2724S, 2764S)	0276"	48-103
Pump Jet (2808S)	0236"	48-81

① - 1 size lean 159-61S, 2 sizes lean 159-66S, 3 sizes lean 159-82S
② - Flow 268-272cc per minute
③ - 1 size lean 159-68S
⑪ - Flow 170cc per minute

OVERHAUL: *See "Carter (B&B) Downdraft" Carburetor and note th following*



Main Vent Tube Replacem nt - Remove rivet plug at lower end of vent tube passage below float bowl (use Tool T109-143), remove main vent tube through this opening, install new main vent tube using Tool T109-195 *(CAUTION* - Tube must seat tightly in body), install new rivet plug to close passage.

SERVICE PARTS: Gask t Set - Carter No 192 (2724S, 2764S) No 324 (2808S)

R pair Packag (With Standard Met ring J t) - Carter No 1798 (2724S, 2764S)

CARTER (B&B) DOWNDRAFT TYPE

CHRYSLER SIX	Carter No.
1954 C62 (Synchro-mesh Trans.)	E9C1
1954 C62 (PowerFlite Trans.)	E9B1
DE S T	
1954 S20 (Synchro-mesh Trans.)	E9C1
1954 S20 (PowerFlite Trans.)	E9B1
1954 S20 (City Traffic)	⑧E7W1
DODGE	
1954 D51, 2 ⑨ (Synchro-mesh Trans.)	E9TI
1954 D51, 2 ⑨ (Overdrive Trans.)	E9N1
1954 D51, 2 ⑨ (Gyro-Matic Trans.)	E9V1
1954 D51, 2 ⑨ (PowerFlite Trans.)	E9U1
PLYMOUTH	
1954 P25 ⑨ (Synchro-mesh Trans.)	D6H2
1954 P25 ⑨ (Overdrive Trans.)	D6U1'
1954 P25 ⑨ (Hy-Drive Trans.)	D6P2
1954 P25 ⑨ (Taxicab)	D6R1
1954 P25 ⑨ (City Traffic)	⑧D6N2

⑧—With "Throttle Restrictor."
⑨—Early 1954 cars only. (See Carter "BBS" for later cars).

►CHANGES, CAUTIONS, CORRECTIONS

►**Carburetor Mounting Flange Gasket Caution (For all Models):** Step-up jet vacuum piston vacuum passage terminates at carburetor mounting flange and special slotted type gasket must be used when mounting carburetor on manifold CAUTION—Use of plain or solid type gasket will shut off vacuum passage and cause excessive fuel consumption complaints.

►**Engine Stalling while Idling Correction**—Check idle setting (see below). Check slow-closing throttle adjustment (first type only) as directed in article on Chrysler Slow-closing Throttle in Carburetion Equipment Section. Remove Idle Orifice Tube and Plug Assembly and clean tube and passages with compressed air. Remove idle adjusting screw and blow out idle ports with air.

►**Carburetor Loading Up Complaints**—Check and adjust float level.

►**Engine Stalling or Stumbling when Throttle Opened**—May be caused by accelerating pump leakage (worn or wrinkled pump leather, inlet or outlet ball check valves not seating). To check pump for leakage, remove bowl cover, float, pump outlet ball check valve plug, and pump assembly. Fill pump cylinder with gasoline and re-install pump plunger, taking care not to wrinkle or damage pump leather. Hold outlet ball check valve firmly on seat (use brass rod inserted through valve plug hole), press down on pump plunger. Leakage will be evidenced by gasoline at inlet or outlet ball check valves or above pump plunger. If pump plunger can be pushed all the way down and all gasoline discharged from the cylinder, replace pump plunger or reseat ball check valves by tapping on ball with a brass rod. Install new ball (original ball will be flattened by reseating operation) and repeat check. Repeat reseating operation if necessary. remove pump jet and clean with compressed air or install new jet.
CAUTION—Ball check valves are relatively soft (inlet ball Monel, outlet ball Stainless Steel) and any ball used in reseating operation should be replaced for service.

►**Poor Gasoline Mileage (Economy) Complaints**—Check float level. See that the main metering jet is correct type and not worn (special lean metering jets available for special service such as high altitudes or high test fuel). See that step-up jet tight on seat and not leaking, make certain that step-up valve rod and piston clean and not binding or sticking, check step-up piston spring (replace spring if weak or damaged). Check for clogged main vent tube (will cause excessive richness and poor gasoline mileage at speeds above 50 MPH.).

DESCRIPTION

DESCRIPTION: Plain tube, downdraft type with balanced bowl vent (bowl vented through tube cast in air horn), throttle operated accelerating pump, and vacuum controlled step-up jet or power orifice. Some models have special features:

Throttle Restrictor (D6N1, D6N2, E7V1, E7W1)—Restrictor consists of a hemispherical casting bolted on top and bottom of throttle valve (special studs used instead of regular throttle valve mounting screws) to provide control similar to a governor action. *See Throttle Valve Setting (below).*

Automatic Choke (E9A1, B1, C, C1)—Carter Climatic Control assembled on carburetor air horn (has integral fast idle mechanism and unloader). *See adjustment data below.*

Fuel System (Idling):—Fuel taken from main nozzle well up through Idle Orifice tube (metered by restriction in tube) to cross-channel in which it is mixed with air admitted through idle air bleed opening in carburetor wall above venturi. From this point fuel mixture is taken down through channel to discharge ports at throttle edge.

Driving Range—Fuel for main nozzle metered by main metering jet in float bowl. Main nozzle air bled by main vent tube in upper end of nozzle which connects with air vent leading to bowl vent. Lower end of nozzle closed by rivet.

High Speed & Wide Open Throttle Operation—Vacuum piston, which is normally at lower end of stroke with piston spring compressed, will be forced up by spring when manifold vacuum falls off, raising the step-up rod or needle and opening the valve, permitting additional fuel to flow through the power orifice (step-up jet) to the main nozzle.

ADJUSTMENT & OVERHAUL

THROTTLE KICK-DOWN SWITCH: *TWO DIFFERENT TYPES used as follows:*
Automatic Transmission Control Kick-down Switch (All Cars with Automatic Transmission)—This switch is built-in the carburetor and does not require attention in service. No adjustment is provided.

Overdrive Control Kick-down Switch (E9N1, D6U1, D6V1): Switch is separate unit mounted on the carburetor and actuated by a lever on the throttle valve shaft. Adjust as directed below. NOTE—On other Overdrive Cars, Kick-down switch is mounted separately and is not part of the carburetor assembly.

Adjustment—Adjust switch position on bracket (loosen one mounting nut on switch stem, tighten opposite nut) for clearance of 1/64-3/64" with throttle valve in wide open position. *CAUTION—Throttle lever must have sufficient overtravel to operate switch.*

VACUUM STEP-UP (ECONOMIZER): No adjustment required but setting should be checked when carburetor reassembled after servicing to insure step-up valve closing. To check, push vacuum piston down in cylinder to end of stroke, check clearance between piston plate and head of step-up valve needle stem. Clearance should be 1/64-1/32". To adjust, bend piston plate slightly.

IDLING ADJUSTMENT: Idle adjusting screw controls fuel discharge through lower idle port and should be turned in for leaner mixture, out for richer mixture. Approximate idle screw settings given in table below. Adjust only with engine warmed up so that choke valve is wide open and fast idle inoperative. Idle speed controlled by throttle lever stopscrew. See tune-up data on car model pages for complete tune-up data on each car model.

IDLE SETTING

Car Model	Carburetor	Idle Setting	Idle Speed
Chrysler 6①	E9C. E9C1	½-1½ turns open	6 MPH.
Chrysler 6④	E9B1. E9A1	½-1½ turns open	475-500 RPM.
De Soto⑤	E7V1. E7W1	½-1½ turns open	6 MPH.
DeSoto①	E9C. E9C1	½-1½ turns open	6 MPH.
DeSoto④	E9B1, E9A1	½-1½ turns open	475-500 RPM.
Dodge①	D6H2, J1, P1, P2, U1, V1	½-1½ turns open	6 MPH.
Dodge④	D6M-1	½-1½ turns open	475-500 RPM.
Dodge①	E9N1, E9T1	½-1½ turns open	6 MPH.
Dodge④	E9U1, E9V1	½-1½ turns open	475-500 RPM.
Plymouth	D6H1, H2, N1, N2, R1, U1	½-1½ turns open	6 MPH.
Plymouth⑥	D6P1, D6P2	½-1½ turns open	450-500 RPM.

①—Cars with Standard Transmission.
④—Cars with Hydraulically Controlled Transmission & Fluid Drive.
⑤—Special City Traffic. ⑥—Hy-Drive Transmission Cars.

FLOAT LEVEL: To check float level, remove air horn (integral with float bowl cover), use special gauge (see Note), placing gauge on top edge of bowl with lugs extending down toward float on either side of soldered seam. Press lip of float lever against needle valve, float should contact both lugs on gauge. Adjust by bending float lever lip slightly at point where it contacts valve needle (do not bend float arm. If gauge not used, measure from top edge of bowl to top of float (not soldered seam). This measurement should be 5/64" for all models except those listed in table below. Float level figures are plus or minus 1/64".

CONTINUED N NEXT PA E

CARTER (B&B) DOWNDRAFT TYPE (C nt.)

FLOAT LEVEL SETTING

Car Model	Carburetor	Float Level	Checking Gauge
Dodge	E9U1	1/16"	T109-49
ALL OTHERS		5/64"	T109-50

►**D6U1, V1, E9B1, N1, U1, V1 FLOAT SETTING CAUTION:** Remove the float pin retainer, hold lip of float arm against seated intake needle and **make certain float pin is at the bottom of its guide slots.**

Float Needle Valve and Seat—Triangular type. Furnished only in matched sets as follows:

FLOAT INLET VALVE

Car Model	Carburetor	Part No.	Intake Hole Size
DeSoto City Traffic	E7V1, E7W1	25-102S	#44
ALL OTHERS		25-82S	#44

ACCELERATING PUMP: Delayed action type (spring operated pump plunger). **Seasonal Adjustment**—Three holes provided in throttle lever for connector link engagement. Inner hole provides minimum stroke, center hole medium stroke, outer hole max. stroke. See car model pages for recommended settings.

Pump Stroke Adjustment—To check, remove air horn and float bowl cover assembly, back off throttle stopscrew so that throttle valve closes tightly, connect pump connector link in correct hole of throttle lever (see table below), install Universal Pump Stroke Gauge T109-117S on bowl so that indicator lip on gauge rests on top of pump plunger shaft. Note gauge reading, then open throttle wide and again note gauge reading. Difference between two readings is pump stroke (in sixty-fourths of an inch) and should agree with table below To adjust, bend horizontal portion of pump connector link

►***EX3, EX3R, E7L3, E7L4, E7W1 (some), E9A1, E9C, E9C1 NOTE***—No pump stroke adjustment required on these models. Make certain that horizontal portion of pump lifter link is at right angles to pump lifter link shaft (bend arm if necessary) using bending tool T109-41.

ACCELERATING PUMP SETTING

Car Model	Carburetor	Pump Stroke	Pump Setting
Chrysler 6 ('51-54)	E9A1, E9C, E9C1, E9B1		See Note (above)
DeSoto ('51-54)	E9A1, E9B1, E9C, E9C1		See Note (above)
Dodge	D6H2, M1, P1, P2, U1, V1	22/64"	Medium Stroke
Dodge	E9N1, E9T1, E9U1, E9V1		See Note (above)
Plymouth	D6H1, H2, D6N1, N2	22/64"	Medium Stroke
Plymouth	D6P1, P2, R1, U1	22/64"	Medium Stroke

THROTTLE VALVE SETTING: When installing valves, insert attaching screws loosely, back throttle stopscrew off, tap valves lightly to centralize in bore, then fasten screws securely.

►***D6N1, D6N2, E7V1, E7W1 CAUTION***—These models have hemispherical throttle restrictors bolted on upper and lower faces of throttle valve. First install valve in usual manner using No. 101-286 Throttle Restrictor Screws (studs) **instead** of usual valve attaching screws, then install restrictors on studs and use special No. 105A-45 Throttle Restrictor Nuts to retain the restrictors.

Setting—With throttle stopscrew backed off so that valve tightly closed, distance from top edge of valve to top of upper idle port should agree with 'Idle Port' figure in table below, and distance from top of valve to top of vacuum spark port should agree with 'Vacuum Spark Port' figure (except as noted).

THROTTLE VALVE SETTING

Car Model	Carburetor	Idle Port Height	Vacuum Spark Port
Chrysler 6	E9A1, E9C, E9C1	.118-.122"	①.012-.018"
DeSoto	E7W1	.118-.122"	①.052-.058"
DeSoto	E9A1, E9C, E9C1	.118-.122"	①.012-.018"
DeSoto Repl. Carb.	E6P5	.088-.092"	①.052-.058"
Dodge	D6H2, M1, P1, P2, U1, V1	.118-.122"	②.021-.027"
Dodge	E9N1, E9T1, E9U1, E9V1	.118-.122"	
Plymouth	D6H1, H2, D6N1, N2	.118-.122"	②.021-.027"
Plymouth	D6P1, P2, R1, U1	.118-.122"	②.021-.027"

①—Top of port above top of valve. ②—Bottom of port above top of valve.

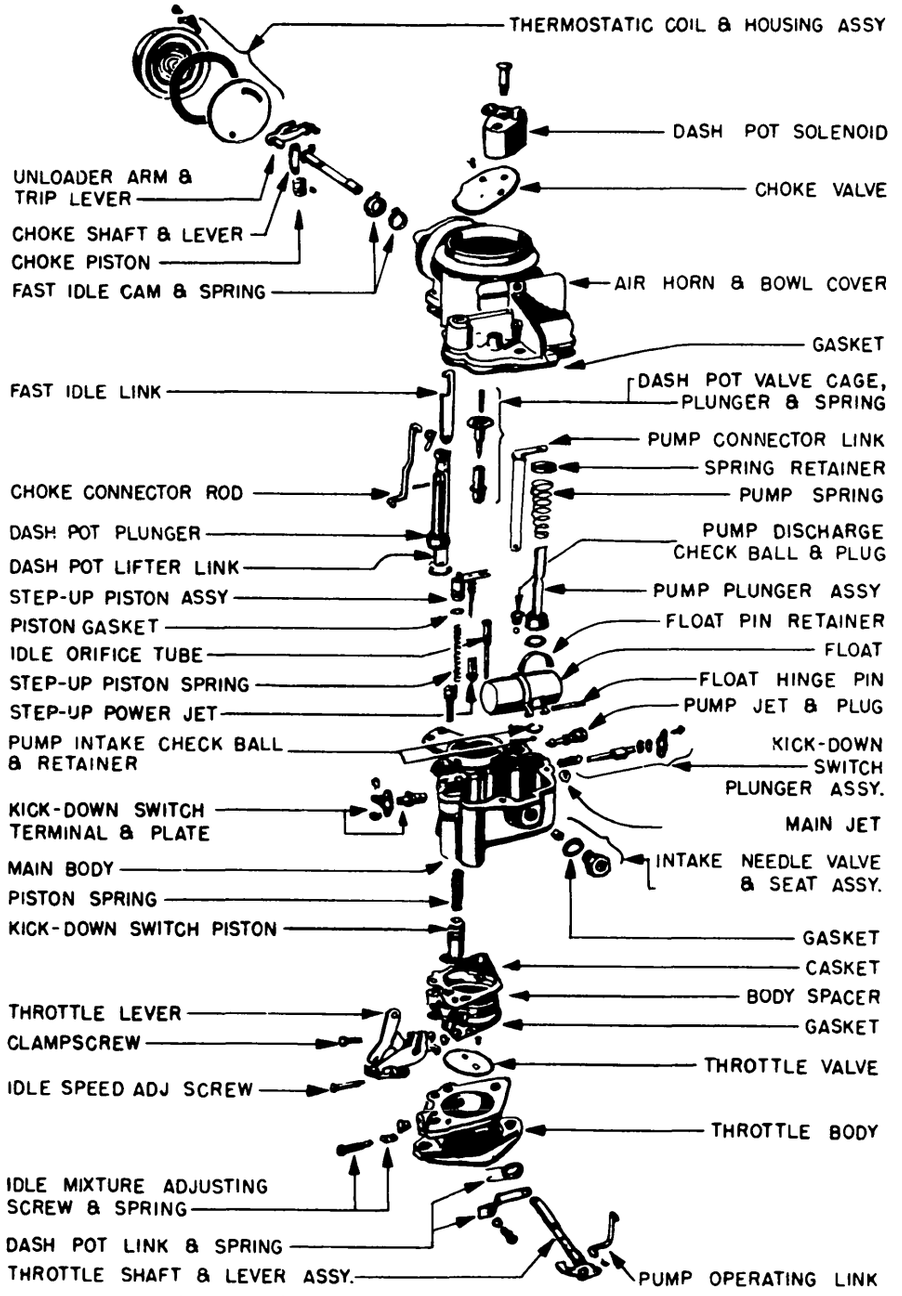
CHOKE (EXCEPT E9A1, B1, C, C1): Offset type with poppet type relief valve. Control on Plymouth models (without Automatic Choke) is semi-automatic (spring-loaded). Sisson Automatic Choke is standard on all models.

CHOKE MODELS E9A1, B1, C, C1): Carter Climatic Control on carburetor air horn.

CHOKE SETTING

Car Model	Carbur tor	Choke Setting
Chrysler 6 & DeSoto	E9A1, E9B1, E9C, E9C1	Centered (At Index)

CONTINUED ON NEXT PAGE



CARTER (B&B) CARBURETOR (WITH AUTOMATIC CHOKE)

Form 40 A

CARTER (B&B) DOWNDRAFT TYPE (C nt.)

►*THERMOSTATIC COIL & HOUSING REMOVAL & INSTALLATION CAUTION*—When servicing carburetor or air cleaner, observe the following precautions to avoid breaking or otherwise damaging the coil housing:
1) Use two wrenches when removing or replacing the heat tube on the housing cover (hold fitting on cover with one wrench while turning coupling nut). Align heat tube with cover fitting to prevent strain on cover.
2) Make certain that gasket installed between air cleaner and carburetor air horn to insure proper clearance.
3) Install air cleaner with indention on underside in line with automatic choke heat tube to provide adequate clearance at this point.

►*THERMOSTATIC COIL ASSY. CAUTION*—Thermostatic coil is mounted on "Delayer Plate" within housing (delayer plate provides longer choke operation during warm-up and prevents choke closing too rapidly after engine stopped). It should not be necessary to remove the coil assembly from the housing for choke servicing, and **coil must not be removed from delayer plate.**

FAST IDLE (EXCEPT E9A1, B1, C, C1): Consists of throttle shaft dog pivoted below the throttle shaft and linked to the choke valve lever so that throttle opened to fast idle position when choke valve closed for starting (dog acts as stop for throttle lever idle speed screw).
No adjustment required.

FAST IDLE (MODELS E9A1, B1, C, C1): Consists of throttle shaft dog pivoted assembly mounted on the choke valve shaft within the Climatic Control housing and linked to the throttle valve lever.

►***CAUTION—Thermostatic Coil Housing, Gasket, and Baffle Plate must be removed to check or adjust the fast idle and unloader.***

Adjustment—To check fast idle setting with thermostatic coil housing, gasket, and baffle plate removed, back out throttle stopscrew so that throttle valve tightly closed. Crack throttle valve, close choke valve completely, then close throttle valve (this will allow fast idle cam to assume fast idle position). Check throttle valve opening or clearance between edge of valve and carburetor wall on side opposite idle port (see table). Adjust by bending choke connector rod at lower angle near throttle lever using tool T109-41. ***Check and adjust Unloader before reassembling choke.***

FAST IDLE SETTING

Car Model	Carburetor	Checking Gauge	Throttle Opening
Chrysler 6 & DeSoto ..	E9A1, E9B1, E9C, E9C1	....T109-44①	.....015-.019"

①—Double-ended gauge (.015" and .018").

UNLOADER (MODELS E9A1, E9C, E9C1): Consists of an arm on choke trip lever in the choke housing which engages a lug on the choke lever and opens the choke valve when the throttle valve is held wide open.

Adjustment—To check unloader with thermostatic coil housing, gasket, and baffle plate removed, hold throttle valve wide open, close choke valve as far as possible (CAUTION—do not force valve closed), measure choke valve opening or clearance between upper edge of valve and air horn wall (see table). Adjust by bending arm on choke trip lever using bending tool T109-187.

UNLOADER SETTING

Car Model	Carburetor	Checking Gauge	Choke Valve Opening
Chrysler 6 & DeSoto	E9A1, E9B1, E9C, E9C1	.T109-154.....	5/32"

OVERHAUL: ***DISASSEMBLY CAUTION—Automatic Choke, slow-closing throttle dashpot, and kick-down switch not used on all carburetors. Disregard data on these units when overhauling carburetors on which they are not used.***

Disassembly: 1) Remove dashpot magnet from air horn by taking out attaching screw (carburetors with magnetic dashpot only).
2) On carburetors with automatic choke, disengage fast idle rod from throttle lever, remove choke thermostatic coil housing (take out screws and remove retainer ring on housing), remove gasket and baffle plate. Remove choke trip lever, slide fast idle link out. Remove choke valve ***(CAUTION***—screws are staked, remove carefully to avoid stripping threads or breaking screws). Rotate shaft counter-clockwise and push in on fast idle cam to disengage choke piston from cylinder, withdraw shaft, lever, and piston ***(CAUTION***—do not loose piston pin).

►***THERMOSTATIC COIL HOUSING CAUTION***—Thermostatic coil, heat retainer plate, and housing are serviced as an assembly. Coil and heat retainer plate can be removed from housing for cleaning by hitting assembly sharply against palm of hand with coil side down. ***DO NOT ATTEMPT TO SEPARATE COIL FROM HEAT RETAINER PLATE.***

3) Take out five air horn screws (one screw underneath choke housing), lift off air horn assembly, remove air horn gasket. Remove fulcrum pin retainer, remove fulcrum pin, lift off float assembly. Remove fuel inlet needle and needle seat assembly. Remove pump operating link after freeing hairpin clip, lift out pump lifter, plunger, and spring assembly.
4) Take out dashpot connector link screw, lift out dashpot lifter and plunger assembly, dashpot valve cage plunger and spring, and dashpot valve cage.
5) Unscrew idle orifice tube, remove tube with step-up piston, plate, and rod assembly. Remove step-up piston spring and gasket, unscrew step-up jet.
6) Unscrew main metering jet, remove pump jet plug, unscrew pump discharge jet ***(CAUTION***—use narrow blade screwdriver). Unscrew pump discharge check ball plug, remove ball check by inverting carburetor.
7) Take out three screws attaching main body to throttle body and separate these parts. If kick-down switch used, remove screws and retainer plates, pull out plunger and spring, carefully pull out terminal assembly to release kick-down limit piston and spring. Unscrew idle mixture adjusting screw and spring. Do not disturb throttle valve assembly.

Cleaning & Inspection: Wash parts in suitable cleaning solvent, blow out all passages with compressed air and dry parts with air. Remove all carbon deposits paying particular attention to throttle bore in vicinity of throttle valve and idle ports. Thoroughly clean choke piston cylinder and slots and grooves in choke piston. Inspect all parts for wear or damage.

►***THROTTLE SHAFT REPLACEMENT CAUTION***—It is recommended that throttle body assembly be replaced if throttle shaft or bearing points in body are worn.

Reassembly: Use all NEW gaskets. Install all parts in reverse order of disassembly procedure and note the following special instructions:

Step-up Piston Assembly—Make certain that step-up rod enters step-up jet, tighten idle orifice tube snugly. Check assembly by pressing the step-up piston down onto its seat. In this position clearance between head of rod and plate should be .010" minimum. Adjust by bending plate slightly.

Accelerating Pump & Dashpot Plungers—Plunger leather must be in good condition (replace if shrunk or hard). Carefully roll leather back, return it to original position (to flare the leather), work leather between thumb and forefinger until soft and pliable. ***NOTE***—Treat new plungers similarly.

Pump Ball Check Valves (Testing)—After pump assembly, test check valves for good seating as follows: Fill bowl to depth of ¼" with clean gasoline, operate pump several times to expel air, then operate pump while holding discharge ball check down with small brass rod. There should be no fuel discharge through either the inlet ball check or discharge ball check valves. If leakage noted, remove parts and clean thoroughly.

Automatic Choke Assembly—Insert choke shaft and piston assembly in air horn, rotate shaft until it is possible to insert piston in cylinder, turn shaft clockwise to enter the piston. Make certain that fast idle cam is centered on boss on air horn. After installing choke valve (below), check assembly for free operation (valve should open freely of own weight from closed position). Make fast idle and unloader adjustment before installing baffle, gasket, and coil assembly (see ADJUSTMENT). Make certain that baffle plate engages locating pin in housing, install new gasket, then install coil housing assembly with indicator mark on rim **downward**, install retainer ring and screws loosely, then rotate coil housing counter-clockwise until indicator mark lines up with center graduation on air horn, tighten retainer screws securely.

Chok Valve Installation—Use new screws and turn screws in loosely, then hold valve in closed position and tap valve gently to center it in bore, tighten screws securely, stake screws by squeezing with pliers.

Form 40 B

CARTER BB UPDRAFT

CHEVROLET TRUCK — **Carter Carburetor No.**

1954-55 6 Cyl. Cab-Over-Engine 2075S
1954-56 6 Cyl. Forward Control Models 871SB
1957-60 6 Cyl. Forward Control Models 871SC

►*ACCESS TO CARBURETOR (For Adjustment or Removal):* Remove toe-pan attaching screws, disconnect wires at stop light switch, disconnect accelerator pedal rod from throttle control rod and remove toe-pan.

DESCRIPTION: Plain tube, updraft type with an accelerating pump, vacuum controlled power jet, and a spring mounted auxiliary air valve located in choke valve.

ADJUSTMENT: Idle Mixture - ½-1½ turns open from a lightly seated position (turn screw out for richer mixture).

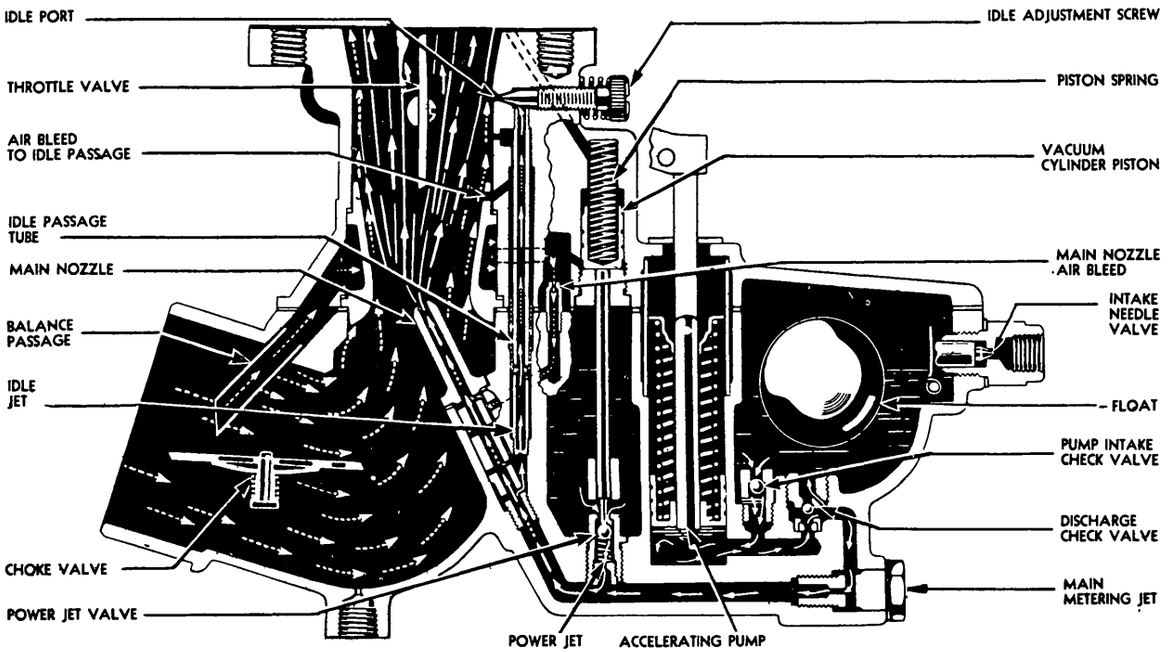
Idle Speed: 1954-58 Models - 450-500 RPM (Synchro-mesh), 400-450 RPM (Auto. Trans.). **1959-60 Models** - 475 RPM (Synchro-mesh), 450 RPM (Auto. Trans.).

Fl at Level: 0-1/32" (Carter Gauge T109-49 or Chevrolet Gauge J-818-13A) from top of float to top edge of bowl with needle valve seated. *NOTE - Use 1/32" side of gauge (other side used for 1/16" settings).*

Accelerating Pump (Seasonal Setting): Summer (Short Stroke), Winter (Long Stroke).

Pump Stroke - 9/16" (short stroke) with connecting screw in holes in throttle lever and pump link assembly nearest throttle shaft. 1" (long stroke) with screw in holes furthest from shaft.

OVERHAUL: Disassembly - Remove upper-to-lower body attaching screws, then remove upper body (with accelerating pump parts attached) from lower body. Compress pump piston spring and remove connector pin, then remove spring retainer, spring, piston and fibre washer from pump rod and plate assembly. Remove pump packing retainer, then disconnect pump shaft from throttle arm and remove shaft and packing. Remove plug from vacuum power cylinder (use Tool J-816-4) and remove piston and spring. Remove idle passage tube, idle adjusting screw and idle hole plug from upper body. Remove accelerator pump sleeve, power jet push rod, float lever hinge pin, float and needle valve from lower body. Remove accelerator pump intake check valve, discharge check valve and power jet (use Tool J-816-7). Remove main nozzle air bleed, idle jet, main nozzle and main metering jet from lower body (use Tool J-816-1).



CARTER BB UPDRAFT CARBURETOR ASSEMBLY

Cleaning & Inspection: Wash all parts in cleaning solvent and blow out all drilled passages with compressed air. Remove all carbon deposits and make sure power jet piston is free in cylinder. Disassemble and clean power jet (use Tool J-816-2). *CAUTION - Do not lose jet spring or ball.* Replace all damaged or worn parts.

Reassembly: Reverse disassembly procedure and note the following:

Choke Valve - If choke valve was removed, reassemble so flutter valve is on opposite side of valve from inlet and small bleed hole is toward balance vent when valve is closed.

Throttle Valve - If throttle valve removed, reassemble with notch on valve lined up with port for vacuum line in body.

►*INSTALLATION NOTE: Install special gasket on carburetor making sure port for vacuum cylinder is open, then install carburetor on manifold.*

SERVICE PARTS: Gasket Set - Carter No. 202.
Repair Package (With Metering Jet): Carter No. 1539A.

CARTER (BB) UPDRAFT CARBURETOR JET SPECIFICATIONS

Car Model	Yr.	Carb. No.	Main Metering Screw: Standard Flow	Main Metering Screw: Standard Part No.	Main Metering Screw: 1 Size Lean Part No.	Main Metering Screw: 2 Sizes Lean Part No.	Main Nozzle Size	Main Nozzle Part No.	Step Up Jet Power Orific Size	Step Up Jet Power Orific Part No.	Idle Orific Tube Size	Idle Orific Tube Part No.	Idle Passag Tube	Pump Valv Size	Pump Valv Part No.
CHEVROLET TRUCK 6 Cyl.															
Fwd. Cont. & C.O.E	1954	871SA, SB	339-343cc.	159-100	159-129	159-35②	③	12-344	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S
Cab.Over-Engine⑤	1955	2075S	366-370cc.	159-98			③	12-344	.040"	162-28	.031"	123-58	123-45	.0635"	149-65S
Forward Control	1955-56	871 SB	339-343cc.	159-100	159-129	159-35②	③	12-344	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S
Forward Control	1957-58	871 SC	339-343cc.	159-100	159-129	159-35②	③	12-505	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S
Forward Control	1959	871 SC	339-343cc.	159-100	159-129	159-35②	③	12-344	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S
Forward Control	1960	871 SC	339-343cc.	159-100	159-129	159-35②	③	12-505	.036"	162-27	.031"	123-58	123-45	.0635"	149-65S

Main Metering Screw "Flow" is capacity in cc. per minute.
Do not gauge these jets with wire drills.

②—1 Size Rich—Part No. 159-99.
③—Discharge Jet Size .150-.152".
⑤—Cab-Over-Engine Models (1st. Series 1955 only).

CARTER (B&B) DOWNDRAFT CARBURETOR JET SPECIFICATIONS

Car Model	Yr.	Carb. No.	Main Metering Jet: Standard Flow	Main Metering Jet: Standard Part No.	Main Metering Jet: 1 Size Lean Less	Main Metering Jet: 1 Size Lean Part No.	Main Metering Jet: 2 Sizes Lean Less	Main Metering Jet: 2 Sizes Lean Part No.	Main Vent Air Bleed Size	Tube Assem. Part No.	Stepup Jet Power Orifice Size	Stepup Jet Power Orifice Part No.	Idle Orifice Tube Size	Idle Orifice Tube Part No.	Pump Jet Assembly. Jet Size	Pump Jet Assembly. Part N
CHRYSLER 6⑭	1954	E9C1	315-319cc	224-13S	—	224-14S	—	224-15S	.0315"	145-13	.0374"	149-70S	.0295"	123-39S	.0413"	48-167
CHRYSLER 6⑮	1954	E9B1	315-319cc	224-13S	—	224-14S	—	224-15S	.0315"	145-13	.0374"	149-70S	.0295"	123-39S	.0413"	48-167
DESOTO 6⑭	1954	E9C1	315-319cc	224-13S	—	224-14S	—	224-15S	.0315"	145-13	.0374"	149-70S	.0295"	123-39S	.0413"	48-167
DE SOTO 6⑮	1954	E9B1	315-319cc	224-13S	—	224-14S	—	224-15S	.0315"	145-13	.0374"	149-70S	.0295"	123-39S	.0413"	48-167
DESOTO 6㉑	1954	E7W1	315-319cc	224-13S	—	224-14S	—	224-15S	.0315"	145-13	.0315"	149-46S	.0236"	123-59S	.0334"	48-145
DODGE 6⑭	1954	E9T1	332-336cc	224-10S	—	224-13S	—	224-14S	.0315"	145-13	.0394"	149-62S	.0276"	123-31S	.0374"	48-75
DODGE 6㉚	1954	E9N1	332-336cc	224-10S	—	224-13S	—	224-14S	.0315"	145-13	.0394"	149-62S	.0276"	123-31S	.0374"	48-75
DODGE 6㉒	1954	E9V1	332-336cc	224-10S	—	224-13S	—	224-14S	.0315"	145-13	.0394"	149-62S	.0276"	123-31S	.0374"	48-75
DODGE 6⑮	1954	E9U1	332-336cc	224-10S	—	224-13S	—	224-14S	.0315"	145-13	.0394"	149-62S	.0276"	123-31S	.0374"	48-75
PLYMOUTH⑭	1954	D6H2	256cc	224-11S	—	224-17S	—	224-18S	.0315"	145-17	#65	149-41S	.0276"	123-31S	.0276"	48-103
PLYMOUTH㉚	1954	D6U1	287cc	224-15S①	—	224-12S③	—	224-11S④	.0315"	145-17	.0295"	⑤149-113S	.0276"	123-31S	.0276"	48-103
PLYMOUTH㉓	1954	D6P2	256cc	224-11S	—	224-17S	—	224-18S	.0315"	145-17	#65	149-41S	.0276"	123-31S	.0276"	48-103
PLYMOUTH㉑	1954	D6N2	256cc	224-11S	—	224-17S	—	224-18S	.0315"	145-17	#71	149-50S	.0276"	123-31S	.0276"	48-103
PLYMOUTH⑩	1954	D6R1	256cc	224-11S	—	224-17S	—	224-18S	.0315"	145-17	#65	149-41S	.0276"	123-31S	.0276"	48-103

①—Supersedes 224-11S used on Carburetors code dated B3 and earlier.
③—Supersedes No. 224-17S.
④—Used as Std. on carburetors code dated B3 and earlier.
⑤—Supersedes No. 149-41S.
⑩—Taxicab models.
⑭—Cars with Synchro-mesh Transmission.
⑮—Cars with Automatic Transmission.
㉑—City Traffic
㉒—Cars with Gyromatic Trans. & Fluid Drive.
㉓—Cars with Hy-Drive Transmission.
㉚—Cars with Synchro-mesh Trans. & Overdrive.

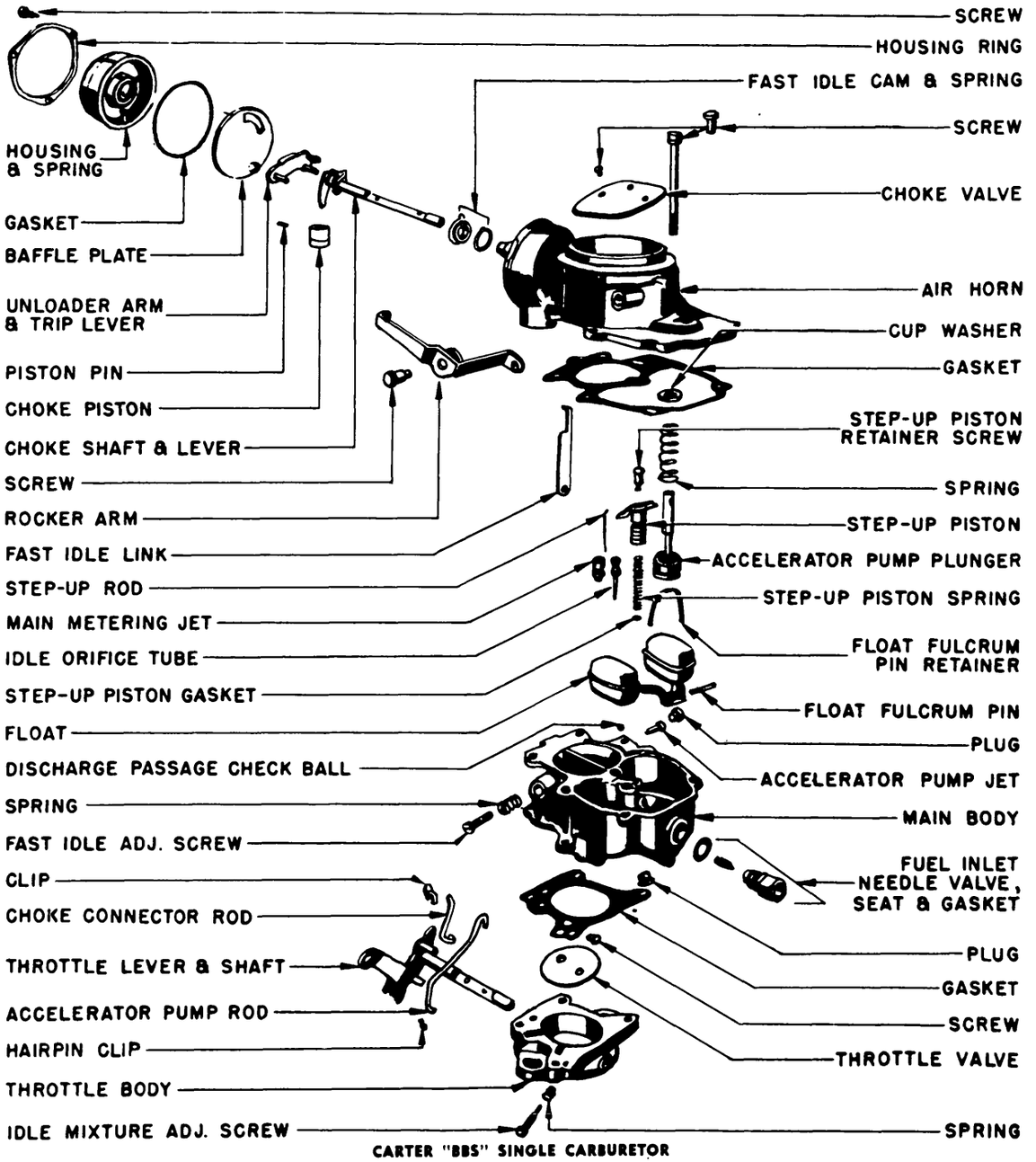
CARTER "BBS"

	Carter Carburetor No.
DODGE SIX	
1954 (Synchro-mesh)	2063S,SA
1954 (Overdrive)	2062S,SA
1954 (Auto. Trans.)	2116S,SA
1959 (Synchro-mesh)	2567S
1959 (Auto. Trans.)	2569S
1959 (Replacement 2567S, 2569S)	2604S
1959 (City Traffic)	2403S
1959 (Taxicab)	2410S
DODGE DART SIX	
1960 (Synchro-mesh)	2985S,SA,SB
1960 (Auto. Trans.)	2986S,SA,SB
1960 (Taxicab)	3053S,SA
PLYMOUTH SIX	
1954 Early (Synchro-mesh)	920S,SA
1954 Early (Overdrive)	993S,SA
1954 Late (Auto. Trans.)	994S,SA
1954 Replacement (920S, 993S, 994S)	2248S
1954 Early (City Traffic)	2203S
1954 Late (City Traffic)	2215S
1954 Late (Synchro-mesh)	2063S,SA
1954 Late (Overdrive)	2062S,SA
1954 Late (Auto. Trans.)	2116S,SA
1955 (Synchro-mesh)	2063S,SA
1955 (Overdrive)	2062S,SA
1955 (Auto. Trans.)	2116S,SA
1955 (Replacement)	2249S
1956 (Synchro-mesh)	2063SA Ⓒ or 2293S
1956 (Overdrive)	2062SA Ⓒ or 2294S
1956 (Auto. Trans.)	2116SA Ⓒ or 2295S
1956 (Taxicab)	2410S
1956 (City Traffic)	2403S
1956 (Replacement)	2380S
1957 (Synchro-mesh)	2567S
1957 (Overdrive)	2568S
1957 (Auto. Trans.)	2569S
1957 (Replacement)	2604S
1957 (Taxicab)	2410S
1957 (City Traffic)	2403S
1958-59 (Synchro-mesh)	2567S
1958-59 (Overdrive)	2568S
1958-59 (Auto. Trans.)	2569S
1958-59 (Replacement 2567S, 68S, 69S)	2604S
1958-59 (City Traffic)	2403S
1958-59 (Taxicab - Synchro-mesh)	2410S
1958-59 (Taxicab - Auto. Trans.)	2771S
1960 (Synchro-mesh)	2985S,SA,SB
1960 (Auto. Trans.)	2986S,SA,SB
1960 (Taxicab)	3053S,SA
VALIANT	
1960 (Synchro-mesh)	2900S
1960 (Auto. Trans.)	2901S
1960 (Taxicab)	3053S,SA

Ⓒ - Partial production.

►CHANGES, CAUTIONS, CORRECTIONS

►*1954-56 PLYMOUTH 6 TAXICAB CARBURETOR IMPROVED ECONOMY (Carter BBS 2062S,SA; 2063S,SA carburetors):* Improved gasoline economy can be secured by installing all parts furnished in Unitized Pkg. Carter No. 195-67U as listed below. Spark plug gap should be set at .040" when this modification made. *CAUTION* - If this change made on cars operated in normal highway use, high speed performance may be affected.



CARTER "BBS" SINGLE CARBURETOR

Part	Unitized Pkg. 195-67U	Part No.
Main Metering Jet		120-215S
Step-up Rod		75-1125
Idle Tube & Plug Assy.		123-65S
Body Gasket		121-225

►*PLYMOUTH REPLACEMENT CARBURETOR NOTE:* When installing 2604S as a replacement, additional parts are required for Overdrive and PowerFlite cars as follows: **Ov rdriv Cars (2568S)** - Use Unitized Pkg.

CONTINUED ON NEXT PAGE

CARTER "BBS" (C nt.)

No. 192-33U, Kickdown Switch Assembly. **P w rFlit Cars (2569S)** - Use Unitized Pkg. No.202-80U, Dashpot, Bracket & Locknut.

►*1960 CARTER BBS 2986S CARBURETOR PRODUCTION CHANGE & SERVICE RECOMMENDATION:* When servicing this carburetor, install Step-Up Wire No. 75-1519 (.035") to replace original Step-Up Wire No. 75-1507 (.33") and add letter "A" to model number. *NOTE - 2986SA production carburetors have this chang .*

►*CARTER 2985SB & 2986SB CARBURETOR NOTE:* These carburetors which are used in later production on Dodge & Plymouth models have a revised fast idle mechanism which requires an additional fast idle adjustment operation (fast idle speed on earlier carburetors was automatically adjusted when hot or slow idle speed was correctly set).

►*1960 POOR ENGINE IDLE PERFORMANCE (In cong st d traffic in hot w ather, or after continuous highway driving at 60-70 MPH): See CARBURETOR on Car Mod l pag s.*

►*1960 HARD COLD START & WARM-UP CORRECTION (ALL MODELS):* May be caused by choke rod or choke shaft arm striking carburetor air cleaner. To correct, remove air cleaner and install air cleaner mounting gaskets as required for sufficient clearance.

DESCRIPTION: Single barrel downdraft type with integral automatic choke (1954-59 Models); "Cross-Over" type choke (1960 Models). Metering jet and step-up mechanism is vacuum controlled and is not adjustable. Fast idle mechanism is different on some models as follows:

Fast Idl Mechanism (2985SB & 2986SB Carburetors Only): The following parts on these carburetors have been changed to accommodate the later type fast idle mechanism: Throttle Body, Throttle Shaft & Lever, Fast Idle Adjusting Screw and Fast Idle Cam.

Idle Adjustment: Make preliminary setting of idle adjusting screw by turning screw in until it is lightly seated and then turn screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative. Set engine idle speed to correct figure, then adjust idle mixture as follows:

Idle Mixtur S tting - With engine at normal operating temperature, adjust idle mixture screw for highest RPM, then turn mixture screw in until speed starts to drop. Turn screw out just enough to recover engine speed that was lost. Readjust idle speed screw for correct engine idle speed.

Idl Mixture Setting

Carb. No.	Idle Screw Setting
920S, 993S, 994S, 2062S,SA, 2063S, SA	½-1½ turns
2116S, SA, 2215S, 2248S, 2249S, 2203S	½-1½ turns
2293S, 2294S, 2295S, 2380S, 2403S	½-1¾ turns
2567S, 2568S, 2569S, 2604S	½-1¾ turns
2410S, 2771S	1-2 turns
2567S, 2568S, 2569S, 2304S, 2604S	½-1¾ turns
2410S, 2771S, 3053S,SA	1-2 turns
2985S,SA,SB, 2986S,SA,SB	1/8-1½ turns
2900S, 2901S	¼-1½ turns

Idl Speed (1954-55 Mod ls) - 450-500 RPM

Idle Speed (1956-59 Models) - 450-500 RPM (Synchro-mesh), 475-500 RPM (Auto. Trans.), with transmission in "N" (Neutral).

Idl Speed (1960 Models) - 550 RPM (Synchro-mesh), 500 RPM (Auto. Trans. with selector lever in "N").

►*IDLE SPEED SETTING NOTE (ALTERNATOR EQUIPPED CARS):* To compensate for alternator load and provide a more accurate idle speed adjustment, turn headlights on during adjustment.

Accelerating Pump: Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as listed below.

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valve fully closed. Make certain that connector rod engaged in center hole of throttle lever. Use scale to measure distance from top surface of bowl cover to top of pump plunger shaft. This distance should be as indicated in table below. If height not correct, adjust by bending connector rod at lower angle with Tool T109-213.

Pump Seasonal Setting - Std. setting is with pump connector rod engaged in hole of throttle lever as indicated below. Outer hole in lever will provide maximum stroke (greater discharge), center and inner holes provide less discharge.

Pump Stroke Setting

Car & Carb.	Plunger Height	Seasonal Setting
All (Exc. Below)	54/64"	Center Hole
Plymouth 2203S	51/64"	Inner Hole
Plymouth 2215S	49/64"	Inner Hole

Float Level: To check float level, remove air horn and bowl cover assembly, and gasket. Place gauge (see table below) squarely on top edge of bowl at center of floats. Remove float pin retainer, hold float arm lip firmly against seated needle valve with float pin at bottom of the guide slots. Ridge or crown on each float should just touch step on gauge. Adjust by bending float lip (*NOTE* - If one float lower than the other, first equalize floats by bending float arm, then adjust both floats by bending the lip). Reinstall float pin retainer.

Float Level Setting

Carb. No.	℄ Float Level
920S, 993S, 994S, 2062S,SA, 2063S,SA	7/32"
2116S,SA, 2203S, 2215S, 2248S, 2249S	7/32"
2293S, 2294S, 2295S, 2380S	7/32"
2403S, 2410S, 2567S, 2568S	9/32"
2569S, 2604S, 2771S	9/32"
2985S,SA,SB, 2986S,SA,SB, 2900S, 2901S	7/32"
3053S, SA	9/32"

℄ - Use Gauge T109-239 for 7/32" & 9/32" settings.

Fast Idle: Different procedures required for various carburetors as follows:

Off Engine (2900S, 2901S, 2985S,SA,SB, 2986S,SA,SB, 3053S,SA,SB) - With choke valve tightly closed and choke connector rod in upper end of slot in cam, align center of throttle stop screw (Exc. 2985SB, 2986SB, 3053SB); center of fast idle screw (2985SB, 2986SB, 3053SB) with index mark on fast idle cam. To adjust, bend choke connector rod at upper angle. *NOTE - Fast idle speed will be correct when engine idle speed properly adjusted (xc. 2985SB, 2986SB, 3053SB). Additi nal "On Engine" fast idle sp ed adjustment required n 2985SB, 2986SB, 3053SB carburetors. See b l w.*

Off Engine (Exc pt 2900S, 2901S, 2985S, SA,SB, 2986S, SA,SB, 3053S,SA,SB) - Remove choke coil housing assembly, gasket, and baffle plate, then back out throttle stopscrew to close throttle valve. Open throttle partially, then close throttle valve, allowing fast idle cam to revolve to fast idle position. Clearance between throttle valve and bore of carburetor on side opposite idle ports should be as indicated in table below. To adjust, bend choke connector rod at lower angle. *CAUTION - Be sure cam trip lever is all the way in piston housing with lub contacting cam.*

Fast Idle Setting

Carb. No.	℄ Throttle Opening
920S,SA, 993S,SA, 994S,SA, 2203S, 2215S, 2248S	.019-.023"
2062S,SA, 2063S,SA, 2116S,SA, 2249S	.022-.026"
2567S, 2568S, 2569S, 2604S	.028-.032"
All Others	.016-.020"

℄ - Use Gauge T109-29 (.022-.026", .019-.023" & .028-.032"), T109-44 (.016-.020").

On Engine (2985SB, 2986SB, 3053SB) - *NOTE - Fast idle adjustment (On Engine) for other carburetors will be correct when slow idle speed properly adjusted.* With fast idle screw on index mark of fast idle cam, adjust engine speed to 1200-1400 RPM by turning fast idle screw.

Fast Idle Throttle Valve Clearance (2985SB, 2986SB, 3053SB) - Clearance between lower edge of throttle valve and carburetor bore with fast idle screw on index mark of cam should be .030".

Unloader (Except 2900S, 2901S, 2985S,SA,SB,2986S,SA, SB, 3053S,SA,SB): After completing fast idle adjustment (above), hold throttle valve in wide open position and close choke valve as far as possible without forcing. Measure choke valve opening between upper edge of valve and air horn with Gauge T109-34 (9/64"). Adjust by bending arm on choke trip lever which actuates choke lever. Reassemble and adjust automatic choke.

Unloader (2900S, 2901S, 2985S,SA,SB, 2986S,SA,SB, 3053S,SA,SB): With throttle valve wide open, clearance between top edge of choke valve and inner wall of air horn should be 11/64" (Gauge T109-166). To adjust, bend unloader arm on throttle valve lever.

Automatic Choke (Integral Type): *CAUTION - When disconnecting hot air tube at choke housing fitting (for removal or adjustment of choke), hold fitting on housing with open end wrench while loosening tube nut to prevent distorting or breaking housing.* To adjust choke, disconnect heat tube and loosen retaining ring screws. Rotate choke housing until index mark on housing is aligned with center line on scale located on air horn. This is correct "Centered" setting for all models.

Automatic Choke (Cross-Over Type): Centered on index. See *"Carter (Cross-Over) Automatic Choke.*

Kickdown Switch (Overdrive Cars): *See CARBURETOR on Car Model pages.*

Slow-Closing Throttle Dashpot (Automatic Trans. Cars): *See CARBURETOR on Car Model pages.*

Throttle Valve Setting: When installing throttle valve it should be positioned as indicated. "Idle Port Opening" is port opening above upper edge of tightly closed valve. "Vacuum Spark Port" is height of top of port above tightly closed valve.

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CARTER "BBS" (C nt.)

Carb.	Throttl Valv Setting Idl P rt Opening	Vacuum Spark Port
920S,SA,993S,SA,994S,SA	.110-.114"	.044-.050"
2248S, 2203S, 2215S	.110-.114"	.044-.050"
2900S, 2901S, 3053S,SA	.138-.142"	.044-.050"
2985SB, 2986SB	140-.144"	.034-.040"
3053SB	.138-.142"	.034-.040"
All Others	.140-.144"	.044-.050"

OVERHAUL: *CAUTION* - Carburetor main castings (air horn, main body, and throttle body) are assembled with long screws (inserted through air horn and threaded in throttle body) so that all three assemblies will be loose when screws removed. Use care not to damage throttle body when removing air horn or main body.

Disassembly (Carbs. With Integral Type Choke): Remove choke connector rod and accelerating pump rod, then take out long screws in air horn flange and lift air horn and bowl cover assembly up and off main body (discard gasket). Remove pump plunger by pressing it up and sliding it off pump arm. Take out step-up piston retaining screw and remove piston, step-up rod, spring and gasket from cylinder. Invert main body to drop out pump discharge ball from pump passage. *NOTE - Inlet check ball is located under retainer in bottom of pump plunger.* Remove main metering jet, gasket, and idle orifice tube. Remove pump jet by first removing plug in side of main body and then removing jet through this hole. *NOTE - Do not remove main vent tube unless replacement required.* Remove idle mixture screw and spring from throttle body. Do not remove throttle valve or shaft unless wear or damage requires replacement (see "Reassembly" for r eplacement data).

Disassembly (Carbs. With "Cross-Over" Type Choke): Disengage pump operating rod from throttle lever, then remove fast idle cam link retaining pin. Remove air horn retaining screws and tilt air horn toward throttle lever far enough to disengage fast idle cam link from fast idle cam, then remove air horn from main body. Disengage accelerator pump shaft by pushing up on bottom of plunger and sliding plunger shaft off hook on rocker arm. Slide plunger out of air horn and remove bowl vent valve, spring seat and spring. *NOTE - If Id plunger is to be reused, or a new plunger is to be installed, soak plunger leather in clean gasoline.* Lift out float fulcrum pin retainer, then lift out floats and fulcrum pin. Remove fuel inlet needle valve, seat and gasket from main body. Remove step-up piston retaining screw and slide step-up piston and rod out of well. Remove piston spring and gasket. Remove main metering jet and gasket, then unscrew and remove idle orifice tube. Use Tool T109-43 and remove accelerator pump jet plug, then remove pump jet with Tool T109-59T. Remove idle mixture adjusting screw and spring. *NOTE - It is not advisabl to remove throttle shaft or valve from throttle body unless it is necessary to install new parts (see "Reassembly" for replacement data).*

Automatic Choke (Integral Type) Disassembly - Remove choke coil housing assembly, gasket & baffle plate. slide out unloader arm and trip lever. Remove staked portion of choke valve screws, then remove screws and valves. Rotate choke shaft until vacuum piston is clear of cylinder, withdraw shaft and piston assembly, then slide fast idle cam and spring off shaft. Choke thermostatic coil and heat retainer plate can be removed from housing assembly by rapping assembly hard against palm of hand. *CAUTION - Do not attempt to remove coil from heat retainer plate.*

Automatic Choke (Cross-Over) Type - *See "Carter (Cross-Over) Automatic Choke".*

Cleaning & Inspection: Clean all parts in cleaning solvent and dry with air. Blow out all passages with air. Do not use wire or drill's to clean jets. Clean main vent tube by removing plug at end of vent passage, soak in solvent, and blow out with air applied at high speed air bleed hole at top of nozzle bar. Clean all parts of choke mechanism thoroughly, make certain that slots in cylinder and air passages are clean. Clean heat tube, remove heat tube shield at manifold and clean shield and tube in manifold. Inspect tube for dents (obstructing hot air flow) and leaks (*NOTE* -Heavy black carbon deposits on choke parts may indicate exhaust leaks in heat tube) Check all parts for wear or damage and replace as required.

Reassembly: Use all new gaskets. Reassemble carburetor by reversing disassembly procedure and note the following:

Throttle Valve Installation - *NOTE* - If throttle valve shaft or throttle body worn, it is recommended that new throttle body assembly be used. Install throttle valve in same relative position as old valve, install new screws loosely, then close throttle and centralize valve by tapping lightly, tighten screws securely and stake by squeezing with pliers. Check throttle valve position (see specifications above).

Choke Valve Installation - With fast idle cam and spring assembled on choke shaft, slide shaft and piston assembly into air horn, rotate shaft to enter vacuum piston in cylinder. Install choke valve, install new screws loosely, close valve and tap lightly to centralize valve in bore, then tighten screws securely and stake by squeezing with pliers. Check for free operation by closing valve with air horn upright. Choke should open of own weight.

Automatic Ch k (Int gral Type) Reassembly - Install unloader arm and trip lever in air horn. See that retaining spring in heat retainer plate clears notch in plate, then align notch with lug in housing and seat plate in housing. Install baffle plate and gasket on air horn, then install choke housing (index mark downward), retainer ring and tighten screws loosely. Rotate housing counterclockwise until index mark on housing is aligned with center line of scale on air horn, then tighten retainer screws.

Accelerating Pump Assembly - If old pump plunger being reinstalled, flare plunger leather by rolling it back and then reshaping it between thumb and forefinger *(NOTE* - Plunger leather must be soft and pliable). Install plunger in cylinder. Install discharge check ball in discharge passage. Check pump operation as follows: Pour clean gasoline in carburetor bowl (½" deep), operate pump plunger several times to fill cylinder and remove air from discharge passage. Use small brass rod to hold discharge ball down on its seat, press pump plunger down. No fuel should be emitted at either discharge or intake passages. If fuel discharge noted, remove check balls and inspect for damage, clean passages thoroughly. Reseat ball by using small brass rod to tap ball lightly to form new ball seat *(CAUTION* - install new check ball after using ball in reseating operation).

Step-up Piston and Rod Ass mbly - Make certain that step-up rod is free on piston plate (must return freely to vertical position when released) and that piston is free in cylinder. See that step-up rod enters metering jet when assembly installed in carburetor.

SERVICE PARTS: Gasket Sets - Carter No. 247A (920S,SA, 993S,SA, 994S,SA, 2203S, 2215S); No. 252 (2062S,SA, 2063S,SA, 2116S,SA, 2249S, 2293S, 2294S, 2295S, 2380S, 2403S, 2410S, 2567S, 2568S, 2569S, 2604S, 2771S); No. 340 (2900S, 2901S; 3053S,SA,SB); No.341 (2985S,SA,SB, 2986S,SA,SB).

Re-Carburetion Kits: Carter No. 1753N (920S); No. 1766N (2062S,SA, 2063S,SA, 2116S,SA, 2249S); No. 1817N (2293S, 2294S, 2295S, 2380S, 2567S, 2568S, 2569S, 2604S); No. 1838N (2403S, 2410S, 2771S); No. 1942N (920SA, 993S,SA, 994S,SA, 2248S); No. 5010N (2900S); No. 5011N (2901S); No. 5013N (2985S,SA,SB, 2986S, SA,SB).

Zip-Kits: Carter No. 900-1 (2062S,SA, 2063S,S A, 2116S,SA, 2203S, 2249S, 2293S, 2294S, 2295S, 2380S, 2403S,2410S, 2567S, 2568S, 2569S, 2604S, 2771S); No. 900-35 (920S); No. 900-96 (920SA, 993S,SA, 994S,SA); No. 900-105 (2900S, 2901S); No. 900-107(2985S,SA,SB, 2986S,SA,SB).

1954-55 CARTER BBS CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb.	Metering Jets: Standard Flow	Standard Part No.	1 Size Lean Part No.	2 Size Lean Part No.	Main Vent Tube Size	Main Vent Tube Part No.	Step-Up Rod Size	Step-Up Rod Part No.	Idle Orifice Tube Size	Idle Orifice Tube Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
DODGE														
Synchro-mesh	1954	2063S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	.027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
Overdrive	1954	2062S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
Auto. Trans.	1954	2116S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	029"	75-999	.0354"	123-67S	.0276"	48-194
PLYMOUTH														
⑪ Synchro-mesh	1954	920S,SA	390cc	120-200S①	120-201S②	120-204S③	.0315"	145-91	.027"	75-998	.0354" ⑥	123-67S	.0276"	48-194
⑪ Overdrive	1954	993S,SA	390cc	120-200S①	120-201S②	120-204S③	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194
⑪ Auto. Trans	1954	994S,SA	390cc	120-200S①	120-201S②	120-204S③	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194
⑪ City Traffic	1954	2203S	322cc	120-182S	120-211S	120-183S	.0315"	145-91	.018"	75-1125	.0315"	123-65S	.0276"	48-194
⑦ Synchro-mesh	1954	2063S,SA	453cc	120-199S	120-206S	120-205S	.0315"	145-91	.027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
⑦ Overdrive	1954	2062S,SA	453cc	120-199S	120-206S	120-205S	.0315"	145-91	.027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
⑦ Auto. Trans.	1954	2116S,SA	453cc	120-199S	120-206S	120-205S	.0315"	145-91	.029"	75-999	.0354"	123-67S	.0276"	48-194
⑦ City Traffic	1954	2215S	322cc	120-182S	120-211S	120-183S	.0315"	145-91	.018"	75-1125	.0315"	123-65S	.0276"	48-194
Repl. All	1954	2248S	390cc	120-200S	120-201S	120-204S	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194
Synchro-mesh	1955	2063S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	.027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
Overdrive	1955	2062S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	.027" ⑤	75-998	.0354"	123-67S	.0276"	48-194
Auto. Trans.	1955	2116S,SA	453cc	120-199S	120-205S	120-206S	.0315"	145-91	.029"	75-999	.0354"	123-67S	.0276"	48-194
Repl. All	1955	2249S	453cc	120-199S	120-205S	120-206S	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194

①—Supersedes No. 120-198S (412 cc.)
②—Supersedes No. 120-200S
③—Supersedes No. 120-201S (now 1 Size Lean)
⑪—Early Cars.
⑥—No. 123-63S (.0315"). Used on early 920S.
⑦—Later Cars.
⑤ - Supersedes 75-999 (.029") on 2062S & 2063S.

1956 CARTER BBS CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Model	Metering Rod Jet: Standard Size	Standard Part No.	1 Size Lean Part No.	2 Size Lean Part No.	Main Vent Tube Size	Main Vent Tube Part No.	Step-Up Rod Size	Step-Up Rod Part No.	Idle Orifice Tube Size	Idle Orifice Tube Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
PLYMOUTH P-28														
Synchro-mesh	1956	2063SA	453cc.	120-199S	120-205S	120-206S	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194
		2293S	406cc.	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
Overdrive	1956	2062SA	453cc.	120-199S	120-205S	120-206S	.0315"	145-91	.027"	75-998	.0354"	123-67S	.0276"	48-194
		2294S	406cc.	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
PowerFlite	1956	2116SA	453cc.	120-199S	120-205S	120-206S	.0315"	145-91	.029"	75-999	.0354"	123-67S	.0276"	48-194
		2295S	406cc.	120-206S	120-215S	120-214S	.0236"	145-136	.024"	75-943	.0315"	123-74S	.0276"	48-194
City Traffic	1956	2403S	382cc.	120-215S	120-214S	120-213S	.0236"	145-136	.021"	75-1207	.028"	123-76S	.0276"	48-194
Taxicab	1956	2410S	382cc.	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194
Repl. Carb. ①	1956	2380S	382cc.	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194

① — Replaces 2293S; 2294S (with Kickdown Switch 192-33U); 2295S (with Dashpot Assy. 202-80U).

1957-59 CARTER BBS CARBURETOR JET SPECIFICATIONS

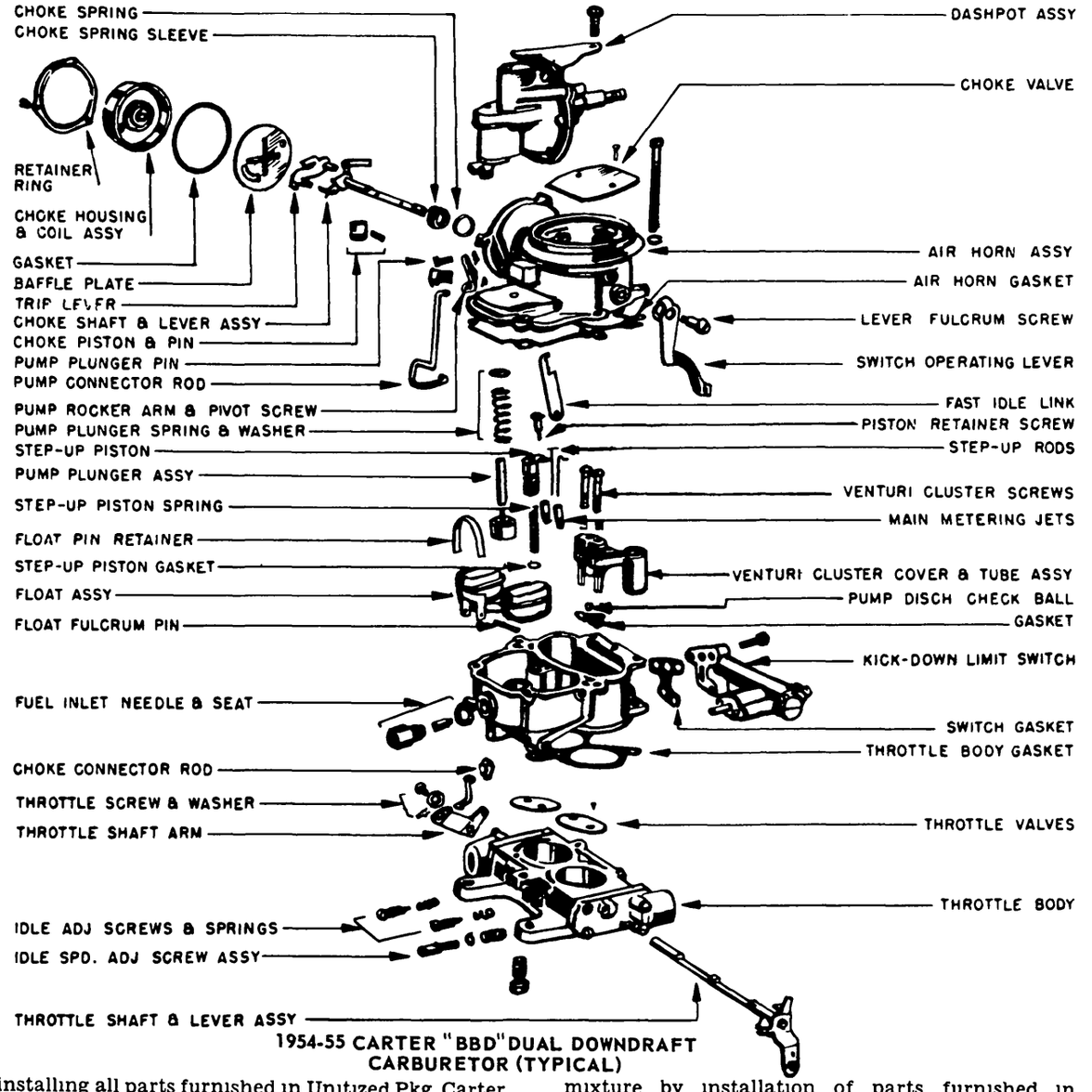
Car Model	Year	Carb. No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No.	Main Metering Jet 1 Size Lean Part No.	Main Metering Jet 2 Size Lean Part No.	Main Tube Vent Size	Main Tube Vent Part No.	Step-Up Rod Size	Step-Up Rod Part No.	Idle Orifice Tube Size	Idle Orifice Tube Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
DODGE														
MD1 (Synchro-mesh)	1959	2567S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
MD1 (PowerFlite)	1959	2569S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.024"	75-943	.0315"	123-74S	.0276"	48-194
MD1 (Repl. Carb.)	1959	2604S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
MD1 (Taxi Std. Trans.)	1959	2410S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194
MD1 (City Service)	1959	2403S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.021"	75-1207	.028"	123-76S	.0276"	48-194
PLYMOUTH														
LP1 (S.M.)	1957-58	2567S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
LP1 (O.D.)	1957-58	2568S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
LP1 (Auto. Trans.)	1957-58	2569S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.024"	75-943	.0315"	123-74S	.0276"	48-194
LP1 (Replacement)	1957-58	2604S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
LP1 (Taxi, Std. Trans	1957-58	2410S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194
LP1 (City Service)	1957-58	2403S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.021"	75-1207	.028"	123-76S	.0276"	48-194
LP1 (Taxi, Std. Trans.)	1958	2771S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194
MP1 (Synchro-mesh)	1959	2567S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
MP1 (Overdrive)	1959	2568S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
MP1 (PowerFlite)	1959	2569S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.024"	75-943	.0315"	123-74S	.0276"	48-194
MP1 (Repl. Carb.)	1959	2604S	406cc	120-206S	120-215S	120-214S	.0236"	145-136	.022"	75-1225	.0315"	123-74S	.0276"	48-194
MP1 (Taxi Std. Trans.)	1959	2410S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194
MP1 (City Service)	1959	2403S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.021"	75-1207	.028"	123-76S	.0276"	48-194
MP1 (Taxi Auto.Trans.)	1959	2771S	382cc	120-215S	120-214S	120-213S	.0236"	145-136	.020"	75-1248	.028"	123-76S	.0276"	48-194

1960 CARTER BBS CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No.	Main Metering Jet 1 Size Lean Part No.	Main Metering Jet 2 Sizes Lean Part No.	Main Tube Vent Size	Main Tube Vent Part No.	Step-Up Rod Size	Step-Up Rod Part No.	Idle Orifice Tube Size	Idle Orifice Tube Part No.	Pump Jet Assy. Size	Pump Jet Assy. Part No.
DODGE & PLYMOUTH 6 CYL.														
Synchro-mesh (Early)	1960	2985S	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.034"	75-1518	.028"	123-76S	.0275"	48-194
Synchro-mesh (Late)	1960	2985SA	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.034"	75-1518	.028"	123-76S	.0275"	48-194
Synchro-mesh (Later)	1960	2985SB	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.034"	75-1518	.028"	123-76S	.0275"	48-194
Auto. Trans. (Early)	1960	2986S	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.036"	75-1519	.028"	123-76S	.0275"	48-194
Auto. Trans. (Late)	1960	2986SA	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.036"	75-1519	.028"	123-76S	.0275"	48-194
Auto. Trans. (Later)	1960	2986SB	454-464cc	120-207S	120-205S	120-206S	.0354"	145-136	.036"	75-1519	.028"	123-76S	.0275"	48-194
Taxicab (Early)	1960	3053S	302-309cc	120-209S	120-211S	120-210S	.0354"	145-91	.023"	75-1208	.028"	123-76S	.0275"	48-194
Taxicab (Late)	1960	3053SA	302-309cc	120-209S	120-211S	120-210S	.0354"	145-91	.023"	75-1208	.028"	123-76S	.0275"	48-194
VALIANT														
Synchro-mesh	1960	2900S	317-323cc	120-212S	120-209S	120-211S	.0354"	145-91	.023"	75-1208	.0295"	123-84S	.0275"	48-194
Auto. Trans.	1960	2901S	317-323cc	120-212S	120-209S	120-211S	.0354"	145-91	.023"	75-1208	.028"	123-76S	.0275"	48-194
Taxicab (Early)	1960	3053S	302-309cc	120-209S	120-211S	120-210S	.0354"	145-91	.023"	75-1208	.028"	123-76S	.0275"	48-194
Taxicab (Late)	1960	3053SA	302-309cc	120-209S	120-211S	120-210S	.0354"	145-91	.023"	75-1208	.028"	123-76S	.0275"	48-194

1954-58 CARTER BBD DUAL

CHRYSLER	Carter Carburet r N .
1955 C67 (S.M. Trans.)	2180S,SA,SB
1955 C67 (PowerFlite)	2162S,SA,SB
1956 C71 (S.M. Trans.)	2312S
1956 C71 (PowerFlite)	2313S
1957 C75-1 (S.M. Trans.)	2527S
1958 LC1 (Exc Air Cond.)	2685S
1958 LC1 (Air Cond.)	2733S
DESOTO V8	
1954 Early S-19 (S.M. Trans.)	2067S
1954 Early S-19 (O.D. Trans.)	2068S
1954 Early S-19 (Auto. Trans)	2070S
1954 Late S-19 (S M. Trans.)	2129S
1954 Late S-19 (O.D Trans)	2130S
1954 Late S-19 (Auto. Trans.)	2131S
1954 Replacement	2250S
1955 S-22 (S.M Trans.)	2176S,SA
1955 S-22 (O.D. Trans.)	2177S,SA
1955 S-22 (Auto. Trans.)	2178S,SA
1956 S-23 (S M. Trans.)	2308S
1956 S-23 (O.D Trans.)	2309S
1956 S-23 (Auto. Trans.)	2310S
1957 S-25	2522S,SA
1958 LS1 & LS2 (S.M. Trans.)	2772S
1958 LS1 & LS2 (Auto. Trans.)	2637S
1958 LS1 & LS2 (All Trans.)	2822S
PLYMOUTH V8	
1955 157 HP (S.M. Trans.)	2141S
1955 157 HP (O.D. Trans.)	2154S
1955 157 HP (Auto Trans.)	2155S
1955 157 HP Replacement	2262S
1955 167 HP (S.M. Trans.)	2259S,SA,SB
1955 167 HP (O.D. Trans.)	2260S,SA,SB
1955 167 HP (Auto. Trans.)	2261S,SA,SB
1955 167 HP Replacement	2274S,SA
1956 277" Eng. (S.M. Trans.)	2299S,2407S
1956 277" Eng. (O.D. Trans.)	2300S,2408S
1956 277" Eng. (Auto. Trans)	2301S,2409S,SA
1956 270" Eng. (S.M. Trans.)	2259SB,2422S
1956 270" Eng (O.D. Trans.)	2260SB,2423S
1956 270" Eng. (Auto. Trans.)	2261SB,2424S
1956 270" Eng. Replacement	2274SA
1957 P-31 (S.M. Trans.)	2512S,SA,SB,SC
1957 P-31 (O.D. Trans.)	2513S,SA,SB,SC
1957 P-31 (Auto Trans.)	2514S,SA,SB,SC
1958 318" Eng. (S.M. Trans.)	2644S
1958 318" Eng. (O.D. Trans.)	2645S
1958 318" Eng. (Auto. Trans.)	2646S



1954-55 CARTER "BBD" DUAL DOWNDRAFT CARBURETOR (TYPICAL)

►CHANGES & CORRECTIONS

REWORKING CARBURETOR (Nos. 2067S, 2068S, 2070S): On 1954 DeSoto V8 before Engine No. S19-18341, if stumbling, stalling, or loading up is experienced, rework carburetors in same manner as earlier models listed above **EXCEPT** do not install new pump operating lever on air horn and do not install new pump connector rod

►***CHRYSLER WINDSOR HESITATION OR LAG ON LIGHT ACCELERATION (PowerFlite Cars with First 2162S Carburetor):*** This condition occurs at 10-20 MPH during warm-up in cold weather Correct by installing all parts furnished in Unitized Pkg Carter No 195-59U as follows Step-up Spring No 61-549, Step-up Rods No 75-1140, Pump Plunger No 64-184S Venturi Cover & Tube Assy No 118-117S.

►***CHRYSLER WINDSOR CARBURETOR PRODUCTION CHANGE (Carter 2162SA, SB, 2180SA, SB):*** These carburetors have later type parts as listed above for "Hesitation or Lag on Light Acceleration" correction installed in production

►***CHRYSLER WINDSOR CARBURETOR CHANGE FOR IMPROVED GASOLINE ECONOMY (All Carburetors)·*** Carburetors may be modified for slightly leaner mixture by installation of parts furnished in Unitized Pkg Carter No 195-66U (BBD 2162S & 2180S), or No 195-65U (BBD 2162SA, SB; 2180SA, SB) as listed below ***CAUTION—This change should only be made to correct gasoline mileage complaints. If installed in carburetors which are on lean limit, some surge or leanness may be experienced.***

Installation Note—Choke Restriction Bushing should be installed in upper end of choke suction passage in main body Install brass tag OVER original tag on carburetor ***NOTE***—Car should be carefully tuned up to secure best results from this change

CONTINUED ON NEXT PAGE

1954-58 CARTER BBD DUAL (C nt.)

Unitized Pkg. 195-65U & 195-66U

Part	Part No.
Main Metering Jet (2 used)	120-213S
Step-up Jet Rod (2 used)	75-990
Choke Restriction Bushing	158-76
Venturi Cluster Screw①	101-413
Venturi Housing Gasket①	121-252
Venturi Cover Gasket①	121-253
Body Gasket	121-254
Brass Tag	107-48

①—Not furnished in Pkg 195-66U (use original Venturi Cluster Screw)

►*PLYMOUTH 167 HP ENGINE CARBURETOR PRODUCTION CHANGES)*· Several changes have been made in carburetors in production as listed below *See also "Plymouth 167 HP Engine Carburetor Improved Gasoline Mileage Change" below.*

1) Carter 2259SA, 2260SA, 2261SA Carburetors—These carburetors have "2nd Type" parts and specifications as listed below to improve Cold Starting, Part Throttle Loading, and Road Load Economy *When making this change on earlier 2259S, 2260S, 2261S carburetors (with "1st. Type" parts), refer also to Improved Gasoline Mileage change below.*

Carter "S" & "SA" Carburetor Parts Changes

Part	Part No. & Setting 1st. Type	2nd. Type
Step-up Rod (2 used)	75-1168①	②75-1182
Venturi Cluster Screws (2)	101-401	③101-404
Choke Piston & Lever Assy	14-503S	④14-515S
Automatic Choke Setting	2 Pts Lean	Centered

①— 018" diameter ②— 019" diameter
③—Has different Air Bleed Hole calibration
④—Has different vacuum piston

2) Carter 2259SB, 2260SB, 2261SB, 2274SA Carburetors—*These carburetors have all parts listed under "Plymouth 167 HP Engine Carburetor Improved Gasoline Mileage Change" (below) installed in production.*

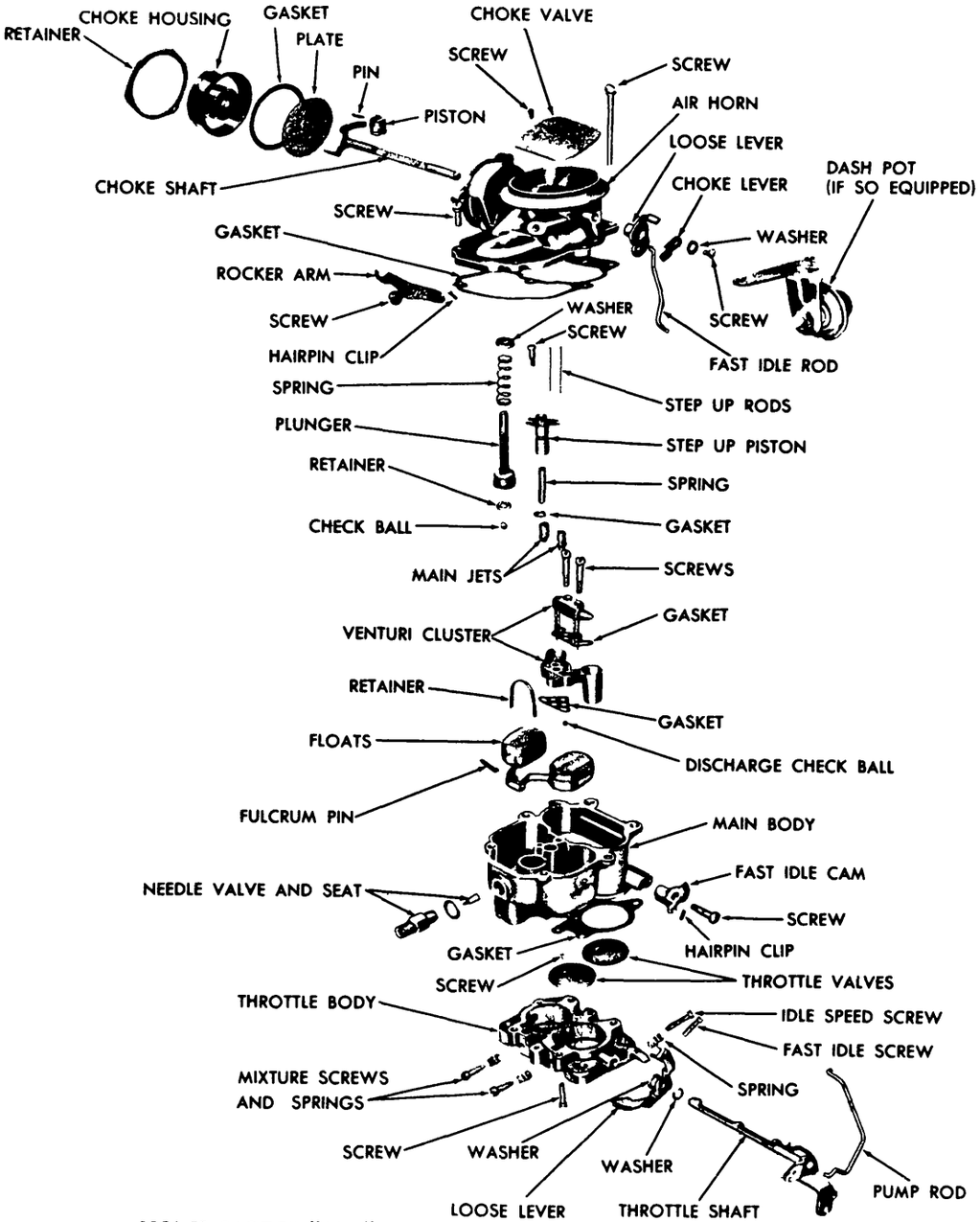
►*PLYMOUTH 167 HP ENGINE CARBURETOR IMPROVED GASOLINE MILEAGE CHANGE (Carter Carburetors 2259S, SA; 2260S, SA; 2261S, SA; 2274S)* Carburetors can be modified for slightly leaner mixture by installation of all parts furnished in Carter Unitized Pkg 195-62U as listed below and by modifying Distributor Vacuum Unit for increased vacuum advance *CAUTION—This change should only be made to correct gasoline mileage complaints If installed in carburetors which are already on lean limit, some surge or leanness may be experienced*

Carter Unitized Pkg. 195-62U

Part	Part No.
Main Metering Jet (2 used)	120-212S
Step-up Rod (2 used)	75-1168
Venturi Cluster Screw (2 used)	101-364
Venturi Housing Gasket	121-252
Venturi Cover Gasket	121-253
Body Gasket	⑤121-274
Brass Tag⑥	107-48

⑤—Supersedes No 121-254 furnished in first kits
⑥—Install over original tag

Distributor Vacuum Unit Change—Replace original Vacuum Diaphragm Assembly with new part, Plymouth No 1439671 or Auto-Lite No IAZ-2023RA, transferring the spring calibration washers, sealing washer, and nut from the original diaphragm assembly to the new part This change will increase maximum vacuum advance to 25° (engine) at 17" of vacuum (was 23°) *NOTE*—Spark plug gap should be changed to 040" (was 035")



1956-58 CARTER "BBD" DUAL DOWNDRAFT CARBURETOR (TYPICAL)

►*1957 CHRYSLER, DESOTO, PLYMOUTH CARBURETOR JET CALIBRATION CHANGES FOR IMPROVED PERFORMANCE*· See *"Carter BBD Carburetor Jet Specifications" for production changes and latest type jets used in these carburetors.*

►*DE SOTO FLAT SPOT OR HESITATION CORRECTION (2522S Carburetors)* If this trouble not corrected by

CONTINUED ON NEXT PAGE

1954-58 CARTER BBD DUAL (C nt.)

complete tune-up procedure (including Ignition Timing, Manifold Heat Control operation check, and Carburetor adjustment including Float Level and Pump Stroke check), check pump valves and make changes in carburetor as detailed below. *NOTE* - These new parts installed in 2522SA carburetors in production.

Acc l rating Pump Check Valves - Check for leakage by holding discharge check ball at bottom of pump discharge cluster hole while operating pump (Discharge Cluster removed). If leakage noted at discharge ball check or at intake ball check reseat balls Use brass rod to tap ball down if new balls not available

V nturi Cluster Screws (Main Idle Air Bleed) - Install new screws, No. 101-434 (supersedes 101-433)

Step-up R ds - Install new rods, No. 75-1145 (supersedes 75-1177).

►*1957 PLYMOUTH HESITATION OR STUMBLE CORRECTION (301" ENG.)*· First check ignition timing and set to specified setting check Manifold Heat Control Valve for free operation and correct positioning on shaft check Carburetor Float Level and set to specified setting (see below) If above steps do not correct complaint install new parts as listed below *CAUTION* - These parts provide richer-than-standard mixture and should only be used in cases of extreme necessity

Plym uth Parts Changes

Part & Usag	Part No
Step-Up Rod (All Cars)	75-1217
Venturi Cluster Screw (Auto Trans)	101-433

►*1957 PLYMOUTH CHOKE PISTON CHANGE FOR INCREASED ECONOMY DURING WARM-UP & SHORT TRIP OPERATION*· New Choke Piston & Linkage Assembly, Carter No 160-165S, used during production on all "SB" and later carburetors. Supersedes previous type, No. 160-142S on earlier carburetors

►*1957 PLYMOUTH CARBURETOR REPLACEMENT NOTE* Carburetor 2512SC used as replacement for all models When installing this carburetor on Overdrive Cars, use Unitized Pkg No 192-36U also.

►*1958 CHRYSLER HESITATION & STUMBLE ON ACCELERATION (AFTER ENGINE IS WARMED UP) CORRECTION* If correct engine tune-up and carburetor adjustment does not eliminate the condition, connect upper end of accelerator pump connector rod to inner hole in pump arm If condition still exists, replace the two step-up rods using two Carter No 75-1370 rods Clean fuel filter bowl and filter, then adjust idle mixture and idle speed to specifications

►*1958 DESOTO WITH AUTOMATIC TRANSMISSION (2637S CARB) HESITATION & FLAT SPOT CORRECTION* This condition is more noticeable on acceleration at slower speeds (0-40 MPH) and may be corrected by installing two 027" step-up rods, Carter No 75-998 in place of the original 029" step-up rods, Carter No 75-999 In addition, set the accelerator pump linkage to the long stroke for cold weather operation

►*1958 DESOTO (2637S, 2772S, 2822S) CARBURETOR BOWL VENT ADJUSTMENT NOTE: S e "B wl Vapor V nt Adjustm nt" below.*

►*1958 PLYMOUTH HESITATION DURING LOW SPEED ACCELERATION CORRECTION & CARBURETOR PRODUCTION CHANGE* To correct this condition, install a new step-up piston spring, Carter No 61-549 (identified by its pink color) Carburetors Date Coded "M7" or later have the later type spring

►*1958 PLYMOUTH PART THROTTLE IMPROVEMENT NOTE (CARS WITH 2644S & 2645S CARBURETORS)* Replace the original 022" step-up rods, Carter No 75-1140 with 020" step-up rods, Carter No 75-1217

DESCRIPTION: Double-barrel downdraft type with "integral" automatic choke (1955-58 Chrysler, 1954-57 DeSoto, 1955-56 Plymouth), "Cross-Over" type automatic choke (1958 DeSoto & 1956-58 Plymouth). The Venturi Cluster (Main Nozzle Assembly) consists of secondary venturi, main nozzles, main vent tubes, and idle tubes which are mounted as a unit in main body (attaching screws are hollow with calibrated restriction at upper end and serve as Idle Air Bleeds) Metering jets are fixed type located in bottom of bowl Each jet has a metering wire (step-up rod) in the jet which is controlled by the vacuum step-up piston 1954 DeSoto carburetors have a "Water-Jacketed" throttle body

ADJUSTMENTS: *Make all adjustments exactly as detailed below*

Idle Adjustment: Make preliminary setting of both idle mixture screws by turning each screw in until it is lightly seated and then backing screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative. Set engine idle speed to correct figure, then adjust idle mixture as follows

Idle Mixture - With engine warmed up and idling at correct idling speed, turn both idle mixture adjusting screws in 1/8 turn for leaner mixture. If engine speed increases and engine runs smoother, lean mixture further by turning both screws in an additional 1/8 turn. If this results in improved performance, reset idle speed, then make a final adjustment of each mixture screw by turning screw in (leaner) or out (richer) for best performance position of the screw. If any step of above procedure causes engine speed to drop off or engine to run roughly, turn both screws out 1/8 turn for richer mixture and then make final adjustment of each screw. *NOTE* - Best idle performance will normally be found with adjusting screws ¼-1½ turns open from inner seated position Both screws should be set alike within 1/8 turn

Idle Speed (1954-55 Models) - 450 RPM

Idle Speed (1956-58 Models) - 450-500 RPM (Synchromesh Trans), 475-500 RPM (Auto Trans), with selector lever in "N" (Neutral)

Accelerating Pump: Three holes provided in throttle lever and two holes provided in pump arm (or in plunger on some models) for connector rod engagement to provide seasonal pump setting as listed below

Pump Str k Adjustm nt - *NOTE - Connector rod must b install d in proper hol s of pump arm and throttl l v r as indicated in tabl wh n s tting pump strok adjustm nt* Back off throttle stopscrew so throttle valves are fully closed Make certain that connector rod is in proper holes of pump arm and throttle lever Use a scale to measure distance from top surface of bowl cover to top of pump plunger shaft If height not correct as indicated in table below, adjust by bending connector rod

Pump Stroke Setting

Carb.	Plunger Height
2067S, 2068S, 2070S, 2129S, 2130S, 2131S	③ 57/64"
2141S, 2154S, 2155S, 2262S	④ 58/64"
2162S, SA, SB, 2180S, SA, SB	⑤ 54/64"
2176S,SA, 2177S,SA, 2178S,SA	⑤ 1"
2216S, 2250S, 2274S,SA	⑤ 1"
2259S,SA,SB, 2260S,SA,SB, 2261S,SA,SB	⑤ 1"
2299S, 2300S, 2301S, 2308S, 2309S, 2310S	⑥ 1 1/32"
2312S, 2313S	⑥ 31/32"
2407S, 2408S, 2409S,SA	⑥ 1 1/32"
2422S, 2423S, 2424S	⑤ 1"
2512S,SA,SB,SC, 2513S,SA,SB,SC	⑥ 1 1/32"
2514S,SA,SB,SC, 2522S,SA,SB, 2527S	⑥ 1 1/32"
2637S, 2772S, 2822S	⑦ 1"
2644S, 2645S, 2646S, 2685S, 2733S	⑥ 1 1/32"

③ - Connector rod installed in **outer** hole of throttle lever and in top hole of pump plunger.
④ - Connector rod installed in **outer** hole of throttle lever and **outer** hole of pump arm.
⑤ - Connector rod installed in outer hole of throttle lever and **inner** hole of pump arm.
⑥ - Connector rod installed in **center** hole of throttle lever and **inner** hole of pump arm
⑦ - Connector rod installed in **center** hole of throttle lever (single hole only in pump arm).

Pump Seasonal Setting - Standard setting is with connector rod installed in holes of throttle lever and pump arm as indicated in table above. Outer hole in throttle lever and inner hole in pump arm will provide maximum discharge. Inner hole in throttle lever and outer hole in pump arm will provide minimum discharge.

Bowl Vapor Vent Adjustment (1958 DeSoto 2737S, 2772S, 2822S Carburetors): With throttle valves fully closed, vapor vent opening or clearance between heel of rubber grommet on vent arm and seat on bowl cover should be .062- 093" (Gauge T109-234) Adjust by bending lip on vapor vent arm *CAUTION - Setting should be checked whenever pump stroke setting changed*

Float Level: To check float level, remove air horn and bowl cover assembly and gasket Place gauge (see table below) squarely on top edge of bowl at center of floats Hold float arm lip firmly against seated needle valve Ridge or crown on each float should just touch step on gauge Adjust by bending float lip *(NOTE* - If one float lower than the other, first equalize floats by bending float arm, then adjust both floats by bending lip).

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Float Level Setting

Carburetor	① Float Level ②
2067S, 2068S, 2070S, 2129S, 2130S, 2131S	
2141S, 2154S, 2155S, 2162S, SA, SB	7/32"
2176S,SA, 2177S,SA, 2178S,SA	7/32"
2180S,SA,SB, 2216S, 2250S, 2262S	7/32"
2259S,SA,SB, 2260S,SA,SB, 2261S,SA,SB	③ 1/4"
2274S,SA, 2299S, 2300S, 2301S	③ 1/4"
2308S, 2309S, 2310S, 2312S, 2313S	③ 1/4"
2407S, 2408S, 2409S,SA	1/4"
2422S, 2423S, 2424S	③ 1/4"
2512S,SA,SB,SC, 2513S,SA,SB,SC	9/32"
2514S,SA,SB,SC, 2522S,SA,SB, 2527S	9/32"
2637S, 2772S, 2822S	5/16"
2644S, 2645S, 2646S, 2685S, 2733S	9/32"

① - Use Carter Gauge T109-239 (9/32" & 7/32"), T109-280 (5/16"), T109-282 (1/4")

② - 9/32" (Gauge T109-239) floats with flat top 7/32" (Gauge T109-239) floats with curved top

③ - Supersedes previous specification of 7/32"

Fast Idle (Off Car): *NOTE - On later carburetors with fast idle adjusting screw and fast idle cam adjacent to throttle shaft lever (not in choke assembly housing), the fast idle cam clearance must be adjusted in addition to adjustment of throttle valve opening*

Fast Idle Cam Clearance (Carburetors with Fast Idle Cam Adjacent to Throttle Shaft Lever) - On early carburetors (without index mark on fast idle cam), there should be .020" clearance between lip of fast idle cam and boss on casting with choke valve closed and lip on inner choke shaft lever contacting lug on outer lever On later carburetors (with index mark on fast idle cam), align fast idle screw with mark on cam To adjust, bend lip on choke shaft lever

Fast Idle Throttle Valve Opening (Carburetors with Fast Idle Cam in Choke Housing Assembly) - With thermostatic coil housing assembly removed and throttle adjusting screw backed out, place fast idle cam in fast idle position Clearance between valve and bore of carburetor (on side opposite idle ports) should be as indicated in table below To adjust, bend choke connector rod at lower angle

Fast Idle Setting

Carburetor	① Throttle Opening
2067S, 2068S	.015-.019"
2070S, 2129S, 2130S, 2131S	.015-.019"
2141S, 2154S, 2155S, 2262S	.009-.013"
2162S,SA,SB, 2176S,SA, 2177S,SA	.015-.019"
2178S,SA, 2180S,SA,SB, 2216S, 2250S	.015-.019"
2259S,SA,SB, 2260S,SA,SB, 2261S,SA,SB	.015-.019"
2274S,SA, 2422S, 2423S, 2424S	.015-.019"
2299S, 2300S, 2301S, 2308S, 2309S, 2310S	.015"
2312S, 2313S, 2407S, 2408S, 2409S,SA	.015"
2512S,SA,SB,SC, 2513S,SA,SB,SC, 2514S, SA, SB, SC	.020"
2522S,SA,SB, 2637S, 2772S, 2822S	.020"
2527S, 2644S, 2645S, 2646S, 2685S, 2733S	.015"

① - Use Carter Gauge T109-29 (.020"), T109-44 (.015" & .015-.019"), T109-200 (.009-.013") to measure clearance

Fast Idl Thr ttl Valv Op ning (Carbur t rs with Fast Idl Cam Adjac nt t Thr ttl Shaft L v r) - With fast idle adjusting screw on high step of fast idle cam, clearance between lower edge of valve and bore of carburetor should be as indicated in table below

Fast Idle (On Car): On later cars with fast idle adjusting screw, adjust engine speed to 1400 RPM, with fast idle screw on high step of fast idle cam.

Unloader (Carburetors with Fast Idle Cam in Choke Housing Assembly): With choke housing assembly removed, hold throttle valve wide open and close choke valve as far as possible without forcing it. Clearance between upper edge of choke valve and inner wall of air horn should be 9/64" (901S, 905S, 906S, 908S, 909S, 910S), ¼" (All Others). To adjust, bend arm on choke trip lever.

Unloader (Carburetors with Fast Idle Adjusting Screw & Fast Idle Cam Adjacent to Throttle Valve Lever)· With throttle valves wide open and choke valve closed as far as possible without forcing, clearance between top edge of choke valve and inner wall of air horn should be 15/64" (2637S, 2772S, 2822S), ¼" (2512S,SA,SB,SC, 2513S,SA,SB,SC, 2514S, SA,SB,SC, 2522S,SA,SB, 2644S, 2645S, 2646S, 2685S, 2733S), 3/16" (All Others) To adjust (Except 2637S, 2772S, 2822S), bend unloader arm on throttle lever On 2637S, 2772S, 2822S, bend unloader finger on fast idle arm

Automatic Choke: Different type choke assemblies used

All Models (Except 1958 DeSoto & 1956-58 Plymouth) - Integral type mounted on air horn with thermostatic coil linked directly to lever on choke valve shaft To adjust choke setting, loosen three screws in retainer ring and rotate choke housing. *NOTE* - Centered setting is secured with the index line on choke housing aligned with center long line of the scale on rim.

1958 DeSoto & 1956-58 Plymouth - Automatic choke is separate "Cross-Over" type mounted in well in intake manifold (at exhaust crossover passage) and linked to choke valve lever by a connector rod *See "Carter Cross-Over Type Automatic Choke" for complete data.*

Automatic Choke Setting

Carburetor	Choke Setting
2067S, 2068S, 2070S, 2129S, 2130S, 2131S	1 Pt Lean
2141S, 2154S, 2155S, 2162S,SA,SB	Centered
2176S,SA, 2177S,SA, 2178S,SA	Centered
2180S,SA,SB, 2216S, 2250S	Centered
2259S, 2260S, 2261S	2 Pts Rich
2259SA,SB, 2260SA,SB, 2261SA,SB	Centered
2262S, 2274S,SA	Centered
2299S, 2203S, 2201S	① Centered
2308S, 2309S, 2312S	Centered
2310S, 2312S	1 Pt Rich
2407S, 2408S, 2409S,SA	① Centered
2422S, 2423S, 2424S	Centered
2512S,SA,SB,SC, 2513S,SA,SB,SC	① Centered
2514S,SA,SB,SC	① Centered
2522S,SA,SB, 2527S	1 Pt. Rich
2637S, 2644S, 2645S, 2646S	① Centered
2685S, 2733S	1 Pt Lean
2772S, 2822S	① Centered

① - " Cross-Over" type choke

Ov rdriv Kickd wn Switch: S *"CARBURETOR" n individual car mod l pages.*

Sl w Cl sing Thr ttl Dashpot: *See "CARBURETOR" n individual car mod l pag s.*

Throttle Valve Setting: When installing valves, they should be positioned as indicated "Idle Port Opening" is the port opening above upper edge of tightly closed throttle valve "Vacuum Spark Port" is height of top of port above upper edge of tightly closed throttle valve

Throttle Valv Setting

Carburetor	Idl P rt Opening	Vacuum Spark P rt
2067S, 2068S, 2070S	.101-.105"	.021-.031"
2129S, 2130S, 2131S	.101-.105"	.021-.031"
2141S, 2154S, 2155S, 2262S	.133-.137"	.030-.040"
2162S,SA,SB, 2176S,SA, 2177S,SA	.102-.106"	.035-.045"
2178S,SA, 2180S,SA, SB	.102-.106"	.035-.045"
2216S, 2250S	.102-.106"	.030-.040"
2259S,SA,SB, 2260S,SA,SB	.148-.152"	.035-.045"
2261S,SA,SB, 2274S,SA	.148-.152"	.035-.045"
2299S, 2300S, 2301S	.144-.148"	.035-.045"
2308S, 2309S, 2310S	.148-.152"	.035-.045"
2312S, 2313S.	.144-.148"	.035-.045"
2407S, 2408S, 2409S,SA	.144-.148"	.035-.045"
2422S, 2423S, 2424S.	.148-.152"	.035-.045"
2512S,SA,SB,SC, 2513S,SA, SB, SC	.144-.148"	②
2514S,SA,SB,SC	.144-.148"	②
2522S, SA, SB	.148-.152"	②
2527S.	.144-.148"	②
2637S, 2772S, 2822S	.140-.144"	.015-.025"
2644S, 2645S, 2646S.	.144-.148"	.025-.035"
2685S, 2733S.	.144-.148"	.025-.035"

② - .035-.045" (Early), .025-.035" (Late).

OVERHAUL: With carburetor off engine proceed as detailed below *NOTE* - It is recommended that carburetor be mounted on stand, Tool C-3225 to protect throttle valves from damage while carburetor is on the bench

Disassembly: Disconnect and remove fast idle and pump connector rods Remove air horn and bowl cover as an assembly (with integral automatic choke), discard air horn gasket Remove pump plunger and spring by pressing up on plunger and cocking it to one side to disengage plunger stem from pump arm Remove fuel inlet needle valve seat, gasket, and needle valve Take out float pin retainer, remove fulcrum pin and floats Remove vacuum step-up piston retaining screw lift out piston and step-up rods, remove piston spring from cylinder Remove main metering jets and gaskets Loosen venturi cluster screws, lift venturi cluster assembly straight up and remove, separate cover and cluster and discard gaskets (*CAUTION* - Do not attempt to remove idle orifice or main vent tubes from cluster - these parts not furnished separately) Invert carburetor to drop out pump discharge check ball from channel under cluster

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mounting. Remove idle mixture adjusting screws and springs. Invert carburetor, remove throttle body attaching screws, lift off throttle body, discard gasket. Do not remove throttle valves or shaft unless wear or damage requires installation of new parts (see Reassembly for installation data).

Aut matic Choke Disass mbly (Integral Type) - Remove choke housing retainer, heat tube cap and gasket, choke housing and thermostatic coil assembly, baffle plate and gasket. On early carburetors with fast idle cam assembly in choke housing, slide unloader arm and trip lever out and away from fast idle link, then slide link down and remove from below. On all carburetors, remove staked portion of choke valve screws (use file or other tool), remove screws, slide choke valve out. On later carburetors with fast idle cam adjacent to throttle valve lever, remove screw in end of choke shaft retaining choke shaft lever (opposite end from automatic choke housing), slide lever, loose lever, and washer off end of shaft. On all carburetors, rotate choke shaft clockwise until vacuum piston clears cylinder in choke housing. Withdraw shaft, lever, and piston assembly from air horn.

Cleaning & Inspecti n: Clean all parts in denatured alcohol, Metalclene, or equivalent cleaner. Clean and blow out all passages in carburetor castings, venturi cluster, and jets *(CAUTION* - Do not use wire or drills to clean jets). Choke thermostatic coil and heat retainer plate can be removed from housing for cleaning by rapping assembly hard against palm of hand *(CAUTION* - Do not attempt to remove coil from heat retainer plate). If heavy black carbon deposits noted on choke parts, check heat tube in exhaust manifold for leaks. Check all parts for wear or damage and replace as required.

Reassembly: Use all new gaskets. Reassemble carburetor by reversing disassembly procedure and note the following:

Throttle Valve Installation - *NOTE* - If throttle valve shaft or throttle body worn, it is recommended that new throttle body assembly (with shaft) be used. Install throttle valves with mark ("C" in circle) downward and on idle port side install new screws loosely, close throttle valves tightly and centralize valves by tapping them lightly, tighten screws securely and stake screws by squeezing with pliers. Check throttle valve position (see specifications above).

Idle Mixture Screws - Replace screws if tapered portion grooved or ridged. Turn screws in by hand until lightly seated, then back each screw out 1 full turn for approximate idle setting.

Choke Valve Installation - Slide choke shaft and piston assembly into air horn, rotate shaft counterclockwise to enter vacuum piston in cylinder. Install choke valve shaft, install new screws loosely, close valve and tap lightly to centralize valve in bore, then tighten screws securely and stake by squeezing with pliers Check for free operation by closing valve with air horn upright. Choke should open of own weight.

Automatic Choke Reassembly (Integral Type) - Reverse disassembly procedure and adjust choke setting.

Accelerating Pump Assembly - If old pump plunger being reinstalled, flare plunger leather by rolling it back several times, install plunger in cylinder. Install discharge check ball in discharge passage. Check pump operation as follows: Pour clean gasoline in float bowl (½" deep). Operate pump plunger several times to fill cylinder and remove all air from discharge passage. Use small brass rod to hold discharge ball down on its seat, press pump plunger down. No fuel should be emitted at either the discharge or intake passages. If fuel discharge noted, remove check balls and inspect for damage, clean passages thoroughly. Reseat ball by using small brass rod on ball and tapping lightly to form new ball seat *(CAUTION* - install new check ball after using ball in reseating operation). When installing plunger, make certain plunger leather enters cylinder evenly.

Step up Piston & Rod Assembly - Make certain that step-up rods are free on piston plate (must return to vertical position when released), and that piston is free in cylinder. See that step-up rods enter metering jets when installing assembly in carburetor.

Carburetor Adjustment - Make all adjustments listed in Adjustment section above.

SERVICE PARTS: Gasket Set - Carter No. 225 (901S, 905S, 906S, 908S, 909S, 910S, 911S, 912S, 913S); No. 243 (2067S, 2068S, 2070S, 2129S, 2130S, 2131S); No. 255 (2141S, 2154S, 2155S, 2262S); No. 265 (2162S,SA,SB, 2176S,SA, 2177S, SA, 2178S,SA, 2180S,SA,SB, 2216S, 2250S, 2274S,SA, 2422S, 2423S, 2424S); No. 278 (2299S, 2300S, 2301S, 2308S, 2309S, 2310S, 2312S, 2313S, 2407S, 2408S, 2409S); No. 298 (2522S,SA,SB, 2527S, 2685S,2733S); No. 300 (2512S,SA,SB,SC, 2513S,SA,SB, SC, 2514S,SA,SB,SC , 2644S, 2645S, 2646S). No. 325 (2637S, 2772S, 2822S).

Repair Package (With Std. Metering Jet) - Carter No. 1717 (901S, 905S, 906S); No. 1728 (911S, 912S, 913S); No. 1757 (2067, 2068S, 2070S); No. 1758 (2129S, 2130S, 2131S); No. 1779 (2141S, 2154S, 2155S, 2262S); No. 1791 (2176S,SA); No. 1793A (2162S,SA,SB, 2180S,SA, SB); No. 1795 (2259S,SA,SB, 2269S,SA,SB, 2261S,SA, SB, 2274S,SA, 2422S, 2423S, 2424S). No. 1820 (2312S, 2313S); No. 1825 (2299S, 2300S, 2301S); No. 1825A (2407S, 2408S, 2409S,SA); No. 1826 (2308S, 2309S, 2310S); No. 1858 (2527S); No. 1860A (2512S,SA,SB,SC, 2513S,SA,SB,SC, 2514S,SA,SB,SC); No. 1863 (2522S,SA, SB); No. 1917N (2733S); No. 1918N (2685S); No. 1919N (2644S, 2645S, 2646S); No. 1925N (2637S, 2772S); No. 1949N (2822S).

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	Carter Carburetor No.
CHRYSLER	
1959 MC1 Windsor	ℂ 2795S & 2872S
1960 Windsor (383" Eng.)	2924S
DESOTO	
1959 MS1 Firesweep	ℂ 2793S & 2870S
1959 MS2 Firedome	2871S
1960 Fireflite (361" Eng.) Early	2923S
1960 Fireflite (361" Eng.) Late	2924S
1960 Adventurer (383" Eng.)	2924S
DODGE	
1959 MD2 Coronet & Royal	ℂ 2870S
1960 318" Eng. (Synchro-mesh)	2921S
1960 318" Eng. (Auto. Trans.)	2922S
PLYMOUTH	
1959 MP2 (Synchro-mesh)	2775S & 2864S
1959 MP2 (Overdrive)	2776S & 2865S
1959 MP2 (Auto. Trans.)	2777S & 2866S
1959 Repl. Carb.	2896S
1960 318" Eng. (Synchro-mesh)	2921S
1960 318" Eng. (Auto. Trans.)	2922S

ℂ - Use Carter 2871S for replacement.

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 CHRYSLER, DESOTO, PLYMOUTH CARBURETOR PRODUCTION CHANGE:* First carburetors as listed above have different Body Flange Assembly and Throttle Shaft & Lever Assembly than second carburetors listed for the same models.

►*1959 PLYMOUTH CARBURETOR REPLACEMENT CAUTION:* When installing Carter 2896S to replace original carburetors on Overdrive Cars, use Unitized Pkg. Carter No. 192-36U also.

►*1959 CHRYSLER STUMBLE OR HESITATION ON ACCELERATION (WITH ENGINE AT NORMAL OPERATING TEMPERATURE):* If this condition persists after engine properly tuned, manifold heat control valve and engine cooling thermostat checked for proper operation, accelerating pump connector rod installed in **outer** hole of throttle lever, fuel filter bowl cleaned, and filtering element replaced (if necessary); a lean mixture is indicated and should be corrected as follows: Install new Step-up Rods (2 required), Carter No. 75-997 or 75-999 (as available), to replace original rods, Carter No. 75-1441.

►*1959-60 HARD COLD STARTING CORRECTION (Cars With "Cross-Over" Type Choke):* This condition may be caused by choke piston sticking and can be corrected by squirting carburetor cleaner, lacquer thinner or alcohol through piston link opening in air horn. Operate valve back and forth to flush out gum formation.

►*1959 DESOTO FIREDOME ENGINE FLAT SPOT OR SURGING ON ACCELERATION OR AT LOW SPEEDS (WITH ENGINE AT NORMAL OPERATING TEMPERATURE):* On cars with Carter 2871S carburetor, if this condition persists after engine properly tuned up with special attention to Ignition Timing and Accelerating Pump Setting, make the following corrections:

Step-up Rod Change - Install new Step-up Rods, Carter No. 75-999 (2 required), to replace original rods, Carter No. 75-1426.

Venturi Cluster Screw Air Bleed Size Change - Remove venturi cluster from carburetor and enlarge inner diameter of the two cluster screws using a No. 54 (.054") drill. DO NOT USE A POWER DRILL. Hold cluster screw and drill firmly and drill out hole carefully to avoid reaming hole oversize. Check gasket surfaces of venturi cluster and carburetor and, if necessary, polish surfaces to insure they are clean and free from burrs for satisfactory sealing of the gaskets. Make certain pump discharge check ball is in discharge passage when reinstalling cluster.

DESCRIPTION: Dual (2-Barrel) downdraft type similar to design used on previous models (except for Bowl Vapor Vent and Fast Idle mechanism described below). A "Cross-Over" type automatic choke is used on all models.

Bowl Vapor Vent (1959-60 Chrysler & DeSoto, 1959 Dodge): Consists of an atmospheric vent in bowl cover flange closed by a rubber grommet on a spring arm. A loose lever on pump countershaft opens the vent when throttle valve is closed. *NOTE - Bowl vapor vent adjustment should be checked whenever accelerating pump stroke setting is changed.*

Bowl Vapor Vent (1960 Dodge & Plymouth): *NOTE - This is a new feature on these carburetors.* Consists of an atmospheric vent in bowl cover flange at slot for accelerating pump shaft. Vent valve is installed over accelerating pump shaft and is operated by a special clip (adjustable) on pump shaft that opens vent valve when throttle valves are closed. *NOTE - If pump rod is installed in either the long or short stroke hole in throttle lever, it will be necessary to move the clip (located under vent valve) either up or down to compensate for change in pump stroke.*

Fast Idle Mechanism (Chrysler & DeSoto): Fast idle cam is located directly on end of choke shaft. Fast idle lever is pivoted on side of main body and is linked to throttle lever by a fast idle connector rod. The fast idle adjustment screw is located on upper end of fast idle lever and contacts the fast idle cam. *See "Fast Idle Adjustment" below.*

Fast Idle Mechanism (Dodge & Plymouth): Fast idle cam is located on carburetor main body adjacent to throttle lever and is linked to choke valve shaft lever by a connecting rod. The fast idle lever is pivoted on throttle valve shaft and contacts the fast idle cam. The fast idle adjusting screw is on fast idle lever. *See "Fast Idle Adjustment" below.*

"Cross-Over" Type Automatic Choke (All Models): This type automatic choke is a separate unit located in well in intake manifold (in exhaust cross-over passage) and is linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in air horn and is linked directly to choke valve. *See "Carter Cross-Over Type Automatic Choke".*

ADJUSTMENTS: *Make all adjustments exactly as detailed below.*

Idle Adjustment: Make preliminary setting of both idle mixture screws by turning each screw in until it is lightly seated and then backing screw out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve is wide open and fast idle inoperative. Set engine idle speed to correct figure, then adjust idle mixture as follows:

Idle Mixture - With engine at normal operating temperature and idling at correct idle speed, adjust idle mixture screws until engine operates smoothly. Recheck engine idle speed and adjust for correct engine RPM.

Idle Mixture Setting

Carb.	Idle Screw Opening
2793S, 2870, 2871S	¼-1¼ turns
2795S, 2895S	¾-2¼ turns
2923S, 2924S	1/8-1½ turns
All Others	¼-1½ turns

Idle Speed Setting

Car	Synchro-mesh	ℂ Auto. Trans.
1959-60 Chrysler		② 500 RPM
1959-60 DeSoto	500 RPM	② 500 RPM
1959 Dodge	450-500 RPM	475-500 RPM
1959 Plymouth	450-500 RPM	475-500 RPM
1960 Dodge	500 RPM	② 500 RPM
1960 Plymouth	500 RPM	③ 500 RPM

ℂ - Automatic transmission in "N" (Neutral).
② - 575 RPM on Air Conditioned Cars.
③ - 550 RPM on Air Conditioned Cars.

Accelerating Pump (1959-60 Chrysler & DeSoto, 1959 Dodge): Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting as listed below. *CAUTION - Bowl Vapor Vent Adjustment must be checked when ever pump setting changed.*

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that pump connector rod engaged in center hole (medium stroke) of throttle lever. Use scale to measure distance from top surface of bowl cover to top of pump plunger shaft (within air horn - remove air cleaner for access). This distance should be 1"±1/64" (all models). Adjust by bending connector rod at lower angle.

Pump Seasonal Setting - Standard setting is with connector rod engaged in center hole of throttle lever (medium stroke). Outer hole will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

Accelerating Pump (1960 Dodge, 1959-60 Plymouth): Three holes in throttle lever and two holes provided in pump arm for connector rod engagement to provide seasonal setting as indicated below. *CAUTION - Bowl Vapor Vent Adjustment must be checked whenever pump setting is changed.*

Fast Idle (On Car): All Models - With engine at normal operating temperature, adjust idle speed to 1400 RPM (1959); 1375-1425 RPM (1960) with fast idle screw on index mark of cam.

Fast Idle (Off Car): *NOTE - Two adjustments required as follows:*

Fast Idle Linkage Adjustment (1959-60 Chrysler & DeSoto, 1959 Dodge) - With choke valve tightly closed and lug on fast idle cam contacting lip on choke shaft lever, index mark on fast idle cam should be aligned with center of fast idle adjusting screw. To adjust, bend lip on choke shaft lever.

Fast Idle Linkage Adjustment (1959-60 Plymouth, 1960 Dodge) - With choke valve tightly closed and lip on inner choke shaft lever contacting lip on outer lever,

CONTINUED ON NEXT PAGE

1959-60 CARTER BBD DUAL (C nt.)

align index mark on fast idle cam with adjusting screw. To adjust, bend lip on inner choke shaft lever.

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that connector rod engaged in center hole of throttle lever and inner hole of pump arm. Use scale to measure the distance from top surface of bowl cover to top of pump plunger shaft. This distance should be 1 1/8" (All models). Adjust by bending connector rod at lower angle.

Pump S asonal Setting - Std. setting is with connector rod engaged in center hole of throttle lever and inner hole of pump arm (Medium Stroke). Outer hole in throttle lever will provide maximum stroke (greater discharge), and inner hole minimum stroke (less discharge).

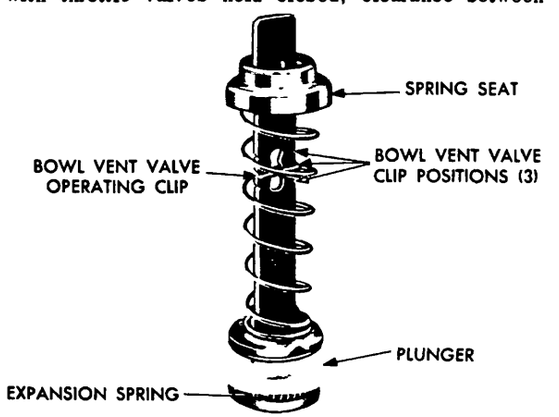
Float L v l: To check float level, remove air horn and bowl cover assembly, and gasket. Place gauge (see table below) squarely on edge of bowl at free end of floats. Hold float arm lip firmly against seated needle valve. Ridge or crown on each float should just touch step on gauge. Adjust by bending float lip (*NOTE* - If one float lower than the other, first equalize floats by bending float arm, then adjust both floats by bending lip).

Float Level Setting

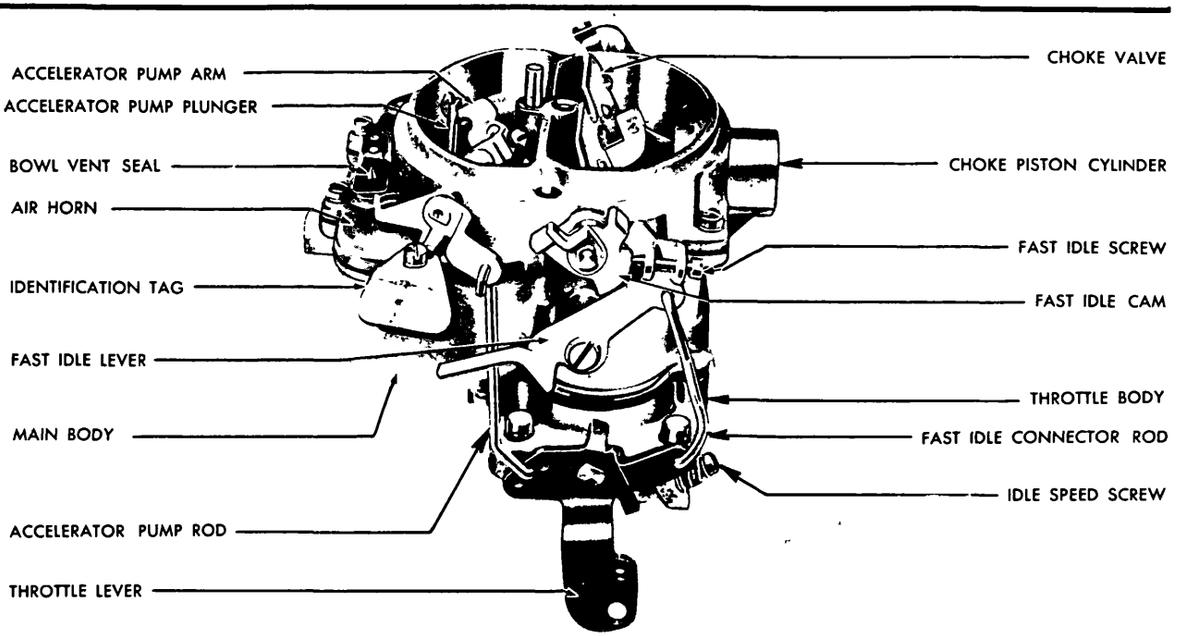
Car	Checking Gauge	Float Level
1959-60 Chrysler	T109-280	5/16"
1959-60 DeSoto	T109-280	5/16"
1959 Dodge	T109-280	5/16"
1960 Dodge	T109-239	9/32"
1959-60 Plymouth	T109-239	9/32"

B wl Vap r V nt Adjustment (1959-60 Chrysler & DeSoto, 1959 Dodge): With throttle valves fully closed, vapor vent opening or clearance between heel of grommet on vent arm and seat on bowl cover should be .062-.093" (Gauge T109-234). Adjust by bending lip on vapor vent arm. *CAUTION - S tting should be checked whenev r pump str k s tting is changed.*

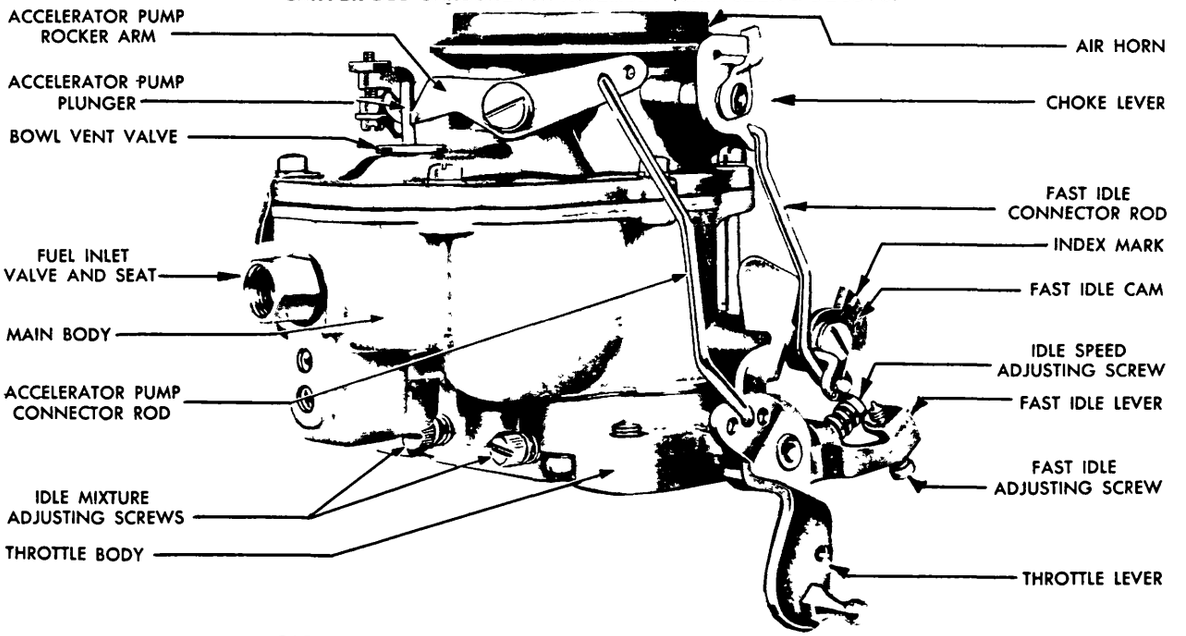
B wl Vap r Vent Adjustment (1960 Dodge & Plymouth): *NOTE - B wl Vap r V nt not used on 1959 Plymouth.* With throttle valves held closed, clearance between bowl vent valve and air horn should be .060" (use a .060" drill shank). To adjust, bend accelerator pump rod at lower angle. *CAUTION - If pump rod is installed in ith r the l ng or sh rt strok h l (cent r hol is normal s tting), it will b n c ssary to mov th hairpin clip l cat d dir ctly und r bowl v nt valv , ither up r down to c mpensat f r change in pump strok and t maintain prop r adjustment.*



1960 DODGE & PLYMOUTH ACCELERATING PUMP PLUNGER ASSEMBLY



CARTER BBD CARBURETOR ASSEMBLY (CHRYSLER & DESOTO)



CARTER BBD CARBURETOR ASSEMBLY (DODGE & PLYMOUTH)

CONTINUED ON NEXT PAGE

1959-60 CARTER BBD DUAL (C nt.)

Fast Idle Throttle Valve Opening (All Models) - Back out idle speed adjusting screw, close choke valve tightly. Fast idle screw should be in line with index mark on fast idle cam (highest step of cam). Turn fast idle screw in or out until correct throttle valve opening is secured (see table below). Check by inserting gauge between lower edge of throttle valve and carburetor wall on side opposite idle ports.

Fast Idle Setting

Car	Checking Gauge	Throttle Opening
1959-60 Chrysler	T109-44	.018"
1959-60 DeSoto	T109-44	.018"
1959 Dodge	T109-44	.018"
1960 Dodge	T109-44	.015"
1959-60 Plymouth	T109-44	.015"

Unloader: To check, close choke valve lightly, open throttle valves to wide open position which will open choke valve slightly. Check choke valve opening or clearance by inserting gauge (see table below) between upper edge of valve and air horn wall. Adjust by bending unloader finger on fast idle arm.

Unloader Setting

Car	Checking Gauge	Choke Setting
1959-60 Chrysler	T109-32	15/64"
1959-60 DeSoto	T109-32	15/64"
1959 Dodge	T109-32	15/64"
1960 Dodge	T109-31	1/4"
1959-60 Plymouth	T109-31	1/4"

Automatic Choke: The automatic choke is a separate "Cross-Over" type mounted in well in intake manifold (at exhaust crossover passage) and linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in carburetor air horn and linked directly to choke valve. *See "Carter Cross-Over Type Automatic Choke" for complete data.*

Automatic Choke Setting

All Models	Centered (At Index)

Overdrive Kickdown Switch (Plymouth): With throttle valves wide open, clearance between kickdown lever and switch stem guide should be 1'64-3/64". Adjust by loosening switch mounting nuts and changing position of switch in bracket.

Throttle Valve Setting: When installing valves, they should be positioned as indicated. "Idle Port Opening" is the port opening above upper edge of tightly closed throttle valve. "Vacuum Spark Port" is height of top of port above upper edge of tightly closed throttle valve.

Thr ttl Valv S tting

Car	Idle Port	Vacuum Spark Port
1959-60 Chrysler	.140-.144"	.015-.025"
1959-60 DeSoto	.140-.144"	.015-.025"
1959 Dodge	.140-.144"	.015-.025"
1960 Dodge	.144-.148"	.025-.035"
1959-60 Plymouth	.144-.148"	.025-.035"

OVERHAUL: With carburetor off engine, proceed as detailed below. It is recommended that elevating legs (T109-287S and T109-288S) be used for carburetor mounting on the bench to protect the throttle valves and throttle lever from damage.

Disassembly: Disconnect and remove fast idle and pump connector rods. Take out air horn-to-main body attaching screws (two screws located within air horn), remove air horn and bowl cover assembly. Remove pump plunger by pushing it up at an angle to disengage plunger stem from pump arm. Remove inlet needle and seat assembly. Take out float lever pin retainer, remove float and lever assembly. Take out step-up piston plate guide screw and remove step-up piston and rod assembly, remove spring and gasket from cylinder. Remove main metering jets. Take out venturi cluster screws and remove venturi cluster *(CAUTION* - Do not attempt to remove tubes from cluster). Invert carburetor and catch pump discharge check ball as it falls out. Remove idle adjusting screws and springs. Take out throttle body attaching screws and remove throttle body. Do not remove throttle valves unless replacement required (see Reassembly for installation data). Do not remove throttle valve shaft (replace throttle body if shaft worn). If choke shaft does not operate freely, disconnect vacuum piston link and check piston for free movement in cylinder. If necessary to remove piston and link, remove welch plug at outer end of cylinder and slide piston and link out.

Cleaning & Inspection: Clean all parts with mineral spirits or suitable cleaner. Blow out all passages in castings and venturi cluster with compressed air *(CAUTION* - Do not use wire or drills to clean jets). Check all parts for wear or damage and replace as required.

Reassembly: Use all new gaskets. Reassemble carburetor by reversing disassembly procedure and note the following:

Throttle Valve Installation - *NOTE* - If throttle valve shaft or throttle body worn, it is recommended that new throttle body assembly (with shaft) be used. Install throttle valves with mark ("C" in circle) downward and on idle port side, install new screws loosely, close throttle valves tightly and centralize valves by tapping them lightly, tighten screws securely and stake screws by squeezing with pliers. Check throttle valve position (see specifications above).

Idle Mixture Screws - Replace screws if tapered portion grooved or ridged. Turn screws in by hand until lightly seated, then back each screw out 1 full turn for approximate idle setting.

Choke Valve Installation - Slide choke shaft and piston assembly into air horn, rotate shaft counterclockwise to enter vacuum piston in cylinder. Install choke valve shaft, install new screws loosely, close valve and tap lightly to centralize valve in bore, then tighten screws securely and stake by squeezing with pliers Check for free operation by closing valve with air horn upright. Choke should open of own weight.

Accelerating Pump Assembly - If old pump plunger being reinstalled, flare plunger leather by rolling it back several times, install plunger in cylinder. Install discharge check ball in discharge passage. Check pump operation as follows: Pour clean gasoline in float bowl (½" deep). Operate pump plunger several times to fill cylinder and remove all air from discharge passage. Use small brass rod to hold discharge ball down on its seat, press pump plunger down. No fuel should be emitted at either the discharge or intake passages. If fuel discharge noted, remove check balls and inspect for damage, clean passages thoroughly. Reseat ball by using small brass rod on ball and tapping lightly to form new ball seat *(CAUTION* - install new check ball after using ball in reseating operation). When installing plunger, make certain plunger leather enters cylinder evenly.

Step up Piston & Rod Assembly - Make certain that step-up rods are free on piston plate (must return to vertical position when released), and that piston is free in cylinder. See that step-up rods enter metering jets when installing assembly in carburetor.

Carburetor Adjustment - Make all adjustments listed in Adjustment section above.

SERVICE PARTS: Gasket Sets - Carter No. 300 (2775S, 2776S, 2777S, 2864S, 2865S, 2866S, 2896S); No. 325 (2793S, 2795S, 2870S, 2871S, 2872S); No. 335 (2923S, 2924S).

Re-Carburetion Kits: Carter No. 1949N (2793S, 2795S, 2871S, 2872S); No. 1951N (2864S, 2865S, 2866S); No. 1976N (2870S); No. 1988N (2921S, 2922S); No. 1993N (2923S); No. 5015N (2924S).

Zip-Kits: Carter No. 900-67 (2793S, 2795S, 2870S, 2871S, 2872S); No. 900-70 (2864S, 2865S, 2866S); No. 900-100 (2923S, 2924S); No. 900-106 (2921S, 2922S).

1954-55 CARTER DUAL BBD CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Main Metering Jet			Step Up Rod		Venturi Cover Assy.				Venturi Cover Screw		
			Std. Part No.	1 Size Lean Part No.	2 Size Lean Part No.	Size	Part No.	Main Vent Tube Size	Idle Tube Size	Pump Jet Size	Part No.	Idle Air Bleed	Idle Restriction	Part No.
CHRYSLER C67														
Synchro-mesh	1955	2180S,SA,SB	120-214S	120-213S	120-212S	022" ①	75-1140	0275"	0334"	0275"	118-117S②	063"	0472"	101-364
PowerFlite	1955	2162S,SA,SB	120-214S	120-213S	120-212S	022" ①	75-1140	0275'	0334"	0275"	118-117S②	063'	0472"	101-364
DESOTO S19														
Synchro-mesh (Early)	1954	2067S	120-195S	120-173S	120-182S	024"	75-990 ⑧	0196"	0295"	0315" ⑥	118-96S	063"	0472"	101-364
Overdrive (Early)	1954	2068S	120-195S	120-173S	120-182S	024"	75-990 ⑧	0196"	0295"	0315" ⑥	118-96S	063"	0472"	101-364
Auto Trans (Early)	1954	2070S	120-195S	120-173S	120-182S	024"	75-990 ⑧	0196"	0295"	0315" ⑥	118-96S	063"	0472"	101-364
Synchro-mesh (Late)	1954	2129S	120-195S	120-173S	120-182S	024"	75-990	0196"	0295"	0315" ⑦	118-96S	063"	0472"	101-364
Overdrive (Late)	1954	2130S	120-195S	120-173S	120-182S	024"	75-990	0196"	0295"	0315" ⑦	118-96S	063"	0472"	101-364
Auto-Trans (Late)	1954	2131S	120-195S	120-173S	120-182S	024"	75-990	0196"	0295"	0315" ⑦	118-96S	063"	0472"	101-364
Repl All	1952-54	2250S	120-214S	120-213S	120-212S	024"	75-990	0197"	0334"	0275"	118-117S②	063"	.0472"	101-364
DESOTO S22														
Synchro-mesh	1955	2176S,SA	120-214S	120-213S	120-212S	024'	75-990	0275'	0334"	0275"	118-117S ⑫	063"	0472"	101-364
Overdrive	1955	2177S,SA	120-214S	120-213S	120-212S	024"	75-990	0275'	0334"	0275"	118-117S ⑫	063"	0472"	101-364
PowerFlite	1955	2178S,SA	120-214S	120-213S	120-212S	.024"	75-990	0275"	0334"	0275'	118-117S ⑫	063"	.0472"	101-364
PLYMOUTH V8 157 HP														
Synchro-mesh	1955	2141S	120-211S	120-210S	120-216S	022'	75-1140	0256'	035"	0275"	118-108S	063"	0472"	101-364
Overdrive	1955	2154S	120-211S	120-210S	120-216S	022"	75-1140	0256"	035"	0275"	118-108S	063"	0472'	101-364
PowerFlite	1955	2155S	120-211S	120-210S	120-216S	022"	75-1140	0256'	035"	0275"	118-108S	.063"	0472"	101-364
Replacement	1955	2262S	120-211S	120-210S	120-216S	022"	75-1140	0256"	035"	0275"	118-108S	063"	0472"	101-364
PLYMOUTH V8 167 HP														
Synchro-mesh	1955	2259S,SA,SB	120-212S ⑤	120-209S	120-211S	019" ③	75-1168	0256"	035"	0275"	118-108S	063"	0472"	101-364 ⑩
Overdrive	1955	2260S,SA,SB	120-212S ⑤	120-209S	120 211S	019" ③	75-1168	0256"	035"	0275"	118-108S	.063"	.0472"	101-364 ⑩
PowerFlite	1955	2261S,SA,SB	120-212S ⑤	120-209S	120-211S	.019" ③	75-1168	0256"	035"	0275'	118-108S	063"	0472"	101-364 ⑩
Replacement	1955	2274S,SA	120-212S ⑤	120-209S	120-211S	019" ③	75-1168	0256'	035"	0275"	118-108S	063"	0472"	101-364 ⑩

①—Supersedes 75-1145 used on 2180S, 2162S

②—Supersedes 118-115S

③—Supersedes 75-1182 used on 2259SA, 2260SA, 2261SA & 2274S, which supersedes 75-1168 used on 2259S, 2260S, 2261S

⑩—Supersedes 101-404 used on 2259SA, 2260SA, 2261SA & 2274S, which supersedes 101-401 used on 2259S, 2260S, 2261S

⑤—Supersedes 120-213S used on 2259S & SA, 2260S & SA, 2261S & SA & 2274S

⑥—Used with Step-Up Piston Rod (metering wire) No 75-798 (022" diam)

⑦—Used with Step-Up Piston Rod (metering wire) No 75-876 (022" diam)

⑧—Supersedes No 75-876

⑫—Part No 48-187

1956-58 CARTER DUAL BBD CARBURETOR JET SPECIFICATIONS

			Main Metering Jet			Step Up Rod		Venturi Cluster Assy.				Venturi Cover Screw		
Car Model	Year	Carb. No.	Std.	1 Size Lean	2 Size Lean	Size	Part No.	Main Vent Tube Size	Idle Tube Size	Pump Jet Size	Part No.	Idle Air Bleed	Idle Restriction	Part No.
CHRYSLER C71														
All Cars ③	1956	2312S, 13S	120-213S	120-212S	120-209S	024"	①75-990	.0256"	.035"	.0275"	118-108S	.063"	.0472"	101-364
C75-1	1957	2527S	120-214S⑦	120-213S ⑧	120-212S ⑨	.026"	75-1370 ⑩	.0393"	.0255"	.0275"	58-127S	.051"	.055"	101-423
LC1(Std.)	1958	2685S	120-215S	120-214S	120-213S	.030"	75-1414	0393"	.0255"	.0275"	58-127S	051"	.055"	101-423
LC1 (Air Cond.)	1958	2733S	120-215S	120-214S	120-213S	.030"	75-1414	.0393"	0255"	0275"	58-127S	051"	055"	101-423
DE SOTO S23														
All Cars ④	1956	2308S, 9S, 10S	120-221S	120-212S	120-209S	023"	②75-1145	.0196"	.035"	.0295"	118-123S	.063"	.0472"	101-364
S25	1957	2522S,SA	120-221S	120-212S	120-209S	.023"	75-1145 ⑪	.0393"	.0275"	.0275"	58-155S	.055"	.055"	101-434⑫
LS1, LS2(S.M.)	1958	2772S	120-205S	120-206S	120-215S	027"	75-998		0315"	0275"	58-292S	059"	.051"	101-454
LS1, LS2(Auto.Trans.)	1958	2637S	120-205S	120-206S	120-215S	.029"	75-999 ㉑		0295"	0275"	58-198S	.055"	.051"	101-450
LS1, LS2(All Trans.)	1958	2822S	120-231S			.031"	75-1426		0295"	.0275"	58-198S	.059"	.051"	101-454
DE SOTO REPL.														
Repl. Carb.	1952-53	2216S	120-213S			.024"	75-990	.0275"	.0334"	.0295"	118-117S	.0629"	.0472"	101-364
Repl. Carb.	1952-54	2250S	120-214S	120-213S	120-212S	024"	75-990	.0275"	.0334"	.0295"	118-117S	.063"	.0472"	101-364
PLYMOUTH V8														
270" Eng. S.M.	1956	2259SB, 2422S	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.059"	.0472"	101-350⑤
270" Eng. O.D.	1956	2260SB, 2423S	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.059"	.0472"	101-350⑤
270" Eng.PowerFlite	1956	2261SB, 2424S	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.059"	.0472"	101-350⑤
270" Eng.Repl.Carb.	1956	2274SA	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.059"	.0472"	101-350⑤
277" Eng. S.M.	1956	2299S, 2407S	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.0629"	.0472"	101-364
277" Eng. O.D.	1956	2300S, 2408S	120-212S	120-209S	120-211S	.018"	75-1168	.0256"	.035"	.0275"	118-108S	.0629"	.0472"	101-364
277" Eng. PowerFlite	1956	2301S, 2409S, SA	120-212S	120-209S	120-211S	.020"	75-1217	.0256"	.035"	.0275"	118-108S	.0669"	.0472"	101-411
P31-1,2,3 (S.M.)	1957	2512S,SA,SB,SC	120-213S ⑬	120-212S ⑭	120-209S ⑮	.026"	75-1177 ⑯	.0393"	.0275" ⑰	.0275"	58-155S ⑱	.0472"	.055"	101-440⑲
P31-2,3 (O.D.)	1957	2513S,SA,SB,SC	120-213S ⑬	120-212S ⑭	120-209S ⑮	.026"	75-1177 ⑯	0393"	0275" ⑰	.0275"	58-155S ⑱	.0472"	.055"	101-440⑲
P31 (Auto. Trans.)	1957	2514S,SA,SB,SC	120-213S ⑬	120-212S ⑭	120-209S ⑮	.026"	75-1177 ⑯	.0393"	.0275" ⑰	.0275"	58-155S ⑱	.0472"	.055"	101-448⑳
318" Eng. (S.M.)	1958	2644S	120-212S	120-209S	120-211S	.022"	75-1140	.0393"	.0255"	0275"	58-127S	055"	.055"	101-434
318" Eng. (O.D.)	1958	2645S	120-212S	120-209S	120-211S	022"	75-1140	.0393"	.0255"	.0275"	58-127S	.055"	.055"	101-434
318" Eng.(PowerFlite)	1958	2646S	120-212S	120-209S	120-211S	.024"	75-990	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440

① — Supersedes No. 75-1177.
② — Supersedes No. 75-1140.
③ — 2312S Synchro-mesh, 2313S PowerFlite.
④ — 2308S Synchro-mesh, 2309S Overdrive, 2310S PowerFlite.
⑤ — Supersedes No. 101-364 .0629" Idle Air Bleed, .0472" Idle Restriction on 2259SB, 2260SB, 2261SB, 2274SA.
⑥ - Main Vent Tube, Idle Tube, Pump Jet now located in Venturi Cluster on later carburetors.
⑦- Supersedes 120-213S.
⑧- Supersedes 120-212S.
⑨- Supersedes 120-209S.
⑩- Supersedes 75-1177.
⑪- Supersedes 75-1177 in 2522S.
⑫- Supersedes 101-433 in 2522S.
⑬- Supersedes 120-212S in SA, SB.
⑭- Supersedes 120-209S in SA, SB.
⑮- Supersedes 120-211S in SA, SB.
⑯- Supersedes 75-990 in SA, SB.
⑰- .0255" in SC.
⑱- 58-127S in SC.
⑲- Supersedes 101-433 in S, SA, SB.
⑳- Supersedes 101-440 which superseded 101-434.
㉑- Use 75-998 (1 size rich) to correct leanness, hesitation, or flat spot.

1959 CARTER BBD CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Main Metering Jet			Step-Up Rod		Venturi Cluster Assy.				Venturi Cover Screw		
			Std.	1 Size Lean	2 Sizes Lean	Size	Part No.	Main Vent Tube Size	Idle Tube Size	Pump Jet Size	Part No.	Idle Air Air Bleed	Idle Restriction	Part No.
CHRYSLER														
MC1	1959	2795S	120-231S	120-232S	120-207S	.032"	③ 75-1441	.038"	.0295"	.0275"	58-198S	.055"	.051"	101-450
		2872S	120-231S	120-232S	120-207S	.032"	③ 75-1441	.038"	.0295"	.0275"	58-198S	.055"	.051"	101-450
DESOTO														
MS1	1959	2793S	120-232S	120-199S	120-205S	.031"	75-1426	.038"	.0295"	.0275"	58-198S	.059"	.051"	101-454
		2870S	120-232S	120-199S	120-205S	.031"	75-1426	.038"	.0295"	.0275"	58-198S	.059"	.051"	101-454
MS2	1959	2871S	120-231S	120-232S	120-207S	.031"	75-1426	.038"	.0295"	.0275"	58-198S	.059"	.051"	101-454
DODGE														
MD2	1959	2870S	120-232S	120-199S	120-205S	.031"	75-1426	.038"	.0295"	.0275"	58-198S	.059"	.051"	101-454
PLYMOUTH														
MP2 (S.M.)	1959	2775S	120-221S	120-212S	120-209S	ℂ	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
		2864S	120-221S	120-212S	120-209S	ℂ	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
MP2 (O.D.)	1959	7776S	120-221S	120-212S	120-209S	ℂ	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
		2865S	120-221S	120-212S	120-209S	ℂ	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
MP2 (PowerFlite)	1959	2777S	120-221S	120-212S	120-209S	ℭ	75-1429	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
		2866S	120-221S	120-212S	120-209S	ℭ	75-1429	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
Repl. Carb.	1959	2896S	120-221S	120-212S	120-209S	ℂ	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440

ℂ - .028" x .024"

ℭ - .024" x .021"

③ - Replace with 75-997 or 75-999 to correct hesitation or stumble caused by lean mixture.

1960 CARTER BBD CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Main Metering Jet			Step-Up Rod		Venturi Cluster Assy.				Venturi Cover Screw		
			Std.	1 Size Lean	2 Sizes Lean	Size	Part No.	Main Vent Tube Size	Idle Tube Size	Pump Jet Size	Part No.	Idle Air Air Bleed	Idle Restriction	Part No.
CHRYSLER														
383" Eng.	1960	2924S	120-238S			.033"	75-1476	.0292"	.0295"	.0275"	58-426S	.059"	.051"	101-454
DE SOTO														
361" Eng. (Early)	1960	2923S	120-245S			.036"	75-1482	.0292"	.0295"	.0275"	58-426S	.059"	.051"	101-454
361" Eng. (Late)	1960	2924S	120-238S			.033"	75-1476	.0292"	.0295"	.0275"	58-426S	.059"	.051"	101-454
383" Eng.	1960	2924S	120-238S			.033"	75-1476	.0292"	.0295"	.0275"	58-426S	.059"	.051"	101-454
DODGE & PLYMOUTH														
318" Eng. (S.M.)	1960	2921S	120-213S	120-212S	120-209S	.024"	75-1442	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440
318" Eng. (A.T.)	1960	2922S	120-213S	120-212S	120-209S	.028"	75-1429	.0393"	.0255"	.0275"	58-127S	.059"	.055"	101-440

FORD 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

FORD PASS. CARS (1957)	Carburetor No.
272" Eng. S.M Trans (Early) ①	B7A-9510-A
272" Eng. S M Trans. (Late) ①	B7A-9510-Q
272" Eng S.M Trans (Later) ①	B7A-9510-Z
292" Eng S.M Trans.	B7A-9510-E
292" Eng. Auto. Trans. (Early)	B7A-9510-L
292" Eng. Auto. Trans. (Late)	B7A-9510-W
FORD PASS. CARS (1958)	
292" Eng. S M Trans (Early) ①	B8A-9510-K
292" Eng. S M Trans (Late)	B8A-9510-N
292" Eng. Auto. Trans.	B8A-9510-P
332" Eng S.M Trans ①	B8A-9510-L
FORD PASS. CARS (1959)	
292" Eng. S.M Trans. ①	B9A-9510-A
292" Eng. Auto. Trans	B9A-9510-B
332" Eng. Auto Trans ②	B9A-9510-C
FORD PASS. CARS & EDSEL (1960)	
292" Eng S.M Trans (Early)	COAE-9510-M
292" Eng S M Trans. (Late)	COAE-9510-AF
292" Eng. Auto Trans. (Early)	COAE-9510-H
292" Eng Auto Trans (Late)	COAE-9510-AG
352" Eng S.M. Trans. (Early)	COAE-9510-R
352" Eng. S M. Trans. (Late)	COAE-9510-AB
352" Eng. Auto. Trans (Early)	COAE-9510-S
352" Eng. Auto Trans (Late)	COAE-9510-AC
EDSEL (1959)	
292" Eng. S.M. Trans.	B9A-9510-A
292" Eng. Auto. Trans.	PB9E-9510-C
332" Eng. S.M. Trans.	PB9E-9510-G
332" Eng. Auto. Trans.	PB9E-9510-B
EDSEL (1960)	
See "Ford Pass. Cars & Edsel (1960)" above.	
MERCURY (1959)	
383" Eng. S.M Trans ③	PB9M-9510-H
383" Eng. Auto. Trans. ③	PB9M-9510-B
MERCURY (1960)	
383" Eng Auto. Trans (Early) ④	COME-9510-G
383" Eng. Auto Trans. (Late) ④	COME-9510-K
383" Eng. Auto. Trans ⑤	COME-9510-J

4-BARREL CARBURETORS

FORD PASS. CARS (1957)	Carburetor No.
312" Eng Auto Trans (Early)	B7A-9510-B
312" Eng Auto Trans (Late)	B7A-9510-X
FORD PASS. CARS (1958)	
332" Eng. S.M. Trans (Early) ①	B8A-9510-A
332" Eng. S.M. Trans (Late) ①	B8A-9510-W
352" Eng Auto Trans (Early) ②	B8A-9510-E
352" Eng Auto Trans. (Late) ②	B8A-9510-V
FORD PASS. CARS (1959)	
352" Eng S.M Trans. ①	B9A-9510-E
FORD PASS. CARS & EDSEL (1960)	
352" Eng S M. Trans	COAE-9510-J
352" Eng. Auto Trans.	COAE-9510-K
EDSEL (1958)	
361" Eng.	B8A-9510-E
EDSEL (1959)	
361" Eng. Auto. Trans.	PB9E-9510-D
361" Eng. Auto. Trans.	B9A-9510-E
EDSEL (1960)	
See "Ford Pass. Cars & Edsel (1960)" above.	
MERCURY (1958)	
383" Eng.	EDG-9510-A
383" Eng. (Modified)	EDG-9510-B
MERCURY (1959)	
383" Eng. Auto Trans. ⑥	PB9M-9510-D

① - Install dashpot for use with automatic transmission
② - Remove dashpot for use with synchro-mesh transmission.
③ - Monterey models
④ - Except Air Conditioned Cars.
⑤ - Air Conditioned Cars.
⑥ - Montclair models.

Carburetion Identification

Carb. No.	Identification
B7A-9510-A	⑥ ECG-9510-AU or AV
B7A-9510-B	① ECZ-U
B7A-9510-E	① ECG-BA
B7A-9510-L	⑦ EDB-9510-K or EDB-J
B7A-9510-Q	① ECG-AY or AZ
B7A-9510-W	① ECZ-N
B7A-9510-X	① ECZ-Z
B7A-9510-Z	② ECG
B8A-9510-A	① EDC-C or EDC-D
B8A-9510-E	① EDT-B or EDT-C
B8A-9510-K	① EDB-U or EDB-V
B8A-9510-L	① EDC-A or EDC-B
B8A-9510-N	③ EDB-AG
B8A-9510-P	③ EDB-AF
B8A-9510-V	③ 5751680 or 81
B8A-9510-W	③ 5751679
B9A-9510-A	③ 5752306
B9A-9510-B	③ 5752307
B9A-9510-C	③ 5752305
B9A-9510-E	③ 5752308
COAE-9510-AB, AC, AF, AG	④
COAE-9510-H, J, K, M, R, S	④
PB9E-9510-B	③ 5752305
PB9E-9510-C	③ 5752307
PB9E-9510-D	③ 5752309
PB9E-9510-G	③ 5752304
PB9M-9510-B	③ 5252005
PB9M-9510-D	③ 5752425
PB9M-9510-H	⑤
COME-9510-G, J, K	④
EDG-9510-A, B	⑤

① - Cast on left side of fuel bowl.
② - BJ or BK stamped below prefix.
③ - Cast on lower left corner of fuel bowl.
④ - Part number stamped on fuel bowl at center.
⑤ - No identification
⑥ - Stamped on main body cover.
⑦ - Stamped on main body cover or on fuel bowl.

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 FORD 2-BARREL & 4-BARREL CARBURETOR POWER VALVE (ECONOMIZER) BOTTOMING CORRECTION:* On carburetors that appear to have a leaking power valve, check to determine if power valve is bottoming before the gasket is sufficiently compressed To check, remove power valve and gasket, then install power valve (finger tight) without gasket Using the removed gasket as a gauge try and insert gasket between valve and carburetor body If gasket can be inserted, the power valve has insufficient thread length To correct, install original gasket and one additional gasket, Part No B5A-9909-A on power valve assembly Install valve and check for proper sealing of the two gaskets

►*1957 FORD 2-BARREL CARBURETOR (B7A-9510-L) MAIN JET PRODUCTION CHANGE* Main jets have been increased in size as follows No 62 (0-5000 ft), No 60 (5000-10,000 ft), No 58 (10 000-15,000 ft) replacing the former sizes of Nos 53, 51, 49

►*1957 FORD 2-BARREL & 4-BARREL CARBURETOR-TO-INTAKE MANIFOLD GASKET-AND SPACER NOTE* Proper gaskets and spacers must be used as follows 2-Barrel (Two gaskets Part No B7A-9447-A and one spacer Part No B7A-9603-C), 4-Barrel except on 312" Engine (Two gaskets Part No B7A-9447-B and one spacer Part No B7A 9603-B), 4-Barrel 312" Engine (Two gaskets Part No B7A-9447-B and one spacer Part No B7A-9603-D)

►*1957 FORD 312" ENGINE HARD STARTING CORRECTION* Replace the early aluminum carburetor-to-intake manifold spacer, Part No B7A-9603-B, with the later "resinoid" spacer, Part No B7A-9603-D This later spacer prevents excessive heat transfer between intake manifold and carburetor

►*1957 FORD 2-BARREL CARBURETOR WHISTLE CORRECTION* This whistling noise is caused by the 90° corner located at bottom of throttle bore and can be corrected by using a file to remove the sharp edge at junction of throttle bores and intake manifold flanges *Care must be taken so that not more than 1/16" of stock is removed The removal of additional stock would cause a vacuum leak at this point*

►*1957 FORD 2-BARREL CARBURETOR SURGE CORRECTION:* This surge may be encountered in the 40-50 MPH range and is caused by air leaking into booster venturi assembly through the plugs on top of the "tower-like" projections in carburetor throat Eliminate this air leakage by replacing the defective booster assembly or by sealing the plugs with sealing compound, Part No 8A-19554-B *CAUTION - Do not cover any of the bleed holes on booster assembly*

►*1957 FORD "HIGH ENGINE SPEED" CORRECTION (Cars with Ford 4-Barrel Carburetors):* This condition results from the secondary valves not closing completely due to rough edge at flat portion of valve diameter, or to a slight bend in the secondary throttle shaft. Correct by removing secondary throttle valves and shaft and polish the valves (where flat portion of diameter joins), and the throttle shaft at the three points where shaft contacts carburetor body Remove any burrs on secondary throttle shaft bores *CAUTION - Do not remove any more stock than is necessary or carburetor calibration will be affected*

►*1958 FORD 2 & 4 BARREL CARBURETOR ACCELERATOR PUMP SETTING NOTE (TO OBTAIN BEST PERFORMANCE):* For the best economy and acceleration performance, a winter and summer accelerator pump adjustment is necessary, as follows **2-Bbl. Carb.** (292" & 332" Engines, all transmissions)install pump rod in hole No 3 for summer and winter operation **4-Bbl. Carb.** (332" & 352" Engines, all transmissions) install pump rod in hole No 3 (Winter), No 2 (Summer)

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FORD 2 & 4-BARREL CARBURETORS (C nt.)

►*1958 FORD 2 & 4 BARREL AND MERCURY 4-BARREL SECONDARY MAIN METERING JET CHANGE FOR IMPROVED PERFORMANCE AT HIGHER ALTITUDES:* *S condary main m t ring j ts have been revised. See " Ford 2 & 4 Barr l Carburetor JetSpecifications".*

►*1958 MERCURY & EDSEL SLOW OPENING CHOKE CORRECTION:* If choke will not fully open or if engine remains on fast idle too long, check for freeness of choke assembly and linkage and free any binding condition. Check thermostatic choke heat tube to make sure asbestos insulator is installed, then check and make sure fast idle cam is operating freely. If the condition exists after the above checks, and the choke operates freely, inspect heat stove cover for warping. If cover is warped, replace with the new cover, Part No. 5751311, and gasket, Part No. 5751312. Inspect cover plate mating surface for high spots, and if found, remove with a file to permit proper sealing.

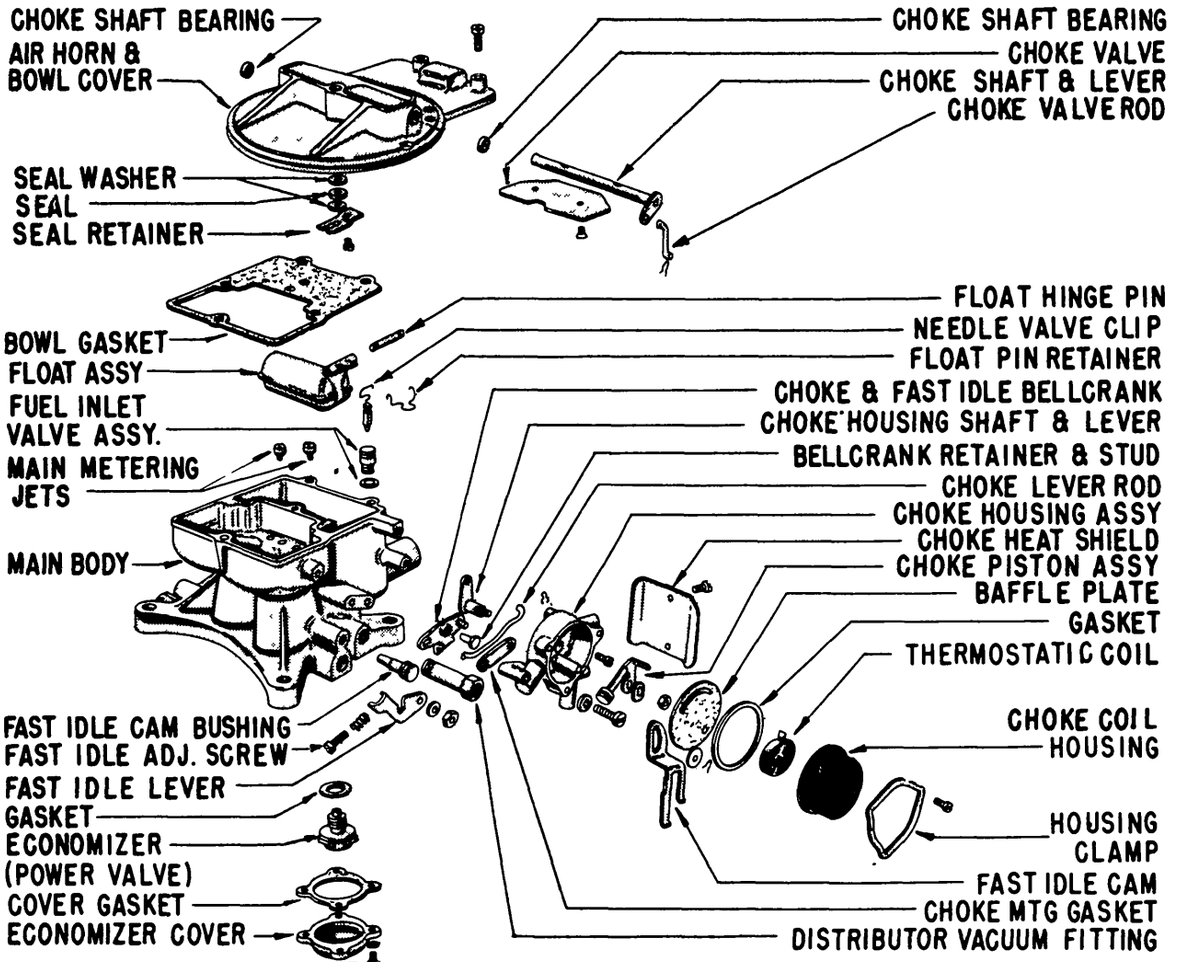
►*1958 MERCURY (WITH FORD 4-BARREL CARB.) FLOODING CORRECTION:* If a chronic flooding condition is encountered, check fuel inlet needle to float lever connector for damage. If connector is deformed, reshape it to correspond to illustration.

►*1958 FORD INTERCEPTOR ENGINE AUTOMATIC CHOKE FAILUTE TO COMPLETELY OPEN CORRECTION:* If choke valves do not open completely or "come off" quickly enough, it may be due to improper sealing of choke stove to manifold. Correct by cementing gasket to manifold and the choke stove cover to gasket with asbestos furnace cement.

►*1958 FORD V8 HARD HOT STARTING CORRECTION (Ford 2 & 4-Bbl. Carb.)* Correct by venting accelerating pump bowl to float bowl which will prevent pump flooding while engine is stopped and hot. Remove carburetor from engine, remove pump cover and internal parts including intake check ball and retaining screw and ball. Center punch vent hole location in top center of pump chamber wall (midway between intake check valve boss and upper edge of pump chamber). Use No. 80 drill in hand operated chuck to drill hole through wall into pump chamber. Clean out all chips and reassemble carburetor. *CAUTION* - DO NOT use power drill and use extreme caution not to damage float. DO NOT use larger drill than No. 80 (.011") or pump action will be affected.

►*1958 EDSEL CHOKE COIL HOUSING CHANGE & ADJUSTMENT NOTE:* A new choke coil housing assembly, Part No. PB8M-9848-A, identified by the letters "TD" embossed in center of bakelite housing is available for service replacement of the previous cover, Part No. EDC-9848-A. Initial adjustment of the new choke coil housing is at "Index" mark.

►*1958 FORD V8 HARD HOT STARTING CORRECTION (Ford Carburetors):* Correct by venting accelerating pump bowl to float bowl which will prevent pump flooding while engine is stopped and hot. Remove carburetor from engine, remove pump cover and internal parts including intake check ball retaining screw and ball. Center punch vent hole location at top center of pump chamber wall (midway between intake check valve boss and upper edge of pump chamber). Use No. 80 drill in hand chuck to drill hole through wall into pump chamber. Clean out all chips and reassemble carburetor. *CAUTION - DO NOT use power drill and use extreme caution not to damage float. DO NOT use larger drill than No. 80 (.011") or pump action will be affected.*



1957 FORD 2-BARREL CARBURETOR BOWL COVER & MAIN BODY ASSEMBLY (TYPICAL)

►*1959 MERCURY CARBURETOR ICING OR PERCOLATING NOTE:* May be caused by improperly operating air vent intake duct assembly. *See "Tune-Up" on Mercury car page.*

►*1959 EDSEL, FORD, MERCURY HARD STARTING, STALLING, POOR COLD DRIVEAWAY & SPARK PLUG FOULING CORRECTION:* Revise carburetor and adjustments as indicated below:

Chok (Eds l 292" Eng.) - Adjust choke coil housing to 2 notches Rich.

Ch k (Eds l 332" & 361" Engs. with 2 r 4-Bbl. Carb.) - Install new Choke Housing, Part No. B9AE-9849-A (colored Red) and adjust choke coil housing to 3 notches lean from index). *NOTE - The above change made in production at Engine Code Date 3-91-M*

Choke (Ford 332" & 352" Engs. with 2 or 4-Bbl. Carb.) - Adjust choke coil housing to 3 notches lean from index.

Choke (Mercury 383" Eng. with 2 or 4-Bbl. Carb.) - Install new Choke Housing, Part No. B9AE-9849-A (colored Red) and adjust choke coil housing to **"Centered (at Index)"** (2-Bbl. Carb,); to **2 notches lean from index** (4-Bbl. Carb.). *NOTE - The above change made in production at Engine Code Date 4-91M.*

Fast Idle (All Models) - With fast idle adjusting screw on starting step of fast idle cam (starting step identified by letter "O"). Adjust engine fast idle speed to 2000 RPM (hot engine).

Acc l rat r Pump Operating Rod (Edsel & Ford) -

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FORD 2 & 4-BARREL CARBURETORS (C nt.)

Install accelerator rod in No. 4 hole (farthest from throttle shaft) position of overtravel lever. *NOTE - On Ford models, install rod in No. 3 hole to improve economy and acceleration in hot weather.*

►*1959 EDSEL & MERCURY IMPROPER RETURN TO IDLE SPEED NOTE:* This condition is due to improperly adjusted carburetor throttle rod. *See "Throttle Linkage Adjustment" on car model pages.*

►*1959 EDSEL, FORD & MERCURY ROUGH IDLE & RICH FUEL CONDITION CORRECTION:* If this condition continues after all other corrective steps have been taken, check the economizer (power) valve for leakage of fuel into vacuum passage. If leakage is indicated, install new type gasket, Part No. B9AE-9A588-A. The new gasket is made of harder material and will not allow power valve to become loose when gasket takes a set.

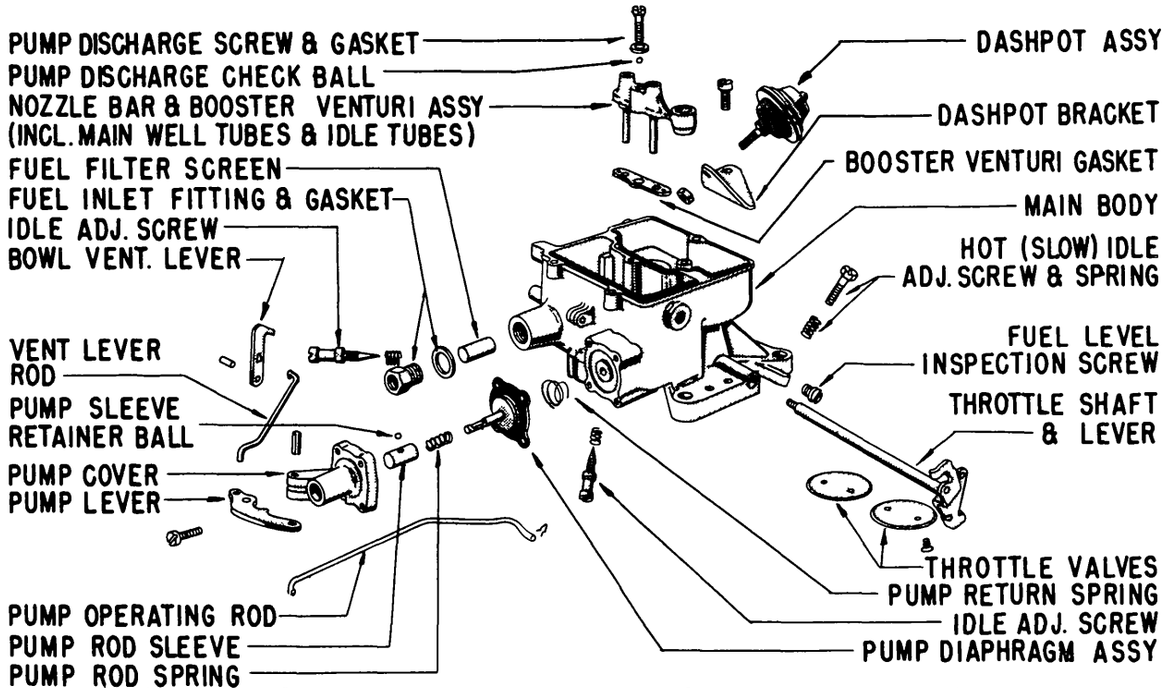
►*1959 CHOKE OPERATING ROD SEAL RETAINER SERVICE REPLACEMENT NOTE:* When necessary to remove choke plate, shaft, operating rod, or rod seal on carburetors having the seal retainer attached with a No. 6 drive screw, drive out old drive screw with a punch, then use a No. 28 drill to enlarge screw hole. Tap the hole with a No. 8-32 tap and install a new retainer, Part No. B8A-9682-A, using a No. 8-32 x ¼" screw. Be sure seal is positioned between air horn casting and retainer so it does not bind the linkage.

►*1959 EDSEL, FORD, MERCURY ACCELERATOR PUMP LINK & OPERATING ROD PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new link, Part No. COAE-9529-A, and rod, Part No. COAE-9B542-A are available for service. The new link and rod must be used together and must not be intermixed with previous rod and link. When installing rod in link, position end of rod in **outer** hole in link (do not use inner hole).

►***1959 MERCURY 383" ENGINE STALLING OR ROUGH IDLE CORRECTION:* If this condition exists with high under hood temperatures and cannot be corrected by carburetor adjustment or engine timing, install Part No. B8LE-9B532, air bleed valve (trade name "Carb-Airator"), in intake manifold as close as possible to vacuum take-off port. This valve is temperature operated and opens under high temperature conditions to allow fresh air to bypass the carburetor and enter directly into intake manifold.**

►*1960 2 & 4-BARREL CARBURETOR FLOODING CORRECTION & FLOAT PRODUCTION CHANGE:* To correct a flooding condition, install a new Fuel Inlet Valve & Needle Assembly, Part No. COAE-9564-B, and Carburetor Float & Lever Assembly, Part No. COAE-9550-A. Later carburetors have these parts.

►*1960 2-BARREL CARBURETOR ROUGH IDLE & STUMBLE (ON DRIVEAWAY) CORRECTION:* This condition may be caused by improperly installed vacuum transfer (balance) tubes which are located in main venturi of carburetor main body. If these tubes are assembled too high they will interfere with the booster venturi assembly and cock it in a manner to prevent proper sealing of booster venturi gasket mounting surface. To check, remove air cleaner and disconnect choke plate operating rod at lever, then remove air horn retaining screws, air horn assembly, and



1957-60 FORD 2-BARREL CARBURETOR THROTTLE & MAIN BODY ASSEMBLY (TYPICAL)

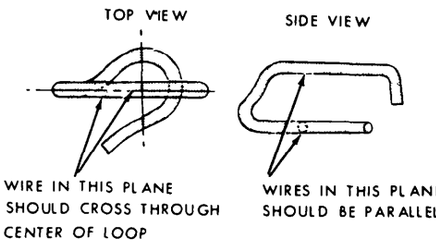
gasket. Remove accelerator pump discharge screw and check clearance between vacuum booster venturi assembly and balance tubes by rocking venturi back and forth to see if it is cocked and sealing improperly. If it is not sealing properly, remove booster venturi assembly (do not lose accelerator pump check ball and weight) and discard venturi gasket and ¼" fibre washer gasket. Clean all gasket mounting surfaces, then carefully drive each balance tube downward with a flat end punch and light hammer to obtain an assembled clearance of .010-.035" between end of tube and booster venturi assembly. Reassemble carburetor using new gaskets and tighten accelerating pump discharge screw to 35-40 inch lbs.

►*1960 FORD 292" ENGINE (AUTO. TRANS.) CHOKE COIL HOUSING CHANGE TO IMPROVE PERFORMANCE WHEN CHOKE IS IN OPERATION:* Replace choke coil housing, Part No. COAE-9848-B (identified by letters "TK" on housing) with Part No. COAE-9848-C (identified by letters "TL" on housing).

►*HARD COLD STARTING CORRECTION (ALL MODELS):* Choke plate may be sticking in open position because of misalignment in air horn. Check choke operation and if necessary, realign choke plate.

DESCRIPTION: 2-Barrel Carburetor - Downdraft type with automatic choke. Throttle body and main body are integral, and the air horn also serves as main body cover. The automatic choke is mounted on main body and is connected to choke valve shaft by linkage. A diaphragm type accelerating pump is also mounted on main body and connected to throttle valve by linkage. A bowl vent is actuated by accelerating pump linkage.

4-Barrel Carburetor - Downdraft type with automatic choke. This carburetor is similar in design to the 2-barrel carburetor (see above). The primary side consists of an idle fuel system, accelerating pump system, main fuel system, power system and choke system. The secondary side has only an idle system and a main fuel system. Secondary throttle valves are operated by a vacuum diaphragm and are connected through linkage to the primary throttle to insure positive closing.



MERCURY FLOAT LEVER CONNECTOR

►*1957-60 CARBURETOR COMPONENT DIFFERENCES: Components on various carburetor models are different as follows:*

Automatic Choke Assembly - 1957 Carburetors - Conventional type having a vacuum piston and a thermostatic coil spring linked to the choke shaft.

1958-59 Carburetors - Heated air is drawn into choke housing by manifold vacuum and is directed onto thermostatic coil spring by a baffle plate that controls speed of temperature rise in coil spring housing. The baffle plate rotates with the choke shaft and directs hot air

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FORD 2 & 4-BARREL CARBURETORS (C nt.)

either through a circuitous route to coil spring for engine warm-up or directly to coil spring for hot engine operation When choke valve is closed (cold engine), small holes in baffle plate pass heated air directly onto coil spring As temperature rises and choke plate opens, baffle plate moves and heated air is directed onto thermostatic coil spring by an alternate longer route When choke valve is fully open, heated air is directed through housing by a shorter route causing coil spring to remain heated and hold choke valve fully open A spring loaded "butterfly" valve in carburetor choke valve plate allows enough air to be drawn through carburetor when engine is first started to enable engine to run and to prevent flooding

1960 Carburetors - Similar to 1958-59 carburetors except that rotating baffle plate in choke housing and butterfly valve in choke valve plate have been eliminated Heated air, controlled by restricted passages in carburetor passes directly through choke housing to heat thermostatic coil spring A new thermostatic coil spring lever, connected to choke housing shaft by a torsion spring allows choke valve to open when manifold vacuum decreases (engine reaches stall point due lean mixture) A series of holes in choke valve plate replaces the "butterfly" valve previously used

Fast Idle Assembly - 1957 Carburetors - Fast idle cam assembly is lifted by a sliding action to engage carburetor throttle lever for fast idle operation

1958-60 Carburetors - Conventional fast idle cam assembly which rotates to engage a fast idle adjusting screw on throttle lever assembly *NOTE - On 1960 carburetors, position of cam, when properly located under fast idle screw, is indicated by a "V" stamped in side of fast idle cam at highest step*

Fuel Bowl Vent - 1957 Carburetors - A saxaphone type key operated by a link from accelerating pump lever vents the fuel bowl

1958-60 Carburetors - Fuel bowl is vented externally at all times

Accelerating Pump Linkage - 1957 Carburetors - Two holes in pump operating lever provide a seasonal adjustment for summer and winter operation

1958-60 Carburetors - Accelerating pump lever is linked to a lever and spring assembly on throttle shaft (primary shaft 4-barrel carburetors) which has four holes in it for pump stroke adjustment **There is no seasonal adjustment on these carburetors.** Rod position on lever is dependent on engine on which carburetor is used

Hot Idle Compensator - 1960 Mercury (With Air Conditioning) Carburetors - This unit is a bi-metal spring that actuates a plunger within the throttle stopscrew to open throttle valves when high underhood temperatures cause loss of engine speed at idle, thus maintaining proper idle speed *NOTE - Not used on other car models*

ADJUSTMENTS: Adjustments are the same for 2—Barrel and 4—Barrel carburetors except as noted below

Idle Mixture Setting: Initial adjustment is 1—1½ turns open from a lightly seated position (to warm up engine) For final adjustment, with engine at normal operating temperature, proceed as follows. On Ford models, turn both idle mixture screws in until engine runs rough from lean mixture, then turn screws out until engine rolls from rich mixture Finally turn screws in just enough for smooth idling and highest vacuum reading On Mercury and Edsel models, install a vacuum gauge and a tachometer, then adjust idle mixture screws until highest vacuum reading is attained at specified hot idle speed Turn idle mixture screws out 1/8 turn Recheck idle speed.

Idle Speed Setting (Hot Engine): With engine at normal operating temperature, choke valve wide open and fast idle screw backed off so it is not contacting fast idle cam, adjust throttle stopscrew on left side of carburetor so engine operates at speed indicated in table below.

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1958 Edsel 361" Eng	475-500	①450-475
1959-60 Edsel	⑨500-525	① ⑨450-475
1957 Ford	475-500	①425-450
1958 Ford 292" Eng	475-500	①450
1958 Ford 332" & 352" Engs	②	①③
1959 Ford	⑤450-475	①⑤450
1960 Ford	500-525	①450-475
1958 Mercury 383" Eng	475-500	①450
1959 Mercury	⑨475-500	①⑥450
1960 Mercury	500-525	①450-475

① - Transmission selector lever in "D" (Drive position)
② - 475 RPM (Engines with hydraulic valve lifters), 600 RPM (Engines with mechanical valve lifters)
③ - 450 RPM (Engines with hydraulic valve lifters), 500 RPM (Engines with mechanical valve lifters)
⑨ - On Air Conditioned cars, compressor clutch must be engaged and compressor operating
⑤ - On Air Conditioned cars, adjust idle speed after operating air conditioner compressor for 20 minutes at maximum cooling and with compressor clutch engaged
⑥ -450-475 RPM on Air Conditioned cars with compressor clutch engaged and compressor operating

►*1960 MERCURY AIR CONDITIONED CAR IDLE SPEED ADJUSTMENT NOTE* With air conditioner in operation for a minimum of 20 minutes, loosen locknut securing the curved bi-metal hot idle compensator to throttle stopscrew, then loosen throttle stopscrew locknut Turn throttle stopscrew to obtain recommended engine idle speed Tighten locknut, then tighten idle compensator nut so opening of curve of bi-metal spring is toward front of carburetor

Anti-Stall Dashpot (Automatic Transmission Cars): See *CARBURETOR* on *Car Model* pages

Accelerating Pump Stroke (1957 Carbs.): Bend accelerator pump rod to obtain correct measurement between end of pump plunger and pump cover when throttle valves are closed Install pump lever rod in inner hole (Winter), outer hole (Summer)

1957 Accelerating Pump Setting

Engine	Pump Setting Synchro-mesh	Fordomatic
272" Engine	3/16 7/32"	3/16 7/32"
292" Engine	3/16 7/32"	7/32 1/4"
312" Engine		7/32 1/4"

Accelerating Pump Stroke Adjustment (1958-60 Carbs.): There is no seasonal adjustment (except as noted) Place pump operating rod in proper hole of operating lever as indicated in table below

1958-60 Accelerating Pump Setting

Car Model	Carburetor	① Setting
1958 Edsel②	2 & 4 Bbl	No 4
1959 Edsel②	2 & 4 Bbl	No 3
1960 Edsel②	2 & 4 Bbl	No 4
1958-59 Ford②	2 Bbl	No 3
1958-59 Ford (Summer)	4 Bbl	No 2
1958-59 Ford (Winter)	4 Bbl	No 3
1960 Ford②	2 & 4 Bbl	No 4
1958 Mercury (Summer)③	4 Bbl	No 2
1958 Mercury (Winter)③	4 Bbl	No 3
1958 Mercury (Summer)④	4 Bbl	No 3
1958 Mercury (Winter)④	4 Bbl	No 4
1959-60 Mercury②	2 & 4 Bbl	No 4

① - Holes in lever are not numbered For identification purposes, the hole closest to throttle shaft is No 1 and the furthest away is No 4
② - Summer and Winter
③ - Standard engine
④ - Modified engine

►*ACCELERATING PUMP ADJUSTMENT NOTE* After installing a new rod or bending the old rod check operation by slowly moving throttle lever to fully opened position If accelerator link strikes pump cover casting file a notch in link as necessary for clearance

Bowl Vent (1957 Carbs.): With engine operating at correct idle speed, place a 100" feeler between idle adjusting screw and screw stop Bowl vent valve should just close To adjust, bend operating rod on vent

Bowl Vent (1958-60 Carbs.): Bowl is vented externally at all times No adjustment

Economizer (Power Valve): *NOTE - On 4-Barrel carburetors, the power valve is located on the primary side only* Diaphragm type located under cover on bottom of fuel bowl surface on main body Power valve opens when manifold vacuum falls to 9½-10" and by-passes fuel through the valve directly to main well No adjustment provided *CAUTION - Power valve forms vacuum chamber and must be tight*

Float Level: To check float level, remove air horn and bowl cover, then hold float in upper position with needle valve closed Distance from gasket surface on main body to top of float should be as indicated in table below *NOTE - If cardboard gauge found in repair kits is used, float must touch low point of gauge and not touch high point of gauge On Edsel & Mercury, Gauge No 9550-MF (see "Modification Note" below) can be used to check float level* To adjust, bend tab on float arm as necessary to obtain correct float level

►*MERCURY CARBURETOR FLOAT GAUGE REWORK FOR USE ON 1960 AIR CONDITIONED CAR CARBURETORS* The dry float setting on carburetors used on air conditioned cars is 500" If Gauge 9550-MF is used, notch out corners of gauge (opposite to present 450" notches) to provide a dimension of 500" Later type Gauge 9550-MFA has the additional notches

Float Level

Car Model	Carburetor	Setting
1957 Ford	2-Bbl	325- 355"
1957 Ford	4-Bbl	540- 570"
1958-60 Ford	2 & 4-Bbl.	435- 465"
1958-60 Mercury & Edsel	2 & 4-Bbl ① 450"	(435- 465")

① - 485- 515" 1960 Mercury with Air Conditioning

CONTINUED ON NEXT PAGE

FORD 2 & 4-BARREL CARBURETORS (C nt.)

Fuel Level: With correct float setting, fuel level should be 1"±1/32" (1957 2-Bbl. Carb.); .970-1.03" (1957-4-Bbl. Carb.); .880-.940" (1958-60 2 & 4-Bbl. Carbs.) below machined surface of main body. *NOTE - Fuel level is same for secondary float on 4-Bbl. carburetors.*

Fast Idle: 1957-59 Models - With slow (hot) idle speed properly adjusted, engine at normal operating temperature, and throttle valves in closed position turn fast idle screw in until it touches low step of fast idle cam. On 1958-59 models, back fast idle screw off ¼-½ turn from above setting. *NOTE* - If setting is considered too high for operating conditions, fast idle speed may be reduced by backing screw off not more than one turn from standard setting.

1960 Models - With slow (hot) idle speed properly adjusted, engine at normal operating temperature, and throttle valves in closed position, align top step of fast idle cam (identified by letter "V") with fast idle screw. Adjust fast idle screw to obtain an idle speed of 1500 RPM (292" Eng. with Synchro-mesh Transmission); 1600 RPM (292" Eng. with Auto. Trans.); 1800 RPM (All others). To initially set fast idle speed (carburetor on bench), place fast idle screw on index mark on fast idle cam, then turn fast idle screw until there is .036" clearance between throttle plate and throttle bore, measured at side opposite idle transfer holes. Use a No. 64 drill to measure clearance.

Automatic Choke Setting

Car Model	Choke Setting
1958 Edsel	Centered
1959 Edsel 292" Eng.	① 2 Pts. Rich
1959 Edsel 332" & 361" Engs. (Early)	② Centered
1959 Edsel 332" & 352" Engs. (Late)	③ 3 Pts. Lean
1960 Edsel 292" Eng.	2 Pts. Rich
1960 Edsel 352" Eng.	3 Pts. Lean
1957-58 Ford	Centered
1959 Ford	② Centered
1960 Ford 292" Eng.	2 Pts. Rich
1960 Ford 352" Eng.	3 Pts. Lean
1958 Mercury	④ 2 Pts. Rich
1959 Mercury 2-Bbl. Carb.	②⑤ Centered
1959 Mercury 2-Bbl. Carb.	③⑥ Centered
1959 Mercury 4-Bbl. Carb.	②⑤ Centered
1959 Mercury 4-Bbl. Carb.	③⑥ 2 Pts. Lean
1960 Mercury	Centered

① - Supersedes previous setting of "Centered".

② - See "Edsel, Ford, Mercury Hard Starting, Stalling Poor Cold Driveaway & Spark Plug Fouling Correction" above.

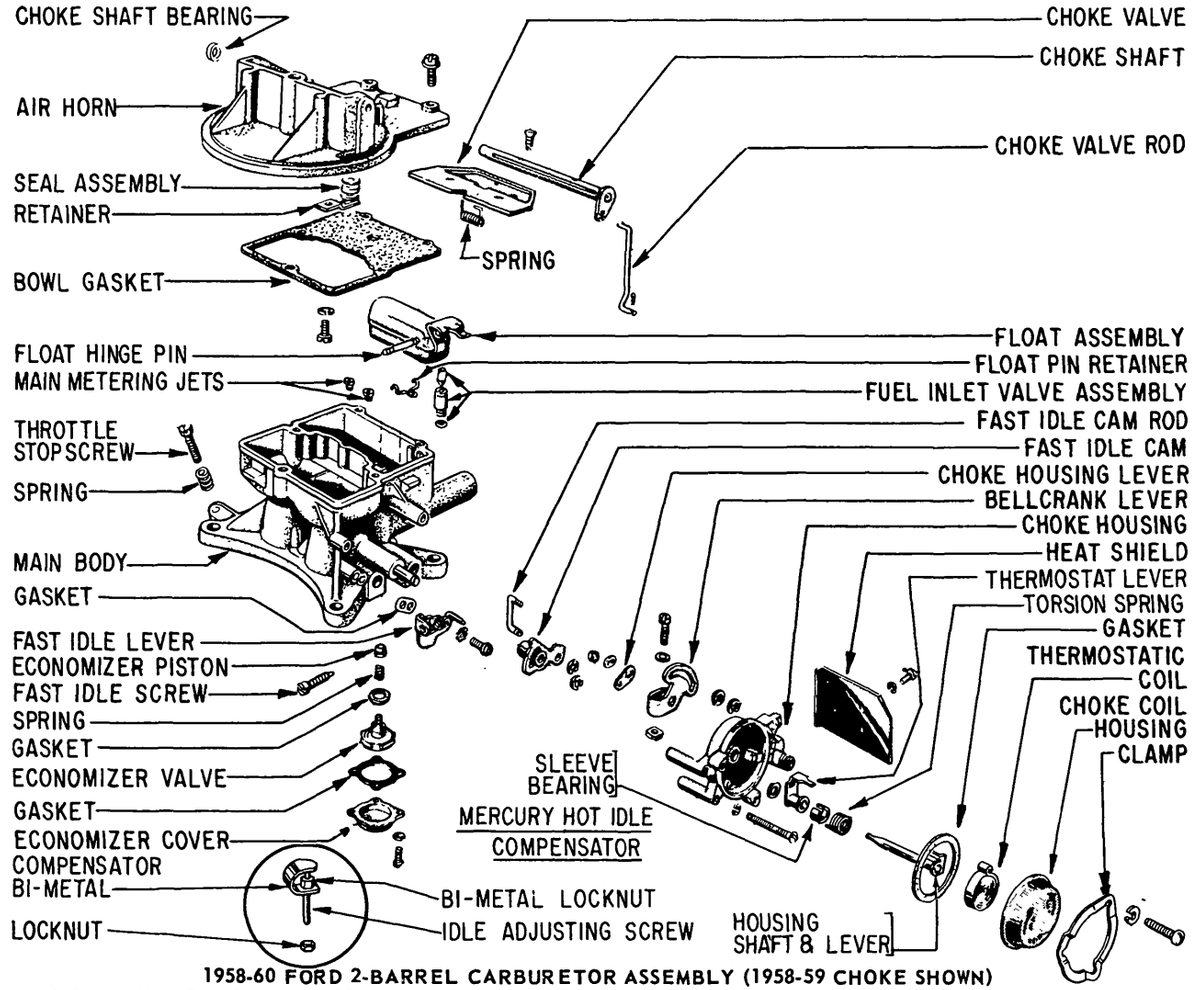
③ - With Red colored choke housing, Part No. B9AE-9849-A.

④ - "Centered" on carburetors with choke housing identified by letters "TD". See "1958 Mercury Choke Setting Change" above.

⑤ - Early cars before Engine Code Date 4-91M.

⑥ - Later cars after Engine Code Date 4-91M.

►*1958 MERCURY CHOKE COIL HOUSING PRODUCTION CHANGE & CHOKE SETTING CHANGE NOTE:* Choke coil housing assemblies identified by letters "TD" embossed in center of bakelite cover are being used in production and for service replacement. The choke setting for this assembly is at INDEX. Choke setting for previous assembly is 2 pts. lean.



1958-60 FORD 2-BARREL CARBURETOR ASSEMBLY (1958-59 CHOKE SHOWN)

Automatic Choke Setting: Loosen choke thermostatic coil spring housing clamp retaining screws and rotate housing to align index mark on housing with proper mark on choke housing as indicated in table below.

►*AUTOMATIC CHOKE ADJUSTMENT NOTE:* For maximum fuel economy, the cover may be rotated in the **lean** direction, dependent on ambient temperatures in the local area. If hard, cold starting is experienced, the cover should be rotated in **rich** direction. *CAUTION - Do not adjust choke in excess of 2 points in either direction from recommended setting.*

Fast Idle Cam & Bellcrank Lever Adjustment (1960 Carbs): With choke plate held in closed position by turning choke housing shaft counterclockwise (as viewed with thermostatic coil housing removed), and throttle plate approximately half-way open, there should be .030" clearance between top side of fast idle cam and the cast stop on back of choke housing. To adjust, loosen clampscrew on bellcrank lever and turn lever on choke housing shaft until proper clearance is obtained.

Choke Plate-to-Choke Housing Shaft Adjustment (1960 Carbs.): Remove thermostatic coil housing, then with .040" clearance between thermostatic coil lever and stop in choke housing, press choke plate open lightly until choke housing lever is against stop in choke housing. There should be 5/32" clearance between front edge of choke plate and air horn (use Gauge T109-154 or Ford Tool 9550-D). To adjust, hold thermostatic coil lever firmly against stop in choke housing and press choke plate open with enough force to bend the tang, then recheck clearance.

OVERHAUL

1957 MODELS

Air Horn Disassembly (2 & 4-Bbl. Carbs.): Remove air cleaner anchor screw and lockwasher. On 2-barrel carburetors, invert carburetor and remove throttle body-

CONTINUED ON NEXT PAGE

FORD 2 & 4-BARREL CARBURETORS (C nt.)

to-main body screws and lockwashers. Lift off main body and remove throttle body gasket. On 4-barrel carburetors, disconnect choke rod at bellcrank assembly, then remove rod seal retainer from air horn and slide felt seal and two washers off rod. On all carburetors remove air horn-to-main body screws, then remove air horn and gasket. Remove choke plate from choke shaft, then remove choke rod and slide choke shaft from air horn.

Disass mbly (2-Barr l Carb.): 1) Remove fuel inlet fitting gasket and screen, then remove fuel bowl retaining screws. Fuel bowl, gasket, metering assembly, and metering assembly gasket will slide off main body. Separate metering assembly from fuel bowl and discard gaskets.

2) Remove vent valve, idle adjusting screws and gaskets, and the power valve and gasket from metering assembly. Remove external vent linkage retainer and spring, then remove vent and linkage from fuel bowl. Remove accelerating pump cover assembly from fuel bowl, then remove diaphragm and spring. Remove float retainer, then lift float out of bowl. Remove float spring and the "O" ring seal from fuel valve seat assembly, then remove baffle plate. Remove fuel valve seat and let the valve, spring, and pin fall out.

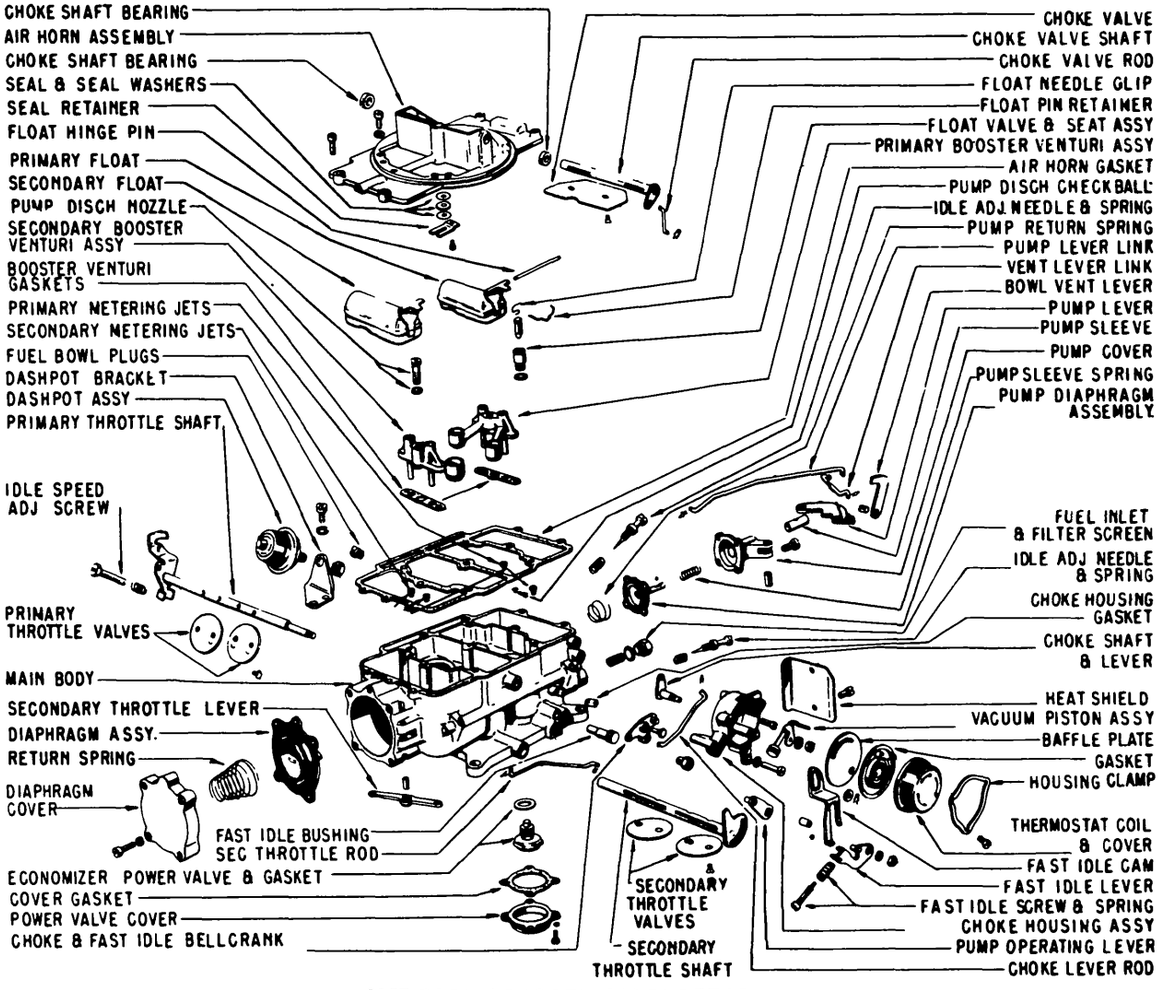
3) Remove choke rod pin from choke housing shaft and lever assembly. Remove thermostat housing and gasket from main body, then remove vacuum passage gasket. Remove nut, lockwasher, and spacer from choke housing shaft, then remove shaft and fast idle assembly. Remove choke piston and lever assembly. Remove choke rod pin from choke shaft lever. Remove choke rod, washers, and seal from main body. Remove choke valve from shaft, then slide shaft and lever out of choke housing.

4) Remove pump discharge nozzle screw, then lift pump discharge nozzle and gasket out of main body. Invert main body and let the pump discharge weight and ball fall out into the hand.

5) Remove dashpot assembly, then remove pump operating lever retainer and remove pump operating lever. Remove fast idle pick-up lever and fast idle cam lever and spring. If it is necessary to remove throttle valves, lightly scribe both valves along throttle shaft and mark each valve and its corresponding bore with a number or letter for proper replacement. Remove throttle valve screws and remove valves. Slide throttle shaft out of throttle body.

Disass mbly (4-Barr l Carb.): 1) Remove fuel inlet fitting, gasket and screen. With needle nose pliers, disconnect float shaft retainer, and remove the main jets. Invert main body and remove power valve cover and gasket, then remove valve and valve gasket. Remove idle adjusting needles and springs and remove distributor vacuum line fitting.

2) Remove accelerating pump discharge screw and gasket, then remove booster venturi assembly and gasket. Invert main body and let accelerating pump discharge ball fall into the hand. Remove accelerating pump operating rod and bowl vent rod. Remove accelerating pump



1957 FORD 4-BARREL CARBURETOR

cover, diaphragm assembly, and spring. Press pump rod sleeve toward diaphragm until sleeve retainer ball drops out. Remove sleeve and spring. Remove dashpot assembly and bracket.

3) Remove choke thermostat shield. Disconnect choke lever rod from choke housing lever, then remove thermostat housing retaining screws and clamp, thermostat housing, gasket, and the choke housing plate. Remove three choke housing-to-main body screws and lockwashers, then remove choke housing and gasket. Remove choke shaft and lever assembly retaining nut and spacer, then remove choke shaft and lever assembly, choke piston, lever and link assembly.

4) Remove nut and lockwasher securing fast idle adjusting lever assembly to throttle shaft, then remove lever assembly. Disconnect fast idle cam assembly at bellcrank, then remove fast idle cam. Remove bushing, primary throttle closing lever, and the inner bushing. Remove choke rod from bellcrank.

5) If it is necessary to remove throttle valves, lightly scribe both plates along the throttle shaft and mark each valve and its corresponding bore with a number or letter for proper installation. Remove throttle valve screws, then slide throttle shaft out of main body.

6) On the secondary side, disconnect float shaft retainer, then remove float and shaft, and the fuel inlet needle and clip. Remove fuel inlet needle seat and float retainer, and remove the secondary jets. Remove secondary diaphragm operating rod, diaphragm cover, return spring, and diaphragm assembly. Remove secondary booster venturi assembly retaining screw and lockwasher, then remove booster assembly and gasket.

7) If it is necessary to remove throttle valve, proceed as for primary valve (above).

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FORD 2 & 4-BARREL CARBURETORS (C nt.)

1958-59 MODELS

Air Horn Disassembly (2 & 4-Bbl. Carbs.): Remove air cleaner anchor screw, then disconnect choke plate operating rod at choke lever. Remove air horn screws, then remove air horn by tilting it slightly as it is lifted off main body to remove choke plate operating rod from choke housing lever. Remove air horn gasket. Remove choke rod seal retainer from air horn and slide felt seal and two washers off choke operating rod. On 2-Barrel carburetors, remove choke plate from choke shaft and lever assembly by sliding it out of shaft from bottom of air horn. Remove choke operating rod, and slide choke shaft and lever assembly from air horn. On 4-Barrel carburetors if it is necessary to remove choke plate, remove secondary throttle vacuum pickup tube by prying it out with needle nose pliers (discard tube after removal). Remove choke plate screws, then remove choke plate assembly by sliding it out of shaft from bottom of air horn. Remove choke plate operating rod, then slide choke shaft from air horn.

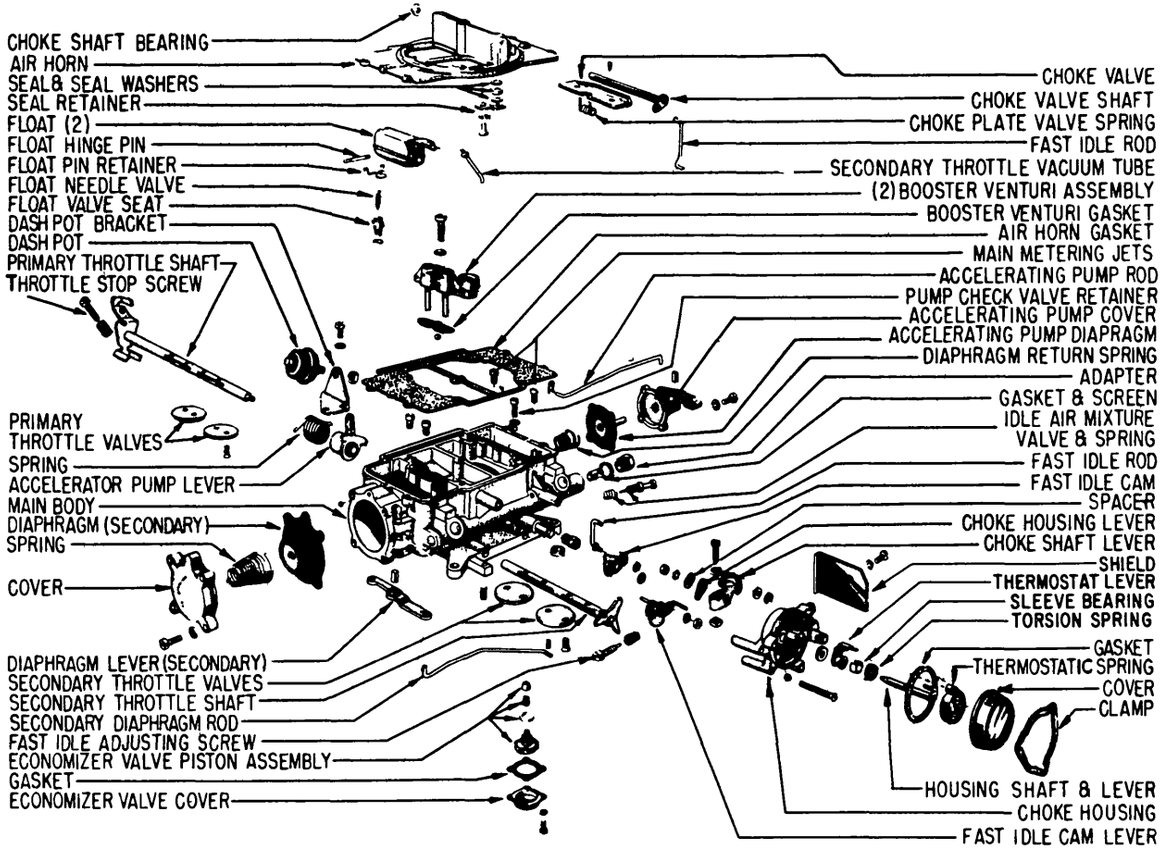
Disassembly (2-Barrel Carbs.): 1) Remove fuel inlet fitting, gasket and screen, then use a hook and disconnect float shaft retainer and remove float, shaft, fuel inlet needle and clip. Remove fuel inlet needle seat and float shaft retainer, then remove main jets. Remove accelerating pump discharge screw and gasket, then lift nozzle bar and booster venturi assembly and gasket out of main body.

2) Invert main body and let accelerating pump discharge ball fall into hand. Invert main body and remove power valve cover and gasket, then remove power valve and gasket. Remove accelerating pump operating rod and pump cover, diaphragm and spring. Remove pump inlet ball check retainer screw and gasket, remove ball check.

3) Remove choke shield. Disconnect fast idle pickup lever on fast idle cam. Remove thermostatic spring housing retainer screws and clamp, then remove housing, gasket, and choke housing baffle plate. Remove choke housing from main body. Remove choke housing lever, then loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft and lever assembly. Remove retainer from choke housing shaft and lever assembly and slide shaft out of choke housing. Remove fast idle cam retainer and slide fast idle cam off boss on main body.

4) Remove fast idle adjusting lever assembly from throttle shaft. Remove distributor vacuum line fitting, anti-stall dashpot (if so equipped), idle mixture adjusting screws and springs, and the hot idle adjusting screw and spring.

5) If it is necessary to remove throttle plates, lightly scribe both throttle plates along throttle shaft and mark each plate and its corresponding bore with a number or letter for proper identification. Remove throttle plate screws and remove throttle plates, then slide throttle shaft out of main body. Slide accelerating pump over-



1958-60 FORD 4-BARREL CARBURETOR ASSEMBLY (1958-59 CHOKE SHOWN)

travel spring and lever off the shaft.

Disassembly (4-Barrel Carbs.): 1) Remove fuel inlet fitting, gasket and screen, then use a hook and disconnect float shaft retainer from each float. Remove float and shaft, and inlet needle and clip from each fuel bowl. Remove fuel inlet needle seat and float shaft retainer from each fuel bowl and remove primary and secondary main jets. Remove accelerating pump discharge screw and gasket from primary side, then lift nozzle and bar assembly and gasket out of main body. Invert main body and let accelerating pump discharge ball fall out into hand.

2) Remove secondary nozzle bar and booster venturi assembly and gasket. Remove accelerating pump operating rod, then remove accelerating pump cover, diaphragm assembly and spring. Remove inlet ball check retainer screw and gasket, then remove ball check. Remove secondary diaphragm operating rod. Remove diaphragm cover, return spring, and diaphragm.

3) Invert main body and remove power valve cover and gasket, then remove power valve and gasket. Remove idle mixture adjusting screws and springs. Remove choke shield. Disconnect fast idle cam pickup lever at fast idle cam. Remove thermostatic spring housing retainer screws and clamp, then remove housing gasket, and choke housing baffle plate. Remove choke housing

4) Loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft and lever assembly. Remove retainer from choke housing shaft and lever assembly and slide shaft out of choke housing. Remove fast idle cam retainer and slide cam off boss on main body.

5) Remove nut and washer securing fast idle adjusting lever assembly to primary throttle shaft and remove lever assembly. Remove distributor vacuum line fitting, anti-stall dashpot (if so equipped), and hot engine idle adjusting screw and spring.

6) If it is necessary to remove throttle plates, lightly scribe primary and secondary throttle plates along throttle shafts and mark each plate and its corresponding bore with a number or letter for proper identification. Slide primary and secondary throttle shafts out of main

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FORD 2 & 4-BARREL CARBURETORS (C nt.)

body. Slide accelerating pump over-travel spring and lever off primary throttle shaft.

7) On the secondary side, disconnect float shaft retainer, then remove float and shaft, and the fuel inlet needle and clip. Remove fuel inlet needle seat and float retainer, and remove the secondary jets. Remove secondary diaphragm operating rod, diaphragm cover, return spring, and diaphragm assembly. Remove secondary booster venturi assembly retaining screw and lockwasher then remove booster assembly and gasket.

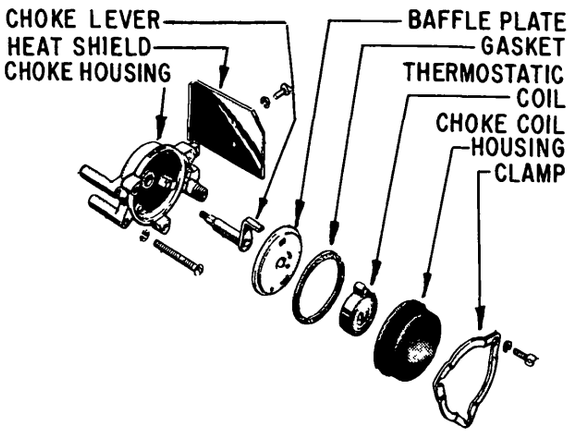
8) If it is necessary to remove throttle valve, proceed as for primary valve (above).

Cleaning & Inspecti n (All Carbs.): Wash all parts, except those noted below in clean solvent. *(CAUTION - Do not use solv nt on accel rating pump diaphragm, power valve, s condary perating diaphragm, and dashpot).* Blow out passages in casting with air. Inspect all parts for wear or damage with particular attention to the following: Inspect castings and main body cover for cracks or leaks, inspect main well tubes, metering jets, and idel tubes for wear or clogged passages. *(CAUTION - Clean with air, d not use drills to clean out calibrated penings).* Replace all worn or damaged parts.

R ass mbly (2 & 4-Barr l Carbs): Use all NEW gaskets. Install parts in reverse order of disassembly procedure (above) and note the following important points: **Thrott l Valv Installati n** - Refer to the line scribed on throttle valve at disassembly, and install valves in their proper location with the screws snug, but not tight. Little or no light should show between throttle valves and throttle bores. Tap valves lightly to seat them, then tighten the screws.

Fl at Installati n (4-Barrel Carb.) - Retainer grooves on float shaft are not equally spaced. To install, slide shaft in float lever so that the groove closest to end of shaft is toward outside of carburetor, then install float retainer.

Acc l rating Pump Ball Check - Seat ball with a brass drift and a light hammer. Make sure the ball is free, then proceed with reassembly.



1960 2 & 4-BARREL CHOKE ASSEMBLY

Air Horn - On 4-barrel carburetors, be sure to install a new fibre washer with the screw that enters the secondary vacuum passage.

Carburetor Adjustments - Make all the adjustments indicated. *See "Adjustments" above.*

1960 MODELS

Overhaul Procedures are the same as for 1958-59 Models (above) except as noted below.

Choke Housing Removal & Disassembly: Remove choke shield, then disconnect fast idle cam pickup lever at fast idle cam. Remove thermostatic coil spring housing and gasket. Remove choke housing-to-main body screws and lockwashers and remove choke housing. Remove choke housing lever attaching nut, spacer and lever, then loosen screw on bellcrank clamp and slide bellcrank off choke housing shaft and lever assembly. Remove retainer from choke housing shaft and lever assembly and slide shaft out of choke housing. Remove thrust washer from choke housing shaft. Slide thermostatic coil lever and bushing assembly off choke housing shaft (allow for twisting action of torsion spring when parts are separated). Remove torsion spring and white sleeve bearing from thermostatic coil lever and bushing assembly.

Ch ke Housing Reassembly & Installation: Install white sleeve bearing and torsion spring on thermostat lever and bushing assembly. *NOTE* - Long tang of spring should be positioned against stop on thermostat lever. Slide thermostat lever, bushing and spring assembly on choke housing shaft. Engage short tang of spring on tang of integral choke shaft lever and wind the spring up approximately one-half revolution by turning choke housing shaft as thermostat lever is positioned against choke shaft lever. Engage tang of choke shaft lever in slot provided in thermostat lever. Install thin thrust washer on choke shaft, then install complete choke housing shaft and lever assembly in choke housing so that thermostat lever is at top of choke housing. Install choke housing shaft retainer. Install bellcrank lever assembly on choke housing shaft and position it so that lever is against shaft retainer and the slot portion is to front of choke housing. Tighten clampscrew sufficiently to hold bellcrank lever in position, then adjust *(see "Fast Idle Cam & Bellcrank Lever Adjustment" above).*

SERVICE PARTS: Gasket Sets - Ford Part No. B7AZ-9502-A (B7A-9510-E,L,Q,W,Z): No. B7AZ-9502-B (B7A-9510-A,B,X); No. COAZ-9502-A (B8A-9510-K,L,N, P, B9A-9510-A,B,C, COAE-9510-AB,AC,AF,AG,H,M. R,S); No. C1AZ-9502-A (B8A-9510-A,E,V,W, B9A-9510-E, COAE-9510-J,K). Edsel Part No. B8A-9502-B (B8A-9510-E, B9A-9510-E, PB9E-9510-D), No. B9A-9502-B (B9A-9510-A, PB9E-9510-B,C,G); Mercury No. NJK-9502-C (EDG-9510-A,B); No. B9A-9502-B (PB9M-9510-B,H); No. B8A-9502-B (PB9M-9510-D); No. COAZ-9502-A (COME-9510-G,J,K).

Repair Kits - Ford Part No. B7AZ-9590-A (B7A-9510-Q); No. B7AZ-9590-B (B7A-9510-L,W); No. B7AZ-9590-C (B7A-9510-A,B,X); No. B7AZ-9590-R (B7A-9510-Z); No. B8AZ-9590-A (B8A-9510-A); No. B8AZ-9590-B (B8A-9510-E); No. B9AZ-9590-A (B8A-9510-L, B9A-9510-C); No. B8A-9590-A (B8A-9510-V, B9A-9510-E); No. B8A-9590-R (B8A-9510-W); No. COAZ-9590-A (COAE-9510-H,M); No. COAZ-9590-C (COAE-9510-J,K); No. COAZ-9590-G (B8A-9510-K,N,P, B9A-9510-A,B); No. COAZ-9590-H (COAE-9510-AB,AC,R,S); No. COAZ-9590-J (COAE-9510-AF,AG). Edsel Part 59EK-9590-A (B9A-9510-A, PB9E-9510-C); No. 59EK-9590-B (PB9E-9510-B,G); No. 59EK-9590-E(PB9E-9510-D,B9A-9510-E). Mercury Part No. MJK-9590-D (EDG-9510-A,B); No. 59MK-9590-G (PB9M-9510-D); No. 59MK-9590-H (PB9M-9510-B,H); No. COMY-9590-D (COME-9510-G,K).

1957 FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model / Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.
FORD V8 Cars						
272" Eng. S.M. & F/M ... 1957	B7A-9510-A	.052"	86H-9533 (1)	B7A-9641-A	B7A-9904-A	B7A-9577-A
272" Eng. S.M. & F/M ... 1957	B7A-9510-Q	.051"	59A-9533-A (2)	B7A-9641-G	B7A-9904-A	B7A-9577-A
272" Eng. S.M. & F/M ... 1957	B7A-9510-Z	.048"	78-9533-B (3)	.....	.....	.....
292" Eng. S.M. & O.D. ... 1957	B7A-9510-E	.054"	06H-9533 (4)	B7A-9641-G	B7A-9904-A	B7A-9577-A
292" Eng. Fordomatic ... 1957	B7A-9510-L	.062"	1GA-9533-B (5)	B7A-9641-A	B7A-9904-A	B7A-9577-A
292" Eng. Fordomatic ... 1957	B7A-9510-W	.061"	B4Q-9533-A (6)	B7A-9641-G	.....	.....
312" Eng. Fordomatic ... 1957	B7A-9510-B Pri.	.054"	06H-9533 (7)	B7A-9641-H	B7A-9904-A	B7A-9577-A
	B7A-9510-B Sec.	.059"	B4Q-9533-B (8)	B7A-9641-B	.....	.....
312" Eng. Fordomatic ... 1957	B7A-9510-X Pri.	.054"	06H-9533 (7)	.....	.....	.....
	B7A-9510-X Sec.	.059"	B4Q-9533-B (8)	.....	.....	.....

(1)- Use 78-9533-A (.050") 5,000 to 10,000 ft. Alt.
Use 78-9533-B (.048") 10,000 to 15,000 ft. Alt.

(2)- Use 59A-9533-B (.049") 5,000 to 10,000 ft. Alt.
Use 59A-9533-C (.047") 10,000 to 15,000 ft. Alt.

(3)- Use 78-9533-C (.046") 5,000 to 10,000 ft. Alt.
Use 78-9533-D (.044") 10,000 to 15,000 ft. Alt.

(4)- Use 86H-9533 (.052") 5,000 to 10,000 ft. Alt.
Use 78-9533-A (.050") 10,000 to 15,000 ft. Alt.

(5)- Supersedes B4T-9533-B (.053").
Use 1GA-9533-C (.060") 5,000 to 10,000 ft. Alt.
Supersedes 59A-9533-A (.051").
Use 78-9533-F (.058") 10,000 to 15,000 ft. Alt.
Supersedes 59A-9533-B (.049").

(6)- Use B4Q-9533-B (.059") 5,000 to 10,000 ft. Alt.
Use 26H-9533 (.057") 10,000 to 15,000 ft. Alt.

(7)- Use 86H-9533 (.052") 5,000 to 10,000 ft. Alt.
Use 78-9533-A (.050") 10,000 to 15,000 ft. Alt.

(8)- Use 26H-9533 (.057") 5,000 to 10,000 ft. Alt.
Use B4T-9533-A (.055") 10,000 to 15,000 ft. Alt.

1958 FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model / Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.
EDSEL						
361" Engine ... 1958	B8A-9510-E Pri.	.052"	86H-9533	B8A-9641-E	B7A-9904-E	B8A-9577-D
	B8A-9510-E Sec.	.....	B6C-9533-A	B8A-9641-F	.....	.....
FORD V8 CARS						
292" Eng. S.M. (Early) ... 1958	B8A-9510-K	.048"	78-9533-B (9)	B8A-9641-K	B7A-9904-E	B8A-9577-D
292" Eng. S.M. (Later) ... 1958	B8A-9510-N	.048"	78-9533-B (9)	B8A-9641-J	B7A-9904-E	B8A-9577-D
292" Eng. Auto. Trans. ... 1958	B8A-9510-P	.048"	78-9533-B (9)	B8A-9641-E	B7A-9904-E	B8A-9577-D
332" Engine ... 1958	B8A-9510-L	.057"	26H-9533 (10)	B8A-9641-G	B7A-9904-E	B8A-9577-D
332" Engine (Early) ... 1958	B8A-9510-A Pri.	.049"	59A-9533-B (11)	B8A-9641-H	B7A-9904-E	B8A-9577-D
	B8A-9510-A Sec.	.066"	8MB-9533-B (12)	B8A-9641-F	.....	.....
332" Engine (Later) ... 1958	B8A-9510-W Pri.	.049"	59A-9533-B (11)	.....	B7A-9904-E	B8A-9577-D
	B8A-9510-W Sec.	.066"	8MB-9533-B (12)	B8A-9641-F	.....	.....
352" Engine (Early) ... 1958	B8A-9510-E Pri.	.054"	06H-9533 (13)	B8A-9641-E	B7A-9904-E	B8A-9577-D
	B8A-9510-E Sec.	.065"	5GA-9533-A (14)	B8A-9641-F	.....	.....
352" Engine (Later) ... 1958	B8A-9510-V Pri.	.054"	06H-9533 (13)	B8A-9641-E	B7A-9904E	B8A-9577-D
	B8A-9510-V Sec.	.065"	5GA-9533-A (14)	B8A-9641-F	.....	.....
MERCURY						
383" Engine ... 1958	EDG-9510-A Pri.	.050"	78-9533-A (15)	B8A-9641-E	B7A-9904-A1	B8A-9577-D
	EDG-9510-A Sec.	.066"	8MB-9533-B (16)	B8A-9641-F	.....	.....
383" Engine (Modified) ... 1958	EDG-9510-B Pri.	.058"	78-9533-F (17)	EDC-99494-A	B7A-9904-A1	B8A-9577-D
	EDG-9510-B Sec.	.067"	B4C-9533-A (18)	B8A-9641-F	.....	.....

(9) - Use 59A-9533-D (.045") 5,000 to 10,000 ft. Alt.
Use 922A-9533-A (.043") 10,000 to 15,000 ft. Alt.

(10) - Use 06H-9533 (.054") 5,000 to 10,000 ft. Alt.
Use 86H-9533 (.052") 10,000 to 15,000 ft. Alt.

(11) - Use 78-9533-C (.046") 5,000 to 10,000 ft. Alt.
Use B7A-9533-B (.044") 10,000 to 15,000 ft. Alt.

(12) - Use 5GA-9533-B (.063") 5,000 to 10,000 ft. Alt.
Use B4Q-9533-A (.061") 10,000 to 15,000 ft. Alt.

(13) - Use 59A-9533-A (.051") 5,000 to 10,000 ft. Alt.
Use 59A-9533-B (.049") 10,000 to 15,000 ft. Alt.

(14) - Use 1GA-9533-B (.062") 5,000 to 10,000 ft. Alt.
Supersedes 78-9533-F (.058")
Use 1GA-9533-C (.060") 10,000 to 15,000 ft. Alt.
Supersedes 06H-9533 (.054").

(15) - Use 59A-9533-C (.047") 5,000 to 10,000 ft. Alt.
Use 59A-9533-D (.045") 10,000 to 15,000 ft. Alt.

(16) - Use 5GA-9533-BUP (.063") 5,000 to 10,000 ft. Alt.
Supersedes B4Q-9533-B (.059").
Use B4Q-9533-AUP (.061") 10,000 to 15,000 ft. Alt.
Supersedes B4T-9533-A (.055")

(17) - Use B4T-9533-A (.055") 5,000 to 10,000 ft. Alt.
Use B4T-9533-B (.053") 10,000 to 15,000 ft. Alt.

(18) - Use 1GA-9533-A (.064") 5,000 to 10,000 ft. Alt.
Use 1GA-9533-B (.062") 10,000 to 15,000 ft. Alt.

1959-60 FORD 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Venturi Assembly Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.
EDSEL							
292" Eng. S.M.	1959	B9A-9510-A	.048"	78-9533-B ①	B9AE-9A523-A	B7A-9904-E (11)	B8A-9577-D
292" Eng Auto. Trans.	1959	PB9E-9510-C	048"	78-9533-B ①	PB9E-99494-A	B7A-9904-E (11)	B8A-9577-D
332" Eng. S.M.	1959	PB9E-9510-G	.049"	59A-9533-B ②	B9AE-9A523-C	B7A-9904-E (11)	B8A-9577-D
332" Eng. Auto. Trans.	1959	PB9E-9510-B	.049"	59A-9533-B ②	B9AE-9A523-B	B7A-9904-E (11)	B8A-9577-D
361" Eng. Auto. Trans.	1959	PB9E-9510-D Pri	.053"	B4T-9533-B ③	PB9E-99494-A	B7A-9904-E (11)	B8A-9577-D
		PB9E-9510-D Sec.	.065"	5GA-9533-A	PB9M-99494-E		
361" Eng. Auto. Trans.	1959	B9A-9510-E Pri.	.053"	B4T-9533-B ③	PB9E-99494-A	B7A-9904-E (11)	B8A-9577-D
		B9A-9510-E Sec.	.065"	5GA-9533-A	PB9M-99494-E		
FORD PASS CARS							
292" Eng. S.M.	1959	B9A-9510-A	.048"	78-9533-B (15)	B9AE-9A523-A	B7A-9904-E (12)	B8A-9577-D
292" Eng. Auto. Trans.	1959	B9A-9510-B	.048"	78-9533-B (15)	B9A-9641-B	B7A-9904-E (12)	B8A-9577-D
332" Eng. S.M.	1959	B9A-9510-C	.049"	59A-9533-B ⑤	B9AE-9A523-B	B7A-9904-E (12)	B8A-9577-D
332" Eng. Auto. Trans.	1959	B9A-9510-C	.049"	59A-9533-B ⑤	B9AE-9A523-B	B7A-9904-E (12)	B8A-9577-D
352" Eng	1959	B9A-9510-E Pri.	.053"	B4T-9533-B ③	B9A-9641-B	B7A-9904-E (12)	B8A-9577-D
		B9-9510-E Sec.	.065"	5GA-9533-A ⑥	B8A-9641-G		
EDSEL & FORD PASS. CARS							
292" Eng.(Synchro-mesh) Early	1960	COAE-9510-M		(13) (14)	COKE-9A523-A (29)	COAE-9A565-D (28)	COAE-9B529-A
292" Eng.(Synchro-mesh) Late	1960	COAE-9510-AF	.047"	59A-9533-C (15)	COAE-9A523-B	COAE-9A565-D (28)	COAE-9B529-A
292" Eng. (Auto. Trans.) Early	1960	COAE-9510-H		(16) (17)	COKE-9A523-A (29)	COAE-9A565-D (28)	COAE-9B529-A
292" Eng. (Auto. Trans.) Late	1960	COAE-9510-AG	.048"	78-9533-C (18)	COAE-9A523-B	COAE-9A565-D (28)	COAE-9B529-A
352" Eng. (Synchro-mesh) Early	1960	COAE-9510-R	.056"	78-9533-E (19)	COKE-9A523-B	COAE-9A565-E (28)	COAE-9B529-A
352" Eng. (Synchro-mesh) Late	1960	COAE-9510-AB	.056"	78-9533-E (19)	COAE-9A523-A	COAE-9A565-E (28)	COAE-9B529-A
352" Eng. (Auto. Trans.) Early	1960	COAE-9510-S	.055"	B4T-9533-A (20)	COKE-9A523-B	COAE-9A565-E (28)	COAE-9B529-A
352" Eng. (Auto. Trans.) Late	1960	COAE-9510-AC	.055"	B4T-9533-A (21)	COAE-9A523-A	COAE-9A565-E (28)	COAE-9B529-A
352" Eng. (Synchro-mesh)	1960	COAE-9510-J Pri.	.054"	06H-9533 (22)	COKE-9A523-C	COAE-9A565-A (28)	COAE-9B529-A
		COAE-9510-J Sec.	.063"	5GA-9533-B (23)			COAE-9B529-A
352" Eng. (Auto. Trans.)	1960	COAE-9510-K Pri.	.053"	B4T-9533-B (24)	COKE-9A523-C	COAE-9A565-A (28)	COAE-9B529-A
		COAE-9510-K Sec.	.063"	5GA-9533-B (25)			
MERCURY							
383" Eng. S.M.	1959	PB9M-9510-H	.060"	1GA-9533-C ⑦	B9ME-9A523-A	B7A-9904-E (11)	B8A-9577-D
383" Eng. Auto. Trans.	1959	PB9M-9510-B	.058"	78-9533-F ⑧	B9ME-9A523-A	B7A-9904-E (11)	B8A-9577-D
383" Eng. Auto. Trans.	1959	PB9M-9510-D Pri.	.057"	26H-9533 (9)	B9EM-99494-A	B7A-9904-E (11)	B8A-9577-D
		PB9M-9510-D Sec	.066"	8MB-9533-B (10)	PB8M-99494-E		
383" Eng. (Auto. Trans.) Early	1960	COME-9510-G	.059"	B4Q-9533-A (26)	COME-9A523-A	COAE-9A565-A (28)	COAE-9B529-A
383" Eng. (Auto. Trans.) Late	1960	COME-9510-K	.058"	78-9533-F (27)	COME-9A523-B	COAE-9A565-A (28)	
383" Eng.(Auto.Trans)Air Cond.	1960	COME-9510-J					

① - Use B4Q-9533-B (.045") 5000 to 10000 ft. Alt. Use 922A-9533-A (.043") 10000 to 15000 ft. Alt.

② - Use 78-9533-C (.046") 5000 to 10000 ft. Alt. Use 78-9533-D (.044") 10000 to 15000 ft. Alt.

③ - Use 78-9533-A (.050") 5000 to 10000 ft. Alt. Use 78-9533-B (.048") 10000 to 15000 ft. Alt.

⑤ - Use 78-9533-C (.046") 5000 to 10000 ft. Alt. Use B7A-9533-B (.044") 10000 to 15000 ft. Alt.

⑥ - Use 1GA-9533-B (.062") 5000 to 10000 ft Alt. Use 1GA-9533-C (.060") 10000 to 15000 ft Alt

⑦ - Use 26G-9533 (.057") 5000 to 10000 ft Alt Use B4T-9533-A (.055") 10000 to 15000 ft Alt.

⑧ - Use B4T-9533-A (.055") 5000 to 10000 ft Alt Use B4T-9533-B (.053") 10000 to 15000 ft Alt

(9) - Use 56A-9533-A (063") 5000 to 10000 ft Alt Use 1GA-9533-B (.062") 10000 to 15000 ft Alt

(10) - Use PB8M-9904-B 5000 to 10000 ft Alt. Use PB8M-9904-C 10000 to 15000 ft. Alt

(11) - Use B8A-9904-D 5000 to 10000 ft Alt Use B8A-9904-E 10000 to 15000 ft Alt

(13) - 78-9533-B (.048") early carbs. 59A-9533-C (.047") late carbs.

(14) - For 5,000-10,000 ft. Alt., use 78-9533-C (.046") for early carbs., 59A-9533-D (.045") for later carbs. For 10,000-15,000 ft. Alt., use B7A-9533-A (.044") for early carbs., 922A-9533-A (.043") for later carbs.

(15) - Use 59A-9533-D (.045") 5,000-10,000 ft. Alt. Use 922A-9533-A (.043") 10,000-15,000 ft. Alt.

(16) - 59A-9533-C (.047") early carbs. 78-9533-C (.046") late carbs.

(17) - For 5,000-10,000 ft. Alt., use 59A-9533-D (.045") for early carbs., B7A-9533-B (.044") for later carbs For 10,000-15,000 ft. Alt., use 922A-9533-A (.043") all carbs.

(18) - Use B7A-9533-B (.044") 5,000-10,000 ft. Alt. Use 922A-9533-A (.043") 10,000-15,000 ft. Alt.

(19) - Use 06H-9533 (.054") 5,000-10,000 ft. Alt Use 86H-9533 (.052") 10,000-15,000 ft. Alt.

(20) - Use B4T-9533-B (.053") 5,000-10,000 ft Alt. Use B9A-9533-A (.051") 10,000-15,000 ft. Alt.

(21) - Use B4T-9533-B (.053") 5,000-10,000 ft. Alt. Use 59A-9533-A (051") 10,000-15,000 ft. Alt.

(22) - Use 86H-9533 (.052") 5,000-10,000 ft. Alt. Use 78-9533-A (.050") 10,000-15,000 ft. Alt.

(23) - Use B4Q-9533-A (.061") 5,000-10,000 ft. Alt. Use B4Q-9533-B (.059") 10,000-15,000 ft. Alt.

(24) - Use 59A-9533-A (.051") 5,000-10,000 ft. Alt Use 59A-9533-B (.049") 10,000-15,000 ft. Alt

(25) - Use B4Q-9533-A (.061") 5,000-10,000 ft. Alt. Use B4Q-9533-B (.059") 10,000-15,000 ft. Alt.

(26) - Use 26H-9533 (.057") 5,000-10,000 ft. Alt. Use B4T-9533-A (055") 10,000-15,000 ft. Alt.

(27) - Use 78-9533-E (.056") 5,000-10,000 ft. Alt. Use 06H-9533 (.054") 10,000-15,000 ft. Alt.

(28) - Use COAE-9A565-B 5,000-10,000 ft. Alt. Use COAE-9A565-C 10,000-15,000 ft. Alt.

(29) - Early carburetors On later carburetors, use COAE-9A523-B

HOLLEY 2 & 4-BARREL CARBURETORS

2-BARREL CARBURETORS

EDSEL 2-BBL. CARBS.	Edsel Part No.
1959 332" Eng. ①②	PB9E-9510-F

FORD PASS. CAR 2-BBL. CARBS.	Ford Part No.
1957 272" Eng. (Early) ①	B7A-9510-F
1957 272" Eng. (Late) ①	B7A-9510-R
1957 272" Eng. (Later) ①②	B7A-9510-AA
1957 292" Eng. (Early) ①	B7A-9510-G
1957 292" Eng. (Late) ①	B7A-9510-S
1957 292" Eng. (Later) ①	B7A-9510-AB
1957 292" Eng. (Early) ③	B7A-9510-K
1957 292" Eng. (Late) ②③	B7A-9510-T
1957 Thunderbird 292" Eng. (Early) ①	B7A-9510-G
1957 Thunderbird 292" Eng. (Late) ①	B7A-9510-T
1958 292" Eng. (Early) ①②	B8A-9510-H
1958 292" Eng. (Late) ①②	B8A-9510-R
1958 292" Eng. Auto. Trans.	B8A-9510-G
1958 332" Eng. (Early) ①②	B8A-9510-D
1958 332" Eng. (Late) ①②	B8A-9510-S
1959 292" Eng. (Governor)	B9AE-9510-B
1959 332" Eng. ③⑩	B9A-9510-D

FORD TRUCK 2-BBL. CARBS.	Ford Part No.
1957 P-350,400,500 Par.Del. (Early)	B7J-9510-A
1957 P-350,400,500 Par. Del. (Late)	B7J-9510-B
1957 F-500, B-500, C-500,550 (Early)	B7T-9510-A
1957 F-500, B-500, C-500,550 (Late)	B7T-9510-D
1957 F-600, B-600, C-600 (Early)	B7T-9510-A
1957 F-600, B-600, C-600 (Late)	B7T-9510-D
1958 272" Med. Duty Eng. (Par. Del.)	B7J-9510-B
1958 272" Med. Duty Eng. (Others)	B7T-9510-D
1958 292" Med. Duty Eng. (Par. Del.)	B8J-9510-A
1958 292" Med. Duty Eng. (Others)	B8C-9510-A
1959 292" Eng.	B9C-9510-C
1960 292" MD Eng. ①⑦	COTE-9510-C
1960 292" MD Eng. ③	COTE-9510-D
1960 292" MD Eng. ①⑧	COTE-9510-E

MERCURY 2-BBL. CARBS.	Mercury Part No.
1958 312" Eng.	5751095
1959 312" Eng. ⑩⑨	B9ME-9510-A
1960 312" Eng. (Early) ⑩	B9ME-9510-A
1960 312" Eng. (Late) ⑩	COME-9510-A
1960 312" Eng. ① (10)	COME-9510-F

RAMBLER 2-BBL. CARBS.	Holley Part No.
1960 6020 & 6080 Series (Early)	R-2040A
1960 6020 & 6080 Series (Late)	R-2040-1A

① - Synchro-mesh transmission.
② - When used with automatic transmission, dashpot and attaching parts must also be used.
③ - Automatic transmission.
⑩ - When used with synchro-mesh transmission, remove dashpot and attaching parts.
⑤ - Low Torque Engine.

4-BARREL CARBURETORS

EDSEL 4-BBL. CARBS.	Edsel Part No.
1958 361" Eng. ①	B8E-9510-A
1958 410" Eng.	B8E-9510-B

FORD PASS. CAR 4-BBL. CARBS.	Ford Part No.
1957 312" Eng. (270 HP)	(Two) B7A-9510-P
1957 312" Eng. (Early) ③⑩	B7A-9510-H
1957 312" Eng. (Late) ③⑩	B7A-9510-U
1957 Thunderbird 312" Eng. (Early) ③⑩	B7A-9510-H
1957 Thunderbird 312" Eng. (Late) ③⑩	B7A-9510-U
1958 332" Eng. (Early) ①②	B8A-9510-C
1958 332" Eng. (Late) ①②	B8A-9510-T
1960 352" Eng. (Police Spec.)	COAE-9510-AA

FORD TRUCK 4-BBL. CARBS.	Ford Part No.
1957 F-500, B-500, C-500, 550	B7T-9510-C
1957 F-600, B-600, C-600	B7T-9510-C
1958 272" Heavy Duty Eng.	B7T-9510-C
1958 292" Heavy Duty Eng.	B8T-9510-A
1959 292" Eng. (Early)	B9T-9510-A
1959 292" Eng. (Late)	B9TE-9510-L
1960 292" HD Eng.	COTE-9510-F

DODGE 4-BBL. CARBS.	Holley Part No.
1960 383" Eng. ①	R-2052A
1960 383" Eng. ③	R-1971A

LINCOLN 4-BBL. CARBS.	Lincoln Part No.
1958 All Models (Early)	EDJ-9510-A
1958 All Models (Late)	5750897

MERCURY 4-BBL. CARBS.	Mercury Part No.
1957 312" Eng. (Early) ①	ECZ-9510-Y
1957 312" Eng. (Late) ①	ECZ-9510-AD
1957 312" Eng. (Early) ③	ECZ-9510-V
1957 312" Eng. (Late) ③	B7A-9510-U
1958 312" Eng. (Optional)	B7A-9510-U
1958 383" Eng. (Early) ①⑤	EDG-9510-C
1958 383" Eng. (Late) ①⑤	5750890
1958 383" Eng. (Early) ③⑤	EDG-9510-E
1958 383" Eng. (Late) ③⑤	5750891
1958 383" Eng. (Early) ③⑥	EDG-9510-D
1958 383" Eng. (Late) ③⑥	5750898
1958 430" Eng. (Early) ③	EDJ-9510-A
1958 430" Eng. (Late) ③	5750897

RAMBLER 4-BBL. CARBS.	Holley Part No.
1958 5820 Series (Early)	R-1748A
1958 5820 Series (Late)	R-1748-1
1958 5880 Series (Early)	R-1312A
1958 5880 Series (Late)	R-1312-1
1959 5920 Series	R-1748-1
1959 5980 Series	R-1312-1
1960 6020 Series	R-1958, R-1958-1
1960 6080 Series	R-1957, R-1957-1

⑥ - High Torque Engine.
⑦ - "B" & "F" Series Trucks.
⑧ - "P" Series Trucks.
⑨ - Adapter, Part No. B9ME-9A621-A must be used with this carburetor.
(10) - Use B9ME-9510-A or COME-9519-A for service replacement.

Ford & Holley Carburetor Numbers & Identification

Ford Part No.	Holley Part No.	①Identification
B7A-9510-AA	R-1379-2A	ECG-BG or BH
B7A-9510-AB	R-1281-3A	EDB-AC
B7A-9510-F	R-1379-2A	ECG-AS or AT
B7A-9510-G	R-1952AS	ECJ-AC or EDB-L
B7A-9510-H	R-1273-2AS	ECZ-V or Y
B7A-9510-K	R-1282-3A	EDB-M
B7A-9510-P	R-1434A	ECJ-AA or AB
B7A-9510-R	R-1379-2A	ECG-BE or BF
B7A-9510-S	R-1281-3A	EDB-Y
B7A-9510-T	R-1952AS	ECJ-AC or EDB-Z
B7A-9510-U	R-1273-2AS	ECZ-AC or AD
B7J-9510-A	R-1974AS	ECY-B
B7J-9510-B	R-1974AS	ECY-D
B7T-9510-A	R-1974AS	ECY-A
B7T-9510-C	R-1214-5A	ECR-L
B7T-9510-D	R-1974AS	ECY-C
B8A-9510-C	R-1848A	EDC-9510-G or F
B8A-9510-D	R-1929AAS	EDC-9510-E or H
B8A-9510-G	R-1929AAS	EDB-9510-AD
B8A-9510-H	R-1929AAS	5750069 or 70
B8A-9510-R	R-1929AAS	5751355 or 57
B8A-9510-S	R-1929AAS	5751356 or 58
B8A-9510-T	R-1848A	5750892 or 93
B8C-9510-A	R-1974AS	5751076, 78 or 79
B8J-9510-A	R-1974AS	5751077
B8T-9510-A	R-1727A	5750530
B9A-9510-D	R-1929AAS	5752297
B9AE-9510-B		B9AE-9510-B
B9C-9510-C	R-1837A	5752310, 312, or 313
B9ME-9510-A	R-1929AAS	②B9ME-9510-A
B9T-9510-A	R-2022A	5751759
B9TE-9510-L	R-2022A	B9TE-9510-L
COAE-9510-AA	R-2112A	COAE-9510-AA
COME-9510-A	R-2015A	②COME-9510-A
COME-9510-F	R-2014A	②COME-9510-F
COTE-9510-C	R-2011A	COTE-9510-C
COTE-9510-D	R-2012A	COTE-9510-D
COTE-9510-E	R-2013A	COTE-9510-E
COTE-9510-F	R-2022A	COTE-9510-F
PB9E-9510-F		5752297

① - Stamped on choke plate flange.
② - Stamped on air horn section of main body.

►CHANGES, CAUTIONS, CORRECTIONS

►*4-BARREL CARBURETOR THROTTLE BODY-TO-MAIN BODY GASKET INSTALLATION CAUTION:* This gasket must be installed so ALL holes in gasket align with mating holes in throttle body. Because the gasket can be installed in either an inverted or rotated position, each gasket installation should be carefully checked before assembling carburetor.

►*1957 HESITATION & STUMBLE CORRECTION (2 & 4-Barrel Carbs.):* This condition may be caused by a binding fuel bowl vent linkage. Check the following points for misalignment: Accelerator pump to throttle shaft lever bind at the center shaft and lever contact alignment. Binding at accelerator pump lever on pin in pump cover assembly. Binding at float bowl vent selector where it enters float bowl casting. Bowl vent hanging on top of float bowl casting recess.

CONTINUED ON NEXT PAGE

HOLLEY 2 & 4-BARREL CARBURETORS (C ntinu d)

►*1957 AUTOMATIC CHOKE STICKING CORRECTION (2 & 4-Barrel Carbs.):* This may be caused by interference between carburetor main body and end of thermostatic choke lever rod. Correct by bending choke lever assembly (bellcrank) away from main body.

►*1957 STUMBLE ON ACCELERATION CORRECTION (2 & 4-Barrel Carbs.):* This condition may be caused by blocked passage in accelerating pump circuit due to misalignment between fuel bowl and metering block which will press the accelerating pump circuit ferrule into metering block and close the circuit. Remove and reposition ferrule as follows: Slip the end of a small piece of wire into ferrule, then using a pair of side cutters or similar tool, work ferrule from metering block. *NOTE - The wire is used only to keep ferrule from collapsing.* Reposition ferrule, remove wire, and then assemble fuel bowl to metering block, making sure that all parts are aligned.

►*1957 ACCELERATOR PUMP-TO-THROTTLE LEVER INTERFERENCE (2 & 4-Barrel Carbs.):* If interference is at the dashpot mounting bracket, correct by bending dashpot bracket upwards. Do not bend more than is necessary to provide clearance. Check and adjust alignment between end of dashpot and contact point on throttle lever by bending bracket outward slightly.

►*1957 HOLLEY 4-BARREL CARBURETOR SECONDARY FLOAT SETTING NOTE:* Some of these carburetors have a boss in the floor of the secondary float bowl which interferes with use of float gauge (Tool 9510-10, Ford; 9550-K-2, Mercury). *(NOTE - These are the gauges supplied with carburetor kit).* Existing instructions indicate the two positioning arms of gauge must touch side of bowl. However, on bowls with boss in floor, the top positioning arm should be tipped away from side of bowl so locating step will seat firmly on bottom of bowl and not ride on boss. Firm pressure on gauge will position gauge for correct float setting.

►*1957 HOLLEY CARBURETOR FLOAT BOWL PRODUCTION CHANGE & FLOAT SETTING CAUTION:* Float bowls and baffle plates have been revised during production as follows, to prevent leakage and flooding. (1) First design includes primary and secondary bowls with no retaining ribs and a baffle plate with a retaining hole through which the fuel inlet valve passes. An "O" ring is used between valve and baffle. (2) Second design has one baffle retaining rib and a baffle of same design as used in first type. (3) Third design bowls have two retaining ribs and a baffle plate which is slotted at the bottom to clear fuel inlet valve assembly. *CAUTION* - When baffle is installed, gently vibrate bowl and determine if baffle has a tendency to tilt toward float. If so, carefully bend upper portion of baffle untio this tendency is eliminated. If an "O" ring is used make sure that a good seating condition is established using a new "O" ring. Handle baffle carefully at all times as it is easily distorted. Do not bend more than indicated above.

►*1957 FORD TRUCK 4-BARREL CARBURETOR "DEPOPPER VALVE" NOTE:* The depopper device has been made inoperative on all 4-barrel carburetors by plugging the air inlet passage located between secondary venturi, next to air cleaner stud hole boss, to maintain proper idle characteristics. If the depopper device is needed, and a higher idle RPM can be maintained, the plug can be removed.

►*1957 FORD TRUCK 4-BARREL CARBURETOR CHOKE VALVE STICKING CORRECTION (B7T-9510-C):* The choke valves sticking in the closed position may be caused by sideways movement of the fast idle cam and shaft assembly. To correct this condition, bend end of choke rod lever which contacts the fast idle pickup arm approximately 10° outboard of its original position.

►*1958 FORD INTERCEPTOR AUTOMATIC CHOKE FAILURE TO COMPLETELY OPEN CORRECTION:* If the choke valves do not open completely or "come off" quickly enough, it may be due to improper sealing of choke stove to manifold. Correct by cementing gasket to manifold and the choke stove cover to the gasket with asbestos furnace cement.

►*1958 FORD FAILURE TO OBTAIN PROPER IDLE SPEED CORRECTION (Cars with 4-Barrel Carburetors):* If idle screw adjustment is ineffective, secondary throttle plate stopscrew may be incorrectly set. Remove carburetor from engine and turn secondary throttle plate stopscrew out until secondary throttle plates stick in throttle bore. Then turn the screw in, with throttle plates held closed, until it just touches tab on secondary operating lever. **Turn screw in an additional ¼ turn.** *NOTE* - Secondary throttle stopscrew is located on underside of lug on throttle body casting.

►*1958 LINCOLN, CONTINENTAL & MERCURY ENGINE STALLING AFTER COLD START CORRECTION:* This condition may be caused by incorrect choke linkage geometry. Check and correct as follows: Remove air cleaner, thermostatic coil housing and gasket. Locate center index mark on top of choke housing, then scribe a line one half notch beyond the last of the calibration marks on left side of center index mark (viewing carburetor from choke side). Rotate choke lever counterclockwise and note exact point choke plate closes. At the same time note exactly where front edge of choke lever stops (same edge of choke lever that contacts finger when choke lever was rotated). At this point, place a small straightedge between scribed mark on choke housing and center of choke lever stud in center of choke. Front edge of lever should contact straightedge at this time. If not, adjust choke operating rod at a point below main body flange so lever contacts straightedge as indicated above. Adjust fast idle setting (see "Adjustments" below). If the above corrections do not eliminate stalling, adjust choke setting 1 or 2 notches richer than specified.

►*1958 FORD & EDSEL STALLING AFTER NORMAL COLD ENGINE START CORRECTION:* This condition may be due to improperly adjusted choke linkage. To check and adjust, remove thermostatic coil housing and gasket, then move thermostatic lever counterclockwise. The choke plate should be completely closed before lever reaches limit of its travel (limit of travel is when edge of lever that contacts the thermostatic coil is approximately 5½ notches from center index mark on choke housing). If choke plate is not completely closed at this point, lengthen choke operating rod by bending at existing bend until correct adjustment is obtained. If the condition is not completely corrected by the above adjustment, set thermostatic coil housing one or two notches richer, as required. If both the above adjustments do not correct choke operation, replace carburetor.

►*1958 2 & 4 - BARREL CARBURETOR (ALL MODELS EXC. RAMBLER) VENT REWORK (To prevent spillag of fuel under flooding conditions):* Plug the vent hole in each of the carburetor throttle bores (located above throttle valve in side of throttle bore) using a 3/16" long, No. 4 type drive screw (Ford & Edsel Part No. 92032-S2. or Lincoln & Mercury Part No. 920328). A punch may be used to drive screws into place after choke assembly has been removed. Be careful not to distort contour of throttle body when installing screws.

►*1958 FORD TRUCK LOSS OF POWER CORRECTION (TRUCKS WITH 4-BARREL CARBURETORS):* This condition may be caused by the ball check in secondary diaphragm housing sticking and can be corrected by removing the ball check. *NOTE - Failure of secondary throttle valves to open, results from a sticking ball check.*

►*1958 FORD FLOAT BOWL PRODUCTION CHANGE & REVISED FLOAT & FUEL LEVEL SETTING PROCEDURE:* Later carburetors having the high fuel inlet bowls also have a removable plug located on face of bowl at hinge end of float, making it possible to gain access to float tab. To adjust fuel level, operate engine at idle speed, then remove fuel sight level plug and float tab access plug. To raise fuel level to bottom of sight level plug, insert a small screwdriver into plug opening and press downward on float tab. To lower fuel level, pry tab upward. *CAUTION - Only a small amount of bending is required to either raise or lower fuel level.*

►*1958 FORD (HOLLEY) CARBURETOR BOWL VENT PRODUCTION CHANGE:* Later carburetors have a mechanically operated bowl vent which closes when main metering system in operation. The new vent is operated by an extension of the wide open throttle stop lever on throttle shaft instead of from the accelerating pump operating lever. To adjust the later vent, bend vent as required to obtain a clearance of .050-.070" between vent valve and machined surface of fuel bowl with the throttle in normal idle position.

►*1958 FORD ENGINE BACKFIRE CORRECTION:* A new thermostatic choke coil housing, Part No. B8A-9848-E (292" Eng.), Part No. B8A-9848-A (332" Eng.) having a loop in the end of the bi-metal spring (to prevent closure of choke plate) is available for service replacement. The new housings can be identified by "57M-1" (B8A-9848-E), and "58L-1" (B8A-9848-A) cast in center of bakelite housing

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HOLLEY 2 & 4-BARREL CARBURETORS (C ntinu d)

►*1958 LINCOLN, MERCURY, EDSEL SLOW OPENING CHOKE CORRECTION:* If choke will not fully open or if engine remains on fast idle too long, check for freeness of choke assembly and linkage and free any binding condition. Check thermostatic choke heat tube to make sure asbestos insulator is installed, then check and make sure fast idle cam is operating freely. If the condition exists after the above checks, and choke operates freely, inspect heat stove cover for warping. If cover is warped, replace with the new cover, Part No. 5751311, and gasket, Part No. 5751312. Inspect cover plate mating surface for high spots, and if found, remove with a file to permit proper sealing.

►*1958 LINCOLN, MERCURY, EDSEL CARBURETORS REMAINING ON FAST IDLE TOO LONG CORRECTION:* Interference between choke rod retainer clip and weighted arm of fast idle cam may be causing the above condition and can be corrected by removing choke assembly from main body and bending the choke rod operating lever approximately 1/16" farther away from choke housing. The bend should be made as close as possible to choke housing shaft. Reinstall and check operation. On later carburetors, offset choke housing used (can be installed on early carburetors).

►*1958 4-BARREL CARBURETOR GASKET REPLACEMENT CAUTION:* When installing new throttle body-to-main body gasket make sure the correct gasket is used.

►*1958 LINCOLN & MERCURY ENGINE STALLING DURING WARM-UP CORRECTION:* If automatic choke opens too early, causing engine stalling, install choke thermostat housing, Part No. EDG-9848-B, identified by "58L2" cast in raised letters in center of bakelite cover. Adjust automatic choke setting so cover is centered (at index).

►*1958 LINCOLN & MERCURY THROTTLE LEVER AND SHAFT ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To minimize deflection of throttle lever stop and improve engine idle stability):* New throttle lever and shaft assemblies, Part Nos. 5751508 (B7A-9510-B Carb.), No. B8A-9581-D (EDJ-9510-A & EDG-9510-D Carbs.) are being used in production and can be used for service replacement. When installing the later type assemblies be sure the return spring is under tension with the inner tang resting on top of throttle body boss.

►*1958 RAMBLER AIR LEAKAGE AT THROTTLE BODY-TO-INTAKE MANIFOLD CORRECTION:* This condition may be indicated by rough engine operation, constant throttle surge, or by abnormal automatic transmission operation. To correct, install an additional gasket between throttle body and spacer.

►*1959 FORD PASS. CAR 332" ENG. AUTOMATIC CHOKE MALFUNCTION CORRECTION (Carburetor No. B9A-9510-A with Date Code "801"):* Poor engine performance may be caused by improper choke housing, Part No. B8A-9849-C (identified by numbers 34R-1523-B cast on back surface of housing directly below fast idle cam bushing) being installed. To correct the condition, set thermostatic coil housing 1 or 2 notches rich, or install choke housing, Part No. B7A-9849-B, which can be identified by numbers 34R-1523-B cast inside choke housing above center bushing. *NOTE - Carburetors with date code "801" which have been corrected in production have a daub of white paint on thermostatic coil cover.* The choke piston for Part No. B8A-9849-C is .510" O.D. Choke piston for B7A-9849-B is .477" O.D.

►*1959 FORD COLD DRIVEAWAY ACCELERATION (IN COLD WEATHER) CORRECTION:* Align lower (No. 2) hole in accelerating pump cam with lower (No. 2) hole in throttle lever and install the screw in lower holes.

►*1959 EDSEL & MERCURY IMPROPER RETURN TO IDLE SPEED NOTE (AUTOMATIC TRANSMISSION CARS):* This condition is due to improperly adjusted carburetor throttle rod. *See "Throttle Linkage Adjustment" on car model pages.*

DESCRIPTION: **2-Barrel Carburetor** - New design dual downdraft type with automatic choke consisting of a main body, throttle body, and a side mounted (on main body) fuel bowl and metering block assembly. The automatic choke is mounted on main body and is connected to choke valve shaft by a connecting rod. The accelerating pump is mounted in bottom of fuel bowl and is connected to throttle shaft by a bellcrank arm and lever. A power valve located in main body is controlled by vacuum and actuated by a power valve spring.

4-Barrel Carburetor - New design downdraft type with automatic choke. This carburetor is similar to the 2-Barrel (above). On the primary side there is an idle system, main fuel system, accelerating pump system, power system and choke system. The secondary side has an idle system, main fuel system and a power system. Throttle valves on secondary side are operated by a vacuum diaphragm.

►*1958 CARBURETOR CHANGES: 1957 and 1958 carburetor models are the same except as noted below:*

Fuel Inlet Needle Valve (Pass. Cars Exc. Rambler) - New type needle valves are solid steel. The former spring loaded actuating pin has been discontinued.

Idle Discharge Passage (Pass. Car 4-Barrel Carbs.) - An idle discharge passage to secondary throttle bores, just below the throttle plates, has been incorporated to provide a small amount of fuel during idling from secondary metering system.

Depopper Valve (Trucks) - On 4-Barrel carburetors, the former air bypass type depopper has been replaced by a fuel enrichment type depopper valve which is similar in appearance to the economizer (power) valve.

Secondary Economizer (Pass. Cars Exc. Rambler) - On 4-Barrel carburetors, the economizer (power valve) formerly used on the secondary side has been eliminated.

►*1959 CARBURETOR CHANGES: Carburetor models are the same as 1958 models except as noted below:*

External Fuel Level Adjustment (Rambler) - Fuel inlet valve has been changed to include an adjusting nut and a lock screw to provide for fuel adjustment without removal of fuel body assembly.

►*1960 CARBURETOR CHANGES: Carburetor models are the same as 1959 models except as noted below:*

External Fuel Level Adjustment (Rambler) - Same as for 1959 models (except Rambler). See above.

Fuel Bowl Level Balance Tube (Ford Truck & Dodge) - This tube connects primary and secondary fuel bowls and balances the fuel level between the two bowls.

"Cross-Over" Type Automatic Choke (Dodge) - This type automatic choke is a separate unit located in a well in intake manifold (in exhaust cross-over passage) and is linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in carburetor main body and is linked directly to choke valve.

ADJUSTMENTS: *See "Fast Idle" below for Cold Engine idle speed setting.*

Idle Mixture Setting: *NOTE - Idle mixture screws are on primary side (Exc. Ford Truck), secondary side (Ford Truck).* Initial adjustment is 1½ turns open (Edsel, Ford, Lincoln); 1¼ turns open (Mercury), 1 turn open (Dodge & Rambler) from a lightly seated position. With engine at normal operating temperature, transmission in "N" (Neutral), turn both screws in until engine runs rough from lean mixture, then turn screws out until engine rolls from rich mixture. Finally turn screws in just enough for smooth idling at highest engine RPM and highest vacuum. Reset engine speed to correct engine RPM (See "Idle Speed Setting" below).

Idle Speed (Hot Engine) Setting: *See "Fast Idle" below for Cold Engine Idle Speed Setting.* With engine at normal operating temperature, fast idle screw backed off so it does not touch fast idle cam, choke valve wide open, and transmission in neutral (Synchro-mesh), proper range (Auto, Trans. - see table below), adjust engine idle speed to correct RPM (see table below) by rotating throttle stopscrew on left side of carburetor.

Car Model	Idle Speed Setting Engin S.M. Trans.	RPM Aut. Trans.
1958 Edsel	475-500	450-475
1960 Edsel	②500-525	①②450
1957-58 Ford Pass. 292" Eng.	475-500	①450
1957-58 Ford Pass. 332" Eng.	③	①④
1957-58 Ford Pass. 352" Eng.	③	①④
1957-58 Ford Trucks	475-500	①425-450
1959 Ford Pass.	⑤450-475	①⑤450
1959 Ford Trucks	475-500	①450
1960 Ford Trucks	475-500	①450-475
1960 Dodge	⑦500	②⑥500
1958 Lincoln		①425-450
1957-58 Mercury	475-500	425-450
1959 Mercury	②475-500	①②450-475
1960 Mercury	500-525	450-475
1958 Rambler	500	⑥475
1959-60 Rambler	550	⑥⑦475

① - Transmission in either "D" (Drive) range.

② - On Air Conditioned cars, compressor clutch must be engaged and compressor operating.

③ - 475 RPM (Hydraulic lifters). 600 RPM (Mechanical lifters).

④ - 450 RPM (Hydraulic lifters). 500 RPM (Mechanical lifters).

⑤ - On Air Conditioned cars, adjust idle speed after operating air conditioner compressor 20 minutes at maximum cooling and with compressor clutch engaged.

⑥ - Transmission in "N" (Neutral).

⑦ - 500 RPM on Air Conditioned cars.

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HOLLEY 2 & 4-BARREL CARBURETORS (Cont.)

Accelerating Pump Over-Rid Adjustment: Hold throttle valves wide open and depress pump arm fully Distance between pump lever adjusting screw hex head and pump arm should be 015" (Exc Rambler 2–Barrel Carbs) To adjust hold hex nut stationary and turn screw on pump lever On Rambler 2–Barrel carburetors turn screw on pump lever until it just contacts pump lever, then tighten screw ¼ turn Check accelerating pump to make sure that when throttle lever starts to move that pump lever also starts to operate *NOTE – One-half turn of adjusting screw is equivalent to 015" vertically*

Accelerating Pump Str ke Adjustment: *NOTE – This is a seasonal setting on all models except Mercury On Mercury, the "Normal (Summer) Setting" should be used for both summer and winter*

Normal (Summer) S tting – Align upper hole in accelerating pump cam with upper (No 1) hole in throttle lever and install screw through upper holes *NOTE – This provid s minimum stroke*

Wint r S tting – Align lower hole in accelerating pump cam with lower (No 2) hole in throttle lever and install screw through lower holes *NOTE – This provides maximum stroke*

Fu l B wl V nt Setting (Pass Cars): *NOTE - Adjustment is made on primary side of 4-Barrel carburetors* With throttle valves fully closed, distance between top of fuel bowl and vent button should be as indicated in table below To adjust, bend vent arm of accelerating pump lever *CAUTION - Do not bend vent valve rod*

Fu l B wl Vent Setting

Car Mod l	Setting
1959 Edsel	067"
1957-58 Ford Pass	1/16"
1959 Ford Pass	050- 070"
1960 Dodge	050- 070"
1959 Mercury	067"
1960 Mercury	060- 080"
1958-59 Rambler	1/16"
1960 Rambler	050- 070"

►*1958 BOWL VENT PRODUCTION CHANGE (FORD MODELS) S e "1958 Ford (Holley) Carburetor Bowl Vent Production Chang " above*

Fl at L vel· *NOTE - Float level settings are for initial bench adjustment only The float level will be correct when fu l level is properly adjusted* On carburetor models with adjustable fuel inlet needle assembly, turn adjusting nut so fuel arm is parallel with top and bottom of fuel bowl On carburetors without adjustable fuel needle assembly, distance between bottom of float and buel bowl floor, with fuel bowl inverted (measured at point ¾" in from end of float bowl, furthest from fuel inlet needle, and ½" in from gasket mounting) should be as indicated in table below To adjust, turn fuel inlet needle adjusting nut until correct clearance is obtained (models with adjustable fuel inlet needle), or bend tab on float arm (models without adjustable fuel inlet needle)

Fl at L vel Setting (1957)

2-Barrel (Pass. Car)	3/4"
2-Barrel (Truck)	11/16"
4-Barrel (Primary)	13/16"
4-Barrel (Secondary)	3/4"

Fl at L v l S tting (1958)

Car M d l	Primary Float	Secondary Fl at
Fdsel	3/4"	1/2 "
Ford 2-Bbl.	.735-.766"	
Ford 4-Bbl. (S.M. Trans.)	.735-.766"	.485-.516"
Ford 4-Bbl. (Auto, Trans.)	.735-.766"	.735- 766"
Lincoln & Continental	11/16"	9/16 '
Mercury 383" Eng.	3/4"	1/2 "
Mercury 430" Eng.	11/16"	9/16 "
Rambler	13/16"	3/4 "

Float Level Setting (1959)

Car Model	Primary Float	Secondary Float
Edsel	①	
Ford Pass (2-Bbl)	7/8"	
Ford Truck (2-Bbl)	11/16"	
Ford Truck (4-Bbl)	11/16"	½"
Mercury	①	
Rambler (4-Bbl)	13/16"	¾"

① - Adjustable fuel inlet needle *See 'Float Level' above*

Float Level Setting (1960)

Car Model	Primary Float	Secondary Float
Ford Truck (2-Bbl)	7/8"	
Ford Truck (4-Bbl)	7/8"	¾"
Dodge (4-Bbl)	①	①
Mercury (2-Bbl)	①	
Rambler (2 & 4-Bbl)	①	①

① - Adjustable fuel inlet needle *See "Float Level above*

►*1957 4-BARREL CARBURETOR SECONDARY FLOAT SETTING NOTE See "1957 Holley 4-Barrel Carburetor Secondary Float Setting Note ' above*

►*1958 FORD FLOAT & FUEL LEVEL SETTING PROCEDURE CHANGE See "1958 Ford Float Bowl Production Change & Revised Float & Fuel Level Setting Procedure ' above.*

►*1958 FORD FUEL LEVEL & FLOAT LEVEL NOTE*

Dry float settings are no longer considered adequate The float level is properly adjusted when fuel is level with lower surface of carburetor bowl sight plugs at engine idle speed If fuel flows from sight plug openings, at idle speed, it will be necessary to adjust float level

Fuel Level· With floats properly adjusted, fuel level should be as shown in table below

Car Model	Primary	Secondary
1958 Edsel	① ½"	① ¾"
1959 Edsel	③	③
1957 Ford 2-Bbl	② ½"	
1957 Ford 4-Bbl	② ½"	② 5/8"
1958 Ford 292" Eng	③	
1958 Ford 332" Eng	① ½"	
1958 Ford 352" Eng	③	① ¾"
1959-60 Ford (All)	③	③
1960 Dodge	③	③
1958 Lincoln	½"	③
1957 Mercury	½"	② 5/8"
1958 Mercury	½"	③
1959-60 Mercury	③	③
1958-60 Rambler	½"	5/8"

① - Below centerline of main discharge nozzle
② - Below centerline of bowl cover (upper) screw
③ - Lower edge of sight plug opening

Fu l Lev l Adjustm nt (Carburet rs with Adjustable Typ Inlet N dl) - With car on level floor, bring engine to normal operating temperature, then remove air cleaner and stop engine Remove sight plug in end of fuel bowl (use container to catch fuel) The fuel level within fuel bowl should be at lower edge of sight plug opening (plus or minus 1/16") Adjust as follows

Fuel Level Too High - With engine stopped, loosen lockscrew on top of fuel bowl just enough to allow rotation of nut underneath *CAUTION - Do not loosen lockscrew or attempt to adjust fuel level with engine running* Turn adjusting nut ½ turn clockwise to lower fuel level below specifications Tighten lockscrew, then run engine to stabilize fuel level Check fuel level at sight plug hole If level is not below specified level, repeat above step With fuel level below specified level, turn adjusting nut in increments of 1/6 turn until correct fuel level is obtained *NOTE - 1/6 turn of adjusting nut will change fuel level at sight plug opening 3/64'* After each adjustment, start engine and stabilize fuel level before checking level

Fuel Level Too Low - Proceed as for "Fuel Level Too High" except that it will not be necessary to initially decrease fuel level below specifications

Fuel Level Adjustment (Rambler) - If there is no sight plug in end of float bowl, fuel level should be 1/2"±1/16" (Primary) 5/8"±1/16" (Secondary), as indicated on Fuel Level Gauge J-10193 To check fuel level, remove either lower bowl attaching screw and install Gauge J-10193 using the bowl screw to attach gauge to bowl Tighten screw just enough to prevent fuel leakage Start engine and insert a 6" depth gauge scale into cylindrical opening in plastic gauge until it contacts **center** of fuel in opening **This measurement is the actual fuel level.** Remove depth gauge and measure down the same distance from top of plastic gauge body on calibrated face of gauge If fuel level is not correct, correct fuel level as indicated above will be registered at end of 6" depth gauge

Fast Idle - On Engine (Except Ford Trucks): With engine at normal operating temperature and "Hot" (slow) idle speed properly adjusted, place choke valve in wide open position and turn fast idle adjusting screw until it just touches **low step** of fast idle cam (1957-58 models & 1959-60 Ford & Rambler), **high step** (1959--60 Edsel, Mercury & Dodge) On 1957-58 models & 1958-60 Ford & Rambler, back off adjusting screw ¼-½ turn

Ford Trucks - On 2-barrel carburetors, fast idle will be properly adjusted when engine hot idle speed is adjusted *On 4-barrel carburetors, with engine at normal* operating temperature and "hot" idle speed adjusted, place primary throttle valves in the closed position and check clearance between fast idle cam and head of fast idle screw The clearance should be 010- 015" If clearance not correct, remove governor housing and insert a 060" rod into hole in end of fast idle screw fitting to prevent it turning, then turn fast idle screw as necessary for desired clearance *NOTE - ¼ turn in or out will change clearance approximat ly 008"* Reinstall governor housing and check clearance between fast idle cam and head of screw

CONTINUED ON NEXT PAGE

Form 41 3

HOLLEY 2 & 4-BARREL CARBURETORS (Continued)

Mercury (1960) - With choke valve wide open and throttle valves closed, adjust fast idle screw to obtain a clearance of .005-.008" between fast idle adjusting screw and lowest step of fast idle cam.

Automatic Choke Setting (Except Ford Trucks & Dodge): Loosen choke cover retaining clamp screws and rotate cover to align index mark on cover with correct mark on choke housing as indicated in table below.

Automatic Choke Setting

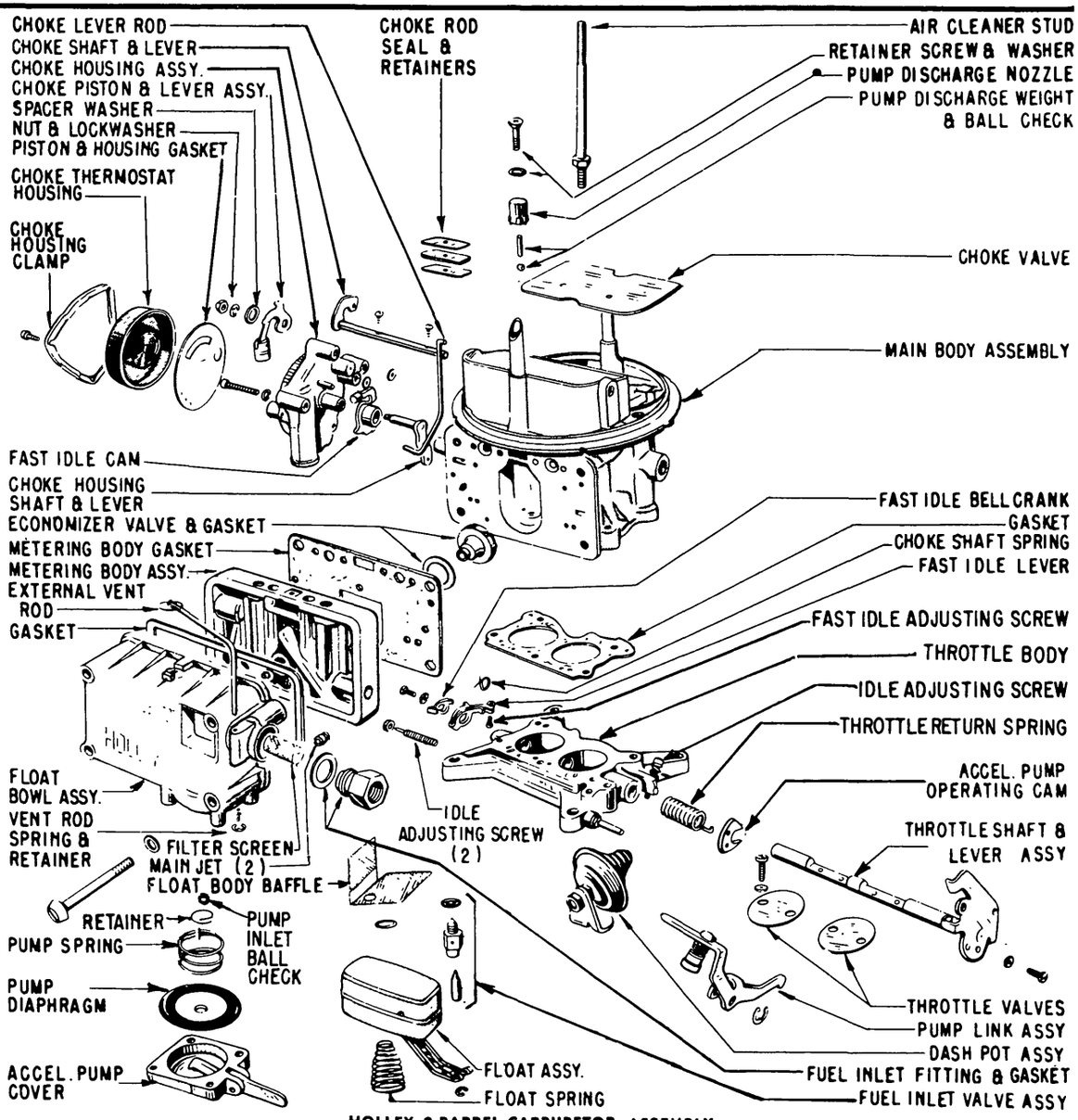
Car & Carb.	Choke Setting
1958 Edsel	Centered (On Index)
1959 Edsel	1 Notch Rich
1957 Ford	Centered (On Index)
1958 Ford	1 Notch Rich
1959 Ford	1 Notch Rich
1960 Dodge	©
1958 Lincoln	Centered (On Index)
1957-59 Mercury	Centered (On Index)
1958-59 Rambler	1 Notch Lean
1960 Rambler (2-Bbl.Carb.)	1 Notch Rich
1960 Rambler (4-Bbl. Carb.)	1 Notch Lean

© - "Cross-Over" type choke. See below.

Automatic Choke (Dodge): This automatic choke is separate "Cross-Over" type mounted in well in intake manifold (at cross-over passage) and linked to choke valve lever by a connector rod. Choke vacuum piston is located in cylinder in main body of carburetor and is linked to choke shaft lever. Choke setting is 1 notch rich. *See "Cross-Over Automatic Choke".*

OVERHAUL: Remove air cleaner anchor screw and lockwasher, and on 4-barrel carburetors, remove secondary diaphragm link assembly. On all carburetors, invert the carburetor and remove throttle body-to-main body screws and lockwashers, then lift off main body and remove throttle body gasket. Proceed as follows:

Disassembly (2-Barrel Carburetor): 1) Remove fuel inlet fitting, gasket, and screen, then remove fuel bowl retaining screws (fuel bowl, gasket, metering assembly and gasket will slide off the main body). Separate main metering assembly from fuel bowl and discard gasket. 2) Remove vent valve, idle adjusting screws and gaskets, and the power valve and gasket from metering assembly. Remove external vent linkage retainer and spring, then remove vent and linkage from fuel bowl. Remove accelerating pump cover assembly from fuel bowl, then remove diaphragm and spring. Remove float retainer, then lift float out of fuel bowl. Remove float spring and remove "O" ring seal from fuel valve seat assembly, then remove baffle plate. Remove fuel valve seat and let valve, spring, and pin fall into the hand. 3) Remove choke rod pin from choke housing shaft and lever assembly. Remove thermostat housing and gasket, then remove choke housing and gasket from main body. Remove nut, lockwasher, and spacer from choke housing shaft, then remove shaft and fast idle cam assembly. Remove choke piston and lever assembly. Remove choke rod pin from choke plate shaft lever. Remove choke rod, washers, and seal from main body. Remove choke valve from shaft, then slide shaft and lever out of choke housing.



HOLLEY 2-BARREL CARBURETOR ASSEMBLY

4) Remove pump discharge nozzle screw, then lift pump discharge nozzle and gasket out of main body. Invert main body and let pump discharge weight and ball fall into the hand.

5) Remove dashpot assembly (if so equipped), then remove pump operating lever retainer and remove pump operating lever. Remove fast idle pick-up lever and fast idle cam lever and spring. If it is necessary to remove throttle valve, lightly scribe both valves along the throttle shaft and mark each valve with a number or letter for proper replacement. Remove throttle valve screws and remove valves. Slide throttle valve shaft out of throttle body.

Disassembly (4-Barrel Carburetor): 1) From the primary side, remove fuel inlet fitting gasket, and screen, then remove primary fuel bowl retaining screws. Fuel bowl metering assembly and gaskets will slide off main body. Remove fuel line tubing and discard "O" ring seals.

CONTINUED ON NEXT PAGE

HOLLEY 2 & 4-BARREL CARBURETORS (C ntinu d)

Separate main metering assembly from fuel bowl and discard the gasket then remove and discard main metering assembly gasket Remove vent valve. On passenger cars remove idle mixture adjusting needles and gaskets. Remove power valve and gasket and the jets from metering assembly. Remove external vent linkage retainer and spring then remove vent and linkage from fuel bowl Remove accelerating pump cover assembly then remove diaphragm and spring Remove float retainer then lift float and spring out of fuel bowl. Remove "O" ring seal from fuel valve seat assembly and remove the baffle plate. Remove fuel valve seat and let valve spring and pin fall out into the hand.

2) Remove secondary fuel bowl retaining screws and remove fuel bowl and metering block. Separate metering block from fuel bowl and discard gaskets. Remove vent valve and main jets from metering block.On trucks, remove main jets, fuel enrichment valve and gasket, and the idle adjusting needles and gaskets from metering block. On all models, slide baffle plate out of fuel bowl. Remove float retainer, then lift float and spring out of fuel bowl. Remove fuel inlet needle and seat.

3) Remove choke rod retainer from choke housing lever assembly. Remove thermostat housing and gasket, then remove choke housing and gasket from main body. Remove choke housing shaft nut, lockwasher and spacer, then remove choke housing lever and shaft assembly and fast idle cam assembly. Remove choke piston and lever assembly. Remove choke rod retainer from choke lever. Remove choke rod, washers and seal from main body, then remove choke valve from shaft and slide shaft out of choke housing.

4) Remove secondary diaphragm housing and gasket from main body. *(NOTE* - Housing must be removed before cover can be removed). Remove diaphragm housing cover, then remove spring and diaphragm from housing.

5) Remove pump discharge nozzle screw, then lift pump discharge nozzle and gasket out of main body. Invert main body and let pump check weight and ball fall into the hand.

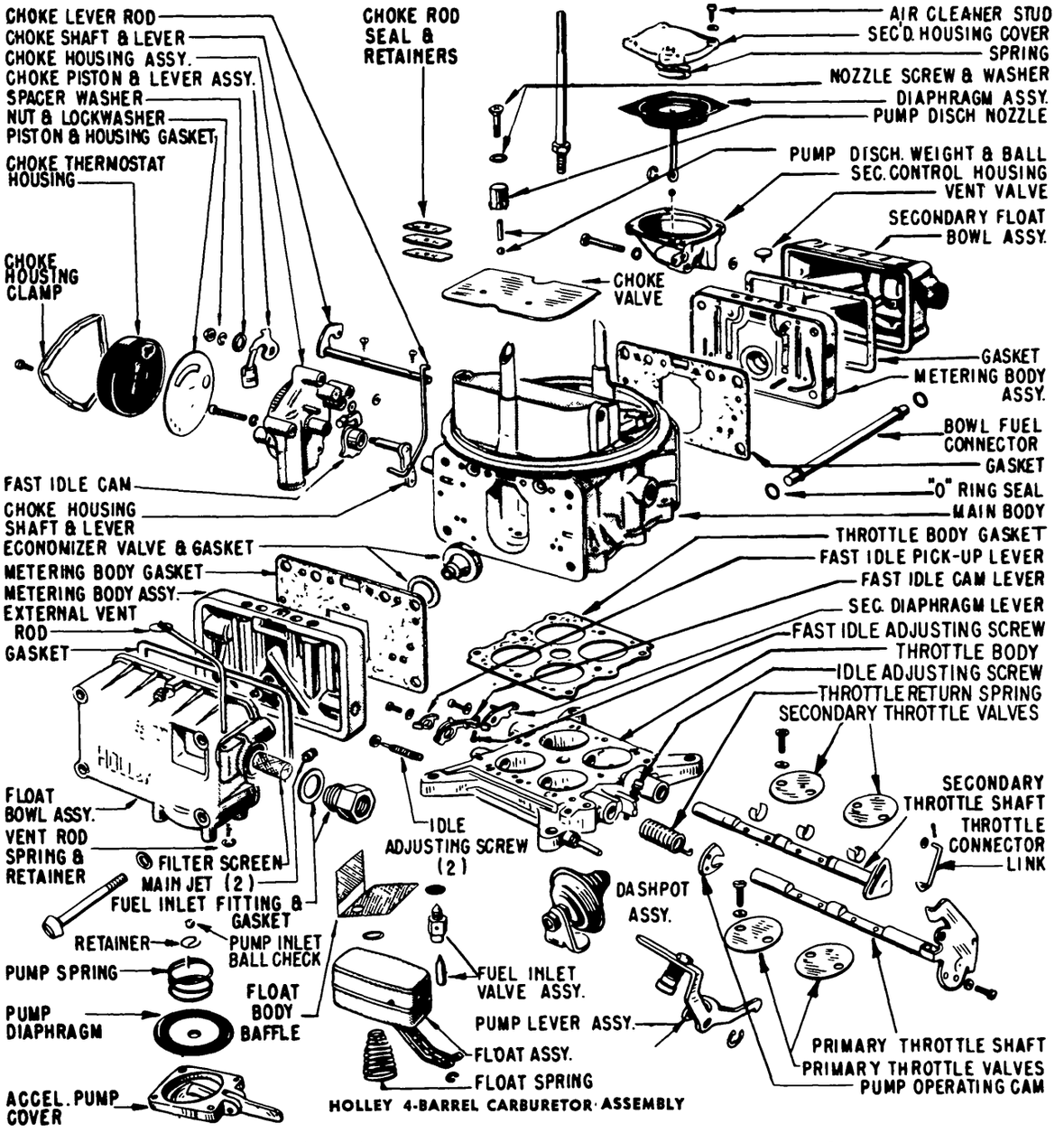
6) Remove dashpot assembly (if so equipped), then remove pump operating lever retainer and pump operating lever. Remove secondary throttle connecting rod and washer. Remove secondary diaphragm lever assembly. Remove fast idle pickup lever and fast idle cam lever and spring. If it is necessary to remove throttle valves, lightly scribe valves along throttle shaft and mark each valve and its corresponding bore with a number or letter for proper installation then remove throttle plates. On the secondary side, remove the two throttle connecting rod retainers and washer. Slide throttle shafts out of throttle body. On primary throttle shaft, remove the throttle connecting rod and return spring.

Cleaning & Insp cti n (All Carbs.): Wash all parts except those noted below in clean solvent. *(CAUTION - Do not us solvent on accelerating pump diaphragm, power valve, secondary operating diaphragm, and dashpot).* Blow out passages in casting with air. Inspect all parts for wear or damage, with particular attention to the following: Inspect castings and main body cover for cracks or leaks, inspect main well tubes, metering jets and idle tubes for wear or clogged passages. *(CAUTION - Clean with air, do not use drills to clean calibrated openings).* Replace all worn or damaged parts.

R ass mbly (2 & 4-Barr l Carbs.): Use all NEW gaskets. Install parts in reverse order of disassembly procedure (above) and note the following important points.

Balance Tube (1960 Ford Truck & Dodge 4-Barrel Carbs.) - Install balance tube, "O" rings and washers so balance tube protrudes 1" from face of secondary metering body (Dodge). On Ford Trucks the balance

CONTINUED ON NEXT PAGE



HOLLEY 4-BARREL CARBURETOR ASSEMBLY

HOLLEY 2 & 4-BARREL CARBURETORS (C ntinu d)

tube should protrude equally from faces of primary and secondary metering bodies.

Throttle Valve Installation - Refer to line scribed on throttle valve at disassembly, and install valves in their proper location with the screws snug, but not tight. Little or no light should show between throttle valves and throttle bores. Tap valves lightly to seat them, then tighten the screws.

Accelerating Pump Ball Check - Seat ball with a brass drift and a light hammer. Make sure ball is free, then proceed with reassembly.

Seconadary Diaphragm Housing (4-Barrel Carbs.) - Install secondary diaphragm housing before installing the choke housing.

Carburet r Adjustm nts - Make all adjustments indicated. *S e "Adjustments" above.*

SERVICE PARTS: Gasket Sets - Ford Part No. B7A-9502-B B7A-9510-F,G,K,R,S,T, B8A-9510-D,G,H, B7T-9510-D, B7J-9510-A,B, B8C-9510-A); No. B8A-9502-F (B7A-9510-AA,AB,B8A-9510-R,S); No. B9A-9502-A (B9C-9510-C,D, COTE-9510-C,D,E); No. B9A-9502-F (B9AE-9510-B); No. B7A-9502-A (B7T-9510-A); No. B7A-9502-C (B7A-9510-H,U); No. B7A-9502-G (B7A-9510-P); No. B8A-9502-A (B8A-9510-C); No. B 8A-9502-G (B8A-9510-T); No. B7T-9502-A (B7T-9510-C, B8T-9510-A); No. B9T-9502-A (B9T-9510-A, B9TE-9510-L); No. C1TZ-9502-A (COTE-9510-A), Mercury Part No. 59MK-9502-D (B9ME-9510-A); No. B9A-9502-A (COME-9510-A, F); No. MJK-9502-A (EDG-9510-A,C,D,E). Edsel Part No. 59MK-9502-D (PB9E-9510-F).

Repair Kits - Ford Part No. B7A-9590-B (B7A-9510-AA, F, R, B7T-9510-A); No. B7A-9590-C (B7A-9510-AB, G, S, T); No. B8A-9590-C (B8A-9510-G, H); No. B8A-9590-M (B8A-9510-R, B9AE-9510-B); No. B8A-9590-N (B8A-9510-D,S); No. B8A-9590-D (B8A-9510-D); No. B7A-9590-P (B7T-9510-D, B7J-9510-B); No. B8C-9590-A (B8J-9510-A, B8C-9510-A); No. B9T-9590-A (B9C-9510-C); No. COTZ-9590-A (COTE-9510-C,D,E); No. COAZ-9590-L (COAE-9510-AA); No. B7A-9590-F(B7A-9510-H); No. B7A-9590-L (B7A-9510-P); No. B7A-9590-D (B7A-9510-U); No. B8A-9590-A (B8A-9510-C); No. B8A-9590-P (B8A-9510-T); No. B7T-9590-AA (B7T-9510-A,C); No. B9T-9590-AA (B9T-9510-A, B9TE-9510-L, COTE-9510-F). Mercury Part No. MJK-9590-A (EDG-9510-C,D,E); No. MJK-9590-B (EDJ-9510-A); No. 59K-9590-A (B9ME-9510-A); No. COMY-9590-A (COME-9510-A,F).

HOLLEY TRIPLE CARBURETORS

MERCURY (1958)	Carburetor No.
Front	5750613
Center	5750614
Rear	5750613

DESCRIPTION: Three Holley 2-Barrel Downdraft carburetors mounted in line on a special intake manifold are used, with the center carburetor having all the conventional carburetion circuits (Float, Idle, Power, Pump, and Choke). The front and rear carburetors have only a float circuit (fuel supply), power circuit, and a pre-calibrated non-adjustable idle metering system which supplies a portion of the idle fuel mixture required by the engine. Both the front and rear carburetors are operated by an externally mounted vacuum diaphragm assembly and connecting linkage. Vacuum for operation of front and rear carburetors originates in the right venturi of the center carburetor. Front and rear carburetors are also linked mechanically to the center carburetor and to each other for synchronization of operation. The linkage connecting the three carburetors moves in a slot in throttle lever on center carburetor which allows throttle valves in center carburetor to open without actuating front and rear carburetors except at wide open throttle.

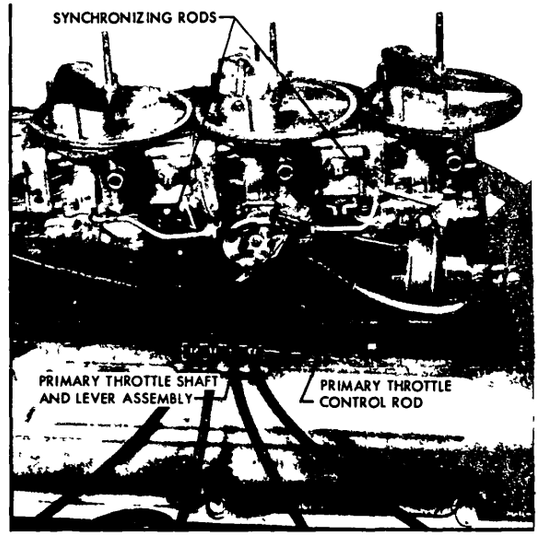
ADJUSTMENTS (ON CAR): All adjustments are made on the center carburetor. *NOTE - It is important that all adjustments be made in the order indicated. If one of the idle adjustments is changed, other adjustments may be affected and should be checked.*

Idle Mixture Initial Adjustment: Turn each idle mixture screw in until it just touches seat, then back each screw out 1¼ turns.

Idle Mixture: With engine at normal operating temperature, turn fast idle speed adjusting screw out so it does not touch fast idle cam, then disconnect throttle linkage at both the front and rear carburetor (to make sure throttle valves are completely closed). Adjust engine idle speed to 500-525 RPM (transmission in neutral) with idle adjusting screw (throttle stopscrew). Turn one idle mixture screw in until engine begins to run rough, then back out same idle mixture screw until engine begins to "roll". Turn same idle mixture screw in just enough for smooth engine idle. Repeat this operation with other idle mixture screw. *NOTE - Final adjustment of idle mixture screws should favor "rich" side of mixture range.* If engine idle speed has changed, reset to 500-525 RPM with idle speed screw (throttle stopscrew), then adjust each idle mixture screw 1/8 turn in either direction for smoothest idle

Idle Speed (Hot Engine): 450 RPM (Automatic Trans.) with transmission in "Cruising Range". 500-525 RPM (Synchro-mesh Trans.). *NOTE - After idle mixture adjustment made, place transmission in "Cruising Range" (Automatic Trans.) and momentarily open throttle slightly and allow throttle to close. Engine idle should be approximately 450 RPM. If not adjust with idle speed adjusting screw (throttle stopscrew).*

Fast Idle (Cold Engine): With fast idle adjusting screw on high step of fast idle cam, adjust fast idle screw as required to obtain an engine speed of 1800 RPM.



CARBURETOR INSTALLATION — LEFT SIDE

Throttle Synchronizer Rod Adjustm nt: With throttle linkage disconnected at front and rear carburetors, loosen locknut on front synchronizer rod. Hold throttle of center carburetor in which open position, and hold throttle of front carburetor completely closed. Adjust synchronizer rod length so the end can be inserted in attaching hole in front carburetor throttle lever. **Sh rt n front synchronizer rod three c mpl te turns.** Install retaining clip on front carburetor throttle lever and connect synchronizer rod. Tighten locknut on rod. Loosen locknut on rear carburetor synchronizer rod, then hold throttle valves completely closed in both front and rear carburetors. Adjust length of rear carburetor synchronizer rod so the end can be inserted in rear carburetor throttle lever. Install retaining clip on throttle lever and connect synchronizer rod. Tighten locknut on rod. Hold center carburetor throttle wide open, then manually open and close front and rear carburetor throttles several times to assure free movement of linkage throughout entire length of slot in center carburetor throttle lever.

Dashpot: With idle mixture, idle speed and fast idle speed adjustments completed, loosen dashpot locknut. Hold dashpot plunger to limit of its travel, then rotate dashpot to obtain .067" clearance between dashpot plunger and center carburetor throttle lever. Use Gauge T109-234 (Mercury Tool 9545-B). Be sure throttle valve is closed so fast idle screw is against stop. Tighten locknut and recheck clearance.

REMOVAL: Remove each carburetor in the usual manner, starting with the front carburetor. *NOTE - This is necessary because of air cl aner flang ov rlapping fuel bowl on adjacent carbur tor.*

INSTALLATION: Reverse removal procedure, starting with rear carburetor. Alternately tighten each mounting nut, in a criss-cross pattern, to 12-15 ft. lbs.

OVERHAUL: Center Carburetor - *See "Holl y 2 & 4-Barr l Carbur tors".*

Fr nt & Rear Carbur tors: Except for removal & installation of parts not used on these carburetors, overhaul procedure is the same as for center carburetor.

1957 HOLLEY 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Venturi Assy. Part No.
FORD V8 Cars								
272" Eng. S.M. & O.D.	1957	B7A-9510-F	.052"	86H-9533 (1)	B7A-9511-B	B7A-9904-B (5)	B7A-9577-D (2)	(7)
272" Eng. S.M. & O.D.	1957	B7A-9510-R	.052"	86H-9533 (1)	B7A-9511-B	B7A-9904-B (5)	B7A-9577-D (2)	(7)
272" Eng. S.M. & F/M	1957	B7A-9510-AA	.049"	59A-9533-B (3)				(7)
292" Eng. S.M. & O.D.	1957	B7A-9510-G	.053"	B4T-9533-B (4)	B7A9511-C	B7A-9904-B (5)	B7A-9577-D (2)	(7)
292" Eng. S.M. & O.D.	1957	B7A-9510-S	.053"	B4T-9533-B (4)	B7A-9511-C	B7A-9904-B (5)	B7A-9577-D (2)	(7)
292" Eng. S.M. & O.D.	1957	B7A-9510-AB	.050"	78-9533-A (6)				(7)
292" Eng. Fordomatic	1957	B7A-9510-K	.057"	26H-9533 (13)	B7A-9511-D	B7A-9904-B (5)	B7A-9577-D (2)	(7)
292" Eng. Fordomatic	1957	B7A-9510-T	.057"	26H-9533 (13)	B7A-9511-D	B7A-9904-B (5)	B7A-9577-D (2)	(7)
312" Eng. S.M. & F/M	1957	B7A-9510-H Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		B7A-9510-H Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
312" Eng. S.M. & F/M	1957	B7A-9510-U Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		B7A-9510-U Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
FORD V8 Trucks								
ECY-272 (Par. Del.)	1957	B7J-9510-A	.052"	86H-9533 (1)	B7T-9511-A	B7A-9904-B (5)	B7A-9577-D (2)	(7)
ECY-272 (Others)	1957	B7T-9510-A	.052"	86H-9533 (1)	B7T-9511-A	B7A-9904-B (5)	B7A-9577-D (2)	(7)
ECR-272	1957	B7T-9510-C Pri.	.051"	59A-9533-A (11)	B7T-9511-B	B7A-9904-B (5)	B7A-9577-B	(7)
		B7T-9510-C Sec.	.062"	1GA-9533-B (12)	B7T-9513-A			(7)
MERCURY								
312" Eng. S.M.	1957	ECZ-9510-Y Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		ECZ-9510-Y Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
312" Eng. S.M.	1957	ECZ-9510-AD Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		ECZ-9510-AD Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
312" Eng. Auto. Trans.	1957	ECZ-9510-V Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		ECZ-9510-V Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
312" Eng. Auto. Trans.	1957	B7A-9510-U Pri.	.055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		B7A-9510-U Sec.	.048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)

(1)- Use 78-9533-A (.050") 5,000 to 10,000 ft. Alt.
Use 78-9533-B (.048") 10,000 to 15,000 ft. Alt.

(2)- Stamped No. 28.

(3)- Use 59A-9533-C (.047") 5,000 to 10,000 ft. Alt.
Use 59A-9533-D (.045") 10,000 to 15,000 ft. Alt.

(4)- Use 59A-9533-A (.051") 5,000 to 10,000 ft. Alt.
Use 59A-9533-B (.049") 10,000 to 15,000 ft. Alt.

(5)- Stamped No. 85.

(6)- Use 78-9533-B (.048") 5,000 to 10,000 ft. Alt.
Use 78-9533-C (.046") 10,000 to 15,000 ft. Alt.

(7)- Part of Main Body Assembly.

(8)- Use B4T-9533-B (.053") 5,000 to 10,000 ft. Alt.
Use 86H-9533 (.052") 10,000 to 15,000 ft. Alt.

(9)- All altitudes.

(10)- Stamped No. 105.

(11)- Use 59A-9533-B (.049") 5,000 to 10,000 ft. Alt.
Use 59A-9533-C (.047") 10,000 to 15,000 ft. Alt.

(12)- Use 1GA-9533-C (.060") 5,000 to 10,000 ft. Alt.
Use 78-9533-F (.058") 10,000 to 15,000 ft. Alt.

(13)- Use B4T-9533-A (.055") 5,000 to 10,000 ft. Alt.
Use B4T-9533-B (.053") 10,000 to 15,000 ft. Alt.

1958 HOLLEY 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.	Venturi Assembly Part No.
EDSEL								
361" Eng.S.M. & O.D.	1958	B8E-9510-A Pri.	.057"	26H-9533	B8E-9511-A	B8A-9904-A	B8A-9577-A	(7)
		B8E-9510-A Sec.	.063"	5GA-9533-B	B8A-9513-A			(7)
410" Eng.	1958	B8F-9510-B Pri.	.062"	1GA-9533-B	B8E-9511-B	B8A-9904-A	B8A-9577-A	(7)
		B8E-9510-B Sec.	.063"	5GA-9533-B	EDJ-99953-A			(7)
FORD V8 CARS								
292" Eng. S.M. (Early)	1958	B8A-9510-H	049"	59A-9533-B (14)	B8A-9511-C	B7T-9904-A (15)	B8A-9577-B	(7)
292" Eng. S.M. (Later)	1958	B8A-9510-R	.049"	59A-9533-B	B8A-9511-C	B7T-9904-A (15)	B8A-9577-B	(7)
292" Eng. Auto. Trans.	1958	B8A-9510-G	.049"	59A-9533-B	B8A-9511-C	B7T-9904-A (15)	B7A-9577-D (2)	(7)
332" Eng. (Early)	1958	B8A-9510-D	.056"	78-9533-E	B8A-9511-B	B7T-9904-A (15)	B8A-9577-A	(7)
332" Eng. (Later)	1958	B8A-9510-S	.056"	78-9533-E	B8A-9511-B	B7T-9904-A (15)	B8A-9577-A	(7)
332" Eng. (Early)	1958	B8A-9510-C Pri.	.056"	78-9533-E (16)	B8A-9511-A	B8A-9904-C	B8A-9577-A	(7)
		B8A-9510-C Sec.	.062"	1GA-9533-B (9)	B8A-9513-B			(7)
332" Eng. (Later)	1958	B8A-9510-T Pri.	.056"	78-9533-E	B8A-9511-D	B7T-9904-A (15)	B8A-9577-A	(7)
		B8A-9510-T Sec.			B8A-9513-C (17)			(7)

(2) - Stamped No. 28.
(7) - Part of Main Body Assembly
(9) - All altitudes

(14)- Use 78-9533-B (.048") 5,000 to 10,000 ft Alt.
Use 59A-9533-C (047") 10,000 to 15,000 ft. Alt.

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(16)- Use B4T-9533-A (.055") 5,000 to 10,000 ft Alt
Use B4T-9533-B (.053") 10,000 to 15,000 ft Alt

(15)- Stamped No. 65

(17)- Stamped 2007-3.

1958 HOLLEY 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carburetor	Main Metering Jet Size	Main Metering Jet Part No	Metering Block Assy Part No	Economizer Assembly Part No.	Pump Nozzle Part No	Venturi Assembly Part No.
FORD V8 TRUCKS								
272" M D Eng (Par Del)	1958	B7J-9510-B	050"	78-9533-A (18)	B7T-9511-C	B7T-9904-A (19)	B7A-9577-D	(7)
272" M D Eng (Others)	1958	B7T-9510-D	050"	78-9533-A (18)	B7T-9511-C	B7T-9904-A (19)	B7A-9577-D	(7)
292" M D Eng (Par Del)	1958	B8J-9510-A	057"	26H-9533	B8C-9511-A	B8A-9904-C	B8A-9577-A	(7)
292" M D Eng (Others)	1958	B8C-9510-A	057"	26H-9533	B8C-9511-A	B8A-9904-C	B8A-9577-A	(7)
272" H D Eng	1958	B7T-9510-C Pri	051"	59A-9533-A (20)	B7T-9511-B (22)	B7A-9904-B (19)	B8A-9577-A	(7)
		B7T-9510-C Sec	062"	1GA-9533-B (21)	B7T-9513-A (23)			(7)
292" H D Eng	1958	B8T-9510-A Pri	052"	86H-9533	B8T-9511-A	B8C-9904-A	B8A-9577-A	(7)
		B8T-9510-A Sec	062"	1GA-9533-B	B8Q-9513-A			(7)
LINCOLN								
All Models (Early)	1958	EDJ-9510-A Pri	067"	B4C-9533-A	EDJ-99952-A	EDJ-9904-A	EDJ-9577-A	(7)
		EDJ-9510-A Sec		EDJ-9533-A	EDJ-99953-A			(7)
All Models (Later)	1958	5750897 Pri	065"	5GA-9533-A (24)		5751306 (9)		(7)
		5750897 Sec			(25)			(7)
MERCURY								
312" Eng	1958	5751095	049"	(26)		B7T-9904-A (15)		(7)
312" Eng (Optl)	1958	B7A-9510-U Pri	055"	B4T-9533-A (8)	B7A-9511-A	B7A-9904-B (5)	B7A-9577-B	(7)
		B7A-9510-U Sec	048"	78-9533-B (9)	B7A-9513-A	B7A-9904-D (10)		(7)
383" Eng S M (Early)	1958	EDG-9510-C Pri	052"	86H-9533 (27)	5750137	EDJ-9904-A	EDJ-9577-A	(7)
		EDG-9510-C Sec	059"	B4Q-9533-B (9)	EDJ-99953-A			(7)
383" Eng S M (Later)	1958	5750890 Pri	052"	86H-9533 (27)		EDJ-9904-A		(7)
		5750890 Sec			B8A-9513-C (17)			(7)
383" Auto Trans (Early)	1958	EDG-9510-E Pri	052"	86H-9533 27	5750137	EDJ-9904-A	EDJ-9577-A	(7)
		EDG-9510-E Sec	059"	B4Q-9533-B (9)	EDJ-99953-A			(7)
383" Auto Trans (Early)	1958	EDG-9510-D Pri	062"	1GA-9533-B (28)	EDG-99952-A	EDJ-9904-A	EDJ-9577-A	(7)
		EDG-9510-D Sec	068"	8MB-9533-A (9)	EDG-99953-A			(7)
383" Auto Trans (Later)	1958	5750891 Pri	052"	86H-9533 (27)		EDJ-9904-A		(7)
		5750891 Sec			B8A-9513-C (17)			(7)
383" Auto Trans (Later)	1958	5750898 Pri	062"	1GA-9533-B (28)		EDJ-9904-A		(7)
		5750898 Sec			(29)			(7)
430" Eng (Early)	1958	EDJ-9510-A Pri	065"	5GA-9533-A (24)	EDJ-99952-A	EDJ-9904-A	EDJ-9577-A	(7)
		EDJ-9510-A Sec	071"	5750103 (30)	EDJ-99953-A			(7)
430" Eng (Later)	1958	5750897 Pri	065"	5GA-9533-A (24)		5751306 (9)		(7)
		5750897 Sec			(25)			(7)

(5) Stamped No 85
(7) - Part of Main Body Assembly
(8) - Use B4T-9533-B (053") 5 000 to 10,000 ft Alt
Use 86H-9533 (052") 10,000 to 15,000 ft Alt
(9) - All altitudes (10) - Stamped No 105
(15) - Stamped No 65
(17) - Stamped 2007-3
(18) - Use 78-9533-B (048") 5,000 to 10,000 ft Alt
Use 78-9533-C (046") 10,000 to 15,000 ft Alt
(19) - 0 to 5,000 ft Alt only
(20) - Use 59A-9533-B (049") 5,000 to 10,000 ft Alt
Use 59A-9533-C (047") 10,000 to 15,000 ft Alt
(21) - Use 1GA-9533-C (060") 5,000 to 10,000 ft Alt
Use 78-9533-F (058") 10,000 to 15,000 ft Alt
(22) - Stamped 1770 (23) - Stamped 1774
(24) - Use 5GA-9533-B (063") 5,000 to 10,000 ft Alt
Use B4Q-9533-A (061") 10,000 to 15,000 ft Alt
(25) - Stamped 2007-9
(26) - Use No 48 5,000 to 10,000 ft Alt
Use No 47 10,000 to 15,000 ft Alt
(27) - Use 78-9533-A (050") 5,000 to 10,000 ft Alt
Use 59A-9533-B (049") 10,000 to 15,000 ft Alt
(28) --Use 1GA-9533-C (060") 5,000 to 10,000 ft Alt
Use B4Q-9533-B (059") 10,000 to 15,000 ft Alt
(29) - Stamped 2007-5
(30) - Use 5750103 (071") 5,000 to 10,000 ft Alt
Use B7T-9533-A (069") 10,000 to 15,000 ft Alt

1958-59 HOLLEY (RAMBLER) 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Venturi Assy. Part No.
RAMBLER 5820 (Early)	1958	R-1748A Pri	049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	(7)
		R-1748A Sec	035"	22R-40-35	34R-1942A			(7)
5820, 5920	1958-59	R-1748-1 Pri	049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	(7)
		R-1748-1 Sec	035"	22R-40-35	34R-1942A			(7)
5880 (Early)	1958	R-1312A Pri	049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	(7)
		R-1312A Sec	035"	22R-40-35	34R-1942A			(7)
5880, 5980	1958-59	R-1312-1 Pri	049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	(7)
		R-1312-1 Sec	035"	22R-40-35	34R-1942A			(7)

►PART NOS. FOR RAMBLER ARE HOLLEY NUMBERS

(7) - Part of Main Body Assembly

1959 HOLLEY 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.	Venturi Assembly Part No.
EDSEL V8							
332 Eng. S.M. 1959	PB9E-9510-F	.052"	86H-9533 ①	B9AE-9A511-B	B7T-9904-A ⑦	B8A-9577-B	②
FORD V8 CARS							
292 Eng. with Gov 1959	B9AE-9510-B	.052"	86H-9533 ①	B9AE-9A511-D	B7T-9904-A ⑦	B8A-9577-B	②
332 Eng. Auto. Trans. 1959	B9A-9510-D	.052"	86H-9533 ①	B9AE-9A511-B ⑥	B7T-9904-A ⑦	B8A-9577-B	②
FORD V8 TRUCKS							
292 Eng. 1959	B9C-9510-C	.058"	78-9533 ③	B9TE-9A511-G ⑧	B7T-9904-A ⑦	B8A-9577-A	②
292 Eng. (Early) 1959	B9T-9510-A Pri.	.052"	86H-9533 ④	B9TE-9A511-C ⑨	B8C-9904-A	B8A-9577-A	②
	B9T-9510-A Sec..	.060"	1GA-9533-C ⑤	B9TE-9A511-C ⑨	.....	.....	②
292 Eng. (Late) 1959	B9TE-9510-L Pri.	.052"	86H-9533 ④	B9TE-9A511-C ⑨	B8C-9904-A	B8A-9577-A	②
	B9TE-9510-L Sec.	.060"	1GA-9533-C ⑤	B9TE-9A511-C ⑨	.....	.....	②
MERCURY V8							
312" Eng. 1959	B9ME-9510-A	.054"	06H-9533 ⑩	B9ME-9A511-A	B7T-9904-A ⑪	B8A-9577-B	②

① - Use 78-9533-A (.050") 5000 to 10000 ft. Alt. Use 78-9533-B (.048") 10000 to 15000 ft. Alt.

② - Part of Main Body Assembly.

③ - Use 78-9533-E (.056") 5000 to 10000 ft. Alt. Use 06H-9533 (.054") 10000 to 15000 ft. Alt.

④ --Use 78-9533-A (.050") 5000 to 10000 ft. Alt. Use 78-9533 (.048") 10000 to 15000 ft. Alt.

⑤ - Use 78-9533-F (.058") 5000 to 10000 ft. Alt. Use 78-9533-E (.056") 10000 to 15000 ft. Alt.

⑥ - Stamped 2633.

⑦ - Stamped 65.

⑧ - Stamped 2562.

⑨ - Stamped 2547.

⑩ - Use 86H-9533 (.052") 5000 to 10000 ft. Alt. Use 78-9533-A (.050") 10000 to 15000 ft. Alt.

⑪ - Use B9TE 9A565-A 10000 to 15000 ft. Alt.

1960 HOLLEY 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assembly Part No.	Pump Nozzle Part No.	Venturi Assembly Part No.
FORD V8 PASS. CARS							
352" Pol. & Spec. 1960	COAE-9510AA Pri.	.064"	1GA-9533-A	.....	.....	.....	②
	COAE-9510AA Sec.	.064"	1GA-9533-A	.....	.....	.....	②
FORD V8 TRUCKS							
292" Eng. (S.M.) ⑫ 1960	COTE-9510-C	.050"	78-9533-A ⑯	COTE-9A511-D ⑰	B7T-9904-A	B8A-9577-B	②
292" Eng. (A.T.) ⑬ 1960	COTE-9510-D	.050"	78-9533-A ⑯	COTE-9A511-D ⑰	B7T-9904-A	B8A-9577-B	②
292" Eng. (S.M.) ⑭ 1960	COTE-9510-E	.050"	78-9533-A ⑯	COTE-9A511-D ⑰	B7T-9904-A	B8A-9577-B	②
292" Eng. (H.D.) 1960	COTE-9510-F Pri.	.050"	78-9533-A ⑯	B9TE-9A511-C ⑨	B8C-9904-A	B8A-9577-A	②
	COTE-9510-F Sec.	.058"	78-9533-F ③	B9TE-9A513-A	.....	.....	②
MERCURY							
312" Eng. (All) Early 1960	B9ME-9510-A	.054"	06H-9533 ⑩	B9ME-9A511-A	B7T-9904-A ⑮	B8A-9577-B	②
312" Eng. (All) Late 1960	COME-9510-A	.053"	B4T-9533-B	COME-9A511-B	B7T-9904-A ⑮	B8A-9577-B	②
312" Eng. (S.M.) 1960	COME-9510-F	.053"	B4T-9533-B	COME-9A511-B	B7T-9904-A ⑮	B8A-9577-B	②

② - Part of main body assembly

③ - Use 78-9533-E (.056") 5000-10000 ft. Alt. Use 06H-9533 (.054") 10000-15000 ft. Alt.

⑨ - Stamped 2547.

⑩ - Use 86H-9533 (.052") 5000-10000 ft. Alt. Use 78-9533-A (.050") 10000-15000 ft. Alt.

⑫ - "B" & "F" Series

⑬ - "B", "F" & "P" Series

⑭ - "P" Series.

⑮ - 0-10000 ft. Alt.

⑰ - Stamped 2908.

⑯ - Use 78-9533-B (.048") 5000-10000 ft. Alt. Use 78-9533-C (.046") 10000-15000 ft. Alt.

FOR RAMBLER JETS SEE PAGE 1615 (1959) 1617 (1960)

1960 HOLLEY (RAMBLER) 2 & 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Size	Main Metering Jet Part No.	Metering Block Assy. Part No.	Economizer Assy. Part No.	Pump Nozzle Part No.	Venturi Assy. Part No.
DODGE								
383" Eng.(Synchro-mesh)	1960	R2052A (Pri.)	.061"	22R-40-61	34R-2834A	25R-237A-65	21R-529A-25	℄
		R2052A (Sec.)			34R-2782-3			℄
383" Eng.(Auto. Trans.)	1960	R1971A (Pri.)	.060"	22R-40-60	34R-2834A	25R-237A-65	21R-529A-31	℄
		R1971A (Sec.)			34R-2834-3			℄
RAMBLER								
6020 & 6080 Series	1960	2040A	.050"	22R-40-50	34R-2813A	25R-237A-85	21R-572-21	℄
6020 Series (Early)	1960	1958 (Pri.)	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	℄
		1958 (Sec.)	.035"	22R-40-35	34R-1942A			℄
6020 Series (Late)	1960	1958-1 (Pri.)	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	℄
		1958-1 (Sec.)	.035"	22R-40-35	34R-1942A			℄
6080 Series (Early)	1960	1957 (Pri.)	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	℄
		1957 (Sec.)	.035"	22R-40-35	34R-1942A			℄
6080 Series (Late)	1960	1957-1 (Pri.)	.049"	22R-40-49	34R-1940A	25R-237A-85	21R-572-21	℄
		1957-1 (Sec.)	.035"	22R-40-35	34R-1942A			℄

℄ - Part of Main Body Assembly.

HOLLEY (FORD) DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Model	Main Metering Jet Size	Main Metering Jet Part No.	Main Discharge Nozzle Part Number Left Hand	Main Discharge Nozzle Part Number Right Hand	Nozzle Air Bleed Plug Part No.	Economizer Assembly Part No.	Idl Tube Part No.	Pump Nozzle Part No.
FORD V8 All	1954	EBU-9510-E	.056"	78-9533-E㊵	B4A-9921-A	B4A-9920-A		78-9904⑲	EBU-9542-B	EBU-9577-A
FORD V8 Trk. (239 Eng.)	1954	EBV-9510-H	.057"	26H-9533㊶	B4A-9921-A	B4A-9920-A		78-9904⑲⑥	EBU-9542-B	EBU-9577-A
FORD V8 Trk. (256 Eng.)	1954	EBZ-9510-C	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 Repl.	1954	B4T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 Std. Tr.	Early 1955	B5A-9510-J	.059"	B4Q-9533-B㊻	B5A-9921-A	B5A-9920-A		78-9904⑲	B5A-9542-B	EBU-9577-A
FORD V8 Auto. Tr.	Early 1955	B5A-9510-K	.059"	B4Q-9533-B㊻	B5A-9921-A	B5A-9920-A		78-9904⑱	B5A-9542-B	EBU-9577-A
FORD V8 All	Late 1955	B5A-9510-B	.057"	26H-9533㊶					㊾	㊿
FORD V8 Repl.	1955	B5A-9510-P	.057"	26H-9533㊶	B5A-9921-D	B5A-9920-D		78-9904⑲	B5A-9542-C	EBU-9577-A
FORD V8 Trk. (239 Eng.)	1955	EBV-9510-H	.057"	26H-9533㊶	B4A-9921-A	B4A-9920-A		78-9904⑲⑥	EBU-9542-B	EBU-9577-A
FORD V8 (256 Eng.)	Early 1955	B4T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 (256 Eng.)	Late 1955	B5T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㊽	8CM-9542	
FORD V8 Std. Tr.	1956	B6A-9510-J	.052"	86H-9533⑨	B6A-9921-B	B6A-9920-C		78-9904	B6A-9542-A	B5A-9577-A
FORD V8 Auto. Tr.	1956	B6A-9510-K	.052"	86H-9533⑨	B6A-9921-B	B6A-9920-C		78-9904	B6A-9542-A	B5A-9577-A
FORD V8 Trk.	1956	B6Y-9510-A	.055"	B4T-9533-A	B6A-9921-B	B6A-9920-C		78-9904	B6A-9542-A	EAB-9577-A
FORD V8 Trk.	1956	B6C-9510-A	.055"	B4T-9533-A	B6A-9921-B	B6A-9920-C		78-9904	B6A-9542-A	EAB-9577-A
FORD V8 Trk.	1957	B7C-9510-A	.054"	06H-9533⑩	B6C-9921-A	B6C-9920-A		78-9904	B6A-9542-A	EAB-9577-A
FORD V8 Trk.	1957	B7C-9510-B	.054"	06H-9533⑩	B6C-9921-A	B6C-9920-A		78-9904	B6A-9542-A	EAB-9577-A

⑥—Power Jet B4C-9590-D (1954), B5C-9590-A (1955).
⑨—Use No. 78-9533-A (.050") for 5000-10000 ft. altitude.
Use No. 78-9533-B (.048") for 10000-15000 ft. altitude.
⑩—Use 86H-9533 (.052") for 5,000-10,000 ft. altitudes.
Use No. 78-9533-A (.050") for 10000-15000 ft. altitude.
㉕—Power Jet B4T-9590-B.
㊵—Use .054" jet for 5,000-10,000 ft. altitudes.
Use .052" jet for 10,000-15,000 ft. altitudes.
㊶—Use B4T-9533-A (.055") for 5,000-10,000 ft. altitudes.
Use B4T-9533-B (.053)" for 10,000-15,000 ft. altitudes.
㊷—Use B4T-9533-B (.053") for 5,000-10,000 ft. altitudes.
Use 59A-9533-B (.051") for 10,000-15,000 ft. altitudes.
㊸—Main Well Tube Assy. B4T-9991-A.
㊻—Use 26H-9533 (.057") for 5,000-10,000 ft. altitudes.
Use B4T-9533-A (.055") for 10,000-15,000 ft. altitudes.
㊽—Power Jet No. B5T-9590-A.
㊾—Stamped "84" for identification.
㊿—Nozzles stamped "68" or "70" both used.

HOLLEY (FORD) V-8

FORD V8 PASS. CARS	Ford Part No.
1954 (All Models)	EBU-9510-E
1955 (Synchro-mesh)	B5A-9510-J
1955 (Fordomatic)	B5A-9510-P
1956 (Synchro-mesh)	B6A-9510-J
1956 (Fordomatic)	B6A-9510-K

FORD V8 TRUCKS	
1954 239" Eng.	FBV-9510-H
1955 239" Eng.	FBV-9510-H
1956 272" Eng ℂ (Synchro-mesh)	B6Y-9510-A
1956 272" Eng ℂ (Fordomatic)	B6C-9510-C
1957 F-100, 250, 350 (Synchro-mesh)	B7C-9510-A
1957 F-100, 250, 350 (Fordomatic)	B7C-9510-B

ℂ - 272" ECW-Y Engine

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 V8 239" ENGINE CARBURETOR PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* Later carburetors (identified by "2" stamped on mounting flange opposite throttle lever) have different Nozzle Bars with bleed hole in idle crossover passage drilled through one wall only (nozzle bars on early carburetors have bleed hole drilled through both walls) Repair Kit, B4A-9590-F has two sets of Idle Jets and correct type should be used for each carburetor as follows **Early Carburetors** - Use Jet No EBU-9542-B (stamped "68") **Later Carburetors** - Use Jet No B4A-9542-A (stamped "54") below *See recommended correction following.*

►*1954 V8 239" ENGINE CARBURETOR STALLING CORRECTION & IMPROVED ECONOMY: See Production above.* To correct stalling on early carburetors, install new nozzles furnished in Nozzle Bar Replacement Kit No. B4A-9920-D in conjunction with Repair Kit No. B4A-9590-F. *CAUTION - Use Idle Jets stamped "54" with thin wall nozzles.* To improve economy and correct stalling, on all carburetors, install new Throttle Body furnished in Throttle Body Replacement Kit No B4A-9518-B

►*1954 CARBURETOR IDLE ADJUSTING NEEDLE PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* Idle adjusting needle changed from 15° included angle tip to a 40° included angle tip New 40° needle can be used to replace former 15° needle in **pairs only.**

►*1956 HARD STARTING (272 Pass. Car Eng.)* New choke thermostat with new bi-metal spring, Ford No. B6A-9848 D (identification mark "56F1"), can be installed to replace choke thermostats with identification "56F" or "56D"

►*1956 ACCELERATOR PUMP PISTON ROD STICKING CORRECTION (272 Eng.)* When this rod sticks or binds, install new rod Ford No. B6A 9531-A, identified by deep blue color. Old rod was zinc plated. Free carburetor of burrs or foreign material when installing new rod.

►*HARD STARTING WHEN ENGINE HOT NOTE* Move pump link to shortest stroke position in throttle shaft plate.

►*HARD STARTING (Due to choke bind):* To correct binding condition check for bent choke shaft or shaft misaligned with choke plate on the choke shaft. If either condition found, replace air horn assembly. When choke plate operates hard manually and no binding exists, check automatic choke piston gasket. Slot must be properly aligned to permit choke plate to completely close.

►*1956 NOZZLE BAR CLEANING CAUTION:* Use only a solvent that will not affect rubber seals when cleaning bar assemblies.

DESCRIPTION

DESCRIPTION: Dual downdraft type with throttle operated accelerating pump and vacuum controlled economizer (power jet) 1954 and later models have a Spark Control Valve in throttle body consisting of a spring loaded diaphragm which controls opening of distributor advance control vacuum channel This valve remains open under normal operating conditions but closes under acceleration (with drop in manifold vacuum) cutting off manifold vacuum to distributor and retarding the spark advance The valve also closes when throttle is wide open

ADJUSTMENT

IDLING ADJUSTMENT

Idle Mixture - To start engine, turn screws in to bottom lightly, then turn screws out 1 turn. Run engine for 20 minutes at fast idle speed to bring it to normal operating temperature. Make sure fast idle cam is in slow position Turn each screw in equally until engine begins to run rough from lean mixture, then turn each screw out equally until engine begins to "roll" from rich mixture. Then turn each screw in an equal amount until engine runs smoothly. Always favor a rich mixture rather than a lean setting. *NOTE* - It may be necessary to reset idle speed after idle mixture adjusted.

Idle Speed Setting

Model	ℂ Idle Speed
1951 Synchro-mesh	475-500 RPM
1951-54 Fordomatic	440-460 RPM
1955 Fordomatic	450-475 RPM
1956-58 Fordomatic	475-500 RPM

ℂ - With transmission selector lever in "N" (Neutral)

►*1956-57 FORDOMATIC NOTE* After setting idle speed to correct specification (see above), with transmission in "N" (Neutral), place selector lever in "D" (Drive) and recheck idle speed Speed should be 425-450 RPM in "D" Readjust throttle stopscrew as necessary

ANTI-STALL DASHPOT

Setting - After idle speed adjusted (above), turn off ignition, loosen locknut on dashpot adjusting screw stud, turn screw out or counter clockwise until screw pushes dashpot rod up to the end of its travel, then turn screw in or clockwise 1½-2 turns and tighten locknut. This will provide correct clearance of .045-.064" between dashpot rod and adjusting screw (when rod bottomed in dashpot).

VACUUM SPARK CONTROL VALVE

No adjustment required Calibrating spring in valve is set to allow the valve to operate at 7-8" of manifold vacuum. If operation not satisfactory, remove and inspect valve for free movement of the valve stem and inspect passage in adapter screw.

ACCELERATING PUMP

Setting (Except B5A-9510-P, *See Note Below*) - Engage pump link in throttle shaft lever as follows Shortest stroke for hot weather, medium stroke for average conditions, and long stroke for cold weather operation.

►*B5A-9510-B CARBURETOR NOTE: The correct designation for this carburetor is B5A-9510-P.*

Setting (B5A-9510-P) - Accelerating pump links stamped "C" or "D" on side of body. Pump nozzles are identified by numerals "69" or "70" in top of nozzle. Set linkage as shown in table below.

B5A-9510-P Pump Setting

Transmission	Nozzle No.	Link Setting
Std & Overdrive	"69"	①#3 hole
Std & Overdrive	"70"	①#3 hole
Fordomatic	"69" or "70"	#2 hole

①—Farthest hole from shaft

ECONOMIZER (POWER VALVE)

Opens at 6-6½" (1951-54), 7.9-9.0" (1955-57) manifold vacuum No adjustment provided

FLOAT LEVEL

Fuel Level (1951-55) - Check fuel level with a sight indicator or other means Level should be 5/8"±1/32" below top edge of bowl.

Fuel Level (1956-57) - Install Tool T56L-9562-A in main jet plug holes. Operate engine at idle speed Fuel level should be at "LO" pins in gauge cap If not correct, remove carburetor air horn and set float level

Float Level - 1 275-1 305" (1951-55), 1.437-1.500" (1956-57) from lower face of bowl cover to bottom of float (at side of soldered seam) with needle valve closed To check float level, invert air horn and float assembly, place Float Gauge T52L-9510-AHD (1951-55), T56L-9550-A, (1956-57), squarely on gasket face of bowl cover with gauge leg extending over float adjacent to soldered seam *(CAUTION - Do not gauge top of seam)* "GO" end of gauge should just clear float. Adjust by bending tab on float arm which contacts intake needle *NOTE - Both ends of float should be gauged and adjusted for equal height.*

CONTINUED ON NEXT PAGE

HOLLEY (FORD) V-8 (C ntinu d)

OVERHAUL: Disassembly—Take out screw and flat washer attaching choke lever to air horn, remove lever, lift choke lever plunger and spring from air horn recess. Remove screw and washer attaching throttle kicker to main body, lift off throttle kicker and spring. Disconnect pump link from pump rod and throttle shaft lever and remove link. Take out throttle body attaching screws and remove throttle body gasket. Take out air horn attaching screws and remove air horn assembly and gasket.

Air Horn Disassembly—Take out float pivot shaft, remove float and inlet needle valve. Remove inlet needle valve seat. Do not remove choke valve unless parts replacement required. To remove valve, take out valve attaching screws, remove valve from shaft, slide choke shaft and lever assembly out.

Main Body Disassembly—Lift accelerating pump plunger assembly out. Remove attaching screws in each nozzle bar clamp, lift pump discharge nozzle and both nozzle bar assemblies out, remove gaskets. Invert body to drop out pump discharge needle. Remove access plugs and gaskets on side of body, use jet wrench T52L-9594-AAD to remove main metering jets. Remove pump inlet check ball retainer from bottom of pump cylinder, invert body to drop out the check ball. Remove idle jet tubes from both nozzle bar assemblies.

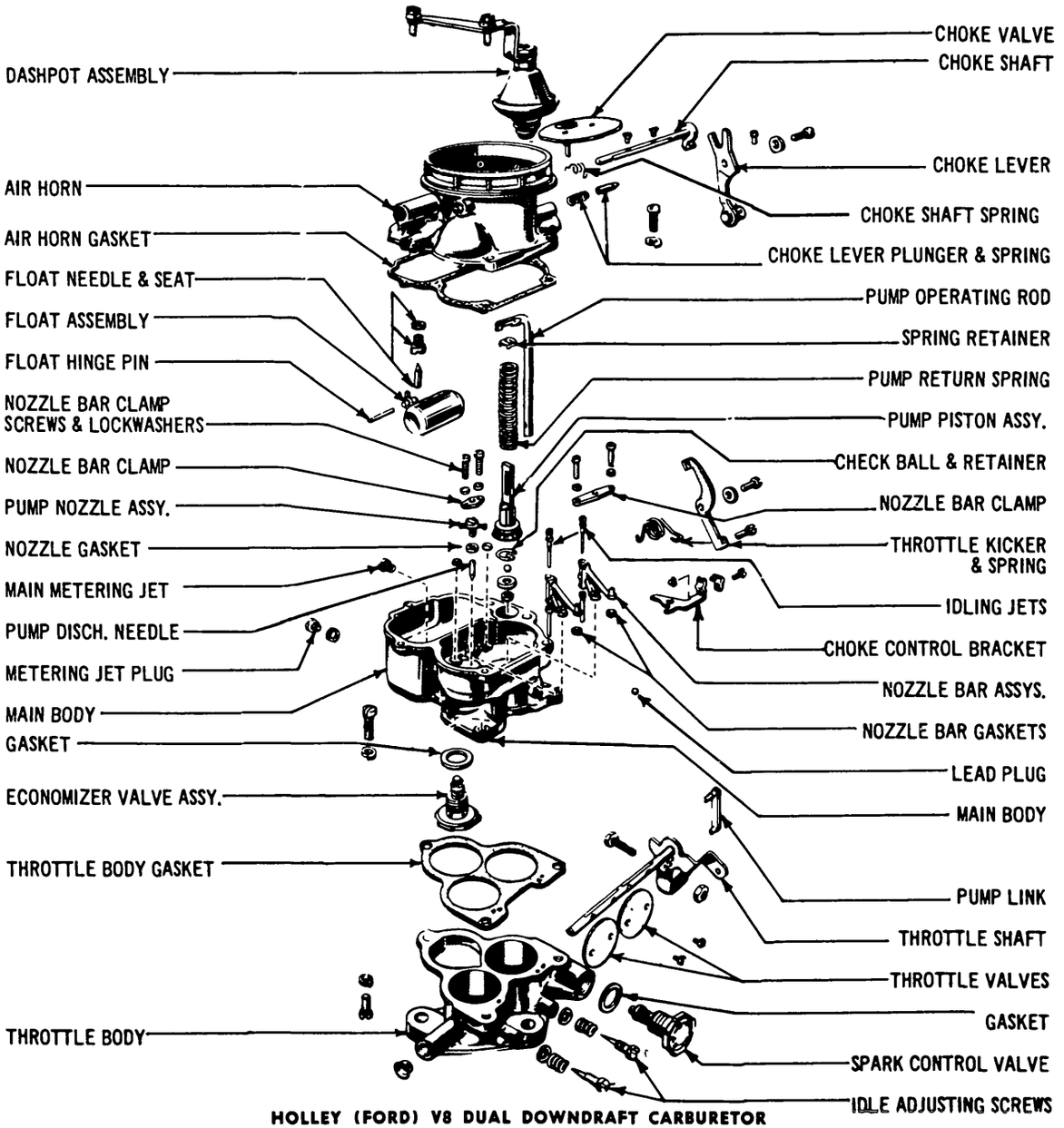
Throttle Body Disassembly—Remove both idle adjusting screws and springs. DO NOT remove throttle valves or disturb throttle assembly. *NOTE* Replace throttle body if valves or shaft worn.

Cleaning & Inspection: Clean all parts except Power Valve in cleaning solvent, make certain that all carbon deposits and gum or varnish completely removed, blow out all passages and make certain they are clean and not restricted. Inspect all parts for wear or damage. Replace throttle body if valves not snug fit or wear of looseness evident.

Reassembly: Use all NEW gaskets. Install parts in reverse order of disassembly procedure above and note the following important points:

Choke Valve Installation—Install choke shaft in air horn with tension spring properly positioned on shaft and engaged in slot in air horn so that valve will remain in closed position, install valve in shaft, install new screws loosely. Close valve and centralize it by tapping lightly, hold valve in position while tightening screws securely, stake screws. Check valve assembly for free operation. After air horn installed on main body, make certain that plunger and spring installed in air horn recess before installing choke lever.

"High Lift" Nozzle Bar Installation—Use two new gaskets for each nozzle bar, position nozzle bars in main body with high end of bar toward float bowl, install nozzle bar clamps, install nozzle bar clamp screws inserting the two **long** screws at the pump discharge side, tighten all screws evenly.



HOLLEY (FORD) V8 DUAL DOWNDRAFT CARBURETOR

SERVICE PARTS

Gask t Sets - Ford No. B5A-9502-C (FAB-9510-C,D,F, EBU-9510-E, B5A-9510-J,P, B6A-9510-J,K, 8RT-9510-A, E,F,G, EBV-9510-H). Ford No. B6A-9502-B (B6A-9510-J, L, B6Y-9510-A, B6C-9510-C, B7C-9510-A,B).

Repair Kits - Ford No. B2A-9590-C (EAB-9510-C,D,F, 8RT-9510-E,F,G). Ford No. B4A-9590-F (EBU-9510-E). Ford No. B5A-9590-E (B5A-9510-J). Ford No. B5C-9590-C (B5A-9510-P). Ford No. B6A-9590-B (B6A-9510-J,K, B6Y-9510-A, B6C-9510-C). Ford No. A8A-9590-A (8RT-9510-A), Ford No. B2C-9590-A (8RT-9510-E,F,G). Ford No. B5C-9590-A (EBV-9510-H). Ford No. B7C-9590-A (B7C-9510-A,B).

1954-58 HOLLEY "VISI-FLO"

FORD 6 CYL. PASS. CARS	Carburetor No.
1954-55 (Synchro-mesh)	EBP-9510-A
1954-55 (Fordomatic)	EBP-9510-B
1956 Synchro-mesh	B6A-9510-H
1956 Fordomatic	B6A-9510-G
1956 Taxi Cab (Special Economy)	B5A-9510-S,V
1957 (Synchro-mesh)	B7A-9510-C
1957 (Fordomatic)	B7A-9510-D
1957 (Later Cars)	B7A-9510-N
1957 (Special Economy)	B7A-9510-M
1957 (All Transmissions)	B7A-9510-Y
1958 Standard (Early)	ℂ B8A-9510-J
1958 Standard (Late)	ℂ B8A-9510-U
1958 Special Economy	ℂ B8A-9510-M
FORD 6 CYL. TRUCKS	
1954-55 (Synchro-mesh)	EBR-9510-A
1954-55 (Fordomatic)	FBP-9510-B
1956 Synchro-mesh	B6C-9510-A
1956 Fordomatic	B6C-9510-G
1956 Economy Special	B5A-9510-S,V
1957 (Synchro-mesh)	B7C-9510-C
1957 (Fordomatic)	B7A-9510-D
1958 Cynchro-mesh & O D (Early)	B8C-9510-B
1958 Synchro-mesh & O D (Late)	B8C-9510-C
1958 Fordomatic (Early)	B8A-9510-J
1958 Fordomatic (Late)	B8A-9510-U
1958 Special Economy (All Trans)	B8A-9510-M

ℂ - Replaced by No EAA-9510-L
② - Replaced by EAA-9510-M

Ford & Holley Carburetor Numbers & Identification

Ford No.	Holley No.	ℂ Identification
EBP-9510-A	R-1241AAS	②
EBP-9510-B	R-1241AAS	②
B6A-9510-G	R-1243AA	EBP-9510-H
B6A-9510-H	R-1243AA	EBP-9510-J
B5A-9510-S	R-1243AAS	EBP-9510-G
B5A-9510-V	R-1243AAS	EBP-9510-K or M
B7A-9510-C	R-1443-1AA	EBP-9510-T
B7A-9510-D	R-1443-1AA	EBP-9510-U
B7A-9510-M	R-1446AA	EBP-9510-V,Y,Z
B7A-9510-N	R-1443-1AA	EBP-9510-AA
B7A-9510-Y	R-1443-1AA	EBP-9510-AB,AC,AD
B8A-9510-J	R-1687AA	5750274,276,493
B8A-9510-M	R-1722-1AAS	5750122,123,557
B8A-9510-U	R-1820-1AAS	5751843,845,846
EBR-9510-A	R-856A	②
EBP-9510-B	R-856A	②
B6C-9510-A		EBR-9510-C
B6C-9510-G		EBR-9510-C
B7C-9510-C	R-1425-1A	EBR-9510-D
B8C-9510-B	R-1880AAS	5750275
B8C-9510-C	R-1880AAS	5751844

ℂ - Stamped on fuel inlet or on main body
② - Ford Part Number stamped on fuel inlet boss or on main body

►CHANGES & CORRECTIONS

►*1956 ACCELERATOR PUMP DISCHARGE NOZZLE DESIGN CHANGE & CAUTION:* Accelerator pump discharge nozzle pressed into main body recess and is locked in place with a pin. If nozzle becomes loose, replace the main body.

►*1956 HARD STARTING, ENGINE STUMBLING OR HESITATION DURING WARM WEATHER CAUTION:* During warm weather, the accelerator pump link should be placed in the hole in throttle shaft plate (hole nearest throttle shaft) giving the shorter stroke.

►*1957 CARBURETOR MODIFICATION TO ELIMINATE ENGINE PING (Carburetor No. B7A-9510-N):* To correct ping under load at low engine speeds, the following carburetor modifications should be made in addition to a distributor advance modification. *See 1957 Ford 6 Cyl. Pass. Car & Truck pages for distributor modification data*

1) Rework Distributor Vacuum Passages in Carburetor - With carburetor removed from engine, remove throttle body assembly *(see OVERHAUL below)*, remove wire retainer from lower end of distributor passage at mounting face of throttle body, remove nylon ball from passage *(CAUTION* - If ball sticks, dislodge ball by tapping throttle body on hand, DO NOT pound throttle body on bench which may mar mounting surface and prevent proper sealing when carburetor reinstalled). Drill out restriction at upper end of this vertical passage to .0585-.0605" using a No 53 drill. Working through distributor vacuum line connection hole, drill out restriction at inner end of horizontal passage to .051-.053" using a No. 55 drill *CAUTION* - Use extreme care to remove all drill chips from passages and mating surfaces of carburetor. Reassemble carburetor.

2) Main Metering Jet Change - Remove glass fuel bowl and install new Main Metering Jets as follows:

Main Metering Jet (New Sizes)

Altitude	Jet Size	Jet Part No.
0-5000 ft	069"	B7T-9533-A
5000-10000 ft.	.067"	B4C-9533-A
10000-15000 ft.	065"	5GA-9533-A

►*1958 CARBURETOR REPLACEMENT NOTE: Different distributors used which must be used with correct carburetor. See "Distributor" on Car & Truck model pages*

►*1958 SURGING & LEANNESS CORRECTION (EXC. B8A-9510-U): Install new main metering jet, No 1GA-9533 B (No 62) This jet used on B8A-9510-U Carburetor.*

►*METERING JET SPECIFICATION CHANGES: See "Holley (Ford) Downdraft Carburetor Jet Specifications" for production changes and latest jet specifications.*

DESCRIPTION: This carburetor has a very low over-all height, side opening glass fuel bowl, diaphragm type accelerating pump, and a special "Main Well & Power Valve Body" sub-assembly in which all of the calibrated metering parts (Main Jet, Power Valve, Pump Inlet and Outlet Check Valves and Fuel Inlet Valve) are mounted. This sub-assembly can be removed as a unit. Beginning with late 1956 carburetors, the Pump Discharge Nozzle was changed to a "pressed-in" type and cannot be removed If nozzle is loose, replace main body assembly. In 1957, the main fuel system was changed so main nozzle tube discharged into a booster venturi formed integrally with the choke valve. This booster venturi rotates with the valve and is turned across the air flow when choke valve is closed In 1958, the booster venturi was eliminated and the main nozzle discharged directly into main venturi.

ADJUSTMENTS: Make all adjustments exactly as follows

Idling Adjustment: If initial adjustment required to warm up engine, turn idle mixture screw in until lightly seated, then back screw out exactly 1 turn. Operate ending at fast idle until normal operating temperature reached (20 minutes for cold engine), then adjust as follows

Idle Mixture - With engine at normal operating temperature (choke valve wide open, fast idle inoperative), adjust idle speed (see below), turn idle mixture adjusting screw in until engine runs rough from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough so that engine idles smoothly. This will provide a slightly rich mixture which is desired Recheck idle speed

Idle Speed - With engine at normal operating temperature so that throttle stopscrew resting on lowest point of fast idle cam (choke lever), adjust stopscrew for correct idle speed of 475-500 RPM (Synchro-mesh), 440-460 RPM (1952-54 Fordomatic), 450-475 RPM (1955 Fordomatic), 475-500 RPM (1956-58 Fordomatic) Transmission selector lever in "N" (Neutral) on Fordomatic models

►*1956-58 FORDOMATIC NOTE:* After setting idle speed with transmission in neutral, place selector lever in "D" (Drive) and recheck idle speed Speed should be 425-450 RPM in "D" Readjust throttle stopscrew as necessary

Antistall Dashpot (Fordomatic): After idle speed adjusted, check dashpot setting by depressing dashpot plunger fully with throttle valve closed. Clearance between end of dashpot plunger and adjusting screw on operating lever should be .045-.064". Adjust by loosening locknut and turning adjusting screw.

Accelerating Pump: Seasonal adjustment provided by two holes in throttle lever for pump link engagement
Inner Hole - Normal or hot weather (short stroke)
Outer Hole - Cold weather operation (long stroke)

Float Level: *NOTE* - Fuel level setting can be checked and adjusted with carburetor on engine, float level setting is a bench check when overhauling carburetor.
Fuel Level - 11/16" below power valve mounting surface To check fuel level, remove power valve diaphragm cover and valve assembly (adjacent to bowl), install gauge, Tool T52L-9550-AGE in this opening. Fuel in bowl should just touch "Low" gauge pin and should not touch "High" gauge pin If adjustment required, remove float bowl and install dummy bowl (with open top) using three of the regular retaining screws Adjust by bending float arm and recheck fuel level before installing regular bowl.
Float Level - With carburetor off engine and float bowl removed, invert carburetor, install special cardboard gauge (furnished in Repair Pkg) on edge of bowl at free

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1954-58 HOLLEY "VISI-FLO" (C nt.)

end of float. Lowest point on float should clear gauging leg. Adjust by bending float arm tab.

Power Valve: No adjustment provided. Power valve opens when manifold vacuum decreases to 9½-10".

Fast Idle: No adjustment required. Consists of a cam shaped section of the choke lever which serves as the stop for the throttle stopscrew.

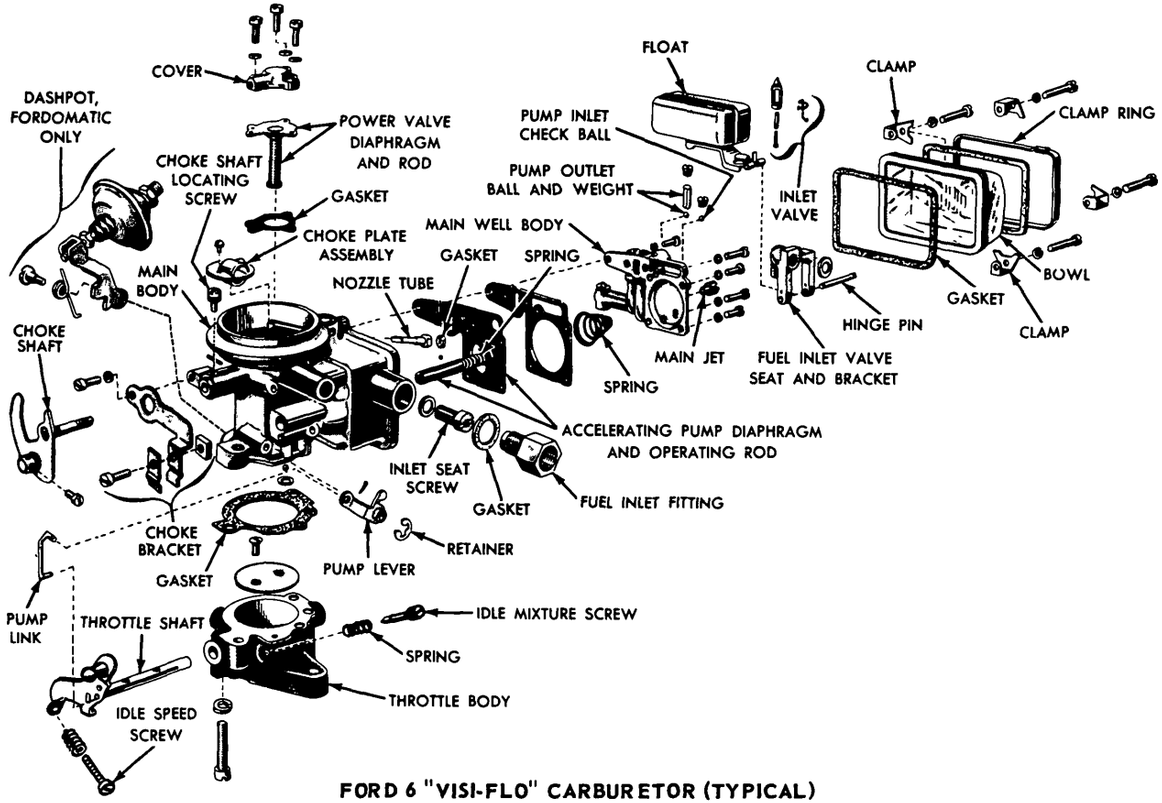
OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Disconnect and remove pump link. Take out two throttle body screws, lift off throttle body assembly, discard gasket. Remove fuel inlet fitting and gasket, remove dashpot assembly (if used). Take out float bowl retainer screws, remove retainer and clamps, retainer gasket, float bowl, and bowl gasket. Remove fuel inlet seat screw and gasket (in inlet passage), remove complete inlet valve and float assembly from within the main body, remove inlet seat gasket. Disassemble float by removing float shaft to free float, then remove wire clip, spring, and plunger from fuel inlet needle. Take out power valve diaphragm screws and lockwashers, lift the power valve diaphragm assembly out, separate the cover from diaphragm and stem assembly. Take out five main well screws and lockwashers, lift off main well assembly. Remove pump return spring from pump piston disc, remove spacer gasket, pull pump diaphragm out of main body. Remove pump operating lever retainer and slide lever off stud. Remove choke bracket screw and choke valve screw, slide choke shaft and lever assembly out, remove choke bracket. Slide main discharge nozzle out of opposite side of body, remove choke valve and booster venturi assembly. Invert main body, take out distributor passage ball retainer, remove ball from passage. Remove main metering jet, pump inlet and outlet check ball retainers from main well body, invert body to remove check balls (*CAUTION* - Balls are not same size, inlet ball is larger). Press pump rod sleeve toward diaphragm until sleeve retainer ball drops out, remove sleeve and spring. Remove idle mixture adjusting screw and spring, remove dashpot lever (if used). *NOTE* - If necessary to remove throttle valve, mark valve to insure correct reinstallation.

► *1954-EARLY 1956 CARBURETOR DISASSEMBLY NOTE:* Pump discharge nozzle in these carburetors is removable type and should be removed as follows: Remove pump discharge nozzle screw (visible at side of choke valve when looking down on carburetor), then lift discharge nozzle out. *Pump discharge nozzle in later carburetors is "pressed-in" type and must not be removed. If loose, replace main body assembly.*

Cleaning & Inspection: Soak all castings and metal parts (except dashpot) in cleaning solution or denatured alcohol. Blow out all passages and jets with air. Inspect all parts for wear or damage.

R ass mbly: Use all new gaskets. Install parts in reverse order of disassembly (above) and note the following important points:



FORD 6 "VISI-FLO" CARBURETOR (TYPICAL)

Choke Valve Assembly - Install choke bracket on main body, insert choke valve and booster venturi assembly in main body with poppet valve stem down, slide choke shaft and lever assembly in to engage valve, install choke valve screw loosely. Install main nozzle to engage opposite side of choke valve. Close choke valve and check for it being centered by holding main body up to a light (little or no light should show around edges of valve), tighten choke valve screw and check choke valve for free operation without binding. Install choke shaft locating screw and lockwasher.

Pump Assembly - Place pump operating lever on main body stud and install retainer on stud. Install spring on pump diaphragm rod, compress spring by pressing pump rod spring into rod, then drop retainer ball into hole in sleeve. Position pump assembly in main body (*CAUTION* - Make certain main nozzle gasket is in place on end of nozzle), place main well s pacer gasket over pump assembly. Install main well assembly (following).

Pump Discharge Nozzle (1952-Early 1956 Carbs.) - Use new gaskets on each side of nozzle, insert screw through grooved side of nozzle, allow nozzle to turn clockwise until stopped by edge of recess in main body when tightening the screw.

Main W ll Ass mbly - Install pump inlet and outlet check balls (*CAUTION* - Inlet check ball is larger), seat balls by using brass drift to tap ball gently down on seat, install inlet ball retainer and outlet ball weight and retainer. Seat large end of pump return spring in disc on pump diaphragm, insert main well attaching screws and lockwashers in body (*CAUTION* - Two longer screws are used in top and bottom center holes), then install main well body as follows: Apply pressure against protruding end of pump rod sleeve to fully compress pump return spring and at the same time press the main well body into position (*NOTE* - This will prevent spring pressure from disturbing alignment of pump diaphragm, spacer gasket, and main body). Tighten all five main well body screws before releasing pressure.

Float & Inlet Needle Valve Ass mbly - Assemble inlet valve parts and float on inlet valve seat (*CAUTION* - Needle must be clipped to float lever tab). Install gasket on inlet seat screw, insert screw in inlet fitting boss in main body, install seat gasket on end of screw protruding into fuel bowl. Set float assembly in position at end of screw, place float gauge under float hinge bracket and across lower corners or bowl mounting face to prevent assembly from tilting, tighten inlet seat screw

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1954-58 HOLLEY "VISI-FLO" (C nt.)

securely before removing gauge. Adjust Float Level using cardboard gauge furnished in repair kit *(see Float Level under ADJUSTMENTS).*

Fu l B wl Installation - Install new gasket in bowl recess of main body, assemble new gasket and retainer on bowl, position bowl on main body. Assemble clamps, screws, and lockwashers. Tighten two center screws first, and then the two end screws, alternately and evenly, to approximately 8-10 in. lbs. torque. *CAUTION* - Do not overtighten these screws which may crack the bowl.

Carburetor Adjustments - *Make all adjustments listed under ADJUSTMENT above.*

SERVICE PARTS: Gasket Sets - Ford No. B2A-9502-C (EAA-9510-D,E,G,H,L,M, EAG-9510-B,D, EBP-9510-A, B, B5A-9510-S,V, B8A-9510-M); Ford No. B7A-9502-C (B6A-9510-G,H, B6C-9510-A, B7A-9510-C, D, N, Y, B7C-9510-C); Ford No. B2A-9502-A (B7A-9510-C); Ford No. B8A-9502-C (B8A-9510-J,U, B8C-9510-B,C).

R pair Kit - Ford No. B2A-9490-E (EAA-9510-D,E,G, H,L,M, EAG-9510-B,D); Ford No. B2A-9590-F (B5A-9510-F, B7A-9510-M); Ford No. B4A-9590-G (EBP-9510-A,B), Ford No. B6A-9590-A (B6A-9510-G, H, B6C-9510-A); Ford No. B7A-9590-G (B7A-9510-C, D,N, B7C-9510-C); Ford No. B7A-9590-M(B7A-9510-Y); Ford No. B8E-9590-E (B8A-9510-J, B8C-9510-B,C); Ford No. B8A-9590-L (B8A-9510-U); Ford No. B8A-9590-J (B8A-9510-M).

1954-58 HOLLEY (FORD) VISI-FLO CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Model	Main Metering Jet Size	Main Metering Jet Part No.	Economizer Assembly Part No.	Power Jet Part No.	Pump Nozzle Part No.
FORD 6 CYL. PASS. CARS							
Synchro-mesh	1954-55	EBP-9510-A	.068"	8MB-9533-A③	EAA-9904-A	EBP-9594-A	EAA-9577-B
Synchro-mesh	1954-55	EBP-9510-B	.068"	8MB-9533-A③	EAA-9904-A	EBP-9594-A	EAA-9577-B
Synchro-mesh	1956	B6A-9510-H	.068"	8MB-9533-A③	EAA-9904-A	B6A-9594-A	⑤
Fordomatic	1956	B6A-9510-G	.068"	8MB-9533-A③	EAA-9904-A	B6A-9594-A	⑤
Economy	1956	B6A-9510-S,V	.047"	59A-9533-A④	EAA-9904-A	B5A-9594-D	⑤
Synchro-mesh	1957	B7A-9510-C	.069"	B7T-9533-A⑥	EAA-9904-A	B7A-9594-A	⑤
Fordomatic	1957	B7A-9510-D	.069"	B7T-9533-A⑥	EAA-9904-A	B7A-9594-A	⑤
Economy	1957	B7A-9510-M	.047"	59A-9533-C	EAA-9904-A	B5A-9594-D	⑤
Standard (Early)	1958	B8A-9510-J	.059"	B4Q-9533-B⑦	EAA-9904-A	B8A-9594-A	⑤
Standard (Late)	1958	B8A-9510-U	.062"	1GA-9533-B③	EAA-9904-A	B8A-9594-B	⑤
Economy	1958	B8A-9510-M	.047"	59A-9533-C	EAA-9904-A	B5A-9594-D	⑤
FORD 6 CYL. TRUCKS							
Synchro-mesh	1954-55	EBR-9510-A	.067"	B4C-9533-A⑨	EAA-9904-A	B4C-9594-A	EAA-9577-B
Fordomatic	1954-55	EBR-9510-B	.067"	B4C-9533-A⑨	EAA-9904-A	B4C-9594-A	EAA-9577-B
Synchro-mesh	1956	B6C-9510-A	.070"	B6C-9533-A	EAA-9904-A	B6C-9594-A	⑤
Fordomatic	1956	B6A-9510-G	.068"	8MB-9533-A③	EAA-9904-A	B6A-9594-A	⑤
Economy	1956	B5A-9510-S,V	.047"	59A-9533-A④	EAA-9904-A	B5A-9594-D	⑤
Synchro-mesh	1957	B7C-9510-C	.073"	B7C-9533-A⑩	EAA-9904-A	B7C-9595-A	⑤
Fordomatic	1957	B7A-9510-D	.069"	B7T-9533-A⑥	EAA-9904-A	B7A-9594-A	⑤
Synchro-mesh (Early)	1958	B8C-9510-B	.064"	1GA-9533-A①	EAA-9904-A	B8C-9594-A	⑤
Synchro-mesh (Late)	1956	B8C-9510-C	.064"	1GA-9533-A①	EAA-9904-A	B8C-9594-A	⑤
Fordomatic (Early)	1958	B8A-9510-J	.059"	B4Q-9533-B⑦	EAA-9904-A	B8A-9594-A	⑤
Fordomatic (Late)	1958	B8A-9510-U	.062"	1GA-9533-B③	EAA-9904-A	B8A-9594-B	⑤
Economy	1958	B8A-9510-M	.047"	59A-9533-C	EAA-9904-A	B8A-9594-D	⑤

① - Use 1GA-9533-B (.062") for 5000-10,000 ft. altitude.

③ - Use 1GA-9533-A (.064") for 5000-10,000 ft. altitude.

④ - Use 59A-9533-A (.045") for 5000-10,000 ft. altitude.

⑤ - Nozzle is pressed in (replace main body).

⑥ - Use B4C-9533-A (.067") for 5000-10,000 ft. altitude.

⑦ - Use 26H-9533 (.057") for 5000-10,000 ft. altitude.

③ - Use 1GA-9533-C (.060") for 5000-10,000 ft. altitude.

⑨ - Use 5GA-9533-A (.065") for 5000-10,000 ft. altitude.

⑩ - Use 8MB-9533-B (.066") for 5000-10,000 ft. altitude.

1959 HOLLEY (FORD) VISI-FLO CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Number	Main Metering Jet: ① Standard Mark	① Standard Part No.	② 1 Size Lean Mark	② 1 Size Lean Part No.	③ 2 Sizes Lean Mark	③ 2 Sizes Lean Part No.	Power Valve Assembly Part No.	Power Jet Part No.	Idle Tube Part No.	Pump Nozzle Part No.
EDSEL 6 CYL.												
Synchro-mesh	1959	B9A-9510F	62	1GA-9533B	60	1GA-9533C	58	78-9533F	EAA-9904A	B8A-9594B		EAA-9577B
Auto. Trans.	1959	B9A-9510F	60	1GA-9533C④	58	78-9533F⑤	56	78-9533E⑥	EAA-9904A	B8A-9594B		EAA-9577B
FORD 6 CYL. CARS												
Synchro-mesh	1959	B9A-9510F	62	1GA-9533B	60	1GA-9533C	58	78-9533F	EAA-9904A	B8A-9594B		EAA-9577B
Auto. Trans.	1959	B9A-9510F	60	1GA-9533C④	58	78-9533F⑤	56	78-9533E⑥	EAA-9904A	B8A-9594B		EAA-9577B
Economy	1959	B9AE-9510A	47	59A-9533C								EAA-9577B
FORD 6 CYL. TRUCKS												
All Models	1959	B9TE-9510A	65	5GA-9533A	63	5GA-9533B	61	B4Q-9533A	EAA-9904A	B8A-9594A		EAA-9577B

④ - Supersedes 1GA-9533B (.062").

⑤ - Supersedes 1GA-9533C (.060").

⑥ - Supersedes 78-9533F (.058").

1960 HOLLEY (FORD) VISI-FLO CARBURETOR JET SPECIFICATIONS

(FOR RAMBLER JET SPECIFICATIONS, SEE PG. 1627)

Car Model	Year	Carburetor No.	Main Metering Jet: Standard Mark	Standard Part No.	1 Size Lean Mark	1 Size Lean Part No.	2 Sizes Lean Mark	2 Sizes Lean Part No.	Power Valve Assembly Part No.	Power Jet Part No.	Idle Tube Part No.	Pump Nozzle Part No.
COMET												
Synchro-mesh ② Early	1960	CODE-9510A	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577A
Synchro-mesh ② Late	1960	CODE-9510C	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577A
Synchro-mesh ③ Later	1960	CIKE-9510A	.055"	B4T-9533A			.054"	06H-9533	EAA-9904A			
Auto. Trans. ② Early	1960	CODE-9510B	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904-A	CODE-9594A		EAA-9577A
Auto. Trans. ② Late	1960	CODE-9510D	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577A
Auto. Trans. ③ Later	1960	CIKE-9510B	054"	06H-9533			.053"	B4T-9533B	EAA-9904A			
EDSEL 6 CYL.												
Synchro-mesh (Early)	1960	COAE-9510E	.062"	1GA-9533B	.060"	1GA-9533C	.058"	78-9533F	EAA-9904A	B7A-9594A		EAA-9577B
Synchro-mesh (Late)	1960	COAE-9510U	.062"	1GA-9533B	.060"	1GA-9533C	.058"	78-9533F	EAA-9904A	B7A-9594A		EAA-9577B
Auto. Trans. (Early)	1960	COAE-9510G	.060"	1GA-9533C	.058"	78-9533F	.056"	78-9533E	EAA-9904A	B7A-9594A		EAA-9577B
Auto. Trans. (Late)	1960	COAE-9510Z	.060"	1GA-9533C	.058"	78-9533F	.056"	78-9533E	EAA-9904A	B7A-9594A		EAA-9577B
FALCON												
Synchro-mesh (Early)	1960	CODE-9510A	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577B
Synchro-mesh (Late)	1960	CODE-9510C	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577B
Auto. Trans. (Early)	1960	CODE-9510B	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577B
Auto. Trans. (Late)	1960	CODE-9510D	.052"	86H-9533	.052"	86H-9533	.051"	59A-9533A	EAA-9904A	CODE-9594A		EAA-9577B
FORD 6 CYL. PASS CARS												
Synchro-mesh	1960	COAE-9510U	.062"	1GA-9533B①	.060"	1GA-9533C	.058"	78-9533F	EAA-9904A	B8A-9594B		EAA-9577B
Auto. Trans.	1960	COAE-9510Z	060"	1GA-9533C	.059"	B4Q-9533B	.057"	26H-9533	EAA-9904A	B8A-9594B		EAA-9577B
Taxi	1960	COAE-9510Y	048"	78-9533B					EAA-9904A			
FORD 6 CYL. TRUCKS												
All Models	1960	COTE-9510S	.065"	5GA-9533A	.063"	5GA-9533B	.061"	5GA-9533C	EAA-9904A	B8A-9594A		EAA-9577B

① - When used on Automatic Transmission Cars
Use 1GA-9533-C (.060") 0-5000 ft. Alt.
Use 78-9533-F (.058") 5000-10000 ft. Alt.
Use 78-9533-E (.056") 10000-15000 ft. Alt.

② -Manual Choke.

③ - Automatic Choke.

1959-60 HOLLEY "VISI-FLO" CARBURETORS

COMET	Comet Part No.
1960 Early (Synchro-mesh) ①	CODE-9510-A
1960 Late (Synchro-mesh) ①	CODE-9510-C
1960 Later (Synchro-mesh) ②	C1KE-9510-A
1960 Early (Auto Trans) ①	CODE-9510-B
1960 Late (Auto Trans) ①	CODE-9510-D
1960 Later (Auto Trans) ②	C1KE-9510-B
EDSEL 6 CYL.	**Edsel Part No.**
1959 All Models	B9A-9510-F
1960 Early (Synchro-mesh)	COAE-9510-E
1960 Late (Synchro-mesh)	COAE-9510-U
1960 Early (Auto Trans)	COAE-9510-G
1960 Late (Auto Trans)	COAE-9510-Z
FALCON	**Ford Part No.**
1960 Early (Synchro-mesh)	CODE-9510-A
1960 Late (Synchro-mesh)	CODE-9510-C
1960 Early (Auto Trans)	CODE-9510-B
1960 Late (Auto Trans)	CODE-9510-D
FORD 6 CYL. PASS CARS	**Ford Part No.**
1959 All Models (Std) ③	B9A-9510-F
1959 Taxi (Spec Economy)	B9AE-9510-A
1960 Synchro-mesh ③	COAE-9510-U
1960 Auto Trans	COAE-9510-Z
1960 Taxi (Spec Economy)	COAE-9510-Y
FORD 6 CYL. TRUCKS	**Ford Part No.**
1959 All Models ③	B9TE-9510-A
1960 All Models ③	10 COTE-9510-S
RAMBLER AMERICAN (CUSTOM)	**Holley Part No.**
1960 Synchro-mesh	R-2168-2
1960 Auto Trans	R-2166-A
RAMBLER SIX	**Holley Part No.**
1959 Series 5910	R-1598-1A
1960 Series 6010 (Early)	R-1598-1A
1960 Series 6010 (Late)	R-1598-2A

① - Manual choke ② - Automatic choke
③ - A dashpot and attaching parts must be added for use on automatic transmission cars

Ford & Holley Carburetor Numbers & Identification

Ford No.	Holley No.	①Identification
CODE-9510-A	R-1921A	③
CODE-9510-B	R-2003A	③
CODE-9510-C		③
CODE-9510-D	R-2109A	③
C1KE-9510-A	R-2111A	③
C1KE-9510-B	R-2111A	③
B9A-9510-F	R-1820-1AAS,	B9AE-9510-A,B, or C
COAE-9510-E	R-2016A	COAE-9510-E or U
COAE-9510-G		③
COAE-9510-U	R-2016A	COAE-9510-A or U
COAE-9510-Z	R-2077A	③
B9AE-9510-A	R-1822-1AAS	B9AE-9510-A,D, or E
COAE-9510-Y	R-2060AA	C0AE-9510-F,V, or Y
B9TE-9510-A	R-1880AAS	5752317,318 or ③
COTE-9510-S	R-2019A	②COTE-9510-S,A,B, or J

① - Stamped on fuel inlet boss, on main body or on choke plate flange
② - Synchro-mesh Use R-2020A for Automatic Transmission ③- Carburetor Part Number

►CHANGES, CAUTIONS, CORRECTIONS

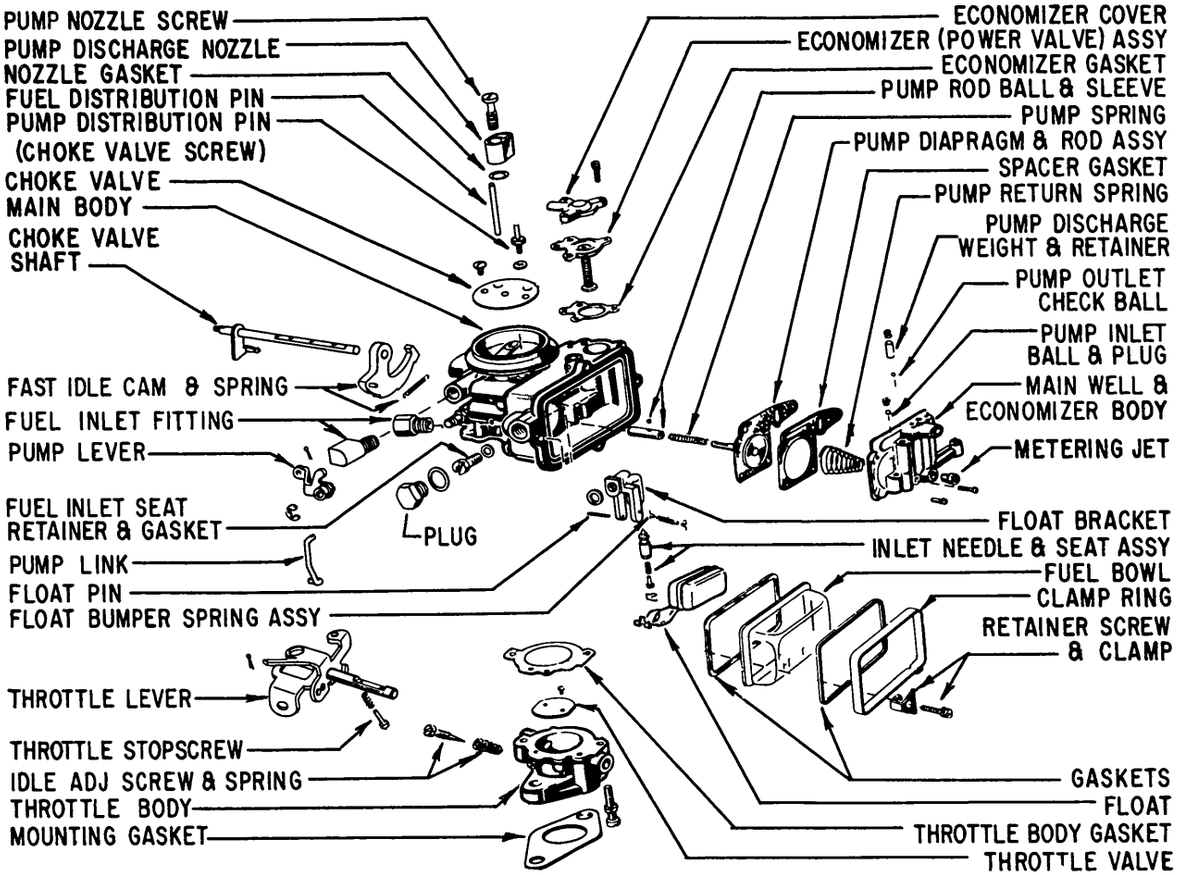
►*1959 EDSEL & FORD POOR ENGINE PERFORMANCE OR ROUGH IDLE* May be caused by blocked carburetor vacuum passage preventing proper distributor advance action Correct by cleaning out the horizontal passage extending from distributor vacuum line boss on side of carburetor to opening in venturi throat

►*1959 EDSEL POOR GASOLINE MILEAGE COMPLAINTS* If this complaint persists after engine has been tuned and all carburetor adjustments made as specified, the fibre pad and screen can be removed from beneath air cleaner cover This will reduce air restriction in cleaner

►*1959 EDSEL & FORD AUTOMATIC TRANSMISSION CAR CARBURETOR MAIN METERING JET CHANGE FOR IMPROVED ECONOMY* Main metering jet can be changed as listed below for improved economy on **automatic transmission cars only** *NOTE* - Carburetors code tagged "AAA9BC" or later have this new jet installed in production

Edsel & Ford 6 Main Metering Jet

Use	First Type Jet	Later Type Jet
0-5000 ft	62 (1GA-9533-B)	60 (1GA-9533-C)
5,000-10,000 ft	60 (1GA-9533-C)	58 (78-9533-F)
10,000-15,000 ft	58 (78-9533-F)	56 (78-9533-E)



HOLLEY "VISI-FLO" CARBURETOR (WITH MANUAL CHOKE)

►*1959 RAMBLER CHOKE SETTING CHANGE TO CORRECT STALLING OR ROUGHNESS DURING WARM-UP* Automatic choke should be set 1 Notch Rich (superseding original specification of "Centered") or, in some cases, 2 Notches Rich to correct above complaint *See Automatic Choke Setting below*

►*1960 COMET (MANUAL CHOKE CARBURETOR CARS) ROAD LOAD SURGE AT PART THROTTLE CORRECTION:* If proper engine tune-up procedures *(see "Part Throttle Surge Correction" under TUNE-UP on car model page)* do not correct the condition, proceed as follows

Synchro-mesh Transmission Cars - Replace spark control valve assembly with a new assembly marked No. 50 and a new spark valve gasket. Recheck operation of car and if surging still exists, install a **one size larger** main metering jet (No. 52 to No. 53).

Automatic Transmission Cars - Replace main metering jet with a jet **one size larger** (No 51 to No. 52) Replace spark valve gasket. Automatic transmission carburetors that have been changed in production are identified by a daub of yellow paint on economizer cover or the letter "D" (or later) on carburetor code tag.

CONTINUED ON NEXT PAGE

1959-60 HOLLEY "VISI-FLO" CARBURETORS (C ntinu d)

►*1960 COMET HESITATION ON ACCELERATION CORRECTION:* This condition may be caused by accelerator pump plunger sticking in bore. To correct, remove carburetor, then remove accelerator pump diaphragm and operating rod assembly. Clean plunger bore in carburetor body with cleaning solvent and a brush. *CAUTION - Plunger bore in carburetor body and the pump push rod sleeve have a protective coating. Do not try to increase bore by drilling or reaming and do not buff or polish push rod sleeve with emery cloth as coating will be destroyed.* Install a new pump pushrod sleeve, Part No. B8A-9934-A, then lubricate sleeve and bore in carburetor with two or three drops of lock lubricant (oil and graphite). After reassembly, wipe surplus lubricant from plunger and carburetor body.

►*1960 COMET (CARS WITH AUTOMATIC CHOKE) FAST IDLE SPEED REDUCTION PROCEDURE FOR HOT WEATHER OPERATION:* If normal fast idle speed is unsatisfactory (cars operating in warm temperatures), it may be reduced as follows: Remove carburetor air cleaner, then remove choke thermostatic coil housing attaching screw (on side opposite choke heat tube). Obtain an 8-32 fillister head screw 1 11/32" long, Part No. 31165-58, and cut it to a length of 1¼". Remove all burrs, then install housing clamp from original screw to new longer screw. With choke plate in closed position, install long screw in place of original screw and tighten securely. *NOTE - New screw will serve as a stop for fast idle cam, preventing it from reaching its former position.* Remove idle adjusting screw and file or grind approximately 1/16" off screw. Install screw and spring and turn it in until it contacts **second step** on cam. Adjust engine idle speed to specifications and install air cleaner. *NOTE - For cold weather operation, either remove long screw and install original screw, or "store" long screw by installing a ½" long sleeve, made from ¼" copper tube, between screw head and housing clamp (this will move end of screw away from fast idle cam and allow cam to rotate to first step). Readjust engine idle speed to proper specifications.*

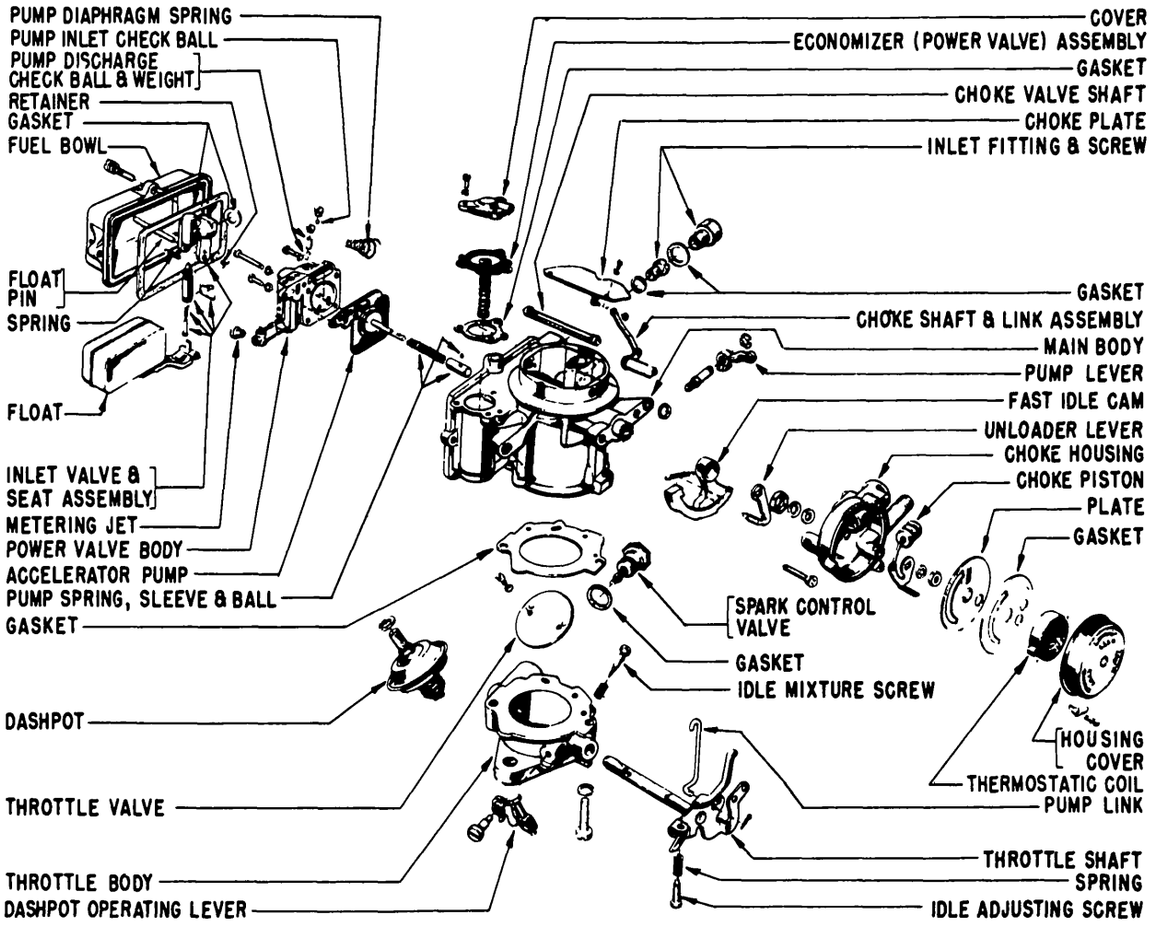
►*1960 EDSEL MAIN METERING JET CHANGE (TO IMPROVE PERFORMANCE AT HIGH ALTITUDE):* See *"Holley Single Barrel (Visi-Flo) Jet Specifications".*

DESCRIPTION: Single barrel downdraft type with automatic choke (Rambler & Later Comet models), manual choke (all other models). Design is similar to 1954-58 carburetors and have the following features.

Main Fuel System (Except Comet Automatic Choke Carburetors) - Main nozzle tube is pressed into venturi wall directly below choke valve axis and discharges into a cutout section of choke valve. A fuel distribution pin (crosswise in choke valve shaft) extends into air stream and improves nozzle action.

Pump Discharge Nozzle (Except Comet Automatic Choke Carburetors) - Nozzle is a separate part mounted on upper ledge of venturi and retained by a special nozzle retainer screw.

Automatic Choke & Fast Idle (Rambler) - Automatic choke is a separate assembly mounted on the air horn (choke valve shaft extends into automatic choke housing and is directly linked to thermostatic coil and vacuum piston link). Fast Idle Cam is mounted on choke valve shaft (behind choke housing) and serves has a stop for the throttle stopscrew. No separate fast idle setting is required.



HOLLEY "VISI-FLO" CARBURETOR (WITH AUTOMATIC CHOKE)

Automatic Choke & Fast Idle (Comet Automatic Choke Carburetors) - Automatic choke is a separate assembly mounted on air horn with choke shaft linked to choke valve shaft within the air horn. Fast idle cam is mounted on choke shaft (behind choke housing) and serves as a stop for the throttle stopscrew. No separate fast idle adjustment is required. The automatic choke has a free floating type choke piston which opens the choke plate to a pre-determined opening for initial cold operation of engine. This opening is controlled by a piston stop located near bottom of piston bore.

Spark Control Valve (Comet, Edsel, Falcon & Ford Carburetors): This unit is a spring loaded diaphragm type valve located in the distributor control vacuum passage terminating at the throttle valve edge (manifold vacuum). The valve is normally open but closes momentarily during acceleration (when manifold vacuum drops) to prevent excessive distributor advance (second port terminating at the venturi provides vacuum to control distributor under these conditions). The valve also provides an intermediate distributor retard position under load conditions where normal spark advance would be too great and where wide open throttle spark retard is not required. No adjustment is provided.

Fuel Bowl - The glass bowl formerly used has been replaced with a metal bowl on some carburetors.

ADJUSTMENTS: Make all adjustments exactly as follows:

Idling Adjustment: If initial adjustment required to warm engine, turn idle mixture screw in until lightly seated, then back screw out 1-1½ turns (Comet & Falcon); ¾-1¾ turns (Edsel); ½-1½ turns (Ford); 1¼ turns (Rambler). Operate engine at fast idle until normal operating temperature reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature (choke valve wide open, fast idle inoperative), adjust idle speed (see below), turn idle mixture adjusting screw in until engine runs rough from lean mixture, then turn screw out until engine begins to roll from rich mix-

CONTINUED ON NEXT PAGE

1959-60 HOLLEY "VISI-FLO" CARBURETORS (Continued)

ture, finally turn screw in just enough so that engine idles smoothly. This will provide a slightly rich mixture which is desired. Recheck idle speed.

Idle Speed - With engine at normal operating temperature so that throttle stopscrew resting on lowest point of fast idle cam (choke lever), adjust stopscrew for correct idle speed as listed in table below. *NOTE* - On Fordomatic cars, set hand brake to hold car and place selector lever in Neutral, then recheck idle speed with selector lever in Drive "D" position. *See Fordomatic Note below.*

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1960 Comet	500-525	①500-525
1959 Edsel (Std.)	475-500	450
1959 Edsel (Air Cond.)③	500-525	①450-475
1960 Edsel	475-500	①⑨450
1960 Falcon	500-525	①475-500
1959 Ford Pass. Cars	475-500	②475-500
1960 Ford Pass. Cars	475-500	①450-475
1959 Ford Trucks	475-500	②475-500
1960 Ford Trucks	475-500	①450
1959-60 Rambler (Std.)	550	⑤475
1959 Rambler (Air Cond.)③	550	⑤500
1960 Rambler (Air Cond.)③	500	⑤500

① - Transmission in "D" (Drive) Range.
② - Transmission in "N" (Neutral) Range. *See Fordomatic Not below.*
③ - Air Conditioner turned ON.
⑨ - See note following for roughness correction on 1960 models.
⑤ - Transmission in "N" (Neutral) Range.

►*1960 EDSEL 6 CYL. ROUGHNESS OR VIBRATION (Auto. Trans. Cars):* If roughness or vibration noted when idling in "D", tailor the idle speed to the individual car as follows: Set parking brake, place selector lever in "D", then adjust idle speed until roughness and vibration are eliminated or improved. Idle speed may vary between 475 and 525 RPM

►*1959 EDSEL DASHPOT PRODUCTION CHANGE NOTE: Two different dashpots used in production which are adjusted differently. For identification see Car Model pages.*

►*1960 FALCON DASHPOT ADJUSTMENT SPECIFICATION CHANGE:* The dashpot adjustment on early cars with Accelerator Retracting Spring, Part No. CODD-9737-C identified by 35¾ coils and an O.D. of .68", is different than for later cars with spring, Part No. CODD-9737-D identified by 22¼ coils and an O.D. of .80". *See "Dashpot Adjustment" below.*

Anti-Stall Dashpot (Cars & Trucks with Automatic Transmission, Except Rambler): With idle speed properly adjusted, check dashpot setting by depressing plunger fully with throttle valve closed. Clearance between end of plunger and adjusting screw should be as indicated in table below. Adjust by loosening locknut and turning adjusting screw.

Car Model	Dashpot Specification	Clearance
1960 Comet		130-.150"
1959 Edsel (Early)①		045-.064"
1959 Edsel (Late)②		060-.090"
1960 Edsel		.060-.090"
1959 Ford Pass Cars		.045-.064"
1960 Ford Pass Cars		.060-.090"
1959-60 Ford Trucks		.045-.064"
1960 Falcon (Early)③		.060-.090"
1960 Falcon (Late)③		.130-.150"

① - See "Edsel Dashpot Production Change" above.
③ - See "Falcon Dashpot Adjustment Specification Change" above

Accelerating Pump: Seasonal adjustment provided by two holes in throttle lever for pump link engagement:
Inner Hole - Normal or hot weather (short stroke).
Outer Hole - Cold weather operation (long stroke).

Float Level: *NOTE* - Fuel level setting can be checked and adjusted with carburetor on engine, float level setting is a bench check when overhauling carburetor. Fuel level should be checked after carburetor reinstalled on engine.

Fuel Level - *See table below for fuel level and checking gauge.* To check fuel level, remove Power Valve diaphragm cover and valve assembly. Install checking gauge in this opening and crank engine to fill bowl. Fuel in bowl should touch "Low" gauge pin and should not touch "High" gauge pin. If adjustment required, remove float bowl and install dummy bowl (with open top) using three of the regular retaining screws. Adjust by using bending tool to bend float arm tab, recheck fuel level before installing regular bowl.

RAMBLER NOTE - Use scale inserted through power valve mounting hole to measure fuel level.

Fuel Level Setting

Car Model	① Fuel Level	Checking Gauge
Comet	23/32" ± 1/32"	9550-AE-4
Edsel	11/16" ± 1/32"	9550-AA-3
Falcon	23/32" ± 1/32"	T52L-9550-AEE
Ford (All)	11/16" ± 1/32"	T52L-9550-AEE
Rambler	23/32" ± 1/32"	Use Scale

① - Below mounting surface of power valve.

Float Level - *This is a bench check and Fuel Level should be checked after carburetor has been reinstalled on engine.* On all models, (Except Rambler) use float gauge furnished in repair package (see table below). On Rambler, use Float Gauge, Holley No. J-10-194 for spring loaded intake needle valve, and Holley No. 1-10-180 for solid intake needle valve. With bowl removed and carburetor inverted, install gauge as follows: On all models except Rambler, place gauge on edge of bowl mounting flange at free end of float. Lowest point on float should clear lower leg of gauge. On Rambler, adjust float bumper spring tab so that end of float is 3/16" from floor of fuel bowl (carburetor in an upright position). Install float gauge, attaching it to bowl attaching bolt holes. With carburetor inverted, check setting on both the "touch" and "no touch" legs of float. Adjust by bending small tab in float lever that contacts head of fuel inlet needle.

Fuel at Level Setting

Car Model	① Fuel at Level	Checking Gauge
Comet	.160-.191"	MC-157
Edsel	.188-.218"	9590-1
Falcon	.160-.191"	MC-157
Ford (All)	.188-.218"	MC-157
Rambler ②		J-10-180
Rambler ③		J-10-194

① - Carb. inverted. Distance from roof to lowest point of float.
② - With solid needle valve.
③ - With spring loaded needle valve.

Power Valve: *NOTE - Used on all carburetors except Ford Taxi (Special Economy). No adjustment provided.* Power valve opens when manifold vacuum drops to 6-7".

Spark Control Valve (Except Rambler Models): Spark control valve is not adjustable.

Automatic Choke (Rambler & Later Comet Models): Adjust by loosening cover retaining screws and rotating choke cover and thermostatic coil assembly. Choke should be set at index. *NOTE - On Comet models, do not vary choke setting more than two notches in either direction from index.*

Fast Idle: No adjustment required. Fast idle speed will be correct when hot (slow) idle speed properly set. *NOTE - On Comet models, if fast idle speed is not satisfactory in high temperature operation, see "Fast Idle Speed Reduction Procedure" above.*

Unloader (Rambler & Later Comet models with Automatic Choke): With throttle valve in wide open position and with choke valve closed against unloader lever, clearance between edge of choke valve and wall of air horn should be ¼" (Comet), 7/16" (Rambler). To adjust, bend unloader tab on throttle lever.

OVERHAUL: With carburetor removed from engine, proceed as follows:

Disassembly: Disconnect and remove pump link. Take out two throttle body screws, lift off throttle body assembly, discard gasket. Remove fuel inlet fitting and gasket, remove dashpot assembly (if used). Take out float bowl retainer screws, remove retainer and clamps, retainer gasket, float bowl, and bowl gasket. Remove fuel inlet seat screw and gasket (in inlet passage), remove complete inlet valve and float assembly from within the main body, remove inlet seat gasket. Disassemble float by removing float shaft to free float, then remove wire clip, spring, and plunger from fuel inlet needle. Take out power valve diaphragm screws and lockwashers, lift the power valve diaphragm assembly out, separate the cover from diaphragm and stem assembly. Take out five main well screws and lockwashers, lift off main well assembly. Remove pump return spring from pump piston disc. Remove main metering jet from main well and economizer body. Take out pump inlet and discharge check valve retainers, invert main well and economizer body to drop out the pump inlet check valve ball, discharge valve weight, and discharge check valve ball (*CAUTION* - Balls are not same size and must not be interchanged). Remove and discard spacer gasket. Remove accelerating pump assembly from main body. Invert pump assembly and press pump rod sleeve toward diaphragm to compress pump spring which will allow sleeve retainer ball to drop out. Slide pump rod sleeve and spring off diaphragm rod. Pump diaphragm

CONTINUED ON NEXT PAGE

1959-60 HOLLEY "VISI-FLO" CARBURETORS (C ntinued)

and rod assembly should be discarded and new part used when reassembling carburetor. Remove pump operating lever retainer, slide pump operating lever off stud. On Rambler & Comet models with automatic choke, disassemble automatic choke assembly *(see Note below)*. On all models, if necessary to remove choke valve assembly, remove bowl vent tube and scribe a line on upper surface of choke valve to insure installation in same position. Support choke shaft by placing a length of brass tubing over fuel distribution pin (if so equipped) on underside of shaft, then drive pin down and out of shaft into tubing. *CAUTION - Use correct size flat tip punch to avoid damaging pin and shaft.* Remove choke valve screws, slide choke valve out, remove choke shaft. Take out pump discharge nozzle screw and remove nozzle and gasket. Remove idle mixture adjusting screw and spring. If necessary to remove throttle valve and shaft, scribe valve lightly to insure, correct reassembly. *CAUTION - Do not attempt to remove main nozzle, or any of the pressed in passage plugs or air bleed plugs.*

► *COMET & RAMBLER AUTOMATIC CHOKE DISASSEMBLY NOTE:* To disassemble the automatic choke, take out cover retaining screws, remove cover and thermostatic coil assembly, gasket, and heat retainer plate. Remove piston lever retaining nut from end of shaft, take out choke housing mounting screws, lift off choke housing and piston assembly. Remove vacuum piston and link from choke housing. Remove felt shaft seal and washer from end of choke shaft. For choke shaft removal, see regular disassembly data above.

Cleaning & Inspection: Clean all carburetor parts (ex cept Dashpot, Spark Control Valve, and power valve or pump diaphragms) in cleaning solution or alcohol, rinse parts in hot water, and dry with compressed air. Blow out all passages and jets with air. Inspect all parts for wear or damage. If throttle shaft worn and loose, or binding in body, replace throttle body.

Reassembly: Use all new gaskets, seals, and diaphragms. Install parts in reverse order of disassembly (above) and note the following important points:

Choke Valve Assembly - On models with manual choke, position choke bracket on main body but DO NOT install bracket screw. On Rambler, assemble fast idle cam on choke shaft and install fast idle cam spring. Install choke shaft in main body and insert choke valve with scribed line in correct position. Install distribution pin (if so equipped) by driving pin in. *CAUTION - Support shaft by length of brass tubing beneath shaft.* Clearance between each end of pin and venturi must be equal with choke valve wide open. Install choke valve screws. *CAUTION* - On Rambler, brass screw with pump discharge distribution pin is installed on pump nozzle side of venturi. Check choke valve for binding by moving it from closed to open position, then tighten screws with valve closed and stake the screws in place. Install bowl vent tube. On models with manual choke, install choke bracket screw. On automatic choke carburetors, install automatic choke as follows:

Automatic Choke (Rambler & Later Comet Models) - Install washer and felt seal on choke shaft, then install choke housing gasket and housing, tighten housing retaining screws. Install choke piston and lever assembly, engaging lever on end of choke shaft, then tighten retaining nut. Install heat retainer plate and gasket. Install cover and thermostatic coil assembly. *CAUTION - Make sure lug on piston lever engages loop of thermostatic coil.* Center automatic choke on index and

Pump Discharge Nozzle Installation - Install pump discharge nozzle with a new gasket. Insert nozzle discharge screw on side of nozzle having deep grooved surface. *NOTE - Screw has drilled passage for pump discharge terminating at the relieved section under screw head.* Tighten screw only finger tight. After carburetor installation on engine, check and adjust nozzle aim. On all models except Rambler, nozzle should discharge into cutout section of choke valve when choke valve is closed. On Rambler, nozzle should discharge directly at brass pump distribution pin on choke valve. When nozzle correctly positioned, tighten nozzle screw.

Accelerating Pump Assembly - Place pump operating lever on stud on main body (on all models except Rambler, install brass washer and return spring on stud under lever, engage long spring tang in hole in body, and short tang over lever), install retainer. Place spring on pump discharge rod, compress spring by pressing rod sleeve on rod, drop retainer ball into hole in sleeve and make sure it engages slot in rod. Position pump assembly in main body, place main well spacer gasket over pump assembly. Install main well assembly.

Main Well Assembly -Install pump inlet and outlet check balls *(CAUTION* - Inlet check ball is larger), seat balls by using brass drift to tap ball gently down on seat, install inlet ball retainer and outlet ball weight and retainer. Seat large end of pump return spring in disc on pump diaphragm, insert main well attaching screws and lockwashers in body *(CAUTION* - Two longer screws are used in top and bottom center holes), then install main well body as follows: Apply pressure against protruding end of pump rod sleeve to fully compress pump return spring and at the same time press the main well body into position *(NOTE* - This will prevent spring pressure from disturbing alignment of pump diaphragm, spacer gasket, and main body). Tighten all five main well body screws before releasing the pump rod sleeve pressure. *(NOTE* - On Rambler, tighten screws only finger tight without compressing lockwashers, then release the pump rod sleeve which will stretch the pump diaphragm properly, tighten screws evenly).

Float & Inlet Needle Valve Ass mbly - Assemble inlet valve parts and float on inlet valve seat *(CAUTION* - Needle must be clipped to float lever tab). Install gasket on inlet seat screw, insert screw in inlet fitting boss on main body, install seat gasket on end of screw protruding into fuel bowl. Set float assembly in position at end of screw, place float gauge under float hinge bracket and across lower corners or bowl mounting face to prevent assembly from tilting, tighten inlet seat screw securely before removing gauge. Adjust Float Level using cardboard gauge furnished in repair kit *(se Float Level under ADJUSTMENTS).*

Fuel Bowl Installation - Install new gasket in bowl recess of main body, assemble new gasket and retainer on bowl, position bowl on main body. Assemble clamps, screws, and lockwashers. Tighten two center screws first, and then the two end screws, alternately and evenly, to approximately 8-10 in. lbs. torque. *CAUTION* - Do not overtighten these screws which may crack the bowl.

Carburetor Adjustments - *Mak all adjustm nts list d under ADJUSTMENT above.*

SERVICE PARTS: Gasket S ts - Comet & Ford Part No. CODZ-9502-A (CODE-9510-A,B,C,D), Comet Part No. C1KY-9502-A (C1KE-9510-A,B); Edsel & Ford Part No. B8A-9502-A (B9A-9510-F); Edsel Part No. 58EK-9502-A (COAE-9510-E,G,U,Z); Ford Part No. B9AE-9502-A (B9AE-9510-A), Ford Part No. B8A-9502-C (COAE-9510-U,Z).

Repair Kits - Comet & Ford Parts No. CODZ-9590-A (CODE-9510-A,C), Comet Part No. C1KY-9590-A (C1KE-9510-A,B), Comet & Ford Part No. CODZ-9590-B (CODE-9510-B), Comet & Ford Part No. CODZ-9590-C (CODE-9510-D), Edsel & Ford Part No. B8A-9590-A (B8A-9510-F), Edsel & Ford Part No. COAZ-9590-E (COAE-9510-E,G,U); Edsel & Ford Part No. COAZ-9590-F (COAE-9510-Z); Ford Part No. COAZ-9590-K (COAE-9510-Y); Ford Part No. B2AZ-9590-A (COTE-9510-S), Holley Part No. 85-981 (R-2166-A, R-2168-2), Holley Part No. 85-642 (R-1598-1A), Holley Part No. 85-964 (R-1598-2A).

1960 HOLLEY (RAMBLER) VISI-FLO CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Number	Main Metering Jet: ① Standard Mark	① Standard Part No.	② 1 Size Lean Mark	② 1 Size Lean Part No.	③ 2 Sizes Lean Mark	③ 2 Sizes Lean Part No.	Power Valve Assembly Part No.	Power Jet Part No.	Idle Tub Part N .	Pump Nozzle Part No.
RAMBLER AMER. CUSTOM												
Synchro-mesh	1960	R-2168-2	56	22R-40-56					25R-166A	34R-2379A		21R-355-28
Auto. Trans.	1960	R-2166-A	55	22R-40-55					25R-166A	34R-3050A		21R-355-28
RAMBLER SIX												
All Models (Early)	1960	R-1598-1A	59	22R-40-59					25R-166A	34R-2379A		21R-355-28
All Models (Late)	1960	R-1598-2A	58	22R-40-58					25R-166A	34R-2379A		21R-355-28

1954 LINCOLN-MERCURY 4-BARREL "CENTRI-QUAD"

LINCOLN	Carburetor No.
1954 Early	EAD-9510-N
1954 Later	⑤ED-EAD-9510-S
MERCURY	
1954 Synchro-mesh	EBY-9510-G
1954 Mercomatic	EBY-9510-H
1954 Later Cars	⑤ED-EBY-9510-K

⑤—These carburetors have new Cover with revised External Vent system to correct fuel spill-over on sharp turns. *See Fuel Spill-over Correction below.*

►CHANGES, CAUTIONS, CORRECTIONS

►***HIGH ALTITUDE OPERATION CAUTION:*** **All production carburetors are equipped with "Sea Level" size main metering jets. On cars operated at higher altitudes, BOTH main metering jets should be replaced with proper size jets for the altitude at which car being operated.**

►***EXTERNAL VENT CHANGE & SEASONAL ADJUSTMENT TO IMPROVE COLD STARTING (1954 Lincoln & Mercury & 1952-53 Lincoln Carburetors where External Vent Kit has been installed):*** On carburetors with external vent through hollow pump rod, spring type Adjustable Clip, No. EAD-99608-A, can be installed on lower end of accelerator pump rod to provide means for cutting off vent during winter operation. See "EXTERNAL VENT ADJUSTMENT" below *NOTE*—This clip will be installed in production on later carburetors.

►***1954 LINCOLN & MERCURY FUEL SPILL-OVER FROM EXTERNAL VENT ON SHARP RIGHT TURNS CORRECTION (Cars with early carburetors):*** Correct by installing new Carburetor Bowl Cover No. ED-EAD-99983-F (Lincoln), ED-EBY-99983-C (Mercury). Install cover as follows:

1)—Remove air cleaner. Remove carburetor cover and gasket, and accelerating pump assembly.

2)—Insert piece of ⅛" string solder in existing vent hole located ¼" down in web between fuel bowl and accelerating pump chamber. Cut off solder so that slight amount protrudes into float chamber *(CAUTION*—do not allow more than 1/16" protrusion in pump cylinder). Use needle-nose pliers to squeeze solder in hole to securely plug this vent hole.

►*CAUTION*—Minimum amount of solder should be left in pump chamber to avoid damage to pump plunger leather piston (use thin shim stock to protect leather when inserting pump plunger in cylinder).

3)—Reassemble carburetor, using new Bowl Cover Assembly as listed above with new gasket. These new bowl covers have a vent passage connecting the accelerating pump chamber with the float bowl which eliminates necessity of vent in web.

NOTE—Later type carburetors ED-EAD-9510-S (Lincoln), ED-EBY-9510-K (Mercury) have this new type bowl cover and revised vent system.

►***1953-54 LINCOLN & 1954 MERCURY AUTOMATIC CHOKE CONTROL HEAT TUBE ASSEMBLY CHANGE (To minimize exhaust gas leakage into automatic choke):*** New type heat tube assemblies (as listed below) and new intake manifolds were used in 1954 production starting approximately June 25, 1954 (Lincoln), August 16, 1954 (Mercury). This assembly can be installed on earlier cars provided that NEW Intake Manifolds are also installed. *NOTE*—Previous type Heat Tube Assemblies are furnished for use with first type manifolds.

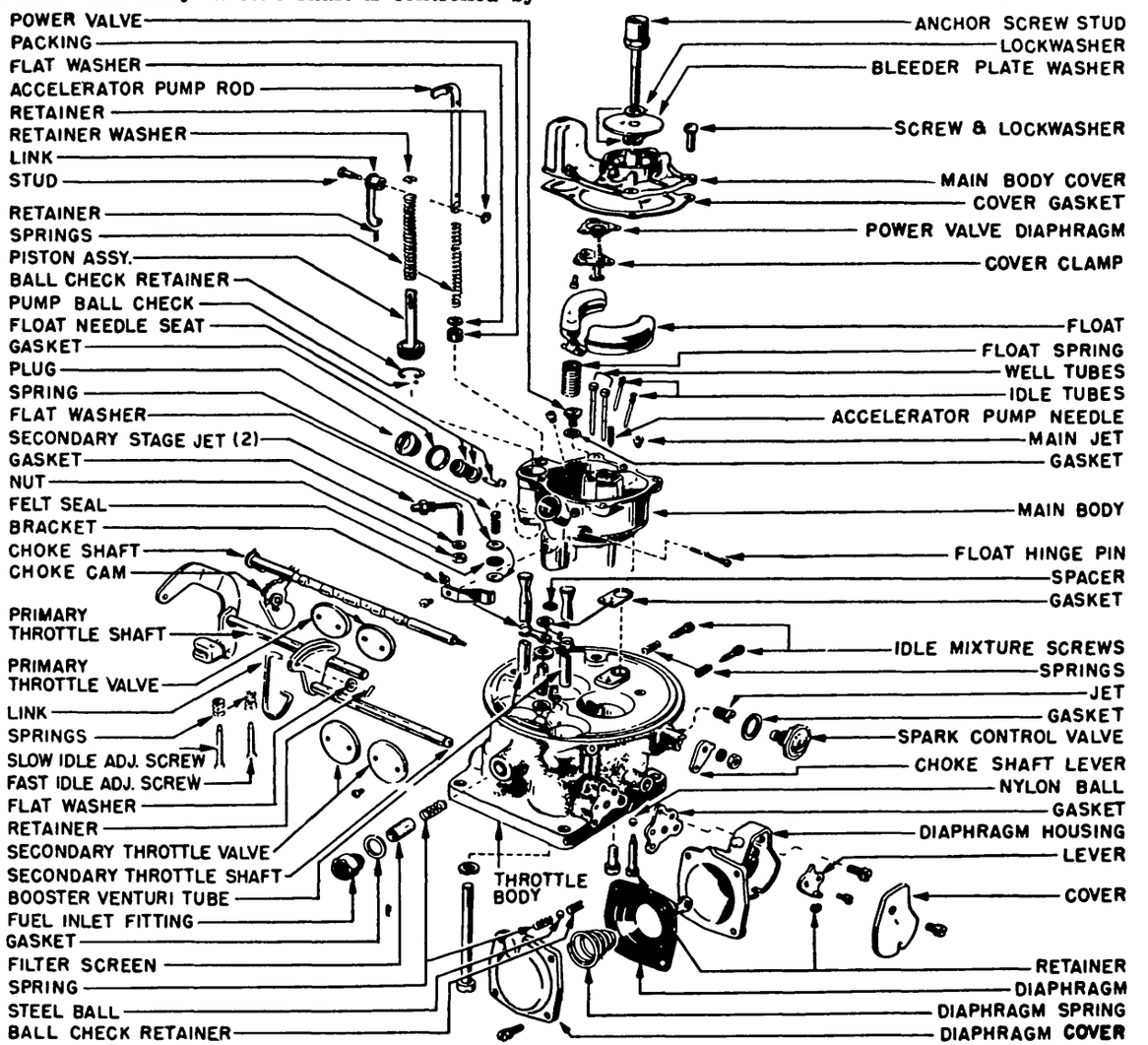
Choke Heat Tube Assy.

Part	Part No.
Heat Tube Assembly	B4A-9890-A
Retaining Nut	B4A-9864-A
Washer Gasket	353999-S
Intake Manifold (Lincoln)	EAD-9425-D
Intake Manifold (Mercury)	EBY-9425-D

DESCRIPTION: The 4-Barrel Centri-Quad carburetor is similar in design to previous dual Centri-flo carburetor with following new features:

Vacuum Control of Secondary Stage Throttle Valves—Secondary throttle shaft is controlled by vacuum diaphragm unit mounted on throttle body. Vacuum passage terminates at right primary stage venturi so that secondary throttle valves open during periods of heavy engine loads or high speed operation (open when vacuum rises to point where atmospheric pressure on opposite side of diaphragm is sufficient to overcome diaphragm spring pressure). The mechanical linkage at the opposite end of the secondary throttle shaft closes the secondary throttle valves promptly (overcoming any lag in vacuum system) when the throttle is closed. *NOTE*—This mechanical linkage will hold secondary throttle valves closed in the event of failure of the vacuum control mechanism.

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1954 LINC LN-MERCURY "CENTRI-QUAD" 4-BARREL CARBURETOR

1954 LINCOLN-MERCURY "CENTRI-QUAD" (C nt.)

ADJUSTMENT: ***Make all adjustments exactly as follows:***

Idle Setting: First set BOTH primary idle mixture adjusting screws EXACTLY 1¼ turns open (no screws used for secondary stage). Start engine and operate it until normal operating temperature secured with choke valve wide open and fast idle cam in slow idle position. Back off fast idle adjusting screw (inner screw on throttle lever) so that it clears the fast idle cam. Set engine speed to correct hot or slow idle speed (see below) by turning slow idle speed adjusting screw (outer screw on fast idle cam). Turn both idle mixture adjusting screws equally ⅛ turn at a time in or out until smoothest idle performance obtained with highest steady vacuum reading. If engine speed changes during this operation, reset speed and repeat idle mixture adjustment. After idle adjustment completed, adjust fast idle (all models), and Anti-stall Dashpot (Mercury Mercomatic Cars).

►***IDLE SPEED SETTING NOTE:*** It is recommended that the idle speed be set with selector lever in NEUTRAL to approximately 475-500 RPM. (Synchro-mesh Cars), 460 RPM. (Automatic Trans. Cars). Then place selector lever in DRIVE and recheck engine idle speed which should be within range shown in table below. Readjust if speed is not within specified range.

Idle Mixture Setting

All Models	1¼ turns open

	Idle Speed Setting	
	Synchro-mesh	**Auto-Trans.**
1953-54 (Lincoln)		①400-425 RPM
1954 (Mercury)	475-500 RPM	①425-440 RPM

①—With selector lever in "DR" position.

►***CAUTION***—Unless idle adjustment made exactly as outlined above (turning screws equally and in same direction), an apparently correct setting may result with a too-rich setting of one screw tending to offset a too-lean setting of the other screw (due to interconnected idle fuel passages in base of throttle body). Screws must be set alike except for slight variation in making final fine adjustment.

Dashpot Setting (Mercury with Mercomatic): After idle adjustment completed, turn ignition off, see that fast idle cam in slow idle position, hold throttle lever in closed position, turn dashpot adjusting screw out (counter-clockwise) until dashpot rod is pushed in to the limit of its travel, then turn adjusting screw in (clockwise) 1½-2 turns which will provide correct clearance of .045-.064".

Seasonal Adjustment for Externally Vented Carburetors: See "Changes, Cautions, Corrections" above for installation of spring clip on pump rod for vent control. Adjust clip as follows to provide best Hot & Cold Starting performance:

Summer (Temp. above 50°F)—Slide clip up on pump rod so that vent holes are exposed.

Winter (Temp. below 50°F)—Slide clip down on pump rod to close off vent holes.

Fast Idle Setting: After completing slow idle setting (above) and with engine at normal operating temperature, so that fast idle cam in slow idle position, turn fast idle adjusting screw (inner screw on throttle lever) in until screw just contacts lowest step on fast idle cam. This will provide correct fast idle speed. *NOTE*—If fast idle speed is unnecessarily high with above setting, fast idle screw may be backed off ***not to exceed one full turn.***

►***CAUTION***—If fast idle screw backed off more than one full turn from specified setting (above), engine flooding and stalling may occur during fast idle operation due to engine speed being too low to burn all fuel discharged into intake manifold.

Accelerating Pump Setting: Seasonal adjustment provided by three holes in primary throttle shaft lever for pump link engagament:

Center Hole—Normal operating conditions.

Outer Hole—Extreme cold weather.

Inner Hole—Extreme hot weather.

Float (Fuel) Level: To check fuel level with carburetor on car, remove air cleaner and main body cover from carburetor, crank engine with starter to fill bowl to operating level. Install Gauge 9550-B (1953 Lincoln) Gauge 9550-AH (1954 Lincoln-Mercury) squarely on top edge of main body so that gauging pins extend down into bowl. Fuel should be at least as high as longer "GO" pin but must not touch shorter "NO GO" pin. Adjust by bending float tab.

►***FLOAT LEVEL ADJUSTING NOTE:*** Due to carburetor design (position of secondary jet tubes above floats), use of Float Adjusting Tool 9550-E may be difficult and following procedure is recommended for float level adjustment: **To raise fuel level**—Support float assembly with finger placed under float bracket, insert tip of medium screwdriver between bottom of float needle seat and edge of float tab, twist screwdriver so as to bend float tab downward. **To lower fuel level**—Support each segment of float by placing finger on top of float, insert tip of medium screwdriver beneath float tab and pry tab upward.

►***CHECKING FLOAT LEVEL:*** After making float level adjustment, remove some fuel from bowl, crank engine (with ignition off) to bring fuel level up to new setting. Recheck fuel level and readjust if necessary.

CAUTION—Both floats must be same height and floats must not contact walls of float bowl.

FUEL LEVEL

All Carburetors	①1/2" ± 1/32"

①—With fuel pump pressure of 3½-4½ lbs.

Automatic Choke: ***NOTE—Choke is separate unit mounted on side of intake manifold and linked to choke valve lever by a rod.*** Mark on cover should be in line with center mark of scale on choke housing. Adjust by loosening three cover retainer screws and rotating cover assembly.

Setting—Centered.

►***CHOKE OPERATING ROD ADJUSTMENT:*** Operating rod length should be checked and adjusted whenever manifold, carburetor, automatic choke, or choke linkage removed and replaced. ***See Step 4 under CARBURETOR INSTALLATION ON ENGINE for operating rod adjustment.***

Spark Control Valve: No adjustment required Calibrating spring in valve is permanently set to allow valve operating at 9½-10½" (1953), 8-10" (1954) of manifold vacuum. If operation not satisfactory, remove and inspect valve for free movement of the valve stem and inspect passage in screw

Power Valve: No adjustment required. Power valve is calibrated to open below 7.5-9" of manifold vacuum.

Spark Advance Control Cable: ***Adjustment required when carburetor installed on engine or whenever linkage disturbed or disconnected. See Lincoln Tune-Up data in Car Model Section.***

Primary & Secondary Throttle Plate Synchronization: Adjust hot engine idle speed to specifications (see Idle Setting above). Clearance between stop located on loose lever on secondary throttle shaft and secondary throttle lever should be .038-.044". To adjust without removing carburetor from engine, bend or file stop tab on loose lever arm. As a bench check, place .039" wire gauge (No. 61 drill) between primary throttle plate and throttle bore on throttle lever side of carburetor. With .039" gauge in position, tab on secondary loose lever on secondary throttle shaft should have a slight play between it and secondary throttle lever. Remove .039" gauge and replace with .040" wire gauge (No. 60 drill). There should be no play between loose lever and secondary throttle lever.

OVERHAUL: *NOTE*—Carburetor Holding Fixture 9510-C can be used to mount carburetor for overhaul if special adapter plate made up to match mounting holes of this carburetor. Check Secondary Throttle Operating Diaphragm before disassembling carburetor (see below). Then disassemble and overhaul carburetor as follows:

►***SECONDARY THROTTLE OPERATING DIAPHRAGM CHECK (Before disassembling carburetor):*** Fully open secondary throttle valves and block off diaphragm passage at opening in primary stage venturi (use eraser end of a pencil) BEFORE releasing secondary throttle valves. Release secondary throttle valves. Valves should remain open as long as venturi opening is blocked off. If valves do not remain open, diaphragm or gasket seal between diaphragm assembly and throttle body may be defective. Remove assembly from carburetor, disassemble, and inspect. Also inspect ball check valve located in diaphragm cover.

Disassembly (Secondary Throttle Operating Diaphragm): Take out attaching screw and remove vacuum diaphragm assembly cover plate. Remove retainer securing diaphragm rod to pin on lever and screw holding diaphragm lever on secondary throttle shaft, remove lever. Take out three screws retaining diaphragm housing on carburetor throttle body, remove diaphragm assembly and gasket.

Disassembly (Carburetor—after Secondary Throttle Operating Diaphragm removed): Mount carburetor on Holding Fixture 9510-C (modified for use with four barrel carburetors) and proceed as follows: Remove air cleaner anchor screw and air bleed washer from top of main body cover, remove four attaching screws and lockwashers holding cover on main body, remove cover and gasket. Remove pump rod pin and retainer from pump operating rod (hold top of pump piston while removing pin from pump rod), lift out pump piston assembly, remove pump rod upper seal and washer, remove pump rod lower seal, washers, and spring.

Main Body Disassembly—Remove float needle seat plug and gasket, using tool 9510-BB, remove float needle seat and gasket, using tool 9564. Remove screw and bracket retaining secondary venturi booster tubes, remove venturi tubes. Loosen locknuts holding secondary jets in man body, remove secondary jets, gaskets, and nuts. Remove float

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1954 LINCOLN, MERCURY "CENTRI-QUAD" (C nt.)

hinge pin, lift entire float assembly out (float, float needle, clip, and float spring). Remove power valve and gasket, using tool 9510-AA. Remove main metering jets, using tool 9533. Remove idle jet tubes, using tool 9544. Remove accelerating pump ball check retainer, using a wire hook to remove retainer from pump cylinder. Tip carburetor up and catch pump ball check, discharge needle, and main well tubes which will fall out of main body. Remove retainer from pump link pin, remove link from throttle lever. Remove two screws and lockwashers retaining main body on throttle body lift off main body *(CAUTION*—Note gasket and spacer between main body and throttle body, and "O" ring seal on fuel inlet adapter). Remove fuel inlet adapter and booster venturi bracket and gaskets *(NOTE*—One gasket on each side of bracket).

Throttle Body—Remove spark control valve and gasket from boss on throttle body, remove metering jet from inside spark control valve housing. Remove fuel inlet adapter, filter, gasket, and spring. Remove both idle adjusting screws and springs. Take out ball retainer in distributor vacuum passage, remove nylon ball. DO NOT disturb throttle valve and shaft assemblies, fast idle cam, or choke valve and shaft assembly unless replacement required due to wear or damage as determined by inspection. If replacement required, install NEW Throttle Body Assembly. Disconnect and remove secondary throttle control rod. If necessary to remove fast idle cam, proceed as follows:

Fast Idle Cam—Tap out retaining pin, remove fast idle cam from shaft. *CAUTION*—do not attempt to remove the cam shaft from the throttle body (retained by pin in body).

Power Valve Diaphragm—DO NOT remove assembly from main body cover unless tests indicate that replacement required. Remove by taking out three attaching screws and lifting off cover clamp and diaphragm assembly.

Cleaning & Inspection: Wash all parts except those noted below in clean solvent *(CAUTION*—Do not use solvent on pump piston leather, power valve diaphragm, spark control valve, nylon fuel inlet needle valve, nylon distributor passage ball, dashpot assembly, or secondary throttle operating diaphragm). Blow out passages in castings with air, dry all parts with air. Inspect all parts for wear and damage with particular attention to the following: Inspect castings and main body cover for cracks or leaks, inspect main well tubes, metering jets, and idle tubes for wear or clogged passages *(CAUTION* —clean with air, do not use drills to clean out calibrated openings). Replace all worn or damaged parts

Reassembly: Use all NEW gaskets. Install parts in reverse order of disassembly procedure (above) and note the following important points:

Distributor Passage Nylon Ball Caution—If new ball installed, make certain that correct size used.

Choke Valve Installation—Slide choke shaft in through throttle body and install nozzle tube drum on shaft as it enters each venturi *(CAUTION*—rounded opening on drums must face inlet side of carburetor and tapered side of hole must face downward). Install choke valves, hold valves closed while tightening attaching screws. Install choke lever on end of shaft and make certain that pin on lockout lever engages slotted hole in choke lever, secure lever on shaft with lockwasher and nut. Install "C" washer on pin of choke lockout lever.

Choke Valve Plate Position—Check choke valve angle in closed position as follows: Hold choke valves closed at limit of travel, measure distance from top edge of venturi to top edge of choke valves at rear side. This distance must be 1/16". Adjust by bending stop tab on choke lever shaft. *NOTE*—*Choke operating rod length is adjusted as part of carburetor installation procedure. See step 4 under CARBURETOR INSTALLATION ON ENGINE below.*

Secondary Throttle Valve Equalization—If secondary throttle valve removed, use strips of .004" shim stock 1/8-3/16" wide between lower side of each valve (viewed from bottom) and carburetor throat, and hold valves closed against shims while tightening retaining screws. This method will insure proper closing of valves which is necessary for maximum manifold vacuum.

Main Body & Throttle Body Assembly—Install fuel inlet adapter, filter, spring, and gasket. Install fuel inlet fitting and bracket with a gasket on each side of the bracket, tighten the fitting securely. Apply light film of lubricant to "O" ring seal and install seal on fuel inlet adapter. Install gasket on main body support and position main body on throttle body aligning rounded opening of each nozzle tube drum with its discharge nozzle and properly positioning choke lever on fast idle cam. Tighten main body-to-throttle body attaching screws to 4-5 ft.lbs. torque. *(NOTE*—One long screw is located in recessed hole in center of bottom face of throttle body and special small diameter washer must be used with this long screw).

Secondary Jet Installation—Use a new gasket on each secondary jet, insert jets through openings in main body, install locknut on end of each jet with chamfered face of nuts toward carburetor wall. Position jets by moving lower ends to each side as far as possible to avoid interference with power valve operating rod, securely tighten retaining nuts.

Power Valve Diaphragm Installation—*This must be installed as follows to properly seat diaphragm on main body cover:* Place cover clamp over diaphragm stem, compress spring and wind rubber band tightly around stem and spring to hold spring compressed while assembly being installed. Position assembly on main body cover, tighten three attaching screws securely, then remove rubber band and check for free operation by pressing on diaphragm stem. Action must be absolutely free.

Carburetor Adjustments—Make all adjustments listed in ADJUSTMENTS above.

CARBURETOR INSTALLATION ON ENGINE: Install carburetor exactly as follows:

►***CAUTION—DO NOT use gasket sealer or compound on carburetor mounting gaskets.***

1) Position spacer on carburetor mounting pad on manifold with one gasket BELOW and second gasket ABOVE spacer.

2) Position carburetor over mounting studs and start fuel line and choke control inlet tube fittings but DO NOT tighten fittings at this time. Do not connect vacuum lines.

3) Install carburetor attaching nuts and lockwashers and tighten exactly as follows: Tighten all nuts just snug, then tighten each pair alternately in a criss-cross to a torque of 12-15 ft. lbs. *CAUTION* —Correct tightening is important to prevent air leaks or fuel leaks at grooved passages in base of carburetor throttle body.

4)—Install choke operating rod. Make certain that choke valve closed position is correct (see Reassembly), then check choke rod length as follows: With rod disconnected from carburetor lever, hold choke plates in fully closed position, raise rod to highest position, and check whether rod end enters carburetor lever freely. If not, bend rod (first type), adjust trunnion on rod (later type) until rod end enters hole in lever freely, connect rod.

5)—Tighten choke control inlet tube fitting, distributor vacuum line, and fuel line connection.

6)—Start engine and run it sufficiently to fill carburetor bowl with fuel. Check fuel level. *See Float Level data above.*

7)—Re-install main body cover (CAUTION—Do not use gasket sealing compound on cover gasket). Install bleeder plate washer (install lockwasher below and above bleeder plate washer), tighten anchor stud screw to 4-5 ft. lbs. torque.

8)—After engine warmed up, make all carburetor adjustments. See ADJUSTMENTS above.

SERVICE PARTS: ***CAUTION—Metering jets furnished in repair kits listed below are STANDARD (for 0 to 5000 ft. Altitude). See High Altitude Carburetor Note (above) for special high altitude metering jets.***

Gasket Set—Lincoln-Mercury No. HDK-9502A (Lincoln Carb.), No. MEK-9502-A (Mercury Carb.).

Repair Kit (With Std. Metering Jets)—Lincoln-Mercury No. HDK-9590-B or HDK-9590-C (1953 Lincoln), No. HEK-9590-B (1954 Lincoln & Mercury).

1955-57 FORD, LINCOLN, MERCURY CENTRI-QUAD CARBURETORS

CONTINENTAL

1956 Mark II	ECU-9510-B,C,D,E

FORD V8 CARS & THUNDERBIRD

1955 Early (Synchro-Mesh) ①	B5A-9510-G
1955 Early (Fordomatic) ①	B5A-9510-H
1955 Late (Synchro-mesh) ①	B5A-9510-M
1955 Late (Fordomatic) ①	B5A-9510-N
1956 Early (Synchro-mesh) ②	B6A-9510-L
1956 Early (Fordomatic) ②	B6A-9510-M
1956 Later (All) ②③	B6A-9510-N,Q
1957 (Exc T-Bird) ④	B7A-9510-AC
1957 Early (Thunderbird) ⑥	B7A-9510-V
1957 Late (Thunderbird) ⑥	B7A-9510-AC
1957 270 HP Eng. (2 Carbs.)	(Front & Rear) B7A-9510-P

FORD TRUCKS

1956 All (272" H D Eng)	⑦ B6T-9510-B,C,D,F,G

LINCOLN

1955 Early	EBJ-9510-D
1955 Late	EBJ-9510-F
1956	ECU-9510-B,C,D,E

MERCURY

1955 Early (Synchro-mesh)	⑤ ECK-9510-C
1955 Early (Mercomatic)	⑥ ECL-9510-B
1955 Late (Mercomatic)	⑥ ECK-9510-D
1955 Later (Mercomatic)	ECK-9510-H
1955 Late (Synchro-mesh)	ECK-9510-G
1956 Early (Synchro-mesh)	B6A-9510-L
1956 Early (Mercomatic)	B6A-9510-M
1956 Late (All) ③	B6A-9510-N,Q

① - Ford 272" Special (with Power Pkg) & 292" Engine (Interceptor & Thunderbird)

② - 292" & 312" Engines

③ - When used on Fordomatic or Mercomatic cars, a dashpot and attaching parts are also required

④ - With 300 HP Supercharged Engine

⑤ - Use B5A-9510-G for replacement.

⑥ - Use B5A-9510-H for replacement.

⑦ - B6T-9510-B,C,D replaced by B6T-9510-F B6T-9510-F replaced by B6T-9510-G

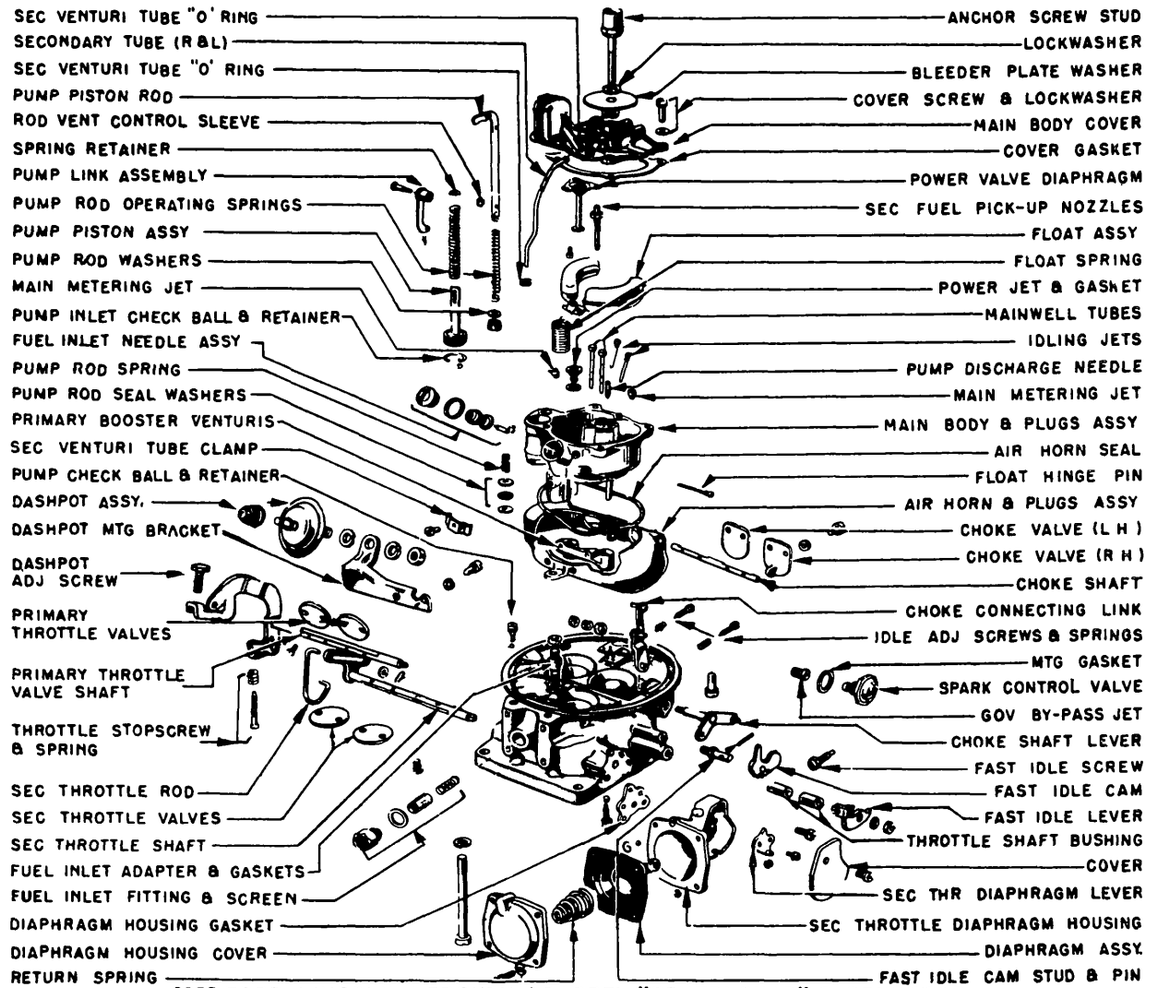
►CHANGES, CAUTIONS, CORRECTIONS

►*1955 CARBURETOR INSTALLATION CAUTION (First Cars with Choke Inlet Air Tube Washer in Throttle Body)* First carburetors have "0" Ring seal and retaining washer in recess in top surface of throttle body which seals air inlet tube when carburetor installed on engine This washer must be properly staked in throttle body and care must be used when installing carburetor that washer and seal are not dislodged by tube **Loose washer or seal may be carried into combustion chamber with resulting damage to engine** If washer is loose, install later type rubber grommet (Ford No B5A 9655 A) which replaces both "0" ring seal and washer

►*1955 CHOKE VALVE BIND CORRECTION (Ford Carburetors)* On first carburetors if choke valves bind on upper surface of throttle body, correct by grinding a slight depression in the top surface of the throttle body to provide 020 minimum clearance between valves and body *NOTE*–Later carburetors have additional clearance at this point

►*1956 FORD HARD COLD STARTING CORRECTION (CARS WITH B6A-9510-L, M CARBURETORS)* Install Choke Kit, Part No. B6A-9849-D which contains all parts used on the later B6A-9510-N, Q carburetor choke assemblies. The complete kit must be installed as the individual parts are not interchangeable with the earlier parts. Install kit as follows Disconnect choke outlet tube and remove the bi-metal spring cover, gasket and plate. Remove choke housing as an assembly (the fast idle cam will be loose and can also be removed). Remove choke plate nearest to choke housing. Check for any binding in linkage after plate removed. Install new plate, but do not tighten. Align choke plate by placing a ⅛" wide strip of paper between choke plate and air horn. Close choke plate and tighten the screws (check for any binding before screws are tightened). Position new fast idle cam and bearing assembly. Use a new gasket and install the new choke housing as a complete unit. *(NOTE* - On early cars where the fast idle cam swings on a boss which is an integral part of the main body, it will be necessary to use the original cam plus the new spacer) Check operation, then open choke plates fully by means of the bi-metal arm. Position template (part of choke kit) on choke housing so that bi-metal operating arm protrudes through hole in template. Rotate template clockwise to close the choke completely Scribe a mark on the choke housing at position where point of arrow on template indicates (this will be the central point of the bi-metal spring adjustment). Remove template and install gasket, plate and bi-metal spring cover. Set the cover on the line scribed on housing (disregard notches cast in choke housing). Connect the choke control outlet tube to choke housing, and place accelerator pump link in the hole giving the longest stroke. Adjust carburetor.

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1955 FORD, LINCOLN, MERCURY 4-BARREL "CENTRI-QUAD" CARBURETOR

1955-57 FORD, LINCOLN, MERCURY "CENTRI-QUAD" (C nt.)

►*1956 CHOKE BINDING NOTE* This condition may be caused by front portion of the aluminum heat baffle being bent toward the rear causing it to bind on choke linkage.

►*1956 FORD ACCELERATING PUMP PISTON ROD REPLACEMENT (ON B6A-9510-N CARBURETOR) NOTE* The later type piston rod with an additional hole in the top end, Part No. B6A-9531-C, can be used as a replacement when used with later Main Body Cover, Part No. B6A-9984-D.

►*1956 FORD CARBURETOR DRY FLOAT LEVEL CAUTION* B6A-9510-Q carburetor float level is 7/32". Float level of other carburetors is 1 /4 '.

►*1956 LINCOLN & CONTINENTAL HARD COLD STARTING CORRECTION* If after depressing the accelerator, the choke plates do not set themselves, the cause may be that too much stock has been removed from upper tip of cam at the point where cam contacts the choke link roller. Correct by replacing the choke cam assembly. Check the choke by operating the choke plates by hand with the throttle plates held open, to determine if the bi-metal spring in the assembly is imparting a closing action to the choke plates. If there is no closing tension, check the following Choke link must be in place and held in its position by tab of thermostat lever. If link is found to be disengaged, reinstall choke link and bend tab of choke thermostat lever toward link sufficiently to prevent link from becoming disengaged, allowing sufficient clearance between tab of thermostat lever and choke link to permit operation without binding or sticking. Eye on thermostat spring must fit over tang on thermostat lever. Adjust choke setting.

►*1956 LINCOLN ECU-9510-D & MERCURY B6A-9510-N CARBURETOR PRODUCTION CHANGE* A sleeve spacer, Part No. B6A-9644-A designed to provide a bearing surface for the fast idle cam assembly on these carburetors is available for service replacement, and should be installed between the integral choke housing and throttle body.

►*1956 LINCOLN VAPOR LOCK NOTE* This condition may be caused by the fuel pump-to-fuel tank tube hose assembly being too small. The correct hose is Part No. LE-9288-A and an inside diameter of .310".

►*1956 LINCOLN & MERCURY AUTOMATIC CHOKE MALFUNCTION NOTE & AIR HEATER TUBE PRODUCTION CHANGE* Improper choke action may be caused by a broken or leaking air heater tube which would be indicated by carbon deposits in choke housing. If this is the case, replace the early type air heater tube with Part No. ECU-9890-S (Lincoln), B6A-9890-A (Mercury) as follows Remove intake manifold and inspect both ends of tube for leakage or insufficient clearance, particularly the small end (right side of manifold), which may be constricted or not properly entering hole in manifold. In this case it will be necessary to ream the small hole using a 5/16" Keystone expansion reamer with the adjusting screw removed. Turn reamer into manifold until 1/2" of cutting surface is sticking out. *(NOTE* - Later manifolds having ar "X" stamped on right exhaust leg just below choke, have the manifold reamed slightly larger in production and do not require additional reaming). Install the new heat tube by inserting the small end of tube into large hole in manifold and guide it through heat riser until the end is started into small opening. Drive tube the rest of the way with a punch large enough to contact full diameter of tube.

►*1956 LINCOLN & MERCURY FLOAT & FLOAT SPRING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To Maintain a Steady Fuel Level)* A new float Part No. B6A-9550-B, and float spring, Part No. B6A-9958-A is being used in production and can be used for service replacement on earlier 1956 carburetors. Carburetors having the later type float and spring assembly are identified by an "S" stamped on carburetor mounting flange adjacent to the idle adjusting screws. With the use of the later type float and spring, the dry float level has been changed to 7/32" in order to maintain a fuel level of 1/2".

►*1956 MERCURY HARD STARTING CORRECTION (ON A FEW EARLY CARS)*· On carburetors built before the third week in September, identified by a date code on accelerator pump tower of the float bowl cover (Example 5-9-3 means 1955, September, 3rd week), turn the automatic choke cover clockwise three additional notches.

►*1956 FORD, LINCOLN, MERCURY BOWL EXTERNAL VENT SEASONAL SETTING CHANGE* For winter operation, close vent for temperatures below 30° F. and open vent for temperatures above 30° F.

►*ROUGH ENGINE IDLE CORRECTION: (Due to Leakage):* Check engine at 2000 RPM to stabilize fuel level in bowl. If engine idles smoothly immediately after operation at 2000 RPM, but roughens progressively with length of time on idle, it can be assumed that leakage at inlet needle or gasket is occuring. Remove inlet needle, seat and gasket. Clean carburetor carefully to remove any foreign material. Install new inlet needle, seat and gasket. If rough idle not corrected by above and by engine tune-up (including valve lash), intake manifold should be checked for air leakage at gasket between manifold and cylinder head mating surface.

►*HESITATION UPON ACCELERATION CORRECTION.* When a slight hesitation is felt upon light acceleration check to see that the carburetor is equipped with the correct accelerator nozzle and link and that link is set to correct adjustment. See Accelerating Pump below.

DESCRIPTION: 4-Barrel downdraft type with vacuum operated secondary throttle valves The automatic choke assembly on 1955 models is located on intake manifold and linked to choke operating shaft & lever on carburetor. 1956-57 carburetors have an integral automatic choke assembly mounted on throttle body assembly and linked to choke intermediate shaft. 1955 and 1956-57 carburetor designs are similar, however, due to internal differences the repair procedures are different as indicated below.

ADJUSTMENTS: *Make all adjustments exactly as follows:*

Idle S tting: First set BOTH primary idle mixture adjusting screws (see table below) for initial adjustment. Start engine and operate it until normal operating temperature is reached with choke valve wide open and fast idle cam in slow idle position. Back off fast idle screw so it clears the fast idle cam. Set engine idle speed to correct hot or slow idle (see table below) by turning slow idle speed adjusting screw. Turn one idle mixture screw in until engine begins to run rough (lean), then back off screw until engine begins to roll (rich), then turn screw inward just enough to provide smoothest engine idle Fuel mixture should favor the rich side Repeat this procedure on other mixture screw Recheck idle speed and if not within limits, readjust to correct specifications

Initial Idle Screw Setting

Model	Turns Out
1955 Ford (B5A-9510-G,H)	1¼
1955 Ford (B5A-9510-M,N)	½-5/8
1956-57 Ford (All)	5/8
1955-56 Continental, Lincoln & Mercury	1½

Idle Speed

Model	Idle Speed
1955 Ford (Synchro-mesh)	475-500 RPM
1955 Ford Pass.Cars (Fordomatic)	① 450-475 RPM
1955 Ford Interceptor (Fordomatic)	① 475-500 RPM
1955 Ford Thunderbird (All)	① 475-500 RPM
1955 Continental & Lincoln	② 425-450 RPM
1955 Mercury (Synchro-mesh)	475-500 RPM
1955 Mercury (Mercomatic)	② 425-450 RPM
1956 Ford (Synchro-mesh)	475-500 RPM
1956 Ford (Fordomatic)	② 475-500 RPM
1956 Lincoln	① 475-500 RPM
1956 Mercury (Synchro-mesh)	475-500 RPM
1956 Mercury (Mercomatic)	③ 475-500 RPM
1957 Ford 300 HP Supercharged	① 500-525 RPM

① - Transmission selector lever in "N" (Neutral).

② - Transmission selector lever in "D" (Drive).

③ - With transmission in "N" (Neutral). Recheck with transmission in "D" (Drive), and adjust to 425-450 RPM, if necessary.

Dashpot Setting (All Auto. Transmissions): After idle adjustment completed, turn ignition off, see that fast idle cam in slow idle position, hold throttle lever in closed position, turn dashpot adjusting screw out (counter-clockwise) until dashpot rod is pushed in to the limit of its travel, then turn adjusting screw in (clockwise) 1½-2 turns which will provide correct clearance of 045- 064 '

Accelerating Pump Setting: Set pump link in hole closest to throttle shaft (shortest stroke) for average or hot weather operation, outer hole for cold weather operation.

Bowl External Vent Seasonal Setting: Adjust clip on lower end of accelerator pump rod to open or close vent hole for best operation as follows

Winter Operation (Temperatures below 50°F)—Slide clip down on pump rod so that vent hole is CLOSED.

Summer Operation (Temperatures above 50°F)—Slide upward on pump rod so that full diameterof vent hole is open

CONTINUED N NEXT PAGE

1955-57 FORD, LINCOLN, MERCURY "CENTRI-QUAD" (C nt.)

Fast Idle Setting: After making idle speed adjustment and with engine at normal operating temperature, turn fast idle speed adjusting screw until it just touches lowest step of fast idle cam *NOTE*—If this setting is unnecessarily high, the idle speed may be reduced by backing off the adjusting screw not to exceed one full turn

D p pper Adjustment (Trucks): *(NOTE*—Depopper adjusting screws are located on underside of throttle body and carburetor must be removed for adjustment. Turn each screw in until spring is completely compressed, then back off screw 2 7/8 turns (adjustment must be held as close to this specification as possible). If engine popping is evident after idle adjustment and depopper ball adjustment is correct, back off depopper adjusting screws 1/8 turn at a time until popping is eliminated.

S c ndary Throttle Operating Diaphragm Check: Remove carburetor from engine, remove main body and choke housing from throttle body Fully open (at the linkage) both primary and secondary throttle Block off the secondary vacuum openings in the right primary and secondary venturi with the fingers Release sedondary throttle linkage while holding primary throttle linkage open If no leak exists secondary throttle plates should remain partially open To check diaphragm unit, remove complete diaphragm and housing assembly from carburetor Pull diaphragm rod in a direction to compress spring Cover slot located in housing to carburetor mounting face with finger Release diaphragm rod If no leaks exist spring should remain partially compressed

►*1956 FLOAT LEVEL PRODUCTICN CHANGE (CONTINENTAL, FORD, LINCOLN & MERCURY): See "Changes, Cautions, Corrections" above.*

Fl at (Fuel) Level: To check fuel level with carburetor on car, remove air cleaner and main body cover from carburetor, crank engine with starter to fill bowl to operating level Install Gauge T54L-9550-C (Ford), 9550-AH (Lincoln-Mercury) squarely on top edge of main body so that gauging pins extend down into bowl Fuel should be at least as high as longer GO pin but must not touch shorter NO GO pin Adjust by bending float tab

► *CAUTION* Both floats must be the same height and floats must not contact walls of float bowl

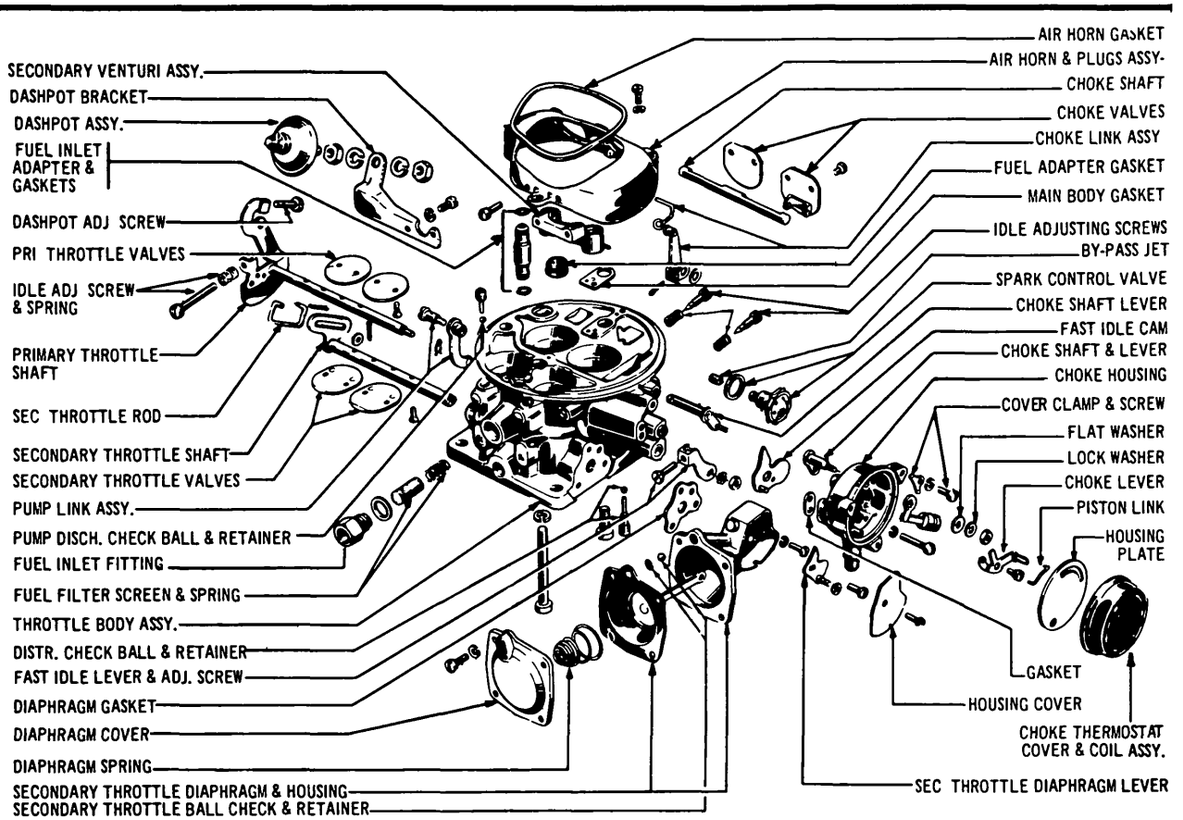
FUEL LEVEL

All Carburetors	① 1/2±1/32'

①—With fuel pump pressure of 3½-4½ lbs

Aut matic Choke Setting. Mark on cover should be in line with center mark of scale on choke housing Adjust by loosening three cover retainer screws and rotating cover assembly

►*1955 CHOKE ROD LENGTH NOTE:* Mercury engine has manifold to carburetor spacer EBJ-9447A (½" thick) and automatic choke rod B5A-9869-A (4¼" long) Whenever difficulty is experienced in adjusting choke rod for proper closing of choke plates, check dimension of these two parts



1956-57 FORD, LINCOLN, MERCURY CENTRI-QUAD CARBURETOR THROTTLE BODY ASSY.

Automatic Choke Rod Adjustment (1955 Carburetors): Remove air cleaner, choke connector rod retainer and pull trunnion out of choke lever. Hold choke plates in fully closed position, raise and hold choke connector rod in its uppermost position and align the adjustable trunnion (on upper section of rod) with hole in carburetor choke shaft lever. Adjust the trunnion two additional turns upward (to lengthen connecting rod). Secure trunnion to choke shaft lever.

Spark Control Valve: No adjustment required If operation not satisfactory, remove and inspect valve for free movement of the valve stem and inspect passage in adapter screw

OVERHAUL: Check Secondary Throttle Operating Diaphragm before disassembling carburetor (see below). Then disassemble and overhaul carburetor as follows

►*SECONDARY THROTTLE OPERATING DIAPHRAGM CHECK (Before disassembling carburetor).* Fully open secondary throttle valves and block off diaphragm passage at opening in primary stage venturi (use eraser end of a pencil) BEFORE releasing secondary throttle valves. Valves should remain open as long as venturi opening is blocked off. If valves do not remain open, diaphragm or gasket seal between diaphragm assembly and throttle body may be defective. Remove assembly from carburetor, disassemble, and inspect. Also inspect ball check valve located in diaphragm cover

Disassembly (Secondary Throttle Operating Diaphragm): Take out attaching screw and remove vacuum diaphragm assembly cover plate. Remove retainer securing diaphragm rod to pin on lever and screw holding diaphragm lever on secondary throttle shaft, remove lever. Take out three screws retaining diaphragm housing on carburetor throttle body, remove diaphragm assembly and gasket.

1955 MODELS

Disassembly (Carburetor—after S condary Throttle Operating Diaphragm removed): Remove carburetor cover and gasket. Remove pump rod pin from accelerator pump activating rod. Lift out pump piston. Remove pump rod upper seal and washer, accelerating pump rod lower seal, washers, and spring. Remove hairpin retainer from pin of the pump link, and link from throttle lever.

Main Body Disassembly—Remove float needle seat plug and gasket, and float hinge pin. Lift out float, float needle and clip, and float spring from carburetor bowl. Remove power valve and gasket, main metering jets and idle tube jets. Remove accelerating pump

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1955-57 FORD, LINCOLN, MERCURY "CENTRI-QUAD" (C nt.)

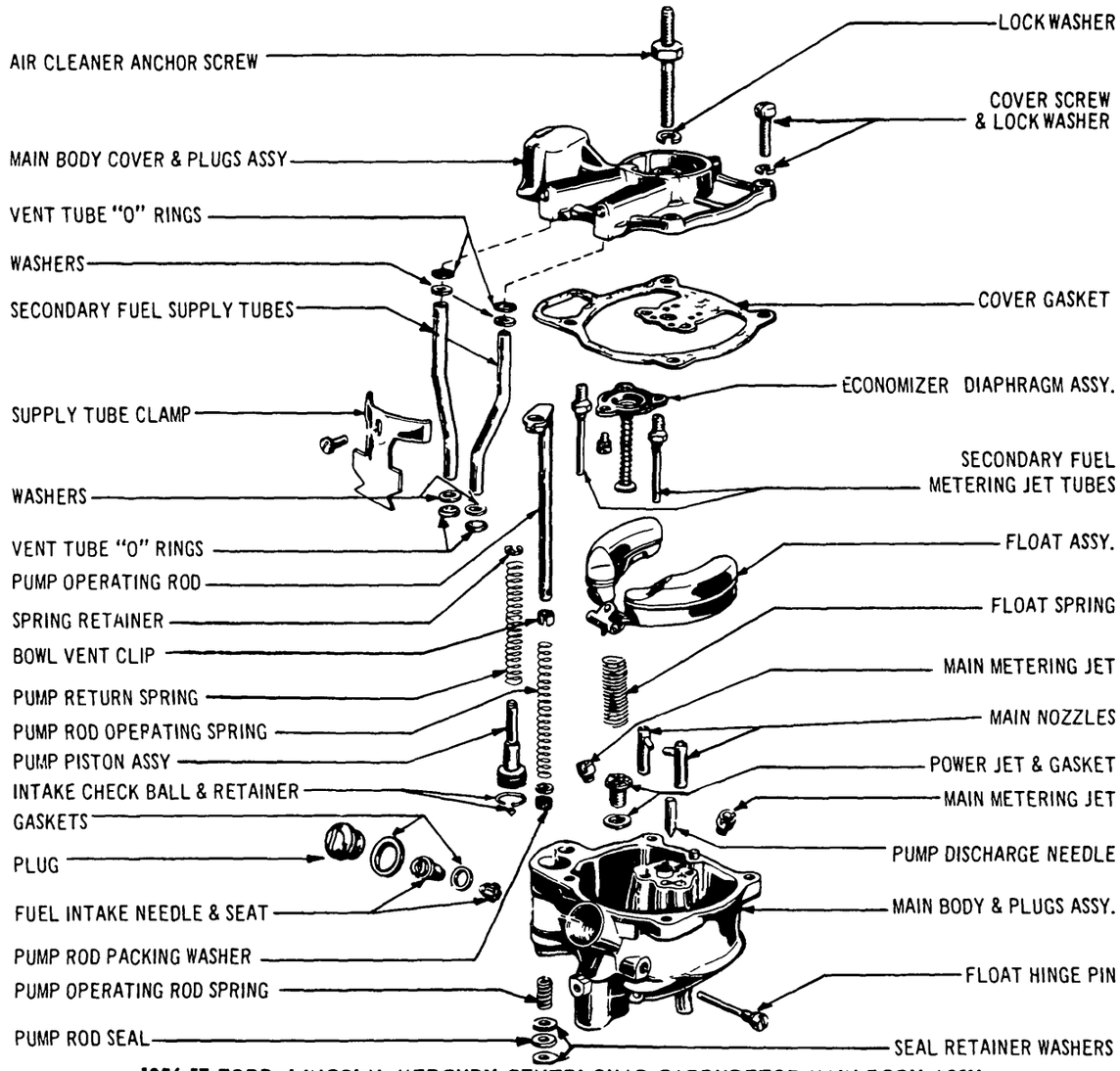
ball check retainer, invert carburetor to release main well tubes, accelerator pump discharge needle, and accelerator pump ball check valve. Remove two screws and lockwashers and separate choke housing from main body, remove main body. Remove spacer between main body and throttle body, remove fuel inlet adapter from main body.

Throttl B dy Disass mbly - Remove spark control valve and gasket and spark control metering jet from inside of spark control valve bore. Remove fuel inlet adapter, screen, filter, gasket, and spring, idle mixture adjusting screws, and the two screw-in plugs in secondary fuel passages Invert throttle body and remove two steel balls. Remove two screws securing dashpot bracket to throttle body and remove bracket and dashpot assembly. Remove pin retainers from each end of throttle control rod, and flat washer from stop lever end of rod, remove rod. If fast idle cam not defective, remove retaining pin with a punch and remove fast idle cam. DO NOT ATTEMPT TO REMOVE FAST IDLE CAM SHAFT If it is necessary to remove throttle plates for cleaning or repair, each plate must be identified as to the bore from which it was removed (left or right) so that plates can be installed in their original positions

Power Valve Diaphragm—DO NOT remove assembly from main body cover unless tests indicate that replacement required. Remove by taking out three attaching screws and lifting off cover clamp and diaphragm assembly.

1956-57 MODELS

Main B dy Disass mbly - Remove center stud and lockwasher. Remove cover retaining screws, then lift cover off main body. Remove screw and bracket retaining secondary fuel tubes. Remove secondary fuel tubes by gently pulling them from throttle body *(CAUTION* - Do not bend secondary fuel tubes). Remove accelerator pump link from operating rod and throttle lever. Remove stud and vent clip from lower end of pump operating rod, then lift pump assembly out of main body. Remove pump rod dust seal, washer and spring. Remove pump rod upper seal and washer. Lift main discharge nozzles out of main body with a pair of needle nose pliers. Use care not to damage nozzles. Invert carburetor and catch pump discharge needle as it falls out. Remove float inlet needle seat spring and seat. Unscrew float hinge pin and lift float assembly out of main body. Remove float damper spring. Remove main jets, then remove power valve. Make a small hook on a suitably sized wire, then lift accelerator pump inlet check ball retainer out of pump well. Invert carburetor and catch inlet check ball as it falls out. Remove secondary jets from main body cover, remove power valve diaphragm retaining screw, then remove diaphragm and stem assembly. If necessary, disassemble accelerator pump assembly. Slip piston cup off end of piston stem. Compress stem spring, pry off stem retainer, then remove the stem and spring from operating rod. Remove air horn to throttle body screw. Invert carburetor and remove two throttle body to main body screws. Lift off the main body and remove main body gasket. Lift air horn off throttle body, and disengage choke actuating lever from choke plate.



1956-57 FORD, LINCOLN, MERCURY CENTRI-QUAD CARBURETOR MAIN BODY ASSY.

Throttle Body Disassembly - Remove idle adjustment needles and springs. Remove the three choke retaining screws, then remove cover and gasket. Remove choke heat shield. Remove thermostatic spring lever, and the small wire connecting rod. Remove three choke housing retaining screws and remove choke housing and gasket. Remove nut, lockwasher and spacer, then slip choke piston assembly out of housing. Remove lever from back side of choke housing. Remove fast idle cam. Remove spark control valve and gasket. Remove fuel inlet fitting, gasket, filter screen, and spring. Remove secondary fuel system check ball retainers, then invert throttle body and catch the two balls as they fall out. Remove vacuum passage check ball retainer from bottom of throttle body, and shake out the check ball. If so equipped, remove dashpot and bracket assembly. *NOTE* - If it is necessary to remove throttle plates for cleaning or repair, each plate must be identified as to bore from which it was removed (left or right) so that plates can be installed in their original positions.

CONTINUED ON NEXT PAGE

1955-57 FORD, LINCOLN, MERCURY "CENTRI-QUAD" (C nt.)

Air Horn Disassembly - Remove choke plate screws. Slide choke plate shaft out of air horn. Remove lock wire from booster venturi screws, then remove the screws.

1955-57 MODELS

Cl aning & Inspection: Wash all parts except those noted below in clean solvent *(CAUTION*–Do not use solvent on pump piston leather, power valve diaphragm, spark control valve, nylon fuel inlet needle valve, nylon distributor passage ball, dashpot assembly, or secondary throttle operating diaphragm). Blow out passages in castings with air, dry all parts with air. Inspect all parts for wear and damage with particular attention to the following: Inspect castings and main body cover for cracks or leaks, inspect main well tubes, metering jet, and idle tubes for wear or clogged passages *(CAUTION*–clean with air, do not use drills to clean out calibrated openings). Replace all worn or damaged parts.

R assembly: Use all NEW gaskets. Install parts in reverse order of disassembly procedure (above) and note the following important points:

Throttle Plate Installation–In addition to replacing each plate in its original position, place a .004" piece of shim stock 1/8-3/16" wide between the upper side (viewed from top) of each secondary throttle plate and the throat. Hold throttle plates closed against shim stock and tighten throttle plate screws. This assures maximum manifold vacuum for smooth efficient engine idle.

Main Body to Choke Housing & Throttle Body–Install spacer over mounting hole for long screw in throttle body, choke plate link so as to permit free travel of link under main body. Be sure "O" ring seal is not displaced and that main body locating dowels engage the throttle body. Small diameter washer must be used with longer of two main body to throttle body screws.

Accelerating Pump–Drop check ball into cylinder bore and tap lightly, using brass rod and mallet, to seat ball. Ball spring retainer projection must be placed over ball, and spring must bottom in cylinder bore groove.

Float Installation–Float spring must seat over boss in main body. Clip must hook the under side of float tab.

Main Body Cover Gasket–Make sure all holes have been punched in new gasket and that no foreign material has adhered to it. Never use any gasket sealer or any form of sealing compound on carburetor gaskets.

Power Valve Diaphragm Installation–Place new assembly on main body cover, position clamp, install the screw and secondary supply jets finger tight. Compress power valve stem to full limit of its travel, then tighten retaining screw and secondary supply jets. *NOTE*–Screw and tubes must be tightened while stem is in the compressed position to insure full travel of the power valve stem.

►*AIR CLEANER ANCHOR SCREW TIGHTENING CAUTION:* Over tightening may cause distortion of the carburetor main body and affect calibration of the metering passages.

Carburetor Adjustments–Make all adjustments listed in ADJUSTMENTS above.

CARBURETOR INSTALLATION ON ENGINE: Install carburetor exactly as follows:

►*CAUTION: DO NOT use gasket sealer or compound on carburetor mounting gaskets.*

1) On 1955 carburetors, position spacer on carburetor mounting pad on manifold with one gasket BELOW and second gasket ABOVE spacer.

2) Position carburetor over mounting studs and start fuel line and choke control inlet tube fittings but DO NOT tighten fittings at this time. Do not connect vacuum lines.

3) Install carburetor attaching nuts and lockwashers and tighten exactly as follows: Tighten all nuts just snug, then tighten each pair alternately in a criss-cross to a torque of 12-15 ft. lbs. *CAUTION*–Correct tightening is important to prevent air leaks or fuel leaks at grooved passages in base of carburetor throttle body.

4) On 1955 carburetors, adjust automatic choke rod (see above). On all carburetors, attach throttle rod to carburetor lever and secure with a clip. Tighten choke inlet tube fitting, distributor vacuum lines and fuel line connection at carburetor. Install air cleaner.

SERVICE PARTS: *NOTE - M t ring j ts furnish d in repair kits listed below are STANDARD (for 0-5000 ft. alt.).*

Gasket Set - Ford No. B5A-9502-B (B5A-9510-G,H, M,N); Ford No. B6A-9502-D (B6A-9510-L,M,N,Q); Ford No.. B7A-9502-G (B7A-9510-AC, V); Ford No. B6T-9502-B (B6T-9510-B); Lincoln & Mercury No. MFK-9502-A (EBJ-9510-D, F, ECK-9510-C,D,G,H); Lincoln & Mercury No. MGK-9502-A, (B6A-9510-L,M,N,Q); Lincoln & Mercury No. MGK-9502-C (ECU-9510-B,C,D,E).

Repair Kit (With Std. Metering J ts) - Ford No. B5A-9590-B (B5A-9510-G,H); Ford No. B5A-9590-E (B5A-9510-M,N); Ford No. B6A-9590-D (B6A-9510-L,M,N,Q); Ford No. B7A-9590-N (B7A-9510-AC,V); Ford No. B6T-9590-AA (B6T-9510-B); Lincoln & Mercury No. HGK-9590-C (ECU-9510-E); Lincoln & Mercury No. MGK-9590-A (B6A-9510-L,M,N,Q); Lincoln & Mercury No. HFK-9590-A (EBJ-9510-D); Lincoln & Mercury No. MFK-9590-B (ECK-9510-C,D); Lincoln & Mercury No. MFK-9590-E (ECK-9510-G,H).

LINCOLN & MERCURY AUTOMATIC CHOKE

F rd 4-Bbl. Carb. (1955)
Lincoln & Mercury 2 & 4-Bbl. Carbs. (1954-55)

►1956 & LATER AUTOMATIC CHOKE NOTE: *Integral type chokes used. Se carburetor pages.*

►***ERRATIC ENGINE PERFORMANCE (Erratic Idle Speed, Poor Gasoline Mileage, or Mis-firing caused by automatic choke opening late or not opening fully):*** May be caused by air leak in hot air tube between manifold and choke housing due to use of 5/16" fitting instead of ¼" type. See that correct type fittings used and that all connections are tight.

DESCRIPTION: ***Two types used (1) Integrally mtd. (on carburetor air horn), (2) Separately mtd. (on manifold and linked to choke valve lever by connector rod).***

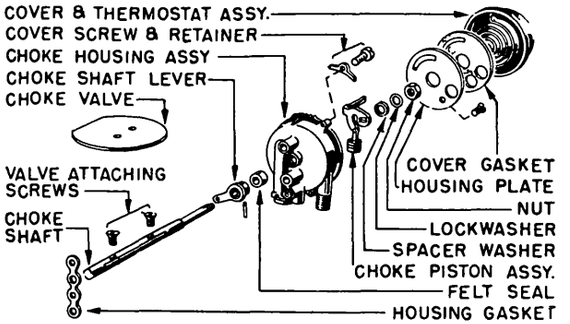
(1) Integrally Mtd. Type—Assembly is mounted on carburetor and linked directly to the choke valve shaft. It consists of a thermostatic coil and vacuum piston assembly to control the choke valve, a fast idle linkage which opens the throttle valve to provide a faster engine idle speed when cold, and an unloading device to correct engine flooding.

(2) Separately Mtd. Type—Choke assembly is similar to first type except that the complete assembly is mounted on the intake manifold by three attaching screws with air and vacuum channels (for control) terminating in ports at the mounting gasket. Automatic choke shaft lever is linked to carburetor choke shaft lever by a connector rod.

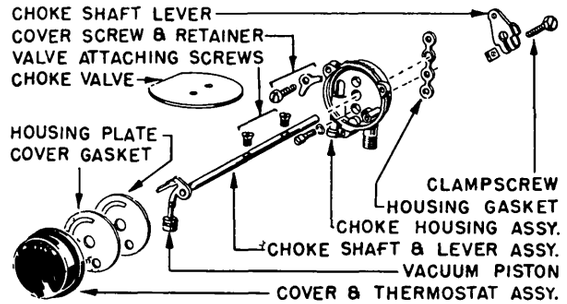
OPERATION: Automatic Choke—Thermostatic coil is bi-metal type and tends to "wind-up" and close the choke valve when the engine is cold so that the choke valve is fully closed for cold starting. In this position, the vacuum piston is at the top of the cylinder. As soon as the engine begins to fire, manifold vacuum tends to pull the piston down in the cylinder which opens the choke valve partially (valve is offset and air flow through the air horn also tends to open the valve). As the engine warms up, the thermostatic coil "unwinds" lessening the tension on the choke valve and allowing it to open so that at normal operating temperatures the choke valve will be wide open. Warm air is introduced into the choke housing to effect this unwinding of the thermostatic coil (filtered air from air horn passes through stove in manifold and then flows to the housing). This air flow is controlled by the vacuum piston (slots in the cylinder are uncovered when piston moves down in cylinder and warm air is drawn into housing).

Fast Idle—Consists of a stepped fast idle cam linked to the choke valve shaft and serving as the stop for the throttle valve idle speed adjusting screw.

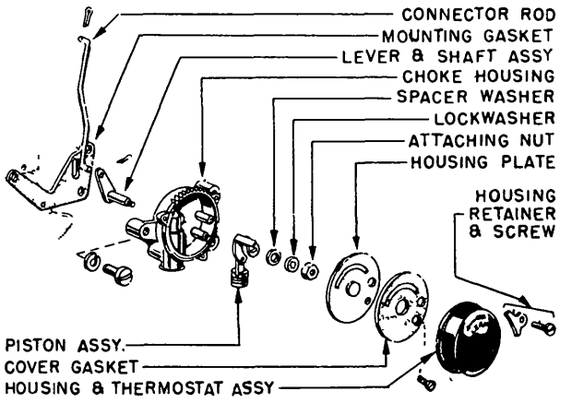
Unloading Device—When the throttle valve is opened wide, the throttle lever opens the choke valve slightly through the fast idle linkage. This can be used to correct flooding caused by over-choking.



LINCOLN INTEGRAL AUTOMATIC CHOKE



MERCURY INTEGRAL AUTOMATIC CHOKE



LINCOLN & MERCURY SEPARATE AUTOMATIC CHOKE

CHOKE SETTING: Centered (At Index). Reference mark on edge of thermostatic coil and cover assembly shound be aligned with center (longer) line of scale on housing. If a richer or leaner setting required, setting should be changed not more than one division either way from centered setting.

Automatic Choke Adjustment—Loosen 3 cover retaining screws, rotate cover and coil assembly in direction of the arrow for Leaner setting and less choke action, and in opposite direction for Richer setting or more choke action.

FAST IDLE SETTING: Fast idle is set in production and should not require adjustment in the field.

DISASSEMBLY: ***Each type disassembled as follows:***

Integrally Mtd. Type—Disconnect and remove connector rod linking choke lever and fast idle cam. On Mercury take out clampscrew and remove choke lever from shaft. Take out retaining screws and remove choke valve. Remove screws and retainers on cover, rotate cover and thermostatic coil assembly toward "lean" to disconnect coil hook, remove cover assembly and gasket. Take out attaching screw and remove housing plate. On Mercury, rotate shaft until vacuum piston is free from the cylinder, withdraw shaft and piston assembly from air horn. On Lincoln, remove nut, lockwasher, and spacer washer from end of shaft, rotate shaft and remove piston and link assembly (shaft cannot be removed until after choke housing removed). Remove choke housing attaching screws, remove housing and mounting gasket from air horn (On Lincoln, felt seal and shaft can then be removed from air horn).

Separately Mtd. Type—Disconnect and remove rod linking choke lever and carburetor choke valve lever. Take out three attaching screws and remove choke assembly and mounting gasket from air horn. Remove screws and retainers on cover, rotate cover and thermostatic coil assembly toward "lean" to disengage coil hook, remove cover assembly and gasket. Take out attaching screw and remove housing plate. Remove nut, lockwasher, and spacer washer on end of shaft, rotate shaft and remove vacuum piston and link assembly, withdraw choke shaft and lever through back of housing.

INSPECTION: See that all parts of choke mechanism are clean and that choke shaft and piston assembly operate freely and that piston edges and cylinder are free from burrs. *NOTE*—Carbon deposits on piston or in choke housing indicate possibility of exhaust gas leakage in Inconel Tube passage (see 1952 Lincoln Improper Choke Operation Note above). Blow out all passages in choke housing (and in carburetor on integrally mounted type) with compressed air. Use all new gaskets and seals when reassembling unit. DO NOT lubricate any part of the choke mechanism.

REASSEMBLY: Reverse disassembly directions (above). When installing cover and thermostatic coil assembly, see that coil hook is down, then rotate cover toward "rich" (opposite to direction of arrow) until hook is felt to engage choke shaft prong, install cover locking plates and screws. Readjust automatic choke after installation.

1954-55 FORD, LINCOLN, MERCURY CENTRI-QUAD JET SPECIFICATIONS

Car Model Year	Carburetor Model	Main Metering Jet Size Part No.	Secondary Metering Jet Size Part No.	Main Well Tube Assembly	Economizer Assembly Part No.	Power Jet Part No.	Idle Tube Part No.
FORD V8 Cars							
Optl. Fordomatic 1955	B5A-9510-H	.052" ⑥ 86H-9533	.078" ⑧...B5A-9648-A	B5A-9991-A	B5A-9904-A	B5A-9594-A	8CM-9542
THUNDERBIRD							
Synchro-mesh 1955	B5A-9510-G	.053" ⑥....B4T-9533-B	.078" ⑧... B5A-9648-A	B5A-9991-A	B5A-9904-A	B5A-9594-A	8CM-9542
Fordomatic 1955	B5A-9510-H	.052" ⑥ ...86H-9533	.078" ⑧...B5A-9648-A	B5A-9991-A	B5A-9991-A	B5A-9594-A	8CM-9542
LINCOLN							
All 1953	EAD-9510-H	.061" B4Q-9533-A	.058" EAD-99594-A	EAM-9991-A	EAD-9904-B	EAD-9594-C	EAD-9542-A
All 1954	EAD-9510-N	.066" IGA-9533C①	.055" EAD-99594-A②	EAM-9991-A	EAD-9904-B	EAD-9594-E	EAD-9542-A
Early 1955	EBJ-9510-D	.052" 86H-9533-B	ECK-99594-A & 600-A	ECK-9991-A	ECK-9904-A	ECK-9594-A	EAD-9542-A
Later 1955	EBJ-9510-F	.053" B4T-9533-B	.....	None ⑨	ECK-9904-A	⑩	EAD-9542-A
MERCURY							
Synchro-mesh 1954	EBY-9510-G	.052" ..... 86H-9533 ⑥	.055" EAD-99594-C②	EAM-9991-A	EAD-9904-B	EBY-9594-A	8CM-9542
Auto. Trans. 1954	EBY-9510-H	.052" 86H-9533⑥	.055" .....EAD-99594-C ②	EAM-9991-A	EAD-9904-B	EBY-9594-A	8CM-9542
Early Synchro-mesh 1955	ECK-9510-C	.053" 86H-9533-B	.078" B5A-9648-A	B5A-9991-A	B5A-9904-A	EBY-9594-A	8CM-9542
Later Synchro-mesh 1955	ECK-9510-G	.051"	.086" ⑫	.....	B5A-9904-A	⑩	8CM-9542
Early Mercomatic 1955	ECL-9510-B	.052" 86H-9533	.078" B5A-9648-A	B5A-9991-A	B5A-9904-A	EBY-9594-A	8CM-9542
Later Mercomatic 1955	ECK-9510-D	.052" 86H-9533	.078" B5A-9648-A	B5A-9991-A	B5A-9904-A	EBY-9594-A	8CM-9542
Later Mercomatic 1955	ECK-9510-H	.050"	.086" ⑫	None ⑨	B5A-9904-A	⑪	8CM-9542

①—Use 78-9533-E (.056") for 5,000 to 10,000 ft. altitudes.
Use 8EL-9533-B (.053") for 10,000 to 15,000 ft. altitudes.

②—Use EAD-99594-C (.052") for 5,000 to 10,000 ft. altitudes.
Use EAD-99594-D (.049") for 10,000 to 15,000 ft. altitudes.

⑥ - Use 78-9533-B (.048") for 5000 to 10,000 ft. altitudes.
Use 59A-9533-D (.045") for 10,000 to 15,000 ft. altitudes.

⑧ - Use B5A-9648-B (.070") for 5000 to 10,000 ft. altitudes.
Use B5A-9648-C (.063") for 10,000 to 15,000 ft. altitudes.

⑨—None (Main Well Discharge Nozzles used). ⑩—New (Size No. 40).

⑪—New (Size No. 43). ⑫—New Secondary Venturi Fuel Supply Metering Jet Tube.

1956-57 FORD, LINCOLN, MERCURY CENTRI-QUAD JET SPECIFICATIONS

Car Model Year	Carburetor	Primary Metering Jet Size Part No.	Secondary Metering Jet Size Part No.	Primary Disch. Nozzles	Primary Venturi Assembly	Power Jet Assembly	Economizer Assembly
FORD V8 Cars & Thunderbird							
Synchro-mesh 1956	B6A-9510-L	.050" .....① 78-9533-A	.073"... ② B5A-9648-F	B6A-9577-A	B5A-9641-A	B4T-9594-A ③	B5A-9904-A
Fordomatic 1956	B6A-9510-M	.050" .... ① 78-9533-A	.073"....② B5A-9648-F	B6A-9577-A	B5A-9641-A	B4T-9594-A ③	B5A-9904-A
All (Repl.) 1956	B6A-9510-N, Q	.050" .... ① 78-9533-A	.073"....② B5A-9648-F	B6A-9577-A	B5A-9641-A	B4T-9594-A ③	B5A-9904-A
270 HP Eng. (2 Carbs.)..1957	B7A-9510-P	.045" 59A-9533-D	.055" B6A-9648-A	B6A-9577-A	B7A-9641-J	B6T-9594-A	B5A-9904-A
300 HP Eng. (Schgd.).... 1957	B7A-9510-V	.065" 5GA-9533-A	#104 ..... B7A-9648-C	B6A-9577-A	B5A-9641-A	B6Q-9594-A	B5A-9904-A
300 HP Eng. (Schgd.)....1957	B7A-9510-AC	.065" 5GA-9533-A	#104..... B7A-9648-C	B6A-9577-A	B5A-9641-A	B6Q-9594-A	B5A-9904-A
FORD V8 Truck							
272" Engine 1956	B6T-9510-B	.051" 59A-9533-A	.055" B6T-9648-B	B6T-9577-A	B5A-9641-A	B6T-9594-C	B6T-9904-A
LINCOLN							
Lincoln & Continental 1956	ECU-9510-B,C,D,E	.060" 1GA-9533-C	.120" EBJ-99938-A	B5A-9577-D	B5A-9641-A	8EQ-9594 ④	B5A-9904-A
MERCURY							
Synchro-mesh 1956	B6A-9510-L	.050" 78-9533-A	.055" B6A-9648-A	B6A-9577-A	B5A-9641-A	B4T-9594-A③	B5A-9904-A
Mercomatic 1956	B6A-9510-M	.050" 78-9533-A	.055" B6A-9648-A	B6A-9577-A	B5A-9641-A	B4T-9594-A③	B5A-9904-A
All (Repl.) 1956	B6A-9510-N, Q	.050" 78-9533-A	.055" B6A-9648-A	B6A-9577-A	B5A-9641-A	B4T-9594-A③	B5A-9904-A

① — Use 59A-9533-B (.049") for 5000 - 10000 ft. Alt.
Use 78-9533-B (.048") for 10000 - 15000 ft. Alt.

② — Use B5A-9648-C (.063") for 5000 - 10000 ft. Alt.
Use B6A-9648-A (.055") for 10000 - 15000 ft. Alt.

③ — Stamped "28".

④ — Stamped "52".

FORD V8 TRUCK "CENTRI-FLO" TYPE

FORD V8 TRUCKS	Carburetor No.
1954 256" Engine (Orig. Equip.)	EBZ-9510-C
1954 256" Engine (Repl. Carb.)	①B4T-9510-A
1955 256" Eng. (Early)	B4T-9510-A
1955 256" Eng. (Late)	B5T-9510-A

①—For 5000-10000 ft. alt.—not furnished for service. See High Altitude Carburetor Note below.

►CHANGES & CORRECTIONS

►*1954 FORD TRUCK HESITATION OR DETONATION WHEN ACCELERATING FROM SLOW SPEEDS (Engines with Camshaft No. B4T-6250-A):* Correct by installing the "New" parts listed below in the original carburetor No. EBZ-9510-C OR by installing Replacement Carburetor No. B4T-9510-A. These parts furnished in Kit No. B4R-9590-B. *NOTE*—This replacement carburetor has the new parts and should be installed if carburetor replacement is required.

Kit B4T-9590-A Carburetor Parts

Carburetor Part	New Part No.
Main Well Tube Assembly	①B4T-9991-A
Vacuum Ball Check Valve Spring	②B4T-9606-A

①—Supersedes Part No. EBZ-9991-A.
②—Supersedes Part No. EAM-99515-B.

DESCRIPTION: These "Centri-flo" models are similar to previous type "Dual Concentric" carburetors with following new features:

Air Horn Eliminated—No air horn casting used and air cleaner fits down around main body to form the air intake passage resulting in lower over-all height.

New Discharge Nozzle & Choke Valve Assy.—Main discharge nozzles consist of two drums mounted concentrically on the choke valve shaft (one drum mounted within each choke valve—valves are cut out to clear drums and rotate around them). Choke valve assembly is mounted in venturi throat in throttle body and no secondary venturis are used.

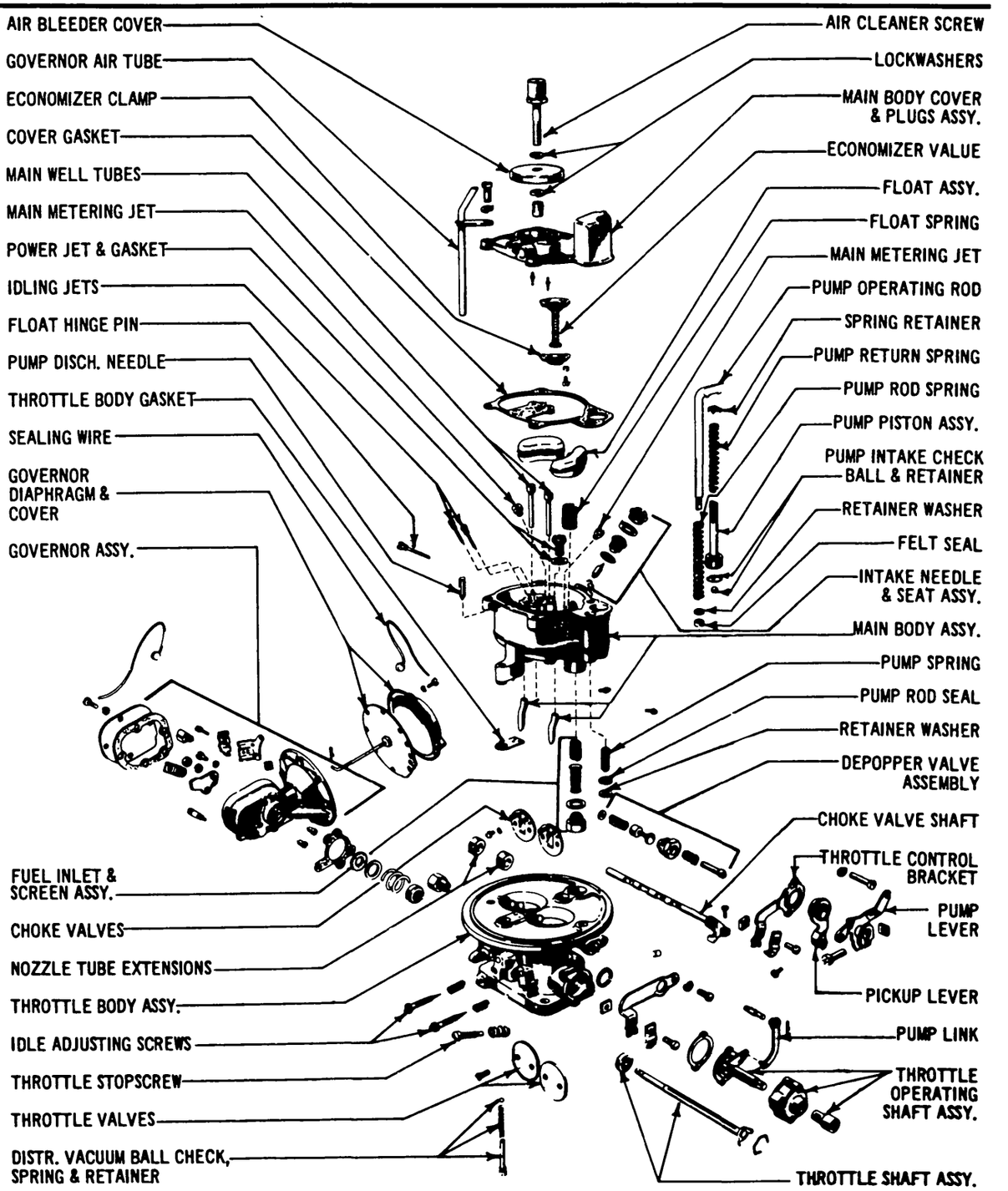
Diaphragm Type Power Valve—Diaphragm type power valve is mounted in main body cover to eliminate possibility of leakage which was possible with previous piston type valve.

De-icing Feature—Consists of two drilled passages in manifold riser, spacer, and slot in base of main throttle body to permit warmed manifold air to heat area around idle jets and passages and prevent condensation and freezing of moisture in idle system.

Vacuum Spark Control Valve (Lincoln only)—Consists of vacuum operated spark control valve assembly on carburetor throttle body (see illustration) which prevents excessive spark advance when engine accelerated (used on all except first 450 cars).

New Vacuum-operated Dashpot (Mercury Merc-O-Matic Cars)—Mounted on carburetor throttle body and operates pick-up lever which opens throttle valves independently of the throttle linkage to prevent engine stalling.

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HOLLEY (FORD) FORD V8 TRUCK "CENTRI-FLO" CARBURETOR

FORD V8 TRUCK
"CENTRI-FLO" (Cont.)

►*NOTE*—Truck carburetors have main body enclosed in air cleaner horn on Cab Forward models and in the air cleaner on other models, plus the following special features.

Governor Assembly—Governor unit is mounted on throttle body and linked directly to end of throttle valve shaft. Throttle body is modified for governor mounting and throttle valve shaft is special type for governor connection.

Depopper Valve—Consists of a spring-loaded piston type valve built in the throttle body. This valve controls a by-pass through which part of the idle air supply passes around the closed throttle valves (a conventional idle system with idle mixture adjusting screws is used to supply the engine idling fuel supply in the usual manner) Valve is normally open during engine operation but closes when manifold vacuum rises to 22" (when throttle is closed). Closing of the valve enriches the idle fuel mixture to the point where it will not support combustion in the engine or exhaust system thus eliminating any "popping." An adjusting screw is provided for Depopper adjustment. See ADJUSTMENTS below.

Choke Control—Convention manual type (automatic choke not used).

ADJUSTMENT: Make all adjustments as follows:
Idle Setting—Turn adjusting screws in to lightly seat and back off each screw ½ turn. Run engine until operating temperature is obtained, then adjust each screw ⅛ turn in the direction which gives smoothest idle at a high steady manifold vacuum Final position of both screws should not vary more than ½ turn. Reset idle speed. ***See depopper valve adjustment below.***

IDLE SPEED SETTING

Ford Trucks	475-500 RPM

►*NOTE*—On Trucks, engine speed should be controlled by adjusting throttle stop screw and not by depopper valve positioning screw.

Float (Fuel) Level: 1/2" ± 1/32" below top edge of bowl with fuel pump pressure of 3½-4½ lbs. Use Fuel Level Gauge 9550-B to check fuel level placing gauge squarely on top edge of main body so that gauging pins extend down into bowl. Fuel should be at least as high as longer GO pin but must not touch shorter NO GO pin. Adjust by bending tab on float lever which contacts intake needle.

CAUTION—Both floats should be set to same height and floats must not contact float bowl walls.

Depopper Valve Adjustment—Adjust throttle screw to close throttle plates to where they will not bind in bores. Turn depopper valve adjusting screw inward (clockwise) until valve seated (closed) CAUTION—Do not force valve against seat Turn depopper valve adjusting screw outward (counter clockwise) ⅜-½ turn Make **Idle Setting & Idle Speed Adjustment** as given above If engine fails to run when throttle released, increase idle speed sufficently (Idle stop screw) to maintain operation of engine If popping is evident after high road speed or maximum engine RPM, upon deceleration without brake action, check depopper valve piston actuating spring as follows

Depopper Piston Spring Test—Use Tool No T54T-9976-A to check calibration of spring and proceed as follows Remove air cleaner, depopper retainer and valve adjusting screw from throttle body Install screw adapter in throttle body, install sleeve on screw adapter until pointer reads approximately 16 ounces Pull back runner (rod protruding from gauge) and release gently Then push runner forward. NOTE—The pointer will move indicating that valve is not seated Screw sleeve in until pointer reads 16½ ounces Repeat step of pulling runner back, releasing runner gently and pushing runner forward in ½ ounces increments until pointer will not move when pushed forward The pointer should then read within 21 0-21 5 ounces NOTE—If reading is not within specifications of 21 0-21 5 ounces, adjust depopper piston spring tension adjusting screw and repeat above procedure Turn adjusting screw clockwise to increase tension and counter clockwise to decrease tension

Alternate Method (Tool not available)—This will give approximate adjustment for emergency operation Connect vacuum gauge to intake manifold Increase engine speed manually to approximately 2000 RPM Close throttle quickly and notice vacuum reading when hissing sound of air is first heard in carburetor This is point when depopper valve opened If vaccum reading was not between 22 5-23 5 inches of mercury, the piston spring tension adjusting screw should be turned until correct vacuum reading is obtained

►*DEPOPPER CLEANING NOTE:* If necessary to clean depopper valve with carburetor on engine, apply light grease to center section of spring tension washer to hold it in place on end of tension adjusting screw during assembly Add light application of grease to end of spring to hold it in valve recess so valve and spring can be installed together without dislodging washer from end of adjusting screw

Accelerating Pump: Seasonal adjustment provided by three holes in throttle shaft lever for pump link engagement:
Center Hole—Normal operating conditions.
Outer Hole—Extreme Cold weather.
Inner Hole—Extreme Hot weather.

Automatic Choke: ***NOTE—Choke is separate unit mounted on side of intake manifold and linked to choke valve lever by a rod.*** Mark on cover should be in line with center mark of scale on choke housing. Adjust by loosening three cover retainer screws and rotating cover assembly.

Choke Setting—Centered

Choke Rod Adjustment—With rod disconnected from choke valve lever, hold choke valves closed, raise rod to upper limit of travel If rod end does not enter hole in lever freely, adjust rod length by bending it at the offset Connect rod and check entire choke linkage for free movement without binding

Fast Idle: No adjustment required (fast idle cam operated directly by lever on choke valve shaft). Fast idle speed will be correct if throttle stopscrew correctly set (Idle Speed setting above).

OVERHAUL: Work on carburetor will be facilitated by use of Holding Fixture 9510-C (hinged fixture which can be clamped in a vise).

Disassembly: Remove air cleaner anchor screw and air bleed washer from top of main body cover, remove four attaching screws and lockwashers holding main body cover on main body, remove cover and gasket Remove pump rod stud from lower end of pump rod, disconnect and remove pump link while holding pump rod and piston assembly down against spring tension, lift out pump piston and rod assembly.

Main Body Disassembly—Remove float needle seat plug, unscrew float needle seat with tool 9564, remove inlet needle. Unscrew and remove float hinge pin, lift float and float spring out. Remove power valve using tool 9510-AA. Remove main metering jets using tool 9533. Remove idle jet tubes using tool 9544. Take out accelerating pump ball check retainer spring using needle-nose pliers. Tip carburetor up and catch pump discharge needle, pump ball check, main well tubes which will fall out of main body. Take out two screws and lockwashers holding main body on throttle body, lift off main body and gasket.

Throttle Body Disassembly—Remove idle adjusting needles and spring, then remove governor plate, gasket and spring Remove cotter pin from vacuum rod and push rod from governor lever Remove governor lever nut, lockwasher and lever Remove governor retaining screws, governor housing and diaphragm Remove depopper valve adjusting screw assembly but DO NOT remove adjusting screw from nut Remove depopper valve, tension spring and spring washer, DO NOT remove tension spring adjusting screw from throttle body Remove throttle shaft seal retainer and spring Throttle plates and

CONTINUED ON NEXT PAGE

FORD V8 TRUCK "CENTRI-FLO" (C nt.)

shaft should not be removed from throttle body If necessary to remove choke plates and shaft, file off tips of choke plate screws and choke plates Slide shaft out of body Identify plates so they can be installed in original positions Clean and inspect all parts for justifiable replacement

Power Valve Diaphragm—DO NOT remove assembly from main body cover unless tests indicate that replacement is necessary. Remove by taking out three attaching screws and lifting off cover clamp and diaphragm assembly.

Distributor Control Nylon Ball—Remove retaining pin and remove nylon ball from vacuum passage in throttle body.

Cleaning & Inspection: Wash all parts except those noted below in clean solvent *(CAUTION*—Do not use solvent on pump piston leather, power valve diaphragm, spark control valve, nylon fuel inlet needle valve, or nylon distributor passage ball). Blow out all passages in castings with dry air, dry all parts with air. Inspect all parts for wear and damage with particular attention to the following: Inspect castings and main body cover for cracks or leaks, inspect main well tubes, metering jets, and idle tubes for wear or clogged passages *(CAUTION* —clean with air, do not use drills to clean out calibrated openings). Replace all worn or damaged parts (nicked or burred gasket surfaces can be stoned lightly but parts should be replaced if stoning does not clean up surfaces).

Reassembly: Use all NEW gaskets. Install parts in reverse order of disassembly procedure (above) and note the following important points:

Distributor Passag Nylon Ball Caution—If new ball installed, make certain that correct size used.

Throttle Valv Installation—Valves have depression on one side and must be installed with this depressed side down. After valves installed, check for free operation and if binding noted, correct by loosening screws and retightening while valves held closed. Stake screws with staking pliers 9586 after installation completed.

Chok Valve Installation—Slide choke shaft in through body and install nozzle tube drum on shaft as it enters each venturi *(CAUTION*—rounded opening on drum must face inlet side of carburetor and tapered side of hole must face downward). Install choke valves and tighten attaching screws while holding valves closed and applying pressure on threaded end of shaft. Check valves for free operation and make certain that nozzle drums rotate freely within choke valves.

Throttle Body Assembly—Install control shaft and housing on throttle body with new gasket A correctly installed throttle shaft and lever will close plates but will not open them Install spring, retainer and throttle shaft seal with seal shoulder inside retainer Install governor housing using new gasket Install governor lever, lockwasher and nut on shaft Install diaphragm rod through lever and secure it with cotter pin Install governor spring Install depopper spring tension washer properly centered on adjusting screw Install spring, depopper valve, and adjusting screw assembly with new gasket Turn valve adjusting screw "IN" until just seated See depopper adjustment while on engine, above Install governor plate with new gasket Install fuel needles and springs Close needles gently against seats, then back out ½ turn for preliminary adjustment

Main Body Assembly—Install main well tubes, idle jet assemblies and main jets Install power valve with new gasket Install float valve seat and plug with new gasket Install float spring, float, inlet needle valve and secure float with hinge pin Install accelerating pump piston and operating rod Install pump discharge needle Install power diaphragm assembly in cover with edge of diaphragm visible all around to insure against leakage Hold cover in position on bowl with new gasket in place and install center screw and plate Install retaining screws NOTE—One of retaining screws also secures the governor air vent tube which seats in the throttle body when sub-assemblies are reassembled

Main Body & Throttle Body Assembly—Install main body and new gasket on throttle body, aligning rounded opening of each nozzle drum with its discharge nozzle, and properly positioning choke opening lever on fast idle cam as main body is seated on throttle body, install attaching screws and lockwashers from underside of throttle body flange.

Diaphragm Assembly Installation—***Assembly must be installed as follows to properly seat diaphragm on main body cover:*** Place cover clamp over diaphragm stem, compress spring and wind rubber band tightly around stem and spring to hold spring compressed while assembly being installed. Position assembly on main body cover, tighten three attaching screws securely, then remove rubber band and check for free operation by pressing on diaphragm stem. Action must be absolutely free.

Accelerator Pump Installation & Check—Use care not to damage piston leather when installing pump piston and rod assembly. Pump system can be checked after bowl filled with fuel as follows: Use blunt instrument (small drift, etc.) to press down on discharge needle while pressing pump piston down in cylinder. If fuel forced past discharge needle, clean needle and seat and reseat needle by tapping needle lightly using a brass drift and light hammer. Replace needle if leakage continues. Also while pressing on pump piston, note if fuel level rises in bowl or if bubbles evident at pump intake hole in base of bowl indicating leakage at pump intake ball check. If leakage noted, remove ball retainer, clean ball and seat and reseat ball by tapping ball lightly using a brass rod and light hammer. If leakage continues, examine seat for foreign material or imperfections and replace ball.

Main Body Cover & Plug Assy. Installation: Tighten air cleaner anchor screw to 4-5 ft.lbs. torque (this supersedes 6-9 ft. lbs. previously recommended). When installing new type Cover Assembly (see Changes & Corrections above), use ¼" lockwasher **above** and **below** the bleeder plate washer (one at each point).

Carburetor Adjustments—Make all adjustments listed in ADJUSTMENTS above.

SERVICE PARTS: ***CAUTION—Metering jets furnished in repair kits listed below are STANDARD (for 0 to 5000 ft. Altitude). See High Altitude Carburetor Note (above) for special high altitude metering jets.***

Gasket Set—Ford No B2Q-9502-B

Repair Kit (incl. Std. Metering Jets)—Ford No. B4T-9590-A (includes B2Q-9502-B gasket set).

FORD V8 TRUCK DUAL CONCENTRIC

FORD V8 TRUCKS	Carburetor No.
1956 272 (ECR)	ℂ B6T-9510-A

ℂ - Replace by B6T-9510-E

DESCRIPTION· Concentric, dual, downdraft carburetor with main body enclosed within air cleaner on all models except Cab Forward On Cab Forward models main body enclosed in carburetor air cleaner horn. Choke plates mounted in air horn and booster venturis used.

Governor Assembly—Governor unit is mounted on throttle body and linked directly to end of throttle valve shaft Throttle body is modified for governor mounting and throttle valve shaft is special type for governor connection

Depopper Valve—Consists of a spring-loaded piston type valve built in the throttle body This valve controls a by-pass through which part of the idle air supply passes around the closed throttle valves (a conventional idle system with idle mixture adjusting screws is used to supply the engine idling fuel supply in the usual manner) Valve is normally open during engine operation but closes when manifold vacuum rises to 22" (when throttle is closed) Closing of the valve enriches the idle fuel mixture to the point where it will not support combustion in the engine or exhaust system thus eliminating any "popping" An adjusting screw is provided for Depopper adjustment See ADJUSTMENTS below

Choke Control—Convention manual type (automatic choke not used)

ADJUSTMENTS· Make all adjustments as follows

Idle Setting - Turn adjusting screws in to lightly seat and back off each screw 1 turn Run engine until operating temperature is obtained, then turn mixture screws in until engine begins to run rough from lean mixture. Turn screws out until engine begins to "Roll" from rich mixture Turn screws in until engine runs smoothly Always favor a rich mixture rather than a lean setting Reset idle speed after an idle mixture setting. See Depopper valve adjustment below

Idle Speed Setting - 475-500 RPM (Synchro mesh), 475-500 RPM (Fordomatic in Neutral) *NOTE* - Adjust idle speed in Neutral to obtain 425-450 RPM in DR (drive) range on all Fordomatic Trucks

► *CAUTION:* If Anti stall Dashpot adjusting screw holds throttle open and prevents proper idle adjustment, loosen locknut, turn Dashpot adjusting screw clockwise until idle speed can be adjusted, then readjust Dashpot set-

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FORD V8 TRUCK DUAL CONCENTRIC (C nt.)

ting, see below.

Accelerating Pump Adjustment—Fuel discharge controlled by position of pump link in throttle lever holes (two). Closest hole for hot weather, longer hole for cold weather.

Fuel Level Setting—Use Gauge T54L-9950-C. Remove air cleaner, main body cover plate and gasket, run engine to secure normal fuel level, check fuel level with tool. Distance from fuel to top of machine casting of bowl should be ½" ± 1/32". To correct level setting bend float lever tab up or down to bring level within limits.

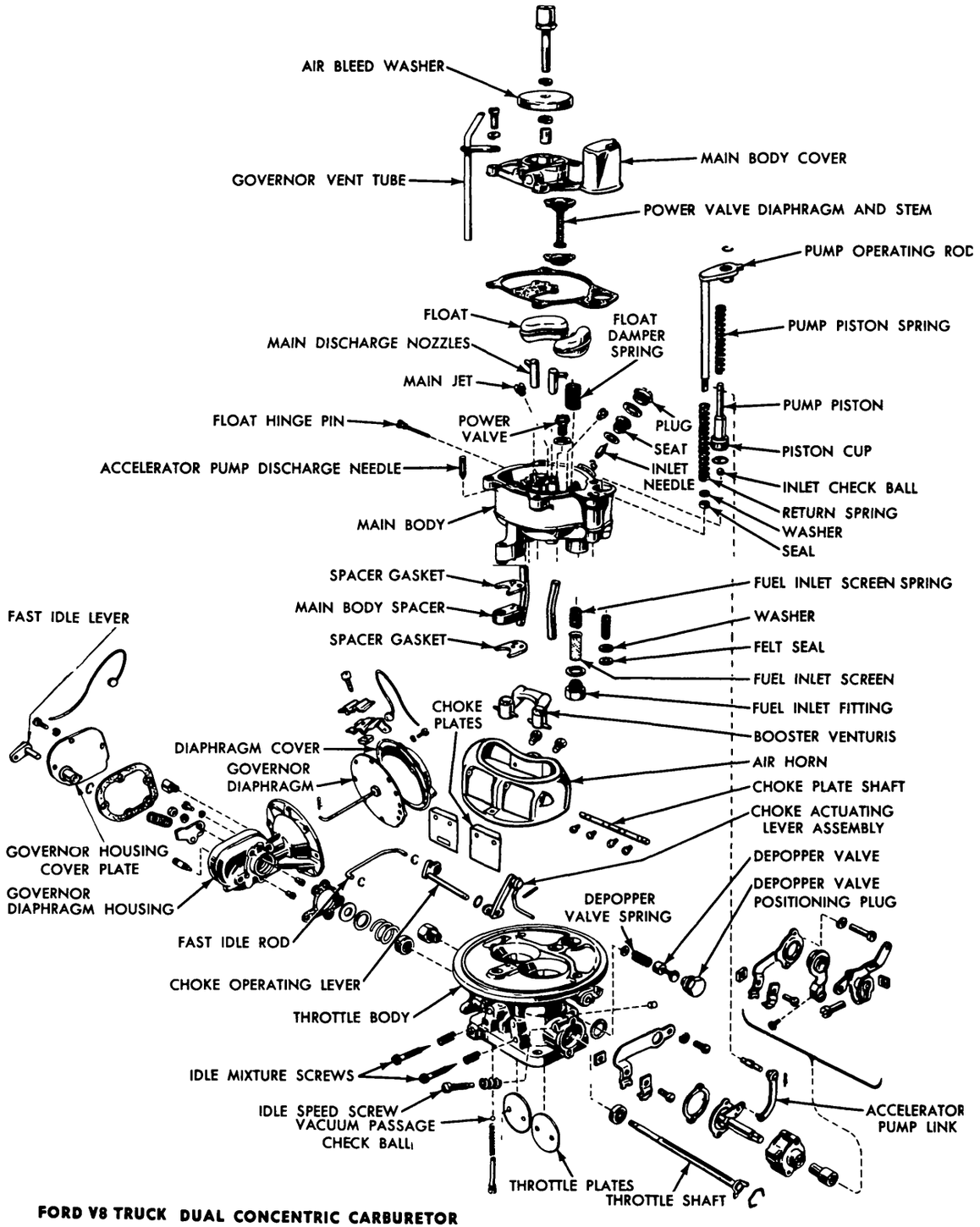
Depopper Valve Adjustment—Adjust throttle screw to close throttle plates to where they will not bind in bores. Turn depopper valve adjusting screw inward (clockwise) until valve seated (closed). CAUTION—Do not force valve against seat. Turn depopper valve adjusting screw outward (counter clockwise) ⅜-½ turn. Make **Idle Setting & Idle Speed Adjustment** as given above. If engine fails to run when throttle released, increase idle speed sufficently (Idle stop screw) to maintain operation of engine. If popping is evident after high road speed or maximum engine RPM, upon deceleration without brake action, check depopper valve piston actuating spring as follows:

Depopper Piston Spring Test—Use Tool No. T54T-9976-A to check calibration of spring and proceed as follows: Remove air cleaner, depopper retainer and valve adjusting screw from throttle body. Install screw adapter in throttle body, install sleeve on screw adapter until pointer reads approximately 16 ounces. Pull back runner (rod protruding from gauge) and release gently. Then push runner forward. NOTE—The pointer will move indicating that valve is not seated. Screw sleeve in until pointer reads 16½ ounces. Repeat step of pulling runner back, releasing runner gently and pushing runner forward in ½ ounces increments until pointer will not move when pushed forward. The pointer should then read within 21.0-21.5 ounces. NOTE—If reading is not within specifications of 21.0-21.5 ounces, adjust depopper piston spring tension adjusting screw and repeat above procedure. Turn adjusting screw clockwise to increase tension and counter clockwise to decrease tension.

Alternate Method (Tool not available)—This will give approximate adjustment for emergency operation. Connect vacuum gauge to intake manifold. Increase engine speed manually to approximately 2000 RPM. Close throttle quickly and notice vacuum reading when hissing sound of air is first heard in carburetor. This is point when depopper valve opened. If vaccum reading was not between 22.5-23.5 inches of mercury, the piston spring tension adjusting screw should be turned until correct vacuum reading is obtained.

►***DEPOPPER CLEANING NOTE:*** If necessary to clean depopper valve with carburetor on engine apply light grease to center section of spring tension washer to hold it in place on end of tension adjusting screw during assembly. Add light application of

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FORD V8 TRUCK DUAL CONCENTRIC CARBURETOR

FORD V8 TRUCK DUAL CONCENTRIC (C nt.)

grease to end of spring to hold it in valve recess so valve and spring can be installed together without dislodging washer from end of adjusting screw.

DISASSEMBLY: Divided into three sections as follows:

►*DISASSEMBLY CAUTION:* Use separate container for component parts: throttle body and main body. DO NOT remove throttle plates and choke plates (unless necessary) to prevent difficulty in correct positioning. Remove booster venturis only when damage makes replacement necessary.

Main B dy Disass mbly - Remove center stud, two lockwashers, and air bleed washer, cover retaining screws, lift out governor vent tube from air horn, remove cover and gasket. Remove accelerator pump link from operating rod, lift pump assembly from well. Remove pump rod dust seal, washers, and spring. Lift out main discharge nozzles carefully, invert carburetor and catch pump discharge needle. Remove float inlet needle plug, inlet needle seat spring, and seat. Unscrew float hinge pin, lift float assembly out and remove float damper spring. Remove main jets and power valve. Lift accelerator pump inlet check ball retainer out of pump well with hooked wire. Invert carburetor and catch inlet check ball. Remove three power valve diaphragm retainer screws from main body cover, and remove power valve diaphragm assembly. To disassemble accelerator pump assembly when necessary, slip pump piston cup off end of piston stem, compress stem spring, pry off stem retainer, then remove stem and spring from operating rod.

Main B dy, Air H rn & Thr ttle B dy S parati n - Invert carburetor, remove fuel inlet fitting, two screws retaining main body to throttle body, lift main body off air horn removing main body spacer and two gaskets at the same time. Remove air horn to throttle body retaining screw, lift air horn off throttle body. Disengage choke actuating lever from choke plate using care not to bend lever.

Throttle Body Disassembly - Remove idle fuel adjusting needles and springs, disconnect fast idle rod from choke lever, and remove governor cover plate and gasket. If necessary, pry off fast idle shaft retainer and remove shaft from cover plate. Remove governor spring and cotter pin from vacuum rod, push rod out of governor lever. Remove governor lever nut, lockwasher, and lever. Remove three retaining screws, then remove governor housing and diaphragm. Remove throttle shaft seal, retainer, and spring, throttle lever and throttle pick-up lever. Remove hand throttle control wire bracket screws, then remove bracket, throttle shaft housing, operating shaft assembly, and gasket. Throttle plates and shaft should not be removed from throttle body. To remove choke lever assembly, when necessary due to binding or damage, remove cotter pin from choke shaft and actuating lever assembly, slide choke shaft out of throttle body, remove actuating lever assembly and washer. Remove depopper valve positioning plug, depopper valve, tension spring, and tension spring washer. DO NOT REMOVE spring tension adjusting screw from throttle body.

Air H rn Disass mbly - Remove choke plate screws, choke plates, slide choke plate shaft out of air horn. Remove lock wire from booster venturi screws, remove screws.

REASSEMBLY: Assemble by reversing disassembly procedure and following sequence below:

1) Assemble all parts of Air Horn.
2) Assemble all parts of Throttle Body.
3) Assemble the Main Body with the Air Horn and Throttle Body.
4) Assemble all parts of Main Body.

Reassembly Notes - 1) Chokeplates must be free of any bind in Air Horn.
2) Be sure fast idle lever is properly positioned in choke lever and fast idle lever.
3) Use light application of grease to hold main body spacer (with gasket on each side) to boss on main body while installing main body on air horn.
4) Hold float in closed position and measure distance from gasket surface on main body to toe of float. Bend float lever tab to obtain 1/4" float level. Float toes must be at same level.
5) Be sure main discharge nozzle tips are pointing away from each other after installation.

SERVICE PARTS: Gasket Set - Ford No. B6A-9502-B.
Repair Kit - Ford No. B6T-9590-A.

HOLLEY DUAL CONCENTRIC & CENTRI-FLO CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Model	Main Metering Jet Size	Main Metering Jet Part No.	Main Discharge Nozzle Part Number Left Hand	Main Discharge Nozzle Part Number Right Hand	Nozzle Air Bleed Plug Part No.	Economizer Assembly Part No.	Idle Tube Part No.	Pump Nozzle Part No.
FORD V8 Trk. (256 Eng.)	1954	EBZ-9510-C	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 Repl.	1954	B4T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 (256 Eng.) Early	1955	B4T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㉕	8CM-9542	
FORD V8 (256 Eng.) Late	1955	B5T-9510-A	.055"	B4T-9533-A㊷	㊸			EAM-9904-A㊽	8CM-9542	
FORD V8 Trk.	1956	B6T-9510-A.E	.060"④	1GA-9533-C				EAM-9904-A⑤		B6T-9577-A

⑪ – Supersedes No. B4Q-9533-A (.061").
⑤ - Power Jet, Part No. B6T-9594-A.
㉕—Power Jet B4T-9590-B.
㊷—Use B4T-9533-B (.053") for 5,000-10,000 ft. altitudes.
Use 59A-9533-B (.051") for 10,000-15,000 ft. altitudes.
㊸—Main Well Tube Assy. B4T-9991-A.
㊽—Power Jet No. B5T-9590-A.

ROCHESTER "RAMJET" FUEL INJECTION

Chevrolet Corvette (1957-60)
Chevrolet Pass. Cars (1958-59)
Pontiac Bonneville (1957)
Pontiac (1958)

►CHANGES, CAUTIONS, CORRECTIONS

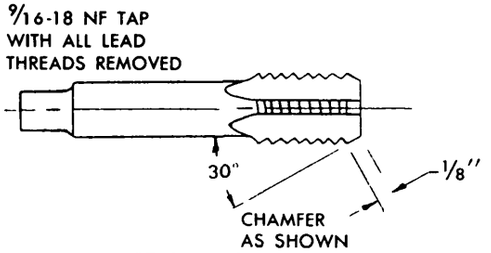
►*1958 PONTIAC FUEL INJECTION FUEL INLFT HOSE NOTE:* On fuel injection cars before Engine No. 47830, a fuel inlet hose having an oversize I.D. was used. In order to prevent possibility of a fuel leak, replace the oversize hose with Part No. 530831. Cars having the correct size hose will be marked with a daub of white paint on hose (outside of fuel injection housing).

►*1958 PONTIAC IMPROPER OPERATION OF FAST IDLE CORRECTION:* This condition may be caused by an improperly scribed cold enrichment cover assembly. To correct these assemblies and to check indexing of any unit, proceed as follows: Normalize car temperature to 75°F (by letting car set in 75°F temperature overnight), then remove shroud assembly and disconnect cold enrichment lead at ignition resistor. Loosen cold enrichment cover and connect a vacuum gauge in cold enrichment line. Start engine, then rotate cold enrichment cover in **lean** direction until a vacuum reading is noted in cold enrichment line. Rotate cover in **rich** direction until vacuum cuts off. Rotate cover an additional 4½ notches rich from point of vacuum cut off. *This is the center index point.* Scribe cover and housing for future reference. Set enrichment cover **one notch rich** from index point and tighten securely. Reconnect cold enrichment at ignition resistor.

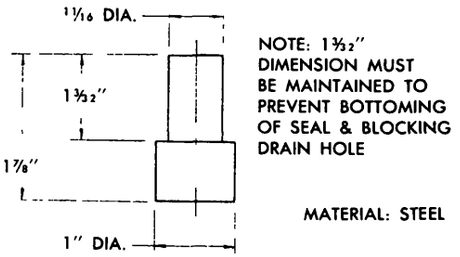
►*1958 PONTIAC FUEL DISTRIBUTOR LINE "O" RING INSTALLATION CAUTION (To prevent a serious fuel leakage into lower shroud):* Fuel distributor line-to-fuel meter is sealed with a small "O" ring (1957 units used a self-sealing installation) which must be correctly installed as follows: Position "O" ring on end of fuel distributor line and fully against shoulder on line, then coat ring with a light coating of petrolatum to prevent cutting on installation. Position end of line in fuel meter and tighten retaining nut fully

►*1958 PONTIAC IDLE MIXTURE NOT LEANING OUT SUFFICIENTLY WITH THE MIXTURE SCREW CORRECTION & DIAGNOSIS: See "Trouble Shooting"*

►*HIGH PRESSURE FUEL PUMP DRIVE SHAFT SEAL LEAKAGE CORRECTION & SHAFT SEAL INSTALLATION NOTE:* Fuel leakage noted at rear of fuel in-injection fuel meter may be caused by a worn drive shaft seal on high pressure fuel pump and may be corrected by installing a new shaft and seal (furnished in Kit No. 7017174). *NOTE - To remove and install s al and shaft, make a seal remover and a seal installer as indicated in illustrations.* To install shaft and seal, remove pump from fuel meter. *NOTE - Mark pump body, gear housing, and front cover for installation in same position.* Remove front cover and mark relationship of idler gear to drive gear with a wax pencil, then remove gear housing and idler gear. Remove drive gear by extending shaft beyond gear so drive pin can be removed. Screw seal remover tool (see illustration) so it is seated in seal not more than two or three turns *(CAUTION - Screwing tool in further will cause damage to rear bushing),* then drive seal and tap out of pump housing using old drive shaft inserted from bearing end. Slide drive shaft through pump body and remove through seal end to avoid damage to bushing. Place a new seal in position in pump body with open end of seal downward and press it into place with seal installer (see illustration). Lubricate new drive shaft and install in housing from seal end. Install drive gear, idler gear, and gear housing in their original positions (remove wax pencil markings). Assemble front cover and inst all screws finger tight. At the same time, rotate drive shaft counterclockwise (looking into drive cable end). If shaft turns freely, gear housing is properly centered. Tighten two of the Allen screws diagonally across front cover. If shaft turns freely, tighten remaining two screws and recheck shaft for free rotation. If shaft is not binding, tighten screws to 40 inch pounds. If pump tends to turn hard, loosen screws and reposition gear housing.



SEAL REMOVER TOOL



SEAL INSTALLER TOOL

DESCRIPTION: This fuel injection system is the "continuous flow" type in which fuel is sprayed through calibrated nozzles adjacent to each intake port. At this point it is combined with air (in proper ratio) from intake manifold. An "air meter" containing a throttle valve and a venturi controls the amount of air admitted to the intake manifold and provides the necessary vacuum for fuel control under various operating conditions. A "fuel meter" containing a fuel reservoir, high pressure pump, and fuel controls, governs the amount of fuel required according to load and speed. Auxiliary controls for fuel cut-off during deceleration and for engine starting are also contained in the fuel meter.

►*1958 & LATER FUEL INJECTION NOTE: 1958 and later model fuel injection units are similar to 1957 models except as indicated below.*

Chevrolet Pass. Cars & Corv tt - A spark port is used to accommodate distributor vacuum advance and the fuel enrichment assembly has been improved for a more stable idle speed, improved hot starting, better par throttle performance and improved fuel economy. On 1959 and later models, the intake manifold adaptor has been redesigned to provide easier distributor removal. Distributor pad on intake manifold is lower and a spacer and gaskets are used to maintain proper distributor level. *NOTE - On 1959 and later models, remove spacer with distributor after removing cap and rotor.* On 1959 and later models, individual manifold-to-adaptor gaskets are used for better alignment, and the air cleaner adaptor and cleaner element are mounted on radiator support.

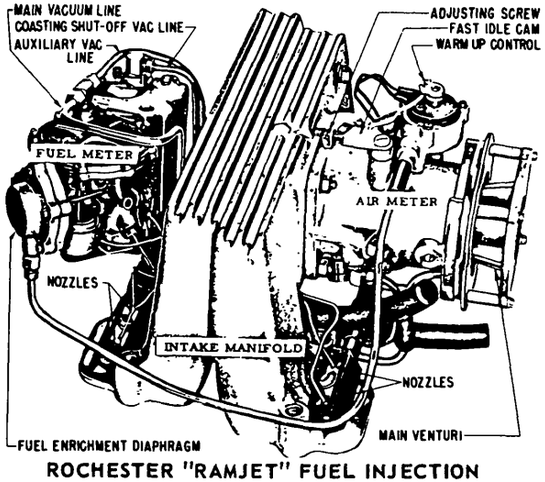
Chevrolet Corvette - In addition to changes noted above, the Starting Cut-Off Switch, Starting Solenoid, Starting Bypass Fuel Tube, Idle Vacuum Signal Tube, and Signal Boost Tube have been eliminated. Elimination of separate idle vacuum signal tube and signal boost tube, vacuum signals for fuel control are now transmitted to main control diaphragm by a single line for all operations except starting. Auxiliary vacuum signals formerly supplied by separate boost tube and idle vacuum signal tube are added to main control diaphragm vacuum signal by means of internal air meter passage connections to main signal tube pickup point. Elimination of starting solenoid, switch, and bypass fuel lines was made possible by application of manifold vacuum during cranking to provide fuel delivery. A normally open diaphragm valve is tapped into injector manifold which transmits manifold vacuum created during cranking through a restriction to main control diaphragm. This substitute vacuum source is eliminated once the manifold vacuum exceeds 1.4" (of mercury), as manifold vacuum completely overcomes diaphragm spring tension at that point. Comparatively, manifold vacuum applied to main control diaphragm on Corvette positions spill plunger to provide fuel meter fuel delivery to nozzles during cranking whereas on Pass. Cars and earlier fuel injection units, fuel delivery is is accomplished through a solenoid activated by the engine cranking circuit which causes spill plunger to be fully depressed to allow engine fuel pump pressure to be delivered directly to nozzles through a starting bypass fuel line. Once the engine starts, operation of Pass. Car and Corvette units is the same.

Pontiac - A simplified cold enrichment system with many passages enclosed in air meter casting has been added. Other new features include a simplified signal system which entails only one vacuum line between air meter and fuel meter for control signal. The idle signal system is built into the air meter. For starting, a manifold vacuum valve is used to introduce cranking vacuum to the signal system to boost control signal for starting. This replaces the solenoid formerly used. The spill plunger and sleeve can be removed as an assembly and replaced without disturbing other parts of fuel meter.

CONTINUED ON NEXT PAGE

ROCHESTER "RAMJET" FUEL INJECTION (C nt.)

Fu l Supply & Regulati n: Fuel is supplied to reservoir in fuel meter by a conventional type fuel pump, and fuel level is maintained in reservoir by a float system similar to that used in conventional carburetors. The high pressure pump is externally driven by a cable from ignition distributor, and feeds fuel under high pressure to the fuel control valve. Incoming fuel passes through a filter screen and passes upward through center of fuel control valve where it lifts a ball check and passes through a series of small holes into main metering chamber. At this point the fuel passes through small holes into fuel distributor tubes or it flows upward and out the spill ports, depending on engine requirements. The position of the spill plunger determines how much fuel is spilled back to the reservoir or diverted to fuel nozzles. The spill plunger position is determined by fuel pressure from below balanced against the force of the control lever from above. For low fuel flow, the spill plunger is in its raised position so that all spill ports are uncovered allowing a **minimum** fuel flow to nozzles. For high fuel flow, the plunger is in its lowest position which shuts off all spill and raises pressure in metering chamber, allowing a **maximum** fuel flow to nozzles. For starting, the



ROCHESTER "RAMJET" FUEL INJECTION INSTALLATION ON ENGINE (TYPICAL)

fuel valve is mechanically forced off its seat so that fuel can by-pass the ball check and flow directly to nozzles. With valve off its seat, a fuel by-pass passage is uncovered which admits fuel from fuel inlet at supply pump pressure to help supply sufficient fuel for engine at cranking speed.

Fuel Contr l Linkage: The correct metering of fuel for a given air flow is accomplished by the main control diaphragm and linkage as follows: A fuel control diaphragm operating on venturi vacuum and linked to the fuel control linkage moves upward with increased vacuum and acts on the linkage to force the spill plunger downward. As the plunger is forced down, the amount of spill is reduced and the fuel flow to nozzles is increased (the spill plunger will come to rest at a point where fuel pressure and lever force are in balance). The system is calibrated so that for a given air flow, venturi vacuum will move diaphragm and linkage so the right amount of spill is allowed for proper fuel pressure and flow to nozzles.

Mixture Control: For starting, warmup, and power, mixture control is accomplished by changing the pivot point of the fuel control lever which in turn changes the effect of the main control diaphragm on the spill plunger. A ratio lever located between main control diaphragm link and spill plunger can be rotated by the enrichment diaphragm to change the pivot point. With ratio lever moved to extreme left side (no vacuum in enrichment diaphragm), the main control diaphragm will depress spill plunger and allow maximum fuel to be delivered to nozzles. As vacuum in the venturi increases, the ratio lever moves to right side allowing spill plunger to rise and uncover spill ports resulting in less fuel to nozzles. For normal driving, the ratio lever is maintained in its extreme right position.

Nozzle Operation: Fuel is fed from fuel meter through fuel distributors to eight nozzles which are a factory matched set. Fuel is metered by the nozzle orifice and is sprayed across an air duct through a larger hole directly into intake manifold just outside the intake valve. An air duct in the nozzle allows fuel to be discharged to atmospheric pressure which allows better fuel control. Fuel is delivered continuously so that a full charge is ready whenever intake valve is open.

Air Flow & Control System: Air flow is controlled by the accelerator which opens and closes a throttle valve located in the air meter assembly which is attached to intake manifold. A cone shaped diffuser fits in place in main bore of air meter, forming a venturi at the point where air enters air meter. Air flow at the venturi creates a vacuum that is used to control the main control diaphragm and the fuel meter so that a proper amount of fuel can be fed in correct ratio to the air which is flowing.

OPERATION: The fuel injection system operates under various engine conditions as follows:

Idle Air Flow: During idle operation, the throttle valve is completely closed against bore of air meter and air is introduced to intake manifold through a by-pass system. Air taken into the by-pass system above the throttle valve is directed through a passage to a point below the throttle valve. An idle air screw at this point regulates the amount of air allowed through the by-pass system and controls engine idle speed. In addition to idle air taken in through the air meter, a portion of air for idle is also taken in through each of the eight fuel nozzles air ducts.

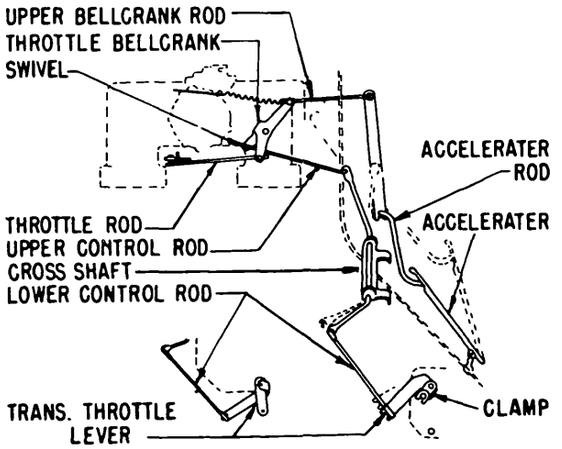
Idle Fuel Control: Since the venturi vacuum is light at idle speed and a higher vacuum is required to provide a richer mixture, the venturi vacuum is strengthened by the addition of a regulated amount of manifold vacuum. Vacuum is supplied to this system at idle needle valve hole and can be controlled by the idle needle. This auxiliary vacuum is transmitted to a "T" at the main control diaphragm where it passes a restriction and combines with main venturi vacuum to operate the main control diaphragm. As the throttle valve is opened, vacuum is introduced to the system through the off-idle port and, at this point, the vacuum is controlled by the restriction in the tube. As the throttle valve continues to open, auxiliary vacuum decreases and the main venturi vacuum operates the diaphragm.

Acceleration: The extra charge of fuel required for acceleration is obtained as follows: As the throttle valve is opened for acceleration, the air flow and the main venturi vacuum increase immediately. Because of the throttle valve opening, vacuum on the auxiliary vacuum system decreases but the decrease is delayed by the restriction in the vacuum line; so, for a short period, a very high vacuum is maintained at the control diaphragm, resulting in an extra charge of fuel for acceleration.

Power: For power operation, the ratio lever in the fuel control linkage is moved to its rich position by means of a vacuum diaphragm which is connected to manifold vacuum. When manifold vacuum is high and lean mixtures can be used, the diaphragm is held in a lean position. When power is required and engine vacuum drops, a calibrated spring moves the diaphragm to the rich position and holds it there until manifold vacuum rises. Stops are provided on the fuel meter casting to determine proper rich and lean mixtures. *CAUTION - These stops must not be moved in the field as doing so would require a complete recalibration of the system.*

Coasting Shut-Off: In order to cut off the flow of fuel during deceleration, a diaphragm controlled coasting shut-off valve is included in the fuel meter, which operates as follows: A heavy calibrated spring holds down a large check valve in the high pressure pump outlet so that under normal driving conditions high pressure fuel is fed to the metering system. The heavy spring is connected to a diaphragm and whenever the very high vacuum (due to deceleration) is applied to

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TURBOGLIDE POWERGLIDE
CHEVROLET TRANSMISSION THROTTLE LINKAGE WITH FUEL INJECTION

ROCHESTER "RAMJET" FUEL INJECTION (C nt.)

the diaphragm, it overcomes the spring and lifts the check valve causing the high pressure pump to discharge directly into fuel reservoir and no pressure is applied to metering system. To prevent operation of the coasting shut-off valve except during prolonged deceleration, a fitting containing a check ball and a restricted opening is installed in the coasting shut-off vacuum line at the diaphragm end. When a high vacuum is applied to this fitting, the check ball is pulled off its seat, and vacuum is applied to the diaphragm through the restricted opening. This has the effect of slowing down diaphragm reaction so that fuel is shut-off only during continuous deceleration. When throttle valve is opened and vacuum drops, the ball falls off its seat and relieves vacuum on the diaphragm.

Starting: Because of the low fuel pressure from the gear pump during engine cranking, a starting solenoid is included in the fuel meter which mechanically forces the fuel valve off its seat so that fuel can flow directly from reservoir inlet to nozzles as follows. The starting solenoid which is energized by the starting circuit forces the spill plunger downward, through linkage, until it forces the fuel valve off its seat. This action uncovers a special by-pass fuel line which delivers fuel at supply pump pressure to the metering chamber where it is combined with gear pump pressure to supply sufficient fuel for starting. As soon as engine starts and ignition switch is returned to "run" position, solenoid current is cut off causing the fuel valve to return to normal position, shutting off the fuel by-pass.

C ld Enrichment: To provide a richer mixture during engine warmup, manifold vacuum is cut-off from the enrichment diaphragm causing it to retain the ratio lever in the rich position, as follows. A thermostatically controlled check valve in the manifold vacuum line is pulled upward by manifold vacuum, cutting off vacuum to the enrichment diaphragm and exerting a pull on the enrichment piston. Opposing the vacuum pull on this piston is the tension of a thermostatic coil which will hold the piston up and leave check ball in a closed position until coil is heated and relaxes. A heating element in the thermostatic coil is energized by generator whenever engine is running. When coil has been heated sufficiently to relax its tension, vacuum pulls piston all the way down and piston stem unseats the check ball so that vacuum is applied to enrichment diaphragm, causing it to move the ratio lever to lean position.

Unloading: To allow cranking without use of the fuel by-pass, a solenoid cut-off switch is attached to air meter next to the throttle lever. Whenever the throttle valve is opened three quarters or wider, a cam on throttle lever operates a micro-switch to break the circuit to fuel by-pass solenoid, allowing a flooded engine to be "unloaded" and restarted.

ADJUSTMENT

► *ADJUSTMENT NOTE. Make all adjustments in the order indicated below*

CHEVROLET PASS. CARS & CORVETTE

Idl Spe d & Mixtur : For an initial adjustment, turn both the idle air adjustment screw (located below and to rear of fuel enrichment housing and facing left side of car), and the idle fuel adjustment screw (located below and to rear of fuel enrichment housing - this screw faces rear of car and is closer to side of engine than idle air adjustment screw), two full turns open from a fully seated position. With engine at normal operating temperature and running, adjust air adjusting screw to obtain best possible idle speed. Adjust idle fuel adjusting screw to smooth out the idle speed. Readjust idle air adjusting screw and fuel adjusting screw until best idle is obtained at approximately 500 RPM (Auto. Trans. in "DR"), 600 RPM (Std. Trans.), 700 RPM (with solid lifter camshaft).

Throttle Linkage (Synchro-mesh Trans.): With accelerator pedal pressed to floor and throttle bellcrank rotated so throttle valves are in wide open position, adjust upper bellcrank rod for free entry into bellcrank lever.

Throttle Linkage (Powerglide & Turboglide): Same as for standard carburetors. *See "Carburetor" on Car Model pages.*

Cold Enrichment Coil Adjustment: Scribe mark on coil cover should be set 1½ notches rich from scribe mark on housing.

Cold Enrichment Rod Adjustment (Chev. Pass. Cars): With engine turned off and cool, disconnect rubber sleeve from cold enrichment housing signal boost tube and insert a short length of rubber hose over tube (such as windshield wiper hose). Crack throttle valve as necessary to place throttle tab just on high step of fast idle cam, then close the throttle. Hold trip lever against counterweight tab and blow into hose while listening at the air meter. If choke rod length is correct, slight air flow should be heard. Repeat check but with throttle tab on second step of fast idle cam. No air should be heard. If necessary, bend rod as required with Bending Tool J-6492 to shorten or lengthen rod in order to meet above requirements.

Cold Enrichment Rod Adjustment (Corvette): To hold trip lever and the counterweight tab together, twist the attaching screw its full limit clockwise. Note point where fast idle screw contacts cam. If rod length is correct, fast idle screw will just touch at center of high step of cam. Otherwise bend rod to lengthen or shorten as required to provide correct adjustment.

Fast Idle Setting: With engine at normal operating temperature, fast idle speed should be 1600-1700 RPM with throttle tab (Pass. Cars), fast idle screw (Corvette) on high step of fast idle cam. To adjust, bend throttle tab (Pass. Cars), rotate fast idle screw (Corvette) to to bring engine to specified RPM.

PONTIAC

► *PONTIAC NOTE:* The fuel injection system used on Pontiac is basically the same as that used on Chevrolet models however, the complete system is fully enclosed in a sheet metal shroud and air is introduced through a conventional type air cleaner

Idl Spe d & Mixture: Remove idle adjustment cover (in center of shroud), and air adjustment plug (on left hand end of shroud) from upper shroud Connect a tachometer and vacuum gauge to engine Insert a screwdriver through hole in shroud and adjust the air screw to obtain a correct idle speed of 480-500 RPM (with transmission selector lever in "Dr" (Drive) range) Set idle mixture screw (through opening in top of shroud) to best idle, highest vacuum and RPM. *(NOTE* - Turn screw in to lean mixture, out to richen mixture). Recheck idle RPM. If any slight stalling tendency shows up on road test, use a slightly richer (1/8 turn) mixture adjustment.

Throttle Linkage Adjustment (Hydra-Matic Cars): Same as for standard carburetors. *S "Carbur t r" n Car Model pages.*

Throttle Return Check Adjustment: Disconnect throttle return check vacuum line and plug manifold to avoid leakage of air. Run engine until completely warm (make sure there is no cold enrichment). Adjust contact screw of throttle return check to obtain 1200 RPM engine speed. Reinstall vacuum connection to manifold.

Cold Enrichment Coil Adjustment: Scribe mark on coil cover should be set 5 notches rich (1957 after Unit No. 1039), 1 notch rich (1958).

Fuel Injection Throttle Control Linkage Adjustm nt: Remove throttle return check from bracket and disconnect inner control rod at throttle lever on air meter. Make sure throttle plate is fully closed (not on fast idle cam), then insert Gauge Pin J-2544 through hole in bracket and hole in lever (on outside of shroud). Adjust length of inner control rod so that with gauge pin installed the air meter throttle plate will be in fully closed position. Connect inner rod to throttle lever and remove gauge pin. *CAUTION - D not adjust clos d throttle stopscrew on air m t r. This is a factory calibrated adjustment.* Install throttle return check on bracket.

Cold Enrichment Rod Adjustm nt (1957 Models): While holding throttle valve open, move choke trip lever clockwise to its full travel. With trip lever in full clockwise position and in contact with tang on cold enrichment lever, check point at which fast idle adjusting screw contacts cam. The screw should be on high step of cam and from flush to .050" from the step. To adjust, bend link at center angle. *CAUTION - In h t idle position, fast idle scr w must be ntirely cl ar of cam.*

Cold Enrichment Rod Adjustm nt (1958 Mod ls): With engine running, rotate cold enrichment lever and trip lever as a unit (keeping both levers in contact) until fast idle screw is positioned at end of second step of fast idle cam. Screw should be overhanging low step of cam. While holding levers in this position, check position of enrichment lever fuel meter. Lever should be against "rich" stop. Rotate cold enrichment lever and trip lever until fast idle screw is positioned on low step of cam and against second step. While holding levers in this position check enrichment lever on fuel meter. Enrichment lever should now be against "lean" stop. If relationship between cam and cold enrichment assembly is incorrect, bend fast idle link to adjust.

Fast Idle Sp d Adjustm nt (All Mod ls): With engine at normal operating temperature, remove upper shroud and

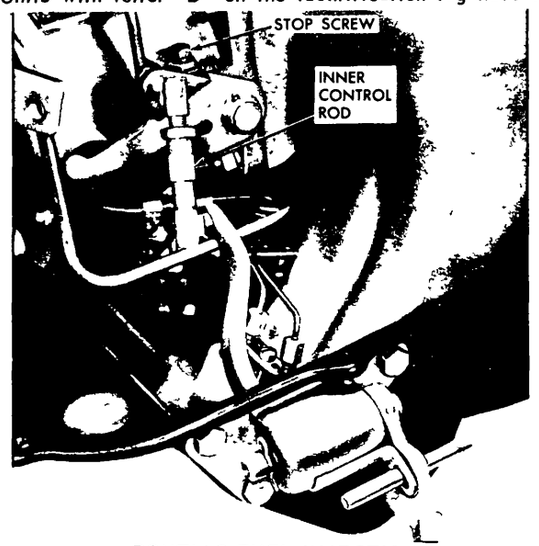
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ROCHESTER "RAMJET" FUEL INJECTION (C nt.)

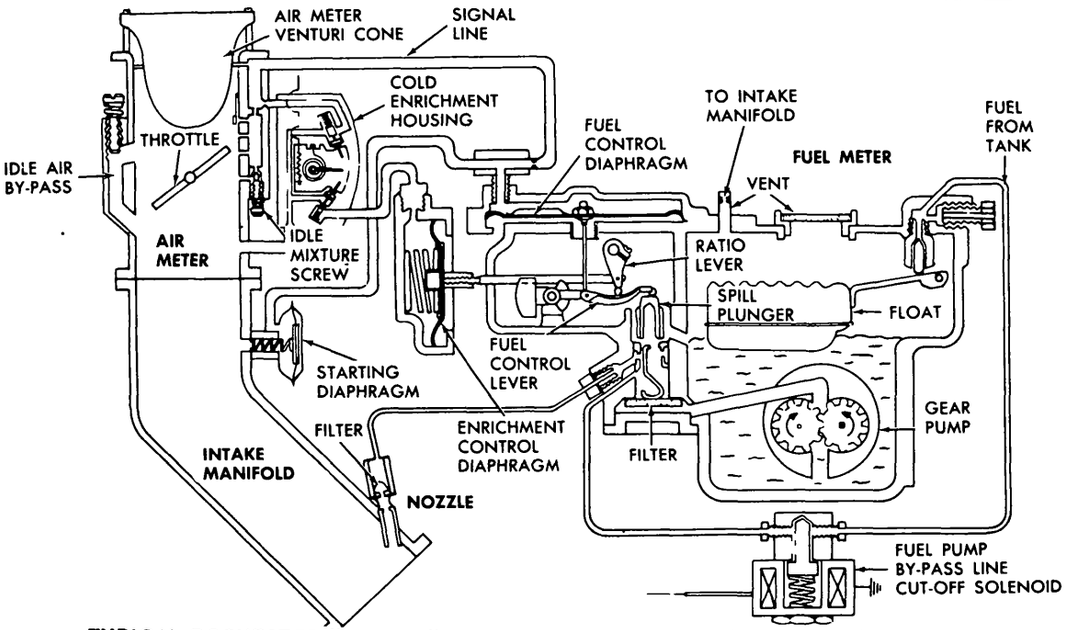
adjust fast idle screw to obtain 1500 RPM with screw on top step of fast idle cam.

TROUBLE SHOOTING & DIAGNOSIS: Check to make sure that all adjustments have been properly made before diagnosing fuel injection trouble.

►*1958 PONTIAC IDLE MIXTURE NOT LEANING OUT SUFFICIENTLY WITH THE MIXTURE SCREW CORRECTION & DIAGNOSIS:* With engine operating at normal temperature, disconnect vacuum line at cranking signal valve. If engine leans out with line disconnected, there is a vacuum leak either through cranking valve or from air meter. To locate leak, cover cranking valve outlet tube and cranking valve vacuum line with fingers or rubber plugs. If engine again runs rich the trouble is in the air meter; but if it stays lean, the cranking signal valve is leaking manifold vacuum and must be replaced. If after checking as above and correcting leakage, the engine continues to run rich, the trouble is in the fuel meter and the unit must be removed from the car. After removal, check bypass solenoid valve for proper sealing. This can be done by attempting to blow air through bypass line. If valve is fully seated there should be no leak. Actuate solenoid with 12 volt current. Air should pass freely through bypass line. Remove fuel control diaphragm cover and fuel control diaphragm and gaskets. Install a new fuel control diaphragm and gasket using only one gasket under the diaphragm in place of the two used in production. *NOTE --When installing diaphragm, it must be positioned evenly to allow flex.* Remove spill sleeve and spill plunger and check spill splunger for freeness in sleeve. *NOTE- Units with letter "D" on the identification tag have a light weight spill plunger to aid in leaning out idle mixture. The lighter plunger is recognized by an undercut to remove excess weight.* On earlier units, the spill sleeve and plunger should be replaced with the light weight type, Part No. 7017081. Reassemble unit and reinstall on car, using new manifold gaskets.



PONTIAC FUEL INJECTION THROTTLE CONTROL LINKAGE



TYPICAL ROCHESTER "RAMJET" FUEL INJECTION SYSTEM (SCHEMATIC)

Failure To Start: Check to make sure that depressing the throttle on a cold engine will allow the fast idle cam to index, and that throttle remains closed until engine has started. Check starting solenoid on fuel meter to make certain it operates when starter is engaged. Make sure fuel is flowing from nozzles. If fuel flows from nozzles, and car won't start, check for large air leaks, such as loose nozzle blocks. If no fuel flows from nozzles, check gas tank and supply pump. Check the gear pump drive cable. There is also the possibility that foreign material under the coasting shut-off valve will prevent pump from delivering fuel.

Starts & Dies: Check for vacuum leaks, especially in lines to main control diaphragm. If this trouble occurs on cold starts, check the thermostat cover for proper location. Check thermostat housing for leaks and make sure the check ball in the sleeve is free to move. Check the spill plunger for sticking by moving it manually (push on solenoid plunger). Check for a leak in main control diaphragm, either at seal between cover and casting or in the diaphragm (diaphragm leakage may be checked by applying a 2.5" vacuum on control line). Check fuel supply pump for capacity and pressure. Be sure the by-pass solenoid is returning to "run" position.

Hesitation or Flat Spot: Check for leaks in control lines and fittings. Check the venturi signal system in the Air Meter for cleanliness and make sure the auxiliary signal passages are clear. Check main control diaphragm for leaks. Make sure there is a restriction in the "tee" on the auxiliary signal side. Check for sticking spill plunger. Apply an 18" vacuum to enrichment diaphragm to check leakage. Check enrichment linkage for proper cut-in and mixture ratio limits (Enrichment lever should leave power stop at 4" of vacuum and reach the economy stop at 8" of vacuum. Check to be sure enrichment diaphragm is receiving manifold vacuum; if not, look for trouble in the thermostat housing, such as a broken heat element or a sticky piston.

Surge: Check the enrichment diaphragm and spill plunger (see above). Disconnect coasting shut-off diaphragm line and plug it to prevent a vacuum leak into the air meter; if this cures the surge, check adjustment of the coasting shut-off and check springs for distortion.

Rough Idle: Check for correct idle speed and mixture adjustments. Look for plugged nozzle (to do this, short out the spark plugs, one by one). Check for any vacuum leaks in control lines and nozzle blocks. Be sure enrichment lever is on the economy stop when engine is warm.

Cold Driveaway: Check for proper adjustment of cold enrichment cover and the fast idle rod. Check thermostat control piston to make sure it is not sticking and that the enrichment lever rests on the power stop during warm-up. *(See "Starts & Dies" above).* Check for vacuum leaks throughout system.

Fuel Economy: Be sure the enrichment lever rests on economy stop during normal operation. *(See "Hesitation & Flat Spot" above).* Check to see that mixture stop screws are locked in place so they cannot move and vary the mixture. *CAUTION - These stops are preset.*

1954-55 ROCHESTER 4-BARREL 4GC CARBURETORS

	Rochester Carburetor No.
BUICK	
1955 Series 50,60,70 (Early)	7006200
1955 Series 50,60,70 (Late)	7009100
CADILLAC	
1954 V8 Series (No. A.C.)	7006220
1954 V8 Series (With A.C.)	7006221
1954 Late (Eng. No. 57962 Up)	7006962
1955 *See SEPARATE "Cadillac (Carter & Rochester)"*	
OLDSMOBILE	
1954 All (S-M)	7006000
1954 All (H-D)	7005900
1955 Super 88, 98 (S-M)	7006000
1955 Super 88, 98 (H-D)	7007000
PACKARD	
1955 Series 5560	7007230
1955 Series 5580	7007230
1955 Caribbean 5588 (Front)	7008230
1955 Caribbean 5588 (Rear)	7008231
PONTIAC	
1955 Hydra-Matic	7007800

(S-M) Synchro-mesh Transmission Cars.
(H-D) Hydra-Matic Drive Cars.

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 CADILLAC "SPEED-UP" CONTROL ON AIR-CONDITIONED CARS:* This device automatically increases engine idle speed when air-conditioning turned on while engine idling with selector lever in Neutral "N" position. *See Speed-Up Control Adjustment following Idle Adjustment below.*

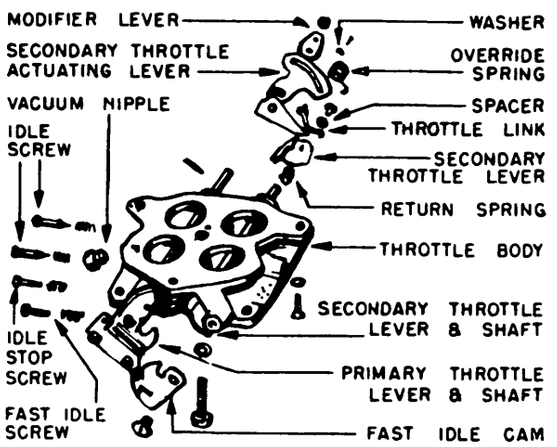
►*1954 CADILLAC CARBURETOR PRODUCTION CHANGE (To eliminate Surge in 20-30 MPH. Speed Range):* Carburetor No. 7006962 used on later cars. This carburetor has revised idle circuit (New Idle Tubes and changed idle channel resistance), New Main Metering Jets, and New Throttle Body. Adjustment specifications are same as for previous carburetor models.

►*1954 CADILLAC IDLE SPEED SETTING CAUTION ON AIR-CONDITIONED CARS:* Idle speed setting should be adjusted seasonally: (1) When air-conditioning use discontinued for winter months, (2) When air-conditioning is put into use for summer months. This is necessary to compensate for compressor load when engine idling in "Dr." *See Idling Adjustment below. CAUTION—Engine may stall during summer months, or operate at too fast an idle speed during winter months, if proper procedure not followed.*

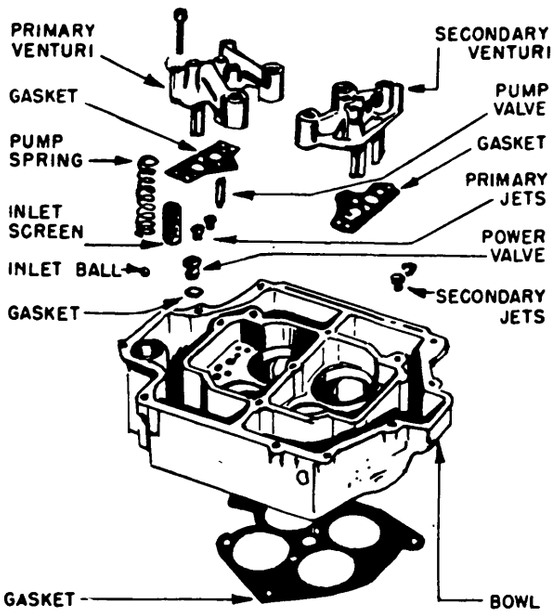
DESCRIPTION: These models are essentially double dual (two-barrel) carburetors with a conventional dual **primary** unit supplemented by a similar dual **secondary** unit for maximum engine performance. Both the primary and secondary units have separate feul bowl and float systems, idle systems, main metering and discharge systems, and interconnected throttle valves as described below. Only the primary unit has an accelerating pump system and choke valve with an automatic choke control (the secondary throttle valves are locked closed for starting and warming up and remain closed during part-throttle operation). *See Throttle Linkage data below.*

Fuel System: A single fuel inlet is used (located on secondary side of bowl cover) with a passage in the cover leading to the fuel inlet valve for each float chamber. Each bowl has a twin float assembly controlling the fuel inlet valve. Bowls are vented to the air horn by vent tubes and have additional vent passages terminating at the air cleaner mounting flange. *See also Idle Vent data below.*

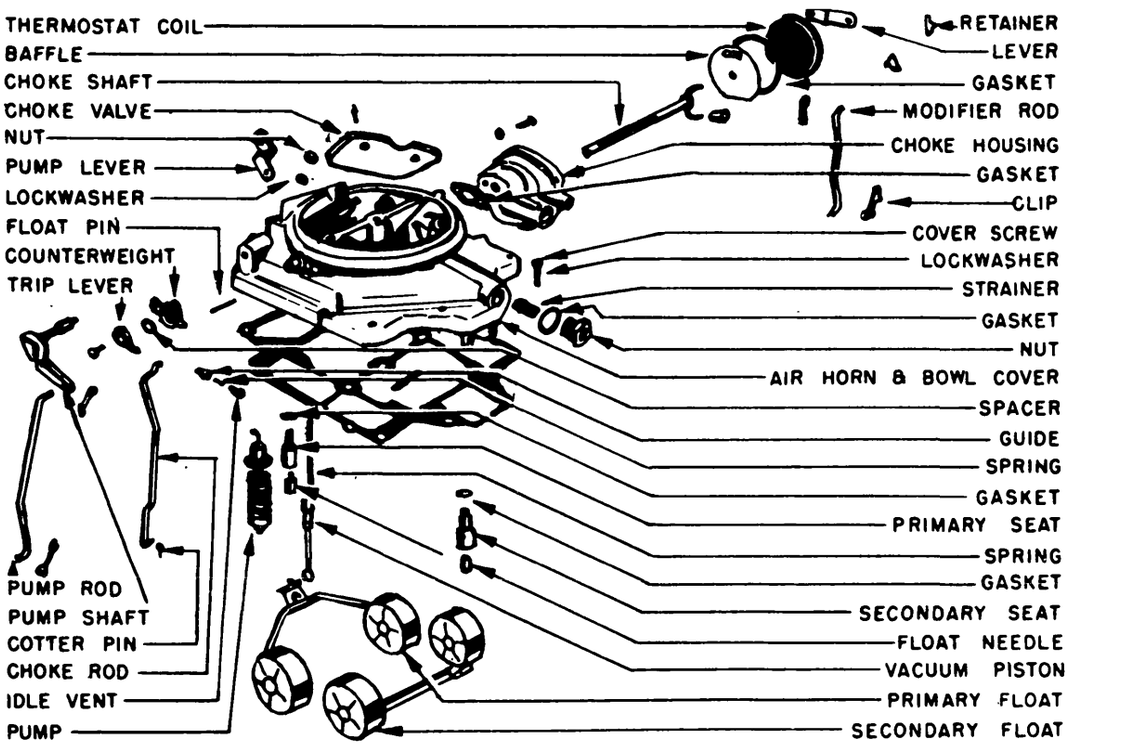
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THROTTLE BODY ASSEMBLY



MAIN BODY ASSEMBLY



R CHESTER 4GC 4-BARREL CARBURETOR AIR H RN & B WL C VER ASSEMBLY

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Idling & Low Speed—Entire idle system is duplicated for both the primary and secondary sides of the carburetor except that idle mixture adjusting screws are provided only on the primary side. Both idle systems discharge into the primary carburetor barrels so that both idle systems are controlled by the opening of the primary throttle valves (idle systems drop out as primary throttle valves open and main nozzles come into action and take over). Secondary throttle valves are locked out by the choke mechanism when the engine is cold and even when the engine is warm these valves do not begin to open until primary throttle valves are 50-60% open.

Accelerating Pump—Used only on primary side of carburetor. Pump is conventional type with pump plunger linked to primary throttle valve lever so that the additional fuel needed for acceleration is discharged through the pump jets into the primary carburetor barrels when the primary throttle valves are opened for acceleration. A relief check valve is located in the pump discharge channel to prevent excessive pressures in the pump circuit (opening of the check valve permits fuel to be by-passed back into the bowl).

Primary & Secondary Throttle Linkage: Secondary throttle valve lever is linked to a secondary actuating lever on the primary throttle valve shaft with an overrun provision so that secondary valves do not begin to open until primary valves are 50-60% open. The linkage provides a more rapid opening of the secondary valves so that both the primary and secondary valves reach the wide open position at the same time. This linkage must be checked and adjusted to insure this synchronized opening. *See Adjustment data.*

Secondary Throttle Lock-out: A means is provided by which the choke mechanism locks the secondary throttle valves closed while the choke is in operation so that no choke valve is required on the secondary side of the carburetor. This lock-out mechanism differs on the various carburetors but all types must be checked and adjusted to insure unlocking of the secondary valves for normal operation. *See Adjustment data.*

Atmospheric Idle Vent: This is an outside bowl vent controlled by a ball or disc type check valve which is opened mechanically (by an arm on the pump countershaft or operating lever) when the throttle valves are closed. This permits fuel vapors to escape and minimizes hot weather starting or idling difficulties due to fuel vapor formation. Vent must close when throttle valves open and vent setting should be checked and adjusted as part of the carburetor adjustment procedure. *See Adjustment data.*

ADJUSTMENT: ***CAUTION—Adjustments must be made in exact sequence as given below (except for Idle Mixture and Idle Speed Tune-up adjustments).***

Idle Setting: ***Adjust only with engine at normal operating temperature with automatic choke not operating*** (choke valve wide open, fast idle inoperative so that engine idles at hot or slow idle speed). With engine warm, set idle speed adjusting screw (throttle stopscrew) for correct idling speed as shown in table below (use tachometer), then adjust each idle mixture adjusting screw (one screw for each primary carburetor barrel—two screws only) until engine idles smoothly and RPM. is at maximum. Recheck idle speed.

OLDSMOBILE NOTE—It is recommended that after above adjustment (for highest vacuum reading and maximum idle speed), each idle screw be turned out ¼ turn for slightly richer mixture (both idle speed and vacuum reading will drop off slightly). Check setting by slowly opening throttle until engine speed increases to 1000 RPM., then close throttle rapidly. If a slightly rich roll is noted as engine returns to idle speed, turn each idle screw in not more than ⅛ turn.

NOTE—Change in Idle Speed affects throttle linkage adjustment on all cars except Oldsmobile. Oldsmobile split throttle lever design insures throttle linkage remaining as set when idle speed adjusted.

IDLE SPEED

Car Model	Synchro-mesh	Auto. Trans.
Buick ('55)	450 RPM	450 RPM
Cadillac ('52)	400 RPM	①375 RPM
Cadillac ('53)③	400 RPM	②400 RPM
Cadillac ('54)		④400 RPM
Oldsmobile ('52-53)	425 RPM	②400 RPM
Oldsmobile ('54)	425 RPM	①400 RPM
Oldsmobile ('55) ⑤	425 RPM	①400 RPM
Packard ('55)	400-450 RPM	400 RPM in "High"
Pontiac ('55)	450-470 RPM	390-410 RPM

①—With selector lever in either "Dr" position.
②—With selector lever in "Dr" (Hydra-Matic Drive Cars), "P" position (Dynaflow Drive Cars).
③—See "Speed-Up" Control below for special idle speed on Air-conditioned Cars.
④—with selector lever in "DR" and Air-conditioner "ON" (Summer months), "OFF" (Winter months). See special procedure following.
⑤—Air Conditioning must be turned "ON" on cars with Air Conditioning equipment.

►***CADILLAC IDLE SPEED SETTING PROCEDURE:*** Set idle speed in accordance with season as follows: When air-conditioning being used (Summer months), place selector lever in "Dr," turn Air-conditioner "ON," set idle speed at 400 RPM. When air-conditioning not being used (Winter months), place selector lever in "Dr," see that Air-conditioner "OFF," set idle speed at 400 RPM. (it will be necessary to cut idle speed setting down from summer setting to maintain this 400 RPM. idling speed).

Cadillac Speed-Up Control (Air-conditioned Cars): This unit increases engine idle speed when idling with selector lever in "N" and air-conditioner "ON."

Adjustment—With engine warm and idling, place selector lever in "N," turn air-conditioning ON, loosen locknut on diaphragm shaft and turn knurled adjusting nut to obtain engine speed of 900 RPM., tighten locknut. *NOTE*—This setting supersedes previous recommendation of 750-800 RPM.

Throttl Return Check Dashpot Adjustm nt: Check setting by opening throttle for a few seconds, then quickly release accelerator pedal. If engine stalls, adjustment is required.

Adjustment (Cadillac)—Check alignment of adjusting screw and contact arm on secondary throttle lever, bend return check bracket as necessary to center screw on contact lever radius. Check performance with selector lever in "Dr" or "L," by opening throttle and quickly releasing accelerator pedal. *(CAUTION*—apply brakes firmly when making this test). If engine stalls, adjust by turning adjusting screw (hold shaft with ⅜" wrench while turning screw), repeat test and readjust until stalling condition eliminated.

Adjustment (Oldsmobile)—Turn adjusting screw in or out of return check plunger to secure 1/16" clearance between screw and throttle lever with plunger bottomed in return check and throttle valves closed in hot or slow idle position. *NOTE*—Plunger travel 7/32" from inner to outer position.

Float Setting: ***CAUTION—Both Primary and Secondary Float Assemblies must be checked and adjusted separately and both FLOAT LEVEL & FLOAT DROP must be checked for each assembly.*** Remove bowl cover and float assembly from carburetor but DO NOT remove bowl cover gasket for following checks:

Float Level—***CAUTION—Do not remove bowl cover gasket.*** Invert bowl cover, install float gauge on cover and against curvature in air horn bore, or use scale to measure distance from gasket on cover to highest point on each float. If floats do not almost touch top portion of gauge between gauge legs, or if scale distance not correct, adjust by bending float arms at rear of float assembly *(CAUTION*—all floats must be set alike). Bend float arms horizontally until each float is centered between the gauge legs and check this setting by tilting bowl cover assembly 90° to each side to make certain that floats do not touch gauge legs under these conditions *(CAUTION*—this adjustment important to prevent floats touching sides of bowl and hanging up in service).

FLOAT LEVEL SETTING
(Primary & Secondary Floats)

Car Model	Float Height	Gauge No.
Buick ('55)	1 35/64"	J-6151
Cadillac ('52)	1 3/4" ①	②BT-85
Cadillac ('53)	1 9/16"	③BT-87
Cadillac ('54)	1 19/32"	BT-101
Oldsmobile ('52)	1 1/4"	BT-66
Oldsmobile ('53)	1 9/16"	BT-87
Oldsmobile ('54-55)	1 5/8"	BT-89
Packard ('55)	1 5/8"	④BT-89
Pontiac ('55)	1 19/32"	J-6179

①—For carburetors WITHOUT Float Balance Springs only (supersedes 1⅜" setting applicable to carburetors WITH balance springs).
②—Cadillac No. J-5198.
③—Cadillac No. J-5465. ④—Packard No. 5399.

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1954-55 ROCHESTER 4-BARREL 4GC CARBURETORS (C nt.)

Float Drop—*CAUTION—Do not remove bowl cover gasket.* Hold bowl cover assembly in upright position so that floats are free to hang down. Use scale to measure distance from bottom face of gasket on bowl cover to bottom of floats. If this distance or float travel (see table below) not correct, adjust each model as directed below *(CAUTION*—All floats must be set alike).

Cadillac Carburetors (without Balance Spring). Bend float tang on float arm under float hinge which contacts side of needle seat (this tang repositioned as part of balance spring removal procedure) away from needle seat to increase float drop, or toward seat to decrease float drop.

Oldsmobile Carburetors (With Balance Spring). Bend tang at rear of float assembly (which contacts balance spring) away from the balance spring to increase float drop, or toward balance spring to decrease float drop.

FLOAT DROP SETTING
(Primary & Secondary Floats)

Buick ('55)	2 1/4"
Cadillac ('52)	①2 1/4"
Cadillac ('53-54)	2 1/4"
Oldsmobile ('52)	② 1 15/16"
Oldsmobile ('53-55)	2 1/4"
Packard ('55)	2 1/4"
Pontiac ('55)	2 1/4"

①—For carburetors WITHOUT Float Balance Springs only (supersedes 1 15/16" setting applicable to carburetors WITH balance springs).
②—2¼" on later carburetors.

Accelerating Pump Stroke: *CAUTION—This is a linkage adjustment and not a seasonal change recommendation.* Back off idle speed stopscrew and fast idle screw so that primary throttle valves are fully seated, hold throttle lever in this position, use scale to measure height of pump plunger rod (from top surface of bowl cover to bottom edge of pump plunger rod). If height not correct (see table below), adjust by bending pump rod as required.

PUMP STROKE SETTING

Buick ('55)	1 3/32"
Cadillac ('52-54)	15/16"
Oldsmobile ('52-55)	1 1/16"
Packard ('55)	1 3/32"
Pontiac ('55)	1 1/16"

CAUTION—Do not readjust fast idle screw until after Choke Modifier has been adjusted on Cadillac.

Atmospheric Idle Vent: *CAUTION—Targeting or centering of the lever tang on the vent valve must be done first to insure proper closing of the valve (hanging up of valve in open position may cause poor mileage).*

Targeting of Lever Tang—Check position of idle vent lever tang and bend tang, as necessary, to centralize it on the vent valve.

Setting—Close primary throttle valves against wire gauge of correct size (see table below) installing gauge on side opposite idle adjusting screws, hold throttle valves in this position while adjusting idle vent. The operating tang on the lever should just touch vent valve. Adjust by bending contact arm using bending tool BT-69.

IDLE VENT SETTING

Car Model	Gauge Size & No.
Cadillac	①② .063" BT-79
Oldsmobile	① .040" BT-67
Packard	①③ .040" BT-67

①—LARGE end of gauge.
②—Cadillac Gauge No. J-5195.
③—Packard No. J-6061.

Automatic Choke: *CAUTION—Cadillac carburetor has Choke Modifier and is adjusted differently as follows:*

Choke Modifier (Cadillac)—With throttle stopscrew and fast idle screw backed off so that primary throttle valves fully seated, loosen retainer screw in index lever and rotate the index pointer on the Choke cover 1 Notch Rich position or one graduation counter-clockwise from long scribed line or center graduation on cover (1952-53), Center At Index (1954), tighten lever retaining screw. Then adjust choke rod, fast idle, unloader.

AUTOMATIC CHOKE SETTING

Car Model	Choke Setting
Buick ('55)	Centered At Index
Cadillac ('52-54)	See Choke Modifier
Oldsmobile ('52-53)	Centered At Index
Oldsmobile ('54-55) Synchro-mesh	1 Notch Lean
Oldsmobile ('54-55)Hydra-Matic	Centered At Index
Packard ('55)	Centered At Index
Pontiac ('55)	Centered At Index

Choke Rod: With automatic choke correctly set (above), turn fast idle screw in until it contacts intermediate step of fast idle cam, rotate cam until fast idle screw is against shoulder of highest step on cam and make certain that choke trip lever is in contact with choke counterweight. Measure choke valve opening by inserting wire gauge of correct size (see table below) between top edge of choke valve and dividing wall in air horn. If valve opening not correct, adjust by bending choke connector rod.

CHOKE ROD SETTING

Car Model	Gauge Size & No.
Buick ('55)	③ .040" J-6152
Cadillac ('52-53)	①② .031" BT-78
Cadillac ('54)	① .040" BT-102
Oldsmobile ('52-55)	① .053" BT-68
Packard ('55)	①③ .053" BT-68
Pontiac ('55)	.054" KMO-480A

①—SMALL end of gauge.
②—Cadillac Gauge No. J-5196.
③—Packard No. J-6056.
④—Large end of gauge.

Fast Idle: *NOTE—Adjustment can be made with carburetor OFF ENGINE or with carburetor ON ENGINE:*

Carburetor Off Engine—With automatic choke and choke rod correctly adjusted, move fast idle cam so that choke valve is fully closed, hold primary throttle valves closed so that fast idle screw is aligned with highest step of fast idle cam. Adjust fast idle screw in against fast idle cam until throttle valve opening is correct as measured by wire gauge (see table below) inserted between edge of valve and carburetor wall on side opposite idle screws.

FAST IDLE SETTING

Car Model	Gauge No.
Buick ('55)	.020" J-1388
Cadillac ('52-54)	①.028" BT-79
Oldsmobile ('52-53)	①.020" BT-67
Oldsmobile ('54-55)	①.024" BT-90
Packard ('55)	①②.024" BT-90
Pontiac ('55)	.033" J-6178

①—SMALL end of gauge.
②—Packard No. J-6057

Carburetor On Engine—Run the engine until both the engine and transmission are at operating temperature. With engine idling and transmission in neutral, and with choke valve wide open, rotate fast idle cam so that high step of cam is under the fast idle screw. Adjust fast idle screw for correct engine speed as shown in table below (use tachometer). *CAUTION—Air cleaner must be in place.*

FAST IDLE SPEED

Buick ('55)	1800 RPM
Cadillac ('52-55)	1700 RPM
Oldsmobile ('52-55)	① 1400-1500 RPM
Packard ('55)	① 1500 RPM
Pontiac ('55)	1800 RPM

①—With transmission in neutral.

Unloader: With automatic choke and choke rod correctly adjusted, hold choke trip lever down so that it is in contact with the choke counterweight, move throttle valves to wide open position, measure choke valve opening by inserting wire gauge of correct size (see table below) between upper edge of valve and dividing wall in air horn. If choke valve opening not correct, bend tang on fast idle cam using tool BT-69.

UNLOADER SETTING

Car Model	Gauge Size & No.
Buick ('55)	③ .115" J-6152
Cadillac ('52-53)	①② .067" BT-78
Cadillac ('54)	① .125" BT-102
Oldsmobile ('52-53)	① .092" BT-68
Oldsmobile ('54-55)	① .115" BT-90
Packard ('55)	①④ .115"BT-90
Pontiac ('55)	.115" J-6178

①—LARGE END of gauge.
②—Cadillac Gauge No. J-5196.
③—Use small end of gauge.
④—Packard No. J-6057.

Secondary Throttle: *CAUTION—Three separate adjustments required as follows:*

1) Secondary Throttle Position—Move both choke and primary throttle valves to wide open position. If secondary throttle valves not wide open, remove throttle operating link, bend tangs on wide open stops on primary and secondary shafts as required to obtain wide open position, then bend throttle operating link to proper length.

2) Secondary Throttle Lock- ut—With choke valve partially closed, check side clearance between secondary lock-out lever tang and edge of slot in fast idle cam using a feeler gauge of correct thickness (see table below). If clearance not correct, adjust by bending tang on lever using BT-18 tool.

3) Secondary Throttle Clearance—With choke valve wide open check clearance between lower face of secondary lock-out lever tang and edge of fast idle

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1954-55 ROCHESTER 4-BARREL 4GC CARBURETORS (Cont.)

cam using a feeler gauge of correct thickness (see table below). If clearance not correct, adjust by bending tang on lever up or down using BT-69 bending tool (1952-53), BT-91 (1954-55).

SECONDARY THROTTLE SETTING

	Feeler Gauge Thickness	
Setting:	**(2) Lock-out**	**(3) Lever Clearance**
Buick	.015"	.030"
Cadillac	.015"	.015"
Oldsmobile	.015"	.035"
Packard	.015"	.015"
Pontiac	.015"	.015"

Car Starter Switch Setting (Buick): Back off throttle stop screw to close throttle valves completely Make pencil mark on switch end of primary throttle shaft to line up with longest of three indicator marks on casting. With test light across switch terminals, slowly open throttle valves Light should come on when pencil mark is between the two marks on casting. Adjust by changing shims (Maximum .066"). Reset idle RPM to specifications.

Dampener Valve Setting (Buick): Remove fast idle cam and replace retaining screw Adjust lever tang (Tool J-6058A) to give measurement of 51/64" (Tool J-6153 No 1 end) from cam screw shoulder vertical to top of counterweight lever Hold lever in this position, seat damper valves against outside of bore and tighten in place Readjust tang to give 53/64" (Tool J-6153 No. 2 end) from cam screw shoulder vertical to top of lever. Proper adjustment prevents valve edge striking bore when in closed position

OVERHAUL: ***CAUTION—When disassembling carburetor, be sure to keep PRIMARY and SECONDARY side parts separate so they will not be confused or interchanged when carburetor reassembled.***

Disassembly: Carburetor consists of three main subassemblies (Air Horn & Bowl Cover, Carburetor Bowl, and Throttle Body) which can be overhauled separately as follows:

Air Horn & Bowl Cover—On Cadillac, disconnect and remove choke modifier rod. On all models, disconnect and remove pump connector rod. Remove trip lever retaining screw from end of choke shaft, remove trip lever and spacing washer from shaft. Take out fast idle cam pivot screw, remove choke rod with lever and cam as an assembly. Take out all air horn retaining screws *(CAUTION*—there are 13 screws—3 inner and 10 outer—with **one screw in counterbore in dividing wall just inside edge of air horn**). Lift air horn and bowl cover assembly straight up using extreme care not to damage float assemblies *(CAUTION*—break cover loose from bowl with finger pressure only, DO NOT pry on cover flange). Disassemble as follows: Invert the cover assembly, take out float hinge pins and remove floats and intake needles, remove needle seats and gaskets *(CAUTION*—Keep each float assembly, intake needle, and seat together, DO NOT mix primary and secondary side parts). Remove power piston by rotating retaining washer until flat side allows piston to pass, remove piston spring. Remove idle vent valve, spring, and retainer by pressing on retainer with a screwdriver and sliding assembly up out of well in bowl cover. Remove pump plunger and rubber seal as an assembly by disengaging plunger shaft from pump lever and pulling assembly out of cover (seal, retainer, washer, and spring can be removed from plunger for cleaning). Remove pump inner lever from countershaft by removing nut and washer, then slide countershaft out of cover boss. Remove fuel inlet fitting, gasket and strainer. If choke to be disassembled, proceed as follows: On Cadillac, remove retaining screw and lift off choke modifier lever. Remove cover attaching screws and retainers, lift off thermostat cover and coil assembly *(CAUTION*—On Cadillac, do not remove metal pointer or coil from shaft in cover), remove gasket and baffle plate. Remove choke valve (remove staking burrs from valve screws before taking screws out). Rotate choke shaft counter-clockwise until choke piston clears cylinder, slide shaft out and remove shaft and piston as an assembly (piston can be disconnected by using a wire to push piston pin out of piston and link). Remove choke housing by taking out two attaching screws, remove and discard choke housing gasket.

Carburetor Bowl—Take out three attaching screws and lockwashers in each venturi cluster, carefully remove clusters by lifting them straight up to avoid damaging idle tubes and main well tubes *(CAUTION*—Clusters are serviced as an assembly and should not be disassembled further). Keep primary and secondary side clusters separate (primary cluster has pump discharge nozzles). Remove all main metering jets (located in bowl adjacent to venturi cluster support). *CAUTION*—Primary and secondary side metering jets are different size and must not be interchanged. Remove power valve and gasket (located in bowl adjacent to primary metering jets). Remove pump return spring from pump cylinder, then invert bowl casting to remove aluminum pump inlet ball (from bottom of pump cylinder) and brass pump outlet check needle (from passage under primary venturi cluster mounting face). *CAUTION*—Do not lose these parts and NEVER substitute a steel ball for the aluminum inlet ball. Remove pump inlet screen from intake passage at side of cylinder.

Throttle Body—Remove large screw and washer from counterbore in center of throttle body (visible when bowl and throttle body inverted), remove three smaller screws and lockwashers from flange, carefully separate throttle body from bowl, remove and discard gasket. Remove both idle adjusting screws and springs, idle stop screw and spring, and fast idle screw and spring *(CAUTION*—keep each screw and its proper spring together). On Cadillac, remove choke modifier lever and retaining screw from primary throttle shaft. Free secondary throttle actuating link by taking out cotter pin in each end, unhook inner end of primary throttle shaft override spring from lever using long-nose pliers, remove override spring retaining screw from primary throttle shaft, remove secondary throttle lever retaining screw and washer, then slide secondary throttle actuating lever and override spring off primary throttle shaft, remove link. Slide secondary throttle lever and return spring from secondary throttle shaft. This completes throttle body disassembly.

►***CAUTION—Throttle body is furnished as an assembly with throttle valves and shafts and no attempt should be made to remove throttle valves (disturbing valves will upset low speed metering performance).***

Cleaning & Inspection: Wash all parts thoroughly in carburetor cleaning solvent **except** following parts which should be cleaned in clean gasoline: Choke cover and coil assembly, pump plunger, primary venturi cluster (with pump discharge nozzles). Blow out all passages in castings with air, remove all gum and carbon deposits *(CAUTION*—do not use drills to clean out jets and passages). Inspect strainer screens and replace if distorted or plugged. Check floats for dents, leaks, or wear at hinge pin holes. Inspect fast idle cam for wear on steps. Inspect throttle body carefully for wear at throttle valves and bore and shaft wear in bore (replace as an assembly if worn excessively). Inspect all parts for wear or damage and replace as required.

Reassembly: Use new gaskets. Install all parts in reverse order of disassembly procedure (above) and pay particular attention to the following:

Secondary Throttle Lever & Spring Installation: Install return spring on secondary throttle shaft with bent end of spring in hole in throttle body, wind up spring one complete turn, then install secondary lever on shaft over straight end of spring (bent portion of lever should be above shaft), install spacer and retaining screw in end of shaft. Install secondary throttle actuating link (insert plain end through lever hole, install cotter pin on shaft side to clear return spring).

Primary Throttle Lever & Spring—Start secondary throttle actuating lever on primary throttle shaft with curved slot portion outward and toward the rear. With inner portion of lever on shaft, start override spring on shaft with long end inward, then slide lever and spring on shaft and engage washer end of secondary throttle actuating link in slot in lever. Install override spring retaining screw through loop end of spring and into primary throttle shaft from upper side. Hook inner end of override spring over top edge of secondary throttle actuating lever. Install washer and cotter pin on end of secondary throttle actuating link. On Cadillac, install choke modifier lever and retaining screw on end of primary throttle shaft (lever must point upward when throttle closed and marking "RP" must be outward).

Throttle Body-to-Bowl Assembly Caution—Install new gasket on bottom surface of bowl with largest projecting tab on primary side and surrounding vacuum passage to power valve piston *(CAUTION*—gasket is not reversible). Install all throttle body attaching screws loosely (including large screw in center of throttle body), then tighten all screws evenly.

Venturi Cluster Installation Caution—Make certain that brass pump discharge needle installed in pump passage in bowl before installing primary venturi cluster. Use new gaskets and install each venturi cluster in correct position making certain that clusters correctly aligned by the tangs on the cluster. CAUTION—Primary and Secondary clusters not interchangeable and can be identified by brass pump discharge nozzzles used on primary cluster only.

►***1953 OLDSMOBILE VENTURI CLUSTER PRODUCTION CHANGE***—See data under Changes, Cautions, Corrections above for different types used in production and replacement parts caution.

Metering Jet Installation Caution—Primary and secondary side metering jets are DIFFERENT sizes

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(in general, secondary jets are larger size than primary jets) and must be installed in correct positions. *NOTE*—On later Cadillac carburetors, primary jets are brass finish, secondary jets are copper-plated.

►*1953 OLDSMOBILE METERING JET PRODUCTION CHANGE*—See data under Changes, Cautions, Corrections above for different sizes used in production and recommended replacement jet sizes.

Accelerating Pump Plunger Assembly—When installing rubber seal on plunger stem, slide seal on shaft with larger end toward the piston, see that upper end engaged in groove in plunger stem. Insert assembly through bowl cover from below and pull seal through cover so that cover edge engages groove in seal. When installing cover, guide plunger carefully into pump cylinder.

Float and Intake Valve Assembly—Make certain that parts installed in correct position (primary and secondary parts not interchangeable). On Cadillac, make certain that float hinge pins installed in holes farthest from bowl cover. On Oldsmobile, see that tang on float arm is back of float balance spring (balance springs not used on later Cadillac carburetors and should be removed and discarded on earlier carburetors—see Changes & Corrections above). Adjust float level and float drop or travel (see Adjustment data above).

Air Horn & Bowl Cover Installation—Use new gasket, carefully align all holes in gasket and cover. When installing cover, use care in guiding pump plunger into pump cylinder and power valve piston into its bore, and see that floats not bent by striking on edge of bowl. Install all bowl cover attaching screws, tighten inner screws first, and then outer screws, evenly and securely.

Choke Valve Installation—After choke shaft and piston assembly installed in air horn, slide choke valve through shaft with letters "RP" upward, use new screws and install screws loosely, then tighten screws as follows: **Cadillac**—press firmly on choke housing end of shaft and hold valve tightly closed, tighten screws securely and stake ends of screws lightly taking care not to bend choke shaft. **Oldsmobile**—First install counterweight, spacing washer, and trip lever on end of choke shaft, press lightly on end of choke shaft to obtain minimum clearance of .020" between spacing washer and counterweight, tighten choke valve attaching screws with shaft in this position, stake screws lightly taking care not to bend choke shaft. Install choke baffle plate with curved slot over tang on choke lever.

Thermostatic Housing & Coil Installation—With retainer screws loose, rotate cover counter-clockwise until coil hook picks up choke lever tang, then position cover for correct choke setting (see Adjustment data) and tighten retaining screws. On Cadillac, install choke modifier lever loosely (lever should be forward and slightly down when metal pointer is at scribed line), tighten lever screw as part of Choke Modifier adjustment (see Adjustment data).

Carburetor Adjustments—Make all adjustments as directed in Adjustment section above.

SERVICE PARTS: Gasket Sets—Rochester No. 7004690 (7004300, 4500, 4800, 5100, 5600, 5700, 6125, 6250), No. 7006135 (7005900, 6000, 6220, 6221, 6250, 6962), No. 7007134 (7007000, 7230), No. 7008804 (7006200).

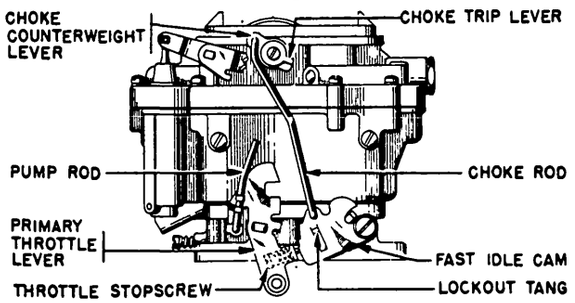
Repair Kit Pkg.—Rochester No. 7004691 (7004500), No. 7005588 (7005100, 6215), No. 7005592 (7004300, 4800, 5600, 5700, 6250), No. 7006375 (7006220, 6221, 6962), No. 7006133 (7005900, 6000, 7000, 7230), No. 7008803 (7006200).

ROCHESTER 4-BARREL "4GC" AUTOMATIC CHOKE

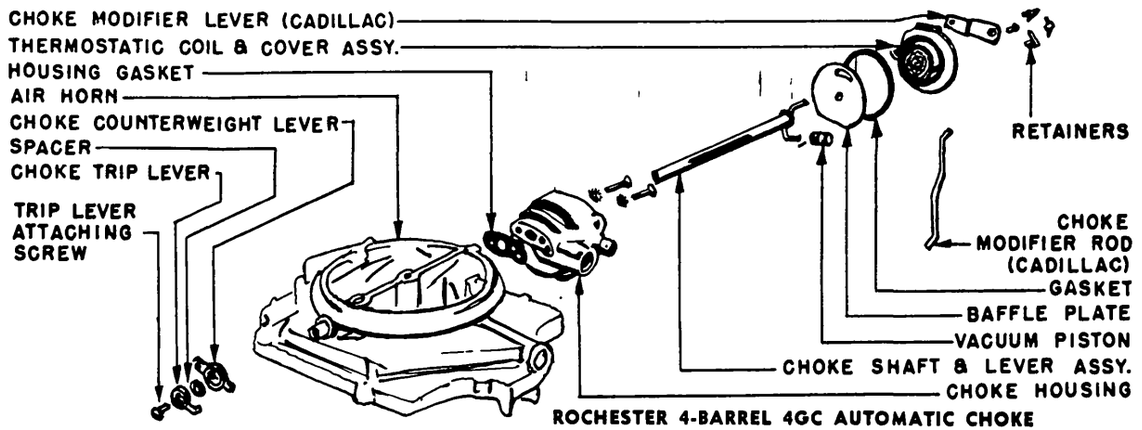
DESCRIPTION: Automatic choke and fast idle mechanism is similar to type used on Rochester dual carburetors and is adjusted in the same manner. Choke valve is located on primary side of the air horn and controls the primary barrels only (Secondary throttle valves are locked closed while the choke is in operation and no choke valve is required).

Cadillac Choke Modifier—Consists of linkage between the thermostatic coil and the throttle lever so that the thermostatic coil tension is controlled by the throttle and is lessened as the throttle is opened to provide a continuously variable unloading action which improves performance and economy during warm-up period.

DISASSEMBLY: On Cadillac, remove retaining screw and lift off choke modifier lever (*CAUTION*—do not remove metal pointer or coil from shaft in cover). Remove thermostatic coil cover attaching screws and retainers, lift off cover and coil assembly, remove gasket and baffle plate. Take out choke trip lever attaching screw, remove choke trip lever, spacing washer, and choke lever and collar assembly from choke shaft. Take out fast idle cam attaching screw, remove choke lever and collar assembly, choke rod, and fast idle cam as an assembly. Remove choke valve by taking out two valve attaching screws (remove staking burrs from screws before removing them). Rotate choke shaft counter-clockwise to free choke piston from cylinder, withdraw shaft and piston assembly from housing. Take out piston pin to remove piston from choke lever. Remove two choke housing-to-air horn screws, remove housing and gasket from air horn.



ROCHESTER 4-BARREL 4GC FAST IDLE



ROCHESTER 4-BARREL 4GC AUTOMATIC CHOKE

Cleaning & Inspection: Wash all metal parts thoroughly in carburetor cleaning solvent **except** choke cover and coil assembly (clean with clean gasoline). Inspect choke shaft for wear in bore in air horn, check fast idle cam for wear on steps or in rod attaching holes. Inspect thermostatic coil for distortion. Blow out all passages with compressed air.

REASSEMBLY: Use new gaskets, install parts in reverse order of disassembly procedure and note the following important points:

Choke Valve Installation—After choke shaft and piston assembly installed in air horn, slide choke valve through shaft with letters "RP" upward, use new screws and install screws loosely, then tighten screws as follows: **Cadillac**—press firmly on choke housing end of shaft and hold valve tightly closed, tighten screws securely and stake ends of screws lightly taking care not to bend choke shaft. **Oldsmobile**—First install counterweight, spacing washer, and trip lever on end of choke shaft, press lightly on end of choke shaft to obtain minimum clearance of .020" between spacing washer and counterweight, tighten choke valve attaching screws with shaft in this position, stake screws lightly taking care not to bend choke shaft. Install choke baffle plate with curved slot over tang on choke lever.

Thermostatic Housing & Coil Installation—With retainer screws loose, rotate cover counter-clockwise until coil hook picks up choke lever tang, then position cover for correct choke setting (see Adjustment data) and tighten retaining screws. On Cadillac, install choke modifier lever loosely (lever should be forward and slightly down when metal pointer is at scribed line), tighten lever screw as part of Choke Modifier adjustment

1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS

	Rochester Carb. No.
BUICK	
1956 Series 50,60,70	4GC 7009200
1957 Series 50,60,70 (Early)	4GC 7010070
1957 Series 50,60,70 (Late)	4GC 7011570
1958 Series 50,60,70,700 (Early)	4GC 7011600
1958 Series 50,60,70,700 (Late)	4GC 7013100
CADILLAC	
1956-58	①
CHEVROLET PASS. CARS	
1956 V8 (Power Pack)	4GC 7008737
1957 283" Eng. Power Pack (Early)	4GC 7009846
1957 283" Eng. Power Pack (Late)	4GC-7012126
1958 283" Eng. (Auto. Trans.)	4GC 7012128
1958 348" Eng. (Auto. Trans.)	4GC 7011108
CHEVROLET TRUCKS	
1957 283" Eng. Super Taskmaster (Early)	4G 7009661
1957 283" Eng. Super Taskmaster (Late)	4G 7011161
1958 Std. (Vac. Governor) ②	4G 7012303
1958 Std. (Vac. Governor) ③	4G 7011487
OLDSMOBILE	
1956 Super 88, 98 Synchro-mesh	4GC 7007222
1956 Super 88, 98 Hydra-Matic	4GC 7007221
1957 All Models Synchro-mesh (Early)	4GC 7009471
1957 All Models Synchro-mesh (Late)	4GC 7010926
1957 All Models Hydra-Matic (Early)	4GC 7009470
1957 All Models Hydra-Matic (Late)	4GC 7010925
1958 All Models Synchro-mesh	4GC 7012401
1958 All Models Hydra-Matic	4GC 7012400
PACKARD	
1956 Series 5680 (290 HP Eng.)	4GC 7008610
1956 Series 5688 (310 HP Eng.) Front	4GC 7009600
1956 Series 5688 (310 HP Eng.) Rear	4GC 7009601
PONTIAC	
1956 Series 27 & 28 Synchro-mesh	4GC 7007900
1956 Series 27 & 28 Hydra-Matic	4GC 7008697
1956 Strato-Streak (285 HP Eng.) (Two)	4GC 7009820
1957 Synchro-mesh	4GC 7009829
1957 Hydra-Matic	4GC 7009830
1958 Models	④ 4GC 7011701

① - See SEPARATE "Cadillac (Carter & Rochester)" data for adjustment specifications and procedures.
② - 3700 RPM Governor. ③ - 4000 RPM Governor.
④ - These carburetors may not have a model number designation but may be identified by Idle Air Bypass Adjusting Screw located on throttle body.

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 BUICK PRIMARY MAIN METERING JET CHANGE (To Improve Performance in Part Throttle Range):* Leaner jets, Part No. 7001860 are used in later production carburetors having a "D" stamped on identification tag. If new jets are installed on early carburetors, use the later type jets.

►*1956 BUICK STUMBLE CORRECTION (ON EARLY CARS):* This condition is noticeable on light acceleration under cold operating conditions and may be caused by the accelerating pump spring being too light. Correct by installing Accelerating Pump Spring, Part No. 7009651 having a .042" diameter wire. Production carburetors having the later type spring are identified by C6, D6, etc., date stamp following the carburetor part number.

►*1956 BUICK PRIMARY MAIN METERING JET PRODUCTION CHANGE (For Increased Fuel Economy):* In later production, Rochester Primary Main Metering Jet, Part No. 7001860, (size .055") is being used and can be used for service replacement. Carburetors having the later type jet can be identified by the letter "D" stamped on the carburetor identification tag.

►*1956 BUICK ACCELERATING PUMP ASSEMBLY CHANGE (To Correct Hesitation on Light Acceleration):* Install Pump Assembly, Part No. 7009129, replacing Part No. 7009279.

►*1956 BUICK COLD ENGINE STALLING & LOADING UP (First Cars):* This condition can be eliminated by installing all parts furnished in special kit, Buick No. 7009948 (Choke Housing, Thermostat Cover & Gasket, Choke Housing Gasket, Choke Piston, Pin, and Lever & Link Assy.). When these parts installed, set carburetor to following specifications:

1) **Choke Setting**—Centered (At Index).
2) **Fast Idle Setting**—1700 Engine RPM (hot engine with fast idle screw on high step of fast idle cam).
3) **Unloader Setting**—Unloader must operate correctly. See Choke Rod & Unloader Adjustment below.

NOTE—When above changes made, stamp letter "C" in lower left hand corner of brass identification tag. Production carburetors on which this change made will also be stamped "C".

►*1957 BUICK FLOAT DROP SETTING CHANGE:* The float drop setting specification has been changed from 1 7/8" ± 1/32" to 1 13/16" ± 1/32".

►*1957 BUICK VACUUM SWITCH STICKING NOTE:* If the vacuum switch sticking is found to be caused by the steel ball sticking in the "up" position and cleaning the unit does not correct the condition, the ball seat may be improperly staked. If this is the case, replace the throttle body.

►*1957 BUICK (WITH CARBURETOR No. 7010070) PRIMARY VENTURI CLUSTER CHANGE (To Correct an Acceleration Flat Spot When Car is Coasted Back From Speed Above 40 MPH and Then Again Accelerated at 30 MPH):* Install primary cluster kit, Part No. 7011329. Make sure that the brass identification tag included in the kit is installed on carburetor along with the original tag. *NOTE - Carburetors built after October 1956 will have this change made and can be identified by the letters "C", "D" or higher on the original identification tag.*

►*1957 BUICK STUMBLE AND FLAT SPOT CORRECTION (CARS WITH CARBURETOR No. 7010070): (NOTE - If carburetor identification tag is not "C" or "D" or later, install primary venturi kit, see "Primary Venturi Cluster Change" above, then proceed as follows):* Install a new pump shaft and lever, Part No. 7011462, which has three holes in end of lever for pump travel adjustment. Install the pump rod in the inner hole. Adjust pump setting to provide a distance of 1 3/32" between bottom of plunger and cover casting (with pump rod in inner hole of lever). Check and adjust float drop (see *"Float Drop Change" above*). Check position of vacuum piston which should be 1/32" to 1/16" above the flush position, (see *"Choke Piston Setting Change" below*). Check choke rod adjustment and adjust the ignition timing.

►*1957 BUICK CHOKE PISTON SETTING CHANGE:* With choke valve held fully closed, vacuum piston should be exposed 1/32" to 1/16" out of cylinder (NOTE—This setting supersedes previous "flush" setting. To adjust, bend intermediate rod (connecting link on choke to choke valve shaft).

►*1957 BUICK CARBURETOR (No. 7010070) MODIFICATION (To correct a lean flat spot condition in part throttle and power ranges):* Install Kit, Part No. 7011481 as outlined in instructions contained in kit and note the following: If carburetor tag does not have the letter "C", "D" or later, make sure the primary venturi cluster has been changed (see *"Primary Venturi Cluster Change" above*). After installation of kit, adjust accelerating pump so that distance from top of air horn casting to bottom of pump plunger shaft is 1 1/64". Install pump rod in outer hole for warm weather and in inner hole for cold weather operation.

►*1957 BUICK CHOKE HOUSING INDEX POINT CHANGED (Moved From Bottom of Housing to Top:* Only the new housing, Part No. 7011276 and Cover, Part No. 7010778 will be available for service. If necessary to replace either of these parts on carburetors having identification tags with the letter "C" or earlier, both parts will have to be replaced. On later carburetors, either part may be replaced

►*1957 CHEVROLET CARBURETOR (No. 7009846) PUMP JET CHANGE (For improved fuel atomization):* A new pump jet cluster assembly, Part No. 7011576, having four (.024") pump jets instead of the customary two, can be used for replacement on this carburetor.

►*1957 CHEVROLET CARBURETOR (No. 7009846) PRIMARY MAIN METERING JET PRODUCTION CHANGE AND SERVICE REPLACEMENT NOTE :* Primary main metering jets, Part No. 7002645 (.045") used in early carburetors were changed to Part No. 7002647 (.047") in carburetors identified by an "A" on the identification tag. Later carburetors with "B" on the identification tag used main metering jets, Part No. 7002648 (.048").

►*1957 CHEVROLET TRUCK CARBURETOR (No. 7011161) PRIMARY MAIN METERING JET CHANGE:* Main metering jet, Part No. 7002647 (.047") replaced Part No. 7002648 (.048") on carburetors identified by "B" or later stamped on the identification tag.

►*1958 BUICK FADE OUT ON TURNS CORRECTION:* Increase the float drop setting 1/32" (from 1 5/16" to 1 11/32"). The increased float drop setting should be used only in cases of the engine cutting out or fading out on turns.

►*1958 BUICK CARBURETOR PRODUCTION CHANGE:* A new carburetor, Buick & Rochester Part No. 7013100 replaced Part No. 7011600. Changes made in the later carburetor are as follows:

Primary Float & Needle Seat - Changed from a needle and seat to a "ball & seat" with a .125" orifice seat (primary), .101" (secondary).

Vent Holes (Secondary Side of Throttle Body) - These vent holes have been eliminated and venting is now accomplished through slots in throttle body-to-float bowl gasket. *CAUTION - Use only gasket, Part No. 7012894*

CONTINUED ON NEXT PAGE

1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (Cont.)

on later type carburetors.

►*1956 OLDSMOBILE ENGINE STALLING (In Warm Weather Immediately after Starting or is Hard To Start):* Adjust choke to one notch lean (from index). Adjust fast idle to 1500 RPM. Adjust throttle return check clearance to .020". Readjust throttle downshift screw so that screw is turned in 1½ to 2 turns after it just contacts tang of downshift lever. Make sure .020" clearance exists on the car between fast idle cam and top side of secondary throttle lockout tang to be sure choke valve is free to close. *CAUTION - Do not bend tang too far so that interference exists between bottom side of tang and fast idle cam.*

►*1957 OLDSMOBILE CARBURETORS (Nos. 7009470 & 71) POWER VALVE & POWER PISTON PRODUCTION CHANGE:* Carburetor No. 7009470 with letter "E" and later, and carburetor No. 7009471 with letter "D" and later stamped on the identification tag have a new power valve assembly, Part No. 7009349, replacing Part No. 7010918; and a new power piston assembly, Part No. 7000204, replacing Part No. 7008612. Only the latest power valve and power piston should be used for service replacement.

►*1957 OLDSMOBILE HARD (HOT) STARTING NOTE: After partial warm-up or partial cooling the car will run below idle speed for a few seconds then either speed up and throw clouds of black smoke or else stall out entirely.* This condition is caused by the choke being set two or three notches rich. (Because of the choke modifier it is not possible to tell visually whether choke setting is correct). Adjust choke as specified under "Adjustments" below.

►*1957 OLDSMOBILE CARBURETOR UNLOADER SETTING CHANGE:* Adjust the unloader to obtain .115"± .015" clearance (Gauge BT-90) between upper edge of choke valve and dividing wall in air horn. *See "Adjustments" below.* This supersedes previous setting of .090" ± .015".

►*1957 OLDSMOBILE IDLE MIXTURE & IDLE SPEED SETTING CAUTION:* These adjustments must be made with the air cleaner in place on the carburetor.

►*1958 OLDSMOBILE HIGH SPEED MISS, FLAT SPOT, OR STICKING THROTTLE CORRECTION:* This condition may be caused by the carburetor-to-manifold gasket being installed improperly. Primary and secondary throttle holes in the gasket are of different size and if the gasket is installed in reverse, would cause secondary throttle valves to contact the gasket and allow only a partial valve opening. Make sure the "V" tab on primary side of gasket is installed toward front of car.

►*1956 PACKARD CARBURETOR HIGH ALTITUDE ADJUSTMENT NOTE:* Leaner jets are not required for operation above 5000 ft. The choke should be set to three notches lean, and the secondary contour clearance should be set at .020" rather than .015".

►*1956 PACKARD CARBURETOR SYNCHRONIZATION (CARS WITH TWO 4-BARREL CARBS.): Special adjustment procedure required for balanced operation.*

See CARBURETOR in Packard Car Mod l pags.

►*1956 PONTIAC COLD ENGINE STALLING CORRECTION & WARMING UP IMPROVEMENT (First Cars with No. 7008697 & 7007900 Carbs.):* Install new choke piston, No. 7009710 (can be identified by single bleed hole on side of piston—first type had two diametrically opposite holes) and set automatic choke 1 Notch Rich (supersedes Centered setting). *NOTE—Carburetors on which this change made in production are stamped "F" on identification tag.*

►*1956 PONTIAC CARBURETOR LOADING-UP (DURING WARM UP) CORRECTION & CHOKE PISTON LINK PRODUCTION CHANGE:* On later production cars, the choke piston link contour has been changed to give an increased opening on cold idle. This change can be make on earlier carburetors by bending the choke link (using a pair of pliers) so that the choke piston protrudes 1/16" from the cylinder and the piston pin is one-half exposed when choke valve is fully closed. Make sure no bind exists after bending link.

►*1956 PONTIAC (EXC. 285 H.P. ENGINE) HARD STARTING CORRECTION (With Partially Warmed-up Engine):* Change choke setting from one notch rich to center index. If hard starting is not eliminated completely with this change, set choke to one point lean.

►*1956 PONTIAC 285 H.P. ENGINE CARBURETOR CHANGE (To Improve Hot Starting Characteristics):* Install a new throttle body-to-bowl gasket, Part No. 7009256. The later gasket is identified by each venturi hole in gasket having an elongated section, and is being used in production beginning approximately March 1, 1956.

►*1956 PONTIAC 285 H.P. ENGINE STALLING (AFTER A FAST STOP) CORRECTION:* This condition can be corrected by removing the air horn assemblies from both carburetors and drilling out one internal vent on each side of each carburetor with a 1/8" drill as follows On automatic choke side of carburetor, drill out the internal vent hole located toward rear of air horn partition. On opposite side of carburetor, drill out the vent located on forward side of air horn partition.

►*1956 PONTIAC CARBURETOR FLOODING CORRECTION (Early Cars):* Install fuel filter, Part No. 854345 which is precipitation type filter having an impregnated fibre element.

►*1957 PONTIAC CARBURETOR MODIFICATION TO PREVENT A FLOODING CONDITION: The following modifications are recommended to eliminate a flooding and stalling condition:*

Fuel Filter Element - Install the later type fuel filter element Part No. 854467.

Float Needle & Seat Assembly - Install Package No. 7012295 which includes needles, seats and gaskets for both the primary and secondary side of carburetor. The needle seat is a new type having a narrower seating area. Do not seat needles by tapping or lapping into place as this would damage the narrow seating area.

Drilling Fuel Balance Ports - With air horn removed from carburetor, drill out the balance passage holes (located below gasket surface of main body in wall of float chambers on side adjacent to choke housing). Use a 3/16" drill, and drill out the existing balance passage holes. *(CAUTION* - These holes are drilled at an angle and care should be taken to make sure the drill does not contact other areas of the carburetor.

Cleaning & Inspection - Use air pressure and clean all passages in carburetor. Remove idle mixture screws and use a light or a tag wire to make sure passages are clean. Remove all gum and carbon deposits.

Float Level Adjustment - Adjust float level to 1 3/8" using gauge J-6628 *(see "Adjustments" below).* (NOTE - Adjust float tip so that lower edge of float tip is flush to 1/16" above gasket surface). Adjust float drop *(see "Adjustments" below).*

Idle Speed - Adjust idle speed to 500 RPM. *See "Adjustments" below for idle mixture and idle speed adjustment procedures.*

►*1957 PONTIAC SECONDARY THROTTLE VALVE SPRING ADJUSTMENT NOTE:* This is a new adjustment to insure positive closing of secondary throttle valves on idle, and must be made with carburetor on the car. *See "Adjustments" below.*

►*1958 PONTIAC ROUGH IDLE & STALLING (CAUSED BY BUILD-UP OF GUM IN THROTTLE BORES) CORRECTION:* Remove carburetor. *(NOTE* - Do not remove gum deposits from throttle bores). Invert carburetor and drill a 1/8" diameter hole in each **primary** throttle plate at a point approximately centered in the half of the throttle plate located adjacent to outside edge of throttle body. Remove chips and reinstall carburetor. Adjust hot idle speed to 500 RPM, then adjust throttle rod setting with gauge pin and adjust the idle mixture screws.

DESCRIPTION: 4-Barrel downdraft type with automatic choke (4GC), without automatic choke (4G), similar in design to previous models except as noted below:

1957 Buick - Float bowl has been lowered and spring balanced, cutaway floats are used. Automatic choke housing has been moved from float bowl to throttle body. Counterweighted type auxiliary throttle valves have been replaced by spring loaded, factory calibrated auxiliary throttle valves which are located in the fuel bowl assembly.

1957 Oldsmobile - Choke housing has been moved from air horn to float bowl and a choke modifier has been added.

1957 Pontiac - Float bowl has been lowered with new type spring balanced, cutaway type floats. Automatic choke housing has been moved from air horn to float bowl.

1958 Pontiac - Engine idle speed is controlled by an Idle Bypass Adjusting screw instead of by the throttle stopscrew used on previous models. An "Idle Compensator" mounted between venturi on secondary side consists of a bi-metal strip which, when heated, opens a valve into a passage leading from secondary side to a point below primary throttle valves prevents engine stalling during prolonged idling.

ADJUSTMENTS: *Make all adjustments in sequence given below (except for Idle Mixture and Idle Speed Tune-up Adjustments).*

►*1956-57 PONTIAC IDLE ADJUSTING SCREW (THROTTLE STOPSCREW NOTE):* The throttle stopscrew (slow idle screw) as such, has been eliminated and replaced by a flat spring for positive closing. The screw

CONTINUED ON NEXT PAGE

1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

which was formerly the fast idle screw is now both fast and slow idle screw. The low step of the fast idle cam is used as a base for slow idle adjustment.

►*1958 PONTIAC IDLE SPEED SETTING NOTE:* Throttle valves are completely closed at slow idle speed and air is admitted through Idle Air Bypass System which consists of a bypass passage (primary side only) through which air for closed throttle operation is taken from above the throttle valves through a metered non-adjustable orifice to each primary bore. An idle speed screw (single screw for both primary bores) controls the adjustable orifice, and all idle speed adjustments are made with this screw (throttle stopscrew not used).

►*OLDSMOBILE IDLE SETTING NOTE: Air cleaner must b in position on carbur tor when idle speed and idle mixture adjustments are mad .*

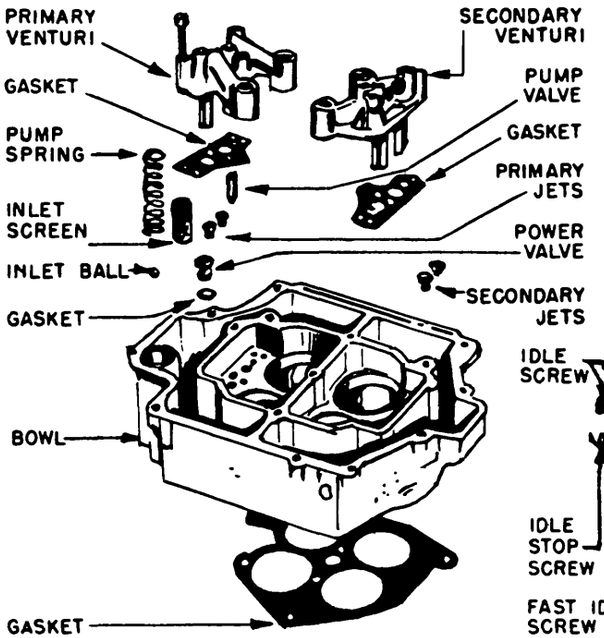
Idle Setting (Exc pt 1958 Pontiac): As an initial setting, back out idle mixture screw 1 full turn from a lightly seated position, then with engine at normal operating temperature, automatic choke not operating (choke valve wide open), and fast idle inoperative so engine idles at hot or slow idle speed, adjust engine to correct idle speed (see table below). Adjust each idle mixture screw (one screw for each primary barrel) until engine idles smoothly and RPM is at maximum (see Oldsmobile Note following). Recheck engine idle speed.

►*1958 PONTIAC IDLE SETTING CAUTION:* Idle Compensator Thermostatic Valve must be held closed while making idle speed adjustments. If necessary, hold closed with a drill rod. Do not damage valve.

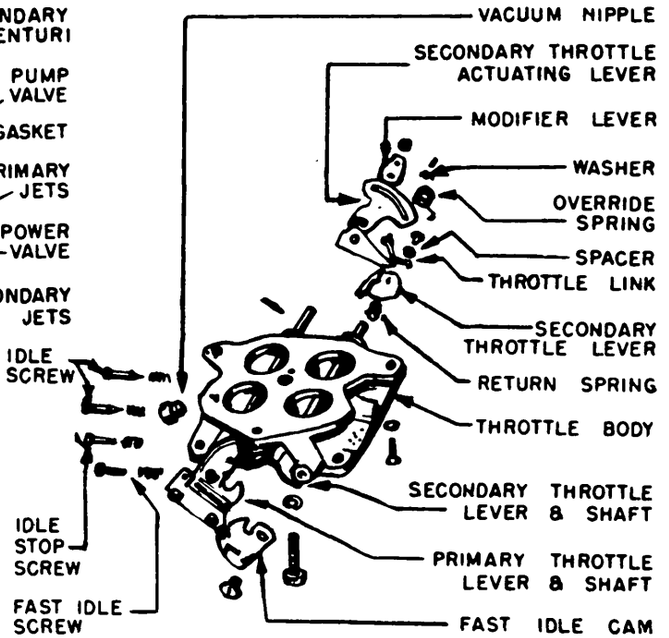
Idl Sp d & Mixtur S tting (1958 Pontiac): As an initial adjustment, turn mixture screws out 1 turn from a lightly seated position and idle air screw out 2 turns. With engine at normal operating temperature, choke fully open and fast idle inoperative, place transmission in "D" (Drive) range and adjust idle air screw to obtain an idle speed of 480-500 RPM. Turn idle mixture screws for best quality (highest RPM) idle. Reset air screw for 480-500 RPM, then recheck mixture adjustment for smoothest possible idle. *NOTE - Always recheck idle mixtur scr w s tting after making idle speed adjustment with idl air scr w*

►*OLDSMOBILE NOTE:* Manufacturer recommends that after setting idle as above (for highest vacuum reading and engine RPM), each screw should be turned out (rich) ¼ turn which will provide desired idling performance. Check this setting by opening throttle to 1000 RPM point and then snapping throttle closed. If engine rolls from richness, turn each screw in (lean) 1/8 turn.

NOTE–Change in Idle Speed affects throttle linkage adjustment on all cars except Oldsmobile. Oldsmobile split throttle lever design insures throttle linkage remaining as set when idle speed readjusted.



MAIN BODY ASSEMBLY

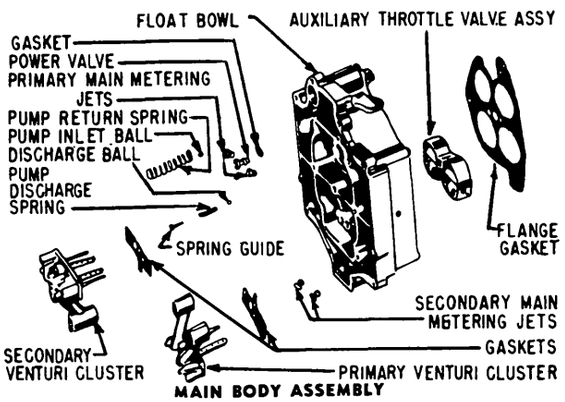


THROTTLE BODY ASSEMBLY

Idle Speed Setting

Car Model	Engine RPM Synchro-mesh	Auto. Trans.
1956 Buick	① 450	①② 450
1957 Buick	① 485	①② 485
1958 Buick		②③ 485
1956 Chev. Pass	① 450-500	④ 400-425
1957 Chev. Pass.	① 450	①④ 425
1958 Chev. Pass.	① 475	①④ 425
1957 Chev. Truck	450	④ 425
1958 Chev. Truck	475	④ 450
1956 Oldsmobile	① 425	①④ 400
1957 Oldsmobile	① 460	①④ 460
1958 Oldsmobile	⑤ 460	④⑤ 450
1956 Packard	① 450-500	①⑥ 450
1956 Pontiac (Exc. 285 HP Eng.)	⑦ 450-470	②⑦ 450-470
1956 Pontiac (285 HP Eng.)	650	② 650
1957 Pontiac	⑧ 450-470	④⑧⑨ 430-450
1958 Pontiac	450-470	④ ⑩ 480-500

① - With Air Conditioner turned "ON".
② - Transmission in "N" (Neutral).
③ - 550 RPM on Air Conditioned Cars.
④ - Transmission in "D" (Drive).
⑤ - 520 RPM on Air Cond. cars with Air Conditioner control lever at extreme right and "Maximum" button pushed in.
⑥ - Transmission in "High" range.
⑦ - 510-530 RPM with Air Cond. turned "OFF".
⑧ - 500-520 RPM with Air Cond. turned "ON".
⑨ - 500 RPM with modified carburetors. See modification above.
⑩ - 540-560 with Air Cond. turned "OFF".



MAIN BODY ASSEMBLY

►*OLDSMOBILE THROTTLE LINKAGE ADJUSTMENT NOTE:* Carburetors have "Split Throttle Lever" and linkage adjustment will not be disturned by Idle Speed Adjustment.

►*1956 PACKARD 5688 (310 H.P. ENGINE) THROTTLE LINKAGE ADJUSTMENT:* See *CARBURETOR on Car Model pages.*

►*1956 PONTIAC 285 H.P. ENGINE THROTTLE LINKAGE ADJUSTMENT:* See *CARBURETOR on Car Model pages.*

Fl at S tting: *Both Primary and Secondary Float Assemblies must be checked and adjusted separately and both FLOAT LEVEL & FLOAT DROP (Float Tip, on cars with "Spring Balanced" floats), must be checked*

CONTINUED ON NEXT PAGE

1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (Cont.)

for each assembly. Remove bowl cover and float assembly from carburetor but DO NOT remove bowl cover gasket for following checks:

►*1958 PRIMARY FLOAT SETTING CAUTION (Oldsmobile 7012400, 7012401, Pontiac 7011701):* A new type vacuum assist primary float is used (operated from an extension on power piston) which allows full fuel flow on heavy acceleration and provides added buoyancy when correct fuel level is reached. Adjustment procedures are different for this float as noted below.

Float Level (Except Carburetors with "Vacuum Assist" Type Floats) - With bowl cover gasket in place, invert bowl cover, then install correct float gauge (see table below) on cover and against curvature in air horn bore (Chevrolet Cars & Trucks) over highest point on float (Others). Upper portion of float should just touch gauge. To adjust, bend float arm at rear of float. With float gauge still in position and centered in air horn, each float should be centered between gauge legs. To adjust, bend float at point where float attached to arm. After centering float, check alignment by aligning screw holes in air horn gasket, with screw hole in air horn. Make sure floats are centered in cut-out section of gasket and sides of floats are parallel with adjacent edges of gasket.

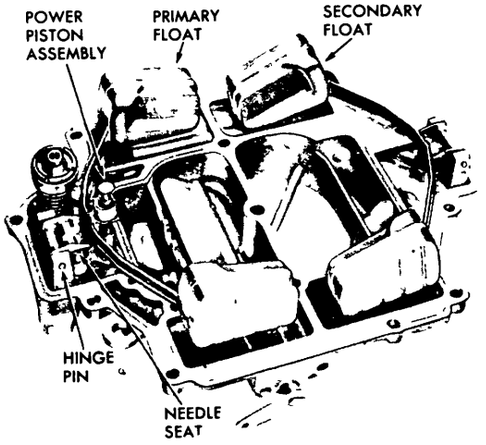
Float Level (Carburetors with "Vacuum Assist" Type Floats) - With bowl cover gasket in place, invert bowl cover, then install float gauge (see table below) under heel of floats. With gauge vertical, floats should just contact gauge. To adjust, bend float arms at rear. Slide gauge under toe of float. In this position, lower surface of float should just touch gauge. Lower surface of float should now be parallel to air horn surface and gauge should slide freely under floats. With gauge still under floats, hold lug on lower surface of gauge against inside of air horn casting. Floats should center in cut-out portion between gauge legs. If alignment is needed, bend float arms horizontally (directly back of floats) until floats are centered at heel and toe. Make sure floats do not rub sides of gauge legs under any condition.

Car Model	Float Height	Gauge No.
1956 Buick	1 35/64"	BT-117
1957 Buick	1 3/8"	BT-132
1958 Buick ①	1 3/8"	BT-132
1958 Buick ②	③ 1 13/32"	BT-150
1956-57 Chev. Pass.	1 5/8"	BT-89
1957 Chev. Truck	1 19/32"	BT-101
1958 Chev. Pass. & Truck	⑦ 1 5/8"	BT-89
1956-57 Oldsmobile	1 5/8"	BT-89
1958 Oldsmobile	③ .276	BT-140
1956 Packard	1 5/8"	BT-89
1956 Pontiac	1 19/32"	BT-101
1957 Pontiac	1 3/8"	BT-132
1958 Pontiac	③ 9/32"	BT-140

① - Early cars with 7011600 Carburetor.
② - Late cars with 7013100 Carburetor.
③ - Primary float. Adjust secondary float to 1 3/8". (BT-132).
⑦ - Primary float. Adjust secondary float to 1 11/16" (BT-143).

Float Toe Adjustment (1957 Buick & Pontiac Carburetors): Move Gauge BT-132 to small end of floats. With gauge held vertically, the upper edge of float at the point where the radius ends should align between scribe marks on gauge.

Float Toe Adjustment (1958 Carburetors, Except Chevrolet Pass. Cars & Trucks and "Vacuum Assist" Type Primary Floats): With air horn inverted and gasket in place, measure distance from gasket to center of dimple on side of float at toe (small end). This distance should be 3/8". To adjust, bend toe of float up or down while holding float arm directly back of float. *CAUTION - Always recheck float level adjustment if toe adjustment is necessary.*



FLOAT ASSEMBLY WITH "VACUUM ASSIST" PRIMARY FLOATS

Vacuum Assist Spring ("Vacuum Assist" type Primary Floats): With air horn held upright, hold power piston in full up position. Jounce float lightly to make sure cup retainer on assist spring is not binding on power piston stem. Measure distance from gasket to center of dimple on float at the toe (small end). This distance should be 1 5/32" (Oldsmobile), 1 1/32" (Cadillac). To adjust, bend tang at center of float arms (tang engages stem of power piston).

Float Drop Adjustment (Except 1958 Chevrolet Pass. Cars & Trucks and "Vacuum Assist" Type Primary Floats): With air horn held upright and level, gasket in place and floats hanging freely, measure distance from gasket to center of dimple on side of float toe (small end). Jounce floats slightly to make sure they are fully settled in position. Distance should be as indicated in table below.

Float Drop Adjustment ("Vacuum Assist" Type Primary Floats): With air horn held upright and power piston fully extended measure distance from gasket to center of dimple. This distance should be as indicated in table below. To adjust, bend tang at rear float hanger towards needle seat to lessen drop and away from seat to increase drop.

Float Drop Setting

Car Model	Float Drop Primary	Float Drop Secondary
1956 Buick	2 1/4"	2 1/4"
1957 Buick	1 13/16"	1 13/16"
1958 Buick (7011600)	1 3/8"	1 3/8"
1958 Buick (7013100)	1 13/32"	1 3/8"
1956-58 Chev. (All)	2 1/4"	2 1/4"
1956-57 Oldsmobile	2 1/4	2 1/4"
1958 Oldsmobile	1 1/2"	1 5/16"
1956 Packard	2 1/4"	2 1/4"
1956 Pontiac	2 1/4"	2 1/4"
1957 Pontiac	1 13/16"	1 13/16"
1958 Pontiac	1 1/2"	1 5/16"

Accelerating Pump Rod Adjustment: *CAUTION - This is a linkage adjustment and not a seasonal change recommendation.* Back out slow idle speed screw (except carburetors with "Idle Air Bypass") and fast idle screw until throttle valves are completely closed. Hold throttle valves in the closed position and proceed as follows: On Buick carburetors with three holes in accelerating pump arm, place pump rod in center hole. If scale is used, measure height of pump rod plunger from top surface of bowl cover to bottom edge of pump plunger rod (see table below for proper setting). If gauge is used, place proper gauge (see table below) on top of air horn next to pump plunger. Pump plunger shaft should slide freely into hole of gauge marked "pump". If height not correct (see table below), or pump plunger does not slide into hole of gauge, bend pump rod as necessary to obtain the correct adjustment.

Pump Rod Setting

Car Model	④ Height
1956 Buick	1 1/32"
1957-58 Buick ②	1 1/64"
1956-58 Chevrolet (All)	1 1/16"
1956 Oldsmobile	1 1/16"
1957-58 Oldsmobile	1 3/64"
1956 Packard	1 1/16"
1956 Pontiac	61/64"
1957-58 Pontiac	15/16"

④ - The following gauges may be used in place of scale measurement: BT-145 (1 1/16"), BT-147 (1 3/64").
② - *See "1957 Buick Stumble and Flat Spot Correction" above.*

►*1958 OLDSMOBILE PUMP ROD ADJUSTMENT NOTE:* Two holes are provided in pump arm. Normal pump rod position is in "inner" (long stroke) position. Pump rod position should **never** be changed on cars operated in moderate or cold climate, and not in warm climates or high altitudes unless there is a complaint of stumble on acceleration (with engine properly tuned-up). *CAUTION - Pump rod adjustment SHOULD NOT be changed to compensate for the shorter stroke, but idle vent MUST be checked and corrected.*

Atmospheric Idle Vent Adjustment: Idle vents not used on all carburetors. Adjustment procedures are different as indicated below.

1956 Oldsmobile & 1956-57 Pontiac - With primary throt-

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1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (Cont.)

tle valves closed against a .063" wire gauge (BT-79), bend idle vent tang so tang just touches face of valve. **1957 Oldsm bil** - Open throttle valves enough to obtain a measurement of 13/16" from air horn to bottom of pump plunger shaft. At this point, idle vent should just close. To adjust, bend tang on pump lever.

1957-58 Ch vr l t Truck (Exc. Carb. No. 7009661), 1958 Oldsm bil & 1958 P ntiac - Open throttle valves to point where vent valve is just closed. Distance from top of air horn to bottom side of pump plunger shaft should be 31/32" (Chev. Truck); 29/32" (Oldsmobile); 53/64" (Pontiac). *NOTE - If Gauge BT-145 (Chev-Truck) or Gauge BT-147 (Oldsmobile is used, place gauge on top of air horn with side marked "vent" next to pump plunger shaft. With throttle valve open to point where vent valv is just closed, the hole marked "vent" should slide fre ly over pump plunger shaft.* To adjust, bend tang on pump plunger shaft.

Int rm diat Ch k R d (1957-58 Buick, Oldsmobile & Pontiac): Hold choke valve closed and bend intermediate rod (rod connecting lever on choke shaft to choke lever on automatic choke housing) so that end of choke piston is flush to 1/32" out of choke sleeve. *NOTE - 1958 Pontiac piston must be flush.*

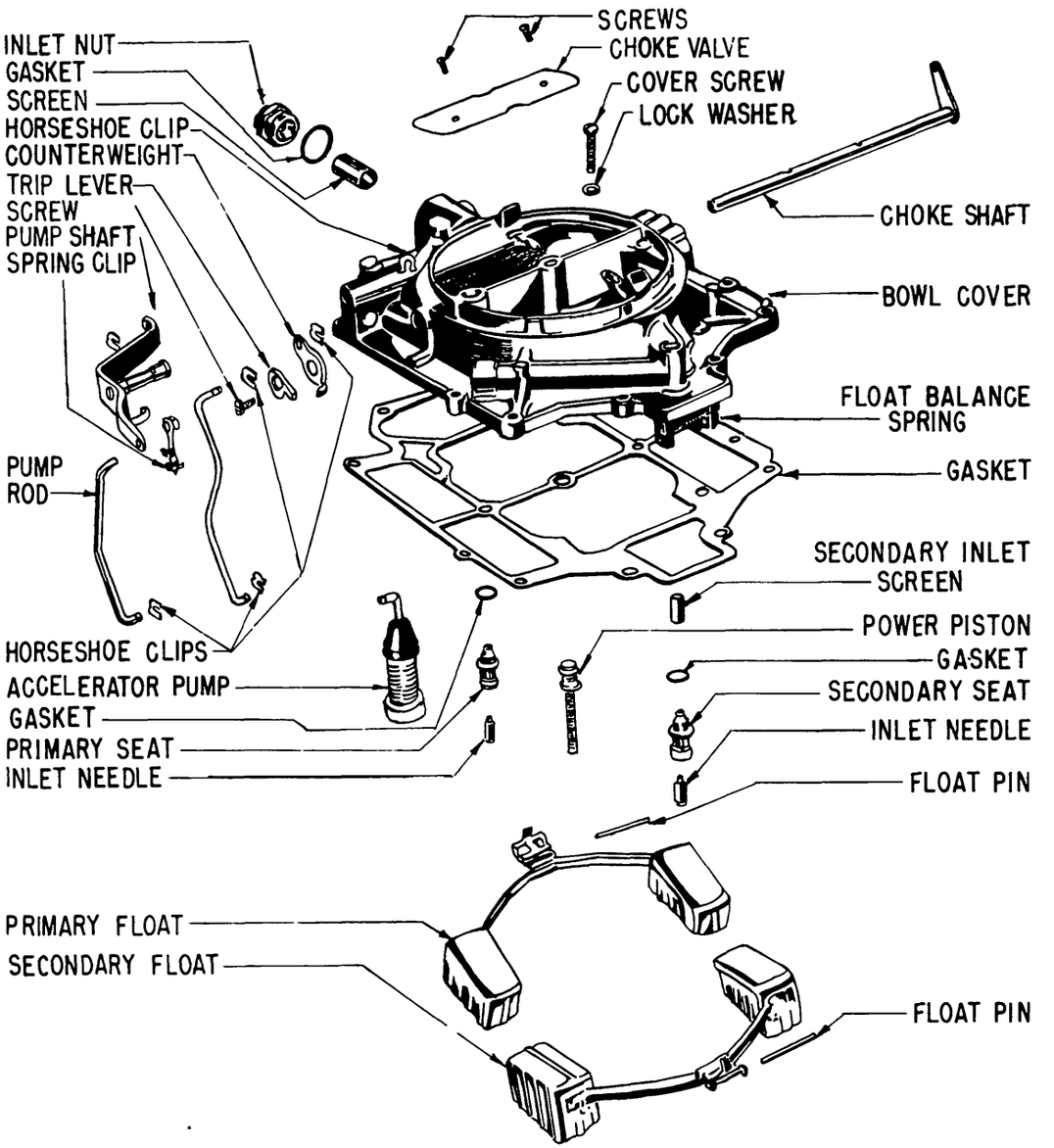
Aut matic Ch k Setting (Except Models with Choke M difi r): To adjust, loosen choke heat suction tube connection on cover and loosen cover retaining screws. Rotate cover until index mark on cover is aligned with correct mark on housing (see table below). Tighten all cover retaining screws and heat tube connection.

Aut matic Choke Setting

Car M d l	Choke Setting
1956-58 Buick	Centered
1956-57 Chevrolet Pass. Cars	1 Notch Lean
1958 Chev. Pass. (Powerglide)	1 Notch Lean
1958 Chev. Pass. (Turboglide)	Centered
1956 Oldsmobile (Synchro-mesh)	2 Notches Lean
1956 Oldsmobile (Auto. Trans.)	1 Notch Lean
1957 Oldsmobile	Centered
1958 Oldsmobile	①
1956 Packard	Centered
1956 Pontiac (Exc. 285 HP Eng.)	② 1 Notch Lean
1956 Pontiac (285 HP Eng.)	Centered
1957-58 Pontiac	Centered

① - See "Choke Modifier Adjustment" below.
② - Supersedes previous Centered setting (see changes above).

Ch ke M difier Adjustm nt: Oldsm bile - With fast and slow idle screws backed out and primary throttle valves tightly closed, loosen the choke modifier lock screw and rotate the index pointer counter-clockwise from free position until the thermostat spring begins to close choke valve. Continue counter-clockwise until pointer lines up with index position on thermostat cover.



ROCHESTER 4GC CARBURETOR AIR HORN & BOWL COVER ASSEMBLY

Fast Idl Setting: *NOTE - 1956-58 Ch vrol t Pass. Cars & 1956-57 Pontiac fast idle adjustm nt will b corr ct aft r "slow idl " speed and chok rod adjustments have been mad . On oth r mod ls, th "On Engin " fast idl adjustment must be made after carburetor installed to insure proper warm-up performance.*

"Off Engine" Adjustment (1956-58 Buick & Oldsmobile, 1956 Packard, 1958 P ntiac) - Turn fast idle screw against high step of fast idle cam until proper gauge (see table below) fits between throttle valve and bore opposite idle adjusting needles.

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1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

Fast Idle Setting (Off Engine)

Car Model	Gauge No.	Throttle Opening
1956-57 Buick	BT-90	024"
1958 Buick	BT-79	028"
1956-58 Oldsmobile	BT-90	024"
1956 Packard(7008610)	BT-90	024"
1956 Packard(7009600)	BT-120	020"
1956 Packard(7009601)	BT-121	030"
1958 Pontiac		033"

"On Engine" Adjustment (Exc. 1958 Pontiac) - With engine at normal operating temperature, rotate fast idle cam so fast idle adjusting screw is on high step of fast idle cam Adjust fast idle screw so engine operates at 1500 RPM (Buick & Oldsmobile), 1700 RPM (Packard 7008610), 1850 RPM (Packard 7009600), 2300 RPM (Packard 7009601).

►*1956 PACKARD FAST IDLE ADJUSTMENT NOTE (CARS WITH TWO 4-BARREL CARBS.): Special adjustment procedure required. See CARBURETOR on Packard Car Model pages.*

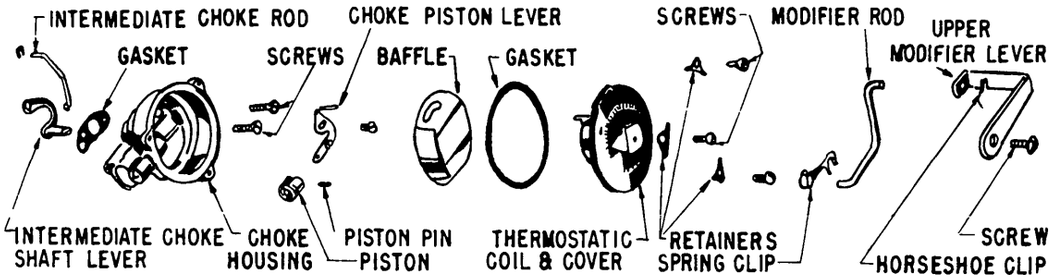
'On Engine" Adjustment (1958 Pontiac) - With hot idle speed and mixture properly adjusted, move fast idle cam so **highest step** is under end of fast idle screw. Adjust fast idle screw to obtain an engine speed of 2700 RPM. *NOTE - Fast idle screw position on highest step of fast idle cam is for adjusting purposes only. Under normal operating conditions (after fast idle has been set as above), fast idle speed will be 1500-1700 RPM.*

Choke Rod Adjustment: *NOTE* - This rod connects choke valve shaft to fast idle cam. Rotate choke valve and fast idle cam until fast idle screw (Exc. 1956-58 Chev. & 1956-57 Pontiac), slow idle screw (1956-58 Chev., 1956-57 Pontiac) is in contact with SECOND STEP of fast idle cam, then close choke valve until screw is against highest step of fast idle cam, making certain that choke trip lever is in contact with choke counterweight lever Measure choke valve opening or clearance between top edge of valve and dividing wall in air horn (see table below for gauge and clearance specifications). Adjust by bending choke at angle with Tool BT-18.

Choke Rod Setting

Car Model	Gauge No.	Choke Opening
1956 Buick	BT-115	140"
1957-58 Buick	BT-135	148"
1956-58 Chevrolet	BT-131	.043"
1956-58 Oldsmobile	BT-68	052"
1956 Packard		052"
1956 Pontiac	BT-68	052"
1957-58 Pontiac	BT-79	063"

Unloader Setting *After choke rod adjusted (above),* move throttle lever to wide open position, make certain that choke trip lever is in contact with choke counterweight Measure choke valve opening or clearance between upper edge of valve and dividing wall in air horn (see table below for gauge and clearance specification) Adjust by bending tang on fast idle cam using BT 69 bending tool



AUTOMATIC CHOKE ASSEMBLY (WITH MODIFIER)

Unloader Setting

Car Model	Gauge No.	Choke Opening
1956 Buick	BT-115	.115"
1957-58 Buick	BT-135	.128"
1956-58 Chevrolet	BT-131	.235"
1956 Oldsmobile	BT-90	.115"
1957 Oldsmobile	BT-90	092"
1958 Oldsmobile	BT-90	.115"
1956 Packard(7008610)	BT-90	.115"
1956 Packard (Others)	BT-119	.150"
1956-58 Pontiac	BT-90	.115"

Secondary Throttle Valve Lock Spring Adjustment (1958 Pontiac): *NOTE - This adjustment must be made accurately. If tension is too great it will interfere with idle speed adjustment.* With choke held fully open and fast idle cam released, close primary throttle valves on a .015" wire gauge inserted between valve and bore at center on same side as idle ports. With throttle valves positioned as above, measure clearance between secondary lock spring and secondary throttle operating lever. This clearance should be .035". Bend lock spring to adjust.

Secondary Throttle Lockout Setting· Close choke valve completely Bend lockout lever to obtain .015' clearance between cam and widest surface of lockout lever.

Secondary Throttle Contour Setting. Hold choke valve completelv closed Bend lockout lever to obtain clearance (see table below) between cam and narrowest surface of lockout lever.

Secondary Throttle Contour Setting

Car & Model	Contour Setting
Buick	030"
Chevrolet	015"
Oldsmobile	.035"
Packard	015"
Pontiac (All)	015"

Buick Vacuum Starter Switch Timing Check (1956): Back off throttle stopscrew to close throttle completely. Make pencil mark on switch end of primary throttle shaft to line up with longest of three indicator marks on casting. With test light across switch terminals, slowly open throttle valves. Light should come on when pencil mark is between the two small marks on casting. Adjust by changing shims (maximum .066"). Reset idle RPM to specifications.

Buick Vacuum Start r Switch Timing Ch ck (1957-58): Back off throttle stop screw and rotate fast idle cam to slow idle position, then fully close throttle valve. *(CAUTION* - Make sure dashpot does not prevent full closing of throttle). Measure distance from diaphram flange of dashpot to near edge of dashpot arm on throttle lever. With ignition turned on, slowly open throttle while holding scale in position against flange of dashpot. When cranking motor is energized, note distance from flange of dashpot to near edge of dashpot arm. Subtract the two measurements. If switch is properly timed, the difference should be 1/2" - 3/4". Adjust by changing timing shims located below contact spring in terminal cap.

Dampener Valve Setting (1956 Buick): Remove fast idle cam and replace the screw. Adjust lever tang (Tool J-6058A) to give measurement of 51/64" (Tool J-6153 No 1 end) from cam screw shoulder vertical to top of counterweight lever. Hold lever in this position, seat damper valves against outside of bore and tighten in place Readjust tang to give 53/64" (Tool J-6153 No. 2 end) from cam screw shoulder vertically to top of lever. Proper adjustment prevents valve edge striking bore when in closed position.

►*AUXILIARY SECONDARY THROTTLE VALVE CAUTION (EXCEPT 1956 BUICK) Auxiliary secondary throttle valves are calibrat d at the factory and fi ld adjustments are not requir d.*

Throttle Return Check Adjustm nt (1956-58 Buick & Oldsmobile & 1958 Chevrol t, With Turb glide): *See "CARBURETOR" on Car Mod l pag s.*

OVERHAUL· *CAUTION–When disassembling carburetor, be sure to keep PRIMARY and SECONDARY side parts separate so they will not be confused or interchanged when carburetor assembled.*

Disassembly: Carburetor consists of three main subassemblies (Air Horn & Bowl Cover, Carburetor Bowl, and Throttle Body) which can be overhauled separately as follows

1956 MODELS

Air Horn & Bowl Cover–On Cadillac, disconnect and remove choke modifier rod On all models, disconnect and remove pump connector rod. Remove trip lever retaining screw from end of choke shaft, remove trip lever and spacing washer from shaft. Take out fast idle cam pivot screw, remove choke rod with lever and cam as an assembly. Take out all air horn retaining screws *(CAUTION*–there are 13 screws–3 inner and 10 outer– with **one screw in count rb re in dividing**

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1956-58 ROCHESTER 4GC 4-BARREL CARBURETORS (C nt.)

wall just inside dge of air h rn). Lift air horn and bowl cover assembly straight up using extreme care n ot to damage float assemblies (CAUTION–break cover loose from bowl with finger pressure only, DO NOT pry on cover flange). Disassemble as follows: Invert the cover assembly, take out float hinge pins and remove floats and intake needles, remove needle seats and gaskets (CAUTION–Keep each float assembly, intake needle, and seat together, DO NOT mix primary and secondary side parts). Remove power piston by rotating retaining washer until flat side allows piston to pass, remove piston spring. Remove idle vent valve, spring, and retainer by pressing on retainer with a screwdriver and sliding assembly up out of well in bowl cover. Remove pump plunger and rubber seal as an assembly by disengaging plunger shaft from pump lever and pulling assembly out of cover (seal, retainer, washer, and spring can be removed from plunger for cleaning). Remove pump inner lever from countershaft by removing nut and washer, then slide countershaft out of cover boss. Remove fuel inlet fitting, gasket and strainer. If choke to be disassembled, proceed as follows: On Cadillac, remove retaining screw and lift off choke modifier lever. Remove cover attaching screws and retainers, lift off thermostat cover and coil assembly (CAUTION–On Cadillac, do not remove metal pointer or coil from shaft in cover), remove gasket and baffle plate. Remove choke valve (remove staking burrs from valve screws before taking screws out). Rotate choke shaft counter-clockwise until choke piston clears cylinder, slide shaft out and remove shaft and piston as an assembly (piston can be disconnected by using a wire to push piston pin out of piston and link). Remove choke housing by taking out two attaching screws, remove and discard choke housing gasket.

1957-58 MODELS

Air Horn & B wl C v r - On Cadillac, (with air conditioning), remove idle speed-up control and bracket. On Chevrolet Pass. Cars, remove choke cover, gasket, and coil assembly from housing. On all cars (except Chevrolet), disconnect intermediate rod from choke shaft lever. On all cars, disconnect pump rod from pump lever. Remove choke trip lever, then disengage choke lever and collar assembly from choke shaft and disengage lower end of choke rod from fast idle cam. Remove choke lever, collar, and rod as an assembly. Remove choke valve, then on all cars (except Chevrolet), remove choke shaft. On Chevrolet Pass. Cars, rotate choke shaft counterclockwise to free choke piston from housing and remove piston and shaft assembly by sliding from bowl cover. Remove choke housing from bowl cover. On all cars, take out all air horn retaining screws (CAUTION - One screw is located in counterbore in dividing wall just inside edge of air horn), then carefully lift air horn straight up from main body to avoid damage to floats, pump plunger and vacuum piston. *(CAUTION - Break cov r loose from bowl with finger pressur only. DO NOT PRY ON COVER).* Invert bowl cover and take out float hinge pins and remove floats and inlet needles, seats, and gaskets. *(NOTE* - On carburetors with spring balanced floats, it is not necessary to remove the balance spring). Keep each float assembly intake needle, and seat together. DO NOT mix primary and secondary parts. Remove power piston assembly by compressing spring and letting it snap repeatedly until hammering action of power piston drives staked retaining disc from air horn. *(NOTE* - It may be necessary to remove burrs if heavy staking is encountered). Remove horseshoe clip from top of accelerating pump plunger shaft and disengage plunger shaft from pump lever. Pull pump plunger, with rubber boot, downward and out of bowl cover. Remove pump lever and choke countershaft. Remove fuel inlet, gasket and strainer.

1956 MODELS

Carburetor Bowl–Take out three attaching screws and lockwashers in each venturi cluster, carefully remove clusters by lifting them straight up to avoid damaging idle tubes and main well tubes (CAUTION–Clusters are serviced as an assembly and should not be disassembled further). Keep primary and secondary side clusters separate (primary cluster has pump discharge nozzles). Remove all main metering jets (located in bowl adjacent to venturi cluster support). CAUTION–Primary and secondary side metering jets are different size and must not be interchanged. Remove power valve and gasket (located in bowl adjacent to primary metering jets). Remove pump return spring from pump cylinder, then invert bowl casting to remove aluminum pump inlet ball (from bottom of pump cylinder) and brass pump outlet check needle (from passage under primary venturi cluster mounting face). CAUTION–Do not lose these parts and NEVER substitute a steel ball for the aluminum inlet ball. Remove pump inlet screen from intake passage at side of cylinder.

1957-58 MODELS

Carburetor Bowl - On Cadillac & Oldsmobile, remove modifier lever from choke cover. On all cars (except Chevrolet Pass. Car & Truck), remove thermostat cover and coil assembly. Remove choke piston lever screw and slide choke piston out of vacuum passage. Disconnect choke piston from link attached to shaft by tapping piston and letting it fall into the hand. Remove choke housing from bowl (or throttle body). Remove intermediate choke shaft lever from housing. On all cars, remove accelerator pump spring, then remove power valve and gasket. Remove primary and secondary venturi clusters. *(CAUTION - Break clusters loose with finger pressure only).* Remove and discard venturi cluster gaskets. On Oldsmobile, disconnect throttle return check vacuum line at throttle flange, then remove throttle return check from carburetor body. On all cars, remove metering jets from primary and secondary sides, keeping each jet separate in separate groups. Invert bowl casting and remove pump inlet and outlet check valve balls. If necessary, remove pump inlet screen and retainer from bottom of float bowl.

1956 MODELS

Throttl Body–Remove large screw and washer from counterbore in center of throttle body (visible when bowl and throttle body inverted), remove three smaller screws and lockwashers from flange, carefully separate throttle body from bowl, remove and discard gasket. On all cars except Buick & Cadillac, remove the secondary auxiliary throttle valve assembly from carburetor body by lifting it out of the secondary throttle bores. Remove both idle adjusting screws and springs, idle stop screw and spring, and fast idle screw and spring. *(CAUTION - Keep each screw and its proper spring together).* On Cadillac, remove choke modifier lever and retaining screw from primary throttle shaft. Free secondary throttle actuating link by taking out cotter pin in each end, unhook inner end of primary throttle shaft override spring from lever using long nose pliers, remove override spring retaining screw from primary throttle shaft, remove secondary throttle lever retaining screw and washer, then slide secondary throttle actuating lever and override spring off primary shaft, remove link. Slide secondary throttle lever and return spring from secondary throttle shaft. This completes throttle body disassembly.

► *CAUTION: Secondary Auxiliary Throttle Body and Main Throttle Body are furnished as an assembly with throttl valves and shafts and no attempt should be made to remove throttle valves (disturbing valves will upset low speed metering performance).*

1957-58 MODELS

Throttle Body - Remove large screw and washer from counterbore in center of throttle body. On Cadillac, with air conditioning, remove idle speed-up control vacuum pipe. On all cars, remove three small screws and lockwashers from flange and carefully separate throttle body from bowl. Remove and discard gasket. Remove secondary auxiliary throttle valve assembly from carburetor body by lifting it out of secondary throttle bores. Remove both idle adjusting screws and springs, idle stop screw and spring, and fast idle screw and spring. On Cadillac, remove idle air by-pass screw and spring. *(NOTE* - Keep each adjusting spring with its screw for easier identification). On Cadillac and Oldsmobile, remove choke modifier lever and retaining screw from primary throttle shaft. On all cars, free secondary operating link by taking out cotter pin in each end. Unhook inner end of primary throttle shaft override spring from lever. Remove override spring retaining screw from primary throttle shaft, remove secondary throttle lever retaining screw and washer, then slide secondary throttle operating lever and override spring off primary shaft. Slide secondary throttle lever and spring from secondary throttle shaft.

► *CAUTION: Secondary Auxiliary Throttle Body and Main Throttle Body are furnished as an assembly with throttl valves and shafts and no attempt should be made to remove throttle valves (disturbing valves will upset low speed metering performance).*

1956-58 MODELS

Cleaning & Inspection: Wash all parts thoroughly in carburetor cleaning solvent **except** following parts which should be cleaned in clean gasoline: Choke cover and coil assembly, pump plunger, primary venturi cluster (with pump discharge nozzles). Blow out all passages in castings with air, remove all gum and carbon deposits (CAUTION–do not use drills to clean out jets and passages). Inspect strainer screens and

CONTINUED ON NEXT PAGE

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replace if distorted or plugged. Check floats for dents, leaks, or wear at hinge pin holes. Inspect fast idle cam for wear on steps. Inspect throttle body carefully for wear at throttle valves and bore and shaft wear in bore (replace as an assembly if worn excessively). Inspect all parts for wear or damage and replace as required.

Reassembly: Use new gaskets. Install all parts in reverse order of disassembly procedure (above) and pay particular attention to the following:

Auxiliary Secondary Throttle Valve Assembly - Install the auxiliary secondary throttle valve assembly into base of carburetor body from bottom side (make sure the calibrated spring, nylon bushing and operating pin are in position in throttle body assembly).

Secondary Throttle Lever & Spring Installation: Install return spring on secondary throttle shaft with bent end of spring in hole in throttle body, wind up spring one complete turn, then install secondary lever on shaft over straight end of spring (bent portion of lever should be above shaft), install spacer and retaining screw in end of shaft. Install secondary throttle actuating link (insert plain end through lever hole, install cotter pin on shaft side to clear return spring).

Primary Throttle Lever & Spring—Start secondary throttle actuating lever on primary throttle shaft with curved slot portion outward and toward the rear. With inner portion of lever on shaft, start override spring on shaft with long end inward, then slide lever and spring on shaft and engage washer end of secondary throttle actuating link in slot in lever. Install override spring retaining screw through loop end of spring and into primary throttle shaft from upper side. Hook inner end of override spring over top edge of secondary throttle actuating lever. Install washer and cotter pin on end of secondary throttle actuating link. On Cadillac, install choke modifier lever and retaining screw on end of primary throttle shaft (lever must point upward when throttle closed and marking "RP" must be outward).

Throttle Body-to-Bowl Assembly Caution—Install new gasket on bottom surface of bowl with largest projecting tab on primary side and surrounding vacuum passage to power valve piston (*CAUTION*—gasket is not reversible). Install all throttle body attaching screws loosely (including large screw in center of throttle body), then tighten all screws evenly.

Venturi Cluster Installation Caution—Make certain that brass pump discharge needle installed in pump passage in bowl before installing primary venturi cluster. Use new gaskets and install each venturi cluster in correct position making certain that clusters correctly aligned by the tangs on the cluster. *CAUTION*—Primary and Secondary clusters not interchangeable and can be identified by brass pump discharge nozzles used on primary cluster only.

Metering Jet Installation Caution—Primary and secondary side metering jets are DIFFERENT sizes (in general, secondary jets are larger size than primary jets) and must be installed in correct positions. *NOTE*—On later Cadillac carburetors, primary jets are brass finished, secondary jets are copper plated.

Accelerating Pump Plunger Assembly—When installing rubber seal on plunger stem, slide seal on shaft with larger end toward the piston, see that upper end engaged in groove in plunger stem. Insert assembly through bowl cover from below and pull seal through cover so that cover edge engages groove in seal. When installing cover, guide pump plunger into cylinder.

Floats and Intake Valve Assembly - Make certain that parts are installed in correct position (primary and secondary parts not interchangeable). On carburetors with spring balanced floats, make sure float arm is back of float balance spring. Adjust float level and float drop or travel. *See "Adjustments" above.*

Air Horn & Bowl Cover Installation—Use new gasket, carefully align all holes in gasket and cover. When installing cover, use care in guiding pump plunger into pump cylinder and power valve piston into its bore, and see that floats not bent by striking on edge of bowl. Install all bowl cover attaching screws, tighten inner screws first, then outer screws, evenly and securely.

Choke Valve Installation—After choke shaft and piston assembly installed in air horn, slide choke valve through shaft with letters "RP" upward, use new screws and install screws loosely, then tighten screws as follows: **Cadillac**-Press firmly on choke housing end of shaft and hold valve tightly closed, tighten screws securely and stake ends of screws lightly taking care not to bend choke shaft. **Oldsmobile**—First install counterweight, spacing washer, and trip lever on end of choke shaft, press lightly on end of choke shaft to obtain minimum clearance of .020" between spacing washer and counterweight, tighten choke valve attaching screws with shaft in this position, stake screws lightly taking care not to bend choke shaft. Install choke baffle plate with curved slot over tang on choke lever.

Thermostatic Housing & Coil Installation—With retainer screws loose, rotate cover counter-clockwise until coil hook picks up choke lever tang, then position cover for correct choke setting (see Adjustment data) and tighten retaining screws. On Cadillac, install choke modifier lever loosely (lever should be forward and slightly down when metal pointer is at scribed line), tighten lever screw as part of Choke Modifier adjustment (see Adjustment data).

SERVICE PARTS

Gasket Sets - Rochester No. 7009943 (7009200); No. 7009944 (7007900, 7008697); No. 7009946 (7002221, 7002222); No. 7009947 (7008610, 7009600, 7009601); No. 7009952 (7009820); No. 7009953 (7008737, 7009846, 7012126); No. 7015740 (7010070, 7011570); No. 7015743 (7009661, 7011161); No. 7015744 (7009471, 7010926, 7009470, 7010925); No. 7015745 (7009829, 7009830); No. 7015840 (7011600); No. 7015842 (7012303, 7011487); No. 7015847 (7012128); No. 7015848 (7011108); No. No. 7015849 (7011701); No. 7015854 (7012400, 7012401); No. 7015861 (7013100).

Repair Kits - Rochester No. 7009923 (7009200); No. 7009924 (7007900, 7008697); No. 7009926 (7002221, 7002222); No. 7009927 (7008610); No. 7009931 (7009600, 7009601); No. 7009932 (7009820); No. 7009933 (7008737); No. 7015720 (7010070, 7011570); No. 7015723 (7009661, 7011161); No. 7015724 (7009471, 7010926, 7009470, 7010925); No. 7015730 (7009846, 7012126); No. 7015778 (7009829, 7009830); No. 7015820 (7011600); No. 7015822 (7012303, 7011487); No. 7015827 (7012128); No. 7015828 (7011108); No. 7015834 (7012401, 7012400); No. 7015835 (7011701); No. 7015860 (7013100).

1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR

	Rochester Carb. No.
BUICK	
1959 Series 4600, 4700, 4800	4GC 7013044
1960 Series 4600, 4700, 4800	4GC 7015040
1959-60 Service Replacement	4GC 7016000
CADILLAC	
1959-60 All Series (Std)	4GC 7013030
1959-60 Service Replacement	4GC 7016000
CHEVROLET PASS. CARS	
1959 283" Eng (Std)	4GC 7013004
1959 283" Eng (Air Cond)	4GC 7013010
1959 348" Eng (Std)	4GC 7013006
1959 348" Eng (Air Cond)	4GC 7013012
1960 283" Eng (Std) Early	4GC 7013004
1960 283" Eng (Std) Late	4GC 7015004
1960 283" Eng (Air Cond) Early	4GC 7013010
1960 283" Eng (Air Cond) Late	4GC 7015010
1960 348" Eng (Std) Early	4GC 7013006
1960 348" Eng (Std) Late	4GC 7015006
1960 348" Eng (Air Cond) Early	4GC 7013012
1960 348" Eng (Air Cond) Late	4GC 7015012
1959-60 Service Replacement 283" Eng	7015907
1959-60 Service Replacement 348" Eng	7015908
CHEVROLET TRUCKS	
1959 283" Eng ①	4G 7013023
1959 283" Eng ②	4G 7013021
1959 Service Replacement ①	7015916
1959 Service Replacement ②	7015917
OLDSMOBILE	
1959 Super 88 & 98 (Std) Early	4GC 7013050
1959 Super 88 & 98 (Air Cond) Early	4GC 7013150
1959 Super 88 & 98 (Std) Late	4GC 7013950
1959 Super 88 & 98 (Air Cond) Late	4GC 7013952
1960 Super 88 & 98 (Std)	4GC 7013950
1960 Super 88 & 98 (Air Cond)	4GC 7013952
1959 Service Replacement (Early)	7015914
1959 Service Replacement (Late)	7015983
1960 Service Replacement	7015983

① - With 3700 RPM Governor
② - With 4000 RPM Governor

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 BUICK INOPERATIVE CHOKE MECHANISM* On early cars, this condition may be caused by foreign material or corrosion in choke housing due to road splash To correct, remove choke thermostat housing, piston, and baffle and thoroughly clean parts with water *(CAUTION* - Do not leave parts in water longer than necessary) and dry with compressed air *NOTE* - Later cars have improved fender skirts and baffles to prevent road splash in engine compartment These parts can be installed on early cars

►*1959 BUICK CARBURETOR PRODUCTION CHANGE (To correct a cutout condition when making a sharp turn under hot operating conditions)* The later carburetor, identified by letter "A" on code tag, has four vertical vent tubes projecting from top of air horn which prevent fuel from spilling into bores on turns A new air horn gasket having the openings at primary float only half cut out (forward half of area is solid gasket) is used With the new gasket, adjustment of primary float requires a slightly different procedure *(see "Float Level Adjustment" below)*

►*1959 BUICK (LATE) PRIMARY FLOAT LEVEL ADJUSTMENT CHANGE:* On later model Rochester No. 7013044 carburetors identified by tag change letter "C" or "D" appearing after part number on the identification tag, or on earlier carburetors which have "A", "B" or no letter following the part number and which have been modified by breaking off the forked tang on the primary float hanger and adding the primary balance spring, adjust primary float as indicated below for late 7013044 carburetors

►*1959 BUICK CARBURETOR PRODUCTION CHANGE TO CORRECT CUTTING OUT ON TURNS* Carburetors code tagged "C" or later have been modified by removal of the cup and spring from the vacuum power piston stem so that there is no "Vacuum Assist" action on the primary floats Float arm tang (which engaged the cup) was not eliminated *NOTE* - On some earlier carburetors, this tang was removed in the field to eliminate the vacuum assist action

►*1959 CADILLAC THROTTLE RETURN CHECK RATTLE (Cars before Engine No 001180) See "Throttle Return Check Rattle Correction" under CARBURETOR on Cadillac Car Model page for installation of restriction in vacuum hose*

►*1959 CADILLAC ENGINE STALLING & STUMBLING (WITH COLD ENGINE) CORRECTION & PRODUCTION CHANGE·* Install a new choke baffle, Cadillac No 7010598, having a ½" wide extension set at right angle on one side Later carburetors with the letter "B" on brass identification tag have the later type baffle

►*1959 CHEVROLET 283" & 348" ENGINE CARBURETOR PRODUCTION CHANGES FOR IMPROVED PERFORMANCE* Rochester Carburetor Nos 7013004, 7013006, 7013010, 7013012 have been changed as listed below to correct conditions listed Changes in adjustment procedure due to these new parts are listed under ADJUSTMENTS

Cutting Out on Turns (Hot weather Operation) Correction – Solid type Air Horn Gasket, No 7015173, furnished for service to correct this condition Use of this gasket requires different Float Level checking procedure

Improved Cold Starting Operation - New Choke Piston, No 7015887 (Carb Nos 7013006 & 7013012), No 7015890 (Carb Nos 7013004 & 7013010) used on later carburetors This change need not be made on earlier carburetors

Air Horn Internal Venting Change - New Air Horn, No 7015794, has four corner pitot tubes for venting Primary vertical vent has been closed and the two large tubes eliminated This is merely a production change

Choke Piston Lever & Link Assembly (Carb. Nos. 7013006 & 7013012) - New assembly, No 7012748, furnished for service Piston link has been lengthened 1/32" for ease in making Intermediate Choke Rod Adjustment

Metering Jet Changes - *See Rochester 4-Barrel Jet Specifications for latest jet recommendations*

►*1959-60 CHEVROLET V8 (AIR CONDITIONED CARS) CUTTING OUT ON TURNS CORRECTION (EARLY CARS WITH CARB. NOS 7013010 & 7013012)* To correct this condition, install Kit, Part No 7017804 which contains two float assemblies, two float assist torsion springs, primary and secondary float gauges and new identification tags Adjust float level to later specifications *(see "Float Level Setting" below)* Install identification tag 7015010 (to replace 7013010) and tag 7015012 (to replace 7013012)

►*1959-EARLY 1960 CHEVROLET V8 (EXCEPT AIR CONDITIONED CARS) CUTTING OUT ON TURNS CORRECTION* To correct this condition on cars with Carburetor Nos 7013004 & 7013006, install modification kit as follows On carburetors identified by a change letter "B" or later on the identification tag, install Kit, Part No 7017803 which contains two torsion springs, float gauges, and new identification tags (floats not included) On earlier carburetors (before change letter "B"), install Kit, Part No 7017804 which contains new floats, two torsion springs, float gauges and new identification tags Adjust float level to later specifications *(see 'Float Level Setting' below)* Install identification tag 7015004 (to replace 7013004) and tag 7015006 (to replace 7013006)

►*1960 CHEVROLET V8 CARBURETOR PRODUCTION CHANGE:* New carburetors, Part No 7015010 (283" Eng. Air Cond cars), 7015012 (348" Eng Air Cond cars), 7015004 (283" Eng. Exc Air Cond. cars), 7015006 (348" Eng Exc Air Cond cars) are being used in production to replace earlier carburetors. These new carburetors have new type float assemblies and new float assist torsion springs Float level settings are different *See "Float Level Setting" below. NOTE - Earlier carburetors may be converted to later type as indicated below.*

►*1960 CHEVROLET AIR HORN GASKET NOTE:* Service replacement gaskets are not fully cutout in the area of the float bowls (production gaskets are) This change was made in service gaskets to eliminate the possibility of engine cutting out on turns during hot weather

►*1960 CHEVROLET V8 (AIR CONDITIONED CARS) CUTTING OUT ON TURNS CORRECTION (EARLY CARS WITH CARB. NOS. 7013010 & 7013012):* To correct this condition, install Kit, Part No 7017804 which contains two float assemblies, two float assist torsion springs, primary and secondary float gauges and new identification tags Adjust float level to later specifications *(see "Float Level Setting" below)* Install identification tag 7015010 (to replace 7013010) and tag 7015012 (to replace 7013012).

►*1960 CHEVROLET V8 7013004 & 7013006 CARBURETOR PRODUCTION CHANGE·* Carburetors identified by a change letter "B" or later on the identification tag have new type primary and secondary float assemblies Float level setting is the same as for earlier carburetors

►*1959 OLDSMOBILE 4GC CARBURETOR PRODUCTION AND ADJUSTMENT CHANGE* On later carburetors, a positive slow idle stop has been incorporated into the throttle body The slow idle adjusting screw now contacts throttle body in a vertical position allowing adjustments to be made more easily Carburetors having this new feature require a "Secondary Actuating Lever Adjustment" *See ADJUSTMENTS below*

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1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR (C nt.)

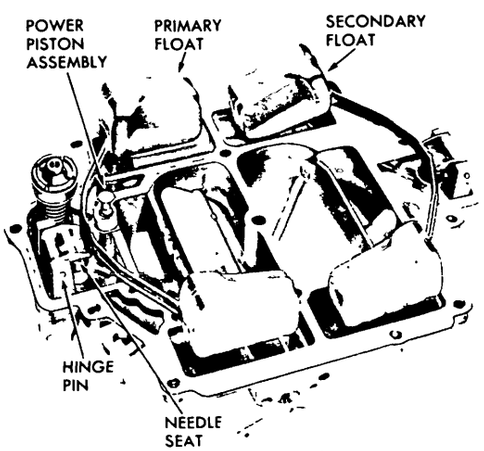
DESCRIPTION: 4-barrel downdraft type with automatic choke (4GC), without automatic choke (4G). Design is similar to corresponding previous models except for the new features indicated below.

Idle Compensator Valve: This new feature is usedon some carburetors (see below) and is mounted between the main venturi on secondary side. The unit consists of a valve, bi-metal strip, holder and mounting bracket. The purpose of the compensator is to admit additional air under hot idle conditions and to prevent engine stalling. With high air temperature in carburetor, the valve opens allowing additional air to be drawn into carburetor bores below the throttle valves, offsetting enrichening effects of hot idle.

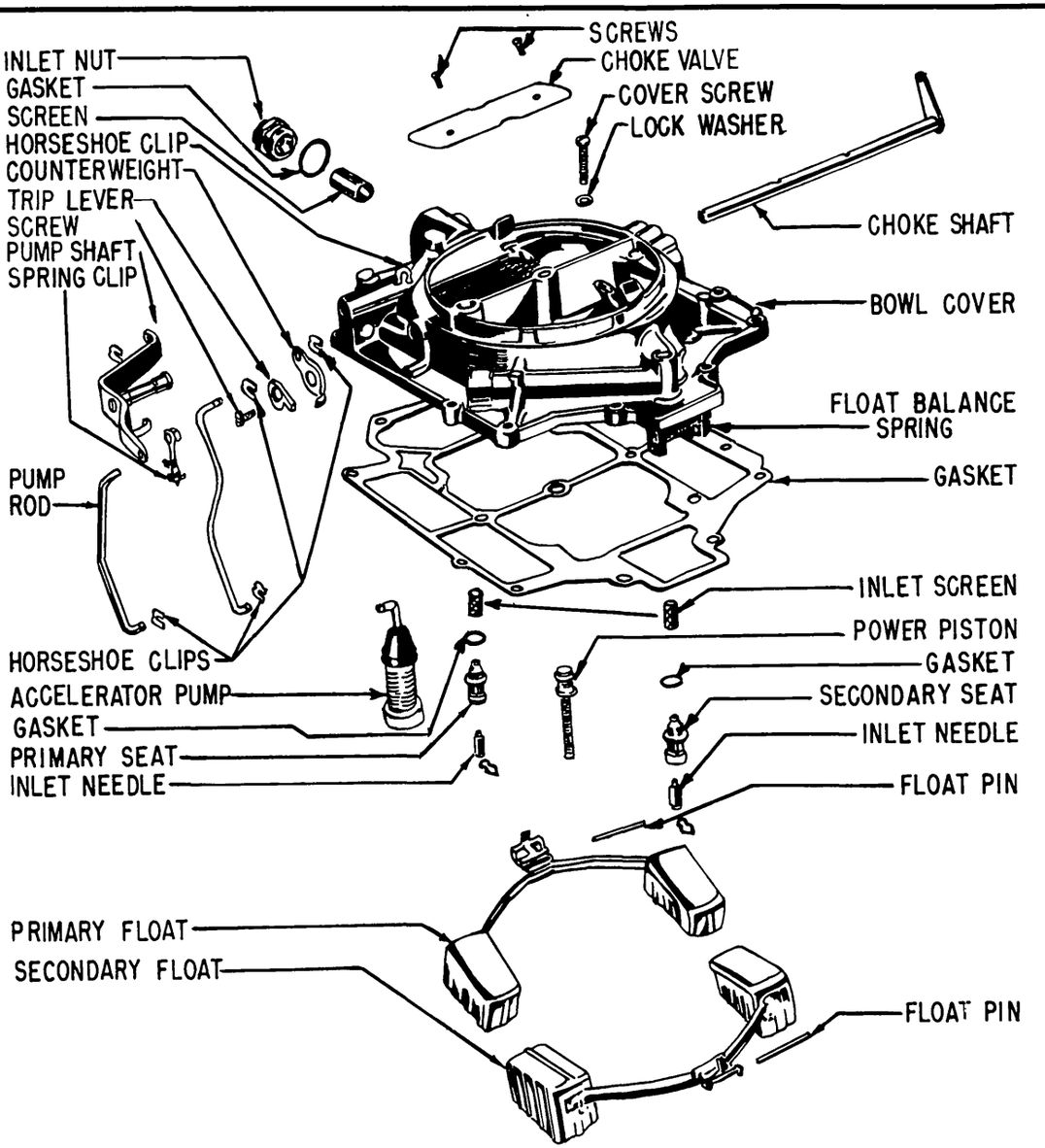
Buick: Throttle levers have been changed and a boss has been added to throttle body casting to provide a more positive stop for the idle speed screw. Four idle vent tubes have been installed in air horn to prevent fuel from spilling into bores on sharp turns. A "vacuum assist" type primary float is used on Early 1959 cars *(see "1959 Buick Carburetor Production Change To Correct Cutting Out on Turns" above).* An "Idle Compensator" is used on all models to prevent stalling during prolonged hot idling conditions.

Cadillac: Choke modifier (used on previous models) has been eliminated. An "Idle Compensator" is used to prevent stalling during prolonged "hot idle" conditions on all models. The down-tubes on secondary cluster have been eliminated and secondary discharge holes have been added above the secondary throttle valves.

Chevrolet Pass. Cars: The automatic choke housing has been relocated on the bowl assembly and an intermediate choke rod and lever (requires adjustment) has been added. A secondary idle system (carburetors used on the 348" engine) has been added to smoothout engine operation between the time secondary valves start to open and the time the auxiliary valves open. An "Idle Compensator" is used in carburetors on air conditioned cars to prevent stalling during prolonged "hot idle" conditions.



FLOAT ASSEMBLY WITH "VACUUM ASSIST" PRIMARY FLOATS



ROCHESTER 4GC CARBURETOR AIR HORN & BOWL COVER ASSEMBLY

Oldsmobil : A secondary idle system has been incorporated. Idle tubes have been added to the secondary cluster to provide fuel to lower idle air bleed tubes in the primary venturi. A new "fast action" choke is used on all models. With this design, the choke valve can be timed to open faster, yet fast idle speed remain high enough for an adequate length of time. Movement of fast idle cam is now directly related to movement of choke coil, instead of following the action of choke valve. This new feature allows fast idle to be regulated separately from the choke valve. An "Idle Compensator" is used in carburetors on air conditioned cars to prevent stalling during prolonged "hot idle" conditions.

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1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR (C nt.)

ADJUSTMENTS: *Make all adjustments in sequence given below (except for Idle Speed & Mixture adjustments).*

►*CADILLAC IDLE SPEED SETTING NOTE:* Throttle valves are completely closed at low idle speed and air is admitted through Idle Air System which consists of a by-pass passage (primary side only) through which air for closed throttle operation is taken from above the throttle valves through a metered (non-adjustable) orifice and an adjustable orifice to each primary bore. An idle speed screw (single screw for both primary bores) controls the adjustable orifice and all idle speed adjustments are made with this screw (throttle stopscrew not used).

►*IDLE SPEED SETTING CAUTION (CARS WITH IDLE COMPENSATOR):* Make sure that idle compensator is closed when adjusting idle speed. If necessary, idle compensator valve can be held closed with a pencil. After idle speed is adjusted, press down on idle compensator valve to see if speed is affected. If speed drops, readjust idle speed, being sure that compensator valve is closed.

Idl Sp d & Mixtur S tting (Except Cadillac): If preliminary adjustment required to warm up engine, set both idle mixture adjusting screws 1½ turns open from a lightly seated position. With engine at normal operating temperature (choke valve wide open and fast idle inoperative so that engine idles at hot or slow idle speed), set throttle stopscrew for correct idle speed as listed below. Adjust both primary idle mixture adjusting screws equally so that engine idles smoothly and RPM is at maximum (see special notes below). Recheck idle speed.

BUICK NOTE - Turn each adjusting screw in until engine begins to lag or run unevenly from lean mixture, then turn screw out until engine begins to roll from rich mixture, finally turn screw in just enough to provide smoothest operation. Adjust both screws alike.

CHEVROLET NOTE - Turn adjusting screw in to lean mixture until engine is moderately rough (slight vacuum and RPM drop), then turn screw out 1/4 turn to enrich mixture. Adjust both screws alike.

OLDSMOBILE NOTE - After adjusting idle mixture screws (above) for smoothest idle with highest vacuum reading and engine RPM, turn each adjusting screw out 1/4 turn (vacuum and RPM will drop off slightly).

►*1960 CADILLAC IDLE SPEED ADJUSTMENT CAUTION:* Due to vacuum released parking brake, it is impossible to set the brake with transmission selector lever in "Dr" position unless the vacuum release is disconnected. Disconnect diaphragm at neutral safety switch and tape switch opening to prevent any air leak.

Idle Spe d & Mixture Setting (Cadillac): With engine at normal operating temperature, transmission in "N" (Neutral), choke valve fully open and carburetor on "slow" idle, loosen throttle lever jam nuts at carburetor trunnion. Place transmission selector lever in either "D" range. Adjust engine idle to not more than 480 RPM using the idle air by-pass screw (idle speed adjusting screw) on throttle body. Turn one idle mixture screw until highest engine RPM is reached and highest vacuum is obtained at the same time, then repeat this operation with the other screw. Check and reset engine idle speed. Repeat idle mixture adjustment until turning the adjusting screws will not increase engine RPM and the smoothest engine idle is obtained. *CAUTION* - Idle mixture screws must be adjuxted last and must always be readjusted when an idle speed adjustment has been made.

Car Model	Idle Speed Setting Synchro-mesh	Auto. Trans.
Buick (Std.)		② 485 RPM
Buick (Air Cond.) ①		② 550 RPM
Cadillac ③		④ 480 RPM
Chevrolet Cars ③	475 RPM	④ 450 RPM
Chevrolet Trucks	475 RPM	④ 450 RPM
Oldsmobile (Std.)	460 RPM	④ 460 RPM
Oldsmobile (Air Cond.) ⑤	460 RPM	④ 520 RPM

① - With air conditioner turned OFF.
② - Selector lever in Neutral "N" or Park "P".
③ - With air conditioner operating on air conditioned cars.
④ - Selector lever in Drive "D".
⑤ - Air conditioner turned OFF (Carburetors with Idle Compensator), turned ON (Carburetors without Idle Compensator).

Anti-Stall Dashpot & Throttle Return Check Adjustment: *See Throttle Linkage Adjustment under CARBURETOR on each car model page.*

Float Setting: *Both Primary and Secondary Float Assemblies must be checked and adjusted separately and FLOAT LEVEL & FLOAT DROP (Vacuum Assist Spring on carburetors with this feature) must be checked for each assembly.* Remove bowl cover and float assembly from carburetor but DO NOT remove bowl cover gasket.

►*PRIMARY FLOAT SETTING ADJUSTMENT NOTE (Carburetors with later type solid or partially cut-out float bowl gasket):* With this type gasket, there is no opening for locating tangs on straight edge of float level gauge (first type). When checking primary float level on these carburetors, use special float level gauge listed in Float Setting table. These gauges have single locating lug on straight side of gauge (for primary float gauging) which engages **outer** edge of cover flange. *NOTE*- Opposite end of gauge is marked PUMP SIDE and gauge must be installed with this marking on same side as accelerating pump.

►*1959 BUICK FLOAT ADJUSTMENT CHANGE NOTE:* Different settings required for early and later 7013044 carburetors. *See "1959 Buick (Late) Primary Float Level Adjustment Change" above.*

Primary Float Level Adjustment (Except Late 1959-60 Buick & 1959-60 Chevrolet) - With bowl cover gasket in place, invert bowl cover and float assembly, then install correct float level gauge on gasket at heel of floats with gauge legs extending upward on each side of each float. On carburetors with solid type gaskets, single locating lug on gauge should be against outer edge of cover flange and gauge marking PUMP SIDE should be on accelerating pump side. Make two adjustments as follows: **1)** With gauge vertical, floats should just touch edge of cutouts in gauge. Adjust by bending float arms at rear. Move gauge to toe of floats and repeat the float check and adjustment. With correct adjustment, lower surface of floats should be parallel to air horn surface and gauge should slide freely from one end of float to the other. **2)** With gauge still in place and locating lug against edge of flange, floats should be centered between gauge legs at both heel and toe ends. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub sides of gauge legs.

Buick (Late 1959) - *NOTE - See "Production Change" above.* With air horn inverted, position float gauge BT-171 over heel of float (large end). Upper portion of float pontoon should just touch gauge. Bend float arm to adjust. With float gauge in position and centered in air horn, each float pontoon should be centered between gauge legs. If necessary, align by bending float arms. Move float assembly from side to side at hinge pin to make sure float does not rub gauge legs. *NOTE - Float setting 1 3/8" measured from gasket to top of float at heel (large end).*

Buick (1960) - With air horn inverted and gasket in place, position float gauge (see table below) under float (between gasket and float), with cutout in float gauge centered under float seam. Float should just touch gauge and be parallel to gasket surface. Adjust float level by bending float arms at a point adjacent to needle valve. To adjust float toe (parallel with gasket surface), bend arm where it connects to float. Check each primary float separately To align floats, install gauge BT-171 over floats, then bend float arms so floats are centered between gauge legs. *NOTE -Gaug will not fit over heel of float and should not be used to make heel setting.* Move float assembly from side to side at hinge pin to make sure floats do not rub sides of gauge.

Chevrolet (1959-60) - *NOTE - Primary and secondary floats are adjusted in same manner except special gauges are settings are required as indicated in tabl below.* With bowl cover and float assembly inverted and gasket in place, install correct float level gauge over floats and against curvature of air horn so that gauging legs rest on cover gasket with locating lugs on inner legs extended into the air horn. Make two adjustments as follows: **1)** With gauge vertical, upper surface of floats should just touch edge of cutouts in gauge. Adjust by bending float arm at rear. **2)** With gauge still in place and centered in air horn, floats should be centered between legs. Adjust by bending float arms horizontally. Move floats from side to side at hinge pin to make sure they do not rub on sides of gauge legs.

Primary Float Toe Adjustment (Late 1959 Buick 7013044 Carb.) - With air horn still inverted and gasket in place, measure distance from gasket to center of dimple on side of float pontoon at toe (small end). This measurement should be ½". To adjust, bend toe of pontoon up or down while holding float arm immediately back of float. Recheck float heel adjustment if float toe adjustment is necessary.

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1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR (C nt.)

Secondary Float Level Adjustment (Chevrolet Carburetors) - Procedures are the same as for Primary Floats (above). Specifications and tools are different than for primary floats. *See "Primary Float Adjustment (Chevrolet)" above.*

Secondary Float Level Adjustment (Except Chevrolet Carburetors) - After checking primary floats (above), invert float gauge and install gauge over heel end of floats so that gauging legs rest on cover gasket with locating lugs on inner gauge legs extending into air horn. Make two adjustments as follows: 1) With gauge vertical, upper surface of floats should just touch edge of cutouts in gauge. Adjust by bending float arm at rear. 2) With gauge still in place and centered in air horn, floats should be centered between gauge legs. Adjust by bending float arms horizontally. Check adjustment by moving float assembly from side to side at hinge pin. Floats must not rub on sides of gauge legs. Then check and adjust float toe (following).

Secondary Float Toe Adjustment (Buick) - With air horn inverted and gasket in place, measure distance from gasket to center of dimple on side of float at toe (small end). This distance should be 3/8". To adjust, bend float as necessary while holding float arm adjacent to float. Recheck float heel adjustment if float toe adjustment is necessary.

Secondary Float Toe Adjustment (Cadillac & Oldsmobile) - With bowl cover and float assembly inverted, raise gasket and sight across flat surface of cover at toe end of secondary floats. Toe end of each float must be FLUSH with this surface. Adjust by bending float arm at a point close to float. Recheck float heel adjustment if toe adjustment is necessary.

Float Level Setting (Primary Floats)

Car Model	Height & Gauge No.
1959 Buick (Early) 7013044) ①	9/32" BT-171
1959 Buick (Late 7013044) ①	1 3/8" BT-171
1960 Buick	9/64" BT-178
1959-60 Cadillac	15/64" BT-172
1959-60 Chevrolet Pass. Cars ②	1 43/64" BT-164
1959-60 Chevrolet Pass. Cars ③	1 33/64"
1959 Chevrolet Trucks	1 43/64" BT-164
1959-60 Oldsmobile	9/32" BT-171

① - See "1959 Buick (Late) Primary Float Level Adjustment Change" above.
② - Carburetors without float assist torsion spring. *See "Chevrolet Production Changes" above.*
③ - Carburetors with float assist torsion spring. *See "Chevrolet Production Changes" above.*

Float Level Setting (Secondary Floats)

Car Model	Height & Gauge No.
1959-60 Buick	1 3/8" BT-171
1959-60 Cadillac	1 3/8" BT-171
1959-60 Chevrolet Pass. Cars ①	1 47/64" BT-165
1959-60 Chevrolet Pass. Cars ②	1 37/64"
1959 Chevrolet Trucks	1 47/64" BT-165
1959-60 Oldsmobile	1 3/8" BT-171

① - Carburetors without float assist torsion springs. *See "Chevrolet Production Changes" above.*
② - Carburetors with float assist torsion springs. *See "Chevrolet Production Changes" above.*

Primary Float Vacuum Assist Spring Adjustment (Except Chevrolet Carburetors): *NOTE - This adjustment not required on early Buick carburetors where float arm tang removed, or later carburetors where vacuum piston stem cup and spring omitted.* With bowl cover and float assembly held upright, hold vacuum piston in full up position, jounce floats lightly to make certain that the vacuum assist spring cup is not binding on the piston stem. Use scale to measure from face of gasket to center of dimple on side of primary floats at toe (free) end with power piston held in full up position. If this distance not correct as shown in table below, adjust by bending tang on float arm which engages power piston stem. Use bending tool BT-142.

Vacuum Assist Spring Setting

Car Model	Primary Float Height
Buick	1 3/64"
Cadillac	① 1 3/32"
Oldsmobile	1 3/64"

① - Supersedes original specification of 63/64".

Float Drop Setting: *Check the Float Drop after the Float Level Setting and Vacuum Assist Spring Adjustment have been made.*

Primary & Secondary Float Drop Adjustment (Except Chevrolet Carburetors) - *NOTE - On carburetors with Vacuum Assist Spring Primary Floats, the vacuum piston must be fully extended in the "down" position when checking float drop of primary floats.* With bowl cover and float assembly held upright, use a scale to measure from face of gasket to center of dimple on side of floats at toe (free) end. *(CAUTION* - On vacuum assist spring type primary floats, make certain that piston fully extended so that float is positioned by stop tang on rear of float arm rather than by tang engaging vacuum piston stem). If this distance not correct as shown in table below, adjust as follows: **Primary Floats** - Bend tang at rear of float arm toward needle seat to decrease float drop, away from needle seat to increase float drop. **Secondary Floats** - Bend tang on rear of float arm toward balance spring to decrease float drop, away from balance spring to increase float drop.

Primary & Secondary Float Drop Adjustment (Chevrolet Carburetors) - With bowl cover and float assembly held upright, use a scale to measure from face of gasket to lowest portion of float (bottom of float at center). This distance should be 2¼" (Gauge BT-93). Adjust by bending tang at rear of float arm toward needle seat to decrease float drop, away from needle seat to increase float drop.

Float Drop Setting

Car Model	Primary Floats	Secondary Floats
1959 Buick (Early) ①	1 1/2"	1 5/16"
1959 Buick (Late) ①	1 7/16"	1 5/16"
1960 Buick	1 7/16"	1 5/16"
1959-60 Cadillac	1 1/2"	1 3/8"
1959-60 Chev. Pass. Cars	2 1/4"	2 1/4"
1959 Chevrolet Trucks	2 1/4"	2 1/4"
1959-60 Oldsmobile	1 1/2"	1 5/16"

① - *See "1958 Buick (Late) Primary Float Level Adjustment Change" above.*

Accelerating Pump Adjustment (Except Buick): *CAUTION - This is a linkage adjustment and is not a seasonal change recommendation.* Back out slow idle speed screw (and fast idle screw on Cadillac) until throttle valves are completely closed. On Oldsmobile, make certain that pump rod connected in **inner** hole of pump arm. Hold throttle valves in closed position and place correct gauge (see table below) on top of air horn next to pump plunger. End of pump plunger shaft should slide freely into hole on gauge marked "Pump". If height not correct (see table below), adjust by bending pump rod using bending tool BT-18

Buick - Back out slow idle speed screw and fast idle speed screw until throttle valves are completely closed. Make certain that pump rod is connected in center hole of pump arm. Hold throttle valves closed and use scale placed on top surface of air horn to measure distance to bottom of horizontal portion of pump plunger shaft. This distance should be 1 1/64". Adjust by bending pump rod.

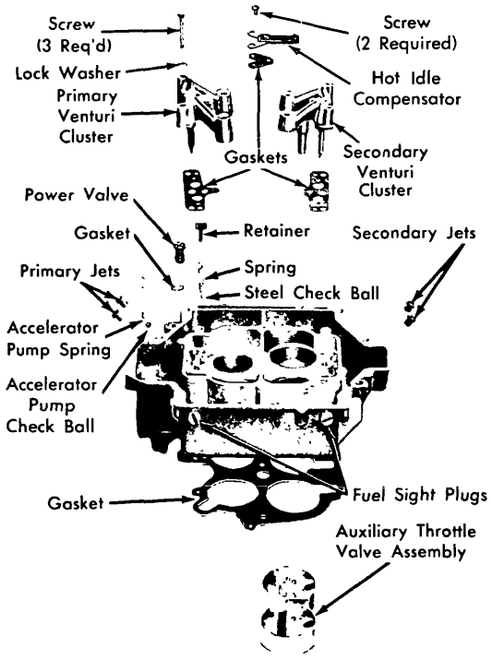
Accelerating Pump Stroke Setting

Car Model	Gauge No.	Pump Shaft Height
Buick	Scale	① 1 1/64"
Cadillac	BT-146	29/32"
Chevrolet Cars	BT-145	1 1/16"
Chevrolet Trks	BT-145	1 1/16"
Oldsmobile	BT-166	② 1 1/64"

① - With pump rod in center hole of pump arm.
② - With pump rod in inner hole of pump arm.

Atmospheric Idle Vent Adjustment (Except Buick): Adjust pump rod (see above), then gradually open primary

CONTINUED ON NEXT PAGE



ROCHESTER 4GC FUEL BOWL ASSY. (TYPICAL)

1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR (Cont.)

throttle valve to point where idle vent valve is just closed. Use a scale and measure distance between top of air horn and bottom of pump plunger shaft (same as checking pump stroke setting). This distance should be as indicated in table below. If a gauge is used (see table below), place the gauge on top of air horn with side marked "vent" next to pump plunger shaft. With throttle valve held in the position where vent is just closed, the hole marked "vent" on gauge should slide freely over pump plunger shaft. If adjustment not correct, adjust by bending tang on pump lever.

Idle Vent Setting

Car Model	Gauge No.	Height
Cadillac	BT-146	13/16"
Chev Pass	BT-145	31/32"
Chev. Truck	BT-145	31/32"
Oldsmobile	BT-166	29/32"

Intermediate Choke Rod Adjustment (Except Chev. Truck & Oldsmobile): *NOTE - This rod connects lever on choke shaft to choke lever on automatic choke housing.* Hold choke valve completely closed and bend intermediate choke rod as necessary so choke piston is flush with end of choke piston sleeve.

Oldsmobile - *CAUTION - Make Fast Idle Adjustment before adjusting intermediate choke rod (see below).* With fast idle properly adjusted, place fast idle screw on high step of fast idle cam and raise intermediate choke lever to its full up position. Make sure all lash is removed from rods in slots. Choke piston should be flush with end of choke piston sleeve. To adjust, bend intermediate rod to correctly position choke piston.

Automatic Choke Setting (All Models): Loosen three retaining screws and rotate thermostat cover until index mark is in line with correct mark on housing (see table below). Tighten cover retaining screws. *NOTE - "Centered" point on housing is indicated by a raised section on housing casting.*

Automatic Choke Setting

Car Model	Choke Setting
Buick	Centered (At Index)
Cadillac	Centered (At Index)
Chevrolet 7013004, 7013010	1 Point Lean
Chevrolet 7013006, 7013012	Centered (At Index)
Chevrolet 7015004, 7015010	1 Point Lean
Chevrolet 7015006, 7015012	Centered (At Index)
Oldsmobile	Centered (At Index)

Fast Idle Setting: *NOTE - Chevrolet Pass. Car fast idle adjustment will be correct after "slow idle" speed and choke rod adjustments have been made. On other models, the "On Engine" fast idle adjustment must be made after carburetor installed to insure proper warm-up performance.*

"Off Engine" Adjustment - Turn fast idle screw against high step of fast idle cam until throttle valve opening or clearance between edge of throttle valve and bore on side opposite idle mixture adjusting screws is correct as shown in table below.

Fast Idle Setting

Car Model	Throttle Valve Opening	Checking Gauge
Buick	.028"	BT-79
Cadillac	.024"	BT-90
Oldsmobile	.024"	BT-90

"On Engine" Adjustment - With engine at normal operating temperature, rotate fast idle cam so that the fast idle adjusting screw is on the high step of the cam. Start the engine and adjust the fast idle for correct engine RPM as shown in table below. *NOTE* - On Chevrolet, the fast idle engine RPM will be correct after the hot or slow idle speed has been correctly set.

Fast Idle Speed

Car Model	Engine RPM
Buick	1500
Cadillac	1700-1750
Oldsmobile	1600

Choke Rod Adjustment: *NOTE - On Buick, Cadillac & Chevrolet, this rod connects choke valve shaft to fast idle cam. On Oldsmobile, the rod connects intermediate choke lever to fast idle cam.* Rotate choke valve and fast idle cam until fast idle screw (slow idle screw on Chevrolet) is in contact with SECOND step of fast idle cam, then close choke valve until screw is against highest step of fast idle cam. On Oldsmobile, raise the intermediate choke lever to the full up position making sure the intermediate rod and choke rod are at upper limit of travel in the slots and that all lash is removed. On all models, bend choke rod to obtain specified clearance between choke valve and dividing wall of air horn. See table below.

Choke Rod Setting

Car Model	Choke Opening	Gauge No.
1959 Buick	.148"	BT-135
1960 Buick	.067"	BT-78
1959-60 Cadillac	.040"	BT-102
1959-60 Chevrolet Pass.	.043"	BT-131
1959-60 Oldsmobile	.052"	BT-68

Unloader Adjustment: After choke rod adjusted (see above), move throttle lever to wide open position and make sure that choke trip lever is in contact with choke counterweight. Measure choke valve clearance between upper edge of choke valve and dividing wall in air horn (see table below for gauge and clearance specifications). Adjust by bending tang on fast idle cam using Tool BT-69.

Unloader Setting

Car Model	Choke Opening	Gauge No.
Buick	.128"	BT-135
Cadillac	.125"	BT-102
Chev. Pass. Cars	.235"	BT-131
Oldsmobile	.115"	BT- 90

Secondary Throttle Lockout Adjustment: Close choke valve fully so that lockout lever tang is engaged in slot of fast idle cam. Measure clearance between side of lockout lever tang and edge of slot in cam (use feeler gauge). Clearance should be .015" (all models). Adjust by bending lockout lever tang sideways using bending tool BT-91A (except Oldsmobile), BT-69 (Oldsmobile).

Secondary Throttle Contour Adjustment: Open choke valve fully so that tang on lockout lever is positioned over contoured section of fast idle cam. Measure clearance between tang and edge of fast idle cam (use feeler gauge). If clearance not correct as shown in table below, adjust by bending tang up or down using bending tool BT-91A.

Secondary Contour Setting

Car Model	Tang Clearance
Buick	.030"
Cadillac & Chevrolet	.015"
Oldsmobile	.030"

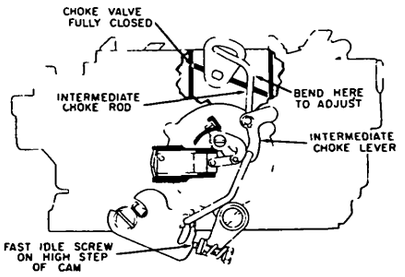
Secondary Throttle Actuating Lever Adjustment (Oldsmobile): Install Throttle Return Check Clamp, Tool J-6342-01 on throttle return check (see "Throttle Return Check Clamp Rework" below). Back out fast idle adjusting screw until throttle valves are fully closed, and make sure screw is not resting against fast idle cam. Remove slack from linkage and insert a feeler gauge between actuating lever and primary throttle lever. Clearance should be .005-.025". To adjust, open throttle valve and bend actuating tang with Tool BT-18.

►*OLDSMOBILE THROTTLE RETURN CHECK CLAMP, TOOL J-6342-01 REWORK:* Grind or file off .015" of flat area of tool to allow tool to go between stopscrew and plunger shoulder of throttle return check assembly.

Buick Vacuum Starter Switch Timing Check (On Car): Place transmission lever in Park and apply parking brake. Back off throttle stopscrew so that throttle valves tightly closed (fast idle cam must be in hot or slow idling position). Place scale against flange on dashpot diaphragm and measure distance to nearest edge of dashpot arm on throttle lever. Turn ignition on, open throttle slowly and, at point where starter is energized, again measure distance to nearest edge of dashpot arm. The difference between the two measurements should be 1/2 - 13/16". If switch timing not correct, adjust by adding or removing square timing shims located under contact spring. Shims furnished in thicknesses of .006" and .018".

OVERHAUL: *CAUTION - When disassembling carburetor, be sure to keep PRIMARY and SECONDARY parts separate so they will not be interchanged when carburetor is assembled.*

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OLDSMOBILE CHOKE & FAST IDLE LINKAGE

1959-60 ROCHESTER 4G & 4GC 4-BARREL CARBURETOR (Cont.)

Disassembly: Carburetor consists of Air Horn (Bowl Cover), Throttle Body, and Bowl which can be overhauled separately as follows

Air Horn (Bowl Cover) - On Chevrolet truck carburetors, remove fast idle cam attaching screw then disconnect rod at fast idle cam and remove cam Remove choke rod from swivel, then remove choke valve screws and choke valve Disconnect choke spring from outer choke lever and shaft assembly and remove choke shaft assembly while depressing pump lever Remove swivel and spring from boss on bowl cover Disconnect accelerator pump rod from actuating lever On all models except Chevrolet truck, remove intermediate shaft from choke shaft lever, then remove idle vent guard and spring metal arm Push rubber valve out of arm *NOTE - Idle Vent Valve not used on all carburetors* Disconnect accelerator pump rod from pump actuating lever then remove choke counterweight lever and trip lever from choke shaft On all carburetors, remove bowl attaching screws *NOTE - On some carburetors, one of the inner bowl screws is located in counterbore just inside edge of air horn* Break bowl cover loose from bowl using finger pressure only, then lift bowl cover assembly straight up out of bowl, being careful not to bend float assemblies With bowl cover inverted remove float hinge pins, floats, and needles Remove and discard bowl cover gasket If necessary, remove vacuum power piston from bowl cover by depressing plunger and allowing it to snap back several times *NOTE - It may be necessary to remove burrs around power piston bore (caused by heavy staking)* Remove spring under piston, being careful not to damage vacuum assist spring and cup retainer on power piston stem (if so equipped) Remove primary and secondary needle seats and gaskets, then remove screens from inlet openings on primary and secondary sides *NOTE - If needle valves and seats are to be reused, keep the needle valves and seats matched with corresponding seats* Disengage accelerating pump plunger shaft from pump lever and pull pump plunger with rubber boot downward and out of bowl cover Remove pump lever and shaft from bowl cover boss On all models except Chevrolet truck, remove choke valve attaching screws and remove choke valve from shaft Remove choke shaft from housing Remove fuel inlet nut, screen and gasket **Float Bowl** - Remove accelerating pump spring, then invert carburetor and remove aluminum pump inlet ball from well *NOTE - When reassembling carburetor, do not confuse this aluminum ball with steel discharge ball check* Remove pump inlet screen and retainer Use a large screw driver and remove power valve and gasket, then remove both the primary and secondary main metering jets *CAUTION - Do not interchange these parts* Remove attaching screws from primary and secondary venturi clusters and break cluster loose with finger pressure only Discard gaskets *CAUTION - Do not remove idle tubes or main well tubes from venturi cluster* Remove hot idle compensator (if so equipped), being careful not to bend or distort bi-metal spring *NOTE - Idle compensator cannot be repaired, if damaged, replace the unit* Remove "T" shaped pump discharge check valve retainer from primary side with needle nose pliers, then remove copper spring and invert bowl and catch steel check ball *NOTE - It is not necessary to remove fuel sight plugs unless threads are damaged*

Throttle Body - If not previously done, disconnect choke rod and pump rod from throttle body Invert carburetor and remove large screw and lockwasher from counterbore in center of throttle body, then remove other throttle body-to-fuel bowl attaching screws and break throttle body loose from fuel bowl with finger pressure *NOTE - On some carburetors, one of the throttle body-to-fuel bowl screws is covered with an asbestos plug which must be removed* Remove and discard throttle body gasket, then remove auxiliary throttle assembly by sliding it out of fuel bowl Remove fast idle cam, and if necessary, remove throttle lever plate and other linkage Remove idle mixture screws keeping the two screws and springs separated in sets If so equipped, remove idle air bypass screw and spring *CAUTION - Do not disassemble throttle body further If any part of the throttle body is damaged or worn, replace the complete assembly*

Reassembly: Reverse disassembly procedure and note the following

Auxiliary Throttle Valves - Slide auxiliary valve assembly into lower side of fuel bowl so spring cavity in auxiliary valve assembly is toward top of bowl

Throttle Body-to-Fuel Bowl Gasket - This gasket is not reversible Largest projecting tab must be placed on primary side, surrounding vacuum passage to power piston

Accelerator Pump Inlet & Discharg Balls - Inlet ball is **aluminum.** Discharge ball is **steel.** If necessary, use a magnet to determine steel ball

Service Parts

Gasket Kit - Rochester No 7015940 (Buick), No 7015941 (Cadillac), No 7015947 (Chevrolet 7013004, 7013010, 7015004, 7015010), No 7015948 (Chevrolet 7013006, 7013012, 7015006, 7015012), No 7015842 (Chevrolet Truck), No 7013050 (Oldsmobile)

Overhaul Kit - Rochester No 7015920 (Buick), No 7015921 (Cadillac), No 7015927 (Chevrolet 7013004, 7013010), No 7015928 (Chevrolet 7013006, 7013012), No 7016030 (Chevrolet 7015004, 7015010), No 7016031 (Chevrolet 7015006, 7015012), No 7015922 (Chevrolet Truck), No 7015934 (Oldsmobile)

Off-Kar Kits - Rochester No FR-104 (Buick), FR-204 (Cadillac), No FR-305 (Chevrolet 7013004, 7013010, 7015004, 7015010), No FR-306 (Chevrolet 7013006, 7013012, 7015006, 7015012), No FR-504 (Oldsmobile)

1954-55 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor	Main Metering Jet Part No.		Power Valve Assy. No.	Power Piston & Spring No.	Float Needle & Seat
			Standard	Size Lean			
BUICK, Series 50, 60, 70	1955	7006200 Pri. 7006200 Sec.	7001860 7008678	7001607	7001608	7000204	7006134
CADILLAC, All Series							
Early Cars (No A-C)	1954	7006220 Pri. 7006220 Sec.	7002648 7002664	7002647	7001608	7000204	7006376
Early (With A-C)	1954	7006221 Pri. 7006221 Sec.	7002648 7002664	7002647	7001608	7000204	7006376
Late Cars (No A-C)	1954 1954	7006962 Pri. 7006962 Sec.	7002649 7002664	7002648	7001608	7000204	7006367
Late Cars (With A-C)	1954 1954	7006963 Pri 7006963 Sec.	7002649 7002664	7002648	7001608	7000204	7006367
CADILLAC, Std. Eng.							
Late (No A-C)	1955	7007970 Pri. 7007970 Sec.	7002649 7008673	7002648	7001608	7000204	7006367
(With A-C)	1955	7007971 Pri. 7007971 Sec.	7002649 7008673	7002648	7001608	7000204	7006367
CADILLAC, Eldorado Eng.							
Front (All)	1955	7007240 Pri. 7007240 Sec.	7002649 7008664	7002648	7001608	7007522	7006376
Rear (No A-C)	1955	7007942 Pri. 7007942 Sec.	7002649 7008664	7002648	7001608	7007522	7006376
Rear (With A-C)	1955	7007241 Pri. 7007241 Sec.	7002649 7008664	7002648	7001608	7007522	7006376
OLDSMOBILE, Super 88, 98							
Synchro-mesh Cars	1954	7006000 Pri. 7006000 Sec.	7002649 7002639	7002648	7001608	7000204	7006134
Hydra-Matic Cars	1954	7005900 Pri. 7005900 Sec.	7002649 7002649	7002648	7001608	7000204	7006134
Synchro-mesh	1955	7006000 Pri. 7006000 Sec.	7002649 7002639	7002648	7001608	7000204	7006134
Hydra-Matic	1955	7007000 Pri. 7007000 Sec.	7002649 7002649	7002648 7002648	7001608	7000204 7000204	7006134 7006134
PACKARD							
5560, 80	1955	7007230 Pri. 7007230 Sec.	7002650 7002658	7002649	7001608	7000204	7006134
5588 Front	1955	7008230 Pri. 7008230 Sec.	7002649 7002644	7002648	7001608	7000204	7006134
Rear	1955	7008231 Pri. 7008231 Sec.	7002649 7002644	7002648	7001608	7000204	7006134
PONTIAC, Hydra-Matic	1955	7007800 Pri. 7007800 Sec.	7001498 7001498	7002652	7001608	7000204	7006134

1956 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet				Venturi Cluster	Power Valve	Power Piston & Spring	Float Needle & Seat
			Standard Size	Standard Part No.	1 Size Lean Size	1 Size Lean Part No.				
BUICK										
50, 60, 70	1956	7009200 Pri.	.055"	①7001860	.054"	7001607	7009493	7009349	7000204	7006134
		7009200 Sec.	.078"	7008678			7009425			7006134
CADILLAC Std. Engine										
Early Cars (No A.C.)	1956	7008750 Pri.	.051"	②7002651	.050"	③7002650	7009104	7008614	7008612	7006376
		7008750 Sec.	.068"	7008668			7009105			7006376
Early Cars (With A.C.)	1956	7008751 Pri.	.051"	②7002651	.050"	③7002650	7009104	7008614	7008612	7006376
		7008751 Sec.	.068"	7008668			7009105			7006376
Later Cars (No A.C.)	1956	7009750 Pri.	.051"	7002651	.050"	7002650	7009104	7008614	7008612	7006376
		7009750 Sec.	.068"	7008668			7009105			7006376
Later Cars (With A.C.)	1956	7009751 Sec.	.051"	7002651	.050"	7002650	7009104	7008614	7008612	7006376
		7009751 Sec.	.068"	7008668			7009105			7006376
CHEVROLET										
V8 Pass. Cars (Powerpack)	1956	7008737 Pri.	.048"	7002648	.047"	7002647	7009697	7009349	7000204	7006134
		7008737 Sec.	.046"	7002646			7009699			7006134
OLDSMOBILE										
88, 98 (Synchro-mesh)	1956	7007222 Pri.	.055"	7001860	.054"	7001607	7009497	7009349	7000204	7006134
		7007222 Sec.	.067"	7008667			7008955			7006134
88, 98 (Hydra-Matic)	1956	7007221 Pri.	.055"	7001860	.054"	7001607	7009497	7009349	7000204	7006134
		7007221 Sec.	.067"	7008667			7008955			7006134
PACKARD										
5680	1956	7008610 Pri.	.052"	7002652	.051"	7002651	7009179	7009349	7007522	7006134
		7008610 Sec.	.064"	④7008666			7009182			7006134
5688 (Frt. Carb.)	1956	7009600 Pri.	.047"	7002647	.046"	7002646	7009582	7006331	7009054	7006134
		7009600 Sec.	.054"	7001607			7008955			7006134
5688 (Rear Carb.)	1956	7009601 Pri.	.047"	7002647	.046"	7002646	7009582	7006331	7009054	7006134
		7009601 Sec.	.054"	7001607			7008955			7006134
PONTIAC										
V8 Synchro-mesh (Powerpack)	1956	7007900 Pri.	.056"	7002656	.055"	7001860	7009247	7009349	7000204	7006134
		7007900 Sec.	.067"	7008667			7009112			7006134
V8 Hydra-Matic (Powerpack)	1956	7008697 Pri.	.056"	7002656	.055"	7001860	7008548	7009349	7000204	7006134
		7008697 Sec.	.067"	7008667			7009112			7006134
V8 285 H.P. (Frt. & Rear Carb.)	1956	7009820 Pri.	.050"	7002650	.049"	7002649	7010026	7009349	7000204	7006134
		7009820 Sec.	.069"	7008669			7009112			7006134

① — Supersedes No. 7002656 (7001860 was 1 Size Lean). ② — Supersedes No. 7002649. ③ — Supersedes No. 7002648. ④ — Supersedes No. 7008664.

1957-58 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet				Venturi Cluster	Power Valve	Power Piston & Spring	Float Needle & Seat
			Standard Size	Standard Part No.	1 Size Lean Size	1 Size Lean Part No.				
BUICK										
50, 60, 70 (Early)	1957	7010070 Pri.	063"	7008663 ⑤			7010364	7010918	7010332	7010894
		7010070 Sec.	081"	7008681			7010365			7010894
50, 60, 70 (Late)	1957	7011570 Pri.	063"	7008663 ⑤			7010364	7010918	7010332	7010894
		7011570 Sec.	.081"	7008681			7011469			7010894
50, 60, 70, 700 (Early)	1958	7011600 Pri	063"	7008663			7012443	7010918	7012080	7012643
		7011600 Sec	075"	7008675			7012020			7012643
50, 60, 70, 700 (Later)	1958	7013100 Pri	062"	7008662			7013134	7010918	7012080	7012907
		7013100 Sec	075"	7008675			7012020			7012906
CADILLAC										
Std. Eng. W/O Air Cond. (Early)	1957	7010100 Pri.	056"	7002656 ⑥			7010334	7010918	7010332	7012144
		7010100 Sec.	084"	7008684			7010335			7012144

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1957-58 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No	Main Metering Jet 1 Size Lean Size	Main Metering Jet 1 Size Lean Part No.	Venturi Cluster	Power Valve	Power Piston & Spring	Float Needle & Seat
CADILLAC (Continued)										
Std. Eng. W/Air Cond.(Early)	1957	7010101 Pri.	.056"	7002656 ⑥			7010334	7010918	7010332	7012144
		7010101 Sec.	.084"	7008684			7010335			7012144
Std. Eng. W/O Air Cond.(Late)	1957	7012000 Pri.	.056"	7002656			7010334	7010918	7010332	7012144
		7012000 Sec.	.084"	7008684			7010335			7012144
Std. Eng. W/Air Cond.(Late)	1957	7012001 Pri.	.056"	7002656			7010334	7010918	7010332	7012144
		7012001 Sec.	084"	7008684			7010335			7012144
Std (Early)	1958	7012010 Pri	059"	7002659			7012165	7010918	7010332	7012144
		7012010 Sec	077"	7008682			7012300			7012144
Std (Later)	1958	7012910 Pri	059"	7002659			7012768	7010918	7011947	7012144
		7012910 Sec	077"	7008682			7012300			7012144
Air Cond (Early)	1958	7012011 Pri	059"	7002659			7012165	7010918	7010332	7012144
		7012011 Sec	077"	7008682			7012300			7012144
Air Cond (Later)	1958	7012811 Pri	059"	7002659			7012768	7010918	7011947	7012144
		7012811 Sec	077"	7008682			7012300			7012144
CHEVROLET V8 Cars										
Power Pack (Early)	1957	7009846 Pri.	048"	7002648 ⑦			7011261	7008614	7008612	7006134
		7009846 Sec.	051"	7002651			7009699			7006134
Power Pack (Late)	1957	7012126 Pri.	.048"	7002648			7011261	7008614	7008612	7006134
		7012126 Sec.	051"	7002651			7009699			7006134
283" Eng (Auto Trans)	1958	7012128 Pri	048"	7002648			7012191	7008614	7008612	7006134
		7012128 Sec	052"	7002652			7012260			7006134
348" Eng (Auto Trans)	1958	7011108 Pri	058"	7002658			7012345	7010918	7008612	7006134
		7011108 Sec	065"	7008665			7012260			7006134
CHEVROLET V8 Truck										
265" & 283" Eng. Pwr.Pk.(Early)	1957	7009661 Pri.	047"	7002647 ⑧			7010665	7008614	7008612	7006134
		7009661 Sec.	048"	7002648			7010534			7006134
265" & 283" Eng. Pwr.Pk.(Late)	1957	7011161 Pri.	047"	7002647 ⑧			7010665	7008614	7008612	7006134
		7011161 Sec.	048"	7002648			7010534			7006134
3700 RPM Vac Governor	1958	7012303 Pri	048"	7002648			7012193	7008614	7008612	7006134
		7012303 Sec	047"	7002647			7012264			7006134
4000 RPM Vac Governor	1958	7011487 Pri	048"	7002648			7012193	7008614	7008612	7006134
		7011487 Sec	047"	7002647			7012264			7006134
OLDSMOBILE										
Synchro-Mesh (Early)	1957	7009471 Pri.	.053"	7001498			7010880	7009349 ⑨	7000204 ⑩	7006134
		7009471 Sec.	070"	7008670			7008955			7006134
Hydra-Matic (Early)	1957	7009470 Pri.	.053"	7001498			7010880	7009349 ⑨	7000204 ⑩	7006134
		7009470 Sec.	070"	7008670			7008955			7006134
Synchro-Mesh (Late)	1957	7010926 Pri.	053"	7001498			7010880	7009349	7008612	7006134
		7010926 Sec.	070"	7008670			7008955			7006134
Hydra-Matic (Late)	1957	7010925 Pri.	053"	7001498			7010880	7009349	7008612	7006134
		7010925 Sec.	070"	7008670			7008955			7006134
Synchro-mesh	1958	7012401 Pri	054"	7001607			7011800	7011994	7011947	7012207
		7012401 Sec	088"	7008688			7011930			7012144
Hydra-Matic	1958	7012400 Pri	054"	7001607			7011800	7011994	7011947	7012207
		7012400 Sec	088"	7008688			7011930			7012144
PONTIAC										
Super & Star Chief (S M)	1957	7009829 Pri.	057"	7002657 ⑪			7010216	7010918	7010332	7010894
		7009829 Sec	082"	7008682			7010217			7010894
Super & Star Chief (H M)	1957	7009830 Pri.	057"	7002657			7010225	7010918	7010332	7010894
		7009830 Sec.	082"	7008682			7010217			7010894
All Models	1958	7011701 Pri.	.060"	7001860			7012323	7011989	7011947	7012207
		7011701 Sec	084"	7008684			7011943			7012144

⑤- Supersedes 7008662 (062").
⑥- Supersedes 7002656 (056").
⑦- Supersedes 7002647 (047") which superseded 7002645 (045").
⑧- Supersedes 7002648 (048")
⑨- Supersedes 7010918.
⑩- Supersedes 7008612.
⑪- Supersedes 7002659 (059")

1959 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet				Venturi Cluster	Power Valve	Power Piston & Spring	Float Needle & Seat
			Standard		1 Size Lean					
			Size	Part No.	Size	Part No.				
BUICK										
46, 47, 4800	1959	7013044 Pri.	.050"	7002650			7013792	7010918	(12) 7011957	7012907
		7013044 Sec.	.077"	7008677			7013463			7012906
CADILLAC										
All (No Air Cond.)	1959	7013030 Pri.	058"	7002658			7013909	7010918	(12) 7015181	7012144
		7013030 Sec.	.084"	7008684			7015142			7012144
All (With Air Cond.)	1959	7013031 Pri.	.058"	7002658			7013909	7010918	(12) 7015181	7012144
		7013031 Sec.	.084"	7008684			7015142			7012144
CHEVROLET PASS. CARS										
283" Eng. (No Air Cond.)	1959	7013004 Pri.	.048"	7002648			7012191	7011989	7006011	7012144
		7013004 Sec.	.053"	7001498			7012260			7012144
283" Eng. (With Air Cond.)	1959	7013010 Pri.	.048"	7002648			7012191	7011989	7006011	7012144
		7013010 Sec.	.053"	7001498			7012260			7012144
348" Eng (No Air Cond.)	1959	7013006 Pri.	.057"	7002656			7013674	7011989	7006011	7012144
		7013006 Sec	.068"	7008668			7013662			7012144
348" Eng. (With Air Cond.)	1959	7013012 Pri.	.057"	7002656			7013674	7011989	7006011	7012144
		7013012 Sec.	067"	7008667			7013662			7012144
CHEVROLET TRUCK										
283" Engine	1959	7013023 Pri.	.048"	7002648			7012193	7011989	7006011	7012144
		7013023 Sec.	.047"	7002647			7012264			7012144
		7013021 Pri.	.048"	7002648			7012193	7011989	7006011	7012144
		7013021 Sec.	.047"	7002647			7012264			7012144
OLDSMOBILE										
88, 98 (No A.C.) Early	1959	7013050 Pri.	056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013050 Sec	.080"	7008680			7013475			7012142
88, 98 (Air Cond.) Early	1959	7013150 Pri.	.056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013150 Sec	.080"	7008680			7013475			7012142
88, 98 (No A C) Later	1959	7013950 Pri	056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013950 Sec	080"	7008680			7013475			7012142
88, 98 (Air Cond) Later	1959	7013952 Pri	056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013952 Sec	.080"	7008680			7013475			7012142

(12) - Spring only (separate part)

1960 ROCHESTER 4-BARREL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet				Venturi Cluster	Power Valve	Power Piston & Spring	Float Needle & Seat
			Standard Size	Standard Part No.	1 Size Lean	1 Part No.				
BUICK										
4600, 4700, 4800	1960	7013044 Pri.	.050"	7002650			7013792	7010918	(12) 7011957	7012907
		7013044 Sec.	.077"	7008677			7013463			7012906
CADILLAC										
All (No Air Cond.)	1960	7013030 Pri.	.058"	7002658			7013909	7010918	(12) 7015181	7012144
		7013030 Sec.	.084"	7008684			7015142			7012144
All (With Air Cond.)	1960	7013031 Pri.	.058"	7002658			7013909	7010918	(12) 7015181	7012144
		7013031 Sec.	.084"	7008684			7015142			7012144
CHEVROLET PASS. CARS										
283" Eng. (No Air.Cond.) Early	1960	7013004 Pri.	.048"	7002648			7012191	7011989	7006011	7012144
		7013004 Sec.	.060"	7001860			7012260			7012144
283" Eng. (No Air Cond.) Late	1960	7015004 Pri.	.047"	7002647						
		7015004 Sec.	.060"	7001860						
283" Eng. (With Air Cond.) Early	1960	7013010 Pri.	.048"	7002648			7012191	7011989	7006011	7012144
		7013010 Sec.	.060"	7001860			7012260			7012144
283" Eng. (With Air Cond.) Late	1960	7015010 Pri.	.047"	7002647						
		7015010 Sec.	.060"	7001860						
348" Eng. (No Air Cond.) Early	1960	7013006 Pri.	056"	7002656			7013674	7011989	7006011	7012144
		7013006 Sec.	.068"	7008668			7013662			7012144
348" Eng. (No Air Cond.) Late	1960	7015006 Pri.	.056"	7002656						
		7015006 Sec.	068"	7008668						
348" Eng. (With Air Cond.) Early	1960	7013012 Pri.	.056"	7002656			7013674	7011989	7006011	7012144
		7013012 Sec.	.067"	7008667			7013662			7012144
348" Eng. (With Air Cond.) Late	1960	7015012 Pri.	.056"	7002656						
		7015012 Sec.	.067"	7008667						
OLDSMOBILE										
88 & 98 (No Air Cond.)	1960	7013950 Pri.	.056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013950 Sec.	.080"	7008680			7013475			7012142
88 & 98 (With Air Cond.)	1960	7013952 Pri.	.056"	7002656			7013785	7011994	(12) 7011957	7012207
		7013952 Sec.	080"	7008680			7013475			7012142

(12) - Spring only (Separate part).

ROCHESTER TRIPLE CARBURETORS

CADILLAC	Rochester No.
1958 Front (Early)	2G 7012201
1958 Front (Late)	2G 7012901
1958 Center, Std (Early)	2GC 7012202
1958 Center, Std (Late)	2GC 7012902
1958 Center, Air Cond (Early)	2GC 7012205
1958 Center, Air Cond (Late)	2GC 7012905
1958 Rear (Early)	2G 7012203
1958 Rear (Late)	2G 7012903
1959-60 Front	2G 7013033
1959-60 Center (No Air Cond)	2GC 7013034
1959-60 Center (With Air Cond)	2GC 7013037
1959-60 Rear	2G 7013035
CHEVROLET (348" Engine)	
Synchro-mesh Cars	
1958 Front (Early)	2G 7011951
1958 Front (Late)	2G 7012851
1958 Center	2GC 7012503
1958 Rear (Early)	2G 7011953
1958 Rear (Late)	2G 7012853
1959 Front (Farly)	2G 7013015
1959 Front (Late)	2G 7013973
1959 Center (Early)	2GC 7013020
1959 Center (Late)	2GC 7013974
1959 Rear (Early)	2G 7013017
1959 Rear (Late)	2G 7013975
1960 Front	2G 7013973
1960 Center	2GC 7013974
1960 Rear	2G 7013975
Automatic Transmission Cars	
1958 Front (Early)	2G 7011951
1958 Front (Late)	2G 7012851
1958 Center	2GC 7011952
1958 Rear (Early)	2G 7011953
1958 Rear (Late)	2G 7012853
1959-60 Front	2G 7013015
1959-60 Center (No Air Cond)	2GC 7013016
1959-60 Center (With Air Cond)	2GC 7013026
1959-60 Rear	2G 7013017

OLDSMOBILE	Rochester No.
1957 Front	2G 7010960
1957 Center	2GC 7010959
1957 Rear	2G 7010958
1958 Front	2G 7011712
1958 Center (Early)	2GC 7011713
1958 Center (Late)	2GC 7012913
1958 Rear	2G 7011714
PONTIAC	
Synchro-mesh Cars	
1957 Front	2G 7011351
1957 Center	2GC 7011500
1957 Rear	2G 7011352
1958 Front	2G 7011705
1958 Center	2GC 7011706
1958 Rear	2G 7011707
1959 Front	2G 7013063
1959 Center	2GC 7013067
1959 Rear	2G 7013065
1960 Front	2G 7013063
1960 Center	2GC 7013068
1960 Rear	2G 7013065
Automatic Transmission Cars	
1957 Front	2G 7011351
1957 Center	2GC 7011350
1957 Rear	2G 7011352
1958 Front	2G 7011705
1958 Center	2GC 7011709
1958 Rear	2G 7011707
1959 Front	2G 7013063
1959 Center	2GC 7013064
1959 Rear	2G 7013065
1960 Front	2G 7013063
1960 Center (Early)	2GC 7015066
1960 Center (Late)	2GC 7015076
1960 Rear	2G 7013065

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 CADILLAC CHOKE ASSEMBLY & VACUUM SWITCH PRODUCTION CHANGE (To prevent richness and eliminate sag when end carburetors come into operation)* On cars before Engine No 032943 (Exc Air Cond), 031061 (Air Cond), install Kit, Part No 7012817 as follows Remove choke assembly and bowl cover (discard gasket), then remove choke valve, choke shaft, choke piston and choke housing Install new choke housing, choke shaft, thermostatic coil spring and cover and install choke valve Set choke pointer at index mark Insert end of vacuum restriction with chamfer around orifice into supply port of vacuum switch and tap into position Install new brass identification tag *NOTE* - Later carburetors (center) have the above changes made in production (see application table above)

►*1958 CADILLAC FPONT & REAR THROTTLE BODY CLEANING CAUTION* Carburetors having a letter "A" stamped on brass identification tag have been coated with a special protective coating to reduce the possibility of air entering the intake manifold past throttle valves Do not clean these throttle bodies in any cleaner stronger than cleaning solvent or gasoline

►*1958 CADILLAC FAILURE TO OBTAIN WIDE OPEN THROTTLE ON CENTER CARBURETOR CORRECTION* On cars before Engine No 012600, if interference exists between throttle lever and throttle control rod, file approximately ¼" from edge of throttle lever in area of interference

►*1958 CADILLAC CENTER CARBURETOR THROTTLE VALVE STICKING CORRECTION* Beginning with Engine No 067140, a new throttle valve spring, Part No 1471929, and vacuum control bracket, Part No 7012832 is being installed to prevent the possibility of throttle valves sticking slightly open with a resultant increase of as much as 100 RPM in idle speed On earlier cars, install the above parts and install lower end of spring at throttle control rod (remove existing cotter pin and hook spring through hole in throttle rod)

►*1958 CADILLAC SLOW OPENING THROTTLE VALVE CORRECTION (FRONT & REARCARBURETORS)* This condition may be caused by an over-restricted vacuum switch Check and correct switch as follows Disconnect vacuum inlet hose and check to see if brass restriction is visible in inlet port If there is no restriction, replace switch If the restriction is in place, disconnect both vacuum hoses from switch on center carburetor Set a Distributor Test Machine vacuum pump regulator to 20" on vacuum gauge with vacuum hose shut off Push sliding switch post on carburetor vacuum switch to full down position *NOTE - Switch will b fully open in this position* Install vacuum hose from Distributor Test Machine to vacuum apply side of switch If a reading of 4 5" or above is obtained, replace switch with a new switch, Part No 7013328 *NOTE - The new later type switch can be identified by having a tapered sliding post (previous switch had a square post)* When replacing the switch, make sure switch actuating tang is not cocked

►*1958 OLDSMOBILE & PONTIAC FRONT & REAR CARBURETOR THROTTLE VALVE 'HANGING UP CORRECTION* If this condition is caused by throttle closing spring becoming wedged between throttle lever and boss on throttle body, correct by bending straight end of spring, beginning at middle of coil, approximately 5/16" toward opposite end of spring

►*1958 PONTIAC CENTER CARBURETOR BINDING CORRECTION* If a binding condition exists between outer pump lever and the pump link, install a revised pump link and clip, Part No 7013192

►*1959 PONTIAC ENGINE CUTTING OUT AT WIDE OPEN THROTTLE CORRECTION* This condition may be caused by carburetor throttle linkage between front and rear carburetors contacting the ignition coil resistor terminal. To correct, remove resistor and coil, and straighten coil mounting bracket front tab to permit clearance between resistor and throttle linkage

DESCRIPTION: One Rochester 2GC (center) and two 2G (front & rear) are used, with the center carburetor having all the conventional carburetor systems (Float, Idle, Power, Pump, and Choke). The front and rear carburetors contain only Float, Pump, and Main Metering systems. Throttle valves in front and rear carburetors are operated by a vacuum diaphragm mounted on front carburetor (1958-60 Chev , 1957-58 Olds , & 1958-60 Pontiac) and on rear carburetor (1958-60 Cadillac & 1957 Pontiac) A vacuum switch on center carburetor controls operation of vacuum diaphragm *NOTE - On 1959-60 Pontiac models, a thermo-controlled vacuum valve mounted on front of engine manifold in water jacket is controlled by engine water temperature This valve closes off all vacuum to carburetor vacuum switch until engine temperature reaches approximately 145°* Front and rear carburetors are connected at throttle shafts so throttle valves and accelerating pump operate simultaneously An Idle Compensator is used on some models This unit is a bi-metal strip, valve and mounting bracket located in bowl casting and is enclosed by a cover and gasket Under hot idling conditions, this valve allows air to be drawn into carburetor bores below throttle valves

CONTINUED ON NEXT PAGE

ROCHESTER TRIPLE CARBURETORS (C nt.)

OPERATION: During idle and part throttle operation, the center carburetor feeds fuel while front and rear carburetors remain idle. On normal acceleration, center carburetor feeds air and fuel until throttle valves are opened approximately 60°, at which time the vacuum switch on center carburetor is operated by a tang on accelerator pump lever. With switch actuated, vacuum is applied to the diaphragm assembly which fully opens front and rear carburetor throttle valves simultaneously. On deceleration, throttle valves on center carburetor close causing the vacuum switch to close, cutting off all vacuum applied to diaphragm. Air is then bled from inside front carburetor air horn by another line through the vacuum switch to diaphragm unit, allowing diaphragm to return to its normal position under spring tension and close throttle valves on front and rear carburetors. Front and rear carburetors are locked out when center carburetor choke is on by means of a lockout lever on rear carburetor (Cadillac), front carburetor (Chevrolet, Oldsmobile, Pontiac).

ADJUSTMENTS: Idle Sp d & Mixture - *(CAUTION - Make sure that front and rear carburetor throttle valves are fully closed).* With engine at normal operating temperature, automatic choke not operating (choke valve wide open and fast idle inoperative so engine idles at hot or slow idle speed), and transmission selector lever in "D" (Drive) range on Automatic Transmission Cars, proceed as follows On Cadillac, loosen front and rear throttle valve rod jam nuts at center carburetor throttle lever trunnion. On all cars, set idle speed to correct engine RPM (see table below). Turn one idle mixture screw in or out to obtain highest vacuum and engine RPM, then repeat with other idle mixture screw. Reset engine idle speed, then readjust idle mixture screws until highest engine RPM and smoothest idle is obtained with the highest vacuum.

►*IDLE SPEED ADJUSTMENT NOTE (Carburetors with Idle Compensator)* **This valve must be closed when idl spe d adjusted** Press in on button located in idle compensator cover plate to hold valve closed during idle speed adjustment

Idle Sp ed Setting

Car M d l	Engine RPM S.M. Trans.	① Auto. Trans.
1958 Cadillac ②		450
1959-60 Cadillac ②		480
1958 Chevrolet	450-475	425
1959-60 Chevrolet ①③	475	450
1959-60 Chevrolet ①④	600	600
1957 Oldsmobile ⑤	460	460
1958 Oldsmobile ⑥	460	460
1957 Pontiac	630-670	430-450
1958 Pontiac ⑦	450-470	480-500
1959-60 Pontiac (No Air Cond)	480-500	480-500
1959-60 Pontiac (Air Cond)⑧	540-560	540-560

① - Transmission selector lever in "D" (Drive)
② - Air Conditioner turned ON
③ - Engines with hydraulic lifters
④ - Engines with mechanical lifters
⑤ - 540-560 RPM on Air Conditioned cars with temperature control lever at extreme right and "Maximum" button depressed
⑥ - On Air Conditioned cars, place controls in maximum cooling position
⑦ - 500-520 RPM on Air Conditioned cars with compressor OFF
⑧- With Air Conditioner turned OFF

Idle Speed-Up Control (Cadillac Air Conditioned Cars): *See Carburetor data under TUNE-UP on Cadillac car model pages*

Throttle Return Check Adjustment: *See Carburetor data under TUNE-UP on car model pages*

Float Level: *NOTE - Two separate adjustments (Float Level & Float Drop required) Float level adjusted differently on some carburetors as detailed below*
Float Level Setting (1958 Cadillac, 1958-60 Chevrolet, 1957-58 Oldsmobile & 1957-58 Pontiac) - Remove and invert bowl cover and float assembly but do not remove cover gasket Install correct float gauge (see table below) over float next to power piston stem Top of float should just clear top edge of gauge cutout and sides of float should be parallel to gauge legs Adjust by bending float hinge arm

Float Level Setting (1959-60 Cadillac & Pontiac) - Remove and invert bowl cover and float assembly but do not remove cover gasket Install correct float gauge (see table below) on cover gasket at free end of float with longer log of gauge "Tee" seating squarely on gasket Edge of seam on float should just clear upper edge of gauge Adjust by bending float hinge arm near pin

►*1959-60 CADILLAC GAUGE NOTE*· Same gauge used for all carburetors but side marked "center" should be used for center carburetor, and cutout section of side marked "end" should be used for both end carburetors

Float Level Setting

Car Model	Float Level	Checking Gauge
1958 Cadillac (All Carbs)	1 25/32"	BT-137
1959-60 Cadillac (Center Carb)	15/16"	BT-158
1959-60 Cadillac (End Carbs)	23/32"	BT-158
1958 Chevrolet (Center Carb)	1 1/4"	BT-129
1958 Chevrolet (End Carbs)	15/16"	BT-136
1959-60 Chevrolet (Center Carb)	1 21/64"	BT-153
1959-60 Chevrolet (End Carbs)	1 27/64"	BT-157
1957 Oldsmobile (Center Carb)	1 9/32"	BT-109
1957 Oldsmobile (End Carbs)	1 5/16"	BT-136
1958 Oldsmobile (All Carbs)	1 25/64"	BT-137
1957 Pontiac (Center Carb)	1 15/64"	BT-130
1957 Pontiac (End Carbs)	1 5/16"	BT-136
1958 Pontiac (Center Carb)	1 17/64"	BT-139
1958 Pontiac (End Carbs)	1 13/32"	BT-138
1959-60 Pontiac (All Carbs)	23/32"	BT-161

Float Drop Setting: 1 29/32" (Exc 1959-60 Pontiac), 1¾" (1959-60 Pontiac) Hold bowl cover and float assembly upright so that float hangs down at bottom of travel Measure distance from lower face of cover gasket to bottom of float at free end using a scale or the float level gauge *NOTE - Float l v l gauges are marked for float drop s tting (with end of longer leg of gauge against gasket, bottom of float should be even with scribed line on float gauge)* Adjust by bending tang on rear of float arm toward needle seat to decrease drop or away from needle seat to increase drop

►*1959-60 PONTIAC FLOAT DROP NOTE* The above setting of 1¾" supersedes previous setting of 1 29/32" This is minimum float drop

Accelerating Pump Rod: Pump rod gauge is used differently on some carburetors as detailed below *CAUTION - This is a linkage adjustment and is not a seasonal setting*
1958 Cadillac, 1958-60 Chevrolet, 1957-58 Oldsmobil & 1957-58 Pontiac - On Cadillac, loosen vacuum switch screws and push switch assembly to full up position, then hold in place by tightening one screw On all carburetors, back off fast and slow idle screw, then with throttle valves held completely closed, check distance from top of pump housing to top of pump rod with float level gauge (see below) by placing inverted float level gauge on top of pump housing on air horn with extended leg of gauge down toward pump connector rod End of gauge should just touch pump connector rod Adjust by bending pump connector rod
1959-60 Cadillac & Pontiac - Back off fast and slow idle screws, then with throttle valves held in completely closed position, check distance from top of air horn to top of pump connector rod with float level gauge (see below) as follows Place float gauge squarely across top edge of air cleaner ring on air horn with "pump" end of "Tee" down toward connector rod End of gauge should just touch pump connector rod (this will be end portion of gauge marked "center" or cutout portion marked "end" on corresponding carburetors) Adjust by bending pump connector rod

Accelerating Pump Rod Setting

Car Model	Pump Rod Setting	Checking Gauge
1958 Cadillac (All Carbs)	15/16"	BT-137
1959-60 Cadillac (Center Carb)	1 3/16"	BT-158
1959-60 Cadillac (End Carbs)	7/8"	BT-158
1958-60 Chevrolet (All Carbs)	15/16"	①
1957-58 Oldsmobile (All Carbs)	15/16"	BT-137
1957-58 Pontiac (Center Carb)	57/64"	BT-139
1957-58 Pontiac (End Carbs)	15/16"	BT-138
1959-60 Pontiac (Center Carb)	1 3/16"	②
1959-60 Pontiac (End Carbs)	55/64"	②

① BT-129, 136, 153 or 157 ② - BT-161 or 175

Idle Vent (Carburetors So Equipped): *Adjust only after Accelerating Pump Rod Setting has been checked and adjusted* Use same gauge installed in same manner as for accelerating pump rod setting check (above) except that gauge should be inverted so that leg marked "vent" is down toward connector rod Slowly open throttle valves to point where vent valve just closes (rubber valve seats on pump housing on air horn) At this point, top of connector rod should just touch end of gauge Adjust by bending tang on pump lever which contacts vent valve arm

Idle Vent Setting

Car Model	Vent Setting	Checking Gauge
1958 Cadillac (Center Carb)	13/16"	BT-137
1959-60 Cadillac (Center Carb)	1 1/16"	BT-158
1958 Oldsmobile (Center Carb)	13/16"	BT-137
1959 Pontiac (Center Carb)	1 9/64"	BT-161
1960 Pontiac (Center Carb)	1 1/32"	BT-175

CONTINUED ON NEXT PAGE

ROCHESTER TRIPLE CARBURETORS (C nt.)

Vacuum Switch Setting (Center Carb.): *Check and adjust each model as follows*

Cadillac - Check switch alignment as follows See that throttle valves completely closed and that sliding switch post is in the extreme "up" position Loosen switch retaining screws, move switch assembly up or down until bottom of switch post just contacts inside edge of return tang of pump lever, tighten retaining screws Check adjustment by opening throttle valves (with sliding post still in up position) and make certain tang on switch return lever clears side of sliding switch post If necessary, adjust by loosening switch retaining screws and moving switch away from tang on switch return lever Check switch setting as follows Hold throttle valves wide open, measure distance from top of switch housing to sliding switch post This distance should be 1 5/32" Adjust by bending tang on pump lever up or down as required

Chevrolet (1958-60), Oldsmobile (1957), Pontiac (1957-58) - With throttle valves completely closed and actuating post in vacuum switch in extreme "up" position, clearance between tang on pump lever and vacuum switch actuating post should be 1/32" Adjust by loosening switch retaining screws and moving switch assembly up or down as required Tighten retaining screws

Oldsmobile (1958) - Same as for Cadillac (see above)

Pontiac (1959-60) - With throttle valves wide open, measure distance from top of switch housing to top of sliding switch post This distance should be 1 5/32" To adjust, loosen retaining screws holding switch on bracket and move switch up or down as required Check adjustment by opening and closing throttle valves with sliding switch post in upward position Inside edge of switch closing tang must clear side of switch post

Automatic Choke (Except 1958 Cadillac): Loosen retaining screws and rotate coil cover counterclockwise until index mark on cover is aligned with correct mark on housing

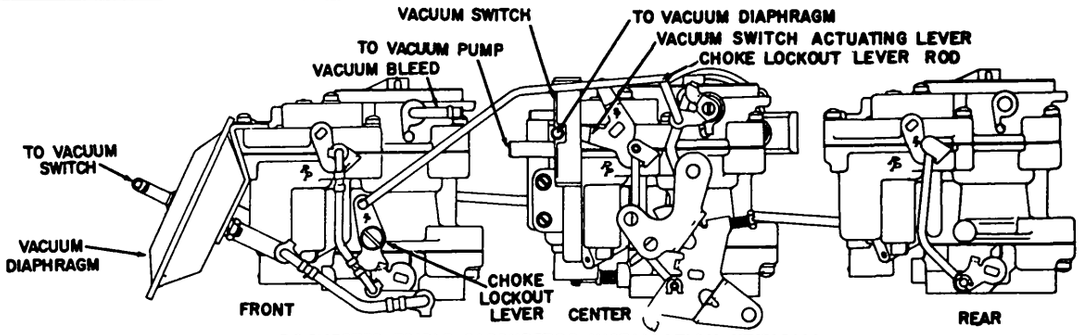
Automatic Choke Setting	
All (Exc 1957-58 Oldsmobile)	Centered (At Index)
1957-58 Oldsmobile	2 Notches Lean

Automatic Choke Modifier (1958 Cadillac): With throttle valves fully closed, loosen center lockscrew on choke and rotate index pointer counterclockwise until choke valve closes and pointer is positioned 2 points rich from index on choke cover Tighten lockscrew securely

Fast Idle Setting: *NOTE - Chevrolet & Pontiac fast idle adjustment will be correct after "slow idle" speed and choke rod adjustments have been made (see below). On other models, the "On Engine" fast idle adjustment must be made after carburetor installed.*

"Off Engine" Adjustment (Cadillac & Oldsmobile) - With choke valve closed and fast idle screw resting on high step of fast idle cam, there should be .024" (Gauge BT-90 clearance between throttle valve and bore opposite the idle needles. Adjust fast idle screw until proper clearance is obtained.

"On Engine" Adjustment (Cadillac & Oldsmobile) - With engine at normal operating temperature, rotate fast idle cam so fast idle screw is on high step of cam. Adjust fast idle screw so engine operates at 1700-1750 RPM (Cadillac), 1500 RPM (Oldsmobile)



ROCHESTER TRIPLE CARBURETOR INSTALLATION (TYPICAL)

Choke Rod (Center Carburetor): Place idle screw on second step of fast idle cam next to high step With choke trip lever in contact with choke counterweight lever, clearance between upper edge of choke valve and air horn wall should be as indicated in table below To adjust, bend tang on choke counterweight

Choke Rod Setting		
Car Model	Clearance	Checking Gauge
1958-60 Cadillac	.061"	BT-128
1958-60 Chevrolet	089"	BT-108
1957-58 Oldsmobile	040"	BT-110
1957-58 Pontiac	061"	BT-134
1959-60 Pontiac	056"	BT-167

Unloader (Center Carb.): With throttle valves held wide open, clearance between upper edge of choke valve and side of air horn wall should be as indicated in table below. To adjust, bend tang on throttle lever as necessary to obtain correct clearance.

Unloader Setting		
Car Model	Clearance	Checking Gauge
1958-60 Cadillac	.163"	BT-128
1958-60 Chevrolet	360"	BT-108
1957-58 Oldsmobile	140"	BT-110
1957-59 Pontiac	163"	BT-134
1959-60 Pontiac	163"	BT-168

Choke Lockout: *NOTE - This adjustment not required on 1959-60 Pontiac (end carburetors locked out by temperature controlled vacuum valve)* With choke valve (center carburetor) wide open and throttle valves in rear carburetor (Cadillac), front carburetor (Chevrolet, Oldsmobile & 1957-58 Pontiac) slightly open, there should be 030" clearance between lockout lever and throttle lever tang on rear carburetor (Cadillac), front carburetor (Chevrolet, Oldsmobile & 1957-58 Pontiac) To adjust, bend lockout rod at center angle

Choke Lockout Lever Contour: *NOTE - This adjustment not required on 1959-60 Pontiac* Hold throttle valves in rear (Cadillac), front (Chevrolet, Oldsmobile & 1957-58 Pontiac) completely closed With choke valve on center carburetor completely closed and lockout lever rod connected, clearance between contoured portion of lockout lever and tang on throttle lever on rear carburetor (Cadillac), front carburetor (Chevrolet, Oldsmobile & 1957-58 Pontiac), should be 015" Adjust by bending tang on throttle lever up or down as required

Throttle Linkage (Front -Rear Carburetor) Disconnect throttle rod at rear carburetor throttle lever With front and rear carburetor throttle valves completely closed, throttle rod end should center in the slot in the throttle lever Adjust by bending rod at existing bend using bending tool BT-18 Connect rod

Vacuum Diaphragm Link: With end carburetor throttle valves completely closed and vacuum diaphragm stem fully extended, end of vacuum unit actuating link should fit freely in hole in throttle lever on rear carburetor (Cadillac), front carburetor (All others) Adjust by bending actuator link

OVERHAUL. *See 'Rochester 2G & 2GC Carburetors for complete data and note the following points*

►*CHEVROLET ACCELERATING PUMP NOTE* Fuel inlet for accelerating pump is provided by a slot in the pump cylinder wall No pump inlet check ball or filter screen is used

►*FRONT & REAR CARBURETOR THROTTLE VALVE SEALING & OVERHAUL CAUTION* Carburetor throttle valves are sealed in production with a protective DAG coating to minimize air leakage around valves in closed position If this coating chipped or removed when servicing carburetor throttle bodies, it can be restored by using DAG-213 coating solution

SERVICE PARTS: Gasket Sets - Rochester No 7015750 (7011500, 7011350), No 7015751 (7010960, 7010958, 7011712, 7011714), No 7015752, (7010959, 7011713, 7012913), No 7015753 (7011351, 7011352, 7011705, 7011703), No 7015840 (7012201, 7012901, 7012203, 7012903), No 7015841 (7012202, 7012902, 7012905), No 7015942 (7013034, 7013037), No 7015956 (7013026), No 7015957 (7013033, 7013035, 7013063, 7013065), No 7015962 (7011706, 7013067, 7011709, 7013064, 7015066, 7013076, 7015068), No 7015972 (7011951, 7012851, 7011952, 7012853, 7013015, 7013017), No 7015973 (7012503, 7013020, 7011952, 7013016)

Repair Kits - Rochester No 7015731 (7010958), No 7015732 (7010959), No 7015734 (7010960), No 7015735 (7011350), No 7015738 (7011500), No 7011739 (7011351, 7011352), No 7015825 (7011952, 7012503), No 7015826 (7011713, 7012913), No 7015829 (7011706), No 7015830 (7011709), No 7015832 (7011705, 7011707), No 7015837 (7012201, 7012203, 7012901, 7012903), No 7015838 (7012202, 7012205, 7012902, 7012905), No 7015850 (7011712, 7011714), No 7015923 (7013016, 7013020), No 7015930 (7013064), No 7015938 (7013034, 7013037), No 7015939 (7013063, 7013065), No 7015953 (7013026), No 7015961 (7013033, 7013035), No 7015971 (7011951, 7011953, 7012851, 7012853, 7013015, 7013017), No 7016024 (7015066, 7015076), No 7016025 (7015068)

1955-58 ROCHESTER 2G & 2GC

	Rochester Carb. No.
CADILLAC	
1958 Triple Carburetors	①
CHEVROLET PASS. CARS.	
1955 V8 Early Cars (Synchro-mesh)	2GC 7006825
1955 V8 Late Cars (Synchro-mesh)	2GC 7008005
1955 V8 Early Cars (Powerglide)	2GC 7005810
1955 V8 Late Cars (Powerglide)	2GC 7008004
1956 V8 Synchro mesh	2GC 7008387
1956 V8 Powerglide	2GC 7008388
1957 V8 Synchro-mesh (Early)	7010647
1957 V8 Synchro-mesh (Late)	7011131
1957 V8 Auto Trans. (Early)	7010648
1957 V8 Auto Trans (Late)	7011124
1957 V8 With Governor (Early)	7010719
1957 V8 With Governor (Late)	7011149
1958 Synchro-mesh (Early)	2GC 7012133
1958 Synchro-mesh (Late)	2GC 7012451
1958 Auto Trans	2GC 7012452
1958 Triple Carburetors	①
CHEVROLET TRUCKS	
1955 2nd Series 265" Eng. (½ ton O.D.)	2G 7008399
1955 2nd Series 265" Eng. (Std Trans.)	2GC 7006770
1955 2nd Series 265" Eng (Auto Trans.)	2GC 7006770
1956 V8 Synchro-mesh	2G 7008389
1956 V8 Overdrive	2G 7008383
1956 V8 With Governor	2G 7008393
1957 265" Eng. Synchro-mesh (Early)	7010649
1957 265" Eng. Synchro-mesh (Late)	7011135
1957 265" Eng. Synchro-mesh (Early) ①	7010716
1957 265" Eng. Synchro-mesh (Late) ①	7012147
1957 265" Eng Overdrive (Early)	7010718
1957 265" Eng. Overdrive (Late)	7011132
1957 283" Eng (Early) ①	7010717
1957 283" Eng (Late) ①	7011143
1958 Series 3000, 4000 (Early)	2GC 7012035
1958 Series 3000, 4000 (Late)	2G 7012453
1958 Series 3000, 4000 (Early) ②	2G 7012047
1958 Series 3000, 4000 (Late) ②	2G 7012455
1958 Series 6000 (Early) ②	2G 7012233
1958 Series 6000 (Late) ②	2G 7012457
OLDSMOBILE	
1955 88 Hydra-Matic	2GC 7006970
1956 88 (Dual Range Hydra Matic)	2GC 7007223
1956 88 (Jetaway Hydra Matic)	2GC 7008800
1957 Triple Carburetors	②
1958 Series 88	2GC 7012450
1958 Triple Carburetors	①
PONTIAC	
1955 Hydra-Matic	2GC 7006100
1956 27 Synchro mesh ①	2GC 7008696
1956 27 Hydra-Matic ②	2GC 7008695
1957 Chieftain (Synchro-mesh)	2GC 7009832
1957 Chieftain (Hydra-Matic)	2GC 7009831
1957 Triple Carburetors	②
1958 Synchro-mesh (Early)	2GC 7011703
1958 Synchro-mesh (Late)	2GC 7012703
1958 Hydra-Matic (Early)	2GC 7011702
1958 Hydra-Matic (Late)	2GC 7012702
1958 Triple Carburetors	①

① - With vacuum operated velocity type governor.
② - See *SEPARATE "Rochester Triple 2-Barrel Carburetors"*.

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 CHEVROLET V8 LEAN SURGE CONDITION AT 55-75 MPH. (All Cars with Early No. 7006825 & 7005810 Carburetors)* Correct by installing late type Venturi Cluster Assemblies & Main Metering Jets as listed below *NOTE*—These new parts are installed in production on later Nos 7008004 & 7008005 Carburetors

Late Type Carburetor Parts

Carburetor	No. 7006825	No. 7005810
Venturi Cluster Assy	7007990	7007989
Main Metering Jet (2)	7002952	7002951

►*1955 PONTIAC V8 ROCHESTER CARBURETOR INSTALLATION CAUTION (First 1000 ENGINES)* Intake manifold on these engines will not take Rochester carburetor without possibility of high vacuum leak at windshield wiper vacuum passage in carburetor flange (insufficient sealing area) These manifolds can be identified by curved section at rear edge of carburetor mounting flange and *only Carter carburetor should be used* On later manifolds, with nearly straight section at above point, *either Carter or Rochester Carburetors can be used*

►*1955 PONTIAC CARBURETOR FLOODING OR OVERLOADING May be caused by excessive fuel pump pressure (in excess of 5 lbs.) See Fuel Pump data on Pontiac V8 car model page*

►*PONTIAC HARD STARTING OR LOADING CORRECTION* New type choke piston Rochester No. 7009032 is used on late production carburetors. It is .041" shorter and has five grooves instead of six. This construction provides a greater initial choke opening and relieves complaints of hard starting or loading on early production cars.

►*1956 CHEVROLET V8 TRUCK ENGINE CARBURETOR-TO-MANIFOLD GASKET PRODUCTION CHANGE (To Eliminate Hard Hot Starting)* New intake manifold-to-carburetor gasket, Part No. 3733281, with better insulation characteristics, is now being used in production and should be used on all 2-barrel carburetor V8 Truck installations when replacement required. Former gasket, Part No. 3704952, will continue to be used on passenger cars.

►*1956 OLDSMOBILE STALLING DURING WARM-UP CORRECTION*· Carburetors with letter "B", "C" or higher stamped in carburetor identification tag incorporate changes in piston and thermostat housing to provide proper "pull off" of choke valve, and permit choke valve to remain at proper "pull off" position until engine is warm On earlier carburetors, drill 3/64" hole in end of choke piston which will reduce the amount of vacuum behind choke piston and eliminate the stalling condition. *NOTE* - When removing choke valve from choke shaft it will be necessary to file the staked choke valve screws. Use a small amount of grease on file to collect any brass chips that might fall into carburetor

►*1956 OLDSMOBILE SLOW IDLE SCREW PRODUCTION CHANGE & INSTALLATION* Slow idle screw spring has been replaced by locknut on later carburetors to obtain a more positive setting. TO INSTALL locknut on early carburetors, back off idle adjusting screw to remove spring (only), spin locknut No 7010819 on screw, turn screw in 6 turns and tighten locknut. Hold choke wide open, idle screw off fast idle cam, throttle closed, then turn idle screw in until throttle valves just begin to open. Turn screw in an additional turn, tighten locknut against throttle lever. Readjust idle speed with engine warm.

►*1956 PONTIAC UNLOADING CORRECTION (To Relieve Flooding)*: Interference between accelerator pedal and floor mat at "Hump" above transmission, prohibits opening of choke, necessary to relieve flooding condition. To correct, move top of pedal to left to obtain clearance for full pedal travel

►*1956 PONTIAC UNLOADER ADJUSTMENT CHANGE*· For complete "Unloader" adjustment, *see "Unloader Setting" below.*

►*1957 PONTIAC ROUGH IDLE OR SURGE CORRECTION:* This condition caused by excessive leanness and can be corrected by installing new Venturi Cluster Assembly as listed below.

NOTE - Revised cluster assemblies used in production on late cars Carburetors—with these new clusters may be identified by letter stamped on carburetor tag as follows· Synchro-mesh Cars - "D", Hydra-Matic Cars - "A"

Pontiac 2GC Venturi Cluster Change

Carburetor	First Type	Later Typ
7009831 (Hydra-Matic)	7010603	7011561
7009832 (Synchro-mesh)	7010575	① 7010575

① - Modified cluster has same part number

►*1957 FUEL FILTER CHANGE TO CORRECT CARBURETOR FLOODING* Carburetor flooding can be corrected by thoroughly cleaning carburetor and installing new type AC Fuel Filter Element No 854347 *NOTE* - This improved filter element can be identified by **heavy blue line** between type designation GF 124 and part no 854347 on package The "blue star" formerly printed behind the numbers has been eliminated

►*1958 PONTIAC CARBURETOR PRODUCTION CHANGE NOTE & IDLE ADJUSTMENT CAUTION (CARBURETORS NO 7012702 & 7012703)*· The above carburetors have a new idle air adjustment screw which is used for all idle speed adjustments, in place of the throttle stopscrew used for idle adjustment on earlier carburetors Adjustment procedures are different for the later type carburetor *See "Adjustments" below*

►*1958 PONTIAC PUMP LINK BINDING CORRECTION:* On early cars, binding between outer pump lever and pump link can be corrected by installing a new pump link and clip assembly, Part No. 7013192

►*1958 PONTIAC ROUGH IDLE & STALLING (CAUSED BY BUILD-UP OF GUM IN THROTTLE BORES) CORRECTION* Remove carburetor from engine *CAUTION - Do not remove gum deposits from throttle bores* Invert carburetor and drill a 1/8" diameter hole in each **primary** throttle plate at a point approximately centered

CONTINUED ON NEXT PAGE

1955-58 ROCHESTER 2G & 2GC (C nt.)

in half of the throttle plate located adjacent to outside edge of throttle body Remove clips and install carburetor Adjust hot idle speed to 500 RPM, then adjust throttle rod setting with gauge pin and adjust idle mixture screws

DESCRIPTION Dual downdraft type with Automatic Choke (2GC) or Manual Choke (2G) Standard Trans Truck These carburetors have Rochester Calibrated Cluster design "Venturi Cluster Assembly", vacuum controlled Power System throttle operated accelerating pump with double spring pump plunger All carburetors have an internal vent in the air horn and an external vent on the bowl cover (On Oldsmobile this vent is controlled by a tang on the pump lever and is opened at low idle only) All carburetors are similar in design exas follows

Chevrolet & Pontiac Atmospheric Idle Vent (1958) - Consists of a vent opening in bowl cover with vent cap actuated by a tang on pump lever Vent is opened at low idle but must be closed at all other throttle positions

Oldsmobile (1956) - Fuel bowl is "concentric" type and metering jets have been relocated toward center of carburetor

P ntiac Automatic Choke (1957 & Later) - Choke assembly is mounted on throttle body (to reduce overall height) and is linked to choke shaft lever by a connector rod An internal fuel bowl vent is also provided in the air horn

Pontiac Idle Air Bypass (1958) - An idle air bypass adjusting screw replaces the former throttle stopscrew All idle speed adjustments are made with this screw

ADJUSTMENT: *Make all adjustments exactly as detailed b low.*

Idling Adjustment: If preliminary adjustment required to warm up engine, turn both idle mixture screws in until lightly seated, then back each screw out 1½ turns. Set parking brake, place transmission selector lever in Neutral, run engine until normal operating temperature is reached (at least 15 minutes operation for cold engine) Connect tachometer and vacuum gauge, then adjust as follows

Idle Mixture - With engine at normal operating temperature and idling at correct idling speed (see below) with choke valve wide open and fast idle inoperative, adjust each mixture adjusting screw separately for smoothest engine performance (highest vacuum and engine RPM) Recheck idle speed

►*OLDSMOBILE NOTE* After setting idle adjusting screws as above, turn each screw out (rich) ¼ turn which will provide desired idle performance (manifold vacuum and RPM will drop off slightly) Check performance by opening throttle to 1000 RPM point and then snapping throttle closed If engine rolls due to richness turn each screw in (lean) not more than 1/8 turn

Idl Sp d (Exc pt 1958 P ntiac with Idl Air Bypass Adjusting Scr w): With engine at normal operating temperature, adjust throttle stopscrew for correct idling speed as indicated below *CAUTION - On Mod l 2GC carbur tors, stopscrew must be resting on low st st p of fast idle cam when adjustm nt b ing made.*

Idle Speed (1958 Pontiac with Idle Air Bypass Adjusting Screw): As preliminary setting, open idle bypass 2 turns from a lightly seated position, then with engine at normal operating temperature, choke fully open, adjust idle air screw to obtain proper engine RPM as indicated in table below Adjust idle mixture screws for highest engine RPM, then reset idle air screws for proper idle speed *NOTE* - Recheck idle mixture screw setting after adjusting idle air screws

Idle Speed Setting

Car Model	Engine RPM S.M. Trans.	Auto. Trans.
1955-58 Chev Pass Cars	475	Ⓒ 425
1955-58 Chev Trucks	475	Ⓓ 425
1955-56 Oldsmobile	425	Ⓒ 400
1958 Oldsmobile	460	Ⓒ 460
1955 Pontiac	450-475	Ⓒ 390-410
1956 Pontiac	Ⓕ 450-470	Ⓓ Ⓖ 450-470
1957 Pontiac	450-470	Ⓒ Ⓖ 430-450
1958 Pontiac	450-470	Ⓒ Ⓒ 480-500

Ⓒ - Transmission selector lever in "D" (Drive)
Ⓓ - Transmission selector lever in "N" (Neutral)
Ⓕ - 510-530 RPM on Air Conditioned cars with air conditioner turned "ON"
Ⓖ - 500-520 RPM on Air Conditioned cars with air conditioner turned "OFF"
Ⓒ - 540-560 RPM on Air Conditioned cars with air conditioner turned "OFF"

►*AUTOMATIC TRANSMISSION THROTTLE LINKAGE ADJUSTMENT* See Car Model pages for necessary adjustment following idle speed adjustment *OLDSMOBILE NOTE*—Carburetor has "Split-Throttle Lever" and linkage will not be disturbed by idle speed setting

Throttle Return Check Adjustment: *See "CARBURETOR" on car model pages.*

Float Level: *CAUTION - Two separate adjustments required as follows*

1) Float Level Setting - Invert bowl cover and float assembly but DO NOT remove cover gasket Install gauge (see table below) over float with one gauge leg against pump side of power piston and outer gauge leg in line with float center Float should just clear top edge of gauge cut-out and sides of float should be parallel to gauge legs Adjust by bending float hinge arm

Float Level Setting

Car Model	Checking Gauge	Float Level
1955 Chev (All)	BT-107	1 5/32"
1956-57 Chev (All)	BT-129	1 1/4"
1958 Chev (All)	BT-144	1 19/64"
1955 Oldsmobile	BT-109	1 9/32"
1956 Oldsmobile	BT-125	1 7/16"
1958 Oldsmobile	BT-137	1 25/64"
1955-56 Pontiac	Ⓒ BT-105	1 15/64"
1957 Pontiac	BT-133	1 15/64"
1958 Pontiac	Ⓓ BT-141	11/16"

Ⓒ - BT-130 may also be used
Ⓓ - BT-149 may also be used

Fl at Dr p—Hold bowl cover and float assembly upright so that float drops down to limit of travel Place combination Float & Pump Gauge against gasket on cover at free end of float (see Float Level Setting table above for gauge number) so that single leg of gauge extends downward Bottom of float at free end should be even with scribed line on gauge (1 29/32' on all carburetors except 1956 Oldsmobile, 2" on 1956 Oldsmobile carburetors) Adjust by bending float arm tang (behind needle seat) toward needle seat to decrease drop or away from needle seat to increase drop

Accelerating Pump Rod Setting: *NOTE - This is a linkage adjustment. Pump does not hav a s asonal setting.* With throttle stopscrew backed off so that throttle valves are completely closed, place gauge (see table below), or scale in position on top of air horn casting (except 1958 Pontiac), on top of air horn ring on 1958 Pontiac Leg on gauge should just contact top of pump rod If a scale is used, distance from scale to top of pump rod should be as indicated in table Adjust by bending lower end of pump rod with Tool BT-18

Pump Rod Setting

Car Model	Checking Gaug	Rod H ight
1955 Chevrolet (All)	BT-107	15/16"
1956-58 Chevrolet (All)	BT-129	57/64"
1955 Oldsmobile	BT-109	15/16"
1956 Oldsmobile	Scale	5/16"
1958 Oldsmobile	BT-137	15/16"
1955 Pontiac	BT-105	15/16"
1956 Pontiac	BT-130	57/64"
1957 Pontiac	BT-133	53/64"
1958 Pontiac	Ⓒ BT-141	Ⓒ 23/64"

Ⓒ - BT-149 may also be used

Atmospheric Idle Vent: Adjustment procedures are different as indicated below

1955 Oldsmobile - Back off fast idle screw until it clears highest step of cam, then insert a 020" gauge (BT-67) between throttle valve and bore opposite the idle adjusting needle Idle vent valve should just be closed To adjust, use Tool BT-69 and bend pump lever tang to obtain proper clearance

1956 Oldsmobile - With throttle valves completely closed, distance between seat in air horn to leading edge of valve should be 3/32" To adjust, bend tang with Tool BT-69

1958 Chevrolet, Oldsmobile & Pontiac - 49/64" (Chevrolet, All Models), 1 17/64" (Pontiac, without Idle Air Bypass Screw), 1 19/64"(Pontiac, with Idle Air Bypass Screw), 13/16" (Oldsmobile) With pump rod properly adjusted, place Gauge BT-144 (Chevrolet), BT-141 or BT-149 (Pontiac) BT-137 (Oldsmobile) on top of air horn ring, with leg of gauge marked "vent" pointing downward toward pump rod Slowly open throttle valve to point where vent valve closes on its seat Lower edge of gauge leg should just touch top of pump rod To adjust, bend tang on pump lever

Fast Idle Setting: Adjustment procedures are different as indicated below

1955-58 Ch vrol t, Pontiac (1958 P ntiac Carbur t rs With ut Idl Air Bypass) - No separate adjustment required Fast idle speed is automatically set when hot

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1955-58 ROCHESTER 2G & 2GC (C nt.)

(slow) idle speed is adjusted (same screw controls both settings).

1958 Pontiac (With Idle Air Bypass Adjusting Screw) - With hot idle speed and mixture properly set, move fast idle cam so **high st st p** is under end of fast idle screw. Adjust fast idle screw to obtain an engine speed of 2700 RPM. *NOTE - Fast idle screw position on* **highest** *st p of fast idl cam is for adjustment purposes only. Under normal p rating conditions (after fast idle has b n s t as indicat d above), fast idle speed will be 1500-1700 RPM.*

1955-58 Oldsm bil - As a preliminary adjustment (with carburetor off engine), close choke valve and place fast idle screw on high step of fast idle cam, then place .020" gauge, BT-67 (1955), .024" gauge, BT-90 (1956 & 1958) between throttle valve and bore opposite the idle needles. Turn fast idle screw until gauge just drops out. Make final adjustment on car with the engine running. Turn fast idle screw until engine speed is 1400-1500 RPM (1955), 1600-1700 RPM (1956), 1500 RPM (1958) with screw on high step of fast idle cam.

Unl ad r (2GC Carbur t rs): Move throttle valves to wide open position which will open choke valve slightly (see Pontiac Note below). Check choke valve opening or clearance between upper edge of choke and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever which contacts fast idle cam using bending tool BT-69.

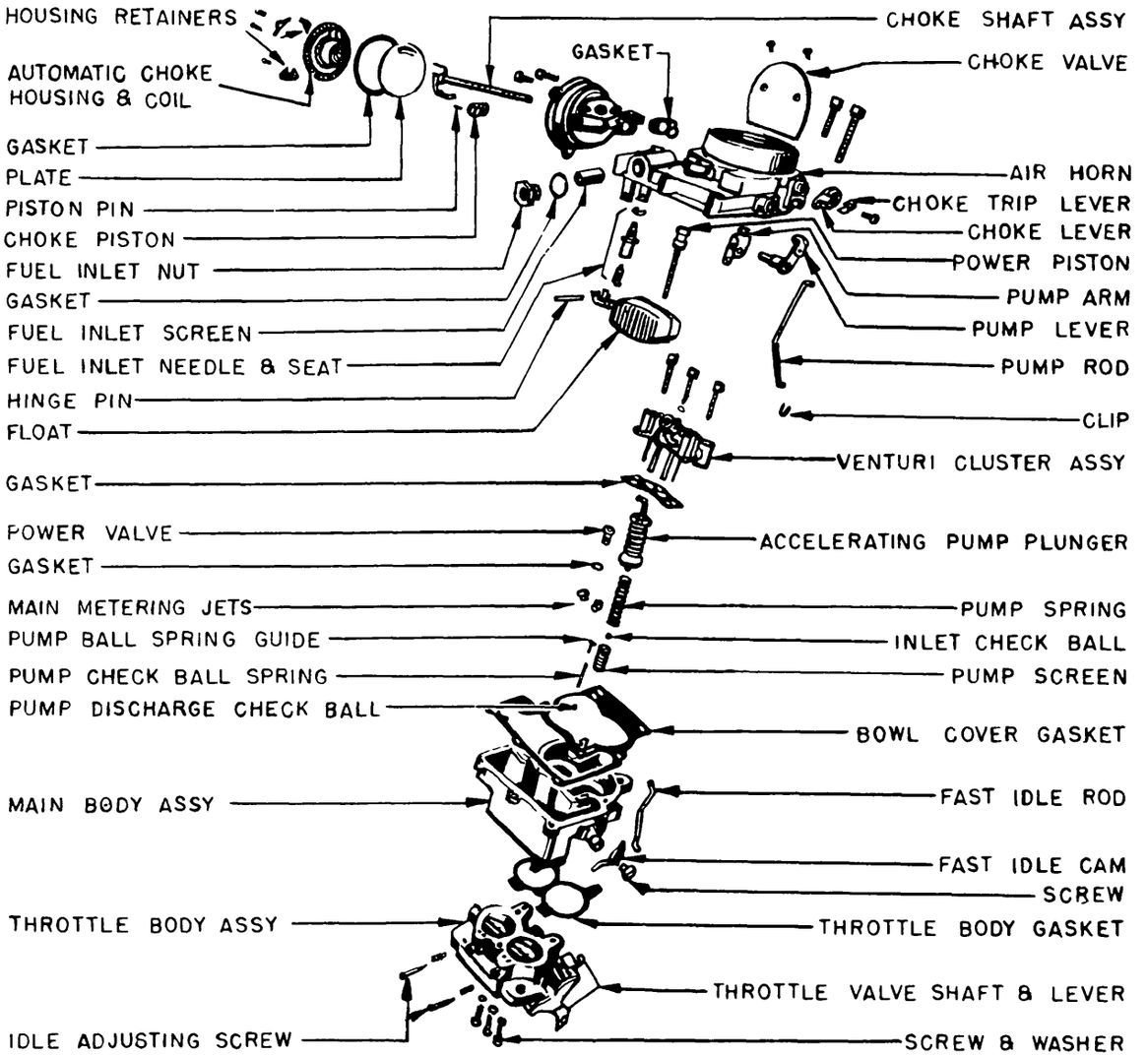
Pontiac Not - If unloader checked with carburetor on engine, it is recommended that following procedure be followed· Open throttle valves by depressing accelerator pedal forcibly to floor. Make certain that pedal does not hit hump over transmission (Correct by moving upper end of pedal to left by enlarging left hand hole in pedal bracket and rotating pedal to the left). Check choke valve opening (above) and bend tang to secure valve opening of .143-.183" which will insure correct unloader action

►*1955-56 OLDSMOBILE NOTE* Before making unloader adjustment, the throttle stopscrew (slow idle speed screw) must be turned IN one turn from point where throttle valves are completely closed.

Car Model	Unl ader Setting Ch cking Gauge	Choke Opening
1955-58 Chev.Pass.Cars	BT-108	360"
1955 Oldsmobile	BT-110	140"
1956 Oldsmobile	BT-127	155"
1958 Oldsmobile	BT-110	140"
1955-56 Pontiac	© BT-106	163"
1957-58 Pontiac	BT-134	.163"

© - BT-128 may also be used.

Aut matic Ch k Setting: CENTERED with scribed index mark on cover in line with long cast mark on choke housing (all models) To adjust, loosen heat tube connection on cover, loosen three cover retainer screws *(CAUTION*–If one retainer is "toothed" type engaging notches in cover, screw must be backed off sufficiently so that retainer can be disengaged from cover notches), rotate cover to align marks



ROCHESTER 2GC DUAL CARBURETOR (2G SIMILAR EXC MANUAL CHOKE)

Intermediate Choke Rod (1958 Pontiac): Remove choke thermostat cover and coil assembly and inside baffle plate. Hold choke valve completely closed and bend intermediate rod as necessary so that end of choke piston is flush to 1/32" out of choke piston sleeve.

Choke Rod: Place idle adjusting screw (fast idle screw if so equipped) on second step of fast idle cam and against the high step, then bend tang on choke lever with Tool BT-69 as necessary to obtain a clearance as specified in table below, between upper edge of choke valve and air horn.

Car Model	Choke Rod Setting Checking Gauge	Choke Opening
1955-58 Chev.Pass.Cars	BT-108	.089"
1955 Oldsmobile	BT-110	.040"
1956 Oldsmobile	BT-127	073"
1958 Oldsmobile	BT-110	040"
1955 Pontiac	BT-106	063"
1956-58 Pontiac	BT-134	.061"

OVERHAUL: Adjustments may be made and various parts be serviced without completely disassembling the entire unit.

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1955-58 ROCHESTER 2G & 2GC (Cont.)

Disassembly: Major units of carburetor consist of Air Horn Assembly, Main Body, and Throttle Body.

Air Horn Assembly–Consists of Automatic Choke & Fuel Bowl Cover.

Automatic Choke (Exc. 1957 & Later Pontiac) - Remove choke cover and coil assembly, gasket and baffle plate. Remove choke trip lever, fast idle link and lever (rotate lever until slot in lever will pass over tang on link). Remove two choke valve screws and choke valve. Rotate choke shaft counterclockwise to free choke piston from housing, then pull piston and choke shaft from carburetor. Remove two choke housing attaching screws and remove choke housing and gasket from air horn.

Automatic Choke (1957 & Later Pontiac) - Remove cover and coil assembly, gasket and baffle plate. Remove choke piston lever attaching screw, then remove piston link and lever assembly. Remove choke housing to carburetor mounting screws and detach housing from throttle body. Remove intermediate choke shaft and lever from housing.

Fuel Bowl Cover–Disconnect pump link from throttle lever by rotating it until it clears pump lever. Remove eight cover screws and remove cover. Invert cover on flat surface, remove float hinge pin, float assembly and float needle. Remove float needle seat and gasket and remove filter screw. Depress power piston shaft allowing spring to snap, which forces piston from casting. Remove retainer on pump plunger shaft and plunger assembly from pump arm. Remove pump lever and shaft by loosening setscrew on inner arm and removing outer lever and shaft. Remove cover gasket.

Main Body–Remove pump plunger return spring from pump well main metering jets, and power valve. Remove three screws from top of cluster and remove cluster and gasket. With long nose pliers, remove pump discharge spring retainer, then the spring and check ball. Invert Main Body and remove three large bowl to throttle body attaching screws, remove throttle body.

Throttle Body–Remove fast idle cam, idle adjusting needles and springs. Throttle body should be replaced as an assembly to insure proper relation of valves.

Cleaning & Inspection: Thoroughly clean carburetor castings and metal parts in clean solvent. *CAUTION*–Choke coil and housing and pump plunger should not be immersed in solvent. Clean pump plunger in clean gasoline only. *DO NOT SOAK AIR HORN ASSEMBLY IN CLEANER OR SOLVENT FOR MORE THAN ONE HALF HOUR IF CHOKE PISTON HOUSING HAS NOT BEEN REMOVED.* Blow out all passages in casting until dry. *CAUTION*–Do not pass drills or wires through calibrated jets or passages as they may enlarge orifice and seriously affect carburetor calibration. Inspect all parts for wear damage, burrs or ridges. Inspect gaskets for being hard or brittle, pump leather for damage.

Reassembly: Throttle Body to Main Body–Install idling adjusting screws and springs in throttle body until finger tight and then back off 1½ turns for temporary adjustment, add throttle body gasket and attach throttle body to bowl. Install fast idle cam, drop pump discharge ball into discharge hole and replace spring and retainer. Install cluster with new gasket, tighten screws evenly, (center screw takes red fibre gasket). Replace main metering jets and power valve with new gasket.

Fuel Bowl Cover (Air Horn)–Replace pump lever assembly, install filter screen float needle seat and gasket. Replace power piston in vacuum cavity (check to see that piston travels freely). Lightly stake retainer in place. Attach plunger shaft with retainer shaft end pointing inward. Install cover gasket. Attach needle to float, position it carefully and insert float hinge pin. Adjust float (see table above for setting). Place cover in position making certain that accelerator pump plunger is positioned and will move freely.

Choke–Place new gasket in position, attach choke housing to cover and tighten screws securely. Place choke shaft in choke housing and rotate clockwise so that piston rides in bore in housing. Install choke valve on shaft with letters "RP" facing upward, center choke valve before tightening screws. Place baffle plate and choke housing gasket into position and install choke coil and cover. Rotate cover clockwise until index marks on cover and housing are aligned. Attach retaining screws and tighten securely. Replace link in fast idle cam and choke lever, place choke lever on cover with the tang facing outward and toward the pump lever. Install trip lever so that tang of trip lever is under tang of choke lever.

Chevrolet Governor Overhaul: Removal - Remove four governor cover attaching screws, remove cover and gasket. Detach and remove governor throttle spring. Remove diaphragm cover attaching screws, lift off cover. Hold throttle lever and loosen nut attaching governor lever and pin assembly to throttle shaft, free lever from throttle shaft and disengage it from diaphragm rod by rotating lever until tang on rod clears slot in lever. Remove diaphragm assembly from housing. Remove three governor housing mounting screws, remove seal retainer and leather seal. Detach governor housing from throttle body, remove housing gasket.

Cleaning & Inspection - DO NOT immerse throttle lever and bearing assembly in cleaning solution (will damage neoprene seal protecting ball bearings). Make certain that throttle bearings are completely dry (blow out with air) and lubricate with very light machine oil (*CAUTION* - Throttle shaft must rotate freely with no trace of any binding which would affect governor operation).

Installation - Install governor housing mounting gasket (narrower edge toward top of carburetor), install housing, leather seal, seal retainer, and mounting screws (DO NOT tighten screws). Check throttle shaft for free operation in seal, tighten mounting screws while holding throttle in closed position, recheck throttle shaft for free operation. Install diaphragm assembly in housing and align vacuum passage holes in diaphragm and housing. Assemble governor lever and pin assembly on end of diaphragm rod (in housing) and position lever on throttle shaft, install lockwasher and nut on shaft, tighten nut while holding throttle lever to prevent damage to valves. Align diaphragm with mounting screw holes in housing, install cover with cover restriction piloting through diaphragm and into vacuum passage in housing, install cover screws finger-tight. Hold throttle valves wide open (to provide maximum diaphragm travel), tighten cover screws to 25-28 in. lbs., install lockwire on screws. Install throttle spring over governor lever pin and stationary post in housing. Check for free operation of throttle shaft, then install governor cover and gasket, tighten attaching screws, install lockwire on screws.

SERVICE PARTS

SINGLE CARB. INSTALLATIONS

Gasket Sets - Rochester No. 7008533 (7008399, 7006770); No. 7008534 (7006825, 7008005, 7005810, 7008004, 7008388, 7010648, 7011224, 7012452); No. 7009949 (7010647, 7008387, 7011131, 7010719, 7011149, 7012133, 7012451); No. 7009950 (7008389, 7008383, 7010649, 7011135, 7010716, 7012147, 7010718, 7011132, 7012035, 7012453, 7012047, 7012455); No. 7009951 (7008393, 7010717, 7011143, 7012233, 7012457); No. 7006999 (7006970); No. 7009942 (7007223, 7008800); No. 7009945 (7006100, 7008696, 7008695); No. 7015752 (7012450); No. 7015846 (7011702, 7011703); No. 7015857 (7009832, 7009831, 7012702, 7012703).

Repair Kits - Rochester No. 7007012 (7006970); No. 7009189 (7005810); No. 7009321 (7006100); No. 7009337 (7008399, 7006770); No. 7009338 (7006825, 7008004, 7008005); No. 7009925 (7008696, 7008695); No. 7009928 (7008388, 7010648, 7011224); No. 7009929 (7008387, 7010647, 7011131, 7010719, 7011149); No. 7009930 (7008389, 7008383, 7010649, 7011135, 7010716, 7012147, 7010718, 7011132); No. 7009934 (7008393, 7010717, 7011143); No. 7009936 (7007223, 7008800); No. 7015728 (7009832, 7009831); No. 7015821 (7011702, 7011703); No. 7015826 (7012450); No. 7015833 (7012133, 7012451); No. 7015836 (7012035, 7012047); No. 7015839 (7012452); No. 7015855 (7012453, 7012455); No. 7015856 (7012702, 7012703); No. 7015859 (7012233, 7012457).

TRIPLE CARB. INSTALLATIONS

SERVICE PARTS: Gasket Sets - Rochester No. 7015740 (7011350); No. 7015750 (7011500, 7011709, 7011706); No. 7015751 (7010960, 7010958, 7011712, 7011714); No. 7015752 (7010959, 7011713, 7012913); No. 7015753 (7011351, 7011352, 7011705, 7011707); No. 7015840 (7012201, 7012901, 7012203, 7012903); No. 7015841 (7012202, 7012902, 7012205, 7012905); No. 7015844 (7011951, 7012851, 7011953, 7012853); No. 7015845 (7011952, 7012503).

Repair Kits - Rochester No. 7015731 (7010958); No. 7015732 (7010959); No. 7015734 (7010960); No. 7015738 (7011500); No. 7015739 (7011351, 7011352); No. 7015824 (7011951, 7012851, 7011953, 7012853); No. 7015825 (7011952, 7012503); No. 7015826 (7011713, 7012913); No. 7015832 (7011705, 7011707); No. 7015835 (7011350); No. 7015837 (7012201, 7012901, 7012203, 7012903); No. 7015838 (7012202, 7012902, 7012905, 7012205); No. 7015829 (7011707); No. 7015830 (7011706); No. 7015850 (7011714); No. 7015853 (7011712).

1959-60 ROCHESTER 2G & 2GC

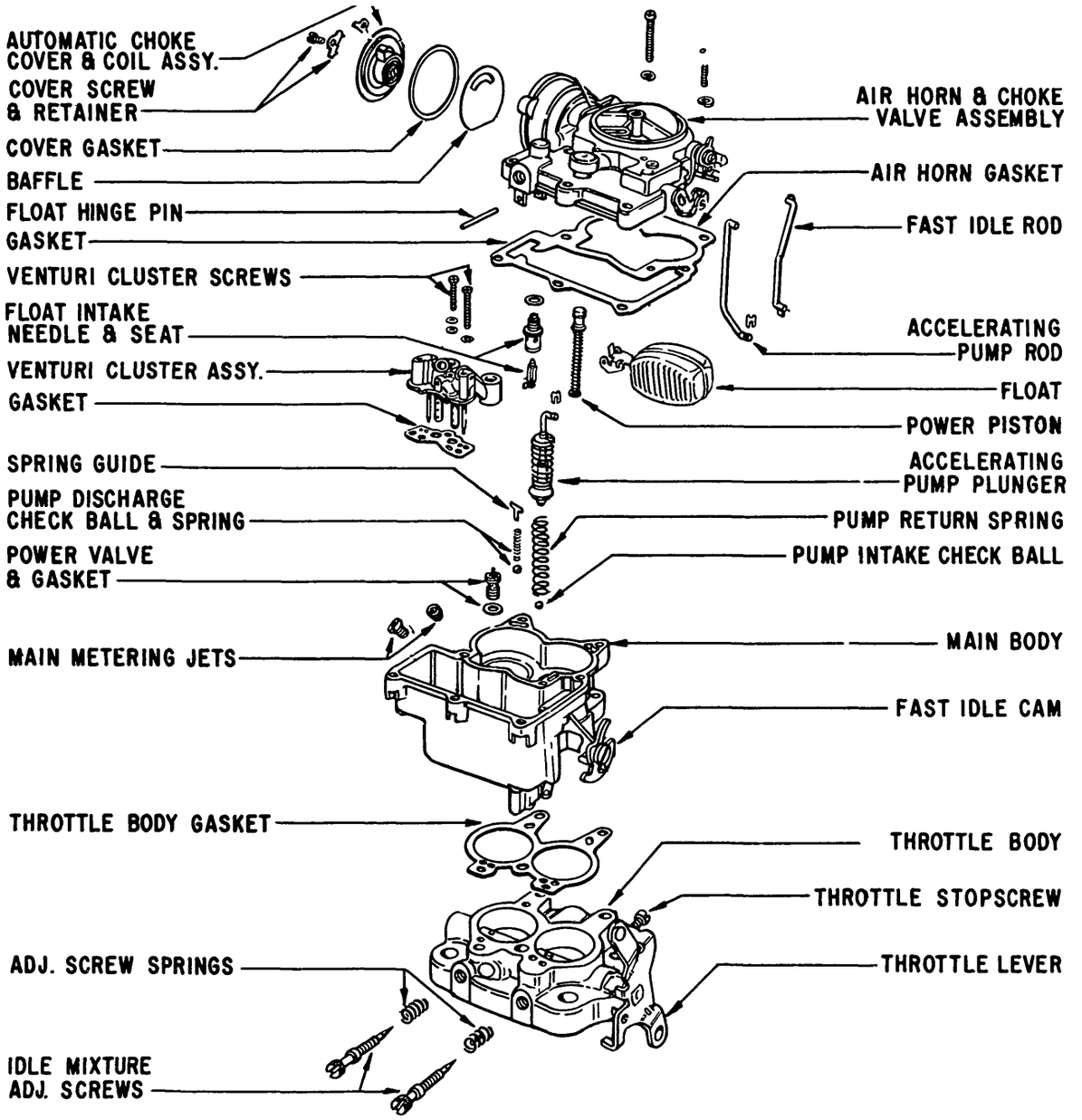
CADILLAC	Rochester Carb. No.
1959-60 Eldorado Eng (Triple Carbs)	ℂ
CHEVROLET PASS CARS (283" ENG.)	
1959-60 Synchro-mesh	2GC 7013007
1959-60 Auto Trans (No Air Cond)	2GC 7013008
1959-60 Auto Trans (Air Cond)	2GC 7013018
1959 Auto Trans (Canada)	2GC 7013082
Service Repl (7013007)	7015904
Service Repl (7013008, 7013018)	7015905
Service Repl (7013082)	7015905
CHEVROLET PASS. CARS (348" ENG.)	
1959-60 Triple Carb Option	ℂ
CHEVROLET TRUCKS (283" ENG.)	
1959 Standard	2G 7013009
1960 Standard	2G 7015015
1959-60 (Velocity Governor)	2G 7013011
1959 (Vacuum Governor)	2G 7013013
1960 (Vacuum Governor)	2G 7015017
Service Repl (7013009)	7015906
Service Repl (7015015)	7016006
Service Repl (7013011)	7015913
Service Repl (7013013)	7015912
Service Repl (7015017)	7016007
OLDSMOBILE	
1959 Series 88 (No Air Cond)	2GC 7013052
1959 Series 88 (Air Cond)	2GC 7013058
1960 Series 88 (No Air Cond)	2GC 7015052
1960 Series 88 (Air Cond)	2GC 7015058
1959 Service Replacement	7015915
1960 Service Replacement	7016005
PONTIAC	
1959 Std Eng (Synchro-mesh)	2GC 7013061
1959 Std Eng (Auto Trans)	2GC 7013060
1959 420E Eng (Synchro-mesh)	2GC 7013075
1959 420E Eng (Auto Trans)	2GC 7013069
1960 Std Eng (Synchro-mesh)	2GC 7015073
1960 Std Eng (Auto Trans) Early	2GC 7015070
1960 Std Eng (Auto Trans) Late	2GC 7015072
1960 425E Eng (Auto Trans)	2GC 7015062
1959-60 Triple Carb Option	ℂ
Service Repl (7013060)	7015909
Service Repl (7013061)	7015910
Service Repl (7013069)	7015958
Service Repl (7013075)	7015982
Service Repl (7015073)	7016010
Service Repl (7015070, 7015072)	7016009
Service Repl (7015062)	7016011

ℂ - *See SEPARATE "Rochester Triple 2-Barrel Carburetor" data.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 CHEVROLET CARBURETOR THROTTLE BODY SCREWS LOOSENING IN SERVICE* Complaints of throttle body-to-float bowl screws loosening can be corrected by installation of new gasket with improved sealing and screw torque retention New gasket can be identified by BLACK color

►*1960 CHEVROLET PASS. (AUTOMATIC TRANSMISSION) HESITATION ON LOW SPEED ACCELERATION CORRECTION* Install new type accelerator pump and spring assembly, Part No. 7019742. Later carburetors having the new parts installed during production are identified by the letter "D" or later on identification tag



ROCHESTER 2GC 2-BARREL CARBURETOR (2G SIMILAR EXCEPT FOR MANUAL CHOKE)

►*1960 CHEVROLET TRUCK WITH 283" ENGINE (CARBS. NO. 7015015 & 7013011) ENGINE SURGE DURING PART THROTTLE OPERATION CORRECTION.* This condition can be corrected by installing Main Metering Jets, Part No. 7001860 (.055") to replace the former jets, Part No. 7002652 (.052"). Carburetors changed in production will be identified by the letter "A" (7015015) "B" (7013011) on brass identification tag.

►*1959 OLDSMOBILE IMPROVED COLD ENGINE OPERATION & CHOKE PERFORMANCE* Fast idle setting and throttle return check clearance setting have been changed *See data below*

►*1959 OLDSMOBILE STUMBLE ON LIGHT ACCELERATION (Carburetors without 'M8" stamped on Brass*

CONTINUED ON NEXT PAGE

1959-60 ROCHESTER 2G & 2GC (C nt.)

Identification Tag): Pump rod setting should be increased 1/16" to provide greater pump capacity. *See Accelerating Pump Setting below. NOTE* - Later carburetors (stamped "M8") have new shorter pump plunger with increased capacity and should be set to specifications.

►*1959 OLDSMOBILE CARBURETOR PRODUCTION CHANGES FOR IMPROVED PERFORMANCE:* Following parts and specification changes have been made in these carburetors for improved performance:

1) Pump Well Change - Carburetors marked "A" on identification tag have pump well wall extended to top of fuel bowl. This is a design change.

2) Idle Restriction Change - Carburetors marked "B" on identification tag have smaller .047" idle restriction hole (was .052"). This change not required on earlier carburetors.

3) Pump Plunger Change - Carburetors marked "M8" have (1 9/32") pump plunger for increased capacity to correct stumble on light acceleration. *See "Oldsmobile Stumble on Light Acceleration Correction" above.*

4) Choke Cover Assembly Change - New assembly with smaller heat inlet hole and larger diameter baffle plate used on later carburetors. Choke setting is unchanged.

5) Setting Changes for Improved Performance - See Fast Idle Setting and Throttle Return Check Setting below.

►***1960 OLDSMOBILE HESITATION & STUMBLE CORRECTION (EARLY CARS):*** **On cars with no letter stamped on identification tag, this condition can be corrected by installation of all parts in Parts Kit No. 7017980 (Std. Cars), new Accelerator Pump No. 7016475 only (Air Cond. Cars). New identification tag stamped "MOD" should be installed on carburetor when this change made. Kit No. 7017980 contains a venturi cluster, cluster gasket, cluster center attaching screw gasket, accelerator pump assembly, identification tag, and installation and adjustment instructions.**

►*1960 OLDSMOBILE CARBURETOR CHOKE STICKING CORRECTION (Carburetors Stamped "A" on Identification Tag):* **Caused by choke link going over center. Correct by installing new intermediate le ver and shaft furnished in Parts Kit 7017981 and installing new identification tag stamped "B" furnished with kit. Carburetors marked "B" or "C" on identification tag do not require this modification.**

►*1959 PONTIAC FLOAT PRODUCTION CHANGE & FLOAT LEVEL SETTING CAUTION (Rochester 2GC 7013060 & 7013061 Carburetors):* Later carburetors(with letter "K" punched in brass tag or code dated "B-9" or later) have floats with different buoyancy characteristics and require different float setting. *See Float Level data below.*

►*1959 PONTIAC MAIN METERING JET CALIBRATION PRODUCTION CHANGES (Rochester 2GC 7013069 & 7013075 Carburetors):* Different main metering jets have been used in production as follows: 1) .066", 2) .064", 3) .063". Jet furnished for service is .063" No. 7008663. *NOTE* - It is not recommended that jets on earlier carburetors be changed to later type as a fuel economy measure (gasoline mileage differences will be negligible).

►*1960 PONTIAC HIGH SPEED ACCELERATION STUMBLE CORRECTION:* **Stumble at speed of 50 MPH or above can be corrected by repositioning air cleaner intake tube 30-40° to right of engine centerline.** ***NOTE - On Air Cond. Cars, cleaner cannot be repositioned to this extent.***

►*1960 PONTIAC CARBURETOR STICKING CHOKE CORRECTION:* **Caused by burr at upper bend of fast idle link or burr around hole for link where it enters fast idle lever. To correct, remove link and dress down burrs to remove all bind.**

►*1960 PONTIAC CARBURETOR PRODUCTION CHANGE & SERVICE REPLACEMENT PARTS CAUTION (STD. ENGINE HYDRA-MATIC CARS):* **Beginning with Engine No. 279533, a new carburetor, Rochester No. 7015072 is used in production. The throttle body on this carburetor is designed with vertical milled slots in place of drilled idle discharge holes used on earlier carburetors. DO NOT interchange later slotted throttle bodies with earlier non-slotted throttle bodies.**

DESCRIPTION: Dual (2-Barrel) downdraft carburetor with manual choke control (2G), automatic choke (2GC). Carburetors are similar to previous models and have the following features.

Idle Compensator (Chevrolet 7013018 & Oldsmobile 7013058, 7015058 Carburetors. Air Conditioned Cars) - Consists of a thermostatically controlled idle air bypass which opens during prolonged hot idling to supply additional air at a point below the throttle valve to offset enrichening effects of high engine temperature. This idle compensator must be held closed when making idle speed adjustments.

Automatic Choke Assembly (All Oldsmobile Carbs. & Pontiac 7013060, 7013061, 7015070, 7015072) - Choke assembly is mounted on throttle body and linked to choke shaft lever by an intermediate choke rod. This intermediate choke rod must be adjusted for correct choke operation.

Idle Air Bypass (Pontiac 7013060, 7013061, 7015070, 7015072 Carburetors) - This idle bypass screw replaces conventional throttle stopscrew and is used to adjust the fuel mixture and engine idle speed. Special Idle Mixture & Speed Adjustment procedure is required for these models.

ADJUSTMENT: *Make all adjustment exactly as follows:*

Idling Adjustment (Except Pontiac 7015070 & 7015072

ADJUSTMENT: *Make all adjustments exactly as follows:*

Idling Adjustment (Exc. Carburetors With Idle Air Bypass) - If preliminary adjustment required to warm up engine, turn both idle mixture screws in until lightly seated, then back each screw out 1½ turns. Operate engine until normal operating temperature is reached with choke valve wide open and fast idle inoperative. Connect tachometer and vacuum gauge to engine, then adjust throttle stopscrew for correct engine idle speed (see table below). Adjust each idle mixture screw for smoothest idle performance with highest manifold vacuum and engine RPM (see special notes below). *CAUTION - On cars with Idle Air Compensator, hold compensator valve closed by pressing in on spring-load d button n sid f main body (Ch vrolet), removing air cl aner and pressing d wn n valv in air horn (Oldsm bile).* Recheck engine idle speed. *CHEVROLET NOTE* - Idle mixture adjustment can be made by leaning the mixture (turn screws in) for a moderate rough idle with slight vacuum and RPM loss, and then richening the mixture by turning the screws out ¼ turn.

OLDSMOBILE NOTE - After adjusting both idle mixture screws for highest manifold vacuum and engine RPM, turn each screw out ¼ turn for slightly richer mixture. Recheck idle mixture and idle speed after air cleaner installed.

Idling Adjustment (Carburetors With Idle Air Bypass) - If preliminary adjustment required to warm up engine, set both idle mixture adjusting screws 1½ turns open and idle air adjusting screw 2 turns open from a lightly seated position. With engine at normal operating temperature (choke valve wide open and fast idle inoperative), turn idle air in or out for correct idle speed (see table below), then adjust each idle mixture screw for smoothest idle performance with highest engine RPM. Recheck idle speed. *CAUTION - If necessary to r set idle air adjusting screw to corr ct idl sp d, r check idle mixture screw adjustm nt (idl mixtur adjustment must always be made last).*

Idle Speed Setting

Car Model	Synchro-mesh Trans.	Aut .Trans.
Chevrolet	475 RPM	ℂ 450 RPM
Oldsmobile (No A.C.)	460 RPM	ℂ 460 RPM
Oldsmobile (A.C.)②	520 RPM	ℂ 520 RPM
Pontiac (No A.C.)	480-500 RPM	ℂ 480-500 RPM
Pontiac (A.C.)③	540-560 RPM	ℂ 540-560 RPM

ℂ - With transmission in Drive "Dr" range.

② - With Air Conditioning turned "OFF" (Carburetors with Idle Compensator), "ON" (Carburetors without Idle Compensator).

③ - With Air Conditioning turned "OFF".

Throttle Return Check (Dashpot) Adjustm nt: Used on Chevrolet and Oldsmobile with automatic transmission. *See "Throttle Linkage Adjustm nt" und r CARBURETOR on each car model page for adjustm nt data.*

►*OLDSMOBILE SETTING CHANGE CAUTION:* Throttle return check clearance should be set at .050"

Float Level: *CAUTION - Two s parat adjustm nts (Float Level & Float Drop) r quir d. Float l v l adjusted differently on Chevrol t as d tail d b low.*

Float Level Setting (Chevrol t) - Remove and invert bowl cover and float assembly but DO NOT remove cover gasket. Install correct float gauge (see table below) over float with top of gauge against pump side of power piston stem. Float should just clear top edge of gauge cutout and sides of float should be parallel to gauge legs. Adjust by bending float hinge arm.

Float Level Setting (Oldsm bil & P ntiac) - Remove and invert bowl cover and float assembly but DO NOT remove cover gasket. Install correct float gauge (see table below) on bowl gasket at free end of float with longer leg of gauge "T" resting squarely on gasket. Edge of seam on float should just clear upper edge of gauge. Adjust by bending float hinge arm at rear of float.

CONTINUED ON NEXT PAGE

1959-60 ROCHESTER 2G & 2GC (Cont.)

Float Level

Car & Carb	Float Level	Checking Gauge
1959-60 Chevrolet (All)	1 23/64"	BT-152
1959-60 Oldsmobile (All)	11/16"	BT-179
1959 Pontiac 7013060,61 ℂ	11/16"	BT-160
1959 Pontiac 7013060,61 ②	5/8"	BT-173
1959 Pontiac 7013069,75	11/16"	BT-169
1960 Pontiac 7015062,73	11/16"	BT-176
1960 Pontiac 7015070,72	5/8"	BT-177

ℂ - Early carburetors.

② - Later carburetors identified by "K" punched in tag or code dated "B-9" or later.

Fl at Drop S tting (All Models) - Hold bowl cover and float assembly upright so that float hangs down at bottom of travel. Measure distance from lower face of cover gasket to bottom of float at free end (surface of flat topped floats will be parallel to bowl cover) using a scale or the float level gauge. On Chevrolet, place side of short leg against gasket, float should just touch extended portion of other leg. On Oldsmobile and Pontiac, invert gauge so that leg of "T" is against gasket, bottom of float should be in line with "Float Drop" line on gauge. Adjust by bending tang on rear of float hinge arm toward intake needle seat to decrease drop, or away from needle seat to increase drop.

Fl at Drop Setting

Car & Carb.	Float Drop	Checking Gauge
1959-60 Chevrolet (All)	1 29/32"	BT-152
1959-60 Oldsmobile (All)	1 29/32"	BT-151 or 179
1959-60 Pontiac (All) ℂ	1 3/4"	BT-176 or 177

ℂ - Supersedes previous 1959 specification of 1 29/32".

Acc l rating Pump R d: *CAUTION - This is a linkage adjustment (pump does not have seasonal setting).* With throttle stopscrew backed out so that throttle valves completely closed, check distance from top of air horn or pump housing to top of pump connector rod as follows: On Chevrolet, invert float gauge (see table below) and place gauge on top of pump housing on air horn with extended leg of gauge down toward pump connector rod. On Oldsmobile & Pontiac, place float gauge (see table below) on top edge of air cleaner ring on air horn with end of "T" marked "Pump" down toward connector rod. On all models, end of gauge should just touch top of connector rod. Adjust by bending pump connector rod using bending Tool BT-18.

Acc l rating Pump Rod Setting

Car & Carb.	Pump Setting	Checking Gauge
1959-60 Chevrolet (All)	57/64"	BT-152
1959-60 Oldsmobile (All)	1 7/16"	BT-151
1959 Pontiac 7013060,61	15/16"	BT-173
1959 Pontiac 7013069,75	1 3/16"	BT-169
1960 Pontiac 7015062,73	1 1/8"	BT-177
1960 Pontiac 7015070,72	1 21/64"	BT-176

Idl V nt: *Adjust only after Accelerating Pump Rod Setting has be n checked and adjusted.* Use same gauge installed in same manner as for pump rod setting check (above). *NOTE* - On Oldsmobile & Pontiac, invert gauge so that leg marked "Vent" is down toward pump connector rod. Slowly open throttle valve to point where vent valve just closes (rubber valve seats on pump housing on air horn). At this point, edge of cutout is gauge marked "Vent" (Chevrolet), or lower end of gauge marked "Vent" (Oldsmobile & Pontiac), should just touch top of pump connector rod. Adjust by bending tang on pump lever which contacts vent valve arm.

Idle Vent Setting

Car & Carb.	Vent Setting	Checking Gauge
1959-60 Chevrolet (All)	49/64"	BT-152
1959-60 Oldsmobile (All)	1 11/32"	BT-151 or 179
1959 Pontiac 7013060,61	1 9/32"	BT-173
1959 Pontiac 7013069,75	1 9/64"	BT-169
1960 Pontiac 7015062,73	1 5/64"	BT-176
1960 Pontiac 7015070,72	1 17/64"	BT-177

Intermediate Choke Rod Adjustment (1959 Oldsmobile & 1959-60 Pontiac): Remove choke cover and thermostatic coil assembly, gasket and baffle plate. Hold choke valve completely closed by lifting up on intermediate choke lever. In this position, inner end of vacuum piston should be flush with end of choke piston bore. Adjust by bending intermediate choke rod.

Intermediate Choke Rod Adjustment (1960 Oldsmobile): *ADJUSTMENT NOTE - Three different vacuum pistons and choke levers have been used in production. Adjustment procedures are different as indicated below.*

Type 1 - Carburetors with this type piston and lever are identified by the word "MOD" in first square of identification tag, or the square will be blank. The vacuum piston is plain on outer end. Adjust this type so vacuum piston is flush or 1/32" out of piston bore .

Type 2 - Carburetors with this type piston and lever are identified with the letter "A", "B", or "C" in first square of identification tag. Adjust this type so vacuum piston is out of piston bore so "V" groove in piston is flush with edge of bore. This vacuum piston has a single groove in outer end.

Type 3 - Carburetors with this type piston and lever are identified with the letter "B" or "C" in first square of identification tag. The vacuum piston has two grooves in outer end and choke shaft lever has three holes for installation of intermediate rod. Adjust as follows: With intermediate choke rod installed in inboard hole, piston must be flush or 1/32" out of piston bore. With intermediate rod in center hole, first "V" groove in piston must be flush with edge of piston bore. With intermediate rod in outboard hole, second "V" groove in piston must be flush with edge of piston bore. *NOTE - The type "3" assembly (three hole lever) choke setting may be tailored for climatic conditions by installing rod in other holes. See "Automatic Choke Setting" below.*

Automatic Choke Setting (All 2GC Carburetors): Adjust by loosening retainer screws on choke cover and rotating cover and coil assembly. Centered setting is with scribed index mark on cover in line with center (longest) mark on housing. *NOTE* - Choke valve should be lightly closed at room temperature (75°F).

Aut matic Ch ke Setting

Car Model	Chok S tting
1959-60 Chevrolet & Pontiac	Centered (At Index)
1959 Oldsmobile	Centered (At Index)
1960 (Early) Oldsmobile ℂ	1 Notch Rich
1960 (Later) Oldsmobile ②	Centered (At Index)

ℂ - Early carburetors with no letter or with "MOD" notation on brass identification tag.

② - Later carburetors marked by letter "A", "B", or "C" on identification tag.

►*1960 OLDSMOBILE CHOKE SETTING "TAILORING" FOR CLIMATIC CONDITIONS (Carburetors Mark d "B" or "C" on Identification Tag and with Three Hol s in Choke Shaft Lever):* Moving intermediate rod to next OUTER hole will provide richer mixture during warm-up for acceleration or load. Moving rod to next INNER hole will provide leaner mixture under same operating conditions.

Fast Idle (2GC Carburetors): *Adjust each model as follows:*

Chevrolet (All) & Pontiac 7013069, 7013075, 7015062 & 7015073) - No separate fast idle adjustment required as fast idle speed is automatically set when hot or slow idle speed is adjusted (same screw controls both settings).

Oldsmobile (All) & Pontiac 7013060, 7013061, 7015070 & 7015072) - As a preliminary adjustment (with carburetor off engine), close choke valve and see that fast idle screw is on high step of fast idle cam. Adjust fast idle screw for correct throttle valve opening or clearance between edge of valve and carburetor bore on side opposite idle adjusting screws as shown in table below. Make final adjustment with carburetor on engine as follows: Connect tachometer, place transmission selector in Neutral "N" position, rotate fast idle cam so fast idle screw is on high step of cam. With engine at normal operating temperature, adjust fast idle screw for correct engine speed as indicated in table below.

Fast Idle Setting
(Off Engine)

Car & Carb.	Throttle Opening	Checking Gaug
Oldsmobile (All)	.030"	BT-121
Pontiac 7013060, 61	.037"	BT-170
Pontiac 7015070, 72	.037"	BT-170

(On Engine)

Car Model	Engine Sp d
Oldsmobile	ℂ 1900 RPM
Pontiac	2700 RPM

ℂ - For sub-zero weather operation set fast idle speed to 2200 RPM.

Choke Rod (2GC Carburetors): Position fast idle screw on second step of fast idle cam, close choke valve until screw is against shoulder of high step on cam. On Oldsmobile, press up on intermediate choke lever and make certain that intermediate choke rod is at end of slot in intermediate lever. In this position, choke valve opening or clearance between upper edge of valve and air horn wall should be as shown in table below. Adjust by bending tang on fast idle lever on choke valve shaft (Chevrolet & Pontiac), or by bending lower choke rod (Oldsmobile).

CONTINUED ON NEXT PAGE

1959-60 ROCHESTER 2G & 2GC (C nt.)

Ch ke Rod Setting

Car & Carb.	Choke Valve Opening	Checking Gauge
1959-60 Chevrolet (All)	.089"	BT-108
1959-60 Oldsmobile (All)	.150"	BT-159
1959 Pontiac 7013060,61	.070"	BT-163
1959 Pontiac 7013069,75	.056"	BT-167
1960 Pontiac 7015062,73	.056"	BT-167
1960 Pontiac 7015070,72	.070"	BT-163

Unloader (2GC Carburetors): Move throttle valves to wide open position (see Pontiac Note below) so that choke valve is partially open. Measure the choke valve opening or clearance between upper edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever using bending tool BT-69.

PONTIAC CHECKING NOTE - It is recommended that the throttle valves be opened by depressing accelerator pedal forcibly to the floor (by someone sitting in driver's seat) to simulate actual driving conditions. Make certain that pedal does not strike hump over transmission. Above procedure will eliminate all variances in linkage, floor mat, or pedal location.

Unloader Setting

Car & Carb.	Choke Valve Opening	Checking Gauge
1959-60 Chevrolet (All)	.360"	BT-108
1959-60 Oldsmobile (All)	.163"	BT-162
1959-60 Pontiac (All)	.163"	Ⓒ

Ⓒ - Use BT-168 (7013069,75, 7015062,73 Carburetors), BT-162 (Other carburetors).

OVERHAUL: It is recommended that a holding fixture be used to mount carburetor on bench for overhaul.

Disassembly: Air Horn - On carburetors with automatic choke mounted on air horn, see Automatic Choke data below for disassembly of automatic choke. On all models, remove fuel inlet fitting and gasket, remove filter screen. Take out idle vent valve retaining screw and remove vent and shield. Disconnect and remove pump rod and choke intermediate rod. Take out screw at end of choke shaft and remove choke trip lever and fast idle link and lever (link can be disconnected from fast idle cam by rotating link until it slips out through slot in cam). Remove eight cover screws, lift air horn and bowl cover straight up and off main body. Invert cover, remove float hinge pin, lift float and needle assembly out, disconnect intake needle from float. Remove intake needle seat and gasket, remove filter from needle seat bore. Remove power piston by depressing stem and allowing it to snap free (or hold stem and tap lightly on air horn). Remove pump plunger assembly from pump arm by freeing retainer on pump plunger shaft. Loosen setscrew on pump inner arm, remove pump outer lever and shaft. Lift off cover gasket. If choke valve being replaced, take out choke valve screws, remove choke valve, slide choke valve shaft out.

Main B dy (Float B wl) - Remove pump inlet filter screen, pump plunger return spring, and inlet check ball from bottom of pump cylinder. On carburetors with idle compensator valve, take out attaching screws and remove idle compensator and gasket. Remove main metering jets and power valve. Take out venturi cluster retaining screws and lift out venturi cluster, gasket, and main well inserts (Chevrolet only). *CAUTION* - Do not attempt to disassemble venturi cluster. Use needle nose pliers to lift out pump discharge spring guide, remove spring and pump discharge check ball. Invert float bowl assembly, remove three throttle body attaching screws, lift off throttle body and gasket.

Throttle Body - On carburetors with automatic choke mounted on throttle body, see Automatic Choke data below for disassembly of automatic choke. On all models, remove fast idle cam or fast idle lever, remove both idle mixture adjusting screws and springs. *DO NOT remove throttle valves or shaft (cannot be assembled correctly in relation to idle discharge ports).*

Automatic Choke (Type mounted on Air Horn) - Take out three choke cover attaching screws and retainers, remove choke cover and thermostatic coil assembly, cover gasket, and baffle plate. Take out retaining screw at end of choke shaft, carefully pry off choke trip lever and fast idle choke rod link and lever. Take out two choke valve screws, remove choke valve, rotate choke shaft counterclockwise to free choke piston from housing, then withdraw choke shaft and piston assembly from air horn. Take out two choke housing attaching screws, remove choke housing and gasket.

Automatic Choke (Type mounted on Throttle Body) - Take out three choke cover attaching screws and retainers, remove choke cover and thermostatic coil assembly, cover gasket, and baffle plate. Remove choke piston attaching screw, rotate link to withdraw piston from cylinder, lift out piston and link assembly. Take out two choke housing attaching screws, remove choke housing assembly and gasket. Remove gasket, remove choke lever and shaft with linkage from choke housing.

Cleaning & Inspection: Thoroughly clean all castings and metal parts in carburetor solvent *(CAUTION - Do not immerse choke coil and housing in solvent).* Use clean gasoline to clean the pump plunger. Blow out all passages and dry parts with air. *CAUTION* - DO NOT use drills or wire to clean out jets or calibrated passages. Inspect all parts for wear or damage and replace as necessary.

Reassembly: Assemble all parts in reverse order of disassembly procedure above and note the following:

Choke Valve Installation - Install valve with identifying mark "RP" upward, center choke valve before tightening screws *(NOTE* - Valve can be centered by installing fast idle lever and choke trip lever on end of shaft and maintaining .020" clearance between fast idle lever and air horn casting). Stake choke valve screws lightly after tightening.

Accelerating Pump Assembly - Lubricate pump shaft with Lubriplate or light grease when installing in bowl cover. Make certain that pump check balls are not interchanged. Inlet check ball is Aluminum, discharge check ball is Steel.

V nturi Clust r Installati n - Center cluster screw must have gasket (to prevent pump discharge leakage around screw). Tighten all cluster screws evenly.

P w r Pist n Installati n - Make certain piston travels freely in its cylinder. Stake retainer washer lightly to retain assembly in place.

Chevrolet Governor Overhaul: R moval - Remove four governor cover attaching screws, remove cover and gasket. Detach and remove governor throttle spring. Remove diaphragm cover attaching screws, lift off cover. Hold throttle lever and loosen nut attaching governor lever and pin assembly to throttle shaft, free lever from throttle shaft and disengage it from diaphragm rod by rotating lever until tang on rod clears slot in lever. Remove diaphragm assembly from housing. Remove three governor housing mounting screws, remove seal retainer and leather seal. Detach governor housing from throttle body, remove housing gasket.

Cleaning & Inspection - DO NOT immerse throttle lever and bearing assembly in cleaning solution (will damage neoprene seal protecting ball bearings). Make certain that throttle bearings are completely dry (blow out with air) and lubricate with very light machine oil *(CAUTION* - Throttle shaft must rotate freely with no trace of any binding which would affect governor operation).

Installation - Install governor housing mounting gasket (narrower edge toward top of carburetor), install housing, leather seal, seal retainer, and mounting screws (DO NOT tighten screws). Check throttle shaft for free operation in seal, tighten mounting screws while holding throttle in closed position, recheck throttle shaft for free operation. Install diaphragm assembly in housing and align vacuum passage holes in diaphragm and housing. Assemble governor lever and pin assembly on end of diaphragm rod (in housing) and position lever on throttle shaft, install lockwasher and nut on shaft, tighten nut while holding throttle lever to prevent damage to valves. Align diaphragm with mounting screw holes in housing, install cover with cover restriction piloting through diaphragm and into vacuum passage in housing, install cover screws finger-tight. Hold throttle valves wide open (to provide maximum diaphragm travel), tighten cover screws to 25-28 in. lbs., install lockwire on screws. Install throttle spring over governor lever pin and stationary post in housing. Check for free operation of throttle shaft, then install governor cover and gasket, tighten attaching screws, install lockwire on screws.

SERVICE PARTS: Gasket S ts - Rochester No. 7015952 (7013007, 7013008, 7013018, 7013082); No. 7015949 (7013009, 7015015, 7013011); No. 7015970 (7013013, 7015017); No. 7016040 (7013052, 7013058, 7015052, 7015058); No. 7016041 (7013060, 7013061); No. 7015962 (7013069, 7013075).

Overhaul Kits - Rochester No. 7015924 (7013007); No. 7015951 (7013008, 7013018, 7013082); No. 7015926 (7013009, 7015015, 7013011); No. 7015932 (7013013, 7015017); No. 7016020 (7013052, 7013058, 7015052, 7015058); No. 7016021 (7013061, 7013060), No. 7015949 (7013075, 7013069).

Off-Kar Kits - Rochester No. TR-304 (All Chev. Pass. Cars); No. TR-305 (7013009, 7015015, 7013011); No. TR-507 (All Oldsmobile); No. TR-605 (7013061, 7013060); No. TR-608 (7013075, 7013069).

ROCHESTER "B" & "BC"

CHEVROLET 6 CYL. PASS. CARS	Roch st r Mod l No.
1954 Synchro-mesh	BC 7005921
1954 Powerglide	BC 7005922
1955 Synchro-mesh	BC 7007181
1955 Powerglide	BC 7007180
1956 Synchro-mesh	BC 7009255
1956 Powerglide	BC 7009254
1957 Synchro-mesh	BC 7009657
1957 Powerglide	BC 7009656
1958 Synchro-mesh	BC 7012127
1958 Powerglide	BC 7011102
1959 Synchro-mesh (Std.)	BC 7013003
1959 Synchro-mesh (Gov.)	BC 7013005
1959 Synchro-mesh (Econ.)	BC 7013955
1959 Powerglide (Std.)	BC 7013000
1959 Powerglide (Gov)	BC 7013005
1959 Powerglide (Econ.)	BC 7013956
1960 Synchro-mesh (Std)	BC 7013003
1960 Synchro-mesh (Gov)	BC 7013005
1960 Synchro-mesh (Econ.)	BC 7013955
1960 Powerglide (Std)	BC 7013000
1960 Powerglide (Gov.)	BC 7013005
1960 Powerglide (Econ.)	BC 7013956
Repl. Carb. (7005921, 7007181, 7009255)	7009911
Repl. Carb. (7012127, 7013003, 7009657)	7015911
Repl. Carb. (7005922, 7007181, 7009254)	7007200
Repl. Carb. (7009656, 7011102, 7013000)	7015902
Repl. Carb. (7013955)	7015975
Repl Carb (7013956)	7015974

CHEVROLET 6 CYL. TRUCKS	Rochester Model No.
1954-57 235" Eng Synchro-mesh	B 7004468
1954-Early 1955 235" Eng Auto. Trans	BC 7005921
1955 Late 235" Eng Auto Trans.	BC 7007181
1956-57 235" Eng Auto Trans.	BC 7009255
1958 235" Eng All Trans	B 7004468
1954-58 261" Eng	B 7005140
1959 235" Eng. All Trans. (Std)	B 7013029
1959 235" Eng. Synchro-mesh (Econ)	B 7013953
1959 261" Eng All Trans.	B 7005140
1960 235" Eng All Trans (Std.)	B 7015011
1960 235" Eng. (Econ.)	B 7015021
1960 261" Eng. All Trans	B 7015013
Repl Carb. (7004468, 7013029)	7015919
Repl Carb. (7005921, 7007181, 7009255)	7009911
Repl. Carb (7013029, 7005140)	7005140
Repl. Carb (7013953)	7015960
Repl. Carb (7015011)	7016001
Repl. Carb (7015021)	7016003
Repl Carb (7015013)	7016003

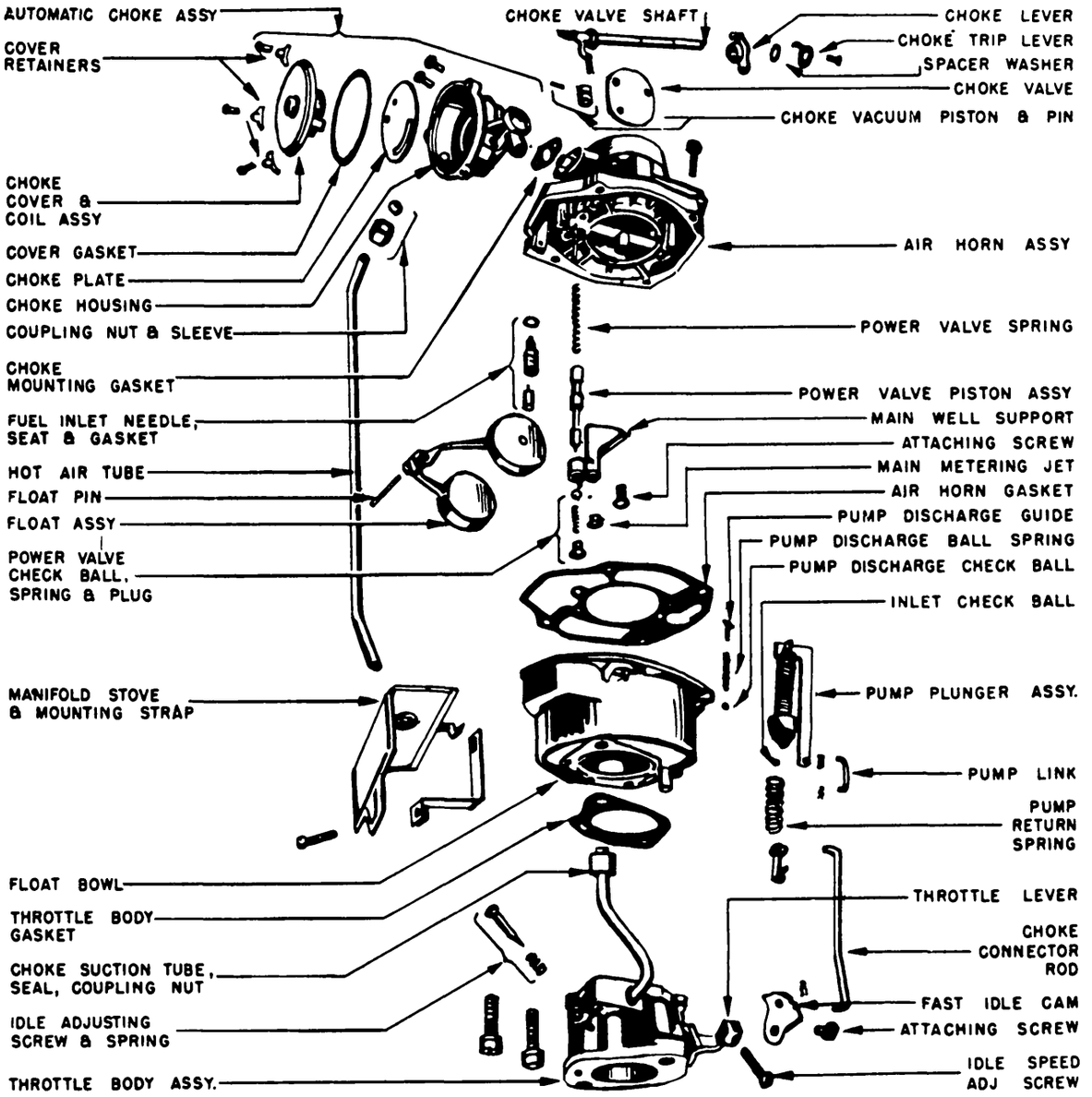
►CHANGES, CAUTIONS, CORRECTIONS

►*1957 METERING JET CHANGE FOR IMPROVED PART THROTTLE PERFORMANCE* See Rochester Single & Dual J t Specifications for latest jets.

►*1957 CHEVROLET 6 LOADING UP DURING WARM-UP CORRECTION (Cars with "BC" Carbs)* Caused by over rich condition Correct by setting automatic choke to new specifications See *Automatic Choke Setting b low*

►*1959 WARM ENGINE HARD START CORRECTION (Auto. Trans. Cars)* If engine tune-up does not correct this condition, set choke one notch lean

►*1959 CARBURETOR THROTTLE BODY TO FLOAT BOWL SEALING CORRECTION:* If throttle body to float bowl screws work loose, install later type gasket (black in color)



ROCHESTER BC CARBURETOR (MODEL B SIMILAR WITHOUT CHOKE)

DESCRIPTION: Plain tube, downdraft type with concentric bowl, double float, vacuum controlled power system, and fast idle assembly 1957 and later carburetors (Pass Cars) have a low air horn design and a new type power piston

►*1960 CHEVROLET TRUCK (235" ENG.) SURGE CORRECTION:* This condition which is noticeable in the 20-60 MPH speed range when accelerating can be corrected by installing a No. 55 main metering jet, Part No. 7001860 in place of the former No. 54 jet.

►*FUEL STRAINER NOTE:* Strainer screen (under fuel inlet fitting nut) can be removed for cleaning Replace filter every 15,000 miles or sooner if needed.

ADJUSTMENTS: Make all adjustments exactly as detailed below.

Idling Adjustm nt: If preliminary setting required to warm up engine, turn idle mixture screw in until it is lightly

CONTINUED ON NEXT PAGE

ROCHESTER "B" & "BC" (Continued)

seated, then back screw out correct number of turns (see table below). Set parking brake tight, place selector lever in "D" (Powerglide), start engine and allow it to idle until normal operating temperature is reached, then adjust as follows:

Idle Mixture - With engine at normal operating temperature and idling at correct speed (see below), turn idle mixture adjusting screw in or out until smoothest engine performance is secured. Recheck idle speed.

Idle Mixture Setting

Car Model	Idle Screw Opening
1954 Chev. Pass. Cars	1-2½ turns
1955-60 Pass. Cars	2½ turns
1954 Chev. Truck 235" Eng.	1½-2½ turns
1954 Chev. Truck 261" Eng.	1-1½ turns
1955-57 Chev. Truck ("BC" Carbs.)	2½ turns
1955-60 Chev. Truck ("B" Carbs.)	1½-2½ turns

Idle Speed - With engine at normal operating temperature, adjust throttle stopscrew for correct idling speed as listed below (*CAUTION* - On "BC" carburetors, stopscrew must be resting on lowest step of fast idle cam when adjustment being made).

Idle Speed Setting

Car Model	Synchro-mesh	Auto. Trans.
1954-57 Chev. Pass. Cars	475 RPM	①425 RPM
1958-60 Chev. Pass. Cars	475 RPM	①450 RPM
1954-57 Chev. Truck	450-500 RPM	②400-450 RPM
1958 Chev. Truck	475 RPM	②400-450 RPM
1959-60 Chev. Truck	475 RPM	①450 RPM

① - Transmission in "D" (Drive) Range.
② - Transmission in "N" (Neutral).

Float Level: *CAUTION - Two separate adjustments required as follows:*

1) Float Level Setting - *CAUTION - When removing air horn and bowl cover on "BC" carburetors, disconnect heat suction tube at upper coupling nut and use care not to disturb seal at lower end of tube.* Invert bowl cover and float assembly but DO NOT remove cover gasket. Install gauge (see table below) over floats with center tang on gauge in main discharge nozzle on cover. Bend float arms **vertically** so that each float just touches top of cut-out in gauge, bend arms **horizontally** so that each float is centered in gauge cut-out. Check setting by tilting assembly 90° to each side to make certain that floats do not touch gauge (*CAUTION* - This setting necessary to insure that floats will not rub on sides of float bowl).

Float Level Setting

Model	Checking Gauge	Float Setting
All Carbs.	① M-250	1 9/32"

① - Chevrolet No. 3696192.

2) Float Drop Setting - Hold bowl cover assembly upright so that floats drop down to limit of travel. Measure distance from lower face of gasket on cover to bottom of floats at center using a scale. This distance should be 1¾" (All Carburetors). Adjust by bending tang at rear of float assembly.

Fast Idle ("BC" Carburetors): *NOTE* - Fast idle speed is automatically set when hot or slow idle speed is adjusted (same screw controls both settings). Adjust fast idle cam position as follows:

Fast Idle Cam Position - Rotate fast idle cam until throttle stopscrew is on second (next to highest) step of cam and against the shoulder of the highest step. Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending choke connector rod at central angle using bending tool J-4552 (Rochester BT-18).

Fast Idle Cam Setting

Model	Choke Opening	Checking Gauge
1954-58 "BC" Carbs.	.076"	①BT-99
1959-60 "BC" Carbs.	.040"	BT-102

① - Chevrolet No. J-6838.

Unloader ("BC" Carburetors): Open throttle valves to wide open position which will open choke valve slightly. Check choke valve opening or clearance between lower edge of valve and air horn wall using correct gauge (see table below). If clearance not correct, adjust by bending tang on throttle lever which contacts fast idle cam using bending tool J-4552 (Rochester BT-69).

Unloader Setting

Model	Choke Opening	Checking Gauge
All Carbs.	.230"	①BT-99

① - Chevrolet No. J-6838.

Automatic Choke: Adjust by loosening three retainer screws on choke cover and rotating cover and coil assembly. Centered setting is with scribed index mark on cover in line with longest (center) cast mark of scale on housing.

Choke Setting

Model	Choke Setting
1954-56 Chevrolet (All Models)	Centered (At Index)
1957 Chev. Cars	①3 Notches Lean
1957 Chev. Trucks	Centered (At Index)
1958 Chev. Cars (Synchro-mesh)	1 Notch Lean
1958 Chev. Cars (Auto. Trans.)	Centered (At Index)
1959 Chev. Cars (Synchro-mesh)	1 Notch Lean
1959 Chev. Cars (Auto. Trans.)	②Centered (At Index)
1960 Chev. Cars (Synchro-mesh)	1 Notch Rich
1960 Chev. Cars (Auto. Trans.)	2 Notches Rich

① - Supersedes previous setting of 1 Notch Rich (Synchro-mesh); 1 Notch Lean (Auto. Trans.).
② - Set 1 Notch lean to correct warm hard start.

OVERHAUL: Disassembly - On manual choke carburetors, remove choke control bracket and air horn attaching screws, then hold throttle kicker in vertical position (free of fast idle cam) and lift bowl cover assembly off fuel bowl being careful not to damage floats. On automatic choke carburetors, disconnect choke heat suction tube at choke housing, then remove choke coil cover assembly, gasket and baffle plate. Remove fast idle connector rod, and retaining screw on opposite end of choke shaft, then remove choke trip lever, washer and counterweight. Remove choke valve screws and remove valve, then rotate shaft until vacuum piston clears housing bore and remove shaft assembly from air horn. Remove air horn to fuel bowl attaching screws and remove air horn, being careful not to damage floats. On manual choke carburetors, remove choke valve screws and valve, then remove retainer ring from groove in shaft boss and slide shaft, spring and lever assembly out of air horn. Remove throttle kicker, lever and spring. On all carburetors, hold pump plunger down in cylinder and remove retainer from pump link, then remove link from throttle lever and plunger and lift plunger from bowl. Remove plunger spring and ball check from bottom of pump cylinder. Turn pump discharge guide until it can be removed, then remove discharge spring and ball by inverting the assembly. Remove pump intake screen retainer and screen. Remove throttle body attaching screws and remove throttle body. Remove idle air mixture screw and spring. On automatic choke carburetors, remove fast idle cam. On all models, remove float hinge pin from air horn and remove float assembly, then remove needle seat and gasket. Remove main metering jet and power valve from main well support, being careful not to lose ball and spring when removing power valve. Remove main well support attaching screw, support, and gasket, then remove power piston and spring. *CAUTION - Do not remov idl tube which is pressed into air horn assembly.* If necessary, remove choke housing.

►*THROTTLE VALVE ASSEMBLY CAUTION: Do not remove throttle valve. If valve assembly is damaged or worn, replace complete throttle body ass mbly.*

Cleaning & Inspection: Wash all parts except choke coil housing and pump plunger in carburetor cleaning solvent and blow dry with air. Blow out all passages with air and inspect for carbon deposits. Inspect all parts for wear or damage.

Reassembly: Reverse disassembly procedure and note the following:

Choke Valve - Install choke valve with "RP" mark on valve toward top of carburetor.

Pump Intake Ball Check - On early carburetors with aluminum ball check, install ball in bottom of pump cylinder and see that it lifts freely from its seat.

►*HEAT SUCTION TUBE SERVICING NOTE:* If tightening of loose seal with Tool BT-45 (Rochester) J-4551 (Chevrolet), does not correct leakage, install new seal as follows: With carburetor fully assembled, loosen throttle body-to-bowl casting screws, then insert flared end of heat suction tube into hole in throttle body and tap seal down lightly into position with either of the two tools listed above. Rotate tube while tapping to insure starting uniformally into throttle body. Tighten coupling nut at upper end of tube finger tight, using new packing on tube. Use a light hammer and either of the two tools to spread seal securely in throttle body (rotate tool to secure uniform spreading of seal). Loosen coupling nut at upper end of tube and check tube tightness in throttle body (tube should not turn). Tighten coupling nut securely, then tighten throttle body-to-bowl casting screws. Check seal for leaks after carburetor installed on engine.

SERVICE PARTS: Gasket Sets - Rochester No. 7004085 (7005921, 7005922, 7007180, 7007181, 7009254, 7009255); No. 7015966 (7009656, 7009657, 7012127, 7011102, 7013000, 7013003, 7013005, 7013955, 7013956); No. 7015965 (7004468, 7013029, 7013953, 7015011, 7015021); No. 7006126 (7005140, 7015013).

Repair Kits - Rochester No. 7009311 (7005921, 7005922, 7007180, 7007181, 7009254, 7009255); No. 7015729 (7009656, 7009657, 7002127, 7011102); No. 7015936 (7013000, 7013003, 7013005); No. 7015976 (7013955, 7013956); No. 7015964 (7004468, 7013029, 7013953, 7015011, 7015031); No. 7009312 (7005140, 7015013).

On-Car Kits - Rochester No. SR-302 (7009656, 7009657, 7012127, 7011102, 7013000, 7013003, 7013005, 7013955, 7013956).

ROCHESTER "H" CORVAIR CARBURETOR

CORVAIR	Carb. No.
All Models (Early)	7015300
Powerglide (Late)	7015310
Powerglide (Limited Production)	7015312
Synchro-mesh (Late)	7015311
Synchro-mesh (Limited Production)	7015313
High Perf. Engine	7015319

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 CORVAIR LIMITED PRODUCTION CARBURETORS (7015312 & 7015313) NOTE & FLOAT SETTING ADJUSTMENT CAUTION:* These two carburetors, with spring loaded needle valve and seat assembly, and with a special float (dimple embossed in side of float at toe end) were used in limited production. Float setting on these two carburetors is different than for carburetors with solid type needle valves. *See "Float Level" below.*

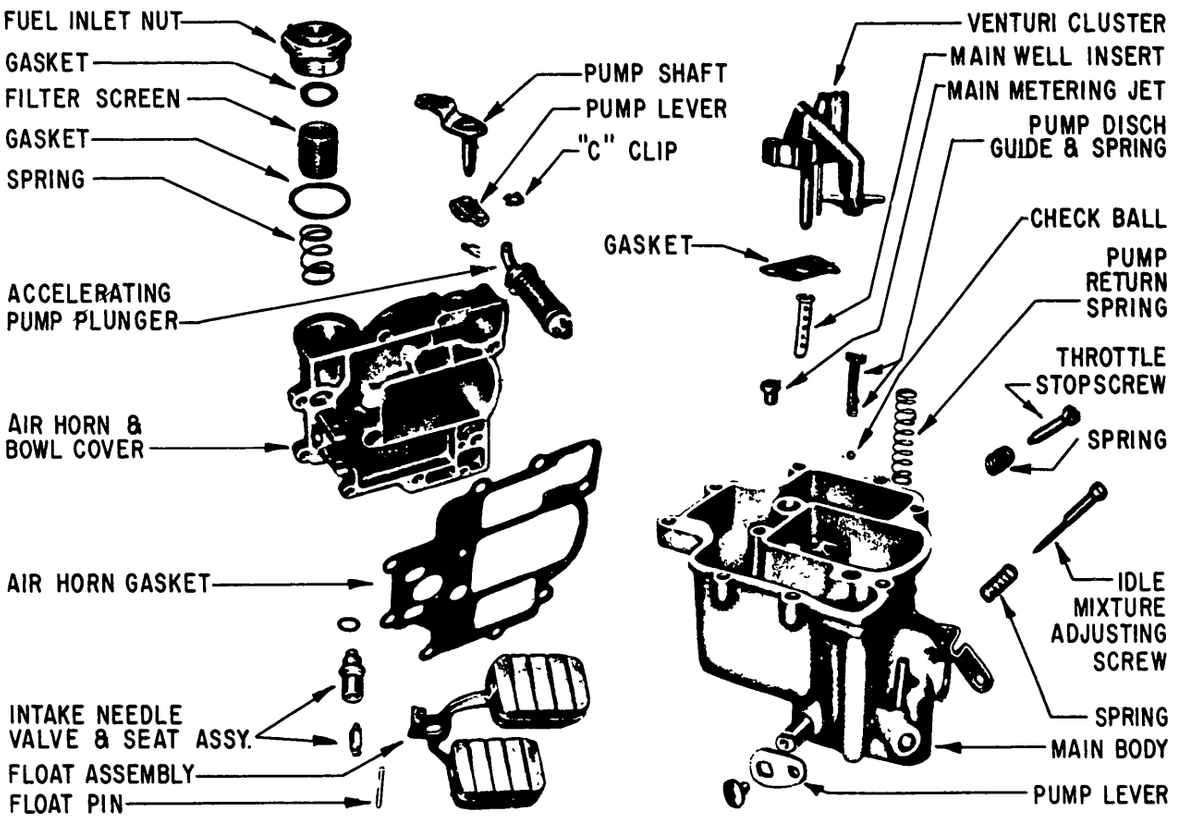
►*1960 CORVAIR CARBURETOR FLOAT ASSEMBLY & NEEDLE VALVE & SEAT ASSEMBLY SERVICE REPLACEMENT NOTE (Carburetors No. 7015312, 7015313 or Earlier Carburetors Stamped with an "A" on Metal Identification Tag):* It is recommended that needle & seat assembly, Part No. 7015789 and float assembly, Part No. 7015241 (without dimple) be used for service replacement on Carburetors No. 7015312 & 7015313. Use float assembly, Part No. 7015241 for service replacement on Carburetors No. 7015310 & 7015311 which have a letter "A" stamped on metal identification tag.

DESCRIPTION: Single barrel downdraft type of new design without choke assembly, fast idle or unloader mechanism. *NOTE – The automatic choke, fast idle and unloader are part of the separate air horn assembly which is centrally located between the right and left hand carburetors. See "Corvair Choke & Air Horn Assembly"*

ADJUSTMENT: *Make all adjustments in the order indicated below.*

Synchronizing Carburetors: *See "Carburetor" on car model page.*

Slow Idle Adjustment: With engine off and choke in full "Off" position, back both idle speed adjusting screws off until they clear throttle shaft lever on each carburetor. Adjust right carburetor idle screw until it just touches throttle shaft lever; then turn screw in an additional ½ turn. Repeat procedure on left carburetor.



ROCHESTER "H" CORVAIR CARBURETOR ASSEMBLY

NOTE - After idle mixture adjustment completed (below), adjust engine idle speed to specifications. See "Idle Speed" below.

Idle Mixture: Connect vacuum gauge to engine as follows: On automatic transmission cars, remove modulator line at "tee" fitting, then attach vacuum gauge hose. On synchro-mesh cars install an adapter "tee" connector and short piece of hose into choke vacuum hose line, then attach vacuum gauge to "tee". On all models, turn idle mixture screws on both carburetors in until lightly seated, then back off each screw 1½ turns. Adjust idle mixture screws to obtain peak vacuum and engine speed on each carburetor. After adjusting idle speed (below), remove vacuum gauge and fittings.

Idle Speed: 500 RPM (Automatic Trans. in Drive range). Adjust idle speed screws equally to obtain specified idle speeds.

Unloader: Adjust swivel on fast idle link to obtain ¼" clearance between top of choke valve and upper wall of air horn with wide open throttle (through detent on automatic transmission cars).

Fast Idle Speed: Rotate fast idle cam counterclockwise to high position and adjust fast idle screw to obtain 2200 engine RPM. *NOTE - If unable to obtain adequate fast idle, adjust swivel toward end on fast idle link, until specified fast idle speed is obtained.*

►*FLOAT LEVEL ADJUSTMENT CAUTION:* Spring loaded needle valve and seat assemblies were used in limited production on Carburetors No. 7015012 & 7015013 in conjunction with a new float assembly identified by a dimple embossed on side of float at toe end. Adjustment specifications and procedures for carburetors with these assemblies are different than for carburetors with solid type needle and seat assemblies. *See "Production Changes & Service Replacement Note" above.*

Float Level (Solid Needle Valve): With bowl cover inverted, gasket in place, distance from top of float (at highest point) should be 1 13/64" (Gauge J-8370).

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ROCHESTER "H" CORVAIR CARBURETOR (Cont.)

NOTE - Floats must be parallel within 1/32" and must be centered between gauge legs. To adjust, bend float tang.

Float Level (Spring Loaded Needle Valve): With bowl cover inverted, gasket in place, distance from gasket surface to "dimple" on side of float at "toe" end should be 7/16". To adjust, bend float tang.

Float Drop: With bowl cover held upright and float hanging free, distance between cover gasket and bottom of float (at free end) should be 1¾". To adjust, bend tang at end of float hinge arm.

Pump Rod: Back off idle speed screw until throttle valve is completely closed, then while holding throttle valve closed, check to see that scribe mark on accelerator pump lever is aligned with the mark cast into bowl cover. To adjust, bend pump rod at lower end.

►*CHOKE, FAST IDLE & UNLOADER ADJUSTMENTS: Th s adjustments ar mad on th s parat air horn assembly located between the two carburetors. See "Corvair Choke & Air Horn Assembly"*

OVERHAUL: Disassembly – Disconnect pump rod from pump lever, then remove fuel inlet nut, gasket, filter element, and spring. Remove bowl cover assembly and gasket (note location of the two longer screws on either side of accelerator pump). Remove floats and float needle. If necessary, needle seat and gasket may be removed with a large screwdriver. To remove accelerator pump, remove "C" clip, then remove shaft and lever. Remove two screws attaching venturi cluster to bowl assembly and lift out cluster, gasket and main well insert. Remove pump discharge valve, idle mixture adjusting screw and spring.

Inspection: Clean all parts in solvent or carburetor cleaner (do not immerse pump plunger or gaskets in carburetor cleaner). Blow out all passages with air. Check all parts for wear and replace as necessary. Check to see that main well tube is not bent. It should be exactly 90° from body.

Assembly: Replace main well insert, venturi cluster, and gasket in bowl assembly, and install the two screws and lockwashers. *NOTE – Hol s in main w ll insert must be aligned with hol s in main w ll tub . Align tab and notch on lat r carburetors.* If accelerator pump has been removed, replace pump and "C" clip (make sure pump return spring is in place in bowl assembly). Install pump discharge valve. Replace needle seat and float needle, float, pin and new gasket, then adjust float level and float drop. Replace filter, gasket, and inlet nut. With a new gasket installed on bowl cover assembly, install cover assembly on bowl. Install six screws and lockwashers (install the two longer screws in original positions on either side of accelerator pump). Install pump rod into pump lever and secure with the clip.

SERVICE PARTS: Gasket Sets - Rochester No. 7016042 (7015300); No. 7016046 (7015310, 7015311, 7015312 7015313).

Repair Kit - Rochester No. 7016027 (all carburetors).

CORVAIR AUTOMATIC CHOKE & FAST IDLE

Corvair (1960)

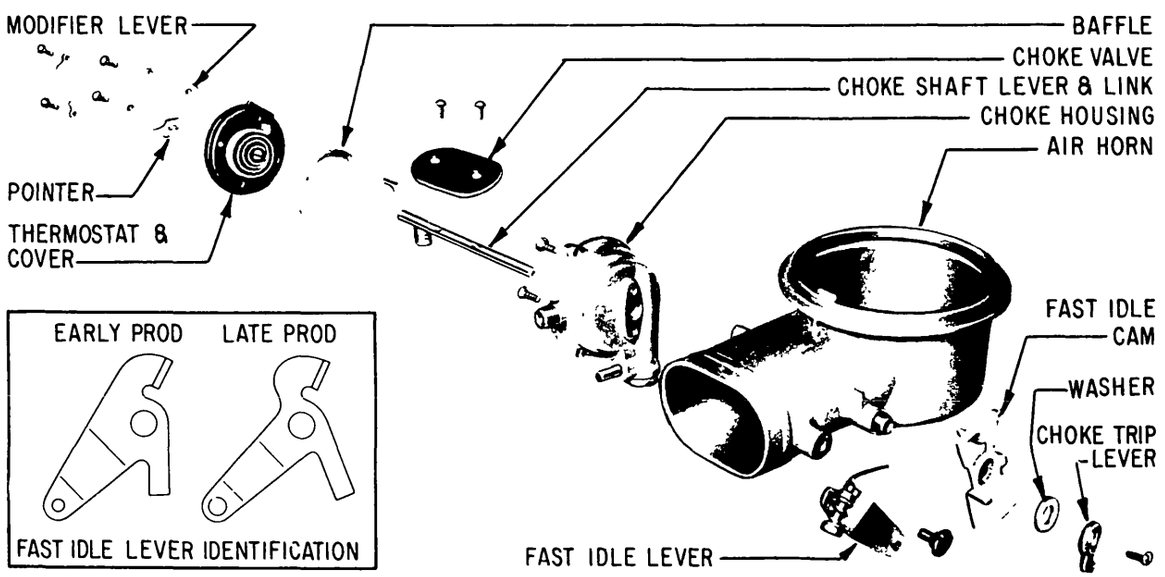
DESCRIPTION: This assembly, which contains the automatic choke (fast idle & unloader), air horn, and air cleaner, is mounted on a tripod directly over the engine cooling blower between the two carburetors. Two tubes from the air cleaner direct filtered air to the top of each carburetor. The cross shaft between the two carburetors control the automatic choke, choke modifier, fast idle and unloader through linkage.

ADJUSTMENTS: The following adjustments are made on the choke & air horn assembly as follows:

Fast Idle: With idle speed and mixture adjustments completed, place a 1/8" spacer between throttle lever and adjusting screw at left hand carburetor, then remove the clip attaching fast idle link swivel to fast idle lever. Turn down fast idle adjusting screw until approximately 5/16" (early type lever); 3/16" (late type lever) of screw projects past fast idle lever. *NOTE – See illustration for identification of early and later type fast idle levers. On early type levers it will be necessary to extend the threads on fast idle link in order to turn swivel down far enough for proper adjustment.* Rotate fast idle cam counterclockwise (viewed from left of car) until fast idle screw can be brought to bear on highest point of cam. Hold fast idle screw in this position and turn swivel on fast idle link until swivel pin will just enter hole in fast idle lever. Clip swivel and link in position. Hold cam and lever in position. Hold cam and lever in slow idle position (screw on low side of cam) and carefully adjust fast idle screw to the 1/8" spacer installed between throttle lever and adjusting screw on left hand carburetor fits snugly but may be slipped out easily.

Automatic Choke (Choke Modifier): With fast idle cam in slow idle position and with modifier link connected to cross shaft lever, loosen lever and pointer screw and rotate pointer to index mark. *NOTE – Lever must point toward rear of car.* Tighten screw to lock lever and pointer in position.

Unloader: With throttle at wide open position, clearance between top of choke valve and adjacent wall of air horn should be ¼". Use Tool J–8370 to check distance. To adjust, bend unloader tang in center of fast idle cam.



CORVAIR AIR HORN WITH FAST IDLE & AUTOMATIC CHOKE

1954-55 ROCHESTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor	Main Metering Jet Part No. Standard	Main Metering Jet Part No. 1 Size Lean	Main Metering Jet Part No. 1 Size Rich	Main Well Support	Float Needle & Seat
CHEVROLET 6 CYL CARS							
Synchro-mesh (Early)	1951	7003152	7002651	7002650		7002061	7002359
Synchro-mesh (Late)	1951	7003865	7002651	7002650		7003922	7002359
Powerglide (Early)	1951	7003160	7002658	7002657		7003079	7002359
Powerglide (Late)	1951	7004495	7002656	7001860		7004523	7002359
Synchro-mesh	1952	7004477	7002652	7002651		7004512	7002359
Powerglide	1952	7003526 ①	7002657	7002656		7003822	7002359
Synchro-mesh	1953	7004915	7002958	7002957		7005422	7002359
Powerglide	1953	7004478	7002958	7002957		7005422	7002359
Synchro-mesh	1954	7005921	7002958	7002957	7002959	7005924	7002359
Powerglide	1954	7005922	7002958	7002957	7002959	7005924	7002359
Synchro-mesh	1955	7007181	7002957	7002956	....	7007165	7002359
Powerglide	1955	7007180	7002957	7002956	....	7007165	7002359
CHEVROLET V8 CARS							
Early Synchro-mesh	1955	7006825	7002952 ①	7002951 ①	7006331	7006011	7006941
Late Synchro-mesh	1955	7008005	7002952	7002951	7006331	7006011	7006941
Early Powerglide	1955	7005810	7002951 ①	7002950 ①	7006331	7006011	7006941
Late Powerglide	1955	7008004	7002951	7002950	7006331	7006011	7006941
CHEVROLET TRUCKS							
216" Eng. Std Trans. (Early)	1951	7003152	7002651	7002650		7002061	7002359
216" Eng. Std Trans. (Late)	1951	7003863	7002651	7002650		7003922	7002359
235" Eng. Std. Trans. (Late)	1951	7003864	7002658	7002657		7003921	7002359
216" Eng. Std Trans.	1952	7004475	7002652	7002651		7004512	7002359
235" Eng Std. Trans.	1952	7004476	7002659	7002658		7004571	7002359
Repl. 216" Eng.	1946-52	7004620 ②	7002652	7002651		7004622	7002359
Repl 235" Eng.	1950-52	7003526 ②	7002657	7002656		7003822	7002359
216" Eng. Std. Trans.	1953	7004475	7002652	7002651		7004512	7002359
235" Eng Std Trans.	1953	7004468	7002959	7002958		7005428	7002359
235" Engine	1954	7004468	7002958	7002957	7002959	7005428	7002359
216" Engine	1954	7005140	7002958	7002964	7002966	7005597	7002359
Automatic Trans	1954	7005921	7002965	7002957	7002959	7005924	7002359
235" Eng. Std. Trans.	1955	7004468	7002958	7002957	.....	7005428	7002359
235" Eng. Auto. Trans.	1955	7005921	7002956	7002957	....	7005924	7002359
261" Eng.	1955	7005140	7002958	7002964	.....	7005597	7002359
CHEVROLET V8 TRUCKS							
½ Ton O.D.	1955	7008399	7002953	7002952	7006331	7006011	7006941
Others	1955	7006770	7002953	7002952	7006331	7006011	7006941
OLDSMOBILE							
All Cars	1955	7006970	7001498	7002652	7006331	7008069	7006998
PONTIAC 6 CYL CARS							
Hydra-Matic	1955	7006100	7001860	7001607	7006331	7006323	7006998

①—Replace float bowl, metering jets, or venturi cluster as a unit.
②—Automatic Choke Carburetor.
③—Two sizes Lean No. 7002956.

1956-57 ROCHESTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No.	Main Metering Jet 1 Size Lean Size	Main Metering Jet 1 Size Lean Part No.	Main Well Support	Venturi Cluster	Power Valve	Float Needle & Seat
CHEVROLET 6 Cyl. Cars										
Synchro-mesh	1956	BC 7009255	.058'	⑤ 7002958	.057'	⑥ 7002957	7007165		7006121	7002359
Powerglide	1956	BC 7009254	.058'	⑤ 7002958	.057"	⑥ 7002957	7007165		7006121	7002359
Synchro-mesh	1957	BC 7009657	.058"	7002958 ⑩			7010240		7006121	7002359
Automatic Transmission	1957	BC 7009656	058"	7002958 ⑩			7010240		7006121	7002359
Governor Equipped Engine	1957	BC 7009784	.055"	7002955			7010240		7006121	7002359
CHEVROLET V8 Cars										
Synchro-mesh	1956	2GC 7008387	.052'	7002952	.051'	7002951		7009493	7006331	7009458
Powerglide	1956	2GC 7008388	.052'	⑦ 7002952	.051'	⑧ 7002951		7009215	7006331	7009458
Synchro-Mesh (Early)	1957	2GC 7010647	053"	7002953 ⑪			7009212	7011497 ⑫	7006331	7009458
Synchro-Mesh (Late)	1957	2GC 7011131	.053"	7002953		--	7009212	7011497	7006331	7009458
Automatic Transmission (Early)	1957	2GC 7010648	.051"	7002951 ⑬			7009212	7009215	7006331	7009458
Automatic Transmission (Late)	1957	2GC 7011124	.051"	- 7002951			7009212	7009215	7006331	7009458
Governor Equipped Engine (Early)	1957	2GC 7010719	.053"	7002953 ⑪			7009212	7011497 ⑫	7006331	7009458
Governor Equipped Engine (Late)	1957	2GC 7011149	.053"	7002953			7009212	7011497	7006331	7009458
CHEVROLET 6 Cyl. Trucks										
235 Engine	1956	B 7004468	.058'	7002958	.057'	7002957	7005428		7002360	7002359
261' Engine	1956	B 7005140	.065'	7002965	.064"	7002964	7005597		7002360	7002359
Automatic Trans.	1956	BC 7009255	.058'	7002958	.057"	7002957	7007165	—	7006121	7002359
235" Eng. Synchro-mesh	1957	B 7004468	.058"	7002958	057"	7002957	7005428		7002360	7002359
235" Eng. Hydra-matic	1957	BC 7009255	.058"	7002958			7007165		7006121	7002359
261" Engine	1957	B 7005140	065"	7002965	064"	7002964	7005597		7002360	7002359
CHEVRCLET V8 Trucks										
Synchro-mesh	1956	2G 7008389	.053"	7002953	.052'	7002952		7009218	7006331	7009458
Overdrive	1956	2G 7008383	.053'	7002953	.052	7002952		7009218	7006331	7009458
With Governor	1956	2G 7008393	.052"	7002652				7009376	7006331	7009458
265" Eng. S.M W/O Governor (Early)	1957	2G 7010649	053"	7002953			7009212	7009218	7006331	7009458
265" Eng. S.M. W/O Governor (Late)	1957	2G 7011135	053"	7002953			7009212	7009218	7006331	7009458
265" Eng. S.M. W/Governor (Early)	1957	2G 7010716	053"	7002953			7009212	7009218	7006331	7009458
265" Eng. S.M. W/Governor (Late)	1957	2G 7012147	053"	7002953			7009212	7009218	7006331	7009458
265" Eng. O D. (Early)	1957	2G 7010718	053"	7002953			7009212	7009218	7006331	7009458
265" Eng. O.D. (Late)	1957	2G 7011132	053"	7002953			7009212	7009218	7006331	7009458
283" Eng. W/Governor (Early)	1957	2G 7010717	052"	7002952			7009212	7009376	7006331	7009458
283" Eng. W/Governor (Late)	1957	2G 7011143	052"	7002952			7009212	7009376	7006331	7009458
OLDSMOBILE										
88 (Dual Range H.D.)	1956	2GC 7007223	.062'	7002662	.061'	7002661		7009772 ②	7009349 ②	7006998
88 (Jetaway H.D.)	1956	2GC 7008800	.062	7002662	.061'	7002661		7009772	7009349	7006998
Triple Carburetors Front	1957	2G 7010960	059"	7002659				7010972		7009458
Center	1957	2GC 7010959	058"	7002658				7011052	7009349	7009458
Rear	1957	2G 7010958	059"	7002659				7010972		7009458
PONTIAC										
Synchro-mesh	1956	2GC 7008696	.058'	7002658	.057"	7002657		7009096	7006331	7006998
Hydra-Matic	1956	2GC 7008695	.058"	7002658	.057	7002657		7009239	7006331	7006998
Chieftan (S M)	1957	2GC 7009832	065"	7008665 ⑭	064"	7008664		7011561 ⑯	7006331	7011264
Chieftan (H M)	1957	2GC 7009831	064"	7008664 ⑮	063"	7008663		7010575	7006331	7011264
Triple Carb. Option (H M) Front	1957	2G 7011351	,056"	7002656				7010972		7012315
Center	1957	2GC 7011350	062"	7002662				7011434	7006331	7011264
Rear	1957	2G 7011352	056"	7002656		-		7010972		7012315
Extra H P Engine Front	1957	2G 7011351	056"	7002656				7010972		7012315
Center	1957	2GC 7011500	062"	7002662				7011513	7009349	7011264
Rear	1957	2G 7011352	056"	7002656				7010972		7012315

② — Supersedes No. 7006331

⑤ — Supersedes No. 7002957 for better Part Throttle Performance.

⑥ — Supersedes No. 7002656.

⑦ — Supersedes No. 7002951.

⑧ — Supersedes No. 7002950.

⑨ — Supersedes No. 7008888.

⑩ - Supersedes 7002955 (055")

⑪ - Supersedes 7002952 (052")

⑫ - Supersedes 7009493.

⑬ - Supersedes 7002952 (052")

⑭ Supersedes 7008664 (064")

⑮ - Supersedes 7008663 (063")

⑯ - Supersedes 7010603.

1958 ROCHESTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model Year	Carburetor No.	Main Metering Jet				Main Well Support	Venturi Cluster	Power Valve	Float Needle & Seat
		Standard Size	Standard Part No.	1 Size Lean Size	1 Size Lean Part No.				
CADILLAC (ELDORADO ENGINE)									
Triple Carbs. Front (Early) 1958	2G 7012201	.060"	7002660				7010976		7012603
Front (Later) 1958	2G 7012901	.060"	7002660				7010976		7012603
Center (Std.) Early 1958	2GC 7012202	.060"	7002660				7012285	7009349	7012602
Center (Std.) Later 1958	2GC 7012902	.060"	7002660				7012285	7009349	7012602
Center (A.C.) Early 1958	2GC 7012205	.060"	7002660				7012285	7009349	7012602
Center (A.C.) Later 1958	2GC 7012905	.060"	7002660				7012285	7009349	7012602
Rear (Early) 1958	2G 7012203	.060"	7002660				7010972		7012603
Rear (Later) 1958	2G 7012903	.060"	7002660				7010972		7012603
CHEVROLET 6 CYL. CARS									
Synchro-mesh 1958	BC 7012127	.057"	7002957			7012667		7002621	7002359
Powerglide 1958	BC 7011102	.056"	7002956			7011493		7002621	7002359
CHEVROLET V8 (283" Eng.) CARS									
Synchro-mesh (Early) 1958	2GC 7012133	.053"	7002953			7009212	7012320	7006331	7012524
Synchro-mesh (Later) 1958	2GC 7012451	.056"	7002956			7009212	7012514	7006331	7012524
Automatic Transmission 1958	2GC 7012452	.056"	7002956			7009212	7012469	7006331	7012524
Triple Carbs. Front (Early) 1958	2G 7011951	.063"	7002963				7012357		7012603
Front (Later) 1958	2G 7012851	.063"	7002963				7012357		7012603
Center (Auto-Trans) 1958	2GC 7011952	.059"	7002959			7009212	7012163	7006331	7012603
Center (S.M. Trans.) 1958	2GC 7012503	.061"	7002961			7009212	7012628	7006331	7012603
Rear (Early) 1958	2G 7011953	.055"	7002955				7012357		7012603
Rear (Later) 1958	2G 7012853	.055"	7002955				7012357		7012603
CHEVROLET 6 CYL. TRUCKS									
235" Engine 1958	B 7004468	.058"	7002958	.057"	7002957	7005428		7002360	7002359
261" Engine 1958	B 7005140	.065"	7002965	.064"	7002964	7005597		7002360	7002359
CHEVROLET V8 (283" Eng.) TRUCKS									
Series 3000, 4000 (Early) 1958	2G 7012035	.053"	7002953			7009212	7012486	7006331	7012524
Series 3000, 4000 (Later) 1958	2G 7012453	.053"	7002953			7009212	7012319	7010918	7012524
Series 3000,4000 W/Vac.Gov.(Early) 1958	2G 7012047	.053"	7002953			7009212	7012486	7006331	7012524
Series 3000,4000 W/Vac.Gov.(Later) 1958	2G 7012455	.053"	7002953			7009212	7012319	7010918	7012524
Series 6000 W/Vac.Gov. (Early) 1958	2C 7012233	.052"	7002652			7009212	7011262	7006331	7012524
Series 6000 W/Vac. Gov. (Later) 1958	2G 7012457	.052"	7002652			7009212	7012518	7006331	7012524
OLDSMOBILE									
Series 88 (1 Carb.) 1958	2GC 7012450	.059"	7002659				7011052	7009349	7012602
Triple Carbs. Front 1958	2G 7011712	.065"	7008665				7010972		7012603
Center (Early) 1958	2GC 7011713	.059"	7002659				7011052	7009349	7012602
Center (Late) 1958	2GC 7012913	.059"	7002659				7011052	7009349	7012602
Rear 1958	2G 7011714	.065"	7008665				7010972		7012603
PONTIAC									
Synchro-mesh (Early) 1958	2GC 7011703	.065"	7008665				7012349	7011989	7012253
Synchro-mesh (Later) 1958	2GC 7012703	.064"	7008664				7012552	7011989	7012253
Hydra-Matic (Early) 1958	2GC 7011702	.069"	7008669				7012647	7011989	7012253
Hydra-Matic (Later) 1958	2GC 7012702	.068"	7008668				7012995	7011989	7012253
Triple Carbs. Front 1958	2G 7011705	.056"	7002656				7010972		7012603
Center (S.M.Trans.) 1958	2GC 7011709	.060"	7002660				7012365	7009349	7012602
Center (Hydra-Matic) 1958	2GC 7011706	.061"	7002661				7012347	7006331	7012602
Rear 1958	2G 7011707	.056"	7002656				7010972		7012603

1959 ROCHESTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No.	Main Metering Jet Lean Size	Main Metering Jet Lean Part No.	Main Well Support	Venturi Cluster	Power Valve	Float Needle & Seat
CADILLAC (ELDORADO ENGINE)										
Triple Carbs. Front	1959	2G 7013033	.067"	7002967				7013259		7013787
Center (No. A.C.)	1959	2GC 7013034	060"	7002660				7013747	7009349	7012602
Center (A.C.)	1959	2GC 7013037	.060"	7002660				7013747	7009349	7012602
Rear	1959	2G 7013035	.067"	7002967				7013259		7013787
CHEVROLET 6 CYL. CARS										
Synchro-mesh	1959	BC 7013003	.057"	7002957			7013609		7006121	7002359
Powerglide	1959	BC 7013000	.053"	7002953			7013608		7006121	7002359
With Governor	1959	BC 7013005	.057"	7002957			7013609		7006121	7002359
Economy (Synchro-mesh)	1959	BC 7013956	.043"	7002642			7015291		7002360	7002359
Economy (Powerglide)	1959	BC 7013955	.043"	7002642			7015291		7002360	7002359
CHEVROLET V8 CARS										
Synchro-mesh	1959	2GC 7013007	.056"	7002656				7013635	7006331	7012524
Auto. Trans.	1959	2GC 7013008	.057"	7002657				7013640	7006331	7012524
Auto, Trans. & Air Cond.	1959	2GC 7013018	.057"	7002657				7013640	7006331	7012524
Canada	1959	2GC 7013082	.057"	7002657				7013640	7006331	7012524
Triple Carbs. (Early)										
Front	1959	2G 7013015	.060"	7002960				7013895		7012603
Center (Synchro-mesh)	1959	2GC 7013020	.063"	7002663				7013894	7011989	7012603
Center (Auto.Trans.)	1959	2GC 7013016	.060"	7002660				7013896	7011989	7012603
Center (A.T.&A.C.)	1959	2GC 7013026	.060"	7002660				7013896	7011989	7012603
Rear	1959	2G 7013017	.061"	7002961				7013895		7012603
Triple Carbs. (Later)										
Front	1959	2G 7013973	.063"	7008663				7013895		7012603
Center (Synchro-mesh)	1959	2GC 7013974	.060"	7002960				7013894	7011989	7012603
Rear	1959	2G 7013975	.062"	7008662				7013895		7012603
CHEVROLET 6 CYL. TRUCKS										
235" Std.	1959	B 7013029	.056"	7002956			7013802		7002360	7002359
235" Econ.	1959	B 7013953	043"	7002943			7015198		7002360	7002359
261" Std.	1959	B 7005140	.065"	7002965			7005597		7002360	7002359
CHEVROLET V8 TRUCKS										
Standard	1959	2G 7013009	.053"	7002953				7012486	7010918	7012524
Velocity Governor	1959	2G 7013011	.053"	7002953				7012486	7010918	7012524
283" Vacuum Governor	1959	2G 7013013	052"	7002952				7012518	7010918	7012524
OLDSMOBILE										
88 Standard	1959	2GC 7013052	.063"	7008663				7013396	7011989	7012253
88 Air Cond.	1959	2GC 7013058	063"	7008663				7013396	7011989	7012253
PONTIAC										
Std. Eng. (Synchro-mesh)	1959	2GC 7013061	065"	7008665				7013610	7011989	7012253
(Hydra-Matic)	1959	2GC 7013060	.069"	7008669				7013768	7011989	7012253
420E Eng. (Synchro-mesh)	1959	2GC 7013075	.066"	7008666				7015551	7006331	7012253
420E Eng. (Hydra-Matic)	1959	2GC 7013069	.063"	7008663				7013922	7006331	7012253
Triple Carbs.										
Front (All)	1959	2G 7013063	.066"	7008666				7013381		7013787
Center (Synchro-mesh)	1959	2GC 7013067	.062"	7008662				7012365	7009349	7012602
Center (Hydra-Matic)	1959	2GC 7013064	.065"	7008665				7013815	7006331	7012602
Rear (All)	1959	2G 7013065	066"	7008666				7013381		7013787

1960 ROCHESTER SINGLE & DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor No.	Main Metering Jet Standard Size	Main Metering Jet Standard Part No.	Main Metering Jet 1 Size Lean Size	Main Metering Jet 1 Size Lean Part No.	Main Well Support	Venturi Cluster	Power Valve	Float Needle & Seat
CADILLAC										
Triple Carbs. Front	1960	2G 7013033	.067"	7002967				7013259		7013787
Center (No A.C.)	1960	2GC 7013034	.060"	7002660				7013747	7009349	7012602
Center (A.C.)	1960	2GC 7013037	.060"	7002660				7013747	7009349	7012602
Rear	1960	2G 7013035	.067"	7002667				7013259		7013787
CHEVROLET 6 CYL. CARS										
Synchro-mesh (Std.)	1960	BC 7013003	.057"	7002957			7013609		7006121	7002359
Synchro-mesh (Gov.)	1960	BC 7013005	.057"	7002957			7013609		7006121	7002359
Synchro-mesh (Econ.)	1960	BC 7013955	.043"	7002642			7015291		7002360	7002359
Powerglide (Std.)	1960	BC 7013000	.053"	7002953			7013608		7006121	7002359
Powerglide (Econ.)	1960	BC 7013956	.043"	7002642			7015291		7002360	7002359
CHEVROLET V8 CARS										
283" Eng. (Synchro-mesh)	1960	2GC 7013007	.056"	7002656				7013635	7006331	7012524
283" Eng. (Auto. Trans.) No. A.C.	1960	2GC 7013008	.057"	7002657				7013640	7006331	7012524
283" Eng. (Auto. Trans.) A.C.	1960	2GC 7013018	.057"	7002657				7013640	7006331	7012524
Triple Carbs. (Std. Eng.)										
Front	1960	2G 7013015	.060"	7002960				7013895		7012603
Center (Synchro-mesh)	1960	2GC 7013020	.063"	7002663				7013894	7011989	7012603
Center (Auto. Trans.)	1960	2GC 7013016	.060"	7002660				7013896	7011989	7012603
Center (A.T. & A.C.)	1960	2GC 7013026	.060"	7002660				7013896	7011989	7012603
Rear	1960	2G 7013017	.061"	7002961				7013895		7012603
Triple Carbs. (High Perf. Eng.)										
Front	1960	2G 7013973	.063"	7008663				7013895		7012603
Center	1960	2GC 7013974	.060"	7002960				7013894	7011989	7012603
Rear	1960	2G 7013975	.062"	7008662				7013895		7012603
CHEVROLET 6 CYL. TRUCKS										
235" Std.	1960	B 7015011	.054"	7002954			7016884		7002360	7002359
235" Econ.	1960	B 7015021	.043"	7002943			7015198		7002360	7002359
261" Std.	1960	B 7015013	.064"	7002964			7016883		7002360	7002359
CHEVROLET V8 TRUCKS										
Standard	1960	2G 7015015	.052"	7002652①				7012486	7010918	7012524
Velocity Governor	1960	2G 7013011	.052"	7002652①				7012486	7010918	7012524
Vacuum Governor	1960	2G 7015017	.054"	7002954				7016695	7010918	7012524
CORVAIR										
All Models (Early)	1960	H 7015300	.052"	7002952				7016782		7015789
Powerglide (Late)	1960	H 7015310	.050"	7002950				7017431		7015789
Synchro-mesh (Late)	1960	H 7015311	.051"	7002951				7017440		7015789
OLDSMOBILE										
88 Standard	1960	2GC 7015052	.062"	7008662				7016265	7011989	7012253
88 Air Cond.	1960	2GC 7015058	.064"	7008664				7016267	7011989	7012253
PONTIAC										
Std. Eng. (Synchro-mesh)	1960	2GC 7015073	.066"	7008666					7006331	7012253
Std. Eng. (Hydra-Matic) Early	1960	2GC 7015070	.064"	7008664					7011989	7012253
425E Eng. (Hydra-Matic)	1960	2GC 7015062	.063"	7008663					7006331	7012253
Triple Carbs. Front (All)	1960	2G 7013063	.066"	7008666				7013381		7013787
Center (Synchro	1960	2GC 7015068	.060"	7008660				7016261	7009349	7012602
Center (A.T.) Early	1960	2GC 7015066	.063"	7008663				7016263	7006331	7012602
Center (A.T.) Late	1960	2GC 7015076	.063"	7008663				7016263	7006331	7012602
Rear (All)	1960	2G 7013065	.066"	7008666				7013381		7013787

① - Use Metering Jet No. 7001860 (.055") to correct engine surge.

STROMBERG 4-BARREL 4A

BUICK **Stromberg Model & Code No.**
1954 Series 60, 70, M/100 Code 7-98

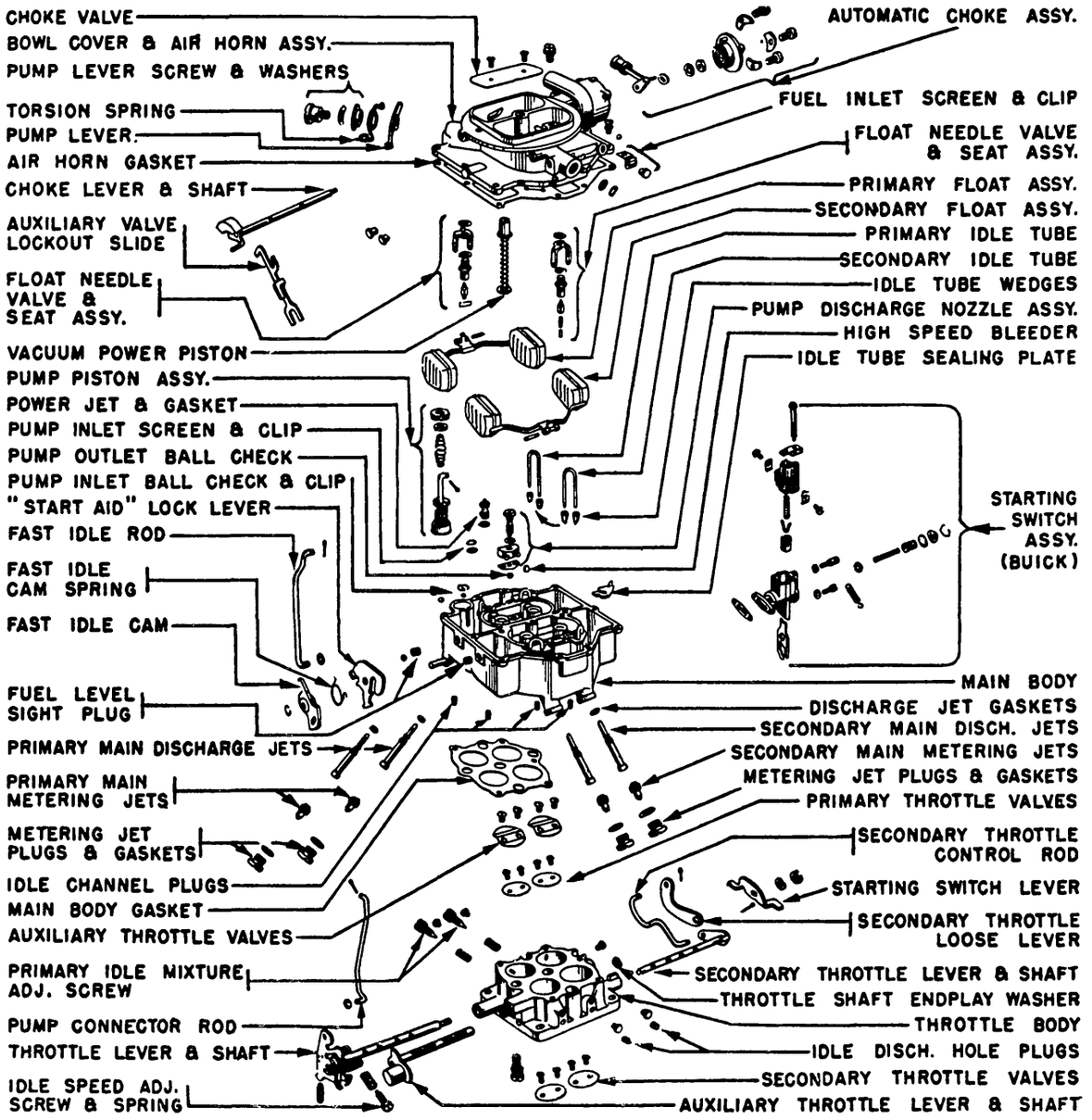
DESCRIPTION: These models are essentially double dual (two-barrel) carburetors with a conventional dual **primary** unit supplemented by a similar dual **secondary** unit for maximum engine performance. Both the primary and secondary units have separate fuel bowl and float systems, idle systems, main metering and discharge systems, and interconnected throttle valves as described below. Only the primary unit has an accelerating pump system and choke valve with an automatic choke control (the auxiliary throttle valves are locked closed for starting and warming up and remain closed during part-throttle operation). ***See Throttle Linkage data below.***

Fuel System: A single fuel inlet is used (located on secondary side of bowl cover) with a passage in the cover leading to the fuel inlet valve for each float chamber. Each bowl has a twin float assembly controlling the fuel inlet valve (secondary inlet valve is "spring-loaded" type). Bowls are vented to the air horn by vent tubes and have additional vent passages terminating at the air cleaner mounting flange (also have external vents in bowl cover). ***See also Idle Vent data below.***

Idling & Low Speed—Entire idle system is duplicated for both the primary and secondary sides of the carburetor except that idle mixture adjusting screws are provided only on the primary side (adjusting screw holes closed by plugs on secondary side). Fuel is discharged into each carburetor barrel and secondary idle system continues to function throughout the part-throttle range until the secondary throttle valves begin to open. Primary idle systems drop out as primary throttle valves open and main nozzles come into action and take over. Auxiliary throttle valves are locked out by the choke mechanism when the engine is cold and even when the engine is warm these valves do not begin to open until primary throttle valves are 50-60% open.

Driving Range (Less than 50-60% Throttle)—The primary throttle valves are directly connected to the accelerator pedal and open as the pedal is depressed (secondary throttle valves are linked to the primary throttle valves and remain closed until primary valves are 50-60% open). Opening of the primary throttle valves bring the main discharge nozzles into action and the primary idle systems drop out (the secondary idle systems continue to function as long as the secondary throttle valves remain closed). Fuel for these main nozzles is metered by the primary main metering jets. Under conditions of low manifold vacuum (hill-climbing, acceleration, etc.), main metering jets are supplemented by fuel by-passed through the power valve and metered by the power restriction (separate valves operated by a spring-loaded vacuum power piston). Power valve is used only for the primary side of the carburetor.

High Speed or Full Power (More than 50-60% Throttle)—At 50-60% throttle, the linkage between the primary and secondary throttle valve levers begins to open the secondary valves. These secondary valves open at a relatively greater rate so that both the primary and secondary valves reach the "wide open" position at the same time. In this range, fuel is discharged through all four carburetor barrels to provide maximum engine power. Secondary fuel is metered by secondary main metering jets and discharged through secondary main nozzles in exactly the same manner as on the primary side except that no power valve is used.



STROMBERG "4A" 4-BARREL CARBURETOR

Accelerating Pump—Used only on primary side of carburetor. Pump is conventional type with pump plunger linked to primary throttle valve lever so that the additional fuel needed for acceleration is discharged through the pump jets into the primary carburetor barrels when the primary throttle valves are opened for acceleration.

Primary & Secondary Throttle Linkage: Secondary throttle valve lever is linked to a secondary actuating lever on the primary throttle valve shaft with an overrun provision so that secondary valves do not begin to open until primary valves are 50-60% open. The linkage provides a more rapid opening of the secondary valves so that both the primary

CONTINUED N NEXT PAGE

STROMBERG 4-BARREL 4A (C ntinu d)

and secondary valves reach the wide open position at the same time. This linkage must be checked and adjusted to insure this synchronized opening. *Se Adjustment data.*

Auxiliary Throttle Valve Lock-out: A means is provided by which the choke mechanism locks the auxiliary throttle valves closed while the choke is in operation so that no choke valve is required on the secondary side of the carburetor. This lock-out mechanism must be checked and adjusted to insure unlocking of the secondary valves for normal operation. *See Adjustment data.*

ADJUSTMENT: *CAUTION—Adjustments must be made in exact sequence as given below (except for Idle Mixture and Idle Speed Tune-up adjustments).*

Idle Setting. *Adjust only with engine at normal operating temperature with automatic choke not operating* (choke valve wide open, fast idle inoperative so that engine idles at hot or slow idle speed). If initial adjustment required to enable engine to be started and warmed up, set each screw 1 turn open. With engine warm, adjust idle speed adjusting screw for correct idle speed shown in table below (use tachometer), turn each idle mixture adjusting screw (one screw for each primary carburetor barrel—two screws only) in until engine begins to miss or run unevenly, then turn screws out until engine begins to roll, finally set screws midway between these two points so that engine idles smoothly. Recheck idle speed.

IDLE SETTING

	Idle Screw Setting	Idle Speed
Buick 70	1 1/8 turns open	450 RPM.

Float Setting: *CAUTION—Primary and Secondary float assemblies must be checked and adjusted separately.* Fuel level can be checked without disassembling carburetor, float level setting requires removal of bowl cover and float assemblies.

Fuel Level—*CAUTION—Primary and Secondary fuel levels are different.* Fuel level in each bowl should be even with bottom of threads in fuel level inspection holes on sides of bowl casting with 5 lbs. fuel pump pressure. Fuel level distance below top edge (gasket seat) of bowl should be 11/16" (Primary), 5/8" (Secondary). See Float Level data for adjustment.

Float Level—*CAUTION—Secondary float intake needle is spring-loaded type and spring must not be compressed when checking float setting.* Remove air horn and bowl cover assembly but DO NOT remove bowl gasket from bowl cover. Invert bowl cover, install Float Setting Gauge No. T-25489 on bowl cover gasket under floats with locating buttons on gauge fitting into two holes along center line of gasket and air horn *(CAUTION*—gauge must seat flat and solidly on gasket). Inner side of each float should just clear upright guide on gauge and be parallel to the guides (floats should move freely with gauge in place). This will insure floats not dragging on sides of bowl in service. Adjust by bending float arm. Check height of each float by using correct size drill rod (see table below) to gauge distance between top of float at center and face of gasket. Adjust by bending float lever. *CAUTION—Both floats of each set must be adjusted exactly alike.*

FLOAT SETTING

Primary Floats

Carb. Code	Float Level	Drill Size
7-98	5/64"	#47

Secondary Floats

Carb. Code	Float Level	Drill Size
7-98	1/16"	#52

►*FLOAT ASSEMBLY CAUTION*—Different float assemblies and intake needle valve and seat assemblies used on primary and secondary sides af carburetor. Floats can be identified by "marking" figure on float lever as follows:

	Float Assy. Marking	Float Assy. Part No.	Intake Valve & Seat Size	Intake Valve & Seat Part No.
Primary	522	385959	.101"	P-22499
Secondary	520	385998	.076"	③385945

③—SPRING-LOADED type needle valve.

Accelerating Pump: Recommended setting is Short Stroke (pump rod connected in inner hole in throttle lever). Not necessary to check pump stroke.

Automatic Choke: Centered (inverted "V" mark on cover in line with end of projection on cover). Thermostat and Cover Assembly stamped "23" (1952-53), "30" (1954). Do not use any other number.

►*ADJUSTMENT CAUTION*—Heat tube connection and cover retainer screws must be loosened for adjustment. Use extreme care not to rotate or distort cover when tightening heat tube connection.

Fast Idle: *CAUTION*—Fast Idle Cam Setting should be checked first before making regular fast idle adjustment (Loose Lever & Lock Lever Clearance).

Fast Idle Cam—Remove air cleaner for access to choke valve. Close the choke valve against correct size drill rod (see table for sizes and changes) placed between center of upper edge of choke valve and air horn wall, hold choke valve firmly against drill. Make certain that fast idle cam spring holds cam up against end of fast idle rod, close throttle until stopscrew contacts fast idle cam. Stopscrew should just clear edge of highest step on cam and come up against second step. Adjust as required by bending fast idle rod at the large curve.

Fast Idle Setting

Carb. Code	Drill Size & Choke Clearance
7-98	#51 (.067")

Loose Lever & Lock Lever Clearance—After adjusting fast idle rod above, substitute a #53 drill for the drill used in making the rod adjustment. Hold choke valve firmly against the #53 drill, open and close primary throttle valve and note clearance between start-aid lock lever on throttle shaft and loose lever behind fast idle cam. This clearance should be just enough to permit the levers to clear. Adjust by bending end of lock lever up or down.

CAUTION—Use care not to distort fast idle cam return spring or cause bind between rod and slot in cam.

Unloader (Wide-open Kick & Deflooder): Move throttle valves to wide open position, measure choke valve opening (clearance between upper edge of choke valve at center and air horn wall). This clearance should be .221" (use No. 2 drill rod). Adjust as required by bending tongue on throttle lever which contacts arm on fast idle cam. Close both choke valve and throttle valve, then open the throttle against the tension of the start-aid loose lever spring. Lock lever should release the loose lever and the spring tension before stop arm on throttle lever contacts stop boss on throttle body.

Secondary Throttle: *Secondary throttle linkage should be checked and adjusted at two points:*

Wide-open Throttle—Move primary throttle valves to wide-open position. If secondary throttle valves are not wide open, or if secondary shaft lever comes up against its stop before primary throttle valves are wide open, adjust vacuum switch lever as follows: Hold switch lever by applying wrench to flat surface below loose lever, then bend curved end of switch lever up or down as required with pliers so that primary throttle valves are wide open (parallel with walls) and secondary throttle valves are also wide open with inner end of secondary throttle shaft lever bearing against stop boss on body.

Part Throttle—With secondary throttle valves closed, open primary throttle valves just enough to take up all slack in linkage so that secondary valves are ready to open. Check primary throttle valve opening (clearance between lower edge of valves and carburetor wall). This clearance must be .125" minimum, .180" maximum. Adjust as required by bending the throttle control rod at the large curve back of the loose lever. Rod ends should measure 2 11/16" plus or minus 1/32" between centers.

Auxiliary Throttle: *Auxiliary throttle valve closed position, and lock-out action must be checked and adjusted:*

Valve Position—With auxiliary throttle valves closed, clearance between edge of valve and carburetor wall should be .015" measured on longer side of valve at dividing wall between primary and secondary barrels. Adjust by loosening valve attaching screws and shifting valve. Check valves for free operation without binding through entire travel except for lock-out action in closed position.

Lock-out Slide Clearance—*Two separate adjustments required as follows:*

Locked Clearance—With auxiliary throttle valves in closed position, close choke valve fully so that locking slide engages auxiliary valve counterweight lever. Check clearance between ear on slide and edge of lever with a feeler gauge. This clearance should be .025" minimum, .060" maximum. Adjust by bending ear on slide.

Unlocked Clearance—With choke valve wide open, move auxiliary throttle valves to wide open position. Clearance between end of locking ear on slide and edge of auxiliary valve counterweight lever should be 3/64" minimum, 5/64" maximum. Adjust by bending choke lever slide actuating arm.

STARTING SWITCH: *See "Carter Car Starter" in Electrical Section. Switch setting can be checked as follows:*

Switch Setting (Carburetor on Engine)—On Dynaflow cars, make certain Dashpot and throttle linkage correctly adjusted, place transmission selector lever in neutral and set hand brake firmly to hold car With engine not running, insert a pin through felt filter and screen to operate vacuum piston, push vacuum piston in and hold it while opening throttle (this will allow slide to engage groove in piston and prevent slide dropping down to complete contact), **hold throttle open,** remove pin Place 5/64" spacer between fast idle stopscrew and fast idle cam with fast idle cam in **cold idle position.** Close throttle so that spacer holds cam in cold idle positon Turn ignition on, hold spacer, depress accelerator to start

CONTINUED ON NEXT PAGE

STROMBERG 4-BARREL 4A (Continued)

engine. **Engine should not crank.** Repeat above test with 3/64" spacer between stopscrew and fast idle cam. **Engine should crank.** If engine cranks with 5/64" spacer, bend tang on switch operating lever downward slightly and recheck switch timing. If engine does not crank with 3/64" spacer, bend tang on operating lever upward slightly and recheck switch timing.

OVERHAUL: ***CAUTION—When disassembling carburetor, be sure to keep PRIMARY and SECONDARY side parts separate so they will not be confused or interchanged when carburetor reassembled.***

Disassembly: Carburetor consists of three main subassemblies (Air Horn & Bowl Cover, Main Body, and Throttle Body) which can be overhauled separately as follows:

Air Horn & Bowl Cover—First disconnect spring from secondary throttle shaft lever and remove accelerator vacuum switch and gasket by taking out two attaching screws in throttle body. Disconnect fast idle rod from choke shaft lever and pump rod from pump lever. Remove pump lever fulcrum screw (left-hand thread), anti-rattle washer, and torsion spring washer, then disconnect pump lever from pump piston stem and remove lever. Take out all air horn and bowl cover attaching screws, lift air horn just far enough to free lock-out slide, remove slide, then lift air horn straight up *(CAUTION*—use extreme care not to damage floats, pump piston, or vacuum power piston). Invert air horn and remove pump piston assembly. Remove float hinge pins (tap plain end of pin to force serrated end out of hanger), remove float and intake needle assemblies, use wrench T-20140 to remove needle seats and gaskets *(CAUTION*—keep each float assembly, intake needle, and needle seat together, DO NOT mix primary and secondary side parts). Remove float hangers and bowl cover gasket. Remove vacuum power piston (compress spring to obtain grip on outer end of piston stem with pliers, then pull piston straight out to avoid bending piston stem). Remove choke cover and coil assembly by taking out screws and removing retainers. Use wrench T-25047 to remove nut on end of choke shaft, remove lockwashers and serrated washer. Remove choke valve attaching screws, remove valve. Remove choke shaft and vacuum piston and lever assembly.

Main Body—Remove four idle tube sealing plates to avoid losing them during overhaul but DO NOT remove Idle Tubes unless replacement required (see special Idle Tube Installation data below). Take out pump discharge nozzle screw, remove nozzle and gaskets, then invert body and catch valve ball which will fall out of pump discharge passage. Take out retainer clip in bottom of pump cylinder and remove inlet check valve ball located in cylinder below retainer. Take out attaching screws and remove throttle body from main body, remove gasket. Pry snap ring from fast idle cam post, remove cam, lock lever, and spacer washer. Take out main discharge jet plugs (tool T-19099), remove copper gaskets, remove main metering jets (Socket wrench tool T-24924), remove main discharge jets (Jet Remover tool T-24967—screw tool into base of jet and then pull jets straight out of main body). *CAUTION*—Lead gasket at discharge jet seat in main body must be completely removed. Take out small plugs on bottom of main body directly below end of tubes (will allow idle tubes and passages to be cleaned without disturbing tubes).

Throttle Body—Remove both idle adjusting screws and springs. Take out attaching screws and remove auxiliary throttle valve from shaft, pry washer off end of shaft, remove shaft and lever assembly. **Mark all throttle valves** by lightly scribing line on valve along both sides of shaft and also indicate location to insure re-installing valve in same barrel, take out attaching screws and slide valves out. Disconnect control rod from secondary throttle shaft lever, remove shaft from body. Remove nut, lockwasher, switch lever and loose lever from end of primary throttle shaft, remove shaft and lever assembly from body.

Cleaning & Inspection: Thoroughly clean all parts using Bendix Metalclene or equivalent cleaning solvent, rinse with clear gasoline and dry with air. Blow out all passages in casting with air (pay particular attention to idle tubes and passages—if tubes require removal, see special removal and installation data below), make certain all gum and carbon deposits removed. Check choke shaft and throttle shafts for wear in bearings. Inspect choke thermostatic coil for distortion or damage, see that vacuum piston and cylinder are clean and free of burrs or scores. Replace fuel inlet strainer and pump strainer if clogged or damaged. Check pump piston leather for cracked, creased or turned edges or other damage, make certain relief valve in piston is tight (blow on lower end of piston). Inspect all check ball seats in castings (if seats rough, reface by placing ball on seat and tapping ball lightly, then DISCARD balls after such use). Inspect all jets for wear or damage. Replace all worn or damaged parts.

Idle Tube Removal & Installation: If tubes require removal for any reason, always install NEW tubes as directed below:

Removal—Pry old tube out using a screwdriver blade placed under tube loop *(CAUTION*—use piece of wood under screwdriver blade to avoid marring top edge of main body. DISCARD old tube and wedges.

Installation—Place tool T-25525 on top surface of main body with flat surfaces vertical, place NEW idle tube and wedges in position over tool (tube should loop over tool which will position the tube properly). *CAUTION*—Small diameter end of tube should be inserted in hole which is directly above main discharge jet passage. Hold tube loop down against positioning tool, slide wedges down into holes in main body, use Wedge Driver T-25488 and light hammer to seat wedges snugly in place. Remove positioning tool T-25525 using care not to disturb tube seals.

Reassembly: Use all NEW gaskets. Install all parts in reverse order of disassembly procedure (above) and pay particular attention to the following:

Throttle Valve Installation—Install each valve in same carburetor barrel from which removed (as marked before removal) with dash mark on primary valves and crescent mark on secondary valves toward top of body and on same side as idle ports. Install new valve screws loosely, align scribe marks carefully, then tighten screws. Check valves by sighting through barrel and shifting valves as required until least amount of light visible around edge of valve. After valves properly set, tighten screws securely and stake ends lightly *(CAUTION*—support screw heads on steel block while staking to prevent bending of shaft).

Auxiliary Throttle Valve Installation—Use new screws to attach valves, position valves so that clearance between inner edge of valve and middle wall of carburetor is .015" (measure with a wire gauge). After valves correctly positioned, tighten screws securely and stake ends in same manner as other throttle valve screws above.

Idle Adjusting Screws & Springs—Turn both screws in until lightly seated, then back screws out 1⅛ turns for preliminary adjustment which will allow engine to be started and warmed up (see ADJUSTMENT data for final setting).

Main Discharge Jets—Use new lead gasket on upper end of jet, install by using Remover Tool T-24967 to seat jet in main body. Flat surface of all jets must be parallel to air flow when installed in carburetor *(CAUTION*—Secondary jets only are notched on this upper flat surface).

Main Metering Jets—Make certain that primary and secondary jets are not interchanged (Secondary jets have groove on shank—primary jets not grooved).

Main Discharge Jet Plugs—Use new copper gasket on plugs. Plugs must be tight.

Choke Valve Installation—Use new screws to attach choke valve and position valve so that clearance uniform between valve edges and air horn. After tightening screws, make certain that valve operates freely and falls open of own weight without binding at any point, then stake ends of screws lightly (support screw heads on steel block to avoid bending shaft).

Choke Piston Installation (1954)—Install vacuum piston in cylinder *(CAUTION*—do not use any kind of lubricant on piston or cylinder), engage lever on end of choke shaft, install lockwasher and nut. Tighten nut with wrench T-25047.

Vacuum Power Piston Installation—When installing piston in air horn DO NOT use any kind of lubricant on piston. Stake edge of cylinder at three points to retain piston. Make certain that piston operates freely in cylinder.

Float & Intake Needle Valve Installation—When installing float hangers and needle seats, use new gaskets above and below hanger. Make certain that corect float, intake needle, and seat used on primary and secondary sides (see Float data under ADJUSTMENTS above). Intake needle must be clipped to float arm properly and float assemblies must operate freely on fulcrum pins. Adjust float height and float alignment (see Float Level under ADJUSTMENTS above).

Accelerator Vacuum Switch Installation & Adjustment—Use new gasket when installing switch and place long grooved mounting screw on primary side, hook secondary throttle shaft lever return spring on this screw). After all linkage assembled, adjust switch as follows: Close primary throttle valve against a No. 41 drill rod, bend tang on switch operating lever until it just touches switch slide. This is an approximate setting only and should be rechecked after carburetor installed on engine.

Carburetor Adjustments—Make all adjustments as listed under ADJUSTMENTS above.

SERVICE PARTS: Gasket Set—Stromberg No. 382361. **Repair Parts Kit**—Stromberg No. RK-182

STROMBERG AAVB DUAL

BUICK	Stromberg Model & No.
1954 Series 40 & 50	⑫AAVB-267 No. 380245
1955 Series 40	⑬AAVB-267 No. 380372

⑫—Code No. 7-96.
⑬—Code No. 7-102 & 7-102A.

DESCRIPTION: Dual or Double Barrel Downdraft Carburetors with automatic choke. Buick carburetors have two types of Starting Switch assemblies. See Starter Switch below. Similar in design to "AAV" carburetors used previously.

ADJUSTMENT: Set these carburetors to the following specifications:

IDLING ADJUSTMENT

Idle Screw Setting—Adjust both screws equally with engine warmed up to normal operating temperature so that choke valve wide open and fast idle inoperative. Set throttle stopscrew for correct idle speed, turn each idle adjusting screw in until engine begins to miss, then turn screw out until engine begins to roll, finally turn screw in until engine runs smoothly. Recheck idle speed. See car model page for complete Tune-Up instructions.

Idle Setting

Buick (All Models) Approx. 1½ turns open

Idle Speed (Buick)—450 RPM. (all cars).

Idle Speed (Studebak r)—550-600 RPM. (Synchromesh Trans. Cars), 500-550 RPM. (Automatic Trans. Cars with selector lever in Neutral "N").

ACCELERATING PUMP

Car Model	Pump Capacity	Pump Setting
Buick 70	...10-14 cc(F), 15-19 cc(S).....	Medium

NOTE—Pump capacity is for 10 strokes, Fast (F), Slow (S) with pump stroke setting as indicated.

Recommended Pump Setting—Buick—Center Hole (medium stroke).

ECONOMIZER SETTING

No adjustment required. Valve opens when manifold vacuum drops to 4-6" (or 65-70 MPH.).

FLOAT LEVEL

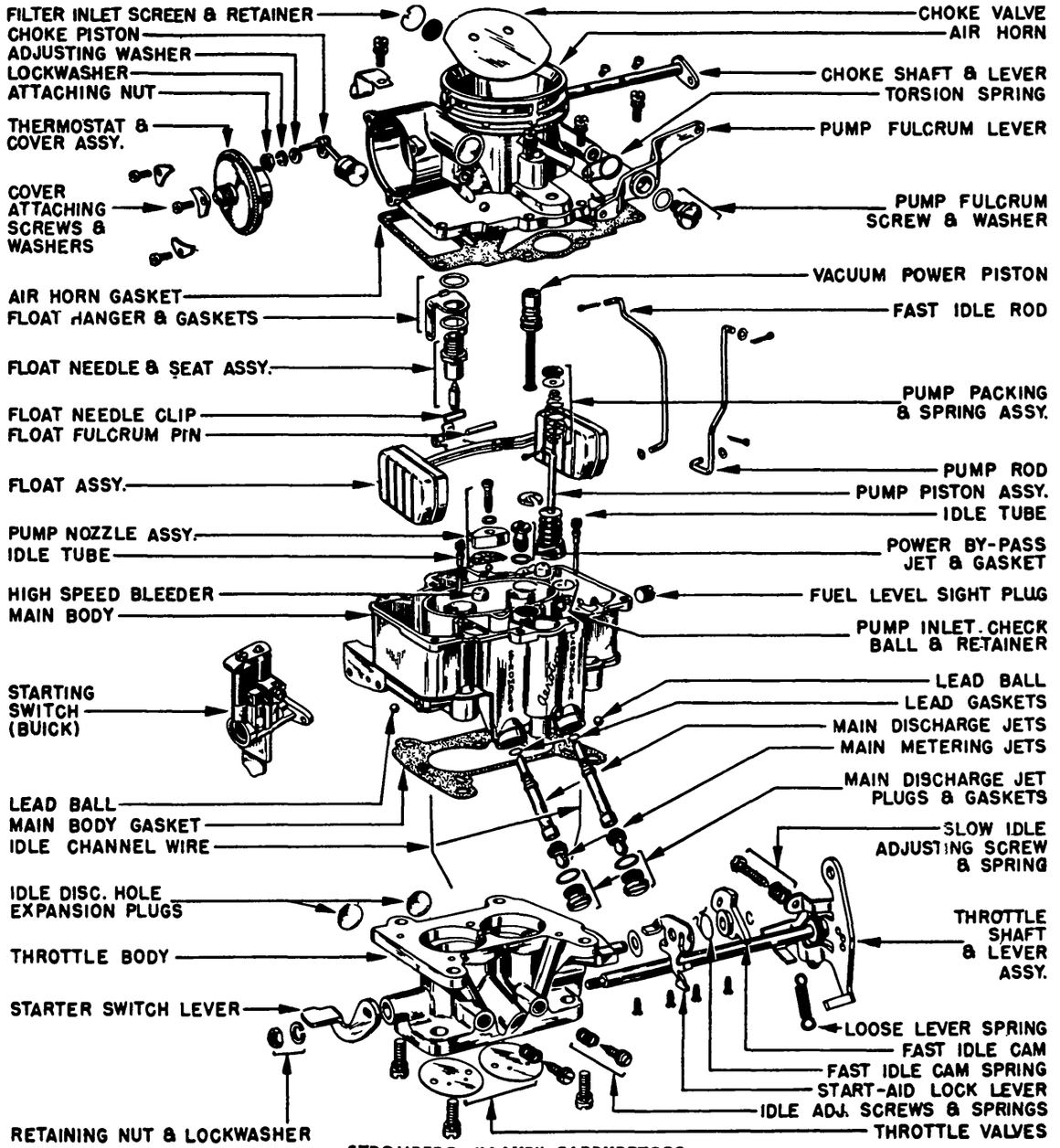
Float Setting—5/64" projection **above** top edge of Checking Gauge T-24971 (all models). To check float level, invert bowl cover and float assembly, place checking gauge on cover gasket (DO NOT remove gasket) with lugs on gauge seated in holes in bowl cover. Adjust both floats **vertically** so that tops of floats are 5/64" above gauge guides, adjust floats **laterally** so that they are parallel to gauge guides without binding (necessary to prevent floats dragging on sides of bowl).

Fuel L vel—21/32" below top edge of bowl with pressure of 5 lbs. (all models) or even with bottom of threads in inspection hole on side of bowl.

FAST IDLE SETTING

Buick Fast Idle: *TWO settings required:*

1) **Fast Idle Cam**—Close choke valve against correct size drill rod (see table below), see that fast idle cam spring holds cam upward against end of fast idle rod (rod in lower end of slot in cam). Close throttle until stopscrew contacts fast idle cam. If screw does not just clear edge of highest step on cam and bear against second (short) step, adjust by bending fast idle rod at upper curve See that rod does not bind on cam or in choke lever.



STROMBERG "AAVB" CARBURETORS

Buick Fast Idle Cam Setting

Car & Carburetor	Checking Drill Size
Buick 40, 50 (1954)	#51 (.067").
Buick 40 (1955)	#54 (.055").

①—Supersedes #26 (see Improved Warm-up and Stalling Elimination Change).

2) **Lever Clearance.** Close choke valve against #53 drill, adjust clearance between ear on locking lever on throttle valve shaft and lug on loose lever on fast idle cam stud so that these levers just clear as throttle valve opened and close. Adjust by bending end of loose lever up or down.

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STROMBERG AAVB DUAL (C nt.)

UNLOADER (CHOKE RELEASE)

Setting—.151-.121" or #29 drill (Exc. 1955 Buick), .086" or #44 drill (1955 Buick), choke valve opening with throttle valve wide open. To check open throttle valve wide, measure choke valve opening or clearance between edge of valve and air horn wall using correct size drill rod. Adjust by bending throttle lever ear which contacts fast idle cam.

►***BUICK NOTE***—After making above adjustment, close throttle and choke valve, then open throttle **against tension of the start-aid lever spring.** The lock lever should release the loose lever and the spring tension before stop arm on throttle lever contacts stop boss on throttle body.

AUTOMATIC CHOKE

Car Model	①Choke Setting
Buick (All Models)	Centered

①—Reference point is left end of boss on choke housing.

CHOKE ADJUSTMENT CAUTION—**Use extreme care when tightening heat tube connection not to rotate or distort choke cover.**

STARTING SWITCH

(1954 Buick Carburetors)

Switch Setting (Carburetor on Engine)—On Dynaflow cars, make certain Dashpot and throttle linkage correctly adjusted, place transmission selector lever in neutral and set hand brake firmly to hold car. With engine not running, insert a pin through felt filter and screen to operate vacuum piston, push vacuum piston in and hold it while opening throttle (this will allow slide to engage groove in piston and prevent slide dropping down to complete contact), **hold throttle open,** remove pin. Place 5/64" spacer between fast idle stopscrew and fast idle cam with fast idle cam in **cold idle position.** Close throttle so that spacer holds cam in cold idle position. Turn ignition on, hold spacer, depress accelerator to start engine. **Engine should not crank.** Repeat above test with 3/64" spacer between stopscrew and fast idle cam. **Engine should crank.** If engine cranks with 5/64" spacer, bend tang on switch operating lever downward slightly and recheck switch timing. If engine does not crank with 3/64" spacer, bend tang on operating lever upward slightly and recheck switch timing. *See "Stromberg Starter Switch" in Electrical Equipment Section for complete data.*

(1955 Buick Carburetor)

Switch Setting (Carburetor on Engine)—On Dynaflow cars make certain Dashpot and throttle linkage are correctly adjusted, and transmission selector lever is in Neutral and parking brake fully applied. Back off throttle stop screw, rotate fast idle cam to slow idle position if necessary, and fully close throttle valve. Hold a stiff 6" scale or straight edge against rear face of lower arm of throttle lever which contacts Dashpot, with scale resting on rocker arm cover. With throttle valve fully closed, scribe pencil mark on cover at front edge of scale Turn ignition switch and open throttle slowly Scribe a second mark on rocker arm cover at point where starting motor is energized. The switch is correctly timed when distance between marks on rocker arm cover is 29/32"-1 7/16". To retime switch, change timing shims in switch assembly. Reset engine idle speed to 450 RPM and recheck throttle linkage and Dashpot adjustments. *See "Carter Car Starter" in Electrical Section.*

OVERHAUL: On Buick carburetors, first remove vacuum switch assembly and gasket. Disconnect and remove accelerating pump rod and fast idle rod. Disconnect pump lever from pump piston stem, then take out pump lever fulcrum screw (this screw has left-hand thread), remove lever. Take out air horn attaching screws and lockwashers, lift air horn assembly straight up and off main body. Remove pump spring from pump cylinder and pump piston assembly from air horn. Take out throttle body retaining screws and lockwashers, then lift main body straight up and off. Remove gasket, lift idle channel wires out of throttle body.

Air Horn Disassembly—Tap float hinge pin out (push pin out toward serrated end), remove float and intake needle assembly, free needle from float lever clip, lift off air horn gasket. Unscrew needle valve seat (Wrench T-20140), remove seat, float hanger, and gaskets. Remove staking from around edges of vacuum piston cylinder, remove piston assembly (piston can be removed by gripping upper end of stem directly above the spring with pliers and using 1" block of wood as a fulcrum so that piston can be pulled straight out). Take out thermostat cover screws, remove thermostat cover assembly. Use wrench T-25047 to remove locknut on end of choke shaft, remove lockwasher and serrated washer (Buick carburetors). Take out choke valve attaching screws, remove valve, slide choke shaft out, remove choke piston and lever assembly.

Main Body Disassembly—Remove power by-pass jet and gasket, remove both idle tubes. Remove main discharge jet plugs and copper gaskets, use special socket wrench T-24924 to remove main metering jets. Use Jet Remover T-24967 to remove main discharge jets (screw tool into end of jet and pull jet from main body—threads formed by tool will not affect metering characteristics of jet), make certain that discharge jet lead gaskets removed from body recess. Take out pump discharge nozzle screw, remove nozzle assembly and gaskets, invert body to drop discharge check ball from discharge passage. Remove intake check ball retainer from bottom of pump cylinder, invert body to drop out intake check ball. Remove pump inlet strainer screen (not used on all carburetors).

Throttle Body Disassembly—Hold down on vacuum switch terminal cap while removing hold-down clip. Remove terminal cap and switch return spring, then lift out switch guide block with contact spring and shims. Do not lose timing shims and the spring washer on contact spring. Turn throttle body over to allow plunger rod ball to drop into hand. Mark throttle valves so they may be reinstalled in original positions in barrel of throttle body (Scribe valve, stem and bore to insure accurate repositioning). Remove screws, slide valves out of stem, remove retainer washer, then remove throttle lever and stem assembly, from throttle body. Remove idle needle valves & springs, pry ring from post which supports fast idle cam and remove fast idle cam, lock lever, and spacer washer.

Cleaning & Inspection: Clean all parts thoroughly in Bendix Metalclene or similar cleaning solution, rinse in solvent. Make certain that all carbon and gum deposits removed, blow out all passages and dry parts with air *(NOTE*—If necessary to remove lead plugs, use Tool T-25052. Install new plugs with Plug Set T-25053. Inspect all parts for wear.

Air Horn & Choke Parts—Vacuum piston and cylinder in air horn must be clean and free of burrs or scores. DO NOT use any abrasive material for cleaning these parts.

Vacuum Power Piston & By-Pass Jet—Surface of piston must be thoroughly cleaned. DO NOT use any abrasive material for polishing the surface of piston. Test by-pass jet for tight seating by sucking on upper end. Replace as necessary.

Main Body—Main body must be thoroughly clean and all passages free of foreign material. Check high speed and idle air bleeders for correct sizes. Use drill size #70 for checking high speed bleeder, and #56 for idle air speed bleeder.

Main Discharge Jets & Idle Tubes—Inspect main discharge jets to insure that tips are not damaged or walls distorted so as to deform holes. Test idle tubes by blowing or sucking to make sure metering holes are clear, be sure small ends are not damaged so as to deform metering holes.

Pump Piston, Discharge Nozzle and Related Parts—Pump piston leather must be free of cracks, creases, turned edges or other damage. Relief valve in piston must seat (test by blowing on lower end of piston). Suck or blow on discharge nozzle to be sure holes are clear and always replace pump inlet and discharge channel check valve balls. Replace check valve ball seats if strong light reveals that they are rough or loose in seat. To replace seat, use a steel ball and tap lightly, then discard ball.

Throttle Valves, Throttle Lever & Stem Assembly—Check throttle stem bearing for wear. Air leaks will affect performance if wear is in excess of .006". Replace throttle valves that show sharp edges, burrs, or are bent.

Reassembly: Use all NEW gaskets, install parts in reverse of disassembly procedure. Note following:

Throttle Shaft & Lever Assembly—Attach fast idle rod to fast idle cam with washer and hook cam spring into groove in rod. Install spacer washer, loose lever lock lever, and fast idle cam on post in throttle body, then snap ring in groove in post. Install lever and stem assembly in throttle body and retainer in end of stem.

Throttle Valve Installation—After throttle shaft and lever assembly installed in body, install each throttle valve in same barrel from which removed, install new valve screws loosely, then close valves, carefully align marks made before disassembly and tighten screws securely. Check valves by holding throttle body up toward a light, shift valves as necessary until least amount of light visible around valve edge, finally stake valve screws (support screw head on steel block while staking opposite end).

Accelerator Vacuum Switch—Lubricate contact surfaces of terminal cap with Beacon M-285 lubricant, or petroleum jelly if Beacon Lubricant not available, by working lubricant into a piece of clean cloth and lightly swabbing inside of cap. ***CAUTION***—Do not use ordinary lubricants or lubricate ball or plunger as poor switch contact will occur during cold weather. Place plunger in position with groove up so that ball rests on lip at inner end of plunger.

CONTINUED ON NEXT PAGE

STROMBERG AAVB DUAL (C nt.)

NOTE—If plunger not correctly installed, poor switch action with resulting gear clashing will occur. Make sure all timing washers, contact spring, and return spring washer are in proper position before installing return spring and terminal cap. Be sure terminal cap is properly seated. ***For switch timing, see "Switch Setting (Carburetor on Engine)" above.***

Main Discharge Jet Assemblies—Place new lead gasket over beveled end of main discharge jet, use remover tool T-24967 to seat jets in main body *(CAUTION*—flat surface on end of jet must be parallel to air flow), install main metering jets and plugs with new copper gaskets.

Idle Channel Wires—When installing throttle body on main body, make certain that idle channel wires installed with **short** end in throttle body and guide opposite end into idle channel in main body. ***CAUTION—use care not to bend channel wires.***

Choke Valve Installation—After choke shaft installed in air horn, install valve with dash mark on valve toward top of air horn, install new screws loosely, close valve and make certain clearance around valve uniform, then tighten screws securely. Check for free operation (valve should drop freely of own weight and should not bind at any position),

Choke Piston Setting (Buick)—After choke piston and lever assembly installed in cylinder, install adjusting washer with serrated side toward piston lever, install lockwasher and nut and tighten nut finger-tight. Install Gauge T-25046 in choke housing with the outer flange piloting in the housing and the small hole in the gauge fitting over the pin on the choke lever. Turn gauge until two indicator lines on face are centered on left end of indicator boss on housing. Close choke valve against #29 drill rod (insert drill between upper edge of valve and air horn wall), tighten piston lever locknut lightly. Remove drill and gauge, close choke valve, tighten locknut securely, recheck setting. *NOTE*—This adjustment not required on Studebaker.

Thermostatic Coil Installation—Place coil assembly on housing with coil hook downward, rotate assembly in direction of arrow until "V" mark on cover in line with left edge of indicator boss on housing, tighten retainer screws securely.

Vacuum Power Piston Installation—Make certain that piston operates freely in cylinder but DO NOT lubricate piston, seat retaining washer in body recess and stake edge of cylinder at three points

Float & Intake Valve Installation—Use new gasket on each side of float hanger, tighten intake needle seat securely. Install new gasket on air horn before installing float assembly, clip intake needle to float arm, install assembly and tap float fulcrum pin in so that serrated end locks in hanger leg. Adjust float level (see ADJUSTMENTS). Make certain that float lever moves freely in hanger and that intake needle has 1/16" travel in closed position (adjust by bending float lever stop).

Carburetor Adjustment—See ADJUSTMENTS.

SERVICE PARTS

Gasket Sets—Stromberg No. 382370 (Buick).

Repair Kits (with Std. Metering Jets):

RK-181 1954 Buick 40, 50 Code 7-96.
RK-187 1955 Buick 40 Code 7-102A.

STROMBERG "AAVB" & "4A" CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carb. No.	Venturi Size	Main Metering Jet Size	Main Metering Jet Part No.	By-Pass Jet Size	By-Pass Jet Part No.	Main Discharge Jet Size	Main Discharge Jet Part No.	H.S. Bldr.	Idle Tube Size	Idle Tube Part No.	Idle Air Bld. Jet Size	Idle Air Bld. Jet Part No.	Pump Discharge Nozzle Size	Pump Discharge Nozzle Part No.
BUICK 40, 50	1954	AAVB267⑯	1	1/8"	.052"	P-19442	#60	386398	#32-28	P-24670	#70⑭	#58	385798	⑳	——	#70	385923
BUICK 70	1954	4A⑰	⑪1	1/32"	.048"	P-19442	#59	386630	#32-28	P-24670	#70⑭	#66	386421	⑥	——		
			⑫1	1/32"	.051"	P-24773			#28-32	386379	#70⑭	#70	386422	⑦	——	#68	P-24595
BUICK 40	1955	AAVB-267㉚	1	1/8"	.052"	P-19442	#70	386398	#28	386931	#70⑭	#66	385804	㉙	——	#68	P-24594

⑥—#70 in Idle Tube, #39 in Throttle Body.
⑦—#70 in Idle Tube, #42 in Throttle Body.
⑪—Primary Side (4-barrel Carburetor).
⑫—Secondary Side (4-barrel Carburetor).
⑭—Part No. P-23985.
⑯—Code No. 7-96.
⑰— Code 7-98
⑳—#60 in Main Body, #42 in Throttle Body.
㉙—#56 in Main Body, #36 in Throttle Body.
㉚—Code No. 7-102.

STROMBERG DUAL "AAVB" & 4-BARREL "4A" TYPES

DESCRIPTION

DESCRIPTION & OPERATION: Thermostatic coil and vacuum piston type. **Thermostatic coil and vacuum piston are mounted on carburetor and linked directly to choke valve lever (no external linkage). Vacuum passage (for piston operation) is drilled in carburetor casting and opens into manifold below throttle valve. Hot air tube (for thermostatic coil operation) is connected between choke housing and hot air stove on exhaust manifold. When engine is cold, thermostatic coil winds up and tends to close choke valve (valve cannot close until throttle opened momentarily to release fast idle screw from cam; but is snapped closed as soon as throttle opened). When engine begins to fire, manifold vacuum causes vacuum piston to be drawn into cylinder which opens choke valve slightly against the thermostatic coil tension to provide proper air mixture for continued running. As engine warms up, thermostatic coil tends to unwind, releasing choke valve and allowing it to open (valves are offset).**

►*BUICK 70 "4A" 4-BARREL NOTE:* Automatic choke and fast idle mechanism is similar to design used on other Buick dual or 2-barrel carburetors and is adjusted in same manner. Choke valve is located on primary side of air horn and controls primary barrels only (Auxiliary Throttle Valves on secondary side are locked closed by the choke valve while choke is in operation so that no choke mechanism is required on the secondary side).

Fast Idle:—Consists of a stepped cam linked to the choke valve. When choke valve closed by thermostatic coil for cold starting, cam is revolved so that the throttle stopscrew rests on highest step of the cam and throttle is held open in fast idle position. As engine warms up and choke valve opens, cam is revolved and throttle allowed to close, until with the engine warm and choke valve wide open, throttle is closed to hot or slow idle position.

ADJUSTMENT & OVERHAUL

►***CAUTION—When reassembling all models except Studebaker AAV-26 & AAUVB-26, special ring gauge must be used to adjust vacuum piston assembly position on choke shaft (see Reassembly data below).***

DISASSEMBLY: Disconnect heat tube from thermostat housing cover, remove carburetor from manifold. Remove thermostat cover retaining screws and lug washers, remove thermostat cover assembly by rotating it clockwise to disengage coil hook from lever prong and then lifting it off the housing. Remove locknut on end of choke valve shaft (use socket wrench T-25047), remove lockwasher and serrated washer (serrated washer not used on Studebaker models). Remove vacuum piston assembly from the housing.

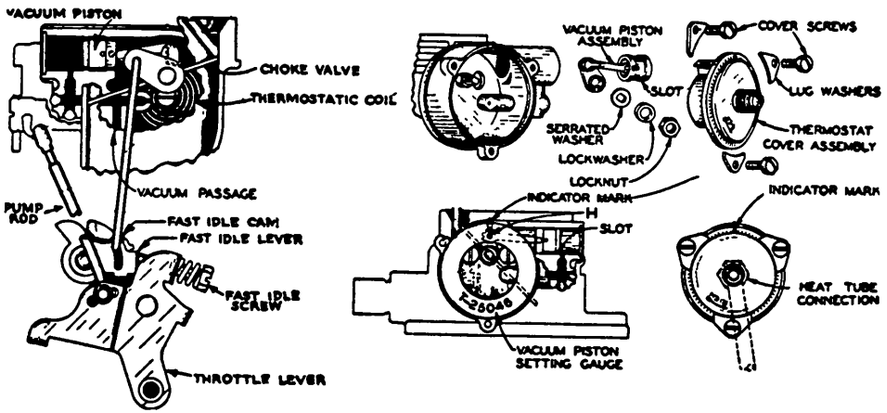
CLEANING & INSPECTION: Clean vacuum cylinder and piston with a clean cloth saturated with acetone or alcohol (CAUTION—do not use abrasives to clean cylinder or piston). Blow out all channels with compressed air. Clean the screen on the inside of the cover by blowing through heat tube connection and around inside cover (CAUTION—when using compressed air, use care not to distort screen or thermostatic coil). Do not attempt to remove thermostatic coil from cover (these parts furnished as an assembly).

REASSEMBLY: ***Do not lubricate piston or cylinder.*** Install vacuum piston assembly in cylinder, assemble lever on choke valve shaft. Install serrated washer (not used on Studebaker), lockwasher, and locknut. On all models except Studebaker, adjust vacuum piston assembly before tightening locknut (see Adjustment below). Tighten locknut securely, recheck choke valve opening to make certain setting not disturbed by tightening the nut. Install thermostat cover assembly with coil hook at the bottom, then rotate cover in "Rich" direction (counterclockwise) until inverted "V" mark on cover is in line with center graduation of scale on housing. Install lug washers and tighten retainer screws securely. NOTE—This procedure will provide "Centered" setting. See Choke Setting data for special settings used on some models.

Vacuum Piston Assembly Adjustment (Not required on Studebaker AAV-26 and AAUVB-26). With locknut tightened loosely (do not tighten fully until piston adjusted), install ring gauge (see Note below) with hole in tool fitting over pin on choke lever and indicator line on rim of tool in line with reference mark on choke housing. Hold choke valve closed against drill or gauge (see table), tighten locknut lightly with wrench T-25047, remove the gauge ring and then tighten the locknut securely. Recheck the choke valve to make certain that setting not changed by tightening of locknut. See that choke valve operates freely. This adjustment is extremely important to properly position vacuum piston and thermostatic coil prong.

►**Buick Ring Gauge Note:** Gauge No. T-25046 used on all Buick models with dual (2-barrel) carburetors EXCEPT Models AAUVB-267 & AAVB-267 for which NEW Gauge No. T-25367 should be used **or T-25046 gauge modified** to permit its use on these models.

►**Buick Series 70 (4-Barrel Carburetor) Ring Gauge Note:** Use Gauge No. T-25367 on these models. Reference point on this gauge consists of two lines and reference point on housing (left end of boss) should be centered between the two lines.



Fast Idle Connector Rod Installation: When reassembling the fast idle connector rod, install bushing (washer—Buick), on lower end of rod after rod has been assembled to lever. See that fast idle cam torsional spring is assembled with end of spring hook against ear of lever. See that cam operates freely and make certain that rod does not bind in slot in cam. This is very important.

Auxiliary Throttle Valve Lockout Slide Clearance (Buick 4A Carburetors): ***The Lockout Slide is operated by the choke mechanism and must be checked and adjusted after the choke mechanism has been reassembled. Two separate adjustments are required:***

Locked Clearance—With auxiliary throttle valves in closed position, close choke valve fully so that lock slide engages auxiliary valve counterweight lever. Check clearance between ear on slide and edge of lever with a feeler gauge. This clearance should be .025" minimum, .060" maximum. Adjust by bending ear on slide.

Unlocked Clearance—With choke valve wide open, move auxiliary throttle valves to wide open position. Clearance between end of locking ear on slide and edge of auxiliary valve counterweight lever should be 3/64" minimum, 5/64" maximum. Adjust by bending choke lever slide actuating arm.

1955-58 STROMBERG "WW" BUICK CARBURETOR

BUICK	Stromberg Code No.
1955 Series 40	WW 7-104
1956 Series 40	WW 7-105, A
1957 Series 40 (Auto. Trans.)	WW 7-106, A, B, C
1958 Series 40 (Auto. Trans.)	WW 7-109, A

►CHANGES, CAUTIONS, CORRECTIONS

►*LEAN MIXTURE ON MODERATE ACCELERATION CORRECTION (7-105 CARB.):* To eliminate this condition, install repair kit Buick Part No. 1392722, consisting of idle tubes, main metering jets and main discharge jets. After installation completed, scribe letter "A" to change carburetor code number from 7-105 to 7-105A. *Carburetors with Code 7-105A have these changes mad in production.*

►*1957 BUICK CARBURETOR PRODUCTION CHANGES:* Production changes designated by the letter suffix of the carburetor code number are as follows:

C d 7 - 106A - This carburetor has blunt ended float inlet needle valve to improve anti-vapor lock characteristic of the carburetor.

C d 7 - 106B - Choke positioning setting was changed to correct loading during warm-up period. *See "Adjustm nts" below.*

C d 7 - 106C - Filter screen added at intake needle valve seat fitting. This screen should be removed after first 1000 miles of operation.

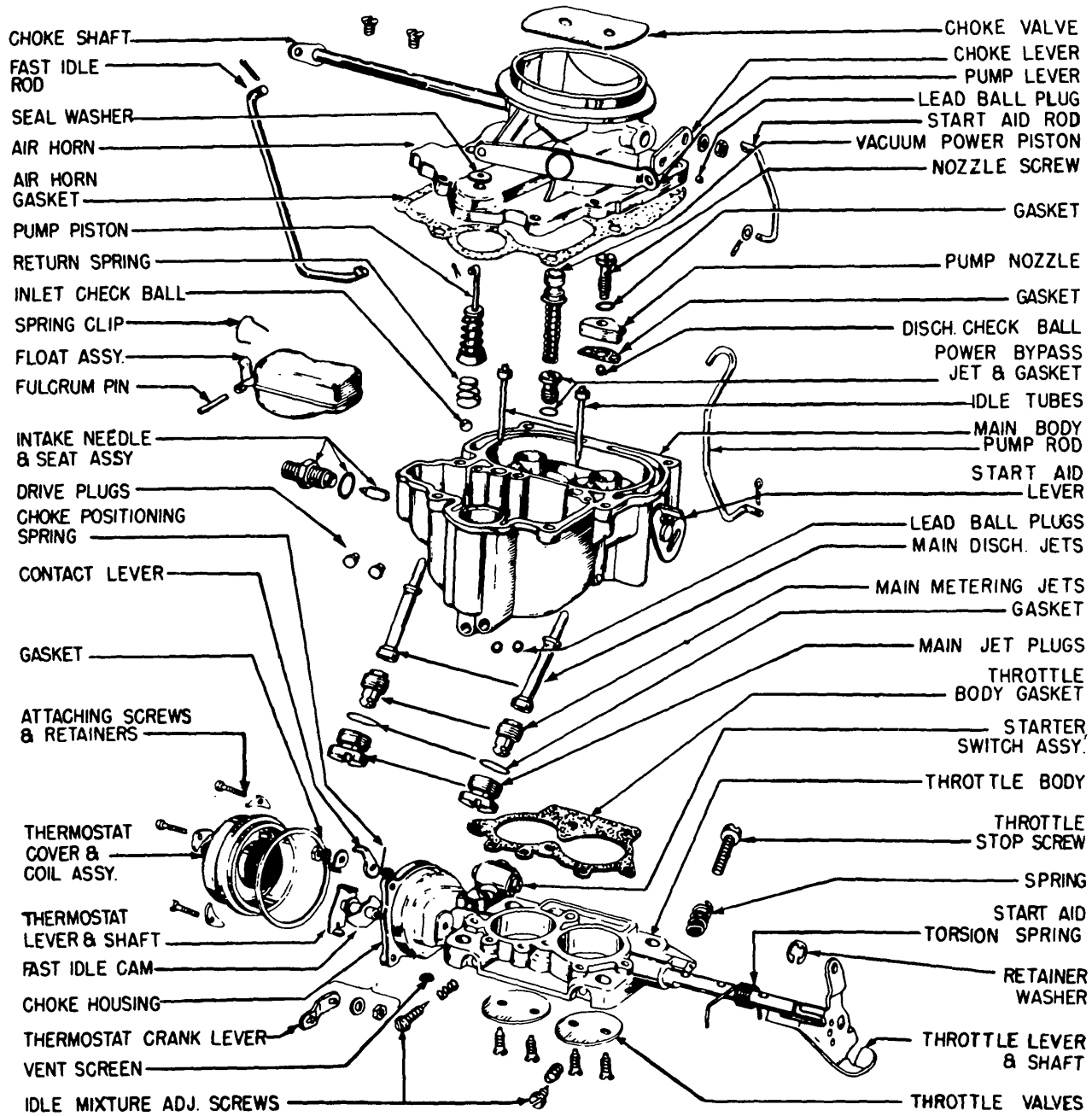
►*ENGINE LOADING DURING WARM-UP PERIOD (Cars with Code 7-106 & 7-106A): See Production Change Not abov for Chok Positioning Setting change. Adjust th s carbur tors as directed in "Adjustments" b low.*

►*1958 BUICK SERIES 40 (AIR COND. CARS) LAG IN THROTTLE RESPONSE CORRECTION:* This condition may exist on some cars and is apparent after deceleration with closed throttle at road speeds. To improve this condition, install a deflector 2½" x 3½" which should be located with its centerline on centerline of the air cleaner snorkel, and attach to fan shroud with two self-tapping screws. When the above change is made, also install high altitude main metering jets (.054") in carburetor.

DESCRIPTION: These carburetors are dual barrel type with each barrel having its own idle system, main metering system and throttle valve. Automatic choke housing with fast idle cam is located on throttle body on opposite side from throttle lever. Two holes drilled in intake manifold into exhaust gas cross-over permit exhaust gas heat to enter passages around throttles to prevent ice formation around throttle area.

ADJUSTMENT: Make all adjustments exactly as outlined below. *NOTE* - Choke setting has been changed (see Production Note above) and should be adjusted as detailed.

IDLING ADJUSTMENT: If initial adjustment required to warm up engine, turn each idle mixture adjusting screw in until lightly seated, then back each screw out exactly 1¾ turns (1955-56), 1 turn (1957-58), then back off throttle stopscrew until throttle valves fully seated. Turn throttle stopscrew in until it contacts throttle lever, then turn screw in **one additional turn.** Run engine until it reaches normal operating temperature (choke valve wide open and fast idle inoperative). Recheck idle speed.



STROMBERG "WW" (BUICK) DOWNDRAFT CARBURETOR

Idl Mixtur - With engine idling at 485 RPM in neutral or park, adjust each idle mixture screw in turn by turning screw in until engine begins to run irregularly due to lean mixture, then turn screw out until engine begins to roll due to rich mixture, finally turn screw in just enough to provide smoothest engine performance. Recheck idle speed.

Idle Speed - 450 RPM (1955-56), 485 RPM (1957-58) with selector lever in Neutral or Park.

Acc l rating Pump: Three holes provided in throttle lever for pump rod engagement to provide seasonal adjustment as listed below.

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1955-58 STROMBERG "WW" BUICK CARBURETOR (Cont.)

Pump Seasonal Setting - Set pump rod in long stroke hole (1955), in middle (medium) hole (1956-58) for normal setting. *NOTE - Inner hole provides minimum pump stroke, outer hole provides maximum pump stroke.*

Pump Stroke Adjustment - With throttle stopscrew backed out so that throttle valves fully closed, and with pump connector rod engaged in center hole of throttle lever, measure vertical distance from top of bowl cover to top surface of pump plunger offset. This distance should be 1" (1955), 7/8" (1956-58). Adjust by bending pump connector rod at lower bend. Pump arm must clear top of bowl cover by at least 1/32". Check setting by opening throttle to wide open position.

Fl at Level: With air horn and bowl cover assembly removed from carburetor, place Gauge T-25569 (3/16") (1955-56); Gauge 6646 (7/32") (1957) Gauge 7294 (5/32") (1958) squarely on top edge of bowl at center of float. Hold float arm tang against needle. Top edge of float should just contact lower edge of gauge. Adjust by bending float arm tang. Make certain that float is centered in bowl and does not touch sides.

Fast Idle, Choke, Unloader & Starter Aid Adjustment: *CAUTION* - To prevent incorrect fast idle setting, unloader operation, or fuel mixture at idle and low speeds, **all of the following adjustments must be made in the rder indicated.** Remove air cleaner, thermostat cover, throttle stop screw and spring, then proceed as follows:

Fast Idle Setting - Replace throttle stop screw without the spring, then with throttle valves held fully closed, turn stop screw in just enough to contact throttle lever. At this point, **turn stopscrew in 5 full turns (1955-56), 6 full turns (1957), 7¼ full turns (1958).** With choke valve fully closed and throttle lever held against its stopscrew, the distance between fast idle lever and high step of fast idle cam should be .076" (No. 48 drill) (1955), .052" (No. 55 drill) (1956-57), .076" (No. 48 drill) (1958). To adjust, bend fast idle lever using Tool J-5197. *CAUTION - Fast idle lever must be parallel to carburetor mounting surface after bending.*

Choke Pickup Lever Adjustment - Turn throttle stopscrew **in 2 additional turns (1955-56), 1 additional turn (1957), out ¼ turn (1958)** *(total of 7 turns from a closed throttle position).* With throttle in this position, choke positioning spring pick-up lever should just contact choke positioning spring. Adjust as necessary by bending pick-up lever with needle nose pliers.

Fast Idle Cam Adjustment - Remove throttle stop screw, then open throttle enough to clear fast idle cam and fully close choke valve by pushing up on thermostat spring lever. Close throttle until fast idle lever rests on high step of fast idle cam. The side of fast idle lever should just clear upper index lug on fast idle cam and rest in the corner formed by index lug and high step of cam. Bend choke rod as required for fast idle lever to just clear index lug on cam.

Start Aid Adjustm nt - Reinstall throttle stop screw and spring. Hold choke valve closed on a No. 53 drill (.60"). As throttle valve is opened, start aid spring should just clear tang on choke unloader plate. To adjust, bend unloader link (side opposite choke thermostat housing).

Unl ad r Adjustm nt - Hold choke valve closed with light pressure. then fully open throttle so unloader arm on throttle lever kicks choke partially open. Clearance between upper edge of choke valve and wall of air horn should be .144" (No. 27 drill). To adjust, bend unloader arm on throttle lever.

Choke Positioning Lever Adjustment - Close choke valve with light pressure upward on thermostatic spring lever until positioning spring lever just contacts choke positioning spring. Clearance between upper edge of choke valve and wall of air horn should be .159" (No. 21 drill (1955-56), .209" (No. 4 drill) (1957-58). To adjust, bend choke positioning lever with needle nose pliers. Install choke cover and gasket. Rotate cover counterclockwise until index mark is aligned with correct mark on housing. See "Choke Adjustment" below.

Automatic Choke Setting: Centered (at index) (1955-56-57) 1 notch lean (1958).

Car Starter (Carburetor Vacuum Switch): Switch timing can be checked with carburetor on engine on Dynaflow Cars only. On all cars, switch can be timed with carburetor off engine as detailed below.

1955-58 MODELS

Switch Timing (Off Engine) - Connect battery and test lamp across switch terminals so that lamp will light when switch contact made. See that choke valve is wide open and fast idle cam is in hot or slow idle position. Close throttle valve against 1/4" drill rod inserted between lower edge of valve and carburetor wall at center. Lamp should light indicating that switch contacts are closed. Repeat test with 7/64" drill rod. Lamp should not light. If switch does not operate within above limits, adjust by adding or removing square timing shims located under contact spring. Shims furnished in thicknesses of .006" and .018".

1955-56 MODELS

Starting Switch Setting (On Car): With transmission in neutral and parking brake applied, back off throttle stop screw, rotate fast idle cam to slow idle position, and fully close throttle valve. *NOTE* - On Dynaflow cars, make certain Dashpot will not prevent full closing of throttle valve. Remove left oil filler cap, hold straight edge against rear face of lower arm of throttle lever which contacts Dashpot, so that scale rests on rocker arm cover. With throttle valve fully closed, mark cover at front edge of scale. Turn ignition switch on, slowly open throttle while holding scale in position against throttle lever, mark point on rocker arm cover at which cranking motor is energized. Distance between pencil marks or rocker arm cover should be 3/4-1 1/8". To adjust switch timing, add or remove shims.

1957-58 MODELS

Switch Timing (On Engine - Dynaflow Cars) - Place transmission selector lever in Park and apply brakes. Back off throttle stop screw so that throttle valves tightly closed (fast idle cam must be in hot or slow idle position). Place scale against flange on dashpot diaphragm and measure distance to nearest edge of dashpot arm on throttle lever. The difference between two measurements should be 13/16-1 3/16" (1957), 1-1 7/16" (1958). If switch timing not correct, adjust as for "off engine" timing above.

OVERHAUL: Remove choke rod, unloader link, and unloader arm. Proceed with disassembly as follows:

Air Horn Disassembly: File off staked ends of choke valve screws, then remove choke valve and shaft. *(NOTE - The choke valve is mad with a slight b nd in it. Do nor straighten this valv).* Remove air horn screws, air horn and gasket *(NOTE* - Tip air horn to disengage pump lever from upper end of pump rod). Remove pump plunger assembly from air horn. Remove power piston assembly by compressing spring and letting it snap repeatedly until hammering action of piston drives staked retaining disc from air horn. *(NOTE* - If heavy staking is encountered, remove burrs).

Main Body Disassembly: Remove pump nozzle with screw, washer, and gasket, then remove idle jet tubes and lower pump spring. Remove float needle seat and connector fitting together with gasket and float needle. Remove float retainer, float, and hinge pin. Remove power valve and gasket, then invert carburetor and catch the large pump inlet check ball and small pump outlet check ball. With main body inverted, remove main well plugs and gaskets using Tool T-19099. Remove main metering jets using wrench T-24924. Remove main discharge nozzles by screwing remover, Tool T-24967 (R. H. thread) into nozzle, then pulling nozzle from main body. *(NOTE - There ar no lead gask ts under nozzles in this carburetor).* Remove throttle body screws, throttle body, and gasket from main body

Throttle Body Disassembly: Remove starter switch screws, terminal cap, return spring and guide block assembly. Tilt throttle body and catch plunger and ball. *(NOTE - If starter switch screen is not visibly damaged r plugged, it need not be removed.* Remove choke cover, gasket, screws and retainers. Remove choke housing shaft outside nut; then remove lockwasher, arm, choke housing shaft and lever assembly, spacer washer, and fast idle cam. Remove idle needles, idle stop screw, and springs. *(NOTE* - Throttle valves and shaft should not be disassembled for normal cleaning and inspection).

Cleaning & Inspection: Use Bendix Metalclene or comparable cleaner to soak all parts for cleaning, then follow cleaning operation by rinsing parts in clean solvent to remove all gummy deposits. Remove lead plugs, if necessary, to clean passages in main body. Remove plugs with remover, Tool T-25052; replace plugs with Tool T-25054 to prevent damage to plug seats. Inspect all parts for excessive wear or damage which might affect their usage, and replace all parts that are questionable. Check all passages for restrictions and check all nozzles and jets to make sure they are clear. Maximum allowance for throttle shaft bearing is .006". Replace throttle valves if bent or damaged. Clean and inspect vacuum switch parts.

Throttle Body Reassembly: Install throttle stop screw and spring and idle needles and springs. Seat idle needles lightly, then back each needle out 1 turn for initial setting. *(CAUTION - Do not forc needl against its s at).* Install fast idle cam, spacer washer, choke housing shaft and lever assembly arm, lock washer and nut. Install starter switch ball, plunger. guide block assembly, return spring, terminal cap, clip, and screws.

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1955-58 STROMBERG "WW" BUICK CARBURETOR (Cont.)

Main Body Reassembly: Invert main body and install throttle body and a new gasket. Install main discharge nozzles using Tool T-24967. *(CAUTION - Make sure that nozzles are positioned so flat surface is parallel with direction of air flow).* Install main metering jets using Tool T-24924, then install main metering well plugs using new copper gaskets if available; otherwise make sure the plugs and seats are clean to insure a tight joint. Tighten plugs with Tool T-19099. Install power valve with a new gasket, then install float and hinge pin and float retainer clip, using needle nose pliers. Install float needle seat and connector fitting together with gasket and float needle. Hold float arm tang against needle, then check and adjust float setting (see above). Make sure that float is centered and does not rub on walls of bowl. Install idle jet tubes. Install accelerator pump check balls (use new balls if available); place large ball in plunger well and place small ball in discharge well. Install lower pump spring in plunger well. Install pump discharge nozzle and screw using a new washer and gasket.

Air Horn Reassembly: Install choke shaft in air horn with attached lever toward choke housing, then install choke valve with identification mark up. Install new choke valve screws loosely, then center valve by pressing up and endwise on choke shaft lever. Tighten screws and check with valve in closed position for uniform clearance and freedom from sticking. If necessary, loosen screws and adjust choke valve position. With valve in correct position and screws tight, check to make sure that choke valve will drop freely of its own weight. Support screw heads on a suitable steel block and stake opposite ends of screws. Install power piston assembly in air horn and carefully stake in three places. Piston must operate freely in cylinder *(CAUTION - Do not apply any lubricant).* Lay a new air horn gasket on inverted air horn, then install pump plunger assembly in air horn with washer on top side of air horn hole and attach to pump arm with a new cotter pin. Slide pump lever on upper end of pump rod and install air horn assembly on main body making certain that pump plunger leather does not have any curled edges when it is inserted in cylinder in main body. Install air horn screws. Make sure lower end of pump rod is in the medium stroke hole. Install choke unloader arm, unloader link, and choke rod. Adjust carburetor *(see "Adjustment" above)*, then install choke cover and gasket.

SERVICE PARTS: Gasket Set - Buick No. 1172374. **Repair Kit** - Buick No. 1173056 (1955-56), No. 1170000 (1957), No. 1185701 (1958).

1954 STROMBERG "WW" (DODGE)

DODGE V8 1954	①Stromberg Model & Code
Synchro-mesh Trans.	WW, 3-108A
Overdrive	③WW, 3-109A
Gyromatic Trans.	④WW, 3-106A
PowerFlite	②WW, 3-105A

①—Code No. stamped on bowl cover above fuel inlet connection.
②—Has Slow-Closing Throttle Dashpot without magnetic control.
③—Has Overdrive Kick-down Switch mounted on bracket on main body.
④—Has Slow-Closing Throttle Dashpot with magnetic control and Transmission Kick-down Limit Switch mounted on main body.

DESCRIPTION: "WW" carburetors are dual barrel, downdraft type of new design with vertical air intake. Fuel system is similar to other Stromberg carburetors with usual Float System (single float), Idle System, Main Metering System, Power System (with vacuum piston operated power by-pass jet), and Accelerating System (pump operated by horizontal fulcrum lever with duration spring type pump piston). Carburetor has automatic choke and Fast Idle. ***All models are alike except for added units for each type service as listed above.***

ADJUSTMENTS: ***CAUTION—Make all adjustments exactly as listed below. Kick-down Switches and Dashpot not used on all models (see listing above).***

Idle Setting: First synchronize both idle mixture adjusting screws by turning each screw in until it is lightly seated, then back each screw out exactly one turn. Start engine and run it until it is thoroughly warmed up (water temperature 160°F. or higher) with choke valve wide open and fast idle inoperative. Then adjust idle mixture and idle speed as follows:

Idle Mixture—First check and adjust idle speed (see below). Make trial adjustment by turning BOTH idle adjusting screws in ⅛ turn to lean the mixture and note effect this has on performance. **If engine speed increases** and engine is smoother, turn both screws in additional ⅛ turn. If performance improved, reset engine idle speed and make a fine adjustment by turning EACH idle adjusting screw in ⅛ turn and out ⅛ turn to find exact best setting for each screw. Finally reset idle speed. **If engine speed decreases** and engine is rougher, turn both screws out ⅛ turn for richer mixture. If performance improved, reset engine idle speed and make a fine adjustment by turning EACH idle adjusting screw in ⅛ turn and out ⅛ turn to find exact best setting for each screw. Finally reset engine idle speed.

►***CAUTION—BOTH idle adjusting screws must be set exactly alike (plus or minus ⅛ turn to allow for final exact setting of each screw).***

Idle Speed—Adjust only with engine at normal operating temperature with choke valve wide open and fast idle inoperative. Turn throttle stopscrew in or out for correct idle speed as measured with tachometer with shift lever in neutral.

IDLE SETTING

	Idle Mixture	Idle Speed
Dodge V8 (All)..	¾-1¼ turns open	475-500 RPM.

Accelerating Pump: ***NOTE***—Pump Seasonal Setting can be changed as required, Pump Stroke Setting should be checked and adjusted whenever carburetor overhauled.

Pump Seasonal Setting—Throttle lever has three holes for pump connector rod engagement:
Center Hole—Normal operating conditions.
Inner Hole—Min. stroke for less discharge.
Outer Hole—Max. stroke for greater discharge.

Pump Stroke Setting—To check pump stroke, back out throttle stopscrew so that throttle valves tightly closed, use scale to measure distance from top of bowl cover at side of pump plunger to top of plunger. This distance should be ¾". Adjust by bending pump connector rod using tool T109-213.

Float Level: To check float level, remove air horn and bowl cover and air horn gasket. Hold lip of float lever firmly against intake needle valve so that float held up in closed-valve position. Use Float Gauge T-25569 placed squarely on top edge of bowl at center of float. Float should just contact step on gauge. To adjust float level, bend lip on float lever as required using bending tool T-24733.

FLOAT LEVEL

Dodge V8 (All)	3/16"①

①—Top of float below top edge of bowl.

Fast Idle: To check fast idle setting, first remove fast idle cam housing to expose fast idle cam on end of choke valve shaft. Open throttle valve, close choke valve against FIRST STEP of Gauge T-25570 (second step of gauge used for Unloader setting) placing gauge between upper edge of choke valve and air horn wall, then move throttle valve toward closed position. Top of fast idle lever should just enter the first step on the fast idle cam. To adjust, bend lever on fast idle cam. *CAUTION*—hold fast idle counterweight while bending the lever.

Unloader: To check unloader setting, close choke valve, open throttle valves to wide-open position, check choke valve opening by inserting Gauge T-25570 between upper edge of choke valve and air horn wall. Choke valve opening should be equal to SECOND STEP on gauge (first step is used for Fast Idle setting). To adjust, bend choke lever on choke shaft which contacts ear on fast idle lever. Reinstall cam housing after completing adjustment.

Choke Setting: Centered (indicator mark on edge of thermostatic coil cover lined up with projection on top of choke housing). To adjust, loosen heat tube connection on cover and three screws in cover retainer, rotate cover and coil assembly.

►***CAUTION—Hold heat tube fitting on cover with a wrench while loosening or tightening heat tube connection to avoid damaging or rotating coil assembly.***

Kick-down Switch (Code 3-109 Carb.): Adjust switch position on bracket by backing off one locknut on mounting stem and tightening opposite nut until switch "B" contacts (terminals on opposite end of switch from plunger) are closed with the throttle valves wide open (use test lamp connected to switch terminals to check operation).

Kick-down Limit Switch (Code 3-106 Carb.): Check operation by road-testing car as follows. With car running at 30 MPH. accelerate with approximately ¾ throttle and when car speed reaches 40 MPH., push accelerator pedal to kick-down position. Re-

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1954 STROMBERG "WW" DODGE (C nt.)

peat this test at 45 MPH. and at 50 MPH. ***Kick-down should operate below 40 MPH. and should not operate above 45 MPH.***

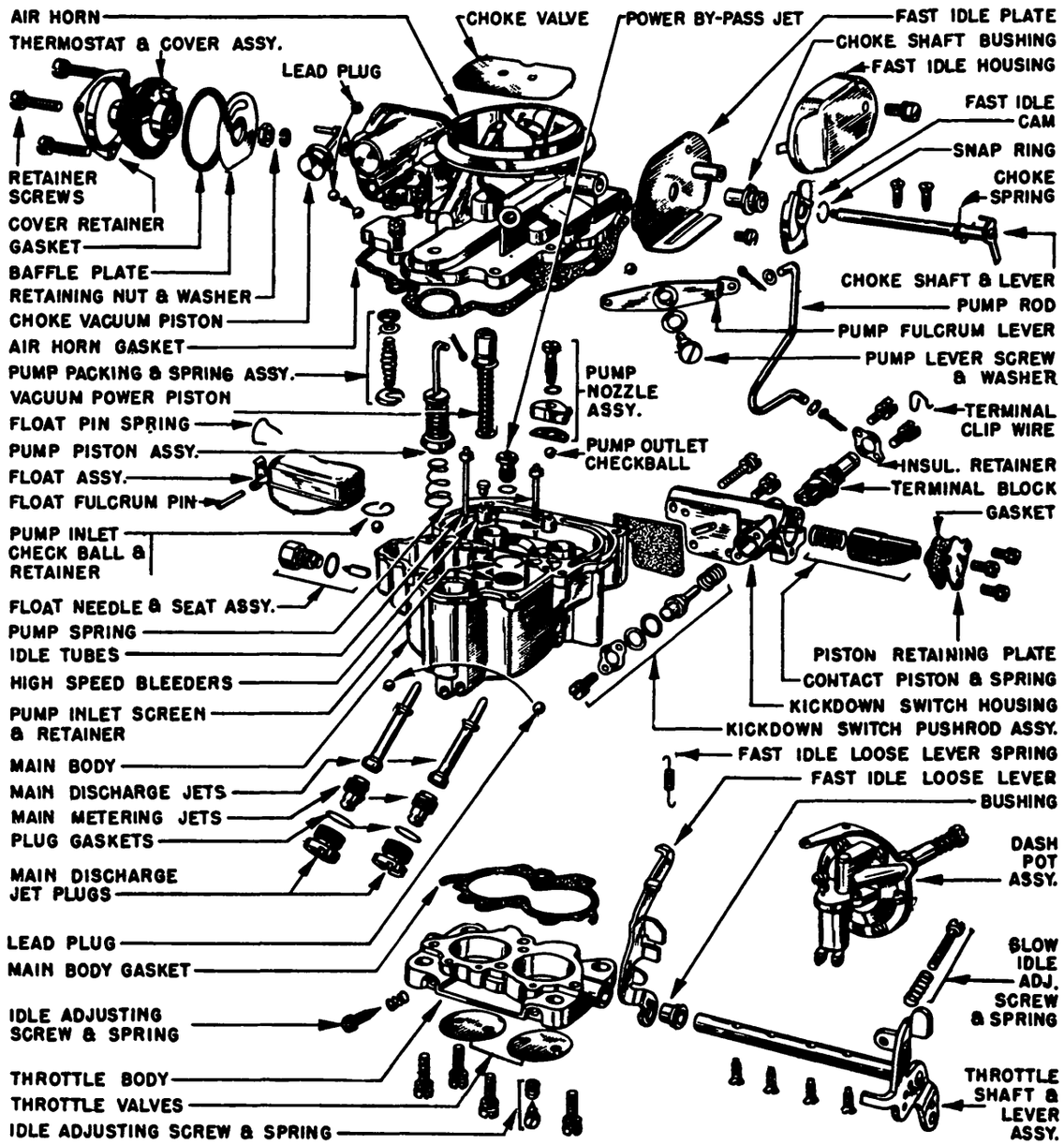
Dashpot (Code 3-105 & 3-106 Carb.): Check operation by running engine and holding car with the brakes. Shift to driving range and rapidly accelerate and decelerate engine. Engine should not stall when accelerator pedal released quickly. If engine stalls, adjust dashpot for maximum action by turning adjusting screw out until overtravel of plunger (possible inward movement of plunger) is only 1/16" with throttle valves in closed position.

OVERHAUL: ***NOTE—Carburetor should be mounted on repair block, Tool C-3225, which will prevent damage to throttle valves while working on carburetor.***

Disassembly: On carburetors so equipped, first remove Dashpot and gasket (two screws in mounting bracket), Kick-down Switch and gasket (two screws in mounting bracket), or Kick-down Limit Switch (three screws and lockwashers in housing). Disconnect pump operating rod from throttle lever, disconnect pump plunger stem from pump rocker arm, take out rocker arm fulcrum screw and spring washer (screw has left-hand thread), remove rocker arm and rod assembly. Remove fast idle cam housing dust cover, disengage fast idle lever return spring from housing and lever. Take out four air horn attaching screws, lift air horn assembly straight up while disengaging fast idle lever from slot in housing by pushing outward.

Air Horn Disassembly—Remove pump compression spring from bottom of pump plunger, slide plunger assembly out of air horn, discard plunger rod felt washer, remove and discard air horn gasket. Remove vacuum power piston by hooking end of small open end wrench under head on piston stem and using wood block on air horn as a fulcrum so that piston assembly can be pulled straight out (*CAUTION*—this assembly is staked in air horn and will be damaged unless removed in this manner). Take out screws in choke housing retainer ring, remove retaining ring, thermostatic coil housing assembly, gasket, and baffle plate. Remove nut attaching choke piston link on choke shaft, take out choke valve attaching screws, remove choke valve. Withdraw choke shaft and lever from air horn and disengage choke piston link, lift out choke piston and link assembly. Disengage spring from choke shaft lever and slide spring off choke shaft. Pry out fast idle cam retaining snap ring, remove fast idle cam. Take out screw and lockwasher attaching fast idle backing plate to air horn, use open end wrench inserted between backing plate and air horn and over choke shaft boss to pry backing plate loose, remove backing plate and choke shaft bushing. Remove lead plug from lower side of choke piston cylinder so that passage can be blown out (plug can be drilled out using No. 44 drill). Remove thermostatic coil and heat retainer plate from choke housing by rapping assembly sharply on palm of hand with coil side down (*CAUTION*—do not attempt to remove coil from heat retainer plate).

Main Body Disassembly—Lift both idle tubes out. Remove attaching screw and gasket in pump discharge cluster, remove cluster and gasket, invert body to drop discharge check ball from discharge passage. Remove fuel inlet needle seat and gasket,



STROMBERG "WW" (DODGE) DOWNDRAFT CARBURETOR

lift out inlet needle. Pry out float fulcrum pin retaining spring (*CAUTION*—do not allow spring to fly out), lift out float and fulcrum pin assembly. Remove power by-pass jet and gasket. Pry out snap ring in bottom of pump cylinder, remove strainer screen, remove snap ring retaining intake check ball, invert body to drop out the check ball. Remove both main jet plugs, discard gaskets. Use tool T-24924 to remove main metering jets. Use tool T-24967 to remove main discharge jets by screwing tool into jet and then pulling jet out of the body (threads formed by tool will not damage jet). Take out screws attaching main body to throttle body, lift main body off and discard gasket.

Throttle Body Disassembly—Remove both idle adjusting screws and springs. DO NOT disturb

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1954 STROMBERG "WW" DODGE (Cont.)

throttle valve and shaft assembly unless new parts must be installed (Manufacturer recommends replacement of Throttle Body Assembly if shaft or shaft hole in body worn). To remove throttle valves, first mark each valve to insure re-installation in same barrel, take out valve attaching screws, slide valves out of shaft slots, withdraw throttle shaft and lever assembly from throttle body.

Cleaning & Inspection: Clean all metal parts thoroughly in suitable cleaning solution. Make certain all carbon and gum deposits removed. Blow out all passages and dry parts with air. Inspect all parts for wear or damage.

Reassembly: Use all NEW gaskets. Install all parts in reverse order of disassembly procedure above and note the following important points:

Throttle Valve Installation—After throttle shaft inserted in throttle body, slide valves in place in throttle shaft lining up marks made before disassembly and with dash stamped on valve toward idle port and visible from top of throttle body, install new screws loosely. Centralize valves by closing valves tightly (throttle stopscrew must be backed off), tap valves lightly and hold them in place by pressing on high side of valves while tightening screws securely. Stake screws by squeezing with pliers.

Main Discharge Jet Assemblies—Engage remover tool T-24967 securely in end of main discharge jet, seat jet firmly in main body with nozzle opening (diagonal end) facing opposite wall of small venturi. Install main metering jet and tighten securely with tool T-24924. Install metering jet plug with new copper gasket and tighten securely.

Accelerating Pump Assembly & Testing—Drop 3/16" intake check ball into recess in bottom of pump cylinder, use tool T-25568 to seat check ball retainer, install new pump strainer, use tool T-25568 to install screen retainer. Drop 1/8" discharge check ball in pump discharge passage in main body, install pump plunger assembly temporarily in pump cylinder, fill carburetor bowl approximately 1/2" deep with clean gasoline. Press lightly on plunger shaft to expel air from pump system, then hold discharge check ball down on seat firmly using a small brass rod, raise pump plunger to fill cylinder and press downward on plunger. No gasoline should pass either the discharge check ball or intake check ball. If check balls are not tight, thoroughly clean pump passages and install new check balls. Install pump discharge cluster with new gasket and tighten screw securely. Check pump action. Identical clear straight streams should be emitted from each pump jet. If either stream diverted or restricted, install new pump discharge cluster. After tests completed, remove pump plunger and pour out the gasoline. Before finally installing pump plunger, flex leather several times and replace assembly if leather hard, cracked or worn. After pump plunger installed in cylinder (with compression spring under plunger), install air horn gasket, then place new metal and felt washer on pump plunger stem before installing air horn.

Vacuum Power Piston Installation—After vacuum piston installed in air horn, lock assembly in place by prick-punching rim at several points. Check piston for free operation and replace if any binding or sticking noted.

Automatic Choke & Fast Idle Assembly—Make certain thermostatic coil and heat retainer plate correctly installed in choke housing with notch in plate aligned with lug in housing and retaining spring seated in groove *(CAUTION*—spring must clear notch in plate). Install choke shaft bushing in backing plate, position backing plate on air horn, use tool T-25570 to drive bushing in place in air horn, slide fast idle lever into backing plate slot, install screw and lockwasher. Install fast idle cam on shoulder of choke bushing and secure with snap ring. Slide choke piston into cylinder, slide choke shaft and lever into position *(CAUTION*—make certain spring properly installed on shaft), hook long end of spring in notch of fast idle cam lever. Install choke valve (see below), engage piston link on choke shaft, install lockwasher and nut and tighten nut securely with tool T-25047. Install baffle plate with dimpled side out *(CAUTION*—lever must clear baffle at full travel). Check choke assembly for free operation (valve must open freely of own weight). Install coil housing gasket, coil housing assembly, and retainer ring with indicator mark on housing straight down, turn assembly counter-clockwise until indicator mark on housing in line with projection on air horn, tighten retainer screws securely. Install fast idle lever return spring with long loop hooked to lever and short loop hooked in backing plate. Adjust fast idle and unloader before installing fast idle housing cover.

Choke Valve Installation—Slide valve in position in shaft, install new screws loosely, close valve and center it by tapping lightly with a screwdriver, then tighten screws securely and stake screws by squeezing with pliers.

Carburetor Adjustments—See ADJUSTMENT above.

SERVICE PARTS: Gasket Set—Stromberg No. 382363 (Code 3-105, A; 3-108, A; 3-109, A). No. 382364 (Code 3-106, A).

Repair Kit Pkg.—Stromberg No. RK-173 (Code 3-108, A; 3-109, A). No. RK-172 (Code 3-106, A).

1955-58 STROMBERG "WW" DE SOTO, DODGE, PLYMOUTH

	Stromberg Code No.
DESOTO	
1957 S27 Firesweep (Synchro-mesh)	WW 3-149
1957 S27 Firesweep (Auto. Trans.)	WW 3-150
DODGE SIX	
1955 D56 (Synchro-mesh)	WW 3-124
1955 D56 (Overdrive)	WW 3-125
1955 D56 (Auto. Trans.)	WW 3-126
1956 D62-1, 2 (Synchro-mesh)	WW 3-124
1956 D62-1,2 (Overdrive)	WW 3-125
1956 D62-1, 2 (Auto. Trans.)	WW 3-126
1957 D72 (Synchro-mesh)	WW 3-159
1957 D72 (Auto. Trans.)	WW 3-160
1958 LD1 (Synchro-mesh)	WW 3-159
1958 LD1 (Auto. Trans.)	WW 3-160
DODGE V8	
1955 D55-1, 2 (Synchro-mesh)	WW 3-131,A
1955 D55-1, 2 (Overdrive)	WW 3-132,A
1955 D55-1, 2 (Auto. Trans.)	WW 3-133, A, B
1955 D55-3 (Synchro-mesh)	WW 3-120, A,B
1955 D55-3 (Overdrive)	WW 3-121, A,B
1955 D55-3 (Auto. Trans.)	WW 3-122, A,B,C
1956 D63-1 (Synchro-mesh)	WW 3-135
1956 D63-1 (Overdrive)	WW 3-136
1956 D63-1 (Auto. Trans.)	WW 3-137
1956 D63-2, 3 (Synchro-mesh)	WW 3-138
1956 D63-2,3 (Overdrive)	WW 3-139
1956 D63-2, 3 (Auto. Trans.)	WW 3-140
1957 D66,67,70,71 (Synchro-mesh)	WW 3-149
1957 D66, 67, 70, 71 (Auto. Trans.)	WW 3-150
1958 LD2 (Synchro-mesh)	WW 3-163
1958 LD2 (Auto. Trans.)	WW 3-164
PLYMOUTH SIX	
1956 Power Pack (Synchro-mesh)	WW 3-124
1956 Power Pack (Overdrive)	WW 3-125
1956 Power Pack (Auto. Trans.)	WW 3-126
PLYMOUTH V8	
1957 P31 (Synchro.mesh)	WW 15-23
1957 P31 (Overdrive)	WW 15-24
1957 P31 (Auto. Trans.)	WW 15-25
1958 LP2 318" Eng. (Synchro-mesh)	WW 15-26
1958 LP2 318" Eng. (Overdrive)	WW 15-27
1958 LP2 318" Eng. (Auto. Trans.)	WW 15-28

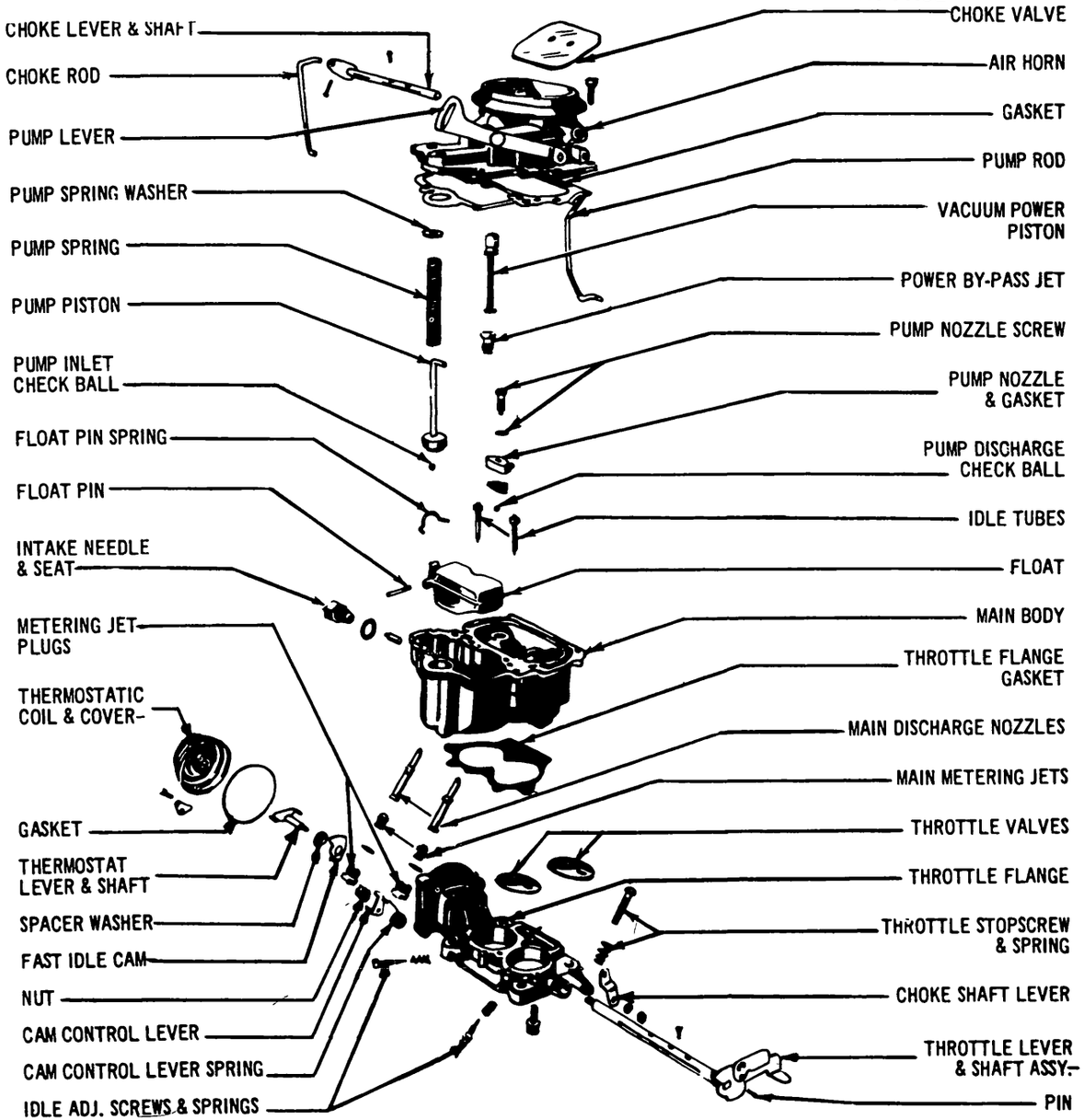
►CHANGES, CAUTIONS, CORRECTIONS

►*1955 HARD STARTING AFTER WARM-UP OR FLOODING CAUTION:* Use of other than mounting gaskets, Dodge Nos. 1615860 or 1634701, can result in restriction or blocking off of hot air passages to choke as well as the vacuum passage to the piston that operates the power by-pass or economizer jet. Incorrect choke setting or incorrect mounting gasket will cause hard starting after normal start and affect economy of operation.

►*1958 DODGE HARD STARTING & STALLING WITH COLD ENGINE CORRECTION: May be due to improper adjustment of choke or fast idle. See "Adjustments" below.*

DESCRIPTION: Dual barrel downdraft type of new design with vertical air intake. All 1955-56 models and 1957-58 Six Cyl. models have an "Integral" type automatic choke assembly which is mounted on the throttle body and connected to choke valve shaft by a rod. With this type automatic choke, the fast idle cam is located within the automatic choke housing. 1957-58 V8 models use a "Cross-Over" type automatic choke which is a separate unit mounted in a well in intake manifold (at exhaust crossover passage) and is linked to choke valve lever by a connector rod. The choke vacuum piston is located in a cylinder on carburetor air horn and is linked directly to choke valve. The fast idle cam assembly is located on opposite side of carburetor and is operated by a separate rod from choke valve

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STROMBERG "WW" DOWNDRAFT CARBURETOR (INTEGRAL AUTOMATIC CHOKE)

1955-58 STROMBERG "WW" DE SOTO, DODGE, PLYMOUTH (Cont.)

shaft and by lever on throttle valve shaft. Fuel system is similar to other Stromberg carburetors with the usual Float System (single float), Idle System, Main Metering System, Power System (with vacuum piston operated power bypass jet), and Accelerating System (pump operated by horizontal lever). All models are alike except for added units for added service as listed above.

►*"CROSS-OVER" AUTOMATIC CHOKE NOTE: See "Stromberg Cross-Over Type Automatic Choke".*

ADJUSTMENTS: *Make all adjustments exactly as listed below.*

Idle Adjustment: Make a preliminary setting of both idle adjusting screws by turning them in until lightly seated and then turn screws out exactly 1 turn. Warm up engine to normal operating temperature so that choke valve wide open and fast idle inoperative. Set engine idle speed to correct figure, then adjust idle mixture as follows:

Idle Mixture - With engine warmed up and idling at correct idle speed, turn each idle mixture adjusting screw in or out until highest engine speed and smoothest running is secured. Recheck idle speed.

Idle Speed - 450-500 RPM. *NOTE* - On Auto. Trans. Cars, Neutral selector button must be pressed in.

Accelerating Pump: Three holes provided in throttle lever for pump connector rod engagement to provide seasonal pump setting is listed below.

Pump Stroke Adjustment - Back off throttle stopscrew so that throttle valves fully closed. Make certain that pump connector rod engaged in **Center** hole in throttle lever. Use scale on bowl cover to measure height of top edge of pump arm at pump plunger, open throttle wide, again measure height of pump arm. The **difference** in the two measurements is **pump travel or stroke** and should agree with table below. Adjust by bending connector rod at lower angle using bending tool T109-213.

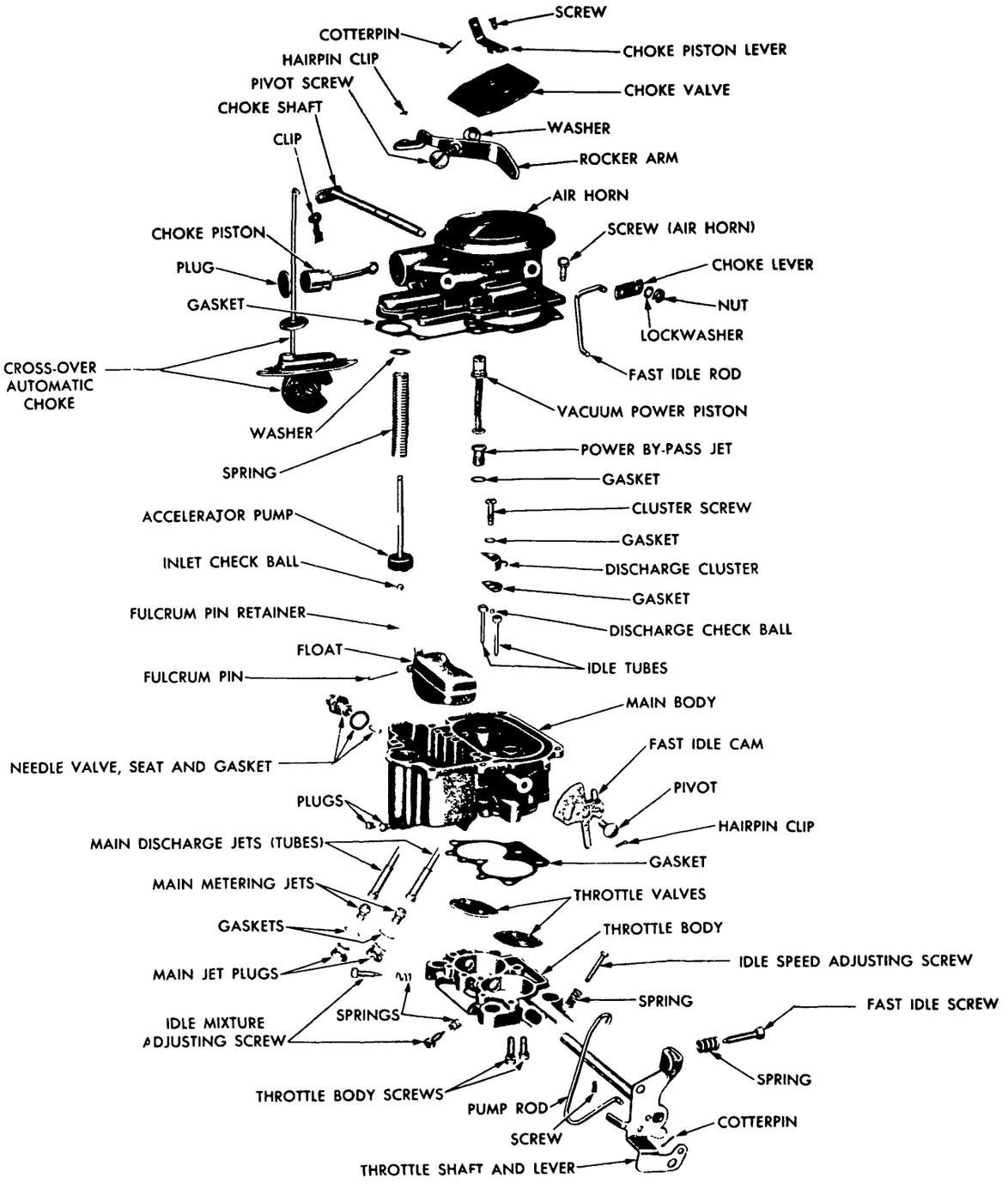
Pump Travel Setting

Car Model	Pump Travel
1955-56 Dodge Six	13/64-15/64"
1955-56 Dodge V8	7/32-1/4"
1957-58 Dodge Six	3/16-7/32"
1957 DeSoto, Dodge, Plymouth V8	9/32-5/16"
1958 Dodge V8	9/32-5/16"
1958 Plymouth V8	1/4-9/32"

Pump Seasonal Setting - Std. setting is with connector rod engaged in **center** hole of throttle lever (medium stroke). **Outer** hole in throttle lever will provide maximum stroke (greater discharge), **Inner** hole minimum stroke (less discharge).

Float Level: To check float level, remove air horn and bowl cover assembly, and gasket. Place gauge (see table below) squarely on top edge of bowl at center of float (on far side and adjacent to slot in top of pump cylinder). Hold float arm lip firmly against seated needle valve. Top of float should just touch step on gauge. Adjust by bending float lip using bending tool T-24733.

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STROMBERG "WW" DOWNDRAFT CARBURETOR (CROSS-OVER CHOKE)

1955-58 STROMBERG "WW" DE SOTO, DODGE, PLYMOUTH (C nt.)

Float Level Setting

Car Model	Gauge No.	Float Level
1955-56 Dodge 6 & V8	T-25569	3/16"
1957 DeSoto	T-26019	7/32"
1957-58 Dodge 6	T-25569	3/16"
1957-58 Dodge V8	T-26019	7/32"
1957-58 Plymouth V8	T-26019	7/32"
1956 Plymouth 6	T-25569	3/16"

►*ADJUSTMENT CAUTION: All Fast Idle Adjustments including Unloader Adjustment must be made in the s quence given below.*

Fast Idle (1955-58 Dodge Six, 1956 Plymouth Six, 1955-56 Dodge V8): Fast idle mechanism is located in choke housing on throttle body and thermostatic coil housing and gasket must be removed before making fast idle adjustments. Three different adjustments required on 1955-58 6 Cyl. and on 1955 V8 models; two different adjustments required on 1956 V8 models as indicated below. *NOTE - Special calibrated spring must be installed (to take place of thermostatic coil) while adjustments being made. Install this spring as follows:*

Calibrated Spring Installation - With thermostatic coil housing removed, install calibrated spring, Tool T-25906 (1955-56 Models), T-73656 (1957-58 Models) by inserting one cover screw through loop at one end of spring and installing screw in right hand upper mounting screw hole in housing and hooking opposite end of spring over long tang of thermostatic lever. Leave this spring in position while making all Fast Idle and Unloader adjustments.

1) Fast Idle Speed (Throttle Opening) Adjustment - Remove spring from throttle stopscrew, reinstall screw and turn screw in until it just touches throttle lever with throttle valves held closed, then **turn screw in an additional 5 1/8 turns (1955-58 6 Cyl. Models), 4½ turns (1956-58 V8 Models).** *NOTE - This will position throttle valves in correct fast idle position.* Hold choke valve closed and hold throttle lever against stopscrew, then check clearance between tang on contact lever on throttle shaft and **first step** of fast idle cam with a No. 48 drill rod (.076"). If clearance not correct, adjust by bending tang on contact lever toward or away from cam using Bending Tool T-25863. *CAUTION - Tang must be parallel to throttle shaft after adjustment. Reinstall spring on throttle stopscrew and reset idle speed.*

2) Fast Idle Cam Position Adjustment - Open throttle valve to clear fast idle cam, close choke valve tightly, then close throttle valves fully against tension of choke positioning spring. In this position, tang on cam contact lever should just clear **high step** of fast idle cam, but clearance at this point should not exceed .020" (measure with feeler gauge). Adjust by bending fast idle connector rod at upper angle near choke lever using bending tool T109-213.

3) Choke Positioning Spring Adjustment (1955-58 6 Cyl. & 1955 V8) - With carburetor in vertical position, install slide weight T-25864 (1955-57 6 Cyl. Models & 1955 V8 Models); T-73655 (1958 Models) over choke lever (between choke shaft and connector rod). Close throttle valve to make sure that cam contact lever tang is resting on high step of fast idle cam (rotate cam as necessary to obtain this position). Lightly close throttle valves which should cause slight opening of choke valve (choke positioning spring acting against slide weight on choke lever). Measure choke valve opening by inserting correct size drill rod (see table below) between upper edge of choke valve and air horn wall. Adjust by bending tang on thermostat lever that contacts choke positioning spring using long nosed pliers. Remove slide weight. Adjust UNLOADER before removing calibrated spring and reassembling choke.

Choke Positioning Spring Setting

Carb. Code No.	Drill Rod	Spring Color
WW3-120	#30	Copper
WW3-120 A,B	#24	Copper
WW3-121	#30	Copper
WW3-121A,B	#24	Copper
WW3-122	#28	Silver
WW3-122A,B,C	#24	Copper
WW3-124, 125	#31	Black
WW3-126	#37	Copper
WW3-131,A	#24	Copper
WW3-132,A	#24	Copper
WW3-133	#24	Silver
WW3-133 A, B	#24	Copper
WW3-159	#31	Black
WW3-160	#37	Copper

►*SPRING NOTE:* Springs are calibrated and can be identified by color as indicated above.

Fast Idle (1957 DeSoto, 1957-58 Dodge & Plymouth V8): Fast Idle cam is mounted on main body (above throttle lever) and is linked to the choke shaft lever by a connector rod. A separate fast idle screw on throttle lever contacts the fast idle cam. Two separate adjustments are required as follows:

1) Fast Idle Speed - Back off throttle stopscrew so that throttle valves tightly closed. Turn fast idle screw out to clear cam, then position cam so that fast idle screw is in line with **first step** of cam and against shoulder of highest step and turn screw in until it just contacts cam. **Turn screw in an additional 5½ turns (1957 DeSoto, Dodge & Plymouth), 8 turns (1958 Dodge), 7½ turns (1958 Plymouth)** which will provide correct fast idle speed. *NOTE - Throttle stopscrew must be adjusted for correct hot or slow idle speed after fast idle adjustments made.*

2) Fast Idle Cam Position - After adjusting fast idle speed, and with fast idle screw in same position as for fast idle speed adjustment (above), close choke valve as far as possible, measure choke valve opening or clearance between top edge of valve and air horn wall using correct size drill rod (see table below). If clearance not correct, adjust by bending fast idle rod at upper angle using bending tool T109-213.

Fast Idle Cam Setting

Car & Carb.	Checking Drill	Choke Opening
DeSoto & Dodge 3-149	#12	.189"
DeSoto & Dodge 3-150	#24	.152"
Plymouth (All)	#12	.189"
Dodge 3-163 & 3-164	"J"	.277"
Plymouth V8 (All)	1/4"	.250"

Unl ader (1955-58 Dodg 6 Cyl., 1955-56 D dg V8 & 1956 Plym uth 6 Cyl.): After completing fast idle adjustment and with calibrating spring in place, close choke valve, opening throttle valves wide which will open choke valve slightly. Check choke valve opening or clearance between upper edge of valve and air horn wall using a No. 19 drill (.150-.180" valve opening). If clearance not correct, adjust by bending tang on cam contact lever using long nosed pliers. After adjustment completed, remove calibrated spring and reassemble automatic choke (see choke data below).

Unloader (1957 DeSoto, 1957-58 Dodg & Plym uth V8): Two different adjustments required as listed below. *NOTE - Vacuum piston (Vacuum Kickdown Adjustment) is located in cylinder in air horn and is linked dir ctly to an ear on the choke valve.*

Unloader (Wide Open Kick) Adjustm nt - Hold choke valve closed lightly, open throttle valves to wide open position which will open choke valve slightly. Measure choke valve opening or clearance between upper edge of valve and air horn wall using a No. 19 drill (.180-.150" valve opening). If clearance not correct, adjust by bending tang on throttle lever using bending tool T109-214.

Vacuum Kick Adjustment - Make up a wire gauge by bending .040" diameter wire (paper clip) as shown in illustration. With choke valve open, insert wire gauge in vacuum cylinder and engage hooked end in slot at bottom of cylinder, close choke valve until inner end of piston grips wire gauge at inner end of slot. Measure choke valve opening or clearance between upper edge of valve and air horn wall using correct size drill rod (see table below). If clearance not correct, adjust by bending choke piston lever ear as required.

Vacuum Kick Setting

Car & Carb.	Drill Rod	Ch k Op ning
DeSoto & Dodge 3-149	"B"	.238" (¼")
DeSoto & Dodge 3-150	#7	.201"
Plymouth (All)	"B"	.238" (¼")
Dodge 3-163	.31/64"	31/64"
Dodge 3-164	29/64"	29/64"
Plymouth 15-26, 15-27	31/64"	31/64"
Plymouth 15-28	29/64"	29/64"

Automatic Choke (Integral Typ): Code number on thermostatic coil cover determines automatic choke setting (see table below). *NOTE - C rr ct c ver ass mbly must be used with right carburetor as indicated in tabl .* Rotate cover counter-clockwise to correct setting and tighten retaining screws. Hold choke open, then open and close throttle valves. Failure to obtain full throttle operation indicates faulty assembly or improper adjustment. Hold throttle wide open, then open choke slowly to wide open position. There should be no bind through entire travel of choke mechanism.

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1955-58 STROMBERG "WW" DE SOTO, DODGE, PLYMOUTH (C nt.)

Ch k Cover Setting

Carb. Cod N .	Cover	Setting
120, A,B	#31	2 points lean
121, A,B	#31	2 points lean
122, A,B	#33	2 points lean
122C	#31	2 points lean
124,125	#32	Centered (At Index)
126	#33	Centered (At Index)
131, A	#31	2 points lean
132, A	#31	2 points lean
133	#33	Centered (At Index)
133A, B	#31	2 points lean
159	#32	Centered (At Index)
160	#33	Centered (At Index)

Aut matic Ch k ("Cr ss-Over" Type): Automatic choke is separate "Cross-Over" type mounted in well in intake manifold (at exhaust crossover passage) and linked to choke valve lever by a connector rod. Choke vacuum piston is located in a cylinder in air horn and linked directly to choke valve. This type choke ordinarily does not require adjustment. *See "Stromberg Cross-Over Typ Aut matic Choke" for complete data.*

Ov rdriv Kickdown Switch: With throttle valves wide open, clearance between kickdown lever and switch stem guide should be 1/64-1/32" (1955-56), 1/64-3/64" (1957-58).

Sl w-Cl sing Throttl Dashpot (Used on some cars with Automatic Trans.): With throttle valves fully closed, it should be possible to move dashpot plunger shaft inward 3/32". Adjust by loosening locknut and screwing dashpot in or out of mounting bracket.

OVERHAUL: With carburetor off engine, proceed as detailed below. *NOTE* - It is recommended that carburetor be mounted on stand, Tool C-3225, to protect throttle valves from damage while carburetor is on the bench.

Disass mbly: If dashpot used, remove two screws in mounting bracket and lift dashpot assembly off. Disconnect and remove pump connector rod and fast idle connector rod. Take out air horn and bowl cover attaching screws, lift assembly straight up and off main body. Remove hairpin clip in upper end of pump plunger, remove plunger assembly from air horn, slide seal washer and spring off plunger rod. Remove vacuum power piston from air horn *(CAUTION* - Edges of cylinder are staked and piston must be removed as follows: Place wood block on air horn as a fulcrum, use open end wrench hooked under end of power piston stem as a pry to force piston out). Remove staking of choke valve screws, remove screws, slide choke valve out allowing piston link and bracket to hang in air horn *(CAUTION* - Do not attempt to remove vacuum piston from air horn cylinder - welsh plug retaining piston and link is factory sealed), withdraw choke shaft and lever from air horn. Lift idle tubes out of main body, invert main body to drop out pump inlet check ball. Remove screw and gasket from pump discharge cluster, lift off cluster and gasket, invert main body to drop out pump discharge check ball. Remove fuel inlet needle valve seat, gasket, and needle valve. Pry out float fulcrum pin retaining spring, lift out float and fulcrum pin. Remove power bypass jet and gasket. *CAUTION* - Do not attempt to remove high speed bleeders from main body. Take out screws attaching throttle body, lift off main body and discard gasket. Invert main body and remove main jet plugs using Tools T-19099, T-24968, & T-25184, discard plug gaskets. Remove main metering jets using Tool T-24924. Remove main discharge jets using Tool T-24967 *(NOTE* - tool has right hand thread and should be screwed into jet - threads formed by tool will not damage the jet). Remove idle mixture adjusting screws and springs. Do not remove throttle valves or shaft unless new parts are to be installed (see Reassembly for removal and installation data).

Automatic Choke Disassembly (Integral Type) - Remove retaining screws and lift off the thermostatic coil assembly and gasket. Remove nut on end of throttle shaft retaining cam contact lever using Tool T-25047 *(CAUTION - This nut has LEFT HAND threads),* remove lockwasher, slide cam contact lever and choke positioning spring off shaft *(NOTE* - Lever engages flats on shaft). Remove nut and lockwasher retaining thermostat crank lever on shaft on rear side of housing, remove lever *(NOTE* - Lever engages flats on shaft). Slide thermostat lever, shaft, and washer out of housing. Lift fast idle cam off shoulder in housing.

Cleaning & Inspection: Clean parts with denatured alcohol or cleaning solvent and dry with air. Blow out all passages with air. Do not use wire or drills to clean jets. Clean all parts of choke mechanism thoroughly *(CAUTION* - Do not attempt to separate thermostatic coil from heat retainer plate - coil, plate, and housing are serviced as an assembly).

Reassembly: Use all new gaskets. Reassemble carburetor by reversing disassembly procedure and note the following:

Throttle Valve Removal & Installation - If new shaft being installed, scribe mark both throttle valves before removal (to insure reinstallation in same position), remove valve screws (screws are staked), slide valves and shaft out. When installing valves, make certain that scribe marks (or dash stamped on valve) is upward and toward idle port and that notch in edge of valve is centered over idle discharge port. Install new screws lightly, then close valves completely (back out stopscrew to insure valves seating), press on high side of valves and tap lightly to seat them in bores, tighten screws securely and stake by squeezing with pliers

Choke Valve Installation - Install choke shaft with lever end toward pump end of air horn. Install choke valve, position choke piston bracket on shaft and install new screws loosely. Hold valve in closed position and tap lightly to seat it in bore, tighten screws securely and stake by squeezing with pliers. Make certain that valve opens and closes freely.

Automatic Choke Assembly (Dodge 6) - Install fast idle cam on hub in choke housing with fast idle steps down and toward throttle shaft (weighted portion against stop). Assemble cam retaining washer on thermostat lever shaft with shoulder against thermostat lever, install assembly in choke housing with choke positioning tang between fast idle steps and weight on fast idle cam. Install thermostat crank lever on end of lever shaft at rear of choke housing (lever must engage flats on shaft), install lockwasher and nut and tighten securely. Install choke positioning spring on end of throttle shaft with coiled portion inward and against thermostat lever shaft housing. Slide cam contact lever over end of throttle shaft with lever tang against fast idle cam, install lockwasher and nut, tighten nut securely *(CAUTION* - This nut has left hand thread). Install thermostatic coil housing *(see Automatic Choke above).*

Main Discharge Jets & Metering Jets - Place main discharge jets firmly on Tool T-24967, seat jets firmly in main body with opening in end of jets (diagonal cut) facing opposite side of main venturi. Install main metering jets and tighten securely with Tool T-24924. Use new copper gaskets on main jet plugs and tighten plugs securely.

Accelerating Pump Assembly & Test - Install pump discharge check ball in discharge passage, fill bowl with clean gasoline to depth of ½", install pump plunger temporarily in cylinder, depress plunger to expel air from discharge passage. Hold discharge check ball down on seat with a small brass rod, operate pump plunger. No fuel should be emitted from intake or discharge passages. If fuel noted, clean passages thoroughly and inspect check balls and seats for damage. Reseat ball by using rod to tap ball down on seat *(CAUTION* - Install new check ball after using ball in seating operation). Recheck pump operation. Install discharge cluster using new gasket. Check pump operation. Discharge from each cluster jet should be a clear straight stream. If stream deflected or restricted, install new cluster. Remove pump plunger and install it in air horn.

Carburetor Adjustments - *Make all adjustments listed under ADJUSTMENTS above.*

1959-60 STROMBERG "WW" BUICK, DODGE, PLYMOUTH

	Stromberg Code No.
BUICK	
1959 Series 4400 (All Trans.)	WW 7-112
1960 Series 4400 (All Trans.) Early	**WW 7-113**
1960 Series 4400 (All Trans.) Later	**WW 7-113A**
DODGE & DART	
1959 V8 326" Eng (Synchro-mesh) ①	WW 3-164
1959 V8 326" Eng. (Auto Trans.) ①	WW 3-181
1959 V8 326" Eng. (Synchro-mesh) ②	WW 3-182
1959 V8 326" Eng (Auto Trans.) ②	WW 3-183
1960 V8 318" Eng. (Synchro-mesh) Early	**WW 15-41**
1960 V8 318" Eng. (Synchro-mesh) Later	**WW 15-41A**
1960 V8 318" Eng. (Auto. Trans.)	**WW 15-42**
PLYMOUTH	
1959 V8 318" Eng. (Synchro-mesh)	WW 15-38
1959 V8 318" Eng. (Overdrive)	WW 15-39
1959 V8 318" Eng (Auto. Trans)	WW 15-40
1960 V8 318" Eng. (Synchro-mesh) Early	**WW 15-41**
1960 V8 318" Eng. (Synchro-mesh) Later	**WW 15-41A**
1960 V8 318" Eng. (Auto. Trans.)	**WW 15-42**

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 DODGE & PLYMOUTH COLD ENGINE STALLING CORRECTION:* On Plymouth, carburetors code dated 15-40A (stamped on air horn above fuel inlet) have improved choke piston to correct condition. For correction on early Plymouth and all Dodge carburetors proceed as follows

1) Remove air cleaner, vacuum cylinder plug and piston with link assembly.

2) Enlarge bleed hole in vacuum piston groove to No. 50 drill (.070"). Replace assembly, install new vacuum cylinder plug (Stromberg No. 387166). Piston must operate freely in cylinder.

3) Place .040" wire gauge in front end of cylinder slot and move choke valve toward closed position. With piston against wire, choke valve opening should be 13/32" (Dodge), 3/8" (Plymouth) Correct by bending arm on choke shaft. *PLYMOUTH NOTE - If excessive loading results during warm-up, increase setting to 13/32". If above correction does not provide satisfactory start, set automatic choke 2 notches rich*

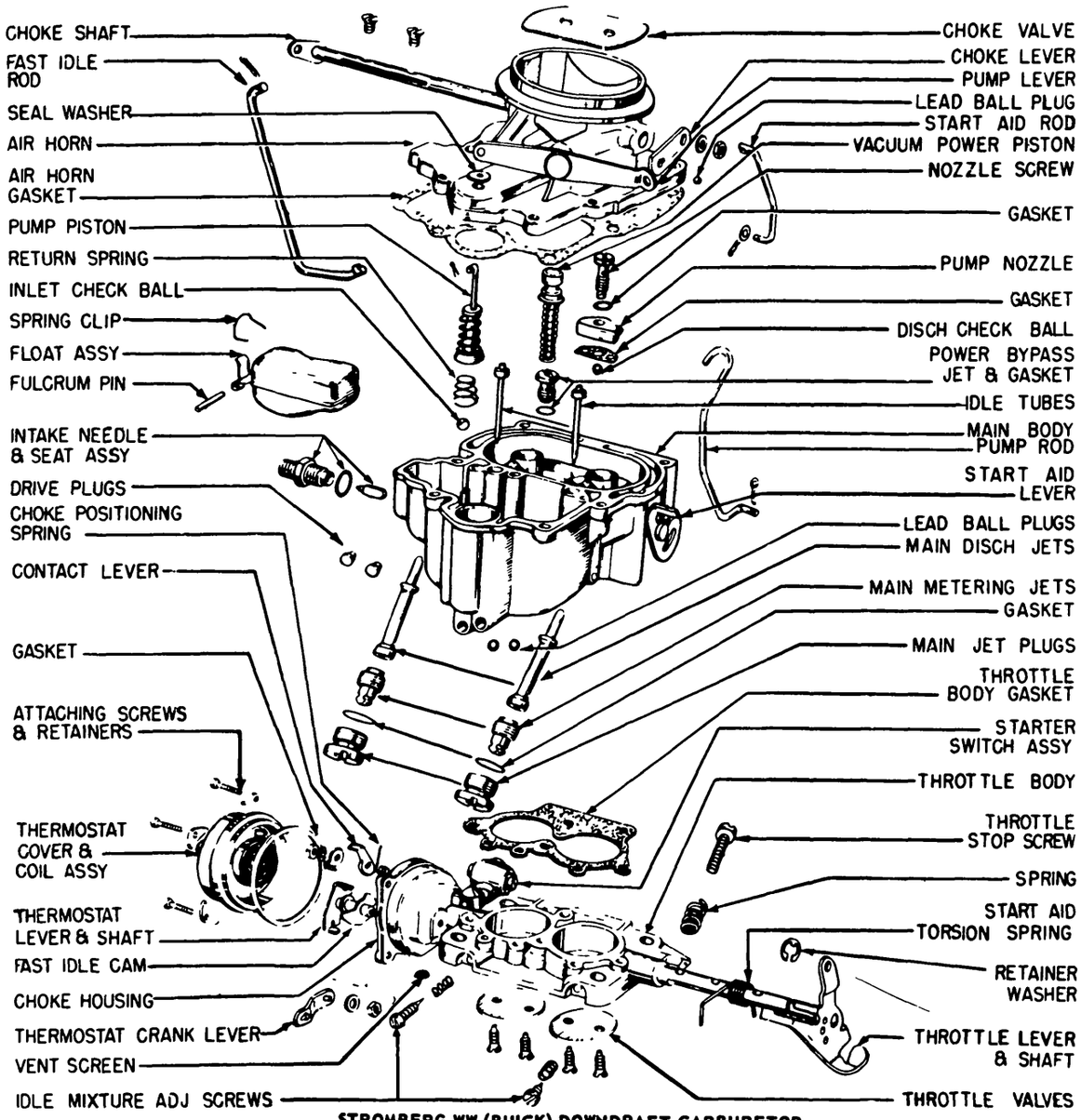
4) Remove wire, check choke shaft for binding and valve for proper seating without binding

►*1960 BUICK CARBURETOR CHANGES FOR IMPROVED HOT WEATHER OPERATION (Code 7-113A):* **This carburetor has baffle in float chamber and air horn gasket with solid section over float chamber.**

►*1960 DODGE & PLYMOUTH CODE 15-42 CARBURETOR HESITATION OR STUMBLE ON LIGHT ACCELERATION (ENGINE NOT COMPLETELY WARMED UP) CORRECTION:* **Install Main Metering Jets, Part No. 386208 (.052"), and Main Discharge Nozzle, Part No. 386949.**

DESCRIPTION: Dual downdraft type of same design used previously. On Buick, integral type automatic choke is mounted on throttle body along with carburetor starter switch. On Dodge and Plymouth, automatic choke is of "Cross-Over" type mounted in well in intake manifold. However, all chokes are linked directly to choke shaft. Se *"Stromberg Cross-Over Automatic Ch k ".*

ADJUSTMENTS: Make all adjustments exactly as outlined below.



STROMBERG WW (BUICK) DOWNDRAFT CARBURETOR

Idle Adjustment: For initial setting, set idle mixture adjusting screws 1 turn (Buick); 1 1/8 turns (1959 Plymouth); 1¼ turns (1959-60 Dodge & 1960 Plymouth) out from a lightly seated position. Bring engine to normal operating temperature with choke valve wide open and fast idle inoperative. Set engine idle speed to correct figure (see below), then adjust idle mixture as follows:

Idl Mixtur - Turn both idle mixture adjusting screws in equally until engine begins to run roughly from lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about halfway between these positions where smoothest possible idle is obtained. On Buick, favor a slightly rich mixture. Recheck idle speed.

Idl Sp d - Adjust by turning throttle stopscrew located on boss on throttle body for desired speed as follows:

CONTINUED ON NEXT PAGE

1959-60 STROMBERG "WW" (Cont.) BUICK, DODGE, PLYMOUTH

Idle Speed Setting

Car Model	Setting
1959-60 Buick	①②485 RPM
1959 Dodge & Plymouth	①②450-500 RPM
1959 Dodge & Plymouth (Auto. Trans.)	①②475-500 RPM
1960 Dodge & Plymouth (All Models)	①②550 RPM

① - Transmission in "N" or "P".
② - 550 RPM on Air Cond. Cars.

Accel rating Pump: Three holes provided in throttle lever for pump rod engagement to provide seasonal adjustment as listed below.

Pump Sea sonal Setting - For normal operation engage connector rod in **cent r** hole (medium stroke). **Upper hole** - Shorter stroke (less discharge). **Lower hole** - Longer stroke (greater discharge).

Pump Str k Adjustment - With throttle stopscrew backed out so throttle valves are fully closed, and with pump connector rod in **cent r** hole of throttle lever, proceed as follows:

Buick - Measure vertical distance from upper side of pump plunger offset to air horn casting. Distance should be as in table below. To adjust, bend connector rod at lower angle.

D dg & Plym uth - Measure pump travel as throttle valves are moved from fully closed to wide open position. Distance should be as in table below. To adjust, bend connector rod at lower angle.

Car Model	Pump Setting Bending Tool	Pump Setting
1959-60 Buick	J-4552	7/8"
1959-60 Dodge	T109-213	9/32-5/16"
1959 Plymouth	T109-213	1/4"
1960 Plymouth	T109-213	9/32-5/16"

Fl at Level: With air horn and gasket removed and float lip held against float needle, place checking gauge across top of main body. Float should just touch gauge at center. Distance should be as in table below. To adjust, bend float lip. Make sure float hangs freely and does not touch sides of casting.

Float L vel Setting

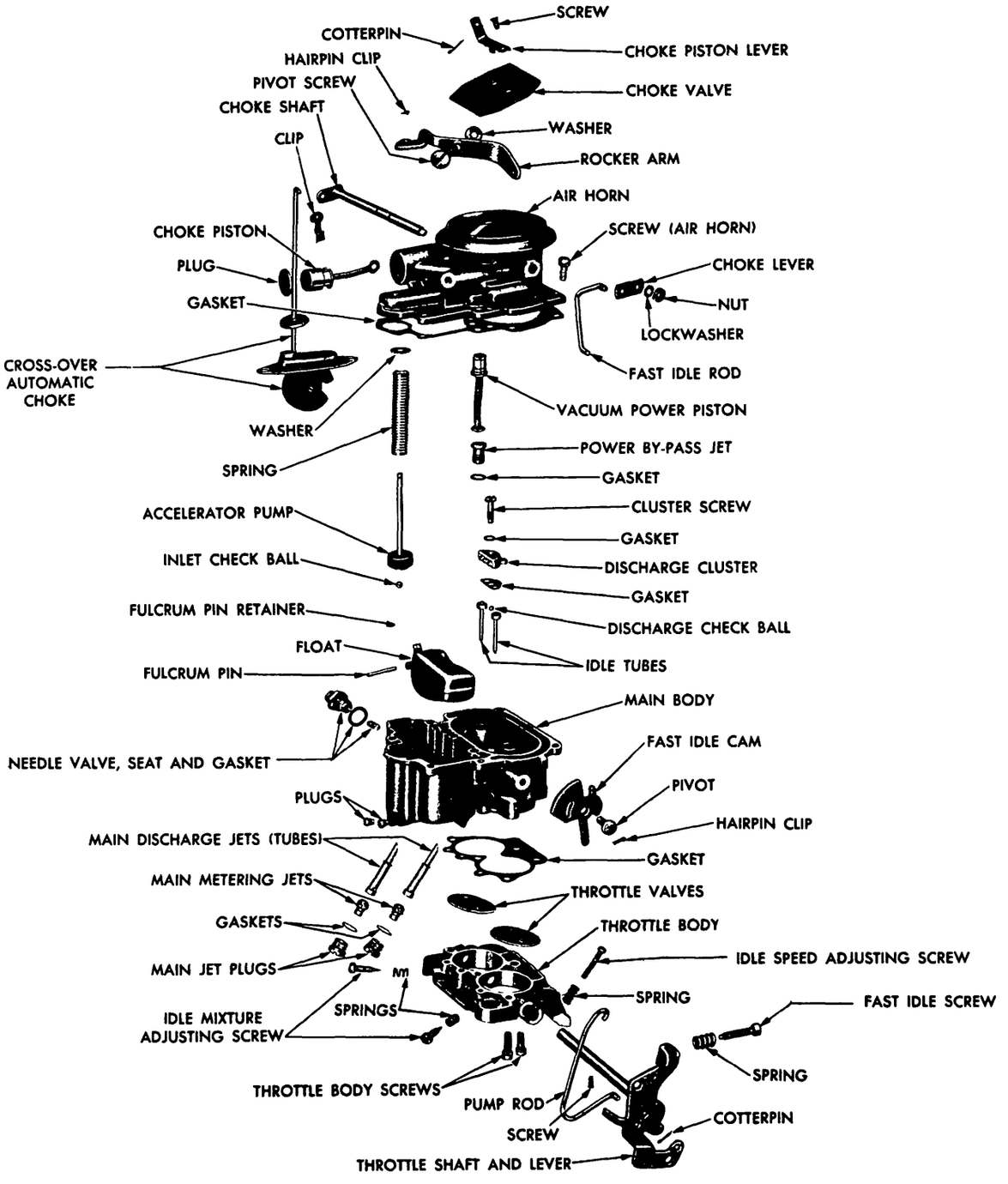
Car Model	Checking Gauge	Float Level
Buick	J-7394	5/32"
Dodge & Plymouth	① 73519	7/32"

① - Stromberg, Dodge & Plymouth tool number.

Fast Idl , Ch k , Unl ader & Start Aid Adjustments (Buick): *CAUTION - T prevent incorrect fast idle s tting, unload r p ration, or fuel mixture at idle and l w speeds, all f the following adjustments must b mad in th ord r indicated.* Remove thermostat cover, throttle stopscrew and spring and replace stopscrew without spring. Proceed as follows:

1) Hold throttle valves fully closed and turn throttle stopscrew in **xactly** 7 turns from point of contact with throttle lever. Choke positioning spring pickup lever

CONTINUED ON NEXT PAGE



STROMBERG WW (DODGE & PLYMOUTH) DOWNDRAFT CARBURETOR WITH CROSS-OVER CHOKE

1959-60 STROMBERG "WW" (Cont.) BUICK, DODGE, PLYMOUTH

should just contact choke positioning spring. Adjust by bending lever. Reinstall stopscrew and spring.

2) Hold choke valve closed and measure distance from upper thermostat cover hole to top of thermostat lever. Distance should be 1 3/32". Adjust by bending choke rod with Tool J-5197.

3) Partially close choke valve by applying light pressure upward on thermostat spring lever until choke positioning spring lever just contacts spring. Opening between upper edge of choke valve and wall of air horn should be .204" (No. 6 drill). To adjust bend choke positioning spring lever.

4) Install choke cover and gasket, set choke **1 notch lean** (1959); **at index** (1960) and tighten screws and retainers.

5) Open throttle enough to clear fast idle cam so choke is in idle choke kick position. Then close throttle so fast idle screw rests on high step of fast idle cam. Side of screw should line up with drop-off to next lower step of cam. To adjust, bend unloader link with Tool J-5197.

6) Hold choke valve closed on a .061" (No. 53) drill. Start aid spring should just clear start aid tang on fast idle cam as throttle valve is opened. To adjust, bend start aid tang.

7) With choke closed with light pressure, fully open throttle so unloader arm on throttle lever kicks choke open partially. Distance between upper edge of choke valve and wall of air horn should be .146" (No. 27 drill). To adjust, bend unloader arm.

8) After carburetor installed on engine (engine at normal operating temperature), position fast idle cam so fast idle screw rests on high step of cam with side of screw lined up with drop-off to next lower step. Adjust fast idle screw so engine is running at 1500 RPM.

Fast Idle (Dodge & Plymouth): Fast idle cam is mounted on main body (above throttle lever) and is linked to choke shaft lever by a connector rod. A separate **Fast Idle Screw** on throttle lever contacts fast idle cam. Two Separate adjustments are required as follows: 1) **Fast Idle Speed** - Back off throttle stopscrew so that throttle valves are tightly closed. Turn fast idle screw out to clear fast idle cam, then position cam so that fast idle screw is in line with **first step** of cam (and against shoulder of highest step). Turn screw in until it just contacts cam, then turn screw in an additional **8 turns (1959-60 Dodge & 1960 Plymouth); 7½ turns (1959 Plymouth)** which will provide correct idle speed of 1300 RPM (1959 Models); 1375-1425 RPM (1960 Models), after carburetor is installed on engine. *NOTE - Throttle stopscrew must be adjusted for correct hot (slow) idle after fast idle adjustments completed.*

2) **Fast Idle Cam Position** - With fast idle screw held the same position as above, close choke valve lightly as far as possible and measure choke valve opening or clearance between top edge of valve and air horn wall using correct size drill rod (see table below). If clearance not correct. adjust by bending fast idle rod at upper angle using Bending Tool T109-213.

Fast Idle Cam Setting

Car Model	Checking Drill	Choke Opening
1959 Dodge	"J" (9/32")	.281"
1959 Plymouth	1/4"	.250"
1960 Dodge & Plymouth	13/64"	.203"

Unloader (Dodge & Plymouth): Two different adjustments required as listed below. *NOTE* - Vacuum piston (Vacuum Kick Adjustment) is located in cylinder in air horn and is linked directly to an ear on choke valve.

Unloader (Wide Open Kick) Adjustment - Hold choke valve closed lightly, open throttle valves to wide open position which will open throttle valves slightly. Measure choke valve opening or clearance between upper edge of valve and air horn using a 15/64" drill. To adjust, bend tang on throttle lever with Tool T109-214.

Vacuum Kick Adjustment - Make a wire gauge from .040" diameter wire (paper clip) with a right angle bend on one end so it will engage in slot at bottom of vacuum cylinder. With gauge in place, close choke valve until inner end of piston grips gauge at end of slot. Measure choke valve opening or clearance between upper edge of valve and air horn wall using correct size drill rod (see table below). Adjust the bending choke piston lever ear.

Vacuum Kick Setting

Car Model	Choke Opening
1959-60 All (Synchro-mesh)	31/64"
1959 All (Auto. Trans.)	29/64"
1960 All (Auto. Trans.)	11/32"

Automatic Choke (Buick): Integral type mounted on throttle body. Set 1 notch lean (1959), At index (1960).

Automatic Choke (Dodge & Plymouth): "Cross-Over" type mounted in well in intake manifold. *See "Stromberg Cross-Over Automatic Choke".*

Car Starter (Carburetor Vacuum Switch): Switch timing can be checked with carburetor on engine on Dynaflow Cars only. On all cars, switch can be timed with carburetor off engine as detailed below.

Switch Timing (Off Engine) - Connect battery and test lamp across switch terminals so that lamp will light when switch contact made. See that choke valve is wide open and fast idle cam is in hot or slow idle position. Close throttle valve against 1/4" drill rod inserted between lower edge of valve and carburetor wall at center. Lamp should light indicating that switch contacts are closed. Repeat test with 7/64" drill rod. Lamp should not light. If switch does not operate within above limits, adjust by adding or removing square timing shims located under contact spring. Shims furnished in thicknesses of .006" and .018".

Switch Timing (On Engine - Dynaflow Cars) - Place transmission selector lever in "P" (Park) and apply brakes. Back off throttle stopscrew so that throttle valves are tightly closed (fast idle cam must be in hot or slow idle position). Place scale against flange on dashpot diaphragm and measure distance to nearest edge of dashpot arm on throttle lever. With ignition turned on, slowly open throttle while holding scale in position against flange of dashpot. When cranking motor is energized, note the distance from flange of dashpot to near edge of dashpot arm. The difference between the two measurements should be 3/4-1 1/8". If switch timing not correct, adjust as for "off-engine" timing above.

Anti-stall Dashpot (Buick with Auto. Trans.): *For adjustment, see "Throttle Linkage Adjustment" under CARBURETOR on car model page.*

OVERHAUL: *See "1955-58 Stromberg (Buick) Carburetors" and "1955-58 Stromberg (Dodge & Plymouth) Carburetors".*

SERVICE PARTS: Gasket Set - Buick No. 1190922 (7-112 & 7-113); MoPar No. 1631368 (3-164, 3-181, 3-182, 3-183, 15-38, 15-39, 15-40, 15-41, 15-42).
Repair Kit - Buick No. 1190921 (7-112), No. 1195309 (7-113 & 7-113A); MoPar No. 1826541 (15-38, 15-39, 15-40). No. 1826540 (3-164, 3-182), No 1826850 (3-181, 3-183), No. 2084726 (15-41, A). No. 2084727 (15-42).

1960 STROMBERG "WWC" (DODGE) CARBURETORS

DODGE	Stromberg Carburetor No.
V8 Matador	WWC 3-188

DESCRIPTION: 2-Barrel downdraft type of new design having an idle system vent (operated from the throttle linkage) and a double venturi cluster which contains the small venturi, discharge nozzles, main discharge tubes and idle tubes. A separate "Cross-Over" type automatic choke assembly is located in a well in intake manifold (at exhaust crossover passage) and linked to choke valve lever by a connecting rod. Choke vacuum piston is located in a cylinder in carburetor air horn and is linked directly to choke valve.

ADJUSTMENT: *Make all adjustments exactly as indicated below.*

Idle Setting: For initial setting, set idle mixture screws (located in throttle body below float chamber) ½ to 5/8 turn open from a lightly seated position, then bring engine to normal operating temperature with choke fully open and carburetor off fast idle.

Idle Speed – 500 RPM with transmission in "N" (Neutral). *NOTE – 550 RPM with air conditioning compressor operating (if equipped).* Adjust idle speed with throttle stop screw on throttle body casting.

Idle Mixture – Turn both idle mixture screws in equally until engine begins to run rough, then turn screws out until engine rolls (from rich mixture). Now turn screws in to a point about halfway between these two positions where smoothest idle is obtained. *NOTE – Both screws must turn equally.* Recheck idle speed.

Fast Idle Cam Position Setting: Turn throttle stop screw (idle speed screw) out far enough to clear throttle lever tang when throttle valves are closed. Hold throttle valves in closed position and back out fast idle adjusting screw so it can be positioned on high step and against shoulder of fast idle cam. Turn fast idle screw in until it just contacts step of cam, **then turn screw in 3½ turns.** Hold fast idle screw in this positions and close choke valve as far as it will go with light pressure. Clearance between top of choke valve and air horn wall should be ¼" (use a ¼" drill to measure). To adjust, bend fast idle rod at upper bend (where it connects to choke shaft lever).

Fast Idle Speed: 1375–1425 RPM with fast idle adjusting screw resting on high step (against shoulder) of fast idle cam.

Unloader: With choke valve held lightly closed, open throttle valves to wide open position. Clearance between top edge of choke valve and wall of air horn should be ¼" (use ¼" drill to measure). To adjust, bend tang (long narrow extension) on throttle lever with Tool T109–214. Make sure throttle valves fully open and close when choke valve is wide open.

Accelerating Pump: With throttle valves fully closed, pump travel from the fully closed to fully open throttle positions should be 7/16", measured at small raised boss near connecting rod end of pump lever. To adjust, bend pump rod at right angle bend. *NOTE – Pump rod must be installed in center slot of pump arm.*

Bowl Vent Valve: With idle speed screw in hot (slow) idle position, hold throttle valve in closed position with choke valve wide open. Opening of vent valve at center of hole, with rubber valve hanging free, should be .062–.094". To adjust, bend bowl vent lever (extension of accelerator pump lever) with Tool T109–214.

►*CAUTION – Make sure the vent valve is not distorted and that it properly seals the bowl vent hole when throttle valve is open.*

Choke Vacuum Piston: With bowl cover removed, insert a No. 59 drill (.041") through vacuum passage on underside of choke piston cylinder and engage the top groove of vacuum piston. Apply a light pressure against choke valve to take up slack, then measure clearance between top of choke valve and wall of air horn which should be .182" (No. 14 drill). To adjust, bend ear on choke connector rod bracket on choke valve.

Float Level: With float installed in float bowl and lip of float held against inlet needle, distance from top of float at center to top of float bowl (gasket removed) should be 1/8". Use Gauge 73725 or "T" scale. To adjust, bend lip of float with Tool 73605.

►*FLOAT LEVEL CHECKING NOTE:* With carburetor installed on engine, the air horn can be removed as follows: Remove three short air horn-to-main body attaching screws, then remove one long air horn-to-throttle body screw next to fuel bowl. Assemble a short screw through main body flange and thread into throttle body. Remove long screw from side away from fuel bowl and on opposite side, then assemble a short screw through main body flange. Securely tighten the short screws, then remove remaining two long screws and lift off air horn. Assemble air horn to main body by reversing removal procedure.

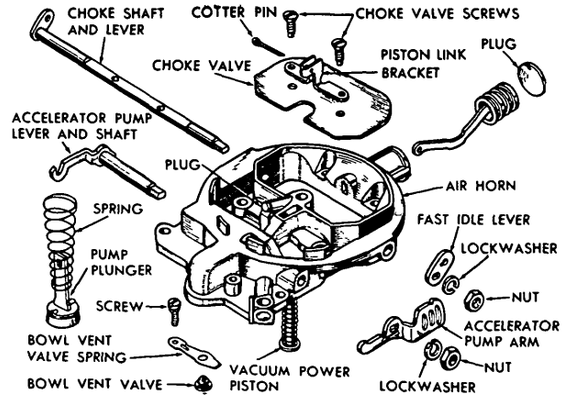
Automatic Choke: Automatic choke is a separate "Cross-Over" type mounted in a well in intake manifold. *See "Cross-Over Choke" in 1957 Annual Data or later Manual edition.*
Setting – 1 notch rich.

OVERHAUL: With carburetor removed from engine, proceed as follows:

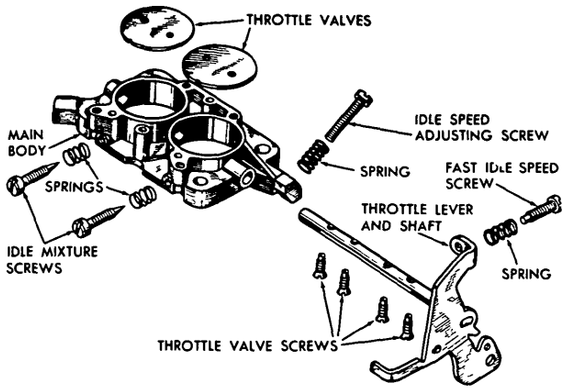
Disassembly: Remove hairpin from fast idle rod and from pump rod, then remove rods. Remove three air horn attaching screws, four main body-to-throttle body screws, then lift off air horn assembly and gasket. Remove main body and gasket from throttle body.

Air Horn - Remove accelerating pump piston and spring from air horn, then remove spring from pump piston. Remove vacuum power piston using a block of wood and small open end wrench as a pry. Remove choke lever attaching nut and lockwasher and remove lever. Remove vacuum piston link cotter pin, then remove

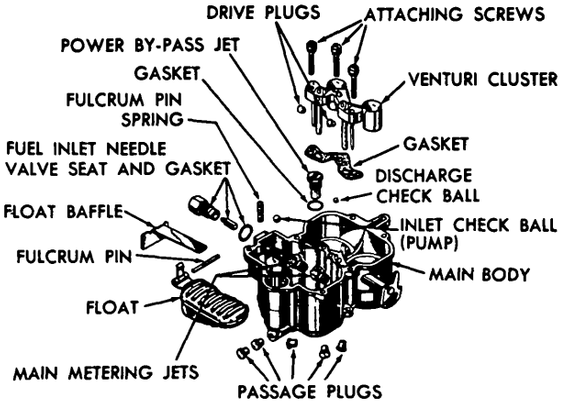
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AIR HORN (EXPLODED VIEW)



THROTTLE BODY (EXPLODED VIEW)



MAIN BODY (EXPLODED VIEW)

1960 STROMBERG "WWC" (DODGE) (C ntinued)

choke valve plate, choke valve, and choke shaft. Remove welch plug and choke piston. Remove pump lever, external vent attaching screw, external vent spring and grommet.

Main Body - Remove baffle, fulcrum pin spring, float, and fulcrum pin. Remove needle valve, seat and gasket. Invert carburetor and catch pump inlet ball check. Remove venturi cluster attaching screws, cluster assembly, and gasket. Remove power bypass jet and gasket, then use Tool T109-173 and remove the two main metering jets.

Throttle Body - Remove idle mixture screws and springs from throttle body. *NOTE - It is not advisable to remove throttle shaft or valves unless necessary to install new parts.* If these parts must be removed, scribe throttle valves along side of throttle shaft and mark valves and throttle body to assure reassembly in same position and barrel, then remove screws, throttle valves, throttle shaft and lever.

Cleaning & Inspection: Clean all metal parts in Bendix Metaclean. *CAUTION - Do not use metaclean to clean non-metallic parts.* Blow out drilled passages and parts with air. Inspect housing for damage, wear, burrs or warpage. Check throttle shaft for excessive wear in throttle body. If wear is extreme, it is recommended that throttle body be replaced rather than installing a new shaft in throttle body.

Reassembly: Throttle Body - If throttle shaft and valves were removed, insert throttle shaft in throttle body and assemble throttle valves in same position and barrel that valves were removed from, leaving screws loose. Close throttle, align valves to scribe marks and check for best closing before tightening screws. *NOTE - Throttle valves must be installed with notch toward idle discharge holes.* Replace idle mixture screws and springs. Turn each needle valve in lightly against its seat, then back out each valve one full turn. If removed, replace slow idle stop screw, fast idle stop screw, and springs.

Main Body - Replace drive plugs and lead plugs if removed, then assemble main metering jets in main body and tighten securely with Tool T109-173. Install power bypass jet and new gasket and tighten securely. Install accelerator pump inlet check ball (1/8") in pump well, and discharge check ball (3/8") in discharge passage.

Air Horn - Slide choke shaft and lever into air horn with choke lever pointing down and away from air horn, then slide choke valve down into slot in shaft. Hold choke valve closed, then position choke piston bracket and install new screws (do not tighten). Hold valve in a closed position and tap gently with a screwdriver to center and locate the valve. Tighten attaching screws securely, then stake in place by squeezing with pliers. Install fast idle lever and secure with lockwasher and nut. Check accelerator pump leather for cracks or wear and hardness. If necessary, install a new pump plunger. *NOTE - If a new pump plunger is installed, flex leather several times before installing in air horn.* Slide compression spring over plunger shaft, then slide plunger over hook and into position. Install a new air horn gasket, then install vacuum power piston in air horn. Lock in position by prick punching on retaining rim. Compress piston plunger to make sure no binding exists. If piston sticks or binds enough to cause rough operation, install a new piston assembly.

1954-58 STROMBERG "WW" STUDEBAKER CARBURETOR

STUDEBAKER	Stromberg Cod No.
1954 V8 Comm. (Early)	WW 6-112B
1954 V8 Comm. (Late)	WW 6-112C
1954 V8 Land Cruiser (Early)	WW 6-112B
1954 V8 Land Cruiser (Late)	WW 6-113
1955 V8 (Early)	WW 6-112C,D, E, F
1955 V8 (Late, Exc. Ultra-Vista)	WW 6-115
1955 V8 (Ultra-Vista, Auto. Trans.)	WW 6-116
1956 V8 Comm. (Early)	WW 6-115
1956 V8 Comm. (Late)	WW 6-117, A
1956 V8 President	WW 6-117, A
1957 V8 Comm.	WW 6-117A
1957 V8 President & Broadmoor	WW 6-117A
1958 V8 Comm.	WW 6-117B,C
1958 V8 Pres. Silver Hawk & Police	WW 6-117B,C

►CHANGES & CORRECTIONS

►*1955 CARBURETOR PRODUCTION CHANGES & REPLACEMENT NOTE:* Starting with carburetor 6-112D, these carburetors have a different air flow system requiring different jet calibration and design has been changed to eliminate such parts as: Pump Inlet Screen & Retaining Clip, Pump Plunger Link Felt Washer, Pump Inlet Ball Check Retainer Clip. *See Stromberg Jet Specifications for complete jet data.*

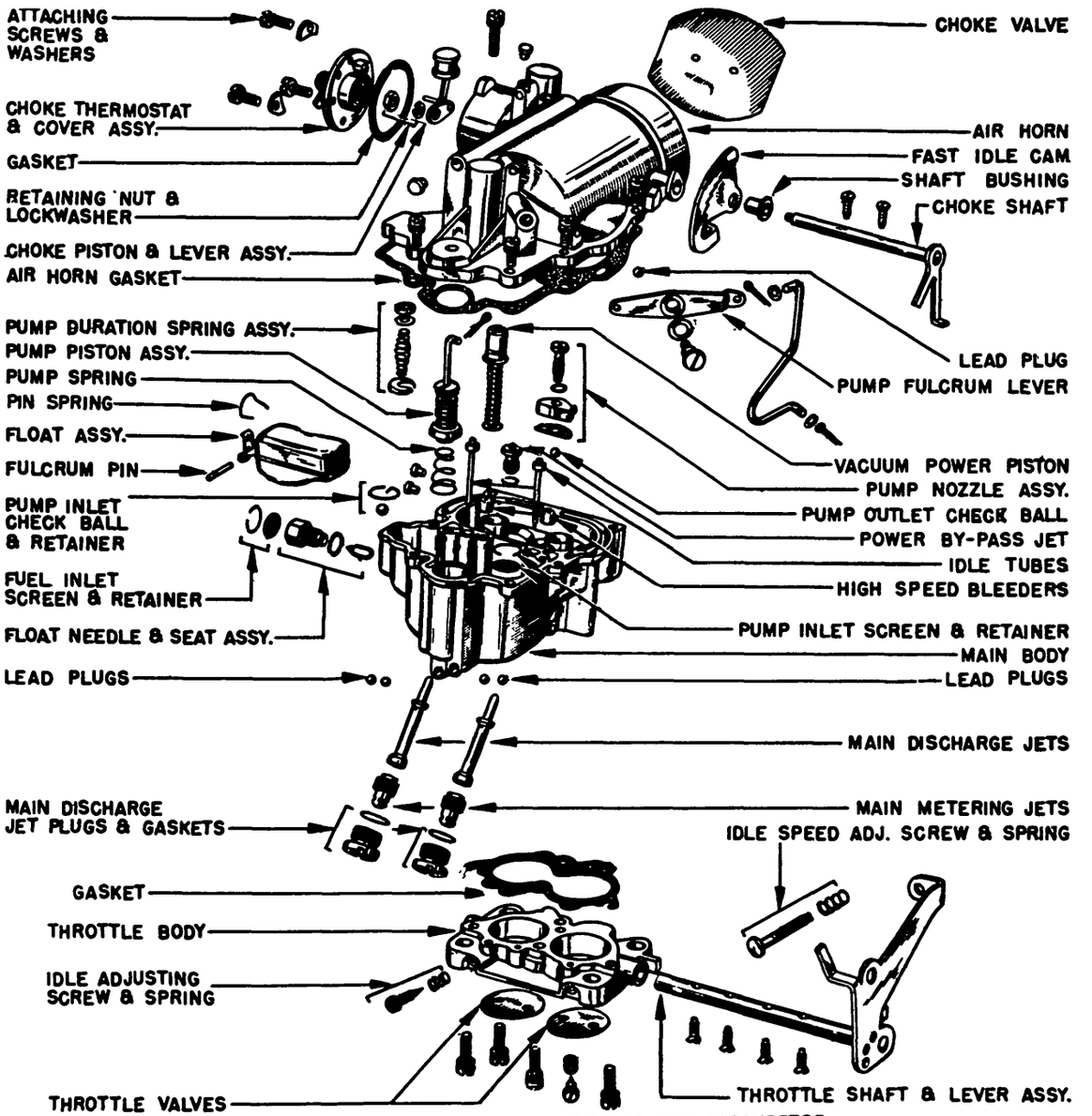
►*1956 CARBURETOR INSTALLATION CAUTION:* Use only Manifold-to-Carburetor Gasket Part No. 684059 for WW6-115 or No. 154006 for WW6-117 carburetors. DO NOT USE Gasket No. 684059 on WW6-117 Carburetors as choke vacuum passage will be shut off by gasket.

►*1956 CHOKE THERMOSTAT COVER (Code WW6-117) PRODUCTION CHANGE (To Improve Cover Seal):* Inner gasket was eliminated and air horn housing revised to offset use of only one gasket. Revised carburetors (Using only one gasket) are identified by Stromberg Model No. WW6-117A. *See "Carburetor Installation Caution"* above for correct Manifold-to-Carburetor Gasket for proper choke operation.

►*1957-58 ALTITUDE CARBURETOR MAIN METERING JET CAUTION:* These jets have different flow characteristics than same size jets used on Studebaker Supercharged models and must not be interchanged. Correct type jets may be identified by groove around wrench end. *See Stromberg Jet Specifications for all jet sizes.*

►*1958 ENGINE CUTTING OUT ON LEFT TURN CORRECTION (WW 6-117B CARBS.)* Caused by gasoline foam being injected into air horn through fuel bowl vent due to float dropping on left turns and allowing hot gasoline to enter fuel bowl. Correct by installing Air Horn Gasket, Part No. 1543362 (vent hole in gasket is not in line with vent tube), and Baffle, Part No. 1543363 (install between float and float needle valve).

DESCRIPTION: Dual downdraft type with side air intake. Fuel System is similar to other Stromberg with usual Float System (single float), Idle System, Main Metering System, Power System (with vacuum piston operated power bypass jet) and Accelerating System (pump operated by horizontal lever with duration spring type pump piston). Carburetor has automatic choke and a fast idle feature.



STROMBERG "WW" (STUDEBAKER) DOWNDRAFT CARBURETOR

CARBURETOR ADJUSTMENT: ***Make all adjustments exactly as follows:***

Idle Setting: Turn both idle mixture adjusting screws in until they are lightly seated, then back each screw out exactly 1¾ turns. Start engine and allow it to run until normal operating temperature is reached. With engine at normal operating temperature (choke valve wide open, fast idle inoperative) and with air cleaner in place, adjust idle speed and mixture as follows:

Idle Mixture—First check and adjust idle speed. Turn BOTH idle mixture adjusting screws in evenly and slowly until engine begins to run unevenly, then turn screws out evenly and slowly until engine again runs unevenly, finally set both screws approximately halfway between these two points where smoothest idling performance is secured. Recheck engine idle speed. *CAUTION*—BOTH adjusting screws must be turned equally and in the same direction when making above adjustment.

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1954-58 STROMBERG "WW" STUDEBAKER CARBURETOR (C nt.)

Idle Speed—With engine at normal operating temperature and fast idle cam in slow idle position so that idle adjusting button contacts lowest step of cam, adjust screw for correct idle speed:

Idle Speed

Model	Synchro-mesh	Auto. Trans.
1954	Ⓒ 550 RPM	Ⓒ 550 RPM
1955-56	Ⓒ 550-600 RPM	Ⓒ 550-600 RPM
1957	Ⓒ 550 RPM	Ⓒ 550 RPM
1958	Ⓒ 550-575 RPM	Ⓒ 575-600 RPM

①—With selector lever in "N" position.

Accelerating Pump: Three holes provided in throttle lever for pump connector rod engagement:
Center Hole—Normal operating conditions.
Inner Hole—Shorter stroke, less fuel discharge.
Outer Hole—Longer stroke, more fuel discharge.

Float Level: To check float setting, remove air horn and bowl cover and gasket, hold float lever lip firmly against intake needle valve to place float in closed-valve position. Measure float height by placing Float Level Gauge T-25569 (Studebaker No. J-5475) squarely on top edge of float bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required using bending tool T-24733 (Studebaker KMO-269-S5).

FLOAT SETTING

Studebaker WW	Ⓒ 3/16"

①—Top of float below top edge of bowl.

Fast Idle Cam Setting: Check with fast idle cam in fast idle position with choke valve fully closed. In this position, one-half of diameter of button on throttle stopscrew should rest on highest step of fast idle cam (button should hang over so that half-diameter travel of fast idle cam will cause screw to drop down on to next-lower step of cam). If button and cam contact not correct, bend ear on choke lever which contacts fast idle cam up or down as required using bending tool KMO-478. *NOTE—Throttle stopscrew is adjusted as part of Idle Setting.*

Unloader (Dechoke) Setting: To check setting, hold choke valve closed tightly, open throttle valves to point where stop on throttle lever rests against stop on carburetor throttle body and choke valve is opened slightly. Check choke valve opening by inserting #1 drill rod (.228") between lower edge of choke valve and air horn wall. If opening not correct (.203-.265"), adjust by bending ear on choke lever which contacts throttle lever using bending tool KMO-478.

Automatic Choke Setting: Centered, with arrow on choke cover aligned with index mark on housing (WW 6-112, 6-113, 6-115, 6-116); one point lean (WW 6-117, A,B,C).

Throttle Return Check (Cars with Automatic Transmission): Consists of a dashpot unit mounted on the carburetor with the dashpot plunger contacting the throttle lever during the last 3/16" of throttle movement toward closed throttle position. Dashpot will prevent too-rapid closing of throttle and keep engine from stalling. *See Throttle Linkage Adjustment under CARBURETOR on car model page.*

OVERHAUL: Disconnect pump operating rod from throttle lever and pump operating lever and remove rod. Take out air horn attaching screws, lift air horn assembly straight up and off main body, remove spring from end of pump plunger (spring may remain in pump cylinder and can be lifted out). Lift off air horn gasket.

Air Horn Disassembly—Disconnect pump plunger stem from pump operating lever, remove pump assembly. Take out pump lever fulcrum screw (screw has left-hand thread), remove spring washer and lift lever off. Remove felt washer, plain washer and retainer spring from pump plunger stem (duration spring can also be removed by compressing spring and sliding retainer out of groove in stem). Clean up staking around vacuum piston cylinder edge, pull vacuum piston assembly out of cylinder. Take out choke cover retainer screws, remove cover and coil assembly and gasket. Use tool T-25047 to remove nut and lockwasher from end of choke shaft, disengage choke piston link from shaft, remove piston and link assembly. Take out choke valve retaining screws, remove valve, slide choke shaft and lever assembly out of air horn.

Main Body Disassembly—Lift both idle tubes out, invert body and take out four throttle body attaching screws (recessed in bottom face of throttle body), lift throttle body off and remove gasket. Remove both main metering jet plugs and gaskets, use tool T-24924 to remove main metering jets, use tool T-24967 to remove main discharge jets (screw tool into base of jets, pull jets out of body recess). Take out pump discharge nozzle screw and gasket, lift discharge nozzle and gasket off, invert body to drop out discharge check ball. Unscrew fuel inlet fitting on side of bowl, remove retainer and fuel strainer from within fitting. Take out float hinge pin spring clip, remove float and hinge pin assembly, tip casting to remove fuel intake needle. Remove power by-pass jet and gasket. Remove pump intake strainer screen retainer and strainer screen from intake passage at side of pump cylinder. Remove pump intake check ball retainer from bottom of pump cylinder, invert body to drop out the intake check ball. *CAUTION*—Retainer not used on later carburetors and care must be used not to lose ball which will drop out whenever carburetor inverted.

Throttle Body Disassembly—Remove both idle adjusting screws and springs. Do not disturb throttle valve and shaft assembly unless required for replacement of parts. If necessary to remove valves, first mark each valve and mark throttle body correspondingly to insure re-installing valves in same barrel, take out valve attaching screws, slide valves out, slide throttle shaft and lever assembly out of throttle body.

Reassembly: Use all NEW gaskets. Re-install parts in reverse order of disassembly procedure above and note following important points:

Accelerating Pump Discharge Nozzle—Install discharge check ball in discharge passage, then install nozzle assembly with new gasket, use new gasket on attaching screw and tighten screw securely.

Accelerating Pump Intake Check & Strainer—Install intake check ball in recess in bottom of pump cylinder, use tool T-25360 to seat the ball retainer clip. Install strainer screen retainer clip

Main Metering Jet Assemblies—Use remover tool T-24967 to seat main discharge jets firmly in main body, tighten main metering jets securely using tool T-24924. Use new gaskets on main metering jet plugs and tighten plugs securely.

Automatic Choke Assembly—Install thermostatic coil assembly and gasket with coil hook downward, rotate cover counter-clcokwise in direction of arrow on cover until reference mark on cover is aligned with boss on housing, tighten retainer screws securely.

1957-58 STROMBERG "WW" STUDEBAKER & PACKARD SUPERCHARGED

PACKARD	Stromberg Code No.
1957 Clipper Model 57L	Ⓒ WW 6-121
1958 Packard Hawk	Ⓒ WW 6-122A
STUDEBAKER	
1957 Golden Hawk Model 57H-K	Ⓒ WW 6-121
1958 Golden Hawk	Ⓒ WW 6-122A

Ⓒ - Used with McCulloch Supercharger.

►CHANGES, CAUTIONS, CORRECTIONS

►*ALTITUDE MAIN METERING JET CAUTION:* These jets have different flow characteristics than same size jets used on other Studebaker models and must not be interchanged. They may be identified by unmarked end (Jets for other models have groove around wrench end). *See Stromberg Jet Specification Tabl for all jet sizes.*

►*1957 HARD STARTING OR PROLONGED CRANKING WITH HOT ENGINE CORRECTION:* Modify carburetor and Supercharger Air Chamber as detailed below. *NOTE*- Carburetor must be removed from engine but need not be disassembled if care is taken to prevent metal chips entering carburetor.

1) Carburetor Vents - Drill a 7/64" hole through side of air horn casting into vertical section of balance vent passage (locate this hole to right and below end of choke vacuum piston cylinder and adjacent to the right hand edge of the passage wall). Drill two 5/64" holes in throttle body (locate holes in small bosses directly above mounting flange and at ends of square section of casting when viewing side of carburetor with automatic choke housing toward right side).

2) Air Chamber Cover Vent Valve - If air chamber cover does not have a vent valve, install valve as follows: Drill a 1" valve hole in cover (When facing air intake hole side of cover, locate this hole 3" to left of right hand cover mounting hole and 3¼" up from mounting flange edge of cover), drill two 5/32" valve mounting holes on a line drawn 45° down and to the left of the valve hole center, drill first hole 2" from valve hole center and second hole 5/8" beyond this point. Instali vent valve assembly, No. 1542765, in cover with two small flat washers between spring and cover, use self-tapping screws, No. G453113, to attach valve. Adjust valve by bending spring for opening of ¼" between cover and highest point at outer edge of valve. Reinstall carburetor and adjust as directed below

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1957-58 STROMBERG "WW" STUDEBAKER & PACKARD SUPERCHARGED (C nt.)

►*1957 STUDEBAKER GOLDEN HAWK CARBURETOR ADJUSTMENT NOTE* On early cars, Air Chamber Cover and Base provided with adjusting holes (closed by pipe plugs) for idle mixture and idle speed adjustments On later cars (and all Packard), extensions are provided on the idle mixture adjusting screws (extending through air chamber base), and the idle speed adjusting screw is located on the external throttle lever, so that all adjustments can be made without disturbing the air chamber cover

►*1957 STUDEBAKER GOLDEN HAWK & PACKARD CARBURETOR CHANGES TO PREVENT STALLING AND IMPROVE PERFORMANCE & ECONOMY* Following changes have been made in production and can be made on earlier cars

1) Engin Stalling n L ft Turn Correction - Due to gasoline foam entering air stream through bowl vent tube caused by float dropping on left turn. Correct by installing new Air Horn Gasket, Studebaker No. 1543362 (with vent hole in gasket moved out of line with bowl vent tube), and Float Bowl Baffle, Studebaker No. 1543363 (installed between float and needle valve to prevent fuel surging in bowl). *NOTE* - When installing these parts, check cover for flatness and correct by filing cover or body casting as necessary to insure good seal along vacuum passage to choke and vacuum power piston

2) Ov r-rich C nditi n After Starting (Cold Engine) - A ¼" hole should be drilled in the center of the choke valve on the wide side. Automatic choke should be set at Index (Centered). This setting supersedes 1 Notch Lean setting used on cars with first type carburetor

3) Lean Condition Aft r Starting - Correct by shortening choke stove-to-carburetor pipe 1¼". See also Over-rich Condition correction (preceding).

4) Improv d Fu l Ec n my - Install new Power Piston Assembly, Studebaker No 1543290. This assembly has different spring tension which allows power jet to come in at higher speed for improved gasoline mileage.

►*1957 STUDEBAKER GOLDEN HAWK AIR CHAMBER VENT VALVE FLUTTER & NOISE (Eng. Idling)* If not corrected by engine idle speed adjustment (when due to insufficient supercharger output or too slow engine speed), check and adjust vent valve as follows Remove air chamber cover, check distance from tip of valve to base or cover (depending on valve mounting location) which should be ¼". Adjust by bending the valve flat spring *See Air Chamber Production Change (following)*

►*1957 STUDEBAKER GOLDEN HAWK AIR CHAMBER PRODUCTION CHANGES* **See Carburetor Adjustment Note (above) for changes affecting carburetor adjustment.** Other changes have been made as follows Beginning Engine No PS-2375, vent valves in base and cover were removed and holes were plugged. At the same time a vent pipe was installed in the base (extending forward from base and down in front of engine) to provide a vent and drain for the air chamber. These new parts are Drain Pipe Assy No. 1543107, Pipe Nipple (Base End) No. 1543108, Drain Pipe-to-Timing Gear Cover Clip No. 182317. *NOTE* - Vent Valve Assy. No. 1542765 is continued for service on first type air chamber.

►*1957 STUDEBAKER GOLDEN HAWK & PACKARD CLIPPER HIGH FUEL CONSUMPTION OR POOR ENGINE PERFORMANCE.* **May be due to fuel leakage within air chamber (not visible from outside) caused by loose fuel line connections or porous base casting. Check these points when correcting above complaints.**

DESCRIPTION: Dual downdraft type similar to design used on other Studebaker models except for straight air horn (vertical air intake) and fast idle cam mounted on main body above throttle lever and linked to choke valve lever Carburetor is mounted on an Air Chamber Base (on manifold) and is completely enclosed by a cover so that the entire carburetor is supercharged All carburetor connections are made to fittings in the base (fuel line, choke hot air stove pipe, and distributor vacuum line) *See Carburetor Adjustment Note above for other features*

ADJUSTMENT: Make all adjustments exactly as detailed below

Idle Setting: With engine at normal operating temperature and idling at correct idling speed, adjust idle mixture, then recheck idle speed and readjust as necessary

Idle Mixture - See Note below for early Studebaker cars with adjusting screws within air chamber Turn both idle mixture adjusting screws (extensions on forward edge of air chamber base) in slowly until engine begins to run unevenly, then turn screws out until engine again runs unevenly, finally set both screws approximately midway between these two points where smoothest idling performance is secured *CAUTION* - Both screws must be turned equally and in same direction when making this adjustment

►*EARLY STUDEBAKER NOTE* On these cars, idle mixture adjusting screw extensions are not used. To adjust, remove pipe plugs (on forward edge of air chamber base) and insert flexible shanked screwdriver through holes to engage slotted adjusting screws on carburetor.

Idle Speed - 550-575 RPM (with selector lever in "N", Neutral, position on Flightomatic cars) Adjust idle speed by turning throttle lever stopscrew located on bracket on left side of air chamber cover This screw serves as a stop for throttle outer arm

Throttle Return Check (Flightomatic Cars): Consists of a dashpot unit mounted on the carburetor within the air chamber cover *See Throttle Linkage Adjustment under CARBURETOR on car model page.*

Float Level: Air chamber cover must be removed and air horn and bowl cover assembly taken off for this adjustment With gasket removed, hold float lever lip firmly against intake needle valve to hold float in closed-valve position Place gauge, Studebaker No J-6646 squarely on top edge of bowl at center of float. If float not even with step on gauge, bend float lever lip next to float pin as required

Float Setting	
Packard & Studebaker	① 7/32"

① - Top of float below top edge of bowl

Fast Idle - This adjustment can be made with the carburetor on the bench (Off Engine) or On Engine as detailed below *NOTE* - If carburetor on engine, it will be necessary to remove air chamber cover for access to fast idle adjusting screw.

Off Engin Adjustm nt - Manually close choke valve so that fast idle adjusting screw rests on highest part of fast idle cam. Adjust fast idle screw so that throttle opening is 030" Check by inserting 030" wire gauge between edge of throttle valve and carburetor wall.

On Engine Adjustment - After adjusting hot or slow idle speed to 550-575 RPM, manually close choke valve so that fast idle adjusting screw rests on highest part of fast idle cam *(CAUTION - Fast idle screw is located on inner throttle arm, within air chamber cover, and can be reached by removing plug on rear face of air chamber cover and inserting a short shanked screwdriver)* Back fast idle screw out until slow idle speed stopscrew just touches the stop, then turn fast idle screw in exactly 7½ turns This will provide correct throttle valve opening of 030- 031"

Unloader (Dechoker) - To check setting, open throttle valves fully, check choke valve opening by inserting No. 1 drill rod (.228") between lower edge of choke valve and air horn wall. If opening not correct (203-.265"), adjust by bending ear on throttle lever which contacts lug on fast idle cam

Automatic Choke: 1 Point Lean with arrow on cover 1 point toward lean side from boss on housing.

Kickdown Switch (Supercharger Control) - Switch is mounted on bracket at auxiliary throttle outer lever and can be adjusted without disturbing air chamber cover. To adjust, loosen switch mounting nuts in bracket, position switch so that plunger is fully depressed and throttle outer lever rests against threaded sleeve of switch in wide open throttle position. Tighten mounting nuts after adjustment completed.

CARBURETOR REMOVAL & INSTALLATION: Removal - Loosen supercharger-to-carburetor air chamber hose clamps, remove air chamber mounting stud nuts and lockwashers Lift cover and disengage studs on right side, then continue to lift and rotate cover to disengage studs on left side and slip hose off supercharger outlet. Disconnect and remove distributor vacuum line, choke heat tube, and fuel line (at carburetor and air chamber base connections). Remove idle mixture screw extensions by unscrewing plugs from base. Remove carburetor mounting nuts Hold auxiliary throttle outer lever so that slot in inner lever is vertical, lift carburetor assembly straight up.

Installation - Use new carburetor-to-manifold gasket on air chamber base. Install carburetor by reversing removal procedure.

AIR CHAMBER BASE REMOVAL & INSTALLATION: Removal - After carburetor removed, disconnect throttle return spring and throttle rod from throttle outer arm, disconnect kickdown switch wires. Disconnect fuel line and distributor vacuum line from base fittings. Remove oil filter bracket screws. Lift air chamber base from manifold.

Installation - Use new gasket between base and manifold. Install base by reversing removal procedure.

CARBURETOR OVERHAUL: *See "Stromberg WW (Studebaker) Carburetors".*

SUPERCHARGER OVERHAUL: *See "McCulloch (Studebaker) Supercharger"*

1959-60 STROMBERG "WW" STUDEBAKER CARBURETOR

STUDEBAKER	Stromberg Carb. No.
1959 V8 Lark & Hawk (Std.)	WW 6-123
1960 V8 Lark & Hawk (Std.)	WW 6-123 & 123A

DESCRIPTION: Dual downdraft type with straight air Horn (vertical air intake) and fast idle cam mounted on main body above throttle lever and linked to choke valve lever. Automatic choke housing mounted on air horn and linked directly to choke shaft. Carburetor contains conventional single float, idle system, main metering system, power system, accelerating system and automatic choke.

ADJUSTMENT: Make all adjustments exactly as detailed below.

Idle Setting: For initial setting, set idle adjusting screws (located in throttle body below float chamber) 1¼ turns out from a lightly seated position. Bring engine to normal operating temperature with carburetor air cleaner in place, choke fully open, and carburetor off fast idle.

Idle Speed – 550–600 RPM with selector lever in "N" on Flightomatic cars. Set idle speed by turning throttle stopscrew located on boss on throttle body until correct speed is obtained.

Idle Mixture – Turn both screws in equally until engine begins to run roughly from lean mixture. Then turn screws out until engine rolls from rich mixture. Now set screws about halfway between these positions where smoothest idle is obtained. Both screws must be turned equally. Recheck idle speed.

Accelerating Pump: No seasonal adjustment. Three holes provided in throttle lever for pump connector rod engagement.

Center Hole – Normal operating conditions.
Upper Hole – Shorter stroke, less fuel discharge.
Lower Hole – Longer stroke, more fuel discharge.

Fl at Level: 3/16" from top of float to top of main body with air horn and gasket removed. Use Gauge J–7477. Top of float should just touch gauge. To adjust, bend float lip.

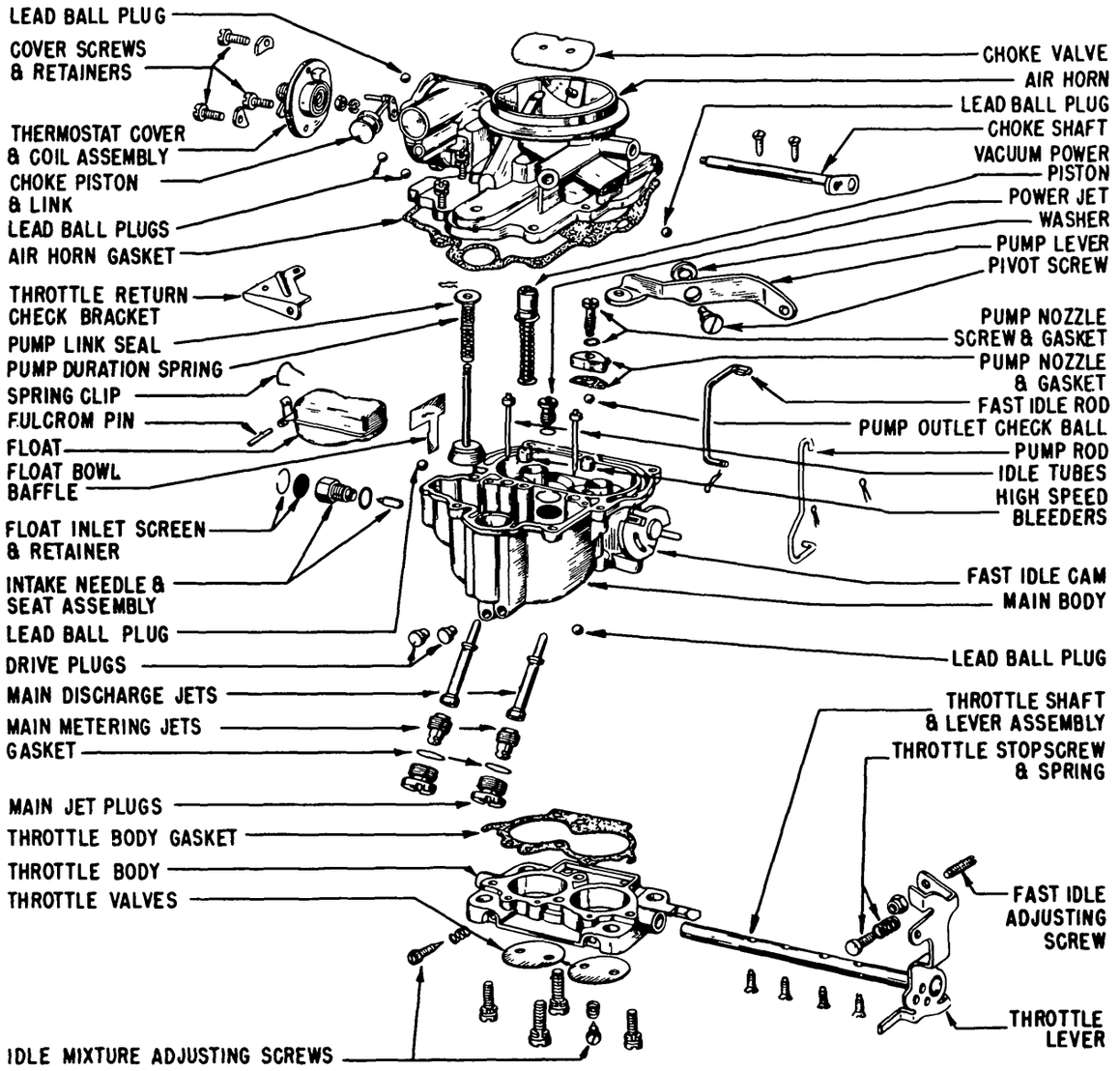
Fast Idle: Off Car - With choke valve closed and high step of fast idle cam touching fast idle screw, adjust fast idle screw so .025" wire gauge can be inserted freely between throttle valves and throttle body on idle port side. *NOTE - This setting supersedes previous setting of .030".*

On Car - With engine running at normal operating temperature, back out fast idle screw a few turns and set engine idle speed to 550 RPM with idle speed screw. Turn fast idle screw in until setscrew just touches low step of fast idle cam, then turn fast idle screw back ½ turn.

Unloader (Dechoke) Setting: To check setting, hold choke valve closed lightly. Open throttle valve to wide open position so throttle lever stop rests on throttle body stop. Choke valve should now be open enough to allow .192" gauge of Tool J–7477 to be inserted between choke valve and inner wall of air horn. To adjust, bend throttle lever ear.

Automatic Choke: Centered at index. To change setting, loosen cover screws and rotate housing as required.

Thr ttl R turn Ch ck (Flight matic Cars): Consists of a dashpot unit mounted on carburetor with dashpot plunger contacting throttle lever. Will prevent too-rapid closing of throttle and keep engine from stalling. *See "Throttle Linkage Adjustment" under CARBURETOR on car model page.*



STROMBERG WW (STUDEBAKER) CARBURETOR

OVERHAUL: With carburetor off engine, proceed as follows:

Disassembly: Air H rn – Disconnect accelerating pump rod from pump lever and remove lever from air horn. Remove pump rod from throttle shaft lever. Remove fast idle rod. Remove air horn assembly from main body. Remove accelerating pump spring from end of pump plunger and remove pump piston from air horn and disassemble. Remove staking over vacuum piston retaining washer and remove vacuum piston. Remove choke cover assembly. With Tool KMO–269–S–10, remove nut and lockwasher from choke shaft, then remove piston and lever assembly. Remove choke valve and shaft.

Main B dy – Remove idle tubes and tip main body to remove inlet check ball from accelerating pump well. Invert main body and remove throttle body and gasket. Remove main metering jet plugs. With Tool J–1561,

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1959-60 STROMBERG "WW" STUDEBAKER CARBURETOR (Cont.)

remove metering jets. Use Tool KMO—269—S—4 to remove main discharge jets. Remove pump discharge nozzle and invert body so pump outlet check ball will fall out. Remove inlet pipe fitting and remove strainer with Tool J—4498, then remove needle valve and seat. Remove main body baffle, float and pivot pin. Take out power bypass jet.

Throttle Body – Remove idle mixture adjusting screws. Scribe a mark on throttle valves and body (to aid in reassembly) and remove valves. Pull shaft and lever from body, remove idle speed and fast idle adjusting screws. *NOTE – Unnecessary to remove throttle valves and shaft unless damaged.*

Cleaning & Inspection: Wash all parts thoroughly in cleaning solvent and blow dry with air. Replace all worn or damaged parts and use all new gaskets.

Reassembly: Throttle Body – Install fast idle screw in throttle shaft lever and install assembly in throttle body along with throttle valves using scribe marks made at disassembly. Install throttle valve screws but do not tighten. Close throttle and align valves to provide best closing action. Tighten screws securely and upset ends. Install idle mixture screws until they seat lightly, then back out 1¼ turns for initial idle setting. Install idle speed screw.

Main Body – Install power jet and main discharge nozzles. Install main discharge jets (Tool KMO—269—S—4). Install new gaskets and main discharge jet plugs. Install float, pivot pin and retaining clip. Install screen in needle valve seat and retainer with Tool J—4498. Install needle valve and seat. Install baffle and check float for proper alignment. Float must operate freely and not rub on sides of casting. Make float level adjustment (see "*Adjustment*" above). Install throttle body. Install inlet check ball in accelerating pump well. Install idle tubes. Drop accelerating pump discharge ball into body and install pump discharge nozzle.

Air Horn – Install choke shaft and valve (tighten screws finger tight). Make sure choke valve aligned and closes properly, then tighten screws and upset ends. Install choke piston and link assembly and hook link to choke shaft. Install choke link retaining washer and nut (Tool KMO—269—S—10). Install main body vent tube, automatic choke assembly and cover. Install vacuum piston and stake air horn metal to hold piston. Assemble accelerating pump and install in air horn. Install small end of pump spring on piston and install fast idle link. Install pump link in center hole of throttle shaft lever, and pump link and rod in pump lever. Install lever (flat washer installed between air horn and lever).

Carburetor Adjustments – *Make all adjustments as listed under "Adjustments" above.*

SERVICE PARTS: Gasket Set – Stromberg No. 382349 (Studebaker No. 1543055).

Repair Kit – Stromberg No. RK—257 (Studebaker No. 1548817).

1954-55 STROMBERG "WW" CARBURETOR JET SPECIFICATIONS

Car Model Year	Carb.	Main Metering Jet Size	Main Metering Jet Part No.	By-Pass Jet Size	By-Pass Jet Part No.	Main Disch. Jet Size	Main Disch. Jet Part No.	High Speed Bleeder Size	High Speed Bleeder Part No.	Idle Tube Size	Idle Tube Part No.	Idle Air Bleed Size	Idle Air Bleed Part No.	Pump Disch. Nozzl Size	Pump Disch. Nozzl Part No.
BUICK															
40 (Dynaflow) 1955	WW7-105	.053"	P-19442	(13)	.....	#28-36	.....	#70	.....	#69	.....	(9)		#66	.....
40 (Dynaflow) 1955	WW7-105A	.054" (10)	P-19442	(13)	.....	#28-36	.....	#70	.....	#66	.....	(9)		#66	.....
DODGE															
V8 1954	WW (3)	.048"	386208	#61	P-21198	-------	386207	#70	P-23985	#66	386197	(11)		#68	P-24594
D56 Synchro-mesh 1955	WW 3-124	.045"	386208	#62 (43)	386951	.....	386943	#70	P-23985	#64	386924	(42)		#68	P-24594
D56 Overdrive 1955	WW 3-125	.045"	386208	#62 (43)	386951	.....	386943	#70	P-23985	#60	386924	(42)		#68	P-24594
D56 PowerFlite 1955	WW 3-126	.045"	386208	#62 (43)	386951	.....	386943	#70	P-23985	#64	386924	(42)		#68	P-24594
D55-1,2 Synchro-mesh 1955	WW (14)	(45)		(24)		.....	386949	#70	P-23985	#60	386939	(41)		#68	P-24594
D55-1,2 Overdrive 1955	WW (15)	(46)		(25)		.....	386949	#70	P-23985	#60	386939	(111)		#68	P-24594
D55-1,2 PowerFlite 1955	WW (16)	(47)		(26)		.....	386949	#70	P-23985	#60	(40)	(111)		#68	P-24594
D55-3 Synchro-mesh 1955	WW (17)	(21)		(27)		.....	386207	#70	P-23985	#60	(30) 386939	(111)		#68	P-24594
D55-3 Overdrive 1955	WW (18)	(22)		(28)		.....	386207	#70	P-23985	#60	(31) 386939	(111)		#68	P-24594
D55-3 PowerFlite 1955	WW (19)	(23)		(29)		.....	386207	#70	P-23985	#60	(32) 386939	(33)		#68	P-24594

(1)—#70 In Air Horn, #70 in Main Body.
(3)—Use Code No. 3-108A for cars with Synchro-mesh Trans.
Use Code No. 3-109A for cars with Overdrive Trans.
Use Code No. 3-105A for cars with PowerFlite Trans.
Use Code No. 3-106A for cars with Gyromatic Trans.
(9)—#36 Main Body, #42 Air Horn.
(10)—Use .052" No. P-19442 above 3500 ft. altitude.
(11)—#70 in Air Horn, #48 in Main Body.
(13)—Two #57.
(14)—Code 3-131, A, B, C, D.
(15)—Code 3-132, A, B, C, D.
(16)—Code 3-133, A, B, C, D, E.
(17)—Code 3-120, A, B, C, D.
(18)—Code 3-121, A, B, C, D.
(19)—Code 3-122, A, B, C, D, E.
(21)—.053" (3-120, A), .052" (3-120B, C, D), #386208.
(22)—.053" (3-121, A), .052" (3-121B, C, D), #386208.
(23)—.053" (3-122, A), .052" (3-122B, C, D, E), #386208.
(24)—#55 (P-23676) for 3-131, A, B; #66 (P-23606) for 3-131C, D.
(25)—#55 (P-23676) for 3-132, A, B; #66 (P-23606) for 3-132C, D.
(26)—#55 (P-23676) for 3-133, A, B, C; #66(P-23606) for 3-133D, E.
(27)—Two #55 (386937) for 3-120, A; #54 (P-21197) for 3-120B, C, D.
(28)—Two #55 (386937) for 3-121, A; #54 (P-21197) for 3-121B, C, D.
(29)—Two #55 (386937) for 3-122, A; #54 (P-21197) for 3-122B, C, D, E.
(30)—Supersedes #68 used on 3-120.
(31)—Supersedes #68 used on 3-121.
(32)—Supersedes #68 used on 3-122.
(33)—#48 Main Body, #60 Air Horn (3-122, A, B).
#45 Main Body, #60 Air Horn (3-122C, D, E).
(40)—386939 (3-133, A, B, C), 386197 (3-133 D, E).
(41)—#56 Main Body, #36 Throttle Body.
(42)—#48 Main Body, #60 Air Horn.
(43)—Restriction in Main Body.
(111)—#45 Main Body, #60 Air Horn.
(45)—.056" (3-131), .055" (3-131A, B), .053" (3-131C, D) #386208.
(46)—.056" (3-132), .055" (3-132A, B), .053" (3-132C, D) #386208.
(47)—.056" (3-133,A), .055" (3-133B, C), .053" (3-133D, E), #386208.

CONTINUED ON NEXT PAGE

1954-55 STROMBERG "WW" CARBURETOR JET SPECIFICATIONS (Continued)

Car Model	Year	Carb.	Main Metering Jet Size	Main Metering Jet Part No.	By-Pass Jet Size	By-Pass Jet Part No.	Main Disch. Jet Size	Main Disch. Jet Part No.	High Speed Bleeder Size	High Speed Bleeder Part No.	Idle Tube Size	Idle Tube Part No.	Idle Air Bleed Size	Idle Air Bleed Part No.	Pump Disch. Nozzle Size	Pump Disch. Nozzle Part No.
STUDEBAKER																
Commander	1954	WW ④	.049"	386272	#60	386418	--------	386207	#68	P-24315	#68	386414	⑫		#66	386416
Land Cruiser	1954	WW ⑤	.047"	386272	#60	386418	--------	386207	#68	P-24315	#68	386414	⑫		#66	386416
Commander	1955	WW ⑳	.050"	㉞386272	#60	P-24674	-	㊴	#68	P-24315	#68	386414	㉟		#66	386416
Commander ㊲	1955	WW 6-115	.050"	386272	#60	P-24674		386839	#68	P-24315	#68	386414	㊱		#66	386416
Commander ㊳	1955	WW 6-116	.048"	386272	#60	P-24674		386839	#68	P-24315	#68	386414	㊱		#66	386416

②—Part No. P-24315
④—Code Nos. 6-112B & 6-112C
⑤—Code No. 6-113.
⑩—Use .052" No. P-19442 above 3500 ft. altitude.
⑫—#58 in Main Body (Part No. 383203).
⑳—Code 6-112C, D, E, F.
㉞—.049' (6-112C, E), 048' (6-112D). Use .050' for service.
㉟—#70 Air Horn, #48 Secondary Side.
㊱—#60 Air Horn, #48 Secondary Side.
㊲—Comm. (Except Custom Sedan and Auto. Trans.).
㊳—Comm. (Custom Sedan with Auto. Trans.).
㊴—386207 (6-112C), 386839 (6-112D, E).

1956 STROMBERG CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Code No.	Main Metering Jet Size	Main Metering Jet Part No.	By-pass Jet Size	By-pass Jet Part No.	Main Disch. Jet Size	Main Disch. Jet Part No.	High Speed Bleeder Size	High Speed Bleeder Part No.	Idle Tube Size	Idle Tube Part No.	Idle Air Bleed Size	Idle Air Bleed Part No.	Pump Disch. Nozzle Size	Pump Disch. Nozzle Part No.
BUICK																
40	Late 1955	WW 7-104	.053"	386208	1 #55	P-23676		386207	#70	P-23985	#69	386985	⑨		#66	386416
40	Early 1956	WW 7-105	.053"	P-19442	2 #57	387237	#28-36	387265	#70	P-23985	#69	386985	⑨		#66	386416
40	Late 1956	WW 7-105A	.054" ①	P-19442	2 #57	387237	#28-36	387265	#70	P-23985	#66	386197	⑨		#66	386416
DODGE SIX D-62-1, 2																
Synchro-mesh	1956	WW 3-124	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#64	386924	⑥		#68	P-24594
Overdrive	1956	WW 3-125	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#60	386924	⑥		#68	P-24594
PowerFlite	1956	WW 3-126	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#64	386924	⑥		#68	P-24594
DODGE V8 D-63-1																
Synchro-mesh	1956	WW 3-135	.052"	386208	1 #62	P-23361		386207	#70	P-23985	#60	386939	⑦		#68	P-24594
Overdrive	1956	WW 3-136	.052"	386208	1 #62	P-23361		386207	#70	P-23985	#60	386939	⑦		#68	P-24594
PowerFlite	1956	WW 3-137	.052"	386208	1 #62	P-23361		386207	#70	P-23985	#68	386414	⑦		#68	P-24594
DODGE V8 D-63-2, 3																
Synchro-mesh	1956	WW 3-138	.051"	386208	2 #61	382675		386949	#70	P-23985	#66	386197	⑦		#68	P-24594
Overdrive	1956	WW 3-139	.051"	386208	2 #61	382675		386949	#70	P-23985	#66	386197	⑦		#68	P-24594
PowerFlite	1956	WW 3-140	.051"	386208	2 #61	382675		386949	#70	P-23985	#70	387183	⑦		#68	P-24594
PLYMOUTH SIX																
Synchro-mesh (Pwrpk)	1956	WW 3-124	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#64	386924	⑥		#68	P-24594
Overdrive (Pwrpk)	1956	WW 3-125	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#60	386924	⑥		#68	P-24594
PowerFlite (Pwrpk)	1956	WW 3-126	.045" ②	386208	#62 ③	386951		386943	#70	P-23985	#64	386924	⑥		#68	P-24594
STUDEBAKER																
Comm. 56B	Early 1956	WW 6-115	.050"	386272	1 #60	P-24674		386839	#68	P-24315	#68	386414	⑩		#66	386416
Comm. 56B	Late 1956	WW 6-117, A	.055"	386272	1 #56	P-21657		387198	#68	P-24315	#70	387183	⑬		#70	385923
Pres. 56H	1956	WW 6-117, A	.055"	386272	1 #56	P-21657		387198	#68	P-24315	#70	387183	⑬		#70	385923

① — Use P-19442 (.052") above 3000 ft.
② — 1 Size Lean 386208 (.044"), 2 Sizes Lean 386208 (.043").
③ — Power Restriction in Main Body.
⑥ — #48 in Main Body, #60 in Air Horn.
⑦ — #45 in Main Body, #60 in Air Horn.
⑨ — #36 in Main Body, #42 in Air Horn.
⑩ — #60 in Air Horn, #48 Secondary.
⑬ — #50 in Air Horn, #40 Secondary.

1957 STROMBERG "WW" CARBURETOR JET SPECIFICATIONS

Car Model Year	Carburetor Code No.	Main Metering Jet Size Part No.	By-pass Jet Size Part No.	Main Disch. Jet Size Part No.	High Speed Bleeder Size Part No.	Idle Tube Size Part No.	Idle Air Bleed	Pump Disch. Nozzle Size Part No.
BUICK								
Series 40 Dynaflow 1957	WW7-106,A,B,C	.053" 386208 (14)	2-.049" 387542	#28-28	#70	#62 387366	(15)	#66
DE SOTO								
S27 S.M. 1957	WW3-149	.053" 386208	#54 386951		#70	#63	(16)	#68
S27 Auto. Trans. 1957	WW3-150	.053" 386208	#54 386951		#70	#67	(16)	#68
DODGE								
6 Cyl. S.M. 1957	WW3-159	.046" 386208	#54 386951		#70	#60	(18)	#68
6 Cyl. Auto. Trans. 1957	WW3-160	.044" 386208	#54 386951		#70	#65	(18)	#68
V8 S.M.(Std.Eng.) 1957	WW3-149	.053" 386208	#54 386951		#70	#63	(16)	#68
V8 Auto.Trans.(Std.Eng.) 1957	WW3-150	.053" 386208	#54 386951		#70	#67	(16)	#68
PACKARD								
Clipper (Schgd.) Early 1957	WW6—121B, C	.057" 386978 (17)	#54 386951		#70	#60 386939	(19)	#57
Clipper (Schgd.) Late 1957	WW6—122	.057" 386978	#54 386951		#70	#60 386939	(19)	#57
PLYMOUTH								
V8 P-31 (S.M.) 1957	WW15-23	.052" 386208	#54 P—21197		#70	#64 386924	(16)	#72
V8 P-31 (O.D.) 1957	WW15-24	.052" 386208	#54 P—21197		#70	#64 386924	(16)	#72
V8 P-31 (Auto.Trans.) 1957	WW15-25	.051" 386208	#54 P—21197		#70	#67 387498	(16)	#72
STUDEBAKER								
Comm. & Pres. 1957	WW6-117A	.055" 386272	1 #56 P-21657	387198	#68 P-24315	#70 387183	(13)	#70 385923
Golden Hawk (Schgd.) Early 1957	WW6—121B,C	057" 386978 (17)	#54 386951		#70	#60 386939	(19)	#57
Golden Hawk (Schgd.) Late 1957	WW6 — 122	.057" 386978	#54 386951		#70	#60 386939	(19)	#57

(13)- #50 in Air Horn, #40 Secondary.

(14)- 1 size lean .052", 2 sizes lean .051".

(15)- #36 in Main Body, #42 in Air Horn.

(16)- #40 in Main Body, #50 in Air Horn.

(17)- .055" 4,000 to 8,000 ft., .053" 8,000 to 12,000 ft., .051" over 12,000 ft.

(18)- #48 in Main Body, #60 in Air Horn.

(19)- #36 in Main Body, #50 in Air Horn.

1958 STROMBERG "WW" CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Code No.	Main Metering Jet Size	Part No.	By-pass Jet Size	Part No.	Main Disch. Jet Size	Part No.	High Speed Bleeder Size	Part No.	Idle Tube Size	Part No.	Idle Air Bleed	Pump Disch. Nozzle Size	Part No.
BUICK															
Series 40 Dynaflow	1958	WW7-109,A	.056"	(20) 386208	2-#57	387237	#28-28		#70		#60		(21)	#66	
DODGE															
6 Cyl. S.M.	1958	WW3-159	.046"	386208	#54	386951			#70		#60		(18)	#68	
6 Cyl. Auto. Trans.	1958	WW3-160	.044"	386208	#54	386951			#70		#65		(18)	#68	
V8 Coronet (S.M.)	1958	WW3-163	.054"	386208	2-#56	382454			#70		#63		(16)	#68	
V8 Coronet (Auto. Trans)	1958	WW3-164	.053"	386208	2-#54	385370			#70		#67		(16)	#68	
PACKARD															
Hawk (Schgd.)	1958	WW6-122A	.057"	386978	#54	386951			#70		#60	386979	(19)	#57	
PLYMOUTH															
318" Eng. S.M.	1958	WW15-26	.052"	386208	#54	P-21197			#70		#66	386197	(16)	#72	
318" Eng. O.D.	1958	WW15-27	.052"	386208	#54	P-21197			#70		#66	386197	(16)	#72	
318" Eng. Auto. Trans.	1958	WW15-28	.051"	386208	#53	P-24064			#70		#70	387183	(16)	#72	
STUDFBAKER															
Comm. & Pres.	1958	WW6-117B,C	.055"	386272	1-#56	P-21657		387198	#68	P-24315	#70	387183	(13)	#70.	385923
Golden Hawk (Schgd.)	1958	WW6-122A	.057"	386978	#54	386951			#70		#60	386979	(19)	#57	

(13)- #50 in Air Horn, #40 Secondary

(16)- #40 in Main Body, #50 in Air Horn.

(18)- #48 in Main Body, #60 in Air Horn

(19)- #36 in Main Body, #50 in Air Horn.

(20)- Use .054" (386208) for altitudes above 3500 ft.

(21)- #36 in Main Body, #52 in Air Horn.

1959 STROMBERG DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Code No.	Main Metering Jet Size	Main Metering Jet Part No.	By-Pass Jet Size	By-Pass Jet Part No.	Main Disch. Jet Size	Main Disch. Jet Part No.	High Speed Bleeder Size	High Speed Bleeder Part No.	Idle Tube Size	Idle Tube Part No.	Idle Air Bleed	Pump Disch. Nozzle Size	Pump Disch. Nozzle Part No.
BUICK															
Series 40 All Trans.	1959	WW7-112	.055" ③	387802	④	388139	#28-28		#70	P-23985	.063"	386197	⑤	#66	386416
DODGE															
V8 326" Eng. S.M. ①	1959	WW3-164	.053" ⑥	386208	2 #54	386951		386949		P-23985		387498			24594
V8 326" Eng. Auto. Trans. ①	1959	WW3-181	.052" ⑦	386208	4 #54	386951		386949		P-23985		386414			24594
V8 326" Eng. S.M. ②	1959	WW3-182	.053" ⑥	386208	2 #54	386951		386949		P-23985		386197			24594
V8 326" Eng. Auto. Trans. ②	1959	WW3-183	.052" ⑦	386208	4 #54	386951		386949		P-23985		386414			24594
PLYMOUTH															
V8 318" Eng. S.M.	1959	WW15-38	.052"	386208		P-21197		386949		P-23985		386197			387712
V8 318" Eng. O.D.	1959	WW15-39	.052"	386208		P-21197		386949		P-23985		386197			387712
V8 318" Eng. Auto. Trans.	1959	WW15-40	.051"	386208		P-24064		386949		P-23985		387183			387712
STUDEBAKER															
V8 Lark & Hawk (Std.)	1959	WW6-123	.054"	386978		386951		387529		P-23985		386197			385923

① - Before throttle change.

② - After throttle change.

③ - Use .053" for high altitudes over 3500 ft.

④ - 1st. step .025", 2nd. step .055".

⑤ - No. 46 Main Body, No. 52 Air Horn.

⑥ - Use .050", 2500 to 5000 ft. Alt.
Use .048", 5000 to 7500 ft. Alt.

⑦ - Use .051", 2500 to 5000 ft. Alt.
Use .049", 5000 to 7500 ft. Alt.

1960 STROMBERG DUAL CARBURETOR JET SPECIFICATIONS

Car Model	Year	Carburetor Code No.	Main Metering Jet Size	Main Metering Jet Part No.	By-Pass Jet Size	By-Pass Jet Part No.	Main Disch. Jet Size	Main Disch. Jet Part No.	High Speed Bleeder Size	High Speed Bleeder Part No.	Idle Tube Size	Idle Tube Part No.	Idl Air Bleed	Pump Disch. Nozzle Size	Pump Disch. Nozzle Part No.
BUICK															
4400 Series	1960	WW7-113,A	.057"	388539	⑧	388541	#28-36		#70		#68		(22)	#66	
DODGE & DART															
318" Eng. S.M.	1960	WW15-41A	.053"	386208	2 #56	382454		386949	#70		#66		(16)	#68	
318" Eng. Auto Trans.	1960	WW15-42	.054"	386208	2 #56	382454		386949	#70		#70		(16)	#68	
361" Eng. All Trans.	1960	WWC3-188	.068"	388111		388494			#70		#69		(23)	#70	
PLYMOUTH															
318" Eng. S.M.	1960	WW15-41A	.053"	386208	2 #56	382454		386949	#70		#66		(16)	#68	
318" Eng. Auto. Trans.	1960	WW15-42	.054"	386208	2 #56	382454		386949	#70		#70		(16)	#68	
STUDEBAKER															
V8 Lark & Hawk (Early)	1960	WW6-123	.054"	386978	#54	386951		387529		P-23985		386197			385923
V8 Lark & Hawk (Late)	1960	WW6-123A	.054"	386978	#54	386951		387529		P-23985		386197			385923

⑧ - 1st step .026". 2nd step .048"

(16) - #40 Main Body, #50 Air Horn.

(22) - #42 Main Body, #52 Air Horn.

(23) - #55 Main Body, #56 in Cluster.

ZENITH MODEL 228BV10C

Check r Sup rba, M d l 10L (1959-60)

DESCRIPTION: Single barrel downdraft type with electrically heated automatic choke, vacuum controlled power jet valve and mechanically operated accelerating pump.

ADJUSTMENT: Idle Setting - ¾-1½ turns open from a lightly seated position (initial setting). Turn screw out for richer mixture.

Idle Speed: 375 RPM (Automatic transmission in "N"). *NOTE* - For an initial setting, turn throttle stopscrew in 1½ turns from a point where stopscrew contacts stop on throttle body.

Fl at L vel: 1 1/2"±1/32" from machined surface on air horn casting to top of float. To adjust, bend float lever.

Accelerating Pump: Install hairpin clip in proper groove in pump guide rod as follows: Bottom groove for full stroke (Winter); middle groove for ¾ stroke (Normal); upper groove for ½ stroke (Summer).

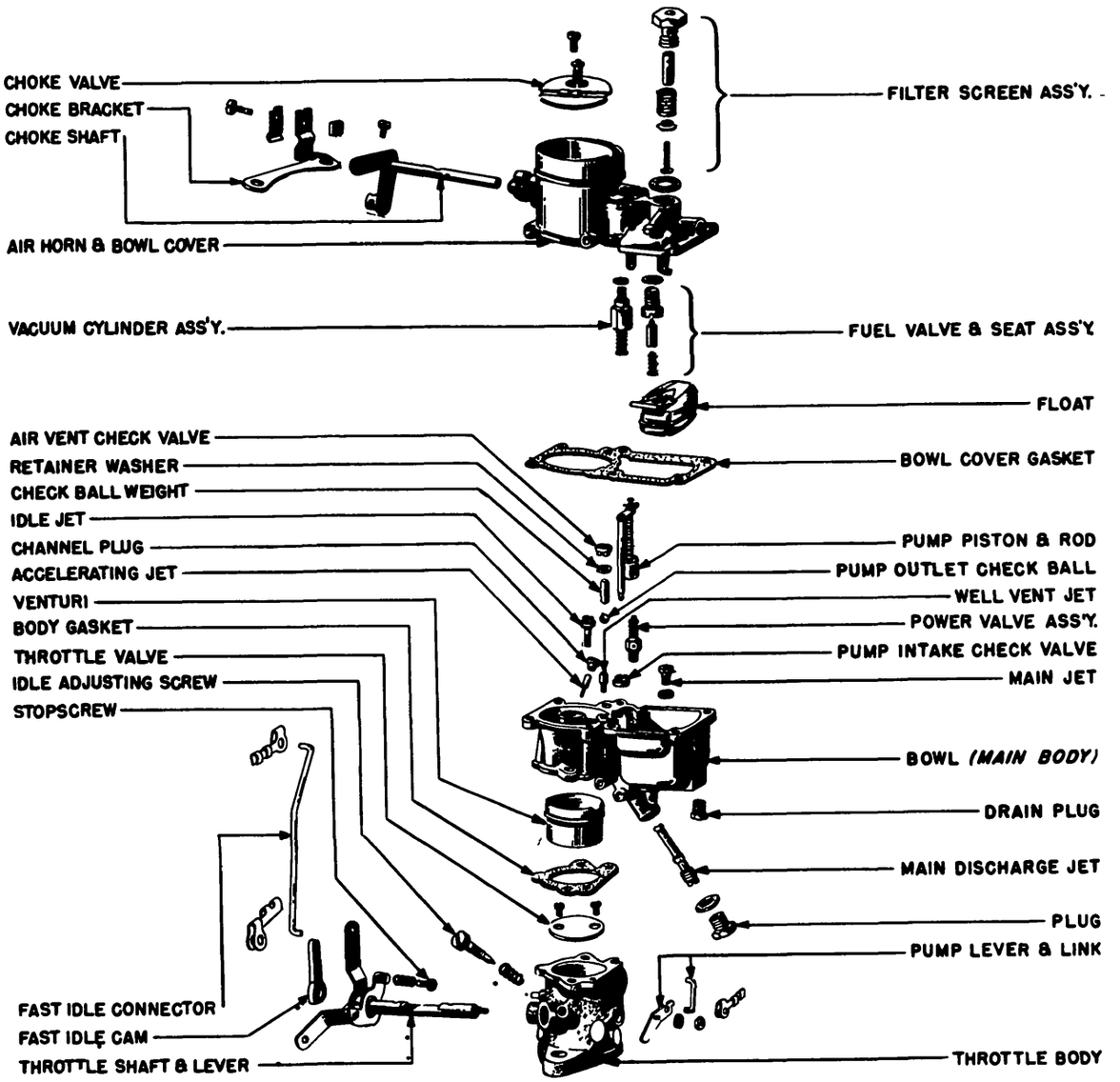
Fast Idl : No adjustment. Fast idle speed will be correct when slow idle properly set.

Unl ader: Not adjustable.

Automatic Ch k Setting: 15 notches rich from index mark.

Ch cking Aut matic Ch k Thermostat - Remove cover plate screws and cover plate and allow thermostat to cool (or warm) until it reaches 70°F. With thermostat at 70°F., inside of eye on end of thermostat should coincide with "zero" marking on outside of cover. When installing a new thermostat, or other parts, check "zero" location at 70°F. and change location if necessary. *NOTE - Each 5° variation in temperature is quival nt to ne graduation on thermostat cover.*

OVERHAUL: Disassembly - Remove large hex plug from top of air horn, then take out attaching screws and remove air horn from fuel bowl. Remove gasket, then use a screw driver on float pin and press against it at slotted side of bracket, forcing pin through bracket. Remove float pin (with fingers) from opposite side and and remove float. Remove needle valve, seat, and fibre washer with Tool C161-85. Use Tool C161-10 and remove vacuum cylinder assembly. Remove idle adjusting screw and spring. If necessary to remove choke valve and shaft, file off riveted end of screws and remove screws, then remove choke valve shaft and lever assembly. Remove large hex plug and fibre washer from bottom of fuel bowl assembly, then remove accelerating pump link retainer and remove link. Remove accelerating pump and rod as an assembly. Remove two screws and lockwasher attaching fuel bowl to throttle body and remove fuel bowl, then remove venturi and gasket. Remove idling jet from top surface of fuel bowl with a screwdriver, then remove well vent jet with Tool C161-80. Remove main jet and fibre washer, then remove power jet valve assembly from inside bottom of fuel bowl with Tool C161-9. Remove main discharge jet from passage on outside bottom of fuel bowl with Tool C161-1. Remove check valves as follows: Turn back ears of pump check valve in pump cylinder and invert bowl so disc will drop out. Use Tool C161-5 to remove check valve body. Remove air vent valve from passage in top surface of fuel bowl with Tool C161-5. Turn fuel bowl over and allow pump refill check valve ball, weight, retainer, and washer to drop out. *CAUTION - Do not remove idle channel bushing or nozzle bushing.* Do not remove throttle valve or shaft unless necessary to replace parts. If necessary to remove these parts follow same procedure as for choke valve and shaft.



ZENITH MODEL 228BV10 CARBURETOR (AUTOMATIC CHOKE NOT SHOWN)

Reassembly: Reverse disassembly procedures and note the following:

Choke Valve & Throttle Valve - Do not rivet screws attaching valves to shafts.

Float Assembly - Insert tapered end of float pin into float bracket on side opposite slot and push through to other side. Press pin into slotted side until pin is centered in bracket.

MC CULLOCH SUPERCHARGER

F rd, 300 HP High P rformanc Eng. (1957). See Note below.
Packard Clipper (1957)
Packard Hawk (1958)
Studebaker Golden Hawk (1957-58)

►*1957 FORD SUPERCHARGER NOTE:* Service procedures for the supercharger used on early 1957 production cars are similar to the procedures outlined below.

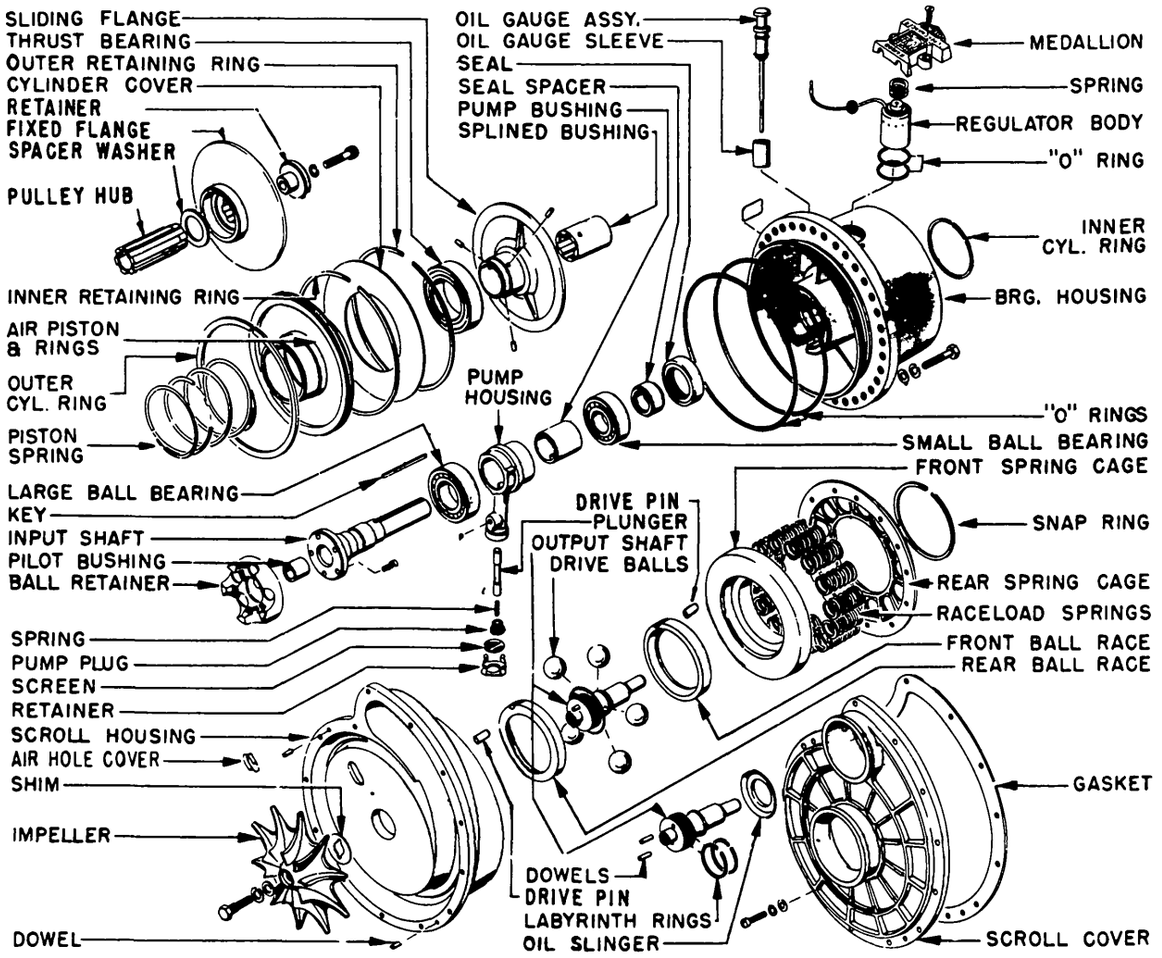
DESCRIPTION & OPERATION: Supercharger is a centrifugal type mounted on engine and belt driven from the crankshaft. Supercharger has two step-up speeds: (1) Variable ratio drive pulley with belt tensioner, and (2) Planetary drive system between input and output shaft. A control system governs shift from LOW BLOWER to HIGH BLOWER and limits HIGH BLOWER boost output by governing the sliding flange of variable ratio pulley. LOW BLOWER step-up speed ratio is 1-5.7 and HIGH BLOWER 1-10 in relation to crankshaft speed. Planetary drive system consists of front and rear outer ball races, five steel balls, ball retainer and inner race which is milled in the output shaft. Drive is from input shaft to ball retainer, to steel balls, to output shaft with a ratio of 1-4.44. Spring tension from race load assembly applies pressure (from assembly) to front race, reducing space between front and rear outer races, forcing ball pressure on output shaft. Balls are forced to rotate around output shaft as well as on own axis causing output shaft to turn. The impeller fits on hub of output shaft and is driven by two dowel pins.

Lubricating System—Oil supply is contained in oil sump. A piston type oil pump driven off camway ground in input shaft supplies lubrication direct to input shaft bushing and to output shaft pilot bushing in rear end of input shaft. Seepage past these bushings supplies lubricant to input shaft roller bearings, air piston and air chamber, and to planetary drive balls and races. A dipstick is provided to check oil level and the oil level should be checked every 1000 miles. *See LUBRICATION below.*

Control System—Consists of an air pressure valve affected by spring pressure and a Solenoid Regulator. The electric switch for the Solenoid Regulator circuit can be operated either by intake manifold vacuum or by accelerator pedal (kickdown). A spring loaded diaphragm limits air pressure build-up by permitting valve to open at adjusted spring pressure.

Solenoid Regulator Operation—There are three phases:
1) Low air pressure, no circuit to Solenoid Regulator, spring between valve head and Solenoid Armature forces valve open permitting air pressure to enter air chamber forcing air piston and floating pulley flange forward causing shift to Low Blower.

2) Low air pressure, Solenoid energized, forcing Armature up, compressing valve spring and sealing off air passage to air piston resulting in shift to High Blower by the belt tensioner.



MC CULLOCH SUPERCHARGER ASSEMBLY (TYPICAL)

3) High air pressure against diaphragm offsets diaphragm spring pressure forcing diaphragm away from valve head. With Solenoid Armature in up position (energized), valve is now permitted to raise sufficiently to open air passage partially. Air piston moves forward reducing input shaft speed ratio and impeller speed, controlling pressure build-up.

LUBRICATION: Check oil level by means of dipstick on left side of housing every 1000 miles. Drain and refill sump at 25,000 mile intervals. Dipstick is marked to indicate "safe" oil level and "add oil" points.
Capacity & Recommended Lubricant—8 ozs. Use Mobiloil ATF200 or Type A Automatic Transmission fluid.

OVERHAUL: *Supercharger is a precision unit with microfinish d surfaces and all pr cautions list d b low must b follow d when disassembling unit and handling parts.*

►*CAUTION:* Remove unit from engine before disassembling. Clean exterior thoroughly with solvent, wiping dry with rags or industrial wipers. DO NOT immerse unit in the solvent and avoid use of compressed air during cleaning operation. Work on clean surface with clean tools, using clean solvent and oils. Proper tools eliminate possible damage to precision built parts. Do not handle micro-finished drive line parts with bare hands (output shaft, drive balls, and ball races) to avoid rust and oxidation on these parts. Use clean dry cloth gloves or oiled patches of clean cloth (lint free paper wiping towels such as Scott Industrial Wipers etc. may be used).

1) Remove dipstick gauge and drain oil sump. Remove scroll cover and gasket by first removing retainer screws and then lifting, **not twisting,** the cover from housing and dowels. *(CAUTION - Impell r wh l is a balanc d unit and chipping, scratches or goug s will d stroy the balance. DO NOT use pli rs or scr w-*

CONTINUED ON NEXT PAGE

MC CULLOCH SUPERCHARGER (C ntinued)

drivers while removing r tain r scr w. If impeller is chipped or gouged, replac the part).

2) Install Impeller Holder, Tool J-6684 and remove retaining capscrew and washer. Insert Impeller Puller, Tool J-6690 into the impeller and turn it clockwise until impeller is lifted clear of output shaft boss, then remove impeller wheel shim or shims. Mount supercharger assembly in holding fixture, Tool J-6689, and using a suitable rubber hose or fan belt to hold the pulley, loosen pulley retaining screw and remove the screw, lockwasher, and retainer. Pull the fixed flange of pulley and splined hub off shaft. *(NOTE* - If splined hub remains on the shaft, use Puller, Tool J-6693 to remove it from input shaft).

3) Remove sealed bearing (ball thrust) from sliding flange using Puller Plate, Tool J-1298, and Puller, Tool HM-925 together with Puller Centering Button, Tool J-6685.

4) *(CAUTION - When r moving retainer rings, and air piston cover, the air piston must be held down constantly).* Push in on hub of air piston to compress piston spring and remove pressure from piston cover. Insert a screwdriver in notch at bottom of bearing housing and snap out the outer retainer ring. Remove air piston cover, then snap out the inner retainer ring. Lift air piston and spring from air chamber then remove large oil seal ring from piston.

5) Remove medallion and solenoid regulator spring. Remove solenoid regulator from housing by grasping top shoulder of regulator with vise-grip pliers and then pulling straight out. Remove two seal rings from solenoid regulator well. Scribe an index mark on the scroll and regulator housings for correct reassembly. Remove hex-head screws, lockwashers, and flat washers retaining bearing housing to scroll housing, then remove bearing housing by twisting it free of scroll housing. After housings are separated, remove the two sealing rings from bearing housing. *(CAUTION - Do not use a t l t pry housings apart which may caus damag to housings or mating surfaces).* Remove inner air piston seal from housing.

6) Remove input shaft and oil pump assembly. *(NOTE-* If shaft and pump assembly remained in bearing housing when it was lifted free of scroll housing, tap pulley end of input shaft with a rubber mallet to drive assembly out of housing). Press the input shaft oil seal out of bearing housing. Remove race load assembly from scroll housing. *(CAUTION - DO NOT at t mpt to disass mble rac load assembly without the use of an arb r press. Internal springs will cause damag if releas d sudd nly).*

7) Remove drive balls of planetary system by lifting the output shaft until balls are free of rear ball race. Output shaft can then be removed by pulling it free of scroll housing. Remove ball races by lifting or tapping them from their seats in race load assembly and scroll housing. *NOTE* - Use Anvil, Tool J-6687 to pry against when removing race from scroll housing.

8) Remove hub key and shaft spacer from shaft using Puller, HM-925; Plate, J-1298; Collets, J-6729; and Centering Button, J-6686. Spring the screen retainer off lower end of oil pump and then remove the screen. Screw out slotted head plunger spring retainer and shake the coil spring out of pump body. *(NOTE* - If pump plunger will not shake out, hold pump body steady and rotate shaft until plunger is at high point of the cam. Pump body will now be free to slide off input shaft. DO NOT force pump body off shaft).

9) Remove bushing from body by pushing it out in direction of the staking tang. *(NOTE* - The small ball at foot of pump is staked in place and serves only to seal the drilled passageway). Remove the large ball bearing on input shaft using Puller, HM-925; Plate, J-1298; Collets, J-1298-3; and Centering Button, J-6686. Remove the ball driver by removing the five centering screws.

► *SOLENOID REGULATOR NOTE:* This unit must not be disassembled. If faulty, replace the unit.

REASSEMBLY: *CAUTION–A clean area for assembly is important. All parts must be thoroughly cleaned and well oiled. Lint and dust must be held to absolute minimum when assembling internal drive parts.*

1) Place a race pin in recess in side of ball race housing, then place a ball race in position in scroll housing. Ball race should be a light tap fit with a plastic hammer. Make sure that race is bottomed in scroll housing. Before installing output shaft, check to see that rings are in the first and third grooves of the shaft, and that chamfer on top ring is toward impeller end of shaft. Turn seal rings on output end of shaft so that gaps are 180° apart, and insert the shaft (dowel pins down) into center opening of scroll housing. Angle the shaft slightly away from gap in each ring as shaft moves down, and straighten it to vertical as top ring slides into place inside the bore. *(NOTE* - A slight taper is provided in face of the opening to compress rings as output shaft seats.

2) Place five drive balls around output shaft, then push down gently on one at a time to seat each in its proper place on the ball race. *(CAUTION - Balls are furnished in matched sets. Never install less than a complete set).* Place another race pin in recess in side of race load assembly and install the remaining race. Place race load assembly into position, ball race down, over the drive balls.

3) Install ball retainer or driver, on end of input shaft and tighten retaining screws to 30 inch-pounds, minimum. Using Tool J-6688, press the large ball bearing onto output shaft until it is seated against the shoulder *(NOTE - Lettering on bearing should face away from oil pump).*

4) Slide oil pump, with bushing insert onto the shaft. When installing the pump body, make sure the pump is not upside down before installing the outer ball bearing. *(NOTE* - When pump is correctly installed, the bore in pump body will align with camway ground on input shaft). Using Tool J-6688, press small bearing into place on shaft with the letters up away from oil pump.

5) Install oil pump plunger (spring opening toward the plug), plunger spring, and the pump plug in oil pump body, and secure the screen to end of pump body with the retainer. Install inner air piston ring on boss of bearing housing, and lock ends of ring together. Press input shaft seal into position inside bearing housing with the lips of the seal facing rearward or toward impeller.

6) Install "O" rings (two required) in the inside and outside grooves of housing shoulder (do not install ring in center groove). Lightly oil the two small "O" rings and install them in channels within regulator well. Oil the sides of solenoid regulator and push it down past the two "O" rings until it is firmly seated. Install outer air piston spring in nose section of bearing housing, then slide air piston into place. Oil liberally, then push in on the piston, depressing the spring, and install rear retaining ring on inside of the air chamber.

7) Install dust shield, and retain in place with the outer retainer ring. Fill bore of oil pump (through the screen), using Automatic Transmission Fluid Type A, and then rotate output shaft while holding pump body until oil can be seen pulsating just under the screen. Install input shaft assembly in bearing housing, then place shaft sealing spacer over pulley end of input shaft and push it down into position in shaft seal.

8) Lubricate all moving parts with Automatic Transmission Fluid Type "A". Install bearing housing onto scroll housing, aligning the marks made at disassembly. Secure in place with capscrews, lockwashers, and flat washers. Tighten capscrews evenly to 100 inch-pounds. Press the thrust bearing onto rear of sliding flange of pulley, then insert special washer into rear of the front (fixed) flange of pulley, with chamfered inner edge of special washer facing rear of pulley flange. Press splined pulley hub into place in front (fixed) flange of pulley. Position sliding flange of pulley on the splined hub. *(NOTE* - Sliding flange should fit splines closely but slide easily). Slide key into shaft keyway, then push pulley assembly down into position on end of output shaft and secure with retainer, lockwasher, and screw. Tighten screw to 200 inch-pounds, using a rubber hose or belt to hold pulley assembly.

9) Place retaining spring on top of solenoid regulator and install supercharger medallion. *(NOTE* - The retaining spring must be in place as it serves to ground the solenoid case to supercharger). Wipe face of diffuser, then measure depth of face of output shaft below face of diffuser. This measurement should be .015". Select shims .050" thick and assemble impeller and shims to boss of output shaft. Secure with a flat washer, lockwasher, and capscrew. Tighten to 200 inch-pounds, using Impeller Holding Tool, J-6684. Check clearance between impeller and diffuser at several points around the impeller using a feeler gauge. The allowable clearance is .046-.051". If not within these limits, add or remove shims as necessary. Assemble scroll cover and gasket to housing and tighten retaining screws securely.

BENDIX ELECTROJECTOR FUEL INJECTION

DESCRIPTION: The Bendix "Electrojector" fuel injection system is electrically controlled and actuated by the "Triggering Selector Unit" located in the engine ignition distributor and by the "Electronic Modulator Unit" enclosed in a separate container attached to the engine. The fuel supply to engine cylinders is a "common rail" type using an electric fuel pump to circulate fuel under approximately 20 lbs. pressure to a solenoid injector valve located in the intake valve port of each of the engine's cylinders. Fuel injector valves are electronically timed by the "Triggering Selector Unit" and the amount of fuel delivered to each injector valve is controlled by the "Electronic Modulator Unit" in relation to engine requirements. Controls are employed to make the system responsive to engine speed, air pressure, temperature, and manifold vacuum.

►*NOTE:* Actual installation may differ in detail from units described below.

OPERATION: General operation of the fuel injection system and controls are as follows:

Throttle Body: This unit, in addition to containing the throttle valves also contains the Manifold Pressure Sensor and the Idle Enrichment Unit.

Fuel Supply: An electric, non-metering fuel pump delivers fuel at approximately 20 lbs. pressure through a fuel filter into the "common rail" fuel supply line which connects to all of the fuel injector valves. A fuel return line to the gas tank allows a continuous circulation of fuel in the system continually purging the fuel supply of air and fuel vapors.

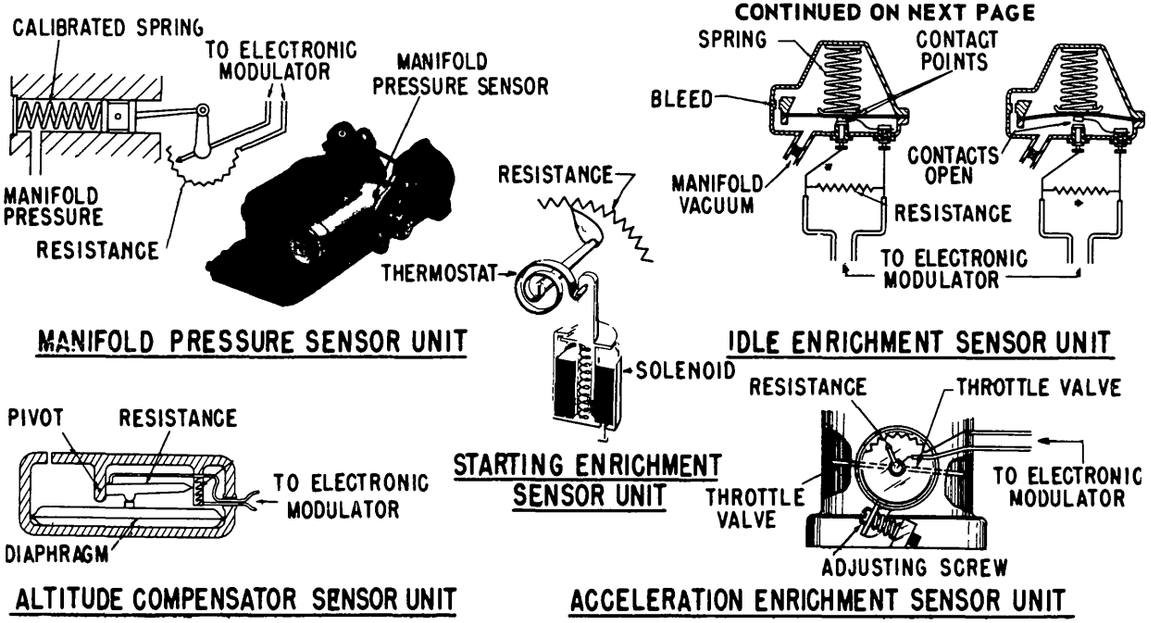
Fuel Injector Valve: This unit is a high speed solenoid operated injector valve and nozzle screwed into the cylinder head so that discharged fuel is directed at the head of the intake valve when the valve is off its seat.

Triggering Selector Unit: Engine speed and injection timing are "sensed" in this unit which consists of a set of breaker points and a distributing commutator having a commutator segment for each of the solenoid injection valves. This assembly is inserted between distributor main body and cap and is actuated by the same cam operating the regular engine ignition points. Each time the fuel injector breaker points make contact, a triggering impulse is transmitted to the modulator where the signal is modified to control the length of time the fuel injector valve is to remain open (depending on engine fuel requirements). The modified signal is then returned to the selector portion of the assembly where it is distributed to the correct injector valve.

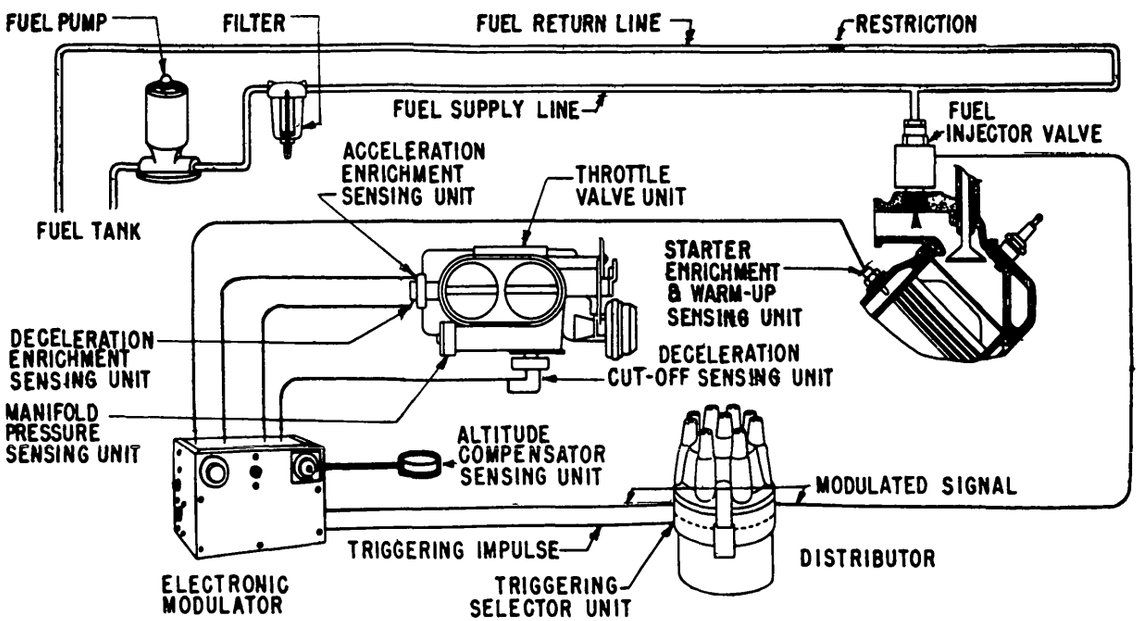
Electronic Modulator: The modulator is an electrical unit employing transistors to transform signals received from the triggering selector unit into an electrical pulse of a given standard width. Simultaneously, signals indicating engine operating conditions are also received by the modulator from sensing units located on various parts of the engine. By integrating these external sensing signals into the standard pulse width circuit of the control system, the standard pulse width is modified to reflect engine conditions. This modified electrical pulse is then transmitted to selector portion of the triggering selector unit which in turn distributes the pulse to the correct fuel injector.

External Sensing Units: In all external sensing units, added resistance is introduced into the fundemental circuit to modulate the pulse width of the electrical impulse that is transmitted to the solenoid injector valves. As the sensing circuits resistances increase, the pulse widths increase and the length of time the injector valves are held off their seats likewise increase, resulting in additional fuel flow. Operation of the various sensing units are as follows:

CONTINUED ON NEXT PAGE



BENDIX "ELECTROJECTOR" FUEL INJECTION SYSTEM SENSING UNITS



BENDIX "ELECTR JECTOR" FUEL INJECTION SYSTEM (SCHEMATIC)

BENDIX ELECTROJECTOR FUEL INJECTION (C nt.)

Manif ld Pressur S ns r - This unit is mounted on the throttle body and transmits a signal to the modulator control, indicating the relative density of the air charge entering the engine.

Acc l rati n Enrichm nt - In order to supply the added amount of fuel required for smooth engine operation when the engine is accelerated, an acceleration enrichment unit controlled by manifold vacuum, is used. This unit, connected to the intake manifold contains a diaphragm and spring assembly, contact points and a resistance circuit. In operation, a rapid decrease in manifold vacuum will cause the points to separate and introduce an additional resistance in the control system thus increasing the operating pulse width of the electrical signal for the length of time necessary to equalize the pressure in the chamber on both sides of the diaphragm. A bleed hole connecting both sides of the diaphragm allows a time interval for the points to close and eliminate the resistance. The added pulse width, during the time the points are open, will increase the fuel flow from each injector as the injectors will be energized for a longer period of time.

Idle Enrichment - This is controlled by a rheostat connected to the throttle shaft to interject a variable resistance in the control circuit when the throttle valve is in an idle position. The idle adjustment is obtained by adjusting this resistance instead of the conventional idle mixture adjusting needle.

Starting Enrichment - Starting and warm-up enrichment is controlled by a thermostatic coil spring which is connected on one end to a solenoid unit, and on the other end to a variable resistance rheostat. During engine cranking the solenoid is energized causing maximum resistance thereby increasing fuel flow during the cranking period. During the warm-up period (solenoid not energized) the thermostatic coil spring maintains a resistance which decreases as engine temperature rises. Enrichment is decreased accordingly. A conventional fast idle cam on the throttle shaft which is linked to the thermostat provides the necessary fast idle speed during the warm-up period.

Altitude Compensator - This sensing unit is connected to the modulator box and consists of a small aneroid connected to a variable resistance unit that transmits its signal to the modulator. As altitude is increased the aneroid expands causing the resistance to be decreased and thereby decreasing the fuel flow.

Fuel Cut-off During Deceleration: As the piston in the manifold pressure sensing device reaches the extreme position during deceleration, fuel is automatically cut off.

SISSON AUTOMATIC CHOKE

DESCRIPTION: The Sisson Automatic Choke is a separate unit mounted on exhaust manifold and connected to the carburetor choke valve lever by a connector rod. A solenoid within the choke case is connected to the starter side of the starting switch so that the solenoid is energized while the starter is operating. A thermostat is also mounted within the choke case and the solenoid and thermostat operate together to close the choke valve for cold starting and to control the choke valve during the warming up period. The AC-700 Series (AC-751, AC-751B, AC-758B) and AC-600 Series operate in the same manner.

ADJUSTMENT: Model AC758B. Remove air cleaner, open throttle approximately ¼. Move choke lever until hole in automatic choke shaft (opposite end from lever) lines up with slot in bearings, insert special tool, Sisson No. C-723, through hole in shaft and push tool down so that lower end engages slot in choke base mounting flange. Loosen clampscrew on choke lever, press up on lever until choke valve is closed tight (sight down air horn), hold lever in this position and tighten clampscrew. Remove tool.

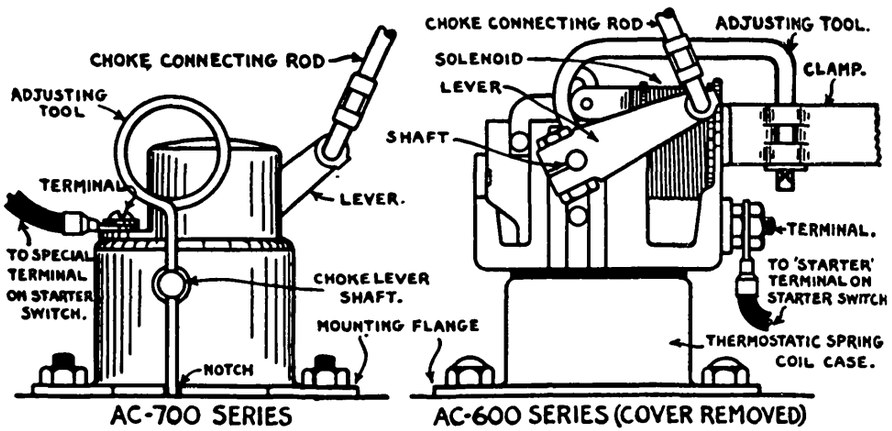
Model AC-600—Remove air cleaner, open throttle approximately ¼, take off automatic choke cover. Clamp special adjusting tool, Sisson No. AC-620, in place on choke so that end of tool enters and lines up hole in armature and hole in magnet core, move flat bar on tool so that armature is locked tightly against magnet core. Loosen clampscrew on choke lever, move lever until choke valve is closed tight (sight down air horn), hold lever in this position and tighten clampscrew. Remove tool and replace automatic choke cover.

SERVICING: If Trouble Shooting data below does not correct faulty operation, remove Automatic Choke Unit and test operation on test fixture such as Sisson Model AC-753. Replace units which are defective. Do not oil any part of choke mechanism. When installing choke, make certain that heat insulating gasket is in place between exhaust manifold and choke case. Do not use a terminal screw on AC-758B models which is longer than original screw (Caution—a longer terminal screw will interefere with correct operation).

TROUBLE SHOOTING: If engine does not start or warm up properly, and for hard starting complants due to faulty choke operation, check following points

Hard Starting with Cold Engine:

1. Check fast idle mechanism to see that it is free and not binding at any point (fast idle connector rod usually connected to choke valve lever).
2. See that choke rod connecting Automatic Choke lever and choke valve lever does not bind in levers.
3. Examine carburetor choke lever, Automatic Choke lever, and fast idle mechanism and remove all paint, grease, or dirt which might cause binding.
4. Check carburetor choke valve, see that edges are smooth and that valve does not rub against air horn walls or bind in any position. See that air cleaner does not interfere with choke valve and that mounting screw is not tightened excessively which will distort air horn and bind choke valve (check choke valve operation with air cleaner in place).
5. Check electrical connections at Automatic Choke and starter switch. Examine wire for short-circuits and breaks.
6. Check Automatic Choke ground (unit grounded through case). See that mounting screws are tight and that manifold under mounting flange is clean.
7. Check throttle cracking linkage (see Tune up instructions on car model page). This is important to insure correct throttle opening for starting and to place automatic choke in operation (on some cars with fast idles, fast idle will prevent choke closing until throttle valve opened to free fast idle cam.
8. Check Automatic Choke adjustment (see instructions above). If Automatic Choke does not function after above points checked, replace the unit.



Hard Starting with Hot Engine:

1. Check for rich mixture or flooding caused by percolating discharge of carburetor when engine stopped. To check, remove air cleaner immediately after stopping engine, note whether gasoline dripping into manifold from carburetor nozzle (this overflow should show up within 3-5 minutes after engine is stopped). Correct by installing special size Float Valve Needle and Seat Assembly and checking float level.
2. Check carburetor for High Float Level.

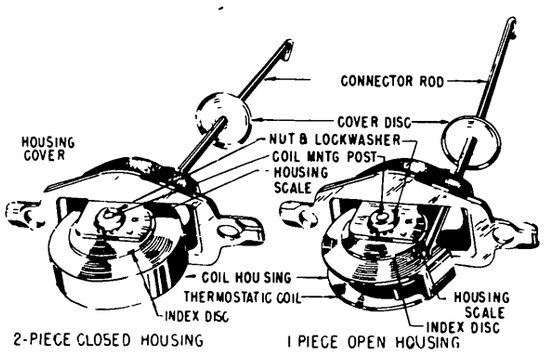
Engine Stalls while Cold:

1. Check Manifold Heat Control Valve. See Manifold Heat Control data on car model page for directions.
2. Check carburetor Fast Idle setting.

DESCRIPTION: These "Cross-over" type automatic choke controls are separate units mounted in a well in the intake manifold (at the exhaust "cross-over" passage) and linked to the choke valve lever by a connector rod. *See illustration.*

OPERATION: Cross-over type automatic choke operates in the same manner as other thermostatic coil types. The vacuum piston is located in the carburetor air horn and is linked directly to the choke valve shaft (not part of automatic choke assembly).

ADJUSTMENT & CHECKING: No adjustment is required and choke must be removed from manifold well to check the setting. Operation can be checked as follows:
Operation Check - With choke mounted on engine and connected to carburetor, lift cover disc and open and close choke valve manually to make certain connector rod does not bind on sides of hole in housing cover. If connector rod does not clear the hole, replace assembly *(CAUTION - Bending rod will change calibration).* Move rod up and down to check for free movement of the coil housing on the pivot. If internal bind noted, replace assembly.
Setting Check - With choke assembly removed from manifold well, index mark on disc should be midway between "L" and "R" marks of scale on housing (Std. setting - see individual car model pages for specific settings). To adjust setting, loosen mounting post locknut and turn mounting post with a screwdriver to align index mark on disc with correct mark on scale. Hold post from turning while tightening locknut.



"CROSS-OVER" TYPE CHOKE ASSY.

CLEANING & INSPECTION: Entire housing and rod assembly can be cleaned with carburetor parts cleaner without disassembly. After cleaning, rinse in solvent and blow out inside of housing with compressed air. Check to make certain that housing revolves freely on mounting post without binding. If necessary, unit can be disassembled for thorough cleaning and should be reassembled as follows:

REASSEMBLY (After Disassembly for Cleaning): *NOTE - Two types of choke assembly have been used: 1) One Piece Open Housing, 2) Two Piece Closed Housing. See illustration. Assemble each type as follows:*

One Piece Open Housing: Insert thermostatic coil in housing with hook on coil pointing toward web on edge of housing approximately 120° below straight upper edge of housing. Insert mounting post through housing and coil with index mark toward hook on coil, secure mounting post with washer and pin spring. Install cover disc on connector rod and install rod through housing cover into housing toward split end of mounting post, secure rod with washer and pin spring (spring eye outward). Assemble housing cover to mounting post with lockwasher and nut, rotate mounting post counterclockwise until hook on coil picks up connector rod, tighten nut. Check for positive spring action by pushing connector rod down through housing cover. Adjust choke setting (see Adjustment above).

Two Piece Closed Housing: Place coil mounting post in one of the coil housing halves, install thermostatic coil on mounting post with hook facing clockwise. Assemble other half of housing with holes in both halves aligned, secure with washer and hairpin. Install connector rod with hairpin end extending through hole in housing toward split end of mounting post, secure with washer and hairpin (hairpin eye outward). Install index disc on mounting post with flat on disc and post aligned, rotate disc and post counterclockwise until hook on coil engages connector rod. *(CAUTION* - Index mark on disc should be approximately 60° to right of connector rod with housing held so that rod points straight up - if mark not in correct position, turn disc over). Assemble housing cover on mounting post and install lockwasher and nut. Install cover disc on rod. Adjust choke setting (see Adjustment above).

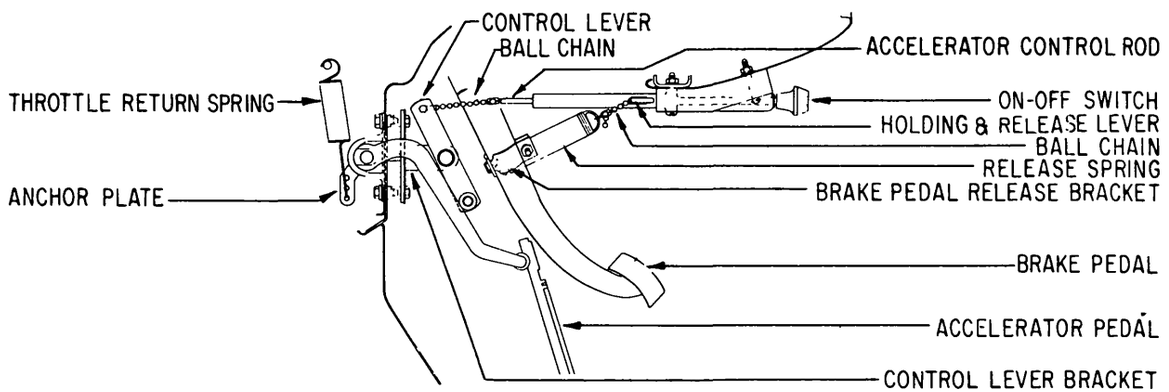
PONTIAC MAGI-CRUISE CONTROL

Pontiac (1959-60) - Optional

DESCRIPTION: Unit is a throttle holding device designed to relieve driver of constant attention to accelerator pedal. Consists of a manual "On-Off" knob on instrument panel and a linkage arrangement connected between brake and accelerator pedals.

OPERATION: The accelerator control rod is connected to accelerator pedal linkage by a chain. Locking lever is connected to brake pedal by a chain and spring. To set throttle, knob must be "ON". When accelerator pedal depressed, chain on accelerator rod becomes slack until brake is tapped, actuating locking lever and releasing spring-loaded accelerator rod so that it seeks its inner-most position governed by chain. Thus accelerator pedal is held in the position it was in when brake was tapped. Unit is released simply by tapping brake pedal or applying brakes, both without holding accelerator pedal down. Unit can also be released by turning knob to "OFF".

ADJUSTMENTS: With carburetor in normal hot idle position, turn knob to "ON" and make sure accelerator control rod extended 1¼" and locked. Chain must be installed without slack. *NOTE - On cars with 4-barr l carburetor, throttle return spring should be moved to bottom hole in anchor plate.* Install release spring in front hole of brake pedal release bracket (engine running on power brake cars). Chain between release spring and locking lever should have about 2 beads of slack. Manually lock throttle open. Now depress brake pedal slowly. Accelerator pedal must release before brakes actually are applied. To adjust, move spring to rear hole of bracket and adjust chain 1 bead shorter. If more adjustment needed, move spring to front hole. Brake pedal must move ½" or more before control rod released. *CAUTION - If chain too tight, unit will slip on rough roads. Release spring must be installed with hook ends down and connector end towards r ar of car.*



PONTIAC MAGI-CRUISE ASSEMBLY

CADILLAC CHEVROLET LINCOLN CRUISE CONTROL

Cadillac (1959–60)
Chevrolet (1960)
Lincoln (1960)

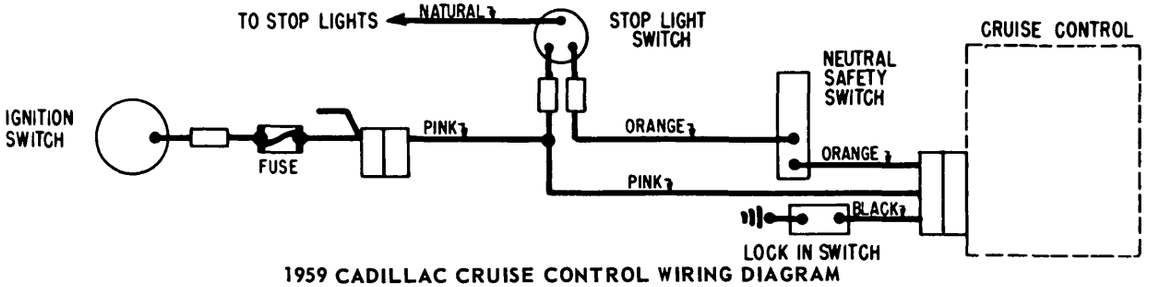
►CHANGES, CAUTIONS, CORRECTIONS

►*1959 CADILLAC CRUISE CONTROL FUSE FAILURE & CONTACT POINT SPECIFICATION CHANGE:* On early models before Engine No. 049525, metal build-up on Cruise Control main contact points, bridging the gap, would cause fuse to blow. *NOTE – This fuse is the same 9 amp. fuse used to protect directional signal circuit, and as a result of it blowing out, the direction signal would also be inoperative. See "1959 Cadillac Control Fuse Production Change" below.* To correct this condition, clean and adjust contact points as follows: Remove control unit from engine and pull green motor wire terminal off terminal blade (do not straighten terminal blade). Inspect points for burrs or metal build-up and clean with distributor point file or flex stone. Install unit, then put transmission in "DR" and turn on ignition. With throttle in wide open position, "latch-in" unit by pulling out dash control knob momentarily or by moving throttle linkage and depressing armature plate on magnet assembly. Loosen contact point locknut on No. 1 contact (point set nearest terminal connector) and hold center contact arm against No. 2 contact point. Back out No. 1 point until total point clearance is .050–.070" (supersedes previous setting of .018–.022" on early cars), then tighten locknut. *CAUTION – DO NOT adjust contact point No. 2 which is pre-set.*

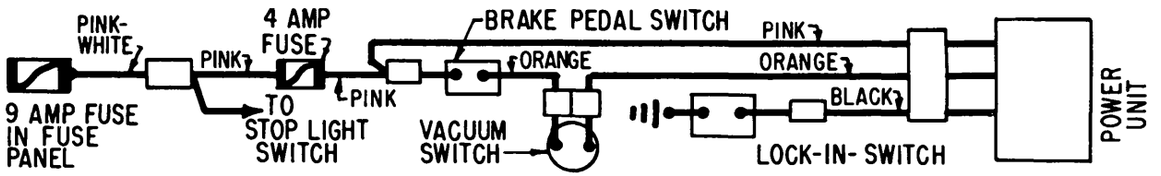
►*1959 CADILLAC CRUISE CONTROL CONTACT POINT ADJUSTMENT CHANGE: On early cars before Engine No. 49525, adjust contact points to .050–.070". This setting supersedes previous setting of .018–.022".*

►*1959 CADILLAC CRUISE CONTROL FUSE PRODUCTION CHANGE:* Beginning with Engine No. 077640, a separate 4 amp. fuse has been added for Cruise Control unit. Fuse is located in separate holder in feed wire to stop light switch.

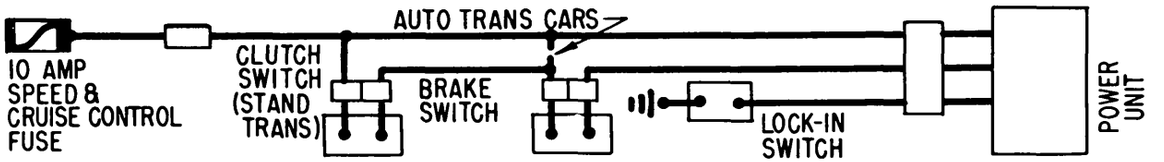
►*1959 CADILLAC CRUISE CONTROL TAPPING NOISE & COVER INTERFERENCE CORRECTION:* May be caused by governor spring pulldown yoke tapping against Cruise Control cover. Correct by placing a rubber or plastic tape inside cover on circular side of yoke cavity. If noise is caused by endplay of magnet assembly pivot bushing on its shaft, lubricate bushing with Lubriplate. *CAUTION – Cover must be centrally positioned when installed so there is no interference between inside of cover and upper section of locking arm plate assembly.*



1959 CADILLAC CRUISE CONTROL WIRING DIAGRAM



1960 CADILLAC CRUISE CONTROL WIRING DIAGRAM



1960 CHEVROLET CRUISE CONTROL WIRING DIAGRAM

DESCRIPTION: This electrically controlled unit acts both as a speed warning device and as an automatic speed control which eliminates the need for manual accelerator operation. Control is by a selector dial mounted on instrument panel. When used as a speed warning, the selector dial is set at desired position and when car reaches this speed a reaction pressure of 5-7 lbs. is felt at accelerator pedal. Driver may exceed this speed by overcoming the pressure and depressing accelerator. When used as an automatic speed control, procedure for setting is the same except when pre-set speed is reached, the button in center of control knob is pushed in. The unit will now maintain pre-set speed without foot pressure on accelerator pedal until brake pedal is depressed sufficiently (with freeplay movement of brake pedal) to actuate stop light switch, or when ignition key is turned off or transmission selector lever is placed in neutral position. Car will then return to manual control. *NOTE - Speed in excess of 85 MPH will also return Cruise Control to manual operation.*

OPERATION: Unit consists of a spring loaded governor driven by a cable connected to transmission speedometer pinion gear. Governor controlled by selector knob which operates a rack and pinion gear attached to a control cable. A speedometer cable connects Auto Pilot to speedometer and indicates car speed in usual manner. Governor is connected by a contact arm to a magnet assembly which actuates a 12-volt reversible motor. This motor, coupled with foot pressure, depresses accelerator pedal by rotating a worm and nut attached to magnet armature shaft and turns entire assembly to increase speed, until pre-set speed is reached. Then governor spring tension will make motor directional contact points break causing a back pressure of 5-7 lbs. on accelerator pedal. If car goes faster, as in descending a hill, opposite motor directional points will close, and motor will reverse operation and make corrections to maintain desired speed.

Automatic Operation - Cycle is same with additional units actuated as follows. When desired speed is reached and button on selector knob is pushed in an electromagnetic coil in center of magnet assembly is actuated. This causes magnet to lock with pintle assembly and unit now operates without foot pressure on accelerator pedal. Selector knob can be moved to any other desired position during automatic operation. When a brake application is made, the combination stop light-Cruise Control opens causing the magnet to release and return car to normal operation.

TROUBLE SHOOTING & DIAGNOSIS

NO PRESSURE ON ACCELERATOR PEDAL: Drive cable from transmission broken. Electrical circuits faulty. Incorrect linkage adjustment.

AUTOMATIC CONTROL DOES NOT ENGAGE: Driver riding brake pedal. Brake pedal does not release. Faulty brake switches. Faulty electrical circuits.

BRAKE APPLICATION REQUIRED TO DISENGAGE AUTOMATIC CONTROL: Stop light switch not adjusted properly (must disengage unit during pedal freeplay movement).

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CADILLAC CHEVROLET LINCOLN CRUISE CONTROL (Cont.)

AUTOMATIC CONTROL REMAINS ENGAGED: Stop light switch faulty or not adjusted properly. Electrical short circuit.

AUTOMATIC CONTROL ENGAGES WITHOUT PULLING SELECTOR KNOB: Electrical circuit grounded to body or chassis Control assembly faulty.

PULSATING THROTTLE: Drive and speedometer cables binding or tight. Speedometer pinion faulty. Linkage binding

SPEEDOMETER POINTER FLUTTER: Drive and speedometer cables binding or tight. Speedometer pinion and/or head faulty.

CARBURETOR WILL NOT RETURN TO NORMAL IDLE: Linkage adjustments incorrect or linkage binding.

TESTING

ELECTRICAL CIRCUITS: *NOTE - Terminal No. 1 should be hot when ignition switch is turned "On". Terminal No. 2 should be hot if stop light and neutral safety switches are properly adjusted.*

No. 2 Terminal: With ignition switch in accessory position and Hydra-Matic in Drive, raise female plug and touch test lamp lead to terminal No. 2. Ground other end of test lamp. Circuit is normal when lamp lights. If lamp fails to light, check for loose connections at stop light switch and terminal block. Make sure switch is not touching brake pedal. If stop light switch operating correctly, check operation of neutral safety switch.

No. 3 Terminal: Again raise female plug, then connect test lamp lead to No. 2 terminal and the other end to No. 3 terminal. Pull out automatic knob. If test lamp lights, the circuit and controls are satisfactory. If it does not light, check for loose wire connections at terminal on rear of control switch on instrument panel. Install new control assembly if no loose connections are found.

ADJUSTMENTS

Linkage (Cadillac): With transmission throttle control rod properly adjusted (see "Carburetor" on Car Model pages), start engine and operate at slow idle speed with transmission in "N" (Neutral) or "P" (Park). Remove cotter pin securing accelerator linkage trunnion on locking arm plate, then remove washers and separate linkage from locking arm. Insert Locking Arm Gauge J-7652 over stop stud and hold locking arm plate securely against gauge. Turn trunnion on accelerator linkage until it aligns with and enters hole in locking arm plate freely, then install washers on trunnion and correct trunnion to locking arm plate. Install cotter pin and remove gauge.

Chevrolet & Lincoln – Remove cotter pin from swivel and remove swivel from regulator lever, then start engine and run at slow idle speed. Insert gauge pin (NOTE – This is a hollow tube with .0625" wall thickness furnished with accessory package) over gauge bolt (located on housing adjacent to regulator lever) and hold regulator lever securely against gauge pin. Adjust swivel on long regulator rod until it will assemble to regulator lever. Replace swivel and cotter pin, then remove gauge pin.

Control Cable (All Models): Rotate selector knob counterclockwise as far as it will go without forcing, then hold dust shield so it will not rotate and unscrew clamp nut. Let clamp nut slide down cable. *NOTE – This nut holds control cable in bottom of dust shield.* Pull control cable out of dust shield until ferrule at end of cable is free from bottom of dust shield. *NOTE – If ferrule is tight in dust shield, carefully pry the fingers apart until ferrule slides out freely. In some cases it may be necessary to unscrew the dust shield from unit in order to pry the fingers apart. Hold hex fitting at top of dust shield as it cannot turn when unscrewing dust shield.* Reinsert ferrule in dust shield and push in slightly on control cable until it stops. *CAUTION – Do not force cable beyond this point.* Fingers of dust shield must clamp ferrule on its largest diameter. Again try to rotate selector knob counterclockwise in order to make sure it is at its lowest setting, which will position dust shield. Tighten clamp nut on bottom of dust shield securely.

OVERHAUL: Unit is serviced by replacement only.

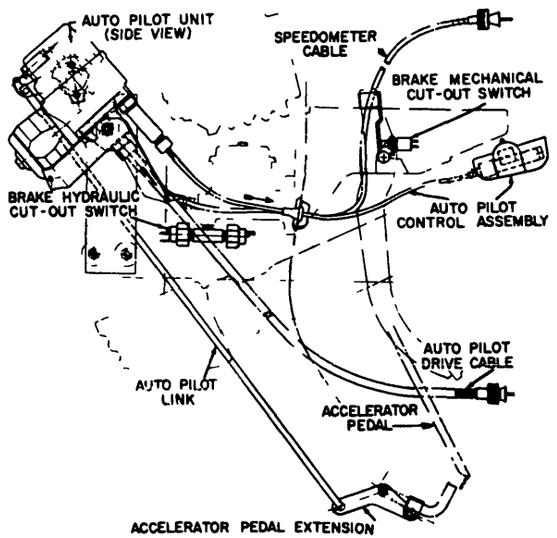
CHRYSLER & DE SOTO AUTO-PILOT SPEED CONTROL

Chrysler & Imperial (1958–60)
DeSoto (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 CHRYSLER & IMPERIAL AUTO-PILOT HYDRAULIC BRAKE SWITCH PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* The Auto-Pilot hydraulic brake switch and "tee" at hydraulic brake master cylinder has been eliminated on later cars. The hydraulic brake switch is now mounted directly on master cylinder. On earlier cars, if the Auto-Pilot hydraulic brake switch requires replacement, it is recommended that the switch be removed and discarded. Also remove the "tee" and mount the hydraulic brake stop light switch directly on master cylinder. Connect the two leads which were connected to Auto-Pilot hydraulic switch, together, using a blade type connector, or solder them together and wrap the connection with tape.

DESCRIPTION: This electrically controlled unit acts both as a speed warning device and as an automatic speed control which eliminates the need for manual accelerator operation. Control is by a selector dial mounted on steering column (1958–59); instrument panel (All Others). When used as a speed warning, the selector knob is set at desired position and when car



CHRYSLER AUTO-PILOT SPEED CONTROL ASSEMBLY

reaches this speed a reaction pressure of 5–7 lbs. is felt from accelerator pedal. Driver may exceed this speed by overcoming pressure of accelerator pedal. When used as an automatic speed control, procedures are the same except when pre-set speed is reached. At this point, the button in center of control knob is pushed in to engage automatic speed control. The unit will now maintain pre-set speed without foot pressure on accelerator pedal until a brake application is made. Beginning with 1960 models, a new automatic lock-in feature has been incorporated which maintains the automatic speed control until pressure is exerted on brake pedal or when knob in center of speed selector is pushed in, however, depressing the brake pedal will not cancel the automatic lock-in feature. To cancel the automatic lock-in feature, it is necessary to push in knob on speed selector.

OPERATION: Unit consists of a spring loaded governor driven by a cable connected to transmission speedometer pinion gear. Governor controlled by selector knob which operates a rack and pinion gear attached to a control cable. A speedometer cable connects Auto Pilot to speedometer and indicates car speed in usual manner. Governor is connected by a contact arm to a

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CHRYSLER & DE SOTO AUTO-PILOT SPEED CONTROL (C nt.)

magnet assembly which actuates a 12-volt reversible motor. This motor, coupled with foot pressure, depresses accelerator pedal by rotating a worm and nut attached to magnet armature shaft and turns entire assembly to increase speed, until pre-set speed is reached. Then governor spring tension will make motor directional contact points break causing a back pressure of 5-7 lbs. on accelerator pedal. If car goes faster, as in descending a hill, opposite motor directional points will close, and motor will reverse operation and make corrections to maintain desired speed.

Aut matic Op rati n - Cycle is same with additional units actuated as follows: When desired speed is reached and button on selector knob is pushed in an electromagnetic coil in center of magnet assembly is actuated. This causes magnet to lock with pintle assembly and unit now operates without foot pressure on accelerator pedal. Selector knob can be moved to any other desired position during automatic operation. On 1958–59 models when a brake application is made, a mechanical switch on pedal bracket and a hydraulic switch on master cylinder causes magnet to release and return car to manual control. On 1960 models, car can be returned to manual control only by depressing knob in center of speed selector as car is returned to automatic control after a brake application by the new lock-in feature.

TROUBLE SHOOTING & DIAGNOSIS

NO PRESSURE ON ACCELERATOR PEDAL: Drive cable from transmission broken. Electrical circuits faulty. Incorrect linkage adjustment.

AUTOMATIC CONTROL DOES NOT ENGAGE: Driver riding brake pedal. Brake pedal does not release. Faulty brake switches. Faulty electrical circuits.

BRAKE APPLICATION REQUIRED TO DISENGAGE AUTOMATIC CONTROL: Brake mechanical switch not adjusted properly (must disengage unit during pedal freeplay movement).

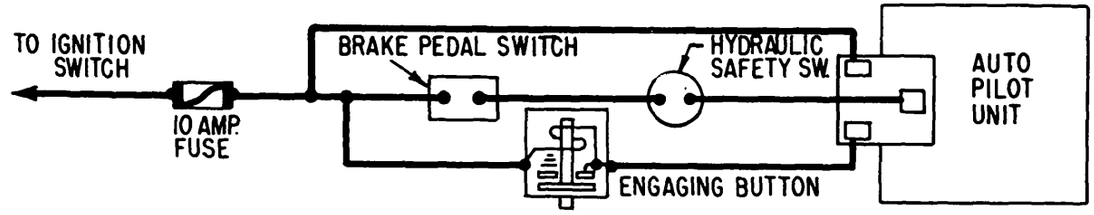
AUTOMATIC CONTROL REMAINS ENGAGED: Brake mechanical and/or hydraulic switches faulty or not adjusted. Electrical short circuit.

AUTOMATIC CONTROL ENGAGES WITHOUT PUSHING SELECTOR BUTTON: Electrical circuit grounded to body or chassis. Control assembly faulty. Auto Pilot faulty.

AUTOMATIC CONTROL DISENGAGES WHEN ASCENDING HILLS OR WHEN SELECTOR KNOB ADVANCED: Linkage adjustment incorrect. Loose electrical connection. Auto Pilot unit faulty.

PULSATING THROTTLE: Drive and speedometer cables binding or tight. Speedometer pinion faulty. Linkage binding.

SPEEDOMETER POINTER FLUTTER: Drive and speedometer cables binding or tight. Speedometer pinion and/or head faulty.



1960 CHRYSLER, IMPERIAL & DE SOTO AUTO-PILOT WIRING DIAGRAM

MOTOR RUNS CONSTANTLY: Linkage adjustment incorrect. Auto Pilot unit faulty.

CARBURETOR WILL NOT RETURN TO NORMAL IDLE: Linkage adjustments incorrect or linkage binding. Improper carburetor accelerator spring (Yellow - LC1; Aluminum - Others).

SELECTOR SETTING DOES NOT AGREE WITH SPEEDOMETER READING: Selector control not properly adjusted.

MINIMUM REGULATING SPEED ABOVE 25 MPH: Improper control cable adjustment.

SELECTOR KNOB HARD TO ROTATE: Control cable kinked or improperly routed. Spring compressor shaft in unit faulty (install new Auto Pilot unit).

TESTING

►*CAUTION: Disconnect ignition coil cable when making electrical tests to prevent starting engine accidentally.*

ELECTRICAL CIRCUITS: No. 1 Terminal - Connect one test lamp lead to No. 1 terminal on Auto Pilot. Ground other lead. Turn ignition switch ON. If lamp lights circuit is normal. If light does not light, fuse burned out, a connector is loose or a wire broken.

No. 2 Terminal - Connect test lamp between No. 2 terminal and ground. If test lamp lights circuit is normal. If lamp does not light some part of circuit is faulty or brake switches faulty.

Brake Switches - Connect test lamp between No. 2 terminal and ground. Depress brake pedal within freeplay distance. Test lamp should not light. If lamp does not light when brakes applied, mechanical switch is faulty or out of adjustment. *NOTE - Switches are normally in closed position.* If lamp lights even after brakes applied both brake switches are at fault, or a short circuit exists between both leads of mechanical switch and opposite connections.

Pushbutton Circuit - Connect one lead of test lamp to No. 3 terminal and other to positive (ungrounded) terminal of battery. Push control button. If lamp lights circuit is normal. If lamp does not light control assembly improperly connected or ungrounded.

Control Assembly - Connect one lead of test lamp to control terminal (Imperial), pigtail lead terminal (Chrysler) of selector control, and other lead to positive terminal of battery. Push control button. If lamp does not light control unit faulty and should be replaced.

ADJUSTMENTS

Selector Control (To make selector speed conform t speedometer reading): Chrysler - Loosen setscrew on plastic collar with calibration numbers. Drive car at 40 MPH and rotate control knob until reaction pressure is felt. Rotate collar on knob until No. 4 on collar lines up with pointer. Tighten setscrew and recheck at 30 and 50 MPH. Readjust as necessary

Imperial - Pry pushbutton off shaft. Remove knob by loosening setscrew. Loosen bezel retaining nut so bezel can be rotated by fingers. Install knob. Drive car at 40 MPH and adjust control knob until reaction pressure is felt. Then adjust bezel until No. 4 on bezel lines up with knob pointer. Recheck at 30 and 50 MPH and readjust as necessary. Reinstall parts properly.

Control Cable Adjustment: Turn selector knob counterclockwise as far as it will go without forcing, then hold dust shield so it will not rotate and unscrew clamp nut. Let clamp nut slide down cable. *NOTE – This nut holds cable in bottom of dust shield.* Pull control cable out of dust shield until ferrule at end of cable is free from bottom of dust shield. *NOTE – If ferrule is tight in dust shield, carefully pry the four fingers apart until ferrule slides out freely. In som cases it may be necessary to unscrew the dust shield from unit in order to pry the fingers apart.* Hold hex fitting at top of dust shield so it cannot turn when unscrewing dust shield. Reinsert ferrule in dust shield and push in lightly on control cable until it stops. *CAUTION – Do not force cable beyond this point.* Fingers of dust shield must clamp ferrule on its largest diameter. Again try to rotate selector knob counterclockwise to place it at low setting and position cable. Tighten clamp nut on dust shield securely.

Linkage Adjustment: Disconnect Auto Pilot link at ball joint end on unit. Bring engine to operating temperature and make sure all carburetor and transmission linkage adjustments are correct. **Choke must be open and engine on slow idle.** Insert a .060" sleeve gauge (make from 5/16" I.D. tubing with .060" wall thickness) or a .060" feeler gauge between stop stud and lockplate on mounting bracket. Hold lockplate securely against gauge. Adjust link ball joint so it will enter hole in lever freely (engine still on slow idle). Tighten ball joint to lever. Recheck linkage for possible binding. Remove gauge.

AC FUEL PUMPS

►*FUEL PUMP PULSATOR NOTE:* Later type fuel and combination fuel & vacuum pumps have a built-in air dome with a diaphragm to dampen out pulsations in the fuel stream.

DESCRIPTION: All AC fuel pumps are mechanically operated, diaphragm type, and operate on the same basic principle. Pumps are driven by a special cam built into the engine camshaft. A rocker arm built into the pump rides the cam, or on some engines a push rod rides the cam which in turn operates pump rocker arm. Pump diaphragm is fastened to a pull rod which is connected to the rocker arm by a linkage. Various linkage types are used. Movement of the diaphragm is controlled by the rocker arm travel on inlet stroke, and by a drive spring on the return stroke. Pumps are equipped with a sediment bowl or built-in sediment chamber and filter screen. On early type pumps the diaphragm was fastened to the pull rod by a nut and washer, later types use one-piece diaphragm and pull rod assembly. Fuel pump pressures range from 2½ lbs. to 5½ lbs. depending on the type of pump used.

OPERATION: Operation of pumps is similar although different types of bodies, valves, linkage are used. In all pumps the down stroke of the diaphragm is positive, being pulled down by the operation of the rocker arm, through the linkage. On the down stroke a vacuum is created above the diaphragm and fuel is drawn into the pump chamber through the pump inlet, sediment chamber, filter screen, and inlet valve. On the return stroke the driving spring forces the diaphragm up, the pressure closing the inlet valve and the fuel is forced out through the outlet valve to the carburetor. The rocker arm is forced to follow the cam at all times by means of the rocker arm spring. The amount of fuel delivered by the pump is governed by the carburetor float needle valve. The pressure is controlled by the drive spring forcing the diaphragm up on the return stroke. The diaphragm can move up on the return stroke only when fuel is flowing out of the pump.

AC COMBINATION FUEL & VACUUM PUMPS

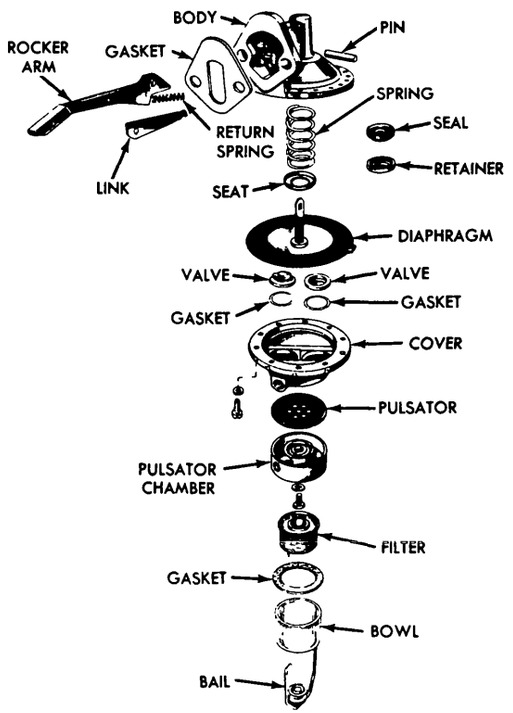
DESCRIPTION: A fuel and vacuum pump are combined in one unit on combination pumps. A single rocker arm operates both pumps. The fuel pump section is similar to the single unit type fuel pump. The vacuum pump is diaphragm type and is used to furnish vacuum for windshield wiper operation when manifold vacuum is low.

►*DOUBLE ACTING VACUUM PUMP NOTE:* Double acting type vacuum pumps used on some models have an inlet and outlet valve on both sides of the vacuum diaphragm assembly in place of the single inlet and outlet valve above the diaphragm as found on single acting vacuum pumps.

OPERATION OF VACUUM PUMP: The vacuum pump consists of a vacuum chamber containing the inlet and outlet valves and is closed at the upper end by the pump diaphragm. A spring is assembled in the center of the pump under the diaphragm. The operating shaft on the upper surface of the diaphragm assembly is connected to the pump rocker arm through the linkage. In operation when the rocker arm is actuated by the eccentric on the camshaft the vacuum pump diaphragm is forced down, expelling any air in the pump chamber through the outlet valve into the manifold. When the rocker arm moves back (freeing the pump linkage), the driving spring under the diaphragm forces the diaphragm upward, creating a vacuum in the chamber, opening the inlet valve, and operating the windshield wiper. Whenever the engine is operated with the windshield wiper turned off the vacuum in the vacuum chamber will hold the diaphragm at its lowest position (with the driving spring compressed) and the vacuum pump will not operate. Whenever the manifold vacuum is higher than the pump vacuum the pump will likewise be inoperative and the windshield wiper will be operated by the manifold vacuum straight through the pump with both valves open. At other times pump acts as a booster to operate windshield wiper.

FUEL PUMP TESTING

TESTING: Static Pressure Test—Disconnect the carburetor fuel line at the pump. Connect Pressure Gauge to pump outlet using adapter fitting. Start engine on fuel remaining in carburetor and run engine to 30 MPH speed. Pressure reading on gauge should be within specified limits.



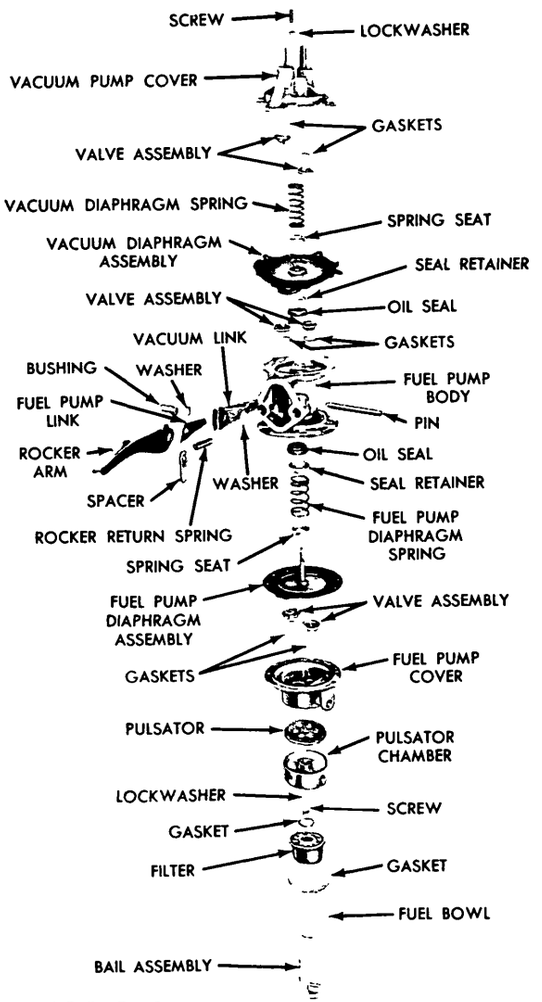
AC FUEL PUMP (WITH PULSATOR)

Capacity Test—Note: Pressure must be within specified limits before making a capacity test. To test capacity, disconnect carburetor fuel line at pump. Insert a Tee fitting in pump. Connect carburetor fuel line to one Tee outlet and a length of hose to the other outlet. Start engine and run at 450 RPM. Hold a one-pint measure approximately the height of the carburetor bowl and fill the measure from the hose on the Tee.

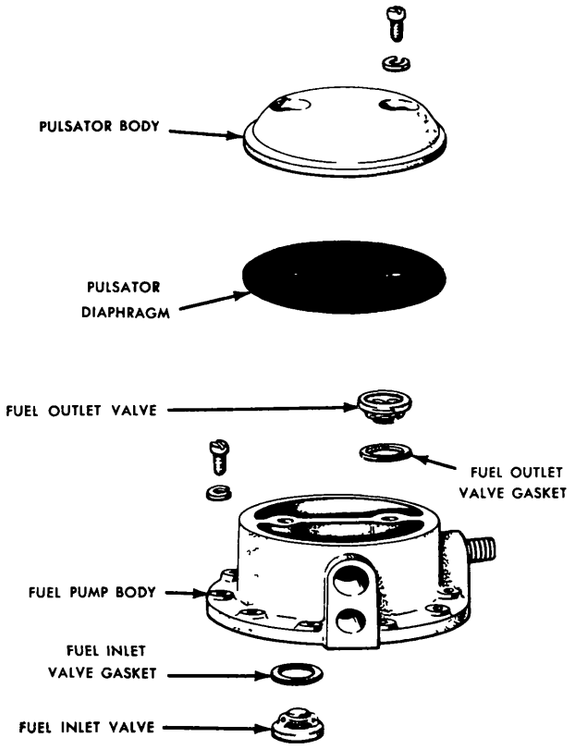
NOTE: Adequate fuel delivery is available when the pint measure is filled in the time shown below according to engine size:

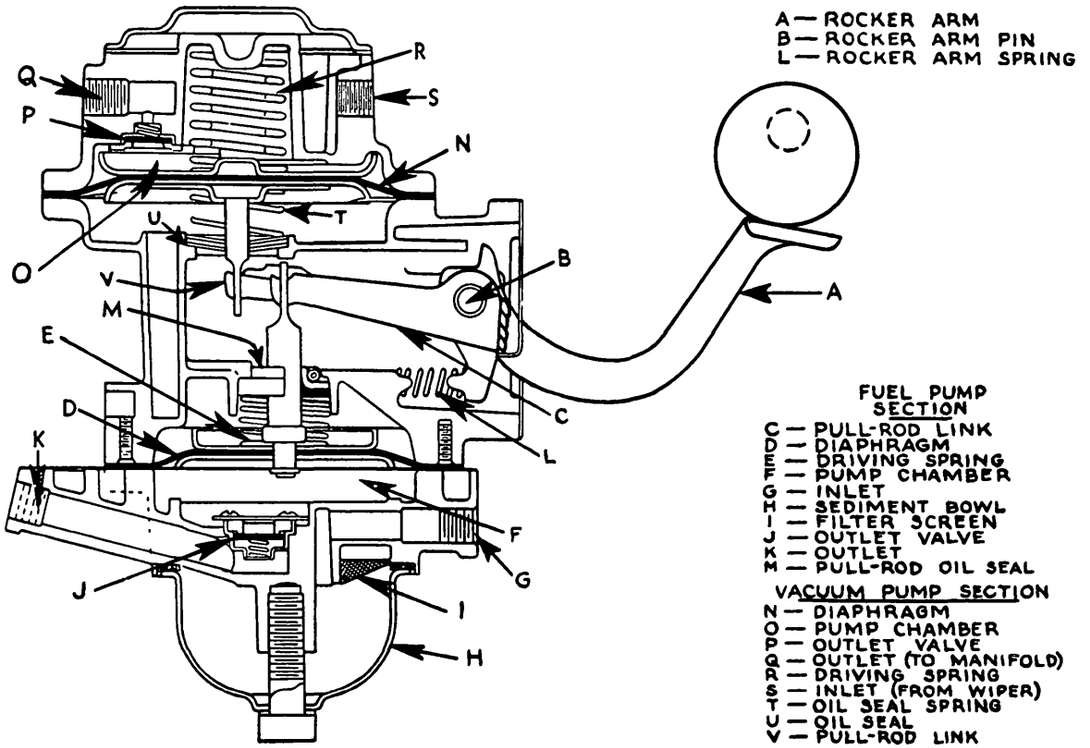
1 Minute—engine under 225 cu. ins. displacement.
45 seconds—engine 225 to 400 cu. ins. displacem't.
30 seconds—engines over 400 cu. ins. displacement.
See car page for displacement under Engine Specifications.

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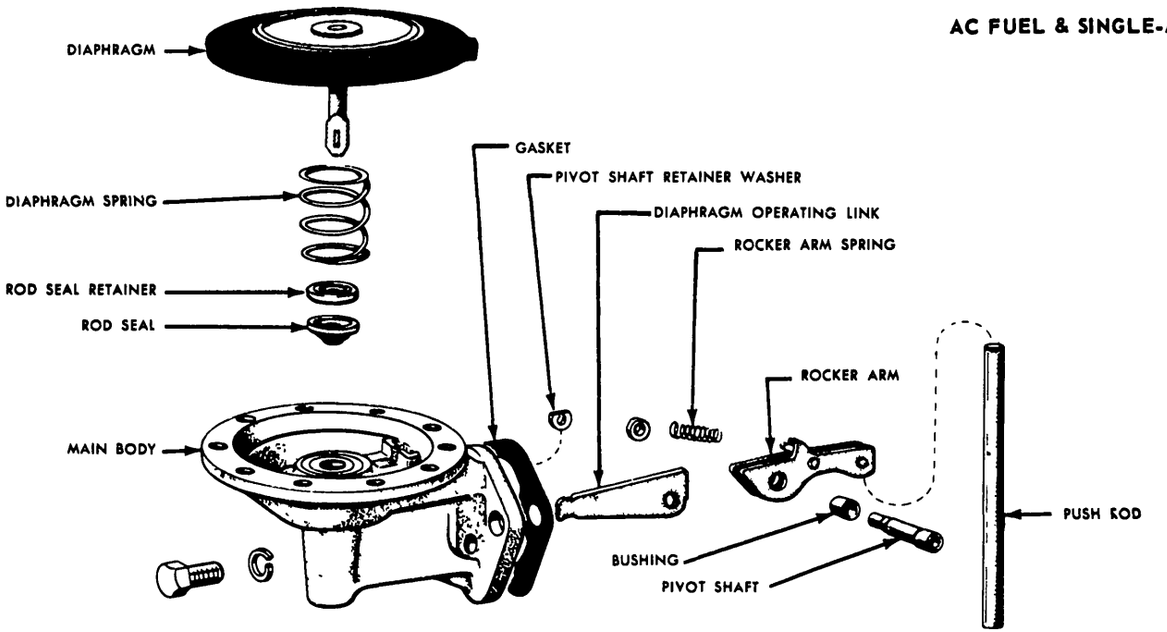


AC FUEL & DOUBLE-ACTING VACUUM PUMP (WITH FUEL PUMP PULSATOR)





AC FUEL & SINGLE-ACTING VACUUM PUMP



AC FUEL PUMP (WITH PULSATOR)

AC FUEL PUMPS (Cont.)

FUEL PUMP TROUBLE SHOOTING

TROUBLE SHOOTING: If the pump action is not satisfactory, check in accordance with the following:

No Fuel or Insufficient Fuel at Carburetor:

(1) Gasoline tank empty.
(2) Plugged fuel line. (Disconnect line at tank and blow out line from pump end, otherwise dirt will be blown back into tank).
(3) Bent, kinked, leaky tubing or connections. Tighten all connections. Check condition of tubing. Replace if necessary.
(4) Clogged filter screen or leaky cork bowl gasket in pump. Remove bowl or sediment chamber cover and remove screen. Always use a new cork gasket when bowl or sediment chamber cover is removed. A leaky gasket will cause loss of pump vacuum.
(5) Dirty or warped valve, broken valve springs, or loose valve cages. Remove pump for inspection.
(6) Worn pump linkage, which cuts down pump pressure and capacity. (Check capacity and pressure).

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AC FUEL PUMPS (C nt.)

Fuel Leakage through Vent in Pump Body:

(1) Worn or punctured diaphragm. Replace diaphragm.

(2) On early models a loose diaphragm nut or gasket on pull rod will cause leakage.

Carburetor Flooding:

(1) Carburetor needle valve not seating. Check for worn valve or seat, sediment or other obstruction preventing seating of valve, or wrong needle valve and seat assembly. Check float level.

(2) Excessive pump pressure. Check pressure. Too high pump pressure can be caused by wrong diaphragm driving spring (too strong).

VACUUM PUMP TESTING

CHECKING WITH VACUUM GAUGE: Due to the strength of the spring used in the vacuum pump unit, it is not practical to check the pump off the engine.

(a) Disconnect both inlet and outlet lines at pump.

(b) Attach vacuum gauge to inlet port (side attached to wiper line).

(c) Operate engine at equivalent of 20 MPH road speed and the gauge should show 7 to 12 inches of vacuum.

(d) If less than 7 inches of vacuum are produced, the vacuum section of the pump is inoperative.

(e) Always test the vacuum pump with the outlet open because internal pressure due to closing the outlet will damage the mechanism.

CHECKING WITHOUT VACUUM GAUGE:

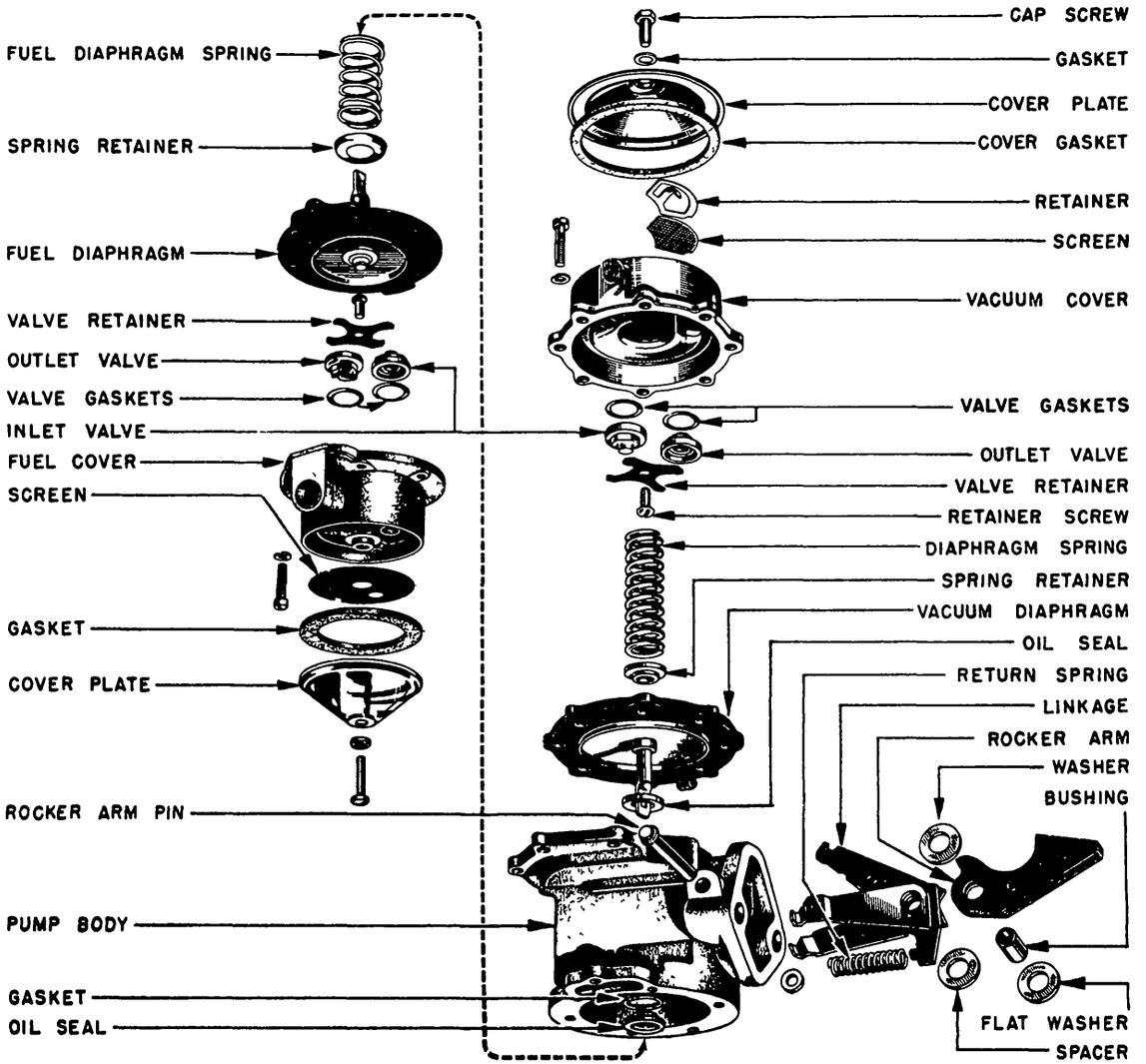
(a) Disconnect manifold line from pump.

(b) Operate engine from idle, through slow acceleration to about 40 MPH.

(c) The wiper should start operating on pump vacuum at about 15 MPH engine speed and reach full speed at about 40 MPH. This indicates the vacuum section is operating correctly.

(d) If wiper does not operate, detach windshield wiper line at pump and join it to the already detached manifold line with a piece of rubber hose.

(e) SLOWLY operate engine from idle to about 25 MPH and the wiper should run at full speed, operating on the engine vacuum only. If it does not, the wiper motor or tubing is defective. The pump vacuum section is inoperative if the windshield wiper operates on engine vacuum, but not on pump vacuum.



AC FUEL & SINGLE-ACTING VACUUM PUMP

VACUUM PUMP TROUBLE SHOOTING

Excessive Oil Consumption: May be caused by a punctured vacuum pump diaphragm. The intake manifold line will suck oil through the punctured diaphragm from the linkage housing. Test vacuum pump to determine if pump is operating properly. A check can also be made before removing pump, by disconnecting the line bteween the pump and manifold, operating the pump, and holding a piece of paper over the pump outlet. Oil spray from the pump outlet onto the paper indicates a punctured diaphragm.

Poor Idle Due to Defective Vacuum Pump: In case the diaphragm of the vacuum pump is punctured it will allow air to be sucked in from the crankcase through the diaphragm and into the intake manifold. This will cause the two cylinders (nearest the manifold leg where the vacuum line connects) to miss when idling.

AUTO-LITE MECHANICAL PUMP

DESCRIPTION: The Auto-Lite fuel pump is a mechanically operated diaphragm type pump, driven by a special cam on the engine camshaft. Operating principle is similar to the AC type pumps. Pump has one piece cam lever (rocker arm), one piece diaphragm and pull rod assembly. "Cage type" valves are used and a filter screen is incorporated in the inlet valve unit.

OPERATION: Suction stroke of pump is positive (eccentric on camshaft causes cam lever to pull up on diaphragm assembly), delivery stroke is powered by a spring on diaphragm shaft which is compressed back during suction stroke. Fuel delivery is controlled by a back pressure in the line and, whenever carburetor float needle valve is closed, the diaphragm assembly remains at the end of its stroke with the spring compressed. Under these conditions the cam lever slides up and down on the diaphragm shaft (lever return spring keeps cam lever in contact with eccentric on camshaft).

DISASSEMBLY & INSPECTION: Mark cover and housing to insure correct location when re-assembling pump. Remove all cover screws. Drive the rocker arm pivot pin through the retaining washer with a center punch. Remove washer and drive pin back to its original position. Remove burrs from pin and drive pin out. With the pin out the rocker arm, arm spring and pad can be removed. Diaphragm can now be removed from the housing. Inspect lever housing for cracks, make sure housing diaphragm flanges are smooth and flat. Inspect diaphragm for cracks around screw holes. Inspect pull rod oil seal and examine rubber carefully by pinching with fingers to determine if it is cracked or punctured. Inspect rocker arm pin for wear and for snug fit in housing. A loose fitting pin will cause an oil leak at that point.

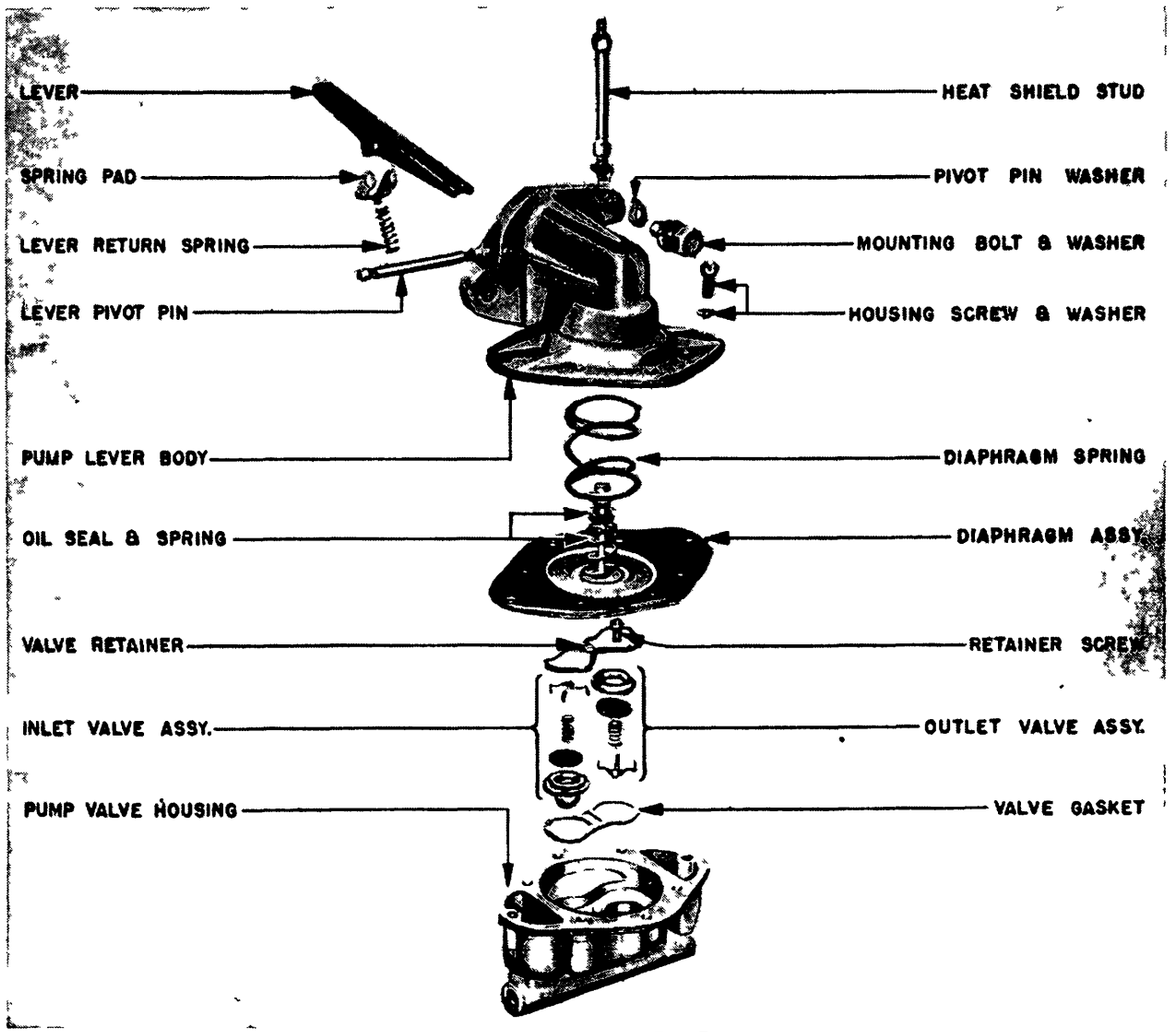
Installing New Diaphragm: Hold diaphragm assembly and diaphragm spring in position in the housing with oil seal and seal spring properly placed. Insert lever and lever spring pad, install a loose dummy pin through lever and housing as a guide to hold parts in place. Drive in new pin, install washer and stake end of pin. Install lever return spring.

Valves: Remove and clean valves in gasoline and allow to dry. **Do not blow off valves with air.** Inspect valve seats and discs. These should be smooth and flat. Inspect valve disc springs for good seating of the discs. When installing valves use new gaskets. The inlet valve screen should be down and be on the "in" side of the housing. The outlet valve should be installed with the spring and disc down. Install valve retainer. Be sure retainer is bearing on both sides of each valve.

REASSEMBLY: Install valve housing in place on lever housing so that the untapped hole in the valve housing lines up with the tapped hole in the lever housing directly under the lever. Install flange screws loose. Mount pump in vise and press rocker arm down beyond normal stroke and tighten all screws.

CAPACITY TEST: Install pump on engine, connect fuel lines. Install a Tee connection in fuel line at the carburetor and connect a line to the Tee. Install a #44 carburetor float seat orifice on the end of the line with a shut-off valve between the Tee and the orifice. Start the engine and operate at idle speed. Open the shut-off valve and measure the amount of fuel which flows from the orifice in a quart measure. If the amount of fuel is 1½ pints or more in one minute the pump capacity is sufficient.

PRESSURE TEST: Connect a pressure gauge to Tee, operate engine at idle. Pressure should be 3 to 5 pounds. Repeat test at 40 MPH speed. If pressure is low use a stiffer diaphragm spring. If pressure is high, remove pump and loosen all diaphragm cover screws and press operating lever beyond normal stroke and retighten screws. If pressure is still too high, disassemble pump and install a weaker diaphragm spring.



AUTO-LITE FUEL PUMP

CARTER MECHANICAL FUEL PUMP
COMBINATION (FUEL & VACUUM) & SINGLE (FUEL) PUMPS

DESCRIPTION: Mechanically operated, diaphragm type fuel pump driven by engine camshaft through an eccentric cam lever. Vacuum pumps used in combination with these fuel pumps are either diaphragm or piston type operated by the same eccentric lever used to operate fuel pump. Valve assemblies used in some units are enclosed in pump body and are not replaceable.

TESTING: Fuel Pump – Connect a tee in fuel line at carburetor for use when making following tests.

Capacity: Connect a short piece of hose to tee in fuel line, then operate engine at 500 RPM allowing fuel to flow into a container. Pump should fill one quart measure in one minute or less.

Pressure: Connect pressure gauge to tee in fuel line. With engine operating at 500 RPM, pressure should be 3½–5 lbs.

Vacuum: Disconnect fuel line from inlet side of pump and connect vacuum gauge at pump inlet connection. Vacuum should be 10" (minimum) at 500 RPM engine speed.

TESTING: Vacuum Pump – Disconnect line to vacuum pump at intake manifold and plug the opening in manifold. With engine running, windshield wipers should operate (wipers may slow down slightly but not stop).

OVERHAUL: Disassembly – File an index mark on fuel and vacuum valve housings and on pump body, then proceed as follows:

Fuel Pump – *NOTE – If combination-type pump, disassemble vacuum unit before disassembling fuel pump (see below).* Remove pivot pin plug with Tool T109–211 or T109–43, then remove eccentric lever spring. Remove pivot pin and disengage eccentric lever from diaphragm pull rod. Remove valve body-to-housing screws, then separate body and housing and lift out diaphragm and pull rod assembly.

Vacuum Unit (Diaphragm Type) – Remove vacuum valve body-to-pump housing screws and remove valve body and diaphragm spring. Take out diaphragm assembly, then remove breather vent filter, plate, retainer, and diaphragm shaft oil seal.

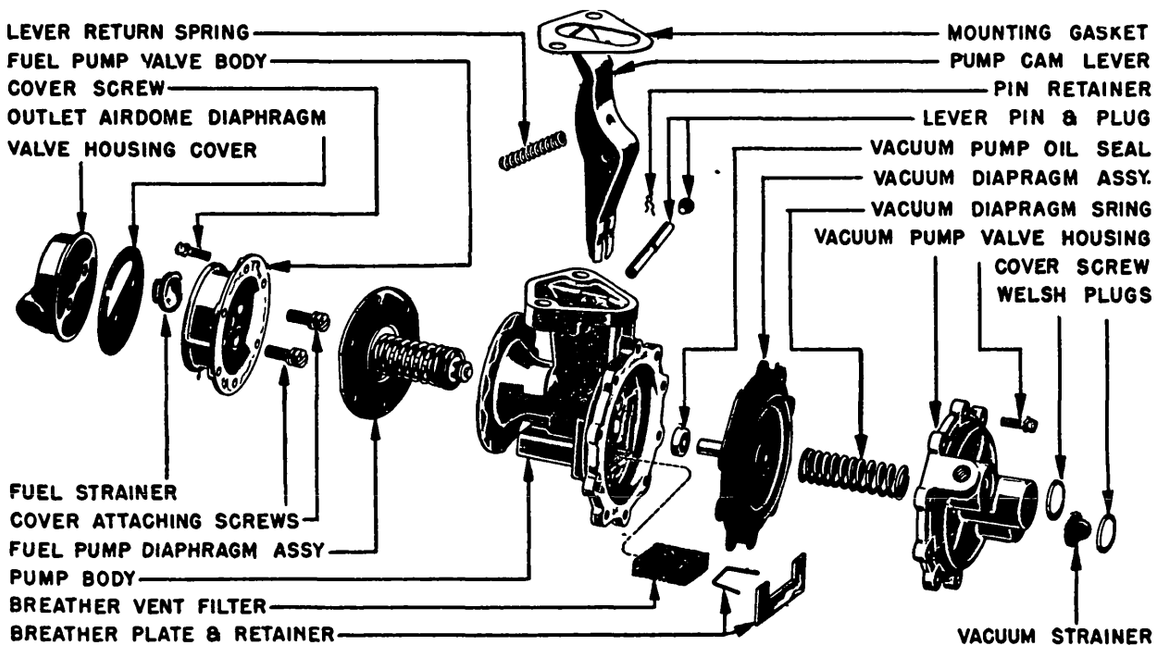
Vacuum Unit (Piston Type) – Remove vacuum valve body-to-pump housing screws and remove valve body, gasket and piston return spring. Operate eccentric lever until piston is as high in cylinder as possible, then grasp nut in center of piston and turn piston slightly while pulling upward. *NOTE – Some engine oil may be found on both sides of piston and in cylinder and valve housing. This is normal as some oil is admitted for lubrication.*

Reassembly: Reverse disassembly procedure and note the following:

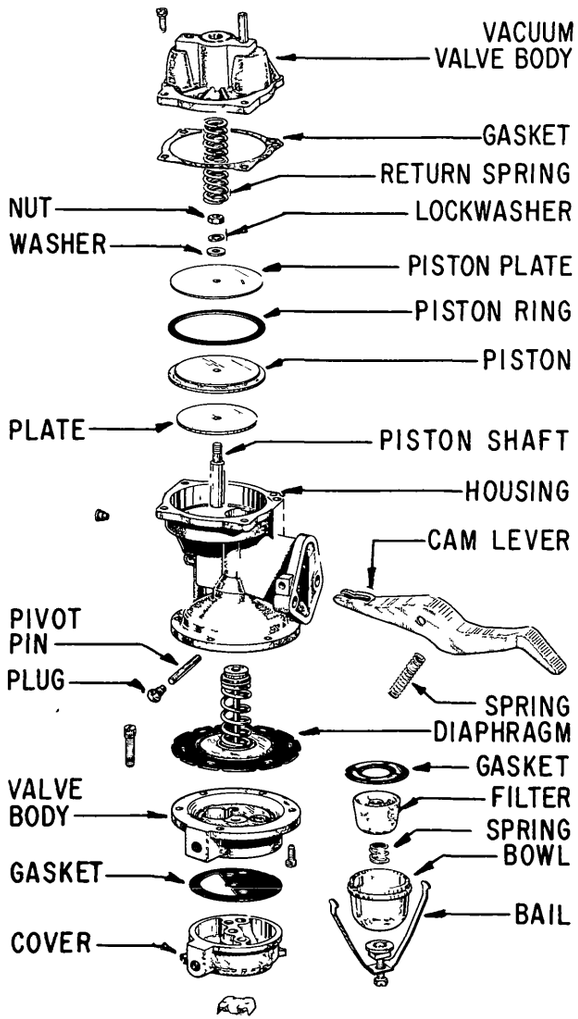
All Units – Align marks made at disassembly to insure correct relationship of valve bodies and housings. Lubricate eccentric arm at point of contact with diashaft and lubricate diaphragm shaft oil seals.

Vacuum Unit (Diaphragm Type) – Use Diaphragm Flexing Tool, T109–192 to hold diaphragm flexed at end of stroke while tightening screws around flange.

Vacuum Unit (Piston Type) – To replace rubber piston ring, do not disassemble piston. Slip old ring off and the new one into place, stretching the ring just enough to slip it over the piston plates. To install piston and ring assembly into cylinder, use a piece of thin feeler stock to work ring into piston.



CARTER COMBINATION FUEL & VACUUM PUMP
(SINGLE FUEL PUMP SIMILAR)



CARTER PISTON TYPE
(FUEL & VACUUM PUMP)

AC TYPES

DESCRIPTION: AC Electric Gasoline Gauge is of the balanced coil type and consists of two units, a dash unit or recording gauge and a tank unit or measuring device mounted on top of the gasoline tank. The dash unit mounted on the instrument panel consists of two coils mounted at an angle of 90 degrees. The gauge pointer is attached to an armature which is pivoted at the intersection of the coil axes. The dash unit is connected to the coil side of the ignition switch and to the tank unit through insulated wires. The dash unit is grounded through the mounting screws to the instrument board and car frame.

Tank Unit:—Gearless type with integral float arm and contactor arm (rheostat ground brush). Float arm is pivoted in lower end of tank unit case so that movement of the arm (with the rise and fall of the float in the tank) causes the upper end of the arm to sweep across the tank unit resistance coil. Except for this float arm construction and separately mounted fuel outlet pipe (some models), all types are similar. NOTE—On first type gauges, float mechanism in tank unit is 'geared' type with float arm clamped to gear pivoted on tank unit bracket so as to mesh with gear on contactor operating shaft. Both types of gauges operate in the same manner.

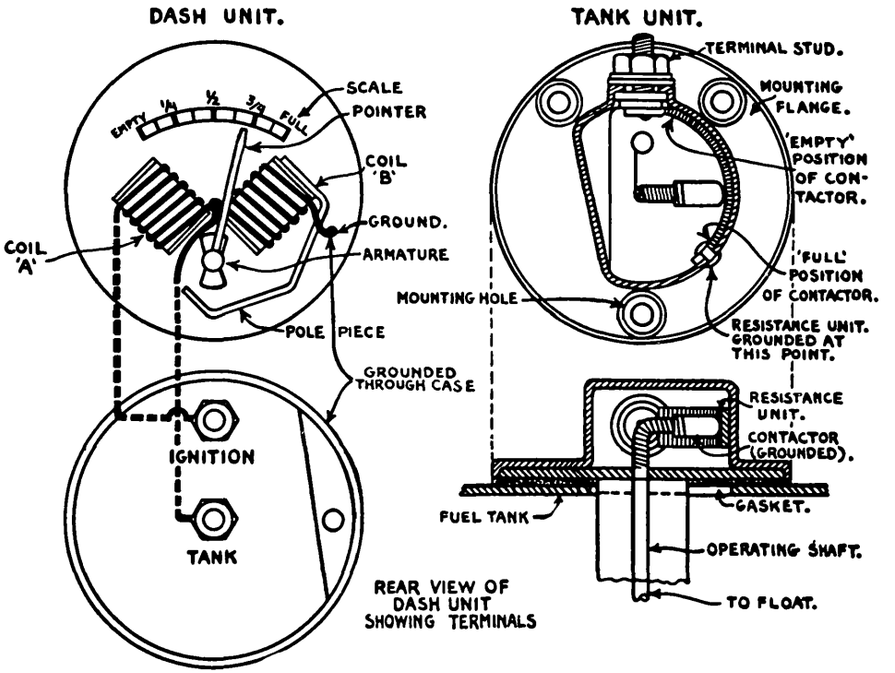
OPERATION: The upper terminal of dash unit marked "Ignition" is connected to the coil side of the ignition switch (or to the 'auxiliary' terminal of lock switch coils) so that the gauge is operative whenever the ignition switch is turned on. Current flows through coil 'A' of the dash unit to the center terminal marked 'Tank'. The second coil 'B' is connected to this terminal. The other end of this coil winding is grounded to the gauge case. The 'Tank' terminal of the gauge is connected to the terminal on the tank unit and circuit is completed to ground through the tank unit resistance winding. This resistance winding in the tank unit is grounded through the movable contactor so that the resistance is cut in or out of the dash unit coil circuits as the float rises and falls with the gasoline level in the tank.

INSTALLATION: Both dash unit and tank unit are grounded and care must be taken whenever the units are installed or replaced that a ground is provided. On the tank unit it will be sufficient to remove paint and carefully clean the tank under the tank unit flange.

TROUBLE SHOOTING: Defective units should be replaced and service operations will be confined to locating trouble in dash unit or tank unit. Check gauge operation from following table:

1. **Pointer does not move when ignition is turned 'on'.**
   The line from the ignition switch to the dash unit is open. Check connections and supply new lead from switch to 'IGN' terminal on gauge.
2. **Gauge indicates 'Full' at all times.**
   The line between dash unit and tank unit is open. Check connections and replace line with insulated wire.
   Tank unit burned out. Replace tank unit.
   Tank unit not grounded. Check by supplying new ground from tank unit to car frame.
3. **Gaug indicates 'Empty' at all times.**
   Wires reversed on dash unit. See that connections are made as indicated above on diagram.
   Dash unit is not grounded. See that dash unit is properly grounded. Check by supplying special test ground to car frame. If dash unit does not register correctly, it must be replaced.

SERVICING:—No service operations required other than to see that wires are properly connected and terminals are tight. Defective units (as determined by tests given below) should be replaced.



AC GASOLINE GAUGE TESTING

NOTE: Manufacturer recommends that AC Gas Gauge Tester, Part 1516000, or HMO-204 be used to make tests. Tester similar to gas gauge Tank Unit equipped with test leads and an operating handle by which the resistance can be cut in and out of the gauge circuit in a similar manner to the operation of the tank unit on the car.

TESTING: Make the following tests in order given which will completely check all gas gauge units and wiring.

DASH UNIT

With ignition switch 'off', disconnect tank wire at terminal on back of dash unit, connect RED tester lead to this terminal, ground BLACK tester lead to frame. Turn ignition switch 'on', move Tester arm up and down. Gas gauge dash unit should register 'Full' and 'Empty'. If operation is O.K., disconnect tester and reconnect tank wire. If dash unit pointer does not register correctly, check feed wire by connecting 6 volt test lamp between dash unit Ignition Terminal (second terminal on back of dash unit) and ground. If test lamp does not light, circuit from ignition switch is defective and ignition switch and connecting wire should be checked or replaced. If lamp lights (gauge circuit O.K.) and dash unit does not operate, replace dash unit and reconnect wires.

GAUGE WIRING

Disconnect tank unit wire at nearest point to tank unit (bayonet type snap connector or junction block). Attach Red tester lead to wire running back to dash unit, ground BLACK tester lead to the car frame. Turn ignition 'on'. Move tester arm up and down and watch dash unit pointer which should move from 'Empty' to 'Full'. If dash unit reads 'Empty' at all times, or if reading is lower than when dash unit tested alone (dash unit test above), check wire for shorts or leaks (broken insulation, short junction block terminals, un-insulated connectors touching body or frame, etc.). If dash unit reads above 'Full' at all times, or if reading is higher than when dash unit tested alone, check wire for open-circuits (break in wire, loose connections, corroded terminals, etc.). If dash unit and wire tests O.K., check tank unit.

TANK UNIT

Remove tank unit, clean tank unit terminal and mounting flange thoroughly, connect tank unit to wire running to dash unit, ground tank unit by connecting jumper wire from tank unit mounting flange to car frame. Turn ignition 'on'. Move tank unit float arm up and down. Dash unit pointer should move from 'Empty' to 'Full'. If dash unit reading indicates tank unit defective, replace tank unit. Always check tank units before installing in tank and make certain that float arm is free (check for freedom of movement by noting that float arm falls back to empty position when released in various positions). See that gasoline tank and tank unit mounting flange are clean (tank unit grounded to frame through tank) and that a good ground contact exists between tank and frame.

AUTOLITE "TWO-WIRE" TYPE

► CAUTIONS

►*IMPORTANT SERVICE NOTE:* Three dash unit types have been used as described below and special precautions must be observed when tightening connections at dash unit terminals on each model. Excessive tightening will loosen terminal stud and destroy the accuracy of the gauge requiring replacement of the dash unit (see also Calibration Adjustment below).

First Type Dash Unit - No identification marks. No terminals staked to prevent turning. Use great care when tightening connections, particularly at "IGN.SW" terminal.

Second Type - May be identified by radio resistor terminal at top of gauge between "1" and "2" terminals and use of round insulating washers on each of these terminals. The "IGN.SW." terminal is staked to prevent turning. Other terminals are not staked.

Latest Type - May be identified by radio resistor terminal and insulating strip extending across between "1" and "2" terminals (replaces individual insulating washers used on other types). All three terminals staked to prevent turning.

DESCRIPTION: Gauge consists of a bimetal or thermostatic arm dash unit and a rheostat type tank unit connected together by two wires.

Dash Unit - Pointer actuated by the two bimetal arms on which heating coils are wound (these arms hinged at upper end with lugs to engage pointer at lower end). The two outer bimetal arms (without heating coils) compensate the dash unit for temperature changes (left hand arm controls dash unit contacts, right hand arm has insulated stop at each side to limit motion in each direction) and the contacts compensate for battery voltage variations (remain closed at 5 volts or less, open and close at voltages above 5 volts to maintain constant gauge input). The circuit through the dash unit is from the "IGN.SW". terminal through the contacts and then through each heating coil to terminals "1" and "2".

Tank Unit - Consists of a resistance coil wound on a flat form and connected between the two tank unit terminals. Contact arm is grounded and circuit from each terminal is through the resistance to ground at the contact arm. Contact arm is mounted on the float lever and moves across the resistance as the float rises and falls so that resistance is cut out of one dash unit heating coil circuit and in on the other heating coil circuit with this movement

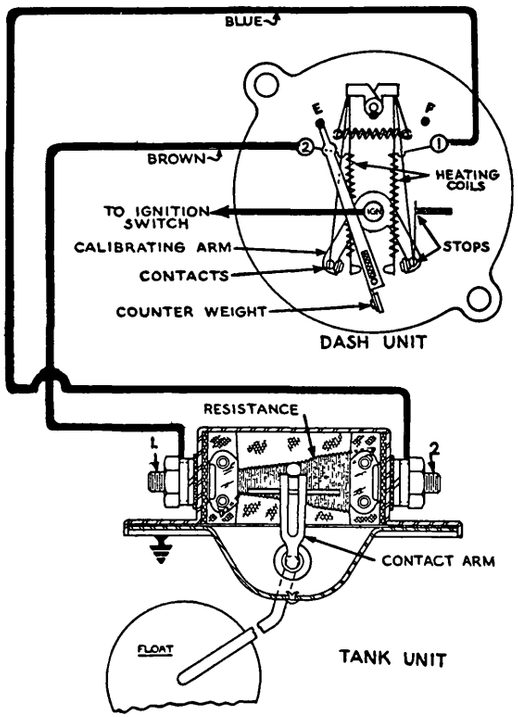
OPERATION: When ignition switch is turned on, current flow through heating coil on each bimetal arm in the dash unit depends on contact arm position in tank unit (contact arm controls amount of resistance in each heater coil circuit) and the unequal current flow through each coil causes an unequal deflection of the bimetal arms so that the pointer is moved on the scale. Any change in the position of the tank unit contact arm (caused by float movement) causes a like change in the bimetal arm deflection and pointer reading of the dash unit. When voltage at gauge exceeds 5 volts, or if bimetal arms become overheated, contacts open and close to maintain constant input so that readings are accurate regardless of voltage fluctuations (pointer position entirely dependent on division of current between heating coils on bimetal arms as controlled by tank unit. Contact opening and closing is sufficiently rapid so that pointer does not change). External temperature changes (affecting outer unwound bimetal arms) cause a slight rotation of the hinge so that position of inner bimetal arms and pointer remains unchanged. Gauge design results in a lag or damping action so that pointer fluctuations due to fuel tank surges are minimized. When ignition switch is turned off, bimetal arms flex away from pointer which is then returned to the empty position by the counterweight at the lower end.

TESTING: Disconnect leads from No. 1 & No. 2 terminals of dash unit and turn on ignition switch. Any movement of the gauge indicates an internal ground in dash unit. With ignition switch in "ON" position, ground No. 2 terminal, and allow approximately one minute for gauge to complete movement. It should read full. Ground both terminals. Gauge should read ½ full. If gauge does not read correctly remove it for check and adjustment.

If gauge reads correctly reconnect leads to both terminals of dash unit and disconnect leads from tank unit. Gauge should not move. Any reading of the gauge with both wires disconnected indicates a ground in one or both wires. If no reading with wires disconnected, ground No. 2 wire, and proceed with test as given above. Failure to have correct reading indicates open circuit or broken wire. If gauge reads correctly for both tests given above, any misoperation of the system can be attributed to a defective tank unit.

NOTE - Should No. 1 & No. 2 wires be crossed on units, readings will be reversed.

TROUBLE SHOOTING: Erratic or incorrect indications may be caused by a loose connection or ground in the wiring or terminals, while a fluctuating pointer is usually caused by dirty contacts in the dash unit. Sticking pointers may be caused by a bent pointer or frame or by interference between the gauge and panel. Remove the gauge from the panel and inspect for a bent pointer or pointer bearings. Check to see that there is a slight amount of endplay in the pointer shaft and that the pointer turns freely. Clean the contacts by drawing a strip of bond paper between them.



AUTO-LITE "TWO-WIRE" GAUGE WIRIN DIAGRAM

CALIBRATION ADJUSTMENT: If pointer position not correct Empty or Full or if gauge reads inaccurately, dash unit should be calibrated as follows: Remove dash unit from car, connect to tank unit known to be in good condition and to a battery (see illustration for connections). Loosen both nuts on "IGN.SW." terminal (inner nut is staked on later type units) to release calibrating arms. Set tank unit float in Empty position, move left hand calibrating arm (on which stationary contact is mounted) to right to raise pointer reading, or to left to lower pointer reading. Move tank unit float arm to Full position, move right hand calibrating arm to right to raise pointer reading, or to left to lower pointer reading. Recheck gauge at Empty position (setting may be changed by the Full adjustment). Tighten nuts on "IGN.SW" terminal to lock calibrating arms in position using extreme care not to shift arms while tightening inner nut.

►*CAUTION:* When making this adjustment, or when testing dash unit on the bench, unit must be shielded from air currents which might cause unequal cooling of the bimetal arms and affect the gauge reading. Allow 1 minute for bimetal arm heating coils to heat up, after moving tank unit float, before checking dash unit pointer position.

AUTO-LITE "ONE-WIRE" TYPE

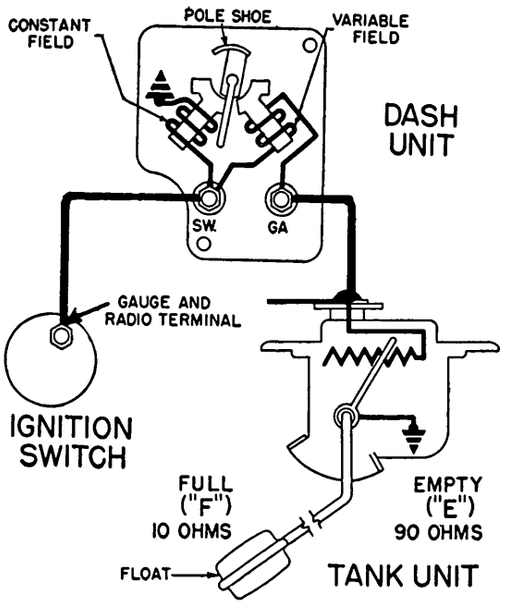
DESCRIPTION: This electro-magnetic fuel gauge has only one wire between the dash unit and tank unit This type gauge responds instantly to any change in fuel level in the tank, and when driving on rough roads or turning sharp curves the needle will fluctuate A radio suppressor is not required for this type gauge, since no contacts are used in the dash unit

TESTING: See diagram for connections All terminals must be clean and electrically tight and both units properly grounded

Dash Unit: Disconnect lead from "GA" terminal With ignition switch "ON" gauge should show empty Ground terminal "GA" Gauge should show full Reconnect lead to "GA" terminal and disconnect lead at tank terminal Repeat above test Failure of gauge to read full with lead grounded indicates open circuit or broken wire

Tank Unit: Connect tank unit (known to be good) or unit removed from tank if none available Ground tank unit, and operate float arm Gauge should read empty to full as arm is operated If gauge does not operate correctly recalibrate dash unit No movement of gauge indicates defective tank unit *NOTE - If constant field winding is open in dash unit, gauge will read full over most of movement of arm*

CALIBRATION (DASH UNIT): Moving the pole shoe toward the armature increases its effect For example, decreasing gap between the armature and variable field pole increases the readings over the entire range, while decreasing the gap at the constant field decreases the indications, and decreasing the gap at the upper pole reduces the amount of pointer movement Proper calibration is obtained by adjusting all three poles to give correct readings over the entire scale



AUTOLITE "ONE-WIRE" GASOLINE GAUGE

KING-SEELEY ELECTRIC TELEGAUGE

DESCRIPTION: This is an electric type gauge using bi-metal arms on which heating coils are wound in both the tank or engine unit "Sender" and the dash unit "Receiver" The two heating coils are connected in series and the gauge circuit is completed to ground through a set of contacts in the Sender unit (one of which is mounted on the bi-metal arm) The feed wire on the Receiver unit is connected to the accessory terminal of the ignition switch so that the gauge registers only with the ignition on

Gasoline, Oil, Water Level - For this purpose the ground contact in the Sender is mounted on a movable arm (arm mounted through diaphragm forming lower cover of Sender unit and flexes diaphragm as it is moved) The lower end of the ground contact arm is actuated by a cam on the upper end of the float rod pivot When the float moves up to follow the gasoline, oil, or water level, the cam moves the arm so that contact pressure and length of time contacts remain closed is increased

OPERATION: When the Sender contacts are closed a current flows through the heating coils of both the Sender and Receiver units This causes the bi-metal arm in the Receiver to bend, moving the pointer, and indicating a reading on the gauge dial At the same time the heating coil in the Sender unit causes its bi-metal arm to bend, opening the contacts and interrupting the current flow When this occurs the heating action stops and the cooling of the bi-metal arm causes it to flex in the opposite direction and again close the contacts In operation, this cycle takes place very rapidly (approximately once each second for the gasoline gauge with tank empty), and a steady reading is obtained on the Receiver dial

TROUBLE SHOOTING: Gasoline, Oil, Water Level Gauges - Manufacturer recommends use of extra or test Sender and Receiver to check operation of units which do not perform satisfactorily Make tests as directed below

Testing Sender: Disconnect lead of Sender unit on car, connect this lead to test Sender and ground this Sender to the car frame Turn on ignition, move Sender float up to "full" position and note reading on Receiver Receiver should read full or "F" after 10-15 seconds time If Receiver reading is correct, check following points before replacing Sender unit

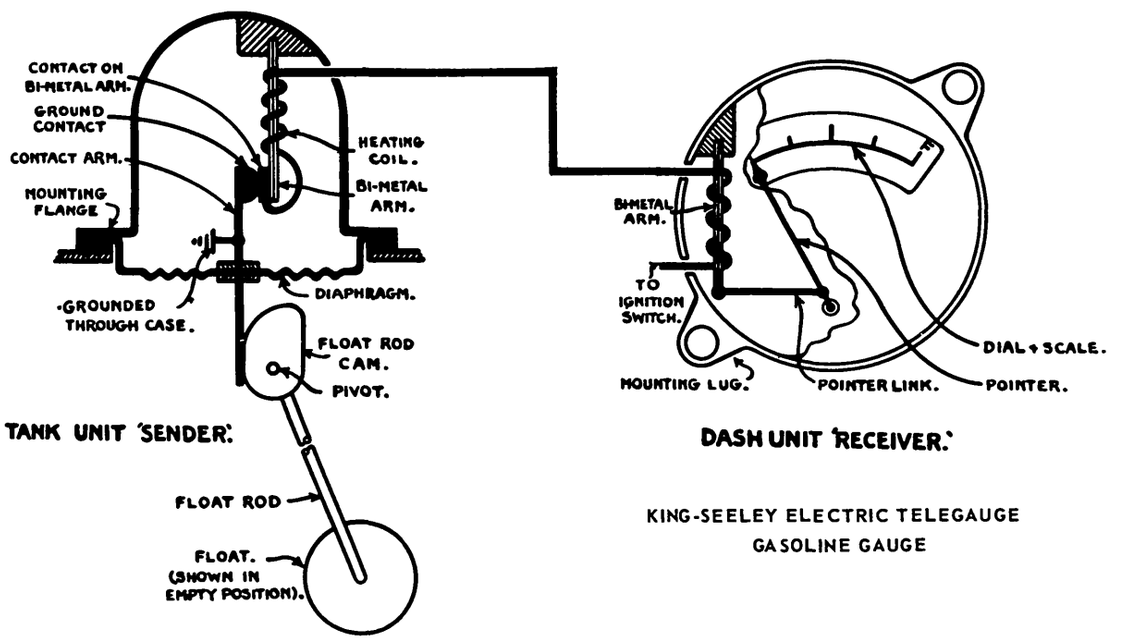
1) Ground. Sender is grounded through case See that all paint and grease are removed under flange and both surfaces make good contact

2) Radio Bypass Condenser Shorted. If bypass condenser is connected at Sender on cars with radio, test for short-circuit by disconnecting condenser and noting gauge operation If gauge is satisfactory, replace condenser Use only condenser of 05 microfarad capacity

NOTE - If reading secured with test Sender is same as that with Sender on car, check wire connecting Sender and Receiver and replace if found to be open-circuited or grounded

Testing Receiver: Disconnect wires on Receiver on car and connect to same terminals on test Receiver Turn on ignition switch and note reading on gauge If test Receiver reading is correct, replace Receiver on car If test Receiver reading is same as Car Receiver, repeat tests on Sender and wiring

SERVICING: No service operations are required other than to see that wires are properly connected and terminals are tight No repair operations are possible and defective Senders and Receivers should be replaced



KING-SEELEY ELECTRIC TELEGAUGE
GASOLINE GAUGE

KING-SEELEY "CV" TYPE ELECTRIC TELEGAUGE

DESCRIPTION & OPERATION: King-Seeley "CV" or constant-voltage gauges differ from previous types in that the tank unit (sender) consists of a variable resistance (rheostat) which regulates the current in the heating coil of the receiver (dash unit) and controls the deflection of the bi-metal arm linked to the gauge pointer. All dash units are of similar design. The feature of these gauges is the "Gauge Voltage Regulator" which regulates input voltage in the gauge circuits and insures accurate gauge readings regardless of the line voltage fluctuations.

Gauge Voltage Regulator: Consists of a vibrating unit (contacts controlled by bi-metal arm on which a heater winder is located), connected in the line between the ignition switch and the gauge. Regulator produces a pulsating voltage, at an effective constant amperage value, of 5.0 volts for all normal input voltage variations (between 5.6 and 8.0 volts). Input voltages lower than 5.0 volts will result in proportionately lower gauge readings while voltages greater than 8.0 volts will not affect gauge accuracy but will overload regulator contacts and may cause premature wear. Regulator is temperature compensated and is intended to be mounted near the gauge dash unit and at the same ambient temperature.

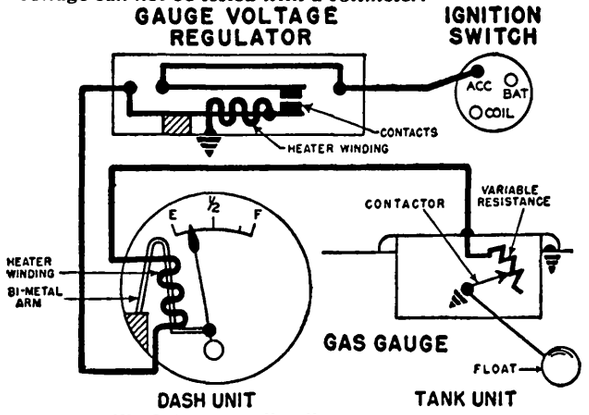
Gauge Indicator (Dash Unit): Gauge pointer is linked to a bi-metal arm on which a heater coil is wound. This coil is connected in series with the tank rheostat so that the gauge reading is in proportion to the current in the circuit.

Fuel Tank Gauge Unit: The rheostat contactor acts as a ground for the gauge circuit and is linked to the gauge float so that it sweeps across the resistance as the float follows the level of fuel in tank. When tank is empty, entire resistance is in gauge circuit and current is at a minimum. When float rises as tank is filled, resistance is cut out of gauge circuit and the increase in current causes dash unit to read higher.

TROUBLE SHOOTING: Units should not be removed from car until testing has been done to determine which unit is defective. See Testing (following).

Gauge Reads Too High or Too Low—Gauge regulator defective (see Voltage Regulator below) or not properly grounded (regulator must be grounded). Battery voltage at regulator (or ignition switch) below 5.0 volts (check with voltmeter).

CAUTION—Gauge Voltage Regulator provides an intermittent voltage averaging 5.0 volts and regulator output voltage can not be tested with a voltmeter.



KING-SEELEY "CV" GASOLINE GAUGE

TESTING: Use a Fuel Level Gauge Tank Unit that is known to be OK, as a test unit. Connect one test lead to terminal on tank unit and a second lead to gauge case to act as a ground. (Gauge will not operate if not properly grounded.) Make test as follows.

Voltage Regulator: Requires use of an OK dash unit also. Connect these test units together in normal manner and ground tank unit. Connect the other dash unit terminal to the output terminal of voltage regulator. Check battery voltage (must be within operating limits). Hold tank unit float in EMPTY position, turn on ignition switch, note reading on test dash unit (should read EMPTY). Start engine and run at faster than normal idle speed. Gauge reading should not change if voltage regulator functioning normally. Move tank unit float to FULL position. Dash unit gauge should read FULL. If voltage regulator not operating correctly, replace unit.

Gauge Unit: Disconnect lead at tank unit on car and hook test unit in circuit at this point. (Make certain test unit is grounded). Move test unit float to EMPTY position, turn on ignition switch, note dash unit reading (gauge pointer should be at lower end of scale). Move float to FULL position, gauge pointer should then be at upper end of scale. If dash unit reads OK in both positions, replace original tank unit with correct type unit. If dash unit does not test OK, connect test unit directly to terminal on dash unit (eliminating the car wire). If dash unit then tests OK, check lead between dash unit and tank for broken wire or shorted wire. If dash unit still does not function normally, replace original dash unit with correct type unit.

REPAIRING UNIT: Repair or calibration of units is not practical in the field and defective units should be replaced.

STEWART GASOLINE GAUGE

DESCRIPTION: This electric gauge is of the "balanced" coil type and consists of a dash unit or recording device and a tank unit or measuring device. The two units are connected by an insulated wire and each unit is grounded. The feed wire on the dash unit is connected to the accessory terminal of the ignition switch (or coil side of switch) so that the gauge is operative only with the ignition turned "on".

OPERATION: The two coils in dash unit are connected in parallel to the switch terminal (1) on the gauge case. Coil (A) is grounded to the gauge case so that the current flow through this coil is constant. The other end of coil (B) is connected to the tank terminal on the gauge case so that the coil is in series with the resistance unit in the tank unit. The resistance unit is grounded through the contactor on the upper end of the gasoline tank float rod so that the resistance is cut in or out of the coil (B) circuit as the float rises and falls.

MOUNTING: Both the dash unit and tank unit are grounded through the case and a good ground must be provided when they are mounted on the car. Remove all paint and grease from under the mounting flange.

TANK UNIT NOTE: Tank units furnished in both gear type (for tanks greater than 12" in depth or where baffles prevent installation of lever type) and Lever Type (for tanks of 12" depth or less). Tank units furnished with floats not attached to arm and should be installed as follows:

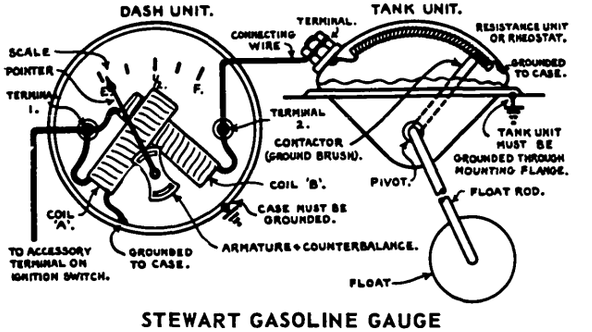
Gear Type - Travel limited to 52½° above and below horizontal position of arm. When installing, cut off float arm to correct length required for depth of tank and solder float on arm in horizontal position.

Lever Type - Furnished with float arm 12" long. Cut off float arm to correct length and solder float on arm at right angles to arm and with long diameter of float horizontal.

TROUBLE SHOOTING: If gauge operation not satisfactory, make following tests:

GAUGE READS "FULL" AT ALL TIMES

1) Lead between dash unit and tank unit is grounded.



STEWART GASOLINE GAUGE

Check by disconnecting lead at each end and substituting a test jumper wire. If gauge operates correctly, replace lead.

2) Connections on dash unit reversed. Reverse wires and note performance.

3) Coil (A) in dash unit open-circuited. To check, disconnect tank unit lead on dash unit momentarily. Pointer should move to "Empty" end of scale. This coil should draw .13 ampere at 6.0 volts (between switch terminal on dash unit and ground on case with tank unit lead disconnected).

4) Resistance unit in tank unit short-circuited. Check with voltmeter and battery between tank unit terminal and ground on case with dash unit lead disconnected. Resistance of unit should be 110 ohms.

GAUGE READS "EMPTY" AT ALL TIMES

1) Dash unit not grounded. Examine ground contact or run extra ground lead from case to car frame.

2) Open-circuit between dash unit and tank unit. Check by connecting jumper wire between terminals on units and noting gauge performance.

GAUGE READING INACCURATE

Mechanical defect in dash unit or tank such as tight pivot bearings, armature counterbalance binding or incorrectly positioned, bent dial pointer or bent float rod.

SERVICING: Replace all defective dash units and tank units.

1960 CHRYSLER CORP. ELECTRIC TYPE

►CHANGES, CAUTIONS, CORRECTIONS

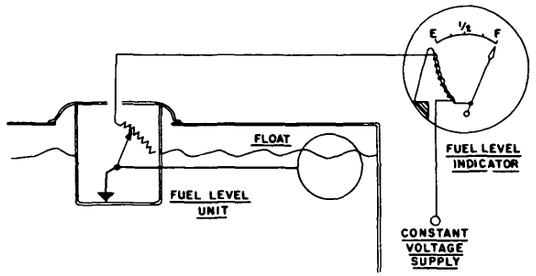
►*1960-61 CHRYSLER & IMPERIAL INACCURATE TEMPERATURE INDICATOR READING CORRECTION (AIR COND. CARS):* May be caused by temperature indicator sending unit grounding on air conditioning compressor. To correct, install special Air Conditioned Car Temperature Indicator Sending Unit, Part No. 2256302.

►*1960-61 CHRYSLER & IMPERIAL INACCURATE FUEL GAUGE READING CORRECTION:* If desh unit, tank unit, and wiring are in good condition, trouble may be caused by high resistance between fuel tank and car body. To correct, install Fuel Tank Grounding Clip, Part No. 2258412, over rubber hose connector of fuel supply line at tank gauge unit. This clip installed in production on 1961 models.

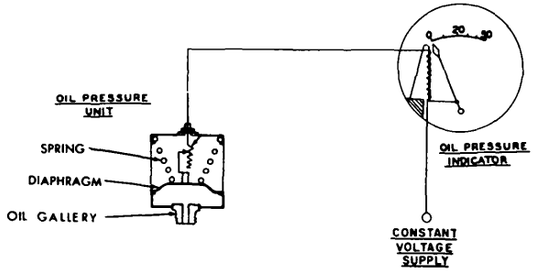
►*1960 CHRYSLER GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE & OIL PRESSURE GAUGE INSTALLATION CAUTION:* External type gauge voltage regulator mounted on speedometer case beginning Serial No. 03148732 with Prefixes 81, 82, 83, 84, 85, 87. New type oil pressure gauge without internal voltage regulator also used. In case of oil pressure gauge failure on later cars, early type gauge, Part No. 2258138, may be installed if short auxiliary wiring to external voltage regulator is removed and instrument panel wiring connected directly to oil pressure gauge.

►*1960 DE SOTO FUEL GAUGE RADIO CONDENSER CAUTION:* A .5 mfd. condenser is installed on fuel gauge on radio equipped cars to suppress rapid clicking noise in radio caused by gauge voltage regulator in fuel gauge. When installing condenser, ground negative side of condenser to fuel gauge and install positive lead at ignition terminal of gauge with a pal nut to allow gauge wiring connection to be installed properly.

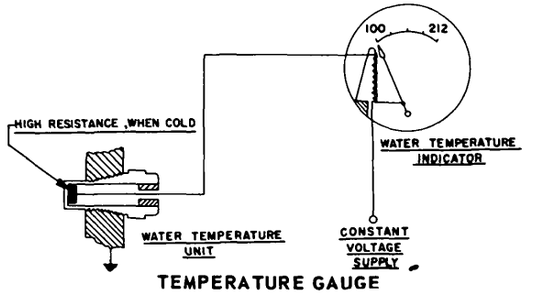
DESCRIPTION: Thermal type, constant voltage units operated by variable resistance type sending units which are sensitive to fuel level, engine temperature, and engine oil pressure. Constant voltage is supplied by a Constant Voltage Regulator built into one of the dash units (except some Chrysler cars – see "Production Change" above) and connected in series to each gauge which provides the same regulator voltage to each gauge regardless of line voltage fluctuations. *See individual Car Model pages for gauge application, part numbers, and to determine which gauge has the internal voltage regulator.* The gauge with the internal constant voltage regulator also may be identified by three terminals marked "A" (output voltage from regulator), "I" (input voltage to regulator), and "S" (connection to gauge sending unit). Other gauges have only "A" and "S" terminals. *NOTE – On Chrysler and Imperial cars with Panelescent Instrument lighting, there is an additional terminal on each gauge for lighting connection.*



GASOLINE GAUGE



OIL PRESSURE GAUGE



TEMPERATURE GAUGE

►*GAUGE TESTER NOTE:* A special Gauge Tester, Tool C-3826, is available for testing gauge dash and sending unit. Procedures for use of tester are detailed below.

►*TESTING CAUTION: DO NOT ground tank or engine sending unit or wire as dash unit will be damaged.*

ALL GAUGES: Trouble – High (against peg), no, or inaccurate reading after ignition switch turned on.

Cause – Defective constant voltage regulator, or open circuit on input side of regulator. Replace dash unit in which regulator is located or correct open circuit in wiring connections.

Testing – Check voltage output at "A" terminal of regulator. Voltage should fluctuate between 0 and 7.0 volts. A steady voltage reading of 12 volts indicates faulty regulator.

FUEL GAUGE: Trouble 1 – Higher or lower fuel level reading than actually exists.

Cause – Defective tank or dash unit. Replace as necessary.

Testing – Connect Tester C-3826 to disconnected tank unit wire and to ground at car body; or connect a known good tank unit to disconnected tank unit wire and to ground at car body. Move tester knob to "L" or tank unit to empty and turn on ignition. Dash gauge unit reading should be "E" to -1/32". With tester knob at "H" or tank unit moved to full, gauge reading should be "F" to +1/32". *NOTE – With tester knob at "M", gauge reading should be Half-way ± 1/16".* If dash unit readings are correct, replace tank unit. If dash unit readings are incorrect, replace dash unit.

Trouble 2: Fuel gauge erratic operation.

Cause – Loose or dirty connections, or faulty tank unit.

Testing – Clean and tighten all connections. Test sending unit (see Trouble 1 above). Make sure tank unit is grounded to tank and tank is grounded to frame. *See "Inaccurate Fuel Gauge Reading Correction" abov for installation of grounding clip.*

TEMPERATURE GAUGE: Trouble 1 – Higher or lower temperature reading than actual engine temperature.

Cause – Defective dash or engine units.

Testing – Connect Tester C-3826 to disconnected sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and ground. Turn on ignition switch and move tester knob to "L" or tank unit to empty. Dash gauge should read "C" ± 1/8". Move tester knob to "H" or tank unit to full. Dash unit should read "H" ± 1/8". *NOTE – With tester knob at "M", dash unit sh uld read Half-way ± 1/8".* If dash unit reads correctly, replace engine unit. If dash unit reads incorrectly, replace dash unit.

OIL PRESSURE GAUGE: Trouble – No or low oil pressure reading.

Cause – Faulty dash or sending unit or engine oiling system.

Testing – Make sure engine oil is at proper level and that engine oiling system is functioning properly *(see Car Model pages for correct oil pressure).* Connect Tester C-3826 to disconnected oil pressure engine sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and to ground. Move tester knob to "L" or tank unit to empty. Dash gauge unit should show no pressure. Move tester knob to "H" or tank unit to full. Dash unit should show high pressure. If dash unit operates correctly, replace engine unit. If dash unit not correct replace dash unit.

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

CHRYSLER, DE SOTO, DODGE PLYMOUTH AUTOMATIC DIMMER

Chrysler & Imperial, All Models (1959-60)
De Soto, All Models (1959-60)
Dodge & Dodge Dart, All Models (1959-60)
Plymouth, All Models (1959-60)

DESCRIPTION: An automatic headlight control unit consisting of a scanner (phototube) mounted on instrument panel and a control unit mounted on left hand side of body behind kick panel. Unit wired through dimmer switch which has override control. A knob on rear of scanner permits sensitivity adjustments by driver for varying road and light conditions.

OPERATION: Light entering scanner generates a current which causes control unit to dim headlights when an oncoming car is approximately 1200 feet away. Upper beams come on within ½ second after car has passed. Foot dimmer switch can override unit and driver can change sensitivity control (see below).

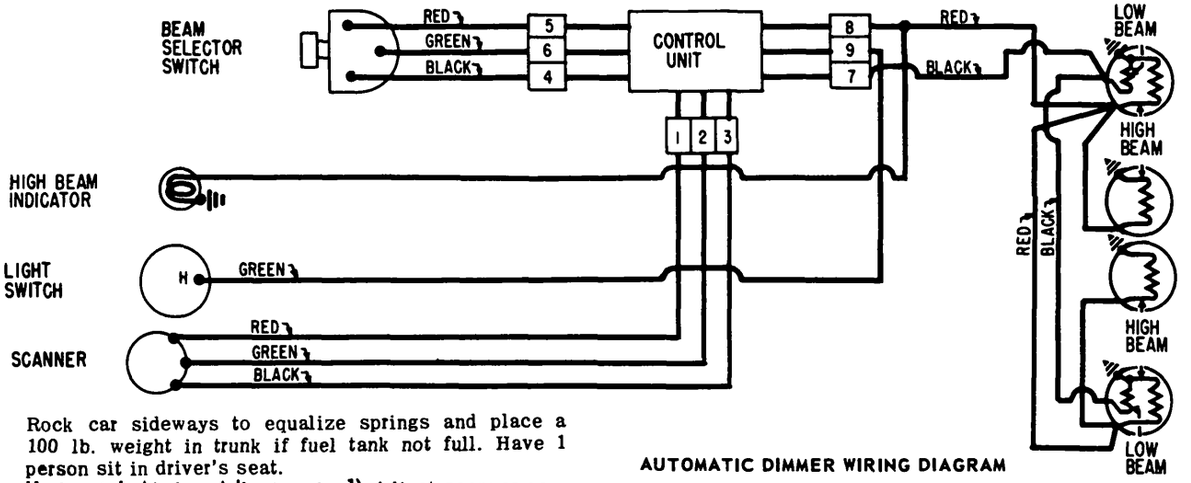
DRIVER ADJUSTMENT: Sensitivity adjusted by a knob at rear of scanner. Center graduation painted red. For initial setting, knob should be at 1 o'clock position for clear glass, at 3 o'clock for tinted glass. If headlights do not change quickly enough, sensitivity is too low; if beams change too quickly, sensitivity is too high. Turn knob clockwise to increase sensitivity, counterclockwise to decrease.

AIMING ADJUSTMENTS: Make adjustments in the order indicated below.

Pre-Aiming Instructions - Place car on level floor, check and adjust front spring height (see "Suspension & Wheel Alignment Section"), check tire inflation (tires must not vary more than 3-5 lbs. from each other). Rock car sideways to equalize springs and place a 100 lb. weight in trunk if fuel tank not full. Have 1 person sit in driver's seat.

Horizontal Aiming Adjustment - 1) Adjust scanner sensitivity knob between 8 and 10 o'clock (depending on light in room), so high beam comes on, but so a flashlight directed straight into scanner from a distance of 5 feet will not change beam. Establish centerline of car. 2) Direct flashlight into scanner from a spot about 5 feet in front and 6 feet to left of car, and walk slowly to right side of car until headlights dim. Mark spot on floor. Reverse procedure, starting from right of car. 3) Center point between two marks made above will be horizontal center of scanner and should be parallel to centerline of car. If scanner aimed to right or left, remove it and its base and ream base attaching holes with 5/32" drill. Remount and recheck alignment.

Vertical Aiming Adjustment - Mount Scanner Aiming Tool C-3697 on top of scanner with adjusting screw towards rear of car. Loosen locking screw in base of scanner to permit scanner to move through its 6° arc. Use floor level finder from Headlight Aiming Tool C-3674 to determine level of floor. Move scanner forward or backward on its base (through arc) so **leading edge** of bubble is in line with "plus" or "minus" reading obtained from aimer kit transit. Tighten locking screw and recheck bubble. If base must be shimmed to obtain alignment, recheck horizontal aiming.



AUTOMATIC DIMMER WIRING DIAGRAM

1954 AUTRONIC EYE

Cadillac (1954)
Chevrolet (1954)
Oldsmobile (1954)
Pontiac (1954)

►CHANGES & CAUTIONS

►*PARTS INTERCHANGEABILITY CAUTION:* 6-Volt and 12-Volt Power Relay and Amplifier Unit assemblies are not interchangeable. When replacing parts be sure proper 6-volt and 12-volt types are used.

►*1954 FUSE ELIMINATION PRODUCTION CHANGE:* 14 ampere fuse used previously in Amplifier Unit no longer used.

►*1954 TESTING EQUIPMENT CHANGE:* AE Tester replaces testing equipment previously used. Testing procedures are greatly simplified. Aiming element replaces Phototube Unit cover for testing purposes.

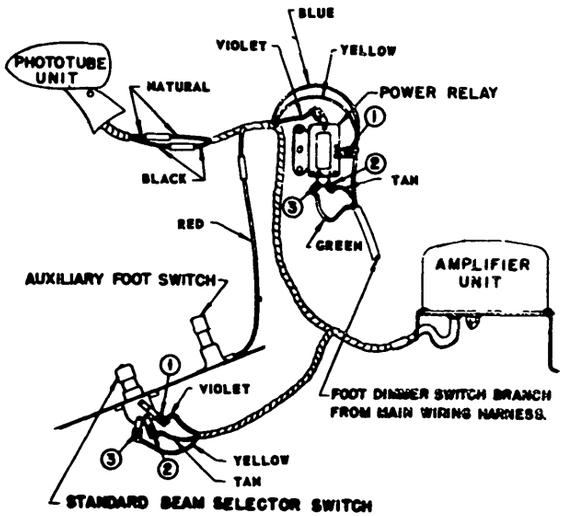
DESCRIPTION: Automatic beam changer consisting of phototube, amplifier, power relay & foot control switch.

ADJUSTMENTS: Proceed in order as follows:

Phototube Aiming: Car unloaded, trunk empty except for spare tire, tires at correct pressure, and gas tank at least half full. Place car on level floor (level within ¼" fore and aft). Rock car to normalize springs. Adjust dial on Aiming Device to number stamped on name plate on bottom side of Phototube Unit. Position Aiming Device on top of Phototube Unit, using care to center it on raised ridge. Then move it to rear until it contacts lens. Adjust Phototube Unit aiming screw until bubble is centered in level. If level floor is not available, perform operations above and mark location of front and rear wheels on floor. Turn car end for end, placing front wheels where rear wheels were, and rear wheels where front wheels were. Readjust aiming dial until bubble is centered in level. Difference in two readings made is twice error in floor level. Adjust aiming dial midway between the two readings and adjust phototube aiming screw until bubble is centered in level again. **NOTE—Phototube must be accurately aimed. If too low, back reflections from car on which Autronic Eye is installed will hold headlamps on lower beam. Also, unit must be aimed as low as possible to allow maximum tolerance for car loading.**

Sensitivity Adjustments: Proceed as follows:

(1) Lower Beam Sensitivity Adjustment—With test lamp in place, turn headlamps "ON" for at least four minutes to allow amplifier to stabilize. On tester, turn zero corrector on face of meter until pointer on zero set line, turn intensity rheostat all the way counter-clock-



AUTRONIC EYE WIRING DIAGRAM

CONTINUED ON NEXT PAGE

1954 AUTRONIC EYE (C ntinued)

wise and selector switch to "DIM" position. *(NOTE–*Be sure to use correct "DIM" position for clear or tinted windshields). Insert Tester connector into cigar lighter receptacle *(CAUTION–*Push straight in). Check car battery voltage. If less than 6 volts (6 volt battery) or 12 volt (12 volt battery), operate engine at fast idle when making sensitivity adjustment. Turn intensity rheostat clockwise slowly just to point where headlamps switch to lower beam. Meter pointer should fall within "DIM" sensitivity adjustment line. If not, adjust rheostat to high side of "DIM" sensitivity adjustment line. Rotate phototube unit sens tivity control counter-clockwise to end of adjustmert with special 1/16" screwdriver provided in Tester. Momentarily switch selector switch to "off" position so headlamps are on upper beam; then turn selector switch to "DIM" position. Carefully and slowly turn phototube unit sensitivity control clockwise just to point where headlamps switch to lower beam. *D n t g beyond this s tting.* Turn intensity rheostat all the way counter-clockwise, momentarily switch selector switch to "off" position and back to "DIM" position. Turn intensity rheostat clockwise slowly just to point where headlamps switch to lower beam. If "DIM" sensitivity has been adjusted correctly, meter pointer should fall within "DIM" sensitivity adjustment line. If not, repeat adjustment beginning with rotation of phototube unit sensitivity control.

(2) Holding Sensitivity Adjustment–Turn on headlamps and wait four minutes to allow amplifier to stabilize. Turn hold control on bottom (outside) of amplifier unit clockwise to end of adjustment (Use small offset screwdriver). Rotate intensity rheostat clockwise to end of adjustment. Turn selector switch to "DIM" momentarily to switch headlamps to lower beam; then switch selector switch to "HOLD" position.*(NOTE–*Be sure to use correct "DIM" position for clear or tinted windshields). Adjust intensity rheostat until meter pointer is in center of the "HOLD" sensitivity adjustment bar on meter scale. Turn "HOLD" control on amplifier counter-clockwise slowly just to point where headlamps switch to upper beam. If headlamps do not switch to upper beam when the "HOLD" control is turned completely counter-clockwise, rotate intensity rheostat counter-clockwise until headlamps switch to upper beam. If meter pointer is within "HOLD" sensitivity adjustment bar, amplifier unit is within tolerance. Again check "HOLD" sensitivity adjustment by rotating intensity rheostat clockwise to end of adjustment. Turn selector switch to "DIM" position momentarily to switch headlamps to lower beam, then turn selector switch to "HOLD" position *(NOTE–*Be sure to use correct "HOLD" position for clear or tinted windshields). Turn intensity rheostat counter-clockwise carefully and slowly just to point where headlamps switch to upper beam. Meter pointer should fall within the "HOLD" sensitivity adjustment bar on meter scale, if adjustment was made correctly. Turn off headlamps, disconnect Tester. Remove test lamp, replace lens, cover and screws.

1955-56 AUTRONIC EYE

Cadillac (1955–56)
Chevrolet (1955–56)
Oldsmobile (1955–56)
Pontiac (1955–56)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 AUTRONIC EYE PRODUCTION CHANGES:* Early in production, several major changes were made in the Autronic Eye. These changes include a completely new wiring circuit, Amplifier and Phototube unit. Alternating instead of direct current is used. "Dim" and "Hold" adjustment knobs are now located on underside of amplifier (1954 and Early 1955 "Dim" adjustment was on phototube unit).

►*1955 ADJUSTMENT CAUTIONS:* Early 1955 "Dim" and "Hold" adjustments are made differently than later 1955 adjustments. *For early 1955 adjustments see "1954 Autronic Eye", later 1955 adjustments, see below. NOTE*–There is a possibility that minor circuit changes were made during the model year. It is suggested that reference be made to printed circuit diagram, located on inside of amplifier cover, before performing any service operations on the autronic eye.

DESCRIPTION: Similar in design and operation to previous models. *See Changes above.*

TESTING: Test for "Hold" Sensitivity and "Dim" Sensitivity are made as follows.

►*NOTE: For early 1955 Autronic Eye Tests, see "1954 Autronic Eye". See Changes, Cautions, Corrections above.*

Hold Sensitivity Test (Later Units): *CAUTION–The "Autronic Eye" develops 800 volts. Turn headlamps "OFF" before removing cover from Phototube unit.*

1) Install Aiming Device AE-4.

2) Turn headlamps "ON" and **wait at least four minutes** for amplifier to stabilize. Set standard foot dimmer switch to "Automatic" position. *(NOTE–*Headlamp switch provides "Automatic" and "Manual" controls. With switch set to "Automatic" upper beam will be on).

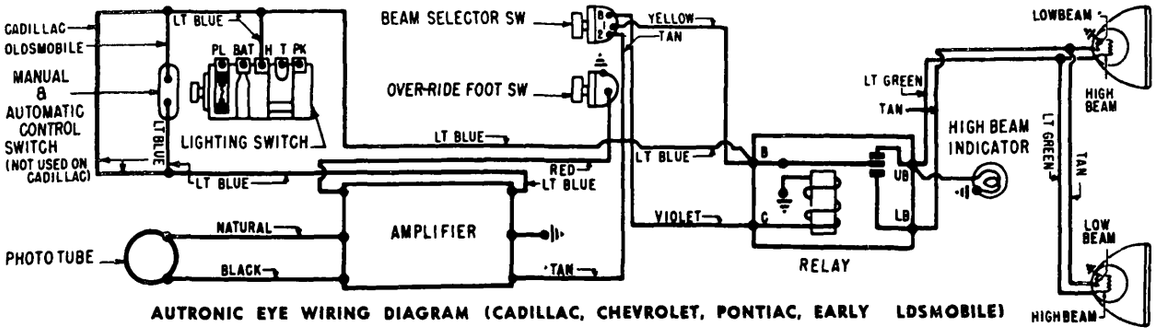
3) Turn Zero Corrector on face of meter until meter pointer is on zero set line. Turn Intensity Rheostat of tester counter-clockwise. Insert tester connector into cigar lighter receptacle. *CAUTION–*Push straight in.

4) Check car battery voltage. If less than 12 volts, operate engine at fast idle while making sensitivity tests and adjustments

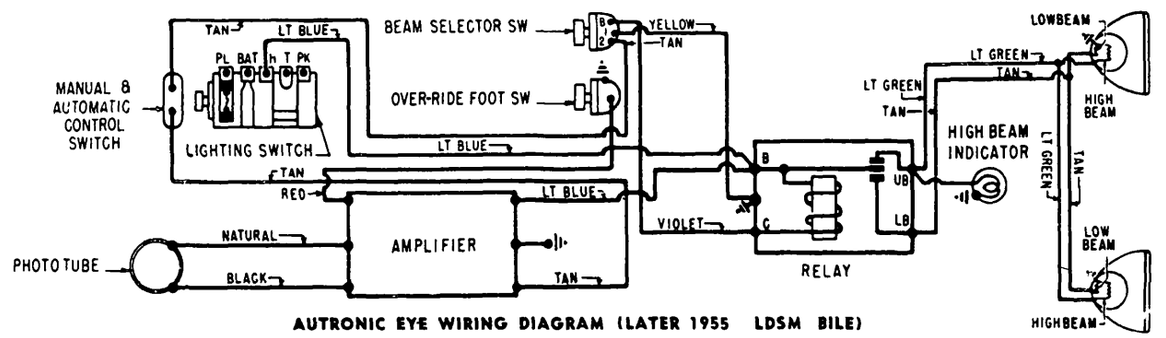
5) Turn tester Selector Switch to "Dim" position (Be sure to use proper "Dim" position for clear or tinted windshield). Turn Intensity Rheostat all the way clockwise to end of adjustment to obtain a lower beam. Turn tester Selector Switch to "Hold" position.

6) **Slowly** turn Intensity Rheostat counter-clockwise just to point where headlamps switch to upper beam. Meter pointer should now read in the "Hold" Sensitivity Adjustment Bar on meter scale. To adjust, see "Hold Sensitivity Adjustment" below.

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AUTRONIC EYE WIRING DIAGRAM (CADILLAC, CHEVROLET, PONTIAC, EARLY LDSMOBILE)



AUTRONIC EYE WIRING DIAGRAM (LATER 1955 LDSM BILE)

1955-56 AUTRONIC EYE (C ntinu d)

Dim Sensitivity Test (Later Units): 1) Rotate Intensity Rheostat completely counter-clockwise. Turn Selector Switch to "Dim" position. Headlamps should now be on upper beam.
2) Turn Intensity Rheostat **slowly** clockwise, stopping at the exact point where headlamps switch to lower beam. Meter pointer should read within "Dim" Sensitivity Adjustment Line. To adjust, see "Dim Sensitivity Adjustment" below

ADJUSTMENTS: *NOTE–For early 1955 "Dim" and "Hold" Sensitivity Adjustments, see "1954 Autronic Eye".*

Aiming Adjustm nts: Replace Phototube cover with Aiming Device AE-4 *(CAUTION–*Turn lights "OFF", before removing cover). With car at curb weight, tire pressures correct, place car on floor, level within ¼" fore and aft. To adjust vertically, adjust aiming dial to number stamped on name plate of Phototube unit, then adjust aiming screw until bubble is centered in level. To adjust horizontally, aim over sights of Phototube unit. Adjust unit so it is aimed at a point within 4" of line parallel to centerline of car with car 25 ft from aiming point

H ld Sensitivity Adjustm nt (Later Units): *NOTE–*This adjustment must be made **before** the "Dim Sensitivity Adjustment" is made

1) Turn "Hold" Adjustment (on underside of amplifier) clockwise to end of adjustment. Rotate Intensity Rheostat all the way clockwise.

2) Turn Selector Switch momentarily to "Dim" position to switch lights to lower beam, then switch back to "Hold" position *(NOTE–*If lights do not switch to lower beam, "Dim" control must be turned clockwise to end of adjustment and then readjusted after "Hold" adjustment is correct).

3) Adjust tester Intensity Rheostat until meter pointer is in center of "Hold" Sensitivity Bar.

4) Turn "Hold" control counter-clockwise **slowly** just to point where headlamps switch to upper beam.

5) Rotate tester Intensity Rheostat clockwise to end of travel, then turn Selector Switch momentarily to "Dim" position and back to "Hold" (Headlamps should now be on lower beam)

6) Recheck "Hold" adjustment by turning Intensity Rheostat **slowly** counter-clockwise just to point where lamps switch to upper beam. Meter pointer should now read in "Hold" Sensitivity Adjustment Bar if adjustment correct, If not, repeat procedure starting with with Step 1).

Dim Sensitivity Adjustment (Later Units): *NOTE–*"Hold Sensitivity Adjustment" must be made before making this adjustment.
1) Rotate "Dim" control completely counter-clockwise.
2) Momentarily turn tester "OFF", then back to "Dim" position (Headlamps should now be on upper beam).
3) Adjust Intensity Rheostat until meter pointer reads in the right hand edge of the "Dim" Sensitivity Adjustment Line.
4) **Slowly** rotate "Dim" control clockwise just to point where headlamps switch to lower beam **Do not go beyond this setting.**
5) Turn tester Intensity Rheostat completely counter-clockwise, then momentarily turn tester "OFF" and back to "Dim" Rotate Intensity Rheostat **slowly** clockwise just to point where headlamps switch to lower beam. If adjustment correct, meter pointer will read within "Dim" Sensitivity Adjustment Line If not, repeat Steps above
6) **Turn headlamps "OFF",** disconnect tester from cigar lighter receptacle Remove tester and Aiming Device from Phototube unit. Replace lens, cover, and screws

1957-59 AUTRONIC EYE

Buick (1957-59)
Cadillac (1957-59)
Chevrolet (1957-59)
Linc ln & Contin ntal (1957-59)
M rcury (1957-58)
Oldsmobile (1957-59)
P ntiac (1957-59)

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 BUICK WIRING NOTE* Some cars have blue wire from foot dimmer switch to power relay instead of yellow wire spliced into blue wire from amplifier

►*1958 BUICK (Early), CHEVROLET, PONTIAC AMPLIFIER CAUTION* On cars with power windows disconnect battery ground strap when working on amplifier Power window relay has exposed "BAT" terminal and is very close to amplifier To facilitate amplifier removal move window relay to one side

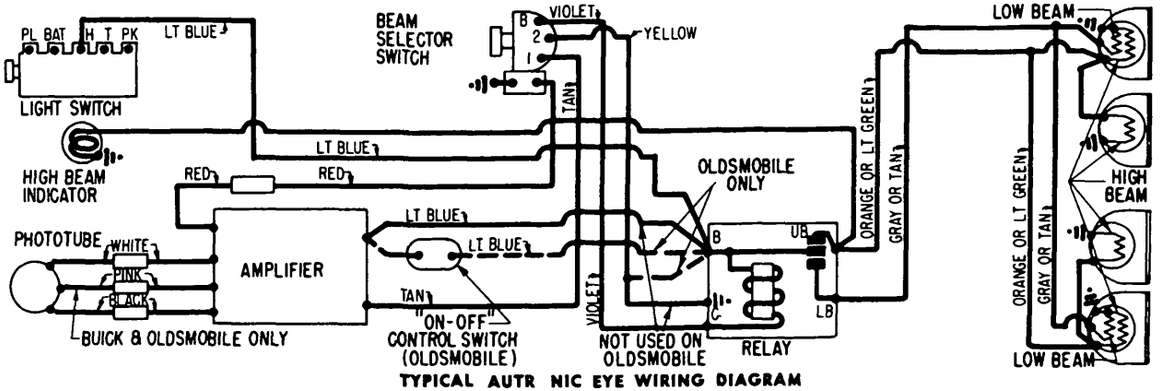
►*1958 CHEVROLET SENSITIVITY RELAY REMOVAL CAUTION.* Relay is sealed in housing and suspended from housing by two screws Removing screws will cause relay to fall to bottom of housing and relay replacement will be necessary

►*1958 OLDSMOBILE HEADLIGHTS REMAINING ON LOW BEAM CORRECTION* Caused by sensitivity relay points sticking together when headlights dimmed manually and autronic eye in "OFF" position On early cars can be corrected by breaking off brass ground tab on headlight switch Later cars do not have tab

DESCRIPTION: Similar in design and operation to previous models. A combination foot operated dimmer switch and Autronic Eye "over-control" switch is used which automatically controls the headlamps when switch is in the "high" beam position. The "low" beam position provides constant low beam operation. When the foot switch is in "high" beam, or automatic position, it can be used as an override switch to manually turn on the "high" beams by applying a slight downward pressure on top of switch. On Oldsmobile models, a separate "On-off" switch located in the headlamp switch, controls the Autronic Eye in addition to the dimmer switch. On all models, the dimmer switch must be in the "high" beam position before lights will operate automatically. *NOTE* - Some cars have a driver sensitivity control on phototube unit This gives driver a certain amount of control for unusual conditions such as heavy snow or fog Adjustment toward "F" (Far) increases sensitivity, toward "N" (Near) decreases sensitivity

TROUBLE SHOOTING & DIAGNOSIS: Preliminary Checks - ***NOTE - If unit operates for these tests, adjustment only is needed.*** **Turn unit on in a lighted area and allow 30 seconds warm-up. Place a black cloth over phototube and operate foot switch. Upper beam should be on in one foot switch position. If not, see "Unable To Obtain Upper Beam" below. Remove cloth and operate foot switch. Lights should be on lower beam in both positions. If not, see "Unable To Obtain Lower Beam" below. In one foot switch position, upper beam should go on by depressing foot switch ¼". If not, see "No Overriding Upper Beam" below.**

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TYPICAL AUTR NIC EYE WIRING DIAGRAM

1957-59 AUTRONIC EYE
(C ntinu d)

Unable To Obtain Upper Beam: Disconnect blue wire from amplifier and operate foot switch. If upper beam does **not** go on, foot switch, power relay, or wiring is faulty. If upper beam goes on, disconnect white wire from amplifier. If upper beam goes on in one foot switch position, phototube is faulty. If upper beam does **not** go on, amplifier is faulty.

Unable To Obtain Lower Beam: With blue wire to amplifier disconnected, operate foot switch. If lower beam **not** obtained, foot switch, power relay, or wiring is faulty. If lower beam **is** obtained, replace blue wire, remove red wire and operate foot switch. If lower beam obtained in **both** positions, foot switch is faulty. If lower beam **not** obtained, disconnect pink wire. If lower beam obtained on both foot switch positions, amplifier is faulty.

No Overriding Upper Beam: Disconnect foot switch red wire and short to ground. If upper beam obtained, foot switch is faulty. If upper beam **not** obtained, wire continuity or amplifier is faulty.

TESTING & ADJUSTING: *CAUTION - The Autronic Eye unit develops 800 volts. Make sure the headlights are OFF before removing cover from phototube unit.*

►*1959 AIMING DEVICE NOTE:* On following cars new aiming devices are used for 1959 models. Use in accordance with instructions furnished (see AE-4 Note below). **Buick** - J-5297-01; **Cadillac** - J-5297-01 (Early), J-7821 (Later - After Engine No. 008790); **Oldsmobile** - J-5297-A or AE-2.

►*AIMING DEVICE AE-4 INSTALLATION NOTE:* Remove cover from phototube and install the aiming device in accordance with instructions enclosed with the unit. Adjust aiming dial on the Aiming Device to the number stamped on name plate at bottom side of phototube unit (number is a single digit located directly below the serial number).

V rtical Aiming Adjustment: Position car on a level floor (level within ¼" fore and aft of car), then rock car gently to equalize springs. Install Aiming Device AE-4 (see installation note above). Adjust phototube unit aiming screw with an Allen Wrench (screw is located on bottom of phototube unit at rear edge of pedestal), until bubble in aiming device is centered in level. *(NOTE* - If phototube unit is aimed too low, reflections from the car's own headlamps will cause them to be held on "low" beam. Also, the phototube unit must be aimed as low as possible to provide maximum tolerance for car loading).

Horizontal Aiming Adjustment: Place two pieces of tape or chalk marks approx. 23-24½" apart on wall or screen at hood level height. With car placed 25 ft. from wall or screen, align centerline of hood with the right hand tape or chalk mark. Install Aiming Device AE-4, then aim over sights to left hand tape. If phototube unit is aimed more than 4" to right or left of left hand tape, reset phototube by loosening mounting stud nut under instrument panel. If necessary, one of the mounting holes in instrument panel may be elongated. *NOTF* - On **Buick, 1957-58 Lincoln & Mercury, adjustment is made by an Allen screw on phototube unit.**

Hold Sensitivity Test: Install Aiming Device (see above), then turn headlamps ON and **wait at least five minutes** for amplifier to stabilize. *NOTE - On Oldsmobile, it will also be necessary to turn Autronic Eye switch ON.* Set foot dimmer switch to "high" beam which also places Autronic Eye in automatic position. Turn "zero corrector" on face of meter until meter pointer is on zero set line. Turn "intensity rheostat" of tester counterclockwise, then insert tester connector into cigar lighter receptacle (necessary only on Sun and AE-2 Testers). Operate engine at fast idle while making sensitivity tests and adjustments. Turn "tester selector switch" to DIM position (be sure to use proper DIM position for clear or tinted windshields). Turn "intensity rheostat" all the way clockwise to end of adjustment to obtain a lower beam. Turn "test selector switch" to HOLD position. Slowly turn "intensity rheostat" counterclockwise just to point where headlamps switch to "high" beam. Meter pointer should now read in the "hold sensitivity adjustment bar" on the meter scale. If not within this range, adjust as follows:

Adjustment - *(NOTE - Both the HOLD and DIM adjustment controls are located on the underside of the amplifier unit and each is identified by a stamp on the amplifier cover. THE HOLD SENSITIVITY ADJUSTMENT MUST BE CORRECTLY MADE BEFORE ADJUSTING THE DIM SENSITIVITY.* Turn the HOLD adjustment clockwise to the end of its travel, then rotate "intensity rheostat" all the way clockwise. Turn selector momentarily to DIM position to switch lights to lower beam, then switch back to HOLD position. *NOTE - If lights do not switch to lower beam, DIM adjustment control must be turned clockwise to end of adjustment, then readjusted after HOLD adjustment is correct.* Adjust tester "intensity rheostat" until the meter pointer is at right hand edge of "hold sensitivity bar". Turn the HOLD adjustment control (on amplifier) counterclockwise SLOWLY just to point where headlamps switch to upper beam. Rotate tester "intensity rheostat" clockwise to end of travel, then turn "selector switch" momentarily to DIM position and back to HOLD. (Headlamps should now be on lower beam). Recheck HOLD adjustment by turning "intensity rheostat" SLOWLY counterclockwise just to point where headlamps switch to upper beam. Meter pointer should now be aligned with the right hand edge of HOLD adjustment green bar if adjustment is correct. If not, repeat the above procedure.

Dim Sensitivity Test: Rotate tester "intensity rheostat" completely counterclockwise. Turn "selector switch" to DIM position. Headlamps should now be on upper beam. Turn "intensity rheostat" SLOWLY clockwise, stopping at the exact point where the headlamps switch to lower beam. Meter pointer should be within the "dim sensitivity adjustment" line. If not properly adjusted, proceed as follows:

Adjustment - *(NOTE - Do not make this adjustment until after "Hold Sensitivity Adjustment" is made).* Rotate DIM control fully counterclockwise. Momentarily turn tester OFF, then back to DIM position. Headlamps should now be on upper beam. Adjust "intensity rheostat" until meter pointer reads in the right hand edge of "dim sensitivity adjustment" line. SLOWLY rotate DIM control clockwise just to point where headlamps switch to lower beam. DO NOT GO BEYOND THIS SETTING. Turn tester "intensity rheostat" completely counterclockwise, then momentarily turn tester to OFF and back to DIM. Rotate tester "intensity rheostat" SLOWLY clockwise just to point where headlamps switch to lower beam. Meter will read within "dim sensitivity adjustment" line if adjustment is correct. If not, repeat the above adjustments. Remove tester, and Aiming Device AE-4. Replace lens, cover and screw.

1955-56 LINCOLN & MERCURY AUTOMATIC HEADLIGHT DIMMER

Linc ln & M rcury (1955–56)

►*1957-59 MODEL NOTE: See "1957-59 Autronic Eye" for data on th s mod ls.*

DESCRIPTION: The Automatic Headlight Dimmer is an electronic device that automatically switches headlamps between the upper and lower beams in response to light from an approaching car and to the tail lights on cars being overtaken. Unit consists of switch and control assemblies.

OPERATION: With headlights turned on, and the pilot light indicating automatic control, light striking the photo-multiplier tube of the control assembly causes generation of a weak electrical current. This current is electronically amplified and used to actuate relays in the switch assembly. The relays then switch headlights from high to low beam. When light source is removed, headlights return to high beam. Foot dimmer switch can be used to override automatic control at any time. When foot switch is pushed, the circuit switches off of automatic and green indicator light in control head goes out. Foot switch must be pushed again to return to automatic control. High beam indicator light indicates actual position of headlight beam whether circuit is on manual or automatic

Switch Ass mbly: A three position switch, located on left side of control head assembly has positions marked "FAR", "NORM" and "NEAR" With switch on "NORM" position, working against standard rated oncoming bulbs on low beam, headlights will dim when approaching lights are 1100-1200 ft. away. Changing switch to either "FAR" or "NEAR" changes dimming distance by approximately 200 ft. in direction indicated.

OPERATIONAL CHECK: Switch the circuit to automatic (green pilot light on), block out light to control tube *NOTE*–Light can be effectively blocked by covering control head lens with one hand and the opening about the "FAR-NORM-NEAR" switch with the other (this procedure will not work in bright sunlight as enough light passes through the hands to cause tube to hold headlights on low beam) With lens covered, headlamps will switch to high beam automatically If they do not, unit is not functioning properly *CAUTION*– Unit developes high operating voltages. Control head is normally grounded to prevent high voltage danger. Red wire at switch assembly connector must be disconnected before removing head, thus breaking ground connection

TROUBLE DIAGNOSIS: Leveling–With headlight circuit on automatic, with dim and hold sensitivity adjustments correct, the head pointing downward will result in reduced dim and hold distances, and cause automatic circuit to hold low beam from reflection of its own headlights. If head aimed too high, dim and hold distances will be reduced, sensitivity to tail lights will be reduced and, in extreme cases, unit will not dim on tail lights

Dim Sensitivity: With head properly leveled, insufficient dim sensitivity will result in reduced dimming distance. Too much dim sensitivity will result in increased dimming distance.

Hold Sensitivity: With head properly leveled, and dim sensitivity properly adjusted, insufficient hold sensitivity will result in excessive high beam operation and excessive hold sensitivity will cause automatic circuit to operate excessively on low beam and, in extreme cases, system will lock on low beam because of reflection from its own headlights

TROUBLE SHOOTING: Unit Will Not Dim Within Range Of Dim Sensitivity Adjustment–Defective phototube (control assembly), defective control tube, defective circuit

Unit Will Not Respond To Hold Adjustment: Defective control tube, defective circuit

Unit Stays On Low B am In Aut matic Positi n: Head not level, fuse blown, vibrator, ballast tube, control head, or control tube defective.

Pilot Light In Head Inoperative: Light defective.

Unit Dims Automatically, Then Locks In Low B am: Head not level; control tube defective, improper headlight alignment (dimming on vehicles own headlights).

►*CONTROL TUBE CHECK:* Disconnect red and green wires at switch assembly connector and use a 45 volt dry cell to make test Ground positive battery terminal and connect negative terminal to switch assembly end of green lead with a jumper wire If headlamps dim, switch assembly is satisfactory and control tube should be replaced. If lights do not dim, replace switch assembly.

ADJUSTMENTS: Make all adjustments according to instructions furnished by the test equipment manufacturer and note the following

Fine Sensitivity: Accessible by removing rubber plug in the cover. It varies "Dim" and "Hold" distances simultaneously through a limited range. To increase, turn adjustment screw clockwise.

Course Sensitivity: Located close to edge of chassis under cover. It varies "Dim" and "Hold" distances simultaneously over a broad range and must be used when fine sensitivity control will not provide desired results Turn adjustment screw clockwise to increase range

Hold Control: Located in center of chassis under cover. It varies the "Hold" distance independent of the "Dim" distance To increase the "Hold", turn adjustment screw clockwise.

Leveling Control Head: To level control head, release locking screw with 1/8" Allen wrench and adjust phototube unit by hand until bubble is centered in spirit level

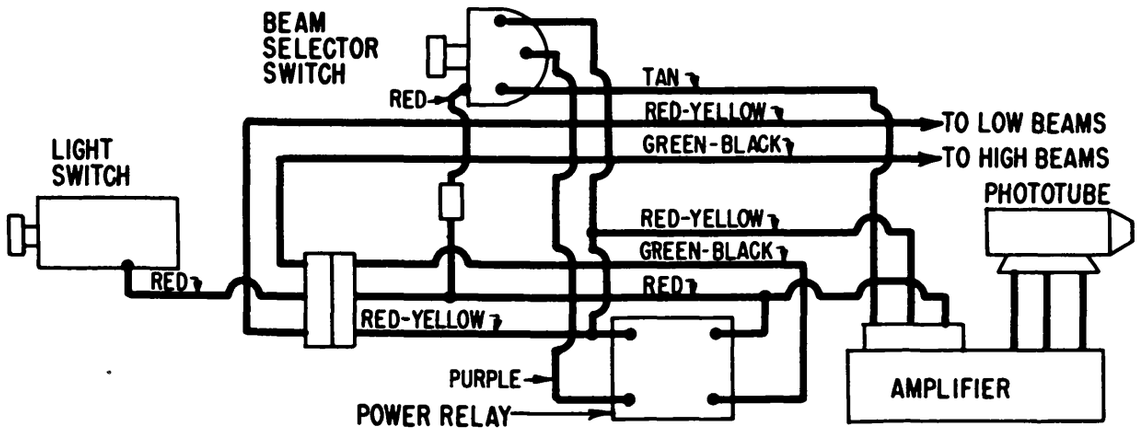
1960 LINCOLN AUTOMATIC HEADLIGHT DIMMER

Lincoln & Continental (1960)

DESCRIPTION: Similar in design and operation to previous models. Headlights are automatically controlled by phototube unit on instrument panel. An override foot control switch is located to left on drivers floor board. Headlights are on automatic control when switch is on high beam and on constant low beam when switch is on low beam. To momentarily obtain high beam for signaling oncoming vehicles or for checking automatic position of switch, depress foot switch part way. A drivers sensitivity control (Driver Control) is located on Phototube Unit to permit driver limited control of "Dim" and "Hold" sensitivity. A detent position (control knob pointing up and in line with center ridge) is for normal sensitivity. Rotate knob clockwise (toward "F") to increase sensitivity, counterclockwise to decrease sensitivity.

TESTING & ADJUSTING: Preliminary Tests - 1) Place car in a lighted area and turn lights to full **ON** position. Lights should be on low beam regardless of foot switch position.

CONTINUED ON NEXT PAGE



LINCOLN & CONTINENTAL AUTOMATIC HEADLIGHT DIMMER WIRING DIAGRAM

1960 LINCOLN AUTOMATIC HEADLIGHT DIMMER (C nt.)

2) Depress foot switch part way. Light should change to upper beam and then back to lower beam when foot switch is released.

3) Place hand or dark cloth over phototube unit. Lights should switch to upper beam if foot switch is on automatic position. Remove cloth and lights should change back to lower beam.

NOTE - When steps 1,2 and 3 are **not** correct, proceed with "Vertical", "Horizontal", "Dim" & "Hold" Sensitivity Tests below.

4) All connections must be tight and properly made. Use known good individual components for substitutes for quick and easy correction procedure.

AIMING ADJUSTMENT: *AIMING EQUIPMENT NOTE: Use Electronic Headlight Control Tester, Model AD or Tester No. 5297-01 and Aiming Device No. 5.* With car unloaded, trunk empty, tire pressure correct, and with gas tank at least half full, locate car on level floor (floor must be level within ¼" fore and aft of car). Equalize springs by rocking car gently. *CAUTION - Turn headlights off before removing cover from phototube unit.* Loosen Allen screw at each side of phototube unit and remove cover, then replace cover with Aiming Device No. 5 and Control Tester Model AD. *NOTE - Oval type adapter ring must be used. DO NOT USE square lens aiming device formerly required.* Tighten cover screws, then insert test lamp into phototube base by inserting locator ring in lens slot. *CAUTION - Lens locator in phototube unit base must fit in locator ring notch. Do not remove amber filter and mask.*

Horizontal Aim: Centerline of Phototube Unit must be aimed parallel to the horizontal centerline of car. Check aim as follows:

1) Locate car approximately 25 feet from vertical wall or screen. Sight down car hood and place a piece of tape vertically on wall at hood height to represent car centerline.

2) Measure distance between centerline of Phototube and center of car windshield. Place second tape vertically at this distance to left of car centerline. Use the two sights on Aiming Device to determine alignment.

3) When horizontal aim is not correct, remove instrument cluster hood and loosen Phototube mounting bracket. Rotate Phototube unit until horizontal aim is correct. Tighten mounting bracket nut and recheck adjustment.

Vertical Aim: Note number stamped on name plate and adjust dial of Aiming Device to this number. Use Allen wrench (inside cover) to adjust aiming screw at rear of Phototube base to bring bubble into center in level. *NOTE* - Aim Phototube low enough to provide maximum tolerance for car loading.

Hold Sensitivity Test: *NOTE - "Hold" sensitivity must be properly adjusted before adjusting "Dim" Sensitivity. Cover Phototube Unit with black cloth for tests and adjustment.*

1) Set Driver Control to detent position. Operate engine at fast idle for tests and adjustment. Turn headlights ON and allow five minutes for amplifier to stabilize.

2) Set foot switch to automatic position (upper beam will be ON). Turn zero corrector on face of meter unit until meter pointer is on "O" set line. Turn "Intensity" rheostat of tester all the way counterclockwise.

3) Switch ground polarity toggle switch to negative (-) position. Insert tester connector into cigar lighter receptacle. *NOTE* - Tester 5287-01 has it own power supply. Model AD Tester provides a selector switch for setting meter for clear or tinted windshield while Tester No. 5297-01 provides separate meter scales for clear and tinted windshields.

4) Turn selector or "Dim"-"Hold" switch to "Dim" position. Turn tester intensity rheostat all the way clockwise to end of adjustment.

5) If lights DO NOT switch to lower beam, the amplifier "Dim" adjustment control must be turned completely clockwise and then readjusted after "Hold" adjustment is correct.

6) Turn tester selector switch to "Hold" position. Then slowly and carefully turn intensity rheostat counterclockwise just to point where headlights switch to upper beam. Meter pointer should now read on right hand edge of the "Hold" sensitivity adjustment on meter scale.

Hold Sensitivity Adjustment: "Hold" and "Dim" sensitivity adjustments are slotted for screwdriver adjustment and located at front of amplifier unit. For access to adjustments, remove center instrument panel lower access cover in back of radio.

1) Rotate amplifier "Hold" control completely clockwise. Rotate tester intensity rheostat all the way clockwise. Turn selector or "Dim"-"Hold" switch momentarily to "Dim" position to switch lights to lower beam, then switch back to "Hold" position.

2) Adjust intensity rheostat until meter pointer is at right hand edge of green "Hold" sensitivity bar.

3) Turn amplifier "Hold" control slowly counterclockwise just to point where headlamps switch to upper beam. Rotate tester intensity rheostat clockwise to end of travel, then turn selector switch momentarily to "Dim" and back to "Hold".

4) Recheck "Hold" adjustment by turning intensity rheostat slowly and carefully counterclockwise just to point where headlights switch to upper beam. Meter pointer should read in "Hold" sensitivity bar if adjustment is correct. If not, repeat procedure.

Dim Sensitivity Test: "Dim" sensitivity should not be adjusted until after "Hold" sensitivity is properly adjusted.

1) Rotate tester intensity rheostat completely counterclockwise. Turn selector or "Dim"-"Hold" switch to "Hold" position and then back to "Dim" position. Headlights should be on upper beam.

2) Turn tester intensity rheostat clockwise slowly just to point where headlamps switch to lower beam. Meter pointer should now read in the **black** "Dim" sensitivity adjustment line. If not, proceed to "Dim Sensitivity Adjustment".

Dim Sensitivity Adjustment: 1) Adjust "Intensity" rheostat until meter pointer reads in right hand edge of "Dim" sensitivity adjustment line. Rotate amplifier "Dim" control counterclockwise to end of adjustment.

2) Momentarily turn tester selector switch to OFF position so that headlights are on upper beam, then turn switch back to "Dim" position.

3) Carefully and slowly rotate amplifier "Dim" control clockwise just to point where headlights switch to lower beam. **Do not go beyond this p int.**

4) Turn tester "Intensity" rheostat slowly clockwise just to point where headlights switch to lower beam. Meter will read within "Dim" sensitivity line if adjustment is correct. If not, repeat steps 1 through 4.

5) Turn off headlights, remove equipment, replace cover and lens assembly and tighten Allen setscrews.

G.M. GUIDE-MATIC HEADLIGHT DIMMER

Buick (1960)
Cadillac (1960)
Chevrolet (1960)
Oldsmobile (1960)
Pontiac (1960)

DESCRIPTION: Similar in design and operation to previous models. A combination foot operated dimmer switch and Guide-Matic "over-control" switch is used which automatically controls headlights when switch is in the "high" beam position. The "low" beam position provides constant low beam operation. When the foot switch is in "high" beam or automatic position, it can be used as an override switch to manually turn on the "high" beams by applying a slight downward pressure on top of switch. On Oldsmobile models, a separate "on-off" switch located in headlight switch (which has a 9 amp. fuse for protection of circuit), controls the Guide-Matic in addition to the dimmer switch. On all models, the dimmer switch must be in the "high" beam position before lights will operate automatically. A sensitivity control on phototube unit gives driver a certain amount of control for unusual conditions such as heavy snow or fog. Adjust toward "F" (Far) increases sensitivity, toward "N" (Near) decreases sensitivity. Courtesy salute section of Guide-Matic switches the headlights from upper to lower beam in a two-step action. When headlights are switched to "low" beam position, upper beams will remain on approximately a second at reduced candlepower to indicate car is equipped with Guide-Matic.

►*CONVERSION TO MANUAL CONTROL:* When Guide-Matic cannot be serviced immediately, lights can be converted to manual switch operation by disconnecting phototube unit connector from amplifier. It may be necessary to remove foot switch from floor and disconnect amplifier harness from car wiring harness and install car wiring harness on foot switch.

TROUBLE SHOOTING & DIAGNOSIS: Preliminary Checks - *NOTE - If unit p rat s f r th se t sts, adjustment only is needed.* Turn unit on in a lighted area and allow 30 seconds warm-up. Place a black cloth over phototube and operate foot switch. Upper beam should be on in one foot switch position. If not, see "Unable To Obtain Upper Beam" below. Remove cloth and operate foot switch. Lights should be on lower beam in both positions. If not, see "Unable To Obtain Lower Beam" below. In one foot switch position, upper

CONTINUED ON NEXT PAGE

G.M. GUIDE-MATIC HEADLIGHT DIMMER (C nt.)

beam should go on by depressing foot switch ¼". If not, see "No Overriding Upper Beam" below.

Unabl T Obtain Upp r B am: With "Hold" control in center of rotation and upper beam obtained, adjustment is necessary (see below). If no upper beam obtained, disconnect phototube from amplifier. If upper beam goes on, phototube is faulty. If upper beam **does not** go on, disconnect foot switch wiring from switch and connect car wiring from amplifier to switch. Operate foot switch. If lamps change beams, amplifier is faulty. If lamps **do n t** change beams, foot switch or car wiring is faulty.

Unabl T Obtain Lower Beam: Ground white wire between phototube and amplifier (remove phototube cover for access). If beams change, phototube is faulty. If beams **d n t** change, remove red wire from switch. If beams change, foot switch is faulty. If beams **do not** change, remove foot switch wiring and connect car wiring from amplifier t o switch. Operate switch. If beams change, amplifier is faulty. If beams **do not** change car wiring is faulty.

N Ov rriding Upper B am: Ground red wire from foot switch. If override obtained, foot switch is faulty. If override **n t** obtained, amplifier is faulty.

TESTING & ADJUSTING: *NOTE* - Use Guide-Matic Tool J-8465 (Buick, Cadillac, Pontiac); Level J-8465-20, Test Lamp & Adapter J-8662 and Tester AE-2 (Oldsmobile) for installing, testing, and adjusting Guide-Matic headlight dimmer.

Vertical Aiming Adjustment: *CAUTION - Unit must be aim d as low as p ssible to provide tolerance for car l ading. Aim unit with car unloaded, trunk empty except for spar tir , gas tank at least half-full and with tires at c rrect pressure.*

1) Locate car on level floor (1/4" fore and aft of car).

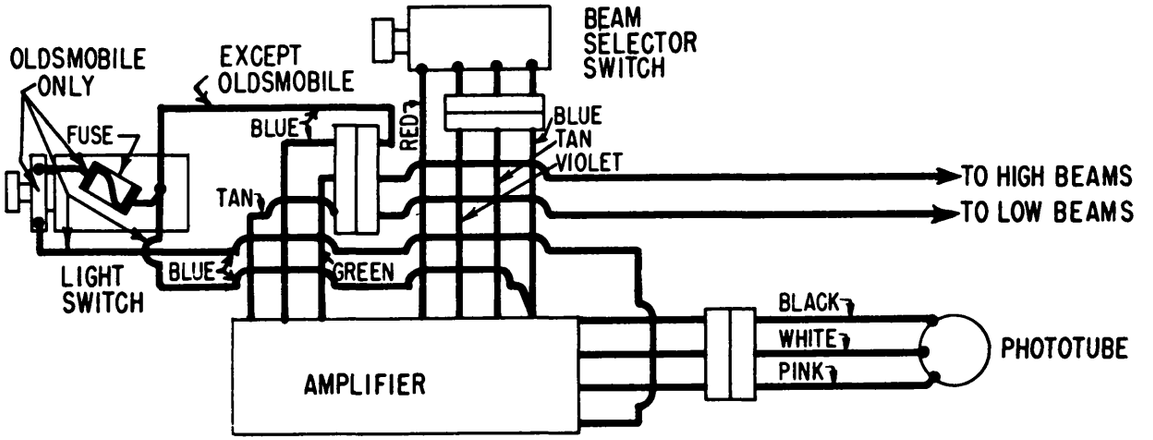
2) Rock car sideways to equalize springs. On Cadillac with Air Suspension, idle engine to insure car levelness.

3) Set Aiming Device on Phototube Unit. *NOTE* - Three points on Aiming Device must rest on top of Phototube Unit and Aiming Device must be touching front of Phototube Unit.

4) Note number stamped on Drive Control knob then adjust aiming dial until corresponding number is under pointer.

5) Adjust vertical aiming screw on Phototube Unit until bubble is centered in level.

Dim and Hold Sensitivity T st: *CAUTION - Cover Ph totube Unit with black cloth. T sts or adjustm nts should be made with Ph totube unit below 100°F. If car has be n in th sun, place it in cool spot for appr ximately on h ur b fore check is mad .*



"GUIDE-MATIC" HEADLIGHT DIMMER WIRING DIAGRAM (TYPICAL)

1) Set Driver Control to "detent" position and install tester lamp. Start engine and operate at fast idle while making adjustments.

2) Turn headlights "ON" and wait five minutes for Amplifier Unit to stabilize. Turn Zero corrector on face of meter until meter pointer is on zero set line then connect battery leads of tester unit to cigar lighter receptacle (Oldsmobile), to battery terminals (Others).

3) For Dim Sensitivity, rotate tester Intensity Control completely counterclockwise. Turn Selector on Dim-Hold Switch to "HOLD" position and then back to "DIM" position. Headlamps should be on upper beam.

4) Turn test Intensity Control clockwise slowly just to point where headlamps switch to lower beam. Meter pointer should now read in Black Sensitivity Range on meter scale. If not proceed to "HOLD" Sensitivity Adjustment, under Hold and Dim Sensitivity below.

5) For Hold Sensitivity, turn Intensity Control all the way clockwise. Turn selector or Dim-Hold Switch to "DIM" position and back to "HOLD" position to obtain a lower beam.

6) Slowly turn Intensity Control counterclockwise just to point where headlamps switch to upper beam. Meter pointer should now read in the Green "HOLD" Sensitivity range on meter scale. If not, proceed to "Hold" Sensitivity Adjustment under Hold and Dim Sensitivity below.

Hold and Dim Sensitivity Adjustment: *CAUTION - "HOLD" Sensitivity must be made properly before adjusting "DIM" Sensitivity. Phototube unit must be covered with a black cl th during adjustm nts.*

1) Complete Steps 1 and 2 under Dim and Hold Sensitivity Test. *NOTE* - Dim and Hold Sensitivity Controls are located on side of Amplifier Unit (slotted for screwdriver adjustment). For access, remove plug from door hinge pillar.

2) **For Hold Sensitivity,** rotate Amplifier Hold Control completely clockwise. Rotate tester Intensity Control Control all the way clockwise. Turn Selector (Dim-Hold Switch) momentarily to "DIM" position to switch lights to lower beam, then switch back to "HOLD" position.
NOTE - If lights do not switch to lower beam, the amplifier Dim Control must be turned completely clockwise and then readjusted after "HOLD" adjustment is correct.

3) Adjust Intensity Control on tester slowly counterclockwise until meter pointer is on HOLD SENSITIVITY adjustment line. Turn Amplifier Hold Control slowly counterclockwise just to point where headlamps switch to upper beam. Do not go beyond this setting. Recheck Sensitivity, Steps 5 and 6 under Dim and Hold Sensitivity tests, above.
NOTE - Dim Sensitivity should not be adjusted until "HOLD" Sensitivity is properly adjusted.

4) **For Dim Sensitivity,** rotate Amplifier "DIM" Control completely counterclockwise. Momentarily turn Dim-Hold Switch on tester to "HOLD" then back to "DIM" position to obtain upper beam.

5) Adjust tester Intensity Control until meter pointer is at Dim Sensitivity Adjustment Line then slowly rotate Amplifier Dim Control clockwise just to point where headlamps switch to lower beam. DO NOT go beyond this setting.

6) Recheck Sensitivity, Steps 3 through 6 under Dim Sensitivity, above. If Sensitivity is not correct, repeat repeat adjustment procedure. If correct, turn off headlights, disconnect tester, remove Tester lamp from Phototube Unit and reinstall plug in door hinge pillar.

ELECTRIC DIRECTION SIGNALS

DESCRIPTION & OPERATION: All direction signal systems are similar in design and operate in the same manner except that various types of indicator circuits are used as listed below. *See typical wiring diagrams below.* The Flasher "Power Source" is usually the "IGN" or "ACC" terminal of the ignition switch so that the direction signals are operative only with the ignition turned on, and a fuse or circuit breaker is connected in this "Power Source" line to protect the direction signal circuits. *See individual Car Model Wiring Diagrams for complete Direction Signal circuit.*

Double "Cross-Over" Type Indicators - Indicators are connected in parallel to the "P" terminal of the flasher and each indicator circuit is completed to ground through the Front Direction Signal on the **opposite** side of the car (Right indicator connected to left signal, Left indicator connected to right signal).

Single "Cross-Over" Type Indicator - The single indicator is connected directly across or between the two Front Direction Signals. The indicator will flash when either of the front signals is operating (circuit is fed from the operating signal lead and indicator bulb is grounded through the other signal bulb).

Double "Parallel" Type Indicators - Each indicator is connected in parallel with the Front Direction Signal on the **same** side of the car (Right indicator connected to right signal, Left indicator to left signal) and each indicator bulb is grounded directly.

Single "Parallel" Type Indicator - This circuit not illustrated. The single indicator is connected directly to the "P" terminal of the flasher and the bulb is grounded directly. The indicator flashes whenever the flasher is operating.

TROUBLE SHOOTING: Operate direction signals by placing switch in "Right Turn" and "Left Turn" positions successively and note operation of signal lights and indicators in each position. In normal operation, lights should flash approximately 90 times per minute. *NOTE* - Ignition switch must be "ON" for signal light operation. Diagnose trouble as follows:

1) All Signal Lights and Indicators do not operate - Blown fuse, defective flasher, defective switch, open circuit between ignition switch and flasher or between flasher and switch.

2) One Signal Light does not operate - Burned out bulb or loose wiring connections. Other signal light on same side of car will flash at twice speed. On systems with "Double Cross-Over Type Indicators", both indicators will flash in unison if rear signal bulb burned out; one indicator will operate normally if front signal light on same side is burned out, but will not operate if front signal light on opposite side is burned out. *NOTE* - Indicator will not operate if both front and rear signal light bulbs are burned out.

3) One Signal Light op rat s but flash s too fast - The other signal light bulb on same side of car is burned out, or there is high resistance (loose connections or corroded contacts) in circuit.

4) All Signal Lights operat but flash t fast - Faulty flasher or high voltage.

5) All Signal Lights operat but flash sl wly - Faulty flasher, low voltage, or high resistance in circuit.

6) Both Indicator Lights flash dimly, at sam tim (faster than normal) - *NOTE - Both indicator lights may appear inoperative.*

Right Turn - Right rear or right front turn signal filament burned out, or lamp base not grounded.

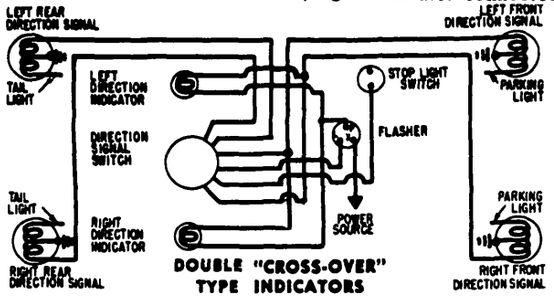
Left Turn - Left rear or left front turn signal filament burned out, or lamp base not grounded.

7) Both Indicator Lights flash dimly (at normal frequency) - Indicator lamp section of flasher inoperative or open circuit in wire from flasher to indicator lights.

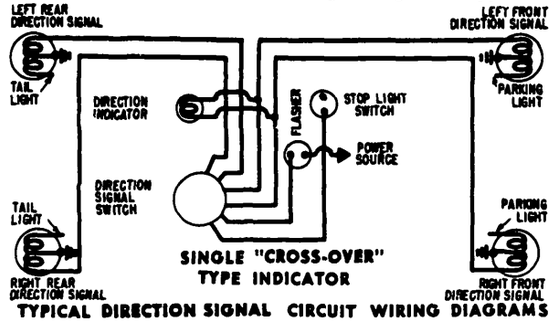
SERVICING: Flashers cannot be repaired and defective units should be replaced.

Fuse Location & Capacity - *S MISCELLANEOUS ELECTRICAL in individual car m d l data pages.*

Directional Signal Switch - Located in housing under steering wheel or attached to steering column jacket. For access to switch, *se "St ring Wh l & Horn Ring Removal" in Steering Section.*

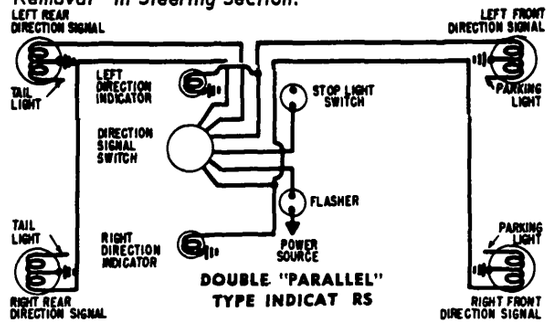


DOUBLE "CROSS-OVER" TYPE INDICATORS



SINGLE "CROSS-OVER" TYPE INDICATOR

TYPICAL DIRECTION SIGNAL CIRCUIT WIRING DIAGRAMS



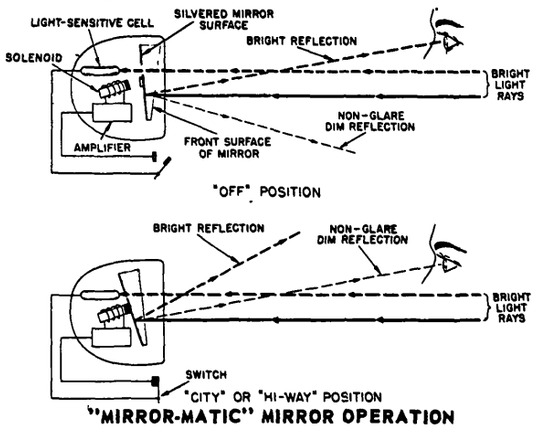
DOUBLE "PARALLEL" TYPE INDICAT RS

CHRYSLER ELECTRONIC REAR MIRROR

Chrysler & Imperial (1959-60)
DeSoto (1959-60)
Dodge & Dodge Dart (1959-60)
Plymouth (1959-60).

DESCRIPTION: An electronically controlled rear view mirror which provides maximum rear vision at night by using bright surface of mirror except when glaring light strikes its surface. Mechanism housed entirely within mirror base and controlled by 3-position switch on mirror bezel. "OFF" position on switch locks mirror in normal "bright" position; "City" position permits less sensitivity to city street lights; "Hi-way" position permits full sensitivity for normal highway conditions.

OPERATION: A small photo-electric cell is set in a hole in mirror surface. Light striking cell generates a small current which increases as light intensity increases. When intensity is high enough to cause glare, current actuates a small amplifier and solenoid assembly which pulls mirror upward a few degrees to reflect a dim image into driver's eyes. When light intensity drops below pre-set level, mirror automatically returns to normal "bright" position.



"MIRROR-MATIC" MIRROR OPERATION

DRIVER ADJUSTMENT (Positioning Mirror): With headlights off, loosen locknut at mirror support base and position mirror for best rear viewing and brightest image. Tighten locknut.

SERVICE ADJUSTMENT: If glare exists in either "City" or "Hi-way" position (mirror does not dim), sensitivity is too low. Raise sensitivity as follows: Remove switch knob by pulling off. Remove mirror bezel, lifting out and up to clear retaining tabs. Move top part of back cover upward and rearward over mirror support just enough to provide access to potentiometer adjusters. To increase sensitivity, turn potentiometer arm marked "City" or "Hi-way" as required, in direction indicated by arrow. To decrease sensitivity, turn arm in opposite direction. Replace cover, bezel and switch knob. Position mirror.

SEALED BEAM HEADLAMPS
(2-HEADLIGHT SYSTEMS)

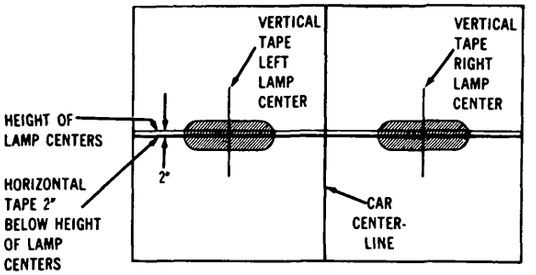
DESCRIPTION: Sealed Beam Headlamps, as used on cars so equipped, consist of a reflector, lens, and lamp filaments assembled as a single sealed unit. This excludes all dirt and moisture so that the original effciency of the lamp is retained throughout the life of the filaments. When replacement is required, the entire sealed beam unit is discarded and a new unit is installed. No attempt should be made to disassemble the sealed beam unit.

OPERATION: Sealed Beam lamps have double "bar" type filaments (filaments are parallel and slightly offset so that lower "Traffic" beam deflected slightly toward right side of road. Beams are controlled by a Beam Selector Switch on the toe-board in the usual manner.

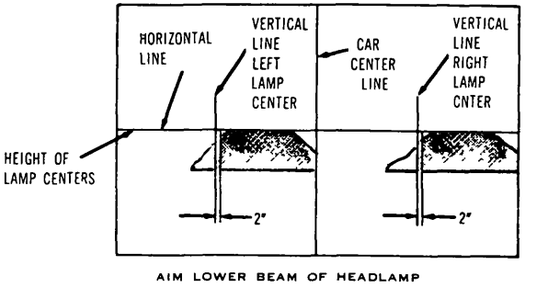
INSTALLATION & REMOVAL: On all cars, a sub-body or housing is provided in the headlamp for the sealed beam unit mounting. This sub-body is retained in the headlamp by the two adjusting screws and by two sets of two springs which are hooked to the sub-body diametrically across from each screw. The sealed beam unit seats directly in the sub-body and is positioned by three heavy lugs which fit into slots in the sub-body. A retainer ring is fitted over the outer edge of the sealed beam unit. This retainer ring has three lugs which engage three clamp screws on the sub-body rim so that the retainer ring and sealed beam unit are securely clamped in place when the clamp screws are tightened (on some cars a gasket is used between the retainer ring and the sealed beam unit). A lamp rim which fits over the retainer ring in such a manner as to conceal the clamp screws and adjusting screws completes the assembly.

Removing Sealed Beam Units—Remove headlamp rim (retained by screws and clips). Loosen but do not remove three clamp screws which engage retainer ring or remove spring (some models) which is attached to retainer ring. In first type rotate retainer ring to release retainer and in both types remove unit connector and unit.

Installing Sealed Beam Units—Terminal clips on sealed beam units and cable plug are designed so that plug can be connected only in correct position. Plug terminals (facing end of plug) are as follows: **Left Side**—Upper Country Beam. **Center (Top)**—Lower Traffic Beam. **Right Side**—Ground wire connected to lamp sub-body or lamp housing. When installing new sealed beam unit, connect plug, see that sealed beam unit lugs properly engage slots in sub-body, install retainer ring and rotate ring clockwise until lugs on ring engage under clamp screw heads on sub-body, or connect spring which secures retainer, tighten clamp screws securely. Then adjust headlamps as directed below.



STANDARD (5000 SERIES)



AIM LOWER BEAM OF HEADLAMP

6000 SERIES (TYPE 2)

SEALED BEAM HEADLIGHT AIMING CHART

ADJUSTMENT: *CAUTION - "Standard" (5000 Series) and "Type 2" (6000 Series) units are used. "Type 2" has number 2 molded into lens at top of bulb. Different adjustment required for each type as detailed below. If both types found on a car, adjust each type according to specifications for that type.* With car perpendicular to and 25 feet from screen or wall, make a horizontal line on wall **2" below** horizontal centerline of headlights (Standard), horizontal line on wall **even with** horizontal centerline of headlights (Type 2). Make a vertical line on wall through the vertical centerline of each headlight (All Types). Cover the headlight not being adjusted. Proceed as follows:

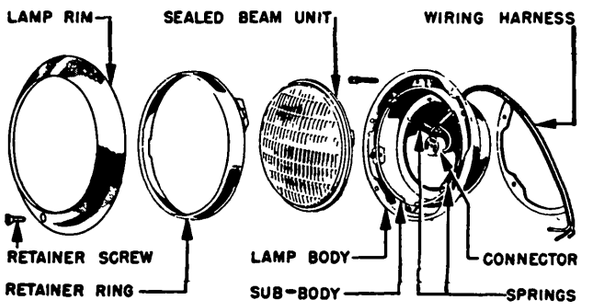
►*NOTE:* Always bring headlight beam into final position by turning aiming screws clockwise so that unit is held under proper tension when adjustment completed.

Standard (5000 Series) Adjustment: Vertical - With headlights on HIGH BEAM, turn vertical aiming screw (at top of bulb) counterclockwise so center of high intensity area is much lower than horizontal centerline on wall. Then turn screw clockwise so center of high intensity area is in the center of horizontal line. **Horizontal** - With headlights on HIGH BEAM, turn horizontal aiming screw (at side of bulb) counterclockwise, then clockwise so center of high intensity area is in the center of vertical centerline.

Type 2 (6000 Series) Adjustment: Vertical - With headlights on LOW BEAM, turn vertical aiming screw (at top of bulb) counterclockwise so center of high intensity area is much lower than horizontal centerline on wall. Then turn screw clockwise so top edge of high intensity area is even with horizontal centerline.

Horizontal - With headlights on LOW BEAM, turn horizontal aiming screw (at side of bulb) counterclockwise, then clockwise so left edge of high intensity area is 2" to the right of vertical centerline.

►*T-3 AIMING EQUIPMENT NOTE:* Aiming equipment may be used with all types headlights. Follow manufacturer's instructions.



SEALED BEAM HEADLIGHT UNIT

SEALED BEAM HEADLAMPS (4-HEADLIGHT SYSTEMS)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 DESOTO HEADLIGHT DOOR INTERFERENCE (First Cars):* Before installing door after aiming headlights, inspect inner side of door and see that lower slots in door flange provide clearance for ears on sealed beam mounting units. If necessary, lengthen slot (lower end of outer lamp slot, upper end of inner lamp slot) to completely clear the ears.

►*1957 LINCOLN AUXILIARY HEADLIGHT WIRING MODIFICATION:* The headlight wiring can be modified so that it will be IMPOSSIBLE to use the Headlights and Roadlamps (second set of Headlights) at the same time, wherever this is preferred or required by regulations. Proceed as follows: Disconnect lead wires on existing Auxiliary Over-ride Switch (on steering column), remove and discard switch. Install new switch, Part No. FDU-15224-C. Connect switch leads as follows: 1) Red Switch Lead with bullet terminal to Blue Lead in Wiring harness, 2) Tape Black Wire in harness (not used). 3) Route Yellow and Black Leads from switch along main wiring harness to Light Switch, 4) Disconnect Red-with-Yellow-Band Wire from Light Switch and connect new Yellow lead to this terminal, 5) Connect Black Lead to the Red-with-Yellow-Band Wire disconnected from the switch.

DESCRIPTION & OPERATION: The 4-Headlight systems use four Sealed Beam units of different size (see Lamp Bulb Data below). Conventional double filament headlights (Upper and Lower Beam) are supplemented by a second set of single filament headlights (Upper Beam only) mounted beside (toward center of car) or below the regular headlights. These additional headlights are connected directly to the upper beam lead of the regular headlights so that they are illuminated only when the upper beams are in use (except Lincoln - see Lincoln Wiring Note below). When the regular headlights are switched to lower beam the additional headlights go out, and the usual two-headlight pattern is presented to a passing car.

►*1957 LINCOLN HEADLIGHT WIRING NOTE:* See Wiring *Modification (above).* The Auxiliary Headlights (additional headlights) are controlled by the main Lighting Switch and are lighted with the switch in the "Park" position (Parking & Tail Lights on, regular Headlights off) and also with the switch in the regular "On" position (Regular Headlights and Tail Lights on, Parking Lights off). The Auxiliary Headlights are not controlled by the Beam Selector Switch and do not go out when the regular headlights are switched to Lower Beam. However, an Auxiliary Over-ride Switch is provided (on right side of steering column) so that the Auxiliary Headlights can be switched off whenever they are not wanted.

Lamp Bulbs (All Models except Lincoln - see Lincoln Bulb Note below): New 5¾" Special Sealed Beam Units. Regular headlight units (double filament) are three-prong type, auxiliary headlight units (single filament) are two-prong type and units cannot be installed incorrectly. **Regular Headlight (Outer or Upper Unit)** - No. 4002 (50-37½ W). Numeral "2" is molded in top of lens. **Auxiliary Headlight (Inner or Lower Unit)** - No. 4001 (37½ W). Numeral "1" is molded in top of lens.

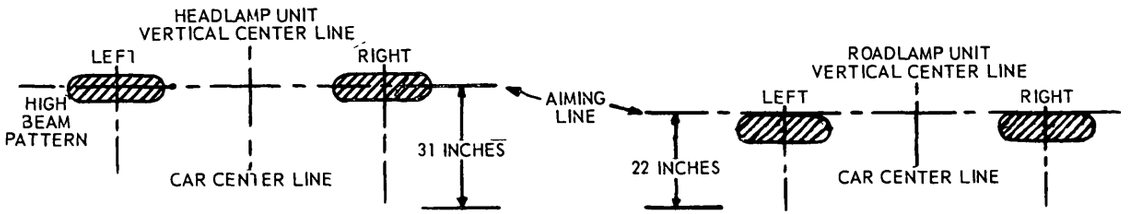
►*1957 LINCOLN BULB NOTE:* This model does not use the new small bulb units. Regular headlights are Sealed Beam Unit, No. 5400 (50-40W); Roadlamps (second set of headlights) are Sealed Beam Unit, No. 4415 (35W-single filament).

HEADLIGHT AIMING & ADJUSTMENT: All headlights are aimed with reference to lamp "Vertical Center-line" and it will be necessary to establish separate center-lines on the screen for outer and inner headlights (side-by-side mounting, or for diagonal mounting as used on Lincoln & Continental). A "Horizontal Lamp Center-line" is also used together with the usual horizontal line 2" below lamp center-height. Correct light patterns are shown in illustration.

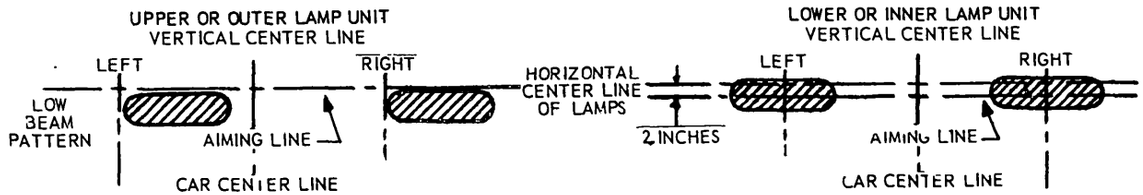
►*1958-60 CHEVROLET & 1960 CORVAIR LOW BEAM PATTERN NOTE: "Hot Spot" f patt rn should be 1" to right of outer lamp vertical c nt rlin n screen.*

Headlight Aiming Gauges - Sealed beam units have the usual pedestals or gauge points molded in the lens and T-3 or other Gauges can be used for headlight adjustment if the necessary adapters are used.

Headlight Aiming Tolerance - Tolerances are Plus or Minus 2" (vertical limits), Plus or Minus 6" (horizontal limits).



1957 LINCOLN MODELS



1957-60 MODELS (EXCEPT 1957 LINCOLN)
4-HEADLIGHT AIMING CHARTS (ALL MODELS)

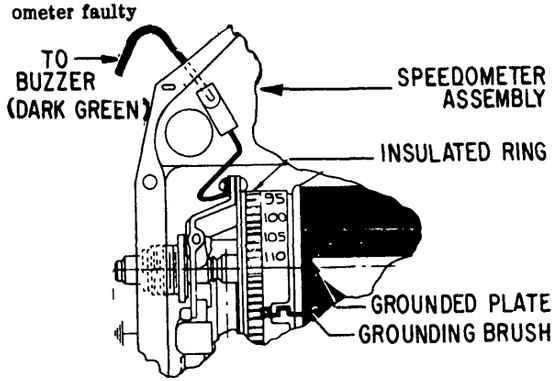
1958-60 BUICK

DESCRIPTION & OPERATION: Unit consists of a buzzer mounted on left ventilator air deflector and connected to the fuse block by a dark green wire. An insulated ring with a dial reading of 20-110 is part of the speedometer assembly. A grounding brush projects from this ring to a grounded plate on speedometer cylinder. The ring is rotated by turning a knob on lower instrument panel to desired speed setting. When cylinder rotates and reaches desired speed, grounded plate will contact grounding brush causing buzzer to sound.

TESTING & TROUBLE SHOOTING: Buzzer Inoperative or Operates Intermittently - Disconnect buzzer at speedometer (slip fuse block down and reach with left hand between fuse block brackets and forward of heat duct). Ground connector with ignition switch ON. If buzzer operates, speedometer is faulty. If buzzer does not operate, fuse is blown, connectors loose, or buzzer faulty.

Buzzer Operates Continuously - Disconnect wire at speedometer. If buzzer stops speedometer is faulty. If buzzer does not stop, buzzer is faulty. Green wire from speedometer to buzzer may be grounded.

Speedometer Sticks - Buzzer must be resistor type (identified by pig tail welded to mounting base). Speedometer faulty



1958 EDSEL

►*WARNING LIGHTS REMAIN ON CORRECTION:* Transfer red feed wire from 12 amp. circuit breaker on fuse panel to "ACC" terminal of ignition switch. *See Car Wiring Diagram for recommended wiring.*

DESCRIPTION & OPERATION: Unit consists of two warning lamps, a control assembly, and a selector control knob and cable. Any speed from 20 to 80 MPH can be selected by turning knob (located just below speedometer). Two flyweights are mounted on a shaft turned by speedometer cable. As speed of flyweights increases, weights move outward, shortening length of flyweight scissors and moving a lever against spring tension (determined by selector knob). This closes a set of points and causes the lamps to light, producing a red glow on speedometer dial.

1958 MERCURY

DESCRIPTION & OPERATION: Unit consists of a selector knob and dial, electrically operated chimes signal, set of contact points in speedometer which ground chimes circuit. Any speed in 5 mile increments between 20-110 MPH may be selected. Tension of a speedometer driven spool spring is controlled by setting of selector dial. When desired speed is reached, points close, completing the circuit and chimes will ring intermittently.

►*SERVICE NOTE:* All service of unit is by replacement

Chimes Assembly Removal & Installation: Disconnect battery ground cable at battery. Disconnect wires at chimes assembly noting carefully position of wires. Remove bolt securing chimes to brake pedal support and remove assembly. Reverse procedure to install.

Selector Dial & Speedometer Synchronization: Raise rear of car so wheels turn freely. Set selector knob on maximum speed position. Start engine and place transmission in gear to obtain constant speedometer reading of 40 MPH. *NOTE - This speed may be varied according to driver's preference.* Rotate knob until chimes sound. Hold knob and rotate dial until number 40 indexed with red mark on bezel.

1959 MERCURY

DESCRIPTION & OPERATION: Consists of a control knob on left side of speedometer hood, spiral grooved shaft with an indicator pointer linked to knob by a bead chain, a black tape wound on a spring-loaded spool behind speedometer tape, and a warning light. Unit operative at any speed between 25 and 90 MPH. Control knob causes indicator pointer to move on speedometer face to desired speed. Indicator pointer pulls black tape behind speedometer tape at same time. When desired speed is reached and exceeded, red part of speedometer tape that passes over pointer lights up (warning bulb is located behind it). *NOTE* - Warning light does not glow until road speed slightly exceeds indicator setting.

►*SERVICE NOTE: All service of unit is by replacement.*

Warning Lamp Replacement - Disconnect battery ground cable. Remove screws holding hood and speedometer assembly to instrument cluster. Raise assembly up and off dowel pins. Warning lamp located at center of speedometer just below high beam indicator lamp.

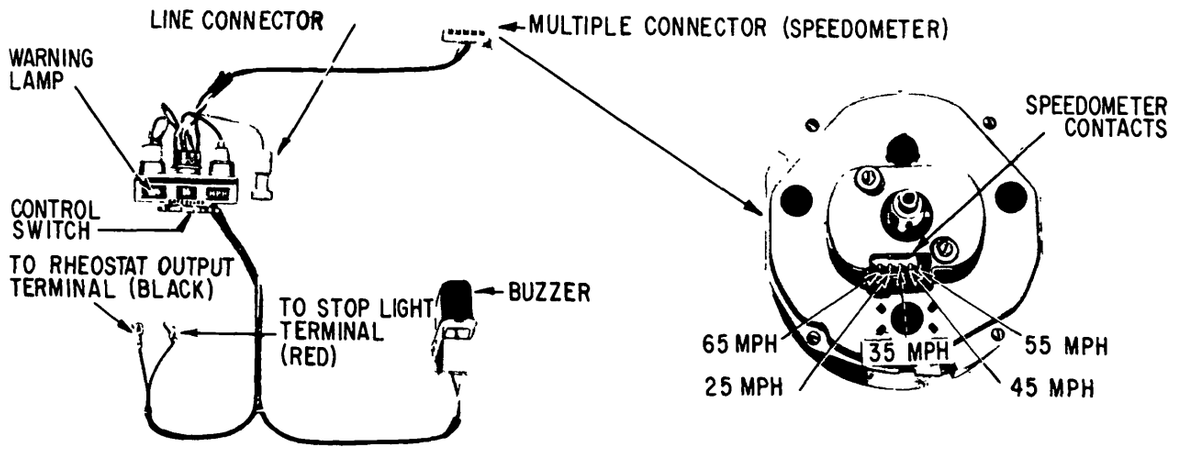
1958 PONTIAC

DESCRIPTION & OPERATION: Unit consists of a control switch on instrument panel allowing 5 settings from 25 to 65 MPH in 10 mile increments, and a warning buzzer and light. Speedometer is equipped to make contact with any one of the five contact points. When desired speed is reached circuit is completed and buzzer and light will operate over a 9 mile range above pre-set speed. Then they stop until car speed is reduced within the range.

TESTING & TROUBLE SHOOTING: 1) If both buzzer and lamp fail, check stop lamp fuse. If only buzzer works, replace bulb. Ground circuit at line connector. If both buzzer and lamp fail, both are faulty; if they operate, switch, multiple connector, or speedometer are faulty.

2) Check all five multiple connector contacts. If buzzer and lamp do not operate, switch or line connector, or speedometer are faulty.

3) If only one or more speed positions are inoperative, contacts are not grounding. To check, place a jumper wire between line connector and individual contacts.



1958-59 OLDSMOBILE

DESCRIPTION & OPERATION: Unit consists of a buzzer behind instrument panel and a light below odometer, a selector knob and dial, and a hair spring on speedometer hand shaft. Any speed from 12 MPH may be selected. *CAUTION - Do not set below 12 MPH.* A hand is mounted behind speedometer and, when speedometer hand reaches Safety Sentinal hand, contact with an insulated pin is made, completing circuit and causing buzzer to sound and light to go on.

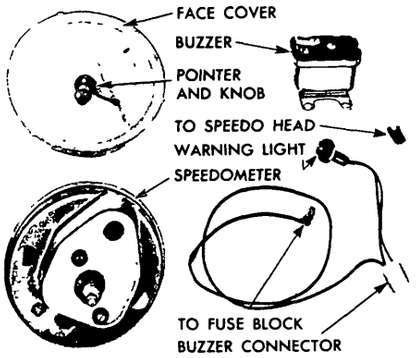
TESTING: Make sure the fuse (yellow wire) is not blown. *NOTE - Parking brake lamp, safety switch, backup lamps, temperature, generator, oil pressure warning lamps and fuel gauge are also on this fuse.* Raise rear wheels from floor. Adjust selector knob to 30 MPH. Accelerate to 32 MPH. Buzzer and light should operate. If buzzer sounds and light is out, bulb is faulty. If light is on and buzzer does not sound, remove yellow wire from instrument cluster and ground with ignition switch in "ACC" position. If buzzer still silent, replace it. If buzzer and light does not operate but other units in same circuit do, and connection to printed circuit is good, speedometer is faulty.

1959-60 PONTIAC

DESCRIPTION & OPERATION: Consists of a setting knob in center of speedometer lens which is connected to a shaft through lens (shaft has a stop to prevent settings below 15 MPH). A speed warning pointer is connected to shaft and pointer moves with shaft to desired setting. Speedometer pointer has a silver alloy contact which contacts speed warning pointer when desired speed is reached so circuit is completed and buzzer and warning light are actuated until speed is reduced below setting.

►*INSUFFICIENT BUZZER LOUDNESS CORRECTION (Early Cars):* Relocate buzzer to left hand defroster nozzle over wiring clip. Reverse clip to accommodate buzzer and, on air conditioned cars, insulate buzzer terminals and center rivet to prevent a short circuit with air conditioning duct.

TESTING: If both buzzer and lamp inoperative, check speedometer fuse. If buzzer only operates, replace lamp bulb. Check circuit at line connector. If buzzer and lamp inoperative at all pointer positions, contacts or line connector are at fault. If buzzer and lamp operate at all speeds, speedometer or line connector are at fault.



PONTIAC SPEED WARNING ASSEMBLY

CHRYSLER PANELESCENT INSTRUMENT LIGHTING

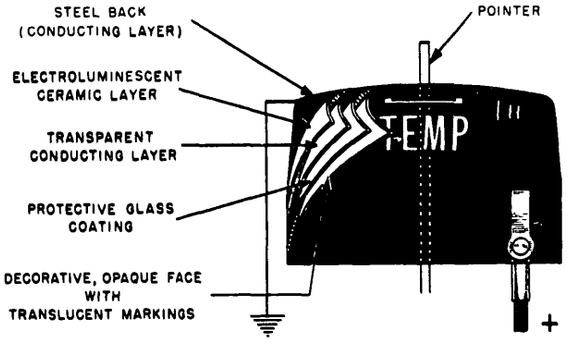
Chrysler & Imperial Models (1960)

►*PANELESCENT LIGHTING SERVICE CAUTION:* System operates at 200 volts, 250 cycles, A.C.; and In strument Panel Switch must be turned off BEFORE disconnecting leads or connecting test equipment to prevent possibility of electric shock from the high voltage. Terminals are protected and shock should not occur unless they are disconnected with the current on. *NOTE* – Wattage of system is low and shock should not result in injury.

DESCRIPTION: Panelescent lighting does not employ conventional bulbs or lamps filaments. Each instrument or other illuminated device has a dial face built up of layers which include an electroluminescent (phosphorescent) layer which glows when the high voltage is applied to the transparent conducting layer (see illustration). Instrument pointers are similarly constructed and also serve as light sources. Power for the system is provided by a Power Pack or Oscillator which converts the 12 volt D.C. power supply to 200 volt, 250 cycle A.C. Power Pack cannot be repaired and is serviced by replacement.

TROUBLE SHOOTING & DIAGNOSIS: *See Service Caution above.* A failure of the power supply or a short-circuit at any of the panel units will cause the entire panel to remain unlighted. An open-circuit at any one of the panel units will cause that unit only to remain unlighted and all other units will be lighted normally. Check by turning on instrument panel switch and observe lighting.

One or More Instruments Unlighted: Replace unit and recheck lighting.



TYPICAL PANELESCENT GAUGE

Entire Panel Unlighted: Turn instrument light switch OFF. Connect tester, Tool C–3764, at Power Pack (disconnect Power Pack connectors, plug in one tool connector to Power Pack, other tool connector to line connector, connect tester BLACK wire to a good ground on the instrument panel). Turn on instrument light switch and observe indicators on ends of tester. Both indicators should glow. *NOTE – Indicator at BLACK end is low voltage D.C. indicator. Indicator at RED end is high voltage A.C. indicator.* If both indicators do not glow, proceed as follows:

Neither Indicator Glows – Supply circuit (orange wire) is open. Check this wire and instrument panel light switch.

Black (D.C.) Indicator Glows – Red (A.C.) Indicator does not Glow – Power Pack is not operating. Replace unit and recheck system.

Both Indicators Glow – This indicates that one or more of the instruments are short-circuited. Disconnect each unit in succession and check by touching test prod (white wire) of tester to the instrument terminal. If instrument does not light up, it is short-circuited and must be replaced. *CAUTION – If more than one instrument is shorted, panel will remain dark after the first instrument is replaced. Continue to check all oth r instruments.*

AUTOLITE DISTRIBUTORS (SINGLE & DOUBLE BREAKER TYPE)

DESCRIPTION: **Single breaker distributors** have a pivoted type breaker plate assembly consisting of a support plate which is mounted rigidly in housing and a separate breaker plate on which the contact assembly and condenser are mounted. The breaker plate is pivoted on support plate at a point under the condenser and rests on brass supports on plate. A tension spring on underside of support plate provides constant uniform friction between the two plates and governs action of vacuum unit in rotating the plate to advance or retard the spark.

Dubl br ak r distributors have a ball bearing type breaker plate assembly which consists of a support plate mounted in distributor housing and a breaker plate on which the contact assemblies and condenser are mounted. Retainer clips on support plate engage the bearing assembly on underside of breaker plate and hold the assembly firmly in recess in support plate. **On all distributors** the vacuum advance link connects directly to breaker plate and rotates it around distributor cam. A single spring is used on each governor advance weight. One spring has light tension to control low speed advance. Other spring has heavy tension for high speed control.

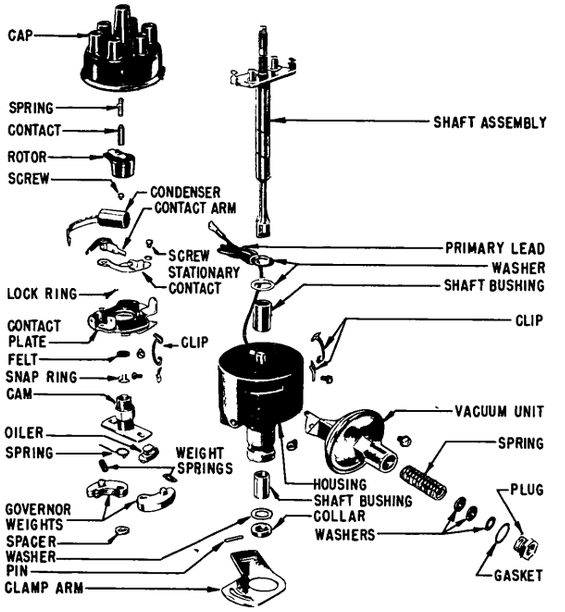
ADJUSTMENT: **Aut matic Advance** - With distributor installed in testing equipment, check distributor automatic advance. *See Car Model pages for "Automatic Advance Specifications".* To adjust automatic advance, bend outer spring lug of light spring for low speed and outer lug of heavy spring for high speed operation.

Vacuum Advanc : *NOTE - Vacuum advance units on 6 Cyl. distributors cannot be adjusted. Replace vacuum unit if not within specifications.* Check vacuum advance after checking automatic advance (above). *See Car Model pages for "Vacuum Advance Specifications".* To adjust V8 vacuum advance unit, adjust washers as follows: Remove retaining plug and gasket and remove washers. Check thickness of removed washers and substitute thinner washer if vacuum required to move plate is greater than specified. Substitute thicker washer if vacuum required to move plate is less than specified. *NOTE - In some cases it may be n cessary to replace spring, then adjust to specifications by means of various combinations of washers.*

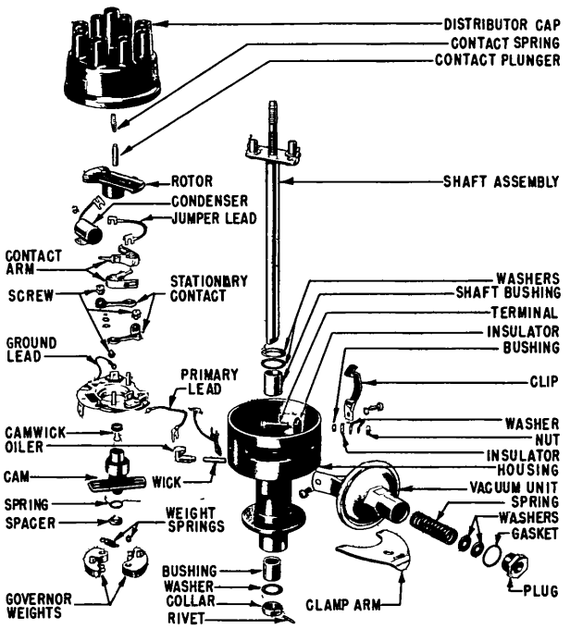
C ntact P int Alignm nt & Gap Setting: Align contacts to provide center contact by bending stationary contact only. Grip bracket next to contact and bend it away from breaker arm, then bend it back to vertical. *NOTE - A new contact is always lower than breaker arm.* If necessary, repeat bending process several times to obtain perfect alignment. *CAUTION - Do not bend movable breaker arm.* After points aligned, check point gap with dial indicator *(see Car Model pages for specifications).*

Br aker Arm Spring Tension: *See Car Model pages for specifications.* Measure tension at point surfaces with a spring scale at right angle to point surfaces. Note scale reading at point where contacts start to separate. To adjust, move end of point spring in or out as necessary.

DISASSEMBLY: Remove vacuum unit, distributor cap clamp springs, and rotor. On single breaker distributors, push in rubber grommet and remove primary lead. On



SINGLE BREAKER DISTRIBUTOR (TYPICAL)



DOUBLE BREAKER DISTRIBUTOR (TYPICAL)

double breaker distributors, loosen primary terminal post nut and remove primary lead. Remove breaker plate attaching screws and remove breaker plate assembly. Remove cam felt and spring clip retainer from center of cam and remove anti-rattle spring. *Check distributor shaft sideplay (see below).* Remove cam and yoke. Drive retaining pin from drive collar and shaft and remove collar. Remove lower thrust washer and push shaft out through top of housing. *NOTE - On distributors with driven gear held on shaft with retaining pin, support hub of gear so gear not damaged when pin driven out.* Remove upper thrust washers, oiler and oiler wick. Remove governor weights and springs.

Inspection: Wash all parts except breaker plate and vacuum diaphragm in solvent and blow dry with air. Check operation of governor weights and check weight springs for distortion. Inspect all bearing surfaces and pivot points for binding, roughness or excessive wear.

Drive Shaft Sideplay: With distributor clamped in a vise, attach a dial indicator to body with indicator plunger against cam. Move shaft back and forth with just enough force to indicate clearance. If sideplay exceeds .005", replace bushings or shaft (see below).

Drive Shaft Endplay: .003-.010" measured after drive shaft collar riveted in place.

Bushing Replacement: On 6 Cyl. distributors, remove bushings with a suitable tap and puller (C-3744). DO NOT drive bushings from housing. On V8 distributors, drive bushings from housing with a suitable driver (C-3041). On all distributors, install new bushings with suitable adapter and driver (C-3041) and press new upper bushing into position in bore. *NOTE - Soak bushing in light engin oil for 15 minutes before installation.* When properly installed, the bushing will be .094" below top of bore. Invert distributor housing and press lower bushing in until it is flush with bottom face of distributor. Drill a 1/8" hole through upper bushing by drilling through oil wick hole. Remove burrs from hole after drilling. Install suitable burnishing tool (part of C-3041) and force through both bushings. Burnishing tool should finish inside diameter to .4995-.5000". Maximum bushing-to-shaft clearance .0005".

REASSEMBLY: Place grease in lubricant hole of governor weights and install weights and springs. Install anti-rattle spring. Slide cam and yoke over end of drive shaft and secure with spring clip. As cam and yoke are being slid over shaft, engage weight lugs with slots in yoke. Lubricate governor weight pivots, yoke slots and cam sleeve with engine oil. Slide inner thrust washers over shaft and up into position against governor plate. Lubricate shaft with light engine oil and install in distributor. Slide outer thrust washer and collar over drive shaft, then install a new pin and peen ends of pin over shaft. *NOTE - On distributors with driven gear held on shaft with retainer pin, support hub of gear so gear will not be damaged when pin driven in.* Soak oiler wick and felt pad in light engine oil, squeeze slightly, then install. Install oiler by tapping into place. Install breaker plate assembly into position and line up attaching screw holes, then attach distributor cap clamp springs and screws and tighten securely. On single breaker distributors, slide primary lead through hole in body and seat grommet in hole. On double breaker distributors, install terminal post assembly. Install vacuum unit, engaging vacuum unit arm with pin on breaker plate. Install attaching screws and tighten securely. Install spring clip over breaker plate pin to secure vacuum unit arm. Install condenser, stationary contact arm, and breaker arm.

CHRYSLER CORP. DISTRIBUTORS

Chrysler (1961)
Dodge & Plymouth (1960-61)
Lancer (1961)
Valiant (1960-61)

DESCRIPTION: Single breaker type distributor with a "pivoted" type breaker plate. The breaker plate assembly consists of a support plate which is attached rigidly to distributor housing and a movable breaker plate which is pivoted on support plate at a point under the condenser. Distributor primary lead is a continuous wire which enters housing through an insulating grommet.

DISASSEMBLY: Remove rotor, then remove clip attaching vacuum control unit to breaker advance arm and remove vacuum control unit from distributor housing. Remove primary lead terminal at terminal screw and remove primary lead wire and grommet as an assembly from distributor housing. Remove two screws and lockwashers attaching breaker plate assembly to housing and lift out the complete assembly including points and condenser. Remove oil wick from distributor cam, then remove wire clip from well in cam and remove cam, yoke and spacer. Clamp distributor in a vise (with soft jaws) and attach a dial indicator to body of distributor with indicator plunger resting against distributor shaft. Hook a spring scale over shaft and pull on a line with plunger of gauge. Apply a 5 lb. pull and check movement of distributor shaft. If side play exceeds .005", replace bushings and shaft. Remove distributor drive gear (six cylinder) or collar (V8) retaining pin and slide gear or collar off shaft. *NOTE - Support hub of gear or collar so pin can be driven out without damaging parts.* Clean burrs from around pin hole and remove lower thrust washer. Push shaft up and remove through top of distributor, then remove upper thrust washers, shaft oiler and oiler wick.

BUSHING REPLACEMENT: Remove upper and lower bushings with Tool C-3744. *CAUTION - Do not drive bushings out of housing.* Before installing new bushings, soak in light engine oil for approximately 15 minutes. Position upper bushing with slot in bushing up and in line with oil hole in housing. Press bushing into housing with Tool C-3041 and adaptor (flat face of adaptor contacting bushing). When properly installed, upper end of bushing should be 1.613" from top of distributor housing (measured from bottom edge of straightedge to top of bushing. Invert distributor and install lower bushing flush with face of distributor base. *NOTE* - Insert a 3/32" rod through housing oiler hole to see if slot in bushing indexes with oiler hole in housing. If rod cannot be inserted through housing and bushing, drill a 1/8" hole through upper bushing by drilling through oil wick hole (remove burrs caused by drilling). Install burnishing tool, C-3041 and press burnisher through both bushings.

REASSEMBLY: Check operation of centrifugal weight and check weight springs for distortion. Lubricate governor weights and inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness. Install spacer on distributor shaft, then slide cam and yoke assembly on distributor shaft and engage weight lugs with slots in yoke. Install cam retaining spring clip, then lubricate and install upper thrust washers on shaft and slide shaft into distributor body. Position lower thrust washer and drive gear on lower end of shaft and install roll pin. *NOTE - Support hub of gear when installing pin so gear will not be damaged.* Install oiler wick and oiler, then install breaker plate assembly. Align condenser lead, breaker point spring, and primary lead, install attaching screws. Install felt wick in top of distributor cam. Attach vacuum control unit to breaker plate and install retainer clip and washer, then install vacuum unit attaching screws. Check breaker arm spring tension (see below) and adjust point gap. Lubricate felt pad in top of distributor cam with 3 to 5 drops of light engine oil and install rotor.

PERFORMANCE DATA: *See Car Model pages for Automatic & Vacuum Advance specifications.*

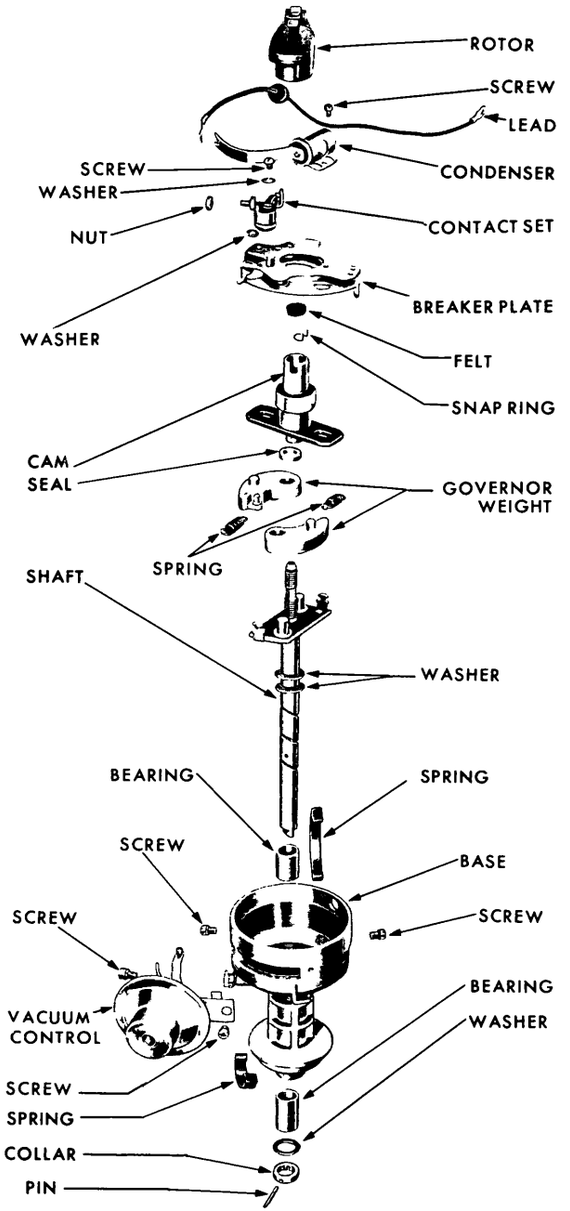
►*DISTRIBUTOR POINT GAP & DWELL NOTE:* Point gap and dwell must be within specifications at the same time (see Car Model pages for data). If this cannot be accomplished, either wrong points are installed or cam lobes are badly worn. Check dwell with engine idling at 475-500 RPM. *Dwell variation at speeds above 1500 RPM is not an indication of distributor wear.*

BREAKER ARM SPRING TENSION: Hook spring scale, Tool MTU-36 on breaker arm and pull in a straight line at a right angle to point surfaces. Take a reading as points start to separate. Spring tension should be 17-21.5 ozs. If not within limits, loosen screw holding end of point spring and slide end of spring in or out as necessary. Tighten screw and recheck spring tension.

LUBRICATION: Add 3 to 5 drops of SAE 10W oil to oiler on outside of distributor base and to felt wick under rotor in top of distributor cam. Wipe old grease from surface of breaker cam and apply a light film of new distributor cam grease. *CAUTION - Do not over-lubricate.*

VACUUM CONTROL UNIT: This unit cannot be disassembled or adjusted. If not within specifications, replace complete vacuum control unit.

HIGH TENSION CABLES: These cables have a non-metallic string type conductor for improved radio noise suppression. Do not jerk cables off spark plugs or out of distributor cap towers as cables may pull out of terminals or be damaged. Check cables for excessive resistance or open circuit. Replace cable if resistance is greater than 30,000 ohms or if terminal has pulled off.



CHRYSLER CORP. DISTRIBUTOR ASSY. (V8 SHOWN - 6 CYL. SIMILAR)

DELCO-REMY "FIXED PLATE" DISTRIBUTORS

DESCRIPTION: Single breaker, fully automatic type Centrifugal advance consists of an automatic cam actuated by two centrifugal weights controlled by springs and mounted under breaker plate Breaker plate is rigidly mounted in distributor housing Vacuum advance is controlled by a vacuum diaphragm unit mounted below distributor housing Vacuum link is riveted to vacuum diaphragm at one end and clamped around distributor stem at other end When vacuum unit is in operation, the entire distributor is rotated in its mounting to secure the proper vacuum advance Distributors with double breakers have both contact assemblies mounted on breaker plate and linked to each other by jumper wire

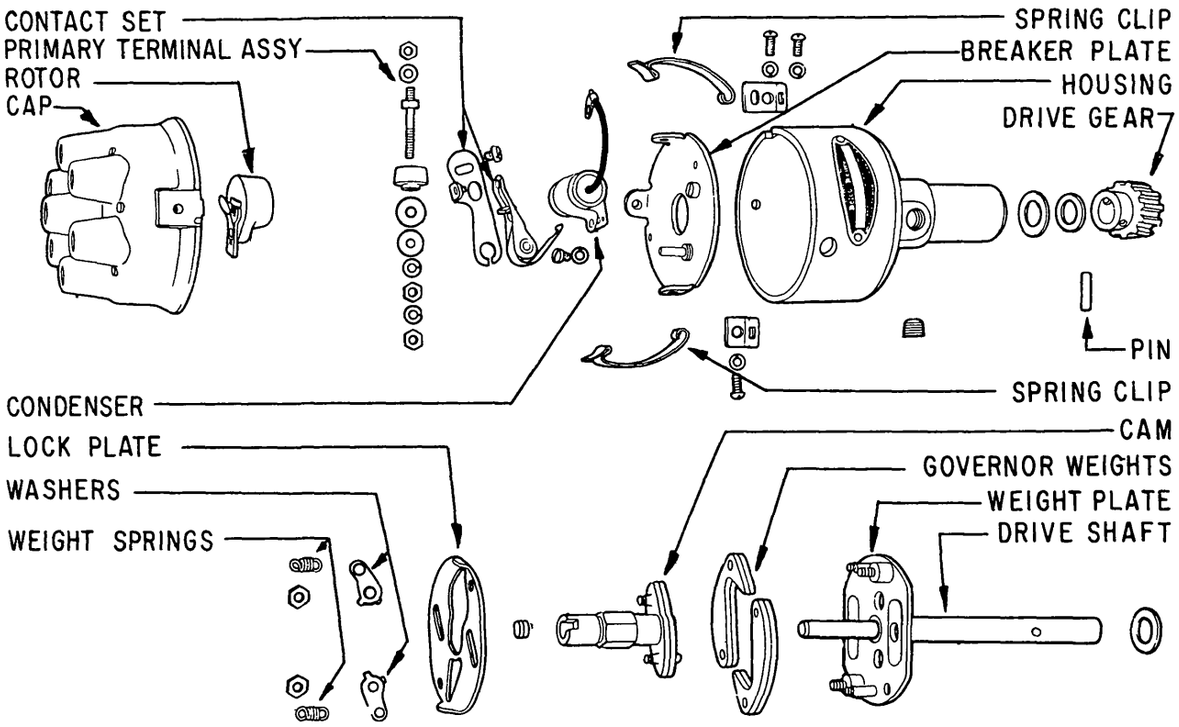
ADJUSTMENT: Automatic Advance - With distributor installed in testing equipment, check distributor automatic advance *See Car Model pages for "Automatic Advance Specifications"* To adjust automatic advance, adjust weight spring calibration, or replace weights, springs, or cam

Vacuum Advanc : Check vacuum advance after checking automatic advance (above) *See Car Model pages for "Vacuum Advance Specifications"* If not within specifications, replace vacuum unit

C ntact P int S tting & Alignment: *Check contact point opening with dial indicator only* With breaker arm rubbing block on extreme top of a cam lobe which will give widest point opening, loosen support lock screw and turn adjusting screw to obtain proper gap *See Car Mod l pages for specifications* Tighten lockscrew Align points by bending fixed contact support DO NOT bend breaker lever Recheck point opening after alignment

Br aker Arm Spring Tensi n: 17-21 ozs measured at center of contact, 19-23 ozs measured just behind contact Measure tension with a suitable spring scale hooked at right angle to contact surfaces and take reading at point where contacts start to separate To adjust, bend spring carefully

DISASSEMBLY: If vacuum unit removed with distributor, loosen clamp screw and remove vacuum unit Remove rotor, breaker arm (loosen insulated terminal outside spanner nut), contact point and support assembly, and condenser Remove insulated terminal stud assembly Remove breaker plate attaching screws and remove breaker plate Remove lubrication cup, spring and bakelite shaft contact plug *NOTE - On distributors with tachometer drive, remove thrust plug and accessory drive shaft from housing before distributor drive shaft can be removed* Drive out pin holding drive gear to shaft, remove gear and lift out shaft and advance mechanism Bend lock plate tangs and remove nuts, lock plate and hold down plate Remove governor weights, springs, and cam from shaft



DELCO-REMY "FIXED PLATE" DISTRIBUTOR (EXPLODED)

Inspection: Wash all parts except cap, rotor, condenser, and vacuum unit in solvent and blow dry with air Inspect all parts for wear, roughness, and for free operation If shaft or bearings are worn, replace shaft and housing *NOTE - If bushings are replaced, use a special arbor and extreme care so that bearing surface is not damaged during installation DO NOT ream new bushings* Check alignment of shaft Shaft runout should not exceed 002"

REASSEMBLY: Assemble governor weights on shaft Oil top of shaft, install cam and weight springs Install hold down plate, lock plate, and nuts and bend lock plate tangs up Lubricate shaft and install in housing Install drive gear with new retainer pin *NOTE - When installing tachometer drive gear and shaft, add or remov shims at thrust plug to obtain 005-010" endplay of accessory drive shaft Pack accessory drive chamber with Delco-Remy No 2½ grease* Install breaker plate assembly Install primary terminal assembly loosely Install condenser and contact point assembly and tighten primary terminal stud Fill lubrication cup with chassis lubricant and install bakelite plug, spring and cup Install vacuum unit Check for free operation of all components

DELCO-REMY "CENTER-BEARING BREAKER PLATE" DISTRIBUTOR

DESCRIPTION: Single breaker, fully automatic with centrifugal and vacuum advance. "Center Bearing" breaker plate assembly consists of a support plate rigidly mounted in distributor housing and a separate breaker plate on which contact assembly and condenser are mounted. Breaker plate rests on three bakelite buttons which slide on support plate when breaker plate is rotated by vacuum control. An oil soaked felt between support plate and breaker plate provides lubrication for buttons. Plates are held together as follows:

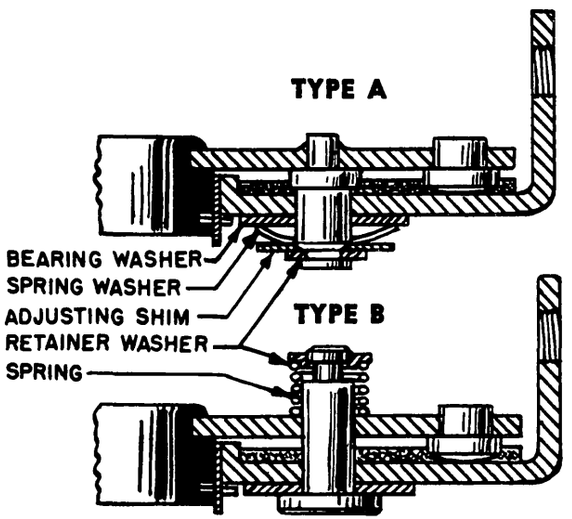
Type A - A breaker plate post extends down through a slot in support plate with washers and tension adjusting shims on post below support plate. A side spring in inner rim of support plate prevents tipping of breaker plate during operation.

Type B - A breaker plate post extends up through both plates and has a spiral tension spring on top of breaker plate. Spiral spring held in place by "C" washer on post. A side spring in inner rim of support plate prevents tipping of breaker plate during operation.

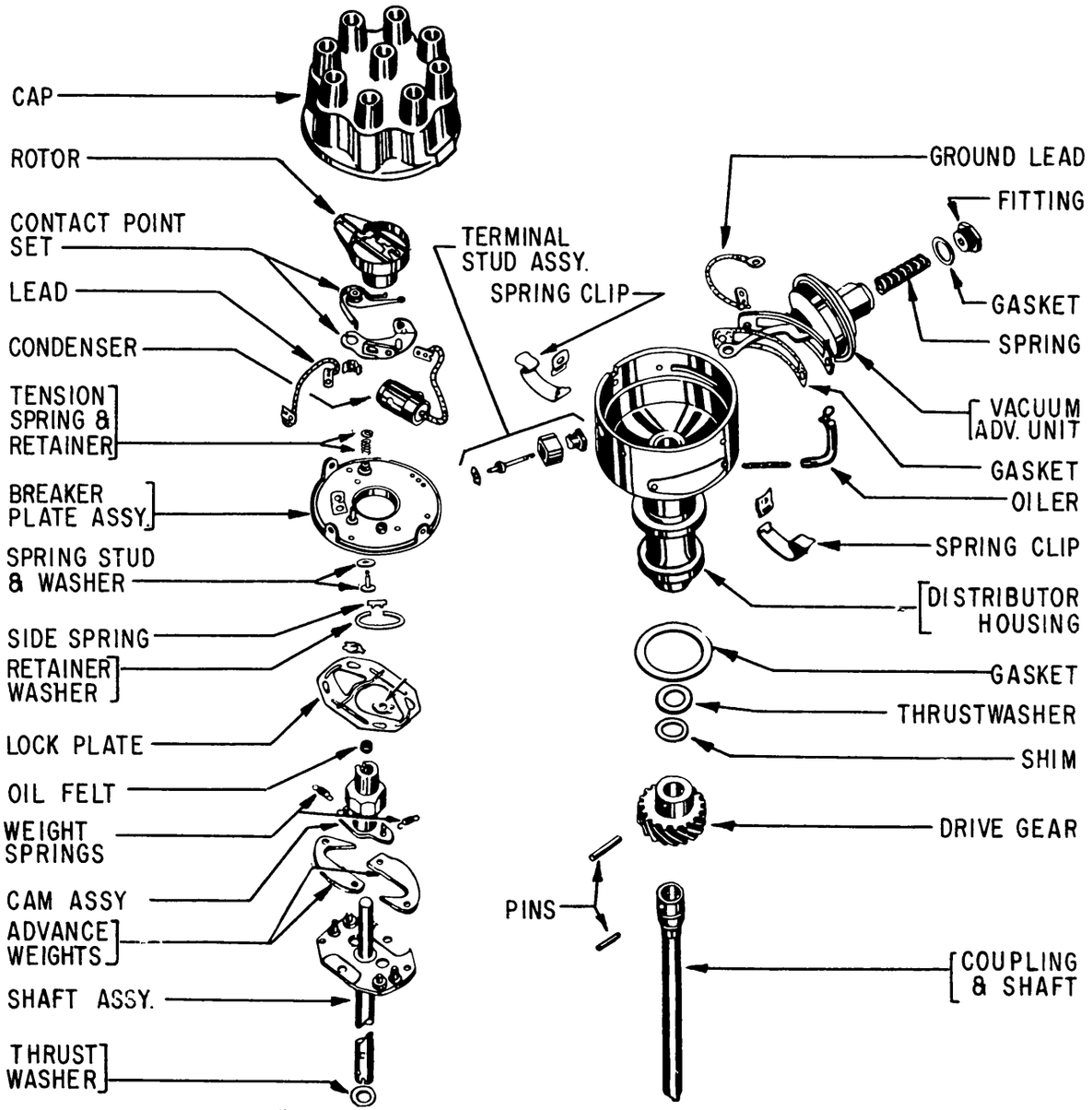
ADJUSTMENT: Automatic Advance - With distributor installed in testing equipment, check distributor automatic advance. *See Car Model pages for "Automatic Advance Specifications".* To adjust automatic advance, adjust weight spring calibration, or replace weights, springs, or cam.

Vacuum Advance: Check vacuum advance after checking automatic advance (above). *See Car Model pages for "Vacuum Advance Specifications".* If not within specifications, replace vacuum unit.

C ntact Point Setting & Alignment: *Check contact point opening with dial indicator only.* With breaker arm rubbing block on extreme top of a cam lobe which will give widest point opening, loosen support lock screw and turn adjusting screw to obtain proper gap. *See Car Model pages for specifications.* Tighten lockscrew. Align points by bending fixed contact support. DO NOT bend breaker lever. Recheck point opening after alignment.



BREAKER PLATE SPRING POST ASSEMBLY (TYPES A & B)



DELCO-REMY "CENTER BEARING BREAKER PLATE" DISTRIBUTOR (EXPLODED)

Breaker Arm Spring Tension: 17-21 ozs. measured at center of contact; 19-23 ozs. measured just behind contact. Measure tension with a suitable spring scale hooked at right angle to contact surfaces and take reading at point where contacts start to separate. To adjust, bend spring carefully.

Breaker Plate Tension: *NOTE - Breaker plate must have sufficient tension on support plate to prevent tipping or side movement but friction between plates must not be excessive or correct operation of vacuum control will be affected. Wh never distributor being serviced or breaker plate reassembled, check and adjust tension as follows:* With breaker plate assembly removed from distributor, hold assembly right side up and on a hori-

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DELCO-REMY "CENTER-BEARING BREAKER PLATE" DISTRIBUTOR (C ntinued)

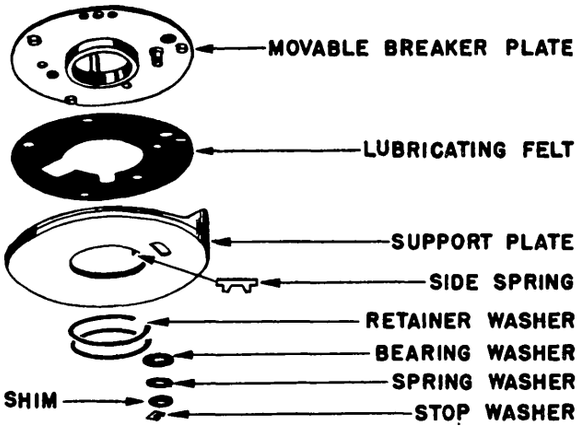
zontal plane. Hook a spring scale at stabilizer spring post and pull upward. Force required to start vertical movement of post should be 32-56 ozs. (Type A). 18-24 ozs. (Type B). With spring scale hooked to vacuum unit link connector post, maximum force required to start breaker plate rotation on support plate should be 20 ozs. (Type A), 15 ozs. (TypeB). *CAUTION - Hold spring scale directly perp ndicular to breaker plate for vertical check and dir ctly parall l for rotation check.* To adjust tension, vary the number of shim washers (Type A), stretch or replace spiral spring (Type B).

Distributor Shaft Endplay: With upper (weight plate) thrust washers between plate and housing and with shaft and plate in housing, place a shim between lower thrust washer and drive gear. Endplay should be .002-.007". Adjust endplay by adding or removing shims at drive gear end of shaft. Shims furnished .005" and .010" thick.

LUBRICATION: In addition to normal distributor lubrication, apply 3-4 drops of light engine oil through oil hole in breaker plate to felt separator at 5000 mile intervals.

DISASSEMBLY: Distributor - Remove rotor and breaker plate ground lead. Remove vacuum control unit. Remove insulated primary terminal assembly and cap clamp springs. Remove breaker plate assembly. Remove lock plate (bend retaining lugs down), weight springs, cam, and weights. *Check distributor shaft endplay (see above).* Drive the drive gear retaining pin from shaft and gear and remove gear. *NOTE - On distributors with tachometer drive, remove thrust plug and accessory drive shaft from housing before distributor drive shaft can b removed.* Remove drive shaft from housing.

Breaker Plat : *CAUTION - DO NOT disassemble Type B breaker plate with plate installed in housing, or post will drop down into housing.* Remove contact point assembly and condenser. Remove "C" washer from post, remove shims, washers and retainer washer (Type A),

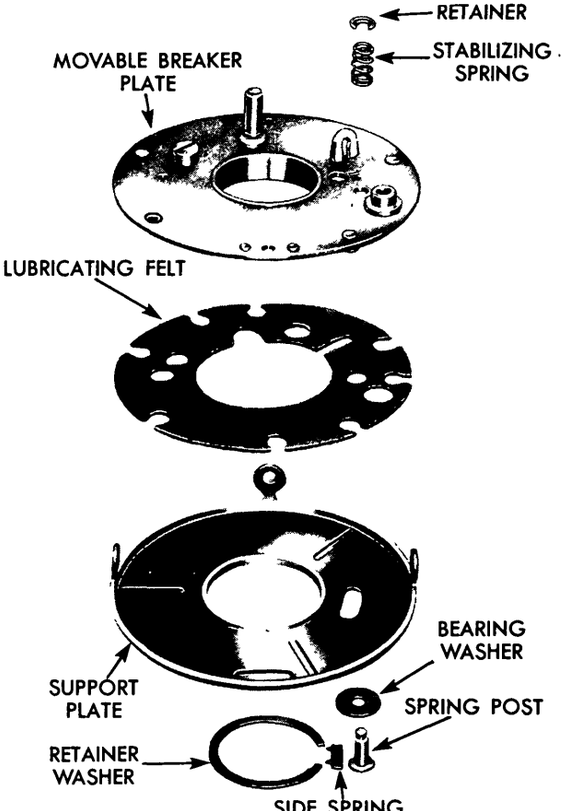


DELCO-REMY "CENTER BEARING" BREAKER PLATE ASSEMBLY (TYPE A)

remove "C" washer and spiral spring from post (Type B). Separate plates. *CAUTION - Do not lose side spring in support plate.*

INSPECTION: Wash all parts except cap, rotor, condenser, and vacuum unit in solvent and blow dry with air. Inspect all parts for wear, roughness, and for free operation. If shaft or bearings are worn, replace shaft and housing. *NOTE - If bushings are replaced, use a special arbor and extreme care so that bearing surface is not damaged during installation. DO NOT ream new bushings.* Check alignment of shaft. Shaft runout should not exceed .002".

REASSEMBLY: Distributor - Reverse disassembly procedure and note the following: Oil drive shaft with light engine oil before installation. Place a few drops of oil on cam wick (if equipped). When installing tachometer drive gear and shaft, add or remove shims at thrust plug to obtain .005-.010" endplay of accessory drive shaft. Pack accessory drive chamber with Delco-Remy No. 2½ grease.



DELCO-REMY "CENTER BEARING" BREAKER PLATE ASSEMBLY (TYPE B)

Breaker Plate: Place a few drops of oil on felt separator. Reverse disassembly procedure, installing all parts in exact order (see illustrations). Check breaker plate tension (see above).

DELCO-REMY "WINDOW" DISTRIBUTORS

DESCRIPTION: The Delco-Remy "External Adjustment" (Window) Distributor has the distributor cap forming the housing enclosing all of the mechanism. Adjustments on the car are made through a slot in the side of the cap after the window has been raised and it is not necessary to remove the cap in service. *See Corvair Note b low for xception.* The contact point assembly has been designed to make this type of adjustment possible through the use of a horizontal spring-loaded adjusting screw accessible through the window slot. The entire automatic (centrifugal) advance mechanism is located above the breaker cam and is enclosed within the large circular rotor. *See illustration for design d tails.*

►*CORVAIR DISTRIBUTOR NOTE: This distributor is ss ntially the sam as conv ntional "window" distributors xc pt that no xt rnal adjustm nt is provid d for br aker gap and cam angl . This adjustment must be mad with distributor cap r mov d, contact support lock screw loosened, and a screwdriver inserted in adjusting slot in breaker plate. Cam angle for this distributor is 33° (limits 31-36°). Other overhaul differences will be pointed out in following data.*

SPECIFICATIONS: Breaker Gap - .016".
Cam Angle - 30° (28-32°).
Breaker Arm Spring Tension - 19-23 ozs.
Automatic & Vacuum Advance - *See individual car model pages.*

ADJUSTMENT: Automatic Advance - With distributor installed in testing equipment, check distributor automatic advance. *See Car Model pages for "Automatic Advance Specifications".* To adjust automatic advance, adjust weight spring calibration, or replace weights, springs, or cam.

Vacuum Advanc : Check vacuum advance after checking automatic advance (above). *S Car Mod l pag s for "Vacuum Advanc Specificati ns".* If not within specifications, replace vacuum unit.

►*CAM ANGLE NOTE: Cam Angle can be adjusted on the car without removing distributor cap. Inspection of replacement of contact points and setting of breaker gap requires removal of cap or distributor assembly removal.*

Cam Angle Setting (On Car): Operate engine at idle speed. Lift adjustment window on side of cap. Use Allen wrench (or special tool - see Note below) to turn contact point adjusting screw. Turn screw in (clockwise) to increase cam angle, out (counterclockwise) to decrease cam angle. Use dwell meter and set cam angle to 30° (limits 28-32°). *NOTE* - If dwell meter not used, approximate setting can be secured by turning adjusting screw in until engine begins to misfire and then turning screw out (counterclockwise) ½-turn (180°).

►*ADJUSTING TOOL NOTE:* Special extensions, J-6296, or J-6788, or BT-1501, may be used for convenience in adjusting cam angle on installations where distributor is not readily accessible.

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DELCO-REMY "WINDOW" DISTRIBUTORS (Continued)

Br aker Gap & Cam Angle Setting (Off Car): Distributor cap can be removed for access to contact point assembly by releasing the two cap retaining latches. Engage screwdriver in slotted head of latch, press down, turn screwdriver ¼-turn in either direction.

Breaker Gap Setting - Use Allen wrench to turn adjusting screw in or out for gap of .016". *NOTE* - Adjusting screw is spring-loaded and no locking screws are used to position the stationary contact mounting plate.

Cam Angle Setting - Operate the distributor on a testing machine, use dwell meter to set cam angle at 30° (limits 28-32°) in same manner as on car adjustment (above). *NOTE* - If testing machine and dwell meter not used, approximate setting can be secured by mounting distributor in a vise and connecting a test lamp and battery across contact points. Turn adjusting screw in (clockwise) until lamp lights (points opening), then turn adjusting screw out (counterclockwise) ½-turn (180°). *CAUTION - Always recheck cam angle after distributor installed on engine.*

DISTRIBUTOR PARTS REPLACEMENT: Remove distributor cap by releasing latches as follows: Engage screwdriver in slotted head of latch, press down, turn screwdriver ¼ turn in either direction

R t r Removal & Installation: Rotor can be removed by taking out two screws attaching rotor to cam plate.

►*ROTOR INSTALLATION CAUTION:* Rotor can be installed in only one position (located by one square nib and one round nib on underside which must fit into corresponding holes in base plate). **Any attempt to install rotor in any other position will result in breaking r tor when attaching screws tightened.**

Contact Point Replacement: Loosen terminal screw on contact plate post and remove condenser and primary leads Take out two screws in contact set base and lift old contact set out Install new contact set When connecting leads, primary lead should be inside condenser lead and then looped over condenser lead and fastened in outer position on terminal screw (spade type lead terminals should be placed back-to-back on screw) Make certain that leads do not interfere with cap, advance weight base, or breaker advance plate Apply trace of Delco-Remy Cam & Ball Bearing Lubricant to face of breaker cam Adjust breaker gap *NOTE*—On Replacement Contact Sets, breaker arm spring tension and contact alignment are pre-set at factory and do not require adjustment

C ndenser Replacement: Remove condenser from breaker plate by disconnecting lead from contact set terminal post and taking out mounting screw in condenser bracket When installing condenser, make certain that bracket is properly located over protrusions on breaker plate and that terminal lead does not interfere with cap, advance weight base, or breaker advance plate

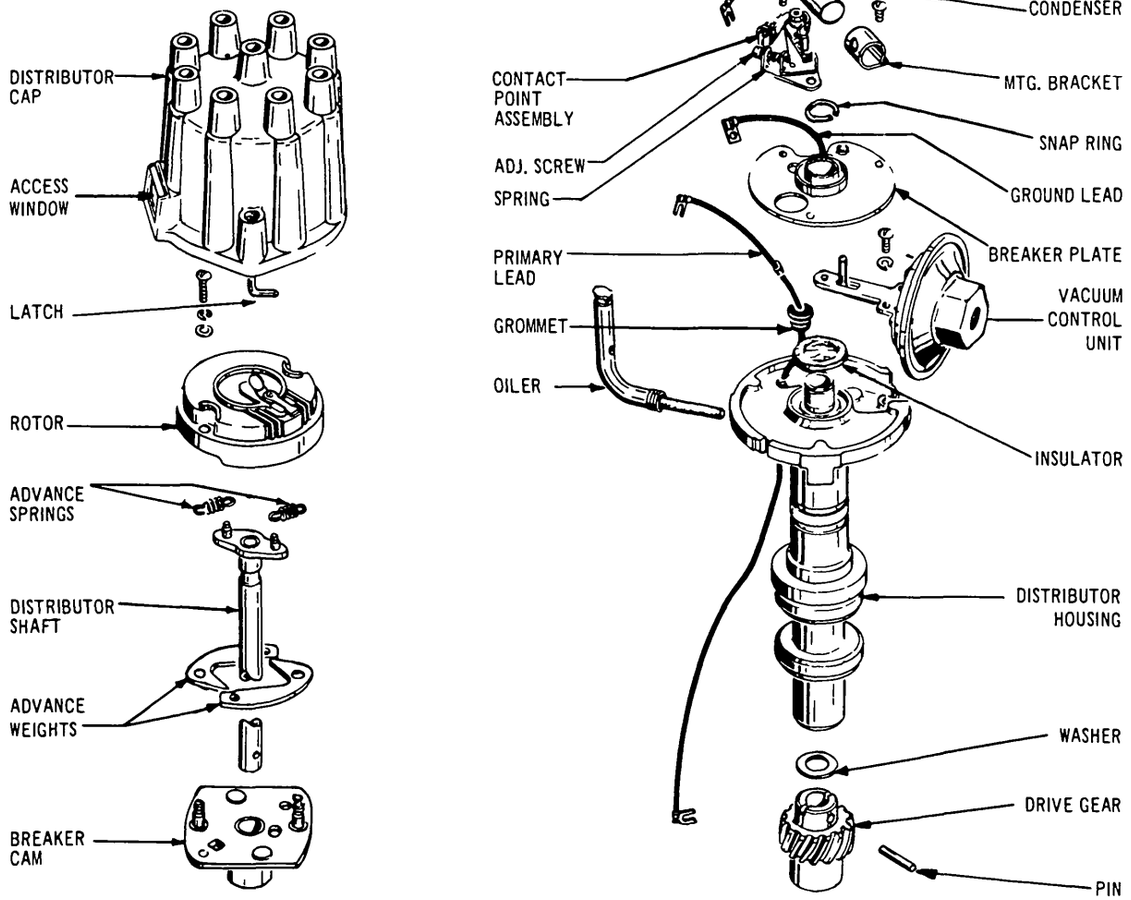
DISASSEMBLY: Remove rotor, weight springs and weights, file off drive gear retaining pin head, drive pin from gear and shaft and remove gear. *NOTE - On C rvair distributors, a second pin retains the two lower thrust washers on shaft. Remove this pin to remove washers before removing shaft.* Pull shaft and cam weight base assembly from housing. *NOTE - On distributors with tachometer drive, remove thrust plug and accessory drive shaft from housing before distributor drive shaft can be removed.* Remove cam and weight base from shaft. Remove condenser, contact point assembly, and cam lubricator from breaker plate. Remove snap ring and remove breaker plate. Remove vacuum unit. Remove felt washer from around housing bushing and remove gasket from housing.

Inspection: Wash all parts except cap, rotor, condenser, and vacuum unit in solvent and blow dry with air. Inspect all parts for wear, roughness, and for free operation. If shaft or bearings are worn, replace shaft and housing. *NOTE - Housing and bushings ar furnish d as an ass mbly only.* Check alignment of shaft Shaft runout must not exceed .002".

REASSEMBLY: Reverse disassembly and note the following: If lubrication in grooves at top of shaft was removed, replace with Plastilube No. 2.

Tachometer Drive Distribut rs - Add or remove shims at thrust plug to obtain .005-.010" endplay of accessory drive shaft. Pack accessory drive chamber with Delco-Remy No. 2½ grease.

Corvair Distributors - When installing vacuum unit, do not tighten retaining screws, then install breaker plate with 23° mark in line with scribe mark on housing and tighten vacuum unit retaining screws.



DELC -REMY "WINDOW" DISTRIBUTOR ASSEMBLY

FORD MOTOR CO. "LOADOMATIC" (SINGLE DIAPHRAGM) DISTRIBUTORS

►CHANGES, CAUTIONS, CORRECTIONS

►*LINCOLN FAF-12127-B & MERCURY FAE-12127-C (Early 1954) DISTRIBUTOR OVER-ADVANCE WHEN ENGINE STARTED AT LOWER TEMPERATURE CORRECTION:* This condition noted when engine detonates excessively after starting under low temperature conditions. Install new Pin & Post Assembly, Part No. FDC-12357-A (see below), which limits advance to 15-15½°. Earlier distributors that have been reworked in production are identified by the part number prefix "ED" *CAUTION - Wh n calibrating a corrected distributor, refer to Automatic Advance Table FDD-12127-A (Lincoln), FDC-12127-A (Mercury).*

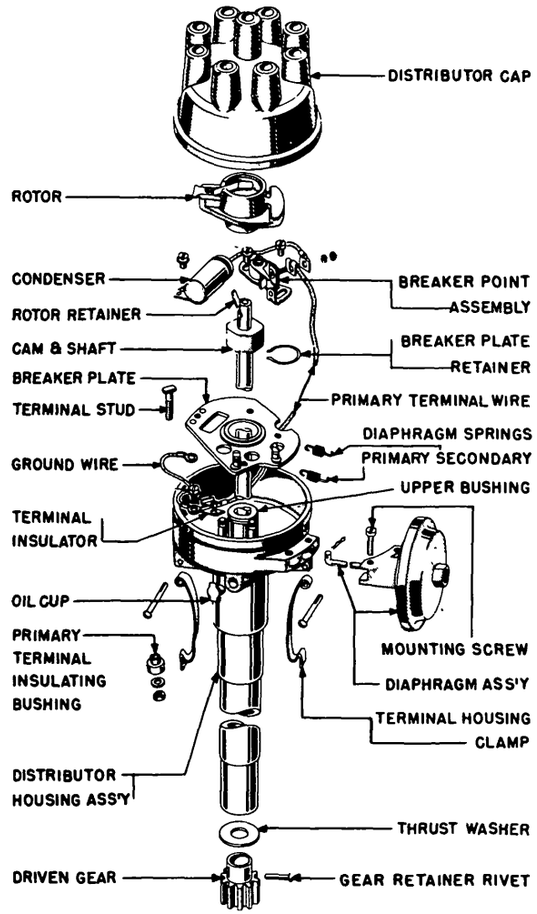
Pin & Post Ass mbly Installation - Remove distributor from engine. Remove rotor and turn primary spring adjustment post (post farthest from diaphragm) counterclockwise to remove all tension from spring and remove spring from post. Support distributor in holding fixture and carefully remove fixed adjusting post with a 1/16" pin punch. Install new Pin & Post Assembly, Part No. FDC-12357-A, so that pin is parallel to breaker plate slot when in full advance position. Attach primary spring and recalibrate distributor to specifications for distribut ors listed above.

DESCRIPTION: "Loadomatic" or pressure type distributor is a full automatic advance type in which the entire advance is provided by action of the vacuum diaphragm unit linked to the breaker plate (no centrifugal weights used). This advance action is controlled by the two diaphragm springs on the breaker plate which oppose diaphragm movement. Springs may be of equal or unequal weight, but act together to produce the desired advance curve. The diaphragm vacuum line is connected to the carburetor and terminates in two separate ports. Upper port is in carburetor venturi tube, lower port is in carburetor throat just above throttle valve edge. Vacuum at these ports and consequent suction on line varies in accordance with engine operating conditions to provide correct advance. On some carburetors, there is a nylon ball in lower port passage and/or a spark control valve to regulate the vacuum.

ADJUSTMENT: Contact Point & Cam Angle Setting - *See Car Mod l pag s for specifications.* On new points, insert a feeler gauge between points with rubbing block on the peak of a cam lobe. To adjust, loosen stationary contact lock screw. On used points, set point gap by checking cam angle since roughness of points will not allow accurate reading. Adjust by loosening stationary contact lock screw.

C ntact P int Alignment - Align points for full face contact by bending stationary contact bracket. *DO NOT b nd breaker arm.*

Br ak r Arm Spring Tensi n: *S Car Model pag s for specifications.* Check tension with spring scale hooked over movable contact and pulled at right angle to contact. Note reading as points just start to open. To adjust, loosen nut holding contact spring and move spring toward or away from breaker arm pivot as necessary.



"LOADOMATIC" DISTRIBUTOR (TYPICAL)

Spark Advance Adjustment: With distributor in a test stand, check operation of lowest and highest vacuum and RPM settings. *See Car Model pages for specifications.* If not within limits for low vacuum, adjust tension of primary spring by turning adjusting post as required. *Primary spring is farthest from vacuum unit.* If advance not within limits for high vacuum, adjust secondary spring in same manner. *NOTE - Always adjust primary spring first.* Make final check thro ughout entire range. If proper advance not obtained by adjustment of springs, replace springs or vacuum unit as necessary.

OVERHAUL

►*BUSHING WEAR TEST:* To determine shaft and bushing wear before distributor disassembled, mount distributor on test stand and operate so cam angle reading is obtained. Slide ring of a spring scale over shaft, hold scale at right angle to shaft, and exert a pull of 16 ozs. If cam angle varies more than 3°, excessive shaft and bushing wear is indicated.

►*DISTRIBUTOR HOLDING FIXTURE NOTE:* For ease in working on distributor and to prevent damage to housing and shaft, holding fixtures listed below are recommended to clamp distributor in vise.

Model	Holding Fixture No.
6 Cyl.	T52L-12132-CGD or 12132-C
V8	T52L-12132-DJD or 12132-D

DISASSEMBLY: Remove oil pump drive shaft (if equipped) by driving out retainer pin. Remove rotor and retainer, vacuum advance rod retainer, and vacuum unit. Remove condenser and contact point assembly. Release tension on advance springs and remove springs. *CAUTION - Do not distort springs.* Remove cap clamps. Drive out drive gear pin and collar pin, press gear off shaft, remove collar and slide shaft from housing. *NOTE - On tachometer drive distributors, remove accessory drive assembly. Drive out tachometer drive gear retainer pin, then press distributor shaft through top of housing and remov tachometer drive gear from bottom of housing.* Remove breaker plate lock ring retainer and remove breaker plate. Remove primary and ground wires.

Inspection: Clean all parts except points, condenser, lubricating wicks, oil seals, wiring, and vacuum unit in solvent and blow dry with air. Inspect all parts for wear, roughness, burning, distortion, etc. Replace parts as necessary. Minimum drive shaft diameter at bushing is .4675". Maximum bushing inside diameter is .4690".

►*BUSHING REPLACEMENT TOOL NOTE:* Use following tools to remove, replace, and burnish bushings:

Car Model	Remover	℄Installer	Burnisher
Edsel & Comet	12132-H	12132-A	12132
All Others	12132-B1 or N	12132-A	12132

℄ - With proper adapter, 12132-A1, A3, A5, A6, A10, as applicable.

Bushing Removal: *NOTE - Some distributors have one bushing, others have upper and lower bushings. Remove lower bushing first through bottom of housing, then remove upper bushing through top of housing. Single bushing is removed in same manner as upper bushings. Procedure following is the same for all bushings.* Compress and insert slotted end of remover tool (see above) in distributor housing, expand and butt tool against bushing, then drive out bushing.

Bushing Installation: *NOTE - On single bushing distributors, install bushing according to instructions for upper bushing.* Oil lower bushing and install with installer tool (see above) until bushing is flush with lower edge of distributor housing. Oil upper bushing and install with lock ring end up with installer tool and proper

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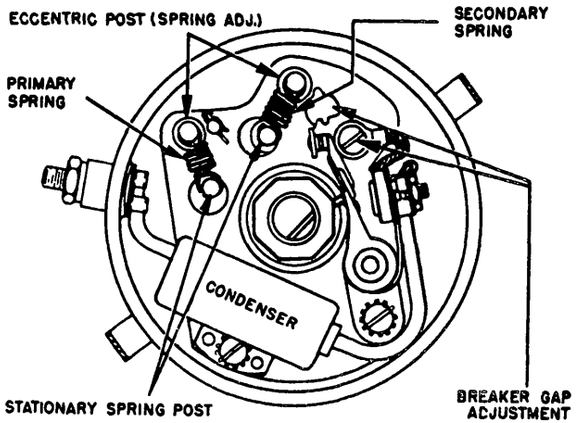
FORD MOTOR CO. "LOADOMATIC" (SINGLE DIAPHRAGM) DISTRIBUTORS (Cont.)

adapter (see above) until adapter bottoms firmly against top of distributor housing. Adapter will seat bushing to proper depth in housing. Burnish bushings to correct size.

REASSEMBLY: *NOTE - Always replace shaft and drive gear as an assembly.* Reverse disassembly procedure, installing all parts in proper order, and note the following:

Old Shaft & Gear Installation (Without Collar): Press gear on shaft until pin holes are aligned. Install pin and peen if solid type pin. Check shaft endplay between gear and housing (see table below). If endplay not within specifications, install new shaft and gear (see below).

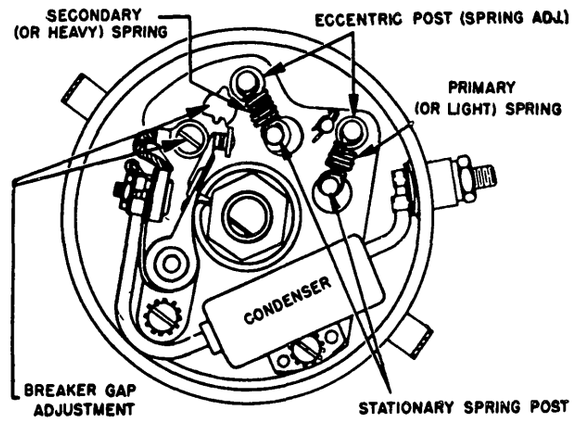
Old Shaft & Gear Installation (With Collar): Slide collar on shaft, align pin holes, install pin and peen if solid type pin. Check shaft endplay between collar and housing (see table below). If endplay not within specifications, replace shaft and gear (see below). Press drive gear on shaft so pin holes align. Install and peen pin. Distance from bottom face of drive gear to bottom face of distributor mounting pad with all shaft endplay removed should be 4.991-4.996". If not correct, replace shaft and gear (see below). *NOTE - On tachometer drive distributors, install tachometer drive gear so pin holes align and install pin. Tachometer drive gear replaces collar on this distributor. Check endplay between cam and bushing (upper end of distributor).*



LOADOMATIC DISTRIBUTOR
COUNTERCLOCKWISE ROTATION

New Shaft & Gear Installation (Without Collar): With distributor inverted and supported, hold distributor shaft with cam against bushing so all endplay is removed. Press new gear on shaft until proper endplay (clearance between gear and housing thrust washer) is obtained. See table below. Drill 1/8" hole through shaft, install new gear retainer pin, and recheck endplay.

New Shaft & Gear Installation (With Collar): With distributor inverted and supported, insert minimum clearance feeler gauge (see Endplay table below) between backing screw (or shaft support) and remove all endplay (cam firmly against bushing). Remove feeler gauge and let shaft rest on backing screw or support. Slide collar over drive shaft and hold against distributor housing. *NOTE - On tachometer drive distributors, install tachometer drive gear so it is firmly against thrust washer inside housing.* Drill 1/8" hole in shaft, install pin to secure collar or tachometer drive gear. Check endplay (see table below). Remove all endplay from distributor shaft and press on distributor drive gear until distance from bottom face of drive gear to bottom face of distributor mounting pad with all shaft endplay removed is 4.991-4.996". Drill 1/8" hole through shaft, install and peen retainer pin. *NOTE - Tachometer driv distributor endplay is check d betw en cam and bushing.*



LOADOMATIC DISTRIBUTOR
CLOCKWISE ROTATION

Distributor Shaft Endplay

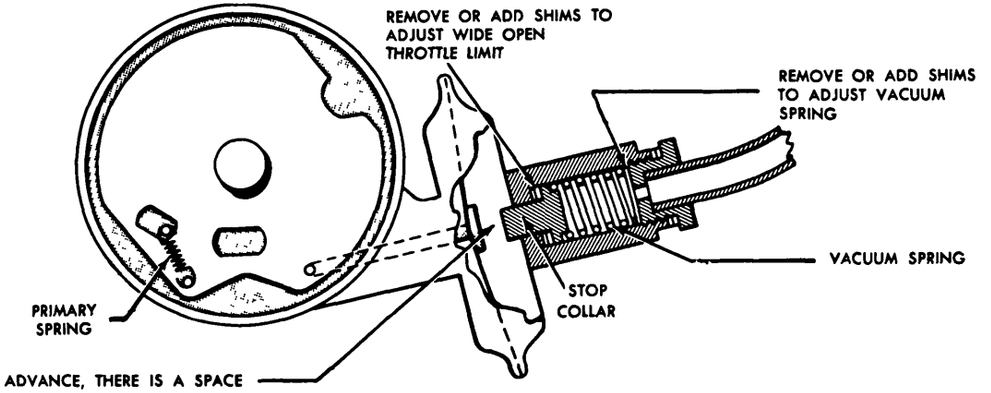
Car Model	Endplay
6 Cyl. (Except Comet & Falcon)	.005-.008"
Comet & Falcon	028"
All V8 Engines 1954-55	.020-.024"
All V8 Engines 1956-58	.022-.030"

FORD MOTOR CO. "STEP-STOP" DISTRIBUTORS

DESCRIPTION: Similar in design to previous "Loadomatic" distributors except that secondary spring and post have been eliminated and modified vacuum diaphragm has a vacuum spring, moveable stop collar and adjusting shims similar to V8 type vacuum units. Stop collar acts as a seat for vacuum spring and is located on inside end of spring with its inward travel limited by a restriction in bottom of spring housing. Projection of collar extends through restriction and is aligned at a predetermined distance with end of diaphragm rod. This design permits lower maximum advance stop for wide open throttle in addition to usual stop for road load conditions.

OPERATION: When vacuum is created in front side of vacuum chamber, diaphragm rod causes distributor advance plate to rotate counterclockwise against tension of primary spring. Plate rotates until diaphragm rod contacts stop collar. Because of vacuum spring tension much more vacuum is needed to compress spring. The part of advance curve between point where rod contacts stop collar and point where vacuum spring begins to move is the maximum advance for wide open throttle. When sufficient vacuum is applied to move vacuum spring, more advance is obtained, but at a different rate.

ADJUSTMENT: 1) Mount distributor in test stand, perform leak tests, adjust breaker arm spring tension, lubricate cam, and make sure advance plate operates freely.
2) Adjust distributor to specifications given for Test "A" in Advance Performance table. If advance not within limits, adjust primary spring.
3) Adjust distributor to specifications given for Test "B" in Advance Performance table. If advance not within limits, add or remove shims from distributor side of stop collar. *NOTE - Shims furnished in .010" & .020" thicknesses.*



FORD MOTOR CO. "STEP-STOP" DISTRIBUTOR

4) Adjust distributor to specifications given for Test "C" in Advance Performance table. If advance not within limits, add or remove shims from capscrew side of vacuum spring. Retest. If advance falls within one set of limits but not within the other, replace vacuum spring and retest. *CAUTION - Do not exceed limits given for highest RPM or engine will be damaged.*
5) Set test stand at vacuum specified for Test "D" in Advance Performance table. If advance greater than specified, replace breaker plate assembly.

►With Distributor on Test Stand

Advance Performance - C0AF-12127-F

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	3½-4½	1.08	800
A	6¼-7¼	1.70	1000
B	7½-8½	2.38	1200
C	7½-8½	5.63	2000
C	9-10½	6.50	1450
D	13 max.	10 min.	

Advance Performance - C1AF-12127-D

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	3½-4½	1.08	800
A	6¼-7¼	1.70	1000
B	7½-8½	2.38	1200
C	7½-8½	5.63	2000
C	13	6.50	1450
D	13 max.	10 min.	

Advance Performance - C1TF-12127-C

Test	Distr. Degrees	Vacuum (" of Hg)	Distr. RPM
A	0-1¼	0.42	400
A	5-6	1.03	800
A	7½-8½	1.62	1000
B	8½-9½	2.32	1200
C	8½-9½	5.65	2000
C	10½-11¾	7.30	1600
D	13 max.	10 min.	

A - Adjust primary spring. **B** - Adjust stop washers.
C - Adjust spring washers. **D** - Replace breaker plate assy.

OVERHAUL: *See "Ford Motor Co. Loadomatic (Single Diaphragm) Distributors".*

FORD, LINCOLN, MERCURY "LOADOMATIC" (DOUBLE DIAPHRAGM) DISTRIBUTORS

►CHANGES & CORRECTIONS

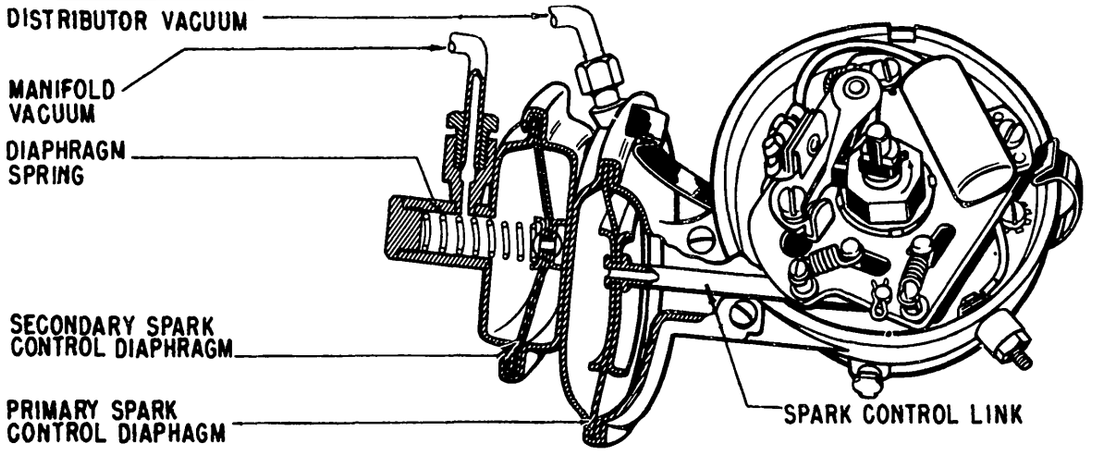
►*SUDDEN ENGINE STOPPING (Ignition Interruption):* May be caused by defective weld at either terminal of distributor primary lead. Examine lead for good weld at terminal lug.

►*DISTRIBUTOR PRIMARY LEAD GROUND:* May be caused by end of distributor identification plate fastening screw extending through case and penetrating primary lead insulation. Correct by replacing damaged lead and filing off sharp point of screw.

►*DISTRIBUTOR DIAPHRAGM UNIT PRODUCTION CHANGE & REPLACEMENT NOTE:* New Distributor Diaphragm Unit, No. B6A-12370-B, used on later cars and can be installed on all cars as replacement. This unit has stronger diaphragm and can be identified by diecast end cover (previous type No. B6A-12370-A had stamped cover).

►*ENGINE DETONATION CORRECTION: If caused by rupture or leakage of secondary diaphragm (allowing primary diaphragm to advance spark excessively), see Distributor Diaphragm Unit Change above.*

DESCRIPTION: This "Loadomatic" type distributor is a full automatic advance type in which the spark advance is regulated entirely by vacuum differential at the carburetor. Spark advance characteristics are controlled by two breaker plate springs, working against the distributor spark control diaphragms. A secondary diaphragm is provided (farthest from distributor body) to give a rapid spark retard at the acceleration "tip-in" point. The primary diaphragm (closest to distributor body) operates in same manner as the single diaphragm type.



FORD, LINCOLN, MERCURY "DOUBLE DIAPHRAGM" DISTRIBUTOR ASSEMBLY

OPERATION: (Distributor Double Diaphragm) - The secondary spark control diaphragm forces a quick, momentary spark retard while distributor vacuun line, carburetor vacuum passages, and primary spark control diaphragm are normalizing to new pressure conditions which develop when spark control valve closes the manifold vacuum passage in the carburetor. The secondary spark control diaphragm is not connected either to the breaker plate or the primary spark control diaphragm. There is merely an air chamber between the two diaphragms. The secondary spark control diaphragm is held in an outward position by straight intake manifold vacuum working against a calibrated spring (this spring is located under the hex head plug in center of secondary diaphragm housing). Vacuum is taken from base of carburetor throttle body above the throttle valves. When throttle is opened suddenly for rapid acceleration, manifold vacuum drops quickly, and the spring loaded secondary spark control diaphragm moves toward primary spark control diaphragm. The resulting air pressure between the two diaphragms pushes the primary diaphragm inward providing a quick spark retard.

ADJUSTMENT: *See "Ignition" on Car Model pages.*

TESTING: (Distributor Double Diaphragm) - Disconnect distributor and manifold fittings at diaphragm and attach a screw-in adaptor, for use with distributor tester vacuum pump, to primary diaphragm fitting (large fitting). Adjust vacuum pump to a steady reading of 20 inches of vacuum. Connect hose to primary fitting. If reading is less than 20 inches, one or both diaphragms are leaking and should be replaced. Disconnect vacuum hose and reset vacuum pump to 3 to 5 inches of vacuum. Connect hose to diaphragm fitting and check for a steady reading of 3 to 5 inches. Replace unit if reading not steady. *NOTE - New diaphragm assemblies should be checked at both vacuum settings befor installation.*

DISTRIBUTOR OVERHAUL: *See "Ford, Lincoln, Mercury Loadomatic Distributors (Single Diaphragm)"*

FORD MOTOR CO. (MECHANICAL & VACUUM ADVANCE) DISTRIBUTORS

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 FORD 312" SUPERCHARGED ENGINE DISTRIBUTOR NOTE: This distributor has "Double Breakers". Both sets of points must be adjusted to the same gap.*

►*1957 LINCOLN & CONTINENTAL DISTRIBUTOR PRIMARY WIRE PRODUCTION CHANGE:* A new primary wire with improved insulation, Part No. B7A-12216-B, having a shiny black vinyl covering, is used in production and should be used for service replacement to correct ignition failures caused by the former cloth covered wire.

►*1957 MERCURY 368" ENGINE DISTRIBUTOR PRODUCTION CHANGE:* Distributors, Part No. FEK-12127-E (Except Turnpike Cruiser), and FEL-12127-B (Turnpike Cruiser) replace the distributors used in early production. The later type distributors have different automatic and vacuum advance curves and different primary and secondary distributor weight springs. Early type distributors can be reworked for improved performance by installing new springs and adjusting the advance to later specifications. *See "Mercury FEK-12127-C and FEL-12127-A Distributor Rework for Improved Performance" below.*

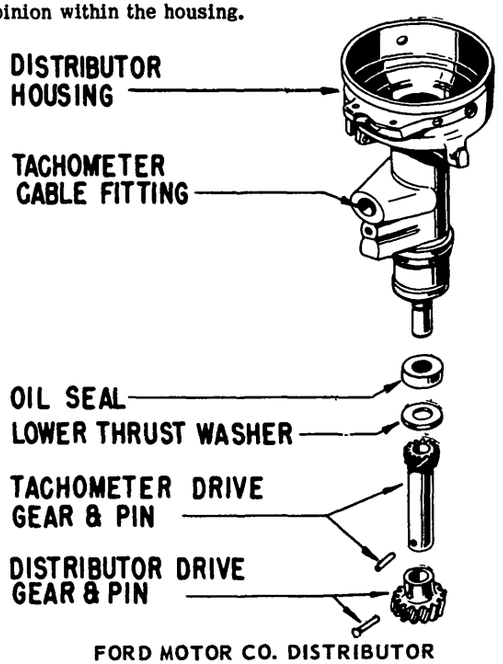
►*1957 MERCURY FEK-12127-C & FEL-12127-A DISTRIBUTOR REWORK FOR IMPROVED PERFORMANCE: (NOTE - Before reworking these distributors check the automatic and vacuum advance characteristics to determine if they have been previously reworked).* Remove the early type primary spring, Part No. B7A-12192-A, and secondary spring, Part No. FEK-12191-A and install the new primary spring, Part No. FEL-12192-A-UP, and secondary spring, Part No. B7A-12191-B. Adjust distributor automatic and vacuum advance as indicated for "Late Production" cars. *See Mercury Car Model Pages for specifications.*

DESCRIPTION: These distributors differ from previous designs in that a conventional centrifugal advance mechanism is used in conjunction with the vacuum spark control unit as described below. Some distributor models have a Tachometer drive mechanism built in the distributor.

Centrifugal Advance - Consists of two spring-loaded weights pivoted on a plate on the upper end of the distributor driveshaft. Drive pins on these weights engage slots in the base of the breaker cam subassembly so that the breaker cam is rotated by the movement of the weights. Weights move out against spring tension as distributor driveshaft RPM increases, rotating the breaker cam ahead of the driveshaft to advance the spark. With a decrease in driveshaft RPM, the springs pull the weights in and rotate the breaker cam in the opposite direction to retard the spark. Springs are identical but are adjusted for unequal tension to provide primary and secondary advance. Primary spring (greater tension) controls advance at lower engine speeds, secondary spring (less tension) controls advance at higher engine speeds. Spring tension is adjusted by bending the posts at the outer ends of the springs.

Vacuum Advance - Spring-loaded, single diaphragm type unit mounted on distributor housing and linked to breaker plate. Manifold vacuum pulls the diaphragm outward (against spring tension) and rotates the breaker plate against the direction of rotation to advance the spark. When manifold vacuum decreases, the spring returns the breaker plate to the normal position. *NOTE* - Vacuum port in carburetor is above closed-throttle position so that vacuum advance does not operate during closed-throttle idling.

Tachometer Drive - A drive gear and sleeve is pinned on the distributor shaft (replaces regular locating collar on shaft). A boss is provided on the side of the distributor housing for mounting of the tachometer driven pinion and cable assembly. The drive gear engages the pinion within the housing.



FORD MOTOR CO. DISTRIBUTOR WITH TACHOMETER DRIVE ATTACHMENT

ADJUSTMENT: Breaker Gap, Cam Angle, Breaker Arm Spring Tension, Ignition Timing, Distributor Automatic & Vacuum Advance - *See individual Car Model pages for specifications.*

Automatic (Centrifugal) Advance: Mount distributor on test set indicating distributor RPM and degrees of advance. Operate distributor in direction of rotation (counter-clockwise), increase RPM until advance begins, then decrease RPM to point where no advance indicated and set advance scale at zero. Increase RPM to first point indicated in Automatic Advance table, check advance and RPM. If advance not correct at this speed, stop distributor and adjust PRIMARY spring (see Adjustment Note below). Recheck minimum advance point. Then increase RPM to point just below maximum advance. If advance not correct at this speed, stop distributor and adjust SECONDARY spring (see Adjustment Note below). Recheck advance throughout entire speed range (first while increasing RPM, and again while decreasing RPM). Readjust as necessary.

►*AUTOMATIC ADVANCE SPECIFICATION NOTE: See individual Car Model pages for specifications.*

►*PRIMARY & SECONDARY ADVANCE SPRING ADJUSTMENT NOTE:* Springs can be identified by turning distributor to point where advance spring directly under adjustment slot in breaker plate, engaging a wire hook in the spring, and moving spring up and down to check spring tension. Primary spring will have greater tension with distributor at rest (secondary spring will be slack or not under tension at this point). To adjust, insert screwdriver blade through the adjustment slot, bend spring bracket (stationary post on base plate) outward to increase tension and decrease advance or inward to decrease tension and increase advance.

Vacuum Advance: Vacuum unit should be checked for free operation and diaphragm leakage whenever engine is tuned up. Vacuum advance performance can also be checked and adjusted as directed below.

Free Operation - Manually rotate breaker plate in direction of rotation (counter-clockwise). Plate should turn without binding and return to original position when released. If binding indicated, remove plate and clean and lubricate it as required.

Vacuum Diaphragm Leakage - Use vacuum source on distributor test set, set vacuum to highest possible figure. Connect vacuum line to fitting on distributor vacuum unit. Vacuum gauge reading should not fall off. Lower vacuum reading indicates diaphragm leak and diaphragm assembly should be replaced.

Vacuum Advance Check & Adjustment - Mount distributor on test set. After centrifugal advance has been checked and adjusted, operate distributor at constant RPM to eliminate centrifugal advance variations (see Specifications). Connect vacuum line to distributor vacuum unit fitting, set vacuum at first figure in specification table, check advance. If advance not correct, change calibration washers located at outer end of spring under vacuum connection. Recheck vacuum advance throughout entire range (*CAUTION* - Keep distributor RPM constant, vary vacuum). If all points not within limits, incorrect spring tension or vacuum leaks in diaphragm chamber or lines is indicated.

►*VACUUM ADVANCE SPECIFICATION NOTE: See individual Car Model pages for specifications.*

►*VACUUM UNIT ADJUSTMENT NOTE:* Decrease number or thickness of calibration washers to increase vacuum advance, increase number or thickness of washers to decrease vacuum advance.

SERVICING: Breaker Point Replacement - Breaker Point Assembly consists of Mounting Bracket & Stationary Point Assembly, Breaker Arm, and Primary Lead and complete unit can be replaced without removing distributor from engine. To remove unit, disconnect primary and condenser lead, take out screws mounting unit on

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FORD MOTOR CO. (MECHANICAL & VACUUM ADVANCE) DISTRIBUTORS (Cont.)

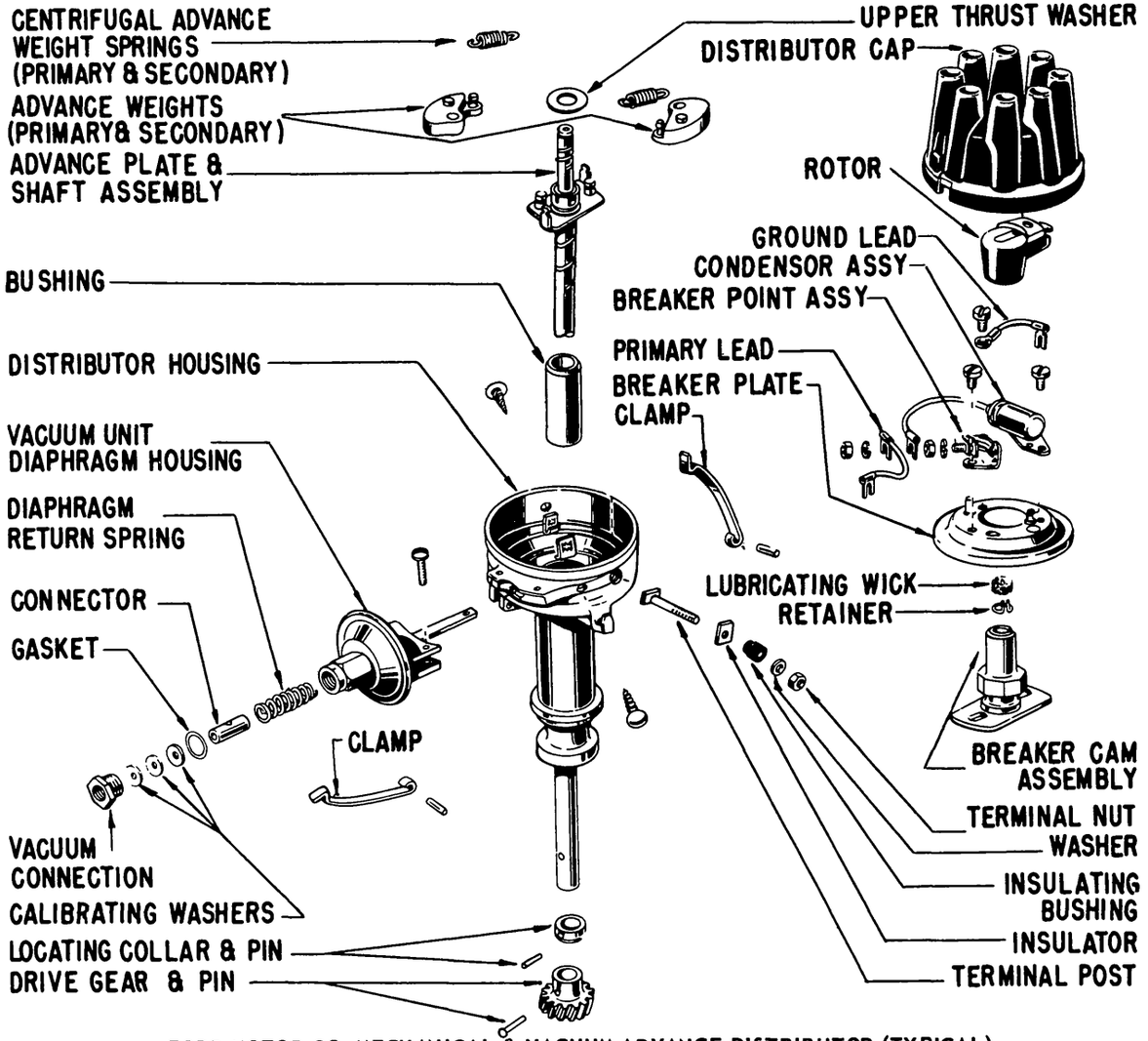
breaker plate. To install unit, connect primary and condenser leads to point assembly terminal, position unit on breaker plate, install and tighten hold-down screws (*CAUTION* - Ground lead terminal must be attached to screw at breaker arm pivot end of bracket).

Vacuum Advance Unit Removal & Installation - Remove spring clip securing diaphragm link to breaker plate, take out two screws mounting vacuum unit on distributor housing, remove vacuum unit by withdrawing link through slot in housing.

Breaker Plate Removal & Installation - After removing vacuum advance unit (above), remove nut, washer, and bushing from primary terminal screw, remove terminal screw and insulator from within housing. Remove two screws and retainers in housing which retain breaker plate assembly, then lift breaker plate assembly out.

►*BUSHING WEAR TEST:* To determine shaft and bushing wear before distributor disassembled, mount distributor on test stand and operate so cam angle reading is obtained. Slide ring of a spring scale over shaft, hold scale at right angle to shaft, and exert a pull of 16 ozs. If cam angle varies more than 3°, excessive shaft and bushing wear is indicated.

OVERHAUL: Disassembly - Remove spring clip and disconnect diaphragm link at breaker plate. Disconnect and remove diaphragm assembly from distributor base. Remove primary terminal screw, bushing, and insulator. Remove breaker point assembly and condenser, then remove two screws and retainers securing breaker plate in housing and remove plate. Remove lubricating wick from cam assembly, cam assembly retainer, cam assembly, and upper thrust washer. Remove distributor weight springs. *(NOTE - Mark the secondary spring and bracket to which it is attached for identification at reassembly).* If gear and shaft are to be reused, mark both parts so pin holes can be aligned for reassembly. Remove driven gear roll pin, then remove gear. On cars with a tachometer attachment, align tachometer drive gear roll pin with holes in distributor base, then secure distributor in a vise and remove roll pin. If gear is to be reused, mark gear and shaft so holes may be aligned at reassembly. Using an arbor press, support the assembly so shaft is clear of support plate, then press shaft out of tachometer gear and housing. Remove gear and lower thrust washer, then using an arbor press (and a shaft smaller in diamet r than the bushing outer diameter), press bushing and oil seal out of housing. On conventional distributors, remove shaft collar roll pin, then press shaft out of collar and housing and remove distributor shaft bushing in same manner as for distributors with tachometer drive.



FORD MOTOR CO. MECHANICAL & VACUUM ADVANCE DISTRIBUTOR (TYPICAL)

Inspection: Inspect all parts for damage or wear and replace as necessary. Check distributor shaft for wear at the bushing. Minimum allowable shaft diameter is .4675". Maximum allowable inside diameter of bushing is .4690". Clean all parts before reassembly.

►*BUSHING REPLACEMENT TOOL NOTE:* Use following tools to remove and replace bushings; **Remover** 12132-B1 or N; or 12132-H1 & H2. **Installer** T57L-12120-A; or 12132-A, A1, A2, A3, A5, A6, A10.

R assembly: Install new bushing with the proper tool and adapter (see Tool Note above) until adapter bottoms against the distributor housing. The correct position of bushing is .009" above the top of the distributor housing. Burnish bushings to the proper size with Tool 12132. On distributors with tachometer drive, install a new oil seal. *(NOTE - If a new shaft is being installed, see "N w Shaft & G ar Installation" below).* On distributors with tachometer drive, when the old gear and shaft are to be installed, install lower thrust washer, then install tachometer drive gear on shaft. Press gear into place until it bottoms on thrust washer. Align holes in gear, shaft and housing and install a new roll pin. On conventional distributors, place collar in position on shaft, then align holes in collar and shaft and install a new roll

CONTINUED ON NEXT PAGE

FORD MOTOR CO. (MECHANICAL & VACUUM ADVANCE) DISTRIBUTORS (Cont.)

pin. Check shaft endplay with a feeler gauge placed between automatic advance stop plate and top of bushing. If endplay is not within limits of .022-.030", replace the shaft. On all distributors, press drive gear on shaft, using the marks made on gear and shaft at disassembly, to align the pin holes. Check gear location which should be 4.991-4.996" (272", 292" 312" & 368" Engines); 5.111-5.116" (332", 352", 361". 383", 410", & 430" Engines) between the bottom face of gear and bottom face of distributor mounting pad with gear pushed toward distributor base so there is no endplay. Install roll pin. *(NOTE* - Shaft and gear must be replaced as an assembly. Do not replace one part without replacing the other). Install weights and springs making sure that secondary spring marked at disassembly is replaced in the proper location. Fill groove of weight pivot pin with ball bearing lubricant. Lubricate inside of cam assembly with ball bearing lubricant, then install thrust washer, cam, and spring retainer. Lightly oil cam lobes, then saturate wick with SAE 10 engine oil and install wick in cam assembly. Lubricate breaker plate bearings and install breaker plate. Install condenser, breaker points and plate retainers. Be sure ground wire lug is attached to breaker plate attaching screw. Install primary wire and insulator on terminal screw and install bushing and screw in distributor base. Install diaphragm assembly. Align distributor points, adjust spring tension and point gap. Adjust automatic and vacuum advance.

New Distributor Shaft & Gear Installation: Oil the shaft and slide it into distributor body. Attach Distributor Shaft Support, Tool T57L-12390-A (Detail 1) or equivalent, to distributor and place distributor in Holding Fixture, Tool T52T-12132-DJD or equivalent, and place assembly in press. Insert a .022" feeler gauge between automatic advance stop plate and top of bushing. Tighten backing screw on support tool enough to remove all shaft endplay. On distributors with tachometer drive, install lower thrust washer, then install tachometer drive gear on shaft and press it into position until it bottoms on thrust washer. Support shaft and align holes in shaft and distributor base, then drill a 1/8" hole through shaft using hole in drive gear as a pilot. Install roll pin. On conventional distributor, place collar in position and support the shaft. Hold collar against distributor housing and drill a 1/8" hole through shaft, using hole in collar as a pilot. On all distributors(support tool .022" feeler gauge still installed), press drive gear into position using an arbor press. Drill a 1/8" hole through gear and shaft, using the hole in gear shoulder as a pilot, then install a new roll pin. Remove support tool and feeler gauge and complete distributor assembly as indicated above.

EDSEL, FORD, LINCOLN, MERCURY "PIVOTED PLATE" DISTRIBUTORS

DESCRIPTION: This distributor is similar in design to the previous centrifugal automatic advance type except for the "pivoted" type breaker plate which is mounted on the stationary sub-plate. The breaker plate contains a brass bushing which is fitted to a pivot pin on the sub-plate and rotates on nylon contact buttons when actuated by the vacuum spark control which is linked directly to the breaker plate.

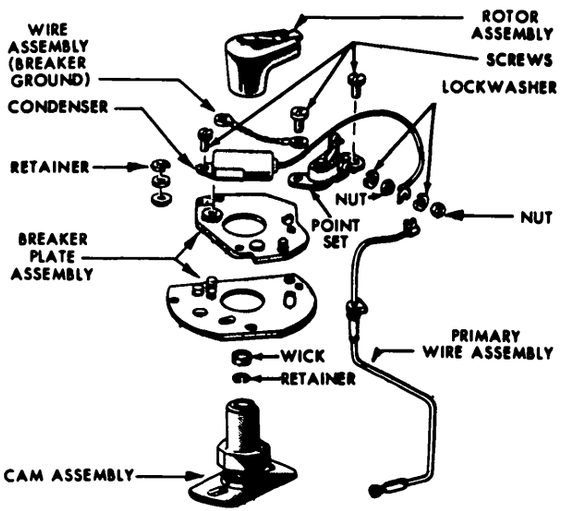
►*ADJUSTMENT SPECIFICATION NOTE: See "Ignition" on individual Car M d l pages.*

ADJUSTMENT: *S "Ford Motor Co. Mechanical & Vacuum Advanc Distributors".*

►*DISTRIBUTOR DWELL VARIATION NOTE:* Dwell variation not to exceed 6° is permissible on this type distributor providing it is caused by moving parts of the breaker plate and vacuum chamber arm. After adjusting dwell to specifications at engine idle speed (250 RPM on distributor) and zero vacuum, the dwell should not vary beyond 6° while advancing to maximum vacuum advance, with distributor speed remaining at 250 RPM. Variations above 6° can be caused by bent vacuum chamber arm, loose fit between arm and pivot plate pin, or a loose pivot plate pin.

OVERHAUL: *See "Ford Motor Co. Mechanical & Vacuum Advance Distributors" and note Breaker Plate and Sub-Plate Removal below.*

BREAKER PLATE & SUB-PLATE REMOVAL: Remove retainer from vacuum unit arm, then remove vacuum unit. Remove primary wire spade connector from terminal and push grommet insulator into distributor and pull primary wire through hole in housing. Remove contact points and condenser, then remove breaker plate retainer, flat washer and spring washer and lift breaker plate from sub-plate. Sub-plate can then be removed after removal of the two retaining screws.



FORD "PIVOTED PLATE" DISTRIBUTOR

AUTOLITE ALTERNATOR & REGULATOR

Car Model	Alternator No.	Regulator No.	Polarity
Checker	ALD-5001	VBT-6201A	Neg.
Willys	ALC-5001	Ⓒ VBS-6201A	Neg.

Ⓒ - With charge indicator light relay.

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Alternator polarity (see above) determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded. *DO NOT REVERSE BATTERY LEADS or rectifiers will be damaged.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

Booster Battery (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

DESCRIPTION: Main alternator components are the stator, rotor, slip ring end housing, drive end housing and rectifiers (diodes). Alternator voltage is controlled by varying the field current through a double contact voltage regulator unit. Because the rectifiers permit current flow in only one direction, no current can flow from battery to alternator and no circuit breaker (cutout relay) is needed. The self-limiting current characteristics of the alternator eliminate the need for a current regulator.

Stator - Consists of a laminated iron core with three phase windings electrically 120° apart wound in slots around inside circumference. A pair of leads are connected to each of the three points of the windings and one of each pair of leads connects to a negative rectifier and one to a positive rectifier.

Rotor - Consists of a single field coil encased between two four-fingered overlapping iron sections assembled on a shaft. The two ends of field coil are connected to two slip rings insulated from each other and the shaft. Battery is connected to field coil through brushes and the slip rings.

Slip Ring End Housing - Supports rectifier heat sinks, pre-lubricated roller bearing for rotor shaft, brush holders and brushes, and field and output terminals.

Drive End Housing - Supports pre-lubricated ball bearing for rotor shaft. Through bolts hold entire assembly together.

Rectifiers - Six silicone diode rectifiers are pressed into heat sinks in slip ring end housing. Three rectifiers have negative polarity and their heat sink is grounded to end housing. The other three rectifiers have positive polarity and their heat sink is insulated from end housing and connected to alternator output terminal.

SPECIFICATIONS

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	Alt. RPM
ALD-5001	38 min.	14.2	Ⓒ 4200
ALC-5001	42 min.	14.2	Ⓒ 4200

Ⓒ - 1750 Engine RPM.

Rotation - Clockwise at drive end.

Rated Output - 40 Amps. (ALD-5001), 45 Amps. (ALC-5001).

Field Coil Draw - 2.34-2.42 amps. (ALD-5001), 2.32-2.43 amps. (ALC-5001) at 10.0 volts and 70°F.

Capacitor Capacity - .1 mfd.

TROUBLE SHOOTING & DIAGNOSIS

ALTERNATOR DOES NOT CHARGE: Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

LOW OR UNSTEADY CHARGING RATE: Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

LOW OUTPUT & LOW BATTERY: High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

EXCESSIVE CHARGING RATE: Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator winding open. Rectifier open.

REGULATOR CONTACTS OXIDIZED: Regulator setting too high or air gap incorrect. Rotor field coil winding shorted.

REGULATOR CONTACTS BURNED: Regulator setting too high. Rotor field coil winding shorted.

REGULATOR COIL WINDING BURNED: Regulator setting too high.

ALTERNATOR NOISY: Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

TESTING

►*CAUTION:* **1)** *Do not ground field circuit between alternator and voltage regulator as regulator will be damaged.*

2) *Do not ground alternator output terminal or alternator and circuit will be damaged (no circuit breaker used and battery applied to output terminal at all times).*

3) *Do not operate alternator on open circuit with field winding energized.*

4) *Do not polarize alternator as it is not required and doing so will damage entire system.*

5) *Before making test connections, ignition switch must be off and battery ground cable disconnected from battery.*

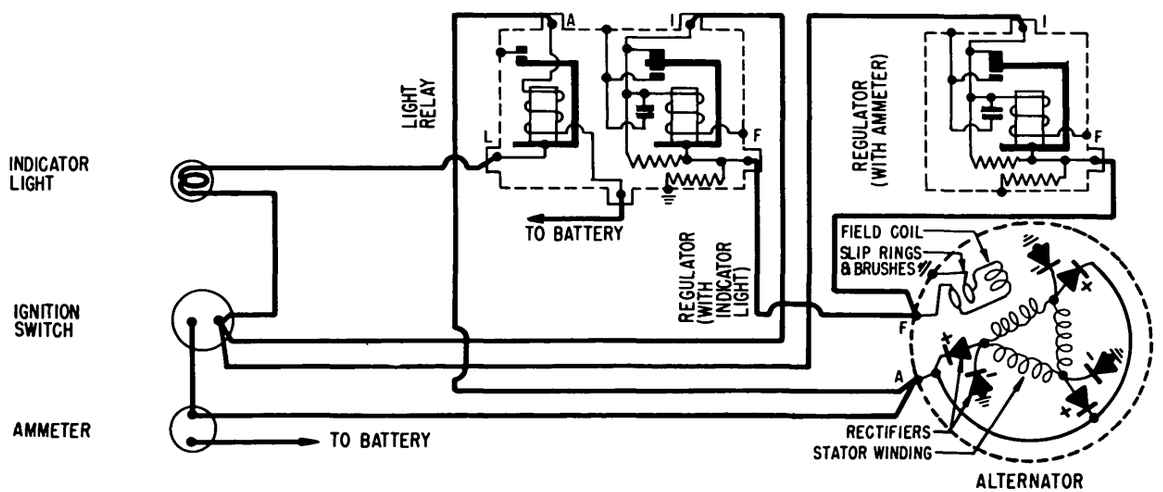
ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

Charging Circuit Resistance: **1)** Connect an ammeter in series between alternator output terminal and charging circuit lead with lead disconnected from terminal. Connect a voltmeter across charging circuit (negative lead of voltmeter to positive terminal of battery and positive lead of voltmeter to alternator output terminal lead). Disconnect lead from regulator field terminal and from alternator field terminal. Connect a jumper wire between alternator field and output terminals. Connect battery ground cable and adjust engine speed and electrical load to obtain 10 amperes in charging circuit. Voltmeter reading should not exceed .3 volt. If more, inspect, clean, and tighten all connections in charging circuit.

2) With same conditions as above, connect voltmeter from negative (grounded) battery terminal to alternator frame, and then from alternator frame to regulator base. With 10 amperes in charging circuit, voltage reading in either case should not exceed .04 volt. If more, correct high resistance ground connections.

Current Output: Leave ammeter and jumper wire connected as in "Charging Circuit Resistance" above. Connect voltmeter with negative lead to ground at alternator frame and positive lead to alternator output terminal. Connect a carbon pile rheostat across battery and a tachometer to engine. Adjust engine to 1750 RPM and rheostat to obtain 14.2 volts on voltmeter. Current output shown on test ammeter should be within specifi-

CONTINUED ON NEXT PAGE



AUTOLITE ALTERNATOR & REGULATOR INTERNAL WIRING DIAGRAM

AUTOLITE ALTERNATOR & REGULATOR (C ntinued)

cations (see Performance Data above) A slightly low reading may mean an open rectifier and a considerably lower reading may mean a shorted rectifier,

ALTERNATOR OFF CAR: Field Coil Draw (Te sting For Shorted R tor) - Connect an ammeter and a rheostat in series between outer slip ring and battery Connect other battery terminal to inner slip ring Connect a voltmeter lead to each slip ring With rheostat, adjust voltage to 10 volts and read field current draw on ammeter If higher than specifications (see above) rotor field coil winding is shorted

R tor Test (F r Grounds): Make test with a 110-volt test bulb with one probe on a slip ring and other probe on rotor core If bulb lights, rotor winding is grounded

Stat r Test: Test for shorted windings with an internal-external growler Test for grounds with a 110-volt test bulb and test probes *Make both tests with stator leads disconnected from rectifiers*

Rectifi r (Di de) Test: *Make initial test without disconnecting stator leads from rectifiers This will eliminat need for complete disassembly To find which rectifier is bad, stator leads must be disconnected and each rectifier tested individually* Use a No 57 test bulb in series with a 12-volt battery and test probes Touch one test probe to rectifier heat sink and other probe to a rectifier lead in same heat sink Reverse the probes If lamp lights in **one** direction, rectifier is good If lamp **does not** light in either direction, rectifier is open If lamp lights in **both** directions, rectifier is shorted

►*RECTIFIER TESTING TOOL NOTE Diode Testing Tool C-3829 is available for testing rectifiers without disconnecting stator leads*

OVERHAUL

►*TOOL NOTE* Tools listed in following procedures are Miller Manufacturing Co tools Similar tools are also available from Draf Tool Co as follows

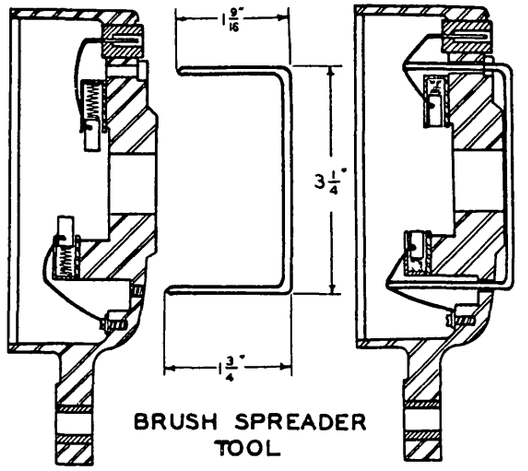
T ol Nam	Draf No.	Miller No.
Drive End Bearing Installer	VA-603	C-3769
Roller Bearing Remover	VA-604	C-3770
Roller Bearing Installer	VA-605	C-3770
Housing Support	VA-606	C-3770
Rectifier Remover Support	VA-607	C-3771
Rectifier Remover	VA-608	C-3771
Rectifier Installer	VA-609	C-3772

DISASSEMBLY: Remove through bolts, tap end housings lightly with soft hammer to separate them from stator, and remove drive end housing and rotor assembly Disconnect positive and negative rectifier heat sink studs from end housing and remove stator If brushes are worn to 5/16" or less, replace them Grip insulated brush at brass terminal and pull it from field terminal insulated bushing Remove ground brush lead attaching screw *Do not lose brush springs when removing brushes from holders* Clamp rotor in a vise (with protective jaws), remove pulley with puller or arbor press, and remove fan and woodruff key from shaft Remove shaft from drive end housing and bearing assembly with a puller which grips under bearing retainer plate *CAUTION - Do not support housing and press on rotor shaft as end housing and retainer screws will be damag d* Remove screws from retainer plate and press drive end bearing from housing with Tool C-3769 Remove roller bearing from slip ring end housing with Tool C-3770

Rectifier R plac ment: *NOTE - Positive rectifiers have red marks, negative rectifiers have black marks Positive heat sink has larger studs All rectifiers are replaced in same manner* Cut rectifier wire as near crimped sleeve connector as possible Support heat sink on Support Tool C-3771 and press rectifier out of heat sink with Remover Tool C-3772 *CAUTION - Do not hammer on tool or rectifier will be damaged Use a press only* To install rectifier, support heat sink with Support Tool C-3771 and press rectifier into sink with Installer Tool C-3772 Strip insulation on stator leads about ¼" and connect them to rectifiers by crimping connector sleeves *CAUTION - DO NOT solder connections as heat will damage rectifiers*

REASSEMBLY: *NOTE - Bearings are pre-lubricated and no further lubrication is required* 1) Install needle roller bearing in slip ring end housing so enclosed end of bearing is flush with outer surface of housing Use same tools used for removal Install felt washer and retainer into drive end housing and press ball bearing into housing (use a block of wood so pressure is exerted on bearing outer race only) Install retainer plate and gasket on end housing With snap ring and retainer on rotor shaft, press housing on shaft with Tool C-3769 which fits over shaft and against bearing center race Bearing must be against snap ring retainer Install spacer, woodruff key, fan and pulley and pulley nut

2) Install brush springs and brushes Ground brush is fastened to end housing with a screw Insulated brush has blade terminal which is pushed into slot in field terminal insulator bushing and a tab on blade terminal snaps into insulator bushing Install both rectifier heat sinks into end housing and install insulator bushings, washers and nuts Push stator into housing by hand Install drive end housing and rotor assembly into slip ring end housing and stator assembly using brush spreader tool as shown in illustration *CAUTION - Make sure through bolt holes line up as no locator pins are used* Install through bolts Remove brush spreader tool and see that brush leads do not drag on rotor and that rotor turns freely when rotated by hand .



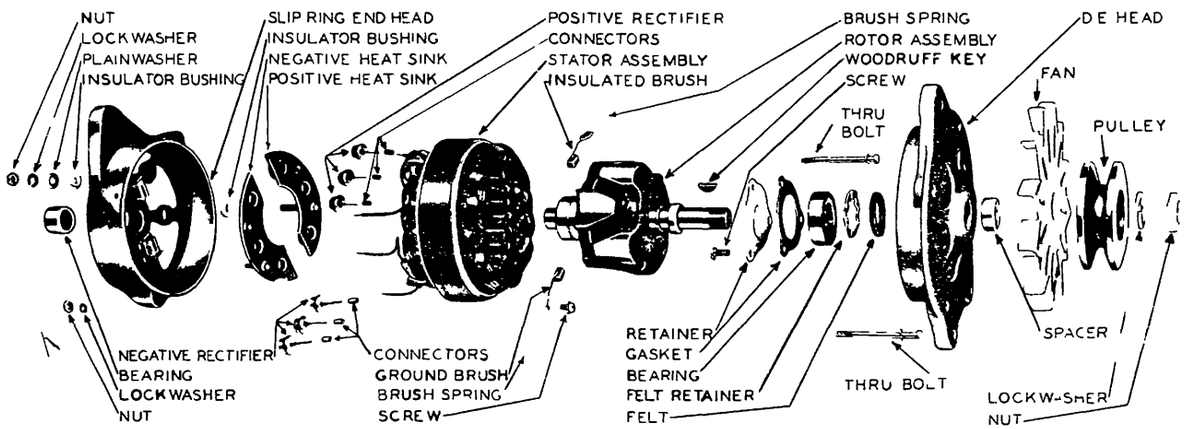
VOLTAGE REGULATOR

DESCRIPTION Regulator - Field control type Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows

Upper Contact Operation (Low Speed & High Load) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current

Lower Contact Operation (High Speed & Low Load) - Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open), and limiting field current

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AUTOLITE ALTERNATOR ASSEMBLY - TYPICAL (EXPLODED)

AUTOLITE ALTERNATOR & REGULATOR (C ntinu d)

Indicator Light Relay: On cars with a charge indicator light in place of an ammeter a relay is used to operate the light. Relay has a single heavy winding in series with charging circuit with a moveable contact on an armature and a grounded stationary contact. Relay contacts are in series with indicator light which is connected to battery through ignition switch. With ignition switch on, light is grounded through contacts & lights up. When alternator charges, current flow through relay winding pulls armature down, opening the contacts and making light go out as long as alternator is charging.

CHECKING & ADJUSTING (ON CAR): Regulator - Disconnect alternator output terminal and install an ammeter between lead and terminal. Connect a voltmeter positive lead to regulator "BAT" terminal and negative lead to alternator frame. Adjust engine speed to 750 RPM and adjust load so there is a 10 ampere charge rate. Operate for 15 minutes to stabilize temperature. Note voltmeter reading. Cycle system by stopping and restarting engine and increase engine speed to 1500 RPM. Turn off all lights and accessories. Voltage should increase and amperage decrease. Voltage difference between readings of both tests should be .1-.3 volt. If greater or less, remove cover and move stationary contact support up or down (loosen support screw). Raising support will increase voltage. Replace cover, operate engine at 750 RPM and note voltage reading which should be as in table below. To adjust, bend lower spring hanger. *CAUTION - Do not short circuit between spring hanger and base or spring. Use an insulated bending tool.*

►*AMBIENT TEMPERATURE NOTE: The ambient temperature is the temperature registered on a reliable thermometer positioned 2" from regulator cover.*

Voltage Setting - Ambient Temp.

Temp. (°F)	Voltage	Temp. (°F)	Voltage
50°	14.1-14.5	110°	13.7-14.1
80°	13.9-14.3	140°	13.5-13.9

Indicator Light Relay: Disconnect field lead from both alternator and regulator. Connect an ammeter between disconnected alternator output terminal lead and alternator output terminal. Connect a carbon pile rheostat from output terminal lead to alternator field terminal. *NOTE - If dash indicator light cannot be seen during this test, use a 12-volt test lamp with a No. 57 bulb between regulator "L" and "B" terminals.* With rheostat resistance turned in, bring engine speed to 800 RPM and slowly turn resistance out of circuit until indicator light goes out. Ammeter reading should be as indicated below. To adjust, bend lower armature spring hanger. Increasing spring tension raises setting.

R lay Opens - 2.0-2.5 amperes.

Relay Closes - 1.5 amperes minimum.

ADJUSTMENTS (OFF CAR): *NOTE - Regulator must be reinstalled and final "On Car Adjustments" (see above) made after following "Off Car" adjustments completed.*

Regulator Lower Contact Gap: .010" measured between lower moveable contact and lower stationary contact with upper contacts closed. To adjust, bend upper stationary contact arm.

Regulator Air Gap (Upper Contacts): .034-.038". Check air gap with test lamp (No. 57 bulb) in series with battery between regulator field terminal and regulator base. Insert a .034" wire gauge between armature and magnet core on contact side of brass stop rivet. Press armature down against gauge. Lower moveable contact should barely touch lower stationary contact and lamp should light. Insert a .038" wire gauge in same position. Light should go out. To adjust, loosen stationary bracket attaching screw and move bracket up or down.

Indicator Relay Air Gap: .015-.020" measured with flat gauge between armature and magnet core. To adjust, bend stationary contact arm up or down.

CHRYSLER CORP. ALTERNATOR & REGULATOR

CHRYSLER	Chrysler No.
Imperial & 300F	① 2095100
VALIANT	
Std. Engine	② 2095060
Hyper Pack Engine	② 2095557

① - Use Part No. 2095300 for service replacement.
② - Use Part No. 2095000 for service replacement.

►CHANGES, CAUTIONS, CORRECTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Negative battery terminal must be connected to GROUND. Positive terminal must be connected to starter lead. *DO NOT REVERSE BATTERY LEADS.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery. *DO NOT use a "Fast Charger" to provide starting voltage.*

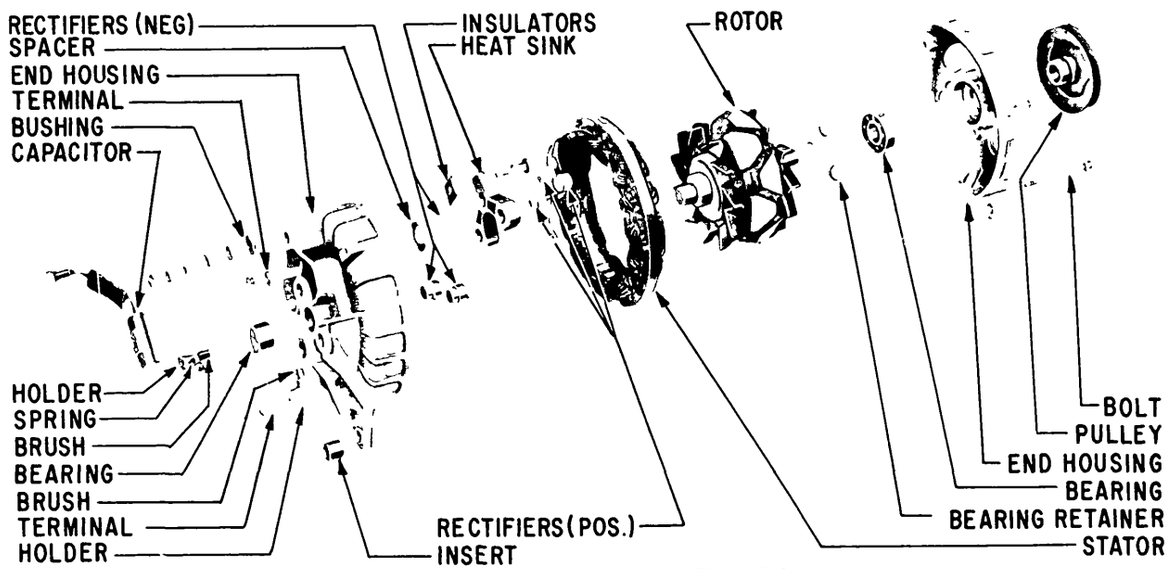
Booster Battery (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative (ground) terminal of battery and positive lead to positive terminal of battery. *DO NOT REVERSE BATTERY LEADS.*

►*EXCESSIVE AMMETER FLUCTUATION CORRECTION:* For tests and voltage regulator modification necessary, see *"Voltage Regulator" below.*

►*ALTERNATOR OUTPUT TERMINAL GROUNDING & INSULATOR CAUTION:* Output terminal of alternator must not be grounded under any circumstances (will severely damage alternator and regulator). To prevent accidental grounding of terminal, make sure that Output Terminal Insulator, Part No. 2258754, is installed on "BAT" terminal of alternator.

DESCRIPTION: Main alternator components are the two end housings, stator, rotor, and rectifiers. Housings are vented at both ends and around the circumference and held together by three through bolts. The rotor consists of a field coil encased between two six-fingered, overlapping sections which are the pole pieces, and produces a 12 pole magnetic field. Ends of the field coil are connected to slip rings and the battery is connected to field windings through brushes and the slip rings. The rotor shaft is supported at drive end by a ball bearing and at the opposite end by a roller bearing. Both bearings are pre-lubricated. Three silicon diode rectifiers having negative polarity are pressed into the end housing, and three similar diodes having positive polarity are pressed into a die cast aluminum sink. Alternator output is controlled by a voltage regulator (current regulator and cutout relay are not required).

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CHRYSLER ALTERNATOR ASSEMBLY (EXPLODED VIEW)

CHRYSLER CORP. ALTERNATOR & REGULATOR (Cont.)

SPECIFICATIONS

Performance Data (Cold - 70°)

Alternator	Amperes	Volts	Eng. RPM
2095060	35.0	15.0	1250
2095100	40.0	15.0	1250

Rotation - Clockwise at drive end.

Rated Output - 35 Amps. (2095060), 40 Amps. (2095100).

Field Coil Draw - 2.38 Amps. (min.) to 2.75 Amps. (max.) at 12 volts, with alternator rotor turned manually. 2.97 Amps. (min.) to 3.43 Amps. (max.) at 15 volts with alternator operating at 750 RPM at 70°F.

Rectifier Resistance - 4-10 ohms in forward direction. Infinity in reverse direction.

Capacitor Capacity - .158 microfarad, minimum (internally installed), .5 microfarad (externally installed).

Fuse: 7½ ampere fuse in line between regulator "IGN" terminal and ignition resistor (Regulator No. 1889960), or two fusible wires inside regulator cover (Regulator No. 2095700). *See "Fusible Wire Replacement Note" under VOLTAGE REGULATOR below.*

TROUBLE SHOOTING & DIAGNOSIS

ALTERNATOR DOES NOT CHARGE: Blown fuse or fusible wire. Drive belt loose. Brushes or slip rings worn. Brushes sticking. Field or charging circuits open. Rectifiers open. Stator windings open.

LOW OR UNSTEADY CHARGING RATE: Drive belt loose. High resistance in charging circuit, battery terminals or engine-to-body ground strap. Stator windings open.

LOW OUTPUT & LOW BATTERY: High resistance in charging circuit. Regulator setting too low. Rectifier shorted or open. Stator winding grounded.

EXCESSIVE CHARGING RATE: Regulator setting too high or contacts stuck. Regulator base not grounded. Regulator winding open. Rectifier open.

REGULATOR CONTACTS OXIDIZED: Regulator setting too high or air gap incorrect. Rotor field coil winding shorted.

REGULATOR CONTACTS BURNED: Regulator setting too high. Rotor field coil winding shorted.

REGULATOR COIL WINDING BURNED: Regulator setting too high.

ALTERNATOR NOISY: Alternator mountings loose. Bearings worn. Drive belt worn. Interference between rotor fan and stator leads or rectifiers. Rotor or rotor fan damaged. Rectifier open or shorted. Stator winding open or shorted.

TESTING

ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows:

►*CAUTION: Do not ground field circuit between alternator and voltage regulator as regulator will be damaged.*

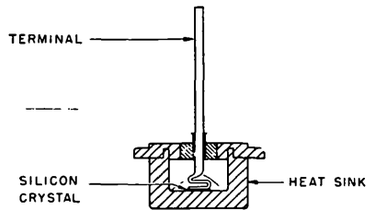
Charging Circuit Resistance: Disconnect lead at alternator output terminal and connect a 0-50 ampere scale D.C. ammeter in series between output terminal and output lead (lead disconnected from terminal). Connect positive lead of test voltmeter to output lead and connect negative voltmeter lead to battery positive terminal. Operate engine to obtain 10 amps. from alternator. *NOTE - The voltmeter reading should not exceed .2 volt.* If a higher voltage drop is indicated, inspect, clean and tighten all connections in charging circuit.

Current Output: Disconnect battery ground and disconnect alternator output lead at terminal on alternator. Connect a 0-75 ampere scale D.C. ammeter in series between alternator output terminal and output lead .Connect positive lead of test voltmeter to output lead and connect negative lead of test voltmeter to ground. Disconnect field lead at alternator and at regulator, then connect a jumper wire from alternator field terminal to alternator output terminal. Connect engine tachometer and connect battery ground cable. Connect a battery-starter tester (with variable carbon pile) to battery terminals. Operate engine at 1250 RPM, then adjust carbon pile to obtain a reading of 15 volts on test voltmeter. Current output as indicated on test ammeter should be within specifications (see Performance Data above). If output is slightly less than specified, it may be an indication of possible "open" rectifier or other alternator internal condition. If output is considerably lower, it may be an indication of a possible shorted rectifier.

Field Coil Draw: With ammeter connected in circuit as for "Current Output" above, stop engine and note the reverse current reading on ammeter, and battery voltage reading on voltmeter. The rotor field coil should draw 2.38 to 2.75 amperes at 12 volts. A low field coil draw is an indication of high resistance in field coil circuit which may be caused by brushes, slip ring, or field coil connections. A high rotor field coil draw indicates a possible shorted coil.

ALTERNATOR ON BENCH: Field Coil Draw - Connect a source of 12 volt D.C. current and a test ammeter in series to field terminal and to ground. Slowly rotate alternator rotor by hand. The test ammeter reading should be 2.38 to 2.75 amperes at 12 volts.

Rectifier (Diode) Test: Rectifiers may be tested with a test lamp or with Tester Tool C-3829 as follows: *NOTE - The usual cause of an open or blown rectifier is a defective capacitor or a battery installed with reversed polarity. If battery is installed correctly and rectifiers are open, test capacitor capacity.*



TYPICAL RECTIFIER (DIODE)

Test Lamp Method - Disassemble alternator and separate wires at "Y" connector of stator. Use a test lamp with a No. 67 (4 cp.) bulb and a 12-volt battery. Test each rectifier in turn as follows: Touch outer case of rectifier with one probe and wire in center of rectifier with other probe. Reverse the probes, moving the probe from outer case to rectifier wire and the probe at rectifier wire to outer case. If lamp lights in **one** direction, the rectifier is good. If lamp **does not** light in either direction, the rectifier is open. If lamp lights in **both** directions, the rectifier is shorted.

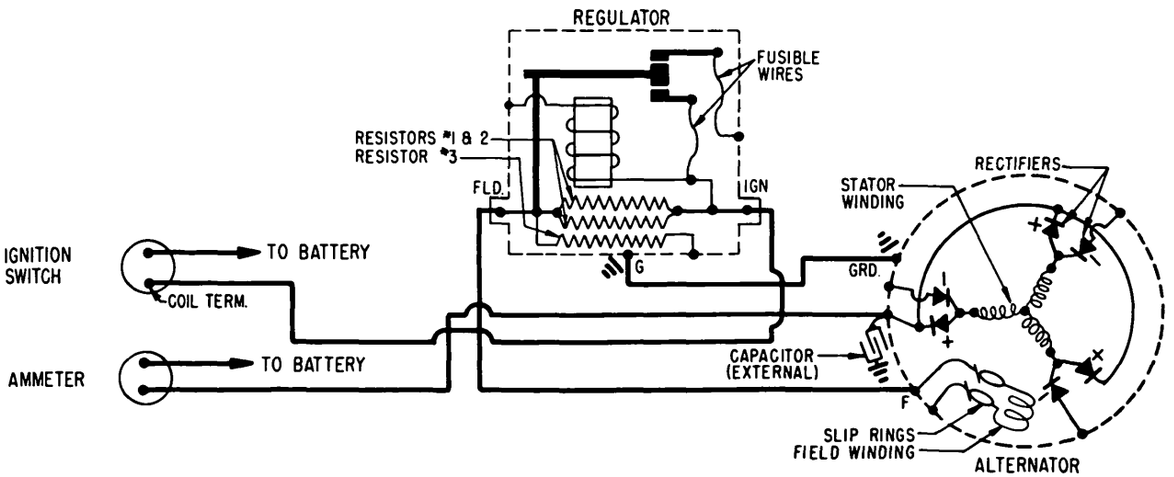
Tester Tool C-3829 Method - Remove brushes and alternator through bolts and separate rectifier end housing and stator from drive end housing and rotor.

Positive Rectifiers - With stator assembly on an insulated surface, connect tool test lead clip to alternator "BAT" (output) terminal and plug tool into 110-volt A.C. power supply. Touch probe to **bare wire connection** of each rectifier. *CAUTION* - DO NOT break sealing around rectifier lead wire or on inner end of rectifier (will accelerate corrosion).

Negative Rectifiers - Connect tool test lead clip to rectifier end housing and touch bare wire connection of each rectifier with probe.

Test Results - Good rectifiers will produce a reading of 2 amperes or more and will be approximately the

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CHRYSLER CORP. ALTERNATOR & REGULATOR INTERNAL WIRING DIAGRAM

CHRYSLER CORP. ALTERNATOR & REGULATOR (C nt.)

same for the three rectifiers tested If two rectifiers are good and one is shorted, the reading on the good rectifiers will be low and the shorted one will be zero (with bad rectifier disconnected, reading on other two will be satisfactory) If one rectifier is open, its reading will be approximately 1 ampere and the other two rectifiers will show a satisfactory reading Positive and negative rectifiers will read on opposite side of scale on tool

►*RECTIFIER RESISTANCE NOTE* A rectifier should have 4-10 ohms resistance in forward direction and infinite resistance in reverse direction Replace rectifiers with more than 10 ohms resistance in forward direction

Stator Test: Test stator for grounds with a 110-volt test lamp *Insulate stator from rectifier end housing* With one probe of test lamp on stator pole frame, touch each of the stator leads with other probe If lamp lights, stator windings are grounded To test windings for continuity, touch one lamp probe to **all three** stator leads at "Y" connection and other probe to each of three stator leads (disconnected from rectifiers) If lamp does **not** light at each of the three rectifier leads, stator winding is open

OVERHAUL

►*AIR CONDITIONED CAR PULLEY REMOVAL NOTE* Double sheave pulley on air conditioned cars is smaller in diameter and requires use of modified puller blocks SP-3002 (part of Puller C-3615)

►*ALTERNATOR BEARING LUBRICATION & REPLACEMENT CAUTION·* Alternator front and rear bearings are lubricated for life If bearings become dry, install new bearings *DO NOT attempt to lubricate NOTE -* When replacing front bearing, use only Part No 2095653 which has a protective shield and install bearing with shielded side toward rotor

►*RECTIFIER (DIODE) INSTALLATION CAUTION & TOOL MODIFICATION NOTE* Design of rectifier has been changed which requires a modification to Rectifier Installing Tool C-3772 to prevent damage to rectifier seal or core To modify Increase diameter of hole in driving end of tool from 3/8" to 515"(33/64") and increase depth to 1¼" *DO NOT use smaller diameter (unmodified) tool on later design rectifiers*

DISASSEMBLY: Remove insulated brush holder retaining screw, flat washer, nylon washer, and field terminal and carefully lift plastic brush holder (with spring and brush assembly) from end housing Remove retaining screw from ground brush holder, then lift clip, spring and brush assembly from end housing Remove through bolts and pry between stator and drive end housing with a thin blade screwdriver *CAUTION - Stator is laminated, do not burr stator or end housing* Carefully separate drive end housing, pulley and rotor assembly from stator and rectifier housing assembly Remove three nuts and washers and while supporting the end frame, tap rotor shaft with a plastic hammer and separate rotor and end housing To remove drive end bearing from rotor shaft, use Tool C-3615 and adapters C-3375 *CAUTION - Make sure lower end of adapters are equally spaced under the bearing and that tool sleeve is bottomed on bearing* Remove DC output terminal nuts and washers, terminal screw (and inside capacitor, if so equipped) If necessary, heat sink and insulator can be removed To remove rectifiers from heat sink or end housing, cut rectifier wire at point of crimp, then support rectifier housing on Tool C-3771 *NOTE - This tool is cutaway and slotted to fit over wires and around bosses in housing.* Make sure that bore of tool completely surrounds rectifier, then press rectifier out of housing with Tool SP-3380 To remove roller bearing in end housing, support housing with Tool SP-3383, then press bearing out with Tool C-3770

REASSEMBLY: Support heat sink or rectifier end housing on circular plate, Tool SP-3377 Check rectifier identification to make sure correct rectifier is being used *NOTE - Identifying part numbers are stamped on case of rectifier Rectifiers are also identified by paint marks Red for positive and black for negative* Start new rectifier in casting squarely and press in with Tool C-3772 (see note) Crimp rectifier wires to wires disconnected at removal Repeat as necessary for other rectifiers in either the end housing or heat sink Support end housing on Tool SP-3383 so that notch in support tool will clear raised section of heat sink and press bearing into position with Tool SP-3381 *NOTE - Bearings are prelubricated and additional lubrication is not required* Insert drive end bearing in drive end housing and install bearing plate, washer and nuts to hold bearing in position Position bearing and drive end housing on rotor shaft and while supporting base of rotor shaft, press bearing and housing in position on rotor shaft with arbor press and Tool C-3769 *CAUTION - Make sure bearing is installed squarely Bearing must be pressed on shaft until it contacts shoulder on shaft* Install pulley on rotor shaft (support rotor so that all pressing force is on pulley hub and rotor shaft), then press into position with an arbor press *CAUTION - Do not use a force greater than 6,800 lbs* Pulley should just contact bearing inner race Install the heat sink and insulator, then install output terminal screw, insulating washers lockwashers, and nuts *NOTE - Some alternators have the capacitor mounted internally On these units, the capacitor is mounted on top of the heat sink insulator and is held in position with the terminal screw* Make sure heat sink and insulator are in position and tighten the locknut Position the stator on rectifier end housing *CAUTION - Make sure all of the rectifier connectors and phase leads do not interfere with rotor fans and that the capacitor (internal) lead has clearance* Position rotor assembly in rectifier end housing and align the through bolt holes in stator, rectifier end housing and drive end housing Enter stator shaft in rectifier end housing, compress stator and both end housings manually and install through bolts, washers, and nuts Install insulated brush and terminal attaching screw, then install ground brush and attaching screw Rotate pulley slowly to be sure that fans do not hit rectifier and stator connectors

VOLTAGE REGULATOR

CHRYSLER	Chrysler No.
Imperial & 300F	1889960
VALIANT	
Early Cars	① 1889960
Later Cars	② 2095700

① - With "In-Line" fuse
② - With fusible wire in regulator

►*EXCESSIVE AMMETER FLUCTUATION CORRECTION* This condition usually indicated by excessive ammeter pointer flutter, headlight flicker and heater blower motor speed variations at steady engine speeds, and may be caused by high resistance in field circuit to alternator or voltage regulator improperly set For proper diagnosis and correction, proceed as follows Run engine at various steady speeds with heavy electrical load (headlights and accessories on) to determine degree of fluctuation Stop engine, disconnect lead at "IGN" terminal of regulator and install a jumper wire from "IGN" terminal to positive terminal of battery Operate engine at 1250 RPM and observe flutter

1) If ammeter is normal, trouble is corrosion or other high resistance in field circuit connectors Clean and tighten all connections *NOTE -* On cars with 7½ ampere fuse in circuit, clean fuse and holder terminals and tape fuse holder to prevent dirt and moisture entry

2) If jumper wire did not correct the trouble or if ammeter fluctuation is excessive regardless of engine speed or electrical load, remove voltage regulator from car and solder a piece of copper wire between 38 ohm resistor terminal connected to "IGN" terminal of regulator and regulator base *CAUTION -* Use only rosin core solder and be sure regulator base is heated enough for proper metal fusion

3) Install regulator and adjust according to procedures and specifications below

►*REGULATOR 2095700 FUSIBLE WIRE REPLACEMENT NOTE* To replace fusible wire, proceed as follows Cut blown wire from connection at rivet in regulator base (do not unsolder as voltage coil wire may be damaged), and unwind wire from regulator contact bracket Use rosin core solder only, tin one end of Fusible Wire No 2275242 and hold wire in recess in rivet against old fuse wire Put a drop of solder on wires When cool, pull fusible wire up and wrap around contact bracket and solder wire to bracket to be sure of a good connection

DESCRIPTION: Field control type Temperature compensated, vibrating type voltage regulator with two sets of contacts using a common armature On Regulator 2095700, upper stationary contact bracket is connected to "IGN" terminal by a fusible wire, and lower stationary contact bracket connected to ground by another fusible wire (Regulator 1889960 has 7½ ampere fuse in line between "IGN" terminal and ignition resistor instead of fusible wires) Regulator operates on either upper or lower contacts (both sets never in operation at same time) depending on load and battery requirements as follows

Upper Contact Operation (Low Speed & High Load) - Armature travel opens and closes upper contacts, cutting regulator resistance in and out of field circuit, and limiting alternator field current

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CHRYSLER CORP. ALTERNATOR & REGULATOR (C nt.)

Low r Contact Op rati n (High Speed & Low Load). Armature travel opens and closes lower contacts, grounding the regulator field terminal and bypassing alternator field coil (contacts closed), or cutting resistance in field (contacts open), and limiting field current

CHECKING REGULATOR: Connect an ammeter in series with alternator output terminal (BAT) and the wire disconnected from alternator DC output terminal Connect a DC voltmeter positive lead to alternator output terminal and ground the voltmeter negative lead to alternator frame or regulator base Start engine and adjust engine speed to 1250 RPM *NOTE - No reading on ammeter indicates blown fuse or fusible wire in regulator* Turn on lights and electrical accessories to create enough electrical load that 15 minutes operation will stabilize the regulator temperature Adjust electrical load so that there will be 15 amperes flowing in circuit with a fully charged battery Voltmeter reading should be as indicated in the following table for the ambient temperature in which the regulator is operating

►*AMBIENT TEMPERATURE NOTE The ambient temperature is the temperature registered on a reliable thermometer positioned 2" from regulator cover*

Voltage Setting - Ambient Temp.

Temp. (°F)	ℂ Voltage	Temp. (°F)	ℂ Voltage
0°	14 0-14 6	95°	13 6-14 2
25°	13 9-14 5	118°	13 5-14 1
48°	13 8-14 4	140°	13 4-14 0
70°	13 7-14 3		

ℂ - There will be a slightly higher voltage at higher engine speeds, however, this must not exceed 7 volts at any temperature range

ADJUSTMENT: V ltag - Adjust voltage by bending lower spring hanger of regulator **down** to increase voltage, up to decrease voltage *CAUTION - Do not short circuit between spring hanger and base or spring Use an insulated bending tool*

Armature Air Gap: 048- 052" Check air gap with test lamp connected between ignition and field terminals on regulator Insert a 048" wire gauge between armature and magnet core at hanger side of nylon stops Press armature plate down Upper contacts should open and test lamp should go dim Insert a 052" wire gauge in the same position and depress armature Upper contacts should remain closed and test lamp should remain bright To adjust, bend upper contact support (1889960), loosen contact bracket attaching screw and adjust contact bracket (2095700)

Lower Contact Clearance: 015"± 001" with armature pressed down so armature rests on nylon stop To adjust, bend lower contact arm *NOTE - Press down on armature and not on contact spring*

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR

► CAUTIONS

►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING ABOOSTEP BATTERY TO START ENGINE CAUTION R versed polarity or excessive voltage will result in extensiv damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE*

Battery Installati n - Alternator polarity determines which battery terminal is grounded For negative polarity alternators, **negative** battery terminal must be grounded *DO NOT REVERSE BATTERY LEADS or rectifier assembly will be damaged*

Charging Battery - If a "Fast Charger" is used, both of the car battery cables must be disconnected from battery *DO NOT use a "Fast Charger" to provide starting voltage*

Bo ster Batt ry (Us d To Start Engine) - Booster battery must be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery *DO NOT REVERSE BATTERY LEADS.*

DESCRIPTION: Main alternator components are the stator, rotor, brushes, slip rings, slip ring end housing and drive end housing Rectifier assembly is an externally mounted dry plate type which is connected to the three output terminals of the alternator Alternator voltage and field circuit is controlled by a voltage regulator unit (see "Voltage Regulator" below for further description) *NOTE - Alternators may be either "A" circuit or "B" circuit types Data below applies to "A" circuit types only*

Stat r - Consists of an iron core with three phase windings electrically 120° apart wound in slots around inside circumference and forming the alternator frame Stator leads are connected to terminal posts in slip ring end housing and these leads are connected to the external rectifier assembly by additional leads

Rot r - Consists of a single field coil encased between two six-fingered overlapping iron sections assembled on a shaft Some field coils contain a main field winding and a reverse high resistance shunt winding connected in parallel to the main winding to insure positive voltage control at high speeds Other field coils have a single main winding only Field coil leads are connected to three slip rings (two rings for main winding, one ring for reverse winding) which are insulated from each other and from the shaft Battery is connected to field coil through brushes and the slip rings *NOTE - Some alternators have a "double" rotor which has two main field windings and two reverse field windings*

Slip Ring End Housing - Supports rotor shaft rear ball bearing, brush holders and brushes, and all terminals for lead connections

Drive End Housing - Supports rotor shaft front ball bearing, pulley fan, and pulley Through bolts hold entire assembly together

Rectifier - Dry plate, three phase, full wave, bridge type, selenium rectifier mounted separately from alternator and connected to it by three leads from stator phase windings Two output terminals are mounted on rectifier to connect to car wiring

SPECIFICATIONS

Performance Data - Cold (70°F)

Alternator	Amperes	Volts	RPM
1117083	ℂ58	14 0	2500
1117102	② 50	14 0	1250
1117103	③ 100	14 0	2250
1117104	② 50	14 0	1250
1117105, 106	③ 100	14 0	2250
1117107	ℂ40	14 0	1150
1117109, 110	④ 37	14 0	1150
1117111	ℂ40	14 0	1150

ℂ -Rated output hot 60 amps
② - Rated output hot 55 amps
③ - Rated output hot 105 amps
④ - Rated output hot 50 amps

Rotati n - Counterclockwise at drive end (1117083), Either Rotation (1117102, 103, 104, 105, 106, 107, 109, 110, 111)

Brush Spring Tension - 13 ozs (1117083), 9 ozs (1117102, 103, 104, 105, 106, 107, 109, 110, 111)

Field Current Draw (80°F)

Alternator	Amperes	Volts
1117083	5 6-6 3	12 0
1117102, 103, 104, 105, 106	ℂ 1 23-1 33	12 0
1117107, 111	1 23-1 33	12 0
1117109, 110	1 4-1 6	12 0

ℂ - Reverse field draw 14- 15 amps at 12 volts (8 °F)

TESTING & TROUBLE SHOOTING

►*CAUTION.* **1)** *Do not ground alternator output terminal or alternator and circuit will be damaged*
2) *Do not polarize alternator as it is not required and doing so will damage entire system*
3) *Before making test connections, ignition switch must be off*

Current Output Test: With alternator, rectifier, regulator, and battery connected in the usual manner, check current output with an ammeter *See "Specifications" above NOTE* - Specifications apply to alternator when operating with full field current determined only by the resistance of main field winding

Rectifier Test: Clean gently between rectifier plates to remove dirt, using *care not to damage painted surfaces* Test as follows Connect an ammeter and a 1 ohm fixed resistor (75 ampere capacity) in series across output side of rectifier Connect a battery and carbon pile rheostat with all resistance turned in across two of the input terminals Adjust rheostat to test voltage shown in "Voltage & Current Specification Table" below and note the current reading *NOTE - Make checks quickly (within 15 seconds) to avoid overheating rectifier* Repeat test for each of six tests (A through F) as shown in "Test Connection Table", below, reversing ammeter connections to obtain current reading Replace rectifier if current reading not within specifications *CAUTION - DO NOT apply more voltage than specified to input terminals as excessive current draw resulting from higher voltage will burn out rectifier*

►*RECTIFIER TERMINAL NUMBERING NOTE* In the following table, rectifier input terminals are numbered

CONTINUED ON NEXT PAGE

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR (Cont.)

from left to right with rectifier viewed with positive output terminal at upper left.

Test Connection Table

Test	Post. Lead to Terminal	Neg. Lead to Terminal
A	No. 1	No. 2
B	No. 2	No. 1
C	No. 1	No. 3
D	No. 3	No. 1
E	No. 2	No. 3
F	No. 3	No. 2

Voltage & Current Specification Table

Rectifier	Test Volts	Min. Current	Max. Variation
1924332	5.75	29.5 amps.	6 amps.
1926291	5.0	16.0 amps.	3.5 amps.
1930086	5.75	29.5 amps.	6 amps.
1930522	11.5	30.5 amps.	5 amps.
1932630	5.75	19.8 amps.	8 amps.
1934404	5.75	24.0 amps.	6.5 amps.

HIGH CHARGING RATE TO FULLY CHARGED BATTERY: Voltage regulator setting too high or regulator faulty. Overheated battery. Alternator field circuit grounded in alternator, regulator, or wiring.

Checking - If battery not overheated, operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, and disconnect lead from regulator "F" terminal. If output drops, regulator is faulty. If output remains high, disconnect field circuit at alternator. If output drops, wiring is grounded. If output remains high, field circuit is grounded in alternator.

►*REVERSE WINDING NOTE:* If reverse field winding is open, high charging rate to fully charged battery will be present at high speeds even though all other parts of the system function properly.

LOW CHARGING RATE & LOW BATTERY: Wiring damaged or has high resistance. Faulty battery. Drive belt loose. Alternator or regulator faulty.

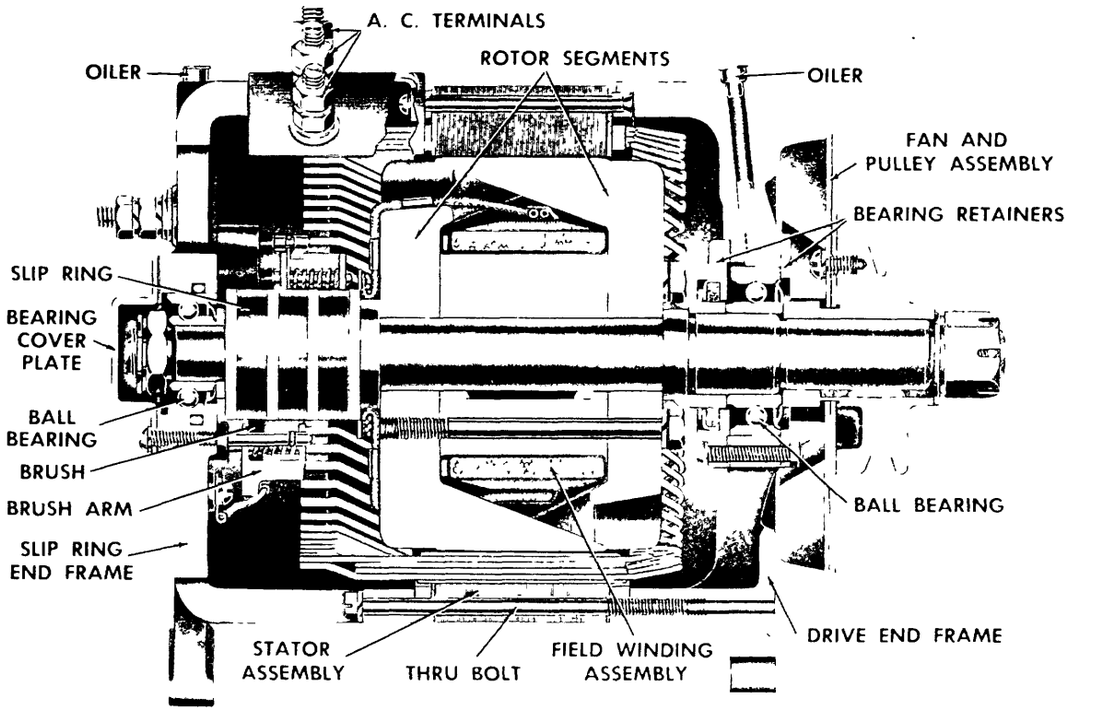
Checking - If wiring, battery, and drive belt are satisfactory, operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, turn on a 30 ampere load and momentarily ground "F" terminal of regulator. If output does not increase to approximately 30 amperes, alternator is faulty. If output increases with "F" terminal of regulator grounded, regulator setting is too low or points are oxidized.

LOW BATTERY & NO CHARGING RATE: Wiring damaged or has high resistance. Battery faulty. Rectifier faulty. Alternator or regulator faulty.

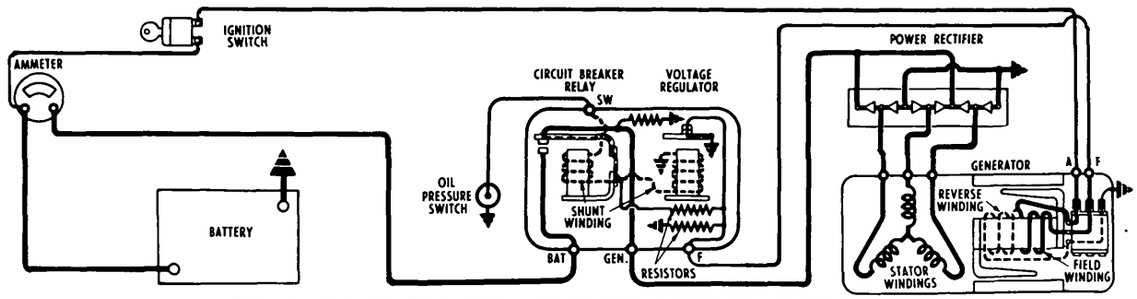
Checking - If wiring and battery are satisfactory, proceed as follows: 1) Operate alternator at idle speed or a speed to give 30 amperes charge, whichever is higher, and measure output voltage at rectifier. If voltage sufficient to charge battery, alternator and rectifier are good.

2) Oil Pressur Switch C ntrol-Type Circuit - Check oil pressure switch by connecting a jumper wire from

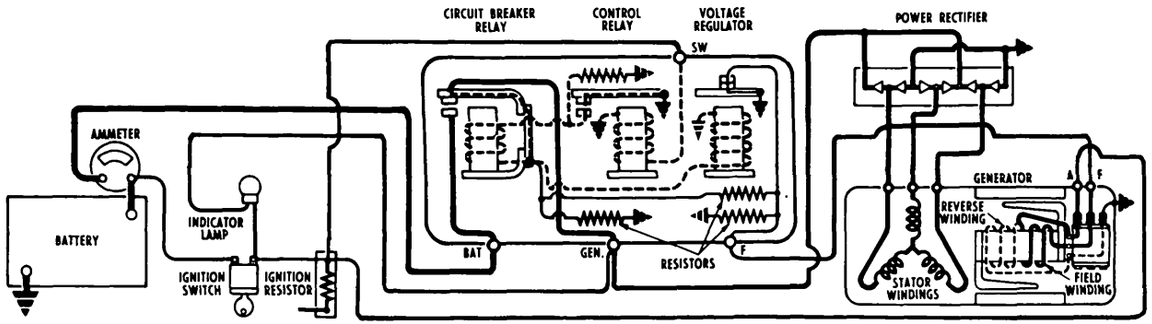
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TYPICAL DELCO-REMY ALTERNATOR (SECTIONAL VIEW)



DELCO-REMY ALTERNATOR & 2-UNIT REGULATOR WIRING DIAGRAM



DELCO-REMY ALTERNATOR & 3-UNIT REGULATOR WIRING DIAGRAM

DELCO-REMY ALTERNATOR (EXTERNAL RECTIFIER) & REGULATOR (Cont.)

"SW" terminal of regulator to ground. If alternator charges, replace oil pressure switch. If oil pressure switch good, circuit breaker relay in regulator is faulty.

3) **Regulator Control Relay Type Circuit** - If control relay contacts are closed but circuit breaker relay contacts are open circuit breaker relay winding is open. If control relay contacts do not close, control relay winding is open. If both control relay and circuit breaker relay contacts are closed, there is an open series circuit in regulator.

4) Check field current draw by disconnecting rectifier from alternator, operating alternator at idle speed and connecting a low reading ammeter in series with the field circuit at regulator "F" terminal If field current less than specified (see "Specifications" above), ground regulator "F" terminal and recheck. If field current remains low, alternator field circuit is faulty. If field current increases to specifications, regulator has an open field circuit or oxidized contact points.

5) If field current normal, check stator winding voltages at alternator output terminals with rectifier disconnected from alternator. If voltages vary more than .2 volt, stator windings are shorted If stator windings are satisfactory, reconnect rectifier and recheck. If voltages vary more than 1 volt with a charge rate of 30 amperes, rectifier is faulty (see "Rectifier Test" above). If voltages vary less than 1 volt with rectifier connected, regulator has a low voltage setting.

EXCESSIVE REGULATOR CONTACT POINT ARCING: Regulator resistors open. Alternator main field winding shorted.

OVERHAUL

Disassembly: Remove through bolts and separate end housings from stator. Remove rotor from stator Use a gear puller or arbor press to remove bearings from end housings or rotor shaft. For rotor disassembly, see "Field Coil Replacement" below.

Bearings: Replace bearings if worn or defective.

Brushes: Brushes should be a free fit in holders. Replace brushes if worn to less than ½ original length (compare with new brushes) Check brush spring tension (see "Specifications" above) and bend spring as required.

Slip Rings: If rough or out-of-round, slip rings can be trued in a lathe **if outside diameter is never reduced below 1.560".** If slip rings cannot be trued to maintain minimum diameter, replace as follows Remove glass twine between slip ring assembly and rotor segment and unsolder leads. Pull slip ring assembly from shaft with a gear puller. *Note position of leads in relation to tab to which connected. DO NOT shorten leads* Clean shaft and rotor segment surfaces in contact with slip rings of varnish to assure proper fit of new assembly. Press new assembly on shaft, using keyway as a guide Solder field leads, using rosin flux, wrap several layers of glass or cotton twine between tabs and rotor, and coat twine with glyptol or varnish. Turn slip rings in a lathe to 1 625" diameter and polish smooth with No. 00 sandpaper

Stator: Use a 110-volt test lamp and check for circuit between each stator terminal and frame. If lamp lights, stator winding is grounded. Check circuit between each two stator terminals. If lamp does not light, stator winding is open. To test for short circuited stator, see step 5) under LOW BATTERY & NO CHARGING RATE above.

Rotor: Use a 110-volt test lamp and check rotor field windings for ground by connecting test lamp between each slip ring and rotor shaft or segments. If lamp lights, reverse or main field winding is grounded. Check for open field winding by connecting test lamp between each two slip rings. If lamp does not light when connected to any two slip rings, a field winding is open. To check for shorted field windings, check field current draw (see "Specifications" above) by connecting voltmeter to both slip rings. If rotor has also a reverse field winding, connect voltmeter as follows Number slip rings with other ring as No. 1, middle ring No 2, and ring nearest rotor segment No. 3. To check main field, connect rings No. 2 & 3. To check reverse field, connect rings No 1 & 3 If current draw is more than specified, a winding is shorted. *CAUTION - To insure accurate measurement, connect voltage source directly to slip rings.*

Field Coil Replacement - Disassemble rotor assembly by removing slip ring assembly, pressing rotor shaft out with an arbor press, and removing through bolts holding rotor segments together. Note relative position of parts for reassembly. *CAUTION - Use a soft hammer only if necessary to tap parts loose* Wash all metal parts in caustic solution to remove varnish At reassembly, be sure that rubber washer fits **around** rotor core After reassembly, dip rotor assembly in a modified phenolic varnish and bake to prevent movement of winding in any direction.

Reassembly: Reverse disassembly procedure, installing all parts in proper order Hold brushes away from slip rings to prevent damage when installing rotor When pressing fan and pulley on shaft, support shaft, not end housing to prevent brush damage.

VOLTAGE REGULATOR

DESCRIPTION: Two and three unit types used **Two unit type** has a voltage regulator of conventional design and a circuit breaker relay to control the D C current between the rectifier and battery. Circuit breaker relay is operated by D.C. voltage from rectifier when engine oil pressure switch completes circuit to ground. **Three unit types** have same type voltage regulator and circuit breaker relay as two unit type, and in addition, a circuit breaker control relay which closes and opens the ground circuit of circuit breaker relay when ignition switch is turned on or off.

SPECIFICATIONS

Voltage Regulator

Normal Setting - 13 8-14.8 volts at 125°F ambient temperature

Air Gap - 075" with armature pressed down until contacts just touch

Circuit Breaker Relay

Closing Voltage - 7.5-10 5 volts (1119159, 160), 7.5-9 5 volts (Others).

Contact Gap - .027" (1119159, 160), .032" (Others) with armature against upper armature stop.

Air Gap - 013" (1119159, 160), .017" (Others) with armature pressed down until contacts just touch

Control Relay

Closing Voltage - 7.5-10.5 volts.

Contact Gap - .025" with armature against upper armature stop.

Air Gap - .035" with armature pressed down until contacts just touch.

TESTING & TROUBLE SHOOTING: *See "Testing & Trouble Shooting" above.*

ADJUSTMENT

►*ADJUSTMENT CAUTIONS:* 1) Before checking or adjusting, bring regulator to operating temperature of 125°F by connecting a ¼ ohm resistance in series with battery and operating regulator for 15 minutes with cover in place and no other load than ignition until regulator heated and temperature stabilized.

2) Voltage regulator checks must be made at alternator speed of 3000 RPM or at maximum operating speed of alternator, whichever is lower.

3) Alternator must be cycled after each electrical adjustment and before each check reading is made as follows Connect a 25 ohm, 25 watt rheostat in series with field circuit. Reduce voltage below 4 volts by setting variable resistance at maximum, opening circuit to "IGN" or "SW" terminal of regulator by disconnecting lead or turning off ignition, and reconnecting circuit or restarting engine and bringing voltage up by decreasing resistance

ELECTRICAL CHECKS & ADJUSTMENTS: Voltage Regulator - *See "Delco-Remy 1119000, 1119100, 1119200, 1972000 Series Single Contact Regulators" in this section.*

Control Relay: Adjust closing voltage as follows· With "BAT" and "SW" terminal leads disconnected, connect a jumper wire between "GEN" and "SW" terminals, and a voltmeter between "SW" terminal and ground. Connect a 25 phm, 25 watt variable resistor in field circuit at "F" terminal with all resistance turned in. With alternator at idle speed, decrease resistance until contacts close and note voltage reading. Adjust by turning spring adjusting screw Increase spring tension to increase setting Remove jumper lead and reconnect "SW" lead to terminal

Circuit Breaker Relay: Disconnect lead from regulator "BAT" terminal. **On Oil Pressure Switch control,** connect a jumper between "SW" terminal and ground and a voltmeter between "SW" and "GEN" terminals. **On Control Relay control,** connect a voltmeter between "GEN" terminal and regulator base. **On all types** connect a 12-volt lamp between "BAT" terminal and regulator base With a 25 ohm, 25 watt variable resistor in field circuit at "F" terminal and alternator at idle speed, slowly decrease resistance until lamp lights and note voltage. Adjust by turning spring adjusting screw. Increase spring tension to increase setting.

MECHANICAL ADJUSTMENTS: Make adjustments as follows

Air Gap: With armature pressed down until contacts just close, measure gap between armature and core. See *Specifications.* Adjust as follows

Voltage Regulator - Loosen upper contact mounting screws and raise or lower contact as required.

Circuit Breaker Relay - Loosen adjusting screws on back of relay and raise or lower armature as required.

Control Relay - Bend lower contact support.

Contact Gap: Check with armature against upper armature stop and adjust by bending upper armature stop. See *Specifications*

LEECE-NEVILLE ALTERNATOR & REGULATOR

FORD CARS & TRUCKS

Alternator	Leece-Neville No.	Ford No.
30 Amp.	5432-G6	B8TZ-10346-A
30 Amp.	5392-GB6	B8TZ-10346-E
50 Amp.	A0015468-GA	① B8TZ-10346-G
50 Amp.	5428-G6	B8TZ-10346-F
60 Amp	A0012088-AA	② C1TF-10346-B
60 Amp.	A0012072-AA	③ C1TF-10346-C
60 Amp.	A0012106-AA	④ C1TF-10346-D
100 Amp ⑤	5440-G6	B8TZ-10346-C
100 Amp. ⑤	5412-GA6	⑥ B8TZ-10346-D

RAMBLER

Alternator	Leece-Neville No.	Rambler No.
50 Amp	A0015428-GA⑦	3156484
60 Amp.	A0012036-AA	3159384

STUDEBAKER

Alternator	Leece-Neville No.	Studebaker No.
50 Amp Std.	5370-GB6	1543136
50 Amp.H.D. & 60 Amp.	5412-GA6	1543137
60 Amp.	A0012002-AA	1550006

① - Replaces B8C-10002-B. May also be marked B9FA-10300-A.
② - Identification Nos C1TF-10300-D, E, G, H
③ - Identification Nos. COTF-10300-E, C1TF-10300-C,K.
④ - Identification Nos C1TF-10300-F, J, M.
⑤ - Also 50 Amp H D.
⑥ - May also be marked B9FA-10300-B.
⑦ - External Rectifier No. C0011068-CA (Rambler No 3149242)

►CHANGES, CAUTIONS, CORRECTIONS

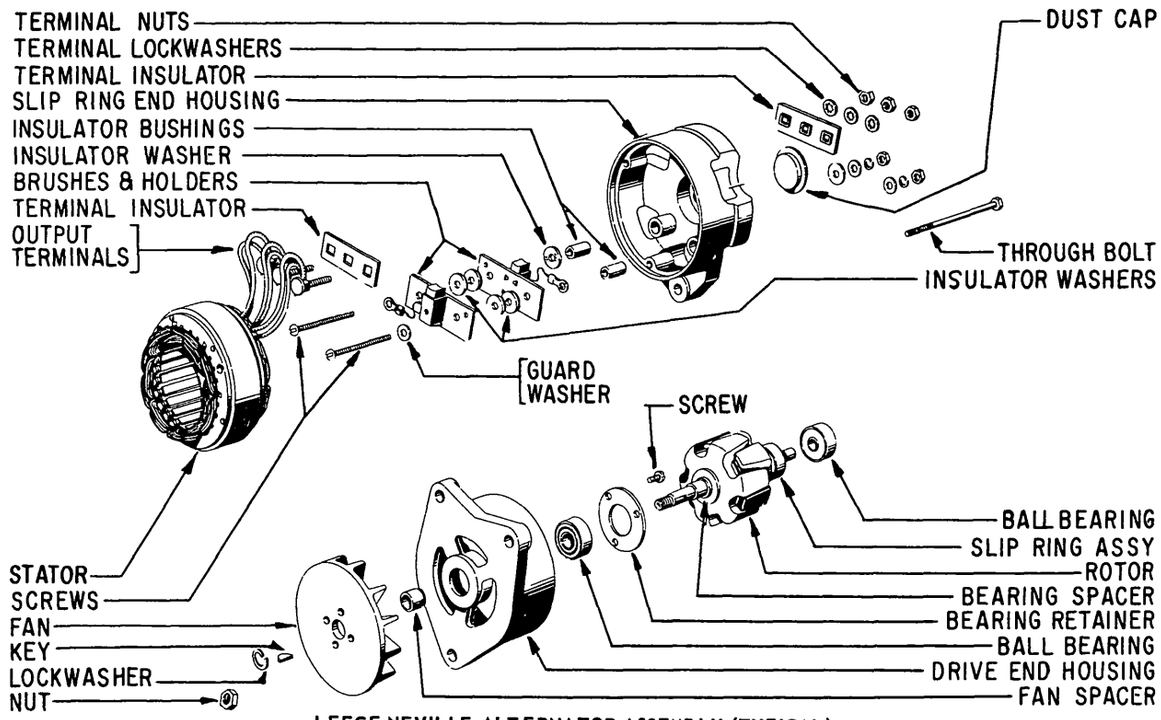
►*BATTERY INSTALLATION, BATTERY CHARGING, OR USING A BOOSTER BATTERY TO START ENGINE CAUTION: Reversed polarity or excessive voltage will result in extensive damage to alternator system. NOTE THE FOLLOWING TO PREVENT DAMAGE.*

Battery Installation - Alternator polarity determines which battery terminal is grounded. For negative polarity alternators, **negative** battery terminal must be grounded *DO NOT REVERSE BATTERY LEADS or rectifiers will be damaged.*

Charging Battery - If a "Fast Charger" is used, both of the car's battery cables must be disconnected from battery *DO NOT use a "Fast Charger" to provide starting voltage.*

Booster Battery (Used To Start Engine) - Booster battery **must** be connected with negative lead to negative terminal of battery and positive lead to positive terminal of battery *DO NOT REVERSE BATTERY LEADS.*

DESCRIPTION: Main alternator components are the stator, rotor, brushes, slip rings, slip ring end housing and drive end housing Rectifiers consist of an externally mounted dry plate type on some models or are incorporated in slip ring end housing on other models Alternator voltage and output is controlled by a voltage regulator unit (see "Voltage Regulator" below for further description).



LEECE-NEVILLE ALTERNATOR ASSEMBLY (TYPICAL)

Stator - Consists of an iron core with three phase windings electrically 120° apart wound in slots around inside circumference. Stator leads are connected to terminal posts in slip ring end housing. These leads are connected to the external rectifier assembly or to internal rectifiers by additional leads.

Rotor - Consists of a single field coil encased between two six-fingered overlapping iron sections assembled on a shaft The two ends of field coil are connected to two slip rings insulated from each other and the shaft Battery is connected to field coil through brushes and the slip rings

Slip Ring End Housing - Supports rectifier heat sink (if equipped), rotor shaft rear ball bearing, brush holders and brushes, and all terminals for lead connections.

Drive End Housing - Supports rotor shaft front ball bearing, pulley fan, and pulley. Through bolts hold entire assembly together

Rectifier (External Type) - Assembly is a dry plate, three phase, full wave, bridge type, selenium rectifier mounted separately from alternator and connected to it by three leads from stator phase windings Two output terminals are mounted on rectifier to connect to car wiring

Rectifier (Internal Type) - Six silicone diode rectifiers are screwed into a metal heat sink mounted in slip ring end housing and insulated from it. Three rectifiers have negative polarity and are connected to ground through negative output terminal The other three rectifiers have positive polarity and are connected to alternator positive output terminal.

►*CHARGE INDICATOR LIGHT RECTIFIER NOTE:* On some Ford Light Duty trucks a modification to accommodate the charge indicator light consists in operating the load relay of the voltage regulator from a pair of rectifiers connected across one phase of the stator winding.

SPECIFICATIONS

Performance Data

Alternator	Amperes	Volts	Alt. RPM
30 Amp. (Ford)	30 min.	14.0	①
50 Amp. (Ford)	50 min.	14.0	① 2040
50 Amp (Rambler)③	50	14.0	② 2050
60 Amp. (Ford)	60 min	14.0	① 3400
60 Amp (Rambler)④	60	14 0	⑤ 4400
100 Amp (Ford)	100 min.	14.0	①

① - 1600 Engine RPM. ② - 880 Engine RPM
③ - Alternator No A0015428-GA.
④ - Alternator No. A0012036-AA. ⑤ - 1800 Engine RPM.

Rotation - Clockwise at drive end.
Rated Output - See Application Table above.
Field Coil Draw - 2 4-3.0 amps (Ford), 2 5-3.0 amps. (Rambler) at 12.0 volts.

TESTING

►*CAUTION: 1) Do not ground field circuit between alternator and voltage regulator as regulator will b damaged. 2) Do not ground alternator output terminal or alternator and circuit will be damaged. 3) Do not op rate alternator on open circuit with field winding energized.*

CONTINUED ON NEXT PAGE

LEECE-NEVILLE ALTERNATOR & REGULATOR (C nt.)

4) *Do not polarize alternator as it is not required and doing so will damage entire system*

5) *Before making test connections, ignition switch must must be off*

ALTERNATOR IN CAR: With battery fully charged and engine at normal operating temperature, test circuits as follows

Current Output: Disconnect alternator "F" and "G" leads *from regulator and connect leads together* Connect an ammeter positive lead to these two leads, start engine and connect ammeter negative lead to battery positive terminal Operate engine at proper speed *(see "Performance Data" above)* and note ammeter reading Current output should reach or exceed specifications *(see "Performance Data" above)*

►*ALTERNATOR TESTER NOTE* When using an Alternator Tester for an output test, the maximum voltage variation between phases should not exceed 1 5 volts (no load), 3 volt (load)

Field Coil Draw: Disconnect "F" lead from alternator and connect an ammeter negative lead to "F" terminal and positive ammeter lead to battery positive terminal Current draw should be as in specifications If current draw is low or zero, field has high resistance or is open If current draw is high field is shorted or open

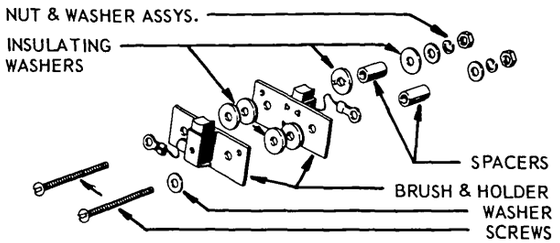
ALTERNATOR OFF CAR: Stator Test - *NOTE - This test may be made on alternators with external rectifier with alternator in car if stator leads to rectifier assembly are disconnected On internal rectifier alternators, remove stator from slip ring end housing* Use a 110 or 220-volt test lamp and test probes With one test probe on alternator end housing or stator core, touch other probe to each phase terminal in turn If lamp lights, stator is grounded Check stator windings for continuity with an ohmmeter and test probes at two of the winding leads in turn Each phase should show a low resistance If resistance is high, stator windings are open or shorted

Rotor Test: Test rotor with a 110-volt test lamp There should be no ground between either slip ring or shaft There should be no ground between rotor core and slip rings

Rectifier (External Type) Service: Clean rectifier assembly frequently by blowing compressed air through plates to remove dirt With rectifier removed, use a bottle brush or rag between plates *CAUTION - DO NOT force brush or rag between plates DO NOT use solvent Clean rectifier DRY.* To test rectifier, connect a 25 ampere load across output terminals with an ammeter in circuit Touch test probes from a 12-volt battery to two of the three terminals in turn Ammeter readings should be equal for all three checks A different reading in any one test indicates a faulty rectifier *CAUTION - DO NOT apply voltage to direct current output terminals of rectifier*

Rectifier (Internal Type) Test: *NOTE - Resistance of silicon rectifiers will vary due to temperature, type of ohmmeter, battery voltage used in test equipment, and other factors* Remove slip ring end housing from stator assembly Proceed as follows

Method 1 - Connect ohmmeter leads to the two alternator output terminals Reverse the leads Resistance should be 3 3-20 ohms in one direction and infinite in the other direction



BRUSH & HOLDER ASSEMBLY (EXPLODED)

Method 2 - With positive probe of ohmmeter on alternator negative output terminal, touch each of stator winding terminals with other probe Resistance should be 5-45 ohms Reverse the probes Resistance should be infinite Now place negative probe on alternator positive output terminal and touch each of stator winding terminals with other probe Resistance should be 5-45 ohms Reverse the probes Resistance should be infinite

Rectifier Mount Ground Test (Internal Type Rectifiers): Use a 110-volt test lamp and check from each output terminal screw to ground If ground exists, check top, center, and bottom rectifier assembly-to-housing mounts, and both output terminals

OVERHAUL

►*OVERHAUL NOTE. Alternator need be disassembled only so far as necessary for testing or needed repairs Bearings need be removed only if loose or if lubricant lost On 100 Amp alternator, repair rotor assembly (except for slip rings, bearing, or coil) only if proper machining and balancing equipment available*

DISASSEMBLY: 30, 50, 60 Ampere Alternators - Remove fan and pulley assembly with a gear puller Remove key and fan spacer Remove splash shields and pry out bearing dust cap Insert a brush clip on brush holders to retract brushes Remove nuts, washers and insulator from the three stator phase terminals Remove through bolts and pull slip ring end housing from rotor shaft with a gear puller Remove stator from housing (tap with soft hammer if necessary to loosen) Remove rectifier assembly mounting screws and remove assembly from housing With arbor press or gear puller, press rotor from drive end housing Tap or press bearings out of each housing Remove brush holder assemblies

Slip Ring Replacement - While removing old slip rings, place new slip rings in a warm area to prevent cracking when installing Unsolder coil wires from slip rings Pull rings from shaft with gear puller or use arbor press Press new slip ring assembly on shaft with slots in line with hole in shaft for coil wires and until outer face of outer slip ring is 9/16" from end of shaft Concentricity of slip ring faces with bearing surface of shaft must be within 002" Cut rings on a lathe to correct

Rectifier Cell Replacement (Internal Type) - *CAUTION - Disturb as few connections as possible Metal-to-metal surface of cell and terminal connections have a special treatment to prevent corrosion and electrolysis Same treatment must be applied to a new or replacement cell* Unsolder cell lead, bend down lock tab on inner bracket and remove cell with a wrench *CAUTION - If spacer between inner and outer rectifier mounting bracket comes out, it must be cleaned on both sides before re-installation* Install new cell Tighten to 20-25 inch-lbs , bend lock tab up Solder lead to cell *DO NOT OVERHEAT OR CELL WILL BE DAMAGED*

100 Ampere Alternator: 1) Remove pulley, both brush holder assemblies from brush end housing and nuts, washers and insulators from stator winding terminals Remove brush end housing dust cap, housing bolts and alternator top support Loosen brush end housing with a soft hammer and remove housing and stator assembly from shaft (use gear puller if bearing is tight) Remove stator from housing Pull drive end housing from shaft with a gear puller Remove retainer and bearing from drive end housing

2) Unsolder both field leads from slip rings and press off slip rings with parallel bars *CAUTION - Use care not to crack slip rings during removal If cracked, they must be replaced* Remove bearing and bearing retainer from slip ring end of shaft (save wood wedge from lead slot under bearing) Remove drive end shaft nut and tap off drive end rotor half with a soft hammer Remove key Press other half of rotor from shaft with an arbor press (use a brass rod on end of shaft to protect and lengthen it) Remove rotor coil from hub *CAUTION - Keep rotor halves together to maintain proper balance*

REASSEMBLY: 30, 50. 60 Ampere Alternators - Press bearings into slip ring and drive end housings (apply pressure to outer race only) Press drive end housing and bearing assembly on rotor shaft with shaft on flat plate of arbor press (use pipe so pressure exerted on bearing inner race only) Install brush holder assemblies as shown in illustration Install a holder clip to retract brushes Install stator over rotor and insert through bolts through drive end housing and stator Install rectifier assembly in slip ring end housing Install slip ring housing and rectifier assembly over stator and rotor assembly and press on slip ring end housing with an arbor press Tighten through bolts Install stator terminal insulator, washers, and nuts Remove brush retainer clip There should be 1/16" clearance between alternator fan fins and drive end housing Install pulley and tighten to 40 ft lbs Test assembly for free turning

100 Ampere Alternator: 1) Press slip ring rotor half (with wire clip) on shaft as far as snap ring and press hub on shaft Install coil with leads under wire clip Install key, press drive end rotor half on shaft and install and tighten locknut Paint rotor with red oxide or red Glyptol varnish to secure coil Place coil leads in slot in shaft, press slip ring bearing on shaft (press on inner race only), place wood wedge in slot and install snap ring and insulating washer Press slip rings on shaft one at a time with tapered side toward bearing and wire cutout aligned with slot in shaft Solder coil leads to slip rings

2) Press drive end bearing into housing (press on outer race only) and install bearing retainer With slip ring end of shaft on press plate, press drive end housing assembly on shaft (use pipe so pressure exerted on bearing inner race only) Install stator over rotor and drive end housing so dowel pin in housing mates with stator hole Install insulator over stator leads and press slip ring end housing on shaft (mate dowel pin in housing with hole in stator) Install alternator top support Install insulator, bushings, washers and terminal nuts on terminals Install brush holder assemblies

CONTINUED ON NEXT PAGE

LEECE-NEVILLE ALTERNATOR & REGULATOR (C nt.)

Clearance between alternator fan fins and housing should be 1/16". Torque pulley nut to 40 ft. lbs.

VOLTAGE REGULATOR

FORD CARS & TRUCKS

Regulator - Ford Nos. -	Alternator
B8C-10505-A	B8TZ-10346-A, E
B8Q-10505-A	B8TZ-10346-G, F
PB8M-10316-A	C1TF-10346-B,C,D
B8C-10505-B	①B8TZ-10346-C,D

RAMBLER

Regulator - Leece-Neville Nos. -	Alternator
R0013456-RA②	A0015428-GA
R0013533-RA③④	A0012036-AA

① - When used as 50 Amp. use Regulator No. B8Q-10505 -A.
② - Rambler No. 3156485 ③ - Rambler No. 3159383.
④ - Two Unit type.

DESCRIPTION: Two and three unit types used (see above) Three unit type has load relay, voltage regulator and current regulator. Two unit type used on some alternators with internal rectifiers has load relay and voltage regulator only. Data and specifications below apply to both types except for current regulator data which is not applicable to two unit type Voltage regulator is a double contact type of conventional design Current regulator is also of conventional design Both units perform the same functions as on a DC current generator-regulator system. Load relay has a single core winding and a single set of contacts. Relay is controlled by ignition switch (except Ford Trucks, see below) which, by energizing core winding, closes relay contacts, energizes alternator field circuit, and connects the "G" and "B" terminals of regulator together (completes alternator charging circuits to battery)

►*FORD LIGHT DUTY TRUCK NOTE*· On trucks with charge indicator light, load relay is operated through a pair of rectifiers connected across one phase of stator windings instead of through ignition switch.

SPECIFICATIONS

Load Relay

Closing Voltage - 5.6-6 4 volts (Ford), 6.0-6.4 volts (Rambler)
Contact Gap - 018-.020" with contacts open.
Air Gap - .018-.020" with contacts closed.
Hinge Gap - .005-.007" with contacts closed.

Voltag R gulator

Voltage S tting (M th d 1) - 13.5-14.3 volts.
Voltage Setting (Method 2) - 13 6-13.8 volts (upper contacts), 13.7-13.9 volts (lower contacts), 14 0-14.2 volts (transfer voltage).
Contact Gap - .018- 020" with lower contacts closed.
Air Gap - .035-.043" with lower contacts closed.
Hinge Gap - .018- 020" with lower contacts closed.

Current Regulator

Setting- 28-32 amps. (30 Amp), 48-52 amps. (50 Amp.), 58-62 amps. (60 Amp.), 98-102 amps. (100 Amp.).
Contact Gap - .018-.020" with contacts open.
Air Gap - 032- 038" with contacts open
Hinge Gap - 005-.007" with contacts open.

ADJUSTMENT

CHECKING & ADJUSTING (ON CAR): *NOTE - Regulator is "Temperature Compensated" type Make following checks and adjustments after regulator heated and stabilized (after 30 minutes operation with 10 ampere load).*

Load Relay: Connect a 250 ohm, 25 watt rheostat from battery positive post to "IGN" terminal of regulator, and a voltmeter positive lead to regulator "IGN" terminal with negative lead grounded Turn full resistance into circuit and slowly decrease resistance until relay points close. Closing voltage should be as specified. To adjust, bend armature spring lower hanger down to increase voltage, up to decrease voltage.

Voltage Regulator: Method No. 1 (Fixed Resistance Method) - Connect voltmeter positive lead to regulator "G" terminal and negative lead to battery negative post. Connect ammeter positive lead to "B" terminal of regulator (disconnect battery lead from regulator) and negative lead to battery negative post with 1½ ohm resistor in line between battery and ammeter. Start engine and slowly increase speed to 1600 RPM. Steady voltmeter reading should be as specified. Retest by stopping engine, momentarily turning off ignition and restarting engine To adjust, bend armature spring lower hanger down to increase setting, up to decrease setting

Method No. 2 - *CAUTION - Before setting each voltage in following test sequence, alternator must be stopped and ignition switch turned off.* Connect an ammeter in series with battery lead to regulator and a voltmeter between "B" and "G" regulator terminals Connect a set of earphones (not less than 1000 ohms resistance) to "F" and "G" regulator terminals. Proceed as follows

1) Start engine and slowly increase speed. Listen (with earphones) for start of vibration of regulator contacts and note voltage reading. Regulator is operating on upper contacts If voltage not as specified, bend armature spring lower hanger down to increase, up to decrease

2) Slowly increase speed past vibration on upper contacts and note voltage when vibration stops. Vibration stops immediately before regulator operates on lower contacts This maximum voltage is "Transfer Voltage" and must be as specified Adjust as in 1) above.

3) Increase speed slowly past "transfer voltage" point and note start of vibration on lower contacts If not as specified, adjust air gap by loosening contact block lock screw and turning carrier block cam adjusting screw.

Current Regulator: Method 1 - With test leads connected as in "Voltage Regulator Method No 1 (Fixed Resistance)" test above, connect a carbon pile rheostat across the 1½ ohm fixed resistor With engine at 1600 RPM slowly decrease resistance of carbon pile rheostat until voltmeter reads 12 volts Ammeter will now indicate specified setting for current regulator To adjust, bend armature spring lower hanger down to increase setting, up to decrease setting. Retest voltage regulator setting with all test equipment removed except the voltmeter and with battery in circuit.

Method 2 - Connect a battery starter variable resistance load tester across battery. With alternator turning at 2000 RPM increase resistance. Current regulator should vibrate and hold line current to specifications To adjust, bend armature spring lower hanger up or down as necessary Retest voltage regulator setting (upper contacts) with only voltmeter connected and battery in circuit

ADJUSTMENT (OFF CAR): The following adjustments are made on load relay, voltage regulator, and current regulator in the same manner

Hinge Gap: Set gap between yoke and armature lower hinge spring by loosening and tightening armature lock screw. *See Specifications.*

Air Gap: Gap between armature or armature stop and core is set by holding armature towards core and adjusting stationary contact adjusting screw *See Specifications.*

Contact Gap: Set gap by adjusting contact carrier or armature stop *See Specifications.*

Armature Travel: Adjust armature to float within travel limits by bending armature hinge springs (armature spring removed) *NOTE* - On load relay, be sure to solder jumper wire to contact plate

AUTOLITE GENERATORS

DESCRIPTION: Two pole, two brush, shunt generators of conventional design. Generators are force-draft air cooled by a fan built into drive pulley which rotates with armature shaft. Both "A" and "B" circuit types are used. "A" **circuit** generators have field windings connected from insulated brush to generator field terminal, and regulation is accomplished between field terminal, and ground (generator field grounded in regulator). "B" **circuit** generators have field windings connected from generator field terminal to ground brush, and regulation is accomplished between armature and field terminals (generator field grounded in generator). See illustrations.

►*GROUND POLARITY NOTE: Test connections given below are for negative grounded systems. If system is positive grounded, reverse test lead connections.*

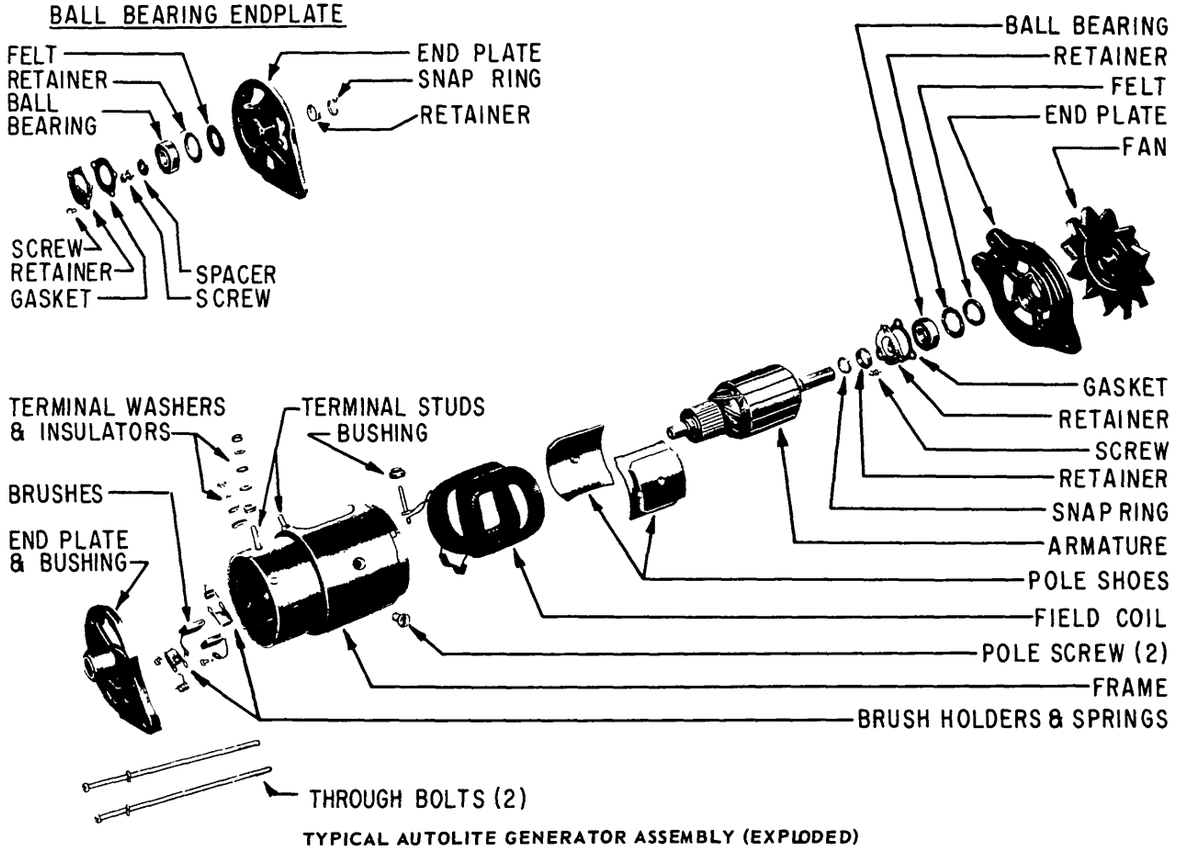
TESTING: Current Output - Connect an ammeter between regulator lead and regulator "BAT" terminal. Connect a voltmeter between regulator "ARM" terminal and regulator base. With engine idling, ground regulator field terminal to regulator base with a jumper wire ("A" circuit), connect regulator field and armature terminals together ("B" circuit). Slowly increase generator speed to indicated RPM and note voltmeter and ammeter readings. *See Car Model pages for specifications.* Generator should reach or exceed rated output.

Charging Circuit Resistance: Connect a carbon pile rheostat in series with field lead and "FLD" terminal of regulator. Connect an ammeter in series with battery lead and "BAT" terminal of regulator. Connect a voltmeter from battery positive post to "ARM" terminal of generator. Start engine and adjust accessory load and rheostat to give 20 ampere reading on ammeter. Maximum voltage drop should not exceed 1 volt (.5 volt with ammeter out of circuit).

Ground Circuit Resistance: Leave rheostat and ammeter connected as in "Charging Circuit Resistance" above. Connect voltmeter from negative (grounded) battery post to generator frame. Start engine and adjust accessory load and rheostat to give 20 ampere reading on ammeter. Maximum voltage drop should not exceed .1 volt.

Motoring Test: Remove generator belt. Disconnect all leads from generator terminals. Connect battery to generator armature terminal with an ammeter in circuit. Connect a voltmeter between generator armature terminal and ground. Ground generator field terminal ("A" circuit), connect generator armature and field terminals together with a jumper wire ("B" circuit). Generator should motor at a steady speed. *See Car Model pages for specifications.*

OVERHAUL: Disassembly - Remove commutator cover band (if equipped) and disconnect terminal lead from insulated brush holder. Reach through openings in generator frame or endplate and lift and hook brushes away from commutator. Remove endplate attaching screws or generator through bolts and remove endplate, bearing and brush assembly. *NOTE - Commutator endplates with ball bearing must be pressed from shaft with an arbor press.* Remove armature and drive endplate and bearing assembly. Remove pulley (see Note below). *CAUTION - On generators with pressed on pulleys, remove pulley and bearing from shaft separately as endplate may crack if both units are removed together.* Press armature from endplate and bearing with an arbor press. Remove ball bearings by removing retainers and washers and gently tapping bearing from endplate. Press bronze bushing (if equipped) from commutator endplate.



TYPICAL AUTOLITE GENERATOR ASSEMBLY (EXPLODED)

►*PULLEY REMOVAL NOTE:* Pulleys are either bolted and keyed to shaft, or pressed on shaft. Pressed on pulleys can be removed with a suitable puller. Puller, Miller Tool No. C-3615, is recommended for pulley removal.

Inspection - Wipe all parts with a clean cloth. Ball bearings may be cleaned in solvent but **must not** be spun when dried with compressed air. Inspect all parts for wear, roughness, scoring, worn insulation, good solder connections, etc.

Armature: Shaft commutator end runout should not exceed .001". Shaft drive end runout should not exceed .002". Commutator runout with shaft bearing surfaces should not exceed .0005". Reface commutator as necessary, removing only enough metal for smooth surface. Undercut mica segments 1/32" deep with mica square the full width of slot. Polish commutator with No. 00 sandpaper. Check for shorts between armature core and commutator with a 110-volt test lamp. Check armature windings for shorts with a growler.

Field Windings: Check for burned or damaged insulation. Check "ARM" and "FLD" terminal posts for ground with generator frame with 110-volt test lamp ("ARM" and "FLD" terminals should be insulated from frame). make sure field windings are not grounded to frame. Test field current draw as follows: Connect a carbon pile rheostat between battery positive post and "ARM" terminal ("A" circuit), to field coil brush lead ("B" circuit). Connect an ammeter between battery negative post and "FLD" terminal. Connect "ARM" and "FLD" terminals ("A" circuit), field coil brush lead and "FLD" terminal ("B" circuit) with a voltmeter. With rheostat, adjust battery voltage to specified figure and note ammeter reading. Field current draw should be as specified. *See Car Model pages for specifications.* High current reading indicates a short or incorrect coils; low current reading indicates poor connections, high resistance, or incorrect coils. Check for short circuits, high resistance or incorrect coils. *NOTE - When replacing field coils, an impact screwdriver such as C-3475 is recommended to prevent damage to screws and to insure proper tightening. After coils installed and pole screws tightened securely, rap frame sharply with a soft hammer to insure proper seating of pole pieces, then stake pole screws.*

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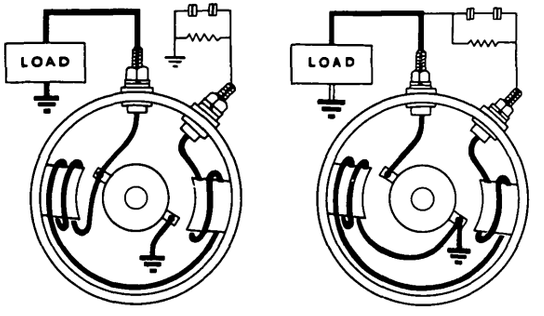
AUTOLITE GENERATORS (C nt.)

Brush s: Inspect brushes for freedom in holders and for proper seating. Replace brushes coated with oil or dirt or if worn to less than ½" long. Check brush spring tension. *CAUTION - If brush holders riveted to endplate, check tension with endplate and brushes installed on armature.* With spring scale hooked in hole in end of brush arm or with adapter hooked under arm as near as possible to brush, pull spring scale at right angle to brush and note reading just as arm leaves the brush. *See Car Model pages for specifications. NOTE - If brush holders riveted to generator frame, install new springs when new brushes installed because of difficulty in measuring brush spring tension.* Test brush holders for ground with endplate or frame If brush holder grounded, repair holder or replace endplate or frame (some brush holders riveted to endplate or frame). Seat new brushes for correct fit on commutator with No. 00 sandpaper between commutator and brush and armature rotated in reverse rotation as sandpaper is pulled away. Repeat operation until brushes seat at least 75% over contact surface.

Commutator End Bearing: Inspect bearings for wear, roughness, scoring, etc. Clean ball bearing in solvent DO NOT spin dry. Replace bronze bushing if necessary with a suitable driver. Soak bushing in light oil before installation. Clearance between armature shaft and bearing must not exceed .002". If commutator endplate equipped with ball bearing, pack bearing about ½-full with high temperature, non-fibre ball bearing lubricant before installation. *See "Reassembly" below for ball bearing installation procedure.*

Drive End Bearing: Inspect ball bearing for roughness, pitting, scoring, wear, etc. Clean in solvent, but DO NOT spin dry. For bearing installation, see "Reassembly" below. *CAUTION - On generators with pulley pressed on shaft, drive end bearing is a loose fit bearing because of larger shaft diameter. When bearing pressed on shaft, inner race expands to provide standard ball clearances. DO NOT install the standard ball bearing used on some commutator endplates as binding and bearing failure will result. This special bearing is Autolite No. X-295A and may be identified as follows·*

Bearing Manufacturer	Identification
New Departure	Black Ball Retainer (1 side)
Marlin Rockwell	Black Ball Retainer (1 or 2 sides)
Norma Hoffman	Black Ball Retainer (1 or 2 sides)
Federal	Black Ball Retainer (1 or 2 sides) or 1203/C3 on Inner Race
SKF	SKF-6203-C3 on Outer Race



"A" & "B" CIRCUIT INTERNAL WIRING

Reassembly: Dip drive end bearing felt washer in oil and squeeze to remove excess oil, Assemble felt washer, retainer, ball bearing, gasket & bearing retainer in drive endplate (fill bearing half full with high temperature, non-fibre ball bearing lubricant). Install snap ring on armature shaft with retainer over snap ring. Press drive endplate and bearing assembly on armature shaft. *CAUTION - Support armature so pressure exerted on armature shaft and not on endplate.* Press on inner race of bearing only until bearing inner race is firmly against armature shaft snap ring. For bolted on pulley, install key, pulley and fan assembly and lockwasher and nut. Tighten nut securely For pressed on pulley, support armature shaft only and press pulley on shaft *CAUTION - DO NOT use more than 6800 lbs. pressure to install pulley. Pressure over 7000 lbs. will damage shaft* Install armature and drive endplate assembly into frame assembly and push parts together On commutator endplate with bronze bushing, slide endplate on armature shaft and align dowel pin hole in plate with dowel pin in frame. On commutator endplate with ball bearing, install snap ring on armature shaft with retainer over snap ring Install endplate into position Dip felt washer in oil and squeeze to remove excess oil Install felt washer and retainer. Fill bearing half full with high temperature, non-fibre ball bearing lubricant and press bearing on shaft until inner race of bearing is firmly against snap ring on shaft. *CAUTION - Press on inner race of bearing only and support armature shaft so pressure exerted on shaft only.* On all generators, install through bolts and tighten securely *NOTE - On "B" circuit generators, install through bolts between field lead wire and g nerator frame to prev nt possible field circuit grounding.* Armature shaft endplay on all generators should be 003- 010" Install cover band. Saturate oiler wick with 8-10 drops of light oil

POLARIZING GENERATOR: *Before operating, generator must be polarized as follows*

"A" Circuit - MOMENTARILY touch a jumper wire between regulator "BAT" terminal and regulator or generator "ARM" terminal

"B" Circuit - Disconnect field lead from regulator and MOMENTARILY flash this disconnected field lead to "BAT" terminal of regulator

DELCO-REMY "EXTRUDED FRAME" GENERATORS

DESCRIPTION: Two pole, two brush, shunt generators of "extruded frame" type design. In this design, commutator end of frame is smaller in diameter than drive than drive end and no cover band is used as there are no inspection openings in the frame. Generators are force-draft air cooled by a fan built into drive pulley which rotates with armature shaft. "A" circuit generators with field grounded through the regulator are the more common type found, however "B" circuit generators with field grounded internally in the generator may also be found on some applications. Data below applies to both type circuits as indicated.

NOTE - Some generators may be of conventional design with cover band around inspection openings in frame. Data below applies to this type also.

LUBRICATION: Hinge oilers should be filled with oil at each lubrication period. If no oilers are provided, repack bearings each time brushes are serviced. *Avoid over-lubrication.*

►*CHARGING CIRCUIT FUSE CAUTION:* Some regulators have a charging circuit fuse clipped to "BAT" terminal of generator regulator. Check for blown fuse and cause of fuse failure when diagnosing generator, regulator, or battery failure. When making test connections, connect test equipment to fuse (do not bypass fuse)

►*GENERATOR FIELD GROUNDING CAUTION: On generators equipped with Double Contact regulators, DO NOT ground generator field with field lead connected to regulator as regulator upper contacts will be burned out instantly.*

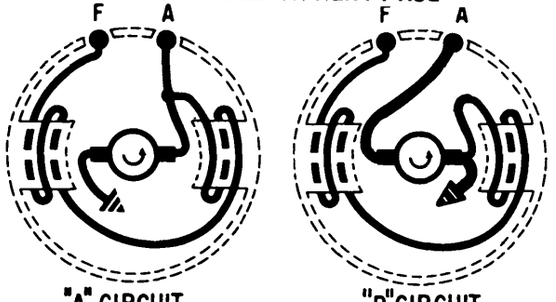
►*GRCUND POLARITY NOTE: Test connections given below are for negative grounded systems. If system is positive grounded, reverse test lead connections.*

TESTING: Current Output ("A" Circuit) - Disconnect and ground field lead from "FLD" terminal of regulator. Connect an ammeter in series with battery lead and "BAT" terminal of regulator. Start engine, slowly increase speed to indicated RPM and note ammeter reading Generator should reach or exceed rated output. *See Car Model pages for specifications.*

Charging Circuit Resistance ("A" Circuit): Connect a carbon pile rheostat in series with field lead and "FLD" terminal of regulator. Connect an ammeter in series with battery lead and "BAT" terminal of regulator. Connect a voltmeter from battery positive post to "ARM" terminal of generator. Start engine and adjust accessory load and rheostat to give 20 ampere reading on ammeter Maximum voltage drop should not exceed 8 volt (including .25 volt drop across test ammeter).

Ground Circuit Resistance ("A" Circuit): Leave rheostat and ammeter connected as in "Charging Circuit Resistance" test above, Connect voltmeter from negative (grounded) battery post to generator frame. Start engine and adjust accessory load and rheostat to give 20 ampere reading on ammeter Maximum voltage drop should not exceed .1 volt.

CONTINUED ON NEXT PAGE



"A" & "B" CIRCUIT INTERNAL WIRING

DELCO-REMY "EXTRUDED FRAME" GENERATORS (C nt.)

OVERHAUL: **Disass mbly** - Remove cover band (if equipped). Remove through bolts and remove commutator endplate. *NOTE - Hook brushes up and away from commutator to prevent damage and loss of parts.* Remove drive endplate and armature assembly from frame. Remove pulley nut, lockwasher, pulley and fan, and key from shaft. Press commutator ball bearing (if equipped) from armature shaft, then press drive endplate and bearing assembly from shaft. Slide spacer washer off armature shaft. Remove drive endplate bearing retainer, gasket, bearing, retainer, and felt washer from drive endplate.

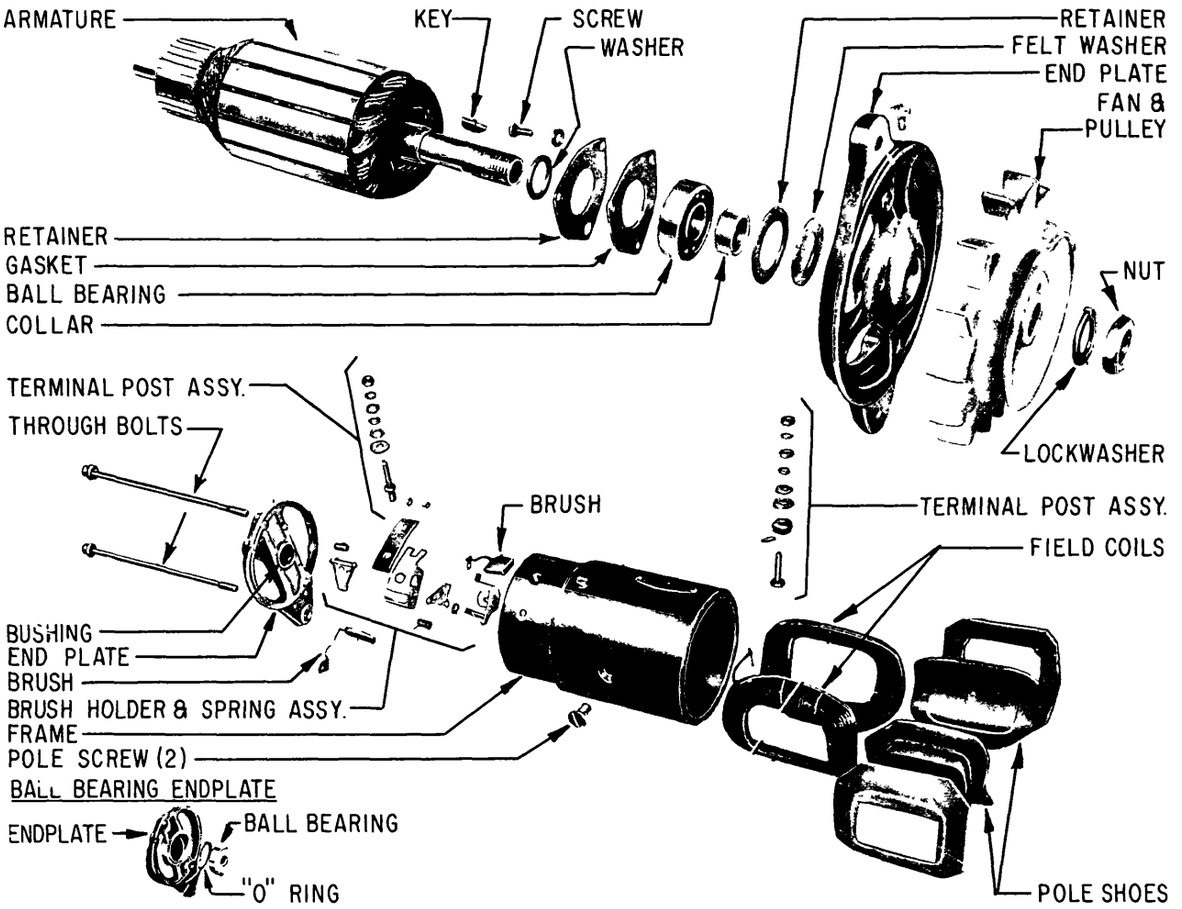
Insp cti n - Clean and dry all parts. Do not use solvent on armature or field coils. Inspect all parts for wear, scoring, roughness, burning, evidence of overheating, worn insulation, poor solder connections, etc.

Armature; Inspect shaft for wear or scoring and replace armature assembly if necessary. Check armature windings for shorts on a growler. Check for short to shaft and for open circuit between segments with a test lamp. If commutator rough or out-of-round, reface as necessary, removing as little metal as possible. Undercut mica segments 1/32" deep and square the full width of slot. Polish commutator with No. 00 sandpaper. Wipe commutator thoroughly to remove dirt and copper dust.

Field Windings: Make tests with a 110-volt test lamp. Check for open circuit between field coil lead and "ARM" terminal. Check for ground between "FLD" terminal and frame. Check "ARM" terminal for ground with frame. Check field current draw as follows: Connect an ammeter from battery positive post to "ARM" terminal. Connect "FLD" terminal to battery negative post. Connect "ARM" and "FLD" terminals ("A" circuit), field coil brush lead and "FLD" terminal ("B" circuit) with voltmeter. Note field current draw. *See Car Model pages for sp cifications.* High current reading indicates a short or incorrect coils; low current reading indicates poor connections, high resistance, or incorrect coils. Check for short circuits, high resistance, or incorrect coils. Replace field coils as necessary.

Brush s: Check brushes for free fit in holders, accumulation of dirt and for wear. If worn to less than ½ original length (compare with new brushes), replace brushes. Check brush spring tension with spring scale at right angle to brush arm. Note reading just as brush arm is lifted from brush. If not within specifications, replace springs. *See Car Model pages for specifications.* Check insulated brush holder for ground with endplate or frame. If ground exists, replace endplate (if brushes mounted in endplate) or replace brush holders.

Bearings: If bronze bushing worn or scored, replace bushing or endplate as required. Clean ball bearings with solvent and blow dry with air. *Do not spin.* Check bearings for wear, scoring, or roughness. Replace if necessary. Pack bearings with cam and ball bearing lubricant. Check "O" ring seal in groove in commutator endplate for distortion and replace if new bearing being installed. Clean "O" ring groove.



TYPICAL DELCO-REMY GENERATOR ASSEMBLY (EXPLODED)

Reassembly: Reverse disassembly procedure, installing all parts in proper order (see illustrations). Make sure "O" ring is seated in groove of commutator endplate before installing endplate (ball bearing endplate type). Saturate oiler wick with a few drops of light oil. After generator reassembled, check that bearings do not bind and that armature shaft turns freely.

POLARIZING GENERATOR: *Before operating, generator must be polarized as follows:*

"A" Circuit - MOMENTARILY touch a jumper wire between "ARM" and "BAT" terminals of regulator. *CAUTION - On generators with Double Contact regulators, insulate brushes from commutator before polarizing generator.*

"B" Circuit - Disconnect field lead from regulator and MOMENTARILY touch this disconnected field lead to "BAT" terminal of regulator.

FORD MOTOR CO. GENERATORS

DESCRIPTION: Two pole, two brush, shunt generators of conventional design. Generators are force-draft air cooled by a fan built into drive pulley which rotates with armature shaft. Generators are of "B" circuit type with generator field grounded internally in the generator. *See illustration.*

LUBRICATION: Oiler for commutator endplate bronze bushing should be filled with a few drops of light oil every 5000 miles. Ball bearings are permanently lubricated.

►*GROUND POLARITY NOTE: Test connections given below are for negative grounded systems. If system is positive grounded, reverse test lead connections.*

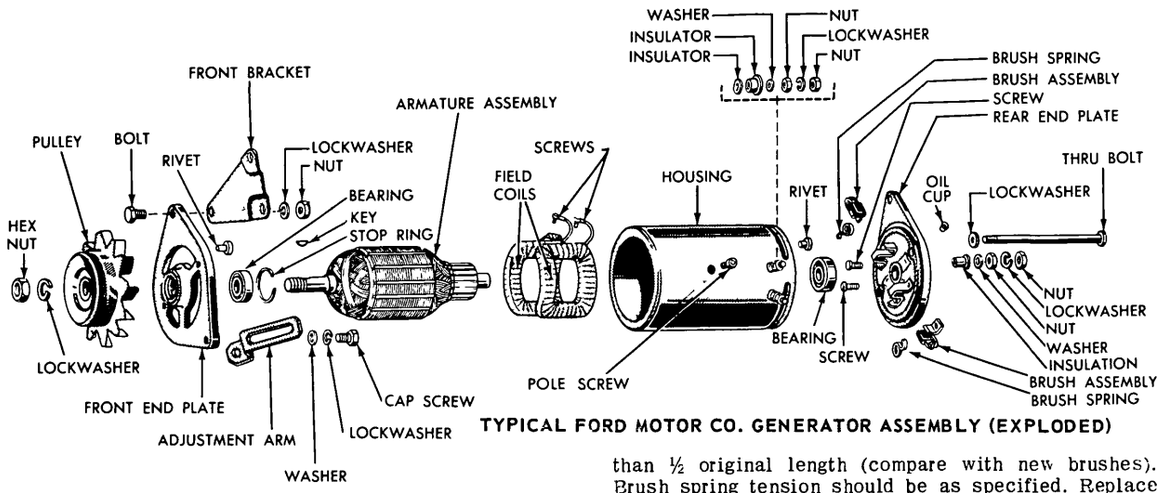
►*CHARGING CIRCUIT FUSE CAUTION:* Some regulators may have a charging circuit fuse clipped to "BAT" terminal of starter relay (fuse may be bypassed on some cars). Check for blown fuse and cause of fuse failure when diagnosing generator, regulator, or battery failure. When making test connections for current output test, bypass fuse by disconnecting lead to fuse and attaching lead directly to circuit breaker at starter relay.

TESTING: Current Output - Connect an ammeter in series with regulator "BAT" terminal and lead to "BAT" terminal. Connect a voltmeter from regulator "ARM" terminal to ground. With engine idling, connect generator "FLD" and "ARM" terminals together with a jumper wire. Slowly increase generator speed to indicated RPM and note voltmeter and ammeter readings. *See Car Model pages for specifications.* Generator should reach or exceed maximum output.

Charging Circuit Resistance: Connect an ammeter between regulator "BAT" terminal and lead to "BAT" terminal. Connect voltmeter positive lead to "ARM" terminal of generator and voltmeter negative lead to battery positive post (or "BAT" terminal of starter relay). Connect generator "ARM" and "FLD" terminals with a jumper wire. Start engine, turn on light and accessories, and adjust engine RPM to give ammeter reading of 20 amperes. Maximum voltage drop should not exceed .8 volt.

Ground Circuit Resistance: Leave ammeter and jumper wire connected as in "Charging Circuit Resistance" test above. Connect voltmeter positive lead to starter motor rear endplate capscrew, and negative lead to generator frame. Start engine, turn on lights and accessories, and adjust engine RPM to give ammeter reading of 20 amperes. Maximum voltage drop should not exceed .1 volt.

OVERHAUL: Disassembly - Remove through bolts and remove commutator endplate. *NOTE - Hook brushes away from commutator to prevent damage and loss of parts.* Remove armature and drive endplate assembly from frame. Remove pulley, drive endplate, and key from armature shaft. Pull or press commutator end ball bearing from armature shaft. *NOTE - Remove bearing only if necessary as bearing will be distorted when removed from shaft and must be replaced.* On drive endplate, remove snap ring and press bearing from endplate.



TYPICAL FORD MOTOR CO. GENERATOR ASSEMBLY (EXPLODED)

Inspection - Wash all parts except armature, field coils, and bearings in solvent and wipe other parts with a clean cloth. Inspect parts for wear, roughness, scoring, worn insulation, evidence of burning, etc. Replace parts as necessary.

Armature: Check armature shaft for wear or scoring and replace armature if necessary. Check armature windings for short on a growler. With a test lamp, check armature for short circuit to shaft and for open circuit between segments. If commutator rough, scored, or out-of-round, reface as required, removing no more than 3/64" maximum from diameter of commutator. Undercut mica and polish commutator with No. 00 sandpaper.

Field Windings: Let field coil ground wire hang freely (disconnect from frame) and check field windings with a test lamp for open circuit from ground wire to "FLD" terminal. Test field for ground with frame with a test lamp. Test field current draw as follows: Connect an ammeter from "FLD" terminal to battery positive post. Connect battery negative (ground) post to generator frame. Field current draw should be as specified. *See Car Model pages for specifications. NOTE - If field current draw checked with generator in vehicle, disconnect "FLD" lead at generator or regulator and do not use a jumper from battery to generator frame.* Check "FLD" terminal for ground with frame. When replacing field coils, Pole Screw Remover and Installer, No. 10044, with generator clamped in a vise or arbor press, is recommended to prevent damage and to assure proper fit of parts.

Brushes: Brushes must be free in holders and free from excess dirt and oil. Replace brushes if worn to less than ½ original length (compare with new brushes). Brush spring tension should be as specified. Replace brush springs if not within limits. *See Car Model pages for specifications.* Check insulated brush holder for ground with endplate. If ground exists, replace endplate.

Bearings: If commutator endplate bronze bushing is worn or scored, replace bushing or endplate as required. Replace ball bearings if worn, scored, loose, or if lubricant lost. *NOTE - Commutator end ball bearing will be distorted if removed from shaft and must be replaced. Drive rear bearing on shaft with a fibre mallet with socket or spacer against inner race of bearing.*

Reassembly: Reverse disassembly procedures, assembling all parts in proper order (see illustration). Make sure drive end bearing snap ring is in position against bearing in drive endplate.

POLARIZING GENERATOR: *Before operating, generator must be polarized as follows:* Disconnect field lead form "FLD" terminal of regulator and MOMENTARILY touch this disconnected wire to "BAT" terminal of regulator. *Do not use a jumper wire or regulator points will be burned instantly.*



FORD MOTOR CO. GENERATOR INTERNAL WIRING

BOSCH GENERATORS

DESCRIPTION: The heavy duty type generator is a four pole, four brush, "B" circuit (field grounded in generator through grounded brush), shunt generator of conventional design Generator is force-draft air cooled by a fan built into drive pulley which rotates with armature shaft. Armature shaft is supported by a ball bearing at both drive and commutator ends

TESTING: Curr nt Output - Disconnect "ARM", "FLD", and "BAT" leads from regulator Tape "BAT" terminal lead Connect ammeter positive lead to "ARM" and "FLD" leads with a carbon pile rheostat in series with ammeter, and negative ammeter lead to engine ground strap. Connect voltmeter positive lead to regulator "ARM" and "FLD" leads and voltmeter negative lead to ground Turn all resistance into the circuit Start engine and set at 800 RPM. Slowly turn resistance out of circuit until voltmeter reads 14 volts Generator should reach or exceed maximum rated output *See Car Mod l pages f r specifications*

Charging Circuit Resistance: Connect an ammeter between regulator "BAT" terminal and lead to "BAT" terminal. Connect voltmeter positive lead to "ARM" terminal of generator and voltmeter negative lead to battery positive post Start engine, turn on lights and accessories, and adjust engine RPM to give ammeter reading of 20 amperes Maximum voltage drop should not exceed 5 volt

Gr und Circuit R sistanc : Connect an ammeter between regulator "BAT" terminal and lead to "BAT" terminal Connect voltmeter positive lead to battery negative (ground) post, and negative lead to generator frame Start engine, turn on lights and accessories, and adjust engine RPM to give ammeter reading of 20 amperes Maximum voltage drop should not exceed 2 volt

OVERHAUL: Disassembly - Remove commutator end band and sealing strip for access to brushes Remove brushes Remove nut, washers, pulley, and key from shaft Remove drive endplate attaching screws and remove drive endplate and armature assembly Remove drive end bearing retainer plate-to-drive endplate attaching screws and remove armature from drive endplate Remove commutator endplate attaching screws and remove endplate Remove spring washer from commutator endplate Remove bearings from endplates with a jaw type bearing puller

Inspection - Wash all parts except armature, field coils, and bearings in solvent Inspect all parts for wear, damage, worn insulation, etc

Armature: Inspect shaft for wear or scoring and replace armature assembly if necessary Check for shorted windings on a growler Check for short to shaft with a test lamp Check for open circuit between segments with a test lamp If necessary to turn commutator, DO NOT remove more than 3/64" maximum diameter of commutator Undercut mica segments and polish commutator with No 00 sandpaper

Field Windings: Remove ground wire from frame and let hang freely Check field coils for open or short circuit with a test lamp Check field current draw *See Car Model pages for specifications*

Brushes: Test insulated brush holders for ground with endplate If ground exists, replace endplate Brushes must be free in holders Replace brushes if worn more than ½ of original length of 1 125" Check brush spring tension and replace springs if necessary *See Car Model pages for specifications*

Bearings: Replace bearings if scored or worn *See Re-assembly" below for installation procedure*

R ass mbly: Position drive end bearing retainer plate on drive end of armature shaft and press drive end bearing on shaft Place spacer on commutator end of shaft and press commutator end bearing on shaft with sealed side of bearing toward armature winding Insert spring washer into bearing bore of commutator endplate with washer prongs facing bearing and install commutator endplate on frame Tighten attaching screws to 25-30 inch-lbs Place armature in drive endplate and tighten bearing retainer plate screws Assemble armature and drive endplate into frame and tighten endplate attaching screws to 30-35 inch-lbs *NOTE - Be sure bearings and armature turn freely* Install brushes Install commutator endplate sealing strip and band Install key, pulley, washers and attaching nut Tighten nut to 45-55 ft lbs

POLARIZING GENERATOR: *Before operating, generator must be polarized as follows* Disconnect regulator "FLD" wire from regulator "FLD" terminal and MOMENTARILY touch wire to "BAT" terminal of regulator *CAUTION - DO NOT use a jumper wire or regulator will be damaged*

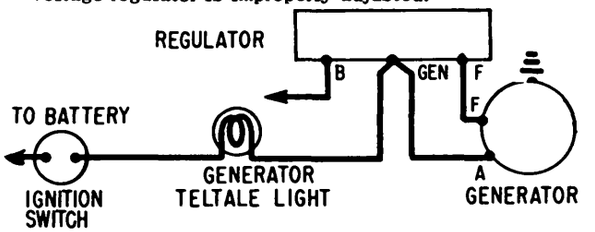
GENERATOR TELTALE LIGHTS

DESCRIPTION: Consists of an indicator light bulb mounted in instrument panel cluster and connected to the ignition switch and grounded through the generator. Light goes on when ignition switch turned on and should go out when generator begins to charge. *NOTE* – On some cars, indicator light circuit is protected by a fuse. *See individual Car Model pages and Car Model wiring diagrams.*

TROUBLE SHOOTING & DIAGNOSIS: Light Off, Ignition On, Engine Stopped – Indicator bulb burned out. Open circuit or loose connections in light circuit. Blown indicator light circuit fuse (if equipped).

Light On, Engine Running: Low idle speed. Low generator output. Faulty generator. Improperly adjusted regulator. Generator field improperly grounded.

TESTING: *CAUTION – On cars with Double Contact Voltage Regulator, DO NOT ground regulator "FLD" terminal when making test. Disconnect regulator fi ld leads and ground leads before testing.* Connect a jumper wire from regulator "FLD" terminal to ground with engine running at medium speed. If indicator light goes out, generator field circuit is improperly grounded, or voltage regulator is improperly adjusted.



TYPICAL TELTALE LIGHT WIRING

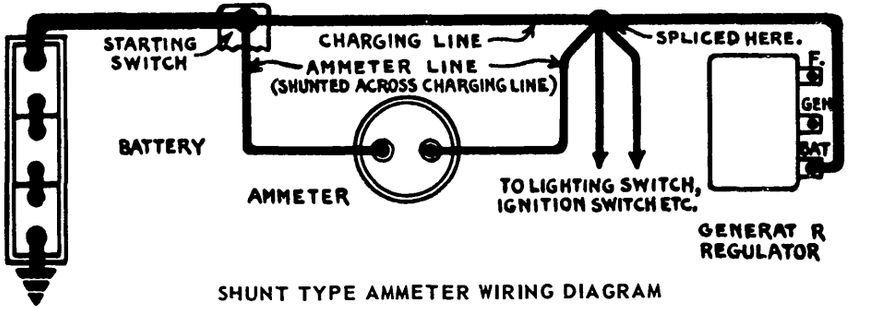
SHUNT TYPE AMMETER

►***CAUTION—When testing voltage regulators on the above cars with shunt type ammeters, and the "BAT" lead is removed from the regulator for the test, it is of utmost importance that the other leads on same terminal be bolted to the "BAT" lead when it is removed. Failure to do this may result in burning up th wiring harness.***

IMPORTANT NOTE: Accessories must not be connected at ammeter terminals as ammeter circuit wires are inadequate to carry more than designed load and any change in ammeter circuit will cause ammeter to read incorrectly.

DESCRIPTION: External shunt type ammeter with push-on type terminals This design lessens number of connections in generator charging circuit and results in better generator performance (less chance for loose or corroded connections and high resistance in circuit).

OPERATION: Ammeter operates in usual manner except only a portion of the charging current (approximately 10%) goes through the ammeter, remainder of charging current being 'shunted' around ammeter through regular charging line (see illustration). Ammeter dial is calibrated so that it indicates entire charging current (25-30 amperes) rather than current actually in ammeter circuit. Correct ammeter operation is dependent on proportional amount of current in each branch of the circuit (through ammeter and through the external shunt) and any disturbance of this balance (such as connection of accessories at ammeter terminals) will cause ammeter to read incorrectly



SHUNT TYPE AMMETER WIRING DIAGRAM

AUTOLITE 6-VOLT "A" CIRCUIT REGULATORS

►*GENERATOR REPOLARIZING:* Whenever regulator or generator leads are disconnected for ANY reason, the generator must be repolarized as follows After generator and regulator leads are reconnected, connect jumper wire between "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator windings. This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of contact relay points).

►*NORMALIZING THE REGULATOR:* Before checking regulator, bring it up to normal operating temperature as follows Operate generator at speed of 1500 RPM, adjust charging rate to 10 amperes (connect .25 ohm resistor in charging line or use variable resistance connected across battery). Continue operation for 15 minutes to "normalize" the regulator or bring it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from cover)

DESCRIPTION: The Regulators that follow are all of the "Temperature Compensated" type consisting of a CUT-OUT UNIT, a VOLTAGE CONTROL UNIT and a CURRENT REGULATING UNIT When correctly adjusted, test readings will be the same as appear in the tables below

CHECKING & ADJUSTMENT (CUT-OUT RELAY): Check and adjust contact gap and air gap first before checking closing and opening voltage

Air Gap: 031- 034" (Exc VBO), 025- 027" (VBO) Use flat gauge (ST-281-9) to measure between magnet core and armature at a point as close to armature hinge as possible **with contacts open.** Adjust by bending armature stop and make certain that stop does not rub against edge of armature
NOTE—Armature 'seals' against yoke after contacts close (measure air gap with contacts open)

Contact Gap— 015" Min (all models) Gap must not be less than 015" but may exceed this figure in service With correct adjustment, contacts will close and armature will then 'seal' against yoke CAUTION—If contact gap too large, contacts will not close before armature seals against yoke

Closing Voltage—Connect ammeter in charging line at regulator 'B' terminal, connect voltmeter between 'A' terminal and ground Operate generator and increase speed slowly until contacts just close **but without sealing against yoke,** note voltmeter reading at this point To adjust, use Tool ST-283, adjust armature spring tension by bending lower spring hanger ***CAUTION***—Closing voltage must always be 5 volt less than voltage regulator setting

Opening Voltage or Amperage—Connect meters as for Closing Voltage Check (above), decrease generator speed slowly and note voltmeter (or ammeter) reading as contacts open Adjust by changing contact gap (see above)

Cutout Relay Settings

Model	Contact Closing Voltage	Contact Opening Voltage
VAV	6 3-6 8	4 1-4 8
VBA	6 3-6 8	4 1-4 8
VBE	6 3-6 8	4 1-4 8
VBF	6 3-6 8	4 1-4 8
VBO	6 3-6 8	ℂ
VRP	6 3-6 8	4 1-4 8

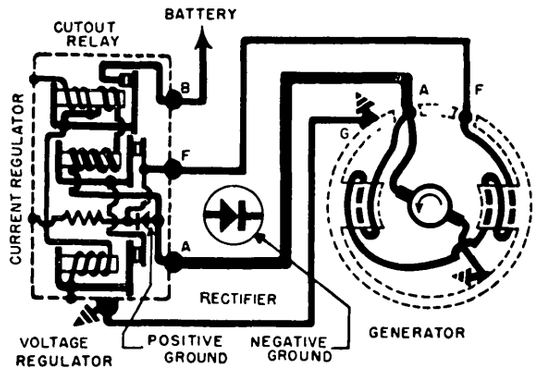
ℂ - 4-6 amps discharge after a charge of 10 amps

CHECK & ADJUST (VOLTAGE REGULATOR):

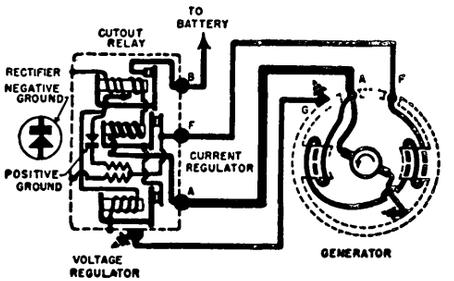
Air Gap (All Series)— 048- 052" (pin gauge ST-281-7). Measure at stop pin on contact side with contacts just opening Test air gap by connecting test lamp and battery between 'F' terminal and ground Insert low limit pin gauge, depress armature by hand, lamp should dim or go out Repeat test with high limit pin gauge Lamp should remain lighted To adjust air gap, loosen screw holding upper contact bracket, raise bracket to increase gap, lower bracket and contact to decrease gap Contact spring must be straight and parallel with armature

►*1960 6 VOLT "VBO" REGULATOR VOLTAGE SETTING CHANGE (To Maintain Batt ry at Satisfact ry Charge Level):* **On later production regulators identified by Code Dates of 3R or later, or by a red dot on base of regulators with Code Date of 2R or earlier, the**

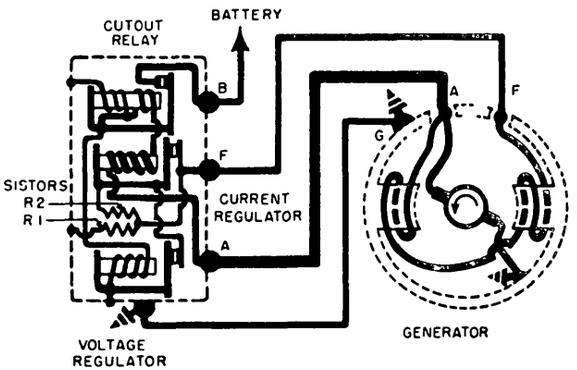
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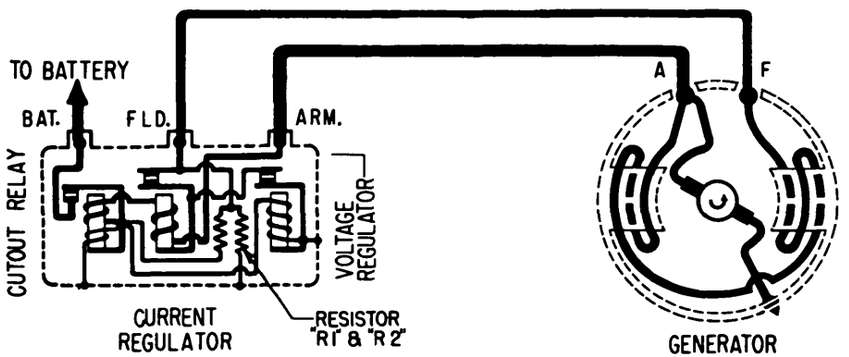
"VBF" REGULATORS



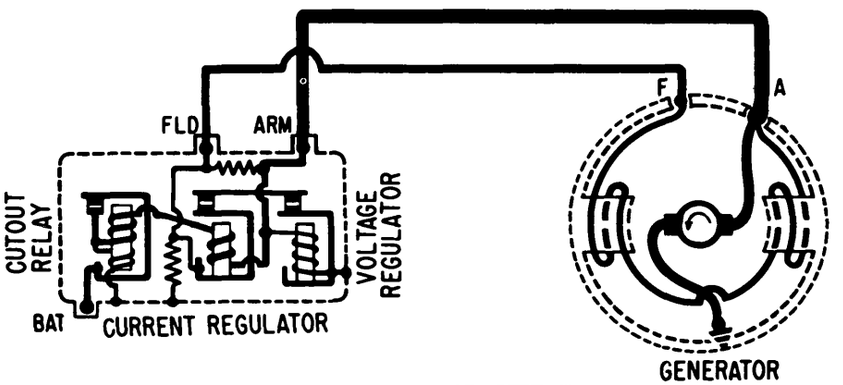
"VBA" SERIES (WITH RECTIFIER)



"VRP", "VAV" REGULATORS



VBE-6000 REGULATORS



VBO-4200 REGULATORS

AUTOLITE 6-VOLT "A" CIRCUIT REGULATORS (Cont.)

voltage setting has been increased to 7.2-7.55 volts at 70°F. (ambient temperature) at a charge rate of 10 amperes or with a 1/4 ohm fixed resistor in series with the battery. Regulators with Code Date 2R or earlier which do not have the red dot may be recalibrated to new voltage setting if required.

Voltage Setting Check—Connect ammeter in charging line at regulator 'B' terminal (ammeter must read to 1 ampere and internal resistance must not exceed 01 ohm, use short heavy leads for connections), connect voltmeter between regulator 'B' terminal and ground (meter must read to .1 volt). car battery must be fully charged (substitute fully charged battery if car battery run down). Run engine at speed equivalent to 30 MPH for at least 15 minutes with generator charging battery to bring regulator up to operating temperature. Then note voltmeter reading (see voltage table below).

Adjustment—Use tool ST-283 to vary armature spring tension by bending arm at lower end of spring. Replace cover and recheck performance.

V Itag Regulator Setting

Mod l	Voltage Setting Table
VAV	
4402A, 3A, 4A, 4B, 5A, 5B	No 3
6001A, B, BF, 2A, 2B, 3AT, 3AXT	No 2
6004AXT	No 5
6005A, BT, 6AT	No 2
7003AT, AXT, 5BT, 6AT	No 2
7004AXT	No 5
8003AT	No 2
VBA	
4101A, B, 2A, 3A, 4A, 4B	No 1
4202A, 3A, 3AF, 4A, 5A, 6A, 6AT, 6B	No 4
4207A, 8A	No 4
6001A, B, C, 2AM, 4AM	No 4
6003A	No 1
VBE	
6001A, AF, AT, 3A, 5AT	No 2
6001AXT, 2AXT, 4AXT	No 5
6101A, 2A, 3A, 4A, 5A, 5AT	No 3
6201A	No 2
VBF	
6001A, 2A, 3A	No 2
VBO	
4601 (All)	No 4
4602 (All)	No 4
VRP	
4501A, C, 2A, 3A, 3B, 3C	No 3
4501AX, 3AX, 3BX	No 5
6001A, A-2, AT, 1B, BT, 2A, 3A, AT, BT	No 3
6005A, 6A, 7A	No 3
6005BX	No 5
6004A, B	No 2
6101A, B	No 3
6008A	No 2
8003A, BT	No 3

V Itag S tting Tabl s (V lts)

Temp.	Tabl 1	Table 2	Tabl 3	Tabl 4	Tabl 5
50°	7 2	7 34	7 41	7 3	7 16
60°		7 29	7 38		7 13
70°		7 25	7 35		7 10
80°	7 1	7 21	7 32	7 2	7 07
90°		7 16	7 29		7 04
100°		7 12	7 27		7 02
110°	7 0	7 08	7 24	7 1	6 99
120°		7 03	7 21		6 96
140°	6 9			7 0	

NOTE - Allowable range variation ± 15 volt (Tables 2 & 3), ± 1 volt (Tables 1 & 5), ± 2 volt (Table 4)

CHECK & ADJUST (CURRENT REGULATOR):

Air Gap (All Series): .048-.052" (pin gauge ST-281-7). Check and adjust as for voltage regulator (above).

Testing "Non-Temperature Compensated" Current Regulators: Connect test meters as directed for Voltage Regulator Check above Connect a load in excess of rated capacity of regulator at a point between regulator and battery (turn on lights and accessories, add additional load such as a lamp band or carbon pile, or use a variable resistance across battery) Note ammeter reading with current regulator operating Generator must be within 5% of rated capacity of regulator under test *NOTE - Make test with regulator cover in place Voltage regulator can be prevented from operating by installing a jumper across voltage regulator points*

Current Regulator Setting
"Non-Temperature Compensated" Regulators

Model	Amperes
VBO-4601AT, -1	34-46
VBO-4601BT, -1	13-15
VBO-4601D, -1	29-31
VBO-4601E, -1	31-33
VBO-4601F, -1, K, -1	39-41
VBO-4601G, -1	34-36
VBO-4601H, -1	24-26
VBO-4601J, -1	19-21
VBO-4601L, -1	21-23
VBO-4601M, -1	16-18
VBO-4601R, -1, V, -1	15-17
VBO-4601U, -1	13-15
VBO-4602H, -1	39-41
VBO-4602J, -1	34-36
VBO-4602K, -1	13-15
VBO-4602L, -1	11-13
VBO-4602M, -1, P, -1	15-17
VRP-6001A, -2, AT	34-36
VRP-6001B, BT, 5A, 6A, 7A	39-41
VRP-6002A, 3A, AT, 3BT, 5BX	34-36
VRP-6101A	34-36
VRP-6101B	39-41
VRP-8003A, 3BT	34-36

Testing "Temperature Compensated" Current Regulators: ***CAUTION—Tests are made in two steps "Test A" and "Test B" as listed below.*** Connect test meters as directed for Voltage Regulator Check (above).

Test A—Operate generator for 15 minutes charging at ½ maximum rate (VAV, VBF, VRP Regulators), at 10 amperes (VBA, VBE, VBO Regulators), then note ammeter reading with current regulator operating Should agree with "Test A" figure in table below

NOTE—If regulator not cold at start of test, Test A reading may be slightly less than specified due to higher temperature.

►*TEMPERATURE CAUTION*—When checking regulator temperature with a thermometer, hold thermometer two inches away from regulator (must not touch regulator).

Test B—Add load on battery to hold voltage to "Test B" Table below to insure current Regulator operation Run generator for 15 minutes with current regulator operating, then note ammeter reading. Should agree with "Test B" figure in Current Setting Table below

"B" Test Voltage.

Model	Volts
VAV, VBE, VBO	6 7 to 6 9
VBA	6 7
VBF, VRP	6 7 to 7 0

Current Regulator Setting
"Temperature Compensated" Regulators

Regulator	Table No.	Regulator	Tabl No.
VAV		**VBE(Cont.)**	
4402A,3A,4A,5A	2	6101A,2A,3A	3
4404B, 5B	1	6104A, 5A, 5AT	3
6001A, 2A, 5BT	1	6201A	3
6001B, BF, 2B, 5A	2	**VBF**	
6003AT,AXT,4AXT	5	6001A, 2A, 3A	4
6006AT	5	**VBO**	
7003AT,3AXT,4AXT	5	4601A, -1	14
7006AT	5	4601B, -1, C, -1	12
7005BT	1	4601CT, -1	12
8003AT	5	4601P, -1	10
VBA		4601Q, -1	9
4101A, 2A, 3A, 4A	15	4602A, -1	14
4101B, 4B	13	4602AT, 2D, -1	10
4202A	15	4602B, -1	9
4203A, AF	9	4602BT, -1, C, -1	12
4204A,5A, 6A, 6AT	15	4602E, -1	12
4207A, 8A	15	4602F, -1	16
4206B	13	4602G, -1	8
6001A	13	**VRP**	
6001B, 3A	11	4501A, AX	6
6001C, 2AM, 4AM	9	4501C, 2A	5
VBE		4503A, AX, 3C	6
6001A, AF, AT, AXT	3	4503B, BX	5
6002AXT, 3A, 4AXT	3	6004A	5
6005AT	3	6004B, 8A	7

Current Setting Tables (VAV, VBE, VBF, VRP)

Table No.②	Test	Operating Current at Test Temp.① 40°	60°	70°	80°	100°
1 (45 amps)	A	53	51	50	49	47
	B	46-50	44-48	43-47	42-46	40-44
2 (50 amps)	A	58	56	55	54	52
	B	51-55	49-53	48-52	47-51	45-49
3 (45 amps)	A	55	53	52	51	49
	B	46-50	44-48	43-47	42-46	40-44
4 (55 amps)	A	69	67	66	65	63
	B	56-60	54-58	53-57	52-56	50-54
5 (40 amps)	A	49	47	46	45	43
	B	41-45	39-43	38-42	37-41	35-39
6 (35 amps)	A	45	43	42	41	39
	B	36-40	34-38	33-37	32-36	30-34
7 (25 amps)	A	35	33	32	31	29
	B	26-30	24-28	23-27	22-26	20-21

①—Test A amps maximum ②—Nominal Setting

CONTINUED ON NEXT PAGE

AUTOLITE 6-VOLT "A" CIRCUIT REGULATORS (C nt.)

Current Setting Tables (VBA, VBO)

Table No. ②	Test	Operating Current at Test Temp. ℃ 50°	70°	90°	110°	130°
8 (25 amps.)	A	34	32	30	28	26
	B	25-29	23-27	21-25	19-23	17-21
9 (35 amps)	A	46	44	42	40	38
	B	35-39	33-37	31-35	29-33	27-31
10 (40 amps,)	A	51	49	47	45	43
	B	40-44	38-42	36-40	34-38	32-36
11 (40 amps)	A	50	48	46	44	42
	B	40-44	38-42	36-40	34-38	32-36
12 (45 amps)	A	56	54	52	50	48
	B	45-49	43-47	41-45	39-43	37-41
13 (45 amps)	A	54	52	50	48	46
	B	45-49	43-47	41-45	39-43	37-41
14 (50 amps)	A	62	60	58	56	54
	B	50-54	48-52	46-50	44-48	42-46
15 (50 amps)	A	59	57	55	53	51
	B	50-54	48-52	46-50	44-48	42-46
16 (55 amps)	A	73	71	69	67	65
	B	55-59	53-57	51-55	49-53	47-51

Adjustment (All Current Regulators): Use tool ST-283 to vary armature spring tension by bending arm at lower end of spring. Replace cover and recheck

REGULATOR RESISTORS: Resistors should be checked for correct resistance by testing with ohm meter (ST-284)

REGULATOR RESISTORS

Model VAV	"R 1" Mark	"R 1" Ohms	"R 2" Mark	"R 2" Ohms
4402A,4A	60	57-63	15	13 5-16 5
4403A,4B,5A,5B	60	57-70	15	14-17 1
6001A,B,BF,2A,B	60	57-70	15	14-17 1
6003AT,AXT,4AXT	38	34 5-42	7	6 5-8
6005A	60	57-70	15	14-17 1
6005BT,6AT	38	34 5-42	7	6 5-8 0
7003AT,AXT,4AXT	38	34 5-42	7	6 5-8 0
7005BT,6AT	38	34 5-42	7	6 5-8 0
8003AT	38	34 5-42	7	6 5-8 0
VBA				
4101A,B	60	57-63	7	6 5-7 5
4102A,3A,4A,4B	60	57-63	7	6 5-7 5
4202A,3A,3AF	80	75-91		
4204A,5A,6A,AT,B	80	75-91		
4207A,8A	80	75-91		
6001A, B, C	80	75-91		
6002AM, 3A 4AM	80	75-91		
VBE				
6001A,AF,AT,AXT	30	28-34 5	7	6 5-8 0
6002AXT,3A	30	28-34.5	7	6 5-8 0
6004AXT,5AT	30	28-34.5	7	6 5-8 0
6101A,2A,3A	30	28-34.5	7	6 5-8 0
6104A,5A,5AT	30	28-34 5	7	6 5-8 0
6201A	30	28-34 5	7	6 5-8 0
VBF				
6001A,2A,3A	80	75-91		

REGULATOR RESISTORS (Cont.)

Model VBO	"R 1" Mark	"R 1" Ohms	"R 2" Mark	"R 2" Ohms
4601A,-1,B,-1	15	14-17	60	57-70
4601AT,-1,BT,-1	15	14-17	40	36-44
4601C,-1,CT,-1	15	14-17	40	36-44
4601D,-1,E,-1,F,-1	15	14-17	60	57-70
4601G,-1,H,-1	15	14-17	40	36-44
4601J,-1	15	14-17	60	57-70
4601K,-1,L,-1 M,-1	15	14-17	40	36-44
4601P,-1,R,-1	15	14-17	60	57-70
4601Q,-1,U,-1,V,-1	15	14-17	40	57-70
4602A,-1,AT,B,-1	15	14-17	60	57-70
4602BT,-1	15	14-17	40	36-44
4602C,-1,D,-1	15	14-17	60	57-70
4602E,-1,G,-1	15	14-17	40	36-44
4602F,-1	15	14-17	60	57-70
4602H,-1,J,-1,K,-1	15	14-17	40	36-44
4602L,-1,P,-1	15	14-17	40	36-44
4602M,-1	15	14-17	60	57-70
VRP				
4501A,AX	38	36-40	7	6 5-8 0
4501C, 2A, 3C	60	57-70	15	14-17 1
4503A,AX,B,BX	38	34 5-42	7	6 5 8 0
6001A,-2,AT	38	34 5-42	7	6 5-8 0
6001B,BT	38	34 5-42	7	6 5-8 0
6002A,3A,AT	38	34 5-42	7	6 5-8 0
6003BT	15	14-17 1	7	6 5-8 0
6004A,B,5A,BX,6A	38	34 5-42	7	6 5-8 0
6007A	15	14-17 1	7	6 5-8 0
6008A	38	34 5-42	7	6 5-8 0
6101A, B	38	34 5-42	7	6 5-8 0
8003A	38	34 5-42	7	6 5-8 0
8003BT	15	14-17 1	7	6 5-8 0

AUTOLITE 12-VOLT "A" CIRCUIT REGULATORS

►CHANGES & CAUTIONS

►*GENERATOR REPOLARIZING:* Whenever regulator or generator leads are disconnected for ANY reason, the generator must be repolarized as follows: After generator and regulator leads are reconnected, connect jumper wire between "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator windings. This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of contact relay points).

►*1956 "VRX" 6201A REGULATOR PRODUCTION CHANGE:* Two resistors were used in early production regulators and three resistors were used in later regulators *See Resistor Table and Wiring Diagram below for differences.*

DESCRIPTION· Auto-Lite "VAT" and "VRX" Regulators are 12-volt types of similar design to previous Auto-Lite 6-volt regulators except for use of a third "R3" resistor on some "VAT" regulators. *See wiring diagram.*

►*CHECKING & ADJUSTMENT CAUTION* Removal of cover (for regulator adjustments) requires breaking of seal Regulator can be checked to determine if it is operating satisfactorily without breaking the seal or removing the cover as directed below

CHECKING REGULATOR (With ut br aking s al): Connect ammeter in charging line at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal and ground Then check as follows

Voltage Regulator—Operate generator at speed corresponding to 30 MPH Adjust charging rate to 10 amperes (.25 ohm resistor can be used connected in charging line) Continue operation for 15 minutes to "normalize" or bring the regulator up to operating temperature (temperature can be checked by placing accurate thermometer 2" from the regulator cover) Note voltmeter reading. If this does not agree with with Voltage Regulator Setting given below, regulator is defective or requires adjustment

Current Regulator—Operate generator at speed corresponding to 30 MPH. Add load in excess of rated capacity shown on regulator cover (turn on car lights and accessories, add additional load such as carbon pile or lamp bank at point between ammeter and battery, or use variable resistance across battery) to insure current regulator operating. Continue operation for 15 minutes to "normalize" or bring the regulator up to operating temperature (temperature can be checked by placing accurate thermometer 2" from the regulator cover). Note ammeter reading If this does not agree with "Test A" figure in Current Regulator Setting below, regulator is defective or requires adjustment

CHECKING & ADJUSTMENT (Requiring C v r R m val): Connect ammeter in charging line at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal and ground (except for Cutout Relay cut-in voltage test when voltmeter should be connected between regulator "ARM" terminal and ground) Make tests as follows

VOLTAGE REGULATOR

►*NORMALIZING THE REGULATOR* Before checking voltage setting, bring regulator to operating temperature as follows Operate generator at speed of 1500 RPM , adjust charging rate to 10 amperes (connect 25 ohm resistor in charging line or use variable resistance connected across battery). Continue operation for 15 minutes to "normalize" the regulator or bring it up to operating temperature (temperature can be checked by placing accurate thermometer 2" from regulator cover)

Air Gap· .048-.052". Check with wire gauge placed between armature and core at contact side of stop pin. Contacts should be closed with 052" gauge and should just open when armature pressed down against 048" gauge Adjust by loosening stationary contact support screw and raising or lowering the contact support

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AUTOLITE 12-VOLT "A" CIRCUIT REGULATORS (Cont.)

Voltage Setting: After regulator normalized (see above), and with generator charging at 10 ampere rate (VAT), 7 ampere rate (VBO, VRX), note voltmeter reading and regulator temperature. If voltage setting not within range shown in Voltage Regulator Setting specifications below, adjust regulator.

VOLTAGE REGULATOR SETTINGS

Model	Voltage Setting Table
VAT 4001A	No. 1
VAT 4002A, AX	No. 2
VAT 4003A	No. 1
VAT 4004AX	No. 2
VAT 4101AM	No. 1
VAT 6001A,6002A,6003A,6004A,6005A	No. 1
VAT 6201A	No. 1
VBO4201A, -1, B, -1, BF-1	No. 1
VBO4201C, -1	No. 3
VBO4201D, -1, E, -1, F, -1, G, -1, H, -1	No. 1
VBO4201J, -1, K, -1, L, -1, M, -1, P, -1	No. 1
VBO4201Q,R, -1	No. 1
VBO4202A, -1, B, -1, C, -1, D, -1	No. 1
VBO4202E, F, G, H, J, K	No. 1
VBO4202L, -1, M, -1	No. 1
VRX 4001A	No. 1
VRX 4001B, 4001BX	No. 2
VRX 4002A, 4002B, 4003A	No. 1
VRX 4003AX,4003B,4003BX,4003C,4003CX	No. 2
VRX 4003D,4003DT,4003E	No. 1
VRX 4004A,4005A,4005AX	No. 2
VRX 4006A, 4401A	No. 1
VRX 5003CX	No. 2
VRX 6001A,6002AT,6002BT	No. 1
VRX 6003A,6003B,6003C	No. 1
VRX 6004A,6004AT,6005AT	No. 1
VRX 6006A,6007A,6008A	No. 1
VRX6009A, 6009B, 6010A, 6011A, 6011B, 6011C	No. 1
VRX6201CX	No. 4
VRX6201A, 6201B, 6202A, 6301A, 7005AT	No. 1

Voltage Regulator Setting

Table No. 1 Temp.	① Volts	Table No. 2 Temp.	② Volts
50°F	14.7	50°F	14.3
80°F	14.5	80°F	14.2
110°F	14.3	110°F	14.0
140°F	14.1	140°F	13.9

Voltage Regulator Setting (Cont.)

Table No. 3 Temp.	③ Volts	Table No. 4 Temp.	① Volts
50°	15.2	50°	14.3
80°	15.0	80°	14.1
110°	14.8	110°	13.9
140°	14.6	140°	13.7

① - Plus or minus .3 volt. ② - Plus or minus .2 volt.
③ - Plus or minus .4 volt.

Adjustment—Decrease generator speed to slow idle, remove regulator cover, adjust voltage regulator by bending armature spring lower hanger down (increase spring tension) to increase voltage setting, or up (decrease spring tension) to lower voltage setting. After each adjustment, check setting by first cycling regulator (decrease speed until cutout relay contacts open, then increase generator speed to 1500 RPM) and then rechecking voltmeter reading and temperature with 10 ampere charging rate.

CURRENT REGULATOR
"Non-Temperature Compensated" Regulators

Current Setting: Connect test meters as directed under "Checking & Adjustment" above. Connect a load in excess of rated capacity of regulator at a point between regulator and battery (turn on lights and accessories, add additional load such as a lamp bank or carbon pile, or use a variable resistance across battery). Note ammeter reading with current regulator operating. Generator must be within 5% of rated capacity of regulator under test. *NOTE - Make test with regulator cover in place. Voltage regulator can be prevented from operating by installing a jumper across voltage regulator points.*

Current Regulator Setting
"Non-Temperature Compensated" Regulators

Model	Amperes
VAT 4001A, 2A, 2AX, 3A, 4AX	39-41
VAT 4101AM	39-41
VBO 4201A, -1	16-18
VBO 4201C, -1	9-11
VBO 4201F, -1	25-27
VBO 4201G, -1	22-24
VBO 4201H, -1	19-21
VBO 4201K, -1	9-11
VBO 4201L, -1	17-19
VBO 4201M, -1	11-13
VBO 4201P, -1	14-16

Current Regulator Setting (Cont.)
"Non-Temperature Compensated" Regulators

Model	Amperes
VBO 4201Q	16-18
VBO 4201R, -1	7.5-8.5
VBO 4202H	17-19
VBO 4202J	11-13
VBO 4202K	14-16
VBO 4202L, -1	7.5-8.5
VBO 4202M, -1	5.5-6.5
VRX 4001A, 1B, 1BX	29-31
VRX 4002B, 3B, 3BX	25-27
VRX 4003A, 3AX	34-36
VRX 4003C, 3CX	29-31
VRX 4003D, 3DT	25-27
VRX 4003E	22-24
VRX 4004A, 5A, 5AX	29-31
VRX 4006A	19-21
VRX 4401A	34-36
VRX 5003CX	29-31
VRX 6002AT	34-36
VRX 6002BT, 4A, 4AT	25-27
VRX 6005AT, 7005AT	22-24
VRX 6006A	19-21

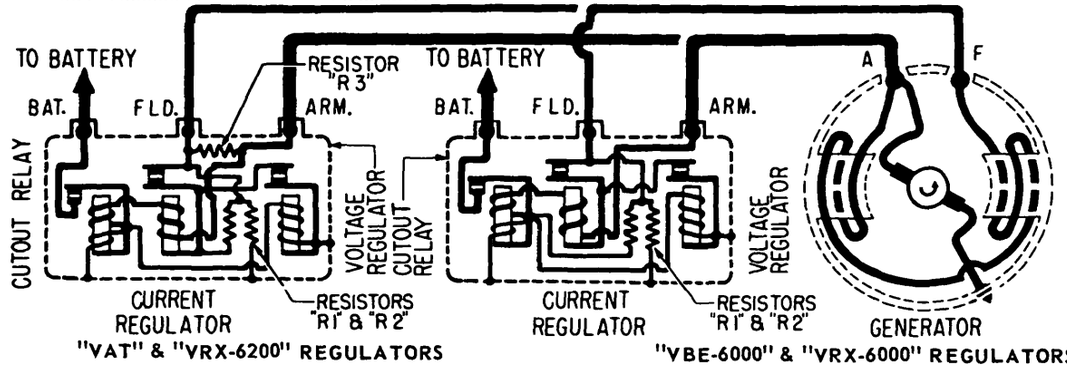
CURRENT REGULATOR
"Temperature Compensated" Regulators

►*NORMALIZING THE REGULATOR*· Before checking current setting, bring the regulator up to operating temperature by following steps (1) and (2) below.

(1)—Follow same procedure given above for Normalizing the Regulator for Voltage Setting checking. *If Current Regulator being checked immediately after checking and adjusting the Voltage Regulator, this step can be omitted. NOTE*—At end of this 15 minute operation, current setting should agree with "Test A" specifications in Current Regulator Setting given below.

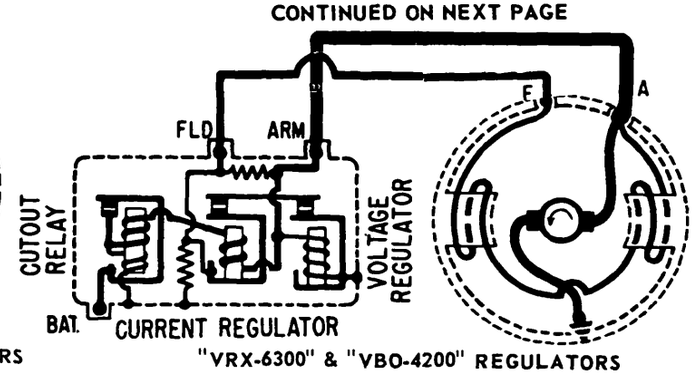
(2)—Operate generator at speed of 2000 RPM., add load sufficient to cause current regulator to operate (turn on car lights and accessories, add additional load such as lamp bank or carbon pile, or use variable resistance across battery) with voltage of 13.7-13.9 volts (VAT Regulators), 13.6-13.8 volts (VRX & VBO Regulators). Continue operation for 15 minutes to "normalize" regulator by bringing it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from the regulator cover). *NOTE*—At end of this total 30 minute operation (steps 1 & 2), current setting should agree with

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"VAT" & "VRX-6200" REGULATORS

"VBE-6000" & "VRX-6000" REGULATORS



"VRX-6300" & "VBO-4200" REGULATORS

AUTOLITE 12-VOLT "A" CIRCUIT REGULATORS (C nt.)

"Test B" specifications in Current Regulator Setting given below.

Air Gap: .048-.052". Check and adjust in same manner as Voltage Regulator (above).

Current Setting: Normalize regulator (see above). Current regulator setting should then agree with "Test A" specifications in Current Regulator Setting table below. For "Test B", operate generator at 2000 RPM, and add sufficient load to cause current regulator to operate (turn on lights and accessories, add additional load such as a lamp bank or carbon pile, or use a variable resistance across battery) with voltage of 13.7-13.9 volts (VAT Regulators), 13.6-13.8 volts (VRX & VBO Regulators). Continue operation for 15 minutes to normalize current regulator by bringing it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from regulator cover). At end of the total 30 minute operation, current setting should agree with "Test B" specifications in Current Regulator Setting table below. If charging rate not within range shown in "Test B" column, adjust current regulator.

Regulator Nominal Setting

Model	Operating Amperes
VAT (All)	40 amps.
VBO 4201B, -1, BF-1	40 amps.
VBO 4201D, -1	30 amps.
VBO 4201E, -1	35 amps.
VBO 4201J, -1	30 amps.
VBO 4202A, -1	40 amps.
VBO 4202B, -1	35 amps.
VBO 4202C, -1, D, -1	30 amps.
VBO 4202E	28 amps.
VBO 4202F	23 amps.
VBO 4202G	25 amps.
VRX 6001A	23 amps
VRX 6003A	25 amps
VRX 6003B, C, 6007A, 6009A, B	30 amps
VRX 6010A, 6011A, B, 6011C	30 amps.
VRX 6201A, B, 6202A	30 amps.
VRX 6201CX	28 amps
VRX 6008A, 6301A	35 amps.

Current Regulator Setting
(23 amps. Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	33 max. 23-27
70°	31 max. 21-25
90°	29 max. 19-23
110°	27 max. 17-21
130°	25 max. 15-19

(25 amps. VBO Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	34 max. 25-29
70°	32 max. 23-27
90°	30 max. 21-25
110°	28 max 19-23
130°	26 max. 17-21

(25 amps. VRX Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	36 max. 25-29
70°	34 max. 23-27
90°	32 max. 21-25
110°	30 max. 19-23
130°	28 max. 17-21

(28 amps. Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	37 max. 28-32
70°	35 max. 26-30
90°	33 max. 24-28
110°	31 max. 22-26
130°	29 max. 20-24

(30 amps. Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	39 max. 30-34
70°	37 max. 28-32
90°	35 max. 26-30
110°	33 max. 24-28
130°	31 max. 22-26

(35 amps. Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	46 max. 35-39
70°	44 max. 33-37
90°	42 max. 31-35
110°	40 max. 29-33
130°	38 max. 27-31

(40 amps. VBO Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	51 max. 40-44
70°	49 max. 38-42
90°	47 max. 36-40
110°	45 max. 34-38
130°	43 max. 32-36

(40 amps. VRX Nominal Setting)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	48 max. 40-44
70°	46 max. 38-42
90°	44 max. 36-40
110°	42 max. 34-38
130°	40 max. 32-36

CUTOUT RELAY

►*NORMALIZING THE REGULATOR.* If regulator is cold, first bring it up to operating temperature as directed under Voltage Regulator above *If Cutout Relay checked immediately after checking Voltage & Current Regulator, no further normalizing will be required.*

Air Gap: .031-.034" (VAT & VRX), .025-.027" (VBO) with contacts open. Check with feeler gauge between lower face of armature and core as close to armature hinge as possible. The .031" and .025" gauges should be "GO", and .034" and .027" gauges "NO GO". Adjust by bending armature upper stop up or down as required.

Contact Gap: .015" minimum. Check with feeler gauge. Adjust by expanding or contracting the stationary contact support to lower or raise the contact.

Cut-in (Closing) Voltage: Connect ammeter in charging line at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "ARM" terminal and ground. Connect a variable resistance in the line between the regulator "FLD" and generator "F" terminal. With the regulator normalized (see above), operate the generator at the engine slow idle speed, set resistor so that full resistance is in the field circuit. Slowly turn resistance out of field circuit and note voltmeter reading at instant relay contacts close (needle will jump slightly). If cut-in voltage does not agree with settings shown below, adjustment is required. Adjust by bending armature spring lower hanger down (increase spring tension) to increase cut-in voltage, or up (decrease spring tension) to decrease cut-in voltage. Then check cut-out amperage.

Cut-Out (Opening) Amperage: After checking cut-in voltage (above), turn resistance completely out of field circuit and note ammeter reading. If ammeter does not indicate charging current of 10 amperes (VAT), 7 amperes (VBO & VRX), increase generator speed until correct ammeter reading is obtained. Turn resistance in field circuit slowly and note ammeter reading at point where ammeter indicates maximum discharge current (ammeter pointer will drop to zero, then go beyond the zero point, and finally return to zero). Take reading just before ammeter pointer snaps back to zero. This ammeter reading is the cut-out amperage and should agree with settings shown below. Adjust by varying the contact gap.

Cutout Relay Settings

Regulator	Volts Cuts-In	Amps. Cuts-Out
VAT 4002A, 2AX, 4AX	12.6-13.3	3.0-5.0
VAT All Others	12.6-13.6	3.0-5.0
VBO All Models	12.5-13.5	3.0-5.0
VRX 4001B, 1BX, 3AX, 3B, 3BX, 3C, 3CX	12.6-13.3	3.0-5.0
VRX 4004A, 5A, 5AX, 5003CX, 6201CX	12.6-13.3	3.0-5.0
VRX All Others	12.6-13.6	3.0-5.0

REGULATOR RESISTORS: Resistors should be checked for correct resistance with an ohm meter. For checking resistances of 3 resistor regulators without disconnecting resistors and coil, see below.

CHECKING RESISTANCES OF 3 RESISTOR REGULATORS (Without disconnecting resistors and coil): Block cut-out relay and voltage regulator contacts open, then proceed as follows.

1) Connect ohmmeter between "F" terminal and current regulator yoke. The reading should be 34.5-42 ohms (value of "R2" resistor). Any other reading indicates that "R2" is defective.

2) Connect ohmmeter between "A" terminal and ground. A reading of **24.8-28.3** (All VAT models and VRX 6010A, 6011A, 6201B models) **22.7-26.2** (VRX 6011B, 6201A models) indicates "R1", "R3", Cutout Relay and Current Regulator resistances are within specifications. If reading is 31-35 ohms, either "R1" or "R3" is open. If reading is **32.2-37 ohms** (All VAT models and VRX 6010A, 6011A, 6201B models), **28.8-33.4 ohms** (VRX 6011B, 6201A models), the Cutout Relay winding is open. If reading is **57.2-66.7** (All VAT models and VRX 6010A, 6011A, 6201B models), **47.2-56.0** (VRX 6011B, 6201A models), the Voltage Regulator winding is open.

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AUTOLITE 12-VOLT "A" CIRCUIT REGULATORS (Cont.)

3) If the above checks indicate that either "R1" or "R3" is open, proceed as follows Ground the "A" terminal and connect ohmmeter between "F" terminal and ground. A reading of 28-34.5 (all models), indicates that "R1" is open. A reading of 95-115 (all models) indicates that "R3" is open.

Regulator Resistors

Model	"R1" Mark	"R1" Ohms	"R2" Mark	"R2" Ohms
VAT				
4001A,2A,2AX,3A,4AX	80	75-92	20	19-23
4101AM	80	75-92	20	19-23
6001A	80	75-92	20	19-23
6002A,3A,4A,5A	① 100	95-115	① 38	34.5-42
6201A	① 100	95-115	① 38	34.5-42
VBO				
4201A, -1	40	36-44	60	57-70
4201B, -1, BF-1	40	36-44	100	95-115
4201C, -1	30	28-34 5	20	19-23
4201D,-1,E,-1,F,-1	40	36-44	60	57-70
4201G,-1	40	36-44	40	36-44
4201H,-1,J,-1,K,-1	40	36-44	60	57-70
4201L,-1,M,-1,P,-1	40	36-44	60	57-70
4201Q	40	36-44	40	36-44
4201R,-1	40	36-44	60	57-70
4202A,-1,C,-1	40	36-44	100	95-115
4202B,-1,D,-1,E,F	40	36-44	60	57-70
4202G	40	36-44	100	95-115
4202H, J	40	36-44	60	57-70
4202K	40	36-44	40	36-44
4202L,-1,M,-1	40	36-44	140	130-150
VRX				
4001A,B,BX	80	75-92	20	19-23
4002A,B	80	75-92	20	19-23
4003A,AX	80	75-92	20	19-23
4003B,BX,C,CX,D,DT	80	75-92	30	28-34.5
4003E	38	34.5-42	20	19-23
4004A,5A,5AX	80	76-84	20	19-21
4006A	80	75-92	30	28-34.5
4401A	60	57-70	20	19-23
5003CX	80	75-92	30	28-34.5
6001A,2AT,2BT	80	75-92	30	28-34.5
6003A,B	135	122-149	38	34.5-42
6003C	80	75-92	38	34.5-42
6004A,AT	60	57-70	30	28-34.5
6005AT	80	75-92	30	28-34.5
6006A	135	122-149	38	34.5-42
6007A	80	75-92	38	34.5-42
6008A,9A,9B	60	57-70	38	34.5-42
6010A,6011A	① 100	95-115	① 38	34.5-42
6011B 6201A	①②	57-70	① 38	34.5-42
6011C	① 38	34 5-42	① 38	34 5-42
6201B	① 100	95-115	① 38	34 5-42
6201CX	① 60	57-70	① 38	34 5-42
6202A	① 35	122-149	38	34 5-42
6301A	38	34 5-42	38	34 5-42
7005AT	80	75-92	30	28-34 5

① - 3 Resistor Regulator. "R3" resistor marked "30", resistance is 28-34.5 ohms.

② - "R1" resistor on early production VRX 6201A regularors were marked "80", later production marked "60"

AUTOLITE 6 & 12-VOLT "B" CIRCUIT REGULATORS

► CAUTIONS

►*1960 6 VOLT "VBO" REGULATOR VOLTAGE SETTING CHANGE (To Maintain Battery at Satisfactory Charge Level)* On later production regulators identified by Code Dates of 3R or later, or by a red dot on base of regulators with Code Date of 2R or earlier, the voltage setting has been increased to 7 2-7 55 volts at 70°F (ambient temperature) at a charge rate of 10 amperes or with a 1/4 ohm fixed resistor in series with the battery Regulators with Code Date 2R or earlier which do not have the red dot may be recalibrated to new voltage setting if required

►*GENERATOR POLARIZING CAUTION* When regulator or generator leads are disconnected for any reason, then generator must be repolarized as follows With all wiring properly attached to both regulator and generator, disconnect generator field lead from its terminal on the regulator and momentarily touch it to the BAT terminal on regulator Re-attach field lead to field terminal on regulator This procedure will establish the correct polarity and prevent damage to the equipment

►*NORMALIZING THE REGULATOR.* Before checking regulator, bring it to normal operating temperature as follows Operate generator at a speed of 1500 RPM, adjust charging rate to 10 amperes (6 volt), 7 amperes (12 volt) by connecting a 25 ohm resistor in charging line or by using a variable resistance connected across battery Continue operation for 15 minutes to "normalize" the regulator or bring it up to operating temperature (temperature can be checked by placing an accurate thermometer 2" from cover)

DESCRIPTION: "Temperature Compensated" three unit type regulator assembly The charging system is a "B" circuit in which the generator field is grounded at generator ground brush and insulated in the voltage regulator from ground Field control resistors are inserted between field and armature circuits to control generator output *CAUTION - This type regulator must be used only with generators having internally grounded fields*

CHECKING & ADJUSTING: *See "Autolite 12-Volt 'A' Circuit Regulators" and note the following*

Voltage Setting: After regulator normalized (see above), and with generator charging at 10 amps (6 Volt), 7 amps (12 Volt), or with a 25 ohm resistor between regulator and battery, note voltmeter reading and regulator temperature If voltage not within range shown in Voltage Regulator Setting specifications below, adjust regulator *See "Autolite 12-Volt 'A' Circuit Regulators".*

Voltage Regulator Setting

Model	Voltage Setting Table
VBO-6601A, 1A-1, 1AT, 1AT-1(6 Volt)	No 1
VBO-6201A, 1A-1, 1A-2(12 Volt)	No 2
VBO-6201B, 1B-1, 1B-2 (12 Volt)	No 2
VBO-6201C, 1C-1 (12 Volt)	No 2
VBO-6201D, 1D-1 (12 Volt)	No 2
VBO-6201E, 1E-1 (12 Volt)	No 2
VBO-6201F 1F-1(12 Volt)	No 2

►*6 VOLT REGULATOR VOLTAGE SETTING NOTE: S "6 Volt "VBO" R gulator S tting Chang " ab v*

V ltag Setting Sp cificati ns

Tabl No. 1 Temp.	① Volts	Tabl N . 2 Temp.	② Volts
50°F	7 3	50°F	14 7
80°F	7 2	80°F	14 5
110°F	7 1	110°F	14 3
140°F	7 0	140°F	14 1

① - Plus or minus 2 volt ② - Plus or minus 3 volt

Current Setting (Temperature Compensated Types): Normalize regulator *(see "Normalizing the Regulator" above)* Current setting should then agree with "Test A" specifications in Current Regulator Setting table below For "Test B", operate generator at 2000 RPM, and add sufficient load to cause current regulator to operate (turn on lights and accessories, add additional load such as lamp bank or carbon pile, or use a variable resistance across battery), with voltage of 6 7-6 9 volts (6 Volt Regulator), 13 6-13 8 volts 12 Volt Regulator) Continue operation for 15 minutes to normalize the current regulator by bringing it up to operating temperature (Temperature can be checked by placing an accurate thermometer 2" from regulator cover) At the end of a total of 30 minutes operation, current setting should agree with "Test B" specifications in Current Regulator Setting table below If charging rate not within range shown in "Test B" column, adjust current regulator *See "Autolite 12-Volt 'A' Circuit Regulators".*

Current Regulator Nominal Setting

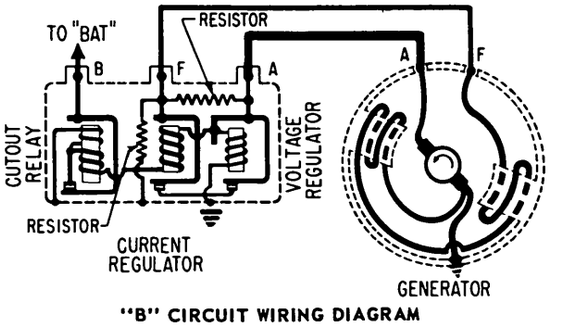
Model	Operating Amperes
VBO-6601A, 1A-1, 1AT, 1AT-1	① 45
VBO-6201A, 1A-1, 1A-2	① 35
VBO-6201B, 1B-1, 1B-2	① 30
VBO-6201C, 1C-1	① 25
VBO-6201D, 1D-1	9-11
VBO-6201E, 1E-1, 1F, 1F-1	14-16

① - Temperature Compensated See Setting specifications below

Current Regulator Setting (VBO-6601A, 1A-1, 1AT, 1AT-1)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	56 Max 45-49
70°	54 Max 43-47
90°	52 Max 41-45
110°	50 Max 39-43
140°	48 Max 37-41

CONTINUED ON NEXT PAGE



"B" CIRCUIT WIRING DIAGRAM

AUTOLITE 6 & 12-VOLT "B" CIRCUIT REGULATORS (C nt.)

(VBO-6201C, 1C-1)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	34 Max. - 25-29
70°	32 Max. - 23-27
90°	30 Max. - 21-25
110°	28 Max. - 19-23
130°	26 Max. - 17-21

(VBO-6201B, 1B-1, 1B-2)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	39 Max. - 30-34
70°	37 Max. - 28-32
90°	35 Max. - 26-30
110°	33 Max. - 24-28
130°	31 Max. - 22-26

(VBO-6201A, 1A-1, 1A-2)

Temp. (°F)	Test "A" - Amperes - Test "B"
50°	46 Max. - 35-39
70°	44 Max. - 33-37
90°	42 Max. - 31-35
110°	40 Max. - 29-33
130°	38 Max. - 27-31

CUTOUT RELAY: *See "Autolite 12-Volt 'A' Circuit Regulators" and note the following:*
Air Gap - .025-.027" with contacts open.
Contact Gap - .015" minimum.
Cut-in (Closing) Voltage - 6.3-6.8 volts (6-Volt); 12.5-13-5 volts (12-Volt).

Cut- ut (Op ning) Amp rag - 4-6 amps. discharge current after a charge of 10 amps. (6-Volt); 3-5 amps. discharge current after a charge of 7 amps. (12-Volt).

REGULATOR RESISTORS: Resistors should be checked for correct resistance with an Ohmmeter.

Regulat r R sistors

Model	"R1" Mark	"R1" Ohms	"R2" Mark	"R2" Ohms
VBO-6601A, 1A-1, 1AT, 1AT-1	15	14-17	40	36-44
VBO-6201A, 1A-1, 1A-2	40	36-44	40	36-44
VBO-6201B, 1B-1, 1B-2	40	36-44	40	36-44
VBO-6201C, 1C-1	40	36-44	40	36-44
VBO-6201D, 1D-1	60	57-70	40	36-44
VBO-6201E, 1E-1	40	36-44	40	36-44
VBO-6201F, 1F-1	60	57-70	40	36-44

BOSCH 12-VOLT REGULATORS

►*GENERATOR POLARIZING: (NOTE* - Polarization is not necessary except when generator has been rebuilt or if new pole shoes have been installed). To polarize a generator on the car, disconnect the field wire and the battery wire from the regulator and momentarily connect the two wires together (engine not running). *CAUTION - Do not polarize generator by any method that applies battery voltage to field terminal of regulator.*

►*NORMALIZING THE REGULATOR:* **On the Car** - Clip special thermometer T56L-10505-A on regulator cover (see Note below). Operate engine with generator charging at 10 ampere rate for 30 minutes or until regulator temperature is stabilized.

On the Bench - Procedure is same as on the car except that a small fan should be mounted 12-15" from the regulator so as to circulate air over the regulator cover while it is being warmed up.

Thermometer T56L-10505-A Note - This thermometer is calibrated in 10°F. increments and has additional Voltage scales indicating the correct voltage regulator setting for each temperature reading (both 6 volt and 12 volt scales provided).

►*AMBIENT TEMPERATURE NOTE:* Ambient temperature is the temperature taken adjacent to the regulator, using Thermometer T56L-10505-A.

DESCRIPTION: Three unit regulator containing cutout relay, voltage regulator and current regulator similar in design to other types, except that voltage regulator is two-stage unit operating on a double set of contacts. Voltage regulator is also temperature compensated.

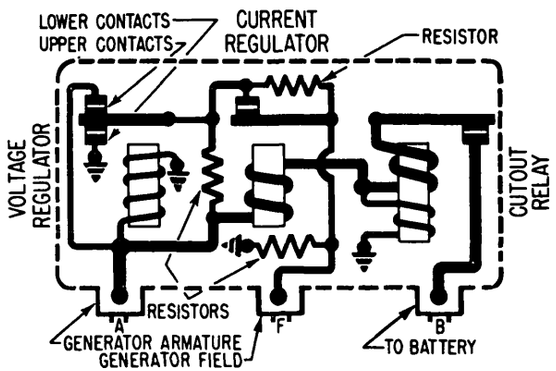
OPERATION: Cutout relay and current regulator operate the same as other conventional units. Voltage Regulator operates in two stages as follows:

Upper Contact Voltage Regulator Operation: With generator at low speeds, regulator armature vibrates on upper set of contacts and limits voltage by intermittently inserting resistance into generator field circuit. With contacts open there is no resistance in field circuit, and with contacts closed, resistance (R1) is inserted. This process continues until transfer point to lower stage operation occurs (transfer point almost instantaneous).

Lower Contact Voltage Regulator Operation: When generator at high speeds or when battery fully charged and electrical load is light, voltage rises and pulls armature down so that it vibrates on lower set of contacts. With lower contacts closed, field current is shunted to ground and with contacts open resistor (R1) is inserted in circuit.

CHECKING & ADJUSTING: *CAUTION* - Regulators are temperature compensated and must be brought up to normal operating temperature before checks are made. This normal temperature is that existing adjacent to the regulator cover after ½ hour of operation in the car or after the regulator has been heated until the temperature is stabilized (standard normal temperature is 75°F.).

►*TEST METER CONNECTIONS:* If special Test Sets used, make all connections in accordance with manufacturer's instructions. If individual meters used, make connections as follows: Connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal, from regulator terminal to ground (Ford). *CAUTION - Disconnect battery cable.* On other cars, connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal in series with battery. Connect voltmeter between regulator "ARM" terminal and ground (regulator base or battery grounded terminal). Connect a 50 ohm variable field rheostat (2 amp. rating) in generator field circuit (disconnect field lead at regulator "FIELD" terminal, connect rheostat between this lead and regulator "FIELD" terminal)



BOSCH 12-VOLT REGULATORS

CUTOUT RELAY

Cut-In (Closing) Voltage: After regulator normalized and with test meters connected (see above), check cut-in voltage as follows:

Ford - With field resistance completely turned in the field circuit, operate engine at 1500 RPM, slowly turn resistance out of field circuit and note voltmeter reading when relay contacts close (pointer will drop back slightly). Repeat this check several times by turning resistance in and out of field circuit.

Lincoln & Mercury - With resistance turned out of field circuit; slowly increase generator speed and note voltmeter reading at instant relay contacts close (pointer will drop back slightly). Repeat this check several times by decreasing generator speed until contacts open and then increasing speed until contacts close. If closing voltage not correct as shown in setting table below, adjustment is required.

Adjustment - Bend cutout relay spring adjusting arm upward to increase voltage, downward to decrease voltage.

Cut-In (Closing) Voltage Setting

All Models - 13.0-13.5 volts.

Cut-Out (Opening) Discharg Curr nt: This can be checked after checking cut-in voltage by increasing generator speed (or turning out field resistance) until charging current is approximately 10 amperes, then slowly decrease generator speed (or turn in field resistance) until maximum **dischargcurrent** indicated on ammeter (ammeter will return to zero as contacts open).

Cut-Out (Opening) Discharg Current

All Models - 2-8 amperes.

VOLTAGE REGULATOR

V ltage Setting: After cutout relay checked and adjusted, cycle regulator by decreasing speed until cutout relay

CONTINUED ON NEXT PAGE

BOSCH 12-VOLT REGULATORS (Continued)

contacts open. Clip special thermometer on regulator cover to establish regulator ambient temperature and corresponding voltage setting (see Voltage Regulator Settings for various ambient temperatures below). Run engine at 750 RPM and note voltmeter reading. This is **Upper Contact voltage regulator setting. Increase engine speed to 1500 RPM and note voltmeter reading. This is Lower Contact voltage regulator setting. If setting not within limits listed in Setting-Temperature table below, adjustment is required.**

Adjustment - Bend voltage regulator spring adjusting arm upward to decrease voltage, downward to increase voltage.

Final Test (Ford) - Remove all test leads except voltmeter leads and connect "BAT" and "F" wires to regulator. Run engine at 1500 RPM (under battery load) and note voltmeter reading (voltage will rise to regulated value after a few moments operation).

Voltage Regulator Settings (Ambient Temperature Correction)

Ambient Temp.(°F)	Lower Contacts (Volts)	Upper Contacts (Volts)
25°	14.4-14.9	14.4-15.1
35°	14.3-14.8	14.3-15.0
45°	14.3-14.8	14.3-15.0
55°	14.2-14.7	14.2-14.9
65°	14.2-14.7	14.2-14.8
75° ℄	**℄ 14.1-14.6**	**℄ 14.1-14.8**
85°	14.0-14.5	14.0-14.7
95°	14.0-14.5	14.0-14.7
105°	13.9-14.4	13.9-14.6
115°	13.9-14.4	13.9-14.5
125°	13.8-14.3	13.8-14.5
135°	13.7-13.2	13.7-14.4
145°	13.7-13.2	13.7-14.4

℄ - Standard Setting

CURRENT REGULATOR

Current Setting: This check requires that a load be added, or that the generator voltage be dropped to approximately 13 volts, to cause current regulator to operate. It is recommended that a heavy duty variable resistance (carbon pile) be connected across the 1½ ohm fixed resistor in the charging line (connect resistance from ammeter lead terminal of fixed resistor to ground - see Test Meter Connections above). After voltage regulator checked (above), and with all resistance turned out of the field circuit, operate generator at 1500 RPM (Ford), 1000 RPM (Lincoln & Mercury), decrease the resistance of the carbon pile resistance until voltage drops to approximately 13 volts and ammeter reading is at maximum. This ammeter reading is the current setting. If not correct (see table below), adjust as follows:

Adjustment - Bend current regulator spring adjusting arm upward to decrease current, downward to increase current.

Current Setting

30 Amp. Regulator - 28-32 amperes
50 Amp. Regulator - 48-52 amperes
60 Amp. Regulator - 58-62 amperes

DELCO-REMY "1118825" & "1118900" SERIES REGULATOR

►*Data following covers both 6-volt and 12-volt Regulators.*

►*"1118825" & "1118900" SERIES REGULATOR NOTE:* Regulators of these series *with letter "B" following Model Number* differ from the "1118825" & "1118900" Series in that the direction of current flow through the Current Regulator Contacts has been reversed (see Wiring Diagram below). The molded insulator formerly located between connector strap and Current Regulator Support has been relocated between the attaching screw washer and the connector (both molded insulators are now on the same side of the connector strap).

►*ADJUSTMENT CAUTION:* When checking current regulators having the "B" suffix, DO NOT USE THE "Quick Check Method" outlined below for previous regulators of these series. Using a screwdriver inserted in hole in regulator base to short out voltage regulator will short out BOTH the voltage and current regulators and allow generator to operate without control.

DESCRIPTION: Regulators in series starting with Model 1118825 differ from previous models in that they do not include an accelerator or series winding on the voltage regulator unit. This difference makes necessary a different method of checking and adjusting voltage setting. "Circuit A" type regulators are used with generators having field insulated and grounded in Regulator.

TROUBLE SHOOTING: The existing conditions determine the "Normal" or "Abnormal" operation of Generator or Regulator as follows:

"Normal" Operation

1)–Battery fully charged and Low charging rate.
2)–Low battery and High charging rate.

"Abnormal" Operation

1)–Battery fully charged and High charging rate denotes defective or improperly adjusted Voltage Regulator unit, grounded field (Generator, Regulator, or Wiring), or high battery temperature permitting battery to accept high charging rate with "Normal" regulator setting.

2)–Low battery and low charging rate denotes loose connections or damaged wiring, defective battery, high circuit resistance, low regulator setting, oxidized Regulator points, defective Generator, Cutout Relay not closing, open series circuit in Regulator, or Generator, not properly polarized. Momentarily grounded "F" terminal. Generator O K if output increases with increased Generator speed.

3)–Burned Resistances, Windings, or Contact Points are caused by: Open circuit operation, open Resistance units or loose or intermittant connections in charging circuit. Check car wiring before installing new Regulator.

4)–Burned Relay Contact Points are due to reversed Generator polarity.

CHECKING & ADJUSTMENT

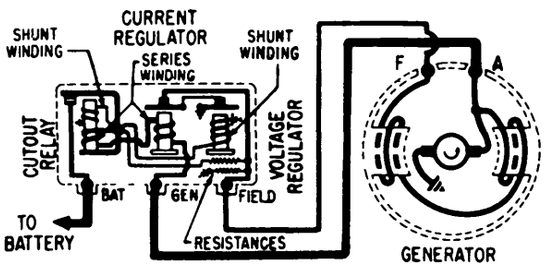
Regulator checks and adjustments should be made in the following sequence: Voltage Regulation, Cutout Relay Operation, and Current Regulation.

►*REGULATOR "NORMALIZING"* Before making any tests, it is important that regulator must be at **operating temperature.** Normalize regulator as follows: Connect ¼-Ohm resistor in series with battery (if variable resistor used, set to 1-10 ampere charging current), operate generator for 15 minutes at specified speed **with Voltage Regulator operating** (to normalize Voltage Regulator), or **with Current Regulator operating** (to normalize Temperature Compensated Current Regulators). This procedure not required for Non-temperature compensated Current Regulators.

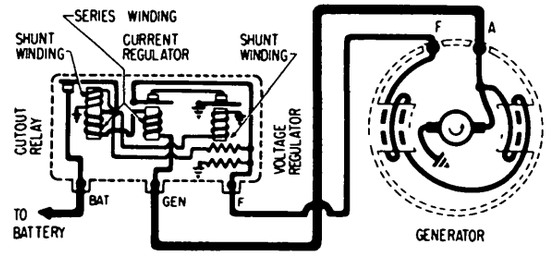
"Specified Speed" Note–Generator RPM for checking and adjusting regulators should be: **Voltage Regulator**-3500 RPM (car & truck units), **Current Regulator**-sufficient speed to produce current in excess of specified current regulator setting.

►*GENERATOR REPOLARIZING CAUTION:* Repolarize generator each time regulator leads have been disconnected. Connect jumper lead momentarily between regu-

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DELCO-REMY "1118825" & "1118900" SERIES (NO SUFFIX LETTER) REGULATOR WIRING



DELCO-REMY "1118825" & "1118900" SERIES (WITH SUFFIX LETTER) REGULATOR WIRING

DELCO-REMY "1118825" & "1118900" SERIES REGULATOR (C nt.)

lator "Bat" and "Gen" terminals. Incorrect polarity will cause vibration and arcing and burning of Cutout Relay contacts.

►*POLARITY CAUTION:* Regulators are designed for a particular battery ground polarity as stamped on end of regulator base. Use of wrong polarity regulator will cause pitting of regulator contacts and shorten regulator life

VOLTAGE REGULATOR: Make checks and adjustments in the following order:

Air Gap - 075" (All models except 1118942,47,48,73), 063" (1118942,47,48,73). To check, press down on armature so that contacts just touch, measure air gap between armature and core. To adjust, raise or lower mounting bracket.

REGULATOR SETTING SPECIFICATIONS

Regulator Number	Cutout Relay Closing Volts	Voltage Reg. Volts	Current Reg. Amperes
1118825,26	11.8-13.5	13.8-14.7	27-31
1118827,28,29	5.9-6.7	6.9-7.3	41-45 5
1118830,31	5.9-6 7	6.9-7.3	36-40.5
1118832,33	5.9-6.7	6.9-7.4	53-57
1118834	5.9-6.7	6.9-7.3	43-47
1118835	5.9-6.7	6.9-7.4	50-54
1118838	11.8-13.5	13.8-14.7	48-52
1118839	11.8-13.5	13.8-14.7	27-31
1118840	11.8-13.5	13.8-14.5	33-37
1118841	5.9-6.7	6.9-7.4	34-39
1118842,43,45,46	5.9-6.7	6.9-7.3	36-40.5
1118847	5.9-6.7	6.9-7.3	38-42
1118849 50	5.9-6.7	6.9-7.3	43-47
1118852	5 9-6.7	6.9-7.3	41-45 5
1118854,55,56,57	5.9-6.7	6.9-7.4	48-52
1118858	5.9-6.7	6.9-7.4	50-54
1118864	5.9-6.7	6.9-7.4	32-37
1118865,66	5.9-6.7	6.9-7.3	33-37
1118867	5.9-6.7	6.9-7.4	30-34
1118869	5.9-6.7	6.9-7.3	28-32
1118870	5 9-6.7	6.9-7.4	25-29
1118871,72	5.9-6.7	6.9-7.3	23-27
1118873	5.9-6.7	6.9-7.3	17.5-20 5
1118874	5.9-6.7	6.9-7 3	16 5-19.5
1118875	5.9-6.7	6.9-7.4	14-16
1118880,81	11.8-13.5	13.8-14.7	48-52
1118882	11.8-13.5	13 8-14.8	18.5-21 5
1118883,84	11.8-13.5	13 8-14 7	48-52
1118885,86,87	11.8-13.5	13.8-14.7	38-42
1118888,89,90	11 8-13 5	13.8-14.7	38-42
1118891,92	11 8-13.5	13.9-14 7	33-37
1118893,94,95	11 8-13.5	13.8-14.8	29-33
1118896,97,98,99	11.8-13 5	13.8-14.8	23-27
1118900	11 8-13.5	13 8-14.8	23-27
1118901,02,03,04	11.8-13.5	13.8-14.7	18 5-21 5
1118905	11.8-13.5	13.8-14.8	15 5-18 5
1118906	11.8-13.5	13.8-14 7	14-16
1118907,08,09	11 8-13.5	13 8-14.8	11-13
1118910	11 8-13.5	13.8-14.8	9-11
1118911	11 8-13 5	13.8-14 7	8-9
1118912	5 9-6 7	6 9-7 4	50-54

Voltage Setting (6 & 12 v lt units)—Use either method as follows:

Fixed ¼-Ohm Resistance Method

1)—Connect ¼ Ohm—25 watt (Min) resistance in charging circuit at regulator "Bat" terminal **in series with with battery.**

►*CAUTION: Battery must remain in charging circuit. DO NOT disconnect battery as in checking procedure for previous series regulators.*

2)—Connect voltmeter from "Bat" terminal to ground

3)—Normalize regulator (see above) Limit electrical load to Ignition only.

4)—Cycle generator using either of the following methods: **(a)** Move voltmeter lead from "Bat" to "Gen" terminal of regulator, retard generator speed until generator voltage is reduced to 2 volts (6 volt units), 4 volts (12 volt units), then move voltmeter lead back to regulator "Bat" terminal, bring generator back to specified speed and note voltmeter reading. Or, **(b)** Connect variable resistance in field circuit (disconnect generator field lead at regulator "F" terminal, connect resistance between this lead and "F" terminal). With all resistance turned out, operate generator at specified speed, slowly increase resistance until generator voltage reduced to 2 volts (6 volt units), 4 volts (12 volt units), then turn out all resistance and note voltmeter reading. In each case, final voltage reading (after cycling generator) will be the voltage regulator setting.

5)—Adjust voltage regulator setting as follows Remove cover, turn adjusting screw on armature spring lower support clockwise to increase voltage setting, or counter-clockwise to decrease setting. After making adjustment, replace cover, cycle generator (step 4 above), and recheck voltage setting.

►*CAUTION*—Final setting should always be made by **increasing** spring tension (never by decreasing tension). If voltage setting too high, decrease spring tension below desired setting, and then increase spring tension for desired setting. If spring support does not return when screw backed off, back off screw for clearance between screw head and support, then bend support up carefully until it contacts screw head.

►*VOLTAGE SETTING CORRECTION FOR TEMPERATURE:* See "Regulator Settings" table (below) for voltage regulator setting range. Any setting within the range indicated is satisfactory provided battery and voltage sensitive equipment is operating properly and without damage. Before operating voltage is compared with specifications in the table, allowances must be made for variation in temperature (see table following). For regulator ambient temperatures below 125° F. SUBTRACT from operating voltage. For ambient temperatures above 125°F. ADD to operating voltage. The **adjusted operating voltage must be within the specified range indicated.**

REGULATOR SETTING SPECIFICATIONS (Cont.)

Regulator Number	Cutout Relay Closing Volts	Voltage Reg. Volts	Current Reg. Amperes
1118913,14,15	5 9-6 7	6 9-7 3	41-45 5
1118916	5 9-6 7	6 9-7 3	38-42
1118917	5 9-6 7	6 9-7 3	43-47
1118918,19	5 9-6 7	6 9-7 3	36-40 5
1118920,21	5 9-6 7	6 9-7 4	34-39
1118922	5 9-6 7	6 9-7 4	32-37
1118923	5 9-6 7	6 9-7 3	28-32
1118924	5 9-6 7	6 9-7.3	23-27
1118925	5 9-6 7	6 9-7 3	17 5-20 5
1118926,27,28	11 8-13 5	13 8-14 7	48-52
1118929,30	11 8-13 5	13 8-14 7	38-42
1118931	11 8-13 5	13 8-14 8	29-33
1118932,33	11.8-13.5	13 8-14.8	23-27
1118934,35,36	11 8-13.5	13.8-14.7	18.5-21.5
1118937	11 8-13.5	13.8-14.8	11-13
1118938	11.8-13.5	13 8-14.8	9-11
1118939	11.8-13.5	13.8-14.7	53-57
1118940	11 8-13 5	13.8-14.7	48-52
1118941	11.8-13.5	13 8-14.7	15.5-18.5
1118942	5.7-6.5	6.8-7.2	52-58
1118943	5 9-6.7	6.9-7.3	41-45 5
1118944	5.9-6 7	6.9-7.3	36-40.5
1118945	11.8-13.5	13.8-14.7	23-27
1118946	5.9-6.7	6.9-7.3	17.5-20.5
1118947	5.7-6.5	6.8-7.2	52-58
1118948	11.5-13	13 6-14.3	37-42
1118950	5.9-6.7	6.9-7.3	41-45.5
1118952	5.9-6.7	6.9-7.4	32-37
1118953	11 8-13.5	13.8-14.7	27-31
1118954	5.9-6.7	6.9-7.3	28-32
1118955	11.8-13.5	13.8-14.8	23-27
1118956	11.8-13.5	13.8-14.7	31-35.5
1118958	5.9-6.7	6.9-7.3	38-42
1118960	5.9-6.7	6.9-7.3	36-40 5
1118966	5.9-6.7	6.9-7.3	36-40.5
1118967	11.8-13.5	13.8-14.7	31-35.5
1118968	11.8-13.5	13.8-14.8	18-22
1118973	11.5-13	13.6-14.3	37-42
1118974	11.8-13.5	13.8-14.8	18-22
1118977	11.8-13.5	13.8-14.7	18.5-21 5
1118978	5.9-6.7	6.9-7.3	36-40.5
1118980	11.8-13.5	13.8-14 8	9-11

Voltage Allowances f r Temp rature

Ambient Temp. Ⓒ	6-V lt	12-V lt
55°	-.40	-.80
65°	-.35	-.70
75°	-.30	-.60
85°	-.25	-.50
95°	-.20	-.40
105°	-.15	- 30
115°	-.05	-.20
125°	0	0
135	+.07	+.10
145°	+.15	+.30
155°	+.30	+.50
165°	+.40	+.70

ⒸAMBIENT TEMPERATURE is the temperature of the air surrounding the regulator approximately 1/4" from cover when regulator is at operating temperature ("Normalizing" procedure as given above should result in an ambient temperature of 125°F) and can be measured by placing a thermometer 1/4" from cover.

CONTINUED N NEXT PA E

DELCO-REMY "1118825" & "1118900" SERIES REGULATOR (Cont.)

Voltage Settings for Unusual Conditions: If battery is being Overcharged (Using too much water) or stays Undercharged (¾ charge or less), vary specified voltage regulator setting as follows:

Overcharged—Reduce Voltage Setting 0.1-0.2 volts and check after reasonable service period. Repeat until "Overcharge" corrected (water use normal). *NOTE*—Recheck cutout relay setting. Keep it 0.5 volts less than Voltage Regulator Setting.

Undercharged—Increase Voltage Setting 0.1 volt and recheck and repeat as above until condition corrected.

►*CAUTION: Avoid settings so high that damage may be caused to lights or other sensitive equipment during cold weather operation. Before changing standard voltage regulator setting, correct all battery conditions such as: Sulphated Plates, Overheating due to operating location, or Damage caused by overheating.*

Variable Resistance Method

1)—Connect variable resistance (25 watt Min.) and ammeter in series at "Bat" terminal of regulator and in series with battery.

►*CAUTION—Battery must remain in charging circuit. DO NOT disconnect battery as in checking procedure for previous series regulators.*

2)—Operate generator and adjust resistance to 10 ampere charging rate. Operate generator for 15 minutes with regulator cover in place to attain operating temperature.

3)—Cycle generator and adjust regulator voltage in same manner as in "Fixed Resistance Method" (steps 4 & 5) above.

CUTOUT RELAY: Air Gap and Contact Gap should be checked and adjusted with "Bat" lead disconnected from regulator.

Air Gap—.030" (All Models). To check, press down on armature until contacts just close (both sets of contacts must close at same instant), measure gap between armature and center of core. To adjust, loosen two armature hinge screws on back of frame, raise or lower armature as required.

Contact Gap—.020" (All Models). Adjust by bending upper armature stop.

Closing (Cuts-in) Voltage—Connect regulator to proper generator and battery, connect Voltmeter between regulator "Gen" terminal and ground. Check closing voltage by either of the following methods: (a) Slowly increase generator speed and note voltmeter reading at instant points close, then decrease generator speed and make certain that points open. Or, (b) With same connections as above, connect a variable resistance in the field circuit (disconnect generator field lead at regulator "F" terminal, connect resistance between this lead and "F" terminal—see note below for resistance values), operate generator at medium speed with all resistance cut in field circuit, slowly cut out resistance until cutout relay points close, note voltmeter reading, then slowly cut in resistance to make certain that points open. Adjust cut-in voltage by turning adjusting screw under armature spring clockwise to increase cut-in voltage, or counter-clockwise to decrease cut-in voltage.

CURRENT REGULATOR: Make checks and adjustments in the following order:

Air Gap—.075" (All Models). Check and adjust in same manner as Voltage Regulator (above).

Current Setting—Any of the following methods can be used. All methods require that the Voltage Regulator be prevented from operating as detailed in the checking procedure.

Quick Check Method

►*CAUTION: Do not use this method on 1118825 and 1118900 Series Regulators with letter "B" following Model Number. See "Adjustment Caution" above.*

1)—Connect ammeter in charging circuit at regulator "Bat" terminal. Turn on all lights and accessories to provide load and cause current regulator to operate.

2)—Normalize regulator (see above). This procedure required for Temperature Compensated Current Regulators only (Non-temperature compensated units operate same cold or hot).

3)—Insert screwdriver blade through hole in regulator base and hold firmly with blade touching base and shield at same time. This will short out Voltage Regulator.

4)—Cycle generator (see Step 4 of Voltage Regulator Adjustment above), note ammeter reading which will be Current Setting.

5)—Adjust current regulator setting in same manner as voltage regulator (see Step 5 under Voltage Regulator above).

Load Method

1)—Connect ammeter in charging circuit at regulator "Bat" terminal. Connect load across battery equal to current regulator setting (use carbon pile or bank of lights).

2)—Normalize regulator (see above). This procedure required for Temperature Compensated Current Regulators only (Non-temperature compensated units operate same cold or hot).

3)—Cycle generator (see step 4 of Voltage Regulator Adjustment above), note ammeter reading which will be Current Setting.

4)—Adjust current regulator setting in same manner as voltage regulator (see Step 5 under Voltage Regulator above)

Jumper Lead Method

►*CAUTION—DO NOT use this method on Temperature Compensated Current Regulators.*

1)—Connect ammeter in charging circuit at regulator "Bat" terminal.

2)—Remove regulator cover and connect jumper lead across Voltage Regulator contacts (use short lead clipped to regulator armature and to stationary contact support).

3)—Turn on all lights and accessories, OR connect load across battery equal to current regulator setting (use carbon pile or bank of lights).

4)—Operate generator at specified speed and note ammeter reading which will be Current Setting.

5)—Adjust current regulator setting in same manner as voltage regulator (see Step 5 under Voltage Regulator above).

►*RADIO BY-PASS CONDENSER CAUTION:* Installation of such condensers on FIELD terminal of either the Regulator or Generator will cause regulator contacts to burn and oxidize which will reduce generator output. All such condensers should be disconnected and regulator contacts should be inspected and cleaned.

DELCO-REMY 6 & 12-VOLT REGULATORS "1119000", "1119100", "1119200","1972000" (SINGLE CONTACT)

►*"1118825" & "1118900" SERIES REGULATOR NOTE:* Regulators of these series **with Letter "B" following Model Number** are similar to "1119000" Series and all data below applies to these models also

DESCRIPTION: These regulators differ from preceding "1118825" and "1118900" series **without Letter "B" following the model number** in that the direction of current flow through the Current Regulator contacts has been reversed (see Wiring Diagram and Contact Mounting illustrations). **Air gap adjustment on some regulators is made by turning a nylon nut located at top of regulator unit All voltage regulators and some some current regulators are "temperature compensated".**

►*ADJUSTMENT CAUTION* When checking Current Regulator on these 1119000 series regulators, DO NOT use the "Quick Check Method" outlined for previous 1118825 series regulators Using a screwdriver inserted in hole in regulator base to short out Voltage Regulator will short out BOTH the Voltage and Current Regulators and allow generator to operate without control.

CHECKING & ADJUSTMENT: Make all checks and adjustments in following sequence Voltage Regulation, Cutout Relay Operation, and Current Regulation AFTER regulator has been brought up to normal operating temperature as directed below. Generator must be repolarized each time leads are reconnected and before operating

►*GENERATOR REPOLARIZING* After generator and regulator leads reconnected, connect jumper lead between regulator "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator winding This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of relay contact points)

VOLTAGE REGULATOR

►*NORMALIZING THE REGULATOR* Before checking voltage setting, bring regulator to operating temperature as follows Connect 1/4 ohm resistance in series with battery, see that regulator cover in place, operate regulator for 15 minutes continuously with no other load than ignition *(NOTE*–If variable resistor used in place of fixed 1/4 ohm resistor, set resistor for 1-10 ampere charging rate).

Air Gap: .075" (except 1119004), .063" (1119004) with contacts just touching. Adjust by loosening upper contact mounting screws and raising or lowering contact bracket (models without nylon adjusting nut), by turning nylon adjusting nut (models with nylon nut). ***NOTE - On models without nylon adjusting nut, align contacts and tighten bracket mounting screws.***

V ltage Setting: With regulator **"Normalized"** (see above), setting can be checked using either **"Fixed Resistance"** or **"Variable Resistance"** method as indicated below.

Fix d 1/4 Ohm Resistance Meth d

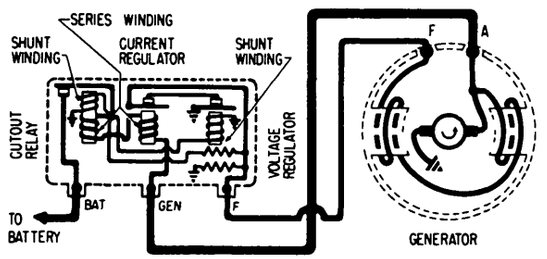
1)–Connect 1/4 ohm fixed resistor (not less than 25 watts) in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between between regulator "BAT" terminal and ground.

2)–Cycle the generator using either of the following methods **(A)** Move voltmeter lead from regulator "BAT" terminal to "GEN" terminal. Reduce generator speed until voltmeter reading is 2 volts (6 volt types), 4 volts (12 volt types), then move voltmeter lead back to "BAT" terminal. **(B)** Connect variable resistance in field circuit (in line between generator and regulator "F" terminals), turn out all resistance, operate generator at 3500 RPM and turn in resistance until generator voltage reduced to 6 volts (6 volt types), 12 volts (12 volt types), then turn out all resistance and remove variable resistor.

3)–Operate generator at 3500 RPM (cars & trucks), note voltmeter reading with regulator cover in place. This is the voltage setting (see data below). Adjust by turning adjusting screw at voltage regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Variable Resistance Method

1)–Connect variable resistance (not less than 25 watts) and ammeter in charging circuit at regulator "BAT" terminal (in series with battery), connect voltmeter between regulator "BAT" terminal & ground



DELCO-REMY 12-VOLT REGULATORS WIRING DIAGRAM

2)–Cycle the generator (use either method outlined in step 2 of Fixed 1/4 Ohm Resistance Method above).

3)–Check and adjust voltage setting as outlined in step 3 of Fixed 1/4 Ohm Resistance Method above

Voltage Setting Specifications

Setting - As indicated in table below with regulator at a specific ambient temperature. When a voltage range only is given, set regulator within that range at 125°F ambient temperature. Regulator settings can be "tailored" to keep battery in satisfactory state under particular operating conditions as directed below.

►*AMBIENT TEMPERATURE NOTE* "Ambient Temperature" is the temperature of the air surrounding the regulator approximately 1/4" from the regulator cover when the regulator is at operating temperature ("Normalizing" procedure as given above should result in an ambient temperature of 125° F.) and can be measured by placing a thermometer 1/4" from the regulator cover **See tables below for specific regulator settings at various ambient temperatures if applicable.**

V ltag R gulat r S tting

R gulat r	V ltag Range r Tabl N .
1119000,1,2,3	No. 3
1119004	13.6-14.3
1119122, 23, 35	No. 3
1119148	13 8-14.8
1119150,51,52,53,55,56,61,62,65,68	No. 3
1119173, 76	No. 4
1119174, 80, 81	No. 3
1119182	7.4-7.9
1119187	No. 4
1119190,92	No. 3
1119200,5,7,9	No. 3
1119210,17,22	No. 4
1119215	No. 3
1119232	No. 4
1119234,35,36,38,39,41,42,43,44,45,47,50	No. 3
1119251	No. 4
1119252,53,55,57,58	No. 3
1119259	No. 4
1119260,61,63,64,66,67,69,70,71	No. 3
1119272	No. 4
1119274,75,77,78,79,80	No. 3
1119281	6.9-7.4
1972029	No. 3
1972030	13.8-14.8
1972031,32,33,41	No. 4
1972059	6.9-7.4
1972060,61	No. 3
1972062,63,65	No. 4
1972064	6.9-7.4
1972066	No. 3
1972067, 70	13.8-14.8
1972157, 60	13.8-14.8
1972159	No. 3
1972201	No. 3

Ambient Temp.	Tabl N . 3	Tabl N . 4
165°F	13.1-13.9 volts	6.5-6.9 volts
145°F	13.5-14.3 volts	6.7-7.1 volts
125°F	13.8-14.7 volts	6.9-7.3 volts
105°F	14.0-14.9 volts	7 0-7.5 volts
85°F	14.2-15.2 volts	7.1-7.6 volts
65°F	14 4-15.4 volts	7.2-7.7 volts

"Tailoring" Voltage R gulator Setting

If battery is consistently undercharged or overcharged (using too much water), adjust voltage regulator within range specified for the ambient temperature in which the regulator is operating, as directed above. ***CAUTION - Regulator setting above upper limit of range given for 125°F ambient temperature may caus damag to lights and other voltage sensitiv quipm nt and should be avoided.***

1)–Battery uses too much water. If voltage regulator setting **above** normal range listed above, reduce setting to within upper portion of normal range and check battery condition over a period of time. If voltage regulator setting **within** normal range listed above, reduce voltage setting 0.1 or 0.2 volts and check battery condition over period of time. This should be continued until battery remains charged.

2)–Batt ry is consistently und rcharged–If voltage regulator setting is **below** normal range listed above, increase setting to within lower portion of normal range and check battery condition over a period of

CONTINUED ON NEXT PAGE

DELCO-REMY 6 & 12-VOLT REGULATORS "1119000", "1119100", "1119200","1972000" (SINGLE CONTACT) (C ntinued)

time. If voltage regulator setting is **within** normal range listed above, increase voltage setting 0.1 volt and check battery condition over period of time. This should be continued until battery remains charged.

CUTOUT RELAY

►*ADJUSTMENT CAUTION: Disconnect battery lead before making Air Gap and Contact Gap adjustments.*

Air Gap: .020" with contacts just touching. To check, press down on armature until points just close (use finger pressure on armature directly above contacts), measure gap between armature and center of core. To adjust, loosen two screws at armature hinge on back of relay, raise or lower armature as necessary. *CAUTION*–Make certain that both sets of contact points close simultaneously.

Contact Gap: .020" with armature up against upper stop *(CAUTION*–Gap must be same for both sets of contacts to insure simultaneous closing). Use feeler gauge to check gap. To adjust, bend upper armature stop up or down as necessary.

Cut-in (Cl sing) V ltag : 6-Volt 5.9-6.7 volts (except 1119281), 5.9-6.5 volts (1119281); 12-Volt 11.8-13.5 volts (except 1119004), 11.5-13.0 volts (1119004). To check with regulator properly connected to generator and battery, connect voltmeter between regulator "GEN" terminal and ground. Use either of the following methods to check cut-in voltage:

1)–Slowly increase generator speed and note voltmeter reading at instant contacts close, then decrease generator speed and make certain that relay contacts open. See item (3) for adjustment.

2)–Connect a variable resistor in the field circuit between regulator "F" terminal and generator "F" terminal (use 15 ohm-25 watt resistor for 6 volt systems, 25 ohm-25 watt resistor for 12 volt systems). Operate generator at medium speed with all resistance turned in, slowly turn out resistance and note voltmeter reading at instant relay contacts close. Slowly turn in resistance and make certain that relay contacts open. Adjust as follows:

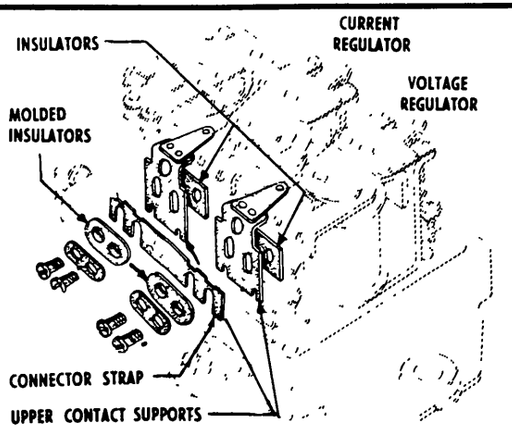
3)–Turn adjusting screw under armature spring (adjacent to contacts) in or clockwise to increase cut-in voltage, out or counter-clockwise to decrease cut-in voltage.

CURRENT REGULATOR

►*CHECKING & ADJUSTMENT CAUTION:* Temperature Compensated Current Regulators should be checked by the "Load Method" which provides for bringing the regulator up to operating temperature. Regulators which are not temperature compensated can be checked by the "Jumper Lead" Method.

Air Gap: .075" with contacts just touching. Check and adjust air gap in same manner as Voltage Regulator.

Curr nt S tting: Use correct method for each type as listed below. *CAUTION–Do not attempt to short out voltage regulator by inserting screwdriver through hole in base (will short out both voltage and curr nt r gulators and cause generator to operate without control).*



DELCO-REMY 12-VOLT REGULATORS CONTACT ASSEMBLY

Load Method

(For Temperature Compensated Regulators)

1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery).

2)–Turn on all accessory load (lights, radio, etc.) and connect additional load (carbon pile rheostat or bank of lights) to reduce voltage to approximately 1.0 volt below voltage regulator setting.

3)–Operate generator at 3500 RPM (cars & trucks) for 15 minutes with regulator cover in place. This will bring regulator up to operating temperature.

4)–Cycle the generator by using either of the following methods: **(A)** Connect voltmeter between regulator "GEN" terminal and ground, reduce generator speed until voltmeter reading is 2 volts (6 volt systems), 4 volts (12 volt systems), then increase generator speed to 3500 RPM. **(B)** Connect variable resistance in field circuit (in line between regulator and generator "F" terminals), operate generator at 3500 RPM with all resistance turned out, turn in resistance until generator voltage reduced to 6 volts (6 volt systems), 12 volts (12 volt systems), then turn out all resistance.

5)–Operate generator at 3500 RPM and note ammeter reading which is the current setting. Adjust by turning the adjusting screw at the current regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Jumper Lead Method

(For Non-Temperature Compensated Regulators)

1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery).

2)–Connect short jumper lead across voltage regulator points (from upper contact bracket to armature).

3)–Turn on all lights and accessories or connect additional load (see step 3 under Load Method above) to cause current regulator to operate.

4)–Operate generator at 3500 RPM (cars & trucks) and note ammeter reading which is the current setting. Adjust as directed in step (5) under Load Method above.

Ⓒ Current Regulat r Setting

Model	Setting	Model	Setting
1119000	No. 8	1119245	No. 9
1119001	No. 6	1119247	22-26
1119002	No. 10	1119250	No. 9
1119003	No. 6	1119251	17.5-20.5
1119004	Ⓓ 37-42	1119252	14.5-17.5
1119122	No. 8	1119253	No. 10
1119123	No. 6	1119255	8-9
1119135	18.5-21.5	1119257	15.5-18.5
1119148	9-11	1119258	15.5-18.5
1119150	Ⓓ 31-35.5	1119259	16.5-19.5
1119151	Ⓓ 31-35.5	1119260	No. 6
1119152	15.5-18.5	1119261	No. 6
1119153	15.5-18.5	1119263	No. 6
1119155	Ⓓ 23-27	1119264	No. 10
1119156	48-52	1119266	38-42
1119161	27-33	1119267	18.5-21.5
1119162	Ⓓ 31-35.5	1119269	53-57
1119165	13-15	1119270	No. 8
1119168	No. 10	1119271	53-57
1119173	No. 11	1119272	38-42
1119174	No. 6	1119274	No. 9
1119176	28-32	1119275	38-42
1119180	13-15	1119277	No. 10
1119181	22-26	1119278	No. 10
1119182	48-52	1119279	No. 8
1119187	13.5-16.5	1119280	No. 10
1119190	38-42	1119281	48-52
1119192	No. 6	1972029	No. 6
1119200	48-52	1972030	28-32
1119205	No. 6	1972031	33-37
1119207	13-15	1972032	33-37
1119209	13-15	1972033	No. 12
1119210	16.5-19.5	1972041	44-49
1119215	14-16	1972059	38-42
1119217	23-27	1972060	No. 8
1119222	43-47	1972061	No. 10
1119232	28-32	1972062	33-37
1119234	No. 6	1972063	No. 11
1119235	No. 10	1972064	48-52
1119236	53-57	1972065	No. 7
1119238	22-26	1972066	No. 6
1119239	22-26	1972067	38-42
1119241	18.5-21.5	1972070	No. 10
1119242	No. 10	1972157	23-27
1119243	13-15	1972159	No. 6
1119244	No. 6	1972160	No. 8
		1972201	No. 12

Ⓒ - Ampere Range for "Non-Temperature Compensated" types. Specification Table number (see below) for "Temperature Compensated" types.

Ⓓ - "Temperature Compensated" type. Set at 125°F ambient temperature.

Ambient Temp.	Spec. No. 6	Spec. No. 7	Spec. No. 8	Spec. No. 9	Spec. No. 10	Spec. No. 11	Spec. No. 12
65°F	30.0-35.0		25.0-30.0	20.0-24.0	35.0-40.0	45.5-50.5	40.5-45.5
85°F	29.0-34.0	53.5-59.5	24.5-29.0	19.5-23.0	34.0-38.5	44.0-48.5	39.0-43.5
105°F	28.0-32.5	51.0-57.0	23.5-28.0	18.5-22.0	32.5-37.0	42.5-47.0	37.5-42.0
125°F	27.0-31.0	49.0-54.5	23.0-27.0	17.5-20.8	31.0-35.5	41.0-45.5	36.0-40.5
145°F	25.0-30.0	46.5-52.5	21.5-25.5	16.5-19.5	29.5-33.5	39.5-43.5	34.5-38.5
165°F	24.5-28.5		20.5-24.5	15.5-18.5			
185°F	23.0-27.0		19.5-23.5	14.5-17.5			

1957 DELCO-REMY 12-VOLT "1119100 SERIES" (DOUBLE CONTACT) REGULATORS

	Regulator	Generator
CADILLAC		
75, 86 (1957) AC Cars	1119163	1102060
Eldorado Brougham	1119175	1106989
PONTIAC		
All (1957) Heavy Duty	1119163	1102074

►CAUTIONS

►*REGULATOR CAUTION* *When testing generator and this type regulator, observe the following precautions*

1) *DO NOT GROUND GENERATOR FIELD WITH REGULATOR CONNECTED TO GENERATOR* - This will cause Lower Set of contacts in Voltage Regulator to burn up immediately.

2) *DO NOT FILE REGULATOR CONTACTS* - All contacts of the Double Contact Voltage Regulator are soft alloy and should be cleaned with crocus cloth or other fine abrasive and washed with carbon tetra-chloride.

DESCRIPTION: These regulators differ from other "1119000 Series" regulators in that a special "Double Contact" Voltage Regulator unit is used. Cutout Relay and Current Regulator units are same as units used in other 1119000 series regulators.

OPERATION: The Double Contact Voltage Regulator has an additional set of "Lower Contacts" connected directly across the generator field (in addition to the regular "Upper Contacts") and the regulating resistor is of lower value than on other type regulators. Regulator operates either on Upper Contacts or Lower Contacts, depending on load and battery requirements, as follows

Upper Contact Operation (Low Speed & High Load - High Generator Field requirement) - Regulator armature travel opens and closes upper contacts (vibrating action) cutting the regulating resistance in and out of the field circuit. This operation is the same as on other voltage regulators with single set of contacts.

Lower Contact Operation (High Speed & Low Load - Low Generator Field requirement) - Under these conditions, upper contact operation is not sufficient to control generator voltage. Regulator armature travel opens and closes lower contacts (vibrating action), shorting the field out (contacts closed) or cutting the regulating resistance in the field circuit (contacts open). This provides additional regulation.

CHECKING & ADJUSTMENT Make all checks and adjustments in following sequence Voltage Regulation, Cutout Relay Operation, and Current Regulation AFTER regulator has been brought up to normal operating temperature as directed below Generator must be repolarized each time leads are reconnected and before operating

►*GENERATOR REPOLARIZING* After generator and regulator leads reconnected, connect jumper lead between regulator "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator winding This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of relay contact points)

VOLTAGE REGULATOR

►*NORMALIZING THE REGULATOR* Before checking voltage setting bring regulator to operating temperature as follows Connect 1/4 ohm resistance in series with battery, see that regulator cover in place, operate regulator for 15 minutes continuously with no other load than ignition *(NOTE*–If variable resistor used in place of fixed 1/4 ohm resistor, set resistor for 1-10 ampere charging rate)

Air Gap: .080" with upper contact just touching. When adjusting air gap, turn air gap adjusting screw all the way out in a clockwise direction *(NOTE - This is the adjusting screw for voltage setting when operating on upper contacts),* then bend upper contact support for correct air gap

Contact Gap (Upper Set of Contacts): 016" with armature pressed down to point where lower contacts just touch Adjust by bending lower contact support

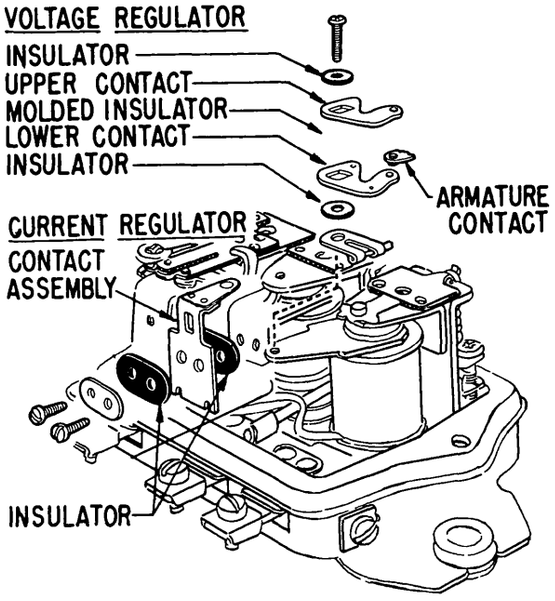
Voltage Setting: With regulator at specific ambient temperature, setting should be as indicated in "Setting Table" below when operating on **lower contacts.** When operating on **upper** contacts, setting should be 3- 5 volts below operating voltage on lower contacts Check and adjust as follows Battery should be fully charged so that charging rate is limited to 1-10 amperes (if charging rate is above 10 amperes, connect ¼ Ohm resistor in series with battery) Connect voltmeter from regulator "BAT" terminal to ground Connect a 25 Ohm (25 Watt) variable resistance in generator field circuit (between regulator "F" terminal and field lead normally connected to this terminal) *CAUTION - Resistor should have an "open" position at the full resistance end to assist in cycling the generator*

Operation on Lower Contacts Turn the field resistance completely out and operate generator at medium speed Regulator should then operate on lower set of contacts Continue operation for 15 minutes to bring regulator up to operating temperature then cycle generator by turning variable resistance to "open" position momentarily then slowly cut all resistance out Note voltmeter reading This is the regulator setting on LOWER CONTACTS and should be as indicated in table below for specific ambient temperature Adjust in usual manner by turning double-slotted screw on armature spring lower bracket

Voltage Regulator Setting

Ambient Temp. (F°)	Setting (Volts)
85°	14 1-14 9
105°	14 0-14 8
125°	13 8-14 6
145°	13 7-14 5
165°	13 5-14 4
185°	13 4-14 2
205°	13 3-14 1

Operation on Upper Contacts - After checking operation on Lower Contacts (above), slowly increase field resistance until regulator begins to operate on upper set of contacts (voltmeter should indicate a slight voltage drop at this point). Voltmeter reading should be .3 to .5 volts below lower contact operation setting for all models. Adjust by turning air gap adjusting screw located on top of armature (turn screw clockwise to increase voltage differential, counter-clockwise to decrease voltage differential). *NOTE* - This adjustment



DELCO-REMY REGULATOR CONTACT ASSEMBLY (DOUBLE CONTACT VOLTAGE REGULATOR)

will affect Voltage Setting on lower contact operation and entire checking procedure should be repeated.

►*ADJUSTMENT CAUTION*· If voltage setting on Upper Contacts is ever found to be HIGHER than voltage setting on Lower Contacts, it must be reduced by turning the air gap adjusting screw in a clockwise direction, and if the adjustment is taken up, **th nominal air gap must be reset (see below).**

CUTOUT RELAY

►*ADJUSTMENT CAUTION* *Disconnect battery l ad before making Air Gap and Contact Gap adjustments.*

Air Gap 020" with contacts just touching To check, press down on armature until points just close (use finger pressure on armature directly above contacts), measure gap between armature and center of core To adjust, loosen two screws at armature hinge on back of relay, raise or lower armature as necessary *CAUTION*–Make certain that both sets of contact points close simultaneously

Contact Gap 020" with armature up against upper stop *(CAUTION*–Gap must be same for both sets of contacts to insure simultaneous closing) Use feeler gauge to check gap To adjust, bend upper armature stop up or down as necessary

Cuts-in (Closing) Voltage: 11 8-13 5 volts To check with regulator properly connected to generator and battery, connect voltmeter between regulator "GEN" terminal and ground Use either of the following methods to check cut-in voltage

1)–Slowly increase generator speed and note voltmeter reading at instant contacts close, then decrease generator speed and make certain that relay contacts open See item (3) for adjustment

CONTINUED ON NEXT PAGE

1957 DELCO-REMY "1119100 SERIES" "DOUBLE CONTACT" REGULATORS (C ntinued)

2)–Connect a variable resistor in the field circuit between regulator "F" terminal and generator "F" terminal (use 15 ohm-25 watt resistor for 6 volt systems, 25 ohm-25 watt resistor for 12 volt systems). Operate generator at medium speed with all resistance turned in, slowly turn out resistance and note voltmeter reading at instant relay contacts close.

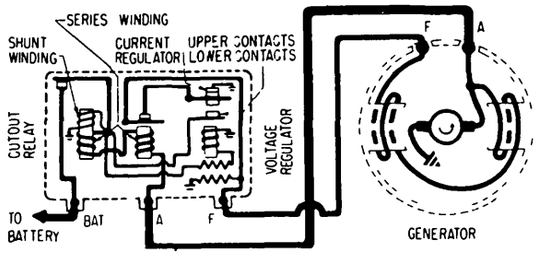
3)–Turn adjusting screw under armature spring (adjacent to contacts) in or clockwise to increase cut-in voltage, out or counter-clockwise to decrease cut-in voltage.

CURRENT REGULATOR

►*CHECKING & ADJUSTMENT CAUTION* Temperature Compensated Current Regulators should be checked by the "Load Method" which provides for bringing the regulator up to operating temperature. Regulators which are not temperature compensated can be checked by the "Jumper Lead" Method

Air Gap 075" with contacts just touching Check and adjust air gap in same manner as Voltage Regulator

Current S tting Use correct method for each type as listed below *CAUTION–Do not attempt to short out voltage regulator by inserting screwdriver through hole in base (will short out both voltage and current regulators and cause generator to operate without control).*



DELCO-REMY 1119100 SERIES (DOUBLE CONTACT VOLTAGE REGULATOR)

Load Method
(For Temperature Compensated Regulators)

1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery)

2)–Turn on all accessory load (lights, radio, etc) and connect additional load (carbon pile rheostat or bank of lights) to reduce voltage to approximately 1.0 volt below voltage regulator setting.

3)–Operate generator at 3500 RPM (cars & trucks) for 15 minutes with regulator cover in place This will bring regulator up to operating temperature

4)–Cycle the generator by using either of the following methods **(A)** Connect voltmeter between regulator "GEN" terminal and ground, reduce generator speed until voltmeter reading is 2 volts (6 volt systems), 4 volts (12 volt systems), then increase generator speed to 3500 RPM **(B)** Connect variable resistance in field circuit (in line between regulator and generator "F" terminals), operate generator at 3500 RPM with all resistance turned out, turn in resistance until generator voltage reduced to 12 volts, then turn out all resistance.

5)–Operate generator at 3500 RPM and note ammeter reading which is the current setting Adjust by turning the adjusting screw at the current regulator armature spring lower bracket clockwise to increase setting, or counter-clockwise to decrease setting.

Jumper Lead Method
(For Non-Temperature Compensated Regulators)

1)–Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery)

2)–Connect short jumper lead across voltage regulator points (from upper contact bracket to armature)

3)–Turn on all lights and accessories or connect additional load (see step 3 under Load Method above) to cause current regulator to operate

4)–Operate generator at 3500 RPM (cars & trucks) and note ammeter reading which is the current setting. Adjust as directed in step (5) under Load Method above.

Current Setting Range

Regulator	Amperes	Regulator	Amperes
1119149	43-47	1119167	48-52
1119157	48-52	1119175	53-57
1119158	33-37	1119183	33-37
1119163	37-42	1119186	43-47

1958-60 DELCO-REMY "1119600 SERIES" 12-VOLT "DOUBLE CONTACT" REGULATORS

►*DOUBLE CONTACT REGULATOR CAUTION: These regulators do not operate in same manner as previous double contact regulators (1119100 Series).*

►*REGULATOR TESTING & SERVICE CAUTION: When t sting generator and this type regulator, observe the following pr cautions:*

1 - DO NOT GROUND GENERATOR FIELD WITH REGULATOR CONNECTED TO GENERATOR - This will cause upp r s t of contacts in Voltage Regulator to burn up immediately.

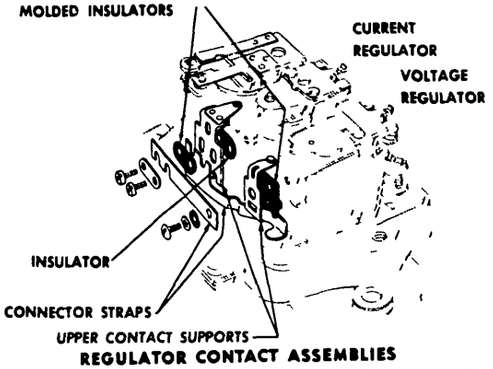
2 - DO NOT FILE REGULATOR CONTACTS - All contacts of the Double Contact Voltage Regulator are soft alloy and should be cleaned with crocus cloth or other fine abrasive and washed with carbon tetrachloride.

DESCRIPTION: These regulators differ from previous "Double Contact" Voltage Regulator units in that operation of the "upper" and "lower" contacts on the voltage regulator have been reversed and additional resistance is included for better regulation.

OPERATION: The Voltage Regulator has an additional set of "Upper Contacts" connected directly across the generator field (which shorts out generator field circuit). The "Lower Contacts" are connected in series with the generator field. The Voltage Regulator operates either on "Upper Contacts" or "Lower Contacts" (both sets are never in operation at the same time), depending on load and battery requirements, as follows

L wer C ntact Op ration (L w Sp d & High L ad–High G n rator Fi ld R quir ment) - Regulator armature travel opens and closes lower contacts (vibrating action) cutting regulator resistance in and out of field circuit. This operation is same as on regulators with a single set of contacts.

Upper Contact Operation (High Speed & Low Load - Low Generator Field Requirement) - Under these conditions, upper contact operation is not sufficient to control generator voltage. Regulator armature travel opens and closes upper contacts (vibrating action), shorting the field out (contacts closed) or cutting the regulator resistance in the field circuit (contacts open). This action provides additional regulation.



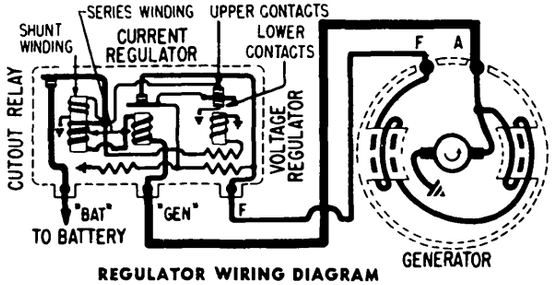
REGULATOR CONTACT ASSEMBLIES

CHECKING & ADJUSTING: Make all checks and adjustments in the sequence indicated below after regulator has been brought up to normal operating temperature. Repolarize generator each time leads are reconnected and before operating.

►*GENERATOR REPOLARIZING* After generator and regulator leads reconnected, connect jumper lead between regulator "GEN" and "BAT" terminals momentarily to allow a quick current surge through generator winding This will prevent damage to equipment caused by reversed polarity (vibration, arcing, and burning of relay contact points)

►*CHECKING & ADJUSTING CAUTION: "Temperatur Compensated" Current Regulators used on some units*

CONTINUED ON NEXT PAGE



REGULATOR WIRING DIAGRAM

DELCO-REMY 1119600 SERIES DOUBLE CONTACT REGULATORS

1958-60 DELCO-REMY "1119600 SERIES" "DOUBLE CONTACT" REGULATORS (Continued)

(see table below). It is necessary that these regulators be adjusted to the setting specified for the "ambient temperature" of the unit. See "Ambient Temperature - Current Setting" table below.

CUTOUT RELAY

►*ADJUSTMENT CAUTION Disconnect battery lead before making Air Gap and Contact Gap adjustments.*

Air Gap 020" with contacts just touching To check, press down on armature until points just close (use finger pressure on armature directly above contacts), measure gap between armature and center of core To adjust, loosen two screws at armature hinge on back of relay, raise or lower armature as necessary *CAUTION*–Make certain that both sets of contact points close simultaneously

Contact Gap 020" with armature up against upper stop *(CAUTION*–Gap must be same for both sets of contacts to insure simultaneous closing) Use feeler gauge to check gap To adjust, bend upper armature stop up or down as necessary

Cut-In (Closing) Voltage: 11 8-13 0 volts (except 1119634), 11 5-12 7 volts (1119634) To check with regulator properly connected to generator and battery, connect voltmeter between regulator "GEN" terminal and ground Proceed as follows Connect a variable resistor in the field circuit between regulator "F" terminal and generator "F" terminal (use 25 Ohm, 25 Watt resistor) Operate generator at medium speed with all resistance turned completely in Turn on all lights or an equivalent load, then slowly decrease (turn out) resistance until cutout relay points close and note voltmeter reading which should be as indicated above To adjust, turn adjusting screw under armature spring (adjacent to contacts) in or clockwise to increase cut-in voltage, out or counterclockwise to decrease cut-in voltage

VOLTAGE REGULATOR

Air Gap: 067" with lower contacts touching To adjust loosen contact support bracket screw 1/8 turn and place a screwdriver in slot in contact support bracket and into molded insulator directly below contact support screw Raise handle of screwdriver to increase air gap and lower handle to decrease air gap *NOTE - Som regulators have an external adjustment screw for air gap adjustment*

Contact Gap (Upper Set of Contacts): 016" with lower contacts just touching (press armature down) Adjust by bending upper contact arm

Voltage Setting: With regulator at operating temperature setting should be as indicated in Voltage Setting - Ambient Temp table below, when operating on **upper contacts.** When operating on **lower** contacts, setting should be 1 to 3 volts below operating voltage on lower contacts Check and adjust as follows Battery should be fully charged so that charging rate is limited to 1-10 amperes (if charging rate is above 10 amperes connect ¼ Ohm resistor in series with battery) Connect voltmeter from regulator "BAT" terminal to ground Connect a 25 Ohm (25 Watt) variable resistance in generator field circuit (between regulator "F" terminal and field lead normally connected to this terminal) *CAUTION - Resistor should have an "open" position at the full resistance end to assist in cycling the generator*

Operation on Upper Contacts - With variable resistance turned out (minimum resistance), operate generator at medium speed, or a higher speed, so voltage regulator is operating on upper set of contacts *Continue to operate 15 minutes to establish operating temperature* (with regulator cover in place). Cycle generator by turning variable resistance to "open" position momentarily, then slowly decrease (turn out all) resistance. Regulator should again be operating on upper set of contacts. Note voltmeter reading and the ambient temperature (temperature of air surrounding regulator ¼" from its cover) Operating voltage should be as indicated in ambient temperature table below.

Operation on Lower Contacts - Increase resistance slowly until voltage regulator begins to operate on lower contacts. Lower set of contacts should operate .1-.3 volts lower than upper contacts.

Adjustment of Voltage Setting - (Upper set of Contacts). Turn adjusting screw clockwise to increase voltage and counterclockwise to decrease voltage *CAUTION* - If adjusting screw is turned down beyond range, spring support may not return when screw is backed off. In this case, turn screw counterclockwise until there is ample clearance between screw head and spring support Then bend spring support up carefully until it touches screw head. Final setting of unit should be made by increasing spring tension. If setting is too high, adjust unit below required value, then raise to exact value by increasing spring tension. After each adjustment, and before taking reading, replace regulator cover and recycle generator

Lower Set of Contacts - Adjust for difference in voltage (1- 3 volts lower) between operation of upper set of contacts and the lower set by increasing or decreasing air gap between armature and center of core. Increase voltage by increasing air gap or decrease voltage by decreasing air gap. Loosen armature screw slightly, than insert screw-driver in slot of bracket and move armature up or down as necessary Lower points should just be touching when air gap is checked. Recheck voltage setting for both sets of contacts.

Voltage Regulator S tting

Regulator	Tabl N .
1119600,1,2,3,4,5,6,7,8,9,10,11,12	No 1
1119613,14,15,17,19,21,23,24,25,27,28	No 1
1119629,30	No 1
1119631	①No 1B
1119632,33	No 1
1119634	No 1C
1119635	No 1
1119636,37,38,39,40,41,42,43,44,45,46	①No 1B
1119647	①No 1B
1119648,49,50,51	No 1
1119652	①No 1B
1119654,55,57,58,59	No 1
1119660,61	①No 1B
1119663,64	No 1

① - Make adjustment with external adjustment screw at "0"

Voltage Setting - Ambient Temperatur

Temp.①	②Table No. 1	②Tabl N . 1B	②Tabl N .1C
65°		13 9-15 0	
85°	14 1-14 9	13 8-14 8	13 4-14 2
105°	14 0-14 8	13 7-14 6	13 3-14 1
125°	13 8-14 6	13 5-14 4	13 1-13 9
145°	13 7-14 5	13 4-14 2	13 0-13 8
165°	13 5-14 4	13 2-14 0	12 8-13 7
185°	13 4-14 2	13 1-13 9	12 7-13 5
205°	13 3-14 1		12 6-13 4

① - Ambient temperature taken within ¼" of cover
② - Operating voltage will be 1- 3 volts low r on lower contacts

CONTINUED ON NEXT PAGE

CURRENT SETTING - AMBIENT TEMPERATURE

Ambient Temp.	Spec. No. 2	Spec. No. 3	Spec. No. 4	Spec. No. 5	Spec. No. 6	Spec. No. 7	Spec No 8	Spec. No. 9	Spec No. 10	Sp c. No. 11	Ambi nt T mp.
65°F											
85°F	43.0-51.5	44 5-49 0	43.0-48 5	35.0-40.0	45.5-50 5	40.5-45.5	50 0-55 0	50 7-59 6	32 4-37 3	30 0-35 0	65°F
105°F	40 5-48 0	43 5 48 0	40.0-45.5	34.0-38.5	44 0-48.5	39.0-43.5	49 0 53 5	48 0-56 4	31 0-35 7	29 0-34 0	85°F
125°F	38.0-45.0	42.5-47.0	37.5-42.0	32.5-37.0	42 5-47.0	37 5-42.0	42 5-52 0	45 3-53 2	29 4-34 0	28 0-32 5	105°F
145°F	35.0-42.0	41.5-46.0	34.5-39.0	31.0-35.5	41.0-45.5	36 0-40.5	46 0 50 5	42 8-50 0	27 8-32 4	27 0-31 0	125°F
165°F	32.5-38.5	40.5-45.0	32.0-36.0	29.5-33.5	39 5-43 5	34.5-38 5	44 5 48 5	40 1-46 7	26 3-30 7	25 0-30 0	145°F
185°F	30.0-36.0	39.5-44.0	29.0-33.0				43 0 47 0	37 6-43 6	24 7-29 0	24 5-28 5	165°F
205°F	27.5-34.5	38.5-42.5	26.0-30.0				41 5 45 5	35 0-41 0	23 2-27 3	23 0-27 0	185°F
											205°F

1958-60 DELCO-REMY "1119600 SERIES" "DOUBLE CONTACT" REGULATORS (C ntinued)

CURRENT REGULATOR

Air Gap: .075" with contacts just touching. Check and adjust gap in same manner as for Voltage Regulator above.

Curr nt S tting: *NOTE - Current regulator must be brought up to normal op rating temperature before checking curr nt's tting. On "T mperature Compensated" curr nt r gulators (see tabl below), the "Ambient Temp rature" must b d t rmined and the regulator set to th current value indicated in "Current Setting - Ambi nt Temp ratur " table* Connect ammeter in charging circuit at regulator "BAT" terminal (in series with battery) Turn on all accessory load (lights, radio, etc) and connect additional load (bank of lights or carbon pile rheostat) to reduce voltage to approximately 1.0 volt below regulator setting Operate generator at a speed sufficient to produce current in excess of specified setting for 15 minutes (with cover in place) to bring regulator up to normal operating temperature. *NOTE - On "Non-temperature Compensated" regulators it is not necessary to bring the regulator to operating temperature.* Cycle the generator by turning the variable resistance to the "open" position momentarily then slowly decrease (turn out all) resistance and note ammeter reading which will be the regulator setting *NOTE - Voltage regulator should be operating on upper set of contacts.* To adjust, turn adjusting screw at current regulator armature spring lower bracket clockwise to increase setting or counter-clockwise to decrease setting

℄ Curr nt R gulat r Setting

R gulat r	Setting	Regulator	Setting	R gulator	Setting	R gulator	Setting
1119600	No. 2	1119615	58-62	1119632	No. 8	1119646, 47	19-21
1119601	No. 3	1119617	No. 3	1119633	No. 9	1119648	No. 6
1119602	No. 4	1119619	No. 8	1119634	23-27	1119649	No. 5
1119603	43-47	1119621	27-33	1119635	No. 10	1119650, 51	53-57
1119604	No. 5	1119623	No. 2	1119636	53-57	1119652	No. 8
1119605	53-57	1119624	No 7	1119637	48-52	1119654	No. 7
1119606, 07	48-52	1119625	22-26	1119638	38-42	1119655	38-42
1119608	No. 6	1119627	38-42	1119639	No. 7	1119657	23-27
1119609	43-47	1119628	58-62	1119640	38-42	1119658	48-52
1119610	No. 7	1119629	No 9	1119641	No 5	1119659	No 3
1119611, 12	33-37	1119630	No 7	1119642	33-37	1119660, 61	48-52
1119613	53-57	1119631	48-52	1119643,44	No. 11	1119663	27-33
1119614	9-11			1119645	23-27	1119664	9-11

℄ - Ampere Range for "Non-Temperature Compensated" types Specification Table number (see below) for "Temperature Compensated" types.

FORD MOTOR CO. 6-VOLT REGULATORS

►CHANGES, CAUTIONS, CORRECTIONS

►**REPLACEMENT GENERATOR NOTE:** FAA-10002-A or B production generators replace generator 8BA-10002-A, 8BA-10002-B, 8BA-10002-D

►**REGULATOR & GENERATOR GROUND CAUTION:** Regulator and generator grounds must be in place when units operated (regulator may be grounded through mounting screw or separate ground lead). See car page wiring diagram for data.

DESCRIPTION

DESCRIPTION: 3 unit (Cutout Relay, Voltage Regulator, Current Regulator) regulator with separate voltage and current regulator units (these units were combined on previous 2-unit regulators). Regulators are vibrating type and charging rate is normally controlled by Voltage Regulator. Current Regulator operates when current reaches value in excess of rated capacity and limits current to this figure. Both regulators operate in the same manner by cutting the resistance in and out of the field circuit and control the generator output by regulating the field current

►*CAUTION*—Ford Generators and Ford Regulators are not wired in the same manner as units of other makes and cannot be operated in conjunction with units of other makes. Always operate Ford Generators & Regulators together.

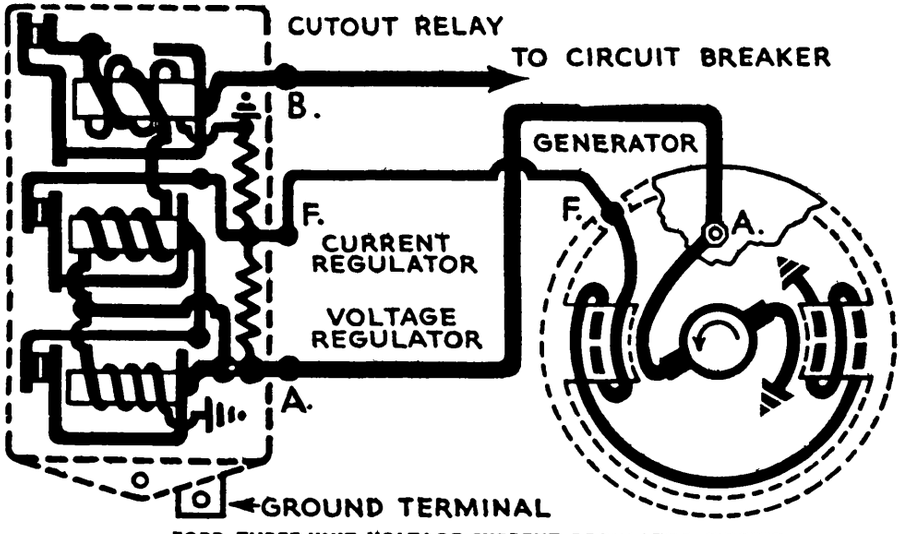
CHECKING & ADJUSTING REGULATOR

CHECKING & ADJUSTMENT OF REGULATOR: Use special test set (with an adjustable field rheostat—see Ford Test Note below). If separate test meters are used to check performance, a variable field rheostat should be used so that generator output can be varied when making tests.

Ford Test Note—Ford Test Set has a variable field rheostat (connected between regulator "F" terminal and generator field lead) and a ¾ ohm fixed resistance through which the generator charges (resistor and ammeter connected in series to regulator "B" terminal while regular charging line is disconnected from this terminal) and a carbon-pile rheostat (in parallel with the ¾ ohm fixed resistance) which can be cut in to the circuit by a push button to provide sufficient load to enable current regulator to be adjusted (carbon-pile rheostat is variable and resistance should be slowly decreased until current regulator operates). This enables all tests to be made with generator operating at 1500 RPM.

►*NOTE*—Regulator should be at normal operating temperature when checking regulator settings.

►*CAUTION*—Ground connection must be in place when generator and regulator are operated. If ground wire disturbed by removal of regulator cover,



FORD THREE-UNIT VOLTAGE-CURRENT REGULATOR CIRCUIT

make certain that regulator and generator are both grounded whenever these units are being operated.

REGULATOR SETTINGS

Relay Cut-in Voltage—Connect ammeter in charging line at regulator "BAT" terminal (disconnect lead at this terminal, connect one ammeter lead to this lead, connect other ammeter lead to terminal). Connect voltmeter between regulator "ARM" terminal and ground on regulator base. Connect jumper wire between generator "A" and "F" terminals Start engine and slowly increase speed until relay contacts close, note voltmeter reading (pointer will drop back slightly at this point). Cut-in voltage should be within limits shown in table below. To adjust, remove regulator cover, bend support at lower end of relay

CONTINUED ON NEXT PAGE

FORD MOTOR CO.
6-VOLT REGULATORS (C nt.)

armature spring in to increase tension and raise cut-in voltage, bend support out to decrease tension and lower cut-in voltage.

Relay Cut-out Reverse Current—After checking cut-in voltage above, increase engine speed until generator charges at approximately 10 amperes, then slowly decrease engine speed and note reverse or discharge current reading on ammeter at instant relay contacts open. If this reverse current not within limits shown in table below, check relay air gap and armature stop setting (see Specifications below).

Cutout Relay Settings

Regulator Type	Cut-in Voltage	Cut-out Reverse Current
5EH-10505-C	6.6-7.0 volts	0-8 amperes
51A-10505-A1	6.6-7.0 volts	0-8 amperes
51A-10505-A2, B2, C2, D2	6.0-6.3 volts (Cold)	0-8 amperes
51A-10505-H, J	6.6-7.0 volts	0-8 amperes
8A-10505-A	6.0-6.6 volts	0-8 amperes
8L-10505	6.0-6.6 volts	0-8 amperes
8M-10505-A	6.0-6.6 volts	0-8 amperes
FAC-10505-A,A1,A2	6.0-6.6 volts	0-8 amperes
FAD-10505-A	6.0-6.6 volts	0-8 amperes
FAE-10505-A	6.0-6.6 volts	0-8 amperes
FAJ-10505	6.0-6.6 volts	0-8 amperes

►***IDLE SPEED NOTE***—**If higher than cut-in point, it will be necessary to back off throttle stopscrew and bring idling speed below cut-in point.**

Voltage Regulator Setting—Check with the cover in place and at 70-80°F. with the regulator at normal operating temperature (after operating for 30 minutes or having been heated on the test bench so temperature stabilized). Connect ammeter in charging line at regulator "BAT" terminal (disconnect lead on this terminal, connect ammeter to this lead and to the terminal), connect voltmeter between regulator "ARM" terminal and ground. Run engine at 1500 RPM., adjust charging rate to 8-10 amperes (if less than 8 amperes, turn on lights or other load; if more than 12 amperes, cut in resistance of the test set). Note voltmeter reading with generator output of 8-10 amperes (CAUTION —cover must be in place when making this reading). To adjust, remove regulator cover, bend spring adjustment (bending arm—see illustration) upward to increase spring tension and voltage setting, or down to decrease spring tension and voltage setting. Re-install cover and repeat test.

►***CAUTION***—**Voltage will drop approx. 0.2 volt when steel cover installed and should be allowed for when adjusting (aluminum covers do not change setting).**

Voltage Regulator Setting

Regulator Type	Setting (Volts)
5EH-10505-C	②7.2-7.6
51A-10505-A1 (Std. & Trop.)	7.2-7.6
51A-10505-A2, C2 (Std.)	①7.0-7.3
51A-10505-B2, D2 (Trop.)	①6.8-7.3
51A-10505-H (Std.)	7.2-7.6
51A-10505-J (Trop.)	7.0-7.4
8A-10505-A (Std.)	②7.2-7.6
8L-10505 (Std.)	②7.2-7.6
8M-10505-A (Std.)	②7.2-7.6
FAC-10505-A,A1,A2	③7.4-7.8
FAD-10505-A	③7.4-7.8
FAE-10505-A	③7.2-7.6
FAJ-10505	③7.1-7.3

①—Cold setting.
②—7.0-7.4 volts with regulator COLD.
③—With Ambient air temperature from 70 to 80°F.

Current Regulator Setting—After checking Voltage Regulator (above) reinstall regulator cover if removed. Proceed as for voltage regulator check with engine running at 1500 RPM. (approx. 30 MPH.), use Battery-Starter Tester to increase load (or decrease resistance of carbon-pile regulator on Ford Test Set), note ammeter reading which should agree with current regulator setting below. To adjust, remove regulator cover, bend spring adjustment (bending arm—see illustration) upward to increase spring tension and current setting, or down to decrease spring tension and current setting.

Current Regulator Setting

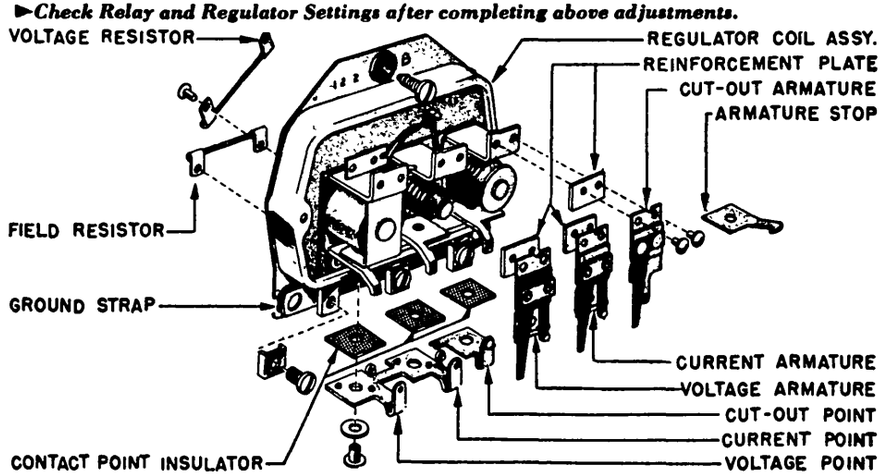
Regulator Type	Setting (Amperes)
5EH-10505-C	38-42
51A-10505-A1	30-34
51A-10505-A2, B2, C2, D2	30-33
51A-10505-H, J	34-38
8A-10505-A	30-34
8L-10505	38-42
8M-10505-A	34-38
FAC-10505-A,A1,A2	34-38
FAD-10505-A	38-42
FAJ-10505	48-52

►***CAUTION***—After tests completed, disconnect test meters, connect charging line to regulator "BAT" terminal. **Make certain that jumper removed from generator "A" and "F" terminals.**

REGULATOR SPECIFICATIONS

Cutout Relay Contact Gap—.010" with armature against stop.
Cutout Relay Air Gap—.014" between armature and core with contacts open.
Contact Gap and Air Gap Setting—Insert .014" feeler between armature and core. Then set contact gap to .010" using a feeler gauge, by lowering armature stop and raising the lower contact, tighten 2 lower contact screws.
►***CAUTION***—Heel of armature must not touch relay frame.
Aligning Cutout Relay Contacts—Contacts must make and break squarely. If adjustment necessary, bend lower contact up or down, then check Air Gap and Contact Gap (may be disturbed by movement of lower contact).
Regulator Air Gap—.032-.035" between armature and core (contacts closed).
Setting Air Gap—Bend the spring adjustment (bending arm)—see illustration —to clear armature spring. Insert .035" gauge (round stock) between armature and core (*CAUTION*—On voltage regulator make certain gauge does not contact rivet on underside of armature). Press armature down, turn contact screw down to just touch armature contact, set contact screw with locknut. Realign contacts
Regulator Contact Spring Tension—5 ozs. minimum with contacts just opening.
Checking Contact Spring Tension—Use a spring scale to measure tension just as contacts open. Adjust upper contact screw after loosening locknut if pressure below limits listed above.

►***Check Relay and Regulator Settings after completing above adjustments.***



REGULATOR CONTACT ASSY.

FORD MOTOR CO. 12-VOLT REGULATORS

►CAUTIONS

►*GENERATOR POLARIZING: (NOTE* - Polarization is not necessary except when generator has been rebuilt or if new pole shoes have been installed). To polarize a generator on the car, disconnect the field wire and the battery wire from the regulator and momentarily connect the two wires together (engine not running). *CAUTION - Do not polarize generator by any method that applies battery voltage to field terminal of regulator.*

►*NORMALIZING THE REGULATOR:* **On the Car**—Clip special thermometer T56L-10505-A on regulator cover (see Note below). Operate engine with generator charging at 10 ampere rate for 30 minutes or until regulator temperature is stabilized.

On the Bench—Procedure is same as on the car except that a small fan should be mounted 12-15" from the regulator so as to circulate air over the regulator cover while it is being warmed up.

Thermometer T56L-10505-A Note—This thermometer is calibrated in 10°F. increments and has additional Voltage scales indicating the correct voltage regulator setting for each temperature reading (both 6 volt and 12 volt scales provided).

►*AMBIENT TEMPERATURE NOTE:* Ambient temperature is the temperature taken adjacent to the regulator, using Thermometer T56L-10505-A.

DESCRIPTION: These 12 volt regulators are the same design as previous 12 volt units.

CHECKING & ADJUSTMENT: *CAUTION*—Regulators are temperature-compensated and must be brought up to normal operating temperature before checks are made. This normal temperature is that existing adjacent to the regulator cover after 1/2 hour of operation in the car or after the regulator has been heated until the temperature is stabilized (standard normal temperature is 70-80°F.

►*TEST METER CONNECTIONS:* If special Test Sets used, make all connections in accordance with manufacturer's instructions. If individual meters used, make connections as follows: Connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal, from regulator terminal to ground (Ford). *CAUTION - Disconnect battery cable.* On other cars, connect test ammeter and 1½ ohm fixed resistor in series in charging line at regulator "BAT" terminal in series with battery. Connect voltmeter between regulator "ARM" terminal and ground (regulator base or battery grounded terminal). Connect a 50 ohm variable field rheostat (2 amp. rating) in generator field circuit (disconnect field lead at regulator "FIELD" terminal, connect rheostat between this lead and regulator "FIELD" terminal).

CUTOUT RELAY

Cut-In (Closing) Voltage: After regulator normalized and with test meters connected (see above), check cut-in voltage as follows:

Comet, Falcon, Ford - With field resistance completely turned in the field circuit, operate engine at 1500 RPM, slowly turn resistance out of field circuit and note voltmeter reading when relay contacts close (pointer will drop back slightly). Repeat this check several times by turning resistance in and out of field circuit.

Edsel, Lincoln, Mercury - With resistance turned out of field circuit, slowly increase generator speed and note voltmeter reading at instant relay contacts close (pointer will drop back slightly). Repeat this check several times by decreasing generator speed until contacts open and then increasing speed until contacts close. If closing voltage not correct as shown in setting table below, adjustment is required.

Adjustment - Bend adjusting arm under armature spring (to left of relay contacts) upward to increase cut-in voltage, or downward to decrease cut-in voltage. Replace regulator cover and recheck the setting.

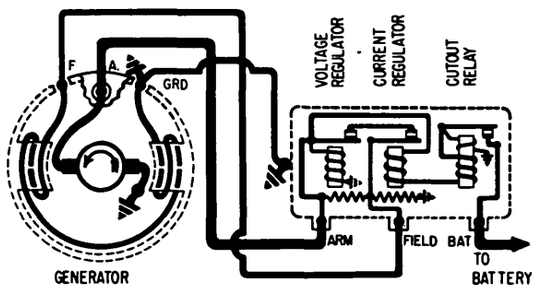
Cut-In (Closing) Voltage Setting

All (Exc. 40 Amp. Auto-Lite) - 12.0-12.8 volts.
40 Amp. Auto-Lite - 12.5-13.9 volts.

Cut-out (Opening) Discharge Current: This can be checked after checking cut-in voltage by increasing generator speed (or turning out field resistance) until charging current is approximately 10 amperes, then slowly decrease generator speed (or turn in field resistance) until maximum **discharge** current indicated on ammeter (ammeter will return to zero as contacts open)

Cut-Out (Opening) Discharge Current

All (Exc. 40 Amp. Auto-Lite) - 5-9 amperes.
40 Amp. Auto-Lite - 2-6 amperes.



12-VOLT REGULATOR WIRING DIAGRAM

VOLTAGE REGULATOR

Voltage Setting: After Cutout Relay checked (above), cycle regulator by decreasing generator speed until cutout relay contacts open and then increase speed to 1500 RPM. Clip special thermometer on regulator cover to establish regulator ambient temperature and corresponding voltage setting (see Voltage Regulator Settings for various ambient temperatures below). Turn resistance completely out of field circuit (charging rate should be approximately 10 amperes). Note voltmeter reading. This is the voltage setting and should agree with setting listed below.

Final Test (Ford) - Remove all test leads except voltmeter leads and install "BAT" and "F" wires on regulator. Run engine at 1500 RPM (under battery load) and note voltmeter reading (voltage will rise to regulated value after a few moments operation).

Adjustment—Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase voltage setting, or downward to decrease voltage setting. Replace regulator cover and recheck the setting after each adjustment.

Voltage Setting

All (Exc. 40 Amp. Auto-Lite) - 14.6-15.4 volts, with ambient air temperature of 70-80°F. *See table below.*
40 Amp. Auto-Lite - 14.2-14.9 volts with ambient air temperature of 70-80°F. *See table below.*

Ford Voltage Regulator Settings (Ambient Temperature Correction)

Ambient Temp. (°F)	All Exc. Auto-Lite 40 Amp. (Volts)	Auto-Lite 40 Amp. (Volts)
25°	15.1-15.9	14.3-15.2
35°	15.0-15.8	14.3-15.2
45°	14.9-15.7	14.3-15.1
55°	14.8-15.6	14.3-15.0
65°	14.7-15.5	14.3-14.9
75°	14.6-15.4	14.2-14.9
85°	14.5-15.3	14.1-14.8
95°	14.3-15.1	14.1-14.7
105°	14.2-15.0	14.0-14.7
115°	14.1-14.9	14.0-14.6
125°	13.9-14.7	13.9-14.5
135°	13.8-14.6	13.8-14.4
145°	13.6-14.4	13.8-14.4

CURRENT REGULATOR

Current Setting: This check requires that a load be added, or that the generator voltage be dropped to approximately 13 volts, to cause current regulator to operate. It is recommended that a heavy duty variable resistance (carbon pile) be connected across the 1-1/2 ohm fixed resistor in the charging line (connect resistance from ammeter lead terminal of fixed resistor to ground—see Test Meter Connections above). After Voltage Regulator checked (above), and with all resistance turned out of the field circuit, operate generator at 1500 RPM (Comet, Falcon, Ford), 2000 RPM (Continental, Lincoln, Mercury), decrease the resistance until voltage drops to approximately 13 volts and ammeter reading is at maximum. This ammeter reading is the current setting. If not correct (see table below), adjust as follows:

Adjustment—Bend adjusting arm under armature spring (to left of regulator contacts) upward to increase current setting, or downward to decrease current setting. Replace regulator cover and recheck setting.

Current Setting

30 Amp. Regulator - 28-32 amperes (all models).
35 Amp. Regulator - 33-37 amperes (all models).
40 Amp. Regulator - 38-42 amperes (all models).

AUTOLITE STARTERS

DESCRIPTION: Four pole, four brush starters of conventional design. Some starters have brush holders riveted to starter frame, on other starters, brush holder and brush assembly is screwed to frame or commutator endplate. Starters are of various "shunt" and "no shunt" designs as listed below. *See individual Car Model pages and Car Model wiring diagrams for starter application and internal wiring.*

Starter Model	Volts	Series Coils	Shunt Coils
MCL	6	4	0
MCH	6	2	0
MZ	6 & 12	4	0
MBG, MDB, MDC, MDD	12	4	0
MDF, MDG, MDL	12	3	1
MDM, MDT, MDY	12	3	1
MDU, MEC	12	2	1

TESTING: Free Running Test – Connect an ammeter and carbon pile rheostat in series with battery positive post and starter terminal. Connect a voltmeter across starter. With all resistance turned into circuit, connect battery negative post to starter frame. Adjust rheostat to obtain proper voltage and note current draw and starter RPM. *See Car Model pages for specifications.* Current draw and starter RPM should be as specified. *CAUTION – On starters with shunt coils, DO NOT operate on "No Load" longer than necessary for test as shunt coil produces more force than series coils under this condition and pulls armature toward shunt coil with possible damage to bearings and other parts.*

Stall Torque Test: Mount starter in a test stand and follow test equipment manufacturer's instructions. Torque, volt, and ampere readings should be as specified. *See Car Model pages for specifications.*

OVERHAUL: Disassembly – Remove solenoid and cover band if equipped. Remove commutator endplate. Remove brushes from brush holders in endplate or frame. Remove drive housing-to-frame attaching screws and remove housing and armature assembly from frame. Remove intermediate bearing plate attaching screws and separate armature and drive assembly from housing. Remove drive assembly from armature shaft depending on method of attachment as follows: **1)** Remove lock ring and push spring plate toward drive pinion to expose setscrew. Remove setscrew and remove drive assembly. Remove key and remove intermediate bearing plate from shaft. **2)** Rotate barrel of drive away from armature to expose hole in worm section of shaft, then rotate barrel in opposite direction to expose roll pin. Drive out roll pin and remove drive unit. **3)** Slide pinion gear toward commutator end of shaft, drive the stop collar toward pinion, remove lock ring and remove drive assembly.

Inspection – DO NOT immerse parts in solvent. Wipe parts with a clean cloth only. Check for wear, distortion, evidence of burning, etc.

Armature: Check for shorted armature with a growler. Check for ground to shaft with a test lamp. Armature shaft runout should not exceed .003". Commutator runout should not exceed .003". Reface commutator if necessary and undercut mica segments 1/32". Polish commutator with No. 00 sandpaper.

Field Coils & Frame: *NOTE – On starters with a shunt field coil, disconnect ground lead from shunt coil before making tests.* If brush holders mounted in starter frame, check insulated brush holders for ground. Check series coils for grounds and shunt coil for continuity or internal ground. Check shunt coil current draw. Specifications should be as in table below. When replacing field coils, an impact screwdriver such as C-3475 is recommended to seat and tighten pole pieces properly and to prevent damage. Long tip of pole shoe should be installed as the trailing edge. Check insulated terminal for ground with frame.

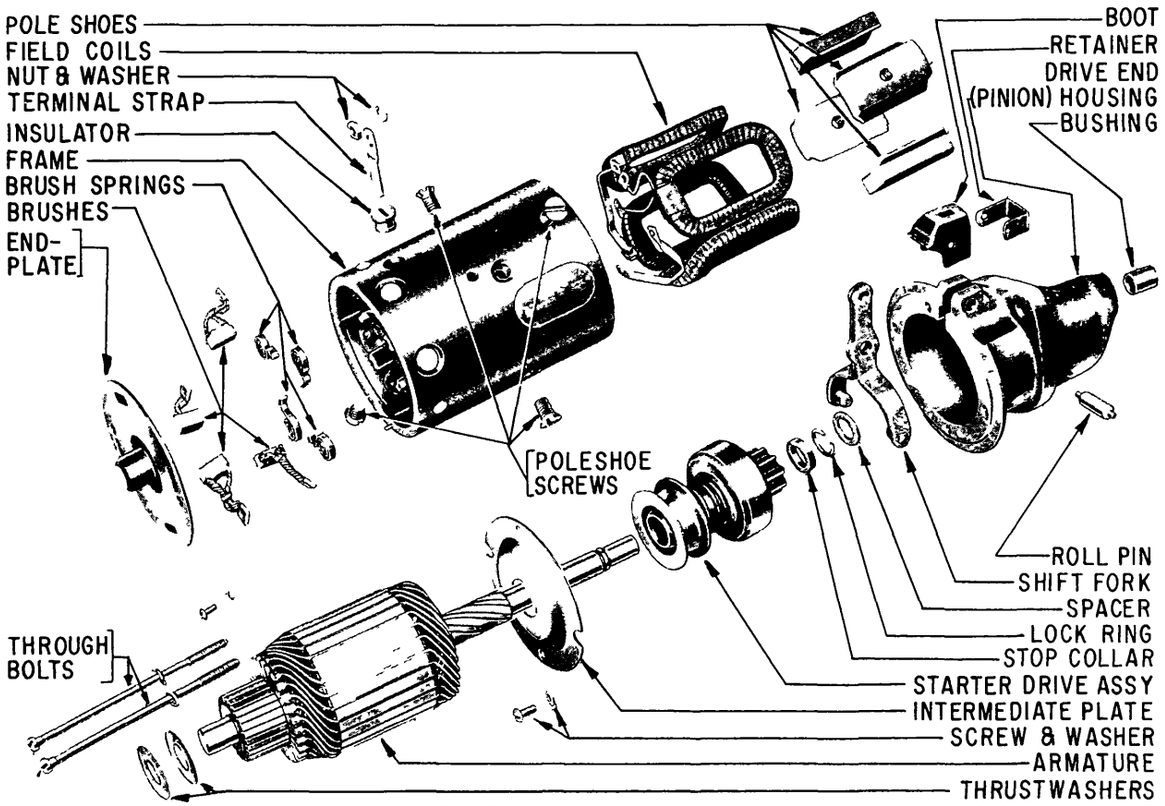
Shunt Field Current Draw

Starter	Amperes	Volts
MDF, MDL, MDT, MDY	8.2–9.6	10.0
MDM, MDU, MEC	4.4–5.1	10.0

Brushes: Replace brushes if oil soaked or worn to less than ½ original length (compare with new brushes). Check brush spring tension as follows:

MCL, MCH, MBG, MDB, MDC, MDF, MDG, MZ – Hook spring scale under spring near brush or at bend in spring just beyond brush. Pull scale straight up and note reading just as spring leaves brush. *See Car Model pages for specifications.*

MDL, MDM, MDT, MDU, MDY, MEC – Hook spring scale under brush screw. Pull scale straight up and note reading just as brush leaves commutator. *See Car Model pages for specifications.*



TYPICAL AUTOLITE STARTER ASSEMBLY (EXPLODED)

Endplate & Bushings: If brush holders mounted in endplate, check insulated holders for ground with endplate. Check bushings for wear, roughness, and for proper fit. Drive end bushing clearance with shaft should be .001–.006". Commutator end bushing clearance with shaft should be .001–.005". Replace bushings, endplates, or pinion housing as necessary.

Reassembly: Reverse disassembly procedures and note the following special points:

Air Gap (Armature-to-Field Coils) – .042–.060" (MCL, MCH), .026–.048" (MBG, MZ).

Oil Felt – Felt oil pad must be in outer end of commutator end bearing before assembling endplate to frame.

Armature Shaft Endplay – .005" minimum. On Positive Pinion Shift types .030" maximum, except .062" maximum on MBG & MCL with Bendix Drive. Endplay adjusted by thrust washers between bearing shoulder on armature shaft and either end bearing as necessary to keep brushes centered on commutator.

Drive End Bushing – Must be flush with bearing bore on outer end (except MDF 6010 & MDG 6003, 6004 on inner end).

Outer Pinion Housing Bushing – Must be flush with bearing bore on inside of housing.

STARTER CONTROL: *See "Starter Controls" in this section.*

CHRYSLER CORP. STARTERS

Car Model	Chrysler Part No.
Chrysler & DeSoto (1960-61)	1889200
Dodge & Plymouth 361" Eng (1961)	1889200
Dodge & Plymouth 318" Eng (1961)	1889100

DESCRIPTION: 12 volt, four-pole type with solenoid pinion shift (overrunning clutch) Brushes and springs are mounted in a separate removable brush holder plate assembly

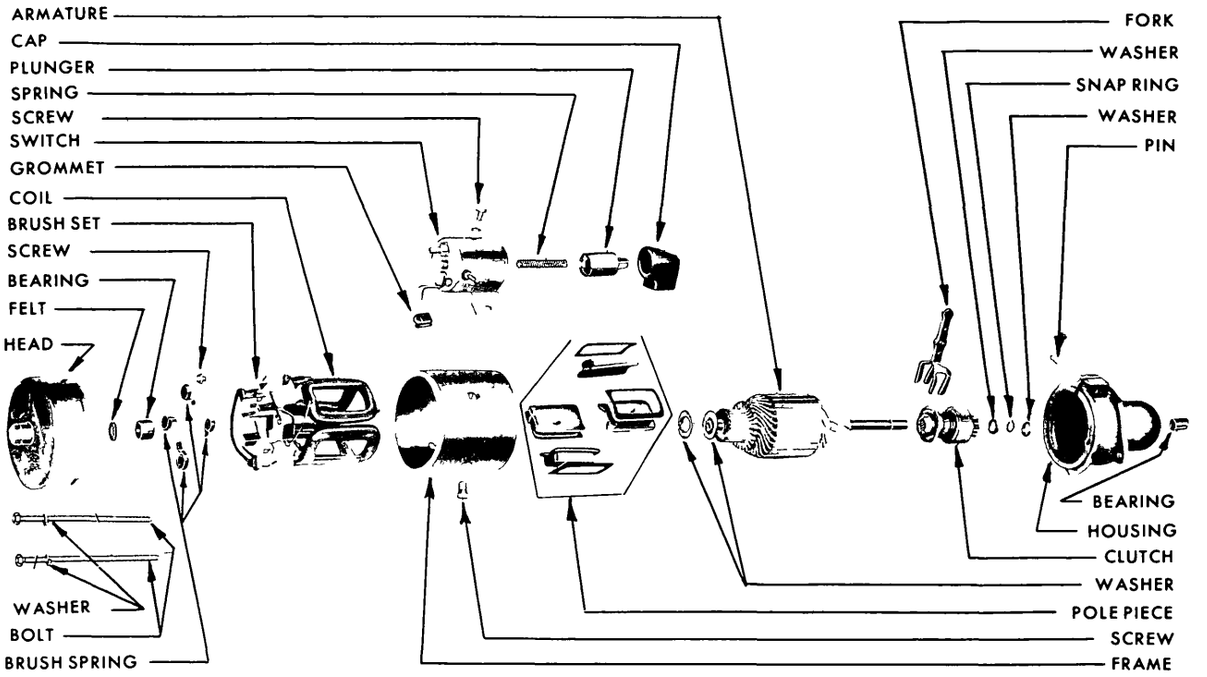
SPECIFICATIONS: **Rotation** - Counterclockwise at commutator end
Brush Spring Tension - 32-48 ozs
Driv Endplay - 005" minimum
Pinion to Housing Clearance - 1/8"±1/32" measured between pinion and pinion stop (with armature endplay removed)
Performance Data: *See Car Model pages*

REPLACEMENT: **Brushes & Springs** - *NOTE - Brushes that are worn to ¼" or less or are oil soaked, should be replaced* With commutator end head, brushes and brush holder removed, unsolder the two leads at ground brush terminal and the two insulated brush leads at field coil terminal (adjacent to hole in front face of field frame which is used in locating brush holder ring assembly) *CAUTION - Use care in removing and installing ground brush s so that shunt wire is not broken* To remove brush springs, spread retainer tabs apart slightly on brush holder ring If new springs are installed pinch the retainer tabs together, if necessary, to hold springs securely Measure brush spring tension with starting motor completely assembled except for end head Measure spring tension with spring scale hooked under spring near the end Pull scale straight back while holding brush against commutator Take a reading just as spring end loses contact with the brush Spring tension should be 32-48 ounces

►*TESTING & OVERHAUL NOTE All testing and service procedures are the same as for conventional starters except as noted below*

TESTING: **Field Coils** - With commutator end head, brushes and brush holder ring removed, disconnect field lead wires at solenoid connector and separate field leads to make sure they do not touch solenoid connector Remove wire attaching ground terminal to field frame and pull brush leads, shunt wire and terminal assembly aside so there will be no contact
1) Touch one prod of test lamp to series field coil lead, and the other prod to field frame Lamp should **not** light
2) Touch one prod to shunt field coil lead and other prod to field frame If lamp lights in either of the two above tests, field coils are grounded and each coil should be tested separately after unsoldering the connecting wires
3) Test two insulated brush holders for proper insulation from ring assembly by touching one test light prod to brush holder and the other to the ring The lamp should not light If lamp lights, the insulated brush holders are grounded and the brush ring assembly must be replaced

OVERHAUL: **Disassembly** - Remove through bolts at commutator end and pull head from frame Remove thrust washers from armature shaft, then lift brush holder spring and remove brushes Remove brush holder plate Disconnect field coil leads at solenoid connector, then remove solenoid attaching screws and remove solenoid and boot assembly Drive out overrunning clutch shift fork pivot pin at upper side of pinion housing, then remove drive end pinion housing and spacer washer Note position of shifter fork on starter drive and remove shifter fork Slide overrunning clutch pinion gear toward commutator end of armature Drive stop retainer toward pinion gear to expose snap ring and remove snap ring Remove overrunning clutch drive from armature shaft *NOTE - If it is necessary to remove field coils, remove ground brush terminal attaching screw and raise brushes with terminal and shunt wires up and away from field frame* Remove pole shoe screws with special impact screwdriver, Tool C-3475



CHRYSLER CORP. STARTER MOTOR (EXPLODED)

Cleaning: Wipe field frame, coil assembly and armature with a clean cloth only To clean drive unit, use a brush moistened in solvent DO NOT immerse starter parts in cleaning solvent

Reassembly: Lubricate armature shaft and splines with SAE 10-W oil or 30-W rust preventive oil, then install starter drive, stop collar (retainer), lock ring and spacer washer *NOTE - Small diameter end of spacer washer should be in contact with lock ring inside collar.* Install shifting fork over starter drive spring retainer washer with narrow leg of fork toward commutator *CAUTION - If fork is not properly positioned, it will restrict starter gear travel, causing a lockup in the clutch* Install drive end pinion housing on armature shaft, indexing shifter fork with slot in housing, then install shifter fork pivot Pin Install solenoid and boot assembly on field frame and tighten screws to 60-70 inch pounds Install pinion housing and armature assembly into field frame so slot in housing indexes with locating tab projecting from solenoid base *NOTE - Make sure shifting fork lever is inserted in solenoid plunger link* Connect field coil leads at solenoid connector, then connect ground brushes and shunt wire terminal to field frame Install brush holder ring assembly, indexing tang on ring in hole in field frame Install brushes in brush holders *CAUTION - Make sure field coil lead wires are properly enclosed behind brush holder ring and do not interfere with brush operation* Position thrust washer on end of armature shaft and install commutator end head Install through bolts and tighten to 40-50 inch pounds

ADJUSTMENT: **Starter Drive Gear** - Place starter assembly in a vise with soft jaws, then push in on forward end of solenoid plunger link (not shifting fork lever) until plunger bottoms Measure clearance between end of pinion and pinion stop with plunger seated and pinion pushed toward commutator end Clearance should be 1/8"±1/32" Adjust for proper clearance by loosening solenoid attaching screws and moving solenoid in slotted holes in base *NOTE - In some cases it may be necessary to remove starter end head and bend the end of the solenoid connector slightly to obtain proper adjustment*

SOLENOID SWITCH: Test Specifications -
Pull-In Coil - 20 0-22 2 Amps at 6 0 Volts at 70°F
Hold-In Coil - 11 2-12 4 Amps at 6 0 Volts at 70°F

DELCO-REMY STARTERS

DESCRIPTION: Four pole, four brush starters of conventional design. Starters are of various two coil or four coil (with or without shunt coils) designs. *See individual Car Model pages and Car Model wiring diagrams for starter application and internal wiring.*

TESTING: *NOTE – On starters with "Enclosed Housing" solenoid unit, make tests with solenoid attached to starter. On other units, remove solenoid before making tests.*

Fr e Running Test: Connect an ammeter and carbon pile rheostat in series with battery and starter terminal or solenoid "BAT" terminal (Enclosed Housing type). Connect a voltmeter across starter and a tachometer to indicate starter armature RPM. Energize starter by connecting other battery terminal to starter frame or solenoid winding terminal. Adjust rheostat to give specified voltage on voltmeter and note ampere and RPM readings. Current draw and starter RPM should be as specified. *See Car Model pages for specifications.*

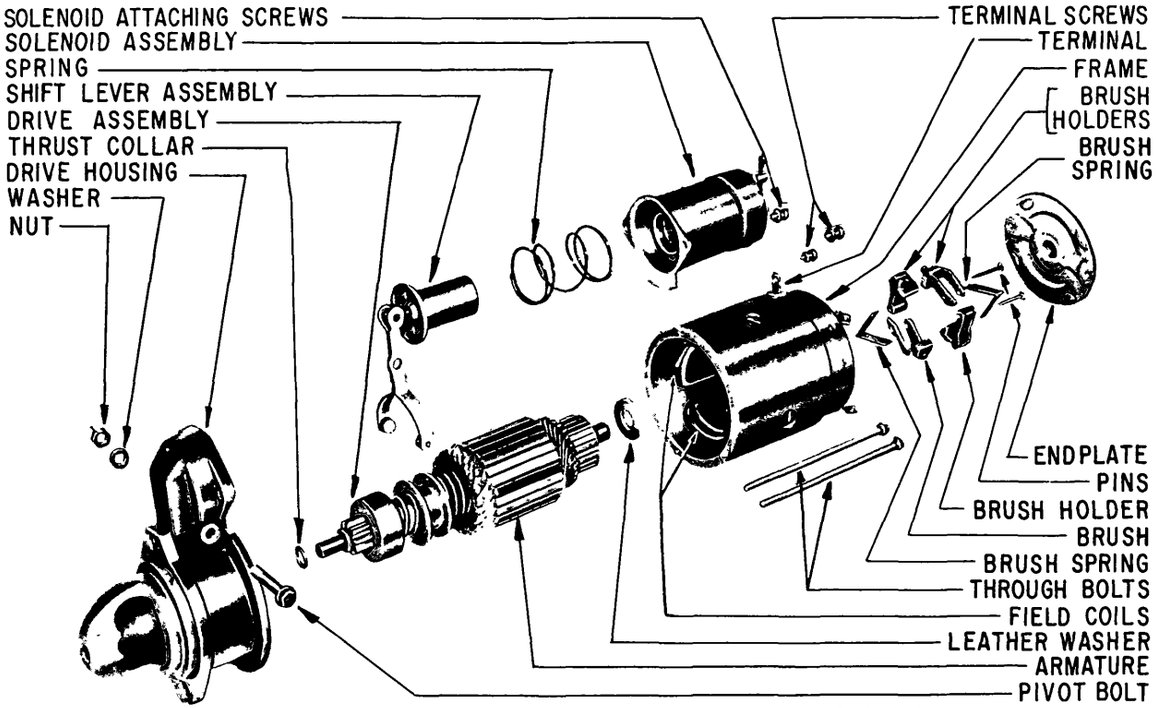
Stall Torque Test: With ammeter, rheostat, and voltmeter connections as in "Free Running Test" above, lock armature (Enclosed Housing type), install a 12" brake arm on drive pinion and hook it to a spring scale held at right angle to brake arm (others). At specified voltage, current draw and torque should be as specified. *See Car Model pages for specifications.*

OVERHAUL: Disassembly (Not Enclosed Housing Type) – Remove solenoid by disconnecting solenoid from plunger linkage and from starter terminal and then removing attaching screws. Remove through bolts and remove commutator endplate assembly and field frame assembly from drive housing. Remove large shift lever retainer clip, unhook and remove shift lever spring. Remove small retainer clip and upper shift lever shaft. Remove armature assembly with lower shift lever from drive housing. Remove drive assembly from armature by removing thrust collar from shaft and driving retainer off snap ring (toward armature windings), then remove snap ring, retainer, and drive assembly.

Disassembly (Enclosed Housing Type): Disconnect field strap from solenoid terminal. Remove through bolts and remove commutator endplate, field frame, and armature assembly from drive housing and solenoid assembly. Separate commutator endplate, field frame, and armature assemblies. Remove thrust collar from armature shaft, press retainer off snap ring (toward armature windings), remove snap ring, retainer, drive assembly, and assist spring from armature shaft.

Cl aning (All Types) – DO NOT use a grease–dissolving type solvent. Clean or wipe all parts with oleum spirits and brush or cloth. Wipe drive assembly with a clean cloth only.

Armature (All Typ s): With a 110–volt test lamp check for open circuit between commutator and armature winding, and for ground to armature shaft from armature laminations. Check for armature short circuits with a growler. Check commutator for out-of-round, or if worn or dirty. Reface commutator as necessary, removing as little metal as possible. Undercut mica segments 1/32" deep and square entire length of slot. Polish commutator with No. 00 sandpaper.



DELCO-REMY "ENCLOSED HOUSING" STARTER ASSEMBLY (EXPLODED)

Field Coils & Frame (All Types): With a 110–volt test lamp check field coils for grounds or open circuit. *NOTE – On shunt coil type starters, disconnect shunt coil from ground before making above tests.* Replace field coils as necessary. *NOTE – Pole Shoe Screwdriver and Pole Shoe Spreader are recommended to replace field coils.* Make sure that long lip of pole shoe is installed so that long lip is in direction of armature rotation and becomes trailing edge of shoe. Check brush holders for bent or deformed condition. With a 110–volt test lamp, check insulated brush holders for ground with frame.

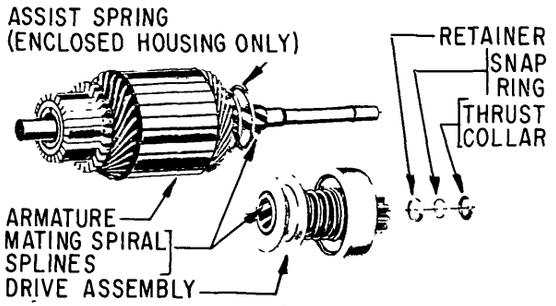
Brushes (All Types): Check brushes for wear, or if dirty and oil soaked, and for free fit in holders. Replace brushes if worn more than ½ original length (compare with new brushes). Check brush spring tension. *See Car Model pages for specifications.*

Bushings (All Types): Armature shaft should fit snugly into bushings. Replace bushings or endplate if clearance excessive, or if worn or grooved.

Reassembly (Not Enclosed Housing Type): Assemble drive assembly to armature as follows: Lubricate armature shaft with light oil and slide drive assembly on shaft with pinion outward. Install retainer on shaft with cupped side toward end of shaft. Place commutator end of shaft on a wood block and place snap ring on shaft and hold in place with another wood block. Hit block with hammer to force snap ring over shaft and then slide snap ring into shaft groove. Place thrust collar on shaft next to snap ring and squeeze retainer and thrust collar together with two pairs of pliers until retainer is forced over snap ring. Complete reassembly by reversing disassembly procedures and placing 4 or 5 drops of light oil in bushings.

Reassembly (Enclosed Housing Type): Assemble drive assembly to armature as detailed under "Reassembly (Not Enclosed Housing Type)" above. Reverse disassembly procedures, making sure leather washer is installed on commutator end of armature shaft, and placing 4 or 5 drops of light oil in bushings.

STARTER CONTROL: *See "Starter Controls" in this section.*



STARTER ARMATURE & DRIVE ASSEMBLY

Form 47 A

EDSEL, FORD, LINCOLN MERCURY STARTERS

DESCRIPTION: Four pole, four brush starters of conventional design. Two coil, no shunt, and three coil, one shunt types are used. *See individual Car Model pages and Car Model wiring diagrams for starter application and internal wiring.*

TESTING: Cranking Test – Connect an ammeter and carbon pile rheostat across battery with **all** resistance turned into circuit. Connect a voltmeter across battery. Crank engine for **15 seconds** (prevent engine from firing by grounding coil primary terminal) and note voltmeter reading at end of 15 seconds. Stop cranking. Adjust carbon pile rheostat until voltmeter reading is the same as when engine was cranked. Ammeter reading should be as specified. *See Car Model pages for specifications.*

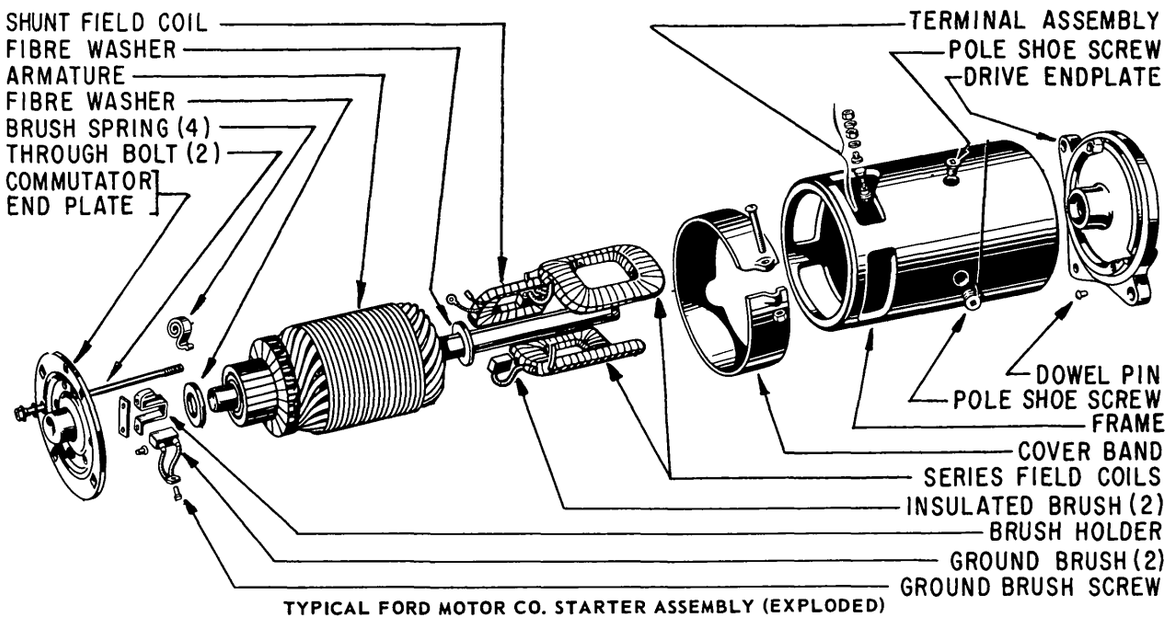
Free Running Test: Method 1 – With engine idling, connect ammeter positive lead to battery ungrounded post and negative ammeter lead to starter terminal of starter relay if test made on car. If test made off car, connect ammeter negative lead to starter terminal, positive ammeter lead to battery positive post, and negative battery post to starter frame. Starter will run at no load. Current draw on ammeter should be as specified. *See Car Model pages for specifications.*

Method 2 – Connect an ammeter and carbon pile rheostat across battery with **all** resistance turned into circuit. Connect a voltmeter across battery. Start engine and hold in "start" position so starter drive pinion remains engaged with flywheel. With engine at idling speed, note voltmeter reading. Stop engine. Adjust carbon pile rheostat so that voltmeter reading is the same as when engine was running. Ammeter reading should be as specified. *See Car Model pages for specifications.*

OVERHAUL: Disassembly – Remove drive assembly from armature shaft by pushing spring toward pinion and removing retaining pin. Remove starter cover band and remove brushes. Remove through bolts, endplates, and armature from starter frame.

Cleaning – Wipe field coils and armature with a clean cloth. Wash all other parts except brushes in solvent.

Armature: Inspect armature windings for broken or burned insulation and unsoldered connections. With a 110–volt test lamp, check for open circuit between commutator and armature windings. Check armature for grounds or short circuits with a growler. Commutator runout should not exceed .002". Reface commutator if necessary, removing as little metal as possible. Polish commutator with No. 00 sandpaper. *NOTE – Unnecessary to undercut mica segments.* Check armature shaft bearing surfaces for scoring or excessive wear.



TYPICAL FORD MOTOR CO. STARTER ASSEMBLY (EXPLODED)

Field Windings & Frame: With a 110–volt test lamp, check field coils for continuity and for short circuit to starter frame. *NOTE – Disconnect shunt coil ground lead at frame before making tests.* Check starter field terminal for ground with frame. When replacing field coils it is recommended that Tool 10044-A be used with an arbor press to hold tool in screw socket and to assure proper installation. When tightening pole shoe screws, strike frame several times with a soft hammer to seat and align pole shoes.

Brushes: Replace brushes if dirty, oil soaked or worn to 5/16" in length. Brushes must slide freely in brush holders. Check brush spring tension. *See Car Model pages for specifications.*

Endplates: Replace endplates if cracked or damaged. Check bushings for wear or scoring. Replace bushings or endplates if bushings worn excessively. Check for ground between insulated brush holders and commutator endplate. Replace endplate if ground exists or if insulation is poor.

Reassembly: Install commutator endplate (with brush springs installed) on starter frame with locating pin on frame in slot in endplate. Install fibre washer on each end of armature shaft and install armature into frame and commutator endplate assembly. Install drive endplate. Install and tighten through bolts. Install brushes, making sure they are free in their holders under spring tension. Install cover band, making sure cutout in band clears field terminal. Lubricate drive end of armature shaft with light graphite oil and install drive assembly.

COMET & FALCON STARTER & STARTER CONTOL

DESCRIPTION: Four pole, four brush starter with three series coils and one shunt coil. Shunt coil is wound around a movable pole piece which operates the integral positive engagement drive mechanism. *See individual Car Model pages and Car Model wiring diagrams for starter application and internal wiring.*

OPERATION: With ignition key in start position, current flowing through starter motor drive coil to ground creates a strong magnetic field in drive coil which causes the movable pole (part of drive unit lever) to be drawn downward to its seat, moving the lever assembly fork to slide drive gear pinion into engagement with engine flywheel *NOTE - When seated, the movable pole functions as a normal field pole and the drive coil functions as a field coil* An extension of the movable pole lever opens the contacts allowing equal flow of current through all field coils causing the armature to rotate *NOTE - Drive pinion gear is engaged to flywheel before motor is energized* A holding coil in the circuit retains drive unit in engaged position and the contacts open, when, due to overrunning conditions, field current may not be sufficient to maintain control of movable pole With ignition key released, starter drive actuating lever and movable pole are released by lever return spring and drive pinion is disengaged from flywheel

TESTING: Cranking Test – Connect an ammeter and carbon pile rheostat across battery with **all** resistance turned into circuit. Connect a voltmeter across battery. Crank engine for **15 seconds** (prevent engine from firing by grounding coil primary terminal) and note voltmeter reading at end of 15 seconds. Stop cranking. Adjust carbon pile rheostat until voltmeter reading is the same as when engine was cranked. Ammeter reading should be as specified. *See Car Model pages for specifications.*

Free Running Test: Connect a voltmeter across a **fully charged** battery. Connect ammeter positive lead to battery positive post, and negative ammeter lead to starter terminal. Connect battery negative post to starter frame. Starter will run at no load. Ammeter and voltmeter readings should be as specified. *See Car Model pages for specifications.*

CONTINUED ON NEXT PAGE

COMET & FALCON STARTER & STARTER CONTOL (C nt.)

OVERHAUL: Disass mbly — Remove cover band and starter drive actuating lever cover. Re move the through bolts, drive end housing, and drive actuating lever return spring. Remove actuating lever pivot pin and remove actuating lever and pole piece assembly. Remove brushes from brush holders. Use a hooked tool to lift brush springs and remove commutator endpl ate. Remove armature. Remove starter drive retaining clip from end of armature shaft and remove starter drive gear assembly. Remove upper and lower ground brush retaining screws and remove lower brush. Separate holding coil terminal from upper ground brush.

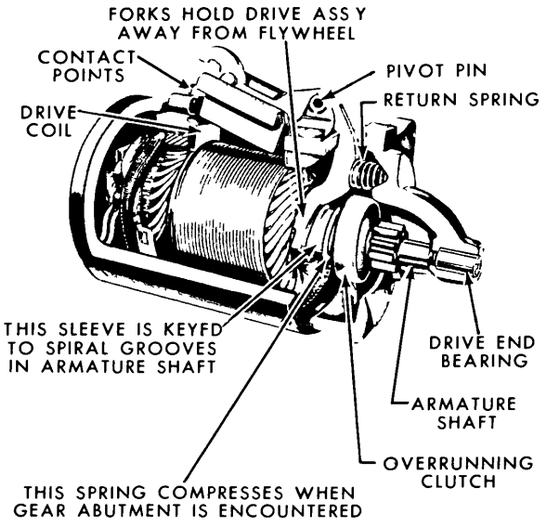
Cleaning — Wipe coils, armature and shaft with a clean cloth. Wash all other parts except brushes in solvent.

Armature: Check armature shaft bearing surfaces for wear or scoring. With a 110–volt test lamp, check armature for short circuit to shaft and for open circuits between commutator segments. With a growler, check for shorted armature windings. Check commutator for burning, rough surface or out-of-round condition. Run-out should not exceed .002". Reface commutator as necessary, removing no more than 3/64" of commutator diameter. Polish commutator with No. 00 sandpaper. *NOTE – Unnecessary to undercut mica segments.* Make sure starter drive operates freely on armature shaft.

Field Coil Assembly: Testing — Check solder connections and insulation for good condition. Test field coils for short circuit to frame. *CAUTION – Block drive coil contact assembly (on top of starter) open with a wood block or cardboard to prevent grounding of field circuit. Also make sure field coil brushes and holding coil terminal are clear of frame.* Check holding coil for continuity with one test probe on holding coil terminal and other test probe on drive coil terminal. Test lamp should light.

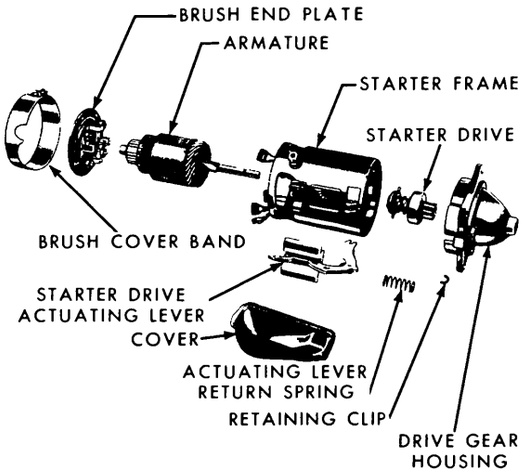
►*TOOL NOTE:* Use Tool 10044-A in a vise or arbor press to hold tool in screw when removing and installing pole shoes. Use of tool will also insure proper tightening of pole shoe screws.

Removal — Remove pole shoes and unsolder field coil leads from terminal screw and from ground contact point plate. *NOTE – Small holding coil lead is soldered to contact plate with drive coil lead and is disconnected at the same time.* Remove drive coil retaining sleeve from frame by collapsing both sides of sleeve and removing from inside frame. Pull field coil assembly from frame. To remove contact assembly, drive attaching rivet from frame from the inside and disassemble the contacts. Remove starter terminal assembly.



STARTER & CONTROL ASSEMBLY

Installation — Thoroughly clean starter frame. Install terminal screw assembly with screw slot perpendicular to frame end surface, but **do not** tighten nut. Install contacts to frame by placing a 5/40 pan head screw in rivet hole in frame with screw head on inside of frame. Place lower contact, insulator cord, upper contact, and insulator washer in position. Install a 5/40 nut on screw, tighten nut and stake screw. Install field coil assembly in frame with drive-holding coil at movable pole opening. Place drive coil upper short lead and lead from opposite coil into contact plate slot. Also place small holding coil lead into contact plate slot. Place drive coil side long lead and adjacent coil long lead into starter terminal screw slot. Install fixed pole shoes and strike frame with soft hammer as screws are tightened to seat and align shoes. Place drive coil retainer flange on retainer sleeve and, from inside frame, install sleeve into drive coil and frame openings. Install armature in frame and press it firmly against sleeve retainer by wedging small screwdrivers between each end of armature and lower pole. Lock coil to frame by bending outer protruding parts of retainer sleeve over frame. Remove armature. Place movable pole in retainer sleeve and tap pole sideways to align sleeve. Remove movable pole. Solder coil leads to contact point plate and to terminal screw. *CAUTION – Small holding coil uninsulated lead must be soldered to contact plate and routed to avoid shorting to frame.* Tighten terminal screw nut. Test assembly for grounds with frame (see above).



STARTER ASSEMBLY (EXPLODED)

Brushes: Replace brushes if dirty or oil soaked or if worn to 5/16" in length.

Bushings & Endplates: If bushings are worn excessively or scored, replace bushings, commutator endplate, or drive end housing as necessary. Check insulated brush holders for ground with endplate. Check for broken brush springs and check brush spring tension. *See Car Model pages for specifications.*

Reassembly: Attach holding coil ground terminal to frame with upper ground brush. Attach lower ground brush to frame. Apply light film of high grade snythetic silicone grease to armature bearing surfaces and spiral teeth. Install drive assembly to armature shaft with a new retaining clip. Install armature and movable pole assembly together, making sure that actuating lever forks engage ears of drive assembly plate. Install and lubricate actuating lever pivot pin (pin retained by lever cover). Place steel washer on armature shaft drive end and leather washer on shaft commutator end. Pull brushes out through frame openings nearest assembled position. Place commutator endplate and through bolts and commutator endplate locating dowel in frame. Install drive actuating lever return spring and drive end housing and install and tighten through bolts. *CAUTION – Do not pinch brush leads between brush plate and frame.* Install brushes in brush holders with brush springs centered on brushes. Install drive gear actuating lever cover and frame cover band.

BARREL TYPE BENDIX

See Starter Drive listing on individual car model pages for type used.

DESCRIPTION: This drive retains Bendix inertia principle of engagement and free longitudinal movement to insure pinion mesh but has been redesigned so that all parts of drive mechanism except drive spring are located within the pinion barrel. The threaded sleeve is mounted loosely on an extension of the drive head (instead of directly on the starter shaft) and is retained by the stop nut which is screwed and staked in place on the outer end of the head. The pinion is integral with the barrel or drive sleeve and is mounted loosely on the starter shaft (not on threaded sleeve as in former types). Starter drive is through lugs on the control nut or driving ring on the screw shaft which engage slots in the end of the pinion barrel. Pinion barrel is held in place on control nut by a locking ring within the end of the barrel directly behind the driving lugs. A coil type anti-drift spring is mounted on the threaded sleeve ahead of the control nut and a meshing spring is located within the head of the barrel

BENDIX SPRINGS: Both Type "F" and "H" driving springs formed with special smaller diameter end coil designed to fit closely on shaft at ends. No spring clips used with these types. Springs may be identified by larger (⅜") spring eye. Spring eyes located on same side of coil (Type F), or 180° apart (Type H).

OPERATION: Pinion, barrel, and control nut operate as a unit and pinion is moved out into mesh with the flywheel as the control nut is threaded along the threaded sleeve. If the pinion teeth strike the ends of the flywheel teeth, the free longitudinal movement of the threaded sleeve on the drive head allows the pinion to turn slightly and mesh properly. This free movement important to insure correct meshing and prevent jammed pinion or damage to gear teeth.

SERVICING: No servicing required except cleaning and oiling of threaded sleeve and armature shaft under pinion when operation not satisfactory.

Armature Shaft:—Rotate pinion back to demeshed position, clean exposed portion of shaft with kerosene, lubricate lightly (Gredag 31¼ graphite grease).

Threaded Sleeve:—Rotate pinion forward to meshed position as far as possible, wipe threads clean with dry cloth or use kerosene sparingly (not gasoline). Do not wash entire drive in kerosene or grease installed under threaded sleeve at time of assembly will be removed (threaded sleeve cannot be removed to replace this lubricant). Lubricate threaded sleeve lightly with 10-W engine oil.

TROUBLE SHOOTING: If pinion jams or meshes improperly, check as follows:

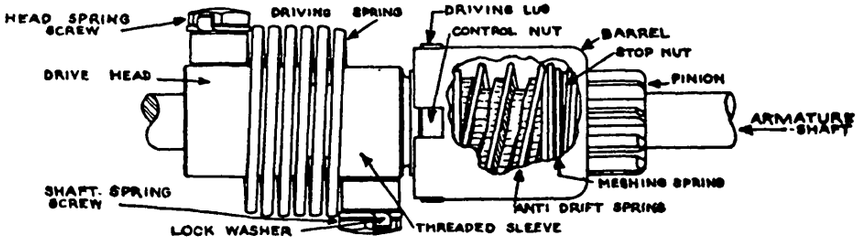
(1) Armature shaft rough or burred, dirty or rusty under threaded sleeve (first type only). Remove Bendix, clean and smooth shaft, lubricate shaft lightly with graphite grease Gredag 31¼ before replacing drive.

(2) Armature shaft rough, burred or dirty under Bendix pinion (all types). Thread pinion back on threaded sleeve (demeshed position), smooth shaft with emery cloth or clean with kerosene (do not use gasoline), lubricate shaft lightly with Gredag 31¼ graphite grease.

(3) Armature Shaft Bent. Remove Bendix drive. Check shaft and straighten

(4) Drive spring screw at threaded sleeve end too long. See that spring does not project through sleeve and bind on drive head extension (on first type screw will bind on armature shaft).

(5) Cocked or deformed drive spring. This will cause threaded sleeve to drag on armature shaft (first type) or on drive head extension (later types). Remove spring by taking out spring screws, examine spring, replace if necessary. Spring eye centers should be at right angles to spring axis (See Spring Note above). Use new lockwashers under spring screw heads when replacing screws and see that one lip of washer is turned down in spring eye gap and other lip turned up against screw head flat.



BARREL TYPE (SPRING SCREW TYPE) BENDIX DRIVE

BENDIX "FOLO-THRU" STARTER DRIVE

DESCRIPTION & OPERATION: The "Folo-Thru" Bendix Drive is similar to other Bendix Barrel-Anchor Plate types and operates in the same manner except for the Detent Pin action which prevents premature demeshing of the pinion from the flywheel ring gear as follows:

Detent Pin Operation—The detent pin consists of a spring-loaded plunger in the Control Nut which drops into notch in the screwshaft when the pinion is in the fully engaged position. The pin cannot be disengaged or the pinion moved manually from the engaged position and will only release when the pinion speed reaches 5800-7300 RPM. (at this point, centrifugal force moves the pin outward to free the pinion) and the pinion then is free to disengage from the flywheel ring gear. A ratchet clutch on the screwshaft (between the pinion and the drive spring) allows the pinion to overrun the starter armature shaft and prevents damage to the starter when the pinion is being driven by the engine. *NOTE*—An Anti-drift Spring (similar in appearance to the Detent Pin) is also located in the Control Nut. This anti-drift pin rides on the teeth of the screwshaft and prevents accidental engagement of the pinion due to vibration while the engine is running.

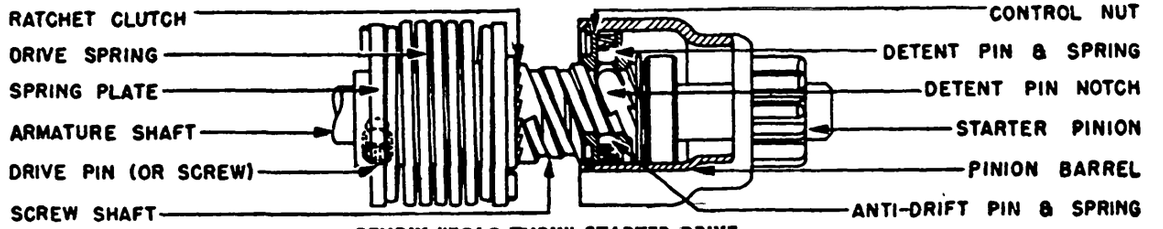
SERVICING: *Do not disassemble this drive* (furnished only as a complete unit due to calibration requirements of Detent and Anti-Drift Pin Springs). Service is limited to removal and installation of the drive or to cleaning when necessary (if drive fails to operate due to gummy deposit of oil or dirt).

Cleaning the Drive: Dip screwshaft and pinion assembly in clean kerosene or use brush to apply kerosene, run pinion back and forth on threads to remove all gum and grit, dry the drive with compressed air. No lubrication is recommended although a very light film of SAE 10W engine oil can be used on moving parts if desired. *CAUTION—Too much oil on screwshaft will collect dust and produce a gummy condition which will interfere with drive operation.*

REMOVAL: To remove drive assembly from armature shaft, push spring plate toward drive pinion to expose the setscrew or pin mounting the drive on the armature shaft. Remove this screw or pin, slide drive off shaft. Do not disassemble the drive.

INSTALLATION: *CAUTION—Drive cannot be moved manually from engaged to disengaged position, however drive can be installed on starter and starter installed on engine with drive in the engaged position.* Slide drive assembly on armature shaft and align mounting screw hole in screwshaft with hole in armature shaft, compress spring plate and insert mounting screw or pin. Install starter on engine.

►*CAUTION*—If drive in "Engaged" position, make certain that pinion properly engaged in flywheel ring gear teeth and that starter seated solidly on its mounting flange before mounting screws are tightened. DO NOT FORCE STARTER INTO PLACE (will cause misalignment and binding of pinion teeth or drive).



BENDIX "FOLO-THRU" STARTER DRIVE

AUTOLITE MANUAL PINION SHIFT STARTER SWITCHES

►***PINION STOP & RETAINING RING WEAR & BREAKAGE (MCH-6106, MCH-6110, MCL-6110, MCL-6111 Starters with MCH-2070 Armature):*** On early starters noted above, failure of the starter may be caused by pinion stop and retaining ring moving on armature shaft. Correct by installing new armature (with hardened shaft) and new retaining ring and pinion stop which have reduced clearances in shaft groove. ***CAUTION***—"Pinion clearance when engaged" setting should be carefully adjusted to limits shown in ADJUSTMENTS below to prevent pounding of the stop when the pinion is engaged.

DESCRIPTION & OPERATION: Manually operated pinion shift and starting switch assembly with switch mounted on the starter field frame. Shift lever is linked to starting pedal on toeboard and is operated by depressing the pedal. First movement of the lever meshes the pinion with the flywheel ring gear and the switch is then closed by a lug on the lever (if pinion teeth butt against flywheel teeth, a spring permits further movement of the lever to close the switch, and the pinion is meshed by the spring as the armature starts to turn). An overrunning clutch in the starter drive prevents starter being driven at excessive speed when the engine begins to fire (pinion is demeshed by the return spring as soon as the pedal is released).

ADJUSTMENT: Check the following specifications and adjust as required:

Pinion Position when Disengaged: With starter at rest, the distance from the outer face of the pinion housing (face of starter mounting flange) to outer face of the pinion is shown in table below.

Pinion Position (Disengaged)

Starter Model	①Pinion Distance	Starter Model	①Pinion Distance
MAW (All Models)	1 11/32"	MCH (All Models)	1.317-1.467"
MAX (exc. MAW-4009)	1 11/32"	MCL (All Models)	1.317-1.467"
MAX-4009 only	See Note	MZ (Exc. MZ-4137, 4162)	1 11/32"
		MZ-4137 & 4162	25/32"

①—Variation of Plus 1/64" or Minus 5/32" is allowable.

MZ-4101 Note—With pinion at rest, distance from center of locating dowel hole to face of pinion should be 3½" with ⅛" clearance between pinion and flywheel. Pinion travel between at rest and fully meshed positions should be ½".

MAX-4009 Note—With pinion at rest, distance from center of locating dowel hole to outer face of pinion should be 2 11/32" plus 1/64" or minus 5/32".

Pinion Clearance when Engaged: With shift lever at end of the travel, clearance between outer face of pinion and thrust washer next to outer pinion bearing is shown in table below. Adjust by pressing down on spring on switch plunger and turning button on outer end of plunger in or out. The button is locked by the end of the spring.

Pinion Clearance (Engaged)

Starter Model	①Pinion Clearance	Starter Model	①Pinion Clearance
MAW (All Models)	5/64"	MCL-6110, F, T; 6111, T	3/32"
MAX (All Models)	5/64"	MCL-6112	5/64"
MCH-6103	5/64"	MCL-6126	3/32"
MCH-6106, F, T; 6110	3/32"	MZ (Exc. MZ-4137, 4162)	5/64"
MCL-6102, 6103	5/64"	MZ-4137, 4162	37/64"

①—Variation of plus or minus 1/64" is allowable.

Switch Travel: The full stroke or travel of the switch plunger should be approximately 5/32" (All MAW & MAX Starters, All MZ Starters except MZ-4137 & 4162), 3/16" (MZ-4137 & 4162), 3/16" (All MCH & MCL Starters). See pinion clearance data above.

MAW-4019 & 4019A Note—Tension required to move yoke lever into contact with starting switch button should be 9-15 lbs. at hole 3 3/16" from yoke pin.

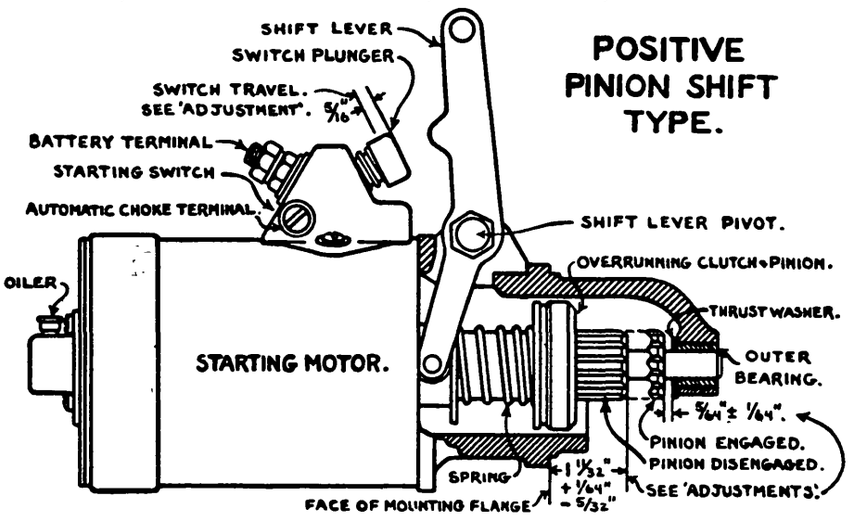
Checking Switch Action: Switch action can be checked by slipping a special steel spacer (square stock 1" wide, ¾" thick, with ⅝" slot in the 1" face) on armature shaft between pinion and thrust washer at pinion housing outer bearing. With spacer in place, switch should close when pressure applied to outer end of pinion shift lever.

MCH-6106, F, T; 6110 Note—When checking switch action on these models, use spacer block ½" thick instead of regular ¾" thick block mentioned above.

MCL-6110. F, T; 6111, T; 6126 Note—When checking switch action on these models, use spacer block ½" thick instead of regular ¾" thick block mentioned above.

MZ-4101 Note—When checking switch action on this model, use spacer bl ck ⅜" thick instead of regular ¾" thick block mentioned above.

Armature Endplay: The armature endplay should be .005" minimum, .030" maximum. Adjust by inserting MU-54 thrust washer of correct thickness between the MAD-96 thrust washer and the commutator end plate. These thrust washers furnished in following thicknesses: MU-54 or MU-54F—1/32", MU-54A or MU-54G—1/64", MU-54B or MU-54J—3/64", MU-54L—1/16", MU-54K—5/64".



AUTOLITE MAGNETIC STARTER SWITCHES

DESCRIPTION: Magnetic solenoid switches of conventional design mounted on the starter field frame and controlled by a pushbutton switch on the instrument panel. The feed wire for the switch solenoid is connected to the coil side of the ignition switch so that the starter is operative only with the ignition turned on. See car diagrams for wiring and connections of each installation.

OPERATION: Two springs are used in connection with solenoid coil to control the switch action. When the solenoid circuit is completed by pressing the pushbutton switch, the solenoid plunger is drawn into the coil against the tension of a light spring. After the main switch contacts close, the plunger compresses a second spring, insuring a positive connection at the switch contacts. When the pushbutton switch is released, breaking the solenoid circuit, this second spring quickly separates the main switch contacts, preventing arcing or burning of the contacts. The first spring then returns the solenoid plunger to the off position.

CHECKING & ADJUSTMENT: If switch does not operate satisfactorily, check performance specifications as given below. No adjustments are required in service.

PERFORMANCE SPECIFICATIONS:	6 Volt Types	12 Volt Types
Closing Voltage	3.0-4.0 volts	6.0-8.5 volts
Opening Voltage	0.5-1.25 volts	1.0-2.5 volts
Coil Draw (at 77°F)	①2.6-3.3 amperes	②1.43-1.62 amperes
Voltage Drop (with 100 amperes)	0.20 volts max.	0.20 volts max.

①—At 6.0 volts. ②—At 12.0 volts.

AUTOLITE SOLENOID STARTER SWITCH (NO RELAY)

DESCRIPTION: This combined starting switch and pinion shift solenoid is similar to earlier types except that no solenoid relay is used.

OPERATION: Solenoid has two windings: (1) Series winding or "pull-in" coil, (2) Shunt winding or "hold-in" coil. Both windings are energized to engage the starter pinion with the flywheel and to close the main starting switch contacts. Series winding is short-circuited when the switch contacts close but shunt winding remains energized to hold contacts closed.

ADJUSTMENT: Pinion position when disengaged (at rest) and pinion clearance when engaged should be checked and adjusted as follows:

Pinion Position when Disengaged—Measure distance from face of mounting flange to outer face or edge of pinion in the "at rest" position with the armature end clearance taken up first in one direction and then in the opposite direction.

Pinion Position (Disengaged)

Starter Model	Pinion Position
MCH 6113, 6113A	1 5/16-1 15/32"
MCL 6117, 6121A, 6133, 6304	1 5/16-1 15/32"
MCL 6132	53/64-63/64"
MDB 6001	1.317-1.467"
MDC (All)	1.317-1.476"
MDF 6008	53/64-63/64"
MDF 6013	17/32-11/16"
MDF All Others	1 5/16-1 15/32"
MDL (All)	1 5/16-1 15/32"
MDT (All)	1 5/16-1 15/32"
MDU 7101	45/64-7/8"
MDU 7106, 7107	9/16-23/32"
MDU 7108	17/32-11/16"
MDY 6002	54/64-7/8"
MDY 6005, 6006	1 13/16-1 31/32"
MDY 6007, 6008	17/32-11/16"
MDY 6009	45/64-55/64"
MEC 6001	23/32-7/8"
MEC 6002	41/64-51/64"

Pinion Clearance when Engaged—With the plunger bottomed in the core (see Note below) and with the armature endplay taken up at the commutator end, measure clearance between outer face or edge of pinion and pinion stop. If not correct, adjust by screwing the solenoid plunger or adjusting pin in or out as required after removing the pin linking the shift lever and the plunger link.

NOTE—Plunger can be bottomed in coil for above check by pressing in on plunger by hand (CAUTION—do not press on shift lever or pinion) or by disconnecting strap connector to starter terminal so that starter will not spin and then connecting battery to solenoid terminal and ground on starter field frame (coil will hold plunger in while adjustment being made).

Pinion Clearance (Engaged)

Starter Model	Clearance
MCH, MDB	3/32"±1/64"
MCL MDC, MDF, MDL	3/32"+1/32" - 1/64"
MDT, MDU, MDY, MEC	3/32"+1/32" - 1/64"

Starter Armature Endplay—.005" minimum, .030" maximum. Adjust by installing MU-54 thrustwashers on armature shaft at commutator end plate (between the MCH-96 thrustwasher and the end plate).

PERFORMANCE: Current draw is as follows:

SOLENOID CURRENT DRAW

Series SSX (All)

Pull-in Coil - 31.5-36.0 amps. at 3.0 volts.
Hold-in Coil - 8.8-10.1 amps. at 3.0 volts.

Series SAD (All)

Pull-in Coil - 28.6-32.9 amps. at 6.0 volts.
Hold-in Coil - 10.2-11.8 amps. at 6.0 volts.

Series SAJ (All)

Pull-in Coil - 19.9-23.0 amps. at 6.0 volts.
Hold-in Coil - 10.0-11.6 amps. at 6 0 volts.

Series SSY (All)

Pull-in Coil -17.0-19.4 amps. at 6.0 volts.
Hold-in Coil - 4.8-5.5 amps. at 6.0 volts.

CONTROL RELAY SPECIFICATIONS

Series HRW (6 Volt)

Contact Closing Voltage - 1.5-3.0 volts.
Armature Seals to Core - 4.0 volts (maximum).
Contact Opening Voltage - 0.5 volts (minimum).
Contact Gap - .020-.040". Adjust by bending armature stop up or down.
Armature Air Gap - .012-.020" with contacts closed. Adjust by raising or lowering stationary stop.

Series RAA (12 Volt)

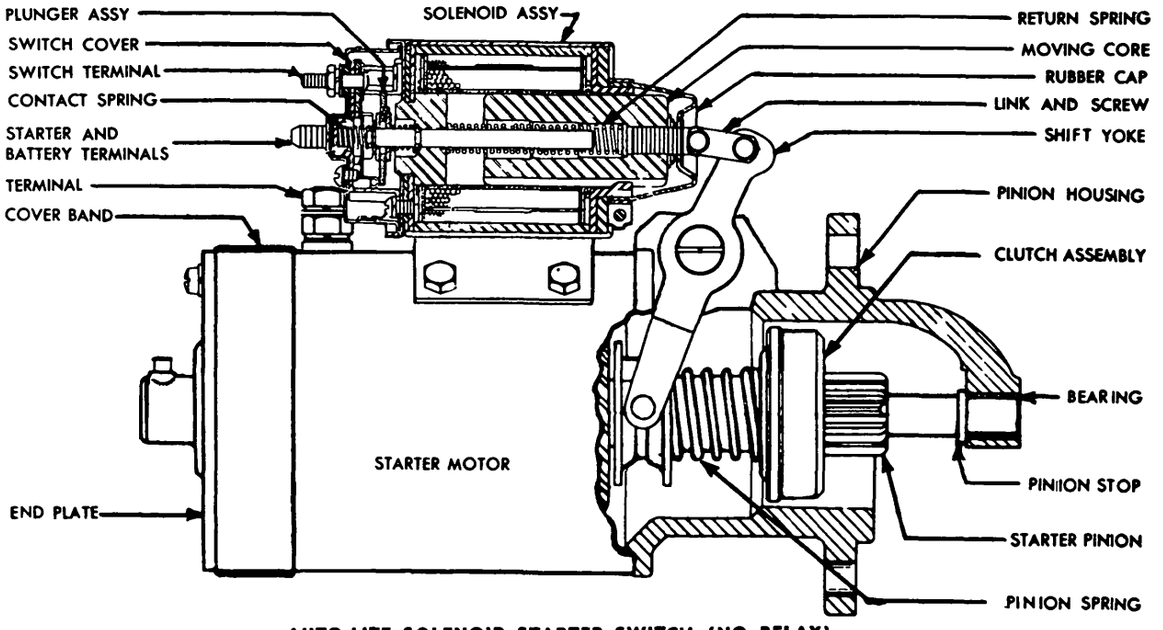
Contact Closing Voltage - 3.0-6.0 Volts (4001); 6.0-8.0 volts (4001A).
Armature Seals to Core - 8.0 volts (maximum).
Contact Opening Voltage - 1.0 volts minimum (4001) 1.0-4.0 volts (4001A).
Contact Gap - .020-.040". Adjust by bending armature stop up or down.
Armature Air Gap - .012-.020". Adjust by raising or lowering stationary stop.

Series RAJ (12 Volt)

Contact Closing Voltage - 6.0-8.0 volts.
Armature Seals to Core - 8.0 volts (maximum).
Contact Opening Voltage - 1.0-4.0 volts.
Contact Gap - .020". Adjust by bending armature stop up or down.
Armature Air Gap - .020-.025" with contacts closed. Adjust by raising or lowering stationary contact.

Series RAM (12 Volt)

Contact Closing Voltage - 5.0-8.0 volts. Adjust by bending hinge ear.
Armature Seals to Core - 8.0 volts (maximum). Adjust by bending hinge ear.
Contact Opening Voltage - 1.0-4.0 volts. Adjust by bending hinge ear
Contact Gap - .020". Adjust by bending armature stop up or down.
Armature Air Gap - .015-.025" with contacts closed. Adjust by raising or lowering stationary contact.



AUTO-LITE SOLENOID STARTER SWITCH (NO RELAY)

DELCO-REMY SOLENOID STARTER SWITCHES (NO RELAY)

DESCRIPTION: This solenoid type combined Starting Switch and Pinion Shift is similar to type used on other cars except that solenoid link is non-adjustable (pinion position adjustable by shifting solenoid assembly on starter) and no relay is incorporated in the solenoid assembly (separate relay used on some cars). 6 Volt and 12 volt units are similar except that special "Ignition Terminal" used on 12 volt units (see Ignition Terminal Note below).

►*IGNITION TERMINAL NOTE (12 Volt Solenoids)*—This special terminal provides an ignition feed which bypasses the ignition coil resistor when the starter is cranking (terminal connected to contact finger in switch which is "live" while switch contacts are closed). See individual car wiring diagrams for ignition coil connections.

►*CONTROL RELAY NOTE: (Buick & Chevrolet Corvette)*—SEPARATE control relay is used in the solenoid control circuit. Relay is not part of solenoid assembly. See CONTROL RELAY data below for specifications and adjustment data. See Individual car wiring diagrams for relay internal circuits and circuit connections.

OPERATION: When the pushbutton is pressed, both solenoid windings are energized (pushbutton is special heavy-duty type designed to handle entire solenoid current). Solenoid plunger is drawn into coil, meshing starter pinion, and closing starting switch contacts (if teeth butt and prevent pinion meshing with flywheel, spring on shaft behind pinion is compressed and meshes the pinion as soon as starter armature shaft begins to rotate). Closing of the starter switch short-circuits the heavy solenoid winding (pull-in coil) and the lighter solenoid winding (hold-in coil) keeps the pinion in mesh until the pushbutton is released when the pinion is withdrawn by the return spring.

►***CAUTION—See special Pinion Clearance Adjustment directions below.***

PERFORMANCE: Solenoid. Current draw below is measured from starter button terminal on solenoid to ground (see illustration). "Both-Coil" specification is with starting switch contacts open, "Hold-in Coil" specification with starting switch contacts closed and pull-in coil short-circuited. If solenoid does not test within limits shown, it should be replaced. *NOTE*—when checking solenoid current draw with solenoid mounted on starter, disconnect solenoid-to-starter connector and ground this solenoid terminal to the solenoid frame. Current draw measured at solenoid control terminal will then be the "Both Coil" draw. Remove the ground wire from the solenoid starter terminal and current will be the "Hold-in Coil" draw.

►***CAUTION—Solenoid should be tested COLD (room temperature of 80°F.).***

SOLENOID CURRENT DRAW

All 6 Volt Types

Both Coils—85-90 amperes, 5 volts, at 80°F.
Hold-in Coil—14-16 amperes, 5 volts, at 80°F.

All 12 Volt Types

Both Coils—72-76 amperes at 10.0 volts.
Hold-in Coil—18-20 amperes at 10.0 volts.

Starter Pinion Overrunning Clutch: Clutch should transmit 50-60 ft.lbs. torque in drive direction without slipping, and should allow pinion to turn freely in overrunning direction.

Shift Lever Return Spring: Check spring tension with spring scale hooked in hole in upper end of shift lever. Pull at start of travel should be 9-12 lbs. and at end of travel should be 28-35 lbs.

ADJUSTMENT: ***CAUTION—It is recommended that starter be removed from engine for adjustment (will provide easier access to solenoid mounting screws).***

Pinion Clearance: *NOTE—Clearance differs for each type starter end thrust device (see identification below) and is the only adjustment required.*

Pinion Clearance—Should be measured from end of pinion to face of drive housing with pinion in operating position. When measuring this clearance, press lightly on outer face of clutch shell to take up all backlash in linkage but DO NOT compress the drive spring.

Pinion Clearance (When Engaged)

Car Model	Thrust Type	Clearance
Buick (1954-56)	③	.010-.050"
Cadillac (1954)	③	.010-.050"
Cadillac (1955-56)	③	.010-.140"
Chevrolet (1954)	①	3/16"±1/32"
Chevrolet (1955-56)	③	.010-.140"
Hudson (1956-57)	③	.010-.140"
Nash (1956-57)	③	.010-.140"
Oldsmobile (1954-56)	③	.010-.140"
Packard (1954-56)	③	.010-.140"
Pontiac (1954)	①	3/16"±1/32"
Rambler (1956-58)	③	.010-.140"

①—Thrust washer on end of armature shaft within pinion housing. Measure clearance between pinion and housing.

③—Thrust washer located within pinion housing and clearance should be measured from face of pinion to this washer.

Pinion Clearance Adjustment—Disconnect solenoid to starter strap to prevent motor operating, place a gauge (see Clearance Specifications above) between pinion and housing or between face of pinion and thrust washer as indicated in table above. Connect battery between switch terminal of solenoid and ground (solenoid base) and push plunger in by hand so that pinion is moved out against gauge (battery current will hold solenoid in this position while adjustment is being made). On models without adjustable plunger link, loosen solenoid mounting screws and shift solenoid on starter so that all play in lever and clutch linkage is taken up. Tighten mounting screws. On models with adjustable plunger link, loosen screw and adjust length of link as necessary to remove all play.

►***CAUTION—Do not compress spring on shaft behind overrunning clutch when making above adjustment.***

STARTER CONTROL RELAY (BUICK & CHEV. CORVETTE): *CAUTION - Both 6 volt and 12 volt units used. All relays are check d and adjust d alik but specifications are different as list d b low.*

RELAY SPECIFICATIONS

6 Volt No. 1116855

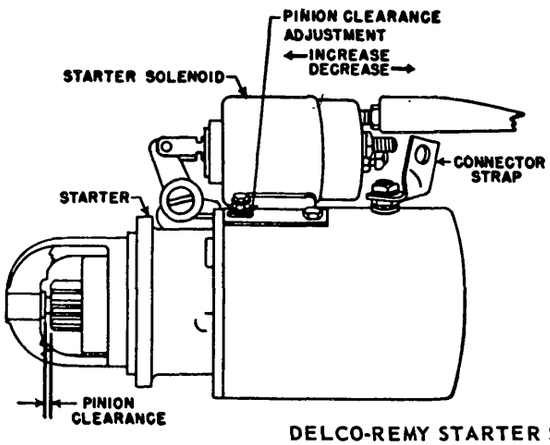
Contact Closing Voltage—1.5-2.1 volts. Armature should "seal" to core at not more than 0.1 volt above closing voltage.

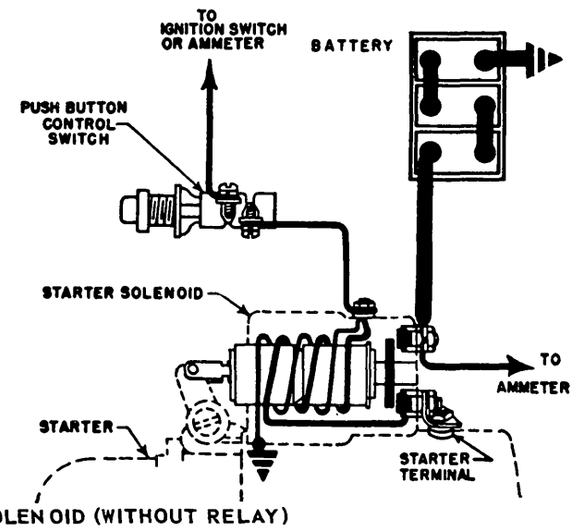
Contact Opening Voltage—Not less than 0.35 volt.

Contact Gap—.025" (.020-.030").

Air Gap—.011" minimum with contacts closed.

CONTINUED ON NEXT PAGE





DELCO-REMY STARTER SOLENOID (WITHOUT RELAY)

DELCO-REMY SOLENOID STARTER SWITCHES (NO RELAY) C ntinu d

6 Volt No. 1116886

Contact Closing Voltage—2.2-3.0. Armature should "seal" to core at not more than .01 volt above closing voltage.

Contact Gap—.025".

Air Gap—.018".

12 Volt No. 1116876 & 1116904

Contact Closing Voltage—3.8-5.0 volts. Armature should "seal" to core at not more than 0.2 volts above closing voltage.

Contact Opening Voltage—Not less than 0.6 volt.

Contact Gap—.025" (.020-.030").

Air Gap—.011" minimum with contacts closed

CHECKING & ADJUSTMENT

Checking Operation—Use rheostat (must have 10 ohm resistance and 2 ampere capacity) and accurate low reading voltmeter. Connect rheostat to relay terminals #1 and #4 (CAUTION—rheostat must be turned to provide full resistance), connect voltmeter to relay terminals #3 and #4. Make certain that ignition switch turned OFF. Slowly decrease resistance by turning rheostat and note voltmeter reading at instant relay contacts close and solenoid switch operates (can be checked by test lamp connected between relay terminal #2 and ground). Voltage reading at this point should agree with "Contact Closing Voltage" in specifications above. Continue to decrease resistance until slight "click" occurs indicating that armature has sealed to the core. Voltage reading at this point should be not more than 0.1 volt higher (6 Volt Relay), 0.2 volt higher (12 Volt Relay) than contact closing voltage. Quickly cut out all resistance to saturate relay magnet core fully, then quickly increase resistance and note voltage reading at instant relay contacts open (if test lamp used, light will go out at this point). Voltage reading at this point should agree with "Contact Opening Voltage" in specifications above.

Relay Adjustment

Contact Closing Voltage—Bend armature spring post **down** (to increase spring tension and closing voltage) or **up** (to decrease spring tension and closing voltage).

Sealing Voltage & Contact Opening Voltage—Adjust by varying air gap (see below) or by changing the closing voltage (CAUTION—closing voltage must be kept within specifications).

Contact Gap—Adjust by bending upper armature stop.

Air Gap—Adjust by bending lower contact support (check air gap by pressing armature down until contacts just touch, then measure between armature and core with feeler gauge).

CHECKING & INSPECTING SOLENOID: If performance not satisfactory, check as follows:

Voltage Drop (High Resistance Check)—Disconnect ammeter lead from battery cable terminal on solenoid, connect voltmeter from battery terminal to starter terminal on solenoid. Use Remote Control Switch connected to pushbutton terminal on solenoid to operate starter motor *(CAUTION*—On 12 volt solenoids with ignition coil terminal, lead must be disconnected from this terminal to prevent engine firing and control switch must NOT be connected to this ignition terminal). Voltage reading with starter cranking must not exceed 0.1 volt (6 volt system). If reading greater, disassemble and inspect solenoid (see below).

Solenoid Inspection—Take out cover retaining screw and remove cover *(CAUTION*—use care not to damage solenoid winding lead. Check solenoid plunger for free movement without binding and see that plunger has sufficient travel for firm contact between the copper contact washer and the starter switch contacts. Make certain that full contact is secured and that contact surfaces are not burned or corroded. *NOTE*—Contacts can be replaced—see OVERHAUL below.

OVERHAUL: Solenoid Contact Replacement: With solenoid removed from starter, remove solenoid plunger from solenoid body. Take out cover retaining screw and remove cover. Remove nuts, lockwashers, flat washers, and insulating washers from each terminal stud. Remove two terminal stud support plate-to-solenoid housing screws, remove support plate, insulating plate, one terminal stud and starter switch stud. Remove outer spring retainer and spring from solenoid plunger contact ring. Compress the contact ring spring, remove retainer, insulating washer, and contact ring from plunger; remove plunger from solenoid body. Unsolder solenoid coil lead from remaining terminal stud.

Reassembly—Place new contact ring and insulating washer on plunger, compress spring and install retainer with open side up *(CAUTION*—Three lugs on bottom of contact ring must index with slots in lower insulating washer). Install solenoid plunger assembly in solenoid body, carefully solder solenoid lead to new terminal stud. Place solenoid plunger spring and outer spring retainer in position over end of solenoid plunger. Place terminal support insulator plate and support plate over the terminal stud soldered to the coil lead *(CAUTION*—Lugs in terminal support plate must fit in holes in insulator). Place starter switch lead stud up through terminal insulator plate, index lugs on stud with slots in insulator plate, snap stud into place. Insert remaining terminal stud up through insulator plate and support plate, install terminal support plate-to-solenoid housing screws (with lockwashers) and tighten screws securely. Install insulating washers, flat washers, lockwashers, and nuts on terminal studs and tighten nuts securely. Install cover and cover attaching screw. Test solenoid for proper operation, install on starter, adjust pinion clearance (see ADJUSTMENT).

DELCO-REMY MANUAL PINION SHIFT STARTER SWITCHES

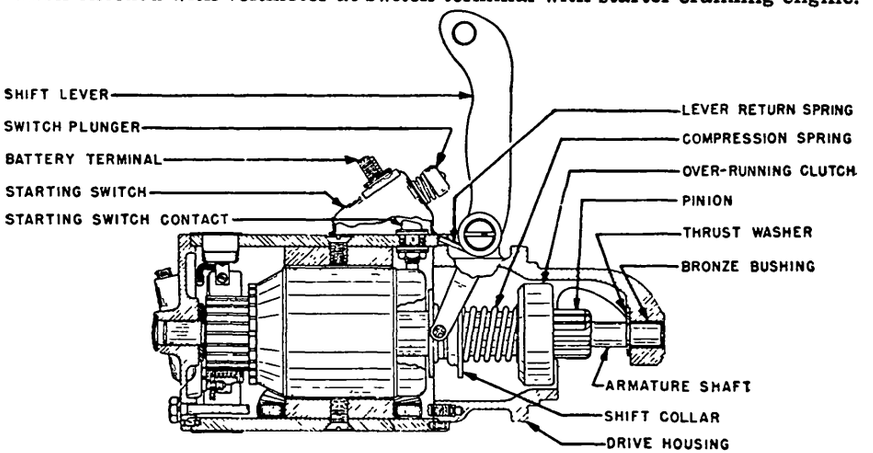
DESCRIPTION: Starters have a pinion assembly and shift lever similar to that used on Solenoid Pinion Shifts but the shift lever is connected through linkage to the starting pedal so that the pinion is positively engaged with the flywheel teeth when the starting pedal is depressed. The starting switch is mounted on the starter field frame and switch plunger is depressed by lug on shift lever to close switch contacts and operate starter after pinion has been meshed with the flywheel.

SERVICING: No service required and no adjustment provided. Switch contacts should not close until after pinion has been meshed (except when pinion teeth butt against flywheel teeth in which case compression of spring between shift collar and overrunning clutch on pinion sleeve will allow switch contacts to close and revolve pinion to meshing position). Return spring on shift lever must have sufficient tension to disengage pinion when pedal released.

Pinion Assembly & Spring (1946 & Later)— Pinion assembly used on these models may be identified by groove in pinion teeth approximately ⅛" from clutch shell. Compression spring must have tension of at least 34 lbs. when compressed to 1". To remove spring, press shift collar down on pinion ring. Spring and collar can be serviced but no attempt should be made to dismantle overrunning clutch mechanism. Clutch is packed with high melting point grease. Do not clean pinion assembly with solvents which may remove grease.

Shift Lever Return Spring—Return spring on shift lever should have tension of 9-12 lbs. (start of travel), 28-35 lbs. (end of travel). Weak spring may cause sluggish disengagement particularly in cold weather or if shaft is gummy.

Switch Test—Switch contacts are defective if voltage drop 0.5 volts or higher when checked with voltmeter at switch terminal with starter cranking engine.



DELC -REMY MANUAL PINI N SHIFT

DELCO-REMY STARTER CONTROLS (ENCLOSED HOUSING)

►1958 *BUICK STARTING MOTOR SOLENOID "S" TERMINAL SEALING (To Prevent Moisture Entrance):* When a starting motor, Part No. 1107667, having a solenoid Part No. 1119919 is disassembled for any reason, the nylon washer and nut on "S" terminal should be replaced by a new sealing nut, Part No. 1940361 Do not rotate terminal stud when removing or installing the nut.

DESCRIPTION: "Enclosed Shift Lever" type combined starter switch and solenoid pinion shift operates in exactly the same manner as previous Delco-Remy "Solenoid Starter Switches (No Relay)". The solenoid has been redesigned for more efficient operation and the entire pinion shift lever mechanism has been enclosed in a housing which is integral with the drive housing and end plate. The starter is of the extruded frame type without any opening at the commutator end so that the entire starter and drive assembly is completely enclosed to protect it from dirt and splash. Drive pinion clearance is not adjustable.

TESTING & CHECKING: Solenoid Windings - With switch disconnected from starter motor, the two following current draw tests may be made.

Pull-In Windings (Both Windings in Parallel) - Remove screw from solenoid motor terminal and bend field leads slightly until clear of terminal. Ground solenoid motor terminal with a heavy jumper wire, then connect a 12 volt battery, a variable resistance, and an ammeter of 100 amperes capacity in series with solenoid "S" terminal. *(NOTE* - The "S" terminal is marked, and is located on engine side of motor field strap connector on front of solenoid). Connect a heavy jumper wire from solenoid base to ground post of battery, then connect a voltmeter between base of solenoid and solenoid "S" terminal. Slowly adjust resistance until voltmeter indicates 10 volts. Reading on ammeter should be as indicated in 'Test Specifications" below.

Hold-In Winding - After completing above test, remove jumper wire from solenoid motor terminal and readjust the variable resistance until voltmeter reads 10 volts. Ammeter reading should be as indicated in "Test Specifications" below.

►*TESTING NOTE:* If solenoid does not test within specifications, replace the solenoid assembly.

Test Specifications

Pull-in Windings - 40-45 amps. (Exc. 1119986); 49-55 amps. (1119986), at 10 volts with relay solenoid at room temperature.

Hold-in Winding - 10-12 amps. (Exc. 1119986); 10.5-12.5 amps. (1119986), at 10 volts with relay solenoid at room temperature.

Pinion Clearance: *(NOTE - Pinion clearance cannot be adjusted. If not correct, motor must be disassembled and defective parts replaced).* To check clearance, connect a 6 volt battery between "S" terminal and ground. *(CAUTION* - Do not connect battery to "R" ignition coil terminal. To prevent motoring, connect a heavy jumper wire from solenoid motor terminal to ground). With the solenoid energized, push pinion away from stop retainer as far as it will go, then use a feeler gauge to check clearance between pinion and retainer. Clearance should be .010-.140"

►*SOLENOID INSTALLATION NOTE:* When installing solenoid, apply sealing compound on both sides of solenoid flange where it extends between drive housing and field frame.

STARTER CONTROL RELAY (BUICK): Check and adjust relay as follows:

Relay Specifications
(Delco-Remy No. 1116921 & 1116963)

Contact Closing Voltage—3.8-5.0 volts. Armature should "seal" to core at not more than 0.2 volts above closing voltage.

Contact Opening Voltage—Not less than 0.6 volt.

Contact Gap—.025" (.020-.030").

Air Gap—.011" minimum with contacts closed.

CHECKING & ADJUSTMENT

Checking Operation—Use rheostat (must have 10 ohm resistance and 2 ampere capacity) and accurate low reading voltmeter. Connect rheostat to relay terminals #1 and #4 (CAUTION—rheostat must be turned to provide full resistance), connect voltmeter to relay terminals #3 and #4. Make certain that ignition switch turned OFF. Slowly decrease resistance by turning rheostat and note voltmeter reading at instant relay contacts close and solenoid switch operates (can be checked by test lamp connected between relay terminal #2 and ground). Voltage reading at this point should agree with "Contact Closing Voltage" in specifications above. Continue to decrease resistance until slight "click" occurs indicating that armature has sealed to the core. Voltage reading at this point should be not more than 0.1 volt higher (6 Volt Relay), 0.2 volt higher (12 Volt Relay) than contact closing voltage. Quickly cut out all resistance to saturate relay magnet core fully, then quickly increase resistance and note voltage reading at instant relay contacts open (if test lamp used, light will go out at this point). Voltage reading at this point should agree with "Contact Opening Voltage" in specifications above.

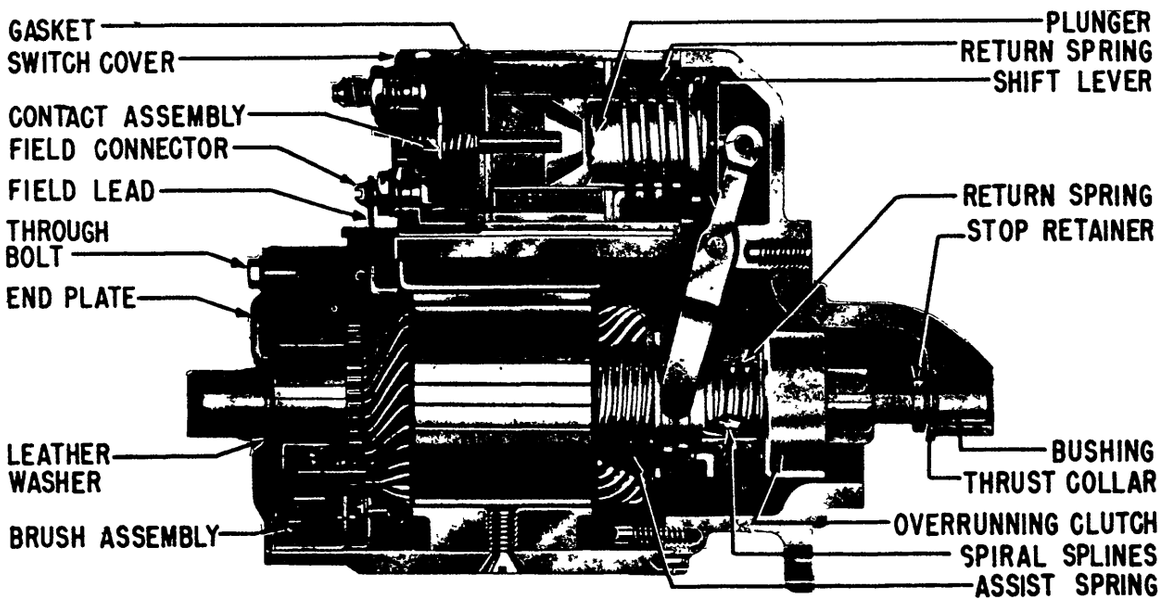
Relay Adjustment

Contact Closing Voltage—Bend armature spring post **down** (to increase spring tension and closing voltage) or **up** (to decrease spring tension and closing voltage).

Sealing Voltage & Contact Opening Voltage—Adjust by varying air gap (see below) or by changing the closing voltage (CAUTION—closing voltage must be kept within specifications).

Contact Gap—Adjust by bending upper armature stop.

Air Gap—Adjust by bending lower contact support (check air gap by pressing armature down until contacts just touch, then measure between armature and core with feeler gauge).



DELCO-REMY "ENCLOSED SHIFT LEVER" SOLENOID PINION SHIFT

CARTER CAR STARTER

►**SERVICE CAUTION:** Car Starter is built in carburetor throttle body casting and must be removed when carburetor is disassembled for servicing (carburetor throttle valve shaft cannot be taken out until switch dismantled and switch ball taken out). CAUTION—Use care not to lose small square switch adjusting shims when switch disassembled

DESCRIPTION & OPERATION: Switch is plunger type mounted on carburetor casting and operated by steel ball which engages switch plunger and flat on carburetor throttle valve shaft when engine is not running. Depressing accelerator pedal to open throttle forces switch plunger up until 'W' shaped contact spring on upper end completes circuit between two brass contact blocks in the switch cap. When the engine begins to fire, switch ball is drawn up out of engagement by manifold vacuum (ball blocks vacuum passage as long as engine is running) so that switch is inoperative. When engine stops, throttle must be closed momentarily to allow switch ball to drop down between throttle shaft and switch plunger.

ADJUSTMENT: Checking Switch Timing - *NOTE - 1957-60 Synchro-mesh models must be checked and adjusted with carburetor off the car. Other models can be checked and adjusted with carburetor installed.*

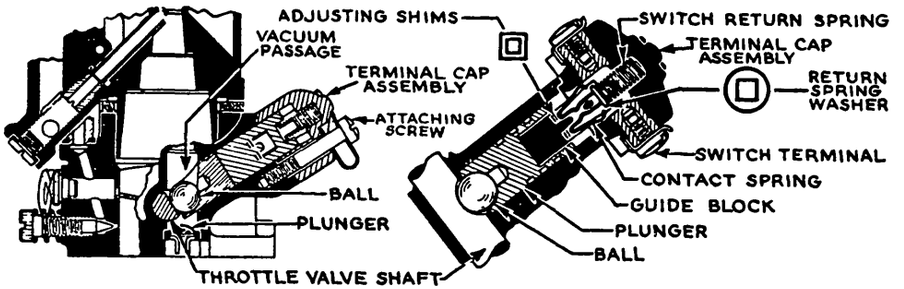
1957-60 Synchro-mesh Cars - Connect a 12 volt battery and test lamp across switch terminals so lamp will light when switch makes contact. Block choke valve wide open so fast idle cam is in slow idle position, then hold carburetor in normal upright position and insert a ¼" drill between throttle body and lower edge of one primary throttle valve at center. With valve closed against drill, the switch should make contact and light test lamp. Remove ¼" drill and insert a 7/64" drill in same location. With valve closed against drill the switch should be open so test lamp does not light. If switch does not operate properly adjust by changing shims (see below).

1954-60 All Models (Exc. 1957-60 Synchro-mesh) - Measure unloader arm travel (1954 & earlier cars), throttle arm travel (1955 & later cars) as follows: Back off throttle stopscrew, turn fast idle cam to slow idle position, see that throttle valves are fully closed. On 1954 and earlier cars place a 6" scale against choke unloader arm and make a pencil mark on float bowl opposite edge of scale. On 1955 and later cars hold scale against flat face of throttle lever lower arm which contacts the dashpot so that scale rests on rocker arm cover. Make a pencil mark on rocker arm cover at front edge of scale. Turn ignition switch on (or use test lamp and battery connected to switch terminal to check switch closing), open throttle slowly while holding scale in position (as indicated above), until starter pinion just engages flywheel (or test lamp lights) indicating that switch contacts have closed. Make a second mark on float bowl (1954 & earlier), or rocker arm cover (1955 & later), at same edge of scale. Measure distance between these two marks which indicate unloader arm or throttle arm travel. See table below for specifications. To adjust change shims (see below).

Adjustment (Retiming Switch) - Add or remove square brass adjusting shims located on bakelite guide block under "W" shaped contact spring (see Disassembly below). *NOTE - These shims have square hole which engages tongue on guide block. So not confuse these shims with round spring seat washer which seats on middle leg of contact spring.*

Unloader or Throttle Arm Travel (For Switch Timing)

Car Model & Carb.	Unloader or Throttle Arm Travel
1954 Buick (2-Bbl Carb.)	15/16-1 5/16"
1954 Buick (4-Bbl Carb.)	¾-1 1/16"
1955 Buick (2-Bbl Carb.)	29/32-1 7/16"
1955 Buick (4-Bbl Carb.)	9/16 15/16"
1956 Buick (2-Bbl Carter)	¾-1 1/8"
1956 Buick (4-Bbl Carter)	½-13/16"
1956 Buick (4-Bbl Rochester)	¾-1½"
1957 Buick (2 Bbl Carter)	5/8-15/16"
1957 Buick (4-Bbl Carter)	3/8-11/16"
1957 Buick (2-Bbl Stromberg)	13/16 1 3/16"
1957 Buick (4-Bbl Rochester)	½-¾"
1958 Buick (2-Bbl Carter)	1 1/16-1 5/8"
1958 Buick (4-Bbl Carter)	13/16-1 5/16"
1958 Buick (2 Bbl Stromberg)	1-1 7/16"
1958 Buick (4-Bbl Rochester)	13/16-1 3/8"
1959-60 Buick (2-Bbl Carter)	9/16-7/8"
1959-60 Buick (2-Bbl. Stromberg)	3/4-1 1/8"
1959-60 Buick (4-Bbl Carter)	1/2-3/4"
1959-60 Buick (4-Bbl Rochester)	1/2-13/16"



CARTER CAR STARTER

REMOVAL & DISASSEMBLY: Disconnect and tape the leads on switch terminals (wire with red tracer on terminal nearest engine is 'hot' with ignition turned on). Remove switch terminal cap attaching screw, hold-down clip, switch cap, withdraw return spring, guide block and contact spring assembly, switch plunger and ball. Be careful not to lose spring seat washer (on contact spring) or adjusting shims (on guide block under contact spring).

Servicing. Clean switch ball, plunger, cylinder, carburetor vacuum chamber and inlet screen, throttle valve shaft flat with gasoline. Check 'W' contact spring and switch return spring. Replace these parts if dimensions incorrect. **'W' Contact Spring**—Distance across spring at widest part (across outer contact legs) should be 7/16" (plus 1/32", minus 0") with spring seat washer seated on middle leg of spring.

Return Spring—Free length of spring should be 11/16-¾" and pressure of 32 ozs should be required to compress spring to length of 3/8".

REASSEMBLY: When installing switch plunger make certain that lip on inner end of plunger is down toward manifold (lip will prevent ball engaging on flat of shaft if installed incorrectly). See that adjusting shims are in place under contact spring, and spring seat washer seated on middle leg of contact spring. Coat contact surfaces of terminal cap lightly with Beacon M-285 lubricant or Rocker Arm Grease No. 1 (petroleum jelly can be used if other lubricants not available). *CAUTION*—Do not use other lubricants and do not lubricate switch ball or plunger. Make certain that return spring enters socket in switch cap and that cap is properly seated in counterbore in casting.

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

BRAKES

BENDIX POWER BRAKE UNIT "VACUUM REACTION" TYPE

Cadillac (1956)①
Ch vr l t Pass. Cars (1954-56)
Huds n (1955-56)
Linc ln & C ntin ntal (1954-59)
M rcury (1954-57)
Nash Ambassad r & Statesman (1954-55)
Nash (1956)
Oldsm bil (1954-57)②
Packard (1954-56)
Pontiac (1954-56)②
Rambler (1956-57)

① - Moraine Power Unit also used
② - Moraine Power Unit also used in 1954-56

►CHANGES, CAUTIONS, CORRECTIONS

►*1953 LINCOLN & MERCURY BRAKE PEDAL TRAVEL CAUTION:* A minimum of 1" (Lincoln), 1½" (Mercury) pedal to floor clearance must be maintained (engine running).

►*1953 EXHAUSTION OF VACUUM SUPPLY CAUTION (Engin Stall d)·* It is possible to exhaust vacuum supply with two applications of brake (engine stalled) *(NOTE–See Oldsmobil Production Change below).* With no vacuum assist pedal pressure required to stop vehicle is greatly increased. If engine stalls (or is parked) on steep grades, stop car completely, set hand brake firmly, turn off ignition, and place selector lever in "R" position. Before releasing hand brake be sure engine is running.

►*1953 OLDSMOBILE SCLENOID VALVE ADDITION & VACUUM RESERVE TANK PRODUCTION CHANGE* A solenoid valve, mounted on top of an enlarged vacuum reserve tank, has been added to Power Brake Unit of late 1953 cars. Solenoid is connected into stoplight switch energized power assist to brakes is available and will permit 3 or 4 brake applications with engine off or stalled at coasting speeds below 20 MPH. **Oldsmobil S l n id Valve Checking and Adjustment–** With transmission in neutral and engine stopped, coast 20-30 MPH and apply brakes. Brake operation should be smooth and the same as with engine running. If there is any catch or hard spot in pedal travel, the stop light switch should be adjusted as follows Loosen stop light switch attaching screws, then adjust switch so that stop lights make contact with first 1/8"-1/4" of pedal travel. Tighten attaching screws, again check to be certain that stop lights go off when brake pedal is in fully released position. Re-check operation by coasting and applying brakes.

►*1953-54 LINCOLN & MERCURY BRAKE MASTER CYLINDER OPERATING LEVER BRACKET INSTALLATION CAUTION.* When installing Lever Bracket, Part No LA-22519-A., into pedal support brace, it is necessary to install lower retaining bolts with head of bolt to inside of pedal support, with nut and lockwasher installed on outside. If installation made with nut to **insid** of pedal support, full travel of brake pedal will be restricted.

►*1955 CHEVROLET BRAKE BLEEDING CAUTION (To Prev nt Trapping Air in System)* Since no bleeder is provided at forward end of power unit to permit trapped air to escape from forward end of unit (due to slight tilting above horizontal line from pushrod eye for design reasons) one of two following methods can be used to eliminate any air trapped in system

Unit Off Car: Fill master cylinder approximately half full, with forward end of unit tilted down below a horizontal line from pushrod eye, before unit is installed in position on dash panel

Unit On Car: Raise rear end of car until forward end of power unit is tilted below a horizontal line from pushrod eye

►*1955 CHEVROLET SLOW BRAKE PEDAL RETURN CORRECTION* Check to see that pushrod has been installed to **inboard** side of lever assembly at the pedal linkage instead of to outboard side, check rubber boot to see that bellows have been pulled through smaller hole in dash panel and mounting plate (This should be done at same time power unit is being assembled to mounting plate) and that bellows are not all gathered on front side of dash panel and mounting plate, causing bind on pushrod, check lubrication at pedal linkage Lubriplate where necessary On early cars, after checking as indicated above and brake pedal return is still slow, remove power unit from front of dash Remove rubber boot, and squirt some rubber lubricant between valve sleeve into which pushrod is assembled and sleeve bore in valve assembly (This will lubricate "O" ring seal in valve sleeve)

►*1955 CHEVROLET VACUUM LEAK CAUTION (Windshield Washer Installation):* Some V-8 engine cars equipped with power brakes and electric windshield wipers (early cars) did not have proper Tee connection at carburetor for washer installation When washer being installed be sure proper fitting is in carburetor If not, install Tee Part No 3718911 to make washer connection **Under no circumstances cut into power brake line at any point.**

►*1956 CADILLAC BRAKE PEDAL LINKAGE BIND CAUSING BRAKE DRAG·* Binding can exist at brake rod-to-relay connection, pedal rod at toe-board hole, and pedal rod to felt air seal retainer *NOTE* - Check level of pedal for correct horizontal position in car as viewed from seat before making repairs to eliminate binding. Correct by shimming between attaching bracket and steering column.

DESCRIPTION: Self-contained hydraulic vacuum power braking device utilizing engine intake manifold vacuum and atmospheric pressure for its power It consists of three separate units as follows

Power Unit: Three elements are combined to make up this single unit, namely

(1) Vacuum Power Cylinder comprising a cylinder power piston, and piston return spring

(2) Hydraulic Master Cylinder containing an hydraulic plunger, compensating valve residual check valve, and fluid reservoir

(3) Control Valve, mechanically actuated, which controls degree of brake application or release in accordance with foot pressure applied to pedal

Vacuum Res rv Tank provides vacuum assist for a limited time when engine stalls

Manif ld Ch ck Valve, in vacuum source line, maintains vacuum in unit should engine stall

OPERATION· With engine running, brakes unapplied, both sides of power piston are open to atmospheric pressure Application of the brake pedal causes vacuum port to open, thus connecting the forward side of vacuum power piston and rear side of reaction diaphragm to engine vacuum This pressure differential causes power piston to move forward, thereby exerting a thrust on the hydraulic plunger This increases line pressure to the four wheels Release of the brake pedal restores the pressure balance in the power cylinder

CHECKING & ADJUSTMENT: Check all parts of the power brake system before disassembling the Power Brake Unit whenever brake trouble experienced

Adjustments: None required If unit becomes faulty, manufacturer recommends that unit be overhauled using Power Brake Repair Kit *NOTE*–Use all parts in kit *DISCARD ALL OLD RUBBER PARTS*

Bleeding Brakes· Bleed in same manner as standard brake system Do not use vacuum assist while bleeding Engine should not be running and vacuum reserve should be reduced to zero by applying the brake several times before starting bleeding

Air Cleaner· Clean twice a year To clean, remove air cleaner and thoroughly wash in cleaning solvent Allow cleaner to dry before reinstalling

Refilling Fluid Reservoir· Check level every 1000 miles If level not up to "L" mark on dipstick (Oldsmobile), ¼' from filler plug opening (Lincoln & Mercury), within ½ from filler plug opening (Others), add brake fluid

Vacuum & Hydraulic Line Inspection: Every 5000 miles, check hose tubing and connections Replace deteriorated hose or damaged tubing

TESTING· Road test brakes by making a brake application at about 20 MPH to determine if vehicle stops evenly and quickly If pedal has a spongy feel when applying brakes, air may be present in hydraulic system. Bleed system as described above When engine is stopped and transmission is in neutral, apply brakes several times to remove all vacuum in system Depress brake pedal, hold light foot pressure on pedal and start engine If vacuum system is operating, pedal will tend to fall away under foot pressure, and less pressure will be required to hold pedal in applied position If no action is felt, vacuum system is not functioning Stop engine and again remove all vacuum in system Depress brake pedal and hold foot pressure on pedal. If pedal gradually falls away under foot pressure, hydraulic system is leaking If brake pedal travels to within 1" of toeboard, brake shoes require adjustment or relining

LUBRICATION: Piston packing seal is lubricated at time of assembly and requires no further lubrication *CAUTION–NEVER lubricate vacuum valve.*

TROUBLE SHOOTING· The following conditions apply to Power Brake operation Be sure brake shoes, drums, linkage, and adjustments correct before repair of Power Brake System

Hard Pedal· Vacuum failure due to faulty vacuum check valve, collapsed vacuum hose, plugged vacuum hose or fittings, leaking vacuum reservoir or vacuum hose and pipe connections, bound up pedal mechanism, glazed

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BENDIX POWER BRAKE UNIT "VACUUM REACTION" TYPE (Continued)

linings; grease, brake fluid, or water on linings; vacuum leak in unit between piston plates, past leather piston packing, between vacuum cylinder and master cylinder, or around hydraulic plunger seal; restricted air cleaner; jammed pushrod and valve plunger; broken counter-reaction spring; leak past atmospheric poppet; vacuum hose on piston loose or restricted.

"Grabby" or Severe Brakes: Grease or brake fluid on linings; scored drums; anchor pins loose; vacuum leak in the reaction diaphragm; sticking pushrod and valve plunger; faulty pivot arm and vacuum poppet action; restricted diaphragm passage.

P dal Goes To Floor (Or Almost To Floor): Brakes require adjustment; air in hydraulic system; hydraulic leak in lines or at wheel cylinders; fluid reservoir needs replenishing; cracked drums or broken linings; hydraulic leakage at compensating valve, hydraulic plunger seal, compensating seal or outlet fitting seals.

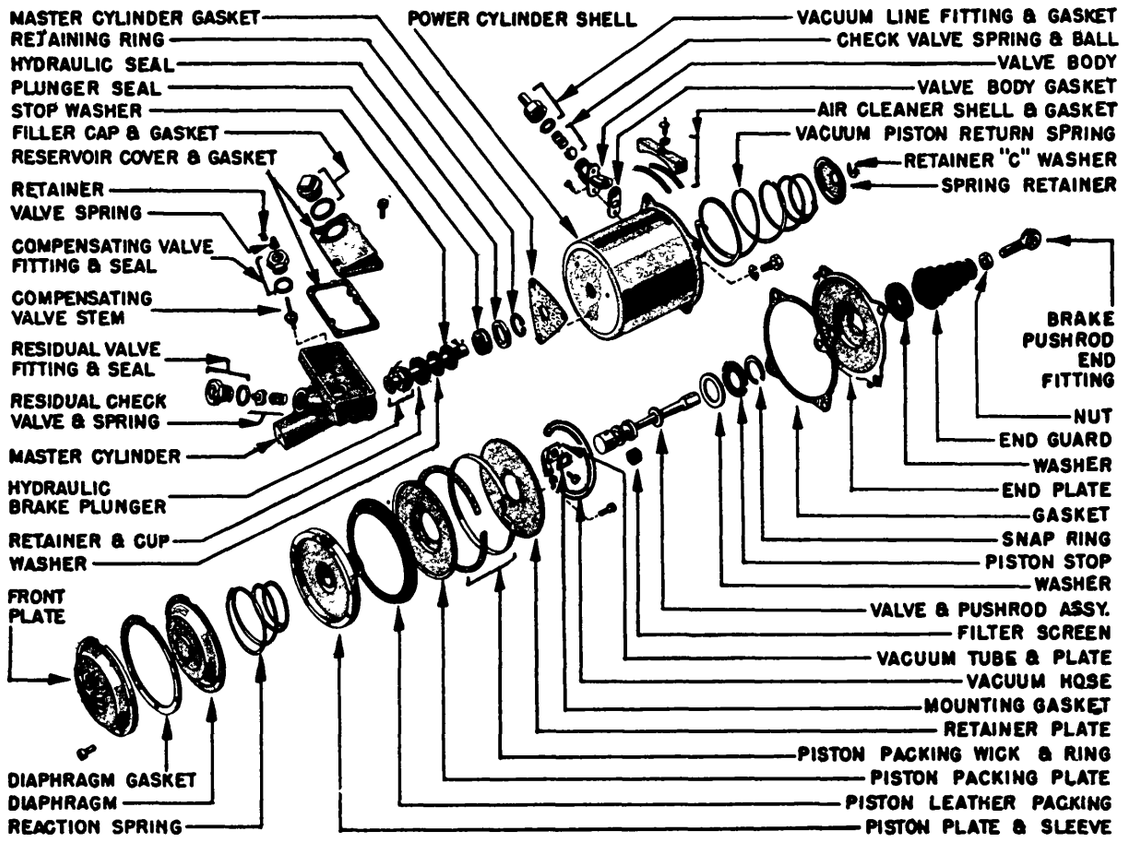
Brakes Fail To Release (Or Slow Release): Anchor pins loose; bound up brake pedal linkage; brakes improperly adjusted; faulty residual check valve; excessive hydraulic plunger seal friction; faulty compensating valve; excessive piston packing friction; restricted air passage in piston plate; restricted air cleaner; sticky pushrod and valve plunger; broken return spring.

REMOVAL (CADILLAC): Disconnect relay to unit rod at clevis. Disconnect relay rod from pushrod. Disconnect both vacuum hoses from power unit. Disconnect hydraulic line at outlet fitting. Remove four screws, lockwashers and nuts from cylinder mounting bracket and remove power brake assembly from car.

REMOVAL (CHEVROLET): From engine side of dash panel remove vacuum lines from vacuum inlet tube on intake manifold (top of engine on V8, left side center on 6 Cyl.). Remove vacuum line to vacuum reservoir. Remove stop light wire connection. Remove hydraulic line from hydraulic cylinder. From inside body remove lever to pushrod retaining bolt washer, lockwasher and nut and disengage pushrod from pushrod lever. Remove bolts and lockwashers retaining power brake unit to dash unit and remove unit from vehicle.

REMOVAL (LINCOLN & MERCURY): Disconnect pushrod from brake pedal. Remove master cylinder outlet fitting bolt (NOTE–It is not necessary to remove stop light switch wire or hose assembly from outlet fitting). Do not disturb outlet fitting in master cylinder. Loosen manifold hose clamp at check valve, remove hose from valve. Loosen vacuum reserve tank hose clamp at check valve and remove hose from valve. Remove bolts securing power brake assembly to bracket on dash panel, remove assembly.

REMOVAL (OLDSMOBILE): Disconnect hydraulic line at power brake master cylinder. Use care to prevent dirt entering hydraulic line and secure hose so that open end is above level of junction assembly to prevent loss of fluid. Plug master cylinder outlet with rubber stopper. Disconnect leads from stoplight switch and fold back floor mat. Remove three brake pedal bracket attaching bolts. Remove bracket and pedal assembly. Remove mast jacket grommet retainer clip and slide



1954 BENDIX BRAKE POWER UNIT (VACUUM REACTION CONTROL)

grommet up mast jacket. Remove mast jacket cover plate attaching screws. Loosen speedometer cable hold down clip and slip cable from under clip, then remove speedometer cable and grommet from mast jacket cover plate. Remove two cover plate to power cylinder bolts, and remove cover plate while positioning power brake unit so it rests on edge of opening in toe pan. Disconnect vacuum hoses and remove power brake unit through toe pan opening.

►*INSTALLATION NOTE:* When reinstalling hoses, position clamps so screw heads may be reached from below car. Place 5/16" bead of 3M Sealer around entire toe pan groove.

REMOVAL (PACKARD): Disconnect vacuum, atmospheric, and hydraulic lines and stoplight wires from power unit (raise hydraulic line above level of junction assembly to prevent fluid leakage). Disconnect and remove brake and accelerator pedals. Remove steering column grommet retainers, slide grommet up out of way. Remove carpet retainers and fold back carpet. Remove cover plate screws, then remove power brake and cover as an assembly, take out mounting screws and remove power brake from cover.

REMOVAL (PONTIAC): Disconnect vacuum hose from vacuum pipe leading to vacuum tee connector. Raise car and remove engine side apron from left side. Remove electrical cables from behind cable guide on reservoir cover of brake unit. Remove coiled hydraulic pipe from outlet fitting on hydraulic cylinder and from tee connector. Disconnect pushrod from pedal and wires from stoplight switch. Remove nuts from U-bolt retaining pedal pivot bracket to steering column; remove pedal and pivot bracket (with stoplight switch assembly attached). Remove accelerator pedal. Push rubber grommet up on steering column and move floor mat out of way. On Synchro-mesh cars, remove clutch pedal seal retainer and steering column seal retainer and remove seals. On Hydra-Matic equipped cars, remove screws retaining mounting plate to floor pan and remove mounting plate with power brake unit attached. On Synchro-mesh cars, remove screws retaining power brake unit to mounting plate (brake will rest on frame). Remove screws retaining mounting plate to floor pan and remove mounting plate, "jockeying" as necessary to clear clutch pedal. Remove power brake unit. *(CAUTION*–Do not support or carry brake unit by pushrod since pushrod may be pulled out of plunger). Remove

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BENDIX POWER BRAKE UNIT "VACUUM REACTION" TYPE (C ntinued)

mounting plate from brake unit, if not previously removed, and hose from vacuum cylinder inlet tube.

DISASSEMBLY: *CAUTION–Use extreme care to prev nt hydraulic syst m parts coming in contact with mineral oil or gr as .* Clean all dirt from outside of unit, using care not to allow dirt or solvent to enter unit. Remove fluid filler cap or dipstick and gasket then empty fluid out of reservoir. On Lincoln, remove screw that secures heat shield to booster body, remove shield by sliding it off hydraulic cylinder.

►*CAUTION: B for furth r disassembly, scratch alignment marks at th following points: (1) Vacuum cylind r sh ll and vacuum cylinder end plate. (2) Vacuum cylind r sh ll and hydraulic cylinder casting. (3) Reserv ir cov r and hydraulic cylinder casting. (4) Tube fitting and hydraulic cylind r casting.*

ALL MODELS

Hydraulic Unit: Place hydraulic unit in vise (lead jaws) at its normal mounting angle and remove the six cover screws, cover and gasket. Using a 1 1/8" (thin-wall) socket wrench, unscrew and remove compensator port and valve assembly. Remove rubber seal ring from port fitting. Unscrew hydraulic output fitting and remove fitting and take off rubber seal ring. Remove check valve assembly and valve spring. Separate check valve rubber cup and cup retainer. Remove unit from vise and empty remaining fluid. *NOTE*–Master cylinder piston assembly will be removed after vacuum cylinder is removed from hydraulic cylinder casting.

1954 MODELS

Vacuum Unit: Replace unit in vise. Release lip of valve rod boot from cylinder end plate and slip boot off over end of rod. Remove screws holding cylinder end plate and gasket and remove these parts. With a small-nose pliers compress ends of valve stop washer snap ring and pry out opposite side of snap ring. Remove snap ring, valve rod and valve assembly. Remove the screen from around vacuum valve. *(CAUTION*–Protect polished surface of vacuum valve assembly). Remove hose from vacuum inlet tube. Compress the vacuum piston into cylinder about ½" and remove inlet tube assembly and gasket. Lift out the piston assembly. Using care not to compress the master cylinder piston from its released position, compress the piston return spring about ½" and remove the return spring seat retainer, spring seat and return spring. Remove the three vacuum cylinder, mounting bolts and lockwashers. Remove vacuum cylinder, gasket, rubber seal ring and metal encased leather seal from hydraulic cylinder casting. Using special pliers, next remove master cylinder piston cup washer retainer ring and lift the master cylinder piston and seal parts as a unit from the hydraulic cylinder. *(CAUTION*–Protect polished surfaces of master cylinder piston). Remove the steel backup washer, phenolic guide washer, cylinder piston seal and seal retainer from the master cylinder piston.

Vacuum Pist n: Scratch alignment marks on front and rear piston plates. Remove the piston steel and rubber stop washers. Remove the five packing plate screws, retainer plate, wick expander spring, wicking, vacuum piston seal retainer and seal. Turn unit over and remove the five piston plate screws and separate the front and rear piston plates, diaphragm assembly, counter reaction-spring, gasket and vacuum valve return spring.

1955-58 MODELS

Vacuum Unit: 1) Replace unit in vise. Release lip of valve rod boot from cylinder end plate and slip boot and felt off over end of rod. Bend up two tabs on end plate and separate end plate and end plate gasket from cylinder. Slide vacuum hose off vacuum tube attached to vacuum cylinder. Remove air cleaner screw and separate screw gasket, shell, hair and rubber seals from vacuum cylinder. Remove two vacuum tube attaching screws, vacuum tube and gasket. *(CAUTION*–Inspect inner surface of vacuum cylinder under holes for burring from attaching screws. Remove burrs to prevent damage to power piston assembly). Pull out piston assembly from vacuum cylinder.

2) Compress piston return spring about ½" and remove the return spring seat retainer, spring seat and return spring. Remove the three vacuum cylinder mounting bolts and lockwashers. Remove vacuum cylinder, gasket rubber seal ring and metal encased leather seal from hydraulic cylinder casting. Using special pliers, next remove master cylinder piston cup washer retainer ring and lift the master cylinder piston and seal parts as a unit from the hydraulic cylinder. *(CAUTION*–Protect polished surfaces of master cylinder piston). Remove the steel backup washer, phenolic guide washer, cylinder piston seal and seal retainer from the master cylinder piston.

Vacuum Piston Stop, Compensating Stem & Vacuum Hose: Remove vacuum hose from piston tube. Remove tube screw and separate tube and rubber seal from piston assembly. Visually inspect condition of rubber stop. If there is no evidence of wear or damage, remove screws and remove steel stop washer with rubber stop attached. If rubber stop warrants replacing, separate stop from steel washer before removing steel washer. Remove compensating stem diaphragm and compensating stem.

Vacuum Piston, Valve Pushrod & Plunger: Hold rear piston plate assembly in vise using care not to damage surface at vacuum tube port. Loosen five piston plate screws and separate front piston plate, gasket, diaphragm assembly and counter-reaction spring from rear piston plate assembly. Remove vacuum poppet spring screw, spring from rear piston plate. Using pliers, remove atmosphere poppet retaining clip. Break clip, if necessary, to remove from poppet stem. Separate atmosphere poppet spring and atmosphere poppet from piston plate. Remove pushrod and plunger, and vacuum poppet assembly from piston plate. From groove in bore of piston plate, remove plunger stop ring. Using sharp tool under end of Spirolox ring, remove ring from groove at end of plunger. Separate pivot washer and pivot arm from plunger. Remove clip and separate vacuum poppet from pivot arm. From recess around plunger remove flat rubber seal.

R ar Pist n Plat Packing & Plat s–Place rear piston plate on bench, with packing and plates facing upward. Remove six retainer plate attaching screws, retainer plate, ring wicking, piston packing plate and leather piston packing.

CLEANING & INSPECTION: Thoroughly wash all parts in diacetone alcohol. Use air hose to blow dirt and cleaning fluid out of recesses and internal passages. Remove rust or corrosion from bore of vacuum cylinder shell with fine emery cloth. Place all cleaned parts on clean paper or cloth to prevent possibility of dirt being assembled into power brake. Inspect all parts for wear or damage and replace as necessary. Particular attention should be given to following items:

Vacuum Cylinder Shell: Inspect shell for scores, pits, dents or nicks, or damaged threads in nuts or in mounting flanges.

Hydraulic Cylinder Casting: Examine bore down one inch from open end. For the hydraulic cup to seal properly, this portion of bore must be free from scores, deep scratches or corrosion. The sealing surfaces at the reservoir cover, compensating port, and hydraulic outlet port must be free of scoring, pitting, dents and nicked edges. Also check casting for cracks and damaged threads.

Hydraulic Port Fitting: The surface at the small end of the fitting must be free from scoring or corrosion which might prevent sealing with rubber cup of residual check valve.

Compensating Port Fitting: Inspect surface around port opening, inside threaded end of fitting, for scoring or corrosion which might prevent proper seating of compensating valve.

Valve Supply Tube: Make sure tube braze is secure and that tube plate is not distorted.

Piston Plates: Examine plates for cracks and damaged threads. Inspect plunger bore in rear piston plate and poppet seats for scratches and nicks. **Do not** attempt to refinish bore. Replace with new plate, if necessary.

Hydraulic Plunger & Washer Assembly: Inspect polished surface for scores, pits, or dents. **Do not** attempt to refinish plunger surface. Replace with new assembly.

Pushrod & Plunger Assembly: Rod must pivot freely in plunger without any noticeable end play. Inspect plunger for scores, pits, or dents on outside diameter of polished surfaces. **Do not** attempt to refinish plunger surface. Replace with new assembly, if necessary.

REASSEMBLY: Before reassembly, make sure working area, parts, and tools are free of dirt, grease and oil.

1954 MODELS

Master Cylinder Piston: Dip piston and cup in hydraulic brake fluid. Install cup retainer on piston with small end of retainer toward washer on end of piston. Dip cup in brake fluid, then install lip side of cup on cup retainer. Place piston-retainer-cup sub-assembly in hydraulic cylinder. Take care not to damage lip of cup as it enters cylinder bore. Install the phenolic guide washer and piston cup steel stop washer in place and install the retaining ring. Hold master cylinder piston in its outward position and install leather seal (with lip toward hydraulic cylinder).

Vacuum Piston: Place rear piston plate on bench with rear side facing up. Install Vacuum Piston Packing Assembly Ring over the piston plate, then install leather piston packing seal, lip side up, until it seats in recess of piston plate. Install vacuum piston packing

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BENDIX POWER BRAKE UNIT "VACUUM REACTION" TYPE (Continued)

seal retainer, wicking, wick retaining expander spring, wick retaining plate, and install the five retaining screws *(CAUTION–Care must be taken when installing these screws to apply sufficient downward pressure on screwdriver to partially compress the packing seal and thoroughly engage screw threads to prevent stripping the threads).* Turn vacuum piston over and install Diaphragm Installation Guide Pins into screw holes, then place the counter-reaction spring, small end down, on piston plate, and install reaction diaphragm (with large diaphragm plate toward rear piston plate) and gasket, over pins. Align the two air passage cutouts. Install the valve return spring with small end into reaction diaphragm (this will be over the back of rubber pad). Install front piston plate, aligning the air passage cutouts or alignment marks. Press down front plate, compressing the spring, and remove one guide pin at a time, replacing each with a screw. Tighten screws uniformly. Saturate new wicking and wipe leather seal with a maximum of two teaspoons full of **shock absorber oil**. Fasten the vacuum tube and hose assembly and gasket to rear piston plate with two screws.

Vacuum Cylinder: Install master cylinder rubber seal ring and the cylinder gasket. Match aligning marks on vacuum cylinder and on hydraulic cylinder casting and install mounting bolts and lockwashers. Tighten to 4-5 ft. lbs. torque. Install the piston return spring engaging the hooked end of the large end of the spring between a mounting bolt and a small hump in the cylinder (any of the three). Place the spring retainer over the piston engaging hooked end of small end of spring in slot of retainer. Install retainer washer. Apply a thin coating of shock absorber oil to inside walls of vacuum cylinder and insert vacuum piston assembly into cylinder and align open end of hose with the center of the large elongated hole in vacuum cylinder. Push piston assembly into cylinder making sure that bore in vacuum piston front plate fits over master cylinder piston. Rotate piston assembly clockwise 20° to 30" and then 20° to 30° counter-clockwise. Move the piston through its full stroke a number of times to make certain open end of vacuum hose will be centered under elongated hole in vacuum cylinder after piston finds its normal working position. Install tube assembly, gasket and screw on vacuum cylinder. Tighten screw firmly and slip the hose on its connection. Again push piston into cylinder to its full stroke a number of times permitting it to return by itself and note if return spring causes piston to rotate. If it rotates enough to cause the coiled hose to rub against the inlet connection, remove piston and move piston return spring 120°.

Hydraulic Cylinder: Dip compensator rubber seal ring in brake fluid and install on compensator port fitting. While holding piston assembly forward in cylinder about ½", install port fitting and valve assembly and tighten securely. Dip line check valve rubber cup in brake fluid and assemble on cup retainer. Position spring and cup-retainer assembly on hydraulic output fitting lower face at small end of fitting. Invert the power unit and screw fitting into place, using care to see that parts remain in correct alignment. Tighten to 30-42 ft. lbs. torque. Assemble copper gasket, hydraulic tube fitting and the second copper gasket over fitting bolt. Screw assembly into outlet, aligning the marks previously made.

1955-58 MODELS

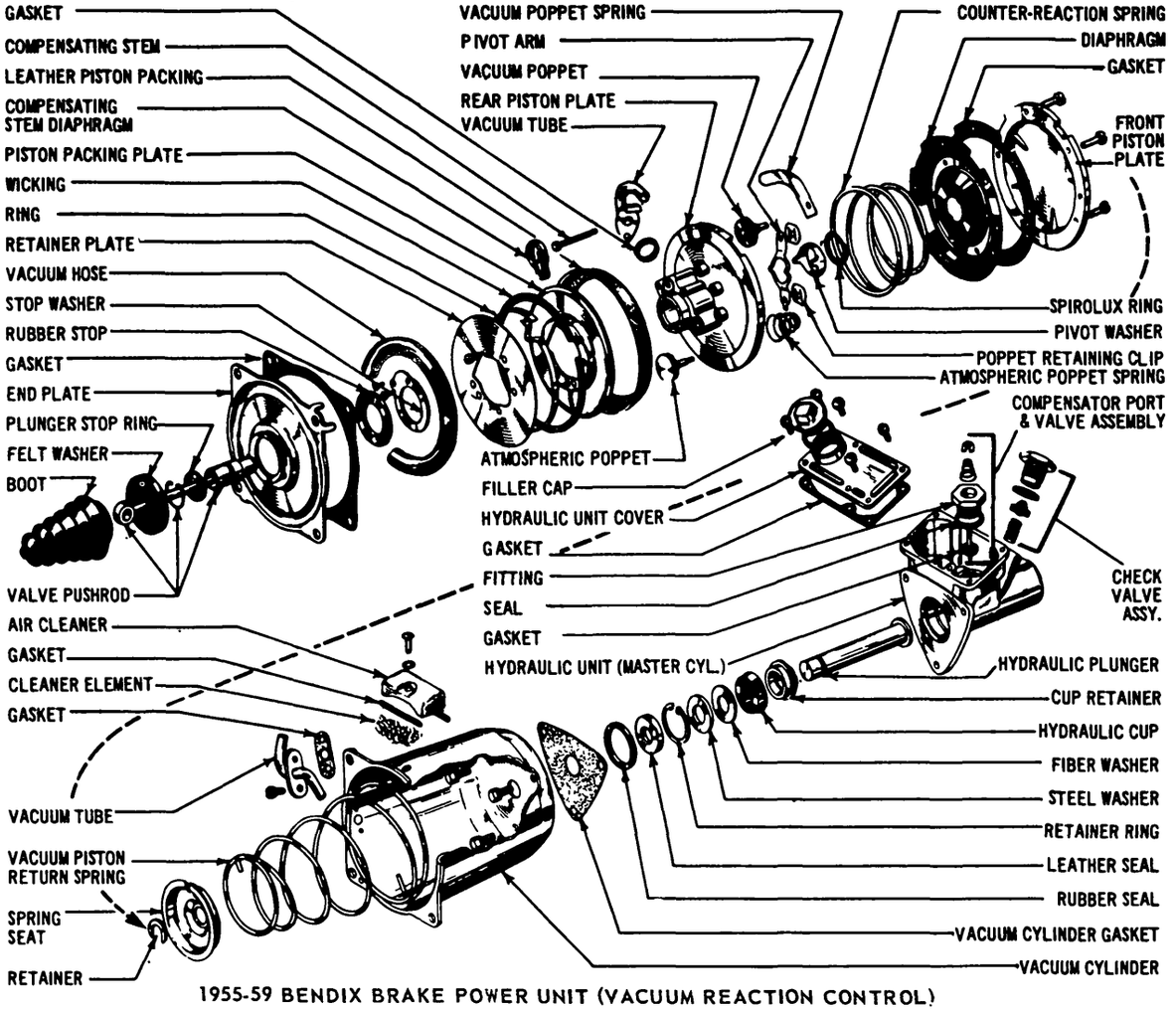
Compensating Valve: Insert stem of valve poppet assembly through hole in threaded end of fitting. Assemble large coil of poppet spring to fitting over end of poppet. Hold poppet on seat, compress spring, and insert "C" washer retainer in groove at end of stem. Crimp ends of "C" washer together to retain in place. Coat rubber seal with brake fluid and assemble over threads of fitting.

Master Cylinder: 1) Coat residual check valve rubber seal with brake fluid and place over threads of hydraulic outlet fitting in inverted position, and insert cone end of cup and retainer assembly in end of fitting. Center check valve spring in recess of rubber cup. Hold master cylinder casting upside down and thread outlet fitting into cylinder. Tighten to 50 ft. lbs.

2) Insert washer end of plunger into cylinder. Place cup retainer on plunger so that smaller inside diameter of retainer is toward plunger washer. Coat hydraulic cup with brake fluid and place over plunger; lip on cup must be toward cup retainer. Place Spauldite guide washer against cup. Place steel washer against guide washer. Slide all parts into bore of cylinder. *CAUTION*–Use care so as not to cut cup when placing on plunger and when inserting cup into bore of cylinder. It will be necessary to use a small screwdriver or similar tool having a smooth edge to start lip into bore.

3) Press parts into cylinder bore and insert snap ring using snap ring pliers. Be sure snap ring is engaged

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1955-59 BENDIX BRAKE POWER UNIT (VACUUM REACTION CONTROL)

BENDIX POWER BRAKE UNIT "VACUUM REACTION" TYPE (C ntinued)

in recess. Push in on hydraulic plunger and then install compensating valve assembly into master cylinder. Pull back on plunger **to be sure** plunger washer tilts compensator valve. Tighten fitting to 15 ft. lbs. Place cover gasket on reservoir of cylinder. Align cover scribe marks and replace cover screws, with exception of rearmost screw on right hand side. Re-place filler cap or dipstick gasket, replace filler cap.

R ar Pist n Plat Packing & Plates: Place piston assembly flat on work bench inside of piston assembly ring. Place leather packing against piston with lip up. Place packing plate inside leather packing, with beveled edge of plate down against packing, so that "cutouts" and holes in plate are aligned with piston. Coil wicking inside lip of leather packing Cut wicking to required size Remove wicking and dip in vacuum cylinder oil, let excess drip off and reinstall wicking. Coil expander ring inside wicking with barbs pointing upward into wicking. Engage notch at loop end of ring with hook at opposite end Replace and align wicking retainer plate Replace screws and tighten evenly

Vacuum Pist n, Valv Pushrod & Plunger: 1) Place stem of vacuum poppet in hole at rounded end of pivot arm and install two retaining clips making sure that clips are pushed down against pivot arm A piece of bar stock with 1/8' hole in end, or piece of brake pipe with flared end, facilitates installation Place rubber seal in recess of pushrod plunger with lip of seal toward pushrod Coat plunger with Lubriplate, place into bore of rear piston plate and engage snap ring in recess in bore of piston plate Place pivot arm vacuum poppet sub-assembly over end of plunger, insert pivot washer and engage Spiroluv ring into groove at end of plunger (Engage end of ring in groove and then screw into place) Place vacuum poppet spring into recess of piston plate and with end of spring over end of vacuum poppet stem, insert screw Place atmospheric poppet spring between pivot arm and piston plate with large coil of spring towards atmospheric port From opposite side of piston plate, place atmospheric poppet so that stem passes through plate, spring, and hole in pivot arm Install retainer clips on stem of poppet in same manner as before A length of round rod with a flat end can be used to back up atmosphere poppet when installing clips

2) Clamp rear piston plate assembly in vise and screw guide pins into place Place large end of counter-reaction spring in piston plate Place diaphragm over guide pins so that by-pass holes and notches in diaphragm and plate are aligned. *NOTE*–When by-pass holes and notches are aligned, correct side of diaphragm will be toward piston plate

3) Move diaphragm downward until it seats on spring When properly seated, flange of metal ring will be within counter-reaction spring Place gasket and front piston plate over guide pins, making sure by-pass holes and notches are properly aligned

4) Apply force on front piston plate to compress counter-reaction spring until front piston plate rests on rear piston plate. Loosely install two screws. Remove guide pins, one at a time, and install remaining three screws, Tighten all screws evenly.

Vacuum Piston Stop, Compensating Stem & Vacuum Hose: Place vacuum poppet compensating stem into hole in recess in hub of piston plate. Place compensating stem diaphragm in recess with "by-pass" slot of diaphragm outward and tab to left (when slot is toward you). Place steel stop washer over pushrod, align washer with hub of piston, replace two screws and tighten securely. Soften coating of rubber stop (if stop was removed) with gasoline and cement to steel washer. Position rubber seal in recess of piston, hook plate of tube to piston plate and replace screw, tighten screw securely. Attach vacuum hose to tube and coil hose around hub of piston

Vacuum Cylinder: 1) Pull out hydraulic plunger, place Plunger Seal Installer (J-5405) over end of plunger, and assemble leather seal over seal tool with lip of seal toward master cylinder. Press seal into recess of master cylinder and then remove tool from plunger. Place rubber seal into master cylinder recess around leather seal. Align vacuum cylinder to master cylinder, and with gasket in place, insert three capscrews (and lockwashers), tighten to 6 ft. lbs.

2) Place larger end of vacuum piston return spring in vacuum cylinder making certain hook on spring is between a screw head and a raised projection on end of cylinder. Assemble retainer plate over end of spring, aligning notch with hook on spring. Compress spring, and with retainer plate over end of plunger, insert "C" washer into groove of plunger.

3) Apply thin film of vacuum cylinder oil to bore of vacuum cylinder and to lip of leather packing, insert piston into cylinder so that free end of vacuum hose is in line with center of hole. Push piston into cylinder, adjusting position slightly until hook seats between two web sections of front piston plate. Move piston 20-25° in both directions in cylinder and stroke piston against spring several times by hand, to allow piston to find its normal operating position. Check location of end of hose with respect to center of hole in cylinder. Install tube and gasket and replace two screws. Slide end of hose onto vacuum tube approximately 5/8". Operate piston by hand through its full stroke several times to make certain that hose does not rub against cylinder or piston. Should interference occur, remove and rotate piston to a new web position where interference does not occur.

Air Cleaner & End Plate: Place two rubber seals on bottom edges of air cleaner shell. Place hair in shell. Replace screw and gasket and attach air cleaner shell to vacuum cylinder. Be sure hair is under shell, a small steel scale or similar tool can be used to push hair under ends of shell. Align end plate gasket and end plate and place against vacuum cylinder. Bend over two tabs of end plate to secure plate to cylinder. Install rod guard felt in large end of boot. Dip small end of boot in brake fluid and place boot and felt over pushrod. Attach lip of boot to scallops at center of end plate.

INSTALLATION: To install power brake assembly reverse removal procedure and note the following:

1954 MODELS

Vacuum Valve & Piston: *CAUTION–Check to see that movement of the vacuum piston is within 3/32" t 7/32" from its full released position. This movement should allow compensator valve to close. If this dimension does not check, unit is not assembled properly and should be rechecked.* If dimension checks install vacuum valve screen over the grooved port in vacuum valve and carefully insert the valve and rod assembly into vacuum piston (phenolic guide washer must be in place on rod) and install retainer snap ring. Install felt washer and rubber boot. Match fluid reservoir cover alignment marks and install cover and gasket, and filler cap and gasket.

1955 MODELS

Hudson & Nash: To prevent any contact during operation, a minimum of ¾" clearance must be maintained between centerline of pushrod-to-bell crank clevis pin and outer surface of front adjusting link locknut.

Pontiac: There should be approximately 1/8" clearance between pushrod and bore of plunger at top or 12 o'clock position with brake pedal released. If improper clearance noted, loosen brake pedal pivot bracket and shift slightly to obtain clearance. *NOTE*– If clearance cannot be obtained, check for bent pushrod or bent mounting plate.

BENDIX POWER BRAKE UNIT "HYDRAULIC REACTION" TYPE

Buick (1957-58) ℂ
Cadillac (1958)
Chev. Pass. Cars (1957-58) ℂ
Edsel (1958)
Hudson & Nash (1957)
Mercury (1958)
Oldsmobile (Late 1957-59) ℂ
Pontiac (1957-58) ℂ
Rambler (1957-59)
ℂ - Moraine Power Unit also used.

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 EDSEL POWER BRAKE PUSHROD NON-INTERCHANGEABILITY CAUTION:* Different pushrods used as listed below. DO NOT INTERCHANGE as brakes either would drag or there would be insufficient pedal travel.

Ranger & Pacer - Part No. B8E-2005-A, identified by E-1 stamped on end of master cylinder body. Pushrod length, measured from end of mounting plate to center of pushrod eye, is 5 7/16".

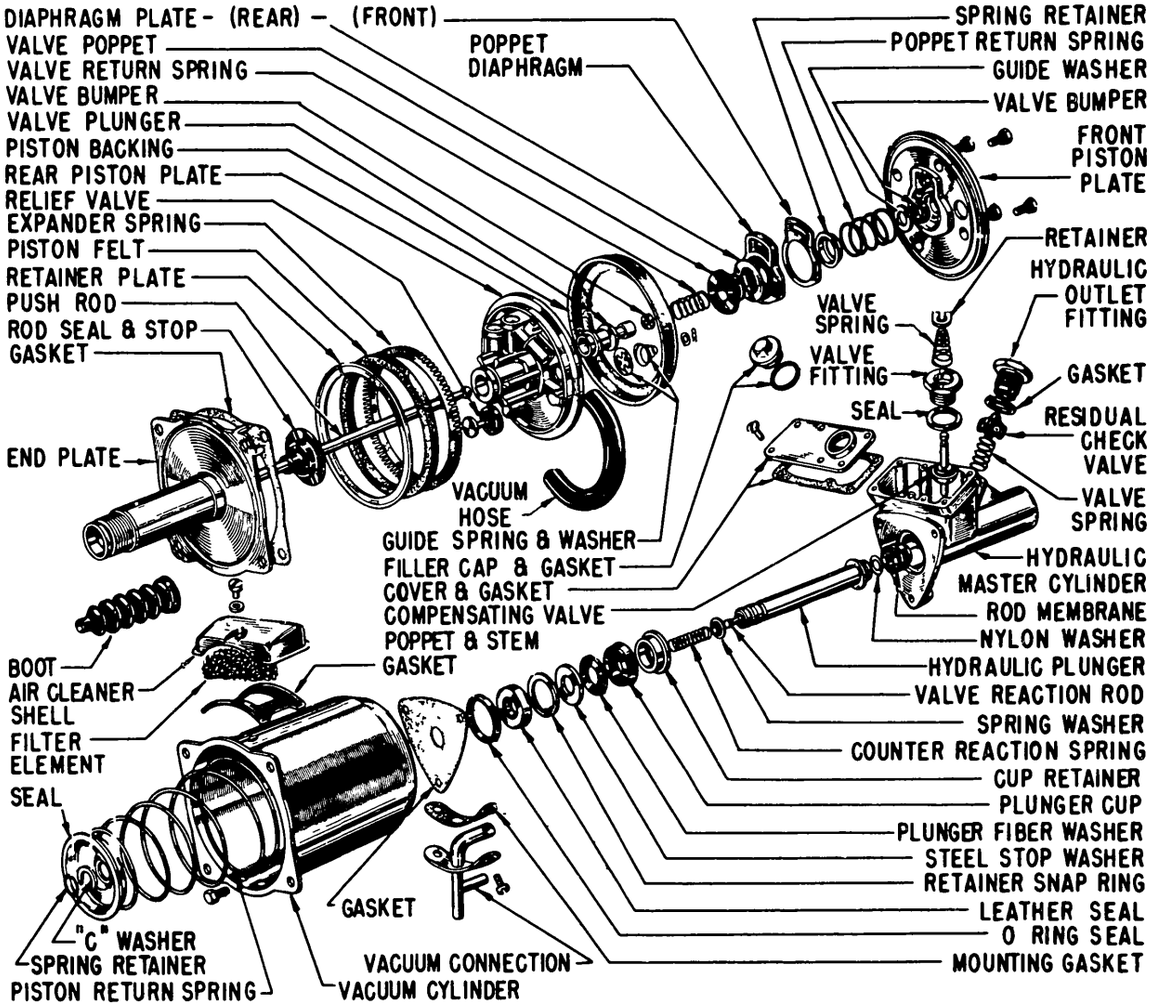
Corsair & Citation - Part No. MG-2005-A, identified by M-5 stamped on end of master cylinder body. Pushrod length, measured from end of mounting plate to center of pushrod eye, is 4 29/32".

►*1958 EDSEL & MERCURY VACUUM CHECK VALVE STICKING IN COLD WEATHER CORRECTION:* Install new design check valve, Part No. MK-22049-A. Install by cutting off 3" (Edsel), 3¼" (Mercury) of vacuum hose, attaching short piece of hose to power brake, and inserting check valve between hoses with new clamps, Part No. B5A-2344-A.

►*1957-58 MERCURY POWER BRAKE AUTOMATIC APPLICATION OR FAILURE TO RELEASE CORRECTION:* This condition may be caused by an inverted brake booster mounting bracket. When properly positioned, small end of "pear shaped" opening in bracket should face downward.

DESCRIPTION: The Bendix "hydraulic reaction" type power unit is similar in design to previous Bendix units having the vacuum piston balanced in atmospheric pressure (both sides of the vacuum piston are open to atmospheric pressure when in the released position). A new "hydraulic reaction" feature transmits changes in hydraulic pressure to the vacuum valve through a reaction rod and rod membrane and provides the operator with a more definite brake "feel".

OPERATION: In the applied position, atmospheric pressure is blocked off from the forward side of vacuum piston as the valve plunger contacts the floating valve. Further movement of valve plunger pushes the floating valve from its seat in vacuum piston and permits vacuum to be connected to forward side of the vacuum piston. Atmospheric pressure on rear side of piston then moves piston and hydraulic plunger in the applied direction. The hydraulic plunger initial movement causes the compensating valve to close, sealing off fluid reservoir from the hydraulic cylinder. Further movement of the plunger in the applied direction increases pressure in master cylinder and forces fluid past the residual check valve and into the hydraulic lines. As fluid pressure is increased in master cylinder, a reaction force is transmitted to the reaction rod through the plunger seal (membrane) to overcome counter-reaction spring pressure and move valve plunger away from the floating valve. This allows the vacuum port to close and the atmospheric port to reopen, resulting in a reaction force which is in proportion to pressure in master cylinder and brake lines.



BENDIX VACUUM POWER BRAKE ASSEMBLY (WITH "HYDRAULIC REACTION" CONTROL)

►*POWER BRAKE UNIT REMOVAL NOTE: The complete unit must be removed from car as an assembly.*

►*POWER BRAKE UNIT OVERHAUL CAUTION: Use extreme care to prevent the natural rubber parts in unit coming in contact with mineral oil, grease, gasoline or cleaning solvent. Clean exterior of unit thoroughly before disassembly and make sure that solvent is not allowed to enter unit.*

DISASSEMBLY: (End Plate & Air Cleaner) - With unit in Holding Fixture J-5433, or hydraulic cylinder end clamped in vise, remove rubber dust guard and felt from valve pushrod (a drop of brake fluid on end of pushrod eye will permit removal of guard without damage). Bend out tabs on end plate and remove end plate and gasket. Slide vacuum hose off tube attached to vacuum cylinder. Remove air cleaner attaching screw and remove shell, hair and rubber seal. (*NOTE* - Remove any burr inside cylinder at air cleaner screw hole to prevent damage to packing during removal).

Vacuum Piston & Valves: Remove tube and plate attaching screws, tube and plate and gasket. Pull out vacuum

CONTINUED ON NEXT PAGE

BENDIX POWER BRAKE UNIT "HYDRAULIC REACTION" TYPE (C ntinued)

piston and valve assembly from cylinder. Remove counter reaction spring and washer from end of hydraulic plunger, then remove "O" ring seal from groove in hydraulic plunger.

Piston R turn Spring: Push in on spring retainer plate to release "C" washer. While holding spring compressed, slide "C" washer out of groove in hydraulic plunger. Remove retainer plate and vacuum piston return spring.

Vacuum & Hydraulic Cylinder: Scribe line across hydraulic master cylinder and vacuum cylinder. Remove three vacuum cylinder attaching screws and lockwashers. Lift off vacuum cylinder, vellumoid gasket and rubber ring gasket. Push hydraulic plunger into master cylinder and remove leather seal from cylinder.

Plung r Seal, Plat & Valv Cover: Scribe a line across master cylinder and cover. Remove filler cap and remove cover attaching screws and gasket. Remove compensating valve (using 1 1/8" "thin wall" socket). Loosen outlet fitting *(CAUTION - Do not remove outlet fitting at this tim)*. Remove retainer ring. Pull hydraulic plunger out of master cylinder and remove steel washer, fibre washer, rubber cup and cup retainer from plunger. Remove membrane seal, and nylon gasket from plunger.

R sidual Ch ck Valv : Remove outlet fitting from master cylinder then remove residual check valve spring, valve cup and retainer. Remove gasket from fitting.

C mp nsating Valv : Clamp compensating valve fitting in vise and spread and remove spring retainer, then remove spring, valve stem and poppet and fitting gasket from valve fitting.

Piston: Remove valve rod seal and stop from piston and piston rod. Remove vacuum hose from piston assembly. Remove retainer plate felt and expander spring. Hold rear piston plate in vise and remove four capscrews, front piston plate, diaphragm plate and poppet return spring. Remove diaphragm parts as an assembly and then separate these parts. Lift off leather piston packing and valve return spring. Remove rubber bumper (using a sharp pointed instrument from end of valve plunger), seal and fibre washer from piston plate. Remove valve operating rod and valve plunger from piston. *(NOTE* - If valve operating rod or valve plunger are to be replaced, inject alcohol in valve plunger opening around the valve operating rod to remove rubber lock. Hold valve operating rod in vise and drive valve plunger off operating rod using a ¾" wrench or similar tool against valve plunger).

CLEANING & INSPECTION: Wash all rubber or parts containing rubber in alcohol. Blow all parts dry with air. Remove rust or corrosion from bore of vacuum cylinder with fine emery cloth. Inspect all parts for wear or damage and replace all parts that are cracked, pitted, scored, scratched or corroded. Make sure that valves and valve seats are sealing properly and are not pitted or damaged. *CAUTION - Do not attempt to refinish bore or plunger of master cylinder.*

REASSEMBLY: *NOTE - Before assembly, dip all hydraulic system parts in clean alcohol and place in a clean pan or on a clean paper.*

Residual Check Valve: Assemble new gasket over threads of hydraulic outlet fitting. Hold fitting in vertical position and insert cone end of cup and retainer in fitting. Place check valve spring in recess in retainer. Hold hydraulic master cylinder upside down and thread outlet fitting into hydraulic master cylinder hand tight.

Compensating Valve: Insert grooved end of valve poppet and stem through hole in fitting from threaded end. Assemble large diameter end of spring over stem, holding poppet valve on seat. Compress spring and assemble retainer washer in groove of valve stem. Squeeze ends of washer together with pliers. Assemble new gasket over threads of compensating valve fitting.

Plunger Seal, Plate and Valve Cover: *With master cylinder in vise, assemble nylon washer and rubber membrane at end of hydraulic plunger. Insert membrane end of plunger in cylinder and assemble seal parts with seal installer Tool J-5405 over end of plunger as follows:* Cup retainer (with counterbored side away from washer on plunger), cup, fibre washer, and steel washer. Slide seal parts into recess of cylinder, push plunger in to end of its stroke and assemble retainer ring in ring groove. Assemble compensating valve in threaded hole in cylinder and securely tighten. Place new gasket on master cylinder, align cover to scribe marks, replace and securely tighten. Tighten outlet fitting securely.

Vacuum & Hydraulic Cylinder: Pull out hydraulic plunger, then, with seal installer Tool J-5405 placed over end of plunger, assemble leather seal over seal installer with lip of leather toward hydraulic master cylinder. Press seal into recess of master cylinder and then remove seal installer. Place "O" ring seal in recess in master cylinder. Insert three capscrews through holes in end of vacuum cylinder and holes in gasket. Align vacuum cylinder, gasket and master cylinder to scribe marks and tighten sapscrews securely. Wipe out vacuum cylinder, pull master cylinder plunger to end of stroke.

Piston Return Spring: Place large diameter end of vacuum piston return spring in vacuum cylinder and assemble retainer plate over end of hydraulic plunger. Compress spring and assemble "C" washer in inner groove of plunger.

Piston: If valve rod and valve plunger are separated, dip valve plunger in alcohol before inserting valve rod. Make certain ball end of rod is locked in place in valve plunger. It may be necessary to tap end of valve rod to seat ball end in valve plunger. Insert bumper in end of valve plunger, insert valve plunger assembly into rear piston plate, and assemble spring over end of plunger. Assemble leather packing on piston with lip side down. Assemble diaphragm plate in groove of diaphragm then assemble diaphragm over shoulder of poppet valve. Place this assembly in recess in piston plate and assemble spring retainer and diaphragm plate in diaphragm. Assemble poppet return spring over flange of spring retainer. Remove burrs from center bore of front piston plate and assemble seal and fibre washer in recess of front piston plate. Stake in place at three points. Place front piston plate on rear piston plate, making certain by-pass holes are properly positioned, and loosely assemble four attaching capscrews. Place assembly ring J-5406 over piston leather and turn piston assembly upside down. Assemble expander spring against inside lip of leather packing. Dip felt in Bendix Vacuum Cylinder Oil and assemble on expander spring. Assemble retainer plate making certain plate is securely anchored in grooves of four projections of piston assembly. Tighten four attaching capscrews securely and remove assembly ring J-5406. Assemble vacuum hose on piston. Dip valve pushrod seal and bumper in brake fluid and assemble over end of valve pushrod making certain seal is seated in groove in piston assembly.

Vacuum Piston in Cylinder: Apply thin film of vacuum cylinder oil to inside of cylinder. Assemble "O" ring seal in groove of hydraulic plunger, then assemble counterreaction spring and washer in recess at end of plunger. Insert piston in cylinder. When end of hose lines up with elongated hole, assemble new gasket, tube and plate and attach with screw. Slide end of hose on vacuum tube approximately 5/8". Operate piston through its full stroke several times to make certain vacuum hose does not rub against cylinder or piston.

End Plate & Air Cleaner: Assemble rubber seal on edges or air cleaner shell. Attach air cleaner to vacuum cylinder using screw and gasket. With 6" scale, push hair into open spaces at each end of air cleaner. Align holes on end plate and gasket with holes in flange of vacuum cylinder and bend over two tabs of end plate to secure end plate and gasket to cylinder. Assemble pushrod felt in second fold of rubber guard. Dip small end of guard in brake fluid and assemble guard and felt over pushrod. Attach lip of rubber guard over "scallops" at center of end plate.

BENDIX POWER BRAKE UNIT "HYDRAULIC (DISC) REACTION"

Cadillac (1959①, 1960②)
Chevrolet Pass. Cars (1959①, 1960②)
Edsel All (1959③, 1960④)
Ford V8 & Thunderbird Later (1959)③
Ford V8 (1960)⑤
Lincoln & Continental (1959⑥, 1960)
Mercury (1959-60)
Oldsmobile (1960)②
Pontiac (1959①, 1960)
Rambler, All Models (1959)⑦
Thunderbird (1960)⑤
Valiant (1960)

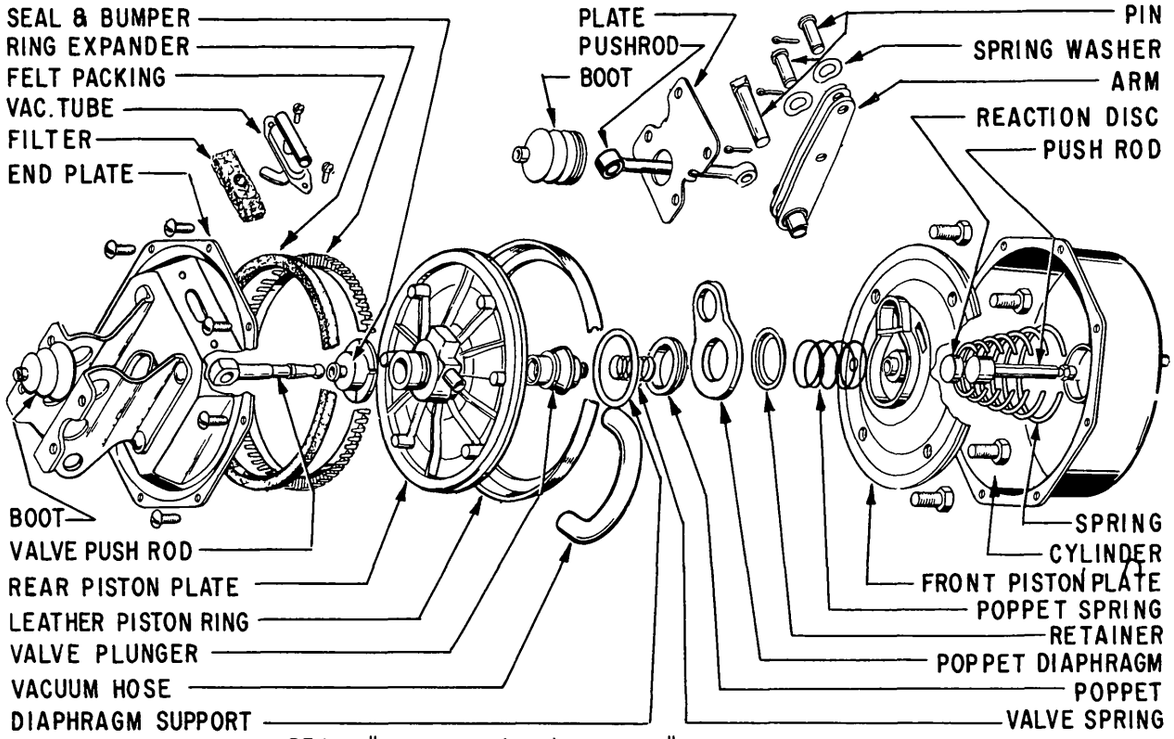
① - Moraine Power Unit "Hydraulic (Disc) Reaction Type" also used.
② - Moraine Power Unit "Hydraulic (Diaphragm) Reaction Type" also used.
③ - Edsel & Ford "Bellows Type" used on Early models.
④ - 6 Cyl. & V8 Models. "Edsel & Ford (Bellows Type)" also used on 6 Cyl. models.
⑤ - Used on models without Air Cond. "Edsel & Ford (Bellows Type)" used on models with Air Cond.
⑥ - Bendix Power Unit "Vacuum Reaction Type" also used.
⑦ - Bendix Power Unit "Hydraulic Reaction Type" also used.

►CHANGES & CORRECTIONS

►*1959 INSUFFICIENT POWER BRAKE CORRECTION:* Loss of power assist is caused by a vacuum leak in the system, either in external components or within the unit. If all external hoses and connections are found to be in good condition, remove power brake assembly from car and remove the end plate. Check internal vacuum hose for leakage and repair as necessary. Check retaining ring on piston assembly which is under the six bosses on piston assembly. If retainer ring is out of position, replace it under the bosses, then decrease ring diameter by gripping it between any two of the bosses with needle nose pliers and twisting to the right until ring is bent. Regrip ring at outer edge of the bent section and twist to left until ring is again flat. A slightly raised section formed by the bends will decrease ring diameter enough to hold it in position under retainer bosses.

►*1960 CADILLAC POWER BRAKE PRODUCTION CHANGE:* Beginning with Engine No. 099805, a new Bendix Power Brake Unit used in production. The new unit, identified by the Code CA-1 stamped on flange of vacuum cylinder sleeve, has been redesigned to give a more definite pedal response and return action. Power piston valve components are different than earlier type units and the piston plates are made of plastic, replacing former die-cast plates. Disassembly procedures are different as indicated below.

DESCRIPTION: This new Bendix Power Brake unit has the vacuum piston balanced in atmospheric pressure (both sides of vacuum piston are open to atmospheric pressure when in released position). The hydraulic reaction feature of this unit transmits changes in hydraulic pressure to the vacuum valve through a new type "reaction disc" (replacing the former reaction diaphragm on earlier models). On all models except Edsel, the master cylinder is the conventional piston type which is similar in design to master cylinders used on cars without power brakes. A plunger (displacement) type master cylinder of same design used on earlier Bendix units used on Edsel models.



BENDIX "HYDRAULIC (DISC) REACTION" POWER BRAKE UNIT

OPERATION: In the applied position, atmospheric pressure is blocked off from the forward side of vacuum piston as the valve operating rod forces valve plunger forward into contact with the poppet valve. Any additional movement of valve operating rod and valve plunger in the apply direction moves the poppet valve away from vacuum valve seat to open the vacuum port and establish direct contact through power piston and valve to hydraulic master cylinder. With vacuum on forward side of power piston, atmospheric pressure on rear side of piston moves the power piston. This movement carries hydraulic pushrod and piston forward to close compensating port and force hydraulic fluid under pressure through the residual pressure check valve and brake tubes into wheel cylinders. As hydraulic pressure is developed, the load in the hydraulic pushrod increases correspondingly and in effect pushes back against the reaction disc. The soft rubber reaction disc bulges through the small hole in center of power piston and presses on end of valve plunger. The hole is so small only a fraction of the reaction force finds its way back through linkage and pedal to driver's foot.

REMOVAL: Power Brake & Mast r Cylind r - Disconnect clevis at brake pedal assembly, then remove vacuum hoses from brake unit and hydraulic line from master cylinder. Remove nuts and lockwashers attaching unit to firewall and remove unit.

Master Cylinder (Exc. Edsel): *NOTE - Master cylinder can be removed on all cars (Except Edsel) without removing power brake assembly from car.* Disconnect hydraulic line from master cylinder and remove nuts and bolts securing master cylinder to power brake unit. *CAUTION - Keep area around pushrod clean.*

Edsel - Power brake assembly must be removed from firewall and disassembled for removal of master cylinder assembly.

►*POWER BRAKE DISASSEMBLY & OVERHAUL CAUTION: Use extreme care to pr vent natural rubber parts in unit from coming in contact with mineral oil, gr as , gasoline, or cleaning solv nt. Clean exterior of unit thoroughly before disassembly and make sure that solvent is not allowed to enter unit.*

DISASSEMBLY: Power Brak Unit - Remove master cylinder from power brake unit (except Edsel). *NOTE - Master cylinder on Edsel models will be removed after vacuum cylind r is removed from power brake unit.* Pull master cylinder pushrod from vacuum unit (DO NOT

CONTINUED ON NEXT PAGE

BENDIX "HYDRAULIC (DISC) REACTION" TYPE (C ntinued)

DISTURB adjustment screw at end of pushrod). Remove dust guard from endplate and valve operating rod, then scribe a line across endplate and vacuum cylinder to insure proper reassembly. Remove six endplate attaching screws, then press down on endplate while removing the other two. Scribe a line across face of piston to register with scribe marks on endplate and vacuum cylinder. Disconnect vacuum hose from vacuum inlet tube and remove endplate, vacuum piston and piston return spring. Remove screws holding air cleaner to endplate and remove air cleaner.

Vacuum Pist n: (Di -Cast Type) - Spring the felt ring to disengage ring from grooves in bosses in rear piston plate, then remove piston felt and expander ring from piston assembly. Remove piston plate attaching screws and separate front plate and piston packing from piston plate. Remove valve return spring, poppet and diaphragm assembly, poppet spring and poppet support plate. Separate poppet spring retainer and poppet diaphragm from poppet. Remove rubber reaction disc from front piston plate. *NOTE - It may be necessary to use a small rod having a smooth flat end to push reaction disc out of piston.* DO NOT REMOVE valve operating rod and valve plunger from rear piston plate unless it is necessary to replace because of damaged or worn parts. If it is necessary to remove either the valve operating rod or valve plunger, remove valve rod seal from groove in piston plate and pull seal over end of rod. Holding piston with valve plunger down, inject a small amount of alcohol in valve plunger, through off valve rod. On Edsel models, remove screws attaching master cylinder to vacuum cylinder and remove master cylinder.

(Plastic Typ Piston) - Remove felt &ring from piston assembly, then lift rod seal and bumper boot from rear piston plate and slide off eye end of operating rod. Remove capscrews from front piston plate, separate front and rear piston plates, and remove leather packing. Remove poppet spring, valve, return spring retainer, poppet diaphragms, poppet, poppet spacer, and plunger and rod assembly. *NOTE - Do not separate valve op rating rod from valv plunger unless replacement of valv rod or plung r is necessary.* If valve rod or plunger must be replaced, hold assembly with valve plunger down and inject alcohol into cavity around valve rod to wet rubber lock in valve plunger, then drive or pry valve plunger off valve rod. Use care not to damage plunger if it is to be reused. Remove rubber reaction disc from front piston plate if necessary.

CLEANING & INSPECTION: Wash all parts in alcohol and blow dry with air. *CAUTION - Do not handle hydraulic parts with greasy hands.* Remove rust or corrosion from bore of vacuum cylinder with fine emery cloth. Inspect all parts for wear or damage and replace all parts that are cracked, pitted, scratched or corroded. Make sure that valves and valve seats are seating properly and are not pitted or damaged.

REASSEMBLY: (Die-Cast Piston) - If valve operating rod and valve plunger were separated, position valve rod seal over valve operating rod, then insert valve rod through piston. Dip valve plunger in alcohol and assemble to valve end of rod. *NOTE - Be sure ball end of rod is locked in position in valve plunger. It may be necessary to tap end of valve operating rod to seat ball end in plunger.* Assemble poppet diaphragm over end of poppet, being sure diaphragm is in recess of poppet, then press poppet spring retainer over end of poppet and diaphragm. Clamp valve operating rod in vise with rear piston plate up and lay leather piston packing on rear plate with lip of leather over edge of plate. Install valve return spring over end of valve plunger. Assemble diaphragm support plate in relief of diaphragm and assemble poppet with diaphragm and plate in recess of rear plate. Install poppet spring over retainer. Align and assemble front piston plate with rear piston plate. Center poppet spring on front piston plate and center valve plunger stem in hole of piston. Hold front and rear piston plate together and install six piston plate capscrews, leaving them loose. Insert rubber reaction disc in recess in center of front piston plate. Place piston on bench with valve operating rod up and place expander ring against inside lip of leather packing. Saturate felt in clean shock absorber fluid, letting excess drip off, and position felt in expander ring. Assemble retainer ring over bosses on rear piston plate, being sure retainer is anchored in grooves of piston plate. Tighten the six retaining screws securely. *NOTE - If retainer ring is not a tight fit in bosses of rear piston plate, see "Insufficient Power Brake Assist Correction" above for procedure to be used to tighten retainer ring.*

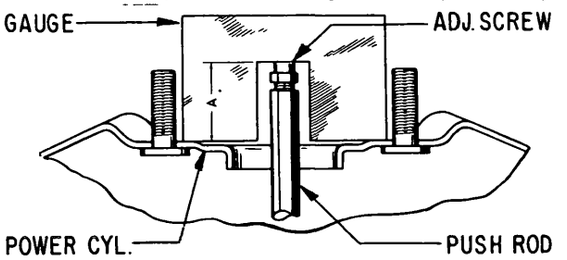
(Plastic Type) - Place plunger and rod assembly into rear piston plate, and install rod seal and bumper boot. Position spacer washer into cavity inside rear piston plate, then assemble poppet through poppet diaphragm, and install poppet spring retainer on end of poppet. Position leather packing on rear piston plate, then install poppet spring and valve return spring on plunger and poppet reaction plate. Postiion and align front piston plate against rear piston plate, and secure in position with capscrews. Soak piston felt in shock absorber fluid, then insert felt in expander ring, and position expander and felt in groove around rear piston plate with expander teeth up.

Power Brak Unit: Assemble air cleaner element over vacuum tube of air cleaner and attach assembly to end plate with two screws. Slide vacuum hose onto vacuum tube inlet of air cleaner assembly, then install pushrod. *CAUTION - Be sure rubber reaction disc is in place in front piston plate.* Apply a thin coat of shock absorber fluid to base of vacuum cylinder and to piston leather. *NOTE - On Edsel, install brake master cylinder on vacuum cylinder.* On all cars, center small diameter of piston return spring in vacuum cylinder with large diameter facing piston then insert vacuum piston into cylinder, aligning scribe marks on end plate and vacuum cylinder. Position vacuum hose so it lays flat against piston and does not rub on cylinder. Compress piston return spring by pressing down on piston and install two screws at opposite side of end plate to secure it to cylinder. Install remaining screws and tighten securely. Dip small diameter of dust boot in alcohol and assemble boot over end of operating rod and flange on end plate.

Pushrod Adjustment (Exc. Lincoln): *NOTE - The self locking screw on end of pushrod is set to correct height on original assembly and adjustment is not required unless hydraulic pushrod has been replaced, or if adjustment has been changed. If necessary, adjust as follows:* With piston assembly free in cylinder and firmly seated in a released position, hold pushrod seated against reaction disc and centered in spring of master cylinder. Use Gauge indicated in table below or measure distance from mounting face of power cylinder to end of pushrod adjustment screw (see table for correct dimension). Rotate adjusting screw as necessary to obtain correct adjustment.

Model	Pushrod Adjustment Gauge No.	Dimensi n
Cadillac	J-7723	1.195-1.200"
Chevrolet	J-7723	1.195-1.200"
Ford		.962-.967"
Edsel, Mercury		.993-.998"
Oldsmobile	J-7723	1.195-1.200"
Pontiac	J-7723	1.195-1.200"
Valiant	C-3815	1.195-1.200"

INSTALLATION: Reverse removal procedures (see above).



PUSHROD ADJUSTMENT

HYDROVAC POWER UNIT (DIAPHRAGM TYPE)

Ch vrolet Truck, Series 40, 50, 60 (1960)

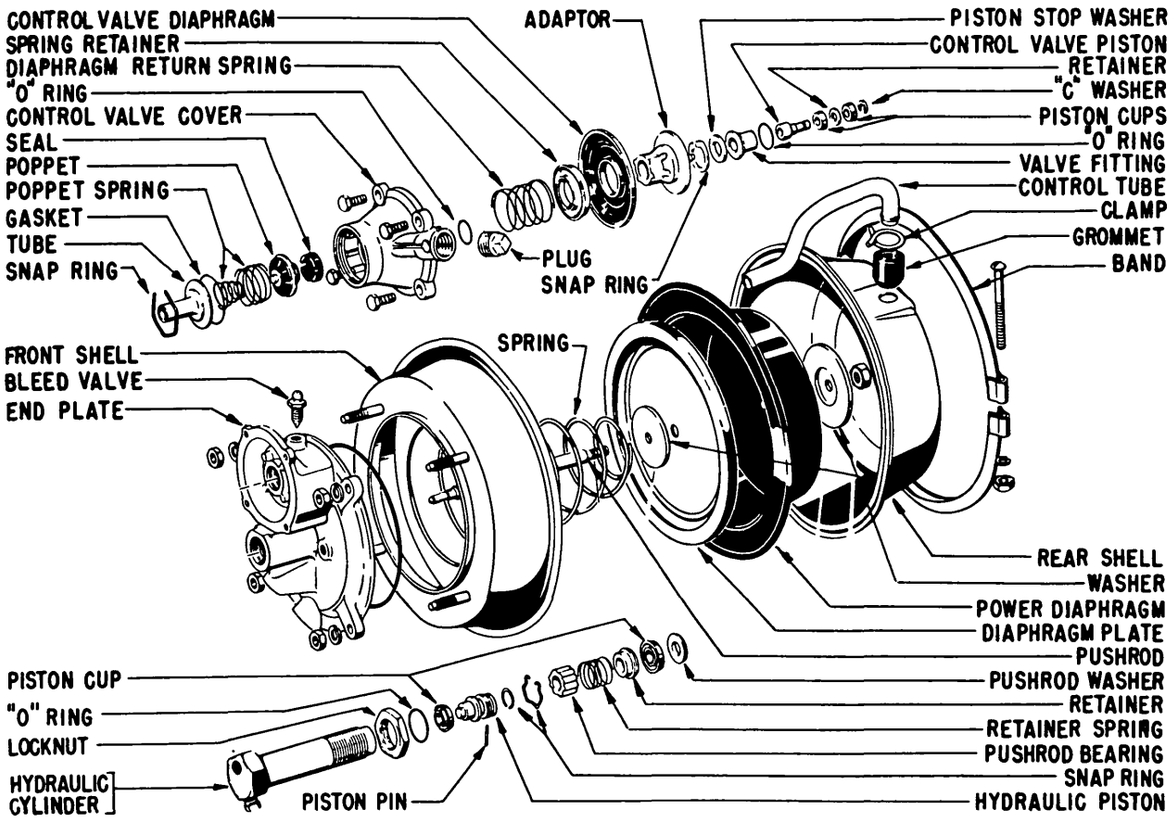
DESCRIPTION: This vacuum operated unit is connected in the brake hydraulic line between master cylinder and wheel cylinders and is controlled by brake master cylinder pressure.

►*BLEEDING BRAKES CAUTION: Before bleeding brakes on models with Hydrovac units, the manually p rated bleed valve located on end of slave cylinder must be opened. Engine must be shut off and there must be no vacuum in the power system.*

DISASSEMBLY: Scribe a line across both halves of vacuum chamber and across end plate and front chamber. Remove clamp, control tube, and rubber grommet from rear vacuum chamber half, then remove clamp screw, clamp band, and rear vacuum chamber. Compress diaphragm return spring and hold spring compressed with clamping tool while removing hydraulic cylinder tube, then remove piston retainer pin and hydraulic piston assembly. Release return spring and remove diaphragm, pushrod assembly, and diaphragm return spring. Remove cup from hydraulic piston. *NOTE - A holding fixture to hold spring compressed while removing hydraulic cylinder and piston can be made from a piece of 3/16" x 1½" x 12" strap and two hook bolts.* To disassemble control valve and piston fitting, remove snap ring, tube, gasket, valve poppet springs, valve poppet, and vacuum poppet seat from valve cover. Remove four valve cover screws, valve cover, diaphragm return spring, spring retainer, diaphragm, and valve diaphragm adaptor. Remove retainer ring, stop washer, and valve piston fitting. Remove "O" ring seal from fitting and press out piston assembly. Remove "C" washer, cups, and cup retainer washer from piston. Remove bleed valve and control valve housing. Remove pushrod seal parts and end plate from diaphragm housing as follows: Remove hydraulic cylinder end seal from center bore of end plate, then remove retainer snap ring, pushrod bearing, spring, cup retainer, cup, and pushrod washer. Remove four end plate attaching nuts and lockwashers and remove end plate from front vacuum chamber half, then remove gasket from end plate. To remove diaphragm from pushrod, clamp pushrod in vise next to diaphragm (use soft vise jaws), then remove nut, diaphragm retaining washer, diaphragm, diaphragm plate, and pushrod.

INSPECTION: Wash all parts in alcohol and blow dry with air. *CAUTION - Do not try to clean small passages with drills or wire.* Check condition of diaphragm and pushrod. Diaphragm must be free of cracks or flaws and pushrod must be smooth. Do not use pliers on pushrod. Inspect slave cylinder casting for scores, pitting or roughness. Make sure there are no dents in vacuum chamber halves.

REASSEMBLY: Clamp pushrod in vise near threaded end (use soft vise jaws), then assemble pushrod washer, diaphragm plate, diaphragm, diaphragm retaining



HYDROVAC POWER UNIT ASSEMBLY (DIAPHRAGM TYPE)

washer and nut. Securely tighten nut and stake in three places. Place end plate gasket in groove (outer) of end plate and assemble end plate to front diaphragm chamber. Align end plate and housing to scribe marks, then assemble pushrod washer in center bore of end plate, beveled side first, flat side next to washer; cup retainer, shoulder side against cup; spring; pushrod bearing; and retainer snap ring. Make sure retainer ring is in inner ring groove. Assemble hydraulic cylinder "O" ring seal in outer groove of end plate. Dip control valve piston cups in brake fluid and assemble on piston with lip of cups away from hole end of piston and with cup retainer washer between cups. Replace "C" washer and squeeze ends of washer together after assembly to piston. Dip piston assembly in brake fluid and insert piston in fitting (as indicated in illustration). Place seal on fitting and insert fitting with piston in hole of end plate. Replace stop washer and retainer snap ring. Assemble control tube seal in recess of control valve housing, then assemble diaphragm and spring retainer on valve diaphragm adaptor. Place diaphragm return spring in position on retainer and attach control valve cover, making sure all parts are assembled to scribe marks. Assemble vacuum poppet seat over end valve poppet and assemble in housing. Replace valve springs (large and small) with small diameter end of spring over button of poppet valve. Place cover gasket in recess of housing and attach tube with snap ring. Assemble hydraulic cylinder, piston, vacuum piston return spring, and vacuum diaphragm as follows: If nut was removed from hydraulic tube, replace nut on tube to limit of threads. Dip piston cup in brake fluid and assemble cup on piston with lip of cup toward hydraulic cylinder. Place small diameter end of diaphragm return spring over spring retainer washer on diaphragm, then guide end of pushrod through stationary seal in end plate. Compress and hold spring sufficiently to project pushrod through end plate. Attach hydraulic piston assembly to end of pushrod with retainer pin and hold pin in place with retainer ring. Carefully guide hydraulic cylinder tube over hydraulic piston and cup, being careful not to damage cup. Thread cylinder into end plate hand tight, then release pressure against diaphragm return spring and remove holding fixture. Assemble rear diaphragm chamber half in position on diaphragm with rear and front chamber halves aligned to scribe marks. Assemble clamp band over rim of front and rear halves and bead of diaphragm, then securely tighten band nut. Assemble rubber grommet in rear shell (wet with brake fluid to aid in assembly), then insert control tube in grommet and replace hose clamp. Align hydraulic cylinder assembly in end plate so that shutoff valve in end cap is at bottom, then securely tighten check nut.

HYDROVAC POWER UNIT "PISTON TYPE"

Buick (1956 Optl.)
Cadillac (1954-55, 1957)
Chev Pass. Cars & C rv tte (1957)
Chev Trucks (1954-60)
F rd Trucks (1954-60)Ⓒ
Packard (1957-58)
Studebaker (1955-60)
Willys (1957-60)

Ⓒ - Midland Hi-Power also used

►CHANGES & CORRECTIONS

►*1954 CADILLAC ACTUATING PISTON & CYLINDER ASSEMBLY PRODUCTION CHANGE:* **Starting with Engine Serial No. 54038 a new 3/8" Actuating Piston and Cylinder Assembly entered production replacing the earlier 5/16" piston and cylinder. Units with the later type piston and valve are identified by the number 377144 stamped on the brass identification tag. Units with the 5/16" assembly have number 376755 (production units), 376930 (replacement units) stamped on identification tag.**

►*1955 CADILLAC PRODUCTION CHANGES* The following changes over previous models have been made in 1955 production **(1)** ½ diameter control valve piston replaces smaller piston formerly used, thereby reducing pedal pressure required for brake assist **(2)** Use of a smaller master cylinder boot and pedal shaft seal at toe-board ,have eliminated need for brake pedal retracting spring **(3)** Residual check valve, formerly located in master cylinder, is now located in hydraulic cylinder end cap on power assembly

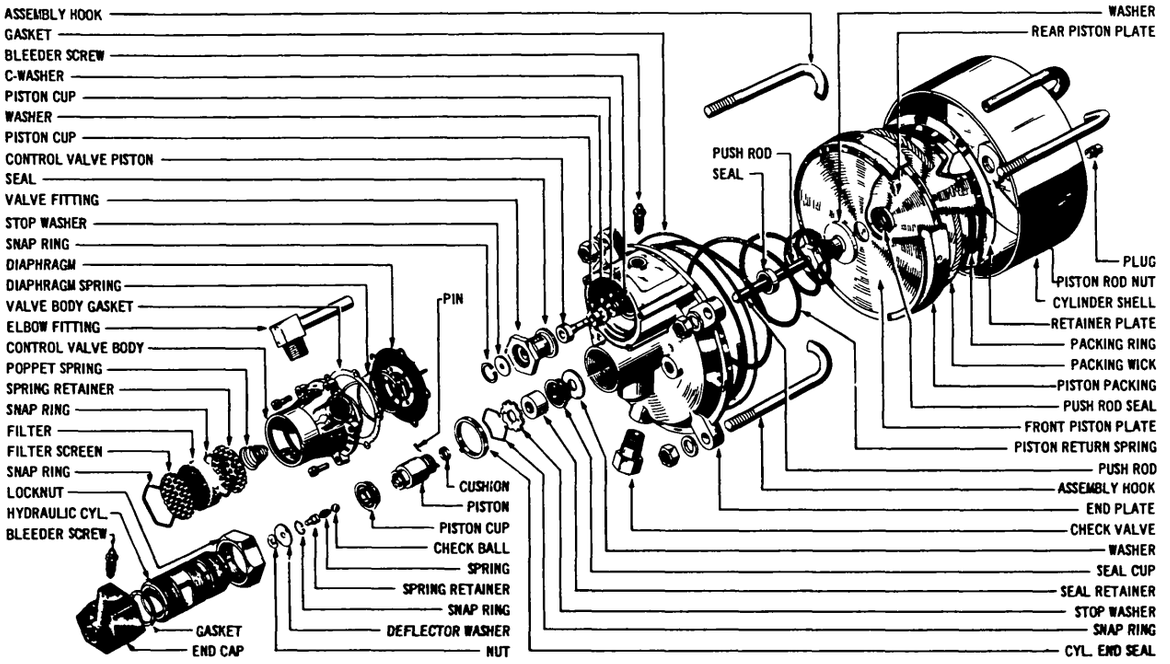
►*1955 CHEVROLET PRODUCTION CHANGE* Beginning with 2nd Series (Except Low Cab Forward) residual check valve has been incorporated in hydraulic cylinder end cap on power assembly

►*1955 STUDEBAKER CONTROL VALVE PRODUCTION CHANGE (To Provide Softer Brake Fedal)* Beginning Serial Nos G-1334649 (16G6), 8403935 (16G8), 7160012 (6HY), and 7160032 (6HC & K), a 7/16 control valve is used in place of 3/8 control valve formerly used Kit, Part No 537939, available to make installation on earlier cars *CAUTION*–7/16 conversion kit is for use on 1955 Models **with factory installed** Power brake units only it is not recommended for installation on any car with power brakes having the high (7 1 ratio) brake pedal

►*1956 CHEVROLET TRUCK HYDROVAC POPPET VALVE PRODUCTION CHANGE* Repair Kit No. 2214318 consisting of large poppet valve, small poppet valve, lead gasket and screw, when installed, eliminates the need to replace Hydrovac control cover and poppet valve as an assembly, when poppet valve failure is encountered.

R m val & Installati n – 1) Remove poppet valve by inserting an offset open end wrench or small pry bar behind the large poppet valve to pry out rivet retaining smaller valve, or support valve body on two wood blocks and drive out poppet shaft with punch.

2) Assemble above parts, being sure lead gasket is behind small poppet, before starting screw into large poppet.



HYDROVAC BRAKE POWER UNIT

3) Hold shaft with pair of thin offset pliers and tighten screw securely.

DESCRIPTION· Bendix HYDROVAC Power Unit connected in hydraulic brake line between master cylinder and wheel cylinders (no mechanical connection)

OPERATION: As brake pedal is depressed, hydraulic pressure developed in master cylinder is transmitted to power brake hydraulic cylinder and to hydraulic piston in vacuum control valve. As hydraulic piston in power brake hydraulic cylinder is against stop washer when pedal is first depressed, check ball in piston is held off its seat by piston yoke. This allows fluid from master cylinder to pass through piston directly to wheel cylinders. This feature permits normal operation of brakes when engine is not running. Fluid under pressure is also directed to hydraulic piston in vacuum control valve. As fluid pressure moves this piston, it actuates vacuum diaphragm control shaft and forces diaphragm against vacuum poppet valve sealing off atmospheric side of diaphragm from manifold vacuum. Continued movement of piston and diaphragm forces atmospheric poppet valve off its seat and admits air under atmospheric pressure to vacuum piston.

BLEEDING BRAKES (Except Cadillac) *(CAUTION– This operation must be done with engine stopped and no vacuum in the power brake system)* Attach bleeder hose to bleeder valve on control body keep end of drain hose below surface of fluid in drain jar Loosen bleeder valve ½-¾ turn Depress brake pedal slowly by hand to expel air When pedal has reached toe board, close bleeder valve before returning pedal to released position Repeat this procedure until air bubbles cease to appear at the end of the bleeder drain hose in the jar and the stream is a solid fluid mass then tighten bleeder valve and remove drain hose *(NOTE–***During the operation the brake master cylinder must be fill d with fluid)** Following above procedure, bleed at bleeder valve on end cap of hydraulic cylinder, then proceed to bleed wheel cylinders in the usual manner

BLEEDING BRAKES (Cadillac)· Use same procedure as described above for cars other than Cadillac, except as follows Bleed valve on end cap of hydraulic cylinder first, then valve on control valve body

LUBRICATION Remove screw plug on front end of vacuum cylinder and fill cylinder to level of hole (Studebaker 1 oz) with Delco Shock Absorber Fluid or Bendix Hydraulic Cylinder Fluid as follows

Cadillac Once yearly
Chevrolet Every 10,000 miles
Ford & Studebaker Once yearly or every 20,000 miles

TROUBLE SHOOTING Before trying to determine cause of trouble make certain that master cylinder reservoir is full, that brake system is free of air that there are no binds in the brake linkage that there are no air or fluid leaks to the master and wheel cylinders Then proceed as follows

Hissing Sound (Engine Running), Brakes Either On r Off· Caused by external leak on vacuum side of control diaphragm Check and correct leak at control valve body, diaphragm, and gasket to end plate Check and correct leak between vacuum cylinder and end plate

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HYDROVAC POWER UNIT "PISTON TYPE" (Cont.)

Hissing Sound (Engine Running), Greater When Brakes Off: Caused by external leak on atmospheric side of control valve diaphragm Check and correct leak at atmospheric poppet, external pipe and rubber tubing, and valve body screws

Hissing Sound (Engine Running), Brakes On: Caused by internal vacuum leak, air entering through breather Overhaul unit and check for leak at vacuum poppet, control diaphragm, or vacuum power piston

Little or No Boost From Power Brake (May be Accompanied by a Hissing Sound or Loss of Brake Fluid):

1) Internal vacuum leak between atmospheric and vacuum side of power piston Overhaul unit, and check for leak at vacuum poppet, control diaphragm, or vacuum power piston

2) Internal hydraulic leak Check for low brake fluid level Overhaul unit and check for presence of brake fluid in inner side of vacuum cylinder, or inner side of control diaphragm Check and correct leaks at control valve cup, control valve fitting "O" ring seal, vacuum piston push rod seals, or hydraulic power piston cup or ball check

3) External hydraulic leak Check and correct leak at point of origin

4) Internal friction Check and correct shock absorber fluid level in vacuum cylinder If necessary, overhaul unit and check for rusty, dirty, or distorted vacuum cylinder wall, dry or worn vacuum piston leather packing, swollen rubber cups due to heat or wrong brake fluid, worn or damaged rubber cups, or dirt, rust, sludge, or foreign matter in power piston or control valve regions

Booster Loses Effectiveness While Stopping (Pedal Grows Harder or "Kicks Back"): Caused by internal hydraulic leak or internal or external vacuum leak Overhaul unit and check for leaks at control valve, valve fitting, power piston, vacuum poppet, control diaphragm, or vacuum power piston Check for sticking power piston, or restricted air cleaner (if so equipped)

Tendency To Over-Brake (Pedal drops under foot. May show up as slow operation of power brake): Restriction in atmospheric passage or sticky control valve Clean air filter for restriction in atmospheric passage If necessary, overhaul unit and check for misalignment of control valve assembly Check for dirty or sticky vacuum or atmospheric poppet as well as sticky control valve NOTE—Above condition may also be caused by internal hydraulic leakage or internal friction To correct, overhaul unit and check for leak at hydraulic power piston cup or ball check Check for binding in power piston assembly Check level of lubricant in vacuum cylinder

Brakes Slow to Release (or fail to release completely): May be caused by sluggish control valve action or internal friction. Overhaul unit and check for weak vacuum power piston return spring or atmospheric poppet return spring Check for dirty or sticky control valve Check for power cylinder lubricant level If necessary overhaul unit and check for binding in power piston assembly

No Power Assist (On first application after engine shut off): Caused by an external vacuum leak or an internal vacuum leak in the check valve Check and correct external leaks at valve body, external pipe, vacuum cylinder, and atmospheric poppet. For the internal leakage, overhaul or replace check valve assembly.

Brakes Apply When Engine Started Caused by broken or improperly assembled atmospheric valve return spring or control valve diaphragm return spring, sticking control valve piston

Air in Hydraulic System: Caused by an improperly assembled, defective or missing control valve piston secondary cup

Grabbing Brakes: Caused by sticking control valve piston or sticking power piston

Loss of Fluid from Brake System Caused by defective hydraulic cylinder cup or seal, defective or damaged control valve piston cup (crack or split in lip at center of cup), dirt chips or other foreign matter under lip of piston cups, improperly tightened or defective gaskets or rubber seals

Power Unit Fails to Operate Low or no vacuum due to clogged or restricted lines, defective check valve, clogged air filter (if so equipped)

REMOVAL OF POWER BRAKE UNIT: Disconnect brake lines at cylinder end plate Loosen vacuum line hose clamp at check valve and slide hose off Remove three nuts and lockwashers from cylinder mounting bracket and remove unit from car *NOTE*—Ford and Studebaker have stop light wires that must be disconnected before unit is removed

DISASSEMBLY OF POWER BRAKE UNIT: When disassembling Power Brake use care in handling parts to prevent their coming in contact with mineral oil or greases Do not handle hydraulic cups and seals with greasy hands

Hydraulic Cylinder Assembly: 1) Loosen the cylinder nut and unscrew hydraulic cylinder assembly from end plate Hold end cap in a vise and remove hydraulic cylinder from cap using an open end wrench on the flat part of cylinder Remove gasket and bleeder fitting from end cap

2) On 1954 Cadillac, Chevrolet 1955 1st Series and Earlier Trucks, and Studebaker, remove the bolt holding the hydraulic line end connection to the end cap and remove fitting and copper gaskets Scribe line on cylinder shell and end plate so these parts can be reassembled in their original positions Loosen hook bolts and remove cylinder shell, sliding tube out of rubber hose

3) On 1955 Cadillac, 1955 Chevrolet 2nd Series Trucks, and Ford, remove residual check valve snap ring, spring seat, spring and residual check valve Loosen hook bolts and remove cylinder shell, sliding connector pipe out of rubber hose

4) On all cars, compress piston spring by pressing down on end plate Hold piston in position with Vacuum Piston Retaining Strap, Tool J-5650 (two wire hooks and a plate can readily be made to hold piston in position) Remove hydraulic piston assembly from pushrod by holding retaining spring back and removing small pin Remove hydraulic piston cup from piston, remove snap ring, retainer, spring, and ball Remove hydraulic cylinder and seal Remove snap ring, then remove pushrod seal cup parts Drive out pushrod leather retainer with a flat end rod or drift

Vacuum Control Valve Assembly: 1) Scribe control valve body and end plate to insure proper location on reassembly Remove control valve body screws and remove control valve assembly with diaphragm and gasket Remove diaphragm from control valve body

2) On Cadillac and Studebaker, remove air intake filter snap ring, screen and filter, and take out lower snap ring and screen

3) On Chevrolet and Ford, remove snap ring which retains cover on control valve and poppet assembly and remove cover, valve spring and gasket,

4) On all cars, remove hydraulic control valve fitting from end plate Push piston out of fitting and remove cups from piston (washer between cups on Chevrolet and Studebaker) Remove seal, retainer ring, and stop washer from fitting

Vacuum Piston: Remove nut from threaded end of push rod, retainer plate, packing, and expander ring Remove small diameter piston plate with rubber seal ring Remove leather packing, larger diameter piston plate, and washer from push rod

Vacuum Piston Pushrod Assembly (Ford): Remove push rod lock ring from groove in piston guide Remove spring washer, then lift out pushrod, spring, bottom spring washer, and bottom lock ring

Vacuum Piston Pushrod Guide (Ford): Clamp hexagonal section of guide sleeve in a vise Remove guide sleeve to body gasket, washer, and nut Loosen outer locknut, then remove assembly from vise Remove locknut gasket, and guide sleeve Remove piston guide by drawing it into cylinder shell

Check Valve (Cadillac & Studebaker): Remove assy from elbow in end plate Remove plug from bushing and bushing from check valve assembly Remove snap ring, spring retainer, and spring with check ball Remove spring from check ball

REASSEMBLY OF POWER BRAKE UNIT: Before reassembling unit, clean all parts thoroughly, and after cleaning, wash all parts for hydraulic system in alcohol Be careful not to get grease or oil on hydraulic parts Use new rubber seals and cups when reassembling

Vacuum Piston: (*NOTE*—An assembly ring can be made by cutting a 1 section from end of a power cylinder) Place front (larger) piston plate in assembly ring with lip down Place new leather packing on plate with lip up, place new rubber seal in center of plate Install rear (smaller) piston plate with lip down Coil new wick inside lip of packing and cut it to proper size Soak wick in cylinder oil (not ordinary oil) and allow it to drain thoroughly Install wick Place packing ring inside wick with gripper points up, and engage notch at loop end of ring with hook at opposite end Install wick retainer plate with cutout portion over loop of expander ring Place flat washer over threaded end of pushrod (guide rod on Ford), insert pushrod (guide rod) through assembled piston parts, being careful not to damage inner seal ring Large piston plate should rest against flat washer Clamp hex on pushrod

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HYDROVAC POWER UNIT "PISTON TYPE" (C nt.)

(guide rod) in a vise, being careful not to damage polished surfaces. Install nut and tighten securely, being careful not to allow either piston plate to rotate while nut is being tightened Remove assembly ring Stake nut with center punch.

Pushrod Ass mbly (Ford)—Clamp hexagonal section of guide rod firmly in a vise Assemble pushrod attaching parts over beveled end of pushrod in following order Lock ring, one spring retainer, spring (large end first), second spring retainer, snap ring (smaller). Use care in assembling smaller diameter snap ring in groove at lower end of pushrod, to avoid distorting ring Insert end of pushrod in recess at end of guide rod. To attach pushrod to guide rod, compress spring and assemble to lock ring in groove of guide rod Be sure lock ring is firmly seated in groove of guide rod.

Vacuum C ntr l Valv Ass mbly: 1) Install stop washer and retainer ring in hydraulic control valve fitting. **2) On Ch vr l t and Stud baker,** dip piston cups in brake fluid and install on piston with washer between cups Install C-washer Lips of both cups must point away from end of piston with hole in it **3) On Cadillac and Ford,** install new rubber cups on piston with lip of cups toward small end of piston **4) On all cars,** install piston in fitting with hole in end of piston next to stop washer Install a new rubber seal gasket in groove in fitting. Install fitting in end plate and tighten securely. **5) On Cadillac and Stud baker,** install poppet return spring with small end down, retainer and snap ring in control valve body. Install new filter, screen and outer snap ring. **6) On Ch vr l t and F rd,** install poppet return spring with small end down, gasket, end cover with air inlet tube, and secure in place with snap ring. **7) On all cars,** place guide pins in control valve body screw holes in end plate (Guide pins can be made by cutting heads off three 8-32 x 2½" machine screws). Install gasket diaphragm, diaphragm spring (if so equipped), and control body on guide pins allowing cylinder tube to slide into connecting hose. *(CAUTION —When assembling diaphragm, spring, and control valve body, extreme care should be taken not to distort the diaphragm when compressing the spring).* Remove guide pins one at a time and install screws and lockwashers. Install hose clamps.

Cadillac Note—One side of valve body mounting flange is straight. This should be positioned next to hydraulic cylinder boss on end plate.

Hydraulic Cylinder Assembly: 1) Install new pushrod leather seal into end plate with lip of seal toward hydraulic cylinder side of end plate. Place end plate on bench and install stop washer with chamfered side down. Install seal cup with lip up and seal retainer with counterbored side next to cup (Cadillac & Studebaker), flat side next to cup (Chevrolet & Ford). **On Ford and Chevrolet,** next install spring with small end toward bore of end plate (No spring on Cadillac and Studebaker) **On all cars,** next install stop washer and install snap ring in groove.

2) Place vacuum piston return spring over pushrod with small end of spring next to piston, carefully guide pushrod through seat in end plate Compress spring. Use vacuum piston restraining strap or hook clamps to hold end plate and the cylinder together Install ball, spring, retainer and snap ring in piston. **On Cadillac and Studebaker,** install deflector washer and nut.

3) Dip hydraulic piston cup in brake fluid and install in groove with lip of cup toward check valve end of piston. Dip hydraulic piston in brake fluid and assemble piston on push rod. Install retaining pin in hole in piston and rod. When pin is in position, retaining spring will hold it in position. Place end cap in vise and install bleeder screw, end cap gasket, hydraulic line connector with copper gaskets and retaining bolt.

4) On 1955 Cadillac, 1955 Chevrolet 2nd Seri s Trucks, and Ford, install residual check valve, spring, spring seat, and snap ring.

5) Thread hydraulic cylinder into end cap with milled flats next to end cap, and securely tighten cylinder. Thread check nut on cylinder to limit of threads. Install hydraulic cylinder end seal against shoulder in end plate. Guide lip of piston cup into cylinder carefully, and threaded cylinder into end plate until cylinder bottoms firmly against end seal. Tighten cylinder until bleed screw on end cap is aligned with bleed screw in end plate and tighten check nut securely.

6) Remove piston retaining strap or clamps. Place rubber gasket in groove on end plate. Saturate cotton wicking by dipping vacuum piston in Shock Absorber Fluid, and allow excess oil to drain off. In addition, coat inside of cylinder shell lightly with shock absorber fluid. Insert piston into shell by tipping piston and gradually working it down into shell. Align scribe marks on shell and end plate (if made) and attach hook bolts. Tighten each bolt evenly until all bolts are uniformly tight.

Check Valve (Cadillac & Studebaker): Install end of spring over check valve ball. Install spring retainer plate with depression in plate in end of spring, install snap ring. Install plug in check valve body. Install fitting in bushing and install valve assembly in elbow on end plate.

INSTALLATION OF POWER BRAKE UNIT: Position power brake unit on mounting bracket and install lockwashers and nuts. Connect vacuum hose to check valve on power brake and tighten hose clamp. Connect brake line fittings to end plate **On Ford and Studebaker,** connect stop light wires. **On all cars,** bleed system (see above).

MIDLAND POWER UNIT

F rd Trucks (1954-60) ℂ
F rd Pass. Cars (1954-57)
F rd "Thund rbird" (1955-57)

ℂ - Hydrovac Power Unit also used on 1956-60 Trucks

►CHANGES & CORRECTIONS

►*1955 500 & 600 SERIES TRUCK BRAKE PEDAL "KICK-BACK" CORRECTION.* An improved design brake booster hydraulic cylinder spring retainer has been released to prevent possibility of brake pedal "kick-back" This retainer has same number as earlier type (TEAA-2423-A) but is identified by code number (8-55) to right of word "retainer" on package

DESCRIPTION: Consists of a vacuum power chamber, hydraulically actuated vacuum control valve, and an hydraulic slave cylinder, all in a single sealed unit Unit is mounted on left side of engine compartment and connected in hydraulic brake line between master cylinder and wheel cylinders There is no mechanical connection and no adjustments are required

OPERATION: With engine running, brakes released, power diaphragm is vacuum suspended Depressing pedal causes fluid to pass from master to slave cylinder moving control valve piston, which admits atmospheric pressure to front of diaphragm As pushrod moves, check valve seals fluid in slave cylinder and hydraulic line pressure builds up to operate brakes

REMOVAL & INSTALLATION: Depress pedal a few times to relieve vacuum Remove lines and attaching bolts To install reverse removal procedure

TROUBLE SHOOTING Brake Pedal Kicks Back—Engine Running—Slave piston cups leaking hydraulic check valve leak intermittent vacuum leak in unit

Brakes Do Not Release—Engine Running: Control valve piston sticking, hydraulic (slave piston) sticking, broken or weak control valve spring, dented or leaky diaphragm body

Vacuum L ak With Brak s Released—Engin Idl s Normally: Defective "O" ring seal or body-to-slave cylinder gasket, dirt or worn atmospheric valve seal, defective or dirty vacuum check valve

Vacuum Leak With Brakes R l ased—Rough Engin Idl: Leaking diaphragm in vacuum chamber, leaking control valve piston or diaphragm, leaking control valve vacuum valve seal.

Hard Pedal—Indicating Inoperative or Weak Booster: Clogged air cleaner element, sticking hydraulic (slave) cylinder piston, air leak at atmospheric valve seal, control valve diaphragm, control valve piston, or power chamber diaphragm

OVERHAUL: *TRUCK NOTE*—Do not remove breather in cab or controls mounted in engine compartment unless operating conditions indicate repairs are necessary

Disassembly: 1) Remove control valve bypass tube from control valve and the body Remove stop light switch Mark both halves of body with a scriber, then mark flanges of control valve and slave cylinder so parts can be assembled in their original positions

2) Remove clamp then remove outer body and the diaphragm and pressure plate assembly with return spring Remove vacuum check valve from inner body

3) Remove retainer and air intake hose fitting (or snap

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MIDLAND POWER UNIT (C ntinu d)

ring, screens, and filter) from control valve body Remove control valve to slave cylinder attaching bolts and lockwashers. Lift the control valve body, diaphragm spring, and the control valve piston and diaphragm assembly from slave cylinder body

4) Remove pushrod bushing, lockwasher, inner body, and gasket from slave cylinder body Remove transfer bushing and "O" ring seal from cylinder body

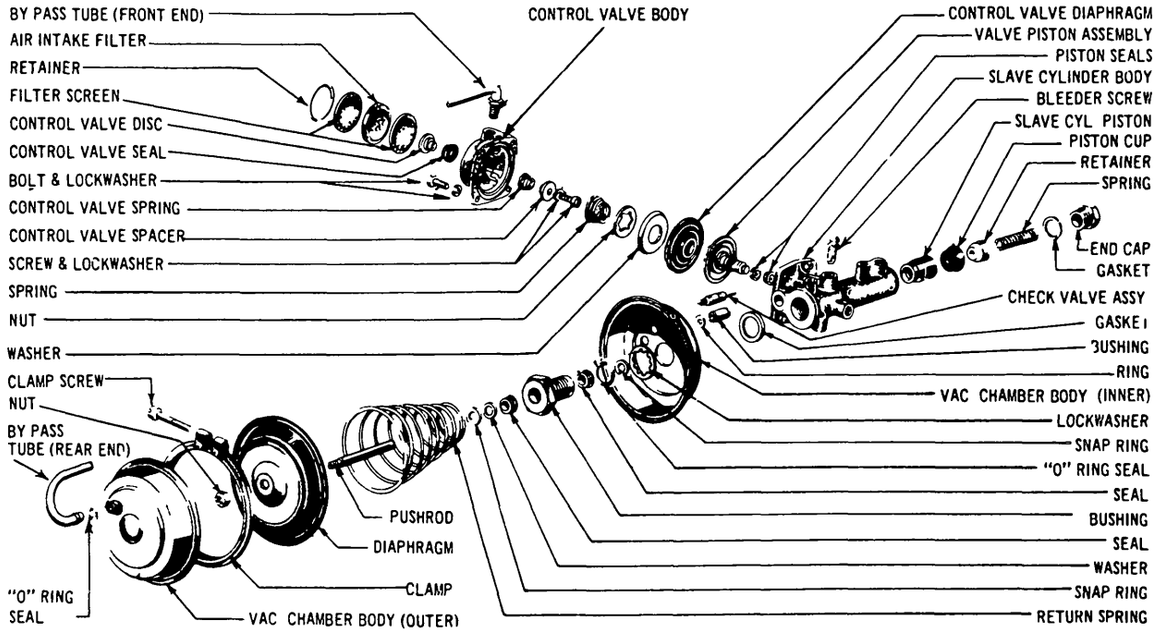
5) Remove end plug or cap, gasket, return spring and retainer, from end of slave cylinder. Remove slave cylinder piston cup and piston from cylinder. Remove inner and outer pushrod bushing seals.

6) Remove inner and outer seals from control valve piston. Remove control valve diaphragm plate and retaining nut by prying inner tangs of nut away from piston shaft. Separate the control valve disc and spacer by removing attaching screw and lockwasher. Then remove disc, seal, spring, and spacer from control valve body. Remove check valve retainer, check valve and return spring as an assembly from slave cylinder piston. Remove pushrod from diaphragm and disassemble check valve.

Insp ction: Wash all metal parts in brake fluid and dry thoroughly Use air to dry all internal passages. Replace all worn or damaged parts and if slave cylinder bores or control valve plunger show wear or evidence of corrosion, the slave cylinder body should be replaced. Replace pushrod if rough or damaged. If control valve seat is worn or damaged, replace control valve body.

R assembly: **1)** Assemble diaphragm on pushrod After nut is tightened, coat threads with shellac to prevent leakage. Assemble control valve disc, seal, spring, and spacer in the control valve body with screw and lockwasher. Position control valve diaphragm and plate on control valve, and secure diaphragm and plate solidly in place with nut Install control valve piston seals on piston

2) Insert check valve spring and valve and retainer in slave cylinder piston. Be sure check valve floats freely and does not bind in bore. Install the inner and outer pushrod bushing seals, and secure them in place with the retainers



TYPICAL MIDLAND BRAKE POWER UNIT

3) Coat the piston bores in slave cylinder body with hydraulic fluid. Dip slave cylinder piston, seal, retainer, and spring in fluid. Install piston in bore with recessed end toward pushrod bushing end of body Carefully position seal and retainer on top of piston. Insert spring in retainer, and secure it in place with end plug or cap, using new gasket.

4) Place new gasket and inner body of vacuum power chamber on slave cylinder body Make certain transfer bushing and "O" ring are in place before inner body is installed on cylinder body. Install pushrod bushing lockwasher over end of bushing. Thread bushing in place, be sure inner body seats squarely on cylinder body, then tighten bushing securely.

5) Dip control valve piston in hydraulic fluid, then install control valve. Position control valve spring on control valve diaphragm with small end of spring on diaphragm plate. Position control valve body over spring, align the scribe marks, then install control valve body-to-slave cylinder body attaching bolts and lockwashers. Tighten bolts solidly. Install air intake hose fitting (or screens, filter, and snap ring) on control valve body.

6) Place small end of diaphragm return spring on top of pushrod bushing Carefully insert end of pushrod into bushing. Align diaphragm plate on large end of spring. Place outer body of vacuum power chamber on top of diaphragm with marks in alignment Install clamp, making certain diaphragm head is properly positioned between two halves of chamber, then tighten clamp screw firmly.

7) Assemble check valve, then install it in inner body of chamber. Install a new seal on slip end of bypass tube, then install tube in outer body of chamber and control valve Tighten nut on control valve body firmly.

MORAINE POWER UNIT "PISTON TYPE"

Buick (1955-59)①
Cadillac (1956, 1958)②
Ch vr l t (1958)②
Oldsm bil (1955-59)②
P ntiac (1955-58)②

① - Hydrovac Power Unit also used in 1956, Bendix Power Brake Unit also used in 1957-58
② - Bendix Power Unit also used.

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 BUICK CHECK VALVE NOISE CORRECTION (Caused by Vacuum Leak Between Check Valve & Vacuum Tank or in Check Valve) (NOTE*–Check valve chatter may be caused by riding brake pedal causing drain on vacuum supply). Make vacuum check, after making sure that brake pedal is in fully released position, properly adjusted and with no binds in it, and that the check valve is free of foreign material and operates freely. If vacuum assist still not obtained, replace check valve (NEW Part No. 5455046) as follows: Remove vacuum line from check valve to "T" connection. Remove cap from old valve body and remove spring and valve *(NOTE*–Leave valve body attached to frame). Discard valve and spring. Cut vacuum pipe just ahead of first bend (From "T" connection end). Install 3/8" pipe flare nut, flare pipe. Install new valve on end of pipe that was just cut off and flared. Replace old valve cap (without spring and valve) Install new valve and vacuum line as an assembly and make sure hose at "T" connection makes sufficient contact with new valve Recheck vacuum assist

►*1955 BUICK HYDRAULIC PISTON REACTION PLATE INSTALLATION CAUTION* If reaction plate installed backwards, faulty brake operation will result and it will be difficult to select proper number of shims (See Overhaul below). Reaction plate should have concave side of rim toward shoulder of piston and rounded side of rim against reaction levers.

►*1955 PONTIAC MASTER CYLINDER SECONDARY CUP EXPANDER ASSEMBLY PRODUCTION CHANGE.* New finger type expander and spacer assembly, Part No 5454862, now used in production, and replaces spring loaded expander used on early cars. Finger type expander requires a new spacer (identified by black oxide finish). *NOTE*–It is not necessary to add expander to early production units which did not originally have it.

►*1955-56 BUICK SLOW PEDAL RETURN OR FAILS TO RETURN TO NORMAL POSITION·* This is caused by vacuum leaks in power brake cylinder, that are the result of any one of three conditions that follow

1) Brok n Air Valv . To check for broken air valve, push in on pushrod to separate valve and piston assembly from power piston, and gently move end of air valve (covered with rubber boot), sideways. Excessive movement indicates broken valve. *CAUTION* - Excessive pressure sideways will break a good valve.

2) Punctured Vacuum H se. Replace with new hose.

3) Weak Inner Piston R turn Spring. Valve & Piston assembly (small piston) not returning to unapplied position completely, causing vacuum leaks between valve reaction plate to piston seal and power piston (large piston). To correct install new inner piston return spring Buick No. 5455800. *NOTE* - New spring has greater length with larger coil diameter than first type spring. To install, remove power brake cylinder from car, mount it in vise (do not crack cylinder by overtightening vise), with hydraulic cylinder down. Remove pushrod boot and retainer from cover, air cleaner assembly, two housing cover screws, cover and gasket. Hold power piston down, disconnect vacuum hose from tee, remove tee and gasket from housing. Slowly release power piston. *NOTE* - Make sure lip of leather piston does not catch in holes in housing. Remove center return spring (valve and piston return spring) and replace it with new spring No. 5455800. Center new piston return spring in cylinder housing, then large return spring around it with its smaller end down. Locate bent end of spring wire between one of bolt heads and adjacent dimple in housing. Place power piston with attaching parts on large return spring so bent end of spring wire rests between two round bosses on piston guide. Locate piston so side of boss opposite vacuum hose clears vacuum tee hole in housing by ¾". Push power piston down in cylinder entering hydraulic piston in hydraulic cylinder and hold piston down while installing vacuum tee with gasket and two screws. Push vacuum hose on tee 5/8". Push power piston down to check for free operation and proper location of springs, then install gasket and cover on cylinder housing with two screws. Install filter assembly and rubber boot, and install power unit on car.

►*1956 CADILLAC BRAKE PEDAL LINKAGE BIND CAUSING BRAKE DRAG* Binding can exist at brake rod to relay connection, pedal rod at toe-board hole, and pedal rod-to-felt air seal retainer. *NOTE* - Check level of pedal for correct horizontal position in car as viewed from seat, before making repairs to eliminate rod binding. Correct by shimming between attaching bracket and steering column support

Pedal Rod to Toe-board Hole - Secure 1/8" clearance on rod with pedal in applied position, by moving pedal attaching bracket at support mount, laterally or by enlarging hole in toe-board.

Pedal Rod at Felt Air Seal - Centralize seal around rod by removing one screw from retainer and rotating entire seal and retainer around other screw, and relocating first screw.

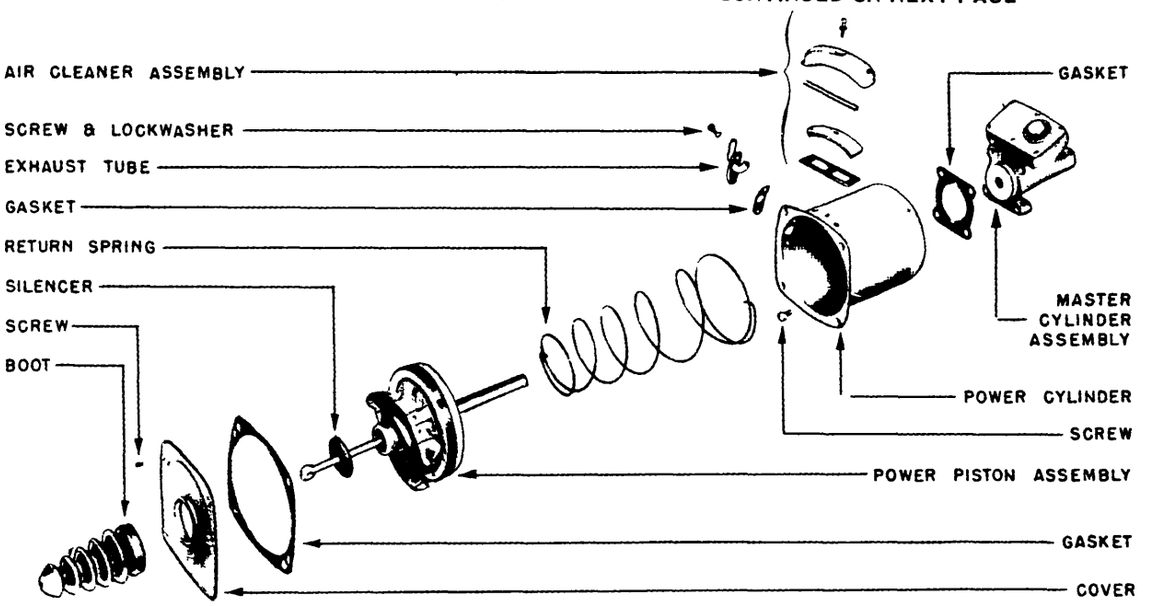
Brake Rod to Relay Connection - With brakes fully released, clevis pin should fit easily into clevis pin hole. Remove stock on upper edge of lower relay arm until clevis pin will enter freely

►*1957 BUICK BRAKE PEDAL HEIGHT ADJUSTMENT* With brake pedal in the full "OFF" position, distance from floor mat (with mat depressed) to top of rubber pad on brake pedal should be 5½". If not correct, loosen pushrod locknut and rotate pushrod as necessary for correct adjustment.

►*CADILLAC OIL DISTRIBUTOR BAFFLE INSTALLATION CAUTION·* **Oil distributor baffle now located against end of cylinder and held in place by piston return spring. DO NOT discard baffle Install baffle with small pocket in line with lubrication hole and large pocket in line with indentation near master cylinder attaching screw hole**

DESCRIPTION: Self-contained, combined vacuum and hydraulic unit using intake manifold vacuum and atmospheric pressure for its pressure. In "brake-released"

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MORAINE POWER BRAKE ASSEMBLY

MORAINE POWER UNIT "PISTON TYPE" (C nt.)

position power piston is balanced by atmospheric pressure on both sides of piston. Unit incorporates two main sections—vacuum power cylinder and hydraulic master cylinder. Unit replaces conventional master cylinder only. *NOTE*—On Buick master cylinder fluid reservoir is separate.

OPERATION: With engine running, brake unapplied, both sides of power piston are under atmospheric pressure. On application of brake pedal, intake manifold port opens and creates vacuum right side of power piston. Atmospheric pressure then moves power piston to right thereby exerting thrust on hydraulic plunger. This increases line pressure to four wheels. Release of brake pedal restores atmospheric pressure balance in power cylinder. In case of engine failure and consequent loss of engine vacuum, several applications of brake are possible by using vacuum supply in vacuum reservoir. In case of complete vacuum loss, brakes can be applied in conventional manner, although more effort is required due to loss of power assist

CHECKING & ADJUSTMENT: Check all parts of power brake system before disassembling Power Brake Unit whenever brake trouble experienced.

Adjustments: No special adjustments required. Anytime brake pedal goes to within 1". from floor (floor mat to underside of pedal pad), brakes should be adjusted. At time brakes adjusted, following inspections must be made.

1) Check vacuum lines and connections between intake manifold, check valve, vacuum reserve tank, and vacuum power cylinder for possible vacuum leaks.
2) Check fluid level in master cylinder reservoir
3) Check condition of air cleaner element and insert clean element, if necessary.
4) Check steering column pedal plate for loose screws. Check for free operation of brake pedal If binding exists, check for misalignment between pedal and vacuum cylinder pushrod.
5) Check stop light switch for proper operation

Bl eding Brakes: Bleed in same manner as for standard brakes. Do not use vacuum assist while bleeding. Engine should not be running and vacuum reserve should be reduced to zero by applying brake several times before starting bleeding procedure. *NOTE* - On Cadillac bleed master cylinder first by attaching bleeder hose to bleeder fitting on end of master cylinder and backing off fitting ¾ turn, and bleeding until brake fluid runs clear and free of bubbles Then proceed to each wheel cylinder.

LUBRICATION: Check level of fluid in reservoir every 1000 miles Bring level up to **(Buick)** - 1/4" below lowest point of bottom thread in filler opening, **(Cadillac)** - 3/4" below top, **(Chevrolet)** - 1/2" below top of filler cap **(Oldsmobile)** - Fluid must register on dipstick, **(Pontiac)** - 1" from top of filler plug opening

PERIODIC SERVICE: Intake manifold tee connector should be removed and cleaned Spring and Fall or every 10,000 miles

TROUBLE SHOOTING: Before checking Power Brake Unit for source of trouble check brake system.

Hard P dal 1) Vacuum failure due to faulty vacuum check valve, collapsed vacuum hose, plugged vacuum fittings, hose or pipes, leak between vacuum power cylinder and hydraulic master cylinder
2) Bound up pedal mechanism
3) Power Brake unit trouble—internal vacuum hose loose or restricted, jammed sliding valve, vacuum leaks in unit caused by loose piston plate screws, loose piston packing, faulty master cylinder piston, vacuum seal, or leak between hydraulic master cylinder and vacuum power cylinder, defective diaphragm

Grabbing Brakes (Apparent Off-and-On Condition): Power Brake unit valve trouble—reaction diaphragm leakage, faulty rubber bumper pad in reaction diaphragm, sticking sliding valve reaction, restricted diaphragm passage, master cylinder piston binding in guide

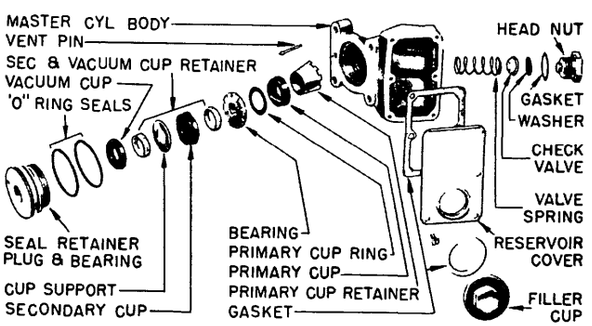
Pedal Goes to Floor (Or Almost to Floor): Brake adjustment, fluid reservoir needs replenishing, power brake hydraulic leakage—defective primary or secondary cup, defective vacuum seal, defective head nut or head nut gasket, cracked master cylinder casting, leaks at wheel cylinders or in pipes, or in connections.

Brakes Fail to Release (Or Slow Release): 1) Bound up brake pedal linkage
2) Weak brake shoe return springs.
3) Faulty residual check valve, excessive hydraulic plunger seal friction, excessive piston packing friction, restricted air passage in vacuum piston, restricted air cleaner, sticky air valve, broken piston return spring, broken air valve return spring

REMOVAL & INSTALLATION: *See Individual Car Pages*

OVERHAUL: *CAUTION – Clean unit externally with declene or diacetone alcohol DO NOT USE ANTI-FREEZE ALCOHOL, KEROSENE OR ANY OTHER OTHER MINERAL OIL CLEANING FLUID Hands must be free of mineral oil or grease when handling power brake parts* Remove filler cap and pump the pushrod to remove all brake fluid Then proceed as follows

Vacuum Cylinder Removal - *CAUTION - Air cleaner must be removed first to prevent air cleaner retainer screw from damaging leather packing of piston* Remove boot and felt washer from pushrod, and vacuum cylinder end plate and gasket Remove rubber hose from vacuum inlet tube inside power cylinder Hold vacuum piston assembly back in power cylinder and remove vacuum tube screws from cylinder. Remove tube Remove vacuum piston assembly and spring then scribe a mark across power cylinder and master cylinder for reinstallation and remove three master cylinder to vacuum cylinder screws Remove master cylinder.



MASTER CYLINDER UNIT

Disassembly: Vacuum Piston - On pushrod side, remove lock ring and stop plate, pull out air valve and pushrod (valve return spring, snubber and valve shims will come out with pushrod) Be sure to note number of shims *NOTE* - It is not necessary to remove pushrod unless it is noisy or excessively loose To remove pushrod, remove snap ring, pull out washer and pushrod from air valve, then remove rubber bumper from end of pushrod and "O" ring from air valve Press down on piston guide and remove screws, then carefully lift off piston guide and hydraulic plunger assembly. Remove "O" ring from vacuum piston guide. Slide vacuum piston guide off hydraulic plunger and remove "O" ring from plunger. If reaction plate or hydraulic piston defective, remove snap ring to separate them Remove six reaction levers, reaction spring, valve reaction plate and floating valve spring. Remove leather cup, cup expander and felt wick Remove floating control valve from vacuum piston To disassemble floating control valve assembly, pry retainer off diaphragm, push floating control valve through diaphragm (this frees retainer plate), then pull diaphragm from retainer Remove rubber vacuum piston top

Hydraulic Cylinder - Clamp hydraulic cylinder in vise with plunger up, then use wrench J-5794 to remove cylinder plug Remove two "O" rings from outside diameter of plug Remove secondary cup, washer, retainer and vacuum seal Lift out expander, spacer, plunger bearing, washer, primary cup and retainer Remove head nut assembly *CAUTION* - Head nut is under spring tension Remove residual check valve and spring, then remove rubber check valve seat washer from head nut

Cleaning & Inspection: Clean all parts with diacetone alcohol or clean brake fluid *CAUTION* - DO NOT use anti-freeze alcohol, kerosene, or any other cleaning fluid that might contain a trace of mineral oil Blow out all passages, orifices and valve holes Air dry and place cleaned parts on clean paper or lint free cloth *NOTE* - Should there be evidence of contamination or corrosion, completely flush hydraulic brake system Inspect rubber or leather parts for cuts, nicks, or other damage Discard all used "O" rings and external gaskets Check all friction surfaces for scratches, scores, pits, or cracks that might affect sealing or sliding action of piston cups Look for damaged threads or gasket seats, distortion or damage to rubber parts. Check master cylinder for free sliding fit with slight play Check vacuum cylinder for scratches, pits or other damage

Reassembly· Hydraulic Cylind r - Place cylinder in vise with threaded outlet hole up and insert check valve spring, then place check valve (concave side up) on spring Place new gasket and stretch new seat washer into head nut Screw head nut in place and tighten to 80-90 ft lbs Install filler cap and gasket Clampmaster cylinder in vise with large counterbore up Coat counter-

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MORAINE POWER UNIT "PISTON TYPE" (C nt.)

bores and threads with brake fluid, place conical primary cup retainer (notched end down) into bore, press primary cup into bore (lip facing and centered over small end of conical retainer) Place steel primary cup washer in place on back of primary cup, add plunger bearing (notched side up) so hub of bearing fits into counterbore on back of primary cup Place spacer on top of bearing, and new expander on top of spacer (fingers down) Make sure spacer and expander are centered over plunger bearing Place two new "O" rings on outside grooves of cylinder plug *CAUTION - DO NOT place "O" ring in center groove that has four vent holes* Install secondary cup washer and seat secondary cup (ribbed side up) in cylinder plug Lubricate "O" rings, secondary cup, and leather seal with shock absorber fluid, then carefully install cylinder plug and tighten to 20-30 ft lbs Place vacuum cylinder gasket on hydraulic cylinder so vent passage is open, (use alignment marks), attach vacuum cylinder to master cylinder and torque screws to 12 ft lbs

Vacuum Piston - Assemble floating valve with flat side of retainer ring against diaphragm, fit lip of diaphragm over outside diameter of retaining ring Hold flat side of diaphragm retainer plate against diaphragm and press floating valve into place in diaphragm Press valve spring retainer over hub of floating valve and the inner lip of the diaphragm Push floating valve assembly into vacuum piston, then install felt wick in expander and expander assembly in groove in vacuum piston with expander fingers outward and toward hub *NOTE* - Saturate new wick with Automatic Transmission fluid Hold wick and expander in place and install leather packing or cup (use cylindrical container to confine packing during installation) Snap valve diaphragm spring in place over valve spring retainer, seat valve plate on top of valve diaphragm spring so center portion nests in spring Seat reaction spring in recess of valve diaphragm retainer ring Set six reaction levers in place so small ends are toward center and they rest on reaction spring Install "O" ring in hydraulic plunger groove, add plunger reaction plate with raised edge extending away from plunger and install snap ring Install "O" ring onto machined hub of vacuum piston guide, lubricate plunger "O" ring and adjacent surface with silicone grease and assemble vacuum piston and piston guide Place plunger and reaction plate on reaction levers, press down levers until they are flat and each lever properly seated, then slide piston guide down plunger and into position on vacuum piston Align raised holes in piston guide with threaded holes in vacuum piston then install screws and tighten to 5-6 ft lbs *NOTE* - Master cylinder piston should have slight movement in vacuum piston assembly Install new rubber vacuum piston stop washer on hub flange of vacuum piston with rubber cement Assemble rubber bumper on end of pushrod, insert bumper and pushrod assembly into air valve Allow metal washer on pushrod to seat on back of rubber pushrod bumper and install snap ring Be sure pushrod is firmly locked in air valve Place new "O" ring in narrow groove on outside of air valve, coat ring and outside diameter of air valve with silicone grease Place same number (or four new) shims on Tool J-5805, invert vacuum piston and insert gauge into bore of vacuum piston Turn vacuum piston over and check position of pin Remove or add shims until pin is flush with or just slightly above gauge body When pin is more than .010" above gauge body, disassemble and check for bent reaction levers, reaction plate, or valve plate Place correct shims and snubber on small diameter of air valve, then insert valve return spring into small bore of air valve Hold vacuum piston assembly with hydraulic cylinder upward, insert (from below), the air valve, spring, and pushrod assembly into hub of vacuum piston Hold pushrod with air valve in vacuum assembly and turn assembly over and install stop washer and triangular lock ring (use small screwdriver as a pry bar to install lock ring) *NOTE* - Air valve will have approximately 1/32" travel against valve return spring before picking up load

Vacuum Piston Installation - Lubricate vacuum cylinder bore with Automatic Transmission or Hydraulic Brake fluid and place vacuum and hydraulic cylinder assembly in vise with vacuum cylinder upward Insert large coil return spring in vacuum cylinder with large diameter of spring at bottom (hook on bottom of coil spring should be placed in narrow space between any one of hex head bolts and closest locating dimple) *NOTE - See "Cadillac Oil Distributor Installation Note" above* Coat vacuum piston leather packing or cup with Automatic Transmission or Hydraulic Brake fluid, then install vacuum hose to vacuum piston assembly with rubber cement and position vacuum piston assembly on top of coil spring Press down on vacuum piston assembly and install vacuum inlet tube and gasket (slip hose onto inlet tube approximately 5/8") Release vacuum piston against inlet tube, with hose flat against piston without rubbing on vacuum cylinder walls Install vacuum cylinder end plate and gasket Install filter element and air cleaner cover by inserting filter cover attaching screw in cover and assembling filter element over cover screw Then install assembly to power cylinder

MORAINE POWER BRAKE UNIT "HYDRAULIC (DIAPHRAGM) REACTION" TYPE

Buick (1960)
Cadillac (1959-60)©
Chevrolet Pass. Cars (1959-60)©
Oldsmobile (1960)©
Pontiac (1959-60)©
Rambler (Exc. American) (1960)

© - Bendix Power Unit "Hydraulic (Disc) Reaction Type" also used

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 CADILLAC POWER BRAKE UNIT AIR VALVE RETURN SPRING PRODUCTION CHANGE.* A new spring, Part No 5460228, is being used in production and may be used for replacement to improve the "feathering" ability of the unit Brake units after Engine No 085791 will have the new spring

DESCRIPTION: This new diaphragm type vacuum brake unit has the diaphragm assembly balanced in atmospheric pressure (both sides of vacuum diaphragm are open to atmospheric pressure when in the released position) The hydraulic reaction feature of this unit transmits changes in hydraulic pressure to the vacuum valve through a reaction diaphragm to provide a more positive "feel" for the operator The new conventional (piston) type master cylinder is bolted to vacuum unit and can be removed without removing power brake unit from car The 1960 models use selective shims between power cylinder and brake master cylinder On Buick units, an additional reaction disc is used between master cylinder piston reaction plate and reaction levers

OPERATION: As brake pedal is depressed, the operating rod moves air valve forward until its seat contacts floating control valve, sealing off atmospheric pressure Further movement carries floating valve away from seat on power piston and opens the area forward of diaphragm to vacuum source while air valve remains closed As air is exhausted forward of diaphragm, atmospheric pressure on opposite side moves diaphragm and piston assembly forward As diaphragm and piston assembly moves forward, the master cylinder piston is depressed into master cylinder As pressure builds up in master cylinder, the hydraulic piston reaction plate moves away from its stop and presses against the reaction levers These levers in turn swing around their pivots and push the valve reaction plate back against the floating control valve snubbers In this manner, approximately 40% of the load on master cylinder piston is transferred through air valve and operating rod to the brake pedal

REMOVAL: Power Brake & Master Cylinder - Disconnect hydraulic line from master cylinder and vacuum line from power unit, then disconnect pushrod from brake pedal Remove nuts attaching power unit to firewall and remove unit

Master Cylinder: *NOTE - Master cylinder can be removed from power unit without removing power unit from car.* Remove hydraulic connection from master cylinder (cover opening and pipe to prevent dirt entering) Remove master cylinder attaching nuts and remove master cylinder from vacuum unit *NOTE - Master cylinder piston assembly will r main attached to vacuum unit. If necessary to replac piston, it will b nec ssary to disassemble vacuum unit.*

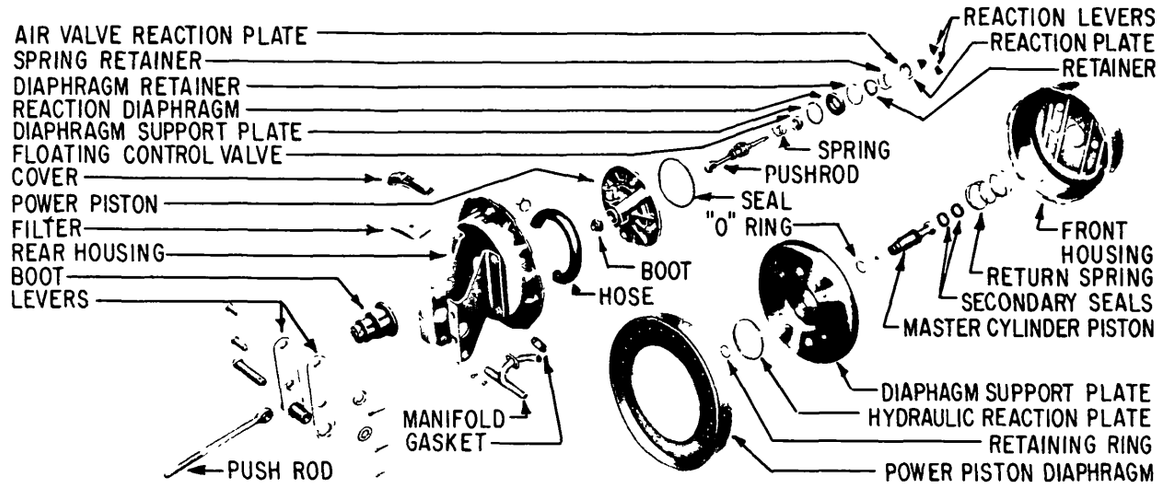
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MORAINE "HYDRAULIC (DIAPHRAGM) REACTION" TYPE (Cont.)

►*DISASSEMBLY & OVERHAUL CAUTION:* Use care to prevent damage to parts. Do not allow oil or grease to come in contact with diaphragm or other rubber parts. If necessary to remove power cylinder from master cylinder (1960 models), be careful not to damage selective shims found between these two parts. If shims are damaged, replace with new shims of the same thickness, as these shims control the distance master cylinder piston projects from front housing.

DISASSEMBLY: Power Brake Unit - Place power brake unit in a vise, clamping sides of master cylinder with pushrod up, then disconnect linkage from air valve pushrod. On Chevrolet and Pontiac, insert a pipe through rear housing mounting bracket holes and rotate counterclockwise to unlock rear housing from front housing. On Cadillac, use two bars between mounting studs (cover studs with heater hose or other suitable material to protect threads) for leverage to rotate housing. Lubricate end of air valve pushrod with brake fluid and lift rear housing so boot is free from end of pushrod, then pull vacuum hose from fitting on inside of rear half housing. *NOTE - Hose is fastened to power piston with a hose clamp.* Remove power piston assembly by lifting straight up, then remove power piston return spring. Reposition master cylinder in vise and remove master cylinder attaching nuts, then remove front half housing from master cylinder. Remove air filter cover and element from rear half housing. *NOTE - Do not disassemble linkage or remove exhaust manifold unless it is necessary to replace parts or to lubricate pins.*

Power Piston: Mount power piston in a vise so assembly is held lightly by two of the four retaining screw bosses and so master cylinder piston is upward. Remove screws and lockwashers from power piston assembly and lift large diaphragm and support plate from piston assembly. *NOTE - The support plate is under spring tension.* Remove power piston seal ring, then remove three reaction levers, air valve reaction plate, floating control valve return spring, and combination reaction and air valve return spring. Remove power piston from vise. Remove air valve boot from groove in power piston, then pull boot over end of rod. The air valve and pushrod assembly can now be pushed through the power piston dislodging floating control valve and reaction diaphragm assemby by pushing on end of pushrod assembly. *NOTE - Floating control valve assembly can also be removed without removing air valve by prying up under one side of reaction diaphragm retainer with a thin blade screwdriver.* Do not disassemble floating control valve further unless it is necessary to replace worn or damaged parts. Remove large power piston diaphragm from support plate and inspect for cuts, pin holes, distortion, folds, or cracks. Remove reaction plate retaining ring from master cylinder piston with snap-ring pliers, then remove reaction plate from piston and press piston through large diaphragm support plate. Remove master cylinder piston "O" ring. *NOTE - Do not remove secondary seals from master cylinder piston unless it is necessary to replace parts. To remove secondary seals, use a thin blade screwdriver to lift seal out of groove and over end of piston.*



MORAINE BRAKE POWER UNIT ASSEMBLY

CLEANING & INSPECTION: Wash all parts in alcohol and blow dry with air. Blow dust and cleaning fluid out of all internal passages. If inside of front housing is slightly scored or scratched, clean with crocus cloth or fine emery cloth. If scratches in front housing cannot be removed, replace housing. Keep all parts clean and do not allow them to come in contact with oil or grease.

REASSEMBLY: Power Piston - Mount piston in a vise with hub end down and lightly hold piston by two of the four screw bosses. Insert air valve and pushrod assembly into power piston with "eye" end of pushrod down. Place reaction diaphragm support plate (curved side down) into center cavity of power piston. Lubricate floating control valve with silicone grease and install into reaction diaphragm. Insert reaction diaphragm retainer under lip of reaction diaphragm and place the floating control valve spring retainer over reaction diaphragm so that the six rubber bumpers are properly positioned in spring retainer. Wipe a film of silicone grease on outside diameter of reaction diaphragm, then place floating control valve and reaction diaphragm assembly over air valve portion of air valve and pushrod assembly so that rubber face of control valve rests on annular seat of power piston. Press outer edge of reaction diaphragm into position in power piston. *NOTE - Be sure diaphragm is not distorted as the assembly is placed in power piston.* Assemble combination reaction and air valve return spring over air valve and into floating valve spring retainer to seat on the air valve. Install floating control valve return spring over air valve to seat on flange of floating control valve spring retainer. Lubricate 9/16" shaft of air valve with silicone grease, then position air valve reaction plate over air valve with dished side down. Lubricate reaction levers with silicone grease and install levers in machined locations in power piston. Rest small ends of levers on air valve reaction plate. Insert power piston seal ring into inner groove on flat surface of power piston face. If secondary seals on master cylinder piston were removed, reinstall them so lips of seals face small holes in piston. Install "O" ring on master cylinder piston and lubricate it with silicone grease "A", then press piston into large diaphragm support plate from flange side. Position reaction plate (with raised rim away from large diaphragm support plate) over master cylinder piston and secure with reaction plate retaining ring. Pull skirt of large diaphragm over support plate, then pilot master cylinder piston and diaphragm support plate (with large diaphragm installed over end of air valve) onto the reaction levers, aligning a vacuum port in support plate with passage in power piston. *NOTE - The position of the bead on large diaphragm and reaction l vers must be correct as support plate is finally positioned. If large diaphragm support plate can b hand pressed with relative ease to its seated position, then diaphragm and reaction levers are correctly position d.* Install support plate-to-power piston bolts and tighten to 5-7 ft. lbs. Install air valve boot, then slip exhaust hose on boss so it is parallel to power piston and attach clamp so one ear is against power piston.

Gauging Master Cylinder Pist n: *NOTE - It is n c ssary to gauge piston if front or r ar housing, pow r pist n assembly, master cylinder pist n, or master cylinder assembly is replaced with a new part.* To check master cylinder piston, remove front housing from master cylinder (DO NOT remove selective shims from studs).

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MORAINE "HYDRAULIC (DIAPHRAGM) REACTION" TYPE (C nt.)

CAUTION - B sur parts are not displaced from bore of mast r cylind r. Place Gauge J-8531 so that it stands perpendicular to front housing next to two lower studs, and bridges over end of master cylinder piston. Piston should be flush with gauge plus or minus .010". If there is excess clearance under legs of gauge, add shims (gasket material) over front housing studs as required to take up clearance. If there is excessive clearance at center of gauge, remove shims. When all shims are removed, and piston end is still lower than gauge, check for deformed parts and replace as required. Install front housing on master cylinder and tighten nuts to 20 ft. lbs. *NOTE - The dimension of Gaug J-8531 provid s a measurement of 1.833-1.844" from nd f mast r cylinder piston to master cylinder surface n pow r cylinder.* If more than five .010" shims are required for correct adjustment, recheck assembly of vacuum piston.

Pow r Brak Unit: Install master cylinder on front housing and tighten nuts to 15-20 ft. lbs., then install this assembly in a vise with open end of front housing up. Install power piston return spring over flange in center of front housing, then position power piston assembly so unattached end of vacuum hose is approximately 180° from master cylinder filler cap. Guide master cylinder piston through return spring and into master cylinder bore making sure the piston contacts back of primary cup. Attach hose to manifold so at least 5/8" of hose is on manifold. Lubricate end of pushrod with brake fluid and force pushrod through boot on rear housing. Install air filter assembly on rear housing. Install large diaphragm in front housing as follows: Start rolling diaphragm into housing, then rest rear housing on front housing. *NOTE - When positioned on diaphragm, air cleaner on rear housing should be slightly to left of master cylinder filler cap.* Plug one side of manifold and apply a vacuum to the other side. Push down on pushrod to permit area under diaphragm to be evacuated and allow atmospheric pressure to force diaphragm into place. Press rear housing down aligning the locking lugs. *NOTE - If diaphragm fails to enter front housing properly, rotate rear housing slightly back and forth while guiding housing into alignment with lugs., If necessary, bend leading edge of rear housing locking lugs to permit engagement.* Rotate rear housing in same manner used for removal, to secure housing to front housing. When properly positioned, air cleaner should be in line with master cylinder filler cap. *CAUTION - Bead of diaphragm must be in recess of front housing and it must not be pinched into slots as the housings are locked together.* Install linkage and check operation of power brake unit.

INSTALLATION: Reverse removal procedure (see above).

BUICK POWER UNIT

Buick (1954)

►CHANGES & CORRECTIONS

►*AIR-VACUUM CYLINDER PRODUCTION CHANGE: Two types used, Series No. 2, identified by letter "K" in front of production date on head of unit, has no control or dampener springs on ends of reaction rod and stop and uses new type power piston and push rod. When overhauling Series No. 1 Power Brake Unit control and dampener springs must be discarded and new power piston and push rod installed. When changes made stamp or paint (use red or yellow) letter "K" on head of unit preceding date of manufacture.*

DESCRIPTION: Vacuum suspended type. Self contained hydraulic vacuum power braking device utilizing engine intake manifold vacuum and atmospheric pressure for its power. It consists of three separate units as follows:

Power Unit: Three elements are combined to make up this single unit, namely

(1) **Air-Vacuum Cylinder** comprising a cylinder, power piston, and piston return spring.

(2) **Hydraulic Cylinder** containing an hydraulic plunger, return spring, and compensating port.

(3) **Control Valve,** mechanically actuated which controls degree of brake application or release in accordance with foot pressure applied to brake pedal It consists of a valve push rod, slide valve, reaction rod, reaction spring assembly, and counter-acting spring.

Hydraulic Fluid Reservoir: Mounted under hood.

Manifold Check Valve: Located in vacuum source line. Maintains vacuum in unit should engine stall.

Pow r Brake Vacuum Pump: Consists of a motor driven vacuum pump with a control relay (see Wiring Diagram). Control relay circuit is connected to accessory terminal of ignition switch (at the car fuse block) and is grounded through the generator main brush. The vacuum pump will operate whenever the engine speed is less than 250 RPM. with the ignition turned on, and supplies vacuum for the power brake operation. When the engine speed exceeds 250 RPM. (which is less than normal idle speed of 450 RPM.) the voltage developed by the generator causes the relay to open and cuts out the vacuum pump. At higher speeds manifold vacuum is sufficient to provide for brake power unit operation. The vacuum pump provides a "Stand-by" vacuum source in the event of engine stalling.

OPERATION: With engine running, brakes unapplied, full vacuum chamber of the unit (both sides of power piston) is held at engine manifold vacuum. Application of the brake pedal causes atmospheric port to open, admitting air to the cover side of the power piston, while full manifold vacuum is maintained on the cylinder side of piston. This pressure differential causes power piston to move forward, thereby exerting a thrust on the small piston in the hydraulic cylinder. This increases line pressure to the four wheels. Release of the brake pedal restores the vacuum balance in the power cylinder. Should failure in the vacuum power system occur, brakes can still be applied conventionally.

POWER BRAKE VACUUM PUMP: Used on all cars after Oct. 1, 1953. May be installed on earlier cars.

Servicing—No attention required other than pump lubrication. At 5000 mile intervals, remove filler screw from top of pump unit, fill as necessary with regular SAE 5 oil.

Specifications—Vacuum pump and motor assembly is Trico or Movac. Serviced as an assembly.

Control Relay—Delco-Remy No. 1116896. Contact gap should be .025" (.017-.033").

Contact Opening Voltage—5.7-7.2 volts.

Contact Closing Voltage—Not more than 3 volts after excitation of 12-15 volts.

Fuse—14 ampere. In fuse holder in line between the car fuse block and the control relay.

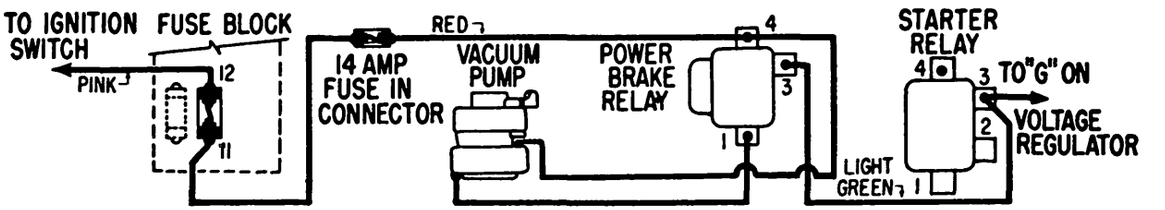
CHECKING & ADJUSTMENT: Check all parts of the power brake system before disassembling the Power Brake Unit whenever trouble is experienced.

Pedal Linkage Adjustment: In cases where hard or sticky initial pedal pressure is encountered or where pedal fails to return to release position when foot removed, check for lack of lubrication of pedal shaft or binding of clevis pin due to rusting or chloride corrosion. To correct latter condition drive out pin and install new pin or clean up old pin. (Early production has no grease fitting at this point —late production has straight fitting). If no fitting in lever, remove engine splash pan, drill and tap lower end of lever with 1/4 x 28 thread and install a 90° grease fitting. Grease fitting should be turned toward rear of car to permit access to fitting with grease gun. Reinstall splash pin. If binding still occurs with joints lubricated, it may be caused by mis-alignment of pedal shaft with push rod. With push rod in position loosen bolts which attach pedal shaft bracket to frame and permit bracket to shift to a free position. Retighten bolts.

Pedal Stop Adjustment: With pushrod removed, adjust pedal stop bolt so that pedal grommet is compressed to 7/8" height (1954). Tighten locknut.

Push Rod Adjustment: After adjusting pedal stop, install push rod and loosen adjusting jam nut. Holding pedal against stop, adjust push rod length to provide 1/16" clearance or lost motion in power cylinder. Note that in making adjustment only finger tip pressure should be used in pushing rod into power cylinder. Pressures above two pounds will

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BUICK P WER BRAKE VACUUM PUMP WIRING DIAGRAM

BUICK POWER UNIT (C nt.)

start valve moving. The 1/16" clearance should be in addition to any movement of cylinder valve. ***CAUTION—Great care must be taken when installing push rod into valve body. Any pressure on push rod will open valve. An open valve will build up pressure in hydraulic system causing brakes to lock after a few miles of operation.*** Shorter adjustment safer as long as push rod will actuate brake valve even with brake pedal fully released.

Brake Shoe Adjustment & Pedal Height: Brake shoe settings and procedures same as for manual brakes. After brake shoes properly adjusted, pedal will have certain height which cannot be adjusted up or down. Normal pedal height from lower, back edge of pedal to floor mat is approximately 2".

BLEEDING HYDRAULIC SYSTEM: Using pressure bleeder attached to fluid reservoir under hood of car, bleed **first** the cylinder **end** bleeder until fluid runs clear, **second** at cylinder **flange** bleeder, and last at the four wheel bleeders. When fluid runs clear at all points, start car engine, pump brake pedal several times, and rebleed at two bleeder screws on unit. After bleeding completed, check for brake system leaks while applying heavy brake pressure, with car engine running.

TROUBLE SHOOTING: If operation unsatisfactory, check as follows:

Brake System Loses Fluid: Tighten all connections. If fluid loss still occurs, the trouble is probably worn or damaged primary cup, seal, reaction cup, or reaction "0" ring. If evidence of presence of abrasive material, polish out light scores with very fine polishing paper, then thoroughly wash parts before assembly. Use Kit in reassembly. NOTE—If heavy abrasive action has taken place due to severe contamination of brake fluid, install new power piston and sleeve assembly after thoroughly flushing reservoir and wheel cylinder lines.

Brakes do not Release Properly: Brake pedal arm, fulcrum or pushrod clevis may be binding; push rod adjustment too long; inspection screw and gasket loose or missing; excessive friction caused by "dry" leather piston cup in 6" diameter air-vacuum cylinder. To remedy the latter lubricate cup by oiling through inspection hole in head of unit, using only 2 or 3 ozs of special oil furnished in Kit. Then back off shoes and, with engine running, pump pedal several times until leather frees up. CAUTION—***Do not pour this special oil into reservoir. It will contaminate fluid.*** Other causes of above difficulty are plugged compensation holes near end of power piston sleeve, broken residual valve spring or power piston return spring, cylinder mis-alignment, damaged or weakened control spring or dampener spring in Series 1 units, or weak or damaged reaction rod spring in Series 2 units (Series 1 units have date only on head of unit, Series 2 units have date preceded by "K"—See Production Change above); excessively dry "0" ring on outside diameter of air valve seat (Series 2 units only). Use entire Kit when making replacements.

Power Unit does not Boost: To determine if unit operating, stop engine, then depress brake pedal several times to eliminate all vacuum from system. Apply brakes, and while holding foot pressure on pedal, start engine. If unit operating, pedal will move forward when vacuum power is added to pedal pressure. **If above check shows unit not operating** manifold check valve may be stuck in closed position; bent, broken, or obstructed vacuum source line from engine to check valve or check valve to unit; blocked air inlet to air cleaner cover; blocked air passage in guide sleeve under boot; jammed air valve seat in power piston due to foreign material becoming lodged in power piston air valve seat bore cavity. **If above test shows unit is operating** difficulty may be damaged secondary cup, insufficient fluid in system, glazed brake lining, grease or brake fluid on linings, bound up pedal fulcrum or push rod clevis. When replacing parts, use **entire kit.**

REMOVAL: Remove cranking motor splash pan. Disconnect return spring, remove clevis pin at front end, then remove brake pedal pushrod with cylinder pushrod attached. Disconnect breather tube which is clamped to inlet tube on power cylinder air cleaner cover. Disconnect hose and pipe from vacuum chamber (rear) end of power cylinder. Disconnect reservoir-to-hydraulic cylinder pipe, allow reservoir and pipe to drain. Disconnect distributor-to-cylinder pipe and allow to drain. **Discard old fluid** and cover pipe ends with tape to exclude dirt. Remove nuts and lockwashers attaching power cylinder to its support and remove cylinder from car.

INSTALLATION: To install, reverse removal procedure, except for installation of pushrod and splash pan. Adjust brake pedal stop and pushrod, then bleed hydraulic system.

DISASSEMBLY: Major Components.

Thoroughly clean entire exterior of Brake Power Unit, being careful not to allow dirt and solvent to enter unit. ***CAUTION—Use extreme care to prevent hydraulic system parts coming in contact with mineral oil or grease.***

1) Remove push rod boot and discard.

2) Clamp unit in vise with hydraulic cylinder end down. In clamping unit USE NO MORE PRESSURE THAN NECESSARY TO HOLD IN POSITION (to avoid cracking or distorting cylinder).

3) Remove air cleaner cover, lift out cleaner core.

4) Remove three head bolts and lockwashers, then insert screwdriver in slots in flange, twist, then remove head by tapping up evenly on flange, using screwdriver and heel of hand, or light hammer. CAUTION—Removing head releases return spring unless power piston held down during head removal. Remove return spring.

Vacuum Side of Unit: 1) If power piston and guide have been removed with head, set power piston assembly (with head) in holding fixture with power piston end **down** and guide end **up**, lift head off power piston guide. Remove "0" ring and bumper from outside diameter of head, **discard.**

2) Place head in arbor press with inside face **up.** Remove bearing, "0" ring, and guide seal. **Discard** "0" ring and guide seal, but **not** bearing.

3) With power piston assembly still in holding fixture, bend back lip of leather piston cup, remove wick and expander spring, **discarding wick** only.

4) Disassemble power piston and guide assembly by removing three bolts and lock washers, lift guide assembly off power piston. Discard "O" ring.

5) Remove floating control valve assembly from guide assembly, **discard valve but not spring.** Lift **off leather piston cup and discard, lift air valve seat out of power piston and discard.**

6) Lift out control spring (Series 1 only) and reaction rod spring from power piston, lift out reaction rod and stop assembly, lift out dampener spring (Series 1 only). ***Discard Series 1 control and dampener springs*** (See Production Change above). Remove washer from reaction rod and stop assembly, **discard** washer.

7) Insert drift pin into center of power piston, push out reaction rod piston assembly. Using ***extreme care*** to avoid marring piston, remove "0" ring and reaction cup from reaction rod piston, **discard.**

Hydraulic Cylinder: 1) Drain hydraulic cylinder thoroughly ***(do not re-use fluid).***

2) Set housing and cylinder assembly on bench, with cylinder end **up,** remove four hex nuts and lockwashers from cylinder flange, lift cylinder off housing, **discard** cylinder-to-housing "O" ring.

3) Place cylinder in vise with outlet end **d wn** and flange end **up;** ***do not grip tightly.*** Using wrench, remove cylinder plug assembly (turn counterclockwise). Disassemble cylinder plug assembly ***by hand*** by removing primary cup, retainer and seal. **Discard cup and seal but not retainer.**

4) Remove power piston bearing assembly. Be careful to avoid marring inside diameter of bearing. Withdraw bearing carefully. ***CAUTION—Removal of bearing releases residual valve spring, which will fly out unless controlled.***

5) Remove secondary cup retainers and secondary cup. **Discard cup but not retainers,** remove "0" ring and **discard.** Unless damaged, do not remove blue steel secondary cup supporting washer. If necessary to remove, apply compressed air to a filler port on outside diameter of bearing.

6) Lift residual valve spring retainer off hydraulic cylinder, then lift spring and residual check valve assembly out of cylinder. Remove residual check valve assembly from end of spring by prying off with screwdriver, **discard** valve. Remove and discard rubber residual check valve seat (loosen from end of cylinder by prying with a screwdriver).

CLEANING & INSPECTION: Before any part of unit is reassembled, all parts must be thoroughly cleaned, using diacetone alcohol or clean brake fluid. Avoid allowing any dirt or grit to get into unit during assembly.

REASSEMBLY: ***NOTE—The Power Brake Cylinder Overhaul Kit includes all necessary replacement parts for both vacuum and hydraulic elements. Whenever unit disassembled for service, all parts contained in Kit should be replaced, regardless of whether they show wear at the time. BEFORE REASSEMBLY, WET ALL "O" RINGS AND CUPS WITH BRAKE FLUID, EXCEPT PRE-GREASED "O" RINGS AND SEALS SUPPLIED.***

Hydraulic Cylinder: 1) Mount hydraulic cylinder in vise with flanged end up. Install spring, residual check valve with concave side outward, and head nut with new gasket, and check valve seat in hydraulic cylinder. Tighten nut securely.

2) Install secondary cup retainer in cylinder with notched edge inward, then install secondary cup with flat side outward, using care that cup lip is not turned back at any point. Place secondary cup support washer on piston bearing with brake fluid, install bearing with notched face outward, and center of bearing in cylinder bore.

3) Place primary cup spacer on piston bearing with notched edge down and center it on bearing so it will not be damaged when cylinder plug is installed.

4) Install a new seal into cylinder plug with flat side inward, seal retainer with flat side outward,

CONTINUED ON NEXT PAGE

BUICK POWER UNIT (C nt.)

and a new primary cup with flat side inward against retainer. Use finger to force outside lip of both seal and cup down and outward against bore of plug to insure sealing contact. Screw plug into hydraulic cylinder by hand, then tighten it firmly with a wrench **but do not use force.**

5) Place new "O" ring around cylinder plug, then install hydraulic cylinder on housing with head nut on **opposite** side from vacuum tube on housing. Install nuts on all studs **but do not tighten.**

Power Piston Guide Assembly: NOTE—Before reassembling Guide Assembly, inspect inner end of guide sleeve where it seats against air valve seat assembly. ***This must be Smooth and Clean.***

1) Assemble expander spring to power piston guide assembly, with ends bent in. With power piston guide on bench, shaft end up, by hand place spring in groove so that approximate center of spring coincides with one of the four slots in power piston guide flange; insert wedge (supplied in Kit) through slot to hold spring in place. Next, wrap each end of spring around power piston guide, secure with wedges in two side slots, then complete wrap of spring, with ends overlapping under fourth slot, lock in place with fourth wedge. Remove first three wedges ***(CAUTION—Final wedge will be removed in step 5—wedges must be removed at final assembly).***

2) Saturate wick in special oil supplied with Kit, assemble to power piston guide over expander spring **with grain of felt running parallel to centerline of power piston. Be sure joints of wick and spring do not coincide.**

3) Invert assembly and set in holding fixture, assemble new leather cup to power piston guide, then slide service ring down over leather cup. Be sure heel of leather cup does not ride over edge of power piston guide and flange lies flat against its face.

4) After wetting inside diameter of new floating control valve assembly with brake fluid, place spring on retainer. Press complete assembly down on power piston guide stop. Install new "O" ring on hub.

Head, Bearing & Seal Assembly: 1) With cylinder head resting on bench, hub end up, insert bearing with flat side down, then press new "O" ring into bearing groove with finger. Insert new greased guide seal (felt side up), use care not to remove grease.

2) Using arbor press, apply load to **outside edge** of seal, press into position. Apply only enough pressure to bottom seal on bearing, ***do not crush.***

Power Piston, Guide, Reaction Rod & Head Assembly:

1) Install a new metering hole seal over end of reaction rod in bore of stop and press down firmly. Install a new stop washer over other end of rod and seat it firmly against the stop.

2) Install new "O" ring in groove of reaction rod, being careful to preserve silicone grease on "O" ring, then install reaction rod in piston with a twisting motion.

3) Install a new "O" ring in groove of reaction piston, being careful to preserve silicone grease on "O" ring, then install piston over end of reaction rod **with wide land inward,** and press it down into bore of power piston sleeve.

4) Wet a new reaction cup with brake fluid, place it over end of reaction rod with lip side outward and carefully push it down into bore of power piston sleeve. Install spring and retainer over end of reaction rod, compress spring and install a new cotter pin to retain these parts.

5) Mount piston on holding fixture with sleeve down, then install control spring around reaction rod stop.

6) Install new "O" ring in outside groove of air valve seat, being careful to preserve silicone grease on "O" ring, then install valve seat assembly in power piston above reaction rod.

7) Place piston guide over piston and insert push-rod through guide to hold air valve seat down against reaction rod spring while starting bolts with lockwashers. Use three equally spaced holes in guide (Other three holes are air passages). After starting one bolt, remove expander spring wedge, then install other bolts and tighten all securely, using care not to strip threads in aluminum piston. Remove service ring.

8) Place cylinder head on bench, hub end up. Insert new guide seal into hub between bronze bearing and flat wick retainer washer that are inside hub; lips of seal must be upward away from bearing. Slide wick retainer washer down against seal, install a new wick in hub between washer and outer lip of hub, then move washer up snug against wick. Apply any remaining grease in seal and wick packing envelopes to inside of hub.

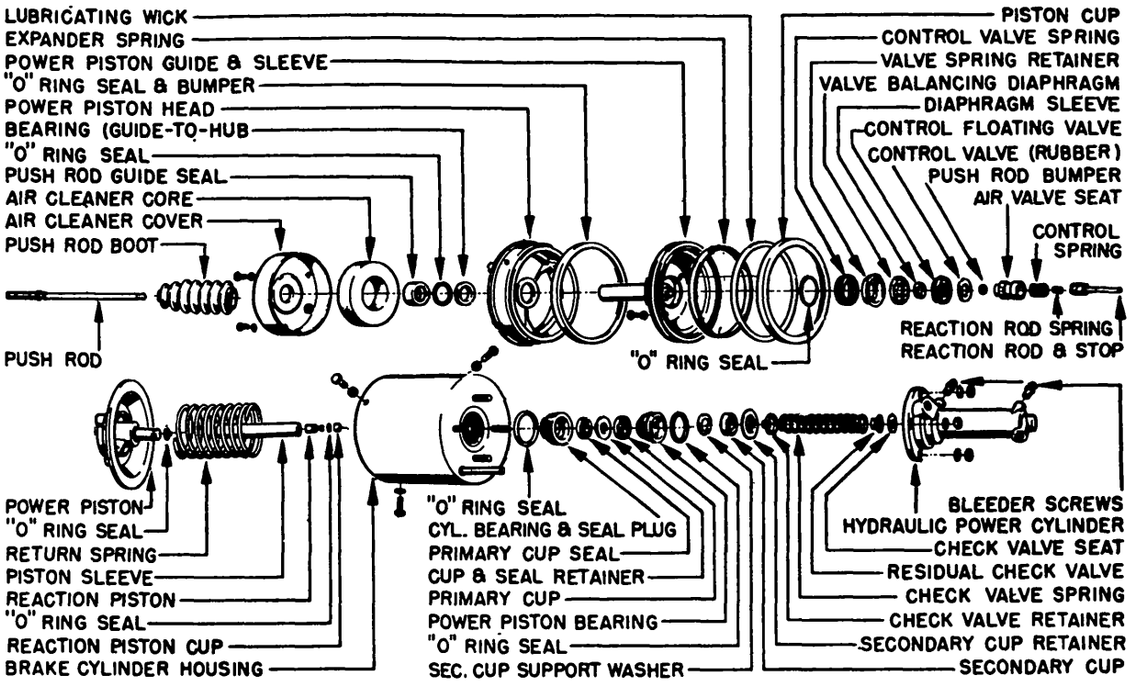
Complete Unit: 1) Install new rubber "O" ring and bumper on outside diameter of head, then wet outside diameter of rubber with oil supplied in Kit. Oil inside of vacuum cylinder and oil leather cup on outer diameter of power piston guide.

2) With housing and cylinder assembly held in vise, housing up, install return spring so that it nests inside the four cylinder flange head bolts.

3) Set power piston and guide assembly in place with retaining shoulder nesting in return spring, then press power piston and guide assembly down against return spring and into housing about two inches. Pour remaining special oil supplied in Kit (should be 1-2 ozs.) into housing on power piston assembly. ***Avoid pouring oil into air holes.***

4) While holding power piston down, assemble cylinder head assembly over power piston guide sleeve and into housing. Locate head with inspection screw hole on opposite side of unit from vacuum tube on other end of housing (1954).

5) Remove assembly from vise and press guide sleeve end down on bench to hold piston and guide in fully applied position while tightening hydraulic cylinder stud nuts evenly. Power piston must move freely when all nuts are tight.



TYPICAL BUICK BRAKE POWER UNIT ASSEMBLY

CHRYSLER VACU-EASE BRAKE POWER UNIT

Chrysler Six & Eight (1954)
D Soto (1954)
Dodge Six & Eight (1954)

DESCRIPTION: -The valve housing and cylinder unit are mounted as an assembly on one end of the main diaphragm housing. The valve housing assembly controls the relative air pressures on both sides of diaphragm. Fluid return system built-in **NOTE**—The External Valve Type unit can be used to replace the Internal Valve Type by using an Adapter Kit, Chrysler Part No. 1321149.

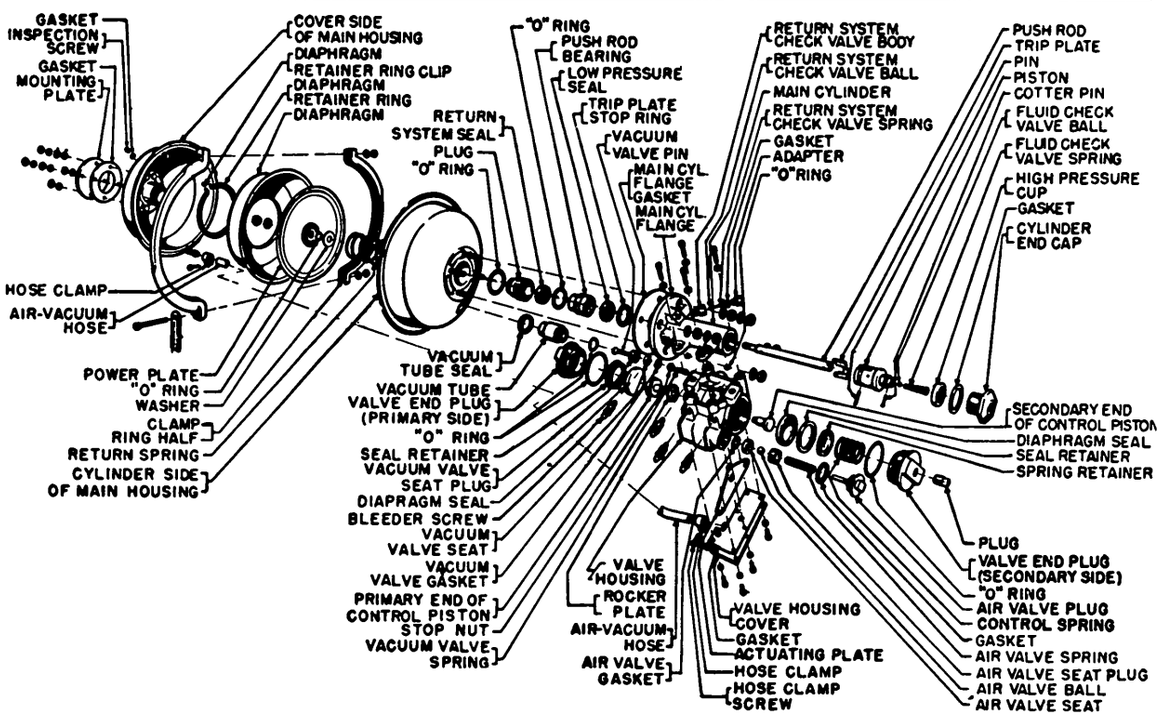
ADJUSTMENT: None required.

►*CAUTION:* Repair of the vacuum and air valves in the field is not recommended by the manufacturer, since these parts are specially calibrated.

EXTERNAL VALVE TYPE UNIT OVERHAUL: After removing the unit from the car, proceed as follows. ***Cleanliness is extremely important.***

Disassembly: Clamp unit in vise (grip four mounting screws). Loosen cylinder end cap and clamp on hose. Remove four Allen head screws holding valve housing to cylinder, and remove housing. Invert the unit, mark both halves of housing, remove clamp ring and disassemble cover side of main housing from cylinder side. Remove hex nut from center of power plate and lift off plate and diaphragm assembly. Remove small "O" ring and washer from end of push rod and remove return spring. Remove the four cylinder-to-main housing nuts, and remove cylinder. Clamp cylinder in vise with push rod end up. Screw special protective "thimble" (included in repair kit) on threads of push rod end, unscrew return system seal retaining plug and remove it. Pull the push rod out of the cylinder. Remove cylinder end cap and examine cylinder walls. Remove light scratches with crocus cloth, and clean with alcohol. Replace badly scored cylinders. Remove cotter pin, fluid check valve ball and spring, and bronze bearing from push rod.

Reassembly: Remove secondary cup from piston being careful not to scratch the anodized aluminum surface, and replace with a new one. Drop check valve ball in piston, install ball spring (small end to ball) and install cotter pin. Lubricate piston and cylinder with brake fluid, insert push rod and piston assembly from cap end of cylinder. Install cylinder cap with new copper gasket, finger tight. Clamp cylinder, push rod end up in vise, and install stop plate washer. Remove primary cup from inside bronze bearing, and "O" ring from outside of bronze bearing, and replace with new cup and ring. Lubricate bronze bearing and slide into cylinder over push rod with primary cup down. Press down lightly with thumb. Lubricate inner lip of retaining seal, slide seal and plug assembly over end of push rod. Screw retaining plug into cylinder and tighten. Place cylinder in vise and tighten end cap to 110 ft. lbs. torque. Remove special thimble nut from threads on push rod. Replace "O" ring seal, and cylinder flange gasket between cylinder and main housing. Remove cylinder from vise and assemble to main housing with flat side of cylinder facing the short studs. Install lock washers and nuts and tighten to 150 ft. lbs torque. Clamp assembly in the vise with push rod end up, and install flat washer first, and a new small "O" ring on end of push rod. Install spring in boss of power plate and press plate and diaphragm down over end of push rod against spring. Secure assembly to push rod with nut and lock washer tightened to 40 inch pounds torque. Assemble the two halves of the housing (lining up marks). See that cross-over tube rests in slot in cylinder side of main housing. Install clamp ring. Tighten clamp ring bolts, being careful to center cross-over line between ears of clamp ring. Pull vacuum tube out of valve housing and replace "O" ring and rubber grommet. Lubricate "O" ring only, and re-install vacuum tube, "O" ring first, into valve housing. Replace "O" rings used between valve housing and cylinder. Reconnect housing hose. Fasten the valve housing to cylinder.



VACU-EASE BRAKE POWER UNIT (EXTERNAL VALVE TYPE)

TROUBLE SHOOTING: Brakes do not Release Properly—With engine **running**, check the brakes for release If not released, crack line from master cylinder to power unit If this releases brakes, trouble is **not** in power unit If brakes not released, crack hydraulic line at end of cylinder of power unit (line between power unit and wheel cylinders) If this releases brakes, power unit is at fault (missing inspection screw or gasket on main housing cover)

Unit does not Boost: With engine running, press the pedal down and listen for a rush of air through the power unit air cleaner If no rush of air is heard, check if vacuum is present at the unit by disconnecting the line If no vacuum is reaching the unit, check for plugged line, or defective vacuum check valve (at the engine manifold) If a rush of air is heard at the unit air cleaner when the pedal is depressed and booster still is inoperative, it indicates the fluid check valve is not seating properly If with engine running, a continuous rush of air is heard, without operating the brake pedal, it indicates the diaphragm punctured or cross-over line between valve housing and cover is leaking.

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "INTEGRAL TYPE" POWER UNIT

Chrysler & Imperial (1955)
De Soto (1955)
Dodge (1955–56)
Plymouth (1955–56)

DESCRIPTION: Integral type, self-contained, vacuum-suspended, power braking device using engine intake manifold vacuum and atmospheric pressure for its power. Unit incorporates air-vacuum housing, hydraulic cylinder, fluid reservoir, air cleaner, and vacuum check valve. Unit is mounted on dash above brake pedal.

OPERATION: With engine running, brakes unapplied, both sides of power piston are under a vacuum. Application of brake pedal causes atmospheric port to open, forcing power piston forward and thereby exerting a thrust on hydraulic plunger. This increases line pressure to the four wheels. Release of brake pedal restores vacuum balance in power cylinder.

CHECKING & ADJUSTMENT: Check all parts of the power brake system before disassembling the Power Unit whenever brake trouble experienced.

Adjustments: No adjustment of Power Unit for free play or return stop is required. Unit has built-in pedal return spring and a pedal return stop. Pedal height and travel are determined by the combined length of the pushrod and pushrod end (clevis) which are adjustable.

Pedal Height & Travel Adjustment (Unit on Car)– Slide scale next to boot, inside of pedal bracket up to and against dash panel, and measure distance back to center line of clevis pin. Distance should be 8 57/64" (Chrysler), 8 23/32" (Others). If not, re-adjust clevis on rod, re-tighten clevis jam nut and re-check dimension.

Pedal Height & Travel Adjustment (Unit Off Car)– Measure from reinforcing plate mounted on unit to center line of hole in rod end (clevis). Dimension should be 8 61/64" (Chrysler), 8 25/32" (Others).

►*PEDAL ADJUSTMENT NOTE:* It is suggested that for greatest braking efficiency, driving ease, and comfort, that brake shoes be kept well adjusted to maintain maximum pedal reserve with brakes applied.

BLEEDING BRAKES: Using a pressure bleeder attached to fluid reservoir of unit, bleed system from bleeder screw immediately forward of the reservoir on top of hydraulic cylinder of unit, then at the four wheel cylinders. When fluid runs clear at all points, start engine, pump brake several times, and then re-bleed system. After bleeding completed, check for leaks in brake system while applying heavy brake pressure with engine running. *NOTE*–After bleeding system, fill reservoir to no higher than 1/8" below filler cap neck.

LUBRICATION: Check level of brake fluid in reservoir every 1000 miles. Fill reservoir to no higher than 1/8" below filler cap neck.

TROUBLE SHOOTING: Before checking power brake unit for source of trouble check remainder of brake system.

Pedal Fails to Return: Overall width of pedal hub plus nylon bushing flanges exceeds length of pedal pivot spacer pinching the hub and bushings; bind of nylon bushings.

Brake System Loses Fluid: Loose or broken connections in brake hydraulic system; worn or damaged primary cup, primary cup seal and dome cup.

Brakes Do Not Release Properly: Pedal fails to return properly; plugged compensating holes in power piston sleeve; damaged or weak power piston return spring, air valve control spring, or reaction spring; excessively dry air valve "O" ring; brakes improperly adjusted; insufficient brake fluid in system; dust boot retainer on air cleaner cover is not concentric with power piston guide sleeve.

Unit Does Not Boost: (*NOTE*–To determine if unit operating, test as follows: With engine stopped, depress brake pedal several times to eliminate all vacuum from system. Apply brakes, and while holding foot pressure on brake pedal, start the engine. If unit operating, pedal will move forward when engine vacuum power is added to pedal pressure). Possible causes for brake not boosting: Bent, broken or obstructed vacuum source line from engine manifold to check valve, or a faulty vacuum check valve; blocked air passage in power piston guide sleeve or in air cleaner element; jammed air valve seat assembly in power piston due to foreign material becoming lodged in power piston air valve seat bore cavity; damaged secondary cup.

Loss of Pedal: Dirt or foreign material lodged between outside lip of secondary cup and cylinder bore.

Brakes "Touchy" or "Grabby": Inspection screw missing on air side of diaphragm; grease, fluid or moisture on brake linings; brakes improperly adjusted.

"Spongy" Pedal: Air in brake lines or in hydraulic cylinder on power unit.

Pedal Travel Too Great: Improperly adjusted brakes; air in brake system.

REMOVAL & INSTALLATION: Remove clevis pin attaching pushrod to power lever. Disconnect hydraulic line at power brake unit. Disconnect vacuum line at power brake unit. Disconnect stop light switch wires. From passenger compartment side, remove nuts from power brake unit two lower studs which extend from power brake unit through dash panel and pedal mounting bracket. Then remove four nuts on engine side of dash panel which hold reinforcement to dash panel. This will allow removal of reinforcement and power brake unit as an assembly. Remove power brake unit assembly from reinforcement by removing two upper stud nuts. At same time, this allows air cleaner cover and air cleaner to be removed. To install, reverse removal procedure. *NOTE*–Before reinstalling unit on car, check brake pedal linkage for freedom of movement. Refill master cylinder.

OVERHAUL: *NOTE*–After removing brake unit and before starting disassembly operations, remove reservoir filler cap and gasket, pour out brake fluid and discard it. Stroke unit at least two applications to dissipate vacuum and to pump out as much of remaining fluid as possible through wheel cylinder connection. Stop light switch in boss on bottom of hydraulic cylinder should not be removed except for replacement or to correct a fluid leak.

Disassembly: Major Components–Remove pushrod from unit by sliding pushrod boot down on rod and clamping end of pushrod in vise, then, gripping lower unit firmly, pull it away from pushrod with a quick jerk. (*NOTE*–Pushrod is held in place by pushrod retainer clip, which cannot be re-used. Whenever pushrod removed from unit, new retainer clip must be used at reassembly). Open boot retainer strap and remove pushrod boot and air cleaner cover boot. Discard retainer strap. Clamp unit in vise with hydraulic cylinder end down. Vise should be clamped on hydraulic cylinder only tightly enough to hold securely; clamping too tightly will crack or distort cylinder. Remove reinforcement plate, then air cleaner cover assembly by removing four hex nuts and lockwashers. With cover assembly removed, lift out four spacers and air cleaner core. Disassemble body assembly by removing two clamp rings. To facilitate correct reassembly, loosen both clamp ring screws but remove only one, keeping the two clamp ring parts held together in their proper relationship. (*CAUTION*–Be sure to lift straight up while holding power piston guide sleeve down against return spring. Valve side of body assembly should slide straight up and off of power piston guide sleeve). Remove power piston and guide assembly from body assembly by lifting straight up. This is important to prevent damage to power piston sleeve and bearing. If edge of diaphragm did not free itself from flange of body assembly, hold power piston and guide down against return spring while loosening edge of diaphragm. Then allow return spring to lift power piston and guide assembly. Remove return spring. Remove hydraulic cylinder assembly off of body assembly. Remove and discard cylinder-to-body seal.

Body Assembly (Cylinder Side)– Remove vacuum check valve assembly, then remove and discard check valve-to-body "O" ring. Position check valve assembly in vise clamping on large hex on body, to remove check valve body cap. Lift out check valve spring and floating valve assembly, but **do not** discard spring.

Body Assembly (Valve Side)–From hub of body assembly, valve side remove and discard guide seal and seal lubricating wick. This can be done with small pointed pliers, using care not to damage guide bearing or wick retainer. Examine inspection screw and gasket; remove only if damaged or not sealing properly.

Power Piston & Guide Assembly–Place power piston and guide assembly in holding fixture, with power piston and guide end up. Lift guide return bumper from guide sleeve, and discard, but note its thickness. It is important that the new bumper be the same thickness as the one removed (Except on very early production, the thicker bumper is smooth on both sides). Remove diaphragm retainer and diaphragm. Lift guide assembly off of power piston assembly, and remove and discard "O" ring seal from between these two assemblies. Remove and discard floating control valve assembly, and valve balancing diaphragm, but **do not** discard spring, or spring retainer. With power piston assembly still in holding fixture, lift out air valve seat assembly and discard. Lift out control spring and reaction spring. Lift out reaction rod assembly. Remove and discard metering hole seal and buffer. Remove power piston assembly from holding fixture, insert a drift

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CHRYSLER, DESOTO, DODGE PLYMOUTH "INTEGRAL TYPE" POWER UNIT (Cont.)

pin into center of power piston, and push out reaction piston insert and dome cup assembly. Using extreme care to avoid marring reaction piston or dome cup insert, remove and discard reaction cup. Reaction piston and cup insert can be popped out of cup by pinching dome between thumb and forefinger.

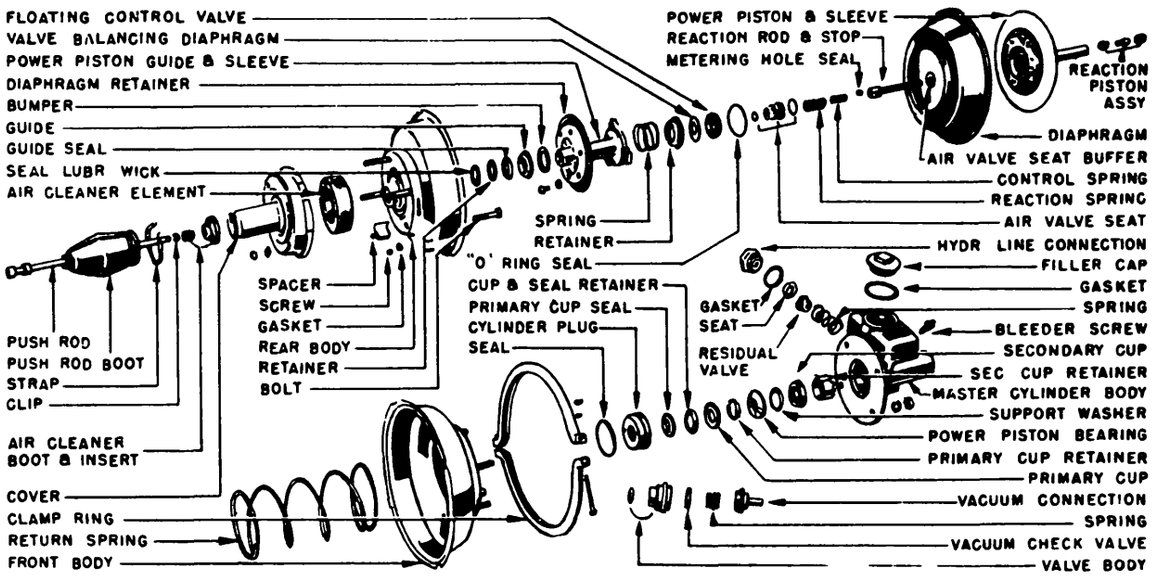
Hydraulic Cylinder Assembly—Place cylinder assembly in vise with flange end up. Do not clamp tightly. Using a face spanner wrench, remove cylinder plug assembly. Disassemble cylinder plug assembly by hand by removing primary cup, retainer and primary cup seal from cylinder plug. Primary cup is easily removed by gripping inner cup lip between thumb and forefinger. Discard cup and seal, **do not discard retainer.** From hydraulic cylinder, lift out primary cup retainer, power piston bearing, and secondary cup support washer. Then remove secondary cup only and lift out secondary cup retainer. With cylinder clamped in vise, remove secondary connection plug, and residual check valve seat. Then lift out residual check valve assembly and valve spring. Discard residual check valve assembly and seat.

Cleaning & Inspection: Before any part of unit is reassembled, all metal parts must be thoroughly cleaned with diacetone alcohol or clean brake fluid and wiped dry. Avoid allowing dirt or grit to get into unit during reassembly. When assembling unit, be sure to discard all parts specified and other damaged parts, replacing them with NEW, clean parts.

Reassembly: Hydraulic Cylinder Assembly—1) Position hydraulic cylinder in vise with secondary connection boss facing up. Insert residual check valve spring and new residual check valve assembly. Place new residual check valve seat on residual check valve; center carefully. Assemble secondary connection plug and new gasket to hydraulic cylinder. Torque to 125 ft. lbs. Position hydraulic cylinder in vise with flange end up, and wet inside of cylinder with brake fluid. Then insert secondary cup retainer, small end up, being sure that it rests evenly on hydraulic cylinder bore. Then, after wetting new secondary cup with brake fluid, insert it into cylinder. Cup lips must be down, be sure that cup lip is not turned back at any point as cup slides into cylinder. Place secondary cup support washer in position on secondary cup.

2) Insert power piston bearing into cylinder on top of secondary cup support washer. Notched face of bearing must face up, and bearing must be centered in cylinder bore Place primary cup retainer, notched edge down in hydraulic cylinder, centering it on notched surface of power piston bearing *(This is very important).* Be sure that retainer is centered as closely as possible by eye, so it will not be damaged when cylinder plug assembly is installed.

3) Assemble cylinder plug assembly by inserting new seal, seal retainer flat side out, and new primary cup in that order. Both seal and cup must enter plug with lips facing out. Use finger to force outside lip of both seal and primary cup down and outward against bore of plug to insure sealing contact. Install cylinder plug assembly into hydraulic cylinder using a face spanner wrench. Torque to approximately 25 ft. lbs.



CHRYSLER, DE SOTO, DODGE, PLYMOUTH "INTEGRAL TYPE" POWER UNIT

Guide Assembly—Inspect end of guide casting where it seats against air valve seat assembly. This must be smooth and clean. Position guide assembly in holding fixture with sleeve end down. Then assemble new valve balancing diaphragm on new floating control valve—after wetting outside diameter of diaphragm slightly with hydraulic brake fluid. Press spring retainer over diaphragm and floating valve assembly, using thumb pressure only. Then wet inside diameter of diaphragm slightly with hydraulic brake fluid and place spring on retainer. Press complete assembly down on power piston guide stop Also install new power piston-to-guide "O" ring seal on power piston guide hub

Power Piston & Guide—1) Assemble stainless steel reaction piston into bronze dome cup insert Small diameter of bronze insert must be toward spherical end of reaction piston

2) Assemble new pre-greased dome reaction cup over spherical end of reaction piston and insert assembly. Force cup back firmly to insure snug fit of cup bead in groove of insert Place power piston and sleeve assembly on bench, sleeve end up, and after lubricating outside diameter of reaction cup with brake fluid, press reaction piston, insert end dome cup assembly into power piston sleeve, dome out. Use care to avoid damaging cup Press down into sleeve firmly until it bottoms. Check to be sure that outside diameter of reaction cup is not obstructing compensating ports, and that all these port holes are open and clean

3) Assemble new buffer and new metering hole seal to reaction rod and stop assembly. Invert power piston and sleeve assembly and place it holding fixture, sleeve end down, then drop complete reaction rod assembly into center of power piston.

4) Place reaction spring in center of reaction stop cavity, and control spring around outside of reaction stop, in power piston cavity.

5) Install new air valve seat "O" ring seal in groove on outside diameter of new air valve seat assembly using care to preserve silicone grease on seal (This seal is supplied pre-greased in cellophane envelope in kit)

6) Install complete air valve seat assembly in center of power piston cavity, over control spring reaction spring and reaction rod stop. Use a twisting motion as seal enters bore of power piston Then use thumb pressure to test air valve seat springs for freedom of movement, *(NOTE*—Air valve seat is steel, power piston cavity is aluminum casting, use extreme care to avoid any damage or marking, especially on aluminum vacuum valve seat.).

7) Position diaphragm retainer over guide and sleeve assembly, with three of the six holes in the retainer lined up with three holes in guide. Position diaphragm on flange of power piston and sleeve assembly with flange of diaphragm down Be sure that inside diameter of diaphragm is nested snugly all around in groove of power piston flange.

8) With power piston diaphragm retainer and guide assembly held directly above power piston assembly, insert pushrod without retaining clip through center bore of guide and into pushrod cavity in center of air valve seat assembly. Then, holding air valve seat down against control and reaction springs, position guide assembly so that three holes in guide line up with three holes (tapped) in power piston. Be sure that "O" ring seal is properly positioned between guide and power piston

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CHRYSLER, DESOTO, DODGE PLYMOUTH "INTEGRAL TYPE" POWER UNIT (Cont.)

9) Install three lockwashers and hex bolts through holes in diaphragm retainer and into tapped holes in power piston. Tighten all three bolts evenly to torque of 90-100 **in. lbs.** Using pushrod, check for freedom of movement of air valve seat against control and reaction springs.

10) Place new rubber guide return bumper over guide sleeve and press firmly down on hub of guide. *NOTE*–A kit, available from Chrysler Corporation Parts Division, contains two guide return bumpers, each of a different thickness. It is important to install the bumper which is the same thickness as the one that was taken out of unit at disassembly.

Body Ass mbly (Valv Side)–With body assembly, valve side resting on bench, hub end up, insert new guide seal into hub, being sure that lips of seal are facing up, away from bearing, and that seal is installed between bearing and wick retainer which is inside hub. *(NOTE*–Seal will slip easily into place if held between thumb and forefinger, in an elliptical shape and inserted through hub of body. This seal is supplied pre-greased in a cellophane envelope in the repair kit). Insert new wick into hub in same manner as seal was inserted, using care to preserve grease on wick. After wick installed, be sure that wick retainer is positioned snugly against wick and away from cup lips. Apply any grease remaining in seal and wick envelopes to inside of hub, to provide maximum lubrication for seal, wick, and guide bearing. Check inspection screw and gasket to be sure they are tight.

B dy Ass mbly (Cylinder Side)–Position vacuum check valve body in vise and insert new floating valve assembly, being sure that bonded rubber seal is facing down, against seat. Then assemble spring and cap.

R ass mbly of Major Components–1) Place new cylinder-to-body seal in groove around cylinder plug assembly, being careful to avoid twisting seal.

2) Assemble hydraulic cylinder assembly to body. Position cylinder on body in such a way that, when viewing assembly from cylinder end, vacuum check valve is to left of hydraulic cylinder. Then assemble hex nuts and lockwashers to studs, finger tight only.

3) Position cylinder assembly with body assembly, cylinder side, in vise with cylinder end down and body assembly flange facing up. Place return spring in body assembly, centering it around cylinder plug assembly and inside the four cylinder flange bolt heads in housing.

4) Assemble power piston and guide assembly to body assembly, valve side, by inserting guide sleeve through hub of body assembly. Be careful to avoid damaging felt wick in hub.

5) Hold assembled power piston and guide assembly and body assembly, valve side, by guide sleeve, which now protrudes out of hub of body. Wipe power piston sleeve with brake fluid, then carefully position power piston on return spring so that spring nests around shoulder of power piston.

6) Press power piston and guide assembly down into unit against return spring, watching to avoid misalignment as power piston sleeve enters bore of cylinder plug assembly. Holding power piston and guide down against spring, place edge of diaphragm in groove on flange of body assembly, valve side, over edge of diaphragm and flange of body assembly, press firmly into position.

7) With two sides of body assembly properly mated, place two half-ring clamps over body flanges, being sure that flat portion of rings match cutaway portions of body flanges. Fasten half-ring clamps with two clamp ring screws, lockwashers and hex nuts. Tap ring clamps snugly into place with a rubber mallet, then tighten securely. "Do Not Lubricate" tag should be attached on either side of unit, under one of these two nuts. *(NOTE*–Two sides of body assembly must be assembled so that notches on one side mate with keys on other, and the cutaway portions of the flanges match).

8) Press power piston and guide assembly down as far as possible against return spring three or four times to be sure that power piston sleeve and hydraulic cylinder are properly centered. Remove unit from vise, invert, and while holding unit down to push power piston and guide assembly into fully applied position, tighten evenly the four cylinder flange nuts, using a torque of 180-200 **in. lbs.** After all flange nuts are tight, power piston and guide assembly must return freely to "off" position as soon as pressure is released. If power piston does not return freely, loosen cylinder flange nuts and re-align cylinder to housing; then retighten nuts and test again for free return.

9) Return unit to vise then blow out or replace air cleaner core, centering it around hub of body assembly. Then place one spacer around each of four mounting bolts.

10) Assemble air cleaner cover assembly to unit over air cleaner core and spacers, position cover so that air inlets will face down when unit is mounted in position on vehicle. Assemble reinforcement plate to unit over air cleaner cover assembly, positioning plate so that its longest dimension will be below unit when mounted in position on vehicle. Install four lockwashers and hex nuts and tighten securely to torque of 180-200 **in lbs.** Be sure guide sleeve and air cleaner cover sleeve are concentric. If necessary, tap cover sleeve lightly with rubber mallet to align.

11) Insert pushrod into pushrod boot, then into air cleaner cover boot, and insert assembly and snap NEW pushrod retainer clip into position on small end of pushrod. Be sure that small end of boot is nested snugly in groove on outer end of pushrod.

12) Holding boots back toward outer end of pushrod, press pushrod with retainer clip straight down through center of guide sleeve and into air valve seat cavity. Exert approximately 40 lbs. of pressure until end of pushrod snaps into place. When properly installed, pushrod is held securely enough in place so that it can be used to lift the weight of the unit.

13) Fit boots on flange of sleeve of air cleaner cover assembly, first the boot cover assembly, then the pushrod boot, being sure that they fit snugly. Then install new boot retainer strap. Reinstall bleeder screw and reservoir filler cap and gasket. Also reinstall stop light switch if it has been removed. Be sure all are in position and secure before reinstalling on vehicle.

CHRYSLER, DE SOTO, DODGE PLYMOUTH "BELLOWS TYPE" POWER UNIT

Chrysler & Imperial (1956-60)
D Soto (1956; S-26 Adv. 1957; 1959-60)
D dg (1956, 1959-60)
Plym uth (1956-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 BRAKE PEDAL RETURN SPRING & CONTROL VALVE SPRING PRODUCTION CHANGE (To Improve Low Temperatur Operation):* New "Kelsey-Hayes" Power Brake Unit No. 1731216 replaces Unit No. 163-7814. New Unit identified by daub of green paint on front outer bellows cover plate. It includes a New Control Valve Spring No. 1676486 and requires the use of New Pedal Return Spring No. 1730077. Both springs are painted green and must be used together. Use Pedal Return Spring painted black with power units not daubed with green paint.

►*1959 PLYMOUTH POWER BRAKE SQUEALING OR WHISTLING NOISE CORRECTION:* Install a new type vacuum check valve, Part No. 1944089 (identified by a daub of white paint on flange of tube section). This new valve is a "T" design which permits a single hose connection to reserve tank in place of the two hoses previously used. To determine if the old valve is faulty, check for looseness of suction tube flange in the valve assembly.

DESCRIPTION: This "Assist Type" power brake unit consists of an oval shaped air-vacuum bellows, control valve, and push rod. A control valve operating rod extends through the push rod and actuates the brake unit control valve. The unit is mounted on the engine side of the dash panel and is connected mechanically to the brake pedal linkage. A trigger arm on brake lever operates the control valve through the valve operating rod. In the event of power failure, normal manual brake action is assured as the brake pedal lever pin is free to slide in slot of power piston rod yoke when brake pedal is depressed.

OPERATION: Vacuum from the intake manifold is applied to unit, and air is evacuated from the air-vacuum bellows through the vacuum valve during brake application. When brakes are released, air (atmosphere) enters the unit through the built in air cleaner and is regulated by the air valve. The valve operating rod, which is controlled by the pedal, overcomes the spring pressure of the air valve and keeps atmospheric pressure inside the air-vacuum bellows. The return spring extends the bellows completely whenever brakes are not applied.

ADJUSTMENT: It should seldom be necessary to adjust brake pedal trigger arm. For adjustment of Pedal Free-play and for Trouble Shooting, see below.

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH "BELLOWS TYPE" POWER UNIT (C nt.)

Pedal Freeplay: Check adjustment as follows: Remove vacuum hose from power unit and press brake pedal several times to eliminate all vacuum in unit. Insert a screwdriver blade between rubber collar of power brake trigger pivot and rear side of elongated hole in power brake lever, forcing them apart. *NOTE - If brake pedal l ver and power brake lever are not held apart, a false freeplay setting will be obtained.* Check the freeplay with linkage in this position by pushing lightly at pad end of brake pedal. Pedal freeplay should be between 1/16" & 1/8". *NOTE - This specification supersedes previous adjustment of 1/32-1/8" on Chrysler and DeSoto models.* Adjust as necessary by shortening or lengthening the master cylinder pushrod.

Trouble Shooting: If operation not satisfactory, correct by turning adjusting screw not more than 90° either way from original setting as follows:

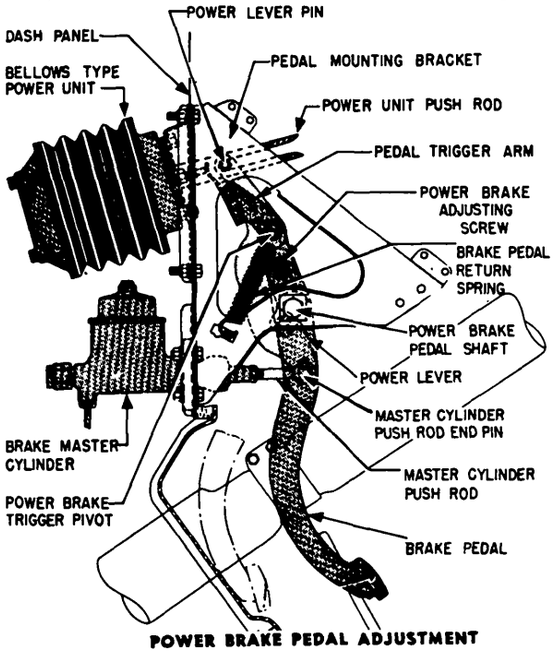
Slow Pedal Release - Rotate adjusting screw counterclockwise.

Time Delay During Fast Application: Rotate adjusting screw clockwise.

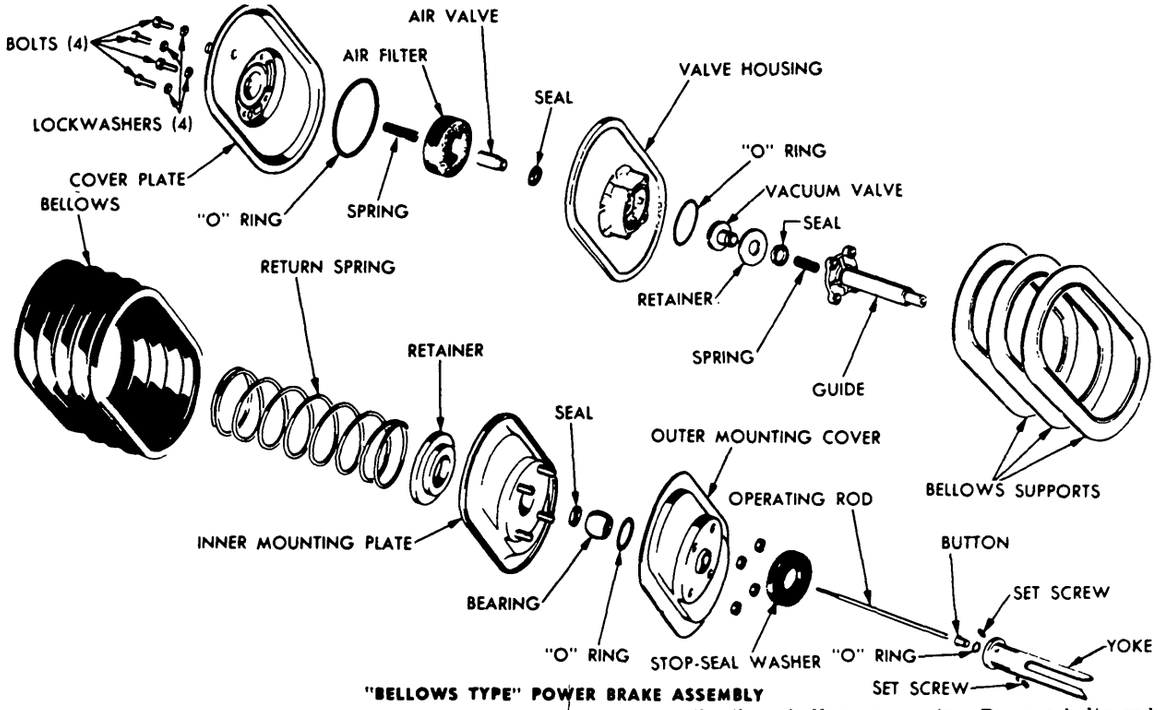
P dal Vibrates (Unit Chatter): Rotate adjusting screw counterclockwise.

CAUTION - Adjusting screw should not be turned more than 90° from vertical (arrow up).

REMOVAL: *(CAUTION – Before removing brake unit, place a wood wedge between brake power lever and the forward edge of triangular opening in brake pedal lever bracket to prevent trigger arm from extending through hole in dash panel which would cause damage to trigger arm).* Remove the nuts and lockwashers mounting unit to dash panel. Pull unit and mounting plate straight out and away from panel, using care not to lose the nylon bushings on pedal linkage pin which engage power unit yoke.



POWER BRAKE PEDAL ADJUSTMENT



"BELLOWS TYPE" POWER BRAKE ASSEMBLY

DISASSEMBLY: 1) Remove nuts attaching mounting plate to power unit and remove plate. Remove and discard "O" ring on mounting plate. With an Allan wrench loosen the two setscrews and remove yoke from power unit shaft. Discard the valve operating rod bottom seal.

2) Remove nuts attaching outer mounting plate. Using a screwdriver, gently pry up plate to loosen, and remove plate. Discard "O" ring seal. Compress bellows by hand sufficiently to remove the guide bearing. Remove and discard seal from inside bearing. Peel back outer lip of bearing completely around inner mounting plate (keep one hand on inner plate to keep it from snapping up). Remove plate and lift out return spring and retainer.

3) Place unit on its side and remove bolts and lockwashers attaching valve cover to valve. Lift off valve cover (if necessary, use a flat blade to separate cover plate from bellows flange). *(CAUTION – Use extreme care to avoid marking or scratching inner face of plate where it contacts bellows flange).* Remove "O" ring from valve cover and discard it. Remove air valve spring from center of valve, then remove the air filter. Slide air valve out of valve housing *(NOTE* – It may be necessary to make a small hook from a paper clip to remove valve).

4) Place valve housing end down on bench, then remove bellows from valve, by peeling back the outer lip of bellows. If a new bellows is to be installed, remove the three bellows supports. Remove bolts and lockwashers attaching guide to valve body. Lift out guide to expose vacuum valve, valve spring and seals. Discard seals. Remove vacuum valve and retainer and discard housing to guide seal. Invert valve housing and remove valve seal from its groove in valve body. *(CAUTION – If using a sharp instrum nt or pointed pliers, be very careful not to mark or scratch insid diameter bore of valve housing).*

REASSEMBLY: Clean all parts except bearing, bellows, and filter and blow dry with air. Bellows may be cleaned with mild soap and water if necessary. Inspect all parts for damage and replace all defective parts. During reassembly, use new "O" and seal rings.

1) Insert a new air valve seal into bore of valve housing (lips of seal facing out when installed). Carefully position a new vacuum valve in retainer. Invert valve housing and install valve and retainer. Press down firmly on retainer to snap in place. Position a new valve housing to guide seal in groove provided. Install a new vacuum valve seal in bore of guide, with lips of seal toward bottom of bore.

2) Install the vacuum valve spring in center of valve (smallest). Position guide over vacuum valve, lining up bolt holes in guide with bolt holes in valve body. Carefully lower guide down against valve body, making sure that tapered portion of vacuum valve enters seal evenly. Press down on guide to seat, then install bolts and lockwashers. Tighten evenly and securely. *(CAUTION – B sur that countersunk holes at nd of guide line up with the long cent rline of valve housing).*

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH "BELLOWS TYPE" POWER UNIT (C nt.)

3) If a new bellows is being installed, position the supports in bellows (bellows supports must be centered in the three center accordian folds and aligned with bellows and each other) Using holding fixture (made from a piece of four inch pipe) to support the guide and valve assembly, install the bellows *(CAUTION – Be sure the arrows on edg of bellows and housing are aligned).*

4) With the bellows in the holding fixture, lightly coat the outside surface of the air valve with silicone grease (do not use any other kind), then insert the **small end first** into bore of valve housing Use finger pressure to test for free movement of valve against vacuum valve spring. Install air valve spring in recess in air valve and filter. Install a new valve housing cover "O" ring on shoulder of valve body hub. Position valve cover over housing, with notch in edge of cover matching arrow on bellows. Be sure that air valve spring nestles on dimple in center of cover. Press cover down evenly over valve housing to seat cover "O" ring. Install bolts and tighten securely.

5) Remove assembly from holding fixture and invert unit Coat guide lightly with silicone grease, then install return spring. Position the spring evenly around hub of valve housing and guide. Place spring retainer and inner mounting plate over spring, being sure that arrow stamped on plate is in line with arrow on edge of bellows. Compress return spring, then fold edge of bellows over edge of plate so it fits evenly around plate

6) Install a new guide bearing seal in groove inside bearing bore (seal must seat snugly in bearing). Using silicone grease, lubricate inside of bearing, then slide over guide while compressing bellows, (bearing must be installed with lip of seal facing out). Push bearing down over guide and into pocket of plate. Release bellows (bearing will ride up guide with plate into position. Install the bearing to mounting plate "O" ring, then lower outer mounting plate down onto assembly (the notch in edge of plate must be in line with arrows on bellows) Install nuts and draw down finger tight.

7) Slide a new valve operating rod seal ring over nylon bumper on end of rod and into groove, then install rod in center of guide. Press on end of guide to test for free operation of air and vacuum valves (a 'two-step" movement should be felt when rod depressed and released fully). Place a new stop seal washer in position and install yoke on end of guide Compress bellows slightly, then alternately tighten set screws (hub of yoke must be down snug against shoulder of guide, with the setscrews aligned with tapered holes in guide). Tighten mounting plate nuts securely Place mounting bracket in position, with long center line of bracket at right angles to long centerline of power unit The off set of the bracket must be so that when installed in car, the axis of the unit will be inclined down toward front of car Install lockwashers, nuts and tighten securely

INSTALLATION: Be sure that unit is so placed that its axis inclines down toward **front** of car and that vacuum inlet connection is toward engine As the yoke passes through dash panel, be sure that it engages pedal linkage correctly by sliding over nylon bushings on power brake lever cross pin Install mounting plate nuts and tighten securely

CHRYSLER, DE SOTO "PISTON TYPE" POWER UNIT

Chrysler & Imperial, All Models (1956)
DeSoto, All Models (1956)

►CHANGES, CAUTIONS, CORRECTIONS

► *1956 VALVE ROD & PEDAL RETURN SPRINGS PRODUCTION CHANGE (To provide more positive action)* New "Bendix" Power Brake Unit No. 1731217 replaces former Unit No. 1671546 and contains a new Valve Rod Spring No. 1676487, and requires the use of new Pedal Return Spring No. 1730077. Both new springs are painted green and must be used together. *NOTE - This new Unit No is stamped on Air Cleaner Cover but is not the Air Cleaner Cover No.*

► *1956 INTERMITTANT BOOSTER ACTION CORRECTION* Inspect booster valve rod at point where it contacts trigger arm. Wipe off all lubriplate, check to see that rubber dust shield is properly placed with 1/8" clearance between shield and nylon button. If sticking condition not corrected, replace Valve Rod Spring with Spring No. 1676487 (painted green) and Pedal Return Spring with Spring No. 1730077 (painted green). Both springs must be used together.

DESCRIPTION: The "Assist Type" power unit consists of a vacuum cylinder, piston operated push rod, and control valve assembly which is integral with piston assembly The unit is mounted on the engine side of the dash panel and connected mechanically to brake pedal linkage through the power brake unit push rod A valve operating rod within the piston rod is operated by a trigger arm on upper end of brake pedal lever In the event of power failure, normal manual brake action is assured as the brake pedal lever pin is free to slide in slot of power piston yoke when brake pedal depressed

OPERATION: With brake pedal released, both sides of vacuum cylinder piston are open to the atmosphere Application of brake pedal causes vacuum port to open, forcing piston toward rear and exerting a thrust on power lever of brake pedal lever assembly which causes master cylinder to be applied. The amount of pressure exerted on master cylinder push rod is in proportion to distance brake pedal is depressed.

ADJUSTMENT: It should seldom be necessary to adjust brake pedal trigger arm For adjustment of Pedal Freeplay and for Trouble Shooting, see below.

Pedal Freeplay: Check adjustment as follows Remove vacuum hose from power brake unit and press brake pedal several times to eliminate all vacuum in unit Insert a screwdriver blade between rubber collar of power brake trigger pivot and rear side of elongated hole in power brake lever, forcing them apart *NOTE - If brake pedal lever and power brake lever are not held apart, a false freeplay setting will be obtained.* Check the freeplay with linkage in this position by by pushing lightly at pad end of brake pedal Pedal freeplay should be between 1/16-1/8". *NOTE - This specification supersedes previous adjustment of 1/32-1/8" on Chrysler and DeSoto models.* Adjust as necessary by shortening or lengthening the master cylinder pushrod

Trouble Shooting: If operation not satisfactory, correct by turning adjusting screw not more than 90° either way from original setting as follows

Slow Pedal Release - Rotate adjusting screw counterclockwise

Time Delay During Fast Application: Rotate adjusting screw clockwise

Pedal Vibrates (Unit Chatter): Rotate adjusting screw counterclockwise

CAUTION - Adjusting screw should not be turned more than 90° from vertical (arrow up).

REMOVAL: *(CAUTION – Before removing brake unit, place a wood wedge between power brake lever and the forward edge of triangular opening in brake pedal lever bracket to prevent trigger arm from extending through hole in dash panel which would cause damage to trigger arm).* Disconnect vacuum hose at power unit and remove complete power unit and bracket after removing the four nuts and lockwashers attaching it to dash panel.

INSTALLATION: Position power unit on dash panel so that its axis inclines down toward front of car. As yoke passes through dash panel, be sure that it engages the pedal linkage correctly by sliding over the nylon bushings on power brake lever cross pin. Replace the attaching bolts and nuts and tighten securely. Remove wedge from pedal bracket.

DISASSEMBLY: *(CAUTION – Do not clamp piston rod or yoke in vise during service operations).* During disassembly of the power unit, scribe lines on all component parts before removing to insure correct reassembly.

1) Remove air cleaner cover screws, cover and filter material Remove remaining plate screws and separate vacuum tube from plate, remove plate and gasket from cylinder Slide end of hose from vacuum tube Remove the four bolts and nuts from end plate and remove cylinder shell and rubber ring gasket. Remove hose from vacuum plate and rubber diaphragm from end of tube fitting Using thin nose pliers, pull out diaphragm balancing pin. Remove tube and plate attaching screws, separate tube and valve poppet parts from piston plate. Separate plate, poppet spring, and diaphragm from poppet From opposite end of assembly remove valve rod rubber seal Remove snap ring, retainer washer, spring and friction collar. Remove valve rod from piston rod.

2) Drive out piston retaining pin from piston (part way) and note if piston is free on piston rod. If piston is free on rod, hold spring compressed while removing retainer pin from piston. If piston is tight on rod after retaining pin removed, use a 5/8" diameter brass rod with squared end to drive piston rod out of piston

3) Separate piston rod, end plate and spring from piston, and remove rubber stop washer from piston rod. Remove bolts and lockwashers and separate mounting ring, seal retaining spring, washer, piston rod leather

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CHRYSLER, DE SOTO "PISTON TYPE" POWER UNIT (Cont.)

seal and mounting gasket from end plate. Take out screws and remove retainer plate, expander spring, wick, packing plate, and leather packing from piston plate.

REASSEMBLY: Wash all metal parts in Bendix Metaclene and all rubber parts in alcohol. Use air to blow out all passages. Inspect piston rod, valve seat at end of valve rod, or valve seat at center of piston plate and replace if scratched or nicked. Replace piston rod leather seal or piston leather packing if these parts worn excessively.

1) Assemble piston plate with threaded hole side up. Assemble leather packing on piston with lip side up. Place packing retainer plate on packing, with raised side up, and align holes in piston. Coil cotton wick inside of packing lip and cut wick to required length. Remove and dip wick in Bendix Vacuum Cylinder Oil. Let excess oil drip off, and again coil wicking inside lip of packing. Install expander ring inside of wicking, with gripper points next to wicking. Engage notch at loop end of spring with hook at opposite end of spring. Align holes in expander spring retainer plate with threaded holes in piston plate. Install screws.

2) Install inspection port screw and gasket, if screw was removed. Insert bolts and lockwashers through holes in end plate and assemble mounting ring rubber gasket over bolts. *NOTE*–Align gasket inspection hole with holes in mounting ring and end plate.

3) Assemble new piston rod leather seal on gasket, with lip away from gasket, and center seal over hole in gasket. Place seal retainer over seal and install retaining spring. Coat bearing surface of mounting ring with silicone grease and assemble mounting ring on end plate, making certain inspection port hole in mounting ring lines up with hole in gasket. Thread bolts into mounting ring and tighten bolts.

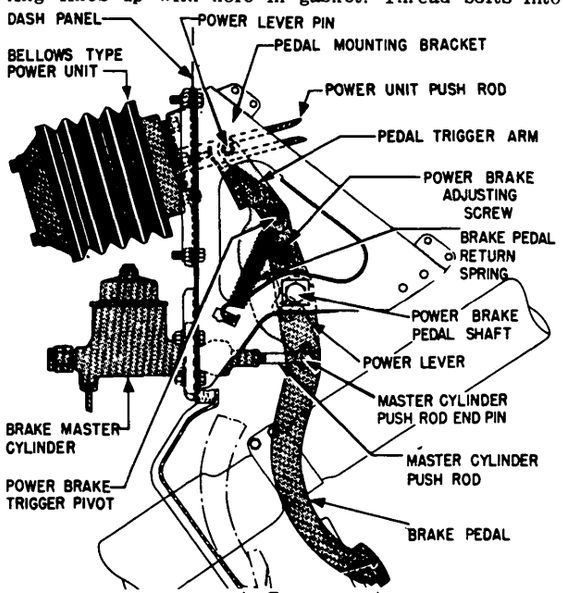
4) Slide rubber stop washer over piston rod up against steel washer on piston rod and insert rod through seal in end plate. Assemble piston return spring on end plate with large diameter end next to plate. Align slot in piston rod and vacuum test port in end plate. Align piston so that two of four threaded bolt holes in valve side of piston are in line with slot in piston rod. Press piston on piston rod and install retaining pin.

5) Insert valve rod in piston until end of rod protrudes at opposite end of plate. Assemble friction collar, valve rod spring, and spring retainer washer over valve rod. Compress spring and install snap ring in groove in valve rod.

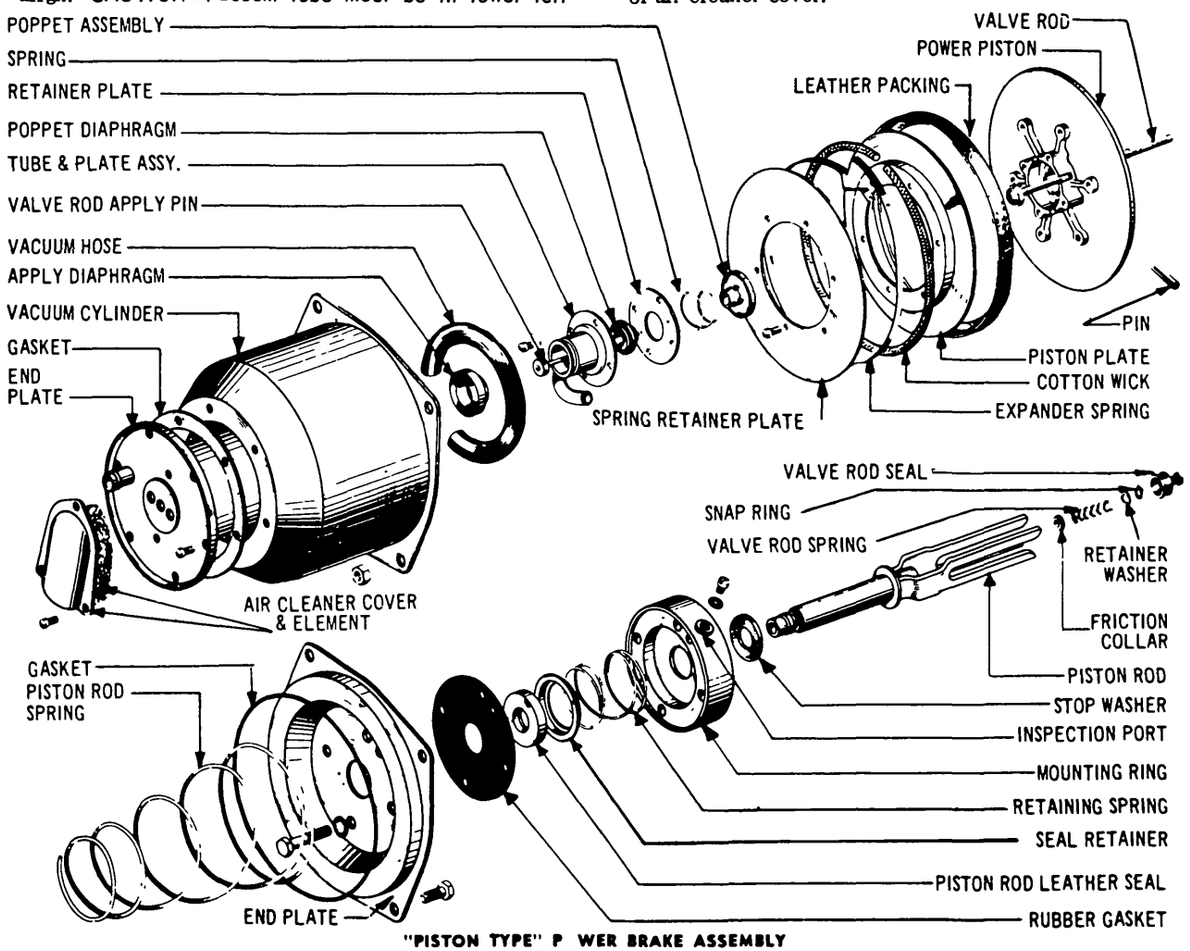
6) Assemble small diameter of poppet diaphragm in recess of poppet assembly. Assemble poppet spring over diaphragm with small diameter end next to poppet plate. Assemble retainer plate over large diameter of diameter of diaphragm and center poppet on piston plate. Align holes in retainer plate with holes in piston plate. Place vacuum tube and plate on retainer plate and align. *CAUTION–Vacuum tube must be in lower left quadrant. Ins rt when the slot in pushrod is horizontal and vacuum t st port is upward and approximat - ly 22½° to right of nd plat c nterline, r gardl ss of the scribe marks on tube plate and piston.*

7) Make certain that bead at outer diameter of diaphragm is in annular groove of tube and plate assembly. Replace tube and plate attaching screws and tighten securely and uniformly. Assemble valve rod applying diaphragm over end of tube and plate assembly. Slide vacuum hose on tube approximately 5/8", and coil hose so it is parallel to piston plate. Place new rubber gasket on end plate. Align vacuum cylinder and end plate to scribe marks. Install bolts and nuts (insert bolts through end plate and into cylinder flange) and tighten securely.

8) Place new gasket on end of vacuum cylinder. Align tube plate and vacuum cylinder scribe marks, and slide vacuum hose on vacuum tube approximately 5/8". Assemble four plate attaching screws. Align cleaner cover with tube plate and install screws. Tighten uniformly. Insert air cleaner material into opening at bottom of air cleaner cover.



POWER BRAKE PEDAL ADJUSTMENT



"PISTON TYPE" P WER BRAKE ASSEMBLY

DE SOTO, DODGE "OVAL PISTON" POWER UNIT

Chrysler Imperial (1959-60)
DeSoto, All Exc. S-26 Adv. (1957)
DeSoto (1958; 1959-60)
Dodge (1957-60)
Plymouth (1960)
NOTE - Chrysler, DeSoto, Dodge, Plymouth "Bellows" type also used.

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 POWER BRAKE "THUMP" OR "THUD" (WHEN RELEASING BRAKE PEDAL) CORRECTION:* Remove brake pedal, then start engine so that piston rod and yoke will move out to expose rubber stop washer. Install an additional stop washer, Part No. 1675099, next to stop washer on piston rod by slipping new washer over piston rod yoke and into position on piston rod. Stop engine and depress power brake valve rod allowing rod and yoke to return to released position. Install brake pedal and reconnect master cylinder pushrod.

DESCRIPTION: Consists of an oval-shaped air-vacuum unit mounted on engine side of dash panel and connected mechanically to the brake pedal linkage through the power unit pushrod. A yoke at end of piston rod is in contact with the power lever pin of the reactionary linkage. The valve operating rod is located at the center of the piston rod and is always in contact with a ramp at the upper end of the valve trigger arm of pedal linkage. A control valve operating rod moves within the piston rod to actuate the vacuum valve and poppet. Mechanical contact between power unit and brake linkage exists only when power unit is assisting in a brake application. If vacuum fails, brake pedal is free to act independently to apply brakes in conventional manner. A vacuum reservoir, with check valve, is provided for a vacuum reserve.

OPERATION: Vacuum from the intake manifold, through the vacuum reservoir, is applied to unit, and air is evacuated from the applied direction side of the piston through the vacuum valve during brake application. When brakes are released, air (atmosphere) enters the unit through the built-in air cleaner and is regulated by the air valve. The valve operating rod, which is controlled by the pedal, and piston, is forced away from applied direction side by a return spring when brakes are released, permitting air to enter both vacuum and atmospheric chambers. Atmospheric pressure remains on both sides of piston until brakes are reapplied.

ADJUSTMENTS: Pedal Linkage Adjustment - If pedal pressure releases slowly, adjust by rotating adjustment screw (accessible through slot in left side of brake pedal bracket) **counter-clockwise.** A time delay (noted during a fast brake application) can usually be corrected by turning screw **clockwise.** Should pedal vibrate (booster chatter) turn screw in **counter-clockwise** direction. *NOTE* - Rotation of adjustment screw should be limited to plus or minus 90° from original setting.

Pedal Free Play Adjustment: Remove vacuum hose and press brake pedal several times to release all vacuum. Insert blade of screwdriver between rubber collar of power brake trigger pivot and rear side of elongated hole in power brake lever, forcing them apart. (*NOTE* - If brake pedal and lever are not wedged apart, a false free play setting (which includes booster valve travel) will be measured at pad end of pedal). Check free play with linkage in this position by pushing lightly at pad end of brake pedal. Free play travel should be 1/32-1/8". If not within limits, adjust by lengthening or shortening pushrod as required.

Free Play Measurement (Alternate Method): Remove master cylinder pushrod end pin. With light finger pressure, move pushrod forward until contact made with master cylinder piston. Attempt to insert pushrod end pin through power lever and pushrod end hole. If pushrod must be pulled back to allow passage of pin, free play is present. If pushrod must be pushed further into master cylinder to allow passage of pin, no free play is present and adjustment must be made at pushrod.

LUBRICATION: Periodically place a few drops of SAE 10W Engine Oil on brake lever pin bushings. No other lubrication required

TROUBLE SHOOTING: Pedal Releases Slowly After Application or Brake Pedal Vibrates (Booster Chatter) - Pedal trigger arm improperly adjusted. *See Adjustments.* **Delay in Application (during Fast Brake Application)** - Pedal trigger arm improperly adjusted *See Adjustments.* **Lack of Power Assistance (When Cold):** (*NOTE* - This condition only occurs after long periods of disuse). To correct, disassemble, clean off all old lubricants. Soften seals and diaphragm with silicone grease.

TESTING (On the Car): Check brake operation on the car using engine vacuum. Remove screw plug from mounting ring, connect test fitting, hose, and vacuum gauge at this port. Run engine to provide vacuum and make test as follows:

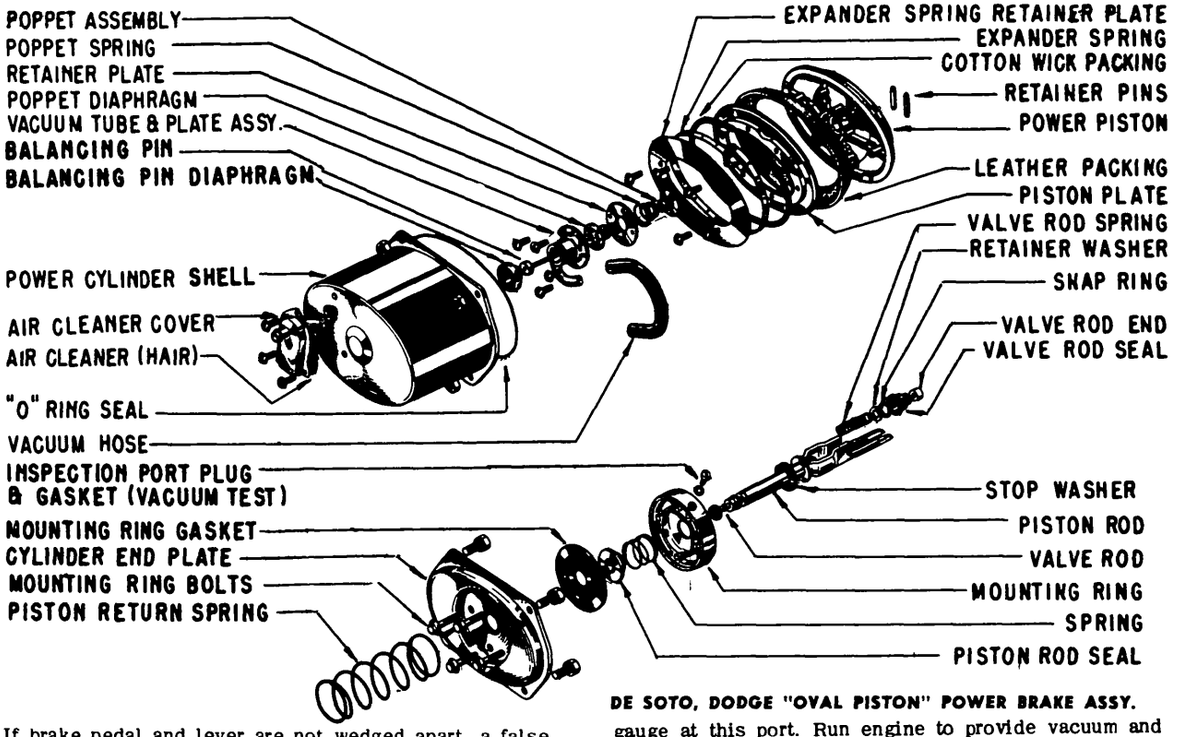
1) With brakes released and engine idling, note vacuum gauge reading Gauge should read Zero indicating that brakes fully released. Reading of 1-16" indicates brakes not fully releasing. Check pedal adjustment. If pedal adjustment correct, power unit is faulty.

2) Depress brake pedal slowly and note vacuum gauge reading. Reading of 1-16" indicates power unit is operating. A zero reading indicates incorrect pedal operation, restriction in vacuum line, or faulty power unit. Check pedal adjustment. If pedal adjustment correct, remove power unit and disassemble for overhaul.

Checking Vacuum Source (Without Gauge): With engine stopped, depress brake pedal several times to exhaust vacuum in system and reserve tank. Start engine while holding pedal partially depressed. As soon as engine starts, pedal should move away from pressure being applied (indicating action of power boost). Shut off engine. Depress brake pedal 6-10 times noting effort required to press pedal in same distance each time. Effort required should increase from first to last application as vacuum source is depleted. If no difference noted in pedal effort with engine running or stopped, check for restriction in vacuum supply line by disconnecting line at power unit and holding finger over end of hose with engine running. A high vacuum should be noted.

REMOVAL & INSTALLATION: Power Unit - Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket to prevent trigger arm

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DE SOTO, DODGE "OVAL PISTON" POWER BRAKE ASSY.

DE SOTO, DODGE "OVAL PISTON" TYPE POWER UNIT (C nt.)

from extending beyond extremities of bracket. (*NOTE* - If pedal linkage is allowed to extend through hole in dash panel, damage to trigger arm may result). Disconnect vacuum nose at power unit. Remove attaching bolts at dash panel and carefully remove power unit assembly. (*NOTE* - Use care not to lose pedal linkage cross pin). To install, reverse removal procedure. Install unit on dash panel so its axis inclines down and toward front of car.

Pedal Linkage - Remove pedal return spring, master cylinder pushrod end pin and power brake pedal lever shaft. Rotate pedal linkage assembly counter-clockwise while withdrawing power lever cross pin from booster unit yoke. (*NOTE* - Pedal is slotted to provide clearance for removal of brake pedal assembly). To install, reverse removal procedure. (*CAUTION* - Use extreme care during assembly and handling of linkage. Trigger arm is easily damaged). If power brake unit has been removed, place a wooden wedge between power brake lever and forward edge of triangular hole in pedal bracket to prevent trigger arm from extending beyond extremeties of bracket.

OVERHAUL: Disassembly - Scribe mark across flange of power cylinder and end plate as a guide for reassembly. (*CAUTION* - Do not clamp yoke in vise at any time). Remove bolts mounting endplate on cylinder, separate endplate and "0" ring seal from cylinder shell, disconnect vacuum hose from fitting within cylinder. Take out air cleaner attaching screws, remove air cleaner and filter material from end of cylinder. Disconnect vacuum hose from fitting on tube and plate assembly. Separate and disassemble all sub-assemblies as follows:

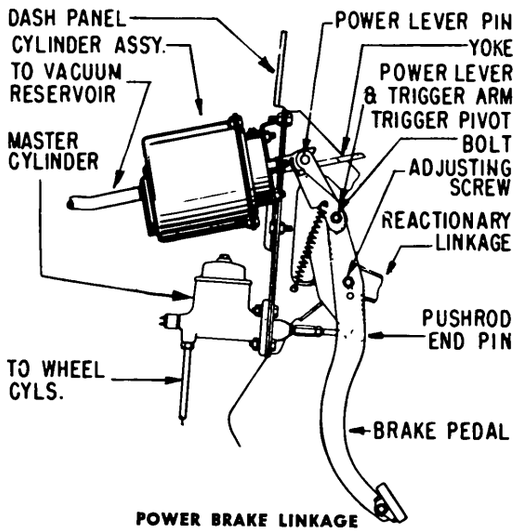
Control Valve - Remove balancing pin diaphragm from end of plate assembly housing, withdraw balancing pin from housing (use long nosed pliers). Take out tube and housing attaching screws, separate housing from piston. Remove valve assembly. Remove valve retaining plate by compressing diaphragm and working plate off over diaphragm, remove spring, remove diaphragm from poppet valve by "peeling" it off. Remove nylon valve rod end button from valve rod (within yoke) by using a thin bladed screwdriver on a 1" x 1" wooden block as a pry. Slide valve rod seal off, remove snap ring retaining valve rod in piston, remove valve rod washer and spring, then slide valve rod out of piston.

Piston Rod - Drive out two piston rod retaining pins using a 3/16" drift (*CAUTION* - Do not allow return spring to snap piston off rod as pins are removed). Remove piston and return spring, then slide piston rod out of endplate and remove rubber stop washer from rod.

Endplate - Take out mounting ring attaching bolts and separate endplate from mounting ring. Remove seal retainer spring, piston rod leather seal and mounting ring gasket. Remove vacuum inspection port plug and gasket from mounting ring.

Pist n Plate - Take out screws mounting retainer plate on piston plate, separate these parts, remove expander spring, wick, packing plate, and leather packing.

Cleaning & Insp ction: Clean all rubber parts in alcohol.



POWER BRAKE LINKAGE

Thoroughly wash all metal parts. If inspection reveals nicks or scratches on piston rod, valve seat end of valve rod, or valve seat at center of piston plate, replace parts. Replace an excessively worn leather packing or piston rod leatner seal. If vacuum cylinder is rusted or corroded, polish with fine steel wool or crocus cloth.

Reassembly: Use all new gaskets. Lubricate parts with oil or silicone grease as noted below.

Piston Plate Assembly - *NOTE* - Installation will be facilitated by using Tool C-3578 to install packing parts on piston. Proceed as follows: Place piston in assembly tool with threaded holes in piston upward, install leather packing on piston with lip side up, place packing retainer plate on packing with the raised side up and align holes in plate with holes in piston. Coil cotton wick inside packing lip and cut to required length. Remove wick and dip in vacuum cylinder oil, allow excess oil to drip off, then install packing on piston. Install expander spring inside wick (with gripper points next to wicking) and engage notch at loop end of spring with hook at opposite end. Install expander spring retainer plate and align holes in plate with threaded holes in piston plate, install screws and tighten securely. *Leave piston assembly in tool until it is installed in vacuum cylinder.*

Mounting Ring & Endplate Assembly - Install vacuum inspection port screw and gasket in side of mounting ring. Insert ring retaining bolts through holes in endplate, apply silicone grease to outer face of gasket around center hole, install gasket on endplate bolts (*CAUTION* - Vacuum port opening in gasket must be aligned with opening in endplate). Install piston rod leather seal on gasket with raised shoulder up, slide spring over shoulder and seat spring against seal with both parts centered on gasket. Coat bearing surface of mounting ring with silicone grease, slide mounting ring down over mounting bolts with recessed side down and vacuum port holes aligned, tighten bolts securely. *NOTE* - Outer rim of mounting ring should contact endplate.

Pist n R d - Install rubber stop on the piston rod and against the steel washer. Install Pilot Tool C-3579 on end of piston rod (*NOTE* - If pilot not used, wrap approximately 1¼" of piston rod with scotch tape to prevent sharp edges of rod damaging seal). Insert piston rod through endplate, remove pilot tool or tape, install piston spring over piston rod so that it is seated against endplate, install piston assembly on rod and seat it against shoulder on rod, install two retaining pins in holes in piston boss (*CAUTION* - Hold rod seated against piston while installing pins).

Valve Rod Assembly - Insert valve rod through piston and piston rod, install spring and retainer-washer on end of rod, compress spring and install snap ring in rod groove. Install valve rod seal on valve rod and piston rod (*NOTE* - To aid in seal installation, turn seal partially inside out and install small diameter over valve rod first, then slide large diameter over piston rod). Install nylon button on end of valve rod and press on until seated.

Control Valve Assembly - Assemble valve diaphragm on valve (small diameter of diaphragm on small diameter of valve), install valve spring over diaphragm (small diameter against valve), install retainer plate over large end of diaphragm (*CAUTION* - Keep assembly compressed to prevent spring separating diaphragm from valve). Install assembly on piston, place vacuum tube assembly in position on retainer plate (*CAUTION* - Bead on diaphragm must be in annular groove of housing and screw holes must be aligned), make certain that scribed marks are aligned, tighten attaching screws securely. Install balancing pin and diaphragm in end of vacuum tube assembly, slide vacuum hose over housing tube.

Final Assembly - Install air cleaner housing on end of cylinder and tighten attaching screws securely. Slide new "0" ring seal over piston and position on shoulder of endplate. Remove assembly tool C-3578 from piston, position piston assembly in front of cylinder, connect vacuum hose to air cleaner tube within cylinder. Slide piston into cylinder and install endplate, tighten bolts securely. Pack air cleaner housing with filter hair. Test brake assembly as follows:

TESTING (Brake Assembly after Overhaul): Operati n Test - Connect vacuum source to vacuum tube at air cleaner end of cylinder, apply vacuum of 15-20". Piston and yoke should move to fully extended or applied position (if valve not depressed). Piston should move throughout full stroke without hesitation. *CAUTION - Piston will move out to end of stroke without restriction in above test (with no force applied to end of valve operating rod) and unit should only be tested wh n fully assembled.*

Leakage Test - Use a vacuum gauge and shutoff valve in the vacuum line near the brake power unit. Press in on valve operating rod, apply 15-20" of vacuum to power cylinder, close shutoff valve. Vacuum leakage (gauge drop) should not exceed ½" in 60 seconds. Open vacuum shutoff valve, release valve operating rod and allow piston to move to the end of its stroke. Close shutoff valve and check leakage which should not exceed 1" in 10 seconds.

EDSEL & FORD "BELLOWS TYPE" POWER UNIT

Edsel 6 Cyl. (Early 1959, 1960) Ⓒ
F rd Pass. Cars Exc. Thunderbird (1957)
Ford Pass. Cars & Thund rbird (1958, Early 1959, 1960) Ⓒ

Ⓒ - Bendix Power Unit "Hydraulic (Disc) Reaction Type" also used.

DESCRIPTION: The "Pedal-Assist Power Unit" consists of an air-vacuum bellows and control valves, with vacuum supplied from engine intake manifold, and vacuum reserve tank. Unit is mounted on driver's side of dash panel and attached to brake power lever. Brake power lever is linked to brake pedal. Brake pedal position controls closing of air valve and opening of vacuum valve. Master cylinder is mounted on engine side of dash panel, and is operated by master cylinder pushrod directly connected to brake pedal.

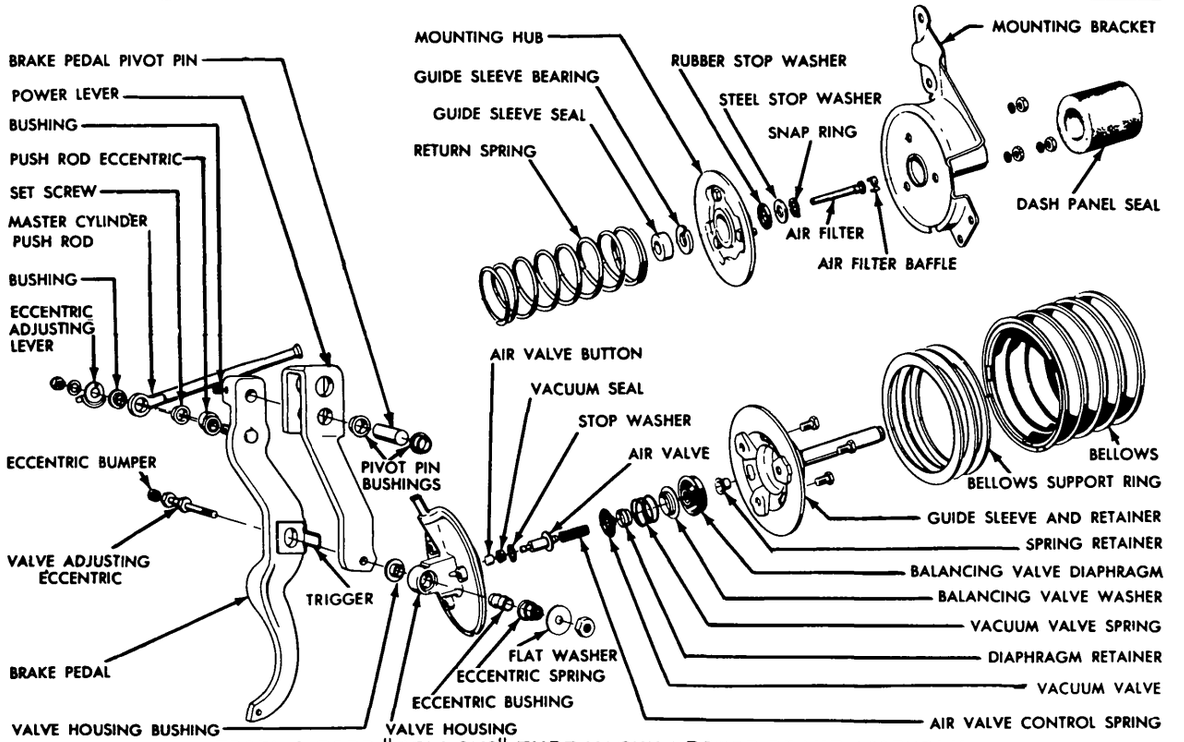
OPERATION: Bellows chamber is open to atmospheric pressure when pedal in released position. As pedal is depressed, finger on pedal contacts air valve causing it to close at the same time opening the vacuum valve. Intake manifold vacuum (or reserve tank vacuum) moves air from bellows chamber. As pressure decreased, bellows contracts and exerts a force on the brake power lever, which is transmitted through the connecting link to the brake pedal and assists the operator in depressing the pedal. When pedal is held in a fixed applied position the assist pressure is held constant. Assist pressure is directly in proportion to pedal apply pressure. As pedal is released, air valve is opened by spring pressure, admitting atmospheric pressure to bellows chamber so bellows expands to normal position.

ADJUSTMENTS: Air Valv - Turn valve-adjusting eccentric until unit chatters when pedal is depressed, then turn eccentric until chatter disappears. (*CAUTION* - Do not turn eccentric more than necessary or "cut-in" will be excessively high). *NOTE* - If satisfactory adjustment of eccentric cannot be made, look for bent pedal trigger. Pedal trigger is bent when distance from back of trigger to front edge of hole in pedal is less or greater than .950"±.005". To correct, bend trigger or replace pedal. Tighten nut to 180-220 inch lbs.

Mast r Cylind r Pushr d - Loosen pushrod eccentric locknut. Rotate eccentric clockwise to maximum to shorten pushrod so master cylinder piston will return to fully unapplied position. Rotate eccentric counterclockwise until master cylinder piston starts to resist movement of pushrod. Hold eccentric and tighten locknut to 180-220 inch lbs. Bubble or spurt at compensator port in master cylinder indicates pushrod properly adjusted.

REMOVAL: P w r Unit - Remove vacuum hose from top of unit. Remove valve adjusting eccentric with flat washer, spring, and bushing. Remove nylon bushing from power unit valve housing. Remove two mounting bracket-to-dash panel screws and remove power unit from car.

Brak P dal - (Cars with clutch pedal). Release clutch release assist spring tension at adjuster, remove spring, idler lever from clutch pedal lever. Remove clutch shaft retaining clip, spring washer, and flatwasher, clutch pedal and shaft from support bracket. **(Cars without clutch).** Remove brake pedal shaft, support brake pedal and power lever, and remove pedal bushing. Leave master cylinder pushrod attached to brake pedal. Pull master cylinder pushrod out of master cylinder boot. *NOTE* - Replace pedal pivot bushings as necessary. Remove pedal pivot pin set screw, drive out pivot pin, remove power lever. Lubricate new nylon bushings with silicone lubricant, reassemble power lever, install pivot pin and set screw, replace brake pedal and power lever in car.



EDSEL & FORD "BELLOWS" TYPE VACUUM POWER BRAKE ASSEMBLY

INSPECTION: Wash all metal parts including air filter in alcohol or solvent which will not leave oil film, and dry all parts with moisture-free compressed air. Wash rubber parts in mild soap and water, rinse clean and dry with air. Replace worn or damaged parts, including valve housing if vacuum valve seat is damaged.

REASSEMBLY: Mount valve housing in vise with alignment marks visible. To install air and vacuum valves, reverse disassembly procedure after lubricating parts with silicone lubricant. *NOTE* - Retainer is installed on valve balancing diaphragm with small diameter toward the diaphragm, and the retainer and center diaphragm must be pressed down over the vacuum valve neck. Use three support rings when replacing bellows. Assemble bellows (either end) over retainer and guide sleeve assembly, with three bosses in retainer aligned with three slots in bellows. Place bellows and retainer over valve balancing diaphragm and in position on valve housing. Finger tighten three capscrews, then tighten to 85-115 inch pounds. *CAUTION* - Sight down guide sleeve to insure air valve control spring is seated squarely in retainer. Test air valve by pressing it in gradually and noting the increased spring tension from air valve spring to vacuum valve spring. Valve should snap back readily. Place return spring on guide sleeve, slide mounting hub on sleeve, hold down against return spring and assemble bellows over mounting hub. Hold mounting hub down, install rubber stop washer, steel stop washer over guide sleeve, then snap ring. Install air filter baffle on filter, filter and baffle in guide sleeve. Filter baffle fits in same groove with and above snap ring. Place mounting bracket on mounting hub, align notch in mounting bracket with tab on bellows, install lockwashers and nuts and tighten to 85-115

CONTINUED ON NEXT PAGE

EDSEL & FORD "BELLOWS TYPE" POWER UNIT (Cont.)

inch lbs. Install dash panel seal. Install nylon bushing in valve housing.

INSTALLATION: Pull brake pedal back until master cylinder pushrod hangs free. Position power mounting bracket on dash panel, with brake pedal finger in position against air valve button and tighten nuts and screws. Install valve-adjusting eccentric and bumper through brake pedal and valve housing of power unit. Slide eccentric bushing (either end) over valve-adjusting eccentric and into valve housing. Install eccentric spring with large coils toward housing, then flatwasher and nut. Tighten valve eccentric nut until eccentric bolt is firmly locked to power lever but can still be turned for adjustment. Adjust eccentric, *see Adjustments preceding.* Disconnect mounting bracket from dash. Pull power unit and pedal back toward car seat until master cylinder pushrod can be inserted in master cylinder boot. Reattach mounting bracket to dash panel. Adjust master cylinder pushrod, *see Adjustments preceding.*

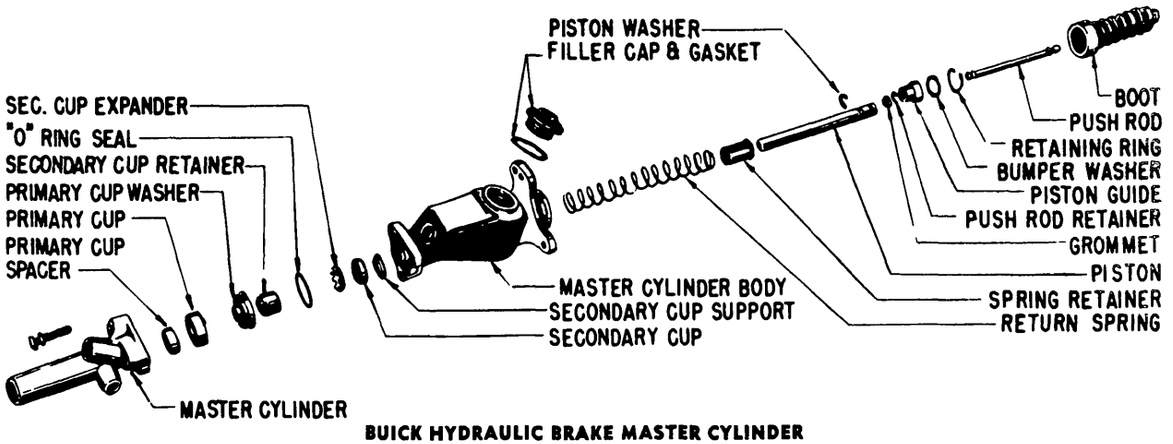
BUICK HYDRAULIC BRAKE MASTER CYLINDER

Buick, All Models (1956)

DESCRIPTION: This new master cylinder is a displacement type and is connected directly to the brake pedal by a pushrod. Pedal linkage adjustment is not required. The hydraulic check valve has been removed from the master cylinder to the junction block which is located inside of the front center cross member just behind the pitman shaft. The stop light switch is located on the left side of the master cylinder.

OPERATION: The operation of the displacement type master cylinder is similar to conventional master cylinders except that the piston travel is longer (4"), and the hydraulic brake fluid check valve is located in the brake line junction block. Fluid replenishment is provided in the usual manner from the master cylinder reservoir, which is integral with the master cylinder.

REMOVAL: Disconnect brake pipe from master cylinder and tape end of pipe to prevent entrance of dirt. Disconnect stop light wires from stop light switch and disconnect pushrod from brake pedal. Remove brake pedal Remove screws holding steering column jacket rubber seal retainer to firewall and push it up on steering column jacket Pull floor mat away from toe pan and remove the toe pan Remove master cylinder attaching bolts and remove master cylinder



BUICK HYDRAULIC BRAKE MASTER CYLINDER

DISASSEMBLY: Remove toe pan from master cylinder (if car is equipped with synchro-mesh transmission, remove heat shield). Clean outside of master cylinder, remove filler cap and drain hydraulic fluid from reservoir. Place master cylinder in vise in vertical position with pushrod up. Remove boot from pushrod and using Truarc Ring Pliers, J-4245, remove retaining ring and guide bumper washer. Remove pushrod and piston from body. Remove return spring, retainer and piston washer. To disassemble pushrod from piston, insert piston into a 9/16" I.D. washer and support washer on jaws of vise *(CAUTION–Protect piston with a cloth. Do not clamp piston in vise).* Hold piston and strike the pushrod with a soft mallet to drive piston out of guide. Remove grommet and pushrod retainer from end of pushrod. Turn cylinder with opposite end up and remove the bolts holding cylinder to body. Remove primary cup insert, cup, and spacer from cylinder. Remove primary cup washer, "O" ring, bearing, secondary cup retainer, expander, cup and cup support from assembly body. Discard primary cup, washer, "O" ring, *bearing, secondary cup, expander, piston guide,* grommet, retaining ring, boot, and filler cap gasket.

INSPECTION: Wash all parts in "Declene" or a good grade of clean alcohol *(CAUTION–*Do not use gasoline, kerosene or mineral base oil) Inspect all parts and replace any that are defective Inspect pushrod bore and counterbore for pits, scoring, rust or dirt. Make sure that bore from reservoir to cylinder bore is clean and open *NOTE–*Bores of master cylinder body and nose piece may be cleaned and reconditioned with fine crocus cloth if not too deeply scratched The piston is chrome plated and sand paper or emery cloth should never be used on its surface

REASSEMBLY: Place piston guide on pushrod and move to a position so that pushrod retainer and grommet can be installed on end of pushrod. Install piston guide on piston so that land of piston guide engages groove of piston. Install piston washer, spring retainer, and return spring on piston. Place pushrod and piston assembly in body and insert guide bumper washer and retaining ring. Replace boot on pushrod and turn cylinder so opposite end is up. Place secondary cup support, cup, expander, retainer, bearing, "O" ring, primary cup washer and insert in body assembly. Install primary cup spacer and primary cup in hydraulic cylinder Bolt hydraulic cylinder to body and check filler cap vent holes to make sure they are clean, then install cap nut and gasket

INSTALLATION: Reverse removal procedure, and bleed brake system

HYDRAULIC BRAKE TROUBLE SHOOTING

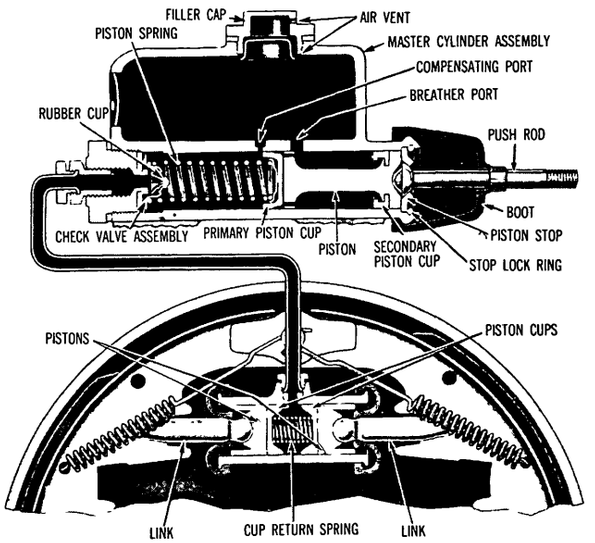
Inspecti n & Testing: Inspect brakes at frequent intervals for pedal reserve (clearance between pedal pad and toeboard, when pedal firmly depressed, while brakes are cold). Increase pedal reserve by adjusting brake shoe to drum clearance. Brakes should be tested on dry, clean, reasonably smooth level roadway (not with wheels jacked up). Test at different speeds both with light and heavy pressure. *CAUTION - DO NOT l ck wh ls and slid tir s on roadway.*

Ext mal Conditi ns That Affect Brake Performance: 1) Right and left tires must be of same size with approximately the same non-skid tread pattern.
2) Car must be loaded equally as heavily loaded wheels require more braking power.
3) Loose front wheel bearings permit drum to tilt causing spotty contact with linings and erratic brake action
4) Misalignment of front end (particularly camber and kingpin inclination) will result in unequal action between wheels.
5) Faulty shock absorbers permit car to bounce on quick stop and will give the impression that brakes are too severe.

INDICATION & CORRECTION: Pedal Travel Excessive r G s t T board - 1) Excessive Brake Shoe Clearanc . Adjust brakes to specified clearance.
2) Low Fluid L v l in Reservoir. Fill reservoir and check for springy pedal action.
3) Air in Hydraulic Syst m. Bleed hydraulic system.
4) Fluid L ak in Hydraulic System. Check for external leaks, if none found, check all wheel cylinders for evidence of fluid loss. When neither of above conditions exist, remove master cylinder and inspect for internal leak. Check Power Brake Cylinder for scores or other damage to hydraulic plunger or rubber cups.
5) Impr per Brak Fluid. Flush system and refill with specified type of fluid.

Springy, Spongy Acti n f Brake Pedal: 1) Air in Hydraulic Syst m, Insufficient fluid in reservoir, disconnected or loose line, clogged filler cap vent, or leaky check valve. Correct above conditions, bleed lines and refill reservoir.
2) Brak Sh s Not Properly Adjusted. Adjust brake shoes to specifications (especially anchor pin).
3) Out-of-R und Brak Drum. True up drum as necessary.

Brak s Sev r on Light P dal Pressure: 1) Loose Front Wheel B arings. Check and adjust as necessary.
2) Lo s Brak Backing Plate. Tighten all backing plate bolts and adjust anchor pins to centralize shoes.
3) Excessiv Dust in Brake Assembly. Thoroughly clean brake shoe linings to remove embedded dirt.
4) Faulty Brak Sh Linings or Drums. Charred linings or scored drums. Grease or brake fluid on linings (will cause grabbing action). Replace linings and true up or replace scored drums.
5) Brak Sh Lining R v rsed. Primary and secondary linings reversed. Install brake shoes in proper position.



HYDRAULIC BRAKE SYSTEM (SCHEMATIC)

Excessive Pedal Pressure Required: 1) Brake Shoe Not Properly Adjusted. Adjust anchor pins and brake shoes.
2) Foreign Substance on Brake Lining. Replace grease or fluid soaked linings. Sand off other foreign substance.
3) Improper Brake Lining. Install standard lining.
4) Improper Brake Fluid. Replace rubber cups, flush system and refill with specified brake fluid.

Hard, or Sticky Initial Pedal Pressure on Power Brakes: 1) Binding in Pedal Linkage. Remove and lubriplate linkage pivot pins.
2) **Swollen Hydraulic Cups.** Replace all rubber parts and completely flush system to remove all traces of mineral oil.

Power Brake Cylinder Does Not Boost: 1) Test For Power Cylinder Operation. Stop engine, apply pedal pressure several times to remove all vacuum from system. Hold pressure on pedal, start engine. Pedal will move slightly forward when cylinder is operating.

2) Power Cylinder Does Not Operate. Check following items: A) Vacuum Check Valve stuck closed. Free up or replace valve. B) Vacuum Pipe Bent, Broken or Obstructed. Replace any damaged or plugged parts and make sure all connections are tight. C) Blocked Air Inlet. Clean or replace parts as required. D) Air Valve Sticking in Power Piston. Remove and disassemble power cylinder for inspection.

3) Power Cylinder Operates But Braking Action Not Normal. Check the following items: A) Insufficient Brake Fluid in System. Fill reservoir, bleed all lines and check for leaks. B) Brake Lining Condition. Check for glazed, dirty, or oily brake linings. Clean or replace.

Brak s Drag At One Wheel: 1) Loose Front Wheel Bearings. Check for play in bearings with wheel jacked up and adjust if necessary.
2) Insuf ficent Clearance at Brake Shoes. Adjust brake shoes.
3) Weak or Broken Brake Shoe Spring. Replace spring and make brake shoe adjustment.
4) Wheel Cylinder Piston Stuck or Cups Distorted. Overhaul wheel cylinder and replace damaged or defective parts.
5) Obstruction in Brake Pipes or Hoses. Flush hydraulic system or replace damaged or defective parts as required.

Brakes Drag at All Wheels: 1) Insufficient clearance at brake shoes. Adjust as necessary.
2) Master Cylinder Compensating Holes Closed. Make certain that pedal is free on pivot and at pushrod connection. When freeing up pedal does not correct condition, remove master cylinder for disassembly and thorough cleaning. *CAUTION* - Never insert test wire through compensating holes as wire will leave burr and cause damage to primary cup.
3) Wheel Cylinder Cups Distorted. When rubber parts of master cylinder are swollen or distorted, all wheel cylinder rubber parts will also be affected. Thoroughly flush the entire system and replace all rubber parts.

Power Brakes Do Not Release Properly: *NOTE - S "Brakes Drag At All Wheels" above for causes not caused by power brake cylinder and its linkage.*
1) Binding Pushrod. See item (1) under "Hard or Sticky Initial Pressure on Power Brakes" above.
2) Swollen Hydraulic Cups. See item (2) under "Hard or Sticky Initial Pressure on Power Brakes" above.
3) Plugged Compensating Ports. Remove and disassemble power cylinder, clean thoroughly and flush brake hydraulic system to remove all dirt.
4) Power Unit Internal Friction. Remove, disassemble, and inspect power cylinder, for weak or broken springs and for dry rubber cups and O-ring seals. Reassemble as specified.

Car Pull to One Side: 1) Tires Unequal. Rearrange tires so tread non-skid characteristics are more nearly equal on both sides of car.
2) Brake Shoes Improperly Set, Adjust anchor pins and brake shoes.
3) Loose Front Wheel Bearings. Check play in bearings with wheels jacked up and adjust if necessary.
4) Out-of-Round or Scored Brake Drums. True up or replace as required.
5) Brake Linings Not Matched or Improperly Placed. Replace or change linings as required.
6) Foreign Substances on Some Brake Linings. Thoroughly clean any linings having water, sand, paint, imbedded particles of metal, etc. on surface. Sand and brush affected surface - DO NOT use any liquid cleaning agent. Replace linings that have oil, grease or hydraulic fluid on them as they cannot be cleaned satisfactorily.

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HYDRAULIC BRAKE TROUBLE SHOOTING (Cont.)

Brakes Squeak: 1) Brake Shoes Not Properly Adjusted. Make uniform clearance adjustment and anchor location, 2) Brake Drum Condition. Rebore any drum that is out-of-round or scored. Replace any drum that is cracked or has hard spots in braking surface.
3) Foreign Material Imbedded in Surface. Clean surfaces of lining and remove all particles of metal. If necessary use portable resurfacing machine to properly clean surfaces and to insure good drum contact.
4) Linings Loose on Brake Shoes. Re-rivet linings to shoes.
5) Bent Brake Backing Plate. True up or replace backing plate.
6) Improper Brake Shoe Lining. Install standard recommended lining.
7) Shoes Scraping on Backing Plate. Clean, smooth up, and lubricate surfaces and reduce shoe movement by adjusting to safe minimum clearance.

Brakes Fade (Fail to Hold): "Fade" is caused by loss of friction due to heat cooking out most volatile ingredients of bonding material in lining that acts as a lubricant. Loss of ingredients through heat affect lining efficiency. Improperly compounded linings will also cause fading. When brake drums have been rebored too thin they will expand under high temperatures causing fade. Replace linings and/or drums as necessary.

SERVICING NOTE: *See following article for directions for bleeding lines and servicing master and wheel cylinders. See separate brake data pages for brake shoe and brake pedal adjustment directions.*

HUDSON MECHANICAL FOLLOW-UP

Hudson, All Models Except Jet (1954-57)

DESCRIPTION & OPERATION: Consists of over-running mechanical linkage between brake pedal and hand lever equalizer bar plate or hand brake bellcrank, by which wheel brakes are set mechanically through hand lever linkage after movement of pedal is sufficient to operate brakes hydraulically. Acts as a reserve if hydraulic application fails or when pedal travel is excessive.

ADJUSTMENT: Adjust models as follows:

1954 Models - With the brakes in fully released position loosen locknut on threaded follow-up rod below brake pedal, and turn adjusting nut until clearance between rear side of brake pull rod slide link retainer pin and rear end of slot in slide link is 1¼", tighten locknut.

1955-57 Models - Disconnect cable from brake pedal and master cylinder piston pushrod from brake pedal. Place a 3½" spacer block between brake pedal rod pad and floor mat. Depress pedal rod until pad contacts spacer block; retain in that position and adjust mechanical follow-up cable length at clevis end so that clevis pin can be installed freely with no slack in cable.

HYDRAULIC BRAKE SERVICING

BLEEDING BRAKE LINES: Bleed hydraulic system at all four wheel cylinders if air has been introduced through low fluid level or by disconnecting brake pipe at master cylinder. When pipe at only one wheel cylinder has been disconnected, only that wheel cylinder needs bleeding. If a pipe has been disconnected at any fitting between master and wheel cylinders, then all wheel cylinders serviced by that pipe require bleeding. The system should be bled in the following sequence:
1) Master Cylinder (when equipped with bleeder fitting).
2) Power Unit (when so equipped).
3) Rear wheel farthest from master cylinder, except as follows: Buick, Pontiac and Valiant, bleed cylinders in following sequence, Left Front, Right Front, Left Rear, Right Rear. When car equipped with 2 front wheel cylinders (per wheel) bleed lower cylinder first, then upper cylinder. Bleeding operations can be made with either a Pressure Tank or Manually.

►*PRESSURE TANK CAUTIONS:* To safeguard against air entering system, avoid the following: 1) Do not shake or agitate pressure tank after air pressure has been added. 2) Do not move pressure tank position, bring air line to tank when Additional air pressure is necessary. 3) Be sure that valves on pressure tank lines are not defective and allowing air to be sucked in when fluid passes through lines. 4) Keep pressure tank at least 1/3 full of fluid at all times. 5) When pressure tank is full of air bubbles, release air pressure so bubbles can escape and refill with pressure.

Pressure Tank Bleeding: Clean master cylinder cap and surrounding area, then remove cap. With pressure tank more than 1/3 full and with hose and master cylinder both filled with specified fluid, attach hose to master cylinder filler opening. Attach bleeder valve hose to wheel cylinder bleeder valve (early models, hose screws into bleeder valve, later models, other end of hose slips over bleeder valve. Place other end of hose in clean glass jar and unscrew bleeder valve 3/4 to 1 turn. Open pressure tank hose valve to supply fluid under pressure (not to exceed 35 lbs.). When fluid flowing from wheel cylinder bleeder valve into glass jar is free of air bubbles, close bleeder valve securely and proceed with bleeding other wheel cylinders in same manner.

Manual Bleeding: Fill master cylinder, install bleeder hose and glass jar to wheel cylinder as in pressure bleeding. Unscrew bleeder valve 3/4 to 1 turn. Depress brake pedal a full stroke, then allow pedal to return to released position. *CAUTION - Should pedal return quickly, air will be drawn into system.* Repeat this operation until fluid flowing from bleeder valve into glass jar is free of air bubbles, then close bleeder valve and proceed to other wheel cylinders as in pressure bleeding. *NOTE - Check level of fluid in master cylinder frequently during bleeding operation to insure that air will not enter system.* Refill master cylinder to proper level.

SERVICING: Wheel Cylinders - Removal & Disassembly - Remove wheel, drum, and brake shoes. DO NOT get grease or dirt on brake linings. Disconnect brake hose or pipe from wheel cylinder and cover opening with tape. On Chrysler Corp. Cars, remove support plate and wheel cylinder to backing plate nuts and washers. Slide support plate out of way, then remove wheel cylinder to support plate bolts and lift wheel cylinder from plate. On Other Cars, remove wheel cylinder from backing plate. Remove links, boots, pistons, cups, cup expanders and spring from cylinder.

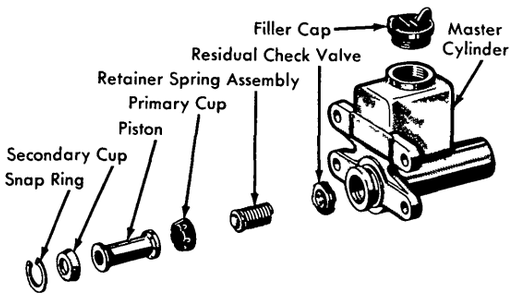
Cleaning & Inspection - Discard rubber boots, expander assembly, and piston cups. Clean all other parts with hydraulic brake fluid or a good grade of alcohol. *CAUTION - DO NOT USE antifreeze alcohol, gasoline, kerosene, or any other cleaning fluid that might contain mineral oil.* Check piston and bores for scores, scratches or corrosion. Use crocus cloth to clean up light scratches or signs of corrosion (Chrysler Corp. Cars) or crocus cloth for light scratches, steel wool and alcohol for corrosion (Other Cars). Follow manufacturers recommendations regarding limited honing to clean up minor scratches.

Reassembly - Reverse disassembly procedure, dipping pistons and cups in specified brake fluid as they are assembled.

Master Cylinder: Removal - *See Car Model Pages.*

Disassembly, Cleaning & Inspection - Clean outside of master cylinder, drain all brake fluid and disassemble. Replace scored or corroded piston and all piston cups. Follow same procedure for master cylinder as described for wheel cylinder in regard to use of crocus cloth, steel wool, alcohol, honing and use of other than alcohol cleaning solutions.

Reassembly - Reverse disassembly procedure and dip all parts in specified brake fluid, as they are assembled. *CAUTION - Compensating port in cylinder must be clear, but DO NOT run wire through port as it will form burr which will damage primary cup.* Recheck Pedal Freeplay when piston does not clear port. Follow manufacturers recommendations for clearances.



BRAKE MASTER CYLINDER (TYPICAL)

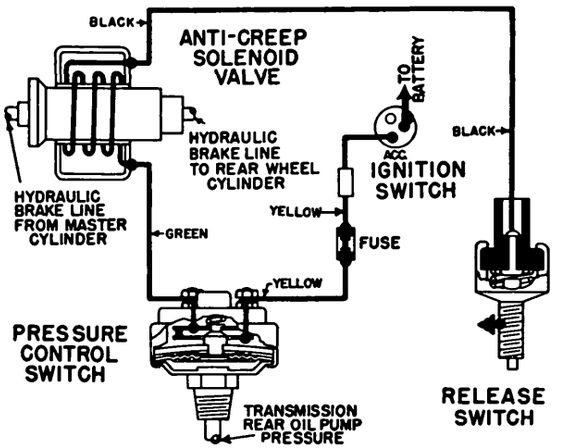
ANTI-CREEP

Stud bak r 1954-55 Models with Aut . Trans.

DESCRIPTION: System comprises a solenoid valve, pressure control switch and a release switch. With ignition on, or when engine idling and car is not in motion and brakes are applied, the rear brakes will remain on, after releasing brake pedal, until accelerator is again depressed. With car in motion, system is inoperative and brakes function normally.

OPERATION: The solenoid valve mounted on rear of master cylinder holds brake pressure on the rear brakes whenever the Anti-Creep circuit is closed. The pressure control switch which is operated by automatic transmission rear pump pressure, opens the Anti-Creep circuit when the car is moving forward, and closes the circuit when the car is stationary, or moving in reverse. The release switch opens or closes the circuit as the accelerator is depressed or released. With the ignition "on", the accelerator released (release switch closed), and the car stationary (pressure control switch closed), the Anti-creep circuit is completed through these switches and the solenoid valve is energized. When the brakes are applied under these conditions, the anti-creep solenoid valve will retain approximately 200 pounds per square inch pressure at the rear wheel brakes to prevent "creeping." When the accelerator pedal is depressed, the circuit is open at the idle adjusting screw switch allowing the solenoid to de-energize thereby releasing the brakes instantly. When the car is moving forward, normal brake operation is not affected since the rear pump pressure holds open the Anti-Creep pressure control switch, preventing solenoid from energizing.

CONTROL UNITS REMOVAL & INSTALLATION: If



ANTI-CREEP CONTROL WIRING DIAGRAM

operation not satisfactory and checking indicates units defective, remove and replace as follows:

Release Switch: To remove switch, disconnect switch lead, loosen locknut and unscrew switch from bracket.

Pressure Control Switch—To remove, disconnect switch leads, unscrew switch from transmission case.

Solenoid Valve: To remove, disconnect all leads, disconnect brake line at solenoid valve outlet. Take out screw mounting solenoid valve on adapter, lift unit out. Install solenoid valve in same manner.

►***CAUTION—Bleed brakes after installing solenoid valve and connecting brake line.***

ADJUSTMENT: Release switch is only point requiring adjustment. Adjust switch, for each model, as follows:

Champion - After transmission linkage adjustment is completed, loosen switch locknut and screw switch into bracket until switch plunger just contacts plate. Connect switch wire, turn on ignition, screw switch in until an audible click is heard in the anti-creep solenoid. Tighten switch locknut.

Commander & President - After carburetor and transmission linkage adjustments are completed, turn release switch into cross-shaft bracket until carburetor idle adjustment screw starts to break with low step of fast idle cam. Back off the anti-creep release switch three complete turns and secure with locknut. Install wire and test operation.

Linkage Adjustment: *See "Studebaker" Automatic Transmission in Transmission Section.*

CHECKING OPERATION: 1) While driving car at approximately 10 MPH, selector lever in "D" position, quickly apply and immediately release brakes. **Do not touch accelerator pedal.** Car should roll freely with no evidence of brake drag after brake pedal is released.

2) While driving car on level ground, release accelerator pedal and apply brakes, bringing car to complete stop. Car should not creep forward until accelerator pedal is depressed.

3) With car standing on level ground and engine idling, selector lever in one of "D" positions, and with anti-creep system preventing car from creeping, touch accelerator pedal lightly, then release it. Car should creep slowly from a standstill.

HILL-HOLDER & NOROL

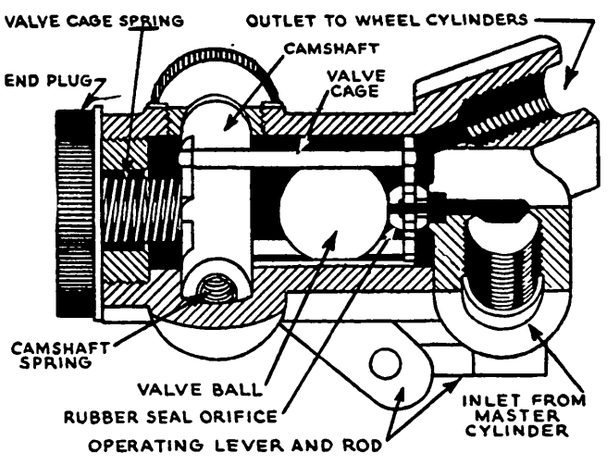
Std. or Optl. Equipment On:

ALL CAR MODELS WITH HYDRAULIC BRAKES

DESCRIPTION:—These units consist of a gravity and clutch pedal controlled check valve in a housing which is ordinarily mounted directly on the end of the hydraulic brake Master Cylinder so that the check valve is in the brake line between the master cylinder and the wheel cylinders The valve ball is free to roll endwise in the valve cage (when unit tilted by car being on an incline) while the valve cage itself is moved endwise by a cam lever linked to the clutch pedal

OPERATION:—The valve cage with the rubber seal orifice is normally held away from the valve seat by the clutch pedal controlled camshaft (with the clutch engaged) so that the valve is open and brake operation is conventional When the clutch is disengaged, the rotation of the camshaft permits the spring behind the valve cage to force the cage back so that the rubber seal seats against the valve seat If the car is pointed uphill the ball within the valve cage rolls down against the rubber seal, closing the orifice within the seal so that the brake fluid in the lines is prevented from returning to the master cylinder and brakes are held 'on' even though brake pedal is released When the clutch is engaged, the valve cage is pulled away from the valve seat uncovering the return passage to the master cylinder and releasing the brakes If the car is on a level road or pointing downhill, the ball will not close the rubber seal orifice

ADJUSTMENT:—Operating lever position must be checked (to insure correct timing of brake release when clutch is engaged) whenever clutch pedal is adjusted See Clutch pedal adjustment instructions on car model page for special instructions Adjust as follows



HILL-HOLDER & NO-ROL C NTROL UNIT

Adjustment:—Check setting by applying brake on slight incline with clutch disengaged, then shift into low gear engage clutch slowly and note point at which brakes release. If brakes release too soon and car has tendency to roll backward, loosen locknut and turn adjusting nut on end of control rod away from pedal to lengthen rod If brakes release late and engine has tendency to stall, turn nut in to shorten rod. Tighten locknut and check setting.

Mounting:—The unit must be mounted in a level position on car frame. To check, place spirit level on bosses on top of hill-holder body casting with car standing on level floor. Unit must be leveled lengthwise (place spirit level on two bosses on top of unit), and crosswise (place spirit level crosswise on one boss).

SERVICING: Before disassembly, mark shaft and lever and replace in same position Remove ball chamber head plug and spring, withdraw camshaft being careful not to lose camshaft spring, withdraw ball cage assembly In reassembling unit, see that ball cage is installed with two large ball rail rods underneath camshaft, and that camshaft spring is in place at inner end of camshaft

BENDIX HYDRAULIC SINGLE ANCHOR

Buick, All Series (1954-60)
Cadillac, All Series (1954-59)
Hudson, All Series Exc. Jet (1954-55)
Hudson, All Models (1956)
Hudson Hornet V8 (1957)
Nash Ambassador (1954-55)
Nash Statesman (1955)
Nash, All Models (1956)
Nash Ambassador V8 (1957)
Oldsmobile, All Series (1954-60)
Packard 8, All Models (1954-55)
Packard & Clipper (1956)
Pontiac, All Models (1954-60)
Rambler, Series 20 & 80 (1958-60) Ⓒ
Valiant (1960)

Ⓒ - For models with Automatic Brake Adjusters, *see "Bendix Automatic Adjuster Hydraulic Brakes" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 PONTIAC BRAKE SILENCER SPRINGS (To Correct Brake "Squeak"):* Brake Drum Silencer Spring Pkg. No. 514278 is available to correct above complaint. To install, make up four tools (see below) and install tools on four of the five wheel studs (use wheel nuts to hold tools in place), place spring on drum over the four tools, roll spring on drum flange using large screwdriver to pry spring on drum at point between two wide spaced installing tools. Install three clips approximately 120° apart to retain spring on drum. Remove tools and re-install wheel.

INSTALLATION TOOL NOTE–Make up tool from 1" wide strap iron with 17/32" hole centered on strap ¾" from one end (to engage wheel stud). Bend opposite end over in form of "U" 3¾" from center of hole and ¾" deep (return on end should be ½" long so as to fit over rim of brake drum).

►*1954 CADILLAC BRAKE PEDAL FREE TRAVEL CAUTION:* **The upper half of brake pedal for the standard brake is not the same as the one for power brakes. Should the incorrect upper half be installed for the standard brake the free travel will not be correct, and full brake action cannot be obtained. The correct measurement (from carpet to lower edge of brake pedal plate) for standard brake is 5¾" (Power Brake 4 7/8"). NOTE– To obtain full brake pedal travel, the rubber grommet should rest against the bottom of toe-board when brake is fully released.**

►*1954 OLDSMOBILE BRAKE RETRACTING SPRING CAUTION:* **Spring load specifications are important to obtain long life from linings. Spring load should be 45-55 lbs. when spring stretched to its normal length (4 7/8"). Free length should be 4½". Measure the distance from end of long hook to inside edge of other hook at opposite end. Replace spring when free length over 4½" or load not within specifications.**

►*1955 BUICK 40 & 60 SERIES LONG BRAKE CABLE CORRECTION (Early Cars):* To correct, disconnect rear brake cable by removing nut and cable sheave. Cut a piece of ¼" steel pipe or tubing that will slip closely over front cable rear shank to length necessary to get ample adjustment. One inch length should be adequate. Install this spacer on shank between rear cable sheave and adjusting nut. Adjust cable to proper tension and lock adjusting nut by installing a plain 5/16" nut as a jam nut and tightening securely against adjusting nut. Check with parking brake in fully applied position to be sure cable sheave does not come up to rubber grommet. There should be at least ½" clearance. If cable sheave within ½" of grommet in fully applied position, remove hand brake cable support (rubber covered bracket) and weld a new one, Part No. 1311223, one or two inches farther ahead on torque tube. Steel shank of front cable must ride in the grommet.

►*BUICK UNEQUAL, ERRATIC, OR SQUEAKING BRAKE CORRECTION:* To correct, proceed as follows: **(1)** Air tires to 24 pounds. Expand brake to a two hand drag in a forward direction (**Do not** tighten excessively so as to distort drum). **Do not** attempt to expand brake by having another mechanic apply pressure to brake pedal. **(2)** Make Anchor Pin Adjustment (See Adjustments below), and repeat adjustment until amount of drag remains constant. **(3)** Make Major Brake Adjustment (See Adjustments below). **(4)** Repeat **(2)** and **(3)** above on all remaining wheels. If any brake has noticeably more drag than others after releasing adjustment 6 notches, repeat anchor pin adjustment on that brake. If still not comparable with others, remove wheel and check brake assembly and backing plate for cause of binding and correction condition. If, during adjustments, anchor pins on one or more brakes were moved, car should be road tested. Usually, during first few applications, original condition will return and then will gradually improve until, after 15 to 20 applications, brakes will begin to operate normally.

►*1954 & EARLY 1955 CADILLAC EXCESSIVE PEDAL EFFORT CORRECTION:* When checking for cause of excessive pedal effort on 1954 Series cars and 1955 Series Cars built prior to Engine No. 22750, examine brake pedal position on shaft. If pedal has moved out over lock ring to such an extent that it is binding, replace shaft and lock ring, using new shaft. Part No. 3510310, and new lock ring, Part No. 1463434. New part numbers are applicable to 1950 through 1955 Series cars equipped with Hydra-Matic transmissions.

►*1955 CADILLAC BRAKE PEDAL BINDING CORRECTION (Cars Built Prior To Engine No. 12725):* To correct bind at clevis and bell crank linkage of brake pedal assembly, install a 1/8" flat washer between frame and master cylinder attaching bosses. After installing washer, check linkage throughout its travel and shim further, if necessary.

►*1955 CADILLAC WHEEL CYLINDER PRODUCTION CHANGE:* Effective approximately Engine No. 54000 a dish type metal expander is being used with wheel cylinder cups. Expander minimizes contraction of cups due to variations in temperature and reduces possibility of air entering wheel cylinder when fluid cools and creates a slight vacuum in cylinder. Wheel cylinders with expanders installed have copper plated bleeder screw assembly. Early cars have a zinc dichromate plated bleeder screw assembly.

►*1954-55 CADILLAC MASTER CYLINDER REPLACEMENT CAUTION:* Service replacement master cylinders for use on 1952-55 Series cars have filler cap designed for use with a remote filler reservoir. Drilled and tapped hole in center of cap for reservoir tube is plugged with red plastic cap. When replacing master cylinder on a 1954-55 Series car, plastic cap must be removed for attachment of remote filler pipe. When using a new master cylinder on a 1952-53 Series car without remote filler reservoir, filler cap must be discarded and filler cap from **ld** master cylinder used.

►*1955 HUDSON HORNET BRAKE PRODUCTION CHANGE & CORRECTION (T Eliminat N is r "Clunk"):* Effective approximately October, 1955 a brake shoe return spring with greater tension (40 lbs.) will be incorporated in production to eliminate noise or "clunk" occurring during initial pedal application in **reverse** direction. New set, Part No. 3119175, including 4 springs (2 wheels), is available for installation on earlier cars.

►*1955 HUDSON & NASH MASTER CYLINDER PRODUCTION CHANGE (To Corr ct "Spongy" Brak P dal):* Master cylinder-to-pedal shaft brace, Part No. 3141435, may not fully engage groove at outer end of pedal shaft, permitting pedal shaft to flex within keyhole slot during application resulting in a "Spongy" brake pedal. Effective at following serial numbers, production enlarged two master cylinder attaching holes in brace to effect a full engagement of keyhole slot to groove in outer end of pedal shaft: Hudson Hornet V8, Y-1483; Hudson Hornet 6, X-1226; Hudson Wasp, W-1347; Nash Ambassador V8, V-1808, Nash Ambassador 6, R-743126; Nash Statesman, K-635418. At same time two original lockwashers on brace to master cylinder attaching screws were replace! with bite washers, Part No. 3138264. When condition occurs in field remove brace and elongate master cylinder attaching holes sufficiently to provide full engagement of keyhole slot to groove in outer end of pedal shaft. When reinstalling brace use two bite washers.

►*1955 HUDSON WASP & NASH STATESMAN BRAKE CHATTER ON LIGHT PEDAL APPLICATION CORRECTION:* Chatter caused by drum distortion occuring when wheels secured to drums (ten wheel-to-hub contact ledges are not uniform in height). Generally, condition will improve with time and mileage. If chattering condition is **sever** , remove wheel and tire assemblies, and clean wheels as necessary. Color a 6½" square of plate glass with a bearing blue or colored crayon. Place the plate glass on the ten wheel-to-hub contact ledges, and oscillate the glass slightly to transfer coloring material to high ledges. With grinding equipment, gradually reduce high ledges to a point where it is not possible to place a .004" feeler gauge between plate glass and any one of the ten ledges. Repeat coloring operation as often as necessary. *Do not remov mat rial in xc ss f .015" from any one of ledges.* If necessary, replace wheel. In cases where severe chattering is encountered it is possible that one or more drums have taken a permanent out-of-round set. Check drums, and in cases where out-of-round exists in excess of .005", a light cut be taken on drum lathe to bring drum within .005" out-of-round limit.

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BENDIX HYDRAULIC (Cont.)

►*1955 OLDSMOBILE BRAKE PRODUCTION CHANGE:* Beginning approximately May 15, a second type front and rear brake assembly was used in production. Primary change in new assembly is use of larger retracting spring and a new anchor pin. In rear brake assembly, new parking brake lever and pin assemblies are used to provide clearance for larger spring, and are held to the secondary shoe by a retaining clip. A new washer is also used in rear brake assemblies between parking brake lever and secondary shoe.

►*1956 BUICK BRAKE SQUEAK CORRECTION:* A new brake anti-squeak spring Part No. 1178586 replaces early spring Part No. 1345469. It is more effective in eliminating brake squeak due to increased tension. To install, remove wheel and tire assembly, hook spring ends together, place spring over upper edge of drum and hold in place while prying spring over balance of drum. Center punch drum at five equal distance points so that point of spring retainer clip will rest in depression.

►*1956 BUICK BRAKE PEDAL TWISTING CORRECTION (DYNAFLOW MODELS WITH MANUAL BRAKES):* On early 1956 Dynaflow models a bending or twisting of the brake pedal plate can be corrected by removing the brake pedal pivot locknut, bolt and pedal as well as the dash insulator retainer. Drill a 9/32" hole through the cowl using the unused hole in brake pedal bracket as a guide. Install a ¼" x 20 x ¾" bolt, washer and locknut and tighten to cowl panel.

►*1956 BUICK BRAKE DRUM REBORE CAUTION:* If brake drum does not clean up when rebored to diameter of 12.083" it must be replaced. Excess reboring will affect dissipation of heat and cause drum distortion.

►*1956 CADILLAC BRAKE (SQUEAL) PRODUCTION CHANGE:* Effective at Eng. No. 021493, paint eliminated from brake drum silence springs and from brake drum in vicinity of springs to reduce brake squeal.

►*1956 HUDSON WASP & HORNET 6 REAR WHEEL BRAKE CYLINDER PRODUCTION CHANGE:* Beginning with Serial No. W-9403 (Wasp), No. X-9204 (Hornet), the diameter of the rear wheel brake cylinder was decreased to 7/8" from 15/16"

►*1957 BUICK BRAKE DRUM PRODUCTION CHANGE:* Motor Wheel drums now used on later production cars on front wheels only. These drums are identified by weld spots around circumference between rim and disk. *CAUTION:* If one drum requires replacement, another drum of the same make must be used. Under no circumstances should two different makes of drums be used on the same end of the car.

►*1957 BUICK ALUMINUM DRUMS:* New aluminum finned drums are used on front wheels of Models 75 & 75R. Special wheel attaching bolts are used with these drums and should not be used with other drums, nor should ordinary bolts be used with aluminum drums.

►*1957 BUICK PEDAL LINKAGE CHANGE:* A change in linkage has been made to increase the clearance between brake pedal arm and idler lever arm. This consists of rotating arm on brake pedal slightly and lengthening brake linkage link which in turn increases clearance between arm of brake pedal and arm of idler lever. New brake pedals and old shorter links are not interchangeable. However, only new pedals are available for replacement which requires a new ty, link also.

►*1958 BUICK DRUM NON-INTERCHANGEABILITY CAUTION:* Cast iron drums (Series 40 front, All Series rear) and aluminum drums (Series 50, 60, 70, 700 front only) are used. Two types of each used (see below) and drums on right and left sides of car must be alike. DO NOT intermix drums.

Cast Iron Drums - Buick and Motor Wheel types used. Motor Wheel drums identified by weld spots around circumference between rim and disk.

Aluminum Drums - Early type have aluminum pegs in iron liner, later type do not.

►*BUICK CAST IRON DRUM FLAKING CAUTION:* When scale is present on edges and in corners of drums, remove with a chisel and hammer, by tapping lightly. This will prevent scale becoming embedded in lining.

►*1957-EARLY 1958 CADILLAC ANCHOR PIN PRODUCTION & TORQUE SPECIFICATION CHANGE:* Heat treated anchor pin nut No. 225857 (identified by three grooves on face of nut) replaced Nut No. 120371 beginning with 1958 Engine No. 038946. This nut should also be used on all 1957 cars. All three backing plate nuts and new anchor pin nut should be tightened to 80-100 ft. lbs.

►*1957 CADILLAC SILENCER SPRING ELIMINATION:* Effective Engine No. 012025 the brake drum silencer spring has been eliminated.

►*1957 CADILLAC "BUZZING" NOISE CORRECTION:* To eliminate "buzzing" or gurgling noise in power brakes caused by air trapped at control valve assembly, thoroughly bleed hydraulic system - twice if necessary. If condition is not corrected, check for leaks.

►*1957 HUDSON & NASH PARKING BRAKE PRODUCTION CHANGE:* A new parking brake cable bellcrank return spring is attached to bellcrank and torque tube. An anchor is welded to torque tube to hold it. Return spring hooks into eye of cotter key at bellcrank.

►*1958 CADILLAC BRAKE SHOE RETRACTING SPRING PRODUCTION CHANGE & CAUTION:* Larger diameter (7/8") brake shoe retracting spring No. 5456495, replaced spring No. 497834 (1/2") on all series FRONT wheel brakes starting with Engine No. 017126. All four front wheel retracting springs must be of same type. All four rear wheel retracting springs (1/2") must be same type (two types - Tile Red and Dark Maroon).

►*1958 CADILLAC PARKING BRAKE PEDAL NO RETURN CORRECTION & PRODUCTION CHANGE:* Make parking brake adjustment as detailed under "Hand (Parking) Brake Adjustment" below. Make sure there is not even a slight bind in brake cable in area of No. 2 body hanger. Entire parking brake pedal assembly must be lubricated and excess friction at pivot points eliminated. Beginning Engine No. 042388, a new pedal assembly with improved locking quadrant entered production on some cars. This pedal uses the 35 lb. retracting spring. At the same engine number, a new 55 lb. retracting spring, Part No. 1472158, was used on cars still having early type pedal assembly. Use 55 lb. spring on early cars if above adjustments and checks do not make brake pedal release.

►*1958 CADILLAC SERIES 75 PARKING BRAKE CABLE PRODUCTION CHANGE:* Beginning Engine No. 058306, parking brake cables were lengthened ¾" to aid in more accurate brake adjustment.

►*1958 OLDSMOBILE PARKING BRAKE HARD APPLICATION AND POOR RETURN CORRECTION:* Caused by binding of front cable at frame bracket which may be bent out of position. To correct, bend bracket so it is at 90° angle to centerline of car.

►*1960 PONTIAC REAR BRAKE ANCHOR PIN NOTE:* Anchor pins on rear brakes are not adjustable (riveted to backing plate). In conjunction with "riveted" anchor pin, production brake drums will not have a feeler slot.

DESCRIPTION: Single anchor, hydraulic type. Fixed anchor pins are used on 1959-60 Oldsmobile and Rambler, 1960 Valiant (front and rear wheels) and on 1960 Pontiac (rear wheels only). Fixed anchor pins are not adjustable and have no major adjustment.

ADJUSTMENTS: Before attempting any adjustments, car should be placed on stands with wheels free. Brake pedal should operate freely and there should be no bind in hand brake lever or cables.

Brake Pedal Adjustment: This adjustment should conform with recommendations before any other adjustment is made. See Car Model below.

Buick - Clearance between pedal and under side of toe board should be 1" (1954), 15/16" (1955). (1956) - No pedal adjustment necessary. Pedal must return to fully released position (piston guide contacting bumper washer). (1957-58) - Make sure large nut holding master cylinder to cowl is tight; tighten brake pedal mounting bracket attaching bolts. Measure from left top side of pedal pad perpendicular to toe pan. With ruler pressed firmly against floor mat, pedal height should be 7½-8" (Std. Brakes through 1959), 5½" (Pwr. Brakes 1957-58). 1959 Pwr. Brakes and 1960 Std. & Pwr. Brakes do not have pedal height adjustment. Adjust by turning pushrod to obtain desired height. *NOTE* - On synchromesh cars, pedal height is same as clutch pedal height.

Cadillac - Rubber grommet on pedal under toe board should just touch underside of toe board (1954-55), (1956) - With power brake pushrod in fully released position, distance between front edge of groove in pedal-to-relay rod and toe board should be 7/8"±1/16". Screw relay rod into or out of trunnion relay to obtain this distance.

(1957-58) - With power brake pushrod in fully released position, pull carpet away from pedal-to-relay rod seal and check distance between pedal reinforcement and seal retainer. Distance should be 4 7/8"±1/8". Screw relay rod into or out of trunnion relay to obtain this distance.

(1959-60) - *See "Pushrod" adjustment in "Bendix Hydraulic (Disc) Reaction" Type, reassembly of Power Brake Unit.*

Hudson & Nash—Pedal free travel should be ¼-½" with master cylinder piston against stop. Adjust at master cylinder pushrod.

Oldsmobil - Two adjustments required.

P dal H ight - 8¼" minus 1/16" from top of brake pedal to top of floor pan. Adjust by loosening locknut and turning stopscrew on underside of brake pedal bracket.

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BENDIX HYDRAULIC (Cont.)

Pedal Free play - 3/16" pedal free travel before pushrod contacts master cylinder piston. To adjust, loosen locknut on the pushrod and adjust pushrod length.

Packard—Brake pedal should have ¼" free play with master cylinder piston against stop. Adjust at master cylinder pushrod.

Pontiac - (1954-57) - Clearance from power side of pedal pad to floor mat with master cylinder piston against stop should be 4 3/8-4 5/8"

(1958) - Adjust pedal stop bracket to give 5½-5¾" pedal height from bottom of pedal to floor mat. Stop lights must operate after ½" pedal travel. Reset pedal stop and bracket separately to correct. Then adjust length of master cylinder pushrod to give 1/64-1/32" clearance between forward end of pushrod and socket seat in master cylinder piston. Tighten locknut.

(1959-60) - Adjust pedal stop bracket to give pedal height from bottom of pedal pad to floor mat as follows: 6¼-7" for 1959 (Std. Brakes), formerly 6¾-7", 3¾" (Pwr. Brakes), formerly 3¼". When pedal height changed, adjust stop light switch so 1/8" of plunger shows when pedal fully released. *CAUTION* - DO NOT lengthen pushrod beyond clearance specification. Primary cup of master cylinder must be completely clear of compensating port.

CAUTION - Do not lengthen pushrod beyond clearance specifications. Primary cup of master cylinder must be completely clear of compensating port.

Rambler - Pedal freeplay should be ¼-½". Adjust by rotating pushrod eccentric bolt. *NOTE* - Compensating port in master cylinder must be wide open when brake pedal is in fully released position. *CAUTION* - Minor adjustment only is made on 1955-57 Nash & Hudson models (anchor pin is fixed)

► *CAUTION:* Minor adjustment only is made on 1955-57 Nash & Hudson models (anchor pin is fixed).

Valiant - No adjustment provided

Minor Wear Adjustment: Check and adjust the brake pedal clearance, then release the hand brake lever, and check to see that the cables are free and are not holding brake shoes against the drum. At each wheel, expand brake shoes by turning adjusting screw up until wheel can just be turned by hand, adjust hand brake (cars where hand brake adjusted with shoes "expanded"-see Hand Brake Adjustment), then back off adjusting screw the number of notches or "clicks" as shown in table below. Check wheel for freedom of drag. If drag noted, tap backing plate to assist centralization of shoes, then recheck. If drag still exists, anchor pin adjustment may be in order. See Major adjustment.

Adjusting Screw Setting

Buick	① 15 notches
Cadillac	14 notches
Hudson & Nash	14 notches
Oldsmobile	16 notches
Packard (1954-56)	②
Pontiac (1954-57)	14 notches
Pontiac (1958-60)	12 notches
Rambler	③ 8 notches
Valiant	10-12 notches

① - Additional 1-2 notches if brakes still drag

② - Turn brake adjusting screw up until wheel can just be turned by hand, then back off screw until wheel turns free. ③ - 10 notches with new lining

Major Adjustment (For New Shoes, Relined Brakes or when Minor adjustment not satisfactory). Jack up all four wheels, loosen or disconnect parking brake cables at equalizer or intermediate lever, remove adjusting hole covers on backing plate and inspection hole cover on drums (remove wheels for access). Check Pedal Clearance (see Brake Pedal Adjustment). Adjust each wheel brake as specified by car manufacturer, given below. *CAUTION*—If hand brake cables not disconnected or loosened, shoes may be held "ON" by cables.

Buick—Turn adjusting screw up to expand shoes until wheel can just be turned with both hands (if wheel off, drum should just turn with long bar). Back off 15 notches. (Max. 17 notches). Wheels should be free at approximately 6 notches. If not it indicates need for anchor pin adjustment or tight parking brake cables.

Anchor Pin Adjustment—Loosen anchor pin nut ½ turn just enough to permit anchor pin to slide in the slotted hole. *(CAUTION*—Loosening anchor pin nut too much will allow brake shoe spring to tilt pin), rap backing plate with hammer adjacent to anchor pin to insure anchor pin assuming central position between shoes, tighten anchor pin nut securely, then recheck drag. (If this has changed recheck anchor pin adjustment). Check and adjust hand brake (see Hand Brake Adjustment). Wheels should be free of any drag.

1952-58 Cadillac - Loosen anchor pin locknut ½ turn, tap anchor pin up with a hammer, then all the way down to bottom of its slot. On front wheels it will be necessary to loosen backing plate upper mounting studs slightly and tap anchor pin up, then all the way down to bottom of its slot. Turn adjusting star wheel to expand brakes until wheel can just be turned with two hands. Tap backing plate near anchor pin to raise it to a central position between shoes. Check brake drag. If centering of anchor pin has released brakes, increase expansion of shoes and reset anchor pin again. Repeat until there is no change in drag with change in anchor pin setting, then tighten anchor pin to 80-120 ft. lbs. torque. Loosen star wheel 14 notches, place .015" feeler through drum slot at bottom and rotate wheel until feeler is wedged between secondary shoe and drum. Primary shoe will be tight against drum for measuring secondary clearance. Reverse wheel rotation until .015" feeler is again at bottom and adjust star wheel to obtain .015" clearance. The clearance at top of shoe should now be .010". If upper clearance is greater or less than .010", loosen anchor pin locknut and reset anchor pin, tapping it up to increase clearance and down to decrease clearance. Reset clearance at lower end with star wheel and recheck upper clearance.

Hudson & Nash (1954); Oldsmobile (1955), Pontiac (1954-59, All Wheels), 1960 Front Wheels. Insert a 015" feeler in slot 1½" from adjusting screw end of secondary shoe, turn screw up to expand shoes so feeler tightly gripped (to move primary shoe out against drum), then back off screw until only a slight drag is felt on the feeler gauge (will insure .015" clearance at this point). Check clearance at point 1½" from anchor pin end of this same secondary shoe. If .015" feeler does not have equal or slightly heavier drag at this point, adjust anchor pin (see notes below on slotted and eccentric type anchors) for correct .015" clearance at this point, tighten anchor pin nut to 75 ft. lbs. torque. Adjust hand brake, check and adjust brake pedal clearance (below).

Eccentric Anchor Pin— Pin has squared end. Can be turned with a wrench after nut has been loosened. Turn pin in direction of forward wheel rotation to decrease clearance. End of anchor pin is beveled and high point indicates high side of eccentric cam. Hold pin with wrench while tightening nut.

Slotted Anchor Pin Hole—Pin hole in the backing plate is slotted. To adjust, loosen anchor pin nut and tap pin out toward drum to decrease clearance.

1955-57 Hudson & Nash - No major adjustment. Anchor pin is fixed.

1956-58 Oldsmobile. Expand shoes until heavy drag felt on brake. Release adjusting screws approximately 16 notches (until brake drums are free of drag) and replace adjusting screw hole covers. Move adjusting screw end at primary shoe against drum by inserting screw driver into slot provided in drum, then turn drum backward to force end of primary shoe against drum. Check clearance at anchor and adjusting ends of secondary shoes with .015" feeler inserted in brake drum slot. Clearance should be equal to within .002". If not adjust anchor and adjusting screw as required. *NOTE* - Clearance at anchor end should not be more than at adjusting screw end.

Packard—Insert a .015" feeler gauge through inspection hole in drum at point 1½" above lower end of secondary shoe. Expand the adjusting screw (star wheel) until a slight drag is felt on the feeler. Remove feeler and insert a .010" feeler through inspection hole in drum at a point 1½" from upper end of secondary shoe. If clearance not within limits, loosen anchor pin locknut and adjust anchor pin. Turn anchor in direction of forward wheel rotation to decrease clearance. At the same time readjust the adjusting screw to maintain .015" clearance at lower end of shoe. Hold anchor in set position and tighten locknut. Turn clearance adjusting screw (star wheel) until drum can just be turned with both hands, then back off screw until drum turns freely (1954-56)

Hand (Parking) Brake Adjustment: *CAUTION—Brake shoes must be expanded on some cars when adjusting hand brake cables.* Adjust each car as follows

Buick (1954-58) - *CAUTION* - DO NOT adjust parking brakes by simply tightening adjusting nut at brake cable sheave. Pull on both ends of rear brake cable to make sure cables operate rear brake shoes freely and do not bind in conduits. Cable must be free in sheave and spring must return lever to fully released position. Adjust brakes at anchor and adjustment screw as described in minor or major brake adjustment. *NOTE* - When brake lever is in fully released position signal switch plunger must be depressed 3/16". Adjust by loosening mounting screws and relocating switch.

Buick (1959-60) - *Make Parking Brake Adjustment when never service brake pedal has good reserve but Parking brake pedal depresses to within 3" of toeboard.* Make Minor Adjustment (see above). Release brake. Cable should have approximately 2" slack when pulled down midway between conduit clip and cable sheave. Adjust cable length at equalizer by holding cable end (to pre

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BENDIX HYDRAULIC (C nt.)

vent twisting) and turning adjusting nut. Make sure rear wheels are free when brake lever fully released.

Cadillac - Make Minor Service Brake Adjustment (see above). Replace relay lever spring if weak or broken. Release pedal. Intermediate cable tension is correct when the ¼" diameter of Gauge Tool J-7503 is a slip fit between relay lever and end of slot in frame. Adjust intermediate cable at front clevis as necessary. Back off equalizer nut so the 1 3/16" portion of gauge will slip between relay lever and end of slot in frame. *NOTE - Cable should have slack when 1 3/16" portion of gauge is in place.* Tighten equalizer nut until rear wheels drag when turned in forward direction. Remove gauge. Parking brake lever should travel 2 1/8 to 2 3/8" with approximately 50 lbs. pressure at pedal.

1954 Hudson - With brake shoes expanded so wheels can just be turned by hand, pull hand brake lever "ON" two notches and check clearance between hand brake cable lever and end of slot in lever guide plate on frame cross-member. If this clearance is not 1/8", loosen locknut and adjust hand brake cable clevis. Pull each rear brake cable taut and adjust clevis on forward end of cable so that clevis pin can just be inserted with all slack removed from cable. Connect cables, release hand brake lever, back off adjusting screw 14 notches for correct shoe clearance, check brake equalization.

1954 Nash - **Do not expand shoes.** Pull hand lever "ON" exactly 3½" (measure from face of bracket to handle). At rear cable equalizer, loosen forward nut and tighten rear nut on hand brake lever cable fitting until rear brakes are fully applied, then tighten forward nut. Release hand brake lever and check brakes for freedom from drag.

1955-57 Hudson & Nash - Pull hand brake lever to rear to provide a 3½" clearance between hand brake lever handle and bracket face. With lever in this position, tighten hand brake cable at equalizer to a point where rear brakes are fully applied. This will prevent possible brake drag. To release parking brake, apply brake pedal pressure, turn parking brake handle counter-clockwise 70° and push it into released position.

1954-55 Oldsmobile - With hand lever **released** and service brakes properly adjusted, adjust hand brake front cable so that hand brake intermediate lever is held from seating itself on the end of the seat in the left "X" member by 1/32-3/32". Adjust rear cables to remove all possible slack without moving brake shoes from released position. Rear cables must not protrude into clevis more than ¾". The threaded part of front cable must extend entirely through front clevis. Distribute the adjustment between rear cables so that equalizer link is parallel to propeller shaft when clevis pin can just be dropped into place. Lock clevis jam nuts and insert clevis pins. Always install clevis pins with head on top.

1956-58 Oldsmobile - Release brake, and make minor brake adjustment if there is excessive brake pedal travel. Adjust front cable so that the intermediate lever is held from seating itself on end of the seat in left hand "X" member by ½". Adjust rear brake cables to remove all possible slack without moving brake shoes from released position. Distribute the adjustment between cables so that equalizer link is 90° to the propellor shaft when clevis pin installed. Lock clevis jam nuts and install cotter pins. Install clevis pins with head at top.

1959-60 Oldsmobile - Release parking brake, and make minor brake adjustment if brake pedal-to-floor board clearance is less than 2" (1959), 4" (1960) standard brakes, or 1" (1959), 1¾" (1960) power brakes. Adjust the front cable so that the intermediate lever is held from seating on end of seat in left "X" member by ½". Adjust rear cables by tightening equalizer nut until heavy drag is felt at rear wheels, then loosen equalizer nut 6 full turns (1959) 10 full turns (1960) and tighten jam nut.

Packard—Tighten adjusting screws until wheel can just be turned by hand. Pull hand lever to first notch on ratchet. Adjust clevis on hand brake cable so that the clevis pin can be easily installed without any slack in the cable. Release hand brake lever. Back off adjusting screw at each wheel until wheel turns freely. Apply hand brake and check equalization by turning each wheel by hand. If not equal, loosen adjusting screw on tighter brake. Replace hole covers and road test.

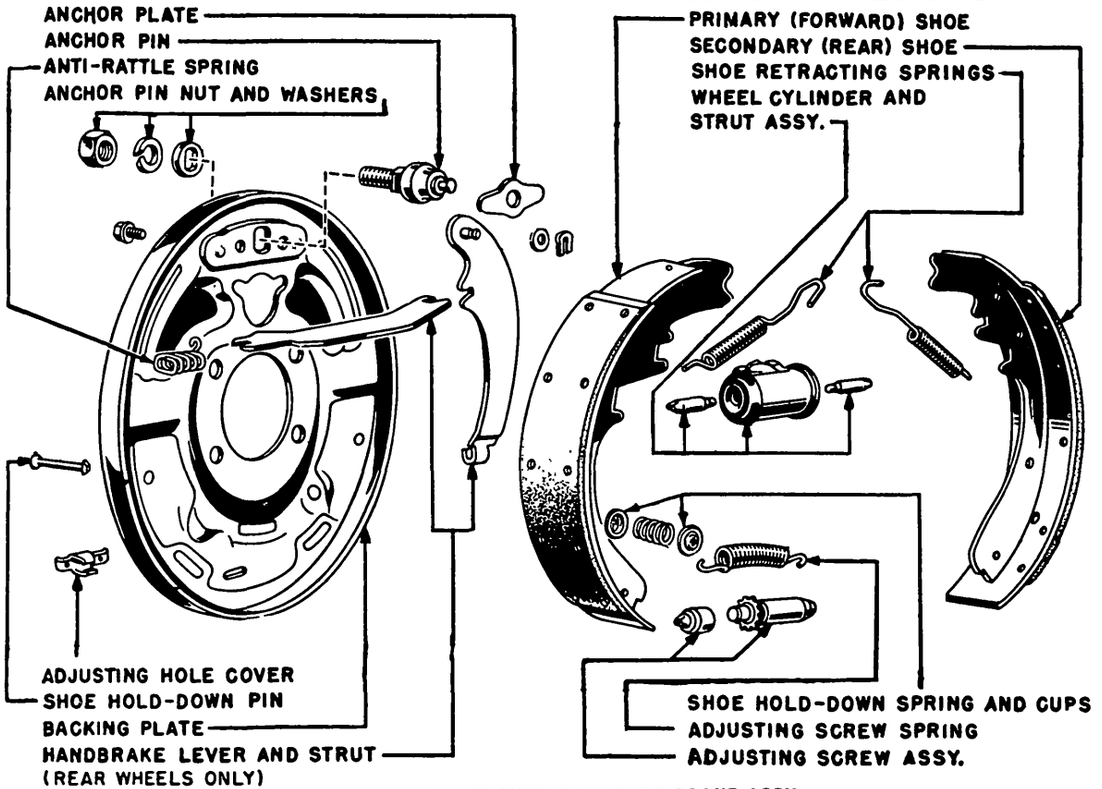
1954-60 Pontiac - Apply hand brake to first notch and then check equalization. Loosen adjusting screw of tightest brake if not equal. If more than a few notches are required, loosen clamp screws on spreader and pull downward on the tight side of cable. This should equalize cable. Tighten spreader clamp screws while hand brake lever is still in the applied position. Brake cables are sufficiently tight if rear wheels can barely be turned by hand with lever in first notch. When lever is fully released, wheels should turn freely with cable pulled down approximately 1½" by gripping cable midway between conduit and clearance hole through frame X-member. When adjusting rear end of front cable for close adjustment for tension, be sure to turn clevis on or off cable end but do not twist cable. Coarse adjustment is secured by selecting the correct hole in the spreader.

Rambler (Hand Operated Type) - Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied.

Rambler (Foot Operated Type) - With lever in fully released position adjust rear cable at equalizer so wheels will turn without drag.

1960 Valiant - With rear brakes properly adjusted (minor adjustment), release parking brake foot lever completely, then slacken front cable until intermediate arm (ratio bar) seats on cross-over stop. Tighten rear cable adjusting nut until rear wheels drag and are dif-

CONTINUED ON NEXT PAGE



BENDIX HYDRAULIC SINGLE ANCHOR BRAKE ASSY.

BENDIX HYDRAULIC (C nt.)

ficult to turn, then slacken rear cable adjusting nut until rear wheels rotate freely. Continue to loosen rear cable adjusting nut **three additional turns.** Secure rear cable equalizer in this position with locknut (forward side of equalizer). Tighten anchor nut on front cable until intermediate arm pulled off cross-over stop. *NOTE - Leave 1/16-1/8" gap between arm and stop with nut s ated in intermediate arm.* Apply foot lever several times and check to make sure rear wheels rotate freely without dragging when foot lever released.

RELINING BRAKES: Manufacturer recommends use of replacement shoes furnished with new linings. If shoes relined, use the same type lining as fitted originally (see Car Model page). Lining on primary and secondary shoes may be of different types (woven on primary, moulded on secondary, etc.) or of different lengths.

BRAKE DRUM GRINDING: If new .030" oversize shoe assemblies are to be installed, machining must not remove more than .030" on drum radius or .060" on diameter.

BLEEDING BRAKE SYSTEM OR OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing".*

► *BLEEDING POWER BRAKE NOTE:* Bleed power brake master cylinder first by attaching bleeder drain hose to fitting on end of master cylinder, backing off fitting ¾ of a turn and bleed fluid into a partially full bottle of clean brake fluid until bubbles cease. Then proceed as for standard master cylinder.

► *1957-58 BUICK FILLING & BLEEDING CAUTION:* Avoid spilling fluid on backing plates of finned aluminum drums as the perforated construction of these drums may cause fluid to come into contact with linings and cause damage.

TROUBLE SHOOTING: *See "Hydraulic Brak Trouble Shooting".*

BENDIX AUTOMATIC ADJUSTER HYDRAULIC BRAKES

Edsel, All Models (1958-60)
Lincoln & Continental (1959)
Lincoln (1960)
Mercury, Turnpike Cruiser (Late 1957)
Mercury, Exc. 312" Eng. Cars (1958)
Mercury (1959-60)
Rambler Series 20, 80 Later (1958) Ⓒ
Rambler Series 20, 80 (1959-60) Ⓒ

Ⓒ - Bendix Single Anchor also used.

►CHANGES, CAUTIONS, CORRECTIONS

► *1960 LINCOLN REPEATED LOSS OF PARKING BRAKE ADJUSTMENT CORRECTION (EARLY CARS):* Check parking brake equalizer lever for buckling or bending and replace with Part No. COLL-2A606-C if necessary. The later type lever entered production approximately 10-28-59.

► *1960 LINCOLN BRAKE DRUM PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A new "flared-type" brake drum is used in production starting approximately Nov. 23, 1959. Do not interchange with previous type non-flared drum as intermixing of the two parts will cause an erratic, uneven brake action.

► *1960 LINCOLN INSUFFICIENT BRAKE PEDAL RESERVE CORRECTION:* A low brake pedal or insufficient pedal reserve can be correcgtd by installing a revised brake pedal-to-brake booster operating lever link, Part No. COLL-2466-A. Make sure the brake system is in good operating condition and the low pedal or insufficient pedal reserve is not caused by leakage, adjustment, air in system, or by low hydraulic fluid. *CAUTION - Because of the slight dimensional differences between early and later type links, make sure the proper link is installed. The dimension between holes is 2.700" (early type), 2.600" (later type).*

► *1960 MERCURY "THUMPING" NOISE (WITH LIGHT BRAKE APPLICATION UNDER 30 MPH) CORRECTION:* Remove drum (or drums) and carefully cut drum .003-.005" (make two cuts to assure a smooth surface), then sand with fine sand paper. Use a fine sand paper and sand brake linings lightly. On cars with one brake shoe hold-down spring, remove and discard each spring and replace with springs, Part No. TDAA-2068-A (color black). If car is equipped with two brake shoe hold-down springs on each shoe, DO NOT replace springs.

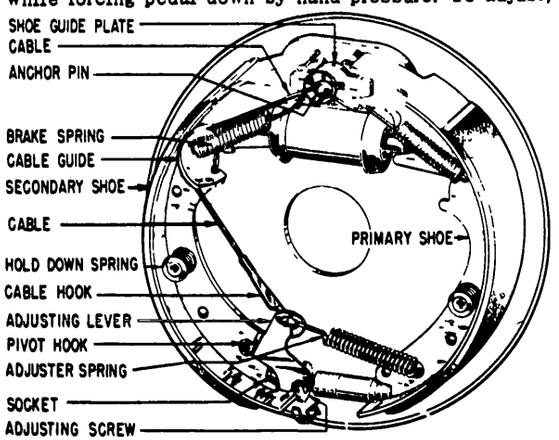
DESCRIPTION: Similar in design to previous Bendix Single Anchor (Without Eccentric) brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of rear (secondary) shoe during a reverse brake application to turn brake adjusting screw a small amount after a predetermined amount of wear on front and rear linings. The adjuster consists of a steel cable with a hook and anchor fitting permanently attached, a cable guide, adjusting lever, adjusting screw, pivot nut, socket and spring.

OPERATION: When lining has worn enough to require adjustment (approximately .0005" on each shoe), secondary shoe on which adjusted is mounted moves far enough from shoe anchor during a **reverse** application to cause cable to lift adjuster lever into engagement with the next tooth in the adjusting screw. When brake is released, secondary shoe returns to the anchor. Movement of the adjusting screw is 1/24th of a revolution each time it is moved by the adjuster. In forward braking, adjusting parts move with secondary shoe as a unit, and there is no lifting of the lever to engage a new tooth in adjusting screw.

INSPECTION: Inspect adjuster and brake assemblies every 10,000 miles (Edsel, Lincoln, Mercury), 16,000 miles (Rambler). Check master cylinder fluid and parking brake at normal service intervals.

ADJUSTMENTS: Make adjustments with drums cool and contracted. If car raised on frame hoist, disconnect parking brake cables.

Pedal Freeplay: (Edsel & Mercury) - 1/4-7/16". Measured while forcing pedal down by hand pressure. To adjust, loosen nut on eccentric bolt and rotate bolt.. When adjusted, tighten nut to 22-28 ft. lbs.



BENDIX AUTOMATIC ADJUSTER ASSEMBLY

(Lincoln) - Freeplay 1/4-3/8".

(Rambler) - Std. Brake Freeplay 1/4-1/2".

Brake Shoe Adjustment: *NOTE - Anchor pins ar fix d in backing plate and no major adjustm nt is r quired.*

On Car (Edsel & Mercury) - When the amount of reverse braking is not sufficient to maintain proper brake shoe to drum clearance the following procedure should be used: Raise car, remove adjusting hole cover, turn adjusting screw upward from backing plate side to expand shoes (use Tool 2018 or screwdriver), until wheel is locked. **Hold adjusting scr w lev r away fr m scr w,** back off screw until wheel turns freely, then back off screw one more notch (approximately 12 strokes – there will be no "clicking" during this operation). Make sure there is no brake drag, replace adjusting hole cover, and then make several reverse stops to complete final adjustment.

On Car (Lincoln & Continental) - Raise car, disconnect parking brake cables. Remove adjusting access hole covers. Rotate wheel. If drum drags on lining at any point in wheel rotation, hold adjusting lever (use small pointed tool through hole in backing plate) away from star wheel and turn star wheel downward (upward motion using pry lever through hole) to bring shoes away from drum. Expand shoes by turning star wheel in opposite direction until a slight drag is felt at some point in wheel rotation, then replace hole cover. Repeat operation on other wheels, and connect parking brake cables. Drive car in reverse, apply brakes 5-6 times to allow adjuster to complete adjustment as necessary.

Initial Adjustment After Disass mbly: Eds l, Linc ln & Mercury - For initial adjustment after overhaul, measure inside diameter of brake drum. Raise adjusting lever, turn adjusting screw to expand shoes so the diameter (use calipers) is .030" (1/32" approximately) less (measured across shoes and lining 90° from anchor) than diameter of drum. When calipers are not available, wheels and drums should be installed and initial adjustment made as outlined under **Adjustm nt** above. Drive car cautiously in reverse, while making 7 or 8 brake applications.

Rambler - Lengthen adjusting screw to expose 3/8" of adjusting screw threads, then install drum. Drive car

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BENDIX AUTOMATIC ADJUSTER HYDRAULIC (C nt.)

cautiously in reverse, making 7 or 8 brake applications before road testing.

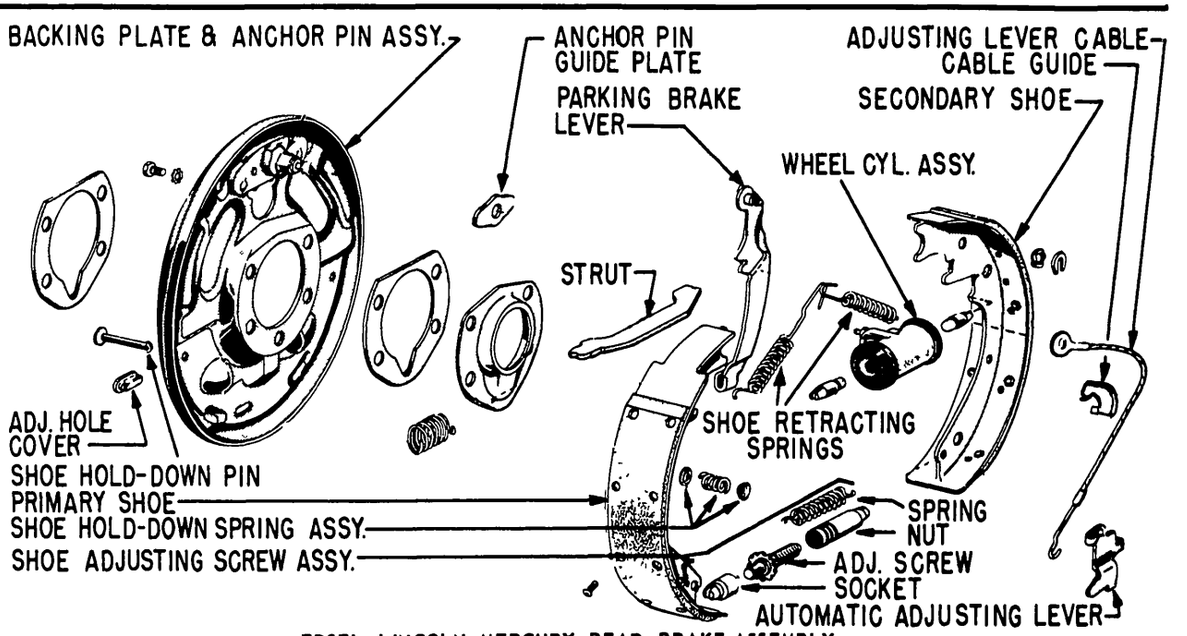
Parking Brak Adjustm nt: Edsel, Lincoln, Mercury - Release parking brake pedal, raise car, then loosen parking brake cable at equalizer lever. Depress parking brake pedal 1" (Edsel & Mercury), 1¾" (Lincoln) from its normal released position. Adjust front and rear cables until a slight drag is felt when turning rear wheels. *NOTE - Th adjustment should be evenly divid d b tw en the two cables to maintain proper qualizer l v r acti n.* On Mercury, the equalizer lever will be properly positioned when the distance from rear cable clevis pin on equalizer bar to rear face of cross-member (to which parking brake bracket is attached) is 5½", with parking brake pedal fully released. Tighten locknut on equalizer rod, then release parking brake and check to make sure that shoes return to fully released position. Depress parking brake pedal 2". Under normal conditions, this will hold car satisfactorily.

Rambler (Hand Op rat d Type) - Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied.

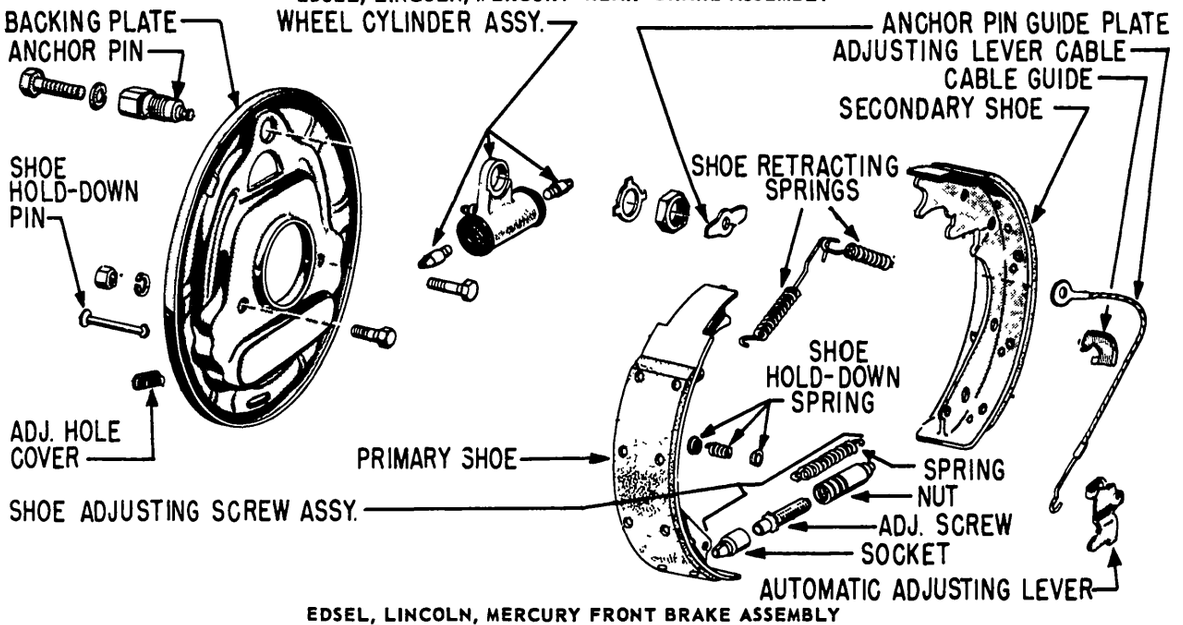
Rambl r (F t Operat d Type) - With lever in fully released position adjust rear cable at equalizer so wheels will turn without drag.

Automatic Adjuster: Rem val - Disengage adjusting lever from adjusting screw by pulling backward on lever. Move outboard side of adjusting screw upward and back up pivot nut as far as possible. Pull adjusting lever, cable and adjusting spring down toward rear to unhook pivot hook from large hole in secondary shoe. *CAUTION - DO NOT pry pivot hook out of hole.* Remove anchor springs and unhook cable anchor. Remove shoe guide plate. Remove cable guide from secondary shoe and remove shoe hold-down springs, shoes, adjusting screws, pivot nut and socket.

Installati n - Install brake shoes on backing plate with hold-down spring pin, springs and cups. Install parking brake link and spring. Connect parking brake cable. Install shoe guide plate on anchor pin. Place cable anchor over anchor pin with crimped side toward backing plate. Install primary and secondary shoe to anchor springs. *CAUTION - Be sure that cable end is not cocked or binding on anchor pin.* Install cable guide on secondary shoe web with flanged hole fitted in hole in web. Thread cable through guide groove, not between guide and shoe web. Turn adjusting screw in to limit of threads then back off ½ turn. *CAUTION - Place left hand screw on right sid of car, right hand screw on left sid of car.* Install adjusting socket on screw, place assembly between shoe ends with adjusting screw nearest secondary shoe. Hook cable hook into hole in adjusting lever from backing plate side. Place pivot hook into large hole in secondary shoe web. Place hooked end of adjuster spring into large hole in primary shoe web and loop end of spring to adjuster lever. Check action of adjuster by pulling cable toward secondary shoe to lift lever past tooth. Spring will pull lever to original position (when cable released) advancing screw one tooth (1/24 revolution). Lever should contact adjusting wheel 3/16±1/32" above centerline of screw. Cable length should be 11 1/8±1/64". Cable guide groove should be parallel with shoe web and body of guide should be flat against web. Pivot hook surfaces should be square with body of lever. Adjusting screw must be seated properly in shoe web. Replace damaged or incorrect parts. Follow adjustment procedures given above.



EDSEL, LINCOLN, MERCURY REAR BRAKE ASSEMBLY



EDSEL, LINCOLN, MERCURY FRONT BRAKE ASSEMBLY

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *Se "Hydraulic Brak Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brak Tr ubl Shooting" in Brak S cti n of Manual.*

BENDIX (LOCKHEED) SELF-CENTERING

Nash Statesman (1954)
Rambler (1954-56)
Rambler 5710 Series before Serial No. D-360492 (1957)①
Rambler 5901, 10 Series (1959)③
Rambler 6001 (1960)②
Willys, All Models (1954-60)

① - Later Rambler 6 Cyl. Cars have Wagner-Lockheed Self-Centering brakes.

② - For cars with automatic adjuster brakes, see "Bendix Automatic Adjuster Hydraulic Brakes".

③ - Used in limited production. See *"Wagner-Lockheed Self-Centering" for Std. production.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 RAMBLER BRAKE SQUEAK CORRECTION (Due t Improper Lining-to-drum Contact):* If minor, sanding of lining surface to eliminate visible high spots, may eliminate condition. If severe, shoe support plate contact area may be causing a rocking action on the three embossed ledges of support plate. To correct, remove shoes from support plate and without use of return springs or hold down clips, place each shoe individually in its proper operating location on the three embossed ledges of support plate. Check for any rocking action of shoe on support plate. If found, grind off sufficient material from center of shoe contact edge to eliminate rocking action. Grinding action should cover an area approximately 2" long on shoe edge where it contacts center embossed ledge of support plate. It may also be necessary to lightly dress up the end shoe contact edges to provide proper shoe-to-support plate contact. Lubriplate support plate embossed ledges and shoe pivot points. Reinstall shoes. Make anchor lip adjustment by bending anchor lip slightly toward brake support plate so that 15 lbs. pressure is exerted by spring to retain shoes on support plate (this can be measured with spring scale hooked to end of shoe).

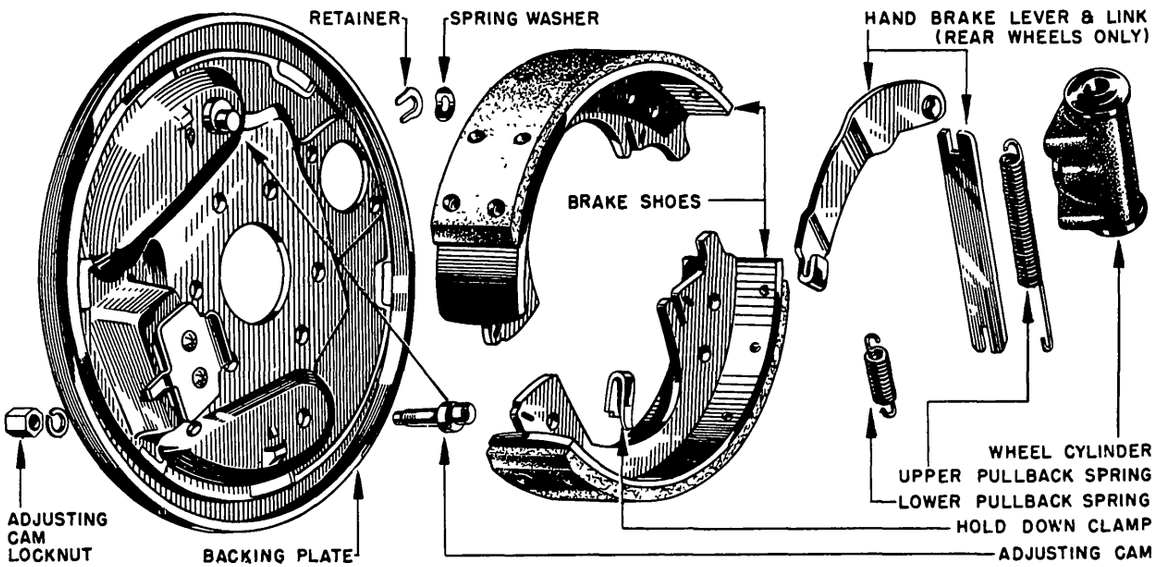
►*1960 RAMBLER AMERICAN REAR WHEEL BRAKE SUPPORT PLATE PRODUCTION CHANGE:* Beginning with Car Code 20215, a new support plate (backing plate) is being used on rear wheels which utilizes a brake shoe anchor pin guide plate, Part No. 3202470, installed between brake shoes and retracting springs.

►*1960 RAMBLER "POPPING" & "SNAPPING" AT FRONT BRAKES (DURING BRAKE APPLICATION) CORRECTION:* This condition may be due to tool marks remaining in brake shoe contact area of drum. To correct, remove tool marks with abrasive cloth or buffing stone.

►*1960 WILLYS (EXC. JEEP & JEEP DISPATCHER) BRAKE SHOE RETURN SPRING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new spring, Part No. 924057, identified by an extended portion ½" longer than previous spring and with hooked end of spring (not extended portion) bent away from center of spring, is being used in production and should be used for service replacement.

►*WILLYS FORWARD CONTROL MASTER CYLINDER NOTE:* Master cylinder mounted on inside front panel of cab, just underneath instrument panel. Access to filler plug is through hole cover on panel to right of speedometer.

DESCRIPTION: "Self-Centering" hydraulic type with non-adjustable anchor ramps for each shoe. An eccentric adjusting cam is used for brake shoe adjustment.



BENDIX (LOCKHEED) SELF-CENTERING REAR BRAKE (FRONT SIMILAR EXCEPT HAND BRAKE PARTS OMITTED)

ADJUSTMENT: Before making adjustments, jack up all four wheels, check brake pedal clearance or free travel (see below), fully release hand brake and make certain that rear wheels are free, then adjust each wheel as follows:

Brake Shoe Adjustment (For Wear or New Linings):

►*CAUTION: Brake shoes must be "centralized" by several hard brake applications before adjusting.*

Eccentric Adjustment - Adjust eccentric for each brake shoe by turning eccentric up and out until brake shoe firmly applied and wheel is locked, then back eccentric off until wheel just rotates freely without drag. Shoe clearance will then be approximately .010".

Anchor Lip Adjustment - Pressure required to pull shoe outward from support plate should be 15 lbs. Measure with spring scale hooked in end of shoe. Adjust by bending anchor lip slightly toward brake support plate to obtain this 15 lb. coil spring pressure to hold shoes on support plate ledges.

Hand Brake Adjustment: Remove all slack from rear wheel brake cables as follows:

Nash Statesman - Pull hand brake handle "ON" exactly 3½" (measure from face of bracket to handle). At rear wheel cable equalizer, loosen forward nut, tighten rear nut on front cable fitting until rear brakes are fully applied, then tighten front nut to lock adjustment. Release hand lever and check rear wheels for freedom from drag.

1954 Rambler - Pull lever "ON" two notches, loosen front nut on adjusting rod at rear cable equalizer, tighten rear nut to remove all slack from cables, then tighten front nut to lock adjustment. Release hand lever and check rear wheels for freedom from drag.

Rambler - Pull hand brake lever to rear to provide 3½" clearance between hand brake lever handle and bracket. Tighten hand brake cables at equalizer to a point where rear brakes are fully applied.

Willys (Vehicles with cabl connected to r ar wh l service brakes) -Pull hand lever "on" three notches, loosen front nut on connecting link between intermediate lever on frame crossmember and rear cable equalizer, tighten rear nut on link until slight drag noted at each rear wheel, then tighten front nut to lock adjustment. Release hand lever and check for freedom of drag.

Willys (Vehicles using pr peller shaft m unted parking brakes). Fully release hand brake lever, check linkage for freedom from bind. Rotate brake drum so one pair of three sets of holes are over adjusting screws. Use tool or screwdriver to rotate each adjusting screw away from drive shaft until shoes are snug against drum, then back off each screw 7 notches for running clearance.

Brake Pedal Adjustment: Adjust master cylinder pushrod by loosening locknut and turning rod for following pedal travel with master cylinder piston and pushrod back against stop:

Brake Pedal Free Travel - Nash (All Models ¼-½", Rambler ¼-½", Willys ½" min.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CADILLAC (BENDIX-MORAINE) AUTOMATIC ADJUSTER BRAKES

Cadillac (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 CADILLAC BRAKE LINING & SECONDARY BRAKE SHOE RETRACTING SPRING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Primary brake shoe lining has been increased in length beginning with Engine No. 090000, and a new secondary shoe retracting spring which is attached to bottom hole in shoe is being used. *NOTE - This spring, Part No. 5460246, replaces the former spring which was attached to center hole in shoe.* A new brake shoe service replacement kit, Part No. 5460218 (standard lining), or Part No. 5460253 (high friction lining) may be used on cars before the above serial number if used with the new type retracting spring.

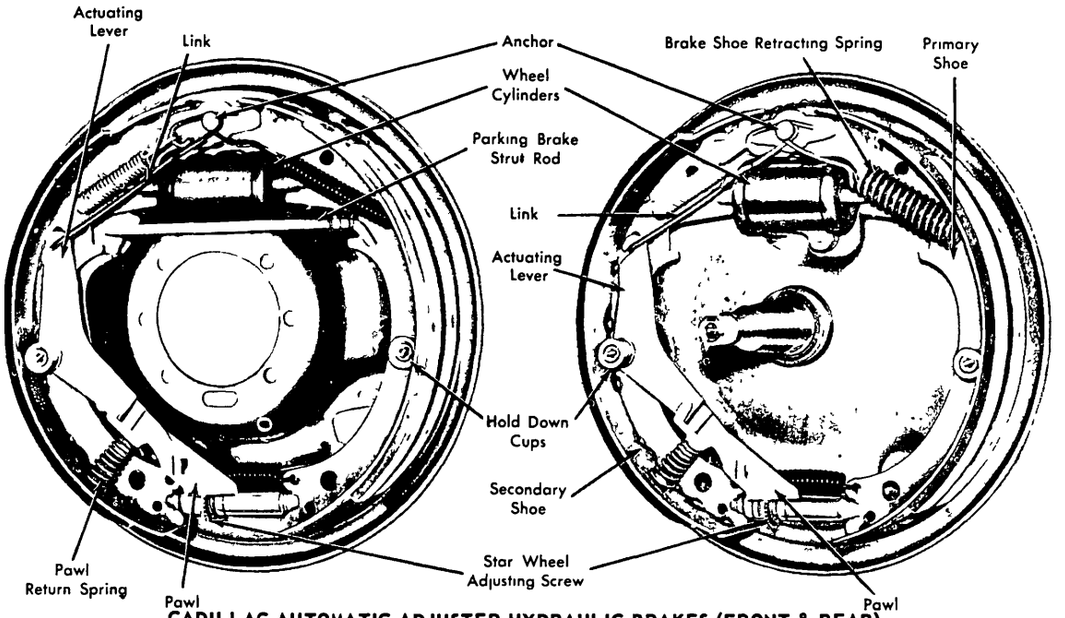
►*1960 CADILLAC BRAKE SHOE RETRACTING SPRING ATTACHING HOLE LOCATION NOTE:* Primary shoe retracting springs must be installed in lowest of the three holes in brake shoe. Secondary shoe retracting springs must be installed in center hole (early production), or in lowest hole (later production). *See "Production Change & Service Replacement Note" above.*

►*AUTOMATIC ADJUSTER & BRAKE BACKING PLATE SPECIAL LUBRICANT NOTE:* A special lubricant, Part No. 1098903, is available for service use to eliminate possibility of star wheel adjusters and automatic adjuster parts rusting and "freezing up", due to lack of lubrication.

DESCRIPTION: Hydraulic single anchor type brake (without eccentric). Brake shoe anchor pins are the adjustable type. The new "Moraine" automatic adjusting mechanism consists of a link, actuating lever, pawl, and pawl return spring.

OPERATION (AUTOMATIC ADJUSTER): The adjusters operate only when brakes are applied as car is moving in reverse. As the brake drums move rearward, the wrap around action of the brake shoes forces upper end of primary shoe against anchor pin and the secondary shoe away from anchor pin. The link which holds top of actuating lever stationary, forces actuating lever to pivot on secondary shoe. This pivoting action forces pawl downward against end of a tooth on the star wheel adjusting screw. If lining-to-drum clearances are correct, the downward movement will stop before star wheel is turned. If clearances are too wide, the secondary shoe will move outward and the pawl will move downward far enough to turn star wheel one notch and take up the adjustment.

ADJUSTMENTS: Brake Sho Adjustment - *NOTE - Adjustment should be required only after shoe relining, replacement or when length of star wheel has been changed.* With master cylinder properly filled with fluid, remove adjusting hole cover from brake backing plate (rear wheels), and from brake drum (front wheels), then make sure that parking brake cables and linkage (including levers on rear wheel secondary shoes) are free. Insert a .020" feeler gauge in slotted hole in brake drum and rotate drum until feeler gauge is between lower end of secondary shoe lining and drum, then tighten star wheel with feeler gauge in position, until a slight drag is felt on feeler gauge. *NOTE - To loosen an overtightened star wheel, it will be necessary to use a suitable tool inserted through the adjusting hole to disengage pawl from star wheel. On front wheels, use a hooked wire to pull forward, and on rear wheels, use a sharp pointed tool to push pawl outboard.* Rotate brake drum until slotted hole is at top of secondary shoe, and measure clearance with a feeler gauge between drum and lining. Clearance should be .010-.030" when clearance at bottom end is .020". If clearance is greater or less than specified, adjust anchor pin (see below). Install adjusting hole covers, install wheels, then drive car in reverse and apply brakes moderately five or six times while car is moving rearward. *NOTE - This action will operate automatic adjusters if any additional brake shoe expansion is required to bring brakes into proper adjustment.*



CADILLAC AUTOMATIC ADJUSTER HYDRAULIC BRAKES (FRONT & REAR)

Anchor Pin Adjustment: Loosen anchor pin locknut ½ turn. *NOTE - On front wheels it will be necessary to loosen backing plate upper mounting stud.* Tap anchor pin up, then all the way down to bottom of slot. Turn star wheel adjuster to expand brake shoes until drum cannot be turned in direction of forward rotation with a two foot bar placed between wheel stud nuts (this is equivalent to a two-hand drag with wheel and tire installed). Tap anchor upward lightly with a hammer. The drum should free up and rotate easily. Retighten star wheel and repeat tapping anchor nut until drum cannot be rotated without use of a two foot bar (this will cause brake shoes to centralize the anchor). Loosen star wheel until a .015" feeler gauge can be inserted between bottom of secondary lining and drum. Rotate drum forward until feeler is wedged between secondary shoe and drum, then turn drum back until feeler is at bottom of secondary lining. This clearance should be .015". If clearance is not as specified, adjust star wheel to obtain proper clearance. Check clearance between upper end of secondary shoe and drum. Clearance should be .010". If clearance not correct, tap anchor pin up if more than specified, or down if clearance is less than specified. A .010" feeler should clear all the way around, including primary shoe. *CAUTION - Do not attempt to set anchor to obtain a .010" and .015" clearance at primary sho* . Tighten front anchor locknut and backing plate upper mounting stud to 80-100 ft. lbs. Tighten rear anchor locknut to 100-120 ft. lbs. Recheck lining-to-drum clearance with a feeler gauge.

Parking Brake: With service brakes properly adjusted, lubricate parking brake linkage and check for free movement of cables in conduit and equalizer. Check rear relay lever spring and replace if necessary. Check for proper tension of intermediate cable by inserting 17/32" portion of Parking Brake Relay Lever Gauge, J-8530, in gap between relay lever and end of slot in frame. Adjust intermediate lever at front clevis until gauge is a slip fit. *NOTE - Make sure that equalizer nut has been backed off enough to leave cable slack when the 1 7/16" wide end of gauge is in place.* Tighten equalizer nut until a near lockup drag is obtained at rear wheels when they are turned by hand in a forward direction, then remove gauge from relay lever slot in frame side bar. *NOTE - After adjustments are completed, parking brake pedal should travel 2 1/8-2 3/8" with approximately 50 lbs. pressure on pedal.*

BRAKE SHOE REPLACEMENT: Removal - Remove wheel and brake drum assemblies, then loosen brake cable locknut on equalizer. Disconnect secondary and primary shoe retracting spring and remove primary shoe hold-down cups and spring, pin, and secondary hold-down cup and spring assembly, pin, and sleeve. *CAUTION - Hold-down cup and spring are an assembly on secondary shoe and are painted blue. On primary shoes, spring and cup are separate and the spring is painted red. Cups and springs are not interchangeable with previous models.* Remove pawl return spring, pawl, and actuating lever, then spread primary and secondary shoes to disengage shoes from wheel cylinder piston rods, and rotate complete assembly until link disengages from anchor pin. Remove star wheel adjuster, connecting spring, actuator link and secondary shoe retracting spring from shoe assembly. Clean brake backing plate and all brake parts. *CAUTION - Handle all brake parts with clean hands to prevent "grab" or "pull" when brakes are reassembled.*

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CADILLAC (BENDIX-MORAINE) AUTOMATIC ADJUSTER BRAKES (C ntinu d)

Installati n: Tighten backing plate bolts to 35-40 ft. lbs. (rear wheels), 80-100 ft. lbs. (front wheels). Lubricate all points of contact between brake shoe and other brake parts. Position brake shoes and hook the connecting spring between primary and secondary shoes, then install star wheel adjuster between shoes so that star wheel will line up with backing plate slot. *CAUTION - Make sure that star wheel adjusters with one identification groove in outer diameter (left hand threads) are installed on right side of car. Adjusters with two grooves (right hand threads) must be installed on left side of car. Before installing star wheel adjusters, make sure that small diameter thin washer is installed between end socket and larger diameter spring washer in adjuster assembly.* Install link actuating lever, pawl spring, and pawl, then install primary brake shoe hold-down pin, cups, and spring (spring is painted red), and secondary hold-down pin, cup and spring assembly, and sleeve (cup and spring assembly are painted blue). Install primary and secondary shoe retracting springs. *NOTE - Primary shoe retracting spring must be installed in lowest of three holes in brake shoe. Secondary shoe retracting spring must be installed in center hole (early production), or lowest hole (later production). See "Production Change & Service Replacement Note" above.* Loosen star wheel adjuster to permit installation of brake drums (adjust wheel bearings on front wheels). Adjust parking brake and service brakes.

PARKING BRAKE ASSEMBLY REPLACEMENT: Disconnect parking brake cable at bellcrank under car, then remove cable from clevis on parking brake assembly. Disconnect hose from vacuum diaphragm and remove two parking brake assembly to instrument panel mounting bolts. Remove parking brake assembly to cowl mounting bolts and remove assembly from car. To install, reverse removal procedures.

Vacuum Chamber Replacement: With parking brake assembly removed, straighten retaining tangs on vacuum chamber, then disconnect link from manual release lever and remove vacuum chamber. To install, reverse removal procedures.

BLEEDING BRAKE SYSTEM & OVERHAULING BRAKE UNITS: *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

WAGNER-LOCKHEED SELF-CENTERING

Checker Superba (1960)
Packard Clipper (1957)
Packard, All Models (1958)
Rambler, Series 10 Beginning with Ser. No. D-360492 (1957)
Rambler, Series 20 (1957)
Rambler, Series 01, 10 (1958-59) Ⓒ
Rambler, Series 10 (1960) Ⓒ
Studebaker, All Models (1954-60)

NOTE - Other Rambler Models have Bendix Lockheed *Self-Centering brakes.*

Ⓒ -Wagner Automatic Adjuster Brakes also used in 1959-60.

►CHANGES, CAUTIONS, CORRECTIONS

►*1954-55 LINING REPLACEMENT CAUTION:* On early production cars, some long and some short primary brake shoe linings were used on either front or rear wheel brakes. When it is necessary to replace primary shoe linings on a front or rear wheel, the other front or rear wheel should be inspected and the lining on the primary shoe also replaced, if necessary, to obtain same length primary lining on both front and rear wheels.

►*1954-55 PARKING BRAKE LEVER CLIP INSTALLATION CAUTION (To Prevent Breakage & Falling Off of Clip):* Above condition is partially result of assembling in reverse or incorrect order the springs that return the shoe assemblies. Assemble rear shoe return spring to the shoe and its spring retainer first, then assemble front shoe return spring.

►*1956-58 STUDEBAKER & PACKARD FRONT WHEEL SECONDARY LINING NOTE:* Front wheel secondary lining is ¼" thick (6 Cyl. Exc. Econ-O-Miler), 7/32" thick (V8 Models) (3/16" thick on all other shoes), and is pre-ground off-center at the factory to eliminate back squeal. This lining is applied to the full length of the shoe and is marked "Secondary" and "Top" and should be installed as marked.

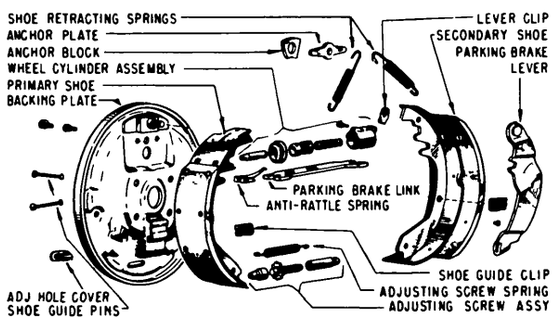
►*1960 RAMBLER "POPPING" & "SNAPPING" AT FRONT BRAKES (DURING BRAKE APPLICATION) CORRECTION:* **This condition may be due to tool marks remaining in brake shoe contact area of drum. To correct, remove tool marks with abrasive cloth or buffing stone.**

DESCRIPTION: Wagner Lockheed Hydraulic self-centering and self-energizing type (with Bendix type brake shoe assemblies). Brakes are not self adjusting, and new adjustment procedure is required. New self-centering device used.

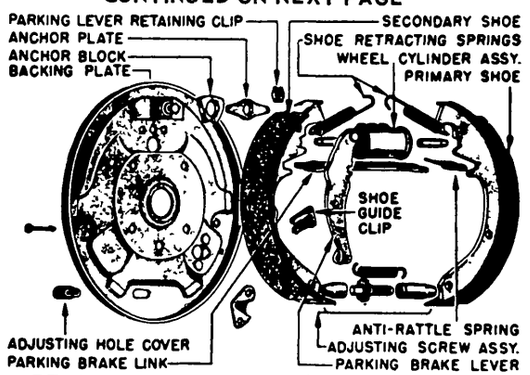
Rambler Rear Brake Cylinder - Single piston type, mounted on backing plate, linked to primary shoe.

Self-centering Device—The upper (anchor pin end of each brake shoe rests against a wedge-shaped anchor block which is mounted on fixed brake anchor pin (shoes do not contact anchor pin directly) so that the shoes are free to move radially. The wide edge of the

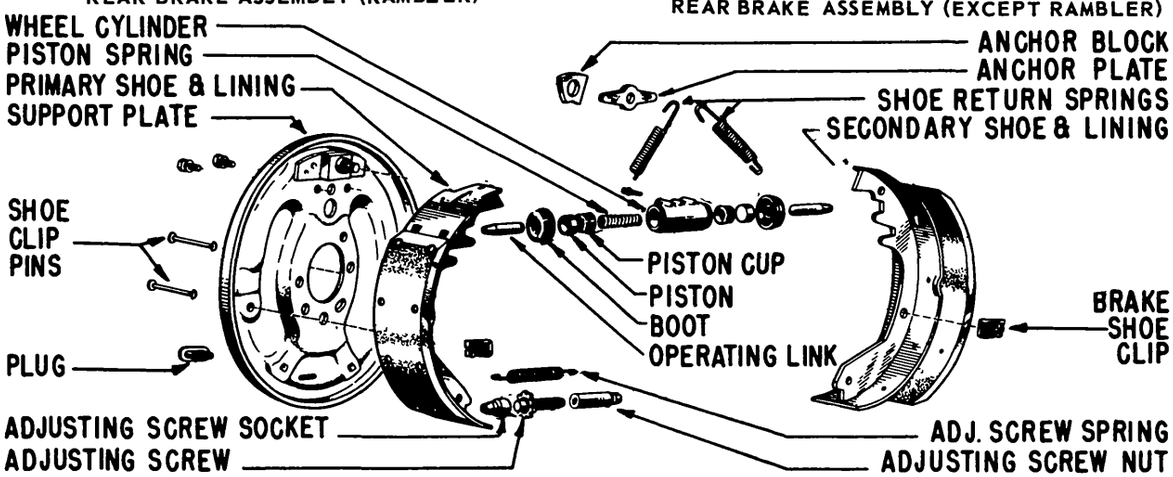
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REAR BRAKE ASSEMBLY (RAMBLER)



REAR BRAKE ASSEMBLY (EXCEPT RAMBLER)



FRONT BRAKE ASSEMBLY (INCLUDING RAMBLER)

WAGNER (LOCKHEED) SELF-CENTERING (C nt.)

anchor block is toward the top. When the brakes are applied, the lining surface pressure tends to force the shoe to adjust its position on the block and center itself in the drum. This centering action takes place on light, or heavy brake application and is continuous with drum expansion. The anchor plate aids in keeping the shoes properly aligned at the self-centering block.

Adjusting D vic —Consists of a "star wheel" adjusting screw and stud assembly mounted between the lower ends of the two brake shoes (similar to Bendix Duo-servo brake shoe assemblies). Adjusting screw spring serves a dual purpose, holding the shoes against notches of adjusting screw, and binding against ratchet on screw to serve as a screw lock.

ADJUSTMENTS: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid level is ½" below top of cylinder. Place parking brake handle in fully released position. Adjust as follows:

Rambler Brake P dal Fr Travel Adjustment: Adjust the brake pedal play ¼" to ½" by rotating the master cylinder piston pushrod to brake pedal attaching eccentric bolt.

Studebaker & Packard Brake P dal Free Travel Adjustm nt: Loosen locknut on brake pedal-to-master cylinder rod, turn master cylinder rod until free travel is ¼" —3/8" (Manual brakes), or 1/8" — ¼" (Power brakes).

Brak Sh Adjustment: Remove adjusting hole cover from backing plate, insert screwdriver or special adjusting tool through adjusting hole and turn adjusting screw to expand shoes until drum is just locked (pivot tool on edge of slot, move handle upward to expand shoes). Then back off the adjusting screw 10 notches (Rambler), 8 notches or clicks (Others) move if necessary until drum is free of any drag. Replace adjusting hole cover, adjust parking brake.

Parking Brake Adjustment: Rambler (Hand Operated Type). Pull handle back to give 3½" clearance between handle and mounting bracket. Tighten cable at equalizer until brakes are fully applied.

Rambler (Foot Operated Type) - With lever in fully released position, adjust rear cable at equalizer so wheels will turn without drag.

Studebaker & Packard - Set control handle four notches from the fully released position. Adjust rear wheel cables at equalizer on frame side rail by backing off front nut and tightening rear nut until all slack is removed from cables and a heavy drag noted when rotating rear wheels by hand. Tighten front adjusting nut. Release control handle fully and see that wheels are free of any drag.

RELINING BRAKES: *See Replacement Caution above.*

BRAKE SHOE REMOVAL & INSTALLATION:

Removal: Install wheel cylinder clamp to prevent hydraulic system leakage. Unhook the two shoe return springs at anchor. On rear brakes, swing the hand brake lever on the secondary shoe toward the axle to slacken cable. Lift cable from lever slot. Compress and remove hold-down spring clip on each shoe. Spread shoes and lift off brake support plate. On rear brakes, remove parking brake link and anti-rattle spring. Separate shoes by removing star wheel adjusting assembly and spring. On rear brakes, pull clip from parking brake lever mounted on secondary shoe and remove lever from shoe. Anchor plate and anchor block may now be lifted from anchor pin.

Installation: Reverse removal procedure. *NOTE* - On Studebaker Taxi and all 8 cylinder models, the parking brake lever is mounted on inner side of rear shoe. On Studebaker 6 cylinder models and all Rambler models, the parking brake lever is mounted on outside of shoe.

BLEEDING BRAKE SYSTEM & OVERHAULING OF MASTER CYLINDER & WHEEL CYLINDERS: *See "Hydraulic Brake Servicing" in Brake Section of Manual and note the following: CAUTION* - To bleed power brakes, engine must be stopped and no vacuum in power brake system. *NOTE* - On Studebaker equipped with power brake and/or hill holder, these units must be bled before the rest of the system.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting".*

WAGNER AUTOMATIC ADJUSTER HYDRAULIC BRAKES

Rambl r, Seri s 01, 10 (1959)
Rambl r, S ri s 10 (1960)

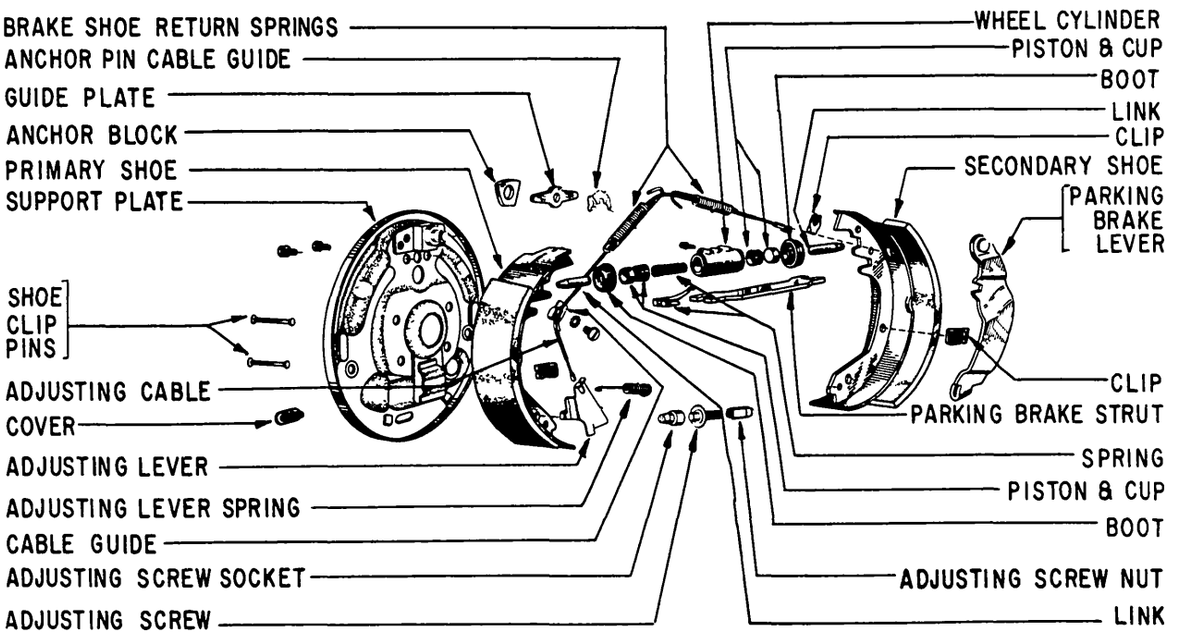
►CHANGES, CAUTIONS, CORRECTIONS

►*1960 RAMBLER SERIES 6010 (& Series 5901, 5910) AUTOMATIC ADJUSTING BRAKE ADJUSTING CABLE WEAR CORRECTION:* If excessive wear is indicated on the adjusting cables at cable guides, install Brake Cable Package, Part No. 3209514 which consists of brake cable assemblies, right and left hand cable guides, special lubricant, and an instruction sheet. The new cable guides have been reworked for smoother operation.

►*1960 RAMBLER SERIES 6010 AUTOMATIC BRAKE ADJUSTER PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Starting with Car Code No. 20328 an improved automatic adjusting brake became effective in production. The adjuster unit is similar to that previously used, however, special procedures are required for installation of brake shoe return springs and for anchor pin cable guide. See "Brake Shoe Replacement" below.

DESCRIPTION: Hydraulic, self-centering and self-energizing type with Bendix type brake shoe assemblies similar in design to Wagner (Lockheed) Self-Centering Brakes and incorporating an automatic adjuster to maintain proper lining to drum clearance. The automatic adjuster uses movement of the front (primary) shoe during brake applications to turn brake ad-

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WAGNER AUTOMATIC ADJUSTER BRAKE ASSEMBLY (REAR SHOWN - FRONT SIMILAR)

WAGNER AUTOMATIC ADJUSTER HYDRAULIC BRAKES (Con..)

justing star wheel a small amount as determined by lining wear. The adjuster consists of an adjusting lever, cable guide and an adjusting cable.

OPERATION: After lining wears enough to require adjustment, the adjusting cable will lift adjusting lever into position to engage with next tooth of star wheel when the brakes are applied. When brake is released, shoes return to the brake shoe anchor. This action will repeat on subsequent brake applications, if necessary, until shoe-to-lining clearance is reduced to a point where shoe movement is not enough to cause cable to lift lever to next tooth. The automatic adjuster is located on the front shoe (primary), and the adjusting action, when required, occurs when applying brakes in either forward or reverse motion.

ADJUSTMENT: Place car on stands so that all four wheels are free. Check master cylinder and see that fluid is ½" below top of cylinder. Place parking brake handle in fully released position, then adjust as follows:

Brak Pedal Free Travel Adjustment: ¼" to ½" free travel required. To adjust, rotate master cylinder pushrod-to-brake pedal attaching eccentric bolt.

Brak Shoe Adjustment: Adjustment not normally required, however, if a manual adjustment is necessary (after installation of new lining or shoes), proceed as follows: Remove access hole cover and use a screwdriver to rotate star wheel. To tighten, rotate backing plate side of star wheel toward axle. To back off star wheel, it may be necessary to insert a second tool, past the star wheel, to force automatic adjusting lever off of star wheel. Back off star wheel to eliminate drag.

Parking Brake (Foot Operated Lever): With lever in fully released position, adjust rear cable at equalizer so wheels will turn without drag.

BRAKE SHOE REPLACEMENT: *See "Wagner (Lockheed) Self-Centering" and note the following:*

Automatic Adjuster (Early Type Before Car Code No. 20328): Install adjuster cable guide on primary shoe but do not tighten cable guide screw at this time. Position adjuster lever fitting into large hole near end of primary shoe rib, then connect adjuster lever spring between secondary shoe rib (small hole) and slot in lever. Thread cable through shoe hold-down spring coils and over cable guide at anchor pin, hooking eye end of cable over secondary shoe return spring hook. Route cable around guide and with a screwdriver, swivel lever upward and engage barrel fitting end of cable in lever slide. *CAUTION - At time brake is assembled, the upper end of primary shoe return spring must be installed on top of secondary spring for proper cable alignment.* With brake in released position, push primary shoe cable guide outward pulling cable taut until bottom edge of adjusting lever is engaging star wheel tooth and parallel to star wheel shank. Tighten cable guide screw, then test action by pulling cable.

Automatic Adjuster (Later Typ Aft r Car Code No. 20328): After brake shoes, adjusting screws and adjusting lever have been installed, install the RED secondary shoe return spring with long hook end flat against shoe guide plate. The BLUE primary spring is installed **last** with short hook end flat against shoe table when hooked on tab of primary shoe. Slip anchor pin cable guide down on anchor pin and thread the cable and tubing through return springs from secondary shoe pin cable guide, through the primary spring, over the cable guide, and secure the pellet in slot of adjusting lever. With shoes centered on backing plate, adjust shoe cable guide so that the adjusting lever, which engages star wheel teeth, is on the centerline to 1/16" above centerline of adjusting screw. Be sure cable tubing is properly assembled in grooves of shoe cable guide and the anchor pin cable guide. Test ratchet action by pulling cable.

BLEEDING BRAKE SYSTEM & OVERHAULING OF MASTER CYLINDER & WHEEL CYLINDERS: *See "Hydraulic Brake Servicing" in Brak Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CHRYSLER, DESOTO, DODGE, PLYMOUTH LOCKHEED "SAFEGUARD"

Chrysler 6, All Models (1954)
Chrysler 8, Exc. C53,59,66,70 Imperial (1954-55)
D Soto, All Models (1954-55)
Dodge, All Models (1954-55)
Dodge, 6 Cyl. D-62-1,2 (1956)
D dge, V8 D-63-1,2,3 (1956)
Plymouth, All Models (1954-55)
Plymouth, All 6 Cyl. & V8 Models (1956)

►CAUTIONS & CORRECTIONS

►*1954 POWER BRAKE CAUTION:* Vacu-Ease Power Unit Standard or Optional on Chrysler, DeSoto, Dodge, and later Plymouth cars. *See "Chrysler Vacu-Ease P w r Unit".*

►*1955 POWER BRAKE CAUTION:* Power Brake Standard on all Chrysler Models except C-67 (Windsor). Optional on Chrysler Windsor, DeSoto, Dodge, and Plymouth Models. *See "Chrysler & Imperial, DeSoto, Dodge, Plymouth Power Unit".*

►*1956 PLYMOUTH MASTER CYLINDER COVER BOLT CAUTION:* New replacement covers use ¼" shorter bolt with less body length. New bolt Part No. 1671571. DO NOT use original type cover bolt with new replacement covers (Bolt will bottom before cover tight).

►*BRAKE SQUEAL OR ABNORMAL LINING WEAR: Cam pins which are too high will cause brake shoe misalignment causing brake squeal and abnormal lining wear. Correct as follows:*

Cam Pin H ight Check & C rrecti n—To check cam pin height alter brake adjusting Tool MT-19-L and follow procedure below.

1) To alter Tool MT-19-L, drill and tap gauge holder and install wing type screw so that gauge can be secured to the bushing adapter.

2) (Front wheel). Place gauge on spindle with shoe removed and set gauge to height of wheel cylinder anchor lug. Check height of cam against this gauge setting. Cam pin should be equal or less than this reading.

3) (Rear wheel). Place gauge on axle with shoe removed and set gauge to height of rear wheel brake support. Check cam pin height against this setting. Cam pin should be equal or less this reading.

4) If cam pin height found to be more than height given above, raise brake shoe guide spring and file head of cam pin or replace pin with one of correct height.

Too Low Cam Pin Correction—To help raise cam pin without distorting brake shoe support plate, use stand-C-clamp and Tool C-3248.

Dimpling of Brake Shoe For Pin Clearance—Support shoe on piece of pipe or socket wrench at point to be dimpled. Place ball end of a ball-peen hammer on web directly over pipe or socket. Using second ball-peen hammer, strike first hammer a few sharp blows, until enough metal is raised on reverse side of shoe web to reduce clearance. To increase clearance, strike shoe from reverse side so as to form a slight cavity in web directly above face of cam pin.

Grooving Brake Lining (See CAUTION below)—If above procedures do not correct squeaks (make certain that brake drum dampener spring are in place also), lining can be grooved to secure more perfect contact between lining and drum as follows: Clamp brake shoe in vise, scribe diagonal line on face of lining beginning at point 7/8" in from side at one end and 7/8" from opposite side at opposite end. Cut groove approximately .050" wide (use two fine hacksaw blades clamped together in holder) completely through lining to face of of brake shoe.

►*CAUTION: Do not attempt to groove riveted lining or any of the edge-bonded, wire-backed, cycl -bonded linings.*

Slotting Brake Shoes (See CAUTION below)—If grooving does not correct squeaks, toe end of shoes can be slotted to depth of 1 3/8". Use hacksaw blade to cut web loose from shoe table (lining surface), cutting as close to table as possible.

►*CAUTION: Do not slot front brake shoes which have four 5/8" holes through the shoe table.*

DESCRIPTION: The "Safeguard" brake system consists of two-cylinder type hydraulic brake (front wheels), single double-acting cylinder type hydraulic brake (rear wheels):

Two-Cylinder (Front Wheel) Typ—Consists of two independent single-acting brake cylinders mounted on the backing plate, each cylinder actuating one brake shoe. Each cylinder is mounted on the anchor pin of the other shoe (top cylinder mounted on rear shoe anchor pin and actuates forward shoe, bottom cylinder mounted on forward shoe anchor pin and actuates rear shoes). All shoes are "primary" or self-energizing type.

Single Cylinder (Rear Wheel) Type—Same as other "Lockheed Double Anchor Hydraulic" brake cylinders. Consists of single double-acting cylinder mounted at top of backing plate and actuating both brake shoes. Shoes are pivoted on anchors at bottom of backing plate.

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH LOCKHEED "SAFEGUARD" (Cont.)

►*CAUTION:* Before making any adjustment be sure anchor bolts are in correct position. Arrows must point away from the heels of shoes they control.

ADJUSTMENT: Before making adjustments, jack up all wheels, check brake pedal free travel (should be 1/8-1/4" to take up pushrod play) plus additional 5/8-3/4" (to close off master cylinder relief port) before brakes begin to be applied. Total pedal travel to apply brakes should be 1¾-2". If Minor Adjustment does not give correct pedal travel, or if relief port is cut off with less than ¾" pedal travel, check brake pedal free play

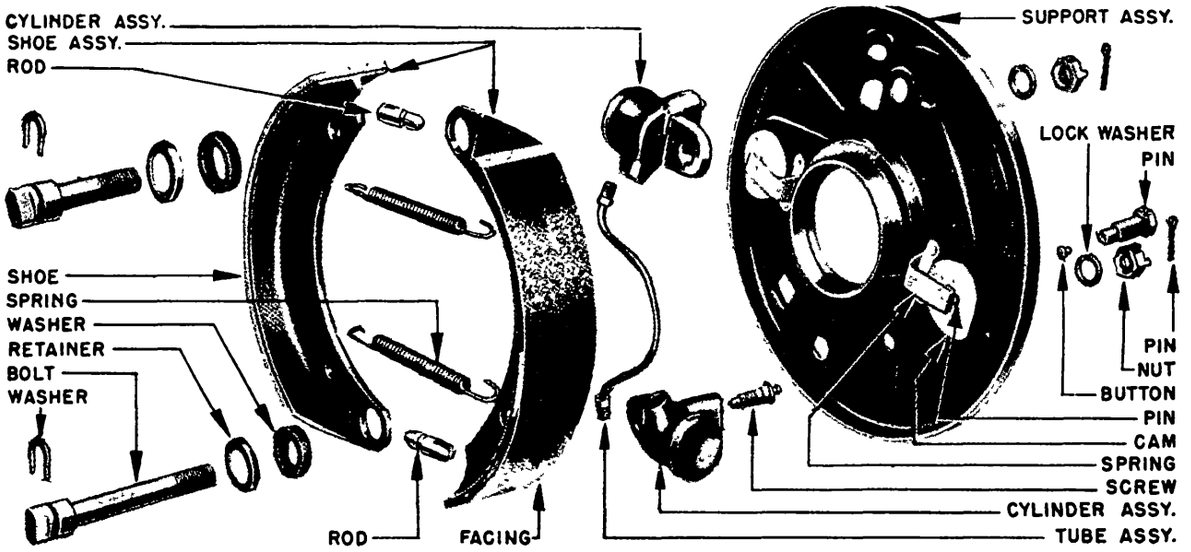
Brake Pedal Adjustment: Adjust master cylinder pushrod to obtain 1/8-1/4" (1954-55), 3/32-3/16" (1956) free play with master cylinder piston against stop. On 1955-56 Plymouth distance between brake pedal and pedal stop should be .015-.030", which will result in approximately 1/8" free play at pedal pad.

►*1955 POWER BRAKE NOTE:* Power Brake unit has built-in pedal return spring and a pedal return stop, and **require s n fre play adjustment.**

Minor Wear Adjustment: Turn adjusting cams(pull down on wrench handle) until shoe is locked against drum (Dodge), light drag (Plymouth). Back off cam just enough to remove all drag. Repeat adjustment for each shoe in all four wheels.

Major (New Lining) Adjustment: Use adjusting gauge MT-19-K or feeler gauges and cutaway drum and adjust eccentric and anchor pin for each shoe to obtain .006" clearance at both toe and heel, for all models.

►*CAUTION:* After adjusting brakes on one wheel, do not use same gauge setting for brakes on another wheel. Gauge must be reset according to inside diameter of brake drum of **each** wheel.



CHRYSLER "SAFEGUARD" FRONT (TWO CYL.) BRAKE ASSY.

Hand Brake Adjustment: Hand Brake is independent type mounted on driveshaft at rear of transmission. *See Car Model Pages and individual model Special Data Pages.*

BLEEDING BRAKES (With Integral Power Unit): With outlet line to wheel cylinders connected loosely, attach pressure bleeder to reservoir, open bleeder screw on top of master cylinder, bleed unit until free of air, close bleeder screw, continue bleeding until no bubbles appear at outlet connection, tighten connection. If pedal not firm, bleed all wheel cylinders as on standard manual brakes.

BLEEDING BRAKES (Manual Brakes & with "Bell ws" or "Piston" Power Units): *See "Hydraulic Brake Servicing"*

OVERHAULING BRAKE UNITS: *See "Hydraulic Brak Servicing"*

TROUBLE SHOOTING: *See "Hydraulic Brake Troubl Shooting"*

CHRYSLER, DE SOTO, DODGE & PLYMOUTH "CENTER PLANE" & "TOTAL CONTACT" BRAKES

Chrysler & Imperial (1956-59)
De Soto, All Models (1956-59) Ⓒ
Dodge 500 (1956)
Dodge, All Models (1957-59)
Plymouth, All Models (1957-59)

Ⓒ - Used on early cars. Later cars have "Three Platform" type brakes. See "Brake Identification Note"

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 BRAKE "SQUEAK" CORRECTION:* To correct brake squeaks or other brake noises proceed as follows:

1) Torque axle housing to rear spring U-bolt nuts to a specified torque of 65-80 ft. lbs.

2) Inspect for out of round drums, distorted support plates, or loose anchor pins. To correct loose anchor pins, remove support plates, check alignment, place support plate with the pin resting in vise, repeen end of pin until it is tight.

3) Torque the five rear wheel brake support to axle bolt nuts to 35 ft. lbs. The four front wheel brake support bolt nuts must be torqued to 55 ft. lbs.

4) Brake shoe guide spring, Part No. 1484680, which is held in place by the retainer, Part No. 1486945, must be very tight against brake shoe and support. Loose guide springs should be bent to restore their tension. The retainer must not exceed specifications of 15/32", measured between inside ends.

►*REAR WHEEL REMOVAL CAUTION:* **Do not apply service brakes to hold shoes against drum while using wheel puller.** To hold hub and drum from turning while using wheel puller back off brake shoes from drum with adjusting cams. Apply hand brake and allow one rear wheel to remain on floor, or block wheel.

►*1958 DODGE & PLYMOUTH MASTER CYLINDER PRODUCTION CHANGE & FREEPLAY ADJUSTMENT NOTE:* Later cars have new master cylinder, Part No. 1829400 (Dodge), No. 1829401 (Plymouth), which incorporates a brake pedal stop and eliminates need for brake pedal freeplay adjustment. The brake pedal stop and return spring are eliminated. This results in a somewhat slower pedal return when brakes are released. *CAUTION* - Do not pull brake pedal to released position with more than 50 lbs. of force as this will cause deflection of piston stop and result in excess pedal travel before brakes apply.

►*1959 BRAKE IDENTIFICATION NOTE:* New "Three Platform" type brakes used in production on different cars at different times beginning in January 1959. Some early cars may have one type at front wheels the other type at rear wheels. *NOTE* - Depressions (for platforms) appear on back side of backing plate on "Three Platform" type. For "Three Platform" data, see "Three Platform Total Contact Brakes".

►*1959 PARTS NON-INTERCHANGEABILITY NOTE:* The following parts are the only ones that are interchangeable between the two types of brakes. 1) Brake Drums. 2) Brake Lining. 3) Rear wheel cylinder boots. 4) Front and rear wheel cylinder pushrods, pistons, expanders, and springs. 5) Front wheel cylinder connecting tube assembly.

►*1959 BRAKE LINING REPLACEMENT CAUTION:* Use only a lining set with same color identification as used on opposite wheel.

DESCRIPTION: These hydraulic brakes have two floating shoes mounted between two plates located on the center plane of the lining. On front wheel brakes, two single piston cylinders (single action) are attached to

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CHRYSLER, DE SOTO, DODGE & PLYMOUTH "CENTER PLANE" & "TOTAL CONTACT" BRAKES (Cont.)

the support plate assembly, the upper cylinder actuating the front shoe, and the lower cylinder actuating the rear shoe. On rear wheel brakes, one double piston cylinder (double action) is attached to the top of the support plate assembly and actuates both brake shoes. An anchor pin in support plate assembly holds spring link in a fixed position at one end. The other end of link is positioned by brake shoe adjusting cam, providing a constant-loaded spring length. Side rattle and twisting of shoe is controlled by spring guide, which maintains a constant pressure against side of web of shoe holding shoe against support plate.

ADJUSTMENTS: Place car on stands, so that all four wheels are free. Check master cylinder and see that fluid level is not over ½" below top of cylinder. Place parking brake lever in fully released position.

Brake Pedal Adjustment: Release locknut on brake pedal to master cylinder pushrod and rotate rod to obtain specified clearance. *NOTE - Pedal adjustment not required on later Dodge & Plymouth cars. See "Production Change & Freeplay Note" above.*

Standard Brakes - 1/32-1/8" (Chrysler & DeSoto), 1/8-1/4" (Dodge & Plymouth, **early cars only**).

Power Brakes - 1/32-1/8" All Cars.

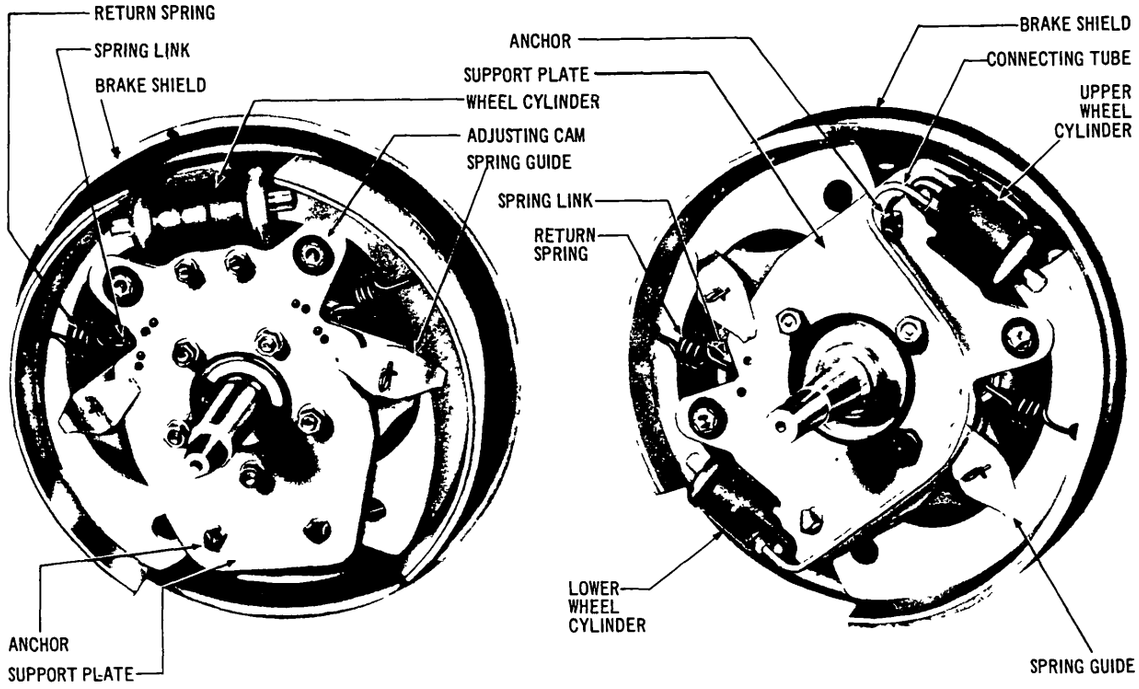
Front Wheel Adjustment: Turn each adjusting cam on both front shoes in the direction of FORWARD wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

Rear Wheel Adjustment: Turn front shoe adjusting cam in direction of **forward** wheel rotation and rear shoe adjusting cam in direction of **reverse** wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

►*RELINED OR NEW SHOE ADJUSTMENT NOTE* – Apply brake pedal prior to adjusting brakes to properly center shoes in brake drum and to assist in adjustment.

Hand Brake Adjustment: Hand Brake is independent type mounted on drive shaft at rear of transmission. *See Car Model Pages and individual model Special Data Pages.*

BLEEDING BRAKE SYSTEM: Use compressed air refiller, Tool C-3496 attached to master cylinder to keep master cylinder filled. Back off adjusting cams all the way, then starting with right rear wheel cylinder, attach bleeder hose, Tool C-650 to valve, with other end in jar partially filled with brake fluid. Bleed intermittently, opening and closing valve (at wheel cylinder) until fluid runs out of bleeder hose in a solid stream without bubbles. Repeat this operation on left rear wheel, right front wheel and finally left front wheel. At front wheels (with two cylinders), bleed lower cylinder first to force air out of connecting line to upper cylinder, then bleed upper cylinder. Repeat bleeding operation if brake action indicates air still in lines. Readjust cams after completing bleeding operation.



REAR WHEEL BRAKE **FRONT WHEEL BRAKE**

CENTER PLANE BRAKE ASSEMBLIES

BRAKE SHOE REPLACEMENT: Removal – 1) Remove wheel, hub and drum assembly using puller C-845 to remove drum assembly.

2) Insert wrench C-3462, in the inner support plate hole, with tool cam slot engaging the spring hook. Turn tool handle to disengage spring from spring link, and turn handle in opposite direction to release the spring. Remove both springs in this manner. *CAUTION* - Do not use brake spring pliers or damage to lining will result.

3) Turn brake shoe guide spring retainer 1/4 turn and remove (the lip on end of spring is for correct positioning on outer support assembly). Slide shoes from support assembly.

Installation: 1) Position brake shoe in support plate, (make sure that wheel cylinder pushrods properly engage toe end of shoes and that shoes are in alignment).

2) Check tension of springs which should be 70 lbs. plus or minus 5 lbs., installed length. This can be checked by hooking a scale at toe end of shoe and pulling shoe away from wheel cylinder. Scale should read 35-45 lbs., before contact is broken between web of shoe and wheel cylinder.

LINING REPLACEMENT: Drum diameter should not exceed .004" out of round at any point. Grind lining to specified clearance of .010"-.024" below drum diameter.

WHEEL CYLINDER & SUPPORT PLATE: Removal & Disassembly 1) Disconnect flexible brake hose at wheel cylinder (upper cylinder on front), and remove wheel cylinder mounting screws and lockwashers at rear of brake shield.

2) Remove support plate mounting bolts and remove support plate with wheel cylinders and connector tube attached.

3) With assembly on bench, remove cylinder connector tube and wheel cylinders.

Assembly & Installation: 1) Assemble wheel cylinders on support plate. (Install connector tube on front assembly).

2) Position support plate on brake shield and install cylinder mounting screws and lockwasners, but do not tighten.

3) Install support plate bolts, lockwashers and nuts. Tighten to 35 ft. lbs. and cylinder mounting screws to 20 ft. lbs.

WHEEL CYLINDER OVERHAUL: Wheel cylinder pistons that are badly scored or corroded should be replaced. Use new piston cups when reconditioning cylinders. Cylinder walls that have light scratches, or show signs or corrosion, can usually be cleaned up with crocus cloth. Cylinders that have deep scratches or scoring, may be honed using Tool C-3080. Diameter of cylinder bore should not be increased more than .002". If a cylinder does not clean up at .002" it should be replaced *(NOTE* - Black stains on cylinder walls are caused by piston cups and will do no harm).

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Manual.*

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "THREE PLATFORM" TOTAL CONTACT BRAKES

Chrysler & Imperial (1959-60) ℂ
D Soto (1959-60) ℂ
Dodge (1959-60) ℂ
Plymouth (1959-60) ℂ
ℂ - Early 1959 Cars have "Center Plane" type brakes. See "Brake Identification Note" below.

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 BRAKE IDENTIFICATION NOTE:* New "Three Platform" type brakes used in production on different cars at different times beginning in January 1959. Some early cars may have one type at front wheels the other type at rear wheels. *NOTE* - Depressions (for platforms) appear on back side of backing plate on "Three Platform" type. *For "Center Plane" data, see "Center Plane Total Contact Brakes".*

►*1959 PARTS INTERCHANGEABILITY NOTE:* The following parts are the only ones that are interchangeable between the two types of brakes. 1) Brake Drums. 2) Brake Linings. 3) Rear wheel cylinder boots. 4) Front and rear wheel cylinder pushrods, pistons, expanders, and springs. 5) Front wheel cylinder connecting tube assembly.

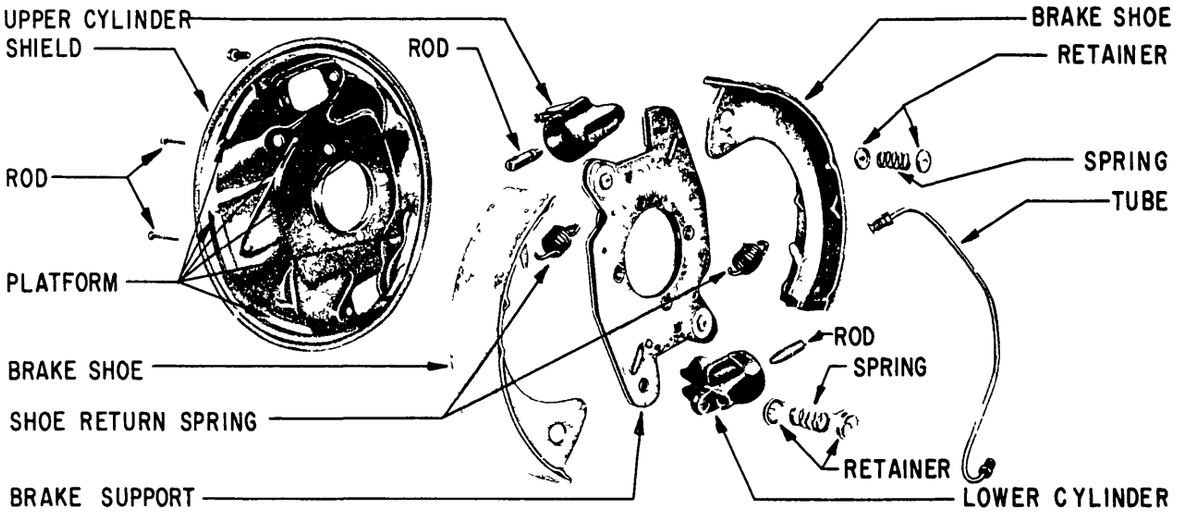
►*1959-60 BRAKE, DRAG, PULL OR TOO FREQUENT BRAKE ADJUSTMENT CORRECTION:* This condition may result from burrs or sharp edges on brake shoe table loops and/or dust shield platforms. To correct, remove drums and brake shoe assemblies and remove any burrs or paint build-up on dust shield platforms. Lubricate all platforms with a thin film of MoPar "door ease" or Lubriplate. Carefully remove all sharp edges on shoe loop with a file or scraper. *CAUTION - Remove sufficient material to smooth loop edges only.* Reinstall brakes, retainers and return springs. Check brake shoe return spring tension by attaching a spring scale at toe of shoe and pull shoe away from wheel cylinder. Shoe should begin to move away from wheel cylinder pushrod at 45-55 lbs. If more than 55 lbs. is required to move shoe check for cause of drag. If less than 45 lbs. is required to move shoe, replace with new return springs.

►*1960 BRAKE SHOE NOISE OR BRAKE HOWL CORRECTION:* Noise or howl may be caused by loose brake shoe anchors in support plate. Check by removing brake drum and inspect anchors for tightness. If anchors are loose, they may be tightened by peening over the ends, or by a pair of tack welds with an arc welder. *CAUTION - Do not use acetylene weld.* If anchors are tightened by peening, be sure to support the anchor while peening to prevent damage to support plate.

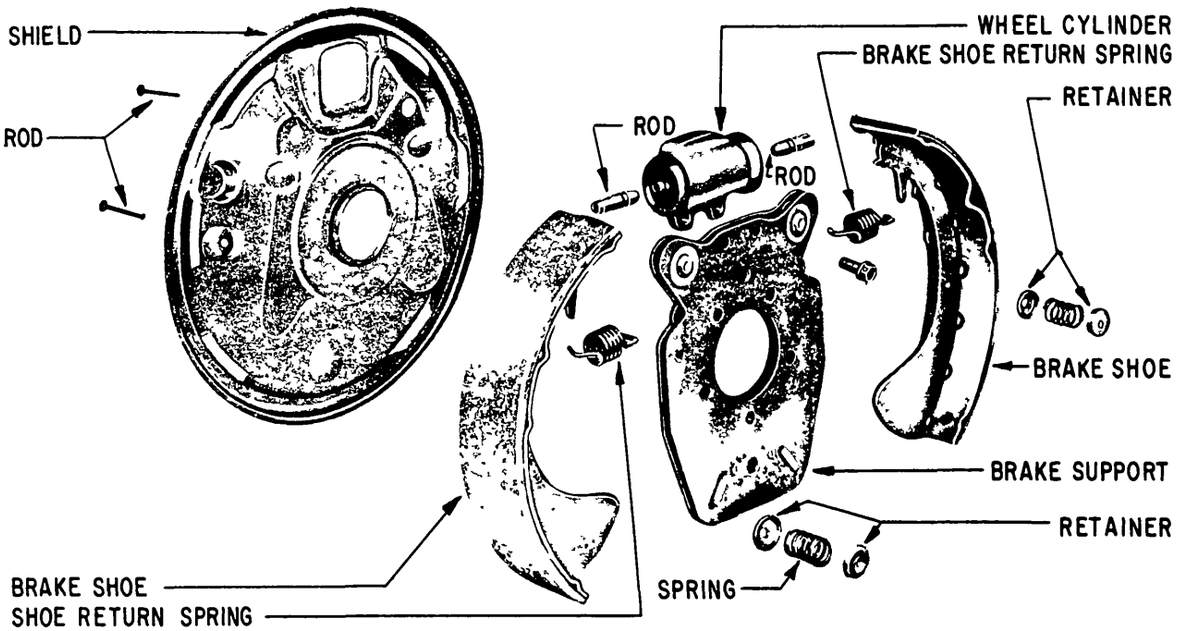
►*1960 DODGE BRAKE HOWL AT LOW SPEEDS:* This condition may be encountered on suburban models and may be corrected by installing rear spring insulators, Part No. 1731797 (upper), 1731798 (lower). If correction is not satisfactory inspect brakes, particularly for loose anchors (see above).

►*BRAKE LINING REPLACEMENT CAUTION:* Use only a lining set with same color identification as used on opposite wheel.

►*REAR WHEEL REMOVAL CAUTION:* **Do not apply service brakes to hold shoes against drum while using wheel puller.** To hold hub and drum from turning while using wheel puller, back off brake shoes from drum with adjusting cams. Apply hand brake and allow one rear wheel to remain on floor, or block wheel in suitable manner.



THREE PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - FRONT WHEELS



THREE PLATFORM TOTAL CONTACT BRAKE ASSEMBLY - REAR WHEELS

DESCRIPTION: These hydraulic brakes have three raised platforms (for each shoe) pressed into dust shield and three contact loops on each brake shoe so that shoe will ride on the platforms. An additional loop in brake shoe is for the attachment of return spring. The platforms act as guides to maintain proper shoe alignment and to reduce vibration and noise. Return spring is hooked in center of brake shoe eliminating need for flat guide springs. On front wheel brakes, two single piston cylinders (single action)

CONTINUED ON NEXT PAGE

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "THREE PLATFORM" TOTAL CONTACT BRAKES (Cont.)

are attached to support plate assembly, the upper cylinder actuating the front shoe and the lower cylinder actuating the rear shoe. On rear wheel brakes one double piston cylinder (double action) is attached to top of support plate assembly and actuates both brake shoes. An anchor pin in support plate assembly holds spring link in fixed position at one end. The other end of link is positioned by brake shoe adjusting cam, providing constant-loaded spring length. Side rattle and twisting of shoe is controlled by shoe retainer spring which maintains a constant pressure against platforms.

ADJUSTMENTS: Place car on stands, so that all four wheels are free. Check master cylinder and see that fluid level is not over ½" below top of cylinder. Place parking brake lever in fully released position.

Brake Pedal Adjustment: *NOTE - Pedal freeplay adjustment not required on cars with manual brakes. The master cylinder has a fluted dust boot and retainer and the retainer acts as a master cylinder piston stop. Pedal return spring and pedal stop have been eliminated. DO NOT pull on brake pedal and lever as master cylinder pushrod may be pulled from master cylinder.*

Power Brakes - Freeplay should be 1/16"-1/8" (all cars). To adjust, release locknut on brake pedal to master cylinder pushrod and rotate pushrod to obtain specified clearance. Insert a screwdriver blade between rubber collar of trigger pivot and rear side of elongated hole in power brake lever, forcing them apart. *See "Power Brakes".*

Front Wheel Adjustment: Turn each adjusting cam on both front shoes in the direction of FORWARD wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

Rear Wheel Adjustment: Turn front shoe adjusting cam in direction of **forward** wheel rotation and rear shoe adjusting cam in direction of **reverse** wheel rotation until lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction until no drag is felt.

►*RELINED OR NEW SHOE ADJUSTMENT NOTE:* Apply brake pedal prior to adjusting brakes to properly center shoes in brake drum and to assist in adjustment.

Hand Brake Adjustment: Hand Brake is independent type mounted on drive shaft at rear of transmission. *See Car Model Pages and individual model Special Data Pages.*

BLEEDING BRAKE SYSTEM: Use compressed air refiller, Tool C-3496 attached to master cylinder to keep master cylinder filled. Back off adjusting cams all the way, then starting with right rear wheel cylinder, attach bleeder hose, Tool C-650 to valve, with other end in jar partially filled with brake fluid. Bleed intermittently, opening and closing valve (at wheel cylinder) until fluid runs out of bleeder hose in a solid stream without bubbles. Repeat this operation on left rear wheel, right front wheel and finally left front wheel. At front wheels (with two cylinders), bleed lower cylinder first to force air out of connecting line to upper cylinder, then bleed upper cylinder. Repeat bleeding operation if brake action indicates air still in lines. Readjust cams after completing bleeding operation.

BRAKE SHOE REPLACEMENT: Removal - 1) Remove wheel, hub and drum assembly using puller C-845 to remove drum assembly.

2) Insert wrench C-3462, in the inner support plate hole, with tool cam slot engaging the spring hook. Turn tool handle to disengage spring from spring link, and turn handle in opposite direction to release the spring. Remove both springs in this manner. *CAUTION* - Do not use brake spring pliers or damage to lining will result.

3) Turn brake shoe guide spring retainer 1/4 turn and remove (the lip on end of spring is for correct positioning on outer support assembly). Slide shoes from support assembly.

Installation: 1) Position brake shoe in support plate, (make sure that wheel cylinder pushrods properly engage toe end of shoes and that shoes are in alignment), **2) Check tension of springs by hooking a spring scale at toe end of shoe and pulling shoe away from wheel cylinder. Scale should read 45-55 lbs. (early 1959 cars with first type spring, was 35-45 lbs.), to move shoe off wheel cylinder. If more than 55 lbs. required to move shoe, check for cause of drag. If less than 45 lbs. is required to move shoe, replace springs.**

LINING REPLACEMENT: Drum diameter should not exceed .004" out of round at any point. Grind lining to specified clearance of .010"-.024" below drum diameter.

►*BRAKE BACKING PLATE & BRAKE SHOE LOOP NOTE:* Platforms for each shoe must be uniform in height and flatness (use surface gauge to check) and mating loops on brake shoes must be uniform and smooth. Replace backing plate when platform heights vary more than .010".

WHEEL CYLINDER & SUPPORT PLATE: Removal & Disassembly - 1) Disconnect flexible brake hose at wheel cylinder (upper cylinder on front), and remove wheel cylinder mounting screws and lockwashers at rear of brake shield.

2) Remove support plate mounting bolts and remove support plate with wheel cylinders and connector tube attached.

3) With assembly on bench, remove cylinder connector tube and wheel cylinders.

Assembly & Installation: 1) Assemble wheel cylinders on support plate (Install connector tube on front assembly).

2) Position support plate on brake shield and install cylinder mounting screws and lockwashers, but do not tighten.

3) Install support plate bolts, lockwashers and nuts. Tighten to 35 ft. lbs. and cylinder mounting screws to 20 ft. lbs.

WHEEL CYLINDER OVERHAUL: Wheel cylinder pistons that are badly scored or corroded should be replaced. Use new piston cups when reconditioning cylinders. Cylinder walls that have light scratches, or show signs of corrosion, can usually be cleaned up with crocus cloth. Cylinders that have deep scratches or scoring, may be honed using Tool C-3080. Diameter of cylinder bore should not be increased more than .002". If a cylinder does not clean up at .002" it should be replaced (*NOTE* - Black stains on cylinder walls are caused by piston cups and will do no harm).

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Manual.*

CHRYSLER DISC BRAKE (WITHOUT SPIDER)

Chrysler Crown Imperial C59,66,70 (1954-55)

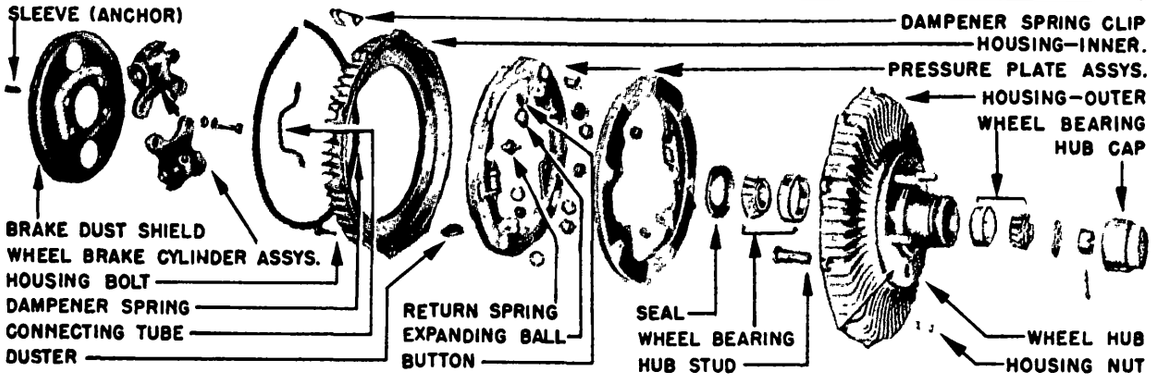
►*1954 ADJUSTER ROD PRODUCTION & CLEARANCE CHANGE:* The automatic adjuster rod-to-outer pressure plate clearance has been increased from .005-.010" to .015-.020". The rod length is reduced from 2.445-2.446" to 2.435-2.436".

DESCRIPTION: The Chrysler Disc Brake is hydraulically operated, self-energizing. The brake assembly, enclosed in a rotating housing, utilizes two lined pressure plates in the form of annular rings which move apart, contacting the inner surfaces of the rotating housing, when brake application is made. The housing is split and held together by 10 bolts around the outside edge. The pressure plate assembly rests on a duster located at the bottom of each brake housing. Automatic brake adjusters are built into the assembly. Brake lining segments are used, bonded to the outer surface of each pressure plate. Two hydraulic cylinders, mounted on steering knuckle in front and on the rear axle flange, move push rods operating against bosses on the pressure plates.

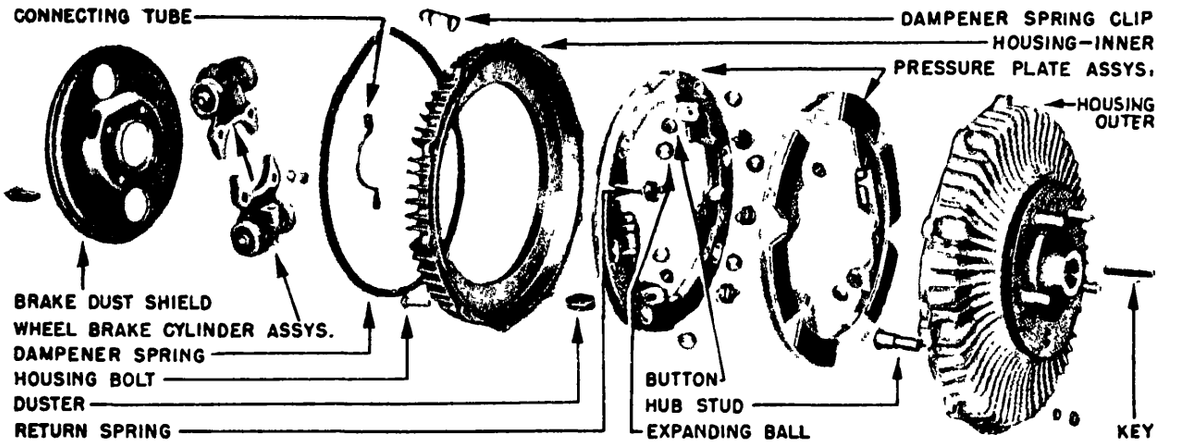
OPERATION: When the outer plate is rotated with respect to inner plate through action of the wheel cylinder push rods, steel balls between the pressure plates are forced up on ramps located on the inside surfaces of the plates. The movement of the balls up the ramps forces the pressure plates apart and contact is made between the lining and the inner surfaces of the brake housing.

Whe l Brake Automatic Adjuster: The self-adjusting mechanism automatically compensates for lining wear. Desired clearance is maintained, at all times, between pressure plates and brake housing. Two identical automatic adjusters are mounted, one on each plate, operating at 180° to each other, and are identical in operation for either front or rear brakes. Two lugs are provided on each of the two pressure plates, placed to straddle automatic adjusters. Each self-adjusting unit comprises a bracket (integral to the individual pressure plate) with two guide flanges, rod, lubricating washer, 11 steel adjuster balls, adjuster washer, bushing and sleeve. When brakes are applied, outer plate is rotated with respect to inner plate and lug contacts adjuster rod. If brake linings are new, linings contact housing before rod is pushed forward. If linings are worn, lug pushes adjuster rod through bracket guide flanges until linings contact brake housing and relative rotation of outer plate stops. When brakes are released, brake return springs cause outer plate to tend to return to former position. When lug on opposite end of rod comes into contact with the rod, the locking action (provided by the automatic adjuster) prevents adjuster rod from being pushed back, and outer plate cannot return completely to former position. Because difference between length of rod and distance between finished surfaces of lugs has been calculated to provide desired clearance between linings and housing when brakes are released, proper clearance is maintained regardless of wear on linings.

ADJUSTMENT: Self-adjusters used and no service adjustment to compensate for lining wear required during useful life of linings. Manufacturer recommends that plate assemblies be switched from front to rear every 15,000 miles to obtain maximum brake lining life.



FRONT BRAKE



REAR BRAKE

CHRYSLER DISC BRAKE ASSY. (WITHOUT SPIDER)

Brake Pedal: ⅛-¼" free travel. Adjust by loosening locknut on master cylinder end of pedal rod and turning large adjusting nut.

Parking (Hand) Brake: Independent, internal expanding type. *See Car Model pages for adjustment data.*

REPAIR DATA: *CAUTION—Inner and outer housings are balanced as an assembly and should be assembled accordingly. Further, do not install left pressure plates or wheel cylinders on right side or vice versa.*

Wheel Brake Cylinders: Front brake cylinders are 1¼" diameter and rear cylinders are 1" diameter. *NOTE—Because there is no direct connection between pressure plate and wheel cylinders, brake assemblies can be removed as a unit from car without opening housings or disrupting hydraulic system.* Normal inspection or replacement of front brake cylinder parts does not require removal of cylinder from steering knuckle.

Bleeding Brakes: *CAUTION—Do not use fluid from pressure type filler or a container that has been open more than a few hours.* Connect hoses at each wheel position. Fill master cylinder with a bottle type filler with fluid from newly opened, sealed container. Bleed lower cylinder on each wheel first—do by hand, not with pressure bleeder—then refill master cylinder reservoir after bleeding each cylinder. After bleeding all four lower wheel cylinders, bleed four upper cylinders.

►*CAUTION—A short section of bleeder hose should be placed over bleeder valve before opening bleeder. If not done, it is possible for fluid to seep inside housings, contaminating linings.* Bleed only one cylinder at a time. Be very sure all air is expelled from brake lines and wheel cylinders.

►*CAUTION—After brakes are thoroughly bled, brake pedal will be very low. Drive car forward very slowly depressing and releasing brake pedal slowly as car moves forward. After pedal has built up to approximately ¾ of its full height recheck fluid level in master cylinder. Car should then be driven five miles applying brakes at intervals. There should be no brake dive or pulling to one side when brakes are applied.*

CONTINUED ON NEXT PAGE

CHRYSLER DISC BRAKE (WITHOUT SPIDER) C nt.

Brake Lining: Molded asbestos, segment type lining used, Cyclebonded. Thickness 5/32". Clearance between lining and housing—Self-adjusting.

►***CAUTION—With new linings, erratic operation may result for a few miles of operation. Normal brake operation should occur after not more than 25 or 30 miles of driving.***

DISASSEMBLY: ***NOTE—Brake assemblies can be removed from car as a unit without opening housings or disrupting hydraulic system.***

Front Disc Brake: Remove hub cap, cotter key spindle nut, then complete brake assembly from steering knuckle. Transfer assembly to clean bench with assembly resting on outer hub section. Remove damper spring and clips, then housing attaching bolts. Check to see that there are cast cut-outs in each housing (these cut-outs must be matched on reassembly). If no cut-outs, mark. Separate inner and outer housings by tapping lightly, at one of the attaching bolt hole flanges, with fibrenose hammer. Remove pressure plate assemblies ***(do not lose duster at bottom of each housing).*** Place brake pressure plate assembly on clean surface or cloth (to avoid contamination of lining segments).

Rear Disc Brake: Remove cotter pin, axle nut and washer. Install Wheel Puller C-844, remove brake housing, pressure plate and hub assembly. Remove axle shaft key, dampener spring and clips, then remove housing attaching bolts (Check to see that there are cast cut-outs in each housing. These cut-outs must be matched on reassembly. If no cut-outs, mark). Separate inner and outer housings by tapping lightly, at one of attaching bolt hole flanges, with fibrenose hammer. Remove outer brake housing pressure plate and hub assembly ***(do not lose duster at bottom of each housing).*** Place brake pressure plate assembly on clean surface or cloth (to avoid contamination of lining segments).

Inner & Outer Pressure Plates: Release automatic adjusters. (By inserting a thin shank screwdriver between release sleeve in automatic adjuster and adjuster guide, then twisting screwdriver, pressure plates will snap back into fully released position). Remove four pressure plate retaining springs ("V" slot cut into one side of a screwdriver will facilitate removal). Separate discs.

Automatic Adjuster: Push or pull rod out by hand (moves in one direction only). Slide sleeve out from between pressure plate lugs. ***CAUTION—Hold finger over each end of sleeve during removal so contents are not lost.***

INSPECTION & CLEANING: Proceed as follows:

Wheel Cylinders: Examine bores and pistons for score marks or pits. Replace if necessary. Replace piston cups with new ones. ***CAUTION—Only front wheel cylinder piston cups Part No. 77526 bearing letters "AA" or "DT" should be used. Do not use cups bearing letters "BQ".*** Reassemble wheel cylinders using new dust boots.

Automatic Self-Adjusters: ***NOTE—It is not necessary to remove adjusters unless new pressure plates to be installed.*** Inspect adjuster rods to determine if correct rods are present and for scoring or brinelling from adjuster balls.

Adjuster Rod Identification—Rod has radial groove machined at one end. Length of rod is 2.435-2.436".

Scoring & Brinelling Inspection—Insert small screwdriver between adjuster bushing and bracket to release adjuster balls. Move rod to one end. Wipe off pin surface and inspect. Move pin to opposite extreme to inspect other end. Pin should be free of scoring or brinelling. ***Do not lubricate automatic adjusters.***

Brake Housings: Inspect for cracks. If found, replace. Light radial marks on surface of housing may be polished out with fine emery cloth. Similarly with bluish heat spots. ***NOTE—Do not mate 40-fin housing with 60-fin housing on opposite side of car.***

Pressure Plate Expanding Balls: Should be clean and free of flat spots, rust or nicks. Dull coating on balls is not reason for rejection. This is protective coating and does not affect operation. Rusted balls may be cleaned by placing in cloth bag partially filled with sand and shaking vigorously.

Master Cylinder: Remove from car. Clean and inspect for pits and scores. Replace if found. Reassemble using new valve and cups. ***CAUTION—Assemble from push rod end to prevent damage to valve seal ring. Be sure valve seal ring in position before installing valve and spring. Note carefully that valve seal, Part No. 1318447 seats directly on the end plug and the valve, Part No. 1318446, is held against this seal by return spring.***

REASSEMBLY: ***NOTE—Inner and outer housings are balanced as an assembly and should be assembled accordingly. Do not install left pressure plates or wheel cylinders on right side or vice versa.***

Disc Brake: Release both automatic adjusters, install brake pressure plate assembly in outer housing half, place duster in "down" position at bottom of pressure plate. Install inner housing and line up aligning marks (cut-outs) in each housing, tighten 10 attaching bolts, install dampener spring and clips. Apply pressure on push rods of wheel cylinders to facilitate pressure plate installation. ***NOTE—It may be necessary to open bleeder screws to allow pistons to retract. Manufacturer recommends that bleeder screws be tightened with pistons retracted. This holds pistons in position desired until pressure plates installed.*** With pressure plates in down position and duster in position, proceed as follows:

Front Brake—Position housing pressure plate and hub assembly, then slip complete assembly over steering knuckle and wheel cylinders making sure plates are piloted properly over wheel cylinders to avoid damaging or dislocating boots Install outer bearing, spacer washer, nut, and adjust wheel bearings. Install cotter key, hub cap, and wheel assembly.

Rear Brake—Mount housing and pressure plate assembly to axle shaft making sure that plates are piloted properly over wheel cylinders to avoid damaging or dislocating boots. Position key-way, install key, washer and nut. Tighten axle shaft nut to 140 ft. lbs. minimum, then install cotter key, tire, and wheel assembly.

Inner and Outer Pressure Plates: With automatic adjuster properly installed on each of pressure plates, place the six steel pressure expanding balls (7/8" diameter) in the six ramps. Place outer plate in position on inner plate. Automatic adjuster rods must also be centered so that operating lugs on the matching plate will straddle rods. Install four pressure plate retaining springs.

Automatic Adjuster: Make dummy shaft out of round stock 1/4" in diameter and 3/4" long, chamfered on one end. Place adjuster sleeve (slotted end down) upright on finger and insert dummy shaft (chamfered end up) in sleeve. Position bushing over dummy shaft. Hold shaft and bushing in position with large end of common paper clip. Install 11 adjuster balls. Tap lightly to position balls, install adjuster washer, position adjuster spring in sleeve. Holding thumb over spring, carefully remove paper clip. Continue to hold pressure on spring-compress sufficiently to slide sleeve into position on bracket. NOTE—Sleeve is grooved and pressure plate stepped so that installation can only be made right way. Align sleeve assembly so that dummy shaft is in line with holes in pressure plate. Insert adjuster rod in pressure plate hole and force dummy shaft out. Center adjuster rod as nearly as possible. Install lubricating washer on adjuster rod at stepped end of adjuster bracket.

CHEVROLET-BENDIX HYDRAULIC

Chevrolet Pass. Cars, All Models (1954-60)
Chevrolet Corvair (1960)
Chevrolet Corvette (1954-60)
Chevrolet ½ Ton Trucks (1954-60)
Chevrolet Trucks, All Models (Exc. 1½ & 2-Ton Rear Brakes (1954-60) ©
© - For 1½ & 2-Ton Rear Brakes, see Chevrolet "Twinplex Brakes".

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 CHEVROLET BRAKE DESIGN CHANGE (Pass. Cars & ½ Ton Trucks):* Brake anchor adjustment has been eliminated. To compensate for this adjustment, brake shoes have been made .057-.087" smaller in diameter than drum. When a bench mounted shoe grinder is used, shoes should be ground to **undersizes** indicated above. When spindle mounted type shoe grinder is used, shoes should be ground to **actual drum diameter.**

►*PASS. CARS & HALF TON BRAKE SHOE GRINDING CAUTION:* If bench type grinder used, grind shoes to .057-.087" smaller diameter than drum size. If spindle type grinder used, grind shoe to drum diameter.

►*POWER BRAKE NOTE:* Bendix Power Unit optional on passenger cars. Hydrovac Power Unit optional on trucks. *See "Bendix Power Unit" or "Hydrovac Power Unit" under Power Brakes.*

►*BRAKE DRUM REPLACEMENT CAUTION:* Use suitable volatile non-toxic greaseless type solvent to clean oil from braking surface of drum before drum is installed.

►*METALLIC BRAKE LINING CAUTION:* This special purpose optional type lining may be used with the old standard drums provided surface of drum is smooth. Service adjustments are the same as for standard brakes except as noted in data below.

►*BRAKE SHOE ANCHOR PIN INSTALLATION CAUTION:* Tighten brake shoe anchor pins to torque indicated in table below.

Anchor Pin Tightening Torque

Model	Ft. Lbs.
Pass. Car (Exc. Corvair)	65
Corvair (Front)	60-85
Corvair (Rear)	100-126
Truck, 10 Series (Front & Rear)	100-125
Truck, 20, 30 Series (Front & Rear)	150-175
Truck, Others (Front)	150-175

►*METALLIC LINING SERVICE NOTES:* When servicing the special purpose optional type lining it is important that the items below are followed:

Pull Back Spring Installation - Heat resistant type springs used as follows; PINK pull back springs must be used with front primary shoes and both rear shoes. YELLOW pull back springs must be used with front secondary shoes. Use GREEN hold down springs on all eight shoes. Paint on the springs will become blistered and burnt in operation but does **not** indicate that springs have been excessively hot.

Hold Down Spring Cup Installation - Install large hold down spring cup against web and small cup at outer end of hold down spring.

Drum Replacement - Blue heat discoloration is normal and drum should not be replaced if surface of drum is smooth.

DESCRIPTION: Duo-Servo, single anchor, hydraulic type without eccentric adjustment.

ADJUSTMENT: Adjustments are made differently for wear (Minor Adjustment) and for new lining or shoe assemblies (Major Adjustment). Major adjustment should also be made whenever a minor adjustment is not satisfactory.

Brake Pedal Adjustment (1954): 7/16" (Cars), 13/16" (Trucks except Fwd. Control), 1" (Fwd. Control) between top of pedal arm and toe pan with brakes released and master cylinder pushrod against its stop. Adjust as follows:

Pass. Cars—Loosen check nut on eccentric pedal bolt, turn bolt, tighten check nut to 20-25 ft. lbs.

►*CAUTION:* If correct 7/16" clearance cannot be secured by turning eccentric bolt, adjust by installing shims under front or rear master cylinder bolts.

Trucks (Exc. Fwd. Control)—Loosen locknut at pushrod clevis, turn pushrod, tighten locknut against clevis. *NOTE*—Hold pushrod while tightening locknut.

Trucks (Fwd. Control)—Remove floor pan and cotter and clevis pins from upper end of brake pedal lever rod. Adjust for proper clearance, install upper end to brake pedal, inserting clevis and cotter pins, replace pan.

Brake Pedal Adjustment (1955-60): Before adjusting make sure pedal returns to fully released position freely, with no binding, and that pedal retracting spring has not lost its tension.

Passenger Cars - 1/16" (1955-56), 1/8-3/8" (1957-60) pedal movement before contact of pushrod and main cylinder piston. To adjust loosen check nut on clevis. Turn pushrod in proper direction to secure adjustment. Tighten check nut on clevis.

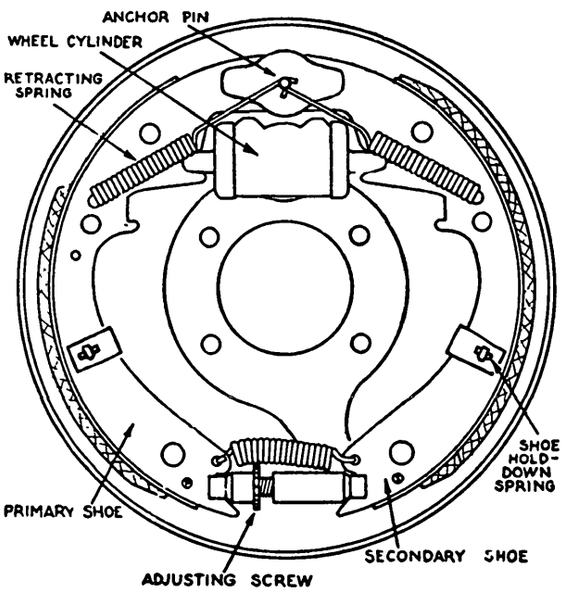
Trucks (Fwd. Contr. 1954-59) - ¾" clearance between top of pedal arm and toe board. To adjust, loosen check nut at rear of clevis on main cylinder pushrod. Turn main cylinder pushrod by knurled portion ahead of boot, in proper direction to secure desired clearance. Tighten check nut.

Trucks (Others 1954-59) - 1¾" (Low Cab Forward), 11/16" (Others except Fwd. Control), clearance between upper corner of lower pedal arm and seal around upper pedal arm in toe board. To adjust, remove cotter pin and loosen castle nut on adjusting bolt, then rotate adjusting bolt in required direction to obtain desired clearance, tighten adjusting bolt nut, recheck clearance, reinstall cotter pin in adjusting bolt nut.

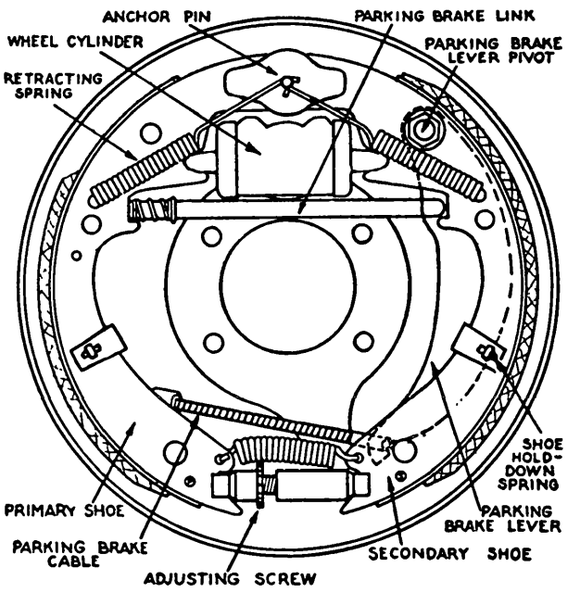
Trucks (1960) - **Rotate eccentric bolt or adjust pushrod so that pedal free travel measured at center of pedal pad is 1/8". *NOTE* - Stop light switch should be adjusted to make electrical contact at approximately 13/16" pedal travel.**

Minor Adjustment (For Wear): Jack all wheels clear of floor. On passenger cars, loosen check nut at brake cable equalizer to remove tension from brake cable. On trucks, disassemble clevis of parking brake pull rod. On all cars and trucks, remove adjusting hole covers from flange plates. Expand brake shoes by turning adjusting screw with Tool J-4707 until a light uniform drag is felt on brake drum (move outer end of tool toward center of wheel to expand shoes). On passenger cars and ½ Ton truck, turn adjusting screw in opposite direction 12 notches (supersedes previous specification of 7 notches), Corvair rear wheels 15 notches, to relieve brake drag. On all other Truck Models, back off

CONTINUED ON NEXT PAGE



FRONT BRAKE ASSY.



REAR BRAKE ASSY.

CHEVROLET-BENDIX HYDRAULIC

(C ntinu d)

adjusting screw just enough to eliminate drag (not to exceed 7 notches). Replace adjusting hole covers, then reconnect and adjust parking brake.

Major Adjustment (New or Relined Shoes) (1954-Early 1955 Pass. Cars; 1954-59 Trucks): Loosen anchor pin nut just enough so that pin can be rotated (*CAUTION*–if nut loosened too much, brake springs will tilt anchor pin). With tool J-4707, turn brake adjusting screw to expand brake shoes until a heavy drag is felt on the drum. Tap brake flange plate and turn eccentric pin in direction tending to reduce drag by allowing shoes to center in drum. If drag on drum is reduced, expand shoes by tightening adjusting screw several more notches and again turn eccentric anchor pin while tapping brake flange plate Repeat this operation until drag remains constant. Then tighten anchor pin nut to 60-85 ft lbs (Pass , ½ & ¾ Ton Front & Rear Brakes, 1 Ton Front Brakes), 125-150 ft lbs (1 Ton Rear Brakes, 1½ & 2 Ton Front Brakes). Back off adjusting screw just enough to eliminate drag but **not more than 7 notches.** If more than 7 notches required to eliminate drag, repeat adjustment procedure. Adjust parking brake (below). *NOTE*–If heavy intermittent drag noted, brake drums should be rebored and new linings installed

HAND (PARKING) BRAKE ADJUSTMENT: Passenger cars and ½ & ¾ Ton Trucks adjusted differently 1,1½,2 and some ¾ Ton Trucks have propeller shaft mounted parking brakes. *CAUTION - Service brakes must be properly adjusted before making parking brake adjustment*

1954 MODELS

Adjustment (Pass. Cars): Pull hand brake handle "on" 7 clicks of the pawls (*CAUTION*–this is not 7 notches). Loosen both check nuts at forward end of each wheel cable, tighten front nuts against clevis plates to tighten each cable until moderate drag secured at each rear wheel, tighten rear nuts securely to lock adjustment. Set hand brake handle 2 clicks from fully released position. No brake drag should be noticed.

Adjustment (½ Ton Truck): Set parking brake foot pedal in fully released position Adjust pedal pull rod clevis so that clearance between brake cross-shaft and frame crossmember at center is 1/8" Depress foot pedal 1½". Pull each wheel cable forward out of the conduit as far as possible, loosen locknut and adjust clevis on forward end of cable until hole in clevis lines up with hole in cross-shaft outer lever, connect cables Depress foot pedal until heavy drag noted, check both wheels for equal drag readjust wheel cable clevis as necessary Release foot pedal, check clearance between release rod handle and rod support bracket This clearance should be ½", correct by adjusting handle

Adjustment (¾ & 1 T n Truck): With parking brake pedal pedal in fully released position, adjust brake pedal pull rod clevis for correct position of cross-shaft outer levers Center of hole in end of lever should be to rear of center-line of cross-shaft the following distance on each model: 29/32" (¾ Ton exc Fwd Control), ¾" (¾ Ton Fwd. Control), 11/32" (1 Ton exc. Fwd. Control), 19/32" (1 Ton Fwd Control) Then adjust wheel cables in same manner as on Half-Ton (above).

Adjustment (1½ & 2 Ton Truck): Parking brake is independent type on propeller shaft at rear of transmission *See "Chevrolet Twinplex" Brakes*

1955-59 MODELS

Adjustment (Pass. Cars & Corvette): Jack up both rear wheels Check clearance between idler lever and mounting bracket at equalizer (approximavely ¼") To correct, disconnect equalizer, tighten check nuts on forward cable. On Pass Cars, remove floor cover and push in parking brake pedal to 6½" from toe pan On Corvette, pull hand brake out 7 "clicks" (not same as notches) Loosen forward check nuts on equalizer and tighten rear one until there is a slight drag on both rear wheels when rotating drums Tighten check nuts securely Set parking lever back to 2 clicks from full release position, no brake shoe drag should be felt

Adjustment (½ & ¾ Ton Trucks using cable connected to rear wheel service brakes) Jack up both rear wheels. If clevis of parking brake disassembled, place parking brake lever in fully released position, then install clevis to brake pull rod to obtain a dimension of 1 7/16' from end of pull rod to centerline of clevis. With parking brake lever in fully released position and pull back spring in place, adjust parking brake cable at idler lever to obtain a clearance of ¼' between idler lever and rear end of slot in guide. Pull hand brake lever back four notches from fully released position. Pull cables out of conduits by hand as far as possible and assemble cables into idler lever links Tighten nuts and locknuts. Pull back hand lever until heavy drag is felt at one wheel. Check other wheel for drag, and if any difference is noted, loosen tight wheel until equal drag is obtained With hand lever pulled out nine notches both rear wheels should be locked so that they cannot be turned by hand. *NOTE*–If more than nine notches are required to lock brakes, check service brake adjustment

1960 MODELS

Adjustment (Chevrolet Pass. Cars): *NOTE - A spring loaded pedal return and a ratcheting mechanism to permit a second stroke of pedal, if necessary, is used. Parking brake application is assured even if rear service brakes are out of adjustment. Pedal returns to normal position after each stroke and will not indicate brake application. When parking brake is applied, the release handle will "pop out" about 2", indicating that brakes are applied. If more than two strokes are required to set brakes, check both service and parking brake adjustment.* Raise rear wheels and adjust front cable by means of the cinch bolts at front of idler lever extension so that forward edge of idler lever is approximately ½" behind rear edge of frame bracket. *NOTE - Pull r arward on idl r l v r wh n making this adjustment to assur that all slack is r moved from front cabl .* Press parking brake pedal until release lever just reaches limit of its travel (approximately 3 clicks). Adjust equalizer bolt nuts until moderate shoe drag is felt at rear wheels, then release brake and check that brakes are not dragging. Parking brake should be as tight as possible without having any significant drag upon release.

Adjustment (Corvair): Raise rear of car and pull parking brake lever up 3 notches from fully released position Loosen forward check nut on equalizer and tighten the rear one until a heavy drag is felt at rear wheels. Tighten check nuts securely. Fully release parking brake and rotate rear wheels, no drag should be felt

Adjustment (Corvette): Pull hand brake out 7 clicks of pawl (not notches). Looseh check nuts on cable ends, then turn forward check nuts against clevis plates until a moderate drag is felt when rotating brake drums. Tighten check nuts and set parking brake lever to 2 notches from full released position. No drag should be felt.

Adjustment (Trucks Without Pr p ll r Shaft Parking Brake): With service brakes properly adjusted, raise rear wheels and apply parking brake lever 4 notches from a fully released position. Loosen jam nut on threaded rod at end of forward cable. *NOTE - If threaded rod length is insuffici nt to obtain adjustm nt, move primary lever to n xt supplem ntal adjusting hole toward rear of truck.* Tighten rear nut on threaded rod until a light drag is felt at rear wheels, then tighten jam nut and lower truck to floor. Test parking brake.

1954-60 MODELS

Adjustment (¾ & 1 Ton Trucks using pr p ller shaft mounted parking brakes): Adjust clevis on brake pull rod so distance from end of rod to center line of clevis pin hole is 1 7/16" Place the hand brake lever in fully released notch of ratchet sector Loosen locknut on brake pull rod Remove cotter pin from clevis pin holding brake rod to brake cam (leave loose) Set brake cam rest flat on upper brake band bracket Back off adjusting nuts (at lower end of spring) and adjusting nut at top of adjusting bolt (bolt joins lower part of band to bracket) (*CAUTION* - Do not remove nuts, loosen only) Remove lock wire from anchor screw. Adjust anchor screw until there is 010- 015" clearance between lining and drum at anchor screw Tighten adjusting bolt (bolt without spring) until there is .020" clearance between drum and lower end of brake band Tighten locknut Tighten adjusting nut at lower end of spring until there is 020" clearance between drum and upper end of brake band Tighten locknut Adjust brake pull rod so clevis pin can be installed while brake cam rests flat on upper brake band bracket Install cotter pin in clevis pin of brake pull rod and tighten locknut on brake pull rod Install lock wire on anchor screw Recheck all points of facing for correct clearances

Adjustment (1½ & 2 Ton Trucks): Use independent type *See "Chevrolet Twinplex" for data.*

BLEEDING BRAKE SYSTEM: *S "Hydraulic Brak S rvicing" for compl t data.*

TROUBLE SHOOTING: *S "Hydraulic Brak Troubl Sho ting" for c mpl t data.*

Form 49 A

CHEVROLET TRUCK TWINPLEX

Ch vrol t Trucks, 1½ & 2 T n R ar Brak s (1954-60)

►*BRAKE BOOSTER NOTE:* Hydrovac Power Unit is Standard or Optional on all models.

DESCRIPTION: Two cylinder, four anchor type (each shoe anchored at each end and linked to wheel cylinder at each end). Brakes are radially self-centering.

ADJUSTMENT: Each shoe has one adjustment (adjusting screw at adjustable anchor end). Adjustment is same for both wear and for new or relined shoe clearance.

Brake P dal Adjustm nt: *See "Chevrolet-Bendix Hydraulic" for data.*

Brak Sho Adjustm nt: Jack up both rear wheels, remove adjusting hole covers from backing plates (two holes at each wheel—one for each shoe). Use tool J-4707 or screwdriver inserted through rear (lower shoe) adjusting hole and turn adjusting screw up (move outer end of tool toward center of wheel) until light brake drag is felt on wheel, then back off adjusting screw 3 notches for correct running clearance. Adjust upper shoe similarly by inserting tool through front adjusting hole.

Parking (Hand Brak) Adjustment: Parking brake is independent type mounted on propeller shaft at rear of transmission.

1½ & 2 T n—Fully release brake lever. Loosen locknut on outer shoe adjusting screw then tighten to secure a clearance of .010" to .015" measured at point directly above screw. Tighten locknut. Loosen locknut on link between hand brake lever and shoe actuating lever. Tighten adjusting nut on link to secure a clearance of .010" to .015" between inner shoe and drum. Tighten locknut.

BLEEDING BRAKE SYSTEM: Pressure or manual methods can be used.

Pr ssur Bl ding: 1) Back off adjusting screw all the way on upper shoes of both rear wheels. Fill master cylinder reservoir to top of filler plug opening. Connect pressure bleeder to master cylinder and open valve in bleeder tank line. (*NOTE*—Bleeder tank should be charged with 25-35 lbs. air pressure and kept at approximately this pressure during bleeding operation. End of bleeder tube must be in a bleeder jar or bottle and covered with fluid while performing all bleeding operations).

2) Connect bleeder tube to bleeder valves in following sequence, open bleeder valve and bleed until all air bubbles disappear, then close bleeder valve. Sequence as follows:

a) Hydrovac slave cylinder (No. 2 bleeder valve on end cap). *NOTE*—Will take approximately ½ pt. of fluid.
b) Hydrovac valve (No. 1 bleeder valve on top of control valve).
c) Front, rear wheel cylinder on left side.
d) Front, rear wheel cylinder on right side.
) Left front wheel cylinder (one only).
f) Right front wheel cylinder (one only).

3) Adjust upper shoe on each rear wheel with pressure tank still connected. Push down hard on brake pedal several times to centralize shoes. Disconnect pressure tank and readjust all brake shoes..

4) Apply approximately 75 lbs. pressure on brake pedal and check pedal clearance from toe board to forward edge of pedal pad. Clearance should be a minimum of 5" with floor mat removed. If reserve less than 5", rebleed Hydrovac and rear brakes in sequence outlined above.

Manual Bleeding: 1) Install adapter and automatic filler J-713. Connect bleeder tube to Hydrovac bleeder valve No. 2 (on end cap). Place end of tube in container having sufficient fluid to cover end of tube.

2) Open bleeder valve approximately ¾ of a turn, depress brake pedal a full stroke and allow it to return slowly, making sure end of tube is under surface of liquid in container. Continue operating pedal, refilling jar at master cylinder when necessary, until liquid emerging from bleeder tube is air bubble free. Close bleeder valve. Proceed to bleed system as outlined in steps **2) b)** through **f), 3) and 4)** under "Pressure Bleeding" above, using automatic filler in place of pressure tank.

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" for complete data.*

BRAKE SHOE REPLACEMENT: Brake linings are riveted type and can be installed in the field after shoes have been removed.

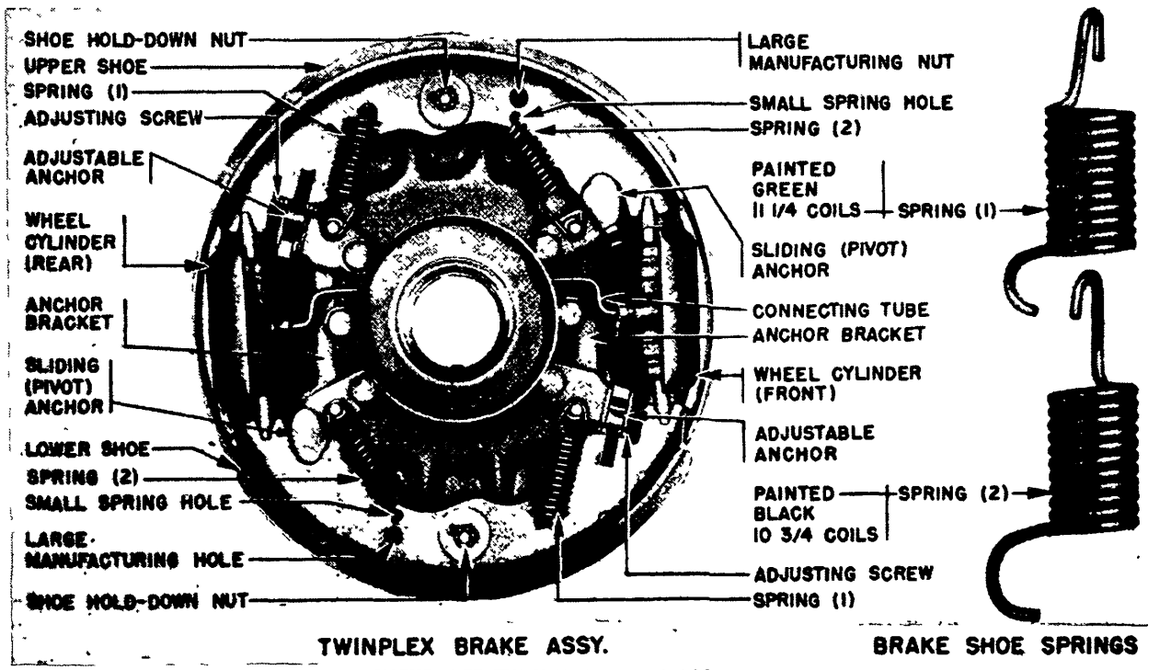
Removal: Support rear end of truck on stands, remove rear wheels, back off adjusting screw for each shoe (two per wheel), remove brake drums by taking out 3 retaining screws on face of drum. Disconnect and remove all shoe pull back springs, remove hold-down nut on washer on web of each shoe. Disengage shoes from cylinder links, lift shoes out.

►*CAUTION: Stops on backing plate will prevent wh el cylinder pistons from coming out but brake pedal must not be depressed when drums are off.*

Installation: Lubricate shoe primary (sliding pivot) anchors and all shoe bearing surfaces on brake flange plate with light film of Lubriplate or Brake Lube. Install shoes, engaging ends of shoes with anchors and slotted ends of wheel cylinder links, and making certain that hold-down bolt enters hole in shoe web. Lubricate hold-down bolts and washers lightly with Lubriplate or Brake Lube, install washer and nut on each hold-down bolt and tighten nuts loosely. Install shoe pull back springs (*CAUTION*—see illustration and Note below for correct spring installation). Tighten each hold-down bolt nut until clearance between edge of shoe and contact face on flange plate is .010" (measure with feeler gauge). Install drums and adjust brakes.

►*BRAKE SHOE PULL BACK SPRING NOTE:* Different spring used at each end of shoes. Install springs thus: **Spring at Primary (Sliding Pivot) Anchor End of Sho** — 10¾ coil, 90 lb. type, painted BLACK for identification, with LARGE hook at shoe end of spring. Install spring with this large hook engaging small hole in shoe web.

CONTINUED ON NEXT PAGE



TWINPLEX BRAKE ASSY. BRAKE SHOE SPRINGS

CHEVR LET TWINPLEX BRAKE ASSY.

Form 49 B

CHEVROLET TWINPLEX (C nt.)

►*CAUTION: This spring must not be engaged in larger manufacturing hole in web adjacent to spring hole.* **Spring at Secondary (Adjustable) Anchor End of Shoe**—11¼ coil, 70 lb. type, painted GREEN for identification, with SMALL hook at shoe end of spring. Install this spring with this smaller hook engaging the large hole in the shoe web adjacent to the shoe adjusting wheel.

►*CAUTION: Interchanging springs or incorrect installation will result in uneven brake shoe wear and unsatisfactory brake operation.*

OVERHAUL: Brak Drums—Rebore brake drums if more than .010" out-of-round. Manufacturer recommends reboring to .060" oversize and use of .030" oversize lining (max. available oversize). Drum runout must not exceed .005".

Master Cylinder: *See "Hydraulic Brake Servicing".*

Wheel Cylinders: To remove wheel cylinders, first remove brake shoes, then take out capscrews holding wheel cylinder on backing plate and remove **both cylinders and connecting line as a unit.**

Disassembly—Disconnect line linking the two cylinders, remove rubber boots and shoe connecting links, withdraw pistons and rubber cups and springs from cylinder. *CAUTION—Do not remove rubber cups (piston rings) from grooves in pistons unless the cups be ing replaced.*

Inspection & Repair—Inspect cylinders for scores, scratches, and corrosion. Light scratches or lightly corroded areas may be cleaned up with crocus cloth, replace cylinder if these cannot be polished out. *(CAUTION*—Honing cylinders not recommended). Replace piston cups and cylinder boots if swollen or damaged. Piston clearance in cylinder .002-.004".

Reassembly—Dip all parts in brake fluid. Install piston and cup assemblies with cupped side toward spring or inward. *(CAUTION*—use care not to damage edges of cups). If new cups being installed, use tool J-4705 and install cups with open end toward flat end of piston.

FORD TRUCK BENDIX UNI-SERVO

Ford Trucks - F-250; F, P-350; B, C, F, P-500; B, C, F-600 (1954-57). Front Wheels Only.
Ford Trucks - F-250; F, P-350; P-400; B, C, F, P-500; C-550; B, C, F-600 (1958-60). Front Wheels Only.

►*REAR BRAKE CAUTION: Different type brakes used on rear wheels as follows:*

F-2, 3; F-250; F, P-350—Ford-Bendix Hydraulic, Duo-Servo type. *See "Ford, Lincoln, Mercury Bendix".*

B, C, F, P-500; C-550; B, C, F-600 - Ford "Self-Centering" type. *See "Ford Truck Self-Centering".*

►*POWER BRAKE NOTE: "Hydrovac" or "Midland Hi-Power" Standard or Optional on these trucks. See "Hydrovac" or "Midland Hi-Power" under Power Brakes.*

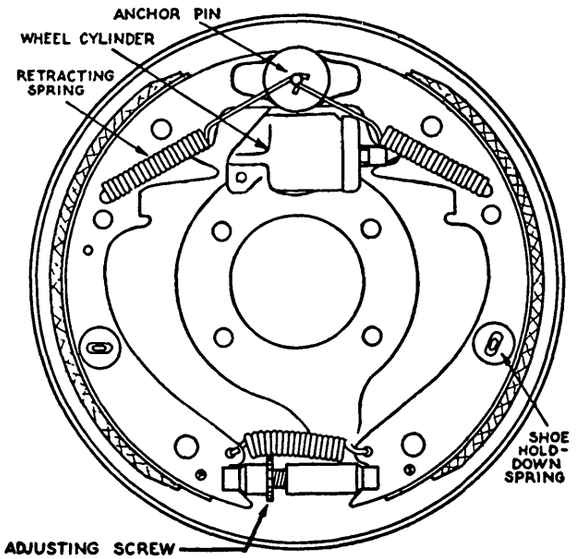
►*1955 MASTER CYLINDER PUSHROD INSTALLATION CAUTION:* On F-100 Trucks master cylinder pushrod and clevis pin are installed in upper hole in brake pedal; on F-250, F-350 and F, B-500 pushrod and clevis pin are installed in upper hole with conventional brakes, and in lower hole with booster brakes; on B, C, F-600 pin and pushrod are installed in lower hole of brake pedal for both conventional and booster brakes.

DESCRIPTION: Bendix "Uni-Servo" single anchor, hydraulic type with single-acting wheel cylinder mounted on the backing plate and actuating the primary shoe through a strut (no direct connection to secondary shoe). Brake shoes are conventional Bendix type (joined by adjusting screw at lower end, single anchor between shoes at upper end with retracting springs hooked to each shoe and anchor pin). Wheel cylinder has single piston and cup with a return spring seated in the end of the cylinder.

ADJUSTMENTS: Make adjustments with brake drums at normal temperature and with wheels either jacked up or contacting road (if wheels on road so they cannot be checked for drag, make this check by striking drum with a hammer—sound will be deadened if shoes contacting drum).

Minor Adjustment: Remove adjustment hole cover from brake carrier plate. Rotate adjusting screw, with a suitable tool, until shoe begins to drag, then back off shoe 10-12 notches until drum can be turned without drag.

Major Adjustment: Rotate drum until feeler slot is at lower end of Secondary (rear) shoe, then insert a .010" thick feeler gauge between brake shoe and drum. Rotate drum and feeler gauge up along secondary shoe until feeler is wedged between secondary shoe and drum. Turn adjusting screw (star wheel) to expand shoes until a heavy drag is felt against drum, then back off adjusting screw just enough to give clearance of .010" between shoe and drum at a point 1½" from each end of secondary shoe. *NOTE - This clearance will give operating clearance for both primary and secondary shoes* When this clearance cannot be obtained, anchor pin must be adjusted.



UNI-SERVO BRAKE ASSY.

Anchor Pin Adjustment - Loosen anchor pin nut just enough so anchor pin can be moved up or down (by tapping with soft hammer) centering shoes in drum and providing the 010" operating clearance at above positions Tighten anchor pin nut to 80-100 ft. lbs. Check other brake assembly.

Brake Pedal Adjustment: Brake pedal free travel should not be less than 3/16" nor more than 3/8" before push-rod touches master cylinder piston. Adjustable at master cylinder pushrod.

Parking Brake Adjustment: Set lever to first notch. Observe position of cam to make sure flat portion is resting on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, then adjust clevis rod to allow flat portion of cam to rest on brake band bracket. Install clevis pin and cotter pin. Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise until clearance of .010" is established between brake lining and brake drum at anchor bracket. Loosen locknut on adjusting screw for lower half of brake band, adjust screw to establish .010" between brake lining and drum at lower half of brake band. Tighten locknut. Turn upper band adjusting nut until .010" clearance established between upper half of band and drum. Be sure to install lock wire in anchor adjusting screw.

BLEEDING BRAKE SYSTEM: *See "Hydraulic Brake Servicing".*

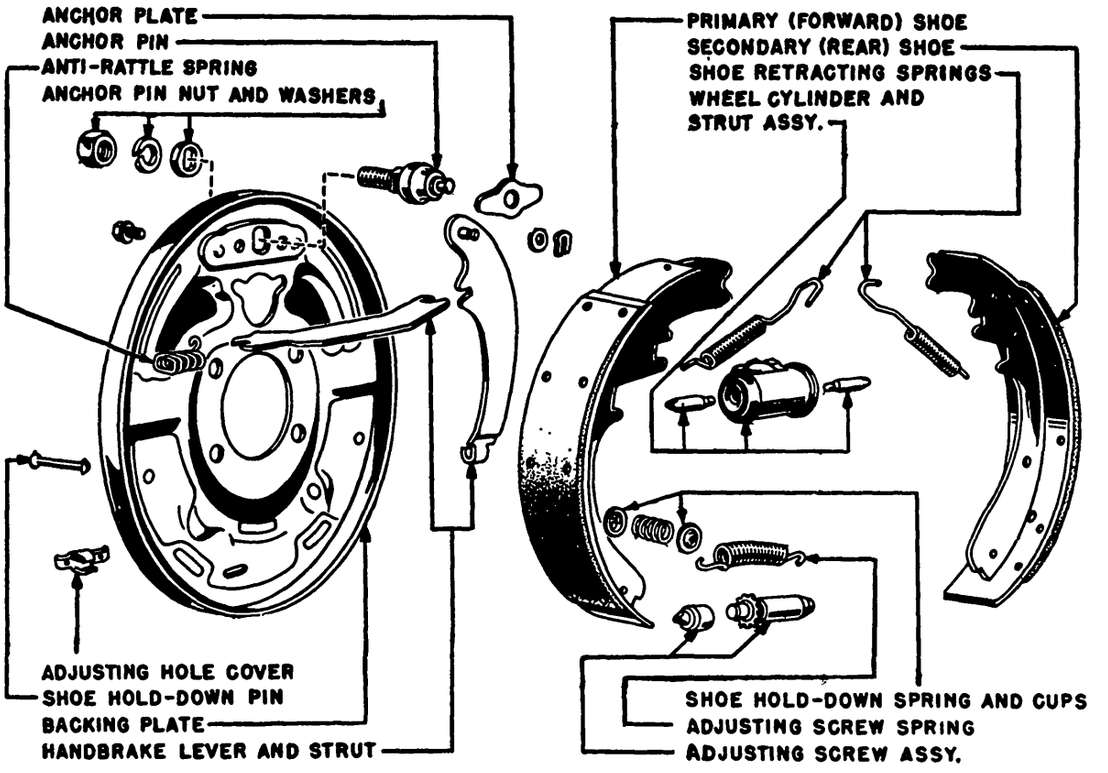
BRAKE SHOE & DRUM REPLACEMENT: *See "Ford, Lincoln, Mercury Bendix".*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting".*

OVERHAUL: Master Cylinder & Wheel Cylinders—*See "Hydraulic Brake Servicing".*

C met (1960)
C ntinental (1956-58)
Falc n (1960)
F rd Pass. Cars (1954-60)
F rd F-1, 100 Truck (1954-60)
Ford F-250, F,P-350 Trucks (1954-60) Rear Wheels
F rd P-400, All 500 & 600 Series (1957) Rear Wheels
Ford P-400 (1958-60) · R ar Wheels
Linc ln, All M dels (1954-58)
Mercury, All Models (1954-Early 1957)
Mercury, With 312" Eng. (1958)
Thund rbird (1955-60)

FORD MOTOR CO. BENDIX HYDRAULIC



FORD-BENDIX REAR BRAKE ASSEMBLY (WITH ADJUSTABLE ANCHOR PIN)

►CHANGES, CAUTIONS, CORRECTIONS

►*FORD TRUCK FRONT BRAKE CAUTION:* Ford-Bendix "Uni-Servo" used on front wheels of above listed trucks except F-1, 100.

►*1954 DESIGN & ADJUSTMENT CHANGE:* Front brakes of all 1954 Passenger cars have eccentric adjustment. Position of front brake assembly has been rotated to give access to anchor pin. A secondary shoe adjusting spring holds secondary shoe in released position. An eccentric, located behind secondary shoe, provides the stop. See Major & Minor Adjustments (With Eccentric) for adjustment procedures. Rear wheel brakes remain the same as previous models (without eccentric adjustment).

►*1955 FORD TRUCK MASTER CYLINDER PUSHROD INSTALLATION CAUTION:* On F-100 Trucks master cylinder pushrod and clevis pin are installed in upper hole in brake pedal for both conventional and booster type brakes; on others, master cylinder pushrod and clevis pin are installed in upper hole in brake pedal for trucks with conventional brakes and in lower hole for trucks with booster brakes.

►*1955 FORD PASS. CAR BRAKE LINING PRODUCTION CHANGE:* Effective approximately August 1, 1955, under-ground brake lining became effective in production. Adjustment procedures for both underground and uniform-ground linings are the same.

►*1954 FORD P-350 TRUCK HAND BRAKE CABLE INTERFERENCE CORRECTION:* To prevent interference between hand brake cable and clutch pedal, attach one clip, Part No. 91A-2279, to upper bolt in seam of left front wheel splash shield, and another clip, Part No. 352605-S8, to boss at top left rear corner of cylinder block. Cable should pass from hand brake lever to 91A-2279 clip, then up to 352605-S8 clip on engine. Be sure cable is positioned between steering column and sheet metal.

►*BRAKE SHOE RETRACTING SPRING PRODUCTION CHANGE & REPLACEMENT CAUTION (Pass. Cars):* Effective production Aug. 24, 1955 a new oil tempered brake retracting spring, Part No. B5A-2035-A, has been used to improve brake life and performance, and should be installed on units produced prior to above date. When installing spring, avoid bending end hooks or stretching beyond attaching point.

►*1955 FORD PASS. CAR PRIMARY BRAKE LINING & SHOE PRODUCTION CHANGE:* A new primary brake lining and modified brake shoe has been released for front and rear wheels. New lining is shorter in length, and is intended to reduce "pulling or diving" on brake application. **New linings may be installed on earlier type shoes,** and earlier type linings may be used on the new type shoes. In either case, two new holes must be drilled in the shoes using the holes in the lining as a template. *NOTE*—Shortened end of primary linings must be located at anchor (upper) end of shoe. When installing new linings on earlier type shoes, two holes must be drilled at anchor end. When relining brakes, make sure new type (shorter) and old type linings are not mixed.

Car Model	Lining Kits Front Wheel Kit	Rear Wheel Kit
Car	B5A-2007-G	B5A-2007-H
Car (Hvy. Duty)	B5A-2007-L	B5A-2007-M
Sta. Wgn., Sed. Del.	B5A-2007-J	B5A-2007-K
Thunderbird	B5S-2007-B①	

①—Lining kit for both front and rear wheels.

►*1955 FORD PASSENGER CAR ADJUSTMENT CHANGE:* Eccentric is located on primary shoe. Initial adjustments made on primary instead of secondary shoe. Adjusting spring is no longer used.

►*1955 FORD PASS. CAR BRAKE LINE INTERFERENCE WITH OIL FILTER CORRECTION:* Clip, Part No. B4A-2244-A, and attaching screw, Part No. 39883-S7, now available to secure brake line to rear side of No. 2 crossmember. On vehicles not equipped with additional clip (now used in production), and on which interference is encountered, proceed with installation of additional clip as follows Locate and mark spot on No. 2 crossmember 4½" to left, and 4 15/16" up from center of existing clip at left hand rear side of crossmember. Drill 9/32" hole at this spot. Position brake line on crossmember, and secure line with clip and screw. *NOTE*—Brake line will move far enough to permit installation without bending or crimping line.

►*1955 LINCOLN & MERCURY FRONT BRAKE PRODUCTION CHANGE:* Front brake eccentric adjuster has been eliminated on later cars and no eccentric adjustment is required. See Adjustments below

►*1955 LINCOLN & MERCURY BRAKE ADJUSTMENT CHANGE:* Adjustment procedures are affected in that eccentric cam is now spring loaded, which eliminates need for lockout to retain it in position. See Adjustments below and also Production Change above.

►*1956 LINCOLN & CONTINENTAL BRAKE SQUEAL CORRECTION:* An anti-squeal spring, Part No. 51A-1140, is available for installation on outside of brake drum. Spring should be installed on a clean drum only.

►*BINDING BRAKE PEDAL CORRECTION:* Brake pedal spacer, Part No. LD-22483-A, is manufactured with large chamfers on the ends. If brake pedal shaft nut is over-tightened, ends of spacer tend to score side walls

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FORD MOTOR CO.
BENDIX (C n't.)

of the support, reducing side wall spacing and causing interference with brake pedal hub. Paint in this area can also be a contributing factor to interference. Replace worn or damaged parts. Reduce length of hub to provide fit but do not remove more than .020" or a rattle may develop.

►*1954-56 MERCURY BRAKE SHOE RETRACTING SPRING PRODUCTION CHANGE:* New oil-tempered spring (painted brown) Part No. B5A-2035-A released to improve spring action.

►*1955 FORD & THUNDERBIRD BRAKE LINING CHANGE & REPLACEMENT CAUTION:* Later cars have "shorter" Primary Shoe Brake Lining and modified brake shoes to reduce any tendency toward pulling or diving when brakes applied. This new primary lining should be installed only as sets and must not be mixed with previous longer lining. If new lining installed on old shoes, shorter end of lining must be toward anchor end of shoe and it will be necessary to drill two additional holes for rivets at anchor end of lining (use new lining as template in drilling holes). *NOTE* - Previous type lining can also be used on new shoes but also requires drilling of two holes. *Install first type (longer) or later type (shorter) Primary Linings only in sets and DO NOT mix linings.*

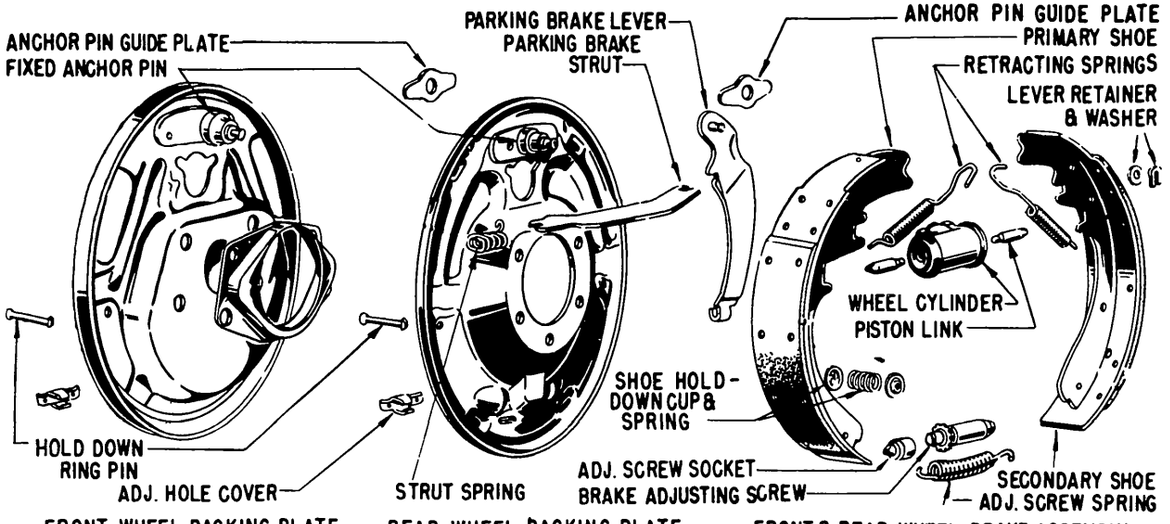
►*1957 FORD ANCHOR PIN BOLT TORQUE:* Torque specifications for front brake anchor pin attaching bolt is 80-100 ft. lbs. When checking sources of trouble for a brake pulling condition, it is recommended that anchor pin bolt be backed off and retightened to 80-100 ft. lbs.

►*1957 MERCURY BRAKE HOSE RUBBING CORRECTION (EARLY CARS):* Rear brake hose may rub on left rear shock absorber. To correct, install new rear axle brake tube fitting Part No. MG-2074-B. *NOTE - Station wagons use Part No. MG-2074-A only.* If old fitting used, twist hose by removing from brake tube and twisting counterclockwise 1 hex flat.

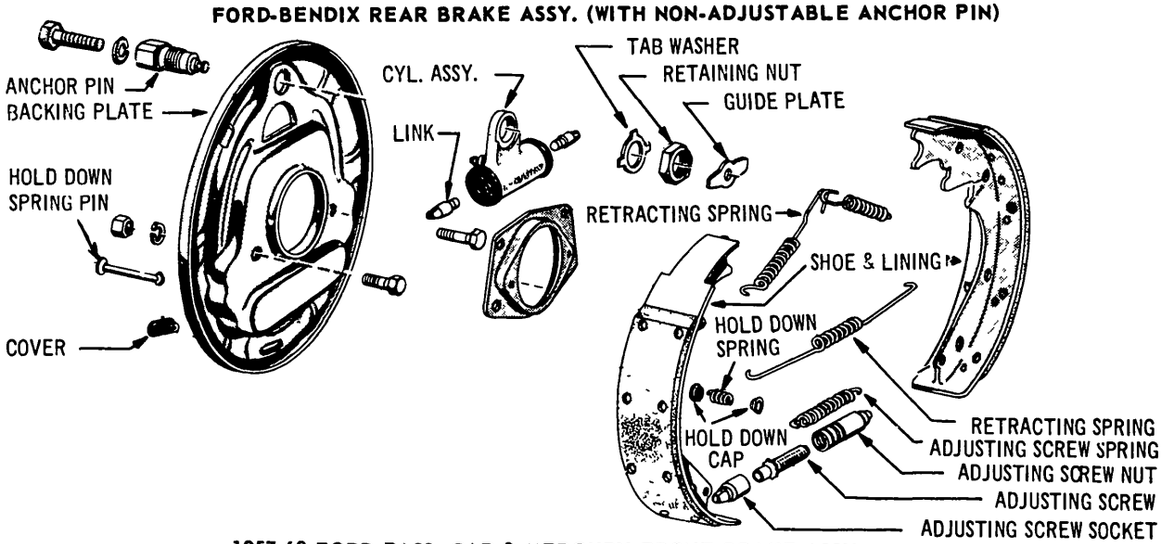
►*1957 MERCURY REAR BRAKE HOSE TENSION CORRECTION (EARLY CARS):* Rear brake hose on some early cars may be under tension. Correct by bending frame bracket tab approximately ¼" to rear *(CAUTION - Do not damage connection between hose and brake tube),* or install ¾" longer hose, Part No. ED-MA-2078-A.

►*1957 MERCURY SPONGY PARKING BRAKE CABLE CORRECTION (EARLY CARS):* If cable has spongy feel, install dash panel retaining clip, Part No. 361767-S8-UP. Drill 13/64" hole in upper portion of "Y" dash panel reinforcement. Install clip with ¼" x 20 self-tapping screw no longer than ½". *CAUTION* - Cable must be free of binding and kinking and not interfere with speedometer cable.

►*1957 MERCURY PARKING BRAKE SPECIFICATION CHANGE:* Two equalizer lever retracting springs installed on later cars to assure positive release of parking brake. When releasing difficulties occur install the second spring, Part No. MG-22794-A. *NOTE - It is important that brake for installing a second retracting spring, the parking brake mechanism be checked and any binding condition and/or improper adjustments be corrected.*



FORD-BENDIX REAR BRAKE ASSY. (WITH NON-ADJUSTABLE ANCHOR PIN)



1957-60 FORD PASS. CAR & MERCURY FRONT BRAKE ASSY.

►*1958 FORD PASS. CAR BRAKE LINE INTERFERENCE WITH FUEL LINE CORRECTION:* On cars except Station Wagons and Retractable Hardtops, brake line may interfere with fuel tank line during rear axle jounce. To correct, position brake line flush against rear axle and make sure there is ½" minimum clearance between fuel line and floor pan.

►*1958 LINCOLN PARKING BRAKE PEDAL NO RETURN CORRECTION:* May be caused by insufficient tension of retracting spring at equalizer. Tension should be 18 lbs. Reform hooks on spring ends to correct.

►*1960 FORD PASS. CAR & THUNDERBIRD LEFT REAR WHEEL ADJUSTING SLOT NOTE:* This slot will be located rearward of vertical centerline (instead of forward of centerline) which changes position of adjusting screw and also reverses the brake adjusting screw rotation (left rear wheel only).

►*1960 COMET REAR WHEEL BRAKE CYLINDER CRACKING NOTE:* Over tightening rear wheel brake tube nut to rear wheel cylinder may result in damage to tube seat surface and possible cracking of the boss in rear wheel cylinder. It is recommended that a "crowfoot" adaptor be used with a torque wrench to tighten tube nut. With the adaptor, tighten nut to 10-11½ ft. lbs.

CONTINUED ON NEXT PAGE

FORD MOTOR CO.
BENDIX (C nt.)

DESCRIPTION

DESCRIPTION: Duo-Servo, single anchor, hydraulic type. *NOTE* - Eccentric used on front wheels of all 1954 Models, 1955 Pass. Car Models and Early 1955 Lincoln and Mercury Models. All 1956 and later Models (Exc. Ford Trucks and Thunderbird), do not use eccentric and the anchor pins are fixed so no major adjustment is required. On Ford (1957-60 Exc. 1957 Thunderbird), Mercury (1957-58), the front wheel anchor pin is mounted on wheel spindle through wheel cylinder and backing plate.

Parking Brak P dal (1958 Lincoln, 1957-58 Mercury) - Toe-set parking brake pedal used instead of T-handle. Located to left of regular foot brake pedal. Set by pushing forward on pedal. On Mercury, release by pushing bar on left end of instrument panel (Auto. Trans. - mounted on selector keyboard).

ADJUSTMENTS

ADJUSTMENTS: Before making any adjustments, jack up all four wheels, check brake pedal clearance (see below), fully release hand brake lever and make certain that all wheels turn freely (Parking brake cables should be disconnected when vehicle is raised on frame hoist). Anchor pin bolt should be tightened to 80-100 ft. lbs. Drums should be at normal room temperature.

BRAKE PEDAL ADJUSTMENT

Brake Pedal Adjustm nt: Adjust as follows:

Comet, Falc n, Ford Pass. Cars (Exc. 1960), Lincoln Thunderbird - 5/16-7/16"; Mercury 1/4-7/16"; Ford Trucks 3/16-3/8" pedal freeplay. *NOTE - 1960 Ford Pass. Cars have non-adjustable pushrod.*

Ford Trucks (1954-56) - Loosen locknut on master cylinder pushrod, remove clevis pin on brake pedal, turn pushrod in or out as necessary, tighten locknut.

Ford Trucks (1957-60) & All Other Models - Loosen master cylinder pushrod to brake pedal eccentric bolt locknut and rotate bolt until free play is within specications.

MINOR ADJUSTMENT

Min r Adjustment (1954-55): Lincoln & Mercury - Use feeler gauge to set shoe clearance to .010". See *Major adjustment for data.*

Minor Adjustment (1954-55 Ford Pass. Car Front Wheels): Check anchor pin with 16" wrench (if loose, Major Adjustment is necessary). Expand brake shoes by turning adjusting screw (star wheel) toward center of brake until it is just possible to rotate drum. Back off adjusting screw 10 to 14 notches. While slowly rotating drum, turn eccentric cam in direction of forward rotation until slight drag is felt, then back off eccentric cam to have a freely rotating drum. *NOTE*—Tap backing plate with hammer when backing off eccentric cam to center shoes. If drum does not rotate freely after backing off adjusting screw and carefully setting eccentric cam, a Major Adjustment is required.

Minor Adjustment (1954-55 Ford Pass. Rear Wheels): Disconnect parking brake cable at equalizer clevis pin. Turn adjusting screw (toward axle) until wheel can just be turned by hand. Back off adjusting screw 10 to 14 notches (away from axle). Wheel should rotate freely. If drag felt, Major Adjustment is required. Connect parking brake cable and adjust. Apply brakes and measure distance from pedal pad to floor board. If distance less than ½ of total travel, Major Adjustment is required. *NOTE*—If car has booster brakes, check must be made with engine running.

Minor Adjustment (Lincoln & Mercury Front Wheels): Two adjustments required as follows:

Eccentric Cam Adjustment—Raise car and remove front wheels. Insert .010" feeler gauge through drum slot and check clearance at lower end of secondary shoe. Feeler gauge should be just snug. To adjust clearance, rotate cam adjusting stud in direction of forward wheel rotation to decrease clearance. To increase clearance, rotate cam in opposite direction. Check clearance at upper end of secondary shoe (.010"). The clearance at both ends should be same within .003". Where variation is greater, make Major Adjustment.

Adjusting Screw Adjustment—Remove adjusting hole cover and insert .010" feeler between lining and drum near lower end of primary shoe. Hold primary shoe snug against feeler. To decrease secondary shoe clearance, rotate adjusting screw from top to bottom, and to increase secondary shoe clearance rotate adjusting screw from bottom to top. Then recheck clearance at both ends of primary and secondary shoes. Check that all brake drums are free of lining drag.

Minor Adjustment (1956-60 Exc. Thunderbird; 1957-58 Mercury; 1958 Lincoln): Remove adjusting hole cover and rotate adjusting screw until shoe begins to drag (Ford Pass. Cars & Trucks), or tight against drum (Lincoln & Mercury). Then back off adjusting screw 10-12 notches (Ford Pass. Cars & Trucks), 12-14 clicks (Lincoln & Mercury) until no drag is felt.

Minor (Wear) Adjustment (Thunderbird): Raise car, make sure brakes are fully released. Loosen eccentric bolt locknut. Remove adjusting hole cover and turn adjusting screw until shoes drag on drum. Then back off screw 14 to 16 notches. Turn eccentric bolt in direction of forward wheel rotation until secondary shoe drags on drum. Back off eccentric bolt until no drag is felt. Tighten locknut.

MAJOR ADJUSTMENT

Major Adjustment (Except 1954-55 Ford Pass: Cars): ►*CAUTION: Recommended procedure for Ford is not the same as for Lincoln & Mercury.*

Ford—Wedge the primary shoe out against the drum by inserting a .010" feeler gauge through the slot in the drum at the center of secondary shoe and expand shoes by turning adjusting screw. Then adjust adjusting screw and anchor pin (slotted type) for .010" clearance at each end of secondary shoe (measure 1½" from each end of shoe).

Lincoln & Mercury—The shoe clearance should be .010" at all points. Check by inserting .010" feeler through slot in brake drum and measuring clearance at several points. Adjust by turning adjusting screw (accessible through slot in backing plate) and by shifting anchor pin if necessary (pin hole is slotted and will allow an up-and-down shifting of anchor pin to correctly center shoes). Torque anchor pin nuts to 80-120 ft. lbs.

Major Adjustment (1954-55 Ford Pass. Car Rear Wheels): Adjust in manner similar to front brakes, omitting eccentric cam adjustment. Connect parking brake cable and adjust.

Major Adjustment (Lincoln & Mercury Front Wheels): *NOTE:* Major adjustment performed only if Minor Adjustment unsatisfactory, or that upper end of anchor has less clearance than lower end.

Anchor Pin-Eccentric Adjustment—Complete operations of rotating Cam Adjusting Stud for secondary shoe clearance as shown in Minor Adjustment. Then adjust anchor pin and eccentric to obtain .010" clearance at each end of secondary shoe. To adjust anchor pin end, loosen anchor pin nut one full turn, tap pin lightly upward, with soft hammer, to decrease clearance or downward to increase clearance. Recheck lower clearance to insure that anchor pin adjustment did not alter lower end of secondary shoe clearance. If lower secondary shoe clearance not correct insert .010" feeler between lining and drum of primary shoe at lower end of shoe and with shoe snug against feeler turn adjusting screw from top to bottom to decrease secondary shoe clearance and from bottom to top to increase clearance. Recheck all clearances and repeat anchor pin adjustment if necessary to maintain a greater clearance at anchor pin end not to exceed .003". Recheck all clearances, replace wheels and road test. Torque anchor pin nuts to 80-120 ft. lbs.

Major Adjustment (1954 Ford Pass. Car Front Wheels): Expand brake shoe by turning adjusting screw (star wheel) toward center of brake until it is just possible to rotate drum. Back off screw 10 to 14 notches. Position drum so inspection slot is within 1" of upper end of secondary rear lining. Insert a .010" feeler between lining and drum at this point. Loosen anchor pin nut one turn and tap with a soft hammer to establish a .010" clearance. Do not tighten anchor pin locknut at this time. Insert .010" feeler 1" from adjusting screw end of secondary lining. Adjust eccentric to obtain .010" clearance. Recheck clearance at anchor end of secondary lining. After clearance has equalized at .010" at both ends of lining, tighten anchor pin locknut to 65-85 ft. lbs. Recheck clearance on secondary shoe to make sure anchor pin has not moved. Check clearance at center of primary lining with .010" feeler. Turn adjusting screw (star wheel) to obtain a .010" clearance on primary lining.

Major Adjustment (1955 Ford Pass. Car Front Wheels): Turn adjusting screw toward center of brake until shoes are tight in drum. Push adjusting screw star wheel toward primary shoe lining. Position drum so inspection hole is within 1" of upper end of secondary (rear) shoe lining. Insert a .010" feeler between lining and drum at this point. Push secondary shoe against feeler by pushing on adjusting screw star wheel. Remove feeler, rotate drum until slot is 1" above lower end of secondary shoe. Do not force shoe out of position. Check clearance at this point with feeler gauge. If greater or less than .010", loosen anchor nut approximately 1 turn. Tap anchor pin in direction of greater clearance (up or down) with soft hammer. After clearance of secondary shoes have been equalized at .010" at both ends, tighten anchor pin nut to 65-85 ft. lbs. Recheck clearance on secondary shoe to be sure

CONTINUED ON NEXT PAGE

FORD MOTOR CO.
BENDIX (C nt.)

anchor pin did not shift. Rotate drum so slot is over any part of primary shoe lining. Insert a .010" feeler between drum and lining. With feeler in place, move drum back and forth keeping inspection slot and feeler over primary shoe lining, at same time rotating eccentric cam in same direction as forward wheel rotation, until a .010" clearance is established between closest point of lining and drum. This should provide clearance for both shoes. If any drag noted, adjusting screw may be backed off another 1 or 2 notches.

Major Adjustment (Ford Trucks with Adjustable Anchor Pin): Rotate drum until feeler slot is at lower end of Secondary (rear) shoe, then insert .010" feeler between brake shoe and drum, and rotate drum, moving feeler gauge up along secondary shoe until shoe assembly is wedged forward as much as possible. Turn adjusting screw until primary shoe contacts drum securely and secondary shoe is snug against feeler. Back off, adjusting screw to obtain .010" clearance 1½" from each end of secondary shoe. If .010" clearance cannot be obtained at both ends of secondary shoe, an anchor pin adjustment is needed.

Anchor Pin Adjustment - Loosen anchor pin nut just enough to permit moving pin up or down by tapping nut with soft hammer. *NOTE - DO NOT BACK NUT OFF TOO FAR AS SHOES WILL MOVE OUT OF POSITION WHEN NUT IS TIGHTENED.* Move anchor pin up or away from center of drum to reduce clearance at anchor end of secondary shoe, and down to increase clearance. Tighten anchor pin nut securely and recheck secondary shoe clearance.

HAND BRAKE ADJUSTMENT

Hand Brake Adjustment: All Pass. Cars and F-1, 100 Trucks (Exc. 1957-58 Mercury and 1958 Lincoln) (1954-60); F-250 and P-350 Trucks (1957-60). Adjust service brakes. With service brakes fully released, place parking brake lever in fully applied position. Equalizer should not touch frame crossmember. Adjust cable from control handle to equalizer lever as necessary. There should be no slack in parking brake cables with control lever in fully released position. To adjust, loosen locknut on equalizer rod, tighten adjusting nut to remove slack. Pull cables alternately to equalize tension on each through yoke, tighten locknut. *CAUTION* - Overtightening cables will pull rear brake shoes off their anchors.

Mercury Parking Brake Release Rod Adjustment (1957): Disconnect parking brake release rod trunnion from release arm of pedal assembly. Turn trunnion on rod until it freely enters hole in pedal release arm with arm in locked position. Turn trunnion 1 turn to shorten rod.

Mercury Parking Brake Adjustment (1957): Depress parking brake pedal 1". Make adjustment as in Ford above. Distance from end of equalizer bracket to center of equalizer rod hole should be 2 1/16" ± 1/16". Parking brakes should be fully applied when pedal is depressed 2".

Lincoln Parking Brake Adjustment (1958): Depress pedal 1" and adjust equalizer until a slight drag on rear drums is felt. Release pedal and make sure brakes are released and that there is no drag.

Mercury Parking Brake Adjustment (1958): With parking brake fully released and rear wheels free to turn, loosen parking brake cable at equalizer lever. Depress pedal 1" and adjust front and rear cables until slight drag is felt on rear drums. *NOTE - Adjustments should be equally divided between both cables. Distance from end of equalizer bracket to center of equalizer rod hole with pedal depressed 1" should be ¼".* Tighten equalizer locknut. Release parking brake and make sure rear shoes return to released position. Car should be held with brake pedal depressed 2".

F-2, F-3, F-250, 350; P-350 Trucks (1954-56); P-400, All 500 & 600 Series Trucks (1957-60) - These models have independent brake on propeller shaft at rear of transmission. *See "Ford Truck Bendix Uni-Servo" for data.*

OVERHAUL

BLEEDING BRAKE SYSTEM: ***See complete "Hydraulic Brake Servicing" for bleeding instructions.***

►*1958 LINCOLN BLEED SCREW CAUTION:* A bleed screw is provided in master cylinder to aid in bleeding operations. DO NOT tighten screw more than 80 INCH LBS. or aluminum housing of master cylinder may crack.

TROUBLE SHOOTING: ***See "Hydraulic Brake Trouble Shooting" for complete data.***

BRAKE DRUM REPLACEMENT: Brake drums are "demountable" type (removable without disturbing wheel hub) on all models except Ford Pass. Car & Station Wagon **front wheels.** To remove brake drums take off nuts or remove capscrews or bolts holding drum on wheel hub or axle shaft flange. **Drum Regrinding Note**—When refinishing drums, inside diameter must not be increased more than .060" (not more than .030" removed from drum wall).

BRAKE SHOE REPLACEMENT: With wheels and brake drums removed, brake shoes are removed and replaced as follows:

Removal: Disconnect brake shoe return springs at anchor pin, remove hold-down cup, spring, and pin on each shoe. Disconnect hand brake cable at lever on rear wheel brake rear shoe. Pull shoes out at top to free wheel cylinder piston links, lift shoe assembly out, lift out hand brake strut and anti-rattle spring on rear wheel brakes. Disassemble shoes by removing adjusting screw spring (free spring by moving anchor pin end of shoes together) and lifting off adjusting screw assembly.

Relining Brake Shoes: Lining should be replaced when worn to point where rivet head less than 1/32" below surface of lining. Inspect shoes for distortion or looseness between rim and web. Clean shoe rim and remove all burrs or high spots before installing new lining. After riveting, new lining must be snug against shoe with not more than .005" separation midway between rivets.

►*BRAKE LINING NOTE*—Lining furnished in brake lining kits is ground in production and does not require grinding after installation.

Installation: Lubricate all points of contact between brake shoes and other brake parts with Lubriplate. Assemble both brake shoes with adjusting screw and spring (see illustration). On rear wheel brakes, assemble parking brake lever on rear (secondary) shoe and install link. Install shoe assembly on backing plate, install hold-down cups and springs, install return spring. Install drums and adjust brakes.

OVERHAUL: Master Cylinder & Wheel Cylinders. ***See "Hydraulic Brake Servicing" for complete data.***

►***BRAKE OVERHAUL NOTE:*** *When overhauling front wheel brake assemblies with eccentric cam adjustment, it is necessary to remove eccentric spring before removing shoe. Replace spring after shoe installed.*

FORD TRUCK SELF-CENTERING

Ford Trucks - Series 500, 550, 600 (1954-60). Rear Wheels Only.

►CHANGES, CAUTIONS, CORRECTIONS

►*FRONT WHEEL BRAKE CAUTION: Ford-Bendix "Uni-Servo" type brakes used on front wheels of these models.*

►*POWER BRAKE NOTE: "Hydrovac" or "Midland Hi-Power" Standard or Optional on these trucks. See "Hydrovac" or "Midland Hi-Power" under Power Brakes*

►*1959 BRAKE PRODUCTION CHANGE & ADJUSTMENT CAUTION:* On later type brakes, the wheel cylinder were changed from a 60° off vertical position to a vertical position. When installing new lining on later type brakes, it will be necessary to adjust brake hold down bolt until a clearance of .045" is obtained between brake shoe gauge surface and brake backing plate. On earlier brakes, the clearance remains at the original .025" clearance.

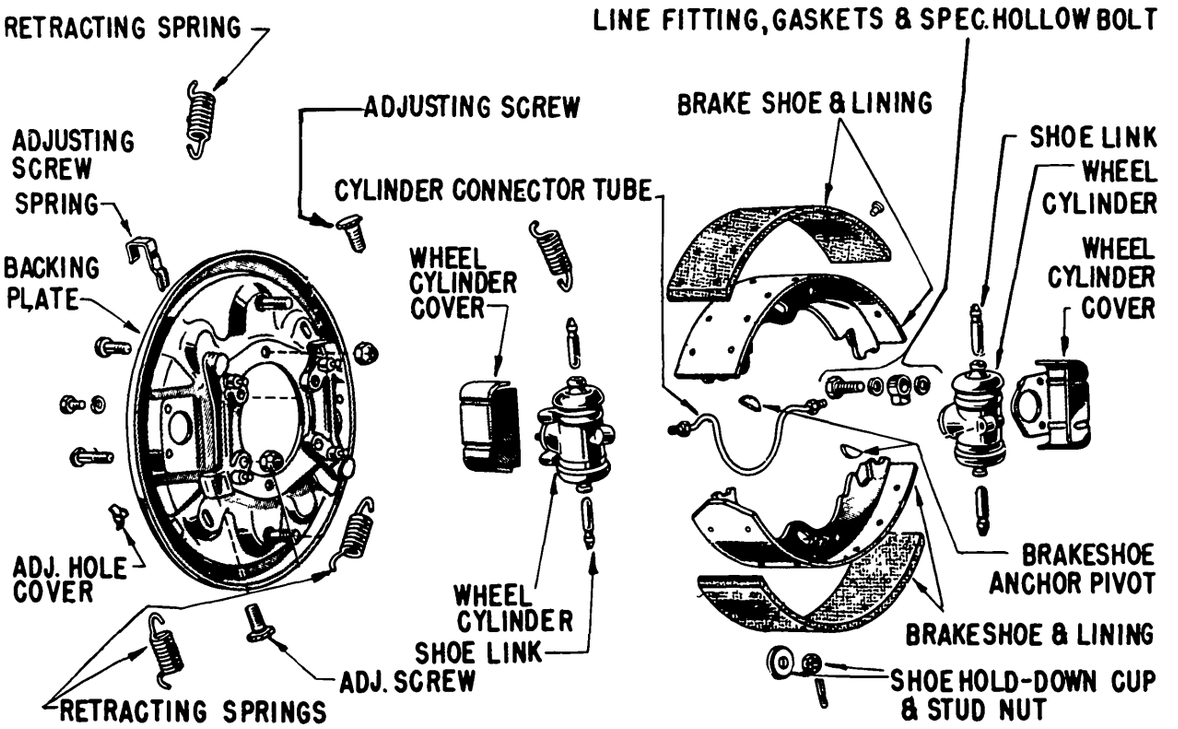
►*BRAKE SHOE RETRACTING SPRING REPLACEMENT NOTE:* If retracting springs are stretched to the point where the free length exceeds 3", measured between inner side of hook on elongated end of spring and inner side of opposite end coil, or if a .010" feeler gauge can be inserted between two or more spring coils, replace the spring.

DESCRIPTION: Two-cylinder, two-shoe, four-anchor type hydraulic brakes. Each shoe is anchored at each end and linked to wheel cylinder at each end so that all shoes are self energizing for both forward and reverse motion. All shoes are radially self-centering.

ADJUSTMENT: Make adjustments with brake drums at normal temperature and with wheels either jacked up or contacting road (if wheels on road so they cannot be turned to check for drag, make this check by striking drum with a hammer - sound will be deadened if shoes contacting drum). Remove two adjusting hole covers on backing plate (adjacent to right hand anchor bolt at each wheel cylinder), insert tool through slot and turn notched adjusting screw "star wheel" until linings drag on drum, then back off adjusting screw until wheel is free of drag. Depress pedal to centralize shoes and recheck wheels. Adjust each shoe in each wheel in this manner. *NOTE* - When brake linings are replaced, an additional adjustment is required. Adjust shoe hold-down bolt until a clearance of .025" (1954-59), .045" (1960), is obtained (measure from brake shoe to gauge surface on backing plate). Gauge surface is machined boss on brake plate which is in line with hold down bolt.

Brake Pedal Adjustment: Pedal must have at least 3/16" but not more than 3/8", free travel measured at pedal pad before master cylinder piston begins to move. To adjust, loosen locknut on brake pedal to master cylinder pushrod, rotate rod until free travel within limits, tighten locknut to 25-30 ft. lbs. torque.

Parking Brake Adjustment: On cable controlled parking brakes, move parking brake lever to fully released position. On transmission mounted parking brake levers set lever to first notch. Observe position of cam to make sure flat portion is resting on brake band bracket. If cam not flat with bracket, remove clevis pin from upper part of cam, then adjust clevis rod to allow flat portion of cam to rest on brake band bracket. Install clevis pin and cotter pin. Remove lock wire from anchor adjusting screw, turn adjusting screw clockwise until clearance of .010" is established between brake lining and brake drum at anchor bracket. Loosen lock nut on adjusting screw for lower half of brake band, adjust screw to establish .010" between brake lining and drum at lower half of brake band. Tighten locknut. Turn upper band adjusting nut until .010" clearance established between upper half of band and drum. Be sure to install lock wire in anchor adjusting screw.



FORD TRUCK SELF-CENTERING BRAKE ASSEMBLY

DISASSEMBLY: *NOTE* - Brakes can be serviced without removing hubs or disturbing wheel bearings. Remove wheels, then screws holding drum to hub (mark drum and hub to insure correct assembly). *(CAUTION - If wheel cylinder connecting tubes and bleeder screws removed, mark ports to which tubes attached to assure correct reassembly).* Disassemble brakes as follows: Remove retracting springs. *CAUTION - On 500 or 600 Series note location of each of four retracting springs before removal (2 each of 2 different springs used).* Remove shoe guide bolt nut, washer and bolt, remove shoes.

REASSEMBLY: *(NOTE* - For best results, new shoe and lining assemblies should have the lining of correct thickness ground to proper radius concentric with brake drum. If linings are not ground, it may be necessary to readjust the linings after the linings have been "worn in". Make sure no nicks or burrs are on shoe edge at point of contact with brake plate). Place light film of Lubriplate on primary (sliding pivot) anchor and shoe bearing surfaces on brake plate. Position brake shoes in anchors and in slotted ends of wheel cylinder. Apply light film of Lubriplate to hold-down screw, then install hold-down screw, washer and nut. Tighten hold-down nut until there is a clearance of .025" (1954-59), .045" (1960) between center of machined bosses (three lugs) on plate and edge of shoe. This clearance is necessary to hold shoe parallel to drum and prevent shoe from binding against outer machined bosses. Install retracting springs, wheel cylinder brake pipe, drum assembly and wheel, then adjust brakes.

BLEEDING BRAKE SYSTEM: Bleed **top** wheel cylinder **first,** then lower. If power unit used, unit must be bled before wheel cylinders, with engine off and no vacuum in power unit system. *See "Hydraulic Brake Servicing" in Brake Section of Manual.*

TROUBLE SHOOTING: *See "Hydraulic Brake Trouble Shooting" in Brake Section of Manual.*

CLUTCH INDEX

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

AUBURN

Dodge & Dart 6 Cyl. (1954-60) ①
Plym uth 6 Cyl. Exc. Ov rdrive (1954-60) ①
Willys (Exc. 6-226) (1954-57) ①②
Willys 6-226 (1955) ①
Willys, All M dels (1958-60) ①③
① - Borg & Beck Clutch also used
② - Rockford Clutch also used
③ - Two types used (heavier springs used on 6 Cyl. 2-Wheel Drive Models)

►CHANGES & CORRECTIONS

►*1958 WILLYS CLUTCH PRODUCTION CHANGE NOTE:* Improved Clutch Pressure Plate, Willys No. 917257 used on Models 6-226 4x4 & 4WD beginning Engine No TW-6-L-T-75827, and on FC-170 beginning Engine No. TW-6-L-F-13801

►*1958 WILLYS 4-CYLINDER CLUTCH VIBRATION CORRECTION:* Install improved clutch driven plate, Willys No 918870, which replaces No. 804327 New clutch driven plate identified by two helper springs located inside two opposed standard vibration springs

AUBURN-ATWOOD NOTE: Clutches made by Auburn Company and formerly listed as "Atwood" now called "Auburn" clutches.

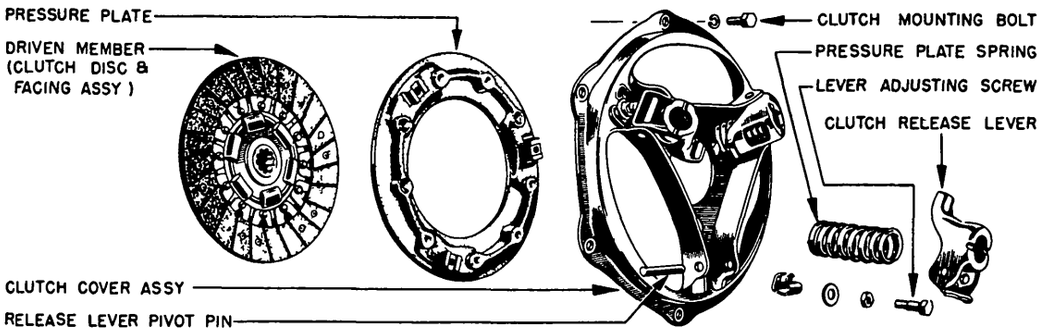
►**RELEASE LEVER INTERFERENCE (causing premature clutch w ar on first CJ-3A Jeeps):** On these cars and other models, check for interference between edges of clutch release lever and lever opening in bell housing which prevent full clutch engagement and cause premature wear of the clutch facings. If interference noted, enlarge opening in bell housing by using a 1/8" or 3/16" drill to drill line of holes vertically 3" forward of rear edge of original opening, and horizontally 3/16" above top edge, and 1/8" below lower edge of original opening, joining the vertical line of holes with the original opening. Break out section of metal within this area with a wrench or drift.

WILLYS DRIVEN MEMBER NOTE: Borg & Beck driven members used on all models. *See Borg & Beck Type "A" Clutch s.*

DESCRIPTION: Clutch is single plate, dry disc type. Cover consists of a three-legged spider with channel section legs in which the clutch springs and release levers are mounted. Release levers pivot on pins riveted in cover legs and actuate pressure plate through adjustable screws in pressure plate under outer end of each lever. Springs are mounted in cups on cover under each lever Hairpin type retracting springs are mounted on each adjusting screw and are retained by the adjusting screw locknut

Willys Pr ssure Plat Assembly (8501-19 Clutch). Has neoprene rubber inserts at sides of pressure plate plate driving lugs (to prevent rattling or fizzing noise when disengaged) and flat Return Clip Spring on each release lever (to insure full disengagement)

REMOVAL OF CLUTCH: *See "Clutch" on car pag .*



AUBURN CLUTCH

►*OVERHAUL TOOL NOTE Use Tool C-585A (Dodge & Plymouth), Tool C-585-C (Willys)*

OVERHAUL: Disassembly (Using Special Tool) - Place cover support plate over main screw of fixture Install clutch cover assembly on the tool Mark the cover and pressure plate with punch and install compression washer and fully compress fingers. Remove adjusting screw, washer, and plate return spring or clip. Place ½" steel block under outer end of each finger. Back off compression nut slowly until release levers rise and contact steel blocks. Remove nut and compression washer, lift off cover. To remove release levers from cover, grind off one end of pin and drive out pin.

Clutch Springs: Three springs used Spring pressure should be as shown in tables below

1954-58 Spring Specifications

Model	Lbs. Pressure
Dodge (9251-12)	251 lbs. at 1 13/16"
Dodge & Plymouth (100052-2)	254-280 lbs. at 1 11/16"
Plymouth (9251)	222-246 lbs at 1 13/16"
Willys (Exc 8501-36, 39)	180-195 lbs. at 1 9/16"
Willys (8501-36,39)	180-203 lbs. at 1 9/16"
Willys (6-226 4WD)	220-230 lbs. at 1 9/16"
Willys (6-226 2WD)	239-264 lbs at 1 13/16"

1959 Spring Specifications

Model	No. & Color	Lbs. Pressure
Dodge	3 Pink	280 lbs. at 1 13/16"
Plymouth	3 Dark Blue	254-280 lbs. at 1 13/16"
Willys		
4 Cyl Utility	3	245-265 lbs. at 1 9/16"
Jeeps	3	220-230 lbs at 1 9/16"
4 Cyl Fwd Cont	3	220-230 lbs. at 1 9/16"
6 Cy 4-Whl Dr.	3	220-230 lbs at 1 9/16"
6 Cyl 2-Whl. Dr.	3	239-264 lbs. at 1 13/16"

1960 Spring Specifications

Model	No. & Color	Lbs. Pressure
Dodge Dart 6 Cyl	3 Aluminum	258-286 lbs at 1 53/64"
Plymouth 6 Cyl.	3 Aluminum	258-286 lbs. at 1 53/64"
Willys 4 Cyl		220-230 lbs. at 1 9/16"
Willys 6 Cyl 2WD		239-264 lbs. at 1 13/16"

R assembly: Assemble levers to cover, peen over ends of lever pins. Install pressure spring between lever and cover. Make sure springs rest on bosses of cover and are seated in the embossed seats of levers. Press down on release lever and then insert steel blocks under outer ends of levers. Place pressure plate on fixture and place cover assembly over the pressure plate Match up punch marks so parts are in original positions Place spacer (see below) on center screw of fixture. Install compression plate, self-aligning washer, thrust washer and compression nut on center screw. Tighten compression nut on fixture. Install washers and adjusting screws in pressure plate. Release fixture compression nut slowly and install pressure plate return springs.

Release Lever Setting: Install the clutch cover plate assembly on fixture and make certain that housing clamps line up with holes. With the spacer (see below), compression washer, self-aligning washer, and compression nut installed, tighten nut until release levers are completely compressed Install clutch housing clamps and tighten securely. Adjust clutch release levers until each of the three feeler gauges has the same slight drag when being pushed in and out. Tighten release lever screws to decrease drag or loosen them to increase drag Recheck adjustment of each lever, tighten locknuts

Release Lever Setting Spacer

Model	Spacer
Dodge & Plymouth (1954-58)	20
Dodge (1959)	42
Dodge Dart & Plymouth, 6 Cyl. (1960)	19
Plymouth (1959)	43
Willys (Exc 6-226) (1954-58)	17
Willys (6-226) (1954-58)	20
Willys (1959-60)	17

Willys Return Clip Spring Installation—Engage slot on flat end of spring under head of release lever adjusting screw, engage loop on curved end of spring over ridge on outer end of release lever

►*INSTALLATION ON CLUTCHES IN SERVICE:* Clips can be installed by working through inspection hole in bell housing without dismantling clutch. *CAUTION*—Use string attached to clip to prevent it dropping down into bell housing during installation.

DRIVEN MEMBER: *S Car Mod l pag s for Part Nos. or facing specifications.*

BUICK (OWN) CROWN SPRING

1954-55 Series 40 (Synchro-mesh Cars)
1954 Series 50 (Synchro-mesh Cars)

►*1954-55 REPLACEMENT CLUTCH ASSEMBLY (Series 40 & 50):* New "finger type" Clutch Assembly, No. 1392653, similar to 1956 Series 40 Clutch is furnished for service to replace previous "Crown Spring" Clutch No. 1393485 (used on 1954-55 Series 40). Individual parts are still furnished for Crown Spring Clutches. New Release Bearing should be used with this replacement clutch as follows:

Replacement Clutch Release Bearing – When "finger type" clutch installed, it is recommended that new type Clutch Release Bearing, Buick Part No. 1310983, be used with this clutch. This bearing has flat face for release lever contact (previous type release bearing has rounded face).

►**Excessive Pedal Pressure and Noisy Clutch Disengagement Correction:** If the clutch pedal pressure required to disengage clutch exceeds 35 lbs., check for dry release linkage and apply small amount of Lubriplate to clutch spring disc at points where it contacts cover. Check clutch release bearing support for correct assembly, brush Lubriplate on bearing surface between bearing retainer and support.

►**Clutch Dragging Correction:** If drag not caused by pedal free travel adjustment, remove clutch housing lower cover, hold pedal in disengaged position and check for clearance between crown spring disc and edge of cover with feeler gauge. Spring must contact cover at all points (clutch will not disengage properly unless firm bearing secured at all points). To correct this condition, disassemble clutch, place cover assembly on surface plate, check height of six ears to which retainer springs are hooked and bend ears so that distance from surface plate to upper edge of each ear is exactly 1⅝". Replace retainer springs if they are weak or distorted. CAUTION—Replace springs as complete set only (necessary to assure even spring tension).

DESCRIPTION: Single plate, dry disc, of new design with corrugated spring disc which replaces both pressure springs and release levers used on former clutch. Corrugations on disc engage ears on inner rim of clutch cover and lugs on pressure plate. Disc pivots on cover plate ears when it is flexed to release clutch, relieving pressure on pressure plate which is then pulled away from driven member by hairpin type retainer springs which pass through holes in pressure plate lugs and are hooked over cover ears.

REMOVAL: *See "Clutch" on car model page.*

DISASSEMBLY: Mark pressure plate, spring disc and cover. Use tool J-1039-2 to unhook retainer springs from the clutch cover ears working springs slightly toward center to permit tool engagement (do not hammer on tool which will distort cover), lift clutch cover off. Unhook retainer springs from spring disc by working one leg of each spring in through pressure plate lug toward center of clutch and other leg out, lift off spring disc, remove retainer springs from pressure plate lugs.

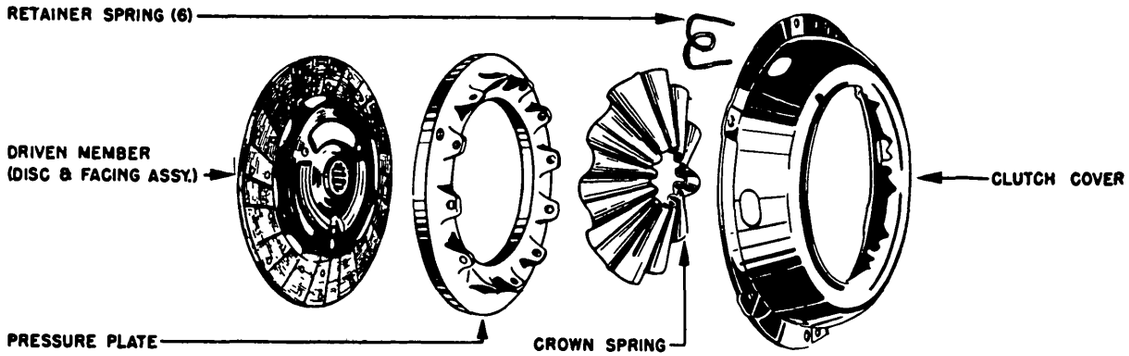
Clutch Cover Inspection—Check height of spring retainer ears by placing cover on flat surface and measuring from surface to top surface of each ear. Distance should be 1 5/8". Correct by bending the ears (*CAUTION*—use care not to crack or distort cover). Replace cover if cracked or distorted.

Crown Spring Inspection—Check for excessive flattening of the spring due to taking on a permanent set, by placing spring on flat surface and measuring height of top surface of spring at inner rim. Normal height is 1 13/16" and height should not be less than 1 11/16"

REASSEMBLY: Install the retainer springs in pressure plate lugs with curved legs of springs up toward spring disc (push one leg of each spring in toward center of clutch and position the other spring leg that it is just entered in hole in lug). Apply 'Lubriplate' lightly on spring disc at points where it contacts pressure plate and retainer springs (excess will ruin clutch facings), place spring disc on pressure plate, maneuver retainer spring loops over disc by turning springs so that they are properly aligned. Install cover, use special tools to engage retainer spring loops on cover ears. Make certain that marks on pressure plate, spring disc, and cover are lined up. This completes clutch assembly (no release lever adjustment, etc. required).

DRIVEN MEMBER: Both Borg & Beck and Long Driven Members used. Driven members serviced as an assembly and parts not furnished separately. When installing driven members, see that large washer or oil baffle is toward transmission.

See Borg & Beck and Long "CF" clutches for complete driven member data.



BUICK "CROWN SPRIN " CLUTCH

1954-55 BUICK (OWN) SINGLE PLATE

1954-55 Series 50 (Synchro-mesh Cars)
1954-55 Series 60 (Synchro-mesh Cars)

►CHANGES, CAUTIONS, CORRECTIONS

►**Excessive Pedal Pressure and Noisy Clutch Disengagement Correction:** If the clutch pedal pressure required to disengage clutch exceeds 28 lbs., check for dry release linkage and lubricate clutch pressure plate driving lugs as follows: Remove clutch housing lower cover, turn clutch so that driving lug is at bottom, brush small amount of 'Lubriplate' on each lug as pedal is being operated (lubricate all 3 lugs in same manner). If clutch still noisy, check clutch release bearing support for correct assembly, brush Lubriplate on bearing surface between release bearing retainer and support. Release lever pins that are dry and noisy can be corrected by spraying dry powdered graphite into pressure plate assembly (graphite will work into bearing when clutch is operated).

►**Clutch Rattle Correction:** Rattles when the engine accelerated with clutch disengaged (similar to noise caused by loose connecting rods or pistons) may be caused by excessive clearance between pressure plate driving lugs and cover. To correct this condition, remove lower cover, turn clutch so that driving lug is down, **hold clutch pedal in disengaged position,** prick punch trailing edge of lug in 3 places so as to swell lug and take up clearance. Clearance between lug and cover should be .005-.008". Correct each lug in same manner.

DESCRIPTION: Single plate, dry disc type. Clutch mounted in slight recess in face of flywheel with pressure plate lugs in grooves cut in flywheel rim so that drive transmitted directly from flywheel to plate. Clutch is actuated by three release levers pivoted on adjusting bolts in cover plate and linked to pressure plate by pins in lugs on plate. Servicing directions below apply to pressure plate assembly and need not be followed unless pressure plate, springs, or release levers to be examined or replaced.

REMOVAL: *See "Clutch" on car model pages.*

OVERHAUL: Mark all parts before dismantling and reassemble in same position to maintain balance.

Disassembly: Place pressure plate assembly on arbor press, place block on cover (clearing release lever adjusting nuts) to take pressure, compress cover slightly, remove adjusting nuts, release pressure slowly. Lift off cover. This will expose all parts for inspection. Replace worn parts, check clutch springs.

Clutch Springs: Check spring pressure and replace if weak or burned. Twelve springs (3 groups of 4) used. **Spring Pressure**—135-145 lbs. at 1¾" spring length.

Assembling:—Place pressure plate on arbor press. Install pressure springs on plate. Place cover in position on springs, install guide pins on release lever adjusting bolts. Compress cover slightly guiding adjusting bolts through holes in cover, install adjusting nuts on bolts, remove assembly from arbor press.

Releas Lever Height Adjustment:—Assemble gauge plate in flywheel in place of driven member, centering gauge in clutch with lugs on plate under release levers. Place short straightedge on top of gauge hub,

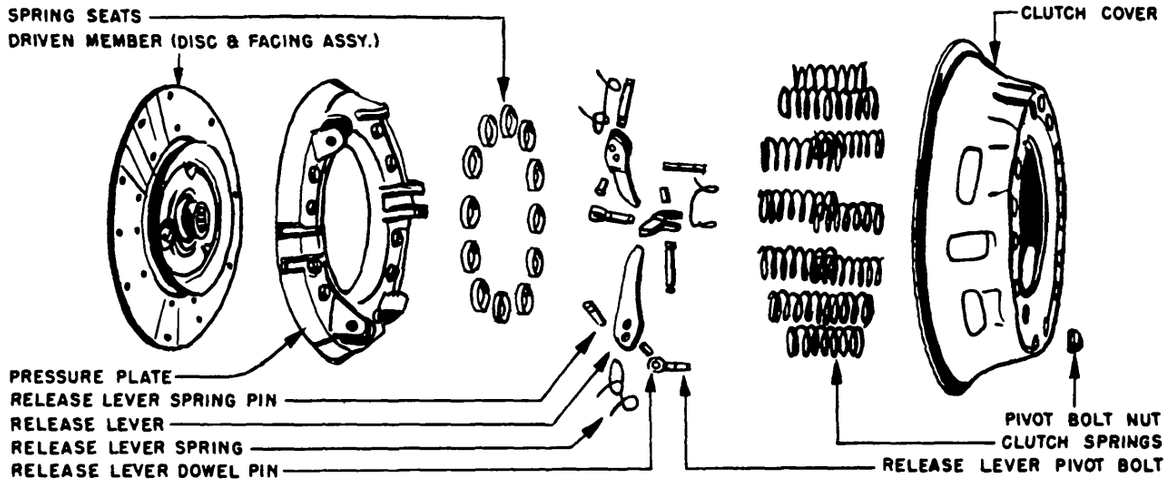
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1954-55 BUICK (OWN) SINGLE PLATE (C nt.)

or use dial indicator & service tool J-1013 mounting indicator on clutch so as to contact release lever tips. Turn adjusting nut until release lever just contacts straightedge or dial indicator and all levers are equal within .005", lock adjusting nut by crimping thin edge against flat on screws, using large pliers.

Gauge Plate—No. J-1036.

DRIVEN MEMBER: Spring dampener type hub used on all models. When replacing facings, drill out old rivets to avoid distorting clutch disc when removing old facings. Both Borglite type and new Long type Driven Members are used. Both types have woven facings which are grooved for quicker release. Driven members are balanced by use of extra rivets or clips on driven member hubs and these balance weights should not be removed. Driven members are serviced as an assembly (parts not furnished separately). CAUTION—Install driven member with large oil baffle toward transmission.



BUICK "SINGLE PLATE" CLUTCH

1956 BUICK (OWN)

1956 Series 40

NOTE - This clutch is a Long 11LC No. 265226

►CHANGES, CAUTIONS, CORRECTIONS

► *CLUTCH EQUALIZER INTERFERENCE CORRECTION (Early Cars).* To correct, grind approximately 1/8" off end of equalizer and remove 1/4" off each end of reinforcement ridge. Correction has been made in later production cars.

► *CLUTCH RELEASE LEVER PRODUCTION CHANGE (Elimination of Release Lever Adjustment After 1st 5000 Cars).* First 5000 cars had release lever adjustment and can be identified by buttons threaded into inner ends of release levers. All later release levers have buttons welded into release levers and are not adjustable.

DESCRIPTION: Single plate, dry disc type.

RELEASE LEVER ADJUSTMENT (1st 5000 Cars): Mount dial indicator on Support J-1013, set support on flat surface, press indicator stem down against surface until indicator hand has made one revolution, then tighten indicator to support and set indicator at zero. Place adjusting gauge, J-1036 on spare flywheel, then place clutch assembly on gauge so release levers are directly above machined bosses of gauge. Install cover bolts and tighten each one several turns at a time until all are uniformly tight. Place support and indicator on machined hub of gauge so that indicator bears on adjustable button. Indicator should read plus or minus .031" and release levers should read within .031" of each other. Adjust buttons to bring levers within limits. Stake buttons to release levers and recheck settings.

RELEASE LEVER CHECK (After 1st 5000 Cars - Non-Adjustable Levers): Proceed as in "Release Lever Adjustment" above. If variation between levers exceeds .031" or any part of clutch assembly is defective, clutch pressure plate and cover assembly must be replaced as a unit.

REMOVAL: *See "Clutch" on Car Model pages.*

OVERHAUL: Clutch cover and pressure plate serviced by replacement.

INSPECTION: Wash all metal parts of clutch, except release bearing and driven plate, in suitable cleaning solution.

Flywheel & Pressure Plate - Examine friction surface for scoring or roughness. Smooth with fine emery cloth, but if deeply scored or grooved, replace part.

Clutch Cover - Inspect cover for cracks or distortion. Check clearance between pressure plate driving lugs and edges of slots in cover with feeler gauges. Clearance should be .005-.008" (excessive clearance may cause rattle when engine intermittently accelerated with clutch disengaged).

Driven Plate - Inspect condition of facings, for loose rivets, broken or very loose torsional springs, and flattened cushion springs. Replace as required.

Driven Plate Run-Out Check - Slide driven plate, **front side first,** over transmission main drive gear until it is tight on spline, then set up dial indicator to bear against plate facing. While holding firmly against front end of main drive gear to take up play in main drive gear bearing, slowly rotate driven plate and observe amount of run-out. If run-out exceeds .025", replace driven plate.

Bearings - Inspect for scoring or excessive wear on front contact face. Test for roughness of balls and races by pressing and turning front race slowly. Inspect main drive gear pilot bearing in crankshaft. Replace if rough or worn, using Puller J-164 for removal.

DRIVEN MEMBER: Long No. CD873. Buick No. 1391632.

BORG & BECK (CORVAIR)

Car Model	Borg & Beck Assy. No.
Corvair	361537

DESCRIPTION: Single plate, diaphragm spring type with starter ring gear mounted on clutch cover. Diaphragm spring is riveted assembly with cover and cannot be disassembled. Pressure plate is bolted to three drive-straps riveted within cover and can be removed.

OVERHAUL: *NOTE* - Servicing is limited to removal of pressure plate and inspection of cover assembly and plate for wear or damage. Parts are not furnished and cover assembly should be replaced as a unit.

Disassembly: Mark cover and pressure plate to insure reassembly in same relative position. Working through slots in cover, take out bolt in each driving strap, remove retracting springs (under bolt head on each driving strap), lift cover off.

Reassembly: Reverse disassembly procedure. Tighten drive strap bolts to 15-20 ft. lbs. torque.

DRIVEN MEMBER: *See Car Model pages for data.*

BORG & BECK MODELS

	Mod l	Ass mbly
CHECKER SUPERBA		
A10 & A10L (1960)	10A7	361538
CHEVROLET PASS. CARS		
Std & O D Pwr Pkg (1956)	10A9	361404
Corvette (1956)	10.5A9	361402
Std. & O D Pwr Pkg. (1957)	10A8W	361468
Corvette (1957-60)	10A8W	361468
Corvette, Two Carbs (1957)	10A8	③ 361466
348" Eng (1958)		361470
CHEVROLET TRUCKS		
Late (1955)	11A9	① 361455
V8, Ser. 3,4000 (1956)	11A8	361403
V8, Ser. 5,6000 (1956)	11A9	① 361455
V8, Ser.3,4,5,6000 (1957-58)	11A9	① 361455
Six,261" Eng H D (1959-60)	11A9	361483
V8, 283" Eng (1959-60)	11A9	361483
CHRYSLER		
Six, Fleet & Taxi (1954)	11A6	929
Six, S M (1954)	10A7	361331
Six, H.D (1954)	11A6	361330
Six, Pol. & Taxi (1954)	11A6	929
Eight, Windsor (1955-56)	10A7	361376
Eight, Windsor (1957)	10A8	361417
Eight, (Spec. Pkg.) (1957)	11A8	361428
Eight, C300 (1957)	11A8	361447
Eight, Windsor (1960)	11A8WW	361527
DE SOTO		
Six, (1954)	10A 7	930
Six, H.D. (1954)	11A6	929
Eight, S.M. (1954)	10A6	361353
Eight, S21, S.M. (1955)	10A6	361353
Eight, S22, S.M. (1955)	10A7	361368
Eight, Firedome (1956)	10A7	361376
Eight, Firedome H.D. (1956)	11A6	361382
Eight, S25, 27 Std. (1957)	10A8	361417
Eight, S25,27 H.D. (1957)	11A8	361428
Eight, (1958)	10.5A8	361461
Eight, Taxi (1958)	10A8	361463
Eight, H.D. (1958)	11A8	361464
Eight, Std. (1959)	10.5A8	361490
Eight, Spec. (1959)	11A8	361497
Eight, Fireflite (1960)	10A8WW	361527
DODGE		
Six, S.M.(1954)④	10A7	360957
Six, Fluid Dr. (1954)	9A7	952
Six, Taxi & H.D. (1954)	11A6	931
Six, (1955,56)	9A7	361373
Eight, S.M. (1954)	10A7	361331
Eight, (1955-56)	10A7	361368
Eight, H D. (1954-55)	11A6	929
Six, Sta. Wgn. (1956)	10A7	361368
Eight, H.D. (1956)	11A6	361382
Six, Std. (1957-58)	9A7	361384
Six, H.D. (1957)	10A7	361376
Six, Spec. Pkg. (1957)	10.5A8	361418
Eight, Std (1957)	10A8	361417
Eight, H.D. (1957)	11A8	361428
Eight, 500 (1957)	11A8	361447
Six, H.D. (1958)	10A8	361463
Eight, Red Ram Eng. (1958)	10A8	361463
Eight, Super Red Ram (1958)	10.5A8	361461
Eight, D500,H.D. (1958)	11A8	361464
Six, Std. (1959)	9A7	361384
Six, Taxi (1959)	10A8	361463
Eight, MD2 (Early) (1959)	10A8	361463
Eight, MD2 (Late) (1959)	10A8WW	361505
Eight, MD2 H.D. (1959)	11A8	361497
Eight, MD3 (1959)	11A8	361497
DODGE & DART		
Six, Std. (1960)	9A7	361529
Six, Taxi (1960)	10A5	361525
Eight, 318" Eng. (1960)	10¼A8WW	361505
Eight, 318" Optl 361"Std.(1960)	10.5A8WW	361506
Eight, 383" Eng (1960)	11A8WW	361527
HUDSON		
Wasp (1955-56)	9A7	361361
Wasp H.D. (1955-56)	9A7	361362
Six, Hornet (1955-56)	10A6	361385
Eight, Hornet Spec. (1956)	8.5A7	361393
Eight, Hornet Spec H.D. (1956)	.9A7	361362
Eight, Hornet (1957)	10.5A6	361442
Eight, Hornet, Taxi & H D. (1957)	10.5A6	361449
MERCURY		
All Models S M. (1954)	10A6	361349
All Models S.M. (1955-56)	10A6	361354
All Models S.M. (1957)	10.5A6	361378
312" Eng. (1958)	10 5A6	361378
"EDG" Eng. (1958)	11A8	361432
312" Eng. (1959-60)	10.5A6	361496
383" Eng. (1959)	11A8	361493
NASH		
Six, Statesman (1954-55)	8A7	360987
Six, Statesman (1956)	8.5A7	361391
Six, Taxi & H.D. (1956)	9A7	361362
Six, Amb. (1954-56)	10A7	950
Six, Amb. H.D. (1956)	10A7	361407
Eight, Amb Spec. (1956)	8.5A7	361391
Eight, Amb. Spec. H.D. (1956)	9A7	361362
Eight, Amb. Std. (1957)	10 5A6	361442
Eight, Amb. H.D. (1957)	10.5A6	361449
PACKARD		
All Models (1957)	10.5A8	361451
Sedan & Sta. Wgn.	10A6	361456
Hawk (1958)	10.5A8	361451
PLYMOUTH		
Six, S M (Early 1954)④	9A7	926
Six, H D. (1954)	10A7	360957
Six, S.M (1954)	8.5A6	361369
Six, (Late 1954-56)	9A7	361373
Six, H.D. (1955-56)	10A7	361368
Eight, (1955-56)	10A7	361368
Eight, H.D. (1955-56)	11A6	929
Six, Std. (1957-58)	9A7	361384
Six, H.D. (1957)	10A7	361376
Six, H.D (1958)	10A8	361463
Six, Spec. Pkg. (1957)	10.5A8	361418
Eight, Std (1957)	10A7	361376
Eight, Fury (1957)	10.5A8	361418
Eight, Spec. Pkg. (1957)	10 5A8	361418
Eight, 318" Eng (1958)	10A8	361463
Eight, Fury (1958)	10 5A8	361461
Eight, 350" Eng. (1958)	11A8	361464
Eight, H.D (1958)	11A8	361464
Six, Std (1959)	9A7	361384
Six. Spec (1959)	10A8	361463
Eight, 318" Std (1959)	10A8	361463
Eight, 318" Eng Spec (1959)	10 5A8	361461
Eight, 361" Eng H D (1959)	11A8	361497
Six Std. (1960)	9A7	361521
Eight, 318" Eng. (1960)	10½A8WW	361505
Eight, 318" Optl ,361" Std (1960)	10.5A8WW	361506
Eight, 383" Eng (1960)	11A8WW	361527
PONTIAC		
All Models (1957)	10.5A9	361423
Sports Car (1957)	10.5A9	361452
Eight (1958)	11A9	361476
Eight, Sports Car (1958,59)	10.5A9W	361472
Eight, H.D. (1959)	11A9W	361500
Eight, Std. (1960)	11A9W	361500
Eight, H.D. (1960)	11A9W	361485
RAMBLER		
All Models (1954-55)	8A7	360987
All Models (1956)	8.5A7	361391
All Models H.D. (1956)	9A7	361362
Six, Std. & H.D. (1957)	8.5A7	361416
Eight, Std. (1957)	10A7	361436
Eight, H.D. (1957)	10A7	361407
Eight, Rebel (1957)	10.5A6	361442
Eight, Rebel H.D (1957)	10.5A6	361449
Six, American (1958)	8A7	360987
Six, 5810 (Early 1958)	8.5A7	361391
Six, 5810 (Later 1958)	8.5A7	361416
Eight, 5820 Std. (1958)	10A7	361436
Eight, 5820 H.D. (1958)	10A7	361407
Eight, 5880 Std. (1958)	10.5A6	361442
Eight, 5880 H.D. (1958)	10.5A6	361449
Six American Std. (1959)	8A7	360987
Six, American H.D. (1959)	8.5A6	361360
Six, 5910 (1959)	8.5A7	361416
Six, 5910 Taxi (1959)	9A7	361494
Eight, 5920 Std. (1959)	10A7	361436
Eight, 5920 H.D. (1959)	10A7	361407
Eight, 5980 Std. (1959)	10.5A6	361442
Eight, 5980 H.D. (1959)	10.5A6	361449
Six, Amer. (1960)⑤	8A7	361531
Six, Amer. Fleet (1960)	8.5A6	361360
Six, 6010 Std. (1960)	8.5A7	361530
Six, 6010 H.D. (1960)	8.5A7	361416
Six, 6010 Fleet H.D (1960)	9A7	361494
Eight, 6020 Std. (1960)	10A7	361436
Eight, 6020 H.D. (1960)	10A7	361407
Eight, 6080 Std. (1960)	10.5A6	361442
Eight, H.D. (1960)	10.5A6	361449
STUDEBAKER		
Champion (1954)	8A7	980
Champion (1955-Early 1958)	9A7	361365
Champion (Later 1958)	8.5A6	361369
Champion Taxi (1958)	9A7	361480
Commander (1954-Early 1955)	9A7	926
Commander (Later 1955-1956)	10A7	361371
Commander (1957-58)	10A7	361454
President (1955)	10A7	361371
President (1956)	10A6	361386
President, Classic (1957)	10A6	361456
President, 57H (1957)	10A6	361386
Golden Hawk,Superchgd (1957-58)	10 5A8	361451
President Std ,Comm H D (1958)	10A6	361456
Six, Lark & Hawk, Std (1959)	8A7	980
Six, Lark & Hawk H D (1959)	9A7	361365

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BORG & BECK MODELS (C ntinued)

	Model	Assembly
Six, Lark Taxi (Early 1959)	9A7	⑥ 1547712
Six, Lark Taxi (Late 1959)	9A7	⑥ 1550568
Eight, Std (1959-60)	10A7	361454
Eight, Taxi (1959)	10 5A8	361451
Six, Lark, Std (1960)	8A7	361526
Six, Lark, H D (1960)	9A7	926
Six, Lark, Taxi (Early 1960)	9A7	⑥ 1547712
Six, Lark, Taxi Optl (1960)	10 5A8	⑥ 1542367
Six, Lark, Taxi, Std (Later 1960)	10 5A8	⑥ 1550526
Eight, Hawk (1960)	10A6	361456
VALIANT		
V100, 200 (1960)	9A7	361521
WILLYS		
Six, 6-226 Eng 2WD (1954-57) ②	9A7	951
Six, 6-226 Eng Others (1954-58) ②	10A7	360982
Six, 6-226 Eng 4WD (1959)	10A7	360982

S.M. - Synchro-mesh Trans **H.D.** - Heavy Duty

Ⓒ - Same cover used with both 10½" & 11" discs (10½" disc Std on V8, 11" Optl)
② - Auburn & Rockford clutches used on 4 Cyl Models
③ - Use 361468 for replacement
④ - Auburn clutches also used
⑤ - American Custom (with Overhead Valve Engine) uses same clutch equipment as the Rambler Six
⑥ - Studebaker Part Numbers

►*BORG & BECK DRIVEN MEMBERS (WITH OTHER CLUTCHES)* Borg & Beck Driven Members are also used by other Clutch Manufacturers

►*1956 NASH & HUDSON SPECIAL V8 CLUTCH SLIPPAGE CORRECTION* **When slippage condition is encountered, install Clutch Spring Set, Part No. 3200026 (three light green & six light blue springs) in original cover and adjust lever height flush with hub with Gauge Plate J-1507 or J-5490. See Spring Specifications below.**

►*STUDEBAKER 6 CYLINDER TAXI CLUTCH PRODUCTION CHANGE & EXCESSIVE RELEASE EFFORT CORRECTION* Both the 9½" and 10½" clutches were changed to reduce pressure load on pressure plate 9½" clutch pressure load reduced from 1557 to 1377 lbs , 10½" clutch load pressure reduced from 2054 to 1230 lbs Parts changed were Pressure Plate & Cover Assembly, Release Bearing Shaft & Lever Assembly, Clutch Operating Rod, and Pressure Plate Springs Coat contact surfaces of shaft and lever assembly, and wear plate with Molydisulfide lubricant before assembly Use this same lubricant to fill recess in bearing collar Check hardness of operating rods with file and replace if necessary

ASSEMBLY NUMBER NOTE: This number stamped on clutch cover Can be used to identify each model

►**Borg-Warner UF-300, 400 Fixtures** Recommended by manufacturer for use in servicing clutch Fixtures

CONTINUED ON NEXT PAGE

CLUTCH SPRING SPECIFICATIONS

Cover Assy.	Springs - No. & Color	Lbs. Pressure
926	9 Lavender	Ⓒ 150 at 1 1/2"
929	6 Purple	Ⓒ 135 at 1 11/16"
	6 No Color	Ⓒ 155 at 1 11/16"
930	9 Lt. Blue	Ⓒ 165 at 1 11/16"
931	4 Green	Ⓒ 110 at 1 11/16"
	8 Purple	Ⓒ 135 at 1 11/16"
950	9 No Color	Ⓒ 155 at 1 11/16"
951	9 Tan	Ⓒ 160 at 1 1/2"
952	9 Tan	Ⓒ 160 at 1 1/2"
980	3 Orange	Ⓒ 170 at 1 1/2"
	3 Red or No Color	② 195 at 1 1/2"
360957	9 No Color	Ⓒ 155 at 1 11/16"
360982	9 Lt. Green	Ⓒ 175 at 1 11/16"
360987	6 Red or No Color	② 195 at 1 1/2"
361330	8 Purple	Ⓒ 135 at 1 11/16"
	4 Lt. Blue	Ⓒ 165 at 1 11/16"
361349	9 Lt. Green	Ⓒ 175 at 1 11/16"
361353	12 Lt. Blue	Ⓒ 165 at 1 11/16"
361354	6 Dk. Blue	③ 190 at 1 11/16"
	6 Green	Ⓒ 110 at 1 11/16"
361360	9-Lavender	Ⓒ 150 at 1½"
361362	6 Black	③ 230 at 1 1/2"
361365	3 Orange	Ⓒ 170 at 1 1/2"
	3 Black	③ 230 at 1 1/2"
361368	9 Dk. Blue	③ 190 at 1 11/16"
361369	12 White	② 245 at 1 1/2"
361371	9 Lt. Green	Ⓒ 175 at 1 11/16"
361373	3 Black	③ 230 at 1 1/2"
	3 White	② 245 at 1 1/2"
361376	9 Brown	② 230 at 1 11/16"
361378	12 No Color	Ⓒ 155 at 1 11/16"
361382	6 Lt. Green	Ⓒ 175 at 1 11/16"
	6 Dk. Blue	③ 190 at 1 11/16"
361384	6 White	② 245 at 1 1/2"
361386	6 Brown	② 230 at 1 11/16"
	3 Purple	Ⓒ 135 at 1 11/16"
361391	6 Black	③ 230 at 1 1/2"
361402	6 Tan	Ⓒ 160 at 1 1/2"
	6 Yellow	Ⓒ 140 at 1 1/2"
361403	3 Orange	Ⓒ 170 at 1 1/2"
	6 Black	③ 230 at 1 1/2"
361404	3 Tan	Ⓒ 160 at 1 1/2"
	6 Red or No Color	② 195 at 1 1/2"
361407	3 Lt. Green	Ⓒ 175 at 1 11/16"
	6 Dk. Blue	③ 190 at 1 11/16"
361416	6 White	② 245 at 1 1/2"
361417	12 Red or No Color	② 195 at 1 1/2"
361418	9 White	② 245 at 1 1/2"
361423	6 Orange	Ⓒ 170 at 1 1/2"
	3 Tan	Ⓒ 160 at 1 1/2"
361428	6 Orange	Ⓒ 170 at 1 1/2"
	6 Red or No Color	② 195 at 1 1/2"
361432	9 Black	③ 230 at 1 1/2"
361436	6 Lt. Blue	Ⓒ 165 at 1 11/16"
	3 Lt Green	Ⓒ 175 at 1 11/16"
361442	6 No Color	Ⓒ 155 at 1 11/16"
	6 Lt Green	Ⓒ 175 at 1 11/16"
361447	3 Orange	Ⓒ 170 at 1 1/2"
	9 White	② 245 at 1 1/2"
361449	3 Dk. Blue	③ 190 at 1 11/16"
	9 Lt. Green	Ⓒ 175 at 1 11/16"
361451	3 Orange	Ⓒ 170 at 1 1/2"
	6 White	② 245 at 1 1/2"
361452	3 Orange	Ⓒ 170 at 1 1/2"
	9 Red or No Color	② 195 at 1 1/2"
361454	3 Lt. Green	Ⓒ 175 at 1 11/16"
	6 Dk. Blue	③ 190 at 1 11/16"
361455	3 Red or No Color	② 195 at 1 1/2"
	6 White	② 245 at 1 1/2"
361456	3 Purple	Ⓒ 135 at 1 11/16"
	6 Brown	② 230 at 1 11/16"
361461	12 Red or No Color	② 195 at 1 1/2"
361463	9 White	② 245 at 1 1/2"
361464	6 Tan	Ⓒ 160 at 1 1/2"
	6 White	② 245 at 1 1/2"
361466	6 Red or No Color	② 195 at 1 1/2"
	6 Tan	Ⓒ 160 at 1 1/2"
361468	3 Orange	Ⓒ 170 at 1 1/2"
	6 Red or No Color	② 195 at 1 1/2"
361470		
361472	6 Red or No Color	② 195 at 1 1/2"
	6 Orange	Ⓒ 170 at 1 1/2"
361476	6 Red or No Color	② 195 at 1 1/2"
	6 Orange	Ⓒ 170 at 1 1/2"
361483	6-Tan	Ⓒ 160 at 1½"
	6-Red or No Color	② 195 at 1½"
361485	2-Lavender	Ⓒ 150 at 1½"
	9-Red or No Color	② 195 at 1½"
361490	6-Orange	Ⓒ 170 at 1½"
	6-White	② 245 at 1½"
361493	3-Orange	Ⓒ 170 at 1½"
	6-White	② 245 at 1½"
361494	6-White	② 245 at 1½"
361495	9-White	Ⓒ 170 at 1½"
361496	12-White	Ⓒ 155 at 1 11/16"
361497	6-Red or No Color	② 195 at 1½"
	6-White	② 245 at 1½"
361500	3-Red or No Color	② 195 at 1½"
	9-Lavender	Ⓒ 150 at 1½"
361505	9-Red or No Color	② 195 at 1½"
361506	3-White	Ⓒ 245 at 1½"
	6-Red or No Color	② 195 at 1½"
361521	3-Black	③ 230 at 1½"
	3-Red or No Color	② 195 at 1½"
361525	9-Red or No Color	② 195 at 1½"
361526	6-Red or No Color	② 195 at 1½"
361527	6-Red or No Color	② 195 at 1½"
	6-Orange	Ⓒ 170 at 1½"
361529	9-Orange	Ⓒ 170 at 1½"
361530	6-Black	③ 230 at 1½"
361531	6-Red or No Color	② 195 at 1½"
361538	3-Dk Blue	③ 190 at 1 11/16"
	6-Lt Green	Ⓒ 175 at 1 11/16"
361542	9-Lavender	Ⓒ 150 at 1½"

Ⓒ - Plus or Minus 5 lbs ② - Plus or Minus 6 lbs. ③ - Plus or Minus 7 lbs

BORG & BECK MODELS (Continued)

consist of surface plate(duplicates the driving surface of flywheel), clamp screws to clamp clutch cover against plate, arbor press to compress springs in dismantling clutch, and gauge standard for use in setting up release levers.

DESCRIPTION: Single plate, dry disc type. Three release levers, mounted on bolts piloted in pressure plate and retained in clutch cover, actuate clutch struts which provide "knife-edge" action.

Semi-centrifugal Clutch Note - These clutches have three roller assemblies in grooves in pressure plate directly under the clutch cover. Centrifugal action on these rollers increases the pressure plate load as the engine speed increases.

REMOVAL OF CLUTCH: *See "Clutch" on car pages.*

►*MERCURY & PONTIAC CLUTCH OVERHAUL NOTE:* Parts are not furnished and these clutches are serviced by replacement.

OVERHAUL: Mark all parts before dismantling clutch and reassemble in same position (necessary to maintain balance). Replace grooved, checked or warped pressure plates. Replace springs when pressure plate discolored from heat.

Disassembly: Place clutch on fixture or arbor press (support pressure plate under release levers), place block across cover resting on spring bosses, compress cover slightly, remove metal staking in adjusting nuts by running hacksaw blade through slot, remove nuts. Release pressure slowly, remove cover and springs. Remove release levers by grasping lever and eyebolt between thumb and forefinger, so that inner end of lever and upper end of eyebolt are pressed together, lift strut over ridge in end of lever(press lower end back against lug), lift lever and eyebolt out.

Reassembly: Place pressure plate on fixture or arbor press supporting plate under release lever lugs. Install lever, eyebolt and strut assemblies by reversing removal procedure. Place pressure plate springs on the plate, and install anti-rattle springs in cover. **(Chevrolet** - Install centrifugal rollers). Place cover on pressure plate. Make certain that springs are seated in cover recesses and anti-rattle springs in place on release levers. Compress cover slowly and guide eyebolts through holes in cover. If assembly made in fixture, use clamps to clamp cover flange to plate at mounting holes. Install eyebolt nuts and turn nuts down flush with head of bolt. Compress and release clutch several times to seat all working parts. Then adjust release lever heights.

Clutch Springs: Note spring color and install in same relative position (groups of two different springs used on some clutch models). Springs should check with table below. Replace springs if weak or burned or if clutch has been subjected to excessive heat.

Release Lever Adjustment (With Borg-Warner Universal Fixtures UF-300, 400): Special lands must be installed on fixture under pressure plate lever lugs. Set adjusting arm on adjusting sleeve so that height of lower side arm above bottom of sleeve is correct for each model (see table below). Install indicating plate on levers. Adjust each lever so that it just contacts indicating plate or adjusting arm, lock lever adjusting nuts by peening nut against notches in eyebolt.

① Release Lever Settings

Clutch Assy.	Lever Setting	Clutch Assy.	Lever Setting
926	2 3/16"	361402	2 5/16"
929	③ 2 1/8"	361403	2 9/32"
930	②③ 2 1/8"	361404	2 1/4"
931	② 2 1/8"	361407	2 5/32"
950	2 5/32"	361416	2 5/32"
951	2 3/16"	361417	2 3/16"
952	2 3/16"	361418	2 3/16"
980	2 1/16"	361423	2 5/16"
360957	2 1/8"	361428	2 5/32"
360982	2 3/16"	361432	2 7/32"
360987	2 9/32"	361436	2 5/32"
361329	2 3/16"	361442	2 5/32"
361330	② 2 5/16"	361447	2 5/32"
361331	2 1/8"	361449	2 5/32"
361349	2 1/4"	361451	2 1/4"
361353	2 1/8"	361454	2 1/16"
361354	2 1/4"	361455	2 9/32"
361360	2 1/4"	361456	2 1/8"
361362	2 3/16"	361461	2 3/16"
361365	2 1/32"	361463	2 3/16"
361368	2 1/8"	361464	2 5/32"
361369	2 1/4"	361468	2 5/16"
361371	2 1/16"	361470	2 3/8"
361373	2 3/16"	361472	2 5/16"
361376	2 1/8"	361476	2 5/16"
361378	2 5/16"	361483	2 9/32"
361382	② 2 5/16"	361494	2 9/16"
361384	2 3/16"	361495	2 7/32"
361386	2 1/8"	361496	2 5/16"
361391	2 5/32"	361500	2 1/4"
		361505	2 3/16"

① - With three 3J Land and 3X Indicating Plate.
② - UF-300 - With three 3J Land, 3X Indicating Plate, six 3K7 Height Sleeves, and four Bars (5/16"x5 1/4" Keystock) on Flange Bridging Holes not in line with slots. UF-400 - With three 3J Lands and 3X Indicating Plate.
③ - 1/16" higher with Baffle.

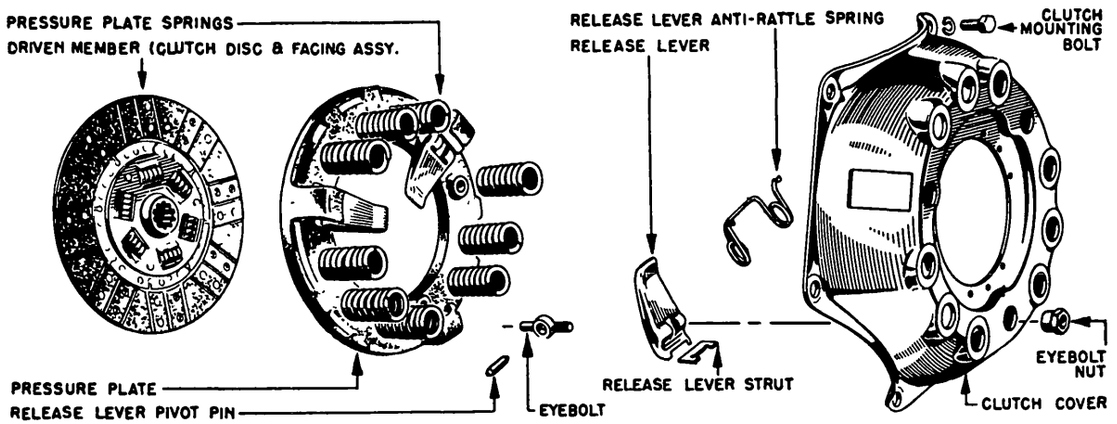
Rear Release Lever Adjustment (Using Gauge Plate): Use gauge plate indicated in table below and install clutch on flywheel with gauge plate in place of regular driven member, with lugs on gauge directly under release levers. Use short straightedge placed on edge on gauge plate hub and adjust release levers so they just contact edge of straightedge for all models marked "flush" in table. If lever setting marked "high", a cut-out or step must be made in edge of straightedge at one end so that levers can be set higher than hub. If lever setting marked "low", cut-out or step should be cut in gauge hub end of straightedge so that end extends below hub. Cut-out or step should be in the amount "high" or "low" indicated in table. Lock adjustment by peening nut into notches in eyebolt.

Release Lever Settings (Using No. 4234 Gauge Plate)

Clutch Model	① Lever Height
8A7	② 3/16" Low
8.5A7	3/16" Low
9A7	③ 1/16" Low
10A6	③④ Flush
10A7	③ Flush
10A8 (Exc. 361417)	1/8" Low
10A8 (361417)	Flush
10A8W	See Chevrolet Gauge Data
10.5A8 (Exc. 361451)	Flush
10.5A8 (361451)	1/4" Low
10.5A9 (Exc. 361423)	3/16" Low
10.5A9 (361423)	Flush
11A6	⑤④ 1/16" High
11A7	1/4" Low
11A8 (Exc. following)	Flush
11A8 (361433)	5/32" Low
11A8 (361448)	1/4" Low
11A9	5/32" Low

① - With Borglite Driven Plate except as noted.
② - Same for Std. thickness Driven Plate.
③ - 1/8" High for Std. thickness Driven Plate.
④ - With Baffle.
⑤ - 3/16" High (without baffle), 1/4" High (with baffle) for Std. thickness Driven Plate.

CONTINUED ON NEXT PAGE



BORG & BECK CLUTCH ASSEMBLY (TYPICAL)

BORG & BECK MODELS
(C ntinued)
RELEASE LEVER ADJUSTMENT
(Using Gauge Plate)

Use gauge plate indicated in table below and install clutch on flywheel with gauge plate in place of regular driven member with lugs on gauge directly under release levers Use short straightedge placed on edge on gauge plate hub and adjust release levers so they just contact edge of straightedge for all models marked "flush" in table (If lever setting marked "high" a cut-out or step must be made in edge of straightedge at one end so that levers can be set higher than hub, if lever setting marked "low" cut-out or step should be cut in gauge hub end of straightedge so that end extends below hub Cut-out or step should be in the amount "high" or "low" indicated in table) Lock adjustment by peening nut into notches in eyebolt

RELEASE LEVER ADJUSTMENT
(C-585 & C-585A Fixture)

With C-585 & C-585A Clutch Fixture—On this fixture feeler gauges are located in base of fixture under the clutch assembly Install the clutch assembly on fixture with release levers directly above feeler gauges (on 4-lever type 11" clutches install clutch with two levers directly over two of the feeler gauges, adjust these levers then rotate clutch so that other levers are over feelers and adjust these levers) Place correct spacers on center screw of fixture (see table below) install compression plate on center screw making certain that it rests directly against all release fingers (plate can be reversed to provide proper clearance on all models) install self-aligning washer plain washer and compression nut Tighten compression nut until clutch fully compressed install clutch housing clamps over cover bolt holes and tighten clamps securely Adjust each release lever adjusting nut until slight drag secured on each feeler (all feelers alike) lock adjusting nuts and recheck adjustment

Release Lever Settings (Using Gauge Plate)

Car Model	Gauge Plate	Lever Setting
Chevrolet Pass. & Truck	J-1048	©
Hudson Wasp	J-5490	1/16" Low
Hudson Hornet	J-5490	1/32" High
Hudson V8	J-1507 or J-5490	1/8" Low
Hudson Sp V8	J-1507 or J-5490	Flush
Nash Ambassador	J-1507	Flush
Nash Statesman	J-5490	1/32" High
Nash V8	J-1507 or J-5490	1/8" Low
Nash Sp V8	J-1507 or J-5490	Flush
Rambler (1952-56)	J-1507 or J-5490	1/32" High
Rambler 5710, 5810	J-1507 or J-5490	3/16" Low
Rambler 5820	J-1507 or J-5490	Flush
Rambler 5880	J-1507 or J-5490	1/8" Low

© - Use correct step of Gauge J-6456

Lever Setting (C-585 & C-585A Fixtur)

Clutch Assy. N .	C-585 Spacer No.
926	20
929	19,20 or 21
930	21
931	19
361330	21
361331	44
361353	21
361368	44
361369	18
361373	20
361376	44
361384	19
361461, 463	21
361464	19
361490, 497	21
361505	20
361506	42
361525	20
361527	19
361529	18
361926	20
361930	21
361931	19

DRIVEN MEMBER: *See Car Model pages for part nos.*
Driven Member Replacement Note: *Manufacturer recommends installation of new driven member with new facings rather than relining plate Driven member hub (Spring Dampener) cannot be serviced in the field*

CHEVROLET (OWN)

CHEVROLET	Clutch Assy. No.
1954-55 Ser 6 (1st Ser)	3751041
1954-59 Ser 3-4 6 Cyl H D	3751041
1954-55 Comm (1st Ser) (Exc H D ,F C)	3752850
1954-60 Pass 6 Cyl (Exc H D)	3752850
1954-60 F C	3751041
1955 Ser 3-4 V8	3751041
1955-56 Pass H D	3751041
1955-57 Pass 2-Bbl (Exc H D)	3752850
1955-59 Ser 3 6 Cyl (2nd ser)Exc F C ,H D)	3752850
1957 Pass H D (Exc 4-Bbl ,Dual 4-Bbl)	3751041
1958 Pass (Fuel Inj 4-Speed)	3744199
1958 Pass H D (Exc 348", 4-Bbl , Fuel Inj,)	3744199
1958-59 Pass 2-Bbl (Exc H D , O D)	3742861
1958-59 Pass (Fuel Inj)	3742866
1958-60 Pass 4-Bbl 283"	3742866
1958-60 348" (2nd design)	3758517
1958-60 Pass O D	3744199
1959 Pass H D 6 Cyl	3744199
1960 Pass 2-Bbl (Exc H D , O D)	3772926
1960 All H D 6 Cyl	3751041
1960 Ser 10-30 6 Cyl (Exc H D)	3752850

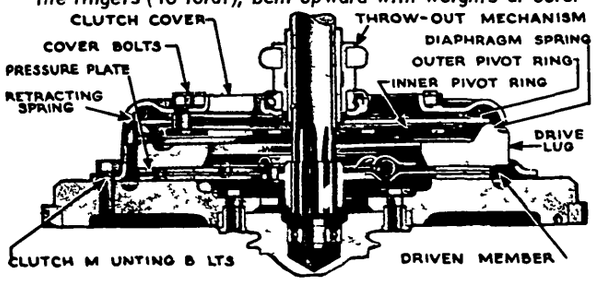
H.D. Heavy Duty **F.C.** Forward Control **O.D.** Overdrive

►CHANGES, CAUTIONS, CORRECTIONS

►**Clutch Rattles at Idling Speed (Pedal Depressed & Clutch Disengaged) Correction:** May be due to insufficient tension of retracting springs and can be corrected without removing clutch from engine as follows: Remove clutch housing underpan, turn flywheel until one retracting spring is at bottom, remove bolt (work through hole in side of cover), withdraw spring, install new spring in same manner. Replace all three retracting springs in this way. If new springs do not correct rattles, check clearance between pressure plate lugs and edge of clutch cover slot. Clearance should be .002-.008" and clutch cover assembly or pressure plate should be replaced if clearance exceeds .010".

►**Clutch Balance Caution:** When installing pressure plate make certain that '0' marks on one lug of plate and on clutch cover flange are lined up. When installing clutch in engine, line up 'X' marks on clutch cover and flywheel. This is necessary to maintain clutch balance.

DESCRIPTION: Single plate dry disc type with a diaphragm spring (replacing conventional clutch release springs and release levers) Diaphragm spring is shaped like a dished washer, with inner rim slotted to form 18 release fingers and is pivoted on inner and outer pivot rings, mounted on 9 bolts in clutch cover *NOTE - The 348" Engine (1959) & 283" Engine with 4-Bbl Carb & 348" Engine (1960) clutches have a new design The clutch is semi-centrifugal with 6 of the fingers (18 total), bent upward with weights at outer ends to provide the centrifugal action*



REMOVAL: *See "Clutch" on car model pages.*

OVERHAUL: Manufacturer recommends the use of Clutch Pilot Tool K-411, to support clutch during disassembly, and Clutch Assembling Fixture J-1113, to compress diaphragm spring when disassembling and assembling pressure plate and cover assembly.

Retracting Spring Replacement. Does not require dismantling clutch. Remove clutch housing underpan, crank engine over until retracting spring bolt appears in lower opening, remove bolt, withdraw retracting spring, install new spring in same manner. Replace other retracting springs (3 used) in same manner.

Disassembly: Take out screws and remove the three retracting springs through slots in cover (screws accessible through holes in side of cover), make certain that one pressure plate lug and cover marked to insure correct reassembly, remove pressure plate.

Servicing: Wash all parts except the throw-out bearing in gasoline (see Caution below), examine pressure plate and flywheel face for scored or rough surface, check pressure plate drive lugs for burrs, see that lugs move freely in cover slots and that clearance in slots is .002-.008" (replace pressure plate or cover if clearance exceeds .010"). Check diaphragm spring and pivot rings for distortion or cracks.

Reassembly: Reverse disassembly directions.

DRIVEN MEMBER: Different diameters used Replace with same size removed

INSTALLATION: Line up 'x' marks on flywheel and cover, install cover bolts and tighten evenly, one turn at a time, to prevent distorting cover

HUDSON (OWN)

Models 4D, 5D, 7D (1954)

DESCRIPTION: Single plate cork insert type operating in oil. Mounted on flywheel by 16 capscrews in cover flange. Gasket used under cover flange to secure oil-tight joint and oil seal mounted on throw-out collar to retain clutch lubricant. Clutch actuated by 3 clutch fingers pivoted on retainers bolted to cover and linked to pressure plate by pins.

REMOVAL: *See "Clutch" on car model page.*

OVERHAUL: Clutch cover need not be dismantled when replacing driven member unless springs are to be tested or replaced, pressure plate replaced, or other service work required. ***Check cover to determine whether disassembly required as follows:***

Checking Cover Assembly—Mount cover on flywheel or base plate with standard driven member (.200-.213" thick) and one gasket (.028-.032" uncompressed thickness) under flange (CAUTION—cover must be held by pressure on flange—not on cover flat or hub). Measure distance from contact surface of lowest clutch finger to top edge of cover hub. This distance should be 1¼-1½". If less than 1¼", clutch will perform satisfactorily if all fingers clear hub by at least ⅛". If distance greater than 1½", cover is distorted or fingers and retainers are worn. Dismantle for inspection as follows:

Dismantling:—Check punch marks near outer edge of pressure plate in line with mark on cover flange or make new marks to insure reassembly in same position. Place clutch assembly on special clutch fixture (#J-298-H) or in arbor press supporting pressure plate so that cover is free. Compress cover slightly, take off 3 nuts on clutch finger retainer bolts on cover, release pressure slowly, lift cover off.

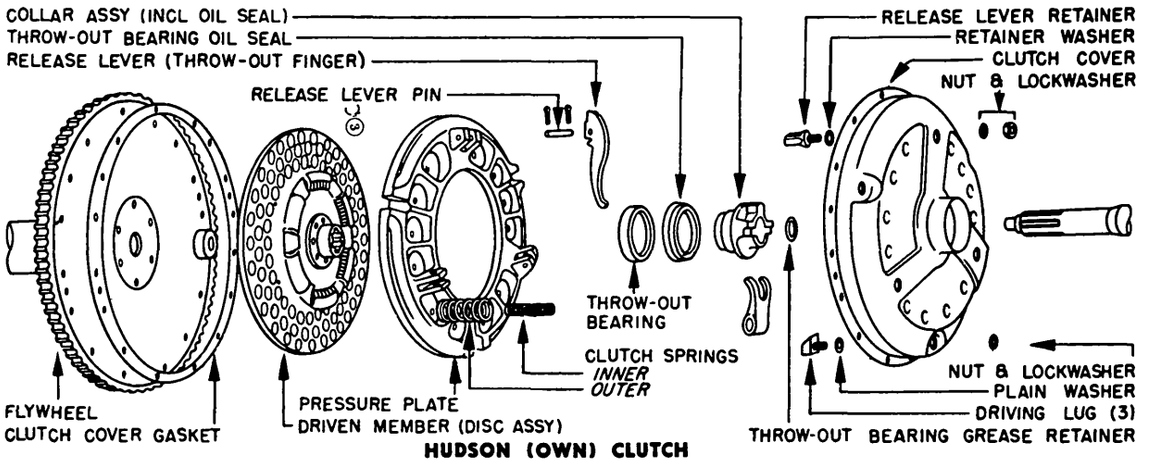
Clutch Cover: Inner surface must be flat and free from scores at finger retainer holes. Front face must be flat within .005" when checked on a surface plate. Measure distance from face of cover flange (mounting face) to retainer washer seat on inner face of cover. This distance must be 2.350" minimum, 2.370" maximum, and equal within .008", measured ⅛" from edge of finger retainer holes. Straighten or replace cover if outside these limits.

►***CAUTION—If cover hub bore considerably worn or scored, check engine rear support plate, flywheel, and bell housing for misalignment or shaft eccentricity.***

Clutch Fingers & Retainers: Check fingers at contact points and pin bore for wear or uneven bearing surfaces. Check retainers for wear at finger contact point in slot. Replace retainers if bearing area grooved deeper than .005". NOTE—Retainers can be continued in service by rotating them 180° when installing so that unworn portion contacts finger lobe.

Pressure Plate:—Examine plate, replace if scored. Check for warping (particularly if plate 'blued' due to overheating). Replace if warped more than .010".

Clutch Springs:—Special combinations of large (outer) and small (inner) springs used on different models (inner springs not used on all models). Check springs and replace if pressure less than service limit in table below. Springs should be replaced if pressure plate 'blued' indicating overheating in service.



HUDSON (OWN) CLUTCH

SPRING SPECIFICATIONS

Spring Part No.	①Pressure & Length
155224 (Inner)	75-85 lbs at 1⅝"
166250, 51 (Outer)	130-140 lbs at 1⅝"

	Outer Springs		Inner Springs	
Car Model	No.	Part No.	No.	Part No.
Wasp, 4D ①	9	166250	6	155224
Optl. 4D	12	166251	3	155224
All Others ②	12	166251	3	155224

① - 9" Clutch. ② - 10" Clutch.

Assembling:—Check clutch throw-out fingers, see that they are straight and do not show wear at tip or retainer lug. Replace retainer washers if necessary. Place pressure plate on fixture with face down. Assemble springs, clutch fingers, retainers and retainer washers on plate. Place cover on top of pressure plate assembly (lining up marks on cover and plate), compress cover slowly, guiding retainer bolts through holes in cover, install lockwashers and nuts on each finger retainer, tighten retainer nuts evenly to 40-45 ft. lbs. after cover has been fully compressed. Remove assembly from fixture and check alignment of clutch fingers in retainers, turn retainers with heavy duty end wrench until fingers centered sideways in retainer slots. See that shoulder on retainers fully seated on wall of cover. Check clutch finger heights with clutch installed on flywheel (below).

Clutch Finger Alignment: With clutch installed on flywheel, check distance from contact end of lowest clutch finger to top edge of cover hub. This distance should be within 1¼" to 1½". If less than 1¼", clutch will operate satisfactorily providing fingers clear cover hub by at least ⅛". If distance greater than 1½", check cover for distortion (see Clutch Cover). Adjust all clutch fingers as follows:

Clutch Finger Adjustment—Use special finger adjusting gauge (#J-774) resting gauge on clutch cover so that pin is directly above clutch finger tip. Turn thumbscrew down until pin contacts finger. Repeat at other clutch fingers to secure final gauge setting equal to lowest finger. If any finger more than .030" higher than others, adjust by installing thin (.005") washer between cover and retainer for this finger. If fingers more than .010" but less than .029" higher than others, turn gauge to higher finger, strike end of retainer bolt with soft hammer until gauge bar rests squarely on cover hub. With final setting, gauge bar should rest squarely on hub over all fingers and clearance between pin and end of thumbscrew must be less than .010" (all fingers equal within this amount—check with feeler gauge).

Throw-out Bearing & Oil Seal:—Insert 1/3 pint Hudsonite through clutch hub before installing throw-out collar assembly. Oil seal is pressed on collar behind throw-out bearing. When installing new oil seal, press firmly near inner diameter (pressure at point near rim may distort outer stamping and allow inner stamping and oil seal leather to revolve with shaft, this will cause noise similar to noisy throw-out bearing). Use arbor press to install throw-out bearing (do not drive on). See that bearing revolves smoothly and that oil seal inner stamping is tight in outer stamping before installing collar in clutch cover.

CAUTION—Install new grease retainer in annular recess in throw-out bearing when assembling bearing on collar. Soak this retainer and oil seal in engine oil for at least 30 minutes before installing.

DRIVEN PLATE: Plate has a spring-dampener type hub and facing consisting of cork inserts. Examine driven member, see that plate runs true and do not have appreciable free play. See that hub is not warped or distorted, and that springs in hub splines are not worn and are free from burrs. Corks must be in good condition. Black glaze indicates use of wrong lubricant. Soak driven plate in Hudsonite and clean corks, or replace driven member.

1954 Driven Member Specifications

Car Model	Outer Diameter	No. of Corks
Wasp, 4D	9"	90
Optl., 4D	10"	108
All Others	10"	108

INLAND

Pontiac 6 & 8 Cyl. Models (1954-56)

►CHANGES, CAUTIONS, CORRECTIONS

►**Pontiac Clutch Poor Release Complaints**—May be caused by the anti-rattle spring wearing into plate and binding at end of spring. To correct this condition, examine pressure plate and spring for indication of interference. Smooth up pressure plate to provide good bearing surface for face of spring. See that spring does not have end thrust on pressure plate lug (shorten end of spring if necessary). Lubricate spring with Lubriplate when reassembling. CAUTION—Driving lug slots must not be widened to correct poor release. Clearance in excess of .005" at either side of lug will cause clutch noise and roughness.

DESCRIPTION: Single plate, dry disc, with diaphragm spring disc which takes the place of both pressure plate springs and release levers.

1954-55 Pontiac 8 Clutch - Larger 10" type may be identified by greater diameter and six mounting bolt holes in cover.

Pontiac Anti-Rattl Spring—Consists of a flat spring installed between the pressure plate and the clutch cover in one of the cover holes adjacent to the '0' balance marked lug hole. This anti-rattle spring should be wired in place before pressure plate is removed and must not be installed in any other position. CAUTION—Changing position of anti-rattle spring will upset clutch balance.

Clutch Applications

Pontiac Cover Assy.	Part No.
1954 Sed. Del., Taxi, H.D.	758645
1954 6 Cyl Std.	755959
1954 8 Cyl. Std.	757370
1955-56 8 Cyl. Std.	758513

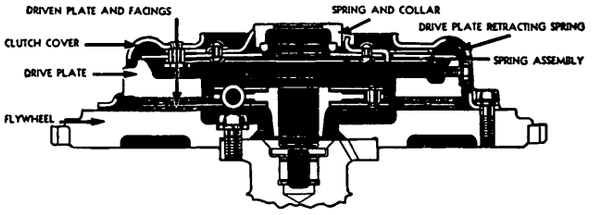
REMOVAL: *See "Clutch" on car model page.*

OVERHAUL: *CAUTION - Clutch cannot be disassembled (riveted construction).*

DRIVEN MEMBER: Long "CF" type used on all models. *See "Long CF" Clutch Data.*

Pontiac Driven Member	Part No.
1954 6 Cyl. Sed. Del., Taxi., H.D.	513582
1954 6 Cyl. Std.	508403
1954 8 Cyl. Std.	513583
1955-56 8 Cyl. Std.	518130

Driven Member Servicing: Manufacturer recommends replacement of driven member.



LONG MODEL 8½

Car Model	Long Assy. No.	Ford No.
Comet	200013	CODD-7563-B
Falcon	200013	CODD-7563-A

DESCRIPTION: Single plate, dry disc type. Three flat release levers extend through slots in cover and engage slots in pressure plate bosses. Pressure plate springs are installed between pressure plate and cover in groups between the release levers.

OVERHAUL: *CAUTION - Parts are not furnished and manufacturer recommends that clutch not be disassembled.* Replace pressure plate and cover assembly if release levers do not operate freely or if lever heights are not equal. See Release Lever Checking (below).

Release Lever Checking: Assemble pressure plate and cover assembly on flywheel with .250" shim installed in place of regular driven member. Use depth gauge or dial indicator to measure height of inner end of each release lever. All levers must be equal within .031". If lever variation greater than .031", replace pressure plate and cover assembly.

DRIVEN MEMBER: *See Car Model pages for data.*

ROCKFORD 8½RM

MODEL 8½ RM

WILLYS	Rockford No.
All Models Exc. 6-226 Eng. (1954-60)Ⓒ	165317

Ⓒ - Auburn Clutch also used.

DESCRIPTION: Single plate, dry disc type. Clutch is three-lever type with six springs mounted in pairs adjacent to levers.

REMOVAL: *See "Clutch" on car model pages.*

OVERHAUL: Clutch cover and pressure plate assembly need not be disassembled when replacing driven member unless springs are to be replaced or other service work performed.

Disassembly: Place cover assembly in arbor press, compress cover slightly, remove release lever pivot pins, unhook lever springs, remove levers. Release pressure slowly, lift off cover.

Clutch Springs: Check springs and replace if weak or burnt. Springs should check as follows:

Spring Specifications

Cover Assy.	Spring Part No.	Pressure & Length
R3030	M-2317-4	140-150 lbs. at 1 7/16"
165317	105348	170-180 lbs. at 1.312"

Reassembly: Reverse disassembly procedure, make certain that pressure plate springs seated in pressure plate and cover and that lever springs correctly installed. Check lever heights after assembly completed.

Release Lever Setting: Manufacturer recommends use of Borg-Warner Fixture UF-300 or 400 for lever adjustment. Lever setting should be as follows:

Release Lever Settings

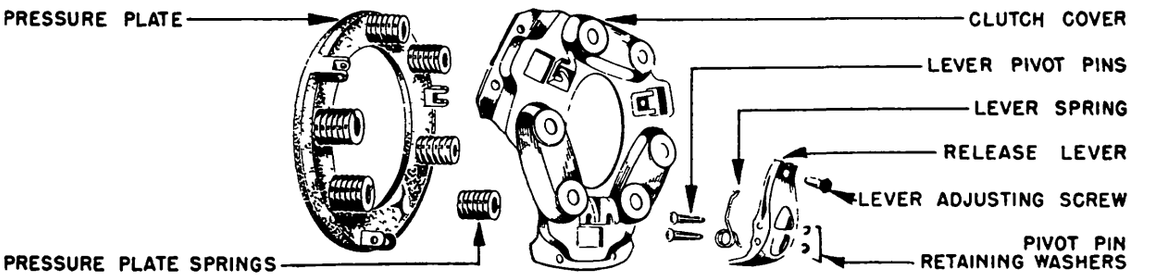
Clutch Assy.	Release Lever Height
R3030	2 13/32"
165317	Ⓒ 2 5/16"

Ⓒ - Use only 3 clamps on UF-300 Fixture.

DRIVEN MEMBER: Borg & Beck "Borglite" type with spring dampener hub. *See car model page for facing specifications.*

Borg & Beck Driven Member

Car Model	Borg & Beck No.
Willys 4 Cyl. (1954)	381580
Willys 4 Cyl. (1955-59)	382298
Willys 6 Cyl. (1954)	382113
Willys Jeep (1955-57)	382297
Willys Jeep Dispatcher (1956-57)	382000
Willys 4 Cyl. Trks. (1958-60)	382878



ROCKFORD "RM" CLUTCH

LONG "CF" & "NC"

	Clutch Mod l	C ver Assy. No.
BUICK		
1957-60 Ser 40	11CF	266716
EDSEL & FORD		
See Ford & Long Part No Table below		
LINCOLN		
1954	11CF	267044
MERCURY		
1957 312" Eng H D	11CF	① 265126
OLDSMOBILE		
1954-58	11CF	L5167
1954-58 Pol , Taxi, H D	11CF	262832
1959-60 Ser 88	11CF	L5167
1959-60 Super 88 & H D	11CF	262832
PACKARD		
1954 288" Eng	11CF	267954
1954 359" Eng	11CF	268349
1955 320" Eng	11CF	268349
1955-56 352" Eng	11CF	268349
STUDEBAKER		
1956 Goldenhawk O D	11CF	② 403502

① - Borg & Beck Std Equip ② - Studebaker No

Ford & Long Clutch Part Nos.: Ford Part Nos. for each Long Clutch Cover Assembly and Driven Member are as follows:

1954-55 Long Model Nos.

FORD PASS. CARS	Model	Assy No.	Ford No.
6 Cyl.	9½CF	268594	1A-7563-A
V8 (1954)	10CF	L5222	B4A-7563-B
V8 (1954-55)	10NC	263934	B5A-7563-A
Police (1954-55)	11CF	261981	B5S-7563-A
Thunderbird (1955)	11CF	261981	B5S-7563-A
FORD TRUCKS	**Model**	**Assy. No.**	**Ford No.**
V8 ½ Ton 3 Spd (1954-55)	10CF	L5222	B4A-7563-B
All, ½ Ton 4 Spd (1954-55)	11CF	L1440	51-7563-A
All, ½, ¾ Ton Pkg. Del.	11CF	L1440	51-7563-A
6 Cyl. ¾, 1 Ton	10CF	L5222	B4A-7563-B
All. 1½, 2 Ton 4 Spd.	11CF	L1440	51-7563-A

1956 Long Model Nos.

FORD PASS. CARS	Model	Assy. No.	Ford No.
6 Cyl.	9½CF	268594	1A-7563-A
8 Cyl.	10CF	265125	B6A-7563-B
Thunderbird	11CF	265126	B6A-7563-A
Pol. & Taxi	11CF	265126	B6A-7563-A
Heavy Duty	11CF	265126	B6A-7563-A
FORD TRUCKS	**Model**	**Assy.No.**	**Ford No.**
6 Cyl. F-100,250 Std.	10CF	L5222	B4A-7563-B
6 Cyl. Opt.	11CF	L1478	8MTH-7563-A
8 Cyl. F-100 ①	10½CF	264300	B6C-7563-A
All Others	11CF	L1478	8MTH-7563-A

① - 3 Spd. L.D. or H.D. Trans. and/or O.D.

1957 Long Model Nos.

FORD PASS. CARS	Model	Assy No.	Ford No.
6 Cyl.	9½ CF	268594	1A-7563-A
6 Cyl. Taxi	11 CF	266978	B6A-7563-A
V8 Eng Std ①	10 CF	267346	B7A-7563-A
V8 Eng. H D ②	11 CF	267350	B7A-7563-B
V8 272" Eng H D	11 NC	266978	B6A-7563-A
V8 292" Eng H D	11 NC	266978	B6A-7563-A
T'Bird 292" Eng	11 NC	266978	B6A-7563-A
FORD TRUCKS			
6 Cyl. 223" Eng. ③	10 CF	L5222	B4A-7563-B
8 Cyl. 272" Eng. ④	10 CF	L5222	B4A-7563-B
6 Cyl. 223" Eng. ⑤	10½ CF	267371	B7C-7563-A
8 Cyl. 272" Eng. ⑥	10½ CF	267371	B7C-7563-A
All Others ⑦	11 CF	267147	B7Y-7563-A

① - 272" & 292" Eng. & O D.
② - 272" & 292" Eng. H.D., 312" Eng. & Thunderbird.
③ - F-100, 250, 350, P-350
④ - F-100 (3-speed light duty trans., O.D.)
⑤ - F-100, 250-EBR, P-350 (Heavy Duty).
⑥ - F-100, 250-ECW, P-350 (Heavy Duty).
⑦ - Through 600 Series.

1958 Long Model Nos.

EDSEL	Model	Assy. No.	Ford No.
All Models	11CF	267454	B8A-7563-A
FORD PASS. CARS			
6 Cyl Std	9½CF	268594	1A-7563-A
6 Cyl H D	11CF	267350	B7A-7563-B
6 Cyl Taxi	11NC	266978	B6A-7563-A
V8 272" Eng	10CF	267346	①B7A-7563-A
V8 332" Eng	11CF	267350	②B8A-7563-A
V8 352" Eng	11CF	267350	③B8A-7563-B
FORD TRUCKS			
6 Cyl 223" Eng	10CF	L5222	B4A-7563-B
6 Cyl 223" Eng	10½CF	267371	B7C-7563-A
6 Cyl 223" Eng	11CF	267147	B7Y-7563-A
6 Cyl 223" Eng H D	11CF	267147	B7Y-7563-A
V8 272" Eng	10CF	L5222	B4A-7563-B
V8 272" Eng	10½CF	267371	B7C-7563-A
V8 272" Eng	11CF	267147	B7Y-7563-A
V8 272" Eng	11CF	267147	B7Y-7563-A

① - Yellow & Brown cover - White pressure plate
② - Brown & Yellow cover - Green pressure plate
③ - Pink & Orange cover - Green pressure plate

1959 Long Model Nos.

EDSEL	Long Model & Assy		Ford No
6 Cyl Std	9½CF	268594	1A 7563-A
6 Cyl H D	11NC	266978	B7A-7563-C
V8 292 Eng Std	10CF	267346	B7A-7563-A
V8 292 Eng H D	11CF	267350	B8A-7563-B
V8 332 & 361 Eng	11CF	267350	B8A-7563-B
V8 332 & 361 Eng	11CF	267454	
FORD PASS. CARS			
6 Cyl Std	9½CF	268594	1A-7563-A
6 Cyl H D	11CF	267350	① B8A-7563-B
6 Cyl Taxi	11NC	266978	B6A-7563-A
292" Std	10CF	267346	② B7A-7563-A
292" O D	10CF	267346	② B7A-7563-A
292" H D	11CF	267350	① B8A-7563-B
332"	11CF	267350	① B8A-7563-B
352"	11CF	267350	① B8A-7563-B

① - Pink & Orange Cover - Green Pressure Plate
② - Yellow & Brown Cover - White Pressure Plate

FORD TRUCKS			
6 Cyl	10CF	L5222	① B4A-7563-B
6 Cyl	10½CF	267371	② B7C-7563-A
6 Cyl	11CF	267147	③ B7Y-7563-A
6 Cyl	11CF	267147	④ B7Y-7563-A
V8 292"	10½CF	267371	② B7C-7563-A

① - Use with Disc Ford No B7C-7550-A, Long No CD870
② - Use with Disc Ford No B7C-7550-B, Long No 287335
③ - Use with Disc Ford No B6D-7550-A Long No CD606
④ - Use with Disc Ford No B7C-7550-C Long No CL607

1960 Long Models.

EDSEL	Long Model & Assy.		Ford No.
6 Cyl Std.	9½CF	268594	1A-7563-A
6 Cyl. H.D.	11NC	266978	B7A-7563-C
292" Eng. Std.	10½CF	260108	COAA-7563-A
292" Eng. H.D.	11CF	267350	B8A-7563-B
352" Eng. Std.	11CF	267350	B8A-7563-B
FORD PASS. CARS			
6 Cyl. Std.	9½CF	268594	1A-7563-A
6 Cyl. H.D.	11NC	266978	B7A-7563-C
292" Eng. Std.	10½CF	260108	COAA-7563-A
292" Eng. H.D.	11CF	267350	B8A-7563-B
352" Eng. Std.	11CF	267350	B8A-7563-B
352" Spec.	10½CF		COAA-7563-C
352" Spec	11CF		COAA-7563-B
FORD TRUCKS			
6 Cyl & V8	10CF	L5222	B6A-7563-B
6 Cyl & V8	10½CF	267371	B7C-7563-A
6 Cyl. & V8	11CF	267147	B7Y-7563-A

DESCRIPTION: Single plate dry disc type Release levers formed with weight on outer ends which increases pressure on driven member as engine speed increases. Levers pivoted on pressure plate on needle bearings with fulcrum located in yoke support on cover plate. Hardened-steel screw contact provided on lever tips.

REMOVAL OF CLUTCH: *See "Clutch" on car page.*

OVERHAUL: *NOTE - Car manufacturers (Buick, Eds l, Ford) do not recommend Clutch Cover & Pressure Plate Assembly overhaul. On these models, if l ver height does not meet specifications shown in "Release Lever Setting" table or if l vers do not operate freely without bind, replace th ass mbly.* Mark all parts before disassembly and reassemble in same relative positions.

Clutch Fixture Note: Manufacturer recommends use of Borg-Warner Universal Clutch Fixture UF-300 or UF-400 for all servicing and rebuilding operations.

Disassembly: Place clutch on fixture (supporting pressure plate on special lands under lugs) or arbor press. Compress cover plate slightly, take out assembly screws (lever yoke mounting screws) on cover, release pressure on cover plate slowly, lift off plate. Note whether washers used on yokes under assembly screws (these washers must be reinstalled if old pressure plate used again). See special directions below on removing and reinstalling release levers.

Pressure Plate. Pressure plate refacing by grinding or turning down on lathe will throw release levers out of adjustment. If pressure plate being refinished remove .020" from face and install spacer washer .015" thick on release lever yoke under cover. *NOTE*–If washers are found on release lever yokes under cover when clutch disassembled, replace these washers (if old pressure plate used) or discard washers (if new pressure plate installed).

Clutch Springs: Pressure springs should check with table below. Replace springs if weak or burned or if clutch has been subjected to excessive heat.

CONTINUED ON NEXT PAGE

LONG "CF" & "NC" (Continued)

Cover Assembly	Spring No. & Color	① Lbs. Pressure
L1440	9 Grey	106 at 1 9/16"
L1478	9 Brown	② 150 at 1 9/16"
L5167	9 Tan	163 at 1 9/16"
L5222	9 Bronze	142 at 1.747"
260108	9 Buff (Brz)	137-147 at 1.747"
261981	9 Brown & White	159 at 1.736"
262832	9 Orange	175 at 1 9/16"
263934	9 Bronze	142 at 1.747"
264300	9 Brown & White	159 at 1.736"
265125	9 Bronze	142 at 1.747"
265126	9 Br. & Wh.	159 at 1.736"
266716	9 Aluminum	205 at 1.751"
266978	3-Pea Green	170-180 at 1.762"
	6-Brown & White	154-164 at 1.736"
267044	9 Yellow	③ 147½ at 1 9/16"
267147	9 Orange	175 at 1 9/16"
267346	9 Bronze	142 at 1.747"
267350	9 Pea Green	175 at 1.762"
267371	9 Bronze	142 at 1.747"
267454	4 Pea Green	175 at 1.762"
	5 Aluminum	205 at 1.751"
267954	9 Pink	155 at 1 9/16"
268349	3 Aluminum	205 at 1.751"
	6 Pea Green	175 at 1.762"
268594	6 Aluminum	205 at 1.751"
403502	⑦ 9	

① - Plus or minus 5 lbs. unless otherwise specified.
② - Plus 3 lbs. or minus 5 lbs.
③ - Plus or minus 2½ lbs.

Release Lever Assembly: Mount lever yoke on release lever, fasten by inserting flat-sided lever pin (flat side out or toward cover) and roller (place roller on flat side of pin). Insert lever in pressure plate lug, use roller pin sawed off to length of lever width as a guide and insert needle bearings, insert roller pin, pushing guide pin out, lock both lever pins with cotter pins. Thread release lever adjusting screws in ends of levers, turning screws down completely.

Assembly: Place pressure plate on fixture or arbor press. Assemble pressure springs, locator washers or insulator washers on plate, place washers on lever yokes (if washers used previously and old pressure plate being used). Place cover plate in position (lining up marks made before dismantling), compress cover slowly guiding lever weights through holes in cover and lining up yokes under cover plate holes. See that pressure springs are seated, insert cover screws in yokes, using lockwasher under screw head, tighten screws securely. Compress and release clutch several times (using weight on release levers) to seat all parts. Then adjust release lever heights.

Release Lever Adjustment (on Fixture): Place special lands on fixture under pressure plate lugs, assemble lever adjusting arm and sleeve setting bottom of adjusting arm correct distance as shown in table (all figures plus or minus 1/32") above bottom of sleeve and lock the adjusting arm with the thumbscrew. Swing arm over each release lever in turn, back off adjusting screw on tip of lever until rounded screw head just contacts arm, lock screws by inverting clutch so that screw head is supported and stake or peen lever into adjusting screw slot. Do not disturb lever yoke screws when making this adjustment.

Release Lever Checking & Adjustment (Without Fixture): Check lever heights as follows (adjustment not recommended on Edsel & Ford clutches).

Buick - Mount clutch assembly on spare flywheel with Adjusting Gauge J-1036 installed in place of regular driven member. Assemble dial indicator on Support J-1013 and zero the indicator as follows: Place support on flat surface, press indicator down until pointer has turned approximately one revolution, tighten indicator on support and zero the pointer. To check release lever height, place support and indicator on gauge hub with indicator stem bearing on inner end of release lever. Indicator pointer should turn one revolution and read within plus or minus .031". All levers must also be equal within .031". Adjust levers as directed under "Release Lever Adjustment (On Fixture)" above.

Ford - Mount clutch assembly on spare flywheel with three .250" thick spacers (drill rod or precision washers may be used) in place of regular driven member (*NOTE* - Place spacer under each release lever). Use dial indicator to measure lever heights. All levers must be equal within .031". Replace pressure plate and cover assembly if greater variation noted.

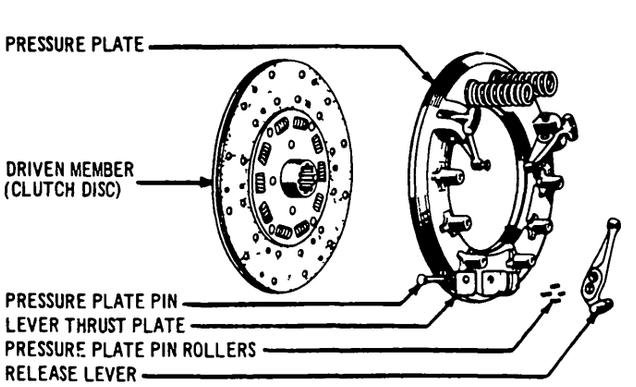
Oldsmobile - Install special lever setting gauge J-4389 on flywheel in place of driven member, placing gauge so that lugs are under release levers and gauge is centered in clutch. Tighten all clutch cover bolts evenly. Place short straightedge across center of gauge (for positioning levers). Bearing surfaces of all levers should be from .0000" to .0625" below level of gauge center boss and all levers must be equal within .015". Adjust levers as directed under "Release Lever Adment (On Fixture)" above.

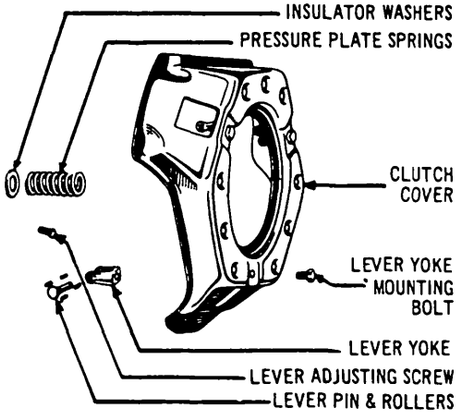
DRIVEN MEMBER: *See Car Model pages for data.*

① Release Lever Setting (Borg-Warner Fixture UF-300 & UF-400)

Clutch Assy.	Lever Height
L1440	2 7/32"±1/32"
L1478	2 7/32"
L5167	1 7/8"
L5222	③
260108	③
261981	1 3/4"
262832	1 7/8"
263934	1 13/16"
264300	② 2 15/32"
265125	1 13/16"
265126	1 3/4"
266716	⑤
266978	②③
267044	1 3/4"
267147	⑥ 2 7/32"
267346	②
267350	②③
267371	④ 2 1/4"
267454	1 3/4"
267953	1 15/16"
267954	1 7/8"
268349	1 15/16"
268594	⑥ 1 13/16"
403502	⑧

① -With 3J Lands and three 3D Rings.
② - No lever adjustment. Use new pressure plate to restore settings. Set levers parallel by tapping assembly screw on top cover.
③ - See "Ford" under Release Lever Checking & Adjustment (without Fixture) data.
④ - With 3J Lands, six 3K4 Height Sleeves, one 3X Indicating Plate and three bars (½" x ½" steel) bridging slots.
⑤ - See "Buick" under Release Lever Checking and Adjustment (without Fixture) data.
⑥ - With 3J Lands and one 3D Ring.
⑦ - **UF-300** - With 3J Lands, Six 3K4 Height Sleeves, three Bars ½" x 4¼" steel (Bridging Slot), and 3X Indicating Plate. **UF-400** - With 3 3J Lands, and 3X Indicating Plate.
⑧ - With three 3J Lands, three 3D Rings, and 3X Indicating Plate.





L N CLUTCH ASSEMBLY (TYPICAL)

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- Eaton Positraction 2210
- Edsel, Ford, & Mercury Equa-Lock 2245
- Rambler Twin Grip 2274
- Rambler Twin Grip (Spicer) 2206
- Spicer (Cone Clutch) 2205
- Spicer (Plate Clutch) 2206
- Spicer (Belleville Plate Clutch) 2208

REAR AXLES
- Spicer Hypoid Semi-Floating 2202
- Timken Semi-Floating 2211

FOR REAR SUSPENSION, SEE SUSPENSION & WHEEL ALIGNMENT SECTION

SPICER HYPOID

FRONT AXLES
Ch vrolet ½ & ¾-T n Trucks (1960)
F rd Truck, F-100 Series (1959-60) ①
Willys (1954-60)

REAR AXLES
Checker Sup rba (1959-60)
Chevrolet ½-T n Truck (1959) ①
Hudson Six (1954)
Hudson Special V8 (1956)
Huds n V8 (1957)
Nash Ambassad r Special V8 (1956)
Nash Ambassador V8 (1957)
Packard (1956-58)
Rambler V8 (1957-58) ②
Stud bak r (1954-60)
Willys (1954-60) ③

① - Used with "Power-Lock" Differential only.
② - Used in partial production. *For other type rear axl , s "1955-57 Hudson, Nash, Rambler Hypoid".*
③ - Used in partial production on L6-226 4WD Jeep Trucks between 1954 and 1958. *For other type rear axl , see "Timk n S mi-Floating".*

►CHANGES, CAUTIONS, CORRECTIONS

►*1954-60 LINCOLN, 1954-56 MERCURY, 1954-56 FORD STATION WAGON, SEDAN DELIVERY & F-1 TRUCK: S e Ford, Lincoln, M rcury Rear Axle.*

►*CHEVROLET & WILLYS 4-WHEEL DRIVE FRONT AXLE OVERHAUL NOTE: Front axle overhaul procedures ar th sam as f r r ar axles*

►*AXLE RATIO CHANGE CAUTION: Use correct differential cas if ring g ar and pinion ratios changed.*

►*STUDEBAKER PINION SEAL LEAKAGE CORRECTION: Us a n n-hardening sealer similar to Permatex No. 2 b tw n seal and housing.*

►*WILLYS 4-WHEEL DRIVE FRONT END CHATTER CORRECTION:* This condition is due to turning angle being excessive and can be corrected by breaking the weld on stopscrews mounted on axle and readjusting turning angle to proper specifications as follows: **29°** (Except CJ-3B, CJ-5, CJ-6 & FC-150). **27½°** (CJ-3B, CJ-5, CJ-6). **27°** (FC-150 with 48" Tread). **29°** (FC-150 with 57" Tread).

►*WILLYS PINION SHAFT OIL SEAL DRIVER TOOL W-147 MODIFICATION FOR USE WITH LATEST TYPE PINION SHAFT OIL SEAL:* To prevent damage to seal during installation, increase outside diameter of tool recess from 1.975" to 2.031". Modified tool can be used on both early and later type seals.

DESCRIPTION: Hypoid gear type with semi-floating axles (Exc. Model 70 rear axles and axles used with front wheel drive units), full-floating axles (Model 70 and models used with front wheel drive units). Rear wheel bearings are roller type on all semi-floating axles except the model used on 1959 Chevrolet ½-Ton Truck which is ball bearing. The differential case used with Model 70 axle is "split type" case and contains four differential pinions.

►*REAR AXLE ASSEMBLY IDENTIFICATION NOTE: Spicer Model number is stamp d on one of th rear axl housing w bs. S Car Pages for axl model application.*

REAR AXLE ASSEMBLY REMOVAL: *Se "R ar Axle" on Car Model pag s.*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Mod l pages.*

AXLE SHAFT ENDPLAY (WHEEL BEARING) ADJUSTMENT: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT OIL SEAL REPLACEMENT: Rear Axle - On all models (Exc. Studebaker & Packard), pry old seal out of housing. On Studebaker & Packard, use Oil Retainer Remover Tool J-943 to remove seal. To install seal, soak seal in oil for 10 minutes, then coat outer surface of seal with Permatex and tap seal into bore using Tool J-2554 (Chevrolet); J-8092 & J-270-13 (Studebaker & Packard); W-186 (Willys) or other suitable tool.

Front Axle (Willys 4-Wheel Drive): With differential case assembly removed from housing, pry old seals out of inner ends of axle shaft tubes, then use Tool W-128 to install new seals.

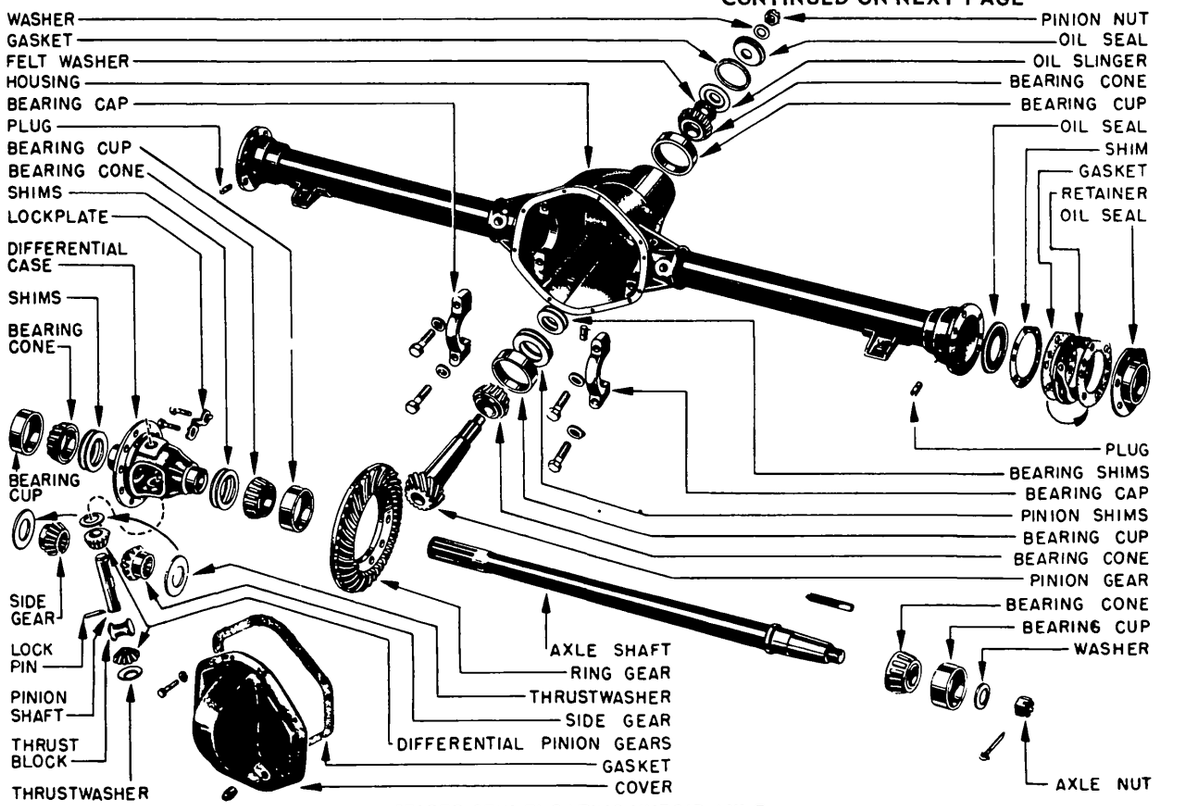
Front Axle (Chevrolet Truck): With differential assembly removed from housing, pry out old seals or drive them inward into housing. Install new guides in tubes, then lubricate new seals and install in tubes with lip of seal inward toward housing.

PINION BEARING OIL SEAL REPLACEMENT: Disconnect rear universal joint at pinion shaft companion flange, then remove pinion shaft nut and washer and remove companion flange with a suitable puller. *NOTE - On Hudson & Nash models, see "Torque Tube & Propeller Shaft (Hudson & Nash)" above.* Remove old seal, then install a new seal by tapping it into place with Tool J-6419-5 (Chevrolet); J-892 & J-2037 (Studebaker & Packard); W-147 (Willys). Install oil deflector, companion flange, washer, and pinion shaft nut. Tighten nut to 200-220 ft. lbs. (Chevrolet); 140-180 ft. lbs. (Studebaker & Packard); 140-180 ft. lbs. (Willys except Model 70 axle); 225-275 ft. lbs. (Willys Model 70 axle).

REAR WHEEL BEARING REPLACEMENT: Chevrolet Truck (Ball Bearing) - With axle shaft removed, expand bearing retaining ring by driving a chisel into it at several points around ring. Support outer face of bearing on Tool J-6378, then press shaft out of bearing and retainer, using an arbor press. Remove outer retainer from shaft. To install, place outer retainer on shaft, then lubricate shaft and bearing and start bearing over shaft. Support inner face of bearing in Tool J-6419-5 and J-6378 in an arbor press and press shaft into bearing until bearing seats firmly against axle shoulder. *NOTE - A pressure of 2700-6000 lbs. is required to install bearing.* Start retaining ring over shaft and press onto shaft against bearing in same manner as bearing was installed. *NOTE - A minimum pressure of 2700 lbs. is required to install retaining ring.*

►*HUDSON & NASH SERVICE REPLACEMENT TORQUE TUBE TRUNNION INSTALLATION: See "Hudson, Nash & Rambler" Rear Axle.*

CONTINUED ON NEXT PAGE



SPICER SEMI-FLOATING HYPOID AXLE

SPICER HYPOID (C nt.)

TORQUE TUBE & PROPELLER SHAFT (HUDSON & NASH): Removal - Raise and support rear end of body. Disconnect hand brake cable at equalizer and remove hand brake bellcrank assembly from torque tube. Disconnect rear stabilizer bar at rear axle tube. Remove truss rods at axle tubes and at center bracket on torque tube. Disconnect torque tube from transmission adapter and move axle assembly and tube to rear to disengage propeller shaft from transmission. Disconnect rear of torque tube from rear axle housing and move tube forward sufficiently to expose coupling. On Hydra-Matic Drive cars, disconnect coupling flange and remove torque tube and propeller shaft. On synchro-mesh transmission cars, the coupling is a slip fit on pinion shaft and a press fit on propeller shaft. On Hydra-Matic Drive cars, remove pinion flange with Puller J-2984.

Installation: Reverse removal procedure, and note the following: Support pinion from rear while pressing companion flange on pinion shaft (Hydra-Matic Drive cars). On synchro-mesh transmission cars, install propeller shaft oil seal and retainer on propeller shaft. Butt propeller shaft at front end against a wood block and drive coupling on shaft with a lead hammer. *(CAUTION* - Do not install the seal and retainer on coupling prior to its installation on propeller shaft). Coupling must be driven on shaft to shoulder on splined area inside coupling. Install spacer, lubricate ground surface on coupling and the torque tube rear oil seal with rear axle lubricant. The propeller shaft with coupling can now be installed on pinion shaft (do not crimp lip of oil seal). Make sure that torque tube seal contacts coupling on the ground surface of coupling.

OVERHAUL

DIFFERENTIAL: Removal - Remove rear axle housing cover and gasket, then remove differential side bearing caps. *NOTE - If bearing caps are not marked for replacement at same location, identify them with punch marks for proper reassembly.* Position Spreader Tool J-5231 (Chevrolet, Hudson, Nash, Rambler, Packard & Studebaker with Model 44 axle); J-5372 (Studebaker with Model 23 & 27 axle); W-129 (Willys), on axle housing, then install dial indicator to indicate amount housing is spread. Expand tool not to exceed .020",then use a pry bar and pry differential assembly out of housing. Remove and tag side bearing cups so they may be reinstalled in original locations. Relieve pressure on spreader tool.

►*POWER-LOCK DIFFERENTIAL DISASSEMBLY NOTE: For disassembly and reassembly procedures see "Power-Lock Differential (Plate Clutch Type)".*

Disassembly (Exc. P wer-L ck Typ Diff rential): Remove differential side bearings with a suitable puller and retain shims located under bearing cones for use at reassembly. Remove ring gear attaching capscrews and tap ring gear off case. Remove differential pinion shaft lock pin (Exc. Model 70 axle), then remove pinion gears, side gears, and thrust washers. On Model 70 axles, remove bolt from differential case cover, then remove cross shaft, pinion gears and thrust washers.

Reassembly (Exc. Model 70 Axle & Power-Lock Type Differential): Install ring gear on case and tighten attaching capscrews to 40-50 ft. lbs. Install thrust washers on side gears and install side gears in bores of differential case. Install thrust washers behind pinion gears and mesh gears with side gears so holes are opposite and in line with each other. Roll gears around until holes are aligned with pinion shaft holes in case, then install pinion shaft and thrust block with lock pin hole in shaft aligned with hole in case. Press shaft into case and measure clearance between side gears and case. This clearance should not exceed .008". *NOTE - On 4-Wheel drive models, side gear clearance on front axles should be .000-.006" with .006" being the absolute maximum.* If necessary, replace thrust washers. Drive lockpin into place and upset end of pin to retain it in case. *NOTE - Do not install side bearings and shims at this time.*

Reassembly (Model 70 Axle): Install ring gear on case and tighten attaching capscrews to 100–110 ft. lbs. *CAUTION – Pull ring gear into position evenly with two or three of the attaching capscrews.* Bend locking tabs over head of screws to prevent loosening in service. Install thrust washers on side gears and install a side gear in each case half. Install thrust washers and pinions on cross shaft, then install the assembly in ring gear side of differential case, meshing side gears and pinion gears. Install differential case cover and side gear assembly on differential case and rotate gears to mesh side gears with pinions. Align cover attaching capscrew holes with holes in case, then install and tighten capscrews securely. *NOTE – Do not install side bearings and shims at this time.*

Installation: With pinion installed and pinion depth and preload adjustment within limits *(See "Pinion Depth Setting" and "Pinion Preload Adjustment" below),* adjust differential side bearing preload and gear backlash *(See "Differential Side Bearing Preload & Gear Backlash Adjustment" below),* then install differential side bearings with proper shim pack under each bearing. Install rear axle housing spreader and spread housing not to exceed .020", then install differential assembly and bearing cups and remove housing spreader. Install bearing caps and tighten bolts to 70-90 ft. lbs. (Chevrolet & Model 70 axle, Hudson, Nash & Rambler); 70-80 ft. lbs. (Studebaker & Packard); 38-42 ft. lbs. (Willys, Exc. Model 70 axle).

PINION & BEARINGS: Removal - Remove companion flange, oil seal, gasket and oil slinger *(See "Pinion Bearing Oil Seal Replacement" above),* then with differential case assembly removed, tap drive pinion and rear bearing cone out of housing with a soft hammer. Tag and save shim pack on splined end of pinion (bearing preload shims) for reference during reassembly. Remove front bearing cone from housing. If pinion bearings are to be replaced, remove rear bearing cup with Tool J-6367 (Chevrolet); W-100 & W-100-4 (Willys). On Hudson, Nash, Rambler, Packard, Studebaker front and rear cups, and Chevrolet and Willys front bearing cups, drive cups from housing with a brass drift and hammer. *NOTE - Tag and save shims from in front of rear bearing cup for use during reass mbly.* Press pinion rear bearing cone off shaft with Tool J-6378 (Chevrolet); J-2245-A (Hudson, Nash & Rambler); J-5365 (Studebaker); W-104 (Willys).

Installation: Install bearing cone on drive pinion using a suitable piece of pipe to seat bearing against shoulder. Install front bearing cup in housing with Tool J-6368 & J-8092 (Chevrolet); J-2534 or J-5367 (Hudson, Nash & Rambler); J-270-6 & J-8092 (Studebaker & Packard); W-142 (Willys). Install correct shim pack in rear bearing recess in housing *(See "Pinion D pth Setting" below),* then install rear bearing cup with Tool J-3234 (Chevrolet); J-2531 (Hudson, Nash, Rambler); J-270-14 & J-8092 (Studebaker & Packard). Install pinion and rear bearing in housing and install outer shim pack *(S e "Pinion Preload Setting" below).* Install outer bearing cone using Tool J-5590 (Chevrolet), J-2204 (Studebaker & Packard). On other models, seat bearing with companion flange, washer and pinion nut. Complete installation of pinion shaft *(See "Pinion Bearing Oil Seal Replacement" above.*

PINION DEPTH SETTING: Procedures are different for the various cars and trucks as indicated below:

Chevrolet: If a new pinion and ring gear are to be installed, note the "plus" or "minus" markings on rear face of original pinion. *NOTE - Pinion markings r present variations from nominal pinion d pth dim nsion.* Approximate depth setting of new pinion may be made by increasing or decreasing shim pack ahead of pinion bearing rear cup to correspond with difference in marking on old and new pinion *(se "Chevrolet Shim Selection Table" below).* To maintain proper pinion bearing preload, shim must be added or subtracted from pinion bearing (front) shim pack to correspond with changes made to rear bearing shim pack. If the difference in markings on old and new pinions is in the plus direction, shims must be added. If in the minus direction, shims must be removed.

Chevrolet Shim S l ction Tabl

Markings on Pinions		Difference Between Markings	Amount To Change Each Shim Pack
New Pinion	Old Pinion		
+8	+5	+3	Decrease. 003"
+5	+8	−3	Increas .003"
−5	−3	−2	Increase .002"
−3	−5	+2	Decrease .002"
+5	−3	+8	Decrease .008"
−4	+2	−6	Increase .006"

CONTINUED ON NEXT PAGE

SPICER HYPOID (C nt.)

Huds n, Nash, Rambl r: *NOTE - Shim pack is determined by amount of shims r m v d at disassembly and by the plus or minus figur tch d on pinion.* For example, if original pinion was marked "+2" and had a shim pack of .035" behind rear bearing cup and the new pinion to to be installed is marked "–1", the shim pack must be increased by .003" to bring new pinion to its correct position. Install pinion bearing front cup *(See "Pinion & Bearing Installation" above),* then install pinion shaft assembly in housing. Check pinion setting as follows: Mount discs J-2499-2 on Arbor Gauge J-6482-1 or discs J-5223-5 on Arbor Gauge J-5223, then install gauge assembly so it is seated firmly in housing bores. Place bearing caps in position and tighten bolts finger tight. Install Gauge Block J-5223-16 in position against end of pinion and clamp in place with Clamp Bar and Screw, J-5223-6 and J-5223-14. Loosen thumbscrew in end of gauge block and move plunger out until head contacts gauge arbor. Lock plunger in position with thumbscrew, being careful not to disturb position of plunger. Loosen screw in clamp holding gauge block against pinion and remove gauge block. Measure distance from end of anvil to top of plunger head with a two-to-three inch micrometer. This measurement represents the distance from rear face of drive pinion to centerline of axle, and should be 2.625" for 1956 models, 2.625" for late 1957 Rambler V8, 2.547" for 1957 Hudson & Nash V8, and 2.095" for 1958 Rambler V8. This measurement applies only to correctly adjusted pinions marked "O". On a pinion marked "+2", the read - ing should be .002" less than this figure and with a pinion marked "–3", the reading should be .003" greater. If micrometer reading shows pinion setting is incorrect by more than .002" plus or minus from given figure, shims equal to that amount must be either added or removed from shim pack between rear bearing cup and housing

Stud baker & Packard: With original shim pack under pinion rear bearing cup, seat cup in housing, then install the shaft and bearing assembly. Lubricate front bearing cone and install on pinion shaft (without preload shims) using Tool J–2204 and companion flange. Tighten nut on tool to obtain 10–20 inch-pounds bearing preload as measured with an accurate spring scale. Use pinion Setting Gauge J–6381 as follows: Install proper size discs on gauge arbor and install discs and arbor in bearing bores of axle housing, then install bearing caps and tighten the capscrews. Place gauge block on pinion, holding it there with the clamp bar and screw. *NOTE – Small extended anvil should extend down along side of pinion gear.* With gauge block in position, loosen thumb screw in end of gauge block and move plunger out of block until plunger head contacts gauge arbor, then lock plunger with thumb screw (use care not to disturb setting). Remove gauge block from pinion, then measure distance from end of anvil to top of plunger head. This measurement represents distance from face of pinion to centerline of rear axle. Measurement on micrometer should be as indicated in table below for a "zero" pinion. If pinions are marked (+) or (–), this must be added or subtracted from the "zero" depth setting. For example: If pinion is marked (+2). .002" must be subtracted from "zero" depth setting. If the pinion is marked (–2), .002" must be added to "zero" depth setting. If pinion depth setting is not correct, shims equalling the difference must be added or remove from shim pack between rear bearing cup and housing to bring setting within limits. Complete installation of pinion (see above).

Studebaker "Zero" Pinion Depth

Spicer Model No.	
44 (All Ratios)	2.625" ± .0015"
23 (Exc. Ratios below)	2.343" ± .0015"
23 (4.1–1, 4.56–1, 4.88–1)	2.250" ± .0015"

Willys: Use Pinion Setting Gauge W–99 which consists of a dial indicator and a mounting fixture to be mounted on rear face of pinion (held in place with "C" clamp which is part of gauge). Before using this gauge, dial indicator must be set to zero through use of a master gauge block supplied with the equipment. Set dial indicator at zero with gauge pin resting on correct lobe of master gauge *(see "Pinion Gauge Setting" table below)* and with one-half turn tension on gauge pin. With pinion installed in axle housing (spacer W–126–6 can be installed on shaft in place of universal joint yoke), and with pinion setting gauge in place, dial reading should be zero for pinions marked "O", or **minus** for pinions marked "–", and should read **plus** for pinions marked "+", by an amount equal to the figure following the "+" or "–" sign on end of pinion. Adjust by adding or removing shims from behind rear bearing cup in housing. Repeat test until correct dial reading is obtained.

Willys Pinion Gauge "Zero" Setting

Spicer Axle Model No.	Lobe of Master Gauge
23	"D"
25 (Exc. 4.27–1 Ratio)	"D"
25 (4.27–1 Ratio)	"G"
44	"E"
53	"F"
70	"G"

► *AXLE MODEL IDENTIFICATION NOTE:* Axle model number will be found on the lower right rib of gear carrier housing when viewed from rear of vehicle.

PINION BEARING PRELOAD: Chevrolet - With original (or adjusted) shim pack behind outer bearing cone and pinion shaft assembly installed in housing (without pinion bearing oil seal and slinger), the torque required to rotate pinion should be 10-20 inch lbs. Add or remove shims behind outer bearing cone to bring preload within limits.

Hudson, Nash & Rambler: Install oil slinger, companion flange and nut (do not install oil seal). Check preload by attaching a spring scale to a "T" handle and socket, and rotate pinion shaft on a horizontal plane. Add or remove shims from between front bearing and shoulder on shaft to obtain a preload of 25-35 inch lbs. required to rotate pinion shaft.

Stud bak r & Packard: With pinion gear set to correct depth, remove front bearing from pinion shaft and install the original pinion bearing adjusting shim pack, then install front bearing and companion flange, using Companion Flange & Pinion Bearing Pusher J-2204 and Holding Tool J-6371. Install flat washer and tighten to 140-180 ft. lbs. Check pinion bearing adjustment with a spring scale hooked to arm of holding tool. The rotating torque should be 10-20 inch lbs. (disregarding starting torque). Install or remove shims from under front bearing as necessary to bring adjustment within specifications.

Willys: To adjust pinion bearing preload, start with approximately .065" shim pack on shoulder of pinion. Reassemble front bearing yoke, washer and nut and tighten nut to 140-180 ft. lbs. (Exc. Model 70 Axle), 225-275 ft. lbs. (Model 70 Axle). Using an inch-pound torque wrench, check rotating torque (disregard starting torque). Torque should be 10-25 inch lbs. Add or remove shims to obtain correct torque.

DIFFERENTIAL SIDE BEARING & GEAR BACKLASH ADJUSTMENT: Hudson, Nash, Rambler - Place differential case assembly in housing and install bearing caps in proper position; tighten capscrews finger tight. Insert two screw drivers between bearing cup and housing on the side opposite the ring and move differential assembly and ring gear away from pinion until opposite bearing cup is seated firmly against housing. Move screw drivers to ring gear side and move assembly over until ring gear teeth contact teeth of pinion. Refer to recording of shim thickness required (taken at time differential case disassembled), and install the shims between bearing cups and housing. Divide total amount of shims between sides in such a manner that all ring gear and pinion backlash is eliminated. Remove bearing caps and take out differential case assembly. Keep each shim pack separate. Remove side bearings from differential and install shim packs on their respective hubs. Install an additional .015" thickness of shims behind the differential bearing on the tooth side of ring gear to provide proper backlash between gear and pinion and proper pre-load. Install bearings. Place axle housing spreader J-5231 in position and spread housing .020" maximum to permit installation of differential assembly. Install bearing caps and use sealing compound on bolt threads. Remove housing spreader and tighten bearing caps to 70-90 ft. lbs. Install dial indicator on housing with contact button resting against edge of ring gear tooth and check backlash between ring gear and pinion which should be .002-.006", and should not vary more than .002" between positions checked; check at four positions on ring gear.

Studebaker & Packard: Place differential case in housing (without shims behind side bearings). Install a dial indicator on housing with contact tip against ring gear back face. Insert two large screw drivers between housing and cup on opposite side from ring gear and move ring gear away from pinion until bearing cone on ring gear side is seated firmly in its cup and against the housing. Set indicator at zero. Move assembly back to-

CONTINUED ON NEXT PAGE

SPICER HYPOID (Cont.)

ward pinion until ring gear meshes lightly with pinion (no backlash or clearance). This reading, less .003" is the thickness of shims required between differential case and side bearing on ring gear side of differential. To find thickness of shims required under other side bearing, subtract the thickness of shims just used from the total side movement obtained earlier (at reassembly of differential). To the figure thus obtained, add 008" shim thickness for pre-load. To facilitate installation of differential assembly in housing, cock the bearing cups and tap them lightly with a lead hammer. When reinstalling bearing caps, be sure numerals on caps and housing correspond. Tighten bearing cap bolts to 70-80 ft. lbs. Mount a dial indicator on axle housing with contact button against one ring gear tooth. Move ring gear by hand to check backlash which should be .003-.006". If backlash is not in the specified range, move shims from one side of carrier to the other to obtain desired setting.

Chevrolet & Willys: With pinion shaft properly installed (depth and preload adjusted), install side bearing cones on differential case (without shims) then install bearing cups matching with cones as marked at disassembly Place differential carrier in housing and install bearing caps tightening bolts just enough to keep caps in place Check ring gear for runout with a dial indicator and correct as necessary Remove indicator then insert a pry bar between bearing and carrier on side opposite the ring gear and move differential case as far as possible toward ring gear side of housing Measure clearance between carrier and bearing on side opposite the ring gear with a long feeler gauge inserted all the way across bearing outer face Record the total gauge thickness, then remove feeler gauge Insert pry bar between carrier and bearing on ring gear side of housing and move differential case toward pinion until no backlash can be detected between ring gear and pinion Measure clearance between carrier and bearing at ring gear side of case with a feeler gauge in same manner as measured at opposite side Record this feeler thickness Remove differential case from housing and remove side bearings Install shim packs as follows *NOTE – If old shims are to be used, make sure nicks in shims caused by bearing puller are placed to line up with notches in case* At ring gear side of case install a shim pack equal to gauge thickness as noted when clearance gauged at ring gear side of case then install bearing tight against shims Subtract the amount of shims installed at ring gear side of case from the feeler gauge measurement taken on side opposite ring gear then add 015" shims to the result of the subtraction to provide bearing preload Install this shim pack on end of case opposite the ring gear and install the bearing tightly against shim pack Install differential case in housing *(see "Differential Installation" above)* Check backlash of gears with a dial indicator If backlash is not in specified range of 003– 006" (Chevrolet) 005– 010" (Willys) interchange shims between the two side bearing shim packs until correct backlash is obtained

POWER-LOCK DIFFERENTIAL (CONE CLUTCH TYPE)

Lincoln & Continental (1957-60)
Packard (1956-Early 1957)
Studebaker (Early 1957)
Willys (1957)

DESCRIPTION: Partial locking type differential. The unit consists of a two-piece case, with each piece having two V-shaped ramps or cam surfaces diametrically opposite. When assembled, the V-shaped ramps of one piece are at a 90° angle to the ramps of the other piece, with the V's facing away from each other. The conventional mounting of pinions is replaced by two individual cross pins with a slidable joint at the center, permitting each one to move independently, although continuously engaged. Ends of the pins are machined in the form of a "V" and ride on the V-shaped ramps. Two internally splined clutch rings are fitted over each of the side gears and mate with tapered surfaces in the case halves. Two internally splined differential gears, as well as the clutch rings, are splined to the axle shaft at each end. Four pinions, carried by the cross pins, mesh with the differential gears. Pinions incorporate shoulders which contact the clutch rings. The unit is interchangeable with the standard Spicer differential.

REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model page.*
AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model page.*
DIFFERENTIAL ASSEMBLY REMOVAL & INSTALLATION: *See "Lincoln, Continental Hypoid" Rear Axle.*

OVERHAUL

►*POWER-LOCK DIFFERENTIAL OVERHAUL NOTE:* Replacement parts are not available for the differential assembly. If parts require replacement due to wear or damage, it will be necessary to install a complete differential unit. The following procedures may be used for inspection or for correcting excessive noise conditions.

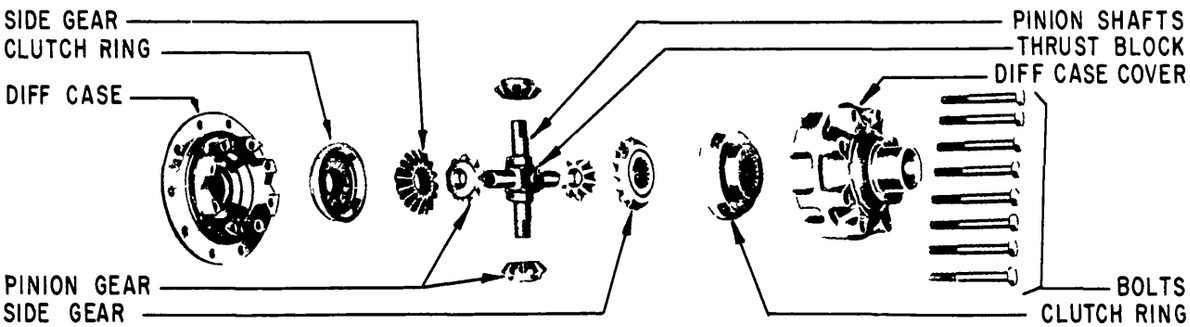
►*DIFFERENTIAL ASSEMBLY REPLACEMENT NOTE:* Power-Lock differential assemblies are interchangeable with the conventional assemblies.

DISASSEMBLY: With case assembly on bench (ring gear removed from case), check clearance between cross pins and ramps by manually raising a cross pin up one side of the ramp and inserting feeler gauges. *NOTE – If clearance at this point is less than .045" it is not necessary to disassemble differential case. If clearance is greater than .045", proceed as follows* Remove case capscrews, then remove cover, clutch rings, side gears, cross pins, and pinion gears. *NOTE - Identify each part and place on a clean cloth so that it may be reinstalled in the same relative location.*

INSPECTION: Clean and inspect all surfaces for scoring burrs, and nicks If excessive, replace complete assembly

REASSEMBLY: Place a side gear with its clutch ring on the bench, then install a 020" shim between side gear and clutch ring and place the pinion gears and cross shaft in proper position on the assembly. *NOTE – Fabricate shims from steel shim stock, of various thicknesses. Shim size should be 2 5/8", O.D., 1½" I.D.* Firmly hold the assembly together and check clearance between shoulder of pinion gear and edge of clutch ring with a feeler gauge. Remove enough shims to allow a minimum backlash of 003" between side gear and clutch ring As it is not possible to directly measure clearance between side gear and clutch ring, determine the thickness of shims required between side gear and clutch ring (in place of the 020" shim pack installed for checking) as follows: As an example, if a .007" clearance was found between shoulder of pinion gear and clutch ring, subtract .007" from thickness of shim pack (.020"), leaving .013" which would be the shim pack required to provide .000" between side gear and clutch ring. As a .003" backlash is desired, decrease the .000" clearance shim pack (.013") by this amount, indicating that a shim pack of 010" between side gear and pinion shaft would provide the desired backlash. Repeat this procedure with side gear and clutch ring on opposite side of case. Apply a light coating of special rear axle lubricant to all parts, then reassemble differential case by reversing disassembly procedures. *NOTE – Match alignment marks stamped on side of differential case assembly.*

LUBRICATION: Use Gear Lubricant, Part No B9L–19A508, only.



POWER LOCK DIFFERENTIAL (CONE CLUTCH TYPE)

POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE)

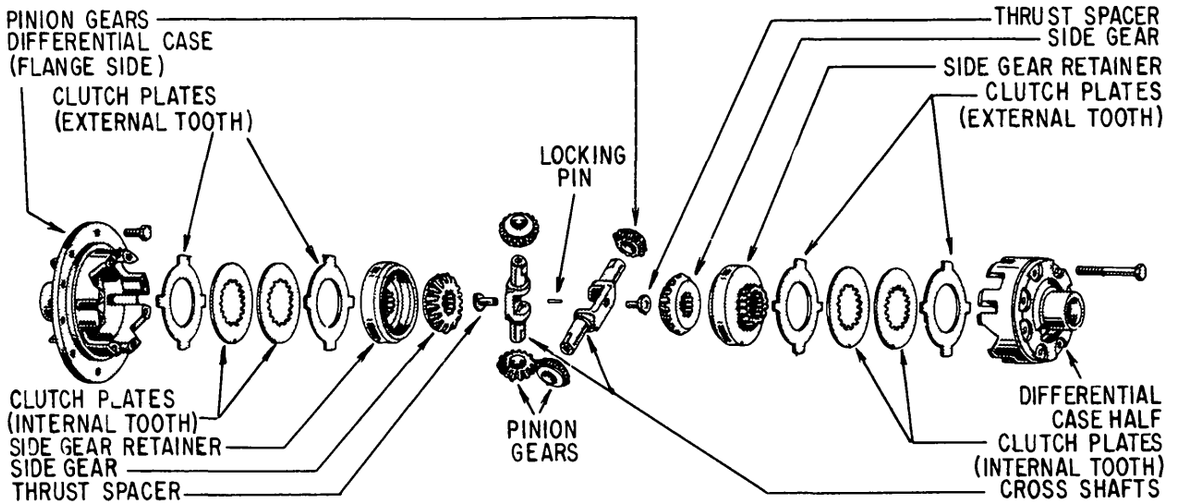
Buick (1959)
Chevrolet Pass. Car & Corvette (1957-59)
Chevrolet ½-Ton Truck (1959)
Chrysler & Imperial (1959-60)
DeSoto (1958-60)
Dodge (1958-60)
Ford F-100 & F-250 Trucks (1959)①
Oldsmobile (1958-59)
Packard (Late 1957-58)
Plymouth (1958-60)
Pontiac (1958-59)
Rambler V8 (1958-59)②
Studebaker (Late 1957-59)
Willys (1957-59)

① - For Ford Pass Cars, see *"Ford Power Transfer Differential"*
② - For Rambler 6 Cyl, see *"Twin-Grip Differential"*

►CHANGES, CAUTIONS, CORRECTIONS

►*1958-59 BUICK DIFFERENTIAL 'CHATTER' CORRECTION NOTE This method supersedes previous procedures* Raise car off wheels, then remove as much lubricant from rear axle housing as possible, using a suction gun Turn wheels by hand so any oil trapped in case will drain down Use an air pressure type gun having a long nozzle and filled with 10W engine oil, then insert nozzle in filler opening and direct oil at openings in case (at cross pins and ramps) Repeat this for all four openings in case Joggle wheels while flushing to release clutch plates and allow oil to flow through unit Fill housing completely with "10W" engine oil, then start engine and bring it to normal operating temperature with selector lever in "Park" With engine at normal operating temperature, apply brakes and place selector lever in "Drive" range, then **slowly** release brakes and allow rear wheels to rotate 60 to 90 seconds *NOTE - During this period, apply and release brakes gently several times to work plates in unit.* Gently apply brakes to slow rear wheels to a stop, then turn engine off and place selector lever in "Park" *CAUTION - Avoid fast idle or sudden brake application as well as fast selector lever changes to prevent damage to ring gear and pinion* Repeat the suction procedure as outlined above Use a clean suction gun filled with Buick Positive Traction Lubricant, Part No 531536 and spray at least one pint into case openings, then fill housing to proper level with the same lubricant If chatter is not corrected after car has been driven 50 to 100 miles, repeat the procedure If chatter is still not corrected, remove differential case, disassemble and thoroughly clean the unit *NOTE - A slight shudder under heavy acceleration during turns is normal and should not be confused with chatter in differential*

►*1957-59 CHEVROLET POWER-LOCK DIFFERENTIAL OPTIONAL PLATE ARRANGEMENT FOR OFF HIGHWAY OR HEAVY DUTY OPERATION* For maximum traction, assemble plates alternately with an internally splined plate against differential carrier or case *NOTE - This type assembly (maximum traction) will result in tire squeal on turns and a slight tendency to oversteer A slight "clink" (due to necessity for looseness in assembly to allow complete release) is normal*



POWER LOCK DIFFERENTIAL ASSEMBLY (PLATE CLUTCH TYPE)

►*1958 CHRYSLER, DESOTO, DODGE, PLYMOUTH POWER-LOCK DIFFERENTIAL LOOSE CASE BOLT CORRECTION* This condition may be noticed by a loud knocking noise in area of rear axle assembly and may be caused by differential case bolts striking carrier housing To correct, remove differential assembly from axle assembly and service as necessary Tighten differential case bolts to 45 ft lbs, then tack weld bolt heads to differential case using electric welding equipment and a very small weld *CAUTION - Do not tack-weld with case assembled in carrier* Later case bolts have left hand threads and will not loosen in service

DESCRIPTION This assembly replaces conventional differential assembly and consists of a multiple disc type clutch (4 or 5 plates) located between each side gear and differential housing The external tooth plates are driven by the differential housing and the internal tooth plates are splined to each side gear retainer Pinion gears are mounted on cross shafts which are free to move on ramps of differential housing *NOTE - Some models have axle thrust spacers that extend on both sides of cross shaft and are held in place with a locking pin*

OPERATION As engine power is transmitted from ring gear to differential case the driving force causes ends of cross shafts to move up ramps of cam surfaces and apply a load on the disc clutch This action locks the axle shafts in normal straight ahead driving preventing momentary spinning of wheels when leaving the road or when encountering poor traction The division of the torque between axle shafts varies in accordance with traction of each rear wheel When cornering the faster turning outer wheel relieves the load from clutch surfaces so that wear is reduced to a minimum and the action is essentially that of a conventional rear axle

REAR AXLE ASSEMBLY REMOVAL *See "Rear Axle" on Car Model pages*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model pages*

DIFFERENTIAL ASSEMBLY REMOVAL & INSTALLATION *See conventional rear axle service procedures*

►*STUDEBAKER DIFFERENTIAL OVERHAUL NOTE* Three different model axle assemblies are used Identification and special service procedures are as follows

Model "23" (No Identification on Housing) – These assemblies have 45° ramps and the clutch assemblies consist of two plates with external lugs and two plates with internal teeth on each side of differential When installing clutch pack start with an external lug plate against side gear retainer ring then alternate with an internal tooth plate an external lug plate then with an internal tooth plate

Model "44" (Stamped With a "T" on Metal Tag) – These assemblies have 30° ramps and the clutch assemblies consist of two plates with external lugs and two plates with internal teeth When installing clutch pack install the two internal tooth plates between the two external lug plates

Model "44" (Stamped With "45" on Metal Tag) – These assemblies have 45° ramps and the clutch assemblies consist of either four or five plates on each side of differential Assembling the clutch pack is the same for both types Start with an external lug plate then alternately install an internal tooth plate and an external lug plate until required number of plates are installed

►*POWER-LOCK DIFFERENTIAL OVERHAUL NOTE· Removal of ring gear and differential side bearings is not required unless replacement is necessary*

DISASSEMBLY: With differential removed from rear axle housing check clearance between pinion shafts and "V" ramp of differential case as indicated below *(see "Adjustment")*, then check to see that differential assembly halves are marked (punch marks number or letter) for use at reassembly *NOTE - If halves are not marked, scribe a line across both halves* Mark ends of pinion shafts case and differential gears with paint so these parts will be installed at the same location Remove end housing attaching bolts and remove end housing Remove side gear retainer ring and clutch pack from end housing then remove cross shaft and pinion gear assembly side gear retainer ring and clutch pack from flange side of differential housing Note the relation of clutch plates for use at reassembly

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POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE) C nt.

INSPECTION: Clean all parts in solvent and dry with air. Check for worn, cracked, or distorted clutch plates. Check all other parts for nicks, burrs, and abnormal wear.

►*DIFFERENTIAL REASSEMBLY NOTE: If cross shaft-to-"V" ramp clearance is not correct as noted at disassembly, see "adjustment" below for procedures required to obtain a correct clearance before reassembling differential.*

REASSEMBLY: Oil clutch plates thoroughly with special Power-Lock lubricant *(see "Lubrication" below)*, then proceed as follows: On all models except Chevrolet Pass. Cars and Studebaker models with Model "23" axle, install internal tooth and external lug clutch plates alternately on side gear retainer ring beginning with an external lug plate (4 or 5 plates required, depending on model). *NOTE – On Chrysler, DeSoto, Dodge, and Plymouth, the 1/16" thick clutch plate must be installed so it will be against differential case.* On Chevrolet Pass. Cars and Studebaker models with Model "23" axle, install an external lug plate on retainer ring, then install **two** internal tooth plates, completing the clutch pack with an external lug plate. Install clutch pack on the other retainer ring in the same manner. *CAUTION – Install only the same number of clutch plates as originally installed, and in the same order.* Install proper clutch pack and retainer in flange half of differential case, then install side gear, pinion gears, and cross shafts. *NOTE – On models with axle shaft thrust spacers, assemble cross shafts, pressing thrust spacers on thrust pin until spacers contact each other, then install cross shafts and pinion* gears. Install other side gear, retainer ring and clutch pack, aligning the external lugs with slots in differential case. Check location of alignment marks on both halves of case, then place end housing over clutch pack, engaging slots with external lugs of plates. Check to make sure all alignment marks are in proper alignment, then install housing attaching bolts and tighten to 35-45 ft. lbs. (45-65 ft. lbs. on Chev. Trucks).

CHECKING & ADJUSTING: With differential completely assembled, check and adjust clearance between pinion shafts and "V" ramp of differential case as indicated below for various models.

Checking Cross Shaft-to-"V" Ramp Clearance (Exc. 1959 Chevrolet Pass. Cars & Ford Truck Models): Insert feeler gauge under one side of "V" ramp on one end of pinion shaft, and the diagonally opposite side of "V" ramp on other end of pinion shaft. *NOTE - This will rotate the pinion shaft up the ramp in either a clockwise or counterclockwise direction.* Progressively increase thickness of feeler gauge under both ends of shaft equally until no clearance remains (clutch pack is closed). Check both pinion shafts in this manner. The clearance under pinion shafts should be within limits indicated in table. If not correct, adjust thickness of clutch plates or replace parts as recommended for the individual car models (below).

Checking Cross Shaft-t -"V" Ramp Cl arance (1959 Ch vrol t Pass. Cars & F rd Truck Mod ls): Insert feeler gauges under b th sid s of the "V" on both nds of pinion shaft at the **same time.** *NOTE - This requires four feeler gauges at four positions.* Increase thickness of all four gauges equally until no clearance remains (clutch pack is closed). Check both pinion shafts in this manner. The clearance should be within limits as indicated in table. If not correct adjust thickness of clutch plates or replace parts as recommended for individual car models (below).

Car Model	Clearance
Buick (1959)	① .030" Max.
Chevrolet Pass. Cars (1957-58)	.010-.035"
Chevrolet Pass. Cars (1959)	.005-. 015"
Chevrolet Trucks (1959)	② .001-.035"
Chrysler, DeSoto, Dodge, Plymouth(1958-60)	.020" Max.
Ford Trucks (1959)	.005-.015"
Oldsmobile (1957-58)	② .002-.020"
Oldsmobile (1959)	.010" Max.
Pontiac (1958-59)	② .002-.020"
Packard (1957-58)	② .020" Max.
Rambler (1958-59)	.004-.030"
Studebaker (1957-59)	③ .020" Max.
Willys (1957-59)	④

① – .005" maximum difference in clearance between the two pinion shafts.
② – .002" maximum difference in clearance between the two pinion shafts.
③ – .002" (30° ramp), .005" (45° ramp) maximum difference in clearance between the two pinion shafts.
④ - Clearance should be only a few thousandths of an inch and it should be equal at all four cross shaft ends.

Adjusting Clutch Pack (Cross Shaft-to-"V" Ramp Clearance): Recommended procedures for the various car models are as follows:
Buick – If pinion shaft clearance is greater than .030", replace excessively worn parts to bring clearance within limits. If the two cross shaft to ramp clearances are not within .005" of each other, equalize the clearances by disassembling differential and equalizing the total thickness of each clutch pack. Special thick service clutch plates, Part No. 1191503 & 1191504, or special thin plates, Part No. 1191501, and standard production plates, Part No. 531308 should be substituted as required to bring clearance within specifications. *NOTE – Production plates average .095" thickness. Special thick plates are marked .096" and special thin plates are marked .094".*

Chevrolet Pass. Cars - If pinion clearance is not within limits *(see table above)*, disassemble differential and inspect all parts for wear. Replace any parts that are worn or defective. If the two cross shaft to ramp clearances are not within approximately .002" of each other, equalize the two clutch pack thicknesses by interchanging plates and discs between the two packs, and/or installing thicker clutch plates, Part No. 531403 (.096-.101" thick), as necessary to bring clearances within limits. *NOTE - If n cessary, install n w compl t clutch packs on each sid of differential.*

►*CHEVROLET CLUTCH PACK & CLEARANCE NOTE: Changing the clutch pack thickness .002" (1957-58); .0065" (1959), will change pinion shaft-to-ramp clearance by .003" (1957-58); .005" (1959). If clutch pack thickness is increased, pinion-to-ramp clearance will be decreased.*

Chevrolet Truck – If the difference between one pair of pinion shaft measurements and the other pair is greater than .005", disassemble and measure all clutch plates and discs with a micrometer. Change thicker parts to side opposite to bring difference in clearance to .005" or less. If clearance at either of the pinion shafts is greater than .035", and it cannot be decreased by interchanging discs and plates from one side to the other, replace with service clutch plates to obtain correct clearance. Service clutch plates are available in the following thicknesses: .096–.101", .092–.097", .088–.093", .058–.063".

Chrysler, DeSoto, Dodge, Plymouth – If cross shaft-to-"V" ramp clearance exceeds .020", install new clutch plates in each clutch pack.

Ford Trucks – If pinion shaft-to-"V" ramp clearances exceed .015", install new clutch plates and discs which are available in one thickness only. If clearance is excessive after installation of new plates and discs, other parts which affect clearance and show wear must be changed.

Oldsmobile – If clearance between pinion shaft and "V" ramp is greater than .010", install thicker clutch plates to bring clearance within limits. Refer to chart (below) to determine thickness to be added to clutch plates to bring pinion shaft-to-ramp clearance to .002". As an example: if .019" feeler gauge (at either end of one cross shaft) was required to take up the clearance, .012" thickness should be added to total clutch plate thickness. Clutch plates are available in the following thicknesses: .092–.097" (Part No. 531402), .096–.101" (Part No. 531403), .088–.093" (Part No. 531404), .058–.063" (Part No. 531405).

OLDSMOBILE CLUTCH PACK ADJUSTING CHART

Cross Shaft Clearance Measured at Ramp (Step 3)	Approximate Thickness to be Added to Clutch Plates (To Obtain .002" Cross Shaft Clearance at Ramp)
.011"	.006"
.012"	.007"
.013" to .014"	.008"
.015"	.009"
.016"	.010"
.017" to .018"	.011"
.019"	.012"
.020" to .021"	.013"
.022"	.014"
.023" to .024"	.015"
.025"	.016"

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POWER-LOCK DIFFERENTIAL (PLATE CLUTCH TYPE) C nt.

Packard - Same as for Studebaker (below).

P ntiac – If pinion shaft-to-"V" ramp clearances are not within the range of .002–.020" or if clearances between the two shafts differ more than .002", interchange clutch plates from one side to the other, or install the necessary thicker clutch plates to bring clearances within proper limits. Clutch plates are furnished in the following thicknesses: .096–.101", .092–.097", .088–.093". .058–.063".

Rambl r – Replace clutch plate assemblies.

Stud bak r (M d ls Id ntified by a "T" Stamped on M tal Tag n Housing) – *NOTE – These models have differential assemblies with 30° ramps. See "Studebaker Diff rential Ov rhaul Note" above.* If pinion shaft-to-"V" ramp clearances exceed .020" or are not within .002" of each other, interchange plates from one side of differential to the other and/or install new plates as necessary to bring clearances within limits. *NOTE – Clearance at pinion shaft is affected .003" for .002" vertical rise in total plate stack height.*

Studebaker (Models Identified by "45" Stamped on Metal Tag on Housing): – *NOTE – These models have differential assemblies with 45° ramps. See "Studebaker Differential Overhaul Note" above.* If pinion shaft-to-"V" ramp clearances exceed .020" or are not within .005" of each other, install new clutch plates.

NOTE – Plates in these clutch packs are not of variable thickness.

Willys - If backlash at axle is not within limits *(see "Willys Backlash Check" below)*, replace clutch pack as necessary.

WILLYS BACKLASH CHECK: Raise one rear wheel, then with transmission in gear, measure travel of the raised wheel on a 10" radius from wheel center. Total movement should not exceed 1¼" for a new axle. Make sure axle assembly universal joint yoke does not move during the check.

LUBRICATION: Only the following special lubricants are to be used in "Power-Lock (Plate Clutch Type)" Differentials.
Buick: Part No. 531536.
Chevrolet Pass. Cars & Trucks: Part No. 3758790 or 3758791.
Chrysler, DeSoto, Dodge, Plymouth: Part No. 1879414.
Ford Trucks: Part No. B9A–19580–A.
Oldsmobile: Part No. 531536.
Pontiac: Part No. 531536.
Rambler: Part No. 3201017.
Studebaker: Part No. SP–50136.
Willys: Part No. 94557.

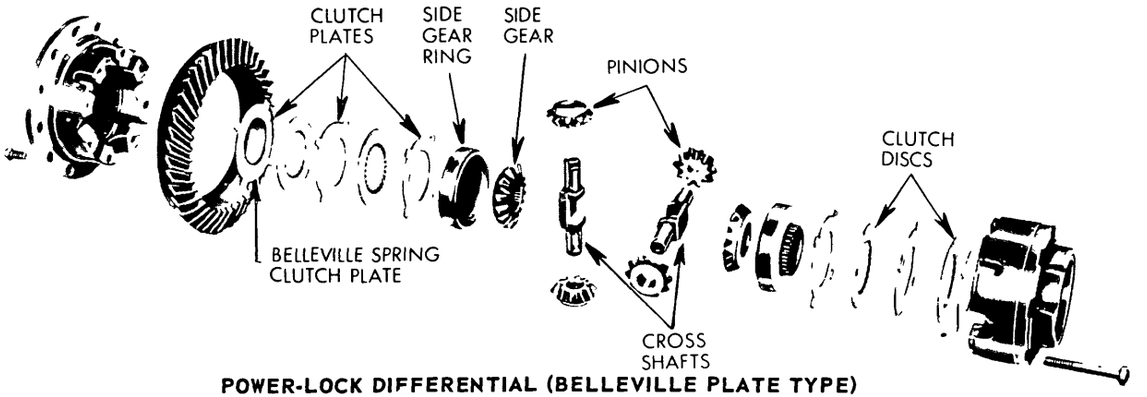
POWER-LOCK DIFFERENTIAL (BELLEVILLE PLATE CLUTCH TYPE)

Buick (1960)
Ch vr l t Pass. Cars (1960) ①
Ford F-100 & F-250 Trucks (1960) ②
Oldsmobil (1960)
Pontiac (1960)
Rambl r V8 (1960) ③
Stud bak r (1960)
Willys (1960)

① - For Chevrolet ½-Ton Truck, *see "Eaton Positraction Diff rential".*
② - For Ford Pass. Cars, *s e "Edsel & Ford Equa-Lock Diff rential".*
③ - For Rambler 6 Cyl. Cars, *see "Twin-Grip Differential".*

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 BUICK DIFFERENTIAL "CHATTER" CORRECTION: NOTE - This m thod supersedes previous procedur s.* Raise car off wheels, then remove as much lubricant from rear axle housing as possible, using a suction gun. Turn wheels by hand so any oil trapped in case will drain down. Use an air pressure type gun having a long nozzle and filled with 10W engine oil, then insert nozzle in filler opening and direct oil at openings in case (at cross pins and ramps). Repeat this for all four openings in case. Joggle wheels while flushing to release clutch plates and allow oil to flow through unit. Fill housing completely with "10W" engine oil, then start engine and bring it to normal operating temperature with selector lever in "Park". With engine at normal operating temperature, apply brakes and place selector lever in "Drive" range, then **slowly** release brakes and allow rear wheels to rotate 60 to 90 seconds. *NOTE - During this period, apply and release brakes g ntly several times to work plates in unit.* Gently apply brakes to slow rear wheels to a stop, then turn engine off and place selector lever in "Park". *CAUTION - Avoid fast idle or sudden brake appli) tion as well as fast selector lever changes to preven damage to ring gear and pinion.* Repeat the suction procedure as outlined above. Use a clean suction gun filled with Buick Positive Traction Lubricant, Part No. 531536 and spray at least one pint into case openings, then fill housing to proper level with the same lubricant.



POWER-LOCK DIFFERENTIAL (BELLEVILLE PLATE TYPE)

If chatter is not corrected after car has been driven 50 to 100 miles, repeat the procedure. If chatter is still not corrected, remove differential case, disassemble and thoroughly clean the unit. *NOTE - A slight shudder under heavy acceleration during turns is normal and should not be confused with chatter in differential.*

►*WILLYS STANDARD FRONT & REAR AXLE CONVERSION TO POWER-LOCK TYPE NOTE:* Standard type front and rear Spicer model assemblies can be converted to Power-Lock type by installing the proper differential assembly as follows:
Model 44 Assembly - All vehicles with Model 44 axle can be converted if the original axle shafts have involute splines. If shafts do not have involute splines it will be necessary to install two new shafts to make the conversion.
Model 23, 25, 27 & 70 Assemblies - On these models it is necessary only to install the proper Power-Lock Differential assembly.
Model 53 Assembly - This model cannot be converted except by installing a complete axle assembly.

►*1960 CHEVROLET POWER-LOCK DIFFERENTIAL PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Later production cars have a new differential assembly consisting of five plate (two friction discs, two friction plates, and one "Belleville" plate), replacing the former four plate type unit. *The "Fiv Plate" clutch pack cannot be used to replace th "Four Plate" type because of dimensional differences in differential case.*

►*1957-60 CHEVROLET POWER-LOCK DIFFERENTIAL ("FOUR PLATE" TYPE) OPTIONAL PLATE ARRANGEMENT FOR OFF HIGHWAY OR HEAVY DUTY OPERATION:* The normal arrangement of clutch plates as used in production is with the "Belleville" type plate installed next to differential case and with the two internally splined plates placed together next to "Belleville" plate. The other externally tanged plate is placed next to side gear retainer. For maximum traction, the plates can be rearranged with an internally splined plate placed next to differential case, followed by the "Belleville" type plate, an internally splined plate, and finally, the externally tanged plate next to side gear retainer. *NOTE - The maximum traction clutch pack arrang m nt will caus tire squeal on turns and a tendency to ov rst r.*

DESCRIPTION: Basic design is the same as used on 1959 models. The addition of "Belleville" type plates in

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POWER-LOCK DIFFERENTIAL (BELLEVILLE PLATE TYPE) Cont.

differential clutch pack has changed the checking and adjusting procedures as indicated in "Overhaul" below.

REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model pages.*

DIFFERENTIAL ASSEMBLY REMOVAL & INSTALLATION: *See conventional rear axle service procedures.*

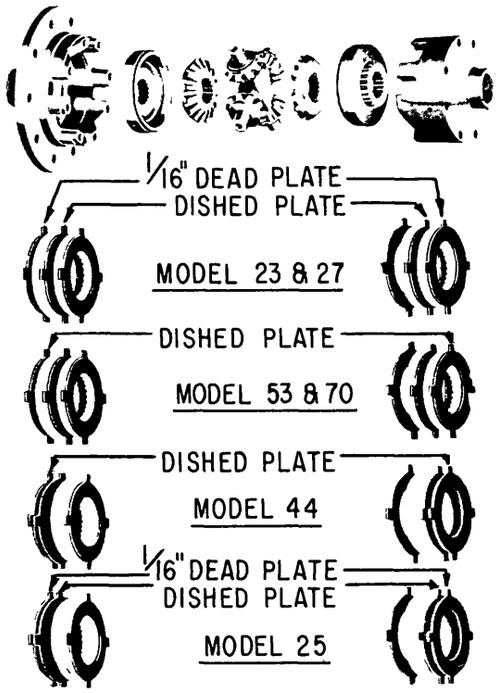
OVERHAUL: *See "Power-Lock Differential (Plate Clutch Type)" in this section and note the following:*

Buick: The outboard clutch plate of each clutch pack is a "Belleville" type spring and should be installed in the same direction (plate is coned) as originally installed. Pinion shaft-to-differential case ramp clearance has been eliminated with the use of "Belleville" type clutch plate in each clutch pack. If clearance exists, replace clutch plates with special thicker service clutch plates.

Chevrolet (Early Cars): These units are the same as used in 1959 with the exception that the inner tanged friction plate in each clutch pack has been replaced with a "Belleville" type (dished) plate. A repair kit is available which includes two of the new dished type plates for service installation on 1958-59 and early 1960 Pass. Cars and ½-Ton Trucks. There is no clearance between pinion shaft and "V" ramp on units with dished type plates. A clearance at this point indicates wear of component parts.

Chevrolet (Later Cars): This is a new type unit with three tanged friction plates installed in clutch pack alternately with two internally splined friction plates. The tanged friction plate placed next to differential case is .059-.061" thick. All of the other plates are .094-.096" thick including the "Belleville" type plate (tanged) which is installed between the two internally splined plates. *NOTE - "Belleville" type plate is installed with concave side toward differential case.* There should be no clearance between pinion shaft and "V" ramp. A clearance at this point indicates wear of component parts.

Oldsmobile: A "Belleville" (Dished) type clutch plate is used in each clutch pack, replacing the first plate in case and first plate in cover. Concave side of "dished" plate should face the clutch pack when installed, allowing the inside diameter to contact case of cover. 1960 clutch plates are .094" thick and the need for selective fitting of plates is eliminated. Checking ramp clearance is not required as the "Belleville" plates preload the clutch pack and eliminate clearance between ramp and cross shaft.



1960 WILLYS DIFFERENTIAL CLUTCH PACKS

Pontiac: The outboard clutch plate of each clutch pack is a "Belleville" type spring and should be installed in the same direction (plate is coned) as originally installed. Pinion shaft-to-differential case ramp clearance should not exceed .004" maximum at either side (zero ramp clearance preferred). If clutch pack parts are to be replaced, obtain a combination to give a total thickness of .475" in each clutch pack. Clutch plates are available in thicknesses of .094" and .096".

►*1959 PONTIAC CLUTCH PACK REPLACEMENT NOTE:* If one or more of the friction discs or clutch plates need replacing, the entire clutch pack should be replaced on each side. Use two kits, Part No. 535595, each of which contains two friction discs, two clutch plates, and one "Belleville" spring type plate.

Rambler: Clearance between pinion shaft and differential case ramps must not exceed .010". If clearance exceeds .010", replace both clutch packs.

Studebaker: *NOTE - There are three different clutch pack combinations using "Belleville" type plates as follows:*
Model 27 Axle (45 Type) - Two clutch plates (externally tanged) and two clutch discs (internally splined) are used. The outer clutch plate (tanged) in each clutch pack is a "Belleville" type plate which must be installed with "Dished" side toward clutch pack.
Model 27 Axle (45B Type) - Same as Model 27 (Type 45) axle except that an additional wear plate is installed between outer clutch disc (internally splined) and differential case at each side.
Model 44 Axle (45B Type) - Three clutch plates (externally tanged) and two clutch discs (internally splined) are used. The outer clutch plate in each pack is a "Belleville" type which must be installed with "dished" side toward the clutch pack.

►**Studebaker Note:** Pinion mate shafts may be tight on their ramps. Clearance between shaft and ramp should not exceed .010" and should be equal at all cross shaft ends. If one or more clutch plates, discs, or wear plates require replacement, the entire clutch pack should be replaced.

Willys: *NOTE - There are four different clutch pack combinations using "Belleville" type plates as indicated in illustration.* Install friction plates in the order shown in illustration. "Dished" plates in the clutch pack are always installed with convex side toward the case. Each pinion mate shaft can be tight against its ramp, or in the event there is a clearance between shaft and ramp, clearance should only be a few thousandths and it should be equal at all four cross shaft ends.

4-WHEEL DRIVE FRONT AXLES

1959-60 FORD TRUCKS

Ford F-100 & F-250 Truck (1959-60)

DESCRIPTION: Spicer Model 44-4F. Full-floating, hypoid gear type with Spicer "Cross Type" axle shaft universal joints. Differential assembly is similar to rear axle used on F-250 & F-350 Series trucks.

AXLE RATIOS: *See Car Model pages.*

AXLE SHAFT REMOVAL: *See Car Model pages.*

AXLE HOUSING ASSEMBLY REMOVAL: *See Car Model pages.*

OVERHAUL & ADJUSTMENT: *See "Ford Truck Hypoid".*

1957-59 CHEVROLET TRUCKS

Chevrolet ½, ¾ & 1-Ton Trucks (1957-59)

DESCRIPTION: Full-floating, hypoid gear type assembly of own design. Constant velocity type universal joints are provided at each wheel to deliver full power at any turning angle. Front and rear axle assemblies are the same on each truck model.

AXLE RATIO: *See Car Model pages.*

AXLE SHAFT REMOVAL & WHEEL BEARING ADJUSTMENT: *See Car Model pages.*

OVERHAUL & ADJUSTMENT: ½-Ton Models - *See "1955-60 Chevrolet Hypoid".*
¾ & 1-Ton Models - *See "Chevrolet Truck Hypoid Full Floating".*

1960 CHEVROLET TRUCKS

Chevrolet ½ & ¾-Ton Trucks (1960)

DESCRIPTION: Spicer Model 44-5F. Full-floating, hypoid type with "yoke & trunnion" universal joint at each front wheel.

AXLE RATIO: *See Car Model pages.*

AXLE SHAFT REMOVAL & WHEEL BEARING ADJUSTMENT: *See Car Model pages.*

OVERHAUL & ADJUSTMENT: *See "1954-60 Spicer Hypoid".*

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4-WHEEL DRIVE FRONT AXLE (C ntinu d)

WILLYS MODELS

Car Mod l	ℂ Spicer Model
Universal Jeep (1954-Early 1960)	25
Universal Jeep (Late 1960)	27
Jeep Utility (All Models)	25
Jeep Fwd Cont FC-150 (48 7/8" Tread)	25
Jeep Fwd Cont FC-150 (57" Tread)	44
Jeep Fwd Cont FC-170 (All Models)	44

ℂ - Axle model numbers appear on one of the axle housing webs

DESCRIPTION: Full-floating, hypoid gear type. Differential assembly is serviced in same manner as for other Spicer rear axle assemblies

►*POWER-LOCK DIFFERENTIAL:* See *"Power-Lock Differential (Plate Clutch Type)".*

►*POWER-LOCK DIFFERENTIAL IDENTIFICATION NOTE & LUBRICATION CAUTION:* Axles with Power-Lock differential assembly can be identified by brass tag stamped "T" attached to housing cover bolt Use only Special Power-Lock Differential Oil, Part No 94557

AXLE RATIOS: See *Car Model pages*

AXLE ASSEMBLY REMOVAL: See *Car Model pages.*

AXLE SHAFT REMOVAL, WHEEL BEARING & END-PLAY ADJUSTMENT: See *Car Model pages.*

OVERHAUL & ADJUSTMENT: See *"Spicer Hypoid" and note the following*

Pini n Setting With S tting Gauge W-99: Use Master Gauge Block indicated for specified Spicer axle model

Car Mod l	Master Gauge Block
Universal Jeep, All Models	"D"
Jeep Utility Models ℂ	"D"
Fwd Cont FC-150 (48 7/8" Tread)	"D"
Fwd Cont FC-150 (57" Tread)	"E"
Fwd Cont FC-170	"E"

ℂ - On L6-226 4-Whl Drive models with 4 27-1 axle ratio, use Gauge Block "G"

EATON POSITRACTION DIFFERENTIAL

Ch vrolet ½-T n Truck (1960)

►*OPERATING NOTE:* Under operating conditions where one rear wheel is on excessively slippery surface and the other wheel is on a good traction surface it may be necessary to slightly apply the parking brake (three or four notches) to produce enough resistance to the spinning wheel to energize differential clutch plates. It is suggested that a very slow application of the throttle on starting be used to provide maximum traction by preventing "break away" of the non-slipping wheel.

DESCRIPTION: This unit which is designed to replace the conventional differential assembly in a standard rear axle housing consists of disc clutches between side gear and case at each side of differential. These clutches are engaged by the tendency of differential pinion gears to force side gears outward as drive is transmitted through the system. The clutch pack on each side of differential consists of seven plates, four of which are driven by the differential case through two tangs spaced 180° apart. The other three discs are splined directly to differential side gear hub.

REMOVAL & INSTALLATION: Same as for conventional differential assembly. *See "Chevrolet Hypoid" in 1956 Annual Data or later Manual edition.*

Disassembly: Remove pinion shaft lock screw and remove shaft from case, then rotate pinion to openings in case and remove pinion gears. Remove side gears, clutch discs, shims and guides (one side at a time) noting location of discs shims and guides to aid in reassembly.

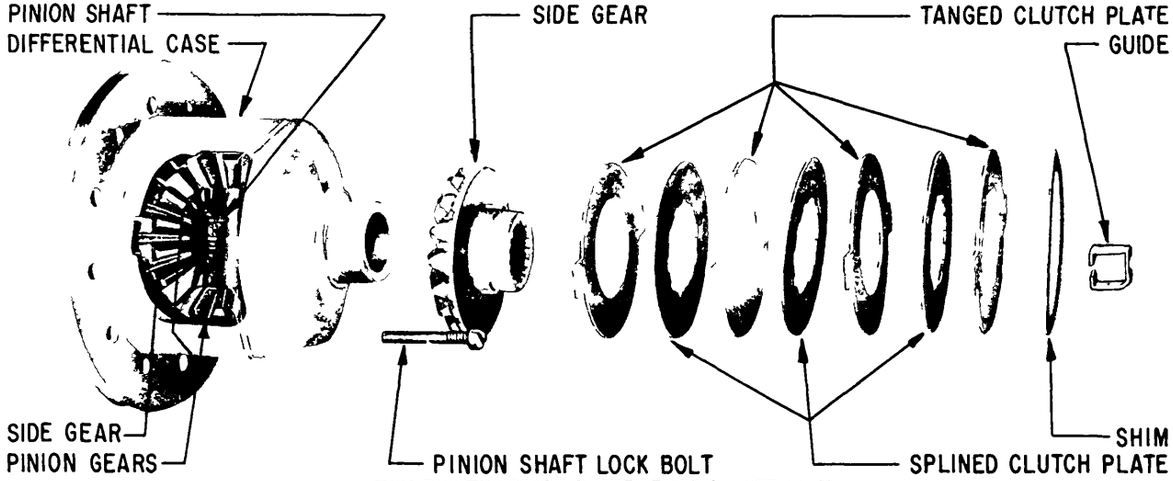
Inspection: Clean and dry all parts, then check all gears for chipped or worn teeth. Check spherical seat of pinion gears and mating seats in case. Inspect case for wear or damage. Check fit of differential pinion gears on shaft. Replace all parts if excessively worn. *NOTE - G ars must b replaced in s ts.* Inspect clutch discs and side gears for excessive wear or scoring. Replace parts as necessary.

Reassembly: 1) Apply a coating of lubricant to all clutch discs and stack four eared discs and three splined discs alternately on each side gear. Place the same shims that were removed (or equivalent thickness), on outside eared disc of each clutch stack.

2) Adjust pinion gear-to-side gear backlash as follows: Install one side gear, with shims and clutch disc, in case and install pinion gears and pinion shaft. Compress clutch stack by inserting a screwdriver or other wedge between side gear and pinion shaft. Install a dial indicator with contact button against a pinion gear tooth and check the backlash. If backlash is greater than .006", add a shim between clutch disc and case. If backlash is less than .001" decrease shim thickness. *NOTE - A .002" shim increase will decrease backlash approximately .001".* When correct backlash is obtained, remove side gear with clutch discs and shims, keeping parts together for final assembly. Repeat same procedures with other side gear and discs to determine shim thickness required for .001-.006" backlash.

3) Apply lubricant to guides and place one guide over ears at each side of each clutch stack so chamfered corner of guides face away from side gear. Install one side gear with guides, discs and shims, then position case so side gear stays in place and install side gear, guides, discs and shims in other side of case. Install pinions, pinion shaft and lockscrew but do not tighten screw.

4) Check the assembly by inserting an axle shaft in one side of differential and rotating to make sure differential action is satisfactory.



EATON POSITRACTION DIFFERENTIAL ASSEMBLY

TIMKEN SEMI-FLOATING

TIMKEN MODEL NO. 51540

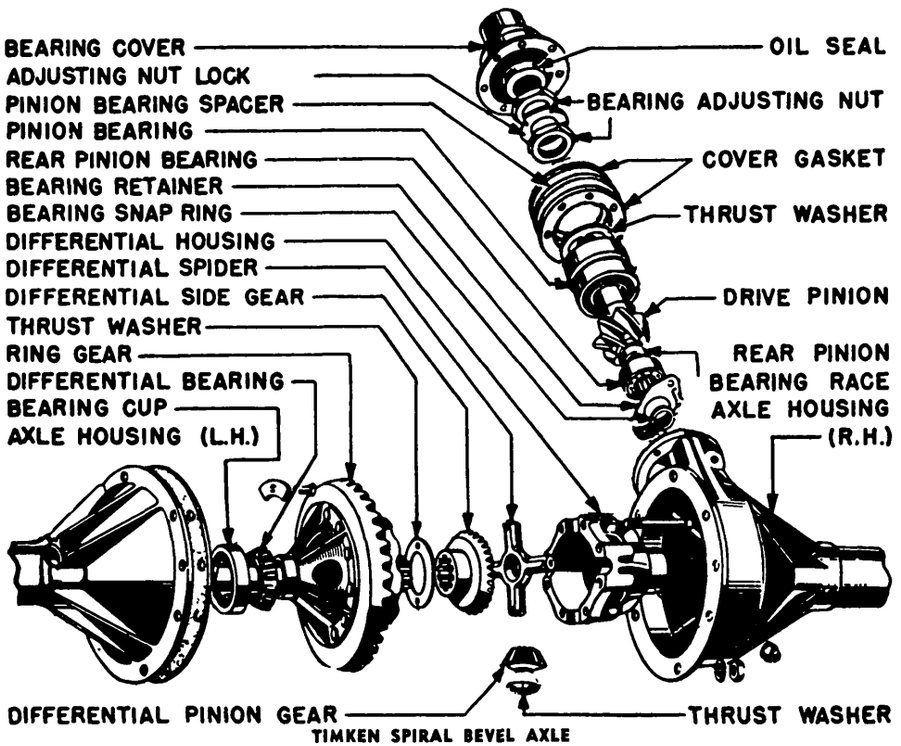
Willys, Truck, Model 475-4WD (1954-55) ①
Willys, Truck, Model 6-226-4WD (1954-56) ①

①–This axle used optionally with "Spicer Semi-Floating (Model 53-2)" Rear Axle since August, 1951.

DESCRIPTION: Spiral bevel, semi-floating type with Hotchkiss Drive. Axle housing is "split" type with one differential side bearing cup seated in recess in each half. Pinion is mounted on taper roller bearings in housing integral with right hand axle housing. Pinion bearing assembly is special type with a single outer race (bearing cup) for both roller bearings. Axle shafts are mounted on single taper roller bearing at each wheel, each bearing taking thrust in one direction while the thrust in the opposite direction is transmitted to the opposite bearing through the axle shafts.

AXLE SHAFT REMOVAL & WHEEL BEARING ADJUSTMENT: Same as for other Willys models. See Spicer Hypoid Semi-floating axle for complete data.

REAR AXLE DISASSEMBLY & REASSEMBLY: Remove eleven screws holding axle housing halves together, slide left housing half away (axle shaft will pull out of differential gear splines). Lift out differential assembly (pull out toward left so that right axle shaft is disengaged from differential gear splines). To remove side bearings, use Puller Tool No. W-104-20 to remove roller and cone assemblies from differential case shoulders, Tool W-200 to pull bearing cups from axle housing. To remove pinion assembly, take out bolts in housing holding bearing retainer (spacer) and cover, lift off cover and oil seal assembly, bearing retainer, and gaskets. Assemble Puller W-203 on end of pinion shaft, pull pinion and bearing assembly out toward front. See Pinion Assembly data below for disassembly of this unit.



TIMKEN SPIRAL BEVEL AXLE

Pinion Bearing Assembly: To dismantle this assembly, clamp pinion in vise (use brass jaws), bend up lips on locking washer, remove pinion locking nut, washer, and adjusting nut. Lift off front bearing cone and roller assembly, (slip fit on shaft), and bearing cup. Use Puller No. W-104-32 to remove rear bearing cone and rollers. To remove pinion bearing from housing, drive out two brass rivets in retaining plate from front of housing, remove plate, drive bearing out using a brass drift. To reassemble, install pilot bearing retainer, drive pilot bearing in place using Tool W-207, press pilot bearing inner cup on end of pinion shaft and install lockring (NOTE–New pinions furnished with cup and snap ring installed). Press rear pinion bearing cone and roller assembly firmly against pinion using Tool W-205, install bearing cup and front bearing cone and rollers, install washer, adjusting nut, locking washer, and locknut. Adjust pinion bearing pre-load (see below), securely tighten locknut and bend locking washer lip against nut. Install pinion assembly in housing using Installer Tool W-203. (CAUTION–Make certain pinion shaft enters pilot bearing in housing.) Check oil seal in pinion shaft cover (install new seal, if required, with Tool W-199). Install bearing retainer and cover assembly on housing using new gaskets (CAUTION–Align oil drain hole with opening in housing), install retainer bolts and tighten securely.

Pinion Bearing Pre-load Adjustment: With pinion bearings assembled on pinion shaft, tighten adjusting nut to pre-load bearings so that torque required to turn pinion shaft is 12-18 in. lbs. Locknut must be tight when checking this pre-load.

Pinion Setting: Pinion position is not adjustable. Ring gear and pinion are furnished only in matched sets and ring-and-pinion gear mesh will be satisfactory if axle correctly assembled and backlash is within limits of .004-.008".

Differential Assembly: To dismantle assembly for replacement of parts, cut lockwire, remove nine screws, separate differential case halves. Replace Differential Pinions, Pinion Thrustwashers, Side Gears, and Gear Thrustwashers as **matched sets.**
CAUTION–Use of mixed new and old parts will result in premature failure. Make certain that differential case screws are secured with lockwire when reassembling. Use Tool W-206 to install side bearing cone and roller assemblies on case, Tool W-204 to install bearing cups in housing. Before reassembling axle, examine ring gear thrust plate for wear and replace if necessary (plate is riveted in left hand housing)

Ring & Pinion Gear Backlash: .004-.018". Check backlash after axle completely reassembled.

1954-55 BUICK HYPOID

All Series (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►**REAR AXLE LEAKAGE CAUTION:** Oil leaks may occur at front pinion bearing unless following precautions observed:

Oil Leakage into Propeller Shaft (causing shaft unbalance)—Can be prevented by properly sealing pinion shaft when propeller shaft installed. *See Pinion & Propeller Shaft Assembly below.*

Oil Leakage into Torque Tube (and transmission)—Can be corrected by installing special oil seal in front of pinion front bearing. *See Pinion Bearing Oil Seal Installation below.*

Oil Leakage at Torque Tube & Housing Mounting Flange—Correct by disconnecting torque tube and installing new gasket (gasket is made of special material—DO NOT use any substitutes for this gasket).

►*CAUTION*—Do not remove torque tube from carrier housing for any other reason than gasket replacement to correct oil leakage. These parts are matched and aligned during manufacture and are not furnished separately.

►*REAR AXLE BREATHER PRODUCTION CHANGE:* A breather has been installed on the rear axle housing to eliminate the possibility of leakage. The new breather, Part No. 3700490 can be installed on axles not so equipped as follows: Remove left axle shaft, and ring gear. Drill a .359-.369" diameter hole on top of the housing approximately 14" from center line of carrier and drive breather into place *CAUTION*—Place a greased rag in axle housing to prevent any chips entering. Make sure that axle is clean of all foreign material before reassembling ring gear and axle shaft.

►*1955 RING GEAR & DIFFERENTIAL CASE PRODUCTION CHANGE:* Farly type is riveted to differential case. Later type is bolted to case, using 12 special 3/8"-24, 300M bolts *(CAUTION—These bolts should not be replaced with any other kind under any circumstances).* The special bolts are identified by six straight lines around bolt head center and in some cases a manufacturers trade mark may also be in center of head. If the bolted type ring gear used to replace early riveted type, the differential case must also be replaced. *DO NOT rework the old case for use with the new ring gear.*

►*1955 DOUBLE ROW RADIAL THRUST BALL BEARING INSTALLATION ON EARLIER MODEL CAUTION:* The new oil seal, Part No. 1339437 must be used to avoid interference with nut hex when bearing, Part No. 954919 is used.

►*1955 REAR AXLE HOUSING FILLER PLUG BREAKING CORRECTION:* Plugs will break if over-torqued. Tighten plug to 20-30 ft. lbs.

►*1955 REAR AXLE CARRIER PRODUCTION CHANGE:* Carrier bolting flange has been increased in thickness from .620" to .800", and reinforcing ribs have been extended to the outer circumference of the bolting flange. Carrier attaching bolts (to rear axle housing) have been eliminated and studs, pressed into housing, have been substituted.

►*1955 PINION GEAR PRODUCTION CHANGE:* A tapered gear (tapered on back of pinion) replaces the early type. A new spacer also entered production at the same time to compensate for changes in pinion.

►*1955 PINION GEAR INSTALLATION IN CARRIER CAUTION:* Different pinion bearing spacer tools are required for early and late type (tapered) pinion installation. *See "Pinion & Propeller Shaft Installation" below.*

►*1955 PINION BEARING REPLACEMENT CAUTION:* If 1955 bearing arrangement (one rear roller bearing) is to be installed in a rear axle in which the old arrangement (double rear roller bearing) has previously been run, *a new gear set MUST be used.* The ridge formed between the two radial bearings would cause rapid wear of the new single bearing.

DESCRIPTION: Hypoid gear, semi-floating type with torque tube drive. The pinion is supported in carrier by two Hyatt roller bearings (rear) and a double-row radial-thrust ball bearing (front) on 1952-54 models, by one roller bearing (rear) and a double-row radial-thrust ball bearing (front) on 1955 models.

REMOVAL OF AXLE: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT REPLACEMENT: Raise rear of car and place on stands. Clean rear end of chassis and all parts surrounding axle housing. Remove wheel and brake drum, drain rear axle housing and remove cover. Remove side pinion shaft lock screw and push pinion shaft from differential case, and remove spacers and pinions. Push axle shaft inward and drive the horseshoe shaped washer from grooved inner end of axle shaft, using tool J-1515. Support axle shaft while pulling it out of axle housing to avoid damaging bearing oil seals. *CAUTION—Do not allow axle to rest on oil seals during repairs.*

Axle Shaft Endplay: Controlled by spacer block between axle ends in differential case. Endplay should be .000" to .008" maximum. Replacement spacers are furnished standard size, and in two oversizes, each spacer having two dimensions for selective fitting. Install spacer between axle shafts and with both shafts pulled out as far as possible, check clearance between axle and spacer. If clearance exceeds .008", turn spacer ¼ turn and test clearance again. If unable to adjust endplay to .008", replace spacer with an oversize, or install new bronze thrust washers between side gears and differential case.

Wheel Bearing & Seal Replacement: After removal of axle shaft, disconnect link from shock absorber arm. Disconnect brake pipe from wheel cylinder and plug openings. Remove entire brake assembly from axle, supporting brake out of way to prevent damage to brake cable. Remove outer seal and roller bearing, then remove inner oil seal, using Remover J-1436 (sliding hammer & puller). If inner bearing race on axle shaft is to be replaced, grind part way through race and split it off shaft. Press a new bearing race into place against shoulder on shaft. Drive a new inner seal squarely and lightly into axle housing using care to avoid distorting seal. Install bearing into housing by tapping with a light drift on alternate sides of bearing *(CAUTION—Do not tap on rollers).* Install new seal and complete installation by reversing removal procedure.

PROPELLER SHAFT & FRONT BEARING: Propeller shaft is part of pinion & shaft assembly. *See "Overhaul" below.*

►*TORQUE TUBE CAUTION: Torque tube and carrier flanges are matched and aligned at the factory and should not be disturbed except for installation of a new gasket (to prevent leakage) or for replacement of either of the two parts.*

OVERHAUL: *After removal of axle shafts, differential side bearings and thrust washers, proceed as indicated below:*

►*1953-54 PINION & PROPELLER SHAFT REMOVAL:* With the type seal used in these cars, it is possible to remove and replace pinion and propeller shaft without disconnecting from torque ball. CAUTION—Care must be taken when installing the propeller shaft with the axle in the car to start propeller shaft in through seal gently to avoid striking seal retainer, as damage will result. Press propeller shaft and pinion assembly into carrier, as driving it in can cause damage to front bearing.

►*PINION PRESS, TOOL J-1292-E, REWORK (Supersedes Rework of Yoke Screws J-1292-36):* To use new type yokes, J-1292-40 and J-1292-41 which are wider than yokes previously furnished with press, it will be necessary to rework the press as follows: Remove the shoulders at each end of propeller shaft support (adjacent to tool side rails) so that surfaces of support between the support slot and the side rails are parallel to top of side rails. Weld casting to side rails and a point below support slot, both at front and rear of the support. *Do not weld upper surface of support at junction with side rails.* It is suggested that if Yoke Screws J-1296-36 were previously reworked, that new screws be secured. New yokes and screws are available in Conversion Kit J-1292-43.

Disassembly: *(NOTE—Before removing differential assembly, check the gear lash with a dial indicator. See "Differential Case, Ring Gear, & Bearing Installation" below).* After removal of both axle shafts, remove differential side gears and thrust washers from case. Mark differential bearing caps so they can be reinstalled in original positions on carrier. Mark both differential bearing adjusters for location, then remove locks and check the bearing adjustment *(See "Reassembly" below).* Remove ring gear and case assembly from carrier, keeping each bearing race with its original bearing.

Pinion & Propeller Shaft Removal & Disassembly—*(NOTE*—Before removing pinion and shaft, the pinion shaft wear can be determined by mounting a dial indicator, with 1¼" extension, to bear vertically against drill center in pinion gear. Pry up on pinion gear with a bar a number of times and check indicator reading. Reading should be less than .0015". If greater, the bearing is worn and should be replaced). Loosen locknuts and remove three bearing sleeve screws from housing. Pull pinion and shaft assembly, using Pinion Shaft Puller J-5502. Remove all pinion bearing shims from propeller shaft and carrier housing to prevent loss or damage. Mark pinion and propeller shaft so that

CONTINUED ON NEXT PAGE

1954-55 BUICK HYPOID (C nt.)

parts can be reassembled in the same relative position. File or cut off end of propeller shaft coupling pin and drive out pin, then pull propeller shaft from pinion using Press J-1292-C. Drive up staked section of pinion bearing lock nut and remove nut, gripping pinion shaft on splined end in vise. *Do not grip pinion gear in vise even though soft jaws are used.* Press off pinion front bearing using Bearing Remover Plates J-5737-6 installed in Press Plate Holder J-358-1 with recessed side upward. *NOTE*-The double row ball bearing will have a slight drag when installed on pinion due to being preloaded.

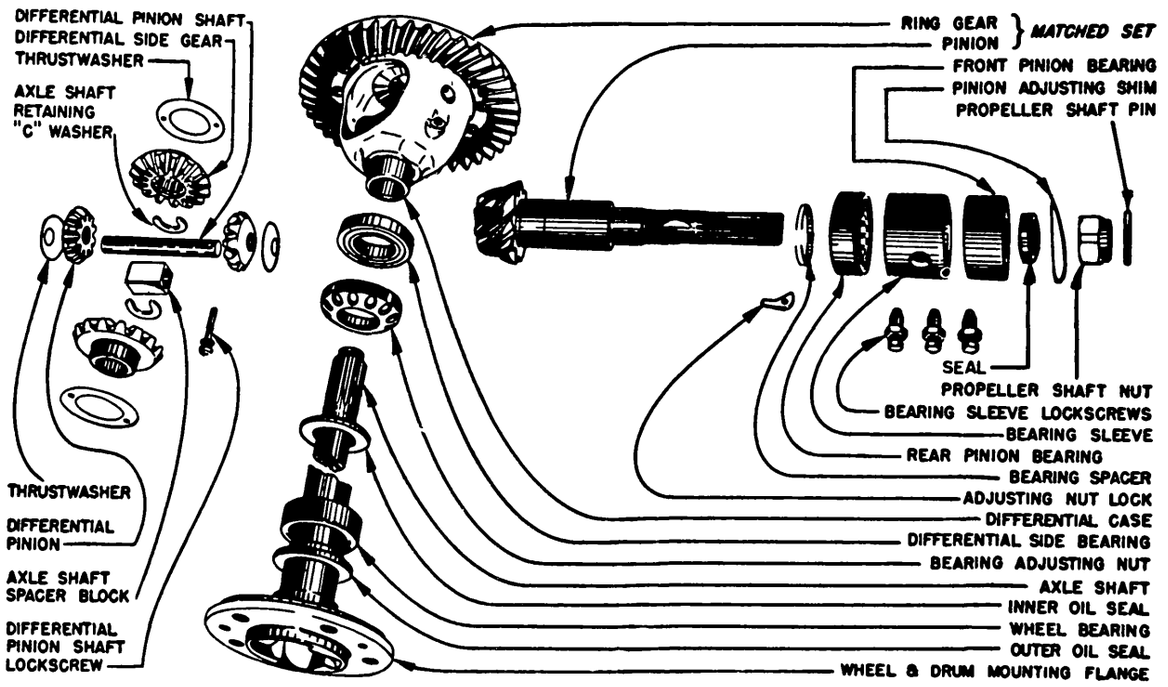
Differential Case, Ring Gear, & Bearings-*(NOTE-Early type ring gear is riveted to case. Later type is bolted. See Production Change above).* Remove all bolts from ring gear (if bolted type) and separated gear from case. If necessary to replace early (riveted type ring gear) type ring gear, drill ½" hole into rivets using a ¼" drill **on ring gear side,** drive out rivets with a punch inserted in drilled hole. Check gear mounting face for burrs around bolt holes and remove burrs with a mill file. Mount case in differential carrier with a dial indicator set to check runout of machined flange surface. If runout exceeds .002", flange must be trued up. To remove differential bearings, pull bearings from case using Puller J-2241 (the ends of puller fit into notches in differential case so that pressure can be applied to bearing inner race). DO NOT PULL ON ROLLERS.

R assembly: *NOTE-Propeller shaft & pinion gear assembly must be checked for runout whenever pinion and shaft installed regardless of whether new or old parts used.*

►*1955 RING GEAR & DIFFERENTIAL CASE PRODUCTION CHANGES: See Production Change above for installation of later type assembly in earlier models.*

Differential Case, Ring Gear, & Bearings-Check matching numbers on new ring gear and pinion (if being used). Bolt gear to differential case (if later bolter bolted type) using 12 special 3/8"-24, 300M bolts, Part No. 186627 *(these bolts are identified by six radial lines around bolt center).* Install bolts **without lockwashers** and tighten bolts on opposite sides of case to 25-30 ft. lbs., then tighten in same manner to 50-60 ft. lbs. On early type (riveted ring gear), use Riveting Jig J-2196-A to install rivets. Use correct rivets which allow 5/16" shank length for heading. Install rivets from ring gear side and use 8 ton pressure to head rivets cold. Install rivets in diametrically opposite positions until all rivets are installed. Recheck gear runout after all rivets installed. Examine bearing seat on differential case for burrs or scores and remove all high metal with a mill file. Coat bearing seat with engine oil or white lead and install bearing using Replacer J-2242, which is designed to pilot in the case and bear squarely against bearing inner race. Press bearing into position (do not hammer it in).

►**Pini n R ar R ll r B aring N t :** Clearance between bearing rollers and pinion shaft should be .0005" (desired), .0014" (maximum allowable). Check bearings for wear by measuring thickness of roller and outer race at four or five points around bearing(use micrometer and make certain that bearing is absolutely clean). Micrometer reading should be .6756" min., .676" max. Replace bearing if less than .6756".



BUICK HYPOID DIFFERENTIAL & PINION GEAR ASSY. (TYPICAL)

Pinion & Propeller Shaft Reassembly - Install parts on shaft in following order. Rear bearing spacer, two rear bearings (1954), one rear bearing (1955), bearing lock sleeve, with chamfered end toward spline (1954), with the thin edge toward the roller bearing (1955). Press front bearing solidly against shoulder of pinion shaft using tube of proper size to bear against inner race only (1952-54), using Bearing Replacer Plate J-5737-7 in Plate Holder J-358-1 (1955). *CAUTION - DO NOT hammer bearing into place as brinelling will result.* Make sure that outer surface of bearing locknut is clean and free of nicks or burrs, then install a new bearing oil seal with spring loaded edge pointed away from hex on nut. Install locknut on pinion with seal toward ball bearing. While gripping splined end of pinion in vise (with soft jaws), tighten nut to a minimum of 150 ft. lbs. Stake outer edge of locknut down into notch in pinion and push oil seal flat to facilitate assembly, then press pinion into propeller shaft until coupling pin holes are aligned using Press J-1292-C and correct yokes. Make sure that pinion is a tight fit in propeller shaft. Install a new coupling pin and solidly rivet both ends. *CAUTION - Whenever a pinion and propeller shaft are assembled together, the compl te ass mbly must be checked for straightness. See "Checking & Straightening (using V-blocks)" b low.*

►**Pinion Sealing Note:** Splined joint must be sealed to prevent lubricant entering propeller shaft and causing unbalanced condition. Seal shaft by dipping end in Presstite Sealer(Permatex or white lead may be used), before assembling propeller shaft. Pinion shaft must not be a loose fit in propeller shaft.

Checking & Straightening (Using V-blocks)-Support pinion and shaft assembly on V-blocks at each end (forward block just to rear of splines at forward end of shaft, rear block under pinion rear roller bearing race). Use dial indicator to measure run-out at points 3" in from each end of shaft tube *(CAUTION*-do not allow unevenness of tube surface to cause indicator to bounce indicating wrong reading). If run-out not within .005" at these two points, straighten tube by exerting pressure on center of tube (support tube at same point at front end and under bearing lock sleeve at rear for straightening). Then check run-out at center of shaft tube. If run-out exceeds .010" at this point, straighten tube while supporting it on blocks at tube weld point at each end. Then check run-out at pinion front ball bearing. If run-out exceeds .001", support shaft at forward V-block and at bearing lock sleeve at rear end, exert pressure at weld points on rear end of tube. Recheck all run-out points, then check run-out at extreme forward end of shaft (must be less than .002").

►*CAUTION: Mor than .002" run-out at forward nd of shaft will cause rapid wear of universal joint bushing and leakage of transmission oil into rear axle.*

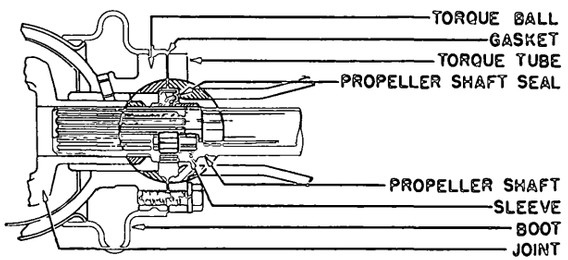
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1954-55 BUICK HYPOID (Cont.)

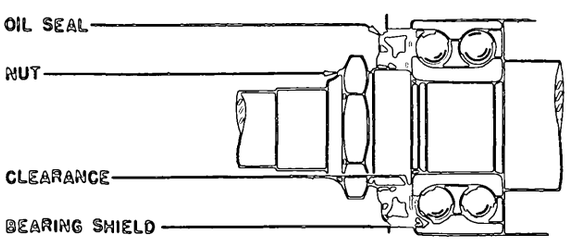
Pinion & Propeller Shaft Installation-*(CAUTION-Two different Pinion Shaft & Gear Assemblies used. These assemblies require use of different spacer tools for correct installation of the pinions. See "Production Changes" above).* Before installation of pinion and propeller shaft assembly make sure that all parts are clean and dry and that bearing shims are not crimped or buckled. Place the original number and thickness of pinion bearing shims over propeller shaft and against front bearing. Use rear axle lubricant to thoroughly lubricate bearings and coat outer surface of oil seal to aid installation. Lightly coat shims to hold them in place. As pinion and propeller shaft assembly is inserted into carrier, turn propeller shaft to engage splined front end in universal joint *(CAUTION-Be very careful to start shaft through front seal in torque tube without damaging the seal retainer. If axle assembly is under car, the universal joint yoke will guide propeller shaft so that sleeve will enter seal centrally. If axle is not under car, a second man should guide shaft as sleeve enters seal. As pinion bearing enters carrier, place tool (See "Pinion Bearing Spacer Tool Note" below)* between bearing and pinion gear. These spacer tools allow bearing to be pushed into place without binding. Mount Replacer J-55-2 on carrier and press shaft and pinion forward until shims and front bearing are firmly seated. Align holes in pinion bearing lock sleeve with tapered holes in carrier and install three sleeve lock screws. Tighten each lock screw a little at a time until lock sleeve is solidly seated and screws are uniformly tightened to 35-40 ft. lbs. Tighten the locknuts to 15-20 ft. lbs. (1954), 12-15 ft. lbs. (1955). *CAUTION - Excessive tightening of locknuts will cause lock screws to withdraw sufficiently to allow end play of pinion bearing. Remove spacer tool.*

▷Pinion Bearing Spacer Tool Note: Consists of a horseshoe shaped spacer which should be inserted between pinion and rear bearing when tapping on face of pinion to seat bearings in carrier (use bronze driving block on pinion and remove tool after installation completed). Spacer Tool No. J-5499 (1954 with late type pinion gear) J-5909 (1955 first type pinion), J-5973 (1955 with second type "tapered" pinion).

Differential Case, Ring Gear & Bearing Installation-Mount ring gear and case assembly in carrier with a dial indicator set to check runout of gear. Runout should not exceed .003". Correct as necessary. Place outer races on differential bearings but do not oil bearings as this would interfere with bearing adjustment. Install gear and case assembly and slide bearing adjusters into position so that threads are properly engaged in threads in carrier pedestal. Install bearing caps with bolts, *(CAUTION-Make sure that caps are installed in original p sition marked before removal).* Turn bearing adjusters to engage threads. Tighten cap bolts to 20 ft. lbs., and then back off bolts ¼ turn. Using Adjuster Wrench J-1365-A turn adjusters as required to set ring gear lash at approximately .010" with both adjusters in contacts with bearings. *(CAUTION-Do not use punch and hammer to turn adjusters as this will distort adjusters and a pr per bearing adjustment cannot be made).* Back off one adjuster (preferably the left) while observing bearing rollers and outer race, until rollers and race just stop turning, then tighten adjuster 4 to 5 notches to properly seat bearings and adjusters. Slowly back off adjuster until bearing outer race just stops turning. Recheck for this "free position" at least once to make sure of proper position. From "free position", tighten adjusting nut 2½-3 (1952-Early 1953 with First type housing and carrier), 2-3 (Late 1953 & later with Later housing and carrier) notches to preload the bearings, then tighten all four cap bolts to 100-120 ft. lbs. Mount a dial indicator to bear against a ring gear tooth so that contact can be made near heel end of tooth. Check gear backlash. On a new gear set, the lash should not be less than .006" nor more than .011", with .007-.009" preferred. If original gear set is being installed, the original gear backlash should be maintained. If backlash is not within limits, move ring gear to right or left as required to secure proper backlash. To move ring gear, loosen all four bearing cap bolts ¼ turn; loosen one notch on bearing adjuster on side toward which gear is to be moved and tighten one notch on opposite side. *(CAUTION-When* one adjuster is loosened, always tighten opposite adjuster the same amount in order to maintain the bearing preload adjustment). One notch change of both adjusters in the same direction will result in changing gear lash approximately .0035". Always tighten all bearing caps to 100-120 ft. lbs. after adjusters have been moved and recheck lash with dial indicator. When lash is properly set, install both bearing adjuster locks. Install differential side gears and thrust washers in case, lubricate bearings and install axle shafts.



PROPELLER SHAFT SPLINE SEAL



PINION SHAFT OIL SEAL

Pinion Setting (Using J-5647 Gauge): This pinion setting gauge consists of a "master gauge" and an "indicator gauge" upon which Dial Indicator KMO-5647 is mounted. Make certain that gauge parts are clean, particularly the center and discs on indicator gauge and the centering holes, indicator pads and the disc pads on the master gauge. Install the small contact button on stem of dial indicator and mount dial indicator on indicator gauge of tool. Place the indicator gauge on master gauge so that spring loaded center is engaged in centering hole corresponding to the indicator pad "B" (which is used for any of the following gear ratios stamped on pinion: 43-11, 43-12, 41-12, 42-13. *NOTE-Pad "A" is used for certain previous models.* Center the indicator contact button on specified indicator contact button on specified indicator pad and lock indicator by tightening lock screw. Hold yoke down firmly, with both discs contacting the horizontal and vertical pads on master gauge, and set dial indicator at "zero". Place transmission in "neutral". Make certain that differential bearing seats in carrier are clean and free of burrs, and that center in pinion is also clean. Rotate pinion until blank tooth between the matching numbers and the pinion setting mark is slightly counterclockwise of top center (at 11 o'clock). This tooth is called the gauging tooth (used for locating and gauging during production) and should be used for gauging. Place indicator gauge in carrier with discs seated in bearing seats (clear of threads and inner edges), with gauge center engaged in center of pinion, and with contact button having good contact on gauging tooth of pinion. Press gauge yoke firmly inward toward pinion and read dial indicator noting whether it is plus (+) or minus (-), as indicated by arrows on surface of yoke. Recheck indicator zero setting on master gauge to make sure it was not changed in handling. If the old ring and pinion gear set is being reinstalled and it had been in use long enough to establish a wear pattern on teeth, the original setting found at time of removal should be maintained. If the ring gear and pinion set is new or has not been in use long enough to establish a wear pattern on teeth, the dial indicator reading should be within .001" of pinion setting marked on pinion.

Pinion Adjustment: Remove pinion and propeller shaft assembly and remove all pinion bearing shims from shaft or from carrier housing. Wipe shims dry, and measure the total thickness with a micrometer. Increase or decrease total thickness of shims to obtain proper pinion setting, by using a different combination of shims *(NOTE-These* shims are furnished in thickness ranging from .010' to .019' in increments in .001"). As an example, if pinion is marked + 8, but dial indicator reads +6, decrease total thickness of shims by .002" (if the above marking and dial reading were "minus", shims would be increased in thickness). If dial reading were to read +10 for the above marked pinion, increase total thickness of shims by .002". Install pinion and propeller shaft assembly with a new combination of shims and be sure to tighten the three bearing sleeve locks uniformly to 35-40 ft. lbs., and lock nuts to 15-20 ft. lbs. Check pinion setting with gauge. Setting must be within .001" of setting marked on pinion.

Form 50 B

1956-60 BUICK HYPOID

All Series (1956-60)

▷CHANGES, CAUTIONS, CORRECTIONS

▷*1956 REAR WHEEL BEARING OIL LEAKAGE CORRECTION & PRODUCTION CHANGE:* An "O" ring seal, Part No. 1466050 is being used in later production cars and can be used on early cars to correct oil leakage. The new seal is installed in groove on outer diameter of the rear wheel bearing.

▷*1956 SERIES 70 DIFFERENTIAL OIL PUMP ELIMINATED:* The oil pump is no longer used in production and whenever the rear axle assembly is disassembled, the oil pump should be removed.

▷*1957 DRIVE LINE RATTLE CORRECTION:* A rubber "square cut" ring, Part No. 1181614 can be installed between the rear propeller shaft and universal joint at the bearing location. Install ring over splines and against face of rear coupling on front propeller shaft. Coat splines with type "O" grease, then reassemble front and rear propeller shaft assemblies and drive lock pin in place. *NOTE* - Force may be required to compress ring which can be done by inserting a small drift or punch as a lever to line up the holes.

▷*1957 REAR AXLE OIL LEVEL CAUTION:* To prevent over-filling of rear axle, the fluid level should be from 1/4 to 3/8" below bottom of filler plug opening.

▷*1957 REAR PROPELLER SHAFT REWORK TO PREVENT LOSS OF LUBRICANT FROM SPLINED COUPLING (Early Production Cars):* Drill a 1/16" diameter hole in plug located at bottom of spline coupling and another hole in propeller shaft tube. These holes act as vents to prevent pressure build-up which will force grease out. Remove the seal retainer and install an .029" thick steel washer, Part No. 5672246 (Saginaw shafts), No. 1179324 (Spicer shafts). *(NOTE* - Saginaw shafts can be identified by the "convex" plug at bottom of spline coupling. Spicer shafts have a "concave" plug at this location. As further identification, the seal retainer on the Saginaw shaft is "staked" around its entire diameter. On Spicer shafts, it is "staked" only in four positions). Before installing seal, washer, and retainer, use a sealing compound on both sealing face and coupling. On Saginaw shafts, stake retainer all the way around. On Spicer shafts, stake the retainer in four places.

▷*1957-58 U-JOINT NON-INTERCHANGEABILITY CAUTION:* 1957 and 1958 U-Joints must not be interchanged (use of incorrect type would result in drive line roughness and vibration) and joints can be identified as follows: 1957 Type - Marked by two notches in line with rear yoke of joint. 1958 Type - Not marked but rear yoke has omitted spline at two points (180° apart) which are 45° off centerline of yoke.

▷*1958 & LATER UNIVERSAL JOINT INSTALLATION CAUTION:* Rear joint has an omitted spline at two points which are 45° off centerline of yoke. Do not use incorrect universal joint. When installing this type universal joint, the two omitted splines must be aligned with blind splines on propeller shaft to provide correct relationship of front and rear universals and prevent drive line vibration.

▷*1958-60 REAR PROPELLER SHAFT LUBRICATION NOTE:* Lubricate propeller shaft coupling and splines (when assembling) with type "O" (non-fibrous) chassis lubricant and pack cavity beyond spline about 2/3 full of grease. *CAUTION - DO NOT plug vent hole in propeller shaft welch plug when servicing as excess lubricant will accumulate in torque tube ahead of access hole. Limit power grease gun to one shot.*

▷*LATE 1958 & 1959 REAR AXLE HOUSING REPLACEMENT CAUTION:* The side gear baffles have been eliminated in 1959 models and in some late 1958 models. When overhauling late 1958 models, determine if case contains baffles, If it contains baffles, baffles must be used when differential is assembled. If it does not contain baffles, the baffles must not be installed. If it is necessary to install a 1958 case (with baffles) in a 1959 model, the baffles must be installed.

DESCRIPTION: Hypoid gear, semi-floating type with torque tube drive. The pinion shaft and gear are supported in carrier by two tapered roller bearings. 1957 and later propeller shafts are two-piece types having two universal joints. The rear universal joint is welded to front end of rear propeller shaft and is supported in torque tube by a sealed ball bearing.

REMOVAL OF AXLE: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT REPLACEMENT: Place car on stands under rear axle housing with wheels clear of floor. Remove rear wheel and brake drum. Remove nuts holding wheel bearing retainer plate to brake backing plate, leaving bolts in place to support backing plate. Pull axle assembly using Puller J-6176 with a slide hammer. Be careful not to disturb backing plate. Replace two opposite nuts finger tight to hold backing plate in position. To install axle (if wheel bearing or seal are the only new parts used), reverse removal procedure and install the old wheel bearing retainer gaskets with same number and thickness of new gaskets. If new rear axle housing or new brake backing plate are used, install axle shaft and bearing assembly without retainer gaskets. Using slide hammer and Puller J-6176, drive axle shaft and bearing into place until bearing is fully seated. To hold retainer plate snug against face of the bearing, install four nuts finger tight. With backing plate pushed tight against housing flange, measure clearance between retainer and backing plate with feelers (use two feelers at same time at opposite sides of retainer and average the two readings so obtained and select the number of new gaskets as required to give .005-.020" less thickness than average of the two measurements). Replace nuts holding wheel bearing retainer plate to brake backing plate and tighten to 65-75 ft. lbs. Then check with a .001" feeler gauge under retainer plate between two lower bolts. If gap exists, remove plate and apply non-hardening Permatex on both sides of gasket to prevent leakage. Replace brake drum.

Wheel Bearing & Seal Replacement: After removal of axle shaft, nick the wheel bearing retainer ring (the ring need not be completely split, but nicked deep enough in 3 or 4 places to spread it). Retaining ring will then slip off with light pressure. Press wheel bearing off using Plate J-6191 in a press. If seal only is defective, pry old seal out of bearing and install new seal using Guide J-6213. Push seal in carefully with fingers until lip is over bearing inner race; then remove installing guide and drive seal in flush with a flat wood block. Press bearing and seal assembly against shoulder on shaft using Installer J-6257 in a press *(CAUTION - Bearing retainer must be on shaft before bearing is installed).* Press retainer ring against bearing with chamfer toward bearing.

OVERHAUL

DISASSEMBLY: 1) Remove rear axle assembly from car and place on suitable stands. Disconnect torque tube brake line from tee fitting located on axle housing. Disconnect strut rods from torque tube bracket. Fasten the two struts to each other loosely, keeping all parts in their original positions. On 1956 models, remove torque tube to carrier bolts and slide torque tube and propeller shaft from carrier. On 1957-60 models, remove the front torque tube to rear torque tube bolts and nuts. Slide front torque tube and propeller shaft assembly from rear torque tube. If any part of propeller shaft assembly needs repair, drive spring pin out and separate front and rear propeller shafts. *CAUTION - The strut rods are easily bent when disconnected.*

2) Remove brake line from housing and both axle shaft assemblies, *see "Axle Shaft Replacement" above.* On 1956 models, remove carrier to axle housing nuts. On 1957-60 models, rotate axle housing so carrier is upward, then remove rear torque tube to carrier bolts and remove rear torque tube. On all models, remove carrier housing nuts and lift carrier from housing.

3) Place carrier assembly in a suitable mounting fixture. Check existing gear lash with a dial indicator positioned against tooth of ring gear (this will indicate gear or bearing wear and will also enable used gears to be installed at original lash setting to avoid changing of gear tooth contact). On 1956 Series 70 with an oil pump, remove oil lines and pump. On all models, remove differential bearing pedestal bolts and open pedestals by tapping a wedge in each pedestal slot. *CAUTION - DO NOT use excessive force on wedges.*

4) On 1956 models, remove differential bearing supports using Puller J-6199 and slide hammer. *See J-6199 Tool Modification above.* On 1957-60 models, remove differential bearing supports using Puller J-6553 with either a sleeve and screw puller or a sleeve and hydraulic ram screw On all models, install Spreader J-6185 and tighten spreader bolt just enough to free case assembly. *CAUTION - Do not spread pedestals more than is necessary to free case.* Lift case straight out until side bearings are half-way clear of pedestals, then take hold of bearings with both hands to keep them from falling and lift case assembly out. *CAUTION - Keep right and left bearings, shims and supports in a set so that they may be reinstalled in the same order.* Remove spreader tool. Mark ring gear and case so they may be reinstalled in same position. Remove ring gear.

5) Drive pinion shaft pin from pinion shaft and then drive shaft from case. Remove pinion shaft shield from case. Mark side gears, pinions and washers so they may be reinstalled on same side. Remove side gears, pinions and washers.

CONTINUED ON NEXT PAGE

1956-60 BUICK HYPOID (C nt.)

6) If differential bearing is to be replaced, pull bearing outer race from case using Differential Bearing Remover J-6552. Check pinion bearing pre-load (see "Pinion Bearing Pre-load Adjustment" below). It is also advisable to check pinion depth setting (see "Pinion Depth Setting" below).

7) Cut out and drive up staked section of pinion bearing locknut with a cape chisel, being careful not to damage threads on pinion. Hold pinion nut to carrier with Holder J-6245 and turn pinion clockwise through nut using socket J-6192 and Handle J-6246. As pinion nut is removed, hold hand under pinion to catch it, as it may fall through.

8) If rear bearing is to be replaced or pinion depth setting is to be changed, remove rear bearing from pinion shaft using Remover J-6184 and Holder J-6274 (1956), Remove J-6531 and Holder J-7407 (1957-60), in a press or with Ram & Yoke Assembly J-6180. Pry pinion oil seal from carrier, being careful not to damage front Pinion bearing. If front pinion bearing is to be replaced, drive outer race from carrier using J-6198 and Handle J-872-5. If rear pinion bearing is to be replaced, drive outer race from carrier using Remover J-6256 with Handle J-872-5. *NOTE - The remover must be inserted in carrier before drive handle is screwed into it.*

9) If 1957-60 propeller shaft bearing is to be replaced place rear propeller shaft and bearing assembly in a press so that it is supported under bearing with shaft down. Using a sleeve or shaft slightly smaller than inside diameter of bearing, press universal joint yoke down through bearing. To install the new bearing, place rear propeller shaft in a press so that it is supported under both sides of front yoke. Start new bearing on yoke, then, using a heavy flat plate, press bearing on yoke until it bottoms against shoulder.

10) If rear universal joint is to be repaired, remove propeller shaft from torque tube. Rear universal joint can then be disassembled.

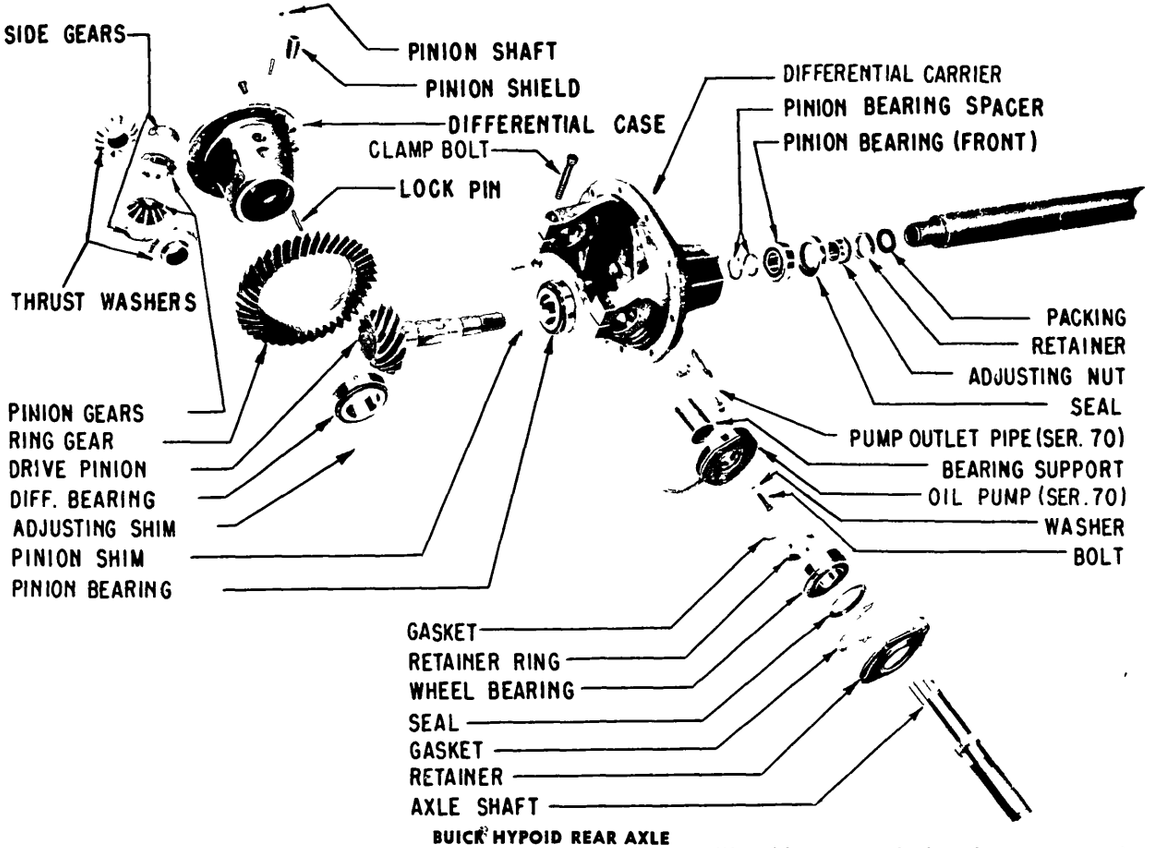
REASSEMBLY: *(NOTE* - Before installation of pinion and bearings, make certain that interior of carrier housing is clean and dry. Also make certain that parts to be assembled are clean and that pinion bearing shims are not burred. Bearings and oil seals should be lightly lubricated with rear axle lubricant just before assembly).

► *PROPELLER SHAFT NOTE: Propeller shaft should be checked for straightness (and straightened or replaced) before installation in rear axle assembly. See "Propeller Shaft Checking & Straightening" below.*

1) Drive front pinion bearing outer race against shoulder in carrier using Replacer J-6197 with driver handle. Drive rear pinion bearing against shoulder in carrier using Replacer J-6255 with driver handle.

2) Whenever a new carrier, a new pinion, or a new pinion bearing is used, a trial assembly must be made in order to determine correct pinion depth setting and pinion bearing pre-load *(see "Pinion Bearing Pre-load Adjustment" and "Pinion Depth Setting" below).*

► *CAUTION – Whenever a new pinion is to be installed, its depth setting must be gauged.*



BUICK HYPOID REAR AXLE

3) After pinion setting and pinion bearing pre-load have been correctly adjusted (if necessary) and front and rear bearings have been installed on pinion, lubricate new pinion seal with rear axle lubricant and install with lip toward bearing, using Installer J-6200. Reinstall pinion and bearings carefully into carrier with new thickness pre-load spacers. Install pinion nut and tighten to 80 ft. lbs. Recheck pinion setting with gauge. Recheck pinion bearing pre-load, which must not exceed 40 inch pounds including drag of lubricated new seal. Stake pinion nut securely.

4) On 1957-Early 1958 models, replace oil baffles and drive differential outer races into case, using Replacer J-6263. *NOTE - Side gear baffles eliminated in late 1958 and later cars. See "Late 1958-59 Rear Axle Housing Replacement Caution" above.* Install side gears, pinions and spherical washers in case *(CAUTION - There are no flat washers behind side gears).* If same parts are used, replace in original sides. Install pinion shield and pinion shaft. Drive spring pin through hole in pinion shaft until flush with case. Bolt ring gear to case, making sure mating surfaces are clean and free of burrs and that matching numbers on ring gear and pinion are the same. *NOTE - Use thru Studs, J-6251 to align parts.* If same ring gear and case are used, line up marks so that parts are assembled in same relative position *(do not use lockwashers or any substitute bolts).* Tighten bolts alternately on opposite sides of case to 25-30 ft. lbs., then tighten in same manner to 65-75 ft. lbs.

5) Before installation of ring gear and case assembly make sure that differential bearings and bearing support surfaces in carrier pedestal are clean and free of burrs. Remove any burrs which might prevent proper seating. Place case assembly and differential bearings in position in carrier. If original bearings are used, replace in original positions. Insert Support Tools, J-6194 (1956 Models), J-6194-01 (1957-60 Models) through the pedestal bores into the bearing inner races Press tools toward each other to seat them, using hand pressure. If support tools are loose, install pedestal clamp bolts and nuts and tighten lightly until support tools can just be moved by twisting them. If support tools are too tight, loosen them by wedging pedestals.

6) Rotate differential assembly three or four times to seat bearing rollers, then manually adjust the whole assembly sideways to get a .008" gear backlash. The assembly tools may be tapped lightly with a hammer to seat them. Check backlash as follows: Mount dial indicator so contact button bears against heel end of tooth on ring gear, and as nearly as possible in line

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1956-60 BUICK HYPOID (C nt.)

with gear rotation and perpendicular to tooth surface. Check backlash at three or four points around ring gear. Lash must not vary more than .003" around ring gear. If lash varies more than .003", check for burrs, uneven bolting conditions or distorted case flange, and make necessary corrections. *(CAUTION* - Gear backlash check must be made with pinion locked to carrier to be sure it cannot turn). Adjust gear backlash at the point of minimum lash to .008" for all new gears. If original gear set is being installed, maintain original backlash.

7) Measure with a shim between each bearing and its pedestal. Do not remove support tools for measuring. Select shim that measures .002" thicker than largest shim that can be inserted for each side, (this should pre-load each differential bearing .002"). The shims are furnished to be used singly in thicknesses ranging from .040" to .082" by two thousandths. Service shims are marked with their thickness in thousandths.

8) Remove support tool farthest from ring gear, insert shim for that side, and replace support tool. Place other shim in position for insertion. While keeping a heavy hand pressure on shim, spread carrier pedestals just enough to start shim, using Spreader J-6185 *(CAUTION - Do not spread pedestals any further apart than is absolutely necessary to push shim into position).* Leave support tool in position until after shim is started to keep case assembly from dropping out of line.

9) Remove left assembly tool and push shim into final position. Center it first with fingers through pedestal bore, then with a support tool. Remove spreader tool and pedestal wedges. Drive each differential bearing support into its pedestal until seated solidly in bearing, **using the Support Tool J-6194 for 1956 models or J-6194-01 for 1957-60 models. Then seat one support** solidly and tighten the clamp bolt and nut on that side to 50-60 ft. lbs. before proceeding to other side. This is to prevent shock caused when second support is seated from dislodging the first support. Secure nuts with cotter pins. Recheck backlash which must be .007-.009" at point of minimum lash, with not more than .003" variation around gear.

► *1956 SERIES 70 NOTE:* Rear axle oil pump has been discontinued in production and it is recommended that it not be reinstalled after rear axle has been disassembled for any purpose.

10) Before installing carrier assembly, make sure housing mounting surfaces are free of old gasket material, nicks, and burrs. Rotate axle housing so carrier mounting surface is upward and install a new carrier gasket. Install carrier in housing using Sling J-6247. Install nuts and tighten them evenly to 50-60 ft. lbs.

11) On 1956 model, check propeller shaft and pinion splines for wear and remove nicks or burrs. Replace propeller shaft seal sleeve if scored or grooved. Inspect propeller shaft rear packing and retainer and replace if worn or damaged. Pack rear propeller shaft coupling with heavy wheel bearing lubricant, bringing level to inner end of splines. Slide propeller shaft on splines.

12) Before installing torque tube, flanges on both ends must be free of burrs or nicks. Also, check torque tube mounting surface on carrier. Slide torque tube over propeller shaft being careful to keep torque tube centered on propeller shaft to avoid side thrust *(CAUTION - Propeller shaft will bend easily if side pressure is put on it).*

13) Position torque tube with strut rod bracket downward, being careful not to damage brake line. Install torque tube to carrier bolts and tighten alternately to 50-60 ft. lbs. *(NOTE* - There is no gasket used between torque tube and carrier). Connect brake line at tee on rear axle housing. Connect strut rods and tighten bolt to 85-100 ft. lbs. Install rear axle assembly in car.

14) On 1957-60 models, pack rear propeller shaft coupling with semi-fluid fibrous lubricant, bringing level to inner end of splines. Install rear torque tube carrier with brake return spring bracket down (no gasket is used). Tighten bolts to 50-60 ft. lbs. Rotate axle housing so that rear torque tube extends in a horizontal direction. Slide propeller shaft assembly into front torque tube until support bearing is seated against shoulder. Push front torque tube and propeller shaft assembly into place in rear torque tube. Rotate propeller shaft as necessary to engage splines. Position torque tube with strut bracket down (no gasket used between front and rear propeller shafts), and make sure that bearing retainer plate is in place. Install torque tube bolts and tighten to 65-75 ft. lbs. Connect strut rods and tighten bolts to 85-100 ft. lbs.

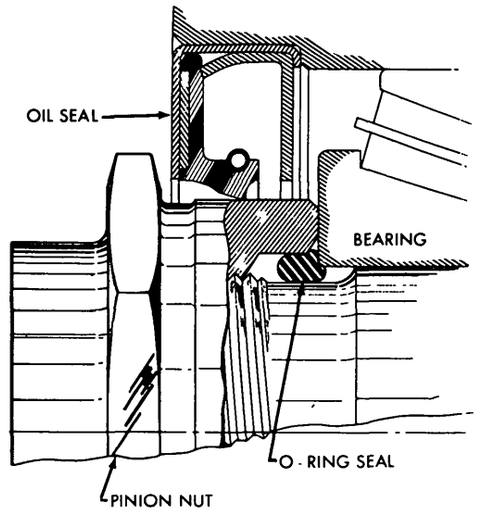
INSTALLATION: Reverse removal procedure. *See "Rear Axle" on Car Model pages.*

PINION BEARING PRE-LOAD ADJUSTMENT

► *NOTE: Whenever a new carrier, a new pinion, or a new pinion bearing is to be used, a trial assembly must be made in order to determine correct pinion depth setting and correct pinion bearing pre-load. Spacers used for pinion bearing pre-load and shims used for pinion setting will have to be changed for final adjustment*

1) For a starting pinion depth setting, use a pinion setting shim with a nominal thickness of .048". Place this shim against head of pinion and install rear pinion **bearing using Replacer J-6377, and Holder J-6407 with Ring J-6407-2 in a press.**

2) For a starting pinion bearing pre-load adjustment use a pair of spacers with a nominal thickness of .435". Place spacers in position on pinion and hold pinion in position in carrier. Install front pinion bearing and pinion nut. Hold nut to carrier with Holder J-6246 (Do not install seal at this time). Torque pinion nut to 80 **ft. lbs., using Torque Wrench J-1313 on outer end of Handle J-2646.** *NOTE - This amounts to an actual 250 ft. lb. torque at nut.* **Rotate pinion three or four times to seat bearings. Turn pinion slowly with an inch-pound torque wrench. Pre-load should be 10-30 inch lbs. If pre-load is under 10 inch-pounds a thinner spacer must be used or if pre-load is over 30 inch-pounds a thicker spacer must be used, under front pinion bearing.** *NOTE - Pinion Bearing pr -load spac rs ar furnished to b used in pairs s that p ssibl thickn ss s rang from .400" t .470" by thousandths. See tabl below.*



PINION NUT OIL SEALS (1959-60)

Pinion Bearing Pre-L ad Spac rs

Part No.	© Thickness	Part N .	© Thickn ss
1169104	.200"	1169386	.208"
1169105	.201"	1169387	.209"
1169106	.202"	1169388	.210"
1169107	.203"	1169389	.220"
1169108	.204"	1170158	.230"
1169109	.205"	1170159	.240"
1169110	.206"	1170160	.250"
1169385	.207"	1170161	.260"

© — Spacer thickness is marked on spacers.

3) *After pinion setting adjustment is completed (s e below)* change preload spacers by same amount that pinion setting shims were changed from the nominal setting. If thickness of pinion setting shims was **d - creased** .002", use pre-load spacers with .002" **less** thickness. If thickness of shim was **increased,** use pre-load spacers measuring .002" **thick r.**

4) Lubricate new pinion seal with rear axle lubricant and install with lip toward bearing, using Installer J-6200. Reinstall pinion and bearings carefully in carrier with "adjusted" thickness pre-load spacers, **Install pinion nut and tighten to 80 ft. lbs. using Torque Wrench J-1313 in outer end of Handle J-6246. Recheck pinion setting with gauge. Setting for new pinion must** be within .001" (1956), .0015" (1957-60) of setting marked on pinion. Setting for used pinion should be within .001" (1956), .0015" (1957-60) of original setting **(as checked before disassembly). Recheck pinion bearing pre-load with an inch-pound torque wrench. Pre-load must not exceed 40 inch-pounds including drag of lubricated new seal, stake pinion nut securely.**

PINION DEPTH SETTING

► *NEW PINION INSTALLATION CAUTION: Whenever a new pinion is to be installed, its depth setting must be gauged with Pinion Setting Gauge J-5647.*

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1956-60 BUICK HYPOID (C nt.)

CHECKING PINION DEPTH SETTING: After pinion bearing pre-load has been established (10-30 inch-pounds, without pinion seal installed) see above. Proceed as follows:

1) Use Pinion Setting Gauge J-5647 consisting of a "master gauge" and "indicator gauge" upon which a dial indicator is mounted. Make certain that gauge parts are clean.

2) Install discs on indicator gauge and install the small contact button on stem of dial indicator. Mount dial indicator on indicator gauge. Place indicator gauge on on master gauge so that spring loaded center is engaged in centering hole corresponding to the indicator pad "B", which is used for any of the following gear ratios **stamped on pinion: 43-11; 43-12; 47-14; 42-13; 43-14 (Pad "A" is used for certain prior model gear ratios).**

3) Center indicator contact button on specified indicator pad and lock indicator by tightening the thumb screw. Hold yoke firmly with both discs contacting the horizontal and vertical pads on master gauge, and set dial indicator at zero (make sure that differential bearing support bores are free of burrs and that center of pinion is clean).

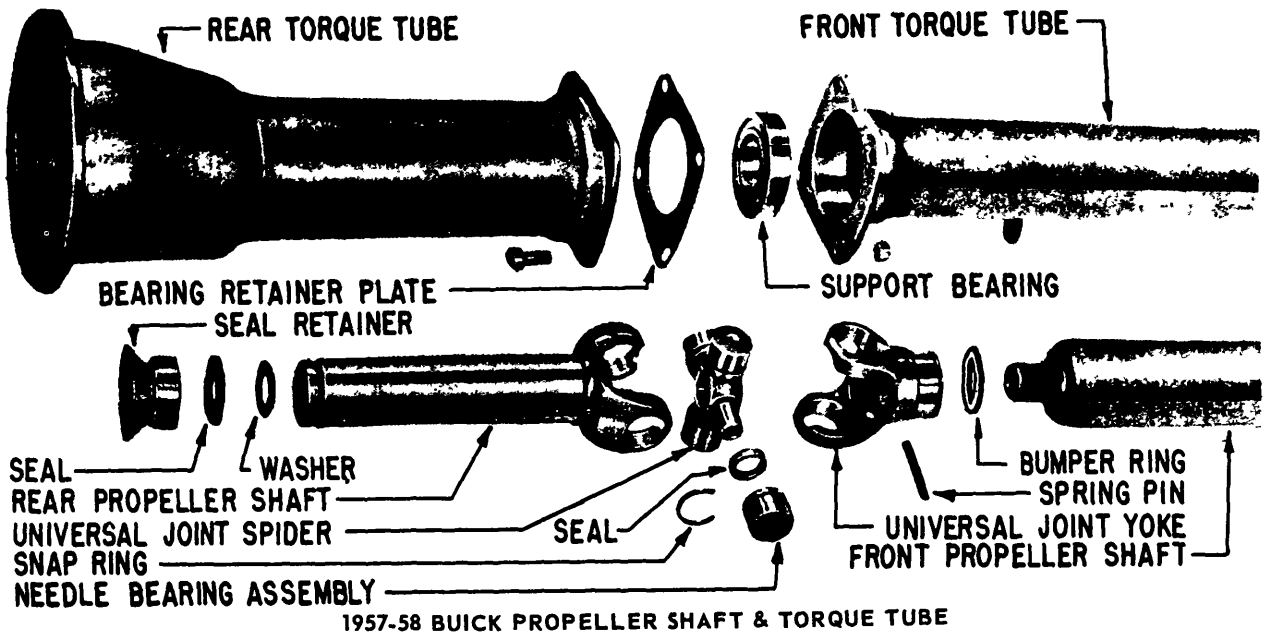
4) *(NOTE* - There are two methods of taking a reading on the pinion setting gauge as follows:) When using the first method, the indicator gauge is zeroed in the master gauge by pressing down firmly on the indicator gauge yoke with the thumbs. It is important when using this method, that equal pressure is applied when taking the actual reading in the carrier. When using the second method, the indicator is zeroed in by pressing the discs into the angle formed by the master gauge. No pressure is applied to the indicator gauge yoke. Since the gauge is zeroed in with no pressure on the yoke, the actual reading is also taken with no pressure on the yoke. However, the adapters must be tight in the pedestal bores; if they are not held solidly in place after the wedges are removed, the pedestal bolts must be installed and tightened to specified torque, (50-60 ft. lbs.).

5) Rotate pinion until blank tooth between the matching number and the pinion setting mark is slightly counterclockwise of the center (at about 11 o'clock). This tooth is called the gauging tooth because it is used for located and gauging during production and should be used for gauging in service.

6) Drive a wedge into each pedestal split and spread them just enough so that an Adapter J-5647-17 will slip in. Then place the indicator gauge in carrier as follows: Remove discs from indicator gauge and hold it in position in carrier with pins centered in pedestal bores. Slide long adapter through pedestal bore farthest from pinion and over gauge pin. Then slide short adapter in place on other side. Be sure that gauge center is engaged in pinion center and that adapters are against shoulders of gauge. Then remove pedestal wedges. Turn pinion if necessary so that indicator contact button has a good contact with gauging tooth of pinion.

7) Take dial reading, noting whether it is plus (+) or minus (–) as indicated by arrows on surface of yoke. *(CAUTION - This reading does not indicate thickness of the shim to be used, but only indicates the variation from the nominal setting of the gauging face of pinion).* Recheck indicator "zero setting" on master gauge with discs to make sure it was not changed in handling.

8) If the old ring gear and pinion set is to be reinstalled and it has been in use long enough to establish a wear pattern on teeth, the original pinion setting found before removal should be maintained to avoid changing tooth contact. If ring and pinion set is new, or has not been used long enough to establish a wear pattern on teeth, the dial indicator reading should be within .001" (1956), .0015" (1957-60) of pinion setting marked on pinion. If pinion is not as specified, adjust as follows:



1957-58 BUICK PROPELLER SHAFT & TORQUE TUBE

PINION SETTING ADJUSTMENT: The pinion setting is adjusted by changing thickness of shim which is located between rear pinion bearing inner race and head of pinion. Shims are furnished as indicated in table below.

Pinion Setting Shims

Part No.	Ⓒ Thickness	Part No.	Ⓒ Thickness
1171083	.040"	1171093	.050"
1171084	.041"	1171094	.051"
1171085	.042"	1171095	.052"
1171086	.043"	1171096	.053"
1171087	.044"	1171097	.054"
1171088	.045"	1171098	.055"
1171089	.046"	1171099	.056"
1171090	.047"	1173482	.058"
1171091	.048"	1173483	.060"
1171092	.049"		

Ⓒ – Thickness is marked on shim.

1) Remove pinion assembly and press off rear pinion bearing using Remover J-6184 and Holder J-6274. Remove shim from pinion and wipe dry. Check thickness of shim to make sure it is correctly marked. Increase or decrease thickness of shim as required to obtain proper pinion setting.

2) Change pinion bearing pre-load spacers by same amount the pinion setting shims were changed, and finally install pinion assembly in carrier. *See "Pinion Bearing Pre-load Adjustment" above.*

CHECKING & STRAIGHTENING PROPELLER SHAFT (Using V-Blocks): Support shaft assembly (1956), front shaft only (1957-60) on V-blocks at each end (forward block just to rear of splines at forward end of shaft, rear block under splined coupling for 1956 models, or under spare seal sleeve placed over splines of rear coupling for 1957-60 models). Use a dial indicator to measure run-out at points 3" from end of shaft tube and at center of tube. Run-out should not exceed .006" at the ends or exceed .010" at the center. On the 1956 models, if run-out at the ends exceeds specifications, straighten tube by pressing on center of tube (support tube at same point at front end and under splined coupling at rear end as used for checking straightness). If run-out at center of tube exceeds specifications, straighten tube while supporting it on blocks at tube weld point at each end. Then check run-out at pinion coupling. If run-out exceeds .001", support shaft at forward end and at splined coupling at rear end and exert pressure at weld points on rear end of tube. Recheck all run-out points, then check run-out at extreme forward end of shaft (must be less than .002"). On 1957-60 models, if runout exceeds specifications, it is probably more economical to replace shaft than attempt to straighten it. However to straighten it, secure support blocks that conform to shape of the tube and the seal sleeve, apply pressure at high center of bend with shaft supported at both ends of bend. When corrected indicator reading at pressure point will be the same as at point 180° opposite.

CADILLAC HYPOID

Cadillac (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE SERVICE CAUTION* Manufacturer recommends that all service on the Differential Carrier Assembly other than oil seal or universal joint yoke replacement (and necessary pinion bearing preload adjustment) be handled by replacement of the complete assembly *No disassembly or adjustment of this unit should be attempted in the field*

►*REAR AXLE IDENTIFICATION MARKS* Gear ratio of axle is indicated by marking stamped on front face of carrier assembly at end of oil return passage Brougham rear axle assembly is identified by letter "B" next to gear ratio mark *See Car Model pages for ratios and markings*

►*PINION BEARING ADJUSTMENT CAUTION* Pinion bearing adjustment (preload) controlled by rear universal yoke nut which compresses spacer or sleeve between pinion bearings

►*CAUTION* Loosening or removal of the pinion shaft nut (for oil seal or yoke replacement) will disturb pinion bearing preload and exact procedure detailed below must be followed to avoid overloading bearings or collapsing bearing spacer

DESCRIPTION: Hypoid gear with Hotchkiss drive Differential housing is barrel type with provision made to remove and install pinions and side gears through right hand end (case closed by end cap screwed in housing and retained by locking screw or taper locking pin installed from outside of case) Differential assembly mounted in taper roller bearings (bearing cups seated in ends of differential housing) with threaded sleeve type adjusting nut at outer end of each bearing Adjusting sleeves are locked by clamp bolt in each bearing post

REMOVAL OF AXLE: *See Rear Axle on car model pages*

PINION OIL SEAL OR UNIVERSAL YOKE REPLACEMENT:

►*CAUTION Pinion bearing preload (turning torque) must be measured before pinion shaft nut loosened*

Pinion Bearing Oil Seal Removal: 1) On Air Suspension Cars, pull out lift valve control handle on instrument panel Raise rear end of car, remove both rear wheels and brake drums (to eliminate drag while taking torque reading) Drain about 1½ pints of axle lubricant with suction gun and disconnect rear universal joint and pinion yoke

2) Measure inch-pounds torque (use 50 inch-pound wrench) required to rotate pinion shaft slowly for at least two turns **N t r ading**

3) Mark pinion shaft and yoke with punch (to be installed in same position) Hold yoke and remove pinion nut Pull pinion yoke from pinion shaft Remove pinion seal, then remove staking burrs on pinion shaft with small file or a 7/8-14 thread die

Installation of Oil Seal: 1) Coat outer edge of seal with non-hardening gasket sealer and lubricate sealing lip Drive seal into carrier *CAUTION - Be sure that outer surface of yoke is free from scratches or nicks*

2) Line up punch marks and install yoke on pinion shaft Install new pinion nut and tighten it until preload at time of removal is obtained, **plus** 2-5 inch-pounds Rotate pinion shaft while tightening pinion nut approximately ½ turn at a time until correct preload torque is obtained Repeat torque operation *CAUTION - DO NOT overtighten pinion nut and never back off nut to reduce preload torque See Pinion Bearing Preload below*

3) Stake pinion shaft nut, connect rear universal joint at pinion yoke and refill rear axle to correct level

4) Replace brake drums and rear wheels Lower car and push in on Air Lift Control

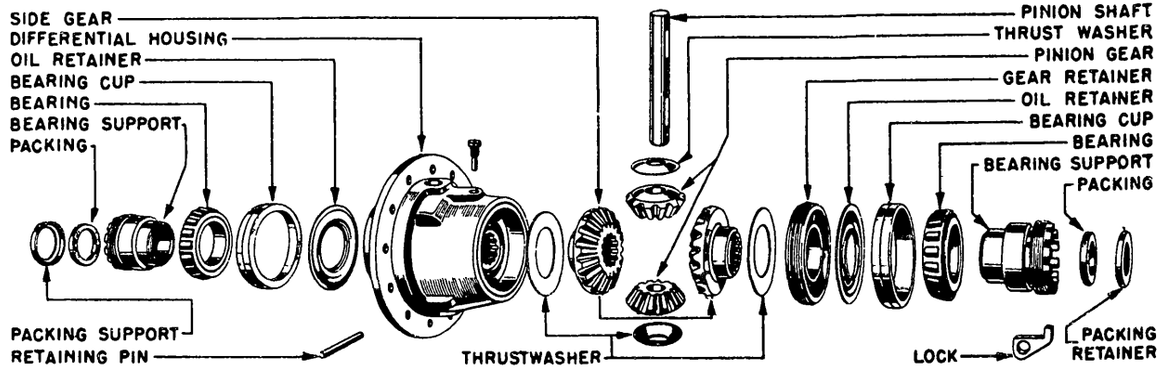
Pinion Bearing Preload
(Pinion Shaft Turning Torque)

New Assembly	50 inch-pounds max
After 1,000 miles (used oil seal)	15 inch-pounds max
After 1,000 miles (new oil seal)	20 inch-pounds max

AXLE SHAFT REPLACEMENT: Axle shaft is "flanged" type which does not have separate wheel hub (brake drum and wheel bolted directly to shaft flange) On 1954-56 models, install new oil seal whenever seal is removed

Axle Shaft Removal & Installation - With wheel off, take out retaining screws and remove brake drum Remove nuts and lockwashers mounting bearing retainer and backing plate on rear axle housing Use Puller, Tool No J-8131, (J-942-1) with slide hammer Tool J-2619 to remove axle shaft using care not to damage oil seal (1954-56) or disturb position of backing plate

►*WHEEL BEARING REPLACEMENT NOTE* On 1954-56 models, bearings are sealed type and pre-lubricated and should be inspected for loss of lubricant A bearing that spins freely (indicating loss of lubricant) should be replaced On 1957-60 models, oil seal is an integral part of bearing and is not serviced separately Bearing is lubricated by rear axle lubricant



CADILLAC REAR AXLE ASSEMBLY

WHEEL BEARING REMOVAL & INSTALLATION: Use cold chisel and hammer to nick spacer next to bearing (not necessary to split spacer), slip spacer off shaft Use Special Bearing Remover & Replacer Tool J-2986 (place "U" shaped part of tool under bearing to prevent it exploding) Press bearing off shaft in arbor press Install bearing on shaft with seal toward flange end of axle shaft (1957-60) with same tool, pressing bearing on until it does not quite touch shoulder on shaft Then press new spacer on shaft against bearing On 1957-60 models, install "O" ring seal in grooved outer surface of bearing

AXLE SHAFT OIL SEAL REPLACEMENT (1954-56): Make certain that all nicks or burrs removed from counterbore into which seal fits Polish shaft on which seal leather bears Dip new seals in clean engine oil, coat inner surface of oil seal leather with chassis lubricant, coat outer surface of oil seal metal shell with sealer compound Use Tool J-3069 to install seal in housing

DIFFERENTIAL CARRIER ASSEMBLY OVERHAUL: Manufacturer recommends that all services other than oil seal or universal joint yoke replacement (above) should be handled by replacement of the assembly No attempt should be made to disassemble or adjust the carrier assembly in the field

Carrier Assembly Installation - When installing carrier, tighten capscrews to 30-35 ft lbs If oil leaks noted between carrier flange and housing, correct by installing extra gasket at this point with sealing compound on gaskets **Do not tighten capscrews exc ssively to correct oil leaks**

Checking Backlash - Raise car on hoist and fasten one end of piece of bar stock to yoke on pinion shaft and the other end to frame side rail by means of "C" clamps to prevent rotation of drive shaft. Apply emergency brake cable on one wheel to hold wheel stationary, and measure backlash in inches at outer circumference of tire tread A stiff wire pointer fastened to fender of car will aid in this measurement Maximum backlash at wheel should not exceed ½"

1954 CHEVROLET PASSENGER CAR HYPOID

Chevrolet Pass. Car & ½-Ton Truck (1954)

►CHANGES, CAUTIONS, CORRECTIONS

►**PINION BEARING LOCK SLEEVE LOCKSCREW INSTALLATION CAUTION:** Both sleeve face and tapered end of Lockscrew should be coated with Rear Axle Lubricant when these parts installed to prevent screw cutting or scoring face of sleeve when screws are tightened. CAUTION—If these parts not lubricated, and screw cuts face of lock sleeve, screw may bottom without forcing sleeve into position against bearing which may cause failure of pinion bearings or ring and pinion gear due to incorrect adjustment.

►**REVACYCLE DIFFERENTIAL PIN & SIDE GEARS (Not used on Half-Ton Truck Models)**—Revacycle gears must be used together and must not be interchanged singly with other type gears.

►**UNIVERSAL JOINT & PROPELLER SHAFT BUSHING LUBRICATION CAUTION (Powerglide Cars):** These parts lubricated from Powerglide transmission output shaft through oil passage in special drilled universal joint retaining bolt No. 3690869 (bolt drilled completely through and has special flat head nail inserted in hole to keep oil passage open). If universal joint or bushing lubrication troubles experienced, **make certain that drilled bolt used and that nail is free in oil passage** (1/32-1/16" clearance between head of nail and head of bolt).

►***CAUTION—Plain bolt used for transmission run-in at factory must be replaced by this special drilled bolt when transmission installed in car.***

►**AXLE IDENTIFICATION & RATIO NOTE**—See Chevrolet Car Model pages for axle ratios and identification.

DESCRIPTION: Hypoid gear, semi-floating type with torque tube drive.

REMOVAL OF AXLE: *See "Rear Axle" on car model page.*

AXLE SHAFT REPLACEMENT: Check endplay when installing axle shafts (see below).

Axle Shaft Removal—Remove wheels, take out both 'zipon' nuts mounting brake drum to axle shaft flange and remove drum. Remove axle housing rear cover, take out pinion shaft screw, withdraw pinion shaft, lift out axle spacer block. Push shafts in toward center of housing, remove "C" washers at inner ends within differential side gears, withdraw axle shafts. When replacing shafts, check endplay.

Axle Shaft Note—Axle shafts are of unequal length. ***See Chevrolet Special Data in car model section for shaft part numbers and identification marks.***

CAUTION—Install longer axle shaft on right side.

New Axle Shaft Installation. Wheel hub bolts are press fit in axle flange and must be installed in new shafts (these bolts hold oil deflector assembly on flange). Coat new gasket with heavy shellac or paint, install gasket and oil deflector on flange lining up oil holes (extra center hole of three closest together should be lined up with notch in flange, oil pocket in deflector should also line up with this notch), insert special wheel bolts and force heads down to deflector, peen shoulder on bolts into countersink around bolt holes in flange (this is very important). Check shaft endplay.

Axle Shaft Endplay (Passenger Cars)—Controlled by spacer assembled on differential pinion shaft between inner ends of axle shafts. Endplay should be from a free fit to .014" maximum. Select correct spacer block (see data below) to give this endplay. Install spacer block with ground faces of block toward axle shaft ends. NOTE—Medium spacer block ground on all four sides and may be installed either way to secure either of these two sizes.

Part No.	Pass. Car Spacer Blocks	Size
597251		Narrow (1.012")
473603		(1.0195" & 1.0295")
597254①		Wide (1.0345")

Axle Shaft Endplay (Trucks)—Same as for Passenger Car (above) except that spacer blocks furnished in two types for three sizes as listed below (wide block ground on all four sides, may be installed either way).

Part No.	Truck Spacer Blocks	Size
370217		Narrow (1.1485")
372515		Wide (1.1575" & 1.1675")

Axle Bearing & Oil Seal Installation—Before installing new parts, make certain that axle housing is clean and smooth (remove old staking marks), coat outer diameter of seal retainer lightly with Permatex (use care not to get Permatex on seal). Assemble bearing, retainer, and oil seal on end of driver, seat parts in place in housing with few light blows of a hammer on the driver. Remove tool, stake oil seal in place with a prick punch. NOTE—Spring-loaded type seals are not staked.

PROPELLER SHAFT & FRONT BEARING: Propeller shaft is part of pinion and shaft assembly (see "Overhaul" data following).

►*PROPELLER SHAFT BUSHING NOTE:* Bushings used in production in torque tube are finish-ground after installation to prevent possibility of interference between torque tube and torque ball sleeve. Use press fit type replacement bushings and remove and install bushings as follows:

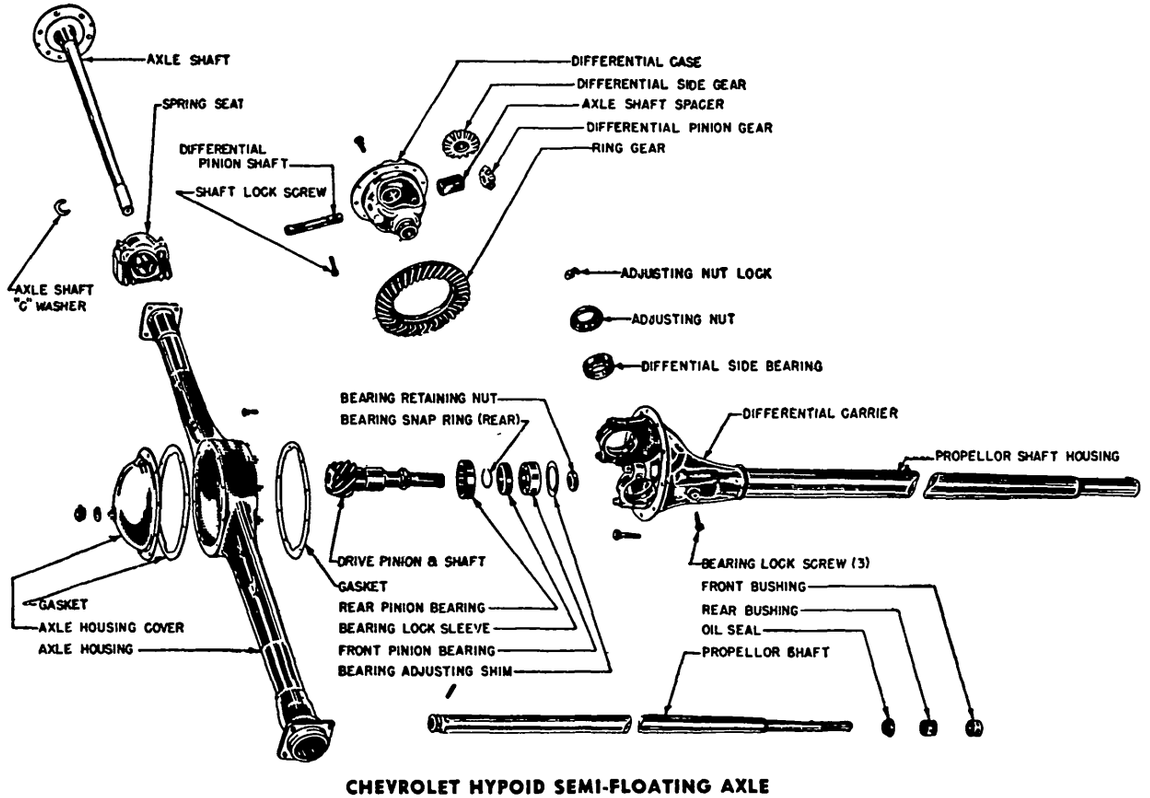
"Press Fit" Bushing Removal & Installation - Use special Puller J-4258 to remove both bushings and oil seal from torque tube. Install new parts in following order: Oil seal (use Driver J-968, placing seal on driver with free side of leather toward head of driver), rear bushing (use Driver J-4259 with spacer washer on driver), front bushing (use Driver J-4290). Drive bushings in until stop on driver is against end of torque tube. Drivers will position bushings correctly. *CAUTION - If new bushings not a tight fit in old torque tube, bushings should be drilled and dowel pins installed.*

Replacement Torque Tube Bushings: Part No. 3694732 (Front); 3694733 (Rear).

►**Oil Seal on Powerglide Cars**—Special rubber-encased seal used to prevent oil leaks around outer diameter of seal retainer. This seal is Part No. 3691457 and is used in this 3.55-1 Ratio axle only.

OVERHAUL: Disassembly—Drain lubricant and remove rear housing cover. Remove axle shafts (see

CONTINUED ON NEXT PAGE



CHEVROLET HYPOID SEMI-FLOATING AXLE

1954 CHEVROLET HYPOID (C ntinu d)

data above). Remove nuts retaining torque tube on axle housing, remove torque tube, propeller shaft and pinion assembly. Remove adjusting nut locks on differential side bearing caps, remove bearing cap screws. Remove bearing caps and adjusting nuts, lift differential assembly out. Dismantle and service sub-assemblies as follows:

Pinion Bearing & Propeller Shaft Assembly: To remove from torque tube, loosen locknuts and take out retaining screws on side of housing, withdraw assembly from torque tube. To dismantle assembly, drill out head of rivet pin in propeller shaft, loosen pinion bearing locknut, disassemble pinion from propeller shaft. Use J-996 pinion bearing remover to press double row ball bearing from pinion shaft, remove locking sleeve or bearing retaining collar, remove lock ring from pinion shaft, take off roller bearing. Front double row ball bearing must have no perceptible endplay (new bearings may be .001" tight or have some drag). Assemble in reverse order making certain that lock ring installed on shaft ahead of roller bearing (to prevent rollers creeping) and that locking sleeve installed with beveled edge towards pinion. Tighten bearing locknut to 200-240 ft. lbs., stake nut in shaft slot. Use new rivet pin when assembling pinion and propeller shaft and rivet both ends of pin securely. Make certain that pinion setting shims installed in housing (see Pinion Setting below), insert propeller shaft assembly with spacer J-4050 between pinion and roller bearing to maintain proper pinion-to-bearing clearance, drive assembly down to seat bearings properly (use drift in hole in end of pinion, do not drive on end of pinion teeth). Make certain that locking sleeve down against front bearing, install the three tapered lockscrews, tighten these screws evenly and securely, tighten locknuts.

►*CAUTION*—Coat beveled face of pinion bearing lock sleeve and tapered ends of lockscrews with rear axle lubricant before installing to prevent screws cutting or scoring sleeve which would cause incorrect axle adjustment and early failure of bearings and gears.

►*HALF-TON TRUCK PINION BEARING ASSEMBLY NOTE:* Install bearing oil seal retainer on shaft next to rear roller bearing, with bevel of large diameter of retainer toward pinion, and ahead of bearing lock sleeve.

Pinion Setting:—Pinion position controlled by shims installed in housing ahead of front bearing. Standard assembly .033" shim thickness (one .015" shim, one .018" shim) and should be used for new gears. Shim pack can be varied from .024" to .042" and shims are furnished as follows:

Part No.	Pinion Setting Shims Thickness
3657740	.012"
3657741	.015"
3657742	.018"
3657743	.021"

Differential Bearing Assembly:—Use special puller to remove bearings from differential case hubs (notches provided in case for puller so that pressure applied to inner races only). Use J-994 bearing replacer to install bearings. When installing differential assembly in carrier (third member), make certain that marks on bearing caps and carrier line up

Differential Bearing Adjustment:—With carrier or third member assembly out of axle housing, tighten differential bearing cap screws until lockwashers are just flattened, turn right hand adjusting nut up until it is just snug, then turn nut additional 1-2 notches to locking position, tighten bearing cap screws evenly to 65-80 ft. lbs. (Pass. Cars), 115-135 ft. lbs. (Half-Ton), install adjusting nut locks.

Ring Gear Backlash Adjustment. To set up differential assembly for correct backlash when installing assembly in carrier, turn left hand adjusting nut in slowly until all backlash between ring gear and pinion taken up (revolve ring gear while making this adjustment), then back adjusting nut off one notch. Adjust differential bearings by turning right hand adjusting nut as directed above. This setting should give correct backlash of .005-.007". After bearing adjustment completed, recheck backlash and if not correct, adjust by backing off one adjusting nut and tightening opposite nut exactly the same amount to avoid disturbing bearing adjustment.

Ring Gear Replacement:—Run-out of differential case flange must not exceed .001" with ring gear removed. When installing ring gear, use guide pins in alternate bolt holes to position gear while bolts are being installed, use new lockwashers under bolt heads, tighten all bolts evenly to 40-60 ft. lbs. (Pass. Cars), 85-95 ft. lbs. (Half-Ton). Check ring gear run-out which should not exceed .0035" (measured on back face of gear).

1955-60 CHEVROLET HYPOID (HOTCHKISS DRIVE)

Pass. Cars, El Camino, Sed. Del. (1955-60)
Corvette (1954-60)
½-Ton Trucks (1955-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955-60 PASS. CAR REAR WHEEL BEARING NOTE:* Either roller or ball type bearings are available for service. Roller type (high capacity) are recommended for use when wheel bearing maximum service life is desired. Roller bearings are available as follows: Part No. 7550792 (1955-56); Part No. 7451112 (1957-60).

►*1956 PASS. CAR WHEEL BEARING NOTE:* Bearing and axle shaft seal are serviced as an assembly. The bearing is permanently lubricated and no further lubrication is required. Install with spring loaded lip toward axle shaft retainer.

►*1955-57 PINION FLANGE OIL SEAL INSTALLATION CHANGE:* When installing the seal, do not bottom it against shoulder in differential bore. This could cause distortion and damage to seal. It is recommended that the seal be pressed to a depth in carrier housing that permits face of seal case to protrude 3/16" to 7/32" from housing.

►*1955-56 RING GEAR & PINION NOTE:* The 1956 wider ring gear and pinion sets may be used on 1955 models for service replacement.

►*1957 REAR WHEEL BEARING REMOVAL PROCEDURE CHANGE:* Due to clearance restrictions, Press Plate Tool 5741, will not fit properly on the 1957 axle. *See "Overhaul" below for revised procedure.*

►*1955-60 REAR WHEEL BEARING GASKET SERVICE REPLACEMENT NOTE:* The single thick gasket formerly used has been replaced by two thinner gaskets, Part No. 3772374 & 3775360, which must be installed together. These new gaskets are installed on both sides of rear brake flange plate, adjacent to axle housing on the inside and bearing retainer on the outside.

►*1959 CORVETTE DRIVE LINE VIBRATION CORRECTION:* This condition may be due to excessive rear universal joint angle and can be corrected by installing either a 3° shim, Part No. 3744488, or a 2° shim, Part No. 3722797, between rear axle pad and spring on both sides, with thick edge of shim toward front. *NOTE - Locating tab on shims should be removed to allow shim to lie flat. See "Propeller Shaft Notes" in Chevrolet Special Data.*

DESCRIPTION: Semi-floating, hypoid gear type with Hotchkiss drive. Drive pinion is mounted on preloaded tapered roller bearings. Power-Lock Differential optional on 1957-60 models.

►*PINION BEARING PRELOAD CAUTION:* Pinion bearing preload must be adjusted whenever universal flange nut on pinion shaft loosened (preload controlled by this nut and will be disturbed when nut loosened).

REAR AXLE ASSEMBLY REMOVAL: *See "R ar Axl " n Car Mod l Pag s.*

AXLE SHAFT REPLACEMENT (PASS. CARS): R m val - Raise car, place jack stands under rear axle housing. Remove hub nuts and remove tire and wheel. Remove brake drum and gasket. Remove nuts and lockwashers from bearing retaining bolts on inside of axle flange. Attach axle puller J-5748 with slide hammer to hub nuts and remove axle and bearing assembly, being careful not to disturb backing plate *(NOTE*—If bearing retainer and parking brake strut interefere, raise strut slightly for clearance). Install bolt and nut to hold backing plate on axle housing.

Bearing or Oil Seal Replacement—Using a hammer and chisel, nick the soft ring next to bearing and remove ring *(NOTE*—It is not necessary to split the ring completely for removal). Install press plate J-5741 between axle flange and bearing with the land of the plates against bearing and inside the retainer. Install bolts in plates. Press bearing from shaft with press plate parting line resting on press bed *(CAUTION*—Press plates must be supported on parting line). On 1957-58 models, support rear wheel bearing retainer and knock the four serrated bolts from retainer. Slide retainer down against axle flange and install Press Plate Tool 5741 on axle shaft between bearing retainer and bearing and fully close the two plate halves. Replace bearing on shaft with retainer ring chamfered side against bearing. When roller bearing used, install inner race on shaft and

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1955-60 CHEVROLET HYPOID (C ntinued)

press in place with "flat" side of Tool J-6661. *NOTE* - Seal must be in place on bearing. Use "flat" side of Tool 6661 to install roller bearing retainer ring. *NOTE* - New roller bearing is a one-piece assembly. On older models, pry out old seal being careful not to damage bearing races. Install new seal using guide Tool J-5747. Tap seal in place with plastic hammer. Install bearing with installer, Tool J-5746, so bearing seats on shaft against shoulder. On 1959-60 models, a second retaining ring is used which must be pressed on shaft.

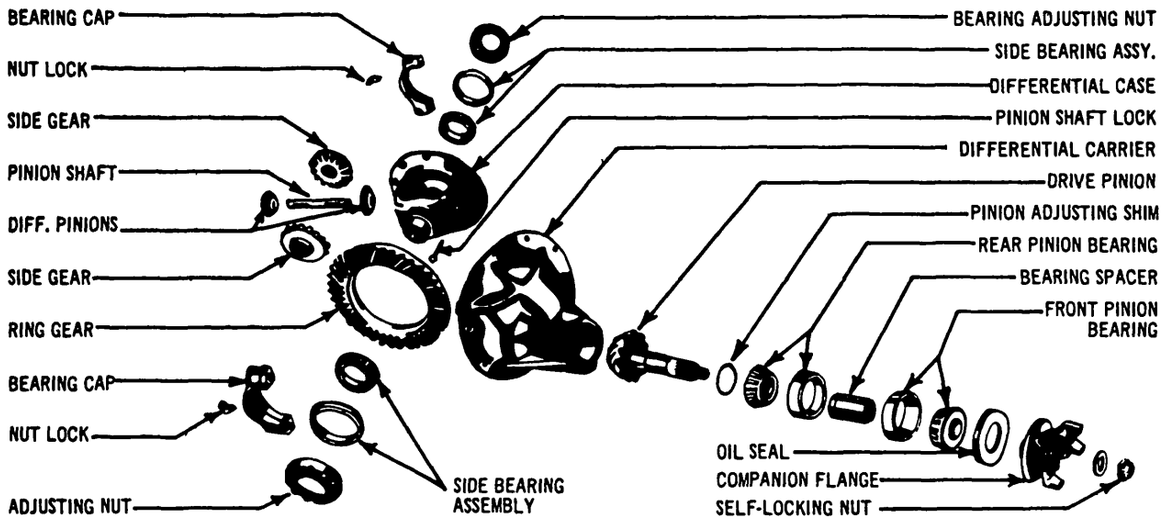
(CAUTION–Bearing retainer must be on shaft before bearing installed). Install new axle shaft bearing retaining ring on shaft with tool J-5746 to seat ring against bearing (chamfered side of ring must be against bearing).

►*AXLE SHAFT REPLACEMENT NOTE:* If a new shaft is being installed, insert the five new special bolts and force heads down to flange on axle. Peen end of shoulder on bolts into countersink around holes in flange using tool J-554. Install new bearing (see above).

Installati n: Replace bearing "O" ring seal. Remove temporary nut and bolt holding brake backing plate in place. Install new retainer gasket and install axle shaft in housing using axle shaft tool J-5748 and slide hammer. Rotate shaft to align splines of shaft and differential side gear. Outer race of bearing must seat against shoulder in axle housing. Install nuts and lockwashers on bearing retainer bolts and tighten securely. Install brake drum gasket, drum, wheel and hub nuts.

AXLE SHAFT REPLACEMENT (½ Ton Truck): Removal - Remove wheel and brake drum, drain lubricant from differential and remove housing cover. Remove differential pinion shaft lock screw, pinion shaft, axle shaft spacer, and differential pinions. Push axle shafts inward to remove "C" washers from inner ends of axle shafts, then remove shafts from housing.

Installati n - Install gasket to flange with center hole (of three holes closest together) aligned with notch in flange. Use heavy shellac or paint on both sides of gasket and oil deflector. Install oil deflector aligning oil pocket with notch in flange. Insert six special bolts, forcing heads down to deflector. Peen shoulder on bolts into countersunk holes in flange with anvil and hub bolt Tool J-554. Check leather oil seal for wear, damage or misplacement. Slide axle shaft into place. *NOTE - DO NOTdamag l ath r il seal when inserting axle shaft and b sur shaft inner splines engage splines of diff r ntial sid g ars.* Replace "C" washers. Spread shafts, but DO NOT damage inner ends of shafts when forcing "C" washers and shafts into counterbores in side gears, then install differential pinions. Select and install spacer to give .014" clearance between ends of axle shaft and spacer. Spacers available in three sizes as follows: Narrow (1.147-1.150"), Medium (1.156-1.159"), Wide (1.166-1.169") wide across ground surfaces. Assemble pinion shaft with lockwasher under head of lock screw. Use new gasket and reinstall housing cover and refill differential. When installing brake drum, be sure that lug in web section is aligned and extends into drain hole in axle shaft flange.



CHEVROLET HYPOID REAR AXLE (HOTCHKISS DRIVE)

Bearing or Seal Replacement - Remove wheel and axle shafts, see above, then use Puller J-1436-A or J-8119 to remove bearing, bearing retainer, and oil seal. Inspect bore and remove old stake points. *NOTE* - If stake points not removed they will make groove in new seal and cause lubricant leak. Place oil seal, bearing, and inside bearing retainer on Tool J-270-7 in that order. Use Permatex No. 2 on oil seal outer diameter. *CAUTION - DC NOT get sealer material on leather lip of oil seal.* Start bearing into housing and tap on tool to seat parts. Remove tool and stake oil seal in place with prick punch. Assemble axle shafts, see above

COMPANION FLANGE, OIL DEFLECTOR OR SEAL REPLACEMENT: Removal–Raise one rear wheel off floor with jack stand placed under frame side rail. *(NOTE–This is to lock one rear wheel and obtain differential to body clearance. If operation is to be performed on a hoist, support frame on jack stands, allow axle to drop for clearance and expand brake shoes on one wheel to lock it securely).*

1) Check free wheel for freedom of rotation. Separate rear universal joint, tape trunnion bearings to joint and drop propeller shaft to floor.

2) Using an inch-pound torque wrench on the companion flange nut, rotate pinion through several complete revolutions and record the torque required to keep pinion turning. If old flange is to be installed, mark pinion and flange for reassembly in the same relative position.

3) Hold drive flange using tool J-2637-A, remove companion flange nut and special washer. Discard nut and use a new one at reassembly. Remove drive flange using tool J-820-A bolted over holding tool J-2637-A. Pry oil seal out using a screwdriver or hammer and chisel. Inspect drive flange for smooth oil seal surface or worn drive splines. On new flanges or old flanges with damaged deflectors, install new deflector, using tool J-5749.

4) Soak new seal in light engine oil for 10 minutes before installation. Wipe outer diameter of seal and then coat outer diameter with Permatex No. 3 or similar sealer. Install seal using tool J-5154.

5) Install drive flange, aligning marks on pinion and flange if old flange is being used. If flange does not go on shaft easily, use tool J-5780 to pull it on.

►*CAUTION: Do not hammer flange on pinion shaft as damage to ring gear and pinion will result.*

6) Install washer and a new self-locking nut. Tighten nut to remove endplay and continue alternately tightening in small increments and checking preload torque with inch-pound torque wrench until it is the same as recorded at disassembly. Readjust brake if it was expanded to hold wheel.

OVERHAUL: Differential Carrier Assembly Removal - Remove axle shafts, see above, just far enough to clear carrier. Remove nuts and copper washers that attach carrier to axle housing. On passenger cars, separate carrier from housing just enough to drain lubricant, then remove carrier.

►*1956 PINION SHAFT REMOVAL NOTE:* Interference may be encountered on some models while pinion shaft is being removed. If pinion shaft will not clear ring gear, ring gear must be removed to avoid damaging teeth while pinion shaft is being removed.

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1955-60 CHEVROLET HYPOID (C ntinued)

Disassembly: Mount carrier assembly in a vise or fixture J-3289. Mark caps and carrier for reassembly in same position. Remove differential adjusting nut locks and bearing cap bolts. Remove bearing caps and adjusting nuts by tapping on bosses of caps until free from dowels. *(CAUTION–Do not pry caps off as this may damage machined face of cap).* Remove differential and ring gear assembly from carrier housing being careful not to drop side bearing outer races. Remove differential pinion shaft screw and lockwasher and differential pinion shaft from case, and remove pinions and side gears. Hold companion flange from turning with tool J-2637-A and remove propeller shaft pinion flange nut and washer. Remove flange with tool J-820-A, bolted to flange with holding tool in place. Remove pinion from carrier by tapping on front end with soft hammer. Remove pinion shaft oil seal, pinion front bearing and bearing spacer from carrier. *(NOTE–*Some axles may have a 1/16" shim located behind spacer. This is a production item only and should be discarded).

Inspection: Wash all parts in cleaning solvent and thoroughly clean axle housing. Inspect all bearing cups, cones and rollers for chipping or evidence of excessive wear. On pinion bearing rollers, inspect large end of rollers for wear *(NOTE–*The pinion bearings are preloaded, and the natural wear pattern is a frosted condition with occasional slight scratches on races or rollers. This does not indicate a defective bearing). Inspect oil seal for wear or damage and pinion shaft splines and flange for excessive wear. Inspect ring gear and pinion teeth for scoring, cracking or chipping and differential case for cracks or scores on side gear and pinion thrust faces. Check fit of differential side gears in case and fit on axle shaft splines. Inspect differential pinion shaft for scoring or evidence of excessive wear. Inspect carrier for cracks or crossed threads on bearing caps and bosses.

►*PINION MARKING & PINION SETTING TOOL NOTE:* The number marked on pinion shaft (39 to 51 on 1955) or (40 to 50 on 1956-60), will indicate in thousandths, the pinion mounting distance. A new Rear Axle Pinion Gauge J-6266 is used with 1956 and later models with the above pinion markings, to obtain accurate adjustment. *NOTE - Gauge J-6266 must not be used on 1955 or earlier models.*

Drive Pinion Bearing Replacement: Remove front and rear bearing outer races from carrier with a brass drift. Install new bearing cups in carrier using tool J-270-6 on front cup and J-270-14 on rear cup, driving bearing races in until they seat against shoulders in housing. Remove rear pinion bearing inner cone and roller assembly using tool J-5740 press plate, in an arbor press *(CAUTION–N t siz f shim r m v d fr m b tw n c n and g ar).* If original ring gear and pinion are being reinstalled in the original carrier, install the original shim pack. If a new ring gear and pinion, or a new carrier is being installed, see *"Pinion Gear Setting" below.*

Pinion Gear Setting (1955): When installing a new pinion gear or differential carrier, determine correct amount of shims to install between pinion gear and bearing by checking the markings on end of pinion gear and on carrier flange face, and then referring to Pinion Shim Table below. Carrier is marked S-1, D-1 etc., and pinion gear is marked +1, -1 etc. As an example, a +1 pinion in a S-1 carrier should have a .030" shim.

Pinion Shim Table

Pinion Mark	Carrier Mark S-3	S-2	S-1	0	D-1	D-2	D-3
-5	.024"	.024"	.024"	.027"	.027"	.027"	.027"
-4	.024"	.024"	.024"	.027"	.027"	.027"	.030"
-3	.024"	.024"	.027"	.027"	.027"	.030"	.030"
-2	.024"	.027"	.027"	.027"	.030"	.030"	.030"
-1	.027"	.027"	.027"	.030"	.030"	.030"	.033"
0	.027"	.027"	.030"	.030"	.030"	.033"	.033"
+1	.027"	.030"	.030"	.030"	.033"	.033"	.033"
+2	.030"	.030"	.030"	.033"	.033"	.033"	.036"
+3	.030"	.030"	.033"	.033"	.033"	.036"	.036"
+4	.030"	.033"	.033"	.033"	.036"	.036"	.036"
+5	.033"	.033"	.033"	.036"	.036"	.036"	

Pinion Gear Setting (1956-60): If original ring gear and pinion, pinion rear bearing assembly and differential carrier will all be reinstalled, the original shim or one of the same thickness may be used. If the ring gear and pinion, pinion rear bearing assembly or differential carrier are to be replaced, the correct thickness of the pinion depth shim may be determined as follows:

1) Lubricate pinion bearing cone and roller assemblies with rear axle lubricant. Position rear bearing in its cup in carrier. Rotate bearing several times to make sure it is seated. Position gauge plate (part of Tool J-6266) on bearing so that the chamfered corner is toward pinion side and top of differential as installed in car.

2) While holding front cone and roller assembly in its cup with the clamp plate, insert the clamp screw (part of Tool J-6266) through the gauge plate, both bearings and clamp plate. Tighten only a sufficient amount to center bearings in cup. Check to see that neither gauge block nor clamp plate touch the housing. Oscillate gauge plate and bearings several times to be sure bearings are seated and then draw up hex nut until 20 inch-pounds of torque are required to oscillate plate and bearings. *(NOTE* - A torque of 60 ft. lbs. may be required to tighten nut on clamp bolt in order to obtain simulated preload of bearings after assembly. After tightening clamp bolt nut, measure turning torque with an "inch-pound" torque wrench).

3) Install Tool J-6266 body assembly across differential bores. Plunger on body must point inward toward center of pinion rear bearing. Mount a dial indicator, KMO-30 on tool body post with indicator button on top of tool plunger. Swing body so that plunger d s n t touch gauge plate. and set dial indicator at zero.

4) Slowly swing inner end of tool plunger across gauge plate until highest indicator reading is obtained. Record this measurement and recheck to see that it is correct. Record factory marking on pinion. **Subtract** the measurement obtained with the tool from marking on pinion. The **difference** between these two figures determines thickness of pinion depth shim to be installed with the particular pinion and ring gear, and rear bearing and carrier being checked. Shims are available in six different thicknesses: .021", .024", .027", .030", .033" and .036". Use the shim which is closest to the difference in measurement.

5) Remove indicator, tool, and pinion rear bearing cone assembly from carrier. Position the shim selected, between pinion gear head and rear pinion bearing with tangs on shim toward pinion head.

Differential Bearing Replac ment: Install differential bearing puller TR-278-R, making sure that puller legs are fitted securely and retaining yoke is tight. Tighten puller screw and remove bearing. Install a new bearing on hub with the thick side of inner race toward case and drive in place with tool J-5768 *(NOTE–*This tool is counterbored and has a pilot to assure proper installation and seating of bearing).

Ring Gear & Differential Cas R plac ment: Remove ring gear bolts and lockwashers and using a soft hammer, tap ring gear off the case. Install guide pins made from 3/8"-24x1½" long capscrews with heads cut off and ends slotted, in alternate bolt holes in ring gear. Make sure back face of ring gear and face of case are free of dirt and burrs. Mount case on "V" blocks placed at side bearings and check face runout with a dial indicator. This should not exceed .003". Drop ring gear over pilot diameter of the case, then install every other ring gear bolt and lockwasher and draw them up evenly and snugly so that ring gear face is flush with face of case. Remove guide pins and install remaining bolts. Tighten all bolts to 40-60 ft. lbs.

Differential Carrier Reass mbly: Mount carrier in a vise or holding fixture. Lubricate pinion bearings with hypoid lubricant and install pinion in carrier. Install pinion bearing spacer with large end toward gear (use a new spacer). Install front pinion bearing cone and roller assembly on pinion shaft. Soak a new oil seal for 10 minutes in light engine oil. Wipe outer diameter of seal dry then coat outer diameter with Permatex No. 3. Install seal using J-5154. Install pinion flange and deflector assembly using tool J-5780 and J-2637-A. Install special washer and new self-locking nut. Tighten pinion flange nut, holding companion flange with tool J-2637-A. until torque required to keep pinion

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1955-60 CHEVROLET HYPOID (C ntinued)

rotating is 15 to 25 inch pounds (this may require a nut torque of as much as 350 ft. lbs. A torque wrench or a scale may be used to determine preload. A scale should read 1 7/8 to 3 1/8 pounds when applied at an 8" radius. *(CAUTION–When checking turning torque, mak sur that th re is no contact between deflector and carrier).* Install differential assembly in carrier and install outer races and adjusting nuts *(CAUTION–Carefully slid adjusting nuts alongside bearing so that thr ads on nuts fit into threads in carrier).* Install bearing caps, aligning marks on cap with marks on carrier. Install and tighten capscrews snugly (these will be retightened after ring gear and pinion are adjusted). On Passenger models, lubricate hubs of differential side gears with hypoid lubricant and install them in differential case. Roll the two differential pinions into position and install pinion gear shaft and shaft lockscrew. On ½-ton trucks, the differential side gears and pinion gears are installed after installation of carrier in rear axle assembly, *see "Axle Shaft Replacement (½-Ton Truck)" above.*

Ring Gear & Pinion Adjustment: Loosen right hand adjusting nut and tighten left hand adjusting nut using wrench J-972 while turning ring gear. Tighten left hand nut until all lash is removed, then back off the left hand nut one notch to a locking position. Tighten right hand nut to force left hand bearing firmly into contact with left adjusting nut. Then loosen the right hand nut and again tighten snugly against the bearing *(NOTE–Nut will be snug against bearing when rollers b gin t mov when c ntact is mad).* Tighten right hand nut a minimum of **ne additi nal notch, to a maximum of tw notch s further** to a locking position. Mount a dial indicator on carrier and check backlash between ring gear and pinion. Backlash should be .005-.008" (1955-56), .003-.010" with .005-.008" preferred (1957-60). Correct by moving each adjusting nut an equal amount in the same direction to retain preload and change backlash. Tighten bearing cap bolts to 70-75 ft. lbs. Recheck backlash and install both adjusting nut locks.

Differential Carrier Installation: Clean out axle housing thoroughly and place new gasket over carrier mounting bolts. Assemble differential carrier assembly to axle housing, install new copper washers and nuts and tighten securely. Connect rear universal joint.

CHEVROLET TRUCK HYPOID

Ch vr l t Truck ¾, 1, 1½, 2-Ton (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 2-TON TRUCK REAR END JACKING CAUTION:* When lifting these models at the rear with a hydraulic jack, the jack should be placed under the spring just forward of axle housing. *NOTE - This procedure supers d s pr vi us jacking procedures.*

DESCRIPTION: Full floating, hypoid gear type, with "straddle" mounted pinion shaft (rear end of pinion is supported in carrier housing on a roller bearing). ¾-ton, 1-ton & Heavy Duty 2-ton trucks have two tapered roller bearings (one piece outer race) on pinion shaft assembly. 1½-ton & Standard Duty 2-ton trucks have a double row ball bearing on pinion shaft assembly. ¾-ton & 1-ton trucks have flange type axle shafts bolted to wheel hub. Other models have a splined flange type axle shaft with splines fitting into splines in wheel hub.

DIFFERENTIAL CARRIER ASSEMBLY REMOVAL: *See "R ar Axl " on Truck M del pages.*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Truck M d l pag s.*

REAR WHEEL BEARING ADJUSTMENT: *See "Rear Axl " on Truck Mod l pages.*

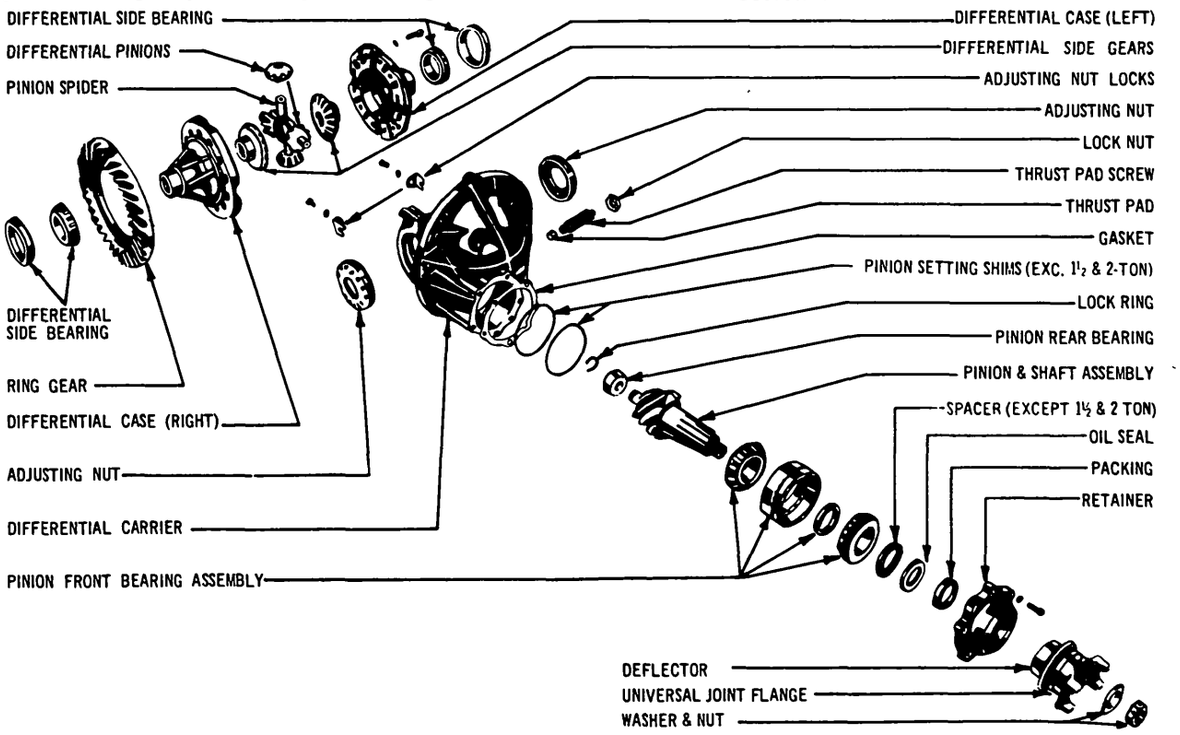
DIFFERENTIAL CARRIER: Disassembly - Mount assembly in a bench vise, then loosen ring gear thrust pad lock nut and remove thrust pad. Remove differential adjusting nut locks and bearing cap bolts, then mark bearing caps and carrier for reassembly in the same position. Remove bearing caps and adjusting nuts by tapping on bosses of caps until free from dowels. *CAUTION - D n t us screwdriver to pry cap off as this may damag machined face of cap.* Remove differential and ring gear from carrier housing being careful that side bearing outer races are not dropped. Remove bolts attaching pinion bearing retainer to carrier, then remove pinion and bearing assembly from carrier. *NOTE - It may be necessary to drive this unit from carri r. Us a brass drift against pilot nd of pini n.* On ¾ & 1-ton trucks, remove shims from inside of carrier housing, making note of number and total thickness of shims removed. On 2-ton heavy duty models, drive the pinion rear bearing outer race and roller from carrier housing. *NOTE - On other models, this bearing will be removed with pinion shaft assembly.*

Pinion: Disassembly - On all models, clamp pinion drive flange in a bench vise and remove cotter pin, nut, and washer from end of pinion shaft. Remove drive flange and bearing retainer from shaft, then drive oil seal and packing from retainer. Proceed as follows:

¾-Ton & 1-Ton - Remove front spacer, front bearing, and center bearing spacer from shaft, then remove rear pinion bearing snap ring and press bearing from shaft with Tool J-2229 and an arbor press. Install Tool J-2224 (¾-Ton truck), J-2225 (1-Ton truck) over pinion teeth and press pinion bearing from shaft.

1½-Ton & Std. Duty 2-Ton - Remove rear pinion bearing snap ring and press pinion rear bearing from shaft with Tool J-1453 and an arbor press, then press off double row ball bearing assembly with Tool J-1439 or J-1440.

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CHEVROLET TRUCK REAR AXLE ASSEMBLY (TYPICAL)

CHEVROLET TRUCK HYPOID (C ntinued)

Hvy. Duty 2-Ton - Press off front pinion bearing assembly (opposed tapered rollers) with Tool J-6203 (6 tooth pinion), J-6171 (5 tooth pinion). Press inner race of rear pinion bearing off shaft with Tool J-0358 or J-1453.

Inspection - Wash all parts in solvent and blow dry with air. Inspect pinion for scored, cracked, chipped, or worn teeth. Inspect splines on pinion shaft for wear. Check pinion bearing assemblies for roughness, defects, or excessive wear.

Differential: Disassembly - Check differential case to make sure the two halves are marked so they may be reassembled in the same position, then remove bolts holding cover and case together. Separate cover from case and remove pinions, spider, and side gears. Remove ring gear from case by tapping back of gear with a soft hammer. Install Tool J-8107, making sure puller legs are securely in notches in case and tighten retaining yoke. Tighten puller screw to remove bearing. Remove bearing on opposite side in same manner.

Inspection - Wash all parts in solvent, then inspect ring gear for cracked, chipped or worn teeth. Inspect differential case and cover for scored side gear and pinion thrust surfaces. On 1½-ton trucks, inspect differential pinion gear and side gear thrust washers.

NOTE - Replace these thrust washers if even the slightest wear is indicated. Check radial clearance between differential side gears and differential case, and fit of pinions on spider. Inspect spider arms for wear and distortion. Inspect splines and teeth of differential side gears and pinions for chipping or excessive wear. Check differential side bearings and cups for broken races, discoloration or roughness. Inspect differential case for cracks or distortion.

DIFFERENTIAL CARRIER: Reassembly - With all parts clean and dry, proceed as follows:

Differential: Reassembly - Place a new bearing on hub with thick side of inner race toward case and drive bearing into position with Tool J-2226 (¾-Ton & 1-Ton), J-1488 (1½ Ton), J-6080 (2-Ton). Install two guide pins (made from capscrew with heads cut off and ends slotted) diametrically opposite to each other on ring gear. Start guide pins through case flange and tap ring gear into position on case. Lubricate differential side gears, pinions, and thrust washers (if so equipped), then place differential pinions (and thrust washers) on spider. Assemble side gears and pinions (and thrust washers) to left half of differential case. Assemble right half to left half being sure to line up the marks on both halves. Install ring gear bolts and lockwashers in ring gear and tighten evenly until ring gear is flush with case flange, then remove guide pins and install remaining two bolts. Tighten all bolts to 85-95 ft. lbs.

Pini n: R assembly - *NOTE - All pini n front b arings ar furnished as a compl t unit. On trucks with ta p red roll d type bearings, th bearing parts sh uld always be installed as a gr up as the bearing spac r is pres lect d to pr vide prop r pini n bearing adjustment.*

¾-T n & 1-T n - Press a new inner race and roller assembly on pinion shaft using a piece of 2" pipe and applying pressure against inner race (large diameter of bearing toward pinion gear), then place spacer and outer race on shaft and press other inner race and roller assembly on pinion (small diameter of bearing toward pinion gear). Lubricate bearing with engine oil. Lubricate rear pinion bearing and press on pinion, applying pressure to inner race. Install lock ring with Tool J-769. Soak a new oil seal and packing in engine oil, then install packing and oil seal in bearing retainer and press into position with Tool J-2231. *CAUTION - Make sure free side of leather in oil seal is toward pinion bearing.* Place pinion bearing retainer (with bolts and lockwashers installed) over hub of pinion drive flange, then install spacer on pinion and install drive flange, pinion bearing retainer, washer and nut to pinion.

1½-Ton & Std. Duty 2-Ton - Soak a new oil seal and packing in engine oil, then install felt packing in bottom of bearing retainer recess. Use Tool 2231 and press oil seal ring into retainer with seal lip toward pinion bearing. Install double row front pinion bearing assembly onto pinion shaft using a piece of 2" pipe to press against inner race until collar on inner race seats against pinion head. Press rear pinion bearing on pinion shaft until chamfered side of inner race seats against shoulder on pinion shaft. Slide oil seal retainer on pinion shaft and tap drive flange onto pinion splines. Clamp drive flange in a vise and install flange washer and nut. Tighten nut to 160-280 ft. lbs., then install cotter pin without backing off nut. Lubricate bearings with engine oil.

Hvy. Duty 2-Ton - Soak new oil seal and packing in engine oil, then install felt packing in bearing retainer recess and install oil seal with Tool J-6078 (lip of seal toward bearing). Press inner race of pinion rear bearing onto pinion shaft until it seats against shoulder on shaft. Press front pinion bearing assembly (opposed tapered rollers), including bearing spacer, onto shaft until it seats against head of pinion. If necessary to replace deflector on drive flange, use Tool J-6081 to drive deflector into position on flange. Slide pinion bearing retainer on pinion shaft, then tap drive flange onto pinion splines. Clamp drive flange in a vise and install flange washer and nut. Tighten nut until cotter pin can be inserted with nut tightened to 160-280 ft. lbs. Lubricate pinion bearings with engine oil.

Pinion: Installation (¾-Ton & 1-Ton) - *NOTE - If original ring gear and pinion are to be installed, replace same thickness of shims in carrier housing that were removed at disassembly. If a new ring gear and pinion are to be installed, use one .021" thick shim as standard starting setup, then after differential carrier is completely reassembled (ring gear and pinion adjusted), check and adjust pinion depth (see below).* Place shim pack in bore in carrier, then install a new gasket on bearing retainer and install pinion assembly in carrier. *NOTE - Carri r assembly should be pr ss d into carri r t prevent damaging shims.* Install bearing retainer bolts and lockwashers and tighten to 85-95 ft. lbs.

1½-Ton & 2-T n - On 2-ton trucks, drive pinion rear bearing outer race and roller assembly into place in carrier housing, then install pinion assembly in carrier housing, using a new gasket under retainer. *NOTE - Shims ar not r quir d f r pini n depth adjustm nt on these models as pinion d pth s tting will be correct when pinion assembly is prop rly install d.* Tighten pinion bearing retainer bolts to 160-170 ft. lbs. (1½ ton trucks), 90-100 ft. lbs. (2-ton trucks).

Differential: Installation - Lower differential assembly into carrier and install side bearing cups and adjusting nuts. *CAUTION - Carefully slid adjusting nuts alongside bearings so that threads on nut fit int thr ads in carrier.* Install differential bearing caps making sure that marks on cap line up with marks on carrier. Install bearing cap bolts and tighten until lockwashers just flatten out.

Ring Gear & Pinion Adjustm nt (Sid B aring Pr l ad & Gear Backlash): With differential bearing cap bolts loosened just enough to permit turning bearing adjusting nuts with Tool J-0972, remove all backlash between ring gear and pinion. Back off left hand adjusting nut one or two notches to a locking position, then tighten right hand nut firmly to force differential in solid contact with left hand adjusting nut. Back off right hand adjusting nut until free of bearing, then retighten snugly against bearing. Tighten right hand nut from one to two additional notches to a locking position. Mount a dial indicator on carrier and check backlash between ring gear and pinion which should be .003-.010" (.005-.008" preferred). If backlash is more than .010" loosen right hand adjusting nut one notch and tighten left hand nut one notch. If backlash is less than .003", loosen left hand nut one notch and tighten right hand nut one notch. Tighten bearing cap bolts to 95-105 ft. lbs. (¾-Ton & 1-Ton), 190-220 ft. lbs. (1½-Ton & 2-Ton). Recheck backlash and install both adjusting nut locks. Tighten attaching bolts to 11-18 ft. lbs.

Pinion Depth Checking & Adjusting (¾-T n & 1-T n): With differential installed and adjust (see above), coat ring gear teeth lightly with red lead or prussian blue, then turn pinion shaft several revolutions in both directions. Check the pattern on ring gear teeth. If pinion depth is correct, tooth pattern will be centered on pitch line and toward toe of ring gear. If pattern is below pitch line on ring gear teeth, pinion is too deep and it will be necessary to remove pinion assembly and increase shim thickness between pinion bearing and carrier. If pattern is above pitch line on ring gear teeth, pinion is too shallow and it will be necessary to remove pinion assembly and decrease shim thickness between pinion bearing and carrier. Shims are furnished in thicknesses of .012", .015", .018", .021". *NOTE - Changes in pinion depth will caus a chang in backlash which makes it nec ssary t readjust backlash.* Tighten bearing capscrews to 95-105 ft. lbs. Recheck backlash and install adjusting nut locks.

Ring Gear Thrust Pad Adjustm nt: Inspect bronze tip on ring gear thrust pad and replace if worn. Install thrust pad and tighten screw until bronze tip engages back of ring gear. Back off screw 1/12 turn and tighten locknut. *NOTE - This adjustment provid s .005-.007" clearanc betwe n pad and g ar.*

1954-55 CHEVROLET TRUCK 2-SPEED (DOUBLE REDUCTION) HYPOID

Ch vr l t Truck 1½ & 2-Ton (1954-55)①, Optional.

①—1955 1st Series Trucks only. "1955 Chevrolet Truck 2-Speed" used on 1955 2nd Series Trucks.

►**Axl Shaft Diff rential Side Gear Note**—Beginning with 1952 production, axle shaft and differential side gears have 27 splines and are interchangeable with axle shafts on 1952 Two-Ton Single Speed Axle.

►CHANGES & CORRECTIONS

►**REPLACEMENT REDUCTION GEAR INSTALLATION CAUTION:** Reduction gear mounting bolt holes in replacement differential case and cover are drilled undersize (35/64" drill) and must be reamed at assembly with a 9/16" reamer using the gear as a pilot. Ream one hole, then install bolt to hold gear and case or cover in correct position while reaming remaining holes. **When replacing reduction gear,** install all bolts which can be inserted without forcing, then ream remaining holes with 9/16" reamer, using gear holes as pilot for reamer.

DESCRIPTION: Hypoid Gear, double-reduction type with conventional first reduction hypoid ring and pinion gear and a second reduction consisting of two helical gears on the ring gear shaft (short separate shaft in front of differential case and axle shafts) which mesh with two larger gears on the differential case. These second reduction gears are constant-mesh type and one set at a time is engaged by the shifting sleeve on the ring gear shaft between the gears. Shifting sleeve locks the gear to the shaft and is actuated by the Vacuum Shift Control diaphragm as follows:

Vacuum Shift Control: Consists of a double-acting diaphragm type vacuum power cylinder mounted on axle carrier housing and linked directly to the double reduction gear shifter sleeve. Diaphragm pushrod is spring-loaded in the piston rod with spacers and stopwashers which limit pushrod travel. This enables the gear ratio to be "pre-selected" by movement of the selector valve on the instrument panel. When selector valve is moved to "Lo" or "Hi" range, a corresponding movement of the diaphragm and pushrod compresses the spring, and as soon as torque is relieved (by momentary letting up on accelerator pedal), the spring moves the piston rod and completes the shift. Shifting sleeve is centered in "Lo" and "Hi" positions by 3 spring-loaded poppet balls in the sleeve hub.

REMOVAL OF AXLE: ***See "Rear Axle" on car model page for removal of carrier assembly from truck.***

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: Same as for full-floating truck axle. ***See "Chevrolet Truck Hypoid (Full-floating)" Rear Axle.***

BRAKE DRUM REPLACEMENT: Brake drum is held to hub by three slotted screws which can be removed and replaced with a screwdriver. Be sure to place soft paper gasket between hub and drum.

VACUUM SHIFT CONTROL: Following operations can be performed without disassembling rear axle:

Vacuum Cylinder Diaphragm Replacement: Disconnect hoses at fittings on vacuum cylinder. Remove bolts holding two cylinder halves together, lift off outer half. Remove outer nut on pushrod **while holding inner nut stationary with ½" wrench.** Remove diaphragm plates and diaphragm. Reassemble new diaphragm in same manner using Permatex around pushrod hole in diaphragm plates to insure a good seal at this point. Check shifting operation in "Lo" and "Hi" range after unit reassembled.

►***CAUTION—Do not transpose hose connections.***

Oil Seal Replacement: Dismantle vacuum cylinder and remove diaphragm (see above). Remove nuts and washers on two mounting studs, lift inner half of vacuum cylinder off axle housing, drive old oil seal out. Soak new seal in engine oil, coat outer diameter of seal with permatex and install in cylinder with free side of leather down (in), press seal in place with tool J-968. Install inner half of cylinder on axle housing, reassemble diaphragm.

Shifter Spring Replacement: Dismantle vacuum cylinder and remove diaphragm (see Diaphragm Replacement above). Press in on end of pushrod to relieve spring pressure, remove snap ring from inner rim of piston rod, withdraw pushrod assembly. Clamp head of pushrod bolt in vise, remove two nuts, short spacer, stop washer, spring, long spacer, and stop washer from pushrod bolt. Reinstall parts in same order using a new spring. Tighten adjusting nut on pushrod until distance between outer faces of stop washers is 3½", install and tighten locknut being careful not to change adjustment. Lubricate inside of piston rod with engine oil, install pushrod and replace snap ring. Reassemble vacuum control.

DIFFERENTIAL CARRIER DISASSEMBLY: Mark differential bearing caps and carrier to insure reassembly in same position. Remove adjusting nut locks, adjusting nuts, and bearing caps, lift differential assembly out of carrier. Remove nuts on pinion cage mounting studs, take out lubrication plug. Install two 3/8" bolts in tapped holes in pinion cage flange, turn nuts up evenly to remove cage assembly. **Note number and thickness of shims under carrier flange** (these shims control pinion mesh). Loosen locknut on bolt attaching shifter fork to vacuum control piston rod, remove bolt. Remove nuts on vacuum cylinder mounting studs, remove cylinder, piston rod, mounting sleeve and shims (tap on end of piston rod to free it from shifter fork). Remove nuts on double reduction shaft bearing caps, remove caps and shims (use two 3/8" capscrews in tapped holes in left bearing cap to remove cap), **note number and thickness of shims removed at each bearing cap** (these shims control ring-and-pinion gear backlash and bearing adjustment). Slide double reduction shaft assembly to left and pull ring gear end to rear to clear differential bearing support, remove shaft assembly. Remove right bearing outer race by driving race through into carrier with driver J-872-1. Do not remove left bearing race (race is pressed in bearing cap and these parts furnished as an assembly). Disassemble and service the major sub-assemblies as follows:

Pinion Cage Disassembly & Reassembly: Remove nut on end of pinion shaft, remove universal joint flange. Support carrier end of pinion cage in arbor press, press pinion and rear bearing out of cage, remove bearing spacer from pinion shaft. Press front bearing and oil seal out of cage. To remove bearing from pinion shaft, use Pinion Bearing Remover J-2228 to prevent damage to bearing while pressing shaft out. Use long drift to drive bearing outer races out of pinion cage. Install new races in cage using special driver J-5676 (front race), J-5677 (rear race). Lubricate all parts before re-installing, make certain that bearing spacer in place on shaft between bearings, install universal flange but **d not install oil seal** until after bearing pre-load adjusted, tighten pinion nut to 75-150 ft. lbs., check and adjust bearing pre-load as directed below. After pre-load adjusted, soak new oil seal in engine oil, install oil seal with driver J-971 with free edge of seal toward bearing. Re-install universal flange, install cotter pin (CAUTION—do not back nut off washer, and nut, tighten nut to 75-150 ft. lbs. and to align cotter pin hole, stop tightening the nut at point where slot lines up with hole).

Pinion Bearing Pre-load Adjustment—Check pre-load by clamping pinion cage flange in vise and using spring scale and rod to measure torque required to turn pinion (pinion nut must first be correctly tightened to 75-150 ft. lbs.). Turning torque should be **12-18 in. lbs.** (or 1-1½ ft. lbs.). Adjust by installing spacer or shims of correct thickness on shaft between bearings (thinner shims will increase turning torque, thicker shims decrease turning torque). These adjusting shims furnished in seven thicknesses as listed below and combinations of two shims will provide necessary range of adjustment from .316" to .354" in .002" steps.
Adjusting Shim Part Nos.—3847424—.157", 3847425—.159", 3847426—.163", 3847427—.167", 3847428—.171", 3847429—.175", 3847430—.177".

Double Reduction Shaft Disassembly & Reassembly: Remove capscrew and bearing retainer washer on each end of shaft, support tooth side of ring gear on hardwood blocks in arbor press, press shaft out of ring gear and bearing. Remove high speed pinion, shifter sleeve and poppet balls and springs (CAUTION—balls and springs will fly out as sleeve is removed). Replace sleeve on shaft with tapered side against pinion, support sleeve on hardwood blocks in arbor press, press shaft out of bearing, lift off bearing and low speed pinion. When reassembling, lubricate all parts for initial lubrication, install high speed pinion with clutch teeth toward splines on shaft, see that ring gear key in place in shaft, press shaft in gear until shoulder on shaft is against gear, press bearing on shaft against gear, install bearing

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1954-55 CHEVROLET TRUCK 2-SPEED (DOUBLE REDUCTION) HYPOID (C ntinued)

retainer washer and capscrews, tighten capscrews to 37-46 ft. lbs. and secure with lockwire. Install poppet springs and balls in shaft holes, install shifter sleeve on shaft with **heavy tapered end of sleeve toward ring gear and three tapered teeth on sleeve in line with poppet balls.** Install low speed pinion, press bearing on shaft firmly against shoulder, install bearing retainer washer and capscrews, tighten capscrews to 37-46 ft. lbs. and secure with lockwire.

Differential Disassembly & Reassembly: Mark halves of case to insure correct reassembly. Remove nuts on eight long through-bolts, separate differential case halves, remove differential side gears, pinions, and thrust washers To remove side bearing cone and roller assemblies, install J-1318 Differential Bearing Puller on bearing, support differential case in arbor press with bearing puller down, use drift inserted through case to press puller and bearing down off case hub Press new bearings on hub firmly against shoulder on case using J-1312 Bearing Replacer. **To replace double reduction gears, remove** gear mounting nuts and bolts, tap gear off case, make certain that mating flanges of case and new gear are clean and smooth, tap gear in place, tighten mounting bolt nuts evenly to 70-110 ft. lbs. and secure with lockwire

CAUTION—Double reduction gear mounting bolt nuts should be at inner face of differential case halves, nuts on long through-bolts should be on left side or AWAY from ring gear.

DIFFERENTIAL CARRIER REASSEMBLY: Reverse disassembly directions and make the following adjustments during the reassembly operations:

Double Reduction Shaft Bearing Adjustment: Install assembly with same thickness of shims under each bearing cap as were removed during disassembly (install left cap first, tighten mounting stud nuts securely). With correct bearing adjustment, shaft should rotate with slight drag (bearing pre-load only—pinion must be out so that no pinion drag added). Adjust by adding or removing shims at right or left bearing cap (shims will be transferred from one side to the other during ring-and-pinion gear backlash adjustment). **After backlash adjusted, tighten all bearing cap nuts to 75-95 ft. lbs.**

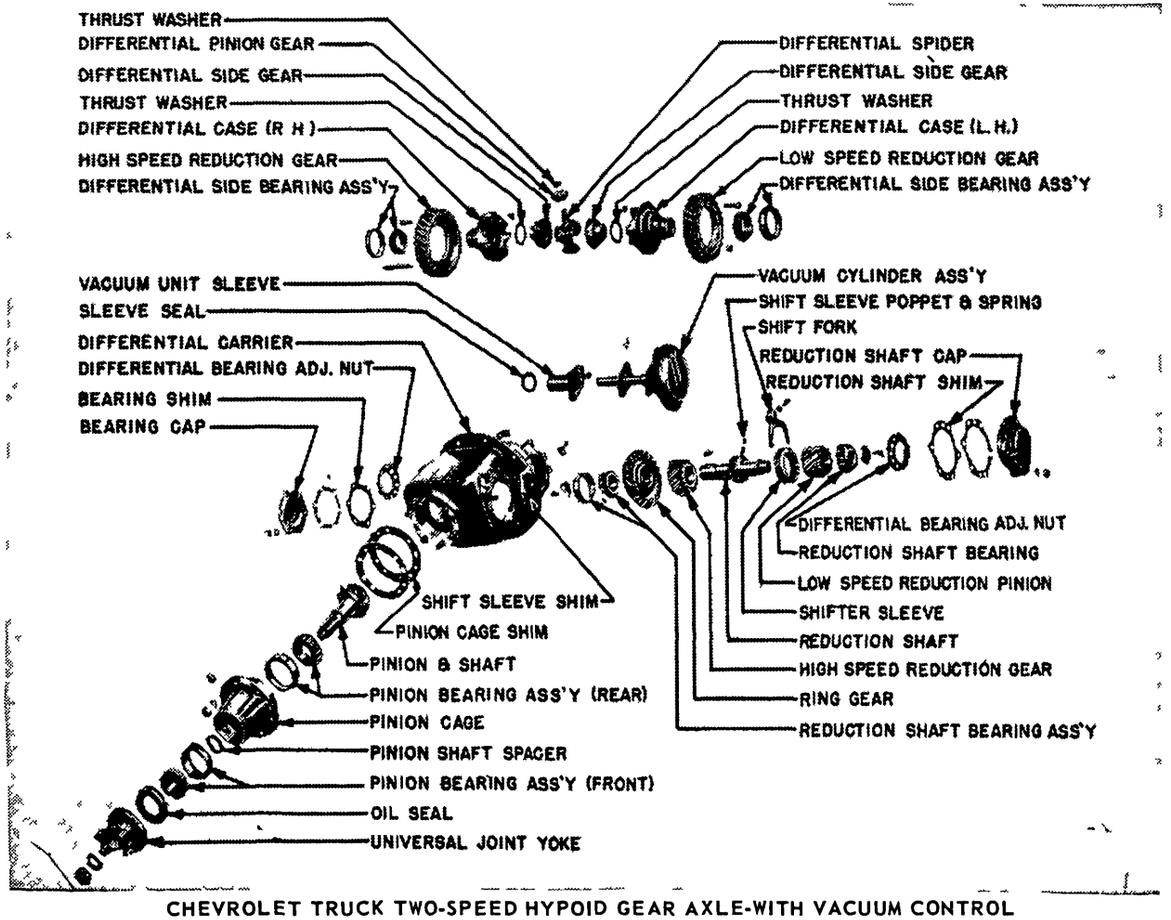
Ring-and-Pinion Gear Mesh (Pinion Setting Adjustment): Install pinion cage in carrier with same thickness of shims under cage flange as were removed during disassembly, install nuts on 3 equally spaced mounting studs and tighten nuts securely. Check gear mesh by painting ring gear teeth with red lead or Prussian blue, rotate pinion by hand in both directions while pressing on back of ring gear to apply a load. Make necessary adjustment of pinion position for correct mesh by adding shims (to move pinion out), or removing shims (to move pinion in) from beneath pinion cage flange. These shims furnished .003", .005" thick. After adjusting pinion position and backlash (see below), install all pinion cage mounting stud nuts and tighten evenly to 115-130 ft. lbs.

Ring-and-Pinion Gear Backlash: Check backlash with dial indicator mounted on carrier. Backlash should be .008-.013". Adjust by transferring shims from under one double reduction shaft bearing cap to the other keeping total shim thickness constant to avoid disturbing bearing adjustment (move shims from left to right side to increase backlash, from right to left side to decrease backlash). These shims furnished .003", .005" thick. After adjustments completed, tighten bearing cap nuts to 75-95 ft. lbs.

Two-speed Shifter Mechanism Installation: With shifter sleeve in low-speed position, install shifter fork in sleeve with lock bolt hole toward rear of carrier. Place rubber oil seal on vacuum unit mounting sleeve and install sleeve in carrier with same thickness of shims under sleeve flange as were removed when unit disassembled. Use new gasket on vacuum cylinder piston rod, insert rod and cylinder assembly in sleeve, enter end of rod in shifter fork and line up hole in rod and fork, install taper bolt and tighten locknut securely. Tighten cylinder mounting stud nuts. Check assembly as follows:

Shifter Mechanism Adjustment—With shifter sleeve in low-speed position, check clearance at each side of shifter fork with a feeler gauge. If clearance less than .010" at either side of fork, loosen vacuum cylinder mounting nuts, add or remove shims from under mounting sleeve flange (shims slotted, not necessary to remove cylinder or sleeve), tighten nuts and recheck shifter fork clearance.

Differential Bearing Adjustment: When installing differential assembly, assemble adjusting nuts and bearing caps in accordance with marks. Tighten bearing cap stud nuts just snug. Shift differential to right or left (by turning up one adjusting nut and backing off opposite nut) until double reduction gears and pinions are centered. Position one adjusting nut in a locking position (slot in line with lock tang), tighten opposite adjusting nut until all clearance or endplay just removed, then tighten each adjusting nut one additional notch for correct bearing pre-load. Tighten bearing cap stud nuts evenly to 150-170 ft. lbs., install adjusting nut locks, secure bearing cap nuts with lockwire.



CHEVROLET TRUCK TWO-SPEED HYPOID GEAR AXLE-WITH VACUUM CONTROL

1955-60 CHEVROLET TRUCK 2-SPEED (PLANETARY) HYPOID

1½-2-T n Trucks (1955 2nd Series - 1959)
2-T n Trucks (1960)

DESCRIPTION: Vacuum controlled 2-speed planetary-reduction type with hypoid primary gears and four planetary pinions. A five tooth and a six tooth drive pinion are used with a correct mating ring gear to furnish two different ratios.

OPERATION: In low range operation the primary (hypoid) reduction is multiplied by a planetary system reduction of approximately 1.36-1 for final drive. The secondary reduction occurs only when the sun gear is held stationary, the four planets then being driven around the sun gear by internal teeth in the large case bolted to the ring gear. Planet journals are integral with the planet support and the differential and planet support cover. The orbit speed of the planets is conveyed to rear wheels through cover, differential pinions, differential side gear and axle shafts. Control of the sleeved sun gear is through lateral movement of a coaxial "shifter sleeve" splined over the sun gear. Left hand movement of shift collar and sleeve causes sun gear to stop when dove-tail teeth in an anchor ring attached to housing engage similar teeth on approaching face of shifter sleeve. Right hand movement of shifter collar and sleeve by the vacuum control mechanism results in release from the anchor ring. Clutching teeth on opposite face of shifter sleeve then mesh with dove-tail teeth projecting from differential and planet support case and ring gear assembly. Thus engaged, the sun gear must turn at speed of ring gear, the planets are locked in place and only the reduction afforded by primary drive gears determine rear wheel speed. A positive, quick acting, two way vacuum system actuates the shift collar and sleeve. The hand control is located on the gear shift lever.

DIFFERENTIAL CARRIER ASSEMBLY: Removal–Drain rear axle housing and remove hub caps. Remove jaws from Sliding Hammer J-1436 (Rear Axle Shaft Bearing & Oil Seal Remover) and install adapter J-1436-8 to puller handle. Install axle shaft puller into hole provided in end of axle shaft and pull shaft (both sides) out about 8" to clear differential. Remove clamps and hose assembly at vacuum cylinder and slip hoses off fittings. Split rear universal joint by removing trunnion bearing "U" bolts from rear flange. Slide propeller shaft assembly forward and tape universal joint bearing to prevent bearings falling out. Swing propeller shaft to one side and tie it to frame side rail. Remove capscrews attaching differential planet and carrier to axle housing (*NOTE*–Before removing last capscrew, place a long drift punch through upper hole in assembly to give it support during removal). Place a roller jack under assembly using a wood block as necessary to support the unit. Work assembly forward until it clears housing, then remove it from under truck.

DIFFERENTIAL CARRIER ASSEMBLY: Disassembly–Proceed as indicated below

Vacuum Cylind r: R moval–Remove three bolts and lockwashers securing cylinder assembly to carrier housing and remove cylinder assembly.

Disass mbly–Remove two nuts and bolts retaining diaphragm housing to flange and separate housing from flange. Unscrew screws and self-locking nuts securing diaphragm cover to housing and separate cover and housing. Using two half inch open end wrenches, remove nut securing diaphragm plates and diaphragm to pushrod assembly. Separate plates and diaphragm. To disassemble pushrod assembly, compress spring of pushrod, remove snap ring from inside diameter of piston rod, and pull pushrod out of piston rod.

Differential & Planet Unit: Removal–Remove differential and planet assembly anchor from left side of assembly. Loosen locknut on ring gear thrust pad and remove pad. Drive out shifter yoke shaft using a drift punch and a hammer. Slide shifter yoke and sleeve to left and remove from end of sun gear. Remove retaining bolts and washers from adjusting nut locks and remove locks from both sides. To remove oil trough, bend tabs downward, remove two bolts and remove trough and locking plate. Remove bolts and lockwashers securing bearing caps and tap caps off dowels in mounting bosses with a soft hammer. Remove adjusting nuts. Lift differential and planet assembly out of carrier housing using extreme care not to drop side bearing outer races.

Disassembly–Mark ring gear, support case and case cover for alignment by scribing lines on case, cover and gear. Remove the twelve bolts retaining ring gear, case, and cover and lift off case assembly. Remove sun gear and planet gears (*CAUTION–Mark or tag all gears so they may be reassembled exactly as removed. If necessary to replace planet gears, the complete set of gears must be replaced).* Lift differential and planet support off case cover. Remove the eight bolts and lockwashers connecting planet support and cover and separate the two parts (*NOTE*–The support and cover are stamped on all four sides with matching numbers to aid in reassembly). Remove spider, pinion gear and thrust washers, and tag all parts as removed. Remove right and left hand side gears and thrust washers from each side of housing. Remove differential bearings from differential and planet support case and case cover.

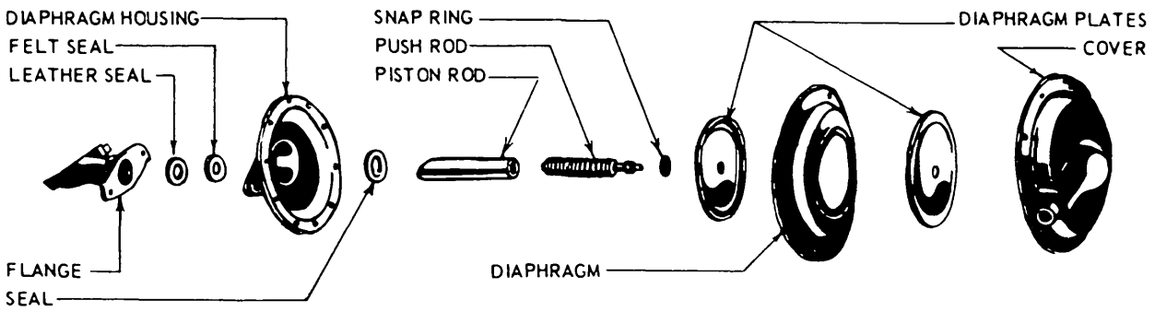
Pinion Gear & Shaft Removal–Loosen bolts and lockwashers securing pinion assembly to differential carrier until bolt heads contact the universal joint flange. Gradually tap pinion assembly outward while loosening bolts to avoid interference with companion flange (*NOTE*–If universal joint flange is removed from pinion assembly, the pinion assembly can be removed by using adapter J-6187 with Slide Hammer J-1436). **Disassembly**–Remove shims from differential housing and note the amount used to assure reinstallation of the same number. Remove rear bearing from differential. Place universal joint flange in a vise and remove cotter pin, nut and flat washer securing flange to pinion and remove flange. Drive oil seal out of retainer housing and remove felt washer (discard oil seal). Press inner race off end of pinion using tool J-1453 and holder J-358-1 Using tool J-6171 (5 tooth pinion), or J-6079 (6 tooth pinion), press double thrust bearing off pinion with an arbor press.

DIFFERENTIAL CARRIER ASSEMBLY· Inspection, Reassembly & Installation–Proceed as follows

Pinion Gear & Shaft· Inspection–Wash all parts in solvent Examine pinion teeth for chips, cracks, and wear and check splines for wear Check thrust bearing for worn or pitted rollers or bearing race. Inspect universal joint flange for cracks or worn splines and examine oil seal retainer housing for cracks and defective sealing surface *NOTE*–If oil seal removed, replace with a new seal. Check rear bearing for worn or pitted rollers. Inspect oil deflector on universal joint flange for bends or other damage. Replace if necessary. **Reassembly**–Install inner race on end of pinion shaft. Lubricate and press double thrust bearing onto pinion shaft Install new felt washer and seal in pinion bearing oil seal retainer using Seal Installer J-6078 Place rear pinion bearing in differential carrier housing If oil deflector on universal joint flange requires replacement, tap off old deflector and install a new one, using Installer J-6081. Install oil seal retainer on pinion shaft. Insert a bolt and lockwasher through each hole in oil seal retainer and then position universal joint flange on pinion shaft With universal joint flange in a vise, install flat washer and nut on pinion and tighten to 180-250 ft lbs , and install cotter pin (*CAUTION–Do not back off nut to install cotter pin).*

Installation–Install rear pinion bearing in carrier housing and install same amount of shims as removed against shoulder in carrier housing (*NOTE–If new*

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CHEVROLET 2-SPEED AXLE SHIFT ASSEMBLY

1955-60 CHEVROLET TRUCK (PLANETARY) 2-SPEED (Cont.)

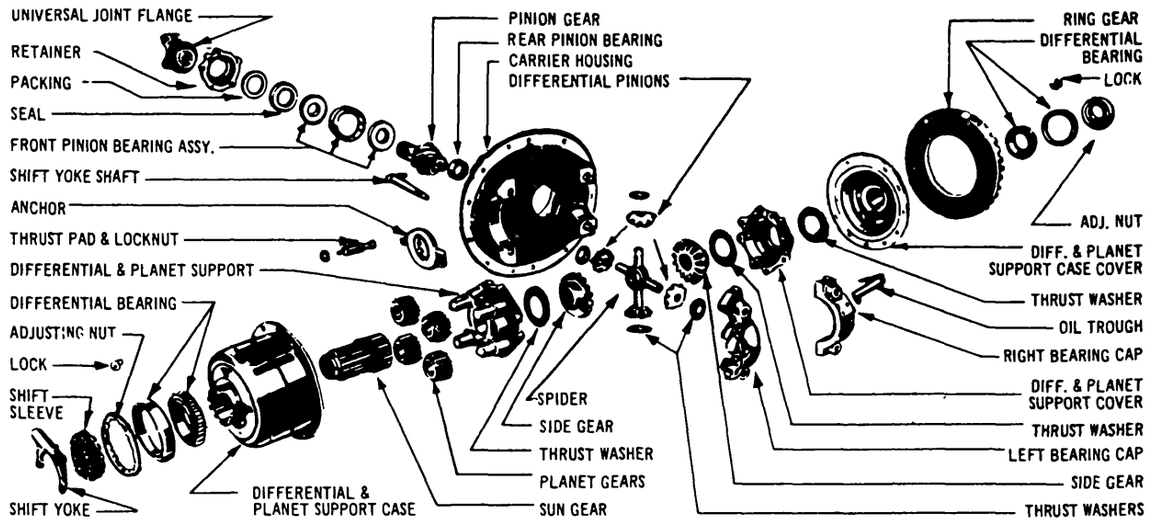
pinion and gear set to be installed, or old pinion requires resetting, see "Pinion Setting" below). Position pinion assembly in carrier housing and tap inward with a soft hammer until retaining bolts can be started in housing. Tighten retaining bolts to 85-95 ft. lbs.

Differential & Planet Unit: Inspection—Wash all parts in solvent (do not use air to dry bearings). Inspect ring gear, planet gears, differential pinion gears, and sun gear for damaged teeth or excessive wear. Inspect thrust washers for excessive wear. Inspect spider for wear or scored pinion bearing area. Inspect differential side gears and thrust washers for damaged teeth or excessive wear.

►*PARTS REPLACEMENT CAUTION:* If necessary to replace any single component in the following groups, all parts in each group must be replaced: (a) Sun gear and four planet gears. (b) Spider, four differential pinion gears, and thrust washers. (c) Ring gear and pinion. (d) Differential bearing and race.

Reassembly—Install differential bearings on differential and planet support case and case cover. Use Bearing Installer J-6080 to install bearing on case cover, and J-6175 to install bearing on case. Position side gear thrust washers on hubs of side gears and install one side gear in differential and planet support and one in differential and planet support cover *(NOTE—Gear with the longer hub is installed in the cover).* Assemble the four pinion gears and thrust washers on the spider, being sure to reinstall gears in their original positions. Install the assembled spider and gears in differential and planet support so that identification numbers on spider and planet support match. Lubricate gears and thrust washers with SAE 90 Multipurpose gear lubricant. Position support cover with matching identification marks aligned and install eight bolts and lockwashers. Tighten bolts to 70-110 ft. lbs. Install four planet gears on journals of differential and planet support *(CAUTION—Gears must be installed with radius on gears toward the planet support).* Mesh sun gear in planet gears. Place ring gear, teeth down on wood block and install four Guide Pins J-6154 in every third hole of the ring gear. With the assembly marks aligned, install differential and planet support case cover onto guide pins. Position support cover thrust washer on hub of side gear, then place planet assembly in differential and planet support case cover, with sun and planet gears upward. Install planet support case over guide pins, making sure that alignment marks are in line, and loosely install eight of the twelve retaining bolts. Remove guide pins and install the other four bolts. Tighten all bolts in rotation to 85-95 ft. lbs.

Installation—Position differential side bearing outer races on differential bearings and place differential and planet assembly in bosses of differential carrier housing. Install left and right adjusting nuts. Tap bearing caps onto dowels in bosses of differential carrier housing and then secure with bolts and lockwashers. Tighten bolts until lockwashers just flattened *(CAUTION—Bolts will be retightened to correct torque after backlash and pinion setting is checked and adjusted).*



CHEVROLET TRUCK 2-SPEED REAR AXLE

Backlash Adjustment—Loosen right hand adjusting nut and tighten left hand nut, Use Differential Adjusting Wrench J-972 on the right side and a drift and hammer on the left side. *(NOTE—Left side nut has internal notched teeth so that adjusting wrench cannot be used).* Continue tightening left hand nut until all backlash is removed between pinion and ring gear. Back off left hand nut approximately 2 notches to a point where notch in nut is aligned with lock. Tighten right hand nut firmly to force differential and planet assembly in solid contact with left hand nut. Loosen right hand nut until it is free of its bearing, then tighten nut snugly against bearing. **Tighten right hand nut from one to 2 notches more** to a point where notch in nut aligns with lock *(NOTE—This procedure provides for proper preload on bearings).* Mount a dial indicator on housing so indicator button contacts tooth on ring gear, and check ring gear backlash. Backlash should be .005-.008". If backlash greater than .008", loosen right hand adjusting nut one notch and tighten left hand nut one notch. If backlash less than .005", loosen left hand nut one notch and tighten right nut one notch. Check and adjust pinion setting as indicated below.

Pinion Setting—Coat ring gear teeth lightly with red lead or Prussian blue, then turn the pinion shaft several revolutions in both directions to establish a gear pattern on the ring gear. Examine pattern on the right gear teeth. If pinion depth is correct, the tooth pattern will be centered on the pitch line and toward toe of ring gear. If pattern is below pitch line on ring gear teeth, the pinion is too deep and it will be necessary to remove pinion and increase the shim thickness between pinion bearing and differential carrier housing. If pattern is above the pitch line, the pinion is too shallow and it will be necessary to decrease shim thickness in carrier housing. *NOTE—Changing the pinion depth will make some change in backlash and it may be necessary to readjust the backlash (see above).* Tighten bearing capscrews to 130-160 ft. lbs. Recheck backlash and install adjusting nut locks.

Thrust Pad Adjustment: Check bronze tip on thrust pad and replace if worn. Install thrust pad and tighten until pad contacts ring gear, then back off 30° to obtain a clearance of .005-.007". Tighten locknut.

Vacuum Cylinder: Inspection—Clean all metal parts with solvent and blow dry with air. Inspect diaphragm for loss of resiliency and punctures. Check spring of pushrod for breaks or distortion. Check mating surfaces of diaphragm housing and cover by placing the two parts in their assembled position and checking for deformation or burrs. Inspect piston rod outer surfaces for burrs as these can cause leaks at leather and felt seals.

Reassembly—Insert pushrod in piston rod and compress rod spring and install snap ring. Apply Permatex to ridges and around the center hole of diaphragm plates. Position diaphragm between the two plates and install plates and diaphragm on pushrod assembly. Install a new oil seal in diaphragm housing using Seal Installer J-968 (soak seal in oil prior to installation and coat outer radius with Permatex to assure a tight seal). Oil and install new leather and felt seals in diaphragm attaching flange. Insert pushrod assembly with attached diaphragm into housing. Align holes in diaphragm and housing and install housing cover.

Installation—Install vacuum cylinder assembly on differential carrier housing with three bolts and lockwashers.

COMET & FALCON HYPOID

Comet (1960)
Falcon (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 REAR AXLE PRODUCTION CHANGES, PARTS REPLACEMENT, ADJUSTMENT & OVERHAUL CAUTIONS: Four different rear axle housings have been used in production. For identification, parts replacement, overhaul and adjustment, see "Overhaul" below.*

►*REAR AXLE CODE NUMBERS:* A production date code is stamped in 3/16" high characters on front of left hand axle shaft tube about three inches inboard from spring pad. The first digit indicates year (0-1960); the letter designates the month (C-March), and the last digit or digits designates day of month. *NOTE - On some very early Falcon models, a three character date code having three characters was used. The first character indicated year; second indicated month; and the third indicated week of month.*

►*PINION BEARING PRELOAD CAUTION:* Rear universal joint companion flange nut controls pinion bearing preload (must be adjusted whenever nut is loosened).

DESCRIPTION: Semi-floating, hypoid gear type with an integral type housing and Hotchkiss drive.

AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model pages.*

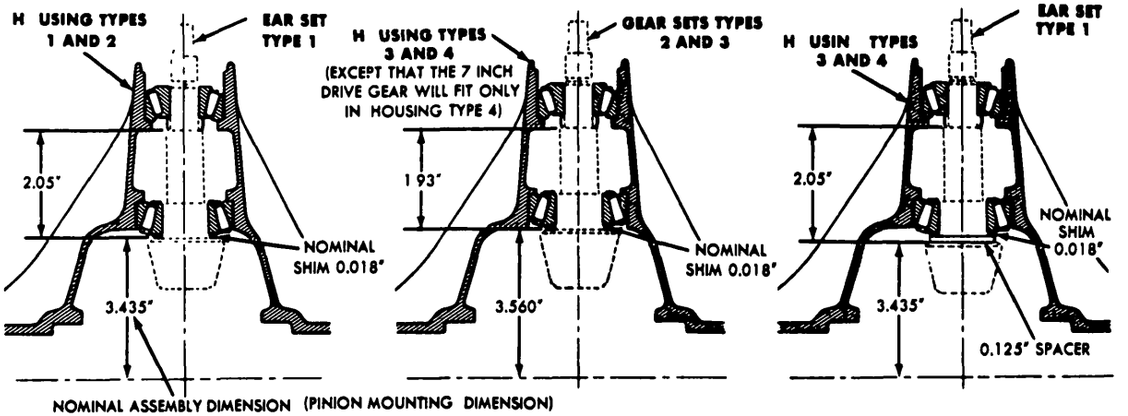
AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model pages.*

REAR WHEEL BEARING REPLACEMENT: With axle shaft removed from housing, nick bearing retainer in several places with a cold chisel and remove retainer. Press bearing off of shaft using a suitable tool and an arbor press. To install bearing, use a suitable tool and press bearing into position with an arbor press, then press bearing retainer on shaft until it seats against bearing. *CAUTION - Do Not attempt to press bearing and retainer on shaft at the same time.*

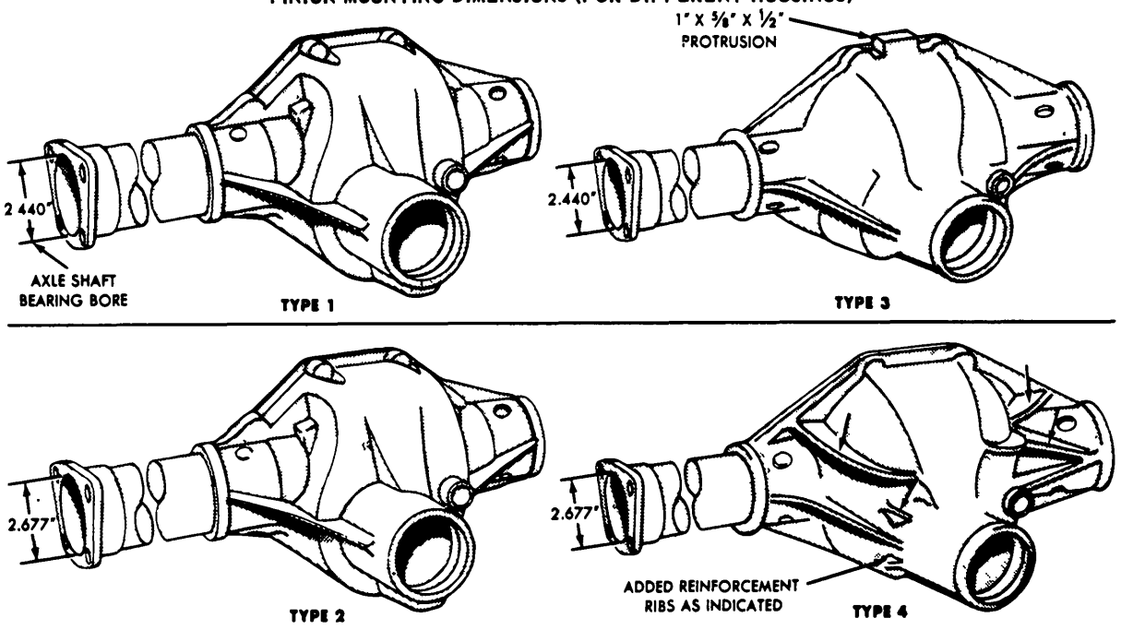
AXLE SHAFT OIL SEAL REPLACEMENT: Remove axle shaft and remove seal from axle housing with a suitable tool (slide hammer). Coat outside edges of new seal with oil resistant sealing compound and install seal in housing with Tool 1177-B making certain that seal is against shoulder and with sealing lips toward differential assembly.

PINION OIL SEAL REPLACEMENT: Drain rear axle lubricant with a siphon, then disconnect drive shaft from drive pinion flange. Mark pinion shaft, end of pinion shaft, and pinion flange splines for realignment purposes. Hold flange with Tool 4851-K (Comet), T57L-4851-A (Falcon) and remove pinion shaft nut and flat washer. Remove pinion flange with Tool 4851-A and 4221-AL and remove pinion oil seal. Clean the oil seal seat and make sure that seal lubricant return passage is clear. Coat outer edge of new seal with oil resistant sealer and install seal with Tool 4676-G (Comet), T55P-4676-A (Falcon). Align pinion flange mark with pinion shaft spline mark and install flange. Install flat washer and pinion shaft nut, then slowly tighten nut until marks are aligned. *CAUTION - Alignment marks made at disassembly must be aligned properly to assure proper pinion bearing preload.* Connect drive shaft and fill rear axle housing with lubricant.

►*REAR AXLE OVERHAUL CAUTION: Four different rear axle housings and three different pinion and drive gear sets have been used in production as indicated below (see illustrations). It is important that housing and gear sets be properly identified before overhaul, parts replacement, or adjustment. See "Rear Axle Code Numbers" above for production codes and note the following:*



PINION MOUNTING DIMENSIONS (FOR DIFFERENT HOUSINGS)



REAR AXLE HOUSING TYPES

Type "1" Housing - *NOTE - This housing used on 2-Dr. and 4-Dr. sedans and has a production code number "OB20" or earlier.* Axle shaft tube ends are machined for 2.4" diameter wheel bearings and the housing is machined to locate "Type 1" gear set at 3.435" nominal pinion mounting dimension. *CAUTION - "Type 2" and "Type 3" gear sets CANNOT be used in this housing.*

Type "2" Housing - *NOTE - This housing used on Taxicabs, Rancheros, and Station Wagons and has a production code number "OB20" or earlier.* Axle shaft tube ends are machined for 2.6" diameter wheel bearings and the housing is machined to locate "Type 1" gear set at 3.435" nominal pinion mounting dimension. *CAUTION - "Type 2" and "Type 3" gear sets CANNOT be used in this housing.*

Type "3" Housing - *NOTE - This housing used on 2-Dr. and 4-Dr. sedans and has a production code number "OB22" or later.* Axle shaft tube ends are machined for 2.4" diameter wheel bearings and the housing is machined to locate "Type 2" gear set at 3.560" nominal pinion mounting dimension. *NOTE - "Type 1" gear set may be used in this housing by using a 1/8" spacer, Part No. CODW-4663-BB and the correct amount of pinion locating shims. "Type 3" gear set CANNOT be used in this housing.*

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COMET & FALCON HYPOID (C ntinued)

Type "4" Housing - *NOTE - This housing is used on Taxicabs, Rancheros, and Station Wagons and has a production code number "OB22" or later.* Axle shaft tubes are machined for 2.6" diameter wheel bearings and the housing is machined to locate "Type 3" gear set at 3.560" nominal pinion mounting dimension. *NOTE - A 7" ring gear is used in this housing.*

Type "1" Gear Set - *NOTE - Used in all rear axles housings having a production code number "OB20" or arlier.* Identified by a 6¾" ring gear and a 2.05" dimension between rear bearing perch and preload spacer shoulder on pinion shaft. Pinion gear thickness is 1.57" (see illustration). *NOTE - This gear set may be found in Type "3" and "4" housings with a 1/8" spacer installed along with regular shims under pinion bearing cone.*

Type "2" Gear Set - *NOTE - Used in 2-Dr. and 4-Dr. sedan rear axle housings having a production code number "OB22" or later.* Identified by a 6¾" ring gear and a 1.93" dimension between pinion rear bearing perch and preload spacer shoulder on pinion shaft. Pinion gear thickness is 1.69" (see illustration). *NOTE - This gear set can be installed in Type "3" and "4" housings only.*

Type "3" Gear Sets - *NOTE - Used in Taxicab, Ranchero, and Station Wagon rear axle housings having a production code number "OB22" or later.* Identified by a 7" ring gear and a 1.93" dimension between pinion rear bearing perch and preload spacer shoulder on pinion shaft. Pinion gear thickness is 1.69". *NOTE - This gear set can be installed in Type "4" housings only.*

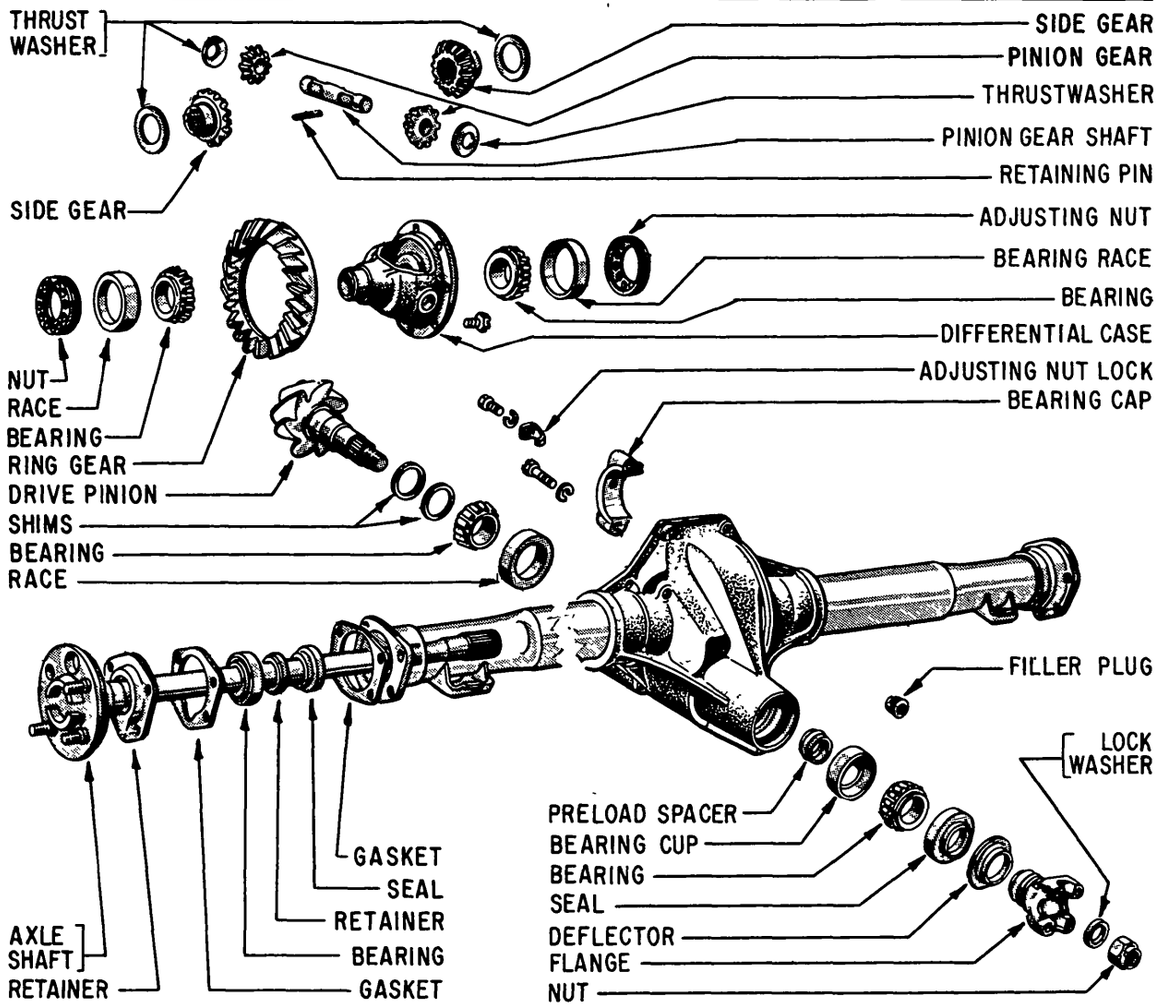
►*DIFFERENTIAL CASE PRODUCTION CHANGE & PARTS REPLACEMENT CAUTION: Two differential cases have been used in production as indicated below. Except for side gear thrust washers, none of the parts are interchangeable between the two cases.*

"Two-Window" Case - *NOTE - This type case used in all early 2-Dr. and 4-Dr. sedans and in some early Taxicabs, Rancheros, and Station Wagons.* On axle assemblies having a production code "OB22" or later, the "two-window" case is used with 3.10-1 ratio only. For identification, differential pinion gears are .640" thick and side gears are 1.040" thick. Differential pinion gear thrust washers are phosphate coated (black).

"One-Window" Case - *NOTE - This type case used in all rear axle assemblies, except 3.10-1 ratio, having a production code "OB22" or later.* For identification, differential pinion gears are .740" thick and side gears are 1.090" thick. Differential pinion gear thrust washers are cadmium plated (white).

►*PINION LOCATING SHIM PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Beginning with axle assemblies having a production code "OB22" or later, larger (same inside diameter, larger outside diameter) pinion locating shims are used. These new shims are furnished for service replacement in thicknesses of .008"to .024" in steps of .001" and are interchangeable with the previous shims.

►*GEAR TOOTH CONTACT PATTERN CHANGE:* 3.10-1 ratio rear axle assemblies having a production code "OB20" or earlier ("Type 1" Housing) have a different gear tooth pattern than other assemblies. S e *"Pini n S tting" and "Backlash Adjustm nt" below.*



COMET & FALCON REAR AXLE ASSEMBLY

DIFFERENTIAL & DRIVE PINION INSPECTION (BEFORE DISASSEMBLY): Before disassembling rear axle, check backlash of drive gears and tooth contact pattern (see below). Note and record the necessary correction to be made in shim pack at reassembly to provide the correct gear tooth pattern.

DIFFERENTIAL CASE: *See "Differential Case Production change & Parts Replacement Caution" above.*

Removal: Mark one differential bearing cap and the case to insure installation at same location, then remove bearing adjusting lock nuts. Remove bearing cap bolts and caps and remove differential case and bearing cups.

Disassembly: Remove differential side bearings from case with Tools 4851-A and 4221-AL (Comet); T56L-400-A (Falcon). Remove bolts attaching ring gear to case and press or tap gear from case. Drive out differential pinion shaft retaining pin with a drift punch and drive out differential pinion shaft. Remove gears and thrust washers.

Inspection: *See "Inspection (General)" below.*

Reassembly: Lubricate all parts with rear axle lubricant before installation, then place side gears and thrust washers in case. Place two pinion gears and thrust washers exactly opposite each other in case opening (or openings) and in mesh with side gears. Turn pinions and thrust washers until holes in pinion align with pinion shaft holes in case and start pinion shaft into case. Align shaft retaining pin hole with pin hole in case, then drive shaft into place and install retaining pin. Place drive gear on case and tighten bolts to 35-45 ft. lbs. Press differential side bearings onto case with Tools 4222-L (Comet); T58P-6019-A (Falcon).

Installation: With drive pinion shaft installed in rear axle housing and properly adjusted for depth (see below), place cups on differential side bearings and set case assembly in axle housing so a slight amount of backlash is felt between gear teeth. Hold differential

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COMET & FALCON HYPOID (Continued)

case in place and install adjusting nuts in bores so they just contact bearing cups. Carefully position bearing caps on carrier casting, aligning marks made at disassembly, then install bearing cap bolts and lock washers. As bolts are tightened, turn adjusting nut with Tool 4067-E (Comet); T60K-4067-A (Falcon). *CAUTION - If adjusting nuts do not turn freely as cap bolts are tightened, remove bearing caps and inspect for damaged threads or incorrectly positioned caps.* Tighten bolts to 30-40 ft. lbs., then adjust ring gear backlash *(see "Backlash Adjustment" below).*

PINION SHAFT: With differential case removed from rear axle housing (see above), proceed as follows:

Removal & Disassembly: Hold drive pinion flange with Tool 4851-K (Comet); T57L-4851-A (Falcon) and remove pinion nut and flat washer. Remove pinion flange with Tools 4851-A and 4221-AL (Comet); T53T-4851-K (Falcon). Drive pinion shaft out of front bearing cone with a soft faced hammer and remove it through rear of housing. Install rear axle housing in an arbor press and remove pinion shaft bearing cups with Tools 4625-L and 4615-G (Comet); drive out with a drift punch (Falcon). Remove pinion rear bearing cone with Tool 4625-F (Comet); T57L-4621-A (Falcon). Remove and measure pinion locating shims from between rear bearing cone and pinion gear.

Reassembly & Installation: Place differential housing in an arbor press and press a new rear bearing cup into housing with Tool 4625-HR (Comet); and a new front bearing into housing with Tool 4615-HF (Comet). On Falcon, install both front and rear cups at the same time with Tool T60K-4616-A. Place selected pinion setting shim pack *(see "Pinion Setting" below)* and bearing cone on pinion shaft and press bearing and shims firmly against pinion shaft shoulder with Tool 6306-AG-3 (Comet); T58P-6019-A (Falcon), then lubricate bearing with rear axle lubricant and place a NEW pinion bearing spacer on pinion shaft. Lubricate pinion front bearing cone and place it in housing, then install a new oil seal in housing *(see "Pinion Oil Seal Replacement" above).* Insert drive pinion shaft flange into seal and hold it firmly against pinion front bearing cone. From rear of housing, insert pinion shaft assembly through front bearing cone and into flange. Install flat washer and start nut on pinion shaft. Hold flange with Tool 4851-K (Comet); T57L-4851-A (Falcon) and tighten pinion shaft nut, pulling pinion shaft into front bearing cone and flange until the flange and cone are felt to "bottom" (indicating these parts are in contact with preload spacer). Complete pinion shaft installation by adjusting pinion bearing preload *(see "Pinion Bearing Preload" below).*

PINION BEARING PRELOAD: Tighten pinion shaft nut very slowly to a minimum torque of 140 ft. lbs. During the tightening operation check pinion bearing preload with Tools 4209-C and 4209-C-12 (Comet); 4858-N and 4610-N (Falcon) so that preload does not exceed the limits of 10-16 inch pounds (used bearings), 17-27 inch pounds (new bearings) torque required to rotate pinion shaft. *CAUTION - If pinion bearing shaft nut is tightened to the point that bearing preload exceeds limit, remove pinion shaft and install a new collapsible spacer. DO NOT decrease preload by loosening nut.* If correct preload is not obtained with a minimum torque of 140 ft. lbs., continue tightening nut slowly (checking preload frequently) until preload is within limits.

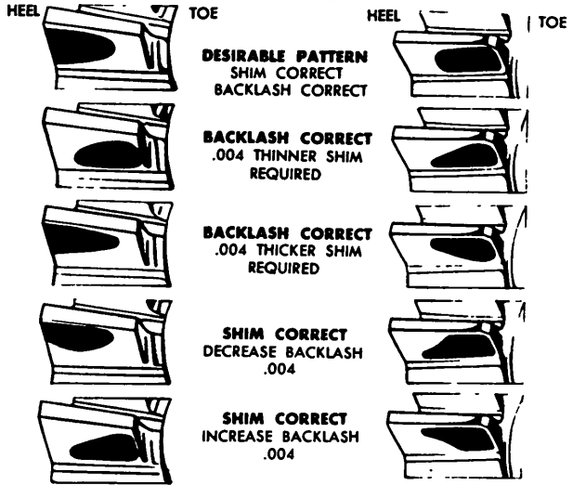
PINION SETTING: *See "Pinion Locating Shim Production Changes & Service Replacement Note" above.* To select correct shim thickness required for installation of a new pinion gear, measure thickness of original shim pack with a micrometer and note the reading. Note shim adjustment number on both old and new pinion (etched in end of pinion gear), then refer to shim table and note the amount of change shown in table under "New Pinion Marking" and in line with "Old Pinion Marking". Add or subtract the reading obtained from that of the original shim pack and record shim pack thickness. To the total shim pack thickness, add or subtract the shim correction indicated during gear tooth contact pattern check. The final result is the shim thickness required for installation of new pinion.

BACKLASH CHECK AND ADJUSTMENT: To check backlash, install dial indicator on rear axle housing so indicator contact is against gear tooth (parallel to ring gear) and check backlash at several points around ring gear. Backlash should be .008-.012". *NOTE - This dimension supersedes previous specifications.* If not within these limits, adjust as follows: Loosen bearing cap bolts and retighten to 5 ft. lbs., then loosen right hand adjusting nut (pinion side of ring gear) until it is away from cup. Tighten left hand nut until ring gear is just forced into pinion with no backlash. *CAUTION - Recheck right hand nut to make sure it is still loose.* Tighten right hand nut two notches past point where it contacts bearing cup, then rotate ring gear several times in each direction to seat bearings in cups. Again loosen right hand nut to release preload. If there is any backlash between gears, tighten left hand nut just enough to remove this backlash, then loosen left hand nut 1-1½ notches. *NOTE - At this time, make sure that one of the slots in left hand nut is located so lock can be installed without turning nut.* Tighten right hand nut until it just contacts bearing cup, then set bearing preload of 2½-3 notches tight by right hand nut to obtain a preload of .008-.012". Tighten bearing cap bolts

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3.10:1 RATIO, DATE CODED OB20 or EARLIER

3.10:1 RATIO, DATE CODED OB22 or LATER and 3.56:1 and 3.89:1



GEAR TOOTH CONTACT PATTERNS

PINION SHIM CHART

Old Pinion Marking	New Pinion Marking								
	−4	−3	−2	−1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003
0	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004
−1	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005
−2	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006
−3	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007
−4	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007	−0.008

COMET & FALCON HYPOID (C ntinu d)

to 30-40 ft. lbs. and recheck backlash. If measurements taken at several points around ring gear vary more than .002", there is excessive runout which must be corrected. If backlash is not within specifications, loosen one adjusting nut and tighten opposite nut an equal amount. *CAUTION - When moving adjusting nuts, the final movement should always be made in a tightening direction.*

GEAR TOOTH CONTACT PATTERN: Paint gear teeth with a suitable gear marking compound (dry red lead and oil), then wrap a cloth around drive pinion flange to act as a brake and rotate ring gear back and forth until gear tooth contact pattern is obtained. Refer to "Gear Tooth Contact Pattern" illustration, and correct as indicated.

INSPECTION (GENERAL): Wash all parts in solvent and blow dry with air, then oil bearings to prevent rusting. Inspect teeth and thrust surfaces of differential gears. Check for wear on hubs of side gears, splines and thrust washers. Inspect bearing cups for score, galling, or erratic wear patterns. Examine roller ends for wear. *NOTE - "Step-Wear" on roller ends indicates bearings were not pr l ad d pr perly or roll rs w re slightly misaligned.* Temporarily install bearing caps in their respective positions and test fit adjusting nuts in their threads. Faces of nuts that contact bearing cups must be smooth and square. Polish these with a fine abrasive on a flat surface. If adjusting nut fit is not correct, replace nuts or examine threads in carrier. Check drive pinion flange to make sure ears of flange are not damaged. End of flange contacting bearing cone must be smooth (polish if necessary). Check differential case hubs and make sure bearings will seat firmly on hubs. Check fit of differential side gear hubs in case.

CHRYSLER, DE SOTO, DODGE, PLYMOUTH "CAGE" TYPE HYPOID

Chrysler Six (1954) Ⓒ
Chrysler V8 (1957-60)
DeSoto Six (1954-55) Ⓒ
DeSoto V8 (1956-60) Ⓒ
Dodge Six (1954-60) Ⓒ
Dodge V8 (1954-60) Ⓒ
Plymouth Six & V8 (1954-60)

Ⓒ - "Barrel" type used on some models (1954-56). *See "Chrysler, DeSoto, Dodge Barrel Type" Rear Axle.*

►CHANGES, CAUTIONS, CORRECTIONS

►*RING & PINION GEAR CAUTION:* Both "Formate" and "Generated" type gears used. Both types of gears are **interchangeable in matched sets only.** Gears can be identified by part number (stamped on all gears) or by word "FORMATE" stamped on all formate gears and pinions. Gears and pinions of "Generated" type have part number only.

►*CAUTION: Ring and pinion gears should be installed as matched sets and both gears must be of same type (Formate or Generated).*

►*1956 REAR WHEEL BEARING GREASE PLUG DISCONTINUED:* Bearings are packed at factory and additional lubrication is not required. If bearings are removed for any reason, they should be cleaned and repacked for reassembly.

►*1957 LUBRICANT LEVEL CAUTION (ALL MODELS):* DO NOT fill rear axle housing to level of filler plug opening. *See individual Car Model pages for correct quantity and lubricant level recommendations.*

►*1957 DRIVE PINION SHAFT NOTE:* Drive pinions used on Chrysler New Yorker & Imperial Models (Exc. Town & Country) do not have a bearing spacer. Front bearing and pinion preload shims bear directly on shoulder on shaft.

►*1959-EARLY 1960 REAR AXLE KNOCKING OR CHUCKLING NOISE CORRECTION:* A noise occurring at a steady 25-35 MPH or on slight deceleration with axle at normal operating temperature may be caused by excessive differential side gear-to-carrier housing counterbore clearance. If clearance is greater than .002" between side gear pilot journal and counterbore in case, install special side gear, Part No. 2070150 (this part number is not indicated in MoPar Parts Catalog). *NOTE - Later cars with selective fit differential case and gears have a yellow and green paint marking on carrier.*

DESCRIPTION: Hypoid gear, semi-floating type with Hotchkiss Drive. Power-Lock Differential, Optl.

AXLE SHAFT REPLACEMENT & ENDPLAY ADJUSTMENT: Release brake cams and remove rear hub and drum assemblies with Puller C-675 or C-845. *NOTE-DO NOT attempt to remove brake drum by hammering on end of axle shaft as damage to bearings and thrust block will result.* Disconnect brake line at each wheel cylinder. On 1954-56 models, take out stud nuts and remove oil seal and backing plate. On 1957-60 models, remove brake support plates and dust shields as an assembly. On 1954-56 models, remove and save bearing adjusting shims. Use Puller C-499 to remove axle shaft and bearing, Puller C-293-C to remove bearing from axle shaft. On 1957-58 models, remove axle keys, install Tool C-745 to protect outer seal, remove shims, axle shafts and bearing cups, then remove inner seals. On all models, clean all parts and check bearing and seal surfaces for wear. To install reverse removal procedure, then adjust axle shaft endplay.

Endplay Adjustment - Remove wheels and hubs, place dial indicator on axle shaft and housing. Pull shaft out and zero dial indicator. Push shaft in and note reading. Endplay should be .003-.008" (1954-56), .013-.018" (1957-60). To correct endplay, remove support plate and add or remove shims located on end of housing. *NOTE* - When necessary to remove more than .020" shims to correct endplay, remove half the amount from each end of housing.

Centering Axle Shafts (Axl Shaft R plac m nt) - Install left axle shaft and bearing (less grease). Use Tool C-413 (to protect housing) and drive bearing cup in as far as it will go. Spacer block will be to full right. Lay straightedge across end of housing, measure distance from straightedge to cup face. A shim pack equal to this measurement less 1/8" centers block. Use shim pack .010" or .020" less than required to center block. Remove left axle assembly, grease bearing and reinstall assembly with bearing cup, shims, and support plate. Repeat operation with right axle shaft assembly, except use straightedge across outer face of cup (cup will extend beyond housing). Use feeler gauges to measure distance between housing face and straightedge. Use shim pack equal to this measurement plus .003" (1954-56), .013" (1957-60), for right axle shaft. Remove right axle shaft assembly, grease bearing, and reinstall assembly with bearing cup, shims (determined above), and support plate.

►*POWER-LOCK DIFF. OPTIONAL:* *See "P w r-L ck Differential (Plate Clutch Typ)".*

OVERHAUL: Disassembly - Remove carrier attaching bolts, remove carrier and mount it in suitable stand. Check ring gear-to-pinion backlash. Mark both differential bearing caps and adjusters (for reinstallation in original positions). *CAUTION - DO NOT interchange bearing caps.* Remove bearing caps and adjusters, then lift differential assembly out of carrier. Remove pinion nut and use Puller C-456 to remove pinion flange. Use Puller C-358 or C-748 to remove oil seal. Remove pinion bearing oil slinger, bearing cone, preload shims and spacer (no spacer used on Chrysler New Yorker & Imperial). Remove drive pinion, bearing and washer from carrier. Use Tool C-293-C and correct plates to remove bearing from shaft. Drive bearing cups out of housing. Remove ring gear from case (left hand thread capscrews) and reinstall differential case in carrier without any bearing endplay. Check ring gear flange runout. It should not exceed .003". Remove differential assembly, drive out pinion shaft cross pin and pinion shaft, rotate

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH "CAGE" TYPE HYPOID (Continued)

side gear to remove pinions, thrust washers, and side gears. Use Puller C-293 and suitable plates to remove differential side bearings.

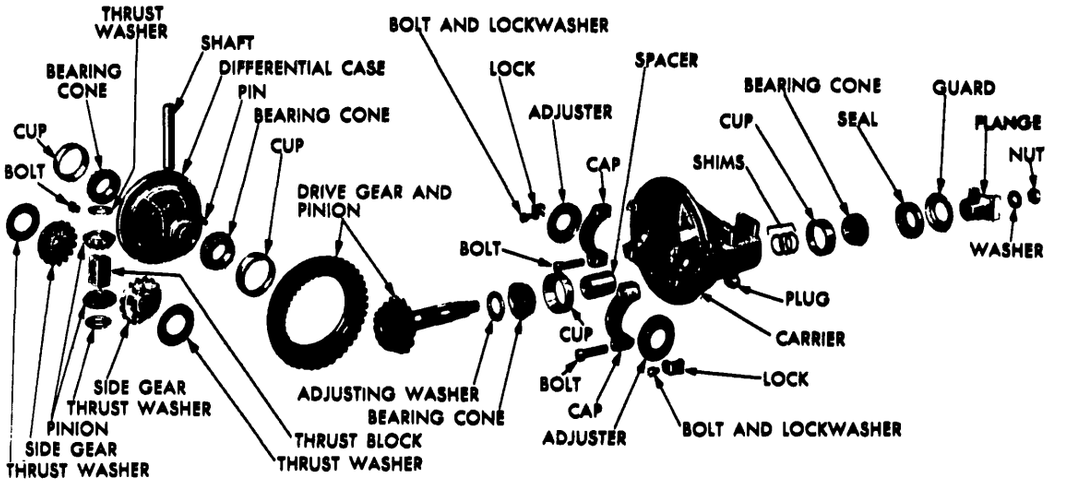
►*PINION OIL SEAL NOTE:* Can be removed and installed without removing differential bearing assembly or pinion. Remove pinion shaft nut, use Puller C-456 to remove pinion flange and puller C-358 or C-748 to remove oil seal. Soak new seal in thin engine oil for 30 minutes, use special tool C-359 to install oil seal in carrier housing.

R ass mbly - *NOTE* - If replacement parts are installed, or differential adjustment is necessary, the proper thickness washer (or shims) must be installed between pinion and rear bearing and pinion bearing preload readjusted. *S "Pinion S tting & Bearing Preload Adjustm nt" b low.*

►*PINION WASHER NOTE: Pinion washers furnished .084" to .100" thick in .002" steps. Shims (when used) furnish d .010", .0125", .015" and .018" thick.*

Differ ntial Cas R ass mbly: Install a thrust washer over hub of each side gear and install gears in case. Install differential pinion gears and thrust washers so that holes of both gears and thrust washers are properly aligned. Rotate gears 90° so that pinion shaft holes in case are in alignment with holes in gears and thrust washers. From the pinion shaft lockpin hole side of case, insert the slotted portion of pinion shaft through case, thrust washer and just through first pinion gear. Install thrust block between the two pinion gears so hole in block is aligned with pinion shaft and with ground sides of block facing the two side gears. Keeping all parts in proper alignment, push pinion shaft through until locking pin hole is in exact alignment with hole in case. *(NOTE* - Before installing shaft lock pin, rotate differential gears, making sure they rotate freely through the complete revolution). Check clearance between each gear and case with a feeler gauge. Clearance should be .001-.008". Install pinion lock pin through case from pinion shaft side of drive flange. Position each bearing cone on hub of case with taper away from drive gear, then with Tool DD-1005, drive cone in until it seats. Position drive gear on case aligning the holes in gear and case. Start all capscrews into threads in flange, then tap gear onto case with a fibre hammer until it seats properly on flange. Position drive gear between brass jaws of vise and alternately tighten each capscrew to 55 ft. lbs. (Chrysler & Imperial), 40 lbs. minimum (DeSoto), 35-40 lbs. (Dodge & Plymouth).

Carrier R ass mbly: Install pinion bearing cups squarely in carrier and pull into place with Tool C-758-D-3 and Adapter SP-535 with Washer SP-534 and Nut SP-533. Remove Tool. Make "Pinion Setting & Bearing Preload Adjustment" *(see below)*, then install preselected washer on pinion shaft and use Tool DD-955 (Chrysler & DeSoto), DD-996 (Dodge & Plymouth) and arbor press to install rear bearing. On Chrysler New Yorker & Imperial, install second preselected shim pack. On other cars, install bearing spacer, then install preselected shim pack. Insert assembly in carrier, add front bearing and seal (lip of seal facing front bearing) against shoulder in housing. Use installer, Tool 496 or DD-999 to start companion flange. Add plain washer (concave side down) and tighten nut to 240 ft. lbs. (Chrysler & DeSoto), 180-200 ft. lbs. (Dodge & Plymouth), then remove tool. Place differential case bearing cups over bearings and install complete assembly in carrier. Seat adjusters in pedestals and install caps and bolts, making sure that caps are correctly located. Using Tool C-406, turn right hand adjuster clockwise until backlash exists between gear and pinion. Back off adjuster nut several turns, then tighten lower pedestal bolts to 85-90 ft. lbs., leaving top bolts slightly loose. Check gear backlash, *see "Backlash Checking & Adjusting" below,* and adjust as necessary. With backlash properly adjusted install adjuster locks and tighten all bearing cap bolts to 90 ft. lbs. Recheck backlash. *CAUTION* -Whenever adjustment of differential assembly is changed to obtain correct tooth contact readjust differential bearing preload and backlash between gears.



CHRYSLER, DESOTO, DODGE, PLYMOUTH REAR AXLE

Gear Adjustment for Correct Tooth Contact: Apply gear marking compound to drive gear teeth, then apply a load against back face of gear with a round bar as drive gear is rotated. The contact pattern of a correctly adjusted assembly is well centered on drive and coast sides about 1/16" from edges of teeth. If tooth contact is across length of tooth, narrow and high on the tooth face, correct by moving pinion gear in toward center of drive gear by installing a thicker washer behind pinion. If tooth contact is across length of tooth, but narrow and low on the flank, correct by moving pinion gear away from center of drive gear by using a thinner washer behind pinion.

Backlash Check & Adjusting & Differential Bearing Pr . load Adjustment: With differential case assembly installed in carrier (see above), mount a dial indicator on housing so plunger rests against one of the ring gear teeth. *(NOTE* - Make sure indicator is properly positioned so plunger will accurately indicate exact amount of backlash). Check backlash at 90° intervals as gear is rotated, the stop at point of least backlash. Turn left hand (tooth side) bearing adjusting nut clockwise until only .001" backlash exists. *(NOTE* - Be sure right hand adjusting nut is screwed out so bearing cup can move without interference). At the point where .001" backlash is obtained, screw the right hand adjusting nut in until indicator just starts to move (to decrease the backlash) and install adjuster lock and attaching bolt. Tighten the **upper** right hand bearing cap bolt to 85-90 ft. lbs. *CAUTION - It is very important to have .001" backlash before upp r bolt is tightened).* Turn left hand adjusting nut **clockwise** until dial indicator shows .006" backlash. *(NOTE*- Considerable effort will be required to turn adjusting nut to last notch or two). This adjustment should be made so that adjuster lock and attaching bolt can be installed. Complete reassembly of carrier (see above).

Pinion Setting & Bearing Preload Adjustment: Install Gauge Block S-528 on end of dummy pinion shaft, Tool C-758-D-3. On Chrysler New Yorker and Imperial, assemble Washer, SP-2921 followed by pinion rear bearing and Sleeve, SP-1730 on dummy shaft. Insert the tool assembly in carrier, then install front bear-

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH "CAGE" TYPE HYPOID (Continued)

ing. On other models, install Locating Washer, SP-2919 and pinion rear bearing on dummy pinion shaft, followed by pinion bearing spacer, with large bore of spacer next to rear bearing. Install Sleeve SP-1730 on tool, then install the assembly in carrier housing and install front bearing. On all models, install Compression Sleeve, SP-535, Centralizing Washer, SP-534, followed by Main Screw Nut, SP-533. Hold compression sleeve with Tool C-784 or C-3281 and tighten nut to 240 ft. lbs. (Chrysler & DeSoto), 180-200 ft. lbs. (Dodge & Plymouth). Install Bearing Arbor, Tool SP-561 in differential carrier bearing supports. Center arbor in pedestals, then insert a piece of .002" shim stock between arbor and each cap and tighten pedestal bolts to 10 ft. lbs. Select a pinion adjusting washer of sufficient thickness so it will just pass between gauge block end of setting tool and machined surface of arbor. For example, if a .090" washer can be installed, but a .092" washer cannot be forced between the two surfaces, the .090" washer should be used. Check end of drive pinion for an etched mark to determine thickness to be added or subtracted from the above selected washer. As an example, if mark on pinion is plus 2, a .002" **thinner** washer should be used for final assembly. If minus 2, a .002" **thicker** washer should be used. When correct washer has been selected for drive pinion, disassemble tool from carrier housing. Add the selected washer to tool, between tool spacer and rear bearing. On Chrysler New Yorker & Imperial, add Spacer SP-2920 over dummy shaft to seat against rear bearing. On all models, add the pinion bearing preload adjusting shims (removed at disassembly), then insert tool into carrier housing. Install front bearing on shaft and into position in bearing cup. Install tool spacer, nut and washer, then tighten nut to 240 ft. lbs. (Chrysler & Imperial), 180-200 ft. lbs. (Dodge & Plymouth). Rotate tool assembly to seat the bearings, then check bearing preload by revolving tool with an inch-pound reading torque wrench. The correct preload should be 25-35 inch-pounds (Chrysler & DeSoto), 20-30 inch-pounds (Dodge & Plymouth). Adjust preload as necessary by **adding a thicker** shim if preload is too great, or a **thinner** shim if preload is not sufficient. Complete reassembly as indicated. *See "Carrier Reassembly" above.*

CHRYSLER, DE SOTO, DODGE "BARREL" TYPE HYPOID

CHRYSLER

1954 Six, Auto. Trans. (Exc. T & C, & 8 Pass.) ② ③
1954 Six, Town & Country & 8 Pass. ①
1954 V8, All Models ① *See "Differential Case Note" below.*
1955 V8, C-67 with PowerFlite, (Exc. Est. Wgn.) ②
1955 V8 C-67 Est. Wgn. ①
1955 V8 C68, C70, C300 All Models ①
1956 V8 C-71 (Exc. T & C Wgn. & Pwr. Pkg. Cars) ② ⑤
1956 V8 C-71 T & C Wgn. & Pwr. Pkg. Cars ① ④
1956 V8 C-72 & C-73 All Models ① ⑤
1956 V8 C-72 & C-73 All Models ① ④
1956 C-70 All Models & 300 B ① ⑤ ⑤

DE SOTO MODELS

1954 Six, Est. Wgn. & 8 Pass. ①
1954 V8 All Models ①
1955 V8, S 21 All Models ①
1955 V8, S22 with PowerFlite (Exc. Est. Wgn.) ②
1955 V8 S22 Est. Wgn. ①
1956 V8 S-23 with PowerFlite (Exc. Sta. Wgn.) ②
1956 V8 S-23 Sta. Wgn. ①
1956 V8 S-24 All Models ①

DODGE MODELS

1954-56 V8, Auto. Trans. ② ③
1955 Six, All Models with PowerFlite ②

① - Pinion bearings adjusted by bearing adjuster washer between shoulder on pinion shaft and front bearing cone.

② - Pinion bearings adjusted by shims placed between bearing spacer and front bearing cone. No shoulder on pinion shaft.

③ - Ring gear thrust pad and screw used on 1953 Cars with Torque Converter. Not used on cars equipped with PowerFlite.

④ - "Bolted" barrel type. ⑤ - "Screwed" Barrel type.

►***DIFFERENTIAL PINION GEAR NOTE:*** Two or four differential pinion gears used. Overhaul and adjustment are the same except where noted.

►***OTHER MODELS NOTE:*** All other Chrysler, DeSoto & Dodge Models use "Cage Type" Hypoid. *See "Chrysler, DeSoto, Dodge & Plymouth Cage Type" Rear Axle.*

►***DIFFERENTIAL CASE NOTE—"Screwed Type" and "Bolted Type" Differential carrier caps used. Different disassembly & reassembly procedures required for each type. See "Differential Case Disassembly" below.***

►***1955 PINION NUT TIGHTENING CAUTION:*** A convex (Belleville Lockwasher) is used on some models. It is important that this washer be installed with the convex side contacting the companion flange nut. Tighten pinion nut as follows when this washer used. 240 ft. lbs. min. (Chrysler Windsor), 250 ft. lbs. min. (Other Chrysler Models) 300-330 ft. lbs. (DeSoto Models).

DESCRIPTION: Hypoid gear, semi-floating type with either "Screwed" or "Bolted" barrel type differential case. Two different types of pinion shaft assemblies requiring different overhaul and adjustment procedures.

REMOVAL OF AXLE: ***See "Rear Axle" on Car Model pages.***

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: Remove rear wheels and hub and drum assembly using Tool C-845 (CAUTION—Do not strike end of axle shaft to loosen hub). Block brake pedal so it cannot be depressed and disconnect brake line at wheel cylinders. Remove rear axle drive shaft key and install sleeve Tool C-757 in axle bearing outer seal before removing brake support plate from axle housing. Remove shims from each end of axle housing and keep each set separate for reassembly. Remove axle shafts and bearings from housing using Tool C-499. Remove rear axle shaft inner oil seal.

Installation & Adjustment—Install axle shaft inner oil seal using Tool C-241. Insert axle shaft in housing making sure shaft and differential side gear splines are in alignment. Install axle shaft outer bearing (if removed) using Tool C-413. Install sleeve Tool C-757 in outer bearing oil seal before mounting brake support plate to axle housing to protect seal. Install brake support plate and tighten nuts to 30-35 ft. lbs. Connect brake tubes and bleed brakes. NOTE—If new axle shaft installed, it will be necessary to adjust the end play and center the axle. See Endplay Adjustment following.

Endplay Adjustment—Remove wheel and hub and tighten brake backing plate securely. Rap each axle shaft to be sure bearings and cups are seated, then place a dial indicator on axle drive shaft and housing in such a way to measure endplay of shaft. Check the endplay by moving axle shaft in and out. If endplay is not between .003" to .008", remove brake support plate and add or remove shims as required.

►***CAUTION***—When making adjustment of endplay, equal thicknesses of shims should be removed or installed on both right and left sides of axle housing, so as to retain central position of axle shaft thrust block.

Centralizing Rear Axles (Initial Installation of New Axle Shaft)—Install left axle shaft and bearing cone assembly (without grease). Drive bearing cup in as far as it will go using Tool C-413 to prevent damage to axle housing. Rear axle thrust block will be removed as far to the right as possible. With left bearing cup remaining at its innermost position, lay a straightedge across end of axle housing. Measure distance from straightedge to bearing cup face, to nearest 1/64". One-eighth inch minus the above measurement gives the thickness of shims required at left end to center the thrust block, (it is best to use a shim about .020" less than that required to center thrust block). Remove the left axle shaft, grease the bearing and reinstall bearing and shaft. Using the correct thickness of shims as determined above, install the support plate. Do not drive bearing cup in all the way (as the brake backing plate, when it is drawn up tight will push the bearing cup into the correct position). Install the right axle shaft and bearing (bearing should be clean and dry). Using Tool C-413, drive bearing cup in as far as it will go, meanwhile rotating axle

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CHRYSLER, DE SOTO, DODGE "BARREL" TYPE HYPOID (C nt.)

shafts to seat bearings, (Right bearing cup should protrude beyond housing end). Hold straightedge firmly across outer face of right bearing cup. Using a set of feeler gauges, measure accurately the distance between housing face and straightedge. This measurement gives thickness of shims that would give zero endplay if it were used. The shim thickness to be used is obtained by adding .003" to above measurement. If this gives a thickness that cannot be built up from existing shims, use the next larger shim combination. Remove the right axle shaft and grease the bearing and reinstall shaft and bearing and shim pack (as determined above), and complete the assembly.

OVERHAUL: (Disassembly)—Mount carrier assembly in stand, then mark both differential bearing adjusters and caps to insure reinstallation in correct position. Remove adjusting nut locks, back off adjusting nuts, take out bearing cap screws, remove bearing caps, and lift differential assembly out of carrier. Remove drive pinion shaft nut, pull universal joint drive pinion flange, and remove pinion shaft through rear end of carrier. Use puller C-293-C to remove rear bearing from shaft.
NOTE—Front oil seal can be replaced without dismantling carrier.

Differential Disassembly (Bolted Barrel Type): Place differential case in large vise with jaw protectors in place. Bend down tabs and remove drive gear to differential case attaching nuts and bolts. Tap drive gear off case with a fibre hammer. Mount case, bearings and cup assembly in carrier and check drive gear flange run-out which should not exceed .003". Remove case from carrier and remove differential case bearings with puller C-293 and No. 18 plates. Remove the six bolts attaching case cap to case, then remove three differential pinion shaft lock pins by driving them out of case. Drive long pinion shaft out of case with a brass drift and hammer, and remove axle shaft thrust block. Drive the short pinion shafts out of case and remove pinion shaft block. Remove pinion gears, side gears and thrust washers.

Differential Disassembly (Screwed Barrel Type): Mount differential case drive gear flange in large vise with jaw protectors, then remove differential case bearings with puller DD-914-89. Remove the differential case cap locking pins by center punching and drilling. Remove shell of pin in hole with punch. Heat outside of case with a torch DO NOT HEAT CAP, to a temperature of **not more than 360°-400°F.** (Check heat by means of a piece of soft solder, which will just start to melt when case is hot enough). Unscrew cap with special wrench DD-921 (start cover by jarring wrench handle with heavy hammer blow). Cool parts in oil and proceed with disassembly. Drive out the pinion shaft retaining pin, and with a hammer and drift, drive the long pinion shaft from case, and remove thrust block. Now drive the short pinion shafts from case and lift out pinion shaft block. Remove differential pinion gears, side gears and thrust washers from bottom of case.

►***DIFFERENTIAL CASE REASSEMBLY NOTE—Assembly of "Bolted Type" differential is identical to assembly of "Screwed Type," except that heating the case for cap installation is not necessary.***

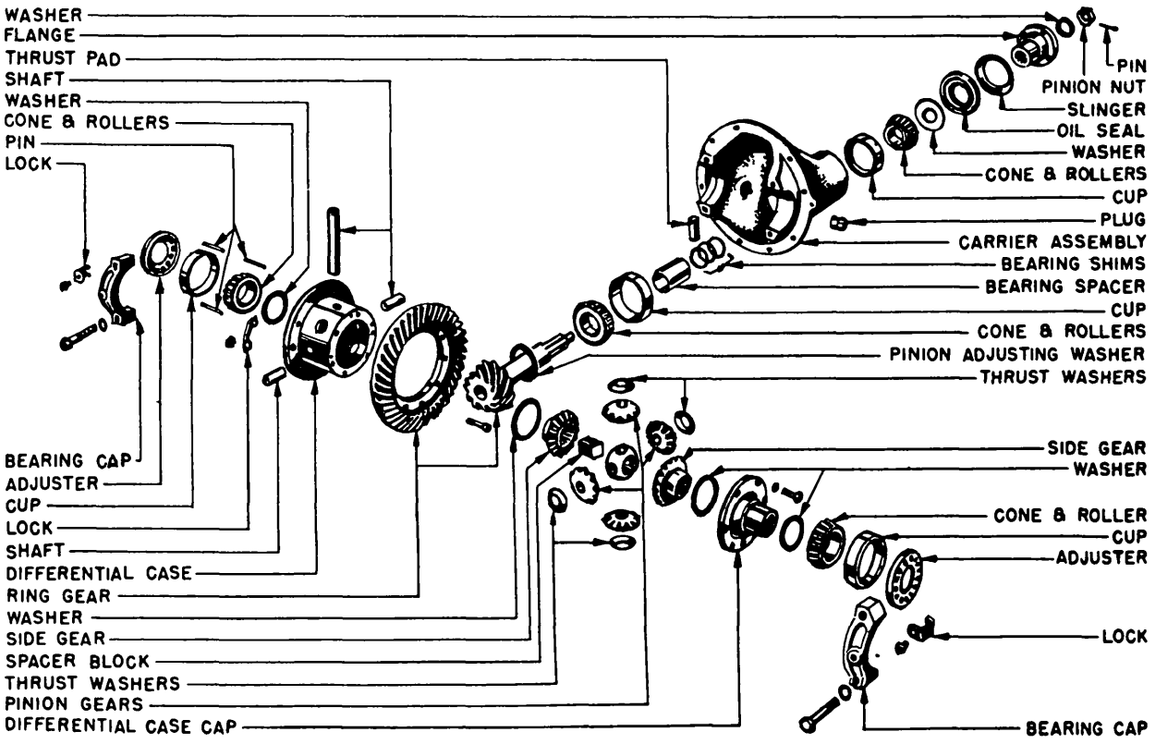
Differential Case Reassembly (Bolted & Screwed Barrel Type): Place thrust washer over hub of differential side gear and lay in position in case. Line up the locking pin hole in long pinion shaft, with the hole in differential pinion boss (opposite boss has no pinion hole) and drive the pinion shaft in until it protrudes about 1/16" on inside of case. Place a pinion gear thrust washer on pinion so the side with indents faces pinion, then install pinion gear and washer on end of shaft that protrudes. Tap shaft and hold pinion until end of shaft is even with edge of pinion. Insert the pinion shaft block with punch marked sides facing the short pinion shaft holes and the side marked "1" facing up. Install thrust block and pinion shaft block. Install the opposite pinion gear and thrust washer, then drive shaft into final position. Drive one of the short pinion shafts into either of remaining holes until shaft protrudes 1/16" on inside of case. (Make sure lock pin holes line up). Install pinion gear and thrust washer and continue to drive until shaft enters hole in pinion shaft block. Install other short pinion shaft, washer and gear in same manner. Lock pinion shafts in place by installing three new locking pins in the holes and peen over.

("Screwed Barrel Type")—Clamp complete assembly in vise and heat outside surface of threaded portion of case with a torch flame as indicated in disassembly procedure. Dip threaded portion of cap in gear oil, and then assemble thrust washer and side gear in cap and screw into differential case with wrench DD-921. Tighten securely with blunt drift and hammer. Drive three new case cap lock pins 1/16" below surface of case and peen metal of case over pins with a ball end punch.

("Bolted Barrel Type")—Assemble a thrust washer and remaining side gear in cap. Using two of the attaching bolts as guides, position differential cap on case, then tap into place using a soft hammer. Tighten cap retaining bolts to 35-40 ft. lbs. Install ring gear on flange, then place locking tabs in position and install gear retaining nuts. Tighten nuts to 35-40 ft. lbs., and bend up tabs to lock nuts in position.

Pinion Bearing Preload: Preload check is made with Tool C-758-D which replaces pinion gear and shaft in housing when making check. Pinion adjusting shims or spacers are placed as indicated in model application above.

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CHRYSLER, DE SOTO, DODGE "BOLTED TYPE" HYP ID

CHRYSLER, DE SOTO, DODGE "BARREL" TYPE HYPOID (C nt.)

Pinion Bearing Preload

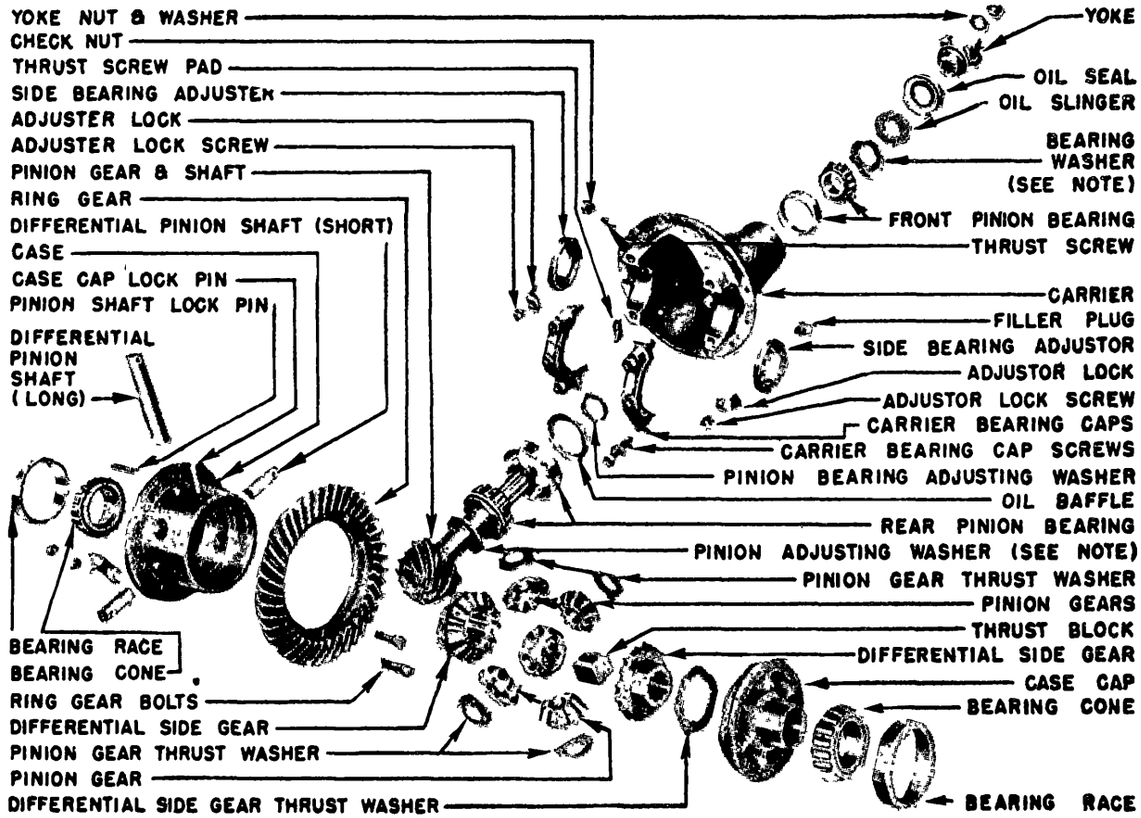
Model	Inch Lbs.
1954-56 Dodge (Wide Spacer or Shim Pack)	35-45
1954-56 Others (Either Spacer)	25-35

Pinion Preload Check (Pinions With Wide Spacer and Shim Pack)—Adjust pinion bearing preload BEFORE pinion gear setting is made. Coat drive pinion with hypoid lubricant, and assemble the drive pinion shaft rear bearing on main body of Tool C-758-D. Slide sleeve SP-1730, drive pinion bearing spacer and bearing adjusting shims over tool and insert the assembly into carrier. Slide front pinion bearing over tool and down into position in bearing cup. Slide compression sleeve SP-535 and centralizing washer over tool and down into position and install the compression nut. Tighten tool nut to torque indicated in "Tightening Torques" table below. Turn tool with a speed wrench to seat bearings, then check preload with an inch-pound torque wrench. Readings should be as indicated in table above. If adjustment does not conform to above readings, increase size of shim pack to **decrease** reading; decrease size of shim pack to **increase** reading. After correct preload setting has been obtained, leave tool in place for pinion setting.

Pinion Preload Check (Pinions With Single Narrow Spacer and Shoulder on Pinion Shaft)—***Pinion bearing preload must be checked AFTER pinion gear setting is made.*** Install pinion shaft adjusting washer and tool spacer SP-1371 over main body of Tool C-758-D with pinion shaft adjusting washer away from gear end of tool, then install pinion shaft rear bearing, and tool spacer SP-1370 and the pinion bearing adjusting spacer (that was removed from axle at disassembly). Insert assembly into carrier housing, then install front bearing onto shaft and into position in cup. Install compression spacer, centralizing washer and compression nut. Tighten nut to the torque indicated in "Tightening Torques" table below. Turn tool with speed wrench to seat bearings, then check bearing preload with an inch-pound wrench. Readings should be as indicated in table above. Increase size of spacer if reading is greater than upper limit, or decrease size of spacer if reading is less than lower limit. When reading is correct, remove tool and reassemble bearings and spacers to pinion shaft and install in housing.

Pinion Bearing Spacers—Spacers are available in sizes from .175" to .203" in steps of .002".

Pinion Bearing Carrier Assembly—After correct shims or spacer has been selected, disassemble Tool C-758-D and install pinion shaft adjusting spacer over pinion shaft and down against the machined surface of drive pinion. Install drive pinion rear bearing on pinion shaft and press it into place with Tool C-996. Slide bearing spacer and shim pack into position against rear bearing (if pinion shaft has a shoulder and narrow type spacer, install this narrow type spacer which was selected for correct



CHRYSLER, DE SOTO, DODGE "SCREWED BARREL TYPE" HYPOID

bearing preload). Insert assembly into carrier housing (lubricate all parts with hypoid lubricant). Slide front bearing over pinion shaft and into position in bearing cup, then install bearing oil slinger. Install new seal over pinion shaft and drive into position using Tool C-359. Install companion flange on shaft and install washer and nut. Tighten nut to torque indicated in "Tightening Torques" table below.

Pinion Nut Tightening Torque

Model	Ft. Lbs.
1954-56	② 180-320

② - 250 ft. lbs. (Chrysler Windsor), 300 ft. lbs. (Other Chrysler), 300-330 ft. lbs. (De Soto) with convex (Bellville Lockwasher).

Pinion Setting: (Without Tool C-758-D)—Pinions are marked "0" (standard) or "+" or "—" followed by figure (1 to 4 indicating necessary correction for other than standard "0" pinions). When installing new pinion of same marking as old pinion, use same spacer thickness for this new pinion. If new pinion marked "+" or "—" used to replace "0" standard pinion, use thinner washer (+ pinion), thicker washer (— pinion) than the washer used with the original pinion. The difference in thickness from the original washer should be equal in thousandths to the figure following the + or — mark on the pinion. Pinion position is controlled by spacer, installed on shaft between pinion and rear bearing. Pinion must be removed from carrier housing and bearings removed from shaft to change washer (or shims as used on some models) to correct pinion setting and gear mesh. See Ring & Pinion Gear Adjustment below also.

Washer Note—Pinion adjusting washers furnished in following thicknesses: .088", .090", .092", .094". Shims (when used) furnished .010", .0125", .015", .018" thick.

►*PINION SETTING NOTE*—Install Tool C-758-D as follows before setting pinion.

Chrysler 6 & Dodge V8 With Torque Converter—Install tool in same manner as that used for Pinion Bearing Preload (See above).

CONTINUED N NEXT PAGE

CHRYSLER, DE SOTO, DODGE "BARREL" TYPE HYPOID (C nt.)

Other Models—Assemble spacer SP-1371 to main section of Tool C-758-D, then install spacer SP-1370 and slide pinion rear bearing over spacer SP-1370 and up against spacer SP-1371. Insert tool as assembled into carrier housing and install front bearing over tool shaft and into position in bearing cup. Tighten tool compression nut so torque required to rotate tool assembly is as indicated in Pinion Bearing Preload table above, with bearing lubricated with hypoid gear oil.

Pinion Setting (With Tool C-758-D): Fasten Gauge Block SP-528 to rear end of main tool body, and place Arbor SP-561 in differential carrier bearing supports. Install bearing caps and bolts and tighten bolts to 10 ft. lbs. (NOTE—Remove all burrs and foreign material in bearing bores before installing arbor). Select a pinion washer that will just pass between arbor and gauge block (For an example: if a .090" can be inserted but a .092" cannot be forced between the two surfaces by hand, the .90" washer should be used even though it feels loose). Check pinion shaft end as it may indicate the amount that should be added or subtracted from the washer in the above check. (If mark on shaft indicated a +2, a .002" thinner washer should be used for final assembly. If a —2 were indicated, then .002" should be added to washer initially selected). When correct washer has been selected for the drive pinion, disassemble tool and proceed with pinion shaft installation (See Pinion Bearing Carrier Assembly above).

Spacer Washer Note—Spacers furnished in sizes from .084" to .100" thick, in steps of .002".

Differential Bearing Preload & Backlash Adjustment: When installing differential carrier assembly, turn adjusting nuts up to marks made before disassembly, then check bearing adjustment as follows: Check drive gear for runout. Gear should be true within .004". Screw out bearing adjusting nut at back face of drive gear, and screw in the opposite nut until ample backlash is obtained. Tighten lower cap bolts to 90 ft. lbs., leaving the top bolts fairly loose. Screw out adjusting nut on tooth side of drive gear, until nut clears cup. Screw in opposite adjusting nut until there is only a little backlash. Turn drive gear a few times by hand to seat bearings. With a dial indicator, find the point of least backlash on drive gear at 90° intervals. At the point of least backlash, screw in adjusting nut at back face of drive gear until .001" shows on indicator. Turn in adjusting nut on tooth side until indicator shows .006". Lock adjusting nuts in place and tighten both top cap bolts to 90 ft. lbs.

Ring Gear Thrust Pad Adjustment: Clearance between thrust pad and rear face of ring gear should be .006-.008". To adjust, loosen locknut on left side of carrier housing (nut and screw are tack welded together). Turn stud up finger tight, and back off so there is .006-.008" clearance between thrust pad and drive gear.

FORD, LINCOLN, MERCURY "INTEGRAL CARRIER TYPE" HYPOID

F rd Sta. Wgn. & Sed. D l. (1954-56)
Ford F-100 Trucks (1954-56)
F rd F-250 & P-350 Trucks (Late 1955-56)
Ford Thunderbird & Interc ptor (1955-56)
Linc ln (1954-58)
Contin ntal (1956-58)
M rcury Pass. Cars (1955-56)
Mercury Sta. Wgn. (1954-56)

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 LINCOLN & MERCURY REAR AXLE PINION SEAL SQUEAL CORRECTION:* A new seal, Part No. MC-4676-A having two sealing lips may be used to replace the old seal. Coat lips of seal with Lubriplate before installation.

►*1954-56 MERCURY REAR AXLE SHAFT ENDPLAY CORRECTION:* A "Clunking" sound on rough roads or sharp turns caused by excessive axle shaft endplay can be eliminated by installing shims between rear axle bearing and shoulder in axle housing tube. Measure axle shaft endplay with a dial indicator. If endplay is over .030" add shims as required to reduce the endplay to not less than .019". Make shims of steel or brass in thicknesses of .010" & .015". Inside diameter should be 2 9/16", outside diameter should be 3 1/8".

►**REAR AXLE IDENTIFICATION NOTE**—Metal tag attached to one axle housing cover screw stamped with number of ring gear and pinion teeth.

►***CAUTION—Re-install identification tag when housing cover replaced.***

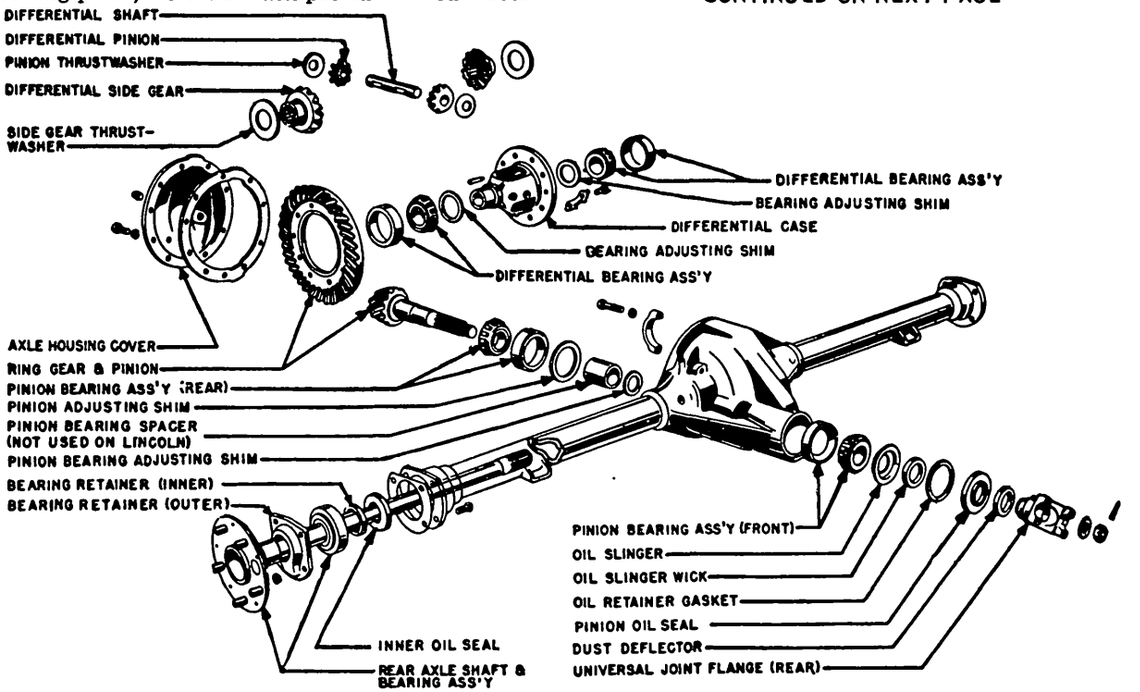
DECRIPTION: Semi-floating, hypoid gear, Hotchkiss drive type. **This axle does not have a separate differential carrier assembly.**

AXLE SHAFT REPLACEMENT: Remove wheel, remove brake drum by taking out tinnerman nuts securing drum to axle flange. Rotate axle shaft until hole in shaft flange lines up with one of four bolts mounting backing plate and bearing retainer on housing, remove all bolts. Use Tool 4235A (sliding hammer) to remove axle shaft and bearing assembly from housing. Use care not to dislodge the brake backing plate or damage the oil seal in the housing. ***NOTE—If oil seal being replaced, disconnect brake tube from backing plate. Plate can be laid on floor without disconnecting brake cable.***

Wheel Bearing Replacement: Cut bearing retainer ring with chisel, slide ring off shaft, use Tool 4234 to press bearing off shaft in arbor press. When cleaning parts, DO NOT wash pre-lubricated wheel bearing with solvents (will remove lubricant) Press bearing on shaft, using Tool 4234, then press on new wheel bearing retainer ring. (CAUTION—do not attempt to press bearing and retainer on in one operation).

Oil Seal Replacement: Use Tool 4235-B to install seal in housing. Use great care to keep seal square with housing while installing. Seat seal **lightly** against

CONTINUED ON NEXT PAGE



LINCOLN, MERCURY, FORD "INTEGRAL CARRIER" HYPOID AXLE

FORD, LINCOLN, MERCURY "INTEGRAL CARRIER" TYPE (Continued)

shoulder in housing. Apply cup grease to seal surface before installing axle shaft.

Axle Shaft Installation: Use care not to damage oil seal when installing axle shaft. Tighten bearing retainer and backing plate bolts to 30-35 ft. lbs. Install brake drum and secure to axle flange with tinnerman nuts. CAUTION—If brake tube removed, reconnect and bleed brakes.

Drive Pinion Oil Seal Replacement: (Without removing Differential Carrier): Disconnect drive shaft at rear universal joint. Mark position of universal joint flange, nut & shaft with a punch, to insure installing at the same position. Remove pinion shaft nut and pull flange with Tool 4858-Q. Install an oil seal puller and pull seal from housing. To install, position seal in housing and drive into place with Tool 4676. Install flange on pinion shaft with marks in line, and install pinion shaft nut and tighten until it is tight on shaft with marks on flange, shaft, and nut aligned.

REMOVAL OF AXLE: *See "Rear Axle" on Car Model page.*

REAR AXLE (Disassembly): Remove axle shafts (see Axle Shaft Removal above).

1)—Remove cover assembly and gasket and install axle housing spreader Tool 4000-A and spread axle housing not more than .015".

►***CAUTION—When using axle spreader tool to spread axle housing, do not spread more than .015" which is necessary for differential removal, and remove spreader immediately to avoid housing taking on permanent "set."***

2)—Mark differential side bearing caps to insure correct reassembly (NOTE—Lincoln bearing caps are marked at factory with a letter or a figure stamped on cap, and on the housing at a point adjacent to the cap. Left side marks are horizontal and right side marks are vertical). Remove bearing caps and pry differential assembly loose from housing and lift assembly out.

3)—Remove nut from pinion shaft, holding the flange with Tool 4851-C. Remove flange with Tool 4858-D (Lincoln & Mercury), 4858-Q (Ford). Drive pinion toward rear of housing with Tool 4201, and withdraw pinion and rear bearing cone and roller assembly.

4)—Remove oil seal from front end of housing with Tool 1175-B. Lift out pinion shaft ring gasket, wick, slinger and front bearing cone and roller assembly.

5)—Remove pinion front bearing cup with Tool 4628-B, and rear bearing cup with Tool 4628-D. ***CAUTION—Do not loose shims located in housing back of rear bearing cup. If pinion is not to be replaced, these shims will be installed at reassembly.***

Differential Disassembly: Remove differential side bearings with Tool 4221-C, and remove shims located between bearings and carrier **(Note the number and thickness of shims behind each bearing as these shims must be replaced unless new parts are to be installed).** Pry ring gear bolt locking tabs away from bolt heads and remove capscrews and ring gear. Drive out pin securing differential pinion shaft in case and take out shaft, pinion, side gears, and thrust washers.

Diff rential Assembly: Lubricate all parts with differential lubricant. Install side gears and thrust washers, pinion gears and thrust washers and the differential pinion shaft. Secure pinion shaft with locking pin (stake pin in place to avoid having it fall out). Position the ring gear on the case and secure in place with capscrews and new lockwashers. Tighten capscrews to 50-60 ft. lbs. Bend tangs of lockwashers up against capscrews.

►***REPLACEMENT DIFFERENTIAL GEAR & PINION CAUTION: See Parts Production Change above for different type gears and pinions which must be used together.***

►*1955 LINCOLN & MERCURY TOOL NOTE:* Tool 4205-A is available for use on 1955 and later Lincoln & Mercury Rear Axles. Tool consists of two dummy bearings which replace differential side bearings in making adjustments as outlined below.

Differential Bearing Preload & Ring Gear Backlash Adjustment (1954 Ford Sta. Wgn. & Sed. Del., 1954 Lincoln & Mercury): Install side bearings on differential assembly **without shims.** Install differential assembly in the housing (without pinion shaft installed) and use a dial indicator to measure total endplay of unit, then note this figure. Select shim pack equal to total endplay **plus** shims equal to desired bearing preload (.007-.009" Ford; .005-.009" Lincoln & Mercury), for TOTAL SHIM PACK of side bearings. After pinion installed in housing (see below), reinstall differential assembly **without shims** and measure endplay on left hand side (from no backlash to maximum backlash). Select shims equal to this measurement (from total shim pack), **less .003-.008" backlash** for installation on left hand side. Select shim pack equal to total endplay plus preload and less thickness of left shim pack (from total shims) for installation on right hand side.

Differential Bearing Preload & Ring Gear Backlash Adjustment (1955-56 Ford, Thunderbird & Interceptor, 1955-58 Ford Sta. Wgn. & Sed. Del., 1954-56 F-100 Truck, 1955-58 Lincoln, Continental & Mercury): Install side bearings on differential assembly without shims (see Lincoln & Mercury Tool Note above). Install differential in housing (without pinion shaft assembly in place) and use dial indicator to measure total endplay of differential assembly in housing, then record this reading. Remove differential assembly and install pinion assembly (see below), Reinstall differential assembly and measure endplay on left side (no backlash to maximum backlash). This measurement represents shim pack for left side. Subtract this left side measurement for total endplay reading and add .015-.020" (Ford) .010-.015" (Lincoln & Mercury). This total will represent the shim pack thickness for the right side and will include both backlash and preload. Remove differential assembly (remove Tool Lincoln & Mercury and install side bearings). Reinstall assembly in housing with shim packs as determined above.

Ring Gear Backlash & Gear Mesh: Measure backlash with a dial indicator. If not within limits of .003-.006" (Ford Truck), .003-.008" (Others), adjust by shifting shims behind side bearing cups from one side of the carrier to the other but **do not change total shim thickness** which would affect bearing pre-load above. Check backlash at four equal spaced points around ring gear. Backlash must be within limits and must not vary more than .002" between these checking points.

REAR AXLE (Assembly): Assemble rear axle in the following sequence:

Pinion Bearing Assembly Installation: Lubricate all bearings and thrust washers with differential lubricant before installation. Install front and rear bearing cups in housing using Tool 4628-D (Lincoln & Mercury), Tool 4628-N (Ford) for rear bearing cup; Tool 4628-B (Lincoln & Mercury, Tool 4628-N (Ford) for front bearing cup *(CAUTION*—Re-install shims behind rear bearing cup. If new parts being used, install approximately .030" shim thickness to check pinion setting). Install rear bearing cone and bearing assembly on pinion shaft, insert pinion in housing and check pinion setting (below) to determine correct thickness of shims required. If correction required, remove rear bearing cup from housing and re-install with correct number and thickness of shims behind bearing cup. Lubricate bearings and insert pinion in housing, place bearing spacer on shaft (spacer not used on Lincoln), re-install bearing adjusting shims on shaft (same thickness as removed unless new parts installed, in which case install approximately .065" shim thickness to check bearing adjustment). Install pinion shaft front bearing cone and roller assembly with Tool 4858-B and tighten tool nut to torque indicated in "Tightening Torques" table below. Check pinion bearing preload (see below) and add or remove shims from shaft behind front bearing cone until correct bearing pre-load secured. Remove tool, install oil slinger, wick, and gasket, and oil seal (use Tool 4676). See that oil deflector on companion flange is in good condition (new deflector can be installed with Tool 4859), install companion flange with Tool 4858-B tighten companion flange nut to torque indicated

Pinion Nut Tightening T rque

Car Model	Ft. Lbs.
Ford Sta. Wgn. & Sed. Del. (1954)	140-180
Ford Sta. Wgn. & Sed. Del. (1955-56)	200-220
Ford Truck F-100 (1954)	140-180
Ford Truck F-100 (1955-56)	200-220
Ford Truck F-250, P-350 (1955-56)	200-250
Ford Thunderbird & Interceptor (1955-56)	200-220
Lincoln (1954-58)	100-150
Continental (1956-58)	100-150
Mercury (1954-56)	100-150

Pinion Bearing Preload: Turning torque with pinion rotating should be as indicated in table below (disregard torque required to start pinion) with nut on end of pinion shaft properly tightened to torque indicated in "Tightening Torques" table above. To check preload, position axle so that pinion shaft is vertical, use torque indicator (with Tool 4858-B) and note indicator reading with shaft rotating.

Adjustment—If torque reading low, remove shims from shaft behind front bearing cone; if reading high, add shims at this point. Shims furnished .003", .005", .010", .030" thick.

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FORD, LINCOLN, MERCURY "INTEGRAL CARRIER" TYPE (C ntinued)

Pini n B aring Preload

Car Mod l	Inch-Lbs.
Ford Sta. Wgn. & Sed. Del. (1954)	8-12
Ford Sta. Wgn. & Sed. Del. (1955-56)	10-30
Ford F-100 Truck (1954)	8-12
Ford F-100 Truck (1955-56)	10-30
Ford F-250, P-350 Truck (1955-56)	10-30
Ford Thunderbird & Interceptor (1955-56)	10-30
Lincoln (1954-58)	ℂ 8-12
Continental (1956-58)	ℂ 8-12
Mercury (1954-56)	ℂ 8-12

ℂ - 18-20 inch lbs. if bearings are new.

Pinion Setting: Pinion position must be checked when new parts installed or when same number and thickness of shims, as removed from behind rear bearing cup, not re-installed. Check pinion position with Pinion Depth Gauge Tool 4020-A (Ford), 4020-B (Lincoln & Mercury) as follows: With pinion inserted in housing, install gauge in differential side bearing bores (use large diameter rings of Tool 4020-B for Lincoln, and small rings for Mercury). Install bearing caps and torque capscrews to 60-70 ft. lbs. Bolt anvil clamp on axle housing flange directly over pinion, install anvil under clamp so that anvil rests on face of pinion and contacts gauge micrometer (Lincoln & Mercury). Check micrometer reading (Micrometer is part of Tool 4020-B. Outside type micrometers must be used with Tool 4020-A) which should agree with table below for all standard pinions marked "0." If micrometer reading greater than figure in table, subtract equal thickness of shims from .030" shim pack installed behind pinion rear bearing cup; if micrometer reading less than figure in table, add equal thickness of shims as above; and finally correct this shim thickness for all pinions marked other than standard "0" pinion as follows:

Pinion Marking Note—Standard pinions are marked "0." When installing a "—" (minus) pinion ADD shims equal in thousandths to the figure following this minus sign on the pinion; for "+" (plus) pinions, SUBTRACT shims similarly from the standard shim thickness (for pinions marked "0"). These shims furnished in thicknesses of .003", .005", .010" (Ford), .0025-.0035", .0045-.0055", .009-.011", .027-.033" (Lincoln & Mercury).

►***CAUTION—Changing shim thickness to adjust pinion position will disturb bearing adjustment unless same shim thickness is added or removed from shaft at front bearing cone***

Pinion Gauge Setting (Gauge 4020-B)
(For Standard Pinions Marked "0")

Lincoln

1954-57 (All Ratios)	.562"
1958 (All Ratios)	.875"

Mercury

1954-55 (All Ratios)	.562"
1956 (All Ratios)	.625"

Pinion Gauge Setting (Gauge 4020-A)
(For Standard Pinions Marked "0")

Ford

1954-57 (All Models)	1.625"

FORD & MERCURY "SEPARATE CARRIER TYPE" HYPOID

F rd Pass. Cars, Exc. Sta. Wgn. & Sed. Del. (1954)
F rd Pass. Cars, Exc. Sta. Wgn., Sed. Del., Thunderbird & Polic Int rc pt r (1955-56)
Mercury Sta. Wgn. (1954)

►*NOTE: S "Ford, Lincoln, Mercury Hypoid (Integral Carri r)" for other Ford & Mercury applications.*

►CHANGES, CAUTIONS, CORRECTIONS

►***REAR AXLE LUBRICATION CAUTION: If necessary t chang rear axl lubricant before 5000 miles, refill axl with M-4642-A or B lubricant. After 5000 miles of peration, Multi-Purp s type gear lubricant can be used for r filling.***

►*1954 DIFFERENTIAL GEAR CASE CAUTION:* Differential Gear Case, Part No. 1A-4205 (Painted Red), used with 3.31-1 ratio carrier and gear assembly. Part No. 8A-4205 used with other ratios. THESE CASES ARE NOT INTERCHANGEABLE.

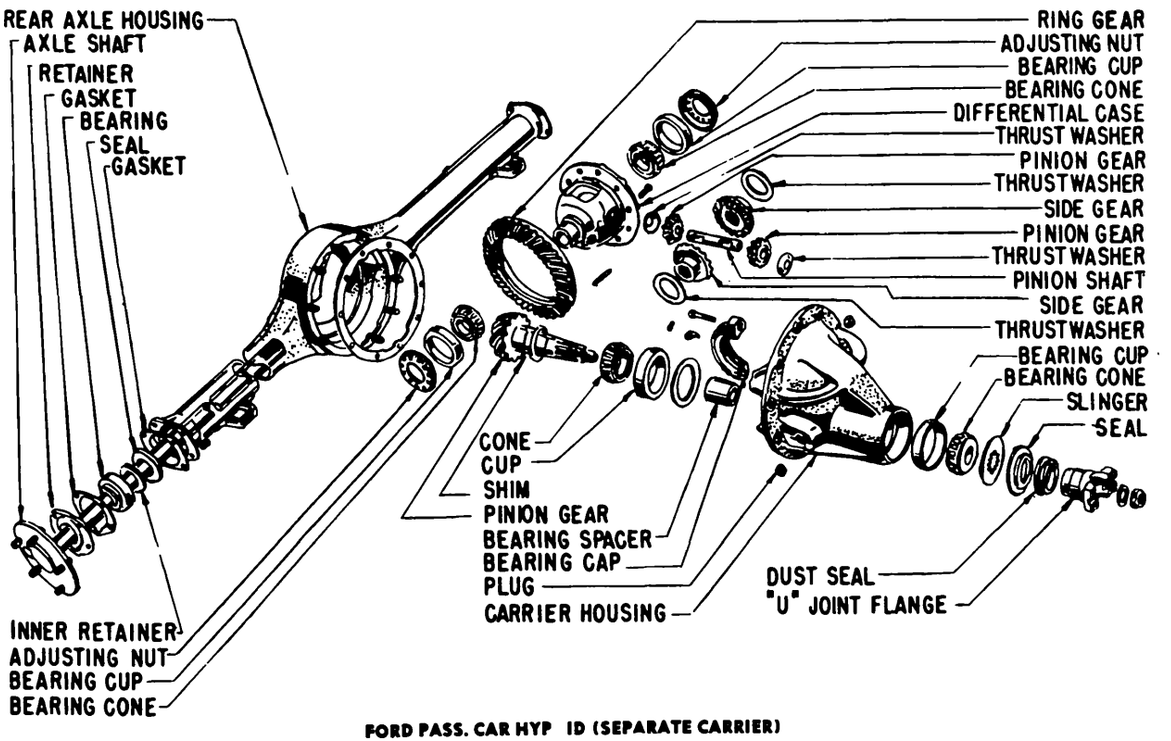
►*1954 MERCURY REAR AXLE "CLINK" CORRECTION:* Hardened, phosphate coated slinger, Part No. MA-4670-A, has been released to alleviate above condition, replacing Part No. 0A-4670. To install proceed as follows: Remove drive shaft assembly. Remove companion flange only from rear axle. Polish end of companion flange where it contacts slinger, with fine crocus cloth. Reassemble companion flange, torque pinion nut to 150 ft. lbs. Install drive assembly.

►*1956 PINION BEARING SPACER PRODUCTION CHANGE:* A new pinion bearing spacer, Part No. B6A-4662-A with indentations on the inner surface has replaced the earlier type paper lined spacer. The later type spacer will center correctly on pinion and prevent cocking of spacer. Do not use the paper liner with later type spacer.

►*1956 3.22-1 RATIO REAR AXLE RING GEAR CHANGE (CARS WITH 312" THUNDERBIRD ENGINE):* The ring gear diameter has been increased from 8 1/4" to 8 1/2" and the attaching bolts have been increased from 3/8" to 7/16". A limited number of ring gears and pinions were released with 3/8" bolts. If failure is encountered with this ring gear, and the B6A-4209-J gear set is not available, it will be necessary to use the B6A-4209-K gear set and replace the differential gear case with a B6A-4205-D gear case.

►*1956 DRIVE PINION OIL SLINGER PRODUCTION CHANGE (Also a service replacement change on all 1950-56 Models):* To prevent losing pinion bearing preload due to wear of drive pinion oil slinger, a new sling-

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FORD PASS. CAR HYP ID (SEPARATE CARRIER)

FORD & MERCURY HYPOID "SEPARATE CARRIER TYPE" (Continued)

er, Part No. B6A-4670-A which is made of harder material, is being used in production and for service replacement. Install the later type slinger whenever disassembly of the rear axle is necessary.

► *1955-56 DIFFERENTIAL GEAR CASE REPLACEMENT CAUTION:* To prevent installation of the wrong differential case, the attaching flange thickness should be measured before installation. It is important that the proper length ring gear bolts be used with the differential case. When using differential gear case, Part No. B5A-4205-B (7/16" flange), the 43018-S (7/8" long) attaching bolts must be used. If differential gear case, Part No. B6A-4205-B (23/64" flange) is used, the 46027-S (3/4" long) attaching bolts must be used.

► *1955-56 RING GEAR TO DIFFERENTIAL CASE ATTACHING BOLT TIGHTENING SPECIFICATION CHANGE:* Tightening specifications for the 3/8" diameter bolts have been changed from 35-40 ft. lbs. to 45-50 ft. lbs. Assemblies using the 7/16" diameter bolt (see 3.22-1 Ratio Rear Axle Change above) must be tightened to 75-85 ft. lbs.

DESCRIPTION: Semi-floating hypoid gear, Hotchkiss drive, with separate differential carrier assembly which can be removed for work.

AXLE SHAFT REPLACEMENT: Remove wheel and tire assembly, then remove the Tinnerman nuts that secure brake drum to axle flange. Remove brake drum. Working through the hole provided in axle shaft flange, remove nuts securing brake carrier plate to axle housing. Pull axle shaft assembly out of housing with Axle Shaft Puller Tool 4235-N (Ford), 4235-A (Mercury). Do not dislodge brake plate or damage oil seal in housing. Install one nut to hold brake plate in place.

Wheel Bearing Replacement (Ford): Remove bearing retainer from shaft with Tool 2240-N. Use puller to remove bearing or grind through both races and lift off bearing *(CAUTION–Do not re-use bearing).* To install bearing, place retainer plate on shaft, using Tool 1225-N to press new bearing firmly in place against shoulder on shaft. Press retainer ring firmly against bearing.

Wheel Bearing Replacement (Mercury): Cut wheel bearing retainer with chisel, then remove bearing with Tool 1225-C. Use Tool 1225-B to replace bearing. Press into place. Use same tool to press on bearing retainer.

► *CAUTION: Use extreme care not to damage oil seal bearing surface on axle.*

Oil Seal Replacement–Soak new seal in engine oil for at least ½ hour. Use Tool 4235-N or A to drive seal into place against shoulder in housing. Check fit of seal in housing to prevent oil leaks around seal.

REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Models pages.*

REAR AXLE OVERHAUL: *(NOTE–It is not necessary to remove rear axle assembly from car for overhaul).* After axle shafts removed, proceed as follows:

Differential Carrier: Removal–Disconnect propeller shaft rear universal joint. Drain lubricant from housing and remove carrier to housing nuts. Remove carrier from housing.

Disassembly–Before disassembling carrier, clean thoroughly and inspect drive pinion, drive gear, and case assembly for endplay. Inspect gear tooth pattern to determine if gears are worn, defective, or out of adjustment. Check backlash and drive gear runout. Mark differential bearing caps and carrier supports with matching numbers to insure proper reassembly. Remove differential adjusting nut locks, bearing caps and adjusting nuts. Lift differential assembly out of carrier. Remove universal joint flange nut and washer, then pull flange off drive pinion. Lift drive pinion, rear bearing and bearing spacer out of carrier. Remove oil seal using Tool 1175-H or B, and lift oil slinger and bearing out of case. Drive pinion bearing cups out of carrier with a brass drift, or use Tool 4628-P or F. (1954-55), T55P-4616-A (1956).

Differential Case Disassembly - Remove differential bearings with Puller 4221-N or C (1954-55), Puller T56L-400-A (1956). Remove drive capscrews and tap off gear with soft hammer. Drive pinion shaft locking pin out of case with drift working from drive gear side of case. Remove pinion shaft and differential bearings, side gears, and thrust washers.

Drive Pinion Disassembly - Remove rear bearing from drive pinion with Puller 4221-N or E. If tool not available, insert a press plate between inner race and drive pinion out of bearing. Remove shims from drive pinion, noting total thickness of shim pack for use at reassembly.

Differential Carrier: Reassembly–If replacement of drive pinion or drive gear is necessary, both parts must be replaced. When differential case is being replaced, be sure that the new case is the same as the original case. Coat all parts with differential lubricant before installation and use new gaskets.

Drive Pinion Adjustment (Master Pinion Tool Method)– Make sure that bores in carrier are free of burrs and metal chips, then install drive pinion bearing cups in carrier with Tool 4228-N (1954-55), F55P-4616-A (1956). Slide drive pinion rear bearing on Master Pinion Tool 4610-CC (1954-55), 4610-PP (1956), then position tool in carrier. Install front bearing on tool, then install universal joint flange, washer, and nut using Tool 4858-P or E. Oil bearing, then tighten nut until bearing preload is 15-20 inch pounds. Check preload with Tool 4610-N. *NOTE - Alternately turn pinion while tightening nut to properly seat bearings.* Install pinion Depth Gauge 4610-A or 4610-P. Measure distance between depth gauge and pinion with a 2-3" micrometer *NOTE - On 1956 models, use adapter rings on depth gauge (bores are 1/8" larger). Use approximately a 1/8" spacer between universal joint flange and front pinion as bearing cup is approximately .108" deeper in carrier casting.* Remove pinion depth gauge and master pinion tool from carrier. Check number etched on end of pinion to be installed. With this number and the micrometer reading select total shim thickness requirement. *See "Pinion Setting Shim Tables" below.* As an example, a reading of 2.531" from Tool 4610-A (reading from Tool 4610-P would be .500" less) with a pinion marked "17" requires .033" in shims. Shims are available in .010", .011", .012", .013" and .016". Install proper shims on pinion shaft, then press rear bearing on pinion until it is seated against shims *(CAUTION - When checking pinion depth, always use the same bearings that are to be used for service in the axle).* Install pinion assembly in carrier, then install a new bearing spacer and front bearing. Place oil slinger and seal on pinion shaft and drive seal into place with Tool 4676-A. Install universal joint flange with Tool 4858-P or E, and install washer and nut. Alternately turn pinion while tightening nut until bearing preload is 22-28 inch pounds (new bearings 1954-55), 18-24 inch pounds (new bearings 1956) or 13-18 inch pounds (used bearings all years).

Drive Pinion Adjustment (Tooth Pattern Method)– Make sure bores in carrier are free of burrs and metal chips, then install drive pinion bearing cups in carrier. If the original drive pinion is being used, install the original shim pack on drive pinion. If a new pinion is

CONTINUED ON NEXT PAGE

1954-55 PINION SETTING SHIM TABLE

Micrometer Reading Using Tool 4610-P	Micrometer Reading Using Tool 4610-A	Pinion Marking								
		12	13	14	15	16	17	18	19	20
2.025	2.525	.022	.023	.024	.025	.026	.027	.028	.029	.030
2.026	2.526	.023	.024	.025	.026	.027	.028	.029	.030	.031
2.027	2.527	.024	.025	.026	.027	.028	.029	.030	.031	.032
2.028	2.528	.025	.026	.027	.028	.029	.030	.031	.032	.033
2.029	2.529	.026	.027	.028	.029	.030	.031	.032	.033	.034
2.030	2.530	.027	.028	.029	.030	.031	.032	.033	.034	.035
2.031	2.531	.028	.029	.030	.031	.032	.033	.034	.035	.036
2.032	2.532	.029	.030	.031	.032	.033	.034	.035	.036	.037
2.033	2.533	.030	.031	.032	.033	.034	.035	.036	.037	.038
2.034	2.534	.031	.032	.033	.034	.035	.036	.037	.038	.039
2.035	2.535	.032	.033	.034	.035	.036	.037	.038	.039	.040

1956 PINION SETTING SHIM TABLE

Micrometer Reading Tool 4610-P	Micrometer Reading Tool 4610-A	PINION MARKING						
		12	13	14	15	16	17	18
2.131	2.631	.008	.009	.010	.011	.012	.013	.014
2.132	2.632	.009	.010	.011	.012	.013	.014	.015
2.133	2.633	.010	.011	.012	.013	.014	.015	.016
2.134	2.634	.011	.012	.013	.014	.015	.016	.017
2.135	2.635	.012	.013	.014	.015	.016	.017	.018
2.136	2.636	.013	.014	.015	.016	.017	.018	.019
2.137	2.637	.014	.015	.016	.017	.018	.019	.020
2.138	2.638	.015	.016	.017	.018	.019	.020	.021
2.139	2.639	.016	.017	.018	.019	.020	.021	.022
2.140	2.640	.017	.018	.019	.020	.021	.022	.023
2.141	2.641	.018	.019	.020	.021	.022	.023	.024
2.142	2.642	.019	.020	.021	.022	.023	.024	.025
2.143	2.643	.020	.021	.022	.023	.024	.025	.026

FORD & MERCURY HYPOID "SEPARATE CARRIER TYPE" (Continued)

being installed, and the drive pinion marking is the same as the old pinion, install original shims. However, a thicker shim pack is necessary if the number on the pinion is greater, or a thinner shim pack if the number is smaller. For instance, if the number on the old pinion was "15", and the number of the new pinion is "17", install a .002" thicker shim pack. Conversely, a .002" thinner shim pack should be used if the new pinion number is "13". If the old bearings are to be used, increase the shim pack thickness .002". If the old shims are not available, use a shim pack .030" to .032" thick (1954-55), .015" thick (1956) for a trial build-up. Install shim pack, then install pinion rear bearing. Install drive pinion assembly in carrier, install a new bearing spacer then install pinion front bearing. On all models, install oil slinger on top of front bearing and coat outer diameter of seal with thin coating of sealer. Drive seal into place with Tool 4676-A. Install universal joint flange with Tool 4858-P or E. Install flange washer and a new nut. Alternately turn pinion while tightening nut. *CAUTION - Do not damage spacer on drive pinion by over-tightening drive pinion nut.* If new drive pinion bearings and a new oil seal have been installed, tighten drive pinion nut until bearing preload is 22-28 inch pounds (1954-55), 18-24 inch pounds (1956) for new bearings, or 13-18 inch pounds (All) for used bearings.

Differential Case Reassembly-Install differential side gears, pinions, and thrust washers in differential case. Install pinion shaft and pinion shaft lock pin. Position ring gear on case and install the drive gear capscrews and tighten screws to 35-40 ft. lbs. Drive differential bearings on case hubs with Replacer Tool 4222-N or H, until they are flush with shoulder on case.

Installation-Place differential side bearing cups on bearings and position differential case assembly in carrier so the adjusting nuts will engage approximately the same amount of threads at each end of case. Thread adjusting nuts in carrier against bearing cups. Be sure that nut threads index with carrier threads. Carefully position the bearing caps on adjusting nuts, aligning marks made during disassembly. Be sure bearing cap threads index with adjusting nut threads. Install bearing cap bolts and tighten bolts until snug (final tightening will be made after ring gear and pinion tooth contact pattern is adjusted). Turn adjusting nuts while tightening bolts, to make sure threads are aligned. Back off the bolts ¼ turn to allow cups to move. Make sure the right hand adjusting nut is loose, then tighten the left hand nut (gear side of differential) until drive gear meshes with drive pinion. Feel the backlash as the nut is being tightened. Continue tightening the nut until no backlash is evident. Tighten the left hand nut two additional notches to properly seat and align the bearing cup. Loosen the nut until it just contacts the bearing cup when the backlash is zero. Tighten the right hand adjusting nut until it contacts the bearing cup, then tighten the right hand nut an additional 3 to 3½ notches to properly preload the differential side bearings. Tighten bearing caps to 75-80 ft. lbs. Install a dial indicator and measure the backlash in several locations (*CAUTION-If backlash readings vary more than .003", the runout of the gear is excessive*). The correct backlash is .003-.008". If not within limits, loosen bearing cap bolts ⅛ turn, and move drive gear and case assembly as required. To move the case assembly, loosen one adjusting nut one notch and tighten the other adjusting nut one notch.

Gear Tooth Contact-*(NOTE-New gear sets have a heavy-load tooth contact pattern rolled on the gear teeth with a special machine. When a new set of gears is installed, duplicate this pattern as closely as possible).* Paint gear teeth with a suitable gear marking compound, place a load on the pinion flange and turn drive gear back and forth until a clear contact pattern is obtained. Compare this pattern with the tooth patterns shown in Rear Axle Section of Manual. *CAUTION-Whenever the drive pinion position is changed a new bearing spacer must be used to establish the correct preload.*

Differential Carrier Installation: Place a new gasket on rear axle housing studs, then position carrier assembly on housing. Install axle ratio identification tag on one of the upper carrier studs. Install all stud nuts and tighten to 30-35 ft. lbs. Fill axle housing to a level of the filler plug hole with rear axle lubricant.

EDSEL, FORD, MERCURY "DEEP-OFFSET" HYPOID

Edsel (1958-60)
Ford Pass. Cars (1957-60)
Ford Thunderbird (1957-60)
Ford F-100 Truck (1957-60)
Mercury (1957-60)

▷CHANGES, CAUTIONS, CORRECTIONS

▷*1958 PINION OIL SEAL PRODUCTION CHANGE (To Reduce Squeal and Oil Leakage):* New 3" Oil Seal B8A-4676-B (Ford & Edsel), WAT-4676-B (Mercury) with related parts used in later production cars. Universal Joint Flange B8A-4851-A has smaller diameter dust deflector and can be used to service either 3" or 4 1/8" seals. *NOTE - DO NOT use Oil Flange Assembly WAA-4851-C with 3" seals.* New Drive Pinion Retainer B8A-4617-B; Seal B8A-4676-B (Ford & Edsel), WAT-4676-B (Mercury); Flange Assembly B8A-4851-A, can be used with both 3" and 4 1/8" seals.

▷*1958 REAR AXLE LUBRICANT LEAK CORRECTION:* Caused by leak around housing thread bolts. To correct, replace early type carrier bolts (No. OA-44044-A) with new bolt (AJ-44044-A) with larger head and apply non-hardening sealer to threads before installation.

▷*1958 MERCURY REAR AXLE PRODUCTION CHANGE (312" Eng.):* New Differential & Carrier Assembly (3.56-1 ratio) released for production (Std. & O.D.). New assembly has smaller side bearings, 6¾" ring gear and a rear axle drive pinion bumper. The new assembly will not be released for service.

▷*1959 MERCURY (WITH 383" & 430" Eng.) DIFFERENTIAL CARRIER & ADJUSTING UNIT PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A new differential carrier, Part No. B9AW-4017-A having .031" larger adjusting nuts is being used in production and can be used to service all 1957-59 models equipped with the large differential case side bearings. The new adjusting nut, Part No. B9MW-4067-A, is identified by the letter "L" stamped on it. Previous adjusting nuts were not stamped.

▷*1957-60 MERCURY REPLACEMENT RING GEAR NOTE:* Replacement ring gears now being furnished for service replacement are approximately ¼" larger in diameter than previous ring gears. If there is insufficient clearance in rear axle housing for the later type gear, grind off enough of housing at point of interference for installation of gear.

▷*1960 MERCURY REAR AXLE GRINDING NOISE AND/OR AXLE SHAFT SPLINE FAILURE CORRECTION:* If this condition is encountered, measure the distance between spring seat and backing plate flange on rear axle tube. The correct housing will measure 5½". If housing measures 6½", an incorrect housing is installed and must be replaced.

DESCRIPTION: Banjo type housing, semi-floating type with "deep-offset" straddle mounted drive pinion. A separate differential carrier assembly is used which can be removed for overhaul without removing rear axle assembly from car. Power Transfer Differential optional in 1958 on Edsel & Mercury.

AXLE SHAFT REPLACEMENT: Remove wheel and tire assembly and then remove nuts holding brake drum to axle flange. Remove brake drum. Working through holes in axle shaft flange, remove nuts attaching wheel bearing retainer. Pull axle assembly out of housing. (*NOTE* - Be careful not to dislodge brake plate - install one nut to hold brake plate in place after axle shaft is removed). To install, reverse removal procedure, tighten bearing retainer nuts to 30-35 ft. lbs.

Oil Seal & Wheel Bearing Replacement: Remove axle shaft from housing. Remove bearing inner retainer and bearing using Bearing Puller T57L-1225-P. Inspect machined surface of axle shaft and axle housing for rough spots which might affect sealing action of oil seal. Remove any burrs or rough spots. Press a new bearing on shaft using Tool T57L-1225-N, installed in an arbor press, until bearing is seated firmly against shoulder on shaft. Press bearing inner retainer on shaft with bearing installation tool until retainer seats firmly against bearing. Install oil seal.

REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model pages.*

OVERHAUL

DIFFERENTIAL CARRIER ASSEMBLY REMOVAL: *(NOTE - It is not necessary to remove complete rear axle assembly from car for overhaul).* Drain rear axle

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EDSEL, FORD, MERCURY "DEEP-OFFSET" HYPOID (C ntinu d)

assembly, then clean area around point where carrier and housing meet. Remove axle shafts, then remove nuts retaining carrier to axle housing. Remove carrier.

►*SPECIAL TOOL NOTE: Special tools listed below supplement the tools indicated in following text.*

1958 MODELS

Wheel Bearing Tools - Puller No. 1225-D (Edsel & Mercury), Installer No. 4234-4 (Mercury).
Differential Bearing Tools - Remover No. 4221-AH (Edsel), Installer No. 57L-4221-A (Ford), 4222-K (Mercury).
Pinion Bearing Tools - Remover & Installer No. 4625-K (Edsel). Installer No. 4625-K & KA (Mercury).
Pinion Fixture - No. 6005-CM (Edsel & Mercury)
Pinion Cone Remover - No. 4621-K (Edsel).
Pinion Cone Installer - No. T57L-4614A & T57L-4621-B (Ford), 4621-L (Edsel & Mercury).
Pinion Cup Remover - No. 4615-F (Edsel), JAW-4615-D-1 & 1202-D (Mercury).
Pinion Bearing Cup Installer - No. T57L-4614-A & Detail 2 (Ford), 4614 & 4615-E (Edsel).
Pinion Seal Installer - No. T57L-4614-A & T57L-4676-A (Ford), 4676-E (Edsel).
Pinion Bearing Installer - No. 4209-C & 4209-C-12 (Edsel & Mercury).

1959-60 MODELS

Rear Wheel Bearing Remover & Installer – Tool No 1225–C (Edsel Exc Sta Wgn), Tool No 1225–C (Edsel Sta Wgn & All Mercury Models) Tool No. 1225–P (Ford)

Differential Side Bearing Remover – Tool No 4221–C13 & 4221–AJ (Edsel), T57L–4220–A (Ford) 4221–AE & 4221–AF (Mercury Exc 312" Eng Models), 4421–AJ (Mercury 312" Eng Models)

Differential Side Bearing Installer – Tool No 4222–H (Edsel), T57L–4221–A (Ford) 4222–K (Mercury)

Pinion Pilot Bearing Remover – Tool No 4625–K (Edsel & Mercury), T57L–4625–A (Ford)

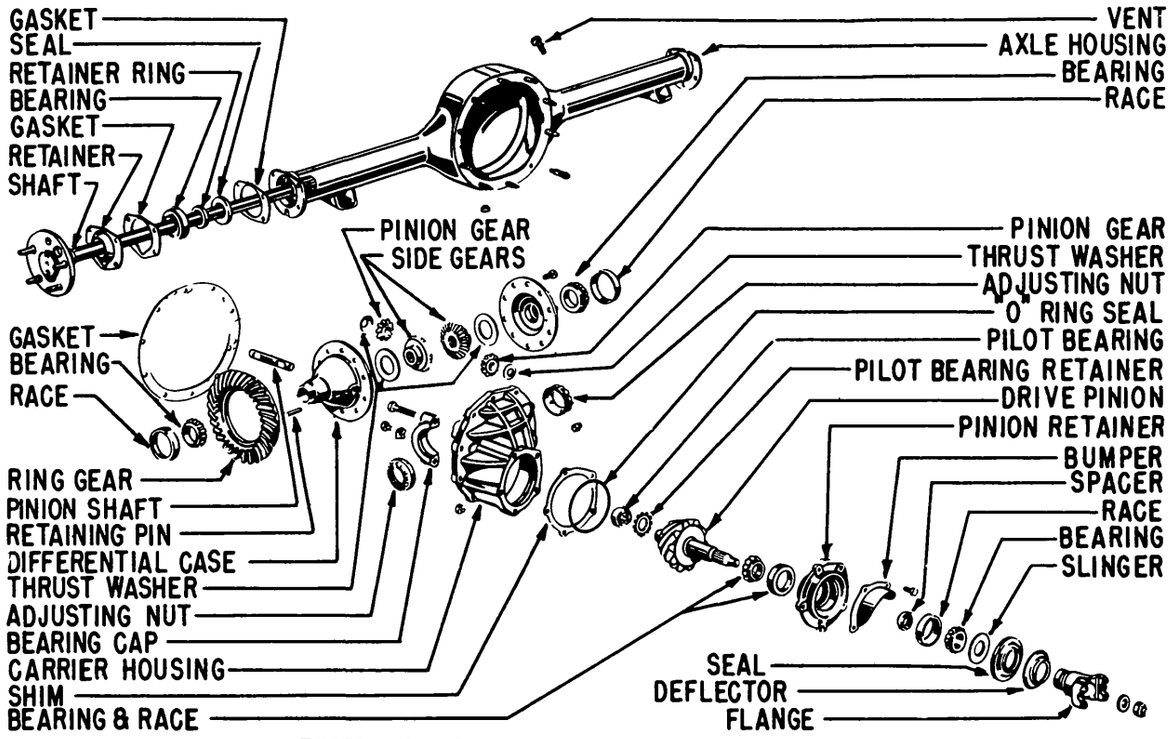
Pinion Pilot Bearing Installer – Tool No 4625–K & 4625–K–A (Edsel & Mercury), T57L–4626–A & T53L–200–A (Ford)

Pinion Preload Indicator – Tool No 4610–N & 4858–N (Ford), 4209C & 4209–C–12 (Edsel & Mercury)

Pinion Oil Seal Installer – Tool No 4676–F & 4614 (Edsel), T57L–4614–A & T57L–4676–A (Ford), 4676–F (Mercury)

Pinion Rear Bearing Cone Remover – Tool No 4621–K (Edsel & Mercury), CJ–951 (Ford)

Pinion Rear Bearing Cone Installer - Tool No 4621-L (Edsel & Mercury), T57L-4614-A (Ford)
Pinion Front Bearing Cup Remover – Tool No 4615–F & 4614 (Edsel), T57L–4616–A1 (Ford), JAW–4615–D–1–1202–D (Mercury).
Pinion Front Bearing Cup Installer – Tool No 4615–E & 4614 (Edsel), T57L–4612–A & Detail 2 (Ford), 4615–E (Mercury)
Rear Wheel Bearing Remover & Installer – Tool No 1225–C (Edsel, Exc Sta Wgn), 1225–D (Edsel Sta. Wgn & Mercury), 1225–P (Ford)
Rear Wheel Bearing Seal Installer – Tool No 1177 (Edsel, Exc Sta Wgn), 4245–B (Edsel Sta. Wgn & Mercury)



EDSEL, FORD & MERCURY REAR AXLE ASSEMBLY

►*1959-60 TIGHTENING TORQUE SPECIFICATION NOTE: Tightening specifications are different for these models as shown in following table*

Tightening Specifications

	Ft. Lbs.
Differential Bearing Capscrews	70–80
Diff Bearing Adjusting Nut Lock Bolts	15–20
Carrier-to-Housing Nuts	30–40
Pinion Retainer-to-Carrier	30–40
Drive Gear Attaching Capscrews	60–65
Rear Axle Shaft Bearing Retainer Nuts	30–35

DISASSEMBLY: *NOTE* - Before disassembling differential carrier, mount a dial indicator on carrier and check ring gear backlash which should be .004-.009". Check contact pattern on gear teeth (see "Gear Tooth Contact Pattern" below), and if found to be erratic, check runout of gear which should be .003" max. Loosen differential bearing cap bolts, then tighten them to 25 ft. lbs. Remove adjusting nut locks, then carefully loosen one of the adjusting nuts to determine if any differential bearing preload remains. If there is at least one notch of preload remaining, bearings may be reused if they are not pitted or damaged.

1) Mark one differential bearing cap and support to insure proper reassembly. Remove adjusting nut locks, bearing caps, and adjusting nuts. Remove differential assembly from carrier. If differential bearings are to be removed, use Tool T57L-4220-A (Ford), 4221-AE and 4221-C-13 (Mercury), to remove bearings.

2) Remove bolts attaching ring gear to differential case, then press gear from case or tap it off with a soft hammer. Using a drift, drive out differential pinion shaft retaining pin and separate the two-piece differential case. Drive out pinion shaft with a brass drift and remove gears and thrust washers.

3) Turn carrier case upright and remove the five bolts securing pinion retainer to carrier, then remove pinion retainer assembly. Remove pinion "O" ring seal from retainer, and remove pinion shim *(CAUTION - Be careful not to damage mounting surfaces of retainer and carrier)* Measure thickness of shim for reference at reassembly.

4) If pilot bearing is to be replaced, drive pilot bearing and retainer out with Tool T57L-4625-A and T53L-200-A (Ford), 4625-K (Mercury). Use the same tools to install bearing, driving it in until it bottoms. Install retainer, with concave side upward, using the same tools as for bearing installation *(CAUTION - Be careful not to crack bearing support when installing bearing and retainer)*

5) Mount pinion retainer assembly in Fixture T57L-500-A (Ford) and using Tool T57L-4851-B (Ford), 4851-G (Mercury), remove pinion shaft nut and washer Re-

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EDSEL, FORD, MERCURY "DEEP-OFFSET" HYPOID (C ntinued)

move universal joint flange, oil seal and slinger. Remove pinion retainer from fixture, place a protective sleeve (use a piece of hose or wrap with tape) on pinion pilot bearing surface, and press pinion shaft out of front bearing cone. Remove spacer. *CAUTION - Do not reuse this spacer.*

6) Install pinion shaft assembly in Tool T57L-4614-A and T57L-4621-A (Ford), 4621-K (Mercury), and press pinion out of rear bearing cone. *(NOTE - Do not remove pinion b aring cups from retainer unless cups or bearings are to be r placed).* If it is necessary to remove cups, press cup from retainer with Tool T57L-4616-A1 (Ford), or remove cups with Tool 4615-D (Mercury). To install cups, use same tools as for removal (Ford), press cups into position with Tool 4615-E (Mercury). *NOTE* - After cups installed, make sure they are solidly seated in retainer by attempting to insert a .0015" feeler between cup and bottom of bore in retainer.

INSPECTION: Clean all parts thoroughly with cleaning solvent. Oil bearings immediately to prevent rusting. Check pinion and ring gear teeth for scoring or signs of excessive wear. Check bearing cups for rings, scores or galling, or erratic wear pattern. Make sure cups are solidly seated in bores. Check bearing rollers for pits, scoring, or roughness. Install bearing caps temporarily and test the fit of adjusting nuts in their threads. Nuts should turn freely when caps are tightened to specifications. Face of adjusting nuts must be smooth and square. If necessary, polish with a fine abrasive on a flat surface. Check end of universal joint flange that contacts oil slinger. This surface must be smooth. Polish if necessary. Inspect pinion retainer for damage and make sure bearing cups are solidly seated. Clean burrs and chips from ring gear mounting flange. Clean grooves for "0" ring seal and clean all lubricant passages. Inspect carrier housing for damage, making sure threads are not damaged and that bearing bores are smooth. Remove nicks and burrs from mounting surfaces of carrier housing. Check bearing mounting hubs in differential for smoothness. Check fit of differential gears in counterbores. Inspect thrust surfaces for damage that might have occurred when bearing was removed.

REASSEMBLY: Diff r ntial Case *(NOTE - Lubricate all parts with r ar axl lubricant as they are assembled).* Place a side gear and thrust washer in differential case bore, then using a soft hammer, drive pinion shaft into case only far enough to retain a pinion thrust washer and pinion gear. Place second pinion and thrust washer in position, then drive pinion shaft into place, being careful to line up pinion shaft retainer holes. Place second side gear and thrust washer in position and install cover of differential case. Install pinion shaft retainer pin. *(NOTE* - Check for free operation of the assembly by inserting a pinion or axle shaft spline in side gear spline, and rotating the assembly). Insert two 7/16" x 2" (N.F.) bolts through differential flange and thread them three or four turns into ring gear as a guide in aligning ring gear bolt holes. Press or tap ring gear into position. Install and tighten ring gear attaching bolts evenly and alternately across gear to 60-65 ft. lbs. If differential bearings have been removed, press them on hubs using Tool T57L-4221-A (Ford), 4222-K (Mercury).

Pini n & Retain r: Install pinion rear bearing cone on pinion shaft using Tool T57L-4614-A and T57L-4621-B (Ford), 4621-L (Mercury), then install a new spacer on shaft. Place bearing retainer on shaft and install front bearing cone, pressing it into place with same tools used for rear cone *(CAUTION - As bearing is pressed into position, rock pinion retainer. Do not press bearing on shaft until all "play" is removed between pinion retainer and bearings as spacer may be compressed too much).* Lubricate both bearings with rear axle lubricant. Place slinger in position, coat outside of new oil seal with an oil resistant sealer and press seal into bearing retainer using Tool T57L-4676-A (Ford), 4676-C (Mercury). *(NOTE - It is not necessary to soak a new Ford or Mercury seal in oil before installation as they are prepared at the factory for immediate installation).* Install universal joint flange and flat washer. Start pinion shaft nut. Adjust pinion bearing preload (see below). *(NOTE - If a new ring gear and pinion, or rear axle assembly housing is being installed, or the tooth contact pattern is not correct, see "Pinion Setting" and "Tooth Contact Pattern" below before further reassembly).*

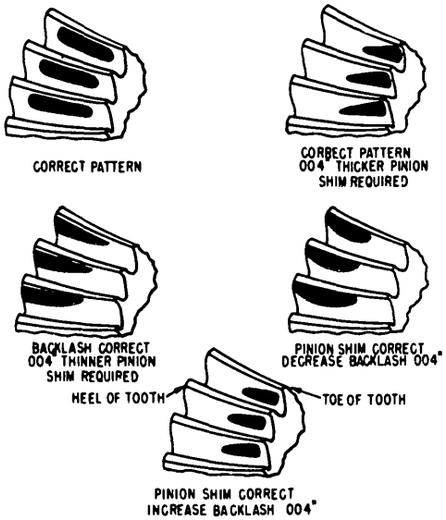
Carrier Assembly: 1) Lubricate the "0" ring seal with rear axle lubricant and install it in its groove in pinion retainer being careful not to twist the seal. Place correct shim on carrier and install pinion and retainer assembly. Install pinion bumper and retainer bolts and tighten bolts to 35-40 ft. lbs.

2) Wipe a thin coating of lubricant on bearing bores. Place cups on the bearings and set differential case in carrier. Slide the assembly along bores until a slight amount of backlash is felt between gear teeth. Set adjusting nuts in bores so they just contact bearing cups *(NOTE - Each cup should be engaging approximately the same number of threads).* Carefully position bearing caps on carrier, matching the marks made at disassembly. Install bearing cap bolts and tighten alternately to 75-80 ft. lbs. Adjust gear backlash (see below). Install adjusting nut locks and tighten to 12-15 ft. lbs.

DIFFERENTIAL CARRIER ASSEMBLY INSTALLATION: Install carrier assembly in rear axle housing and tighten attaching nuts to 35-40 ft. lbs. Install axle shafts *(CAUTION* - Axle shafts are not the same length and are not interchangeable), wheels, and tires. Fill axle assembly with lubricant until level with filler plug hole.

PINION BEARING PRELOAD ADJUSTMENT: Hold retainer flange and tighten pinion shaft nut until the torque required to turn pinion shaft, as determined by Torque Indicator 4610-N and 4858-N (Ford), 4209 (Mercury), is 8-12 **inch pounds** (used bearings), 17-27 **inch pounds** (new bearings). *(NOTE - A minimum tightening torque of 175 ft. lbs. should be required on pinion shaft nut in order to obtain correct pinion bearing preload).*

PINION SETTING (Shim Selection): *(NOTE* - Differential carrier assemblies are manufactured to require a .015" pinion setting shim. If a new carrier assembly is being built up, a .015" shim should be used tentatively, and then adjusted in relation to tooth contact pattern). Adjusting shims are available in .010" to .021" thicknesses in steps of .001". Matching marks are placed on edge of



TYPICAL GEAR TOOTH PATTERN (DRIVE SIDE)

ring gear and on face of pinion gear *(CAUTION - Mak sure that both ring gear and pinion have the same matching marks, usually a three digit numeral).* A plus (+) or minus (−) digit, or an "0" (indicating a standard pinion gear) is placed on the pinion gear following the matching number to indicate pinion setting shim requirements as follows: A minus (−) number means that the pinion should be moved closer to the ring gear, and a thinner shim is required. A plus (+) number means the pinion should be moved farther from ring gear, and a thicker shim is required. A pinion marked zero (0) is a standard pinion. To select a shim, measure original shim with a micrometer. Then note dimensional mark on original pinion. Compare the mark on original pinion with mark on new pinion to determine how the original shim should be modified (Example: Original shim is .015", original pinion is marked −1, and new pinion is marked +1. The new pinion would require a .002" thicker shim. Therefore a .017" shim must be used). If new pinion is marked the same as the old pinion, no shim change is required.

GEAR BACKLASH ADJUSTMENT: With differential case installed in carrier, and with adjusting nuts, bearing caps, and bearings in place (see "Carrier Assembly" above), loosen the bearing cap bolts from a fully tightened position, then tighten them to only 20 ft. lbs. before making adjustments. Loosen adjusting nut on pinion gear (right hand) side until it is away from cup. Tighten nut on ring gear side (left hand) until the ring gear is just forced into pinion with no backlash (recheck right hand nut to make sure it is still loose). Tighten the right hand nut two notches beyond the position where it first contacts the bearing cup. Rotate ring gear several revolutions in each direction while the bearings are loaded, to seat bearings in cups *(CAUTION - This step is very important to insur prop r s ating of bearings).* Again loosen right hand nut to release the preload. If there is

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EDSEL, FORD, MERCURY "DEEP-OFFSET" HYPOID (C ntinu d)

any backlash between gears, tighten left hand nut just enough to remove this backlash. Carefully tighten right hand nut until it just contacts bearing cup, and continue to tighten 2½ to 3 notches. Install dial indicator on carrier so that contact tip of indicator bears against face of a gear tooth on outer diameter of ring gear. Measure backlash which should be .004-.009". Repeat this measurement at several other teeth around ring gear. If measurements vary more than .003", there is excessive runout in gear or mounting. If backlash is not within specification of .004-.009", loosen one adjusting nut and tighten opposite nut an equal amount to move ring gear away from or toward pinion. *(NOTE - When moving the adjusting nuts, the final movement should always be made in a tightening direction. For example, if left hand nut had to be loosened one notch, loosen the nut two notches, then tighten it one notch).*

GEAR TOOTH CONTACT PATTERN: With completed carrier assembly mounted in a holding fixture, coat gear teeth with a suitable gear marking compound such as red lead and oil. Wrap a cloth around drive pinion to act as a brake, then rotate ring gear back and forth until a clear pattern is obtained. If tooth pattern is not correct, as indicated in the tooth pattern illustration, make the necessary adjustments for backlash and pinion position. *(NOTE - Tooth patterns in th illustrati n ar typical and are not characteristic of any n gear).*

EDSEL, FORD, MERCURY EQUA-LOCK DIFFERENTIAL

Edsel All Models (1958-60)
Ford Pass. Cars (1959-60)
Mercury All Models (1958)

►*WHEEL BALANCING CAUTION:* Do not use on-the-car type wheel balancers on models equipped with this type differential.

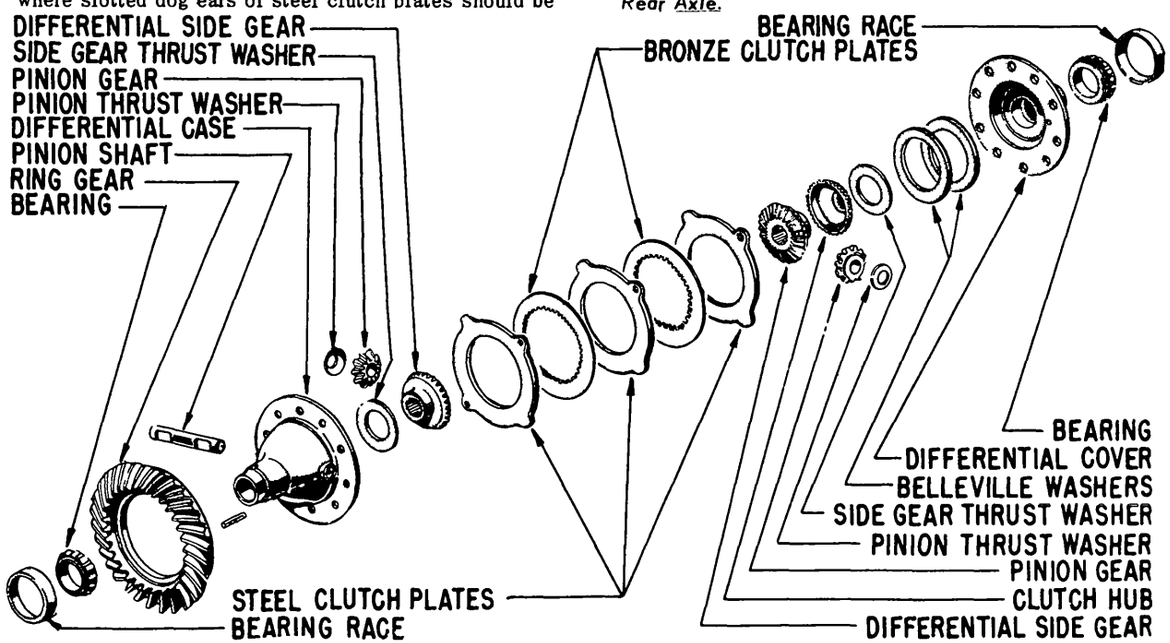
DESCRIPTION: Constant friction type differential assembly having three steel clutch plates locked into the differential cover, and two bronze bonded clutch plates splined to a clutch hub which, in turn, is splined to the left hand axle shaft. Two belleville spring washers maintain a constant pressure between the steel and bonded plates so that clutch is always engaged. The pressure of the clutch plates opposes differential action at all times. When the car is turned the clutch slips, allowing normal differential action to take place. With one wheel on a low traction surface, friction between clutch plates will transfer a portion of usable torque to the wheel with most traction, thus the wheel on the low traction surface will have a tendency to operate with opposite wheel in a combined driving effort.

►*REAR AXLE ASSEMBLY OVERHAUL NOTE:* Except for disassembly and reassembly of differential case, overhaul procedures are the same as for the standard axle. *See "Ford (Deep-Offset) Hypoid" Rear Axle.*

DISASSEMBLY: With differential assembly removed from rear axle housing, mark ring gear, differential case, and differential cover with paint or a scribed line to insure reassembly of all parts in the same position. Remove differential side bearings with a suitable puller. Alternately loosen bolts attaching ring gear to differential case until spring pressure has been decreased enough to prevent stripping threads from capscrews. *NOTE - A Hydraulic press may be used to reduce spring tension while capscrews are being removed. Apply approximately one ton pressure between case hubs and remove ring gear capscrews.* Remove cover from carrier, then remove ring gear. Remove steel dog-eared clutch plates and bonded clutch plates from cover. Remove two bellville spring washers, then remove differential clutch hub, side gear and thrust washer. Drive out differential pinion shaft lock pin, then drive out pinion shaft and remove gears and thrust washers.

INSPECTION: Check clutch plates for uneven or extreme wear. Dog-eared clutch plates must be free of nicks, scratches or burrs. Internally splined clutch plates should be checked for condition of bonding material and wear. Replace bonded plates if thickness is less than .085" or if material is scored or badly worn. Examine all thrust surfaces and hubs for wear. Inspect belleville washers for proper bevel. Free height should be .258".

REASSEMBLY: *NOTE - When reassembling differential, lubricate all parts liberally with Ford Lubricant, Part No. B9A-19580-A as they are installed.* Install side gear and thrust washer in differential case, then using a soft hammer, drive pinion shaft into case far enough to retain a pinion thrust washer and pinion gear. Place the second pinion and thrust washer in position and drive pinion shaft into place. *CAUTION - Carefully line up pinion shaft retainer holes.* Install pinion shaft retainer making sure it does not extend beyond machined surface of case. Insert two 2" x 7/16" (N.F. Threads) bolts through differential flange and thread them three or four turns into ring gear as a guide to aligning ring gear bolt holes. Press or tap ring gear into position. Clamp differential case in soft jawed vise, then install the second differential side gear on differential pinion gears and install clutch hub on side gear. Install thrust washer on clutch hub. Insert two 3/16" x 2" dowel pins into differential case (holes are provided at points where slotted dog ears of steel clutch plates should be located), then place a steel plate on differential case so slots in dog ears straddle dowel pins. Place a bonded plate on steel plate, making sure that inner splines of plate engage hub spline. Assemble remaining plates: a steel plate, a bonded plate, and finally a steel plate. Place two bellville springs on the top steel plate (concave side of washers should be down). Install differential case cover over dowel pins onto differential case, then start the ring gear bolts. Tighten bolts evenly and alternately across diameter of ring gear to compress springs and pull cover and differential case together. Tighten differential case-to-ring gear bolts to 65-75 ft. lbs., then remove aligning dowel pins. Install Tool T59P-4204-A1 and T59L-4204-A2 (Ford), Tool 44211 and 44211-A (Edsel in differential side gear splines and mount the complete assembly in a vise. Use a torque wrench and check torque required to rotate one side gear while the other is being held. The torque required to keep it turning should be 155-195 ft. lbs. If torque is not within these limits, check for improper reassembly. Complete reassembly of rear axle, *see "Edsel, Ford, Mercury (Deep Offset) Hypoid" Rear Axle.*



EDSEL, FORD & MERCURY EQUA-LOCK DIFFERENTIAL ASSEMBLY

Form 51 A

FORD TRUCK HYPOID "SPLIT HOUSING" TYPE

F-250 All Models (1954-Early 1955)
F-350 Parcel Delivery (1954-Early 1955)

►*NOTE:* "Ford, Lincoln, Mercury Hypoid (Integral Carrier)" Rear Axle used beginning Late 1955.

DESCRIPTION: Full-floating hypoid gear type with Hotchkiss drive. Axle housing is of split type, each half consisting of a steel tube riveted into a cast housing. Rear spring seats are welded to tops of axle housing tubes. Outer ends of tubes are machined for installation of wheel bearings and are threaded for installation of wheel bearing adjusting nuts. Flanges, forged integral with housing tubes, provide facilities for installation of brake carrier plates. Differential side bearing cups are pressed into machined bores in axle housing. Differential case is single piece type with two pinion gears.

REMOVAL OF AXLE: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: This work can be done without removing wheels and hubs, as follows:

Axle Shaft Removal—Drain lubricant from housing, remove axle shaft stud nuts and washers. Tap center of axle shaft flange to loosen tapered dowels, and remove the dowels. Remove axle shaft and gasket from housing.

Axle Shaft Installation—Install brake carrier plate, then hub and drum assembly, place new gasket on hub. Insert axle shaft in housing, lining up shaft splines with differential side gear splines. Install tapered dowels, lockwashers, and nuts on studs. Tighten nuts to 50-70 ft. lbs. torque.

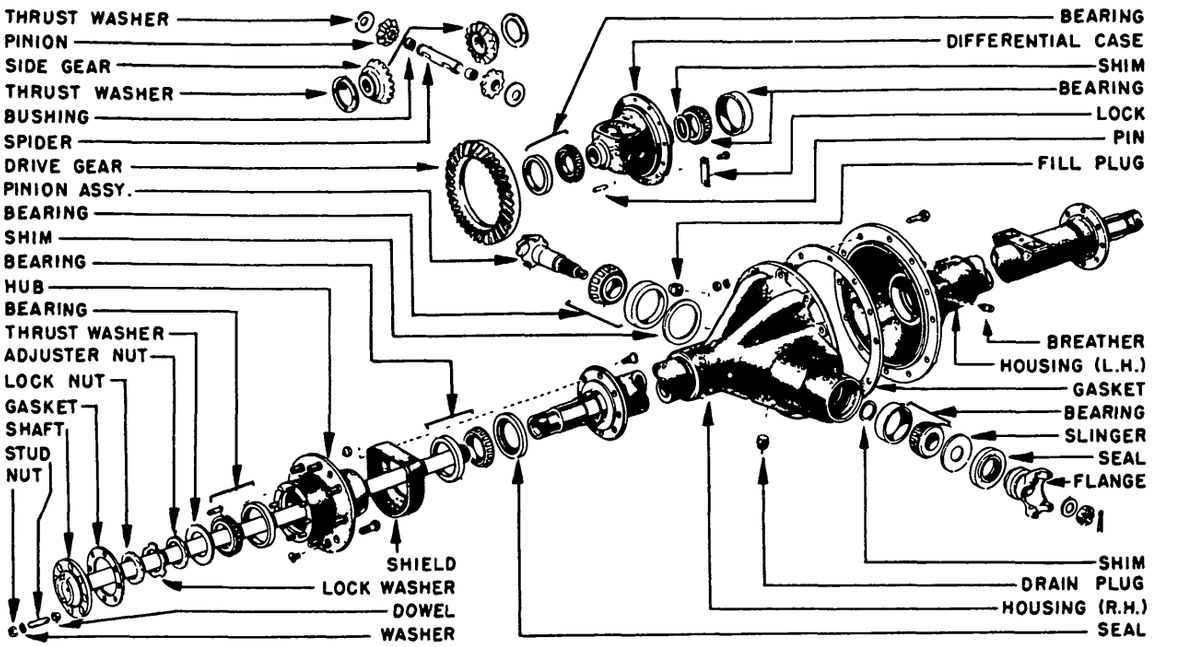
Wheel Bearing Adjustment—Remove axle shaft (above), bearing locknut and washer. Tighten wheel bearing adjusting nut while rotating wheel back and forth, until a noticeable drag is felt, then back off adjusting nut ⅛ turn. Install bearing lock washer and locknut, and bend one tab of lock washer over adjusting nut and one tab over locknut. Install axle shafts.

OVERHAUL: Before disassembling axle, check drive gear backlash and record the reading for reference when reassembling axle. *See "Backlash Checking & Adjusting (below).*

Disassembly: Remove wheels, axle shafts (see "Axle Shaft Removal" above). Remove hub and drum assemblies and brake backing plates.

Differential Removal—Insert a piece of pipe slightly smaller than axle shaft splines, approximately two-thirds way through housing from the differential case side to prevent differential assembly from dropping. Remove nuts, washers, and bolts securing the two halves of axle housing together, and separate the axle housing. Remove differential assembly and pipe from housing. Remove differential side bearing cups from housing with Tool T53T-4222-A.

Differential Disassembly—Mark ring gear and differential case to insure reassembly in same position. Remove bolts and lock plate holding ring gear to differential case and remove the gear. Remove lock pin securing spider shaft in differential case with a long pin punch, then remove spider shaft, pinions, side gears and thrust washers. Remove differential side bearings with Tool T53T-4242-F (Be sure the side bearing cups are clamped in place over bearings when using the tool). Remove side bearing shims.



FORD TRUCK "SPLIT HOUSING" HYPOID AXLE

Drive Pinion Disassembly—Remove drive pinion shaft cotter pin. Hold universal joint with Tool T53T-4851-E, and remove nut and washer from drive pinion shaft. Remove flange from drive pinion shaft with Tool T53T-4851-A. Remove drive pinion from axle housing by rotating shaft while driving it from housing with a soft hammer. Remove drive pinion oil seal, oil slinger, and drive pinion outer bearing from housing. Remove outer bearing cup with Tool T53T-4621-A. Tap inner bearing cup and adjusting shims from axle housing with a soft drift. CAUTION—Measure and note thickness of shims found behind inner bearing cup. Remove the pinion bearing shims from pinion shaft, then press inner bearing from shaft with Tool T53T-4629-A.

Reassembly & Adjustment: Inspect gear teeth, bearings and bearing cups for signs of galling, pitting or wear, and replace any parts found to be defective. Clean all parts and blow dry with air.

Differential Reassembly—Lubricate all differential parts with gear lubricant, then position the thrust washers and pinion gears in case, and install differential side gears and differential spider. Install the lock pin that secures spider to differential case, and stake the lock pin in place. Align the marks (made at disassembly) on drive gear and differential case, then position drive gear on case. Be sure drive gear is properly seated, then install bolts and lock plates securing gear to case. Tighten bolts to 40-50 ft. lbs. torque. Press differential side gears on case with Tool T53T-4221-A, and arbor press. *(CAUTION—Do not install bearing shims at this time).* Install differential side bearing cups in each half of axle housing, using Tool T53T-4242-B (left side), and Tool T53T-4242-A (right side).

Differential Side Bearing Preload Adjustment—Position differential assembly in housing, using a piece of pipe to support assembly. Place new axle housing gasket on housing flange, then bring housing halves together. Install alternate housing bolts, washers, and nuts, and tighten bolts to 20-26 ft. lbs. Install a dial indicator on left-hand axle housing so that indicator stem enters access hole and contacts back face of drive gear. Push drive gear from side to side to check differential endplay. Rotate drive gear to several positions, and check endplay at each position. Remove differential from housing, and add shims behind side bearings necessary to bring differential preload within range .001-.005" (.003" preferred). *(NOTE*—Shim thickness should be equal to endplay plus .003".) Split shim pack equally and install shims behind both side bearings. Install differential in axle housing, and tighten alternate bolts to 20-26 ft. lbs. Install dial indicator stem against back face of drive gear. Rotate drive gear and recheck the runout. Maximum drive gear runout is .005".

Drive Pinion Assembly—Press the inner bearing on drive pinion shaft, using Tool 4615-A and arbor press.

Drive Pinion Installation—Position the original

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FORD TRUCK HYPOID "SPLIT HOUSING" (C nt.)

shims in axle housing, then install inner and outer bearing cups with Tool T53T-4616-A. Install shims on pinion shaft, then position pinion in axle housing. Install outer bearing on pinion shaft with Tool T53T-4261-A. Install universal joint flange with Tool T53T-4851-B. Hold flange with holding tool, then install flange nut and washers. Tighten nut to 200-250 ft. lbs. torque.

Pinion Bearing Preload Check—(With Differential Assembly Removed). Wrap a heavy twine several turns around shank of companion flange and attach scale Tool 6110-A. By pulling horizontally on scale check torque required to rotate assembly. If torque is not within 12 to 18 inch pounds, remove pinion shaft and add or remove shims from pinion shaft to bring torque within specified limits. Removing shims INCREASES torque, adding shims DECREASES torque. Reassemble pinion and recheck preload.

Differential Installation & Adjustment—Paint 12 drive gear teeth with red lead.. Insert pipe, used in axle disassembly, through housing half, then position differential assembly in housing. Install axle housing gasket, and bring both housing halves together. Install alternate bolts and nuts, then tighten bolts to 20-26 ft. lbs. torque. Install a dial indicator so contact arm rests against pinion shaft companion flange (on long side, opposite center of bolt hole) and check backlash between drive gear and drive pinion teeth. Rotate companion flange away from indicator until contact between gear teeth is felt. Set dial indicator at zero, rotate the flange against contact stem until all backlash is removed, then note reading on indicator. This reading will be exactly 1½ times the amount of backlash between gears. The correct lash is .008-.013" (dial indicator will read .012-.020"). If backlash is not within limits, add or remove shims behind pinion inner bearing cup until correct backlash is obtained.

Check Gear Tooth Contact—Insert axle shafts in housing. Hold axle shaft to impose a load on the gears, and turn universal joint flange several times in both directions to obtain tooth pattern. Disassemble axle and check tooth contact pattern (pattern should be fairly well centered on tooth, and slightly toward inner diameter, with ends of tooth not indicating a contact pattern). Add or remove shims from behind drive pinion inner bearing cup to correct depth for proper tooth pattern (CAUTION—Add or Remove the same amount of shims from pinion shaft outer bearing so pinion bearing preload will not change). When correct tooth pattern obtained, install remaining bolts, washers and nuts, and tighten nuts to 20-26 ft. lbs.

Drive Pinion Oil Seal Installation—Remove the universal joint flange after completing preload, ring gear tooth pattern, and backlash checks. Place oil slinger on pinion shaft, then install drive pinion oil seal with Tool T53T-4676-A. Install flange, washer and nut and tighten nut to 200-250 ft. lbs. torque. Install cotter pin.

FORD TRUCK HEAVY DUTY "SPLIT HOUSING" HYPOID

F-350, Exc. Parcel Delivery (1954-55)

DESCRIPTION: Hypoid gear type with full floating axles and Hotchkiss drive.

REMOVAL OF AXLE: *See "Rear Axle" on car model page.*

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: It is not necessary to remove wheels and hubs.

Axle Shafts—Remove axle shaft stud nuts and lock washers. Turn two shaft pulling bolts (located between stud hole) in evenly to loosen axle shaft from hub. Tap axle shaft in center of flange to loosen dowels and remove dowels. Pull shaft from housing. To install, place new gasket on hub and install axle shaft in housing, rotating axle to line up spline with splines in side gears. Install tapered dowels, lock washers and nuts on studs and tighten to 50-70 ft. lbs.

Wheel Bearing Adjustment—Remove axle shaft (above) bearing lock nut and lock washer. Tighten wheel bearing adjusting nut while rotating wheel back and forth, until a noticeable drag is felt. Back off adjusting nut ⅛ turn. Install bearing lock washer (NOTE—If adjusting nut is equipped with a dowel, make sure lock washer fits over dowel). Install bearing lock nut and tighten. If flange type lock washer is used, bend one flange over adjusting nut and one over lock nut. Install axle shafts.

Wheel Bearing Assembly—To disassemble, remove axle shaft, adjusting locknut, washer and adjusting nut. Remove wheel hub. Tap out inner bearing cone and grease retainer. Bearing races may be tapped out, using a brass drift. To re-assemble, install inner bearing race and bearing cone, install oil seal. Install outer race and bearing cone. Install axle on hub and adjust bearings (see above).

RING GEAR BACKLASH: .006-.012". Adjustment by shims behind bearing cups in axle housing.

OVERHAUL OF REAR AXLE ASSEMBLY:

Disassembly: Remove axle shafts and wheel hubs. Insert a length of pipe slightly smaller than axle shaft in left axle tube (facing front of truck) so as to engage differential case to prevent it dropping. Remove nuts and bolts from housing and separate it. Remove differential assembly, and pipe from housing.

Differential Disassembly—Mark differential case halves with a punch. Cut lock wires, remove nuts and separate case. Remove spider, pinions, side gears and thrust washers. Remove differential bearings using Tool 4221-K. Centerpunch rivet heads and drill through heads with a drill 1/32" smaller than rivet body. Press rivets out and remove ring gear. Using a suitable puller, remove bearing cups from each side of axle housing. *(CAUTION*—Keep spacers found behind each cup together, and wire them to their respective axle housing half).

Drive Pinion Cage Assembly Removal—Hold universal joint flange with Tool 4851, and remove nut and washer from pinion shaft. Use a suitable puller and remove universal joint flange. Remove drive pinion bearing cover and oil seal assembly. Remove drive pinion and cage assembly, using puller screws in holes provided in cage.

►*CAUTION—Do not drive pinion from inner end as this will damage bearing lock ring groove.*

Drive Pinion and Cage Disassembly—Tap or press drive pinion from cage assembly. Remove outer bearing from cage and remove spacer or spacer combination from pinion. On F-350 Trucks, remove drive pinion rear bearing with Tool T53T-4242-F, then remove pilot bearing snap ring from inner end of drive pinion. Position pinion in press and remove pilot bearing.

Reassembly of Rear Axle:

Drive Pinion Cage Reassembly—Press pilot bearing on end of pinion shaft, using a sleeve to apply pressure evenly to bearing inner race. Install snap ring and press into groove securely. Install bearing cups in bearing cage and press to seat them on cage shoulders. Lubricate bearings and cups with light oil and install rear bearing on pinion shank and insert drive pinion and bearing assembly in bearing cage. Install spacer or spacer combination on pinion shank and press front bearing firmly against spacer.

Drive Pinion Bearing Pre-Load Check—Install a sleeve on drive pinion shank that will apply pressure to pinion bearing inner race. Place pinion and cage assembly in a press and apply 25,000 lbs. pressure on the bearing. Wrap a soft wire around the cage and attach a pound-pull scale to wire. Pull on the scale on a horizontal line. It should require 12-18 inch lbs. to keep the cage rotating. If rotating torque is not between 12-18 inch lbs., install a thinner spacer to increase or a thicker spacer to decrease the pre-load. If a press is not available, the yoke may be installed and the pinion nut tightened to 300-400 ft. lbs., for checking the pre-load. After preload is checked and is satisfactory, install new oil seal in drive pinion bearing cover, using Tool 1175-D (F-6). Tool T53T-4676-B (F-350). *(NOTE—Soak new seal in oil at least one-half hour before installing).* Install drive pinion bearing cover, yoke, nut, and washer. Tighten nut to 300-400 ft. lbs. and install cotter pin.

Differential Reassembly—Position ring gear on case, making sure it is tight on case pilot. Install rivets and upset them cold. Head should be ⅛" larger than rivet hole, after forming Formed head of rivet should be at least 1/16" smaller in diameter than performed head. Excess pressure will distort case and result in gear eccentricity. Lubricate all parts with gear lubricant. Position a thrust washer and side gear in ring gear half of differential case assembly. Place spider with the pinions and thrust washers in position on the side gear. Install remain-

CONTINUED ON NEXT PA E

FORD TRUCK HEAVY DUTY "SPLIT HOUSING" (C ntinu d)

ing side gear and thrust washer. Align marks on each half of case and place two halves together. Install the bolts and nuts and tighten to 80-110 ft. lbs. Lock nuts with lock wire. Install differential case bearings, using a press or suitable driver.

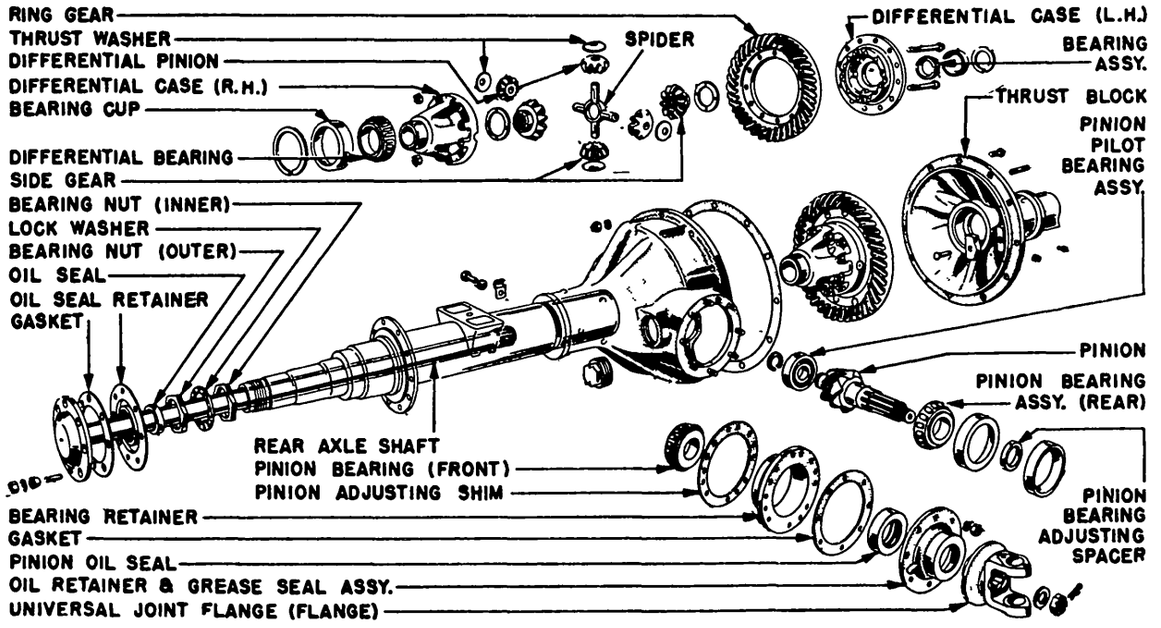
Differential Bearing Pre-Load Adjustment—Remove thrust block from housing. Install differential bearing cups and spacers in their original position in differential housing. *(CAUTION—Install spacers with chamfered edge toward machined surface in housing).* Insert pipe used in disassembly through the housing half. Place differential and gear assembly over the pipe and slide assembly into position in housing. Install new flange gasket and position the other half of housing half in place and secure the two halves together with 6 bolts evenly spaced. Install dial indicator on housing so that dial shaft extends through thrust block pin hole and contacts ring gear. Using two screw drivers, check differential assembly end play. Should be 0.000-0.005".

NOTE—Both the differential bearing pre-load and gear lash ar controlled by selective spacers, available in .004" thickness, which are installed between bearing cups and axle housing halves).

It is necessary to separate the housing halves and remove the differential bearing cups each time spacer thickness is changed. The gear may be moved toward the pinion, to decrease gear lash, by decreasing spacer thickness in case half and increasing spacer thickness in cover half. Reversing this procedure will move gear away from pinion to increase gear lash. (IMPORTANT—Increase or decrease thickness of spacer used in COVER half of housing to obtain a free rotating gear with from .000-.005" end play. AFTER END PLAY HAS BEEN ESTABLISHED, add spacer to equal .008" PLUS THE END PLAY). After endplay has been established, separate axle housing and move differential assembly out on support far enough to permit installation of drive pinion and cage assembly. Install the thrust block.

Pinion Cage Installation—Position drive pinion and cage assembly on rear axle housing studs and tap cage into place with soft hammer. Install lock washers and stud nuts or capscrews. Tighten to 70-90 ft. lbs. (F-6). 25-30 ft. lbs. (F-350).

Gear Backlash Check—After correct preload has been established, install six bolts evenly spaced in housing and tighten to 85-95 ft. lbs. Install a dial indicator so indicator shaft will rest on one side of universal joint yoke approximately 2" from centerline of pinion shaft. Check movement for backlash. The amount indicated at this point will be double the actual amount. Shift the spacer used in back of the differential bearing cups in axle housing, DECREASING the thickness of spacer used, on side TOWARD which gear is to be moved, and increasing the thickness of the opposite spacer EXACTLY the same amount as required to obtain a backlash of .006-.012" (dial will read .012-.024"). After correct backlash is obtained, install remaining housing bolts and tighten to 85-95 ft. lbs.



FORD TRUCK HEAVY DUTY "SPLIT HOUSING" HYPOID AXLE

1954-55 FORD TRUCK HYPOID "BANJO HOUSING" TYPE

Ford Truck, 500 & 600 Series (1954-55)

►*NOTE—Different axle assemblies used for each series. Except for minor structural differences and variation in size of parts; the two axle assemblies are identical. The service procedures apply to both assemblies unless otherwise noted.*

DESCRIPTION: Full-floating, hypoid gear type with Banjo Type housing and Hotchkiss drive.

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: This work can be done without removing wheels and hubs, as follows:

Axle Shafts—Drain lubricant from housing, then remove axle shaft stud nuts and washers. Tap center of axle shaft flange to loosen tapered dowels, and remove the dowels. Remove axle shaft and gasket from housing. To install, place new gasket on hub and install axle shaft in housing, rotating axle to line up axle splines with splines in gear. Install tapered dowels, lock washers, and nuts on studs and tighten to 50-70 ft. lbs torque.

Wheel Bearing Adjustment—Remove axle shaft (above), bearing locknut and washer. Tighten wheel bearing adjusting nut while rotating wheel back and forth, until a noticeable drag is felt, then back off adjusting nut ⅛ turn. Install bearing lock washer and lock nut, and bend one tab of lock washer over adjusting nut and one tab over locknut. Install axle shafts.

►*OVERHAUL NOTE—Axle assemblies are different for the F-500 & F-600 Trucks, in parts sizes and structural variation.*

OVERHAUL (1954-55 500 SERIES, 1954 600 SERIES): The following service procedures apply to both series trucks except where noted. *See "Overhaul (1955-600 Series)" below for differences which apply to the lat r 600 Series Rear Axle.*

Disassembly: Remove wheels, axle shafts (see "Axle Shaft Removal" above). Remove hub and drum assemblies and brake backing plates.

Differential Carrier Removal—Support carrier assembly with a roller jack and remove carrier-to-housing nuts and lockwashers. Tighten the puller screws provided in carrier, until carrier is loosened from housing. Carefully withdraw carrier assembly from axle housing, then back off puller screws. Remove and discard axle housing gasket. Position carrier in transmission stand or on open end of oil drum, for further work.

Differential Carrier Disassembly—Loosen thrust block screw (used on Series F-500 only), then back out thrust screw to provide clearance between thrust block and ring gear, when differential is removed. Mark differential bearing caps and carrier legs to insure reassembly in same position. Remove the adjuster locks, bearing cap bolts and caps. Remove side bearing adjuster, then lift differential assembly out of carrier. Remove ring gear thrust block from carrier.

Differential Disassembly—Clamp assembly in a vise equipped with brass jaws, then remove differential side bearings. *(CAUTION—Make sure bearing cap is clamped tightly on bearing)* with Tool T53T-4242-F. Mark the differential case halves with a punch to insure aligning case when reassembling. Cut the

CONTINUED ON NEXT PAGE

1954-55 FORD TRUCK HYPOID "BANJO HOUSING" TYPE

lock wires and remove differential case bolts and nuts (F-600), or cap screws (F-500). Separate case halves, using a brass hammer if necessary, then remove side gears, spider, pinions and thrust washers. Center punch the drive gear rivet heads and then drill through the rivet heads using a drill 1/32" smaller than rivet body. Press out the rivets, then tap drive gear off case with a soft hammer.

Drive Pinion Removal—Hold universal joint flange with Tool T53T-4851-E, then remove cotter pin, nut and washer from drive pinion shaft. Remove flange with Tool T53T-4851-A. Remove nuts or bolts and lockwashers attaching oil seal retainer and pinion bearing sleeve to differential carrier. Remove pinion and sleeve from carrier with a soft hammer.

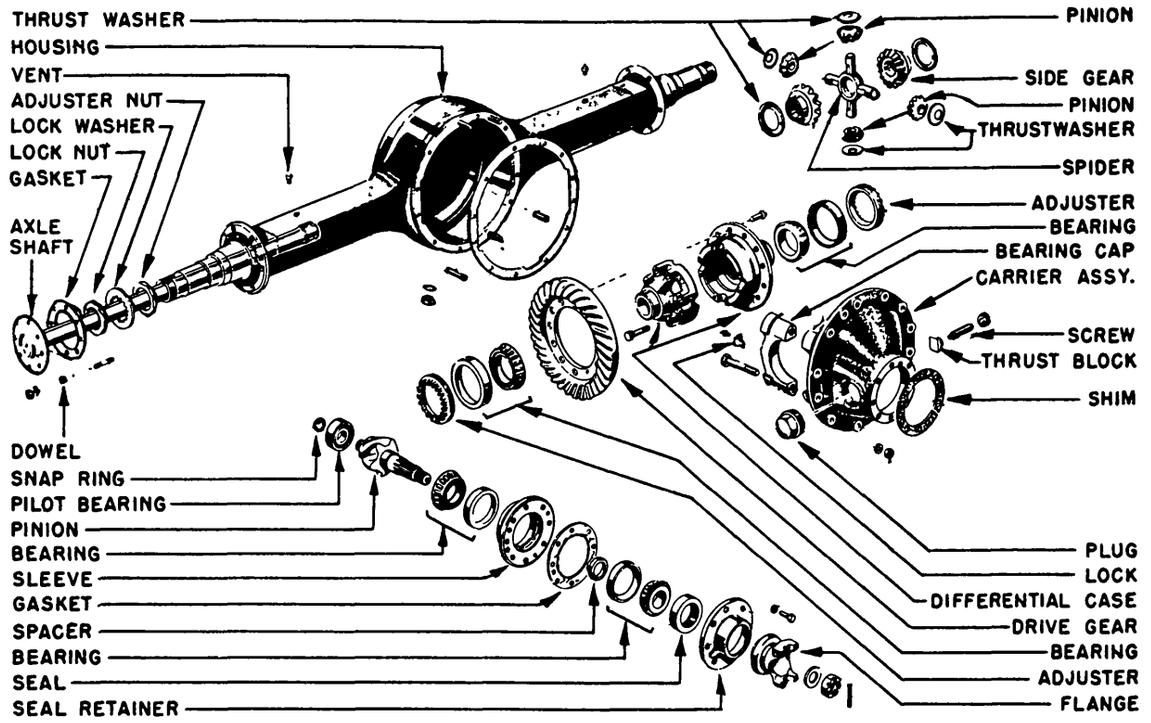
Drive Pinion Disassembly—Remove pinion bearing sleeve shims noting quantity and thicknesses used. Remove oil seal retainer. Remove universal joint flange thrust washer (F-600). Remove front pinion bearing and spacer from sleeve. Tap or press drive pinion out of bearing sleeve. Press drive pinion rear bearing off shaft with Tool T53T-4242-F. Remove pilot bearing snap ring, then remove pilot bearing with Tool T53T-4625-A and arbor press. Remove pinion bearing cups from sleeve.

Reassembly & Adjustment: Inspect gear teeth, bearings and bearing cups for signs of galling, pitting or wear, and replace any parts found to be defective. Clean all parts and blow dry with air.

Drive Pinion Reassembly & Preload Adjustment—Press drive pinion pilot bearing on pinion, then install snap ring. Press pinion rear bearing on shaft until seated against back face of pinion gear. Press pinion bearing cups in sleeve, then insert drive pinion, and install pinion bearing spacer. Install front bearing in sleeve.

Preload Checking & Adjustment—Install a sleeve on the pinion shank that will apply pressure to pinion inner race. Place drive pinion and cage assembly in a press and apply 25,000 lbs., pressure on bearing. Wrap a soft wire around cage and attach a pound pull scale to wire. Pull on scale in a horizontal line and note pull required to keep cage rotating. If rotating torque is not between 12 to 18 inch lbs., install a thicker washer to decrease or thinner washer to increase the preload. (NOTE—If a press is not available, install the universal joint flange, tighten nut to 300-350 ft. lbs., then check the preload. After correct preload has been obtained, remove universal joint flange).

Installation in Carrier—Install a new oil seal in drive pinion bearing cover with Tool T53T-4676-B (F-500), or Tool T53T-4676-C (F-600). ***(NOTE—Soak new oil seals in oil for one-half hour before installation).*** Position the universal joint flange thrust washer (F-600 only), bearing cover, universal joint flange, washer and nut on drive pinion. Hold flange with holding tool and tighten nut to 300-350 ft. lbs. torque. Install cotter pin. Place the original pinion bearing shims on differential carrier, then place drive pinion and cage assembly in carrier. Tap assembly into place with soft hammer and install capscrews or nuts, and lockwashers. Tighten capscrews (F-500) to 25-30 ft. lbs., and tighten nuts (F-600) to 55-75 ft. lbs. torque.



FORD TRUCK "BANJO HOUSING" HYPOID AXLE

Differential Reassembly—Position drive gear on differential case, making sure that drive gear and differential case are clean, then rivet gear to case. Assemble pinions, side gears, spider, and thrust washers in drive gear half of differential case. Install other half of case, making sure the punch marks on case halves are aligned. Install differential case bolts and nuts (F-600) or capscrews (F-500). Tighten capscrews (F-500) to 45-50 ft. lbs., or nuts (F-600) to 95-105 ft. lbs. Install lock wires.

Differential Installation & Backlash Adjustment—Install thrust block screw in axle housing, then place thrust block on screw (F-500 only). Place side bearing cups over side bearings, then position differential assembly in carrier. Position bearing adjusters in carrier, making sure adjuster threads mesh with threads in carrier. Install bearing caps in their original position using alignment marks as guide. Tighten bearing cap bolts enough to hold adjusters snug but still permit rotation. Tighten adjusters hand tight against side bearing cups. Turn left hand adjuster until drive gear is loosely meshed with pinion gear. Mount a dial indicator so contact stem bears against back face of drive gear, then loosen right hand adjuster just enough to notice endplay on indicator. Tighten this adjuster until .000" endplay is obtained. Check drive gear runout. If runout exceeds .008" remove differential and check cause. TIGHTEN EACH ADJUSTER ONE NOTCH FROM .000" POSITION to preload differential bearings.

Backlash Adjustment—Mount dial indicator on carrier with contact stem of indicator bearing against face of one tooth on drive gear, then adjust drive gear to obtain .006-.012" backlash. To reduce the backlash, loosen right hand adjuster and tighten left hand adjuster the same number of notches. To increase, perform the same operation in reverse. Check pinion gear setting (below) and if correct, tighten bearing cap bolts to 80-100 ft. lbs. (F-500), or 120-140 ft. lbs. (F-600). Install adjuster locks, tighten lock bolts to 15-20 ft. lbs. torque, then install lock wires.

Pinion Gear Setting—Check gear tooth contact pattern by coating a number of ring gear teeth with red lead, and rotating the pinion shaft back and forth while maintaining a slight pressure on ring gear. Pressure pattern should be uniform and centered slightly toward inner side of tooth center. If adjustment is necessary, pinion position can be changed by varying thickness of shim pack between pinion cage and carrier.

Thrust Pad Adjustment (F-500)—Tighten thrust block screw until thrust block just touches drive gear. Back off screw at least 1/6 turn but not more than 1/4 turn to provide proper clearance between block and drive gear. Tighten thrust block lock screw while holding screw in this position.

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1954-55 FORD TRUCK HYPOID "BANJO HOUSING" TYPE (Cont.)

Differential Carrier Installation—Place a new carrier-to-housing gasket on axle housing studs, making sure puller bolt holes in gasket are aligned with holes in housing. Place differential carrier on roller jack, then roll assembly into position. Start carrier into housing with four nuts evenly spaced. Tighten nuts alternately to draw carrier squarely into housing. Install remaining nuts and lockwashers and tighten nuts to 55-75 ft. lbs. torque.

OVERHAUL (1955 600 SERIES): Procedures for overhauling are the same as for 1954-55 500 Series, 1954 600 Series Rear Axles except as noted below

Disassembly: Differential Carrier Removal—Remove rear axle housing cover and gasket, then remove differential carrier from housing

Differential Dissassembly—Differential case halves are held together by capscrews.

Drive Pinion Disassembly—Grind peened portion off of drive pinion, then press pinion out of pilot bearing Remove pinion bearing cup from sleeve

Reassembly & Adjustment: Drive Pinion Reassembly & Preload Adjustment—Press pilot bearing on drive pinion, then peen or stake end of drive pinion to secure pilot bearing in place

Preload Checking & Adjustment—Rotating torque should be 18-25 in lbs

Installation in carrier—Install new felt grease seal with Tool T53T-4676-C. Make certain that gasket groove in face of pinion sleeve flange is clean, then install a new cork gasket, which has been soaked in water, in the groove Tighten capscrews to 25-30 ft. lbs Tighten nuts to 85-95 ft lbs

Differential Reassembly—Tighten differential case capscrews to 50-70 ft lbs

Differential Installation & Backlash Adjustment—Runout should not exceed .006".

Backlash Adjustment—Tighten bearing cap bolts to 160-175 ft lbs

Differential Carrier Installation—Install new cover gasket and cover with capscrews and new lockwashers Torque capscrews to 50-70 ft lbs.

1956-60 FORD TRUCK HYPOID "BANJO HOUSING" TYPE

F-350 (1956-60)
P-350, P-400 (1959-60)
B,C,F, P-500 & 600 (1956-60)

DESCRIPTION: Full floating, hypoid gear type with Hotchkiss drive

▷*REAR AXLE NOTE. Different model axle assemblies are used for the different model trucks Assemblies used on 1959-60 F-350 & P-400 Series trucks have a single type casting differential carrier (other series trucks have a multiple casting carrier) Service procedures apply to all assemblies unless otherwise specified*

▷*DIFFERENTIAL SIDE BEARING NOTE (Single Type Casting Differential Carrier) Right hand bearing and adjusting nut is larger than left hand bearing and adjusting nut. The larger right hand bearing cone has 19 rollers and the smaller left hand bearing cone has 22 rollers*

REMOVAL OF AXLE ASSEMBLY: *See "Rear Axle" on Truck Model pages.*

AXLE SHAFT REPLACEMENT: Drain lubricant from housing, then remove axle shaft stud nuts and washers. Tap center of axle shaft flange to loosen tapered dowels, and remove the dowels. Remove axle shaft and gasket from housing. To install, place new gasket on hub and install axle shaft in housing, rotating axle to line up axle splines with splines in gears Install tapered dowels, lockwashers and nuts on studs and tighten to 50-70 ft lbs

WHEEL BEARING ADJUSTMENT Remove axle shaft (see above), bearing locknut and washer Tighten wheel bearing adjusting nut while rotating wheel back and forth, until a noticeable drag is felt, then back off adjusting nut 1/8 turn Install bearing lockwasher and locknut and bend one tab of lockwasher over adjusting nut and one tab over locknut. Install axle shafts.

OVERHAUL: The following service procedures apply to all series trucks except as noted

Differential Carrier Removal: Remove axle shafts (see above). Support carrier assembly properly with a roller jack, then remove carrier to housing bolts and lockwashers. Tighten the puller screws, when provided in carrier, until carrier is loosened from housing. Carefully withdraw carrier assembly from axle housing, then back off puller screws Remove and discard axle housing gasket.

Differential Carrier Disassembly: Adjust differential bearing pre-load (if bearings are in good condition) then check runout of drive gear with a dial indicator Make a note of runout for reference during reassembly. On 500 Series trucks, loosen the thrust block locknut, then back out the thrust screw and block to provide clearance for drive gear. On all models, mark differential bearing caps and carrier legs with a punch as a guide when reinstalling bearing caps. Remove adjuster locks. Remove bearing caps and remove differential assembly from carrier Remove thrust block on 500 Series trucks.

Differential Disassembly: Clamp assembly in a vise with soft jaws, then remove differential side bearings with a suitable puller Mark differential case halves with a punch before disassembling, and remove bolts or cap screws Separate case halves, using a brass hammer if necessary, then remove side gears, spider, pinions and thrust washers. Center punch the drive gear rivet heads on drive gear end of rivets. Drill through the rivet heads using a drill 1/32" smaller than rivet body. Press out rivets, then tap drive gear off case with a soft hammer.

MULTIPLE CASTING CARRIER

Pinion Removal & Disassembly: Hold universal joint flange, then remove cotter pin, nut and washer from drive pinion shaft. Remove flange using Tool T53T-4851-A. Remove bolts which attach oil seal retainer and pinion bearing sleeve to carrier. Remove oil seal retainer then on 600 Series trucks, remove the universal joint flange spacer washer. Drive the drive pinion and sleeve assembly out of carrier, or remove it with puller screws. Remove pinion bearing sleeve shims, noting the number and thickness of shims used. Tie shim pack together and retain for future use Tap or press drive pinion out of the front pinion bearing and sleeve, then press the drive pinion out of spacer and rear pinion bearing. Remove pilot bearing snap ring, then remove pilot bearing with Tool T56T-4625-A (F-350), T53T-4625-A (F-500 & F-600). Remove pilot bearing snap ring and remove pilot bearing.

Pinion Reassembly & Adjustment: Press drive pinion pilot bearing on drive pinion, then install snap ring. Press rear bearing on shaft until seated against back face of pinion gear. Press pilot bearing cups in sleeve. Insert drive pinion into pinion bearing sleeve, then install old pinion bearing spacer for a trial build-up. Install front bearing in sleeve On 350 Series trucks, install universal joint flange and tighten flange nut to 175-250 ft. lbs. Wrap a strong cord or soft wire around the bearing cage and attach a pound-pull scale to cord. Measure the torque required to keep cage rotating (disregard torque required to start cage rotating). If torque required to keep cage rotating is not between 12-18 inch pounds, install a thinner spacer to increase or a thicker spacer to decrease the pre-load. This same procedure is used on 500 & 600 Series trucks, except that the universal joint flange nut is tightened to 300-400 ft. lbs. After pre-load is properly set, install a new oil seal in drive pinion seal in drive pinion seal retainer with Tool T53T-4676-B (350 & 500 Series); T53T-4676-C (600 Series). On 600 Series trucks, place the universal joint flange thrust washer on top of drive pinion outer bearing. Install oil seal retainer assembly, universal joint flange, washer and nut on drive pinion. Hold flange and tighten nut to 300-350 ft. lbs., then install cotter pin. Place original bearing cage shims on differential carrier, then place drive pinion and sleeve assembly into carrier and tap it into place with a soft hammer. Install cap screws and lockwashers, then tighten screws to 23-31 ft. lbs.

SINGLE CASTING CARRIER

Pinion Removal & Disassembly: With differential case assembly removed from rear axle housing, press pinion out of flange and pinion front bearing cone Remove pinion bearing preload shims from pinion shaft (or from front bearing cone) Remove pinion flange oil seal with Tool 1175-AE or 4676-N, then remove pinion bearing rear cup *NOTE - Use a micrometer and measure shim or shims which were found under pinion bearing rear cup* If pinion front bearing cup is to be removed, use a drift and drive it out of housing Press pinion rear bearing cone from shaft using Tool T53T-4629-A (4 86-1 ratio), T56T-4630-D (5 14-1 ratio), T56T-4630-E (5 83-1 ratio)

Pinion Setting: Pinion depth is adjusted by removing or installing shims located behind pinion rear bearing cup (between cup and carrier). *Increasing* the shim pack *decreases* pinion and drive gear assembled dimension. *Decreasing* the shim pack *increases* pinion and drive gear assembled dimension. When a new pinion and ring gear are installed, check the markings on both old and new pinion and adjust pinion locating shim pack ac-

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1956-60 FORD TRUCK HYPOID "BANJO HOUSING" TYPE (C nt.)

cordingly. A plus (+) marked pinion requires removal of shims in amount of the marking. A minus (−) marked pinion requires additional shims in amount of the marking. *NOTE - Before pinion is installed, check for a backlash marking which may be etched on pinion spline.*

Pinion Installation & Bearing Preload Adjustment: 1) Place pinion rear bearing cup shim pack in bore in carrier housing and press cup into case with Tool T53T-4616-B and an arbor press. Check installation of cup by trying to insert a .0015" feeler gauge under cup. If pinion front bearing cup was removed, install cup with Tool T53T-4616-D. If a new pinion is being installed, add or subtract from original pinion bearing preload shim pack, then same amount in thousandths of an inch that was added or subtracted from shim pack behind pinion rear bearing cup.

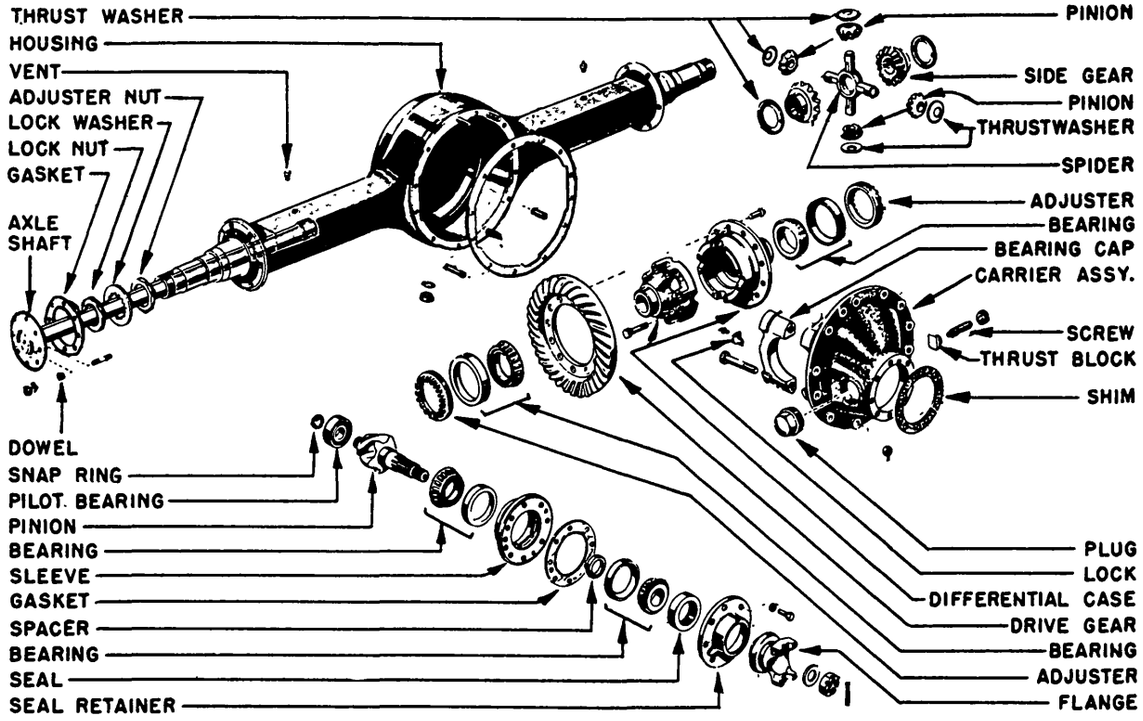
2) Place Tool T53T-44807-B on press bed with open end upward, then place pinion front bearing cone on tool with tapered rollers pointing upward. Center bearing on tool. Place carrier housing with front end down, on pinion front bearing cone (carrier housing is now resting on pinion front bearing cones and rollers). Hold housing in this position and start pinion shaft (with rear bearing cone and preload shims in place) into pinion front bearing cone. Lower ram of press and press pinion shaft into front bearing cone. As pinion shaft is pressed into position, rotate carrier housing in both directions so bearing rollers seat properly. Gradually increase ram pressure with case still rotating and "feel" for preload on bearings.

3) As soon as slight preload is felt, install a bolt in differential bearing support pedestal which is nearest to pinion gear, then, using a pound pull scale hooked to pedestal bolt, rotate case by pulling on scale. Keep scale at right angles to a line through center of pedestal bolt and through center of pinion gear. Note reading on scale while carrier is steadily rotated (disregard pull required to start carrier rotating). *NOTE - The distance from center of pedestal bolt to center of pinion gear is approximately 2½". The scale reading in pounds, multiplied by 2½" (radius) is the actual pinion bearing preload.* Specified pinion bearing preload is 5 to 15 inch-pounds with 5000 lbs. pressure applied (minimum scale reading should be 2 lbs., and maximum scale reading should be 6 lbs.). To **increase** preload, decrease the preload shim pack thickness. To **decrease** preload, increase shim pack thickness.

4) Adjust shim pack thickness as required, then press a new pinion flange seal into carrier housing with Tool T53T-4676-B. Support pinion gear on press bed and press pinion shaft flange into position with Tool T53T-4851-B. Remove carrier assembly from press and mount it in an overhaul stand, then install flat washer and nut on pinion shaft. Hold pinion flange and tighten shaft nut to 200-275 ft. lbs.

ALL MODELS

Differential Assembly: If the drive gear runout check during disassembly exceeded .008", the condition may be caused by a warped gear, defective case, or by excessively worn differential bearings. To determine cause of excessive runout, before riveting gear to case, press the differential side bearings in place on case hubs until seated against shoulders of case. Assemble the two halves of case, aligning marks made at disassembly. Tighten differential case capscrews or nuts to 23-31 ft. lbs. (350 Series); 50-70 ft. lbs. (500 Series); 80-105 ft. lbs. (600 Series). Install case in differential carrier, then check runout of case flange with a dial indicator. If runout exceeds .005", the drive gear is true and the condition is due to either a defective case or differential side bearings. Install new bearings on case hubs, and install case in carrier, then check runout again. If runout is still excessive, the differential case is defective and must be replaced. After the condition has been corrected, disassemble differential case. Position drive gear on case flange, then attach drive gear to case with rivets. *(CAUTION - Be sure drive gear and case are clean, and the drive gear is not cocked before riveting gear to case. Cold rivets must be used to attach gear to case).* Apply a thin coating of lubricant on spider, side gears and thrust washer, then assemble them in drive gear half of case. Install cap screws or bolts and nuts, and tighten to correct torque. Install lock wire.



FORD TRUCK "BANJO HOUSING" HYPOID AXLE

Drive Gear Adjustment: Place side gear bearing cups over side bearings, and position differential assembly in carrier. Position bearing adjusters in carrier, making sure the adjuster threads mesh with threads in carrier. Install bearing caps in their original position using the aligning marks made at disassembly, as a guide. Install bearing cap bolts and tighten to 81-106 ft. lbs. (350 Series); 80-100 ft lbs. (500 Series); 110-145 ft. lbs. (600 Series). *(NOTE - Th bearing adjust rs and bearing cups can b m ved with the bearing cap bolts at n rmal t rqu).* Tighten bearing adjusters hand tight against side bearing cups. Turn left hand adjuster until drive gear is loosely meshed with pinion gear. Mount a dial indicator on carrier flange with the contact button bearing against back of gear or differential carrier, then loosen the right hand adjusting nut just enough to notice endplay on indicator. Tighten this adjuster until zero endplay is obtained. Tighten each adjuster one notch from the zero endplay position to pre-load differential bearings. Mount the dial indicator on the carrier so contact button bears against rear face of ring gear tooth, then adjust drive gear to obtain .006-.012" backlash. To reduce backlash, loosen right hand adjuster and tighten left hand adjuster equally. To increase backlash, perform the same operation in reverse. Check gear tooth contact for correct pattern. If tooth contact adjustment is necessary, the drive pinion position may be changed by varying the thickness of shim pack between pinion case and carrier. Adjust drive gear position by bearing adjusters.

Differential Carrier Installati n: Place a new carrier to housing gasket on axle housing making sure the puller bolt holes in gasket are aligned with holes in housing. Place differential carrier assembly on a roller jack, then roll carrier into position. Start carrier into housing with four cap screws equally spaced. Tighten cap screws alternately to draw carrier squarely into housing. Install remaining carrier to housing screws, lockwashers and tighten to 53-59 ft. lbs.

INSTALLATION OF REAR AXLE ASSEMBLY: *Se "Rear Axl " on Truck M d l pag .*

FORD TRUCK HYPOID

F-250 & P-350 Trucks (1956-60)

DESCRIPTION: Spicer Model 60. Full-floating, hypoid gear with Hotchkiss drive. **This axle does not have a s parat diff rential carri r assembly.**

REMOVAL OF REAR AXLE ASSEMBLY: *See "Rear Axl " on Truck Mod l pag s.*

AXLE SHAFT REPLACEMENT: Remove axle shaft stud nuts and lockwashers. Strike center of axle shaft flange with a hammer and drift to loosen tapered dowels, then remove dowels. Pull axle shaft from housing. To reinstall, place gasket in position on housing and install axle shaft. Install tapered dowels, lockwashers and nuts on studs. Tighten nuts to 50-70 ft. lbs.

WHEEL BEARING ADJUSTMENT: Remove axle shaft (see above), bearing locknut and washer. Tighten wheel bearing adjusting nut while rotating wheel back and forth, until a noticeable drag is felt, then back off adjusting nut 1/8 turn. Install bearing lockwasher and locknut and bend one tab of lockwasher over adjusting nut and one tab over locknut. Install axle shaft.

OVERHAUL: With axle housing removed from truck, remove axle shafts (see above), then proceed as follows:

Disass mbly: 1) Remove rear cover from rear axle housing. Rotate gears to check for roughness and inspect teeth for scoring, flaking, or abnormal wear. Check backlash and runout of ring gear (see below).

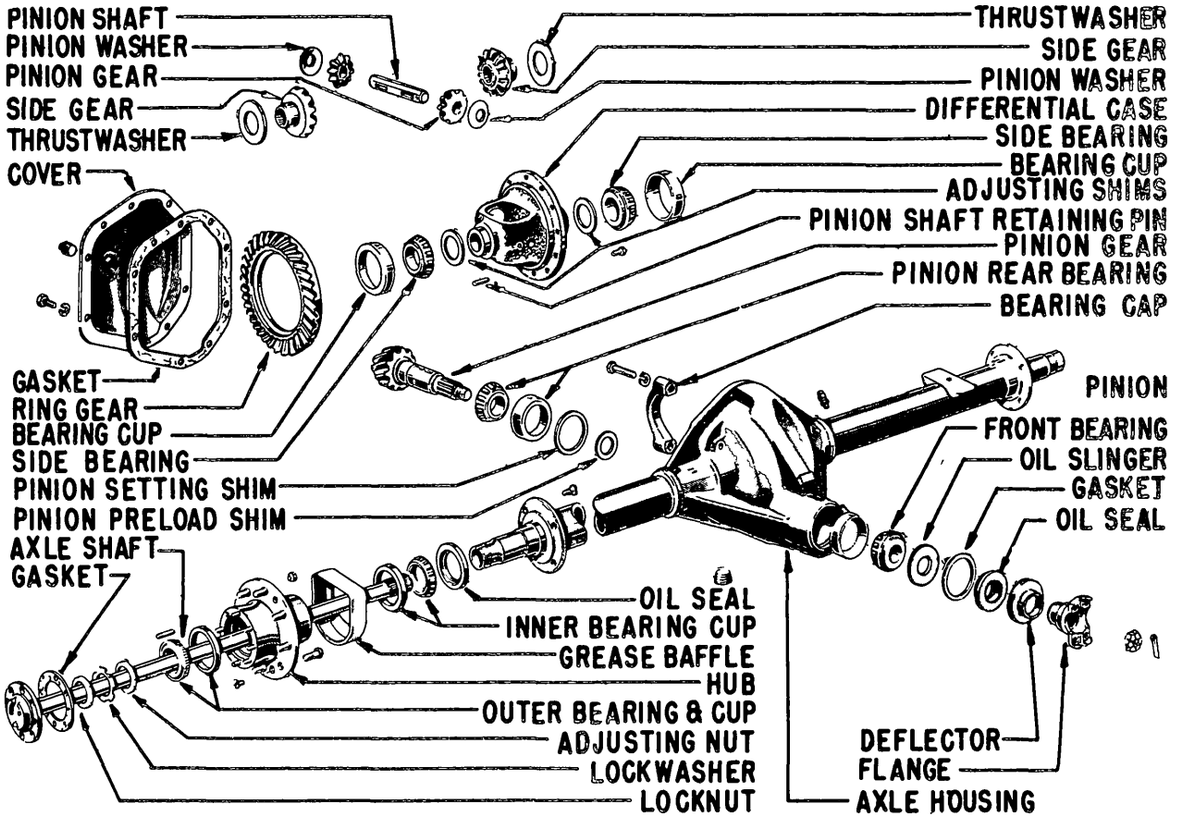
2) Mark side bearing caps and housing to assure reassembly of caps in same position, then remove caps. Install housing spreader Tool 4000-A, and spread housing until differential assembly can be forced out with a pry bar or heavy screwdriver. *CAUTION - Do not spread housing m r than .020" t remove differential assembly. Loos n th spr ad r imm diately after lifting out differ ntial ass mbly to pr vent springing the housing.*

3) Using Tool T56L-400-A, remove differential side bearings. Remove and tag shim packs which were installed under each bearing. Remove drive gears from differential case. Drive out pinion shaft lock pin with a punch and remove differential pinion shaft, differential pinions, and thrust washers. Remove side gears and thrust washers.

4) Hold universal joint flange with Tool T53L-4851-D & E and remove nut and washer from pinion shaft. Remove universal joint flange with Tool T53L-4851-A. Press pinion shaft out of housing. If rear bearing cone is to be replaced, use Tool T56T-4630-A (4.88-1 ratio axle), 4630-B (5.87-1 ratio axle), 4630-C (4.55-1 ratio axle), and press cone off pinion shaft. Remove oil seal with Tool 4676-N.

5) Remove oil slinger, pinion front bearing cone, and pinion bearing preload adjusting shim pack (located between front bearing cone and shoulder on pinion shaft). If pinion bearing cups are to be replaced, use Tool T55P-4616-B (front cup), T53T-4616-E (rear cup). Measure thickness of shims found back of rear bearing cup and record the reading or tie shims together for reinstallation.

Inspection: Wash all parts with solvent and blow dry with air then oil all bearings. Check gear teeth for scoring or signs of wear. Check differential side gear hubs, thrust washers, splines and thrust surfaces for pitting or wear. Check bearing cups for rings, galling, scores, and for erratic wear pattern. Make sure that all bearing cups are seated properly in their bores. Temporarily install bearing caps and test fit of adjusting nuts in their threads. They should turn easily when bearing caps are tightened to specifications. Face of nuts must be smooth and square. Polish with a fine abrasive on a flat surface. Remove all nicks and burrs from mating and mounting surfaces.



FORD F-250 & P-350 TRUCK REAR AXLE

Differential Case Reassembly: Install side gears and thrust washers, pinion gears and thrust washers, and pinion shaft in differential case. Install pinion shaft locking pin. Install drive gear on differential case and tighten attaching bolts to 70-90 ft. lbs. Install both differential side bearings on case without shims. Make sure that bearings bottom on shoulders of case. Place cups on bearings and install complete assembly in rear axle housing. Install bearing caps and tighten cap bolts just enough to keep bearing caps in place. Mount a dial indicator on axle housing with indicator button against back side of ring gear. Pry differential assembly away from dial indicator with a screwdriver, then set dial indicator to zero. Pry differential assembly toward dial indicator and note indicator reading. Record this reading for reference when installing differential case in axle housing as it represents the total amount of shims (less those required for bearing preload) necessary to take up clearance between differential cups and case. Remove differential case assembly from axle housing. *NOTE - Do not install shims under bearings at this tim .*

Pinion Gear Assembly Installation: With correct pinion depth adjustment shim pack and pinion bearing preload adjustment shim pack selected (see below), install front and rear bearing cups in axle housing (shim pack back of rear bearing cup), using Tool T56T-4616-A and T53T-1239-A. Press rear bearing on pinion shaft with Tool T53T-4621-B and install pinion assembly in housing. Install correct pinion bearing preload adjusting shims on pinion against shoulder and install front bearing. Install oil slinger, oil seal (soak new seal in oil for 30 minutes before installation). Install universal joint flange, washer, and nut. Tighten nut to 200-250 ft. lbs.

Pini n D pth Setting (Shim Sel ction M th d) - *(NOTE - This m thod can b us d when nly a n w ring g ar and pini n ar installed. Should any f th carrier housing*

CONTINUED ON NEXT PAGE

FORD TRUCK HYPOID (C nt.)

parts be changed, or if tooth contact patt rn not correct, the "Master Gauge Method", below, must be used). The thickness of shims required is determined by thickness of shim pack removed at disassembly and by the plus or minus figure etched on pinion. For example, if original pinion was marked +2 and had a .035" shim pack back of rear bearing cup, and the new pinion to be installed is marked −1, the shim pack must be increased by .003" to bring new pinion to its correct position. *NOTE* - A (+) marked pinion calls for the removal of shims in the amount of the marking. A (−) marked pinion calls for addition of shims in the amount of the marking. Replacement shims are available in .003"& .005" thicknesses.

Pinion Depth Setting (Using Gauge T56T-4020-A) - *(NOTE - This method must be used whenever any of the carrier housing parts are changed or when the original shim pack thickness is unknown).* Install pinion in housing (see above) without the front bearing preload adjusting shim pack. Install universal joint flange, flat washer and nut, then tighten nut until pinion bearing preload is 10-30 inch pounds (see "Pinion Bearing Preload" below for checking procedure); as pinion shaft nut is tightened, rotate pinion shaft to seat bearing rollers. Place gauge shaft and discs in differential bearing pockets and tighten caps on larger discs only. Attach dial indicator to its holder and place it on highest step of gauge block. Place gauge block squarely on pinion gear and squarely against gauge shaft. With indicator button resting on gauge block, set dial indicator to zero. Swing indicator to highest point on gauge block and note reading *(NOTE - The highest point on gauge shaft is highest indicator reading while indicator hand is moving clockwise).* The indicator reading at this point must correspond to marking on pinion gear. A (+) reading (clockwise from zero) at highest point on gauge shaft with a zero marked pinion means that the actual dimension is too great in the amount of the plus reading. To correct, add shims that correspond to the plus reading. For a (−) reading (counterclockwise from zero) at the highest point on gauge shaft with a zero marked pinion, remove shims equal to the minus reading. *NOTE* - A −3 marked pinion is installed at the proper depth when the indicator reads −3 at the highest point on gauge shaft. Similarly, a +3 marked pinion is installed at the correct depth when the indicator reads +3.

Pinion Bearing Preload Adjustment - *(NOTE - When pinion setting shim pack is changed (see above), add or subtract the same thickness of shims from pinion bearing preload shim pack at front bearing to maintain correct pinion bearing preload).* To check preload, wrap a strong cord around universal joint flange and attach a pound-pull scale to cord. Note the pull required to keep pinion shaft rotating (disregard pull required to start pinion rotating), which should be **10-30 inch pounds.** *NOTE* - The inch-pound torque required to keep pinion shaft rotating is calculated by multiplying the scale reading in pounds, with one half the diameter in inches. As an example, a 15 lb. pull on a 4" diameter is 30 inch pounds.

Differential Case Installation: With pinion shaft correctly installed in housing (pinion setting & bearing preload adjusted), install differential assembly (with correct shim packs back of bearing cones; see "Differential Bearing Preload & Backlash Adjustment" below), as follows: Install housing spreader Tool 4000-A and spread housing not more than .020". Install differential assembly, with bearing cups in position on bearings, into rear axle housing. Rotate and tap ring gear with a soft hammer to seat bearings properly in cross-bores. Install bearing caps (make sure indexing marks made at disassembly are in alingment), then remove housing spreader. Install and tighten capscrews to 70-90 ft. lbs. Check backlash (see below). Install rear cover and gasket and tighten capscrews to 15-25 ft. lbs.

Differential Bearing Prel ad & Backlash Adjustment - With differential bearings installed on case without shim packs, install case, with bearing cups, in housing. Install bearing caps and tighten bolts lightly. Mount a dial indicator on housing with indicator button bearing against back side of ring gear. Move differential assembly tight against pinion gear and set dial indicator at zero. Move differential assembly toward indicator and note maximum reading *(NOTE* - This reading indicates the shim pack thickness required behind bearing cone on ring gear side of case). To obtain shim pack required for opposite side of case, take the reading just obtained and subtract it from the reading taken when differential case was reassembled and checked in rear axle housing (see "Differential Case Reassembly) above). The remainder, plus .015-.020" for preload and backlash, will be total shim pack required on side of case opposite the ring gear. As an example, if the reading obtained when differential case clearance checked in axle housing was .070" and the reading obtained on dial indicator (above) was .038", then the thickness of shims required on opposite side of housing from ring gear, would be .070" minus .038"; or .032" to which should be added .015-.020" (.017") shims for preload and backlash, giving a total shim pack of .049". Remove bearing caps and take differential case out of housing. Remove side bearings and install proper amount of shims on each side. Press side bearings on case until they are firmly seated against shims. Install differential case in housing.

Differential Ring Gear Backlash Ch ck: Install a dial indicator to check backlash at four equally spaced points around ring gear. The backlash must be .004-.009" and must not vary more than .002" between positions checked. If backlash does not meet specifications, change the shim packs behind both differential side gears by taking shims from one side and installing them on the other as required. Total shim pack must not be changed.

FORD TRUCK TWO-SPEED

F, B, C-500 & 600, P-500 Series (1954-60)

DESCRIPTION: Two-speed planetary differential assembly with either a spiral bevel or hypoid ring gear and pinion. Spiral bevel pinion shaft is piloted at rear by a roller bearing. Shift control is electrically operated.

►*AXLE IDENTIFICATION NOTE: Eaton model numbers ar cast in housing n right side of cover.*

CONTROL UNIT: *See "C ntrol Unit" be low.*

REMOVAL OF AXLE: *See "Rear Axle" on Truck Model pag s.*

AXLE SHAFT REPLACEMENT & WHEEL BEARING ADJUSTMENT: Same as for full-floating truck axle. *Se "R ar Axl " on Truck Model pages.*

REAR AXLE RATIO: *See "Rear Axle" on Truck Model pag s.*

OVERHAUL: Carrier Assembly Removal - Shift axle into low ratio, then drain lubricant from housing. Remove axle shaft stud nuts. Hold a short drift firmly in center of axle shaft flange and strike it sharply to loosen tapered dowels in flange, then remove dowels and axle shaft. Remove electric shift unit from carrier housing and disconnect drive shaft at rear universal joint. Support carrier on a roller jack and remove carrier attaching bolts. Remove carrier and discard axle housing gasket.

Disass mbly: Remove oil distributor plug and gasket and pull oil distributor and spring out of carrier. Remove shift fork shaft plugs and remove shaft, then remove shift fork and seal from housing. Pull sliding clutch gear out of carrier, then mark right and left hand bearing adjusters with a punch for reference at reassembly. Remove bearing cap bolts, caps, adjusters, and locks. Lift differential and planetary assembly out of carrier and remove side bearing cups. Remove lock wire and nuts from bolts holding drive gear to gear support cases and remove bolts. Tap drive gear with a brass hammer and remove right hand gear support case, then remove left hand gear support case, high speed clutch plate thrust washer, and oil collector drum. Slide drive gear off differential and planetary gear assembly and remove high speed clutch plate by tapping on each side alternately with a soft hammer. Remove planetary gears and gear pin, then remove lock wire and capscrews from differential assembly and separate right and left hand differential cases. Remove differential side gears and thrust washers, differential spider gears, thrust washers, and differential spider. After removing flange nut, drive flange off drive pinion with a soft hammer. Remove bolts retaining pinion bearing sleeve to carrier housing, then use a drift and drive pinion assembly out front of case. Place pinion assembly on a press bed and press pinion shaft out of flange and front bearing cone, then remove bearing preload spacer from pinion shaft. If pinion rear bearing cone is to be replaced, remove pilot bearing (if so equipped) with Tool CJ-951, or equivalent, and an arbor press. Remove rear pinion bearing with a suitable tool or use a blunt chisel and tap on bearing cone between teeth of pinion. Remove bearings from gear support cases by using a drift and striking bearing inner race through holes provided in support case. *NOTE - To install a n w bearing on support case, install cas in an arbor pr ss, th n plac a short square ste l bar across inn r bearing rac and press b aring on until it is flush with should r of cas . R peat for oth r half of case.* Place drive pinion sleeve in a press, then insert a steel bar through hole in sleeve between bearing cups and press out one of the cups. Turn sleeve over and remove other bearing cup in same manner.

Pinion Bearing Preload Adjustment: Completely assemble pinion and bearing retainer (without oil seal) and tighten pinion shaft nut to 200-325 ft. lbs. (Eaton Axle Model 1350); 325-450 ft. lbs. (Eaton Axle Models 13602 & 13800). Check preload as follows: Clamp the universal joint flange of pinion shaft assembly in a vise, then wrap a strong cord around pinion bearing retainer. Attach a pound-pull scale to end of cord, then note the pull required to keep pinion bearing retainer rotating (disregarding pull required to start retainer moving). The reading on scale multiplied by one-half the diameter of bearing retainer (in inches) at point the cord is wrapped, is the inch-pound torque. Bearing preload torque should be 15-30 inch pounds. To adjust preload, install pinion bearing spacer of proper length. *NOTE - A shorter spacer increases preload and a longer spacer decreases preload. Original spacers are not marked and must be measured with a micrometer to determine length.*

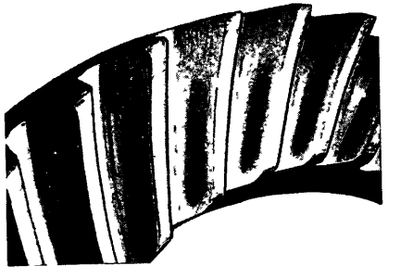
Pinion Depth Adjustment: *NOTE - Pinion depth is adjusted by adding or removing shims between pinion bearing sleeve and carrier housing.* If the old ring gear and pinion are being installed, install the same shim pack that was removed at disassembly. If a new ring gear and pinion are being installed, adjust shim pack thickness in accordance with "plus" or "minus" marking on new pinion assembly. As an example: Original shim pack is .015", original pinion is marked −1, and new pinion is marked +1. The new pinion should require a .002" thicker shim pack (total .017"). If new pinion is marked same as old pinion, no shim change is required. *NOTE - After axle is completely assembled and adjusted, check tooth contact pattern (see below).*

Ring Gear & Pinion Tooth Contact Pattern Check: With carrier completely reassembled, pinion depth and ring gear backlash properly adjusted, check gear tooth pattern as follows: Paint gear teeth with a suitable gear marking compound, such as a paste made with dry red lead and oil, then wrap a cloth around drive pinion flange to act as a brake. Rotate drive gear back and forth (use a box wrench on ring gear attaching bolts for a lever) until a clear tooth contact pattern is obtained, then compare pattern with illustration of correct tooth pattern. *NOTE - Some minor differences will exist on individual gear sets but, in general, desirable patterns will have the following characteristics: (1) Drive pattern should be centered on tooth. (2) Coast pattern should be centered on tooth but may be slightly toward toe. (3) There should be some clearance between pattern and top of tooth.* Adjust pinion setting shim pack and/or backlash to obtain correct pattern.

Differential Bearing Preload & Backlash Adjustment: Mesh drive gear and pinion with a slight amount of backlash, then set adjusting nuts in carrier bearing pocket threads, so they just contact bearing cups. Position bearing caps on carrier, matching the marks made when carrier was disassembled. Install bearing



CORRECT TOOTH PATTERN (EXC. PILOTED PINION SHAFT)



CORRECT TOOTH PATTERN (PILOTED PINION SHAFT)

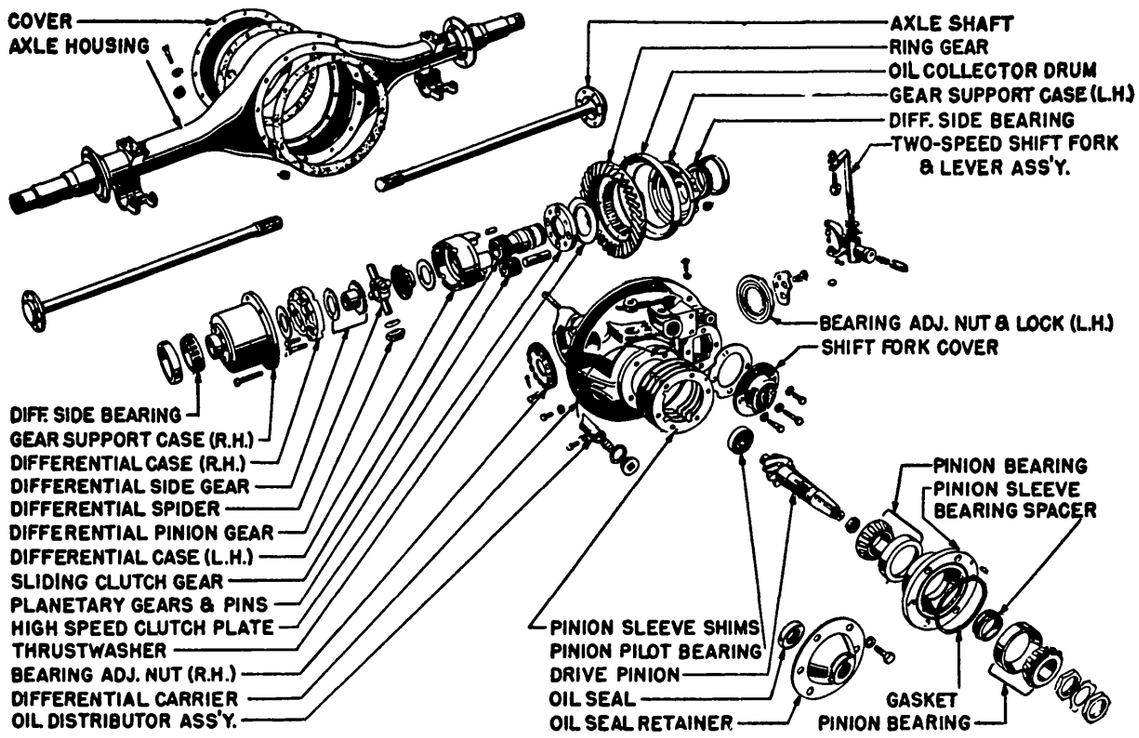
cap bolts or stud nuts and alternately tighten to 150-175 ft. lbs. *CAUTION - Check adjusting nuts for freedom of movement as bolts are tightened. If adjusting nuts do not turn freely, remove bearing caps and insp ct for damaged threads or incorrectly positioned caps.* Alternately tighten adjusting nuts until there is some backlash between drive gear and pinion and there is some preload on bearings. While bearings are preloaded, rotate drive gear several turns in each direction to seat bearing rollers in cups. Loosen bearing adjusting nuts until they are clear of bearing cups, then tighten them until they just touch bearing cups. Install a dial indicator on carrier housing with button against back face of drive gear, then adjust differential endplay at zero without preloading differential bearings. From zero endplay and zero preload condition, tighten each bearing adjusting nut 1½-2 notches to preload the bearings. Mount dial indicator to check drive gear backlash and check backlash at four equally spaced points on drive gear. Backlash should be adjusted to the best contact pattern within the range of .006-.016". To reduce backlash, loosen drive gear side adjusting nut and tighten pinion side adjusting nut the same number of notches. To increase backlash, perform same operation in reverse. *NOTE - When moving adjusting nuts, th final movement should always be made in a tightening direction. As an example: If one nut is to be loosen d ne n tch, loosen it two notch s, th n tight n it n .*

Reassembly: Press new pilot bearing on pinion shaft (if so equipped) and stake pinion shaft end at six points,

CONTINUED ON NEXT PAGE

FORD TRUCK TWO-SPEED (C nt.)

then press pinion rear bearing on pinion shaft until seated. To install a new bearing cup, place pinion sleeve in a press and, using a steel bar, press cup into sleeve until it is seated against recess in sleeve. Repeat this operation for other cup. Install pinion in bearing retainer and place old spacer on shaft for a trial build-up, then install pinion front bearing. Check and adjust pinion bearing preload (see above). Install a new oil seal in seal retainer or bearing retainer, then install universal joint flange flat washer and pinion shaft nut. Tighten nut to 200-325 ft. lbs. (Eaton Axle Model 1350); 325-450 ft. lbs. (Eaton Axle Model 13600 & 13602). *NOTE - If a new pinion and ring gear are being installed, adjust shim pack between pinion bearing retainer and carrier housing. See "Pinion Depth Adjustment" above.* Install a new gasket in pinion bearing retainer (if so equipped), then place shim pack on bearing retainer and install pinion and retainer assembly in carrier housing. Install bolts and lockwashers and tighten to 100-125 ft. lbs. Place left hand half of differential case in a vise with planetary side facing downward, then place one differential side gear thrust washer in place in case with chamfered side facing upward. Place differential left hand side gear (with short hub) in position in case. Install four differential pinions and thrust washers on differential spider, then place spider in differential case. Place differential right hand side gear and thrust washer (chamfered side of washer facing downward) on pinions, then place right hand side of the case in position over differential spider. Install and tighten differential case bolts to 50-70 ft. lbs. Place differential assembly on bench and insert the four planetary gear pins in holes in differential case. Place four planetary gears in position on pins, then position high speed clutch plate on planetary gear pins with chamfered teeth facing planetary gears. Tap plate into place with a soft hammer. Place right hand gear support case in a vise with bearing side facing downward and position gear support thrust washer in case. Place differential assembly in gear support case with with planetary end facing upward, then place drive gear over differential assembly with teeth on drive gear facing downward and mesh planetary gears with internal teeth on drive gear. Line up bolt holes in drive gear with bolt holes in gear support case. Place oil collector drum on drive gear with open side facing gear (place notches in oil collector drum between bolt holes in drive gear). Apply oil to each side of high speed clutch plate thrust washer, then position washer on high speed clutch plate. Place left hand gear support case on drive gear and line up bolt holes in drive gear and both gear support cases. Install bolts through gear support cases with bolt heads against flange of right hand gear support case. Install nuts and tighten to 50-70 ft. lbs., then install lock wire. Install differential assembly in carrier housing and adjust backlash and preload (see above). Check and adjust gear tooth pattern (see above). Install sliding clutch gear, then position shift fork on sliding clutch gear. Install shift fork shaft through hole in differential carrier and into shift fork, then install shift fork shaft plugs. Place shift fork seal and retainer on shift fork and shift axle into low range. Place oil distributor and spring in position in carrier and install distributor plug and gasket.



FORD TRUCK TWO-SPEED REAR AXLE (SPIRAL BEVEL)

Installation: Install guide studs in axle housing, then place new gasket over guide studs. Install carrier in axle housing, then install and tighten bolts to 50-70 ft. lbs.

TWO-SPEED CONTROL UNIT

ELECTRIC CONTROL UNIT OPERATION: High Speed Range—With control button on gear shift lever in upper position, current is supplied to the motor in the rear axle shift unit, causing motor to rotate in a clockwise direction and move drive screw assembly nut toward bottom of screw. When nut has traveled far enough to wind the torsion spring, a contact bumper on the nut breaks electrical connection on automatic switch and stops the motor. The nut is held at the end of its travel by a ball screw detent spring mounted on front cover. As nut is moved downward, a spring winding lever, which pivots on a pin in the nut, winds the torsion spring. The axle is ready to shift into high range as soon as the load on the rear axle gears is relieved. The torsion spring is assembled in the unit under 50 to 80 lbs. pressure. When spring is wound, the tension is increased to 90 to 150 lbs. This additional pressure is used to shift the axle. When shift is completed, the ends of the spring come together, leaving the original tension in the spring. This preload tension holds the axle in either range.

Low Speed Range—When button is placed in the down position, current is supplied to opposite field of motor and to speedometer adapter (adapter is mounted on speedometer and compensates for variation in speed of drive shaft between high and low ranges of the axle). Motor rotates in opposite direction (counter-clockwise) to that of high range operation, causing the drive screw assembly nut to travel toward top of screw. Torsion spring is wound for a shift to low range which is accomplished in the same manner as for high range.

Electric Control Unit Lubricati n—Change oil in unit every 10,000 miles using SAE 10W engine oil.

ELECTRIC CONTROL UNIT OVERHAUL: *(NOTE—Speedometer adapter, circuit break r, and contr l switch cannot be repair d and must b replac d if failure occurs).*

Removal: Disconnect one of the battery cables. Remove two shift housing to carrier stud nuts and lockwashers and remove unit from carrier.

Disassembly: Remove front cover and drain the lubricant. Turn drive screw until nut is in the center of the screw *(CAUTION—This is important t av id damag to driv nut c ntact bump r).* Pull shaft out of tension spring assembly and remove assembly from housing. Remove screws and lockwashers which attach drive screw bearing cover to housing, then remove cover and gasket.

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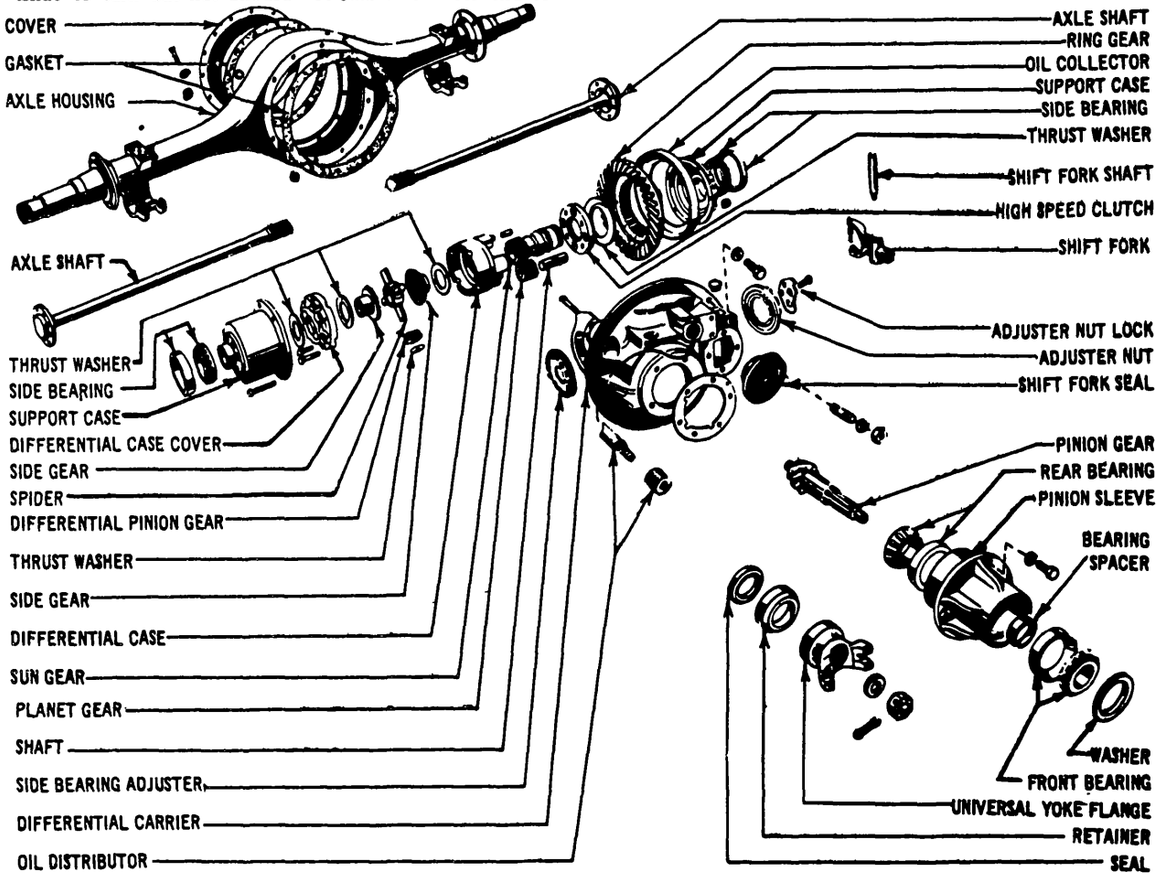
FORD TRUCK TWO-SPEED CONTROL UNIT (C nt.)

Push down on screw assembly until the bearing is forced out of housing. Remove bearing retainer nut and bearing (hold shaft with a screwdriver inserted in drive slot). Remove locknuts from automatic switch terminals and remove motor wires from terminals. Remove motor cover screws and remove motor, cover, and gasket from housing. Remove jam nuts and fibre washers from terminals at rear of housing. Remove automatic switch center screw and lift switch out of housing. Mount torsion spring and lever assembly in a vise. Turnspring winding lever clockwise, and pull outward to disengage spring from lever.

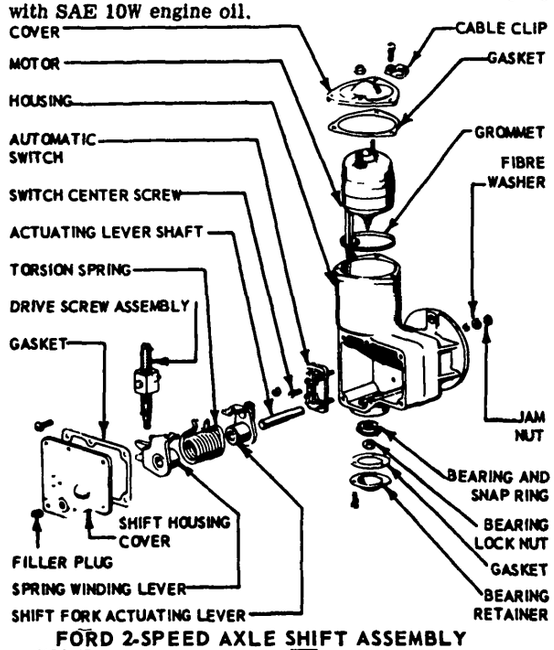
Insp cti n: Wash all parts except motor in cleaning solvent. Check all parts for signs of failure. Check automatic switch points for cleanliness and free movement. Make sure that points will close firmly under spring tension. Chęck operation of drive screw by rotating screw while holding nut. The screw must turn freely. When nut reaches end of screw, the screw should continue to turn but nut should not jam or run off end of screw. Turn screw in opposite direction and check operation at top end of screw. The fibre bumper in nut should be a tight press fit. Check stall torque of shift motor as follows: Place a wrench on rectangular drive of motor shaft. Hold wrench in one hand, hold motor itself in vise. Connect one motor wire to battery terminal and connect motor housing to other terminal. The wrench should tend to turn with a pull of about six inch pounds. Allow the wrench to turn very slowly, making sure that this torque is present for the full 360° turn of the wrench. *(NOTE–While testing the motor, do not allow it to overheat).* Check rubber diaphragm and make sure that spring clamp is in position in diaphragm groove and that it clamps diaphragm tightly around shift fork. Replace diaphragm if it is not in good condition or if it is not tight on shift fork.

Reassembly: Position rubber diaphragm on shift shaft (refer to lettering on face of diaphragm for correct position). If torsion spring assembly was disassembled, locate parts in the correct position and turn spring clockwise until end of spring is past the shift fork operating lever, then push lever inward until spring is locked in place. Position automatic switch in housing, then install switch attaching screw. Install fibre washers and jam nuts on the switch terminals at rear of housing. Place motor cover gasket on housing, then install motor and cover on housing. Install cover screws. Position motor wires on automatic switch terminals and install locknuts. Place drive screw assembly in housing and install drive screw bearing and bearing retainer nut. Tap bearing into seat in housing and install cover and gasket. Center drive screw nut on drive screw, making sure the contact bumper on nut is toward automatic switch. Position torsion spring assembly in housing and install shaft. Install housing cover and gasket and tighten attaching screws securely. Install lead wires on housing terminals with the **red wire on the bott m terminal.**

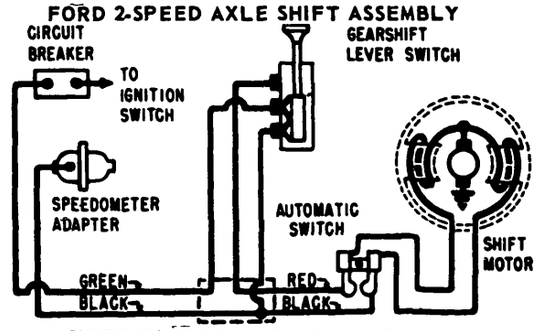
Installation: Position shift unit on carrier studs with the torsion spring swivel block installed in shift fork slot, then install nuts and lockwashers. Tighten nuts to 50-70 ft. lbs. Fill shift unit to level of filler plug with SAE 10W engine oil.



FORD TRUCK TWO-SPEED REAR AXLE (HYPOID)



FORD 2-SPEED AXLE SHIFT ASSEMBLY



SHIFT CONTROL WIRING DIAGRAM

LINCOLN & CONTINENTAL HYPOID

Linc ln & C ntin ntal (1959-60)

►*PINION DEPTH GAUGE, TOOL NO. 4020-B, INSTALLATION CHANGE (To insure hold-down clamp centering on pinion):* Because of increased pinion offset, it will be necessary to remove hold-down screw from clamp bar and insert it from the opposite side, then, install clamp bar in an inverted position on rear axle housing. This will cause hold-down screw and anvil to seat securely on end of pinion gear.

DESCRIPTION: Semi-floating hypoid gear type with Hotchkiss drive. Differential carrier assembly is integral with rear axle housing.

REMOVAL: *See "Rear Axle" on Car Model pages.*

AXLE SHAFT REPLACEMENT: Removal – Remove wheel, then remove nuts securing brake drum to axle flange and remove drum. Work through hole provided in axle shaft flange and remove nuts securing wheel bearing retainer. Pull axle shaft out of housing with Tool 4235-C2, being careful not to damage the oil seal or dislodge brake backing plate. After axle is removed, install one nut to hold backing plate in position.

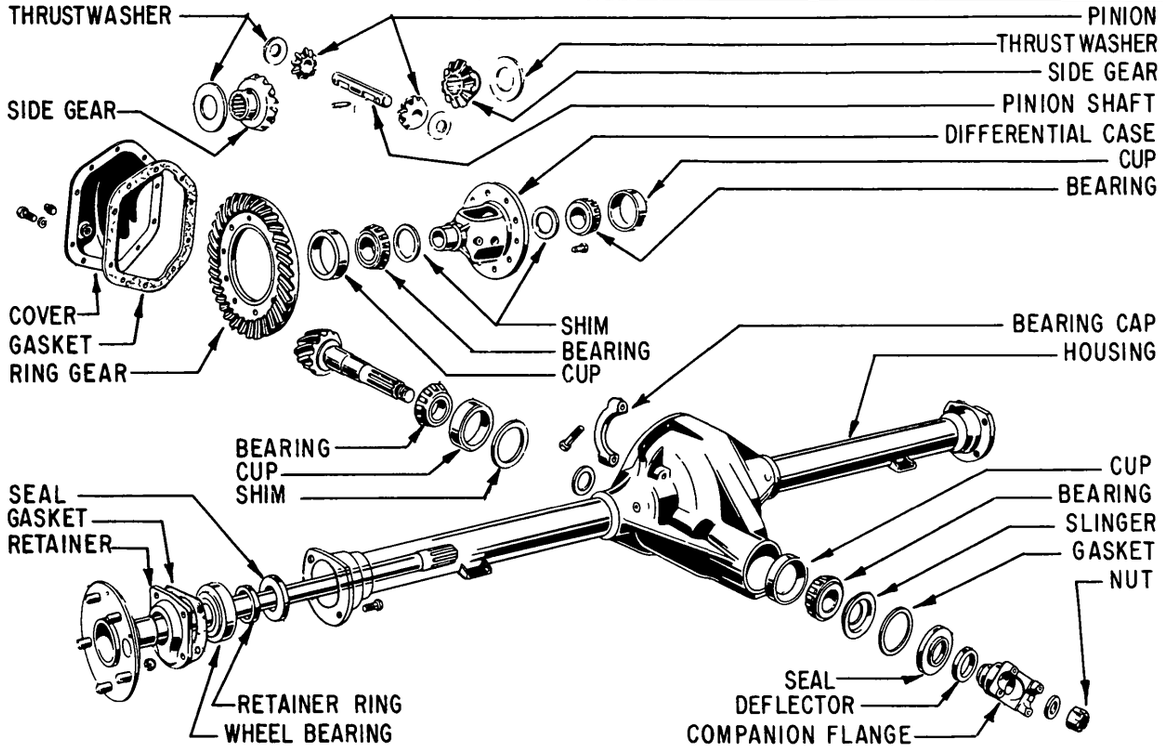
Installation: Apply lubricant to seal and bearing bore and install a new brake plate gasket. Install axle shaft into housing and differential side gear, being careful not to damage oil seal. *CAUTION – Right and left hand axle shafts are not the same length. Longer shaft should be installed in right hand side.* Install retainer plate and tighten nuts to 50–65 ft. lbs., then install brake drum and secure with Tinnerman nuts. Install wheel assembly.

AXLE SHAFT SEAL & BEARING REPLACEMENT: Removal – With axle shaft removed, remove seal with Tool 1175–AE. To remove wheel bearing, cut bearing retainer off with a chisel, being very careful not to damage axle shaft. Install Tool 1225–D on bearing, then install axle shaft and bearing assembly in an arbor press and remove bearing.

Installation: Place retainer plate on axle shaft and press new bearing on shaft with Tool 1225–D and an arbor press, then press on a new retainer ring. *CAUTION – Do not attempt to press both wheel bearing and retainer n at the same time.* Coat outside edges of new seal with sealing compound, then drive seal tight against shoulder with Tool 4245–B and a light soft faced hammer. Replace axle shaft and wheel.

DRIVE PINION SEAL & COMPANION FLANGE REPLACEMENT: Removal – *CAUTION – Mark universal joint, drive shaft and companion flange so that all parts will be installed in the original position. In the vent drive shaft, companion flange or universal joint are replaced, it will be necessary to reposition replacement parts until correct driveline balance is obtained.* Disconnect rear universal, then remove nut from pinion shaft with Tool 4851–G or J. Remove companion flange with Tool 4858–D (remove dust shield if damaged). Remove pinion shaft seal assembly with Tool 1175–AE.

Installation: Start a new seal over drive pinion with sealing edge facing inward. *NOTE – Soak neoprene seal in engine oil for 20 minutes before installing.* Coat lip of seal with lubricant, Part No. B9L–19A508, and drive seal into position with Tool 4676. Start a new dust shield (deflector) over companion flange and drive it into position with Tool 4859. Coat inside of companion flange with same lubricant used on seal lip and start it over drive pinion, aligning the reference marks made at time of removal. Use Tool 4858–B to press flange into position and tighten nut to 180–200 ft. lbs. Attach rear universal joint to companion flange, aligning the reference marks.



LINCOLN REAR AXLE

OVERHAUL

DIFFERENTIAL CASE: Place rear axle housing in a suitable holding fixture, then clean exterior of housing thoroughly. Remove housing cover and clean all internal parts with solvent. Before removing differential case, check the following:

Ring Gear Runout – Attach dial indicator, Tool 4201–A to differential housing so actuating plunger of indicator bears against rear face of ring gear. With indicator at zero setting, revolve ring gear one revolution and note total runout which must not exceed .006".

Side Bearing Clearance – Check clearance between side bearing caps and bearing cups. If clearance is .003" or more, it could indicate that bearing is turning in housing. Check to make sure cap is properly seated against mating surface of housing.

Ring Gear & Pinion Gear Tooth Contact – Inspect tooth contact using a suitable gear marking compound.

Removal: Remove differential side bearing caps. *NOTE – Identification marks are stamped on differential housing and on each bearing cap.* Install housing spreader, Tool 4000–A, making certain that dowels on tool registers with openings in housing, then tighten hold-down bolts. Spread the housing opening approximately .015", then pry carrier assembly loose and remove from housing. *Id ntify b arings and cups so they may be r install d in th ir original position.*

Disass mbly: Position differential case in a suitable fixture (Tool 4205–B), then install Tool 4221–C so fingers of tool are located in cast recesses of case and pull one differential side bearing. *NOTE – If ring gear and pinion are to be reassembled, note the number and thickness of shims found between side bearing and case.* Remove second bearing in the same manner. Remove ring gear from case, then drive out pin locking pinion shaft to case and remove shaft, differential pinions, side gears and thrust washers. With pinion shaft in a vertical position, remove nut from pinion shaft with Tool 4851–G or J, then check pinion bearing preload *(see "Pinion Bearing Preload" below).* Remove companion flange and pinion shaft seal (see above). Lift out gasket and slinger and use Tool 4201 to drive pinion shaft and rear bearing out of housing. Remove tool and front bearing, then use Tool 4628–D to remove rear bearing cup and shims. *NOTE – Check and record number and thickness of original shims so they may be reinstalled in their original position.* With forward end of housing up, use Tool 4628–B and remove front bearing cup. If necessary, press rear bearing from drive pinion with Tool 4621–BA. Wash all parts except wheel bearings in solvent and blow dry with air.

Inspection: Gears – Examine gears for scoring or signs of excessive wear. Check wear of splines, thrust surfaces and thrust washers.

Bearing Cups – Check cups for rings, scores, galling, or erratic wear patterns. Pinion bearing cups must be solidly seated. Check by trying a .0015" feeler between cups and bottom of bores.

Bearings – Check for scoring, galling, or overheating and check roller ends for wear.

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LINCOLN & CONTINENTAL HYPOID (Continued)

Bearing Caps – Check for wear and to see if bearings have been moving inside caps.

Universal Joint Flange – Make sure ears of flange have not been damaged and that end of flange which contacts oil slinger is smooth.

Housing – Check for damage and inspect all bearing bores for smoothness. Remove any nicks or burrs from mating surfaces of carrier housing. Check threaded holes for damage.

Differential Case – Make sure bearing hubs are smooth and that thrust surfaces of case are not damaged.

Reassembly: *NOTE – Ring and pinion gears are a matched set. If replacement is necessary, both gears must be replaced.* Place a thrust washer over each pinion and side gear, then assemble pinion and side gears in differential case and secure with pinion shaft. *NOTE – Lubricate all parts with axle lubricant during reassembly.* Slide side gears and thrust washers tight against pinion gear and check clearance between case and thrust washers with a feeler gauge. Clearance should not exceed .015". If greater, install new thrust washers. Align lock pin hole in pinion shaft with hole in case and install lock pin, then peen case metal over lock pin. Install ring gear and tighten bolts to 50–60 ft. lbs. *NOTE – If tooth contact pattern was not correct as determined at disassembly, or if new parts are being installed (including bearings), pinion depth and ring gear-pinion backlash must be adjusted (see below).* Start rear bearing on pinion (tapered end up), then use Tool 4621–A and press bearing on pinion shaft. Use a .0015" feeler gauge between bearing and pinion to make sure bearing is fully seated. Place shim pack (same thickness removed at disassembly) in rear bearing counterbore and drive rear bearing cup into housing with Tool 4628–A. With front end of housing down, then place dummy bearings, Tool 4205–C on case assembly and install assembly in housing. Install bearing caps in their respective position with bearing bolts finger tight. Install dial indicator, Tool 4201–A on housing with contact point against back side of ring gear. Apply pressure to both sides of ring gear and move the entire assembly as far as it will go in one direction. Adjust indicator to zero, then apply pressure to both sides of ring gear and move entire assembly as far as it will go in opposite direction. Record the amount of travel for use later in assembly. Remove dial indicator and differential assembly and remove dummy bearings. With forward end of housing upward, install front bearing cup with Tool 4616. Place housing in a horizontal position and install drive pinion and rear bearing assembly. *NOTE – If depth adjustment of pinion is required, see "Pinion Depth Adjustment" below.* With pinion adjusted to its correct depth, place shims (removed at disassembly) over forward end of shaft, then lubricate front bearing and install it on shaft (tapered end down) with Tool 4858–B. Use Tool 4858–G or J and tighten nut on tool to 180–200 ft. lbs. Check pinion bearing preload *(see "Pinion Bearing Preload Adjustment" below).* If necessary, readjust shim pack. Place oil slinger (concave side up) against bearing, then install gasket. Drive a new seal into position in housing with Tool 4676. Drive a new seal deflector into position on companion flange with Tool 4859, then start companion flange on drive pinion and press it into place with Tool 4858–B. Install washer and locknut and tighten nut to 180–200 ft. lbs. Install differential case with dummy bearings in housing and check backlash *(see "Backlash Adjustment" below),* then remove case and dummy bearings from housing. Install selected shim pack under each of the side bearings and press side bearings on case with Tool 4222–K. Attach spreader, Tool 4000–A on housing and spread housing opening enough to permit installation of differential case and bearing assembly. *CAUTION – Do not spread opening more than .015".* Install bearing caps in their correct positions as marked on caps and housing. Remove spreader, then place sealing compound on bearing cap bolts and tighten bolts to 70–90 ft. lbs. Check backlash with a dial indicator mounted on housing. Backlash should be between .003" and .008" and must not vary more than .002" between points checked at four positions around ring gear. Install gasket and cover with identification tag beneath one of the cover bolts. Refill housing with gear lubricant, Part No. B9L–19A508.

PINION DEPTH (With Gauge Assembly 4020–B): Install gauge shaft and micrometer assembly in differential housing, then install bearing caps and tighten bolts to 70–90 ft. lbs. Attach anvil clamp to differential housing *(see "Pinion Depth Gauge Installation Change" above).* Place anvil block on pinion and tighten anvil block clamping screw. Check micrometer depth reading and refer to calibration chart. Select reading that applies to pinion drive being used. If micrometer reading is greater than that specified in chart, it will be necessary to remove .001" in shim stock for each .001" difference between micrometer reading and that specified in chart. If micrometer reading is less than that specified in chart, it will require the installation of .001" in shim stock for each .001" difference between micrometer reading and that specified in chart. Service shims are available in .0025"-.0035", .0045"-.0055", .009"-.011", and .027"-.033". Remove checking gauge. If shim adjustment is required, remove rear pinion bearing cup and install or remove shims as required. Recheck pinion depth.

Shim Method: If a new pinion is to be installed, refer to gear end of old and new pinions for a "plus" or "minus" sign followed by a number. If marks are not present, the shaft is considered "zero". The amount of shims required for a new pinion can be determined by amount of difference between markings on old and new pinion (unless tooth contact pattern previously taken indicated improper pinion depth adjustment). For example: If old pinion marking was +2 and the new pinion is −1, a difference of .003" is noted. If original shim pack totaled .035", it will be necessary to add an additional .003" shim to bring −1 pinion in line with old +2 pinion. *NOTE – If pinion markings were reversed, it would be necessary to deduct .003" in shims from original, making a total of .032".* Place shim pack in rear bearing counterbore and drive rear bearing cup into housing.

PINION DEPTH CHART

Gear Ratio	No. of Teeth on Ring Gear	No. of Teeth on Pinion	+10	+9	+8	+7	+6	+5	+4	+3	+2	+1	0	−1	−2	−3	−4	−5	Pinion Marking
2.89:1	55	19	.865	.866	.867	.868	.869	.870	.871	.872	.873	.874	.875	.876	.877	.878	.879	.880	Micrometer Reading
3.11:1	59	19																	

PINION BEARING PRELOAD: With pinion shaft depth properly adjusted and shaft installed in housing, place approximately .065" shims on shaft at forward end and install front bearing, pressing it into position with Tool 4858-B. With Tool 4858-G or J, tighten nut on tool to 180-200 ft. lbs. With pinion shaft in a vertical position, use Tool 4209 and check torque required to rotate drive pinion. Torque required should not be less than 8 or exceed 12 inch pounds when using original bearings. If new pinion bearings installed, a preload setting of 18-20 inch pounds is recommended. If torque is less than specified minimum, remove shims. If torque exceeds maximum specification, add shims. Service shims are available in .003", .005", .010" and .030".

BACKLASH (RING GEAR-PINION) & SIDE BEARING PRELOAD: With pinion shaft properly installed in case, install differential case with dummy side bearings in their respective positions and install bearing caps and tighten retaining bolts finger tight. Attach dial indicator (Tool 4201–A) to housing with indicator contact bearing against rear side of ring gear. Hold ring gear tight against drive pinion and adjust indicator to zero. Move ring gear away from pinion as far as it will go and record the dial indicator reading. Repeat this procedure and recheck reading. *NOTE – This reading represents total thickness of shims to be placed on ring gear side of differential.* Subtract this reading from reading obtained before pinion shaft installed in housing (see above), and add .015". *NOTE – This will give total thickness in shims to be placed on tooth side of ring gear.* For example: Total travel with pinion out of housing was .100" and with pinion in housing, travel is .050". This means that .050" must be placed on ring gear tooth side of differential carrier and the rest of the shims (.050") will go on opposite side. *NOTE – This will set case assembly at zero preload and backlash.* To correctly adjust preload and backlash add .015" to ring gear tooth side, making a total of .065". Remove dial indicator, then remove differential case from housing. Install proper amount of shims as determined above under each of the side bearings, then press bearings on case with Tool 4222–K.

NASH & RAMBLER HYPOID

Nash Rambler & Statesman (1954)
Nash Ambassador (1954)

►**REAR AXLE IDENTIFICATION TAG:** Ring and pinion gear ratio stamped on tag attached to axle housing by one differential housing cover bolt.

►***CAUTION—Tag should be kept with axle parts and re-installed when axle reassembled. Install new tag (furnished with gear sets) when axle ratios changed.***

►CHANGES, CAUTIONS, CORRECTIONS

DESCRIPTION: Semi-floating, hypoid gear, Torque Tube Drive with Coil Springs (All Models except Rambler), Hotchkiss Drive with Semi-elliptical springs (Rambler).

AXLE REMOVAL: ***See "Rear Axle" on car model page.***

PROPELLER SHAFT (RAMBLER): Removal—Loosen coupling nut on rear end of rear universal joint yoke, use soft hammer to tap universal joint and propeller shaft off pinion shaft.

Installation Caution—Make certain that universal joint yoke lined up with pinion shaft when tapping yoke on shaft, tighten coupling nut securely.

►*RAMBLER 108" WHEELBASE MODEL PROPELLER SHAFT REMOVAL & DISASSEMBLY:* **(Removal)**—Remove propeller shaft coupling nut from coupling and tap coupling off pinion shaft with a soft hammer. Remove nuts from propeller shaft center bearing retainer studs and disconnect cross member from support brackets at side rail. Remove cross member and propeller shafts from car.

TORQUE TUBE & PROPELLER SHAFT (EXCEPT RAMBLER): These units not same design on all models.

Statesman (Exc. Overdrive & Hydra-Matic) - Torque tube drive with rear end of propeller shaft connected to drive pinion by a "Slip Type" coupling.

Statesman (Overdrive Trans.) - Same as for synchro-mesh transmission except that two propeller shaft bearings used.

Statesman (Hydra-Matic)—Torque tube drive type with rear end of propeller shaft connected to drive pinion by flange type coupling (same as Ambassador). No propeller shaft center bearing used.

Ambassador (All Models)—Torque tube drive with propeller shaft connected to drive pinion by flange type coupling. Single propeller shaft center bearing (Exc. Hydra-Matic Drive Cars). No bearing used with Hydra-Matic Drive.

Removal: (All Models)—Disconnect truss rods at center bracket ("600" & Statesman); center bracket and axle housing (Ambassador). Pry universal joint off forward end of propeller shaft (joint is light press fit). Disconnect torque tube from rear axle housing, move tube forward to expose shaft coupling, loosen coupling nut or remove bolts from coupling flange, and lift off torque tube and propeller shaft.

Propeller Shaft Center Bearing (Not used On All Models): Prelubricated type ball bearing retained on propeller shaft by snap ring on each side and rubber mounted in torque tube. To remove bearing take out snap ring, drive bearing off **toward front end** of shaft (forward end of shaft .003" undersize to facilitate removal & installation). Install new bearing in same manner and see that new snap rings properly seated to hold bearing in position.

Propeller Shaft Coupling Installation (All "600" & Statesman Models with "Slip-Type" Coupling): Install propeller shaft oil seal Part No. 3138146, on propeller shaft. Butt the propeller shaft at forward end against a wood block and drive the coupling Part No. 3138142 on propeller shaft with a lead or soft face hammer. Tap retainer and oil seal on coupling (CAUTION—Do not install seal and retainer on coupling prior to its installation on propeller shaft as seal will be damaged). Coupling must be driven on propeller shaft to the shoulder or splined area inside coupling. Install Spacer, Part No. 3138466. Install torque tube rear oil seal Part No. 3138166, and retainer Part No. 3138144. Propeller shaft with coupling can now be installed on pinion shaft. Lubricate ground surface on coupling and torque tube rear oil seal with rear axle lubricant. DO NOT CRIMP LIP OF SEAL.

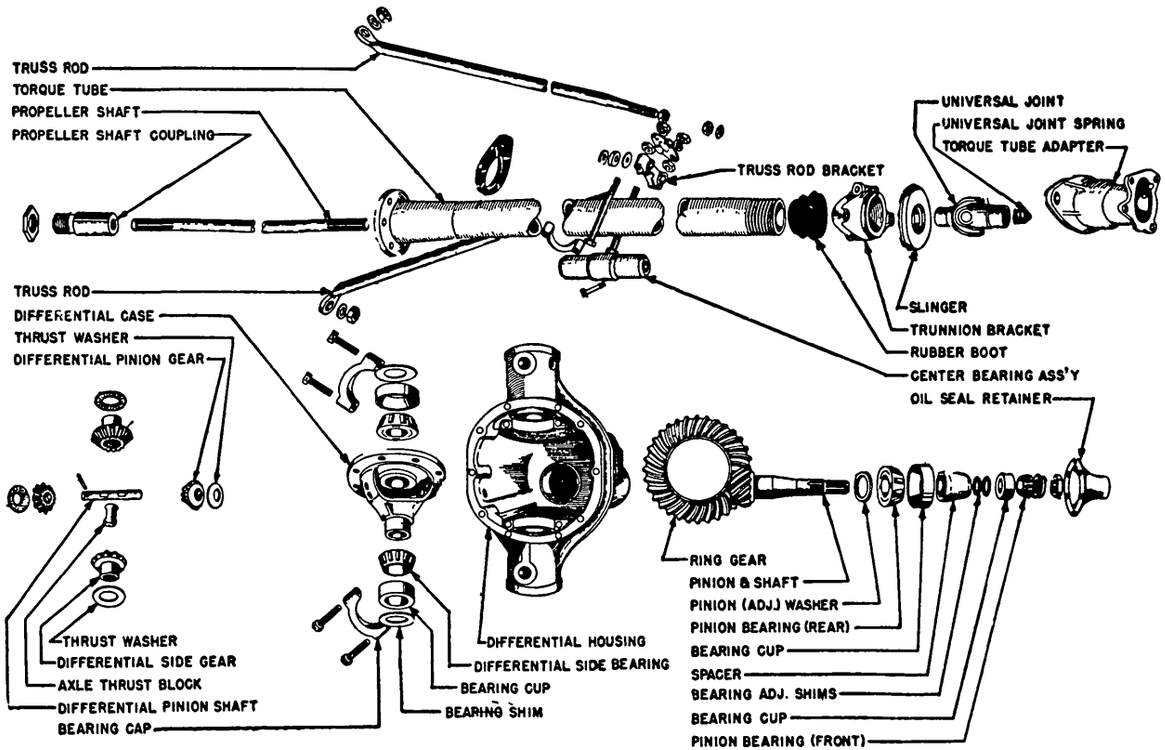
Torque Tube Trunnion Bracket ("600" & Statesman): On front end of torque tube and must be properly installed and adjusted when rear axle installed on car as follows:

Trunnion Bracket Adjustment—With axle completely assembled (rear end of propeller shaft against pinion shaft, torque tube assembled on housing), position trunnion bracket on torque tube so that front end of propeller shaft projects ⅛" to ¼" beyond the face of trunnion bracket. After bracket properly positioned, adjust clampscrew on underside of bracket to remove all excess clearance between threads on bracket and tube without setting up excessive friction. Bracket must be free to move on threaded tube. Lock clampscrew nut with cotter pin. Rubber boot must be installed behind bracket to protect threads on tube from road dirt. Threaded parts require no lubrication except at time of assembly. Lubricate these parts sparingly.

►***CAUTION—If propeller shaft extends less than ⅛" beyond face of trunnion bracket, universal joint slinger may rub on bracket. If shaft extends more than ¼", effectiveness of slinger will be reduc d.***

Trunnion Bracket Installation on Car: After bracket position adjusted (above), torque tube and rear axle assembly can be assembled to transmission as follows: Thread 2 special trunnion bracket studs (with tapered ends to rear) on trunnion bracket and lock with nuts and lock washers. Assemble plain stamped steel retainer, rubber cushion block (with small extension to front), steel retainer with pilot flange over extension on rubber block, on each stud. Install torque tube and rear axle assembly with trunnion bracket studs passing through holes in transmission (or overdrive) rear bearing retainer. Assemble steel retainer with pilot flange to rear, rubber block with extension to rear, and plain steel retainer on front end of studs. Tighten retainer nuts on studs until rubber cushions held under slight tension. Lock nuts with 'palnuts'.

CONTINUED ON NEXT PAGE



NASH HYPOID GEAR AXLE (TORQUE TUBE DRIVE)

NASH & RAMBLER HYPOID (C nt.)

REAR AXLE OVERHAUL: With torque tube and propeller shaft removed (see above), use stand to support axle and proceed as follows:

Disass mbly (Differential Removal): Mark bearing caps to insure correct reassembly, then remove bearing caps and pry differential assembly out of housing being careful not to damage bearings or shims.

Differ ntial Installation - Place bearing cups and shims in position on bearings, then tilt bearing cups slightly so that they enter seat in housing and force assembly into place, which will cause bearing cups to straighten on bearing rollers. If shims project, tap them into place, then install bearing caps and tighten bolts securely.

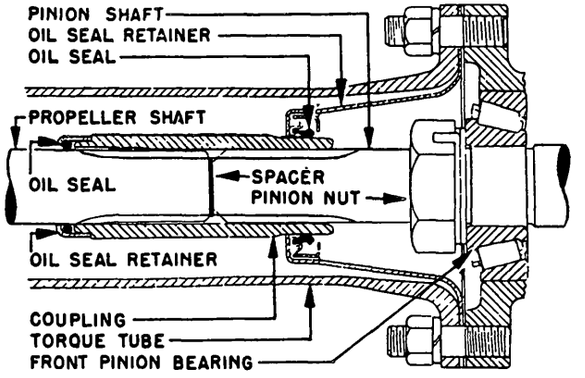
Pinion Bearing Disassembly: Before pinion shaft can be removed, propeller shaft must be disconnected by loosening coupling nut on rear end of shaft. Then remove the oil seal from housing, bend back lip of pinion nut locking plate, loosen nut. On Ambassador models, remove nut on forward end of pinion shaft at coupling flange, pull coupling flange from shaft, lift off oil seal (held in place by torque tube flange).

Pinion Disassembly—Tap on pinion shaft with soft hammer to loosen front bearing cone, remove bearing cone and roller assembly, remove shims located behind bearing cone, **note number and thickness of these shims** which control bearing adjustment. Remove pinion and rear bearing assembly through rear of housing. Use long drift to drive pinion bearing cups from housing (recess provided behind each cup for this purpose). Use pinion bearing tool J-2244 (600 & Statesman), tool J-2245 (all Amb. models) to remove rear bearing from pinion shaft, **note number and thickness of washer or shims on shaft behind bearing** which control pinion setting (gear mesh). To remove differential side bearing cone and roller assemblies, use special puller J-2497 being careful that puller does not contact roller cage or damage shims in back of left hand bearing (these shims control ring and pinion gear backlash).

Pinion Bearing Reassembly: Assemble each model as follows:

Rambler—Install pinion, shims, and rear bearing) through rear of housing, then install bearing adjusting shims (same thickness as were removed when axle disassembled) and front bearing on forward end of shaft. Install bearing washer and pinion nut but **do not install oil seal,** tighten pinion nut to 90-95 ft. lbs. Check and adjust bearing pre-load. After bearing adjustment completed, lock pinion nut to prevent loosening, install oil seal (use installer J-4485).

All Models except Rambler—Bearing adjustment controlled by shims on the pinion shaft between spacer and forward cone (A production change in late 1950 eliminated the spacer. Shims are placed between front bearing and shoulder on pinion shaft). When installing pinion, install correct washer and shim pack for correct pinion mesh (see Pinion Setting below) on shaft against pinion, install rear bearing cone and bearing spacer. Install sufficient shims on shaft in front of spacer (or against shoulder) to insure positive endplay of shaft when installed in housing, install front bearing cone, shaft coupling flange (Ambassador) or special tool (splined sleeve) and tighten nut on shaft securely. Then check bearing adjustment as directed below. NOTE—Do not install oil seal until adjustment has been made.



STATESMAN "SLIP TYPE" PROPELLER SHAFT COUPLING

Pinion Bearing Pre-load Adjustment:

Rambler Bearing Pre-load—Pre-load controlled by shims on pinion shaft behind front bearing cone. use two shims only, varying thickness of each shim to secure total thickness of .106" to .138" for correct .003" tight bearing adjustment and 12-14 in. lbs. pre-load. If pre-load less than 12 in. lbs., decrease shim thickness. If pre-load greater than 14 in. lbs., increase shim thickness.

►**Bearing Adjusting Shim Note**—These shims furnished in following thicknesses (combination of two shims provide range of .106" to .138" in .001" steps): .053", .054", .056", .058", .059", .063", .064", .066", .068", .069".

All Models exc. Rambler Bearing Pre-load (Tool J-2496: With pinion installed in axle housing (make certain that spacer and bearing adjusting shims in place on shaft between bearing cones), install tool on end of shaft in place of the coupling flange, tighten pinion shaft nut securely. Attach spring scale to exact center of tool handle (will provide 6" arm), check torque required to turn pinion shaft. See table below for desired torque reading. **If less than lower figure, remove shims from between spacer and front bearing cone, if greater than higher figure,** add shims at this same point. When bearing adjustment completed, install new oil seal, install coupling flange (Ambassador), see that pinion nut tightened to 105-110 ft. lbs.

Pinion Bearing Pre-load

Model	Pinion Shaft Turning Torque
Rambler & Statesman	12-14 in. lbs.
Ambassador	15-20 in. lbs.

Pinion Setting: Pinion depth and consequent ring and pinion gear mesh is controlled by spacer washer or shims installed on pinion shaft between rear bearing cone and pinion. Must be adjusted when new gears or other parts installed.

Pinion Setting without Gauge—If new pinion being installed and pinion setting gauge not available, note washer and shim thickness used for old pinion, secure standard washer thickness for this housing by adding (if pinion marked +), subtracting (if pinion marked —) shims equal to figure following this plus or minus mark on the old pinion, finally correct this standard washer thickness in accordance with new pinion marking as directed under Pinion Setting above.

Pinion Setting using Rear Axle Drive Pinion Gauge No. J-2499: With rear pinion bearing cup installed in housing, place bearing cone and roller assembly in cup, press in and revolve bearing cone so that rollers are properly seated. Bolt special gauge plate on bearing cone (thread bolt through housing and secure in place with cross-piece and thumbnut at forward end), make certain that gauge plate does not contact housing at any point. Mount dial indicator on tool with indicator button on top of gauge pin, set dial indicator at Zero with tension on gauge pin. Install tool in axle housing with larger diameter of adapter rings seated in side bearing seats (install adapters on tool with larger diameter rings outward for Ambassador, small diameter outward for 600). Swing gauge point across gauge plate and note highest reading of dial indicator, subtract this reading from .140" and resulting figure will be washer thickness required for a standard "0" pinion. If pinion is not standard (marked by — or + figure on end), add (if pinion marked —), or subtract (if pinion marked +) from the standard washer thickness an amount equal in thousandths to the figure following this — or + sign.

Differential Disassembly: Use Puller Tool J-2497 to remove bearing cone and roller assemblies from differential case. Note number and thickness of shims located behind each bearing cone. These shims control ring and pinion gear backlash and differential bearing preload. Remove capscrews attaching ring gear to differential case (be sure and mark ring gear and case to retain same location when reassembled). Using a brass drift, tap ring gear from case. (CAUTION—Do not chisel or wedge ring gear from case). Use a 3/16" diameter drift at least 3" long to drive out the lock pin holding differential pinion shaft in place. Pinion shaft can then be removed, and the thrust block can then be dropped out through differential side gear. Roll differential pinion gears around on side gears until they can be lifted out through holes in case, then lift out side gears and thrust washers.

Inspection: Clean all parts and blow dry with air. Check gears for worn, cracked, chipped, or scuffed teeth. Check thrust washers and oil seal surfaces for wear or roughness, and check bearings for roughness or wear. Replace defective parts.

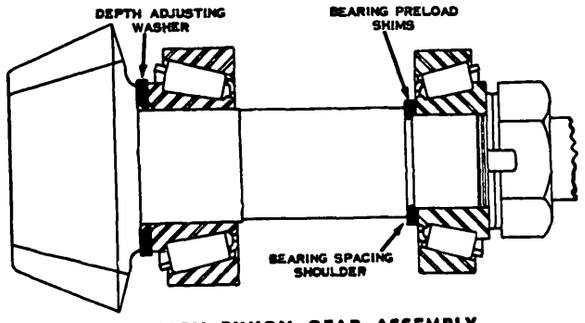
Differential Reassembly: Install thrust washers on side gears, with oil pocket toward gear, and install gears in bores of differential case. Install thrust washers behind differential pinion gears and mesh gears with side gears so the holes are opposite and in line with each other. Roll gears around until gear holes are aligned with differential pinion shaft hole in case. Install pinion gear shaft with the lock pin hole in line with the lock pin hole in differential case. Before pressing differential pinion shaft in place, install the thrust block through side gear, aligning hole in block with differential pinion shaft. Press differential pinion shaft in place and measure the clearance between differential side

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NASH & RAMBLER HYPOID (Cont.)

gear and case. This clearance should not be more than .010" (side gears should not fit tight enough to require more than 8 ft. lbs. to turn differential gears). Check by installing on axle shaft and using a torque wrench to turn shaft. Drive lock pin in place. Press differential side bearings on case using Tool J-2104 (Ambassador); J-2100 (Statesman).

Differential Bearing Adjustment: Bearing preload should be .004-.006" which is controlled by shims placed between side bearing cups and axle housing on each side. To determine shim thickness, install carrier in housing with one .075" shim at each side, then check endplay. If endplay noted, install next thicker shim on each side and recheck. With endplay just taken up, **install .005" thicker shim on right hand side** which



NASH PINION GEAR ASSEMBLY

will provide correct bearing preload of .004-.006". Tighten bearing capscrews to 55-60 ft. lbs. Check ring gear backlash with a dial indicator, then finally check ring gear and pinion mesh by painting gear teeth with red lead and rotating gears to provide a contact pattern. *NOTE - Adjusting shims are furnished in .075", .080", .085", .090", .095" thickn sses.*

Ring & Pinion Gear Adjustment: Gear mesh should be correct if pinion setting properly made (see above). Check gear mesh after all adjustments made by painting 8-10 teeth of ring gear with red lead and rotating gears by hand (turn pinion shaft with wrench while supplying drag on ring gear with the hand). Check backlash and adjust as follows:

Ring Gear Backlash Adjustment - Should be .004-.006". Adjust by adding or removing shims between left hand differential bearing cup and housing. *CAUTION - Total shim pack must not be changed and any shim chang on left hand side must be ffset by corr sp nding shim change on right hand side (t maintain bearing pr load).*

1955-57 HUDSON, NASH, RAMBLER HYPOID

Hudson Wasp & Hornet (1955)
Hudson Wasp (1956)
Hudson Hornet (Exc. Spec. V8) (1956)
Nash Statesman & Ambassador (1955)
Nash Statesman (1956)
Nash Ambassador (Exc. Spec. V8) (1956)
Rambler (1955)
Rambler 6 Cyl. (1956-57)
Rambler V8 (Early 1957) ℂ

ℂ - From start of production to Serial No. A-11269.

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE IDENTIFICATION TAG:* Ring and pinion gear ratio stamped on tag attached to axle housing by one differential housing cover screw. *CAUTION - Tag should be kept with axle parts and reinstalled when axle reassembled. Install new tag (furnished with gear sets) when axle ratio changed.*

►*REAR AXLE ASSEMBLY NOTE:* The assemblies used on all series cars are similar and overhaul procedures are the same except as noted.

►*1955 HUDSON HORNET V8 & NASH AMBASSADOR V8 PROPELLER SHAFT NOISE CORRECTION & PRODUCTION CHANGE:* A noise developing at 58-62 MPH, under light throttle pressure, either on pull or coast (similar to rear axle gear noise) may be caused by drive shaft and can be corrected by installing a two-piece shaft Part No. 3145400. The later two-piece shaft replaced the former one-piece type shaft in production at Car Serial No. V-8235 (Nash), Y-5887 (Hudson).

►*1956 PINION DEPTH SHIMS LOCATION CHANGE & DEPTH ADJUSTMENT PROCEDURE CHANGE:* In early production cars, the pinion depth adjusting shims were located between the pinion gear and rear bearing cone. In later cars the shims were located in the carrier housing behind the rear bearing cup. On later cars the rear face of the pinion gear is machine ground and the depth adjusting procedure changed. *See "Pinion S tting (Lat r Cars)" und r "Ov rhaul" below.*

►*1956 & EARLIER SERIES 50, 60, 80 TORQUE TUBE TRUNNION ASSEMBLY SERVICE REPLACEMENT:* Torque Tube Trunnion Kit, Part No. 3117235 containing a trunnion and six rivets is available for service replacement. For installation procedures, see "Overhaul" below.

►*1956 HUDSON HORNET & NASH AMBASSADOR V8 REAR AXLE NOTE:* A "Spicer" type rear axle is used on these models. *See "Spicer Semi-Floating" Rear Axle.*

►*1957 RAMBLER V8 REAR AXLE PRODUCTION CHANGE:* Spicer type rear axle used beginning with Serial No. A-11296. Spicer type axles are identified by number "44" cast on housing.

►*1957 RAMBLER SIX AXLE SHAFT PRODUCTION CHANGE:* Beginning with Serial No. D-393951, serrated type axle shafts and hubs used in production, replacing the earlier "Keyed" type shaft and hub and drum assembly. *See below.*

DESCRIPTION: Semi-floating hypoid gear type with torque tube drive and coil springs (Exc. Rambler), Hotchkiss Drive and semi-elliptical springs (Rambler).

REAR AXLE REMOVAL: *See "Rear Axle" on Car Model Page.*

AXLE SHAFT: Removal (Key Type) - Remove wheel, use puller J-1644-B or J-736-B attached to rear wheel hub, remove hub from axle *(CAUTION–Do not use "knock-out" type axle pullers).* Check axle shaft endplay using Endplay Checking Tool J-2092 and note endplay for use at reassembly. Remove capscrews attaching brake support plate to axle tube. Slide oil seal, support plate and shims off axle (the oil seal on Rambler Models is located between support plate and axle tube). Measure shims with a micrometer to determine amount to be used at reassembly. Attach Axle Shaft Puller J-2498-A to axle and pull shaft out of housing. Slip bearing cup off axle and press bearing cone off axle shaft.

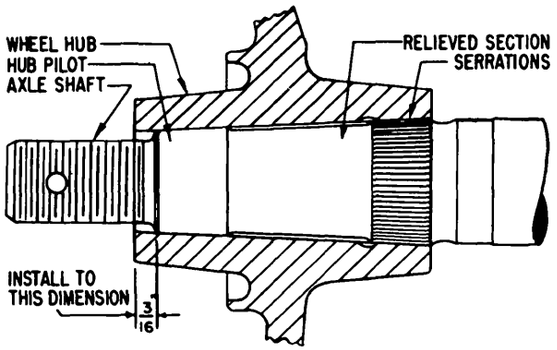
Installati n: Press axle shaft bearing onto axle shaft with small diameter of cone toward outer tapered end of shaft using Replacer J-2995. Soak new inner axle oil seal in light engine oil and install seal using Replacer J-2539. Install axle shaft, indexing splined end with differential side gears *(NOTE–Horn t & Ambassador right hand axle shaft is 1½" long r than l ft hand shaft).* Install outer bearing cup using Replacer J-1433-1. Install original shims onto axle with the drain holes aligned with hole in axle tube (if endplay was checked at time of disassembly and required correction, adjust the shim pack as necessary for correct axle shaft endplay of .002-.004"). Install brake support plate, spacer and oil seal (Rambler oil seal is installed behind brake support plate). Tighten support plate bolts to 50-55 ft. lbs. (Hornet & Ambassador), 30-35 lbs. (Other Series). Check and adjust axle shaft endplay (see below). Inspect wheel hub key for a snug fit in keyway of shaft and hub. *(NOTE–On* Rambler, install wheel hubs after axle assembly installed in car). Slide hub onto axle shaft aligning the keyways. Install key and press hub onto shaft. Key must be flush with hub. Install thrust washer and axle nut and tighten to 180-190 ft. lbs. (Hornet & Ambassador), 160-165 ft. lbs. (Other Series). Install cotter pins.

Replacement (Serrated Type): Remove the tire and the wheel assembly from the brake drum and hub, then remove speed nuts holding drum to hub. Use Hub Puller, Tool J-736-B or J-1644-B to remove hub from axle shaft. To install hub, index serrations of hub with those on shaft and tighten with the axle shaft nut and washer. The hub is properly located on axle shaft when the measurement from outside face of hub to the taper of the axle shaft is 3/16". *(CAUTION - Ov r-tightening beyond this dim nsion will cause int rf r-ence between drum and brak support plat).*

►*SERVICE REPLACEMENT HUB NOTE:* Service replacement hubs are not serrated. Serrations will be cut in the hub when it is installed on the shaft. The measurement of 3/16" from outside face of hub to the taper of the axle shaft applies to a service replacement hub without serrations.

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1955-57 HUDSON, NASH, RAMBLER HYPOID (C nt.)



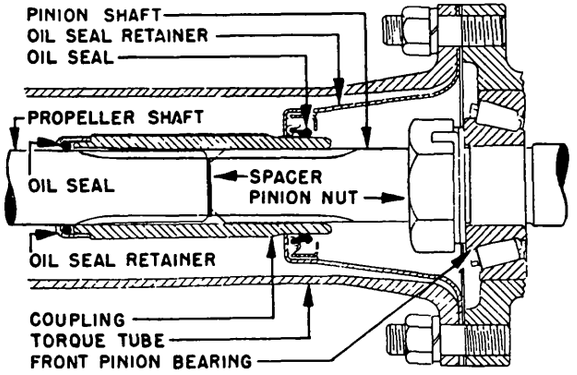
RAMBLER (6 CYL.) SERRATED AXLE

TORQUE TUBE & PROPELLER SHAFT (Exc. Wasp & Stat sman with Standard & Overdrive Transmission): R m val—Raise and support rear end of body. Disconnect hand brake cable at equalizer and remove hand brake bellcrank assembly from torque tube. Disconnect rear stabilizer bar at rear axle tube. Remove truss rods at axle tubes and at center bracket on torque tube. Disconnect torque tube from transmission adapter and move axle assembly and tube to the rear to disengage propeller shaft from transmission. Disconnect rear of torque tube from rear axle housing and move tube forward sufficiently to expose coupling. Disconnect coupling flange and remove torque tube and propeller shaft. Remove pinion flange with Puller J-2984.

Installation—Reverse removal procedure and note the following: On Hornet & Ambassador use new locks on companion flange nut. On Wasp, support pinion from the rear while pressing on companion flange. Tighten flange nuts to 30-35 ft. lbs.

TORQUE TUBE & PROPELLER SHAFT (Wasp & Statesman with Standard & Ov rdrive Transmission): Removal—Raise and support rear end of body. Disconnect hand brake cable at equalizer and remove hand brake bellcrank assembly from torque tube. Disconnect rear stabilizer bar at rear axle tube. Disconnect truss rods at center bracket. Disconnect trunnion bracket from the adapter by removing rear nuts from dowel studs. Move torque tube and rear axle to rear to clear studs. Disconnect torque tube from rear axle housing and move tube forward. The coupling is a slip fit on the pinion shaft and a press fit on the propeller shaft. Slide coupling off pinion shaft. Place propeller shaft in a vise and drive coupling off shaft with a lead hammer.

Installati n—Reverse removal procedure and note the following: Install propeller shaft oil seal and retainer on propeller shaft. Butt propeller shaft at forward end against a wood block and drive the coupling on the shaft with a lead hammer. *(CAUTION*—Do not install the seal and retainer on the coupling prior to its installation on the propeller shaft). Coupling must be driven on shaft to the shoulder on the splined area inside coupling. Install the spacer. Lubricate the ground surface on the coupling and the torque tube rear oil seal with rear axle lubricant. The propeller shaft with coupling can now be installed on pinion shaft (do not crimp lip of oil seal). Make sure that the torque tube seal contacts coupling on the ground surface of coupling.



"SLIP TYPE" PROPELLER SHAFT COUPLING

PROPELLER SHAFT (Rambler 100" Wheelbase & 108" Wheelbase with Hydramatic): Removal—Raise and support rear of body at the side sills and the rear axle at center of housing. Loosen propeller shaft coupling using Propeller Shaft Coupling Wrenches J-4486. Disconnect rear shocks at the axle tubes, hand brake cable at adjusting yoke, and rear brake hose clip from body floor pan. Remove rear spring front bracket attaching nuts and lower the rear axle, continuing to support the body, thus lowering rear spring front brackets from the floor pan. Move axle assembly to the rear sliding propeller shaft yoke of transmission main shaft splines. Remove propeller shaft from pinion shaft.

Installation—To permit correct location of propeller shaft when assembling on the car, slide shaft onto transmission main shaft until it is bottomed. Mark propeller shaft front yoke adjacent to the oil seal and remove shaft. Install propeller shaft on rear axle pinion shaft. Move rear axle assembly to rear and slide the front universal joint yoke onto transmission main shaft. Loosen rear spring front eye bolt and tilt front bracket so that rear holes are aligned with studs in floor pan. Raise rear axle assembly aligning rear spring front bracket with studs, and tighten. Reinstall brake hose clip, hand brake cable, and rear shocks. Permit rear axle assembly to hang freely, the shocks fully extended, and move the shaft to the front or rear to locate the mark on the propeller shaft 5/32" to rear of transmission oil seal. Tighten coupling nut to 300 ft. lbs.

PROPELLER SHAFT (Rambler 108" Wheelbase with Standard & Overdrive Transmission): Removal—Remove propeller shaft coupling nut from coupling and tap coupling off pinion shaft splines with a soft faced hammer. Remove nuts from propeller shaft center bearing retainer studs. Disconnect crossmember from support brackets at side sills and remove crossmember. Remove assembly from car. Place propeller shaft in a vise and turn back propeller shaft bearing lock to allow propeller shaft center locknut to be removed. The rear shaft can now be removed by sliding the splined slip joint from front propeller shaft, (the locknut will remain on splined slip joint). Remove felt washer and felt washer retainers, and remove the nut. Remove propeller shaft center bearing spacer, cover, center bearing and retainer, bearing cover, and dust shield. Remove center bearing from retainer with a brass drift.

Installation—Reverse removal procedure and note the following: Yokes of universal joints must be in alignment when installed.

TORQUE TUBE TRUNNION BRACKET ADJUSTMENT (Wasp & Statesman): Tighten trunnion bracket clampscrew enough to remove excess clearance without setting up friction and so trunnion bracket is free to move on torque tube. When rear end of propeller shaft is against pinion shaft and torque tube is secured to axle housing, the front end of the propeller shaft must protrude from 1/8" to 1/4" beyond front face of trunnion bracket (except Hydra-Matic Drive models). On Hydra-Matic Drive models, adjust trunnion bracket so forward edge of dust shield is in alignment with centerline of universal joint bearing cups. Connect bracket bolts to transmission adapter.

REAR AXLE OVERHAUL: With rear axle assembly removed from car and with axle shafts removed, proceed as follows:

Differential Removal & Disassembly: Remove cover bolts (note ratio tag on one of bolts which should be retained for installation after overhaul), mark differential side bearing caps with a center punch to assure correct reassembly, and remove bearing caps from housing. With a pry bar inserted from each side of differential case adjacent to pinions, pry against housing and lift case assembly out. *(CAUTION*—Take care to prevent damage to bearings and shims) Tie side bearing shims to their respective bearing caps and cups to prevent misplacement. Install Bearing Puller J-2497 on bearings in such a manner as to leave rollers free, and remove bearings from case. Remove capscrews attaching ring gear to differential case, and using a brass drift, tap ring gear from case. *(CAUTION—Do not chisel or wedge the ring gear from case).* Use a 3/16" diameter drift at least 3" long to drive out the lock pin holding differential pinion shaft in place Drive out pinion shaft, dropping the thrust block out through differential side gear. Roll differential pinion gears around on side gears until they can be lifted out through holes in case, then lift out side gears and thrust washers.

Inspection—Inspect all parts for distortion, cracks, and excessive wear. Inspect all bearing surfaces for nicks and burrs and dress down small nicks or burrs with a smooth file or stone. Check fit of differential pinion shaft in case. Shaft should be a press fit to .010" loose. Inspect fit of differential side gears in differential case bore. This clearance should not exceed .007". Clearance between side gear and case should be .000" to .008" with .004" preferred. Where differential assembly is a tight fit, it will be acceptable if not more than 8 ft. lbs. of torque applied to either side gear will rotate the internal gears. If gears need replacement, pinion and side gears should be replaced as a set. Inspect ring gear and if tooth pattern indicates pinion and ring gear have not been meshing correctly, replace both gears. Inspect ring gear attaching bolts for elongation and replace any bolts that are defective.

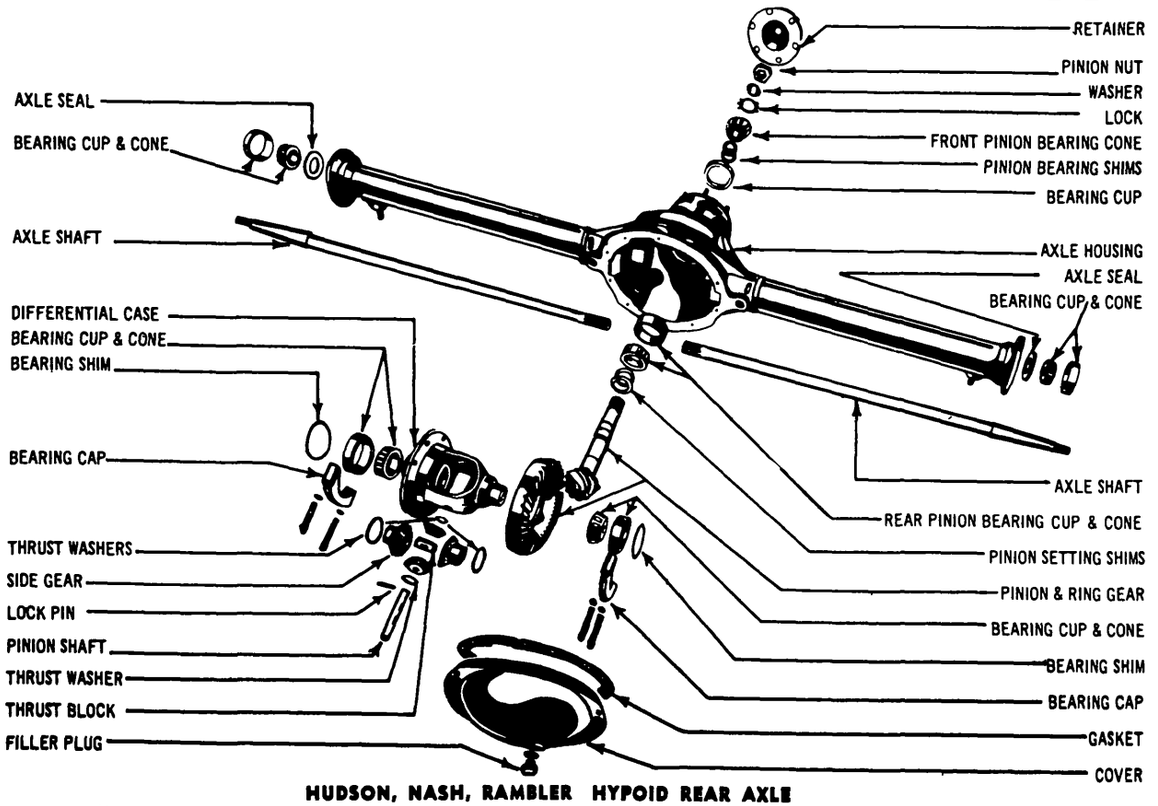
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1955-57 HUDSON, NASH, RAMBLER HYPOID (Cont.)

Pinion Shaft Removal & Disassembly: Remove companion flange or coupling from pinion shaft (see "Torque Tube & Propeller Shaft" above). Tap end of pinion shaft slightly with a fibre hammer to free front bearing cone from pinion shaft and remove bearing. Retain shim located between bearing and shoulder on pinion shaft (this shim controls bearing preload) and tag it for use at reassembly. Remove pinion and shaft assembly from rear of housing. Drive bearing cups out of rear axle housing using a drift inserted in recess in housing. Keep cups square in the bore to prevent damaging bores. Remove rear bearing from pinion shaft using Pinion Bearing Remover J-2245-A (Hornet & Ambassadore), J-2244 (Wasp, Statesman & Rambler) and an arbor press. Remove pinion bearing adjusting washer located between bearing and pinion gear. Tag and retain this washer for use at reassembly (washer is used to adjust pinion depth in housing).

Inspection—Check to see that ring gear and pinion are matched sets (numbers or marks are etched in rear face of pinion gear and the edge of ring gear). Inspect oil seal surface for wear or roughness and pinion splines for damage caused by worn or loose coupling. Inspect pinion gear teeth. Inspect bearings, cones, cups and rollers for excessive wear, overheating, or scoring. If replacement required replace bearing cone and cup.

Differential Reassembly & Side Bearing Adjustment: Install new thrust washers on side gears with oil pockets on washer toward gear, and install gears in bores of differential case. Install new thrust washers behind differential pinion gears and mesh gears with side gears so holes are opposite and in line with each other. Roll gears around until gear holes are aligned with differential pinion shaft holes in case. Install pinion gear shaft with the lock pin hole in line with lock pin hole in case, partially into case. Install thrust block through side gear, aligning hole in block with pinion shaft. Press pinion shaft into place and measure clearance between differential side gear and case. This clearance should not exceed .008". (see "Differential Inspection" above to check tightness of side gears). Drive lock pin into place to secure pinion shaft. Press differential side bearings into place on case using Side Bearing Replacer J-2646 (Hornet & Ambassador), J-5364 and handle J-875-5 (Other models). Place bearing cup over each side bearing and install differential case assembly in axle housing (ring gear not installed on case and drive pinion not installed in housing). Install a .070" shim (Hornet & Ambassador), .075' shim (Other Series) on each side between bearing cup and housing. Test assembly for side play by rotating it, and install progressively greater shims to eliminate all side play. Hornet & Ambassador Series shims are available in thicknesses from .070" to .100" in .002" increments. Other Series are available in thicknesses from .075" to .098" in .002" increments. (*NOTE*—If additional thickness of shims is required to eliminate side play on Hornet & Ambassador, thin shims .003", .005", or .010" may be installed between bearing cone and differential case. For other series, use Hornet & Ambassador pinion depth adjusting shims in the same manner). When side play is eliminated, a slight bearing drag is noted. Install respective bearing caps and tighten cap bolts to 105-110 ft. lbs., (Hornet & Ambassador), 55-60 ft. lbs., (Other Models). Recheck differential for excessive bearing drag. Attach a dial indicator to axle housing and check ring gear face of differential case for runout. Runout should not exceed .002'. Remove case from housing, **retaining shims used to eliminate side play.** Install ring gear on differential case and bolt gear to case with capscrews and new locks. If necessary, two 3/8"-24X1" capscrews installed in opposite holes may be used as guides to pull gear into position. Tighten capscrews to 50-55 ft. lbs. and install locks.



HUDSON, NASH, RAMBLER HYPOID REAR AXLE

Pinion Shaft Reassembly & Installation: Install rear bearing cup in axle housing with Installer J-2533 (Hornet & Wasp), J-5367 (Other Series). Install front bearing cup with Installer J-2531 (Hornet & Ambassador), J-2532 (Other Series), being careful to drive all bearing cups straight into clean bores. Slide proper depth washer and new shims that have been selected (if old pinion and ring gear being reinstalled, use same washer and shims pack found under rear bearing at time of removal. If a new pinion and ring gear or new bearings being installed, adjust pinion depth as indicated below. *See "Pinion Setting").* Use bearing Installer J-2995 (Wasp, Statesman, Rambler) and press bearing tight against washer and gear. On Hornet & Ambassador, a piece of steel tubing 1 11/16" I.D. about 8" long may be used to install pinion gear assembly in housing. Install same thickness of shims as removed and install front bearing. If adjusting washer thickness was changed, add the necessary shims to compensate for the change. On Hornet & Ambassador use pinion holding and spacer tool J-2496 and install spacer in place of the companion flange. Tighten pinion nut to 125-150 ft. lbs. On other series, install pinion nut, thrust washer, and lockwasher. Tighten nut to 90-100 ft. lbs.

Pinion Bearing Preload: Install Pinion Holding Tool & Spacer J-2496 on pinion shaft. Attach a spring scale to center of handle and pull tool in a circular motion. Note reading on scale and multiply it by six to determine the inch pounds of torque required to rotate pinion shaft (*NOTE*—For a more accurate reading, turn axle up so pulling effort is on a horizontal plane). Pinion bearing preload is .15-18 inch pounds (Hornet & Ambassador), 12-14 inch pounds (Other Series). If preload is too high, **increase** shim thickness behind front bearing. If too low, **decrease shim thickness.** Complete installation as indicated below.

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1955-57 HUDSON, NASH, RAMBLER HYPOID (C nt.)

H rn t & Ambassador–Remove spacer tool and install a new oil seal. Install companion flange using Tool J-1375. Install lockwasher and pinion nut and tighten to 125-150 ft. lbs.

Wasp, Statesman & Rambler (Exc. Wasp with Hydra-Matic)– Install lockwasher next to bearing then the plain washer and nut. Tighten nut to 90-100 ft. lbs. Install pinion oil seal on Wasp and Statesman. Use Tool J-4485 to install pinion oil seal on Rambler.

Wasp (With Hydra-Matic)–Press pinion shaft companion flange onto pinion shaft while supporting shaft from the rear to prevent damage to bearings or axle housing.

►*PINION BEARING PRELOAD ADJUSTING SHIM NOTE:* A thickness range of .106" to .138" in .001" increments can be obtained by using a combination of two of the following size shims which are supplied for service installation. .053", .054", .056", .058", .059", .063", .064", .066", .068", .069".

Pinion Setting (With Pinion Setting Gauge J-2499): Place rear pinion bearing cone in bearing cup and revolve it using a little pressure to "set" the rollers. Bolt gauge plate over bearing cone so that it does not touch housing at any point (the bolt runs down through housing and is secured at pinion end). Attach a dial indicator to tool. With indicator button on top of the gauge pin, set dial indicator, under tension, to zero. Install tool with adapter squarely seated in side bearing bores in housing (Large diameter of adapter is used for Hornet & Ambassador, and small diameter is used for other models). Swing gauge point across plate until highest reading is obtained. This reading subtracted from a constant of .140" will give the standard adjusting washer thickness for that particular housing. Using this figure, add or subtract according to marking on pinion to determine correct adjusting washer thickness. For example: When gauge point is moved across plate and a reading of .015" is obtained, subtracting this figure from the constant of .140" will give a standard of .125". That means, using a standard "O" pinion, and adjusting washer of .125" thickness would be required. However, if pinion marking read -3 (meaning that it is .003" away from ring gear) it would be necessary to add this .003" to the standard. Thus the adjusting washer and shim combination would be .128".

Pinion Setting (With ut Pinion Setting Gauge): Note pinion marking on old pinion and new pinion gears and measure the thickness of the old depth washer and shims. Compensate for the difference in the old and new pinion markings and correct the depth washer and shim thickness. As an example: If old pinion is marked +2 and the new pinion is marked -3, there is a difference of .005" (indicating new pinion .005" further away from ring gear than old pinion). If old washer is .123", the new washer and shim pack must be .128". In In this case use a .125" washer and a .003" shim.

Pinion Depth Setting Adjustment (Later cars with pinion depth adjusting shims located between rear pinion bearing cup and bore in rear axle housing): The amount of shims used is determined by the amount of shims removed at disassembly and by the plus or minus figure etched on pinion. For example, if original pinion was marked + 2 and had a shim pack of .035" behind rear bearing cup and the new pinion to be installed is marked – 1, the shim pack must be increased by .003" to bring the new pinion to its correct position. Install the pinion front bearing cup with Replacer J-2534 or J-5367. Insert pinion in position and install front bearing cone and cup. Check pinion setting as follows: Mount discs J-2499-2 on Gauge Arbor J-6482-1 or discs J-5223-5 on Arbor Gauge J-5223. Install gauge seated squarely in housing bores. Place bearing caps in position and tighten bolts finger tight. Install Gauge Block J-5223-16 in position against end of pinion gear and clamp in place with Clamp Bar and Screw J-5223-6 and J-5223-14. Loosen thumb screw in end of gauge block and move plunger out until head contacts gauge arbor. Lock plunger in place with thumb screw, being careful not to disturb position of plunger. Loosen screw in clamp holding gauge block against pinion and remove gauge block. Measure distance from end of anvil to top of plunger head with a two to three inch micrometer. This measurement represents the distance from rear face of drive pinion to centerline of the rear axle and should be as follows: 2.095" (Rambler); 2.094" (Statesman & Wasp); 2.547" (Hudson Hornet & Nash Ambassador). This measurement applies only to correctly adjusted pinions marked "0". On a pinion marked + 2, the reading should be .002" less than this figure and with a pinion marked –3, the reading should be .003" greater. If the micrometer reading shows pinion setting is incorrect by more than .002" plus or minus from the given figure, shims equal to that amount must either be added or removed from shim pack between rear bearing cup and housing.

Ring Gear & Pinion Backlash Adjustment: Install differential assembly in housing using the shims selected to remove side play (see above). Tighten bearing caps to 105-110 ft. lbs. (Hornet & Ambassador), 55-60 ft. lbs. (Other Series). Attach a dial indicator to housing with the button contacting drive side of a tooth on ring gear and at right angles to it. "Rock" the ring gear and note dial reading. The backlash should be .002-.006" (.004" preferred). To increase backlash, install a thinner shim on ring gear side and a thicker shim on opposite side. To decrease backlash, reverse the procedure. *(CAUTION–Total thickness of shim pack must not be changed from those selected to remove all sideplay).*

Differ ntial Sid B aring Pr load: Increase shim pack (selected to remove sideplay) by adding a .004" to .008" thicker shim. These additional shims can be installed on one side only, or equally on both sides.

Diff r ntial Ass mbly Installati n: Assemble side bearing cups and shims on side bearings (make sure that bearing cups completely cover rollers of side bearings). Lower assembly into axle housing until bottom edge of bearing cups and shims are started in bearing bore. Keep differential assembly square in housing and push it down as far as possible. Using a soft hammer, tap outer edge of bearing cups until seated in housing *(CAUTION–Do not distort shims by hammering th m into housing).* Install bearing caps and tighten to 105-110 ft. lbs. (Hornet & Ambassador), 55-60 ft. lbs. (Other Series). Recheck ring gear and pinion backlash and correct as necessary. Coat eight or ten teeth of ring gear with red lead in oil and check tooth contact pattern. *See "Hypoid Gear Adjustment"* Install axle shafts.

Service Replacement Torque Tube Trunnion Installati n (Series 50, 60, & 80, 1956 & Earlier): *(NOTE* - On models prior to 1956, the trunnion assembly is riveted to torque tube. On 1956 models, it is welded). On 1956 models, remove original trunnion by making a hack saw cut through one thickness of metal adjacent to weld. Strike trunnion a sharp blow with a hammer to break away portions that may not have been cut all the way through. Remove trunnion and grind off remaining portion of weld on torque tube. On earlier models, remove rivets, then remove trunnion. Place new trunnion on torque tube, then place trunnion and torque tube assembly on bench and block tube at truss rod brackets or studs and position trunnion so that distance from front face of trunnion flange to rear face of rear torque tube flange is correct for the model being worked on (see "Torque Tube Lengths" below). *(NOTE* - Trunnion must be installed on torque tube so that the wider flat surface on trunnion flange is upward. When properly installed, the lower narrow flat surface on trunnion flange will be parallel to truss rod bracket (Series 50); truss rod studs (Series 60 & 80). Weld trunnion to torque tube (1956 models), or rivet to torque tube (earlier models). *NOTE* - If desired, the trunnion may be riveted to torque tube on 1956 models. Use trunnion as a template and mark the six holes located on torque tube. Drill 21/64" diameter holes and install trunnion with rivets supplied in kit. Rivet heads are installed to inside of torque tube.

Series	Torque Tube Lengths	① Length
50 (Std. & Overdrive)		61 1/32"
50 (Hydra-Matic)		63 31/32"
60 (Std. & Overdrive)		62 3/8"
60 (Hydra-Matic)		65 7/32"
80 (Ultramatic)		65 7/32"

① - Front flange face to rear flange face.

Torque Tube & Propeller Shaft Removal, Installation & Adjustment (Rambler Models): Procedures are the same as for 1955 Statesman & Wasp models except that on Rambler models with Hydra-Matic Transmission, the rear coupling is integral with the propeller shaft.

AXLE ASSEMBLY INSTALLATION: *S "T rqu Tub & Pr pell r Shaft" and "Axle Ass mbly R m val" ab v and rev rs th rem val pr c dur s utlin d.*

OLDSMOBILE HYPOID

All Models (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*PINION BEARING PRELOAD CAUTION: Pinion bearing preload must be adjusted whenever universal joint flange nut on pinion shaft is loosened. Preload is controlled by this nut and will be disturbed when nut loosened for any reason.*

DESCRIPTION: Semi-floating hypoid gear type of own design.

REMOVAL OF AXLE: *See Rear Axle on Car Model Page.*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model page.*

WHEEL BEARING & OIL SEAL REPLACEMENT: *(NOTE-* Wheel bearings have .012-.015" endplay between balls and the races. Do not reject bearing unless endplay is greater than .020" or if there is definite roughness between ball and race). With axle shaft removed, remove bearing retainer collar after splitting with a cold chisel. *(CAUTION* - Do not damage axle when removing collar). Using Tool J-947-2 and J-947-1, press off bearing in an arbor press. To install bearing, use Tool J-947-3 and Plate J-947-1 with an arbor press and press bearing over axle shaft, being sure that pressure is being applied to inner race of bearing. After bearing has been pressed firmly against axle shaft shoulder, press new bearing retainer collar on shoulder of shaft against bearing. Be careful not to damage shaft surface on which oil seal runs.

Oil Seal: With axle shaft removed, remove seal. Before installing a new seal, apply sealer around its outside diameter then install seal in housing with Tool J-5818. *CAUTION* - When installing axle shaft, be careful not to damage seal.

PINION SHAFT OIL SEAL REPLACEMENT: Mark pinion shaft nut before loosening so that it may be retightened to the exact same location. This will avoid necessity of resetting pinion bearing preload. Remove companion flange nut and washer, then remove companion flange with Tool 6295-01. Remove seal by driving it out of housing with a blunt chisel. Lubricate new seal and coat outer diameter with sealing compound. Tap seal into place using Tool J-5395. Apply seal lubricant, Part No. 567196 to outer diameter of flange and to lip of new seal. Install flange and tighten nut 1/16" beyond alignment mark.

OVERHAUL: Carrier Removal - Remove axle shafts, then clean area around carrier to prevent entry of dirt. Disconnect propeller shaft at rear universal joint and support shaft in body tunnel. Remove nuts from carrier mounting studs and move carrier away from housing sufficiently to drain the lubricant. Remove carrier from housing. *NOTE* - Do not wash carrier assembly until after it has been completely disassembled.

Carrier Disassembly: Mount carrier assembly in Holding Fixture, Tool J-3289-B. If original pinion and ring gear are to be reinstalled, install Dial Indicator, KMO-30 on carrier and measure backlash of ring gear at two points 180° apart. The lowest reading should be within .003-.012". Check tightness of ring gear to differential case cap screws which should be 55-60 ft. lbs. Mark the right side bearing adjusting nut, bearing cap, and carrier with two punch marks, then mark left side in same manner with one punch mark. *(NOTE- These marks will be used at reassembly if the original gear set is being used).* Remove bearing cap lock screws and locks, then check side bearing preload to determine if it is correct, as follows: Loosen each bearing cap attaching bolt ¼ to ½ turn (just enough to turn adjusting nut), then tap bearing lightly to assure freeness of nuts in threads. Back off right hand adjusting nut (right hand nut is opposite ring gear) and watch the outer race of bearing. *(NOTE* - If side bearing preload is correct, the outside bearing race should start to turn the instant the adjusting nut is loosened, and should continue to turn until adjusting nut is loosened 1½ to 3 notches. **Count and record the number of notches between punch marks on nut and those on carrier where race stopped turning**). Remove bearing cap bolts, bearing caps, and adjusting nuts. Remove differential case from carrier while holding outer bearing races against rollers. Check pinion bearing preload (see below), then turn carrier assembly to a horizontal position and remove companion flange nut, then remove companion flange with Puller J-6295-01 and Holding Tool J-6544. Remove drive pinion rear bearing and spacer as follows: Tap out front bearing with a plastic hammer, or if necessary, install carrier in an arbor press and press pinion out of front bearing. *NOTE* - In all cases, a shim washer .037" to .045" will be found between the compressible spacer and inner race of front bearing. A second shim is used in production to salvage the compressible spacer should recommended preload be exceeded. This second shim can be used in the same manner for service *(see "Compressible Spacer Note" below).* Remove oil seal by driving it out of housing with a blunt chisel, then remove front inner race and roller assembly. Press front bearing race out of carrier with Tool J-6198, and rear bearing race with Tool J-6533. Using Tool J-6531 and arbor press, remove rear bearing from pinion shaft.

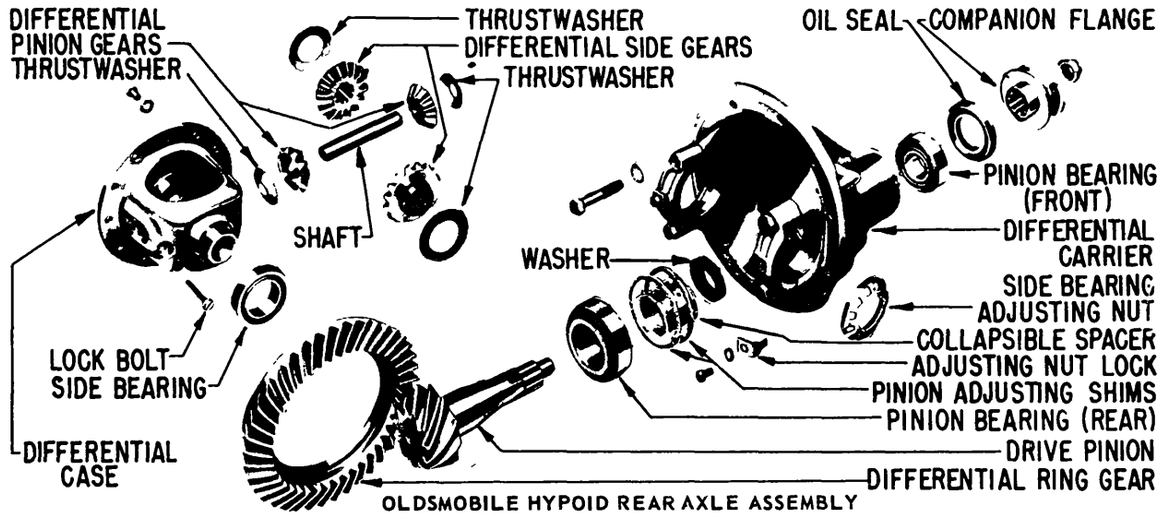
Differential Case Disassembly: Remove lock screw and pinion gear shaft, then remove pinion gears, side gears and thrust washers from case. If ring gear or case are to be replaced, remove ring gear. *(NOTE* - Do not remove side bearings from case unless they are to be replaced). If necessary to remove side bearings use Differential Side Bearing Remover, Tool TR-278-R, with ends of puller placed in recess in case.

Differential Case Reassembly: Reverse disassembly procedure and note the following: Lubricate gears and thrust washers, then place side gear thrust washers over hubs and install side gears in case. While holding upper side gear up into its bore, position one pinion gear (without thrust washer) between side gears and rotate gears until pinion gear is directly opposite loading opening in case. Place the other pinion in position between side gears so that pinion shaft holes line up. Rotate pinion gears in position to assure pinion gear shaft holes in gears are lined up with shaft holes in case. If holes do not line up, pinion will require repositioning in side gear teeth. With gears properly meshed, rotate assembly just enough to permit working the pinion gear thrust washers into position between gears and case. Install gear shaft and lock it in place with lock screw and lockwasher.

Carrier Reassembly: Reverse Disassembly procedure and note the following:

Pinion Gear Setting - Before assembling the carrier, the correct number of shims required to locate drive pinion properly must be determined from markings on differential carrier and end of pinion. Carrier is marked on face of flange with either of the following codes: "D" (indicating "deep"); "S" (indicating "shallow"); "O" (indicating "standard"). The digit following the letter designates number of thousandths "deep" or "shallow". *NOTE - A carrier marked "O" will require .010" (1954-56), .016" (1957-60) of shims under pinion bearing, plus or minus the markings on pinion). Pinions are etched on gear end with marks "plus" or "minus" together with the number indicating in thousandths of an inch the shims required to position pinion in carrier. Drive pinions machined to zero specifications are not*

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OLDSMOBILE HYPOID REAR AXLE ASSEMBLY

OLDSMOBILE HYPOID (C nt.)

mark d. DISREGARD STAMPED NUMBERS ON END OF PINION SHAFT AT GEAR END. REFER TO "ETCHED" NUMBERS ONLY. Determine markings on carrier and on pinion, then refer to "Pinion Shim Chart" for correct thickness of shims to use.

►*PINION SHIM NOTE:* Pinion shims are furnished in the following sizes and are marked for identification as follows:

1954-56 Shims - .002" (Plain), .003" (Blue or Plain color or 1 hole), .004" (Copper or Plain with 2 holes), .005" (Plain), .010" (Plain).

1957-60 Shims - .004" (no notch), 005" (1 notch), .006" (2 notches), .007" (no notch), .008" (1 notch), .009" (2 notches), .010" (no notch), 013" (1 notch), .014" (2 notches), .015" (no notch), .016" (1 notch), .017" (2 notches).

Pini n Driv G ar Installation - Press rear pinion bearing race into carrier with Tools J-2940 & J-2937. Install front bearing race with Tool J-6133. Install correct number of pinion adjusting shims against shoulder of drive pinion shaft, then lubricate rear bearing and press it firmly against shims on pinion shaft with Tools J-2935 and J-358-1 and an arbor press. Place compressible spacer over pinion shaft (with large diameter against shoulder on pinion), then install washer. *(NOTE - S "Compressible Spacer Note" below).* Place drive pinion into position in carrier. Lubricate front bearing and install it over pinion shaft. *(NOTE* - If pinion shaft is a press fit in front bearing, use an arbor press and Tool J-6133 to install bearing while supporting the pinion shaft. Coat outer diameter of a new pinion seal with Permatex No. *2*, then start seal into carrier by tapping lightly and then finish driving in place with Tool J-5395. Apply a coating of seal lubricant, Part No. 567196 to companion flange and sealing lip of new seal. Support drive shaft and tap companion flange onto pinion shaft. Oil flat washer and threads of shaft and install washer and nut, but do not tighten.

Pini n Bearing Pr load - *CAUTION - Care must be taken in tightening companion flange nut to preload pinion bearings correctly. If specified preload has be n exceeded, it will b necessary to install a new spacer or a second wash r. DO NOT back off nut to secure proper preload.* With drive pinion properly installed in carrier (new compressible spacer, companion flange and nut installed), tighten companion flange nut using Flange Holding Tool J-6544, until all endplay in drive pinion assembly is removed. Continue to tighten carefully (not more than 1/6 turn at a time), and check bearing preload with an inch-pound torque wrench or a spring scale. Repeat tightening and checking until preload friction is correct, see table below.

Pinion Bearing Preload Setting

(1954-56)

New Bearings	24-32 inch lbs.
Old Bearings ①	15-20 inch lbs.

(1957-60)

New Bearings	24-32 inch lbs.
Old Bearings ①	10-12 inch lbs.

① - After several thousand miles usage.

►*COMPRESSIBLE PINION BEARING PRELOAD SPACER NOTE:* A second washer or a new compressible spacer and one washer must be used under the following conditions When a new ring gear and pinion is installed. When either front or rear pinion bearings are changed. When a new carrier is installed, or when the compressible spacer is compressed too much and the preload has been exceeded. If two washers are found between spacer and bearing assembly, one washer should be discarded and a new compressible spacer used.

Ring Gear Backlash & Differential Case Side Bearing Adjustment - *(NOTE* - When new parts, such as gear sets, bearings, etc., are installed, the markings on the carrier and adjusting nuts which indicated original position of gears and side bearing preloads, should be disregarded. Whenever original parts are installed the markings can be used to reset the adjustments providing original settings were correct). With differential case installed in carrier and adjusting nuts installed, install the bearing caps and capscrews (no washers) and draw them down sufficiently to lightly hold caps in place. Using Tool J-972-A back off the right hand adjusting nut (one opposite ring gear) approximately three turns. Tighten left hand adjusting nut to move ring gear into mesh with pinion until all lash is removed, **then back off adjusting nut three notches.** *(NOTE* - This is only a starting point and may need to be readjusted depending on backlash present after making the following adjustments).

Tighten the right hand adjusting nut while watching the outer race of bearing. When bearing race just starts to move along with adjusting nut, indicating tension on bearing, continue to tighten two notches. Tighten adjusting nut to align closest notch with capscrew hole in bearing cap. Tighten bearing cap bolts to 70-75 ft. lbs. Clamp dial indicator to differential carrier and check backlash between ring gear and pinion using Dial Indicator, Tool KMO-30. *(NOTE* - If same ring gear and pinion were installed, the backlash should be adjusted according to markings on bearing caps and adjusting nuts providing the differential was not disassembled to correct a noise complaint). If backlash is not within limits of .004-.006" (1954-56), .003" min. or .012" max. with .007-.008" preferred (1957-58), .005" min. or .009" max. with .007-.008" preferred (1959-60), loosen bearing cap bolts slightly, then move both adjusting nuts one notch at a time until correct backlash is obtained. To increase backlash, move ring gear away from pinion, and to decrease backlash, move it toward pinion. If left nut is backed off one notch, right nut should be tightened one notch. Tighten bearing cap bolts to 70-75 ft. lbs. (1954-58), 65-85 ft. lbs. (1959-60).

Pedestal Spread Measurement & Adjustment - Position Tool J-5340 (1954-56); J-511 (1957-58) over pedestal caps, then check clearance between gauge and machined surface of bearing caps. This clearance should be .004- 012" (1954-58). *NOTE - It is not necessary t check pedestal spread on 1959-60 models.* If clearance is less than specified, loosen right hand bearing cap bolts and loosen adjusting nut ½ notch and again tighten pedestal cap bolts and recheck clearance. *NOTE - Right hand nut should not be loosened mor than ½ notch from original 2 notch tight position.* If clearance is more than specified, then tighten right hand nut one notch After side bearing preload is correct, install bearing cap locks and lock bolts.

Carrier Installation: Clean gasket surface on housing and install a new gasket. Install carrier over studs and carefully align carrier with housing so that both pedestal caps enter supports in housing. Apply Permatex No. 2 on stud threads, then install nuts and tighten equally to draw carrier pedestal caps evenly into support in housing. Tighten nuts to 50-60 ft. lbs. Complete installation by reversing removal procedure.

1954-56 PINION SHIM TABLE

Carri r Marking	Pinion Marking								
	-4	-3	-2	-1	0	+1	+2	+3	+4
S-5		.002	.003	.004	.005	.006	.007	.008	.009
S-4	.002	.003	.004	.005	.006	.007	.008	.009	.010
S-3	.003	.004	.005	.006	.007	.008	.009	010	.011
S-2	.004	.005	.006	.007	.008	.009	.010	.011	.012
S-1	.005	.006	.007	.008	.009	.010	.011	.012	.013
0	.006	.007	.008	.009	.010	.011	.012	.013	.014
D-1	.007	.008	.009	.010	.011	.012	.013	.014	.015
D-2	.008	.009	.010	.011	.012	.013	.014	.015	.01′
D-3	.009	.010	.011	.012	.013	.014	.015	.016	.017
D-4	.010	.011	.012	.013	.014	.015	.016	.017	.018
D-5	.011	.012	.013	.014	.015	.016	.017	.018	.019

1957-60 PINION SHIM TABLE

Carrier Marking	Pinion Marking								
	-4	-3	-2	-1	0	+1	+2	+3	+4
S-5	.007	.008	.009	.010	.011	.012	.013	.014	.015
S-4	.008	.009	.010	.011	.012	.013	.014	.015	.016
S-3	.009	.010	.011	.012	.013	.014	.015	.016	.017
S-2	.010	.011	.012	.013	.014	.015	.016	.017	.018
S-1	.011	.012	.013	.014	.015	.016	.017	.018	.019
0	.012	.013	.014	.015	.016	.017	.018	.019	.020
D-1	.013	.014	.015	.016	.017	.018	.019	.020	.021
D-2	.014	.015	.016	.017	.01°	.019	.020	.021	.022
D-3	.015	.016	.017	.018	.019	.020	.021	.022	.023
D-4	.016	.017	.018	.019	.020	.021	.022	.023	.024
D-5	.017	.018	.019	.020	.021	.022	.023	.024	.025

1954-55 PACKARD HYPOID

All Models (1954-55)

►***REAR AXLE ASSEMBLY NOTE:*** *Axle similar in design to previous types, but with heavier construction. Housing is heavier, bearings are larger, and axle shafts are larger.*

►***PINION BEARING PRE-LOAD CAUTION:*** *Adjustment procedure and settings changed. See OVERHAUL data below.*

DESCRIPTION: Hypoid gear, semi-floating type with Hotchkiss drive.

REMOVAL OF AXLE: *See "Rear Axle" on Car Model page.*

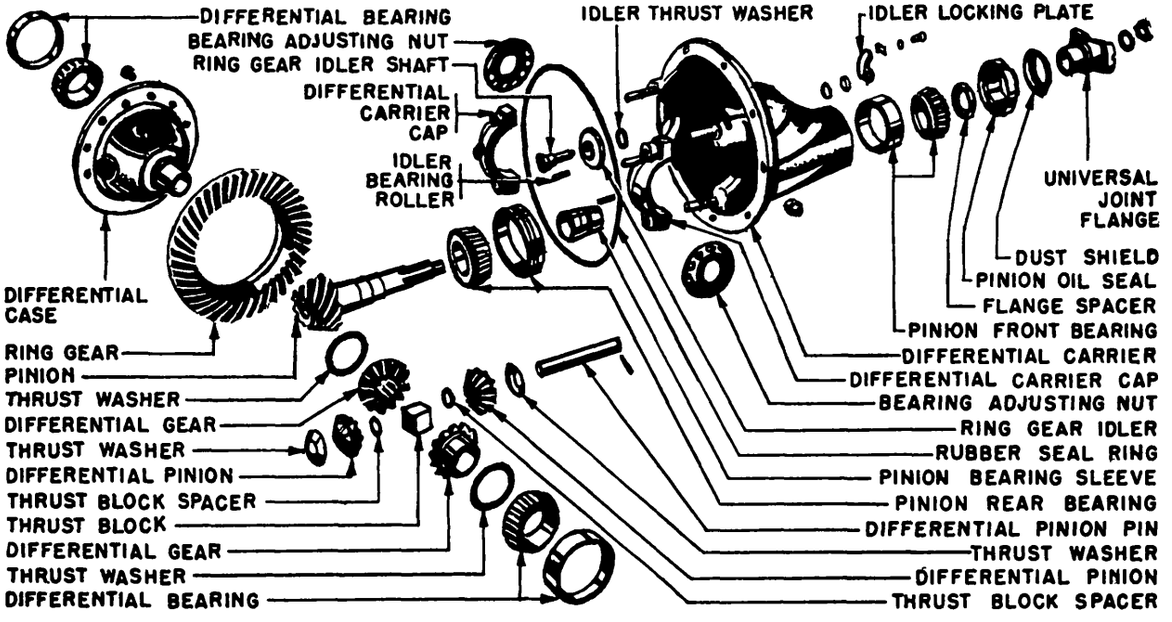
AXLE SHAFT REPLACEMENT & ENDPLAY ADJUSTMENT: Raise car and place stand under each side of frame near rear spring front hanger. Remove rear wheel from hub and drum, then raise rear axle housing and place stands under housing near outer end. Remove hub and drum assembly using puller J-4153 *(CAUTION—Do not use "knock-off" type puller).* Disconnect hydraulic brake line from wheel cylinder. Remove brake support attaching nuts and lock washers. Remove seal guard, gasket, retainer, oil seal, brake support, and axle shaft bearing adjusting shims. Remove axle shaft and bearing using puller J-2552. *CAUTION*—Be careful that the axle shaft splines do not damage inner seal. To install axle, reverse the removal procedure. Adjust endplay by installing Tool J-2560, then with axle shaft forced in toward differential, turn long adjusting screw to bear aaginst backing plate, and then pull shaft outward. Check with feeler gauge to determine clearance which should be .004-.007". Add or remove shims at backing plate to obtain specified clearance.

OVERHAUL: Carrier can be removed from rear axle housing without removing axle assembly from car.

Carrier Removal: Remove axle shafts (see above), and disconnect propeller shaft at rear universal joint by removing screws and lock plates (On Ultramatic Drive cars, the universal joint is disconnected by removing bearings and cross from yoke). Prop propeller shaft up against floor with block of wood under it at "X" member. Drain lubricant from housing, and clean area around carrier gasket, then remove carrier and gasket from axle housing.

Carrier Disassembly: Securely clamp carrier flange in a soft jawed vise. Measure differential case run-out and replace if run-out exceeds .004". Mark carrier side bearing caps, bearing adjusting nuts, and pedestals with punch marks to insure correct installation. Remove carrier bearing capscrews. Hold ring gear and differential case in place with one hand and lightly tap bearing caps loose with hammer. Lift off differential case bearings, bearing cups, adjusting nuts and caps. (CAUTION—Bearing cap, bearing cup, and adjusting nut should be kept together until reassembly.)

Differential Disassembly: Remove ring gear attaching cap screws, tap the outside of ring gear with a soft hammer and loosen it. Remove ring gear from case. Drive out the differential pinion shaft lock pin, using a pin punch and hammer. Drive out pinion shaft. Remove differential pinions, pinion thrust washers, axle shaft thrust block, and spacers, differential side gears and thrust washers. Differential side bearings may be removed if necessary, using Tool J-3250, and adapter plate J-3250-4.



PACKARD HYPOID REAR AXLE

Pinion Shaft Removal: Remove universal joint flange nut using socket wrench J-5512, while holding flange from turning with Tool J-2659. Drive universal joint flange from shaft using a soft hammer. Drive out pinion, sleeve, and rear bearing using a soft hammer, then drive out pinion oil seal and front bearing in the same manner. Drive out front bearing cups from housing using Tool J-872-5, and Tools J-3235-A (front bearing cup), or J-5521 (rear bearing cup). Remove pinion rear bearing using Plate Holder J-2574 and Remover P-5508 in arbor press.

Pinion Shaft Installation: Install pinion bearing cups using Tool J-872-5 and Tools J-3230-A (rear cup), J-5506 (front cup). Press the pinion rear bearing onto pinion shaft until inner race is tight against shoulder. Install the pinion shaft collapsible spacer on shaft with large diameter of spacer toward rear bearing, then install assembly in carrier. Lubricate and install front bearing and tap into place on shaft. Lubricate pinion oil seal and install it in carrier using Tool J-3244. Coat splines of shaft with oil and install universal joint flange or yoke, dust shield, washer, and a new nut.

Pinion Bearing Preload Adjustment: (With carrier assembly out of car and with differential assembly removed)—Lock universal joint flange in vise and tighten flange nut with socket wrench J-5512 and a long handle wrench until only a slight amount of endplay can be felt in pinion shaft. *(NOTE—If a new collapsible sleeve is being used, a great amount of turning effort on the wrench will be required to buckle the sleeve).* Using a preload indicator wrench and adapter Tool J-2571-B and socket J-5512, notice the amount of torque required to rotate the pinion. **This indicates the amount of drag caused by pinion seal.** After seal drag torque is obtained, continue tightening the flange nut until pinion bearing preload is correct, the torque reading on the preload indicating wrench will read 2½ to 3 ft. lbs. PLUS the amount of torque that was required to overcome the oil seal drag (above). *(For example, if the oil seal drag was 2 ft. lbs., the reading on the indicating wrench should be 4½ to 5 ft. lbs.).*

Pinion Bearing Preload Adjustment: (With carrier and axle assembly in car)—Raise rear of car so that wheels are off floor. Be sure rear brakes are not dragging (it may be necessary to loosen rear wheel brake adjustments). Disconnect rear universal joint from pinion flange. Loosen the pinion flange nut (with Tool J-5512) and tap pinion shaft lightly to insure removing all preload on bearings. With preload indicating wrench and socket (J-5512), **measure the amount of torque required to turn pinion shaft, differential, and rear wheels** (rotate pinion shaft a few turns before taking torque reading). While holding universal joint flange with a large wrench, or applying the brakes, tighten pinion shaft nut until preload of 15 ft. lbs. is obtained, PLUS the amount of torque required to overcome drag of rear wheels, differential and pinion shaft (above). While pinion bearings are under the 15 ft. lbs. preload, strike the differential carrier a couple of sharp blows directly over front and rear bearing cups with a brass hammer. *(CAUTION*—Do not operate car at this high pinion bearing preload). Loosen pinion shaft nut until pinion shaft turns free, then retighten nut to obtain 2½ to 3 ft. lbs. torque on pinion bearings PLUS the amount required to overcome drag of rear wheels, differential and pinion shaft (above). Connect rear universal joint to pinion flange, and adjust the rear brakes.

Differential Reassembly: Install differential side bearings using Tool J-5507 and Handle J-872-5. Install differential side gear thrust washers on hubs of

CONTINUED ON NEXT PAGE

1954-55 PACKARD HYPOID (C ntinu d)

side gears, sticking them in place with cup grease. Install differential side gears and thrust washers in case. Coat cupped side of differential pinion thrust washers with grease and stick them to outer end of pinions, then place pinions in mesh with side gears, opposite each other, and rotate the side gears with the pinions until bore in pinions line up with pin bore in differential case. Start pinion pin into differential case so lockpin hole will line up with lockpin hole in case. As the pinion pin is pushed into case, install the thrust washer. Push pinion pin all the way in until lockpin hole registers with hole in case. (CAUTION—Measure the endplay of each side gear with feeler gauge placed between gear and thrust washer. If endplay not within .0015-.003" replace thrust washers with washers of correct thickness which are furnished in the following sizes: .031", .036", .041" & .046"). When correct endplay is obtained, and pinion pin installed, drive in the lockpin and stake edge of lockpin hole in case. Install ring gear on differential case and tighten capscrews evenly to 50-55 ft. lbs. Lubricate differential side bearings and place cups on bearings. Install differential assembly in carrier and install side bearing adjusting nuts and turn it in to make sure it is threading properly. Install bearing caps, lining them up with marks made at disassembly. Tighten capscrews enough to hold adjusting nuts in place and allow them to be turned. Temporarily adjust ring gear to pinion lash to approx. .010".

Differential Bearing Preload & Backlash Adjustment: Bearing preload is determined by measuring spread of carriers with a large outside caliper and a .010" feeler gauge. Back off side bearing adjusting nut on ring gear side one full turn so a little endplay can be felt in differential case. Place caliper and .010" feeler gauge against boss on pedestal cap and adjust caliper so jaw contacts pedestal boss on other side of differential case, to determine distance from outside of one pedestal to outside of other pedestal. Lock jaws of caliper in place so they will not be disturbed. Tighten the side bearing adjusting nut on ring gear side one full turn (previously backed off). Tighten adjusting nut opposite from ring gear side until caliper jaws will just contact both pedestal cap bosses **without** feeler gauge. (CAUTION—recheck pedestal spread).

Backlash Adjustment—Mount a dial indicator on carrier flange with indicator contact resting on face of ring gear tooth. Backlash should be .004-.008". By turning BOTH side bearing adjusting nuts in the same direction, ring gear can be moved toward or away from ring gear without disturbing side bearing preload. (NOTE—Moving both side bearing adjusting nuts in the same direction ONE NOTCH changes backlash .004"). Tighten side bearing cap bolts, recheck backlash.

Carrier Installation: Install new carrier sealing ring holding it in place with heavy grease. Install plastic seals on carrier studs and install carrier in axle housing. Tighten all carrier nuts to 35-40 ft. lbs.

PONTIAC HYPOID

All M d ls (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►**PINION BEARING PRE-LOAD CAUTION: Pinion bearing pre-load must be adjusted** whenever universal joint companion flange nut on pinion shaft loosened (pre-load controlled by this nut and will be disturbed whenever nut loosened for any reason). See Pinion Bearing Pre-load data.

►**REPLACEMENT AXLE SHAFT CAUTION**—Axle shafts are covered with a protective coating of rust inhibiting grease. This grease must be completely removed before shaft installed in car (particularly between axle flange and oil guard flange) to prevent grease melting and running out on brakes.

►*1955 SPACER PRODUCTION CHANGE:* Early production differential have a two-piece spacer which fits over pinion stem and bears against inner races of pinion bearings. Late production differentials have a one-piece spacer which fits over pinion stem and bears against a shoulder on drive pinion and inner race of front bearing. **New spacer is not serviced. Ue new two-piece spacer for replacement of one-piece or two-piece spacer.**

►*1956 PINION BEARING PRELOAD COMPRESSIBLE SPACER NOTE:* In production, a one-piece spacer is used for adjusting pinion bearing preload. A two-piece type spacer is furnished for service replacement, which replaces either a one-piece or a two-piece type.

DESCRIPTION: Semi-floating, hypoid gear type with Hotchkiss drive. Beginning with 1959 models, an oil gallery was included in housing to direct oil to front end of pinion shaft and the rear axle oil seals were pressed into end of axle shaft tube. In earlier models, the oil seal was combined with rear wheel bearing.

Differential Side Gears & Pinions - Gears are "crowned" teeth type to insure tooth bearing at center. Gears and pinions are interchangeable with previous type in c mpl te s ts only (individual gears and pinions must not be interchanged).

REAR AXLE RATIO & IDENTIFICATION: *See "Rear Axle" on Car Model pages.*

DIFFERENTIAL CARRIER ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model pages.*

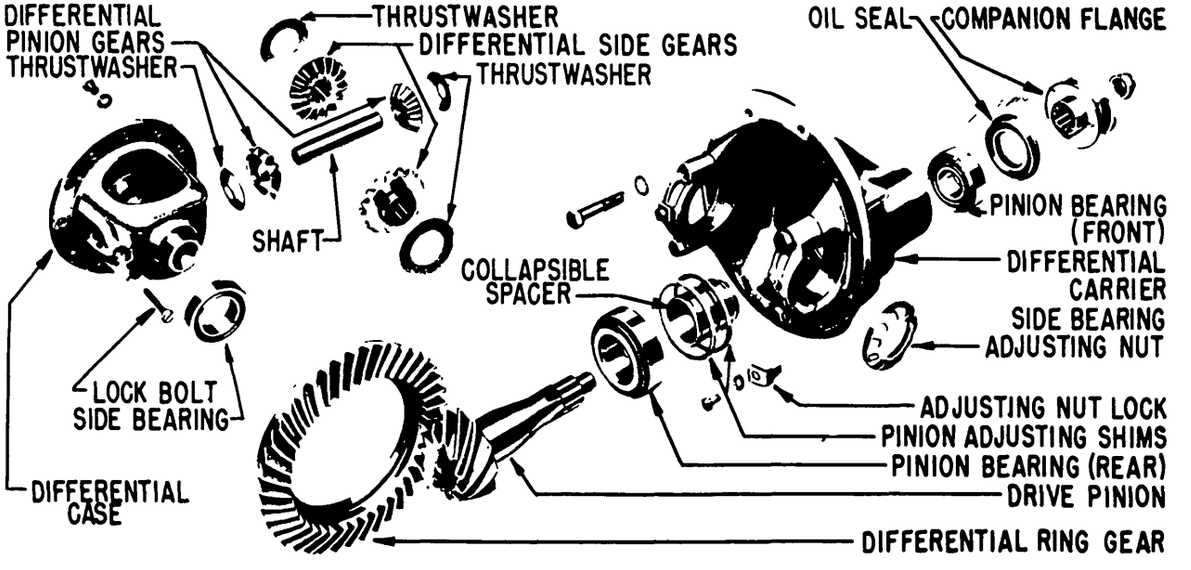
AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Mod l pages.*

WHEEL BEARING & OIL SEAL REPLACEMENT: 1954-58 Models - With axle shaft removed, remove bearing inner retainer by carefully cutting it with a cold chisel. *CAUTION - Do not cut into shaft.* If a new bearing is to be installed, old bearing and retainer may be pressed off shaft together. With Tool J-947-P engaging outer race of bearing and ring enclosing bearing, press shaft out in an arbor press. *NOTE - If oil seal only is to b replaced, remove "0" ring from outer diameter of bearing race, then with an offset screwdriver, pry oil seal assembly from axle shaft bearing. Install "0" ring seal on bearing and start seal assembly into bearing, with lip side of seal toward bearing.* To reinstall bearing, install oil deflector, bearing outer retainer plate, and a new gasket. Install bearing on shaft using Tool J-947-P to bear only on bearing inner race and press bearing firmly against shoulder on shaft. Press a new bearing retainer ring in place firmly against bearing using Tool J-947-P. Reinstall axle shaft.

►*1954-58 BRAKE DRUM INSTALLATION CAUTION: Inner edge of brake drum must not extend beyond edg of backing plate. Install Gasket, Part No. 499930 between axle shaft flange and brake drum as necessary to correctly position brake drum.*

1959-60 Models - With axle shaft removed, remove oil seal from axle housing with Tool J-943. To remove

CONTINUED ON NEXT PAGE



P NTIAC REAR AXLE ASSEMBLY

PONTIAC HYPOID (C ntinu d)

bearing from shaft, install axle shaft in Tool J-947-P so tool engages outer race of bearing and ring enclosing bearing, then press bearing and retainer from shaft with an arbor press. To install bearing, install outer bearing retainer on shaft (if removed), then install bearing on shaft with Tool J-947-P (tool should bear only on inner race), pressing it into place with an arbor press. Press a new bearing inner retainer in place against bearing with Tool J-947-P. *CAUTION - Do not press bearing and inner retainer on in one operation as edge radius of retainer will climb over corner of bearing inner race and force grease seals into balls.* To install seal in housing, coat new seal lip with oil and coat outside of of seal retainer with Permatex No. 3 or similar compound, then install seal with Tool J-5818. Install axle shaft. *NOTE - If both axle shafts removed, shaft with left hand threads on wheel bolts must be on left side of car. Install bearing outer retainer and gasket and tighten self-locking retainer nuts to 30-45 ft. lbs.*

Pinion Shaft Oil Seal Replacement: Mark the position on companion flange, pinion nut, and pinion shaft to insure reassembly in the same location. *(NOTE* - If companion flange is to be replaced, it will not be necessary to mark the above parts as pinion bearing preload will have to be readjusted). Remove drive pinion nut and washer using Holding Tool J-6289, then remove companion flange with Puller J-6295. Remove oil seal by prying it out of carrier with a blunt tool. Oil lip of new seal and coat outer diameter with Permatex No. 3. Install seal by tapping into place with Tool J-5395. Install companion flange, then install washer and nut. Tighten nut until it and the companion flange are in the same position as marked at disassembly. *(NOTE* - Pinion nut will turn relatively easy until original position is approached and bearings begin to preload. Stop turning nut at this point and check position).

OVERHAUL: Carrier Removal - Remove axle shafts, then disconnect rear universal joint at the companion flange. Clean differential carrier adjacent to axle housing and drain oil by loosening all differential attaching bolts. Pull carrier out about 1/8" to allow oil to drain. Remove nuts and remove carrier assembly.

Carrier Disassembly: Mark right and left bearing caps and adjusting nuts, then remove adjusting nut locks. Loosen bearing cap bolts and back off on left adjusting nut to relieve side bearing preload. Remove bearing caps and adjusting nuts, then remove differential case assembly from carrier. *(CAUTION* - Keep outer bearing races with side bearings so these mating parts can be reassembled in the same location). Remove drive pinion nut and washer using a heavy duty socket and Holding Tool J-6289, then remove companion flange with Puller J-6295 and Holding Tool J-6289. Remove pinion from carrier, being careful not to damage threads or oil seal. If pinion does not slide freely from front bearing, temporarily install pinion nut and lightly tap pinion out of bearing with a soft hammer. If necessary, use an arbor press to press pinion through bearing. Remove spacer and spacer washer (if washer installed). Remove pinion oil seal with a screwdriver. On 1954-56 models, press front and rear bearing cups out of carrier with Remover J-2938 and Handle J-2940 (Front), J-2936 and Handle J-2940 (Rear). On 1957-60 models, press front bearing cup out with Tool J-6198 and Handle J-8092, and rear bearing cup out with Tool J-6533 and Handle J-8092. On 1954-56 models, use Holder J-358-1 and Plates J-2934 to remove rear bearing. On 1957-60 models, use Tools J-6555 and J-7407 to remove rear bearing. Remove pinion setting shims (from carrier 1954-56 from pinion shaft 1957-60).

1954-56 PINION SHIM TABLE

Carri r Marking	Pini n Marking								
Mark	−4	−3	−2	−1	0	+1	+2	+3	+4
S-5		.002	.003	.004	.005	.006	.007	.008	.009
S-4	.002	.003	.004	.005	.006	.007	.008	.009	.010
S-3	.003	.004	.005	.006	.007	.008	.009	.010	.011
S-2	.004	.005	.006	.007	.008	.009	.010	.011	.012
S-1	.005	.006	.007	.008	.009	.010	.011	.012	.013
O	.006	.007	.008	.009	.010	.011	.012	.013	.014
D-1	.007	.008	.009	.010	.011	.012	.013	.014	.015
D-2	.008	.009	.010	.011	.012	.013	.014	.015	.016
D-3	.009	.010	.011	.012	.013	.014	.015	.016	.017
D-4	.010	.011	.012	.013	.014	.015	.016	.017	.018
D-5	.011	.012	.013	.014	.015	.016	.017	.018	.019

1957-60 PINION SHIM TABLE

Carrier Marking	Pinion Marking								
Mark	−4	−3	−2	−1	0	+1	+2	+3	+4
S-5	.007	.008	.009	.010	.011	.012	.013	.014	.015
S-4	.008	.009	.010	.011	.012	.013	.014	.015	.016
S-3	.009	.010	.011	.012	.013	.014	.015	.016	.017
S-2	.010	.011	.012	.013	.014	.015	.016	.017	.018
S-1	.011	.012	.013	.014	.015	.016	.017	.018	.019
O	.012	.013	.014	.015	.016	.017	.018	.019	.020
D-1	.013	.014	.015	.016	.017	.018	.019	.020	.021
D-2	.014	.015	.016	.017	.018	.019	.020	.021	.022
D-3	.015	.016	.017	.018	.019	.020	.021	.022	.023
D-4	.016	.017	.018	.019	.020	.021	.022	.023	.024
D-5	.017	.018	.019	.020	.021	.022	.023	.024	.025

Differential Case Disassembly: Remove pinion shaft lockscrew and washer and drive pinion shaft out of case. Remove pinions, side gears and thrust washers. If necessary, remove ring gear from case. If side bearings are to be replaced, install Remover Tool J-986-P with hooks of puller in recesses in differential case and pull bearings off.

Differential Case Reassembly: Position ring gear on case. *(CAUTION* - Do not use hammer to force ring gear onto case). Install ring gear attaching bolts and tighten all bolts evenly to 55-60 ft. lbs. *(NOTE* - Tighten screws finger tight first, then tighten evenly and alternately across diameter in progressive steps until final tightness is reached). Install side bearing on hub of differential case using Tool J-5292. After bearing has been installed on one side, support side bearing with a front wheel bearing outer race or other suitable means, then install opposite side bearing. Lubricate gears and thrust washers, then place side gear thrust washers over hubs and install side gears in case. While holding upper side gear up into its bore, position one pinion gear (without thrust washer) between side gears and rotate gears until pinion gear is directly opposite loading hole in case. Place other pinion in position between side gears so that pinion shaft holes line up. Rotate pinion gears in position to assure pinion gear shaft holes in gear are lined up with shaft holes in case. If holes are not lined up, pinion will require positioning in side gear teeth. With gears properly meshed, rotate assembly just enough to permit working the pinion gear thrust washers into position between gears and case. Install gear shaft and lock it in place with lockscrew and washer.

Carrier Reassembly: Reverse disassembly procedure and note the following:

Pinion Gear Setting - Before assembling the carrier, the correct number of shims required to locate drive pinion properly must be determined from markings on differential carrier and on end of pinion. Carrier is marked on face of flange with either of the following codes: "D" (indicating "deep"); "S" (indicating "shallow"); "O" (indicating "standard"). The digit following the letter designates number of thousandths "deep"

CONTINUED ON NEXT PAGE

PONTIAC HYPOID (C ntinu d)

or "shallow". *NOTE - A carri r marked "0" will requir .010" (1954-56), .016" (1957-60) of shims in housing or under pinion bearing, plus or minus the markings on pinion.* Pinions are marked (+) or (-) together with the number indicating in thousandths of an inch the shims required to position pinion in carrier. *NOTE - Drive pinions machined to zero specifications ar not marked.* Determine markings on carrier and on pinion, then refer to "Pinion Shim Chart" for correct thickness of shims to use.

►*PINION SHIM NOTE:* **Pinion shims are furnished in the following sizes and are marked for identification as follows:**

1954-56 Shims - .002" (Plain), .003" (Blue or Plain Color or 1 hole), .004" (Copper or Plain Color or 2 holes), .005" (Plain), .010" (Plain).

1957-60 Shims - .004" (Plain), .005" (Blue), .006" (Copper), .007" (Plain), .010" (Plain).

Pinion Driv Gear Installation - 1954-56 Models - Use Holder J-358-1 and Plates J-2934 to install new rear bearing on pinion shaft (bearing must seat solidly against shoulder on shaft). Install correct pinion adjusting shim pack (see Pinion Setting data above) against shoulder of rear bearing bore in carrier, press bearing cup in place with J-2937 Installer and Handle J-2940, then install front bearing cup using J-2939 Installer and Handle J-2940.

1957-60 Mod ls - Press rear bearing race into carrier with Tool J-6255 and J-8092. Install front bearing race with Tool J-6197. Install correct number of shims against shoulder of drive pinion shaft (see Pinion Setting above), then lubricate rear bearing and press it onto shaft with Tool J-6547 and Plate J-6407.

On All M d ls - Place a new compressible spacer over pinion and install the assembly in carrier housing. Oil pinion front bearing and roller assembly and install on pinion shaft. Coat outer surface of seal retainer with Permatex No. 3 or similar compound, then install seal by tapping it into place using Tool J-5395-A. Install companion flange, then oil threads of pinion nut and face of washer and install these parts. Position entire assembly horizontally and tighten pinion nut only enough to remove endplay, using Flange Holding Tool J-2933 (1954-56), J-6289 (1957-60) and a heavy socket.

Pini n B aring Pr load - *(CAUTION - Extr m car must be taken when tightening pinion nut to preload bearings correctly. Never back off nut to reduce preload. If torque required to keep pinion turning exceeds the following specifications, a new bearing spacer must be installed).* With drive pinion properly installed in carrier (companion flange, nut, and a new compressible spacer installed), tighten pinion shaft nut using Flange Holding Tool J-6289 and a heavy socket until all pinion shaft endplay is removed. Continue to tighten the nut a little at a time, stopping frequently to turn pinion several revolutions to seat rollers and to check turning torque with an inch-pound torque wrench (Tool KMO-652). Repeat this procedure until turning effort required to keep pinion moving is as follows:

Pinion Bearing Preload Setting

(1954-56)

Pinion Bearings	Bearing Preload
New Bearings	27-37 inch lbs.
Old Bearings ℂ	ℂ 10-12 inch lbs.

(1957-60)

New Bearings (New Seal)	24-32 inch lbs.
New Bearings (Old Seal)	22-26 inch lbs.
Old Bearings (New Seal)	12-15 inch lbs.
Old Bearings (Old Seal) ℂ	10-12 inch lbs.

ℂ - After several thousand miles usage.
ℂ - Supersedes original specifications of 15-20 inch lbs.

►*NOTE:* Torque measurement may be taken using a spring scale hooked to Holding Tool J-6289 at a point 10" from pinion shaft center. Reading in lbs., times 10 will give the inch-pounds.

Ring Gear Backlash & Differential Side Bearing Adjustment - Hold outer races squarely on side bearings and install differential case into carrier, positioning ring gear against pinion gear. Place adjusting nuts (on correct sides as indicated by marks) into threads of pedestals and squarely against outer races. Install bearing caps and capscrews making certain that threads in caps match those in adjusting nuts. Tighten capscrews slightly more than finger tight. Tighten right adjusting nut, backing off left nut, if necessary, to bring adjusting nuts into full contact with outer races and to provide a slight amount of backlash. When turning nuts keep them in contact with races to maintain a slight amount of preload on bearings. Tighten left nut, backing off right nut, if necessary (keeping nuts against bearing), while rocking case until backlash has just been eliminated. If left nut is not in a locking position when backlash has been eliminated, back off to nearest locking position. Back off right nut to insure that nut and outer race do not turn together. Retighten right nut until outer race just starts to turn with nut, then mark this point on adjusting nut. Tighten right nut **one notch**, tap each bearing cap, and rock ring gear. Check backlash as follows: Install Dial Indicator, KMO-30 on carrier flange so indicator button is bearing against rear face of a ring gear tooth, then measure the movement of ring gear against pinion. Continue to turn right nut until it has been tightened a total of two to three notches. Recheck backlash which should be .003-.012". Tighten bearing cap bolts to 70-75 ft. lbs. tapping each bearing cap several times with hammer while tightening to insure proper seating of caps.

Carrier Installation: Clean interior of axle housing with solvent and thoroughly clean surface of housing contacting carrier gasket. Install a new gasket, then install carrier over bolts in housing. Tighten attaching nuts to 45-60 ft. lbs. Install axle shafts (see above), then connect rear universal joint to companion flange. Tighten nuts to 14-20 ft. lbs., then bend ears of lockplate up against flat side of nuts.

Carrier Oil Gallery Plug Replacement (1959-60 Models): *NOTE - This plug is located at forward end of differential carrier housing lower reinforcing web.* **Mark position of companion flange, pinion nut and pinion shaft so all parts may be installed in exactly the same positions to maintain proper pinion bearing preload. Remove companion flange and pinion shaft, then thread a ½" bottom tap into plug until plug starts to turn. Remove plug by turning tap and pulling at the same time. To install plug, apply a light coat of Permatex No. 3 to hole in carrier and to plug, then install plug, making sure that it does not enter drain hole.** *CAUTION - Do not attempt to drill a hole in plug for removal as shavings will fall into drain hole.*

1958-60 RAMBLER HYPOID

Rambl r American (1958-60)
Rambler 6 Cyl. & V8 (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*REAR AXLE DRAIN & REFILL NOTE:* Drain and refill periods are no longer recommended and drain plug is being discontinued in production.

►*1958 SERIES 20 REAR AXLE NOTE:* Spicer type rear axle assemblies used on this series with Flash-O-Matic Transmission from beginning of production to Serial No. A-17647 and from Serial No. A-17701 to A-18257. *See "Spic r Hyp id" in this s cti n.*

►*REPLACEMENT HUB AND AXLE NOTE:* New hubs are not serrated. Serrations are cut when hub and shaft are assembled. DO NOT install an old hub on a new shaft as serrations in old hub will not match serrations in new axle, however a new hub may be installed on old shaft but scribe hub and shaft for reinstallation. *NOTE* - When installing new hub, tighten axle shaft nut until distance from outside face of hub to outside taper on axle shaft is 3/16" (regardless of torque required).

►*REAR BRAKE DRUM INSTALLATION CAUTION:* When tightening axle shaft nut for either new wheel hub installation or replacement of old hub on old axle (250 lbs. torque) or when adjusting axle shaft endplay, results in brake drum contacting support plate, install 1/16" spacer Part No. 3200966 between hub and drum. Spacer must be installed with three small screws used to hold drum to hub

►*1959 6 CYL. MODEL PINION SETTING ADJUSTMENT NOTE: Two types of drive pinions are used in production, each of which requires a different adjustm nt procedure. See "Pinion Gear Installation & Adjustment" below.*

►*1960 6 CYL. REAR AXLE ASSEMBLY PRODUCTION & OVERHAUL PROCEDURE CHANGE:* Three types of axle assemblies are used as indicated below:

First Type - Same as 1959 Models.

Second Type - Pinion bearings and side bearings have been changed dimensionally. This type axle assembly can be identified by the side bearing cup number (Timken No. LM-501311). Service procedures for this

CONTINUED ON NEXT PAGE

1958-60 RAMBLER HYPOID (C nt.)

type axle are the same as for previous models except that certain new tools are required (s "Ov rhaul" below).

Third Type - Same as second type except that inner end of axle shaft has 27 "rolled" splines in place of the 16 machine cut splines.

►*1960 V8 REAR AXLE PRODUCTION CHANGE:* Two types have been used as follows:

First Type - Same as 1959 models. Axle shaft has 16 machine cut splines on inner end.

Second Type - Same as first type except that inner end of axle shaft has 29 "rolled" splines in place of the 16 machine cut splines.

►*1960 6 CYL. (EARLY AUTOMATIC TRANSMISSION CARS) DIFFERENTIAL SIDE GEAR BREAKAGE CORRECTION:* This condition is caused by automatic transmission front clutch. *See "Rambler Six Transmission Front Clutch Production Change & Service Replacement Note" under "Rambler & Checker Superba Automatic Transmission".*

DESCRIPTION: Own. Semi-floating, with hypoid type ring gear and pinion, Hotchkiss drive (Rambler American), torque tube drive (others).

AXLE SHAFT REPLACEMENT: Remove wheels and drums. Pull hubs with Puller J-1644-B or J-736-B, then check axle shaft endplay (.002-.004") with Tool J-2092. Remove brake support plate, oil seal retainer, seal and shims. *NOTE* - Seal is located in retainer between axle tube and brake support plate (6 Cyl.), behind dust shield (V8). Use Puller J-2498-B to remove axle shaft. Remove bearing cup and remove bearing cone with arbor press. To install, use new seal soaked in light lubricating oil and reverse removal procedures.

WHEEL HUB INSTALLATION: 1) Slide hub onto axle shaft aligning punch marks on shaft and hub, then place two lubriplated thrust washers between nut and hub (to facilitate installation) and tighten axle nut to 250 ft. lbs. torque. *NOTE* - When installing a new hub on new or old axle shaft, tighten nut until outer face is 3/16" from outer end of taper on axle shaft, then punch mark both hub and axle shaft. Remove lubriplated thrust washers and reinstall axle nut and tighten to above specifications.

►*AXLE SHAFT BEARING INSTALLATION NOTE:* Pack axle shaft bearings with a good grade of wheel bearing lubricant and install bearing with Tool J-2995.

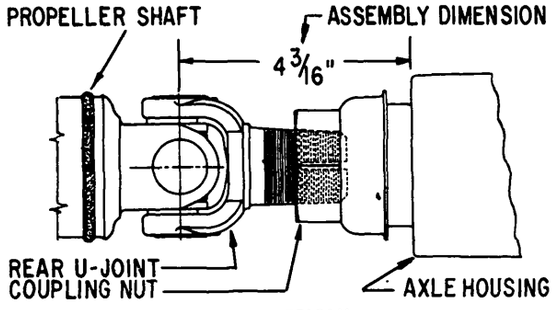
REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" n Car Model Pages.*

"POWER-LOCK DIFFERENTIAL" DISASSEMBLY: *See "Power-Lock Differential".*

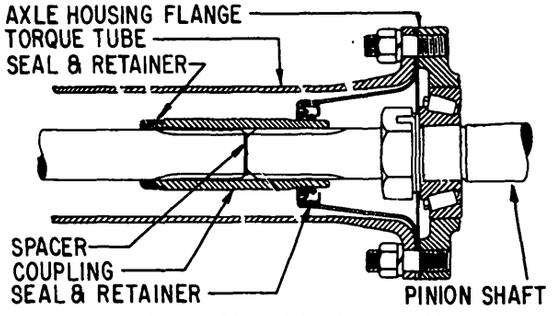
PROPELLER SHAFT REMOVAL (SERIES 10, 20, 80): Disconnect truss rods, torque tube and propeller shaft from rear axle. *NOTE - Do not lose spacer (Synchro-mesh & Overdrive).*

PROPELLER SHAFT CENTER BEARING REMOVAL (Synchro-mesh & Overdrive): Remove snap ring and press propeller shaft through center bearing.

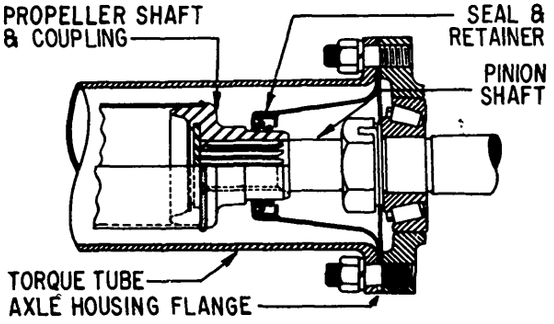
TORQUE TUBE & TRUNNION BRACKET ADJUSTMENT (SERIES 10): With rear end of propeller shaft against pinion shaft and torque tube attached to rear axle



5801 AMERICAN



5810, 20, 80 STD. & O.D. TRANS. CARS



5810, 20, 80 AUTO. TRANS. CARS
PROPELLER SHAFT COUPLINGS

housing, front end of propeller shaft should protrude 1/8-1/4" beyond front face of trunnion bracket. Adjustable clamp screw should be tightened enough to remove excess clearance without setting up friction.

►*REAR AXLE TRACK BAR (STABILIZER) CAUTION:* The connection at rear axle and body bracket must be kept tight to maintain vertical alignment between rear axle and body. If loose, it will cause noise and body sway.

OVERHAUL

►*1960 6 CYL. MODEL "SECOND" & "THIRD" TYPE REAR AXLE OVERHAUL NOTE:* Because of a change in bearing sizes used with these axles, the following new tools will be required: Tool No. J-7828 (Rear Pinion Bearing Remover); J-7817 (Front Pinion Bearing Cup Installer); J-7818 (Rear Pinion Bearing Cup Installer); J-6318-2 (Pinion Setting Gauge Discs). *NOTE - Small diam t r discs are us d for "second" & "third" typ s. Larg diam ter discs are used for prior type.*

►*1960 6 CYL. MODEL DIFFERENTIAL SIDE BEARING & PINION BEARING PRELOAD SHIM NOTE (MODELS WITH "SECOND" & "THIRD" TYPE AXLE ASSEMBLIES):* On cars with these type axle assemblies, use Differential Side Bearing Shims, Part Nos. 3202326 (.142") to Part No. 3202343 (.176") in .002" variables. Pinion Bearing Preload Shims, Part Nos. 3202285 (.170"); 3202286 (.002"); 3202287 (.003"); 3202288 (.005"); 3202289 (.010"); 3202290 (complete set).

DIFFERENTIAL REMOVAL: Remove cover bolts, cover and gaskets (save Ratio Tag attached to one bolt). Use center punch to mark bearing caps for reinstallation. Insert two bars through differential case and pry differential assembly out of housing. DO NOT damage bearing cups, rollers or shims. *NOTE* - Tie side bearing shims to respective side bearing and cap for reinstallation.

DISASSEMBLY: 1) Use Puller J-2497 to remove side bearing cones (do not pull on rollers). Remove ring gear capscrews and tap ring gear from case. *CAUTION* - Do not chisel or wedge ring gear from case. Use 3" long drift to drive out differential pinion shaft lock pin. Drive out pinion shaft and drop out thrust block through side gear. Roll differential pinion gears and remove them and side gears from case and lift out thrust washers.

2) Remove pinion oil seal, locknut and tap end of pinion shaft lightly to free front bearing cone from pinion shaft and remove bearing. *NOTE* - Shims are located between bearing and shoulder on pinion shaft and should be retained for reassembly as they control endplay. Remove pinion gear and rear bearing from rear of housing. Use Remover J-2244 (s "1960 6 Cyl. Mod l Second & Third Type Rear Axl Ov rhaul Not " abov for special tools required for thes axl s) and an arbor press to remove pinion rear bearing. Remove pinion bearing adjusting washer and mark for reinstallation.

INSPECTION: Clean all parts in cleaning solution and inspect as follows: Differential pinion shaft for wear. It should be a press fit in case to .010" loose fit. Thrust block should be free of wear or distortion. Check pinion gears for excessive wear or chipping and check with pinion shaft for wear in hole. Always use new thrust washers. Differential side gears should be free of wear, cracked or chipped teeth and be a snug fit on splined shaft. Side gear to case clearance should not exceed .007" and endplay when assembled should be 0" to .008" with .004" desired. Not to exceed 8 ft. lbs. should be required to rotate internal gears. Dress down differential case bearing surfaces with stone or file. Check ring gear for cracks or chipping and examine tooth contact pattern. Replace both ring gear and pinion when tooth pattern indicates gears have not been meshing properly. Replace ring gear-to-case capscrews

CONTINUED ON NEXT PAGE

1958-60 RAMBLER HYPOID (C nt.)

if elongated. First etched mark on rear face of pinion gear should match etched mark on edge of ring gear. The second number with either a + or - sign indicates corrected pinion cone setting. An "O" indicates no correction necessary. Oil seal surface should be free of wear or roughness and pinion splines should not be damaged. Replace both cone and bearing if worn, or show over-heating or scoring. Inspect housing for cracks, sand holes or burrs, deep scratches or nicks on gasket or oil seal areas. Bearing cup bores should be free of burrs or nicks. Clean axle tubes.

REASSEMBLY: *NOTE* - Specifications for adjustments are on the basis of dry parts. Use new thrust washers and oil seals.

Differential Cas - 1) Place thrust washers on side gears with oil pocket side toward gear and install gears in case bores. Place thrust washers behind differential pinion gears and mesh them with side gears, then roll pinion gears around to align them for installation of pinion gear shaft. Place pinion gear shaft into case, add thrust block and align pin hole with hole in case. Check clearance of side gears. Drive lock pin in place.

2) Press differential side bearings on case with Replacer J-2100 or J-5364 (6 Cyl.); J-2104 or J-2646 (V8). Place cup over side bearing and insert differential in case, adding one .075" thick shim on each side between bearing cup and housing. *NOTE - See "1960 6 Cyl. Mod l Diff rential Side Bearing & Pinion Bearing Pr load Shim Not "* above. Eliminate sideplay by installing correct thickness side shim (single shim should be used at each side). *NOTE - If an additional thickn ss of shims is required to eliminate sideplay n V8 mod ls, adjusting shims may be installed betw n b aring con and differential case. Thin shims, .003", .005", .010" ar available.* When all side play is eliminated, a slight drag should be present.

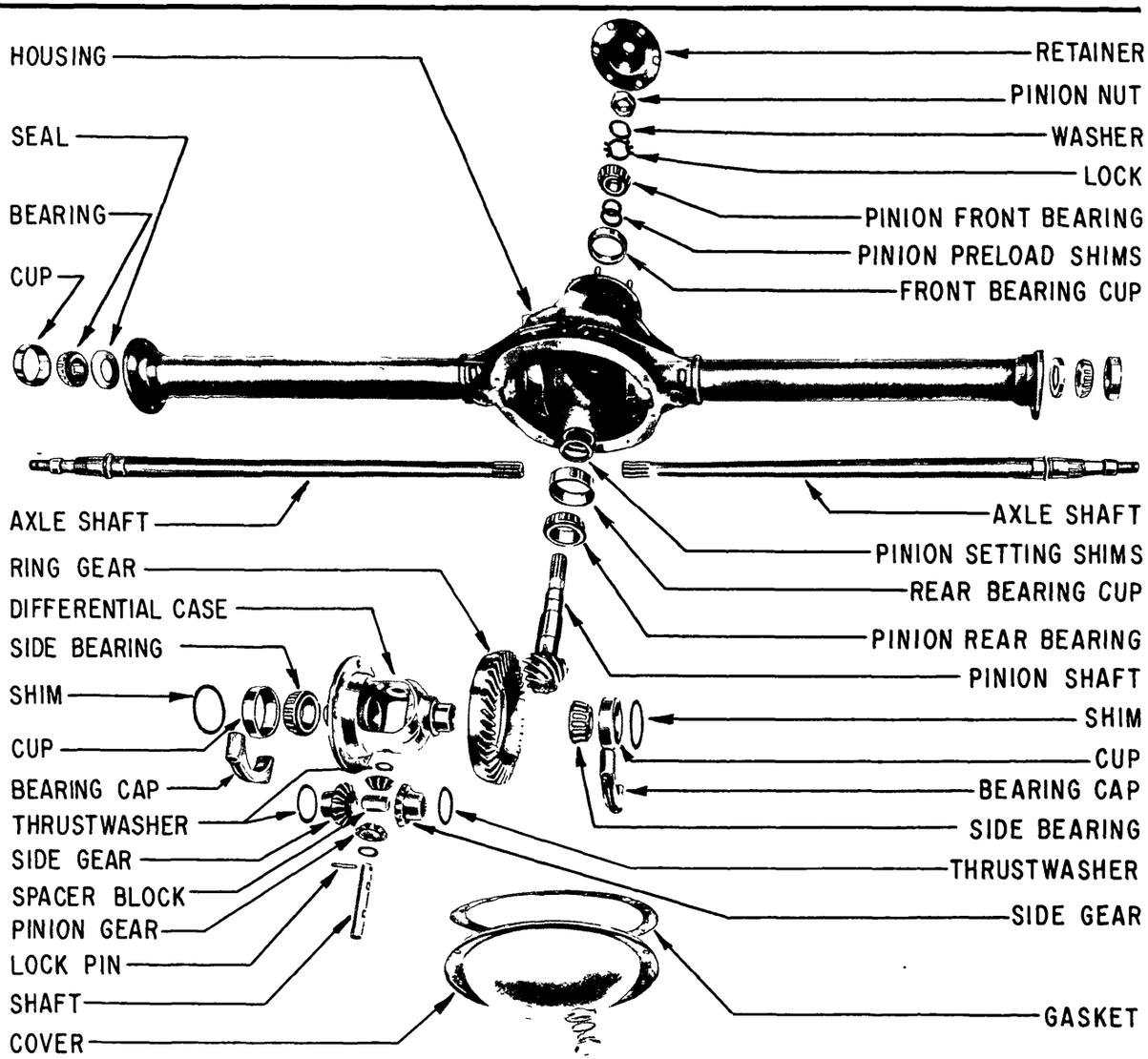
3) Install correct bearing caps and tighten to 55-60 ft. lbs. (6 Cyl.); 105-110 ft. lbs. (V8).

4) Check ring gear case runout (.002" maximum) with dial indicator. Remove differential case from housing retaining shims used for endplay elimination.

5) Use two 3/8"-24 x 1" capscrews to guide ring gear on case and tighten capscrews to 45-50 ft. lbs.

PINION GEAR INSTALLATION AND ADJUSTMENT: Correct shim pack to go between rear bearing cup and pinion gear is determined by the marking etched on rear face of pinion. Example - If original shim pack was .035" thick with pinion marked +2 and new pinion to be installed is marked -1, shim pack must be increased .003", represented by difference between +2 and -1.

►*1959 6 CYL. MODEL REAR AXLE PINION DEPTH SETTING (PINIONS NOT HAVING MACHINED END FACE):* Pinion depth setting on pinions without a machined end face is done WITHOUT pinion gear and shaft installed in housing. *See "Pinion Setting Adjustm nt".(6 Cyl. Models Without Machined Face on Pinion). NOTE - On mod ls with this type pinion, pinion depth setting shims are installed betwe n pinion g ar and bearing cone (between bearing cup and housing on other models).*



1958-60 RAMBLER HYPOID

►*1960 6 CYL. MODEL "SECOND" & " THIRD" TYPE REAR AXLE OVERHAUL NOTE: Because of change in bearing sizes used with these axles, use the following tools in place of those indicated below: Front Pinion Bearing Cup Installer, J-7817; Rear Pinion Bearing Cup Installer, J-7818; Pinion Setting Gauge Discs, J-6318-2.*

►*1960 6 CYL. MODEL PINION BEARING PRELOAD SHIM NOTE (MODELS WITH "SECOND" & "THIRD" TYPE AXLE ASSEMBLIES):* Use Pinion Bearing Preload Shims, Part Nos. 3202285 (.170"); 3202286 (.002"); 3202287 (.003"); 3202288 (.005"); 3202289 (.010"); 3202290 (Complete Set).

1) Use Tool J-2995 (6 Cyl.) or 1 11/16" x 8" steel pipe (V8 Models) to press or drive rear bearing cone (large diameter toward gear) against pinion gear. Use Tool J-2534 or J-5367 (6 Cyl.) or J-2533 (V8 Models) to replace rear bearing cup in housing, placing predetermined shims between cup and housing. *CAUTION - Drive the bearing cups straight into clean bores.*

2) Use Tool J-2532 (6 Cyl.) or J-2531 (V8 Models) to install front pinion bearing cup in housing. Insert drive pinion in housing and install original pinion bearing preload shim pack on pinion shaft shoulder.

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1958-60 RAMBLER HYPOID (C nt.)

NOTE - For v ry shim add d to or d ducted from pinion d pth adjustm nt shim pack, d duct or add a like amount to pinion bearing preload shim pack for preliminary preload setting.

3) Install front bearing cone and rollers on pinion shaft. Install washer, lock ring and nut (do not bend lock ring on nut). Torque pinion nut to 90-100 ft. lbs. (6 Cyl.); 125-150 ft. lbs. (V8 Models).

4) Mount disc J-2499-2 on Gauge Arbor J-6482-1, or disc J-5223-17 on Gauge Arbor J-5223-4 (6 Cyl.). Use large diameter discs J-2499-2 and Arbor J-6482-1, or discs J-5223-5 on Gauge Arbor J-5223-4 (V8 Models). Position Gauge Block J-5223-20 against end of drive pinion with clamp bar and screw J-5223-6 and J-5223-14. Loosen thumb screw in end of gauge block to permit spring loaded plunger to contact gauge arbor. Lock plunger with setscrew. DO NOT disturb plunger position.

5) Remove gauge block and measure distance from end of anvil to top of plunger head with a 2-3" micrometer. This distance should be 2.095" (6 Cyl.), 2.457" (V8 Models), with "O" marked pinions. Add or deduct pinion adjusting shims (located between bearing cup and housing) to correct this reading on "plus" or "minus" marked pinions.

Pinion Setting Adjustment (6 Cyl. Models Without Machined Face on Pinion): *NOTE - Use Gauge J-2499 for pinion depth adjustment.* Place rear pinion bearing cone in bearing cup and rotate it a few times to "set" the rollers, then bolt gauge plate over bearing cone so that it does not touch housing at any point (bolt runs down through housing and is secured at pinion end). Attach a dial indicator to tool. With indicator button on top of gauge pin, set dial indicator (under tension) to zero. Install tool with adapter discs seated squarely in side bearing bores in housing. *NOTE - Use small diameter discs of adapter.* Swing gauge point across plate until highest reading is obtained. This reading subtracted from a constant of .140" will give standard shim thickness for that particular housing. Using this figure, add or subtract, according to marks on end of pinion, to obtain correct adjusting shim thickness. For example: When gauge point is moved across plate and a reading of .015" is obtained, subtracting this figure from the constant of .140" will give a standard of .125". This means that if a standard "O" pinion is being used, adjusting shims totalling .125" would be required. However, if marking on pinion is -3 (meaning that pinion is an additional .003" away from ring gear), it would be necessary to add this .003" to standard. Thus, the adjusting shim pack thickness would be .128".

PINION BEARING PRELOAD ADJUSTMENT: *NOTE -* Thickness range from .106" to .138" can be obtained by using two of the following size shims: .053", .054", .056", .058", .059", .063", .064", .066", .068" or .069".

1) Use a piece of flat bar 3/8" thick, approximately 13" long by 2" wide welded to a slip-type coupling. Drill two holes 6" from exact center of coupling to accept the spring scale claws. Cut a ½" square hole 12" from exact center of coupling to make tool for extension when torquing pinion nut.

2) To check pinion bearing preload attach spring scale to center of handle, pull tool in circular motion and note reading in lbs. on scale, then multiply by 6. This determines the inch pounds necessary to turn shaft. *NOTE* - Turn axle up to eliminate effect of gravity and pull horizontally.

►*NOTE: See "1960 6 Cyl. Model Pinion Bearing Preload Shim Note (Models with "Second" & "Third" Type Assemblies)" above.*

3) Pinion bearing preload should be 12-14 inch pounds (6 Cyl.), or 15-18 inch pounds (V8 Models). Increase shim pack to reduce preload or decrease shim pack to increase preload.

RING GEAR & PINION BACKLASH ADJUSTMENT: 1) Install differential assembly in housing and tighten bearing caps to 55-60 ft. lbs. (6 Cyl.); 105-110 ft. (V8 Models). Attach dial indicator to housing with button contacting drive side of a tooth on ring gear and note movement of gear on dial indicator. Backlash should be .002-.006" with .004" desired.

2) To increase backlash, install a thinner shim on ring gear side and a thicker shim on opposite side. *CAUTION - Do not chang total shim pack thickn ss. S "1960 Mod l Diff r ntial Sid B aring & Pinion Preload Shim Note (Models with "S c nd" & "Third" Typ Axle Assemblies).*

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTMENT: Correct preload is .004-.008". Add .004-.008", shims (between shim packs) when all side play has been eliminated.

DIFFERENTIAL ASSEMBLY INSTALLATION: 1) Assemble side bearing cups and shims on side bearings. Lower assembly into axle housing until bottom edge of bearing cups and shims are started in bearing bore (keep differential assembly square in housing and push it down as far as possible). Use a soft hammer to tap outer edge of bearing cups until seated in housing. *CAUTION - DO NOT DISTURB SHIMS.* Install bearing caps and torque to 55-60 ft. lbs. (6 Cyl.); 105-110 ft. lbs. (V8 Models). *NOTE - R check backlash and c rrect as necessary.*

PROPELLER SHAFT INSTALLATION (Rambler American): Install propeller shaft and coupling on pinion shaft until center of universal joint yoke is 4 3/16" from front face of rear axle housing, then tighten coupling (use Wrenches J-4486) to 300 ft. lbs.

PROPELLER SHAFT INSTALLATION (EXCEPT RAMBLER AMERICAN): Synchro-m sh & Overdriv Trans. - Install propeller shaft oil seal and retainer on propeller shaft. Place forward end of propeller shaft against wood block and drive coupling (use a lead hammer) on propeller shaft to shoulder on splined area in coupling. Tap retainer and oil seal on coupling, then install spacer and torque tube rear oil seal. Lubricate ground surface of coupling and torque tube rear oil seal with rear axle lubricant and install propeller shaft and coupling on pinion shaft. *NOTE - Do not crimp lip of seal as it must contact ground surface of coupling.*

Automatic Trans: Coupling is part of propeller shaft. *NOTE - Do not crimp seal when sliding coupling on pinion shaft as it must contact ground surface of coupling.*

RAMBLER TWIN-GRIP DIFFERENTIAL

Rambler 6 Cyl. (1959-60)

►*NOTE: For Rambler V8, See "Power-Lock (Plate Clutch Type)".*

DESCRIPTION: This unit is a "limited slip" (or locking) type differential assembly which directs the major driving force to the rear wheel with the greater amount of traction. The limited slip action is accomplished by two spring loaded thrusts blocks which bear against each side gear, which in turn are seated in a tapered cone clutch member inside each differential case half. The thrust block spring load is calibrated to permit slippage under variable torque conditions (turning corners or other unbalanced tractive conditions), allowing the torque created on one wheel by differential action to overcome thrust block spring load on side gears.

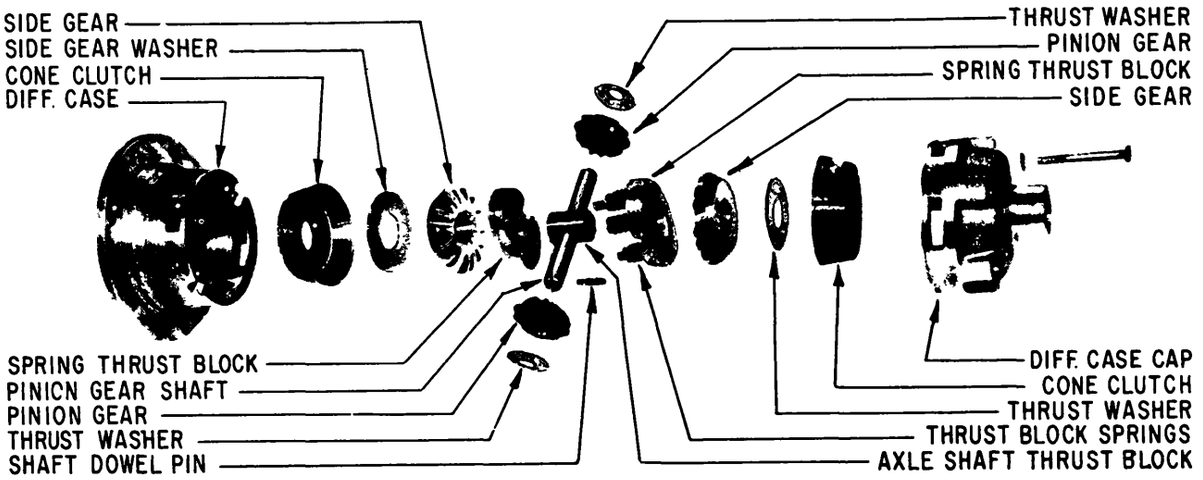
REAR AXLE ASSEMBLY REMOVAL: *See "Rear Axle" on Car Model Page and not the following:* DO NOT rotate one axle shaft until both shafts are in position. Rotation of one shaft without the other shaft installed will result in misalignment of cone and side gear splines and prevent entry of second shaft.

DIFFERENTIAL ASSEMBLY REMOVAL & INSTALLATION: *See "Rambler Hypoid" Rear Axle.*

To prevent unnecessary disassembly of rear axle and differential, proper operation and effectiveness of the differential unit can be determined as follows: With transmission in neutral and engine turned off, raise one rear wheel on a jack. Turn raised wheel in a forward motion with a socket and torque wrench on axle shaft nut. A torque reading of 80—120 ft. lbs. should be attained before differential assembly will slip. If the torque reading is within the above range, differential assembly is in proper operating condition.

►*TWIN-GRIP DIFFERENTIAL ASSEMBLY OVERHAUL*

NOTE: Individual components of the differential assembly are not available for service replacement. If necessary to replace parts, the complete unit assembly must be replaced. The following outlined procedures are for inspection and cleaning.



RAMBLER TWIN-GRIP DIFFERENTIAL ASSEMBLY

DISASSEMBLY: Remove differential case cap retaining bolts and separate the two halves of differential case. Remove all parts and wash in solvent, then dry with air.

INSPECTION: Inspect all parts for wear or damage. Inspect cone seats in differential case and male cone surfaces for excessive wear. Cone surfaces in case should be slightly grooved and male surfaces of cones should be grooved similar to transmission synchronizer friction rings. If excessive wear or damage is found, replace complete unit.

REASSEMBLY: Clamp an axle shaft in a vise vertically, allowing about 3" of splined end to extend above jaws. Place ring gear flange side of differential case over shaft with interior of case upward, then install the cone having the word "flange" stamped on it into case, over the axle shaft splines. Place washer and side gear over axle shaft and seat side gear on cone mounting face. Position one of the spring thrust blocks over gear face in alignment with pinion gear shaft grooves. Install pinion shaft, axle shaft thrust block, pinion gears, and thrust washers into flange half of differential case, positioning the assembly so pinion shaft dowel can be inserted through pinion gear shaft and into differential case. Insert springs into spring pockets (6 large springs and 2 small springs), then install the two small springs inside the two large springs located at each end of spring thrust block. Install second thrust block over spring and thrust block assembly. Align second side gear to mesh with pinion gears and Install it face down on spring thrust block, then place side gear washer and the remaining cone, stamped "cap", over side gear. Install differential case cap over cone in proper position, then insert two bolts 180° apart and tighten finger tight. Install the other axle shaft through cap side of differential case, turning it to enter splines in cone and side gear. Leave axle shaft in this position, then insert remaining bolts and tighten to 15—18 ft. lbs. Remove axle shafts, tapping with a soft hammer as necessary to disengage from splines. Install differential case in rear axle housing *(see "Rambler Hypoid" Rear Axle).*

VALIANT HYPOID

Valiant (1960)

►*PINION BEARING PRELOAD ADJUSTMENT NOTE:* Bearing preload specifications of 13-20 inch pounds is for **new** bearings. If used or run-in bearings are re-installed, bearing preload should be 0-10 inch pounds.

►*PINION SHAFT NUT TIGHTNESS NOTE:* On early cars, built before Jan. 1, 1960 pinion shaft nut must be checked for proper tightness. Tighten to 240 ft. lbs. If nut is found to be less than 240 ft. lbs., check turning torque of pinion shaft after tightening nut. If turning torque exceeds 30 inch pounds, readjust pinion bearing preload.

DESCRIPTION: Semi-floating, hypoid gear type with differential carrier integral with rear axle housing.

REMOVAL: *See "Rear Axle" on Car Model page.*

AXLE SHAFT REMOVAL: *See "Rear Axle" on Car Model page.*

OVERHAUL

DIFFERENTIAL CASE: Place rear axle assembly in a suitable holding fixture, then drain lubricant from housing and remove cover. Clean interior of housing and gears with solvent. Before removing differential case, check the following:

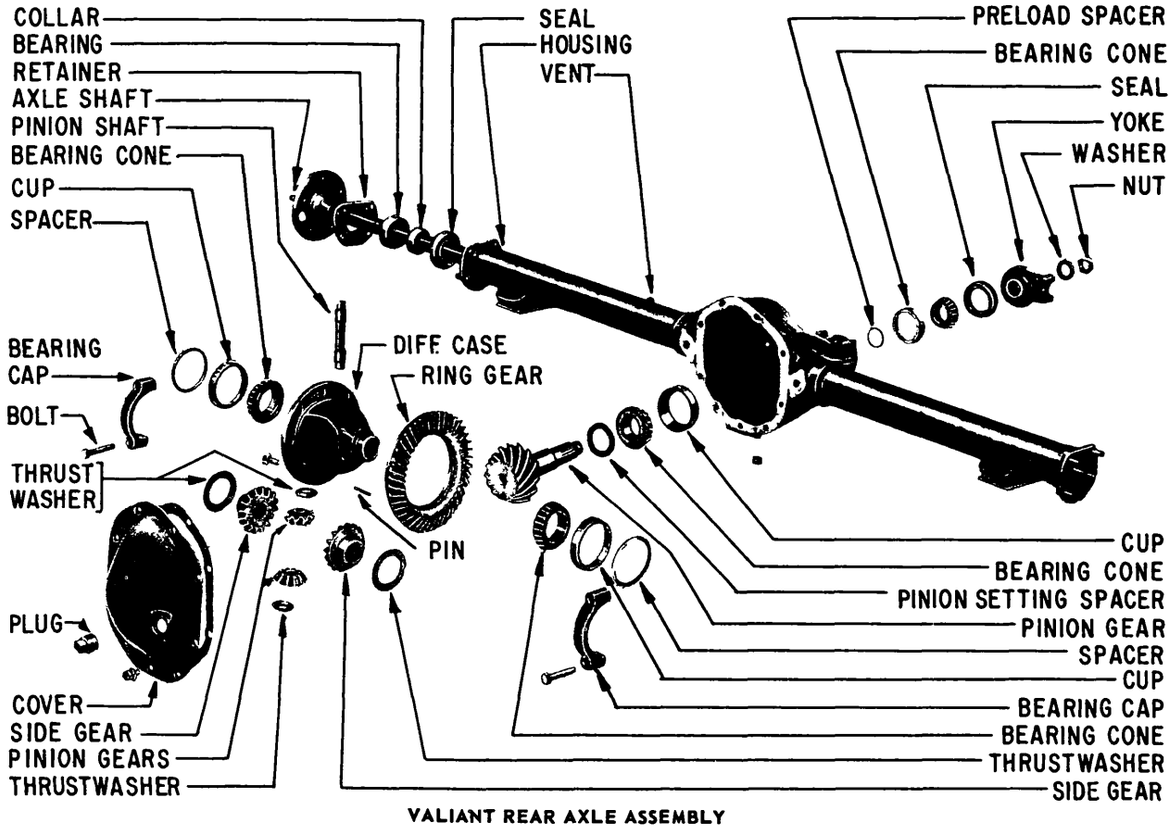
Ring Gear Runout - Check for differential side play (there should be none). If there is no differential side play, mount dial indicator, Tool C-3339 on pilot stud, Tool C-3288 and load indicator slightly when plunger is at right angle to back face of ring gear, then set indicator dial to zero. Turn ring gear several revolutions and mark ring gear and differential case at point of maximum runout. Total indicator reading should not exceed .005".

R moval: Mark carrier and differential bearing caps for installation at the same locations, then remove bearing caps. Install spreader, Tool C-3721 on rear axle housing with tool dowels seated in locating holes in housing, then turn tool screw finger tight (in direction to spread housing). Screw pilot stud, Tool C-3288 in one side of carrier and install dial indicator so indicator arm is against opposite side of carrier on centerline of axle shafts. Spread carrier approximately .012-.015" (DO NOT exceed .020"), then remove dial indicator. Remove differential assembly from rear axle housing. *NOTE - Release tension on spreader tool but do not remove it from rear axle housing until reassembled differential case is installed for side bearing preload adjustment.*

Disassembly: Mount differential case assembly in a vise having soft jaws, then remove ring gear attaching bolts. *NOTE - Ring gear attaching bolts are LEFT HAND Thread.* Drive differential pinion shaft lock pin out of case from ring gear side, then remove differential pinion shaft by driving it out with a brass drift. Rotate differential side gears to remove pinion gears and thrust washers, then remove differential side gears and thrust washers. Remove differential bearings with Tool C-293 and No. 39 plates.

Inspection: Wall all parts in solvent and blow dry with air. Inspect gears for worn, chipped or damaged teeth and inspect thrust surfaces, including thrust washers for scoring, wear or damage. Inspect pinion shaft for pitting, scoring, or wear. Replace all parts as necessary.

Reassembly: Install thrust washers on differential side gears and position gears in case, then place thrust washers on both pinion gears and mesh pinion gears with side gears. Rotate gears to align pinion gears and washers with shaft holes in case. Install pinion gear shaft with hole in shaft aligned with lockpin hole in case. Be careful not to damage thrust washers when installing shaft. Install lockpin from ring gear side of case. Position ring gear on case and start all bolts through case into ring gear, finger tight. Tap ring gear against flange and tighten bolts to 30 ft. lbs. *NOTE - These bolts have LEFT HAND threads.* Install side bearing cones with Tool C-3716.



VALIANT REAR AXLE ASSEMBLY

Differential Side Bearing Preload Adjustment: After pinion shaft assembly is removed from rear axle housing (see below), spread housing as outlined for differential case removal (above) and install differential case assembly in rear axle housing, with bearing cups on bearing cones. Select and install spacer washers which, when installed between cups and housing will leave a small amount of free play. *NOTE - Spacer washers are available in .003" variations from .254" to .284".* To measure endplay, use two sets of feeler gauges. Push differential case to one side of rear axle housing as far as it will go. Insert feeler of greatest possible thickness between cup and spacer on opposite side above centerline of housing, then insert the same thickness feeler gauge of the other set between came cup and spacer, below centerline of housing. Rotate differential bearings several times to align bearings, then increase thickness of feeler gauges, if possible, to provide a hard drag. Select two new spacer washers having a total thickness equal to the two spacers installed for trial, plus thickness of feeler gauge, plus .003-.006". As an example: If two .257" spacers were used for trial purposes and a .012" feeler gauge was the maximum thickness inserted between cup and spacer, two .263" spacers would produce zero end play. As proper preload is made with spacer washers which add .003-.006" to zero endplay, the thickness of one spacer would be .263" and the other .266" for minimum preload, and two .266" spacers would be used for maximum preload. Remove differential assembly from housing and tie selected preload washers to bearing cups to have them available for use in determining backlash (see below).

PINION: Removal - Remove pinion nut and yoke with puller, Tool C-452 and holding Tool C-3281, then remove pinion oil seal with puller, Tool C-748, Remove pinion front bearing and preload spacer washer. Remove pinion from carrier, then remove pinion bearing cups with a flat faced drift. Remove pinion rear bearing from pinion shaft with puller, Tool C-293 and No. 40 plates.

Pinion Bearing Cup Installati n: Start both bearing cups into rear axle housing, then place rear spacer, Tool SP-3244 on main part of Tool 3715. Seat pinion rear bearing on spacer and hold tool in rear axle housing. Place centralizing sleeve, Tool SP-3245 on tool and place pinion front bearing cone on centralizing sleeve,

CONTINUED ON NEXT PAGE

VALIANT HYPOID (Continu d)

then tool compression sleeve, and centralizing washer and nut. Draw cups tightly against shoulders in rear axle housing by tightening the nut while holding compression sleeve from turning with Tool C-3281. *NOTE - Permit tool to turn to sev ral locations during tightening op ration to avoid brinneling the bearings.* Leave tool in rear axle housing to determine pinion setting.

Pini n S tting (With Tool C-3715): With main tool left in rear axle housing after installing pinion bearing cups, loosen tool nut and retighten to produce 10-15 inch pounds of turning torque. Attach gauge block to main tool. Place cross bore arbor in housing and install bearing caps. Tighten cap bolts lightly. Select a spacor washer which will fit between arbor and gauge block when washer is flat on block. *NOTE - Spacer washers ar availabl in .002" variations from .084" to .100".* The fit should have a definite drag, similar to pull of a feeler gauge. *NOTE - Should a washer have a littl drag and the n xt thicker washer will not pass through, us thinner washer.* This washer is the proper one for use in the rear axle housing being checked providing the pinion has a "0" (zero) marking. If the pinion being used has a "+2" marking, select a washer **.002" thinn r.** If the pinion being used has a "–2", select a washer **.002" thicker** for installation. Pinions having other markings should be handled in a similar manner. Remove tools from housing.

Installati n: Place selected pinion setting spacer washer (see above) on pinion shaft with chamfered side toward pinion gear, then use Tool C-3717 and an arbor press to press bearing on pinion. Hold pinion in rear axle housing and install original pinion bearing preload washer (chamfered side toward shoulder), then install front bearing, yoke and nut on pinion shaft. Turn rear axle housing to bring pinion shaft yoke upward, then tighten nut to 240 ft. lbs. (minimum), using holding Tool C-3281 on yoke to hold the assembly in several positions to make a complete revolution while tightening. Remove holding tool and rotate assembly several turns in both directions to align bearing rollers. *NOTE See "Pinion Bearing Preload" below for installation of oil seal.* Adjust pinion bearing preload.

Pinion Bearing Preload Adjustment: With pinion yoke upward, test preload with Tool C-685 (torque wrench) by noting torque wrench reading required to turn pinion shaft through several turns. *NOTE - Wrench must be moving when readings are taken.* If preload is 13-20 **inch pounds** (new bearings); 0-10 **inch pounds** (used bearings), preload is correct. If not, use a **thicker** washer to **decrease** preload and a **thinner** washer to **increase** preload. *NOTE - Preload washers are available in .002" variations from .074" to .106".* When preload is correct, remove nut and yoke. Apply a thin coating of sealing compound to inner bore of housing in area of pinion seal, then install pinion oil seal (lip toward bearing) with Tool C-3656. Install yoke with tools C-3718 and C-3281. Install washer with cupped side toward yoke, then install nut and tighten to 240 ft. lbs. minimum.

Drive Gear & Pinion Backlash Adjustment: With pinion gear properly adjusted, attach spreader, Tool C-3721 and spread rear axle housing *(see "Differential Case Removal" above),* then install differential case assembly and pre-selected differential bearing preload spacers in housing. Release tension on spreader tool and install bearing caps. Tighten bolts to 40 ft. lbs. Attach a dial indicator to housing so indicator actuating arm is in contact with one tooth, parallel to ring gear rotation. Check backlash and mark the gear tooth, then re-check backlash on three other teeth approximately 90° apart. When minimum backlash position is located, use dial indicator at that tooth only. If backlash is not within limits of .004-.006", adjust by using different thickness spacers on both sides of differential case. Any change in one spacer must be compensated for by a similar change in other spacer. The total thickness of both spacers must be the same after backlash adjustment as before in order to maintain correct preload. When backlash is correct, check gear tooth pattern with red lead, then install cover and tighten bolts to 20 ft. lbs.

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AIR SUSPENSION SERVICING

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AIR SUSPENSION CONTROL VALVES
Buick, Cadillac 2512
Ford, Mercury 2515
Oldsmobile, Pontiac 2512
Rambler 2512

IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

►*CAUTION:* On all Air Suspension cars, and other cars with special frames or Unit Body - Frame construction, special precautions and procedures are required when jacking or hoisting the car as listed below. *For TOWING instructi ns n Air Suspension Cars, see individual car mod l Air Suspensi n Data.*

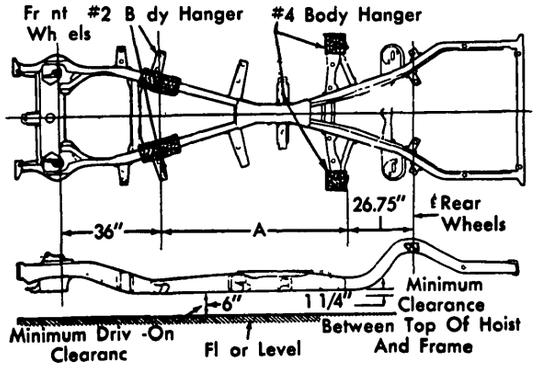
BUICK
1958-59 MODELS

BUICK (Air Susp nsi n Cars): *NOTE* - Before raising the car on a jack or hoist, pull out manual life knob located below instrument panel to right of center heater air outlet, to place car in full rebound position. Leave knob in OUT position while car is raised.

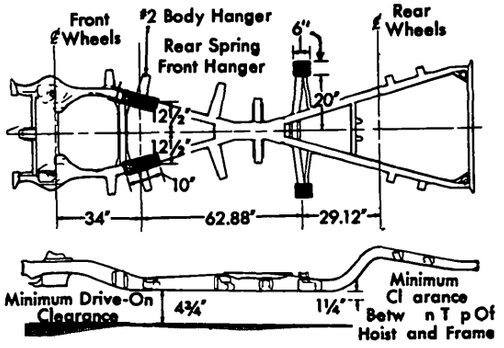
Hoisting Car: Place car in full rebound position (see note above). *CAUTION - D not completely deflate or inflate air suspensi n system (such as opening air lines to let air scape r running engine to inflate system) whil car is on any typ lift that supports front of car by the front spring s ats.*

CADILLAC
1958-60 MODELS

CADILLAC: *CAUTION (CARS WITH AIR SUSPENSION)* - Before jacking, hoisting or towing cars (Exc. Eldorado Brougham), pull the manual valve knob on instrument panel to full OUT position which will raise car to its full rebound position. On Eldorado Brougham, do not



CADILLAC (EXC. BROU HAM) FRAME CONTACT POINTS



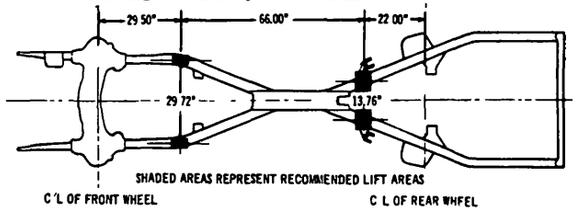
ELDORADO BR UGHAM FRAME C NTACT P INTS

open any door or turn on the ignition when any wheel is off ground (changing tire or when car is on a hoist). Air suspension leveling action could cause car to shift on lifting equipment. Never raise rear of car with rear shock absorbers disconnected which could cause car to be lifted off its suspension.

Hoisting Car (All Models): Hoisting equipment of the type that engages suspension, axle, or wheels is preferred. When using this type equipment the necessary precautions must be taken to prevent damaging shock absorber mounts, exhaust pipes and mufflers. When using a frame contact type hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration. Care should be taken to prevent hoist adapters contacting any part of the No. 2 body hanger. Hoist contact at rear should be at outer ends of No. 4 body mounting brackets. In no case should rear contacts be less than 40" apart. *CAUTION* - Do not allow hoist to contact rear lower control link front mounting bracket.

CHEVROLET
1958-60 PASS. CARS

CHEVROLET: *CAUTION (CARS WITH AIR SUSPENSION)* - Before jacking up any wheel or raising car on a frame contact type hoist (any hoist that does not support car under all four wheels), the manual shutoff valve located on top of junction block at left side of engine adjacent to accumulator tank, must be closed when car is at normal operating height. Be sure valve is opened after removing car from jack or hoist.



CHEVROLET FRAME CONTACT POINTS

Hoisting Car (All Models) - Hoisting equipment that engages suspension, axle, or wheels is preferred. When using this type equipment the necessary precautions must be taken to prevent damaging shock absorber mounts, exhaust pipes and mufflers. When using a frame contact type hoist, special adapters must be used on hoist rails to assure engagement with car frame at locations indicated by shaded areas in illustration. Make sure the manual shutoff valve (see above) is closed before lifting car on this type hoist.

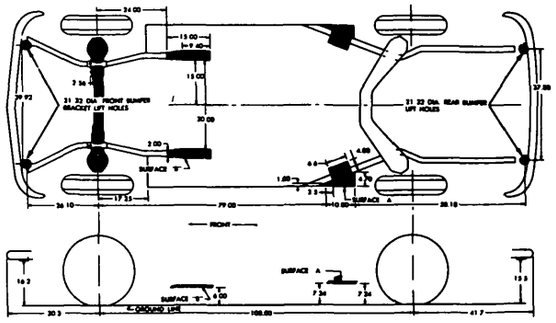
CORVAIR
1960 MODELS

CORVAIR: The integral body design requires that precautions be observed when raising car with a jack or on a hoist.

Jacking the Car (Floor Jack): Place jack directly under side edge of body approximately 8" toward center of vehicle from body door opening as follows: **Front End** - 8" toward rear from front edge of door opening. **R ar End** - 8" forward from rear edge of door opening.

H isting (Fram Contact H ist): If frame contact hoist is used, it must be equipped with proper adapters so that car will be supported at correct points as shown in illustration. *CAUTION - Fuel tank is located behind front axle and ahead of body sill lifting pads. Hoist must not contact tank.*

►*CAUTION:* When rear of vehicle is supported at rear lifting pads and more than 200 lbs. load is placed on rear end, vehicle will teeter (front end will lift) if luggage compartment and fuel tank are empty. *Chain or tie down the front end to assure safety.*



1960 CORVAIR

CHEVROLET TRUCKS
1960 MODELS

CHEVROLET TRUCKS (Vertical Type Jack): Following list of jacking points will assist in performing wheel and tire assembly changes with vertical type emergency jacks supplied with 1960 Chevrolet trucks.

FRONT

10, 20, 30 Models - Lower arm pivot or torsion bar socket.
40 Models - Frame side rail ahead of steering gear or idler support.
50, 60 Models - Frame side rail behind front crossmember. Use hardwood block between front crossmember and upper control arm to reduce jack travel.

REAR

10, 20, 30 Models - Axle housing.
40 Models - Spring ahead or behind axle.
50, 60 Models - Spring, in front of axle housing.

CHRYSLER, DE SOTO, DODGE PLYMOUTH & VALIANT
1960 MODELS

Integral frame requires that certain precautions be observed when raising car on hoist or jack.

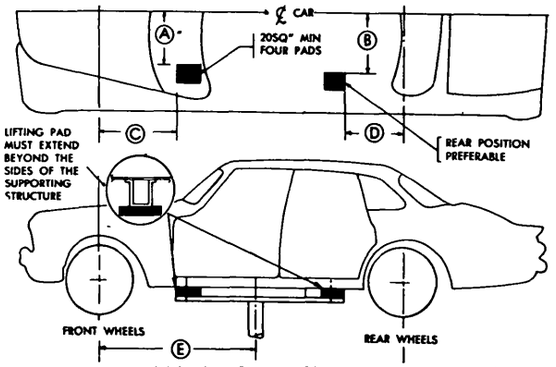
Jacking the Car (Floor Jack): Caution should be used when raising car with floor jack. Locate jack **only** under rear axle housing or under front suspension lower control arms. *CAUTION* - DO NOT contact jack on any part of underbody.

CONTINUED ON NEXT PAGE

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Hoisting (From Contact Hoist): If frame contact hoist is used to raise car it must be equipped with proper adapters in order that car will be supported in correct position as shown in illustration, and to specifications indicated in table below:

	A	B	C	D	E
Chrysler PC1	16.50"	17.25"	24"	22"	54"
Chrysler PC2,3	16.50"	17.25"	28"	22"	59"
DeSoto			24"	22"	54"
Plymouth	16.50"	17.25"	24"	18"	54"
Valiant	14.2"	16.2"	20.3"	23.7"	48"



CHRYSLER, DE SOTO, DODGE, PLYMOUTH & VALIANT FRAME CONTACT POINTS

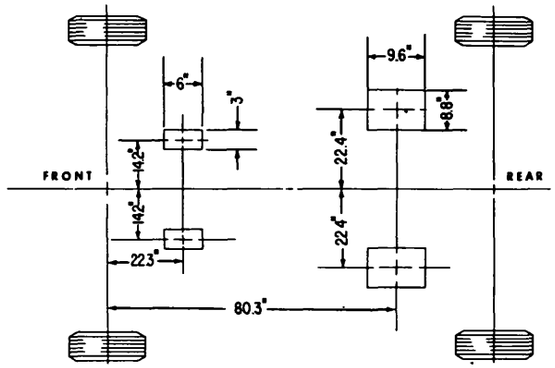
COMET, FALCON, THUNDERBIRD

1958-60 MODELS

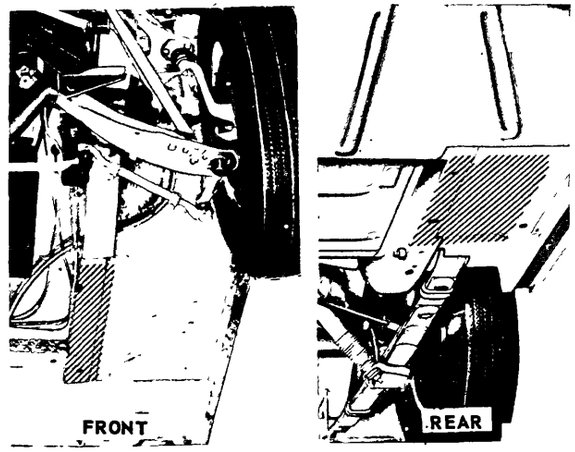
Jacking the Car: When a stationary floor jack or a roll jack is to be used there are several specific recommended points of contact: Either side of car may be raised at front by jack contact at lower arm strut connection. Either side of front end may be raised by jack pressure on front crossmember or crossmember to which stabilizer is connected. Either side of rear end may be raised by jack pressure on rear crossmember. DO NOT put pressure on fuel tank. To raise front of car with bumper jack, position jack directly in front of parking lights. At rear, place jack under tail light midway between bumper attaching bolts.

Hoisting the Car: All drive-on type hoists should be checked first for possible interference between hoist rails and car underbody. Hoists should be modified and approach ramps built up to provide necessary clearance.

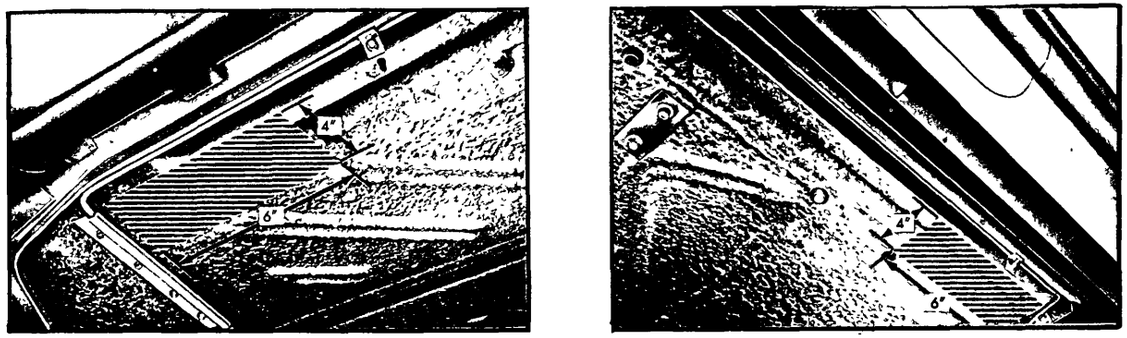
Rail Type & Fork Lift (Twin Post) Hoists - Front adapters or hoist plates must be carefully positioned to contact lower suspension arms and must be large enough to cover entire spring seat area. Rear adapters or forks must be positioned under rear axle (forks must not contract axle at points more than 1" outboard from circumference welds near differential housing). *CAUTION* - Raise car slowly and check to make certain that rear shock absorbers are not damaged.



COMET FRAME LIFT DIMENSIONS



FALCON FRAME CONTACT POINTS



FRONT FORD THUNDERBIRD FRAME CONTACT POINTS REAR

Frame Contact Hoist - Frame contact hoist adapters are necessary to lift car. The hoist adapter pads should each cover at least 12 square inches (Falcon) or 24 square inches (Thunderbird) of underbody areas shown in illustrations.

FORD & MERCURY

1958 MODELS

FORD AND MERCURY *(CARS WITH AIR SUSPENSION):* *CAUTION* - Do not open any door or turn on the ignition when any wheel is off ground (changing tire or when car is on a hoist). Air suspension leveling action could cause car to shift on lifting equipment.

Hoisting Car: (Air Suspension Units Inflated): Hoisting equipment of the type that engages suspension, axle, or wheels *(see "Two-Post" hoist not below)*, is preferred. When using a frame contact type hoist, make certain that proper adapters are used to prevent contact with rear shock absorbers or suspension links.

►*TWO-POST HOIST NOTE:* At the rear, make certain rear axle housing centers over hoist post center. Check where rear saddle jaws will contact rear axle. If necessary use special adapters to prevent damage to rear shocks, track bar, gas tank, etc. In instances where front air springs are extremely low or deflated the front hoist rail will contact oil pan and may result in damage to oil pan, oil pump and vacuum pump. If available, install shipping pedestals *(see "Hoisting Car, Air Suspension Units Deflated" below)*. If pedestals not available, install small wooden blocks between lower suspension arm and hoist saddles to provide clearance for oil pan.

Hoisting Car (Air Suspension Units Deflated): Jack up car at front and rear and install shipping pedestals *NOTE* - These may be procured from car dealer. Front pedestals are installed between lower arm jounce bumper and its contact surface on side of upper spring "beehive" on frame. Rear pedestals are installed between rear axle housing and rear axle bumper. Lower jack and allow weight of car to rest on pedestals.

CONTINUED ON NEXT PAGE

JACKING & HOISTING PRECAUTIONS

CONTINUED FROM PRECEDING PAGE

LINCOLN & CONTINENTAL

1958-60 MODELS

LINCOLN & CONTINENTAL: *CAUTION* - Because of the new body-frame unitized construction, serious damage may result from improper jacking and hoisting.

Jacking th Car (Fl r Jack): Jack should be placed under lower suspension arms at front and rear axle at rear of car, raising each wheel individually. *CAUTION* - When jacking against sheet metal, a wooden block (2" x 4") of suitable length should be used to prevent denting or deforming metal. *DO NOT* attempt to raise one entire side of car by placing jack midway between front and rear wheels.

Bump r Jack - A 1¼" hole is provided in each bumper mounting bracket at underside of front and rear bumpers. End of bumper jack hook should be positioned in this hole. Be sure wheels are blocked and transmission is in "P" (Park) position.

Hoisting Car: *(NOTE* - When using a rail type hoist or a twin post hoist, special adapters may be required to avoid damaging rear shock absorbers and to fully encompass the wider front lower control arms).

Frame C ntact Hoist - Special pads located on underside of body floor pan adjacent to each wheel are provided for use with frame contact type hoist. These pads are corrugated (front), plain (rear) and special adapters must be used, if necessary, for frame type hoist to contact all four points. *CAUTION - Do not allow hoist pads r adapter arms t contact body floor pan.*

OLDSMOBILE

1958-59 MODELS

OLDSMOBILE (Air Suspension Cars): *CAUTION* - Before disconnecting air lines, working under car, or raising car on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

Raising Car (On a Jack) - Raise car in same manner as with conventional suspension (**do not** pull out on air suspension manual lift knob). When jack is lowered at right or left front of car, front end will follow jack down to slightly below normal, but will automatically raise to correct level. When jack is lowered at right or left rear, only the side supported by the jack will follow jack to slightly below normal position.

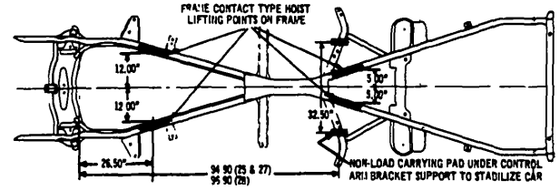
Raising Car (On Frame-Contact Hoist) - Wheels will drop and exhaust air from air springs. When hoist is lowered, car frame may continue to rest on hoist until air springs are inflated (it may be necessary to start engine for sufficient pressure). *CAUTION* - Do not pull out on air suspension manual lift knob while car is in a raised position.

Raising Car (On Twin-Post Hoist) - Use caution to prevent left hand yoke of rear hoist contacting hydraulic brake hose or junction block on rear axle housing.

PONTIAC

1958-60 MODELS

PONTIAC: *CAUTION (CARS WITH AIR SUSPENSION)* - Before jacking, hoisting or towing, raise car to its maximum height by pulling out on "Car Lift" knob located on underside of instrument panel to left of steering column. After work completed, return knob to the "In" position. *CAUTION* - If car has been raised with "Car Lift" knob in the IN position, DO NOT pull out knob while car is supported on a twin post hoist or by jacks under the front lower control arms. This action would cause lower control arms to swing down and might cause car to slide off hoist or jacks.



PONTIAC FRAME CONTACT POINTS

Hoisting Car (All Models): Hoisting equipment of the type that engages suspension, axle, or wheels is preferred. When using this type equipment the necessary precautions must be taken to prevent damage to shock absorber mounts, exhaust pipes and mufflers. When using a frame contact type hoist, adapters must be used to contact the X-type frame at points indicated in illustration. Non-load carrying pad (or block) must be used between hoist and frame outrigger as indicated in illustration to prevent shifting or movement of car on hoist. *CAUTION* - Rear support points are only 5" out from center line of car and car will not be stable on hoist unless these non-load carrying pads are installed.

1954-56 BUICK

All Series (1954-56)

►CHANGES & CORRECTIONS

►*STABILIZER BAR INTERFERENCE CORRECTION:* If water outlet hose on radiator contacts the stabilizer bar, insert a spacer under left hand stabilizer bracket to provide a minimum of 3/16" clearance between hose and stabilizer

►*1955 LOWER CONTROL ARM OUTER PIVOT PIN & BUSHING POSITION CHANGE* Head of bushing has been reversed so it will be toward front of car on right side, and toward rear on left side.

►*1955 BRAKE PIPE INTERFERENCE WITH UPPER CONTROL ARM CORRECTION·* A clip, Part No. 1334584 should be installed over brake pipe and secured to right frame side rail to hold brake pipe away from upper control arm. Bend pipe away from contact with control arm.

►*1956 FRONT TIRE RUBBING ON FRAME CORRECTION (Turning Angle Too Great).* To correct, install a 1/32" thick plain washer under bolt head of rear steering arm bolt on both right and left sides. In order to install washer, it will be necessary to remove hub and drum assembly to gain access to nut on rear steering arm bolt.

►*1956 CASTER CHANGE* Caster now specified is 0° to Neg. 2°, with Neg. 1° desired. This supersedes previous specification of Pos. ½° to Neg. 1½°.

DESCRIPTION: New design with Direct Acting Shock Absorbers and Upper Support Arm pivoted on bracket shaft mounted on frame front cross-member as follows:

Front Shock Absorbers—Delco direct acting hydraulic type located within the coil springs. Upper end is mounted in tower bracket on frame cross-member (bayonet type end with rubber grommets in bracket), lower end is bolted to bracket bolted on underside of spring seat on lower support arm ("eye") type with rubber grommets on mounting bolt). Shock absorbers are interchangeable from right-to-left and can be removed and installed without disturbing suspension.

►*CAUTION—Shock absorber calibrations differ in some models and are not interchangeable from one car to another.*

Upper Support Arm—New assembly (furnished with shaft, bushings, and dirt seals) mounted at inner end on frame cross-member by two bolts in pivot shaft. Shaft and bushings can be replaced separately.

CHECKING & ADJUSTING: Check front wheel bearings, wheel runout, tire inflation, and front end trim dimensions, and see that car is at curb weight before checking front end alignment.

Tire Inflation—24 lbs. cold (after standing for more than 3 hours or driven less than 1 mile), **26 lbs.,** (after car driven more than 3 miles at less than 40 MPH), **28 lbs.** (after car driven more than 3 miles at more than 40 MPH).

Trim Dimension (Front Springs): Before measuring, bounce both ends of car up and down several times to make sure there is no bind in suspension members, and to let springs take a natural position. When car is at rest, measure the trim height between top side of lower control arm and underside of frame cross-member (at bumper bracket). Trim dimension should be within limits shown in table below and lower control arm heights should be same on both sides of car.

►**Trim Dimension Correction**—If trim dimension is less than specified, or additional height is required to prevent "bottoming", install additional spring insulators, divided between upper and lower ends of spring. If more than three additional shims required, replace the spring NOTE—New springs should not increase the trim dimension more than 1" over specified maximum limit.

Front Trim Dimensions

46C 56C, 76C, 100	3½-4"
All Other Models	3¾-4¼"

NOTE - When checking new car add ¼".

Kingpin Inclination: (1954-55) 0° crosswise with 7/8° camber. Not adjustable.
(1956) 7° at 7/8° camber.

Caster: (1954-55) Neg. ¼° desired (Limits Pos. ½° to Neg. ¾°). Both sides of car should be equal within ½°. **(1956)** 0° to Neg. 2° (Neg. 1° desired). *NOTE* - Supersedes previous specification of Pos. ½° to Neg. 1½°. **Adjustment** - Remove lubricant fitting from bushing at outer end of upper support arm (front bushing right side, rear bushing left side), loosen clamp bolt in upper end of knuckle support, use Allen wrench inserted through lubricant fitting hole and turn pivot pin to adjust caster. *CAUTION* - Camber will be changed unless pivot pin rotated in complete turns only - check camber after adjusting caster.

Camber: Pos. 3/8° desired (Limits Pos. 7/8° to Neg. 5/8°). Both sides of the car should be equal within ¾°. **Adjustment** - Adjust in same manner as Caster (above) except that eccentric pin should be turned only slightly from point where correct caster secured (entire range of adjustment secured in ½ turn).

Toe-In: 0" to 1/16" (1954), 1/16" to 1/8" (1955-56).

Adjustment—Loosen clamp bolt at each end of adjusting sleeve at outer end of each tie rod, turn each adjusting sleeve equally to adjust toe-in. *NOTE*—Threads at each end of the sleeve should be equal and slots in sleeve and clamp should be aligned.

Toe-Out on Turns: Inner wheel turns 22½° ±¾° with outer wheel turned 20° No adjustment.

►*DYNAFLOW CARS (WITH POWER STEERING) NOTE: A special shim, Part No. 1290142, is used on the upper end of LEFT front spring between spring and insulator.*

►*REAR SPRING NOTE—See "Buick Rear Suspension" in Rear Axle Section for standard and special rear springs.*

Front Spring Application

Series	Standard	Air Conditioned
40, 60 (1954 Synchro-mesh)	.1165046①	1165048
40, 60 (1955 Synchro-mesh)	1167272④	1165048
50 (1954 Synchro-mesh)	.1165047②	1165049
50 (1955 Synchro-mesh)	.1167273②	1165049
40, 60 (1954 Dynaflow)	1165047②	1165049
40, 60 (1955 Dynaflow)	1167273②	1165049
50 (1954-55 Dynaflow)	1165048③	1165050
70 (1954-55 Dynaflow)	1165049	1165050
100 (1954)	1165049	
40 (1956 Synchro-mesh)	1171037⑤	1165048
40, 60 (1956 Dynaflow)	1171038	1165049
50, 70 (1956 Dynaflow)	1165049	1165050

①—No. 1165047 200 lb. overload (Except Series 40 Convertible & Series 60 Estate Wagon).
②—No. 1165048 200 lb. overload
③—No. 1165049 200 lb. overload.
④—No. 1167273 200 lb. overload (Except Series 40 Convertible & Series 60 Estate Wagon).
⑤ - 1171038 300 lb. overload.

FRONT SPRING REPLACEMENT (Removal): Place jack under lower control arm and raise sufficiently to remove wheel. Disconnect stabilizer link from lower control arm and outer end of tie rod from steering arm. Remove shock absorber and remove lower pivot pin nut, pivot pin nut, pivot pin, lock washer, and dust seals. Support car frame with another jack, then slowly lower jack under lower control arm, and remove spring.

Installation: Before installing front spring, check the spring part number to make sure it is the correct spring (See "Front Spring" Table above). Make sure that rubberized fabric spring insulator is around spring centering flange on frame and is in good condition. Place one end of spring over centering flange, and as lower control arm is raised, position lower end of spring so that end coil seats in recess in spring seat. Support lower control arm on a jack. Slip lower pivot pin dirt seals over outer ends of lower control arm. Centralize lower end of knuckle support between outer ends of lower control arm, then install lower pivot pin and lock washer from front side and tighten securely. Install and tighten nut. Snap dirt seals into place over pivot pin Connect tie rod outer end to steering arm, and connect stabilizer link to lower control arm (NOTE—When stabilizer rod nut is tightened, the overall length of each grommet assembly should be 1 11/16". Adjust nut as necessary to obtain this dimension) Reinstall shock absorber and wheel. Adjust front end alignment

SHOCK ABSORBER REPLACEMENT: Not necessary to disturb front suspension assembly.

Removal: Hold upper mounting stem with a wrench, remove palnut and retaining nut (on top of shock absorber mounting bracket in engine compartment), lift off upper retainer and rubber grommet. Remove bolts and lockwashers attaching lower mounting bracket to underside of spring seat on lower support arm, pull shock absorber and mounting bracket assembly down through opening in spring seat. Do not lose retainer and grommet on shock absorber mounting stem To remove shock absorb-

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1954-56 BUICK (C nt.)

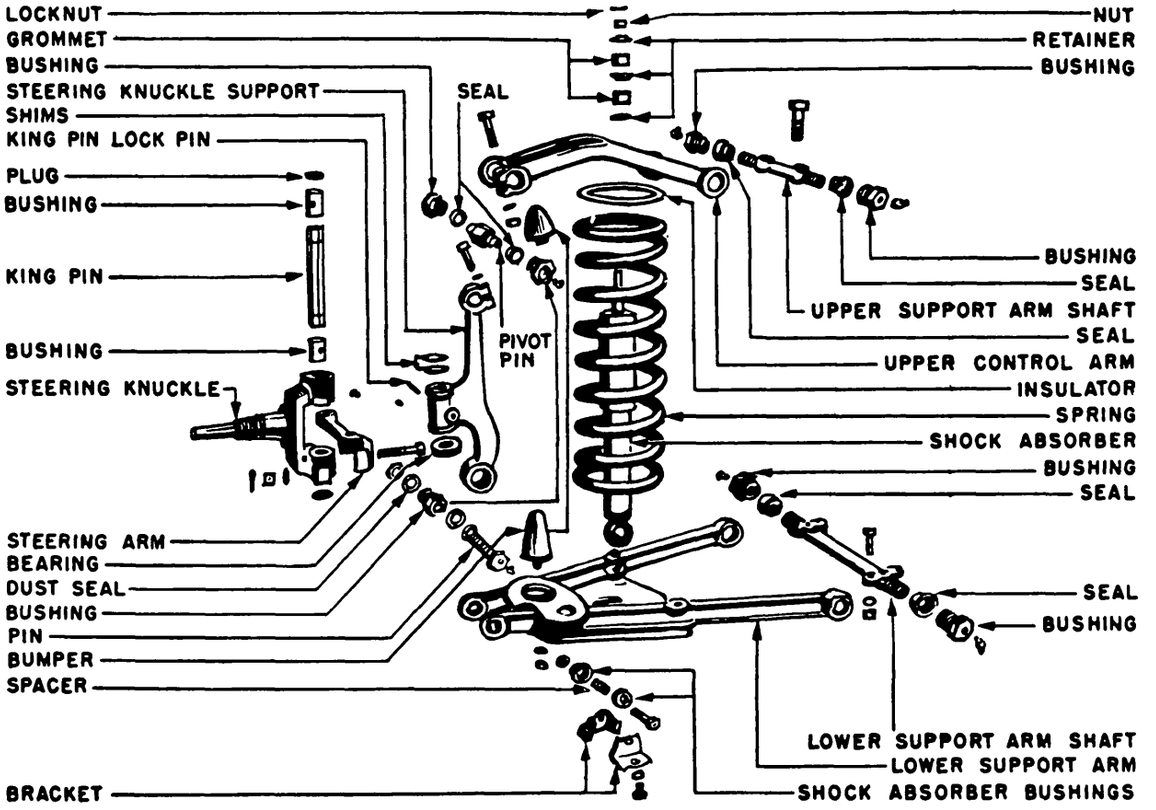
er from lower mounting bracket, remove pivot bolt and nut, pull bracket off, remove rubber grommets and spacer from shock absorber eye.

Installati n: Check to make sure the correct shock absorber is being installed *(See "Shock Absorbers" on Car Mod l page)*, then reverse the removal procedure as given above.

UPPER SUPPORT ARM REPLACEMENT (Removal): Remove generator and engine front mounting nuts, and raise engine just enough to allow removal of support upper arm shaft bolts. Remove pivot pin and bushings from support arm by taking out the pivot pin clamp bolt and turning bushings out of support arm. Remove rubber seals. Loosen clamp bolt in knuckle support and remove pivot pin, using a ½" hex Allen wrench. Remove support arm shaft attaching bolts and remove support arm assembly from car. Unscrew shaft bushings and remove shaft and seals from arm.

Installati n: *(CAUTION–Before installing any new parts, check the distanc between the two shaft bosses at inner nd of support arm assembly–this distance should b 6 5/16"± .020").* Install a rubber seal over each end of upper arm shaft, with large or bell end of seal outward. Insert one end of shaft with a seal, in one end of upper arm, and force other end of shaft into opposite end of arm. Fasten upper control arm securely in vise (close to one end of arm to avoid spring or distortion). Apply a liberal amount of white lead or Lubriplate to both bushings before installing. Start first bushing on shaft and into upper support arm at same time. Turn bushing until head is tight against arm, then tighten to 100 (1954-55), 150 (1956) ft. lbs. Center the shaft between ends of arm and install second bushing in same manner as first bushing, tightening the second bushing so that no binding exists. Before installing support arm, turn the shaft to locate the bolt holes equally distant from ends of arm, then bolt shaft to frame front front cross member. Lower engine and tighten front mounting nuts. Reinstall upper pivot assembly as follows: Hold knuckle support in line with hole through support arm and screw pivot pin into knuckle support, with adjusting wrench hole in pin toward split side of control arm. Turn pivot pin until large diameter section is centralized in knuckle support and tighten clamp bolt. Install rubber seals on both ends of pivot pin. Centralize knuckle support boss in support upper arm yoke and start the externally threaded bushing on threads of pivot pin and into threads of control arm. Start the plain (grooved) bushing on threads of pivot pin, then turn the opposite bushing up tight. Turn plain bushing until hex is just clear of arm, then install and tighten clamp bolts. Check and adjust front end alignment.

LOWER CONTROL ARM REPLACEMENT (Removal): Remove front chassis spring, then remove lower control arm assembly from frame front cross member.



BUICK FRONT SUSPENSION

Bushing Replacement: *(CAUTION–Before installing any new parts, check the distance between the two shaft bosses at inner end of support arm assembly (this distance should be 11¼"" ± 1/32").* Install a rubber seal over each threaded end of new control arm shaft, with the large or bell ends of seals outward toward ends of shafts. Insert one end of shaft with a seal in place in one control arm end and force opposite end of shaft into other control arm end (a piece of wood approximately 1¼" x 2½" x 24" can be used as a pry). Fasten control arm securely in a vise (close to one end of arm to avoid spring or distortion). Apply a liberal amount of white lead or Lubriplate to both bushings before installing. Start first bushing on shaft and into control arm at same time. Turn bushing until head is tight against arm, tighten to 100 (1954-55), 150 (1956) ft. lbs. Center shaft between arms and install the second bushing, turning shaft as required to thread into bushing so that no binding exists.

Installation: Before installing lower control arm and shaft assembly, turn shaft to locate bolt holes at both ends so they are equally distant from the inside surface of arms, then bolt shaft to frame front cross member. Install chassis spring and other parts, and check and adjust front end alignment.

STEERING KNUCKLE REPLACEMENT (Removal): Remove front wheel with hub and drum assembly. Remove brake backing plate and steering arm from steering knuckle (Do not disconnect brake hose but support backing plate out of way to avoid strain on hose). Drive out kingpin lockpin. Remove upper welch plug from knuckle by piercing with a sharp pointed punch and prying out. Drive kingpin down and out, which will drive lower welch plug from knuckle. Remove thrust bearings and shims.

Installation: Reverse removal procedure and use shims as required between knuckle support and upper boss of knuckle to provide .003" endplay of knuckle on support. Use new welch plugs at each end of kingpin. Check and adjust front end alignment.

1957-58 BUICK FRONT SUSPENSION

All Series (1957-58)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 LOWER CONTROL ARM-TO-FRAME BOLT PRODUCTION CHANGE & TIGHTENING CAUTION:* Two different type bolts have been used at this location. On early cars, bolts having three radical marks in head should be tightened to 55-65 ft. lbs. *(CAUTION - Do not tighten in excess of this specification).* Later cars have bolts with six radial marks in head. Tighten these bolts to 70-80 ft. lbs. A special hardened steel plate, Part No. 1180406 is used with the later type bolts. The normal length of the later type bolts is 1¾", however, a few cars were produced with 1½" bolts. On these cars, if shimming of lower control arm is necessary, the longer bolts must be installed. *If bolts are to be replaced for any reason, be sure and install the later type together with the hardened steel plate.*

►*1957 TIE ROD INTERFERENCE (POWER STEERING CARS):* If an interference condition between outer and of intermediate rod and tie rod exists, it may be caused by the head of the cotter key used to lock plugs in end of intermediate rod rubbing against tie rod. Correct by loosening idler support arm attaching bolts and positioning idler arm support rearward as far as possible. It may also be necessary to change position of cotter key 45°, so that head of key is at rearward side of intermediate rod.

►*1957-58 LOWER BALL JOINT LOOSENESS NOTE:* **With car raised (no load on front wheels), the lower ball joint is loose and no corrective measures should be taken unless the looseness, measured at outer circumference of tire is greater than ¼" laterally. If movement of front wheel exceeds this specification, replace lower ball joint.**

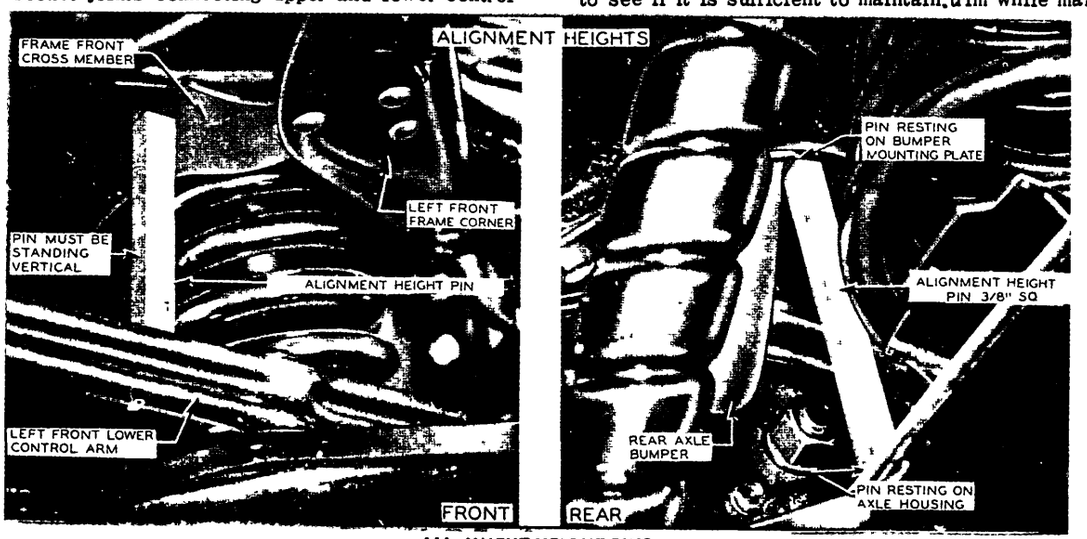
DESCRIPTION: "Ball joint" type suspension with ball and socket joints connecting upper and lower control arms to steering knuckles Coil springs or air springs are mounted between lower control arms and frame front crossmember and the shock absorbers are mounted adjacent to springs on lower control arm and attached to bracket on frame side rail at a point between spring and steering knuckle. Control arm shafts are bolted to frame crossmember and are connected to control arms by threaded type bushings.

ADJUSTMENT

CHECKING & ADJUSTING: Before checking or adjusting front suspension alignment, inflate tires to specified pressure. Check front wheel bearings for looseness and correct as necessary. Check for runout of wheels and tires and correct to within limit of 1/8" runout at side of tires. Check for looseness at upper ball joints and tie rod ends and correct if found excessive. Bring car to height specified below.

►*CAMBER & CASTER ALIGNMENT NOTE (CARS WITH COIL SPRINGS):* Place a 3/8" square pin 3 21/32" (1957), 3 29/32" (1958) long between frame and front lower control arm at each front wheel (see illustration), making sure that pin is standing vertical and not leaning. Use sandbags or other weight to hold car down on pins. Bring rear of car to proper trim height *(See "Buick Rear Suspension").* If the gas tank is full, trunk empty (except for spare tire), and if car is bounced and allowed to settle, it may then be considered at proper trim height. If these conditions cannot be met, a 3/8" square pin 5 13/32" (1957), 5 19/32" (1958) long should be placed between axle housing and frame at each rear wheel location (see illustration). Use sandbags or other suitable weight to hold car down on pins.

►*FRONT END ALIGNMENT NOTE (CARS WITH AIR SUSPENSION):* Inflate all tires to proper pressure, then locate car properly on front end equipment. Check tank pressure at top center high pressure tank fitting to see if it is sufficient to maintain trim while making check. Pressure should be 200 lbs. minimum. Check, and if necessary, set front and rear trim heights *(NOTE - For front trim heights, see "Trim Dimension Adjustment" below; for rear trim heights, see "Buick Rear Suspension").* Place car in override position and make necessary corrections for wheel runout by jacking up on wheel, rotating and letting wheel down at point midway between runout extremes. Place override valve in normal position and allow car to settle to trim height. Recheck pressure in tank when car has settled back down If necessary run engine to bring pressure up to minimum of 150 lbs.



ALIGNMENT HEIGHT PINS

Tire Inflation: 24 lbs. (after car has been standing for 3 hours or driven less than 1 mile). **26 lbs.** (after car has been driven for 3 miles or more **below** 40 MPH). **28 lbs.** (after car has been driven 3 miles **above** 40 MPH).

Steering Axis Inclination: Approximately 8° at 0° Camber. Both sides should be within 1° of each other. No adjustment.

►*CAMBER & CASTER ADJUSTMENT CAUTION: Both camber & caster are adjusted by shimming in the same locations, therefore both should be checked before changing either setting.*

►*CONTROL ARM SHIMMING NOTE (FOR CAMBER & CASTER ADJUSTMENT):* If only a small adjustment is required to bring alignment within limits, make shim adjustments at lower control arm. If the amount of shims exceed .160" in any one stack on lower control arms, make adjustments at the upper control arm shafts. Under no circumstances should total shim thickness exceed .160" on lower control arm shafts, and .380" on upper control arm shafts. Replace necessary parts if proper alignment cannot be obtained within these limits.

Caster (1957): Neg. ¼° to Neg. 2¾° (Neg. 1¾° desired), both wheels. *See "Shimming Procedure" below.*

Caster (1958): Pos. ¾° to Neg. 1¾°. Both sides should be within ¾° of each other. *See "Shimming Procedure" below.*

Camber: Pos. 1° to Neg. ½° (Pos. ½° desired). Both wheels should be within ¾° of each other. *See "Shimming Procedure" below.*

Toe-In: 1/16" to 1/8". *(CAUTION - Car must be at curb weight and running height - bounce car and allow it to settle to running height. DO NOT ALLOW ALIGNMENT PINS (see above) TO REMAIN IN POSITION WHILE CHECKING OR ADJUSTING TOE-IN).* Loosen clamp bolts and turn adjusting sleeves at tie rod end as required. Turn right and left adjusting sleeves exactly the same amount but in opposite directions when changing toe-in, in order to maintain front wheels in straight ahead position when steering wheel spoke is straight down. Position tie rod clamps downward to 45° forward to provide frame clearance. *NOTE - It is very important to position bottom face of tie rod end parallel with machined surface at outer end of steering arm when tie rod length is adjusted.*

Turn-Out On Turns (1957): With outer wheel turned 20°, inner wheel should be 23° (Manual Steering), 21¾° (Power Steering). Not adjustable.

Turn-Out On Turns (1958): With outer wheels turned 20°,

CONTINUED ON NEXT PAGE

1957-58 BUICK FRONT SUSPENSION (C ntinued)

inner wheel should be 22°55' (Manual Steering), 22°5' (Power Steering). Not adjustable.

Shimming Procedure: *NOTE - No lower control arm shims are installed in production, however, it is recommended that all shimming required for service adjustments be done at low r control arm shaft providing shim stacks at any one location do not exceed .160". If in excess of this thickness, adjustment must be made at upper control arm shaft. Do not exceed .380" in any one stack at upper control arm.*

Shim Selection (For installation at both upper and lower control arms) - *(NOTE - Upper and lower control arm shaft shims are different and are furnished in sizes indicated in table below).* Adding shims at front location will change **caster toward negative** (Practically no change in camber or toe). Adding shims at rear location will change **cast r toward positive** and camber toward negative (toe toward toe-out). Adding shims at both locations will **not change caster,** but will change **camber t ward negative**

►*SHIMMING AT LOWER CONTROL ARM NOTE:* If shims are added at lower control arm, replace original lower control arm shaft bolts with 300M bolts (½" - 20 x 2"), Part No. 455016. Tighten bolts to 105-120 ft. lbs.

►*SHIMMING AT UPPER CONTROL ARM NOTE:* On right side of car, remove generator and bracket. On left side of car, disconnect battery negative cable. Tighten control arm shaft-to-frame bolts to 90-100 ft. lbs.

1957 L wer C ntrol Arm Shaft Shims

Thickn ss	Part No.
.040"	1179204
.120"	1179205

1958 L wer Control Arm Shaft Shims

Thickn ss	Part No.
.040"	1180938
.120"	1180939

Upper Control Arm Shaft Shims

Thickness	Type ①	Identification ②	Part No.
.060"	Horseshoe	6	1171175
.080"	Horseshoe	8	1172986
.100"	Horseshoe	10	1175585
.060"	Round	6	1175794
.080"	Round	8	1175795
.100"	Round	10	1175796

① - Furnished with either "horseshoe slot" or round hole.
② - Identification number stamped on shim.

►*1957 LOWER CONTROL ARM-TO-FRAME BOLT PRODUCTION CHANGE & TIGHTENING CAUTION:* Two different type bolts have been used at this location. On early cars, bolts having three radial marks in head should be tightened to 55-65 ft. lbs. *(CAUTION - Do not exc d this tightening specification).* Later cars have bolts with six radial marks in head. Tighten these bolts to 70-80 ft. lbs. A special hardened steel plate, Part No. 1180406 is used with the later type bolts. The normal length of the later type bolts is 1¾", however, a few cars were produced with 1½" bolts. On these cars, if shimming of lower control arm is necessary, the longer bolts must be installed. If bolts are to be replaced for any reason, be sure and install the later type bolts with hardened steel plates.

Shim Installation (Lower Control Arm) - To prevent movement of lower control arm shaft on frame member during shim installation, loosen only one bolt at a time. Install shim and tighten bolt before installing shim at opposite end. Tighten bolts to 105-120 ft. lbs.

Shim Installation (Upper Control Arm) - On left side, disconnect negative battery cable from battery. On right side, remove generator and bracket. Wedge bolt heads of all upper control arm shaft bolts to prevent turning, then loosen both bolts on each shaft to free shims for removal. Tighten bolts to 90-100 ft. lbs.

Trim Dimensions Adjustment (Front): *(NOTE - The following dimensions are for a standard car without undercoating or optional equipment and with the car at curb weight. Curb Weight includes gas, oil, and spare tire, but no passengers).* Before measuring trim dimensions, bounce both ends of car up and down several times to make sure there is no bind in suspension members and to let springs take natural position. When car is at rest, measure trim height between front arm of lower control arm assembly and frame at a point between rubber bumper and spring. Measurement must be made as vertical as possible. See table below for trim height limits. When trim dimension is found to be too low, install special 1/8" shims between upper end of spring and frame *(NOTE - If more than three shims are required, replace spring).*

►*FRONT SPRING SHIM NOTE (CAR WITH POWER STEERING):* One spring shim is installed on top of left spring on these cars. None installed on right side in production.

1957 Front Trim Dimensions

Model	Trim Height
46C, 66C, 56C, 76C	4-4½"
Other Models	4¼-4¾"

1958 Front Trim Dimensions

Model	Trim Height
All (With Coil Springs)	①4.70"
All (With Air Springs)	②4.08"

① - Plus or minus .240". ② - Plus .240", minus .120"

REMOVAL & INSTALLATION 1957 MODELS

FRONT SPRING: Removal - Place jack under lower control arm in a position that will not interfere with removal of shock absorber, and raise wheel off floor. Remove wheel and tire. Disconnect stabilizer link and disconnect outer end of tie rod from steering arm. Remove shock absorber *(see "Shock Absorber Replacement" below).* Remove upper ball joint-to-control arm attaching bolts. Support car frame with another jack, then slowly lower jack under lower control arm which will allow lower control arm to drop low enough to remove coil spring without damaging the brake hose *(NOTE - If nec ssary, rem v brak pipe clip and m ve pipe slightly to gain ough slack).*

Installati n: *(NOTE* - Before installing front spring, check the part number stamped on spring to make sure it is correct for the car model. *See "Front Spring Application" below).* Make sure rubberized fabric spring insulator is in place around spring centering flange on frame and is in good condition. Place one end of spring over centering flange, and as lower control arm is raised, position lower end of spring so that end coil seats in recess in spring seat. Support lower control arm on a jack. When lower control arm is raised far enough, install the two upper ball joint-to-control arm bolts with upper bumper pad to rear. Tighten bolts to 70-80 ft. lbs. Connect tie rod outer end to steering arm, and connect stabilizer link. Adjust stabilizer link grommets *(S "Stabilizer Link Grommet Replacement" below).* Reinstall shock absorber, wheel and tire assembly, and adjust camber, caster, and toe-in.

1957 Front Spring Application

Series	Standard	Air C nd.
40 Synchro-mesh	1174155	1174154
40, 60 Dynaflow	1174154	1174153
50, 70 Dynaflow	1174153	1174152

FRONT SHOCK ABSORBER: *(NOTE - Rubber bushings in mounting eyes of shock absorber are not replaceabl . If worn or damaged, the complete shock absorber assembly must be replaced).*

Removal: Raise car by center of frame crossmember far enough to allow removal of upper shock absorber bolt. Remove bolt and shove eye down through opening in frame. Remove bolts and lockwashers attaching lower mounting bracket to spring seat on lower control arm, then pull shock absorber assembly down through opening in spring seat.

Installation: Make sure that replacement shock absorber is correct one for the car model. Insert shock through opening in lower control arm spring seat, and mounting eye up through opening in mounting bracket on frame. Install upper bolt, with nut forward, and tighten to 25-35 ft. lbs. Bolt lower mounting bracket assembly securely to lower control arm spring seat and lower car to floor.

►*1957 SHOCK ABSORBER APPLICATION: See "Shock Absorbers" on Car Model page.*

STABILIZER LINK GROMMET REPLACEMENT: Remove nut from lower end of link rod, then remove rod, spacer, retainer and grommets. When assembling, install rubber grommets dry and use care to center grommets in seats on stabilizer shaft and lower control arm. Also center retainers on grommets before tightening rod nut. Tighten rod nut to limit of thread on rod. When rod nut is tightened to limit of thread on rod, the overall dimension between both grommet retainers should be 1 11/16". If this dimension is not correct, adjust nut as necessary.

BALL JOINT & STEERING KNUCKLE: Removal - Jack up car and support weight on front spring seat. Remove wheel and tire assembly. Remove backing plate-to-steering knuckle attaching bolts and remove backing plate. Do not remove brake hose. Support backing plate out of way to avoid damage to brake hose. Remove bolts through lower control arms and ball joint. Lower steering arm out of the way, and remove rubber bumper from ball

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1957-58 BUICK FRONT SUSPENSION (C ntinu d)

joint if ball joint is to be replaced. Remove bolts through upper control arms and ball joint. Remove knuckle and ball joint assembly from upper and lower control arms. *(NOTE* - If ball joints are to be replaced, drive directly on studs to remove joints from knuckle. If ball joints are to be reinstalled, care should be taken to avoid damage to threads. This can be done by loosening nuts on tapered studs and installing short bolts half way into nuts. Tighten securely and drive ball joint out of knuckle).

UPPER CONTROL ARM: *NOTE - Upper control arms are not furnished separately, their replacement must be made as an assembly.*

Removal: Jack up car, supporting weight on spring seat and remove wheel and tire. Remove upper control arm-to-ball joint bolts, supporting knuckle and brake drum assembly to avoid damage to brake hose. Remove shock absorber upper mounting bolt and force top of shock absorber down. On right side of car, it will be necessary to remove generator and bracket. Disconnect battery ground strap. Remove shaft attaching bolts *(CAUTION - Remove shims from between shaft and crossmember, noting position and number of shims in each pack).* Remove arm and shaft assembly from car.

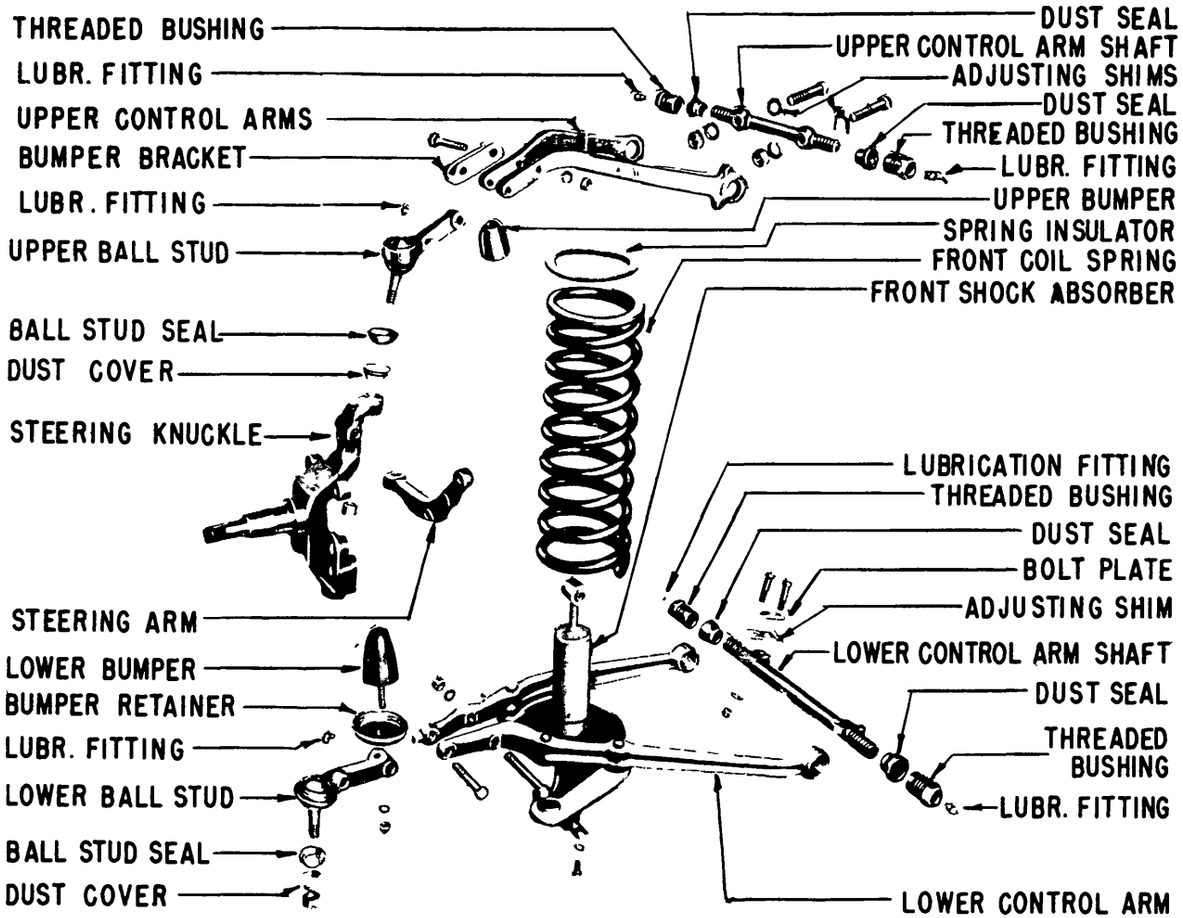
Upper Control Arm Shaft & Bushing Replacement - Clamp control arms in vise and remove old bushings and shaft. Apply a liberal amount of Lubriplate to new bushings and ends of shaft. Install bushings and tighten to 150 ft. lbs. Install rubber dust seals on shaft and screw shaft into forward arm so center of attaching bolt hole is 1 9/16" from control arm. Thread rear control arm onto shaft until the distance between front and rear control arms is 7 13/16".

Installation: Using care not to disturb dimension between control arms, install assembly on car by reversing removal procedure. *(CAUTION - Be sure that the shim packs removed at disassembly are installed in their correct positions).* Tighten upper ball joint bolts to 70-80 ft. lbs. Tighten upper control arm shaft-to-shaft bracket bolts to 90-100 ft. lbs. Check and adjust front wheel alignment.

LOWER CONTROL ARM: *NOTE - Riveted parts of lower control arm assembly are not furnished separately.*

Removal: Remove front coil spring *(see "Front Spring Replacement" above),* then remove lower control arm assembly from frame crossmember.

Lower Control Arm Shaft & Bushing Replacement - Unscrew bushings and remove from control arm. Check distance between inner ends of control arm. The normal distance is 11¼" ± 1/32", from inside to inside. Install rubber seal over each threaded end of new control arm shaft, with the large or bell ends of seals outward toward ends of shaft. Insert one end of shaft (with seal in place) in one control arm end and force opposite end of shaft into other control arm end, using a piece of wood as a pry bar. Fasten control arm securely in vise close to one end to prevent springing or distortion. Apply a liberal amount of Lubriplate or white lead to both bushings, then start first bushing in shaft and into control arm at the same time. Turn bushing until head is tight against arm and tighten to a minimum of 150 ft. lbs. Center shaft between arms and install second bushing, turning shaft as required to thread into the bushing so that no binding exists. Rotate shaft to locate bolt holes at both ends so they are equally distant from inside surface of arms.



1957 BUICK FRONT SUSPENSION ASSEMBLY

Installation: Place lower control arm assembly in position on frame crossmember and bolt in place. Tighten bolts to 70-80 ft. lbs. *(NOTE - Two different type bolts have been used at this location. See "Changes, Cautions, Corrections" above).* Install front spring and other parts. Check and adjust caster, camber, and toe-in.

►*1957 NOTE: Two different type bolts have been used at this location. See "Changes, Cautions, Corrections" ab ve.*

1958 MODELS

FRONT COIL SPRING: R m val - *(NOTE - For r m val f fr nt air spring, s Buick Air Suspension).* Raise car and support at all four corners of frame. Disconnect stabilizer link and shock absorber at lower end, then remove cotter pin and loosen nut on lower ball joint stud. With car supported by frame, place jack under outer edge of spring seat Wrap a chain around upper control arm and under base of jack and fasten chain securely. Raise jack to place tension on lower ball joint stud. Rap steering knuckle in area of stud to separate stud from knuckle. Lower jack slightly and remove stud nut and chain. *NOTE* - Interference may exist between nut and backing plate. After nut partially removed, raise jack slightly or move knuckle in relation to lower control arm to provide clearance. Raise jack and separate stud from knuckle. Lift knuckle, hub and drum assembly and support in raised position by placing suitable prop between upper control arm and frame. Lower jack carefully and remove coil spring.

Installati n: Tape rubber cushion to top of spring. *(NOTE* - On power steering models a shim is used at top of left hand spring). Position spring correctly

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1957-58 BUICK FRONT SUSPENSION (C ntinued)

in frame crossmember and raise lower control arm to contact spring. Rotate spring if necessary to locate end of spring in drain hole of spring seat, then wire spring in spring seat. Raise lower control arm with jack placed under outer edge of spring seat. Remove prop under upper control arm and lower steering knuckle. Wipe stud and hole in knuckle clean, then assemble stamped and plastic dust shields on stud and start stud into knuckle hole. Before inserting stud completely, turn cotter pin hole fore and aft and start nut on stud. Tighten nut to 60-70 ft. lbs. and install cotter pin. Install grommets, retainers and nuts on lower end of shock absorber and stabilizer link. Reinstall wheel and tire and remove frame supports.

1958 Fr nt Spring Application

S ri s	Standard	Air Ci nd.
40 (Std. Trans)	1181626	1181627
40 & 60 (Auto. Trans.)	1181627	1181628
50, 70, 700	1181628	1174153

SHOCK ABSORBERS: *(CAUTION - Rear shock absorbers for cars with air susp nsion are not interchangeable with shocks for cars with conventional coil springs).*

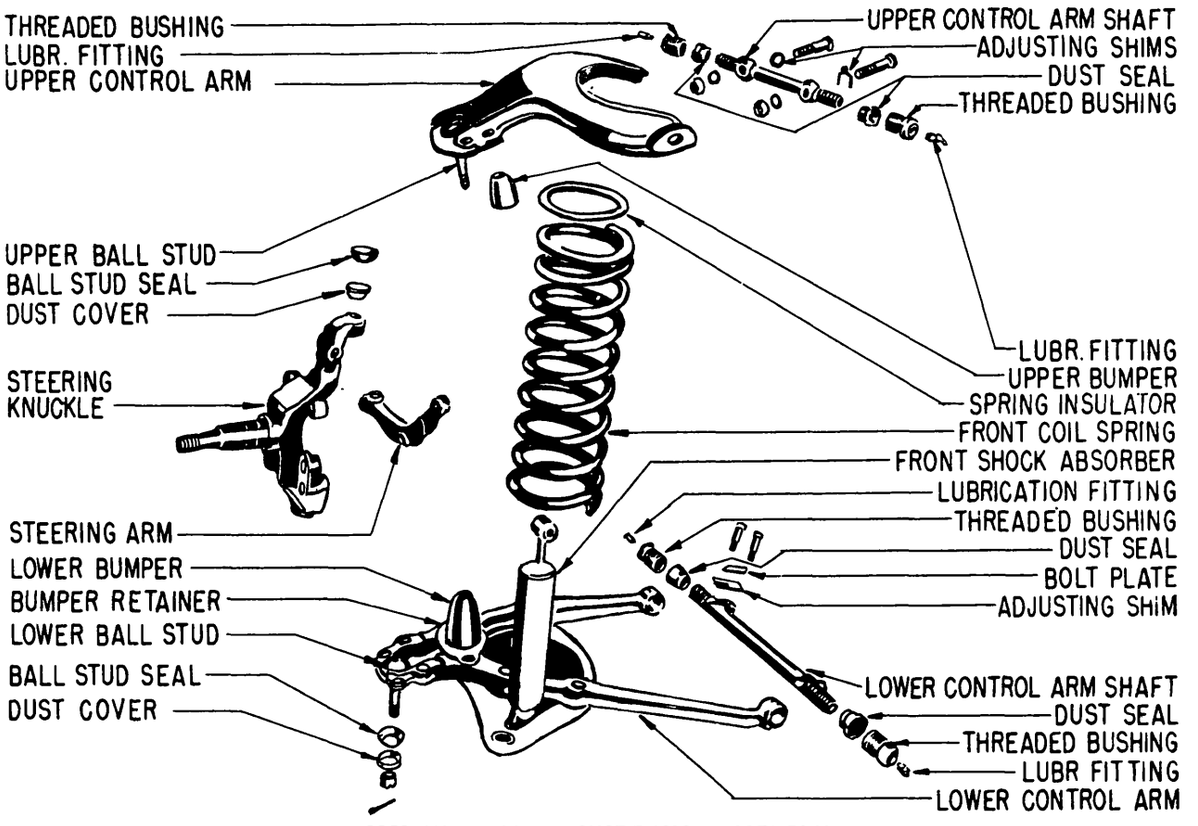
R m val: Remove upper and lower mounting stem nuts, grommets, and retainers. Compress shock and disengage from mounting bracket and spring seat extension. Remove remaining grommets and retainer.

Installati n: Reverse removal procedure.

►*1958 SHOCK ABSORBER APPLICATION: See "Shock Abs rb rs" on Car Mod l page.*

STABILIZER LINK GROMMET REPLACEMENT: Remove nut from lower end of link rod, then remove rod, spacer, retainer and grommets. When assembling, install rubber grommets dry and use care to center grommets in seats on stabilizer shaft and lower control arm. Also center retainers on grommets before tightening rod nut. Tighten rod nut to limit of thread on rod. When rod nut is tightened to limit of thread on rod, the overall dimension between both grommet retainers should be 1 11/16". If this dimension is not correct, adjust nut as necessary.

BALL JOINT (AND STEERING KNUCKLE): Upper Ball J int R m val - Raise car with jack under frame (on air suspension cars, place in manual override position and support car at frame in rear and at frame front on side opposite from that being worked on). Remove wheel and tire. Remove cotter pin from nut on upper tapered stud, then loosen nut (but do not remove). Force of chassis spring will tend to disengage tapered stud from steering knuckle. Rap knuckle sharply in area of tapered stud to disengage from knuckle. On air suspension cars, return control to normal ride position). On coil spring cars, support car weight under outer edge of spring seat and remove nut from ball joint stud. On cars with air suspension, support car weight on frame and also place jack under spring seat. Support car weight on frame and lower jack under spring seat slightly. Be careful not to damage brake hose. Raise upper control arm and remove rubber bumper under upper control arm. Center punch the four rivets as close to center as possible, then drill a 1/8" hole through center of rivets. Drill a 1/4" hole more than half-way but not all the way through each rivet. Use a 1/2" drill or chisel to remove rivet heads. Drive rivets out with a 1/4" punch.



1958 BUICK FRONT SUSPENSION ASSEMBLY

Upper Ball Joint Installation: Assemble new ball joint to upper control arm with 5/16" bolts inserted from bottom (nuts and lockwashers on top), and tighten nuts to 15-20 ft. lbs. Reinstall rubber bumper. Turn tapered stud so cotter pin hole is fore and aft and assemble stamped and plastic dust shields over stud. Move knuckle up by jacking under outer edge of spring seat. Wipe tapered hole in knuckle and tapered stud clean and assemble stud to knuckle with castellated nut. Tighten to 30-40 ft. lbs. and install cotter pin. On air suspension cars, set in manual override position and operate engine until override position is reached. Reinstall wheel and tire and remove frame support.

Lower Ball Joint Removal: Raise car and remove wheel and tire. On cars with air suspension, place in override position and support frame of car at all four corners. Disconnect stabilizer link and shock absorber at lower end, then remove cotter pin and loosen nut (do not remove) on lower ball joint stud. With car supported at frame, place jack under outer edge of spring seat Wrap a chain around upper control arm and under base of jack, then fasten chain securely. Raise jack to place tension on lower ball joint stud. Rap steering knuckle in area of stud to separate knuckle from stud. Lower jack slightly, then remove nut and chain. *NOTE* - Interference may exist between nut and backing plate. After partially removed, raise jack slightly or move knuckle in relation to lower control arm to provide clearance. On air suspension cars, return control to normal ride position. Raise jack and separate stud from knuckle, then raise knuckle assembly and support in raised position by placing prop under upper control arm. Lower jack carefully (on cars with air suspension, remove spring nut at bottom of plunger bearing to allow lower control arm to be lowered leaving air spring attached to frame). Remove front chassis spring if coil spring equipped. With outer end of lower control arm resting on floor and car supported in a safe manner, center punch the four 3/8" rivets and drill a 1/8" hole through each rivet, Drill a 5/16" hole more than half-way through each rivet (not all the way through), then use a 5/16" punch to drive rivets out.

L w r Ball J int Installation: Install a new ball joint using 3/8" bolts (longer bolts at inner location). Assemble bolts with head down and tighten nuts to 35-40

CONTINUED ON NEXT PAGE

1957-58 BUICK FRONT SUSPENSION (Continued)

ft lbs On coil spring cars, tape rubber cushion to top of spring (on cars with power steering, a 1/8" steel shim is used at top of left hand coil spring) On air suspension cars, locate plunger pilot and bearing in socket If equipped with coil spring, position spring correctly in frame crossmember and raise lower control arm to contact spring Rotate spring if necessary to locate end of spring in drain hole of spring seat Wire spring in spring seat, then raise lower control arm with a jack placed under outer edge of spring seat Remove prop under upper control arm, then lower steering knuckle Wipe stud and hole in knuckle clean, then assemble stamped and plastic dust shields on stud and start stud into knuckle hole Before inserting stud completely, turn cotter pin hole fore and aft and start nut on stud Tighten castellated nut to 60-70 ft lbs and install cotter pin Reassemble grommets, retainers, and nuts on lower end of shock absorber and stabilizer link, and on cars with air suspension reinstall spring nut on plunger bearing On air suspension cars place in manual override position then operate engine until override position is reached Reinstall wheel and tire and remove frame support

UPPER CONTROL ARM: *NOTE Upper control arms are not furnished separately, their replacement must be made as an assembly.*

Removal: Separate upper ball joint from knuckle (see above), then remove shaft to frame bracket nuts, carefully noting number, location, and thickness of shims between shaft and frame bracket Remove arm assembly

NOTE - On right side of car, it will be necessary to remove generator and bracket On left side of car, remove negative battery cable

Upper Control Arm Shaft & Bushing Replacement Clamp arm assembly in vise and remove old bushings and shaft Assemble new grease seals on shaft and position shaft in arm Start new bushing in original threads of arm and thread shaft into bushing to aid in alignment Tighten bushing to 70-75 ft lbs Start second bushing into original threads of arm with shaft threaded into opposite bushing After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing as an aid to piloting bushing squarely into position Tighten bushing to 70-75 ft lbs (shaft should be free enough to turn by hand) Install grease fittings and lubricate bushings Rotate shaft so distance between shaft bolt holes and arms is equal on both sides

Installation: Reverse removal procedure being careful to locate steel washers under heads of shaft-to-frame bolts Install same number and thickness of adjusting shims in correct location as noted at removal, between shaft and frame bracket Tighten shaft-to-frame bracket bolts to 90-100 ft lbs

LOWER CONTROL ARM: *NOTE - Riveted parts of lower control arm assembly are not furnished separately.*

Removal: Remove front coil spring *(see "Front Spring Replacement" above)*, then remove lower control arm assembly from frame crossmember.

Lower Control Arm Shaft & Bushing Replacement - Unscrew bushings and remove from control arm. Check distance between inner ends of control arm The normal distance is 11¼" ± 1/32", from inside to inside. Install rubber seal over each threaded end of new control arm shaft, with the large or bell ends of seals outward toward ends of shaft. Insert one end of shaft (with seal in place) in one control arm end and force opposite end of shaft into other control arm end, using a piece of wood as a pry bar. Fasten control arm securely in vise close to one end to prevent springing or distortion. Apply a liberal amount of Lubriplate or white lead to both bushings, then start first bushing in shaft and into control arm at the same time. Turn bushing until head is tight against arm and tighten to a minimum of 150 ft. lbs. Center shaft between arms and install second bushing, turning shaft as required to thread into the bushing so that no binding exists. Rotate shaft to locate bolt holes at both ends so they are equally distant from inside surface of arms.

Installation: Place lower control arm assembly in position on frame crossmember and bolt in place. Tighten bolts to 70-80 ft lbs Install front springs and other parts Check and adjust camber, caster, and toe-in

1959-60 BUICK FRONT SUSPENSION

All Series (1959-60)

▷CHANGES, CAUTIONS, CORRECTIONS

▷*LOWER BALL JOINT LOOSENESS NOTE:* With car jacked up (no load on front wheels), lower ball joint is loose and no corrective measures should be taken unless the looseness, measured at outer circumference of tire, is greater than ¼" laterally If movement of front wheel exceeds ¼", replace lower ball joint

DESCRIPTION: "Ball Joint" type suspension with ball and socket joints connecting upper and lower control arms to steering knuckles Coil springs or air springs are mounted between lower control arms and frame front crossmember and the shock absorbers are mounted within the front coil springs on lower control arm and attached to brackets on frame front crossmember Control arm shafts are bolted to frame crossmember and are connected to control arms by threaded type bushings.

ADJUSTMENT

CHECKING & ADJUSTING: Before checking or adjusting front suspension alignment, inflate tires to specified pressure. Check front wheel bearings for looseness and correct as necessary. Check for runout of wheels and tires and correct to within limit of 1/8" runout at side of tires Check for looseness at upper ball joints and tie rod ends and correct if found excessive Bring car to height specified below

▷*CAMBER & CASTER ALIGNMENT NOTE (CARS WITH COIL SPRINGS):* Place a piece of ¾" pipe 4 15/16" long between frame and lower control arm at each front wheel (see illustration) Place pipe over the front outer spring seat rivet and make sure it is vertical Use sandbags or other suitable weights when necessary to hold car down on pipes Bring rear of car to proper height If gas tank is full and the trunk empty except for spare tire and jack on a coil spring car, the rear of the car may be considered at the proper height If these conditions cannot be met, a ¾" pipe, 6¾" long (1959), 6 13/16" long (1960) should be placed between axle housing and axle bumper stop (see illustration) Use sandbag or suitable weight to hold car down on pipe

▷*FRONT END ALIGNMENT NOTE (CARS WITH AIR SUSPENSION):* Check distance between lower side of frame side rail, immediately forward of the air spring (rear end of bumper if car is so equipped) This distance should be 5¾"±¼" (Exc Sta Wagon), 5 13/64"± ¼" (Sta Wagon) *NOTE – Car should be loaded slightly and allowed to lift slowly so as to measure trim height at the bottom of height valve "dead spot"*

Tire Inflation: 24 lbs. (Starting pressure) after car has been standing for three hours or driven less than one mile (28 lbs on Station Wagon rear tires) 26 lbs. (city pressure) after car has been driven three miles or more below 40 MPH (30 lbs on Station Wagon rear tires) 28 lbs. (highway pressure) after car has been driven three miles above 40 MPH (32 lbs on Station Wagon rear tires)

Steering Axis Inclination: 7° at ¾° camber No adjustment

▷*CAMBER & CASTER ADJUSTMENT CAUTION Both camber & caster are adjusted by shimming in the same locations, therefore both should be checked before changing either setting.*

▷*CONTROL ARM SHIMMING NOTE (FOR CAMBER & CASTER ADJUSTMENT):* If only a small adjustment is required to bring alignment within limits, make shim adjustments at lower control arm If the amount of shims exceed 160" in any one stack on lower control arms, make adjustments at the upper control arm shafts Under no circumstances should total shim thickness exceed 160" on lower control arm shafts, and .380" on upper control arm shafts Replace necessary parts if proper alignment cannot be obtained within these limits

Caster: Neg 2° ± ¾° Both sides should be within ¾° of each other *See "Shimming Procedure" below*

Camber: Pos 1° to Neg ½° (Pos ½° desired) Both wheels should be within ¾° of each other *See "Shimming Procedure" below*

Toe-In: 1/16" to 5/32" *CAUTION – Car must be at curb weight and running height (bounce car and allow it to settle to running position DO NOT ALLOW ALIGNMENT PINS (see above) TO REMAIN IN POSITION WHILE CHECKING OR ADJUSTING TOE-IN* Loosen clamp bolts and turn adjusting sleeves at tie rod end as required Turn right and left adjusting sleeves exactly the same amount but in opposite directions when changing toe-in, in order to maintain front wheels in straight ahead position when steering wheel spoke is straight down. Position tie rod clamps downward to 45° forward

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1959-60 BUICK FRONT SUSPENSION (C ntinu d)

to provide frame clearance. *NOTE - It is very important to position bottom face of tie rod end parallel with machined surface at out r end of steering arm when tie rod length is adjusted.*

T e-Out n Turns: With outer wheel turned 20°, inner wheel should be 23° (Manual Steering), 22° (Power Steering). Not adjustable.

Shimming Procedure: *NOTE - No lower control arm shims ar installed in production, however, it is recommended that all shimming required for service adjustments be done at low r control arm shaft providing shim stacks at any one location do not exceed .160". If in excess of this thickness, adjustment must be made at upper control arm shaft D not exceed 380" in any one stack at upper control arm*

Shim Selection (For installation at both upper and lower contr l arms) - *(NOTE - Upper and lower control arm shaft shims are different and are furnished in sizes indicated in table below).* Adding shims at front location will change **cast r t ward negative** (Practically no change in camber or toe). Adding shims at rear location will change **cast r toward positive** and camber toward negative (toe toward toe-out). Adding shims at both locations will **n t change caster,** but will change **camber t ward negativ**

►*SHIMMING AT LOWER CONTROL ARM NOTE:* If shims are added at lower control arm, replace original lower control arm shaft bolts with 300M bolts (½" – 20x 2 1/8"), Part No. 427576. Tighten bolts to 105–120 ft. lbs.

►*SHIMMING AT UPPER CONTROL ARM NOTE:* On right side of car, remove generator belt tensioning bracket. On left side of car, disconnect battery ground strap. Tighten control arm-to-frame bolts to 90–100 ft. lbs.

1959 L w r Control Arm Shaft Shims

Thickn ss	Part No.
040"	1180938
120"	1180939

1960 L wer C ntrol Arm Shaft Shims

Thickn ss	Part No.
.040"	1194541
.100"	1194542

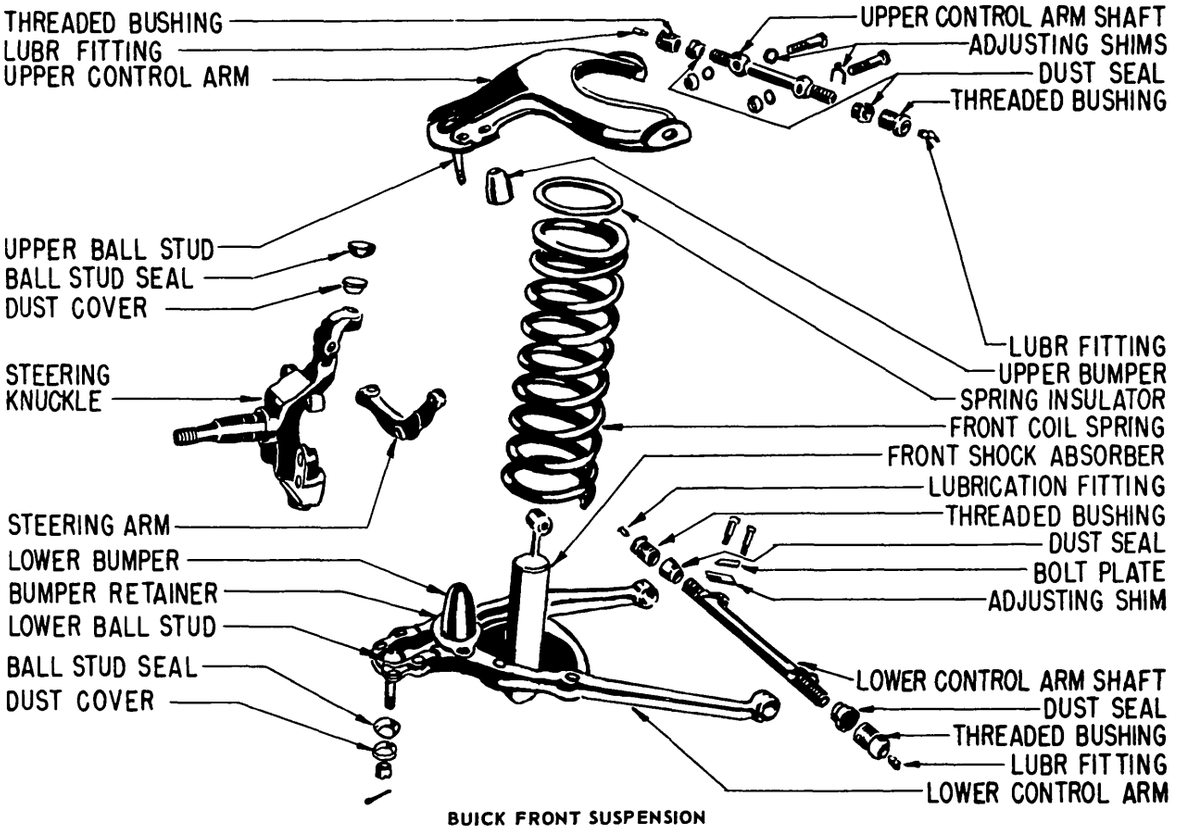
1959-60 Upp r Control Arm Shaft Shims

Thickn ss	Typ ①	Identification ②	Part No.
.060"	Horseshoe	6	1171175
.080"	Horseshoe	8	1172986
.100"	Horseshoe	10	1175585

① - Furnished with either "horseshoe slot" or round hole.
② - Identification number stamped on shim.

Shim Installati n (L wer Control Arm) - To prevent movement of lower control arm shaft on frame member during shim installation, loosen only one bolt at a time. Install shim and tighten bolt before installing shim at opposite end Tighten bolts to 105-120 ft lbs

Shim Installati n (Upp r C ntrol Arm) – On left side, disconnect battery ground strap from battery. On right side, remove generator belt tensioning bracket. Wedge bolt heads of all upper control arm shaft bolts to prevent turning, then loosen both bolts on each shaft to free shims for removal. Tighten bolts to 90–100 ft. lbs.



BUICK FRONT SUSPENSION

Trim Dimensions Adjustment (Front): *(NOTE - The following dimensions are for a standard car without undercoating or optional equipment and with the car at curb weight. Curb Weight includes gas, oil, and spare tire, but no passengers).* Before measuring trim dimensions, bounce both ends of car up and down several times to make sure there is no bind in suspension members and to let springs take natural position. When car is at rest, measure trim height between front arm of lower control arm assembly and frame crossmember at a point between rubber bumper and spring. Measurement must be made as vertical as possible. See table below for trim heights. When trim dimension is found to be too low, install special 1/8" shims between upper end of spring and frame. *NOTE – If more than three shims required, replace spring.*

►*FRONT SPRING SHIM NOTE (CAR WITH POWER STEERING):* One spring shim is installed on top of left spring on these cars None installed on right side in production.

1959-60 Fr nt Trim Dimensions

Mod l	Trim H ight
4400 & 4600 Series	4.96"
4700 & 4800 Series	4.92"

REMOVAL & INSTALLATION

Procedures are the same as for 1958 Models. S "1957-58 Buick Front Suspension" and note the f llowing:

1959 Front Spring Application

Series & Model	Part. N .
4400 Sta. Wag. ① (Std. Trans.)	1192425
4400 Sta. Wag. ①② (Auto. Trans.)	1192425
4400 Exc. Sta. Wag. ① ② (Std. Trans.)	1192425
4400 Exc. Sta. Wag. ① ⑪ (Std. Trans.)	1192425
4400 Exc. Sta. Wag. ① ② (Auto. Trans.)	1185808
4400 Sta. Wag. ③ (Std. Trans.)	1190519
4400 Exc. Sta. Wag. ② ③ (Auto. Trans.)	1190520
4400 Exc. Sta. Wag. ③ ⑩ (Std. Trans.)	1190520
4400 Exc. Sta. Wag. ② ③ (Std. Trans.)	1190519
4400 & 4600 Sta. Wag. ① ⑩ (Auto. Trans.)	1185808
4400 & 4600 ① ⑪ (Auto. Trans.)	1185809
4400 & 4600 Sta. Wag. ② ③ (Auto. Trans.)	1190519
4400 & 4600 Sta. Wag. ③ ⑩ (Auto. Trans.)	1190520
4400 & 4600 Exc. Sta. Wag. ③ ⑩ (Auto. Trans.)	1190521
4600 Sta. Wag. ① ②	1192425
4600 Exc. Sta. Wag. ① ②	1185808
4600 Exc. Sta Wag. ② ③	1190520
4700 & 4800 ① ②	1185809
4700 & 4800 ① ⑩	1185810
4700 & 4800 ② ③	1190521
4700 & 4800 ③ ⑩	1190522

① – Except Air Suspension. ③ – With Air Suspension
② – Except Air Conditioning ⑩ – With Air Conditioning

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1959-60 BUICK FRONT SUSPENSION (C ntinu d)

1960 Front Spring Application

Series & Model	Part No.
4400 Sta. Wag. (Std. Trans.)	1192425
4400 Sta. Wag. ① (Auto. Trans.)	1192425
4400 Sta. Wgn. ② (Auto. Trans.)	1192426
4400 Exc. Sta. Wgn. ① (Std. Trans.)	1192425
4400 Exc. Sta. Wgn. ② (Std. Trans.)	1192426
4400 Exc. Sta. Wgn. ① (Auto. Trans.)	1192426
4400 Exc. Sta. Wgn. ② (Auto. Trans.)	1192427
4600 Sta. Wgn. ①	1192425
4600 Sta. Wgn. ②	1192426
4600 Exc. Sta. Wgn. ①	1192426
4600 Exc. Sta. Wgn. ②	1192427
4700 & 4800 ①	1192427
4700 & 4800 ②	1192428

① - Without Air Conditioning. ② - With Air Conditioning.

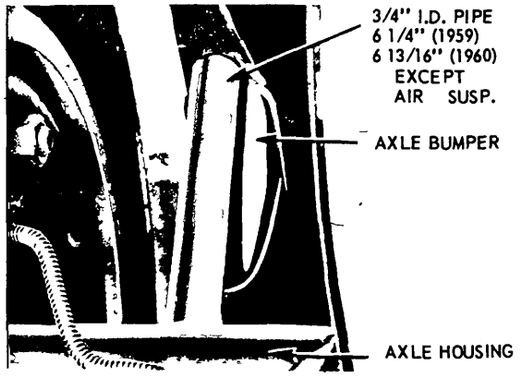
►*1960 SPRING IDENTIFICATION NOTE:* Springs are identified by a dab of paint as follows: Red (1192425); Orange (1192426); Light Blue (1192427); Light Green (1192428).

SHOCK ABSORBER: Removal – With front of car raised, remove upper mounting stem nut, grommet retainer and grommet. *NOTE – ¼" flat on shock absorber stem may be used to hold stem while removing nut.* Remove two lower mounting bracket-to-spring seat bolts and lower shock absorber through spring seat.

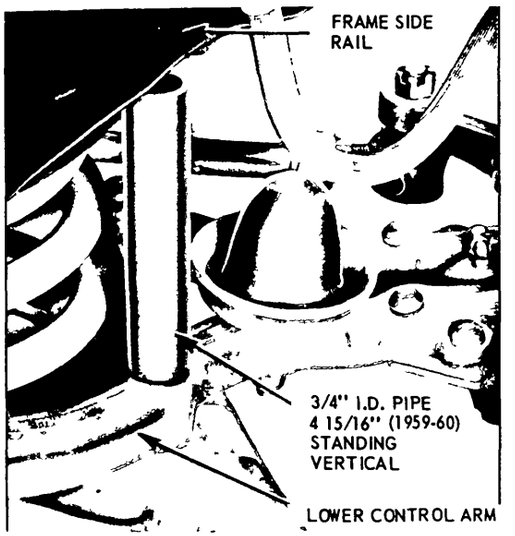
Installation: Reverse removal procedures.

►*SHOCK ABSORBER APPLICATION:* S "Shock Absorbers" n Car Mod l pages.

►*1959 BUICK UPPER CONTROL ARM & BALL JOINT PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new coil spring preloaded ball joint, Part. No. 1388924, is being used in production and for service replacement on later cars. The upper control arm has also been changed to accomodate the new ball joint which is bolted to the control arm (previous ball joints were riveted to control arm). The new joint is not interchangeable with previous type, however, the previous type may be used for service replacement.



REAR HEIGHT ALIGNMENT SPACERS



FRONT HEIGHT ALIGNMENT SPACERS

All Series (1954-57)

DESCRIPTION: Coil spring type.

TRIM DIMENSION: Before measuring rear spring trim dimension, bounce car up and down several times to make certain that suspension is not binding and to allow springs to assume natural position and proceed as follows: Measure distance from top of axle housing to top of bumper clip on frame side rail to rear of bumper 1954-55), from pivot bolt to raised portion on forward end of bumper bracket (1956-57) If trim dimension not correct with car at curb weight, replace springs

TRIM DIMENSIONS

1954 Models	Height
46C, 56C, 76C, 100	5¼-6"
All Other Models	5½-6¼"
1955-56 Models ①	**Height**
46C, 46R, 56C, 56R, 66C, 66R, 76C, 76R	4¼-5¼"
All Other Models	5½-6¼"
1957 Models ①	**Height**
46C, 46R, 56C, 56R, 66C, 66R, 76C, 76R	4 5/8-5 5/8"
48, 49, 69	5 1/2-6 1/2"
All Other Models	5 1/8-6"

REAR AXLE RADIUS ROD: Radius rod need not be removed for rear axle removal (disconnect rod at right hand end) but should be removed and checked for straightness and twist when new bushings installed.

Removal—Support rear end of car on jacks under axle housing so that weight of car is on springs. Take off nuts and washers on radius rod pins (at each end of rod), remove pin support at right end and frame bracket brace (pin support on 40 series) at left end of rod. Remove rod and bushings from pin on frame bracket.

1954-57 BUICK REAR SUSPENSION

Installation—Reverse removal procedure, using new rubber bushings. **Car weight must be on rear springs when tightening pin nuts** (to insure that rubber bushings will be clamped in neutral position).

REAR AXLE STRUT ROD REPLACEMENT CAUTION: Replacement torque tubes are furnished without holes drilled for strut rod rivets in the mounting bracket. Drill these holes only after rear axle housing, torque tube, and strut rods have been assembled. With strut rods in normal position (without up or down strain), drill bracket to match holes in strut rod with ½" drill, then drill through strut rods and bracket with 9/16" drill, install No. 1312923 bolts with lockwashers and thin nuts.

SPRING SPECIFICATIONS: Special 200 lb. and 500 lb. Overload Rear Springs are available for use with trailers or when heavy loads carried in car.

1955 Std. & Overload Springs

Model	Std.	100 lb.	200 lb.	500 lb.
41,43,48	1341972		1165116	1315231
46C	1168769	1341972	1165116	1315231
46R	1168766	1341972	1165116	1315231
49	1315231		1315233	1315231
52	1165116		1334701	1315233
56C	1168767	1165116	1334701	1315233
56R	1168766	1341974	1334701	1315233
61, 63	1341972		1165116	1315231
69	1315231		1315233	1315231
66C	1168769	1341972	1165116	1315231
66R	1168766	1341972	1165116	1315231
72	1165116		1334701	1315233
76C, 76R	1168767	1165116	1334701	1315231

1956 Rear Spring Application

Series	Rear Spring Part No.
41, 43, 48, 63, 63D	1341972
46C, R, 66C, R④	1341972
46C, R; 66C, R	1174150
49, 69	1315231
40, 60 Exc. 49 & 69⑤	1315231
40, 60 Exc. 49 & 69④	1165116
52, 53, 72, 73	1165116
56C, R; 76C, R②	1165116
50, 70④	1334701
56C, R; 76C, R	1168767
50, 70⑤	1315233
49, 69④	1315233

1957 Rear Spring Application

41, 43, 46C, 48, 56R, 61, 63, 66C, 75R, 76R, 76A①	1175992
46R, 66R, ②	1175992
41, 43, 46C, 46R, 48, 61, 63, 66C, 66R③	1175995
53, 56C, 73, 73A, 75, 76C①	1175995
41, 43, 46C, 46R, 48, 61, 63, 66C, 66R⑨	1175995
56R, 75R, 76A, 76R, ②	1175995
46R, 66R①	1175993
49, 49D, 69	1175994
41, 43, 46C, 46R, 48, 61, 63, 66C, 66R⑤	1175994
50, 70③	1178403
50, 70④	1178403
50, 70⑤	1315233
49, 49D, 69④	1315233

① - Omit on export high spring jobs.
② - 100 lb. overload. ④–200 lb. overload.
③ - Export high spring jobs. ⑤–500 lb. overload.

1958-60 BUICK REAR SUSPENSION

All Series (1958-60)

►*1958 REAR SPRING PRODUCTION CHANGE (SERIES 40, 50, 60, 70 4-DOOR SEDAN MODELS).* To increase rear wheel travel and prevent bottoming, rear springs, Part No 1175992 (Series 40 & 60), Part No 1175995 (Series 50 & 70) have been replaced in production with Part No 1185351 (Series 40 & 60), Part No 1182896 (Series 50 & 70) Should improper trim height be encountered on the above early production cars, install one additional insulator, Part No 1172761 over each rear spring

DESCRIPTION: Rear wheels are held in proper alignment by rear axle housing and by torque tube and radius rods between car frame and rear axle assembly Side sway of chassis springs and rear end of frame is prevented by a transverse radius rod Coil type springs, or air springs, are mounted between frame crossmember at top of kickup and spring seats (for coil springs) or a special bracket (for air springs) welded to axle housing Direct acting shock absorbers are angle mounted between axle housing and rear spring crossmember

REAR COIL SPRING: Removal - *(NOTE - For removal of rear air springs, see "Buick Air Suspension")* Raise car and support frame, then disconnect both rear shock absorbers at lower end Remove upper and lower spring clamps and remove spring

Installation: Make sure that spring insulator at upper end is in good condition, then attach upper end of spring using spring clamp, bolt insulator, flat washer, lock washer and nut Attach lower end of spring to axle housing bracket with spring clamp Lower car and attach shock absorbers with normal car weight on rear wheels

Trim Height Adjustment: *(NOTE - The following dimensions are for a standard car without undercoating or optional equipment and with car at curb weight Curb weight includes gas, oil, and spare tire, but no passengers)* Before measuring spring trim dimensions, bounce both ends of car up and down several times to make sure there is no bind in suspension members, and to let springs take natural position When car is at rest, measure trim height between top of axle housing and flange of rubber bumper (see illustration) See table below for trim height limits If rear spring trim dimension is less than specified, or additional height is required to prevent excessive bottoming install additional spring insulators, divided between upper and lower ends of spring If more than three additional insulators are required, replace the spring *NOTE* - Installation of a new spring should not increase spring trim dimension more than 1" over specified limits

1958 Rear Spring Application

Series & Model	Standard	100 lb. Overload	200 lb. Overload	500 lb. Overload
40 & 60 4 Dr Sedan	1185351	-	1175995	1175994
40 & 60 Coupe	1175993	1175992	1175995	1175994
40 & 60 Convertible	1185352	1175992	1175995	1175994
40 2-Dr Sedan	1175992	-	1175995	1175994
40 & 60 Estate Wagon	1175994	-	1315233	
50 & 70 Coupe	1175992	1175995	1178403	1315233
50 & 70 4 Dr Sed	1182896	-	1178403	1315233
70 Convertible	1185351	-	1178403	1315233
700 Coupe	1185351	1182896	1315231	1315233
700 Convertible	1175995	-	1315231	1315233
700 4-Dr Sedan	1182896	-	1315231	1315233

1959 Rear Spring Application

Series & Model	Standard	200 Lb. Overload
4400 & 4600 4 Dr (Exc Est Wgn)	1188956	1188957
4400 & 4600 2 Dr & Conv	1190667	1188956
4400 & 4600 Estate Wagon	1189062	
4700 4 Dr	1188957	1188959
4700 & 4800 2 Dr & Conv	1188956	1188957
4800 4 Dr	1188958	1188959

1960 Rear Spring Application

Series & Model	Standard Spring Part No.
4400 & 4600 2-Dr. & Conv.	1188956
4400 & 4600 (Exc. Sta. Wgn.)	1193937
4400 & 4600 Sta. Wgn.	1193934
4700 2-Dr.	1188957
4700 4-Dr.	1193936
4800 (Exc. Conv.)	1193935
4800 Convertible	1188957

200 Lb. Overload Spring - Spring No. 1193935 (4700 series), 1193935 (4800 Convertible), 1193936 (All others).

500 Lb. Overload Spring - Spring No. 1188960 (4700 Series 2-Dr.), 1188960 (4800 Convertible), 1193934 (All others).

►*NOTE: Overload springs are not available for station wagon models.*

►*SHOCK ABSORBER APPLICATION* See *"Shock Absorbers" on Car Model pages and note the following* Shocks on air suspension cars have an extended length 1" shorter than for standard suspension cars Do not use standard suspension shock absorbers on air suspension cars

Track Bar Bushing Installation (1959-60) Raise car and support axle housing so weight of car will be on rear springs. On right side of car, remove three track bar support to frame bolts and remove track bar pivot bolt, then remove support. At left side, remove track bar pivot bolt, then remove track bar. Press out old bushing using an arbor press, then press in new bushing until flange is in contact with eye of track bar. *NOTE - Bushings may be pressed into track bar from either direction, however, both bushings should be pressed in from the same side.* To install track bar, slip it into axle bracket and install the bolt but do not tighten it. *NOTE - Track bar bracket bolts must not be tightened unless car is at normal trim height.* Position track bar against frame bracket and install three support bolts and track bar pivot bolt loosely. Tighten track bar pivot bolt to 90-105 ft. lbs. Tighten support bolts to 15-25 ft. lbs. Tighten axle end track bar pivot bolt to 90-105 ft. lbs.

1958 Rear Trim Dimensions

Model	Coil Springs	Air Springs
40 & 60 4-Door Sedan	5 50"	4 18"
50, 70 & 700 4-Dr Sed	5 40"	4 18"
40 & 60 Coupe & Conv	5 00"	4 18"
40 2-Door Sedan	5 70"	4 18"
40 & 60 Estate Wgn	6 40"	3 84"
50, 70 & 700 Coupe	4 90"	4 18"
70 & 700 Convertible	5 14"	4 18"

1959 Rear Trim Dimensions

Series & Model	Trim Height
All Series 4 Dr (Exc Est Wgn)	6 45"
All Series 2 Dr (Exc 4400 2 Dr Sed)	6 00"
4400 2 Dr Sedan	6 45"
All Series Convertibles	6 00"
4400 & 4600 Estate Wagons	7 10"

1960 Rear Trim Dimensions

Series & Model	Trim Height
4400 & 4600 (Exc. Sta. Wgn.)	6 92"
4400 & 4600 (Station Wagon)	7 54"
4700 (All)	6 86"
4800 (All)	6 72"

1954-56 CADILLAC FRONT SUSPENSION

All Series (1954-56)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 DRAG LINK TO TIE ROD INTERFERENCE CORRECTION:* This interference is on the right side and is generally caused by the idler arm being too high. Correct by loosening the idler arm support-to-frame screws and rotate the idler arm down and forward as far as possible, then tighten screws. In addition, the idler arm should be backed out of its bushing in the support a total of 2½ turns.

►*1954 COMMERCIAL CHASSIS FRONT WHEEL RUBBING FENDER CORRECTION (On Extreme Right or Left Turns):* Check the special steering arm-to-knuckle screw which incorporates the wheel stop. A 1/16" washer should be between the head of the screw and the steering knuckle. If this washer in place, the trouble lies in excessive weight on the front springs and can be corrected by installing front spring shims, Part No. 1457838 on TOP of each spring, or installing heavy duty front springs. To determine if heavy duty springs are required, proceed as follows: Weigh front end of car (with total load carried at time of complaint, and with vehicle level). If weight exceeds 3200 lbs., heavy duty springs are indicated. These springs, Part No. 1460998 are available for service replacement. *NOTE —Heavy duty Rear Springs, Part No. 1460931 are also available if rear end weight exceeds 3900 lbs.*

►*1954 KINGPIN LUBRICATION FITTING INTERFERENCE CORRECTION (Fitting Strikes Steering Knuckle Support and is Damaged):* If difficulty is encountered getting grease through this fitting, remove the fitting and counterbore the original tapped hole to a depth of 3/32"-1/8", using a ½" drill ground at 140° included angle. Run a ¼"-28 tap through to clean the threads, then install a new fitting.

►*1955 FRONT WHEEL BEARING NOISE CORRECTION:* On cars between Engine No. 33512 and 34344, there is the possibility that oversize bearing cones were installed. Check bearing cone to shaft clearance as the oversize cone will have in excess of 1/32" clearance.

►*1955 EL DORADO FRONT & REAR SPRING PRODUCTION CHANGE:* At Engine No. 41150 the overall height of the Eldorado has been lowered 1" by the use of different springs, as follows: No. 1461008 (Front), No. 1460932 (Rear).

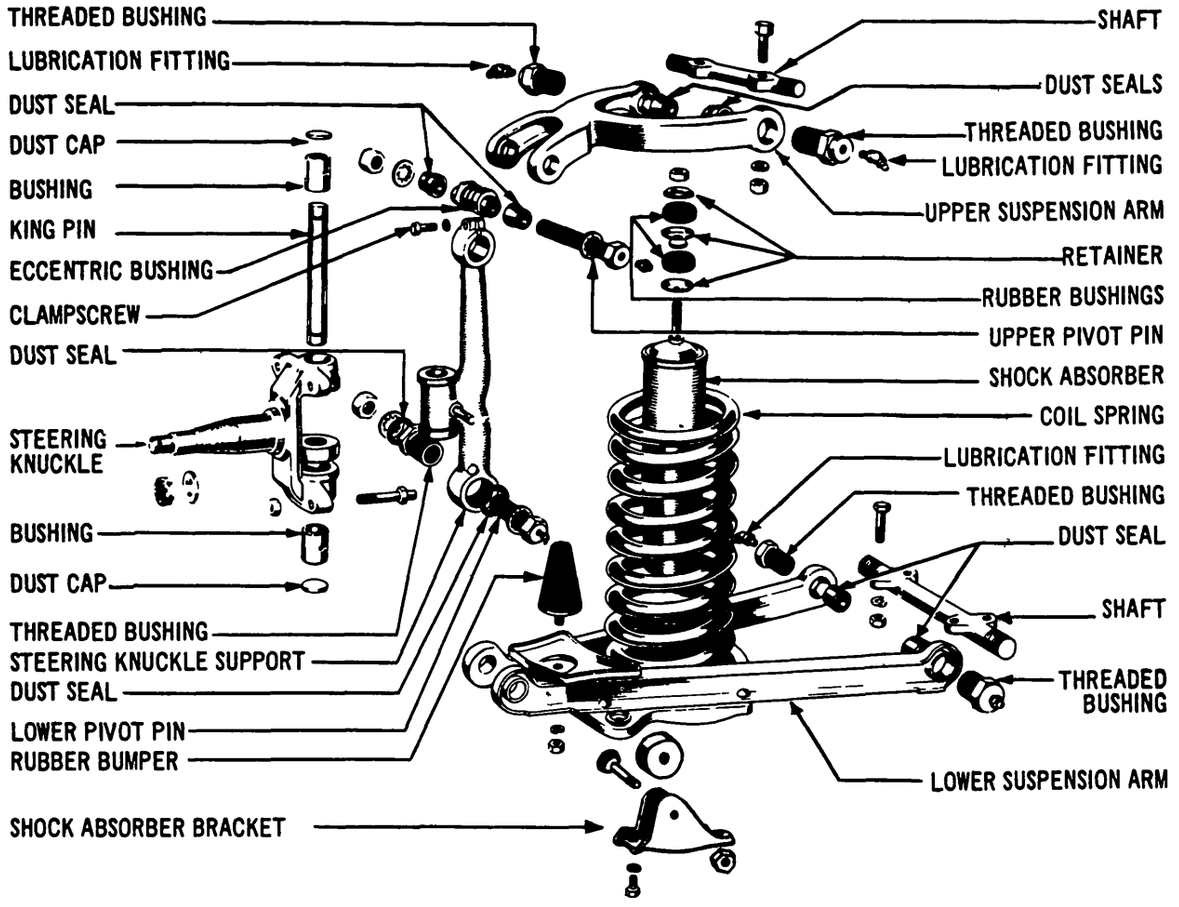
►*1955 STABILIZER LINK PRODUCTION CHANGE & INSTALLATION CAUTION:* At Engine No. 70000, a shorter link (6⅜"), and spacer (2½") replaced the early link (7"), and spacer (3⅛"). Either the short or long link may be used but it is important that links on both ends of the front stabilizer be of the same length.

►*1955 FRONT COIL SPRING PRODUCTION CHANGE:* Later cars do not have a spring lower insulator and the front springs have been increased slightly in length. When installing the later type front spring, the lower insulator should be discarded.

►*FRONT SPRING NOISE CORRECTION:* If click, scrape or grind noted (particularly on low speed brake application) correct as follows:

Seating Spring in Upper Seat—Drive car at moderate speed and apply brakes sharply (will cause spring to center itself in upper seat) or use pry bar to push upper end of spring onto its seat.

Insufficient Clearance at Lower Cross-Member flanged opening—After spring seated properly, check clearance between spring and lip of flanged opening in lower cross-member. Correct by bending lip on flange (CAUTION—do not use heat and bend lip only in area where contact occurs).



CADILLAC FRONT SUSPENSION

DESCRIPTION: New design independent "parallelogram" type with coil springs and direct acting shock absorbers mounted independently of upper control arm. Upper control arm is new design mounted on frame bracket shaft in same manner as lower control arm. Shock absorbers can be removed and installed without disturbing upper control arm assembly.

ADJUSTMENT: Before making adjustments, check tire pressures (see data below), front wheel bearing adjustment, check for run-out and high spots (3/64" maximum in each case), wheel and tire balance, and spring height. Make certain that entire suspension system operates freely without binding or excessive play, place wheels in straight-ahead position and see that car is at curb weight. Then check and adjust following points in order:

Tire Inflation—(60S, 61, 62) 24 lbs. front and rear, (75) 28 lbs. front and rear, (86 Comm'l) 24 lbs. front, 30 lbs. rear.

Front Spring Height—See that car is at curb weight (full tank of gasoline, no load in trunk or car), normalize spring position by working bumper up and down and release slowly so that car assumes normal position. Then check distance from center of front lower rivet on rubber bumper bracket on frame to top surface of lower control arm spring seat directly below this rivet. Correct heights are listed in table below and should be equal on both sides of car within ⅜". Correct height by installing shim between bottom of spring and spring seat on low side of car or replace springs. See Spring data.

►*CAUTION—Do not replace springs to correct excessive height during first 2000 miles (springs settle considerably during this period).*

CONTINUED ON NEXT PAGE

1954-56 CADILLAC (C nt.)

1954-55 Front Spring Heights

Car Mod l	Spring Height
All Models (Exc. 75 & 85)	4½-5¼"
75	5 3/8-6 1/8"
85 (Commercial)	5½-6¼"

1956 Front Spring Heights

Car Mod l	Spring Height
All Models (Exc. 75 & 86)	4 1/4-5 1/4"
75	5 3/8-6 1/8"
86 (Commercial)	5 1/2-6 1/4"

Rear Spring Height—Measure at point 3¼" forward from center of lower rivet in frame side bar above rear axle (make chalk mark on frame at this point). Measure vertical distance from top of spring U-bolt to chalk mark on frame. Correct height as listed in table below and should be equal on both sides of car within ½".

1954-55 Rear Spring Heights

Car M del	Spring Heights
All Models (Exc. 75 & 85)	8¾-9½"
75	10-10¾"
85 (Commercial)	9 5/8-10 3/8"

1956 Rear Spring Heights

Car Model	Spring Height
All Models (Exc. 86)	8 3/4-9 1/2'
86 (Commercial)	10 1/4-11'

Front Wheel Run-out—Mark point of maximum run-out on tire, turn wheel so that this mark is at front or rear when checking Caster and Camber, at top or bottom when checking Toe-In and Toe-Out.

Kingpin Inclination: 5°51' crosswise, all models.

Caster: 0° to Neg 1° Must be equal on both sides of car within ½°

Adjustment—Loosen clampscrew in upper end of knuckle support, use special wrench, Adjusting Tool KMO-366 or J-4691 (see Tool Note), to turn eccentric bushing on pivot pin. (NOTE—hexagonal head on bushing for wrench engagement located at rear end of bushing on early 1950 cars, front end on later cars). Turn eccentric bushing in complete turns only until correct caster secured, tighten clampscrew.

►**Adjusting Tool Note**—KMO-366 is special thin open-end wrench, J-4691 is special "crow-foot" wrench with square drive opening and can be used on all cars (regardless of bushing head location).

►***CAUTION—Camber will be disturbed unless bushing rotated in complete turns only.***

►***ADDITIONAL RANGE OF ADJUSTMENT***—If correct caster cannot be secured within limits of eccentric bushing rotation, additional range of adjustment can be secured by disconnecting lower support arm inner mounting shaft at frame cross-member and turning shaft in the arm (moving shaft to rear will increase positiv caster).

Camber: 0°±3/8° (Neg 3/8° to Pos. 3/8°) 0° preferred Variation limit between right and left wheels ½°. NOTE - ¼° to ½° more camber (1956) on left wheel on high crowned roads.

Adjustment—Same as for Caster (above). Turn eccentric bushing not more than ½ turn in either direction from point where correct caster is secured.

►***CAUTION—Entire range of camber adjustment secured in ½ turn of the eccentric bushing.***

Toe-In: 3/16-1/4" (1954-55), 5/32-7/32" (1956) Check with wheels in straight ahead position and point of maximum wheel "run-out" vertical

Adjustment—Loosen clampscrews and turn Adjuster at outer end of each tie-rod equally (turning adjuster in direction of forward wheel rotation will decrease toe-in). Tighten clampscrews.

►***CAUTION—Open side of adjuster clamps must be over open side of adjuster when clampscrews tightened.***

Toe-Out on Turns: With outer wheel turned 20°. inner wheel should be turned as follows:

1954-56 Series (All) - With outer wheel turned 20°, inner wheel should be 22°40'.

SHOCK ABSORBER REPLACEMENT: ***Not necessary to disturb Front Suspension Assembly.*** **Remove upper retaining nut, retainer, and rubber grommet from upper spring seat tower in engine compartment (NOTE—use wrench on squared upper stem of shock absorber to prevent it turning while loosening nut). Remove two bolts retaining lower shock absorber bracket on lower face of spring seat on lower control arm, then withdraw shock absorber and bracket assembly through hole in spring seat. Remove lower bracket by taking off retaining nut, grommets and retainers from shock absorber stem.**

►**Installation Note**—See illustration for correct assembly of grommets and retainers on shock absorber stem. Use wrench on squared upper stem of shock absorber to prevent unit turning while tightening retaining nuts.

COIL SPRING REPLACEMENT: Support front end of car on jack under center of front cross-member, use second jack under suspension arm to support spring which is being removed. Disconnect front stabilizer link on same side of car. Remove shock absorber (see data above). Remove nut on lower pivot pin, unscrew pin from lower control arm and knuckle support. Lower jack under suspension arm until spring tension relieved, remove jack, lift spring out. Install spring by reversing this procedure.

►**Spring Installation Caution**—Install spring with open (tanged) end upward and seated in upper seat so that tang parallel with raised area on cross-member and visible through correct hole in the cross-member (right front spring tang visible through rear hole, left front spring tang visible through front hole). Hold spring in this position while raising lower suspension arm, drive or pry bottom of spring into its seat on lower arm (will not seat freely with arm lowered and spring fully extended).

FRONT STABILIZER REMOVAL & INSTALLATION: Disconnect link by removing nut on lower end and withdrawing link bolt from above (CAUTION—note location of retainers and grommets at upper and lower ends of link and replace in exact same order). Remove bolts from two frame mounting brackets, remove stabilizer. Remove rubber bushings from stabilizer brackets and bar (these bushings serviced separately). Install stabilizer by reversing above procedure.

SPRINGS: Part number is stamped on end coil and springs are color-marked for identification.

1954 Spring Specifications④

Car Model	Color Code	Part N .
6019①	Lt. Blue	1460194
6219, 37, & 37D①	Green	1460193
6267, 6267S①	Pink	1460195
6019, 6219, 37, & 37D②	Pink	1460195
7523, 7533①	Purple	1460191
7523, 7533②	Orange	1460192
86	None	③ 1460189

①—Without Air-Conditioning
②—With Air-Conditioning
③—See "FRONT WHEEL RUBBING CORRECTION" above for Heavy Duty Springs available
④—Spring part number is stamped on an end coil

1955 Spring Specifications①

Car Model	Early – Part No. – Lat	
6019②	1460194	1461000
6219, 37, & 37D②	1460193	1461001
6267, 6267S②	1460195	1461002
6019, 6219, 37, & 37D③	1460195	1461002
7523, 7533②	1460191	1461003
7523, 7433③	1460192	1461005
86	1460189	1461004
60S, 62 (Heavy Duty)	1460999	1461007
86 (Heavy Duty)		1461006

①—Spring part number is stamped on an end coil.
②—Without Air Conditioning.
③—With Air Conditioning.

1956 Front Spring Identification ①

Car Model	Part N .
62 (Exc. 6267X, SX) with A C	1461002
62 (Exc. 6267X, SX) without A.C	1461000
6267X, SX & 6019X with A C	1461009
6267X, SX & 6019X without A C	1461002
60S, 62 Heavy Duty	1461007
75 with A C	1461005
75 without A C	1461003
86 Standard	1461004
86 Heavy Duty	1461006

① - Spring part number is stamped on an end coil

►*1956 FRONT SPRING INSTALLATION NOTE* Lower insulator no longer used

1957-60 CADILLAC FRONT SUSPENSION

All Series (1957-60)

►*JACKING & HOISTING: See "Jacking & Hoisting Precautions".*

►*AIR SUSPENSION CAR NOTE:* Except where noted, front wheel alignment and front suspension linkage removal and installation is the same as for conventional cars. *See "Cadillac Eldorado Brougham Air Suspension" & "Cadillac Air Suspension", for air spring removal, installation and adjustment.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 TIRES RUBBING ON STABILIZER BAR CORRECTION:* This condition occurs on sharp turns and can be corrected by installing Steering Knuckle Stop, Part No. 1468700. This "U" shaped stop is thicker than used in production and is attached to lower suspension arm by the rear outer spherical joint attaching bolt. If only one tire rubs on stabilizer bar, reposition stabilizer bar to center it on car before determining if thicker stops are necessary.

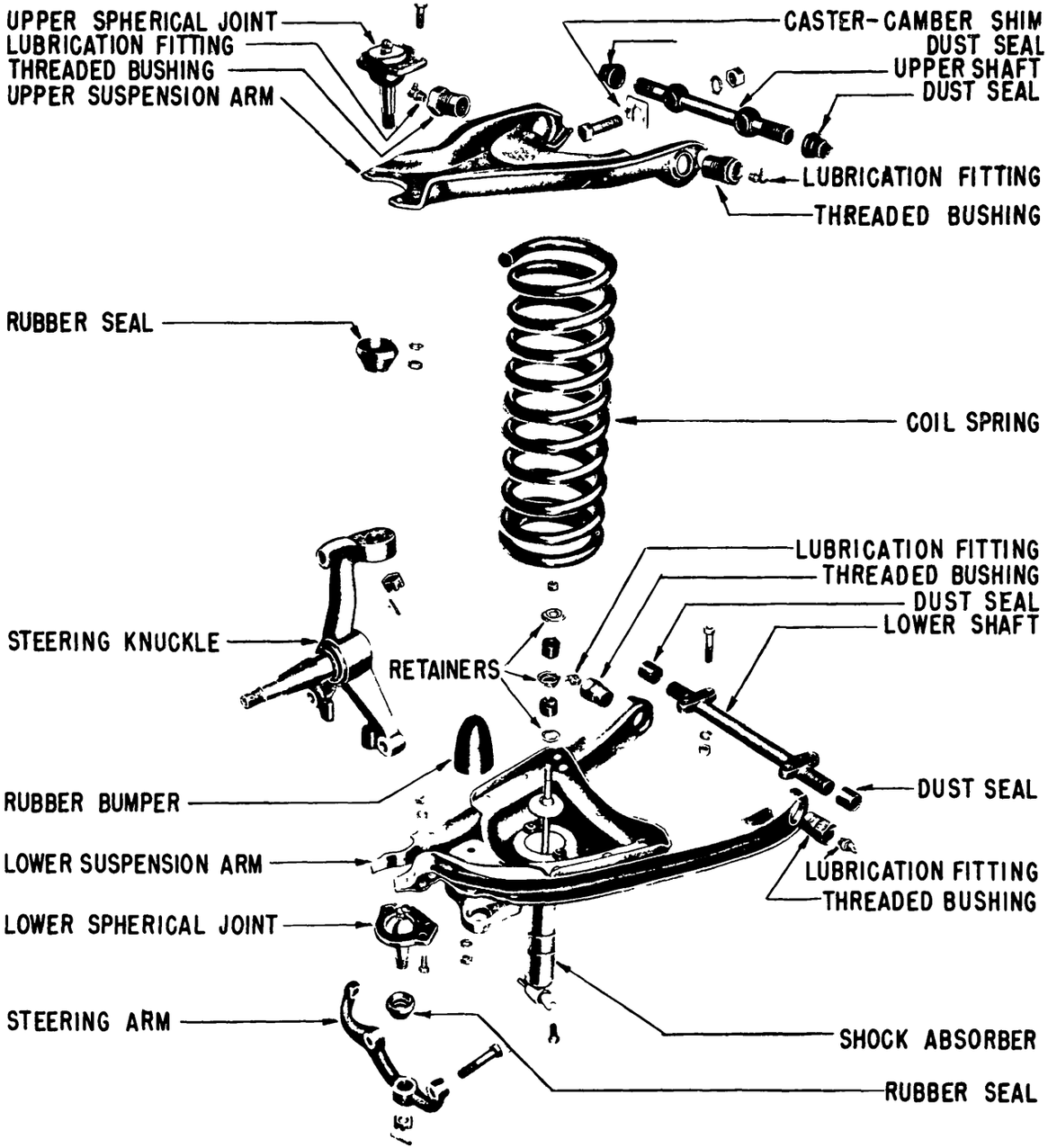
►*1957 DRAG LINK & TIE ROD PRODUCTION CHANGE TO IMPROVE STEERING GEOMETRY DURING BODY ROLL:* A new drag link and tie rod assembly is used in production beginning with Engine No. 023831. With this change, the clearance between frame and tie rod makes repositioning of tie rod sleeve clamps necessary which will eliminate the possibility of clamp interfering with frame when driving over severe bumps. On all cars above Engine No. 023831, the tie rod sleeve should be rotated so that openings in clamps are underneath the tie rod.

►*1957 LOWER CONTROL ARM MOUNTING BOLT PRODUCTION CHANGE:* Beginning with Engine No. 042036, mounting bolts, Part No. 1468512 having larger diameter heads are being used in production and for service replacement. When installing the later type bolt, the hardened steel flat washer formerly used should be discarded.

►*1960 UPPER & LOWER CONTROL ARM MOUNTING BOLT PRODUCTION CHANGE:* Beginning with Engine No. 020420, "Stover" type self-locking nuts are used on these bolts. Lockwashers have been eliminated. Upper control arms with this type self-locking nut, identified by a depressed section of two opposite "flats" of nuts, should be tightened to 65-85 ft. lbs. (supersedes previous limits of 130-140 ft. lbs.). The nuts on lower control arm mounting bolts are self-locking type of same design as upper control arm nuts (without lockwashers) and should be tightened to 60-70 ft. lbs. (same as previous tightening limits). *DO NOT OVERTIGHTEN bolts having this type nut.*

►*1960 TIE-ROD ADJUSTER CLAMP BOLT NUT TIGHTENING NOTE:* Later cars have the new "Nylok" type self-locking nuts on tie-rod clamp bolts which should be tightened to 15-20 ft. lbs. These nuts can be identified by their shape and by the absence of a lockwasher.

DESCRIPTION: "Spherical joint" suspension using ball and socket type joints to connect upper and lower control arms to steering knuckle. On cars with conventional coil springs, the shock absorber is mounted within the coil spring between seat on lower control arm and spring pocket on frame. On cars with air suspension, the shock absorber is mounted between bracket at outer end of lower control arm and bracket on frame. Threaded type bushings are used to connect control arms to control arm shafts.



CADILLAC FRONT SUSPENSION ASSEMBLY

ADJUSTMENT

CHECKING & ADJUSTING: Before checking or adjusting front wheel alignment, check and correct any looseness in spherical joints, steering gear, and connections.

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1957-60 CADILLAC FRONT SUSPENSION (Cont.)

Check and correct standing height (*see "Trim Dimensions" below*). Inflate tires to correct pressure and check for runout. Make sure cars with coil springs are at curb weight (not necessary on air suspension cars).

►*AIR SUSPENSION CAR CHECKING & ADJUSTING NOTE:* When checking cars with air suspension (exc. Eldorado Brougham), make sure car has reached its normal height. On Eldorado Brougham, open any door and allow car to come to normalized standing height before checking each point. *See "Cadillac Air Suspension" and "Cadillac Eldorado Brougham Air Suspension" for height adjustment and specifications.*

Tire Inflation: Series 60, 62 & Eldorado Brougham - 24 lbs. (front & rear). **Series 75** - 28 lbs. (front & rear). **Commercial** - 24 lbs. (front), 30 lbs. (rear).

Steering Axis Inclination: 4° at 0° camber. Not adjustable.

Caster: 0° to Neg. 1° (Exc. 1959-60 Series 75 & Comm.); Neg. ¾° to Neg. 1¾° (1959-60 Series 75 & Comm.). Adjustment must be within ½° or less on both sides. *See "Shimming Procedure" below.*

Camber: Neg. 3/8° to Pos. 3/8° (1/4° to 1/2° more positive camber preferred on left wheel). *See "Shimming Procedure" below.*

Toe-In: Coil Spring Cars - 3/16-1/4". *NOTE - To avoid interference, tie-rod clamp screws must be in a downward position.*

Air Suspension Cars - 1/8"±1/32" (1957 Eldorado Brougham); 1/16-1/8" (1958 Models); 1/16"±1/32" (1959-60 Models). After adjustment, tie-rod clamp screws must be in downward position to avoid interference.

Toe-Out on Turns: With outer wheel at 20°, inner wheel 22°40'.

Shimming Procedure: Caster and camber adjustments are made by adding or removing shims between upper control arm mounting shaft and frame mounting bracket. To change caster, remove or add shims at one of the mounting bolts. Addition of shims at front bolt or removal of shims at rear bolt will **decrease** positive caster. Removal of shims at front bolt or addition of shims at rear bolt will **increase** positive caster. To change camber, add or remove shims of equal thickness at both mounting bolts. Addition of shims at both bolts will **decrease** positive camber. Removal of shims at both bolts will **increase** positive camber. Tighten both upper and lower control arm shaft bolts to 130-140 ft. lbs. after changing shims. Camber and caster adjusting shims are furnished in .0149", .0418", & .1046" thicknesses. *See tables below for approximate amount of change made by adding or removing shims.*

Shim Selection

Shim Size	Caster Change (Shim at rear bolt)	Camber Change (Shim at both bolts)
.0149"	1/6°	1/15°
.0418"	1/2°	1/5°
.1046"	1 1/16°	1/2°

►*CASTER CHANGE NOTE:* When possible, make caster adjustments by changing shims at **front bolt** as the resulting camber change will be small.

►*SHIM PACK THICKNESS NOTE:* If more than ¼" total thickness of shims are necessary to bring adjustment within specifications, check for bent or damaged parts.

Trim Dimension Adjustment (Cars With Coil Springs): Before checking front trim height, make sure that trunk is empty and the gas tank full. Normalize position of springs by working bumper up and down and release slowly, permitting car to assume normal position. Measure distance from top of lower control arm to center of second lowest rivet on front of frame side rail. The standing height should be equal on both sides of car within 3/8". If heights are unequal, adjust low side by installing a shim between top of spring and seat inside the frame.

1957 Front Trim Heights

Model	Height
All Models (Exc. Below)	4 11/16-5 7/16"
6237S, 6267S	4 3/4-5 1/2"
7523, 7533	5 7/16-6 3/16"
85 Comm.	5 5/16-6 1/16"

1958 Front Trim Heights (Conventional Cars)

Model	Height
All Models (Exc. below)	5-5 1/2"
7523, 7533 & 86 Comm.	5 9/16-6 1/16"

1959-60 Front Trim Height (Conventional Cars)

Series	①Height
All Series (Exc. Below)	5 1/8"
75 & Comm. Series	5 7/8"

① - Plus or minus ¼".

Trim Height Adjustment (Air Suspension Cars): *See "Cadillac Air Suspension" or "Cadillac Eldorado Brougham Air Suspension".*

FRONT COIL SPRING REPLACEMENT: *See "Lower Control Arm" below.*

1957 Spring Application

Model	Part No.
6039X, 6237SDX, 6267X (Air Cond.)	1465761
6039X, 6237SDX, 6267X, 6267SX (Exc. Air Cond.)	1465759
6237, 6237DX, 6239, 6239DX (Air. Cond.)	1465760
6237, 6237DX, 6239, 6239DX (Exc. Air Cond.)	1465758
6267SX (Air Cond.)	1465762
75 (Exc. Air Cond.)	1465764
75 (Air Cond. or Hvy. Duty)	1465765
86 (Exc. Hvy. Duty)	1465766
86 (Hvy. Duty)	1465767

1958 Spring Application

Model	Standard	Air Cond.
6039X, 6237SDX, 67X, 67SX	① 1465768	1465762
6237, 37DX, 39, 39E, 39EDX	① 1465760	1465768
7523X, 7533X	1465764	② 1465765
8680 (Comm. Chassis)	1465766	② 1465767

① - For heavy duty service, use Part No. 1465763.
② - Heavy duty or for use with air conditioning.

1959 Spring Application

Body No.	Model	Std.	Air Cond.	Hvy. Duty
6237	Std. Coupe	1465760	1465762	1465763
6337	Cpe. DeVille	1465760	1465762	1465771
6329	Sed. DeVille	1465760	1465765	1465771
6339	Sed. DeVille	1465760	1465762	1465763
6267	Convertible	1465765	1465765	1465763
6029	60 Spec. Sed.	1465765	1465765	1465771
6229	Std. Sedan	1465765	1465762	1465763
6239	4 Dr. Sedan	1465765	1465765	1465771
6723	Sedan	1465765	1465765	1465771
6733	Imperial Sed.	1465765	1465765	1465771
6890	Commercial	1465766		1465767

1960 Spring Application

Series	Standard	Air Cond.	Hvy Duty
60 & 62 (Early) ①	1465772	1465772	
60 & 62 (Late) ②	1465773	1465772	
75	1465765		1465771
Commercial	1465766		1465769

① - Before Engine No. 44094. ② - After Engine No. 44093.

REMOVAL & INSTALLATION

FRONT SHOCK ABSORBER (Cars With Coil Springs): *(NOTE - Bushing in lower mounting bracket on shock absorber is not replaceable. If worn or damaged, the complete shock absorber must be replaced).*

Removal: Raise hood and remove shock absorber upper retaining nut, retainer, and rubber grommet at upper suspension arm frame mounting bracket *(NOTE -* Upper stem of shock absorber is square so that it may be held with a wrench when removing nut). Remove two screws holding shock absorber to lower spring seat and remove shock absorber from spring assembly.

Installation: Install retainer and rubber grommet on shock absorber upper stem. Install shock absorber assembly up through coil spring and guide stem through tower in crossmember. Place lower end in position on lower spring seat and install lockwashers and screws. Install grommet, retainer, and nut on upper stem and tighten nut.

►*SHOCK ABSORBER APPLICATION:* See *"Shock Absorbers" on Car Model pages.*

FRONT AIR SPRING REMOVAL & INSTALLATION: *See "Cadillac Air Suspension" or "Cadillac Eldorado Brougham Air Suspension".*

UPPER SPHERICAL JOINT REPLACEMENT: *(NOTE -* To check condition of joint, lubricate it first, then using a regular spherical joint stud nut and a second nut as a locknut, turn joint in its socket with a torque wrench. It should require 2-4 ft. lbs. to rotate joint. Replace if joint is too loose or too tight.

Removal: Raise front of car and place jack stands under lower suspension arms. Remove front tire and wheel, then remove cotter pin from joint stud. Strike steering knuckle with a hammer in area of joint stud to loosen it. Raise upper suspension arm so that joint clears knuckle. With a 5/16" drill, drill out all four joint mounting rivets being careful to avoid damage to mounting holes. Remove spherical joint.

Installation: Install new spherical joint on upper control arm with bolts, nuts, and lockwashers (these items are

CONTINUED ON NEXT PAGE

1957-60 CADILLAC FRONT SUSPENSION (Cont.)

provided in replacement kit). Tighten nuts to 20-25 ft. lbs. Position spherical joint stud in steering knuckle, install stud nut and tighten to 50-60 ft. lbs. Install cotter pin, then install tire and wheel.

LOWER SPHERICAL JOINT REPLACEMENT: *(NOTE* - The lower joint is designed to turn freely in its socket and cannot be checked with a torque wrench. To check, note amount of free play as joint is worked vertically in its socket. This movement should not exceed 1/16".

Removal: Raise front end of car and place stands under forward portion of frame side members. Place a hydraulic jack under lower control arm spring seat and raise arm approximately 1" (measured at its outer end). Remove cotter pin and nut from joint stud. Strike steering arm with a hammer in area of joint to break it loose. Remove four lower joint nuts, lockwashers, and bolts. Raise arm sufficiently to allow joint to be removed.

Installation: Install joint on lower control arm with four bolts, lockwashers, and nuts and tighten to 35-40 ft. lbs. *(NOTE* - Head of bolt should be under joint flange). Position joint stud in steering arm mounting hole and lower hydraulic jack to allow joint to seat itself in steering arm. Install stud nut and tighten to 50-60 ft. lbs. Install cotter pin.

STEERING KNUCKLE REPLACEMENT: Removal - Raise front end of car and place jack stands under lower control arms. Remove wheel, then remove cotter pin and nut from upper joint stud. Strike steering knuckle in area of joint to break it loose. Raise upper control arm and allow top of knuckle to move outward. Remove upper nut on knuckle and two lower nuts on side of brake backing plate (leave two lower screws in position). Remove brake backing plate and wire it to a convenient location to prevent damage to brake hose. Remove and discard gasket on spindle between knuckle and backing plate. Separate knuckle from steering arm.

Installation: Install two lower legs of steering knuckle on two lower screws (in steering arm). Install new gasket on spindle. Install backing plate on two lower screws and install lockwashers and nuts. Tighten to 90-100 ft. lbs. Install upper screw through backing plate and knuckle. Install lockwasher and nut and tighten to 85-95 ft. lbs. Position upper spherical joint in knuckle. Install nut and tighten to 50-60 ft. lbs. Install cotter pin. Install brake drum, tire and wheel assembly.

UPPER CONTROL ARM: Removal - Disconnect upper spherical joint from steering knuckle *(see "Steering Knuckle Replacement" above)*, then remove mounting bolts on control arm shaft and remove control arm assembly.

Disassembly: Place control arm shaft in vise and remove threaded bushings from arm and shaft. Remove seals and suspension arm from shaft. Place suspension arm in vise and drill out with a 5/16" drill or grind off the four spherical joint rivets and remove joint.

Reassembly: Install new rubber seals on mounting shaft and lubricate threads of shaft. Center shaft in position in control arm and install bushing into arm and onto one end of shaft *(NOTE* - Lubricate new bushings with carbon tetrachloride or penetrating oil for easier installation). Tighten bushings to 140-150 ft. lbs. Install Upper Control Arm Spreader, Tool J-6590, between arms and tighten finger tight. Then, using a wrench, tighten tool *two additional flats*. Install other bushing in arm and onto shaft and tighten to 140-150 ft. lbs. Remove tool from arms and center shaft between arms by turning shaft in bushings. Install new spherical joint assembly *(see "Upper Spherical Joint Replacement" above)*.

Installation: Install arm in position on frame mounting bracket with mounting bolts and tighten to 130-140 ft. lbs. (1957-Early 1960); 65-85 ft. lbs. (Late 1960). *See "1960 Upper & Lower Control Arm Mounting Bolt Production Change" above.* Position joint stud in steering knuckle hole, then install nut and tighten to 50-60 ft. lbs. and install cotter pin.

LOWER CONTROL ARM (Cars With Coil Springs): Removal - Raise front end of car and place jack stands under forward parts of frame side members. Place hydraulic jack under control arm to be removed, then disconnect front stabilizer link on side from which control arm is to be removed. Remove shock absorber (see "Shock Absorber Replacement" above). Make sure hydraulic jack is supporting lower control arm, then remove lower spherical joint pin and nut, and strike steering arm in area of joint to break it loose. Move wheel downward and outward so it clears joint. Slowly lower hydraulic jack and remove spring and rubber insulator. Remove four bolts attaching control arm shaft to frame member, and remove control arm.

Disassembly: Place control arm shaft in vise and remove threaded steel bushings from arm and shaft. Remove seals and control arm assembly from shaft. Remove four joint mounting nuts and bolts and remove joint.

Reassembly: Install new rubber seals on shaft and lubricate threads. Center shaft in position in control arm and install bushing into arm and onto one end of shaft *(NOTE* - Lubricate bushings with carbon tetrachloride or penetrating oil for easier installation). Tighten bushing to 195-205 ft. lbs. Install Lower Control Arm Spreader, Tool J-6591, between arms, tighten center bar finger tight, then with a wrench, tighten *two additional flats*. Install other bushing in arm and onto shaft and tighten to 195-205 ft. lbs. Remove tool and center control arm shaft between arms by turning shaft in bushings. Install lubrication fittings. Install spherical joint with four bolts and tighten to 35-40 ft. lbs.

Installation: Install control arm shaft to crossmember and tighten bolts to 60-70 ft. lbs. Tape upper rubber insulator to top (flat end) of spring and place spring in upper seat of frame crossmember. Rotate spring so that lower tang end will fit in formed depression of lower control arm spring seat when arm is in position. With hydraulic jack placed under lower control arm, raise arm into position. Guide spring into place with tang end bisecting hole in spring seat. Guide spherical joint stud into steering knuckle and install nut. Tighten to 50-60 ft. lbs. Install cotter pin. Connect stabilizer link to lower spring seat. Install shock absorber. Remove car from jack stands and check front end alignment.

LOWER CONTROL ARM (Cars With Air Suspension): Removal - Raise car and place jack stands under front and rear frame side members, and remove front wheel. Exhaust air from system by opening drain cock on accumulator tank. Disconnect stabilizer link from lower control arm and disconnect shock absorber. Remove lower spherical joint cotter pin and nut, and strike steering arm with a hammer in area of joint to break it loose. Remove control arm shaft mounting bolts at frame front crossmember, and remove lower control arm.

Disassembly & Reassembly: Same as for control arms used with coil springs. *See "Lower Control Arm (Cars with Coil Springs)" above.*

Installation: Install control arm shaft to frame crossmember and tighten bolts to 60-70 ft. lbs., then install spherical joint stud in steering knuckle and tighten nut to 50-60 ft. lbs. Connect shock absorber and stabilizer linkage. Pull out lift valve control handle on instrument panel, close drain cock on accumulator tank and replenish air supply in tank. Install wheel, lower car, and push in lift valve control handle.

1958-60 CADILLAC REAR SUSPENSION

All Series, Exc. Commercial Chassis (1958-60)

►*JACKING & HOISTING: See "Jacking & Hoisting Precautions".*

►*TOWING CARS WITH AIR SUSPENSION: See "Cadillac Air Suspension".*

►*1960 REAR SUSPENSION NOTE: Ball joint, bracket, control yoke and rear axle housing are different than for previous models. The new parts are not interchangable on earlier cars.*

DESCRIPTION: Rear suspension linkage consists of two lower control links and an upper control yoke. Front ends of lower control links are connected to a body mounting bracket that is welded part of frame. Rear ends of lower control links are attached to a bracket on rear axle housing. The two front arms of upper control yoke are attached to a frame crossmember just forward of the rear axle. To permit movement of the rear axle as rear wheels move up and down, a spherical rubber joint is used in rear axle end of control yoke, and rubber bushings are used in both ends of lower control links. The upper yoke is designed to take all thrust forces resulting from cars turning or cornering. Rear shock absorbers are mounted between lower control arm mounting brackets at rear of axle and a bracket on car frame. Coil springs are mounted with lower end seated on lower control link and upper end seated in tower bracket welded to frame side member. *(NOTE* - With air suspension, the coil springs are replaced by air springs in the same location).

ADJUSTMENT

TRIM DIMENSION ADJUSTMENT (Cars With Coil Springs): *(NOTE - On cars with air suspension, see "Cadillac Air Suspension" or "Cadillac Eldorado Brougham Air Suspension").* Before checking rear trim height, make sure trunk is empty and gas tank full. Normalize position of springs by working bumper up and down and release slowly, permitting car to assume its normal position. Measure distance from top of rear axle housing to underside of frame at a point directly above axle housing, (see table below). Rear standing heights should be equal within 1/2" on both sides of car.

1958 Rear Trim Height

Model	① Coil Springs	② Air Susp.
All Models (Exc. Below)	5 5/8"	4 1/2"
7523, 7533	7"	5 3/8"
86	4 1/8"	

① - Plus or minus 3/8". ② - Plus or minus 1/4".

1959 Rear Trim Height

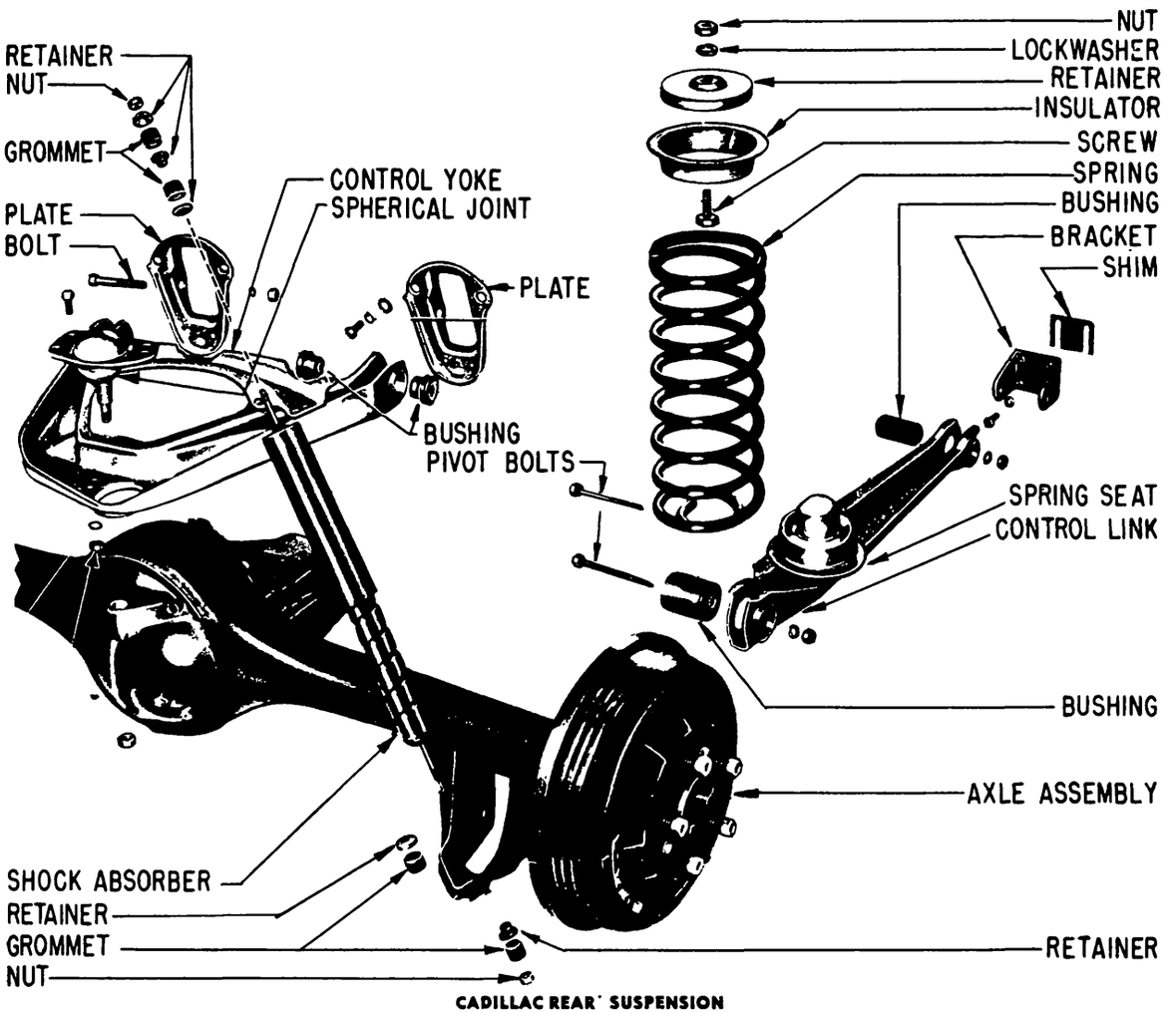
Series & Model	① Coil Springs	② Air Susp.
60, 62, 63 (All Models)	5 7/8"	4½"
64 (All Models)		4½"
67 (All Models)	7 1/16"	5 13/32"
68 Commercial ③	4 1/8"	

① — Plus or minus 3/8". ② — Plus or minus ¼".
③ — Leaf spring.

1960 Rear Trim Height

Series & Model	① Height
60, 62, 63 (All Models)	6 1/8"
75 (All Models)	7 1/16"
68 Commercial ②	4 1/8"

① - Plus or minus 3/8". ② - Leaf spring.



CADILLAC REAR SUSPENSION

REAR AXLE PINION ANGLE: *(NOTE* - All pinion angles given are at the air suspension standing height; on cars with coil springs, it will be necessary to add weight to trunk until standing height is equal to that specified for air suspension cars). Place car on a wheel alignment machine or on a "drive-on" type hoist (all wheels must be on a level surface), locating it so slots in pinion shaft universal joint yoke on differential are vertical. Disconnect universal joint at differential and allow propeller shaft to hang down. Set Axle Angle Checking Gauge, J-6997, for proper pinion angle (3° - Series 60, 62 & 75.4° - Series 70, Eldorado Brougham), then place proper combinations of shims under adjustable leg of tool to privide desired angle for checking. *(NOTE - Three shims are furnished with each tool; the smallest represents 1°, the next 2°, and the largest 3°).* Hold Tool J-6997 against bottom plate of frame tunnel with adjustable leg forward, and adjust setscrew until bubble in level is exactly centered (tool is now set for exact pinion angle). Position rounded projections on rear edge of pinion angle tool in slots in pinion yoke and check the level. If air bubble is exactly centered, pinion angle is correct. If bubble is off center, note which line on glass that bubble most nearly touches. Each line represents 1/16" shim requirement behind the lower link front mounting bracket. If bracket is too far forward, shims must be added; and if too far to rear, shims must be removed. To install or remove shims, loosen all four bolts securing each lower control link bracket to No. 4 body bracket until lockwashers are free. With a long bar placed at front end of control link between bushing and frame bracket, pry rearward. Add or remove shims as required. Shims are furnished in the following thicknesses: 1/16" (Part No. 1465858), 3/32" (Part No. 1465859), 1/8" (Part No.

CONTINUED ON NEXT PAGE

1958-60 CADILLAC REAR SUSPENSION (Cont.)

1465860). Tighten each lower control link mounting bracket screw to 35-40 ft. lbs., and recheck pinion angle with gauge. *(CAUTION - Equal thicknesses of shims must be installed or removed from right and left control links).* Connect propeller shaft, and lower car to floor. Remove any weights added for checking purposes.

REMOVAL & INSTALLATION

SHOCK ABSORBERS: (Removal) - Raise rear of car and place jack stands under axle housing. Remove shock absorber upper retaining nut, retainer and grommet. *(NOTE* - Upper stem of shock absorber is square at top so it can be held by a wrench to prevent turning when removing retaining nut). Remove lower retaining nut, retainer, and grommet. *CAUTION - Under no circumstances should rear end of car ever be raised in such a way that rear suspension is in rebound position with shock absorbers disconnected.*

Installation: Reverse removal procedure.

►*SHOCK ABSORBER APPLICATION: See "Shock Absorbers" on Car Model pages.*

CONTROL YOKE SPHERICAL JOINT (Coil & Air Spring Cars): Removal - Disconnect spherical joint from mounting bracket *(see "Control Yoke" below),* then grind off heads and punch out all four spherical joint mounting rivets. Do not damage mounting holes.

Installation: Position spherical joint on yoke and secure with four bolts, nuts, and lockwashers provided in service replacement kit. Tighten bolts to 35-40 ft. lbs. Install bolts with heads upward. To complete installation, *see "Control Yoke" below.*

CONTROL YOKE (Coil & Air Spring Cars): Removal - Raise car and place jack stands under frame side rails at front and rear. If car is equipped with air suspension, exhaust all air from system by opening drain valve on bottom of accumulator tank. Place a jack under forward end of differential housing and raise slightly to relieve tension on drive line. Remove cotter pin and nut from spherical joint stud and strike mounting base with a hammer in area of joint to break it loose. Remove bolts securing front control yoke mounting plates to frame crossmember, then remove yoke over top of rear axle housing. Remove control yoke front attaching bolts, and remove plates.

Installation: Position mounting plates approximately perpendicular to control yoke front attaching flanges and install attaching bolts. Tighten to 85-95 ft. lbs. Position yoke assembly over differential housing and secure front mounting plates to frame crossmember. Adjust jack at front end of differential housing until spherical joint stud will go into mounting hole, then install nut on stud and tighten to 80 ft. lbs. Install cotter pin, and remove jack from end of differential housing. On air suspension cars, pull out lift control handle on instrument panel, close drain valve, and replenish air supply in accumulator tank through service valve. Lower car and push in lift valve control handle.

COIL SPRING REMOVAL & INSTALLATION: *See "Lower Control Link" below.*

1958 Rear Coil Spring Application

Model	Part No.
6039X, 6237SDX, 39E, 39EDX, 67X, 67SX (Std.)	1469459
6237, 37DX, 39 (Standard)	1469458
60S, 62 All Models (Heavy Duty)	1469461
75 (Standard)	1469460
75 (Heavy Duty)	1469462
86 (Standard)	1465733
86 (Heavy Duty)	1465732

1959 Rear Coil (& Leaf) Spring Application

Body No.	Model	Standard	Hvy. Duty
6237	Std. Coupe	1469459	1469461
6337	Cpe. DeVille	1469459	1469462
6029	60 Spec. Sed.	1469459	1469462
6267	Convertible	1469459	1469461
6229	Std. Sedan	1469464	1469461
6339	Sed. DeVille	1469464	1469461
6239	4 Dr. Sedan	1469464	1469462
6329	Sed. DeVille	1469464	1469462
6723	Sedan	1469464	1469462
6733	Imperial Sedan	1469464	1469462
6899 Ⓒ	Commercial	1465733	1465732

Ⓒ — Leaf spring

1960 Rear Coil (& Leaf) Spring Application

Series & Model	Standard	Heavy Duty
60 & 62 (All Models)	1469465	1469461
75	1469464	1469462
Commercial Ⓒ	1465733	1465732

Ⓒ - Leaf spring.

AIR SPRING REMOVAL & INSTALLATION: *See "Cadillac Air Suspension" or "Cadillac Eldorado Brougham Air Suspension".*

CONTROL LINK (Coil & Air Spring Cars): Removal - Raise rear end of car and place jack stands under frame side rails, then remove wheel. On cars with air suspension exhaust air from system by opening drain valve on bottom of accumulator tank, then disconnect leveling valve adjusting link from lower control link *(CAUTION - Do not disturb adjusting nuts).* On all cars, disconnect parking brake line clamp on control arm. On cars with coil springs, place hydraulic jack under control link and relieve tension on rear pivot bolt. On all cars, remove rear pivot bolt. On air suspension cars, remove front pivot bolt, then remove link from mounting brackets. On coil spring cars, slowly lower hydraulic jack and remove rear coil spring and rubber insulator. Remove front pivot bolt and remove control link from mounting bracket.

Installation: On all cars, install control link in position in front mounting bracket and install pivot bolt from inner side of bracket, then install lockwashers and nut on pivot bolt but do not tighten nut. On coil spring cars tape upper rubber insulator to top of spring and place spring in upper seat of frame tower. Seat bottom of spring on control link spring seat and, with hydraulic jack placed under control link, raise rear end of link into position. On air suspension cars, slide control link into position in axle bracket. On all cars, install rear pivot bolt, lockwasher, and nut, but do not tighten nut. Install brake line bracket to control link. On air suspension cars, raise rear axle until leveling valve linkage will connect freely, then connect linkage (this is normal standing height). On coil spring cars, lower car to floor. On all cars, tighten nuts on front and rear pivot bolts to 85-95 ft. lbs. *(NOTE* - Bushings on lower control arm must be tightened with car at normal standing height). On air suspension cars, pull out lift control knob on instrument panel, close drain valve on accumulator tank, and replenish air supply in tank through the service valve. Lower car to floor and push in lift valve control knob.

CHECKER FRONT SUSPENSION

Checker Superba (1960)

Checker Cab (1960)

DESCRIPTION: Independent type with steering knuckle connected directly to upper and lower control arms with ball joint assemblies. Shock absorbers are direct acting type mounted within the coil springs. Rubber type bushings attach upper and lower control arms to control arm shafts.

ADJUSTMENT: Steering Axis Inclination - 7° at 1° Camber. Not adjustable.

Caster: Pos. 2° (Superba); Pos. 1° (Checker Cab). To adjust, loosen two bolts attaching upper control arm to frame bracket and remove or add shims at one or the other mounting bolt. *NOTE - These shims are located between inner side of shaft and frame bracket.* To increase positive caster, add shim at front bolt or remove shim at rear bolt. To increase negative caster, remove shim at front bolt or add shim at rear bolt. The addition or removal of one 1/16" shim will change caster ¼°.

Camber: Pos. ½° to Pos. 1½° (Superba); 0° to Pos. 1° (Checker Cab). To adjust, remove or add shims equally at both front and rear shaft mounting bolts. To increase positive camber, add shims equally at both bolts. To decrease positive camber, remove shims equally at both bolts. *NOTE - Total shim thickness at either bolt must not exceed 9/16".*

Toe-In: 1/16" to 1/8" (All Models). To adjust, loosen clamp bolts on adjusting sleeves at outer end of each tie rod and turn both adjusting sleeves equally in opposite directions to obtain correct toe-in. *NOTE - On cars with power steering, the engine must be running when toe-in adjustments are made.*

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be 17.5°. Not adjustable.

REMOVAL & INSTALLATION: *See "1954-56 Ford Pass. Cars, Lincoln & Mercury Front Suspension" in this section.*

1954 CHEVROLET

Ch vr let Pass. Cars (1954)

►**FRONT SUSPENSION UNIT ASSEMBLY REMOVAL:** Entire assembly is mounted on special cross-member bolted to frame side rails and can be removed as a unit for servicing and overhaul by taking out these mounting bolts.

DESCRIPTION: New design, independent, linked parallelogram type with direct acting shock absorbers, coil springs, and new type upper control arm (not part of shock absorber assembly). Cross-member on which suspension unit mounted has new "tower type" bracket at each end for spring housing, shock absorber mounting, and upper control arm shaft mounting.

CHECKING & ADJUSTMENT: First check entire front end for excessive play and wear, check steering gear adjustment, wheel bearing adjustment, tire inflation pressure (see data below), wheel balance and run-out (run-out should not exceed 1/16"), then place car on level floor and check front end specifications as follows:

Tire Inflation Pressure: For each type tire (Cold): **Pass. Cars** (6.70x15—4 ply)—24 lbs. frt. & rear. **Station Wagon & Sedan Delivery** (6.70x15—6 ply) 26 lbs. front, 30 lbs. rear.

Riding (Spring) Height: Rock car sidewise several times and allow it to settle, then measure vertical distance from center of pivot pin at each end of lower control arm to floor. Difference between these two measurements should be 1⅝" ± ¼". If difference between measurements less than this amount, or if unequal on both sides of car, install spring shims or replace springs (see Spring data).

Kingpin Inclination: 4° ± ½° crosswise.

Caster: Pos. ½° ± ½°.

Adjustment—Loosen clamp bolt in upper end of knuckle support, remove lubricant fitting from rear bushing at outer end of upper control arm, insert Allen wrench through hole, turn pivot bolt until exact caster setting secured, then adjust camber.

►*CAUTION—Caster adjustment will change camber unless pivot bolt rotated in full turns only.*

Camber: Pos. ½° ± ½°.

Adjustment—After adjusting Caster (above), rotate pivot bolt not more than ½ turn in either direction to secure correct camber. Entire range of adjustment is secured in ½ turn of the pivot bolt.

Toe-In: 1/8"±1/16".

Adjustment—Loosen clamp bolts at each end of **left hand tie rod** and turn rod (right hand tie rod is one-piece non-adjustable type), tighten clamp bolts to 8-12 ft. lbs.

►*CAUTION—Align tie rod ends before tightening clamp bolts (ball studs will bind if not aligned).*

Toe-Out on Turns: With inner wheel turned 20°, outer wheel should be turned 17°40'. No adjustment, replace steering arm if incorrect.

SHOCK ABSORBER REPLACEMENT: *Not necessary to disturb Front Suspension Assembly.* Remove nut on shock absorber upper threaded end while holding stem from turning with ¼" wrench (this nut located on top of spring housing tower), lift off grommet retainer and grommet. Remove nut and lockwasher from shock absorber lower mounting bracket stud (on underside of lower spring seat), lower shock absorber and mounting bracket assembly down and out through hole in spring seat.

►**Installation Note**—When installing rubber grommet assemblies on shock absorber threaded ends, hold end from turning with a ¼" open-end wrench, tighten nut on stem until it bottoms on shoulder. This will provide correct compression of grommets.

COIL SPRING REPLACEMENT: Disconnect stabilizer link at lower control arm bracket, remove shock absorber on side on which spring being removed. Support car on jack stands placed under frame side rails. Place hydraulic jack under lower control arm inner shaft, remove nuts and lockwashers from control shaft bracket bolts, drive out bolts, lower arm slowly to relieve spring pressure, lift spring out (CAUTION—remove all shims used with old spring). Install spring by reversing this procedure.

►**Spring Installation Caution**—Service replacement springs are checked for height and are furnished with necessary shims wired to the spring.

►*CAUTION—These shims must be installed on top of the spring to insure correct riding height of the car.*

LOWER CONTROL ARM REPLACEMENT: Lower control arm assembly must be removed from the car for replacement of arm, inner shaft, or shaft bushings. Other operations can be performed without removing the assembly.

Removal—Remove wheel and tire assembly, remove front spring (see Coil Spring Replacement), disconnect tie rod from steering arm, remove nut on forward end of lower control arm pivot bolt, unscrew pivot bolt, lift control arm assembly out.

Lower Control Shaft & Bushing Installation: Hold control shaft in vise, then place new seals on each end of shaft (push seals up onto shaft shoulders). Position control arm on shaft using a scale to center arm on shaft. *NOTE - Gauge J-3184 cannot be used because of welded reinforcement plate on inner face of arms.* Thread bushings on shaft and into control arm making sure that threads on bushings index with threads in arm and engage properly. Tighten bushings to 85-100 ft. lbs., then slip seals down into place.

Lower Pivot Bolt & Bushings: Bushing in lower end of knuckle support should be installed from rear-to-front and tightened to 150-170 ft. lbs. Place new seals over exposed ends of bushing, position control arm so that knuckle support is centered in outer end of arm, start pivot bolt through arm from rear-to-front, thread bolt through knuckle support bushing using care not to disturb centered position of support in control arm, continue to screw pivot bolt in and through opposite eye of control arm until bolt head firmly contacts rear face of arm (NOTE—If bolt threads do not index properly with threads in opposite eye of arm, use "C" clamp to compress ends of arm slightly until threads index and bolt can be turned through arm freely). Tighten pivot bolt to 100-200 ft. lbs., then install locknut on end of bolt and tighten nut to 90-120 ft. lbs. Use wire hook to slip seals down off ends of bushing into their seats.

UPPER CONTROL ARM REPLACEMENT: Control arm should be assembled on control shaft in cross-member tower bracket and checked for free movement throughout entire range before connecting knuckle support.

Removal—Support car on jack stand placed under lower spring seat (to keep spring compressed and lower control arm in place), remove wheel and tire assembly. Take out lubricant fitting in rear bushing at outer end of control arm, unscrew both front and rear bushings from arm, remove seals from pivot pin ends. Take out clamp bolt in upper end of knuckle support, slide pivot pin out (use ¼" Allen wrench in pin recess to assist in removal), swing knuckle support out and free of upper control arm. Unscrew front and rear bushings from control arm at inner control shaft (NOTE—On left side of car, remove sheet metal splash guard over steering gear housing for access to rear bushing), lift control arm off shaft. To remove shaft from frame bracket, use Remover & Replacer Tool J-2958 and pull shaft out toward front of car.

►**Replacement Control Arm Note**—Arms furnished with threads in bushing holes slightly undersize to insure snug bushing fit when new arm installed.

►**Replacement Control Shaft Note**—New shafts are marked by "F" on end to insure correct installation ("F" end toward front of car) and diameter of threads which screw into spring housing tower are oversize to insure correct fit (CAUTION—these threads must be lubricated when installing new shaft to avoid tearing threads).

Upper Control Shaft & Bushing Installation: Lubricate threads on new shaft to avoid tearing during installation, see that shaft end marked "F" (larger diameter end) toward front of car, use Remover & Replacer Tool J-2598 to install shaft from front-to-rear of spring housing until rear end projects exactly 1⅛" back of housing (CAUTION—Do not back shaft out which will leave shaft loose in housing—rear end is smaller diameter and threads are tapered). Install new seals on ends of shaft, position control arm on shaft using a scale. Lubricate the bushing inner and outer threads, start both front and rear bushings on shaft and into arm (CAUTION—see that control arm not moved out of position more than necessary to start bushing threads—see Caster Adjustment Caution below), turn bushings in until head seats against arm, then tighten bushings to 30-40 ft. lbs. (CAUTION—this is new specification to prevent stripping of threads and distortion and binding of arms). See that seals seated on their seats, install lubricant fittings in bushings, lubricate arm. Check installation for free movement throughout entire range with rubber bumper removed (arm should fall of own weight).

►**Caster Adjustment Caution**—The thread starting points for control arm and shaft are not controlled and it may be necessary to move arm out of centered position by ½ thread pitch or 3/64" to start bushings in arm. This will require correction by Caster Adjustment after suspension assembly completed.

Upper Pivot Pin & Bushings: Position control arm on upper end of knuckle support, install pivot bolt through arm and knuckle support with Allen wrench hole toward rear of car, center bolt in support, install lock bolt in support and tighten to 30-35 ft. lbs. Place new seal on each end of pivot bolt. Lubricate both inner and outer threads of bushing. Thread front bushing on pivot bolt, center knuckle support in arm, thread bushing into arm (CAUTION

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1954 CHEVROLET (C nt.)

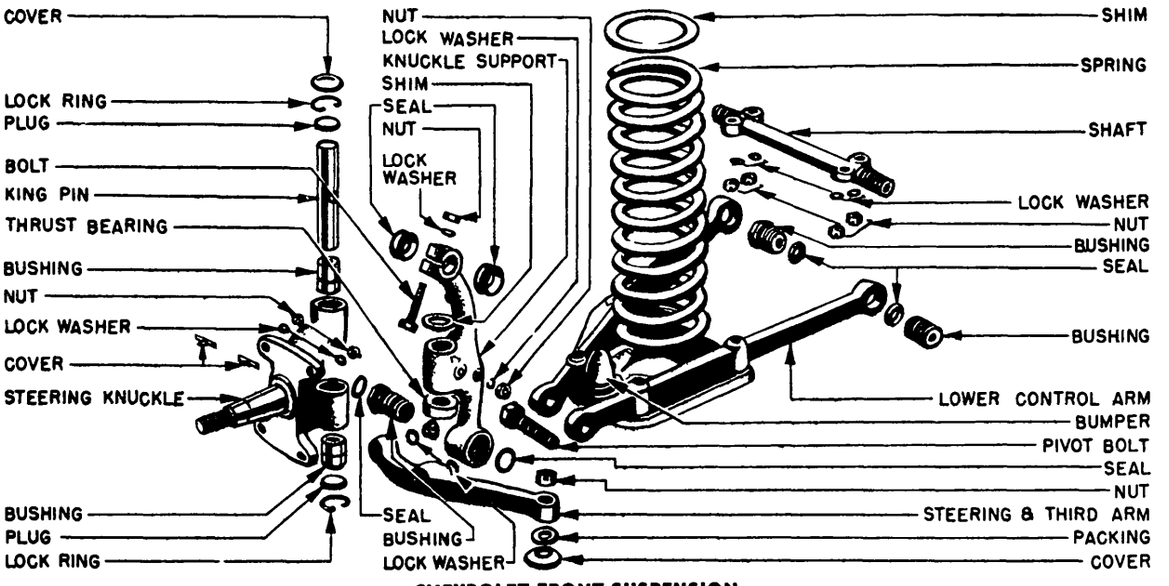
—carefully index threads on bushing and arm and see that support does not move out of centered position when starting threads in arm). Install rear bushing similarly. Screw both bushings in until heads seat against arm, then tighten bushings to 30-40 ft. lbs. (CAUTION—this is new specification to prevent stripping of threads and distortion and binding of arms).

KINGPIN BUSHING REPLACEMENT: ***Not necessary to remove knuckle support from car (bushings are "floating" type).*** New bushings are machined to finished size and do not require reaming.

Removal—Support car with jack under lower spring seat, remove wheel and tire assembly. Remove kingpin lock pin, upper bearing plug cover, upper and lower lock rings, and lubrication fittings. Drive sharp drift punch through lower plug, drive kingpin up until upper plug is forced out, then drive kingpin down and remove from below. Lift off steering knuckle and thrust bearing, remove floating bushings from knuckle support.

Installation—Install new bushings in knuckle support (CAUTION—oil grooves in bushing must line up with lubricant fitting hole in knuckle and bushings must be free in knuckle support and on kingpin). Install thrust bearing between lower yoke of steering knuckle and support with shield on bearing upward, install kingpin from below lining up lockpin slot with hole in support. Check knuckle endplay with a feeler gauge, install steel shim between support and top of steering knuckle if this clearance exceeds .006". Install kingpin lock pin, bearing plugs, lock rings, and bearing plug cover.

SPRINGS: Springs have one end ground flat which should be placed at top with shim (when used) between top of spring and spring seat in cross-member. Lower end is not ground and should be fitted in recess in spring seat on lower control arm.



CHEVROLET FRONT SUSPENSION

Model	Color Mark	Part No.
Convertible	Black	3703787
Others (Synchro-mesh)	Black	3703788
All Powerglide	Black	3703787

Spring Height Correction—If spring height too low (riding height less than 15⅞"), install not more than two 599810 Shims (1/16" thick) on top of spring.

►***CAUTION***—If more than two shims required to secure correct riding height, replace spring (additional shims will cause spring coils to bottom before rubber bumper on lower control arm stops arm.

►***REPLACEMENT SPRING CAUTION***—Shims furnished with new springs (wired to spring) must be installed with the spring (riding height will not be correct if shims omitted).

1955-60 CHEVROLET

Chevrolet Pass. Cars, Exc. Corvette (1955-60)

DESCRIPTION: Front suspension utilizes short and long arms with spherical type joints connecting control arms and steering knuckles. Coil springs and direct acting shock absorbers are mounted between spring seats on lower control arms and spring pockets in front cross member Inner ends of upper and lower control arms are mounted on rubber torsion bushings which, in turn, are on forged steel shafts bolted to front cross member (no lubrication required). System uses a forged steering knuckle that is connected directly to upper and lower control arms at spherical joints. This knuckle has brake backing plate, anchor pin, and steering arms bolted to it

ADJUSTMENT: Before making adjustments of front suspension steering geometry check for following: Loose or improperly adjusted steering gear, steering gear housing loose at frame, play or excessive wear in spherical joints, loose tie rod or steering connections, improper front spring heights (see below), underinflated or unbalanced tires, wheel bearings improperly adjusted, shock absorbers not operating properly. *Mak adjustments at curb w ight.*

Shimming Procedure: Adjustment is made by means of shims between upper control arm inner support and support bracket attached to frame side rail. Shims may be changed at either front or rear of inner shaft to change caster, or at both points equally to change camber. Addition of shims at front bolt or removal of shims at rear bolt will decrease positive caster. A 1/32" shim difference will change caster approximately 1/4°. Adding shims at both front and rear of inner shaft will change camber 1/6°. To adjust, loosen upper inner shaft-to-bracket bolts and add or remove shims as required.

►*1955 CAMBER ADJUSTMENT CORRECTION:* If it is found that proper camber cannot be obtained even after removal of all shims, it will be necessary to reposition lower control arm 1/8" inward. New position provides over 1° camber which in turn can be adjusted through addition of shims. Added shims can be moved forward or backward to obtain proper caster. To reposition lower control arm, remove lower control arm shaft. Scribe mark on forward and rear edge of front crossmember, corresponding to present centers of forward and rear inner lower control arm bolt holes in front crossmember. Weld both inner holes shut and redrill new inner holes 1/8" inward from marks scribed above. Weld both outer holes shut and reinstall lower control arm shaft on new inner holes. Using lower control arm shaft as a template, drill two new outer holes and secure with bolts. Recheck camber and add shims as required. Adjust caster by moving shims (see below).

Steering Axis Inclination: (1955-56) 3½°±½°, (1957) 3-4°, (1958-60) 7¼°±½°

Caster: (1955) 0°±½°, (1956-57) 1°±½°, (1958-60) 0°±½°

►*1958-59 AIR SUSPENSION CASTER NOTE· Cast r is* 1½°±½°.

Camber: Pos ½°±½°

Toe-In: 1/8" to 1/4" (Std Susp) 0 to 1/8" (Air Susp) Equally divided between wheels

Toe-Out on Turns: With inner wheel at 20°, outer wheel should be 18°10' (1955-57); 18½° (1958-60). Not adjustable

RIDING HEIGHT (COIL SPRING CARS): Position car on a smooth floor, then bounce and rock car several times and allow it to settle to normal height Proceed as follows

Fr nt Springs: Measure distance from floor to center of front inner pivot of lower control arm, then measure the

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1955-60 CHEVROLET (C nt.)

distance from floor to lower face of lower steering knuckle boss for spherical joint *The difference b - twe n th se two measurements should be as indicated in table below.* Measure opposite side of car in the same manner. Differences between the two sides should be closed. If necessary to correct height, springs must be replaced These springs do not have flat ends and shims should not be used

1955-56 Front Standing Height

All Models	2½-3"

1957 Front Standing Height

All Models	2¼-2¾"

1958 Fr nt Standing Height

Model	6 Cyl.	8 Cyl.
All (Exc. following & Corvette)	3 5/16"	3 9/16"
Convertible	3 3/16"	3 7/8"
Yeoman Sta. Wgns.	3 1/4"	3 7/16"
Brookwood 6 Pass. Sta. Wgn	3 1/4"	3 7/16"
Brookwood 9 Pass. Sta Wgn	3 1/4"	3 11/16"
Nomad	3 1/4"	3 7/16"
Sedan Delivery	3 1/16"	3 3/8"

① - Measurements are plus or minus 1/4"

1959-60 Front Standing Height

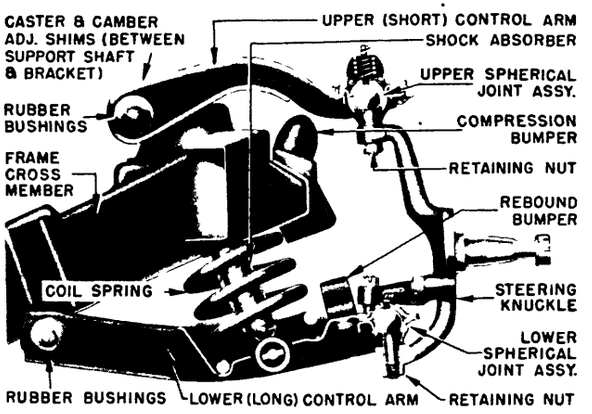
Model	6 Cyl.	8 Cyl.
2 & 4 Dr. Sed. (Exc. Spt. Sed.) ②④	3"	3 5/16"
2 & 4 Dr. Spt. Sedan ② ④	3 5/8"	3 5/8"
Convertible ③	3½"	3½"
Sed. Del. & El Camino ③	3"	3"
Station Wagon ③	4 1/8"	4 1/8"

① – Measurements are plus or minus ¼".
②–If equipped with 8.00x14 tires, add 19/64" to specs.
③–If equipped with 8.50x14 tires, add 19/64" to specs.
④–If equipped with 8.50x14 tires, add 19/32" to specs.

►*REAR STANDING HEIGHT MEASUREMENT: See "Chevrolet Rear Suspension".*

FRONT SHOCK ABSORBER REPLACEMENT: With ¼" open end wrench, hold upper stem from turning and remove upper stem retaining nut, grommet retainer and grommet. Remove two bolts retaining lower shock absorber pivot to lower control arm and pull absorber assembly and mounting out at bottom of spring housing. Inspect rubber grommets and, if necessary, replace. To install, place rubber grommet retainer and grommet on upper stem of shock absorber and install shock absorber up through lower control arm and spring housing. Index upper stud through mounting hole in top of spring housing. Install retainer nut to upper shock absorber stem and holding stem with ¼" wrench, tighten nut until it bottoms on shoulder of stem. Tighten to 4-6 ft. lbs. torque and stake in place. Install pivot bolts through lower pivot to lower control arm and tighten securely.

SPRING REPLACEMENT (1955): Remove front shock absorber on side spring to be replaced (see above). Raise front end of car off floor and place stand jacks under frame side rails. Lower car on jacks. Remove tire and wheel assembly (*NOTE*–To avoid damage to spherical joints during spring operations). Remove four lower control arm cross shaft bushing bolts. Install Spring Compressor J-5817 through shock absorber



1955 CHEVROLET FRONT SUSPENSION

mounting hole in front cross member and through spring. Install plate, thrust washer and nut and tighten to slightly compress spring. Remove lower spherical joint cotter pin and nut. Loosen stud by hammering on side of steering knuckle joint boss, backing up steering knuckle with heavy hammer. Remove upper spherical joint stud from knuckle in similar manner, and hang drum and knuckle assembly without loading brake hose. Remove four lower control arm inner shaft-to-cross member nuts and bolts. Unscrew spring compressor nut and remove spring. To install, reverse removal procedure. Rotate spring to make certain it fits helical seats in both cross member and lower control arm.

SPRING REPLACEMENT (1956-57): Remove front shock absorber on side spring to be replaced (see above). Raise front end of car off floor and place stand jacks under frame side rails. Lower car on jacks. Remove tire and wheel assembly (*NOTE*–To avoid damage to spherical joints during spring operations). Remove four lower control arm cross shaft bushing bolts. Install Spring Compressor J-6318 through shock absorber mounting hole in front crossmember and through spring. Install nut washer and thrust bearing on Compressor shaft to keep Compressor from falling back through. Index Cross Shaft of Tool J-6318 through eye in Tool. Attach Cross Shaft to shock absorber pivot bar bolt holes in bottom of lower control arm. Use bolts from pivot bar, tighten securely. Tighten upper Compressor nut to slightly compress spring. Remove lower spherical joint cotter pin and nut. Loosen stud by hammering on side of steering knuckle joint boss, backing up the steering knuckle with a heavy hammer. Remove upper spherical joint stud from knuckle in similar manner, and hang drum and knuckle assembly without loading brake hose. Remove four lower control arm inner shaft-to-crossmember nuts and bolts. Unscrew spring compressor nut and remove spring and lower control arm. (*NOTE* - On some models generator may have to be loosened, then raised in order to compress spring compressor). To install, reverse removal procedure. Rotate spring to make certain it fits helical seats in lower control arm and crossmember.

SPRING REPLACEMENT (1958-60): Raise car on a hoist (at frame so control arms are free) and remove wheel, stabilizer bar, and shock absorber. Loosen lower ball joint to steering knuckle nut, and two lower control arm cross shaft bushing bolts. Place Tool J-6874-1 across sixth coil (approx.) and secure Tool J-6874-2 to upper shoe with capscrews and lockwashers. *NOTE - Upper shoe "V" notch and lower shoe raised land should contact spring.* Insert Tool J-6874 through center of spring and attach to upper and lower shoe assembly with bolt and nut. Place spacer under shock absorber mounting hole and against bottom of lower control arm. Install special bearing washer and Tool J-6874-5 and locate bearing against spacer and large washer against bearing. Feed screw into Tool J-6874-5 up through large washer bearing and spacer, then thread into Tool J-6874 and tighten snugly. Center shoe assembly in spring. Tighten screw to lightly compress spring, then tighten the two capscrews securing upper and lower shoes to lock these shoes to spring. Compress spring just enough to clear spring tower and remove lower ball joint to steering knuckle nut. *NOTE - It may be necessary to use pry bar to remove spring.* Disconnect lower ball joint from steering knuckle and lower control arm with spring. IMMEDIATELY release compression on spring and remove tool. *CAUTION - Clear area (people and material) from path of spring when control arm is lowered.*

1956 Front Spring Application

Model	Spring Part N.
Sta. Wgn. (Exc. Powerglide)	3721371
Sta. Wgn. (Powerglide)	3721372
Convertible (Exc. Powerglide)	3721372
Convertible (Powerglide)	3721373
Sed. Del. (Without A.C.)	3713966
Sed. Del., Conv. (Powerglide & A.C.)	3714506
Taxi (Exc. Powerglide)	3719736
V8 Sport Cpe. (Without A.C.)	3723902
6 Cyl. Sport Cpe. (Exc. Powerglide)	3723903
Other Pass. (Powerglide & A.C.)	3722423
Other Pass. (A.C. Exc. Powerglide)	3714506
Other Pass. (Powerglide)	3723903

1957 Front Spring Application

Model	② Part N.
Sed. & Coupe (Synchro-mesh) ①	3721372
Sed. & Coupe (Auto. Trans.) ①	3721373
Sed. & Coupe (Auto. Trans. & Air Cond.)	3722423
Sed. & Coupe (Synchro-mesh & Air Cond.)	3714506
Convertible (Synchro-mesh) ①	3721373
Convertible (Auto. Trans.) ①	3737293
Convertible (Auto. Trans. & Air Cond.)	3714506
Sedan Del. (Synchro-mesh) ①	3713966
Sedan Del. (Auto. Trans. & Air Cond.)	3714506
Station Wagon (Synchro-mesh) ①	3721371
Station Wagon (Auto. Trans.) ①	3721372
Taxi (Synchro-mesh)	3719736
Taxi (Auto. Trans.)	3714506

① - Without Air Conditioning.
② - Springs are marked with the following colors for identification: Orange (3721372). Blue (3721373). Yellow (3722423). Dark Green (3714506). White (3737293 & 3713966). Light Green (3721371). Pink (3719736).

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1955-60 CHEVROLET (Cont.)

Model	1958 Front Spring Application	② Part No.
Sed. & Coupe (Synchro-mesh) ①		3721372
Sed. & Coupe (Auto. Trans.) ①		3721373
Sed. & Coupe (Auto. Trans. & Air Cond.)		3722423
Sed. & Coupe (Synchro-mesh & Air Cond.)		3714506
Convertible (Synchro-mesh) ①		3721373
Convertible (Auto. Trans.) ①		3737293
Convertible (Auto. Trans. & Air Cond.)		3714506
Sedan Del. (Synchro-mesh) ①		3713966
Sedan Del. (Auto. Trans. & Air Cond.)		3714506
Station Wagon (Synchro-mesh) ①		3721371
Station Wagon (Auto. Trans.) ①		3721372
Taxi (Synchro-mesh)		3719736
Taxi (Auto. Trans.)		3714506

① - Without Air Conditioning.

② - Springs are marked with the following colors for identification: Orange (3721372). Blue (3721373). Yellow (3722423). Dark Green (3714506). White (3737293 & 3713966). Light Green (3721371). Pink (3719736).

1959 Front Spring Application

Model	6 Cyl. Models	Part No.
Biscayne & Bel Air, Exc. Sed. Del. (PG)		3746853
Biscayne & Bel Air, Exc. Sed. Del. (SM)		3746852
Impala, Exc. Convertible (SM)		3741497
Impala, Exc. Convertible (PG)		3758760
Convertible (SM)		3758760
Convertible (PG)		3764582
El Camino & Sedan Delivery		3746851
Station Wagon, Exc. Kingswood ①		3758760
Kingswood Station Wagon ①		3764582
Station Wagon (Exc. PG) ②		3741497
Station Wagon (PG) ②		3758760
Taxi (SM)		3746853
Taxi (PG)		3752906

(PG) — Powerglide Trans. (TG) — Turboglide Trans.
① — First design. ② — Second design.

Model	V8 Models (Without Air Conditioning)	Part No.
Sedan & Spt. Cpe. 283" Eng. (Exc. PG)		3741497
Sedan & Spt. Cpe. 283" Eng. (PG)		3758760
Sedan & Spt. Cpe. 348" Eng. (PG)		3758760
Sedan 348" Eng. (PG)		3764582
Sedan & Spt. Cpe. 283" Eng. (SM) ②		3764582
Spt. Cpe & Convertible 348" Eng. (PG)		3758763
Convertible 283" Eng.		3758760
Convertible 283" Eng. (PG) ②		3764582
Convertible 348" Eng. (Exc. PG) ①		3758760
Convertible 348" Eng. (Exc. PG) ②		3764582
El Camino 283" Eng. (SM)		3746853
El Camino (Exc. 283" Eng. & SM)		3746851
Station Wagon 283" Eng. (Exc. PG) ②		3741497
Station Wagon 283" Eng., ① ③		3758760
Station Wagon 283" Eng. (PG) ②		3758760
Station Wagon 283" Eng. (SM) ②		3764582
Station Wagon 348" Eng. (PG) ①		3758763
Station Wagon 348" Eng., (Exc. PG) ① ③		3758760
Station Wagon 348" Eng. (PG) ②		3764582
Kingswood Station Wagon		3764582
Sedan Delivery		3746851
Taxi (SM)		3746853
Taxi (PG)		3752906

(PG) — Powerglide Trans. (TG) — Turboglide Trans.
① — First design. ② — Second design.
③ — Except Kingswood Station Wagon.

Model	V8 Models (With Air Conditioning)	Part No.
Sedan & Spt. Cpe. 283" Eng.		3758762
Sedan & Spt. Cpe. 283" Eng. (TG) ②		3764582
Sedan & Spt. Cpe. 348" Eng. (PG)		3759987
Sedan & Spt. Cpe. 348" Eng. (TG)		3758763
Convertible 283" Eng. (PG)		3759987
Convertible 283" Eng. (TG)		3758763
Convertible 348" Eng. (PG)		3764408
Convertible 348" Eng. (TG)		3759987
El Camino 283" Eng. (PG)		3752906
El Camino 283" Eng. (TG)		3746853
El Camino 348" Eng. (PG)		3752908
El Camino 348" Eng. (TG)		3752906
Station Wagon 283" Eng. (PG) ①		3759987
Station Wagon 283" Eng. (PG) ②		3758763
Station Wagon 283" Eng. (TG) ①		3758763
Station Wagon 283" Eng. (TG) ②		3764582
Station Wagon 348" Eng. (PG) ①		3764408
Station Wagon 348" Eng. (PG) ②		3759987
Station Wagon 348" Eng. (TG) ①		3759987
Station Wagon 348" Eng. (TG) ②		3758763

(PG) — Powerglide Trans. (TG) — Turboglide Trans.
① — First design. ② — Second design.

► *COIL SPRING IDENTIFICATION NOTE:* Springs are marked with paint as follows: Brown & White (3752908); Orange & White (3746852); White (3746853); Orange & Blue (3741497); Lime & White (3752906); Yellow & White (3746851); Lt. Green & Purple (3758763); White & Lt. Blue (3758760); Purple (3759987); Gray & Purple (3764408).

1960 Front Spring Application

Model	6 Cyl. Models (Without Air Conditioning)	Part No.
Biscayne & Bel Air, Exc. Sed. Del. (SM)		3746852
Biscayne & Bel Air, Exc. Sed. Del. (PG)		3746853
Impala, Exc. Convertible (SM)		3741497
Impala, Exc. Convertible (PG)		3758760
Convertible (SM)		3758760
Convertible (PG)		3764582
El Camino & Sed. Del.		3746851
Kingswood Station Wagon (PG)		3746853
Kingswood Station Wagon (SM)		3746852
Station Wagon, Exc. Kingswood (SM)		3741497
Station Wagon, Exc. Kingswood (PG)		3758760
Taxi (SM)		3746853
Taxi (PG)		3752906

(PG) - Powerglide Trans. (SM) - Synchro-mesh Trans.

Model	V8 Models (Without Air Conditioning)	Part No.
Sedan & Spt. Cpe. 283" Eng. (Exc. PG)		3741497
Sedan & Spt. Cpe. 283" Eng. (PG)		3758760
Sedan & Spt. Cpe. 348" Eng. (Exc. PG)		3758760
Sedan & Spt. Cpe. 348" Eng. (PG)		3764582
Impala Spt. Cpe. 348" Eng. (PG)		3758763
Convertible 283" Eng. (Exc. PG)		3758760
Convertible 283" Eng. (PG)		3764582
Convertible 348" Eng. (SM, PG, TG)		3764582
El Camino & Sed. Del. 283" & 348" Eng.		3746851
Kingswood Sta. Wgn. 283" Eng.		3746852
Kingswood Sta. Wgn. 348" Eng. (Exc. PG)		3746853
Kingswood Sta. Wgn. 348" Eng. (PG)		3752906
Sta. Wgn. 283" Eng., Exc. Kingswood(Exc.PG)		3741497
Sta. Wgn. 283" Eng., Exc. Kingswood (PG)		3758760
Sta. Wgn. 348" Eng., Exc. Kingswood(Exc.PG)		3758760
Sta. Wgn. 348" Eng., Exc. Kingswood (PG)		3746852
Taxi (SM)		3746853
Taxi (PG)		3752906

(PG) - Powerglide Trans. (SM) - Synchro-mesh Trans.
(TG) - Turboglide Trans.

Model	6 Cyl. Models (With Air Conditioning)	Part No.
Biscayne & Bel Air, Exc. Sed. Del. (SM)		3752906
Biscayne & Bel Air, Exc. Sed. Del. (PG)		3752908
Impala, Exc. Convertible (SM)		3764582
Impala, Exc. Convertible (PG)		3758763
Convertible (SM)		3758763
Convertible (PG)		3759987
El Camino & Sed. Del. (SM)		3746853
El Camino & Sed. Del. (PG)		3752906
Kingswood Station Wagon (PG)		3752908
Kingswood Station Wagon (SM)		3752906
Station Wagon, Exc. Kingswood (SM)		3764582
Station Wagon, Exc. Kingswood (PG)		3758763

(PG) - Powerglide Trans. (SM) - Synchro-mesh Trans.

Model	V8 Models (With Air Conditioning)	Part No.
Sedan & Spt. Cpe. 283" Eng. (TG)		3764582
Sedan & Spt. Cpe. 283" Eng. (PG)		3758763
Sedan & Spt. Cpe. 348" Eng. (TG)		3758763
Sedan & Spt. Cpe. 348" Eng. (PG)		3759987
Convertible 283" Eng. (TG)		3758963
Convertible 283" Eng. (PG)		3759987
Convertible 348" Eng. (TG)		3758987
Convertible 348" Eng. (PG)		3764408
El Camino 283" Eng. (TG)		3746853
El Camino 283" Eng. (PG)		3752906
El Camino 348" Eng. (TG)		3752906
El Camino 348" Eng. (PG)		3752908
Kingswood Sta. Wgn. 283" Eng. (TG)		3752906
Kingswood Sta. Wgn. 283" Eng. (PG)		3752908
Kingswood Sta. Wgn. 348" Eng. (TG)		3752908
Kingswood Sta. Wgn. 348" Eng. (PG)		3759987
Sta. Wgn. 283" Eng., Exc. Kingswood (TG)		3764582
Sta. Wgn. 283" Eng., Exc. Kingswood (PG)		3758763
Sta. Wgn. 348" Eng., Exc. Kingswood (TG)		3758763
Sta. Wgn. 348" Eng., Exc. Kingswood (PG)		3759987

► *COIL SPRING IDENTIFICATION NOTE:* Springs are marked with paint as follows: Brown & White (3752908); Orange & White (3746852); White (3746853); Orange & Blue (3741497); Lime & White (3752906); Yellow & White (3746851); Lt. Green & Purple (3758763); White & Lt. Blue (3758760); Purple (3759987); Gray & Purple (3764408); Lime & Purple (3764582).

LOWER CONTROL ARM (Air Suspension Cars): Removal & Installation - Remove air spring (See "*Chevrolet Air Suspension*"), then remove control arm in usual manner.

LOWER CONTROL ARM SPHERICAL JOINT, CROSS SHAFT OR BUSHINGS REPLACEMENT: Remove lower control arm (See Front Spring Removal above).

Spherical Joint Replacement: Chisel or drill heads of rivets retaining spherical joint to control arm and drive out rivets. Discard spherical joint and seal. Install new joint with flange against underside of control arm and retain joint in place with special bolts and nuts supplied with new joint. *CAUTION*– Use only alloy bolts supplied for this operation.

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1955-60 CHEVROLET (C nt.)

Cr ss Shaft r Bushing R placement: Remove bolt, lock lockwasher and collar from each end of cross shaft Install three-piece spacer of J-5888 Bushing Remover and Installer in control arm Thread a 7/16"-20 capscrew (furnished with J-5888) to bottom of threads in one end of cross-shaft Support control arm in an arbor press, on support detail of Tool J 5888 *(CAUTION*–Be sure bushing flange does not contact support) Press on capscrew until bushing is free of control arm Discard bushing Remove capscrew, insert capscrew in other end of shaft and repeat above operation To install, coat outside sleeve of bushing sparingly with a lubricant *(CAUTION*–Avoid getting lubricant on rubber bushing) With cross-shaft in control arm and three-piece spacer in place, place control arm on support Hand start bushing into control arm and over end of cross-shaft *(CAUTION*–End of shaft with greatest distance from end of shaft to bolt holes should be toward front of control arm) Install collar of Tool J-5888 over bushing Be sure three-piece spacer is not over-lapping bushing holes in control arm Press bushing into control arm until flange contacts control arm Invert arm in press, and repeat above operation on other bushing After installation, cross-shaft should be able to be rotated by hand Install collar, lockwasher, and capscrew in each end of cross-shaft but do not tighten

L w r C ntr l Arm Installation: See "Front Spring - Installation" above Tighten bushing collar bolts to 45-55 ft lbs

UPPER CONTROL ARM SPHERICAL JOINT, CROSS-SHAFT OR BUSHINGS REPLACEMENT: Support vehicle weight at outer end of lower control arm. Remove wheel and tire assembly Remove cotter pin and nut from upper control arm ball stud Loosen stud by hammering on side of steering knuckle joint boss, backing up knuckle with heavy hammer Remove two nuts retaining upper control arm shaft to front cross-member *Not numb r of shims at each bolt.* Remove upper control arm from vehicle

Sph rical J int R plac m nt: Same as spherical joint replacement for lower control arm (above), except that flange of joint is installed on topside of upper control arm and a shield is installed around joint on underside of control arm

Cr ss-Shaft r Bushing Replacement: Same as cross-shaft and bushing replacement for lower control arm, except that one-piece spacer instead of three-piece spacer of Tool J-5888 used and 3/8"-24 capscrew (furnished with J-5888) instead of 7/16"-20 capscrew.

Upper C ntr l Arm Installati n: Reverse removal procedure Tighten bushing collar bolts to 35-40 ft lbs

1955-60 CHEVROLET CORVETTE FRONT SUSPENSION

Ch vrol t Corv tt (1955-60)

DESCRIPTION: Independent, linked parallelogram type with direct acting shock absorbers and coil springs "Threaded Bushing" pivot joints used on upper and lower control arms for connection to steering knuckle. Caster and camber adjustments made by rotating upper control arm pivot bolt (eccentric)

ADJUSTMENT & PARTS REPLACEMENT: *See "1954 Chevrolet Front Suspension"*

Kingpin Inclination: 3½-4½° crosswise Not adjustable

Caster: 0° to Pos 1° (1955-56), Pos 2¼°±½° (1957-60) Loosen clamp bolt in upper end of knuckle support, remove lubricant fitting from rear bushing at outer end of upper control arm, then insert an Allen wrench through hole and turn pivot bolt until correct caster setting secured *NOTE - Pivot bolt must be turned in full turns only for caster adjustment, otherwise camber will be changed*

Camber: 0° to Pos 1° (1955-56), Pos ½°±½° (1957-60) After adjusting caster (above), rotate pivot bolt not more than ½ turn in either direction to secure correct camber Entire range of adjustment is obtained in ½ turn of pivot bolt

Toe-In: 0-1/8" (1955-56), 1/8" (1957-60) Loosen clamps at each end of left hand tie rod and turn tie rod (right hand rod is one-piece non-adjustable type) Tighten clamp bolts to 8-12 ft lbs

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 23° Not adjustable

1955-58 Spring Application

Type	Color Code	Part N .
Standard	Black ℂ	3709497
Heavy Duty		3735953

ℂ - Dot on second coil.

1959-60 Spring Application

Type	Color Code	Part N .
Standard	ℂ	3756540
Heavy Duty	ℂ	3748140

ℂ - Gray stripe on lower 4 coils Free height is 13¾" (Std), 11 1/8" (Heavy Duty)

1958-60 CHEVROLET REAR SUSPENSION (EXCEPT CORVETTE)

Chevrolet Pass. Cars, Exc. Corvette (1958-60)

DESCRIPTION: 1958 Models - Suspension linkage consists of two lower control arms and a single upper control arm Forward ends of lower control arms are attached to brackets on frame side rails and rear ends are attached to brackets on rear axle housing Upper control arm is attached at front to inner side of both frame side rails and at rear to a bracket welded to center of rear axle housing Coil springs are mounted with lower end seated on lower control arm and upper end seated in tower bracket welded to frame side member *NOTE - With air suspension, coil springs are replaced by air springs in same location*

1959-60 Models: Suspension is similar in design to 1958 models except that lower control arm bushings are a new design and the upper control arm is connected to rear axle housing at right hand side on top of axle tube and to bracket on frame right hand side rail A tie-rod is attached to frame left hand side rail and to right hand side of rear axle housing

REMOVAL & INSTALLATION

►*REMOVAL & INSTALLATION NOTE Except where noted, following procedures apply to all models*

SHOCK ABSORBERS (Coil & Air Spring Cars): Removal - Remove lower attaching bolt, lockwasher and spacer, then remove upper two attaching nuts, bolts and washers Pull shock absorber off of lower anchor pin

Installation: Assemble two-piece bushing into eye on shock absorber, then install spacer lockwasher and nut (do not tighten) Install and tighten upper bolts, flat washers, lockwashers, and nuts, then tighten lower attaching nut

Shock Abs rber L wer Anchor Pin: R m val - *NOTE* - Remove rear coil spring (see below), or support rear suspension lower control arm Remove shock absorber from lower mounting, then remove anchor pin nut and lockwasher Install Tool J-7063, and sliding hammer J-2619, and drive pin out of rear suspension lower control arm *(NOTE* - It may be necessary to put a horizontal load on lower control arm rear bushing to keep it from flexing)

Installation: Use chalk and mark flat spot location on anchor pin threads and on corresponding flat on lower control arm bracket *(NOTE* - It is advisable to remove rear wheel to aid in alignment of these two chalk marks) Install Tool J-7063 to anchor pin and enter into lower control arm Attach sliding hammer, Tool J-2619, and drive into place, keeping the two chalk marks aligned Install shock absorber on lower mounting, then install anchor pin lockwasher and nut

REAR COIL SPRINGS: Removal - *(NOTE - For removal of rear air springs, see "Chevrolet Air Suspension")* Place car on a hoist and support it at both frame side rails. Place jack (or post of a twin post hoist) under rear axle. Remove rear shock absorber lower mounting from anchor pin, then remove nut and lockwasher from upper control arm rear pivot By using a tapered punch, tap out pivot bolt but leave punch in its place. Disconnect propeller shaft from differential and loosen center bearing support. Carefully lower rear axle housing until it or the tires (depending on type of hoist used) just hangs clear of hoist. *(CAUTION - Be careful not t damage flexible brake line)* Remove rear spring from seat. *NOTE* - In some cases it may be necessary to remove tapered punch locating control arm to pivot bushing on axle housing to permit hoist to clear axle housing Also it may be necessary to assist the springs out of their seats by using a pry bar or one "screw type" jack stand that will permit raising car frame in relation to rear axle.

Installati n: Place spring in its seat on lower control arm with end of spring not more than ½" from end of

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1958-60 CHEVROLET REAR SUSPENSION (C nt.)

pocket in seat. Raise rear axle assembly and attach lower shock absorber mounting. Connect propeller shaft to differential assembly If tapered punch was removed, tap the upper control arm to start it over the pivot bushing. Hold alignment of upper control arm and pivot bushing with a pry bar, then remove tapered punch (if installed) and install pivot bolt through upper control arm and bushing. Install lockwasher and nut but do not tighten. Position center propeller shaft bushing, then lower car to floor. Bounce rear end several times and tighten pivot attaching nut to 90 ft. lbs

REAR RIDING HEIGHT (COIL SPRING CARS): Position car on a smooth floor, then bounce and rock car several times and allow it to settle to normal height.

R ar Springs: Measure distance from top of rear axle housing to the frame kick-up. The height should be as indicated in table below. Repeat on opposite side If necessary to correct height, springs must be replaced. Springs do not have flat ends. DO NOT use shims

1958 Rear Standing Height ℂ

Model	6 Cyl.	8 Cyl.
All (Exc following & Corv)	6 1/4"	6 1/4"
Convertible	6"	6 1/8"
6-Pass Sta Wgn	6 3/16"	6 1/8"
Brookwood 9-Pass Sta Wgn.	6 1/16"	6"
Sedan Delivery	6 15/16"	6 7/8"

ℂ - Measurements are plus or minus 1/4"

1959-60 Rear Standing Height ℂ

Model	6 Cyl.	8 Cyl.
2 & 4 Dr Sed. (Exc. Spt. Sed.)	5 43/64"	5 59/64"
2 & 4 Dr. Spt. Sed.	5 43/64"	5 43/64"
Convertible	5 9/16"	5 9/16"
Sed. Del. & El Camino	5 7/8"	5 7/8"
Station Wagon	6 11/64"	6 11/64"

ℂ - Measurements are plus or minus ¼".

1958 Rear Spring Application

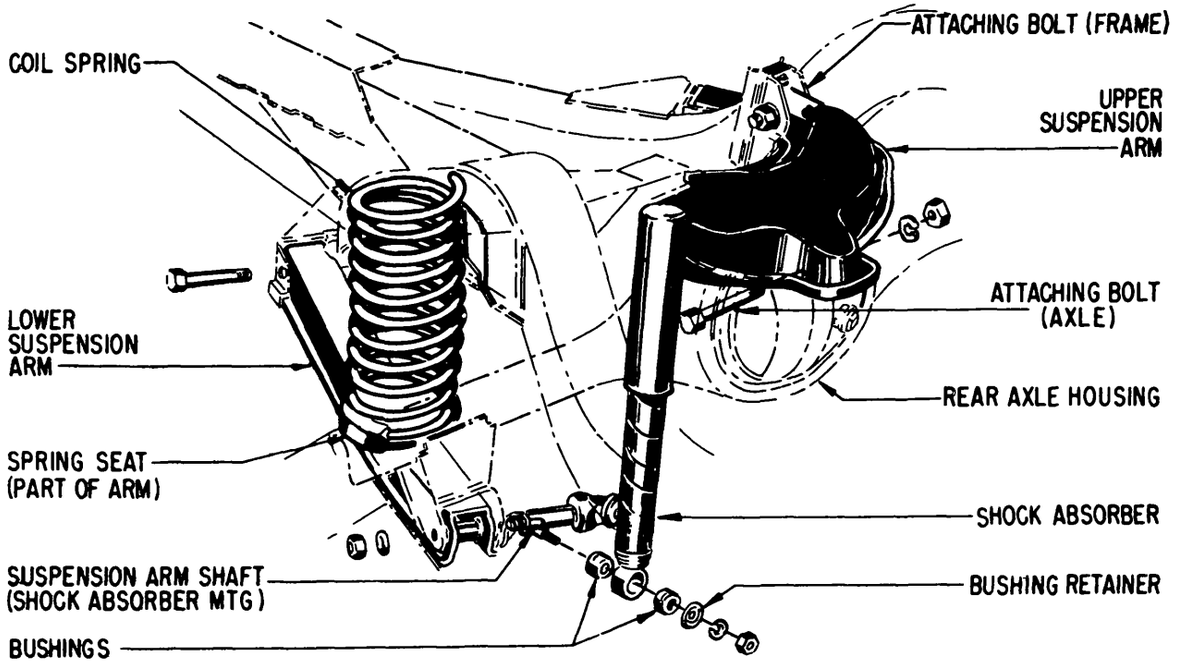
Model	Color Code & Part No.
Sedans, Spt. Models, 6 Cyl. (Exc. below)	ℂ 3744361
Sedans, Spt. Models, 8 Cyl. (Exc. below)	② 3748924
Sed Del , Taxi, Sta. Wgn. (Exc. 9 Pass)	③ 3744362
Brookwood 9 Pass. Sta Wgn	④ 3744364
Sedans Spt Mdls., Hvy Duty (Exc Taxi)	⑬ 3744362
Pass Cars (Extra Hvy Duty)	⑭ 3744364

ℂ - Orange & White. ② - Yellow & White
③ - Coral & Purple ④ - Coral & Lime

1959 Rear Spring Application

Model	Part No.
Biscayne & Bel Air 6 Cyl ℂ	③ 3754513
Impala 6 Cyl (Exc Conv & Hvy Duty)	⑭ 3752910
Sedans Spt Cpe V8 (Exc Hvy Duty)	⑭ 3752910
Convertible (Exc Hvy Duty)	③ 3754513
Pass Car 6 Cyl & V8 ②	⑤ 3758764
Station Wagon (Exc Kingswood)	⑥ 3765137
Station Wagon Hvy Duty (Exc Kingswood)	⑦ 3744364
Kingswood Station Wagon	⑦ 3744364
Sed Del El Camino & Taxi	⑤ 3758764
Sed Delivery & El Camino (Hvy Duty)	⑧ 3764330
Sed Delivery & El Camino (Extra Hvy Duty)	⑥ 3765137

ℂ — Except Sedan Delivery & Heavy Duty
② — Except Sta Wgn Sed Del & El Camino
③ — Dark Blue & Orange ⑭ — Dark Blue & Yellow
⑤ — Light Blue & Lime ⑥ — Purple & Lime
⑦ — Coral & Yellow ⑧ — Coral & Lime



CHEVROLET REAR SUSPENSION

1960 Rear Spring Application

Model	Part No.
Sedan (6 Cyl.) Exc. Impala	3777133
Sedan (V8) Exc. Impala	3777136
Bel Air Spt. Cpe. (6 Cyl.)	3754513
Bel Air Spt. Cpe. (V8)	3744364
Impala (6 Cyl.) 4-Dr.	3777136
Convertible	3777133
Station Wagon (Exc. Kingswood)	3765137
Kingswood Sta. Wgn.	3744364
El Camino & Sed. Del. (Std.)	3758764
El Camino & Sed. Del. (H D)	3764330
Taxi	3758764
Station Wgn., Exc. Kingswood (H D)	3744364
Sedan, Spt. Cpe. & Conv. (H D)	3758764

► *COIL SPRING IDENTIFICATION NOTE:* Identified by two stripes of paint as follows· 3777133 (Yellow-Orange), 3777136 (Yellow-Yellow), 3754513 (Blue-Orange), 3744364 (Coral-Yellow), 3765137 (Purple-Lime), 3758764 (Lt. Blue-Lime), 3764330 (Coral-Lime).

UPPER CONTROL ARM (1958): Removal - Use a hoist that will support rear axle housing or wheels, then remove three bolts (each side) attaching upper control arm bracket to frame bracket and remove reinforcement *(NOTE* - This reinforcement was not used on early models, when reassembling, be sure and install reinforcement, Part No 3751601, and two longer attaching bolts). Separate upper control arm bracket from frame bracket, noting the number of shims removed (these shims control driveline angles). Remove arm from car. If control arm bushings (located on axle housing and in forward ends of control arm) are to be removed, use hammer and chisel and drive point of chisel between the two inner bushing surfaces to drive them apart Tap out with a short punch. *(NOTE - On forward bushing, first remove bracket from control arm)*

Installation: *(NOTE - If necessary to replace bushings, see "Bushing Installation" below)* Place upper control arm in position on rear pivot then tap down over pivot and bushings If necessary install a tapered punch through control arm and bushing to aid in alignment. Align forward ends of upper control arm bracket with frame bracket, then install two lower bolts through each bracket assembly Make sure shims and reinforcement are in place (see "Removal" above), then install flatwashers lockwashers and nuts Install upper bolts, lockwashers and nuts with head of bolt pointing toward front of car Install rear pivot bolt through upper control arm and pivot bushing assembly and install lockwasher and nut, but do not tighten Check drive line angles *(see "Chevrolet Special Data")* Lower car to floor, then bounce car several times to settle bushings Tighten rear bushing bolt to 80-90 ft lbs , and the two upper control arm to bracket bushing bolts to 55-70 ft lbs

UPPER CONTROL ARM (1959-60): R m val - Raise car on a hoist that will support rear axle housing or wheels, then remove rear pivot bushing bolt at rear axle housing *NOTE - Rear axle must be supported in such a way as to prevent axle housing from rotating about the lower control arm rear pivot, and to also relieve load on pivot bushings* Remove bolts, lockwashers, and nuts securing upper control arm bracket to frame bracket or crossmember *CAUTION - Note number of shims removed as th y control driveline angle* Remove arm from car, then remove bolt, nut and washer attaching upper

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1958-60 CHEVROLET REAR SUSPENSION (C nt.)

control arm to bracket and separate control arm from bracket. To remove bushings, proceed as follows: With control arm bushing centered over Tool J-7574-4 and with Tool J-7574-3 in place, support arm at opposite end so it is horizontal, then press or tap bushing from arm with Tool J-7574-1 and Tool J-7079-2. Repeat procedure for opposite end of arm.

Installati n: *NOTE - If necessary to replace bushings, see "Bushing Installation" below.* Tap front of upper control arm into bracket, then install bolt, lockwasher, and nut but do not tighten. Set control arm (with front bracket installed) on axle housing bracket and tap into place. Install bolt (head of bolt must be toward outboard side), lockwasher and nut but do not tighten. Align forward end of upper control arm bracket with frame bracket or crossmember, then install two lower bolts through control arm bracket and frame bracket or crossmember. *CAUTION - Make sure shims removed at disass mbly are r installed in original locations.* Install both nuts and lockwashers. Install upper bolt and flat washer from front of bracket, then install lockwasher and nut. Tighten the three bracket bolt nuts to 60-80 ft. lbs. *NOTE - If a new control arm was installed, check driveline angle (see Chevrolet Special Data).* Lower car to floor, then bounce rear of car several times to settle bushings. Tighten upper control arm nuts to 80-90 ft. lbs.

UPPER CONTROL ARM BUSHING INSTALLATION (1958) Proceed as follows:

R r Bushing: Assemble Tool J-7055-1 to bushings and position both bushings at bracket locations. Place washer and thrust bearing on screw and insert this through bushings and tool. Install nut and draw up finger tight. Position Tool J-7055-2 between bracket flanges to prevent pivot bracket damage, then turn head of tool while turning nut to draw bushings into position. *NOTE - Check for binding during installation. Inner flanges of bushings must be flush with pivot bracket surfaces for proper installation.*

Fr nt Bushings: Assemble Tool J-7055-5 to both bushings and position both bushings at control arm locations. Place washer and thrust bearing on screw and insert this through bushing and Tool J-7055-5. Install nut and draw up finger tight. Position Tool J-7055-4 between channel flanges at bushing to prevent distortion of control arm, then turn screw to draw bushings into position. *NOTE - Check for binding during installation. Inner flanges of bushings must be flush with control arm surfaces for proper installation.* Compress bushing halves with "C" clamp and tap bracket into place. *(NOTE* - Be sure flared portion of bracket is inboard and pivot bolts are installed with head outboard). Install nut but do not tighten.

UPPER CONTROL ARM BUSHING INSTALLATION (1959-60): Proceed as follows:

Front & Rear Bushings: Turn arm to proper side (bushing can only be installed from one direction), then center bushing hole over support, Tool J-7574-4, and install Tool J-7574-3 between flanges at hole location. *NOTE- Tool J-7574-3 will prevent distorting arm during bushing installation.* Fix Tool J-7574-2 on driver handle, J-7079-2, then start bushing into hole and press or tap into place. Check to see that no interference or cocking takes place. *NOTE - Flange of bushing must be seated against arm.* Repeat procedure for opposite end of arm.

LOWER CONTROL ARMS: Removal - Place car on hoist and support frame side rails. Remove shock absorbers, then remove wheels. Remove rear springs. *NOTE* - On Air suspension units, the air spring bellows will remain in place. Remove shock absorber lower anchor pin (see above). *NOTE* - If both rear suspension control arms are to be removed, support rear axle housing to prevent its moving or falling from hoist or jack. Remove parking brake cable hold down clip, then remove attaching nut, bolt, and lockwasher on forward end of control arm and remove arm. If control arm bushings are to be removed, proceed as follows: **1958 Models** - Use Tool J-7053-1, J-7053-3, and J-5888-3 and press out old bushings. **1959-60 Mod ls** - Support control arm horizontally, then center control arm and front bushing over Tool J-7574-4, and with Tool J-7574-3 in place, press or tap bushing from arm with Tool J-7574-5 and J-7079-2. *NOTE - Be sure to place remover tool on end of bushing without the flange.* To remove rear bushing, repeat the above operation on opposite end of arm using Tool J-7574-1 in place of Tool J-7574-5.

Installation: If bushings were removed, proceed as follows: **1958 Models** - Use Tools J-7053-2, J-7053-3 & J-5888-3 to press bushings into control arm. **1959-60 Models** - To install front bushing, fix Tool J-7574-6 onto driver handle, Tool J-7079-2, then start bushing into hole and press or tap into place. Check to see that there is no interference or cocking and make sure bushing flange is seated against arm. To install rear bushing, repeat the above operation using Tool J-7574-2 in place of Tool J-7574-6. **1958-60 Models** - Install forward end of control arm but do not tighten bolt. Swing control arm into place and install shock absorber lower anchor pin, but do not tighten attaching bolt. Install wheel, then install coil springs (see above), and shock absorber. Check drive line angle *(see Ch vrolet Special Data).* Lower car to floor and bounce it several times to settle bushings, then tighten all attaching nuts to 80-90 ft. lbs.

REAR SUSPENSION TIE-ROD (1959-60): Removal - Remove nut, washer and bolt from left hand side, and nut and washer from stud on right hand side that secures tie-rod to brackets, then remove tie-rod.

Bushing Replacement - With tie rod centered over Tool J-7877-2 and with tie rod supported horizontally, press or drive bushing from rod, using Tool J-7877-1 and J-7079-2. With tie rod centered over Tool J-7877-2 and rod supported horizontally, press or drive bushing into arm using Tools J-7877-3 and J-7079-2. *NOTE - To l J-7877-2 should bottom on rod when bushing is fully seated.*

Installation - Mount tie rod to right hand stud, then install nut and special washer but do not tighten. Install bolt, lockwasher and nut to left hand bracket but do not tighten. Lower car to floor and bounce rear end several times, then tighten nuts to 55-70 ft. lbs.

1960 CHEVROLET TRUCK FRONT SUSPENSION

Ch vr l t Trucks (Exc. Fwd. Cont. & 4-Whl. Dr.) (1960)

DESCRIPTION: 10, 20, 30, 40 Series - Front end of each torsion bar is supported in a steel tube in lower control arm and is held in position in hexagon section of tube. Rear end of torsion bar is supported in an adjustable anchor connected to a special crossmember. Upper end of each shock absorber is bolted to a frame bracket and lower end is bolted to lower control arm.

50, 60 S ri s: Front end of each torsion bar is supported in hexagon section of upper control arm. Rear of torsion bar is supported in a bracket attached to outside of frame side rail and is held by hexagon portion of bracket. A pin which passes through the bracket and a notch in torsion bar rear hex locates and locks the bar in position. Shock absorbers are connected between front crossmember and lower control arm.

ADJUSTMENT: *NOTE - Truck curb height must be checked and corrected before making camber and caster adjustment.*

Truck Curb Height: 10, 20, 30, 40 Series - 4½" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. Adjust torsion bar rear anchor to obtain correct height.

50, 60 Series - 5 1/16" measured from bottom edge of crossmember to top outer flange of lower bumper bracket at centerline of spindle. No adjustment provided. If dimension not correct, replace torsion bars.

Caster (10, 20, 30, 40 Series): Pos. 1°±½°. *NOTE - Change shims between upper control arm spacer and bracket at eith r fr nt or r ar bolt.* One .0299" shim added to rear bolt changes caster a **minus** 24' and camber a **minus** 1'. One .0299" shim removed from rear bolt changes caster a **plus** 24' and camber a **minus** 2'. *NOTE - .0598" and .1196" shims are available to reduce the number of shims.* The shim pack at each bolt location should not exceed 5/8" (twenty-one .0229" shims). The total difference in shims between front and rear bolts should not exceed .33" (eleven .0299" shims).

Caster (50, 60 Series): Pos. 2½°±½°. *NOTE - Cast r adjustments are made by changing location of low r control arm shafts with reference to notched plat s welded to crossmember.* Check caster to determine amount of change required to obtain Pos. 2½°±½° caster, then mark location of control arm shaft with reference to notched attaching plate. Loosen four shaft-to-crossmember bolts to free shaft from notches in attaching plates, then move shaft rearward to decrease caster or forward to increase caster. *NOTE - Moving shaft a distanc f on notch chang s cast r approximat ly* ½°. Tighten bolts and recheck adjustment.

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CHEVROLET TRUCK FRONT SUSPENSION (C ntinu d)

Camb r (10, 20, 30, 40 S ri s): Pos. ½°±½°. *NOTE - Change shims between upper control arm spacer and bracket at both front and rear bolts equally.* One .0299" shim added or removed from both bolts changes camber 10'38". Removing shims decreases camber. Adding shims increases camber. *See "Caster" above for available shim thickness and total thickness of shim packs.*

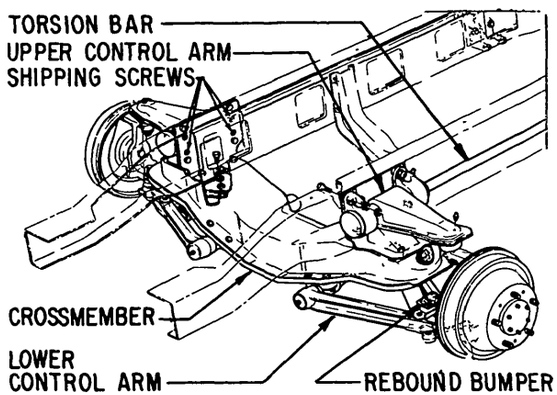
Camber (50, 60 Series): Pos. ¾°±½°. *NOTE - Change shims between upper control bracket and support at both front and rear bolts equally.* One .0299" shim added or removed changes camber approximately ½°. Adding shims increases camber. Removing shims decreases camber. *CAUTION - Make sure that the Phillips type screws (installed during manufacture) located in upper control arm brackets have been removed and discarded. These screws are needed during plant assembly only.* Remove two upper nuts and bolts attaching control arm bracket to frame and loosen two lower nuts. Lift truck at front crossmember until control arm bracket can be pried away from support. Insert or remove shims as required.

►*UPPER & LOWER CONTROL ARM SHAFT & BRACKET NUT TIGHTENING SPECIFICATION CAUTION:* These nuts must be tightened to the following specifications: **Lower Control Arm Shaft Nuts** - 90-115 ft. lbs. (10, 20 Series); 100-135 ft. lbs. (30, 40 Series); 180-240 ft. lbs. (50, 60 Series Exc. H.D.); 315-420 ft. lbs. (50, 60 Series H.D.). **Upper Control Arm Shaft Nuts** - 60-75 ft. lbs. (10 Series); 85-110 ft. lbs. (20 Series); 120-155 ft. lbs. (30, 40 Series). **Upper Control Arm Bracket Nuts** - 125-165 ft. lbs. (50, 60 Series).

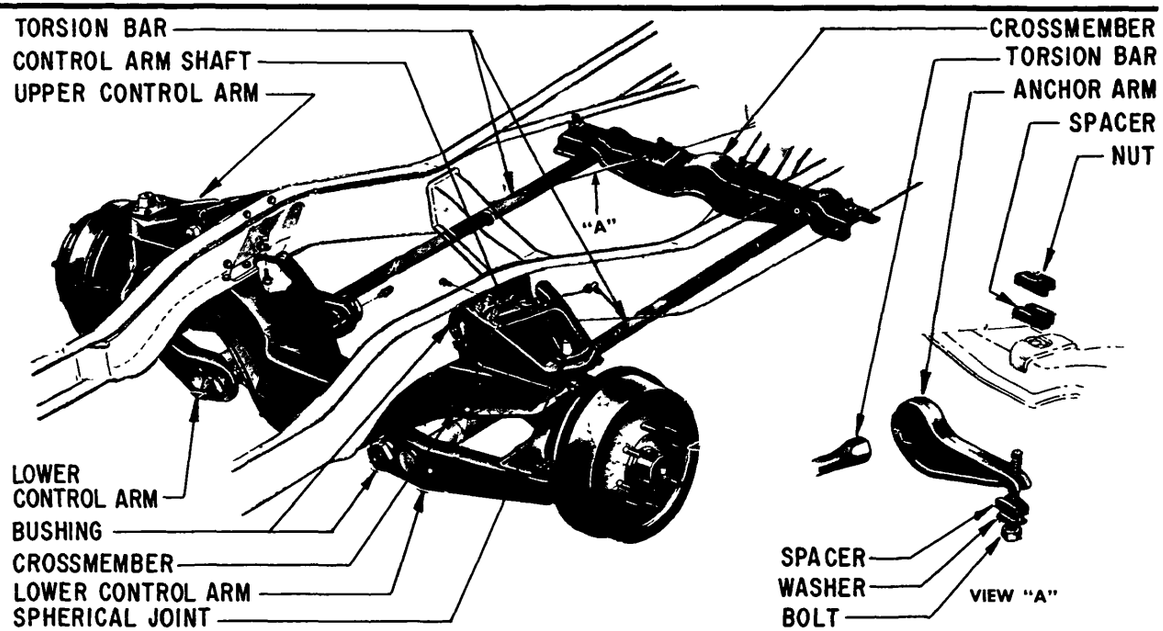
T e-In: 1/8"-1/4". Loosen clamp bolts at ends of each tie rod and turn tie rod until proper toe-in is secured and steering gear is on "high point" for straight ahead travel.

Steering Axis Inclination: 8° (10, 20, 30, 40 Series); 6°53' (50, 60 Series). All at 0° camber.

SHOCK ABSORBERS: 10, 20, 30, 40 Series (Removal) - Remove upper bolt at frame bracket, then remove lower pivot nut and washer from inside lower control arm. Remove shock by pulling rearward out of control arm.



CHEVROLET TRUCK FRONT SUSPENSION (50, 60 SERIES)



CHEVROLET TRUCK FRONT SUSPENSION (10, 20, 30, 40 SERIES)

Installation - Insert shock absorber pivot in rear of lower control arm, install opposite end in bracket on frame and install bolt, lockwashers and nuts. Tighten nuts to 65-85 ft. lbs. (upper); 40-50 ft. lbs. (lower).

50, 60 Series (Removal): Remove nuts from mounting bolt at front of crossmember support and lower ball stud arm. Drive out bolts and remove shock absorber.

Installation - Position eye at large end of shock absorber inside crossmember support from below, then align eye with holes in support and install bolt through support and eye from rear of support. Install nut and tighten to 75-90 ft. lbs. Align lower end of shock absorber with hole in ball stud arm, then install bolt (from rear) and nut. Tighten to 95-115 ft. lbs.

TORSION BARS: *CAUTION - Torsion bars are furnished as right and left parts and must be installed on correct side of truck so proper curb height can be obtained. New bars are identified by colored bands located 6" from rear hex, one band indicating right hand bar and two bands indicating left hand bar. When handling bars, be careful to prevent nicks or scratches. Nicks or scratches may cause failure of bar in operation. When a torsion bar is replaced, front end alignment must be checked.*

Removal (10, 20, 30, 40 Series): Remove upper control arm bumper from control arm, then raise truck and support frame so control arms are at full rebound position Back off adjusting bolt to unwind torsion bar, until bolt and lower spacer can be slipped out of anchor arm, then pull anchor arm rearward off bar. Pull torsion bar rearward out of front socket.

Installation (10, 20, 30, 40 Series): With front suspension control arms in full rebound position (rebound bumper not installed), install front hex of torsion bar into rear of torsion bar socket in lower control arm and slide forward until bar stops against dimple in socket (this locates fore and aft position of torsion bar). Locate torsion bar anchor spacer and nut so rocker groove of spacer and ridge of nut (long sides of spacer and nut) are parallel to crossmember. Install special washer and lower spacer on bolt, then insert bolt up through crossmember and upper spacer and start into nut. Assemble torsion bar arm to rear hex of torsion bar so spacer and bolt can be slipped into arm when bolt engages about half the threads of the nut. Position arm to bar so rear face of arm is flush with rear of bar (within 1/32"). Check position of spacer and nut to be sure the rocker surfaces are parallel to crossmember, then tighten torsion bar adjusting bolt on each side until truck is at normal curb height: *NOTE - Right and l ft hand adjustments can be made consecutiv ly or simultan lusly.* Install rebound bumper.

Removal (50, 60 Series): Remove rebound bumper and remove shock absorber bolt from lower ball stud support. Remove weight from front suspension by jacking frame until upper control arm contacts crossmember. Drive lock pin up out of torsion bar rear bracket, then pull torsion bar to rear and out of control arm hex and bracket box. Pull torsion bar out through rear bracket. *NOTE - On short wheelbas mod ls, or oth r mod ls with special equipment that limits cl aranc for r arward removal of torsion bar, proc d as follows:* Pull bar forward to remove rear hex from rear bracket, then loosen upper control arm bracket nuts and pull control arm out far enough so torsion bar can clear outside of rear bracket. Pull torsion bar rearward to remove front hex from control arm. Tilt bar and remove through wheel opening. Another method to remove torsion bar is to pull bar to rear to remove hex from upper control arm, then remove upper control arm bracket bolts and swing control arm rearward around ball joint. Pull torsion bar forward to remove rear hex from rear bracket. Tilt bar downward and out forward end of truck.

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1960 CHEVROLET TRUCK FRONT SUSPENSION (Continued)

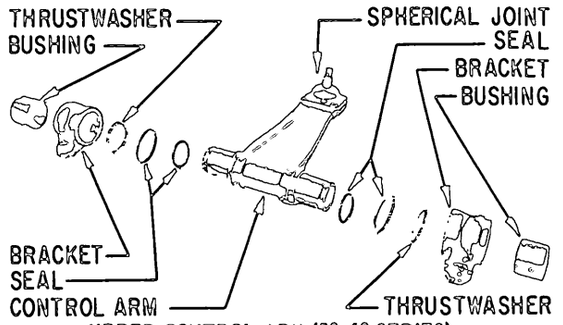
Installation (50, 60 Series): Pass forward end of bar (end not notched) through bracket and place adjacent to control arm. Align notched corner on rear hex of bar with drilled corner of bracket hex, then slide bar into control arm and bracket hexes. Align notch in bar with lock pin hole in bracket and start lock pin into top of hole, then drive pin in flush with surface. Allow weight of truck to rest on suspension and lubricate control arm. Install shock absorber lower mounting bolt and rebound bumper. *NOTE - On truck models requiring the use of special removal procedure, reverse the removal procedure for installation.*

Torsion Bar Application & Identification

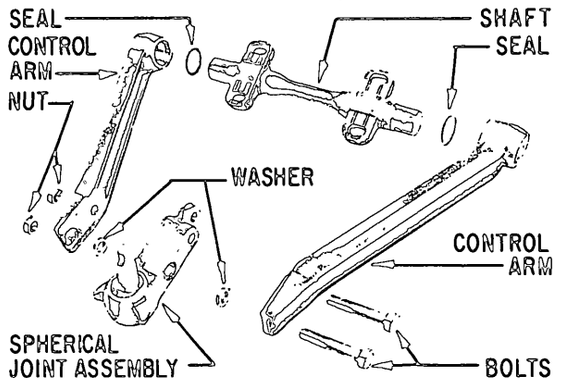
Truck Series	Right Bar	Left Bar	①Ident.	Length
10 (Std.)	3753876	3753875	White	45.70"
10 (H.D.)	3766852	3766851	Red	45.70"
20 (Std.)	3766852	3766851	Red	45.70"
20 (H.D.)	3753878	3753877	Green	45.70"
30 (Std.)	3763502	3763501	Blue	45.70"
30 (H.D.)	3766854	3766853	Yellow	45.70"
40 (Std.)	3766854	3766853	Yellow	45.70"
40 (H.D.)	3766856	3766855	Orange	45.70"
50 (Std.)②	3773110	3773109	White	57.96"
50 (H.D.)②	3773112	3773111	Green	57.96"
50,60 (Std.)③	3773116	3773115	Green	70.45"
60 (Std.)②	3773112	3773111	Green	57.96"
60 (H.D.)③	3773118	3773117	Yellow	70.45"
60 (Std.)④	3773118	3773117	Yellow	70.45"

① - New bars are identified by colored bands located 6" from rear hex, one band indicating right hand bar and two bands indicating left hand bar.
② - Except School Bus Chassis.
③ - With School Bus Chassis.
④ - With 243" Wheelbase School Bus Chassis.

SPHERICAL JOINT: Inspection (All Models) - The spherical joint on the control arm which does not carry the torsion bar (10, 20, 30, 40 Series upper; 50, 60 Series lower) can be checked as follows: Support frame and separate torsion bar from control arm (*see "Torsion Bar" above*), then loosen spherical joint stud nut. Release stud by rapping sides of steering knuckle at flats adjacent to stud, then remove nut, separate stud from knuckle and remove rubber seal. Install stud nut and measure torque required to turn stud in joint assembly. Torque should be at least 2 ft. lbs. (10, 20, 30, 40 Series); 5 ft. lbs. (50, 60 Series). If excessive wear is indicated on this joint, both upper and lower joints should be replaced. *NOTE - Maximum allowable torque, with joint well lubricated, should be 15 ft. lbs. (10, 20, 30, 40 Series); 20 ft. lbs. (50, 60 Series).* If the spherical joint as outlined above is in good condition, inspect joint on control arm which carries the torsion bar (10, 20, 30, 40 Series lower; 50, 60 Series upper) as follows: With joints, control arms and steering knuckles completely installed, support truck weight on wheels or wheel hubs. Use an outside micrometer or caliper and measure distance between end of lube fitting and end of ball stud. Record this dimension. Repeat the procedure on opposite side of truck. On 10, 20, 30, 40 Series, support truck weight at outer end of each lower control arm so wheels are free. On 50, 60 Series, support truck at center of crossmember to let wheels hang free. Again measure the distance between end of lube fitting and end of ball stud. If the difference in dimensions on either side is greater than 3/32", the joint is excessively worn and joints at both sides of truck should be replaced. If measurements do not indicate worn joints, check torque tightness of stud nut at each side as follows: Clean nut and cotter pin and check for evidence of looseness of stud in knuckle. If looseness is not indicated, mark stud and nut to identify relative location, then back off stud nut and retighten to original position. Note the torque reading required to tighten nut. If less than 45 ft. lbs., stud may have been loose in knuckle and should be replaced.



UPPER CONTROL ARM (50, 60 SERIES)



LOWER CONTROL ARM (50, 60 SERIES)

Replacement (10, 20, 30, 40 Series Upper & Lower & 50, 60 Series Upper): With control arm assembly removed from truck, cut rivet heads with a chisel and knock out the rivets. Install new joint on arm and secure with bolts and nuts furnished with service replacement joint. Tighten nuts to 13-19 ft. lbs. (10, 20 Series upper); 18-24 ft. lbs. (30, 40 Series upper); 40-55 ft. lbs. (7/16" bolts); 65-85 ft. lbs. (½" bolts). *CAUTION - Use only alloy bolts furnished for this installation.*

Replacement (50, 60 Series Lower): Remove two joint-to-arm bolts, then spread front and rear arms and remove joint assembly. Remove special washers from joint casting or control arms. Insert joint between ends of arms and install special washer in bolt hole counterbore in each arm. Install bolts and nuts and tighten securely.

CONTROL ARMS: Removal (All Models) - Support frame and separate torsion bar from control arm (*see "Torsion Bars" above*). Loosen spherical joint stud nut, release stud by rapping sides of steering knuckle at flats adjacent to studs, then remove nut, separate stud from knuckle and remove rubber seal. *NOTE - When removing lower control arm on 50, 60 Series, mark location of shaft with reference to attaching plate on crossmember to aid in adjustment when installing control arm.* Remove nuts from mounting bolts at frame or crossmember and lift the assembly from truck. When removing upper control arm, remove and tag shims for use when installing control arm.

Shaft, Bushing and/or Seal Replacement (10, 20, 30, 40 Series Upper & Lower Control Arms): Unscrew bushing from control arm and shaft at each end of shaft and remove shaft. Slide seals off shaft. To reassemble, slide new seal on each end of shaft and insert shaft through openings in control arm. Start new threaded bushings on shaft and into control arm. Turn shaft until it is centered between edges of control arm, then turn bushings in until inner surface of hex bottoms on outer edge of control arm. Tighten bushings to 170-190 ft. lbs. (10, 20 Series upper); 200-220 ft. lbs. (10, 20 Series lower); 200-220 ft. lbs. (30, 40 Series upper); 240-260 ft. lbs. (30, 40 Series lower). Check shaft for free rotation.

Lower Spherical Joint, Control Arm, or Shaft Replacement (50, 60 Series): Remove nuts from joint-to-arm bolts and remove bolts, then spread front and rear arms and remove joint assembly. Remove special washers from joint casting or arm. Unscrew arms from each end of shaft and remove "O" ring seals. To reassemble, lubricate new "O" ring seals and install one in bore in each arm. Carefully start threads into arm to avoid damage to "O" ring seal. Turn arm until threads bottom, then install "O" ring seal in other arm and install arm on shaft in same manner. Back off each arm a minimum of 1/8 turn, then an additional amount necessary for both arms to point in same direction. Place arm and shaft assembly on bench with notches in shaft facing upward. Insert joint between ends of arms and install special washer in bolt hole counterbore in each arm. Install bolts and nuts and tighten to 40-55 ft. lbs. (7/16" bolts); 65-85 ft. lbs. (½" bolts). Check shaft for free rotation.

Upper Control Arm, Brackets & Bushings (50, 60 Series): Pull mounting brackets off ends of control arm and remove "O" ring seals and thrust washers from brackets and control arm. To replace bushings in brackets, remove old bushings, then start new bushing straight in bore in bracket so open end of lubricating grooves in bushing inner diameter face into bracket. Press bushings into bottom of bore in bracket with an arbor press. Install "O" ring seal in groove at each end of control arm, then install thrust washer in counterbore of each bracket and install large "O" ring seal in groove in each bracket. Slide brackets onto control arm, using care to avoid damaging seals.

Installation (All Models): Install mounting bolts on truck and on 10, 20, 30, 40 Series upper control arms, install spacers on bolts so flat side of spacer faces outside of frame. Place control arm assembly in position on truck and install mounting bolts loosely. On upper control arms, install same shims that were removed. On 50, 60 Series lower control arms align notches on shaft and attaching plate with marks made

CONTINUED ON NEXT PAGE

1960 CHEVROLET TRUCK FRONT SUSPENSION (Continu d)

before removal. On all models, tighten mounting bolt nuts to following specifications: **Lower Control Arm Shaft Nuts** - 90-115 ft. lbs. (10, 20 Series); 100-135 ft. lbs. (30, 40 Series); 180-240 ft. lbs. (50, 60 Series, exc. H.D.); 315-420 ft. lbs. (50, 60 Series, Heavy Duty). **Upper Control Arm Shaft Nuts** - 60-75 ft. lbs. (10 Series, 7/16" bolt); 85-110 ft. lbs. (20 Series, ½" bolt); 120-155 ft. lbs. (30, 40 Series. 9/16" bolt). **Upper Control Arm Bracket Nuts** - 125-165 ft. lbs. (50, 60 Series). Install rubber seal on spherical joint and insert stud through steering knuckle. Install nut and tighten to 100-135 ft. lbs. (10, 20 Series, upper); 175-250 ft. lbs. (30, 40 Series, upper & All Series, lower). Install torsion bar.

FRONT SUSPENSION UNIT & WHEEL HUB ASSEMBLY: *NOTE* - If extensive overhaul is necessary to front suspension, the complete unit can be removed and installed as follows:

Removal: Separate both torsion bars from control arms, then support engine and remove front engine mount center bolt. Separate main brake feeder line from crossmember tee. On 10, 20, 30, 40 Series, remove bolts retaining crossmember hangers to frame side rails. On 50, 60 Series, support hub and drum and remove bolts retaining upper control arms. Remove bolts securing crossmember to frame side rail lower flange and lower the assembly from vehicle.

Installation: Jack crossmember into position under frame and install frame side rail lower flange mounting bolts. On 50, 60 Series, secure upper control arm brackets to frame side rails and tighten nuts to 185-235 ft. lbs. On 10, 20, 30, 40 Series, install bolts securing crossmember hanger to frame and tighten nuts to 60-80 ft. lbs. Position engine on front mount and install mounting bolt. On 50, 60 Series, tighten to 70-85 ft. lbs. On 10, 20, 30, 40 Series, tighten to 40-50 ft. lbs. Install torsion bars, then connect front brake main feeder line and bleed brakes. Check and adjust front end alignment.

1960 CHEVROLET TRUCK REAR SUSPENSION

Chevrolet Trucks, Series 10 & 20 (1960)

DESCRIPTION: Two link suspension system with a control arm attached between each end of rear axle housing and central area of frame. A single "U" bolt attaches each control arm to axle housing and a rubber bushing is used to connect forward end of each arm to a bracket on a frame between side rails and tunnel. A pigtailed coil spring is seated and clamped between each control arm and frame forward of the rear axle. Shock absorbers are installed between brackets welded to the frame and brackets held beneath rear of each control arm. A rubber bushed tie rod parallel to axle housing is attached between right side of axle housing and frame left side rail.

SHOCK ABSORBERS: Replacement - Remove shock absorber pivot bolt nuts and washers, pull bolts and remove shock absorber from truck. To install, position eye at large end of shock absorber in frame bracket or crossmember, then install bolt, washer and nut. Align opposite end of shock absorber with anchor bracket at axle. Install bolt, washer and nut and tighten upper and lower nuts to 19-25 ft. lbs.

TIE ROD: Removal - Remove nuts and bolts from each end of tie rod and remove rod from truck.

Inspection: Check rod for deformation by sighting down its length or with a straightedge. Minor defects may be removed by bending. Replace bushings if damaged

Bushing Replacement: Support end of rod on a suitable support, then index pin end of Tool J-8518-2 in center hole of bushing. Use Tool J-7079-2 and an arbor press and press bushing from rod. Position a new bushing on rod, then use Tool J-8518-1 and an arbor press and press bushing into rod eye until tool contacts rod.

Installation: Position rod ends in mounting brackets at frame and axle, lining up holes with a drift, then insert bolts and install nuts finger tight. Let weight of unloaded truck rest on suspension and tighten pivot nuts to 55-70 ft. lbs.

CONTROL ARM: Removal - Remove load from springs by jacking up frame, then remove parking brake cable from control arm bracket. *NOTE - Mark position of notch in spring clamp in relation to end of spring so it may be reinstalled in the same position.* Remove spring clamp bolt from underside of control arm, then remove "U" bolt nuts and separate shock absorber bracket from control arm. Separate control arm from "U" bolt and lower rear of control arm. Remove pivot bolt and remove control arm from truck.

Bushing Replacement: Insert Tool J-8448-3 in fork of control arm, astride bushing, then rest bushed end of arm on Tool J-5888-3 with bushing flange centered in tool. Place Tool J-8448-2 on top of bushing, indexing pin of tool in center hole of bushing. Use Tool J-7079-2 and an arbor press and press bushing from arm. To install bushing, support arm in same manner as when removing bushing, then center a new bushing with flanged side up over control arm hole. Place Tool J-8448-1 on top of bushing. After seating bushing in tool, press bushing into arm until flange contacts arm wall.

Installation: Position bushed end of control arm in pivot yoke between tunnel and frame, align holes with a drift and insert pivot bolt. Tighten nut on bolt finger tight. Position clamp inside spring so notch in clamp is in original position as marked at removal, and so it seats freely on spring end without hanging up. Raise control arm to the spring, then pass bolt, with flat washer installed, up through control arm and clamp. Install lockwasher and nut and tighten to 40-50 ft. lbs. Place arm adjacent to axle, then install "U" bolt over axle and through holes in arm. Place shock absorber bracket on ends of "U" bolt and tighten nuts to 175-250 ft. lbs. Install parking brake cable in control arm fitting and slide rubber cover into position on conduit. Lower truck to put full weight of unloaded truck on front and rear suspension, then tighten control arm pivot bolt nuts to 175-250 ft. lbs.

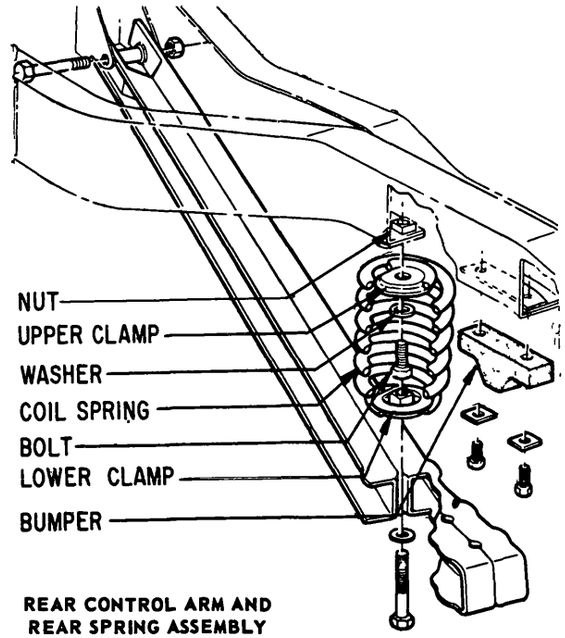
COIL SPRINGS: Removal - Remove shock absorber bolt from mounting bracket on axle, then remove truck weight from rear suspension by jacking up frame and adjust axle-to-frame height so that spring is relaxed or very slightly compressed. *NOTE - Mark position of notch in spring lower clamp in relation to end of spring so it may be reinstalled in its original position.* Remove upper and lower clamps from spring by backing out lower bolt from underside of lower control arm, and upper bolt from inside spring. Lower control arm sufficiently to permit removal of spring.

Installation: Place spring clamp inside spring, then position clamp in its original position as marked at removal so it seats freely on spring without any hang up. Pass clamp bolt with washer up through hole in control arm and hole in clamp, then install nut, but do not tighten. Position upper clamp inside spring and secure to frame with bolt and washer. Connect shock absorber to bracket at axle and tighten to 19-25 ft. lbs. Tighten spring clamp bolts to 40-50 ft. lbs.

Rear Spring Application

Series	Part No.
10, exc. 4-Whl. Drive (Std.)	3762207
20, exc. 4-Whl. Drive (H.D.)	3762263
20, exc. Fwd. Cont. & 4-Whl. Drive (Std.)	3762264
20, exc. Fwd. Cont. & 4-Whl. Drive (H.D.)	3762855

► *SPRING IDENTIFICATION NOTE: Coils are marked with paint as follows: Green (3762207); Blue (3762263); Purple (3762264); Gray (3762855).*



REAR CONTROL ARM AND REAR SPRING ASSEMBLY

1954-56 CHRYSLER, DE SOTO, DODGE, PLYMOUTH

All Models (1954-56)

►CHANGES & CORRECTIONS

DESCRIPTION: *Independent "Parallelogram" type with coil springs.* **1955-56 Models have shock absorbers mounted inside coil springs.**

CHECKING & ADJUSTMENT: Before adjustments made, check wheel and tire balance and run-out, front wheel bearing adjustment and king pin bushing clearance, steering gear adjustment, and shock absorbers. See that springs and shock absorbers in normal position (grasp bumper and work front end of car up and down several times). Then check following points first:

Front Spring Height: With car on level floor, tires inflated to recommended pressure, measure vertical distance from inner and outer ends of lower control arm to floor (center of control arm pin at outer end, center of grease fitting in control arm pivot bar on inner end). See table below for allowable variations. Make measurements at right and left sides of car and compare. If the measurements differ more than ¼", check each front spring for correct installation at top and bottom. If springs are correctly installed and measurements made at left and right sides still differ by more than ¼", insert spacers at top of spring between seat and silencer. *If more than two spacers required to make correction for a spring, replace spring.* If measurements taken above for allowable difference as shown in table below are not within limits, check rear end of car for unequal spring heights by measuring from spring plate to frame on each side (front spring height will be affected if rear spring heights differ more than ¾").

►*NOTE:* In the following table a plus (+) sign indicates the inner end of lower arm is higher than outer end and a minus (-) sign indicates that it is lower.

CHRYSLER	Allowable Difference
1954-55 C62, C67 (Exc. 8 Pass.)	+1¼" to -¼"
1954-55 C62, C67 (8 Pass.)	+¾" to -¼"
1954-55 C63, C68 Sedan & Coupe	+1" to -0"
1954-55 C63, C68 Town & Country	+1¼" to -¼"
1954-55 C63, C68 8 Pass.	+¾" to -¼"
1954-55 C64, C69	+0" to -1"
1954-55 C66, C70	+¾" to -¼"
1955 C300	+1¼" to -¼"
C70 (All)	+1¼" to —¼"
C71, 72, 73 Sedans & Coupes	+1" to — 0"
C71 Town & Country	+1¼" to +¼"
C72 Town & Country	+1¼" to —0"

DESOTO	Allowable Difference
1954 S19, 6 Pass. Sed., Cpe.	+1" to -0"
1954 S20, 6 Pass. Sed., Cpe	+1¼" to +¼"
1954 Sta. Wgn. & 8 Pass. Sed.	+¾" to -¼"
1955 6 Pass, Sed, & Cpe.	+1" to -0"
1955 Station Wagon	+1¼" to +¼"
All (Exc. S23 Sta. Wgn.)	+1" to —0"
S23 Sta. Wgn.	+1¼" to +¼"

DODGE	Allowabl Diff rence
1954 (All Models)	+1¼" to +¼"
1955 D55, D56 (Exc. Suburban)	+0" to -1"
1955 D55, D56 Suburban	-½" to -1¼"
All (Exc. Suburban)	+0" to —1"
Suburban	-¼" to —1¼"

PLYMOUTH	Allowable Difference
All Models	①

①—No allowable variation given. Follow procedure as given above (except for allowable variations).

Tire Inflation (1954-56): Check and inflate tires to 24 lbs. (Cold), 27 lbs. (Warm) on all models before checking front end alignment.

Kingpin Inclination

1954-55 (Exc. Chrysler C53, 59, 66, 67, 70)	5-6½°
1954-55 (Chrysler C53, 59, 66, 70)	6½-8°
1955 (Chrysler C67)	5½°
1956 (Chrysler C70)	7°
1956 (Chrysler Other Models)	5½°
1956 (DeSoto & Plymouth)	5-6½°
1956 (Dodge)	5½°

Caster: *NOTE - All Models set alike.*

1954 (Chrysler & DeSoto) - Neg. 2° preferred. Limits Neg. 1° to Neg. 3°.

1954 (Dodge & Plymouth) - 0° preferred. Limits Neg. 1° to Pos. 1°.

1955-56 (All Cars) - Neg. 2° to 0° (Neg. 2° preferred with manual steering, 0° preferred with power steering). Left side should be 0° to ¾° greater than right side within these limits.

To Adjust - Caster controlled by distance knuckle support upper pivot pin bushing (eccentric camber adjustment) turned in on upper control arm. *See Camber Adjustment.*

Camber (1954): Neg. 3/8° to Pos. 3/8°. *See Note.*

1955 (Chrysler & Plymouth) - Neg. 1/8° to Pos. 5/8° (Left side Pos. ½°, Right side 0° preferred).

1955 (DeSoto & Dodge) - Pos. 1/4°±3/8° (Left side Pos. ½°, Right side 0° preferred).

1956 (Chrysler, DeSoto, Dodge) - Pos. 1/4°±3/8° (Pos. ½° on left, 0° on right preferred).

1956 (Plymouth) - Neg. 1/8° to Pos. 5/8° (Neg. 1/2° on left, 0° on right preferred).

►*NOTE: 1954-55 Cars. Camber on left side of car should be ¼-½° greater than right side of car.*

►*TOOL NOTE:* Special tool (narrow wrench designed to fit between knuckle support and upper control arm fork so as to engage eccentric bushing) must be used for camber adjustment. Tool No. C-829 (1 7/16"), C-830 (1½"), or MT-269 (1 5/16") are used with any standard ½" square socket wrench extension.

To Adjust—Loosen clampscrew in upper end of knuckle support, turn eccentric bushing in upper end of knuckle support not more than ½ revolution from place where correct caster is secured (bushing eccentric and entire range of adjustment secured in ½ turn). Bushing must not be turned so as to bind on upper control arm.

►*CAUTION:* Bushing must not be turned so as to bind against either side of upper control arm (keep bushing centered in control arm as nearly as possible).

►*ADDITIONAL RANGE OF ADJUSTMENT:* If correct camber cannot be secured by turning eccentric bushing within limits given above, not more than two spacer shims can be installed at top of each front spring. Each shim will increase camber approximately ½°.

Toe-In (1954-55): 0" preferred. Limits 0" to 1/16" (Exc. 1954-55 Plymouth), 1/8" (1954-55 Plymouth).

(1956) 3/32-5/32" (3/32" preferred on Dodge, 1/8" preferred on all others).

Check toe-in with wheels turned to straight ahead position, measure between center of tire treads hub high, at front and rear of wheels.

To Adjust—Loosen clamp bolts on each tie rod (long rod right side, short rod left side, or both rods of equal length), turn both tie rods equally. Make certain that ball studs at each end of rod are against same side (to permit angular rotation of rod on ball studs when making turns), and see that clamp bolt on inner (left) end of long tie rod is beneath the rod (to prevent interference on turns).

Toe-Out on Turns: (All Models)—With outer wheel turned **20°, inner wheel should be turned 21½°±1° (Exc. 1956 Plymouth). 1956 Plymouth - With inside wheel at 20°, outside wheel should be 17½-19°.**

OVERHAUL: Steering Knuckle & Kingpin Bushings—To remove, remove wheel and hub assembly. Block brake pedal so it cannot be depressed, then remove nuts and bolts that fasten brake support to steering knuckle, remove steering knuckle arm from steering knuckle. Remove brake hose and connections, lift off brake support. (*CAUTION*—Do not allow brake support and shoe assembly to be supported by flexible brake hose). Remove kingpin locking pin. Drive a punch into upper steering knuckle welch plug and pry out of steering knuckle. Drive kingpin downward, forcing out lower welch plug. (*NOTE*—A soft brass drift should be used when driving against head of kingpin). Remove steering knuckle upper bearing or bushing with Tool C-328. Remove steering knuckle lower bushing with same tool if of stationary type (See Note below). Install new lower bushing and line-ream with special tool using pilot in place of upper bearing (When upper bushing not used). If upper bushing used, install bushing from top making sure slot or identification line is between outer end and grease fitting and line-ream both bushings at same time. Install upper bearings from top with trade mark at top and oil hole in bearing lined up with oil hole in steering knuckle. Lower bushings should be installed with oil hole in bushing lined up with oil hole in steering knuckle (*NOTE*—On cars equipped with Power Steering and Disc Brakes, kingpin bushings should be installed with open end of oil groove leading toward "O" ring seals).

Upper Control Arm & Bushings: Install as follows: Use new bushings when installing pivot bar and use special spreader tool C-608 to maintain correct control arm spread while bushing being installed. Install pivot bar (with seal on each end of bar) in control arm, install spreader tool on inner ends of control arm and bolt pivot bar to tool using two capscrews and

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1954-56 CHRYSLER, DE SOTO, DODGE, PLYMOUTH (C nt.)

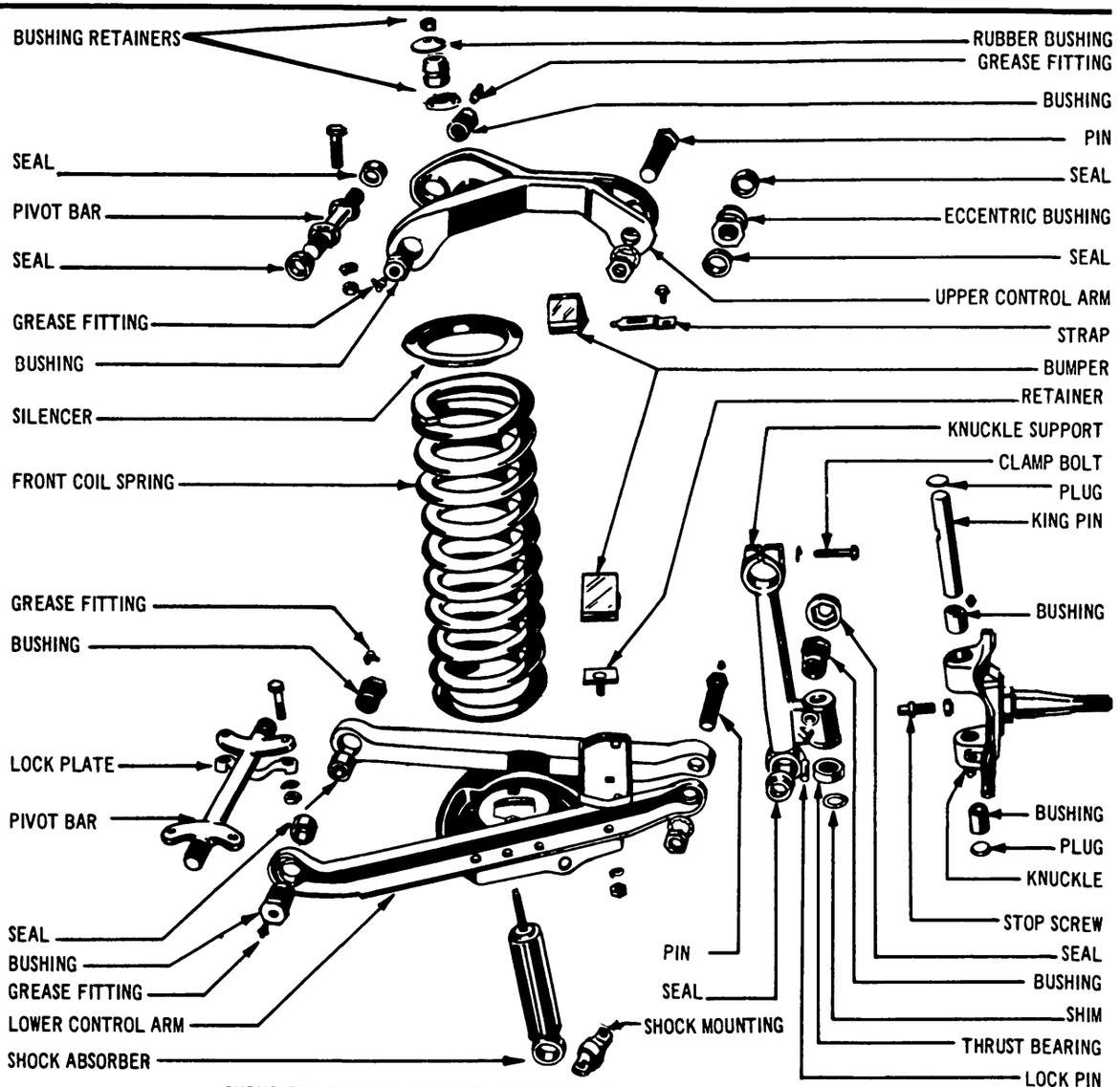
nuts. (*CAUTION*—Spreader tool has two sets of mounting holes to accommodate all sizes of pivot bars—make certain that correct holes used). Make certain that spreader tool jaws seat firmly against inner faces of control arm ends, expand tool until it is just snug against inside of the control arm. Start bushings on both ends of the pivot bar, lubricate bushings with tapping compound or other suitable lubricants (bushings cut own threads), turn bushings in until shoulder of bushings contact surface of control arm on car. With pivot bar correctly installed, only a moderate grip should be required to turn it. To correct slight centering error, the pivot bar may be rotated one turn in either direction.

Knuckle Support Upper Pivot Pin—Consists of a bolt threaded through both eyes of upper control arm from rear with nut on forward end. Seals are installed on pin at each side of eccentric bushing which is threaded on pin within control arm fork (bushing is clamped in upper end of knuckle support by clampscrew). With pin installed, over-all width of control arm fork (from front face of front eye to rear face of rear eye) should be 3 1/8" on all models. Eccentric bushing should be centered in fork on all models.

Lower Control Arm & Bushings: Control arms and spring seat are riveted assembly. Bushings at inner end (frame connection) are self-threading type and new bushings should be used when a new control arm assembly is installed as follows:

Control Arm Pivot Bar Bushings—(*NOTE*—Due to relocation of lower control arm pivot bar mounting bolt locations beginning 1955, Tool C-594 cannot be used for centering lower pivot bar, but can be used to maintain set dimensions of control arm. On 1954 models, tool can be used to center the bar). Install dust seals on pivot bar and position bar in control arm. Assemble Tool C-594 to bar. (*NOTE*—When Tool C-594 used on **1955-56 models, remove guide studs from tool**). **Lubricate self-threading bushings with light oil, start on both ends of pivot bar, thread into control arm until shoulders of bushings contact. Torque to 165 ft. lbs.** minimum (1954), 180 ft. lbs. minimum (1955-56). Check **pivot bar for free movement.** *NOTE* - **Rotating pivot bar will change setting. On the 1955-56 models** bar can be rotated one turn in either direction to correct a slight centering error. For correct centered position of arm as measured from rear face of arm to centerline of rear pivot bar mounting hole, see table below.

Knuckle Support Lower Pivot Pin & Bushing—Tighten pin nut to 100 ft. lbs. minimum. Install bushing in knuckle support (head to rear), then position knuckle support so that distance from rear face of support to rear face of support pin boss on rear arm is as shown in table below.



CHRYSLER, DE SOTO, DODGE, PLYMOUTH FRONT SUSPENSION (TYPICAL)

Car Model	Arm Centered Position	Support Position
1954 (Exc. 8 Cyl. & 8 Pass.)	2 5/32"	15/16"
1954 (8 Cyl. & 8 Pass.)	2 7/32"	1 1/32"
1955 (Exc. Chrysler C69, 70, 8 Pass.)	1 11/16"	.15/16"
1955 (Chrysler C69, 70, All 8 Pass.)	1.74"	1 1/32"

FRONT SPRING: Removal—Raise front of car and place stands under frame side members behind suspension arm. Remove shock absorbers (see below) and place jack under lower control arm pivot bar where it is attached to frame crossmember. Raise jack and relieve pressure on pivot bar bolts and remove bolts (place tapered drift in each hole to keep pivot bar lined up until bolts are removed). Lower jack slowly allowing lower control arm to come down, and remove front spring.

Installation—Place spring on end in lower control arm spring seat (flat end up). Lay upper silencer on spring and install lower silencer (if so equipped).

CONTINUED ON NEXT PAGE

1954-56 CHRYSLER, DE SOTO, DODGE, PLYMOUTH (C nt.)

Install spring and upper silencer in frame crossmember, turn spring until it indexes with lower spring seat and bring lower control arm up to hold it in position. *(NOTE*–Some models have lower end coil ground flat and have flat spring seat). *Look up through spring, using a bright light, to see if upper end of spring is position correctly. Also determine (by feel) if lower end is in position.* Raise jack to align pivot bar and frame bolt holes and attach bar to frame. Tighten nuts to 60 ft. lbs.

FRONT SHOCK ABSORBER (1954): Removal - Remove nuts from upper and lower mounting studs and remove shock absorber.

Installation–Assemble new bushings in shock absorber eyes and install inner bushing retainers. Install shock absorber on studs, assemble outer bushing retainers and stud nuts. Tighten nuts to 60 ft. lbs

FRONT SHOCK ABSORBER (1955-56): Removal - Disconnect shock absorber pushrod and the lower mounting. Pull assembly, with lower bushing washer, out through lower control arm.

Installation–If it is necessary to install a new upper rod mounting bushing, wet the bushing, press it into place and install spacer. To install lower mounting assembly in shock absorber eye, position assembly so that mounting holes are at right angles with shock absorber. With Tool C-3413, and a vise, press assembly into eye until centered *(CAUTION–To avoid damaging the assembly, always press against steel sleeve).* Place lower mounting washer on rod of shock absorber and push shock into position from lower side. Install upper washer and nut, and tighten down to spacer. Install lower mounting screws and tighten to 35 ft. lbs.

1957-60 CHRYSLER, DE SOTO, DODGE, PLYMOUTH "TORSION-AIRE"

Chrysler, DeSoto, Dodge, Plymouth (1957-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 PLYMOUTH FRONT SUSPENSION BALL JOINT SEAL INSTALLATION CAUTION:* Failure to install seals and seal retainer in proper position will result in dirt and moisture entering ball joint and cause loss of lubricant and noisy front suspension. Seals and retainer positions are shown in front suspension assembly.

►*TORSION-AIRE SUSPENSION NOISE CORRECTION:* To properly lubricate ball joints, raise car so weight is on both lower control arms to unload lower ball joint and move upper control arm rebound bumper away from frame bracket. Use grease with not to exceed 10% lead powder and apply grease intermittently to cause ball joint action. When noise not corrected by lubrication, rotate ball joint stud ¼ turn as follows: Mark ends of both upper and lower ball joint studs and steering knuckle bosses. Start to remove knuckle or until stud-knuckle tapers are separated, then rotate studs 90° or ¼ turn from marked position. Retighten studs to specifications and thoroughly lubricate joints.

►*LOWER BALL JOINT FREEPLAY NOTE:* With suspension hanging freely, lower ball joints are loose. This is a design feature as joints are assembled without preload. No steps should be taken to eliminate this freeplay.

►*1957-58 LOWER BALL JOINT SEAL REPLACEMENT NOTE:* When replacing a lower ball joint, use new improved seal which is neoprene bonded to a steel shell.

►*1957-58 TORSION BAR REAR ANCHOR SEAL INSTALLATION:* New type seals are available for installation on these models to prevent corrosion and entry of dirt into rear anchor cavity. *See "Torsion Bar" below.*

►*1959 TORSION BAR REAR ANCHOR SEAL BOOT SERVICING: See "Torsion Bar" below.*

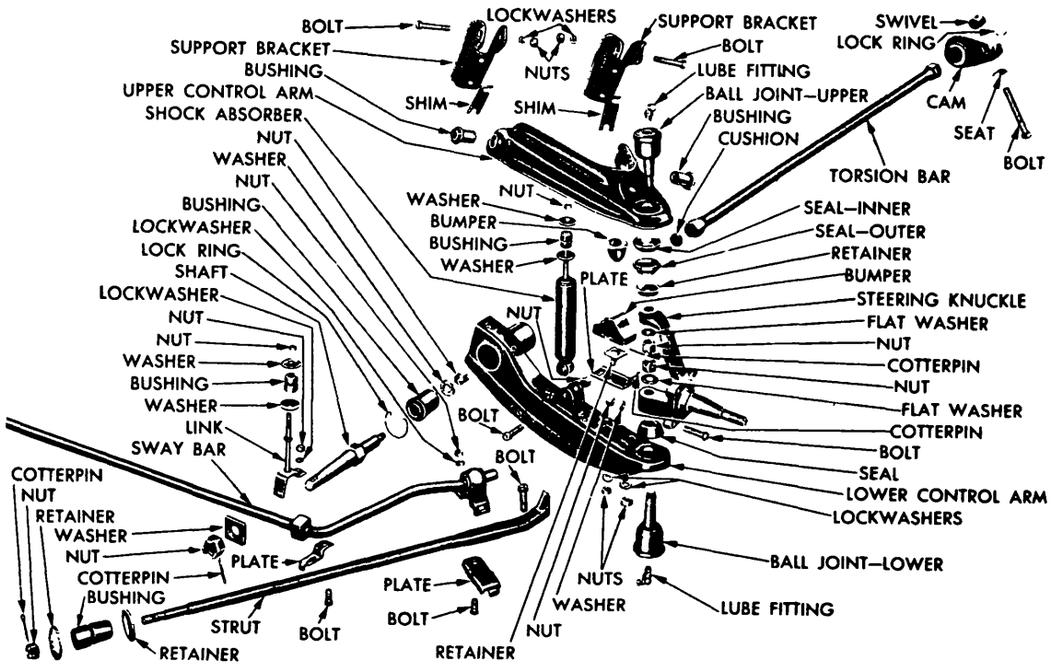
►*TORSION BAR SERVICE CAUTION:* When clamping torsion bar in a vise use soft blocks (copper plates or wood) on vise jaws to prevent any nicking or scarring of bar, which can result in torsion bar failure.

DESCRIPTION

DESCRIPTION: 1957-58 Models - Suspension consists of a new rubber mounted ball joint type system using torsion bars instead of front coil springs. Torsion bar springs, one on each side, are indexed with the lower control arm at inner pivot point, the other end of bar is indexed in an anchor connected to frame side rail below drivers compartment. Steering knuckles are connected to upper and lower control arms by ball joints, eliminating the kingpins. Upper control arms are attached to brackets bolted to frame side rails, and shim packs between brackets and side rails control camber and caster settings at each wheel. The lower control arm pivot point is set in replaceable rubber bushings located on back side of intermediate front crossmember. Shock absorbers are connected to lower control arm and to a frame tower. Two struts, one on each side, prevent fore and aft movement of lower control arm, and a sway eliminator bar is connected between the two struts. The forward end of the strut is attached to a frame crossmember forward of the control arms, and the other end is attached to the lower control arms.

1959-60 Models: Front suspension assembly design is similar to that used on 1957-58 Models except for new upper control arms and frame brackets. Camber and caster adjustment is made with eccentric type bolts at inner ends of upper control arms in place of the "shim" method used on 1957-58 Models. Upper control arms are attached to brackets welded to frame by special bolts having an integral cam at head of bolt. A matching removable cam is installed at threaded end of bolt. Control arm attaching brackets are provided with

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1957-58 CHRYSLER, DESOTO, DODGE, PLYMOUTH "TORSION-AIRE" ASSEMBLY

Form 53 B

1957-60 "TORSION-AIRE" (C nt.)

slotted holes and each bracket has cam retainers welded to its front and rear faces to engage cams on upper control arm attaching bolts. Rotating head of cam bolts causes upper control arm to move in slots provided in bracket. Turning one bolt will move upper control arm ball joint fore or aft to affect caster (more than camber). Turning both bolts on one side an equal amount in same direction will move upper ball joint in or out to affect camber.

ADJUSTMENT

ADJUSTMENT NOTE: Procedures for camber and caster adjustment on 1957-58 model is different than on 1959-60 Models.

ADJUSTMENT: Before checking front wheel alignment inflate all tires to recommended pressure. Check adjustment of front wheel bearings, upper and lower ball joints, tie rod ends and idler arm for excessive loosemess. Check for bent frame and rear spring "U" bolts for tightness or shifted axle housing. Grasp front and rear bumper at center and jounce car up and down several times to place torsion bar springs and shock absorbers in their normal "unloaded" position. Make adjustments in the following order:

1957-58 MODELS

Camber: 0°±¼°, 0° preferred (right wheel); Pos. ½° to 0°, Pos. 3/8° preferred (left wheel). The addition of shims at both front and rear brackets will decrease positive camber. Shims are furnished in 1/16" and 1/32" thicknesses. One shim (1/16") at each bracket will decrease positive camber approximately 5/16°. *NOTE - Shim pack at either front or rear bracket must not exceed 9/16".* To install or remove shims, raise front wheel off floor with a jack placed under lower control arm as near to wheel as possible. Loosen upper support bracket bolts and add or remove shims.

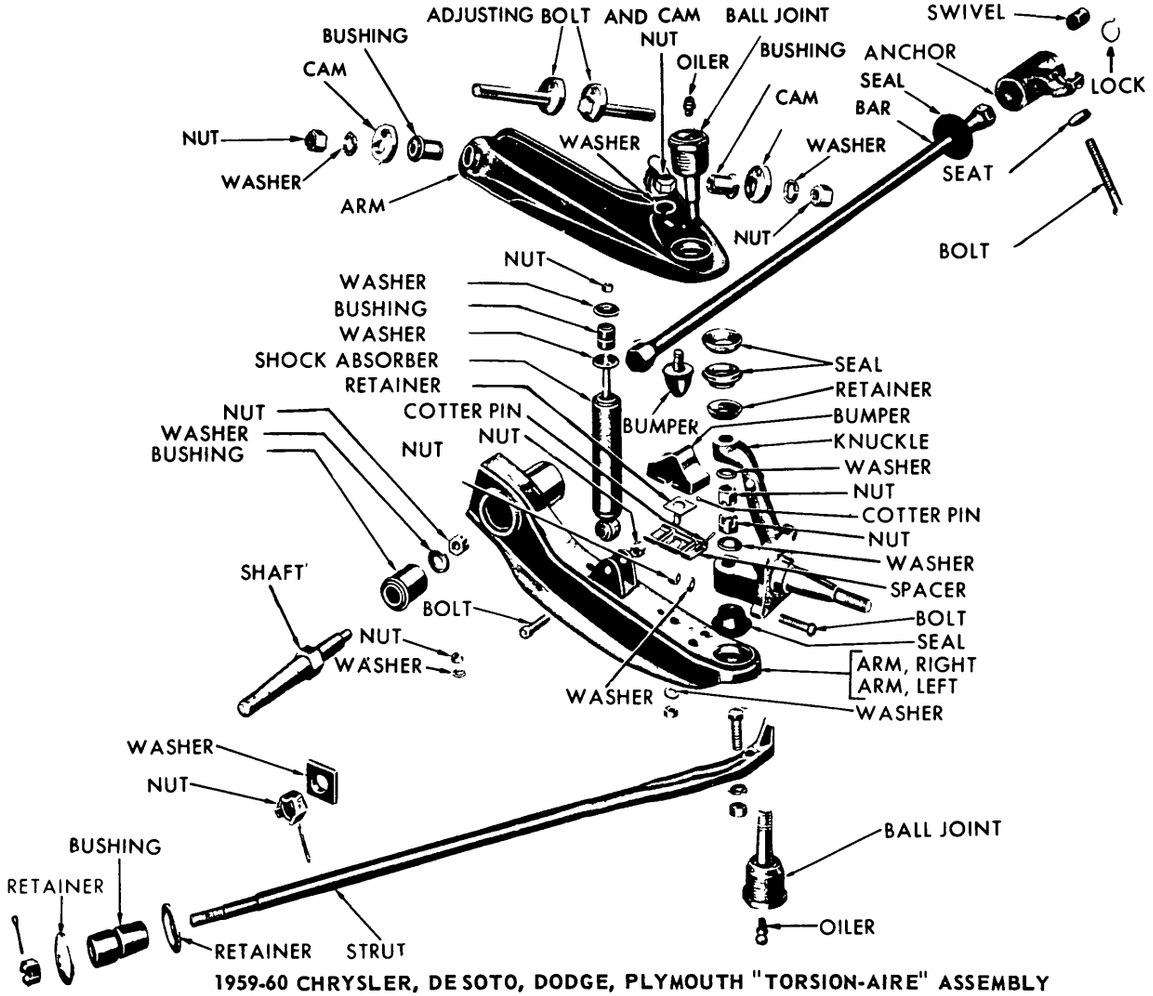
Caster: Neg. ¾°±¾° (Manual Steering); Pos. ¾°±¾° (Power Steering). The removal of shims at rear bracket or addition of shims at front bracket will decrease positive caster. Shims are furnished in 1/16" and 1/32" thicknesses. One shim (1/16") will change caster approximately 3/8°. *NOTE - Shim pack at either front or rear bracket must not exceed 9/16".* To install or remove shims, see "Camber Adjustment" above.

Steering Axis Inclination: (Chrysler) - 5° to 7°. **(DeSoto)** - 5½° to 7°. **(Dodge & Plymouth)** - 6½°. No adjustment provided. If camber can be adjusted within recommended limits it is unnecessary to check steering axis inclination. *CAUTION - Do not heat parts in order to straighten.*

Toe-In: 1/8"±1/32". 1/8" preferred. Lengthen or shorten tie-rods an equal amount until wheels toe-in specified amount.

NOTE - Steering wheel hub, steering gear arm, steering tube and steering gear roller shaft are machined with master serrations to place front wheels in straight ahead position when steering wheel is centered. Do not alter these serrations to change position of these parts. Improper position of steering wheel must be corrected by adjusting tie rod lengths.

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 21½°±1° (Chrysler, DeSoto, Dodge). With inner wheel at 20° outer wheel should be 17½-19° (Plymouth). *CAUTION* - Replace parts that are bent, DO NOT straighten by heating.



1959-60 CHRYSLER, DE SOTO, DODGE, PLYMOUTH "TORSION-AIRE" ASSEMBLY

1959-60 MODELS

Steering Axis Inclination: 6½° at 0° camber (1959); 5½ to 7½° (1960). No adjustment.

Caster: 1959 Models - Neg. ¾°±¾° (Manual Steering); Pos. ¾°±¾° (Power Steering).

1960 Models - Neg. ½°±½° (Manual Steering); Pos. ¾°±½° (Power Steering).

Adjustment - Adjust caster by turning one eccentric bolt at a time as necessary to obtain the correct setting. *NOTE - Turning both eccentric bolts in opposite directions affects caster with a minimum amount of change in camber.*

Camber: 1959 Models - 0°±¼°, 0° preferred (right wheel); Pos. ½° to 0°, Pos. 3/8° preferred (left wheel).

1960 Models - Pos. 3/8°±¼°, Pos. 3/8° preferred (right wheel); Pos. 1/8°±¼°, Pos. 1/8° preferred (left wheel).

Adjustment - Adjust camber by turning both eccentric bolts equally in same direction as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in the same direction affects camber with a minimum amount of change in caster.*

Toe-In: 3/32-5/32" (1/8" preferred).

Toe-Out on Turns: 1959 Models - With inner wheel at 20°, outer wheel should be 18°46' (Chrysler Windsor, DeSoto Firesweep, Dodge & Plymouth); 18°26'(Chrysler, except Windsor); 18°30' (DeSoto, Except Firesweep). No adjustment.

1960 Models - With outer wheel at 20°, inner wheel should be 21½±1°.

Front Suspension Height: Checking - Make sure the car is on a level floor, tires inflated to recommended pressure, and car at curb weight (full gas tank, no passengers or load). Measure from lowest point of lower support arm ball joint to floor and from underside of lower

CONTINUED ON NEXT PAGE

1957-60 "TORSION-AIRE" (C nt.)

control arm bushing (at center line of bushing housing) *(NOTE - Under car weight, the bushing housing will always be higher than the ball joint housing)* The difference between these two measurements should be as specified in table below If the difference in measurements between the two sides of the car are less than ¼" (1957-59), 1/8" (1960) of each other and are within the limits specified, suspension height is correct If these measurements differ more than ¼" (1957-59), 1/8" (1960), or if one or both of them are outside specified limits, then torsion bars must be adjusted

1957 Front Susp nsion Height Limits

M del	① Height Difference
Chrysler (All Models)	2 1/8-2 1/4"
DeSoto (Exc Sta Wgn)	2 1/8-2 1/4"
DeSoto (Sta Wgn)	2 5/8-2 3/4"
Dodge (Sed & Coupe)	1 7/8-2 3/8"
Dodge (Suburban)	2 3/8-2 7/8"
Plymouth (Sed & Coupe)	2 1/8-2 1/4"
Plymouth (Suburban)	2 5/8-2 3/4"
Plymouth Fury	1 5/8-1 3/4"

① - Difference between measurement at lower ball joint and at lower support arm housing See "Checking" above

1958 Front Suspension Height Limits

M d l	ℂ Height Difference
Chrysler (Sedan & Coupe)	2 1/8-2 3/8"
Chrysler (Sta Wgn)	2 5/8-2 7/8"
Chrysler (300D)	1 5/8-1 7/8"
Imperial	2 1/8-2 3/8"
DeSoto (Sedan & Coupe)	2 1/8-2 1/4"
DeSoto (Sta Wgn & Hvy Dty)	2 5/8-2 3/4"
Dodge (Sedan & Coupe)	2 1/16-2 5/16"
Dodge (Sta Wgn)	2 9/16-2 13/16"
Dodge (Sports Cars)	1 9/16-1 13/16"
Plymouth (Sedan & Coupe)	2 1/8-2 1/4"
Plymouth (Sta Wgn)	2 5/8-2 3/4"
Plymouth (Fury)	1 5/8-1 3/4"

ℂ - Difference between measurement at lower ball joint and at lower support arm housing See "Checking" above

►*TORSION BAR ADJUSTMENT NOTE Torsion bar adjusting bolt should only be loosened or tightened with a torqu wrench, with car supported to relieve load on torsion bars If more than 200 ft lbs is required to turn adjusting bolt, then bolt and swivel must be replaced*

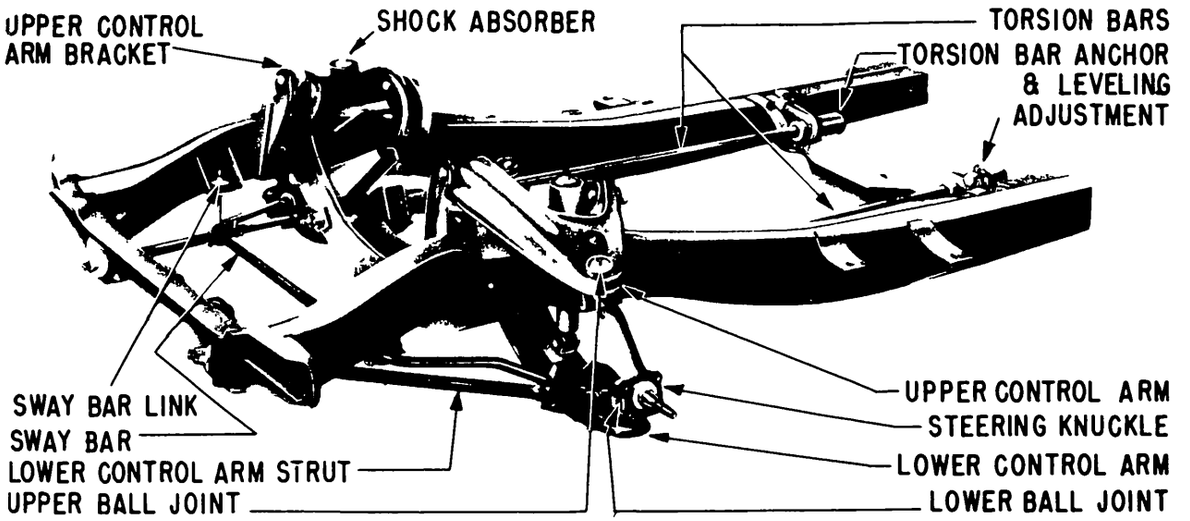
1959 Fr nt Suspension Height Limits

M d l	ℂ Height Difference
All Models (Fxc Following)	2 1/8"
Station Wagons ②	2½"
Air Suspension Models (Exc Imperial)	1 7/8"
Air Suspension (Imperial)	2 1/8"

℃ - All measurements are plus or minus 1/8"
② - And models with heavy duty front springs

1960 Fr nt Suspensi n Height Limits

Mod l	Height Diff renc
All Models (Exc Sta Wgn)	2"±1/8"
Sta Wgn & Cars with Hvy Duty Springs	2½"±1/8"



"TORSION-AIRE" SUSPENSION SYSTEM

Adjustment - Tighten or loosen the adjusting bolt at rear end of each torsion bar until measurement differences are as specified *NOTE - Always jounce front and rear after making adjustment prior to a height check Also when torsion bar spring adjustment is made, check alignment of front wheels and headlight aiming*

REMOVAL & INSTALLATION

SWAY BAR: (Removal) - Remove sway bar link retaining nuts and washers and the two sway bar cushion retaining bolts (one on each strut) Slide sway bar out through control arm struts and away from car *NOTE* - Sway bar cushions are not serviced separately

Installation: Dip new sway bar link bushing in water, install in opening in frame bracket, using a twisting motion When installed properly, the groove in bushing will index with opening in frame bracket Thread sway bar into position over top of lower control arm struts Engage sway bar cushion housing with struts and install lock plates Insert bolts and lockwashers and tighten to 25 ft lbs Install washers over ends of links (concave side up), then slide links up through bushings Install washers (concave side down), over ends of links and down on bushings Install nuts and tighten to 15 ft lbs

LOWER CONTROL ARM STRUTS: (Removal) - Remove bolts attaching sway bar bushing housing to struts Disconnect sway bar from struts Remove the strut-to-lower control arm mounting bolts and nuts Remove cotter pin nut and bushing retainer from forward end of strut at front crossmember Slide strut and inner bushing retainer from bushing in frame Cut old bushing out of frame with a knife

Installation: Dip new bushing in water and with tapered portion toward rear of car, install in opening in frame using a twisting motion until groove in bushing indexes with frame With cupped side out slide washer over threaded end of strut Push strut through bushing in frame Slide outer washer over end of strut (cupped side in) Install nut and tighten sufficiently to install strut to lower control arm mounting bolts Install bolts, lockwashers, and nuts and tighten to 65 ft lbs Tighten strut nut to 30 ft lbs and install cotter pin Check caster and camber

STEERING KNUCKLE: (Removal) - Remove wheel, tire and drum Cover brakes with a clean cloth and remove cotter pins, nuts and lockwashers attaching steering arm and brake dust shield to steering knuckle Remove steering arm and brake assembly from steering knuckle (leave brake hose attached) (Do not allow assembly to hang by the brake hose) Remove ball joint studs from steering knuckle (see "Upper & Lower Ball Joints" below) Lift steering knuckle up and away from car

Installation: Slide upper and lower ball joints into steering knuckle and install lockwashers and nuts Tighten ball joint stud to 135 ft lbs Install cotter pins Slide brake assembly over knuckle and into position Install lockwashers and nuts on upper rear and lower front bolts Install upper front and lower rear bolts through dust shield and steering knuckle, then slide steering arm over bolts Install lockwashers and nuts and tighten evenly to 55 ft lbs Install cotter pins Remove covering from brake shoes, replace wheel and drum assembly Adjust front wheel bearings.

UPPER & LOWER BALL JOINTS: (Removal) - *(CAUTION - Upper and lower ball joints are not interchangeable The Upper joint is preloaded and should not be used in the lower control arm)* Remove wheel assembly, and remove upper and lower ball joint stud nuts (Install Tool C-3564 (with threaded end upward to remove lower joint, and with threaded end downward to remove upper joint) Apply load to studs and rap knuckle at ball joint boss sharply with a hammer to loosen stud *(CAUTION Do not attempt to hammer stud out of knuckle)* Reverse position of tool to remove the opposite ball joint and

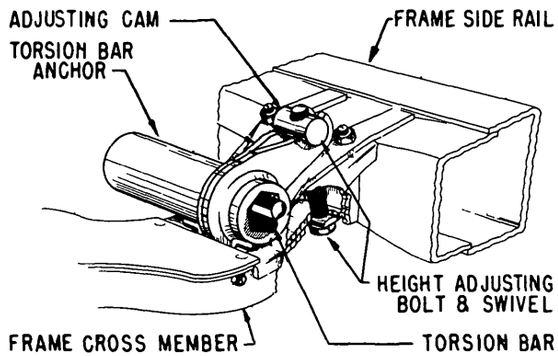
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1957-60 "TORSION-AIRE" (C nt.)

repeat the above procedure Remove tool and disengage ball joint from knuckle Remove dust cover and grease seal Remove lubrication fittings Use a suitable tool (C-3560, C-3561 or equivalent) and unscrew ball joint from control arm

Installation: *CAUTION - When installing new ball joints, make sure that ball joint threads squarely engage threads in control arm* With lubrication fittings removed, screw ball joint into control arm using a suitable tool (C-3560, C-3561 or equivalent) and tighten until ball joint housing is seated in control arm Tighten to a minimum of 250 ft lbs Install seal and dust cover in position over stud and place stud in steering knuckle Install cotter pin and lubrication fitting, then lubricate ball joint with chassis lubricant

TORSION BAR: (Removal) - *(CAUTION - Torsion bars are not interchangeable, side for side Torsion bars are*



TORSION BAR ANCHOR & ADJUSTMENT

marked "L" (Left), "R" (Right), stamped on one end of the rod These stamped markings must always be toward rear of car) Raise car off floor *by jacking under front crossmember* Release load from torsion bar by unscrewing the cam adjusting bolt partly out of swivel *(CAUTION - To prevent swivel from falling into frame bracket, do not loosen swivel bolt all the way out until torsion bar is removed)* Remove seal assembly (if so equipped) from rear end of torsion bar anchor, then remove lock ring from anchor Slide torsion bar rearward sufficiently to disengage from lower control arm, then slide bar forward and down to disengage it from anchor Remove anchor adjusting bolt, swivel and seal

Installation: 1957-58 Models - Replace anchor bolt and swivel with new parts, then tap rear anchor to loosen all dirt and thoroughly clean socket in rear anchors *NOTE - If there is moisture in cavity, rinse with methanol type anti-freeze and blow dry with air* Check torsion bar cushion in lower control arm housing and make sure it is in place at end of lower control arm pivot shaft With cam bolt barely entered in cam swivel, slide torsion bar into rear cam, then rotate cam and torsion bar until cam is positioned as close to floor pan as possible Engage front of torsion bar in lower control arm shaft assembly as far as bar will go (up against cushion) *NOTE - Unless anchor is positioned properly, it will be impossible to adjust front suspension to proper specifications* Install lock ring in rear of cam housing and tighten cam bolt until approximately 1" of threads show above anchor bolt swivel Force approximately 1/3 lb of short fibre wheel bearing grease into cavity between anchor and torsion bar *NOTE - This can be done by holding a cloth firmly against mouth of anchor and applying grease with a high pressure gun until entire cavity is full and grease is forced out of cavity* Install Torsion Bar Seal Package, Part No 2196067 (small size torsion bar), Part No 2196068 (large size torsion bar), as follows Place new type seal on torsion bar with tapered end toward rear anchor (split side must be on bottom of anchor), then push tapered end of seal into annular grease filled space in anchor Use a ¼" wide, blunt ended non-metallic tool and gently force seal into opening by pushing on the outer diameter, compressing seal and packing it into the opening *NOTE - This should be done in many steps around outside of seal until it is uniformly packed into the anchor and is flush with forward face of anchor* Wrap plastic clamp around the bar with "Teeth" toward the outside, then thread flat end through the loop and slide plastic seal clamp tight against rubber seal Pull flat end until clamp is tight around bar Check and adjust suspension height, caster, and camber

1959 Models - Installation procedures are the same as for 1957-58 models except that it is not necessary to install Torsion Bar Seal Package If original seal boot is damaged, replace with a new boot, Part No 1613388, as follows Coat each end of torsion bar with wheel bearing grease, then install boot on bar, small diameter toward front of car Install torsion bar and slide boot over end of anchor Adjust suspension height, caster, and camber

1960 Models - *NOTE - A new adjusting bolt and swivel must be installed* Slide new rear anchor end seal over torsion bar with cup side toward rear Apply a liberal coating of wheel bearing grease around each end of torsion bar *NOTE - Rear end of bar should be coated equal to depth of anchor hub socket* Install torsion bar and position end seal in groove on anchor hub Turn torsion bar until anchor end is positioned 120° (eight o'clock position) down from frame *CAUTION - If anchor end is not in proper position when installing torsion bar it will be impossible to adjust front suspension height correctly* Install plastic seal into rear end of anchor Slide new adjusting bolt swivel into position on frame and hold in position while installing new adjusting bolt and seal, then tighten bolt until 1" of threads are showing out of swivel Lower car to floor and adjust suspension height, caster, and camber

►**1957-60 TORSION BAR SEAL REPLACEMENT (WITHOUT REMOVING TORSION BAR).** On 1957-58 Models, remove rear anchor to torsion bar seal (if installed), then forcibly tap anchor to loosen all dirt and scale accumulated between inside diameter of anchor and torsion bar Blow out space between bar and anchor *NOTE - If moisture is present in the cavity, rinse with methanol-type anti-freeze and blow dry with air* Force approximately 1/3 lb of short fibre wheel bearing grease into cavity between anchor and torsion bar by holding a cloth firmly against mouth of anchor and applying grease with a high pressure gun until cavity is full Install Torsion Bar Seal Package, Part No 2196067 (small size torsion bar), Part No 2197068 (large size torsion bar), as follows Place new type seal on torsion bar with tapered end toward rear anchor (split side must be on bottom of anchor), then push tapered end of seal into annular grease filled space in anchor Use a ¼" wide, blunt ended non-metallic tool and gently force seal into opening by pushing on outer diameter, compressing seal and packing it into the opening *NOTE - This should be done in many steps around outside of seal until it is uniformly packed into the anchor and is flush with face of anchor* Wrap plastic clamp around bar with "Teeth" toward outside then thread flat end through the loop and slide plastic seal clamp tight against rubber seal Pull flat end until clamp is tight around bar On 1959-60 Models, the 1957-58 seal packages may be used to replace balloon type seal if only the seal is to be replaced and torsion bar is not to be removed from car

UPPER CONTROL ARM: (Removal) - *Place jack under lower control arm and raise front wheel off floor,* with jack placed as close to wheel as possible Remove wheel Remove cotter pin, nut and washer from upper ball joint stud Install tool C-3564 and remove ball joint (See "Upper & Lower Ball Joints" above) Remove upper control arm front and rear pivot bolts Remove control arm from support mountings (do not remove brackets from frame)

Upper Control Arm Bushing Replacement: Remove bushings by pressing them out with Tool C-3558 (1957-58) C-3710 (1959-60) *NOTE - A hammer and suitable drift may be used to remove bushings if support arm is properly supported and care is taken not to damage bushing surface in control arm* When installing new bushings, make sure control arm is supported at point bushing is pressed in Position flange end of bushing in Tool C-3558 (1957-58), C-3710 (1959-60) then use an arbor press and install bushing until flange is seated against arm

Installation: Position upper control arm in frame mounting bracket and install mounting bolts, washers and nuts With control arm in normal position, tighten nuts to 65 ft lbs (1957-58 Models), 55-65 ft lbs (1959-60 Models) Place upper ball joint in steering knuckle and install washer and nut Tighten to 135 ft lbs (1957-58), 100 ft lbs (1959-60 Chrysler Windsor, DeSoto Fireflite, Dodge & Plymouth), 135 ft lbs (Other 1959-60 Models), then secure with a cotter pin

LOWER CONTROL ARM: (Removal) - Raise car by placing jack under frame crossmember Remove torsion bar (see "Torsion Bar" above) Remove shock absorber lower eye attachment nut and bolt from mounting bracket Push lower portion of shock absorber up into frame opening Remove strut to lower control arm mounting bolts Remove lower ball stud from knuckle (see "Upper & Lower Ball Joints" above) Remove cotter pin nut and washer from lower control arm shaft assembly With washer removed, reinstall nut (to protect threads) until it is flush with end of shaft, (shaft is a tapered fit in crossmember) Use a hammer and brass drift for loosening then remove nut from shaft Slide lower control arm and shaft assembly from rear crossmember *(CAUTION - Do not lose torsion bar spring cushion located in shaft assembly)*

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1957-60 "TORSION-AIRE" (C nt.)

Installati n: Position shaft and lower arm assembly in crossmember in normal position, and install washer and nut. Tighten to 175-200 ft lbs and secure with a cotter pin. Position lower ball joint stud in steering knuckle and install washer and nut. Tighten nut to 135 ft. lbs. and secure with a cotter pin. Place shock absorber in position in lower mounting bracket and install bolt and nut and tighten to 40 ft. lbs. Install wheel. **Do not lower front of car until torsion bar spring is installed.** See "Torsion Bar" above.

LOWER CONTROL ARM PIVOT SHAFT BUSHING RE. PLACEMENT: (Disassembly) - Remove lock ring from end of bushing housing. Support lower control arm assembly in an arbor press, then using a brass drift, press shaft and bushing assembly from control arm. Remove cotter pin, nut and washer; and slide bushing from shaft.

Reassembly: Position new bushing (flanged end of bushing first) on shaft and install washer and nut. Tighten nut to 100-150 ft. lbs. and install cotter pin. With lower control arm supported, install shaft and bushing assembly by using Tool C-3556 or C-3557 and pressing bush- into lower control arm until flange portion of bushing is seated all the way into control arm. Install lock ring making sure it is properly seated in ring groove. Install torsion bar spring cushion in control arm.

UPPER CONTROL ARM SUPPORT MOUNTING BRACK-ETS: *CAUTION - 1959-60 brackets are welded to frame and cannot be removed. On 1957-58 Models, brackets are bolted to frame and should not be removed unless damaged due to accident.* On 1957-58 Models, when removing mounting brackets, care should be taken not to lose alignment shim pack located between bracket and frame side rail. In the event a shim pack is lost, a selection of shims 5/16" thick, **may be used as a starting point when reassembling.**

VALIANT "TORSION-AIRE" FRONT SUSPENSION

Valiant (1960)

DESCRIPTION: Independent type with torsion bars instead of conventional type coil springs. Upper control arms are attached to brackets which are welded to shock absorber tower and to body horizontals (side rails). Lower control arms are attached to the "K" type front suspension crossmember which is connected to body horizontals (side rails). Ball joints are used to attach both upper and lower control arms to steering knuckles. Torsion bars are anchored at rear to engine rear support member in the body and at the front to lower control arm. Eccentric bolt assemblies at upper control arms control camber and caster adjustments. Car riding height is controlled by a lever assembly at front end of each torsion bar.

TIRE INFLATION: Tir s Cold - 24 lbs. (Front, All Models); 24 lbs. (Rear, Sedan & 2-Seat Sta. Wgn.); 28 lbs. (Rear, 2 & 3-Seat Sta. Wgns. With Captive Air Tires). *NOTE - Captive Air Tires are standard on 3-S at and optional on 2-Seat Station Wagons.*

ADJUSTMENT: With car at curb weight (fuel tank full but with no luggage or passenger load), tires at recommemded pressure (see above) and with front suspension and steering linkage in good condition, make adjustments in the following order:

►*NOTE: Jounc car up and down several times at center of bumpers (r ar bump r first) prior to taking each m asur m nt. Car should be jounced the same number of tim s and th bump r should be released at the same point in cycl ach tim .*

Front Riding H ight: Jounce car and measure from lower ball joint to floor and from control arm torsion bar spring anchor housing to floor. Subtract first measurement from second measurement. The difference should be 1¾" ± 1/8". The difference from one side of car to the other should not exceed 1/8". To adjust, turn nut on lower side (inner end) of lower control arm clockwise to increase height and counterclockwise to decrease height. After adjusting, jounce car and recheck height.

Cast r: Neg. ½° ± ½° (Manual Steering). Pos. ¾° ± ½° (Power Steering). Adjust caster by turning **one** eccentric bolt at a time as necessary to obtain correct setting. *NOTE - Turning both eccentric bolts in opposite directions aff cts caster with a minimum amount of chang in camber.*

Camb r: Right Wheel - Pos. 1/8° ± ¼° (Pos. 1/8° preferred); Left Wheel - Pos. 3/8° ± ¼° (3/8° preferred). Adjust camber by turning both eccentric bolts equally in the same direction as necessary to obtain correct setting. *NOTE - Turning both ecc ntric bolts in th sam dir ction aff cts camb r with a minimum amount f chang in caster.*

T e-In: 1/8" ± 1/32". Turn both tie rod adjusting tubes equally with steering wheel centered and steering gear on "high point" for straight ahead travel. *NOTE* - Before tightening clamps, turn tie rod assembly so sockets are either against front or back sides of studs. Tighten bolts to 15 ft. lbs.

Steering Axis Inclination: 6½° to 8½°. Not adjustable.

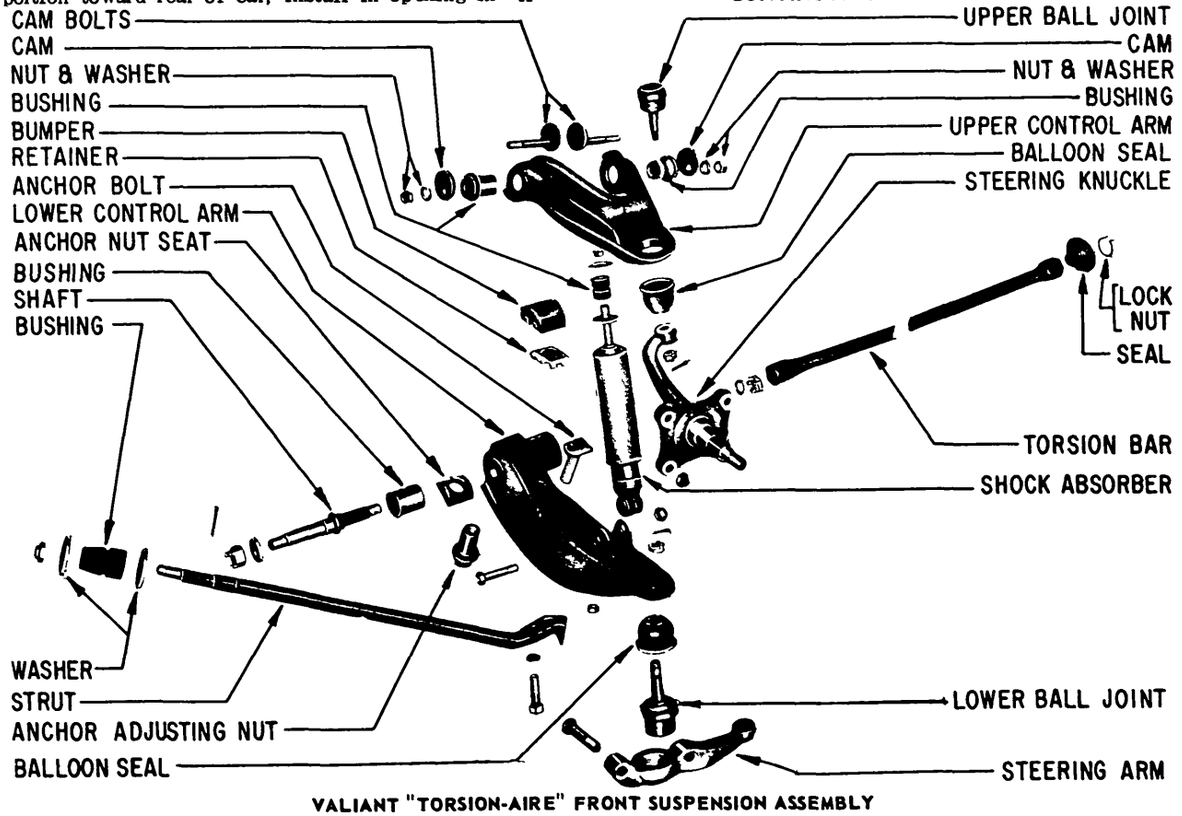
Toe-Out on Turns: With inner wheel at 20°, outer wheel should be at 17° 40' ± 1°.

LOWER CONTROL ARM STRUT: Removal - Remove strut to lower control arm mounting bolts and nuts, then remove nut and bushing retainer from forward end of strut at crossmember. Slide strut and inner bushing retainer from bushing, then pry bushing out of "K" member.

Installation: Dip new bushing in water and, with tapered portion toward rear of car, install in opening in "K" member, using a twisting motion until groove in bushing seats properly with support member. With cupped side out, slide bushing retainer over threaded end of strut. Push strut through bushing in crossmember, position outer bushing retainer over end of strut (cupped side in) and install nut finger tight. Install strut-to-lower control arm mounting bolts, lockwashers and nuts and tighten to 100 ft. lbs. Lower car to floor, then with full body weight on wheels, jounce car to permit bushing to assume its normal position on strut. Tighten nut on forward end of strut to 40 ft. lbs.

TORSION BARS: *NOTE - Torsion bars are not int r-changeable side for side. Bars are marked with eith r*

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VALIANT "TORSION-AIRE" FRONT SUSPENSION ASSEMBLY

VALIANT "TORSION-AIRE" FRONT SUSPENSION (C ntinu d)

"L" or an "R" stamped n ne nd of bar r by a number consisting of the last three digits of the part number. An even numbered bar is for right hand side. An odd numbered bar is for left hand side.

R m val: Raise car so front suspension is in full rebound position (under no load). *NOTE - If a hoist is used, make sure car is lifted on body. If a jack is used, place jack under center of "K" member.* Release load from torsion bar by backing off anchor adjusting nuts located on lower side (at inner end) of lower control arm, then remove adjusting nut and swivel bolt. Remove strut (see above), then remove lock spring from rear of torsion bar rear anchor. Install Tool C-3728 on torsion bar and remove bar rearward by holding tool firmly and hitting striking pad with a hammer. *CAUTION - Do not apply heat to front or rear anchors and do not mar or scratch torsion bar during removal or installation.* Remove tool and slide rear anchor balloon seal off front end of bar, then remove bar by sliding it rearward and out through rear anchor.

Installation: Remove all foreign matter from hex openings in front and rear anchors and from hex ends of torsion bars. Insert torsion bar through rear anchor, then slide rear anchor balloon type seal over torsion bar with large cupped side of seal facing to rear. Coat both ends of torsion bar with multi-purpose grease. When inserting torsion bar into lower control arm, position adjusting arm approximately 60° below plane of control arm (otherwise adjustment of front suspension to correct height will not be possible). Install lock ring in rear anchor, then move torsion bar rearward until bar contacts lock ring. Position swivel bolt on control arm and hold in place while installing adjusting nut and seat. Tighten adjusting nut approximately 10 turns before lowering car to floor. Pack annular opening in rear anchor with multi-purpose grease, then slide rear anchor balloon type seal into position over rear anchor until lip of seal indexes with groove. Install strut (see above), then lower car to floor and adjust front suspension height (see above).

UPPER BALL JOINTS: Removal - Place jack under lower control arm as close to wheel as possible, then raise wheel off floor and remove wheel. Remove upper ball joint stud nut, then place Tool C-3711 down on flat section of lower control arm and turn threaded portion of tool, locking it securely against upper stud. Spread tool enough to place upper stud under pressure. Strike steering knuckle sharply with a hammer to loosen stud. *CAUTION - Do not try to force stud out of knuckle with tool alone.* Remove tool, then disengage ball joint from knuckle. Remove ball joint balloon type seal by prying metal retainer edge loose with a screwdriver. Use Tool C-3714 and unscrew ball joint from upper arm.

Installation: *CAUTION - When installing a new ball joint, it is very important that ball joint threads contact and engage those of the control arm squarely. Always replace balloon type seals with new ones once th y have been removed.* Screw ball joint squarely into control arm as far as possible by hand, then use Tool C-3714 and tighten until ball joint housing is seated on control arm. Tighten to a minimum of 125 ft. lbs. Slide a new balloon type seal up into position over stud, and install seal with Tool C-3713. Position stud in steering knuckle, install washer and tighten nut to 55 ft. lbs. then install cotter pin. Lubricate ball joint with chassis lubricant and install wheel.

LOWER BALL JOINTS: R moval - Place jack under lower control arm and raise car, then remove wheel and brake drum as an assembly. Disconnect tie rod from steering arm, then remove nut and loosen stud by striking arm sharply while "backing up" with a heavier hammer. Remove bolts attaching steering knuckle arm assembly to brake backing plate and support brake backing plate to eliminate strain on brake hose. Use Tool C-3646 to disconnect lower ball joint from lower control arm, then remove steering arm assembly. Place the assembly in a vise and remove balloon seal, then use Tool C-3714 and remove ball joint from steering arm.

Installation: *CAUTION - When installing a new ball joint, it is very important that ball joint threads engage those of steering arm squarely. Always replace balloon type seals with new ones once they have been removed.* Screw ball joint into steering arm as far as it will go by hand, then use Tool C-3714 and tighten ball joint housing to a minimum of 300 ft. lbs. until ball joint is seated in steering arm. Slide a new ball joint balloon seal onto ball joint being careful not to pinch rubber or deform metal retainer of seal. Lubricate ball joint with chassis lubricant, then install steering knuckle arm assembly on brake support plate and connect ball joint to lower control arm and the tie rod end to steering knuckle arm. Tighten ball joint stud nut to 90 ft. lbs. and tie rod end nut to 50 ft. lbs.

LOWER CONTROL ARM & SHAFT: Removal - Place a jack under "K" member and raise car until both front wheels are off the floor. Disconnect strut from lower control arm, then remove torsion bar (see above). Remove wheel and drum as an assembly, disconnect shock absorber at lower control arm bracket, then push shock absorber up out of way. Disconnect lower ball joint stud from lower control arm with Tool C-3646. Support brake backing plate to remove strain from brake hose. Remove cotter pin, nut and washer attaching lower control arm shaft to "K" member, then with cotter pin and washer removed, reinstall nut until flush with end of shaft to protect threads. Use a hammer and brass drift and loosen shaft (shaft is a tapered fit in "K" member), then remove nut. Slide lower control arm and shaft out from rear of crossmember.

Disassembly: Place lower control arm in an arbor press with torsion bar hex opening up. Use a brass drift through opening and press shaft and nut out of lower control arm bushing. Cut and remove rubber portion of bushing from control arm, then cut and collapse bushing shell and remove it from control arm. Remove cotter pin, nut, washer, and remainder of bushing from shaft.

Reassembly: Position new bushing over shaft (flange end first) and seat on shoulder of shaft. Install nut and washer and tighten to 90 ft. lbs. *NOTE - Hold shaft securely in a vise, using protector jaws, when tightening nut.* Install cotter pin. Press lower control arm shaft and bushing into lower control arm assembly with an arbor press and, using Tool C-3712, press in until flanged portion of bushing is seated past lock groove.

Installation: Clean mounting surface thoroughly, then position shaft and control arm in "K" member in approximate operating position. Install washer and nut finger tight. Connect upper ball joint to steering knuckle and tighten to 55 ft. lbs. Connect shock absorber to its bracket on lower control arm and tighten nut to 55 ft. lbs. Install torsion bar, strut, and wheel assembly. Lower car to floor and with full body weight on wheels, jounce car, adjust front suspension height, then tighten lower control arm shaft nut to 160 ft. lbs. and install cotter pin.

UPPER CONTROL ARMS: R m val - Place a jack under lower control arm as close to wheels as possible, then raise car until wheels clear floor. Remove wheel, then remove upper ball joint stud from steering knuckle with Tool C-3711. Remove nuts, lockwashers, cams and cam bolts that attach upper control arm and bushings to front and rear supports. Lift upper control arm up and away from supports.

Disassembly: Remove balloon seal by prying retainer loose with a screwdriver, then remove ball joint with Tool C-3714. Assemble Tool C-3710 over bushing and press out of arm. *NOTE - Press from insid arm.*

Reassembly: *NOTE - When installing new bushings, support control arm squarely at point wh r bushing is being pressed in. Do not use oil or gr ase to aid in installation.* Position flange end of new bushing in Tool C-3710, then support control arm squarely and force bushings into control arm (from outside of arm) until tapered portion of bushing seats on arm. Install ball joint into arm with Tool C-3714 and tighten until it is seated (125 ft. lbs. minimum). *NOTE - Ball joint will cut threads in a new control arm during tightening operation. Install a new seal with Tool C-3713.*

Installation: Slide upper control arm into position and install control arm cam bolts, removable cams and nuts and tighten nuts in preparation for final adjustments. Slide upper ball joint stud into position in steering knuckle and install washer and nut. Tighten nut to 55 ft. lbs. and install cotter pin. Install a new ball joint seal with Tool C-3713. Check and adjust car height and front suspension alignment, then tighten control arm cam bolt nuts to 65 ft. lbs.

STEERING KNUCKLES: Rem val - Place jack under lower control arms as near to wheel as possible and remove wheel and brake drum as an assembly. Disconnect upper ball joint stud from steering knuckle with Tool C-3711. Remove nuts and bolts attaching brake support plate assembly to steering knuckle and steering knuckle arm assembly, then remove steering knuckle. *CAUTION - Do not allow brake support assembly to hang by brake hose.*

Installation: Position steering knuckle and steering knuckle arm assembly on brake support assembly and install mounting bolts and nuts. Tighten upper nuts to 55 ft. lbs. and lower nuts to 50 ft. lbs. Position upper control arm ball joint stud in steering knuckle and install stud nut and tighten to 55 ft. lbs., then install cotter pin.

FRONT SUSPENSION CROSSMEMBER ("K" MEMBER): Removal - Disconnect engine front supports from "K" member, then remove carburetor air cleaner and throttle rod. Attach engine lifting plate, Tool C-3804 to cylinder head, then attach lifting fixture, Tool C-3809 to lifting plate and lift engine off "K" member. Raise car and support it under flat sections of side members forward of the crossmember under transmission, leaving front suspension in full rebound position. Remove both struts, then back off torsion bar anchor adjusting nuts. Remove idler arm from "K" member, then remove lower control arm pivot shafts from "K" member. Remove "K" member bolts and move forward and down, tapping lower control arm pivot shafts with a plastic hammer.

Installation: Lift "K" member into position, guiding both lower control arm shafts into "K" member. Install attaching bolts but do not tighten. Install lower control arm shafts and tighten nuts to 160 ft. lbs. Install idler arm and tighten to 85 ft. lbs. Install struts and tighten to 40 ft. lbs. at crossmember and to 100 ft. lbs. at lower control arms. Tighten torsion bar anchor adjusting nuts, temporarily, approximately 8-10 turns. Tighten "K" member attaching bolts to 150 ft. lbs., then remove body supports. Lower engine and install front support bolts and remove lifting tools.

COMET & FALCON FRONT SUSPENSION

Comet (1960)
Falcon (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*FRONT SUSPENSION LOWER CONTROL ARM STRUT SERVICE REPLACEMENT NOTE & ADJUSTMENT CAUTION:* A new kit, Part No. CODZ-3468-A which includes a new longer spacer, insulators, strut, and attaching parts is available for service replacement. Strut adjustment specifications are different when the new kit is installed. *See "Lower Control Arm Strut Adjustment" below.*

DESCRIPTION: "Ball-Joint" type suspension with front coil spring and shock absorber mounted between upper control arm and tower in wheel housing. Lower control arm is connected to underbody with a mounting bolt. A strut connected between outer end of lower strut and bracket at forward end of underbody prevents horizontal movement of lower control arm. Shims located between upper control arm inner shaft and mounting bracket control camber and caster adjustments.

CHECKING & ADJUSTING: Before adjusting front end alignment, inflate tires to specified pressure (see below). Raise front of car and check front suspension ball joints for looseness, wear, or damage. *CAUTION – Do not raise car with jack under lower suspension arms.* Check steering gear mountings and all linkage for looseness. Adjust front wheel bearings. Check tracking of front and rear wheels.

►*ADJUSTMENT NOTE: Previous adjustment specifications are superseded by the following:*

Tire Inflation: Falcon - (Sedan) 24 lbs. front & rear. (Station Wagon) 22 lbs. front, 30 lbs. rear. (Ranchero) 24 lbs. front, 30 lbs. rear.
Comet - 22 lbs. front, 26 lbs. rear.

Caster: 0° to Pos. 1°. Preferred setting is ½° (Comet), 0° (Falcon). *NOTE - Maximum variation from side to side should not exceed ½° (¼° preferred).*

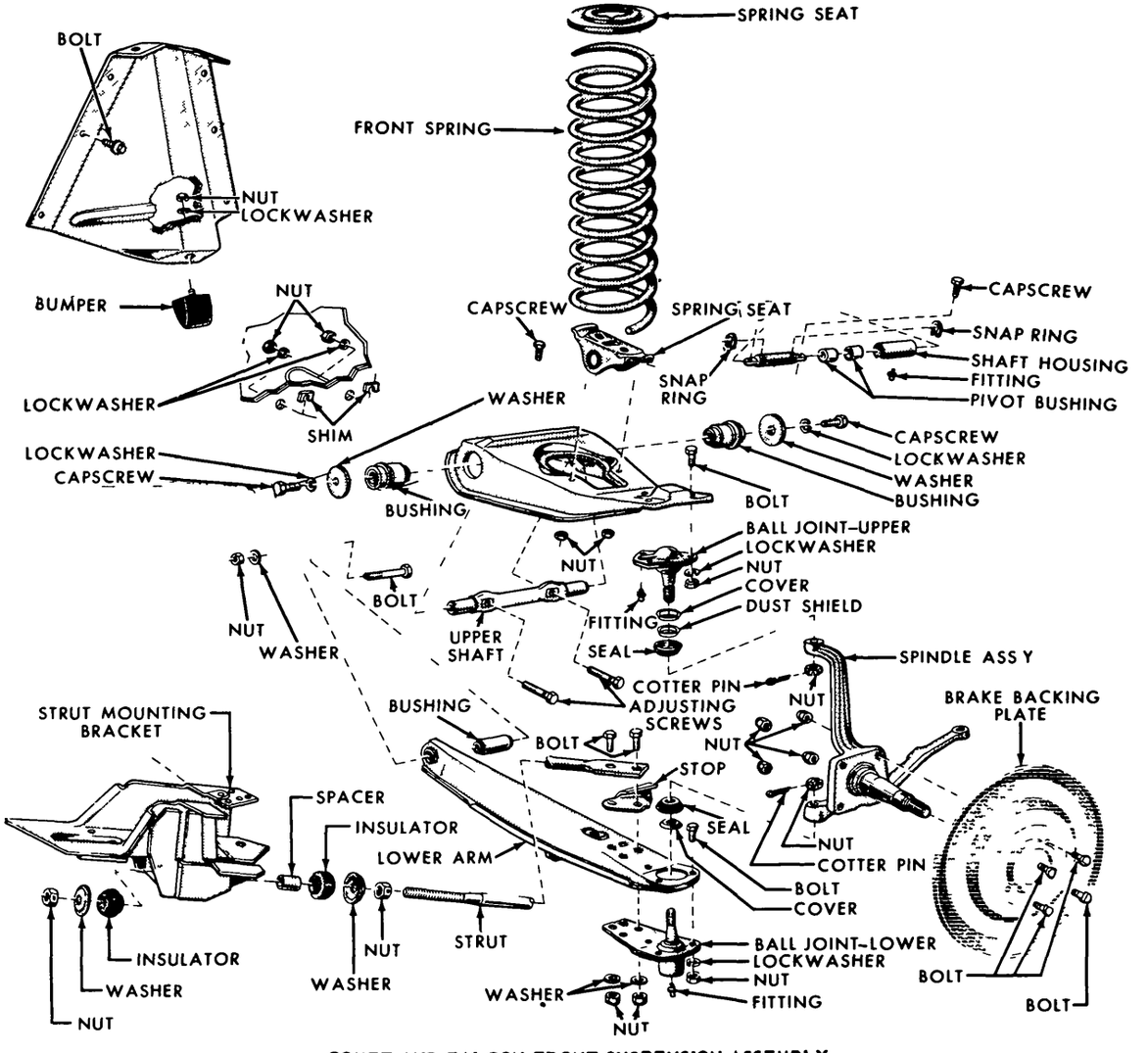
Camber: 0° to Pos. 1° (½° preferred). *NOTE - Maximum variation from side to side should not exceed ½° (¼° preferred).*

Toe-In: ¼" to 5/16" (9/32" preferred).

Toe-Out on Turns: With outer wheel turned 20°, inner wheel should be 20¾°.

Shimming Procedure: Camber and caster adjustments are made by adding or removing shims between upper control arm inner shaft and mounting pad. To change caster, remove or add shims at one of the mounting bolts. The removal of shims at front bolt or installation of shims at rear bolt will cause ball joint on upper control arm to move forward. Reversing this procedure will cause joint to move to rear. A 1/32" change of shim thickness at either bolt will change caster angle ½°. *NOTE – The difference between shim thicknesses at the two bolts should not exceed 1/16" and the maximum thickness of shim stack at each bolt must not exceed 9/16".* To adjust camber, remove or install equal shim thicknesses at both bolts. Removal of shims at both bolts will move upper ball joint inward, and installation of shims will move upper ball joint outward. A 1/16" change in shim thickness at both bolts will change camber angle 1/3°.

Lower Control Arm Strut Adjustment: Adjust length of strut by turning front and rear nuts securing strut to frame body member to a length of 17¾" (cars with early type 1.42" long insulator spacer); 17 5/8" (cars with later type 1.58" long insulator spacer), measured from back face of rear insulator washer to center strut-to-lower control arm front attaching bolt. The correct distance between insulator washers when the strut rod nut is tightened to 40-50 ft. lbs. is 1.15" (short spacer); 1.30" (long spacer). *NOTE - If the distance between insulator washers with nuts tightened to 40-50 ft. lbs. is .88", the spacer has been omitted and must be installed before operating car.*



COMET AND FALCON FRONT SUSPENSION ASSEMBLY

SHOCK ABSORBER REPLACEMENT: Removal - Raise front of car and place supports under both suspension lower arms (make sure lower end of shock absorber is accessible). Disconnect shock absorber lower retaining nuts from spring lower plate, then remove shock absorber upper mounting bracket nuts. Lift bracket and shock absorber out of coil spring. Remove bushings and washers from shock absorber stud and remove shock absorber from bracket.

Installation: Install bushings on lower stud, then install washer and upper bushing. Install bracket, bushing, washer, and retaining nut. Extend shock absorber and install on spring lower retaining plate. Install lower bushings and washers and tighten nuts to 12–17 ft. lbs. Install upper mounting bracket on body and tighten nuts to 8–13 ft. lbs. Tighten shock absorber-to-mounting bracket nut to 15–25 ft. lbs.

FRONT SPRING REPLACEMENT: Removal - Raise car and remove wheel assembly, then remove shock absorber. *CAUTION - Install a safety stand under front end of underbody.* Install Tool 5310-B (Comet), T60K-5310-A (Falcon) in shock absorber lower mounting holes and use tool to compress the spring ½-1". Remove spring lower plate retaining nuts, then lift spring

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COMET & FALCON FRONT SUSPENSION (Continued)

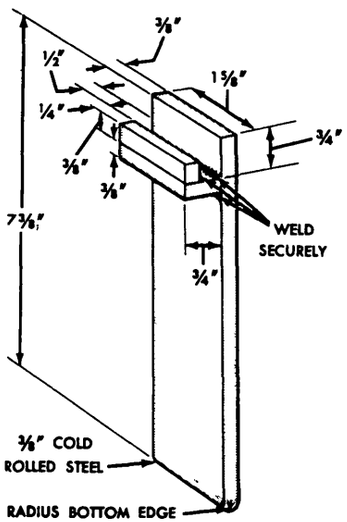
and plate and remove plate. Guide spring and tool down and out forward end of wheel housing.

Installation: If spring is to be replaced, measure spring height compressed in tool. Place tool nut in vise and remove nut by rotating the spring by hand. Install tool in new spring, then with tool nut in a vise, rotate spring until the previously measured spring height is attained. Guide spring into position (spring lower end installed outside of spring plate). Install spring lower plate retaining nuts, then loosen spring removal tool nut until spring is seated properly, then remove tool. Install shock absorber, wheel and tire, and lower the car.

UPPER BALL JOINT REPLACEMENT (CONTROL ARM IN CAR): Removal – Raise car high enough to provide working space, and place a support under upper arm (see "Support Tool Note" below). Remove wheel and tire, then use a large chisel to cut off the three upper ball joint retaining rivets. Remove upper ball joint from spindle, *see "Front Wheel Spindle Replacement" below.*

Installation: Clean end of arm and remove all burrs from hole edges. Check for cracks in metal at holes, and replace arm if it is cracked. Attach new ball joint to upper arm using the specified bolts, nuts and washers. *CAUTION – DO NOT attempt to rivet new ball joint to arm.* Tighten ball joint attaching nuts to 12–17 ft. lbs.

FRONT WHEEL SPINDLE REPLACEMENT: Removal – Raise car until front wheels clear floor, then place upper assembly support under arm (see "Support Tool Note" below). Remove wheel and drum, then remove backing plate from spindle. *NOTE – Support plate to prevent damage to brake hose.* Disconnect spindle connecting rod end from spindle arm, then remove cotter pins from both ball joint stud nuts, and loosen nuts one or two turns. DO NOT remove nuts from studs at this time. Place a box wrench over lower end of ball joint remover tool, and install tool between upper and lower ball joint studs. Make sure tool seats firmly against ends of both studs and not against stud nuts. Turn wrench until studs are under tension, then tap spindle near studs to loosen them in the spindle. *CAUTION – Do not loosen studs in spindle with tool pressure alone.* Remove stud nuts and spindle from both studs.



UPPER CONTROL ARM SUPPORT TOOL

Installation: Install spindle on both ball joint studs and install stud nuts. Tighten upper and lower stud nuts to 35–65 ft. lbs. Continue to tighten both nuts until cotter pin holes and slots line up, then install new cotter pins. Connect spindle connecting rod end to spindle arm. Install brake backing plate on spindle and tighten bolts to 25–35 ft. lbs. Install wheel and drum and adjust wheel bearing, then check and adjust front wheel alignment.

UPPER CONTROL ARM: Removal – Raise car until front wheels clear floor, then place upper arm support tool under the arm, see "Support Tool Note" below. Remove wheel and tire, then disconnect spindle arm from upper ball joint *(see "Wheel Spindle Replacement" below).* Remove spring, then remove upper arm inner shaft retaining nuts (from engine compartment), and remove upper arm. Measure and note total shim thickness at each inner shaft bolt. *NOTE – Do not wash ball joints with a solvent.*

Inspection: Inspect arm and shaft for cracks, bends, or other damage. Check condition of bushings and rubber seal on ball joint stud. Install the nut on ball joint stud, and turn stud in ball joint with a torque wrench. If turning effort is not within 20–30 inch-pounds, replace the ball joint.

Bushing & Inner Shaft Replacement: *NOTE - Always replace both upper arm bushings if either bushing is worn or damaged.* Remove bolts and washers from both ends of inner shaft, then rotate shaft so that retaining studs can be removed with a soft mallet. Place Tool 3044-AB (Comet); T60K-3044-A3 (Falcon), around inner shaft with rounded end against bushing to be removed and install tool retaining bolts and nuts. *NOTE - Shaft and tool may have to be rotated so tool retaining bolts will not bind on upper arm brace.* Remove bushing from shaft with Tool 3044-AB and 3069-H (Comet); T60K-3044-A2 (Falcon). *NOTE - Be sure tool cup rests squarely against upper arm.* Remove other bushing from shaft using same procedure. Clean ends of shaft and install shaft-to-body retaining studs and install shaft in upper arm. Position Tool 3044-AB (Comet); T60K-3044-A4 (Falcon), on inner shaft with retaining studs through tool and tool tab against upper arm inner edge. Place bushings on each end of inner shaft, then using Tool 3044-AB, 3068 and 3069-H (Comet); T54P-3044-A and details 7 & 8 (Falcon), install bushings with arbor press. Install washers and bolt at each end of shaft and tighten to 40-55 ft. lbs.

Upper Ball Joint Replacement: Remove ball joint from arm. If ball joint is riveted to arm, drill a 1/8" pilot hole completely through each rivet, then drill off rivet head through the pilot hole with a 3/8" drill. Drive rivets out of holes. Clean ends of arms and remove all burrs from hole edges. Check for cracks in metal at holes, and replace arm if it is cracked. Install a new ball joint on arm. *CAUTION – Use only the specified bolts, nuts and washers. DO NOT attempt to rivet the new ball joint to arm.* Tighten ball joint retaining nuts and bolts to 12–17 ft. lbs.

Installation: Position upper arm on underbody mounting bracket, and install but do not tighten the nuts and lockwashers on two inner shaft retaining bolts. *CAUTION – The specified keystone-type lockwashers must be used.* Install adjusting shims on both bolts between inner shaft and underbody. *NOTE – Install the same shim thicknesses that were removed from both bolts during disassembly.* Tighten nuts to 65–90 ft. lbs. Install wheel spindle (see "Wheel Spindle Replacement" above). Tighten bolts on ends of inner shaft to 40–55 ft. lbs.

LOWER CONTROL ARM: Removal – Raise car and remove wheel and tire, then install support tool under upper control arm, see "Support Tool Note" below. Disconnect spindle from lower ball joint stud (see "Wheel Spindle Replacement" above). Remove stabilizer bar and link retaining nut, then remove strut-to-lower arm retaining nuts and bolts. Remove lower arm-to-underbody retaining bolt and remove lower arm.

Inspection: Check ball joint and socket, bushings, and rubber seal on ball joint stud. Inspect rubber bumper on arm. If parts are cracked, worn or damaged, replace them.

Lower Ball Joint Replacement: Remove and install lower ball joint in same manner as for upper ball joint (see above). Tighten lower ball joint attaching bolts to 28–45 ft. lbs. *NOTE – If lower joint must be drilled for strut retaining bolts, use the lower arm holes as a guide, being careful not to elongate holes in lower arm.*

Installation: Position lower arm on underbody, then connect stabilizer bar and link, lower ball joint to spindle, and strut to lower arm. Tighten strut-to-lower arm bolts to 40–55 ft. lbs. and spindle stud nut to 35–65 ft. lbs. Tighten lower arm retaining bolts to 30–40 ft. lbs. Lubricate lower ball joint (do not lubricate lower arm bushings), then remove upper arm supporting tool. Check and adjust front wheel alignment.

STABILIZER REPLACEMENT: Raise car and place supports under both front wheels, then disconnect stabilizer from both lower arms. Disconnect both stabilizer retaining brackets, and remove front crossmember guard, then remove stabilizer. To install, coat necessary parts of stabilizer with a suitable rubber lubricant and slide new insulators onto stabilizer. Connect stabilizer retaining brackets and connect stabilizer to both suspension arms. Tighten capscrews to 12–17 ft. lbs. and the nuts for the special 5/16" bolt to 12–17 ft. lbs. Install front crossmember guard, then remove supports and lower car.

►*UPPER CONTROL ARM SUPPORT TOOL NOTE:* A tool as shown in illustration can be fabricated locally to support upper control arm when removing other parts of the front suspension system. Tool should be installed between underbody ledge and opening in upper control arm, adjacent to ball joint.

CORVAIR FRONT SUSPENSION

C rvair (1960)

DESCRIPTION: Spherical (ball) joint type suspension with ball and socket joint connecting upper and lower control arms to steering knuckles. Coil springs are mounted between lower control arm and tower in front crossmember. Shock absorbers are mounted within coil spring on lower control arm and connected at top to tower in front crossmember. Strut rods are connected between outer ends of lower control arms and brackets that trail back from front crossmember. Caster adjustments are made with this strut rod.

TIRE INFLATION PRESSURE: Cold Tire - 15 lbs. (front), 26 lbs. (rear). **H t Tir** - 18 lbs. (front), 30 lbs. (rear).

ADJUSTMENT: Adjust front wheel alignment using the following sequence:

Camb r: Pos ½° ± ½°. Equal within ¼° on both sides of car. Loosen upper support shaft-to-crossmember bolts and add or remove shims as necessary. *NOTE - Shimming must be don equally at both front and rear bolts. Adding shims at both front and rear of support, shaft will d creas positiv camber.*

Cast r: Pos. 4° + 0°, − ½°. Equal within ¼° on both sides of car. Adjust by turning the two nuts at rear of strut rod. Lengthening this rod by turning the nuts increases caster. Shortening the rod by turning the nuts decreases caster. *NOTE - Because of manufacturing tol ranc s, it is p ssibl t run out of threads on strut rod r caus front coil spring to be cocked in its seat and rub spring tow r. Only when this happens is it permissabl to shim un v nly at upper control arm. If shims ar chang d, r ch ck camber.*

Toe-In: 3/16" + 0", − 1/16" (one wheel). 3/8" + 0", − 1/8" (two wheels). Loosen clamp bolts at each end of each tie rod and turn each tie rod sleeve as necessary to obtain proper toe-in with steering gear on "high point" for straight ahead travel.

► *TOE-IN NOTE (REAR WHEELS): A rear wheel toe-in adjustment is n c ssary on these cars. See "Corvair R ar Suspensi n".*

T -Out n Turns: With inner wheel at 33¾°, outer wheel should be at 30°. Not adjustable.

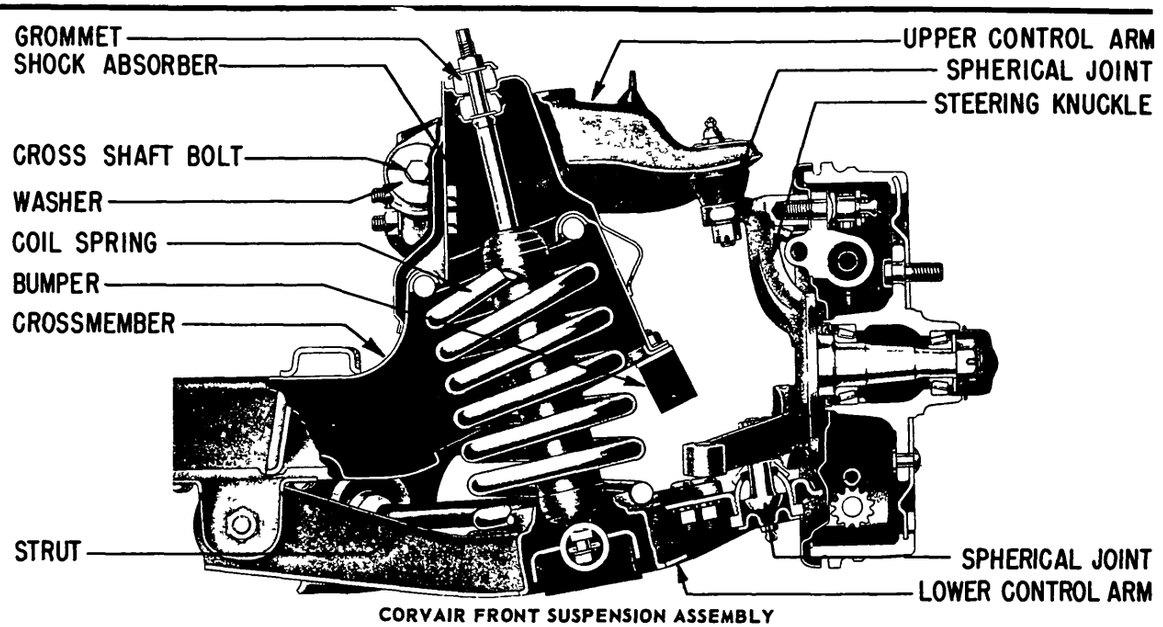
Steering Axis Inclination: 7° at 0° camber. Not adjustable.

Riding H ight: With car at curb weight (full tank of gasoline but an empty front compartment except for spare tire), position car on a smooth, level floor, then bounce and rock car several times and allow it to settle to normal position. Measure distance from floor to bottom of rocker panel 27 inches back from centerline of the front wheel. This measurement should be 9 3/8" ± ½". Measure opposite side of car in the same manner. The difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - Th se springs do not have flat ends and shims must not b used.*

► *RIDING HEIGHT NOTE: The above check should be used in conjunction with rear end riding height. See "Corvair R ar Suspension".*

SHOCK ABSORBERS: R m val - Raise front of car so front suspension hangs free and there is sufficient clearance on lower control arms for removal of shock absorbers. Hold shock absorber upper stem on flat section and remove nut, washer and grommet. Remove two lower attaching bolts and withdraw shock absorber.

Installati n: Install cup washer and new grommet on shaft, then pull out shaft to its full length. Install shock absorber up through lower control arm and through coil spring. Make sure shaft protrudes out of small hole in top of spring tower. Install both lower attaching lockwashers and bolts, then hold upper flat and install and tighten nut.



CORVAIR FRONT SUSPENSION ASSEMBLY

SPHERICAL JOINTS: *NOTE - For removal and installation, see below.*

Inspection (Upper): Support car weight at outer end of lower control arm, then remove wheel and tire assembly. Remove cotter pin and nut from upper control arm ball stud and remove stud from steering knuckle with Tool J-6627. Raise control arm to clear knuckle, then install a stud nut on stud and measure the torque required to rotate stud in the assembly with a torque wrench. This should be a minimum of 2 ft. lbs. If excessive wear is indicated in upper joint, both upper and lower joints should be replaced. *NOTE - The maximum allowable torque is 5 ft. lbs. with joint well lubricated.*

Lower - *NOTE - Lower joint is a loose fit in the assembly when not connected to steering knuckle.* If inspection of each upper joint indicates them to be within limits, inspect each lower joint for excessive wear as follows: Support car weight on wheels (or wheel hubs), then with an outside micrometer, measure distance from top of lubrication fitting to bottom of ball stud, and record the dimension for each side. Support car weight at outer end of each lower control arm, so that wheels or hubs are free, then repeat the measurement. If difference in dimension on either side is greater than 3/32", the joint is excessively worn and both lower joints should be replaced. If measurements do not indicate worn joints, check torque tightness of stud nut at each side as follows: Clean nut and cotter pin and check for evidence of looseness of stud in knuckle. If looseness is not indicated, mark stud and nut to identify relative location, then back off stud nut and retighten to original position. Note the torque reading required to tighten nut. If less than 45 ft. lbs., stud may have been loose in knuckle and should be replaced.

FRONT COIL SPRINGS: R m val - Place car on a suitable hoist or jackstands. *NOTE - Front c ntrol arms must be allowed to swing free but must be positioned so they may be raised or lowered with the hoist or a jack.* Remove shock absorbers, then remove the two strut rod-to-control arm nuts and lockwashers (the studs are pressed into end of strut rod). *NOTE - Th strut rods are under slight tension from the rubber grommet on opposite end.* **Loosen but do not remov lower control arm inner pivot nut.** *CAUTION - Do not remove pivot bolt and nut at this time.* Place jack or hoist under control arm and take up slightly on spring compression. If jack is used, place it under inner end of control arm on bushing. Remove control arm pivot nut and lockwasher and tap out pivot pin. Carefully lower hoist until spring is free, then withdraw spring. *NOTE - A bar placed through control arm and into spring tower will retain spring and keep it from slipping until free. Otherwise, keep clear of suspension until all compression is removed from spring.*

Installation: Set rubber spacer in place on top of coil spring and secure with friction tape. *NOTE - Step in spacer must contact end of coil spring.* Place spring on control arm with rubber spacer at top. Rotate spring until upper end of coil makes contact with its seat, then using a jack, raise control arm, line up arm, and bracket and install bolt (from front), nut and washer. DO NOT tighten at this time. *NOTE - A bar placed up through control arms and into tower will retain spring and keep it secure until pivot bolt is installed.* Attach strut rod to control arm and tighten nuts. Install shock absorber, then lower car to floor. Bounce front end several times and tighten lower control arm pivot bolt and nut.

LOWER CONTROL ARM & SPHERICAL JOINT: Removal - Remove coil spring, see above, then remove nut from lower spherical joint. Tap on control arm to remove it and the joint from steering knuckle. If spherical joint is to be removed, place control arm in a vise and use a six point 1 5/8" wrench to remove self-tapping joint from lower control arm. *NOTE - If prop r size wrench*

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CORVAIR FRONT SUSPENSION (C ntinu d)

is not available, hold joint in a vise and rotate control arm.

Control Arm Bushing Replacement: Use Tools J-7079-2, J-8346-2, J-8346-I, & J-5888-3 and press or hammer bushing out of control arm. *NOTE - Be sure to press on end of bushing that does not have the large collar on outer shell.* To install, use same tools used for removal, entering bushing in control arm from front side.

Installation: If spherical joint was removed, start into control arm by turning, as it is self-tapping. Secure in place with proper size wrench. *NOTE - A small hand press will help to steady spherical joint on installation.* Install lube fitting in bottom of joint and lubricate with chassis lube. Place rubber cap over stud. Install coil spring (see above).

UPPER CONTROL ARM & SPHERICAL JOINT: Removal - Support car weight at outer end of lower control arm, then remove wheel and tire. Remove upper control arm ball stud with Tool J-6627. Remove two nuts retaining upper control arm cross shaft to front crossmember. Note number and thickness of shims at each cross shaft bolt.

Spherical Joint Replacement: Drill through heads of the four rivets securing joint to arm, then use a sharp chisel and cut off rivets, being careful not to enlarge holes in control arm. Tap out rivets and remove from control arm. To install new joint, position it against top side of control arm and secure in place with the special alloy nuts and bolts furnished with service replacement joint. Tighten nuts to 20-25 ft. lbs. *CAUTION - Use only alloy bolts supplied for this operation.*

Cross-Shaft & Bushings: Removal - Remove bolts, washers, and collars from both ends of cross-shaft, then remove rubber spacer from rear end of shaft. Install a same size but longer bolt in end of cross-shaft (opposite side from bushing that is installed outside of arm). *NOTE - This bolt is furnished with Tool J-8345.* Set arm in place in Tool J-5888-3 and press bushing out with an arbor press. Turn control arm over and press out bushing with Tools J-8345-3 and J-7079-2, using Tool J-5888-3 as a support.

Installation - Set control arm in place on Tool J-5888-3, then press bushing into place with Tools J-7079-2 and J-8345-2. *NOTE - Start with bushing that has to be installed from inside of arm.* Install cross shaft in arm, invert in press and press in second bushing with Tools J-8345-1, 8345-2 and J-7079-2. *NOTE - This bushing must be installed from outside arm.* Check to see that cross shaft can be turned by hand. Install rubber spacer on rear end of shaft, then install collar, washer, and bolt in ends of cross-shaft but do not tighten bolt.

Installation (Control Arm): Install new upper control arm shaft-to-front crossmember studs, then install control arm. Install same number and thickness of shims that were removed at disassembly on each bolt. Install a new rubber seal on ball stud and install ball stud through knuckle. Tighten nut securely and install cotter pin. Install wheel assembly and lower car to floor. Bounce front end of car several times to centralize bushings, then tighten cross-shaft bolts to 35-40 ft. lbs. *NOTE - If a new spherical joint was installed or if proper number of shims w r not reinstalled, recheck caster and camber.*

FRONT CROSSMEMBER: *NOTE - Crossmemb r may b removed as either a compl t ass mbly or aft r components have been removed.*

Removal: Raise and support car so front suspension will swing free, then remove both brake pipes from brake hoses and remove hoses from body brackets. Remove nuts securing inner ends of tie rods to relay rods. Support crossmember with a jack or other means that will allow raising and lowering it, then remove the three bolts at each side that attach crossmember to frame (one of the bolts at each side is installed up through strut rod bracket). *CAUTION - B car ful that crossmember does not slip or fall from its supp rt.* Lower crossmember to floor.

Installation: Raise crossmember into position, then align bolt holes with a tapered punch and install the six bolts. *NOTE - Do not tighten any on bolt until all bolts are in position.* Tighten bolts securely. Remove crossmember support or jack and install tie rod studs into relay rod and tighten the nuts securely. Install brake hoses to body brackets and install brake pipes to hoses. Bleed brakes and position hoses properly.

CORVAIR REAR SUSPENSION

Corvair (1960)

DESCRIP TION: Independently sprung with individual single control arm at each side of car. Coil type rear springs are mounted between control arm and frame crossmember. Rear shock absorbers are mounted within coil springs.

ADJUSTMENT: Toe-In: 0" to ¼". *NOTE - If drive-on type equipment is used, reverse car and back it into position. Toe-In (overall) will be read as toe-out (readings taken from rear of tires rather than front).* To adjust, add or remove shims equally at each side of front edge of transmission case (with engine rear support loosened). *CAUTION - Shims must be added or removed qually from each side of transmission. DO NOT attempt to adjust one wheel at a time.* A shim added to each side will increase toe-in. Removal of shim from each side will decrease toe-in. *NOTE - Because of manufacturing tolerances and parts "stack-up" it is possible to have toe-out on one wheel and toe-in on opposite wheel. In this case, adjust the wheel with toe-out as close to specifications as possible but not letting opposite wheel go out of specifications. If for example, one wheel toes-out by ¼", then opposite wheel must toe-in enough to give 0" to ¼" overall toe-in.*

Camber: 1½°±½°. Not adjustable. If camber is not within limits, either the crossmember is out of alignment with the body or has become distorted due to collision.

Rear Riding Height: With car at curb weight (full tank of gasoline but an empty front compartment except for spare tire), position car on a smooth, level floor, then bounce rear end several times and allow it to settle to its normal height. Measure distance from floor to bottom of the rocker panel 29" ahead of centerline of rear wheel. This measurement should be 9" ±½". Measure opposite side of car in the same manner. The difference between the two measurements must not exceed ½". To correct riding height, replace springs. *CAUTION - These springs do not have flat ends and shims must not be used.*

► *RIDING HEIGHT NOTE: The above check should be used in conjunction with front end riding height. See "Corvair Front Suspension".*

COIL SPRING: Removal - Raise car by body side rails so control arms swing free. *NOTE - Raise car high enough for a rolling floor jack to be placed under the brake drum.* Loosen control arm cross-shaft bolts (in ends of shaft), then remove bolt that holds brake hose bracket to underbody. *NOTE - It may be necessary to disconnect and plug fuel line and heater fuel line (on left side only).* Remove wheel, then replace wheel stud nuts to hold drum in place. Position axle shaft so side surface of universal joint yoke is at an angle of 45° to centerline of axle case (this must be done to allow axle shaft and control arm to swing down far enough to remove spring. Otherwise, universal joint yoke would strike axle case or side bearing adjusting nut). Place a rolling floor jack under brake drum and flange, then raise jack slightly to place a light load on coil spring. Remove two bolts and lockwashers securing bottom of shock absorber to control arm, then remove upper attaching nut, washer and grommet. Remove shock absorber. Carefully lower floor jack until spring is free. *CAUTION* - Do not remove or lower jack too far as this places too much strain on axle shaft and/or brake hose.

Installation: Set spring in place on lower control arm and rotate spring until it seats against step in crossmember. Extend shock absorber shaft, then place it up through control arm and spring and attach bottom of shock absorber to control arm. *NOTE* - Installing shock absorber at this time will give safer working conditions in case jack was not securely placed. Raise control arm until shock absorber top attaching nut, washer and grommet may be installed. Connect fuel line and heater supply line (if removed) and attach brake pipe bracket to underbody. Remove floor jack and install wheel. Lower car to floor and bounce rear end several times with full weight on suspension control arms, then tighten cross-shaft bolts to 45-55 ft. lbs.

SHOCK ABSORBERS: *CAUTION - Th r ar shock absorbers hold all of the rear spring compr ssion. For this reason, the weight of th car must b r sting n the tires during removal. If an attempt is mad to support car on rear suspension low r control arms, and unless proper support is giv n to control arm, it is possible that when shock absorbers ar removed the car may tend to rise up at the rear or control arms may be forced downward, causing car to slip from support. If car is supported at body sid rails and no support is given to wheels and control arm, and the shock absorber is removed, spring pr ssur would force control arm downward and inward with extrem forc .*

Removal: Place car on drive-on (ramp) type hoist, frame contact hoist, or place jack stands under the body at each side rail, just forward of rear wheel openings. The body should be raised high enough so that wheels hang free and so that a floor jack can be placed under tire. With a second jack, raise tire so that it is in its normal position (this will allow shock to be removed without interfering with floor). Hold shock absorber upper stem on flat section and remove upper attaching nut, cup washer and grommet. Remove shock absorber lower attaching bolts, then withdraw shock absorber.

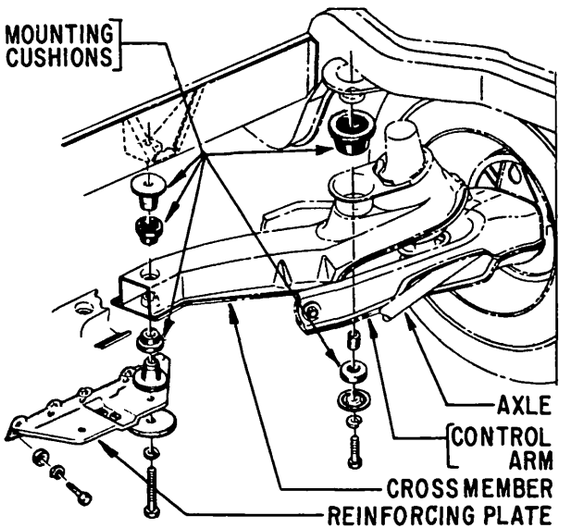
Installation: Install cup washer and new grommet on shaft, then pull out shaft to its full length. Install shock absorber up through control arm and through coil spring. Make sure shaft protrudes through small hole in top of spring tower. Install both lower attaching bolts and lockwashers, then hold upper flat and install and tighten nut.

CONTINUED ON NEXT PAGE

CORVAIR REAR SUSPENSION (C ntinu d)

CONTROL ARM: R m val - Remove coil spring, see above, then before removing jack from under brake drum, support control arm with a suitable jack stand. *CAUTION - D not place a strain on brake hose.* Remove wheel nuts from axle shaft and remove brake drum. Place upper end of brake shoe (still assembled and attached to backing plate) onto brake anchor (this will allow axle flange plate and axle shaft to be pulled out past parking brake strut). Line up hole in axle shaft flange with nuts retaining backing plate to lower control arm, then remove these four nuts and lockwashers. Pry between axle flange plate and backing plate until axle shaft and universal joint assembly can be pulled out of axle case. Remove nuts and washers securing universal joint "U" bolts and remove "U" bolts. Remove bolt, washer, and flat spacer from end of axle shaft. Remove universal joint yoke with Tool J-5504 and withdraw axle shaft. Remove backing plate from control arm studs and wire backing plate to crossmember. Remove bolts, nuts, and lockwashers attaching control arm to crossmember and remove control arm. *NOTE - A parking brake cable bracket is retained by tw of th s bolts.*

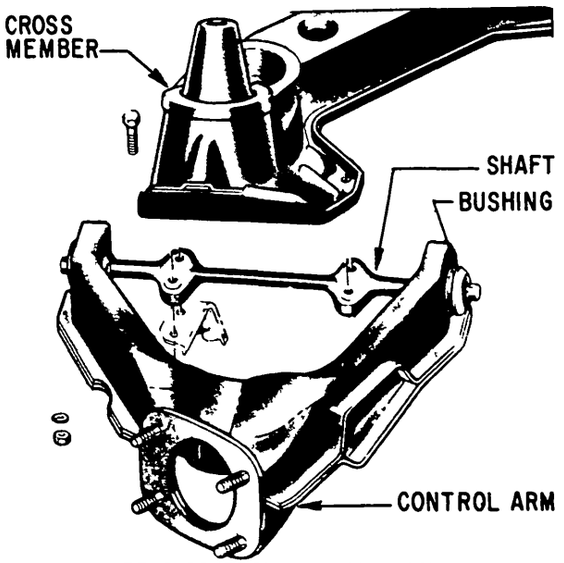
Bushings & Cr ss-Shaft: Removal - Remove bolt, lockwasher and collar from each end of shaft, then thread large bolt (furnished with Tool J-8347) to bottom of threads in one end of cross-shaft. Support control arm in press on Tool J-5888-3 and install Tool J-8347 between arms of control arm assembly, then press on bolt until bushing is free of control arm. Remove bolt from end of shaft and insert it in opposite end and invert control arm on Tool J-5888-3, then press bushing out of control arm and remove cross-shaft. *NOTE - Be sure that bushing flang does not contact support tool during pr ssing op ration.*



REAR SUSPENSION ASSEMBLY MOUNTING

Installation - With cross-shaft in control arm and Tool J-8347 in position, Place control arm on Tool J-5888-3. Hand start bushing into control arm and over end of cross-shaft. Install Tool J-7052-5 over bushing (be sure that Tool J-8347 is not overlapping bushing holes in control arm), then press bushing into control arm until flange contacts control arm. *NOTE - In some instances it may be necessary to shim under Tool J-8347 to assure proper contact with both flanges of control arm.* Invert arm in press and repeat the above process on opposite bushing. After installation, cross-shaft should be free enough to turn by hand. Install collar, lockwasher, and bolt in each end of cross-shaft. DO NOT TIGHTEN NUTS until after coil spring installed.

Installation (Control Arm): Set control arm assembly in place on crossmember, then install attaching bolts, lockwashers and nuts. *NOTE - Be sure to attach parking brake bracket to front two attaching bolts.* Replace jack stand under control arm. Remove brake backing plate from crossmember and check to make sure axle shaft oil slinger is in place (small drain hole at bottom), then install backing plate on studs in end of control arm. Temporarily install two nuts on studs. Install axle shaft through backing plate and control arm, then install yoke on end of axle shaft. Install flat spacer, lockwasher and bolt that retains yoke to shaft. Install universal joint "U" bolts, nuts and lockwashers. Remove the two temporarily installed backing plate nuts, then install universal joint spline into axle housing (be careful of seal). *NOTE - Properly position brake shoe on anchor.* Line up holes in axle bearing flange plate with studs on end of control arm, then install lockwashers and nuts through hole in axle shaft flange. Install drum onto axle flange being certain that holes (not stud holes, but machine holes) in drum DO NOT line up with hole in axle flange. Temporarily install wheel nuts to hold drum in plate. Install shock absorber and coil spring (see above).



REAR CONTROL ARM ASSEMBLY

REAR SUSPENSION CROSSMEMBER: R m val - Remove both shock absorbers and coil springs (see above), then support control arms with jack stands. Disconnect parking brake cable at rear equalizer and disconnect transmission linkage or remove clutch cross-shaft. Remove brake pipe from brake hose (both sides) and remove speedometer cable bracket on underbody. Remove four bolts attaching control arm to crossmember (let parking brake cable bracket hang free), then remove jack stands from under control arms. Support control arm assembly by hand, then pull control arm (with drum and axle shaft still assembled) outward to remove axle assembly from axle case. Repeat for opposite side of car. Place a hydraulic floor jack under axle housing to support power train when front (toward front of car) mounting is removed. Remove two inner crossmember-to-body attaching bolts, lockwashers and thick metal washers. *NOTE - The rubber and metal conical shaped spacers will probably remain with crossmember.* Remove four bolts retaining mounting bracket to transmission and note the number of shims removed at each point. Remove two nuts and lockwashers attaching bracket to crossmember and remove bracket. Remove reinforcing plate between crossmember and body, noting the number of shims removed at plate mounting. Remove bolt, lockwasher, large "dished" washer and rubber spacer from both sides of crossmember, then carefully lower crossmember to floor by "rolling" it slightly forward and pulling (not bending) transmission accelerator control rod to one side (if so equipped).

Installation: If necessary, tape crossmember outer mounts in place, then set crossmember in place and install outer mounts to body (do not tighten). Install reinforcing plate between body and crossmember (do not tighten). Loosely install power plant brace to crossmember, then install four bolts and tighten to 20-30 ft. lbs. *NOTE - Coat threads with "anti-seize compound" and install the same number of shims as removed at each bolt location.* Tighten crossmember outer mounting bolts securely, then install and tighten inner attaching mounts. Tighten the two bolts attaching brace and mounts to crossmember. Replace the same number of shims between body and reinforcing plate as removed. *NOTE - Shims are available in 1/32", 1/16", 1/8" sizes to fill gap between body floor pan and reinforcing plate.* Tighten attaching bolts on reinforcing plate between body and crossmember. Remove jack from under axle housing, then install clutch and transmission linkage except accelerator control rod (if used). Install speedometer cable bracket to underbody, then place two rear control arm assemblies under car (these are still attached together by parking brake cable). Pick up one control arm assembly (axle shaft assembly and brake assembly still attached) and place universal joint into axle case being careful not to damage seal. Place a jack stand under the control arm to support it and install four control arm attaching bolts, lockwashers and nuts (make sure parking brake bracket is in place) and tighten to 40-50 ft. lbs. Pull parking brake cable (one attached to each brake assembly) up over transmission accelerator control and hook up control. Install opposite arm assembly in same manner as for first assembly (see above). Install transmission or clutch linkage (if removed), then hook up brake pipe and position brake hose. Install rear coil springs and shock absorbers (see above). Bleed brakes and check rear wheel toe-in.

1954-56 FORD PASS. CARS LINCOLN, MERCURY

Continental (1956)
Ford Pass. Cars (1954-56)
Lincoln (1954-56)
Mercury (1954-56)
Thunderbird (1955-56)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 FORD LOWER ARM BUMPER ASSEMBLY INSTALLATION CAUTION:* Bumpers are supplied as right-hand (AD-3019-B) and left-hand (AD-3020-B) and are designed to point slightly inboard when correctly installed If right-hand bumper installed on left side or vice versa, bumper will not contact frame on rebound and serious damage to the suspension may result

►*1955 FORD CAR & THUNDERBIRD LOWER ARM MOUNTING BOLT BUSHING INSTALLATION CAUTION* Double-shoulder front suspension lower arm mounting bolt bushing (Part No B4A-3069-D) was released for use on Ford cars and Thunderbird but **was not** used in production Bushing used in production is single-shouldered The front bushing is pressed in from the inside of the lower arm front leg

►*1955 FORD FRONT SPRING SHIM INSTALLATION (When Air Conditioning Unit Installed):* Spring shim and rubber insulator (Part No AD-5355-A) should be installed on top of front springs when air conditioning unit is installed in the field in order to maintain front end and ride height

►*1955 FORD STABILIZER & SHOCK ABSORBER LOCKNUT PRODUCTION CHANGE* To prevent possibility of locknut (45218-S) from coming loose from stabilizer link and shock absorbers, locknut has been eliminated and a lockwasher (34920-S7) has been added. Torque nut and lockwasher to 15-25 ft lbs. Specification for locknut (45218-S) remains 25-35 ft lbs.

►*LUBRICATION CAUTION* DO NOT use any type of lubricant on rubber bushings at inner ends of upper and lower control arms Upper and lower ball joint assemblies are only points requiring lubrication

►*1955-56 FORD LOOSE UPPER SUSPENSION ARM CORRECTION:* When loose upper suspension arm bolts are found, remove old lockwashers and install reverse keystone lockwashers (Part No 357626-S7) Tighten bolts to 65-90 ft. lbs.

►*1955 FORD UPPER BALL JOINT STUD TIGHTENING CORRECTION (Due to Too Short Ball Joint Stud):* To correct, use Lockwasher, Part No. 34850-S7, as a spacer between nut and spindle. Tighten nut to 60-80 ft. lbs.

►*1954-56 LINCOLN REBOUND "THUMP" CORRECTION:* Install Bumper, Part No LD-3025-A These bumpers have a flat surface on top and are designed to correct "thump" condition Replace bumpers in pairs only

DESCRIPTION: "Ball-Joint" type with direct acting shock absorbers mounted within front coil springs

CHECKING & ADJUSTMENT: Check wheel bearing adjustment, wheel spindle wear, tire inflation pressure, wheel runout and balance Check steering linkage, and steering gear for excessive looseness or play, then place car on level floor and check front end specifications with car at curb weight

►*ADJUSTMENT CAUTION Due to differenc s in mounting of upper support arm shaft and location of adjusting shims, all models are not adjusted exactly alike. See Adjustment data following:*

Tire Inflation Pressure For each tire size and model (Cold)

FORD

Model	Tire Size	Lbs. Press. Front	Rear
Conv with Fordomatic (1954)	7 10x15-4	24	21
Victoria, Fordomatic (1954)	7 10x15-4	24	21
Fairlane 8, Fordo (1955)	6 00x16-4	28	25
Fairlane 8, Fordo (1955)	7 10x15-4	26	23
Pass (Except above) (1954)	6 70x15-6	30	27
Pass. (Exc above) (1954-55)	6 70x15-4	26	23
Courier (1954-55)	6 70x15-4	23	26
Ranch Wgn & Cour. (1954-55)	7 10x15-4	23	26
Sta Wgn & Cour (1954-55)	7 10x15-6	25	30
Sta Wgn (1955)	6 00x16-4	28	25
Thunderbird (1955)	6 70x15-4	24 C	C 24

LINCOLN

Closed Cars (1954-55)	8 00x15	26	22
Convertible (1954-55)	8 20x15	24	22

MERCURY

Convertible (1954-55)	7 60x15-4	24	22
Station Wagon (1954-55)	7 60x15-4	24	24
Others (1954-55)	7 10x15-4	26	22

C — 30 lbs at sustained high speed

►*THUNDERBIRD CASTER & CAMBER ADJUSTMENT: Addition or removal of shims for caster and camber adjustment on Thunderbird cars produces effect reverse to that on other Ford cars.*

Kingpin Inclination: 6-7° (Ford & Thunderbird). 7°10" (Lincoln), 7° (Continental & Mercury) with Pos. ¾° camber.

Caster: Continental - Pos 1°±¼° with ½° variation limit. Ford (1954-55) - 0° to Pos 1°, (1956) Pos ½° to Pos 1½° with ½° variation limit Lincoln & Mercury - 0° to Neg 1½° with ½° variation limit

Adjustment (Ford)—Loosen two bolts attaching upper support arm shaft to frame bracket, remove or insert shims at one or the other mounting bolt. **These shims located between inner side of shaft and frame bracket.** To INCREASE POSITIVE CASTER, add shim at front bolt or remove shim at rear bolt. To INCREASE NEGATIVE CASTER, remove shim at front bolt or add shim at rear bolt. A 1/16" shim thickness change at either point will change caster ½°. Shims furnished in thicknesses of 1/32" & 1/16". Check Camber. After adjustments completed, tighten shaft bolts to 65-90 ft. lbs.

►*CAUTION—Difference in thickness of shim pack at front and rear bolts must not exceed 1/8".*

Adjustment (Lincoln & Mercury)—Loosen two bolts attaching upper support arm shaft to frame bracket, insert shims at one or the other mounting bolt **These shims locat d b tw n uter sid f shaft and fram brack t.** For POSITIVE CASTER INCREASE, add shim at rear bolt (or remove shim at front bolt), for NEGATIVE CASTER INCREASE, add shim at front bolt (or remove shim at rear bolt) A 1/16" shim thickness change will change caster ½°. Shims furnished in thicknesses of 1/32" and 1/8" (also 1/64" and 1/16" for Lincoln). Check Camber After adjustments completed, tighten shaft bolts to 75-90 ft. lbs. (Lincoln), 70-80 ft. lbs. (Mercury).

Camber: Continental Pos. ¾°±¼°. Ford Pos. ¼° to Pos. 1¼° with variation limit of ¼°. Lincoln & Mercury 0° to Pos. ¾° with ¼° variation limit.

Adjustment (Ford)—Procedure is same as for Caster Adjustment above except that shims should be added or removed equally at both front and rear bolts. For POSITIVE CAMBER INCREASE, add shims equally at both bolts; for NEGATIVE CAMBER INCREASE, remove shims equally at both bolts. A 1/16" shim thickness change will change camber ¼°. After adjustment completed, tighten shaft bolts to 65-90 ft. lbs. torque.

►*CAUTION—Total shim pack thickness at each bolt should not exceed 9/16".*

Adjustment (Lincoln & Mercury)—Procedure is sam as for Caster Adjustment above xcept that shims should be added or removed equally at both front and rear bolts. For POSITIVE CAMBER INCREASE, remove shims equally at both bolts; for NEGATIVE CAMBER INCREASE, add shims equally at both bolts. A 1/16" shim thickness change will change camber ¼°. After adjustment completed, tighten shaft bolts to 75-90 ft. lbs. (Lincoln), 70-80 ft. lbs. (Mercury).

Toe-In: 3/32-5/32" (Continental & Mercury), 1/16-1/8" (Ford), 3/32-3/16" (1954-55 Lincoln), 1/8-3/16" (1956 Lincoln)

►*1954-56 MERCURY POWER STEERING CONTROL VALVE INTERFERENCE CAUTION:* Use caution when installing the left hand drag link adjusting sleeve. Clamps should be installed with the bolts in a vertical position and forward of the steering link. If clamps are installed with bolts to the rear, or horizontal, it is possible for them to interfere with the power steering valve assembly

Adjustment (All Models)—Loosen clamp bolts n adjusting sleeve at outer end of each tie rod, turn both adjusting sleeves equally f r correct toe-in (turn sleeves in opposite directions).

►*CAUTION—On Power Steering cars, run engine whil adjusting toe-in to insure contr l valv being properly centered in pitman arm end f steering arm-to-idler arm rod.*

Toe-Out on Turns: Inner and outer wheel angles are shown below. No adjustment.

Toe-out Sp cificati ns

	Inn r	Outer
Continental (1956) G	36°	26°
Lincoln (1954-55)	23½°	20°
Lincoln (1956) G	36°	26°
Mercury (1954)	24°	20°
Mercury (1955)	24°9'	20°
Mercury (1956 Exc Conv) G	38°	27°40'
Mercury (1956 Conv) G	36°	26°50'

G - Maximum turning angle

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1954-56 FORD PASS. CARS LINCOLN & MERCURY (C nt.)

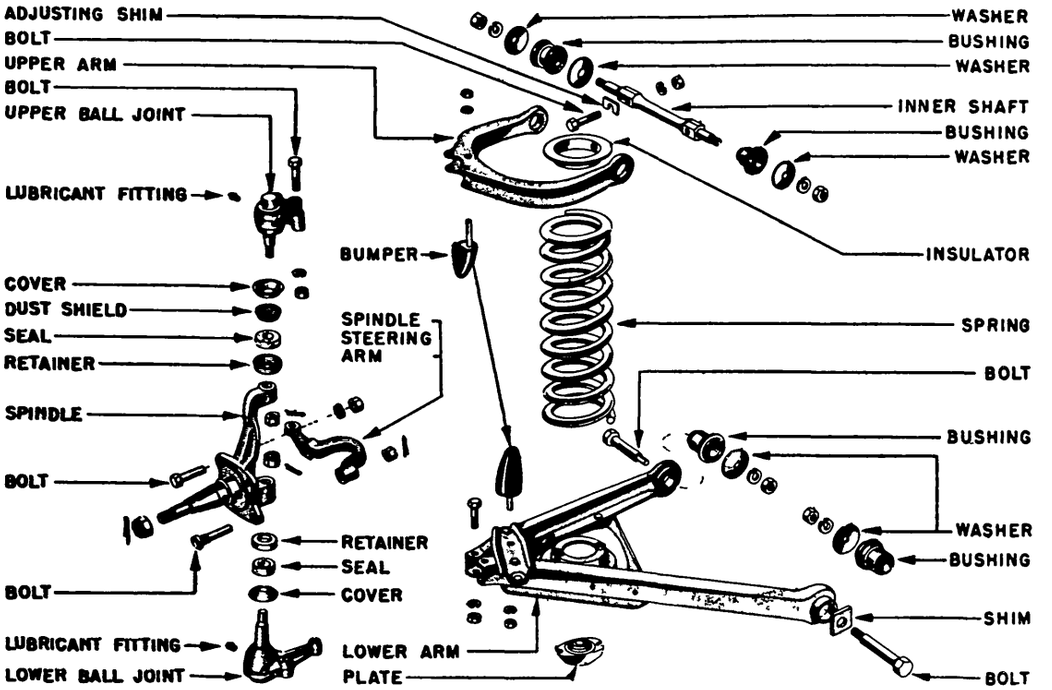
SHOCK ABSORBER REPLACEMENT: Not necessary to disturb front suspension assembly. Remove two nuts on mounting studs which hold shock absorber mounting plate on under side of spring seat on lower control arm. Remove nut on shock absorber stud at upper end of shock absorber, lower shock through hole in spring seat.

Installati n: Reverse removal procedure. Make certain that rubber bushings and washers installed in correct position, tighten shock absorber stud nuts to 20-35 ft lbs. (Ford), 20-30 ft. lbs. (Lincoln & Mercury). Tighten shock absorber mounting plate-to-lower support arm capscrews to 12-20 ft lbs. (Ford), 13-18 ft lbs. (Lincoln & Mercury).

COIL SPRING & LOWER SUSPENSION ARM REPLACEMENT (Rem val): Raise front of car and place support stand under each frame side rail to rear of lower suspension arm. Remove front wheel, hub, and drum as an assembly. Remove shock absorber (above), disconnect stabilizer bar from lower suspension arm. Loosen lower ball-joint to wheel spindle stud nut approximately two turns and loosen ball-joint (see "Ball-Joint Removal" below) Place a jack under lower suspension arm and raise arm until rebound bumper on upper arm is clear of the frame. Remove nut from lower ball-joint stud and lift wheel spindle up and off the stud. Lower jack until spring tension is relieved and spring can be removed. Remove coil spring, rubber insulator and retainer ring (Note location of these parts to insure correct reassembly). To remove lower suspension arm, take out the two bolts attaching arm to frame. Inspect bushings on inner end of each member and replace if necessary.

Bushing R plac m nt (Lincoln & Mercury)—Position Split Adapter Ring Tool 3069-F on inside of inner end of rear (short) arm and place Tool 3069 to fit into groove of Tool 3069-F. Place Tool 3069-G over the bushing. Press bushing from arm with an arbor press to remove bushing from the front (long) arm, position flange of inner bushing in Tool 3069 and place Tool 3069-G over the bushing. Press bushing from arm To install bushings, center bushings in arm hole and place bushing flange on Tool 3069-A (Lincoln), 3069-E (Mercury), then place Tool 3069 over arm Press bushings in place Tool 3069 over the arm Press bushings into place until shoulder ribs of bushing bottom on suspension arm (do not attempt to press bushing beyond edge of shoulder ribs or raised section of outer sleeve as distortion will result). *CAUTION—Under no circumstances should only on bushing be replaced .*

Bushing Installati n (F rd)—Use Tool T54P-3044 to install bushings (this tool is composed of a number of various parts and each part is referred to as a "Detail #6" etc.). Position both halves of Detail #12 on inside of inner end of rear (short) arm and place Detail #6 to fit into groove of Detail #12 Place Detail #5 over the bushing and press bushing from arm with an arbor press To remove bushing from front (long) arm, position flange of inner bushing in Detail #6 and place Detail #5 over bushing and press bushing from arm. To install bushings, center the bushings in the arm hole and place bushing flange on Detail #7, and then place Detail #6 over the arm. Press bushing into place until shoulder ribs of bushing bottom on suspension arm (Do not attempt to press bushing beyond edge of shoulder ribs or raised section of outer sleeve as distortion will result). *CAUTION—Under no circumstances should only* one bushing be replaced.



LINCOLN & MERCURY "BALL JOINT" FRONT SUSPENSION

Installation: Install the lower arm rear leg to frame cross member and tighten attaching nuts to 55-75 ft lbs torque Add enough shims between forward arm and frame to fill the existing space, and tighten nut finger tight Loosen nut on rear arm and run it up finger tight With the arm in curb load position (approximately horizontal with outer ends slightly lower than inner) torque the attaching nuts to 55-75 ft lbs Place coil spring and upper rubber insulator in position With a jack under the lower suspension arm, raise arm to compress coil spring Care must be taken so that both upper and lower ends of spring are properly seated Guide the spindle boss over ball joint stud Install nut and torque to 100 ft lbs , continue to tighten until cotter pin hole is lined up install cotter pin Remove jack from under suspension arm, and install shock absorber Secure stabilizer to lower suspension arm with spacer, insulator, washers, and bolt Install wheel and hub assembly and adjust front wheel alignment

BALL-JOINT REMOVAL (Upper & Lower): Ball-joints are furnished as assemblies except for seals and related parts assembled on ball-joint stud. Raise front of car with a jack placed under lower control arm, then place a support under frame side rail to rear of suspension arm. Remove front wheel and remove cotter pin in ball-joint stud (NOTE—If both ball-joints are to be removed, free the lower stud first). Loosen stud hex nut approximately 2 turns and install Tool 3006-A with the screw end resting against lower stud nut. Turn screw of tool and apply sufficient pressure to place ball-joint under tension Strike the spindle sharply at a point opposite the stud bore to pop it loose Increase tension and strike again if necessary *(CAUTION—Spindle or tool may be damaged if pressure only is used to free stud)* Repeat this procedure with other stud if it is to be removed Ball-joint assembly can be removed from suspension arm by taking out the three attaching bolts

Servicing—Remove retainer, seal, and covers from stud, inspect parts for wear or damage and replace if necessary If new rubber seals being installed, see that they are pushed down into retainer cup before cup

CONTINUED ON NEXT PAGE

1954-56 FORD PASS. CARS LINCOLN & MERCURY (C nt.)

is installed on stud. Reassemble all seal parts in original position.

►*CAUTION—Do. not wash ball-joint assemblies with solvent which may remove lubricant.*

Installation—Reverse removal procedure as given above. Tighten to following torques:

Ball-Joint Assembly Mounting Bolts

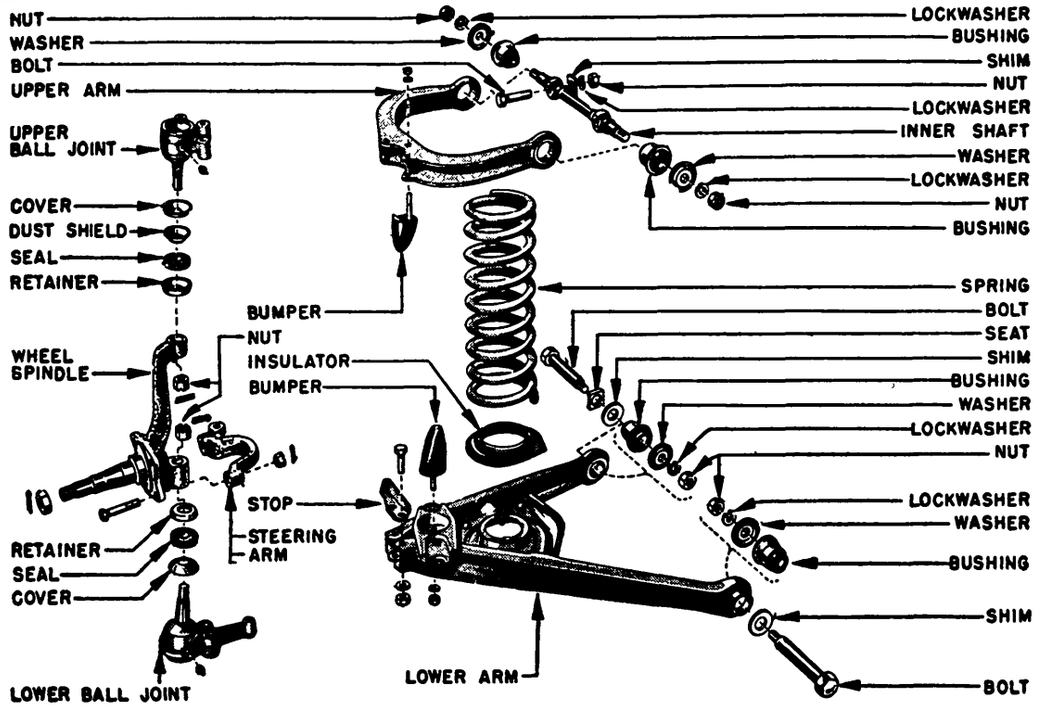
Car	Upper	Lower
Ford	28-43 ft. lbs.	65-90 ft. lbs.
Lincoln & Mercury	30-40 ft. lbs.	70-90 ft. lbs.

Ball-Joint Mounting Stud Nuts—Tighten stud nuts to minimum torque of 80 ft. lbs. (upper ball-joint), 100 ft. lbs. (lower ball-joint), and then continue to tighten until cotter pin holes line up.

UPPER SUSPENSION ARM REPLACEMENT (Removal): Place jack under lower suspension arm near ball joint mounting and raise lower arm until some of the tension has been removed from the upper bumper. Remove wheel and tire assembly. Wire spindle to frame to avoid damage to brake hose. Remove cotter pin from ball-joint stud and loosen nut approximately two turns. Loosen ball -joint stud (see "Ball-Joint Removal" above), then remove ball-joint stud hex nut. Remove the two bolts securing inner shaft to frame (NOTE—Check the number of shims removed from between shaft and frame (Lincoln & Mercury), or between nut and frame (Ford), at each end of bolt locations). Remove upper suspension arm.

Bushing Replacement (Lincoln & Mercury)— Install Tool 3044-B on the inner shaft and place Tool 3069 over bushing. Press bushing from arm. Remove inner shaft and steel washer. To remove the opposite (double shoulder) bushing, on the rear upper arm, insert Tool 3069-F into flange of arm, then place Tool 3069 over bushing and into recess of Tool 3069-F. Center bushing over Tool 3069-G and press out. (NOTE—Tool 3069-G will shear rubber until steel shell is contacted). To install double shouldered bushing in rear of upper arm, lubricate rubber portion of bushing for easier installation. Position Tool 3069 on inner side of rear arm. Install bushing in hole from outer side of arm, position tool 3068 (Lincoln), 3068-C (Mercury) over bushing. Press bushing into arm to shoulder stop. Install long machined end of inner shaft, with washer on shaft, into bushing. Install bushing on front arm, positioning it over end of shaft and pressing it into place with Tool 3068. With both bushings in place, install washer and nut on each end of shaft and tighten finger tight. Position shaft in suspension arm so that holes are parallel with shaft and tighten nuts to 55-75 ft. lbs. torque. *CAUTION—Under no circumstances should only one bushing be replaced.*

►*FORD TOOL T54P-3044-A (Detail #10) REWORK TO AVOID INTERFERENCE:* If interference between upper suspension arm rod and "Detail#10", correct by grinding a 1/8" radius on bottom inner edge of each half of tool, blending it into the flat portion of tool. A pencil type grinder should be used for this purpose.



FORD "BALL JOINT" FRONT SUSPENSION

Bushing Replacement (Ford)—Remove front bushing first. Install Tool 3044-A Detail #10 (see Note above) on the inner shaft and place Detail #6 over bushing. Press bushing from arm. Remove inner shaft and steel washer. To remove opposite (double shoulder) bushing, on the rear upper arm, install Detail #6 over bushing and center bushing over Detail #9. Press bushing from arm. To install double shouldered bushing in rear of upper arm, install Detail #6 on inner side of rear arm. Install bushing in hole (entering it from outer side of arm), and position Detail #9 over bushing. Press bushing into arm until shoulder stop is reached. Install long machined end of inner shaft, with washer on shaft, into bushing. Install bushing on front arm, positioning it over end of shaft and pressing it into place with Detail #8. With both bushings in place, install washer and nut on each end of shaft and tighten finger tight. Position shaft in suspension arm so that holes are parallel with shaft and tighten nuts to 55-75 ft. lbs. torque. *CAUTION—Under no circumstances should only one bushing be replaced.*

Installation: Position the upper suspension arm on frame cross member. Install inner shaft-to-frame bolts and insert the same number of shims that were originally used between shaft and frame cross member (Lincoln & Mercury), between inner shaft attaching nut and frame cross member (Ford). Tighten bolts to 70-90 ft. lbs. torque. Place ball joint stud in spindle and install the the nut. Tighten to 80 ft. lbs. minimum, then continue to tighten until cotter pin holes line up.

FRONT SPRING APPLICATION

1954 Ford 6 Cyl.

Model	Spring No.	Color Mark
All (Exc. Sta. Wgn. & Sed. Del.) ①	AD-5310-D	Brown
All (Exc. Sta. Wgn. & Sed. Del.) ②	AD-5310-E	Green
Sta. Wgn. & Sed. Del.	AD-5310-H	Blue
Heavy Duty ③	AD-5310-H	Blue

1955 Ford 6 Cyl.

2 Dr. & 4 Dr. ①	AD-5310-E	
2 Dr. & 4 Dr. ②	AD-5310-F	Red
Sunliner, Victoria, Skyliner ①	AD-5310-F	Red
Sunliner, Victoria, Skyliner ②	AD-5310-G	Alum.
Ranch Wagon & Sed. Del.	AD-5310-H	Blue
2 Dr. & 4 Dr., Heavy Duty	AD-5310-J	Orange
Country Sedan & Country Squire	AD-5310-J	Orange

1954 Ford 8 Cyl.

Model	Spring No.	Color Mark
2-Dr., 4-Dr., Cl. Cpe., Bus. Cpe. ①	AD-5310-E	Green
Conv., Victoria, Skyliner ①	AD-5310-F	Red
2-Dr., 4-Dr., Cl. Cpe., Bus. Cpe. ②	AD-5310-F	Red
Conv., Victoria, Skyliner ③	AD-5310-G	Alum.
Sta. Wgn. & Sed. Del.	AD-5310-J	Orange
Heavy Duty ③	AD-5310-J	Orange

①—With Manual Shift Trans.

②—With Fordomatic Trans.

③—Use on 2-Dr., 4-Dr., Cl. Cpe., & Bus. Cpe., with Manual Shaft Trans.

CONTINUED ON NEXT PAGE

1954-56 FORD PASS. CARS LINCOLN, MERCURY (C nt.)

1955 Ford 8 Cyl.

M del	Spring No.	Color Mark
2 Dr & 4 Dr ①	AD-5310-F	Red
Sunliner, Victoria, Skyliner ①	AD-5310-G	Alum
2 Dr & 4 Dr ②	AD-5310-G	Alum
Sedan Delivery	AD-5310-H	Blue
Ranch Wagon	AD-5310-J	Orange
Sunliner, Victoria, Skyliner ②	B5A-5310-C	
2 Dr , 4 Dr , Pol Int H D	B5A-5310-D	
Thunderbird	B5S-5310-B	

1954-55 Mercury

All (Exc Conv. & Sta Wgn.)	ME 5310-D	Yellow
Convertible	MB-5310-E	Orange
Sta. Wgn	MB-5310-F	Bronze
All (Exc Conv & S W)1955 only	AD-5310-G	Alum

1954-55 Lincoln

All (Exc Conv)	LA-5310-A	Pink
Convertible	LA-5310-C	Blue
Heavy Duty	LA-5310-D	Gray

1956 Front Spring Application

F rd 6 Cyl.

M d l	Spring No.	Color Mark
2 Dr. & 4 Dr. ①	AD-5310-E	
2 Dr. & 4 Dr. ②	AD-5310-F	Red
Sunliner, Victoria, Skyliner ①	AD-5310-F	Red
Sunliner, Victoria, Skyliner ②	AD-5310-G	Alum.
Ranch Wgn. & Sed. Del.	AD-5310-H	Blue
2 Dr. & 4 Dr., Heavy Duty	AD-5310-J	Orange
Country Sedan & Squire	AD-5310-J	Orange

F rd V8

M d l	Spring No.	Color Mark
2 Dr. & 4 Dr. ①	AD-5310-F	Red
Sunliner, Victoria, Skyliner ①	AD-5310-G	Alum.
2 Dr. & 4 Dr. ②	AD-5310-G	Alum.
Sedan Delivery	AD-5310-H	Blue
Ranch Wagon	AD-5310-J	Orange
Sunliner, Victoria, Skyliner ②	B5A-5310-C	
2 Dr., 4 Dr., Pol. Int. H D	B5A-5310-D	

Thund rbird

All	B5S-5310-B

Linc ln

All (Exc. Conv.)	LD-5310-G
Conv. & Air Cond.	LD-5310-H
Heavy Duty	LD-5310-J

C ntinental

All	4048042	Red

M rcury

All (Exc. Conv. & Sta. Wgn.)	AD-5310-G	
Convertible	MB-5310-E	Orange
Sta. Wgn.	MB-5310-F	Bronze
Heavy Duty (Exc. Sta. Wgn.)	MB-5310-F	Bronze
Hvy. Duty (Exc. Conv. & Sta. Wgn.)	MB-5310-E	Orange

① - Manual Shift. ② - Fordomatic.

1957-60 EDSEL, FORD, MERCURY

Eds l (1958-60)
F rd (1957-60)
Mercury (1957-60)
Thunderbird (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 LOWER BALL JOINT CHANGE & CHECKING NOTE.* Lower ball joints are not spring loaded and as a result, when there is no load on wheel, a slight looseness will be apparent that is entirely normal *See "Lower Ball Joint" below.*

►*1957 MERCURY STABILIZER BAR INTERFERENCE WITH FRAME CORRECTION.* Loosen the two stabilizer bar-to-frame brackets and slide the two rubber mounting insulators along stabilizer bar as necessary to center the bar Tighten clamps and check clearance between bar and frame. If clearance cannot be obtained in the above manner, replace stabilizer bar *CAUTION - Do not apply heat to bar.*

►*1957 MERCURY "RUBBING" NOISE CORRECTION:* A metallic rubbing noise in front suspension may be caused by the coil spring upper shim being installed without a shim locator allowing shim and spring to shift out of frame pocket Check clearance between outboard side of coil spring and spring pocket by jacking car up with the jack placed under car frame or crossmember (spring extended) If spring is found to be contacting the spring pocket, remove spring and shim and reinstall with a shim locator

►*1958 FORD FRONT COIL SPRING SQUEAKING CORRECTION* This condition may be caused by interference between side of spring seat depression in lower control arm and spring Correct by hammering the the point of interference down sufficiently to allow spring to seat in control arm

►*1958 EDSEL UPPER CONTROL ARM INNER SHAFT PIVOT BUSHING PRODUCTION CHANGE* The rubber bushings formerly used at this location have been changed to permanently lubricated steel threaded type bushings Removal procedures for later type bushings are as indicated below For removal and installation of early type bushings, see "Ford (Except Thunderbird) and Mercury Front Suspension" in 1957 Annual Data

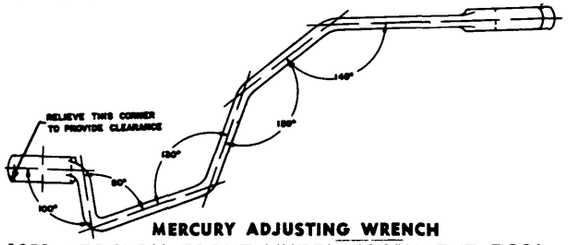
►*1958 MERCURY FRONT SUSPENSION NOISE CORRECTION & PRODUCTION CHANGE* On cars built before December 10, 1957, install a teflon washer, Part No 371139-S between lower suspension arm front bushing and front mounting shim bolt to prevent bushing sleeve rubbing on lower arm Cars built after the above date have the teflon washer installed

►*1958 MERCURY LOWER SUSPENSION ARM FRONT MOUNTING BOLT NOISE CORRECTION* This bolt may be rubbing on front stabilizer bar due to the bolt being too long On some early cars, a 7½" bolt was used at this location, instead of a 7 11/32" bolt Correct by cutting 5/32" from end of bolt

►*1958 MERCURY LOWER CONTROL ARM BALL JOINT NOTE* This ball joint is not spring loaded and will appear to have excessive movement when wheel is shaken (car on a jack) This movement is normal and does not affect operation of joint

►*1958 MERCURY FRONT UPPER CONTROL ARM SQUEAK CORRECTION & "O" RING SEAL PRODUCTION CHANGE* A squeak at this point may be caused by lubricant loss at the threaded pivot bushing due to damage to the "O" ring seal To correct, install "O" ring Seal, Part No 370367-S100 which is being used in later production cars If squeak is not corrected with the new "O" ring replace threaded bushing. *CAUTION - Excess grease at this point can caus seal failure*

►*1958 MERCURY CAMBER & CASTER ADJUSTMENT TOOL NOTE* A special wrench can be made from a 10-12" long 3 4" box end wrench (see illustration below) to aid in reaching the upper arm inner shaft-to-frame bolts



MERCURY ADJUSTING WRENCH

►*1959 MERCURY FRONT WHEEL ALIGNMENT TOOL NOTE* A tool made from a battery hold down bolt, Part No B5A-10756-BUP can be made as indicated in illustration The use of this tool will eliminate the necessity of holding the adjustment bolt during alignment adjustments *NOTE - On some early cars, the holes in frame bracket are ¼" diameter and the tool cannot be used See "Adjustment" below*

►*1959 MERCURY FRONT SUSPENSION "CLUNKING" NOISE CORRECTION* This condition may be caused by interference between stabilizer bar attaching bolt and jounce bumper bracket If stabilizer bar attaching bolt and rubber bushing show signs of wear caused by interference with bracket, measure the distance between bracket and frame gauge hole (gauge hole is approximately ¾" diameter and is located on front face of front suspension crossmember), this distance, measured on a straight line, should be at least 12¾" If bracket is out of location, carefully chisel off and relocate 12¾-13¼" from frame gauge hole Arc weld to frame front, rear, and outside edges

►*1959-60 MERCURY UPPER SUSPENSION ARM SPACER TOOL NO. 3082-A REWORK:* This tool which is designed for previous models may be reworked for use on 1959-60 models as follows Elongate each of the bolt holes at end of tool with a ½" round file Edge of hole should be extended to a point 2 20" from end of tool Grind or file a 1/8" notch (using a round file) in edge of each of the four washers

DESCRIPTION: "Ball-joint" type suspension with shock absorbers mounted adjacent to coil spring between lower control arms and brackets on frame side rails Rubber type bushings are used to connect lower

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1957-60 EDSEL, FORD, MERCURY (C ntinu d)

control arms to inner pivot shaft on all models. Upper control arms on 1957 Ford and Mercury, 1958-60 Thunderbird, and early 1958 Edsel are connected to inner pivot shafts by rubber type bushings. All other models have upper control arms connected to inner pivot shaft by threaded steel bushings. *NOTE - On cars with threaded steel bushings, threads in upper control arm pivot bushing holes are cut by steel bushing when bushing is installed.* On 1959-60 Mercury models, the upper control arm inner pivot shaft is mounted directly on top of frame member (not on brackets) and front wheel adjustments are accomplished by moving pivot shaft mounting bolts in elongated holes in frame member (shims not used for camber and caster adjustment).

ADJUSTMENT

CHECKING & ADJUSTING: Before adjusting front end alignment, inflate tires to correct pressure, then raise front of car and check front suspension ball joints for looseness, wear or damage. *NOTE - Lower ball joint is not spring loaded and a slight normal looseness will be found when car is raised and wheel is hanging free. See "Lower Ball Joint Checking" below).* Check steering gear mounting and all linkage for looseness. Adjust front wheel bearings. Check tracking of front and rear wheels.

► *LOWER BALL JOINT CHECKING:* Raise front of car with a jack placed under lower control arm. Adjust front wheel bearing, then, using a dial indicator perpendicular to wheel, measure the in and out travel of wheel (Dial indicator should be clamped to front suspension lower control arm with indicator button contacting edge of the wheel rim). The total travel from extreme inboard to outboard position should be less than .125" (1/8"). Replace ball joint if in excess of this specification.

Caster Specifications

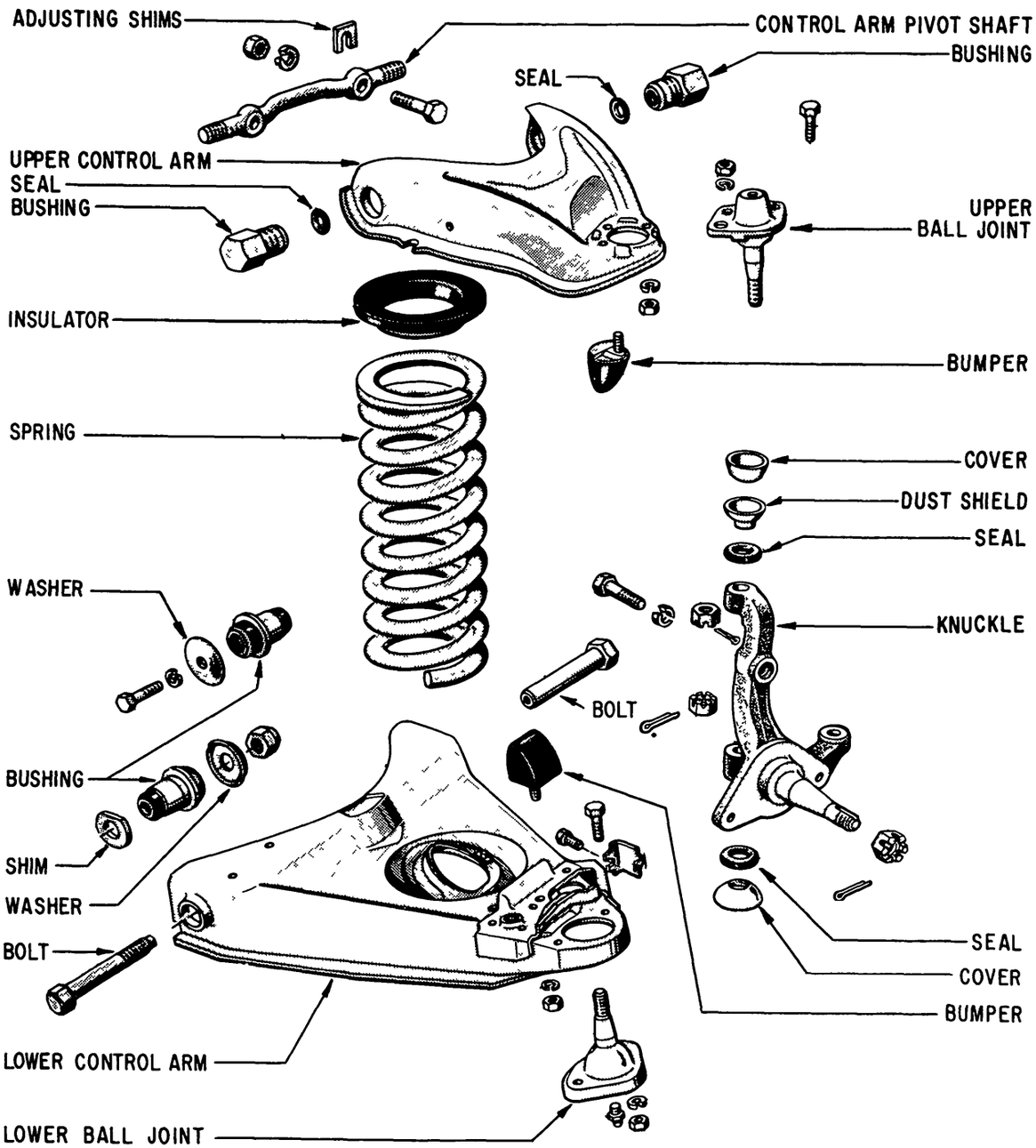
Model	Caster
Ford (1957)	Pos. ½° to Pos. 1½°
Ford (1958-59 Exc. T-Bird)	0° to Pos. 1°
Ford (1960)	ℂ Pos. ¾° to Pos. 1¼°
Thunderbird (1958-60)	Pos. ½° to Pos. 1½°
Mercury (1957-60)	0° to Neg. 1½°
Edsel (1958) ②	0° to Neg. 1½°
Edsel (1959-60)	0° to Pos. 1°

℃ - Supersedes previous specifications of Neg. ½° to Pos. ½°.
② - Corsair & Citation. Pos. ½° to Pos. 1½° (Ranger, Pacer & Station Wagon).

Camber Specifications

Model	Camber
Ford (1957-59)	Pos. ½° to Pos. 1½°
Ford (1960)	ℂ Pos. ½° to Pos. 1°
Thunderbird (1958-60)	Pos. ½° to Pos. 1½°
Mercury (1957-60)	0° to Pos. ¾°
Edsel (1958) ②	0° to Pos. 1½°
Edsel (1959-60)	Pos. ½° to Pos. 1½°

℃ - Supersedes previous specifications of Pos. ½° to Pos. 1½°.
② - Corsair & Citation. Pos. ½° to Pos. 1½° (Ranger, Pacer & Station Wagon).



1960 FRONT SUSPENSION ASSEMBLY (TYPICAL)

►*NOTE:* Maximum camber variation between wheels must be less than ½° with ¼° preferred. *See "Shimming Procedur " below.*

T -In: *Se "Toe-In Specification Tabl " below.* To adjust, place front wheels in straight ahead position and

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1957-60 EDSEL, FORD, MERCURY (C ntinu d)

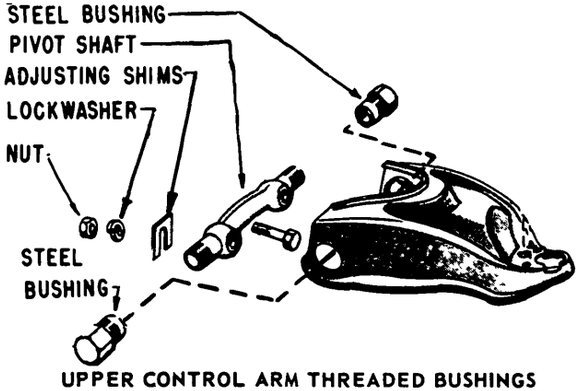
loosen two clamp bolts at each spindle connecting rod sleeve. If steering wheel spokes are in their normal position, lengthen or shorten both rods equally to obtain correct toe-in. If steering wheel spokes are not in their correct position, make necessary rod adjustments to obtain correct toe-in and steering wheel spoke alignment. *NOTE* - On left hand sleeve turn sleeve **downward to incr as l ngth.** On right hand sleeve turn **upward to increas l ngth.**

Toe-In Sp cifications

Mod l	Toe-In
Ford (1957-59)	1/16-1/8"
Ford (1960)	①1/8-1/4"
Thunderbird (1958-60)	1/16-1/8"
Mercury (1957)	②3/16-5/16"
Mercury (1958)	3/16-5/16"
Mercury (1959-60)	1/16-3/16"
Edsel (1958)③	1/16-3/16"
Edsel (1959-60)	1/16-1/8"

① - Supersedes previous specification of 1/8-5/32".
② - Supersedes previous specification of 1/16-3/16".
③ - Corsair & Citation. 1/32-1/8" (Ranger, Pacer & Sta. Wgn).

T e-Out on Turns: F rd (1957-60) - With **outer** wheel turned 20°, **inner** wheel should be 24¼°.
Thunderbird (1958) - With **inner** wheel turned 20°, **outer** wheel should be 17°7'.
Thund rbird (1959) - With **uter** wheel turned 20°, **inner** wheel should be 24¼°.
Thunderbird (1960) - With **inn r** wheel turned 20°, **outer** wheel should be 17 1/8°.
M rcury (1957-58) - With **inner** wheel turned 20°, **outer** wheel should be 17°6' (Manual Steering); 17°20' (Power Steering).
M rcury (1959-60) - With **inn r** wheel turned 20°, **outer** wheel should be 17°30' (Manual Steering); 17°18' (Power Steering).
Eds l (1958) - With **ut r** wheel turned 20°, **inner** wheel should be 24¾° (Corsair & Citation); 23½° (Ranger, Pacer & Station Wagon).
Eds l (1959-60) - With **outer** wheel turned 20°, **inner** wheel should be 24½°.



UPPER CONTROL ARM THREADED BUSHINGS

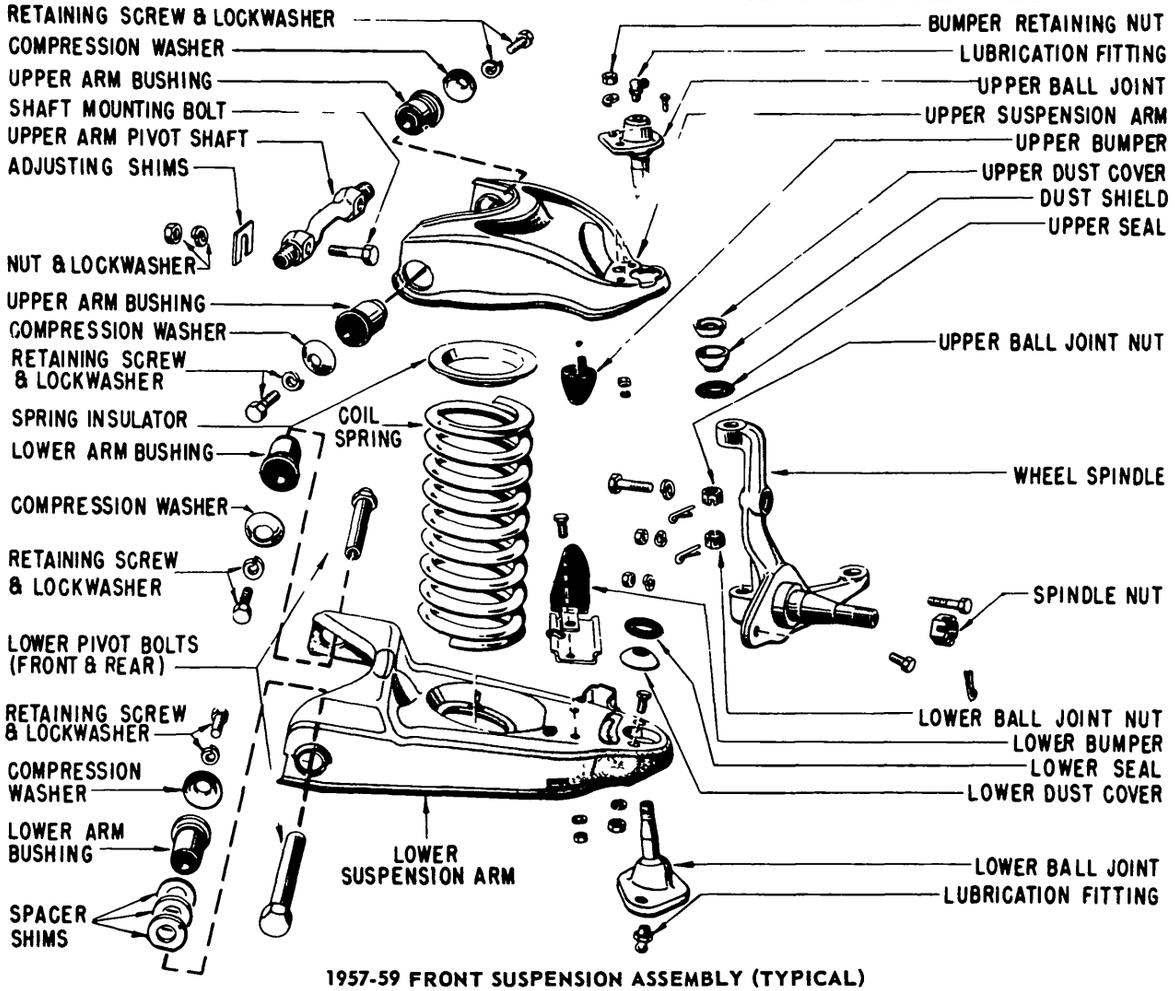
CAMBER & CASTER SHIMMING PROCEDURE (EXC. 1959-60 MERCURY): Caster & Camber adjustments are made by adding or removing shims between upper control arm mounting shaft and frame mounting bracket. To change caster, remove or add shims at one of the mounting bolts. The removal of shims at the front bolt or installation of shims at the rear bolt will cause ball joint on upper control arm to move forward. Reversing this procedure will cause joint to move to rear. A 1/16" change of shim thickness at either bolt will change caster angle ½° *(NOTE - The difference between shim stack thicknesses at the two bolts should not exceed 1/8" and the maximum thickness of shim stack at each bolt must not exceed 9/16").* To adjust camber, remove or install equal shim thicknesses at both bolts. Removal of shims at both bolts will move upper ball joint inward, and installation of shims will move upper ball joint outward. A 1/16" change of shim thickness at both bolts will change camber angle ¼°. Shims are available in 1/32" & 1/8" thicknesses. Tighten control arm shaft mounting nuts to 65-90 ft. lbs.

CAMBER & CASTER ADJUSTMENT (1959-60 MERCURY): *NOTE - On early 1959 models with ¼" holes in frame bracket, insert ¼" x 1½" x 20 bolts through holes in bracket. On later 1959 & 1960 models, insert 5/16" x 1½" x 18 bolts through holes in bracket, then install nuts on bolts (between frame bracket and pivot shaft - see illustration).* With bolts installed in bracket, loosen both bolts securing pivot shaft to frame and move shaft by threading bolt in or out as required. See illustration for number of turns of bolts to change camber and caster. When adjustments are correct, tighten pivot shaft bolts to 100-110 ft. lbs., and remove adjusting bolts.

REMOVAL & INSTALLATION

SHOCK ABSORBER REPLACEMENT: Removal - Raise car and place stands under both lower control arms,

CONTINUED ON NEXT PAGE



1957-59 FRONT SUSPENSION ASSEMBLY (TYPICAL)

1957-60 EDSEL, FORD, MERCURY (Con.inued)

making sure that shock absorbers are accessible for servicing Disconnect shock absorber from lower control arm and mounting bracket on frame Free lower stud and bushing from arm by removing one mounting bolt and loosening the other. Remove bushings and washers.

Shock Absorber Lower Bushing Replacement - Remove bushing, using Tool T57P-18201-A1 & A5, and pressing it out of shock absorber with an arbor press. To reinstall bushing, apply a vegetable soap solution to bushing and press it into shock absorber, using Tool T57P-18201-A1, A4, & A5. *NOTE* - One quick drive of the press ram should be used to position bushing

Installation: Place bushings and washers on studs in their correct order. Extend shock absorber and install it inside coil spring with upper stud inserted through hole in mounting bracket. Install and tighten lower bolts to 12-15 ft. lbs Install upper bushing and washer on upper stud and tighten nut to 25-29 ft lbs. Install and tighten locknut.

COIL SPRING REPLACEMENT: *See "Lower Control Arm" below.*

Front Spring Application

1957 Ford 6 Cyl.

Model	Color Code	Part No.
Custom Sedan	Green	B7A-5310-A
Custom Sedan (H.D.)	Red	B7A-5310-B
Town & Club Sedan & Victoria	Red	B7A-5310-B
Town Victoria	Alum	B7A-5310-C
Town Sed & Club Sed. (H D)	Alum	B7A-5310-C
Club Victoria (H.D)	Alum	B7A-5310-C
Fairlane Tudor Sedan	Yellow	B7A-5310-D
Retractable Hard Top	Yellow	B7A-5310-D
Town Victoria & Conv. (H.D.)	Yellow	B7A-5310-D
Custom Ranch Wagon	Blue	B7A-5310-E
Country Sedan & Squire	Blue	B7A-5310-E
Ranchero & Sed Del.	Blue	B7A-5310-E
Fairlane Country Sed (H.D.)	Orange	B7A-5310-F
Country Squire (H.D.)	Orange	B7A-5310-F
Custom Sedan (H.D.)	Orange	B7A-5310-F

1957 Ford V8

Model	Color Code	Part No.
Custom Sedan	Red	B7A-5310-B
Custom Sedan (H.D.)	Alum.	B7A-5310-C
Town Sedan	Alum.	B7A-5310-C
Town Victoria & Conv.	Yellow	B7A-5310-D
Club Victoria & Club Sed	Yellow	B7A-5310-D
Town Sedan (H.D.)	Yellow	B7A-5310-D
Ranchero & Sed Del	Blue	B7A-5310-E
Custom Ranch Wagon	Orange	B7A-5310-F
Country Sedan & Squire	Orange	B7A-5310-F
Ranchero (H D)	Orange	B7A-5310-F
Town Victoria & Conv. (H.D.)	Purple	B7A-5310-G
Fairlane Tudor Sedan	Purple	B7A-5310-G
Retractable Hard Top	Purple	B7A-5310-G
Custom Sedan (H.D.)	Grey	B7A-5310-H
Fairlane Country Sedan (H.D.)	Grey	B7A-5310-H
Country Squire (H D.)	Grey	B7A-5310-H

1957 Mercury (312" Eng.)

Mod l	C lor C d	Part No.
Exc Sta. Wgn & Conv. ①	Yellow	MG-5310-F
Exc Sta Wgn & Conv. ②	Orange	MG-5310-G
Convertible ①	Orange	MG-5310-G
Convertible ②	Brown	MG-5310-H
Station Wagon ①	Yellow	MG-5310-F
Station Wagon ②	Orange	MG-5310-G
Exc Convertible ①③	Green	MG-5310-J
Convertible ①③	Purple	MG-5310-K

1957 Mercury (368 ' Eng.)

Model	Color Code	Part No.
Exc. Sta Wgn & Conv. ①	Orange	MG-5310-G
Exc. Sta Wgn & Conv ②	Brown	MG-5310-H
Convertible (All)	Brown	MG-5310-H
Station Wagons (All)	Orange	④ MG-5310-G

① - Without Air Conditioning
② - With Air Conditioning
③ - Heavy Duty
④ - MG-5310-H may also be used on these models.

1958 Ford 6 Cyl.

Model	Color Code	Part No.
Custom Sedan	Green	B7A-5310-N
Custom Sedan (H D)	Red	B7A-5310-P
Town Sedan	Red	B7A-5310-P
Club Vict & Club Sedan	Red	B7A-5310-P
Town Vict. & Convertible	Alum	B7A-5310-Q
Town Sedan (H D)	Alum	B7A-5310-Q
Club Vict. & Club Sedan (H D)	Alum	B7A-5310-Q
Town Vict & Convtble (H.D)	Yellow	B7A-5310-R
Ranchero	Blue	B7A-5310-E
Station Wgn (H.D)	Blue	B7A-5310-E
Sedan Delivery	Blue	B7A-5310-E
Custom Sedan & Taxi (H D)	Orange	B7A-5310-F
Sta Wgn 9-Pass.(Fordomatic)	Orange	B7A-5310-F
Station Wagon		B8A-5310-A

1958 Ford 8 Cyl.

Model	Color Code	Part No.
Custom Sedan	Red	B7A-5310-P
Custom Sedan (H D)	Alum	B7A-5310-Q
Town Sedan	Alum	B7A-5310-Q
Thunderbird	Alum	B7A-5310-Q
Club Vict & Club Sedan	Yellow	B7A-5310-R
Town Vict & Convertible	Yellow	B7A-5310-R
Town Sedan (H.D)	Yellow	B7A-5310-R
Sedan Delivery	Blue	B7A-5310-E
Station Wagon (H D)	Orange	B7A-5310-F
Ranchero	Orange	B7A-5310-F
Retractable Hardtop	Purple	B7A-5310-L
Custom Sedan & Taxi (H D)		B7A-5310-M
Sta Wgn 9-Pass (H D)		B7A-5310-M
Station Wagon		B8A-5310-B
Sta Wgn. 9-Pass. (Fordomatic)		B8A-5310-C

1958 Edsel

Model	Part No.
Ranger & Pacer (Exc Conv & Sta Wgn	B8E-5310-A
Ranger & Pacer (Station Wagon)	B8E-5310-F
Pacer (Convertible)	B8E-5310-B
Corsair & Citation (Exc Conv)	B8E-5310-E
Citation (Convertible)	B8E-5310-D

1958 M rcury

M del	C l r C d	Part N .
Monterey (Exc Conv & Ph Sed)	Pink	①②MG-5310-M
Monterey Phaeton Sedan	Brown	③④MG-5310-N
Monterey Convertible	White	④⑤MH-5310-A
Montclair (Exc. Conv.)	Brown	③④MG-5310-N
Montclair Convertible	White	④⑤MH-5310-A
Park Lane (Exc.Conv)	Brown	③④MG-5310-N
Park Lane Convertible	White	④⑤MH-5310-A
Station Wagons	Brown	①②MG-5310-N

① - For Air. Cond. Cars, use MG-5310-N (Code Brown).
② - For heavy duty, use MG-5310-S (Code Purple).
③ - For Air Cond Cars, use MH-5310-A (Code White).
④ - For heavy duty use MH-5310-B (Code Red).
⑤ - For Air Cond Cars or for heavy duty, use MH-5310-B (Code Red) and ¼" shim, MG-5355-A and locator, MG-55328.

1959 Eds l

Model		Part N .
6 Cyl All Models (Exc Sta Wgn)		B7A-5310-Q
6 Cyl Station Wagon		B8A-5310-B
V8 292" Eng 4-Dr Hardtop (Std)	①	B9K-5310-A
V8 292" Eng 4-Dr Hardtop (H D)	②	B9K-5310-C
V8 292" & 332" Eng 2 & 4-Dr Sed (Std)	①	B9K-5310-A
V8 292" & 332" Eng 2 & 4-Dr Sed (H D)	②	B9K-5310-C
V8 292" & 332" Eng 2-Dr Hardtop (Std)	①	B9K-5310-A
V8 292" & 332" Eng 2-Dr Hardtop (H D)	②	B9K-5310-C
V8 332" Eng 4-Dr Hardtop (Std) ⑤	①	B9K-5310-A
V8 332" Eng 4-Dr Hardtop (H D) ⑤	④	B8E-5310-H
V8 332" Eng 4-Dr Hardtop (Std) ⑥	③	B9K-5310-B
V8 332" Eng 4-Dr Hardtop (H D) ⑥	④	B8E-5310-H
V8 361" Eng 2 & 4-Dr Sed (Std)	③	B9K-5310-B
V8 361" Eng 2 & 4-Dr Sed (H D)	④	B8E-5310-H
V8 361" Eng 2-Dr Hardtop (Std)	③	B9K-5310-B
V8 361" Eng 2-Dr Hardtop (H D)	④	B8E-5310-H
V8 361" Eng 4-Dr Hardtop (Std)	③	B9K-5310-B
V8 361" Eng 4-Dr Hardtop (H D)	④	B8E-5310-H
V8 Station Wagon (All Models)		PB9E-5310-D
Convertible (Std)	④	B9K-5310-C
Convertible (H D)	④	B8E-5310-H

① - Use B9K 5310-B on Air Cond Cars
② - Use B8E-5310-H on Air Cond Cars
③ - Use B9K-5310-C on Air Cond Cars
④ - With or without Air Cond
⑤ - Synchro-mesh Trans
⑥ - Automatic Trans

1959 F rd 6 Cyl.

Model	Col r Code	Part No.
All, Exc Following (Std)	Red	B7A-5310-P
All, Exc Following (H D)	Grey	B7A-5310-M
Convertible (Std)	Alum	B7A-5310-Q
Ranchero (Std)	Orange	B7A-5310-F
Sta Wgn (Std)	Brown	B8A-5310-B
Sta Wgn (H D)	Grey	B7A-5310-F

CONTINUED ON NEXT PAGE

1957-60 EDSEL, FORD, MERCURY (C ntinu d)

1959 Ford V8

Model	Color Code	Part No.
All, Exc. Following (Std.)	Alum.	B7A-5310-Q
292" Eng. ①②	Yellow	B7A-5310-R
332" & 352" Eng. ①	Yellow	B7A-5310-R
332" & 352" Eng. ①③	Purple	B7A-5310-L
Retractable Hardtop & Conv.	Purple	B7A-5310-L
Ranchero	Grey	B7A-5310-M
Ranchero (Air. Con.)	White & Red	B9A-5310-B
300 2 & 4-Dr. Sedans	White & Red	B9A-5310-B
Thunderbird (332" Eng.)	Alum	B7A-5310-Q
Thunderbird (430" Eng.)	Purple	B7A-5310-L
Station Wagon (Std.)	White & Red	B9A-5310-B
Station Wagon (Std.)	Pink	B8A-5310-C
Station Wagon⑤	White & Green	B9A-5310-A

① - Except Ranchero, Retractable Hardtop, Convertible & Station Wagon.
② - With Cruise-O-Matic, Air Conditioning, Std. Trans., or Fordomatic.
③ - With Overdrive, Fordomatic (2-Spd.) & Cruise-O-Matic.
④ - Air Conditioning & Synchro-mesh Trans.
⑤ - Cruise-O-Matic & Air Conditioning.

1959 Mercury

Mod l	Part No.
312" Eng. Monterey (Exc. Conv.), (Std.)	① B9M-5310-A
312" Eng. Monterey (Exc. Conv.), (H.D.)	② B9M-5310-E
383" & 430" Eng. Monterey (Std.)⑥	③ B9M-5310-C
383" & 430" Eng. Monterey (H.D.)⑥	① B9M-5310-G
383" & 430" Monterey Conv. (Std.)	① B9M-5310-D
383" Monterey Convertible (H.D.)	④ B9M-5310-C
430" Monterey Convertible (H.D.)	① B9M-5310-C
383" & 430" Montclair (Std.)	① B9M-5310-D
383" & 430" Montclair (H.D.)	④ B9M-5310-C
430" Parklane Convertible (Std.)	① B9M-5310-D
430" Parklane Convertible (H.D.)	④ B9M-5310-C
Station Wagon (Std.)	⑤ B9M-5310-B
Station Wagon (H.D.)	② B9M-5310-F

① - With or without Air Conditioning.
② - Use B9M-5310-B on Air Cond. Cars.
③ - Use B9M-5310-D on Air Cond. Cars.
④ - Use B9M-5310-G on Air Cond. Cars.
⑤ - Use B9M-5310-C on Air Cond. Cars.
⑥ - Except Convertible.

1960 Edsel

M d l & Engine	Part No.
6 Cyl. Exc. Station Wagon (Std.)	COKK-5310-C
6 Cyl. Exc. Station Wagon (H.D.)	COAA-5310-F
6 Cyl. Station Wagon (Std.)	COAA-5310-C
6 Cyl. Station Wagon (H.D.)	COAA-5310-G
292" V8 Exc. Sta. Wgn. & Conv. (Std.)	① COKK-5310-D
292" V8 Exc. Sta. Wgn. & Conv. (H.D.)	① COAA-5310-E
292" V8 Station Wagon (Std.)	① COAA-5310-B
292" V8 Station Wagon (H.D.)	① COAA-5310-F
292" V8 Convertible (Std.)	① COAA-5310-A
292" V8 Convertible (H.D.)	① ② COAA-5310-E
352" V8 Exc. Sta. Wgn. & Conv. (Std.)	① COAA-5310-A
352" V8 Exc. Sta. Wgn. & Conv. (H.D.)	① COAA-5310-E
352" V8 Station Wagon. (Std.)	① COAA-5310-B
352" V8 Station Wagon (H.D.)	① COAA-5310-F
352" V8 Convertible (Std.)	① COAA-5310-D
352" V8 Convertible (H.D.)	① ② COAA-5310-E

① - On Air Conditioned cars, use the following springs: COAA-5310-A (All models except 352" Eng. with Dual-Power Transmission & Convertibles). COAA-5310-D (352" Eng. with Dual-Power Transmission & Convertibles). NOTE - On convertible models with Dual-Power Transmissions, use Shim, B8E-5355-A also.
② - Use Shim, Part No. B8E-5355-A also.

1960 Ford 6 Cyl.

Model	Part No.
All Models Except Sunliner (Std.)	COAA-5310-C
All Models Except Sunliner (H.D.)	COAA-5310-G
Sunliner (Std.)	COAA-5310-A
Sunliner (H.D.)	COAA-5310-E

1960 Ford V8

►*NOTE: Spring part numbers are stamped on spring and each spring is also identified by a painted stripe as follows:*

Part No.	Paint Color
COAA-5310-A	Red
COAA-5310-B	Green
COAA-5310-C	Blue
COAA-5310-D	Yellow
COAA-5310-E	Orange
COAA-5310-F	Gray
COAA-5310-G	Purple

1960 Mercury (Without Air Conditioning)

Model	Engine	Part No.
Monterey (Exc. Conv.) Std.	312"	COMM-5310-A
Monterey (Exc. Conv.) H.D.	312"	COMM-5310-E
Monterey (Exc. Conv.) Std.	383"	COMM-5310-C
Monterey (Exc. Conv.) H.D.	383"	COMM-5310-G
Monterey Convertible, Std.	312"	COMM-5310-B
Monterey Convertible, H.D.	312"	COMM-5310-F
Monterey Convertible, Std.	383"	COMM-5310-D
Monterey Convertible, H.D.	383" ...①	COMM-5310-G
Montclair, All Models, Std.	All	COMM-5310-C
Montclair, All Models, H.D.	All	COMM-5310-G
Park Lane, All Models, Std.	All	COMM-5310-D
Park Lane, All Models, H.D.	All ...①	COMM-5310-G
Commuter Sta. Wgn., Std.	312"	COMM-5310-A
Commuter Sta. Wgn., H.D.	312"	COMM-5310-E
Commuter, Sta. Wgn., Std.	383"	COMM-5310-B
Commuter Sta. Wgn., H.D.	383"	COMM-5310-F
Colony Park Sta. Wgn., Std.	All	COMM-5310-B
Colony Park Sta. Wgn., H.D.	383"	COMM-5310-G
Colony Park Sta. Wgn., H.D.	430" ...①	COMM-5310-G

1960 Mercury (With Air Conditioning)

Model	Engine	Part No.
Monterey (Exc. Conv.) Std.	312"	COMM-5310-A
Monterey (Exc. Conv.) H.D.	312" ...①	COMM-5310-E
Monterey (Exc. Conv.) Std.	383"	COMM-5310-D
Monterey (Exc. Conv.) H.D.	383" ...①	COMM-5310-G
Monterey Convertible, Std.	312"	COMM-5310-C
Monterey Convertible, H.D.	312" ...①	COMM-5310-F
Monterey Convertible, Std.	383"	COMM-5310-D
Monterey Convertible, H.D.	383" ...①	COMM-5310-G
Montclair, All Models, Std.	All	COMM-5310-D
Montclair, All Models, H.D.	All ...①	COMM-5310-G
Park Lane, All Models, Std.	All	COMM-5310-D
Park Lane, All Models, H.D.	All ...①	COMM-5310-G
Commuter Sta. Wgn., Std.	312"	COMM-5310-B
Commuter Sta. Wgn., H.D.	312" ...①	COMM-5310-E
Commuter Sta. Wgn., Std.	383"	COMM-5310-B
Commuter Sta. Wgn., H.D.	383" ...①	COMM-5310-F
Colony Park Sta. Wgn., Std.	383"	COMM-5310-C
Colony Park Sta. Wgn., H.D.	383" ...①	COMM-5310-F
Colony Park Sta. Wgn., Std.	430"	COMM-5310-C
Colony Park Sta. Wgn., H.D.	430" ...①	COMM-5310-G

① - Use two or four Shims, Part No. MB-5355-B and two Locators, Part No. MG-55328 also.

UPPER CONTROL ARM: R moval - Raise car and place a stand under lower control arm. Remove wheel and tire and remove cotter pin from nut on upper ball joint stud, tnen loosen nut one or two turns (do not remove nut at this time). Place a box wrench over lower end of ball joint remover, Tool T57P-3006A (Ford), then install the tool between upper and lower ball joints, making sure that tool seats firmly against ends of both studs and not against stud nuts. Turn wrench until tool places studs under tension, then tap spindle near upper stud with a hammer to loosen stud in spindle (do not loosen stud in spindle with tool pressure only). If both arms are being removed, loosen lower stud in same manner as upper stud. Remove nut from upper stud and remove stud from spindle. Support spindle to prevent damage to brake hose. Remove nuts from retaining bolts on upper arm inner shaft (*CAUTION - These bolts are pressed into inner shaft and should not be turned when removing the nuts).* Remove upper control arm from mounting bracket (*CAUTION* -Measure and note thickness of shim pack at each inner shaft bolt).

Inspection: Inspect upper arm and inner shaft for cracks, bends, or other damage. Check condition of bushings, rubber seal on ball joint stud, and rubber bumper on arm. Replace as necessary. Install nut on ball joint stud, then turn stud in ball joint with a torque wrench. If turning effort is not within 25-40 inch pounds, replace the ball joint.

Upper Arm Bushing & Inner Shaft Replacement (All 1957 Models, Early 1958 Edsel, 1958-60 Thunderbird - With "Rubber-Type" Bushings) -With upper control arm assembly removed from car, remove bolts and washers from ends of inner pivot shaft. Use Bushing Remover, Tool T54P-3044-A10 and T54P-3044-A6 at front bushing and press bushing out of arm with an arbor press. Remove inner shaft from rear bushing, then press rear bushing out of arm with Tool T54P-3044-A5 and T54P-3044-A6. Use Tool T54P-4044-A6 and T54P-3044-A9 to press rear bushing into control arm (flange of bushing at outside of arm). Insert end of pivot shaft in rear bushing and press front bushing into arm with Tool T54P-3-44-A. Press all bushings into arm until shoulder ribs of bushings bottom on control arm. *CAUTION - Do not press bushings beyond edge of shoulder ribs or raised section of outer sleeve.*

Upper Arm Bushing & Inner Shaft Replacement (1958-60 Ford & Mercury, Late 1958-60 Edsel - With "Steel-Type" Bushings) - With upper control arm removed from car, hold shaft in a vise and turn bushing off shaft and out of control arm. Install a new "0" ring seal in each bushing, then coat inside of each bushing with a small amount of multi-purpose lubricant (coat outer threads also). *CAUTION - An excessive amount of lubricant inside bushing will force "0" ring seal out of place when bushing installed.* Insert inner shaft in upper control arm, making sure that "bow" in shaft is facing upward (except 1959-60 Mercury); toward center of car (1959-60 Mercury), then install Tool T58P-3044 (Ford); Tool 3082-A (Mercury). *NOTE - See "1959-60 Mercury Upper Susp nsion Arm Spacer Tool R work" above.*

CONTINUED ON NEXT PAGE

1957-60 EDSEL, FORD, MERCURY (C ntinu d)

With tool inserted between arms of upper control arm to properly locate arms the correct distance apart, place tool in a vise and thread bushing on each end of shaft, then turn bushings in until hex heads bottom on upper arm. *NOTE - New upper arms are not threaded. Bushings are self-tapping type.* Tighten bushings to 160-190 ft. lbs. Remove assembly from vise and remove tools, then check to see that shaft rotates with moderate effort. If shaft binds, check for misalignment.

►*1959-60 MERCURY UPPER CONTROL ARM & INNER PIVOT SHAFT REMOVAL & INSTALLATION NOTE:* Before removal of upper control arm, install bolts as described under "Camber & Caster Adjustment (Mercury) Note" above. This will hold wheel alignment procedures to a minimum after replacement of upper control arm.

Upper Ball Joint Replacement - *(NOTE* - The ball joint cannot be repaired and must be replaced if damaged). If ball joint is riveted to arm, drill a 1/8" pilot hole completely through each rivet, then drill off the rivet head through pilot hole with a 3/8" drill. Drive rivets out of holes. Remove burrs from hole edges and install new joint on arm, using only the specified bolts, nuts, and washers (furnished in Ball Joint Repair Kit). *CAUTION - Do not attempt to rivet new ball joint to arm.* Tighten nut on suspension arm bumper to 20-35 ft. lbs. and other ball joint retaining nuts and bolts to 28-45 ft. lbs.

Installation: Position upper arm on frame mounting bracket, then install but do not tighten the nuts on inner shaft retaining bolts *(NOTE - "Keystone" type lockwashers must be used on these bolts).* Install adjusting shims on both bolts between inner shaft and mounting bracket (Install the same thickness of shims that were removed from both ends during disassembly). Tighten nuts on both bolts to 65-90 ft. lbs. Position upper ball joint stud in top of wheel spindle then install stud nut and tighten to 80 ft. lbs. Continue to tighten until cotter pin hole and slots line up. Install cotter pin. Install wheel and tire and remove stand from under lower control arm. Tighten bolts on ends of inner shaft to 40-46 ft. lbs. Lubricate upper ball joint (do not lubricate upper arm bushings). Check and adjust front end alignment.

LOWER CONTROL ARM: Removal - Raise car and place stands under frame side members just back of lower arms and under both front wheels. Remove engine splash shields, disconnect stabilizer from lower arms and loosen both outer stabilizer bushing brackets. Remove both inner brackets, then slide one end of stabilizer at a time out of outer bushings. Disconnect lower end of shock absorber and push it up through lower arm. Remove cotter pin from nut on lower end of ball joint stud, then loosen nut two or three turns (do not remove nut from stud at this time). Loosen lower ball joint (procedure is the same as for upper ball joint, see above). Place a jack under lower arm, then remove nut from lower ball joint stud and slowly lower control arm on jack *(CAUTION - On Mercury be careful to prevent coil spring from jumping out of its seat).* Remove coil spring and insulator. Remove lower control arm retaining bolts, sleeve, and shims, and remove arm from car.

Inspection: Inspect lower arm for cracks, bends, or other damage, and replace arm if necessary. Check condition of ball joint and socket, bushings, rubber seal on ball joint stud, and rubber bumper on arm. Replace damaged parts.

Lower Arm Bushing Replacement - *(NOTE - Replace both lower arm bushings if either bushing is worn or damaged).* Using bushing removing tools, T54P-3044-A13 and T57P-3044-A (Ford), press both bushings out of arms with an arbor press. Press new bushings into arms with tools T57P-3044-A and T54P-3044-A7 (Ford). Bushing flanges must be at inner sides of arm.

Lower Ball Joint Replacement - *(NOTE* - The ball joint cannot be repaired and must be replaced if damaged). Replace ball joint assembly in same manner as for the upper ball joint (see above), using parts furnished in Ball Joint Repair Kit. *CAUTION - Do not attempt to rivet new ball joint to arm.* Tighten nut on suspension arm bumper to 20-35 ft. lbs. and other ball joint retainnuts and bolts to 28-45 ft. lbs.

Installation: Position lower arm on frame crossmember and install shims as needed between forward arm and frame member to remove all fore and aft motion of control arm assembly. Install pivot sleeve and retaining bolt in each arm but do not tighten bolts. Tape insulator to top of coil spring, then position insulator and spring between upper spring seat and lower arm *(NOTE - Mercury springs require a special procedure for installation. See "Mercury Spring Note" below).* Raise lower arm with a jack and guide lower ball joint stud into bottom of wheel spindle. Install and tighten nut to 70-80 ft. lbs., then continue to tighten nut until cotter pin hole and slots line up. Install cotter pin. Remove jack from under control arm and tighten arm retaining bolts to 40-46 ft. lbs. (make sure arms are in normal load position when bolts are tightened). Pull shock absorber down through coil spring and lower control arm and secure it in place. Connect stabilizer to both lower arms. Coat parts with vegetable soap solution and slide ends of stabilizer into outer bushings. Install inner bushing brackets and tighten all inner and outer brackets to 12-15 ft. lbs. Install engine splash shields. Lubricate lower ball joint (do not lubricate lower arm bushings). Check and adjust front end alignment.

►*MERCURY SPRING INSTALLATION NOTE:* Due to free height of the coil spring being greater than distance between upper and lower spring seats, it is necessary to compress the springs approximately 4" before installation. Install spring in an arbor press (if possible, use a salvage 1957 Mercury lower control arm as a holding fixture to properly retain angled lower end of spring while it is being compressed). Compress spring approximately 4", then fasten chains on sides of spring coils so spring will have a slight curve. Remove from press and install in car, making sure that end coil is fully seated in lower control arm.

FRONT WHEEL SPINDLE: R m val - Raise car until front wheel clears floor, then place a support under lower control arm. Remove wheel and drum. Remove brake backing plate and support it to prevent damage to brake hose. Remove upper and lower ball joints (see above), and remove spindle.

Installation: Reverse removal procedure and note the following: Install brake backing plate and tighten upper retaining bolts to 62-72 ft. lbs. Tighten lower bolts to 25-29 ft. lbs. Check and adjust front wheel alignment.

STABILIZER: *NOTE - Removal & Installation of stabilizer is different on Ford and M rcury as not d b low:*

Removal (Ford): Raise car and place supports under both front wheels. Remove engine splash shields and disconnect stabilizer from lower control arms. Loosen both stabilizer outer bushing brackets and remove both inner bushing brackets. Slide one end of stabilizer at a time out of outer bushings.

Installation (Ford): Connect stabilizer to both lower arms. Coat parts with vegetable soap solution and slide ends of stabilizer into outer bushings. Install both inner bushing brackets, and tighten all inner and outer brackets to 12-15 ft. lbs. Install engine splash shields.

Removal (Mercury): Remove engine splash pan and front wheel. Remove two stabilizer to frame mounting brackets and slide left rubber mounting insulator along stabilizer bar about three inches toward center of car. Disconnect stabilizer bar from links and remove rubber insulators from eyes of bar. With front suspension in full rebound, remove bar by moving it out to right of car. The right eye at end of stabilizer bar will just pass over right front brake drum. *NOTE* - It may be necessary to spread coils of left spring slightly to allow left end of stabilizer bar to pass through spring during removal.

Installation (Mercury): Reverse removal procedure. Tighten bracket bolts to 12-15 ft. lbs.

1957-60 FORD THUNDERBIRD LINCOLN & CONTINENTAL

Ford Thunderbird (1957)
Lincoln (1957-60)
Continental (1957-60)

►*JACKING & HOISTING: See "Jacking & Hoisting Precautions".*

►*1958-60 LINCOLN & CONTINENTAL LOWER CONTROL ARM BALL JOINT CHECKING NOTE: Ball joint is not spring loaded and will appear to have excessive movement when wheel is shaken. This movement is normal and does not affect operation of joint.*

DESCRIPTION: "Ball-joint" type with direct acting shock absorbers mounted within front coil springs.

ADJUSTMENTS

CHECKING & ADJUSTING: *ADJUSTMENT NOTE - Due to differences in mounting upper control arm shaft and location of caster & caster adjusting shims, Thunderbird models are adjusted differently than Lincoln & Continental models. See Adjustment data following:*

Tire Inflation: Lincoln (1957-60) - 24 lbs., front & rear. **Continental (1957)** - 26 lbs., front; 24 lbs., rear. **Continental (1958-60)** - 24 lbs., front & rear. **Thunderbird (1957)** - 22 lbs., front & rear.

Caster: Lincoln (1957-60) - 0° to Neg. 1½°. **Continental (1957)** - Pos. 1°±¼°. **Continental (1958-60)** - 0° to 1½°. **Thunderbird (1957)** - Pos. ½° to Pos. 1½°. Caster should not vary more than ½° from side to side. *See "Shimming Procedure" below.*

Camber: Lincoln (1958-60) - 0° to Pos. ¾°. **Continental (1957)** - Pos. ¾°±¼°. **Continental (1958-60)** - 0° to Pos. ¾°. **Thunderbird (1957)** - Pos. ½° to Pos. 1½° Camber should not vary more than ¼° from side to side. *See "Shimming Procedure" below.*

Toe-In: Adjust to following specifications.

Toe-In Specifications

Model	Toe-In
Lincoln (1957-59)	1/8-3/16"
Lincoln (1960)	1/16-3/16"
Continental (1957)	3/32-5/32"
Continental (1958-59)	1/8-3/16"
Continental (1960)	1/16-3/16"
Thunderbird (1957)	1/16-1/8"

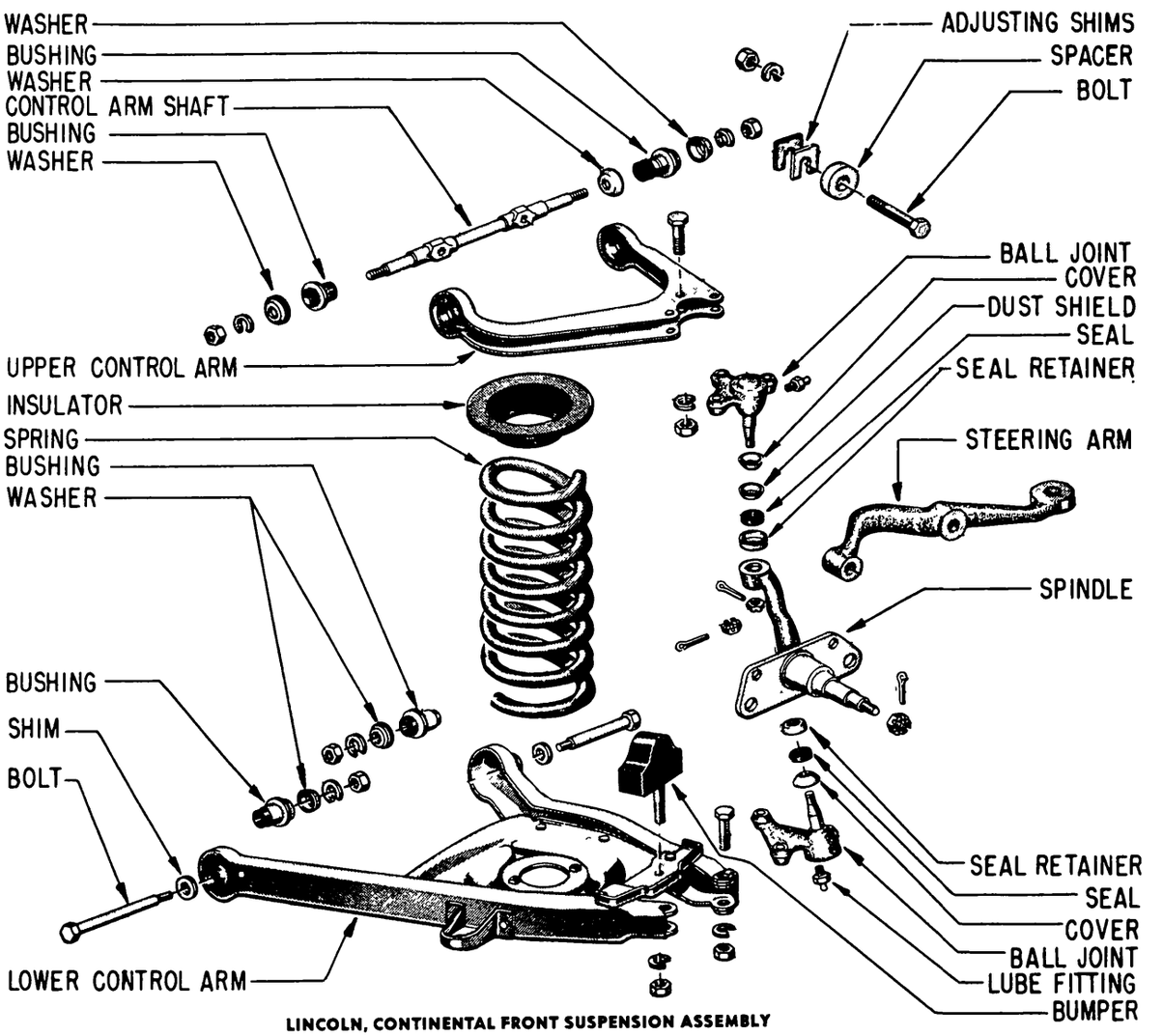
Toe-Out In Turns: Wheel angles should be as follows. No adjustment provided.

Wheel Angle Specifications

Model	Inner Wheel	Outer Wheel
Lincoln (1957)	36°	26°
Lincoln & Cont. (1958)	27°45'	28°
Lincoln & Cont. (1959-60)	37°45'	27°26'
Thunderbird (1957)	25°	20°

Shimming Procedure: Caster and camber adjustments are made by adding or removing shims between upper control arm mounting shaft and frame mounting bracket. To change caster, remove or add shims at one of the mounting bolts. *(NOTE - On Thunderbird, the adjusting shims are located between inner side of mounting shaft and frame bracket. On Lincoln & Continental these shims are located between outer side of mounting shaft and frame bracket).* On Thunderbird, to **increase positive caster,** add shim at **front** bolt or remove shims at **rear** bolt. On Lincoln & Continental, to **increase positive caster,** add shim at **rear** bolt or remove shim at **front** bolt. To change camber, remove or install equal shim thicknesses at both front and rear mounting bolts. On Thunderbird, for positive camber increase, add shims equally at both bolts. On Lincoln & Continental, remove shims equally at both bolts. A 1/16" shim change at either bolt will change caster ½°. A 1/16" shim change at both bolts will change camber ¼°. Tighten control arm mounting shaft bolts to 65-90 ft. lbs. (Thunderbird), 75-90 ft. lbs. (Lincoln & Continental).

►*ADJUSTING SHIM THICKNESS NOTE:* Difference in thickness of shim pack at front and rear bolts must not exceed 1/8". Total shim pack thickness at each bolt must not exceed 9/16".



LINCOLN, CONTINENTAL FRONT SUSPENSION ASSEMBLY

1957-58 Tightening Specifications (Lincoln & Continental)

	Ft. Lbs.
Lower Control Arm to Front Underbody	55-75
Lower Ball Joint to Wheel Spindle	70-90
Lower Control Arm Bumper to Arm	22-24
Shock Absorber to Lower Arm	10-13
Shock Absorber Top Attaching Nut	60-75
Stabilizer Assembly & Bracket	22-24
Upper Ball Joint to Wheel Spindle	60-80
Upper Control Arm Inner Shaft to Shaft Bushings	55-75
Upper Control Arm Shaft to Underbody	70-80

CONTINUED ON NEXT PAGE

1957-60 FORD THUNDERBIRD LINCOLN & CONTINENTAL (Cont.)

1959 Tightening Specifications (Lincoln & Continental)

	Ft. Lbs.
Lower Control Arm to Front Underbody	70-80
Lower Arm Bumper to Lower Arm	22-28
Shock Absorber Mounting Plate to Lower Arm	18-24
Shock Absorber Top Attaching Nut	55-75
Stabilizer Assembly	28-35
Wheel Nuts	75-85

1960 Tightening Specifications (Lincoln & Continental)

	Ft. Lbs.
Lower Arm to Front Underbody	35-50
Rear Lower Arm to Crossmember	35-50
Lower Arm Ball Joint to Wheel Spindle	70-90
Lower Arm Bumper to Lower Arm	22-28
Shock Absorber Mounting Plate to Lower Arm	18-24
Shock Absorber Top Attaching Nut	40-60
Stabilizer Assembly & Stabilizer Bracket to Frame	28-35
Stabilizer to Lower Arm	28-35
Upper Arm Ball Joint to Wheel Spindle	60-80
Upper Arm Inner Shaft to Inner Shaft Bushings	35-50
Upper Arm & Shaft to Underbody	70-80

1957 Tightening Specifications (Thunderbird)

	Ft. Lbs.
Upper Control Arm Inner Shaft to Frame	65-90
Upper Control Arm Inner Shaft to Bushings	40-46
Upper Ball Joint to Wheel Spindle	80
Lower Ball Joint to Wheel Spindle	70-80
Lower Control Arm Bumper to Arm	20-35
Lower Control Arm to Inner Brackets	40-46
Stabilizer Assembly Brackets	12-15

RIDING HEIGHT: 1957 Lincoln - 4.18-4.65" measured vertically from underside of frame to top of lower control arm adjacent to bumper.

1958 Lincoln & Continental - With car on a level surface and at curb weight (no passengers, luggage compartment unloaded, and gas tank full) bounce car several times and allow it to settle to normal height. Measure distance from level surface on float to center of front inner pivot of lower control arm, then measure distance from level surface of floor to bottom of lower ball joint on same side of car. The differences between these measurement should be between 1 5/32" and 1 21/32" (1958); 1½ and 2" (1959); 2" and 2¾" (1960). Measure opposite side of car in same manner. Difference between sides should not exceed ½".

1957 Front Spring Application

Model	Spring No.
Thunderbird	B5A-5310-B
Lincoln, (Exc. Conv. & Air. Cond.)	LD-5310-K
Lincoln (Conv. & Air Cond. Cars)	LD-5310-L
Lincoln (Heavy Duty)	I-500915
Continental	4050384

1958 Front Spring Application

Model	Part No.
All (Exc. following)	LF-5310-C-F
Convertible	LF-5310-D-3
Air Cond. & Hvy. Duty	LF-5310-D-3

1959 Front Spring Application

Model	Part No.
All (Standard)	LF-5310-J
All (Hvy. Duty)	LF-5310-K

1960 Front Spring Application

Model	Part No.
Lincoln (Std.) ①	LF-5310-J
Lincoln (H.D.) ①	LF-5310-K
Lincoln (Std.) ②	LF-5310-K
Lincoln (H.D.) ②	LF-5310-K
Continental Convertible & Landau (Std.) ①	LF-5310-K
Continental Convertible & Landau (H.D.) ①	LF-5310-K
Continental Convertible & Landau (Std.) ②	LF-5310-K
Continental Convertible & Landau (H.D.) ②	B9L-5310-A
Continental (Other Models)	④

① - Without Air Conditioning. ② - With Air Conditioning.
③ - Use Shim, Part No. PB8L-5355-A as necessary.
④ - Same as Lincoln models.

REMOVAL & INSTALLATION

►*SHOCK ABSORBER APPLICATION NOTE: See "Shock Absorbers" on Car Model pages.*

COIL SPRING REPLACEMENT: *See "Lower Control Arm" below.*

LOWER CONTROL ARM: Removal - Raise front of car and place stand under each side of frame or underbody to rear of lower control arm. *NOTE - See "Jacking & Hoisting Precautions".* Remove wheel and brake drum as an assembly, then remove backing plate assembly from spindle and attach to frame with a wire. Remove shock absorber and disconnect stabilizer bar from lower arm. Loosen lower ball joint-to-wheel spindle stud nut two turns and loosen ball joint *(see "Ball Joint Removal" below).* Place a jack under lower control arm and raise arm until rebound bumper on upper arm is clear of frame or underbody. Remove nut from lower ball joint stud and lift spindle up and off stud. Lower jack until spring tension is relieved and spring can be removed. Remove spring, insulator and retainer ring note (location of these parts to insure correct reassembly). To remove lower control arm, take out bolts attaching arm to frame or underbody. Inspect bushings on inner end of each member and replace if necessary.

Bushing Replacement - Press bushings from control arms using an arbor press and the following tools: 3069, 3069-F, & 3069-J (Lincoln & Continental), T54P-3044-A13, & T54P-3044-A6 (Thunderbird). Install bushings in control arm with tools 3069 & 3069-A (Lincoln & Continental), T54P-3044-A6 & T54P-3044-A7 (Thunderbird). Press bushings into arm until shoulder ribs of bushings bottom on control arm. *(CAUTION* - Do not attempt to press bushings beyond edge of shoulder ribs or raised section of outer sleeve. Under no circumstances should only one bushing be replaced).

Installation: Install lower arm rear leg to frame or underbody crossmember and tighten attaching nut to proper specifications *(see "Tightening Specifications" above).* Add enough shims between forward arm and crossmember to fill existing space and tighten nut finger tight. *NOTE - Shim pack at this point should not exceed ½".* Loosen nut on rear bolt to a finger tight position. With arm in curb load position (approximately horizontal, with outer end slightly lower than inner), tighten nuts to specifications. Place coil spring and upper rubber insulator in position, then place a jack under lower control arm and compress the spring, making sure that both upper and lower ends of spring are properly seated. Guide spindle boss over ball joint stud, then install stud nut and tighten to specifications. Continue to tighten nut until cotter pin hole is lined up with slot in locknut. Remove jack from under control arm and install shock absorber. Secure stabilizer to lower control arm, then install backing plate, wheel, and drum. Adjust front end alignment.

BALL JOINT (UPPER & LOWER): Removal - Ball joints are furnished as assemblies except for seals and related parts assembled on ball joint stud. Raise front of car with a jack placed under lower control arm, then place a support under frame side rail to rear of control arm. Remove front wheel and cotter pin in ball joint stud *(NOTE* - If both ball joints are to be removed, free the lower stud first). Loosen stud nut approximately two turns and install Tool 3006-A with the screw end resting against lower stud nut. Turn screw of tool and apply sufficient pressure to place ball joint under tension. Strike the spindle sharply at a point opposite the stud bore to pop it loose. Increase tension and strike again if necessary *(CAUTION - Spindle or tool may be damaged if pressure only is used to free stud).* Repeat this procedure with other stud if necessary. Remove ball joint from control arm by removing the attaching screws. Remove retainer, seal, and covers from stud. Inspect parts for damage and replace if necessary. If new rubber seals are being installed, make sure they are pushed down into retainer cup before cup is installed. Reassemble all seal parts in original position.

►*CAUTION: Do not wash ball joint assemblies with solvent which may remove lubricant.*

Installation: Reverse removal procedures and tighten all bolts and nuts to proper specifications. *See "Tightening Specifications" above.*

UPPER CONTROL ARM: Removal - Place jack under lower control arm near ball joint mounting and raise lower arm until some of the tension has been removed from upper control arm. Remove wheel and tire assembly. Wire spindle to frame to avoid damage to brake hose.

CONTINUED ON NEXT PAGE

1957-60 FORD THUNDERBIRD LINCOLN & CONTINENTAL (C nt.)

Remove cotter pin from ball joint stud and loosen nut approximately two turns. Loosen ball joint stud *(see "Ball Joint R moval" abov)*, then remove ball joint nut. Remove bolts securing inner shaft to frame *(NOTE* - Check and record amount of shims removed from between control arm mounting shaft and frame). Remove upper control arm.

Bushing R plac m nt (Linc ln & Continental) - Install Tool 3044-B on inner shaft and place Tool 3069 over bushing. Press bushing from arm. Remove mounting shaft and steel washer. To remove the opposite (double shoulder bushing), on rear upper arm, insert Tool 3069-F into flange of arm, then place Tool 3069 over bushing and into recess of Tool 3069-F. Center bushing over Tool 3069-G and press out *(NOTE* - Tool 3069-G will shear rubber until steel shell is contacted). To install double shouldered bushing in rear of upper arm, lubricate rubber portion of bushing for easier installation. Position Tool 3069 on inner side of rear arm. Install bushing in hole (entering it from outer side of arm), and position Tool 3068 over bushing. Press bushing into arm until shoulder stop is reached. Install long machined end of inner mounting shaft, with washer, into bushing. Install bushing in front arm, positioning it over end of shaft and pressing it into place with Tool 3068. With both bushings in place, install nut and washer on each end of shaft and tighten finger tight. Position shaft in suspension arm so that holes are parallel with shaft and tighten nuts to specifications. S *"Tightening Specifications" above. CAUTION - Under no conditions should only one bushing be installed.*

Bushing Replacement (Thunderbird) - Install bushing remover Tools T54P-3044-A6 & T54P-3044-A5 in arbor press and press rear bushing out of arm. Install rear bushing with Tools T54P-3044-A6 & T54P-3044-A9. Bushing flange should be at outer side of arm. Insert end of mounting shaft in rear bushing, then press new front bushing into arm using Tool T54P-3044-A8. Install bolts and washers on both ends of shaft, but do not tighten bolts until upper arm is installed on the mounting bracket.

1958-59 LINCOLN & CONTINENTAL REAR SUSPENSION

Linc ln (1958-59)
C ntinental (1958-59)

►*JACKING & HOISTING See "Jacking & Hoisting Precauti ns".*

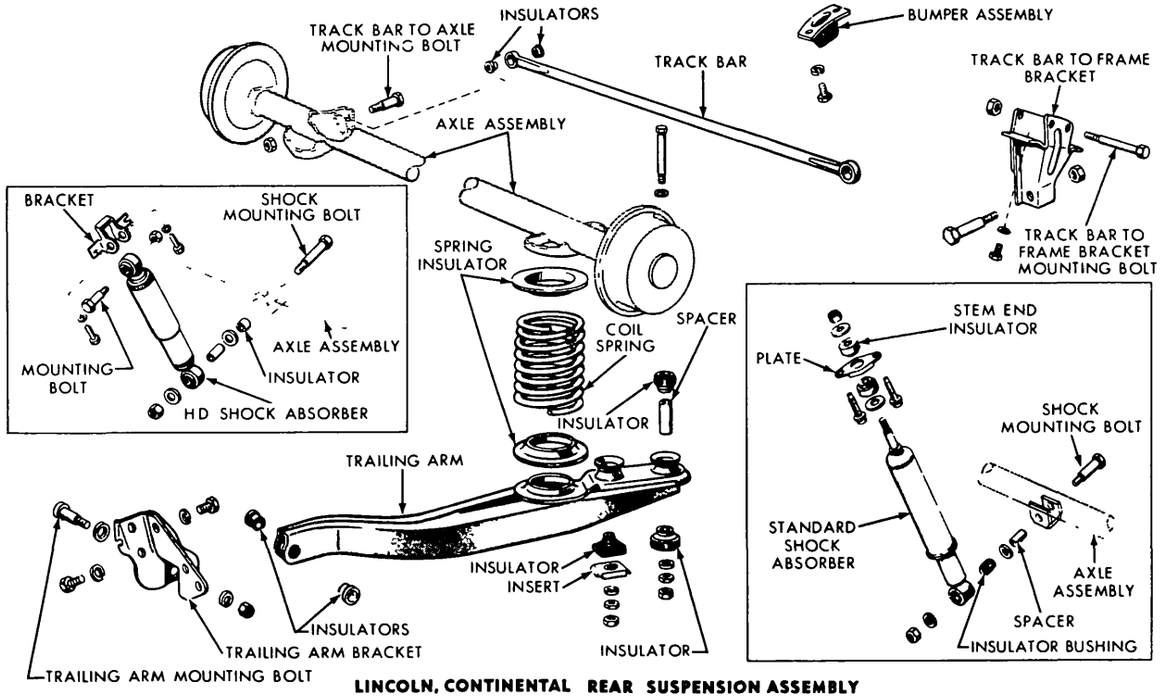
►*1958 SUSPENSION ARM BUSHING & PIN ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT*

NOTE: Larger suspension arm pin assemblies, Part No LF-5886-D (7/8" diameter), and bushings, Part No. LF-55272-A are used in later production cars. If suspension arms are removed or if noise occurs in this area on earlier cars, install later type pin and bushing assen.blies

►*1959 TRAILING ARM MOUNTING BOLT TIGHTENING CAUTION (T prev nt xcessive wear and noise):* Trailing arm axle mounting bolts (with double nuts) should be tightened to 50-60 ft. lbs. and the trailing arm-to-hanger bolts should be tightened to 55-65 ft. lbs. every 4,000 miles. If loss of torque is noted, insulators and spacers should be inspected for wear and replaced as necessary.

DESCRIPTION: Coil spring rear suspension system consists of two suspension arms connected at the rear to rear axle housing and at the front to brackets attached to car underbody. Coil springs are located between suspension arms at center and spring seat in underbody A stabilizer bar connected to underbody on left side and to rear axle housing on right side control lateral movement of rear axle housing

COIL SPRINGS: R moval - Raise car on a hoist or jack and place a jack stand under box section of underbody directly opposite each end of fuel tank. Using a floor jack, raise rear axle housing and disconnect lower end of shock absorber from rear axle housing Remove locknut, nut, and bolts securing suspension arms to rear axle housing, then lower rear axle housing just enough to free coil springs. *NOTE* - If a replacement of a spring is necessary, both should be replaced.



LINCOLN, CONTINENTAL REAR SUSPENSION ASSEMBLY

Installation: Reverse removal procedure

Model	Rear Spring Application	Part No.
All (Exc Following)		LF-5560-C
Convertible		LF-5560-D
Heavy Duty & Air Cond		LF-5560-D

REAR SUSPENSION ARMS: Remove coil springs (see above), then disconnect parking brake cable and hydraulic brake line from suspension arms Remove nut and bolt securing arm to underbody bracket and withdraw arm

Installation: Reverse removal procedure.

1958 FORD & MERCURY REAR SUSPENSION (AIR SUSPENSION CARS)

F rd (Except Thunderbird) (1958)
M rcury (1958)

DESCRIPTION: Rear axle is attached to car frame by two trailing arms which allow vertical and roll movement. A track bar located to rear of axle assembly is attached to frame side rail on one side and to rear axle housing on the other to control lateral movement of the axle Shock absorbers are mounted at the top to brackets located at rear of frame crossmember, and at the bottom to brackets located on front of rear axle housing.

REAR SUSPENSION ARM: Removal Loosen air line connection at top of air spring assembly and allow pressure to escape. *(CAUTION - Do not remove fitting while spring is under pressure).* Remove air spring lower mounting nut, then remove four nuts securing rear of suspension arm to suspension arm mounting bracket. Remove locknut from forward end of suspension arm and remove metal washer. Remove suspension arm assembly by pulling toward rear and out of rubber bushing. Remove remaining rubber bushing and washer from arm assembly, then remove rubber bushing from frame bracket.

Installation: Position metal washer and bushing on suspension arm and position arm in frame bracket. Install second bushing on arm and install outer washer and locknut. Install four locknuts attaching suspension arm to arm mounting. Install rear spring lower mounting nut and connect air line fitting to top of air spring.

SUSPENSION ARM MOUNTING BRACKET: Removal - Loosen, but do not disconnect, air line at top of spring, and allow air pressure to escape. After pressure has escaped, disconnect the air line. Remove four locknuts holding suspension arm on mounting bracket *(NOTE* - Bolts cannot be removed until bracket is removed) Support rear axle assembly with jack stands, then remove two bolts and nuts securing bracket on rear axle assembly, and remove bracket Remove retaining bolts from bracket.

Installation: Position suspension arm mounting bolts in bracket, then position bracket in mounting bracket on rear axle assembly and install retaining nuts and bolts (heads of bolts toward centerline of car). Position rear suspension arm on bracket and install four locknuts and tighten to 65-75 ft. lbs. Tighten bracket mounting nuts to 80-100 ft. lbs. Connect air line to spring.

TRACK BAR: Removal (Ford) - Remove locknut from end of track bar on right side and remove washer, rubber bushing and the second washer. Remove bolts securing left side mounting bracket to frame, then pull left mounting bracket and bar as an assembly, out of right mounting bracket.

R moval (Mercury): On right side of car, remove nut on track bar bracket and pull track bar from bracket. Remove rubber bushings and washers. Remove nut from left end of track bar and pull bar from bracket, then remove rubber bushings and washers.

Installati n (Ford & M rcury): Reverse removal procedure.

1958 FORD THUNDERBIRD REAR SUSPENSION

F rd Thund rbird (1958)

►*JACKING & HOISTING: See "Jacking & Hoisting".*

DESCRIPTION: Rear axle is attached to car underbody by two suspension arms at each side. Lower suspension arms are attached to lower side of rear axle housing at the rear and to a bracket in car body at the front. Upper suspension arms are attached to top of rear axle housing adjacent to brake backing plate, and to car body. A track bar connected to a bracket on left side of car body and to a bracket on right end of rear axle housing control lateral movement of rear axle assembly. Shock absorbers are mounted between a bracket on rear side of rear axle housing and a bracket on car body.

REMOVAL & INSTALLATION

TRACK BAR: Removal - Raise car and remove nut and bolt from each end of track bar, and remove track bar. If bushings are to be replaced, remove old bushings.

Installation: To install new bushings, apply RuGlyde or a similar lubricant and press bushings into track bar, using Tool T58P-55551-A-1 and an arbor press. Support end of track bar on Tool T58P-55551-A-3 while pressing bushings into place. Position track bar in mounting brackets and tighten mounting bolts to 80-100 ft. lbs.

LOWER SUSPENSION ARM: Removal - Raise car and install supports under rear crossmember *(NOTE - If twin post hoist is used there must be at least 4¾" clearance between hoist fork and suspension arm horizontal mounting bolt).* Remove rear wheels and disconnect drive line at rear universal joint. Disconnect both shock absorber lower mounting brackets and disconnect brake fluid line bracket. Disconnect track bar at axle mounting bracket, then disconnect both upper suspension arms at front, and lower rear axle assembly, and remove the spring. Remove nut from insulator retaining bolt, and remove the insulator washer, lower insulator spacer and bolt. Remove horizontal bushing retaining bolt, then remove lower arm front retaining bolt, and remove suspension arm. Remove four bolts attaching support mounting to suspension arm. Using Tool T58P-55551-A-1 and Tool T58P-55551-A-3, press out bushings from support and from front of arm.

Installation: Apply RuGlyde or a similar lubricant to bushings, then press bushings into support and front of arm, using an arbor press and the same tools used for bushing removal (see above). Install support on arm and tighten mounting nuts to 65-75 ft. lbs. Install front end of arm in mounting bracket then install, but do not tighten, mounting nut and bolt. Position rear end of arm so the support bolt coil spring and upper insulator can be positioned Install, but do not tighten, the nut. Position insulator retaining bolt, spacer, lower insulator, and washer. Install, but do not tighten, the nut Raise axle assembly so upper arms can be connected to body, then partially tighten attaching bolts. Connect track bar, leaving bolt partially loose. Remove safety stands so axle will be positioned at normal ride height and tighten all nuts and bolts to specifications *(see "Tightening Specifications" below).* Connect shock absorbers and tighten mounting bolts to 12-15 ft. lbs. Connect brake line bracket, then install wheels and connect rear universal joint. Tighten nuts to 15-20 ft. lbs., and lower car to floor

COIL SPRINGS: Removal - Raise and support car *(see* "Lower Suspension Arm" above), then remove rear wheels and disconnect rear universal joint Disconnect both shock absorbers at lower mounting bracket, and disconnect brake fluid line bracket. Disconnect track bar from axle mounting bracket and both upper suspension arms at front end Lower axle assembly and and remove the coil spring (upper insulator may fall out). Remove coil spring insulator from spring pocket.

Installation: Tape coil spring insulator to top of spring and position spring in its pocket and on suspension arm pedestal *(NOTE - Lower end of spring must seat against end of boss on pedestal).* Raise rear axle assembly so it is at normal riding height Connect track bar, and tighten bolt to 80-100 ft. lbs. Connect upper arms and tighten bolts to 80-100 ft lbs Connect shock absorbers and tighten nuts to 12-15 ft lbs., then connect brake line bracket. Install wheels and connect universal joint Tighten nuts to 15-20 ft lbs and lower the car

►*COIL SPRING REPLACEMENT NOTE: Standard spring, Part No. B8S-5560-A, is the only spring available for these models.*

SHOCK ABSORBERS: Removal - Disconnect shock from suspension arm mounting bracket, then remove rear wheel and disconnect shock at body bracket and remove shock Remove bushing and washer from upper stud *(NOTE* - Remove lower bushing only if shock absorber is serviceable and bushing requires replacement, using an arbor press and Tools T57P-18201-A1 & A5)

Installation: If bushing was removed, install a new bushing using Tools T57P-18201-A1, A4 & A5 ·Use RuGlyde on bushing and drive it into place with one quick movement of arbor press Complete installation by reversing removal procedure Tighten upper nut to 15-25 ft lbs , and lower nuts to 12-15 ft. lbs.

Tightening Specifications

	Ft. Lbs.
Shock Absorber Lower Nuts	12-15
Shock Absorber Upper Nut	15-25
Rear Universal Joint Flange	15-20
Lower Suspension Arm to Support Assembly	65-75
Track Bar to Rear Axle	80-100
Track Bar to Bracket on Body	80-100
Rear Suspension Arm Pivot (front)	80-100

1954-55 NASH & RAMBLER FRONT SUSPENSION

Nash (1954-55)
Rambler (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 ALL CARS (EXC RAMBLER) FRONT SUSPENSION CROSSMEMBER INSTALLATION CAUTION:* Reinstallation of the crossmember after removal for service operations requires special attention to proper spacing of the suspension brackets as follows. There should be 19½" between the centers of the front and rear inner crossmember-to-mounting bolt bracket holes to insure maintaining the front wheel alignment.

DESCRIPTION: Independent linked parallelogram type with new type coil spring and shock absorber mounting as follows

Coil Springs—Mounted above upper control arm with lower end piloted in spring seat mounted on knuckle support upper trunnion and upper end piloted on spring seat in frame

Shock Absorber—Upper end mounted on bracket (part of upper control arm pivot bar—Rambler)

►*NOTE Front Suspension Systems are similar, but parts are not interchangeable*

►*CONTROL ARM ASSEMBLY INTERCHANGEABILITY CAUTION* Upper Control Arm and Lower Control Arm assemblies **are interchangeable from right to left on Rambler Series only.** Statesman & Ambassador require different control arms for right and left and for front and rear arms

CHECKING & ADJUSTMENT: Check wheel bearing adjustment steering gear adjustment, tire inflation pressure, wheel and tire balance and runout, then place car on level floor, check as follows

Kingpin Inclination: 8½° (Rambler), 6½° (Nash) Not adjustable.

Camber: Rambler - Pos. ¼° to Pos ¾° (½° preferred). **Nash** - Neg ¼° to Pos ¼° (0° preferred)

►*NOTE Loosen front suspension brace before adjusting Caster and Camber.*

Adjustment - Add or remove "C" washers equally at both studs, as required between lower support arm pivot bar and frame bracket or shoulder of mounting stud Adding washers will **increase** Camber angle Removing washers will **decrease** Camber angle

►*CAUTION* "C" washers of equal thickness must be removed or installed from each end of control arm pivot bar OR CASTER WILL BE CHANGED

Caster: Rambler - Pos ¾° to Pos 1¼° (1° preferred)
Nash - Manual Steering - 0° to Pos ½° (0° preferred)
Power Steering - Pos ½° to 1° (1° preferred)
Adjustment - Add or remove "C" washers between lower control arm pivot bar and frame bracket or mounting stud shoulder To increase Caster, ADD "C" washer at FRONT end of pivot bar To decrease Caster, ADD "C" washer at REAR end of pivot bar.

Toe-In: Rambler - 1/8" to 1/4" (1/4" preferred) **Nash** - 1/16" to 3/16".

Adjustment - Measured at a point 8" above floor with wheels set in straight-ahead position Loosen tie rod adjusting tube clamps and turn adjusting tubes equally in opposite directions

►*NOTE Before tightening tie rod clamp bolts, square up the ball joint studs.*

Toe-Out on Turns: With inner wheel turned as indicated below, outer wheel should be as follows

Car Model	Inner Wheel	Outer Wheel
Rambler (1954)	23°, plus ½°, minus 0°	20°
Rambler (1955)	25°	21½°
Nash (1954 Amb.)	23°, plus ½°, minus 0°	20°
Nash (1954 Stsm.)	23½°, plus ½°, minus 0°	20°
Nash (1955 Amb. V8)	25°	©
Nash (1955 Stsm)	25°	20¾°

© - 20¼° (Exc. V8 Pwr. Strg.), 21¾° (Pwr Strg.).

UPPER & LOWER CONTROL ARMS: Control arms are attached to pivot bars by rubber insulated bushings Outer end of control arm is attached to trunnions by threaded bushings except the upper trunnion on Rambler which is attached with a screw and locked in place with a nut and lockwasher

Removal Remove the Harris type rubber bushings by driving them straight out of control arm Do not turn or twist (bushings must be tight press fit)

Installation Rubber bushings can be installed into the control arms by using two inner bearing cones of suitable size (Statesman or Rambler rear axle rear pinion bearing inner cone is right size) as pressing tools Place control arm in arbor press and start bushing into flanged side of control arm Install pivot bar inner washer over bushing and place cups in position (one over washer and the other on the under side of control arm to provide clearance in press) Press bushing into control arm until bushing is ⅛" from arm

Steering Knuckle Pin Installation (Lower) Screw knuckle pin into lower trunnion until there is approximately ⅛" clearance between shoulder on knuckle pin and trunnion

Steering Knuckle Pin Installation (Upper-Nash): Upper control trunnion incorporates needle bearings and is retained on knuckle pin by a castellated nut and pin. A thrust bearing installed on knuckle pin between lower side of upper trunnion and a shoulder on knuckle pin absorbs end thrust of knuckle pin.

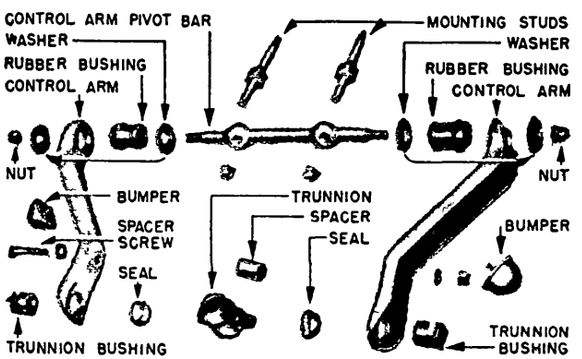
Steering Knuckle Pin Installation (Upper-Rambler): On 1954 models, bolt the spring seat to trunnion prior to installation of knuckle pin into trunnion, then proceed as for lower knuckle pin (above) 1955 Models are the same as for Nash (above) *NOTE - On 1955 models, two self-tapping screws must be removed to permit removal of lock pin.*

Front Suspension Tightening Specifications: *NOTE*—It is very important that tightness of front suspension system be maintained The following torque values will insure correct tightness

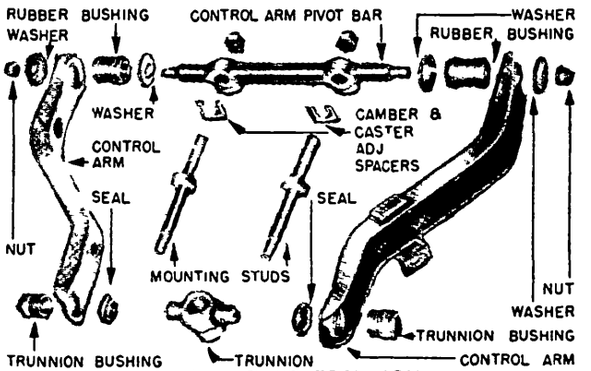
	Ft Lbs
Pivot Bar Bushing Retaining Nut	50-55
Lower Shock Mounting	90-95
Upper Control Arm Spacer Nut Screw	50-55
Lower Mounting Stud to Sill	75-85
Upper Mounting Stud to Sill	35-45
Upper Pivot Bar to Mounting Stud Nut	75-80
Lower Pivot Bar to Mounting Stud Nut	75-85

COIL SPRING REPLACEMENT *(NOTE*—Two front coil spring compressors used (KMO-735 for Rambler J 5224 for Others) Remove two rebound bumpers from upper control arms and raise front end of car to permit spring to extend to its full rebound position Install upper section of one compressor on highest coil of spring and lower section of other compressor on lowest coil

CONTINUED ON NEXT PAGE



UPPER CONTROL ARM



LOWER CONTROL ARM

NASH & RAMBLER CONTROL ARM ASSEMBLIES

1954-55 NASH & RAMBLER FRONT SUSPENSION (Cont.)

Lower front end of car to partially compress spring with car weight (Maintain support under front end). Install remaining sections of compressors enclosing the five (Rambler), nine (Others) coils. Raise front of car and remove wheel, hub, and drum as an assembly. Tighten compressors evenly until spring can be removed.

►*CAUTION:* Lip of lower spring seat must engage upper end of knuckle pin to prevent spring slipping off pin.

►*SPRING REMOVAL NOTE: To facilitate installation and removal of spring compressor tools, a spring compressor can be made from two Ambassador Series lower spring retainers and a 5/8" bolt 18" long threaded at both ends. Insert bolt through spring and install spring retainers, then draw spring together by turning nuts on bolt.*

Spring Free Height

Rambler, 100" W.B. (Early Type Spring)	18"
Rambler, 100" W.B. (Later Spr., Std. & O.D.)	16 7 8"
Rambler, 100" W.B. (Hydra-Matic)	18"
Rambler, 108" W.B. (Std. & O.D.)	18"
Rambler, 108" W.B. (Hydra-Matic)	18 3 8"
Ambassador 6	17½-18"
Ambassador V8	18¼"
Statesman	17 3/16-18 5/8"

►*SPRING HEIGHT NOTE:* Low limit springs identified with one grind mark or white paint, high limit springs identified with one grind mark or white paint, high limit springs with two grind marks or red paint on flat section of end coil.

Spring Application

Model	Part No.
Rambler	
1954 100" W.B. (Hydra-Matic)	3129502
1954 108" W.B. (Hydra-Matic)	3139055
1954 100" W.B. Exc. 2-Dr.Sed. (S-M)	3138301
1954 100" W.B. 2-Dr. Sed. (S-M)	3129503
1954 108" W.B. (S-M)	3129502
1955 Hydra-Matic (Without Air Cond.)	3129502
1955 Hydra-Matic (With Air Cond.)	3139055
1955 Synchro-mesh (Without Air Cond.)	3129503
1955 Synchro-mesh (With Air Cond.)	3129502
1955 Overdrive (Without Air Cond.)	3129503
1955 Overdrive (With Air Cond.)	3139055
Nash	
Model	
Statesman	3133526
Ambassador 6	3133545
Ambassador V8 Ⓒ	3143348

Ⓒ - Used intermittently in production with Spring, Part No. 3143889. Diameter of wire different as follows: .536" (3143348), .610" (3143889).

1955-57 HUDSON, NASH, RAMBLER FRONT SUSPENSION

Hudson 1955-57
Nash 1955-57
Rambler 1956-57

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 HUDSON & NASH ECCENTRIC BOLT NUT BOTTOMING ON SHOULDER OF ECCENTRIC BOLT CORRECTION & PARTS PRODUCTION CHANGE:* Eccentric bolt will not tighten sufficiently to prevent eccentric bolt from turning. On early cars install a 5/8" I.D. washer between nut and eccentric washer. At Car Serial V-1511 (Ambassador V8), R-743047 (Ambassador 6 Cyl.); K-635286 (Statesman); Y-1292 (Hornet V8); X-1152 (Hornet 6 Cyl.); W-1200 (Wasp); the counterbore of the eccentric bolt nut has been increased to 3/16".

►*1956 FRONT TIRE RUBBING NOTE:* Inside wheel on right or left turns should be adjusted to a maximum turn angle of 38° (Rambler), 36° (Others) to avoid possibility of damaging front wheel tires as a result of contacting brake hose bracket on tight right or left turns. In addition, it is recommended that rear corner of brake hose bracket be trimmed 1/8" to prevent possible tire damage under abnormal turning conditions such as steep driveways. Effective April 11, 1956, brackets have been reworked in production.

►*LOWER CONTROL ARM THROUGH BOLT TIGHTENING CAUTION:* The lower control arm through bolt which also acts as the front shock absorber lower anchor is a special heat treated bolt that must be properly tightened to 90-95 ft. lbs. *DO NOT REPLACE THIS BOLT WITH ONE THAT IS NOT HEAT TREATED.*

►*POWER STEERING TOE-IN ADJUSTMENT NOTE:* When adjusting toe-in on Power Steering cars, operate engine which will permit steering pump oil pressure to center valve spool in control valve

DESCRIPTION: Similar to design used on previous models. Upper and lower control arms are connected to steering knuckles by a trunnion assembly and coil springs are mounted between spring seat attached to top of steering knuckle and seat in wheelhouse panel. Shock absorbers are mounted between lower control arm and bracket on wheelhouse panel. Eccentric bolts are used at inner ends of lower control arm for camber and caster adjustment.

ADJUSTMENT

CHECKING & ADJUSTING: *ADJUSTMENT NOTE - Eccentric bolts used at inner ends of lower control arm for camber and caster adjustment on all models.*

Tire Inflation: (1955-56 All Models) - 24 lbs. (Front & Rear) (1957) - Hudson & Nash, 24 lbs. (Front), 20 lbs. (Rear). Rambler 24 lbs. (Front & Rear). All with tires cold.

Kingpin Inclination: 1955 Nash 6½°, Hudson 3°36', 1956-57 All Models 6½°.

Caster: **(Exc. Power Steering)** - 0° to Pos. ½° (Pos. ½° desired). **(Power Steering)** - Pos. ½° to Pos. 1° (Pos. 1° desired). *See "Camber & Caster Eccentric Bolt Adjustment" below.*

Camber: Neg. ¼° to Pos. ¼° (0° desired), all models. *See "Caster & Camber Eccentric Bolt Adjustment" below.*

►*CASTER & CAMBER ECCENTRIC BOLT ADJUSTMENT:* Lower control arm attaching bolts are provided with eccentric washers, one being attached to bolt and the other keyed to threaded end of bolt. Loosening the attaching bolt nut will permit turning the bolts and eccentrics for adjustment of camber and caster. Adjust caster first, using one bolt as necessary, then adjust camber, turning both bolts equally as required.

Toe-In: 1/16" to 3/16". Loosen clamps and rotate adjusting tube on each front wheel tie-rod equally in opposite directions. To adjust steering wheel for correct spoke position after toe-in adjustment, rotate both tubes equally in the same direction.

►*1957 TOE-IN ADJUSTING TUBE CLAMP POSITION FOR MAXIMUM CLEARANCE:* **(Series 10 & 20)** - Open end of clamp should be to front and bolt head up. **(Series 30)** - Open end of clamp should be down with bolt head to front. **(Series 80)** - Open end of clamp should be to rear with bolt head up.

Toe-Out on Turns:	**Inner Wheel**	**Outer Wheel**
Nash Amb. (1955-56)	25°	Ⓒ
Nash Stsm. (1955-56)	25°	20¾°
Hudson Hornet (1955-56)	26°	20°
Hudson Wasp (1955-56)	24°	20°
Rambler (1956-57)	25°	22°
Hudson & Nash (1957)	25°	Ⓒ

Ⓒ - 20¼° (Exc. V8 Pwr. Strg.), 21¾° (V8 Pwr. Strg.).

REMOVAL & INSTALLATION

COIL SPRING REPLACEMENT (1955-56): Two front coil spring compressors used (KMO-735 for Rambler, J-5224 for Others) Remove two rebound bumpers from upper control arms and raise front end of car to permit spring to extend to its full rebound position Install upper section of one compressor on highest coil of spring and lower section of other compressor on lowest coil. Lower front end of car to partially compress spring with car weight (Maintain support under front end). Install remaining sections of compressors enclosing the five (Rambler), nine (Others) coils Raise front of car and remove wheel, hub, and drum as an assembly. Tighten compressors evenly until spring can be removed.

►*CAUTION:* Lip of lower spring seat must engage upper end of knuckle pin to prevent spring slipping off pin.

►*SPRING REMOVAL NOTE: To facilitate installation and removal of spring compressor tools, a spring compressor can be made from two Ambassador Series lower spring retainers and a 5/8" bolt 18" long threaded at both ends. Insert bolt through spring and install spring retainers, then draw spring together by turning nuts on bolt.*

COIL SPRING REPLACEMENT (1957): *NOTE* - **Spring seats have been added at each side so special hooks, Tool No. 3200378 can be installed for spring removal and installation.**

CONTINUED ON NEXT PAGE

1955-57 HUDSON, NASH, RAMBLER FRONT SUSPENSION (C nt.)

R m val: Raise rear of car on side opposite from which spring is to be removed and install hooks, Tool No. 3200378 in holes of ears on spring seats (if necessary, additional compression of spring can be obtained by leaning on front fender over spring). Lower rear of car, then raise front of car with a jack placed under frame at point that will allow wheel and suspension assembly to hang freely. Coil spring, upper and lower spring seats, and insulator can then be lifted out of spring support.

Installati n: If original spring is to be installed, reverse removal procedure. If a new spring is to be installed, install upper and lower cushions and spring seats on spring. Align holes in ears on upper and lower spring seats and compress spring in an arbor press to a point where hooks can be installed. Install springs on spring support, lower front of car, then raise rear of car at side opposite spring being installed.

Fr nt Spring Height

Rambler

Less Air Cond.	17 5/16"
Air Cond. (Left side)	17 5/16"
(Right side)	17 1/2"

Huds n & Nash

Hornet & Amb. 6 (1955-56) Exc. AC	17¼-18"
Hornet & Amb. 6 (1955-56) AC	17 7/16"
Hornet & Amb. V8 (1955)	18 1/4"
Wasp & Stsm.(1955-56)	17 13/16-18 5/8"
Hornet & Amb. V8 (1956) Exc. AC	17 7/16"
Hornet & Amb. V8 (1956) AC	18 1/4"
Hudson & Nash V8 (1957) AC	21 5/16"
Hudson & Nash V8 (1957) Exc.AC Left	20 9/16"
Hudson & Nash V8 (1957) Exc. AC Right	21 5/16"

Fr nt Suspensi n Tight ning Specifications (1956): It is very important that tightness of front suspension system be maintained. The following torque values will insure correct tightness.

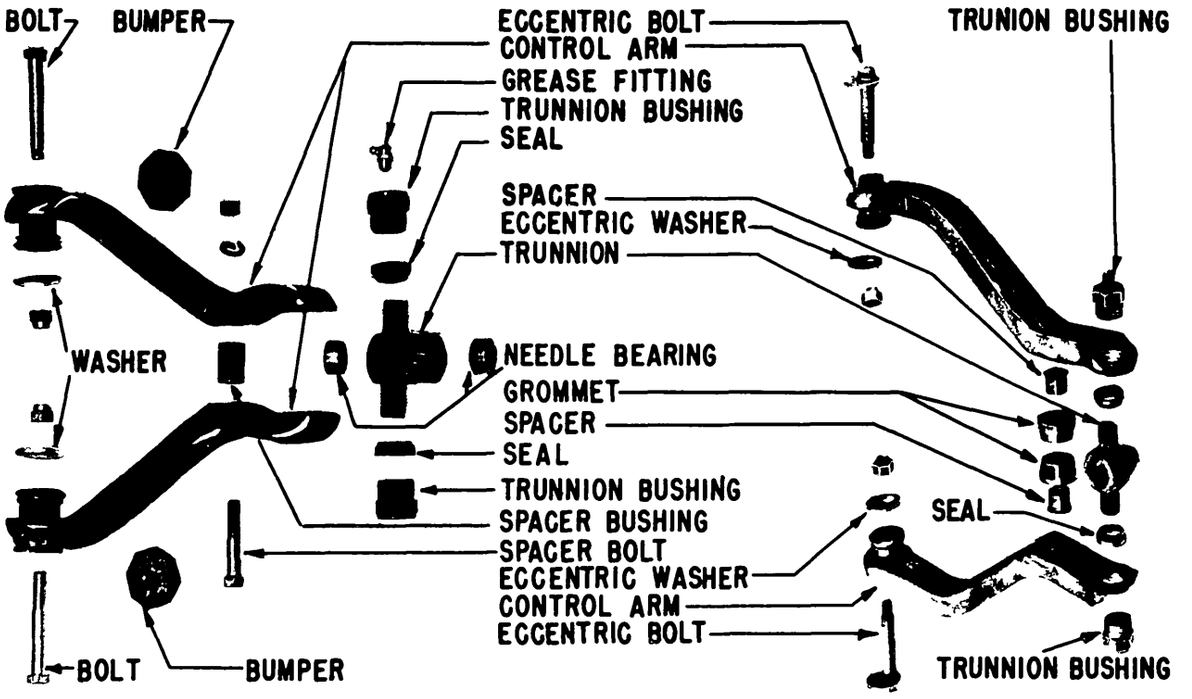
	Ft Lbs
Pivot Bar Bushing Retaining Nut	50-55
Lower Shock Mounting	90-95
Upper Control Arm Spacer Nut Screw	50-55
Lower Mounting Stud to Sill	75-85
Upper Mounting Stud to Sill	35-45
Upper Pivot Bar to Mounting Stud Nut	75-80
Lower Pivot Bar to Mounting Stud Nut	75-85

Spring Application

1955 Hudson & Nash	Part No.
Series 60 AC	3145947
Series 80 Exc AC	3145947
Series 80 ©	3143349
Series 80	3143889

© - Used beginning with Serial No. V-3496 and prior to Serial No. V-3560 Beginning with Serial No V-6086 and prior to Serial No. V-6105.

1956 Huds n & Nash	Part No.
Series 40	3133526
Series 50, 60 AC	3145947
Series 50, 60 Exc. AC	3133545
Series 80 AC	3143889
Series 80 Exc. AC	3145947



UPPER CONTROL ARMS (TYPICAL) LOWER CONTROL ARMS

HUDSON, NASH, RAMBLER UPPER & LOWER CONTROL ARMS

1957 Hudson & Nash	Part Nos. Right	Left
Series 10 (Std.)	3144874	3147585
Series 10 (Air Cond.)	3147585	3147585
Series 20 & 30 (Std.)	3150589	3150588
Series 20 & 30 (Air Cond)	3150589	3150589
Series 80 (Synchro-mesh) ①	3150590	3150590
Series 80 (Hydra-Matic) ②	3150591	3150591

① - On Air Conditioned cars use No 3150591

② - On Air Conditioned cars use No 3152622

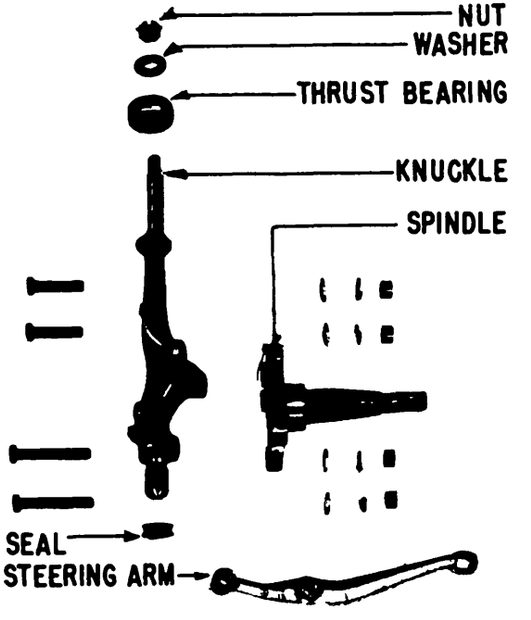
1956-57 Rambler	Part No.
Right Spring Exc AC	3144874
Left Spring Exc AC	3147585
Right & Left AC	3147585

UPPER CONTROL ARM: Removal - Remove front coil spring, (see above) Disconnect inner ends of control arm assembly from wheelhouse bracket and remove control arm spacer bolt and spacer Remove bushings from both sides of trunnion and remove control arms

Installation: Reverse removal procedure, making sure that trunnion is centered between control arms

OWER CONTROL ARM: Removal - Remove front coil spring (if not previously removed) Disconnect inner ends of control arms by removing eccentric bolts and washers at wheelhouse bracket Remove shock absorber mounting bolt at lower end and remove spacers and

CONTINUED ON NEXT PAGE



STEERING KNUCKLE ASSEMBLY

1955-57 HUDSON, NASH, RAMBLER FRONT SUSPENSION (C nt.)

grommets. Remove both trunnion bushings, then remove control arms.

Installation: Reverse removal procedure, making sure that trunnion is centered in lower control arm

►*UPPER & LOWER CONTROL ARM RUBBER BUSHING REPLACEMENT NOTE:* These bushings are not furnished separately. If replacement is necessary, the complete assembly must be installed

STEERING KNUCKLE: Removal - Remove wheel and brake drum assembly, then remove brake backing plate. Remove front coil spring (see above) Remove spacer bolt from upper control arm and shock absorber mounting bolt, spacers, and grommets from lower control arm. Remove trunnion bushings from upper and lower trunnions Remove steering knuckle assembly after disconnecting steering arm

Disassembly: Remove nut and washer securing spring lower support from knuckle and remove support and thrust bearing Unscrew lower trunnion from knuckle and remove trunnion seal.

R assembly· Reverse disassembly procedures and note the following: Screw lower trunnion onto steering knuckle until there is approximately ¼" clearance between shoulder on knuckle and lower trunnion.

1954-57 HUDSON & NASH REAR SUSPENSION

Nash Statesman (1954-57)
Nash Ambassador (1954-57)
Hudson (1955-57)

►*1954-55 RAMBLER NOTE: Rear suspension on these models is conventional type with leaf type springs and Hotchkiss drive*

DESCRIPTION: Special coil spring type with springs insulated by rubber cushions at top (in body) and at lower end (at spring seat on axle housing). Direct acting shock absorbers are mounted within springs and Stabilizer is used to maintain alignment

REMOVAL OF SPRING & SHOCK ABSORBER: Lift rear of body until all weight removed from springs, remove two nuts on shock absorber bolts at rear axle. Lift rear of body sufficiently to free shock absorber bolts from axle housing, remove lower spring saddle. Swing spring, shock absorber, and lower spring seat to one side, lower spring and lift out. To remove shock absorber after spring removed, remove nuts and rubber grommets on upper mounting stud within body, lower shock absorber and remove from below.

INSTALLATION OF SPRING & SHOCK ABSORBER: Install grommets and nuts on upper end of shock absorber in body, assemble bolts, bushings and spacer on lower end of shock absorber. Install upper rubber cushion on spring by placing projection or tab on cushion between stationary end coil of spring and first movable coil and rotating cushion until flat end of stationary coil is tight against shoulder of tapered projection on spring (CAUTION—positioning necessary to prevent contact between first closed coils of spring in operation). Install lower spring cushion similarly

SPRINGS: Springs are ground flat at upper and lower ends Same type springs used on all models.

Rear Spring Specifications

Model	Free Height	Loaded Height
All Models (Std)	17 7/8"	10 9/16"
Heavy Duty (1954)	15 1/2"	10 17/32"
Heavy Duty (1955-57)	16 3/4"	11 1/4"

►*NOTE When heavy duty springs are installed, heavy duty shock absorbers must be installed at front and rear.*

►*NOTE*—When heavy duty rear springs are installed, heavy duty shock absorbers must be installed in both front and rear.

1958-60 RAMBLER FRONT SUSPENSION

Rambler, Series 10, 20, 80 (1958-60)
Rambler American (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 RAMBLER AMERICAN FRONT SPRING UPPER AND LOWER SEAT PRODUCTION CHANGE:* Beginning with Car Serial No M-12686, new spring seats, Part No 3155664 (upper), No 3155668 (lower) are being used in production The later type seats have "ears" for use with Spring Clamp, Tool 3200377 and are similar to seats used on other Rambler models *See "Coil Springs" below*

►*1958 RAMBLER AMERICAN UPPER CONTROL ARM TRUNNION PRODUCTION CHANGE* Beginning at Car Serial No M-2253, upper control arm trunnion bronze bushings, Part No 3155455 were replaced in production with needle bearings, Part No 3133514 The later type bearings may be installed in place of the bronze bushings on early production cars

►*1958 RAMBLER SERIES 5810 UPPER CONTROL ARM TRUNNION BEARING CHANGE (To prevent road shock and steering wheel movement on rough roads):* New Trunnion Assemblies, Part No 3155439, which have bronze bushings in place of the former needle bearings, were used in production beginning with Car Serial No D-416950 Later type trunnions may be used for service replacement on cars built before the above serial number

►*LOWER CONTROL ARM THROUGH BOLT TIGHTENING CAUTION·* The lower control arm through bolt which also acts as the front shock absorber lower anchor (on all models) is specially heat treated and must be properly tightened to 110-125 ft lbs *DO NOT REPLACE THIS BOLT WITH ONE THAT IS NOT HEAT TREATED*

►*TOE-IN ADJUSTMENT NOTE (Cars with Power Steering)* Operate engine to permit steering pump oil pressure to center valve spool in control valve assembly before checking or adjusting toe-in

DESCRIPTION: Upper control arms are connected to steering knuckles by trunnion assemblies On Rambler American, upper trunnion is integral with front spring lower support On other models, coil spring lower support is threaded on upper trunnion Coil springs are mounted between support on top of steering knuckle and seat in wheelhouse panel Shock absorbers are mounted between lower control arm and bracket on upper control arm inner shaft (Rambler American), between lower control arm and bracket on wheelhouse panel (Series 10, 20, 80) Camber and caster adjustments are made by eccentric bolts, (Exc Rambler American), shims (Rambler American) located at inner ends of lower control arms

ADJUSTMENT

CHECKING & ADJUSTING: *CAMBER & CASTER ADJUSTMENT NOTE - Eccentric bolts at inner end of lower control arms (series 10, 20 & 80), shims between lower control arm shaft and frame (Rambler American) control camber and caster adjustment*

Tire Inflation: 24 lbs front & rear (cold)

Steering Axis Inclination: 8° (Rambler American), 6°11' (Series 10 20 & 80) Not adjustable

Caster: (Exc. Power Steering) - 0° to Pos ½° (Pos ½° preferred) **(Power Steering)** - Pos ½° to Pos 1° (Pos 1° preferred) *See "Camber & Caster Adjustment" below*

Camber: Neg ¼° to Pos ¼° (0° preferred) *See "Camber & Caster Adjustment" below*

►*CAMBER & CASTER ADJUSTMENT (SERIES 10, 20 & 80)* Lower control arm attaching bolts are provided with eccentric washers, one being attached to the bolt and the other keyed to threaded end of bolt Loosening attaching bolt nut will permit turning the bolt and eccentrics for adjustment of camber and caster Adjust caster first, using one bolt as necessary, then adjust camber, turning both bolts equally as required

►*CAMBER & CASTER ADJUSTMENT (RAMBLER AMERICAN)* "U" type spacers are installed between lower control arm pivot bar and mounting surface Increasing number or thickness of spacers at either front or rear mounting bolt permits adjusting caster angle Increasing or decreasing equally at both front and rear bolts will change camber angle *NOTE - Lower control arm pivot bar must be loosened before making camber or caster adjustments When reinstalling brace, tighten attaching bolts to 90-95 ft lbs*

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1958-60 RAMBLER FRONT SUSPENSION (Continued)

Toe-In: 1/16-3/16" (Exc Series 20 & 80), 3/16" (Series 20 & 80) On all models (Exc Series 20), loosen clamps and rotate adjusting tube on each front wheel tie rod equally in opposite directions On Series 20, loosen clamps and rotate adjusting tube on steering drag link adjacent to right side idler lever Adjust steering wheel for correct spoke position by rotating adjusting tubes equally in same direction (Exc Series 20), by rotating adjusting tube on pitman arm-to-steering arm link (Series 20)

►*TOE-IN ADJUSTING TUBE CLAMP POSITIONING FOR MAXIMUM CLEARANCE* Open end of clamp should be toward REAR (Exc Series 20), toward FRONT (Series 20) when clamp bolt is tightened

Toe-Out in Turns: 1958 Models - With inner wheel at 20°, outer wheel should be 17°40' (Rambler American), 17°17' (Series 10), 17°14' (Series 20), 17°28' (Series 80) Not adjustable
1959-60 Models - With inner wheel at 25°, outer wheel should be 21½° (American), 22° (Others) Not adjustable

REMOVAL & INSTALLATION

FRONT COIL SPRING: *NOTE - Early 1958 Rambler American models do not have coil spring seats with "ears" for attachment of spring compressor tools such as used on other Rambler models*

Removal (Rambler American Before 1958 Serial No. M-12686): With weight of car on wheels, install two front spring compressors, Tool J-8081, on spring to enclose nine coils, then compress spring evenly Raise and support front end of car with a jack placed under frame side rails and remove spring

Installation (Rambler American Before 1958 Serial No. M-12686): If original spring is being reinstalled, reverse removal procedures If a new spring is to be installed (or compressor, Tool J-8081 is to be removed), spring can be compressed using two spring seats and a ½" x 17½" threaded rod as follows Install spring seats on each end of spring and insert rod through center of seats and spring, then install necessary washers and nuts and draw spring together Install Spring Clamp, Tool J-8081 to enclose nine coils and remove supplemental compressing tool, then install spring *NOTE - Lip of lower spring seat must engage seat of knuckle pin to prevent spring from shifting*

Removal (Rambler American After 1958 Serial No M-12686 & 1958-60 Series 10, 20, 80 Rambler): Raise rear of car on side opposite front spring to be removed and install Tool J-7842 (Rambler American), Tool J-7389 (Series 10, 20, 80) on ears of upper and lower spring seats *NOTE - If additional compression of spring is necessary to install tool, apply weight to front fender over spring being removed* Lower rear of car, then raise front of car with a jack placed under frame at a point that will allow wheel and suspension to hang free Coil spring, upper and lower spring seats, and insulator can then be lifted out of spring support

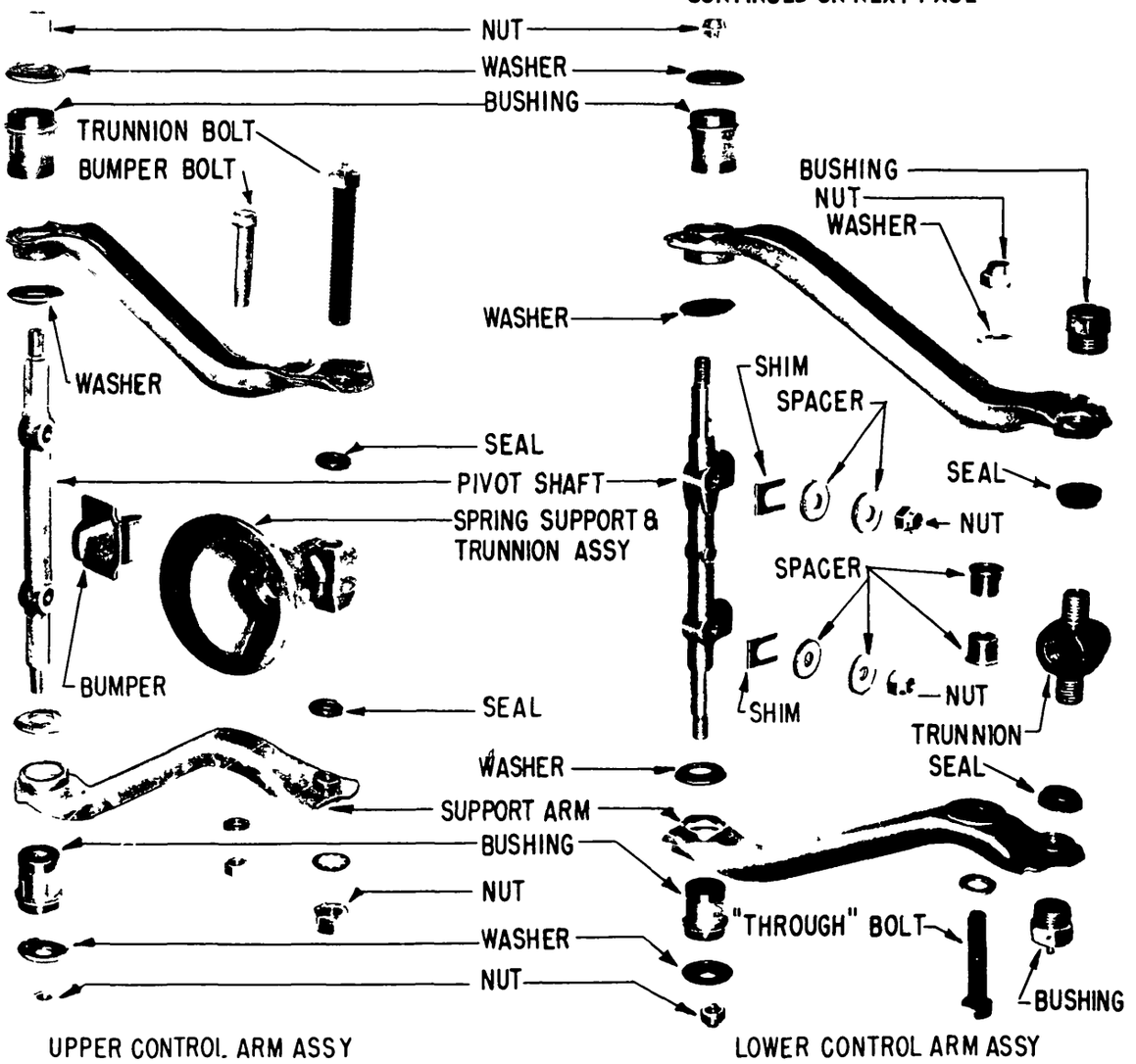
Installation (Rambler American After 1958 Serial No. M-12686 & 1958-60 Series 10, 20, 80 Rambler): If original spring is being reinstalled, reverse removal procedure If a new spring is to be installed, install upper and lower cushions and spring seats on spring, then align holes in ears on upper and lower seats and compress spring in an arbor press to a point where compressing tool can be installed Install spring in car

1958-60 Front Coil Spring Application

Model	Right	Left
American (Std & O D)①	3129503	3129503
American (Auto Trans)②	3129502	3129502
Series 10 (Std)	3144874	3147585
Series 10 (Air Cond)	3147585	3147585
Series 20 (Std)	3150589	3150588
Series 20 (Air Cond)	3150589	3150589
Series 80 (Std)	3154378	3154378
Series 80 (Air Cond)	3154379	3154379

①- 1958-Early 1960 Use Part No 3159326 for Late 1960
②- 1958-Early 1960 Use Part No 3159327 for Late 1960

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RAMBLER AMERICAN CONTROL ARM ASSEMBLIES

1958-60 RAMBLER FRONT SUSPENSION (C ntinu d)

SHOCK ABSORBERS: Removal - On Rambler American, loosen lower control arms at pivot bar ends. On all models, disconnect shock absorber from upper bracket, then remove through bolt in lower suspension arm and remove shock absorber.

Installation: Reverse removal procedure and tighten through bolt in lower suspension arm to 110-125 ft. lbs.

►*SHOCK ABSORBER APPLICATION: See "Shock Absorbers" on Car Model pages.*

UPPER CONTROL ARM (SERIES 10, 20 & 80): Re- m val - Upper control arm may be removed without removing the entire assembly. Remove front spring (see above), then remove front or rear arm by disconnecting at trunnion, wheelhouse panel, and control arm spacer. Both front and rear arms may be removed as an assembly by disconnecting them from mounting bracket. Remove lower spring seat support, lock pin, and nut from knuckle pin. Upper control arms with spacer and upper trunnion may then be removed from car.

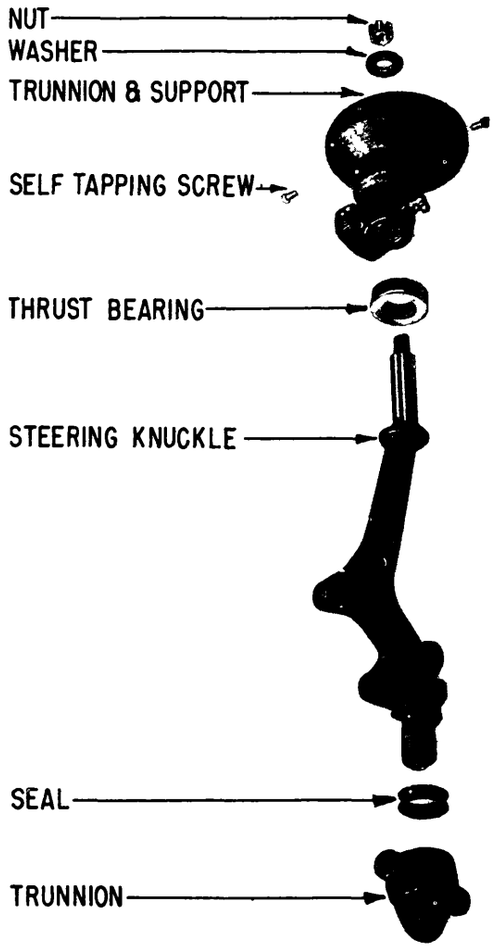
Installation: *(NOTE - Upper and lower control arm bushings are not furnished separately. If replacement is necessary, the complete assembly must be installed).* Install upper control arm by reversing removal procedure.

UPPER CONTROL ARM (RAMBLER AMERICAN): Re- m val - Remove front spring (see above), then remove screw attaching outer end of control arms to trunnion. Disconnect shock absorber at lower end by removing the control arm through bolt. Remove bolts securing control arm pivot shaft to bracket and remove shock absorber upper mounting bracket, then remove control arm.

Installation: Reverse removal procedure. *CAUTION - The trunnion screw has a larger thread diameter at head than at the end and must be installed into same control arm when being assembled to insure a tight fit.*

LOWER CONTROL ARM (SERIES 10, 20 & 80): Re- m val - Arms may be removed individually after removing front spring (see above). Disconnect at lower shock absorber mounting, trunnion, and at mounting bracket.

Installati n: Reverse removal procedure and note the following: Install and tighten bushings at outer end of control arms and onto trunnion centering the trunnion between control arms. *CAUTION - Shock absorber lower mounting bolt is specially heat treated and must be tightened to 110-125 ft. lbs. Do not substitute this bolt except with special heat treated type.*

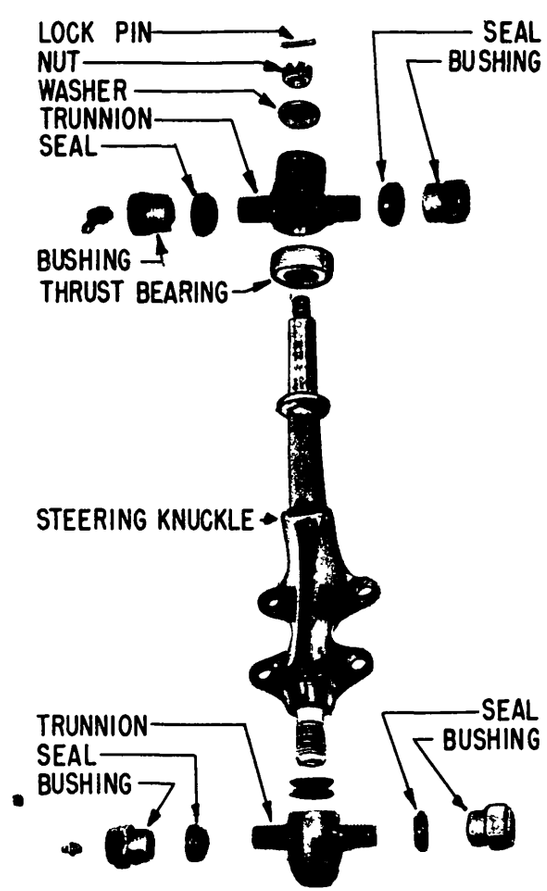


RAMBLER AMERICAN STEERING KNUCKLE ASSEMBLY

LOWER CONTROL ARM (RAMBLER AMERICAN): Re- moval - Remove front spring (see above), then disconnect shock absorber at lower end. Remove threaded bushings from trunnion and disconnect control arm inner pivot shaft from bracket. *NOTE* - Camber and caster adjusting spacers are located between pivot arm and bracket.

Installation: See Series 10, 20 & 80 installation (above), and tighten trunnion bushings to 125 ft. lbs.

CONTROL ARM BUSHINGS (RAMBLER AMERICAN): Re- plac m nt - Rubber bushings are pressed into control arms. Do not turn or twist bushings when removing or installing as bushings must be a tight press fit in arms. *(NOTE - Bushings may be id ntifi d by the ight shoulders running lengthwis on out r sh ll f upper control arm bushing and the plain out r sh ll on l w r control arm bushing).* Remove bushings with a 13/16" socket and a 1 7/16" socket by installing the sockets and control arm (bushing end) in a vise, then press bushing into large socket with the smaller socket. Install bushing using a 1¼" socket and a 1 7/16" socket. Press bushing into control arm with the 1¼" socket until flange on bushing is ½" from arm on upper control arm. On lower control arm, bushing is pressed in until flange is against arm.



RAMBLER (EXCEPT AMERICAN) STEERING KNUCKLE ASSEMBLY

STEERING KNUCKLE (SERIES 10, 20 & 80): R m val - Remove front spring, then remove front wheel and brake drum. Remove brake backing plate. Unscrew spring

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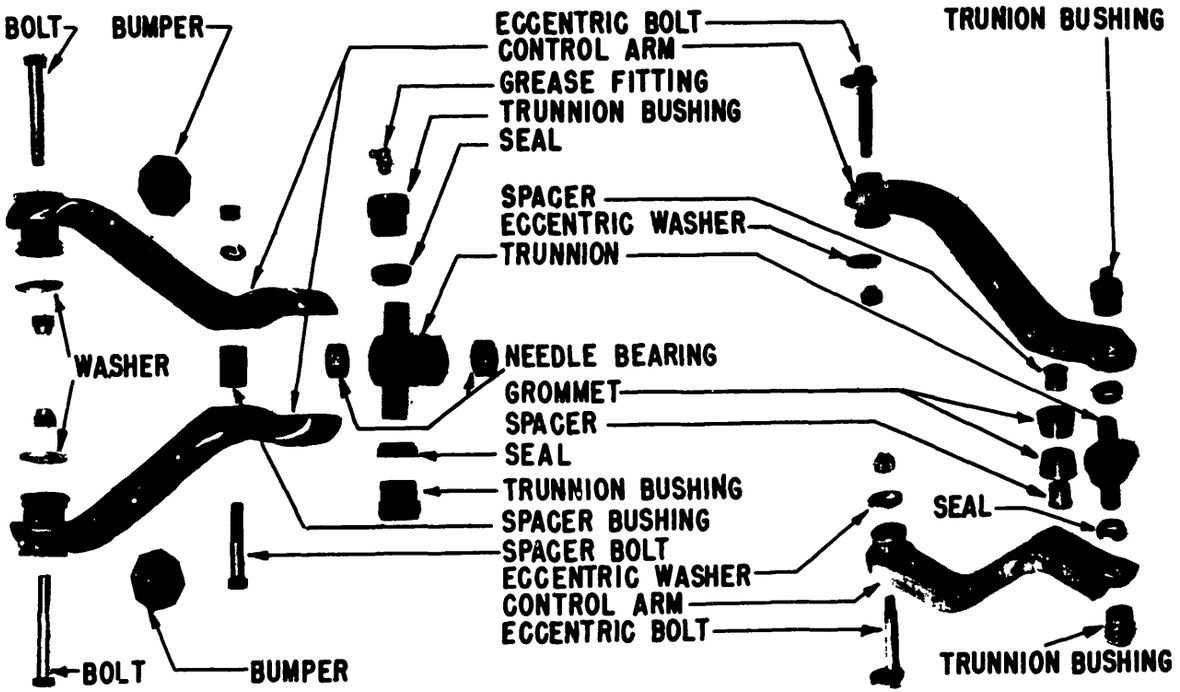
1958-60 RAMBLER FRONT SUSPENSION (C nt.)

lower support from upper trunnion, then remove pin from castellated nut at top of steering knuckle. Unscrew steering knuckle from lower trunnion and withdraw knuckle from upper trunnion.

Installati n: Reverse removal procedure and note the following: Screw knuckle into lower trunnion until there is approximately ¼" clearance between shoulder on knuckle pin and the trunnion. Tighten castellated nut at upper end of knuckle so there is a minimum of end-play and knuckle rotates freely.

STEERING KNUCKLE (RAMBLER AMERICAN): Rem val - Remove front spring, then remove front wheel and brake drum assembly Remove brake backing plate. Remove two self tapping screws from spring lower support (screws located 180° apart just below flared portion of support). Rotate support to line up pin through castellated nut, with holes in support, then drive pin out through one of the holes. Remove castellated nut and washer and raise upper support arm to free support from knuckle. Unscrew steering knuckle from lower trunnion and withdraw knuckle.

Installati n: Reverse removal procedure and note the following: Screw knuckle into lower trunnion until there is approximately ¼" clearance between shoulder on knuckle pin and the trunnion. Tighten castellated nut on upper end of knuckle so there is a minimum of end-play and knuckle rotates freely. Line up pin holes in knuckle with slots in nut and holes in spring lower support and install pin. Install self tapping screws in both holes of lower spring support.



RAMBLER (EXCEPT AMERICAN) CONTROL ARM ASSEMBLIES

1956-60 RAMBLER REAR SUSPENSION

Rambl r, Except American (1956-60)

DESCRIPTION: Rear springs are mounted between seats on rear axle housing and seats on car underbody and are held in position by weight of car on springs and by extended limits of shock absorbers. A rear stabilizer bar connected between car underbody on right side and a bracket on left side of rear axle housing prevents prevents lateral movement of rear axle assembly. Shock absorbers are mounted adjacent to rear springs on forward side of rear axle housing and are connected to a bracket on rear axle housing and to car underbody assembly. Rear wheel driving force is transmitted to car body by a torque tube between rear axle housing and transmission.

SHOCK ABSORBERS: Removal - Disconnect shocks from car underbody and from bracket on rear axle housing and remove shock.

Installation: Reverse removal procedure.

►*SHOCK ABSORBER APPLICATION: See "Shock Absorbers" on Car Model pages.*

REAR COIL SPRINGS: Removal - Raise and support rear of car with a jack stand placed under car underbody, then raise rear axle assembly to approximately normal ride position. Disconnect shock absorbers at bracket on rear axle, then lower rear axle sufficiently to free springs from seats. Springs can then be lifted out. *CAUTION* - When lowering rear axle assembly be careful not to lower it to the point where a strain will be placed on torque tube connection at transmission.

Installation: Reverse removal procedure.

Rear Spring Application

Model & Series	Part N .
All Series 10 & 20, Exc.Sta.Wgn.(Std.)	ℂ 3144929
All Series 80, Exc. St. Wgn. (Std)	3154380
All Series Sta. Wgn. (Std.)	3147610
All Series, Exc. Sta. Wgn. (Air Susp.)	3155786
All Series Sta. Wgn. (Air Susp.)	3155393

ℂ - For heavy duty, use Part No. 3147610.

1954 OLDSMOBILE

All S ri s (1954)

DESCRIPTION: Independent linked parallelogram type with double acting shock absorbers integral with upper control arm assembly.

CHECKING & ADJUSTING: Check and adjust front wheel bearings, then proceed as follows:

Tire Inflation: 24 lbs. (front); 22 lbs. (rear).

Kingpin Inclination: 5°51'10" at 0° camber. Not adjustable.

Caster: Must be equal within ½° on both sides. Machined bosses provided on front side of knuckle support for protractor mounting.

Caster Specifications

Oldsmobile (All Models)	0° to Neg. ¾°

To Adjust—Loosen clamp bolt in upper end of knuckle support, remove lubricant fitting on front bushing of upper support pivot pin, insert Allen wrench J-720 through lubricant fitting hole and turn upper pivot pin clockwise to increase caster, counter-clockwise to decrease caster. CAUTION—Pin must always be turned in complete turns only to avoid disturbing camber adjustment (below).

Camber: Camber adjustment (upper pivot pin) eccentricity is 1/16". 3/32" pin is available from the Parts Dept. and can be installed if regular 1/16" pin does not give sufficient range of adjustment.

Camber Specifications

All Models	Neg. ¾° to Pos. ¾°

①—New Car limits Neg. ¼° to Pos. ¾°.

To Adjust—Same as for Caster (above) except that entire range of adjustment secured in ½ turn of eccentric pivot pin. CAUTION—Do not turn pin more than ½ turn when adjusting camber to avoid disturbing caster adjustment.

Toe-In: Measure 9-10" above floor with wheels turned straight ahead.

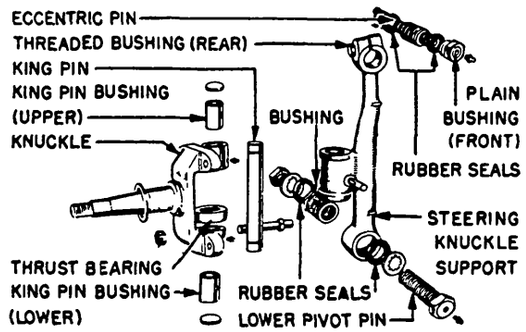
Toe-In Specification

Oldsmobile (All Models)	1/16-1/8"

To Adjust—Loosen clamp bolts at wheel end of each tie rod, turn tie rod adjuster on each rod equally. On Oldsmobile, turn both adjusters in direction opposite to that in which wheel revolves to increase toe-in.

Toe-Out on Turns: With outer wheel turned exactly 20°, inner wheel 23° ± ½°. No adjustment.

SERVICING: Lower Control Arm & Pivot Shaft. Serviced as an assembly and not interchangeable on right and left sides of car. Pivot shaft at inner ends of control arms can be removed by taking out bushing in each arm. To install shaft, install tool J-1052 or block between arms adjacent to shaft



OLDSMOBILE FRONT SUSPENSION

eyes so that distance between inner faces of arms at shaft eyes is exactly 11½" (necessary to prevent distortion of arms when bushings installed). Install shaft with seal on each end adjacent to mounting bracket, thread bushing in on shaft and in arm simultaneously (new bushings cut their own thread in arm as they are turned in), tighten bushings with 150 lb. pull on 16" wrench (200 lbs. on 12" wrench) so that there is no clearance between bushing flange and control arm. See that distance between shaft bracket mounting holes and inner face of control arm is exactly 1½" at each end (turn shaft to centralize), and that seal ends lap over bushings.

Knuckle Support Lower Pivot Pin—To install pin, slip rubber seal over outer end of each lower control arm, center knuckle support between lower control arms (approximately ⅛" between end of bushing and front arm, same distance between head of bushing and rear arm). Screw pivot pin through front arm, knuckle support bushing, rear arm, install nut on rear end of pin. Pull seals down over end of arms so that they seat on pin between arm and bushing at each side.

Knuckle Support Upper Pivot Pin—To install, center knuckle support in upper control arm yoke, screw pivot pin in until larger center section is centered in knuckle support, tighten clamp bolt. Install seal on pin at each side, start front bushing in on pin, then screw rear bushing in control arm and on pin and tighten securely. Turn front bushing in until clearance between front face or arm and head of bushing 1/32", tighten clamp bolt.

Kingpin Installation (Oldsmobile)—Bushings should be installed with oil hole lined up with oil hole in knuckle support and short groove on inner surface leading from oil hole to outer end of bushing (up on top bushing, down on lower bushing). Bushings should be burnished with Tool Set J-1061 and line-reamed to size with Tool HM-592.

SPRINGS: Lower end of spring not ground flat and must be installed with end coil fitted into recess in lower spring seat. Upper end of spring is ground flat. CAUTION—Spring must be installed with flat (ground) end up and lower end fitted in spring seat.

1954 Springs

88 (Without Air Cond.)	565270
88 (With Air Cond.)	564262
Super 88 Exc. Conv. (Without Air Cond.)	564234
Super 88 Conv.	565271
Super 88 (With Air Cond.)	564262
98 Exc. Conv. (Without Air Cond.)	564235
98 Conv.	565271
98 (With Air Cond.)	566550

Part Number Location—Stamped on lower end of coil.

Color Mark—Consists of one or two paint daubs on one spring coil.

COIL SPRING REPLACEMENT: Support car frame with car stands, center jack under lower control arm pivot shaft and disconnect stabilizer link. Disconnect pivot shaft from front cross-member. Lower jack from under pivot shaft, allowing control arm to drop out of position, and remove spring.

Installation—Reverse removal procedure and be sure that flattened top coil is toward top and centralized by four lugs on cross-member. Bottom must index with hole in spring seat.

SHOCK ABSORBER REPLACEMENT: Place jack under knuckle support and raise car and remove wheel. Remove upper pivot pin. Remove the four shock absorber mounting bolts (nuts inside cross-member must be held from turning). Remove shock absorber.

Servicing (Front Shock Absorbers): Unsatisfactory ride control may be due to lack of fluid or malfunction of shock absorber. (NOTE—Presence of an appreciable amount of oil under shaft bearings on outside of shock absorber usually indicates shaft bushings are worn or oil seal has failed. In either case, unit should be replaced without further examination). To test shock absorber action without removing from car, proceed as follows: Be sure shock absorber is securely mounted, then disconnect shock absorber arm at upper pivot pin. Holding shock absorber at approximately the same angle as installed on car, move shock absorber through complete travel. There should be no free travel in shock absorber arm and amount of force required to move arm up and down should be almost equal. If control of shock absorber defective, fluid level should be checked and shock filled if found to be low (See Filling Front Shock Absorber below). If fluid is at proper level, replace shock absorber. NOTE—If shock absorbers checked while removed from car, they should be checked in same position as when mounted.

Filling Front Shock Absorber: If shock absorber off car, place shock absorber on mounting block with filler plug tilted upwards approximately 15° from horizontal position. Remove filler plug and make sure shock is completely full of fluid.
CAUTION—It is important that front shock absorber be filled through filler plug with shock in above position, otherwise air may be locked in shock absorber.

Installation—Reverse removal procedure and check front end alignment.

Form 54 A

1955-56 OLDSMOBILE

All Series (1955-56)

►CHANGES & CORRECTIONS

►*1955 PIVOT PIN PRODUCTION CHANGE (To Eliminate Need for Lockwashers)* Effective approximately July 1, 1955 new upper and lower pivot pins are used in production. New pins have head of bolt undercut, and a higher pitch thread diameter is used immediately under the head of the bolt. Changes cause locking action when bolt is tightened and eliminate need for lockwashers.

DESCRIPTION: New design independent "parallelogram" type with shock absorbers mounted within front coil springs. Shock absorbers are independent of upper control arm and can be removed and installed without disturbing upper control arm assembly.

ADJUSTMENT: Before checking and adjusting front wheel alignment, inflate tires to recommended pressure. Check front wheel bearings for proper preload. Check front wheel and tire assemblies for radial and lateral run-out. Grasp front bumper in center and raise and lower front end several times to allow frame to come to its normal level. Check front shock absorber action. All specifications below, are for car at curb weight.

Tire Inflation Pressure: 24 lbs. (front), 22 lbs. (rear)

Kingpin Inclination: 5°51'10" at 0° Camber. Not adjustable.

Caster: 0° to Neg. ¾°. Variation between wheels should not exceed ½°.

Adjustment—Loosen clamp bolt at upper end of steering knuckle support and using special wrench J-5343, turn eccentric bushing in a clockwise direction to increase caster, and in a counter-clockwise direction to decrease caster. *NOTE*—Before tightening clamp bolt, adjust camber (see below).

Camber: Neg. ¾° to Pos. ¾°. Variation between wheels should not exceed ½°.

Adjustment—Same as for caster (above). Turn eccentric bushing not more than ½ turn in either direction from point where correct caster secured. *NOTE—The entire range of camber adjustment is secured within ½ turn of eccentric bolt.*

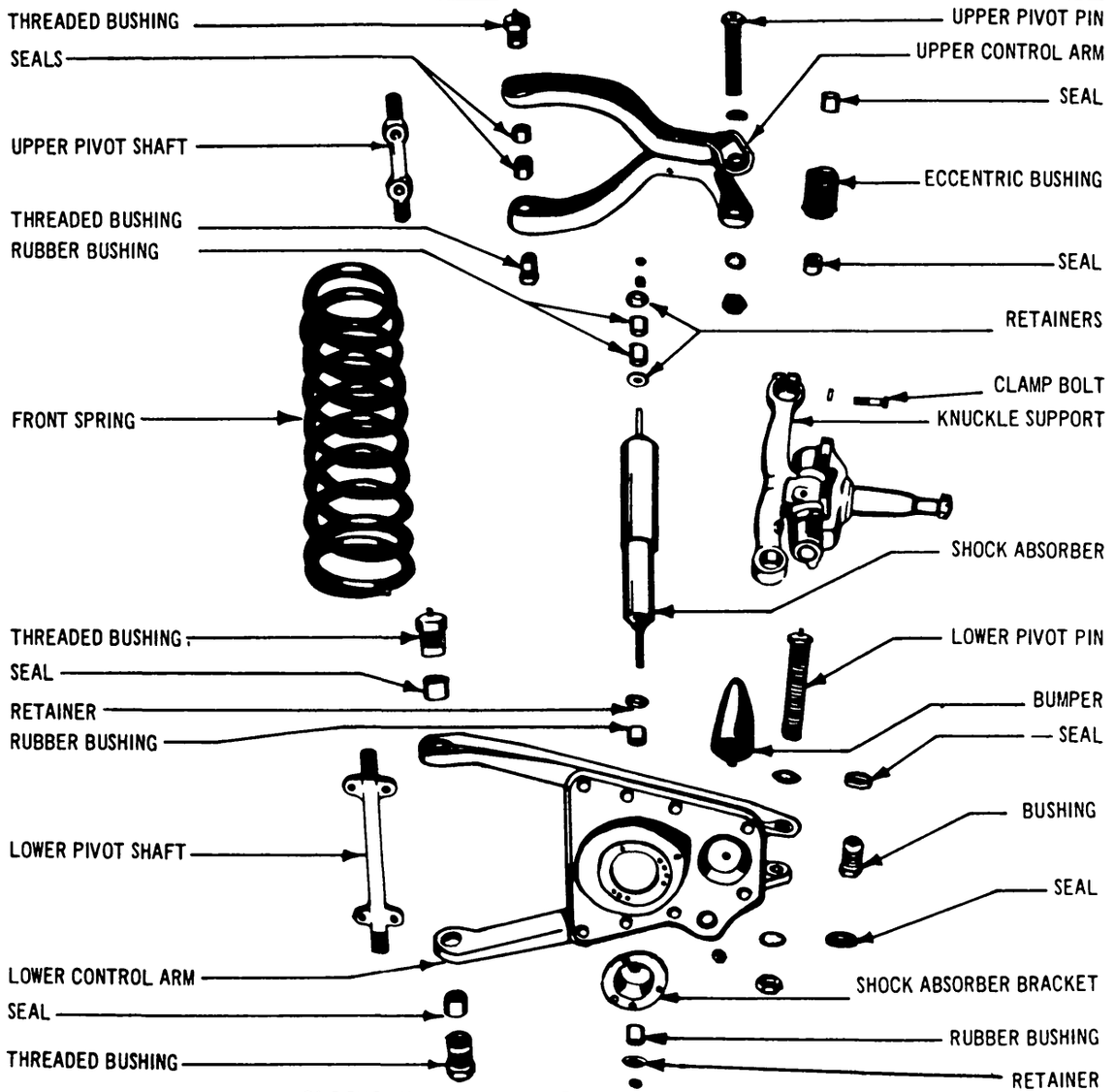
Toe-In: 1/16" to 1/8"

Adjustment—Loosen clamp bolts at each end of steering tie rod adjustable sleeves. With steering wheel set in straight ahead position, turn tie rod adjusting sleeves to obtain the proper toe-in adjustment. *CAUTION*—After adjustment completed and tie rod end ball studs are square in their seats, position tie rod-to-relay rod ball studs to bottom of slot in relay, then position clamps so bolts are below upper surface of adjusting sleeves. End of clamp must not be in slot.

Toe-Out on Turns: With outer wheels turned 20°, inner wheel should be 23°±½°. Not adjustable.

SHOCK ABSORBER REPLACEMENT: *NOTE—It is not necessary to disturb front suspension assembly.*

Removal—Remove nut and jam nut on upper end of shock absorber (*CAUTION—Flats are provided on upper stud so it can be held while loosening the nuts*). Remove three capscrews and lockwashers attaching shock absorber bracket to lower control arm, and remove shock absorber out through lower control arm spring seat.



OLDSMOBILE FRONT SUSPENSION ASSEMBLY

Installation—Reverse removal procedure.

FRONT STABILIZER: Removal—Disconnect stabilizer linkage, each side, by removing nut from top of link-bolt. Pull out bolt from bottom of linkage, and remove retainers, grommets, and spacer. Remove stabilizer bracket to frame bolts and remove stabilizer bar, rubber bushings and brackets.

Installation—Reverse removal procedure and note the the following. Rubber bushings should be positioned squarely in brackets and the nut retaining the stabilizer link assembly should be drawn down to the limit of the threads. *CAUTION—Never lubricate stabilizer bushings.*

COIL SPRINGS: Removal—Support car with floor stands. Disconnect stabilizer link from lower control arm and remove rubber bumper from lower control arm. Remove shock absorber (see above). Center jack pad under lower control arm pivot shaft and raise jack until it just contacts shaft, then disconnect pivot shaft from front crossmember. Lower jack slowly, allowing control arm to drop out of position until spring is fully extended and remove spring.

Installation—Place jack pad under lower control arm pivot shaft. Position rubber insulator over pilot in crossmember. Hold the upper end (flat end) of coil

CONTINUED ON NEXT PAGE

Form 54 B

1955-56 OLDSMOBILE (Cont.)

spring in crossmember and raise lower control arm until spring seat contacts lower coil of spring, then rotate spring so end of bottom coil will index in hole provided in spring seat. Raise control arm gradually, checking to see that spring is seated correctly top and bottom, and insulator is in place. Use a drift punch to line up pivot shaft with bolt holes in crossmember and install bolts. Tighten to 55-60 ft. lbs. Connect stabilizer link, and install shock absorber

▷*COIL SPRING IDENTIFICATION NOTE:* Spring part number is stamped on the outside of one of the end coils.

1955 Springs

Series	Spring Part No.
88 (Without Air Cond.) Synchro-mesh	566124
88 (Without Air. Cond.) Hydra-Matic	566125
88 (With Air Cond.)	566127
Super 88 Exc. Conv. (Without A.C.) S-M	566124
Super 88 Exc. Conv. (Without A.C.) H-M	566125
Super 88 Conv.	566127
Super 88 (With Air Cond.)	566127
98 Exc. Conv. (Without Air Cond.)	566126
98 Conv.	566127
98 (With Air Cond.)	566559

1956 Springs

Series	Spring Part No.
88, S88 Std. Trans.(Without A.C.) Exc. Conv.	566125
88, S88 Hydra-Matic(Without A.C.) Exc.Conv.	566126
88, S88 (With A.C.)	566127
S88, 98 Convertible	566127
98 (Without A.C.) Exc. Conv.	566126
98 (With A.C.)	566559

UPPER PIVOT PIN & ECCENTRIC BUSHING: Removal–Place jack under lower control arm and raise wheel off floor. Remove wheel and loosen knuckle support clamp bolt. Remove nut and washer from front end of pivot pin and remove threaded pivot pin. *(CAUTION–*To prevent damage to brake hose, fasten knuckle support to upper control arm with a short piece of wire). Remove threaded eccentric bushing from knuckle support (eccentric has left hand thread).

Installation–Position pivot pin rubber seal over the outer ends of upper control arm to facilitate their installation over the pivot pin after assembly. Install eccentric bushing from front into knuckle support so that the threaded outer diameter of bushing is centralized; then tighten clamp bolt to keep bushing from turning. Centralize knuckle support between forked ends of upper control arm and install pivot pin with shake-proof lock washer from rear. Install nut and tighten to 50-60 ft. lbs. Check to be sure pivot pin bolt head and nut are tightened securely against metal of control arm. Using a heavy wire or other hooked tool, snap rubber seals over end of control arm and into place on pivot pin. Lubricate pivot pin, install wheel, and check front end alignment.

▷*PIVOT PIN NOTE: See Production Change above.*

LOWER PIVOT PIN & BUSHING: Removal–Place jack under lower arm, raise wheel off floor, and remove wheel. Remove nut and lockwasher from front end of lower pivot pin. Remove pin and bushing (use a long handle socket wrench to remove bushing and bear down with other hand on brake drum hub when working on left hand side).

Installation–Position pivot pin rubber seals over forked outer ends of lower control arm. Install bushing into front of knuckle support and seat tightly. Centralize lower pivot pin bushing with knuckle support between forked ends of lower control arm and install pivot pin with shake-proof washer from the rear and tighten to 50-60 ft. lbs. *(NOTE–*When knuckle support is properly spaced between ends of lower control arm there should be approximately 1/8" clearance between ends of bushing and inner surface of the front and rear control arm). Install a shake-proof washer and pivot pin nut and tighten securely.

▷*PIVOT PIN NOTE: See Production Change above.*

LOWER CONTROL ARM PIVOT SHAFT: Removal–Remove front coil spring (see above). *(NOTE–Before removing pivot shaft, loosen the bushings).* Unscrew pivot shaft bushings and remove shaft from lower control arm assembly. *NOTE–*The lower control arm pivot shaft bushings have threads on the inside and outside of the bushing. The inside of the bushing threads onto the pivot shaft, but the bushing cuts its own threads in the lower control arm

Installation–Install rubber seals on ends of pivot shaft and place shaft in lower control arm assembly. Start bushing on pivot shaft and into arm at same time, tighten bushing in place. Center pivot shaft between control arms and install the other bushing as above, being sure threads index so there is no bind. The distance between the center of the pivot shaft bolt holes and the inside face of the arm should be 1½" at each end. Turn pivot shaft as necessary to centralize. Position front coil spring on spring seat and complete assembly (see Coil Springs above).

LOWER CONTROL ARM: Removal–Remove coil spring (see above). Remove lower pivot pin and remove pivot shaft bushings and shaft.

New Control Arm–Place tool J-1052 in position between forks of control arm, and expand until there is a distance of 11½" between inside surface of inner ends of control arm. Apply chassis lubricant to pivot shaft threads and install rubber seals on shaft. Position pivot shaft in control arm and while holding shaft centered, start bushings on shaft and into arms. Tighten bushings until they are solidly seated against the shoulder. Remove expander tool and turn shaft, as necessary, to centralize. Install lower pivot pin. Install coil spring (see above).

UPPER CONTROL ARM & PIVOT SHAFT: Removal–Remove upper pivot pin (see above). Remove two bolts holding upper control arm to frame and remove shaft and control arm assembly. Flat washers and self-locking nuts on lower end of bolts can be reached through access hole in bottom of front crossmember. Remove threaded pivot shaft bushings and shaft

New Control Arm–Place tool J-5799 in position between forks of control arm, and expand until there is a distance of 6 9/16" between inside surface of inner ends of control arm. Apply chassis lubricant to pivot shaft threads, and install rubber seals on shaft. Position pivot shaft in control arm and while holding shaft centered, start bushings on shaft and into arms. Tighten bushings until they are solidly seated against the shoulder. Remove expander tool and turn shaft, as necessary, to centralize. Complete assembly by reversing removal procedure.

1957-60 OLDSMOBILE FRONT SUSPENSION

All Series (1957-60)

DESCRIPTION: "Ball-Joint" type with direct acting shock absorbers mounted within front coil springs.

ADJUSTMENT

CHECKING & ADJUSTING: Before checking or adjusting front wheel alignment, inflate tires to recommended pressure, check and adjust front wheel bearings, and check front wheel and tire assemblies for runout. Bounce front of car several times and allow it to come to its normal position. Check for erratic shock absorber action.

Tire Inflation: Front - 22 lbs. (Exc. Air Cond.); 24 lbs. (Air Cond.). Rear - 20 lbs. (Exc. Fiesta); 22 lbs. (Fiesta). *NOTE - On air conditioned cars with 9.50 x 14 tires, inflate front tires to 22 lbs.*

Steering Axis Inclination: 6° (1957-58); 10° (1959-60) at 0° camber. Not adjustable.

Caster: 0° to Pos. ¾° (1957); 0° to Neg. 1° (1958-60). Maximum variation between wheels must not exceed ½°. *See "Shimming Procedure" below.*

Camber: Neg. ¾° to Pos. ¾° (1957); Neg. ¼° to Pos. ¼° (1958-60). Maximum variation between wheels must not exceed ½°. *See "Shimming Procedure" below.*

Toe-In: 1/16-1/8" (1957); 0"-1/16" (1958-60). To adjust loosen clamp bolts at each end of steering tie rod adjusting sleeves. With steering wheel set in straight ahead position, rotate sleeves as necessary to obtain correct toe-in. Position tie rod to relay rod ball studs to bottom of slot in relay rod. Position inner clamps so edge of clamp is not adjacent to slot in adjusting sleeve.

Toe-Out on Turns: With outer wheel turned 20°, inner wheel should be 23°±½° (1957-59), 22°±½° (1960 Std. Strng.), 23°±½° (1960 Power Steering).

Shimming Procedure: Caster and camber adjustments are made by adding or removing shims between upper control arm mounting shaft and frame mounting bracket. To change shims, raise car to remove weight from front wheels. Loosen top and rear fasteners on fender filler plate aprons to gain access to control arm shaft mounting bolts, then loosen the bolts. Addition of shims at front bolt, or removal of shims at rear bolt, will increase positive caster. Removal of shims at front bolt, or addition of shims at rear bolt, will decrease positive caster. To change camber, add or remove shims of equal

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1957-60 OLDSMOBILE FRONT SUSPENSION (Cont.)

thickness at both mounting bolts. **Addition** of shims at **both** bolts will **increase camber. Removal** of shims at **both** bolts will **decrease camber.** See "Shim Selection" table below for approximate amount of change made by adding or removing shims. After shims have been installed or removed as necessary, tighten control arm inner shaft mounting bolts to 85-110 ft. lbs. Check adjustment

Shim Selection Table

Shim Size	Caster Change (Shim at front bolt)	Camber Change (Shim at both bolts)
.020"	3/8°	1/8°
.060"	1 1/8°	3/8°
.120"	2 1/4°	3/4°

REMOVAL & INSTALLATION

COIL SPRING REPLACEMENT: *See "Lower Control Arm" below*

1957-58 Front Spring Application

Model	Part No. ② Right	Left
Series 88 & Super 88		
2 & 4 Dr Sed. (S-M) ①	568862	568863
Holiday Cpe & Sed (S-M) ①	568862	568863
2 & 4 Dr Sed (H-M) ①	568863	568864
Holiday Cpe & Sed (H-M) ①	568863	568864
Convertible (1957)	568865	569994
Convertible (1958)	571096	568865
Air Conditioned Cars	568865	569994
Police & Export Cars	568865	569994
Sed Wgn. & Holiday Wgn ①	571096	568865
Series 98		
4 Dr Sed, Holiday Cpe & Sed ①	568864	571065
Convertible (All)	568865	569994
Air Conditioned Cars (Exc Conv.)	569994	571067
Export Cars	568865	569994

(S-M) - Synchro-mesh Trans **(H-M)** - Hydra-Matic
① - Without Air Conditioning

1959-60 Front Spring Application

Model	Part No. Right	Left
All (Exc. Convertible) ① ③	574427	574428
All (Exc. Convertible) ② ③	574428	574429
Convertible ③	574431	574432
Air Conditioned Cars	575133	575133
Police & Taxi	574432	575132
Series 98		
All (Exc. Convertibles) ③	574429	574430
Convertible ③	574432	574432
Air Conditioned Cars	577979	577979

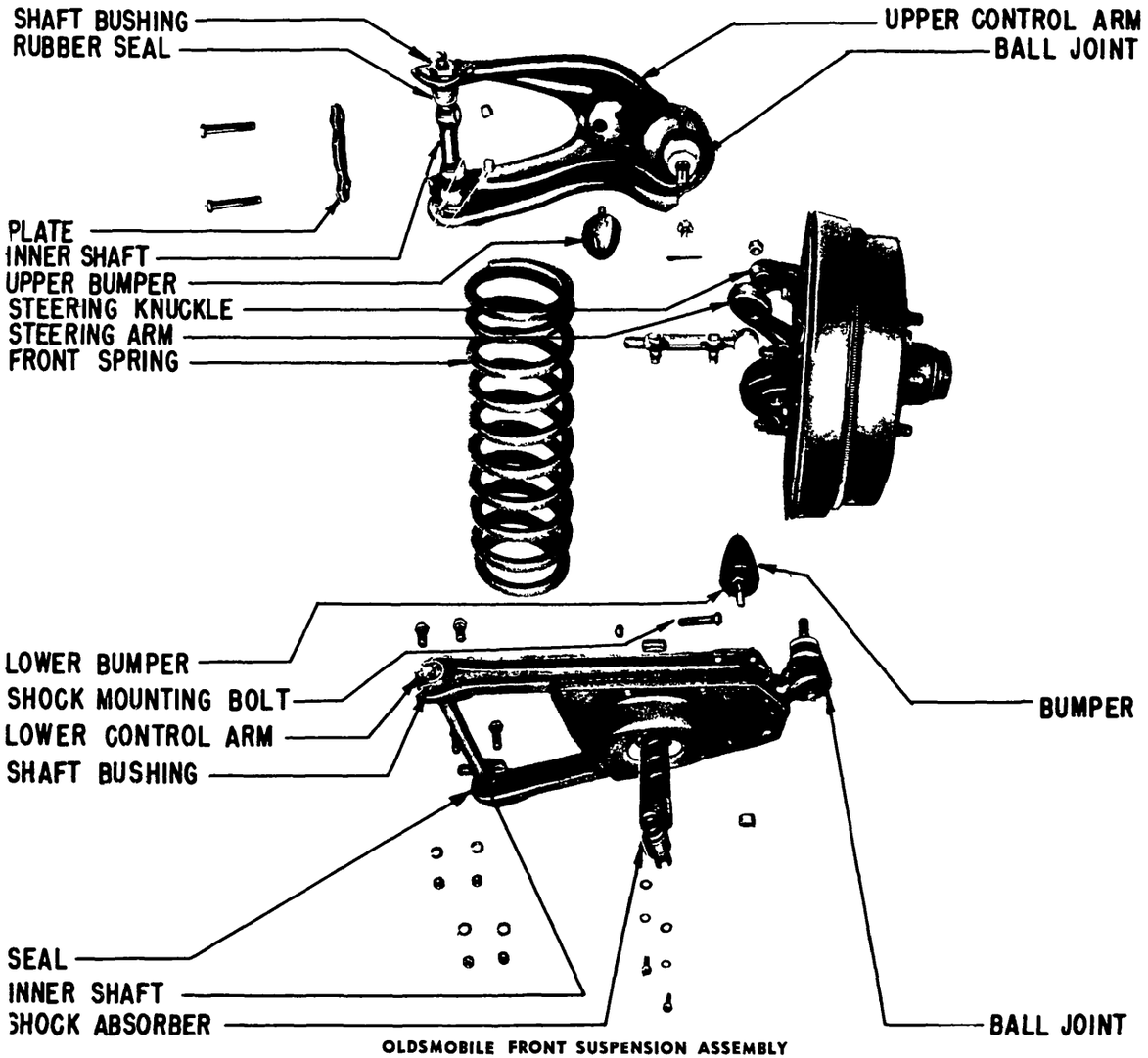
① - Synchro-mesh Trans. ② - Automatic Trans.
③ - Without Air Conditioning.

Riding Height: Front - 10 9/16-11 7/16" (1957), 10 9/16-11 1/4" (1958), 11 3/8-12 1/16" (1959-60) from underside of front spring lower seat to underside of upper seat To measure, insert a 1/8" welding rod in drain hole on lower spring seat (inboard side of spring) and push it up to contact underside of upper spring seat Mark rod, then remove and measure distance rod inserted

Rear - 6 1/8" (1957), 6 1/8-6 13/16" (1958), 6 1/8-6 7/8" (1959-60), from top of rear axle housing to bottom of frame side rail at a point immediately to rear of rubber bumper

SHOCK ABSORBER: Upper and lower shock absorber mounting bushings are integral with the shock, and, if replacement is necessary, the complete shock absorber assembly must be replaced

Removal: Remove pivot bolt from upper end of shock absorber, then remove capscrews and lockwashers attaching shock to lower control arm Remove shock absorber out through lower control arm spring seat



OLDSMOBILE FRONT SUSPENSION ASSEMBLY

Installation: Reverse removal procedure Tighten pivot bolt to 60-70 ft lbs (1957-58), 65-75 ft lbs (1959-60)

STABILIZER: Removal - Disconnect each side of stabilizer linkage by removing nut from top of link bolt, pull out bolt from bottom of linkage, and remove retainer, grommets, and linkage Remove stabilizer bracket-to-frame bolts and remove stabilizer bar, rubber bushings, and brackets

Installation: Reverse removal procedure and note the following Rubber bushings should be positioned squarely in brackets Tighten stabilizer link nut to 8-18 ft lbs., and bracket bolts to 25-35 ft lbs

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1957-60 OLDSMOBILE FRONT SUSPENSION (C nt.)

UPPER CONTROL ARM ASSEMBLY: Removal - Raise front of car and support lower control arm with jack stands, placing the stands between lower spring seats and ball joints Remove front wheel and loosen upper control arm ball joint from steering knuckle *(see "Ball Joints" below)*. Remove ball joint stud and pull stud free of knuckle. Support hub and drum assembly to prevent weight damaging brake hose *(NOTE* - If inner control arm shaft is to be removed, loosen shaft bushings at this time). Remove inner control arm shaft-to-frame attaching bolts, nut, lock plate, and wheel alignment shims (retain shim pack found at each bolt so it may be replaced in the same location) Remove arm assembly and inner shaft from car

Disassembly: *(NOTE* - The ball joint assembly is riveted to control arm and should not be removed If necessary to replace either the control arm or ball joint, the en-'ire assembly should be replaced) Remove control arm inner shaft bushings and shaft from control arm

R assembly: Apply chassis lubricant to threads of inner shaft and install rubber seals Position inner shaft in control arm and, while holding shaft centered, start bushing on shaft and into arms. Tighten bushings until they are solidly seated. Rotate inner shaft so that shaft bolt holes are centralized in control arm (centerline of bolt hole should be approximately 1 11/16" (1957-58), 1 5/16" (1959-60), from edge of boss on arm)

Installation: Install control arm inner shaft on frame and install attaching bolts, nuts, and lock plate with the original alignment shims installed between inner shaft and mounting bracket on frame Tighten nuts to 100-110 ft lbs Remove temporary support from hub and drum assembly, then connect ball joint to steering knuckle. Tighten ball joint stud nut to 40 ft lbs (minimum) and install cotter pin (tighten nut further as necessary to install cotter pin) Install wheel and lower car Check alignment and adjust if necessary

LOWER CONTROL ARM ASSEMBLY: *(NOTE* - If ball joint is suspected of being worn, check by attempting to chuck top of wheel in and out with weight of car on wheels Under other conditions the lower ball joint will appear to be worn regardless of its actual condition)

► ***1960 LOWER CONTROL ARM REMOVAL NOTE: When removing lower control arm it is not necessary to install Tool J-6509 in shock absorber mounting in spring seat.***

Removal: Raise front of car and support with floor stands Remove wheel assembly and disconnect stabilizer bar from lower control arm Remove shock absorber (see above) Install Tool 6509 in shock absorber mounting hole in spring seat Raise floor jack until it supports lower control arm between spring seat and ball joint Remove lower ball joint from control arm *(see "Ball Joints" below)*. Slowly lower floor jack until spring is fully extended and remove spring. Remove control arm inner shaft-to-crossmember attaching bolts and remove assembly from car

Disassembly: *(NOTE* -The ball joint assembly is riveted to control arm and should not be removed If necessary to replace either the control arm or ball joint, the entire assembly should be replaced) Remove inner shaft bushings and shaft from control arm assembly

Reassembly: *(NOTE* - If a new lower control arm is to be installed, the bushings must cut their own thread in the new arm. To prevent arms from moving inward during bushing installation, Tool J-1052 must be installed between front and rear arms until distance between inner surfaces of inner ends of control arm assembly is 11½" If the old arm is to be installed it will not be necessary to use expander tool) Apply chassis lubricant to inner shaft threads and install rubber seals on shaft Position inner shaft in control arm, and while holding shaft centered, start bushings on shaft and into arms *(NOTE* - If threads are being cut in new control arm assembly, apply white lead to bushing) Tighten bushings until they are solidly seated against shoulder If expander used, remove it from the assembly and rotate shaft so bolt holes are centralized in control arm (centerline of bolt holes should be approximately 1½" from edge of bushing boss on arm)

Installation: Connect control arm inner shaft to frame crossmember and tighten attaching bolts 65-75 ft lbs (1957-58), 75-95 ft lbs (1959-60) *CAUTION - Right and left coil springs are not interchangeable See "Spring Application" above* Tape spring insulator to top of spring *NOTE - Top of spring is identified by a flat coil which will allow insulator to seat squarely* While holding spring and insulator against pilot in frame crossmember, tilt spring so it will pilot over Tool J-6509 in lower control arm *NOTE - Tool J-6509 not required on 1960 springs* Rotate spring so end of bottom coil will index with edge of hole in control arm spring seat (coil should not cover any portion of hole) Position floor jack between spring seat and ball joint, then chain upper control arm to base of jack Raise lower control arm until ball joint is tight in steering knuckle, then install ball joint stud nut and tighten to 40 ft lbs and install cotter pin (tighten nut further as necessary to install cotter pin) *NOTE - A screwdriver slot is provided in ball joint stud to prevent stud turning when tightening nut.* Remove Tool J-6509 (if used) and install shock absorber Connect stabilizer to lower control arm and install wheel and tire Check front end alignment

BALL JOINTS: *NOTE - Upp r control arm ball joint is not replaceable. If ball j int is worn r damaged, complete upper control arm ass mbly must b install d.*

Removal (From Steering Knuckl): Raise front of car and place jack stands under lower control arm at a point between spring seal and ball joint Proceed as follows

Upper Ball Joint - Loosen ball joint stud nut a few turns, then install Removing Tool 6446 with hollow end of tool positioned over lower ball joint stud nut Rotate screw on tool and press ball joint loose from steering knuckle Remove tool and ball joint stud nut.

Lower Ball Joint - Loosen ball joint stud nut a few turns, then proceed as for upper ball joint (above), reversing tne tool position

Lower Control Arm Ball Joint R placem nt (On Car): Raise front of car and support outer end of lower control arm with a floor stand, then remove wheel. Disconnect lower joint from steering knuckle and block steering knuckle, backing plate, and hub assembly away from lower control arm for accessibility. Drill a 5/16" hole 1¼" deep in rivet (through head), then use a 7/8" drill and drill deep enough to remove rivet head. Drive rivet out of control arm and ball joint. Repeat this procedure with other rivets. Install the new ball joint using the special bolts furnished. *NOTE - If riv ts cannot be driven out, then the bottom riv t h ods must also be drilled out. Be very careful not to l ngat holes in lower control arm wh n drilling riv ts.*

STEERING KNUCKLE: Rem val - Raise front of car and place jack stands under lower control arm at a point between lower spring seat and ball joint Remove wheel and drum assembly Remove brake backing plate without disconnecting brake hose Leave plain arm connected to tie rod end *(NOTE* - Support backing plate to avoid damage to brake hose) Remove cotter pin from upper ball joint, then remove upper and lower ball joints *(see "Ball Joints" above)*.

Installation: Connect lower ball joint to steering knuckle and tighten stud nut to 40 ft lbs and install cotter pin (tighten nut further as necessary to install cotter pin) Repeat this procedure with upper ball joint Install brake backing plate and plain arm to steering knuckle and tighten bolts to 55-60 ft lbs (1957) On 1958 and later cars, tighten steering knuckle-to-backing plate bolts to 75-80 ft lbs and plain arm-to-steering knuckle to 80-130 ft lbs Install wheel and drum assembly, then check wheel alignment

1958 OLDSMOBILE REAR SUSPENSION (AIR SUSPENSION CARS)

Oldsm bil (1958)

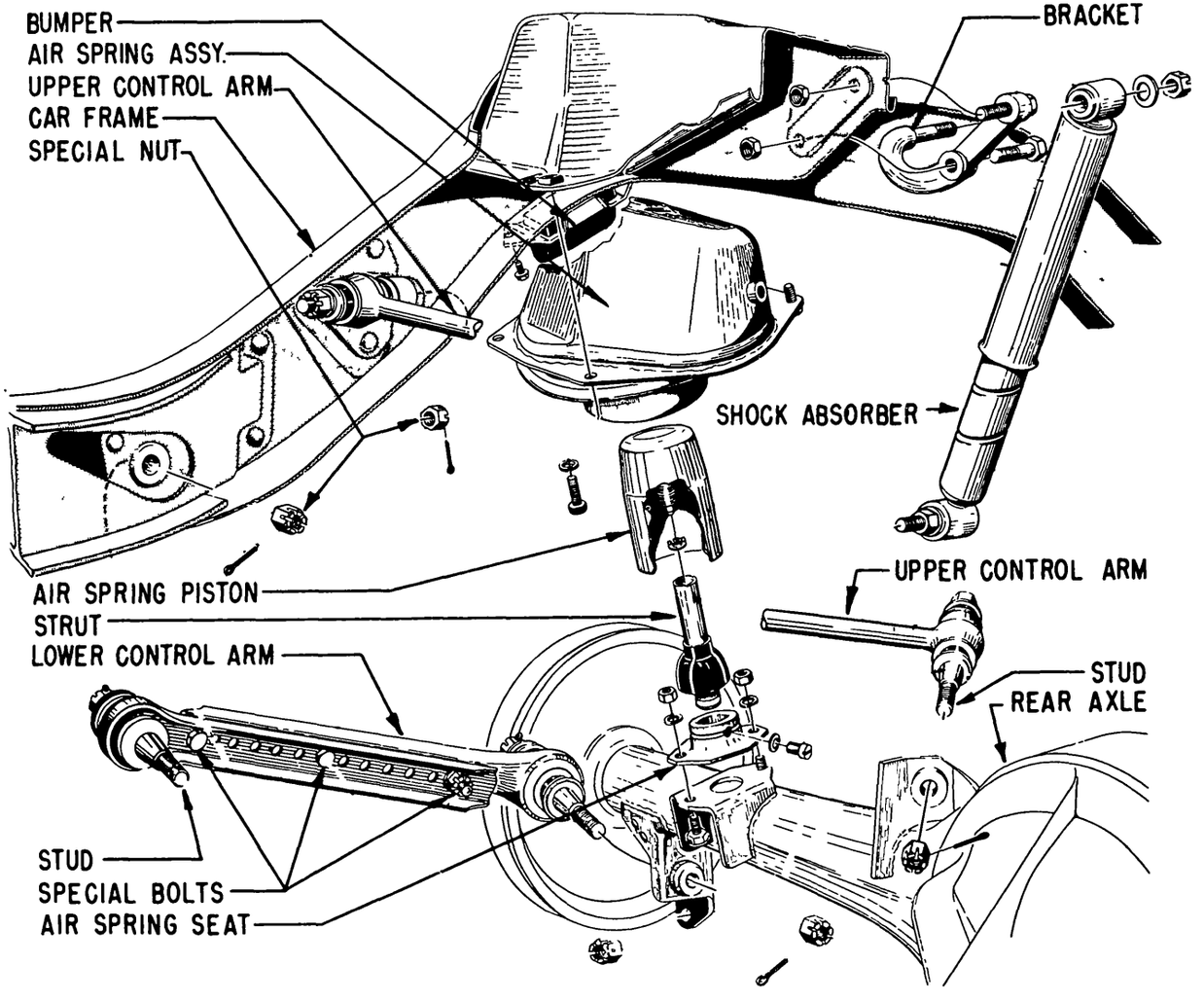
DESCRIPTION: Rear suspension linkage consists of two lower control arms connected between outer ends of rear axle housing and frame side rail, and two upper control arms connected between rear axle housing adjacent to differential carrier, and a bracket on frame side rail. A "track" bar or rear stabilizer is not used as the two upper control arms, being mounted at an angle prevent lateral movement of rear axle housing Lower control arms are adjustable for production to correctly position differential angle. Do not change adjustment of these arms.

►*LOWER CONTROL ARM REPLACEMENT CAUTION:* When replacing a damaged lower control arm, adjust new arm using the same corresponding holes before installing it in car

REMOVAL & INSTALLATION

UPPER & LOWER CONTROL ARMS: Upper and lower control arms can be removed without disturbing air spring or leveling valve assemblies When installing upper or lower control arms, tighten attaching stud nuts to 80 ft lbs. minimum

AIR SPRINGS: *See "Oldsmobile Air Suspension".*



1958 OLDSMOBILE REAR SUSPENSION ASSEMBLY

1959 OLDSMOBILE REAR SUSPENSION (AIR SUSPENSION CARS)

Oldsmobile (1959)

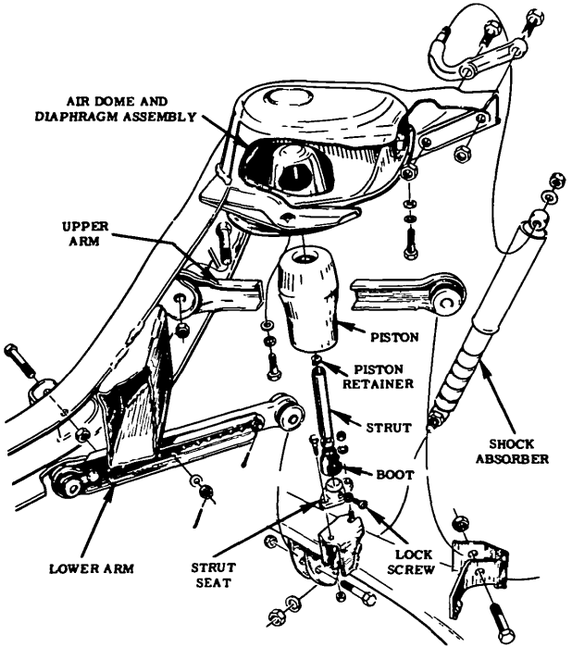
DESCRIPTION: Rear suspension linkage consists of two lower control arms connected between outer ends of rear axle housing and frame side rail, and two upper control arms connected between rear axle housing adjacent to differential carrier, and a bracket on frame side rail. A "track" bar or rear stabilizer is not used as the two upper control arms, being mounted at an angle prevent lateral movement of rear axle housing. Lower control arms are adjustable for production to correctly position differential angle Do not change adjustment of these arms.

►*LOWER CONTROL ARM REPLACEMENT CAUTION:* When replacing a damaged lower control arm, adjust new arm using the same corresponding holes before installing it in car.

REMOVAL & INSTALLATION

UPPER & LOWER CONTROL ARMS: Upper and lower control arms can be removed without disturbing air spring or leveling valve assemblies. When installing upper or lower control arms, tighten attaching stud nuts to 80 ft lbs. minimum.

AIR SPRINGS: *See "Oldsmobile Air Suspension".*



1959 OLDSMOBILE REAR SUSPENSION ASSEMBLY

1954-56 PACKARD

Packard, All Series (1954)
Packard Series 5540 & 5560 Clipper (1955-56)

► *1955-56 SERIES 5560, 5660 (CLIPPER DELUXE) & SERIES 5580, 5680 (PACKARD) NOTE: "Torsion Level" Suspension used on these models. Front end alignment (as indicated below) is the same for both types of suspension.*

DESCRIPTION: Independent, parallelogram "Broad-Beam" type with new design Upper Support Arm and Direct Acting Shock Absorbers.

CHECKING & ADJUSTMENT: First check and adjust front wheel bearings, wheel and tire balance and run-out, and tire inflation. Place car on level floor and check following:

Tire Inflation (1954): As follows:
5413—30 lbs. front, 40 lbs. rear.
5426—26 lbs., front and rear.
5433—36 lbs., front and rear.
Others—(With Conventional Steering) 24 lbs. front, 20 lbs. rear. (With Power Steering) 22 lbs. front, 20 lbs. rear.

Tire Inflation (1955): 24 lbs., front and rear. *NOTE*—If more than four passengers, inflate to 26 lbs., front and rear.

Kingpin Inclination: (5413, 5433) 2°30' (Other Models) 5°50'.
Caster: (5413, 5433) 2°±½°. (Other Models) 1°±½°.

Adjustment—Remove lubrication fitting in bushing at forward end of upper support arm outer pivot pin, use Allen wrench inserted through this hole to turn the pivot pin in **complete revolutions only.**

►***CAUTION—Pin is eccentric and will disturb camber setting unless it is rotated in full turns only.***

Camber: 0° plus ¾°, minus ¼°.

Adjustment—Same as for Caster (above) except that eccentric pin should be turned **not more than one-half revolution** from point where correct caster setting secured. Entire range of adjustment is secured in ½ turn of the pin.

►***CAUTION—Caster will be disturbed if pin turned more than one-half revolution.***

Toe-In: 0", plus 1/16", minus 0" (0" to 1/16" range).

Adjustment—Loosen clamp bolts at each end of adjusting sleeve at outer end of each tie rod, turn adjusting sleeves on **both tie rods equally.**

Toe-Out on Turns: With outer wheel at 20°, inner wheel should be 23¾°. Not adjustable.

SHOCK ABSORBER REPLACEMENT: Raise car until there is sufficient clearance to permit shock absorber to be removed through hole in bottom of lower support arm. Using an offset screw driver, insert the tool in slot of shock absorber extension. While holding top of shock absorber extension, remove shock absorber nut, washer, grommet. From underneath lower support arm, remove nuts holding shock absorber retainer bracket to bottom of lower spring seat, and remove shock absorber.

Installation—Reverse the removal procedure. Tighten shock absorber stud nut to 12-18 ft. lbs., and the lower retaining bracket nuts to 15-18 ft. lbs.

►***CAUTION—Make certain that rubber grommets and cup-shaped washers correctly assembled on upper and lower mounting studs.***

COIL SPRING REPLACEMENT: Raise front end of car and place a jack stand under frame side rail to rear of suspension cross-member. Remove stabilizer to frame horn attaching nuts. Disconnect stabilizer end from lower support arm and remove shock absorber. Remove the front wheel and place a jack under outer end of lower support arm and raise just enough to relieve pressure on lower support pivot pin. Remove the pivot pin nut and screw out the pivot pin. Lower jack slowly to allow support arm to go down, then remove coil spring.

Installation—Position spring in lower support arm with the flattened end of spring upward. Place jack under lower support arm near outer end, and raise jack until holes in outer end of support arm are in line with holes in knuckle vertical support lower bushing. Centralize knuckle support in support arm (there should be approximately ⅛" clearance between inner face of arm and each bushing). Install lower pivot pin in through the front of support arm and tighten to 85 to 95 ft. lbs. torque. Position end of front stabilizer rod in lower support arm. Insert "ears" of the stabilizer attaching clips in holes of support arm, and spring the clip over bottom edge with tool J-4654. Install shock absorber through bottom frame front cross-member opening with the extension extending out through top of cross-member. Slip the rubber grommet and washer over top end of shock absorber and install the nut. Tighten retaining nut to 12-18 ft. lbs. torque. Install front wheel, remove stand from under car and lower car to floor.

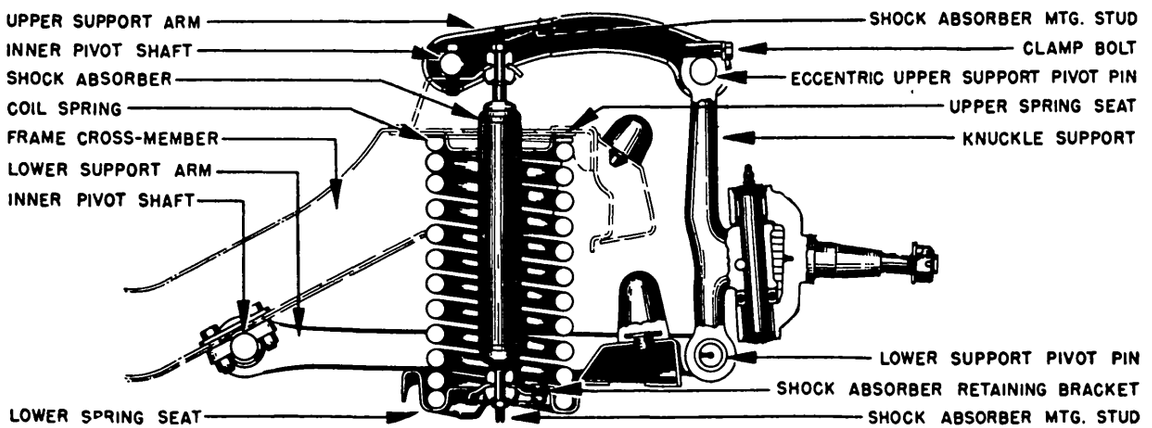
►***SPRING INSTALLATION CAUTION***—**Flattened end of spring must be upward and end of lower coil must be seated in recess in lower spring seat so as to cover the drain hole in the spring seat.**

UPPER SUPPORT ARM REPLACEMENT: Support front end on jack placed under lower support arm, remove wheel and tire assembly. Unscrew front and rear bushings on outer pivot pin. Remove clamp bolt from upper end of knuckle support, unscrew pivot pin from support. Remove two mounting bolts from support arm inner shaft, lift support arm assembly off. To remove shaft from support arm, unscrew bushing from arm at each end of shaft.

►***INSTALLATION CAUTION***—When installing inner pivot shaft bushings in arm, use Spreader Tool J-3957 to maintain arm alignment while screwing bushings in. After installing support arm on frame, hold knuckle support centered in arm while screwing bushings in arm and on pivot pin. Make certain rubber seals installed at inner end of each bushing.

LOWER SUPPORT ARM REPLACEMENT: Remove shock absorber and coil spring (see directions above). Remove nut and lockwasher from rear end of lower pivot bolt at outer end of arm, unscrew bolt from knuckle support and support arm, lift support arm assembly off. Remove pivot shaft by unscrewing bushing from arm at each end of shaft.

►***INSTALLATION CAUTION***—When installing pivot shaft bushings in arm, use Spreader Tool J-1052 to maintain support alignment. Install rubber seal at inner end of each bushing.



PACKARD FRONT SUSPENSION

PACKARD "TORSION LEVEL" SUSPENSION

5560 S ri s (Clipp r D Luxe) (1955)
5580 S ri s (Packard) (1955)
5660 S ri s (Clipper Custom) (1956)
5670 S ri s (Packard Ex cutive) (1956)
5680, 5688 S ri s (Packard) (1956)

► CAUTIONS

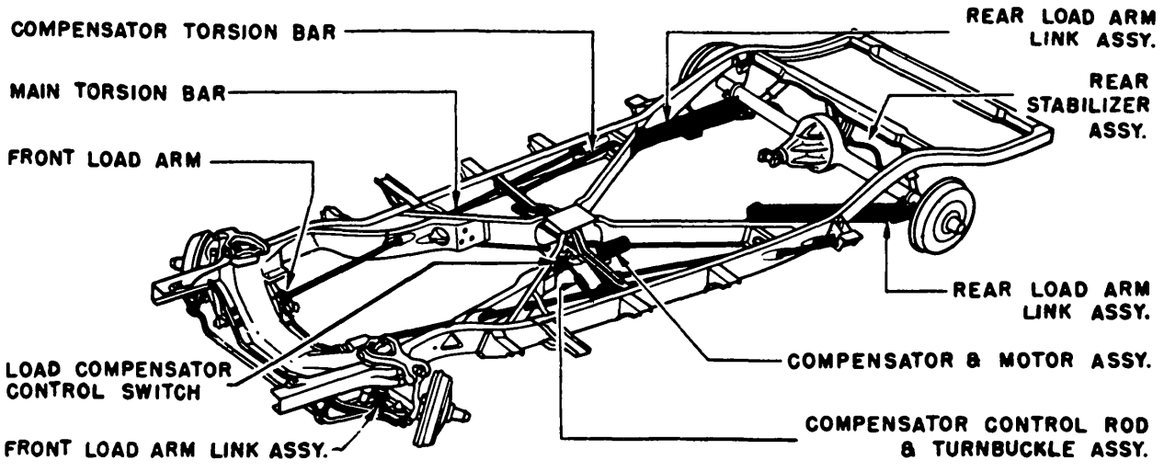
►*FRONT END ALIGNMENT NOTE: Alignment specifi- cations or th same for "Conventional" & "Torsion L v l" type suspensions. See "Packard (Conventional)" Front Susp nsi n for data.*

►*SERVICING CAUTION: The "On-Off" Switch located below th instrument panel must be in the "OFF" positi n when cars "jacked-up" for service operations. DO NOT plac jack r hoist under rear load arms as thes may b com disc nnected.*

► *1956 RAISING &LOWERING OF CAR CAUTION (To Perform Servic Functions on "Torsion Level" Suspension):* Due to complete change in wiring and new type limit switches method of raising and lowering car by grounding at each side of limit switches or the "A" and "B" terminals of the control switch can no longer be used. To raise or lower car with later type switches proceed as follows: Remove four small screws from small cover plate on bottom of control switch. Lower plate slightly to expose wire terminals in control switch. The two outer terminals of the center group of three can be grounded with a screwdriver or jumper wire to raise or lower the car. *CAUTION* - Do not raise or lower the car by grounding wires on solenoids as limit switches will be by-passed and compensator gears may be damaged.

► *FUSE NOTE:* Control Circuit Fuse (AGW-7½ amps.) and Compensator Motor Feed Fuse (AGC-30 amps.) are located under hood on left side of engine compartment.

DESCRIPTION: Two long, torsionally flexible bars (running generally fore and aft along frame side rails) have hexagonal ends which fit into load arms (one at each end of each bar) which are hexagonally broached at one end. Front load arms pivot on anti-friction needle type bearings on brackets mounted on frame front cross member. Rear load arms also pivot on needle type bearings in brackets attached to frame side rails. Front arms are loaded against anti-friction links which seat in front suspension lower support arms. Rear arms are loaded against stirrup type links suspended from driving torque arms. Arms on each side are installed in such a manner that loaded ends are pointing in opposite directions (loaded end of front arm is pointing away from center of car whereas loaded end of rear arm is pointing toward center of car). Initial loading of arms is accomplished by "winding up" or twisting torsion bar during its assembly in chassis. Operating in conjunction with Torsion Level Suspension is a levelizing or compensating mechanism which automatically keeps car level and approximately at its designed height regardless of load.



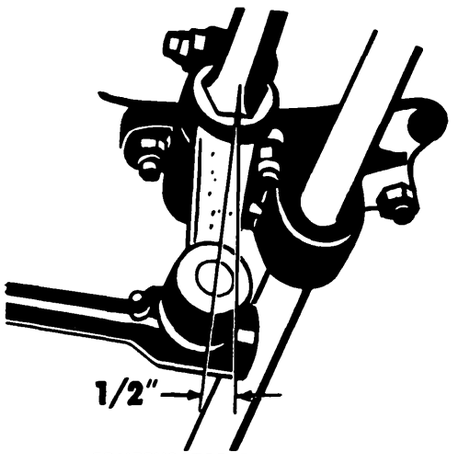
PACKARD TORSION LEVEL SUSPENSION ASSEMBLY

Front Suspension: Except for minor design changes, the independent parallelogram type front suspension remains unchanged. Major change is elimination of coil springs.

Rear Suspension: Thrust of rear axle to frame, in order to move car, is accomplished by two driving torque arms, one at each side of frame, attached to frame at forward end by rubber cored bushings. Arms are also insulated by rubber at points of attachment to rear axle housing, permitting free movement of axle. Transverse or side-to-side movement of rear axle is controlled by two waved stabilizer bars which permit true vertical movement of rear axle. Rubber grommets, at ends of bars, insulate wheel shocks from frame.

Compensator: Basically, compensator consists of torsion bars approximately four feet long, connected by means of levers and links to a two-way motor with reduction gearing. Forward end of compensator bars rotate in bearings attached to frame. Hexagonal rear end of bars fit into rear load arms in milled hexagonal openings adjacent to main torsion bar openings. Bar type links are connected to the compensator gear box at their inner ends and, at their outer ends, to levers attached to front end of compensator bars. Six switches are used in compensator electrical system to control its operation. Control switch assembly is attached to frame forward of compensator motor. A lever in switch assembly is linked to a lever clamped to left main torsion bar near center of bar.

OPERATION: Torsion Level Suspension—Vertical wheel movement causes link end of load arms to move vertically. Vertical movement of either arm increases or decreases the amount of twist in the torsion bar which in turn transmits this twisting force to the arm on the opposite end of the bar and the load on the link end of this arm then is increased or decreased. The force beapplied to move front load arm is in an upward direction. The force opposing the movement of the rear load arm may be thought of as being in an upward direction. Therefore, the arms are being loaded against each other with the bar absorbing the torsional load. In addition to absorbing the torsional stresses created by road irregularities the load arms and torsion bars also



COMPENSATOR BAR "NO LOAD" POSITION

function in a manner which raises or lowers the car, front and rear, on the side where road irregularity is encountered.

Compensator: With front and rear of car equally loaded, center section of main torsion bar has no rotation du to equal twisting forces being applied at each end of bar. When loading at either end of car is increased or decreased, center section of main torsion bar will rotate causing control switch to make contact and "make" and "break" circuit to compensator motor. This causes connecting links to move inward or outward to rotate compensator bars. The bars, in turn, cause rear load arms to pivot and either raise or lower rear end f car to make it level with front end. Thus, regardless of

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PACKARD "TORSION LEVEL" SUSPENSION (Cont.)

weight distribution, car remains level to road, front and rear, with very little change in car height. It should be remembered that compensator functions only when loading of car is changed and does not function to compensate for road irregularities. *NOTE*–Control switch has approximately a seven second delayed action to prevent motor from operating each time wheels pass over an irregularity in road.

Switches–Six switches used to control compensator as follows:

"On-Off" Switch–Located below instrument panel to left of steering column.

►*CAUTION: This switch is normally in "ON" position and is moved to "OFF" position to prevent compensator from operating when car is raised for service operations.*

Stop Light Switch–A three terminal two-way stop light switch is used to prevent compensator operation during brake application.

Control Switch–Used to energize compensator motor when car load is increased or decreased.

Limit Switch–Employed to permit compensator motor to operate only within a predetermined range in accordance with load changes in car.

Solenoid Switches–Two used to complete electrical circuit to compensator motor, one for each direction of rotation of the motor.

ADJUSTMENT: Compensator Linkage–Set car on its wheels. If rear end of car is too high, shorten compensator switch turnbuckle. If rear end too low, lengthen link.

LUBRICATION: Incorporates ten lubrication points which should be lubricated every 1000 miles with pressure gun grease. Whenever torsion bars are replaced or unloaded for other service operations, link seats should be lubricated with a special grease.

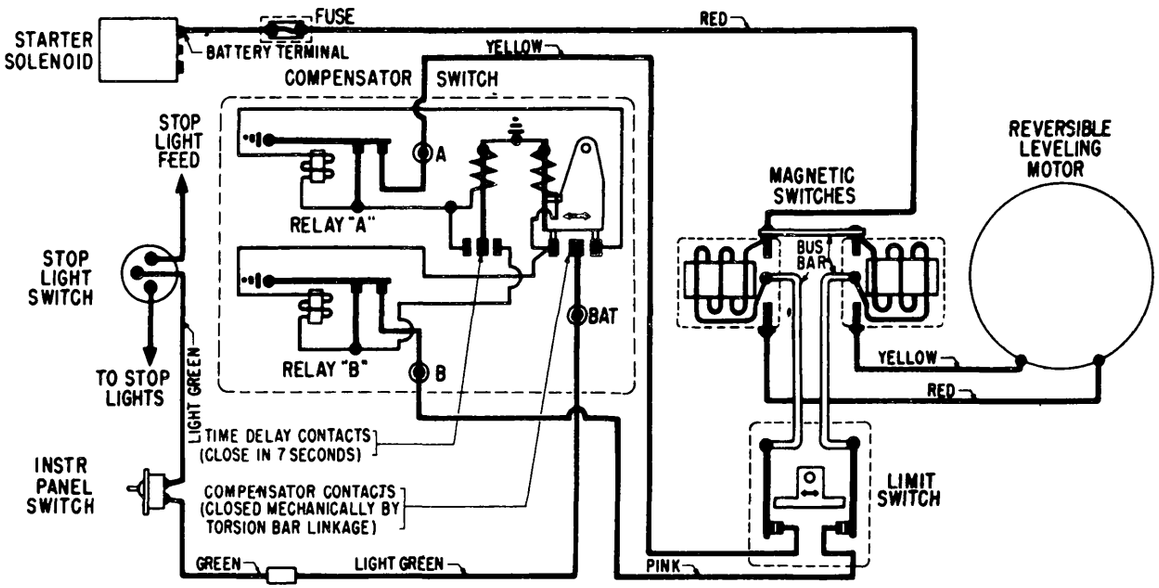
►*SERVICING CAUTION: Car should never be jacked in rear with jack or hoist under rear load arms as the rear load arm link may become disconnected.*

TORSION BAR REMOVAL: Position car on hoist and move the "on-off" switch, located under instrument panel to left of steering column, to the "off" position. Raise car and remove rear wheel on side from which torsion bar is to be removed. Proceed as follows:

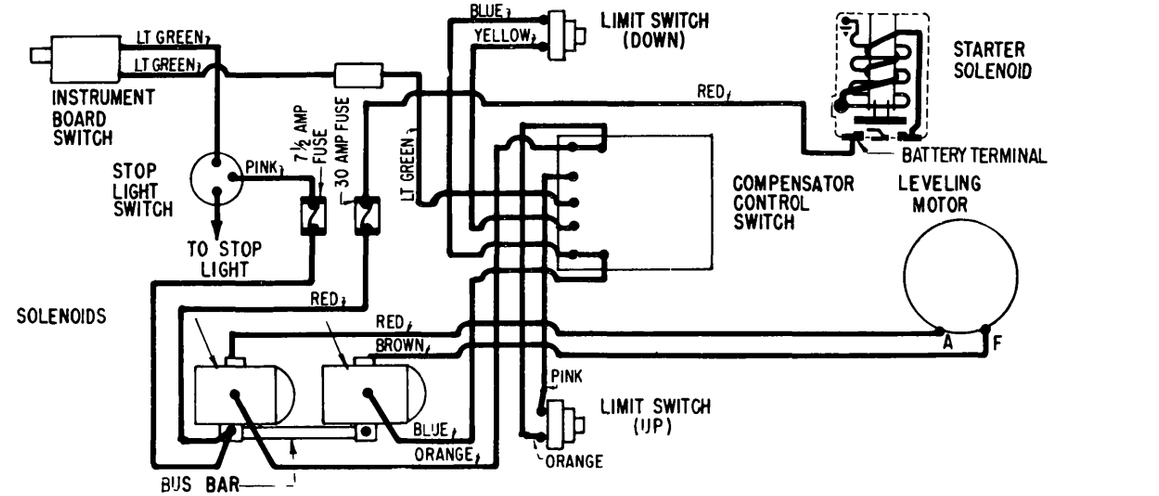
1)–If a frame contact type hoist is used, place the high-jacks under rear axle housing and under the outer ends of front lower supports. On other type hoists, place the high-jacks at all four corners, front and rear, then extend jacks so that pads contact the frame.

2)–Note position of compensator bar lever in illustration, as this is the position in which no load is being transmitted through the bar. Bar should be just off vertical toward the center. Move levers as necessary by grounding a terminal at the limit switch. Grounding rear terminal will move lever outward, front terminal will move lever inward.

3)–Remove nuts retaining rubber guide bearing and compensator retainer bracket to cross member and remove these parts. (*NOTE–If I ft t nsi n bar is being r m v d, d tach c mpensat r link fr m c mp nsator link from c mpensator bar).*



1955 TORSION LEVEL SUSPENSION CONTROL WIRING DIAGRAM



1956 TORSION LEVEL SUSPENSION CONTROL WIRING DIAGRAM

4)–Loosen rear load arm clamping bolt using an 11/16" socket and offset handle. Tap compensator bar forward and out of load arm. Slightly raise or lower rear hoist lift if required to centralize hex in arm with hole in bracket.

5)–Attach Load Arm Centering Tool J-6045 with piloting shoulder of tool in hole in bracket and opposite end of tool installed in elongated hole above compensating bar hole in bracket, tighten the locknut.

6)–Attach clamping detail of Torsion Bar Loading and Unloading Tool J-5954 at inner end of load arm and then install jack attachment to clamping detail. The hole in frame for attaching jack attachment is in line with the front of the brake drum. Operate jack to move inner end of load arm upward far enough to centralize the pivot bolt in bracket (pin is located between load bar and compensator bar holes in bracket). Use a brass drift and tap pivot bolt out of bracket.

7)–Tighten jack to move inner end of arm upward to clear load arm link and then move load arm link inward. Place a four inch block between rear axle case and bottom of frame "kick-up". While holding link inward, reverse tool ratchet and lower inner end of arm to relieve load on bar.

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PACKARD "TORSION LEVEL" SUSPENSION (C nt.)

8)–Remove clamp from load lever and attach Removing Tool J-6046 to bar forward of bracket. Strike tool with a hammer and drive bar toward rear. Remove tool and push bar out toward rear.

TORSION BAR INSTALLATION: *CAUTION–An arrow is stamp d in nd of bar denoting direction in which bar must be "wound up". The three digits stamped in end of bar ar th last three digits of bar part number.*

1)–Insert rear load arm in bracket and feed bar through bracket and load arm (if left bar being installed, feed bar through compensator link also), and into front load arm making sure that front load arm link is in correct position and that rear load arm is nearly vertical with clamping detail of Torsion Bar Loading and Unloading Tool J-5954, and Centering Tool J-6045 in place. Distance from rear end of torsion bar in load arm to rear face of bracket should be ¾" with rear load arm centered in bracket.

2)–Place special lubricant in seat in load arm link and connect tool jack to clamp on load arm. Operate jack and draw load arm up into position where pivot hole in arm lines up with pivot hole in bracket, and then insert pivot pin.

3)–Continue to draw upward while holding link inward until link can be swung outward under arm, then back off jack to seat arm.

4)–Position compensator bar in rear load arm and attach bearing at front of arm to frame (seal between bearing and lever should not be squeezed together but should contact both the bearing and lever). Tighten clamp nut in rear load arm. Remove clamp, jack, and centering tools.

5)–If left torsion bar replaced, attach compensator motor linkage so that rear edge of clamp lever is ¾"from front edge of rubber guide bearing retainer. Adjust compensator linkage (see above).

1954-57 PONTIAC

All S ri s (1954-57)

►CHANGES, CAUTIONS, CORRECTIONS

►*PIVOT PIN INSTALLATION NOTE:* Effective 1956 production, upper and lower pivot pins are installed from rear **on right hand side.** This makes it necessary to lubricate pivot pins on right hand side from rear.

►*REAR SPRING ASSEMBLY CAUTION (1956):* Early production new rear spring assembly, with Butyl rubber liners, was used on Catalinas, sedans, and convertibles **at P ntiac Ass mbly Plant only.** They are not being released for service. Rear spring U-Bolt torque has been reduced to 45-55 ft. lbs. and it is especially important that these torque limits be observed on springs with Butyl liners.

DESCRIPTION: Independent linked parallelogram with direct acting shock absorbers mounted within coil springs.

CHECKING & ADJUSTING: Check entire front end for wear and excessive play, inflate tires to correct pressures, check steering gear adjustment, wheel bearing adjustment, wheel & tire balance and run-out (run-out should not exceed 1/8"). With car on level floor, jounce both ends (see Leveling instructions) and check frame height. Check and adjust front suspension assembly in following order:

L veling Fram : Jounce car at the rear and then at the front and allow car to settle to normal operating position. Measure frame height.

Fram H ight–Measure vertical distance from underside of frame side rail to top of lower control arm on each side of car. Distance should be the same on both sides of car. Unequal heights indicate sagged springs. See Spring Data below.

Tir Inflati n Pr ssur : With tires COLD inflate to following pressures:

7.10 x 15 – 24 lbs.. Front & Rear.
7.60 x 15 – 22 lbs., Front 20 lbs., Rear.
7.10 x 15 (Sta. Wgn.)–28 lbs., Front. 30 lbs., Rear.
7.60 x 15 (Sta. Wgn.) 26 lbs. front and rear.
7.60 x 15 (Safari Sta. Wgn.) 24 lbs. front and rear.
7.60 x 16 (Air Cond.) 24 lbs. front and rear.
7.50 x 14 22 lbs. front and rear.
8.00 x 14 22 lbs. front and rear.
8.00 x 14 (Air Cond.) 24 lbs. front, 22 lbs. rear.
8.50 x 14 (Exc. Safari & Air Cond.) 22 lbs. front and rear.
8.50 x 14 (Star Chief Safari) 22 lbs. front and rear.
8.50 x 14 (Chieftain & Super Chief Safari) 24 lbs. front and rear.
8.50 x 14 (Air Cond.) 22 lbs. front, 20 lbs. rear.

Kingpin Inclination: 4½° at ½° camber (1954). 1°20' (1955-57).

Caster: 0°±½° (1954). Neg. 1°±½° (1955-57).

Adjustment–Loosen clamp bolt in upper end of knuckle support, use special wrench J-5343 to engage hexagonal head of bushing on pivot bolt in upper end of support, adjust caster by turning bushing in **complete turns only to avoid disturbing camber.**

►*CAUTION:* Clearance must be maintained between ends of bushing and control arm throughout suspension unit travel. Check for binding when adjusting caster.

Camber: Pos. ½°±½°.

Adjustment–Same as for Caster (above) except that eccentric bushing should be turned not more than ½ revolution from point where correct caster secured, (entire range of adjustment secured in ½ revolution of bushing).

Toe-In: 0" to 1/16" measured 9" from floor.

Adjustment–Loosen clamp bolts at each end of adjusting sleeve at outer end of each tie rod, turn adjusting sleeves **on both rods equally.**

Toe-Out on Turns: With inner wheel turned 20°, outer wheel should be 18-19°.

SHOCK ABSORBER REPLACEMENT: *Not necessary to disturb front suspension assembly.* Shocks remove from above upper control arm. Raise car so weight is off front wheels. Remove nut from bottom stud on shock absorber (hold shock with water pump pliers). Remove grommet and retainer and compress shock as far as possible by pushing lower section up. Remove two nuts holding shock bracket to frame (on left side of car, remove bracket from shock first). Shock can be removed through hole in frame. Install shock absorber with shock compressed, into spring, then extend shock so nuts and grommet can be installed on lower end.

UPPER CONTROL ARM REPLACEMENT: *Upper pivot pin and cc ntric bushing can be replaced without r - moving control arm from car.*

Removal: Support car with jack placed under lower control arm and remove wheel. Remove shock absorber and upper bracket (see Shock Absorber). Take off nut on rear end of upper pivot pin, unscrew threaded pivot pin from knuckle support and control arm (CAUTION–Wire knuckle support to frame to prevent damage to brake hose). Loosen clamp bolt in knuckle support, and unscrew eccentric bushing. Take out two bolts mounting inner control arm shaft to frame (the nuts can be reached through access hole in front cross member).

Pivot Shaft Installation: Use spreader tool J-5324 to expand inner end of control arm to 6 9/16" (measured between inner faces of arm). Place pivot shaft with new rubber seals in position in control arm. After lubricating pivot shaft threads with chassis grease, start bushing on pivot shaft and into arm at same time. Tighten so bushing flange is firmly seated against control arm (326-380 ft. lbs. torque). Center pivot shaft in control arm and start other bushing being sure threads index so there is no bind. Tighten in same manner as other bushing. Remove spreader tool. Check to see that distance between inner faces of control arm is 6 9/16". Rotate shaft to centralize it so that bolt hole at each end of shaft is an equal distance from arm. *NOTE*–Frictional drag of shaft in bushings should not exceed 12 in. lbs.

Upper Pivot Pin & Eccentric Bushing Installation: Install new rubber seal on inner face of control arm eyes (slip end of rubber seal over boss, double other end back to allow clearance for assembly). Install eccentric bushing in knuckle support. Hold knuckle support centered in upper control arm, thread pivot pin through control arm and bushing (coat pin threads with chassis lubricant, see that one lockwasher placed under head of pin) and tighten pin against arm with 50-55 ft. lbs. torque, then install pivot pin nut and lockwasher and tighten to 50-55 ft. lbs. torque. Turn pivot pin seals back to cover pivot pin threads.

Control Arm Installation: Position upper control arm on frame cross member and install bolts and nuts. Tighten nuts to 80-85 ft. lbs. torque (nuts are self-locking and must be tightened with an extension inserted through hole in front cross member).

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1954-57 PONTIAC (C nt.)

LOWER CONTROL ARM REPLACEMENT: *Low r pivot pin and bushing can be replaced without removing control arm from car.*

Removal: Remove shock absorber (see Shock Absorber data) then proceed as with Front Spring Removal. After spring removed , remove nuts and lock washers holding lower control arm shaft to frame cross member and remove control arm and shaft assembly. Remove shaft from control arm by removing front and rear threaded bushings from shaft and control arm.

Pivot Shaft Installation: Use Spreader Tool J-1052 to expand inner end of control arm to 11½" (measured from inner faces of arm). Position pivot shaft (with new rubber seals) in control arm, lubricate shaft threads with chassis lubricant, start one bushing on shaft and into threads in arm at the same time, tightening bushing to 385-455 ft. lbs. torque and firmly seated against arm. Center shaft in arm (distance from shaft mounting hole centers to inner face of arm should be 1½"±3/64" at each end). Install second bushing similarly. Remove tool and check control arm dimension (11½"±3/32" between inner faces of arm at pivot shaft), recheck pivot shaft position and centralize it by rotating shaft if necessary.

Lower Pivot Pin & Bushing Installation: Install new bushing in lower end of knuckle support and tighten to 250 ft. lbs.(CAUTION—Bushings must be firmly tightened and bushing shoulder must be seated against support). Position new rubber seal on each end of bushing, hold knuckle support centered in lower control arm, thread pivot pin through control arm and bushing (coat pin threads with chassis lubricant, see that one lock washer placed under head of pin) and tighten pin against arm with 50-55 ft. lbs. torque, install pivot pin nut and lockwasher, tighten to 50-55 ft. lbs. torque. Check knuckle support for centralized position (distance from end of bushing to inner face of control arm must be equal within one thread or 1/8" at each end of bushing).

KNUCKLE SUPPORT REMOVAL (For Kingpin Bushing Replacement): Remove brake backing plate and hang plate up out of way (not necessary to disconnect brake line). Remove upper and lower pivot pins (see Upper and Lower Control Arm data above).

SPRINGS: Upper end of springs are flattened and lower end must be fitted in recess in lower seat. Color marks located on outside surface of spring center coil

1954 Spring Application
Synchro-mesh Transmission Cars

Car Model	Color Mark	Part No.
6 Cyl. Sed. & Catalina	Red	516432
6 Cyl. Other Models	Grey	516433
8 Cyl. Sed. & Catalina	Grey	516433
8 Cyl. Other Models	Grn. & Brn.	516434
Heavy Duty (All Models)	Red & Blue	516730

Hydra-Matic Drive Cars

Car Model	Color Mark	Part No.
6 Cyl. Sed. & Catalina	Grey	516433
6 Cyl. Police & Taxi	Grey	516433
6 Cyl. Other Models	Grn. & Brn.	516434
8 Cyl. Sed. & Catalina	Grn. & Brn.	516434
8 Cyl. Convertible	Grey & Ylw.	516435
Heavy Duty (All Models)	Red & Blue	516730

1955 Spring Application
Synchro-Mesh Trans. Cars

Model	Color Mark	Part No.
Chieftain, 2 Dr. & Catalina	Grey	①516433
Star Chief, Catalina Custom	Grey	①516433
Chieftain, Sta. Wgn. ②	Grn. & Brn	516434
Star Chief, Convertible ②		520926
Police & Taxi	Grn & Brn	516434

Hydra-Matic Drive Cars

Model	Color Mark	Part No.
Chieftain, All Models ②	Grn & Brn	516434
Star Chief Convertible ②		520925
Star Chief Sedan ②	Grn & Brn	516434
All Models ③	Yel & Orange	518776
Police & Taxi	Grn & Brn	516434

①—Same spring used with air conditioned cars.
②—Cars without Air Conditioning.
③—Cars with Air Conditioning.

1956 Front Spring Application
Synchro-mesh Trans. Cars

Model	Color Mark	Part No.
27 Sta. Wgns.(Exc. A.C.)	Gr. & Br.	516434
27 (Exc.Sta.Wgns.)	Grey	516433
27 Taxi & Pol. (Exc. A.C.)		520925
All Taxi & Pol. (Exc. A.C.)	Gr. & Br.	520926
Heavy Duty (Exc. A.C.)		522106

Hydra-Matic Trans. Cars

Model	Color Mark	Part No.
Air Conditioned Cars	Yel. & Orange	518776
28 Convertible		520925
Others (Exc. A.C.)	Gr. & Br.	516434
Heavy Duty (Exc. A.C.)		522106

1957 Front Spring Applicati n
(Synchro-mesh Transmission Cars)

Model	C lor Mark	Part N .
Exc. Sta. Wgn. & Conv.	Yel. & Red	516432
Station Wagon	Grn. & Brn.	516434
Convertible	Grey	516433
Taxi & Police	Red	520926
Air Conditioned Cars		516435
Heavy Duty ①		522106

(Hydra-Matic Driv Cars)

Model	Color Mark	Part No.
Exc. Sta. Wgn. & Conv.	Grey	516433
Sta. Wgn. & Conv.	Grn. & Brn.	516434
Taxi & Police		520925
Air Conditioned Cars		516435
Heavy Duty ①		522106

① - Except Air Conditioned Cars.

COIL SPRING REPLACEMENT: Raise front of car until wheels are 10" off floor, then place jack stands under frame side rails at a point forward of front door hinge pillar. Place another jack stand under lower control arm of spring which is not being removed. Place a floor jack under lower control arm spring seat from which spring is to be removed and raise jack until it touches spring seat. Remove wheel, and then remove shock absorber (see above). Disconnect lower end of stabilizer link at lower control arm. Remove lower pivot pin from bushing, then slowly lower jack until coil spring is fully extended, then remove spring. To install spring, place jack under spring seat, then place coil spring in seat on lower control arm with end of coil at bottom of spring indexing with hole in spring seat *(NOTE* -Top of spring is identified by a flat surface on coil). Raise jack gradually until lower arm is in position. Complete installation by reversing removal procedure

►*FRONT SWAY BAR INSTALLATION CAUTION:* Sway bar must be installed with the proper side up or grommets may be damaged due to improper contact with eye in bar.

1958-60 PONTIAC FRONT SUSPENSION

Pontiac (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*LOWER BALL JOINT LOOSENESS NOTE:* A slight looseness in the lower ball joint, with weight of car off the wheels, is normal. If movement of wheel at outer circumference is greater than ¼", excessive wear in wheel bearing, ball joints, or both is indicated.

►*STABILIZER BAR REPLACEMENT CAUTION:* Different stabilizer bar is used on cars with air suspension. The shaft for cars with coil springs has a diameter of 3/4" (13/16" on air suspension cars). Do not interchange.

►*FRONT SUSPENSION "CRACKING" NOISE CORRECTION:* This condition may be caused by rough surfaces on wheel stops and is noticeable when wheels are turned full right or full left. Correct by smoothing the forged stop pad on steering arm. Do not remove an excessive amount of material. Lubricate wheel stops every 2,000 miles with Lubriplate.

DESCRIPTION: "Ball-joint" type suspension with spherical ball joints connecting upper and lower control arms to steering knuckle. Coil springs are mounted between lower control arm and frame front crossmember with direct acting shock absorbers mounted within the springs. On 1958 models, lower control arm inner end is pivoted on a shaft which is bolted to frame crossmember. Threaded steel bushings connect lower control arm to pivot shaft. On 1959-60 models, pressed-in rubber bushings at inner end of lower control arm are bolted to brackets on crossmember by special 9/16" bolts.

ADJUSTMENT

CHECKING & ADJUSTING: Before checking or adjusting front wheel alignment, inflate tires to correct pressure, check adjustment of front wheel bearings and check steering gear and linkage for excessive looseness see *"Lower Ball Joint Looseness Note"* above.

►***NOTE: Check and adjust camber and cast r with car at curb h ight. On 1960 mod ls, install sp cial front and rear spac rs (see "1960 Riding H ight" below).***

CONTINUED ON NEXT PAGE

1958-60 PONTIAC FRONT SUSPENSION (C ntinu d)

Tir Inflation: (8.00 x 14) - 22 lbs , front & rear(exc Safari & Air Cond Cars) (8.50 x 14) - 20 lbs , front and rear (exc Safari & Air Cond Cars) (8.50 x 14) - 22 lbs , front, 20 lbs , rear (Safari and Air Cond Cars) Above pressures are with tires cold

Steering Axis Inclination: 4°50' at 0° Camber Not adjustable

Cast r: Neg. ½°±½° (1958). Neg. 1½°±½° (1959-60). *See "Shimming Procedur s" b low.*

Camber: Pos ½°±½°. *See "Shimming Procedure" below*

T -In: 0-1/16", with trammel 9" above floor

T -Out n Turns: With right wheel turned 20° to right from straight ahead position, left wheel should be turned 18° to 19°

SHIMMING PROCEDURE: Adjustments are made by placing shims between upper pivot shaft and frame Caster and Camber adjustments can be made at the same time To **decreas** positive caster, add shims to front bolt To **incr as** positive caster, remove shims from front bolt To **incr ase** camber, add shims to both front and rear bolts *NOTE* - By adding or subtracting an equal amount of shims from front and rear bolts, camber will be changed without affecting caster

Shim Selection Table

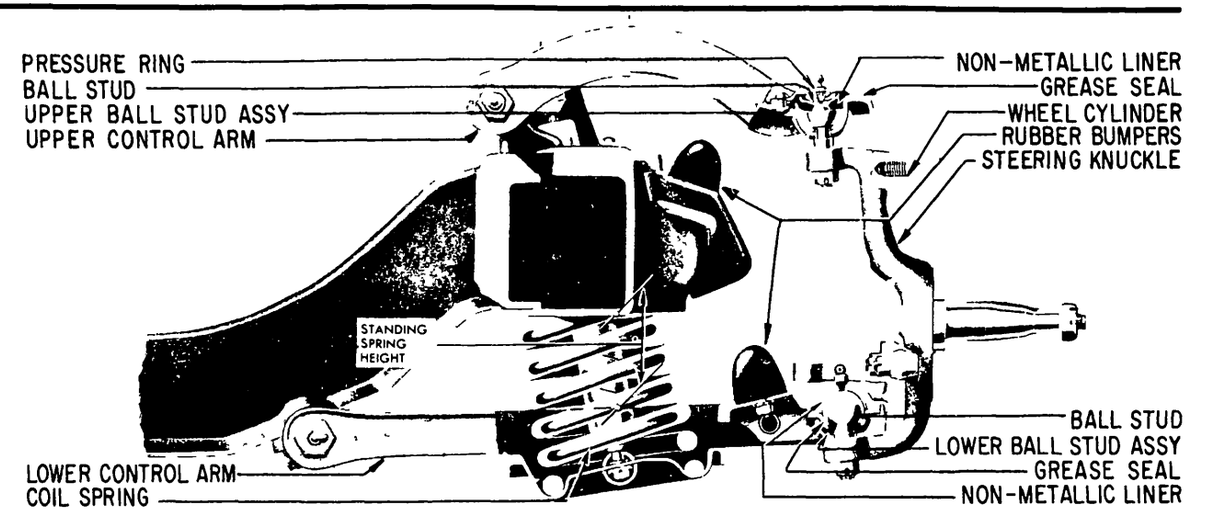
Shim Siz	Caster Change (Shim at fr nt bolt)	Camber Change (Shim at both bolts)
030"	23'	1/6°
060"	45'	1/3°
164"	2° 7'	1°

REMOVAL & INSTALLATION

►*FRONT COIL SPRING REMOVAL & INSTALLATION NOTE: Tool J-7592-01 can be used to compress spring for removal and installation. If used on 1959-60 models, inn r nd of lower control arm can be disconnected from frame front crossmember by removing two special 9/16" bolts which pivot lower control arm on brackets.*

FRONT COIL SPRING: R moval - Raise front of car with jack until wheels are about 10" off floor and place car stands under frame side members on each side of car forward of radiator Place floor jack under outer edge of lower control arm spring seat from which spring is to be removed and raise jack until it touches spring seat Remove wheel assembly then remove shock absorber (see below) Disconnect stabilizer link at lower control arm and steering arm at tie rod Remove lower ball joint stud nut Using Tool J-6627 press lower ball stud from steering knuckle Tilt steering knuckle out to clear control arm and lower jack until spring is fully extended and remove spring

Installation: Place jack pad under spring seat and place spring on spring seat with flat coil end toward top Raise jack gradually checking to see that spring is positioned correctly Raise until lower arm clears steering knuckle, then lower jack slightly while guiding ball stud into knuckle Install nut and cotter pin on stud and install shock absorber Connect stabilizer link and steering linkage. On 1959-60 models, if inner ends of lower control arm were disconnected from crossmember, tighten special 9/16" bolts attaching arm to frame crossmember to 150-175 ft. lbs.



PONTIAC FRONT SUSPENSION ASSEMBLY

1958 Front Spring Application
(Synchro-mesh Transmission Cars)

Model	Color Mark	Part No.
All (Exc Below)	Yel & Blue	530141
Sport Coupe (Exc Air Cond)	Yel & White	530145
Sport Coupe (Air Cond)	Yel & Lt Gr	530627
Convertible (Exc Air Cond)	Yel & Red	530144
Convertible (Air Cond)	Yel & Pink	530625
2&4 Dr Sed (Police) ①	Yel & Pink	530625
2&4 Dr Sed (Police) ②	Yel & Yel	531486
Taxi	Yel & Pink	530625
Air Cond Cars	Yel & Purple	530626
Safari	Yel & Purple	530626

① - Except Special Equipment
② - Special Equipment

(Hydra-Matic Drive Cars)

Model	Color Mark	Part No.
All (Exc Below)	Yel & Dk Gr	530143
Sport Coupe (Exc Air Cond)	Yel & Blue	530141
Sport Coupe (Air Cond)	Yel & Lt Gr	530627
Convertible (Exc Air Cond)	Yel & Orange	530146
Convertible (Air Cond)	Yel & Pink	530625
2 & 4 Dr Sed (Police) ①	Yel & Purple	530626
2 & 4 Dr Sed (Police) ②	Yel & Alum	531488
Taxi	Yel & Pink	530625
Air Cond Cars	Yel & Purple	530626
Safari	Yel & Purple	530626

① - Except Air Conditioning
② - Special Equipment, exc Air Conditioning

1959-60 Front Spring Application

Model	Synchro-mesh Trans.	Auto. Trans.
All (Exc. below) ①	532886	532888
Catalina Safari ①	534358	534359
Bonneville Safari ①	532887	533886
Police & Taxi	534359	532890
Heavy Duty Chassis	532891	532891
All (Exc. below) ②	532889	532889
Safari (All) ② ③	532890	532890
Safari (All) ② ④	532889	532889

① — Without Air Conditioning ③ — Without high rate springs.
② — With Air Conditioning. ④ — With high rate springs.

►*COIL SPRING IDENTIFICATION NOTE: Springs are marked with paint as follows:* Yellow & Blue (532886); Yellow & Brown (534359); Yellow & White (532890); Yellow & Dark Green (532888); Yellow & Pale Green (534358); Yellow & Red (532889); Yellow & Orange (532887); Yellow & Grey (532891).

Riding Height (1960 Models): 3¾"-4" (3 15/16"), measured from top of lower control arm to underside of frame at a point directly behind centerline of spring. *NOTE - For front wheel alignment adjusting, a spacer (steel bar stock ½" x ½" square) cut to above length, may be used between lower control arm and crossmember at at centerline of spring to position car at correct riding height.*

SHOCK ABSORBERS: Removal - Raise front of car so weight is fully off front wheels, then remove nuts, retainer, and grommet attaching upper end of shock absorber to frame bracket *NOTE - Shock absorber piston rod must not turn while loosening nut. Use pliers or wrench to hold top of shock mounting while removing nuts* Remove bolts retaining shock at lower end and remove shock absorber

Installation: Reverse removal procedure

LOWER CONTROL ARM (1958 COIL SPRING CARS): Removal - Remove front coil spring, then remove nuts and lockwashers holding lower control arm shaft to frame crossmember. Remove shaft from arm by removing front and rear threaded bushings from shaft and control arm.

Installation: Reverse removal procedure and tighten control arm shaft-to-frame nuts to 70-85 ft lbs If a new lower control arm is being installed, it will be necessary to cut a thread in extruded portion of arm for the bushing as follows Place Tool J-1052 in position and expand arms until distance between inner faces of arms is 11½" Place shaft with rubber seals in position in control arm, then lubricate shaft threads with a 25% graphite lubricant and start bushing on pivot shaft and into arm at the same time Tighten until bushing flange is firmly seated against metal of control arm

CONTINUED ON NEXT PAGE

1958-60 PONTIAC FRONT SUSPENSION (C nt.)

(385-455 ft. lbs. will be required). Center shaft in control arm and install other bushing being sure threads index so there is no bind. Tighten until bushing flange is firmly seated against metal of control arm, then remove Tool J-1052. Check to see that distance between inner faces of shaft ends of control arm is 11½"±3/64". Also check to see that distances from center of pivot shaft bolt holes to inside faces of arm are equal at each end. Equalize if necessary.

LOWER CONTROL ARM (1958 AIR SUSPENSION CARS):

Removal - Raise front of car so wheels are off floor, then remove wheel. Disconnect pipe at spring to relieve pressure, then remove locknut at upper end of control link and lift end of stabilizer shaft from link. Disconnect ball stud from steering knuckle *(see "Coil Springs" above)*, then remove air spring piston to lower control arm attaching bolt. Remove bolts holding lower control arm to frame crossmember and remove arm (air spring will hang free in air diaphragm). Remove rubber bushing retainer from each end of control arm pivot shaft. Thread bolt into one end of control arm pivot shaft and rest opposite end of arm on bed of press, then press shaft through upper bushing (bolting pad on shaft will force lower bushing from control arm).

Installation: Place Spreader, Tool J-1052 in position in arm and tighten nut. Distance between inner faces of control arm at bushing bosses should be 11½". Position shaft in control arm so shaft bolting pads are approximately 20° above alignment with arm. Using bushing replacer cups, J-7166 press bushings onto shaft and into control arm. Remove bushing installing tools. Attach lower control arm shaft to frame crossmember and tighten bolts to 70-75 ft. lbs. Swing arm into position aligning air spring attaching bolt hole with hole in arm. Guide ball stud through steering knuckle and secure with nut. Tighten nut to 60-95 ft. lbs. and install cotter pin. Tap ends of control arm to insure no twist exists in rubber bushings, then install bushing retainers and bolts. Tighten bolts to 50-70 ft. lbs. Attach air spring to control arm and tighten bolt to 50-70 ft. lbs. To complete installation, reverse removal procedure. Tighten stabilizer shaft-to-link inner nut to 10-25 ft. lbs., and outer nut to 60-120 ft. lbs.

LOWER CONTROL ARM (1959-60 COIL SPRING CARS):

Removal - Remove coil spring (see above), then disconnect inner end of lower control arm by removing nuts and withdrawing two special 9/16" diameter bolts.

Lower Control Arm Bushing Replacement: With lower control arm removed, rest arm on Remover Tool J-7022-1 and place Spacer Tool J-7022-7 around bushing, then with Sleeve J-7022-3 between control arm and arbor of press, press bushing from arm. Remove other bushing in same manner. To install bushing, rest arm on Sleeve J-7022-3 and place Spacer Tool J-7022-7 between arm flanges at bushing position. Start bushing in arm, then press it into position with an arbor press and Tool J-7022-2.

Installation: Reverse removal procedure and tighten lower control arm to frame bolts to 150-175 ft. lbs. Tighten lower ball stud nut to 60-95 ft. lbs.

Installation: Reverse removal procedure and tighten control arm shaft-to-frame bolts to 80-95 ft. lbs. If a new control arm is being installed, proceed as follows: Place Tool J-7167 in position between arms and expand until distance between inner faces of arms is 8 31/32". Place pivot shaft with new rubber seals in position in control arm. Lubricate pivot shaft threads with chassis lubricant, then start bushing on pivot shaft and into arm at the same time. Tighten so bushing flange is firmly seated against control arm (326-380 ft. lbs. will be required). Center pivot shaft in arm and install other bushing being sure threads index so there is no bind, then tighten in same manner as for first bushing. Check to see that distance between inner faces of shaft ends is 8 31/32"±1/32" and that shaft is centered between arms.

LOWER CONTROL ARM (1959 AIR SPRING CARS): *NOTE - Removal and installation procedures are the same as for 1959-60 Cars with Coil Springs, except that pipe must be disconnected from air spring to relieve pressure.*

UPPER CONTROL ARM (1958-60 COIL SPRING CARS):

Removal - Place jack under lower control arm and raise wheel off floor, then remove wheel. Remove ball stud from steering knuckle using Tool J-6627, then remove bolts and self-locking nuts holding control arm shaft to frame and remove control arm. Remove shaft from arm by removing front and rear threaded bushings.

UPPER CONTROL ARM (1958 AIR SUSPENSION CARS):

Removal - Raise front of car so wheels are off floor, then remove wheel. Disconnect pipe at spring to relieve air pressure. Disconnect upper ball stud at steering knuckle *(see "Coil Spring Cars" above)*, then disconnect control arm shaft from frame bracket noting number and location of shims found between shaft and frame bracket. Remove bushing from each end of shaft, then thread bolt into one end of control arm shaft and rest opposite end of arm on bed of press, and press shaft from upper end of arm (shoulder on shaft will force lower bushing from arm). *NOTE - If rubber of lower bushing tends to shear, insert 7/16" diameter pin through lower shaft attaching hole, then with 1/8" washer on pin at each end of shaft, press bushing from arm.* Remove bushing from shaft, then press remaining bushing from arm in same manner.

UPPER CONTROL ARM (1959 AIR SUSPENSION CARS):

Removal - *NOTE - Removal and installation procedures are the same as for 1959-60 Cars with Coil Springs.*

Installation: Place Spreader, Tool J-7167 in position in arm and expand arms by tightening nut. Overall dimension to outside of control arm bushing bosses should be 9.920". Place shaft in control arm with new rubber bushings at outer ends. *NOTE - Position shaft in arm so flats of shaft bolting bosses are approximately perpendicular to arm.* Using bushing replacer cups, Tool J-7179, press bushings onto shaft and into control arm. Remove bushing installing tools, then attach control arm shaft to frame bracket, replacing same number of shims at bolts from which they were removed. Tighten bolts to 50-60 ft. lbs. Complete installation by reversing removal procedure.

UPPER & LOWER BALL JOINT: Removal - With control arm removed, chisel or drill heads of rivets retaining ball joint to control arm and drive out rivets, then remove ball joint assembly.

Checking Ball Joints: *NOTE - This procedure supersedes previous procedures and should be used whenever it is necessary to check ball joints.* Check and lubricate all ball joints, then raise car at lower control arm supporting outside of spring seat so upper control arm is not touching rebound bumper and front wheels are free from contact with lift or floor. Check movement of each front wheel by moving top and bottom of tire in and out. If travel at periphery of tire is greater than ¼", wear in front system is indicated. If wheel bearings or upper control arm shafts are not the cause of looseness, remove upper ball stud and disconnect upper control arm from steering knuckle. With joint properly lubricated, install a nut snug against upper ball joint and rotate ball in its socket with a torque wrench. If torque required is less than ½ ft. lbs. or more than 6 ft. lbs., the ball joint should be replaced. If excessive looseness still exists, disconnect lower ball stud from steering knuckle. Install a nut on lower ball joint stud and check for excessive wear by measuring end play which should be .035" to .045". If endplay is greater, replace ball joint.

Installation: Install new ball joint and retain in position with special bolts supplied with the new joints. *CAUTION - Use only special alloy bolts supplied with ball joint replacement kit.* Tighten nuts to 10-12 ft. lbs.

Tightening Specifications

	Ft. Lbs.
Ball Stud Nut (1958-60)	60-95
Upper Arm Shaft to Frame (1958-60)	80-95
Lower Arm Shaft to Frame (1958)	70-85
Lower Arm Shaft to Frame (1959-60)	150-175
Upper Arm Shaft Bushing (1958)	Ⓒ 280-326
Upper Arm Shaft Bushing (1959)	Ⓒ 150-175
Upper Arm Shaft Bushing (1960)	Ⓒ 90-175
Lower Arm Shaft Bushing (1958)	Ⓒ 385-485
Shock Absorber Upper Nut (1958-60)	5-10
Shock Absorber Lower Bolts (1958-60)	15-25
Stabilizer Bracket-to-Frame (1958-60)	20-35
Stabilizer Shaft Link Nut (1958-60)	5-10

Ⓒ - These parts must be tightened with sufficient torque to secure metal-to-metal seating.

1958-60 PONTIAC REAR SUSPENSION

P ntiac (1958-60)

DESCRIPTION: Rear suspension linkage consists of two lower control arms and a single upper control arm. Forward ends of lower control arms are attached to brackets on frame crossmember and rear ends are attached to brackets welded to rear axle housing. Upper control arm is connected at two points to a frame crossmember and to a bracket welded to center of rear axle housing. Rubber bushings are used at all connecting points. Coil springs are mounted with lower end seated on lower control arm and upper end seated in tower in frame crossmember. *NOTE - With air suspension, coil springs ar r plac d by air springs in the same locati n.* On station wagon models, a rear stabilizer bar is mounted at rear of axle and is linked to frame.

LOWER CONTROL ARM & BUSHING: Removal - Remove pivot bolts at frame bracket and at rear axle housing. Press bushings out of control arm using Tools J-7022-1, J-7022-3 & J-7022-4 (1958-59); Tools J-8481-2, J-8481-3, J-8481-4 (1960), and an arbor press.

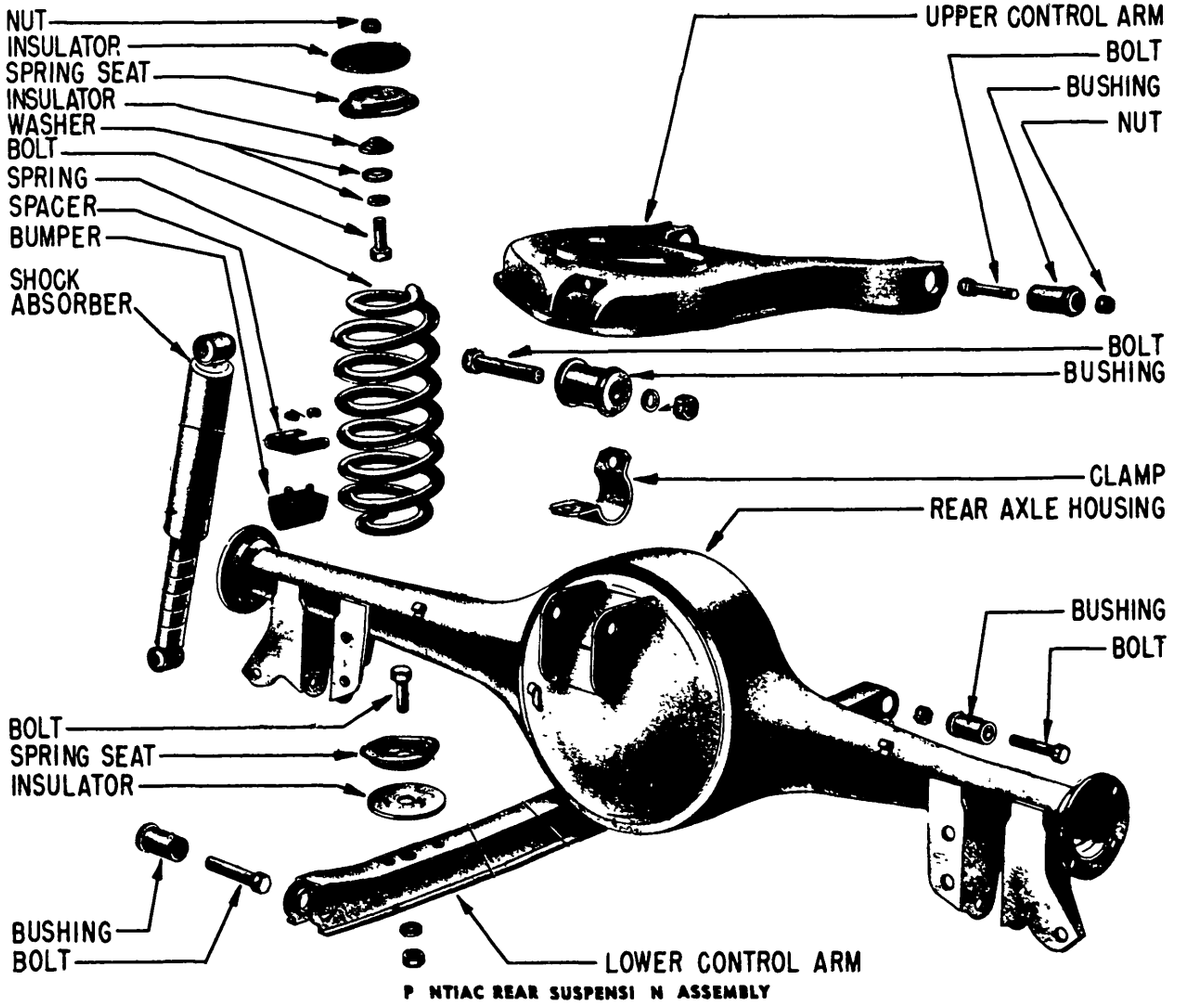
Installation: Install bushings using Tools J-7022-1, J-7022-2, J-7022-3, J-7022-4 (1958-59); Tools J-8481-1, J-8481-2, J-8481-3 (1960), and an arbor press.

UPPER CONTROL ARM & BUSHING: Removal - Remove pivot bolts at frame bracket and at rear axle housing. Press bushings out of control arm using Tool J-7022-1, 3 & 4 and an arbor press.

Installation: Install new bushings in control arm using the same tools as used for removal, then install control arm on frame and rear axle brackets. Tighten bolts as indicated in table below.

Tightening Specifications

Upper & Lower Arm Pivot Bolts	150-175
Coil Spring Upper Clamp Bolt	25-35
Coil Spring Lower Clamp Bolt	25-35
Rear Shock Absorber Bolts	50-65



P NTIAC REAR SUSPENSI N ASSEMBLY

REM VAL & INSTALLATI N

REAR COIL SPRINGS: Removal - *NOTE - For removal of rear air springs, see "Pontiac Air Suspension".* Raise car with chain fall until rear wheels are 8" off floor, then remove wheel assembly. Place car stand on floor jack under lower control arm spring seat and remove nut securing spring lower retainer. Remove pivot bolt from rear end of lower control arm, then raise car or lower jack as necessary to allow spring to expand. Remove upper retainer nut of spring and remove spring and retainers.

Installation: Reverse removal procedure and tighten bolts and nuts as indicated in table below.

1958 Rear Spring Application

Model	Color Mark	Part N .
Bonneville Spt. Cpe.	Yellow	530153
Convertible	Yel. & Orange	530152
Chieftain Catalina Cpe	Yel. & Blue	530150
Chieftain 2-Dr. Sed. ①	Yel. & Blue	530150
Cheiftain Catalina Sed. ①	Yel. & Red	528824
Chieftain 4-Dr. Sed. ①	Yel. & Red	528824
Chieftain 2 & 4-Dr. Sed. ②		530629
Star Chief Super Deluxe Safari ③	Yel. & White	528825
Safari ③	Yel. & Lt. Gr.	531443
Super & Star Chief Cpe	Yel. & Brown	530151
Super & Star Chief Sed.	Yel. & Brown	530149

① - Exc. Taxi & Police.
② - Taxi & Police.
③ - Except Star Chief Super Deluxe.

1959-60 Rear Spring Application

Model	Part N .
Catalina 2—Dr. (Exc. Conv. & Police)	534313
Catalina 4—Dr. Sed. (Exc. Taxi & Police)	534257
Catalina Safari ①	534315
Catalina Safari ②	534316
Catalina Convertible	532895
Star Chief 2—Dr. Sedan	532896
Star Chief 4—Dr. Sedan	532893
Bonneville 2—Dr. Sedan & Convertible	532896
Bonneville 4—Dr. Sedan	532893
Bonneville Safari ①	532897
Bonnevill e Safari ②	534316
Police (Early)	532893
Police (Late)	535273
Taxi	532899
Heavy Duty Chassis	532900

① - Except high rate springs.
② - High rate springs.

► *COIL SPRING IDENTIFICATION NOTE: Springs are marked with paint as follows:* Yellow & Pink (534313); Yellow & Green (534257); Yellow & Pale Green (534315); Yellow & Aluminum (534316); Yellow & Red (532895); Yellow & Blue (532896); Yellow & Dark Green (532893); Yellow & Brown (532897); Yellow (532899); Yellow & Purple (532900).

Riding Height (1960 M d ls): 6" to 6½" measured from top of axle housing to frame at a point approximately 1½" outboard from rubber bumper on frame.

1954-60 STUDEBAKER & PACKARD

Studebaker (1954-60)
Packard (1957-58)

►CHANGES & CORRECTIONS

►*1955 CHUCKLING OR CRACKLING NOISE AT FRONT END CORRECTION:* Check lower support arm inner shaft attaching bolt nuts for tightness (black paint around inner shaft to crossmember contact area may be worn off or marked). Correct by removing the hug nuts one at a time. Place a hardened washer, Part No. 1539073 against the inner shaft boss and install new hug nuts. Tighten to 60-65 ft. lbs.

►*1955 SPEEDSTER MODEL FRONT SPRING SPACER PRODUCTION CHANGE:* Beginning with Car Serial No. 7166614, two spacers, Part No. 526830, are being installed on the left hand front spring as follows, to compensate for the greater load on that side. Install one spacer between front spring insulator and lower suspension arm. The other spring is installed between upper insulator and frame.

►*1957 CONTROL ARM BUSHING RETAINER PRODUCTION CHANGE:* Plain washers formerly installed on the control arm in shaft bushing retainer are no longer used in production. It is necessary and important that bushing retainer be torqued to proper specification (60-65 ft. lbs.).

►*1957 FRONT END NOISE CORRECTION (When Due to Looseness at Upper Control Arm Inner Shaft):* Can be caused by retaining screw having backed out, bushing retainer being worn and not holding inner sleeve of bushing, or bushing itself being worn. Inner side of retainer should have six serrations in good condition. Outside of retainer should not have pronounced galled spots from lockwasher. If retaining screw has worked loose, install a "Nylok" self-locking screw (Part No. 1541700). Also a plain washer, Part No. G446211, has been released to replace original lockwasher used in production. Tighten new screw to 35 ft. lbs. *CAUTION* - Under no circumstances should any lubricant be applied to bushing or retainer to eliminate a noise condition.

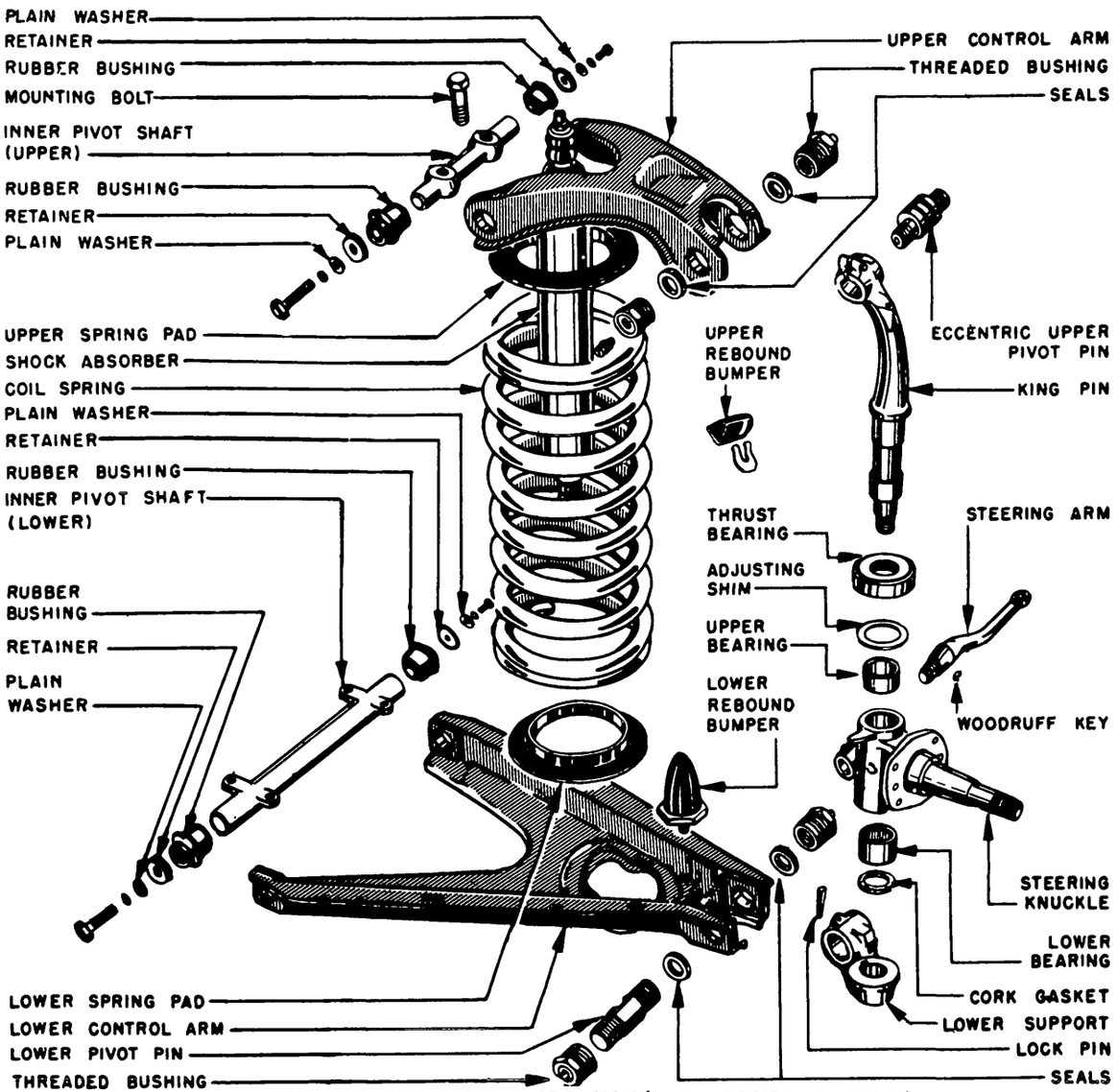
DESCRIPTION: Independent parallelogram type with coil springs. Shock absorbers are direct acting type mounted within front coil springs. Upper control arm outer pivot is eccentric and camber and caster adjustments are made at this point.

CHECKING & ADJUSTMENT: Before checking and adjusting front end alignment, check (and adjust if necessary) front wheel bearings, steering gear, steering arm and tie rod ends.

Tire Inflation: 1954-56 Models - Front - 26 lbs. **Rear** - 22 lbs. (Commander & President, Exc. Sta. Wgn.); 24 lbs. (Champion, All Models, & Commander Sta. Wgn.).
1957-58 Models - Front - 24 lbs. **Rear** - 20 lbs. (Exc. Sta. Wgn.); 24 lbs. (Sta. Wgn.).
1959-60 Models - Front - 24 lbs. (Exc. Sta. Wgn.); 26 lbs. (Sta. Wgn.). **Rear (5.90x15)** - 20 lbs. (Exc. Sta. Wgn.); 26 lbs. (Sta. Wgn.). **Rear (6.40x15)** - 20 lbs. (Exc. Sta. Wgn. & Taxi); 24 lbs. (Sta. Wgn. & Taxi). **R or (6.70x15)** - 20 lbs. (Exc. Sta. Wgn.); 24 lbs. (Sta. Wgn.).

►*CAPTIVE AIR TIRE NOTE:* **Front** - 24. lbs. **Rear** - 22 lbs.

Kingpin Inclination: 5¼° (1954-56); 6° (1957-60). At 0° camber.



STUDEBAKER FRONT SUSPENSION (RUBBER TYPE BUSHINGS)

Caster: Neg. 1° to Neg. 2½° (1954-58); Neg. 1½° to Neg. 3° (1959-60). There should not be more than ¾° variation between wheels. *NOTE - Adjust caster before making camber adjustment.* To adjust caster, loosen kingpin clamp bolt, then remove lubrication fitting from rear bushing at upper control arm outer pivot pin. Insert an Allen wrench into pin and turn until proper caster is obtained (one full turn will change caster ½°).

►*CAUTION:* Camber will be disturbed by caster adjustment unless pivot pin rotated in complete turns only.

Camber: 0° to Pos. 1° (½° greater camber desired on left side). To adjust camber (after caster adjustment completed), turn outer pivot pin, using an Allen Wrench to obtain desired setting. *NOTE - ½ turn of th pin covers entire range of camber adjustm nt.* Tighten clamp bolt and install lubrication fitting.

Toe-In: 1/16-1/8". Adjust as follows: With steering gear cam lever shaft on high spot of cam (steering wheel spoke straight down) and left front wheel in straight ahead position (adjust left hand tie rod to bring wheel into straight ahead position if necessary), adjust **right hand** tie rod to obtain desired setting.

CONTINUED ON NEXT PAGE

1954-60 STUDEBAKER & PACKARD (C ntinu d)

T -Out on Turns: As indicated in table below Not adjustable If incorrect, check for bent steering arm

M d l	Inn r Wheel	Outer Wheel
1954	23½°± 1°	20°
1955-57	22½ to 23½°	20 °
1958-60	23½° to 24½°	20°

FRONT COIL SPRING (1954-58): Removal - Raise car and support it with jack stands placed under frame at rear of engine rear support crossmember (be sure car is high enough for lower control arm to clear floor when released) Place a roller jack under center of lower control arm inner shaft and raise jack so it just contacts shaft Remove front shock absorber (see below), and disconnect stabilizer shaft from control arm Remove inner shaft-to-crossmember retaining bolts, then release jack slowly and lower control arm until spring is unloaded Remove jack and swing control arm outward, lifting spring off its seat Remove rubber spring pad from control arm

Installation: Place shock absorber mounting bolt in position on lower control arm, then place lower spring pad on spring seat Position spring on upper spring seat, and while holding spring so that it remains seated, swing control arm inward, seating spring on control arm seat Position roller jack under center of inner shaft and slowly lift jack to compress spring Align holes in inner shaft and holes in crossmember flange with a drift pin, and continue to lift inner shaft until attaching bolts can be installed Tighten bolts to 75-80 ft lbs

FRONT COIL SPRING (1959-60): Removal - Raise car and support with jack stands under frame (be sure car is high enough for lower control arm to clear floor when released) Place a roller jack under extreme outer end of lower control arm (not under pin on steering knuckle) and raise car slightly to support control arm Remove shock absorber (see below), then remove wheel, brake drum and backing plate (do not disconnect brake hose) Remove upper rebound bumper and disconnect tie rod outer end from steering arm If so equipped, disconnect stabilizer from lower control arm Remove upper control arm inner shaft attaching bolts and loosen the two inner shaft bushing capscrews sufficently to allow shaft to turn Pull upper control arm outward and lower the jack and lower control arm until spring is free, then remove spring

Installati n: Place top of spring into crossmember and position lower end on lower control arm *CAUTION - Install spring with closer coils to top, and the lower coil nd toward c nt rlin of car Be sure lower coil is placed ov r lip of seat in lower control arm to prevent it slipping when compr ss d* Place roller jack under extreme outer end of lower control arm and slowly raise the jack *NOTE - Mak sure upp r control arm is clear of crossm mber whil jack is raised* With spring sufficiently compressed, position upper control arm on crossmember and use a drift to align inner shaft and crossmember bolt holes, then install capscrews Install nuts and tighten to 75-80 ft lbs *CAUTION - To pr v nt injury, us a wr nch for positioning and holding nuts A short piece of masking tape will hold washer and nut to wrench.* Replace rebound bumper and install backing plate, brake drum and wheel Connect tie rod and replace stabilizer (if so equipped) Install shock absorber and lower car to floor, then tighten upper control arm inner shaft bushing capscrews to 50-55 ft lbs

SHOCK ABSORBER: Removal - Remove nut from upper end of shock absorber, then remove lower attaching bolts at lower control arm Thread shock absorber out of spring through lower control arm

Installation: Reverse removal procedures and tighten attaching screws securely

LOWER CONTROL ARM (1954-60): Removal - Remove coil spring and shock absorber (see above) On 1959-60 models, remove lower control arm inner shaft-to-crossmember bolts and remove arm from frame On all models, remove threaded bushings from outer end of control arm and remove tapered lockpin through outer pin by driving it upward with a pin punch Use a brass drift and drive outer pin out of steering knuckle support and remove control arm

Disassembly: To remove rubber bushings from control arms, place Tool J-5472-4 over one insulator and screw the ½" x 2½" capscrew into other end of shaft Turn inner shaft on control arm so that lugs on shaft contact outer shell of lower insulator, and install Tool J-5472-6 to prevent distortion of control arm Using an arbor press, move inner shaft down so that lugs on shaft contact outer shell of lower insulator Continue to press until outer shell is flush with flange on control arm Place control arm in a vise, gripping near the partly removed insulator, and knock the insulator the rest of the way out with a hammer and blunt chisel Remove capscrew from inner shaft and install it in other end of shaft, then using the same tools as for opposite end, remove second bushing in same manner.

Reassembly: Insert one end of inner shaft in one arm of lower control arm, then install opposite end in other arm. Place Tool J-5472-6 in position between ends of control arm Start rubber bushings in holes at either end of control arm, then place Tool J-5472-1 in position on each bushing, and using an arbor press, force both bushings in place until shoulder on outer sleeve of bushing is seated against control arm *(CAUTION - Do not attempt to seat flange of bushing on control arm).* Install bushing caps, flat washers, lockwashers, and capscrews *(NOTE* - Tighten these capscrews to 65 ft lbs. after control arm has been installed on car and weight of car is on springs)

Installation: *(NOTE - Outer ends of lower control arm must be spread .015" before installing outer pin and thr aded bushings. Determine this dimension by adjusting calipers to fit over outer end of control arm adjacent to bushing holes with a .015" f el r gaug inserted between outside surface of control arm and one prong of calipers).* After setting calipers, position outer end of lower control arm at lower steering knuckle support and install the outer pin, with a grease seal on pin on each side of steering knuckle support Using a screwdriver in slot provided in end of outer pin, turn pin and align slot at center of outer pin and hole of lower knuckle support and install lock pin Install spreader Tool J-2044 between inner surfaces of outer ends and spread the outer ends until the outside dimension is equal to caliper setting. Centralize outer end of control arm on outer pin, then install bushings and tighten to 170 ft lbs minimum. Remove spreader tool and make sure control arms turn freely on outer pin On 1959-60 models, connect lower control arm inner shaft to crossmember and tighten attaching bolts *NOTE - After weight of car is on springs, tighten lower control arm inn r shaft-to-crossmember attaching bolts to 65 ft. lbs* On all models, complete installation by installing coil spring (see above) *NOTE - If new bushings have been installed on inner shaft, tighten retaining capscrews to 60-65 ft lbs*

UPPER CONTROL ARM (1954-60): Removal - Support car at outer end of lower control arm. Remove front wheel assembly Remove threaded bushings from upper control arm outer pin Mark top front of inner shaft so that it can be installed in the same position *(CAUTION - Holes in control arm inner shaft are drilled off shaft centerline and turning the shaft over will change camb r setting).* Remove bolts and nuts retaining inner shaft to frame bracket (be careful not to drop bolts or nuts into front crossmember) Shift upper control arm to one side, turn the arm and lift it off end of pin, then remove arm by slipping it off other end of pin.

Disassembly: Install Tool J-5472-25 on inner shaft and insert the two short capscrews through tool and inner shaft, then install the two nuts to hold tool in position. Insert Tool J-5472-5 between inner surfaces of control arms adjacent to inner shaft holes Thread a 3/8" x 2½" capscrew into end of inner shaft and install the complete assembly in an arbor press so one end of inner shaft rests on Tool J-5472-3. Press on capscrew in end of inner shaft until Tool J-5472-25 has pushed shell of bushing to a flush position. Invert control arm in press and put capscrew in other end of shaft, then press second bushing to a flush position. Remove control arm from press and knock the bushings out the rest of the way with a hammer and blunt chisel.

Reassembly: Insert one end of inner shaft in one arm of lower control arm, then install opposite end in other arm. Place Tool J-5472-5 in position between ends of control arm. Start a rubber bushing in each hole at end of control arm, then place Tool J-5472-2 in position on each bushing, force bushing into place using an arbor press, until shoulder on outer sleeve of bushing is seat-

CONTINUED ON NEXT PAGE

1954-60 STUDEBAKER & PACKARD (Continued)

ed in control arm. Install bushing cap, washer, lockwasher, and capscrews. *(NOTE* - Tighten these capscrews to 32-37 ft. lbs. after control arm has been installed on car and weight of car is on springs).

Installation: Place one side of outer end of control arm over one end of outer pin and install opposite side of control arm on outer pin. With marked side of inner shaft up, align holes in inner shaft and holes in frame bracket, and install retaining bolts. washers, and nuts. *(NOTE - Outer ends of upper control arm must be spread .015" before installing outer pin and threaded bushings. Determine this dimension by adjusting a pair of calipers to fit over outer end of control arm adjacent to bushing holes, with a .015" feeler gauge inserter between outside surface of control arm and one prong of calipers).* Install spreader Tool J-2044 and spread ends of control arm to setting of caliper. Start bushings on ends of outer pin, then center end of kingpin in control arm. With spreader still in place, start bushings and tighten to 170 ft. lbs. minimum. Remove spreader and install wheel assembly. Check and adjust front end alignment.

STEERING KNUCKLE: Removal - Raise car and support it at outer end of lower control arm. Remove wheel, hub, and drum assembly. Remove brake backing plate assembly from steering knuckle flange without disconnecting brake hose and suspend the assembly in an out of way place (do not allow assembly to hang on hose). Disconnect tie rod from steering knuckle arm. Remove cotter pin and kingpin retaining nut, then using a lead mallet, drive kingpin upward out of lower support. Remove upper control arm outer pin bushings and remove kingpin and steering knuckle assembly from outer pin.

Steering Knuckle Bushing & Bearing Replacement - Invert steering knuckle and place Adapter J-1294-9 on inner end of bushing, then insert Pilot J-1294-4 in bearing end of knuckle and press bushing out of knuckle with Arbor J-1294-A and an arbor press. To remove needle bearing, turn knuckle over and place Adapter 1294-9 on inner end of bearing and place Pilot J-1294-4 in bushing end. Use Arbor J-1294-A and press needle bearing out of knuckle. *NOTE - Bearing rollers (41) may fall out when kingpin removed.* To install bushing, place Pilot J-1294-6 over arbor with wide shoulder of pilot against shoulder of arbor. Insert Pilot J-1294-4 in bearing end of knuckle and press bushing in until Pilot J-1294-6 stops against knuckle. *NOTE - Bushing will be exposed about 1/16" above knuckle.* Remove Arbor J-1294-A, reverse Pilot J-1294-6, and press bushing in until pilot stops against knuckle. To install needle bearing in knuckle, place Pilot J-1294-4 on Arbor J-1294-A so that wide shoulder of pilot is against shoulder of arbor. Place bearing on Pilot J-1294-4 so that lettered end of bearing is against shoulder of pilot, then insert Pilot J-1294-6 in bushing bore. Insert the arbor in bearing end of knuckle and press bearing in until Pilot J-1294-4 stops against knuckle.

NOTE - Bearing will be processed in knuckle, leaving spacer from rack gasket.

Steering Knuckle Endplay Adjustment - Place kingpin in a vise and install steering knuckle on kingpin without the cork gasket (normally installed in bottom of knuckle). Install the thrust bearing and shims on kingpin, then insert a .003-.006" feeler gauge between shoulder of kingpin and steering knuckle. Place a straightedge across top surface of thrust bearing and lower shoulder of kingpin and press down on thrust bearing. If surface of the thrust bearing is not flush with shoulder of kingpin, remove or add shims as required.

Installation: Install upper control arm outer pin *(see "Upper Control Arm" above).* Place thrust bearing, shim, and steering knuckle on kingpin, making sure that shim is located between thrust bearing and steering knuckle. Install Woodruff key in kingpin, then start lower end of kingpin in through support far enough to allow installation of the kingpin through the support. Install cotter pin. Install brake backing plate assembly and wheel and drum assembly. Check and adjust front end alignment, then tighten kingpin upper retaining nut.

1954-55 Spring Identification

Model	Part No.
Champion—Exc. Sta. Wgn. (1954-55) Std.	526128
Champion—Sta. Wgn. (1954-55) Std.	526133
Champion—Exc. Sta. Wgn. (1954-55) H.D.	526129
Commander—2 & 4-Dr. Sed. (1954) Std.	526126
Commander—2 & 4-Dr. Sed. (1955) Std.	526134
Commander—Coupe, Hardtop (1954-55) Std.	526127
Commander—Station Wagon (1954-55) Std.	526130
Commander—2 & 4-Dr. Sed. (1954-55) H.D.	526125
Commander—Coupe, Hardtop (1954-55) H.D.	526130
President—4-Dr. Sedan (1955) Std.	526134
President—Coupe, Hardtop (1955) Std.	526127
President—4-Dr. Sedan (1955) H.D.	526125
President—Coupe, Hardtop (1955) H.D.	526130

SPRINGS: Springs are installed with rubber pad in spring seat recess in front cross-member (upper) and lower control arm (lower).

1956 Spring Identification

Champion

Car Model	① Part No.
Coupe & 2-Dr. Std. ②	526128
All (Exc. Sta. Wgn.) Std. ③	1539500
Sta. Wgn. Std.	526133
Heavy Duty (Exc. Sta. Wgn.)	526129

Commander & President

Model	Part No.
Cmmdr. (Coupe) Std. ④	526127
Cmmdr. (Coupe) Std. ⑤	1539501
Cmmdr. 2 & 4-Dr. Sedan Std. ⑥	526134
Cmmdr. (Others Exc. Sta. Wgn. & Cpe.)	1539501
Cmmdr. Sta. Wgn.	526130
Pres. (Exc. Sta. Wgn.)	1539501
Pres. Sta. Wgn.	526130

Golden Hawk

Model	Part No.
Standard	526124
Heavy Duty	526125

① — Spring part number stamped on one of end coils.
② — Before Serial No. G-1,359,504.
③ — Beginning Serial No. G-1,359,504 (Coupe & 2-Dr.).
④ — Before Serial No. 8,430,316.
⑤ — Beginning Serial No. 8,430,316.
⑥ — First 150 cars.

1957 Spring Identification

Model (Champion)	Part No.
Custom Sed., Coupe, & Hard Top	1539500
Deluxe & Regal Sedan	1541865
Station Wagon	526133
Heavy Duty (Exc. Station Wagon)	526129
Model (Commander & President)	**Part No.**
Sedan	1541866
Coupe & Hard Top	1539501
Station Wagon	526130
Heavy Duty (Exc. Station Wagon)	526130
Air Conditioned Cars	526122
Model (Golden Hawk)	**Part No.**
Hard Top	1539501
Model (Packard Clipper)	**Part No.**
Sedan	1541867
Station Wagon	526130
Heavy Duty (Exc. Station Wagon)	526130

1958 Spring Identification

Model	Part No.
Scotsman (Exc. Sta. Wgn.) ①	1541868
Champion (Exc. Taxi) ①	1541868
Scotsman (Sta. Wgn.)	526133
Taxi	526120
Commander, President & Packard ②	1541869
Silver Hawk (6 Cyl.) ①	1541868
Silver Hawk (V8) ②	1541869
Golden Hawk & Packard Hawk ②	1541869

① - Use Part No. 526120 for heavy duty.
② - Use Part No. 526130 for heavy duty.

1959-60 Spring Identification (Lark 6 Cyl.)

Model	Standard	Hvy. Duty
Early 1959 Coupe	1541868	526132
Late 1959-60 Coupe	1547371	526132
Early 1959 Sed. & Hardtop	1547371	526132
Late 1959-60 Sed. & Hardtop	1547373	526132
Early 1959 2-Dr. Sta. Wgn.	1547371	526132
Late 1959-60 2-Dr. Sta. Wgn.	1547373	526132
1959-60 4-Dr. Sta. Wgn.	1547373	526132
1959-60 Taxi	526132	
1960 Convertible	1547372	526120

(Lark V8)

Model	Standard	Hvy. Duty
Early 1959 Coupe	1541869	526129
Late 1959-60 Coupe	1547372	526129
1959-60 Sed. & Hardtop	1547372	526129
1959-60 2-Dr. & 4-Dr. Sta. Wgn.	1547372	526129
1959-60 Taxi	526129	
1960 Convertible	1547374	526125

1954-55 WILLYS PLANADYNE

2-Wheel Dr. Sta. Wgn. (Exc. 6-226) 1954-55
2-Wheel Dr. Sed. D l. (Exc. 6-226) 1954-55

►CHANGES, CAUTIONS, CORRECTIONS

►**SPRING MOUNTING PRODUCTION CHANGE (4-63 & 6-63):** Effective Serial No. 65974 (4-63) and Serial No. 12098 (6-63) front spring clip plate changed. Parallel plate and two spring clip plates were added. Clip plates fit over ends of "U" bolts and are held in place by the downward projecting edges of parallel plate preventing side movement of spring and any change in camber.

►**REPLACEMENT SPRING CAUTION (4-63 & 6-63):** Manufacturer recommends that whenever front spring replacement required, special **Heavy Duty Spring** be installed on assumption that car is subjected to overloads or operated on rough roads. When these springs installed, other parts should also be installed as follows:

Replacement Spring Parts

Heavy Duty (Export) Front Spring	No. 646855
Spring Clip (2 required)	No. 646813
Spring Bumper (2 required)	No. 645763
Spring Clip Plate (2 required)	No. 641020
Front Shock Absorber	See Note

►**TOE-IN CAUTIONS TO PREVENT UNDUE TIRE WEAR:** Excessive tire wear may be caused by incorrect toe-in due to following causes:

Bent Tie-Rods—May be caused by tie rods contacting rails of "free-wheel type" lift and weight of wheels hanging on tie rods in this position.

CAUTION—Wheels should be blocked up when car raised on this type lift.

Incorrect Toe-In Adjustment Procedure—Toe-in changes with load and must be set exactly as specified under Toe-in below.

►**KNUCKLE SUPPORT INSTALLATION CAUTION:** on right & left side similar in appearance but must **not be interchanged** (results in wrong camber causing unstable steering). These parts marked for identification as follows:

Left Knuckle Support—Has part number—641026 (early cars) or letter "L" stamped on front face at center (later cars).

Right Knuckle Support—Has part number—641027 (early cars) or letter "R" stamped on front face at center (later cars).

DESCRIPTION: Planadyne independent suspension with transverse spring serving as lower control arm (spring is "Dow" type with second leaf wrapped around spring eye in main leaf for safety). Short upper control arm is mounted at frame end on rubber bushings (movement of arm on frame bracket shaft permitted by flexing of rubber bushings). Direct acting type shock absorber is linked to spring pivot pin (lower end) and special mounting stud at midpoint of upper control arm (upper end).

CHECKING & ADJUSTMENT: Check front wheel bearing adjustment, tire inflation pressure, steering gear adjustment, shock absorber action, and steering linkage for correct adjustment and freedom of movement first, then check front suspension system as follows:

Tire Inflation: Check and inflate each size tire as follows:
(6.00x15 & 6.50x15)—24 lbs. frt., 28 lbs. rear.
(6.70-15)—20 lbs. front, 24 lbs. rear.

Kingpin Inclination: 5° crosswise.

Caster: 1°. No adjustment (determined by design of front suspension units—correct by replacing necessary parts).

Camber: 1¼-1¾° (4-63, 6-63), 1° (Others). Controlled by shims under each control arm mounting bracket.

►*CAUTION*—Number and thickness of shims under both brackets on same side of car must be equal.

To Adjust—Loosen upper control arm frame bracket mounting screws, remove shims from between bracket and frame (to decrease camber), add shims (to increase camber) **equally at each bracket.** Shims are furnished in thicknesses of .060" and .120" and are slotted to facilitate adjustment (bolts need not be completely removed).

Toe-In: 1/16-1/8" at curb weight (car ready for road with full tank of fuel and spare tire, but without load).

►*CAUTION—Toe-in varies slightly with load and should be checked and adjusted exactly as follows:*

To Check Toe-In: Jack up front wheels, chalk center of tread over entire circumference of both front tires, use pencil to scribe a line at exact center of tread over entire circumference of tires (hold pencil on steady rest while rotating tire). Turn wheels to straight ahead position with steering gear on high midpoint of cam and steering wheel spoke parallel to windshield, lower car so that weight rests on wheels and load or weight down the front end of the car so that the **front spring main leaf is flat** (measure with straightedge below leaf). Roll car forward and backward to allow all parts to assume natural position. **Check distance between marks on tires at front and rear of wheels and adjust to ZERO TOE-IN** (equal distances at front and rear) under these conditions. **NOTE**—With toe-in set at ZERO under above loading conditions, toe-in will be 1/16" to 1/8" when load removed (dependent on arch of front spring).

To Adjust Toe-In: Loosen clamps on adjusting sleeve on each tie rod and turn adjusting sleeves on **both tie rods equally** when setting toe-in.

SPRINGS: ***CAUTION—See "Replacement Spring Caution" above for recommended replacement spring and other changes necessary when this spring installed.***

Standard Spring—"Dow" type with rubber inserts in forged cups at ends of spring leaves (spring movement flexes these rubber inserts).

Heavy Duty (Export) Springs—Not "Dow" type (no rubber inserts) but spring assembled with graphited compound between spring leaves. Both first and second leaves are wrapped around spring eyes for greater safety, and four additional clips are used to distribute rebound stress of main leaf throughout spring. **NOTE**—This spring is recommended as replacement for standard spring above.

SUSPENSION ASSEMBLY: When disassembling suspension system for renewal of parts, assemble as follows:

Upper Support Arm & Knuckle Support: Upper support arm is mounted on rubber bushings at inner (frame) end and on pivot bolt threaded through eyes in arm and in bushing in knuckle support at outer end.

Knuckle Support & Spring Pivot Bolt: When installing support on car, hold support centered on spring eye while installing pivot bolt.

BUICK AIR-POISE SUSPENSION

Buick (1958)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS:* Before working under the car, jacking it up, or raising it on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

Raising Car (On a Jack) Before raising car on a jack, pull out the manual lift knob located below instrument panel to right of center heater air outlet, to place car in the full rebound position. Leave knob in the out position while car is on jack.

Raising Car (On a Hoist) - Place car in full rebound position by pulling out on the manual lift knob. See "Raising Car (On a Jack)" above. *CAUTION - While car is on a lift which supports front of car by front spring seats, DO NOT completely deflate or inflate Air-Poise system by any such operation as opening air lines to permit air to escape or running the engine to inflate the system.*

Working Under The Car - Always place jack stands under an air ride car before using a creeper as a precaution in case air should be exhausted from system.

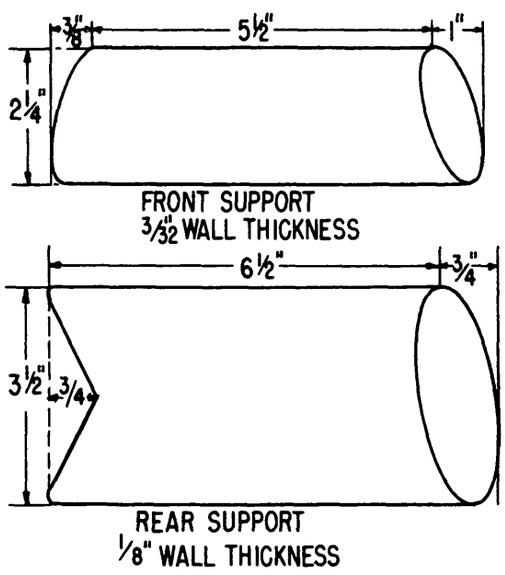
►*TOWING THE CAR:* To prevent bumper from striking the ground while car is being towed (whether Air-Poise system is functioning or not), it will be necessary to block up end of car which remains on the ground as follows: Fabricate blocks (see illustration for dimensions) using metal tubing of 2¼" O.D. and wall thickness of 3/32" (Front) or 3½" O.D. and wall thickness of 1/8" (Rear). Install blocks as follows: **Front End** - Raise car to full rebound position and place a block over lower compression bumper and against bumper contact surface on frame. Repeat on other side of car. **Rear End** - Raise car to full rebound position and place a block over compression bumper on lower side of frame and engage "V" notch on other end of block with top of axle housing. Repeat on other side of car. *NOTE* - Weight of car on blocks will hold them in place.

Towing Procedure - Attach lift chains under bumper face plate and up over bumper back bars *(CAUTION* - Use hard wood blocks between lift chains and plate). Do not tow car at speeds in excess of 20 MPH. *CAUTION - Air-Poise system MUST NOT be in Manual Override position with towing blocks installed (car weight must be on blocks to hold them in place).*

►*AIR TANK DRAIN COCK CLOSING CAUTION:* Damage to valve will occur if valve is closed and tightened more than finger tight (1 ft. lb. maximum).

►*CROSS FLOW "TEE" & RELIEF VALVE LEAK CORRECTION CAUTION:* Do not resolder tubing on cross flow "tee" and relief valve (located at bottom of manual override valve) to correct leakage. Damage to nylon check ball in "tee" fitting and rubber seated disc in relief valve will result. Correct leakage by replacing with later type "tee", Part No. 1179722, or relief valve, Part No. 1185257.

►*FRONT HEIGHT CONTROL VALVE LEVER POSITION CHANGING IN SERVICE CORRECTION:* This condition may be due to lever being assembled improperly on front stabilizer bar. Make sure lever is installed with "bow" pointing toward rear of car. If installed toward front, lever may strike bottom of radiator when front suspension is in rebound position.



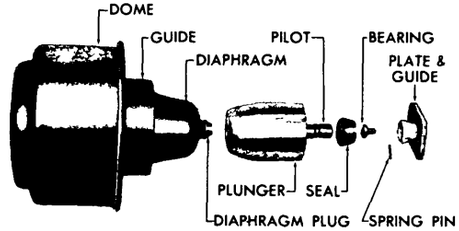
BUICK TOWING BLOCKS

►*MANUAL OVERRIDE LEVER LOOSENESS CORRECTION:* If the adjusting lever-to-cam setscrew on manual valve is loose due to stripped threads caused by overtightening, insert a 10-32 nut between lever and shaft (file nut as necessary to allow it to be inserted), then insert setscrew through lever and screw into nut.

►*HIGH PRESSURE HOSE FREEZING CORRECTION (WHERE CAR IS OPERATING IN TEMPERATURES BELOW 32°F):* Every 1000 to 2000 miles, open drain cock on reservoir tank and completely exhaust air supply, then tighten drain cock. Remove Schrader valve core from fitting at top of tank and pour ½ pint of METHANOL anti-freeze into tank. *(CAUTION - Do not use a permanent type anti-freeze as this would cause compressor failure).* Install valve core and run engine to bring air pressure up to normal.

DESCRIPTION: Air springs, consisting of an air chamber and a rubber diaphragm assembly attached to the frame and a piston assembly attached to the lower control arm (front), axle housing (rear), replace the conventional coil springs. Normal riding height is maintained automatically by air pressure controlled by two height control valves (rear), one control valve (front). A manually operated lift control valve located on frame left side rail is controlled by a cable and knob below instrument panel to right of car centerline. This valve, when actuated, provides air to all four springs if conditions require that the car body be raised above normal height. Basic components of the system operate as follows:

Air Compr ss r: This is a single stage, two cylinder reciprocating compressor rated at 5 cu. ft. of air per minute. The compressor shaft is splined to the power steering pump rotor and both units are mounted together. Oil supply for the compressor lubrication is obtained from power steering pump reservoir.



BUICK REAR AIR SPRING ASSEMBLY

High Pressure Reserve Air Tank: This tank is mounted forward of the front crossmember between the two side rails and is used to maintain a reserve supply of high pressure air and to trap moisture and oil in the system. A Schrader type valve on the tank permits filling the tank with air from an outside source. A drain valve on lower left side of tank is provided to drain any accumulation of water and oil.

Manual Override Valve (Car Lift): Located on frame left side rail and operated by a control cable and knob on instrument panel. By pulling out on instrument panel knob, the body can be raised above normal height to a maximum allowed by the rebound bumpers at front and rear. Regulator valves are also included in the manual valve to control air pressure in the system.

Rear Height Control Valv s: There are two rear height control valves mounted on the frame (one at each side) and actuated by linkage connected to rear axle housing. These valves act not only to control height of rear of car but also to maintain proper height of right and left side of car to maintain it in a level position.

Front Height Control Valve: The single front control valve is mounted on the number one crossmember and is actuated by linkage connected to the front stabilizer bar. Its function is to increase or decrease air pressure in the front springs to compensate for differences in car loading to maintain proper car height. Rotation of the front stabilizer bar operates the linkage to actuate the height control valve.

Cross Flow Control Tee: This tee is inserted in air supply line between air springs and front height control valve and is attached to the front control valve. Two check balls and metered orfices allow a restricted flow of air between the two front air springs to maintain equal pressure and not allow a free flow of air when cornering.

Air Springs: Each unit consists of a metal air dome and a rubber diaphragm assembly attached to the frame, and a piston or plunger assembly attached to lower control arms in the front and the axle housing in the rear. Pressure in the air springs is controlled automatically by height control valves to compensate for differences in car loading.

LUBRICATION: Air Compr ss r - Check fluid level in power steering pump every 1000 miles. To add oil to reservoir, remove cover and bring oil level to the "Oil Level" line embossed on side of reservoir housing using Automatic Transmission Fluid Type "A".

CONTINUED ON NEXT PAGE

BUICK AIR-POISE SUSPENSION (C ntinu d)

DRAINING HIGH PRESSURE AIR TANK: At least every 1000 miles, or more often if necessary, open the drain valve located at lower left end of tank and drain out the accumulated oil and water.

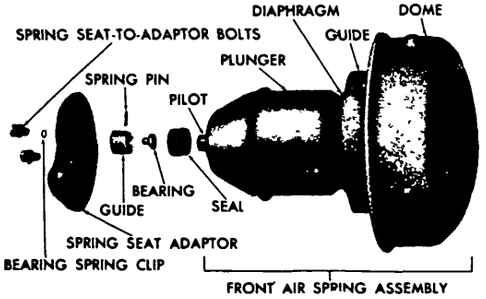
ADJUSTMENTS

ADJUSTMENTS: Trim H ight - Check operation of height control valves by applying weight to each side of rear bumper, one side at a time, and to center of front bumper. The car should raise back to normal trim height after weight has been added and should lower to normal after weight is removed. Check and correct tire pressures and inspect for binding in suspension system. Check shock absorber action and replace as necessary. Place car on a front end machine and proceed as follows:

Fr nt Trim H ight: Measure distance between top of compression bumper and lower side of frame side rail, directly above the compression bumper on each side. Distance should be 1 1/4"± 1/4", on all models. To correct, loosen two nuts and bolts at link clamp-bracket on front stabilizer bar and rotate clamp-bracket as necessary. Recheck trim height setting. *NOTE* If trim height varies between each side at the front, it could be caused by variation in the rear height valve trim setting. If this is the case, correct the front as closely as possible, correct trim heights at rear (see below), then recheck the front.

R ar Trim H ight: Check distance between tip on bottom of rear compression bumper and the strut rod-shock absorber bracket directly below the compression bumper. Distance should be 1 5/8" ± 1/4" (Exc. Station Wagon) 1 1/4" (Station Wagon). Repeat this check on opposite side. To correct, loosen the two bracket-to-height valve screws, on the front side of each bracket, and rotate height valves in the correct direction. *NOTE* - Holes in brackets are elongated to allow for valve rotation.

Supply Lin Pr ssur S tting: Bring air tank pressure to 200 lbs. Disconnect air return line on top of manual override valve and install hose, Tool J-7143. Pull manual lift knob on instrument panel to put car into lift position. Press Gauge J-6840 on end of Tool J-7143 and take a reading. Remove the gauge. If pressure is more than 125 lbs. remove boot from override valve and turn adjusting screw out (counterclockwise). Depress Schrader valve core for two or three seconds, then take another gauge reading. Repeat this procedure until correct gauge reading is obtained. If gauge reading is less than 125 lbs., proceed as above only turning the adjusting screw clockwise. When correct gauge reading is obtained, push manual lift knob all the way in to lower car to normal trim height. Depress Schrader valve core in hose to exhaust all air, then remove the hose. Connect air return line at override valve using a new "O" ring seal, and pull the manual lift knob to put car into the lift position. Check for leakage at fitting with a bubble solution. Push in manual lift knob to return car to normal position.



BUICK FR NT AIR SPRIN ASSEMBLY

Compressor Belt: Loosen compressor mounting bolts and adjust belt tension so torque required to slip belt on pulley is as follows: **(First Type Belt)** 30-35 ft. lbs., used belt; 40-45 ft. lbs., new belt. **(Later Type Belt, see note below)** 50-55 ft. lbs.

►*COMPRESSOR BELT PRODUCTION CHANGE:* A new "dacron" belt, Part No. 1186400 (Exc. Air Cond. Cars), Part No. 1186399 (Air Cond. Cars) was used in production beginning approximately Jan. 13, 1958. Later type belt is tightened to a different tension than earlier belts, see above.

Manual Override Control Cable: Push control knob fully in, then, on manual override valve, lift lever lightly by the stopscrew. If cable is properly adjusted, lever should have a slight amount of movement (not to exceed 1/8"). If necessary to adjust, loosen conduit clamp screw and slide conduit fully down then raise it 1/16". Tighten conduit clamp screw and recheck adjustment.

Manual Override Lever Stopscrew: Check control cable adjustment (see above) and adjust if necessary. If stopscrew is against its stop and there is still a leak past override plunger, adjust stopscrew as follows: Note position of screw, then loosen locknut and back screw out until air just stops leaking. (If backing screw out does not stop the air leak, stopscrew adjustment was not at fault). Back screw out an additional two turns (from point where air just stopped leaking), and tighten locknut.

TROUBLE SHOOTING

One Side Of Car Higher Than Trim Height: Rear height valve improperly adjusted. Plugged orifice or screen in one rear height valve exhaust fitting. Inoperative exhaust valve in one rear height valve.

Front Of Car Higher Than Trim Height: Front height valve improperly adjusted. Plugged orifice or screen in front height valve exhaust fitting. Inoperative exhaust valve in front height valve.

Entire Car Higher Than Trim Height (or car fails to trim after manual override setting is used): Manual override valve exhaust screen or orifice plugged. Manual override valve not properly adjusted.

One Side Of Car Lower Than Trim Height (with minimum of 150 lbs. tank pressure): Rear height valve not properly adjusted. Plugged intake valve orifice or screen in rear height valve. Inoperative intake valve in rear height valve.

Fr nt Of Car L w r Than Trim H ight (with minimum f 150 lbs. tank pr ssur): Front height valve not properly adjusted. Plugged intake screen or orifice in front height valve. Pressure regulator in manual override valve adjusted too low.

L ss Of Tank Pressure (car settl s on ne side whil park d): Leak at rear air spring, height valve, or connecting lines.

Loss Of Tank Pressure (car settles in front while parked): Leak at front air spring, height valve, or connecting lines. *(NOTE* - Due to normally greater weight on front of car, if there is a drop in tank pressure, the front intake check valve may leak back through supply line and allow front of car to settle).

Loss Of Tank Pressure (car stays at trim while parked): Leak at compressor check valve. Leaking intake valve core allowing supply leak into air spring raising car above trim height and opening exhaust valve to trim car. Repetition of cycle lowers tank pressure to air spring pressure.

Poor Handling While Driving (car rolls excessively): Cross flow control "tee" not restricting flow of air from one front spring to the other.

REMOVAL & INSTALLATION

AIR COMPRESSOR: Removal - Open drain cock and exhaust air. Loosen vented pulley nut and remove pulley and compressor belt. Disconnect power steering pump hoses and remove air inlet tee at compressor. Remove high pressure hose and check valve at compressor. Disconnect compressor-pump assembly from brackets and remove from car. Remove oil from compressor, then remove two compressor to pump bolts. Unless pump seal is to be replaced, install two guide pins, Tool J-7003 (3/8" - 16 x 3") in compressor to prevent damage to seals. Separate pump from compressor.

Installation: Install guide pins in compressor and carefully align pump on guide pins to avoid damage to seal, then push into contact with compressor. Remove pins and install two compressor to pump bolts. Tighten to 25-30 ft. lbs. Mount compressor in bracket and install bolts, but do not tighten. Connect high pressure hose and check valve to compressor. Connect inlet tee at compressor, then connect power steering hoses to pump. Install compressor pulley and belt and securely tighten vented pulley nut. Adjust belt tension (see above) and tighten mounting bolts. Fill reservoir with Dynaflow fluid, run engine, and check for leakage.

FRONT AIR SPRINGS: Removal - Raise front of car and support with jack stands placed at front under frame side rails. Remove tire and wheel assembly. Remove air spring dome outer attaching bolt (on top of crossmember and below cutout in upper control arm), then remove inner attaching bolt (located approximately six inches toward center of crossmember from outer bolt). Remove spring nut at bottom of pilot bearing. Disconnect height control valve link from clamp bracket on stabilizer bar, and disconnect air line at fitting on air spring dome. *(NOTE* - Air will be exhausted from both front air springs, but will not affect rear). Place floor jack under spring seat but do not raise car off jack stands. Disconnect stabilizer bar link at lower control arm, then disengage lower ball joint stud from steering knuckle *(see "Buick Front Suspension" in Suspension & Wheel Alignment Section).* Remove air spring assembly.

Installation: Position air spring assembly in crossmember opening and raise lower control arm assembly

CONTINUED ON NEXT PAGE

BUICK AIR-POISE SUSPENSION (C ntinued)

into position and install lower ball joint stud in steering knuckle. Position plunger pilot bearing into hole in spring seat adapter and secure with spring nut. Place jack under spring seat but do not raise car off jack stands. With one man below to position and hold spring up, and another on top, replace dome bolts and lockwashers. Connect air line to fitting at air dome using a new sealing ring and connect stabilizer bar link to lower control arm. Fill air tank with air and operate height control valve link to pressurize air spring. Check for leaks, then connect height valve link to clamp bracket on stabilizer bar. Remove car from jack stands.

REAR AIR SPRINGS: Removal - Raise rear of car and place jack stands under frame side rails, then lower jack and allow axle assembly to lower close to full rebound position. Disconnect height control valve link at axle strut rod on spring being removed. Disconnect air line fitting on spring, allowing air to exhaust from spring. Remove two bolts retaining plunger bearing plate to axle housing and pull plunger loose from diaphragm center plug. Remove plunger and bearing plate assemblies. Remove two self-tapping screws at dome upper and side retainer brackets, then remove air spring.

Installation: Reverse removal procedure and note the following: Install new sealing ring when connecting air line at dome fitting. Before connecting height valve link to strut rod, raise height valve lever carefully to allow air to inflate air spring assembly. Check for air leaks. *CAUTION - N v r disconnect radius rod or torque tube unless all air is exhausted from rear air springs. If shock absorbers are to be removed, disconnect height control valve links at axle strut rods before disconnecting shocks.*

FRONT HEIGHT CONTROL VALVE: Removal - *(CAUTION - Never force a height control valve lever hard against its stop in either direction, as inner valve lever would be bent, changing the valve setting).* Open drain cock and exhaust all air from tank. Raise front of car and support with jack stands under front of frame side rails and remove jack. Disconnect height valve link at clamp bracket on stabilizer bar, then remove front spring crossmember lower cover. Disconnect all air lines at height control valve allowing cross flow control tee to remain with air lines. Remove two valve bracket mounting bolts at front of crossmember and remove bracket and valve assembly.

Installation: Reverse removal procedure and note the following: Before replacing spring crossmember lower cover, fill air tank and operate height control valve to pressurize springs. Check for leakage and valve operation.

REAR HEIGHT CONTROL VALVE: Removal - Raise car with a jack placed at center of rear axle housing. Place a block of wood (½" shorter than normal trim height) between frame and axle housing at center, then place jack stands under axle housing and remove jack. Open drain cock on tank and exhaust all air. Disconnect height valve link at valve lever and disconnect all lines at height control valve. Remove two brackets to valve body bolts and remove valve.

Installation: Reverse removal procedure and note the following: Install new "O" ring seals on all air line fittings. Fill air tank and raise height control valve lever to fill air spring and valve body. Check for leakage, then connect height control valve link to lever. Check trim height and correct as necessary. *See "Adjustments" above.*

MANUAL OVERRIDE VALVE: R m val - Open drain cock and exhaust all air. Raise car at front and disconnect all air lines at override valve. Disconnect Bowden control wire assembly, then remove valve-to-bracket bolt at lower front of valve and remove valve.

Installation: Reverse removal procedure and note the following: Fill air tank, then check adjustment of Bowden control cable for correct lift action. Operate lift control knob on instrument panel and place car into lift position. Check for leakage at all override valve fittings, then lower car to normal height.

OVERHAUL

LEVELING & MANUAL CONTROL VALVES: *See "Air Suspension Leveling & Manual Contr l Valv s.*

AIR COMPRESSOR: *See "Air Susp nsion Air Compr ssors".*

Front End Adjustment: *Same as for cars with conventional coil springs. See "Front Susp nsi n" n Car M d l pag .*

CADILLAC AIR SUSPENSION (EXCEPT 1957-58 ELDORADO BROUGHAM)

Cadillac, Exc. C mm. (1958-60) S N t Bel w.

►*1957-58 ELDORADO BROUGHAM NOTE: For data on thes models, se "1957-58 Cadillac Eldorado Brougham Air Suspension".*

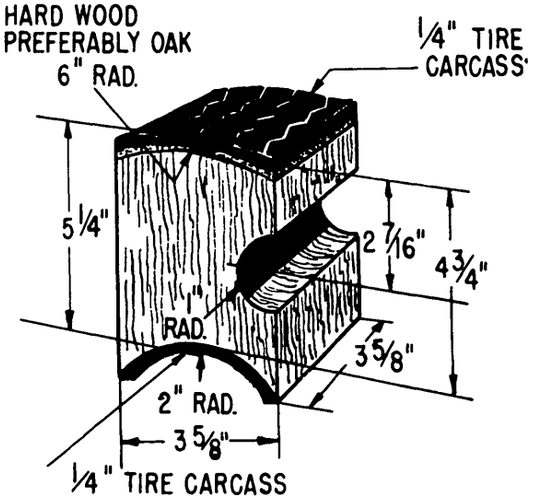
►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS:* Before working under the car, jacking it up, or raising it on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

Raising Car (On a Jack) - Before raising car on a jack, pull the Manual Valve on instrument panel to the full OUT position which will raise the car to its full rebound position. *CAUTION* - Never raise rear of car with shock absorbers disconnected. Rear shocks serve as rear suspension rebound stops and if disconnected, the car could be raised off its suspension, causing a separation of the rear suspension air spring assemblies.

Raising Car (On a H ist) - Before raising car on a hoist, pull the Manual Valve on instrument panel to the full OUT position which will raise the car to its full rebound position. *NOTE* - Hoisting equipment that engages suspension, axle, or wheels is preferred. If a frame contact type hoist is used the following precautions must be taken: Use special adapters to assure engagement with car frame at points indicated in illustration. Care should be taken to prevent hoist adapters contacting any part of the No. 2 body hanger. Hoist contact at rear should be at outer ends of the No. 4 body mounting brackets. In no case should rear contacts be less than 40" apart. *CAUTION - Do not allow hoist to contact rear low r control link front mounting brack t.*

►*TOWING THE CAR: (CAUTION - Do not tow car with r ar wh els on th ground unless propeller shaft is disconn ct d. Th only xc ption to this would be when distanc t b tow d is only a few blocks).* When towing with front or rear wheels off the ground with air in suspension system, pull out the manual valve control handle on instrument panel to lock air in the suspension system. Then depress service valve core on accumulator tank and exhaust enough air to let the car down to approximately normal height. When towing car with front end raised off ground with no air in suspension system, first raise rear of car and install support blocks (see illustration for dimensions of block) upright in front of shock absorbers, between rear axle housing and frame side members. Lower rear end, then raise front of car with truck hoist, making certain that a minimum of 6" clearance remains between lower edge of rear bumper and ground. For towing with rear wheels raised off ground, first raise front end and install support blocks, with small groove against rubber compression bumpers on lower suspension arms and large groove encircling shock absorbers. Lower front end, then raise rear end with truck hoist, making certain there is a minimum of 6" clearance between lower edge of front bumper and ground. Secure steering wheel to hold front wheels in straight ahead position. *(NOTE - T w lin s must b hook d to low r control arms at front, or r ar axl housing at r ar).* With all wheels on



CADILLAC FRONT TOWING BLOCKS

ground and no air in suspension system, it is permissible to tow or push car without use of support blocks. DO NOT attempt this except on hard smooth pavement, and limit towing speed to 10 MPH. When towing car using the above blocks, do not exceed 25 MPH on rough roads.

►*1958 AIR DOME BALL CHECK FLOW VALVE PRODUCTION CHANGE (To Permit Front & Rear of Car to Raise Simultaneously):* Starting with Eng. No. 141902, the air dome ball check flow valve has been altered so air flow is restricted at both intake and exhaust. Later type valves have the same part number as used previously, however, they can be identified by a daub of red or blue dye on top of hex, or by a groove etched around hex of fitting. When installing new valve, the valves at all four air domes must be changed if they are not the later type.

►*1958 AIR PRESSURE WARNING LIGHT PRODUCTION CHANGE:* Beginning with Eng. No. 151370, air pressure tell-tale light bulb in instrument panel of Series 60, 62 & 75 has been eliminated. In the event of air pressure switch failure on cars before the above engine number, electrical lead at switch should be disconnected and lead cut off close to point where it leaves harness, then tape wire at harness. Replacement pressure switches are not available for service installation.

►*COMPRESSOR OIL LEAKAGE OR SLINGING FROM BREATHER HOLE IN PULLEY NUT CORRECTION:* This condition may be caused by leakage between manifold in steering pump tank and the tank itself, causing a gravity feed to flood compressor crankcase when engine stopped. If manifold is distorted (caused by over-torqueing cover holddown screw), replace manifold. Check gasket under manifold and tighten manifold to tank attaching screws securely. If leakage cannot be traced to distorted manifold, it will be necessary to replace the compressor.

►*HARSH RIDING OR ERRATIC LEVELING OF CAR CORRECTION:* Excessive friction in front suspension lower control arm pivot shafts may be cause of this condition. If lubrication will not correct excessive friction, it is suggested that new shaft and bushing kits be installed.

►*AIR DOME FLOW VALVE INSTALLATION CAUTION:* When installing the flow valve in air spring dome, DO NOT tighten in excess of 5-10 ft. lbs. Excessive tightening may break the fitting.

►*ICE FORMATION IN SYSTEM CORRECTION:* To prevent ice from forming in air suspension system during cold weather, add one-half pint of methyl (wood) alcohol to the accumulator tank each time car is lubricated.

DESCRIPTION: Air springs, consisting of an air dome and a rubber bellows assembly attached to frame and a piston assembly attached to lower control arm (front), control link (rear), replace the conventional coil springs at both front and rear of car. Normal riding height is maintained automatically by two height control valves (rear), one control valve (front). A manually operated lift valve is located on frame right side rail (1958), inside front face of left hand No. 1 body mounting bracket (1959-60), and controlled by a lift control handle on the instrument panel. This valve, when pulled out, provides air to all four springs, causing the car body to be raised above its normal height. Basic components of system operate as follows:

Air Compressor: Single stage, two cylinder reciprocating type rated at 3.5 cu. ft. of air perminute. The compressor shaft is splined to the power steering pump rotor and both units are mounted together. Oil supply for compressor lubrication is obtained from power steering pump reservoir. Fresh air is drawn into the compressor from a line connected to the carburetor air cleaner.

Accumulator Tank: Mounted forward of radiator (1958), in front and to left (1959-60). Maintains a supply of high pressure air and traps moisture, dirt, and oil. This tank is equipped with a blow off valve and a service valve (1958 models included a pressure switch for operation of air pressure tell-tale light on instrument panel).

Manual Lift Override Valve: Located on frame right hand side rail (1958); on left hand No. 1 body mounting bracket (1959-60) and operated by a cable connected to a handle on the instrument panel. The car body can be raised to a maximum allowed by rebound bumpers by pulling manual control valve to its full out position. Pressure in the system will be trapped with handle in the full out position and car will remain at the full rebound position until handle is pushed in. *CAUTION - If handle is left in a middle position, air can bleed from system.* Air pressure regulator valves are also included in manual valve assembly to control pressure in system.

Rear Leveling Valves: A leveling valve is located on each frame side rail and is connected by linkage to the rear control link. These valves not only act to control height of rear of car but also to maintain proper height of right and left side of car to maintain it in a level position

CONTINUED ON NEXT PAGE

CADILLAC AIR SUSPENSION (C ntinu d)

under varying load conditions.

Fr nt Leveling Valve: The single front leveling valve is mounted on the number one crossmember and is actuated by linkage connected to the front stabilizer bar. This valve increases or decreases air pressure in both front air springs to maintain proper car height under varying load conditions.

►*1960 FRONT LEVELING VALVE NOTE:* Front leveling valve utilizes two port adapters (one to each front wheel suspension bellows) in place of the single valve previously used. A rubber umbrella-type check valve core is used in intake valve adapter in each leveling valve instead of the tire-type core previously used.

Air Springs: Each unit consists of a metal air dome and rubber bellows assembly attached to car frame; and a piston or plunger assembly attached to lower control arms at front, and to the control link at the rear. Pressure in the air springs is controlled automatically by the leveling valves. An orifice valve at each air spring restricts the flow of air in both directions so air spring action is not subject to sudden changes in loading conditions.

Pr ssure Blow-Off Valve: This unit is located in the rear intake line tee and is set for 150-165 lbs. pressure. In the event a pressure regulator should fail with the lift valve open, damage to bellows assemblies would be prevented by the excessive pressure escaping through the blow-off valve.

LUBRICATION: Air Compressor - Every 2000 miles, check fluid level in power steering reservoir and fill to mark on tank with Automatic Transmission Fluid Type "A".

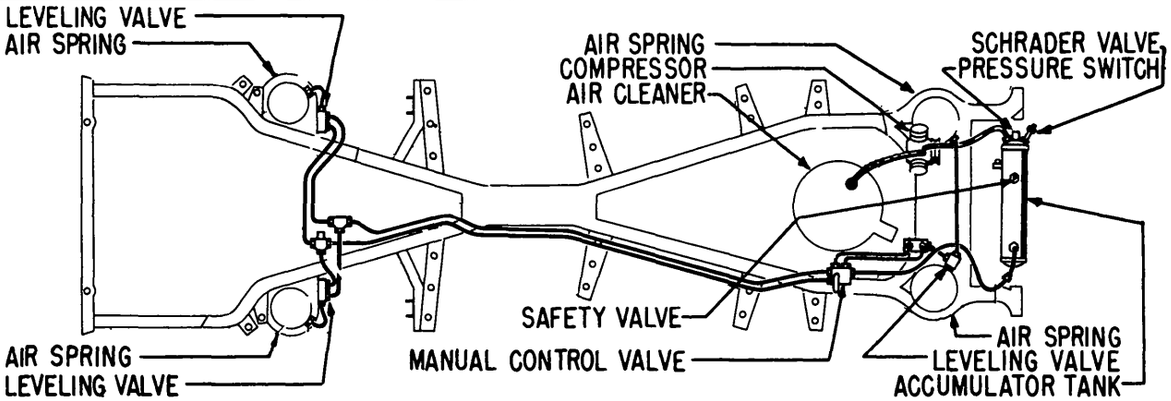
DRAINING ACCUMULATOR TANK. When car is lubricated (every 2000 miles), open the drain cock located on lower side of tank and drain off accumulated oil, water, and dirt.

►*1958 ACCUMULATOR TANK DRAIN VALVE CHANGE:* Accumulator tank drain valve has been eliminated beginning with Eng. No. 102500. On cars not equipped with drain valve, condensate can be drained from tank through service valve by cautiously opening service valve not more than three turns. Allow tank pressure to be completely relieved, then remove service valve from tank and allow condensate to drain out.

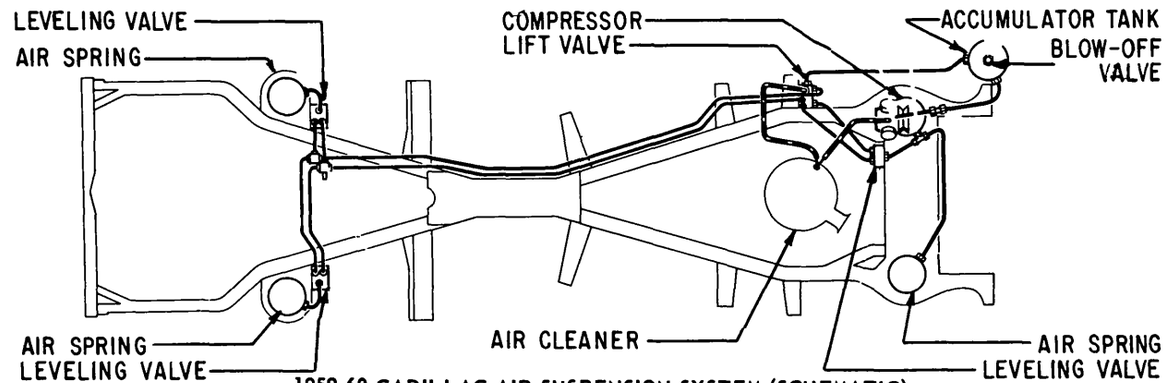
ADJUSTMENT

ADJUSTMENTS: Compressor Drive Belt - Place Belt Tensioning Gauge, J-6733 midway between pulleys. Loosen compressor mounting bolts and tighten belt until shoulder of gauge is between lines on barrel of gauge. Hold this tension and tighten compressor mounting bolts.

►*TRIM HEIGHT CHECKING NOTE:* Maintain 125 lbs. minimum in accumulator tank when checking trim height. Place car on a level surface (wheel alignment machine, or drive-on type hoist), then normalize position of air springs by working bumper up and down, permitting car to assume its normal standing height. Make sure that leveling motion has stopped, then proceed as follows:



1958 CADILLAC AIR SUSPENSION SYSTEM (SCHEMATIC)



1959-60 CADILLAC AIR SUSPENSION SYSTEM (SCHEMATIC)

1958 MODELS

Front Trim Height: With car height normalized (see above), measure distance from top of left lower suspension arm to center of second lower rivet from front of frame. This distance should be 4 5/16" ± 3/16" (Exc. Series 75), 5" ± 1/4" (Series 75). If not within specifications, loosen adjusting nuts on leveling valve adjusting link and move control arm as required to bring measurement within specifications. Allow sufficient time for leveling action to take place, then tighten adjusting nuts and recheck measurement Check standing height on right side. If measurement varies from left side by more than 1/4", check and adjust rear trim height (see below).

Rear Trim Height: With car normalized (see above), and front trim height adjusted, measure distance from top of rear axle housing to underside of frame at each side of car. This measurement should be 4 1/2" ± 1/4" (Exc. Series 75). 5 3/8" ± 1/4" (Series 75). The rear trim height should be equal within 1/8" on both sides of car. If not within specifications, loosen adjusting nuts on leveling valve adjusting link and raise or lower adjusting link until measurement is within specifications. Allow sufficient time for leveling action to take place, then tighten adjusting nuts and recheck measurement. Recheck front trim height (see above), and correct as necessary.

1959-60 MODELS

Front Trim Height: With car height normalized (see above), measure distance from top of left lower suspension arm to center of second lower rivet from front of frame. This distance should be 4 5/8" ± 3/16" (Exc. Series 75), 5 11/32" ± 3/16" (Series 75). If not within specifications, loosen adjusting bolt on leveling arm and move leveling valve control arm as required to bring measurement within specifications. Allow sufficient time for leveling action to take place and recheck measurement. If measurement varies from left side by more than ¼", check and adjust rear trim height (see below).

Rear Trim Height: With car normalized (see above), and front trim height adjusted, measure distance from top of rear axle housing to underside of frame at a point directly above axle housing (at each side of car). This measurement should be 4½" ± ¼" (Exc. Series 75), 5 13/32" ± ¼" (Series 75). The rear trim height should be equal within 1/8" on both sides of car. If not within specifications, loosen adjusting bolt on leveling valve arm and raise or lower arm until measurement is within specifications. Allow sufficient time for leveling action to take place, then tighten adjusting bolt and recheck measurement. Recheck front trim height (see above) and correct as necessary.

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CADILLAC AIR SUSPENSION (C ntinu d)

ALL MODELS

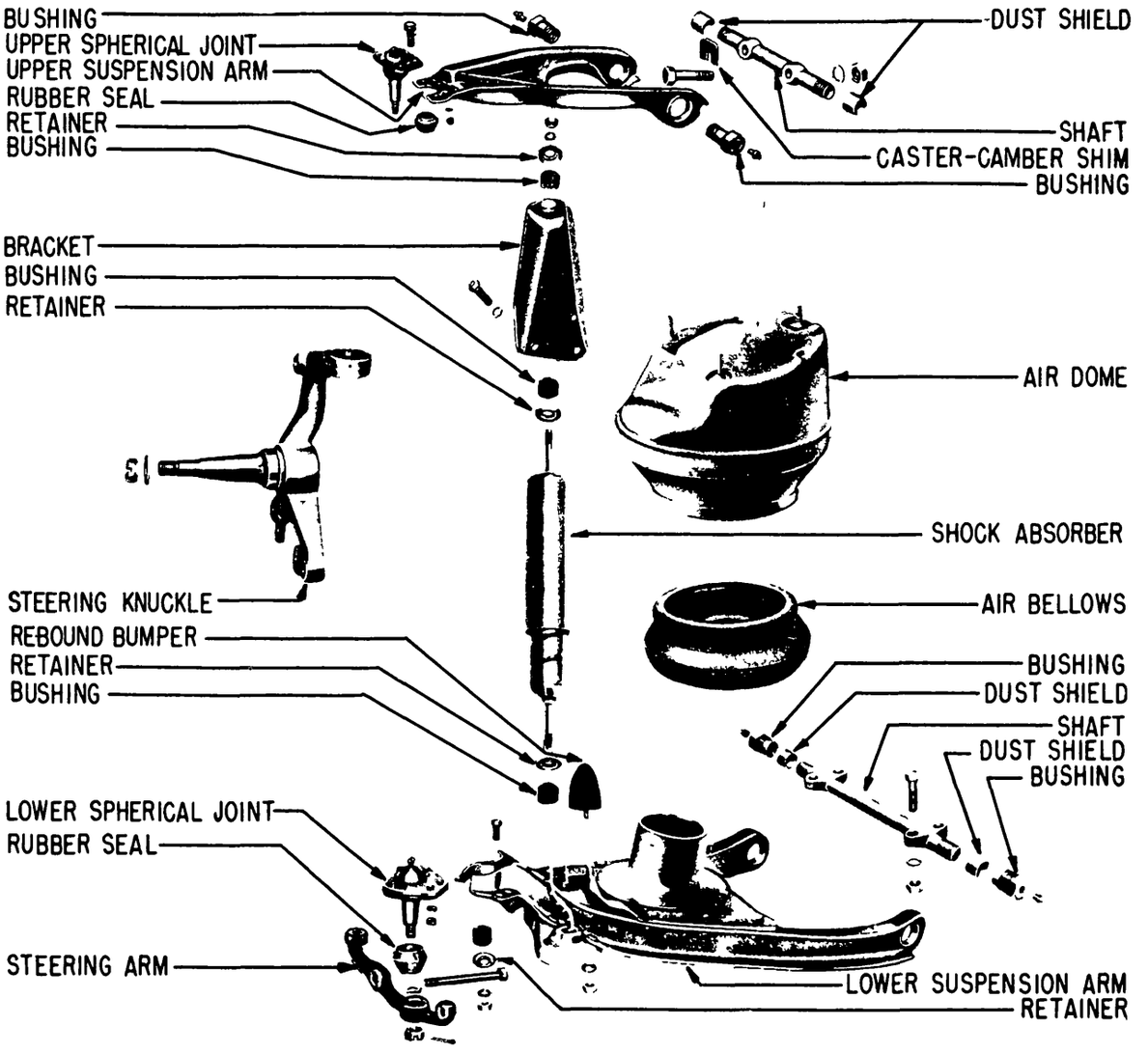
Fr nt End Adjustm nt: Toe-In adjustment should be 1/16" ± 1/32" on all cars with air suspension. All other adjustment specifications are the same as for conventional cars with coil springs. S *"Front Suspension" on Car Mod l pag .*

1958 MODELS

Lin Pr ssur Regulat r: Raise car and place jack stands under front and rear frame side members, then exhaust air from system by opening drain cock on bottom of accumulator tank. Disconnect high pressure air line to front air springs at fitting on lift valve, making certain that "0" ring seal remains in lift valve seat. Connect Air Ride Hose & Fitting, Tool J-7143, to lift valve front high pressure line fitting, routing hose so it does not contact exhaust manifold. Close drain cock and replenish air supply in accumulator tank so pressure is above 125 lbs. (Series 60 & 62), 150 lbs. (Series 75). Check pressure with Gauge J-6840. Run engine at slow idle to maintain pressure during adjustment. Depress service valve stem on end of Air Ride Hose, J-7143, momentarily allowing air to escape (this actuates regulator valve to insure it is not stuck). Check regulated air pressure at service valve end of Air Ride Hose, using Air Pressure Gauge, J-5880. Pressure should be 125 lbs. ± 5 lbs. (Series 60 & 62), 150 lbs. ± 5 lbs. (Series 75). If pressure not within these limits, proceed as follows: Remove rubber regulator boot from top of lift valve, then using a short screwdriver, rotate regulator screw (clockwise to increase pressure, counterclockwise to decrease pressure). Depress valve stem on Air Ride Hose to actuate regulator valve, then check pressure. If not correct, repeat the above procedure. Replace rubber boot on regulator valve and remove Air Ride Hose and checking gauge. *(NOTE* - It will be necessary to exhaust air from system before removing Air Ride Hose).

1959-60 MODELS

Lin Pressur Regulator: Raise car and place jack stands under front and rear frame side members, then exhaust air from system by opening service valve on bottom of accumulator tank. Disconnect high pressure air line to front springs at fitting on air lift valve, making certain that "O" ring seal remains in lift valve seat. Connect Air Ride Hose & Fitting, Tool J–7143 to lift valve front high pressure line fitting, routing hose so it does not contact exhaust manifold. Close service valve and replenish air supply in accumulator tank so pressure is above 175 lbs. Check pressure with Gauge J–6840. Run engine at slow idle to maintain pressure during adjustment. Depress service valve stem on end of Air Ride Hose, J–7143, momentarily allowing air to escape (this actuates regulator valve to insure it is not stuck). Check regulated air pressure at service valve end of Air Ride Hose, using Air Pressure Gauge, J–6840. Pressure should be 125 lbs. ± 5 lbs. (Series 60, 62 & 64); 150 lbs. ± 5 lbs. (Series 67). If pressure not within specifications, proceed as follows: Remove rubber regulator boot from top of lift valve, then using a screwdriver, rotate regulator screw (clockwise to increase pressure, counterclockwise to decrease pressure). Depress valve stem on Air Ride Hose to actuate regulator valve, then check pressure. If not correct, repeat the above procedure. Replace rubber boot on lift valve and remove Air Ride Hose and checking gauge. *NOTE – It will be necessary to exhaust air from system before removing Air Ride Hose.*



CADILLAC FRONT SUSPENSION ASSEMBLY

TROUBLE SHOOTING

Air Pressure Warning Light Remains On: Low pressure in system or grounded switch or connecting wire.

Car Will N t R turn T L v l P siti n (Air Pr ssur Normal): Front or rear leveling valve control links not adjusted properly. Leak or obstruction in high or low pressure lines.

Air System Too Sensitive (Resulting In Excessive Leveling Action): Leveling valve dashpot does not operate properly.

Air Spring Inoperative: Leakage in bellows, air dome, air lines, or insufficient air pressure. Defective leveling valve, lift valve, or orifice valve.

R ad Sh cks: Incorrect standing height, if not due to shock absorbers, tires, or front suspension parts.

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CADILLAC AIR SUSPENSION (C ntinu d)

REMOVAL & INSTALLATION

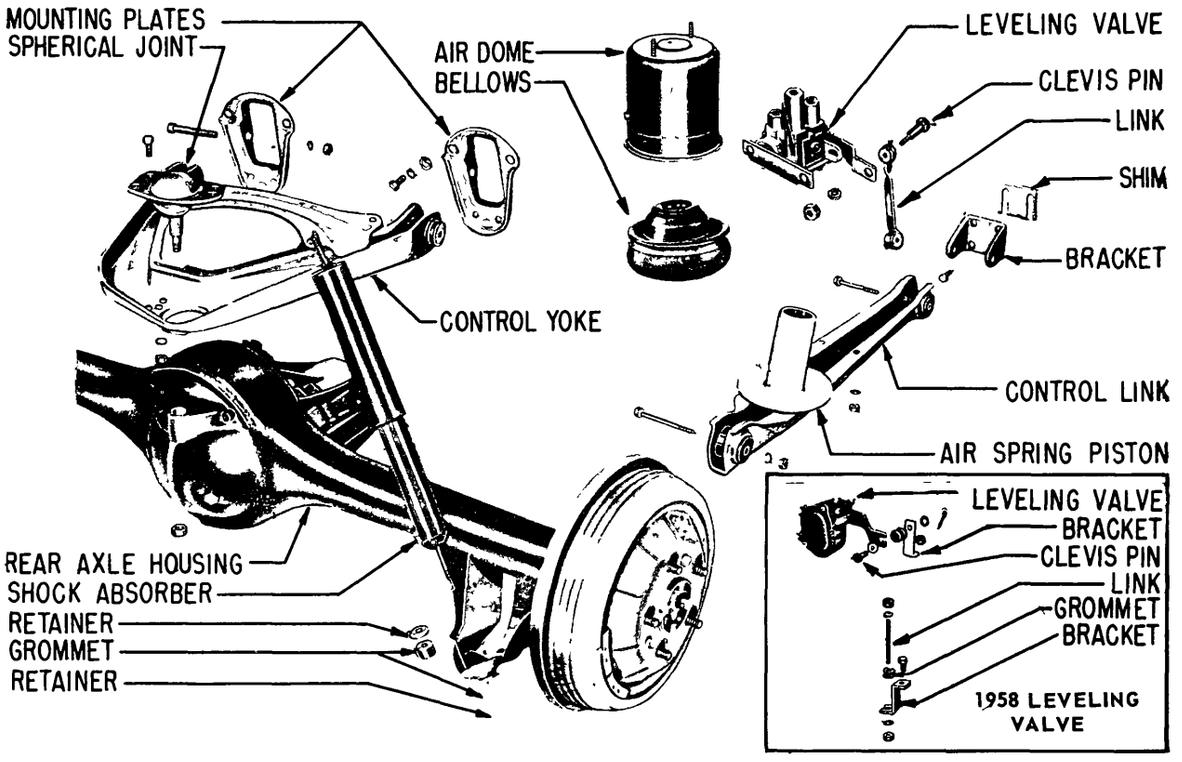
AIR COMPRESSOR: Removal - Remove power steering reservoir cover and syphon off all fluid. Disconnect hydraulic hoses at pump and cap the ends. Remove two screws retaining pump to rear face of air suspension compressor. Pull pump off splined compressor shaft and discard "0" ring seals. Disconnect fresh air inlet, then disconnect high pressure fitting on compressor. Remove drive belt and pulley, then remove two screws holding compressor to bracket, and remove compressor.

Installation: Reverse removal procedure and note the following: Adjust belt tension (see above), and check all high pressure fittings for leakage.

FRONT SPRINGS: Removal - Raise car and place jack stands under front and rear frame side members and remove wheel. Exhaust air from system (open drain cock on bottom of accumulator tank). Disconnect front shock absorbers at lower suspension arm and remove lower spherical joint cotter pin and nut. Strike steering arm with a hammer in area of spherical joint to break joint loose. Raise lower suspension arm until spherical joint is free, then allow suspension arm to swing down. Push on one side of rubber bellows until bead unseats from air dome, then pull bellows out of dome, being careful not to overstress bead or damage rubber seal. To remove air dome, disconnect air line at dome (two lines on right side). Remove three nuts retaining air dome to frame spring tower, and remove air dome.

Installation: Reverse removal procedure and note the following: Coat outside of bellows with silicone to prevent rubber to metal contact, then insert bellows completely inside the air dome, being careful not to overstress bead or damage rubber seal. Position bellows with bead seat up, then grasp bellows with both hands and pull into position. *(NOTE* - An alternate method is to disconnect dome air line and orifice valve, then using an air hose, bellows can be forced into position). Whichever method is used, make sure that bellows is seated properly in air dome. Check for air leakage.

REAR AIR SPRINGS: Removal - Raise car and place jack stands under front and rear frame side members. Exhaust all air from system (open drain cock on bottom of accumulator tank), then push on one side of rubber bellows until bead unseats from air dome. To remove air dome, disconnect air line at dome and remove two nuts retaining air dome to frame spring tower.



CADILLAC AIR SUSPENSION (REAR) WITH 1959-60 LEVELING VALVE

Installation: Reverse removal procedure and note instructions for installation of front bellows (above).

FRONT LEVELING VALVE: Removal - Raise car and place jack stands under front and rear frame side rails, then exhaust all air from system (open drain cock on bottom of accumulator tank). Remove two screws securing top of leveling valve bracket to front frame crossmember (screws may be reached through engine compartment). Disconnect adjusting link at control arm *(CAUTION* - Do not disturb adjusting nuts). Remove remaining bracket mounting bolt and remove leveling valve and bracket.

Installation: Reverse removal procedure, using new square cut tube fitting gaskets at air line fittings. Check fittings for leakage.

REAR LEVELING VALVE: Removal - Raise car and place jack stands under front and rear frame side rails, then exhaust all air from system (open drain cock on bottom of accumulator tank). Disconnect adjusting link at control arm, then disconnect three lines from leveling valve (a slight amount of air may discharge). Remove bolts retaining valve to frame spring tower and remove valve.

Installation: Reverse removal procedure and install new "0" ring seals at air line fittings. Check fittings for leakage.

LIFT VALVE: Removal - Raise car and place jack stands under front and rear frame side rails, then exhaust all air from system (open drain cock at bottom of accumulator tank). Disconnect Bowden cable at lift valve and disconnect five air lines at valve. Remove two bolts retaining valve to frame member and remove valve.

Installation: Reverse removal procedure and note the following: Use new "0" ring seals on all fittings. Connect Bowden cable, making sure that control handle on instrument panel is all the way in and that control lever on lift valve is all the way down. Check lines for leakage.

OVERHAUL

LEVELING & LIFT VALVES: *Se "Air Suspensi n L veling & Manual C ntr l Valves"*

AIR COMPRESSOR: *Se "Air Suspension Air Compressors"*

1957-58 CADILLAC ELDORADO BROUGHAM AIR SUSPENSION

Cadillac Eldorad Br ugham (1957-58)

►CHANGES, CAUTIONS, CORRECTIONS

►*AIR COMPRESSOR OIL INLET FITTING PRODUCTION CHANGE:* **Starting with Engine No 5770-122962, a new oil inlet fitting, Part No 5534103 is used in production and is recommended for installation on previous cars to prevent varnish deposits blocking the inlet fitting orifice**

►*REAR AXLE PINION ANGLE ADJUSTMENT (To Prev nt Pr pell r Shaft Vibration): See "Cadillac Rear Suspensi n".*

►*AIR SUSPENSION ELECTRICAL CIRCUIT CHANGE:* **Wiring changes were made in later production cars to include a new 25 ampere fuse in air compressor and lockout solenoid feed circuits Fuse is located under dash, near fuse block Protective relay-to-ground has been rewired through generator armature instead of through oil pressure tell-tale switch**

►*TOWING CAUTION: Instructions for various methods of towing car are diff rent as noted below. NOTE -When towing with front or rear wheels raised off the ground, disconn ct battery strap to prevent any leveling action.*

Air in Susp nsi n Syst m (Front End Raised) - Hook chain around front bumper mounting bar through opening in underside of impact bar above fog lights (both sides). Attach both ends of chain to tow truck spreader bar. Place protective padding around front bumper bar extensions, hold a 6 ft length of 2" pipe under bumper bar guards parallel with front bumper Then raise front end of car with truck hoist until spreader bar and chains are bearing against length of 2" pipe and front end of car is raised sufficiently for towing purposes *CAUTION - Check rear end to assure ground clearance at spare tire w ll.*

N Air in Susp nsi n System (Front End Raised) - Attach tow chains as for "Air in Suspension System" above, then remove front wheels and lower front end of car until there is 6" clearance between lower edge of rear license plate holder and ground *Disconnect propeller shaft if being towed more than a few blocks.*

R ar End Rais d - Turn front wheels to straight ahead position and tie steering wheel securely to prevent movement of front wheels while towing Hook chain around rear bumper outer mounting bar through opening under rear bumper exhaust ports (both sides) Place protective padding on under side of rear bumper outer impact bars where chain contacts, and connect chain to spreader bar of tow truck Raise rear end of car with tow truck *CAUTION - Make certain that front bumper is clear of ground.*

All Wheels on Ground - Hook chain around front bumper mounting bar through opening on underside of impact bar above fog lights *CAUTION - Do not tow car at speeds over 10 MPH. Disconnect propeller shaft if being towed more than a few blocks.*

►*HOISTING CAUTION:* Use lifting equipment that engages suspension, axle, or wheels. When using a frame contact hoist, special adapters must be used on hoist rails to assure engagement with frame at a point 34" to rear of front wheel centerline *(CAUTION - Do not allow adapters to contact any portion of No. 2 body hanger)* and at extreme tips of widest crossmember which is approximately 97" to rear of front wheel centerline. In no case should rear contact points be less than 40" apart

►*RAISING REAR OF CAR CAUTION:* Never raise rear end of car with rear shock absorbers disconnected as it is possible to raise rear end off its suspension and result in separation of rear air spring assemblies

►*SERVICING CAUTION: Do not open any door or turn ignition on when any wheel of the car is off the ground, such as changing a tire or when car is on a hoist.*

►*AIR FILTER LOCATION & CLEANING NOTE:* Three pourex filters located in the high pressure air line fitting at top left side of control solenoid and in the two exhaust line fittings at lower right front and bottom of unit must be cleaned at six-month intervals (more often if car is operated in sandy or desert areas) *See "Overhaul" below for cleaning procedures.*

►*AIR COMPRESSOR OIL FILTER LOCATION & CLEANING NOTE:* A pourex type filter located in the compressor oil inlet fitting must be cleaned each time the engine oil filter is changed *See "Overhaul" below for cleaning procedures.*

DESCRIPTION

DESCRIPTION: This new suspension consists of pressurized diaphragm units replacing the conventional coil and leaf type springs Air, under 110-130 lbs pressure, is controlled by three leveling valves (two at the rear and one at front) and maintains car level at a pre-determined height from the ground regardless of load The front suspension is basically the same as on conventional models having upper and lower control arms connected to steering knuckle by spherical joints. The rear suspension consists of two lower control links and an upper control yoke which are connected between car frame and rear axle housing. A pressure of 110-130 lbs. is maintained in a 500 cu. in. accumulator tank by an electrically driven, low capacity, piston type compressor mounted on the car generator An oil pressure switch in engine oil line prevents compressor from operating except when engine is running Solenoid valves control air flow to and from the air spring units when car ignition is turned on or when a door is opened

OPERATION

OPERATION: Leveling - (All Doors Closed - Igniti n Off) - No leveling occurs. Restriction solenoid and lockout solenoid are closed. High pressure air from accumulator passes through restriction in restriction solenoid and stops at closed lockout solenoid. Lockout solenoid prevents movement of air to and from air springs

Any Door Open - Ignition On or Off - Both the restriction solenoid and lockout solenoid are open which allows high pressure air to flow unrestricted to the three leveling valves. If weight is added, raising leveling valve arm, the inlet passage is opened allowing air to flow to air spring. If weight is removed, leveling valve arm is lowered, opening the exhaust passage and allowing air to escape from spring

All Doors Closed - Ignition On - *(NOTE - Two-second delay dashpots in leveling valves prevent any leveling action taking place when wheels move rapidly up and down. Intake or exhaust action occurs only when car is above or below normal standing height for a sustained period of more than two seconds).* The restriction solenoid is closed and the lockout solenoid open. Air to or from the springs is metered as it passes through the restriction solenoid as regulated by the leveling valves

Door Open - Ignition On - When more weight is added to one side, or when car is parked on an uneven surface, both the restriction and lockout solenoids are open. High pressure air from the accumulator flows unrestricted through control solenoid to leveling valves and levels the car as required by change in weight distribution.

Air C mpr ssor: This unit is a low capacity, piston type

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CADILLAC ELDORADO BROUGHAM (C ntinu d)

compressor having an integral electric motor controlled by a pressure switch. Pressure is maintained in the accumulator at 110-130 lbs. The compressor is lubricated from the engine oil system which provides a restricted flow of oil into compressor reservoir. A standpipe in the compressor reservoir returns overflow to engine oil pan. The compressor electrical circuit is energized only when engine is running due to the feed circuit being connected to engine oil pressure tell-tale switch.

C ntr l Solenoid: Consists of two lockout solenoid valves and two restriction solenoid valves. One of each type valve is in the inlet circuit and the other in the exhaust circuit to the leveling valves. The lockout valves, when closed, prevent flow of air to or from the leveling valves. The restriction valves, when open, provide fast leveling (with car standing), and slow leveling (with car moving). Both lockout valves open together as do the two restriction valves. Operation of the valves is controlled by ignition switch and door switches.

Accumulator Tank: This tank stores enough air at high pressure to re-level the car from curb weight to a five passenger load without additional air from the compressor. A pressure switch on the accumulator actuates a red light on instrument panel when pressure falls below 82 lbs. pressure (required for car leveling). A petcock at lower side of tank permits periodic draining of dirt and moisture. A "Schrader" valve located in a tee fitting in air line leading from the air compressor is provided to fill accumulator with a service air hose.

R stricted "Tee" Check Valve: Due to a single leveling valve being used for both front air springs, a check valve is provided to allow rapid flow of air between front springs and control solenoid for fast leveling, and at the same time restrict the air flow between the front air springs during car roll or cornering. This valve is mounted on frame front crossmember just to right of left hand radiator support bracket.

TROUBLE SHOOTING & DIAGNOSIS

► *TROUBLE SHOOTING & DIAGNOSIS NOTE: The following trouble shooting & diagnosis data indicates conditions and corrections peculiar to Cadillac Air Susp nsion only. Conditions arising from incorrect wheel alignment, loose or worn steering linkage, spherical joints, shock absorbers, or worn tires should be corrected in the usual manner.*

ROAD SHOCKS: May be caused by incorrect standing height or wrong type or size of tires. *See "Adjustment" below.*

AIR PRESSURE WARNING LIGHT REMAINS ON: Check and correct any air leaks. Check operation of air compressor and solenoid. Check for grounded switch or connecting wire.

AIR COMPRESSOR OPERATES CONTINUOUSLY: Pressure control switch diaphragm ruptured. Air leak in system. Valve plate in compressor head worn or broken. Pressure limit switch not functioning. Compressor relay defective.

CAR WILL NOT RETURN TO LEVEL POSITION (AIR PRESSURE NORMAL): Front or rear leveling valve control links not adjusted properly. Kink, leak, or obstruction in high or low pressure lines. Air compressor relay will not actuate. solenoid. Control solenoid not operating.

NO LEVELING ACTION WITH EITHER FRONT DOOR OPEN: An open circuit may exist between front door dome light switch and control solenoid relay. Control solenoid not operating.

NO LEVELING ACTION WITH EITHER REAR DOOR OPEN: An open circuit may exist between rear door transmission interlock switch and control solenoid relay. Control solenoid not operating.

AIR SYSTEM TOO SENSITIVE (EXCESSIVE LEVELING ACTION): Leveling valve dashpot does not delay valve action (replace leveling valve). Control solenoid restriction valve not operating. Defective dome light switch at front door hinge or transmission interlock switch at rear door.

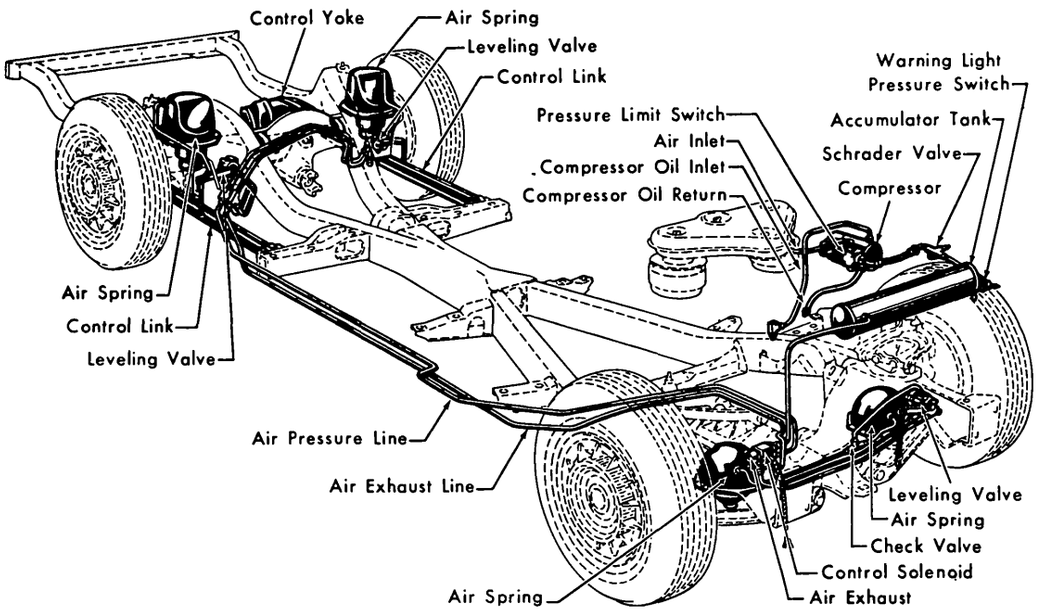
AIR SPRING INOPERATIVE: Air leak in diaphragm, air dome, or air lines. Defective leveling valve, control solenoid, pressure switch, compressor, or compressor relay. Insufficient air pressure. Defective restriction "Tee" valve. Loose electrical connections.

HARD RIDING: Insufficient lubrication. Tires over-inflated. Shock absorbers faulty. Standing height incorrect. Scuffed air spring diaphragm, Insufficient air pressure.

BOTTOMING OF REAR SPRINGS: Incorrect standing height. Worn or defective rear suspension linkage. Insufficient air pressure in system.

ADJUSTMENT

FRONT WHEEL ALIGNMENT: Alignment and adjusting procedures are the same as for conventional models. *See "Cadillac Front Suspension".*



CADILLAC ELDORADO BROUGHAM AIR SUSPENSION SYSTEM

STANDING HEIGHT: *NOTE - Air pressur in accumulator tank should be maintained at 90 lbs. or abov wh n checking standing height. All wh ls must b on a level surface when checking or adjusting standing h ight.*

Checking: *NOTE - Normalize position of air springs by working the bumper up and down with a car door open, permitting car to assume its normal standing h ight.*

Front of Car - Measure distance from top of left lower control arm to center of the outer lower rivet on front of frame. This measurement should be 3 5/8" ± 1/16". If not within specifications, adjust as outlined below.

Rear of Car - Measure distance from top of rear axle housing to underside of frame at a point directly above the axle housing. This measurement should be 4 13/16" ± 1/16". *(CAUTION - The rear standing height must be within 1/8" on both sides of car).* If not within specifications, adjust as outlined below.

Adjusting: **Front of Car** - Loosen adjusting nut on leveling valve adjusting link at connection on lower control arm. Raise or lower adjusting link until measurement between left lower control arm and center of rivet is 3 5/8" ± 1/16". Allow sufficient time for leveling action to take place, then tighten adjusting nuts and recheck measurement. Check standing height on right side. If measurement varies more than 1/4", check and adjust rear standing height.

Rear of Car - Loosen adjusting nuts on leveling valve adjusting link at connection on lower control link. Raise or lower adjusting link until measurement between top of axle housing and underside of frame is 4 13/16" ± 1/16" on both sides of car. Allow sufficient time for leveling action to take place, then tighten adjusting

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CADILLAC ELDORADO BROUGHAM (C ntinu d)

nuts and recheck measurement. Recheck front standing height and readjust if necessary.

OVERHAUL

►*REAR UPPER CONTROL YOKE PRODUCTION CHANGE:* The spherical joint used on early production models has been replaced with a rubber bushing on later cars. The grease fitting formerly used with the spherical joint has been replaced with a threaded plug. Under no circumstances should the plug be replaced with a grease fitting on cars with rubber type bushings.

►*AIR SUSPENSION TUBING NUT TIGHTENING CAUTION:* Overtightening of the tubing nuts will damage the "0" ring seal, causing an air leak. Nuts should be tightened to 5-10 ft. lbs. for proper seating.

►*AIR SUSPENSION TUBING NUT FITTING CAUTION:* Whenever any air line fitting is disconnected, the "0" ring seal, Part No. 1467287, should be replaced. After tightening, each fitting should be checked for leakage

►*RAISING REAR OF CAR CAUTION: Never raise rear end of car with rear shock absorbers disconnected as it is possible to rais rear nd off its suspension and result in s paration of r ar spring assemblies.*

►*SERVICING CAUTION: Do not open any door or turn ignition on wh n any wh el of car is off the ground.*

FRONT SHOCK ABSORBER: Removal - Raise front of car and place jack stands under lower control arms. Turn wheel for access to shock absorber and remove shock upper retaining nut, retainer, and rubber grommet at frame tower mounting bracket *(NOTE* - Upper stem is square at top so it may be held from turning). Remove shock lower retaining nut, lockwasher, retainer, and rubber grommet at mounting bracket and remove shock. **Installati n:** Reverse removal procedure.

SPHERICAL JOINTS: Rem val, Checking & Installation - Same as for conventional type suspension. *See "Cadillac Front Suspension".*

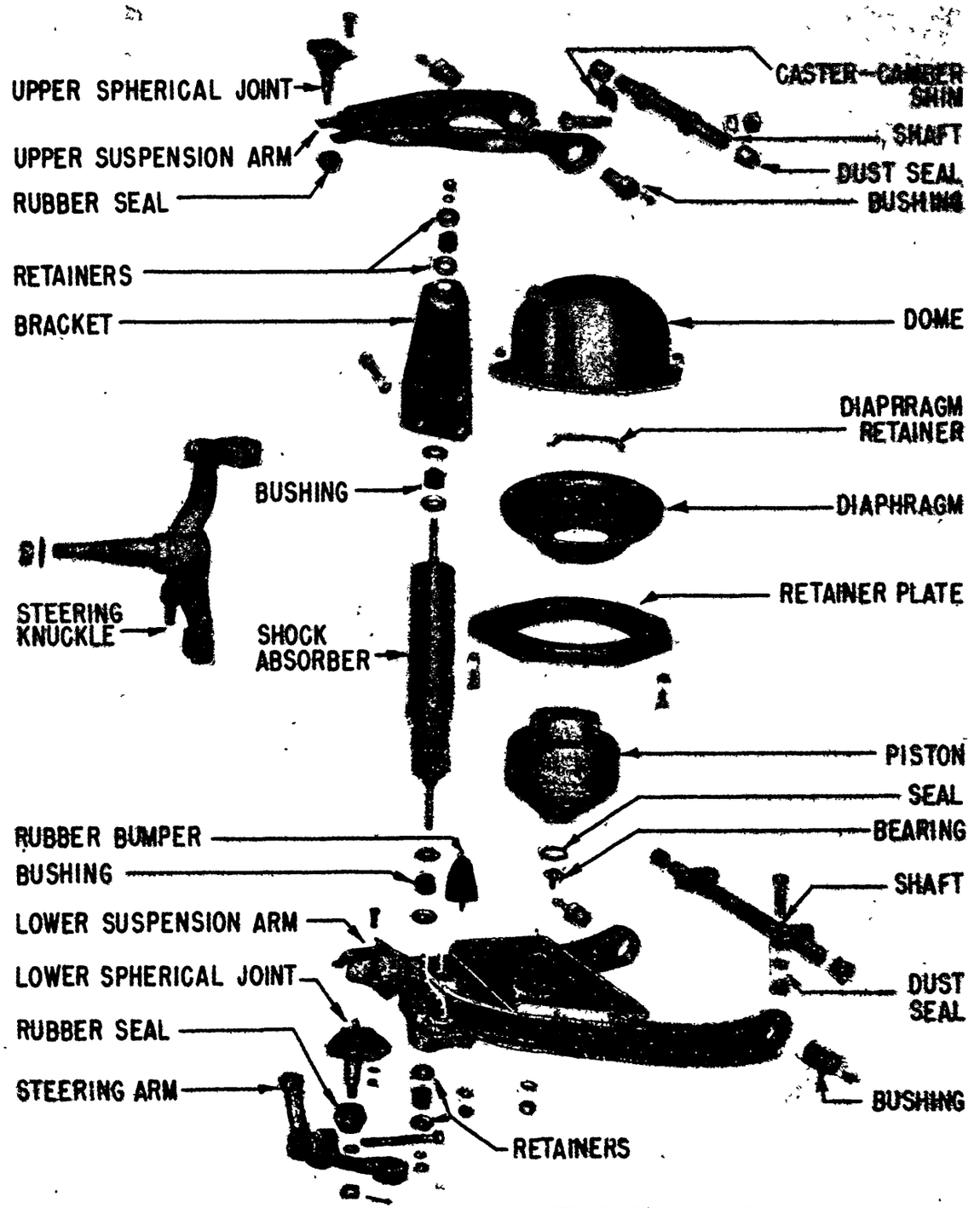
REAR SHOCK ABSORBER: Removal - Raise rear of car and place jack stands under rear axle housing. Remove upper and lower retaining nuts and lockwashers and remove shock. *CAUTION - Under no circumstances should rear of car be raised in such a manner that rear suspension is in rebound position with shocks disconnected* **Installati n:** Reverse removal procedure.

UPPER CONTROL ARM: Removal - Disconnect battery ground strap. Raise front of car and place jack stands under lower control arms, and remove wheel. Remove cotter pin and nut from spherical joint stud. Strike steering knuckle with a hammer in area of spherical joint to break joint loose. Remove mounting bolts at mounting shaft and remove upper suspension arm with shaft.

Disass mbly & R ass mbly: Same as conventional type. *S e "Cadillac Front Suspension".*

Installation: Install arm in position on frame mounting bracket and tighten bolts to 130-140 ft. lbs. Use original caster and camber shims until alignment checked. Position spherical joint stud in steering knuckle hole, install nut and tighten to 50-60 ft. lbs. Install wheel and connect ground strap to battery.

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CADILLAC ELDORAD BR UGHAM FRONT SUSPENSION ASSEMBLY

CADILLAC ELDORADO BROUGHAM (C ntinu d)

LOWER CONTROL ARM: Removal - Raise front of car and place jack stands under frame side rails. Remove wheel. Disconnect stabilizer linkage from lower control arm. Disconnect leveling valve adjusting link at lower control arm and pull down on leveling valve control arm to exhaust air from front springs (battery must be connected and a door open). Disconnect battery ground strap, close all doors and remove air piston bearing retainer nut at lower suspension arm. Disconnect air line and remove Schrader valve from front air dome, using Valve Core Remover and Installer Tool J-6888. Disconnect shock absorber at lower control arm and remove lower spherical joint cotter pin and nut. Strike steering arm in area of joint to break it loose, then remove four shaft mounting bolts at frame front crossmember and remove lower control arm.

Disassembly & Reassembly: Same as conventional type. *See "Cadillac Front Suspension".*

Installation: Install mounting shaft on frame crossmember and tighten bolts to 60-70 ft. lbs. Guide spherical joint stud into steering knuckle and install nut. Tighten to 50-60 ft. lbs. and install cotter pin. Connect shock absorber at lower control arm. Install Schrader valve and connect air line in front dome. Install air spring piston bearing retainer nut at bottom of lower control arm Connect leveling valve adjusting link and stabilizer link at lower control arm. Connect battery ground strap and open car door. Install wheel, remove jack stands and lower front end of car. Replenish air supply in accumulator tank through Schrader valve. Check air line fitting on front dome for air leaks by using a soapy water solution. Check standing height and adjust as necessary (see above). Check wheel alignment.

STEERING ARM: Removal & Installation - Same as conventional type suspension. *See "Cadillac Front Suspension".*

REAR WHEEL & BRAKE DRUM: Removal - Raise rear of car and place jack stands under rear axle housing. Place jack under rear bumper on side that wheel is to be removed and raise car sufficiently to remove wheel. *(CAUTION - Do not disconnect rear shock absorber for removal of rear wheel).* Remove brake drum.

Installation: Reverse removal procedure.

AIR COMPRESSOR: *NOTE - If air compressor defective, replace it with a new unit. Do not attempt repairs other than replacement of pressure switch, diaphragm, relay, or oil inlet fitting.*

R moval - Disconnect battery ground strap and exhaust air in accumulator tank at Schrader valve. Disconnect oil inlet and return lines at compressor. Disconnect air cleaner hose at inlet side of compressor. Disconnect harness lead (black) at relay on compressor. Remove two bolts securing compressor to mounting bracket on top of generator and remove compressor.

Installation: Reverse removal procedure using a new "0" ring seal at accumulator tank air line. Replenish air supply in accumulator tank through Schrader valve.

AIR COMPRESSOR RELAY: Removal - Disconnect motor lead (black) at relay, and three pressure switch leads (green, white, and pink), at relay. Disconnect harness lead (black) at relay. Remove relay.

Installati n: Reverse removal procedure.

AIR COMPRESSOR PRESSURE SWITCH: Removal - Disconnect three pressure switch leads (green, white, and pink) at relay. Remove two screws securing pressure switch cover to mounting on air compressor head and remove switch cover. Remove four screws securing pressure switch assembly to air compressor head and remove switch assembly. Remove rubber diaphragm from air compressor head.

Installation: Reverse removal procedure, making certain that rubber diaphragm is installed with raised side facing pressure switch plunger.

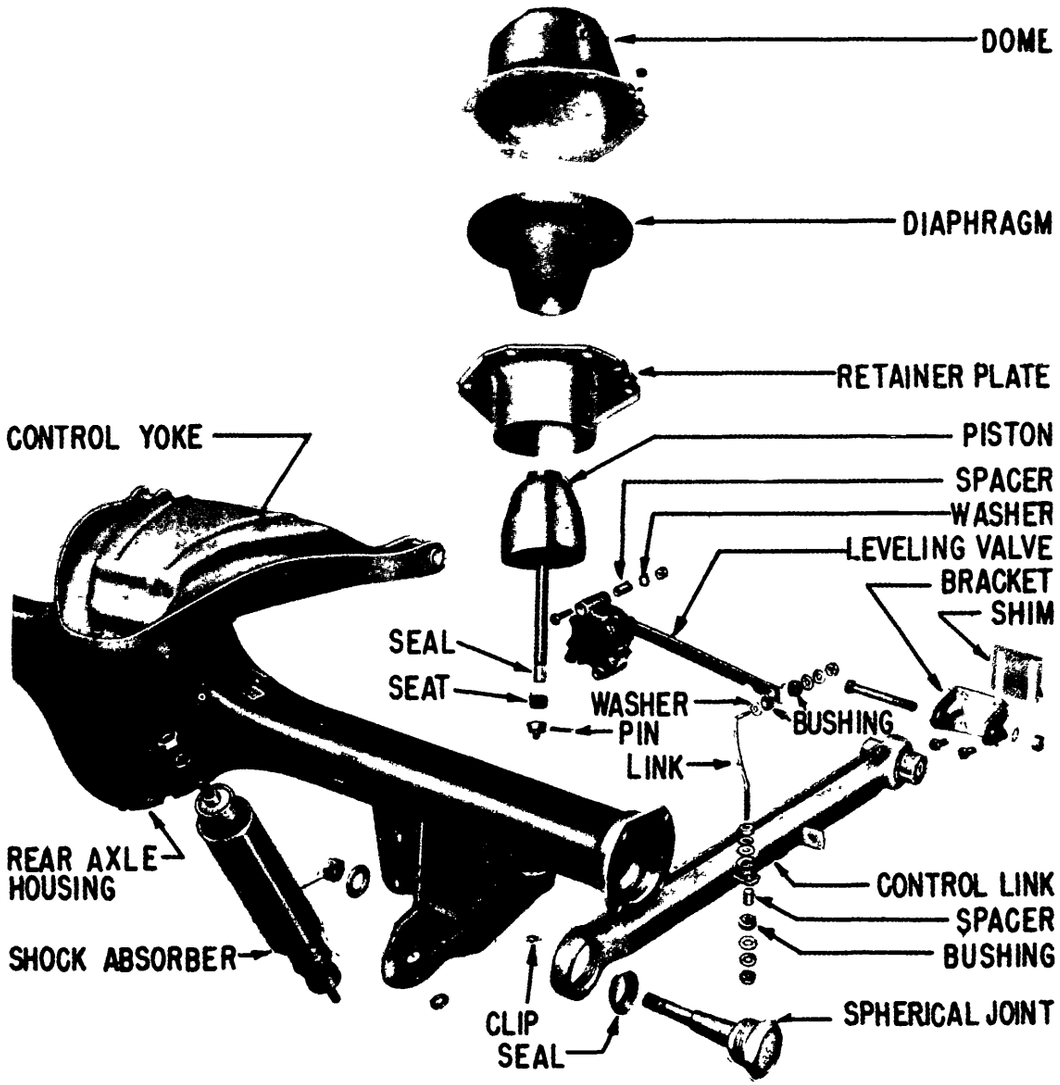
AIR COMPRESSOR FILTER: *NOTE - A pourex filter in oil inlet fitting should be cleaned when filter changed.*

Removal: With engine **not** running, remove oil inlet line at top of air compressor and remove fitting *(NOTE - The filter is an integral part of fitting and should not be removed).*

Cleaning: Soak oil inlet fitting in grease dissolving solvent and wash thoroughly. Blow air through fitting with air hose and wipe dry.

Installation: Install oil inlet fitting on compressor and

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CADILLAC EL DORADO BROUGHAM REAR SUSPENSION ASSEMBLY

CADILLAC ELDORADO BROUGHAM (Continued)

connect inlet line. Run engine and compressor to check for oil leakage at fitting.

ACCUMULATOR TANK: Removal - Disconnect battery ground strap and remove radiator grille. Release air pressure in accumulator tank by opening pet cock at lower left side of tank. Disconnect two air line fittings at top of tank. Disconnect electrical lead on pressure switch at bottom left side of tank. Remove two accumulator tank attaching bolts from mounting brackets on each side of air conditioning condenser, and remove tank through grille opening, using care not to damage pressure switch.

Installation: *(NOTE - If new tank is being installed, check for air leakage before installation).* Reverse removal procedure using new "0" ring seals at ends of accumulator tank air lines. Replenish air supply in tank through Schrader valve. Test all fittings for leakage by using a soapy solution. Connect battery ground strap.

ACCUMULATOR TANK PRESSURE SWITCH: Removal - Disconnect battery ground strap and release air in tank by opening pet cock at lower left side of tank. Disconnect electrical lead at pressure switch and unscrew pressure switch from tank.

Installation: Apply permatex to bolt threads at bottom of pressure switch and install switch on tank. Connect electrical lead on switch. Replenish air supply in accumulator tank through Schrader valve. Check for air leakage using a soapy solution, then connect battery ground strap.

CONTROL SOLENOID: Removal - Disconnect battery ground strap, then raise front of car and place jack stands at outer ends of lower control arms. Exhaust air from accumulator tank at Schrader valve. Disconnect accumulator tank air line at top left side of control solenoid. Disconnect front and rear air spring high pressure and exhaust lines from control solenoid *(NOTE* - When exhaust lines are disconnected, front of car may lower slightly). Disconnect two electrical leads at relay on right front fender dust shield. Remove screws securing control solenoid to supporting bracket and remove solenoid.

Installation: Reverse removal procedure, using new "0" ring seals at ends of all air lines.

CONTROL SOLENOID FILTERS: *NOTE* - Three pourex filters, located in the high pressure air line at top left side of unit and in the two exhaust line fittings at lower right front and bottom of unit, are used to prevent foreign particles in air lines. These filters should be cleaned at six-month intervals (more frequently in sandy or desert areas).

Removal: Disconnect battery ground strap. Raise front of car and place jack stands at outer ends of lower control arms. Exhaust air from accumulator tank through Schrader valve. Disconnect high pressure line at top left side of control solenoid. Disconnect exhaust lines at lower right front and bottom of control solenoid. Remove air line fittings from control solenoid where air lines were previously disconnected and lift out filters.

Cleaning: Clean filters in suitable solvent and blow dry with air.

Installation: Reverse removal procedure using new "0" ring seals at ends of air lines. Check for leakage at all air line fittings using a soapy solution.

RESTRICTION CHECK "TEE" VALVE: Removal - Disconnect battery ground strap. Raise front of car and place jack stands at outer ends of lower control arms. Disconnect leveling valve air line at top of check valve *(NOTE* - All air will exhaust from front air springs and front end of car will settle into full compression in approximately five minutes). Wait for front end to lower, then disconnect front spring air line at check valve. Remove screw securing check valve to front frame member and remove check valve.

Installation: Reverse removal procedure using new "0" ring seals on ends of all lines. Replenish air supply in accumulator tank. Check for air leakage at all fittings using a soapy solution.

FRONT LEVELING VALVE: Removal - Raise front of car and open any door. Disconnect adjusting link at leveling valve control arm and pull down on control arm to exhaust air from front springs. Disconnect three air lines from leveling valve *(NOTE* - A slight discharge of air might take place). Remove two bolts retaining leveling valve to support bracket and remove leveling valve.

Installation: Reverse removal procedure using new "0" ring seals at ends of all lines. Lower car and leave any door open. Replenish air supply in accumulator tank. Check air line connections for leakage using a soapy solution. Check and adjust standing height (see above).

REAR LEVELING VALVE: Removal - Disconnect battery ground strap. Raise rear of car and place jack stands under rear frame side rails. Disconnect air line at rear spring air dome. Disconnect adjusting link at leveling valve control arm. Disconnect three air lines from leveling valve *(NOTE* - A slight discharge of air may take place). Remove two bolts retaining leveling valve to support bracket and remove valve. *(NOTE* - On right side only, remove two valve-to-support bracket spacers).

Installation: Reverse removal procedure, making sure to replace leveling valve-to-support bracket spacers on right side. Use a new "0" ring seal at ends of all air lines and check for air leakage. Check and adjust standing height (see above).

FRONT AIR SPRING (RIGHT OR LEFT): Removal - Remove lower control arm (see above). Remove three mounting bolts securing air spring assembly to front frame member and remove spring assembly.

Disassembly: Remove four attaching bolts securing retainer plate to dome, and separate retainer plate from dome. Remove "0" ring seal and phenolic resin bearing from bottom of piston. Remove piston and diaphragm from air dome. Remove diaphragm retainer from piston and lift diaphragm off piston.

Reassembly: Wipe inner surface of air dome and outer surface of piston with a clean cloth. Make sure that diaphragm contact areas are free from foreign particles or sharp edges. Apply DC-4 Silicone compound to outer edges of upper and lower diaphragm lips. Install diaphragm on piston and replace diaphragm retainer. Install piston and diaphragm assembly in air dome in as straight a position as possible, using care not to distort or bend out the upper lip of diaphragm. Install retainer plate on air dome and secure with four attaching bolts. Install Schrader valve core in air dome. Apply a liberal amount of heavy front wheel bearing grease in cavity at base of piston and install a new phenolic resin bushing and "0" ring seal.

Leak Test - Using a vise, install front air spring assembly in Holding Tool, J-6885, making sure that tool is securely attached as it will be subjected to extreme pressure. Insert Pilot Adapter, Tool J-6885-5, in hole at bottom of holding tool. Install Air Dome Valve Adapter, Tool J-6881, in air fitting in dome, making sure that fitting contains valve core. Introduce air slowly into air dome, guiding piston retainer bolt so that it seats properly in pilot adapter. Continue to add air until pressure builds up to 80-100 lbs., check air pressure with Pressure Gauge, Tool J-6840, and remove valve adapter tool. Remove complete assembly from vise, submerge in water and check for air leaks. Release all pressure in air dome by removing Schrader valve core. Remove spring from holding tool and install Schrader valve core in air dome.

Installation: Add a small amount of air to the air dome (approximately 5 lbs.) to prevent movement of diaphragm during installation. Reverse removal procedure using a new "0" ring seal at end of front spring line at air dome. Replenish air supply in accumulator tank and check for air leakage. Check and adjust standing height.

REAR AIR SPRING (RIGHT OR LEFT): Removal - Raise rear end of car, with any door open, and place jack stands under rear frame rails. Remove rear wheel *(CAUTION - Do not disconnect either rear shock absorber).* Disconnect adjusting link at leveling valve control arm and pull down on arm to exhaust air from rear spring. Disconnect battery ground strap. Disconnect air line at dome and remove Schrader valve core, using Valve Core Remover & Installer, Tool J-6888. Remove hairpin clip at bottom of piston rod, then push piston rod up and remove rod from socket in axle housing support bracket. Unscrew piston from diaphragm and remove piston assembly. Remove four mounting bolts securing rear air spring assembly to frame mounting bracket, and remove rubber bumper. Remove rear air spring assembly through wheel opening in fender

Disassembly: In the event piston is still attached to diaphragm in air spring, unscrew and remove it. Remove four attaching bolts securing retainer plate to dome and separate dome from plate. Remove rubber bumper. Remove diaphragm from air dome and tapered pin from lower end of piston rod. Remove seat and rubber seal.

Reassembly: Wipe inner surface of air dome with a clean cloth and make sure that diaphragm contact area is free from foreign particles or sharp edges. Apply DC-4 Silicone compound to outer edge of diaphragm lip, then install diaphragm in air dome in as straight a position as possible, using care not to distort or bend out the lip of diaphragm. Install retaining plate on air dome and secure with four attaching bolts. Install valve core in air dome. Install rubber seal on piston rod. Fill piston rod seat with heavy front wheel bearing grease, then install seat on rod and secure with tapered pin. Attach

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CADILLAC ELDORADO BROUGHAM (C ntinu d)

piston to diaphragm, **tightening as much as possible by hand only.**

Leak Test - *See "Front Air Spring (Right or Left)" above.*

Installation: Add a small amount of air to air dome (approximately 5 lbs.) to prevent movement of diaphragm during installation. Reverse removal procedure, installing rear air spring as a complete assembly with piston securely attached to diaphragm. Use a new "0" ring seal at end of air line at air dome. Replenish air supply in accumulator tank and check for air leakage. Check and adjust standing height (see above).

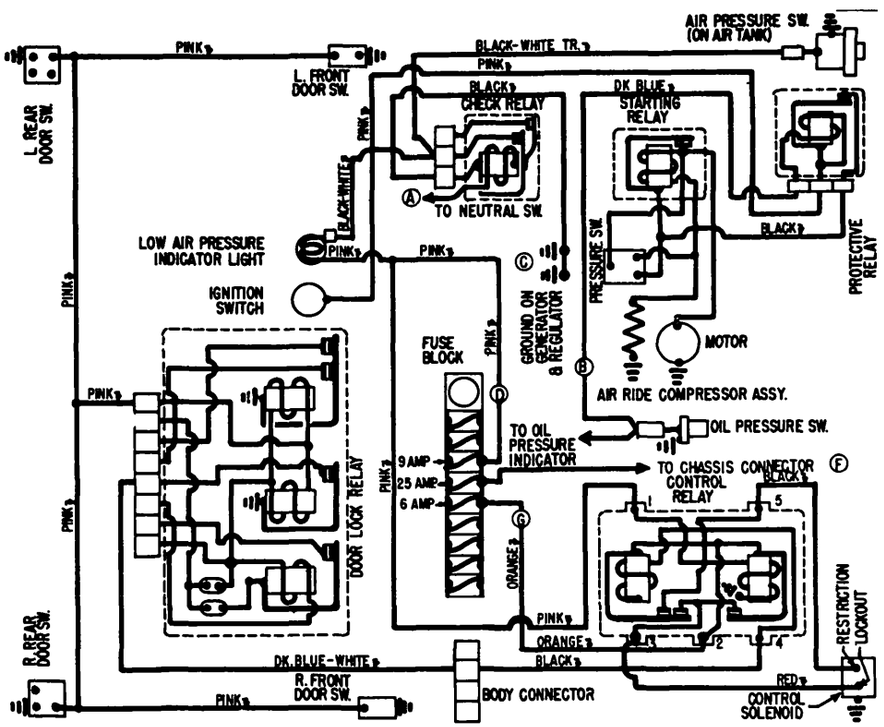
REAR UPPER CONTROL YOKE: *NOTE - Early cars are equipped with a spherical joint at rear mounting of yoke. Later cars have a rubber bushing. The lubrication fitting used with the spherical joint is replaced with a threaded plug on later cars having the rubber bushing. Under no circumstance should the plug be removed and replaced with a grease fitting on cars with rubber type bushings.*

R moval: Raise rear of car, with one door open, and place jack stands under rear frame rails. When air pressure is exhausted in springs, remove battery ground strap. Disconnect both rear spring air lines at leveling valves. Center jack under differential housing as a support (do not raise housing). Disconnect rear end of upper control yoke by removing mounting bolts securing yoke to spherical joint or rubber bushing on top of differential housing. Yoke will spring up to its design height position *(CAUTION - Note this position by measurement as control yoke front attaching bolts must be torqued with yoke in this position when yoke is installed).* Remove control yoke front attaching bolts at frame crossmember just forward of rear axle. Remove yoke over top side of differential housing.

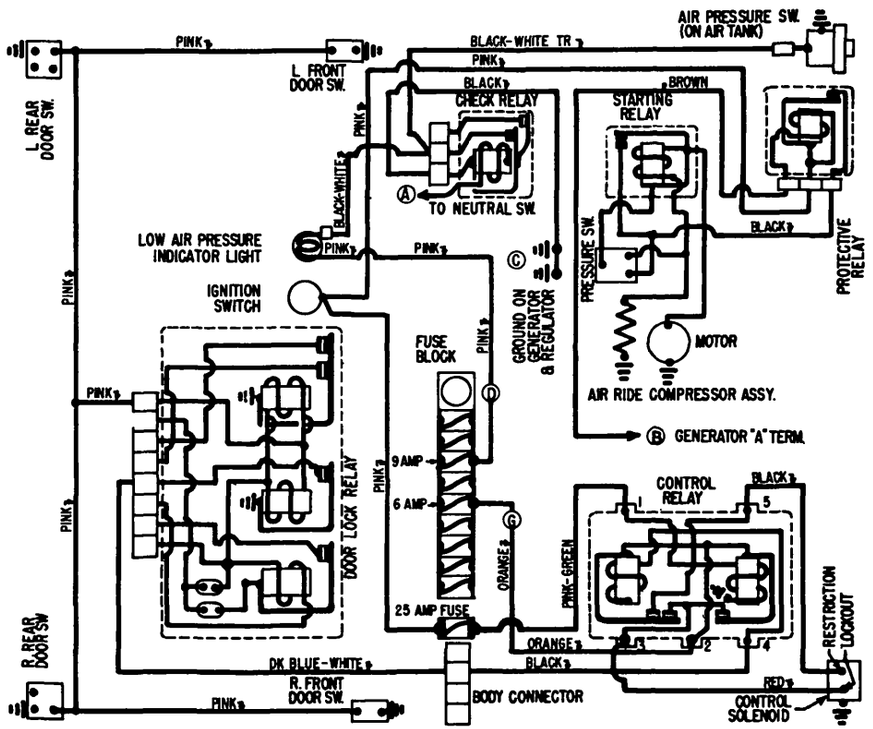
Installation: Place control yoke in position and install the two front attaching bolts (do not tighten bolts). Position yoke to same position as noted by measurement at removal and tighten front attaching bolts to 85-95 ft. lbs. Pull down on yoke and attach rear end to spherical joint or rubber bushing. Tighten bolts to 35-40 ft. lbs. Connect both rear spring air lines at leveling valves, using new "0" ring seals at ends of lines. Lower car, open any door, connect battery, and replenish air supply in accumulator tank. Check all air line fittings for leakage. Check and adjust standing height (see above).

REAR LOWER CONTROL LINK (RIGHT OR LEFT): Removal - Raise rear of car with one door open. Place jack stands under rear frame rails, and remove rear wheel. *(NOTE* - Rear end of control link is not in rebound position, 5" below design height). When air in rear springs is exhausted, disconnect battery ground strap. Center jack under differential housing to support it (do not raise housing). Disconnect rear spring air line at leveling valve. Loosen parking brake equalizer locknut and disconnect cable. Remove spring clip retaining parking brake cable at No. 4 body bracket. Draw parking brake cable through grommet in bracket on outer side of control link. Disconnect leveling valve adjusting link at control link. Measure distance from ground level to centerline of spherical joint at rear of control link. **Add 5 inches to this measurement** to compensate for rebound distance, and note total. When control link is installed, front attaching bolt must be torqued with control link at design height. Remove attaching bolt from front end of control link at body mounting bracket. Disconnect spherical joint at rear end of control link under rear axle housing and remove control link.

Installation: Install front end of control link first. Replace attaching bolt but do not tighten. Position control link at design height as determined at removal, and tighten front attaching bolt to 85-95 ft. lbs. Pull down on control link and attach rear end to spherical joint under rear axle housing. Tighten stud to 70-80 ft. lbs. Complete installation by reversing removal procedure, using new "0" ring seals in all air lines. Lower car, open door, connect battery, and replenish air supply in accumulator tank. Check for air leakage at all fittings. Check and adjust standing height (see above)



1957 CADILLAC ELDORADO BROUGHAM AIR SUSPENSION WIRING DIAGRAM



1958 CADILLAC ELDORADO BROUGHAM AIR SUSPENSION WIRING DIAGRAM

CHEVROLET LEVEL AIR SUSPENSION

Ch vr l t (1958-59)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS:* Before working under the car, jacking it up, or raising it on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

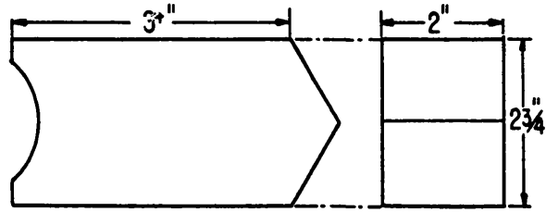
Raising Car (On a Jack) - With car at its normal operating height, close manual shutoff valve located on top of junction block at left side of engine adjacent to the accumulator tank. *CAUTION - Be sure valve is opened after removing from jack, as serious damage can result.*

Raising Ca (On a H ist) - When raising a car on a frame contact type hoist or on any hoist that does not support the car under all four wheels, the manual shutoff valve must be closed. *S e "Raising Car (On a Jack)" above.*

W rking Under Th Car - Always place jack stands under an air suspension car before using a creeper as a precaution in case air should be exhausted from system.

►*TOWING THE CAR:* **Air Suspension System Operating** Run engine and compressor long enough to fill system, then close manual shutoff valve. Raise car and proceed in the normal manner.

Air Suspension System Operating (Compressor Not Working) Fill system from a tow truck equipped with a compressor or storage tank. Remove cap from Schrader valve on the high pressure accumulator and apply pressure until system inflates to normal. Close manual shutoff valve on junction block and proceed in the normal manner.

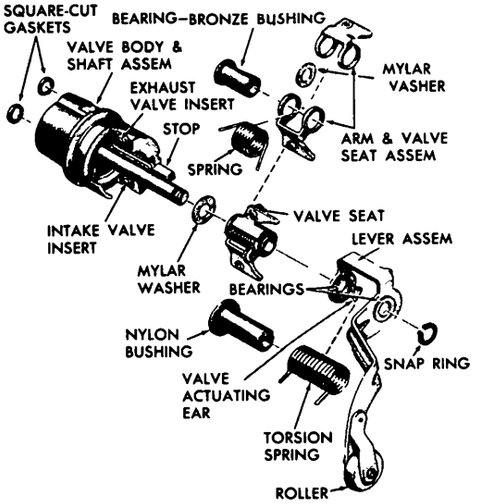


CHEVR LET REAR TOWING BLOCKS

Air Suspensi n System N t Operating: *NOTE* - With air pressure completely exhausted from system the body-frame assembly will not have more than 2-4" ground clearance. The car may be towed on a smooth road at a speed not exceeding 10 MPH. If necessary to move car over a rough or hilly road, proceed as follows:

Fr nt End Rais d (Meth d No. 1) - Attach tow truck lifting chains to appropriate locations on frame or crossmember. Raise slightly to allow removal of front wheels, then lower chains slightly to give adequate clearance for towing. DO NOT tow for great distances or at speeds over 10-15 MPH. Check periodically to make sure chains have not slipped or that ground clearance has not changed due to type of load, shifting loads, etc.

Fr nt End Raised (Meth d N . 2) - Make two blocks, (see illustration), from a good hardwood that will not break or crack. Raise frame of car with a jack and place a block between rear axle housing and frame. Holes drilled at each end of block should be used to attach



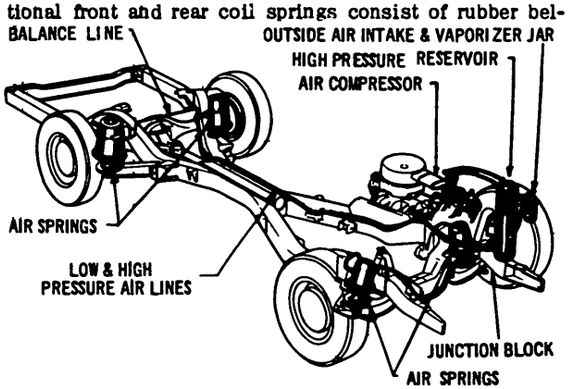
CHEVROLET LEVELING VALVE ASSEMBLY

block to frame and axle housing. Attach chains to front cross member or frame and tow car in the usual manner, but at a reduced speed.

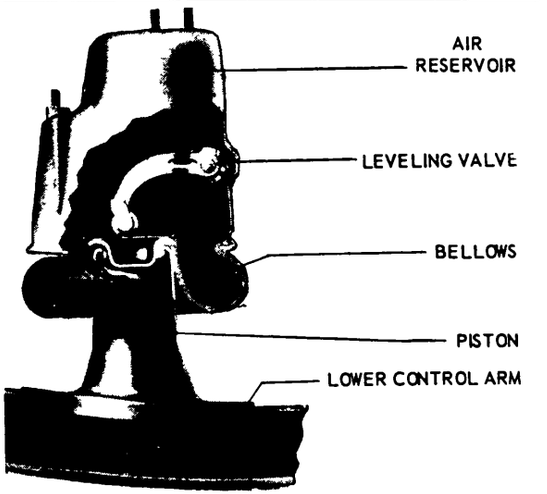
Rear End Raised - Install a cable loop around both frame side members at a point 5" forward or rear edge of frame to provide means of lifting rear of car. Raise car at front so that inner ends of lower control arms are pointing upward a slight amount, then using a piece of 2" x 6" board (channel or angle iron), securely attach under the crossmember and to outer portions of lower control arms. Use suitable "C" clamps, chain, or steel cable to attach this piece to control arms and crossmember. Lower car to ground and tow in the usual manner at a reduced speed.

►*1959 LOW PRESSURE BLOW-OFF VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new valve, Part No. 3769872 is being used in production and for service replacement to reduce blow-off pressure from 20—25 lbs. to 5—10 lbs. The new valve will reduce compressor drive belt squeal and increase durability of compressor belt.

DESCRIPTION: Air springs used to replace the conventional front and rear coil springs consist of rubber bellows and metal reservoir assemblies. These units are attached to the frame crossmember and lower suspension arms (front of car) and to frame side rail and lower control arms (rear of car). Normal riding height is maintained automatically by air pressure controlled by the height control valve in each of the front springs and in the left rear spring. Other basic components of the system operate as follows:



CHEVR LET AIR SUSPENSI N SYSTEM



CHEVROLET FRONT AIR SPRING ASSY.

Air Compressor: Single stage, single cylinder reciprocating type, driven by a belt from engine fan assembly. Compressor is lubricated by oil from the engine pressure oiling system which is introduced through a connection on the compressor bearing housing. Drilled passages in the compressor crankshaft provide lubrication to connecting rod and crankshaft bearings and to cylinder walls. Oil is returned to the engine crankcase by a line from the compressor sump.

High Pressure Accumulator Tank: Mounted in engine compartment on left side of car adjacent to manual shutoff valve. This tank is used to maintain a reserve supply of high pressure air and to trap moisture and oil in the system. A Schrader type valve on accumulator tank permits filling tank with air from an outside source. A drain valve at lower end of tank is provided to drain accumulated oil and water.

Manual Shutoff Valve & Junction Block: This valve is located in the junction block adjacent to accumulator tank in engine compartment and is provided as a means of shutting off low pressure side of system from compressor inlet and the low pressure safety valve. It is used for special purposes such as shipping, towing, using a bumper jack, or raising the car on any type hoist that does not support the car under all four wheels. Also included in the junction block is the high pressure safety valve, low pressure safety valve, and passages connecting accumulator tank, compressor, and leveling valves.

CONTINUED ON NEXT PAGE

CHEVROLET LEVEL AIR SUSPENSION (C ntinu d)

Fr nt Height Control (Leveling) Valves: Each of the front air spring assemblies contain a height control (leveling) valve mounted in the metal portion of the assembly. The valve is actuated by a lever assembly contacting the center of the air spring bellows. Vertical movement of the car causes the valve to admit or exhaust air from bellows assembly in relation to car loading requirements, and to maintain car in a level position.

R ar Height Control (Leveling) Valve: This valve is located in the left rear air spring assembly and operates in the same manner as for front height control valves. An intake and exhaust line interconnects left and right rear air springs and the rear height control valve controls pressure in both springs.

Vaporizer Jar: Located adjacent to accumulator tank in engine compartment. Make-up air drawn by the compressor from outside the system passes over alcohol in the bottle and prevents icing conditions in air suspension system during cold weather.

ADJUSTMENTS

ADJUSTMENTS: Air Compressor Drive Belt - Loosen compressor-to-bracket mounting bolts and nuts and move compressor until there ¼" deflection with a 15 lb. pull between fan and compressor. Hold compressor in position and tighten attaching nuts.

Fr nt End Alignment: Same as for cars with conventional coil springs. *See "Front Suspension" on Car Model page.*

DRAINING ACCUMULATOR TANK: Every 1000 miles, open drain valve located at bottom of tank and drain out accumulated water and oil *NOTE - This drain period supersedes previous recommended drain period of 5000 miles*

VAPORIZER JAR: For cold weather operation, fill jar half full with grain, wood, denatured, or methyl alcohol Every 1000 miles, when accumulator tank is drained, it will be necessary to bring the alcohol level in vaporizer jar to the one-half full mark *NOTE - It is not necessary to add alcohol to vaporizer jar between accumulator drain tank drain periods*

FRONT LEVELING VALVE EXTERNAL ADJUSTMENT (1959 MODELS): *NOTE - Front leveling valves have been revised to provide an external adjustment, permitting and "out of plane" car to be correct without removing valve* To adjust valve, loosen valve retaining nut and rotate the valve as follows **Left Front Valve** - Counterclockwise rotation of valve raises corner of car Clockwise rotation lowers it **Right Front Valve** - Clockwise rotation of valve raises corner of car Counterclockwise rotation lowers it After tightening nut, check for leakage around nut

REMOVAL & INSTALLATION

LOWER CONTROL ARM: Removal & Installation - Remove air spring (see below), then remove lower control arm in same manner as for coil spring cars *(see "Chevrolet Front Suspension")* Install by reversing removal procedure

UPPER CONTROL ARM: R m val & Installati n - Remove and install upper control arm in same manner as for coil spring cars *(s "Ch vrol t Front Suspensi n")* Install by reversing removal procedure

AIR COMPRESSOR: R m val - Disconnect air and oil lines at compressor and remove the four compressor to mounting bracket bolts, drive belt and compressor.

Installation: Clean oil supply line to compressor and if possible run engine for a few seconds to be certain oil supply to compressor is flowing freely. *(CAUTION - Extreme care must be used during this operation. Make sure engine crankcase is full and operate engine no longer than necessary to check oil flow).* Clean oil return line to engine crankcase, then install compressor by reversing removal procedure. *NOTE* - To maintain proper oil level in compressor, it is important that the oil return hose must not be higher than the opening into compressor.

LEVELING VALVE (FRONT OR REAR): Removal - Completely inflate air suspension system, then block up front control arms so there is more than 6¼" between base of rubber bumper and pad on frame that bumper contacts. On rear end, install spacer blocks (same as used for towing, see illustration). Bleed all air from system and disconnect air lines at leveling valve by slowly loosening the two (three on left rear valve) tubing fitting locknuts. Using a 1 9/16" deep socket (with an adapter for ½" drive) remove locknut on leveling valve at air bellows. Carefully withdraw leveling valve from air bellows by hand. Valves withdraw easily by rotating valve body slightly to allow for offset angle of lever. DO NOT force or use tool to remove.

Installation: *(NOTE* - Each leveling valve has the part number stamped on lever assembly and each are color coded as follows for further identification **Left Front** - Orange (Part No. 5539293), **Right Front** - Blue (Part No. 5539294), **Left Rear** - Gold (Part No. 5539295). Place new "0" ring gasket over lever assembly and slide into recess against shoulder of valve body (do not stretch "0" ring). Carefully insert valve into neck of air reservoir housing so that neck detent engages locating slot of valve body. *(CAUTION* - Spacing blocks must still be in place during installation of valves). With shoulder of valve body pressed firmly against neck, tighten valve retaining nut to 12-14 ft. lbs. Install new "0" ring seals in fittings and install air lines to valve. Tighten locknuts to 5-7 ft. lbs.

FRONT AIR SPRINGS: Removal - Place car on frame contact hoist or support frame with jack stands so front wheels swing down freely. Exhaust all air from suspension system (open drain valve at bottom of accumulator tank). Disconnect stabilizer bar from frame and control arm, then remove shock absorber lower mounting. Remove bolts attaching control arm cross shaft to frame and swing control arm down and away from crossmember. Remove leveling valve (see above). Remove two locknuts on top of frame (directly above air spring bellows assembly) and withdraw assembly from frame. Push bellows near the sealing lip using a hammer handle, until lip is approximately half way up into reservoir. This will place bellows almost crosswise in reservoir and then it can easily be rolled out. *NOTE* - The rubber bellows is serviced separately from reservoir. DO NOT reuse an old rubber bellows after removal as this operation will destroy rubber material and will not allow it to seat properly on sealing lip of reservoir.

Installation: Clean sealing surface of reservoir thoroughly, using steel wool (in a circular motion). Blow clean with air. Coat sealing lip of reservoir and bellows with a rubber lubricant, then using a length of common clothes line or rope (approx. ¼" diameter), wrap it once around rubber bellows above lip. Tie rope with a simple knot. Tuck "bulge" part of bellows, at red dot, under the sealing lip, then insert it into reservoir with red dot toward pivot (forward) end of suspension arm. Untie rope. While pushing sealing lip into reservoir, the seal must be pulled into position and against the retaining ring by a pulling manipulation on the rope. Set air spring bellows in place on suspension arm, then working through drilled hole in floor pan, and under floor pan, secure with four attaching locknuts. Plug drilled hole with plug, Part No. 1178365. Install new "0" ring seals on valve and insert leveling air spring assembly (see "Leveling Valve Installation" above). Check for leaks after car has been removed from hoist or jack.

REAR AIR SPRINGS: Removal - On 1958 Models, remove rear seat, seat back, rear floor covering and partition between trunk compartment and rear seat back Drill 1½" holes on each side of car at a point 4 5/32" from wheel housing and 12 15/32" forward of rear edge of raised portion of trunk compartment (Pass Cars) *NOTE - On 1958 Station Wag ns, there are dimples in production floor pans indicating locations to be drilled On 1959 Models, it is not necessary to drill floor pan* To remove bellows, inflate system and place wooden spacer blocks *(use Rear Towing Blocks' see illustration above),* between body mount and floor pan *NOTE* - If system cannot be inflated, jack up rear of car and install blocks Place car on a hoist (if frame contact hoist used, no spacer blocks will be required except to assist car onto hoist), then exhaust all air from system Remove air lines and 1 9/16" retaining locknut then remove leveling valve On 1958 Models work through drilled holes in floor pan and remove locknuts attaching bellows assembly to frame On 1959 Models, remove four body bolts and rear bumper bolts at corner being worked on Carefully pry up body and insert a 2" block between body mount and floor pan, then remove two locknuts on top of reservoir On all models, remove bellows assembly

Installation: Reverse removal procedures and note the instructions for installation of "Front Air Springs" above

HIGH PRESSURE ACCUMULATOR: R m val - Exhaust all air from accumulator, remove bolts holding horn relay and regulator to bracket on top of tank. Remove tank to junction block air passage line, and remove compressor discharge line and check valves. Remove two upper attaching bolts, washers, spacers, grommets, washers and nut. Remove lower attaching bolt and withdraw tank from under hood.

Installation: Reverse removal procedure and note the following Install new "0" ring seals in all fittings. Tighten attaching bolts to 7-9 ft. lbs.

JUNCTION BLOCK: Removal - Exhaust all air from high pressure accumulator, then remove seven air pressure lines and one hose from junction block. Discard insert seals. Remove mounting bolts and remove valve.

CONTINUED ON NEXT PAGE

Form 55 A

CHEVROLET LEVEL AIR SUSPENSION (C ntinu d)

Installati n: Reverse removal procedure. *NOTE* - Install new "0" ring seals in junction block.

TROUBLE SHOOTING

Entir Unit Will N t H ld Air: Leakage in system. Compressor not operating properly. Safety valve not operating properly. Schrader valve core loose or leaking. Drain cock leaking or not closed.

Impr p r Acti n At Air Spring Bellows: Broken, bent, or worn leveling valve. Pinched or plugged air pressure line to leveling valve. Plugged outlet on junction block. Ruptured air spring bellows.

Syst m Exhausts Wh n Jacking Up Car or When Placed n a Hoist: Manual shut-off valve open.

Unit Rais s t Full R b und Position: Manual shut-off valve closed with compressor operating.

Will N t Ris T D sign Height With Compressor Operating. Compressor discharge line not connected, or broken. Drain cock at bottom of high pressure accumulator tank open. High pressure accumulator tank to junction block line loose, broken or disconnected. Excessive number of leak points.

Rear Of Car High Or L w, Or One Front Corner High Or L w: Improperly adjusted leveling valve or valves. See "Front Leveling Valve External Adjustment" above. Leveling valve retaining nut tightened excessively. Leveling valve arm bent. Manual shutoff valve closed during car operation. Pinched or plugged air pressure line to leveling valve. Leveling valve not operating properly in freezing climate because of an icing condition in valve.

Car High At Whe ls: Manual shutoff valve closed during car operation. Improperly operating low pressure blow off valve. Leveling valve not operating properly in freezing climate because of an icing condition in valve.

Car S ttl In A Sh rt Tim : Small system leaks. High pressure tank check valve stuck open. Leakage in high pressure relief valve (in junction block). Accumulator drain cock open or leaking. Schrader valve core loose or leaking.

N Build-Up Of Air Pressure: Improperly operating compressor. Complete blockage in compressor outlet line. Large leakage in system. Diffuser on accumulator inlet fitting plugged with carbon. Accumulator drain cock open or leaking Schrader valve core loose or leaking.

Compressor Driv B lt Jumps Off Pulley: Improperly operating low pressure blow off valve. Complete blockage in compressor outlet line. Diffuser on accumulator inlet fitting plugged with carbon. Wrong pulley installed. Misalignment of compressor on its base. Very loose compressor drive belt.

Sl w Build-Up Of Air Pr ssur : Poor compressor efficiency. Restriction in compressor inlet system. Accumulator drain cock open or leaking. Schrader valve core loose or leaking. High altitude.

System Exhausts When Jacking Up Car Or When Placing On Hoist: Manual shutoff valve open.

Noisy Leveling Valve: Leveling valve inlet check valve not operating properly.

Excessive Accumulation Of Water In Accumulator Tank: Leaks in system. High climatic humidity.

Excessive Quantity Of Oil In Fluid Passed From Accumulator Tank: Restriction in compressor inlet system. Improperly operating compressor.

OVERHAUL

AIR COMPRESSOR: *See "Air Suspension Air Compressor".*

►*LEVELING VALVE BODY REPLACEMENT CAUTION:* After reassembly of valve, check endplay of actuating lever on shaft. This endplay should be .005-.015", measured at the snap ring. If endplay is greater, support valve assembly and slowly press shaft into body until endplay is within specifications.

LEVELING VALVES: Disassembly - *(NOTE* - Leveling valves are factory adjusted according to individual parts requirement. Keep parts separate and replace same parts in each valve). Using a small punch or suitable tool, release tension on torsion spring by depressing upper spring tang away from retaining tab on lever assembly. *(CAUTION* - Keep fingers clear of spring tang when releasing spring). Carefully remove lever assembly snap ring with Truarc pliers. Note position of lower spring tang and valve actuating ear of lever assembly in relation to stop of valve body and shaft assembly. Remove lever assembly, torsion spring any nylon bushing from shaft. Press arm and valve seat assemblies away from valve inserts and slide arms, spring mylar washer, and bearing off shaft. Note position of spring and arms before further disassembly. Remove mylar washer located at base of shaft. Remove "0" ring gasket from valve body recess and discard. Remove tube fitting gaskets and discard.

Reassembly: Check all parts for wear or breakage, then clean all parts quickly by dipping each part into solvent and immediately blowing dry. *(CAUTION - Do not use a solvent that is injurious to rubber).* Replace mylar washer on shaft of valve body and shaft assembly, then move it down to seat against valve body. Assemble arm and valve seat assemblies (spring, mylar washers, and bearing) as a unit before placing on shaft. Place this unit on shaft with pointed ends of arms away from valve body. Spread arms at least 180° and press unit down to seat against mylar washer and valve body. Release arms, permitting rubber valve seats to engage valve inserts. Be sure valve seats and and inserts are correctly aligned. Insert nylon bushing into torsion spring and place both between the two bearings of lever assembly, with wide base of bushing nearest valve actuating ear of lever. Place lever, spring and bushing on shaft of valve body. Carefully mount valve body in soft jawed vise with lever arm up *(CAUTION* - Use care not to damage valve body). Locate upper spring tang against retaining tab of lever, then using a small tubing or suitable tool, rotate lower spring tang nearly one full turn counterclockwise against tension and engage tang against valve body stop. Install Truarc snap ring into recess near end of shaft.

Checking Leveling Valve Operation: *NOTE – Use Tool J-7417 consisting of stepped gauges and a mounting fixtures for proper checking of leveling valves.* With leveling valve removed from car, clamp lower flange of mounting fixture in a vise, then slide valve body into large hole in fixture and tighten the thumb screw into keyway on valve body. Install large leveling valve attaching nut removed from the car. Connect an air line to threaded opening of inlet valve. *NOTE – The pipe fittings used for past model Chevrolet spark control lines may be used for the air line connections.* Select the proper gauge for the valve being tested and use the "inlet open" step on gauge to position nylon roller relative to the end of fixture. With gauge held against the roller, apply air to inlet valve. Air should be heard coming through the valve. Check "inlet closed" position in a similar manner. No air should be heard coming through valve. If a valve leak is heard on the "valve closed" position, check rubber valve seat for possible damage. Replace seat if necessary. Recheck valve operation in the checking gauge, and if necessary, carefully adjust valve opening by bending the metal actuating tab on valve seat assembly (in area that contacts valve lever). *NOTE – The small rubber button type seats are easily replaced by pulling them out with needle nose pliers. To replace these seats, set them in place and pull snugly against arm. Be sure that rubber shoulder on rubber seat is fully seated.*

►*LEVELING VALVE LUBRICATION NOTE (After Overhaul):* After each valve is overhauled and assembled, add not more than 2 or 3 drops of SAE 20 oil to each of the following parts: Torsion spring, arm and valve seat spring, lever assembly bearing, arm and valve seat bearing, and lever assembly roller. *DO NOT ov r lubricate.*

JUNCTION BLOCK: *NOTE* - Each individual component (Schrader valve, manual shut-off valve, hose connection or high and low pressure safety valves) can be unscrewed from junction block for replacement or inspection.

FRONT END ADJUSTMENT: *See "Front Suspension" on Car Model pages.*

CHRYSLER, DE SOTO, DODGE, PLYMOUTH AIR SUSPENSION

Chrysler, DeSoto, Dodge, Plymouth (1959)

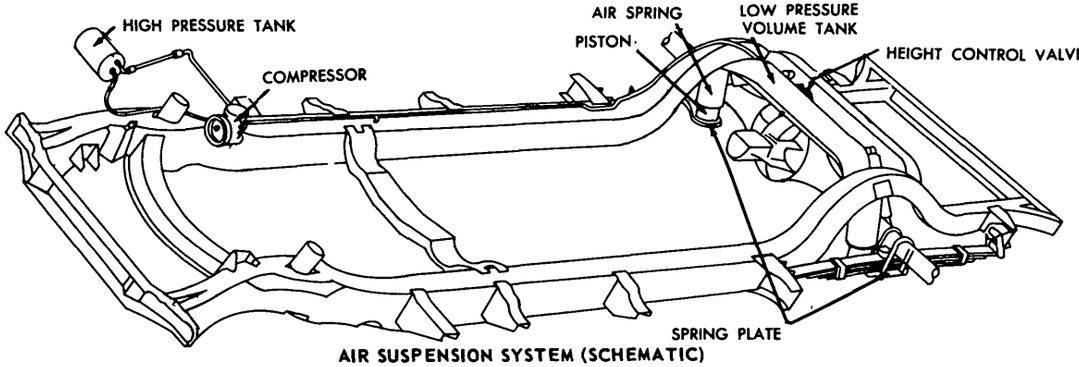
► *1959 COMPRESSOR RATTLE NOISE CORRECTION:* This noise, if caused by excessive end float of compressor crankshaft, can be corrected by installing Service Package, Part No. 2084466 as follows: Remove compressor from engine and remove rear plate. *NOTE – Remove base plate only if necessary for access to rear cover plate.* Remove old oil inlet connector from rear cover plate and install recessed connector supplied with package. Tighten to 130 inch lbs. Remove plug from end of crankshaft with tapping screw supplied with package. Set the 11-64" steel ball in chamfer at end of crankshaft, holding it in place with a small amount of heavy grease, then install spring in end of oil inlet connector. Use a new gasket and install rear cover plate on compressor with spring seated on steel ball. Tighten capscrews to 35 inch lbs.

DESCRIPTION: This air suspension system (on rear of car only) consists of an air piston and spring assembly mounted on an extension of the rear spring mounting plate directly forward of the rear axle assembly. The upper end of each air spring is connected directly to a transverse low pressure air tank which is mounted between frame side rails over the rear axle. A "bleed-feed" type height control valve connected to the low pressure air tank and linked to rear axle assembly at the center maintains a constant car height. Air is supplied to the system by a 2-cylinder reciprocating compressor mounted on the engine and driven by a belt from engine crankshaft. A high pressure air tank is mounted under the right front fender. *NOTE - Air compressor is lubricated by engine oil circulated from engine crankcase.*

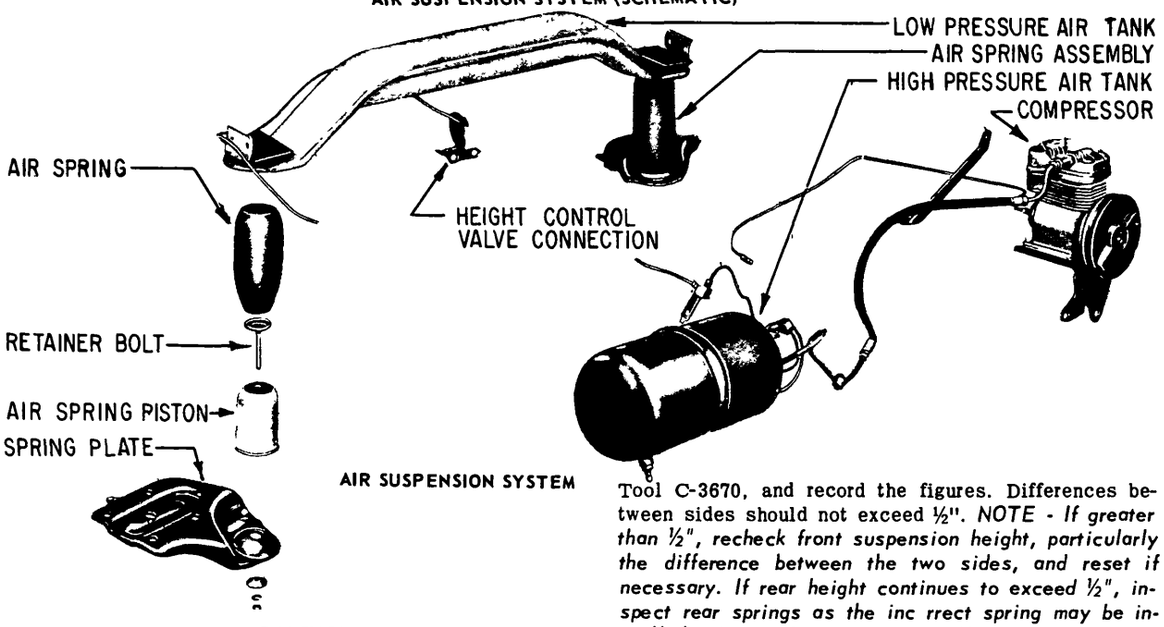
OPERATION: With engine running at 1800-2000 RPM and car standing still, air pressure in high pressure tank is maintained at 220 lbs. ± 20 lbs. by the compressor. This high pressure air is supplied to the low pressure air tank and air spring assemblies through the height control valve to maintain the car at constant level under changing load conditions. The running pressure in air springs and low pressure air tank is approximately 20 lbs. (one passenger load and a full gas tank); 70 lbs. (six passenger load, except Station Wagons); 90 lbs. (nine passenger load, Station Wagons). A minimum valve incorporated in height control valve maintains a pressure of 8-15 lbs. in low pressure air tank and air springs to prevent damage to air springs when car is lowered to ground after being jacked up. The height control valve also has a high pressure relief valve which opens at 150 lbs. to protect system against extremely high pressures under excessive load conditions.

LUBRICATION: Air Compressor - Oil is circulated from engine oiling system and no special lubrication is required.

DRAINING HIGH PRESSURE AIR TANK: Drain tank at least once a month by depressing the non-removable



AIR SUSPENSION SYSTEM (SCHEMATIC)



AIR SUSPENSION SYSTEM

core in the drain valve. *CAUTION* - Should it become necessary to remove the valve, remove high pressure line at check valve first.

ADJUSTMENTS: Suspension Height - With front suspension height properly adjusted and within specified limits, tires at recommended pressure and gas tank full, place car on a level floor (with no passenger load), then proceed as follows: *NOTE - Rear suspension height is measured (both sides), once with load, and again without load. Both pairs of figures are compared as as well as averaged.* Run engine three to five minutes to stabilize pressure in system, then with engine running, add 150-200 lbs. of load to center of luggage compartment (height control valve should admit additional air to low pressure system causing car to return to original height). Measure height at both sides at a point between top of axle housing and highest part under the axle bumper straps, to rear of rubber bumpers, using Tool C-3670, and record the figures. Differences between sides should not exceed ½". *NOTE - If greater than ½", recheck front suspension height, particularly the difference between the two sides, and reset if necessary. If rear height continues to exceed ½", inspect rear springs as the inc rrect spring may be installed.* When difference is under ½", average the two figures for later use. Remove added weight from compartment and allow height control valve to bleed system for approximately 3 minutes. Measure rear heights and average the two figures. The difference between this average and the average previously obtained should not exceed ½". Adjust valve if necessary. Average the four measurements (do not average the two averages). The average should be 4¾"±1/8" (All models except Imperial); 4 3/8"±1/8" (Imperial). Adjust valve as necessary to obtain correct measurement.

Height Control Valve Adjustm nt: Loosen both attaching nuts, then rotate cam on lower attaching stud to adjust to correct car height. *CAUTION - Do not bottom cam tightly against valve body (low pressure volume tank port could be damaged).* Tighten attaching nuts to 100 inch pounds. Recheck rear suspension heights.

CONTINUED ON NEXT PAGE

CHRYSLER, DE SOTO, DODGE, PLYMOUTH AIR SUSPENSION (C ntinued)

C mpr ssor B lt Adjustment: Without Air Conditioning - 9/16" (Used Belt), 5/16" (New Belt) deflection, all models, with a 5 lb. force midway between pulleys. **With Air C nditi ning** - ¼" (Used Belt), 1/8" (New Belt) deflection, except Chrysler Windsor & DeSoto Firesweep. 1/8" (Used Belt), 1/16" (New Belt) deflection, Chrysler Windsor & DeSoto Firesweep, with a 5 lb. force applied midway between pulleys. To adjust, loosen compressor bracket mounting bolts and move assembly as necessary.

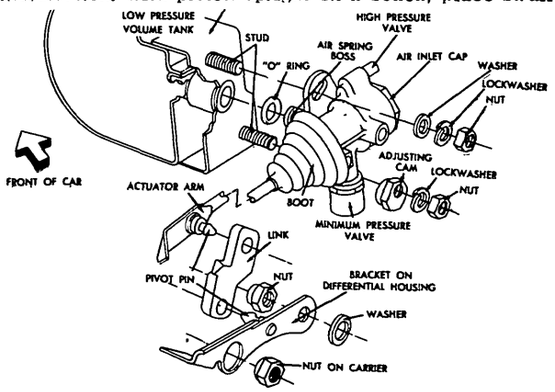
DISCHARGING THE SYSTEM: *CAUTION - Do not use from contact hoist wh n discharging the system.* Discharge high pressure system by depressing valve core in high pressure air tank drain and charging valve. DO NOT REMOVE VALVE FROM TANK. Discharge low pressure system by pulling the height control valve actuator arm off pivot pin on rubber linkage at the axle housing and moving the arm down.

REMOVAL & INSTALLATION

AIR SPRINGS & PISTONS: Removal – With car on hoist, discharge system. Remove nut holding air spring piston to spring plate, then raise piston off spring plate and remove air spring from lower pressure volume tank by pulling it outward and down. Remove piston mounting bolt and retainer assembly from piston, using a soft mallet. Push piston out of air spring by inserting a hammer handle into air spring. *CAUTION – DO NOT pull small end of air spring out to a fully extended position. Special tools are required to place it in the corr ct position.*

Insp cti n: Clean all parts, then inspect piston and mounting bolt assembly for nicks, burrs or cracks. Remove burrs with crocus cloth. Replace any piston showing indications of heavy cracks. Mounting bolt assembly must be snug fit in the piston and retainer section must seat solidly against piston. If necessary, peen piston around the bolt hole to obtain a snug fit. Inspect air spring for cuts, cracks, holes and excessive carcass wear. Small cracks in outer rubber cover are permissible provided there is no leak.

Installation: With piston upright on a bench, place small end of air spring over rounded end, then roll spring down to cover piston completely. Insert retainer bolt assembly and examine for snug fit in piston. Remove rear shock absorbers. *NOTE – Make hold-down straps or use Tool C–3694, and install them in place of shock absorbers. Strap will hold weight of body on leaf springs and assist in seating the air spring.* Position piston and air spring assembly on spring plate and install retainer bolt, washer, and nut. Tighten to 5 ft. lbs. temporarily. Coat mounting rim of air spring with diluted liquid soap solution. *NOTE – If both springs were removed from low pressure volume tank, it will be necessary to install both simultaneously to permit pressure build-up in tank.* Start engine, then hold air spring (or springs) tightly in position against tank seat (or seats) and operate control valve manually. Air pressure entering air springs will force spring up on its seat. Check seating of air spring on tank flange and seat of piston on spring plate. Align piston and tighten nut to 12 ft. lbs. Remove hold down straps and install shock absorbers. Connect actuator arm to rubber linkage, then check for air leaks.



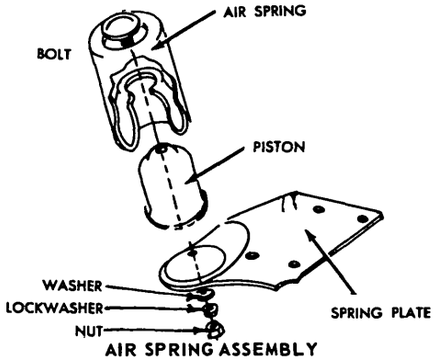
HEIGHT CONTROL VALVE ASSEMBLY

HEIGHT CONTROL VALVE: Removal – Discharge system and remove high pressure line from valve and cap, then remove mounting nuts and valve assembly. *NOTE – Height control valves are serviced only as an assembly.*

Installation: Apply liquid soap to "O" ring on housing boss and install valve assembly on low pressure volume tank, inserting the boss in tank without damaging "O" ring. Install adjusting cam in housing at the lower mounting stud and install mounting nuts finger tight, then connect air line to valve end cap. Start engine and check valve for operation, then tighten mounting nuts to 7 ft. lbs. Connect actuator arm to rubber linkage and check for leaks. Check car height and adjust if necessary.

LOW PRESSURE VOLUME TANK: Removal – Discharge system, then remove air springs from tank. Disconnect air line at valve and cap. Disconnect actuator arm at rubber linkage, then loosen and lower right tail pipe only. Support axle and remove right rear wheel. Remove self-tapping screws (two on each side) holding tank to frame side rails. Remove tank from right side of car, then remove height control valve assembly and adjusting cam.

Installation: Install new "O" ring on height control valve air spring boss. Coat ring with diluted soap solution, then install valve assembly and adjusting cam. Tighten nuts to 7 ft. lbs. and install tank and tighten mounting screws to 13 ft. lbs. Connect air line to control valve and install air spring. Position and tighten right tail pipe, then install right rear wheel. Check system for leaks and adjust car rear height.



AIR SPRING ASSEMBLY

HIGH PRESSURE AIR TANK: Removal – Discharge system, then disconnect both air lines at tank and remove bolts holding tank cradle to car. Remove tank and bracket assembly, then remove bracket assembly and drain valve.

Instal lation: Install gasket and drain valve and tighten to 12 ft. lbs. Position tank and bracket assembly and install bolts. Tighten bolts to 7 ft. lbs. (¼"), 10 ft. lbs. (5/16"). Connect air lines to tank and check for leakage.

COMPRESSOR: Removal – Remove oil pressure line at rear of compressor. Remove air line from check valve, then remove oil return line at engine end. Loosen belt adjusting bolt, remove belt from compressor, then remove bracket bolt. Remove bolts holding compressor support to engine and remove compressor assembly from car.

Installation: With compressor attached to support, attach support to engine. Tighten bolts to 30 ft. lbs. Install compressor bracket and tighten bolts to 30 ft. lbs. Install belt, connect air pressure line, oil pressure and return lines. Start engine and check for leakage.

OVERHAUL

HEIGHT CONTROL VALVES: Serviced only as a complete assembly. Do not attempt overhaul.

COMPRESSOR: Only the following parts are available for service replacement: Cylinder head & gasket. Valve plate assembly & gasket. Pulley & Key. Bottom mounting plate & gasket. Front bearing, housing and oil seal assembly. Check valve assembly. Suction muffler felt. If piston, bearings, etc., are required, replace the complete compressor.

Cylinder Head Replacement: Discharge the system and remove air line from check valve, then remove cylinder head bolts. Remove cylinder head and valve plate assembly. *NOTE – If plate does not separate from head, tap plate lightly with a soft mallet. Do not pry apart.* Clean piston heads, top of cylinder block and head bolt holes, cylinder head and valve plate, using mineral spirits. Do not use a scraper. Inspect pistons and walls. If damaged, replace the compressor. If valve plate or cylinder head is damaged, replace. Remove check valve only if replacement is necessary. Use new gaskets when installing valve plate and cylinder head. Tighten bolts to 155 inch lbs. Connect air lines to check valve and then check for leaks and test compressor.

Valve Plate: *See "Cylinder Head Replacement" above.*

Pulley, Front Bearing Housing, Oil Seal Replacement: Remove compressor from engine. *NOTE – Original pulleys are a .002" press or interference fit on crankshaft. If pulley has been previously replaced, check to see if roll pin has been installed. If so, remove pin with a drift punch.* Remove pulley with tool PO–11, remove front bearing housing and seal assembly. Clean and inspect bearing and housing assembly. If damaged, replace the assembly. To reassemble, install front bearing housing using Tool C–3680 to protect oil seal. Tighten bolts to 17 inch lbs. Remove chrankshaft rear plate and install Tool C–3677 to support crankshaft while pressing pulley on crankshaft. Using an arbor press, press pulley into contact with flange on crankshaft. Remove tool and install rear cover plate. Tighten bolts to 17 inch lbs. *NOTE – A new pulley has a hole through one side of hub. Use this hole as a guide to drill a 5/32" hole in crankshaft and the opposite side of pulley hub.* Install a roll pin, then install compressor on engine.

FORD-AIRE SUSPENSION & MERCURY AIR CUSHION RIDE

Ford (1958)
Mercury (1958)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS:* Before working under the car, jacking it up, or raising it on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

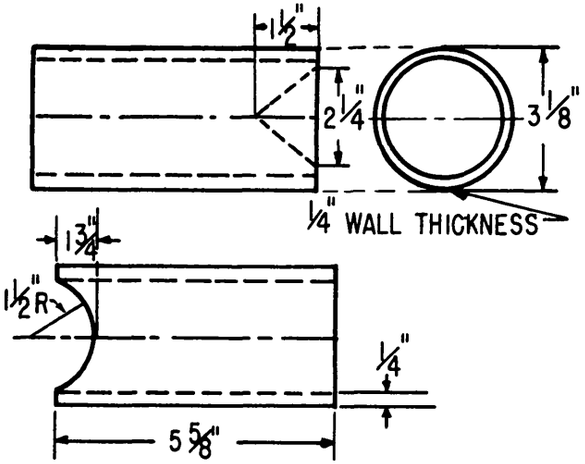
H isting Car: (Air Suspension Units Inflated): Hoisting equipment of the type that engages suspension, axle, or wheels *(see "Two-Post" hoist note below),* is preferred. When using a frame contact type hoist, make certain that proper adapters are used to prevent contact with rear shock absorbers or suspension links.

►*TWO-POST HOIST NOTE:* At the rear, make certain rear axle housing centers over hoist post center. Check where rear saddle jaws will contact rear axle. If necessary use special adapters to prevent damage to rear shocks, track bar, gas tank, etc. In instances where front air springs are extremely low or deflated the front hoist rail will contact oil pan and may result in damage to oil pan, oil pump and vacuum pump. If available, install shipping pedestals *(see "Hoisting Car, Air Suspension Units Deflated" below).* If pedestals not available, install small wooden blocks between lower suspension arm and hoist saddles to provide clearance for oil pan.

Hoisting Car (Air Suspension Units Deflated): Jack up car at front and rear and install shipping pedestals *NOTE* - These may be procured from car dealer . Front pedestals are installed between lower arm jounce bumper and its contact surface on side of upper spring "beehive" on frame. Rear pedestals are installed between rear axle housing and rear axle bumper. Lower jack and allow weight of car to rest on pedestals.

Working Under The Car - Before using a creeper or crawling under an air suspension car, place jack stands under the frame as a precaution in case air should be exhausted from the system.

Towing: When towing air suspension car on which air suspension is inoperative, special support blocks (see illustration, or use Tool T58P-5783-A which includes a special set of blocks) are required to prevent bumpers from scraping the ground, as follows: When towing car by front bumper, install rear blocks on frame just above rear axle housing. Upper half of block encases rubber bumper on frame. Lower half of block rests on and partially encircles rear axle housing. When towing car by rear bumper, install front blocks over rubber bumpers so bottom of block rests on front suspension arm. *(CAUTION - B for installing support blocks, raise front or rear of car as required, and place support jacks under car).* If car is to be towed from the rear for long distances, it is recommended rear axle and No. 4 crossmember be chained together to prevent damage to rear shock absorbers.

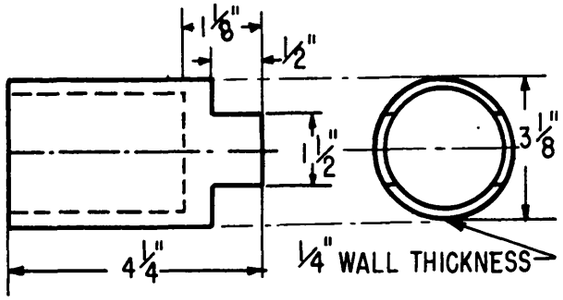


MERCURY REAR TOWING BLOCKS

►*PRESSURE REGULATOR FITTING LEAKAGE CORRECTION:* On early cars with air suspension, leakage at pressure regulator fittings can be eliminated by installing two seal washers, Part No. 370868-S in each port of regulator assembly. Two seals are being installed in fittings on later production cars.

►*FORD AIR COMPRESSOR MOUNTING BRACKET PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new mounting bracket, Part No. B8A-55205-B is now being used in production and is available for service replacement on earlier cars. If bracket distortion is encountered on early cars, replace bracket with the later type.

DESCRIPTION: Air springs, consisting of a hollow rubber cylinder within a metal container, and a piston assembly replace conventional front coil springs and rear leaf springs. Two rear suspension arms connected between rear axle and frame side members maintain fore and aft position of rear axle and absorb driving and braking forces. A track bar mounted across rear end of car connects rear axle housing and frame to prevent rear axle side motion. Car leveling and riding height are maintained by two leveling valves at front, and a single valve at rear. Valves are mounted on car frame and connected by linkage to rear axle housing (rear), and the two upper control arms (front). Fast leveling of the car is provided, when any door is opened, by switches



MERCURY FRONT TOWING BL CKS

located at each door which control an electric solenoid valve in the high pressure air line. Check valve located between the two rear air springs and at each front air spring prevent air pressure in air springs from completely discharging should leak occur elsewhere in the system. On Mercury, a low pressure warning light on left side of instrument panel operates when pressure in air tank drops below 125 lbs. Basic components of system operate as follows:

Air Compressor: Single cylinder, reciprocating piston type mounted on right front side of engine and driven off engine water pump pulley by a single "V" belt. The compressor is lubricated by engine oiling system through a line from filter outlet connection directly to compressor crankcase.

Air Reservoir: This tank, located under right front fender, has a check valve at inlet port to prevent air pressure being exhausted through compressor when engine not running, a filter at outlet port, and a Schrader type relief valve which also acts as a condensation drain valve.

Leveling Valves: Two leveling valve assemblies are located at the front, one at each spring, and a single leveling valve at rear which controls both rear springs. These valves are connected by mechanical linkage to front and rear suspension members and are used to maintain a constant car riding height by admitting air to, or exhausting air from, air springs to compensate for varying load conditions. Air is admitted to these valves either through the copper (low pressure) line at approximately 160 lbs. pressure, or through the nylon (high pressure) line at approximately 300 lbs. pressure, and is exhausted to atmosphere directly from an opening in bottom of the valve.

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FORD & MERCURY AIR SUSPENSION (Continued)

Check Valves: Located at each of the leveling valve assemblies and prevent air pressure in the air spring from dropping below approximately 65 lbs., due to air leakage at some other point in the system.

Restrictor Valve (Front): Located in the line between the two rear air springs and is connected to both the slow-leveling system and the fast-leveling system, controlling the flow of air between the two rear springs.

Pressure Regulator Valve: Supplies reduced air pressure from air reservoir to the leveling valves for slow-leveling operations.

Solenoid Valve: This valve is electrically operated when a car door is opened and supplies high pressure air to the leveling valves for fast-leveling operation. The solenoid valve also operates as a pressure relief valve for the system and will open at 400 lbs. pressure should the system pressure become abnormally high.

Low Pressure Air Lines (Copper): These lines supply air from the pressure regulator to the leveling valves for slow-leveling operation.

High Pressure Air Lines (Nylon): These lines supply air from the solenoid valve to leveling valves for fast-leveling operation.

Air Springs: Each air spring consists of a pedestal (piston) which is connected to the lower control arm (front), or to the suspension arm (rear), a hollow rubber air spring, an air spring container, and an upper end plate and seal. The rear air spring assembly also contains a mounting flange which is used to bolt the air spring assembly to the frame side member.

DRAINING AIR RESERVOIR: Every 1000 miles, drain accumulated moisture, dirt, and oil from air reservoir under right front fender. Push in on valve stem (same as tire valve) located on under side of air reservoir.

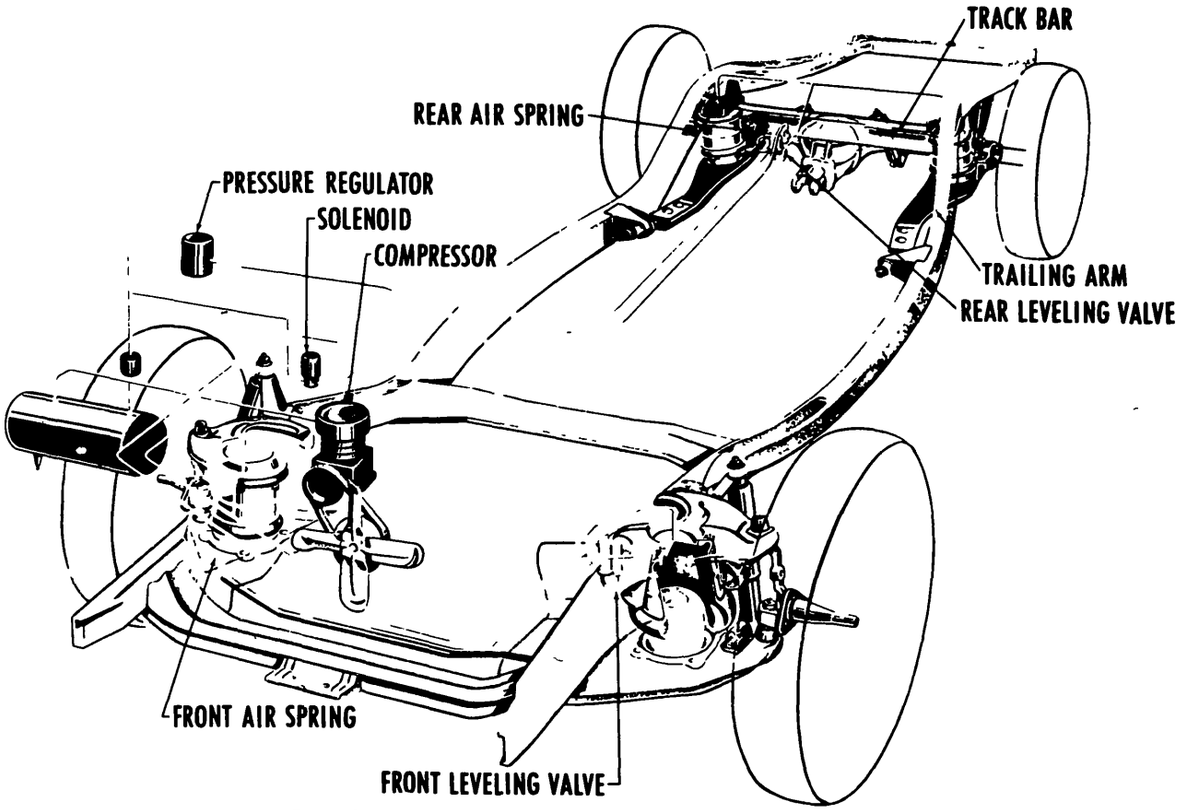
AIR COMPRESSOR INTAKE FILTER: Ford - Clean filter every 8000 miles under normal operating conditions (every 2000 miles under dusty conditions), in solvent. Saturate "curled hair" element in engine oil and squeeze dry before installation.

Mercury: Clean filter every 4000 miles. Replace filter every 10,000 miles.

ADJUSTMENT

RIDING HEIGHT ADJUSTMENT: Adjust front and rear riding height by shortening or lengthening linkage connecting each of the leveling valves to suspension members. Riding height should be as indicated below. *NOTE:* Riding height at rear should be an average of the right and left hand sides.

Front: (Front) - 3 1/4" ± 1/16" measured between top edge of lower control arm bumper bracket and lower outside edge of spring pocket on the frame.
Rear - 4" ± 1/16" measured between top of rear axle housing and bottom of axle bumper bracket.



FORD & MERCURY AIR SUSPENSION SYSTEM (SCHEMATIC)

Mercury: (Front) - 4 11/32" (all models) measured between top of air spring lower plate and lower outside edge of spring pocket on frame.
Rear - 5.57" (122" wheelbase), 5.63" (125" wheelbase) measured between top of rear axle housing and bottom of axle bumper bracket.

AIR COMPRESSOR BELT ADJUSTMENT: Loosen air compressor mounting bracket and adjust belt so there is 1 2" deflection with normal thumb pressure midway between the two pulleys.

FRONT END ADJUSTMENT: Same as for cars with conventional coil springs. *See "Front Suspension" on Car Model pages.*

TROUBLE SHOOTING

Car Settles Down: Leakage in system. Check system with a Freon leak detector.

Car Remains High: Check adjustment of leveling valves. If valve is defective and will not exhaust air, remove, disassemble, and clean valve. See "Leveling Valves". *NOTE* - A sticking "Tee" check valve will also cause the above condition. Remove valve and blow out the passages. If valve continues to stick, replace valve.

Car Remains Low: Check leveling valve adjustment. Check reservoir check valve. If valve is sticking, disconnect pressure line at tank and push valve off its seat to clean it. If valve continues to stick, replace it. A sticking "Tee" check valve will also cause the above condition. Remove valve and blow out passages. If valve continues to stick, replace valve. Check compressor at 1200 RPM. If output is less than 275 lbs., replace or repair compressor. Check pressure regulator valve. With engine running, pressure should be approximately 160 lbs., with gauge connected to low pressure line at either front leveling valve.

Car Remains Low at Rear (or on one side only at rear): Remove and clean restrictor valve by blowing out all passages. Replace valve if it continues to give trouble. Check operation of leveling valves.

Car Does Not Respond Immediately on Fast Leveling (Operates Satisfactorily on Slow Leveling): Check operation of solenoid valve. Remove solenoid pressure line from either front leveling valve and install a 400 lb. gauge. With engine running to maintain full reservoir pressure, and one door open, pressure on gauge should be approximately 275-375 lbs. If no pressure is indicated on gauge, disconnect solenoid valve bullet connector and connect to positive terminal of battery. Ground valve mounting bracket to negative terminal of battery and check pressure gauge. If gauge reading is within specifications, door contact switches should be checked. If no pressure exists, replace solenoid valve.

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FORD & MERCURY AIR SUSPENSION (C ntinu d)

Car Rolls Excessively on Turns: Check restrictor valve piston to determine if it is sticking in fast leveling position. Replace valve if trouble continues after cleaning.

REMOVAL & INSTALLATION

LOWER CONTROL ARM: Removal & Installation - Raise and support car, then exhaust air from system. Disconnect air spring pedestal from lower control arm and remove arm from car in same manner as for coil spring cars *(see "Ford & Mercury Front Suspension")*.

REAR SUSPENSION CONTROL ARMS: Removal & Installation - *See "Ford & Mercury Rear Suspension (Air Suspension Cars)".*

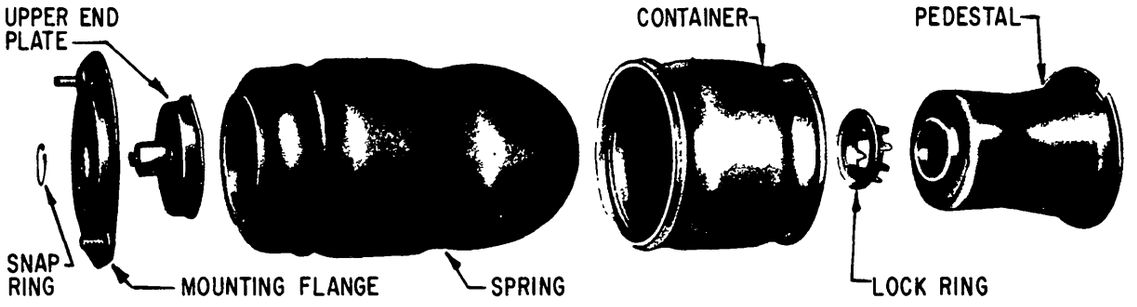
AIR COMPRESSOR: Removal - Exhaust all air from system by opening drain valve on air reservoir. On Ford models, disconnect air outlet tube. On Mercury models, disconnect oil supply line, oil outlet line, and air outlet line. On all models, loosen compressor adjusting strap bolt and compressor mounting bracket bolts, then remove belt. *NOTE* - On air conditioned cars, remove air conditioner compressor belt before removing air compressor. On Ford models, rotate compressor to gain access to compressor crankshaft rear end plate. Remove rear end plate retaining screws. On all models, remove compressor from engine.

Installation: Reverse removal procedure and note the following: On Ford, install a new "O" ring seal in crankshaft rear end plate. On all models, tighten mounting bolts to 12-15 ft. lbs.

FRONT AIR SPRING (FORD): Removal - Raise and support front of car with jack stands placed under frame side rails. Disconnect air line at top of spring and allow air pressure to slowly escape *(CAUTION* - Do not remove fitting with spring under pressure). Remove spring nut and rubber insulator from upper end of spring seal plate, then remove four nuts, bolts and lockwashers holding pedestal to lower control arm. Push pedestal up into spring until bottom of pedestal is above lower control arm, then remove air spring.

Installation: Position spring assembly between upper and lower control arms, making sure the locating slot on upper end plate seal is lined up with corresponding tab on upper control arm. Secure pedestal to lower control arm. Slide rubber insulator and spring nut over air line fitting on upper seal plate fitting, then connect air line fitting to air spring.

FRONT AIR SPRING (MERCURY): Removal - Support car on jack stands placed under each frame side rail adjacent to No. 1 crossmember. Remove wheel, then loosen stabilizer retaining bolt to allow front suspension to drop into full rebound position. Disconnect air line at "Tee" check valve, allowing air to be exhausted from air spring assembly. Remove upper suspension arm rubber bumper retaining nut; and raise the lower suspension arm. Remove rubber bumper, then drop the lower arm. Remove upper and lower air spring retaining nuts. Compress spring and pedestal assembly; rotate ½ turn, and remove by sliding lower pedestal toward rear of car.



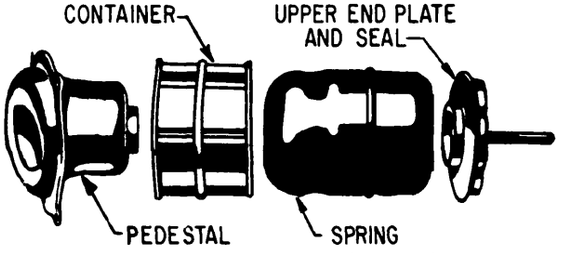
FORD & MERCURY REAR AIR SPRING ASSEMBLY

Installation: Compress spring and pedestal assembly as far as possible, then insert tube up through hole in top of upper spring seat. Slide lower pedestal assembly into approximate position on lower suspension arm. Holding air spring in place against upper seat, place rubber insulator and Tinnerman nut on air tube of locator assembly, and tighten until they seat firmly against upper seat. Raise lower suspension arm and attach rubber bumper to upper suspension arm. Secure pedestal assembly to lower suspension arm and tighten to 22-28 ft. lbs. Tighten stabilizer bar retainers to 22-28 ft. lbs. Attach air spring line to "Tee" check valve. Place shipping pedestal (towing blocks) between lower suspension arm and frame to prevent complete collapse of air spring when car weight is placed on wheels. Install wheel. Remove support stands, then start and run engine. Remove blocks when spring is inflated. Check for leakage, then check and adjust riding height.

REAR AIR SPRING (FORD): Removal - Loosen, but do not disconnect, air line at top of spring to allow pressure to bleed out. After pressure has escaped, disconnect air line. Remove brass adapter and copper washer from spring and discard washer. Remove lower mounting nut, then remove both nuts retaining upper spring mounting pad to frame. Remove air spring assembly.

Installation: Position rear spring assembly between the frame and rear suspension arm, making sure that locating slot on pedestal is lined up with corresponding tab on rear suspension arm. Install nuts securing upper mounting plate to frame, then install lower mounting nut. Install air line adapter and a new copper gasket. Connect air supply line to spring.

REAR AIR SPRING (MERCURY): Removal - Raise car and support with jack stands under each frame side rail adjacent to No. 5 crossmember. Blow dirt from around air spring, then disconnect air line at spring side of check valve to exhaust air from spring. *(NOTE* - With rear suspension in rebound position, no air will be lost from rest of system). Disconnect air line from air spring assembly. Remove nuts and lockwashers attaching air spring assembly to upper rear spring mounting bracket, then remove nut and lockwasher attaching air spring to trailing arm assembly. Support rear axle with a hoist and remove rear shock absorbers, then remove air spring from car. *(CAUTION* - Do not allow suspension to exceed full rebound position).



FORD & MERCURY FRONT AIR SPRIN ASSEMBLY

Installation: Position air spring assembly between upper frame support and trailing arm assembly, then loosely attach air spring to upper frame support. Attach air spring lower mounting stud to trailing arm and tighten to 22-28 ft. lbs. Tighten air spring to upper frame support being careful not to twist air spring assembly. Connect air line to spring assembly and to check valve. Place towing block (see above) between trailing arm and frame to prevent complete collapse of air spring when car weight is placed on the wheels. Remove support stands and lower car. Operate engine and inflate air spring, then remove towing block. Check for leakage, then adjust riding height.

LEVELING VALVE (FORD & MERCURY): R m val - Raise car and support with jack stands at front and rear of frame side rails. Open drain valve on air reservoir and exhaust all air from system. Disconnect actuating lever from leveling link, then depressurize air spring. Disconnect high and low pressure lines at leveling valve. Remove nuts from mounting brackets and remove leveling valve.

Installation: Reverse removal procedure, then adjust riding height of car.

SHOCK ABSORBER REMOVAL (REAR): When rear shock absorbers have been removed, car should be raised only by picking it up underneath rear axle assembly. Raising the car at any point which will allow rear suspension to hang freely would result in damage to air spring assemblies.

OVERHAUL

AIR COMPRESSOR: *See "Air Susp nsion Air C mpr s- sor".*

LEVELING VALVE: *Se "L v ling & Mannual Control Valv s".*

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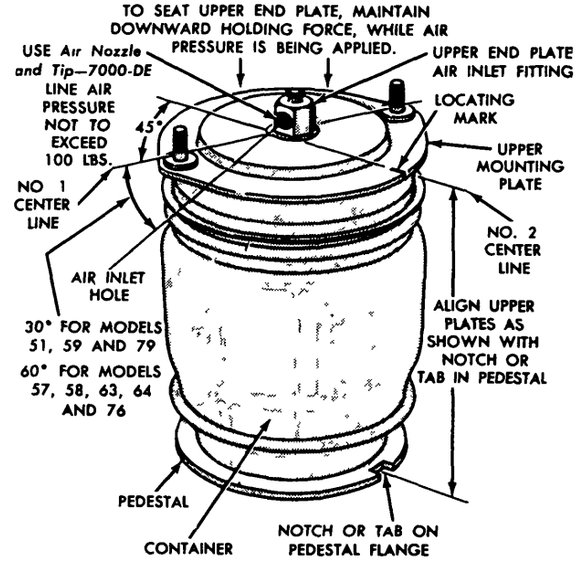
FORD & MERCURY AIR SUSPENSION (C ntinued)

AIR SPRING (FRONT): Disassembly - Remove upper end plate and seal from spring assembly by pulling plate off spring. Remove container from spring, then remove pedestal from spring. If pedestal does not come off easily, it can be forced off with a screwdriver between pedestal and spring. Clean all metal parts in solvent and dry with air. Check end plate seal and pedestal for burrs or sharp edges and remove if necessary. Wash air spring with soap and water and dry with a clean cloth. Inspect air spring for wear at ends and around the container area. If excessive wear is found, replace air spring.

R ass mbly: Apply a generous amount of RuGlyde on lower end of spring and on pedestal retaining lip. Position spring on pedestal and push spring down until lower opening is flush with upper opening. Place assembly in a vise to hold edge in place, using the vise to seat one side of spring on pedestal lip *(CAUTION* - Be careful not to damage bead on air spring). Insert a blunt screwdriver between spring opening and pedestal, and push spring into place. Remove assembly from vise and pull spring back to normal shape, then install container. Again push spring assembly down over pedestal. Apply a generous amount of RuGlyde at critical area and position upper end plate over spring opening. *(NOTE* - Notch in pedestal and notch in upper end plate must be in alignment). With one person holding air spring assembly, carefully and slowly inflate air spring until upper end plate seats in spring. If leaking air indicates that upper end plate is not sealing properly to permit assembly, relocate the plate for a more satisfactory seal.

AIR SPRING (REAR): Disass mbly - Remove snap ring from upper end of spring assembly and remove upper mounting plate. Remove end plate by pushing the plate inside spring, then turning plate on edge, and pulling it back out of spring. Position spring assembly in a vise by clamping vise at pedestal base. Insert a blunt screwdriver between pedestal and spring to force spring from Pedestal. *(CAUTION* - Do not damage air spring). Remove pedestal, then remove container from spring. Wash all metal parts in solvent and blow dry with air. Inspect end plate and pedestal for burrs or sharp edges and remove as necessary. Clean air spring with soap and water, then wipe dry. Inspect for wear at end plate and container area. Replace if necessary.

Reassembly: Slide container over air spring, then apply a generous amount of RuGlyde to lower end of spring assembly and position spring on pedestal. Push pedestal all the way through air spring until lock ring surface is exposed. Place spring assembly in a press, using Tool T56T-4221, then press spring down on pedestal seat. Install lock ring and bend tabs toward outside of spring, using water pump pliers. Push pedestal back through spring to its normal position and install upper end plate in spring. While holding end plate by the fitting to prevent dropping it in spring, push spring down over pedestal. Make a prominent locating mark on edge of mounting plate at the No. 2 centerline (see illustration for locating points). Position mounting plate over end plate fitting so centerline No. 1 is at either 30° or 60° to the air inlet, according to the model as indicated in illustration. *(NOTE - Mounting plate is machined to position over hex at 30° intervals).* Grasp edge of mounting plate



FORD & MERCURY REAR AIR SPRING ASSEMBLY

and turn complete assembly until locating mark (centerline No. 2) is aligned with notch or tab on pedestal (see illustration). After properly positioning upper end plate and upper mounting plate, hold upper end plate by the fitting and pull up to position the fitting firmly in mounting plate hole. Apply air pressure to fitting until end plate has seated in spring, then install snap ring.

OLDSMOBILE NEW-MATIC RIDE

Oldsm bil (1958-59)

►CHANGES, CAUTIONS, CORRECTIONS

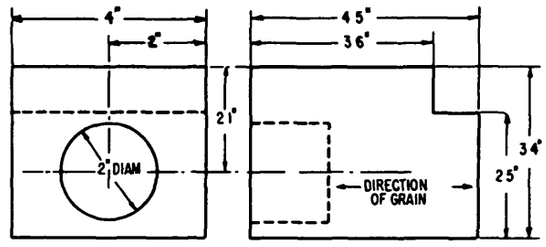
►*SERVICE CAUTIONS:* Before disconnecting air lines, working under car, or raising car on hoist, the following precautions must be taken to prevent personal injury or damage to car.

Raising Car (On a Jack) - Raise car in same manner as with conventional suspension (**do not** pull out on air suspension manual lift knob). When jack is lowered at right or left front of car, front end will follow jack down to slightly below normal, but will automatically raise to correct level. When jack is lowered at right or left rear, only the side supported by the jack will follow jack to slightly below normal position.

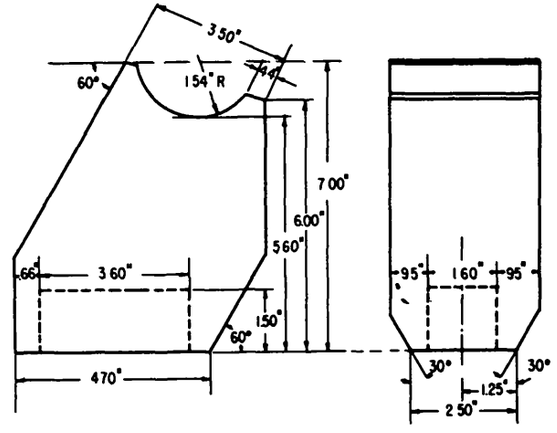
Raising Car (On Twin-P st Hoist) - Use caution to prevent left hand yoke of rear hoist contacting hydraulic brake hose or junction block on rear axle housing.

Raising Car (On Fram -Contact Hoist) - Wheels will drop and exhaust air from air springs. When hoist is lowered, car frame may continue to rest on hoist until air springs are inflated (it may be necessary to start engine for sufficient pressure). *CAUTION* - Do not pull out on air suspension manual lift knob while car is in a raised position.

►*TOWING THE CAR: (CAUTION - D not tow car with rear wheels on ground unless propeller shaft is disconnected).* When towing with front or rear wheels off ground, with air in suspension system, check air pressure in tank which should be above 100 lbs. Hook up tow chains or cables *(CAUTION - Do not attach chains to suspension arms at front of car).* Raise car and remove wheels from raised end, then lower car to horizontal position. DO NOT tow car at speeds in excess of 30 MPH. If air is exhausted from system, or body of car carries too low while towing, raise body of car (at end which is on ground) and install towing blocks (see illustration) as follows: At the rear, position radius of blocks



OLDSMOBILE FRONT TOWING BLOCKS



OLDSMOBILE REAR TOWING BLOCKS

on axle housing and align hollow in blocks with rubber bumper on frame. At the front, position hollow of block over rubber bumper on lower control arm. Lower body on blocks making sure that rubber bumpers enter hollows

CONTINUED ON NEXT PAGE

OLDSMOBILE NEW-MATIC RIDE (C ntinued)

in blocks at rear of car or that frame rests on right angle offset of block at front of car. If rear end of car is raised, steering wheel must be centered and tied in position. *CAUTION - Distance from bottom of tire to ground at raised end should not be more than 6", and towing speed should not exceed 30 MPH.*

Disconnecting Air Lines - When removing tubing connections from units on the car, loosen connection and allow pressure to leak down slowly before removing the fitting.

Working Under Car - Always place jack stands under car frame as a precaution in case air should be exhausted from the system.

►*1958 HIGH PRESSURE AIR VALVE (IN SEPARATOR) HANGING UP CORRECTION:* A restriction in air flow due to high pressure check valve hanging up can be corrected as follows: Exhaust all air pressure by opening drain valve on separator, then remove high pressure check valve plug. Remove spring and high pressure check valve. *NOTE - Check valve may not come out with its spring, in which case, force valve out by using air pressure through bottom of drain valve opening while holding a cloth over check valve opening.* Use a sharp knife or razor blade and cut off 1/8" from square end of check valve, then sand a 1/16" radius using fine sandpaper, around diameter of cut area on valve. Reinstall valve, spring, and plug, making sure that parts are clean.

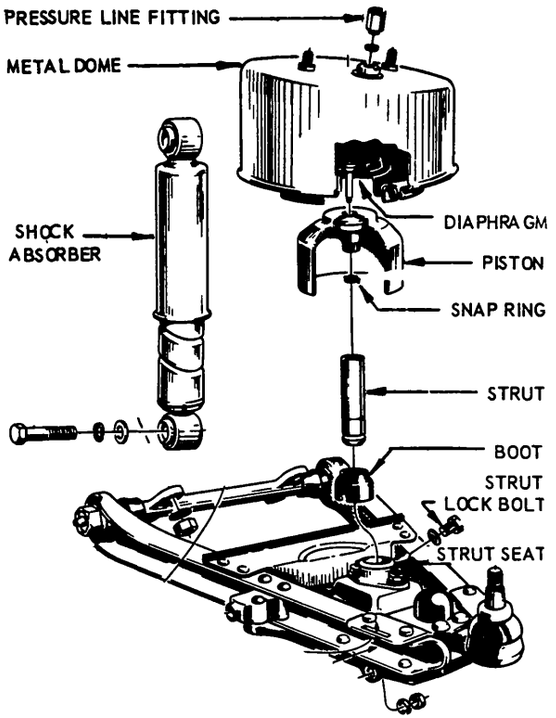
DESCRIPTION: *NOTE - 1958 and 1959 systems are different as indicated below:*

1958 Models; Air springs, consisting of an air chamber and rubber diaphragm assembly attached to frame and a piston assembly attached to lower control arm (front), axle housing (rear), replace conventional coil springs at front and leaf springs at rear. Normal riding height is maintained automatically by air pressure controlled by two height control valves (rear), one control valve (front). A manually operated elevator valve assembly located on left side rail is operated by a control cable and knob on instrument panel. This valve, when actuated by the control knob, provides air to all four springs when conditions require car body to be raised above normal height. When raised to full rebound position, the car body will be raised approximately 4 inches. Basic components of the air suspension system operate as outlined below.

1959 Models: Same design as used for 1958 models (above) except for changes to allow for an "open" type air circuit (air exhausted from air springs is not returned to compressor through a low pressure circuit). Basic components of the air suspension system operate as outlined below.

OPERATION: Except as noted, 1958 and 1959 systems and components are similar.

Air Compressor: Two cylinder reciprocating type with a rated capacity of .5 cu. ft. per minute with 250 lbs. pressure at 1250 compressor RPM. Compressor is lubricated with a two stage vane type pump which draws oil from a reservoir in the power steering pump. A relief valve limits lubrication pressure to approximately 24 lbs.



OLDSMOBILE FRONT AIR SPRING

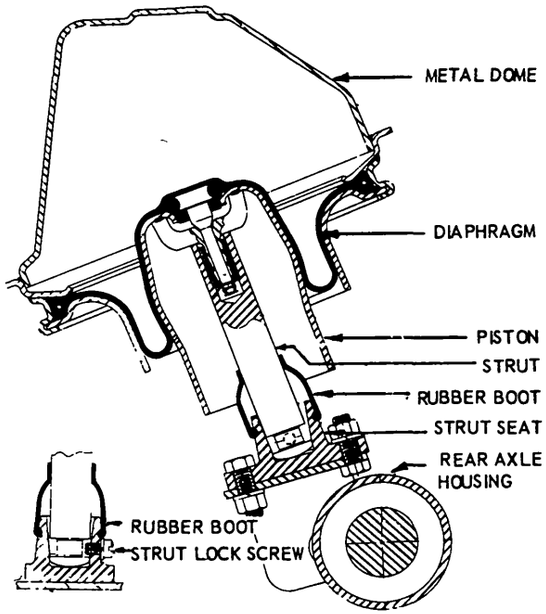
Air Filter & Check Valve Assembly (1959 Models): This combination unit is located in the system between high pressure side of compressor and high pressure tank at a point adjacent to manual valve. The filter unit removes water and solid particles which are collected in bottom of reservoir shell. A drain cock, located in bottom of shell, should be opened every 2,000 miles to drain filter shell.

High Pressure Reserve Tank (1958 Models): Mounted on frame behind right rear wheel. This tank is used to maintain a reserve supply of high pressure air and serves to trap moisture. A Schrader type valve is provided in rear of tank for discharging accumulation of water and oil.

High Pressure Tank (1959 Models): Located on left frame side rail at rear of car. The high pressure tank supplies pressure to air spring to compensate for uneven weight distribution when compressor is not operating. A drain cock is provided on end of tank to remove moisture. Moisture from bottom of tank leaves the drain cock through a permanently positioned metal tube. Drain moisture from tank every 2,000 miles.

Low Pressure Air Tank (1958 Models): Mounted on frame behind left rear wheel. This tank is used to receive air released from air springs by the height control valves to be returned to compressor. Use of this tank provides a silent discharge of air from air springs as well as to reduce amount of outside air taken into system.

Separat r Assembly (1958 Mod ls): Mounted on frame ahead of left front upper control arm. This unit has five functions as follows: Filters incoming air. Separates



OLDSMOBILE REAR AIR SPRING

oil, moisture, and foreign matter. Prevents air in high pressure tank from exhausting through compressor when engine not running. Limits pressure in low pressure system air tank to approximately 70 lbs. maximum. Prevents air in low pressure tank from exhausting through compressor when engine not running.

Manual Override Valve: This valve consists of a pressure regulator and a manually operated elevator valve (lift valve) and is located at left front of car. The pressure regulator regulates air pressure from the high pressure tank down to 155–165 lbs. The manually operated elevator valve which is controlled by a cable connected to a handle located beneath the instrument panel, allows the car to be raised to the full rebound position.

Rear Height Control Valves: There are two rear height control valves mounted on the frame (one at each side) and actuated by linkage connected to the rear axle housing. They act not only to control height of rear of car but also to maintain proper height of the right and left side of car to maintain it in a level position.

Front Height Control Valve: The single front height control valve is mounted on the number one crossmember and is actuated by linkage connected to the front stabilizer bar. Its function is to increase or decrease air pressure in the front springs to compensate for differences in car loading to maintain proper car height. Rotation of the front stabilizer bar operates the linkage to actuate the height control valve

Air Springs: Each unit consists of a metal air dome and a rubber diaphragm assembly attached to the frame, and a piston and strut assembly that is attached to lower control arms in the front and the axle housing in the rear. Pressure in the air springs is controlled automatically

CONTINUED ON NEXT PAGE

OLDSMOBILE NEW-MATIC RIDE (C ntinued)

by the height control valves to compensate for differences in car loading.

LUBRICATION: Check fluid level in power steering pump every 2,000 miles and maintain level at "Full" mark on filler neck of power steering pump reservoir. *CAUTION – Use only Synthetic Fluid, GM Part No. 577080 to replenish reservoir.*

Piston Strut Seat: Lubricate front and rear seats every 26,000 miles using Special Lubricant, Part No. 571035, as follows:

Front - Raise front of car so wheels are hanging free, then disconnect air spring line from front height control valve (shortest adaptor on height control valve) Remove strut retaining bolt from strut seat and disengage rubber boot. Remove strut seat attaching bolt, and seat. Wash out seat and end of strut with clean solvent and blow dry with air. Reinstall strut seat and lubricate with ¼ ounce of Special Lubricant, Part No. 571035. Reinstall strut in seat using a new boot. Connect air line, using a new seal and slowly lower car. Operate engine if necessary to bring car to normal riding height.

R ar – Raise and support car at frame to relieve weight from wheels. Loosen pressure line at the air spring and allow air pressure to exhaust. Pull dust seal away strut seat and loosen seat setscrew almost to limit of its threads. Remove strut seat attaching bolts and remove strut seat by raising strut into piston for clearance. Clean strut and strut seat and lubricate with ¼ ounce of Special Lubricant, Part No. 571035. Reinstall strut in seat using a new boot. Connect air line using a new seal and slowly lower car. Operate engine if necessary to bring car to normal riding height.

AIR INTAKE FILTER (1958): Clean air filter on the separator assembly every 4,000 miles (more often if car is operated under dusty conditions). Unscrew filter from separator and wash in a petroleum base solvent. *CAUTION - Do not use compressed air to dry filter as this will separate filtering material.*

AIR INTAKE FILTER (1959): Drain filter every 2,000 miles. To drain unit, open drain cock on bottom of reservoir shell until air pressure has expelled water and oil. *NOTE - If there is no pressure in filter, momentarily start engine to build up pressure, then stop engine and drain unit.*

DRAINING SEPARATOR ASSEMBLY (1958): Drain water and oil accumulation from separator assembly every 2,000 miles as follows: Open drain valve on bottom of separator assembly and allow air pressure to force out water and oil. Close drain valve when discharge of water and oil stops.

DRAINING HIGH PRESSURE AIR TANK (1958): Drain water and oil accumulation from tank every 4,000 miles as follows: Remove cap from Schrader valve at back end of tank and depress valve stem until discharge of water and oil stops.

DRAINING HIGH PRESSURE AIR TANK (1959): Drain tank every 2,000 miles as follows: Open drain cock located at rear end of tank until air pressure has expelled all water and oil.

ALCOHOL VAPORIZER (Dealer Installed Unit): Check fluid level every 2,000 miles during winter months and fluid added to keep jar ¾ full. Use a non-permanent type anti-freeze (colorless methyl alcohol) to replenish fluid. Every 2,000 miles, check, and if necessary, clean vaporizer air inlet filter. Clean filter in solvent and blow dry with air (low pressure).

Vaporizer Spring Maintainenc : After the winter season, drain vaporizer and remove vaporizer-to-compressor hose and the rubber cap from carburetor air cleaner hose connection. Place hose and cap in trunk compartment. Reinstall short air cleaner-to-compressor hose.

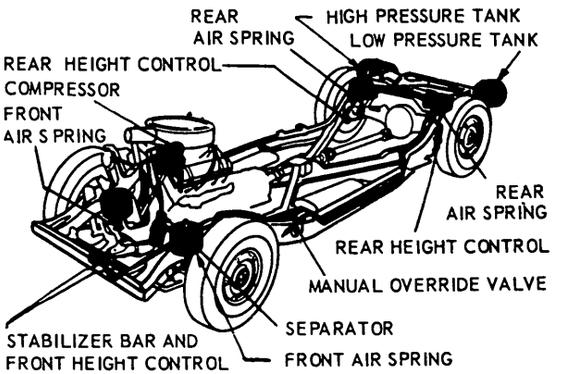
Vaporizer Fall Maintainence: Remove short air cleaner-to-compressor hose and install the rubber cap on air cleaner hose connection, then install vaporizer-to-compressor hose. Fill jar ¾ full with colorless methyl alcohol.

ADJUSTMENT

ADJUSTMENTS: Compressor Belt – Use Gauge 33–70 to check belt tension. *NOTE – Pointers on sleeve of tool must index with groove on tool plunger.* To adjust, loosen idler pulley bracket bolts and insert a flex handle in the ½" square hole provided in idler pulley bracket and pivot bracket until pointers on Gauge 33–70 index with line on tool plunger. Tighten idler pulley bracket bolts to 20–28 ft. lbs. Check the other belt. If it is outside gauge limits, replace both belts as a matched set.

Elevator Valve (1958 Models): *NOTE - Elevator valve is not serviced other than by replacement or by adjustment of control cable and stopscrew. DO NOT attempt to change adjustment of pressure regulator adjusting screws. This is set in production to 145-155 lbs. and must not be changed.* To determine if elevator valve lever stopscrew requires adjustment, disconnect low pressure line identified by stamping on valve("To L.P. Tank"), from valve. **Air will exhaust from low pressure line.** If air exhausts from elevator valve, it will be necessary to adjust actuating lever stopscrew and cable (see below). If valve stopscrew adjustment is correct, adjust cable (see below).

Cable Adjustment - Remove actuating lever and spring from elevator valve and check freeness of cable in housing. If cable binds, remove kinks in housing and make sure cable is free. Reinstall actuating lever and spring. Loosen cable housing clamp at body floor pan or frame and remove excessive slack from cable by sliding housing through clamp, then tighten clamp. To recheck, pull out elevator handle on instrument panel slightly. There should be 1/8" free movement in cable and no air should escape while cable is moved 1/8".



1958 OLDSMOBILE AIR SUSPENSION SYSTEM

Pull out elevator valve handle about half way. Air should escape from elevator valve at disconnected fitting. Release elevator lever handle slowly and allow spring tension to draw cable through housing to close valve. Air should not escape from valve. If air escapes, the cable is binding or actuating lever is incorrectly adjusted. Recheck if necessary. To check if valve seats properly in elevated position, pull elevator valve cable all the way out. Air should blast out of elevator valve momentarily, but should stop after check valve has seated for elevated position. If air does not stop, repeat the above adjustment. Also check for defective check valve in elevator valve, in which case elevator valve assembly must be replaced. Replace low pressure line to elevator valve and install valve baffle.

Lever Stopscrew Adjustment - Raise car and remove elevator valve baffle plate, then remove actuating lever and spring and check freeness of cable (see above). Loosen locknut on stopscrew and turn screw in until air just starts to escape from elevator valve. Back off screw until leak stops, **then back off an additional tw complete turns.** Tighten locknut on stopscrew, making sure screw does not turn. Adjust cable (see above).

Elevator Valve Cable (1959 Models): *NOTE - If elevator valve cable is properly adjusted, there shoul be no free travel of elevator handle.* Operate elevator handle to be sure it is not restricted by air lines. If necessary, bend lines to obtain clearance. Loosen cable conduit clamp and disengage conduit from clip. With elevator handle on instrument panel pushed all the way forward, slide conduit forward at clamp until cable is slack at operating lever. *NOTE - In some cases it may be necessary to adjust cable at operating lever setscrew to obtain slack.* Pull conduit rearward until operating lever just moves, then push conduit forward until lever just stops. With conduit held in this position, tighten clamp. Secure conduit in clip and check elevator operation. *NOTE - There should be no free travel at elevator handle.*

Pressure Regulator (1959 Models): Connect Gauge J-7065 to high pressure tank valve, then operate engine, if necessary, to build up at least 200 lbs. in tank. Shut off engine and remove gauge. Disconnect front and rear height control valve exhaust lines at manual override valve, then connect Gauge J–7065 to the exhaust port at rear of manual override valve. *NOTE - Plug the front port as follows:*

Assemble a flare nut, ferrule and rubber seal onto a 1½" length of copper tubing. Seal ends of tube by crimping and folding, then install in the exhaust port. Pull elevator valve operating lever rearward and check gauge reading. Pressure should be 155–165 lbs. If not, adjust as follows: Remove rubber boot, hold elevator valve operating lever rearward and turn adjusting screw until reading on gauge is 155–165 lbs. *NOTE – Clockwise rotation of screw increas s air pressure.* Install rubber boot and remove gauge and special plug. Reinstall exhaust lines and check for leaks.

Carrying Height: *NOTE – It is recommended that rear carrying height be adjusted first whenever it is necessary to adjust both front and r ar carrying h ight. Wh n ch cking and adjusting, maintain a pr ssur of 175 lbs. of air in high pr ssur tank.*

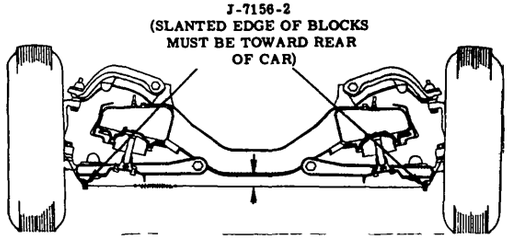
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OLDSMOBILE NEW-MATIC RIDE (Continued)

Rear – Raise car and place floor stands under axle housing. Raise rear of car and hold in this position for at least 10 seconds, then release rear of car. The car should settle below normal height, then raise through valve action until it returns to normal height. Check distance from bottom edge of the piston to bottom edge of air spring diaphragm retainer with Gauge J–7156–1 or Magnetic Gauge J–7156–7. This checking must be done on the inboard side with the gauge parallel to centerline of air spring piston. If the dimension is not 1½" ± 1/16", adjust as follows: Loosen height control valve operating lever lock screw and turn the eccentric (located adjacent to lockscrew) to exhaust some of the air from air spring to lower car below normal carrying height. Slowly turn eccentric in opposite direction until car rises to proper carrying height. *CAUTION – Always raise the car for final carrying height adjustment.* Tighten lockscrew on operating lever and recheck carrying height. Repeat this procedure with opposite rear height valve, then recheck adjustment on both rear height control valves.

Front – Position a jack at front edge of front crossmember and raise the car. With both wheels in a straight ahead position, attach hooks of Gauge J–7156–2 (see illustration) to steering plain arms. *NOTE – Gauge cable must be installed so that its spring is beneath right hand lower control arm.* Position gauge blocks on underside of lower control arms in the flat between ball joint rivets and rubber bumper nut. The slanted edge of each block must face rear of car. Slowly lower floor jack. *NOTE – If the car is on a hoist, the front of the car must be raised at bumper or crossmember for approximately one minute, then release front end of car. The car should settle below normal height, then raise through valve action until it returns to normal height.* Check front carrying height between top edge of gauge cable and center of frame crossmember with Magnetic Gauge J–7736 or a steel rule. Distance should be 1" (1958); 1 19/32" (1959), plus or minus 1/16". If not, adjust height control valve in same manner as for rear height adjustment (see above). *NOTE - If eccentric has been turned for maximum adjustment, and the front carrying height is still incorrect, additional adjustment can be obtained by loosening locknut and bolt holding the lever to stabilizer bar. Radially reposition lever on stabilizer bar and tighten bolt and locknut.*

Front End Alignment: Same as for cars with conventional coil springs. See "Front Suspension" on Car Model pages.



OLDSMOBILE AIR SUSPENSION
(CHECKING FRONT CARRYING HEIGHT)

TROUBLE SHOOTING

On Or M r Air Springs G D wn (Will pump up in 10 minutes or less): Internal leak at high pressure check valve in the air filter. Internal exhaust leakage. External leak in system. A leak under any of the above causes plus a leak at the intake adapter check valve.

One or More Air Springs Go Down (Will not pump up): If one or two springs are down, check height control valve action. Compressor output low. Internal exhaust leakage. External leak in system. Restriction in high pressure system. To check for restriction in high pressure system, install Gauge J–7056 on high pressure tank. If pressure does not increase with engine at fast idle proceed as follows: Stop engine and disconnect high pressure hose at compressor. Disconnect line from tank to air filter assembly at the filter, then inject compressed air into high pressure hose. If air does not flow from air filter assembly, check for a restricted bronze filter or check valve in filter assembly. If air flows from filter, check for a restriction in high pressure line from air filter to manual override valve.

Car Will Not Elevate: Elevator valve cable out of adjustment. Compressor output low. External leakage in exhaust lines. Low regulated pressure. Internal leakage in elevator valve. Restricted exhaust lines.

Car Will Not Return From Elevated Position or Rides High: Elevator valve cable out of adjustment or binding. Restricted exhaust lines. Improper height control valve action. Incorrect carrying height.

Car Rides Hard: Incorrect carrying height. Bind in suspension members.

REMOVAL & INSTALLATION

AIR COMPRESSOR: Removal - Loosen compressor pulley nut and remove fan belts, then remove pulley nut from compressor shaft. Disconnect hoses from compressor, then position a small flat pan under power steering pump hoses and disconnect hoses from pump. Cap and plug fittings and hoses. Disconnect right and left rear auxiliary brackets, then loosen left rear brace-to-cylinder head stud so brace can be rotated out of way. Remove compressor mounting bolts and remove compressor and pump assembly.

Installation: Reverse removal procedure.

HEIGHT CONTROL VALVE (FRONT): Removal - Support front of car with jack stands placed under frame side rails so front wheels are hanging freely. Loosen all tubing connections at height control valve so all air pressure will be exhausted. *(NOTE* - Use a wrench to hold adaptors when loosening fittings). Disconnect link from height control lever, then carefully remove the tubing connections from height control valve. *(CAUTION - Use care as pressure may not be exhausted).* Tape ends of tubing, then remove height control valve.

Installation: Reverse removal procedure and note the following: Install low pressure line to medium length adaptor but do not tighten before installation of valve assembly. Check carrying height and adjust control valve eccentric as necessary (see "Adjustments").

HEIGHT CONTROL VALVE (REAR): R m val - Support rear of car with jack stands placed under frame side rails so rear wheels are hanging freely, then remove valve in same manner as for front height control valve (see above).

Installati n: Same as for front height control valves (see above).

ELEVATOR VALVE (1958): Rem val - Raise car and remove elevator valve baffle plate, then loosen five tubing connections to allow air to completely exhaust, and disconnect lines from valve. Loosen cable wire setscrew, then disconnect valve from bracket and remove.

Installation: Position valve on bracket at frame side rail and install and tighten bolts. Install air lines, using new "O" ring seals. Install cable wire to lever, then with lever pulled back against its stop, remove slack from cable wire and tighten setscrew. Lower car so springs are lower than normal but not supporting entire weight of car. Start engine and build pressure in system to approximately 100 lbs. Raise car and check all previously loosened fitting.

MANUAL OVERRIDE VALVE (1959): Rem val - Pull low pressure hose from valve, then loosen line connections at valve and allow all air to escape before disconnecting lines. Remove the two manual override valve attaching bolts and nuts and turn valve assembly so operating lever return spring is accessible. Disconnect return spring from lever and bracket, then loosen operating lever screw and slide lever from shaft. Remove valve assembly from car.

Installation: Reverse removal procedure and note the following: Tighten valve to bracket attaching bolts to 8 ft. lbs. Use new seals on line connections. Check all points for leakage, then adjust elevator valve cable.

AIR FILTER & CHECK VALVE (1959): Open drain cock and drain all water and oil from reservoir shell. Disconnect high pressure line at connector, then raise front of car and loosen lines at check valve retainer. Allow pressure to exhaust, then disconnect line. Remove three bracket-to-frame attaching bolts and block bracket away from frame. Remove three bracket-to-filter attaching bolts and remove air filter (with high pressure line) from car. Remove high pressure line from filter.

SEPARATOR (1958): Rem val - Loosen all air hoses and pipe fittings at separator and permit air to exhaust, then disconnect hoses and pipes from separator. Remove separator attaching bolts and remove separator.

Installation: Reverse removal procedure and operate engine to bring system up to operating pressure. Check for leakage at all connections.

AIR SPRING (FRONT): R m val - Support front of car at frame so weight of car is off front wheels, then remove wheel assembly. Loosen pressure line fitting at air spring and permit pressure to exhaust. Pull dust shield from strut seat and loosen strut seat setscrew almost to limit of threads. Disconnect shock absorber and stabilizer from lower control arm. Disconnect lower ball joint from steering knuckle using Tool J-6446 (same as for standard suspension). Disconnect air pressure line from air spring, then remove the 2 air spring mounting nuts and remove spring, piston and strut assembly. Tape lower end of strut to protect retainer groove and hardened end. Unscrew strut from

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OLDSMOBILE NEW-MATIC RIDE (C ntinu d)

piston, using a strap wrench to hold piston and a pipe wrench to turn strut. Pull retainer from air spring diaphragm pilot and remove piston.

Installati n: Clean strut and strut seat and lubricate seat with one ounce of special lubricant, Part No. 571035. Reverse the removal procedure and tighten strut to piston to 40-45 ft. lbs. and air spring nuts to 20-30 ft. lbs. Run engine to bring system up to operating pressure and leak test all fittings.

AIR SPRING (REAR): R m val - Support rear of car at frame so that weight is off rear wheels and support axle housing with jack stands, then remove wheel assembly. Loosen pressure line fitting at air spring and permit air pressure to exhaust. Pull dust shield from strut seat and loosen strut seat setscrew almost to limit of threads. Tape lower end of strut to protect retainer groove and hardened end. Unscrew piston strut from piston using a strap wrench to hold piston and a pipe wrench to loosen strut. Disconnect shock absorber at lower mounting, then remove pressure line from air spring and remove air spring mounting bolts. Push piston into air spring and remove piston strut. Remove piston and air spring as an assembly. Pull retainer for air spring pilot and remove piston.

Installation: Follow same procedure as for installation of front air spring (see above).

OVERHAUL

AIR COMPRESSOR: *See "Air Suspension Air Compressor".*

LEVELING VALVE: *See "Air Suspension Leveling & Manual Valves".*

PONTIAC EVER LEVEL AIR RIDE

P ntiac (1958-59)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS:* Before working under the car, jacking it up, or raising it on a hoist, the following precautions must be taken to prevent personal injury or damage to the car.

Raising Car (On a Jack): Raise car to its maximum height by starting engine and pulling out "Car Lift" knob located on underside of instrument panel to left of steering column before jacking. After car fully raised, shut engine off, then proceed with jacking the car. *NOTE* - Car can be returned to its normal riding level by pushing in "Car Lift" knob.

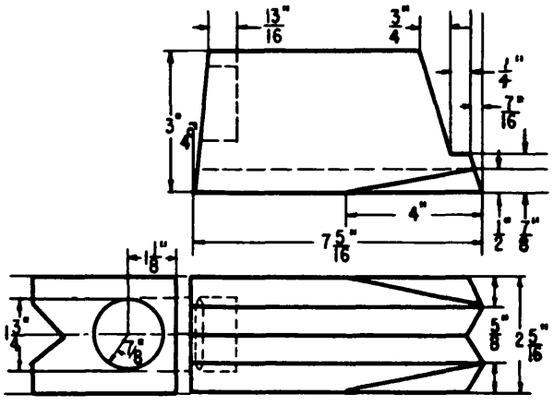
Raising Car (On a H ist): Always use jack stands under outer ends of axle or frame when supporting air ride car on a hoist.

W rking Und r Car: Always place jacks under an air ride car before using a creeper as a precaution in case air should be exhausted from system.

►*TOWING THE CAR:* **Air Ride System Operating** - Pull out "Car Lift" knob and raise car to maximum height before towing.

Air Rid Syst m N t Op rating - Raise end of car (which will ride on the ground), using jack or hoist (see above) until wheels just begin to leave ground. *(CAUTION - Do not rais car furth r than necessary since bumper fac plat on opposit nd will be against ground).* Block car with safety stands, then insert blocks, Tool J-7299 between lower control arm and frame at front, Tool J-7315 between frame and axle at rear. If blocks are to placed at front (car being towed with front end on ground), these blocks must be between control arm rubber bumper and bumper pad on frame. Place bottom end over bumper first, then index "V" groove of block against upper end of steering knuckle to hold top of block in position. Rubber bumper will keep lower end of block in place. If blocks are to be placed at rear, position blocks so "V" notch at top is indexed with and centered on rubber bumper. *(CAUTION* - If block is positioned too far forward, it will bear against air cylinder retaining bolt). Remove safety stands and carefully lower car making sure blocks remain in position. Raise opposite end of car for towing. *CAUTION - Tow car cautiously as sharp bumps can result in s rv r damag t car.*

►*1958 TWO CYYLINDER AIR COMPRESSOR HEADREPLACEMENT CAUTION:* When one or both cylinder heads are replaced, install Spacer Gasket, Part No. 5549900, in addition to regular gasket, Part No. 5540189. Before replacing a complete air compressor, install the new spacer gasket under both cylinder heads.



PONTIAC FRONT TOWING BLOCKS

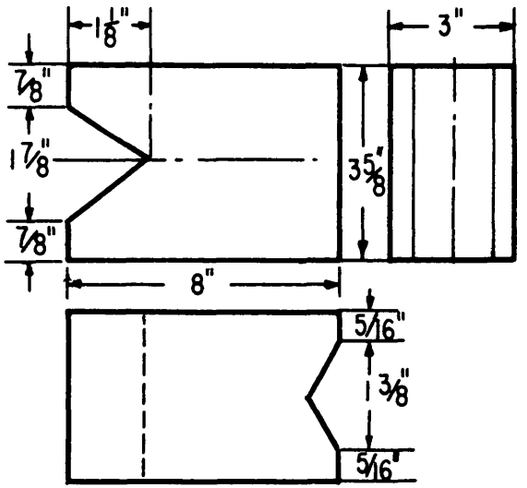
►*1958-59 AIR COMPRESSOR VENT FILTER SCREEN REMOVAL NOTE (TO DECREASE "COKING"):* Remove and discard screen whenever pulley nut is removed.

DESCRIPTION: *NOTE - 1958 and 1959 air suspension systems are similar, however, location of circuits and some of the components are different.* These systems consist of four rubber air springs, air compressor, height control valves, manual valve, and air reservoir tank. Operation is automatic and the car is maintained at its normal height above road level under varying load conditions. A "Car-Lift" knob on instrument panel is provided to raise car above rebound stops for tire changing or for additional road clearance. Basic components of systems are the same for 1958 and 1959 except as indicated below.

Air Compressor (1958-Early 1959): Single stage, two cylinder, reciprocating type mounted either integrally with power steering pump or as a separate unit. Lubrication for these units is obtained from power steering pump reservoir or from separate compressor oil reservoir.

Air Compressor (Late 1959): Single stage, single cylinder, reciprocating type mounted on front of engine and driven by either power steering pump belt or by a separate belt. This unit is lubricated by engine oil under pressure from engine main oil gallery.

Air R s rvoir: High pressure air reservoir tank is mounted in right front fender compartment and is provided with inlet and outlet openings at the top and a drain valve at bottom. A valve at inlet opening permits filling system from an outside source.



PONTIAC REAR TOWING BLOCKS

Manual Valve: Mounted on outrigger at left side (1958); right side (1959) side of frame back of front wheel. This valve contains a pressure regulator which maintains a pressure of 125-135 lbs. (1958); 130-140 lbs. (1959) when car is moving or a pressure of 145 lbs. (1958); 150-160 lbs. (1959) when car is standing. A manually operated "override" valve controlled by "Car Lift" knob in drivers compartment provides regulated air pressure to air spring to raise car body above normal operating level.

Air Pressure Relief Valve: This valve is located in the lower of two "tees" attached to frame near left (1958); right (1959) rear height control valve. The purpose of this valve is to prevent reservoir pressure (approximately 250 lbs.) from reaching air springs in the event of manual valve failure. Relief valve opens at approximately 165-175 lbs.

►*HEIGHT CONTROL VALVE NOTE: 1958 and 1959 height control valves are different types.*

Height Control Valves: There are three height control valves; one at the front and two at the rear. The front valve is mounted on the frame front crossmember and its operating link is connected to a clamp on the stabilizer shaft. The rear control valves are mounted on the rear

CONTINUED ON NEXT PAGE

PONTIAC EVER LEVEL AIR RIDE (Continued)

lower control arm brackets and are operated by links to the lower control arms. These valves control the car height by controlling the flow of air in or out of the individual air springs.

Air Springs: Each air spring consists of a metal cylinder, closed at the upper end and sealed at the lower end by a rubber diaphragm, making an air tight compartment. Each spring rides on a piston attached to a lower control arm in a manner to cause the piston to bear on the center of the air spring diaphragm.

LUBRICATION: Air Compressor (Two Cylinder) - *NOTE - It is not necessary to change lubricant in air compressor unless it is removed for repairs.* Check fluid in reservoir (or in power steering reservoir if so equipped) every 2,000 miles and add special fluid, Part No. 532186, as necessary to bring level up to "Full" mark on indicator.

Single Cylinder: This compressor is lubricated by a line from engine oiling system and special lubricating procedures are not required.

DRAINING AIR RESERVOIR TANK: Every 2000 miles, open the drain valve at bottom of reservoir and drain sediment.

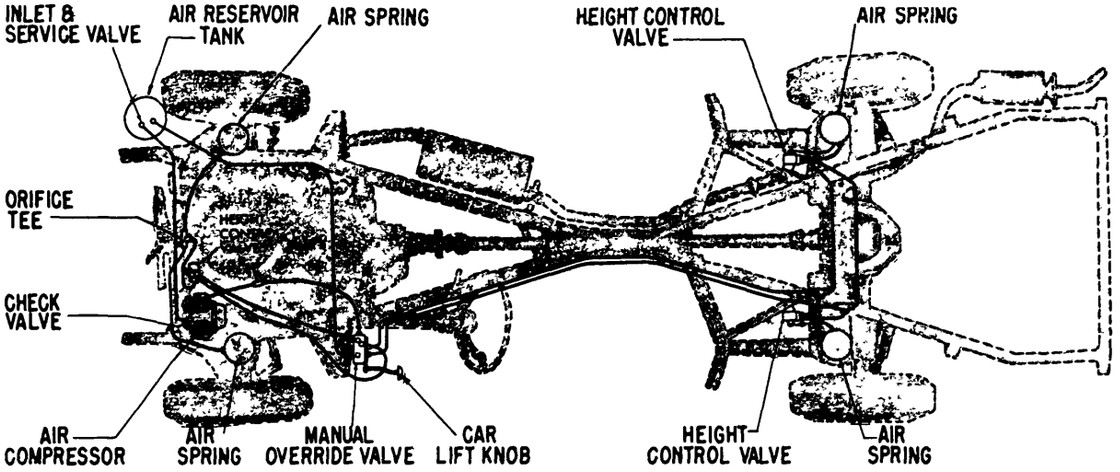
VALVE CLEANING: Clean the Manual Control and Leveling Valves every 25,000 miles as follows:

Manual Valve: Remove valve from car, then insert temporary plugs in all openings. Clean valve exterior with solvent and blow dry with air. Remove intake filter and retainer assembly. Remove and discard the "O" ring. Clean filter in solvent or replace filter. Install retainer, using a new "O" ring, and tighten to 45-55 inch-pounds. *(NOTE* - Use shim stock or suitable sleeve over retainer threads to prevent damage to "O" ring when installing). Remove exhaust filter plate and gaskets and discard gaskets. Cover valve body opening while cleaning parts. Clean plate and retainer in solvent and blow dry with air. Install plate and new gaskets and secure in valve body with fitting tightened to 5-8 inch-pounds. Check manual valve lever and spring, then install assembly on the car.

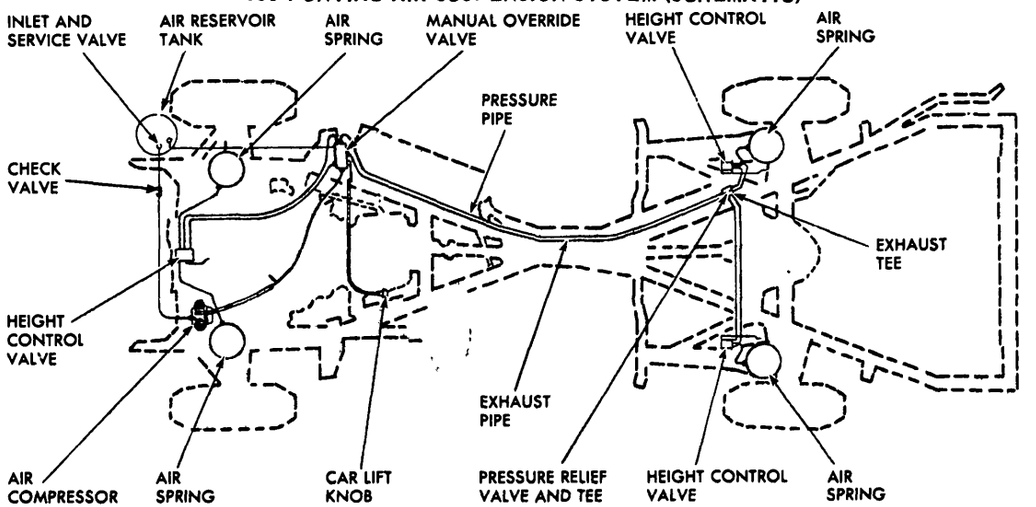
Height Control Valves: Remove control valve from car, then insert temporary plugs in three pipe adapters. Clean exterior of valve with solvent and blow dry with air. *(CAUTION - Do not use pipe plugs in the adapters).* Remove three adapters and discard the "O" rings. *(NOTE* - Hold intake valve stem firmly with open end wrench while removing intake adapter, do not remove intake valve). Remove temporary plugs, then clean adapters in solvent and blow dry with air. Install new screens. Install new "O" rings on intake valve stem and exhaust adapters using a suitable sleeve to prevent damage to "O" rings. Check tightness of intake valve stem which should be 12-15 inch-pounds. Apply a film of SAE 20 oil to "O" rings and install adapters. Tighten to 12-15 inch-pounds.

ADJUSTMENT

ADJUSTMENTS: Manual Valv - There are no adjustments within the manual valve. If valve has been removed and reinstalled or there is evidence the sliding valve (double acting) is not seating properly (indicated by low air pressure at height control valves), make sure stop screw in the override lever contacts flat on lever spring bracket when "Car Lift" knob is in the closed position.



1958 PONTIAC AIR SUSPENSION SYSTEM (SCHEMATIC)



1959 PONTIAC AIR SUSPENSION SYSTEM (SCHEMATIC)

Trim Height: Run engine 3-5 minutes to insure 145 lbs. pressure in reservoir tank, then check and adjust trim height as follows:

1958 MODELS

Front - Check distance between upper end of rubber rebound bumper and contact surface on frame crossmember. This distance should be 3½ - 3¾" (all models). To adjust, loosen one control link clamp U-bolt nut and rotate clamp on stabilizer shaft as required to obtain the proper trim height. Tighten the nut securely.

Rear - Check distance (vertically) between top of rear axle housing and lower side of frame crossmember. This distance should be 4" - 4¼" (Exc. Station Wagon); 4½" - 4¾" (Station Wagon). Adjust by rotating height control valve operating arm eccentric bolt as necessary to obtain correct trim height.

1959 MODELS

Front – Check distance between frame and rear top surface of lower control arm. This distance should be 2 7/8". To adjust, loosen one control link clamp U-bolt nut and rotate clamp on stabilizer shaft as required. Tighten nut.

Rear – Check distance (vertically) between frame bumper bracket beside rubber bumper and axle housing. This distance should be 4 1/8" (all models). To adjust, loosen height control lever retaining screw, then turn cam with a screwdriver or box end wrench, then tighten retaining screw.

Front End Adjustment: Same as for cars with conventional coil springs. *See "Front Suspension" on Car Mod l pag .*

Compressor Belt: Adjust belt tension to 50 ft. lbs., using

CONTINUED ON NEXT PAGE

PONTIAC EVER LEVEL AIR RIDE (C ntinued)

torque wrench in square hole provided in compressor front support (rubber mounted compressor). On rigid mounted compressors, apply a spring scale midway between crankshaft and compressor pulleys and adjust idler pulley until deflection in belt is 1/4" with a 6 lbs. pull.

Manual Valv C ntr l Cabl : *(NOTE* - There is no adjustment within manual valve. If manual valve has been removed and reinstalled or there is evidence the sliding double-acting valve is not seating properly indicated by low pressure at height control valves, make sure stopscrew in override lever contacts flat on lever spring bracket when car lift knob is in closed position). If stopscrew does not contact bracket, loosen control cable clampscrew, then move cable to permit screw to contact bracket, and tighten clampscrew. *(CAUTION - Stopscr w must not b adjusted since it is factory set to pr v nt l v r ov rriding shaft of cam when valve is clos d).*

TROUBLE SHOOTING

N Air In Syst m: Compressor drive belt slipping or broken. Check valve plugged or stuck open preventing air flow to tank or permitting leak back from tank. Ruptured or plugged hose or pipe between compressor and reservoir tank or between tank and manual valve. Leakage at tank service valve or pipe connections. Manual valve diaphragm ruptured. Manual valve sliding valve stuck in neutral position or defective. Manual valve lever retaining screw loose. Manual valve control cable or lever stopscrew out of adjustment. Plugged filter in manual valve inlet retainer. Compressor output below normal, broken rings or reed intake valve.

Car Ab v Trim Height (Will not come down): Shipping or towing block in place. Sliding valve stuck against exhaust port in plate of manual valve or port is plugged. Intake valve cores in all height control valves fail to close. Exhaust valve cores in all height control valves fail to open. Plugged orifice tee at front, and/or exhaust tee at rear.

Fr nt f Car D wn r L w r Than Specified Trim Height: Front height control valve not properly adjusted. Plugged intake valve in front height control valve. Height control valve adapter screens plugged. Leak between air spring diaphragm and piston. Leak at pipe connections. Control link clamp loose on front stabilizer shaft.

Fr nt f Car Can b Rais d To Override, Then Not L w red: Plugged orifice tee. Intake valve core in front height control valve fails to close. Exhaust valve core in front height control valve fails to open.

R ar f Car D wn or L wer Than Specified Trim Height: Rear height control valves not properly adjusted. Plugged intake valves in height control valve. Leak at crimp of air spring cylinder.

R ar of Car Can b Raised To Override, Then Not Low r d: Plugged exhaust tee at rear. Intake valve cores in both rear height control valves fail to open. Exhaust valve cores in both rear height control valves fail to open.

On Sid of Car Low r Than Oth r Sid : Rear height control valves not properly adjusted. Plugged or defective intake or exhaust valve at one height control valve.

On R ar Spring High, Opp sit Diag nal Fr nt Spring Low: Orifice in rear height control valve exhaust adapter plugged. Intake valve core in rear height control valve fails to close. Exhaust valve core in rear height control valve fails to open. Intake and exhaust pipes to rear height control valve crossed.

Car Rolls: Orifice tee at front not restricting flow of air between springs.

Oil In System: Vent passage in compressor crankshaft and pulley nut plugged, permitting piston ring blow-by.

REMOVAL & INSTALLATION

AIR COMPRESSOR: Proceed as follows for the various models:

1958 Models (Removal) - Disconnect air hoses at compressor. On power steering cars, drain oil from reservoir, then disconnect hoses from unions at rear of steering pump and cap the fittings. Loosen adjusting strap bolts (early cars), or idler pulley (later cars) and remove drive belt, then remove compressor.

Installation - Reverse removal procedures and note the following: If compressor is rubber mounted, do not tighten mounting bolts until after belt tension has been adjusted.

1959 Models (Removal, Two Cylinder Compressor) - Disconnect air hoses at compressor, then disconnect two hoses at rear of power steering pump and cap openings to prevent oil from draining. Release tension on drive belt by loosening idler pulley bracket bolts. Remove belt, then remove compressor and power steer-pump assembly.

Installation - Reverse removal procedure making sure that any spacers are installed in same location from which they were removed.

1959 Models (Removal, One Cylinder Compressor) - Disconnect hoses from compressor, then loosen idler pulley adjusting bolts and remove drive belt. Disconnect oil pressure pipe from compressor rear bearing cover. Disconnect oil drain pipe from side of compressor (other end of pipe connects to long hollow fuel pump attaching bolt). Loosen compressor mounting bracket brace bolt at manifold, then remove compressor from bracket. *NOTE - It may be necessary to remove fuel filter before removing compressor.*

Installation - Reverse removal procedures.

HEIGHT CONTROL VALVE (FRONT): Removal - Disconnect link from clamp at front stabilizer shaft, then remove pipes from valve adapters (tag pipes to insure correct connection when installing). Remove bolt and screw holding valve to mounting bracket or two valve bracket-to-frame attaching bolts and remove valve.

Installation: Reverse removal procedure and tighten pipe nuts to 5-10 ft. lbs. *CAUTION - Do not overtighten pipe nuts.*

HEIGHT CONTROL VALVE (REAR): Removal - Disconnect operating lever from link, then disconnect pipes from valve adapters (tag pipes to insure correct connection when installing). Remove valve to bracket attaching bolts and remove valve.

Installation: Reverse removal procedure and tighten pipe nuts to 5-10 ft. lbs. *CAUTION - Do not ov rtight n pipe nuts.*

MANUAL VALVE: R m val - Remove clamp securing control wire to bracket, then disconnect the high pressure and exhaust pipes at manual valve. Remove bolt securing manual valve to frame outrigger and remove valve.

Installation: Reverse removal procedure and adjust valve control cable (see "Adjustment" above).

RESERVOIR TANK: Removal - Discharge pressure from tank, then disconnect inlet and outlet pipes. Remove fender and tank assembly from car, then remove tank from fender.

Installation: Reverse removal procedure. If inlet valve is replaced, use a new "0" ring between tank and valve nut.

AIR SPRING (FRONT): Removal - Place jack stands under forward end of each frame side rail, then raise front end of car (on side from which spring is to be removed), a sufficient distance to permit removal of wheel and tire. Disconnect pipe from air spring cylinder, then disconnect stabilizer shaft link from lower control arm. Remove shock absorber and remove nut from lower control arm ball stud. Force lower ball stud assembly off steering knuckle, using Tool J-6627. Swing steering knuckle assembly out to clear lower control arm and lower the control arm. Remove two air spring cylinder to frame attaching bolts and the nut securing cylinder to upper control arm bracket, then withdraw air spring assembly. Piston can be removed from lower control arm by removing attaching bolts and plate.

Installation: Secure air spring to frame with two bolts and to upper control arm bracket with nut, then connect pipe to air spring cylinder. Raise lower control arm and swing steering knuckle into place. Use a floor jack and raise lower control arm, making sure piston is properly centered in diaphragm. (Coat lip of diaphragm with silicone grease to aid assembly of head of piston into diaphragm). If necessary, use air pressure in air spring to facilitate seating of spring piston in diaphragm, or guide hole in diaphragm over pilot on head of piston with a heavy screwdriver. Secure ball stud with nut and tighten to 60-95 ft. lbs., then install cotter pin. Install shock absorber and connect stabilizer shaft link to lower control arm. Install wheel and lower car to floor. Adjust trim height (see above).

AIR SPRING (REAR): Removal - Disconnect height control valve link from lever, then raise rear end of car high enough to permit piston to clear diaphragm *(CAUTION* - Use care not to break rubber hose at rear axle housing cover). Remove piston to lower control arm attaching nut and self tapping screw and slide piston off control arm. Disconnect pipe from air spring cylinder, then remove two air spring cylinder to frame bolts and withdraw air spring assembly.

Installation: Reverse removal procedure and note the following: Tighten bolts to 20-35 ft. lbs. When installing piston, the self tapping screw must be toward rear. Align air spring with piston using shims as required (with car at proper trim height).

OVERHAUL

AIR COMPRESSOR: *S "Air Susp nsion Air Compr ssor"*

LEVELING VALVES & MANUAL VALVE: *Se "Air Suspension L veling & Manual Control Valv s"*

RAMBLER AIR SUSPENSION

Rambler (1958-60)

►*TOWING & HOISTING NOTE:* No special procedures are required when either towing or hoisting cars equipped with air suspension.

DESCRIPTION: The air suspension system consists of a neoprene air spring mounted within "low rate" conventional type coil springs on the rear axle assembly (front coil springs are not equipped with air suspension) a single cylinder air compressor, air reservoir, and a leveling valve. Operation of the system is automatic, maintaining the car at its normal height above the road under varying load conditions.

OPERATION: Basic components of the air suspension system operate as follows:

Air Compressor: Single cylinder reciprocating type rated at 1 cubic foot of air per minute at 150 lbs. pressure, at 50 MPH. The air compressor is belt driven by a double pulley on power steering pump (Series 20 & 80), and by a double pulley fan hub (Series 10). Oil is piped from engine lubricating system for compressor lubrication.

Air Reservoir: This is a 300 cubic inch capacity tank located under the left front fender. In addition to inlet and outlet fittings, the reservoir is equipped with a combination (Schrader type) refill and drain valve, located at bottom of tank, and an air filter.

L veling Valve: A single leveling valve located on car body at the rear, and connected to rear axle assembly by an adjustable link, controls the amount of air entering or leaving the two air springs. A delay or "dwell" feature included in leveling valve prevents leveling action during slight operating motions of car suspension system. This feature allows approximately 1/2" movement vertically in either direction from normal trim height before valve will open to admit or exhaust air. Operating height of car is controlled by adjustment of the leveling valve connecting link.

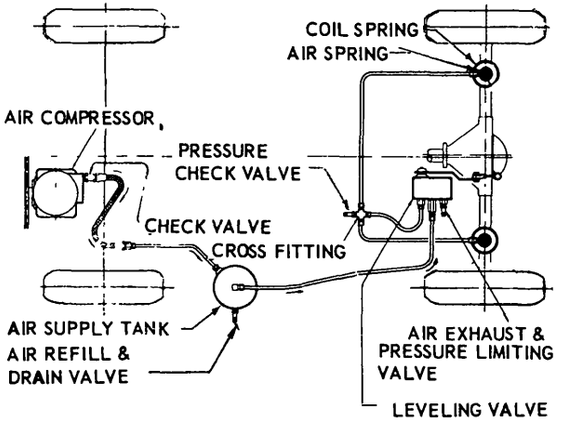
Air Springs: These assemblies mounted within the "low rate" conventional type coil springs consist of a neoprene air bag, an upper spring seat assembly (through which air is admitted to the air bag), and an air spring piston. A check valve at air spring outlet in the leveling valve prevents air pressure in air spring from dropping below approximately 18 lbs. pressure. This prevents air spring from being entirely deflated if body is jacked up.

LUBRICATION: Air Compressor - Oil from engine lubricating system is piped to the compressor and additional lubrication is not required.

DRAINING AIR RESERVOIR: Every 1000 miles, depress the Schrader type valve located at bottom of reservoir and allow trapped moisture to be exhausted.

AIR FILTER CLEANING: Remove air filter cover and clean air filter element every 2,000 miles.

ADJUSTMENTS: Trim Height - Measure distance between top of rear axle tube to the flat portion of top coil of spring. This distance must be 9 13/16" to 10 7/16" (sedan); 10 9/16" to 11 3/16" (station wagon). If adjustment is required, loosen eccentric bolt locknut on leveling valve arm and rotate eccentric bolt to move arm up or down until correct spring height is obtained.



RAMBLER AIR SUSPENSION SYSTEM (SCHEMATIC)

TROUBLE SHOOTING

Loss Of Tank Pressure & Car Settles While Parked: Check for leakage at air springs, height control valve, or supply lines from valve to air spring.

Loss Of Tank Pressure & Car Stays At Trim Height While Parked: Leakage at compressor check valve. Leaking intake valve core in height control valve allowing air supply to air springs, which moves height control valve arm, to exhaust (this condition of cycling exhausts or lowers tank pressure to air spring pressure). Check for leakage at tank, fittings, or supply lines.

Slow Trimming: Check for low air reservoir pressure, leakage in lines or at valves, low compressor output, or for restrictions at all fittings.

Failure To Return To Within ½-1" Of Normal Trim Height: Check height control valve operation and adjustment. Check for inoperative intake or exhaust valve cores, restrictions in air exhaust or intake orifice fittings, or restrictions in air spring fittings and lines.

Hard Or Soft Ride: Check tire pressure, shock absorber operation, spring height, or for control valve operation.

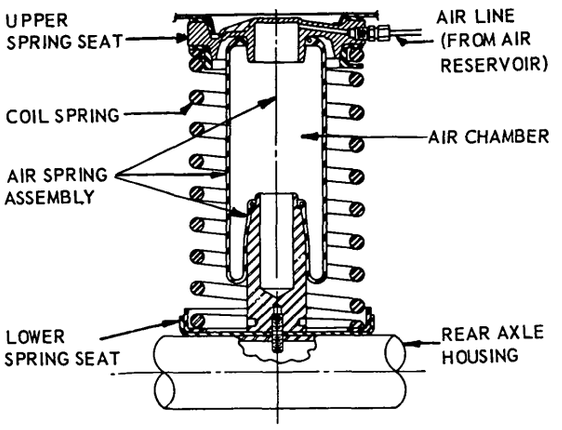
REMOVAL & INSTALLATION

AIR COMPRESSOR: Removal - Discharge air pressure in system by opening drain valve on supply tank, then disconnect air line at compressor. Loosen drive belt and remove oil connections on compressor. Remove compressor from mounting flange and remove base plate and gasket.

Installation: Reverse removal procedure.

HEIGHT CONTROL VALVE: Removal - Raise rear of car on a hoist or jack. Drain air from system by opening drain valve on supply tank, then disconnect and remove height control valve to rear axle link Remove air exhaust and pressure limiting valve from height control valve, then disconnect air supply line. Disconnect air supply line from height control valve to air spring cross "tee". Remove height control valve from bracket, noting position of valve in relation to slotted hole in bracket.

Installati n: Reverse removal procedure and adjust height control valve. See "Adjustments" above.



RAMBLER AIR SPRING ASSEMBLY

AIR SPRINGS: Removal - *(NOTE* - Height control valve lever arm to rear axle link must be removed whenever shock absorbers, coil springs, air springs, or rear axle are to be removed). Exhaust all air from system by opening drain valve on supply tank. *(NOTE* - Height control lever arm must be moved into exhaust position to completely exhaust air from spring and wired in that position whenever air springs are to be removed). Raise car on a hoist or jacks and remove height control valve to rear axle link. Disconnect air spring lines from each upper spring seat and the shock absorbers at their mounting bracket studs, then lower axle assembly. Coil spring, upper spring seat, and air spring may be removed as an assembly by using a spanner type wrench on the air spring piston to turn it out of the lower spring seat. Pry air spring from upper spring seat with a screwdriver blade. Pull air spring piston out as far as it will go, then place air spring on a bench with only the piston projecting over the edge. A sharp downward twist will remove piston from air spring.

Installation: Invert small end of air spring by turning it inward, apply liquid soap to air spring and piston and insert piston into inverted end of air spring. Place air spring assembly and piston into an arbor press with piston on the bottom, then use Tool J-7480 and J-872-5 in press so bead ring of air spring is positioned over lip end of air piston (Pilot of installing tool is indexed into position and the lip of the tool contacts bead area). Install air spring on upper spring seat by assembling both spring seats and coil spring, then install on axle assembly. Apply liquid soap solution to seat and air spring and index upper bead with the upper seat; raise axle assembly and pump air into air spring to seat the bead. Complete installation by reversing removal procedure.

OVERHAUL

AIR COMPRESSOR: *See "Air Suspension Compressors"*

LEVELING VALVE: S *"Air Suspension Leveling & Manual Valves"*

G.M. AIR SUSPENSION VALVES

Buick (1958-59)
Cadillac (1958-60)
Oldsmobil (1958-59)
Pontiac (1958-59)
Rambler (1958-60)

►*RAMBLER NOTE: Manual valve not used on Rambler models.*

DESCRIPTION: L v ling Valve (1958 Buick, Cadillac, Oldsmobil , P ntiac & 1958-60 Rambler) - Leveling valves on all models are similar in design except for shape of operating lever and slight differences in valve assemblies. Dashpots, built into valve housing, are used on all Cadillac models and on early Pontiac models (not used on later Pontiac models).

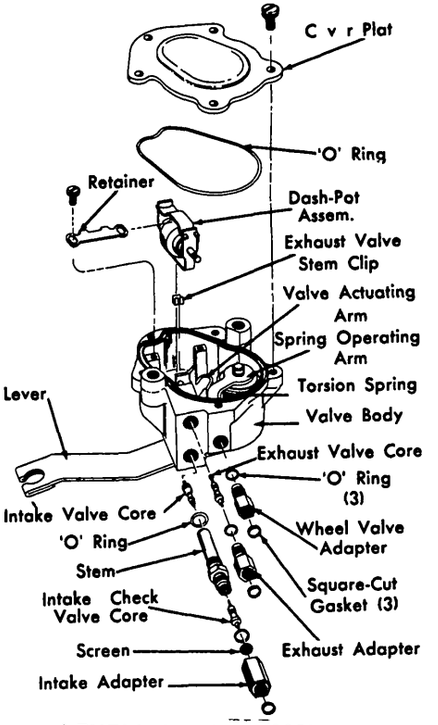
L v ling Valv (1959 Buick, Cadillac, Oldsmobile, & P ntiac): Valve design is changed from type used on 1958 models and overhaul procedures are different. Valves for all 1959 models are similar in design except for shape of operating lever and slight differences in valve assemblies.

Lev ling Valv (1960 Cadillac): Rear leveling valves are same as used on 1959 Cadillac. Front leveling valve is similar in design to 1959 models except that it utilizes two port adapters (one to each wheel suspension bellows) in place of the single valve adapter previously used. A rubber umbrella-type check valve core is used in intake valve adapter in each leveling valve instead of tire-type core previously used.

Manual Valv (All Mod ls, Exc. Rambler): Cable operated valve and pressure regulator assembly. Valve assembly design is similar on all models except for mounting and control lever.

OPERATION: Height C ntr l Valve - As car loads, height valve body lowers and valve operating lever moves upward in relation to valve causing valve actuating arm to open intake valve permitting air to enter and pass through to air spring. As air spring fills and raises car body to normal level, valve operating lever moves down allowing intake valve to close. An intake check valve prevents air returning into intake pipe from control valve if reservoir tank is low in pressure. As car unloads, air springs tend to expand, raising car body and in turn rotating operating lever below its normal position. This causes actuating arm to open exhaust valve permitting air to exhaust from air spring, through the control valve and return to the compressor. Air will exhaust from spring until operating lever assumes its normal position and closes the exhaust valve. A lash band of approximately 3° prevents hunting in normal operation.

Manual Valve: The regulator controls air pressure from reservoir tank to height control valves and springs. When pressure on regulator diaphragm builds to its designed pressure, the spring pressure is overcome permitting valve to close against its seat in valve body. As air pressure between regulator and height control valve drops, the spring expands, opening the valve and the pressure build-up cycle repeats. The override section of valve supplies regulated air pressure to air springs when it is desired to raise car body above its operating level. In normal operation, one end of two-way sliding valve is firmly seated against valve body



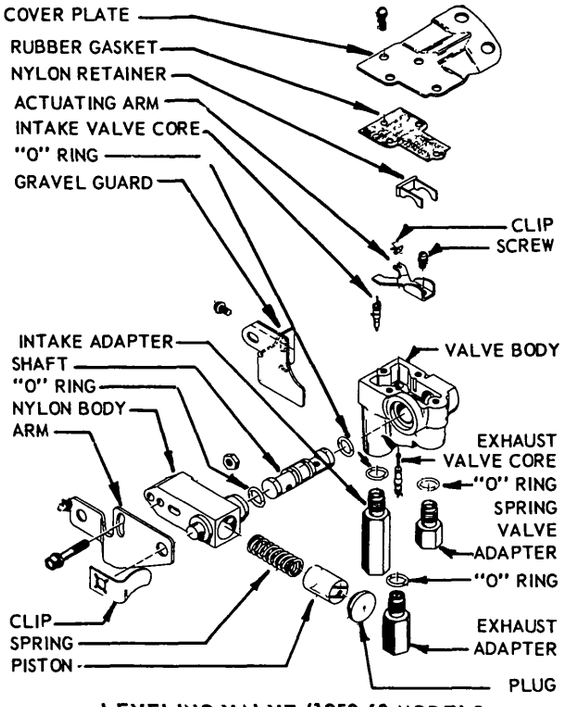
LEVELING VALVE (1958 MODELS & 1959-60 RAMBLER)

preventing regulated air from entering exhaust lines and allowing free air flow in exhaust side of system through the exhaust port to air compressor. When override lever is raised by pulling out on knob on instrument panel, the sliding valve moves off its seat in valve body and at the same time closes the exhaust port. This permits regulated air to reverse flow through exhaust lines, height control valves, and into springs, increasing pressure in the air springs and raising the car.

REMOVAL & INSTALLATION: *See individual car model air suspension data.*

LEVELING VALVE OVERHAUL
1958 MODELS & 1959-60 RAMBLER

DISASSEMBLY: *(CAUTION - Location and number of screens used in leveling valves is different for individual models. Care must be taken at disassembly to note location of screens for proper installation).* Clean exterior of height control valve with water and brush (do not use solvent). Remove valve cover screws and lockwashers, then remove cover and "0" ring. On leveling valves having a dashpot, remove dashpot retainer screws and carefully disengage dashpot shaft from slot in valve actuating arm. Rotate dashpot slightly and remove. On all valves, remove high pressure (longest) adaptor, then remove high pressure stem and "0" rings. Remove high pressure Schrader valve front stem using Tool J-6888. Remove low pressure adaptor (medium length) and "0" ring from valve body. *(NOTE - If low pressure Schrader valve is to be removed, remove copper*



LEVELING VALVE (1959-60 MODELS EXCEPT RAMBLER)

clip from end of valve, using care to prevent damage to clip so it can be reused, then remove Schrader valve using Tool J-6888. Remove air spring adapter (shortest) and "0" ring from valve body. Leveling valve cannot be dismantled further as actuating lever, torsion spring, and outside operating lever are pressed into the shaft and are not serviced separately. Valve shaft seal is vulcanized to shaft and to housing and cannot be removed. *(CAUTION - Do not force actuating lever as this will damage vulcanized shaft seal).*

CLEANING & INSPECTION: Clean interior of valve body with compressed air (do not use solvent or gasoline). Clean valve adaptors with solvent and compressed air. Inspect high and low pressure adaptors to be sure orifices are not plugged. Inspect screens. If plugged and cannot be cleaned, replace screen (if part of adaptor assembly, replace adaptor). Inspect valve cores for damaged sealing surfaces. Discard all "0" rings.

REASSEMBLY: *(CAUTION - Install all screens in same location from which they were removed at disassembly).* Clamp hex head of valve stem in vise, using soft jaws. Install both intake and check valve cores in stem with Tool J-6888, tightening each to 2½-3 inch lbs. (see illustration for valve identification). Install new "0" ring under hex head of valve stem using a suitable sleeve if available, to prevent damage to "0" ring. Start stem by hand into valve body and tighten to 12-51 inch lbs. Install exhaust valve core in body using Tool J-6888 and tighten to 2½-3 inch lbs. Spread ears of clip and as-

CONTINUED ON NEXT PAGE

G.M. AIR SUSPENSION VALVES (C ntinu d)

semble immediately behind exhaust valve stem head. Brace valve stem with screwdriver and, using Tongnose pliers, pinch ears together. *(NOTE* - Do not install clip too tightly as it must rotate freely on valve stem). Install new "0" ring on each adaptor, using suitable sleeve to prevent damage to seal. Apply film of SAE 20 oil on "0" rings to aid in air-tight seal. Install intake adaptor and exhaust adaptor, then install air spring adaptor and tighten all adaptors to 12-15 inch lbs. *(NOTE - Be sure and install screens in same locations noted at disassembly).* On valves with a dashpot, place dashpot into valve body and engage recess of dashpot shaft in slot of valve actuating arm. Retainer tabs must hold dashpot firmly against two shoulders of valve body recess. If necessary, manually operate lever assembly slightly to allow dashpot body to seat against shoulders. *(CAUTION* - Use care not to damage exhaust valve stem). Install retaining screws and tighten. Check position of intake and exhaust valve cores (not intake check valve) to be assured they open at correct time as follows: Connect hose, J-7143, to air pressure line and reduce pressure to 10-20 lbs. (Do not exceed 20 lbs.). Connect other end of hose tightly to exhaust adaptor. Place .049" end of gauge, J-7148-1 between middle ear of actuating arm and its stop opposite to valve cores. Insert wedge, Tool J-7148-2 between other side of arm middle ear and stop. Wedge should hold gauge, J-7148-1 so it will not fall out. Press slightly against exhaust core at seal seat using a thin screwdriver. A slight air leakage should be heard. Remove wedge and gauge. Place .053" end of gauge, J-7148-1 between middle ear of actuating arm and stop opposite to valve cores. Insert wedge on other side of arm and again press lightly against core seal seat. This time no air leakage should be heard. If leakage is heard in this test (with gauge and wedge still in place), bend upper ear of actuating arm slightly toward valve core seat using Tool J-7148-3. Press lightly once more against core and seal seat. If no leakage is heard, bending of arm was sufficient; however, if leakage still exists, bend ear a little more. Remove wedge and gauge and reverse their positions placing .049" gauge between actuating arm middle ear and stop on valve core side. Transfer air hose from exhaust to intake adaptor and increase air pressure to 50-80 lbs. Slight leakage should be heard and, if not, bend lower ear toward intake valve core until leakage is heard. Remove wedge, insert .053" end of gauge and replace wedge in same location from which it was removed. No air leakage should be heard; however, if leakage does exist, bend lower ear away from valve core with Tool J-7148-3 just enough to stop it. Place new "0" ring in valve body groove and apply a light coating of SAE 20 oil. Install cover and tighten screws to 20-25 inch lbs. Check for leakage, then remove air hose.

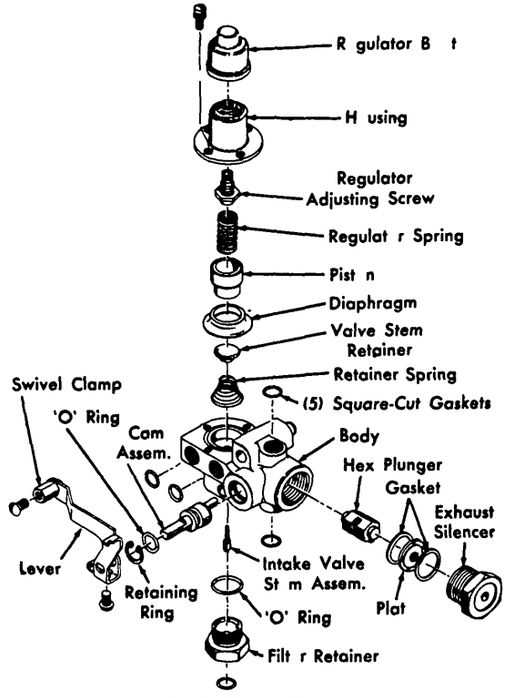
LEVELING VALVE OVERHAUL 1959-60 MODELS (EXC. RAMBLER)

DISASSEMBLY: Remove cover plate and discard gasket, then remove intake and exhaust valve adapters and wheel valve adapter. Discard the "O" rings. *NOTE – Do not remov exhaust or intake valve cor s unless d f ctiv . If defectiv , remov nylon r tain r, valve actuating arm r tainer screw, lockwasher, and actuating arm.* Remove exhaust valve core clip and then remove valve core from outer side of valve body, using Core Remover & Installer, Tool J–6888. *NOTE – exhaust valve core is the longer core.* Remove intake valve core from inner side of valve body with Tool J–6888. Remove leveling valve arm assembly by pulling assembly away from valve body. Discard the "O" ring. Remove screw securing gravel guard to body and remove guard. Remove spring clip from arm body by prying off with a screwdriver. *CAUTION – Be careful not to break plastic body or pivot point.* Remove rubber plug end from end of plastic body, then depress spring loaded piston (use Tool J–7796, Cadillac; J–8424, Oldsmobile to depress piston), and remove shaft from body. *CAUTION – Use care when depressing piston as it is spring loaded and could be ejected with great force.* Remove piston and spring from plastic body, then discard shaft "O" ring seals. Remove adjusting bolt from arm assembly and remove arm.

INSPECTION: Inspect all parts for defects or damage and replace as necessary. Clean all parts with solvent and dry with low pressure air.

REASSEMBLY: Use Valve Core Remover & Replacer, Tool J–6888 with a torque wrench, install both cores in valve body and tighten to 2½–3 inch lbs. *NOTE – Intake valve core is the shorter core and must be installed in smaller valve seat, inside valve body. The exhaust valve core must be installed in counterbored valve seat from outside the valve body.* Use a new "O" ring and install intake flow valve over intake valve core in valve body, then tighten to 12–15 inch lbs. Do not damage "O" ring. Install wheel valve adapter with a new "O" ring and tighten to 12–15 inch lbs., then install gravel guard on valve body. Reassemble leveling valve arm by reversing disassembly procedure, then lubricate arm spring with several drops of engine oil and install assembly in valve body, using a new "O" ring seal on arm shaft. Lubricate shaft bearing surfaces with petrolatum, then position arm shaft with slot up and install actuating arm so that tab with slotted end is under the exhaust stem core and install exhaust valve core clip. Install nylon retainer with radius over arm shaft and secure actuating arm with screw and lockwasher. *NOTE – Whenever intake or exhaust valve core is removed and replaced it is necessary to check adjustment of respective tabs on valve actuating arm.* Install new rubber gasket on valve body and install cover plate. Tighten retaining screws to 10–15 inch lbs. Check valve for leakage.

ADJUSTMENT: Cadillac – Remove leveling valve cover and rubber gasket, then remove wheel valve adapter and intake valve adapter. Fasten clamp portion of Dial Indicator Set, Tool J–8001, on leveling valve (see illustration). Use a thin flat washer to protect machined surface of leveling valve, and to hold down nylon retainer. Place clamp and leveling valve in a vise, then remove knob from indicator and replace with Extension, Tool J–7057. Install dial indicator assembly on clamp and position extension over intake valve core. Move leveling valve arm downward until actuating arm bottoms, then move dial indicator assembly down until light tension is obtained against actuating arm. Set dial indicator to zero, then insert a 1/8" drift punch into intake valve opening from bottom and lightly depress valve core to fully closed position. Record reading on dial indicator (this reading indicates intake valve travel). While still holding intake valve core in closed position with drift punch, set dial indicator to zero and raise leveling valve arm until exhaust valve core starts to unseat. Record dial indicator reading at this point. *NOTE – This distance is the "dead band area" and is the distance the actuating arm trav ls from the time the intake valv closes until exhaust valve begins to open.* After "dead band area" distance has been determined, continue raising leveling valve arm upward until actuating arm contacts nylon retainer, and note indicator reading. Remove drift punch. Subtract "dead band area" distance reading from the final reading taken to determine exhaust valve core travel. *NOTE – Exhaust and intake valve core travel should be a minimum of .025". Any travel over .025" is allowable. The "dead band area" should be between .035–.050".* If any of the above travel distances are not within specifications, bend legs of actuating arm, using Bending Tool J–7183–2, as follows: To increase intake valve core travel, bend intake leg of actuating arm down slightly. To increase exhaust valve core travel, bend exhaust leg of actuating arm up slightly. To increase "dead band area", bend leg of actuating arm corresponding to valve having the most travel. To decrease "dead band area", bend leg of actuating arm corresponding to valve having the least travel. *NOTE - If any adjustments are made, recheck all measurements.*



LIFT VALVE (TYPICAL)

Buick: With valve cover, exhaust valve clip, and intake fitting removed from valve body, mount Dial Indicator, KMO–30–B, Sleeve, KMO–30–K, and Support J–1013 on machined cover surface of valve body so indicator stem contacts the exhaust valve core. Set indicator to zero and move valve lever to raise core. *NOTE – Make sure that plastic stop is held down to insure*

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G.M. AIR SUSPENSION VALVES (C ntinued)

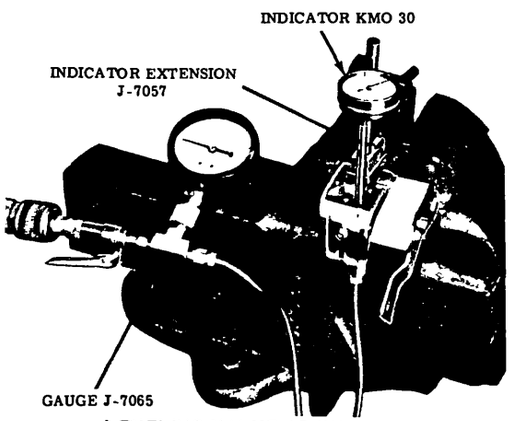
proper reading. Total travel of exhaust core should be .010—.015". If core travel is not correct, bend lever ear a very slight amount with Bending Tool, J—7148—3. Recheck valve travel and adjust as necessary. Install valve core clip and avoid bending core stem. Install long extension, J—5339, on dial indicator, then install intake fitting **in air spring fitting opening** in valve body. *NOTE — Air spring fitting is farthest from intake core.* Mount dial indicator assembly on top of intake fitting and check intake core travel as follows: Set dial indicator to zero and move lever to raise core. Total travel of core should be .025—.030". If core travel is not correct, bend the lever ear, using Bending Tool J—7148—3. Recheck valve core travel and adjust as necessary. Remove intake fitting from air spring fitting opening in valve body, then replace cover using a new gasket. Install air spring fitting in proper opening and install intake fitting.

Oldsmobil : Remove valve cover, then remove air spring valve adapter (two adapters on front height valve). Remove small contact from Dial Indicator, KMO—30 and replace with Extension J—7057, then attach dial indicator to height control valve (see illustration), and mount the assembly in a vise. Connect Gauge J—7065 to intake adapter and attach air supply line to gauge. Position Indicator Extension J—7057 so it contacts and exerts pressure on actuating arm directly above intake valve core. Raise operating lever until it is horizontal, then move lever down **until actuating y k stops m ving** (air should flow through intake adapter). Set dial indicator to zero. Slowly raise operating lever until intake valve closes (air just stops flowing) and note reading on indicator which should be .025—.060". If reading is not within specifications, bend intake arm of yoke with Bending Tool J—7148—3, bend arm away from valve to decrease reading, toward valve to increase reading. Recheck valve travel adjustment. To check "dead band area", raise operating lever until yoke arm just starts to open exhaust valve, then set dial indicator to zero. Slowly lower operating arm until air just starts flowing and note reading on indicator. Travel should be .030—.040". To adjust "dead band area", bend yoke exhaust arm with Tool J—7148—3. Bend arm away from exhaust valve to decrease reading, bend arm toward exhaust valve to increase reading. Recheck travel and adjust as necessary. Remove indicator assembly and install adapters, gasket and cover.

MANUAL VALVE OVERHAUL

ALL MODELS (EXC. RAMBLER)

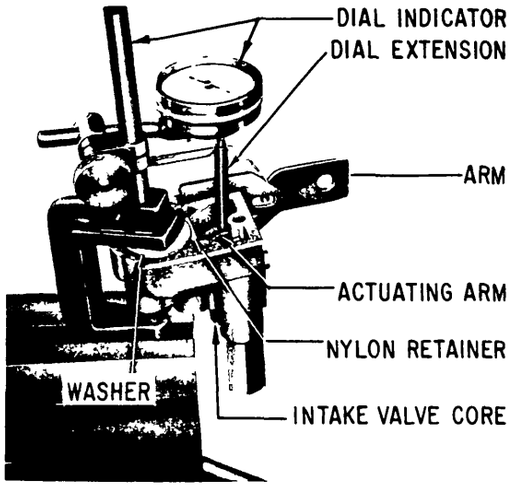
DISASSEMBLY: On Cadillac, loosen lever retaining screw and remove lever. On other cars remove lever return spring, then loosen retaining screw and pull lever from shaft. If lever spring bracket attached to valve housing, remove three screws and remove bracket. Remove rubber boot, then remove remaining screw and



LEVELING VALVE ADJUSTMENT (EXCEPT OLDSMOBILE)

remove piston housing assembly. Withdraw diaphragm, piston and spring from piston housing. Remove filter retainer assembly and destroy "0" ring. While holding valve stem retainer firmly in place, unscrew valve stem from retainer with Tool J-7085. Destroy retainer. Remove cam retaining ring using Truarc pliers, then remove cam and destroy "0" ring. Remove exhaust fitting and withdraw plate, gasket, and sliding valve. Destroy gasket.

REASSEMBLY: Before reassembly clean all parts in solvent and blow dry with air. Replace all defective parts. Insert sliding valve into body with slot toward top (diaphragm side of body). Install new gasket, plate, second new gasket, and fitting into body. Tighten retainer to 45-55 inch lbs. Install new "0" ring into groove in cam and install into valve body with flat of shaft upward. Cam pin must enter slot of sliding valve. Install cam retaining ring using Truarc pliers. Assemble new valve stem retainer in small diameter end of retainer spring and insert assembly into valve body, large end of spring first. While holding retainer firmly in place, insert valve stem through intake port and screw stem carefully into retainer using Tool J-7085 *(NOTE* - Stem must be secure in retainer, but must not bottom since it will raise a small knob on rubber diaphragm side of retainer which may puncture diaphragm). Assemble new "0" ring on filter retainer. Using shim stock or suitable sleeve over retainer threads, install "0" ring. Apply film of SAE 20 oil on "0" ring and install filter retainer. Tighten to 45-55 inch lbs. Form a pocket in fabric side of new diaphragm with finger and place diaphragm, rubber side down, in groove in valve body. Insert regulator spring in piston. With regulator



LEVELING VALVE ADJUSTMENT (OLDSMOBILE)

screw turned as far as possible out of piston housing, slip spring and piston into housing. Make sure diaphragm is exactly centered and set piston, spring and housing assembly on diaphragm and body. Small end of piston must seat in diaphragm. Start housing attaching screw and lockwasher in hole nearest center of body. Complete reassembly by reversing disassembly procedure, then adjust pressure regulator for correct working pressure (see below).

PRESSURE REGULATOR ADJUSTMENT: With car on jack stands and air suspension system completely exhausted, disconnect high pressure line to front air springs on manual valve. Connect Air Ride Hose, J-7143 (make sure that "0" ring remains in seat in valve) to line fitting. Operate engine to replenish supply in air suspension system, then operate engine at slow idle to maintain air pressure. Depress service valve stem on end of hose, Tool J-7143 momentarily allowing air to escape, then check pressure at service valve end of hose, J-7143 using a suitable pressure gauge. Pressure in system should be 145 lbs. (Exc. Cadillac); 125 lbs. ± 5 lbs. (Cadillac Series 60 & 62); 150 lbs. ± 5 lbs. (Cadillac Series 75). If pressure not within limits, remove rubber boot from top of lift valve and rotate pressure regulator screw as necessary to bring pressure within specifications. *(NOTE* - After each adjustment, depress service valve in end of hose to allow regulator to operate before checking pressure). After completing adjustment, replace rubber boot, then turn off engine and exhaust all pressure in system. Remove hose, Tool J-7143, install a new "0" ring in valve seat and install front air line.

FORD & MERCURY AIR SUSPENSION VALVES

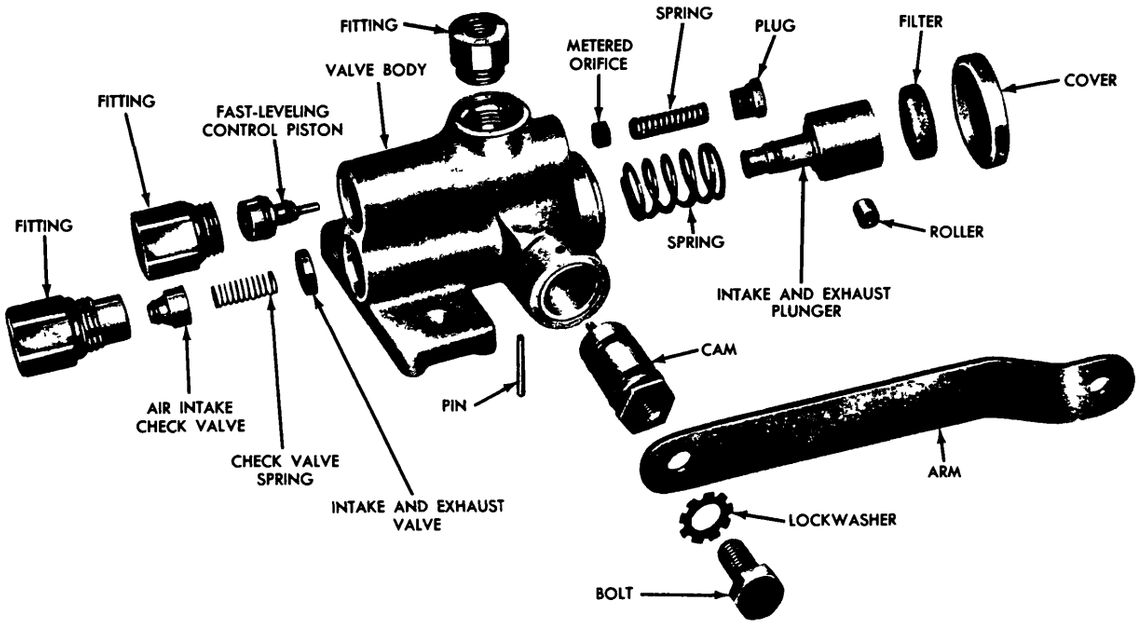
Ford (1958)
Mercury (1958)

►*OVERHAUL NOTE:* Solenoid Valve, Pressure Regulator Valve, T-Check Valve, and Restrictor Valve are not serviced and must be replaced with a new assembly if found to be faulty.

DESCRIPTION: These lever operated Leveling Valve assemblies consist of two separate valves; one controlling low air pressure for "slow-leveling" and the other controlling high pressure for "fast leveling". A lever, connected between valve cam and car body regulates the amount of air admitted to, or exhausted from, the air spring or springs (individual valves for each air spring at front of car, and a single valve for the two air springs at rear of car).

OPERATION: Slow-Leveling Control - Reservoir pressure at pressure regulator valve is reduced to 160 lbs., and is directed to leveling valve where it enters just above the air intake check valve. This pressure unseats check valve and enters above intake and exhaust valve. When leveling arm is moved upward by suspension arm or rear axle, the intake and exhaust plunger moves intake seat upward, allowing air pressure to flow around valve and metered orifice valve. Pressure flows through center of metered orifice valve, out of leveling valve, through T-check valve, and into air spring. When leveling valve arm is moved down, intake and exhaust plunger also moves down, opening the exhaust seat. Intake and exhaust valve closes off pressure supply to T-check valve. Pressure flows from the air spring through T-check valve, to leveling valve, and through center of metered orifice valve. This pressure then flows to intake and exhaust valve plunger, and exhausts through center of the plunger.

Fast-Leveling Control: When one of the doors is opened, the solenoid valve is energized by action of plunger type switch at door. Full reservoir pressure passes through solenoid valve and enters each leveling valve above fast leveling piston which moves down to open the metered orifice valve. This open valve permits air pressure from pressure regulator valve or from T-check valve to pass through leveling valve more rapidly. When leveling valve arm is moved up by suspension upper arm or axle, the movement of air pressure from pressure regulator valve is the same as for slow-leveling control system except that the pressure travels around metered orifice valve instead of through the orifice. Downward movement of leveling valve arm also provides same pressure flow as in slow-leveling control system, except that metered orifice valve is open and permits air to exhaust more rapidly from T-check valve.



FORD & MERCURY LEVELING VALVE

REMOVAL & INSTALLATION: *See individual car model air suspension data.*

DISASSEMBLY: Position leveling valve assembly in a soft jawed vise, then remove both the low and high pressure fittings from valve. Remove valve assembly from vise and remove air intake and check valve, spring, and intake and exhaust valve in that order from low pressure side. Remove exhaust end cap from bottom of valve. Remove fitting from underneath metered orifice valve and remove spring and valve. Remove bolt and washer holding operating arm on valve, then drive out pin holding operating arm cam roller on valve body, and remove cam assembly. Remove intake and exhaust plunger and spring from valve. A nylon roller connecting the operating arm cam will be removed with plunger. Remove air spring supply line fitting from valve.

CLEANING & INSPECTION: Clean all metal parts in solvent and dry with compressed air. Inspect threads and valve seats for damage, and correct as required. Inspect valve body for cracks or casting flaws that might cause leakage. If valve body or valves are damaged, it will be necessary to replace complete valve assembly. Inspect all "O" rings and seals for damage, and replace as necessary. Inspect nylon cam roller for evidence of wear.

REASSEMBLY: Position nylon cam roller on operating arm cam, then install intake and exhaust plunger spring. Insert intake and exhaust plunger in its bore and slide the leveling valve arm cam into place so nylon roller fits into slot in intake and exhaust plunger. Move arm cam in and out to align the pin hole in valve body with locating slot in cam, and install pin. Position felt breather over end of intake and exhaust plunger assembly and snap plastic cover in place. Position arm on cam and install bolt and external toothed washer. Install intake and exhaust valve and check valve spring. Position check valve over spring and install low pressure line fitting. Insert fast-leveling operating piston in high pressure line orifice and install high pressure line fitting. Install metered orifice valve with the wobble wire and spring. Install plug and seal in metered orifice valve bore and air spring supply fitting.

AIR SUSPENSION COMPRESSORS

Car Model	Air Compressor Type
Buick (1958)	G.M. 2 Cyl.
Buick (1959)	G.M. 1 Cyl.
Cadillac (1958-60)	G.M. 2 Cyl.
Chevrolet (1958-59)	G.M. 1 Cyl.
Ford (1958)	Ford, Merc., Rambler
Mercury (1958)	Ford, Merc , Rambler
Oldsmobile (1958-59)	G M. 2 Cyl.
Pontiac (1958-Early 1959)	G.M. 2 Cyl.
Pontiac (Late 1959)	G M. 1 Cyl.
Rambler (1958-60)	Ford, Merc , Rambler

DESCRIPTION: Different type air suspension air compressors used as follows:

G.M. Two Cylinder: "V" type reciprocating type bolted directly to power steering pump and reservoir assembly (Exc. Pontiac with manual steering) On Pontiac models with manual steering, a separate oil reservoir is bolted to compressor in place of power steering pump assembly Compressor is lubricated by a two-stage vane type pump located at drive end of compressor Oil from power steering reservoir (separate reservoir on Pontiac models with Manual steering), flows by gravity into crankcase of compressor where it is maintained at a constant level by one stage of compressor oil pump which returns excess oil to reservoir The second stage of compressor oil pump furnishes pressure lubrication to front and rear crankshaft bushing and connecting rods Cylinder walls and pins are spray lubricated by connecting rods

G.M. One Cylinder: Single stage, single cylinder reciprocating type driven by a belt from engine fan hub assembly Compressor is lubricated by oil from engine pressure oiling system which is introduced through a connection on compressor bearing housing Drilled passages in compressor crankshaft provide lubrication to connecting rod and crankshaft bearings and to cylinder walls Oil is returned to engine crankcase by a line from compressor pump

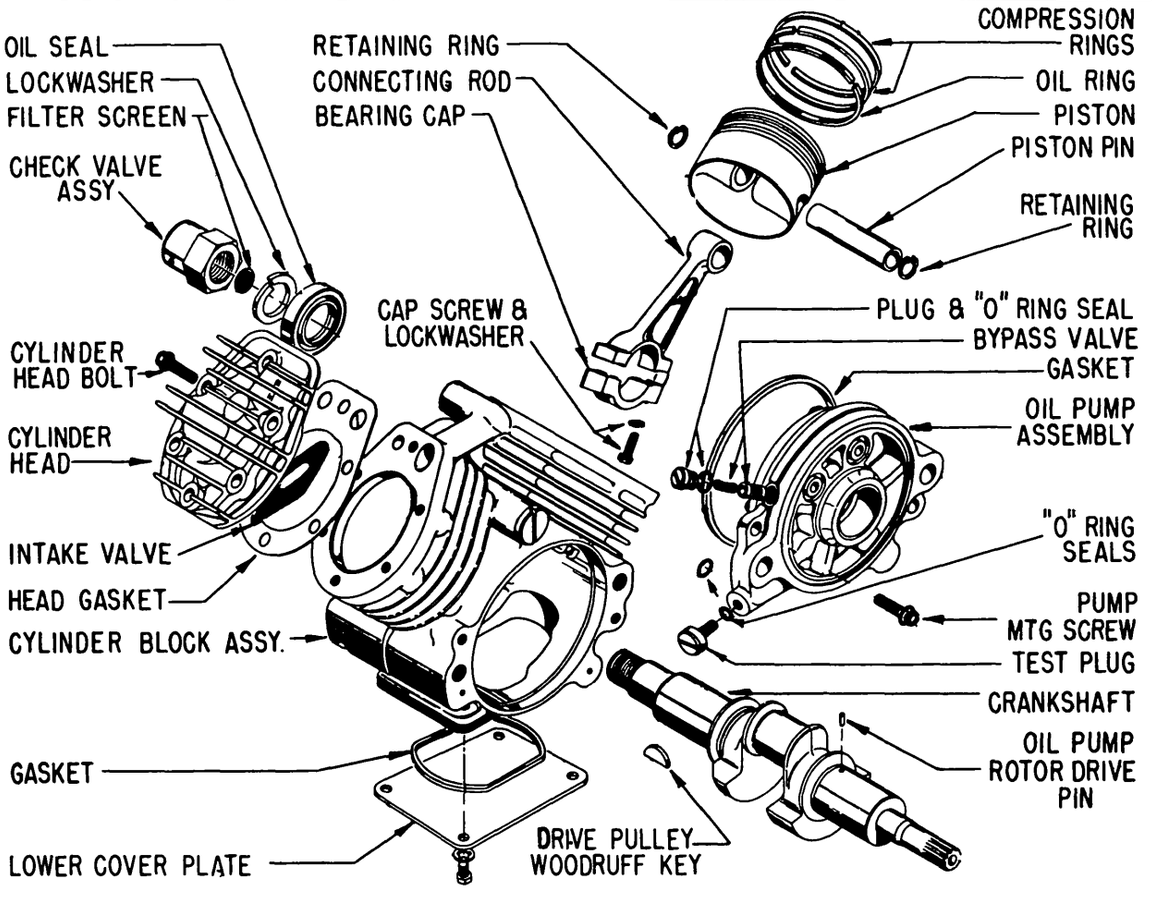
Ford, Mercury & Rambler: Single cylinder reciprocating type driven by belt from engine water pump pulley (Ford & Mercury); from power steering pump (Rambler Series 20 & 80), from double fan hub (Rambler Series 10). Oil for compressor lubrication is piped from engine lubricating system. A return line allows oil to return to engine crankcase.

REMOVAL & INSTALLATION: *See individual car model air suspension data.*

COMPRESSOR OVERHAUL

G.M. TWO CYLINDER

DISASSEMBLY: Remove grease and dirt from exterior of compressor with a wire brush and air hose. If compressor has an integral reservoir, remove cap and invert reservoir to drain oil. If unit is compressor and steering pump assembly, remove two bolts and carefully withdraw compressor from steering pump so as not to damage pump seals with splines of crankshaft. Remove sump cover plate and gasket. Support unit on its base and remove cylinder heads and gaskets. Clean cylinder heads and mating surfaces on cylinder, then cover underside of head to keep passages clean. Invert unit and remove connecting rod caps, then push pistons, with connecting rods attached out top of cylinder. Remove two bolts attaching bearing plate and oil pump to cylinder block, then carefully slide bearing plate and pump assembly off crankshaft so as to prevent damage to bearing. Remove gasket and "0" rings from plate and pump assembly. Withdraw crankshaft straight out of cylinder housing to prevent damage to bearing. Place a large steel washer (approximately 1½" I.D.) over face of seal opening to protect cylinder housing, then insert tip of screwdriver well into seal flange and pry seal out of bore. Use caution while removing seal to prevent damage to bearing. Remove retaining rings from each end of piston pin and remove pin and connecting rod, then remove three rings from piston. If necessary to disassemble oil pump, see "Oil Pump" below.



G. M. 2 CYLINDER AIR SUSPENSION COMPRESSOR

INSPECTION: Wash all parts in solvent and blow dry with air. Check oil passages to insure that openings are free of foreign material. Inspect crankshaft bearings.

REASSEMBLY: Install a new seal in bore using Tool J-7079, so it is flush with top of bore. Lubricate front bearing and seal with power steering oil, then install crankshaft and push it through seal and bearing with a slow, steady pressure. Be sure oil passage in shaft is open. Install new "0" rings in oil pump and bearing plate assembly at oil passage holes, then place a new square cut sealing ring against shoulder in compressor housing. Rotate crankshaft until oil pump drive pin points toward one of the retaining bolt holes in compressor housing, then rotate pump rotor so that slot points toward corresponding hole in bearing plate. Lubricate crankshaft journal and bearing and ease pump and plate assembly over shaft *(CAUTION - Do not force)*. Rotate bearing plate back and forth slightly until drive pin can be felt in rotor slot, then press assembly forward. Install retaining bolts and tighten to 40-50 inch lbs. Inspect piston, pins and rods for excessive wear and replace complete assembly if any part is defective. Position rod into piston and push pin through rod and piston. Replace snap rings at each end of pin and be sure rings seat properly in groove of piston. Before replacing rings, press rings down into bore with piston and check end gaps which should be .002-.007" (two upper rings), .005-.013" (bottom ring). Replace rings on piston with raised dot on each ring in

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AIR SUSPENSION COMPRESSORS (C nt.)

an up position. Stagger ring openings 120° apart (*CAUTION* - Be sure correct rings are installed in proper grooves of piston). Insert piston and rod assembly through ring compressor, Tool J-7081, until piston skirt extends below bottom of ring compressor. Install assembly into bore with long ear of connecting rod toward top of block, then press piston and rod assembly into bore until rod contacts crankshaft journal. Install rod cap and tighten bolts to 25-30 inch lbs. Install remaining rod and piston assembly in the same manner. Clean oil sump return line filter screen and install it carefully. Place a new square cut rubber sealing ring in channel around sump opening, then replace sump cover and tighten screws to 40-50 inch lbs. Install head gasket using a few drops of oil to hold gasket in position (do not use sealing compound). Make sure intake valve (reed valve) is properly located over dowel pins on head, then replace head and tighten bolts alternately from side-to-side to 80-90 inch lbs. Install remaining cylinder head in same manner.

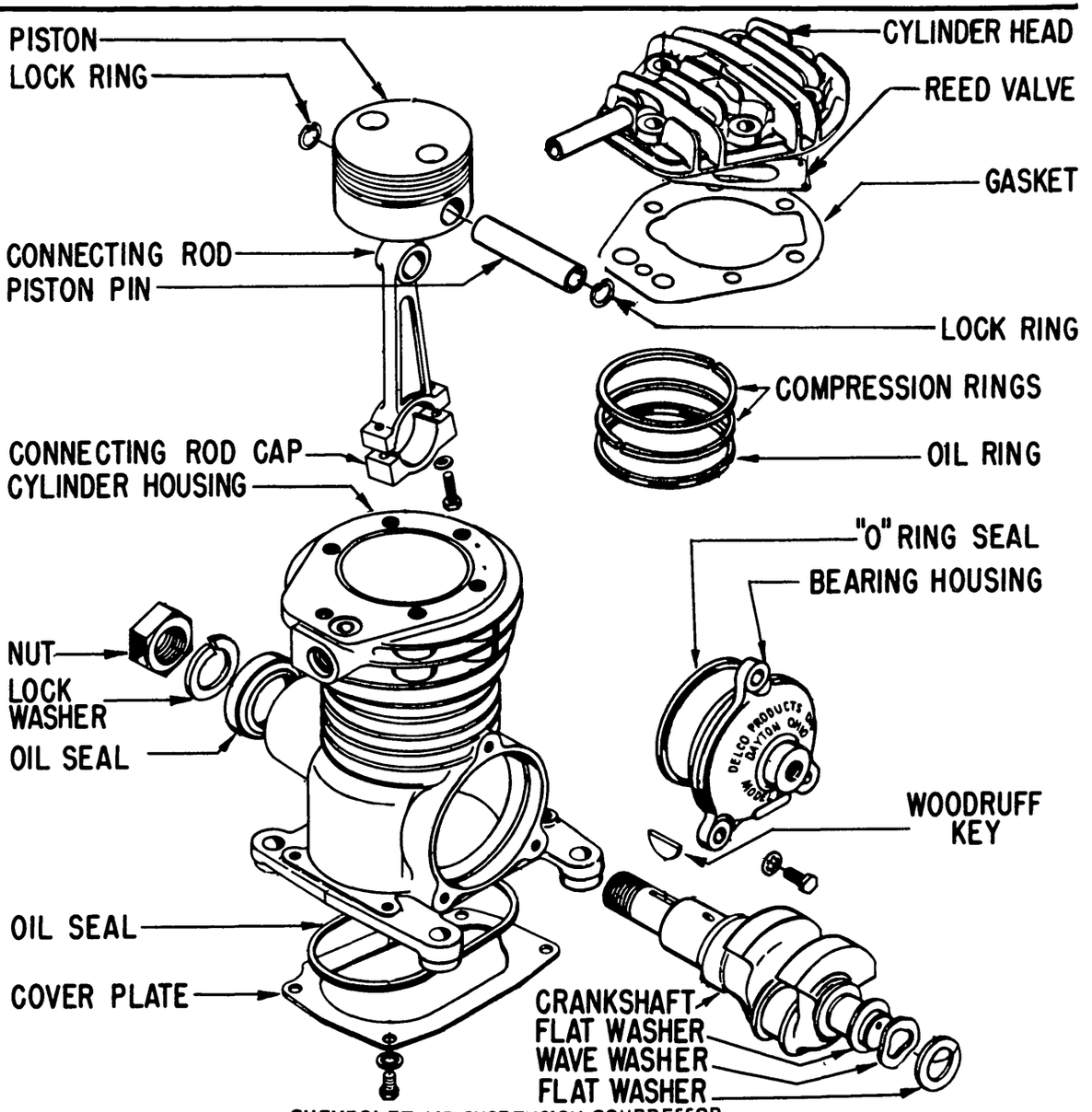
OIL PUMP: Disassembly - (*NOTE* - Whenever oil pump pressure or flow is not satisfactory; pump must be disassembled). Remove bearing plate and pump assembly from compressor, then bend tabs of pump shield and remove retaining screws. Remove shield and cover, then remove pump vanes and springs. Remove two retaining screws from pump stator, and remove pump rotor and stator. Remove by-pass valve plug, spring, and plunger. Remove test plug.

R assembly & Adjustment: Wash all metal parts in solvent, blow out oil passages, then blow parts dry with air. Replace test plug with a new "0" ring. Replace by-pass valve plunger, spring, and plug, using a new "0" ring. Position pump stator on bearing plate with the six mounting holes aligned and install two stator retaining screws finger tight in threaded holes nearest external mounting holes. Place stator aligning tool, J-7153 in stator cavity making sure that tool is clean and free of oil. (*NOTE* - If crankshaft from compressor is used for alignment, then bearing journals must be within limits of .999-1.000" in two places 90° apart. If not within these limits, a new crankshaft or a plug which meets these limits must be used). Work aligning tool and bearing plate very carefully onto crankshaft to prevent damage to bearing journal. (*CAUTION - Do not use force).* With stator in position where aligning tool and bearing plate rotate freely on crankshaft, tighten two retaining screws. Recheck stator alignment by removing bearing plate from crankshaft, revolving aligning tool 90°, and again placing on crankshaft. Aligning tool should rotate freely on crankshaft and in pump rotor. If tool does not rotate freely, loosen stator retaining screws and repeat alignment procedure. Remove stator aligning tool and install new or acceptable rotor. Install new pump vanes and springs in vane slots. Lubricate pump rotor and vanes with power steering oil. Place pump cover plate and shield in position so holes align and tighten retaining screws to 25-30 inch lbs. Bend tabs of pump shield up in lock position.

G.M. ONE CYLINDER

DISASSEMBLY: Remove grease and dirt from exterior of compressor with a wire brush and air hose. Invert compressor and remove screws retaining sump cover plate. Remove plate and square cut rubber seal. Place unit on its base and remove cylinder head, flapper valve, and gasket. (*NOTE* - After prolonged service, cylinder head may be hard to remove. If necessary, leave compressor mounted on engine, then back off cylinder head screws 2 or 3 turns and operate engine until cylinder head is loosened). Scrape off gasket material from cylinder head and block, then invert unit and work through sump opening. Remove connecting rod cap and push piston and rod assembly out through top of cylinder. Use Truarc pliers and remove retaining rings from each end of piston pin. Remove piston pin and connecting rod, then remove three piston rings. Remove bearing housing and "0" seal ring. Remove crankshaft from block, pulling straight out to prevent damage to bearing, then remove washers from end of crankshaft or from end of bearing housing. Place a large steel washer (approximately 1½" I.D.) over face of seal opening to

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CHEVROLET AIR SUSPENSION COMPRESSOR

AIR SUSPENSION COMPRESSORS (Cont.)

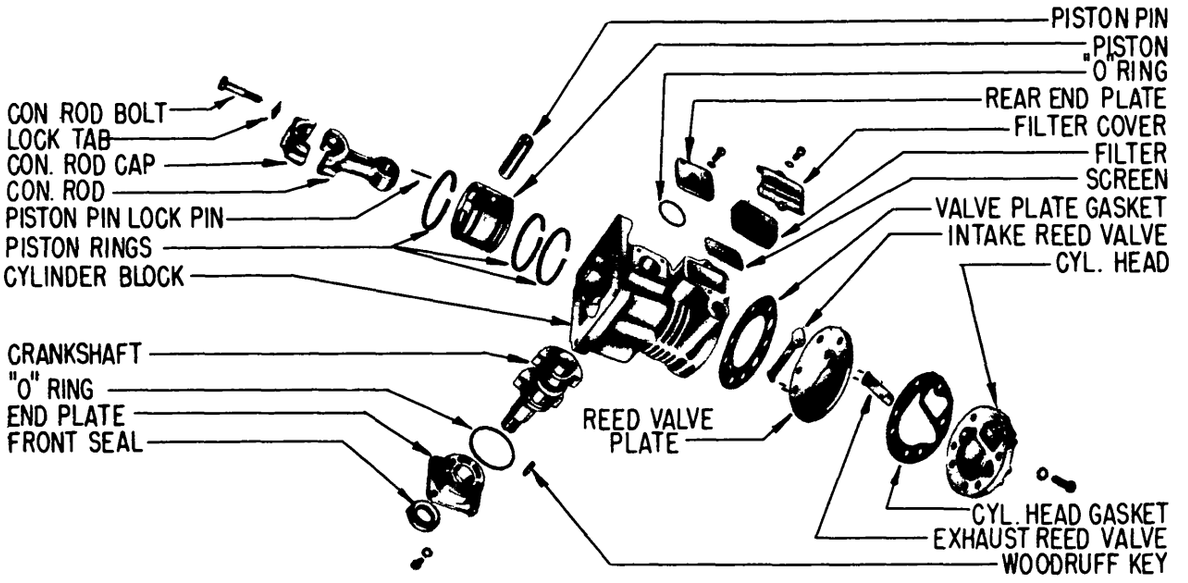
protect bore, then insert tip of screwdriver well into rubber seal to insure contact with metal flange and pry upwards (*CAUTION* - Be careful not to damage bearing while removing oil seal).

CLEANING & INSPECTION: Wash all metal compressor parts in cleaning solvent and blow dry with air. Check all openings and passages to make certain they are free of foreign matter and are open. Inspect bore of shaft opening for pitting or scoring. Any such damage should be dressed with fine lapping compound before inserting in new seal. Inspect all parts for wear, pitting, or damage and replace necessary parts. *NOTE* - Piston, pin, and connecting rod are serviced only as an assembly.

REASSEMBLY: Insert a new seal with "Bore-Tite" coating in compressor using Tool J-7080. (*NOTE* - Compressor bodies will have step in which seal must be seated against. Tolerance stack-ups could have seal above, below, or seated flush with compressor lug face when seated against cap). Push crankshaft through bearing and oil seal with a steady pressure to eliminate possible damage to bearing and new seal. Insert a new "O" ring seal in bearing housing opening and slide bearing housing in position. Align mounting holes, insert retaining screws and lockwashers and tighten to 40-50 inch lbs. Install new piston rings on piston in proper location with pip marks up. Position connecting rod in piston and press pin into position and secure piston pin by installing retaining rings at each end of pin. Before installing piston and rod assembly in cylinder, use a hand hone and roughen cylinder walls to remove glaze. Stagger piston ring gaps so they are 120° apart, then insert piston and rod assembly through Tool J-7081 until a portion of piston extends below bottom of ring compressor. Lubricate cylinder walls with light engine oil, then insert piston and connecting rod assembly into cylinder bore making sure that long ear of connecting rod is on down position toward oil outlet opening in cylinder housing. Rotate crankshaft until rod journal is in upper dead center position, then press connecting rod and piston assembly in until rod is in contact with crankshaft journal, then install connecting rod cap and tighten bolts to 25-30 inch lbs. (*NOTE* - Connecting rod and connecting rod cap should be matched by notched flange). Place a new square cut rubber seal in channel around sump opening, then install sump and tighten screws to 40-50 inch lbs. Install new head gasket (do not use gasket compound), then install cylinder head making sure that intake valve is in position on locating pins. Tighten cylinder head bolts to 80-90 inch lbs. Alternate in a triangular sequence to prevent cylinder head distortion.

FORD, MERCURY, RAMBLER

DISASSEMBLY: Clean exterior of compressor with cleaning solvent and a wire brush. Remove crankshaft pulley by removing "nylock" bolt and flat washer. Gently tap pulley from shaft, then remove key from keyway. Remove cylinder head bolts, then remove cylinder head and valve plate. Scrape all gasket material from cylinder head, valve plate, and cylinder block after removing the reed type valves. Be careful not to damage surfaces or reed valve dowel pins and valve seats. Release connecting rod lock tabs and remove bolts. Remove connecting rod and piston assembly by pushing it through top of cylinder bore. Remove crankshaft front end plate capscrews, then remove crankshaft and front end plate by pushing crankshaft through front of crankcase. Remove air filter retaining screws, lockwashers, and cover plate, then remove filter. Remove piston rings from piston, then using needle nose pliers, work out the piston pin retaining (roll) pin from inside diameter of piston pin. Drive out piston pin from piston and connecting rod. If necessary, use a blunt tool.



FORD, MERCURY, RAMBLER AIR SUSPENSION COMPRESSOR

CLEANING & INSPECTION: Clean cylinder head and valve plate to remove all foreign material from discharge and intake cavities. Scrape all dirt and particles of old gaskets from surfaces, then inspect cylinder head and valve for damage, and replace as required. Clean reed type valves by lapping on a piece of crocus cloth on a flat surface. Replace if worn or damaged to to the extent that they do not contact seat. Clean all passages in crankshaft, connecting rod and end covers. Probe and flush with cleaning solvent. Use cleaning solvent to remove foreign material from cylinder block and cavities. Inspect block for cracks or other damage. Wash the air filter and attaching parts in solvent and dry with compressed air. *NOTE - Do not oil the filter.*

REASSEMBLY: Install crankshaft through front of cylinder block, then check clearance between crankshaft and main bearing using a feeler gauge. Install a new crankshaft seal in front cover recess and a new "O" ring seal in groove. (*NOTE* - Coat new seal lightly with sealer and install in front cover recess by using a flat tool or plate and driving gently inward with a mallet until flush or fully seated). Carefully position crankshaft front end plate assembly over crankshaft and into cylinder block recess and tap into place with a mallet. Install bolts and lockwashers and tighten to 6-9 ft. lbs. Check piston bore for out-of-round, and piston fit in bore. Correct as necessary. Position rings in bore and check end gap. Piston bore should not exceed .002" out-of-round, or taper should not exceed .003". Piston ring end gap should be .005-.015". Install connecting rod in piston, then install pin and align piston pin lock pin hole in relation to hole in piston boss. Lubricate pin with engine oil and install lock pin. Using a pin punch, drive pin slightly below surface, and secure by staking hole slightly. Install piston rings on piston (all rings are identical) so dot mark on chamfered side of ring is upward. Stagger end gaps so they are approximately 120° apart. Check ring to groove side clearance which should be .002-.006". Position crankshaft rod journal toward bottom dead center, then install piston and connecting rod assembly in cylinder bore so piston pin lock pin (roll pin) is at the air inlet side of cylinder block. Lubricate bearings, piston and cylinder bore with clean engine oil then install piston fully into position using fingers or ring compressing tool. Install connecting rod cap and tighten bolts to 6-9 ft. lbs. (*NOTE* - Machined ribs on cap and rod should match). Secure connecting rod bolts by bending lock tab against flat of bolt heads. Position valve plate gasket, intake valve, valve plate, discharge valve, cylinder head gasket, and cylinder head on cylinder block. Install cylinder head bolts and tighten to 15-17 ft. lbs. Install air filter in cylinder block recess, then install cover plate and retaining screws and tighten securely. Install crankshaft pulley key in crankshaft keyway and install crankshaft pulley. Install "nylok" bolt and flat washer and tighten to 14-18 ft. lbs. Check compressor for freedom of rotation.

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

STEERING LINKAGE

►*STEERING LINKAGE (POWER STEERING CARS)*

NOTE: Linkage on these cars is essentially the same as for manual steering cars. *See individual Power Steering pages for diff r nc s.*

STEERING LINKAGE & ADJUSTMENT: Special linkage and adjustment on cars and trucks as follows:

1954-60 BUICK

Buick: Linkage—Consists of an intermediate rod between steering gear pitman arm and idler lever on right side of frame, and individual tie rods between intermediate rod and each wheel. Adjustable sleeves provided at end of each tie rod for toe-in adjustment.

Idler Lev r & Supp rt Adjustment—In order that idler lever ball stud is kept level with pitman arm ball stud, thread support into idler arm bushing until distance from center of support lower bolt hole to nearest face of idler lever is 2 21/32" to 2 3/4" (1954-58); 2 15/16" to 3" (1959-60).

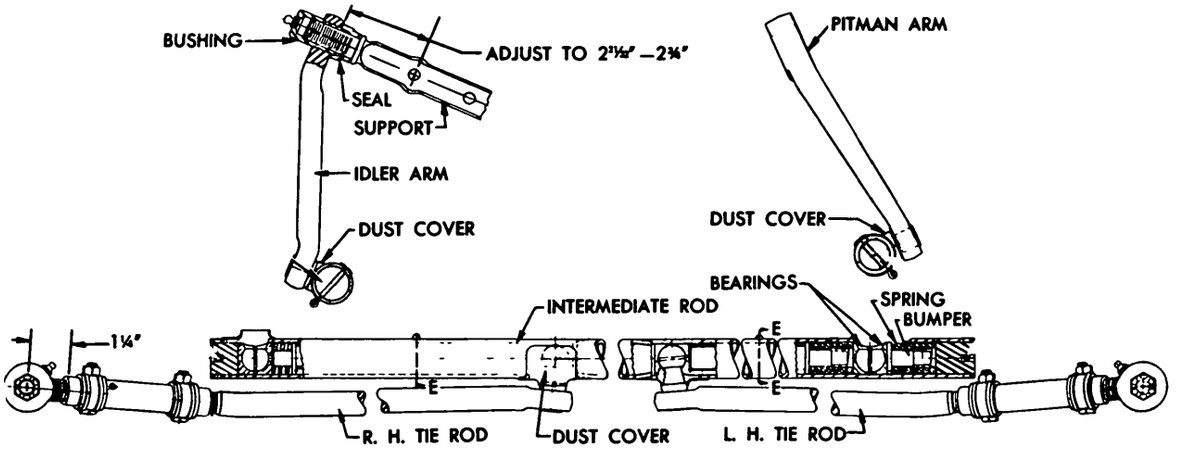
Int rm diat Rod End Plug Adjustment - On idler lever end of rod, turn end plug up tight, then back off ¼-½ turn (½ turn preferred) and install cotter pin. On pitman arm end of rod, tighten end plug, then back off 2±1/8 turns (1954-58 Manual Steering); 4±1/8 turns (1959-60 Manual Steering). On Power Steering cars, tighten pitman arm end in same manner as for idler arm end.

1954-60 CADILLAC

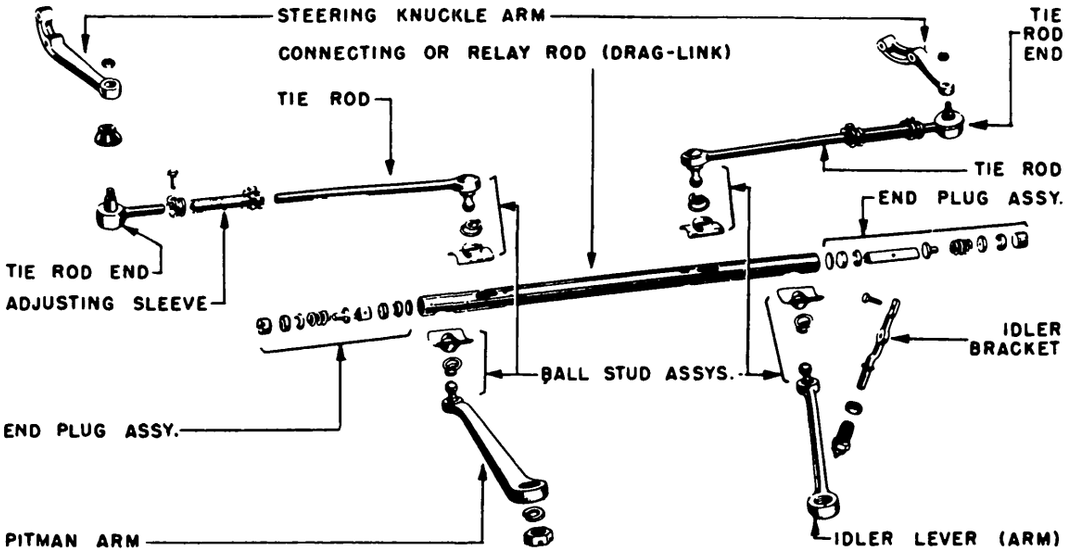
Cadillac: Linkag—Consists of a drag link between steering gear pitman arm and idler arm mounted on right frame side rail, and individual tie rods between drag link and each wheel. Adjustable sleeves provided at outside ends of tie rods for toe-in adjustment.

Drag Link Adjustm nt - Place a straight bar across two adjustable jacks directly below drag link, then adjust jacks so that distance from top of bar to flat spot on frame (1954-56); ½" outboard of frame side rail (1957-60) is equal on both sides. *NOTE - Adjusting jacks to even number of inches will aid in measurements.* Measure distance from bottom of drag link to top of bar on both sides. Difference in measurement bxtween first measurement (top of bar to point on frame) and second measurement (bottom of drag link to top of bar) should be 4 7/8" (1954-56); 4½" (1957-60) and equal at both ends of drag link within 1/8". *CAUTION - Drag link must be parall l to frame, within 1/8".* If idler end of drag link not within limits, remove idler arm support mounting screws on frame side bar and screw idler arm in or out of bushing until correct height obtained. *CAUTION - Wh n turning idler arm into bushing to raise drag link, be sure idler arm is at least ½ turn from base or exc ssive play will exist.* If proper height cannot be obtained with this adjustment, replace idler arm. If pitman arm end of drag link is not within limits, pitman arm must be removed and bent as required.

Drag Link Plug Adjustments - Install end plug in pitman arm end of drag link and adjust by turning down tight and backing plug off ¼ to ½ turn. Install cotter pin. Install right end plug and make the same adjustment. Install cotter pin.



BUICK STEERING LINKAGE



CADILLAC, CHEVROLET, OLDSMOBILE, PONTIAC STEERING LINKAGE (TYPICAL)

Idler Arm Support Adjustment—Turn idler arm support with seal into idler arm bushing until it bottoms, and then back off 1/2 to 1 1/2 turns.

1954 CHEVROLET PASS. CARS

Chevrolet Passenger Cars: Linkage—Consists of steering idler and third arm mounted on frame cross member and linked to each front wheel by separate tie rods (adjustable rod on left side, non-adjustable rod on right side). Idler arm is linked to steering gear pitman arm by steering connecting rod (adjustable for length to enable maintaining high point of steering gear adjustment with front wheels straight-ahead).

St ring C nn cting Rod Adjustm nt—If wheels not in straight-ahead position with steering gear on high point, set front wheels in straight-ahead position (can be checked by measuring distance between lubrication fitting on lower control arm shaft and the wheel fellow on each side). Remove ornamental cap or horn button and check position of mark on end of worm shaft designating gear high point (mark should be at top of shaft). If gear has been moved off high point when setting wheels in straight-ahead position, loosen steering connecting rod adjuster clamps and adjust as necessary to bring gear back on high point.

Idler & Third Arm Pivot Pin Bushings Replacement—Drive out old bushings using K-318 steering knuckle bushing driver. Press new bushings in bracket using Tool K-318. Ream bushings to .922-.923" using J-3189 bushing reamer.

CONTINUED ON NEXT PAGE

STEERING LINKAGE

(C ntinu d)

Idler & Third Arm Clearance Adjustment—If clearance between idler and third arm and bracket exceeds .006", when measured with a feeler gauge, install shim, Part No. 3687657, between bracket and lower face of idler and third arm assembly. If clearance between front suspension cross member and bracket at upper mounting hole exceeds .008", when measured with feeler gauge, add shims as necessary to bring space within allowable limits (.010" shims available).

1955-57 CHEVROLET PASS. CARS

Ch vrolet Passenger Cars: Linkage—Consists of steering connecting rod between pitman arm and idler arm, bracketed on right frame side rail, and individual adjustable tie rods between steering connecting rod and each front wheel. Tie rods have adjusting sleeves at outer ends for making toe-in adjustment.

Steering Connecting Rod Adjustment - If wheels not in straight-ahead position with steering gear on high point, set front wheels in straight-ahead position (can be checked by measuring distance between lubrication fitting on lower control arm shaft and the wheel fellow on each side). Remove ornamental cap or horn button and check position of mark on end of worm shaft designating gear high point (mark should be at top of shaft). If gear has been moved off high point when setting wheels in straight-ahead position, loosen adjusting sleeve clamps on both left and right hand tie rods, then turn each sleeve an equal amount in same direction to bring gear back to high point. *CAUTION* - Turning sleeves an unequal amount or in different directions will disturb toe-in.

Idler Arm Bushing Replacement - Remove relay rod from idler arm bracket. Press out old bushing, press in new bushing. Install idler arm over idler arm bracket and install nut but do not tighten. Install relay rod to idler arm and do not tighten. Place wheels in straight ahead position and steering gear on high point, then tighten idler arm nut and relay rod nut to 70 ft. lbs. Advance nuts to align castellations and insert pins.

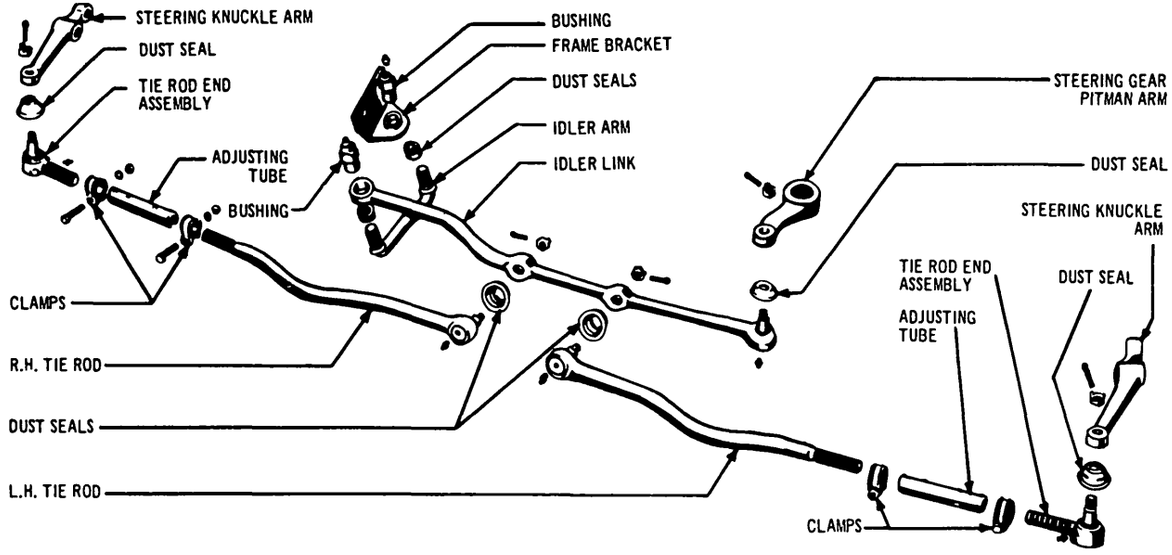
1958-60 CHEVROLET PASS. CARS (EXC. CORVAIR)

Ch vrolet Passenger Cars: Linkage—Consists of steering connecting rod between pitman arm and idler arm bracketed on right frame side rail, and individual adjustable tie rods between steering connecting rod and each front wheel. Tie rods have adjusting sleeves at outer ends for making toe-in adjustment.

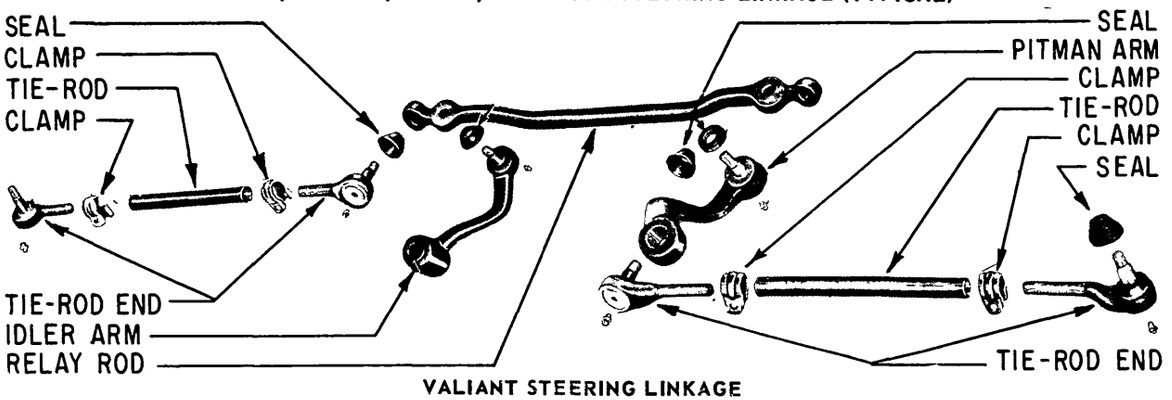
Idler Arm Inspection - Remove idler arm from bracket and remove relay rod from idler arm. Remove idler arm stud seals and all grease, then inspect idler arm for damage or wear. Place idler arm in vise, turn nut on stud until nut bottoms on threads. Torque to turn stud should be not less than 1 ft. lb. not more than 10 ft. lbs. Replace idler arm when turning torque not within specifications.

1954-59 CHEVROLET TRUCKS

Ch vrol t Trucks: Linkage—Consists of three-piece tie rod (rod and two tie rod end assemblies) between front wheels. Tie rod end assemblies have right and left hand threads to facilitate toe-in adjustment. A connecting rod, between steering third arm (on left wheel) and pitman arm, has permanently installed studs in ends. Ends of studs are threaded and are attached to steering third arm and pitman arm with a nut and cotter pin.



CHRYSLER, DESOTO, DODGE, PLYMOUTH STEERING LINKAGE (TYPICAL)



VALIANT STEERING LINKAGE

1960 CHEVROLET TRUCKS

Chevrolet Trucks: Linkage - Consists of two tie rod assemblies connected between pitman arm and wheel on left hand side and between idler arm and wheel on right hand side. A relay rod is connected between pitman arm and idler arm.

Idler Arm Inspection: Remove idler arm from bracket and remove relay rod from idler arm. Remove idler arm stud seals and all accumulated grease, then inspect arm for wear or damage. Place idler arm in a vise and turn nut on stud until nut bottoms on threads, then use a torque wrench to turn stud. Note the reading which should not be less than 1 ft. lb. or more than 10 ft. lbs. Replace idler arm if not within limits.

Idler Arm Bushing Replacem nt - *NOTE - On S ri s 10 through 40, idler arm bushing is n t replac abl .* On Series 50 & 60, remove idler arm, then press bushing out with Tool J-1614. *NOTE - Wh n pr ssing bushing from housing, pressing tool must thr ad down through one bushing and onto top of low r bushing. Aft r pressing this bushing out, turn support housing ov r and press second bushing out. Always pr ss from inn r rim of bushing toward outside of housing.* Press new bushing into place with Tool J-7079-2 and Tool J-8522. Bushings will be properly located in bore when pressed in until tool contacts housing.

1954 CHRYSLER & DESOTO

Chrysler & DeSoto: Linkage—Consists of steering gear intermediate arm mounted on frame cross member which transmits motion from steering gear, through drag link, to each front wheel, through independent tie rods. Both tie rods are adjustable.

CONTINUED ON NEXT PAGE

STEERING LINKAGE (C ntinu d)

Drag Link Installati n—Whenever drag link removed, care must be taken to insure proper reinstallation in order to provide clearance on extreme turns. It will be noted that one end of drag link is offset slightly, while other end is straight. Offset end should be connected to steering gear arm. On most cars, the drag link is marked "Rear" on the ball retainer expansion plug at rear end to insure proper installation.

Int rmediate Arm B aring Adjustment—Insert sufficient number of shims between upper bearing race and arm spacer so that when assembly is clamped in vise, arm can be rotated with a pull of approximately 1 lb. at end of arm (drag link end).

1954-55 DODGE 6 & PLYMOUTH

D dg 6 & Plym uth 6: Linkage—Consists of long and short tie rods (both adjustable) attached directly to steering gear arm

1955 CHRYSLER, DESOTO & PLYMOUTH 8 1954-55 DODGE V8

Chrysl r, D S to, D dge V8, Plymouth V8: Linkage—Consists of idler arm bracketed to right frame side side member and connected to right end of drag link. Pitman arm is connected to left end of drag link. Individual tie rods, connected to drag link near its center, have sleeve adjustment for toe-in at ends.

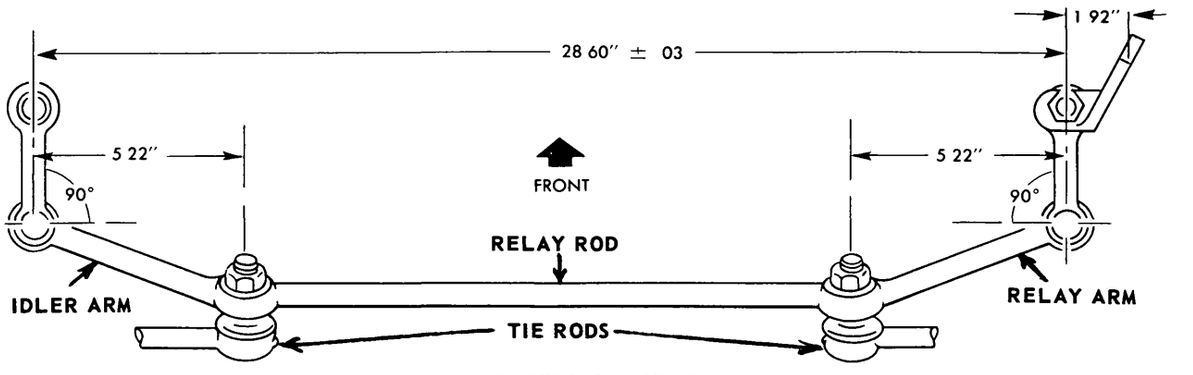
Idl r Arm Cl aranc Adjustment—Screw idler arm support bracket into bushing until it bottoms. Then back off approximately one full turn of idler arm or, until a clearance of 1 7/16" plus or minus 1/16" has been obtained between shoulder of bracket and flat surface of arm.

Idl r Arm Bushing R placement—If idler arm bushing play exceeds 1/8" when idler arm is moved up or down or, if noise has developed in steering linkage a new idler arm bushing, support bracket or both should be installed as follows: Remove cotter pin, nut and spacer that holds drag link end ball stud to idler arm. Insert pry bar between idler arm and drag link. Jar drag link ball stud loose by driving on end of link. Separate link and arm, then remove seal. Remove two bolts and lockwashers that attach idler arm support bracket to frame side rail. Remove support bracket, idler arm and bushing as a unit. Unscrew idler arm support bracket from idler arm bushing, then remove seal. Clamp end of idler arm bushing in a vise and remove locknut. Now, unscrew idler arm from bushing. (NOTE—Before removing idler arm from bushing, mark flat of arm to indicate up or down side. Arm has tapered hole for ball stud and can only be installed in one position). To install, reverse removal procedure, noting "Idler Arm Clearance Adjustment" above. If straight fitting (lubrication) found on end of bushing, replace with a 60° or 90° fitting for ease in lubrication.

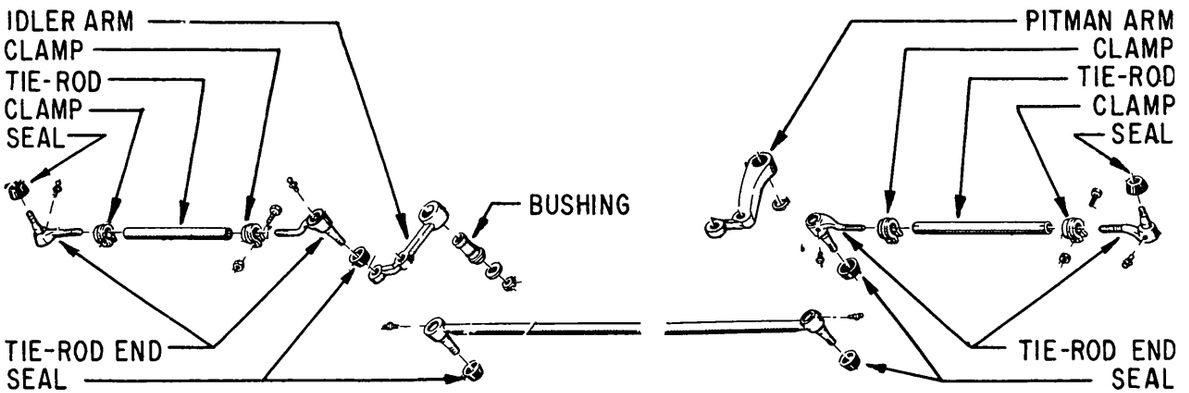
1956-60 CHRYSLER, DESOTO, DODGE, PLYMOUTH & VALIANT

Chrysl r, D S t , D dg , Plym uth (All): Linkage - Consists of idler arm bracketed to right frame side member and connected to right end of drag link. Pitman arm is connected to left end of drag link. Individual tie rods, connected to drag link near its center, have sleeve adjustment for toe-in at outside ends.

Idler Arm Bushing Replacement - Idler arm with bushing is serviced only as an assembly. When bushing worn replace assembly. Opening in Idler Arm Bracket between Idler Arm Bushing positions or contact points should be 2¼" (Exc. Valiant). Bend bracket to correct.



CORVAIR STEERING LINKAGE



COMET & FALCON STEERING LINKAGE

1960 CORVAIR

Corvair: Linkage - Consists of a relay rod connected between pitman arm and steering idler arm located on right hand side of frame. Tie-rods are connected between relay rod and each front wheel.

Relay Rod and Idler Arm Bushing Replacement - *NOTE - Early models have a replaceable bushing at each end of relay rod, and at each end of idler arm. On later models a replaceable bushing is provided only at pitman arm end of relay rod.* With relay rod or idler arm removed from car, drive bolt out of bushing, then use a suitable size socket to press bushing sleeve and rubber out of relay rod or idler arm. Press a new bushing into place with Tool J-8357. *CAUTION - When installing relay rod in car, idler arm and pitman arm must be in proper alignment (see illustration). Be sure to hold hex head of bushing bolts so bushing will not be twisted.*

1960 COMET & FALCON

Comet & Falcon: Linkage - Tie-rods are connected between pitman arm and wheel at left side of car and between steering idler arm and wheel on right side of car. A relay rod connects pitman arm and steering idler arm. Tie-rod ends are replaceable while relay rod ends are not. When worn or damaged, relay rod must be replaced.

1954 FORD PASS. CARS

Ford Passenger Cars: Linkage—Consists of steering arm-to-idler arm rod which transmits motion from steering gear through steering arm, attached to left end of steering arm-to-idler arm rod, to front wheels through spindle connecting rods (tie rods). Spindle connecting rods have adjustable sleeves on outside ends for toe-in adjustment. Idler arm attached to right frame side rail and to right end of steering arm-to-idler arm rod.

Idler Arm & Bracket Adjustments—Steering idler designed to operate with 1/8" vertical free play. To reduce, proceed as follows (same procedure used when replacing idler arm or bushings): Remove bracket from frame side rail. Thread bracket and bushing off idler arm, then remove idler arm from steering arm-to-idler arm rod. Remove bushings from idler arm bracket and steering arm-to-idler arm rod, remove

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STEERING LINKAGE (C ntinu d)

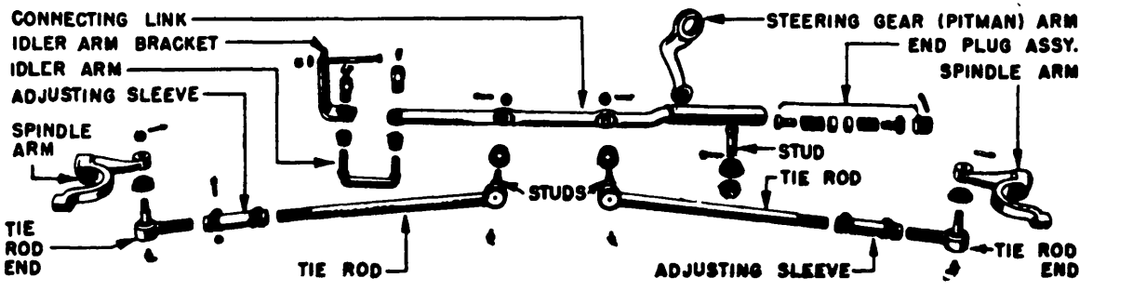
lubrication fittings from bushings. Check face of side rail for squareness by placing car on level floor, then measure distance from each side rail to floor. If distances unequal, jack up lower side rail until even with other rail. Place spirit level against inside surface of right hand side rail, adjacent to idler arm position, then establish true perpendicular. Measure distance between edge of level and side rail. Distance represents amount of spacing washers that must be installed between bracket and side rail to correctly position idler arm bracket. Check idler arm bracket for 92° included angle (between inside faces of bracket) and correct if necessary. Replace bushings in bracket and in steering arm-to-idler arm rod. Tighten bushings to 85-100 ft. lbs. torque. Reinstall grease fittings. Place new seals on idler arm. Thread idler arm into idler arm rod bushing until shoulder on arm is 11/16" plus or minus 3/64" from top face of rod when arm is in straight-ahead position. Thread bracket and bushing assembly onto idler arm until shoulder on arm is 19/32" plus or minus 3/64" below bottom side of bracket when bracket is parallel to frame side rail. Mount bracket on frame side rail, installing necessary number of washers between bracket and frame. Tighten attaching bolts to 30-35 ft. lbs. torque.

Ball Socket Adjustment—Whenever steering arm ball stud found to have play in socket, remove cotter pin from end of rod, tighten threaded plug in end of socket until all ball stud end play removed, then back off plug approximately 1 1/2 turns, install new cotter pin. Test adjustment by turning steering arm-to-idler arm rod by hand. Rod must move freely, but there should be no end play at ball stud.

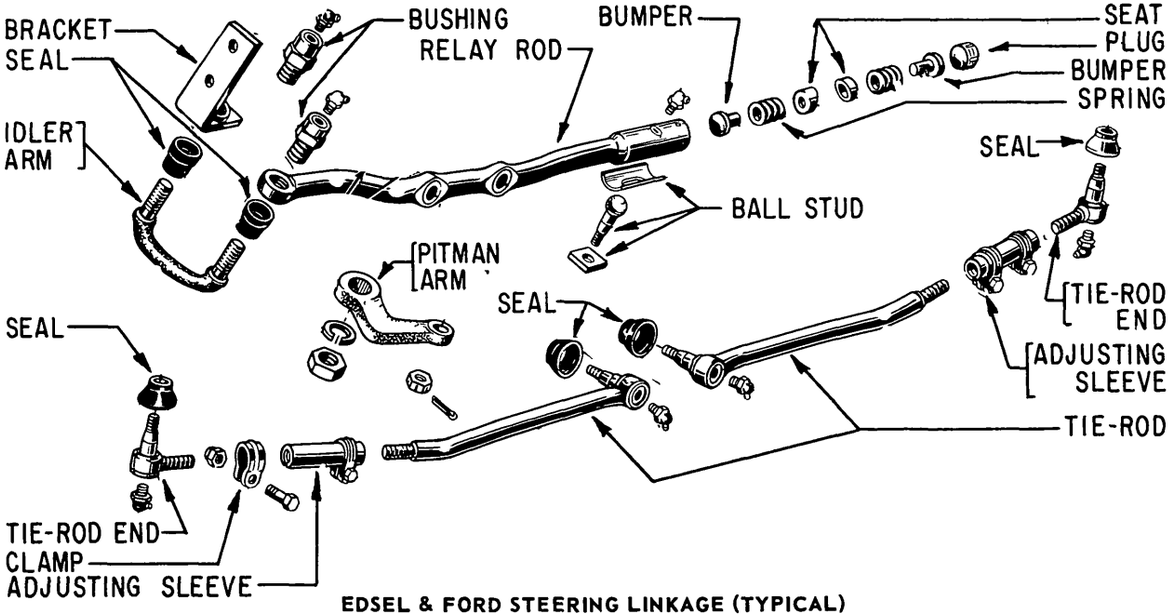
1956-60 FORD PASS. CARS

F rd Passenger Cars: Linkage - Consists of steering arm-to-idler arm rod which transmits motion from steering gear through pitman arm, attached to left end of steering arm-to-idler arm rod, to front wheels through spindle connecting rods (tie rods). Spindle connecting rods have adjustable sleeves on outside ends for toe-in adjustment. Idler arm attached to right frame side rail and to right end of steering arm-to-idler arm rod.

Idler Arm & Bushing Replacement - Remove bracket from frame side member, then remove bracket and rear bushing from the idler arm. Remove idler arm from bushing in steering arm to idler arm rod, then remove seals from both ends of idler arm. Remove bushings from idler arm bracket and steering arm to idler arm rod. Replace bracket if cracked or bent. DO NOT STRAIGHTEN IDLER ARM BRACKET. Install new bushings in steering arm to idler arm rod and idler arm bracket and tighten bushings to 85-100 ft. lbs. then install new seals at both ends of idler arm. On 1956-58 models, thread arm into bushing in idler arm-to-steering arm rod until shoulder on arm is 19/32"±3/64" from top face of rod when arm is in straight ahead position. Thread idler arm bracket and bushing on arm until shoulder on arm is 19/32"±3/64" below bottom side of bracket when bracket is parallel to frame side member.



LINCOLN & MERCURY STEERING LINKAGE (TYPICAL)



EDSEL & FORD STEERING LINKAGE (TYPICAL)

On 1959-60 models, thread arm into bushing in steering arm-to-idler arm rod until arm bottoms, then back off arm about ¾ turn. Thread idler arm bracket and bushing onto arm until bushing bottoms, then back off bushing until bracket mounting surface is parallel with frame side member. On all models, install bracket on frame side member and tighten mounting bolts to 28-43 ft. lbs. (1956-58); 25-30 ft. lbs. (1959-60).

1954-60 FORD TRUCKS

Ford Trucks: Linkage—Consists of a connecting rod between front wheels. Rod has adjustable features at both ends. Spindle arm, attached to connecting rod at its left end, is in turn attached to a one-piece drag link with manual adjustment features at both ends. Rear of drag link is attached to sector shaft arm (pitman arm).

Drag Link Adjustm nt—Remove cotter pins from each end of drag link. Tighten each drag link plug until drag link ball springs are fully compressed. Back off each plug to first cotter pin hole, then install new cotter pins.

1954 HUDSON

Hudson & Hudson Jet Linkage: Consists of center steering arm on frame crossmember linked to each front wheel by adjustable tie rods and to pitman arm by a short drag link.

Center Steering Arm Adjustm nts—Using Tool J-2953 adjust arm for centered position as follows: Remove center steering arm nut and front bolt from arm support bracket, install gauge clamp over steering arm, install gauge. Insert bolt at front of gauge in hole in bracket from which bolt removed. Attach screw in center steering arm shaft, adjust gauge rods to contact both sides of front wheel evenly. Repeat procedure for opposite wheel, adjust tie rods equally until reading is same on both sides.

Center Steering Arm Pivot Shaft R plac m nt Adjustm nt—Press new shaft in place maintaining the 2.052-2.055" dimension from top of upper spacer and top of lower spacer before drilling and reaming hole for No. 5 taper pin.

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STEERING LINKAGE (Continued)

1954-60 LINCOLN & MERCURY 1958-60 EDSEL

Lincoln, Mercury & Edsel Linkage - Consists of steering connecting link between steering gear arm (Pitman Arm) and idler arm, mounted on right frame side rail, and adjustable tie rods between connecting link and each front wheel. Adjustable sleeves provided at outside ends of tie rods for toe-in adjustment.

Connecting Link Plug Adjustment - Screw end plug in left end of connecting link until it bottoms, then back off plug the number of turns indicated in table below. Align cotter pin holes and install cotter pin.

Car Model	℄ Plug Adjustment
1954-55 Mercury	1½ turns
1954-55 Lincoln	2-2½ turns
1956-57 Lincoln & Mercury	1-1½ turns
1958 Lincoln (Torsion Bar Strg.)	1¾-2½ turns
1958 Lincoln (In-Line Steering)	¾-1½ turns
1958-60 Edsel	1½ turns
1959-60 Lincoln	¾-1½ turns
1958-60 Mercury	¼-¾ turns

℄ - Plus or minus 1/8 turn to align cotter pin holes.

1955-57 HUDSON, 1954-57 NASH & RAMBLER

Nash (Exc. Metropolitan), Rambler: Consists of steering linkage cross tube between steering gear pitman arm and idler arm, bracketed on right frame side rail. Individual adjustable tie rods are attached to ends of cross tube. Adjusting tubes at outer ends of tie rods provide for toe-in adjustment.

1958-60 RAMBLER

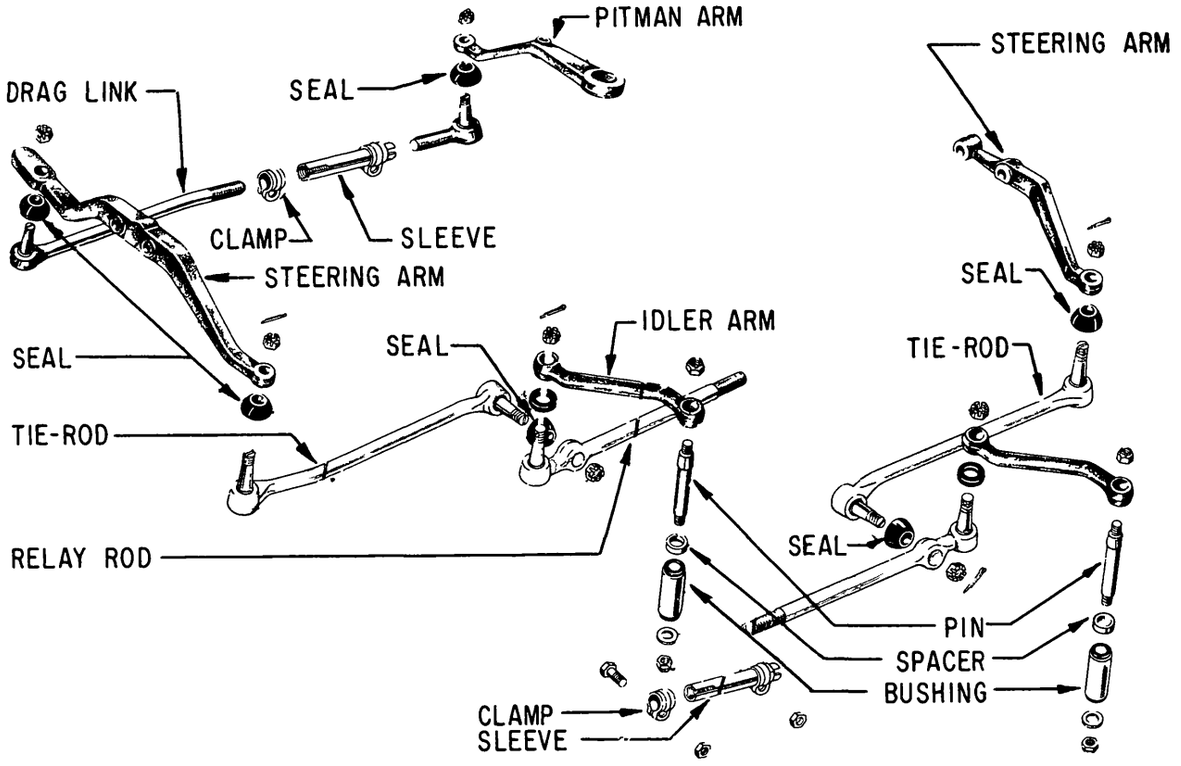
Rambler: Linkage - Except on Series 20, relay rod is connected between pitman arm and steering idler arm with tie-rod on left side connected between pitman arm and steering arm. On right side, tie-rod is connected between idler arm and steering arm. On Series 20, relay rod is connected between idler arm at each frame side rail and steering arm at right and left sides of car. A tie-rod at forward side of suspension crossmember connects pitman arm to steering arm. Ball and socket joints are adjustable on Series 01, 10, & 80 and are not adjustable on Series 20.

Ball & Sock t Joint Adjustment - Tighten adjusting plug until solid contact is made, then back off plug to first cotter pin hole, not to exceed ¼ turn or less than 1/8 turn. *NOTE - On Series 10, pitman arm side, tighten end plug solid, then back off 1½-2 turns.*

1954-60 OLDSMOBILE

Oldsmobile: Linkage—Consists of steering relay rod between pitman arm and idler arm, bracketed to right frame side rail. Individual, adjustable tie rods are attached to center portion of steering relay rod and are provided with adjustable sleeves for toe-in adjustment.

Relay Rod Plug Adjustment—Draw nut tight, then back off 1/4-3/4 turn, install cotter pin.



RAMBLER STEERING LINKAGE (1958-60 SERIES 20 SHOWN)

Idler Lever & Support Adjustment—Whenever idler arm is disassembled from idler arm support, reassemble so that there is a dimension of 23/32" between upper face of idler arm and shoulder on support.

1954-56 PACKARD

►*NOTE See "Studebaker-Packard" below for 1957-58 Models.*

Packard: Linkage—Consists of steering connecting rod between pitman arm and idler lever, bracketed to right frame side member, and individual tie rods (steering cross tubes) between steering connecting rod and each wheel. Adjusting sleeves at outer ends of cross tubes provide means for toe-in adjustment.

Connecting Rod End Plug Adjustment—Draw plugs up tight, then back up 1/4-1/2 turn to align slot with cotter pin hole.

1954-60 PONTIAC

Pontiac: Linkage—Consists of steering connecting rod between pitman arm and idler arm, bracketed on right frame side rail, and individual, adjustable tie rods between steering connecting rod and each front wheel. Tie rods have adjusting sleeves at outer ends for making toe-in adjustment.

Idler Lever & Support Adjustment - With lever and support off car, thread idle support into bushing until distance between upper face of lever and shoulder on support is approximately 11/16".

Steering Connecting Rod Plug Adjustment - Screw end plugs in until tight, then back off to nearest cotter pin hole alignment and insert new cotter pins.

1954-60 STUDEBAKER & 1957-58 PACKARD

Studebaker: Linkage—Consists of two adjustable tie rods attached to bell crank mounted at center of frame cross member. Bell crank is attached to steering gear pitman arm by a reach rod (drag link).

Bell Crank Bearing Adjustment—Insert shims between lower thrust washer and shaft until there is no end play. Shaft should, however, turn freely in bearings. Lock nut securely with cotter pin.

1954-60 WILLYS UTILITY

Willys Utility: Linkage—Bell crank on frame cross member, linked to each front wheel by adjustable tie rods and to steering gear pitman arm by a steering connecting rod (drag link).

BENDIX LINKAGE TYPE
CHECKER, EDSEL, FORD, MERCURY & STUDEBAKER

Checker Superba (1959-60)
Edsel (1958-60)
Ford Pass. Cars (1954-60)
Mercury (1954-60)
Studebaker (1958-60) ℂ

ℂ - Saginaw (Not-in-Line) Power Steering used on Early 1959 Silver Hawk Models before Serial No 59V-34592 See *"Saginaw (Not-in-Line) Power Steering"*

►CHANGES, CAUTIONS, CORRECTIONS

►***1954 FORD 6 CYL. PUMP LEAKAGE CORRECTION:*** To minimize leakage at unused return port on pump, a plug (B4A-3569-A) and gasket (B4A-3592-A) are available for service and should be used to replace cup type plug used on earlier models

►***1955 FORD PRESSURE CHECK GAUGE ADAPTER KIT CHANGE:*** Due to pump design change in May, 1955 it is necessary to use new adapters for pump fittings Fittings can be made up using ⅝" inverted male connector (87974-S), 2¼" inverted female connectors (87200-S), 3⅝" inverted flare nuts (87953-S), a ⅝" short nut (87424-S), a ⅝" male connector (87234-S) and two pieces of soft copper tube 2½" long, ⅜" O D

►***1955 MERCURY PUMP PRODUCTION CHANGE:*** New pump differs from earlier type in that return port has been moved from pump body to a position on side of reservoir near bottom. Adapter, No 3500-C must be used with Pressure Check Gauge No 3500 when checking pressures See Ford Pressure Check Gauge Adapter Kit Change (above).

►*1956 FORD POWER STEERING SQUEAL CORRECTION & PUMP PULLEY PRODUCTION CHANGE.* A new pump pulley, Part No B6A-3356-A and a new solid type pump belt is used in production and may be used for service replacement to correct pump belt squeal. The early type belt, with serrations, can be used with either early or late type pulleys

►*1956 FORD STEERING ARM & LINKAGE INTERFERENCE WITH POWER STEERING CONTROL VALVE CORRECTION:* Check the steering arm-to-idler arm rod and replace it if it is bent If interference exists after new arm is installed, replace the spindle connecting rod assembly (Part No AD-3280-B) If the two above corrections do not eliminate the interference, it may be necessary to replace the lubricant fitting or grind off the boss of the oil pressure line on power steering cylinder *CAUTION* - A wall thickness of 3/32" must remain after grinding is completed.

►*1956 MERCURY POWER STEERING CONTROL VALVE INTERFERENCE CORRECTION & DRAG LINK ADJUSTING CAUTION:* When installing the left hand drag link adjusting sleeve, the clamps should be installed with bolts in a vertical position and forward of the steering link to prevent interference with the control valve.

►*1957 MERCURY CONTROL VALVE CENTERING SPRING CHANGE (To provide heavier steering feel in center position):* A new heavier spring, Part No. MG–33704–B, replaces the earlier spring, Part No. MG–33704–A in production. On cars with 368" engine the later type spring must be used for service replacement. On cars with 312" engine, either spring may be used. For identification, the early spring is dyed a maroon color, and the later spring is dyed green.

►*1957 MERCURY POWER STEERING NOISE CORRECTION:* A new power steering pressure line hose, Part No. MG-33589-A, having a relocated step-down orifice and revised dimensions for steel tubing at each end of hose to improve clearances in valve and pump areas

►*1958 EDSEL CONTROL VALVE INSTALLATION NOTE·* Distance between center of ball stud in sector shaft arm and center of stud at inner end of left-hand spindle connecting rod should be 10 7/8" (Ranger, Pacer, and Station Wagons), 11 1/4" (Corsair and Citation models).

►*1958 EDSEL HYDRAULIC PUMP BELT CAUTION (Early Cars)·* DO NOT use ½" x 40 ½" long belt (found on some early cars). Use pump belt B8A-33558-D (3/8" x 39" long) which can be properly adjusted (14-16 ft lbs. slip) without placing pump at undesirable position.

►*1958 FORD RESERVOIR COVER LEAK CORRECTION:* Remove cover and filter spring, then push new seal ring 372144-S down around cover stud until seal ring is on top of metal filter retaining washer Install spring, cover, and flat washer and secure with wing nut. **DO NOT** rework flat washer under wing nut.

►*1958 FORD HYDRAULIC PUMP NOISE CORRECTION:* Before replacing improved type hydraulic pump (with yellow stripe), check the following items and correct as necessary: Fluid level in reservoir, Belt tension, Air in system, Hoses properly routed to eliminate interference with frame or sheet metal, Leaks causing low oil level in reservoir.

►*1958 THUNDERBIRD BELT INTERFERENCE CORRECTION (Early Cars with Air Conditioning)·* When belt interferes with radiator lower hose it should be replaced with Belt No B8A-33558-D identified by numerals EDD-33558-A on outside of belt. Late cars have new belt installed.

►*1958 FORD STEERING WHEEL SHUDDER CORRECTION·* When shudder is present while car is standing still and the wheels are turned rapidly, it is caused by incorrect pump belt adjustment. Adjust belt to 25 ft. lbs. slip torque.

►*1958 MERCURY VALVE CENTERIMG SPRING NOTE:* Lighter valve centering spring No. MG-33704-A released to reduce turning effort Install lighter spring **only** after eliminating all excessive binding and checking the following points Misalignment of steering gear at frame or instrument panel, Steering gear worm and sector preload adjustment, pitman arm to frame interference *(see "Pitman Arm to Frame Interference Note" below)*, and incorrect hydraulic pressures.

►*1958 MERCURY PITMAN ARM TO SIDE RAIL INTERFERENCE CORRECTION:* Increase clearance between frame and pitman arm by installing shims between gear box and frame or by grinding off excessive forging flash (if advisable), from pitman arm.

►*1958 MERCURY CONTROL VALVE REMOVAL & INSTALLATION CAUTION:* Use wrench only (not pipe wrench), on cast iron valve housing to remove valve. This will prevent distortion of sleeve which would result in a binding and restricting of the movement of ball stud socket in sleeve.

►*1958 MERCURY CRACKING NOISE ON TURNING CORRECTION:* Cracking noise caused by serrated washer on inner idler arm bushing turning. To correct, install serrated washer with serrations **d wnward** and tighten nut to 50-65 ft. lbs.

►*1959 EDSEL POWER STEERING PUMP RESERVOIR LEAK CORRECTION* Oil leakage past the power steering pump reservoir stud and cover can be corrected by installing a new type seal, Part No 372144-S DO NOT try to correct leakage by venting the reservoir, reservoir cover, or by reworking cover retaining flat washer

►*1959 POWER STEERING PUMP HOSE INTERFERENCE (6 CYL MODELS).* To prevent possible hose failure caused by hose rubbing on left hand horn, drill a 3/8" hole, 2 3/8" above original horn mounting hole in front fender apron and radiator support and install horn in the new location

►*1959 EDSEL POWER STEERING HYDRAULIC CONTROL VALVE PRODUCTION CHANGE (For Improved Steering & Recovery)* A revised control valve assembly, Part No B9AA-33577-B, identified by a daub of yellow paint is being used on later cars and may be used for service replacement on early 1959 models *DO NOT USE on 1958 cars* The new valve incorporates a valve spool with the center land reduced in width to a nominal 020" New centering spring and centering spring washers are also used

►*1959 EDSEL & 312" ENGINE MEPCUPY POOR RECOVERY FROM LEFT HAND TUPN CORRECTION* To correct this condition, remove centering spring spacer from control valve assembly and measure length of spacer with a micrometer If it is not at specified length of 879- 880", rework spacer to proper length by filing with a fine file *CAUTION - Keep ends of spacer square and remove burrs after filing* Install plastic spring seat, reworked spacer, centering spring, outer plastic spring seat, small washer, and adjusting valve spool nut Tighten spool nut until it bottoms, then back it off ¼ turn Install centering spring cap and retaining screws

►*1959 EDSEL & FORD POWER STEERING PUMP REPLACEMENT CAUTION* Pumps used on 1959 models must have "850 Max " etched in relief valve cap 1959 pumps have a maximum pressure of 850 lbs maximum which must be used with the larger diameter power cylinder *DO NOT USE 1958 Pumps for replacement* These pumps have a maximum pressure of 1050 lbs and are identified by either "1050 Max " etched in relief valve cap or by a stripe of yellow paint

►*1959 EATON ROLLER TYPE POWER STEERING PUMP NOISE CORRECTION (ALL MODELS)* To eliminate the noise in power steering pumps (after a cold start), install revised pump carrier, with rollers and cam which is available in a kit, Part No B9MY-3A711-A The later type parts are used in all pumps built after March 11, 1959 The revised carrier can be identified by a circled "A" and the words "This Side Up" that are marked on side of carrier *S e "Eaton Roller Type' Power Steering Pumps in 1958 Annual Data or later Manual edition for installation proc dures*

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BENDIX LINKAGE TYPE (C ntinued)

►*1959 MERCURY 383' & 430' ENGINE POWER STEERING PUMP PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE* A new power steering pump assembly, Part No B9ME-3A576-B having a two bolt (in place of a four bolt mounting used previously) is being used in production and may be used for service replacement on earlier models with crankshaft mounted pump When installing this unit on earlier cars two nylock setscrews, Part No UP-372816-S must be used to plug existing unused mounting holes in front cover Two insulators, Part No B9ME-3A577 A installed in unused bolt holes must be inserted from rear of housing Two insulators, Part No B9ME 3A584-A installed in bolt holes are inserted from the front of housing The existing reservoir (pump intake) hose must be replaced by a longer one Part No B9ME-579-A *NOTE* When using an old pump with a new type engine front cover, Part No B9ME-6059-C two new front insulators, Part No B9ME-3A584-A must be used for attaching old pump to new front cover New insulators are inserted from front side into the two bolt holes The existing one-piece insulators should be used in unused holes with larger diameter of insulators between pump and front cover

►*1959 MERCURY STEERING WHEEL SHAKE & STEERING SHAFT RATTLE CORRECTION* Check thrust loading spring located between flange of steering gear assembly and steering shaft flange and insulator for proper thrust load as follows Loosen setscrew on flange and insulator assembly then move insulator down against force of thrust loading spring by prying on upper flange *NOTE This will preload steering shaft bearing, eliminating looseness* While prying downward tighten setscrew *CAUTION - Flange and insulator assembly should be moved just enough so that deformation of steering shaft flange insulator is held to a minimum*

►*1959 MERCURY 383' & 430' ENG POWER STEERING CONTROL VALVE SEAL REPLACEMENT NOTE* New type seals Part No B9MY-3A650-A (complete kit) should be used whenever control valve is disassembled *See Overhaul below for installation procedures*

►*1959 MERCURY POWER STEERING PITMAN ARM REMOVAL TOOL 3290-B REWORK NOTE* To use this tool approximately ½" has to be removed from end of threaded screw The overall length of screw should be 2 5/8" *CAUTION - Fork type or other similar tools should not b used as they will damage power steering valve*

►*1960 MERCURY (383" & 430" ENG.) CRANKSHAFT MOUNTED POWER STEERING PUMP PRODUCTION CHANGE:* An Eaton "roller" type pump is being used on later production cars replacing the former "vane" type pump The new pump is identified by the letter "M" following date code which is stamped on mounting face of pump

►*1960 MERCURY ERRATIC POWER STEERING ASSIST CORRECTION:* This condition may be caused by moisture in control valve assembly. To correct, apply a "4X" silicone grease or its equivalent in the centering spring area on all cap and spacer mating surfaces and in all bolt holes Threads of cap retaining bolts should also be coated before assembly.

DESCRIPTION: "Linkage Type" with control valve assembly and power cylinder built into steering linkage or attached to it The units used on 1959-60 Mercury models with 383" & 430" engines have a "Reaction Limiting Valve Assembly" incorporated into main control valve This valve assembly limits amount of effort required to turn steering wheel when parking or when making sharp turns at low speeds

ADJUSTMENT: Pump Drive Belt - Procedures are different as follows

1954-57 Ford (All Models) - Place a heavy duty "C " clamp on pump bracket so pressure can be exerted on the movable adjusting bracket above the adjusting lock bolt. Loosen adjusting bolt enough to permit moving pump when "C" clamp is tightened, then tighten "C" clamp until pulley slips against belt friction when a torque of 14—16 ft. lbs. is applied to pump pulley bolt, using a torque wrench. *(NOTE* - Pull on wrench as if tightening bolt). Tighten belt adjusting bolt to 30—35 ft. lbs. and mounting bolt to 20—25 ft. lbs.

1958-60 Ford (292" Eng.) - Place a heavy duty "C" clamp on adjusting bracket, then loosen pump adjusting bracket, pump support bolts, and pump-to-exhaust manifold so "C" clamp can be tightened Tighten "C" clamp to obtain 25 ft lbs slip torque on belt (torque wrench applied to pump pulley nut) Tighten all bolts to 20-25 ft lbs

1958-60 Ford (6 Cyl.) - Loosen top pivot bolt on pump adjusting bracket and adjust bolt to obtain ½" belt deflection

1958-60 Ford (Spec. V8 & Thunderbird) - Loosen bracket adjusting bolt and pivot bolt, then move pump until pulley slips against belt friction at 25 ft lbs (21-23 ft lbs on 1958 Thunderbird) Tighten all bolts to 20-25 ft lbs

1954-58 Mercury (All Models) - Adjust pump belt tension to obtain ¼" belt deflection at center with 5-7 lbs pull Tighten nuts to 20-25 ft lbs

1959-60 Mercury 312" Eng.) - *NOTE - Other models have a crankshaft mounted pump.* With 7-9 lb force applied upward on belt midway between pulleys, belt deflection should be ¼" To adjust, loosen pivot and adjusting bolts on pump mounting bracket and move bracket in its adjusting slot Tighten pivot bolt to 20-25 ft lbs

1958 Edsel (All Models) - Use torque wrench and socket on pump pulley bolt Torque required to slip pulley against belt friction should be 14-16 ft lbs

1959-60 Edsel (All Models) - Use a torque wrench and measure torque required on pulley bolt to cause belt to slip Torque should be 23-25 ft lbs To adjust, loosen belt pivot and adjusting bolts on pump mounting bracket, then raise pump body

1958-60 Studebaker - Belt deflection should be 1/4-3/8" (1958-59), 3/16-1/4" (1960) with a 4 lb pull midway between pulleys To adjust, loosen bracket mounting screws and shift pump body to secure proper belt tension

LUBRICATION: Check fluid level every 1000 miles (Ford & T-Bird), 2000 miles (Edsel & Mercury), 5000 miles (Checker Superba & Studebaker) Start engine and turn steering wheel right and left a few times, then shut off engine Add Automatic Transmission Fluid to bring level up to following specifications

►*1960 MERCURY POWER STEERING CONTROL VALVE LUBRICATION CAUTION:* When lubricating power steering control valve, the two clamp screws retaining protective boot on sleeve should be removed to allow escape of chassis lubricant Boot will be ruptured if screws not removed

1959-60 Checker Superba: Bring level to within 1" of top of reservoir
1958 Edsel: ½" from top of reservoir
1959-60 Edsel: Bring level up to "Full" mark
1954-57 Ford: Bring level up to "Full" mark
1958-60 Ford & T-Bird: ¼" from top of reservoir
1954-60 Mercury Bring level up to "Full" mark.
1958 Studebaker: Bring level to within 1" of top of reservoir
1959-60 Studebaker: Bring level up to mark indicated on side of reservoir

TESTING: Turning Effort - With front wheel properly aligned and tire pressures correct, place car on dry concrete, set parking brakes, then proceed as follows: With engine running at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to rim of steering wheel and measure pull required to turn wheel at least one complete turn in both directions. The pull should be about equal in both directions as shown in table below

Model	Lbs. Pull
Edsel (1958-60)	7-12
Ford Pass Cars (1954-58)	7-12
Ford Pass Cars (1959-60)	7
Thunderbird (1955-57)	7-12
Thunderbird (1958)	(Maximum) 7
Thunderbird (1959-60)	Ⓒ
Mercury (1954-58)	7-12
Mercury 312" Eng (1959-60)	7-12
Mercury 383" & 430" Engs (1959-60)	5-7
Studebaker (1958-60)	11

Ⓒ - On 1959-60 Thunderbird, check turning effort at wheel nut with an inch-pound torque wrench Torque required should be 7-11 inch-pounds

Pump Pressure: Install a suitable pressure gauge between pump hose and pump outlet with pressure gauge between pump and shutoff valve of pressure gauge Run engine at idle speed (with shutoff valve open) for two minutes to normalize temperature, then turn wheel all the way to right then to left Note fluid pressure reading on gauge when each wheel is against its stop, see table below for correct pressures *CAUTION - Do not hold wheel against its stop for more than 30 seconds* If pressure is less than minimum, pump is faulty If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder If pressure is within limits and steering gear does not function properly, trouble is in control valve or power cylinder

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BENDIX LINKAGE TYPE (C ntinu d)

Pr ssur Rang

Model	Pressure (Lbs.)
1954-57 (All Models)	700-900
1958 Edsel	975-1100
1958 Ford (Exc. Thunderbird)	700-900
1958 Thunderbird	900-1050
1958 Ford Truck	900-1050
1958 Mercury	800-1000
Checker Superba (1959-60)	700-900
Edsel (1959)	700-900
Edsel (1960)	700-850
Ford & T-Bird (1959-60)	700-850
Mercury (1959-60)	800-1000
Studebaker (1958-60)	850

TROUBLE SHOOTING: Binding or Poor Recovery - Check pitman arm ball stud in control valve sleeve which may be rubbing against the sleeve slot. If this is the case, the roll pin may be missing. Check idler arm bushings. Check all steering gear adjustments. Check operation of control valve and for interference between sector shaft arm and dust shield. Check control valve travel regulator stop adjustment. Check for damaged control valve sleeve and socket tube.

Hard Steering: Check to see that pump drive belt is properly tightened and that pump pressure is correct. If pump pressure is within specifications, check control valve spool centering spring adjustment. Check control valve spool for free movement and repair as necessary. See *"Binding or Poor Recovery"* above.

Excessive Free Play: Check steering gear worm and roller mesh adjustment. Check for excessive clearance between steering arm ball stud and ball stud seats. If ball stud is loose in seat, adjust control valve travel regulator stop. Check control valve centering spring adjustment.

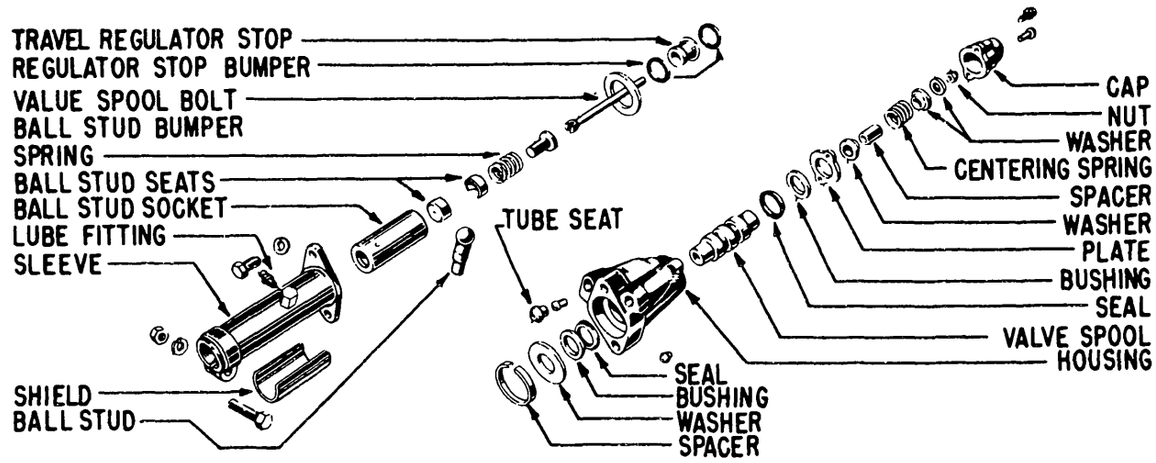
Noisy Pump: Check pump belt tension. Noise may also result if correct hose is not used *(see "Changes, Cautions, Corrections" above).*

Steering Chatter: A loose pump belt can cause chatter against the wheel stops during an extremely sharp turn. Check belt tension. Check for looseness in idler arm connection, and check idler arm bushing. Check power cylinder piston rod insulators for looseness.

Loss of Power Assist: Check for damage or broken hoses. Check pump pressure (see above). Disconnect power cylinder piston rod from idler arm bracket and operate piston by hand to check for resistance to movement. If piston moves freely with little or no resistance, internal parts of power cylinder are damaged. Replace cylinder. Check adjustment of valve spool centering spring. Check operation of control valve check valve.

OVERHAUL

CONTROL VALVE: Removal (Exc. Studebaker) - Disconnect hoses at control valve (turn wheels to force out fluid). Loosen clamp at right hand end of sleeve, then pull roll pin out of steering arm-to-idler arm rod through slot in sleeve. Remove cotter pin from control valve ball stud nut, then loosen nut and back it off far enough



EDSEL, FORD & MERCURY POWER STEERING CONTROL VALVE ASSEMBLY

to cover threads on end of ball stud. Hold a soft hammer against forward side of sector shaft arm to absorb the shock, then lightly tap ball stud with a hammer to loosen it from arm. *(CAUTION - Do not strike any part of valve body while loosening ball stud).* Remove nut from end of ball stud, then raise control valve high enough to remove ball stud from pitman arm. Turn front wheels fully to left and turn control valve counterclockwise to remove it from steering arm to idler arm rod.

Removal (Studebaker): Disconnect hoses at pump body, reservoir, and power cylinder. Drain fluid from hoses, then remove hose retaining clips. Disconnect reach rod from steering bellcrank, then remove pitman arm from steering gear shaft with Puller J-5664. Remove control valve, reach rod and hoses from car as an assembly. *CAUTION - Before removing valve assembly from reach rod, clean assembly to remove dirt and grease from valve body, then loosen clamp on actuator sleeve and screw valve assembly off reach rod, counting the number of turns required to unscrew valve from reach rod. Record the number of turns for use at installation to maintain proper reach rod length.*

►*1959-60 MERCURY (383" & 430" ENG.) CONTROL VALVE DISASSEMBLY & REASSEMBLY NOTE:* These control valve assemblies have a "Reaction Limiting Valve" which is disassembled and reassembled as follows: After control valve is disassembled (see above), remove aluminum plug and "O" ring assembly (see illustration) from each end of control valve body, then remove springs, washers, and reaction valve. To reassemble, insert washer, spring and longest plug and "O" ring assembly into valve housing from sleeve end. Carefully insert reaction valve into bore of valve housing from spring cap end, then insert washer, spring and short plug into housing.

Disassembly: Remove two centering spring cap bolts and cap from valve housing. *(CAUTION - When holding control valv in a soft jaw d vis for disass mbly, clamp valv only around th sl eve flang).* Remove nut from end of valve bolt, then remove washers, spacer, centering spring, adapter and bushing. Remove two bolts holding valve housing and sleeve together, then separate housing from sleeve. Remove lubrication fitting from sleeve and push valve spool out of centering spring end of housing. Remove seal from spool. Remove spacer, bushing and seal from sleeve end of valve housing. Drive stop pin out of travel regulator stop with a punch and hammer *(NOTE* - Pull head of valve spool bolt tightly against travel regulator stop before driving pin out of stop). Turn travel regulator stop counterclockwise in valve sleeve to remove stop from sleeve. Remove valve spool bolt, spacer, and rubber washer, from travel regulator stop. Remove dust shield from valve sleeve. Slide bumper, spring, and ball seat out of sleeve, then remove ball stud socket.

Inspection: Wash all parts in solvent and wipe with a lint free cloth. Inspect valve seals and bushings for wear, making sure that lips of seals are not nicked or scratched. Check bushings for nicks or scratches. Inspect valve housing for nicks and burrs. Use crocus cloth to remove burrs, being carefull not to round off sharp edges of spool *'NOTE* - If spool or inside of valve housing are badly scored, replace the assembly). Dry spool and housing thoroughly, and insert valve into housing. The spool should fall freely of its own weight in housing. *(NOTE* - Clearance between spool and housing should be .0002-.0009"). Inspect mating surfaces of ball stud socket and valve sleeve for wear or damage. Remove minor burrs and scores with crocus cloth. Check fit of socket in sleeve. Socket should slide freely in sleeve.

►*RELIEF VALVE & HOSE SEAT REPLACEMENT NOTE:* If replacement is necessary, proceed as follows: Tap existing hole in hose seat, using a 3/8" starting tap for large hose seat and a 1/4" starting tap for small seats. *(CAUTION - Remov all metal chips from s at ports after tapping).* Place a nut and large flat washer on a bolt of the same size as tapped hole. *(NOTE* - Washer must be large enough to cover hose seat port). Insert bolt in tapped hole, then use it as a puller to

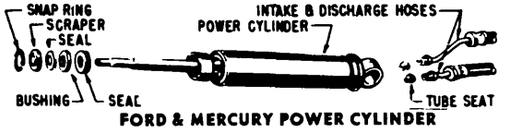
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BENDIX LINKAGE TYPE (C ntinued)

remove hose seat. If return line hose was removed, remove relief valve from port with a screwdriver, and install a new relief valve. Place a new hose seat in port, then thread a bolt of the same size as the port into the port. Tighten bolt enough to bottom seat in port.

R ass mbly: Coat all parts with Automatic Transmission Fluid Type "A". Insert one of the ball stud seats (flat end first) into ball stud socket, then insert threaded end of ball stud into socket. Place socket in control valve sleeve so threaded end of ball stud can be pulled out through slot in sleeve. Place other ball stud seat, spring, and bumper in the socket, then install and securely tighten travel regulator stop, Loosen stop just enough to align nearest hole in stop with slot in ball stud socket, then install stop pin in ball stud socket, travel regulator stop, and valve spool bolt. Install dust shield and lubrication fitting on sleeve. *(NOTE* - Make sure lubrication fitting is tight and does not bind on ball stud socket). Insert valve spool in housing so that large end of spool will be at centering spring end of housing and small end of spool will face sleeve end of housing. Rotate spool while inserting it in housing. Move spool toward centering spring end of housing, then place small seal, bushing, and spacer in sleeve end of housing. Press valve spool against inner lip of seal and, at the same time, guide lip of seal over spool with a small screwdriver. *(CAUTION - Do not nick or scratch seal r spool).* Place seal end of bushing on a flat surface so that seal, bushing, and spacer are at bottom end, then push down on valve spool until it stops. Carefully install spool seal and bushing in centering spring end of housing around large end of spool. Press spool against inner lip of seal and guide lip over spool with a small screwdriver. *(CAUTION - Do not nick or scratch s al or spool).* Slide spool back and forth in housing and check for free movement. Place valve sleeve on housing so that ball stud is on same side of housing as ports for the two power cylinder hoses, then install two bolts in sleeve. Tighten to 30-35 ft. lbs. (1954-55 Ford, Mercury & Thunderbird); 17-22 ft. lbs. (1956-60 Ford & Thunderbird, 1956-58 Mercury, 1958 Edsel); 15-20 ft. lbs. (1959-60 Edsel & Mercury); 140-170 inch-pounds (1958-60 Studebaker). Place adapter on centering spring end of housing and install bushing, washers, spacer, and centering spring on valve spool bolt. Compress spring and install nut. Tighten nut securely, then loosen it not more than ¼ turn. Move ball stud back and forth in sleeve slot to check for free movement of spool. *NOTE - This spool sh uld travel approximately .060" in each direction from center.* Install centering spring cap on housing and tighten the two cap bolts to 4-6½ ft. lbs. Install nut on ball stud so that valve can be positioned in a vise with the vise clamping the nut and holding valve securely, then push forward on cap end of valve to check valve spool for free movement. Turn valve around in vise and push forward, checking for free movement.

Installati n: Thread valve on steering arm-to-idler arm rod until about four threads are still visible on the rod. Position ball stud in sector arm, then measure the distance between center of ball stud in pitman arm and



FORD & MERCURY POWER CYLINDER

center of stud at inner end of left hand spindle connecting rod. *(CAUTION - Make sure the measurement is taken parallel to centerline of control valve).* The measurement should be as indicated in table below. If the measurement is not correct, disconnect ball stud from pitman arm and turn valve on steering arm-to-idler arm rod as necessary to obtain the correct measurement. With correct distance obtained and ball stud positioned in pitman arm, align hole in steering arm-to-idler arm rod with slot in end of valve sleeve. Install roll pin in rod hole to lock valve in position on rod. Tighten valve sleeve clamp bolt to 30-35 ft. lbs. Install nut on ball stud and tighten to 56-60 ft. lbs. Install cotter pin. Connect hoses to control valve and tighten all fittings securely. Fill reservoir to "F" mark on dipstick or reservoir with Automatic Transmission Fluid Type "A". Start engine and run at fast idle speed for two minutes, then turn steering wheel to right and left a few times and check for leaks.

Valve Installation Measurement

Model	Dimension
1954-56 Ford & Mercury	9"
1955-56 Thunderbird	9 9/16"±1/32"
1957 Ford (Exc. Thunderbird)	10 7/8"
1957 Thunderbird	9½"
1957-58 Mercury	11¼"
1958 Ford & Thunderbird	10 7/8"
1958 Edsel (Corsair & Citation)	11 1/4"
1958 Edsel (Ranger, Pacer & Sta. Wgn.)	10 7/8"
1959-60 Edsel	11 15/16"
1959 Ford (Exc. Thunderbird)	10 7/8"
1959 Thunderbird	9 1/2"
1960 Ford (Exc. Thunderbird)	12"
1960 Thunderbird	10 3/4"
1959-60 Mercury	9 3/8"
1958-60 Studebaker	See Note Below

►*STUDEBAKER INSTALLATION NOTE:* With control valve reinstalled and control valve assembly screwed into reach rod the same number of turns (recorded at time of removal), set wheels in straight ahead position and center wheel in the high spot. Slip pitman arm on steering gear shaft, aligning marks on arm and shaft, then check distance between center of pitman arm ball and reach rod ball by holding end of reach rod in position at bellcrank. Adjust length of reach rod so that reach rod ball stud will slip into bellcrank without moving front wheels from straight ahead position. *NOTE - It is necessary to remove unit from car to make adjustments.*

POWER CYLINDER: Except for cylinder seal and hose seat replacement, the power cylinder should be replaced as a complete assembly if faulty.

Removal: Disconnect hoses from power cylinder and fasten open ends of hoses in a raised position to prevent fluid draining out. Move front wheels to left and right several times to force all fluid from cylinder. Disconnect piston rod from idler arm bracket, but do not remove at this time. Remove locknut holding cylinder on mounting stud in steering arm-to-idler arm bracket and remove outer washer, bushing, and cylinder from stud. Remove inner bushing and washer from stud and pull inner insulator and washer from piston rod.

Inspection: Clean exterior of cylinder and piston rod. Inspect cylinder and rod for damage or wear and check for leakage. If parts are damaged or piston is leaking internally, replace the entire power assembly. Inspect mounting bushings and insulators for wear or damage and replace as necessary.

►*POWER CYLINDER SEAL REPLACEMENT NOTE:* Install all parts furnished in repair kit as follows: Clamp cylinder in vise and remove snap ring from end of cylinder, being careful not to distort or crack the cylinder. Pull piston rod out as far as it will go, then apply compressed air to other end of cylinder to blow seals out of cylinder. Lubricate new inner seal with Automatic Transmission Fluid Type "A", then place seal, bushing, outer seal, and scraper on piston rod. Push piston rod all the way in, then using a deep socket slightly smaller than cylinder opening, tap parts into cylinder and replace snap ring.

►*HOSE SEAT REPLACEMENT NOTE:* If either seat is damaged, both seats should be replaced as follows: Tap the hole in power cylinder hose seat with a 3/8" starting tap. *(CAUTION - Remove all metal chips from hole after tapping).* Place a nut and large washer (enough to cover seat port) on a 3/8" bolt, then insert bolt in tapped hole and turn it to pull seat out of port. Position a new seat in port, and thread a 5/8"-18 bolt in the port until seat bottoms in port.

Installation: Install inner washer and bushing on mounting stud in steering arm-to-idler arm rod. Install inner insulator and washer on power cylinder piston rod, then install cylinder on mounting stud with piston rod in idler arm bracket. Install outer bushing, washer, and locknut on the mounting stud. If a new nut is installed, tighten it to 60-70 ft. lbs. If a used nut is installed, tighten to 50-60 ft. lbs. Install outer insulator, washer, and nut on piston rod and tighten to specification indicated in table below. Connect hoses to cylinder and tighten fitting securely. Fill reservoir (see "Lubrication" above), then run engine and check for leaks.

POWER STEERING PUMP: *See "Power Steering Hydraulic Pumps" and note the following application for different models.*

1954-57 Ford (All Models) - Eaton "Rotor" type pump.

1958-60 Ford & Thunderbird - Eaton "Roller" type pump.

1954-57 Mercury - Eaton "Rotor" type pump. *NOTE - Used on 312" Eng. (Exc. Turnpike Cruiser & Air Cond. Cars).*

1957 Mercury - Vickers Vane Type pump. *NOTE - Used on Turnpike Cruiser & Air Cond. Cars with 368" Eng.*

1958-Early 1960 Mercury & Edsel - Vane type. Mounted on front of engine and driven directly by crankshaft. *NOTE - Used on some models.*

1958-60 Mercury & Edsel - Eaton "Roller" type pump. *NOTE - Used on some models.*

Late 1960 Mercury - Eaton "Roller" (Crankshaft Mounted) type pump. Mounted on front of engine and driven directly by crankshaft.

1958-60 Stud baker - Eaton "Rotor" or "Roller" type pump; Vickers Vane Type, or Saginaw Vane Type pumps used.

1959-60 Ch ck r Sup rba - Eaton "Roller" type pump.

BENDIX LINKAGE TYPE (NASH, PACKARD)

Nash, Amb. 6 (1954-56)
Packard, Exc. Clipper (1954-56)

DESCRIPTION: This "Linkage Type" Power Steering differs from other types in that the power mechanism is built in the steering linkage (or attached to it) and is used in conjunction with a standard steering gear (gear has special ratio to take advantage of added power). Power steering system consists of the following units:

Hydraulic Pump & Reservoir Assy.—Mounted on the engine and belt-driven from the crankshaft. Consists of an Eaton rotor type pump with a built-in Relief Valve (pre-set to specified limits—See Testing Hydraulic Oil Pressure below) and Flow Control Valve (limits maximum volume, at high engine speed, to steering gear requirements.

Control Valve—Spool type valve located in end of steering drag link with valve spool directly connected to pitman arm. Valve is actuated by pitman arm (when steering wheel turned) and directs fluid pressure to one end of the power cylinder and at the same time vents the opposite end of the cylinder to the reservoir. Control valve also has a ball check valve in a by-pass passage in the valve housing to permit manual steering with the power off.

Power Cylinder—Double-acting piston type. Piston rod is anchored to frame side rail and cylinder is connected to the drag link so that power application tends to move the drag link in the same direction in which it is being moved by the steering wheel. Cylinder is double-acting (with fluid pressure in one end of cylinder, opposite end is vented to the reservoir through the control valve).

PUMP DRIVE BELT ADJUSTMENT: Nash - Adjust pump drive belt sufficiently tight to prevent slippage.
Packard - Adjust belt to 26-28 ft. lbs. torque. Make sure pulleys are in alignment.

►***ADJUSTMENT CAUTION—Whenever hydraulic system disturbed (by disconnecting lines, removal or installation of units ,etc.) hydraulic system must be bled to remove air. See Bleeding Hydraulic System.***

LUBRICATION: ***CAUTION—Power Steering System and Steering Gear are lubricated separately and with DIFFERENT lubricants as follows:***

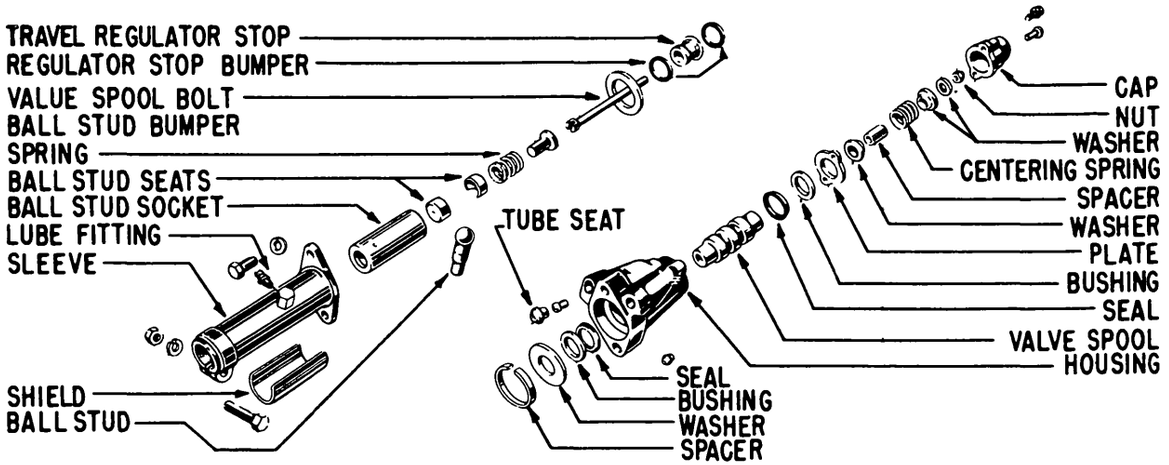
Power Steering System: Check fluid level in reservoir at 1000 mile intervals (remove reservoir cover.) Maintain level at 1" below top of reservoir using Automatic Transmission Fluid Type "A"

Steering Gear: Check lubricant level every 3000 miles and maintain even with filler plug hole. Use SAE. No. 90 Steering Gear Oil.

BLEEDING HYDRAULIC SYSTEM: Whenever lines disconnected, or units disturbed, bleed system by making complete right and left power turns, then recheck oil level in reservoir.

TROUBLE SHOOTING: ***If operation not satisfactory, diagnose trouble as follows:***

HARD STEERING: 1) Pump failure, loose or broken belt.
2) Broken or weak relief valve spring, sticking relief valve.
3) Low pump pressure, line leakage, or low fluid in system.



NASH & PACKARD POWER STEERING CONTROL VALVE ASSEMBLY

4) Under-inflated tires.
5) Bent linkage, steering tube mis-alignment, improper wheel alignment.
6) Steering adjustment tight.
7) Improper lubrication.
8) Leakage in power cylinder past piston ring.
9) Air in system.
10) Pump control valve sticking.
11) Control valve spool out-of-round or damaged.

STEERING TOO SENSITIVE: 1) Overinflated tires.
2) Pump pressure too high.
3) Flow control valve stuck in closed position.

LOOSE STEERING: 1) Wheels out of alignment, bearings loose or worn.
2) Loose ball joints, steering knuckle pins, steering gear-to-frame bolts, pitman arm, or lash in linkage.
3) Air in system.

POOR CENTERING: 1). Faulty or binding control valve spool or power cylinder.
2) Control valve spool nut too loose or too tight.
3) Steering misalignment, one tire underinflated, loose wheel bearings.

POOR RECOVERY: 1) Steering gear adjusted too tight, improper caster adjustment.
2) Lack of lubrication of linkage, low tire pressure.
3) Stop nut pin installed in wrong hole causing spool assembly to bind in bore.

PUMP NOISE: 1) Improper fluid level, loose return hose connection, clogged intake line or filter, improper fluid.
2) Pump belt squeal, hose rubbing against other parts, loose pulley, mechanical trouble in pump, relief valve chattering.
3) Wheels held at stops too long, overheating pump.

LOW PRESSURE (When Tested With Gauge):
1) Low fluid level, external or internal leakage.
2) Slipping belt or pump mechanical trouble.
3) Pump relief valve weak or stuck open, flow control valve struck open.

NO POWER ON STEERING GEAR (Engine Running): 1) No pressure at pump. Items 1) to 3) for Low Oil Pressure (above) apply.

CHUCKLE OR RATTLE IN STEERING: 1) Too much back lash in steering, worn or loose parts, ball socket or studs loose.
2) Control valve improperly adjusted.

SHIMMY: 1) Lash in linkage, worn or loose steering parts, wheels out of balance.

OIL LEAKS (PUMP): 1) Loose or defective connections, defective "O" ring seals between reservoir and pump, or between connections.
2) Defective seal on pump shaft or between cover and body, hose leaks.

OIL LEAKS (POWER CYLINDER): 1) Loose or defective connections.
2) Defective seals between cylinder flange and body.
3) Defective spring loaded metal encased seal on shaft, scored shaft.

OIL LEAKS (CONTROL VALVE): 1) Worn seals on end of spool.
2) Drippage of fluid from ball stud section indicates seals on spool are passing fluid.

CONTROL VALVE NOISE: 1) Spool bolt nut loose, causing spool flutter.

STEERING WHEEL DOES NOT CONTROL OPERATION OF POWER STEERING (After Assembly To Car): 1) Improper hose connections.

TESTING HYDRAULIC OIL PRESSURE (NASH): Check reservoir for correct fluid level. If low, fill to proper level with Hydra-Matic Transmission Fluid. Inspect all hoses and connections for evidence of external leaks. Test as follows:

(1) Install Oil Pressure Gauge J-5548 in main oil pressure line at control valve. Start engine, allow oil to circulate for several minutes to warm oil in reservoir.

(2) With car standing on dry, rough concrete, make complete turn in each direction. Observe oil pressure gauge during this operation. Gauge should indicate 450-550 P.S.I. If oil pressure low, pump opera-

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BENDIX LINKAGE TYPE (NASH, PACKARD) (Continued)

tion or oil leakage is cause. If pressure varies more than 100 P.S.I. in either direction, internal leakage is cause.

(3) Check oil pump pressure output and relief valve operation by disconnecting pressure gauge from control valve and capping pump pressure line so pump will develop maximum pressure. Plug control valve to prevent excessive oil loss. With engine idling, gauge should indicate 700-900 P.S.I. If pressure low or erratic, pump belt may be loose. Watch pump pulley for smooth operation. If pump belt not slipping pump is at fault.

(4) After pump checked and operation satisfactory, reconnect gauge to control valve, disconnect two lines to power cylinder, plug two ports in control valve using special plugs. With engine idling, steer car in both directions observing pressure. Pressure should be 700-900 P.S.I. If pressure low turning one way and correct the other, inspect control valve spool spacer sleeve for correct length (41/64"). Low pressure turning both ways indicates internal leakage in control valve.

(5) If pump pressure check and inspection of control valve shows both units operating satisfactorily, then power cylinder is cause of the difficulty.

TESTING HYDRAULIC OIL PRESSURE (PACKARD): Remove reservoir clamp, cover and gasket, then use a suction pump and remove oil from reservoir. Test as follows:

(1) Disconnect pressure hose at union on right side of pump, install pump pressure Gauge Hose and Valve PK-13 on union at pump with hand valve open. Connect pressure hose to fitting on hand valve side of gauge. Refill reservoir to proper oil level.

(2) Run engine until warmed up, then turn wheels from full right to full left position to bleed air from system. Add oil as required to bring fluid to proper level. After engine warmed up and idled at 375 RPM., wheels should be resting on ground in straight-ahead position. Close gauge hand valve and observe gauge reading. Reading should be approximately 650 P.S.I. Gauge will oscillate several hundred P.S.I. on gauge dial. Center reading will be approximately 650 P.S.I. if pump at maximum efficency. If average reading below 550 P.S.I. pump needs repair. ***CAUTION—Do not keep gauge hand valve closed any longer than necessary to read gauge.***

(3) Turn steering wheel toward either of wheel stops. As wheel is turned from straight-ahead position, pressure will start increasing until it reaches wheel stops where pressure should be 600-650 P.S.I. If pressure less than 600 P.S.I. trouble lies in control valve or power cylinder.

(4) After completing above tests, shut engine off, drain reservoir. Disconnect and remove gauge hose and valve from pump and pump pressure line. Reconnect pump pressure line to pump, tighten hose-to-pump connector. Fill reservoir to level mark with Ultra-matic Drive Fluid, start engine. Turn wheels from full left to full right position several times to bleed system of air. Add oil as required. Check pump pressure line at pump for fluid leakage. Install reservoir gasket, cover, clamp and clamp screw on reservoir, tighten screw.

REMOVAL & INSTALLATION: Proceed as follows:

►***CAUTION—Before removing assemblies thoroughly clean the assembly and surrounding parts to prevent dirt from entering assemblies.***

NASH Control Valve Removal From Car: Disconnect oil pressure and return hoses at control valve and two lines connecting valve to power cylinder. Remove cap and gasket from outer end of control valve, then remove self-locking nut and special washer located under cap. Remove two valve-to-linkage attaching bolts, then remove control valve.

Installation: Slide control valve spacer and control valve assembly on bolt of linkage. Be sure spacer sleeve is in place on special bolt. Install special flat washer and a new self-locking nut on end of bolt at outer end of control valve. Adjust nut until there is just a slight amount of play. NOTE—If nut too tight, spool may bind in housing, if too loose, there will be excessive lost motion before spool moves. Reinstall gasket, cap and oil lines.

PACKARD Control Valve Removal From Car: Remove cotter pin and ball stud nut attaching forward end of pitman arm to control valve. Using tool No. PK-11, Ball Stud Remover, install jaw of tool between pitman arm and ball stud in control valve. If dust cap spring is under jaws of tool, pry it up before inserting tool. After ball stud loosened, push up on linkage to release ball stud and control valve from pitman arm. Disconnect reservoir port hole at left end fitting on control valve. Drain fluid. Cap or plug hose fitting to prevent fluid from dripping and dirt getting into hose line. Disconnect pump port hose at connector on valve (second connection from left end). Disconnect left turn hose at connector on valve (connection farthest to right). Using calipers or a rule measure distance between end of control valve and center of connecting rod ball stud (control valve on reinstallation threaded on end of steering connecting rod to exact position from which removed). Unscrew and remove zerk grease fitting from control valve. Loosen bolt in clamp on end of control valve, turn valve to provide room for tools used for disconnecting hose. Disconnect right turn hose at fitting (center front of valve body). Plug or cap hoses to prevent dripping. Unscrew control valve from end of connecting rod.

Installation: Thread control valve onto end of steering connecting rod. Check measurement with a rule or calipers to make sure valve is in identical position from which removed. Tighten locking clamp bolt to 25-30 ft. lbs. Install zerk fitting. Position control valve ball stud in pitman arm, install attaching nut and tighten to 45-50 ft. lbs. Install new cotter pin. Install hoses, tighten.

POWER CYLINDER REMOVAL: Disconnect hoses at power cylinder. Secure hoses in an upright position and cap or plug ends to prevent fluid from dripping and dirt entering hoses. Disconnect power cylinder from frame bracket and piston rod from steering linkage connecting rod, remove power cylinder.

Installation: To install Power Cylinder reverse removal procedures. Tighten attaching nuts to 45-50 ft. lbs. torque.

OIL PUMP REMOVAL: Disconnect oil lines from pump, drain oil into container. Cap or plug fittings of pump. Release pump belt tension, remove pump belt from pulley. Remove pulley, then pump and reservoir.

Installation: To install pump, reverse removal procedures. Tighten pulley to 15-18 ft. lbs. torque.

CONTROL VALVE OVERHAUL: Disassembly—Mark or scribe control valve housing flange to assure proper reassembly. (Packard) Remove capscrews holding control valve cap and gasket to end of control valve spool housing, remove these parts. Remove nut and washer from valve spool bolt. Remove attaching capscrews holding valve spool housing and adaptors to flange end of sleeve and flange assembly, then separate spool housing, adapters, spool washer and spacer from valve spool bolt. Using small punch, push out pin that locks socket tube, stop screw and valve spool bolt together as unit. Unscrew stop screw from socket tube. Remove ball seat spring, ball seats and ball stud from ball socket tube. Remove socket tube from bore of sleeve and flange assembly. (All) Valve spool bushings have "push fit." To remove spool, use round piece of brass rod slightly smaller in diameter than spool stem, tap lightly until bushing free from spool housing bore. This method may be used at either end of spool housing. After removing bushing and spool, bushing at other end may be tapped out.

Inspection & Cleaning: Inspect packings on inner and outer diameters of valve spool bushing for damage or excessive wear. Inspect lands of spool for nicks and burrs. Clean with crocus cloth if necessary. Inspect valve spool housing bore and adaptor bore for wear, cracks, or scoring. Examine valve spool to see if bent. Check condition of ball seat spring. Replace as required. Wash all parts with carbon tetrachloride or suitable cleaner, blow out passageways with compressed air. Use new packing rings on reassembly.

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BENDIX LINKAGE TYPE (NASH, PACKARD) (Continued)

Reassembly: Install control valve spool in housing. Using seal guide tools install bushings (large bushing on large stem end of spool). Check movement of spool in housing for free operation. (Nash) Slide control valve spacer and control valve assembly onto bolt of linkage. Be sure spacer sleeve is in place on special bolt. Install and tighten attaching bolts. Install special flat washer and new self-locking nut on end of bolt at outer end of control valve. Tighten nut to provide just a slight amount of side play. (Packard) Install ball seats in ball socket tube, insert assembly into sleeve and flange assembly. Install ball stud and ball seat spring. Slide stop screw over valve spool bolt, tighten stop screw into ball socket tube which has been assembled into sleeve and flange assembly. Back off stop screw to nearest hole and where stop screw lines up with hole in spool bolt and socket tube. If spool bolt can be rotated, install stop screw pin. Install adapters, spool washer, spool spacer on valve spool bolt. Assemble these parts with capscrews to valve spool housing making certain alignment marks are lined up. Tighten capscrews to 25-30 ft. lbs. Install washer and nut on valve spool bolt and tighten nut so that there is just a slight amount of slide play. Center ball stud in socket tube. Check operation of control valve spool in housing by moving stud. Install valve spool body end gasket, cover and capscrews. Torque tighten to 12-15 ft. lbs.

POWER CYLINDER OVERHAUL: Disassembly—Mark or scribe flanges of power cylinder. Remove fluid communication tube from cylinder. Remove adapter assembly from cylinder, then piston rod from bore. Remove scraper washer and seals from adapter and bore.

Inspection & Cleaning: Wash all parts with carbon tetrachloride or suitable cleaner, blow parts dry with air. Inspect cylinder rod end of casting and bore of cylinder body for cracks, dents, wear, broken welds, and excessive scratching. Inspect threads of fittings, examine piston rod to see if bent or threads damaged. Examine ball stud on piston rod for excessive wear and damaged threads. Replace as required. Replace ring packing and seals.

Reassembly: Install seals in adaptor assembly and bore. Install scraper washer. Lubricate piston rod with oil (Hydra-Matic or Ultramatic). With piston rod guide insert piston rod through seals into adaptor housing bore. Install piston assembly in bore (Nash has two rings with end gap .001-.007", sideplay .001-.003". Packard one ring with not more than .016" gap and free movement in groove). Realign scribe marks on flanges, torque tighten attaching bolts to 15-18 ft. lbs. Install oil communcations tube, tighten. Install hoses in fittings of power cylinder, tighten.

POWER STEERING PUMPS: *See "Eaton (Rotor) Type", "Vickers (Vane) Type" or "Saginaw (Vane) Type" pump data under "Power St ring Hydraulic Pumps" for complete data*

STEERING GEAR ADJUSTMENT & OVERHAUL: *S e "Gemmer Worm & Roller' Steering Gears.*

1954-58 MONROE LINKAGE TYPE

D dg 6 (1954)
Huds n (1954-57)
Nash (1954-57)
Packard (1955-56)
Plymouth (1954)
Rambler (1955-58)

DESCRIPTION: Monroe Power Steering is of the "Linkage Type". The power mechanism is built into the steering linkage and is used in conjunction with a standard steering gear. Power steering system consists of the following units:

Hydraulic Pump & Reservoir Assembly: On Dodge and Plymouth, the pump and reservoir assembly is mounted at rear of generator and driven by generator armature shaft. On others, assembly is mounted on engine and is belt-driven by crankshaft. Consists of rotor type pump with built-in relief valve (pre-set to specified limits - See "Testing Hydraulic Oil Pressure' below) A flow control valve limits maximum volume, at high engine speeds, to steering gear requirements

Power Link: Serves as drag link in steering linkage. Double-acting piston type. Piston rod is anchored to bracket on right frame side rail, with tie rods connected to ball studs which are firmly attached to the cylinder of the Power Link. The control valve body is an integral part of the Power Link, and moves with the Power Link cylinder. Precision type spool valve is centered in valve body by springs at either end. Stud, attached to pitman arm, extends through valve body, and can be moved in either direction to change position of valve spool thereby actuating Power Link.

►*ADJUSTMENT CAUTION–Whenever hydraulic system disturbed (by disconnecting lines, removal or installation of units, etc.) hydraulic system must be bled to remove air. See Bleeding Hydraulic System below.*

PUMP BELT ADJUSTMENT: Dodge & Plymouth - Install adjusting tool C-3379 and torque wrench C-3005 Pull torque wrench to 15 ft. lbs torque and tighten adjusting strap bolt and generator-to-generator bracket bolts.

Hudson 6 & Rambler: At proper tension, belt should not deflect more than ¼" with thumb pressure midway between pulleys

Nash & Hudson V8: Tension should be sufficient to prevent slippage.

POWER LINK ADJUSTMENT: When it has been determined that valve spool in Power Link is not adjusted properly, adjustment can be made by turning plug in valve end of Power Link in or out, as required, 1/6 turn at a time. In no case should it be necessary to turn it a total of more than 1/2 turn to have a correct adjustment. Road test car and turn plug **IN** if left turn too hard, right turn too easy, poor recovery after right turns with good recovery after left turns, tendency of vehicle to wander to the right. Turn plug **OUT** if one or more conditions opposite the above exist. Proceed with adjustment of the link valve as follows: Scribe mark on plug in valve end of power link to indicate original position of plug. Remove cotter pin, turn plug in or out 1/6 turn (as determined by symptoms above). If plug held by wire and lead seal, remove seal and after adjustment, replace with cotter pin. Road test vehicle, then if steering action improved but still not correct turn plug an additional 1/6 turn, then road test vehicle again. If necessary, plug can once more be turned an additional 1/6 turn. When steering action is proper, install cotter pin to lock plug in position. If steering action still not correct after plug moved 1/2 of a full turn replace power link.

FRONT END ALIGNMENT: *Se individual car mod l pages or "Suspension & Wheel Alignment" S ction.*

PITMAN ARM STOP SCREW ADJUSTMENT: Proceed as follows.

Hudson (1954) Turn steering wheel to full right turn and place a 1/16" shim between the stop on the right hand outer steering arm and the stop on the spindle support. With shim in place, adjust the stop screw at pitman arm stop bracket until screw just touches pitman arm, then tighten lock nut securely.

HUDSON (1954) DRAG LINK ADJUSTMENT Disconnect drag link at stud which extends through valve portion of power cylinder. Set front wheels in straight-ahead position with steering gear on the high point (steering wheel spokes in horizontal position). If drag link will not enter over stud freely, loosen clamp screw and turn drag link arm in or out as required. After adjustment, securely tighten clamp screw and valve stud nut. *NOTE*–If adjusted properly, drag link and stud fit snugly on power cylinder without bind. It is essential that drag link and stud be able to move a few thousandths inch sideways to operate power cylinder. Maintain the 1.990" plus or minus .010" dimension between inner face of thrust washers. If drag link and stud drawn down too tightly on power link, steering effort will increase and wheels will not return properly after a turn. It may be necessary to disengage drag link from stud and remove one of two metal washers on stud and rubber cushion and the drag link. If this does not correct condition, it may be necessary to replace stud or drag link.

LUBRICATION· *CAUTION–Pow r Steering Unit and Steering Gear are lubricated separately with DIFFERENT lubricants*

Power Steering System: Check fluid level every 2,000 miles (Dodge & Plymouth 1000 miles), maintain at indicated level near top of reservoir (Dodge & Plymouth 1/2" above highest point of filter element). Check for leaks before adding fluid to system. Capacity of system is 3 pints.

Recommended Fluid–(Dodge & Plymouth) SAE 10-W Engine Oil when temperatures consistently above 10° F. above zero, and SAE 5-W when temperatures reach 10° F. below zero and remain consistently below 10° F. above zero. At extreme high temperatures use SAE 30 Engine Oil. (Others) Automatic Transmission Fluid (Type A–AQ-ATF).

Draining System (Dodge & Plym uth): *(NOTE–Extrem care should be exercised to prevent dirt from ntering r s rvoir while cover is removed. To prevent damage to filter elem nt, do not insert sharp objects into reservoir. Do not disturb filter el ment as periodic*

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1954-58 MONROE LINKAGE TYPE (C ntinued)

chang s of this unit are not requir d.) Disconnect high pressure (small) hose at power steering unit, place end of hose in suitable container. While holding hose in container start engine and allow to idle until all fluid is forced from unit (CAUTION—Do not run engine above idle speed). As soon as fluid starts to show great quantities of air bubbles, stop engine. Reconnect high pressure hose, refill.

BLEEDING (REFILLING) HYDRAULIC SYSTEM (HUDSON): Loosen hose connections at booster cylinder valve; with hoses disconnected at pump, fill hoses with fluid (Type A—AQ-ATF) until fluid runs out at the hose connections at booster cylinder free of air bubbles; then tighten connections at booster cylinder, while keeping hoses full of liquid. Install hose connections at oil pump and tighten securely. Fill oil pump reservoir to mark with recommended fluid. Fill cooling system. Start engine and run at idle speed for approximately 10 minutes to allow hydraulic system to clear itself of air that may be trapped in the system. *(CAUTION—Do not turn the steering wh l during this 10 minute period).* Recheck oil level. Install reservoir gasket, cover, cover attaching screw, flat washer and lock washer (use new gasket). Check all hose connections for leaks. *NOTE*—If oil pump is noisy and fluid level is up to mark in reservoir and all connections are tight, place car in service. Noise will disappear after three or four days usage. Pump noise is caused by air forced into the oil. The air will be gradually dissipated during usage. If care is taken during filling and while connecting hoses, condition should not occur.

BLEEDING (REFILLING) HYDRAULIC SYSTEM (OTHERS): Fill reservoir to within one inch of top (Dodge & Plymouth slightly above normal). Start engine and allow to run for a short time to circulate oil through hoses. With engine running at idle speed, turn steering wheel back and forth several times from extreme positions to bleed any remaining air out of system. Check oil level in reservoir, refill to proper level.

TESTING: If Power Steering operation is unsatisfactory and before making any tests be sure pump belt tension is correct, fluid level proper, leaks eliminated; that wheel alignment, pressure and condition of tires and shock absorbers are satisfactory. Then make tests as follows:

Ste ring Effort: Start engine. With engine running at idle speed (Automatic Transmission in neutral), front wheels on dry, smooth concrete (or smooth steel plates), a 3-10 lb. pull should be sufficient to turn steering wheel one full turn in either direction from center. If otherwise see "Trouble Shooting" below.

Hydraulic Pr ssure (D dge & Plymouth): With engine turned off, connect pressure gauge in pressure line between pump and hose with shut-off valve open. Start engine. If, when turning steering wheel to either extreme position, the gauge does not show 500 lbs. per square inch, slowly close valve. If pressure does not gradually increase as the valve is closed, flow control valve may be stuck in open position or drive coupling may be broken. *(NOTE*—If gauge not available, a fairly accurate way of making test is as follows: Start engine and turn wheel to both extreme positions. If high pressure hose flexes, pump is in good condition. If high pressure hose does not flex, lack of pressure from pump is indicated.) Turn engine off, and remove reservoir cover. Restart engine and turn steering wheel. If oil flows through filter, flow control valve plunger is stuck. Turn engine off and remove gauge. Insert a 1/4" blunt probe against valve plunger. If valve moves inward, it was stuck. Recheck pressure and if gauge registers less than 500 lbs. per square inch, a broken coupling is indicated and must be replaced. Remove pump from generator. If either coupling is broken, turn pump shaft by hand at least ten revolutions. If shaft turns freely, install a new coupling on both the pump and generator shafts. If pump shaft binds when turned by hand, replace both pump and couplings. If generator armature shaft is damaged, replace necessary parts.

Hydraulic Pressure (Others): With engine turned off, connect pressure gauge in pressure line at pump, turn gauge to open position. Start engine and idle for approximately two minutes for fluid to reach operating temperature. With gauge valve open, turn wheels against a curb or other suitable object, maintain sufficient force on steering wheel to keep hydraulic power applied to steering linkage and front wheels. Note pressure on gauge, then release steering wheel. *CAUTION—Do not maintain force on steering wheel for any extended period of time to avoid undue wear in hydraulic system.* If pressure noted was 500-800 psi., power link and pump are operating properly and it is unnecessary to continue further. If less than 500 psi. close gauge valve and note pressure developed by pump, then open gauge valve. *CAUTION—Do not leave gauge valve closed for more than 3 or 4 seconds.* If pressure developed by pump increase to 500-800 psi. (650-900 psi. Nash, Hudson & Rambler V8) fault is in Power Link. Check pitman arm for binding on valve body. If pitman arm not binding, remove Power Link piston and rod assembly. Check piston and rings, replacing parts as necessary. Reinstall Power Link, then make another pressure check, and if pressure is still low, replace Power Link. If pressure does not increase to 500-800 psi (650-900 psi, Nash, Hudson & Rambler V8), replace relief valve spring and flow control valve spring. If pressure still low, pump must be removed and overhauled. If pressure ever exceeds 800 psi. (900 psi Nash, Hudson & Rambler V8), replace relief and flow control valve unit.

TROUBLE SHOOTING: *Diagnose trouble as follows:*

Hard Steering in Both Directions: 1) Leak in system, fluid level low, insufficient fluid flow in system due to plugged flow restrictor or hoses.

2) Steering gear and linkage not lubricated, pitman arm and stud binding on power link, bend in power link piston rod, bind in steering column or gear.

3) Low pump pressure caused by stuck relief and flow control valve, weak or broken flow control valve spring, weak or broken relief valve spring, rotors not turning, rotors worn, pump body or cover worn.

4) Loss of pressure in power link caused by internal fluid leak past piston or valve.

5) Valve in power link misaligned or sticking.

6) Tire pressure too low, improper front end alignment.

7) Pump belt slipping or broken.

Hard Steering in one Direction Only: 1) Valve in power link misaligned or sticking.

2) Tire pressure too low, improper front end alignment.

3) Bend in power link piston rod, bind in steering column or gear.

Poor Recovery on Turns: 1) Tire pressure too low, improper front end alignment.

2) Pitman arm and stud binding on power link, bind in steering column or gear, bind in steering knuckles.

3) Bend in power link piston rod, or valve in power link misaligned or sticking.

Vehicle Attempts to Turn unless Force Applied to h ld Steering Wheel: 1) Tire pressure uneven.

2) Pitman arm and stud binding on power link.

3) Valve in power link misaligned or sticking.

Noise: 1) Pump belt tension is incorrect, pump drive pulley retaining bolt loose, pump drive pulley key does not fit, pump shaft bearing worn, worn bushings in pump body or cover.

2) Low fluid level, dirt and sludge in pump.

3) Pitman arm stud loose, tie rod clamps tightened in wrong position, power link bracket on frame hitting lower suspension arm.

4) Restricted air vent in reservoir cover.

5) Noise in power link valve.

REMOVAL & INSTALLATION OF VALVE & POWER CYLINDER (POWER LINK): Proceed as follows:

Dodge & Plymouth: Raise vehicle (preferably with hoist). Remove right and left tie rod ends at steering knuckle arms. Place drain pan beneath power unit at hose fittings. Disconnect hoses, plug hose fittings and cap fittings on unit. *(CAUTION—After fittings n unit have been capped, care should be exercis d to prevent movement of the unit on piston rod. If steering wheel is turned or if other force is put on unit, seals can be blown. Do not start engine after removing hoses and putting plugs in lines.)* Disconnect power unit from steering arm at steering arm attaching stud. *(CAUTION—Power steering unit should b prevented from dropping by either holding or tying in place. Tap on steering arm, not on attaching stud and do not pry between valve and steering gear arm).* Holding piston rod at flat section with 9/16" open end wrench, remove piston rod attaching nut. Remove outer linkage bracket cushion retainer and cushion. Disconnect piston rod from frame bracket. Remove tie rods from power unit if necessary and replace before installing in vehicle. To install, reverse removal procedure. Tighten nuts to 45-75 ft. lbs. torque. Check oil level in reservoir and refill (see Lubrication above) as necessary.

Hudson (1954): Turn front wheels full left. Remove cotter pin from drag link ball stud at valve shaft and remove castle nut (7/8" wrench). Remove drag link ball stud from valve stud, using Tool J-2781. Remove

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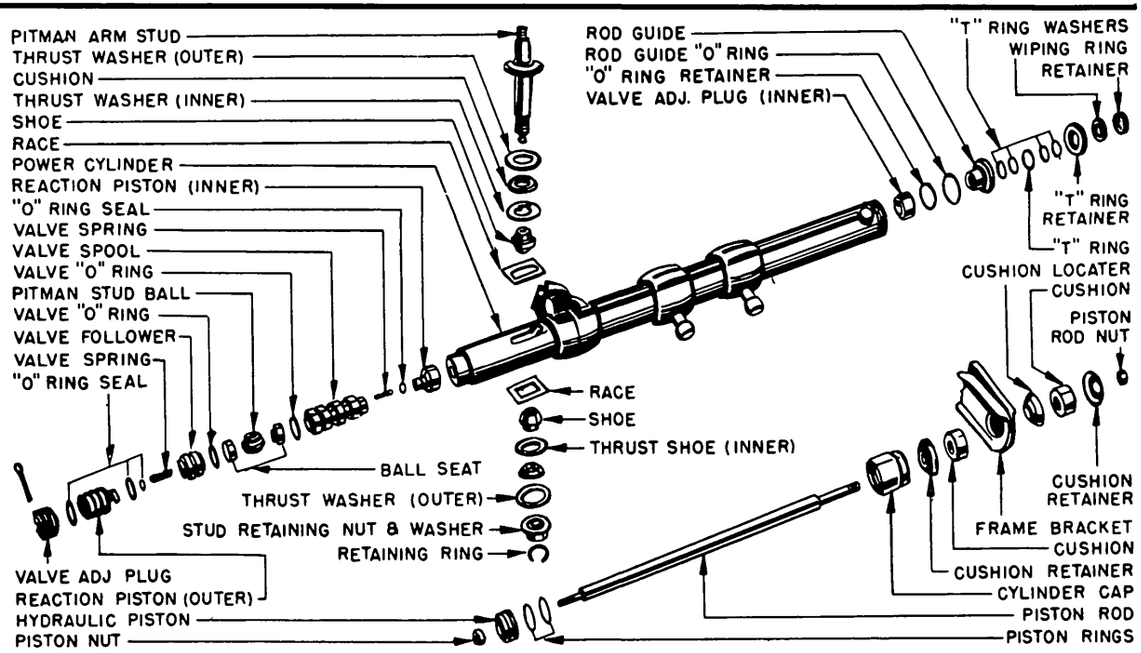
1954-58 MONROE LINKAGE TYPE (C ntinued)

cotter pin, end plug, safety plug, spring and ball seat, then disconnect valve and cylinder from center steering arm. Raise car and place on stand jacks. Disconnect piston rod at support bracket at No. 3 crossmember by removing cotter pin and lock nut (3/4" wrench) and push the piston rod through bracket and remove piston shaft washers, rubber bushings and retaining washers. Disconnect hoses at oil pump and lift valve and power cylinder up through engine compartment. To install, connect piston to frame bracket and tighten castellated nut until **two full threads** of piston rod extend beyond top of nut. (DO NOT exceed this limit). Assemble drag link onto valve stud and install nut and cotter pin. Tighten drag link arm-to-valve stud nut to 50-60 ft. lbs. torque, then tighten other valve stud nut to give equal compression of rubber cushion against power cylinder. It is essential that valve and drag link are able to move a few thousandths of an inch sideways to operate power cylinder spool valve. (CAUTION—Maintain the 1.990" plus or minus .010" dimension between inner face of thrust washers. If this dimension not held, drag link and stud may be drawn down too tightly on power cylinder, increasing steering effort so that wheels will not return properly after making a turn. Install washers in sequence (reverse to that in which removed). It may be necessary to remove one of metal thrust washers to correct an overtight condition). Assemble steering arm ball (center) into slot in unit and install ball seat, spring and spring seat plug. Install hoses, but do not tighten. Fill hoses with fluid until fluid runs out at hose connections at booster cylinder free of air bubbles, then tighten connections at booster cylinder, while keeping hoses full of fluid. Install hose connections and tighten securely. Refill system

Hudson (Exc. 1954), Nash & Rambler: Disconnect oil hoses from unit and disconnect rod from side sill bracket. Disconnect tie rods from cylinder and valve assembly. Remove putman arm stud adjusting nuts, washers, cushions and spacers and remove cylinder and valve assembly from pitman arm. To install, reverse removal procedure. Tighten inner nut on pitman stud until there is sufficient tension on rubber cushions to prevent rattles and grease leakage and still permit free movement of the stud.

VALVE & POWER CYLINDER (POWER LINK) OVERHAUL: Valve Disassembly: Remove valve and power cylinder assembly from vehicle (See Removal & Installation above), then proceed as follows:

Dodge & Plymouth - Clean outside of the valve and cylinder assembly in suitable solvent. Remove cotter pin from outer adjusting plug. Using a scribe, mark the location of the adjusting plug (to assist in making final adjustment *(CAUTION–Do not use center punch for marking)*. Count number of turns, turning adjusting plug in until it bottoms, and record. *(CAUTION–Do not bottom adjusting plug unless attaching stud has been left assembled through ball, otherwise damage to ball may result from crushing.)* Remove outer adjusting plug. Note air vent in plug to see that it is open. Disassemble and remove steering arm stud. Using attaching stud, or brass rod, inserted through steering arm ball pull the right turn (outer) reaction piston, spring, follower and ball seat toward outer end of valve bore as far as possible. Remove attaching stud and ball. Insert finger in valve bore and push out assembly. Remove valve spool by tapping valve end on wooden bench or block of wood. Remove spring and left turn (inner) reaction piston.



MONROE LINKAGE TYPE POWER STEERING UNIT (TYPICAL)

All Other Models - On Hudson, disconnect hoses and remove cotter pin and outside spring seat plug to disconnect unit from center steering arm. All cars, clean outside of valve and cylinder assembly thoroughly. Punch mark adjusting plug to insure accurate reassembly, remove plug, then remove the valve spring, follower (or retainer), ball and ball seat. Hold unit in vertical position and tap valve end lightly on wooden bench or block to allow valve spool to slide out of valve body. Remove inside valve spring. *NOTE*–Inner adjusting plug cannot be removed.

Cylinder Disassembly: Remove cylinder cap (or unscrew cylinder plug) from cylinder. Pull out on piston to remove piston and guide assembly. To disassemble rod guide, use a screwdriver to separate "T" ring retainer from rod guide, then remove two outer phenolic rings, "T" ring and two inner phenolic rings. Remove large "O" ring from piston rod guide and discard. Disassemble "T" ring retainer only when wiper needs replacement. If necessary, use a screwdriver and remove wiping ring from "T" ring retainer. To reassemble rod guide, reverse removal procedure (lubricate rings with Lubriplate

Inspection: Thoroughly clean all parts in suitable solvent. Remove "O" rings and discard. Inspect all parts for nicks, scores, and burrs. (NOTE–Valve spool not replaceable as separate item, due to close fits). Small scores and burrs can be removed with crocus cloth, if used carefully. Make sure rings rotate freely in piston ring grooves.

Valve Reassembly (Dodge & Plymouth): Reverse the removal procedures. Lubricate new "O" rings with Lubriplate or equivalent. To facilitate assembly, place inner reaction piston spring in recess in spool and hold with Lubriplate or equivalent. Back off adjusting plug same number of turns as recorded when valve disassembled. Check valve assembly operation by placing a long pin through ball, you should be able to slightly move valve assembly back and forth in bore. Do not install cotter pin until unit has been installed in vehicle and power link adjustment checked.

Valve Reassembly (Other Models): Reverse removal procedures. Lubricate rings with Lubriplate or equivalent. Line up adjusting plug punch marks made at disassembly.

Cylinder Reassembly: Reverse removal procedures. Lubricate rings with Lubriplate or equivalent. Be sure rings locked in position and staggered. Wet "T" ring seals with power steering fluid.

POWER STEERING PUMPS: Different pumps used as follows:

Dodge & Plymouth (1954): *See "Chrysler, D Soto, Dodge & Plymouth Single Rotor"*

Hudson & Nash (1954): *See "Vick rs Van Type" (3-Piece Housing).*

Hudson & Nash (1955-57): *See "Eaton Rotor Type".*

Packard (1955-56): *See "Vick rs Vane Type". (3-Piec Housing).*

Rambler (1955-58): *See "Eaton Rotor Type".*

1959-60 MONROE LINKAGE TYPE

Rambl r, All M d ls (1959-60)

DESCRIPTION: Linkage type with control valve and power cylinder assembly combined in a single unit which is connected to frame side member, tie rods and to steering pitman arm

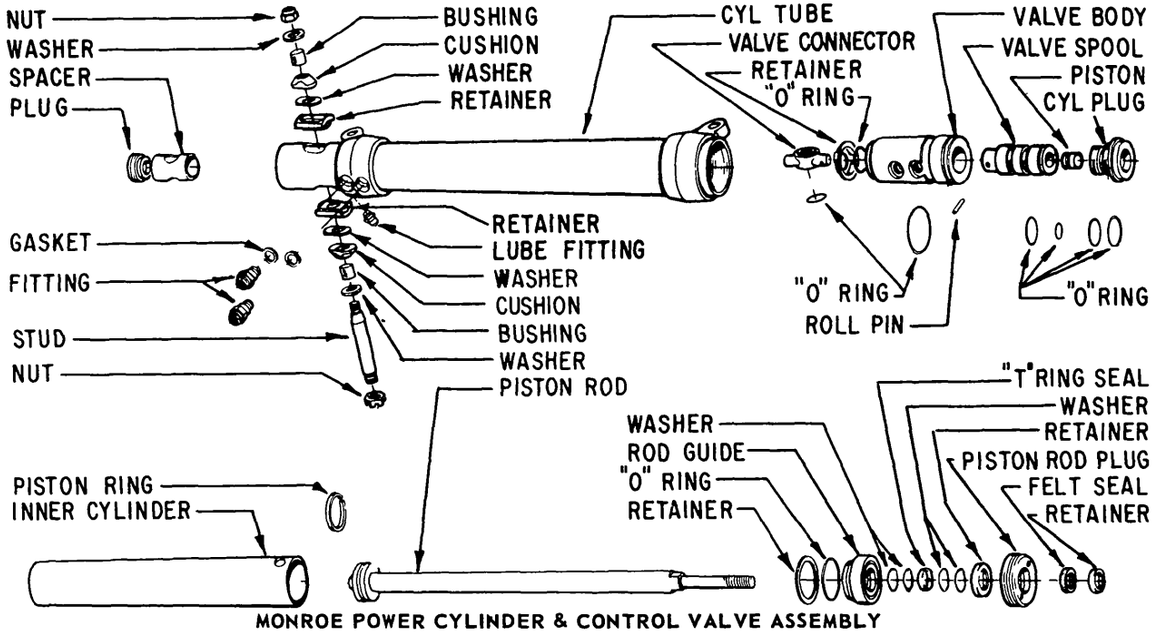
FRONT WHEEL ALIGNMENT: *See "Front Suspension" on Car Model pages*

ADJUSTMENT: Valv Spool Centering - *NOTE - This adjustment is preset at the factory and is not ordinarily required in service* An improperly adjusted valve spool will be indicated by hard steering in one direction and easy steering in opposite direction Recovery will be poor from direction of easy steering and good from direction of hard steering Car will also have a tendency to wander in direction of easy steering To adjust, turn piston rod end plug OUT and turn pitman arm end plug IN the SAME amount (approximately ½ turn at a time) to correct for hard turn to LEFT, easy turn to RIGHT, poor recovery from RIGHT turn, or car wander to RIGHT Turn piston rod end plug IN and turn pitman arm end plug OUT the SAME amount (approximately ½ turn at a time) to correct for hard turn to RIGHT, easy turn to LEFT, poor recovery from LEFT turn, or car wanders to LEFT After final adjustment, tighten end plugs to 50 ft lbs

PRESSURE TEST: With fluid level in reservoir correct, install oil pressure gauge J-5548-A in main oil line at control valve assembly, then start engine and bring oil to normal operating temperature. Turn wheels against curbing or other obstacle and hold tension on wheel. Oil pressure should be 800-900 lbs. (Roller Type Pump), 850-950 lbs. (Slipper Type Pump). Turn wheel in opposite direction and note pressure. If there is a variation between right and left turns, internal leakage is evident. If pressure is low, stop engine and disconnect gauge from cylinder and valve assembly and cap pressure line. Restart engine and note pressure. If pressure is within specifications, pump is operating properly If pressure is low (belt tension correct), trouble exists in pump. *CAUTION - Do not hold wheels at maximum pr ssur longer than is necessary to obtain a st ady pr ssur reading.*

TROUBLE SHOOTING: Hard Steering or Lack of Suffici nt P w r Assistance - Bent piston rod Low oil pump pressure Insufficient oil flow in system Internal leak in control valve Internal leakage in cylinder Front wheel alignment incorrect Steering knuckle pins binding or steering linkage too tight Steering gear adjustment too tight Binding valve spool in control valve Pitman arm stud binding

Lack f P w r Assistanc in On Dir cti n: Steering gear binding Bent piston rod Valve in cylinder and valve assembly incorrectly adjusted Front wheel alignment incorrect



MONROE POWER CYLINDER & CONTROL VALVE ASSEMBLY

Car Wanders from Straight Ahead (without force on steering wheel): Pitman arm stud binding on cylinder and valve assembly Valve of cylinder and valve assembly not properly adjusted or binding

Poor Recovery From Turns: Piston rod bent Front wheel alignment incorrect Valve in cylinder and valve assembly not adjusted properly or binding

Noisy Operation: Pump pulley shaft key loose Restricted air vent in reservoir cover Pump bearing or bushings worn Dirt in pump Loose pitman arm stud may be cause of rattle

Front Wheel Shimmy: Pitman arm stud loose

REMOVAL: Disconnect oil lines, then disconnect piston rod from frame side member, and tie rods from cylinder and valve assembly Remove pitman arm stud nut and roll pin, washer, cushion, and spacers Remove cylinder and valve assembly from pitman arm stud

INSTALLATION: Reverse removal procedure and bleed system by turning steering wheel several complete turns in both directions with power steering pump operating *NOTE - Wheels must be raised off floor when bleeding system*

DISASSEMBLY: Mount cylinder in a vise in a horizontal position, using tie rod mounting pad to hold cylinder in vise *CAUTION - Do not clamp rounded area of cylinder in vise* Mark piston rod end plug locations in cylinder before disassembly *CAUTION - Marking th plug location is very important to properly center th valve spool when reassembling the unit* Remove cylinder end plug, then remove piston rod and inner cylinder assembly by carefully pulling piston rod assembly from cylinder Remove inner cylinder end plug (if it came out with piston rod assembly) *NOTE - End plug is a light press fit in inner cylinder* If felt dirt seal in piston rod end plug is to be replaced, lift out the old retainer and seal with a screwdriver *NOTE - For replacement, a new seal only should be used Install new seal flush with surface of plug, using Tool J-5619, which will not damage raised inner surface of seal retainer* Remove "O" ring, washers, and "T" ring from piston rod guide If necessary, remove piston ring from piston Remove plug on valve end of inner cylinder, then remove spacer Remove pressure and return line fittings and copper gaskets from cylinder tube assembly Press valve assembly out of cylinder toward piston rod end of cylinder *NOTE - A piece of seamless steel tubing 1 3/8"-1 1/2" I D approximately 18 gauge wall thickness, 22" long, may be used to press out valve assembly* To disassemble valve spool, remove roll pin between valve connector and valve spool, and remove connector Remove inner cylinder end plug (if it did not come out with inner cylinder assembly) Remove retainer cap from valve body and push valve spool out opposite end, then remove inner "O" ring from valve body *CAUTION -*

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1960 MONROE LINKAGE TYPE (C ntinued)

Valve spool must be removed in this direction to prevent cutting the "O" ring Remove valve piston from valve spool Apply air pressure to small hole near piston end of spool to aid in removal of spool *CAUTION - Remove all 'O' rings and replace with new rings when disassembling unit Lubricate all "O" rings with Lubriplate at reassembly*

REASSEMBLY: Install piston into valve spool,then install valve spool in valve body (see illustration) *CAUTION - If valve spool is assembled in wrong direction, the "O" ring seal could be cut in passing over valve spool inner passages* Install retainer, then install valve connector assembly with the roll pin Center roll pin in mounting so pin does not scrape during operation *CAUTION - Be careful not to push valve spool assembly out of position while installing roll pin* Reassemble piston rod and inner tube assembly (see illustration), noting that hole at end of inner cylinder must be assembled toward end of outer cylinder Reassemble inner components into outer cylinder, lining up pressure and return ports in valve assembly with corresponding holes in cylinder *NOTE - For final assembly, ports may be lined up with a fibre rod* Install piston rod end adjusting plug, tightening it into the previously marked position Install spacer and pitman arm end adjusting plug, holding spacer from turning while tightening end plug to 50 ft lbs Install pressure and return line fittings using new copper gaskets Tighten fitting to 17 ft lbs Install pitman arm components (see illustration), then tighten stud nut until there is sufficient tension on rubber cushions to prevent rattles and grease leakage and still permit free movement of stud *CAUTION - Overtightening stud nut will cause poor recovery from turns and binding when turning Looseness may result in wheel shimmy* With stud correctly adjusted, install locking roll pin Install unit in car

HYDRAULIC PUMP: *See "Vickers Vane Typ ', "Eaton Roller Type" or 'Rambler Slipper Type' Power Steering Pumps*

ROSS LINKAGE TYPE

Dodge V8 (1954)

DESCRIPTION: Ross "Hydrapower" hydraulic, linkage type power unit (power cylinder and control valve assembly). Power unit is an integral part of the steering linkage and transmits steering wheel motion to the wheels mechanically which permits manual steering when hydraulic power not available.

►*ADJUSTMENT CAUTION: Whenever hydraulic system disturbed (by disconnecting lines, removal or installation of units, etc.) hydraulic system must be bled to remove air. See Bleeding Hydraulic System below.*

BELT ADJUSTMENT: *CAUTION–Pump is driven by fan belt and belt should be checked frequently and adjusted exactly as follows.* Use special tool C-3379 with a torque wrench. Hook tool over generator frame at the adjusting strap bolt lug, loosen strap bolts and bracket bolts, pull outward on torque wrench until indicated torque is 15 ft. lbs., tighten adjusting strap bolts before slackening off on wrench, tighten bracket bolts.

OTHER ADJUSTMENTS: No adjustments required in service.

►*STEERING GEAR ADJUSTMENT NOTE:* If steering gear chuck replaced due to accident or extremely high mileages, make check as follows. Remove chuck from vehicle. Torque required to rotate wheel (with scale pulled 90° to spoke of wheel at rim) when roller tooth (steering gear arm) shaft is not assembled in housing, should be 1-4 ozs. with no endplay in bearing. Then, after roller tooth shaft has been assembled, additional pull is required, making a total of 6-10 ozs. pull at rim to rotate steering wheel through mid-position, with no backlash in the worm and roller shaft at that point.

FRONT END ALIGNMENT: Same as for Manual Steering Gear. *See "Front Suspension" on Car Model Page.*

LUBRICATION: *CAUTION–Power Steering System and Steering Gear are lubricated separately and with different lubricants as follows:*

P w r Ste ring Syst m: Check fluid level in reservoir every 1000 miles, add fluid to maintain correct level. **Ch cking Fluid L v l**–If dipstick provided in reservoir cover, maintain fluid level at mark on dipstick. If no dipstick provided, thoroughly clean top of reservoir, remove cover, maintain fluid level at least 1/2" above filter element in reservoir. Use SAE 10-W engine oil (5-W for temperatures consistently below 10°F).

Draining System–*CAUTION–Extreme care should be taken to prevent dirt from entering reservoir while cover is removed. To prevent damage to filter element, do not insert sharp objects into reservoir. Do not disturb filter element as periodic changes of this element are not required.* Disconnect high pressure (small) hose at booster. Place hose in suitable container. While holding hose in container start engine and allow to idle until all fluid is forced from unit. *(CAUTION–Do not run engine above idle speed).* As soon as fluid starts to show great quantities of air bubbles, stop engine. Reconnect high pressure hose.

Refilling System (after units removed or disconnected)–Fill reservoir to higher level than normal. Start engine and allow it to idle for short time to circulate oil through system. With engine idling, turn steering wheel through entire travel (from extreme right to extreme left) several times to bleed air out of system. Check oil level in reservoir, add oil as necessary. **Capacity**–3 pints.

Steering Gear: Same type as used on cars without power steering and lubricated similarly.

BLEEDING HYDRAULIC SYSTEM: With engine running at idle speed, turn steering wheel back and forth several times from extreme right to left to bleed any air out of system. Check oil level in reservoir. Add oil as necessary to bring level to "Full" mark.

TESTING: Should lack of steering assistance be encountered and other checks have been made (See Trouble Shooting below), a pressure check should be made to determine if pump is at fault.

Hydraulic Pressure Check: 1) Connect gauge C-3102 in pressure line between pump and hose with shut-off valve on gauge in open position. Start engine and turn steering wheel. If gauge does not show at least 400 lbs. pressure when steering wheel is in either extreme position, check pump by turning valve of gauge to closed position. If pressure does not gradually increase as valve is closed, flow control valve in pump may be stuck in open position, or drive coupling may be broken. See step 2) below. If 400 lbs. pressure does show on gauge with engine idling, pump is in good condition (Look for trouble as indicated in Trouble Shooting below). Remove gauge and connect high pressure hose to pump.

2) Remove cover from reservoir, start engine and turn steering wheel. If oil flows through filter, a stuck flow control valve plunger is indicated. Shut off engine, remove high pressure hose at pump fitting and insert a 1/4" clean, blunt probe against valve plunger. If plunger moves inward 3/16-1/4", plunger was stuck and will probably function properly next time.

3) Recheck pressure. If it still registers less than 400 lbs. and if oil still flows through filter but does not flex pressure line, remove flow control valve plunger and clean thoroughly. If this does not correct condition, install a new pump assembly.

4) If oil does not flow through reservoir filter in above test, a broken coupling is indicated. Remove pump from generator. If either coupling is broken turn pump shaft by hand at least ten revolutions. If shaft turns freely, install new couplings on both pump and generator shafts. If pump shaft binds when turned by hand, replace both pump and couplings. If generator armature shaft is damaged, replace necessary parts. *(CAUTION–*Service package, Part No. 1450759 has been made available to prevent mixing of new coupling Part No. 1552859 with OTHER couplings in field). Reinstall pump on generator.

TROUBLE SHOOTING: *Diagnos trouble as follows.*

Hard Steering in Both Dir cti ns: Leak in system, pump belt slipping or broken, fluid level low, steering gear and linkage not lubricated, tire pressure too low, anti-roll bracket and pin binding, bend in power unit piston rod, low pump pressure, loss of pressure in power unit, insufficient fluid flow in system, bind in steering column or gear, improper front end alignment, valve in power unit sticking.

Small r Turning Radius in On Dir cti n: Wheel stops not adjusted properly.

CONTINUED ON NEXT PAGE

ROSS LINKAGE TYPE
(Continued)

Hydraulic Fluid Leaks (Locations): At hose adapters, pump body, valve assembly, valve spool assembly, reservoir cover gasket; around piston rod on power unit; between control valve body and cylinder head.

Hard Steering in One Direction Only: Tire pressure too low, bend in power unit piston rod, bind in steering column or gear, improper front end alignment, bind in control valve assembly.

Poor Recovery on Turns: Tire pressure too low, bind in valve assembly, bind in steering column or gear, bind in steering knuckles, bend in power unit piston rod, improper front end alignment, anti-roll pin and bracket binding.

Noise: Fan belt tension incorrect, low fluid level, pump shaft bearing worn, bushings worn in pump body or cover, dirt and sludge in pump, reactor link loose, tie rod clamps tightened in wrong position, steering gear arm adapter to valve spool loose or worn, steering gear arm nut loose, frame bracket cushion retainers striking frame bracket, position of clamp interfering with left tie rod.

REMOVAL & INSTALLATION: Proceed as follows:

Reactor Link Assembly (Unit in Car): Removal–Raise vehicle (preferably with hoist). Remove tie rods from reactor link assembly by removing cotter pins and nuts holding tie rods to threaded ends of the reactor link ball studs. Note position of clamp assembly (to prevent interference on turns), then loosen. Remove reactor link-to-cylinder mounting bolt and lockwasher. Lift reactor link assembly over dowel ring (at mounting bolt end) and slide out of cover reducer end of control valve assembly. *NOTE–Dowel ring may remain in link or cylinder.*

Installation–Place dowel ring in position in cylinder. Install tie rod dust seals and lubrication fittings into reactor link assembly. Install clamp assembly (if removed), then slide reactor link assembly into cap reducer end of the control valve assembly, and position over dowel ring. Install mounting bolt and lockwasher, torque to 45-55 ft. lbs. Position clamp assembly for maximum clearance with tie rod ends, torque to 15-20 ft. lbs. Lubricate fittings and road test.

Power Steering Assembly: Removal–Raise vehicle (preferably on a hoist). Place drain pan beneath power unit at hose fittings, disconnect both hydraulic lines (pressure and return) from power unit. Remove tie rods from reactor link assembly by removing cotter pins and nuts which hold tie rods to threaded ends of the reactor link ball studs. Disconnect piston rod boot at frame bracket end. Holding flattened section of piston rod with 9/16" open end wrench, remove piston rod-to-frame bracket retaining nut. Remove outer linkage bracket cushion retainer and cushion, disconnect piston rod from frame bracket. *(CAUTION–*Booster unit should be prevented from dropping by either holding or tying in place). Disconnect steering gear arm from steering gear arm adapter by removing cotter pin and nut. *(CAUTION–*Tap on steering gear arm and not adapter stud). Remove unit. Then proceed with Bench Operation below.

Installation: Reverse removal procedures.

OVERHAUL: *CAUTION–*Cleanliness through all phases of overhaul cannot be overemphasized.

Disassembly of Power Steering Unit Assembly (Into Major Components): Note position (to prevent interference on turns) of clamp assembly on reactor link then loosen nut. Remove reactor link mounting screw and lockwasher and slide link assembly from end cover. Remove dowel from cylinder. Scribe a line across valve body and cylinder head to show position of parts when reassembled. *(CAUTION–*There is only one correct position of control valve on cylinder head which will permit proper alignment of the four oil passages. Should valve be incorrectly assembled, unit will not function). Remove the four valve body-to-cylinder head mounting bolts, nuts and lockwashers and separate valve body from cylinder. Note two different length bolts used. Power Unit is now set up into three serviceable items–Reactor Link Assembly, Control Valve, and Power Cylinder. Disassemble these components and inspect as follows:

Reactor Link Assembly–Assembly is self-contained unit. Check ball studs for wear. If studs are loose in ball sockets, replace reactor link assembly.

Control Valve–*NOTE–*Since this unit works in oil during operation, very little wear is anticipated on any of moving parts. The major component parts of valve are machined to very close limits and selectively fitted. Use extreme caution when handling these parts as damaged sealing edges or burrs will not permit unit to function properly. It is not practical to service valve body or spool separately. Because of their selective fit and difference in size, gland and reaction rings will be referred to as **Left** and **Right.** This identification has reference to position of parts relative to their position in the vehicle and **not** to the direction of steering wheel turn. These parts are not interchangeable. **Always note their position when disassembling** so their position is not changed when reassembling. The largest gland and reaction ring are the parts for the left side and **must** be installed in the steering gear arm end of the valve. Glands and reaction rings are serviced in matched sets. Disassemble as follows: Using screwdriver or punch, unlock end cover caps by straightening lock ring tabs. Unscrew and remove both end covers from valve body. *(CAUTION–*Use extreme care so as not to damage mating surfaces on valve body when removing caps. Also the use of a strap wrench will prevent damage to exterior finish of caps). Remove lock rings. Remove right gland and spring by slightly pushing on threaded end of valve spool. Remove "O" ring from end of valve spool (end from which gland was just removed). Remove left gland and spring by pulling on threaded end of valve spool. When removing spool, one reaction ring will probably remain in valve body and can easily be removed. The other ring remains on spool. Remove remaining "O" ring and reaction ring from valve spool. Match reaction rings with their respective glands. Remove "O" rings from glands.

Cylinder–Drain oil from cylinder assembly by moving piston rod in and out from one extreme end of its travel to the other. Remove four "O" ring seals from cylinder head. Note position of piston rod bearing retainer snap ring in end of cylinder (retainer locks snap ring into position). Using punch, straighten tang on retainer and remove snap ring with tool C-3106. Remove piston, rod, bearing and seal assembly from cylinder. *(CAUTION–*Do not clamp or mark sealing surface of piston rod as damage will result to seals. When removing parts from piston rod, always slide them off piston end of rod). Holding piston rod at flattened section at frame bracket end of piston rod, remove cotter pin, nut and backup washer (steel). Remove piston and rings, piston rod bearing, and "O" ring seal from outer diameter of bearing. Remove oil seal from inside of bearing. Remove piston rod bearing backup washer (steel). Remove plastic shims (Note number removed). Slide piston rod seal retainer and spline seal from piston rod.

Reassembly: Reverse disassembly procedures and note the following: Adjust amount of endplay between piston rod bearing retainer snap ring and bearing seat in cylinder to a maximum of .005" by installing plastic shims. Shims are available in thicknesses of .005", .010", .015".

POWER STEERING PUMP: *See "Chrysler, DeSoto, Dodge, Plymouth Single Rotor Type".*

SAGINAW LINKAGE TYPE

Hudson Hornet, Model 7D (1954)

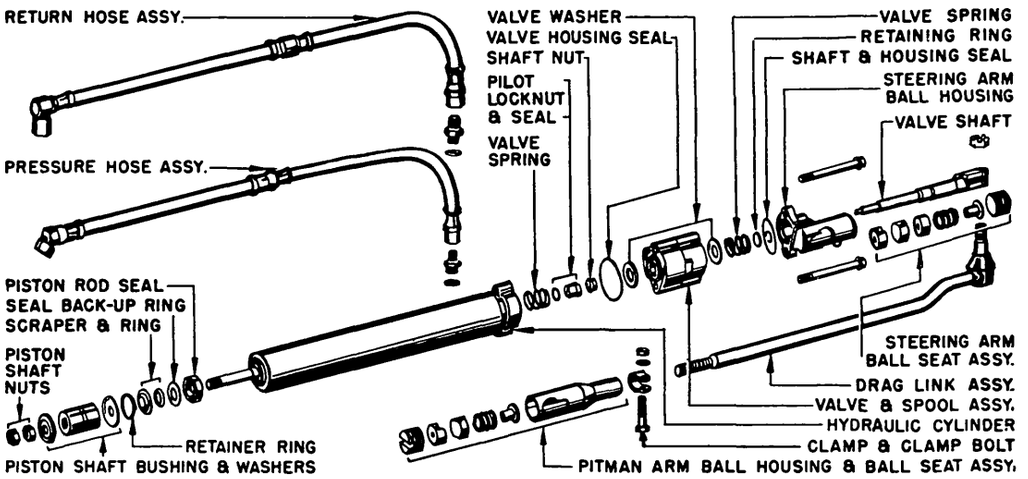
DESCRIPTION: Hydraulic linkage type. Power unit is a complete assembly with control valve built-in the end of the hydraulic power cylinder. The unit is connected in the steering linkage between the drag link and the center steering arm on the frame front cross-member (drag link connected to spool valve stem, center steering arm connected directly to same end of power cylinder) so that steering wheel motion is transmitted to the wheels mechanically to permit manual steering when hydraulic power is not available. Power unit piston rod is attached to a bracket on the frame so that hydraulic pressure tends to move the hydraulic cylinder on the stationary piston. Hydraulic application is controlled by the spool valve which is connected directly to the drag link.

Hydraulic Pump & Reservoir Assembly: Vickers vane type hydraulic pump. *See "Vickers & Eaton Hydraulic Power Pumps" in Power Steering Section*

BELT ADJUSTMENT: Loosen two bolts attaching pump to mounting bracket, move pump upward until belt deflection midway between fan and pump pulleys is ¼" with thumb pressure, tighten attaching bolts to 25-30 ft. lbs.

POWER CYLINDER ADJUSTMENT: Remove Power Cylinder Assembly (See Removal & Installation below). Clamp head of valve shaft in vise so that shaft is in a vertical position. While holding spool shaft nut, remove pilot lock nut and loosen shaft nut. Tighten shaft nut until a definite resistance is met, then back off nut ½ turn. A minimum of 5/16" thread should be showing beyond nut. (*NOTE*—If there is less than 5/16" thread, the inner valve washer has caught on the spool shoulder and is not centralized on valve shaft). After determining that 5/16" dimension is correct, screw on pilot lock nut **by hand**. Using the two valve body-to-cylinder attaching screws and two 3/8"-16 nuts, assemble the valve body and shaft assembly together (tighten to 12-15 ft. lbs. torque). Tighten valve shaft nut to 9-11 ft. lbs. torque. Release tension and tighten to 3-5 ft. lbs. torque. While holding valve shaft nut against turning, tighten pilot lock nut to 5-10 ft. lbs. After final tightening, use a fine punch and working through one of the small holes in the pilot lock nut, make a punch mark to stake lock nut to valve shaft. Place power cylinder on valve assembly and install attaching screws (dip threads in sealer). (CAUTION—Do not gouge or slice pilot lock nut seal when assembling cylinder to valve assembly). Tighten valve housing attaching screws to 12-15 ft. lbs. torque. Install valve fittings and seals in their proper places. Assemble pressure and return hoses to their proper fittings on valve body assembly. Install assembly on car (See Removal & Installation below).

STEERING LINKAGE ADJUSTMENTS: Pitman Arm & Stop Screw—Turn steering wheel to full right hand turn, place a 1/16" shim between stop on right hand outer steering arm and stop on spindle support. With shim in place, adjust stop screw at pitman arm stop bracket until screw just touches pitman arm, then tighten lock nut securely.



SAGINAW LINKAGE TYPE POWER STEERING UNIT

Drag Link—Set front wheel in straight-ahead position with steering gear on high point (steering wheel spokes in horizontal position). Drag link stud should hole in valve shaft freely. If not, disconnect drag link at pitman arm, loosen clamp at junction of male and female connection of drag link and turn drag link in or out as required. After adjustment, tighten clamp screw securely. Adjust drag link end plug by tightening plug to end of travel and back off to nearest cotter pin hole. Install and secure cotter pin. Install drag link, nut and cotter pin to valve shaft.

LUBRICATION: *CAUTION—Power Steering System and Steering Gear are lubricated separately and with different lubricants:*

Power Steering System: Check fluid level in reservoir every 2000 miles, add fluid to maintain level.

Checking Fluid Level—Thoroughly clean top of reservoir, remove cover, maintain fluid level even with mark near top of reservoir. Use Automatic Transmission Fluid Type A.

Refilling System (After units removed or disconnected)—*CAUTION—Fill exactly as follows to prevent air entering the system which will cause pump to be noisy:*

1) With both hydraulic hoses disconnected from the pump, loosen hose connection at the power unit, fill the hoses with fluid and allow it to run out at the power cylinder end until it is free of air bubbles, tighten connections at power cylinder end, connect hoses to pump. *CAUTION*—keep hoses filled with fluid while making the connections.

2) Fill oil pump reservoir to the full mark. Start the engine and run it at idle speed for approximately 10 minutes to remove air which may be trapped in system. *CAUTION—DO NOT TURN STEERING WHEEL DURING THIS PERIOD.*

3) Recheck fluid level, add fluid as required. Install reservoir cover. Check all connections for leaks.

NOTE—If pump is noisy after system has been refilled exactly as noted above, this noise should disappear after several days useage when air in fluid should be dissipated.

BLEEDING HYDRAULIC SYSTEM: Follow steps 2) and 3) of "Refilling System" under LUBRICATION above.

TESTING: If power steering operation is unsatisfactory and cause unknown, refer to "Trouble Shooting" below, and starting with easiest operations first continue to check until trouble found.

Steering Effort: Attach spring scale to spoke near rim of steering wheel. With engine running at idle speed and transmission in neutral, and with front wheels on dry, smooth concrete floor or smooth steel plates, a 3-8 lb. pull should be sufficient to turn wheel one full turn in either direction from center. If steering effort in both directions greater than 8 lbs. at rim of steering wheel, it indicates hard steering. (See "Hard Steering in Both Directions" in Trouble Shooting). If steering effort is more than 8 lbs. in one direction only and very low in other direction refer to "Hard Steering in One Direction Only" in Trouble Shooting for possible causes.

Hydraulic Pressure: If "Trouble Shooting" of items in system other than pump does not disclose trouble, difficulty may lie in pump. To check pump proceed as follows: With engine off, install pressure gauge in pressure line. Turn gauge valve to open position. Start engine and let it idle for approximately two minutes to permit fluid to reach operating temperature. With gauge valve open, turn wheels against a curb or other suitable object and maintain sufficient force on steering wheel to keep hydraulic pressure applied to steering linkage and front wheels. Note pressure shown on gauge, then release steering wheel. (*CAUTION—Do not maintain force on steering wheel for any extended period of time, as this may cause undue wear in hydraulic system*). If pressure reading above is 500-800 psi., the power cylinder and pump are operating properly and it is unnecessary to continue further. If reading less than 500 psi., close gauge valve and note pressure developed by pump, then open gauge valve (*CAUTION—Do not leave gauge valve closed for more than 3 or 4 seconds*). If pressure reading increases to 500-800 psi., pump is delivering sufficient pressure and

CONTINUED ON NEXT PAGE

SAGINAW LINKAGE TYPE (Continued)

fault is in power cylinder (See Power Cylinder Check below). If pressure did not increase to 500-800 psi., replace relief and flow control valve unit and flow control spring. If pressure still low, pump must be removed and overhauled. If pressure ever exceeds 800 psi., replace relief and flow control valve unit

POWER CYLINDER CHECK: Check drag link and stud to make sure it does not bind on valve body Correct if necessary (See Steering Linkage Adjustment above). If drag link is not binding, remove power cylinder piston and rod assembly Check piston and rings and replace if necessary. Make another pressure test and, if pressure still low, replace power cylinder

TROUBLE SHOOTING: *Diagnose trouble as follows:*

Hard Steering in Both Directions—Leak in steering system, pump belt slipping or broken, fluid level low, steering gear and linkage not lubricated, tire pressure low, drag link and stud binding on power cylinder, power cylinder piston rod bent, low pump pressure, loss of pressure in power cylinder, insufficient fluid in system, bind in steering column or gear, improper front end alignment, valve in power cylinder misaligned or sticking

Leaks: At hose fittings, pump body, valve end, around piston rod on power cylinder

Hard Steering in One Direction Only: Tire pressure too low, power cylinder piston rod bent, bind in steering column or gear, improper front end alignment, valve in power cylinder misaligned or sticking.

Car Attempts to Turn Unless Force Applied to Hold Steering Wheel: Tire pressure uneven, drag link and stud binding on power cylinder, valve in power cylinder misaligned or sticking

Poor Recovery on Turns: Tire pressure too low, drag link and stud binding on power cylinder, bind in steering column or gear, bind in power cylinder piston rod, improper front end alignment, valve in power cylinder misaligned or sticking

Noise—Pump belt tension incorrect, fluid level low, pump drive pulley retaining bolt loose, pump drive pulley key does not fit properly, pump shaft bearing worn, bushings worn in pump body or cover, dirt and sludge in pump, drag link stud loose.

REMOVAL & INSTALLATION: Proceed as follows.

Reservoir & Pump Assembly: Removal—Raise hood and drain radiator by opening cock at lower right side of radiator Remove upper radiator hose Disconnect hydraulic hoses at unions on pump (*NOTE*—Secure ends of hoses in raised position at pump unions to prevent oil drainage) Remove drive pulley attaching nut, lockwasher and flat washer (¾" wrench) Loosen two pump-to-bracket screws (9/16" wrench) Slide pump toward engine and remove pulley belt. Remove pump pulley by tapping lightly on back face with a soft hammer Remove two screws attaching pump to bracket (9/16" wrench) Remove reservoir and pump assembly to bench for draining and repair

Installation—Reverse removal procedure Adjust belt tension, then follow procedure outlined for "Refilling System" under LUBRICATION

Valve & Power Cylinder: Removal—Turn front wheels fully to left. Remove cotter pin from drag link ball stud at valve shaft and remove castle nut (7/8" wrench). Remove drag link ball stud from valve shaft with Tool J-2781 Remove cotter pin, end plug, safety plug, spring and ball seat and disconnect valve and cylinder assembly from center steering arm. Raise car and place on stand jacks Disconnect piston rod at support bracket at No. 3 crossmember by removing lock nut and retaining nut (¾" wrench) and push the piston rod through bracket. Remove piston shaft washers, rubber bushings and retaining washers. Disconnect hoses at oil pump and lift valve and power cylinder up through engine compartment (*NOTE*—Use screw caps to plug both hoses and both pump fittings to keep oil from draining out)

Installation—Enter complete assembly through hood opening. Attach piston rod to bracket at No. 3 crossmember, assemble one piston shaft washer, one rubber bushing and one rubber bushing retainer on each side of bracket. Cupped portions of washers should be toward rubber bushings. Install one attaching nut and compress rubber bushing to 1 11/16-1 3/4". Tighten securely. Install second nut and tighten securely. Second nut must be flush with end of shaft. Attach steering arm ball stud housing to center steering arm. Install ball seat on side of center steering arm. Enter steering arm ball, ball seat, dust seal, spring, safety plug and end plug Adjust end plug by tightening plug to end of travel and backing off to nearest cotter pin hole. Install and secure cotter pin Install drag link, nut and cotter pin to valve shaft. Refill system following procedure outlined for "Refilling System" under LUBRICATION

VALVE & POWER CYLINDER OVERHAUL: Disassembly—Clean outside of valve and cylinder assembly thoroughly Remove both hoses from valve body and inspect hoses for wear or cracks Replace if necessary (13/16" and 7/8" fittings) Remove two screws attaching steering arm ball housing and the valve and spool assembly to hydraulic cylinder assembly (*CAUTION—This is a spring loaded assembly and screws should be loosened equally until spring is relieved).* Overhaul components as follows

Hydraulic Cylinder: Hydraulic cylinder serviced only as an assembly Following parts **only** are furnished separately Retaining lock ring, scraper back-up ring scraper, seal back-up ring, piston rod seal

Piston Rod Seal—(*NOTE—Piston seal should not be removed unless there are signs of leakage around the piston shaft seal).* To replace seal, proceed as follows. Use a hook tool or screwdriver and remove retaining lock ring. Remove scraper back-up ring, scraper, seal back-up ring and piston rod seal (*CAUTION—When removing seal do not damage piston rod).* Install NEW oil seal, reversing removal procedure

Valve: Remove valve centering spring Remove "O" ring from pilot lock nut While holding spool shaft nut, remove pilot lock nut (11/16" wrench) Remove control valve assembly with spools from valve shaft Remove valve washer from valve shaft. Remove "O" ring seals from each end of valve body. Remove spools from valve housing, being careful not to damage or drop either the spools or housing (*NOTE*—Check spools and housing bore for excessive wear) Remove pressure and return fittings and seals from valve housing. DO NOT place housing in vise Remove valve washer and valve return spring. Push valve shaft through steering arm ball housing so that valve shaft "O" ring seal may be accessible Remove shaft retaining ring and seal. Remove valve shaft from steering arm ball stud housing. Clean all parts in a clean solvent and blow dry with compressed air

Reassembly: Valve & Power Cylinder—Clamp head of valve shaft in a vise so that shaft is in a vertical position, install steering arm ball housing over valve shaft Install new valve shaft "O" ring and spiral retaining ring. Place valve return spring and valve washer over valve shaft and into steering arm ball housing (*NOTE*—Install valve washers with machined surfaces toward valve spools). Assemble valve spools into valve housing. Insert largest diameter spool in end of housing having three small holes (*CAUTION*—Use care to prevent scratching or nicking spools or bore in housing) Install "O" ring seal in circular housing groove Slide valve housing and spool assembly carefully over valve shaft. The three holes in the valve housing should point up toward threaded end of valve shaft Install valve washer over valve shaft. Apply Lubriplate to valve shaft threads. Install shaft nut until a definite resistance is felt. Back off ½ turn. A minimum of 5/16" thread should be showing beyond nut. (*NOTE*—If there is less than 5/16" thread, the inner valve washer has caught on spool shoulder and is not centralized on valve shaft) After determining that 5/16" dimension is correct, screw on pilot lock nut **by hand.** Using the two valve body-to-cylinder attaching screws and two 3/8"-16 nuts, assemble valve body and shaft together (tighten to 12-15 ft lbs. torque). Tighten valve shaft nut to 9-11 ft lbs torque. Release tension and re-tighten to 3-5 ft lbs torque. While holding valve shaft nut against turning, tighten pilot lock nut to 5-10 ft lbs torque After final tightening, use a fine punch and working through one of the small holes in the pilot lock nut, make a punch mark to stake lock nut to valve shaft Install "O" ring seal on pilot lock nut Remove two cap screws and nuts used to assemble valve body and shaft together Install valve spring Insert housing seal in the contoured ring groove in valve housing Place power cylinder on valve assembly and install attaching screws(dip threads in sealer) (*CAUTION*—Do not gouge or slice pilot lock nut seal when assembling cylinder to valve assembly) Tighten valve housing attaching screws to 12-15 ft lbs torque. Install valve fittings and seals in their proper places Assemble pressure and return hoses to their proper fittings on valve body assembly.

HYDRAULIC PUMP OVERHAUL: *See "Eaton Rotor Type" or "Vickers Van Typ (3-Piece Housing)' under "Power Steering Pumps"*

STEERING GEAR ADJUSTMENT & OVERHAUL: *See "Gemmer Worm & Roller"*

BENDIX LINKAGE TYPE (CHEVROLET TRUCK)

Chevrolet Trucks (1955-59)

DESCRIPTION: Hydraulic power cylinder assembly is mounted on front axle, at one end, and to tie rod at the other. Hydraulic control valve is attached to tie rod between pitman arm and steering arm (replaces pitman arm tie rod). The control valve regulates the flow of fluid under pressure from pump to either anchor end or rod end of cylinder, and the return fluid from either end is directed to fluid reservoir

Hydraulic Pump & Reservoir Assembly: Vane type oil pump is mounted on end frame of generator and driven by a splined extension of the special generator armature shaft. Pump contains a combination overload relief valve which opens at 750-lbs., and a flow control valve which circulates oil within pump as required to regulate output volume.

BELT ADJUSTMENT: Loosen outer bracket-to-generator bolt on generator rear brace, and move generator to obtain correct belt tension. Tighten the retaining bolts. Push in on belt midway between water pump and generator pulleys with light pressure. If tension is correct, there will be 5/16" deflection (6 Cyl.), 13/16" (V8).

LUBRICATION: Checking Fluid Level - Check oil level in reservoir by removing dipstick, and fill to indicated level using Automatic Transmission Fluid Type "A" bearing an "AQ-ATF" number.

Refilling System (After Units Removed or Disconnected): Fill oil reservoir to proper level and let oil remain undisturbed for about two minutes. Raise front end of vehicle so that wheels are off ground. Start engine and run at idle speed for two minutes. Increase engine speed to approximately 1500 RPM. Turn wheels (off ground) right and left, lightly contacting stops. Lower vehicle and turn wheels right and left on ground. Recheck for leaks. Check oil level and refill as required.

Checking Pump Pressure: Disconnect pressure line at pump connection (smallest, top line). *(CAUTION* - Some fluid will leak out when line is disconnected so provision must be made to collect this drainage). Install checking gauge, Tool J-5176, with gauge valve closed on pump and hose connection *(NOTE* - Adapter Kit J-5900 must be used to adapt pressure gauge to pump). Open gauge valve and run engine at idle. Turn wheels (on ground) against stops. Pressure should not be less than 750 lbs (Exc 4000 Series and larger trucks), 600 lbs (4000 Series and larger trucks) If pressure is less, slowly close gauge valve observing pressure increase (pressure will increase as valve is closed if pump is good) *CAUTION - Do not leave valve closed for more than 15 seconds.* If pressure does not increase when valve is closed, pump is faulty Shut engine off and remove gauge and valve and reconnect hose to pump (if pump pressure is satisfactory) Bleed hydraulic system.

Pump Pressure Adjustment: *NOTE - The valve is preset at the factory and should not normally require adjustment* Pump pressure is regulated by the control valve assembly and can be increased or decreased by adding or removing shims located under hex head valve plug. Control Valve Shim, Part No 5682628 (016") should be used in selective combination with shims used in production to set pump pressure Add shims to decrease pressure and remove shims to increase pressure A 016" change is equivalent to approximately 60 lbs change in pump pressure

HYDRAULIC PUMP: Removal - Loosen bracket-to-generator retaining bolts and remove fan belt. Pull generator away from engine. Place a container under the pump and disconnect hydraulic lines from pump allowing oil to drain out of reservoir. Remove retaining bolts from pump-to-generator and generator rear brace on 8 cylinder models and remove pump from vehicle. Drain remaining oil from reservoir.

Disassembly: Remove retaining bolts and sealing washers from pump reservoir-to-pump cover assembly, and remove reservoir. Remove oil filter spring retainer from pump cover assembly. Remove cover plate spring and cover plate and then remove plug and "0" ring, flow spring and pressure relief valve assembly from pump cover. Remove three retaining bolts from pump cover assembly and remove pump cover from pump body. Remove oil filter and retainer. Remove cam ring, pump rotor and vanes. Remove and discard "0" rings from pump body, cover, and cam ring. Remove and discard generator shaft oil seal from pump body.

Inspection: Wash all parts in solvent and dry with a lint free cloth. Check fit of vanes in rotor. Vanes must slide freely, but snugly in slots. Inspect flat face of pressure plate, cam ring, cover, rotor and pump body. If necessary, lap these parts for a good fit. Check surface of pressure relief valve and check fit of valve in pump cover. Correct slight irregularities by polishing.

Reassembly: Coat new "0" rings with Lubriplate and install in pump cover, cam ring and pump body. Install rotor and vanes in pump body with wear pattern or beveled edge of vanes against cam ring inner diameter. Install alignment sleeve in cam ring and install cam ring in pump body *(CAUTION - Wider edge of cam ring should be installed toward pump body. Be certain to align holes in cam ring to body bolt holes. Install rotor with rounded side of splines toward generator end of pump).* Install pressure plate in pump cover and install filter retainer and oil filter. Install cover assembly to pump body, then install plunger and flow control spring. Install plug and "0" ring assembly, cover plate and retainer spring. Install filter retainer spring in cover assembly and install reservoir, retaining bolts and sealing washers.

► *BRASS FITTING NOTE:* Brass fitting seats are of the pressed in type and are replaceable by tapping threads in hole in the seat and then pulling the seat by using a bolt threaded into tapped out seat and a flat washer and nut as an extractor. Install new seats by aligning seat in bore and pressing it into place using the correct hose or tube fitting as a pressing tool.

CONTROL VALVE: Disassembly - Remove three bolts and lockwashers from valve housing and separate drag link from valve housing. Remove ball stud and then remove outer sleeve and flange. Remove Huglock nut and remove inner sleeve with stop screw, and spool bolt as a group. Remove bushing plate. Drive out lock pin, thread stop screw out of inner sleeve, and remove spring seat, spring, and ball stud seats from inner sleeve. Remove spacer from spool bolt and remove spool bolt from stop screw. To remove spool from valve housing, press alternately on the spool end projections by hand sufficiently to expose the "U" cup seals. Remove spool seal bushings and "U" cup seals and spool. Remove control valve plug with a rod having a bent end, and pry against plug. Remove check valve with a screw driver. *NOTE* - The plug and check valve should only be removed to correct a faulty check valve.

Cleaning & Inspection: Wash all parts in solvent and dry then with lint free cloth. Inspect all parts for scratches, burrs, distortion, evidence of wear, and replace all parts where necessary. Replace all seals, gaskets, and covers

Reassembly: Carefully assemble spool into bore of valve housing with the large diameter projection end of spool next to sliding sleeve end. Assemble large bore and small bore "U" cup seals over large and small diameter projections of spool with lips of seals facing each other. Assemble bushing plates on their respective ends of spool. Insert spool bolt through screw stop from side having the large diameter, and assemble spacer on bolt. Assemble lock pin in hole of screw stop and through slot in bolt head to secure bolt to screw stop. Place inner (sliding) sleeve in outer sleeve and flange assembly and then assemble the following parts in sliding sleeve Ball seat, ball stud, ball seat, spring and spring seat. Assemble screw stop with bolt to sleeve assembly by threading screw stop into inner (Sliding) sleeve, and tighten securely. Assemble bushing plate over bolt and on shoulder of outer sleeve flange. Insert spool bolt through hole in spool and assemble Huglock nut and secure as follows draw up nut tight then back off nut (less than ¼ turn) until the spool can be rotated with a minimum of endplay. Position drag link flange on valve housing so ball stud is on side opposite the valve ports. Align holes and assemble three bolts and lockwashers and tighten to 40-45 ft lbs

POWER CYLINDER: Disassembly - *(NOTE - This only repair to make in the field on the power cylinder is the replacement of piston rod seals).* Before removing piston rod seal parts from rod bearing end of power cylinder, clean the exposed portion of seal cavity with clean solvent, brush and compressed air. Remove snap ring. To dislodge scraper, washer, dust seal, seal back-up washer and "U" cup seal, use air hose and apply pressure to cylinder port (right hand port, looking down), and seal the left hand port. Remove seal parts from rod.

Cleaning and Inspection: Clean all parts in solvent and dry with compressed air. *(CAUTION* - Do not use waste to wipe off spool or inside bore of valve housing). Protect spool edges and bore of valve housing from damage during disassembly and reassembly. Inspect parts for nicks and burrs and excessive wear. Check cylinder scraper washer for fit on piston rod, which should be .001-.0035". Replace if worn.

Reassembly: Assemble open side of "U" cup seal over the rod and into bearing cavity, seal back-up washer, dust seal (with side away from seal cavity), and scraper washer. Slide parts in place on rod and lock in place with snap ring.

POWER STEERING PUMP: Same as used on passenger cars. *See "1955-59 Chevrolet Power Steering Pump".*

1955-59 CHEVROLET (PASS. CAR) LINKAGE TYPE

Ch vrol t Pass. Cars (1955-59)

DESCRIPTION: Hydraulic linkage type. Hydraulic power cylinder assembly is mounted on a bracket on the relay rod at one end and to bracket on frame at other end. Hydraulic control valve is attached to left end of steering relay rod and is operated by pitman arm acting on spool valve assembly, through valve shaft. Spool is restricted to a .050" travel to right and left from centered position. Spool valve is normally centered (straight -ahead position) and in this position oil from hydraulic pump flows through center passage of valve body, through annular grooves in spool to annular passages in housing and back to pump. When axial movement of spool occurs with a 3 lb. effort on steering wheel, direct circuit of pump is interrupted by shutting off both direct return passages. Oil is then forced to travel to one end of power cylinder to move cylinder axially on piston shaft. At same time opposite end of power cylinder is open to hydraulic pump return line and permits oil at this end to return through control valve to pump reservoir. Manual steering is possible when hydraulic power not available.

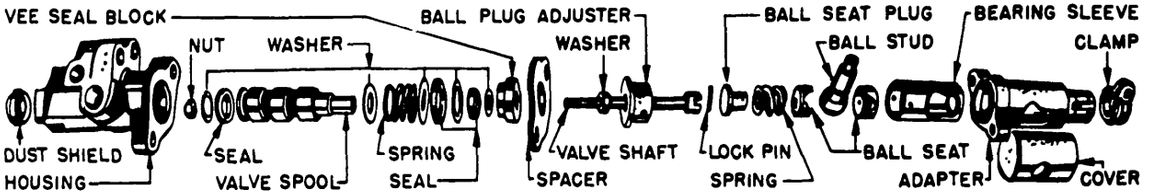
BELT ADJUSTMENT: Loosen outer bracket-to-generator bolt and retaining bolt on generator rear brace. Pull generator out from engine with all slack taken out of belt. Tighten retaining bolts. Push in on belt midway between water pump and generator pulleys with light push. If tension correct there will be 5/16" (6 Cyl.), 13/16" (8 Cyl.), deflection at this point with light push.

LUBRICATION: Checking Fluid Level–Check oil level in reservoir by removing dipstick. Fill to indicated level using Automatic Transmission Fluid "Type A" bearing an "AQ-ATF" number.

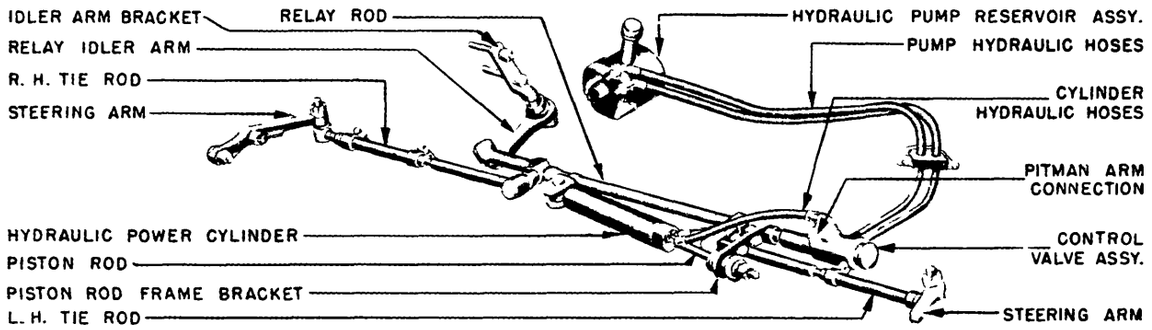
R filling System (Aft r Units Removed or Disconnected): Fill oil reservoir to proper level and let oil remain undisturbed for about two minutes. Raise front end of vehicle so that wheels are off ground. Start engine and run at idle for two minutes. Increase engine speed to approximately 1500 RPM. Turn wheels (off ground) right and left, lightly contacting stops. Lower car and turn wheels right and left on ground. Recheck for leaks. Check oil level and refill as required.

CONTROL VALVE: (R m val)–Raise front of car and place it on stands. Loosen relay rod to control valve clamp and disconnect the two pump to control valve hose connections. Drain fluid into a container and then disconnect the two remaining valve to power cylinder hoses. Remove the retaining nut from the ball stud to pitman arm connection and disconnect control valve from pitman arm. Turn pitman arm to right to clear control valve and unscrew control valve from relay rod. Remove control valve.

Disass mbly: Remove dust shield from control valve housing and remove retaining pin and nut from valve shaft. Remove retaining bolts connecting valve assembly housing to adapter assembly housing and separate the two assemblies. *(NOTE–*Valve spool remains in housing when the two assemblies are separated. The seal at the end of the spool makes it necessary that spool be removed from the end of the housing). Remove spring thrust washer, spring, flat washer, "V" seal assembly, flat washer and spacer from valve shaft. Remove ball stud cover from adapter assembly housing. Push ball stud to the end of the adapter housing and remove lockpin. Remove threaded ball plug adjuster and valve shaft. Remove ball seat plug, spring, ball seats and ball stud. Remove bearing sleeve.



POWER STEERING CONTROL VALVE ASSEMBLY



CHEVROLET POWER STEERING ASSEMBLY

Inspection: Wash all parts in solvent and dry with a lint free cloth. Inspect all parts for scratches, burrs, distortion, evidence of wear, and replace all parts that are worn or damaged, including mating parts where necessary. Replace all seals, gaskets and covers.

Reassembly: Place ball seat in bearing sleeve and insert sleeve in housing. Insert ball stud in sleeve. Install the remaining ball seat, spring and spring seat in bearing sleeve *(CAUTION–This is the heavier of the two springs used in the control valve).* Install valve shaft in adjuster and screw adjuster into sleeve. Tighten adjuster until it bottoms, and then back if off ¼ turn, plus or minus the amount necessary to install lockpin in nearest hole *(CAUTION–*Be sure ball seats remain in correct position, otherwise there will be insufficient clearance to correctly install retaining pin). Install ball stud cover and install washer and annulus spacer on the valve shaft. Install "V" seal block and ring assembly. Install the annulus washer, spring and spring thrust washer with chamfered side of thrust washer toward spool side. Install spool valve assembly and retaining nut *(CAUTION–*Install spool valve with the "V" seal at the threaded end of valve shaft). Tighten the retaining nut to 25 inch lbs. with a torque wrench and install retaining clip. Make sure that all parts are correctly located before tightening. Insert the assembled valve and adapter assembly into valve housing and install retaining bolts and lockwashers. Fill the end area with GM 4617-M grease and install valve housing dust cover.

Installation: Install control valve on relay rod so that distance from center of control valve ball stud to center of tie rod end ball stud measures approximately 3 5/8". Tighten control valve clamp *(NOTE–*The clamp securing control valve to relay rod end should be positioned before tightening so that it will not interfere with steering linkage. Reconnect the four hydraulic hoses to control valve and fill system with Automatic Transmission Fluid Type "A".

POWER CYLINDER: (Removal)–Disconnect hydraulic lines connected to cylinder and drain fluid into a container. Remove retaining nut, washer, and rubber grommet from cylinder rod to brace attached to frame. Remove cotter pin, retaining nut, flat washer and bolt from end of power cylinder where it is fastened to relay rod bracket. Remove power cylinder.

Inspection: Inspect seals for leaks around cylinder rod and if leaks are present, replace the seals as follows: Use a hook tool and remove retaining ring. Remove wiper ring, backup washer, backup seal ring and seal *(NOTE–*Piston rod should not be removed unless there are signs of leakage along piston shaft at the shaft seal). Examine brass fitted hose connection seats for cracks or damage and replace if necessary. If other service required on power cylinder, replace the unit.

Installation: Install power cylinder by reversing the reversing the removal procedure. Reconnect the hydraulic lines and fill system with Automatic Transmission Fluid Type "A".

POWER STEERING PUMP: S *"1955-59 Ch vrol t Pow r Steering Pump".*

1960 CHEVROLET PASS. CAR LINKAGE TYPE

Chevrolet Pass. Cars (1960)

►CHANGES, CAUTIONS, CORRECTIONS

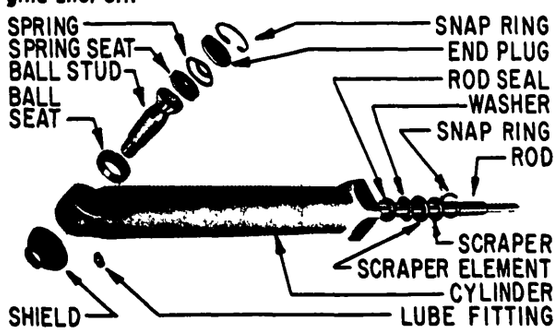
►*1960 (EARLY CARS) POWER STEERING RESERVOIR OVERFLOWING NOTE: On early models, the power steering reservoir will overflow when wheels are turned from right to left with engine stopped.*

DESCRIPTION: Linkage type with power cylinder mounted between steering relay rod and bracket on frame side rail. Control valve assembly is mounted on left side relay rod and is operated by pitman arm acting on spool valve assembly. The new control valve assembly is adjustable to provide greater uniformity of operation and faster response. The new power steering pump is mounted on engine and is driven by a belt from crankshaft pulley.

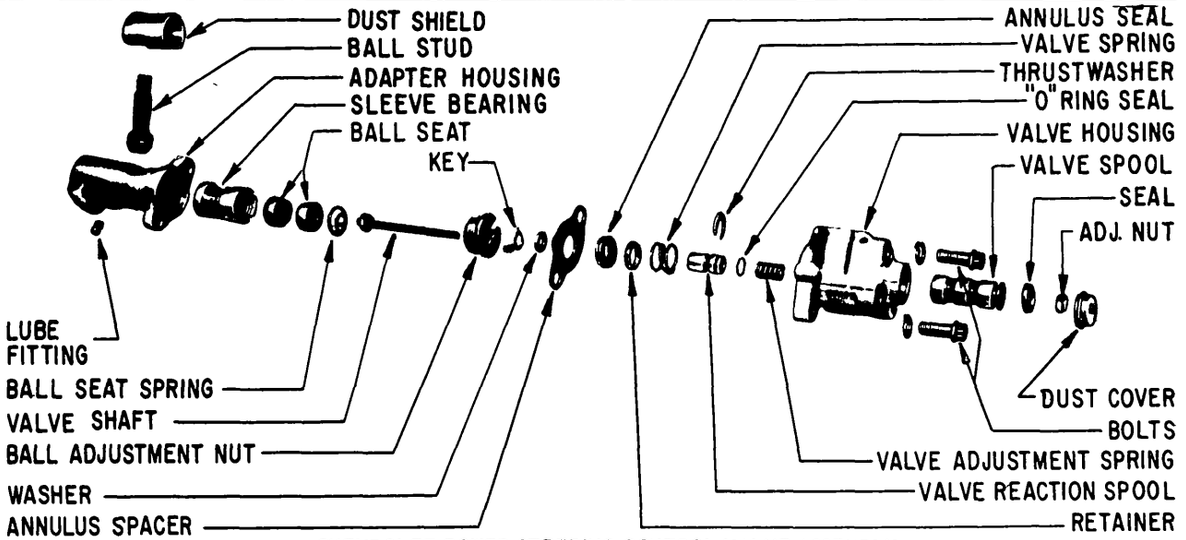
ADJUSTMENT: Power Steering Pump Belt - Loosen power steering pump-to-bracket attaching bolts and move pump, with belt in place, until belt is tensioned so that a 15 lbs. force applied at midpoint between fan pulley and pump pulley will cause a ½" to ¾" belt deflection, then tighten mounting bolts.

Control Valve Balancing: *NOTE - If a hard steering effort is required (in one direction), balance control valve as follows:* With car on a hoist, engine running, and power cylinder rod disconnected from frame bracket, piston rod will be fully retracted or fully extended (if valve is out of balance). If piston rod remains retracted, turn adjusting nut clockwise until rod begins to move out, then turn nut counterclockwise until rod begins to move in. Now turn nut clockwise to exactly one-half the rotation needed to change direction of shaft movement. If rod remains extended, move nut counterclockwise until rod begins to retract, then clockwise until rod begins to move out. Now position nut to exactly one-half the rotation needed to change direction of shaft movement. *CAUTION - Do not turn nut back and forth more than is absolutely necessary to balance valve.* With valve properly balanced, it should be possible to move rod in and out manually. Stop engine and connect cylinder rod to frame bracket, then restart engine. If front wheels (still on hoist) do not turn in either direction from center the valve is properly balanced. With valve properly adjusted, install dust cap.

LUBRICATION: *NOTE - On early cars, check fluid level in reservoir with oil at normal operating temperature and front wheels in straight ahead position, with engine shut off.*



POWER CYLINDER ASSEMBLY



CHEVROLET POWER STEERING CONTROL VALVE ASSEMBLY

Checking Fluid Level: Check oil level in reservoir by removing dipstick (normal operating temperature). Fill to indicated level with Automatic Transmission Fluid.

Bleeding Hydraulic System: Fill reservoir to proper level and let oil remain undisturbed for at least two minutes, then start engine and run at idle speed for two minutes. Add oil if necessary, raise front of car so wheels are off ground. Increase engine speed to 1000 RPM and turn wheels full right and left, contacting stops lightly. Lower car and turn wheels right and left on the ground. Check oil level and refill as necessary. Continue this process as long as required to bleed all air from system (oil in reservoir should be clear).

REMOVAL & INSTALLATION

CONTROL VALVE: Removal - Raise front of car and place it on stands, then loosen relay rod to control valve clamp and disconnect the two pump to control valve hose connections. Drain fluid into a container and then disconnect the two remaining valve to power cylinder hoses. Remove retaining nut from ball stud to pitman arm connection and disconnect control valve from pitman arm. Turn pitman arm to right to clear control valve and unscrew control valve from relay rod.

Installation: Install control valve on relay rod so that distance from center of control valve ball stud to center of tie rod end ball stud measures approximately 3 5/8", then tighten control valve clamp. *NOTE - Clamp securing control valve to relay rod end should be positioned before tightening so that it will not interfere with steering linkage.* Reconnect the four hydraulic hoses to control valve and fill system with Automatic Transmission Fluid Type "A". Balance control valve *(see "Control Valve Balancing" above).*

POWER CYLINDER: Removal - Disconnect hydraulic lines connected to cylinder and drain fluid into a container. Remove retainer nut, washer, and rubber grommet from cylinder rod to brace attached to frame. Remove cotter pin, retaining nut, flat washer and bolt from end of power cylinder where it is fastened to relay rod bracket. Remove power cylinder.

Installation: Install power cylinder by reversing removal procedures. Reconnect lines and fill system with Automatic Transmission Fluid Type "A". Bleed air from system (see above).

POWER STEERING PUMP: Removal - Disconnect hoses from pump and secure ends in a raised position, then cap all open fittings. Loosen pump bracket-to-pump bolts and remove pump from car. Remove drive pulley attaching nut and slide pulley from shaft. *CAUTION - Do not hammer pulley off shaft.*

Installation: Slide pulley on shaft (do not hammer on shaft), then install pulley nut and tighten to 35-45 ft. lbs. *NOTE - Always use a new pulley nut.* Position pump assembly on mounting bracket and install bolts loosely, then connect and tighten hoses. Fill reservoir with Automatic Transmission Fluid Type "A" and bleed pump by turning pulley (counterclockwise as viewed from front) until air bubbles cease to appear. Move pump outward until belt is properly tensioned (see "Belt Adjustment" above), then tighten mounting bolts.

OVERHAUL

CONTROL VALVE: Disassembly - Place valve assembly in a vise with dust cap upward. *CAUTION - Clamp adapter housing end of assembly only in vise.* Remove dust cap, then remove adjusting nut. Remove valve to adapter bolts and remove valve housing and spool from adapter. Remove spool from housing, then remove spring, reaction spool, washer, reaction spring, spring retainer, and seal. Remove "O" ring from reaction spool. Remove annulus spacer, valve shaft, washer and plug to sleeve key. Turn adjusting plug out of sleeve very carefully so as not to nick top surface. Remove adapter from vise and invert, permitting one of the two ball seats to drop out. Remove ball stud and the other ball seat and the seal will drop out.

Inspection: Wash all metal parts in solvent and dry with a lint free cloth. Inspect all parts for scratches, burrs, distortion or wear. Replace all seals, gaskets, covers.

Reassembly: Install sleeve and ball seat in adapter, then install ball stud, other ball seat and spring (small coil of spring down). Clamp adapter in vise, then put shaft through seat in adjuster plug and screw adjuster plug in sleeve. Turn plug in until it is tight, then back it

CONTINUED ON NEXT PAGE

1960 CHEVROLET LINKAGE TYPE (Cont.)

off until slot lines up with notches in sleeve. Insert key, making sure that small tangs on ends of key fit into notches in sleeve. Install valve shaft washer, annulus spacer, and reaction seal (lip up), spring retainer, reaction spring and spool, washer and adjustment spring. *NOTE - Install "O" ring on reaction spool before installing spool on shaft.* Install washer with chamfer up. Install seal on valve spool (lip down), then install spool in housing being careful that spool is not jammed in housing. Install housing and spool onto adapter with side ports on same side as ball stud, then bolt housing to adapter. Depress valve spool and turn lock nut onto shaft about four turns. *NOTE - Always use a new locknut.* Install valve in car and balance before installing dust cap.

POWER CYLINDER: Disassembly - To remove piston rod seal, remove snap ring, then pull out on rod, being careful not to spray oil out of parts. Remove piston rod scraper and scraper element, back-up washer and piston rod seal from rod. To remove ball stud, depress end plug and remove snap ring. Push on end of ball stud and the end plug, spring, spring seat and ball stud may be removed. If ball seat is to be removed it must be pressed out using a suitable size socket.

Reassembly: Reverse disassembly procedures and note the following: Apply a thin coating of Lubriplate on inner surfaces of seal and scraper element before reassembly. Fill area beneath end plug with GM grease, Part No. 4618-M. Make sure snap rings are firmly seated in grooves.

POWER STEERING PUMP: *See "Chevrolet Power Steering Pump".*

PRESSURE TEST: Disconnect pressure line at pump connection and install checking gauge, Tool J-5176 (with gauge valve closed) on pump and hose connection. *NOTE - Adapter Kit J-5900 must be used to install pressure gauge to pump.* Open gauge valve and run engine at idle speed, then turn wheels (on ground) against stops. Pressure should not be less than 750 lbs. If pressure is less, slowly close valve and check for pressure increase. *NOTE - Pressure will increase if pump is in good condition.* If pressure does not increase with valve closed, pump is faulty. *CAUTION - Do not hold valve closed more than 15 seconds.* After removing gauge, bleed hydraulic system (see above).

FORD TRUCK LINKAGE TYPE POWER STEERING

Ford Truck, Exc. Tilt Cab Models (1958-60) ℂ
Ford Truck Tilt Cab Models (1958-60) ℂ

ℂ - Power cylinder used.
ℂ - Booster (rack & piston) cylinder used.

▷CHANGES & CORRECTIONS

▷*1959 F-600 TRUCK FRONT END SHIMMY CORRECTION (POWER STEERING MODELS):* This condition may be caused by collapsed power steering piston rod insulators. To correct, install new type insulators, Part No. B9T-3314-A.

DESCRIPTION: Linkage type with control valve assembly connected directly to steering gear pitman arm. On Tilt Cab Models, the operating cylinder is a "rack & piston" booster type cylinder connected between pitman arm and wheel spindle. On other models, the hydraulic power cylinder is anchored to left side of front axle with the piston rod connected to center of spindle connecting rod. The only basic differences between the two units is in the construction of the operating cylinders.

ADJUSTMENT: Pump Drive Belt - ½" belt deflection midway between pulleys. Tighten belt adjusting bolt to 30-35 ft. lbs.

LUBRICATION: Check fluid level every 1000 miles. Remove cover from reservoir and add Automatic Transmission Fluid as required to bring level within 1 inch of top of reservoir.

TESTING: Turning Effort - With front wheels properly aligned and tire pressure correct, place car on dry concrete, set brakes, then proceed as follows: With engine at normal idle speed, turn wheel to right and left several times to bring fluid to normal operating temperature. Hook a spring scale to rim of steering wheel and measure pull required to wheel at least one complete turn in both directions. The pull should be 35-65 lbs., and about equal in both directions.

Pump Pressure: Install pressure gauge, Tool T54L-33610-C between pump hose and pump outlet with pressure gauge between pump and shutoff valve of tool. Run engine at idle speed (with shutoff valve open) for two minutes to normalize oil temperature. Note pressure reading while turning wheels to full right and left positions. Pressure should be 50-60 lbs. (F-100); 60-70 lbs. (F-200 to F-600). Increase engine speed to 2500 RPM, then slowly close shutoff valve. Pressure should increase to 900-1050 lbs. *CAUTION - Do not leave valve closed for more than 15 seconds.* If pressure is less than minimum, pump is faulty. If pressure increases but does not reach maximum, inspect pump, control valve, and power cylinder. If pressure is within limits and power steering is not satisfactory, trouble is in control valve or power cylinder.

TROUBLE SHOOTING: Binding or Poor Recovery - Check pitman arm ball stud in drag link outer sleeve. Check steering gear adjustments. Check operation of control valve spool in valve housing. Check for interference between sector shaft arm and dust shield. Check valve spool bolt locknut adjustment. Check control valve inner and outer sleeves for damage.

Hard Steering: Check hydraulic pressures. Check control valve and control valve spool. Check sector arm ball stud for free movement.

Excessive Free Play: Check steering gear worm and roller mesh adjustment. Check clearance between sector arm ball stud and ball stud seats.

Noise: Check and adjust pump belt tension. Check to make sure correct hose is being used. If necessary, remove and check pump. Bleed air from system by turning wheel several times to each stop.

Steering Chatter: Loose pump belt. Check for looseness in spindle connecting rod connections.

Rattles: Check for looseness between sector arm ball stud and seats.

Loss of Power Assist: Check system for damage or broken hoses. Check hydraulic pressures. Check control valve and power cylinder.

POWER STEERING PUMP: Removal - Remove reservoir cover, then disconnect reservoir-to-pump hose from pump and drain fluid from reservoir. Disconnect pump-to-control valve hose from pump, and fasten it in a raised position to prevent fluid from draining out. Remove belt, then remove pump.

Installation: Reverse removal procedure and adjust pump belt to specifications.

CONTROL VALVE: Removal - Disconnect four hose assemblies at control valve fittings and drain fluid from hoses. Remove dust cover from end of drag link outer sleeve, then remove cotter pin and unscrew drag link ball plug from end of sleeve. Remove nut and bolt from drag link dust shield (if so equipped). Turn steering wheel so steering sector shaft moves toward rear of truck and remove washer and outer drag link ball seat from sleeve. Pull sleeve away from sector shaft arm ball stud. Remove dust shield from sector shaft arm stud. Remove inner drag link ball seats and spring from the sleeve, then disconnect forward end of drag link from left spindle arm and remove control valve and drag link assembly from truck.

Installation: Install a new dust shield on steering sector shaft arm if old shield is worn or damaged, then install drag link stud in spindle arm and tighten nut to 45-55 ft. lbs. (F-100, F-250); 60-70 ft. lbs. (F & P-350, P-400 F-500 & 600, B-500 & 600, P-500), 90-100 ft. lbs. (C-550 & 600), and install new cotter pin. Position flat faced inner ball seat, ball spring, and the other inner ball seat in control valve sleeve. Install control valve sleeve on sector shaft arm ball, then install outer ball seat and washer in end of sleeve. Install the plug. Tighten control valve sleeve plug until ball spring is fully compressed, then back plug off to first cotter pin hole and install a new cotter pin. Connect four hose assemblies at control valve and drag link fittings with chassis lubricant, then fill reservoir to correct level with Automatic Transmission Fluid. Operate engine at idle speed for about two minutes, check fluid level, then check all hose connections for leakage. Increase engine speed to 1000 RPM, then turn steering wheel to right and left several times. Stop engine and check control valve and hose connections for leakage. Recheck fluid level in reservoir.

POWER CYLINDER (EXCEPT TILT CAB TRUCKS): Removal - Disconnect control valve-to-power cylinder hoses at power cylinder and fasten ends of hoses in a raised position to prevent fluid drainage. Disconnect spindle connecting rod at end of power cylinder, then disconnect power cylinder from truck.

Installation: Position anchored end of power cylinder in its mounting bracket with a bushing on either side, then install anchor pin through bottom of the bracket and tighten nut securely. Place a washer and insulator on piston rod, then insert end of rod through stud eye or mounting bracket on spindle connecting rod. Place

CONTINUED ON NEXT PAGE

FORD TRUCK LINKAGE TYPE POWER STEERING (C nt.)

an insulator, washer, and nut on end of rod, and tighten nut until washer bottoms on piston rod shoulder. Install locknut. Connect hoses to control valve and tighten fittings securely. Fill reservoir to specifications with Automatic Transmission Fluid, then start engine and run at idle speed for two minutes and check for fluid leakage. Bleed air from system by turning wheel fully to right and left.

BOOSTER CYLINDER (TILT CAB MODELS): Removal - Tilt cab forward and drain cooling system, then remove fan assembly. Disconnect upper and lower radiator hoses and the accelerator and choke cable clamps, then remove radiator assembly. Remove intermediate sector shaft arm (pitman arm) from booster cylinder sector shaft. Place a drain pan under cylinder, then disconnect left turn and right turn lines from cylinder. Remove booster cylinder-to-frame retaining bolts and cylinder.

Installation: Position booster cylinder on frame and install retaining bolts. Connect right and left turn lines to cylinder and tighten fittings to 30-40 ft. lbs. Install intermediate sector shaft arm on sector shaft and and tighten nut to 180-220 ft. lbs. Complete installation by reversing removal procedure. Fill cooling system, then fill power steering reservoir with Automatic Transmission Fluid. Operate engine and check for leakage, then bleed system of air by turning wheel fully to right and left.

OVERHAUL

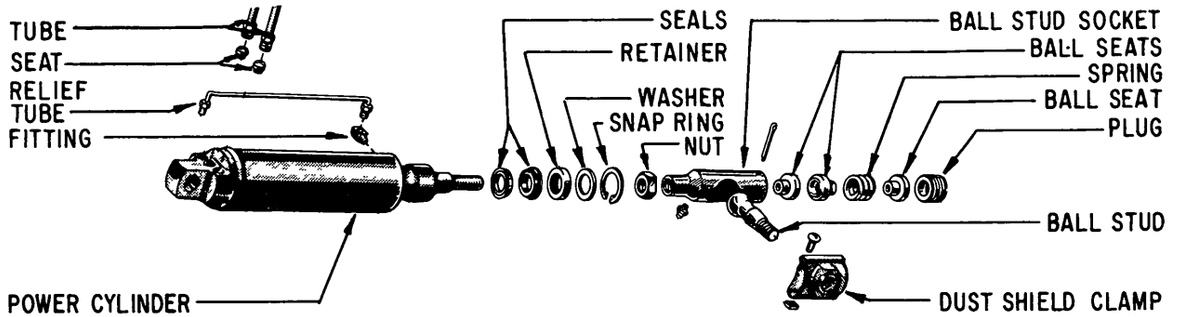
CONTROL VALVE: Disassembly - Drain as much fluid as possible from hose fitting holes on top of control valve housing, then clean outside of housing, being careful not to allow dirt to enter holes. Remove four bolts that fasten drag link control valve housing and drag link outer sleeve together, then separate drag link and outer sleeve from housing. Remove locknut from end of control valve spool bolt, and remove bolt, washer, and inner sleeve from housing. Remove control valve spool and housing seals from housing. *NOTE - One of the seals can be pushed out with the spool, and the other seal can be removed from opposite end of housing.*

moved from opposite end of housing.

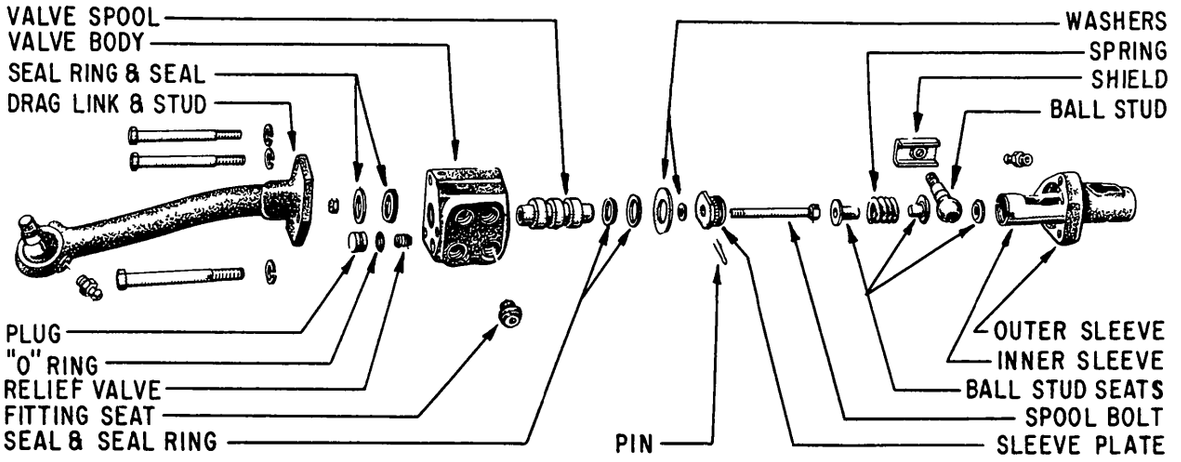
Inspection: Inspect all parts for wear or damage. Examine lips of seals carefully for nicks or scratches that would allow fluid to escape from control valve. Inspect spool for nicks or burrs and scoring. Remove burrs with crocus cloth. DO NOT round off sharp edges on spool. Inspect housing for burrs, and scored or damaged surfaces. Remove burrs with crocus cloth. With spool clean and dry, insert spool in housing. Spool should fall free of its own weight. Check fit of drag link inner and outer sleeves. Inner sleeve should slide freely in outer sleeve. Check ball stud seats for wear or damage.

Check Valve Replacement: If necessary to replace return port relief check valve assembly in control valve housing, remove plug from forward end of housing. *NOTE - Apply air pressur to return port to blow plug out.* Remove relief valve with a screwdriver, then install a new valve. Install plug in relief valve hole.

Valve Housing S at R plac m nt: If necessary to replace control valve hose connector seats, tap the existing hole in hose seat, using a 3/8" starting tap for the large hose seat and a ¼" starting tap for small seats. *CAUTION - Remove all metal chips from hose seat port after tapping.* Place a nut and large flat washer on a bolt of the same size as tapped hole (washer large enough to cover hose seat port). Thread bolt into tapped hole and turn nut to remove hose seat. Place a new hose seat in port and thread a bolt of the same size as port into the port. Tighten bolt enough to bottom seat in port.



FORD TRUCK POWER STEERING POWER CYLINDER



FORD TRUCK POWER STEERING CONTROL VALVE ASSEMBLY

Reassembly: Lubricate all parts with Automatic Transmission fluid, then insert valve spool in housing with large end of spool toward inner sleeve end of housing. Rotate spool while inserting it. Install two seals in control valve housing over ends of the spool (beveled lip of each seal should be against outer edge of valve housing bore). *CAUTION - Do not nick or scratch seal during installation.* Position valve spool bolt in drag link inner sleeve, then place washer over forward end of inner sleeve and position inner sleeve on end of control valve housing. Install a new locknut on end of valve spool bolt, and tighten nut securely. Back off the nut 1/16-1/8 turn until spool bolt can be rotated freely (without endplay) while holding the spool. Place drag link, control valve housing, and drag link outer sleeve together in their correct positions, then install and tighten the four bolts fastening the three parts together. Install new lock wires on bolts.

POWER CYLINDER (EXCEPT TILT CAB MODELS): *NOTE - Power cylinder internal parts and rod, except seals and hose seats, cannot be replaced.*

Seal Replacement: Clamp power cylinder in a vise and remove snap ring from end of cylinder. *CAUTION - Be careful not to distort or crack cylinder.* Pull piston rod out all the way to remove scraper, bushing, and seals. Lubricate new inner seal with Automatic Transmission Fluid and place seal, bushing, outer seal, and scraper on piston rod. Push rod in all the way, then install parts in cylinder with a deep socket slightly smaller than cylinder opening. Install snap ring in end of cylinder.

Hose Seat Replacement: Procedure is the same as installing seats in control valve. *See "Control Valve" above.*

POWER CYLINDER (TILT CAB MODELS): Disassembly - Remove front end plate-to-rear end plate connector tube and drain as much fluid as possible from cylinder. Remove sector shaft bushing support plate from side of cylinder, then remove sector shaft and thrust washer from housing. Remove both of the cylinder assembly

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FORD TRUCK LINKAGE TYPE POWER STEERING (C nt.)

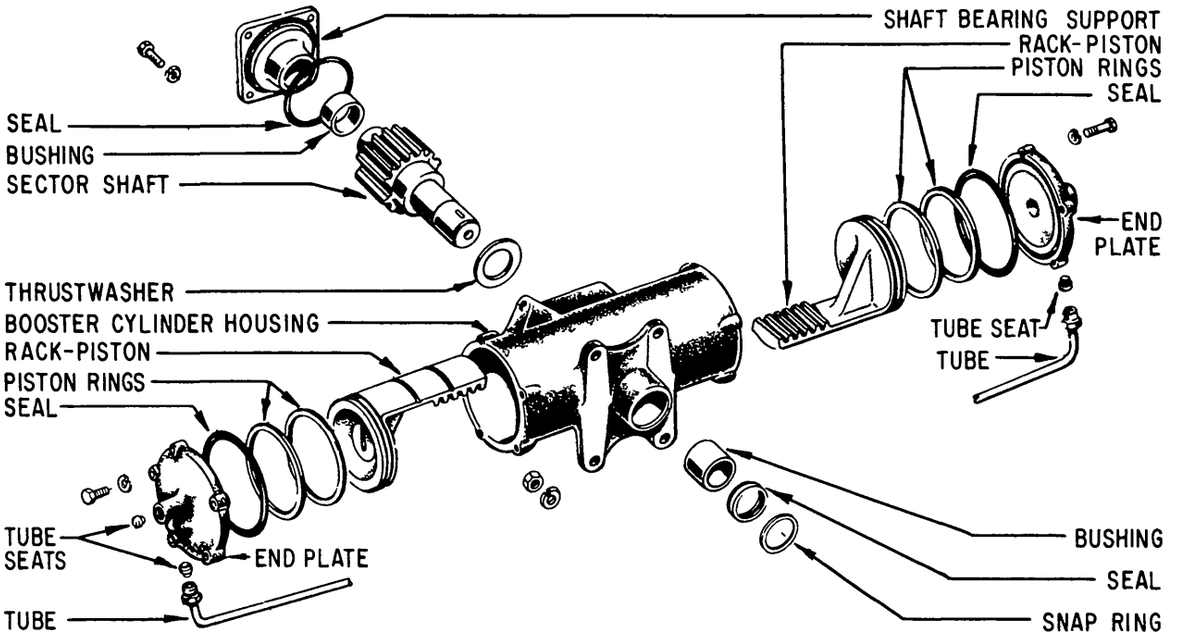
end plates, then reach in through support plate opening and push piston out of cylinder Remove sector shaft seal snap ring, and remove seal

Insp cti n: Clean all parts with solvent and wipe dry with a clean lint free cloth Blow out all passages and grooves Inspect cylinder bore for nicks, scores, and scratches Touch up minor damages with crocus cloth *NOTE - Cylinder housing is not available as a service part If replacement is necessary, the complete unit must b replaced* Inspect piston rings for scores on contact surfaces and replace rings if necessary Check ring side clearance which should be 002- 004" Check condition and clearance of sector shaft bushing Clearance should be 0005- 0025" Check sector shaft for burred or broken teeth and for rough spots on bushing and seal contact surfaces Inspect end plates, bushing support plate, and cylinder housing for nicks and burrs on mating surfaces Dress any rough spots with a file Inspect tube connector seats in housing and end plates and replace seats if necessary Check thickness of sector shaft thrust washer which should be 058- 062" thick If less than minimum, replace thrust washer

Conn ctor S at Replacement: Procedure is the same as installing seats in control valve *See "Control Valve" above*

Bushing R plac m nt· If clearance between sector shaft and bushings exceeds 0025", or if bushings are damaged, replace as follows Press bushing out of housing or support plate with a suitable tool When pressing bushing into housing or support plate, place slit in bushing at bottom center or top center Press bushing into housing far enough so that thrust washer will not ride on it, and will be approximately flush with seal counterbore Press bushing into support plate flush with, or a little below, edge of its bore

R assembly: Lubricate sector shaft seal with Automatic Transmission Fluid and position it in shaft bore in cylinder with metal side of seal facing outward Install seal snap ring Lubricate pistons, rings and cylinder bore with Automatic Transmission Fluid, then compress rings with a piston ring compressor tool (stagger the ring gaps), and install piston in cylinder by tapping



FORD TRUCK POWER STEERING BOOSTER CYLINDER

gently with a hammer handle Position rack of front piston at the top of cylinder and rear piston at bottom of cylinder The two center teeth on each rack are identified by "X" marks The upper and lower center teeth on sector shaft pinion are also identified by "X" marks Position the pistons in cylinder so "X" marks on pinion teeth are located between "X" marks on racks when sector shaft is installed Place sector shaft thrust washer in cylinder housing, then install sector shaft with serrations facing down and with "X" marks properly aligned Install a new "O" ring seal in groove in sector shaft bushing support plate, then install support plate

NOTE - Mounting holes are not concentric, and support plate can be installed only in one position Tighten screws to 12-15 ft lbs Install a new "O" ring seal in groove in front end plate (end plate with two tube connector holes) Install front end plate making sure to position end plate connector tube hole facing down and slightly toward frame mounting bracket Tighten screws to 12-15 ft lbs Install a new "O" ring seal in rear end plate groove, then install rear end plate on cylinder, making sure the tube connector hole is lined up with its counterpart in front end plate Tighten screws to 12-15 ft lbs Install front end plate to rear end plate connector tube and tighten fittings to 30-40 ft lbs

HYDRAULIC PUMP: *See "Eaton Roller Type Pow r Steering Pump"*

GEMMER HYDRAGUIDE (CHRYSLER & DESOTO) (INTERNAL OIL PASSAGE TYPE)

Chrysler (1954)
DeSoto (1954)

►CHANGES & CORRECTIONS

►*1954 "HIGH SPOT" OR "LUMPY FEELING" AT OR NEAR STRAIGHT AHEAD POSITION (Or feeling of oversteering when turning from center to right or left)* Check and adjust Cross-shaft Backlash and check Steering Tube-and-Column Alignment EXACTLY as detailed below NOTE—See 1953 Steering Column Jacket Bearing Spring Change (below)

DESCRIPTION

DESCRIPTION: The "Internal Oil Passage" Power Steering Gear is of the same basic design and operates on the same principle as the previous Gemmer Hydraguide type. The new type has numerous structural changes

Gear Housing—Cast aluminum (was malleable iron) Oil passages are provided in the housing and all external oil tubing and connections have been eliminated.

Power Cylinders—Cylinders are gray iron castings with integral mounting flange and are attached by capscrews No piston travel adjustment is required

Valve Body & Valve Body Cap—Both parts are die-cast aluminum Valve identification is stamped on valve body above each valve cylinder.

Power Piston Assembly—Two piece aluminum die-cast type with new seal ring assemblies (rectangular section rubber seal ring backed up by molded nylon ring) *NOTE*—Piston assembly is interchangeable with previous type used in earlier model steering gears

Worm Adjustment—Threaded type adjustment screw and locknut provided in worm shaft lower cover (replaces adjusting shims).

Worm Lubrication—Entire steering gear (including worm and roller now lubricated by SAE 10-W Engine Oil (used for both lubrication and hydraulic power). Nylon Elastic Stop Nuts and nylon washers are used on both the worm and shaft adjusting screws for sealing at these points.

Hydraulic Pump & Reservoir Assembly: "Single Rotor" type mounted on generator and driven by armature shaft *See Hydraulic pump data in "Gemmer Hydraguide (External Oil Passage Type)".*

LUBRICATION: *CAUTION—New "Internal Oil Passage" type is lubricated entirely by the hydraulic pressure oil supply and special lubricant not required for steering gear worm-and-roller (as on previous External Oil Tube type).*

Checking Fluid Level: Check at 1000 mile intervals or every 30 days. Thoroughly clean top of reservoir, remove cover. Add oil as required to maintain level even with mark stamped on inside of reservoir or ½" above top of filter element.

Recommended Oil—SAE. 10W (MM or MS). For temperatures below —10°F., use SAE. 5W.

BLEEDING HYDRAULIC SYSTEM: *CAUTION—Before removing reservoir cover, carefully clean cover and adjacent surfaces to prevent possibility of dirt entering the system.*

1. Fill reservoir slightly higher than normal, place cover on reservoir.
2. Start engine and allow to run for short time to circulate oil through hoses and chuck, stop engine and refill reservoir to proper level (see below). NOTE —If gear chuck contained no oil, filling operation may have to be repeated until level remains constant.
3. With engine running at idle speed, turn steering wheel back and forth several times from extreme right to left
4. Refill reservoir to proper level (see below).
5. Re-install reservoir cover.

TESTING

HYDRAULIC PRESSURE TEST: Use special gauge C-3102 assembly which is designed to be connected to pressure hose connection at pump so that pressure can be checked while unit is operating.

1. Connect gauge C-3102 in the pressure line between pump and hose. Start engine and turn steering wheel. If gauge does not show at least 500 lbs. pressure when steering wheel is in either extreme position, check the pump by turning the shut-off valve to its closed position. If the pressure does not gradually increase as the valve is closed, the flow control valve in the pump may be stuck in an open position or the drive coupling may be broken, *See PUMP below.* If 500 lbs. pressure does show on gauge with engine idling, the pump is in good condition; and trouble is probably in steering gear assembly.

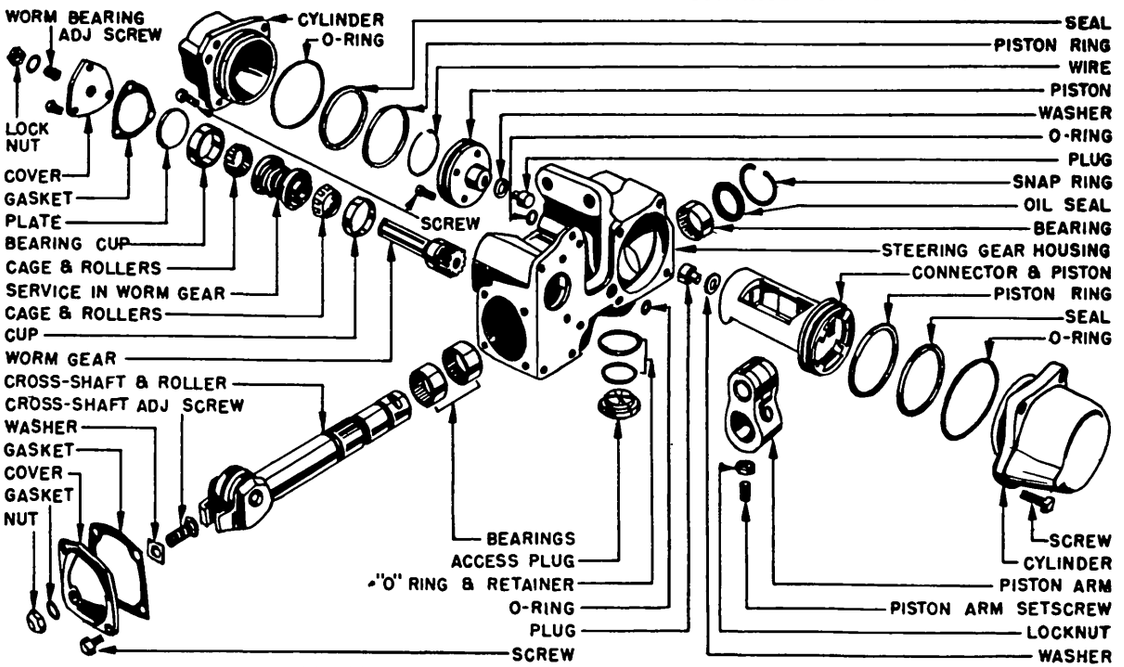
►*TESTING NOTE*—If a gauge is not available, a fairly accurate way of making the test is as follows: Start the engine and turn the wheel to both extreme positions. If the high pressure hose flexes, the pump is in good condition. Look for trouble in the gear assembly. If the high pressure hose does not flex, lack of pump pressure is indicated. See below.

TROUBLE SHOOTING

NO POWER ASSISTANCE (with engine running):

1. **Hydraulic Pressure**—Check hydraulic pressure (see Testing above).
2. **Pump**—Remove reservoir cover and with plug or finger held over center hol at top of filter start engine and turn steering wheel. If oil flows through filter, stuck flow control valve plunger is indicated. Shut off engine and free the valve as follows: Disconnect high pressure hose at the pump fitting and insert a ¼" clean blunt probe against valve. If valve moves inward 3/16" to ¼", then it was stuck open. Remove valve and clean with crocus cloth to remove foreign material or scores; reinstall and test. Pressure should be obtained on extreme turns of 500 lbs on gauge, or without gauge, the high pressure line should flex. If this does not correct condition, check coupling.
3. **Coupling**—Remove pump and coupling from generator. Remove snap ring that attaches coupling to pump shaft and remove coupling. If coupling is damaged, turn pump drive shaft at least ten revolutions. If shaft turns freely, install a new coupling on pump. Insert tongue of pump shaft into slot of coupling and fasten with snap ring. Then reinstall pump. If pump shaft binds when turned by hand, replace both pump and coupling. If generator shaft is damaged, repair generator.
4. **Drive Belt**—Check condition of the fan and generator drive belts and pulleys. Check belt adjust-

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EMMER HYDRAGUIDE STEERING GEAR & POWER UNIT

HYDRAGUIDE (C nt.) (INTERNAL OIL PASSAGE)

ment. See Generator Belt Adjustment on car model page.

5. Steering Gear Assembly—Erratic lack of steering assistance (occasionally or repeatedly) may be due to broken power cylinder piston rings (phenolic rings or rubber "T" rings). Replace piston ring assemblies.

►*CAUTION—If broken rings found, or if pieces of ring noted when draining system, Oil Pump and Reservoir should be cleaned (see LUBRICATION above).*

POWER ASSISTANCE LACKING IN ONE DIRECTION (Car steers easily in one direction but greater effort required to turn in opposite direction):

1. Steering Gear Misalignment—Check and correct alignment of steering gear and steering column jacket. *See Steering Gear Alignment.*

2. Control Valve Assembly—Check all reaction and distribution valves for correct assembly and installation. Make certain all valves are clean and that bleeder hole in check valve is open.

SENSITIVE STEERING (Too much assistance—front wheels tend to turn too far or too quickly): Can be detected without turning wheels by tendency of engine to slow down, and pressure hose from pump expanding when engine accelerated (hose may also show some seepage). Test as follows:

1. Install gauge and valve (see No Power Assistance Test above). Without turning wheels, accelerate engine and note pressure. If pressure excessive (300-400 lbs.), flow control valve sticking in closed position is indicated. Correct as follows:
2. Remove flow control valve (directly behind large plug to which high pressure hose connected), clean out all foreign material and polish valve with crocus cloth. Re-install valve and check for free movement.
3. Recheck pressure. Gauge should show 30-60 lbs. when engine accelerated.

NOISY OPERATION:

1. Low Oil Level—If steering wheel is turned while engine is not running, oil will be lost through reservoir vent and air will be drawn into system resulting in noisy operation. Replenish oil supply and bleed system. *See BLEEDING HYDRAULIC SYSTEM above.*

2. Singing Relief Valve—Indicates that the steering wheel is being held in either extreme position, or against curb. Release steering wheel.

►*CAUTION: Do not hold steering gear in either extreme position and accelerate engine at same time. Excessive heat will be generated and may cause damage to pump.*

3. Banging or Cracking Noise or Thump when turning corners—Indicates loose clamp bolt on steering arm (tighten to 120 ft.lbs. using a torque wrench), loose mounting bolts, or misalignment between steering column jacket bearing and steering tube. *CAUTION*—when tightening steering gear-to-bracket bolts or bracket-to-frame bolts, alignment must be checked. *See Steering Gear Alignment.*

4. Valve operating gears out of adjustment. *See Spur Gear Adjustment.*

5. Rubber insulator between steering gear and steering column jacket worn or out of place.

LEAKS:

1. Between Reservoir and Pump—Remove lower plug on pump and drain reservoir. Check to see that the four reservoir to pump screws are tight. If they are tight, the leak is probably due to "O" rings not sealing. Remove the four screws and lift reservoir from pump. Replace all six "O" rings in proper position and examine pump and reservoir surfaces for flatness and freedom from surface defects. Tighten screws to 7-12 ft. lbs. torque.

2. At Banjo Fittings—Cross-over lever on gearshift may interfere with fluid lines going to gear assembly and cause leaks at banjo fittings. Loosen banjo fittings. Pry between the lines and gearshift lever rod and force lines and rods apart, allowing fitting to move a little. While holding lines apart, tighten fittings to 16-20 ft. lbs. torque.

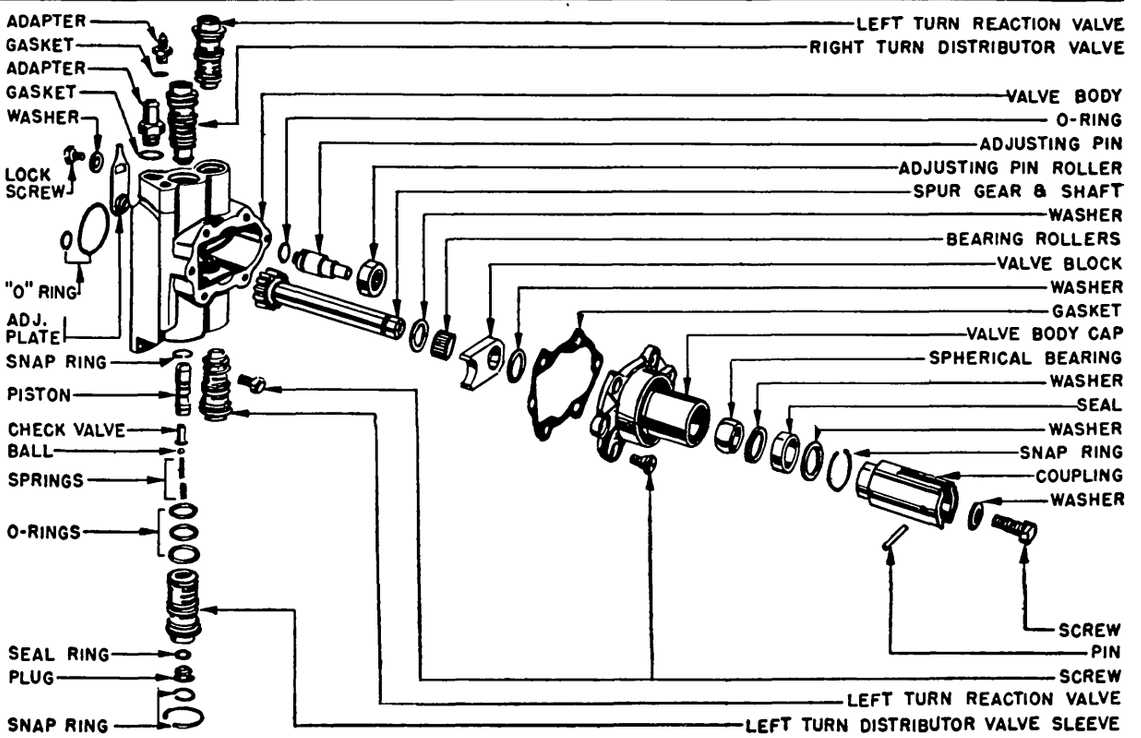
3. Between Cylinder Mounting Lock Rings & Housing: Replace "O" ring gaskets as follows: Back off lock ring far enough to permit removal of old "O" ring, disconnect banjo oil line connections on cylinder, slip new "O" ring (use two rings if necessary) under pipe connections and stretch ring over lock ring. Apply lubriplate to "O" ring and tighten lock ring to 35-45 ft.lbs. torque.

EXCESSIVE PLAY IN STEERING WHEEL:

1. Check and adjust valve operating gears (spur gears) and steering gear worm and roller. *See ADJUSTMENT.*
2. Tighten steering gear-to-bracket bolts to 65-75 ft.lbs. torque and bracket-to-frame bolts to 50-56 ft.lbs. torque with a torque wrench. *See Hydraguide Mounting Bolt Loosening Correction.*

ADJUSTMENT

All adjustments are made with Steering Gear Unit off car. *See "Overhaul" for adjustments with Steering Gear off Car.*



GEMMER HYDRAGUIDE CONTROL VALVE ASSEMBLY

BELT ADJUSTMENT: Keep generator drive belt in adjustment (¾" deflection midway between fan and generator pulleys).

STEERING COLUMN HORIZONTAL & VERTICAL ALIGNMENT: If spacing between column and chuck is not equal, loosen bracket-to-frame bolts and shift chuck and bracket in required direction to equalize the spacing between column jacket base, grommet, and valve body face. *CAUTION*—In some instances it may be necessary to install shims between bracket and frame to obtain sufficient movement of gear for proper alignment. Shims should be "U" shaped or flat washers and placed around bracket-to-frame bolts. *DO NOT PLACE SHIMS BETWEEN GEAR AND BRACKET.*

STEERING GEAR REMOVAL

STEERING WHEEL & HORN BUTTON REMOVAL: Disconnect battery, center steering wheel in straight-ahead position. Press down on horn blowing ring ornament and turn counter-clockwise. Lift out ornament retaining spring and pad. Disconnect horn wire from terminal on travel plate and insulator assembly. Remove bushing, travel plate, horn blowing contact ring spring and triangular ground plate. Curl and push horn wire into steering gear tube to make room for steering wheel puller pilot. Remove steering wheel nut. Attach puller Tool C-612 and remove steering wheel.

STEERING GEAR ASSEMBLY REMOVAL: (1)—Remove horn blowing ring, turn steering wheel to extreme left position, and remove steering wheel. Re-

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HYDRAGUIDE (C nt.) (INTERNAL OIL PASSAGE)

move transmission position indicator lamp housing from gearshift lever housing. Remove snap ring retaining turn signal and carefully work turn signal switch housing upward until it clears column jacket. Remove cross head screws retaining upper and lower halves of shifting yoke collars together and lift off upper collar. Remove large Oilite bearing with care. Remove snap ring retaining shift lever yoke and bushings in gear shift tube.

(2)—Lift shift lever yoke upward and out of housing. Do not drop yoke bushings in tube. Otherwise it will be necessary to disassemble column jacket in order to recover bushings. Remove lower collar from steering column jacket.

(3)—Remove steering column jacket toe pad, floor mat, clutch, and brake pedal pads. Remove clutch and brake pedal floor pan toe board cover. Remove clutch pedal horseshoe lock, slide pedal sideways and toward rear of car to allow for clearance of steering assembly removal.

(4)—Remove shift linkage clevis pin from bellcrank assembly in engine compartment. Disconnect directional signal indicator wires and remove horn wire connector from steering column. Remove two steering column to instrument panel screws.

(5)—Remove column jacket shroud assembly by removing column and shroud assembly down and away from gear chuck. Disconnect pressure and return hose from steering gear housing assembly, and cap the fittings.

(6)—Raise car off floor and remove left front wheel and drag link. Remove fender side shield. Remove steering gear chuck-to-frame bracket attaching capscrews. Install front wheel, lower car and remove steering gear assembly through toe board opening.

STEERING GEAR OVERHAUL

►*DISASSEMBLY NOTE*—Drain assembly by removing piston arm screw access plug at bottom center of cylinder housing. Remove caps from inlet and outlet oil passages. Turn steering gear coupling to extreme right and left, while draining oil, to force out all oil. Thoroughly clean all surfaces of unit.

DISASSEMBLY (Valve Assembly & Steering Gear Tube): (1)—Remove capscrew from steering arm and remove arm from steering cross shaft. Remove four bolts attaching valve body and valve cap assembly to housing, and lift valve body and cap from housing. *(CAUTION*—Valve body is made of die-cast aluminum and must be handled carefully to prevent damage to cover or its mating surfaces). Remove five "O" ring oil seals from valve body face.

►*VALVE REMOVAL CAUTION*—Each valve body port boss is marked to aid in reassembly of valves in correct position. Work carefully when removing valves, as internal parts of valves may become loose and fall into housing. To prevent improper assembly, units of valve assemblies should be cleaned separately and placed in separate containers. ***Valve parts are a select fit with each other and ar not interchangeable.***

(2)—Remove outer snap ring retaining each valve assembly in valve body, and pry out each valve assembly.

►*VALVE POSITION IDENTIFICATION MARK CAUTION*—Valve position identification marks on valve body port bosses indicate the number of "O" ring seals used on each valve as follows: (a) Right Turn Reaction Valve (Lower Right)—two "O" rings. (b) Left Turn Distributor Valve (Lower Left)—three "O" rings. (c) Left Turn Reaction Valve (Upper Right)—two "O" rings. (d) Right Turn Distributor Valve (Upper Left)—three "O" rings.

►*VALVE INTERCHANGE NOTE*—Right and left valves are interchangeable as an assembly, if correct number of "O" ring seals are installed on valves for each location.

(3) Remove valve piston assembly from valve sleeve and remove check valve. Inspect valve balls, springs and valve body bleed holes for obstructions. Clean all parts in solvent and replace "O" ring oil seals. Assemble valves in sleeves, making sure each valve is clean and is assembled in its respective position in valve sleeve. Remove the six valve body cap recessed head screws and star washers. Remove valve body cap and gasket from valve body housing.

(4)—Clamp steering tube coupling in vise and remove capscrew and washer holding coupling to steering shaft.

►*CAUTION—Do not clamp tube gear or valve cap body casting in vise. Clamp only the coupling to prevent damaging the assembly.*

(5)—Mount Puller Tool C-3132 (adapted to C-293 puller stand) to valve body cap and steering gear tube coupling assembly. Clamp puller in vise and remove coupling from gear tube. Slide steering gear tube and valve block assembly out of valve body cap. Remove oil seal snap ring and lift out oil seal outer washer.

(6)—With Remover & Installer Tool C-3269, drive the spherical bearing, steering gear tube oil seal and inner washer from valve body cap. Inspect bearing, roller, and valve block for damage, and wear. Clean all parts with solvent and blow dry with air.

Steering Gear Cylinders and Power Pistons: (1)—Remove cylinder-to-housing attaching capscrews. Thread cylinder removing studs, Tool C-3336 evenly into threaded cylinder flange holes until studs bottom in housing. Continue threading studs inward, evenly, until cylinder is free from housing. Remove large "O" ring seal from outer machined surface of cylinders, and small "O" ring seals from steering gear housing face.

(2)—Center piston arm in center of steering housing and remove piston screw retaining wire from pistons. Remove three piston-to-connector attaching capscrews and remove piston from connector. Remove connector and piston assembly from housing. Remove the neoprene seals and nylon thrust rings frim pistons. Carefully inspect rings for damage.

►*PISTON RING CAUTION—If piston rings are damaged or appear to be in doubtful condition, rings should be replaced.*

(3)—Loosen piston setscrew locknut and remove setscrew. Remove steering gear shaft cover adjusting screw locknut and nylon washer. Turn steering gear shaft to center position. Remove the four shaft cover attaching capscrews and copper sealing washers. Withdraw steering shaft from housing sufficiently to allow for removal of cover. Turn shaft cover adjusting screw in. Slide adjusting screw and cover out of slot in end of shaft. Remove cover and gasket. NOTE—A nylon washer is being used instead of the adjusting screw star washer.

(4)—Withdraw steering shaft from piston arm and remove piston arm assembly from steering gear housing. Loosen worm gear shaft cover adjusting screw locknut. Remove the three cover attaching screws and lift cover and screws from housing. Remove the steering gear shaft outer oil seal retaining snap ring with Remover Tool C-3137. Remove outer oil seal.

(5)—Remove the thrust pad, cup bearing, and worm assembly from housing. Remove adjusting screw locknut, nylon washer, and adjusting screw from worm cover. Clean housing and parts thoroughly in solvent and blow dry with air. Inspect worm shaft and gear, bearings, cups, bearing rollers, and other parts.

(6)—Inspect the three steering shaft needle bearings in housing. If rollers do not rotate freely, or if bearings are damaged, remove steering shaft center and inner bearings by driving bearings toward outer bearing with Tool C-3114. Remove outer bearing by driving bearing toward inside of steering gear with Driver Tool C-3113.

REASSEMBLY (Steering Gear Cylinders and Power Pistons): (1)—When installing steering gear shaft bearings in steering housing, bearings should be always driven against lettered end of bearing cage. Install center bearing in housing from steering gear arm side of housing. Drive bearing into housing with Driver Tool C-3114, until bearing is flush with inner face of housing.

(2)—Install shaft outer bearing, drive bearing with Driver C-3113, until bearing is approximately .050" below outer seal counter bore of housing.

(3)—Lubricate worm gear bearings and cups with lubriplate. Install worm gear, outer bearing, cup and thrust pad in housing. Lubricate gasket with Lubriplate and install gasket in position in housing. Remove adjusting screw from worm gear cover and place cover on steering housing. Install the three cover attaching capscrews, with copper sealing washers under screw heads. Tighten to 20 ft lbs. Install adjusting screw in cover, nylon washer and locknut on adjusting screw. Turn locknut down until it barely touches the washer.

Worm Shaft Bearing Adjustment—Turn adjusting screw clockwise until worm rotates freely without binding from one extreme to opposite extreme. ***(CAUTION—The worm gear when properly adjusted, should rotate freely in bearing cones without binding, and should also be sufficiently tight to eliminate any free play between shaft and bearings).*** Hold adjusting screw and tighten locknut to 25 ft. lbs. Recheck worm shaft bearing adjustment after tightening adjusting screw and locknut.

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HYDRAGUIDE (C nt.) (INTERNAL OIL PASSAGE)

Checking Piston Arm and Plug Clearance—Assemble piston on piston connector outside of steering housing. Check clearance between piston plugs and piston arm roller. ***It is important that this clearance be held as close to zero as possible.*** This can be controlled by various thickness of shims inserted between piston and piston plugs. These shims are available for service in a number of sizes varying in steps of .001" thickness. After checking the above clearance, disassemble piston and connector, leaving plugs in piston. Remove connector from piston arm.

(4)—Make sure steering shaft rollers rotate freely and that the housing oil passages and piston arm are clean. Place piston arm in position in housing so that splines on shaft will mesh with splines on piston arm. Insert steering shaft into piston arm until shaft is positioned in housing.

(5)—Install steering gear shaft cover gasket on housing after coating with Lubriplate. Install steering gear shaft cover and adjusting screw assembly in slot in end of shaft. Turn adjusting screw counter-clockwise to draw shaft cover up to housing. When cover is properly seated on housing, install the four cover attaching capscrews and copper sealing washers under head of each screw. Tighten screws evenly to 20 ft. lbs. Install nylon washer and locknut on shaft adjusting screw until nut barely touches nylon washer. Install gear shaft outer oil seal (lip of seal facing inside housing) with Sleeve Tool C-3136. Install outer seal snap ring (beveled side out). Position snap ring so that ring opening is pointing downward toward bottom of unit so that snap ring can be removed readily from under car when necessary. Make sure snap ring is properly seated in groove. Install steering gear arm on steering shaft. Tighten arm clamp bolt to 200 ft. lbs.

Steering Gear Shaft Adjustment—***(CAUTION—When making cross shaft adjustment, always remove power arm access plug and loosen power arm set screw before attempting to adjust cross shaft).*** Set worm gear and piston arm at center position. Hold worm at center with one hand. With other hand on pitman arm, check backlash between gear and worm in both directions. Turn shaft adjusting screws so that no backlash will be felt while worm is turned approximately 45 degrees, either side of center line.

►***CAUTION: Clearance should be at a minimum at the degree positions without binding. Do not adjust cross shaft roller and worm too tightly.***

Hold adjusting screw in the adjusted position and tighten locknut to 20-25 ft. lbs. Install piston arm adjusting lock screw and locknut. Tighten screw to 30-35 ft. lbs. and tighten locknut to 20 ft. lbs. Lubricate and install a new "O" ring seal on access plug, and tighten plug to 35 ft. lbs.

(6)—Center piston arm in steering housing. Install piston and piston connector assembly in housing, with piston plug bearing against piston arm and roller. Assemble the removed piston and plug assembly to opposite side of piston connector. Tighten Allen screws to 16-20 ft. lbs. Install piston screw retaining lock wires. ***CAUTION***—New "O" ring seals, gaskets, copper and nylon washers should be used each time unit is disassembled.

(7)—Lubricate neoprene "D" ring (cross section of ring is shaped like a "D"), and nylon thrust rings on piston with Lubriplate. Make sure that tapered side of thrust ring fits against tapered side of piston ring groove.

►***NOTE: Tapered side of thrust ring fits against tapered side of piston ring groove.***

(8)—Remove cylinder removal screws from cylinder flange, check face for burrs, clean and lubricate cylinder bores. Lubricate cylinder "O" ring with Lubriplate and install ring on outer machined section of cylinder. Install oil passage "O" rings on housing-to-cylinder oil passages. With pistons located in center of housing, place cylinders in position on housing. Work carefully to avoid damaging "O" rings during installation. Align cylinder holes with holes in housing. Install capscrews and tighten screws evenly to 30-40 ft. lbs.

Valve Assembly & Steering Gear Tube: (1) Install spherical bearing in valve body cap and place oil seal inner washer in body against bearing. Lubricate steering tube gear oil seal with Lubriplate and install seal in valve body (with lip of seal inward). Using Remover & Installer Tool C-3269, drive seal in valve body cap sufficiently to allow for installation of outer washer and snap ring. Install oil seal outer washer and snap ring, making sure snap ring is properly seated in valve body cap. Place steering gear tube and valve block assembly in valve body cap. Install coupling on steering tube gear and secure with capscrew and washer. Tighten screw to 20 ft. lbs.

►***VALVE BLOCK ADJUSTING PIN NOTE***—To replace or inspect needle roller bearings in adjustment pin roller, lift bearing and roller off pin as an assembly from shaft. To replace needle bearing in roller, use one end of Driver Tool C-3141 to remove bearing and the other end to install bearing. If leakage around valve block adjusting pin is apparent, remove adjusting plate capscrew, washer and adjusting plate. Remove valve block adjusting pin from inside valve body and remove "O" ring seal from adjusting pin. Lubricate new ring seal with Lubriplate and install ring on adjusting pin. Install pin in valve body. Do not damage ring when installing. ***(CAUTION—When assembling valve block adjusting pin in valve body, locate offset side of pin away from steering tube gear. The adjusting plate should not be installed on adjusting pin until unit is completely assembled).*** Inspect steering tube gear thrust button located in valve body for wear and replace if necessary.

(2)—Place adjusting pin roller on pin and lubricate valve body cap gasket. Install valve body cap assembly on valve body. Install the six recessed head screws and star washers in valve body cap. Tighten screws to 20 ft. lbs.

(3)—Lubricate "O" rings on valve assemblies with Lubriplate and install valves as indicated on valve body ports. Install snap rings with beveled edge out. Make sure snap rings are properly seated in grooves. Lubricate the five valve body-to-housing "O" ring seals and locate them in valve body.

(4)—Set worm gear and piston arm to center position. Locate steering tube coupling slot in vertical position and assemble valve body to steering gear housing. Install valve body to housing attaching screws and lockwashers. Tighten screws to 40 ft. lbs.

Spur Gear Adjustment (Unit off Car)—With worm gear and piston arm centered, turn tube coupling slot in vertical position. Install adjusting plate on adjusting pin. Rotate adjusting pin and plate until no backlash is felt at steering tube coupling. Hold lock plate in adjusted position. Install and tighten capscrew to 12 ft. lbs.

STEERING GEAR INSTALLATION

STEERING GEAR ASSEMBLY INSTALLATION: Reverse removal procedures.

HYDRAULIC PUMP OVERHAUL

See "Chrysler, DeSoto, Dodge, Plymouth (Single Rotor) Pump" under "Power Steering Pumps".

CHRYSLER. DE SOTO, DODGE, PLYMOUTH 1954-56 "CO-AXIAL"

Chrysler (1954-56)
DeSoto (1954-56)
Dodge (1954-56)
Plymouth (1954-56)

►CHANGES & CORRECTIONS

►*GEARSHAFT PRODUCTION CHANGE & ADJUSTMENT CAUTION:* Early cars (prior to approximately Jan. 1955) have a gearshaft with teeth having **unequal widths.** Later cars, have a gearshaft with teeth of **equal width.** The later type shaft is identified by a "O" stamped on the steering arm end of the shaft, and is adjusted in a different manner than the early type shaft.

►*1955 POWER STEERING PISTON PRODUCTION CHANGE:* Effective production March 18, 1955 a new type piston has been used. New piston has a narrow ring groove, a "D" type ring seal, Part No. 1634561, and eliminates the use of a steel ring. Kit, Part No. 1692656, is available to service earlier type piston with "L" type piston ring and steel ring. New "D" type seal should be used to correct a "lack of feel" condition.

►*1955 DODGE JERKY OPERATION OF POWER STEERING GEAR CORRECTION:* After generator drive belt has been adjusted (See Generator on Car Page), adjust fan drive belt so that a maximum of 1/4" deflection is obtained when applying a 10 lb. pull with spring scale at middle of widest belt span.

► *1955 CHRYSLER, DE SOTO, DODGE, PLYMOUTH CO-AXIAL STEERING GEAR PRODUCTION CHANGE & OVERHAUL CAUTION:* On later steering gears, a new "D" section rubber piston ring seal without metal spacer or backing ring was used with a new piston as listed below. This ring replaced original "L" section ring seal which must not be used at any time. New "D" section piston ring seals can be used with original piston if installed as follows:

"D" Section Piston Ring Seal Installation (On Original Piston) – Remove old "L" section piston ring seals and metal spacer or backing rings from piston, discard the "L" type neoprene rings. Install new "D" section rings on original piston, then install original metal spacer rings behind "D" rings (toward center of piston). *NOTE* - If necessary to replace the original metal spacer rings, use Assembly No. 1692657 (contains "D" rings and metal spacers).

Co-axial Power Steering Piston Assy.

Part	New Part No.	Old Part No.
Power Piston	1639169	1554388
"D" Sect. Ring Seal	1618789	1531420

► *1956 POWER STEERING GEAR WORM NUT PRODUCTION CHANGE:* A new worm nut, Part No. 1673971 having a hexagonal shape and a built-in staking collar is being used on steering gears identified by the date 12-15-55 or later stenciled on housing side of flange, where upper housing bolts to lower housing. The present tool, C-3320 can be modified to accomodate both early and later type nuts by removing the two opposing lugs.

DESCRIPTION

Components of this system have been fitted into an elongated, tubular-shaped housing, concentrically located about the axis of the steering column. Unit fastens to steering column at underside of instrument panel and extends down through firewall to a bracket bolted to top of frame, System incorporates a worm and worm connector and a rack and sector gear. Worm and worm connector acts in a manner similar to a bolt and nut assembly with left hand threads. Rotation of the worm causes linear (axial) motion of the worm connector. Fastened to worm connector, in succession, are an upper piston rod, piston, and a lower piston rod, all concentric to the steering column axis. A rack, machined in the lower portion of the lower piston rod, meshes with a sector gear. This combination produces rotation of the steering gear arm, actuating steering linkage. The conventional system of steering linkage is used. Hydraulic elements of the system include:

Hydraulic Power Mechanism—Consists of a double-acting piston, a spool valve (which fits inside the piston), and an hydraulic reaction chamber (which gives the driver the "feel" of the road). Axial positioning of the valve directs high pressure oil to one side or the other of the double-acting piston. At the same time, valve movement opens an oil return line which carries oil from low pressure side of the piston to the oil reservoir. The direction of oil flow (which depends on direction of steering wheel rotation) is such that hydraulic force is added to the driver's effort and is transmitted through the rack and sector gear to the steering gear arm.

Pump and Reservoir Assembly—Consists of generator driven oil pump with pressure relief valve and flow control valve, and a filter with oil reservoir. Flow control valve limits oil flow to a predetermined maximum (2 gallons per minute) and thus holds the horsepower required to drive the oil pump to a minimum.

ADJUSTMENT

SELECTOR LEVER & TRANSMISSION SHAFT LINKAGE: Loosen gear shift rod lever clamp bolt. Position selector lever in low or reverse, then holding the gear shift rod lever and spacer flush against gear housing, tighten nut. Place selector lever pointer lever in neutral position on indicator dial at top of steering column. Disconnect gearshift control rod at bellcrank on transmission. Make sure manual control lever (at the transmission) is in neutral position (second detent position from rear of vehicle). With selector lever pointer still in neutral position, adjust the gearshift control rod to the required length for a free fit in the lever of the bellcrank, then reinstall rod. Operate selector lever through all indicator positions. Road test vehicle.

1954 MODELS

GEAR SHAFT ONLY (UNIT IN VEHICLE): Remove drag link from steering gear arm. One man should be seated in vehicle to turn steering wheel and record positions while the other does the adjusting. Start engine and turn steering wheel from one extreme position to the other, and count the number of turns (this should be approximately 3 3/4 turns). Then, starting with steering wheel setting at one end of the travel, turn it back approximately 1 7/8 turns (center position). The steering gear shaft, when correctly adjusted, will have an arc of no backlash for at least 300° but less than 340° (or 150° either side of center). When making this adjustment, it has been found to be more accurate to turn the gear into a backlash position and adjust gear mesh to a point where backlash disappears. As an aid in establishing the 150° positions of the steering wheel when making the gear shaft adjustment, it is suggested that the clock system be used. In using system 12 o'clock would represent center position and each hour would represent 30°; therefore the 150° position would be at 5 o'clock if steering wheel was turned to right (clockwise). If turned in the opposite direction (counter-clockwise) from 12 o'clock, the 150° point would be at 7 o'clock. With steering gear in centered position, turn steering wheel to 150° (5 o'clock) and adjust, if necessary, into a backlash position. Then, using steering gear arm for checking, reduce backlash to zero at the 150° (5 o'clock) point.

►*CAUTION: When checking for no backlash, use a very light (feather) touch with a slight wrist motion. Greater effort to move the steering gear arm back and forth when checking may result in moving other parts of the gear and give a false sense of true gear shaft to rack clearances. To further aid the sense of touch, a pair of vise grips may be clamped ont the steering gear arm.*

Again with steering gear in centered position, turn the steering wheel in the opposite direction (counter-clockwise) past the 150° (7 o'clock) point into backlash position. Then turning the steering wheel back slowly toward center and using steering gear arm, check for point at which backlash disappears. If it disappears at the 150° (7 o'clock) point, the steering gear is properly centered and adjusted to the center of no backlash arc. If backlash did not disappear until after the 150° (7 o'clock) point, the steering gear is too loose and gear not properly centered to no backlash arc. To center a gear in this condition with the center of no backlash arc, the jacket and shroud assembly will have to be removed and position of tube coupling on worm shaft changed as follows: Turn coupling back to center position. Then divide the difference of 60 (2 hours 7 to 9) in half, which would be 30° (1 hour). Since the shorter distance of no backlash travel was in a counter-clockwise direction, remove coupling from worm shaft and turn it clockwise 30 (1 hour) so that when reinstalled the slot in the coupling will be 1 o'clock. Then turn coupling to 12 o'clock and gear will be centered to center of no backlash arc. Again starting from center, turn the coupling to 150° (5 o'clock) and adjust into a backlash position. Then, using steering gear arm for checking, reduce backlash to zero at the 150° (5 o'clock) point.

►*CAUTION: Too loose adjustment will result in free play and a noisy gear. Too tight an adjustment will affect recoverability and will cause excessive wear of the gear teeth.*

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Recheck adjustment by turning coupling counter-clockwise past the 150 (7 o'clock) point in the backlash position. Turn coupling back slowly toward center and backlash will disappear at the 150° (7 o'clock) point if coupling was properly centered to center of no backlash arc. (NOTE–If backlash had disappeared at 6 o'clock instead of 7 o'clock it would have indicated 330 of no backlash arc, which is permissible, and position of coupling would not necessarily have to be changed. Should it be desired that the position be changed, make sure that slot in coupling, when installed, is relative to the center of no backlash arc and not the overall travel (3 3/4 turns of the steering gear). When adjustment is completed, stop engine and tighten adjusting screw locknut to 40 ft. lbs. torque. Install drag link to steering gear arm and tighten nut to 45-75 ft. lbs. torque. Check centered position of steering wheel with straight-ahead position of front wheel. If not centered properly, correct by adjusting tie rod ends.

CONTROL VALVE: *CAUTION–Since considerable effort is involved in adjusting the control valve, it is sugg sted that it be c rtain that the difficulty lies within th c ntr l valv before making the adjustment. If diagnosis indicates that gear assembly is not cent red hydraulically, and all other possibilities hav been check d, th n pr ceed as follows:*

1) Remove steering gear assembly (See "Removal & Installation").

2) Remove worm housing filler plug and drain lubricant through filler hole. Attach holding fixture C-3323 to unit and place in vise. Remove tube coupling screw, lockwasher and washer from center of coupling. Using tool C-3392, remove coupling from worm shaft. *(NOTE*–Tool C-3112 may also be used to remove coupling. However, to accomplish this, necessitates the cutting of one adapter plate SP-1409 in half and using the two pieces instead of the two plates). Remove worm housing oil seal.

3) Unlock bearing adjusting nut by bending tang of lockwasher. (NOTE–Only one tang locks nut in position). Place tool C-3320 over worm shaft followed by C-3319. Holding worm stationary remove worm bearing adjusting nut, lockwasher and thrust washer. Remove worm outer bearing race and bearing roller from worm. Remove the three worm-to-gear housing screws and belleville washers. (NOTE–Concave side of washers are against housing when installed). Remove worm housing and "O" ring.

►*CAUTION: Do n t b ttom worm shaft in the outward dir cti n when rem ving or installing. Bottoming th w rm shaft may damage the ball guides which w uld result in a tight r r ugh operating worm.*

4) Remove the two worm connector ball guide clamp screws and lockwashers. Remove guide clamp. Using care not to lose any of the worm balls, carefully remove ball guide from the worm connector.

►*CAUTION: Balls us d in w rm c nn ct r are a s lect fit with ach oth r. If any ar lost or damaged, it is rec mmended that a compl t s t (40) be install d.*

5) Turn worm connector over and carefully thread the remaining worm balls out of the worm connector by turning the worm in and out. Remove worm from connector.

►*CAUTION: If h using h ad has becom s parated from gear housing, make sure the "O" ring is in position between housing head and gear housing.*

6) Secure housing head to gear housing by guiding tool C-3324 (Dummy Housing) over rails on worm connector until it is flush with gear housing. Install the three washers and screws, draw down evenly and tighten to 25-30 ft. lbs. torque.

7) Secure steering gear arm from stock or remove the one from vehicle. Install steering gear arm, lockwasher and nut. Tighten nut to 30-40 ft. lbs. torque. Install the 3/4" hose adapter fitting in the return outlet of the gear housing. Connect return hose (large diameter) C-3318 to the 3/4" adapter fitting. Connect small end of C-3211 hose to the 5/16" adapter (pressure) in gear housing. Install pressure gauge C-3309 in pressure side of pump. Connect the pressure hose C-3211 to fitting at the shut off valve. Connect the return hose C-3318 to reservoir and tighten all fittings. Thoroughly clean the outside of the reservoir and remove cover or filler cap.

8) To maintain oil in the reservoir to normal level while hydraulically centering the steering, add sufficient oil over and above the normal oil level of the reservoir to approximate the volume in the test hoses.

9) Open the shut off valve at the gauge and start engine. Allow engine to operate long enough for pump to circulate oil through steering gear assembly and test hoses.

10) Place alignment cap and dial SP-2619, which is part of tool C-3325, over worm connector and lock in position by tightening thumb screw. Insert extension rod SP-2621 through alignment cap and over valve adjusting rod in bottom of worm connector. Tap extension rod lightly so that it is a tight fit on valve adjusting rod. Position adjusting handle SP-2620 on extension rod so there is approximately 1/16" clearance between handle and alignment cap, then lock in place by tightening set screw in handle Adjust valve by turning handle until the pump pressure registered on the gauge is at a minimum.

►*CAUTION: Do not apply heavy pressure on the adjusting tool as valve rod may twist off in assembly.*

11) Carefully rotate valve adjusting handle SP-2620 to the right until the piston bottoms in the gear housing. Then, rotate valve adjusting handle to the left until the piston bottoms in the opposite direction. Repeat the rotation of the valve adjusting handle first to the right and then to the left until piston bottoms each time. This operation purges the air from the gear housing.

12) Check the oil level in the reservoir and refill to the required level.

13) With engine idling, close the shut off valve and check pump pressure. The gauge should read approximately 750 psi. **Open shut off valve.**

Cent ring Contr l Valv –Turn valve adjusting handle SP-2620 until the steering gear arm reaches approximately the center of its travel and minimum pressure is again noted *(CAUTION–Adjust the gear shaft into a backlash condition at center of gear travel. Make sure that xtension rod and tool handle fit tight on the adjusting rod. Turn valve adjusting handle in on direction until the st ering gear arm just starts to move. Note degree of valve adjusting handle on dial. Then, without removing handle, turn it in the opposite direction until steering gear arm starts to move at the same rate of speed in the opposite direction and again note the degree of valve adjusting handle on dial. Next, turn valve adjusting handle to center of the degrees required to move arm in both directions. Recheck to make sure adjustment is correct).* Stop engine, remove valve adjusting handle, extension and alignment cap. *(CAUTION–Do not change position of valve adjusting rod when removing tool. Do not disconnect test hoses at this time).* Remove the three screws from tool C-3324 (Dummy Housing), and carefully slide tool from worm connector assembly.

Required Re-Assembly Operations After Adjusting Control Valve–Insert worm shaft into connector and visually align the **upper** portion of the spiral grooves with the ball guide holes. Insert 30 balls into lower hole by tapping them gently (use rubber end of a lead pencil or similar object) while slightly oscillating the worm. *(NOTE*–When the 30 have been inserted, they should be visible in the other hole). Place the remaining balls (10) in either half of the worm connector ball guide. Grease end balls to help hold them in place and add other half of ball guide assembly. Insert assembly into holes until it seats on worm connector. Place ball guide clamp into position on ball guide and install the two lockwashers and screws. Tighten to 10-12 ft. lbs. torque. Check operation of worm making sure it is free to oscillate. Caution should be exercised not to bottom worm in the outward direction, otherwise damage to the ball return guide may result and cause a rough or tight operating worm. Lubricate worm connector rails with Lubriplate. Lubricate housing head "O" ring with Lubriplate and install on housing head pilot opposite piston side. Drop inner bearing into housing and hold in place, rotate connector so ball guide is in downward position and pilot worm housing over rails on worm connector until flush with gear housing.

►*CAUTION: Worm housing cannot be installed if bearing is installed on worm shaft prior to installing housing.*

Install the three screws and belleville washers, draw down evenly and tighten to 25-30 ft. lbs. torque. Lubricate worm outer bearing roller with Lubriplate and install in bearing cup. Slide thrust washer over worm and against outer bearing race and follow with worm bearing nut lockwasher. Turn worm shaft out until lower race seats in bearing. Install worm housing bearing adjusting nut (tapered end first). Place tool C-3320 over worm shaft followed by tool C-3319. Then using tool C-3319, with a torque wrench, turn worm shaft in a clockwise direction to 20 ft. lbs. torque against inner bearing. While holding worm shaft at this point against inner bearing, use tool C-3320 with another torque wrench and tighten adjusting nut to 15 ft. lbs. torque. Rotate worm shaft

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several times to insure proper seating of bearings. Next, loosen adjusting nut and again using tool C-3319 with torque wrench, hold shaft at 5 ft. lbs. torque (clockwise direction) against inner bearing and retighten adjusting nut to **5 inch pounds torque.** Lock adjusting nut in position by bending tang of lockwasher to index with slot in the nut. (NOTE–Only one tang needed to lock adjusting nut).

►*CAUTION: Too loose adjustment will result in free play before steering is accomplished. Too tight an adjustment will result in erratic steering and lack of returnability.*

Using driver C-3317, drive worm housing oil seal (lip of seal in) until it is seated against worm housing. Add 18 ounces of SAE-10W oil to the worm housing through worm bearing filler hole. Keep gear assembly in a level position to facilitate filling. Install worm housing filler plug and tighten to **50 inch pounds torque.**

►*CAUTION: It is very important that the worm housing be filled since there is no hydraulic connection between the worm and gear housings.*

CENTERING STEERING TUBE COUPLING & ADJUSTING BACKLASH BETWEEN GEAR SHAFT & RACK TEETH: With unit off car, turn worm shaft from one extreme of its travel to the other and count the number of turns; this should be approximately 3 3/4 turns. Then starting with the worm shaft setting at one end of travel, turn it back 1 7/8 turns (approximately center position). With steering gear centered as above, install the tube coupling with the slot in a vertical plane in the installed position of the gear assembly. **Do not install screw and washer at this time.** Then proceed as for adjustment of "Gear Shaft Only (Unit in Vehicle)" above noting the following:

1) Slot in coupling, when installed, must be relative to the center of no backlash arc and not the overall travel (3 3/4 turns of the steering gear). If installed incorrectly, and the steering gear is installed in vehicle, the jacket and shroud assembly will have to be removed in order to correct.

2) When adjustment completed, stop engine and tighten adjusting screw locknut to 40 ft. lbs. torque. Install coupling screw and lockwasher and tighten to 15-20 ft. lbs. torque.

3) Disconnect C-3211 and C-3318 hoses and remove adapters from gear housing. Install pressure hose connector and gasket, tighten to 18-22 ft. lbs. torque. Install return hose connector and copper gasket, tighten to 25-30 ft. lbs. torque. Cap fittings to prevent loss of oil.

4) Remove steering gear arm (to permit installation of unit in vehicle).

5) Remove holding fixture C-3323.

6) Refer to "Required Re-Assembly Operations After Adjusting Control Valve" above.

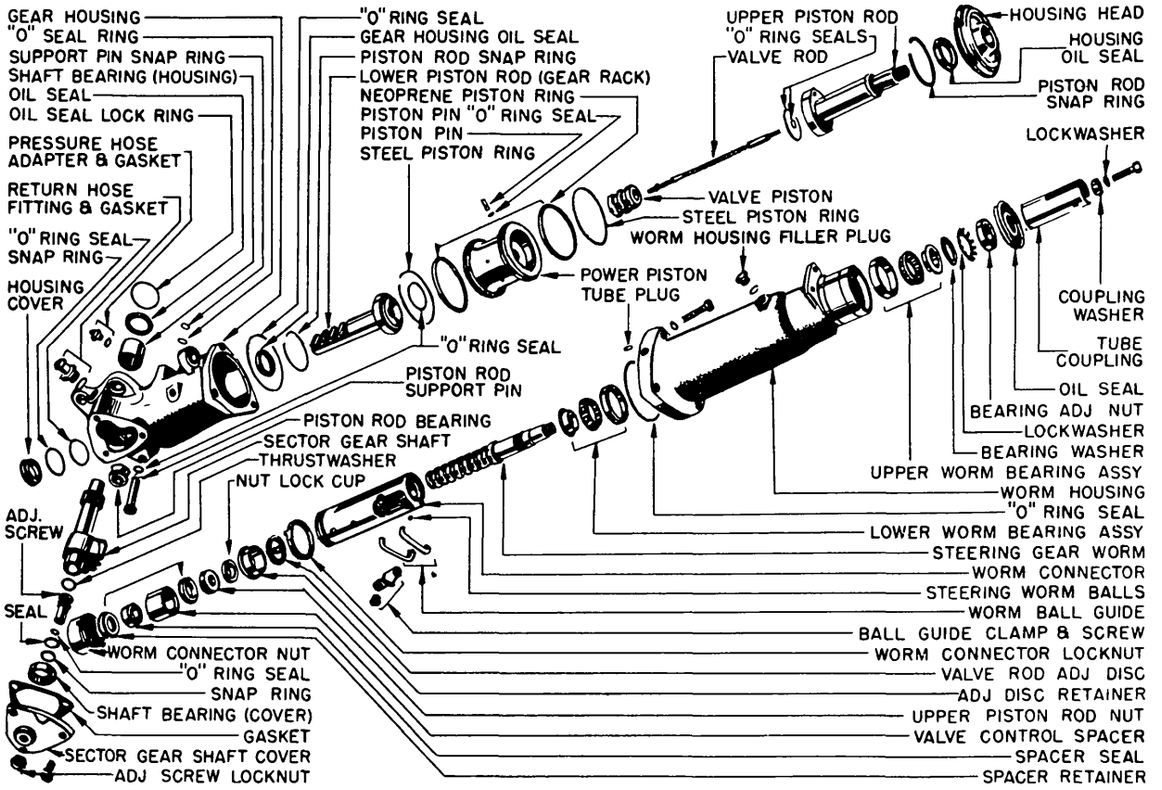
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GEARSHAFT ADJUSTMENT: *(Early 1955 Cars - See Production Change & Adjustment Caution above)* - Check steering for being properly centered by turning the coupling in each direction from center. Pitman arm backlash should become evident at equal distances in both directions when turning from center. It may be necessary to reposition the coupling to obtain equal travel in both directions in which case it will be necessary to readjust pitman arm backlash.

GEARSHAFT ADJUSTMENT: *(Late 1955 & 1956 Cars - See Production Change & Adjustment Caution above)* - Center the steering tube coupling or steering wheel to the overall travel of the steering gear. With gear in center position, loosen adjustment screw in end of shaft opposite pitman arm until there is some backlash. Slowly turn adjusting nut in until the backlash disappears. **Turn the adjusting screw in ¼ of a turn and lock in position.** *CAUTION - Use a very light touch on steering wheel when checking for backlash.*

►*1955 LATER TYPE GEARSHAFT INSTALLATION ON EARLY MODELS WITH FIRST TYPE GEARSHAFT:* Later type gearshaft can be installed on early cars without changing the lower piston rod. If new shaft is used, the later type adjustment must also be used.

►*IDENTIFICATION OF EARLY 1955 CARS WITH LATER TYPE GEARSHAFT (Installed in field):* If difficulty is experienced in adjusting the gearshaft on early cars, the following check may be made to determine if later type gearshaft installed. Center steering wheel and tighten adjusting screw until a small amount of backlash is felt, then turn coupling or wheel to either extreme limit. If backlash increases, it is the early type gearshaft.



1954-56 CHRYSLER & DE SOTO "CO-AXIAL" POWER STEERING GEAR

Installing Coupling at Center: Install steering tube coupling with slot in coupling in the vertical plane. There are no master serrations on either worm shaft or the coupling. A mark is scribed on the coupling which must be set at 12 o'clock when the steering worm shaft is at center so that the steering tube master serration will be in position to allow for proper installation of steering wheel.

MANUAL CONTROL VALVE NEUTRAL POSITION ADJUSTMENT (Power Steering Unit Removed): With unit secured in a vise or suitable fixture, connect test hoses to hydraulic pump on car and to steering assembly. Remove oil reservoir cover. Start engine and operate at idle. Fill reservoir to level mark and allow system to warm up *(CAUTION–Oil level must be maintained above filter while hydraulically centering valve).* Insert manual control valve centering tool C-3445 (slotted end first) into worm shaft and engage slot in tool with tang on control valve operating rod (tool can be rotated by using a tap wrench). *If pitman arm moves to one extreme or the other and stays there, rotate tool in either direction until arm starts to move. Slightly rotate tool in opposite direction until arm stops moving.* Install a 1 7/16" socket on a torque wrench and place on pitman arm retaining nut. Rotate gear

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shaft in both directions from one extreme to the other The torque required should be the same in both directions Where torque is higher in one direction than in the opposite, rotate the valve adjusting tool slightly in the opposite direction to the direction in which the pitman arm has the highest torque reading *(Change valve position in slight variations to prevent over adjusting).* When torque is the same in both directions, remove tool

MANUAL CONTROL VALVE NEUTRAL POSITION ADJUSTMENT (P w r St ring Unit in Car): *(NOTE–Th following proc dur can be used when it is difficult to rotat th st ring wheel in one direct ion but not in th oth r, or wh r the wheels turn of their own accord. B for proc ding with the adjustment, make sur that un qual tir pressure is not the cause of steering whe l turning hard in one direction).* Remove all parts, as necessary to gain access to steering tube coupling Remove coupling retaining screw, lockwasher and plain washer from worn shaft Insert manual control valve centering tool C-3445, slotted end first into worm shaft and engage tool with tang on control valve operating rod. *(NOTE–*Two men are required to center the valve). Move pitman arm through its travel from one direction to the other with a torque wrench and a 1 7/16" socket, observing the torque reading The torque should be the same in both directions. Turn adjusting rod as required until an equal torque reading is obtained *(NOTE–*Where gearshaft requires more than 40 ft. lbs to rotate it, or where torque is uneven at any point through the full shaft travel, check for cocked gear shaft cover, dirt in unit, or recirculating balls are defective or improperly installed)

ALL MODELS

PUMP DRIVE BELT ADJUSTMENT: Sufficiently tight to prevent slipping.

HYDRAULIC PRESSURE TEST

Connect Gauge C-3309 in pressure line between pump and hose Refill reservoir to proper level Open valve on gauge, start engine, and run until power steering oil pump reaches operating temperature With engine at normal operating speed, turn shut-off valve on gauge to its closed position *(CAUTION–Do not keep valve closed mor than a few seconds or accelerate engine with valve clos d)* If pressure does not gradually increase to 700 lbs pressure (Chrysler & DeSoto), 600 lbs pressure (Dodge), 750-800 lbs pressure (Plymouth), it is possibly due to fan belt slipping or flow control valve stuck in the open position, or a broken drive coupling If the above pressures are indicated on the gauge, pump is in operating condition

►*TESTING NOTE–*If gauge not available, a fairly accurate way of making the test is as follows. Start engine and turn the wheel to both extreme positions. If the high pressure hose flexes, the pump is in good condition. If hose does not flex, lack of pressure from pump is indicated. Shut off engine and check pump as indicated below.

PUMP CHECK: Remove cover from reservoir start engine and turn steering wheel If oil does not flow through filter, a stuck flow control valve is indicated Shut off engine Remove high pressure hose at pump fitting and insert a ¼" blunt probe against valve plunger If plunger moves inward 3/16-1/4", plunger was stuck and will probably function properly next time Recheck pressure and if found to be below normal (see above), remove flow control valve and clean thoroughly If this does not correct the condition, remove and repair pump assembly If oil does not flow through reservoir filter in above test, check for broken filter or slipping fan belt Check shaft rotation by hand if coupling found to be broken If shaft turns freely, install new couplings on both pump and generator shaft If pump shaft binds when turned by hand, replace both pump and couplings If armature shaft is damaged, replace necessary parts

TROUBLE SHOOTING

HARD STEERING IN BOTH DIRECTIONS: 1) Leak in steering system, pump belt slipping or broken, fluid level low.
2) Steering gear linkage not lubricated, tire pressure too low, bind in steering column or gear, improper front end alignment.
3) Low pump pressure (see Hydraulic Pressure Test above) with particular attention to following: Relief and flow control valve, rotors (not turning or worn), pump body or cover worn.
4) Loss of pressure in power unit (see Hydraulic Pressure Test above).

SMALLER TURNING RADIUS IN ONE DIRECTION: 1) Wheel stops not adjusted properly.

HYDRAULIC LEAKS: 1) Check for leaks at hose adapters, pump body, between gear and worm housings, and gear shaft oil seal.

HARD STEERING IN ONE DIRECTION ONLY: 1) Tire pressure too low.
2) Control valve maladjusted.
3) Bind in steering column or gear, improper front end alignment.

VEHICLE ATTEMPTS TO TURN UNLESS FORCE APPLIED TO HOLD STEERING WHEEL: 1) Tire pressure uneven.
2) Control valve maladjusted.

POOR RECOVERY ON TURNS: 1) Tire pressure too low, improper front end alignment.
2) Gear shaft adjustment too tight, worm bearing adjustment too tight.
3) Balls in worm connector binding, fit too tight.
4) Bind in steering column or gear, bind in steering knuckles.

NOISE IN CHUCK ASSEMBLY: Check belt adjustment Check for vibrating condition set up by control shaft rod Remove unit and install a new valve rod adjusting disc.

HISSING NOISE (NO LOAD): Caused by low oil pressure or improper operation of back pressure valve

HISSING NOISE (RIGHT TURN ONLY): Caused by oil leaking past lower piston rod gear housing seal

HISSING NOISE & LOSS OF OIL THROUGH UPPER HOUSING VENT (LEFT TURN ONLY): Caused by oil leaking past upper piston rod housing head oil seal

CREAKING NOISE ON TURNS: Check for loose gear-to-frame mounting bolts If noise persists after tightening gear-to-frame bolts, install a new equal tooth sector or gear shaft

SNAPPING NOISE: Tighten gear-to-frame mounting bolts Check coupling screw for tightness. Check lower piston rod bushing dowel pin for being too high. Check bushing for seating properly Check lower piston rod for tight fit at piston

CHUCKLE NOISE: Check as follows Steering arm nut loose on gearshaft Loose front wheel bearing Gearshaft adjustment too loose Excessive kingpin endplay Steering tube coupling screw loose Worm bearing preload adjustment too loose Excessive worm shaft endplay

WANDER (STEERING WHEEL FREEPLAY): Check steering wheel freeplay which should not exceed 5/8" If freeplay excessive (without moving steering linkage), check in same manner as for "Chuckle" above, and also check steering linkage and front wheel alignment.

POOR RETURNABILITY (BOTH DIRECTIONS): Check torque required to turn gearshaft from one extreme to the other with torque wrench on steering gear arm nut (linkage disconnected from steering arm). Torque should not exceed 40 ft. lbs., ± 10 lbs. If torque reading not excessive, check wheel alignment and steering linkage. If torque excessive, check steering column jacket bearing. Check gearshaft adjustment. Check worm shaft bearing preload. Check wormshaft for binding in connector.

POOR RETURNABILITY (ONE DIRECTION ONLY): Check tire pressure. Center control valve (see Adjustment). Check gearshaft adjustment.

UNEQUAL STEERING EFFORT: Check control valve adjustment. Check for upper piston rod movement in piston. Check worm shaft connector nut for tightness. Check control valve rod for looseness in valve. Check upper piston rod nut for looseness. Check upper piston rod for being scored at reaction seal retainer. If the above fails to correct unequal steering effort, replace all reaction parts

UNABLE TO MAINTAIN CONTROL VALVE ADJUSTMENT: This may be caused by reaction spacer being too short or too long, or by burrs or out of squareness. Check valve control rod for looseness in disc, or control valve looseness on rod. Upper piston rod nut may be loose, or upper piston rod may be loose in piston

LACK OF ASSIST(ONE DIRECTION): Check for damaged neoprene piston ring. Check for damaged or improperly seated housing head oil seal. Valve rod lower "O" ring may be damaged, or piston rod "O" rings may be damaged.

LACK OF ASSIST (BOTH DIRECTIONS): Check the following. Low tire pressure. Drive belts slipping. Low oil pressure.

LUBRICATION

Since there is no hydraulic connection between the worm and gear housing, the Power Steering has two separate fluid levels. Lubricate as follows

R s rv ir–Check every 1000 miles or every 30 days. Reservoir is mounted at rear of generator. Make sure top of reservoir is absolutely clean. Then, remove cover or filler cap and check oil level. Oil level

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should be 1/2" above filter element (if reservoir is tilted, oil level should be 1/2" above highest point of filter element). (NOTE—An oil level mark is stamped on the inside of the reservoir or on the dipstick on type using a filler cap). Replenish as necessary with SAE-10W engine oil. When temperatures are constantly below minus (-) 10° F., drain hydraulic system and refill with SAE-5W engine oil (see Draining and Refilling Hydraulic System below). When temperatures are consistently above minus (-) 10° F., drain the lighter lubricant which may have been added and replace with SAE-10W engine oil. Should the vehicle be operated at extremely high temperatures, it may be necessary to drain and replace the SAE-10W oil with SAE-30 oil for the time it is being operated in these extremely high temperatures. NOTE—When temperature is below minus (-) 10° F. run engine for at least three minutes before putting car in motion or turning steering wheel. Capacity is approximately 2 quarts.

Worm Housing—*(NOTE*—It is not necessary to change oil in worm housing due to temperature). Worm housing does not require periodic checks (unless leakage occurs). However, should the steering gear assembly be removed for any reason, it is recommended it be checked at that time. The oil should be level with the filler plug opening when the gear assembly is in an installed position. Replenish as necessary with SAE-10W engine oil.

DRAINING HYDRAULIC SYSTEM: *(CAUTION—Extreme care should be taken to prevent dirt from entering reservoir while cover or filler cap is removed. To prevent damage to filter element, do not insert sharp objects into reversoir. Do not disturb filter element as periodic changes of this unit are not required).* Disconnect high pressure (small) hose at the gear housing and jack up front end of car sufficiently to raise wheels off floor. Place hose in suitable container. While holding hose in container start engine and allow to idle, turn steering wheel from one extreme to the other until all fluid is forced from unit. *(CAUTION—Do not run engine above idle speed. As soon as fluid starts to show great quantities of air bubbles, stop engine).* Reconnect high pressure hose and refill.

REFILLING HYDRAULIC SYSTEM: Bleed steering gear as follows: Fill reservoir slightly higher than normal. Start engine and run for a short time to circulate oil through hoses. With engine running at idle speed, turn steering wheel back and forth several times from extreme right to left to bleed any remaining air out of system. Check oil level in reservoir. Add oil to reach level mark. Capacity is approximately 2 quarts.

REMOVAL & INSTALLATION
1954 MODELS

REMOVAL: Turn steering wheel to extreme left position to allow for removal of steering gear arm and drag link. Remove horn control ring ornament, cushion and spring. Disconnect horn wire and remove steering wheel nut and wheel. (NOTE—Horn control ring and contact plates will have to be removed if puller C-612 used to remove wheel. See below). Remove steering wheel column jacket bearing spring and spacer (cone shaped). Remove three shroud-to-toe board cover screws, then remove cover from the shroud. Remove accelerator and brake pedal pads and floor mat. Remove steering column jacket toe pad screws (6) and slide toe pad up on jacket assembly. Remove floor pan pedal opening cover screws, remove cover. Remove directional signal indicator, horn and selector lever indicator light wires. Disconnect pressure and return hose from steering gear housing and cap fittings.

Steering Wheel & Horn Button Removal (Using Puller C-612): Disconnect battery, center steering wheel in straight-ahead position. Press down on horn blowing ring ornament and turn counter-clockwise. Lift out ornament retaining spring and pad. Disconnect horn wire from terminal on travel plate and insulator assembly. Remove bushing, travel plate, horn blowing contact ring spring and triangular ground plate. Curl and push horn wire into steering gear tube to make room for steering wheel puller pilot. Remove steering wheel nut. Attach puller Tool C-612 and remove wheel.

►*CAUTION: Fasten ends of hose above level of reservoir to prevent further loss of oil.*

Remove cotter pin and disconnect gearshift control rod from gearshift rod lever. Remove steering gear arm nut, then using tool C-143 with short puller screw SP-2623, remove steering gear arm and drag link. Remove access cover in left front fender shield and remove front lever steering gear assembly to bracket screw, washer and spacer (convex). Note position of wedge between bracket and gear housing. Remove front upper and rear steering gear assembly to bracket screws, washers and spacers (convex) through opening in toe board.

►*CAUTION: Do not lose spacers or wedge.*

Holding jacket and shroud assembly in position, remove the two steering column to instrument panel screws.

►*CAUTION: Steering column to instrument panel screw retaining plate and anti-squeak pad may fall from behind instrument panel when screws are removed.*

Lower jacket and shroud assembly, then remove insulator collar. Slightly push the steering gear column jacket and shroud assembly toward passenger side of vehicle (to permit gear shaft to clear frame bracket) and remove assembly through toe board opening. Place assembly on bench, loosen gear shift rod lever nut and slide lever and spacer (oilite) off gear shift rod. Loosen two nuts on the jacket clamp assembly and slide the jacket and shroud assembly from worm housing. (NOTE—Spring and spring seats (2) may fall from gear shift rod when jacket and shroud assembly is removed). Remove steering gear tube insulator pin, then remove tube and insulator from coupling.

INSTALLATION & ALIGNMENT: Center gear to center of no backlash arc (slot in coupling vertical). Place steering gear tube insulator on tube and position tube and insulator (master serration on steering wheel end of tube in "UP" position) in coupling. Install pin. The horn connector which is located on the jacket assembly is spring loaded. Because of this, the contact point will have to be raised to permit clearance with contact ring on steering tube when jacket and shroud assembly is installed. To accomplish this, bend one end of a piece of wire in the shape of a hook to raise contact point, then bend other end over shroud to hold it in raised position while being installed.

►*CAUTION: In some instances it will be necessary to remove lower half of shroud from jacket assembly and remove horn connector from jacket. Install jacket assembly over steering gear tube, then install horn connector on jacket and reassembl .*

Place gear shift rod spring seats in position in spring (flange portions of seats facing to inside of spring), slide spring and seats over gear shift rod. With horn contact held in raised position by piece of wire and holding spring and seats on gear shift rod, slide jacket and shroud assembly over steering gear tube, guiding gear shift rod into bushing on gear housing. Tighten the two nuts on the jacket clamp assembly and remove piece of wire which was used for holding the horn contact point. Install steering gear assembly through toe board opening pushing column jacket and shroud assembly slightly toward passenger side of vehicle to permit gear shaft to clear frame bracket. Install front upper and rear steering gear housing to bracket spacers (convex), screws and washers through opening in floor pan. Tighten (snugly), then back each one off one turn. Position insulator collar on upper shroud and align the jacket and shroud assembly to instrument panel. Install the two screws, tighten securely. Tighten front upper and rear steering gear housing to bracket screws to 70 ft. lbs. torque (ones that were loosened one turn). Install front lower steering gear housing to bracket spacer (convex), washer and screw **but do not tighten.** Tap wedge into position (over front lower gear to bracket screw) and between bracket and gear housing.

►*CAUTION: Make definitely sure wedge is positioned properly. Tap wedge lightly but do not drive.*

With wedge in position, tighten front lower steering gear housing to bracket screw to 70 ft. lbs. torque. Replace access cover in left front fender shield. Install steering gear arm and drag link, tighten steering gear arm nut to 100-120 ft. lbs. torque. Connect direction signal indicator, horn and selector lever indicator light wires. Install steering column jacket bearing spacer (cone shaped) and spring. Install steering wheel, tighten nut securely (install horn contact plates and control ring, if removed) and connect horn wire. Install horn control spring, cushion and ornament. Check clearance between steering wheel and direction signal housing. If clearance is more or less than 1/8" loosen the two column jacket to instrument panel screws slightly, then, loosen the two nuts on the jacket clamp assembly at top

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of worm housing and slide steering column jacket upward or downward to allow for proper clearance. Retighten jacket clamp assembly nuts and column jacket to instrument panel screws. Slide gear shift rod lever spacer (oilite) and lever on rod. Position selector lever in low or reverse, then holding the gear shift rod lever and spacer flush against gear housing, tighten nut.

►*CAUTION Make definitely sure the selector lever remains in the low or reverse position while tightening nut. This procedure necessary to obtain the proper selector lever gate clearances. Check operation by shifting selector lever to all positions.*

Connect gear shift control rod to lever and install cotter pin. Remove the protective caps from fittings in gear housing and connect the pressure and return hoses. Remove reservoir cover or filler cap and fill reservoir to proper level. Start engine and turn steering wheel from one extreme of its travel to the other several times to purge air from system and note operation of steering. If steering seems to operate properly, install the floor pan pedal opening cover and tighten screws securely. Slide the steering column jacket toe pad down into position and install screws (6). Install floor mat, accelerator and brake pedal pads. Place cover on shroud and install screws (3). Recheck oil in reservoir and fill to proper level. Place selector lever pointer in neutral (N) position. Disconnect gear shift control rod at bellcrank located on transmission. Make sure manual control lever (at transmission) is in neutral (N) position (second detent position from rear of vehicle). With selector lever pointer still in neutral (N) position, adjust the gear shift control rod to the required length for a free fit in the lever of the bellcrank, then re-install rod. Operate selector lever through all indicator positions. Road test vehicle.

1955-56 MODELS

REMOVAL: Remove horn ring and ornament from steering wheel. Disconnect horn wire and remove horn ring. Remove steering wheel with puller C-612, and remove signal lever and plate. Loosen steering column to instrument panel bracket. Loosen steering column jacket clamp screws and raise front of car Disengage drag link from pitman arm and pull pitman arm with Tool C-3402. Loosen three gear housing to frame attaching bolts. Remove floor mat retaining plate and rubber dust pad. Disconnect pressure and return hoses and drain gear assembly by slowly rotating steering wheel until all oil is expelled from unit. Fasten disconnected ends of hoses above oil level in reservoir to prevent loss of oil and cap hose ends to prevent dirt entering. Remove gear housing to frame bolts and alignment wedge and remove gear assembly from lower side of car.

Steering Wheel & Horn Button Removal (Using Puller C-612): *See 1954 Removal & Installation.*

INSTALLATION & ALIGNMENT: Install steering gear assembly from under the car and up through the dash panel into the jacket Install housing to frame attaching bolts, flat washers, swivel washers and nuts, but do not tighten (swivel washers permit alignment to dash) Slide steering column jacket down over worm housing. Install turn signal lever, being sure column jacket does not restrict lever Tighten jacket to steering gear housing clamp. Connect turn signal wires. Install steering column to instrument panel bracket and install steering wheel If clearance between steering column jacket and steering wheel is less than 1/8", adjust steering column jacket to provide proper clearance. Install dust pads and retaining plates. Tighten front upper and lower gear housing to frame attaching bolts to 20 ft lbs. Install wedge over rear bolt between housing and frame, so that tapered surfaces match, tapping it lightly in place. Tighten three attaching bolts to 70 ft. lbs Install horn ring and horn wire in steering wheel and install horn ring ornament Connect hoses from steering gear to hydraulic pump

STEERING GEAR OVERHAUL

►*CAUTION* Cleanliness in executing all overhaul procedures cannot be over-emphasized. Unit should be thoroughly cleaned in a suitable solvent when removed from vehicle. When disassembling, each part should be placed in the solvent, washed, then dried with compressed air. Careful handling of parts is necessary to avoid occurrence of nicks and burrs. Crocus cloth may be used to remove small nicks and burrs provided it is used carefully. When used on valve spool, use extreme care not to round off sharp edge portion. (NOTE–Sharp edge portion helps prevent dirt and foreign matter from getting between the valve and bore, thus reducing possibilities of sticking). Remove and discard all "O" ring seals, and seals, using new ones lubricated with Lubriplate when reassembling.

DISASSEMBLY & INSPECTION: Proceed as follows.

Removal of Worm Housing from Gear Housing: 1) Drain lower portion of steering gear through pressure and return connections, by turning steering tube coupling from one extreme of travel to the other. Using a 3/16" allen wrench, remove worm housing filler plug and drain worm (upper) housing.

2) Attach holding fixture C-3323 to unit and place in vise.

3) Remove tube coupling screw, lockwasher, and washer from center of coupling. Using tool C-3392, remove coupling from worm shaft. (NOTE–Tool C-3112 may also be used to remove coupling. However, to accomplish this, it will be necessary to cut one adapter plate SP-1409 in half and using these two parts instead of the two plates).

4) Using extreme care and a screwdriver, remove worm housing oil seal from housing and worm shaft.

5) Unlock bearing adjusting nut by bending tang of lockwasher. (NOTE–Only one tang locks nut in position). Place tool C-3320 over worm shaft followed by C-3319. Holding the worm stationary remove worm bearing adjusting nut, lockwasher, and thrust washer (NOTE–Worm bearing adjusting nut tapered on one side).

6) Remove worm outer bearing race and bearing roller from worm. Inspect bearing roller for wear or pitting.

7) Remove three worm to gear housing screws and belleville washers (Note installed position of washers on screws. Concave side of washers fit against housing). Remove worm housing. (NOTE–It may be necessary to tap housing lightly due to interference of "O" ring seal between housing head and housing

8) Remove inner bearing race from worm shaft and inspect for wear or pits.

9) Remove lower bearing roller from housing. Inspect bearing roller and the upper and lower bearing cups in housing. **Do not remove bearing cups unless inspection reveals it is necessary to do so.** To remove upper and lower bearing cups use tool C-3322.

Removal of Worm Connector: 1) Remove housing head "O" ring and discard (Use new rings when assembling). Unlock worm connector nut lock and slide lock back sufficiently to loosen worm connector nut.

2) With tool C-3321 attached to worm connector, remove connector nut using tool C-3326 (NOTE -It may be necessary to rotate steering gear shaft to raise worm connector and permit installation of tool C-3326).

3) Slide worm connector assembly from valve control spacer.

Disassembly of Worm Connector–*(CAUTION–Do not bottom worm shaft in the outward direction upon disassembly or assembly. Bottoming the worm shaft may damage the ball guides and cause a tight and rough operating worm).*

1) Remove the two worm connector ball guide clamp screws and lockwashers. Remove guide clamp.

2) Using care not to lose any of the worm balls, carefully remove the ball guide from the worm connector. *CAUTION–Worm balls are a select fit with each other. If any of them are damaged and require replacing, it is recommended that a complete set (40) be installed.*

3) Turn worm connector over and carefully thread the remaining worm balls out of the worm connector by turning worm in and out. Count the worm balls which were removed so that the same number can be installed. There should be (40).

4) Remove worm from connector, slide connector nut lock from connector.

5) Inspect guide rails on connector for nicks and burrs.

Removal of Piston & Rods from Gear Housing: 1) Remove pressure and return hose adapters and copper gaskets.

2) Remove steering gear shaft oil seal lock ring (circular section), then, using tool C-3350, remove steering gear shaft oil seal.

3) Remove lock nut from shaft adjusting screw.

4) Remove three cover screws, belleville washers, and neoprene seals.

5) Remove steering gear shaft cover from housing by turning adjusting screw in. Remove cover gasket and discard (use new gasket when reassembling)

6) Using steering arm (if necessary) align steering gear shaft with cover opening in housing. Remove steering gear shaft assembly from gear housing by using a fiber hammer and tapping lightly.

7) Using tool C-3229, remove adjusting screw retaining snap ring. Remove adjusting screw, thrust washer

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and washer from steering gear shaft. Remove adjusting screw "O" ring.

8) Inspect needle bearings in cover for broken needles and inspect bearing surface on shaft for scoring or pitting. *CAUTION–Do not remove bearing from cover as bearing and cover are serviced as an assembly. Inspect condition of teeth on shaft.*

9) Using C-760 pliers remove gear housing cover snap ring (tapered) at bottom of housing, remove housing cover. Remove "O" ring from housing and discard (use new ring on reassembly).

10) Place a suitable container under the assembly (to catch trapped oil), then slide piston assembly and rods from gear housing. *CAUTION–Use extreme care in handling so as not to damage the sealing surfaces on housing head.*

Disassembly of Piston & Rods– 1) Remove valve rod adjusting disc from valve rod, slide valve rod adjusting disc retainer from upper piston rod, remove upper piston rod nut lock cap.

2) Using tool C-3328, remove upper piston rod nut. *CAUTION–Support upper piston rod on block of wood to help prevent damaging housing head when removing nut. Assembly may also be supported by wrapping several layers of masking tape around the rack teeth and sealing surfaces of lower piston rod and clamping it in a vise equipped with protective jaws.*

3) Slide valve control spacer, seal assembly, upper and lower valve control spacer seal retainers from upper piston rod. Remove spacer retainers from spacer, slide seal assembly from valve control spacer.

4) Remove worm connector nut from upper piston rod, slide housing head off upper piston rod. Remove housing head "O" ring and discard (use new ring on reassembly).

5) Using suitable drift, remove upper piston rod seal (lip type) from housing head.

6) Remove two backup (steel) and "D" type (neoprene) piston rings from piston.

7) Using C-760 pliers, remove lower piston rod snap ring and slide lower piston rod from piston.

8) Using care not to bend valve adjusting rod, slide valve assembly from piston assembly.

9) Using a 1/4" punch, drive piston pin into upper piston rod, then using C-760 pliers, remove upper piston rod snap ring. **Note position and construction of snap ring.**

10) Remove upper piston rod from piston. Using a wire hook, remove piston pin and "O" ring from piston rod, discard "O" ring (use new ring on reassembly). Make sure oil passage is open. Inspect sealing surface on piston rod for scoring. Remove the two valve rod "O" rings (one in each end of upper piston rod) remove upper piston rod "O" ring (discard rings, use new rings on reassembly).

11) Remove lower piston rod "O" ring (discard and use new ring on reassembly). Inspect rack teeth and sealing surfaces on lower piston rod. Make sure oil return hole is open.

12) Inspect piston for nicks and burrs. Make sure all oil passages are open and free of dirt.

Removal of Relief Valve Assembly: Thread a ¼"-28 bolt into threads provided in plug. Clamp bolt in vise and pull on lower piston rod to remove plug. If end plug is seized in rod, tap on retaining flange at lower end of piston with a fibre hammer. Inspect piston for nicks and burrs. Make sure all passages are open and free from dirt.

Disassembly of Steering Gear Housing: 1) Using C-3128 pliers, remove piston rod bearing support pin snap ring. Slide bearing support pin out of gear housing and remove roller support assembly. Inspect roller and needle bearings. Inspect bearing support pin for wear or scoring. Remove two bearing support pin "O" rings located in each side of gear housing and discard (use new rings on reassembly).

2) Inspect steering gear shaft needle bearing in gear housing for broken or rough needles. **Do not remove bearing unless inspection reveals it is necessary to do so.**

3) Using driver C-3333, drive steering gear housing shaft needle bearing from inside gear housing. Remove lower piston rod seal (lip type) from housing.

REASSEMBLY & ADJUSTMENT:–Proceed as follows:

Steering Gear Housing: 1) Remove garter spring from a **new** piston rod seal (to prevent being damaged by tool when installing) and position seal over driver C-3331 (position seal so lip will be facing up or to inside of cylinder when installed). Insert seal aligning pilot of tool in end of driver and drive lower piston rod seal into position in gear housing. *CAUTION–Replace garter spring in piston rod seal.*

2) Using driver C-3333, install housing shaft needle bearing assembly into gear housing until driver marking on driver is even with side of housing. *CAUTION–Always drive on letter side of bearing, otherwise damage to bearing may result.*

3) Lubricate the two **new** piston rod bearing support pin "O" rings with Lubriplate and install into gear housing at outer edge of bearing support pin holes. Make sure they are properly seated in housing.

4) Start piston rod bearing support pin through hole in cover side of housing. Place roller support assembly into position in housing and push support pin through roller assembly until it protrudes sufficiently on opposite side of housing to install snap ring. Using C-3128 pliers, install snap ring, making sure it is properly seated.

Piston & Rods 1) Insert relief valve spring followed by plunger into valve body and insert assembly (milled end first) into lower piston rod. Press end plug into lower piston sufficiently to seat against relief valve body (*NOTE*–A suitable adapter will be required to press end plug into place. Otherwise, damage to rod will result. If plug is not pressed in far enough to properly seat against the valve body, it will produce a rattling or clattering sound when hydraulic pressure is applied. If the plug is pressed in too tightly, it will cause relief valve ports in valve body to collapse, restricting the plunger and creating high back pressure, resulting in lack of steering assistance). Lubricate the two **new** valve rod "O" rings with Lubriplate and install one in each end of piston rod. Make sure the rings are seated properly.

2) Lubricate the two **new** large "O" rings with Lubriplate and install one on each upper and lower piston rod. Make sure rings seat properly in ring grooves.

3) Install lower piston rod (with rack) into end of piston assembly opposite piston pin hole and using C-760 pliers, install snap ring. *CAUTION–When installing snap ring, minimum gap opening of 25/64" is specified. Care should be exercised to locate the gap at the middle ports of the five ports without obstructing the middle port or adjacent ports with snap ring ends. Make sure snap ring is seated properly.*

4) Lubricate valve assembly with Lubriplate and slide into piston assembly. Using care not to damage "O" rings, slide upper piston rod over valve rod, aligning piston pin hole in the piston assembly with the hole in the upper piston rod.

5) Lubricate **new** piston pin "O" ring with Lubriplate and install on piston pin. With piston pin holes aligned in both the piston and upper piston rod, position piston pin (tapered end first) in piston. Using a 1/4" punch and hammer, tap lightly until piston pin is flush with bottom of piston pin groove. Using C-760 pliers, install upper piston rod snap ring. *See CAUTION under 3) above.*

6) Remove garter spring from a **new** upper piston rod seal (to prevent being damaged when installing seal) and position seal on driver C-3331 (lip of seal facing tool). Insert seal aligning pilot of tool in end of driver. Drive upper piston rod seal (lip of seal out) into position in housing head. Replace garter spring and lubricate seal with Lubriplate. Install housing head assembly (sealing lip first) onto upper piston rod. *CAUTION– Use extreme care to protect sealing surfaces on housing head.*

7) Slide connector nut onto upper piston rod with open threaded end away from piston.

8) Lubricate the valve control spacer seal (new) with Lubriplate and install in center of valve control spacer. *CAUTION–Should it be necessary to replace the valve control spacer or upper piston rod for any reason, always select a spacer to match. The length of the valve control spacer selected, must be identical to the distance between the seat of the valve control spacer seal retainer and the seated upper piston rod nut.*

9) Slide one of the valve control spacer retainers (large diameter first) on upper piston rod. Lubricate with Lubriplate. Place tool C-3329 over threaded end of upper piston rod. Lubricate the valve control spacer retainer with Lubriplate and place into posi-

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tion (small diameter first) so it nests in valve control spacer. Slide spacer, seal and retainer over tool C-3329 and into position on piston rod, remove tool.

10) Install upper piston rod nut and using tool C-3328, tighten securely (25-30 ft. lbs. torque). Lock in place using piston rod nut lock by tapping outer diameter of lock into nut recess.

11) Slide valve rod adjusting disc retainer (largest diameter first) over end of upper piston rod. Thread valve rod disc (extended lock thread section being outward) onto valve rod until approximately three threads show (for aid in later adjustment).

12) Place lock ring on worm connector (tang of ring toward threaded end). Slide worm connector (less ball bearings and worm shaft) over valve control spacer, then screw worm connector nut onto connector. Hold worm connector with tool C-3321, then using tool C-3326, tighten nut. Stake ring with punch.

13) Lubricate the two "D" type (neoprene) piston rings with Lubriplate and install on piston. To aid in installation of rings, first slide rings over ring lands and to center of piston with lips facing away from each other. Next, slide rings into position in ring lands. Install backup (steel) rings one on each end of the piston, in extreme position from the center of the piston.

Installation of Piston & Rod Assembly into Gear Housing: 1) Lubricate lower piston rod, teeth of rack and tool C-3391 with Lubriplate, then position tool in teeth of rack.

2) Place ring compressing tool C-3344 on gear housing. Position piston and rod assembly so teeth on rack are 180° from roller support assembly and install into gear housing. *CAUTION–Use extreme care when performing this operation so as not to damage gear housing oil seal or piston rings. Do not use screwdriver to compress piston rings. To further aid in installation, piston and cylinder may be lubricated with Lubriplate. If rack is not positioned properly when it is installed, it may be corrected by rotating the lower piston rod with a screwdriver through opening in end of gear housing.* Remove ring compressing tool C-3344, and tool C-3391 from teeth of rack through opening in gear housing.

3) Lubricate large new "O" ring with Lubriplate and install on the side of housing head which faces piston assembly.

4) Carefully slide tool C-3324 (dummy housing) over worm connector and secure housing head to gear housing, tighten the three screws to 25-30 ft. lbs torque.

5) Install thrust washer on gear shaft adjusting screw and position tool C-3401 over thread of screw. Lubricate adjusting screw "O" ring with Lubriplate and slide over tool and into position on adjusting screw. Remove tool and insert adjusting screw thrust washer into gear end of steering gear shaft. Insert adjusting screw assembly into gear shaft and lock into position by inserting internal snap ring. Use C-3229 pliers and make sure snap ring is properly seated. Screw shaft adjusting screw with gear attached into the gear shaft cover assembly as far as possible.

6) Center the second tooth of the rack over center line of piston rod bearing support pin.

7) Lubricate a **new** gear shaft cover gasket with Lubriplate (to help hold it in place) and position it on cover of housing.

8) Center the center line of the middle tooth on gear shaft with second tooth **space** from end of rack. Insert gear shaft assembly with cover attached into gear housing, tap lightly into position. Place belleville washers and new seals on screws and secure cover to gear housing. Draw down evenly and tighten to 25-30 ft. lbs. torque.

9) Lubricate **new** gear housing cover "O" ring with Lubriplate and install on housing cover. Push assembly (seal end first) into housing and install snap ring.

10) Before attempting to install a **new** seal, thoroughly clean sealing surface on the gear shaft and counterbore of steering gear housing. Lubricate a **new** steering gear shaft oil seal with Lubriplate and place (lip of seal down) on a piece of clean paper. **Carefully** install tapered end of sleeve (part of tool C-3350) in seal and slide seal back approximately 1/4" on sleeve. Install this assembly (lip of seal toward housing) over steering gear shaft until seal contacts counterbore in housing. Push seal into position by installing adapter over sleeve, and installing coupling nut on shaft threads until shoulder of adapter contacts housing. Remove nut and adapter. Wrap a new piece of friction tape around sleeve to provide a firm grip and with a turning motion, remove sleeve from seal and gear shaft. Seal is then positioned properly. Install oil seal lock ring (circular section) and make sure it is properly seated. Install gear shaft adjusting screw lock nut, but do not tighten.

11) Secure steering gear arm from stock or remove one from vehicle. Install steering gear arm, lockwasher and nut, and tighten nut from 30-40 ft. lbs. torque (low torque reading for checking purposes only). Work steering arm back and forth forcing piston to its full length of travel. Adjust gear, if necessary, into a backlash position, then tighten lock nut.

CAUTION–This adjustment necessary before hydraulically centering gear assembly and is not to be considered a final adjustment.

12) Proceed as indicated under steps **7)** through **13),** Centering Control Valve, and Required Re-Assembly Operations After Adjusting Control Valve, outlined under "Control Valve" in ADJUSTMENT section above.

13) For final gear adjustment proceed as outlined under "Centering Steering Tube Coupling & Adjusting Backlash Between Gear Shaft & Rack Teeth" in ADJUSTMENT section above.

HYDRAULIC PUMP

►*PUMP COUPLING NOTE:* Two different types of pump drive coupling have been used and special Pump and Generator must be used with each type coupling (special shaft used with each coupling).

1) Rubber Insulated Coupling–Oilite coupling flanges are pressed on generator and pump shafts and retained by special "thread locking" type capscrew and **plain** washer (lockwashers should not be used with these screws). A rubber insulator and insulator sleeve are installed between the coupling flanges to transmit the drive.

2) Metal Tongue Coupling–Tongue-and-slot type metal coupling. Coupling members are retained on shaft ends by a retaining ring and slide off after ring removed.

PUMP OVERHAUL: *See "Chrysler, DeSoto, Dodge, Plymouth (Single Motor)' under "Power Steering Pumps".*

CHRYSLER. DE SOTO, DODGE, PLYMOUTH 1957 "CO-AXIAL"

Chrysler, Imperial, De Soto, Dodge, Plymouth (1957)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 CHRYSLER NOISY FAN BELT OPERATION CORRECTION:* This noisy condition may be caused by a stuck flow control valve in the power steering pump. Check pump pressure with engine operating at 1200 RPM. If pressure is greater than 950 lbs., replace the pump. DO NOT attempt to recondition the pump.

►*DODGE SELF-STEERING TO RIGHT CORRECTION* Adjust power steering gear control valve. If condition is not corrected, it may be caused by fluid leaking by the valve adjusting rod upper "O" ring seal or the reaction seal. See "Overhaul" below for correction.

►*1957 DESOTO POWER STEERING PUMP PRODUCTION CHANGE:* A new power steering pump, Part No. 182-6158, identified by the convex shape of the pulley, replaces Part No. 1730892, beginning with Car Serial Nos. S-25-55337661, S-26-50399739, S-27-58003300. The new pulley used with the later type pump is not interchangeable with the earlier pump. The later type pump will be furnished for service replacement.

►*PUMP PULLEY LOOSENESS CORRECTION:* If the pump pulley is loose and pulley attaching capscrew is tight, replace the washer with Part No. 567331.

DESCRIPTION: Design is similar to power steering gear used on 1954-56 models, however, changes have been made in the lower housing, power piston rings, and in worm shaft bearing assemblies.

ADJUSTMENT: *(NOTE - Three adjustments as follows, can be made without removing steering gear from the car. Make adjustments in the sequence indicated).* Remove steering wheel (see below), steering column jacket and tube. Remove tube coupling bolt and washer from center of coupling, then using Tool C-3392, remove coupling from worm shaft and remove worm housing seal. Remove steering drag link from steering gear arm. Back off gear lash adjusting screw until lash is maximum. Proceed as follows:

Worm Shaft Bearing Adjustment: Slide Tool C-3320A over adjusting nut, and Tool C-3319 on splines of worm shaft with sufficient space between tools to lift Tool C-3320A off the adjusting nut. Turn steering gear to full left and hold in this position with a ft. lb. torque wrench. Attach torque wrench C-3380 to Tool C-3320A in an "in-line" position *(NOTE - Tool C-3380 is a special inch-pound torque wrench having a special extension adapter).* While holding 5 ft. lbs. tension (toward left), loosen nut with small wrench and then adjust to exactly 5 inch-pounds on Tool C-3380. Remove tools with caution to prevent moving adjusting nut and crimp ring section of adjusting nut into keyway in worm shaft. Install worm housing seal.

Piston Valve Adjustment: Start engine and run at medium idle speed. Allow gear to reach normal operating temperature. Attach a small tap handle to flat on end of Tool C-3445, then insert tool through the worm shaft over end of piston valve rod. With a ft. lb. torque wrench on the steering arm nut, read tension while turning steering gear to full right and left. Wrench movement should be smooth. Turn piston valve in the direction necessary to obtain the same torque reading in both directions. Torque reading must be equal and under 40 ft. lbs. If torque reading is equal at less than 25 ft. lbs., a more accurate reading can be made using a 300 inch-pound torque wrench.

Gear Lash Adjustment: With engine running and steering gear at normal operating temperature, turn steering gear to straight ahead position. Using a very light finger tip touch at end of steering gear arm turn gear shaft adjusting screw clockwise until all gear lash has been eliminated. **Turn adjusting screw ¾ turn tighter (clockwise) and tighten locknut.** Stop engine and install worm housing oil seal (with lip of seal down). With gear still in the straight ahead position, install coupling on worm shaft with slot in an up-and-down position. Install drag link on steering gear arm, then install steering tube, steering wheel, etc.

Pump Drive Belt Adjustment: Adjust as follows:

Chrysler & Imperial (Early Cars) - Loosen pivot and adjusting slot bolts, then using a lever between pump and engine, tighten belts so that deflection on one of the belts is 3/8" with a 5 lb. force applied midway between fan and pump pulleys. Tighten pivot bolt first, then tighten adjusting slot bolt.

Chrysler & Imperial (Later Cars) - A square hole is provided in pump bracket to permit using a torque wrench for adjusting belt tension. Loosen pivot and adjusting slot bolts, then insert torque wrench in square hole and apply a 90 lb. torque. Tighten pivot bolt first, then tighten adjusting slot bolt.

DeSoto.- 3/16" belt deflection with a 5 lb. force applied midway between fan and pump pulleys.

Dodge - 1/8" (new belt), ¼" (used belt) deflection of belt measured midway between crankshaft and pump pulleys.

Plymouth V8 - A 20 ft. lb. torque should be required to slip pump pulley on belt with torque wrench applied to pump pulley attaching bolt.

LUBRICATION: Check fluid level in reservoir every 1000 miles or every 30 day. Maintain level of fluid to "Full" mark on reservoir using Automatic Transmission Fluid Type "A".

►*WORM HOUSING FLUID LEVEL NOTE:* It is not necessary to check fluid level in worm housing at regular intervals. When gear is removed for overhaul or for other reasons, fill worm housing to level of filler plug hole (with gear in normal installed position).

DRAINING HYDRAULIC SYSTEM: *(CAUTION–Extreme care should be taken to prevent dirt from entering reservoir while cover or filler cap is removed. To prevent damage to filter element, do not insert sharp objects into reservoir. Do not disturb filter element as periodic changes of this unit are not required).* Disconnect high pressure (small) hose at the gear housing and jack up front end of car sufficiently to raise wheels off floor. Place hose in suitable container. While holding hose in container start engine and allow to idle, turn steering wheel from one extreme to the other until all fluid is forced from unit. *(CAUTION–Do not run engine above idle speed. As soon as fluid starts to show great quantities of air bubbles, stop engine).* Reconnect high pressure hose and refill.

REFILLING HYDRAULIC SYSTEM: Bleed steering gear as follows: Fill reservoir slightly higher than normal. Start engine and run for a short time to circulate oil through hoses. With engine running at idle speed, turn steering wheel back and forth several times from extreme right to left to bleed any remaining air out of system. Check oil level in reservoir. Add oil to reach level mark. Capacity is approximately 2 quarts.

TROUBLE SHOOTING

HARD STEERING IN BOTH DIRECTIONS: 1) Leak in steering system, pump belt slipping or broken, fluid level low.
2) Steering gear linkage not lubricated, tire pressure too low, bind in steering column or gear, improper front end alignment.
3) Low pump pressure (see Hydraulic Pressure Test above) with particular attention to following: Relief and flow control valve, rotors (not turning or worn), pump body or cover worn.
4) Loss of pressure in power unit (see Hydraulic Pressure Test above).

SMALLER TURNING RADIUS IN ONE DIRECTION: 1) Wheel stops not adjusted properly.

HYDRAULIC LEAKS: 1) Check for leaks at hose adapters, pump body, between gear and worm housings, and gear shaft oil seal.

HARD STEERING IN ONE DIRECTION ONLY: 1) Tire pressure too low.
2) Control valve maladjusted.
3) Bind in steering column or gear, improper front end alignment.

VEHICLE ATTEMPTS TO TURN UNLESS FORCE APPLIED TO HOLD STEERING WHEEL: 1) Tire pressure uneven.
2) Control valve maladjusted.

POOR RECOVERY ON TURNS: 1) Tire pressure too low, improper front end alignment.
2) Gear shaft adjustment too tight, worm bearing adjustment too tight.
3) Balls in worm connector binding, fit too tight.
4) Bind in steering column or gear, bind in steering knuckles.

NOISE IN CHUCK ASSEMBLY: Check belt adjustment. Check for vibrating condition set up by control shaft rod. Remove unit and install a new valve rod adjusting disc.

HISSING NOISE (NO LOAD): Caused by low oil pressure or improper operation of back pressure valve.

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1957 "CO-AXIAL" (Cont.)

HISSING NOISE (RIGHT TURN ONLY): Caused by oil leaking past lower piston rod gear housing seal.

HISSING NOISE & LOSS OF OIL THROUGH UPPER HOUSING VENT (LEFT TURN ONLY): Caused by oil leaking past upper piston rod housing head oil seal.

CREAKING NOISE ON TURNS: Check for loose gear-to-frame mounting bolts. If noise persists after tightening gear-to-frame bolts, install a new equal tooth sector or gear shaft.

SNAPPING NOISE: Tighten gear-to-frame mounting bolts. Check coupling screw for tightness. Check lower piston rod bushing dowel pin for being too high. Check bushing for seating properly. Check lower piston rod for tight fit at piston.

CHUCKLE NOISE: Check as follows: Steering arm nut loose on gearshaft. Loose front wheel bearing. Gearshaft adjustment too loose. Excessive kingpin endplay. Steering tube coupling screw loose. Worm bearing preload adjustment too loose. Excessive worm shaft endplay.

WANDER (STEERING WHEEL FREEPLAY): Check steering wheel freeplay which should not exceed 5/8". If freeplay excessive (without moving steering linkage), check in same manner as for "Chuckle" above, and also check steering linkage and front wheel alignment.

POOR RETURNABILITY (BOTH DIRECTIONS): Check torque required to turn gearshaft from one extreme to the other with torque wrench on steering gear arm nut (linkage disconnected from steering arm). Torque should not exceed 40 ft. lbs., ± 10 lbs. If torque reading not excessive, check wheel alignment and steering linkage. If torque excessive, check steering column jacket bearing. Check gearshaft adjustment. Check worm shaft bearing preload. Check wormshaft for binding in connector.

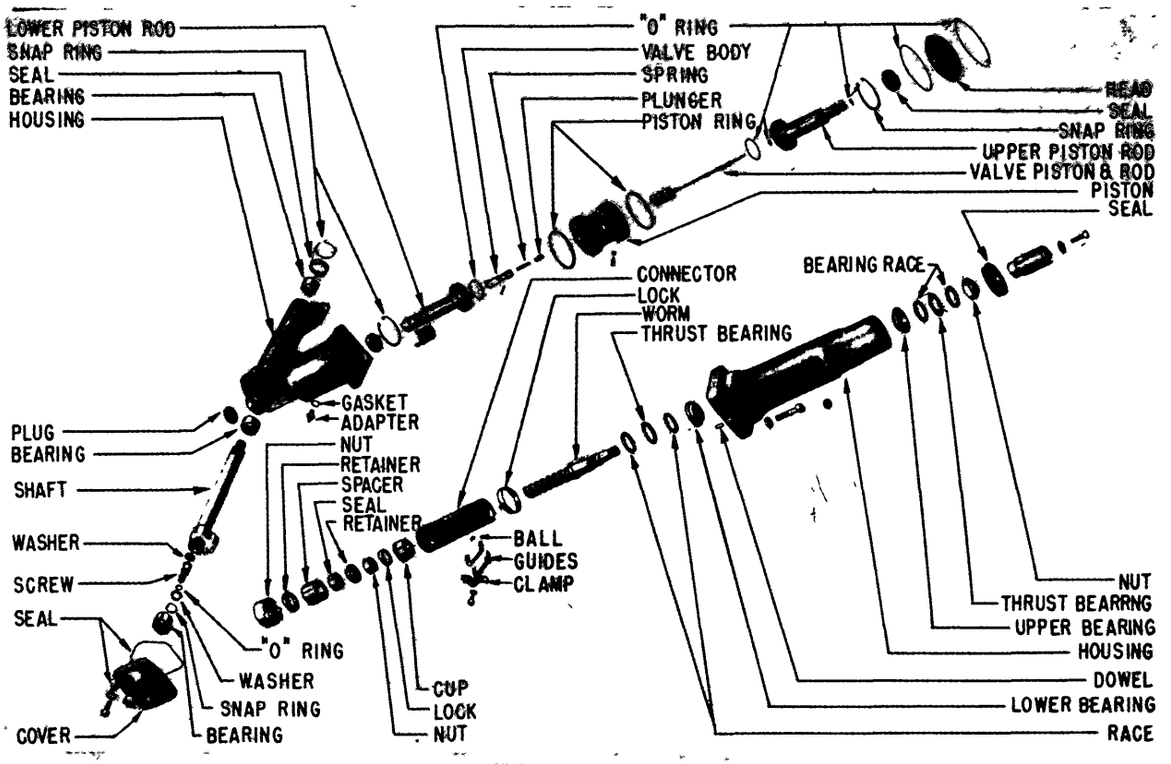
POOR RETURNABILITY (ONE DIRECTION ONLY): Check tire pressure. Center control valve (see Adjustment). Check gearshaft adjustment.

UNEQUAL STEERING EFFORT: Check control valve adjustment. Check for upper piston rod movement in piston. Check worm shaft connector nut for tightness. Check control valve rod for looseness in valve. Check upper piston rod nut for looseness. Check upper piston rod for being scored at reaction seal retainer. If the above fails to correct unequal steering effort, replace all reaction parts.

UNABLE TO MAINTAIN CONTROL VALVE ADJUSTMENT: This may be caused by reaction spacer being too short or too long, or by burrs or out of squareness. Check valve control rod for looseness in disc, or control valve looseness on rod. Upper piston rod nut may be loose, or upper piston rod may be loose in piston.

LACK OF ASSIST(ONE DIRECTION): Check for damaged neoprene piston ring. Check for damaged or improperly seated housing head oil seal. Valve rod lower "O" ring or piston rod "O" rings may be damaged.

LACK OF ASSIST (BOTH DIRECTIONS): Check the following: Low tire pressure. Drive belts slipping. Low oil pressure.



CHRYSLER, DESOTO, DODGE, PLYMOUTH "CO-AXIAL" POWER STEERING GEAR

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

HORN BUTTON REMOVAL & INSTALLATION: Chrysler - Disconnect battery. Turn horn blowing ring ornament counterclockwise and remove ornament. Disconnect wire from terminal. Remove three screws and three bushings and remove horn ring. Remove horn blowing contact ring switch from steering wheel hub. Reverse removal procedure to install.

Imperial: Remove two screws and washers from underside of steering wheel spokes and remove horn ring and cushion assembly. Disconnect horn wire. Remove four screws and bushings and remove horn blowing ring retainer and horn switch. Remove four screws and washers and remove ground plate from steering wheel. Reverse removal procedure to install.

DeSoto: Disconnect battery ground cable, then remove horn ring ornament by turning it counterclockwise. Disconnect horn wire at stationary plate and remove plate. Remove horn ring mounting base attaching screws and remove horn ring. Reverse removal procedure to install.

Dodge: Remove two screws from horn ring ornament and remove ornament from steering wheel. Disconnect horn wire, then remove three horn ring screws and remove horn ring. Reverse removal procedure to install.

Plymouth: Disconnect battery, then remove the two screws on underside of medallion and remove medallion. Disconnect horn wire from terminal on travel plate and insulator, then remove horn ring, travel plate and insulator assembly, contact spring plate and ground plate. Reverse removal procedure to install.

STEERING WHEEL REMOVAL: Chrysler, Imperial, & DeSoto - Remove horn ring assembly (see above), then loosen steering wheel nut three full turns and attach Puller, Tool C-3428. Remove wheel from serrations, and remove tool, nut and steering wheel. To install steering wheel, place both front wheels in the straight ahead position, then install steering wheel and nut and tighten nut to 40 ft. lbs. *(NOTE* - Check to make sure cancelling dogs on steering wheel actuate the directional switch).

Dodge & Plymouth - Remove horn ring assembly (see above), then install Puller, Tool C-612 and remove steering wheel. When installing steering wheel make sure that master serrations are in alignment and that directional signal cancelling cam on bottom of wheel is inserted between switch levers (if so equipped).

STEERING GEAR REMOVAL & INSTALLATION

REMOVAL: Chrysler & Imperial - Remove horn ring assembly and steering wheel (see above). On Chrysler, remove two screws and bracket clamp securing steering column jacket at instrument panel. Disconnect directional indicator wires and horn wire at connectors

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1957 "CO-AXIAL" (C nt.)

below instrument panel. Loosen two screws and nuts at steering gear housing jacket at lower clamp. Remove column jacket by carefully turning assembly clockwise and pulling upward. On Imperial, remove cover plate, then remove turn signal and bracket. Remove shield, Loosen two clamp screws at lower clamp and loosen three gear housing to frame attaching bolts and remove jacket cover. On Chrysler & Imperial, remove pin and disconnect steering tube from coupling. Remove floor mat retaining plate, then remove dust pad and floor panel opening cover. Disengage drag link from steering gear arm and pull steering gear arm with Tool C-3402. Disconnect pressure and return hoses. Cap fittings at steering gear and raise hoses above oil level in reservoir to prevent oil loss. Cap ends of hoses. Disconnect stop light switch wires from brake master cylinder, then disconnect brake booster reservoir from fender side shield and move aside. Remove gear housing-to-frame attaching bolts and alignment wedge. Remove gear assembly by sliding unit forward and out of engine compartment.

Desoto, Dodge, & Plymouth-Remove horn ring assembly and steering wheel (see above), then remove front seat cushion. Raise front of car and remove pitman arm with Tool C-3402 and loosen steering gear housing to frame bolts. Remove jacket tube support bracket at dash panel. On DeSoto, disconnect shroud retaining spring from gear housing shroud and remove shroud and rubber shield at firewall. Remove floor opening panel, then remove jacket tube. On Dodge & Plymouth, remove shroud at upper end of steering column, then pull jacket from steering column shaft. Remove floor mat retaining plate, dust pad and access cover. Disconnect pressure and return hoses and cap ends of hoses and fittings on steering gear. Remove steering gear attaching bolts, then lift gear assembly up through opening in floor pan.

INSTALLATION: All Models - Reverse removal procedure and note the following: Tighten front upper and lower gear housing to frame attaching bolts to 20 ft. lbs. Install wedge over rear bolt between housing and frame, tapping lightly in place. Tighten the three attaching bolts to 50 ft. lbs. (Chrysler, Imperial, & DeSoto), 70 ft. lbs. (Dodge & Plymouth). Check alignment of steering column on DeSoto, Dodge, & Plymouth to make usre there is no bind at instrument panel bracket. If necessary, install shims between frame and gear housing to eliminate any binding condition.

OVERHAUL

►*1957 DODGE SELF-STEERING TO RIGHT SIDE CORRECTION:* If adjusting the control valve does not correct this condition, remove the valve adjusting cup to determine if fluid has leaked by the valve adjusting rod upper "0" ring seal or the reaction seal, correct by replacing the seals, then check to see if there is a port in the adjusting cup. If there is no hole, drill a 3/16" opening in disc midway between nylon inserted nut and rim of disc.

►*DISASSEMBLY & REASSEMBLY NOTE: Clean st ering gear with s lv nt before disassembly. During diass mbly, cl an each part and dry with compressed air. Install all n w "0" ring s als.*

DISASSEMBLY: (W rm H using R m val) - Drain upper and lower housing, then attach holding fixture Tool C-3323 and install in a vise. Remove coupling attaching bolt and drive coupling from shaft with Tool C-3392. Gently pry worm housing seal from end of worm shaft, then pry locking collar portion of bearing adjusting nut out of keyway in worm shaft. Install Tool C-3320A on adjusting nut and Tool C-3319 over end of shaft, engaging the serrations. Hold worm shaft steady and loosen bearing adjusting nut. Remove tools and adjusting nut *(NOTE - A new nut must be used at reassembly).* Slide outer bearing race, thrust bearing inner race and spacer out of housing. Remove worm housing attaching bolts, then slide worm housing away from gear housing exposing the worm connector. Remove and discard "0" ring seals on housing head. Remove bearing assembly and spacer from worm housing *(NOTE - The spacer and bearing assembly is serviced as a unit).*

Inspection - Check bearing races and roller for pits or scratches. Spacers should fit flat against shoulders in housing and machined surfaces at each end of housing must be smooth and free of nicks or burrs. Replace all parts that show signs of wear.

Worm Connector & Valve Control: Pry worm connector locknut from openings in connector, then slide up on connector far enough to clear the unit. Using Tool C-3321 and Tool C-3326, remove worm connector nut, then slide connector assembly from upper piston rod. Remove valve adjusting cup from inside of worm connector. Pry retaining portion of piston rod nut lock from indents in nut and remove lock. *(CAUTION - Use care when removing lock so as not to damage control spacer).* Remove nut with Tool C-3328. Slide spacer, seal assembly and nut from valve rod and slide housing head off end of valve rod.

Inspection - Piston rod must be smooth on both ends and Nylon insert nut must be tight in valve adjusting cup. Flange inside connector nut should be smooth and housing head should be free from nicks and burrs. Inner bore of valve control rod should show little or no wear from retainers, and edges should be smooth and free from nicks or burrs. Use crocus cloth spread over a flat surface to remove burrs.

►*VALVE CONTROL SPACER NOTE:* Spacer is serviced in two different lengths, with a .001" differential. Spacer must be exactly the same length as space between piston rod nut and shoulder of piston rod. With nut tightened, spacer should roll freely in groove, barely holding its own weight.

Worm Connector: *(CAUTION - When disassembling the worm connector, be careful not to bottom worm shaft in either direction as the ball guides may be damaged causing either a tight or rough operating worm).* Remove ball guide clamp and carefully remove guide (with balls). *(CAUTION - If one or more of the balls are lost or damaged, replace the complete set of 40 balls. Balls are a selected fit and must not be replaced singly).* Hold connector upside down and remove remaining balls by turning connector in and out. Count balls that were removed so that same number may be installed at reassembly. Slide worm out of connector and remove nut lock.

Insp ction - Guide rails on connector should be free of nicks or burrs and slide freely on guides in housing. Ball track on worm should be smooth without pitting or roughness. Check balls for pitting, brinelling or flaking. Check fit of adjusting cup and spacer in connector, if loose, install new spacer; adjusting cup, or both.

Gear Housing: Remove locknut from gear adjusting screw. Remove gear shaft oil seal snap ring, then using Tool C-3350, pull seal out of housing. Remove bolts and washers attaching gearshaft adjusting cover to housing (sealing washers are used on the two bolts that thread through to inside of housing). Discard sealing washers. To remove gearshaft cover, turn the adjusting screw into cover until flush, then spin cover off adjusting screw. Remove and discard cover "0" ring seal. Align gear on gearshaft to clear opening in housing, and using a fibre hammer, rap lightly on end of gearshaft. Slide gear and shaft out of housing. Remove adjusting screw retaining snap ring with pliers, Tool C-3229. Slide adjusting screw, "0" ring seal and retaining washer from end of gearshaft. Remove thrust washer from seat in end of shaft. Discard "0" ring seal.

Inspection - Gearshaft should be free of pits, scores, or signs of excessive wear in seal and bearing contact areas. Gear teeth should be smooth and show a good contact pattern. Needle bearings in cover should be smooth and rotate freely in race.

Piston & Rods: Place a suitable container under gear housing to catch trapped oil, remove piston assembly and rods from housing and disassemble as follows: Grasp upper piston rod firmly, twist slightly and pull piston and lower rod straight out of housing. *(CAUTION-Do not allow lower piston rod to touch piston bore).* Remove snap ring holding lower rod in piston, then carefully work lower rod out of piston to expose piston valve. Remove and discard "0" ring seal and slide piston valve out of piston, using care not to bend valve rod. Support piston assembly using a soft wood block and drive piston pin into upper rod using a ¼" round drift. Using snap ring pliers, remove upper rod retaining snap ring, then carefully work upper piston rod out of piston. Insert wire or paper clip down through piston pin, bend inserted end over through oil passage hole in rod and pull pin out of piston. Remove and discard "0" ring seal. Remove large "0" ring seal from base of upper rod, using a paper clip and remove valve rod "0" ring seals from each end of upper rod. Remove and discard piston rings from each end of piston. Using a 7/16"-14 (standard thread) bolt, remove restrictor valve from lower piston rod. Thread bolt into valve, finger tight. Clamp head of bolt in a vise and rap end of rod with a fibre hammer. Slide valve out of rod. Disassemble valve by inserting a stiff wire into pin hole and pushing out retaining pin. Remove plunger and spring.

Inspection - Restrictor valve plunger should slide freely in valve body and show no signs of sticking. Lower piston rod should be free of pits, burrs, or scratches. Upper rod should be unmarked in seal contact area. Valve port ring inside piston should have a bright polished surface with sharp edges, and the valve rod should slide freely through the "0" ring seals. Check valve rod by inserting valve in piston until centered, then lay piston on flat surface and place Tool C-3333 under valve rod. Rotate piston slowly and check rod

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1957 "CO-AXIAL" (C nt.)

for straightness. If valve is loose, install a new assembly. Check adjusting cup to make sure it grips valve rod tightly by installing cup on valve rod, then, using a torque wrench (inch-pound) rotate cup which should require a minimum of 5 inch-pounds.

Gear Housing: Drive welch plug from bottom of gear housing (drive from cylinder side). Using a thin bladed screwdriver, pry out lower piston rod thrust pad from gear housing. Remove lower piston rod seal, using Tool C-3450 as follows Insert disc end of tool through opening in end of housing, locating disc between seal and housing shoulder. Using offset (curved) section as a fulcrum, force disc between shoulder and seal until retainer screw almost contacts seal (viewed from opposite end). Drive seal out of housing.

Inspection - Inspect gearshaft needle bearings in housing *(NOTE - Do not remove unless they are damaged).* If lower piston thrust pad is scratched, replace it. Check piston walls for nicks or scratches. All machined surfaces of housing should be smooth and free from nicks and burrs.

REASSEMBLY: *NOTE - Clean all parts with solvent and blow dry with compressed air. Use all new "0" ring seals, coating them with Lubriplate at reassembly.*

G ar Housing: Remove garter ring from new piston rod seal and install seal on Driver, Tool C-3331 with lip of seal toward driver. Insert Pilot, Tool SP-1927 through seal and into driver until bottomed, then insert assembly into housing, keeping tool centered in bore. Drive seal into position, then very carefully work garter spring into seal with two long shank screwdrivers. *(NOTE* - If Tool C-3331-A is used, it will not be necessary to remove garter spring from seal). If gearshaft lower needle bearing was removed, drive bearing into position with Tool C-3333 (lettered end of bearing against driver). *(NOTE* - Outer end of bearing should be 1 1/16" from end of housing when properly seated). Install upper bearing in the same manner, with outer end of bearing flush with end of bore. Place lower piston rod thrust pad in position, align shoulder with recess in housing and press into position.

Pist n & R ds: Slide restrictor valve spring and plunger into valve body, secure with pin, then install assembly into lower piston rod bore. Check plunger for free operation in valve. Install two new valve rod "0" ring seals in each end of upper piston rod, making sure that rings are seated evenly in grooves. Coat a new "0" ring seal with Lubriplate and slide into position in groove on end of upper piston rod. Carefully slide rod into piston, aligning piston pin holes. Align new "0" ring seal over piston pin and insert into piston. Be sure pin is perfectly straight, then tap into piston, using a ¼" drift. *(NOTE* - Pin should be flush in piston). Install retaining snap ring with bevelled side out, **making sure that ends f snap ring d n t bstruct an oil passage** and that it is fully seated in groove. Slide valve and rod into piston and upper rod, carefully working past "0" ring seals previously installed. *(CAUTION - Be careful not to bend th rod).* Slide new "0" ring seal into position in groove on bottom of lower piston rod, then carefully slide rod into piston and down into position. Install retaining snap ring with bevelled side out, **making sure that ends of snap ring d n t bstruct an il passage.** Install new "0" ring seals on each end of piston, then locate Tool C-3344 on gear housing (around cylinder bore). Coat Tool C-3554 with Lubriplate and place over teeth of lower piston rod. Slide piston and rod assembly into cylinder bore, guiding Tool C-3554 out of lower housing as piston is being pushed into cylinder. As piston is installed, align teeth on lower rod for meshing with teeth on gearshaft.

Gear Shaft: Install adjusting screw thrust washer, screw and retaining washer, then install snap ring. Install "0" ring seal on adjusting screw, using Tool C-3401. Install sector gear in mesh with rack and seat shaft to mesh teeth. Check gear timing, using steering gear arm to rotate gearshaft. **Full piston travel must be 2 ".** *(CAUTION - Failure to obtain proper timing will result in a broken gear housing).* Check operation of gears by rotating gear shaft. Place a new shaft oil seal with lip down (coated with Lubriplate) on a piece of clean paper then carefully slide tapered end of sleeve, Tool C-3350 in seal and slide seal back about ¼" on sleeve. Slide sleeve and seal over shaft with lip of seal toward housing until seal contacts housing bore. Slide adapter over sleeve, followed by coupling nut. Install seal in housing by turning nut on shaft threads until shoulder of adapter touches housing. Remove nut and adapter. Wrap tape around sleeve to provide a firm grip, then slide sleeve off shaft using a twisting motion *(CAUTION - Do not use any tool to remove sleeve).* Install "0" ring seal on adjusting cover, place cover on screw and spin down as far as possible. Align cover with bolt holes, then move adjusting screw outward until cover is seated *(CAUTION - Do not force).* Install bolts and washers (with seals), in inside holes and tighten to 30 ft. lbs. Install adjusting screw locknut but do not tighten. Install a new welch plug in bottom of housing.

Valve Control Spacer: Remove garter spring from a new upper piston rod seal and position seal on Driver, Tool C-3331 with lip of seal toward driver. Install seal aligning pilot in end of driver *(NOTE* - If Tool C-3331-A is used it will not be necessary to remove garter spring). Place housing head on a flat surface with single flange side up and drive seal into head until seated, then install garter spring. Install "0" ring seal over shoulder on head, then slide head over piston and down against housing, making sure it is seated. Install connector nut over piston rod with threaded end out. Slide a new control spacer seal into spacer and install retainers. Place Seal Protector, Tool C-3329 over threads on upper rod and slide spacer assembly over tool and down against shoulder of upper rod. Remove tool. Install piston rod nut and tighten with a sharp rap of a hammer on Tool C-3328. Install new lock cap over nut and index with slots in rod. Using a suitable punch, drive outer diameter into recess in nut.

Worm Connector & Valve Control: Install worm into connector and visually align upper portion of passages with ball guide holes. Insert 30 balls (no more), into lower hole by pushing them gently, using rubber end of pencil, and at the same time, oscillating worm. *(NOTE* - When 30 balls have been installed, they should be visible in the hole). Place remaining 10 balls in either half of ball guide, greasing the balls to keep them in place, then place other half of guide over balls. Insert ball and guide assembly into holes in connector and install clamp, lock washers and bolts. Check operation of worm, making sure that it is free to turn to maximum travel of worm shaft. *(NOTE* - Worm should rotate freely by its own weight in either direction). *(CAUTION - Do not allow worm to bottom at either end).* Install valve adjusting cup on end of valve rod. Slide worm connector nut lock over threaded end of connector with tang side facing threads. Slide worm connector over control spacer and screw nut onto connector by hand. Hold worm connector with Tool C-3321, then using Tool C-3326, tighten nut securely. Engage tang of lock with recess in nut, stake lock in hole in connector, then remove tools.

► *TESTING FOR LEAKS·* Align housing head to gear housing, then install Tool C-3555 over head. Install bolts and tighten securely. Install hose fittings, adaptors and test hoses from pump to unit. Fill pump reservoir with Automatic Transmission Fluid Type "A" and have additional fluid available. Install Tool C-3445 through worm shaft (forked end first) and engage valve rod. Remove wire from ignition coil and turn engine over, using the starting motor (this will prevent damaging steering gear unit should the valve be positioned to give excessively fast steering). As steering gear fills, it will self steer *(CAUTION - Be ready to turn the valve to stop the self steering before piston reaches limit of travel, turning valve to right if piston moves up, and to the left if piston moves down).* Fill reservoir. Replace engine ignition coil, start engine and allow steering gear to warm up to normal operating temperature, then check for leaks. *(NOTE - The above valve adjustment is only temporary. Make final adjustment after unit is completely assembled).* After leak test, stop engine and remove tools.

Worm Housing: Install "0" ring seal on smallest land of housing head, then slide bearing race over wormshaft, followed by a thrust bearing and race. Slide spacer and needle bearing assembly into housing past rail guides, then press shoulder of spacer into housing. Turn connector until ball guide is directly down and rails are aligned. Slide worm housing over connector with the vent on top side. *(CAUTION* - Be careful not to force "0" ring seal off housing head). Hold housing in alignment with connector rails, then seat against gear housing. *(NOTE* - Worm housing must meet gear housing with hand pressure only). Install attaching bolts and washers and tighten to 25-30 ft. lbs. Slide bearing spacer over worm shaft with shoulder towards worm, and seat in housing. Slide bearing race thrust bearing and race over worm and down against spacer. Install a new adjusting nut with locking flange up. Pour 14 ounces of Automatic Transmission Fluid Type "A" into upper housing and install filler plug.

► *ADJUSTMENT NOTE* Make worm bearing adjustment, piston valve adjustment, and gear adjustment before installing steering gear. *See "Adjustment" above .*

POWER STEERING PUMP· Different pumps used as follows

Chrysler & Plymouth - *See "Thompson Sleeve Type" under "Power Steering Pumps"*

DeS to (Early) & Dodge - *See "Vickers Vane Type (3-Piece Housing)" under "Power Steering Pumps"*

DeS to(Lat) - *See "Vickers Vane Type (2-Pi ce Housing)" under "Power Steering Pumps"*

CHRYSLER, DE SOTO, DODGE, PLYMOUTH VALIANT "CONSTANT CONTROL" POWER STEERING

Chrysler, DeSoto, Dodge, Plymouth (1958-60)
Valiant (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 POWER STEERING WORM SHAFT PRODUCTION CHANGE:* Power Steering units with new wormshaft are identified by change letter "L" and subsequent letters (after date stamp on housing). New worm shaft has knurled section on coupling adjacent to threads and worm bearing adjusting nut has a tapered flange section. Early and later type shafts are interchangeable in service. Late type adjusting nuts are reusable. *See "Overhaul" for installing new nut or reinstalling old nut.*

►*1958 PRODUCTION CHANGE & TAPPING NOISE CORRECTION (Early Cars):* A back pressure control valve spring was used in cars with Code 8-31-C or later (stamped on lower portion of housing) to correct tapping noise caused by shoulder on back pressure relief valve striking seat in valve bore. To install spring in early cars, proceed as follows:

1) Remove return hose from back pressure valve body, then remove back pressure valve assembly *NOTE* - DO NOT disturb steering control valve body.

2) Remove valve spring retainer pin from valve body and remove spring and piston. A spacer washer may be on top of spring and must be reinstalled.

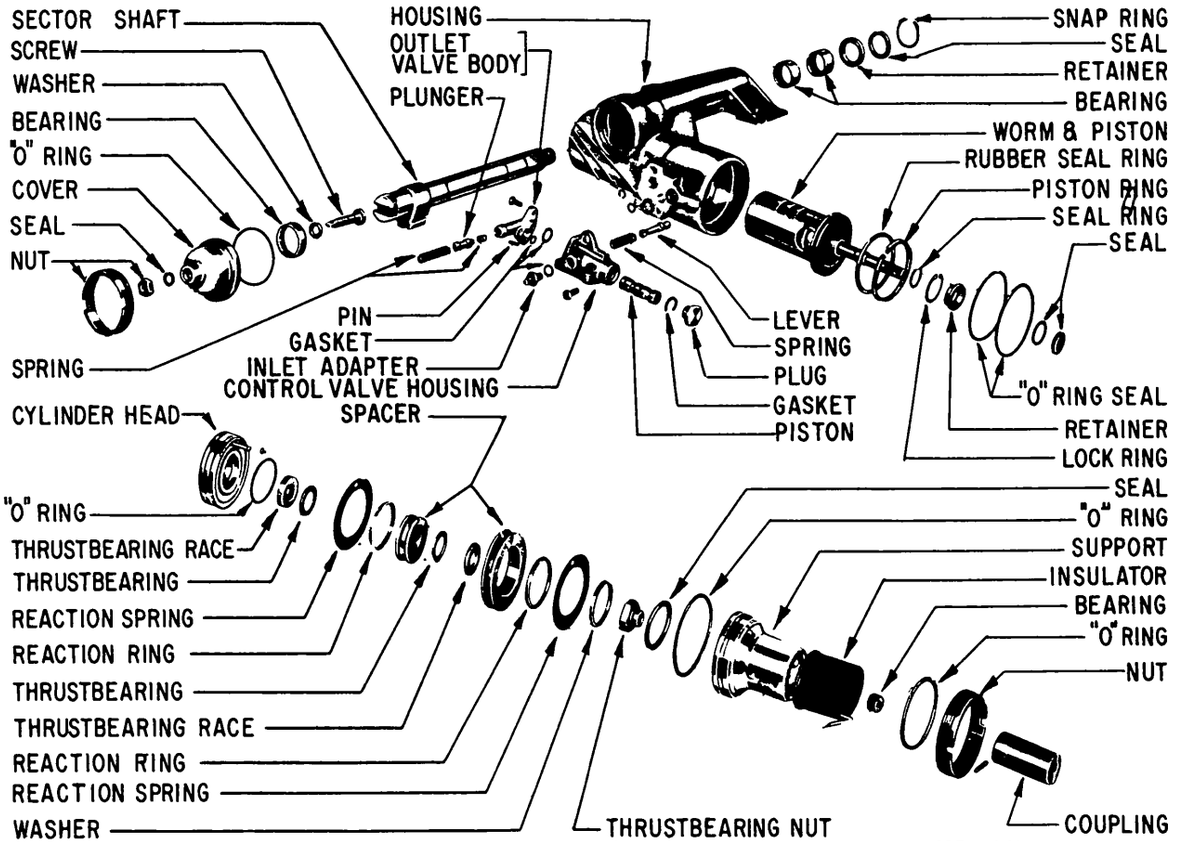
3) Place valve cushion spring in valve body. *NOTE*- Check through oil passage to see that spring is seated properly and is not cocked. Install piston with chamfered end down against cushion spring, then add pressure control valve spring and retaining spring.

4) Reassemble back pressure valve assembly with "O" ring seal to steering control valve body, and tighten screws to 10 ft. lbs. Reinstall hose and test operation. Check fluid level in reservoir after operating gear.

►*1959 CHRYSLER & DESOTO POWER STEERING "LUMPINESS" FEELING CORRECTION:* This "lumpiness" feeling will be encountered on long sweeping curves and may be caused by recirculating balls of worm and piston assembly crowding and jamming in the ball retainer. To eliminate this condition, a spring and a counterbore was incorporated in each of the ball guide plugs. Later units having this change are identified by the letter "P" or subsequent letters stamped on housing following the date code. On prior units, the ball guide plugs can be replaced by the later type ball guide springs and counterbored plugs which are furnished in Ball Guide Spring Service Package, Part No. 2084215. *See "Overhaul" below for installation procedures.*

►*1959 POWER STEERING PUMP OIL FILLER CAP PRODUCTION CHANGE & OIL LEVEL CHECKING CHANGE:* A new oil pump oil filler cap, without a dipstick for checking oil level is being used in later cars. *See "Lubrication" below for new checking procedure on units with the later type cap.*

►*1960 V8 ENGINE (EXC. 318" ENG.) POWER STEERING PUMP PRODUCTION CHANGE:* A new pump having a larger diameter shaft and seal and a load reaction type belt tensioner is used on some models. The new pump is mounted on a flexible swivel-type mounting to enable steering pump load to be increased when the pump moves outward and increases belt tension. Service procedures are the same as for previous pumps except for belt adjustment. *See "Belt Adjustment" below.*



CHRYSLER, DESOTO, DODGE, PLYMOUTH, VALIANT POWER STEERING GEAR ASSEMBLY

►*1960 DODGE POWER STEERING POOR RETURNABILITY CORRECTION:* This condition may be caused by the steering column jacket bearing being out of place. To correct, remove column jacket assembly and straighten the column jacket bearing retaining tabs and remove bearing. Straighten all three retaining tabs, then reinstall bearing and bend the three tabs down to retain bearing. *NOTE - Make sure large end of bearing tapered inner bore is facing down. Reinstall column jacket assembly. NOTE - A bearing washer, Part No. 2201299 is now used to retain nylon separator in bearing. Washer is placed on upper side of bearing and is held in position with same tabs that retain bearing.*

►**1958 *CHUCK ASSEMBLY PRODUCTION CHANGE:*** **Revised chuck assembly used in later cars. Steering gear units with new chuck assembly are identified by letter "H" or later following date code on gear housing.** ***CAUTION - N w parts are n t int rchang abl individually with pr vious parts and form r steering g ar housing assembly and worm and piston ass mbly are n longer serviced.***

DESCRIPTION: 1958 Models - This power steering assembly consists of an integral power steering gear and hydraulic power unit enclosed in a single housing. The power piston is engaged directly with steering gear worm shaft by recirculating balls and with gear shaft and sector by gears milled into side of piston forming a direct connection between worm shaft and sector shaft. A control valve mounted on the gear housing is operated by a valve lever that is actuated by slight back and forth movement of the worm shaft. In the event oil pressure is interrupted, steering wheel movement will rotate the worm shaft within the power piston causing it to move and rotate sector shaft in same manner as in a manual steering gear.

1959-60 Models: Similar to previous model except as follows: Piston flange is now fitted with a cast iron ring backed up by a rubber ring. Steering gear valve pivot lever has been redesigned. A spring has been added to maintain constant pressure against steering valve housing and a spring loaded back pressure valve is provided which maintains a constant pressure of 35 lbs. in gear whenever steering gear pump is operating.

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH VALIANT "CONSTANT CONTROL" POWER STEERING (C nt.)

OPERATION: With control valve in neutral position, oil under pressure flows through both grooves in valve body, then into chambers on both sides of power piston and into both reaction chambers When steering wheel is turned, the worm shaft moves in piston a few thousandths of an inch, causing center thrust bearing race which is clamped axially to worm shaft to move the same distance. The bearing race thus tips valve pivot lever and moves control valve spool in proper direction to reduce flow in one groove and increase it in the other. Oil then flows from power steering pump through the enlarged orifice to proper side of power piston causing it to move and rotate sector shaft. Simultaneous with turning steering wheel, the restraining force of the reaction spring is overcome which is necessary before center race can move to actuate control valve lever. At the instant power steering is no longer required, the reaction spring and operating oil pressure move race and spool valve back to neutral position. Equal oil flow is directed through unit and no power assist is provided.

ADJUSTMENTS

PUMP BELT ADJUSTMENT: With a 5 lb. load applied midway between the pulleys, belt deflection should be as indicated in table below.

Car Model	New Belt	Used Belt
1958 Chrysler (LC-1)①	②3/32"	②5/32"
1958 Chrysler (Others)	②3/32"	②3/16"
1959-60 Chrysler (All)	③1/8"	③3/16"
1958-60 DeSoto (All)	③1/8"	③3/16"
1958 Dodge (LD-1)	③3/32"	③5/32"
1958 Dodge (LD-2)④	③1/16"	③ 1/8"
1958 Dodge (LD-3)④	③1/8"	③3/16"
1959 Dodge Six	③3/32"	③5/32"
1960 Dodge Six	③3/8"	③ 1/2"
1959-60 Dodge (326" Eng.)	③1/16"	③ 1/8"
1959-60 Dodge (361 & 383" Engs.)	③1/8"	③3/16"
1958-59 Plymouth Six	②3/32"	②5/32"
1960 Plymouth Six	③3/8"	③ 1/2"
1958-60 Plymouth (318" Eng.)	③1/16"	③ 1/8"
1958-60 Plymouth (Exc. 318" Eng.)	③1/8"	③3/16"
1960 Valiant⑤	3/8"	

①- On early models with bolted-on pulleys, adjust deflection to 3/32" (new belt), 3/16" (used belt).
②- Between power steering pump and water pump.
③- Between power steering pump and crankshaft.
④- On early models with bolted-on pulleys, adjust deflection to 1/8" (new belt), 3/16" (used belt).
⑤- With 10 lbs. load applied midway between pulleys.

Belt Adjustment (1960 Models with Load Reaction Belt Tensioner): With engine stopped, loosen adjustment bracket-to-engine bolts, then exert outward pull of 50 lbs. with a spring scale attached to swivel bolt. Hold tension and tighten mounting bolts. *NOTE - Mounting bracket will bear against stop. With engine running, mounting bracket will move away from stop.*

STEERING GEAR ADJUSTMENT: *NOTE - The following adjustments can be made with power steering unit installed on the car.*

Control Valve: With oil reservoir filled to the full mark, operate engine at idle speed to bring steering gear to normal operating temperature. Loosen gear arm (pitman arm) at disconnect, or disconnect arm at steering linkage. Turn gear shaft adjusting screw outward through gear shaft cover to assure no mesh adjustment preload during this adjustment. Loosen valve body attaching screws, then tighten them to 7 ft. lbs Apply oil pressure to the complete unit and position steering gear control valve by tapping one of the control valve screws or on valve end plug to position valve assembly (up or down) on steering gear housing so that torque required to turn gear shaft in both directions is equal within 5 ft. lbs. (turning effort must not exceed 20 ft. lbs in either direction). When valve is properly located, tighten attaching screws to 15 ft. lbs. Adjust gear shaft preload as follows, then reconnect steering arm to steering shaft or to linkage.

Gear Shaft Preload: Loosen adjusting screw until backlash is evident (if not previously done), then tighten adjusting screw until backlash just disappears. Continue to tighten 3/8 to 1/2 turn from this position and tighten locknut to 50 ft. lbs.

LUBRICATION: Check fluid level in reservoir every 5000 miles. Add Power Steering Fluid, Part No. 2084329 as necessary to bring level up to "Full" mark on reservoir. *NOTE* - When checking fluid level, fluid must be at normal operating temperature.

BLEEDING SYSTEM: All air can be expelled from unit by turning steering wheel several times from full right to full left and back again.

HYDRAULIC PRESSURE TEST: Disconnect pump-to-steering gear pressure hose at steering pump and connect test hose C-3388 with proper adapters between pump and gauge C-3309-B with shut-off valve between gauge and steering gear. With engine idling at 500 RPM and oil at normal operating temperature (150° to 170°F., checked with thermometer in reservoir), pressure should be 55-80 lbs. (Exc. Valiant), 35-80 lbs. (Valiant). Increase engine speed to 1000 RPM and slowly close shut-off valve. Pump pressure should be 950-1050 lbs. (Chrysler and DeSoto), 850-950 lbs. (Dodge & Plymouth), 650-750 lbs. (Valiant). *CAUTION - Do not hold valve closed for more than a few seconds.* If pressure is in excess of maximum, check for faulty relief valve. If pressure is less than minimum, power steering pump is defective.

TROUBLE SHOOTING

TROUBLE SHOOTING: Hard Steering - 1) Tires not properly inflated or steering linkage requires lubrication.
2) Low oil level in pump reservoir, loose pump belt, pump belt oily, or oil pump output low.
3) Steering gear not operating properly; caused by one or more of the following conditions:
(a) Cross shaft adjustment too tight or pressure control valve stuck in closed position.
(b) External oil leakage at lower sector shaft oil seal. Sector shaft adjusting screw seal, Sector shaft cover "O" ring seal. Valve housing-to-gear housing "O" ring seals.
(c) Defective or damaged valve lever. *NOTE* - If pump pressure will build up to 850-950 lbs., check the following points: Defective or damaged gear shaft bearings. Dirt or chips in steering gear. Damaged column support worm shaft bearings. Damaged thrust bearings or excessive preload adjustment. Rough, hard-to-turn worm and piston assembly.
(d) Excessive internal leakage. *NOTE* - If pump pressure will not build up to 850-950 lbs., check the following points: Cylinder head "O" rings. Cylinder head reaction seal. Cylinder head worm shaft oil seal assembly. Column support-to-ferrule "O" ring seal. Column support reaction seal.

Poor Recovery From Turns: 1) Tires improperly inflated, steering linkage binding, or wheels not properly aligned.
2) Damaged or defective steering tube bearing, or steering wheel column jacket and steering unit not properly aligned.
3) Steering gear not operating properly; caused by one or more of the following conditions:
(a) Improper cross shaft mesh adjustment or pressure control valve stuck in open position.
(b) Column support spanner nut loose, defective or damaged valve lever, or improper worm thrust bearing adjustment.
(c) Burrs or nicks in reaction ring grooves in cylinder head or column suppert. Defective or damaged cylinder head worm shaft seal ring.
(d) Dirt or chips in steering gear unit, or rough or catchy worm and piston assembly.

Self-Steering or Leads to Either Side: 1) Tires not properly inflated or wheels not properly aligned. Steering wheel off center when car is traveling straight ahead.
2) Valve body out of adjustment. *(NOTE* - If steering to the left, move body down on housing; if steering to right, move body up on housing). Valve lever damaged or column support spanner nut loose.

Temporary Increase in Effort When Turning Steering Wheel to Right or Left: 1) Low oil level, pump belt loose, oil on pump belt, or defective power steering pump.
2) Engine idle speed too slow, air in steering system, or steering linkage binding.
3) Steering gear not operating properly due to external leakage, improper cross shaft adjustment, or excessive internal leakage.

Excessive Steering Wheel Freeplay: 1) Improper cross shaft adjustment, column support spanner nut loose, or improper worm thrust bearing adjustment.

Lack of Assistance: 1) If encountered in one direction, check for oil leaking past worm shaft cast iron oil seal ring or ferrule "O" ring.
2) If encountered in both directions, check the following: Broken "D" ring or worm piston, loose piston end plug, missing reaction seal, slipping pump belt, or low pump output.

Noise in Steering Unit: 1) Buzzing noise in neutral position which stops when steering wheel turned may be caused by a sticking pressure control valve.
2) Noisy oil pump, damaged hydraulic lines, pressure control valve sticking, improper sector shaft mesh adjustment, or air in system.

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

Chrysler & DeSoto (1958-59): Disconnect battery, then turn ornament counterclockwise and remove. Disconnect horn terminal wire. Remove three screws and three

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH VALIANT "CONSTANT CONTROL" POWER STEERING (Cont.)

bushings, then remove horn ring. Remove horn contact ring switch from steering gear hub, then loosen wheel nut three turns and pull wheel with Tool C-612 or C-3428 (depending on model).

Chrysler & DeSoto (1960): Disconnect battery, then remove steering wheel ornament by pressing down on center and turning ornament ¼ turn. Disconnect horn wire and remove three screws, bushings, horn blowing ring, rubber insulator and horn terminal plate. Loosen steering wheel nut and use puller, Tool C-3428 to loosen steering wheel

Dodge & Plymouth (1958-59): Disconnect battery, then center steering wheel and remove two screws under medallion. Remove medallion and remove horn wire from terminal on travel plate and insulator assembly. Remove horn ring, travelplate and insulator assembly, contact spring plate and ground plate. Push wire aside and pull steering wheel with Tool C-3428 or C-612.

Dodge & Plymouth (1960): Disconnect battery. Remove steering wheel ornament by removing screws from underside of steering wheel and remove stationary plate, bushings, horn ring and attaching screws. Disconnect horn wire at stationary plate, then loosen steering wheel nut three turns and pull wheel with Tool C-3428.

Valiant (1960): Disconnect battery, then rotate horn button ¼ turn counterclockwise and remove button. Remove three screws and bushings from horn button base and lift out base or horn ring. Disconnect wire from horn switch and remove switch, then remove steering wheel nut and washer. Place wheels in straight ahead position and install puller, Tool C-612 and remove steering wheel.

STEERING GEAR REMOVAL & INSTALLATION

Steering Gear Removal: Except Valiant - With steering wheel removed, remove directional signal cancelling mechanism then remove retainer snap rings from groove in steering tube at top of bearing with Tool C-3229. Remove jacket tube shield to allow access to column tube clamp and remove screws attaching steering jacket tube clamp at instrument panel and remove clamp. Raise carpet and move rubber grommet up on jacket column, then remove screws attaching rubber dust boot to firewall. On Imperial models, remove floor inspection panel. Loosen jacket tube clamp at steering gear housing. Remove cotter key and nut at drag link and disconnect link from steering arm, then remove steering arm nut and washer at steering gear shaft. Slide Tool C-3646 up on steering arm and place shoe of puller behind steering arm and pull steering arm from gear shaft. *CAUTION - Do not remove steering arm by prying with a lever or striking with a hammer.* Disconnect hydraulic brake line at master cylinder and brake tee and remove line, then disconnect pressure and return hoses at steering gear (fasten ends of hoses above reservoir oil level and cap all openings). Slide jacket tube up and off steering gear through drivers compartment, then remove jacket tube upper spring and retainer. Remove steering tube coupling pin, two plastic inserts, horn ground strap, rubber insulator and upper steering tube. Remove gear housing to frame bolts, washers and alignment wedge. Slide steering gear upwards and toward rear of car and at the same time raise lower end of gear and remove gear from engine compartment. *NOTE - On cars with Ram Jet Manifolds, to remove gear, raise lower end of housing in a clockwise motion towards panel until gearshaft end of housing and shaft will clear "A" frame of front suspension, then tilt entire gear assembly towards engine slightly to allow swinging steering gear assembly downward through opening at fender side panel (fender side panel removed). Gearshaft end of housing should go through opening first and the housing should be rolled through opening end-over-end.*

Installation - Reverse removal procedures and note the following: Make sure there is at least 1/16" clearance between bottom face of jacket tube clamp and column support spanner nut. With steering gear completely installed (gear assembly-to-frame bolts not tightened), tighten front upper and lower gear housing to frame attaching bolts to 20 ft. lbs. Install wedge over rear bolt between housing and frame so that tapered surfaces match, tapping it lightly into place, then tighten all three attaching bolts to 50 ft. lbs.

Valiant - Remove steering arm from steering gear shaft with Tool C-3646, then disconnect hydraulic lines from steering gear. Remove bolts attaching steering gear to frame and remove bolt from coupling clamp at upper end of steering gear worm shaft. While supporting steering gear, tap coupling upward with a mallet until it is free from worm shaft splines, then lift out steering gear.

Installation - Reverse removal procedures and note the following: Tighten steering gear-to-frame attaching bolts to 75 ft. lbs. and steering arm nut to 85 ft. lbs.

OVERHAUL

►*1959 CHRYSLER & DESOTO POWER STEERING "LUMPINESS" FEELING CORRECTION: See "Changes, Cautions, Corrections" above and note the following procedure for installing Ball Guide Spring Service Package, Part No. 2084215.* With steering unit removed from car, remove power train from steering unit, then remove coupling pin. Remove valve assembly and valve lever, then remove cross shaft cover spanner nut. With unit in the "on-center" position withdraw cross shaft until teeth clear the housing. Rotate shaft 180° and allow ends of teeth to rest on housing. Turn coupling full right and remove the coupling. Remove jacket support spanner nut. Firmly install a suitable drift through hole in jacket support to engage groove in worm shaft (locking these two parts together). While holding drift, pry on piston teeth with a soft metal tool. *NOTE - With this procedure, the worm will be all the way into piston and power train parts will be resting against piston flange. Cylinder head, center race and spacer assembly and the jacket support must be maintained in close contact with each other. This will eliminate the chance of Teflon sealing ring on worm shaft from becoming disengaged from its mating sleeve retained in cylinder head. It will also eliminate possibility of reaction rings becoming disengaged from their grooves in both cylinder head and column jacket support. HOLD THESE PARTS OF POWER TRAIN TOGETHER.* Clamp piston of power train in a vise in vertical position (use a soft jawed vise). Hold cylinder head center race and spacer assembly, and jacket support together, then apply a vertical upward force to cylinder head. The cylinder head will separate from piston as the worm rotates and withdraws from piston. Place a socket or other suitable block between piston flange and cylinder head. Pour clean solvent or cleaning fluid around worm and into cavity of piston until cavity is filled, then hold cylinder head, center race and spacer assembly and jacket support together. Remove block between piston flange and cylinder head. By applying a vertical force, cause the worm to rotate and screw into and out of piston. This will agitate and circulate the cleaning fluid inside the piston and cause it to dilute the residual hydraulic oil. *CAUTION - The above procedure is important to insure that the return guide does not adhere to guide plug when guide plug is removed from piston. If the return guide is removed from the piston, or loses contact with worm by 3/16", one or more of the three balls encased in track of return guide will be displaced. One or more of these balls will lodge themselves in the wrong groove outside the normal ball circuit. If this should occur it may be possible to recapture the displaced balls by using a magnetized drift or rat-tail file. If balls are recaptured, place them in track of the return guide, then smear petroleum jelly over the balls to make them adhere to guide. Reinstall balls in piston. If the balls cannot be recaptured it will be necessary to remove all balls and rebuild this circuit. This should be avoided if possible. The only other alternative is to replace worm and piston assembly.* While holding the cylinder head, center race and spacer assembly and jacket support together, withdraw the worm as far as possible from piston. Remove power train assembly from the vise and drain off cleaning fluid. Hold the same parts together and rotate worm into piston until cylinder head rests on piston flange. Reclamp power train into the vise in a horizontal position with either one of the guide plugs upward. Install conical springs from service package, Part No. 2084215 into counterbore in new plugs. *NOTE - Large diameter of spring must contact counterbore in plug.* Retain spring in plug with a small amount of petroleum jelly. Unscrew and remove old guide plug from piston. *CAUTION - Do not remove return guide. Guide plug is staked in place. Do not attempt to remove staking. Force the plug in a counterclockwise direction to loosen by shearing the staking. Remove any chips that may result. Hold return guide down against worm and gently rotate worm in both directions to make sure it operates freely and that the return guide is in position against worm.* Carefully install the new plug and spring assembly and tighten to 50 ft. lbs. Use a ¼" flat nosed punch and stake flange of plug into locking flat provided in piston so plug cannot loosen. *CAUTION - Guide plugs must be tight.* Turn power train over and install opposite plug in same manner. Check end plug in piston. If necessary, tighten to 100 ft. lbs. Install power train in housing and reassemble steering gear unit.

►*NOTE:* Clean gear assembly thoroughly in suitable solvent and install unit in holding fixture C-3323. Each part removed should be thoroughly washed in solvent and dried by compressed air. Handle parts carefully to avoid nicks or burrs. Use crocus cloth to remove nicks or burrs being especially careful not to round off

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sharp edged portions of two lands on steering gear valve. Discard old "O" ring seals and lubricate new "O" ring seals with petrolatum.

DISASSEMBLY: Drain unit through pressure and return connections by turning steering tube coupling from one extreme to the other. Support coupling while driving pin out to avoid damaging bearings. Remove valve body housing screws, valve body, and three "O" rings. Pry under spherical head to remove valve lever. *CAUTION - DO NOT use pli rs, and DO NOT collapse slotted nd f valv l v r.* Loosen gear shaft adjusting screw locknut and remove gear shaft cover nut with wrench Tool C-3633. Rotate worm shaft to full turn right, then return worm shaft and piston to center of travel and remove gear shaft and cover as an assembly. *CAUTION - Oil will discharg when shaft and cover are pulled from housing.* Remove steering column support nut with Tool C-3634 and remove tanged washer. *NOTE - Turn worm shaft to full right to compress parts and back off as n c ssary to align holes in column support and worm shaft.* Place drill rod through holes in jacket support and worm shaft (to keep parts from turning), and carefully remove power train as a complete assembly. *CAUTION - Oil will be expelled when power train is b ing r mov d.*

P w r Train Disass mbly (All Models) - Place power train in soft jawed vise. *NOTE - Do not turn worm shaft mor than one-half turn during disassembly.* Remove column jacket support assembly, reaction spring, reaction ring and spacer, ferrule "O" ring center, and bearing spacer. Hold worm shaft from turning, then turn nut slightly to left (to shear staked portion of nut) and carefully pick out locking portion of bearing adjusting nut from notch in worm shaft. *CAUTION - B sur staked portion is removed from slot of worm shaft to avoid damaging worm shaft threads.* Remove thrust bearing nut, upper thrust bearing race (thin), upper thrust bearing, center bearing race, lower thrust bearing, lower thrust bearing race (thick), lower reaction ring, and lower reaction spring. Remove head assembly. *NOTE* - Worm and piston assembly furnished as a complete assembly only.

Column Jacket Support Disassembly - Remove worm shaft upper seal with puller Tool C-3638. *NOTE* - Column jacket support and worm shaft upper bearing are serviced as an assembly. Remove large "O" ring from groove in jacket support, then remove reaction seal from groove in face of jacket support by blowing air pressure in ferrule chamber. Inspect grooves for burrs. Be sure there is no obstruction in passage from ferrule chamber to upper reaction chamber.

Cylind r Head Disassembly - Remove two "O" rings from two outer grooves in cylinder head, then remove lower reaction "O" ring from groove in face of cylinder head (use air pressure at oil hole located in groove between the two "O" ring grooves). Inspect worm shaft seal in cylinder head counterbore for possible damage, replace cylinder head seal if necessary. Check oil passage in ferrule for obstruction and check lands of cylinder head for burrs.

Ste ring Valv Disass mbly - Compress pressure control valve spring and remove spring retainer pin, spring, and pressure control valve piston. Remove pressure control valve body-to-steering valve screws and remove valve body. Carefully shake out valve piston. *NOTE* - Replace complete valve assembly if steering valve or valve housing is damaged. DO NOT remove valve and plug unless inspection indicates a leak at seal.

Gear Shaft Disassembly - Remove gear shaft adjusting screw lock nut and unscrew cover from adjusting screw. Remove screw and washer from "T" slot in end of gear shaft, then remove small "O" ring from top of cover and large "O" ring from base of cover. *NOTE* - Gear shaft cover and bearing are serviced as an assembly only.

Steering Gear Housing Disassembly - *NOTE* - Steering gear housing with inner and outer gear shaft needle bearings is serviced as an assembly. Attach housing to fixture Tool C-3323 and install in vise. Remove oil seal snap ring and seal back-up washer, then remove gear shaft oil seal with adapter SP-3056 and Tool C-3350 as follows: Slide threaded adapter SP-3056 over end of gear shaft and install threaded nut section of Tool C-3350 on shaft. Maintain pressure on adapter SP-3056 with nut of Tool C-3350 while turning adapter, forcing it into seal until it bottoms in seal. Apply two half rings and retainer over both portions of tool. As hexagon nut is removed from shaft the seal will be pulled from housing. *NOTE* - Inspect steering housing gear shaft needle bearings for broken or rough needles.

REASSEMBLY: Steering Gear Housing - Install gear shaft oil seal in gear housing (lip of seal toward needle bearing) using adapter Tool SP-3052 and Tool C-3350. Place adapter against seal and tool nut on threaded end of gear shaft. Tighten tool nut until adapter shoulder contacts housing, then install oil seal back-up washer and snap ring. *NOTE* - Be sure snap ring is properly seated in groove.

Gear Shaft Reassembly - Place adjusting screw washer over adjusting screw and alide both into "T" slot of gear shaft. Screw cover onto adjusting screw until gear shaft bottoms in cover. Lubricate new small "O" ring and install it over adjusting screw into position at top of gear shaft cover. Install adjusting screw lock nut on adjusting screw but do not tighten. Lubricate a new large "O" ring and "O" ring groove heavily with petrolatum, then install "O" ring in groove on lower face of gear cover.

Steering Valve Reassembly - Install valve in valve housing so that valve lever hole is aligned with steering gear valve lever opening in bottom of valve housing. Valve must fit smoothly in housing without sticking or or binding. Install end plug with new seal and tighten to 50 ft. lbs. Lubricate pressure control valve piston and slide it into pressure control valve body (nose end first), then install pressure control valve spring on top of valve piston. Compress spring and install spring retainer pin through both holes at top of pressure control valve body. Assemble pressure control valve body to main valve and tighten two screws to 10 ft. lbs. Install new copper sealing gasket and fitting in threaded hole on top of valve body, tighten fitting to 30 ft. lbs.

Cylind r Head Reassembly - Lubricate two large "O" rings and install in grooves on cylinder head. Install the lower reaction seal in groove in face of cylinder head. The small "O" ring for the ferrule groove should be installed after worm shaft bearing preload has been established, otherwise "O" ring will be damaged by reaction springs.

Column Jacket Support Reassembly - Install worm shaft upper seal with sealing lip toward bearing. Use Tool C-3650 and drive seal in until tool bottoms on casting to obtain proper compression of rubber seal. Lubricate reaction seal and install in groove in face of column jacket support with flat side of seal out.

Power Train Reassembly (1958 Models) - Place piston on bench with worm shaft up. Slide cylinder head assembly (with ferrule up) on worm shaft. Check worm shaft seal ring to be sure gap is closed to avoid breaking ring as cylinder head moves against piston flange. Lubricate and install each item in the following order: Lower thrust bearing (thick), lower thrust bearing, lower reaction spring (with small hole over ferrule), lower reaction ring (flange up so ring protrudes through reaction spring), center bearing race, upper thrust bearing, upper thrust bearing race (thin); then start worm shaft thrust bearing nut but do not tighten. Turn worm shaft counterclockwise one-half turn *(CAUTION - Shaft must not be turned out more than one-half turn or cylinder head seal will clear oil ring on worm shaft).* Hold worm shaft in this position while tightening nut to 10 ft. lbs. (early worm shaft), 50 ft. lbs. (late worm shaft to stretch threads). Rotate worm center bearing race several times to position parts. Loosen thrust bearing adjusting nut and retighten it to give a bearing torque of 8-12 inch ounces (early worm shaft) or 8-16 inch ounces (late worm shaft). Check torque by placing several rounds of cord around center bearing race (make loop in end of cord and hook on distributor breaker arm spring scale No. MTU-36). Pull on scale to rotate bearing race should be 8-12 ozs. (early worm shaft) or 8-16 ozs. (late worm shaft). Stake bearing adjusting nut into depression in worm shaft (early type) or nut flange into knurled section of worm (late type), with large radius chisel (early type) or standard drift with ¼" flat point diameter (late type) so staking has to be sheared to remove nut. Recheck torque after staking nut. Install center bearing spacer with dowel pin in slot of center bearing race and with valve lever hole in center bearing spacer and race aligned. Install inner and outer reaction rings (flange down), then install upper reaction spring with cylinder head ferrule through small hole and outer reaction ring protruding through large hole. Install new "O" ring in ferrule groove. Lubricate small bore of column jacket support (for cylinder head ferrule) and install jacket support assembly over worm shaft (carefully engaging cylinder head ferrule and "O" ring and making sure reaction rings enter groove in jacket support assembly). Align parts of power train so valve lever hole in center bearing spacer is 90° counterclockwise from piston rack teeth and lock all parts to worm shaft by entering suit-

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able drift through jacket support and worm shaft groove.

Power Train Reassembly (1959-60 Models) - With Tool C-3676 held in vise, place piston and ring assembly in tool with piston and ring resting in tool land. Pressing down on piston will cause piston ring to bottom in its groove, forcing open ends of ring upwards for ease of locking the piston ring (ring should be positioned with ring hooks in line with ball guide hole). *NOTE - Positioning hooks in this manner will control internal leakage through the ring.* Wire brush knurled area of worm shaft to remove staking deposits Lubricate each part with Automatic Transmission Fluid, then place piston on bench in a vertical position (worm shaft up). Install cylinder head assembly on worm shaft, making sure that gap on worm shaft seal is closed to avoid damaging the ring when cylinder head is bottomed against piston top flange. Install lower reaction plate over ferrule on cylinder head, then install lower reaction ring on pressure plate with flange up so that ring protrudes through pressure plate. Lubricate following parts with Automatic Transmission Fluid and slide them over shaft in the following order Lower (thick) thrust bearing race, lower thrust bearing, center bearing race, upper thrust bearing and upper (thin) thrust bearing race Install a new worm shaft thrust bearing nut and tighten nut as follows Grip piston assembly in a soft jawed vise, then turn worm shaft counterclockwise one-half turn and while holding worm shaft in this position, tighten worm shaft nut to 50 ft lbs to preset the bearings. *CAUTION - If worm shaft is turned more than one-half turn, the cylinder head sleeve will clear the oil seal ring on worm shaft Always position worm shaft oil seal ring before bottoming the cylinder head against piston top flange to avoid damaging oil seal ring* Loosen the adjusting nut and place several rounds of cord around center bearing race, then make a loop in one end of cord and hook the loop of a distributor breaker arm spring scale (Tool MTU-36) in the cord loop Pulling cord will cause bearing race to rotate Retighten worm bearing adjusting nut while pulling on the cord with the scale If adjusting nut is tightened properly, reading on scale should be 8-16 ounces (12 inch ounces preferred) while bearing race is turning. *CAUTION - Place a support under the adjusting nut during the staking operation to avoid brinnelling piston and worm bearings* Stake the upper part of worm shaft adjusting nut into knurled area of shaft as follows Hold a ¼" flat end punch on centerline of worm shaft and perpendicular to worm shaft at a slight angle to nut flange Strike the punch a sharp blow with a hammer and recheck preload If adjusting nut moved during the staking operation, it can be corrected by striking the nut a glancing blow in direction required to regain proper preload After proper preload, stake the nut at three more locations 90° apart around upper part of nut. To test staking, torque nut to 20 ft. lbs in either direction If nut does not move, the staking operation is satisfactory. Recheck adjustment Install center bearing spacer assembly over center bearing race and engage dowel pin of spacer in slot of race and slot of spacer entered over cylinder head ferrule *NOTE - This will align valve lever hole in center bearing race with valve lever hole in center bearing spacer assembly* Place reaction ring (outer) with flange, down against center bearing spacer. Place reaction ring (inner), without flange, inside of the outer reaction ring, with flange, and install upper reaction pressure plate over both reaction rings and over cylinder head ferrule and "O" ring making sure reaction rings enter circular groove in jacket support *CAUTION - Form a .0015" feeler into a coil and insert with jacket support to protect seal lip when installing over worm-shaft serrations* Align parts on power train so that valve lever hole in center bearing spacer assembly is 90° counterclockwise from piston rack teeth and lock all parts in worm shaft by entering a drill rod or suitable drift through jacket support holes and groove in worm shaft

Steering Gear Reassembly (All Models) - Place housing in Tool C-3323 in approximate car position, then lubricate bore of housing with petrolatum and carefully install power train assembly with center bearing spacer valve lever UP to align with control valve lever clearance hole in steering gear housing. *NOTE - Place a .0015" feeler to cover aligning notch in steering gear housing to protect "O" ring seals when installing gear train. Make sure cylinder head is bottomed on housing shoulder. DO NOT remove power train locking pin until all parts are positioned in steering gear housing.* Align valve lever hole in center bearing spacer exactly with clearance hole in housing (use Aligning Tool C-3649). *CAUTION - Do not remove tool until spanner nut is securely tightened.* Install column support spanner nut and tighten to 110-200 ft. lbs. with Tool C-3634. Set piston at center of travel and install gear shaft and cover assembly so that sector teeth index with piston rack teeth. Make sure "O" ring is positioned. Install cover spanner nut and tighten to 110-200 ft. lbs. Install valve lever (double bearing end first) into center bearing spacer through hole in steering housing so that slots in valve lever are parallel to worm shaft, then engage anti-rattle pin in center bearing race. Install valve body on housing making sure that valve lever enters hole in piston. Be sure "O" ring seals are in place, then tighten valve mounting screws to 30 inch pounds.

Bench Test & Adjustment (All Models) - Connect test hoses C-3211 and C-3318 with proper adaptors to hydraulic pump on car with pressure gauge C-3309-B installed between pump and steering gear. Expel all air from unit by turning worm shaft several times to right and left. Temporarily tighten valve body attaching screws to 7 ft. lbs., then with gear shaft on center, tighten gear shaft adjusting screw until backlash just disappears. Temporarily tighten 1¼ turn from this position and while holding adjusting screw, tighten locknut. *NOTE - This procedure will bring piston rack and sector teeth in full alignment.* Turn off hydraulic power to unit and operate unit manually 180° from center in each direction. With hydraulic power to unit and with gear shaft on center plus or minus 2°, readjust gear shaft backlash. This will require loosening adjusting screw until backlash is evident, then retighten adjusting screw until backlash just disappears. Continue to turn adjusting screw for 3/8 to 1/2 turn from this position and tighten locknut to 50 ft. lbs. to maintain this setting. Starting at a point at least one full turn either side of center, the torque at gear shaft required to turn unit through center at 2 RPM in each direction will not exceed 20 ft. lbs. or vary more than 5 ft. lbs. from right to left. Position steering valve to obtain equal torque and tighten valve body attaching screws to 15 ft. lbs. With unit at or near full turn in either direction, attempt to return the unit to center by applying a torque wrench at steering gear cross shaft Hold worm shaft until cross shaft torque builds up to 50 ft. lbs. Release worm shaft and maintain a constant steady pull on cross shaft (turning cross shaft slowly). If cross shaft torque does not drop to 25 ft. lbs. maximum as the piston passes through center, check for too much interior drag, binding valve lever, binding valve spool, or cross shaft adjustment is too tight. With unit under power, but with no load, the torque required to rotate the worm shaft through an angle of 180° (90° either side of center) shall be 6-9 inch pounds. Disconnect test equipment and mounting fixture and install unit in car.

HYDRAULIC PUMP

HYDRAULIC PUMPS: Various types used as follows:

"Slipper Type" Constant Displacement Pump - Used on 1958 Chrysler, DeSoto & Plymouth; 1959-60 All Models. *See "Chrysler, DeSoto, Dodge, Plymouth, Valiant (Slipper Type)".*

Thompson Sleeve Type - Used on 1958 Chrysler. *See "Thompson Sleeve Type".*

Vickers Vane Type (2-Piece Housing) - Used on 1958 DeSoto & Dodge. *See "Vickers Vane Type (2-Piece Housing)".*

EDSEL & LINCOLN "TORSION BAR" POWER STEERING

Eds l (1958) See Note below.
Linc ln (1958-60) See Note below.

►*1958 EDSEL POWER STEERING NOTE: Linkage type power ste ring units used on Pacer and Ranger models and on arly Citation & Corsair models.*

►*1958 LINCOLN POWER STEERING NOTE: "Saginaw ln-Lin " power ste ring units used on early models.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 CYLINDER END CAP LEAKAGE CORRECTION:* Fluid leak at cylinder end cap (when cap is not distorted or blown out or housing is not damaged) can be corrected by installing new "O" ring No. WAN-33822-A and snap ring WAN-33823-B. *CAUTION - Both items can be replaced with gear in car by working end cap out with fingers. Use of compressed air will cock and wedge cap so it cannot be removed.*

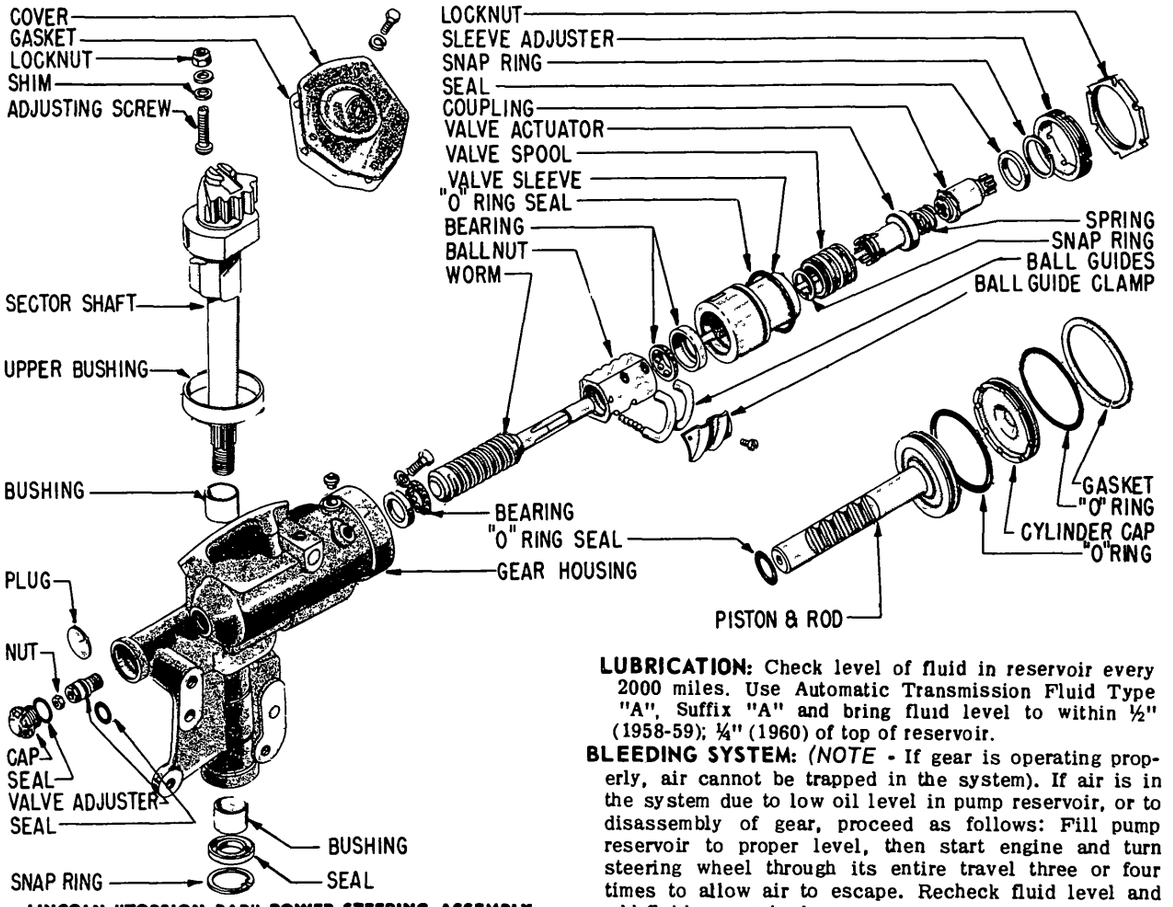
►*1958-59 STEERING GEAR "HISSING" NOISE CORRECTION:* A steering gear "hissing" or "whistling" noise when steering wheel is turned may be caused by inlet tube seat in gear assembly being deformed due to overtightening of pressure hose fitting. To correct, replace tube seat in gear assembly.

►*1959 EATON ROLLER TYPE POWER STEERING PUMP NOISE CORRECTION:* To eliminate the noise in pumps (after cold start), install revised pump carrier, with rollers and cam, Kit No. B9MY-3A711-A. Pumps built after March 11, 1959 have the new parts which are identified by a circled "A" and the words "This Side Up" marked on side of carrier. *See "Eaton Roller Type" Pow r Steering Pumps*

DESCRIPTION: Piston type hydraulic assist power unit having a torsion bar operated control valve combined with a ball nut and worm steering gear enclosed in a single housing. Hydraulic fluid under pressure is supplied to steering gear by a positive displacement type pump. Beginning with 1960 models, steering gear housing, piston rod, cylinder cap and cylinder cap retaining ring were changed to accommodate internal gear stops on power piston and for the later type double lipped sector shaft seal which replaced the former single lip seal. Manual steering is available at all times in the event of loss of hydraulic pressure.

PUMP BELT ADJUSTMENT: ½" deflection with moderate pressure on belt midway between pulleys. Move bracket on support to adjust.

STEERING GEAR ADJUSTMENT: Centering Valve Spool - *(NOTE - This is the only steering gear adjustment that can be made with steering gear installed in car).* Attach pressure gauge in high pressure line between power steering pump and steering gear. Start engine and rotate wheel several times to bring oil up to normal operating temperature. With a spring scale on rim of steering wheel, and steering gear centered, note the amount of pull required to make a left and right hand turn. The difference should not be more than ½ lb. If more than ½ lb., remove adjuster cap at lower end of steering gear and install Tool 3553-K. Loosen locknut and turn adjusting wrench in the direction of the lighter scale reading. *(NOTE - If less force required to turn wheel to left than to right, turn adjusting wrench to the left).* Recheck reading and lock jam nut. Install cap.



LINCOLN "TORSION BAR" POWER STEERING ASSEMBLY

Worm Bearing Preload & Sector Mesh Adjustments - Disconnect steering gear pitman arm from steering connecting link, loosen sector adjusting screw nut and back off adjusting screw. Attach spring scale to rim of steering wheel. Pull required to keep wheel moving from one complete turn off high spot should be ½ - 2/3 lbs. When preload not correct, proceed as follows: Loosen steering shaft bearing adjuster lock nut and tighten or back off adjuster until preload is within specifications, then tighten lock nut and recheck preload. Turn steering wheel to either stop then return 2 1/8 turns to center point. Turn sector adjusting screw until steering wheel pull is 1-1½ lbs. (1958-59); 1½-2 lbs. (1960) to rotate worm through center point. Tighten sector adjusting screw locknut and recheck mesh adjustment. *NOTE - Ther should be no backlash at 30° ither sid of center point. R install pitman arm.*

LUBRICATION: Check level of fluid in reservoir every 2000 miles. Use Automatic Transmission Fluid Type "A", Suffix "A" and bring fluid level to within ½" (1958-59); ¼" (1960) of top of reservoir.

BLEEDING SYSTEM: *(NOTE* - If gear is operating properly, air cannot be trapped in the system). If air is in the system due to low oil level in pump reservoir, or to disassembly of gear, proceed as follows: Fill pump reservoir to proper level, then start engine and turn steering wheel through its entire travel three or four times to allow air to escape. Recheck fluid level and add fluid as required.

HYDRAULIC PRESSURE TEST: Connect pressure gauge in pressure line between pump and steering gear housing. Let engine idle until oil reaches operating temperature, then turn steering wheel for a full right and full left turn to the wheel stops. *(CAUTION - Hold whe ls in this position only long enough to obtain an accurat reading).* Pressure should be 900-1150 lbs. (1958); 975-1100 lbs. (1959-60). If pressure is less than minimum specification, close valve at gauge and note pump pressure. If it is low with valve closed, pump is not operating properly. If pressure goes up with valve closed, low pressure in system would be due to internal leakage in steering unit (providing all connections are tight).

SECTOR SHAFT OIL SEAL: Removal - Raise front of car and remove sector shaft (pitman arm) nut. Use Puller 3590-AA (1958); 3590-E (1959-60) and remove pitman arm, then pry seal out of housing.

Installati n - Place Seal Adapter 3576-J on sector shaft, then place seal on adapter. Install seal with Tool 3591-A. Install pitman arm and sector shaft nut,

CONTINUED ON NEXT PAGE

EDSEL & LINCOLN "TORSION BAR" POWER STEERING (Cont.)

tighten nut to 120-130 ft. lbs. Fill system with Auto. Trans. Fluid Type "A".

TROUBLE SHOOTING

►*NOTE* Conditions listed below are attributable to Power Steering Units and do not include items common to both Conventional & Power Steering.

HARD STEERING: Improper gear adjustment, insufficient or incorrect hydraulic fluid, pump belt out of adjustment, pump output low, air in system, valve spool out of adjustment, or valve spool sticking.

HARD STEERING (Straight Ahead): Steering adjustment too tight, steering gear shaft binding.

HARD STEERING (Turning or Parking): Oil level low, pump pressure low, oil leakage past "O" rings, pressure loss between valve spool and sleeve or past piston ring or scored housing bore.

LOOSE STEERING: Fluid level low, insufficient mesh load, insufficient worm bearing load or valve spool out of adjustment.

WANDERING: Steering gear adjustments too tight or gear backlash excessive.

ROAD SHOCKS: Improperly adjusted steering gear.

BINDING OR POOR RECOVERY: Steering gear binding or out of adjustment, valve spool binding due to dirt or burred edges, valve spool out of adjustment, interference at sector shaft arm and ball stud.

LOSS OF POWER ASSIST: Pump inoperative, lines damaged, power cylinder damaged, valve spool out of adjustment.

LOSS OF POWER ASSIST (One Direction): Valve spool out of adjustment, by-pass valve in control valve inoperative.

NOISY PUMP: Air being drawn into pump, lines touching other parts of car, oil level low, excessive back pressure from obstructions in line, or excessive wear of internal parts.

POOR RETURN TO CENTER: Valve spool sticking or out of adjustment.

STEERING WHEEL SURGE WHEN TURNING: Valve spool sticking.

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

Edsel (Pushbutton Shift Control) Type: Removal - Disconnect battery then pry off button trim plate medallion Remove two screws from trim plate and lift off plate Pull off pushbuttons and unscrew three screws from inside horn ring and hub, and lift off ring and trim pad Remove three nuts holding horn blowing contact plate assembly and steering wheel to lower hub, then lift contact plate out of hub, and remove steering wheel

Installation - Reverse removal procedure

Lincoln (1958-59): Removal - Remove cap and emblem from wheel by inserting a flat implement between steering wheel hub and horn ring and pushing up Remove steering shaft nut, then remove wheel with Tool 3600-A Remove three screws from rear of steering wheel hub and remove horn ring, coil spring and contact ring or insulator

Installation - Reverse removal procedure

Lincoln (1960): Removal - Remove cap and medallion from steering wheel by depressing and turning cap counterclockwise Remove steering shaft nut and remove wheel with Tool 3600-AA Remove turn signal indicator cam from steering wheel hub, then remove four nuts retaining horn ring and brush plate to steering wheel Separate parts being careful to note insulator washers on each retaining bolt *NOTE - If necessary to replace horn contact wire assembly, remove turn signal lever and switch plate, steering shaft bearing retainer and lower column shroud. Disconnect steering shaft at coupling and remove shaft and bearing Remove two flange-to-selector lever socket nuts and separate the two parts. Remove horn wire bracket screw and remove wire assembly*

Installation - Reverse removal procedure, positioning turn signal indicator cam on steering wheel hub so opening in side of cam will face 180° opposite turn signal indicator switch assembly when steering wheel is installed in straight ahead position Tighten steering wheel nut to 20-25 ft lbs and stake nut in position

STEERING GEAR REMOVAL & INSTALLATION

REMOVAL: Edsel - Remove battery ground cable at battery, cover front seat and seat back, disconnect signal wires at connectors behind instrument panel to left of steering column, Remove selector switch terminal block-to-lower end of steering column screws and secure block to one side. Remove steering column-to-instrument panel clamp, lower column slightly from car. Use suction gun to remove fluid from pump reservoir and place drain pan to catch oil from system. Disconnect pressure return hoses at power steering gear and drain steering gear by turning it to full travel in each direction. Raise car and use Tool 3590-E to remove pitman arm from sector shaft. Remove steering gear to frame screws and lower steering gear through linkage.

Installation - Work steering gear up through linkage into position on frame with shim between gear assembly and frame side member at rear bolt but do not tighten retaining screws. Line up master spline in steering gear shaft coupling with master spline in steering shaft and install steering column and wheel assembly, engaging dowel in instrument panel with hole in steering column. Install but do not tighten column bracket screws. Tighten steering gear bolts to 40-50 ft. lbs., then tighten steering column bracket screws to 10-13 ft lbs. Attach switch block to lower side of steering column and connect directional signal wires at connector. Turn steering wheel to both extremes while counting number of turns, then return wheel to center position (½ number of turns). Install pitman arm (large spline on sector shaft with wide groove in arm) and tighten nut to 120-130 ft. lbs. *CAUTION - DO NOT drive pitman arm on with a hammer.* Reinstall return and pressure lines, fill pump reservoir, start engine and turn steering wheel through several extreme right and left turns to bleed system. Refill reservoir. With engine running, pull required to turn wheels full right or left should be 3½-4½ lbs.

REMOVAL: Lincoln - Remove pressure and return lines from steering gear (raise lines to minimize fluid leakage) and remove power brake assembly. Remove steering shaft coupling bolts and remove pitman arm with Tool 3590-AA. Remove gear assembly-to-underbody rail bolts and remove gear from vehicle.

Installation - Place steering gear against side rail and tighten bolts to 40-50 ft. lbs. Install pitman arm with large spline on sector shaft aligning with large groove in arm and tighten nut to 120-130 ft. lbs. *CAUTION - DO NOT drive pitman arm on with a hammer.* Replace power brake assembly, assemble steering shaft coupling, pressure and return lines. Torque pressure line to 10-15 ft. lbs. and return line to 20-30 ft. lbs. Fill and bleed power brake and steering systems.

OVERHAUL

DISASSEMBLY: *NOTE* - Keep bench, tools and parts clean and DO NOT use magnetized tools.

1) Remove steering shaft coupling (support shaft while driving out pin to protect valve sleeve bearing) and drain fluid. On Edsel, place Tool 3524 on end of worm shaft (and spring scale on tool), then measure effort required to turn worm shaft from end of travel through center section It should require 1-1½ lbs. more effort through center position

2) Remove cylinder cap snap ring *(See "Tool Note" above)*, and cap. Remove cap "O" ring.

3) With gear housing in vise, install tool 3524 on worm shaft and turn worm shaft to bottom piston in housing then back off 2 turns (Edsel), 2 1/8 turns (Lincoln) to center gear.

4) With worm bearing preload and sector mesh adjusted correctly (see "Adjustments"), check backlash between sector gear and piston rack as follows Place dial indicator on center of piston, turn worm shaft to move piston .020" toward open end of bore and return piston until indicator returns to zero. *NOTE - DO NOT back up piston should indicator move past zero, but return to above step.* Push piston down (by hand) to bottom of travel and note indicator reading while holding piston under pressure. Backlash should not exceed .004". When backlash exceeds .004", replace piston with one having oversize gear rack.

5) Loosen sector shaft lock nut and adjusting screw. Remove housing cover screws, then tap lower end of shaft with lead hammer to remove sector shaft, cover, and gasket.

6) Slide cover to one side to release adjusting screw from shaft and remove adjusting screw

7) Use pry through sector shaft bore to remove piston from housing and remove piston "O" ring from bore.

8) Loosen valve sleeve locking screw and remove valve spool adjuster cap with Tool 3553-L and remove "O" ring from cap Remove thrust bearing locknut, control valve sleeve adjuster nut (Tool 3821), torsion bar and sleeve assembly (tap lower end of torsion bar with soft hammer) Remove sector shaft seal retaining ring with Tool 33621 and gear housing snap ring with Tool 1175-AE

Torsion Bar & Sleeve Disassembly: 1) Use cloth to clamp ball nut assembly in vise and remove valve spool sleeve from torsion bar assembly and remove "O" ring from sleeve. Remove valve spool adjuster lock nut, valve spool adjuster, and adjuster "O" ring.

CONTINUED ON NEXT PAGE

EDSEL & LINCOLN "TORSION BAR" POWER STEERING (Cont.)

2) Remove torsion bar, valve spool, and actuator from worm shaft by tapping end of bar with soft hammer. *CAUTION - Valv spool and actuator are spring loaded.*

3) Remove worm thrust bearing and cup from gear housing, then separate valve spool and actuator assembly from torsion bar by turning valve spool and actuator while holding torsion bar.

4) Use Tool 33621 to remove valve spool snap ring and remove actuator. Check ball nut assembly for binding or rough spots in the assembly. *CAUTION - DO NOT disass mbl th ball nut assembly unless check indicates binding or rough spots and DO NOT rotate ball nut against nd of worm shaft.*

Ball Nut Disass mbly - Remove ball nut guide retainer, ball guides, then turn nut over and remove balls by rotating worm shaft from side to side. *NOTE* - Keep balls in clean pan on clean cloth. Remove ball nut from worm shaft noting position of ball nut on worm shaft.

Cl aning & Insp cti n - Wash all parts in clean solvent and blow dry. Check worm, ball nut grooves, and all balls for wear or scoring. *NOTE - Worm and ball nut are servic d as matched assembly.* Inspect ball nut teeth for pitting, wear or scoring. Be sure ball return guides where balls enter and leave are not damaged.

Ball Nut R ass mbly - 1) Slide ball nut over worm for correct position and align ball return guide holes with worm groove. Drop exactly 31 balls (one circuit capacity) into both guide holes of one circuit while alternately turning worm in opposite directions. Fill circuit from bottom of one guide hole to bottom of other guide hole. The remaining balls should fill the return guide.

2) Coat groove of one half of return guide with clean solvent grease and place remaining balls in guide. Place other half of guide over balls.

3) While holding two halves together, push guide into guide holes in gear rack. Tap guide lightly with soft hammer as necessary to seat it. Fill second ball circuit in same manner and attach guide clamp with lockwasher and retaining screws.

Ste ring G ar H using Disassembly, Inspection, Reass mbly: Clean thoroughly with solvent and blow out all passages. Inspect housing for cracks or stripped threads and mating surfaces for burrs. Check fluid passages for obstructions or leakage and inspect housing bore. Replace housing if scored or worn. Check sector shaft bushings in housing for wear and replace as necessary.

1) Remove lower worm bearing cup and inspect for wear. Use Tool 3553-D to remove upper bushing. *NOTE* - Be sure jaws of tool are properly seated on edge of bushing.

2) Remove sector shaft lower bushings separately from each end of sector shaft housing with Tool 3553-A and 3553-C1 and C2 with small outside diameter of Tool 3553-C2 toward bushing to be removed. *NOTE* - Spread jaws of tool until they are properly seated on edge of bushing. To install upper bushing, place it on Tool 3353-F and drive into housing.

3) Install lower sector shaft bushing with Tool 3553-E2 and E1 and handle Tool 3553-B, then install lower worm bearing and cup in housing.

Sector Shaft & Piston Inspection: 1) - Replace sector shaft when worn, pitted, or scored.

2) End play of adjusting screw in slot in sector shaft should not exceed .002". Check with feeler gauge between head of screw and bottom of slot in shaft. Insert proper shim to correct end play (available in .063", .065", .067" and .069" sizes).

3) Cneck piston rack teeth for pitting, wear and scoring, then check piston for cracks. Check "O" ring grooves in piston rack bore, piston, and cylinder cover for burrs and nicks. Check cylinder cover for nicks.

Torsion Bar & Sleeve Reassembly: 1) - Inspect splines on torsion bar for nicks, pitting, wear or scoring. Replace torsion bar assembly when blind spline on torsion bar DOES NOT line up with punch mark on upper end of assembly (large splined end).

2) Place actuator on torsion bar with spring in place. Hold torsion bar and turn actuator. Spring should pop actuator off threads when released. Replace spring and check for burrs on gear teeth when spring does not pop off.

3) Torsion bar bearing should be free to rotate. If bearing is satisfactory replace oil seal. If not satisfactory, remove bearing and seal together with Tool 3583-J.

4) Use Tools 3583-J and 3583-J2 to install torsion bar bearing in sleeve and use same tools to install seal. Install snap ring and check bearing operation.

5) Lubricate parts with Auto. Trans. fluid and check fit of worm gear outer race to insure that it is a hand fit. Install bearing and race on worm shaft.

6) Place valve spool on actuator and secure with snap ring. Spool must operate freely.

7) Place torsion bar spring and actuator on torsion bar and turn shaft so that the two identifying punch marks are in line. Hold assembly together and insert torsion bar into worm (aligning blind spline on torsion bar with scribed line on end of worm). *NOTE* - Torsion bar assembly is installed properly when valve spool bottoms against upper bearing and cup.

8) Install new "O" ring on valve spool adjuster. Install adjuster on torsion bar but do not tighten. Install lock nut and lubricate lip of torsion bar seal with Auto. Trans. fluid.

9) Place Tool 3591-B on upper worm shaft and install valve sleeve over spool until worm gear upper race is seated in recess of sleeve. Install new "O" ring seal on sleeve.

REASSEMBLY: 1) Align slot in sleeve with lock screw in housing and install torsion bar and sleeve assembly in housing. Tap on sleeve until it bottoms, then tighten lock screw to 15-20 ft. lbs. *NOTE* - When properly installed, lock screw and brass washer will be seated against housing.

2) Install pre-load adjusting nut and lock nut, then place Tool 3524 on lower shaft and check worm bearing preload. Adjust to½-2/3 lbs. on spring scale. *CAUTION* - Final adjustment must always be made on a tightening stroke.

3) Install spool valve centering wrench Tool 3553-K on valve spool adjuster and center valve spool until only "valley" between lands can be seen through pressure port. Hold torsion bar with Tool 3524 while turning centering wrench. Lock centering screw with locknut. *NOTE* - This is preliminary adjustment, final adjustment made on car.

4) Center ball nut with centerline of sector shaft opening and install new "O" ring in piston rack bore of housing and lubricate.

5) Use hand hone to carefully hone all edges of piston rack teeth to save damage to piston rack bore "O" ring during installation.

6) Install new "O" ring on piston and install piston in housing, then align center rack teeth with sector bore in housing (third groove in piston rack).

7) Grease splines of sector shaft and install it making sure that sector shaft is centered by installing Tool 3524 on torsion bar and rotating worm shaft. There should be at least four (4) turns from one stop to the other. Reinstall sector shaft when minimum turns not possible.

8) Use Tool 3591-A to install sector shaft seal with seal protector Tool 3576-J, and install snap ring.

9) Use proper shim and install sector shaft adjusting screw in slot in sector shaft and place housing cover (with new gasket in place) over adjusting screw. Turn screw until cover is seated. Tighten cover screws to 15-20 ft. lbs.

10) Adjust sector shaft (see "Adjustments" above) and check piston rack backlash. Install new "O" ring on cylinder end cap, install cap and secure with snap ring.

HYDRAULIC PUMP

HYDRAULIC PUMPS: Various types used as follows:

Eaton Roller Type (Belt Driven) - Used on 1958-Early 1959 Lincoln and on some 1958 Edsel model. *See "Eaton Roller Type Power Steering Pumps".*

Eaton Roller Type (Crankshaft Mounted) - Used on Late 1960 Lincoln. *See "Eaton Roller Type (Crankshaft Mounted)Power Steering Pumps".*

Van Typ (Crankshaft Mounted) - Used on Late 1959 & Early 1960 Lincoln and on some 1958 Edsel models. *See "Edsel, Lincoln, Mercury (Crankshaft Mounted) Power Steering Pumps.*

SAGINAW (NOT IN LINE)

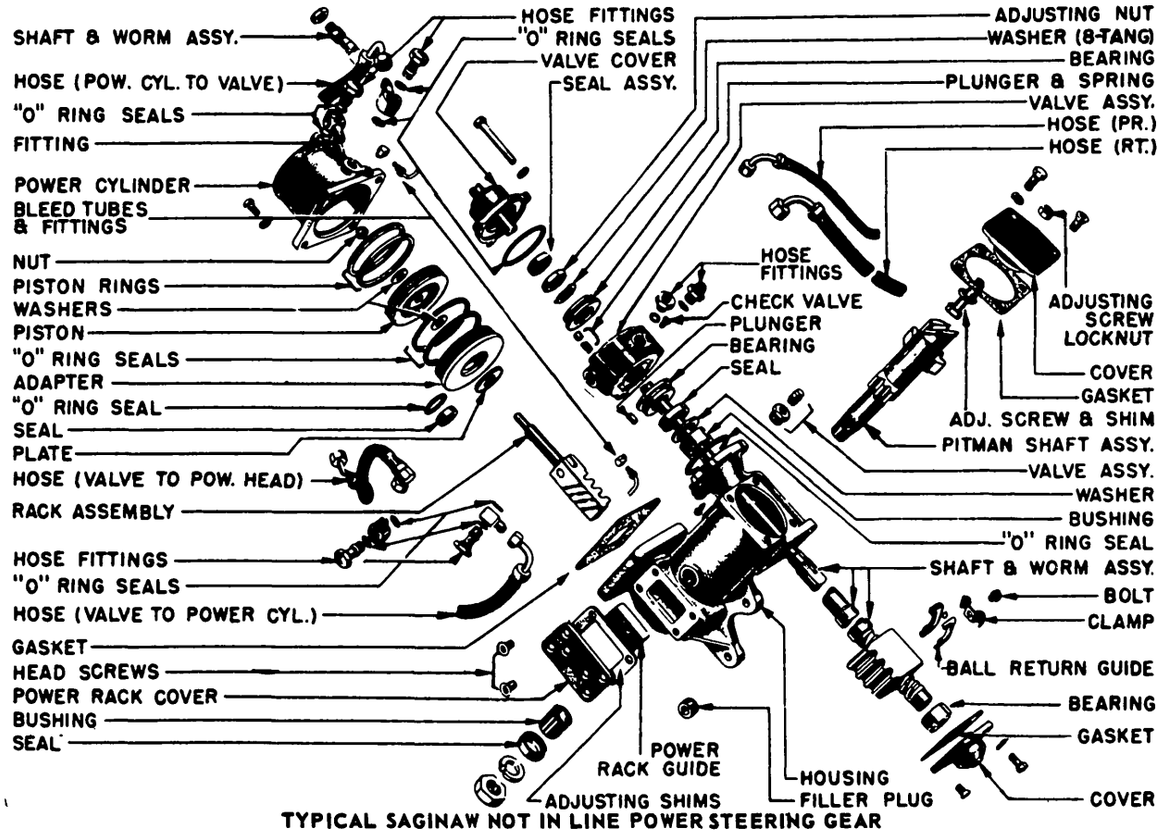
Buick (1954-55)
Cadillac (1954-55)
Chevrolet (1954)
Lincoln (1954-55)
Oldsmobile (1954-55)
Packard (1957-58)
Pontiac (1954-55)
Studebaker (1954-Early 1959)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 VICKERS PUMP FRONT SHAFT SEAL PRODUCTION CHANGE (To Reduce Leaks):* Front shaft seal, Part No. 5681410, replaces Vickers Seal, Part No. 5665833, used in early production. New seal has greater lip pressure than previous one. A hardened shaft, Part No. 5681681, **must** be used with new seal and may be used with old type seal. New shaft and seal are carried in package, Part No. 5681951. Pumps with new seal have smaller reservoir and are marked with daub of green paint on front of hub body instead of yellow daub at same place on earlier pumps. New hardened shaft is identified by a daub of green paint on threaded end of shaft or by a machined groove on the .75" diameter adjacent to splined end of shaft. To service pumps built after change use Master Kit, Part No. 5681964, and for those built prior to change use Master Kit, Part No. 5682130 (includes new shaft and seal).

►*1954 CADILLAC "CHATTER" CORRECTION:* Some cases of chatter (not chuckle) may be noted on cars built previous to Engine No. 01688 when making light turns or parking. Noise is particularly noticeable after reversing direction of steering wheel rotation when backing into a parking space. To correct, replace valve body assembly.

►*1954 CHEVROLET LEAD OR WANDER CORRECTION:* Cenerally can be attributed to improper assembly of valve body assembly or improper usage of "O" ring seals. Trouble in valve body assembly can be checked by end motion of steering shaft with respect to its housing while oscillating pitman arm between right and left turn positions. Measurement in excess of .002" indicates that valve has excessive free movement in the valve body and can be allowing fluid to pass to power cylinder. If in excess of .002" check valve spool for proper installation and check for proper "O" ring usage. Turn valve spool over and recheck. If endplay still excessive, replace valve body assembly.



TYPICAL SAGINAW NOT IN LINE POWER STEERING GEAR

►*1954 PONTIAC BELT ADJUSTMENT CORRECTION:* In some cases it is not possible to adjust belt tension as specified due to interference between pump body and bracket. If belt is in good condition, place flat washer on each of three mounting studs, under bracket, to raise bracket and pump.

►*1955 BUICK STEERING SHAFT BUSHING PRODUCTION CHANGE & STEERING SHAFT RATTLE CORRECTION:* A new nylon, spring loaded, steering shaft upper bearing, Part No. 1169623, is used in production and is available for service replacement. Replace the former fabric bearing, Part No. 5664839 to eliminate steering shaft rattle and chucking noises.

►*1955 PONTIAC POWER ST. VALVE CENTERING SPRINGS & PLUNGER PRODUCTION CHANGE:* Early type springs are shorter (.660") and are plated. Plungers are grooved. Later type springs (.760") are plain steel (not plated), and plungers do not have a groove. These parts are interchangeable in complete sets only.

►*1956 STUDEBAKER & PACKARD POWER STEERING GEAR NOISE CORRECTION:* If excessive gear "chuckle" is evident, check to see if "T" mark on steering gear flange is properly located in relation to mid-position or "high point" of gear. If this condition exists, then pitman arm will not be centered and the left tie-rod will be short and the right tie-rod will be longer. To correct, center front wheels, then remove steering wheel and reposition it 90° clockwise in relation to existing mark. Install retaining nut and horn ring, then turn steering wheel back to normal horizontal position which should place gear on "high point". This should also center steering bellcrank. Readjust tie-rods to obtain a straight ahead front wheel setting and adjust toe-in.

►*1957-58 STUDEBAKER & PACKARD STEERING POST FLANGE PIN CHANGE:* To improve flange fit on steering post, install flange pin, Part No. 1547173 and flange, Part No. 533251 as follows: Remove steering wheel, post and jacket and remove old flange. Remove post from jacket assembly, then assemble old flange on post (with new lower insulator and with "T" marks aligned), adding sufficient washers so nuts can be tightened. Position assembly in drill press vise or "V" blocks, then align old flange on post by centering drill through flange and post. Lock post in vise or "V" blocks, then remove drill and install new flange with insulator. Drill a 3/16" hole through new flange.

DESCRIPTION

DESCRIPTION: Power steering unit consists of a conventional Saginaw Recirculating Ball Bearing Worm & Nut type steering gear with an additional hydraulic power and control assembly. Hydraulic power assist is effective when a pull of 3-4 lbs. or greater is exerted at steering gear rim.

ADJUSTMENT

►*ADJUSTMENT CAUTION: When ver hydraulic system is disturb d by disconn cting lin s, r m val or installation of units, tc., hydraulic system must be bl d to remov air. S "Bl eding Hydraulic System" bel w.*

C NTINUED N NEXT PA E

SAGINAW (NOT IN LINE) (C ntinu d)

1954 MODELS

►*LINCOLN ADJUSTMENT NOTE:* All adjustments of steering gear are to be made with unit removed from vehicle and disassembled. *See Overhaul.*

►*OLDSMOBILE & STUDEBAKER ADJUSTMENT NOTE:* All adjustments of steering gear, except high spot adjustment, are to be made with unit out of car. *See Overhaul.*

Adjustm nts n Car: *CAUTION–BEFORE MAKING ADJUSTMENTS,* disconnect drag link at pitman arm, check tightness of pitman arm nut, check steering gear for binding by turning steering wheel slowly from one end position to the other *(CAUTION–*Do not turn steering gear hard against stops in end position to avoid damage to ball nut mechanism). Correct any binding due to misalignment before attempting to adjust steering gear.

Cadillac Alignm nt N te–Check alignment as follows: Loosen all three gear-to-frame mounting screws, tighten front screw only, check clearance between housing and frame at rear mounting screws and shim as required to fill the gap. If no clearance noted at rear screws, loosen front screw and tighten rear screws. Check clearance at front screw and shim as required to fill the gap. Tighten all three screws to 40-50 ft. lbs. torque. Recheck steering gear for freedom from binding.

Off-C nt r Pre-l ad Ch ck (Unit on Car)– Proceed as follows:

Buick–Disconnect pitman arm from intermediate tie rod, then loosen four corner bolts of the power rack guide cover about 1/2 turn or just enough to assure lash between power rack and pitman shaft sector (NOTE–If bolts loosened too much, rack will bind on sector teeth). Turn steering wheel 2-3/4 turns from either extreme position to center ball nut on the central "high point" of pitman shaft sector (At this position center spoke of wheel should be straight down). Turn pitman shaft adjusting screw clockwise until lash between pitman shaft sector and ball nut is just removed (check by working pitman arm), then tighten locknut. Turn steering wheel two turns either way from central position and check pull with scale at rim of wheel and pulling at 90° to spoke. This should be 3/8-3/4 lb. (1952-53), 1/2-1 lb. (1954).

Cadillac–Disconnect drag link at pitman arm. Back off power rack and pitman shaft adjusting screws at least 1/2 turn. Using spring scale, check "off-center" pull through at rim of steering wheel. This should be 7/8-1 1/8 lbs. (1952-53), 3/8-3/4 lb. (1954).

►*NOTE–*If readings outside above limits it will be necessary to remove unit from car.

Pitman Shaft Adjustm nts–*Two separate adjustments required as f ll ws:*

Oldsm bil & P ntiac Adjustment N te–Special "offset" screwdriver required for this adjustment.

Stud bak r Adjustm nt N t –Steering Gear Adjusting Tool J-5563 is used in lieu of steering wheel for pitman shaft adjustment.

1) High Sp t r Pitman Shaft-t -Ball Nut Lash (Pitman Shaft Endplay)–Loosen power rack cover bolts. Turn steering wheel slowly through its full range to check for freedom of movement, then turn wheel back to midway position to center ball nut on central high point of pitman shaft. Turn steering wheel shaft 45° right or left of center. Place spring scale on spoke of wheel at rim and pull on scale, at a 90° angle to spoke, to turn steering wheel. Adjust pitman shaft adjusting screw so that pull on 9" radius to turn wheel smoothly over center high spot is:

Buick–1/2-3/4 lb. **higher** than in "Off-Center Pre-Load Check".

Cadillac–1/2-1 lb. **higher** than in "Off-Center Pre-Load Check".

Chevrolet–1 1/8–1 1/2 lbs.

Oldsmobile–1 3/4 lbs. maximum.

Pontiac–1-1 1/2 lbs.

Studebaker–1/2-1 lb.

Note–Lincoln "High Spot" adjustment included in overhaul.

Record reading for Power Rack Guide adjustment.

2) Pitman Shaft-to-Power Rack Lash (Power Rack Guide Adjustment)–Tighten power rack cover bolts. Turn steering wheel slowly through its full range to check for freedom of movement, then turn wheel back to center position. Turn steering wheel shaft 45° right or left of center. Place spring scale on spoke of wheel at rim and pull on scale, at a 90° angle to spoke, to turn steering wheel. If power rack cover shims have been selected properly there will be a preload in addition to over-center or pitman shaft adjustment when column shaft is rotated past center high spot as follows:

Buick–1/4-1/2 lb. higher than in 1) or 1 1/4–2 1/4 lbs.

Cadillac–1/8-1/4 lb. higher than in 1) or 1 1/4–2 lbs.

Chevrolet–1/8 lb.

Pontiac–No increase.

Note–Lincoln, Oldsmobile, and Studebaker "Power Rack Guide Adjustment" included in overhaul.

If adjustment is above or below that specified, add or subtract shims. Subtracting shims will decrease reading and adding shims will increase reading.

NOTE–Add or subtract one .003" shim (.003", .005", and .010" available) at a time until desired reading is reached. After all adjustments made, there should be no perceptible backlash in sector shaft when column shaft is rotated 30° either side of center. Recheck of over-center adjustment after complete assembly of column jacket, gear one turn off center, and pitman arm disconnected, should give following minimum to maximum readings:

Buick–1 1/8–2 lbs.

Cadillac–1-2 lbs.

Chevrolet–1-5/8 lbs. maximum.

Pontiac–1–1 1/2 lbs.

Worm Thrust Bearing Adjustment–This adjustment normally made when assembling steering gear and **can nly b mad with st ring gear ut f car.** If adjustment required in service, remove steering gear from car. *For adjustm nt proc dur s e St ring Gear Ov rhaul (following).*

PUMP DRIVE BELT ADJUSTMENT: Adjust as follows:

Buick - Belt should have 3/8" deflection with thumb pressure applied midway between pulleys. To adjust, loosen pump mounting bolts and shift pump horizontally (bolt holes in bracket slotted).

Cadillac - If belt squeals on hard turns, belt is too loose. Adjust by loosening pump to bracket screws and moving pump outward to torque wrench reading of 13-15 ft. lbs. Tighten screws to 25-29 ft. lbs.

Chevrolet - Loosen inner bracket to pump and outer bracket to pump fixed mounting bolts. Insert Belt Tension Adjusting Tool J-5470 between pulley and pump with inner end of tool resting under pulley hub and not in tool over head of outer fixed mounting bolt. Pull outward on torque wrench until a torque of 14 ft. lbs. is obtained. Tighten mounting bolt at slotted hole, remove tool and torque wrench, then tighten fixed mounting bolt.

Lincoln - Lift up on pulley to tighten belt. Do not lift on reservoir. Belt tension should have 5-7 lbs. pull at ¼" deflection. Torque 35-50 ft. lbs.

Oldsmobile - Use Belt Tension Adjusting Tool J-5192 and Torque Wrench. Loosen inner and outer bracket-to-pump mounting screws (inner screw hole slotted), insert adjusting tool between pulley and pump with inner end of tool under smaller diameter of pulley hub and notch in tool over head of outer mounting screw. Pull outward on torque wrench until reading of 30 ft. lbs. (new belt), 20 ft. lbs. (broken-in belt) obtained, tighten mounting screws before slacking off on wrench. This setting corresponds to belt deflection of 7/8" with 25 lbs. pressure midway between pump and fan pulleys.

Pontiac - Loosen pump to bracket attaching bolts two full turns so pump falls free of own weight. Place pump belt tightener J-5452 (Eaton type pump); J-5574 (Vickers type pump) over head of upper bolt so that curved portion of tool fits under pulley. Using ½" drive 0-100 ft. lbs. torque wrench perpendicular to tool, apply torque of 43-45 ft. lbs. (Eaton Pump); 58-65 ft. lbs. (Vickers Pump - New belt); 51-53 ft. lbs. (Vickers Pump - Used belt). Tighten lower pump to bracket attaching bolt. Remove tool and tighten upper attaching bolt.

Studebaker - Belt deflection should be 1/4-3/8" with pull of four lbs. at point midway between pump and crankshaft pulleys. Slots provided at mounting screws in bracket to permit shifting pump body to secure proper belt tension.

1955 & LATER MODELS

ADJUSTMENT: (ON CAR)–Before making adjustments, disconnect drag link at pitman arm, check tightness of pitman arm nut, and check steering gear for binding by turning steering wheel slowly from extreme right to extreme left *(CAUTION–*Do not turn steering wheel hard against stops in end position to avoid damage to the assembly). Correct any binding due to misalignment before making adjustments. Loosen four corner bolts of power rack guide cover about one-half turn or just enough for lash between rack and sector.

►*BLEEDING HYDRAULIC SYSTEM NOTE: Syst m must be bled for mov air wh n v r lines ar disconn cted r units r moved and install d.*

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High Spot Adjustment (Pitman Shaft Sector-to-Ball Nut Lash): As follows:

Buick—Turn wheel to extreme right or left position. Attach scale J-544-A to a spoke at rim of wheel and, while pulling scale at 90° to spoke, check pull required to turn wheel steadily in the range where lash normally exists between pitman shaft sector and ball nut (lash range is 1/8 turn of steering wheel from either extreme position). Reading on scale should be between 1/2 and 7/8 lbs. (If not within these limits, check steering column alignment at frame mounting bolts, faulty steering shaft upper bearing, or worm thrust bearing adjustment). If reading within limits, turn steering wheel 2¾ turns from either extreme position to center ball nut on "high-spot" of sector (center spoke of wheel should be straight down). Turn pitman shaft adjusting screw clockwise until lash between sector and ball nut is removed (check by working pitman arm), then tighten locknut. Turn steering wheel 2 turns in either direction from center position and check pull with scale. This should be between 1/2 and 7/8 lb., record this reading for reference. Turn steering wheel back to near center position and check pull required to turn wheel through "high spot". Turn pitman adjusting screw clockwise as required to obtain a scale reading ½-¾ lb. higher than that obtained at end position of travel, after locknut tightened. Record this latest scale reading for "Power Rack Adjustment" reference, below.

Cadillac—Check flexible steering shaft coupling for distortion and correct as necessary. Using spring scale J-544-A, check the "off-center" pull through at rim of steering wheel which should be 3/8 to 3/4 lb. (If reading not within these limits, remove steering gear and check thrust bearing locknut torque which should be 30 ft. lbs.). Check for binding or rough bearings in upper and lower thrust bearing retainers. Adjust pitman shaft endplay screw until pull through center is ½-1 lb. greater than pull at one full turn off center.

Lincoln—Adjustments on car are not recommended, and should be performed when steering gear is removed for overhaul or when being installed.

Oldsmobile—Turn steering wheel through full range (5½ turns), to check for free action; then, turn wheel back one full turn from right or left position. This positions wheel in middle of lash range. Attach spring scale J-544-A to spoke of wheel at the rim, and while pulling on scale steadily at 90° to spoke, observe amount of pull required to turn wheel through lash range (record this reading for reference). Turn wheel to center position (2¾ turns from full right or full left) and observe the amount of pull required to turn wheel through the "high spot" (center) range. This should be 5/8 lb. more than the amount recorded in lash range. Adjust pitman shaft adjusting screw to obtain the correct amount of pull at the "high-spot" and tighten adjusting screw locknut.

P ntiac—Loosen pitman shaft adjusting screw locknut and back off adjusting screw a few turns, using an offset screwdriver. With steering gear on "high-spot" (center position), adjust pitman shaft thrust screw so that pulling on steering wheel rim through a 3" arc using J-544-A spring scale, is 1-1¾ lbs., through the center "high-spot". Tighten locknut and recheck pull through "high-spot".

Studebaker—The "high -spot" and power rack adjustments should be made while steering unit is out of car, although minor changes can be made in "high-spot" adjustment with the unit installed.

Power Rack Guide Adjustment: This adjustment must be made after "High Spot" Adjustment completed.

Buick—Tighten the four power rack guide cover bolts and recheck pull through the "high spot". The scale reading should be ¼ to ½ lb. higher than the final reading taken in "High Spot" Adjustment (above), or between 1 1/8 & 2 lbs. If reading is not within these limits, add or remove shims as required to obtain the specified pull through the "high spot". Guide cover shims are available in .003" and .005" thicknesses.

Cadillac—Using tool J-5648, tighten the power rack adjusting screw so that "high spot" pull through (see above), is 1/8 to 1/4 lb. higher than that obtained in "High Spot" Adjustment. This should be measured at rim of wheel through an arc not exceeding 3".

Lincoln—Adjustments on car are not recommended, and should be performed when steering gear is removed for overhaul or when being installed.

Oldsmobile—Tighten power rack guide cover bolts evenly, being sure that bolt threads do not pick up shims when tightening cover to housing. Attach spring scale to wheel rim and check pull through "high spot". If pull is increased over the final reading taken in "High Spot" Adjustment (above), add shims of .003" thickness, one at a time until pull decreased to original reading. If pull remains the same as final reading, remove shims of .003" thickness, one at a time, until pull is increased above original amount, then add one .003" shim. Recheck pull through the "no lash" range which should not be more than 1¼ lbs. Pull required in pull through "High spot" should not be greater than 1¾ lbs.

Pontiac—Tighten four power rack guide cover bolts evenly. Recheck pull through "high spot" position which should be 1½ lbs. maximum. If "high spot" pull increased after power rack guide cover bolts tightened. above the maximum (1½ lbs.), add .003" shims under cover until last shim added decreases the load. If pull through "high spot" remains the same after cover bolts tightened, remove .003" shims until load increases above that obtained in final check of "High Spot" Adjustment. Then add one .003" shim.

Studebaker—The "high spot" and power rack adjustments should be made while steering unit is out of car.

Worm Thrust Bearing Adjustment: This adjustment made with steering gear out of car. If adjustment required in service, remove steering gear. See "Steering Gear Overhaul" below, for adjustment procedure.

Pump Drive Belt Adjustment: Proceed as follows:

Buick—Adjust belt tension so that pulley will slip in belt when 40-45 ft. lbs. (new belt), 30-35 ft. lbs. (used belt), is applied to pulley nut with a torque wrench.

Cadillac—Loosen pump to mounting bracket screws and move pump outward until belt is tight. With shift lever in "N" race engine while turning steering wheel. If belt squeals, it is too loose and must be retightened.

Linc ln—Belt tension should be 5-7 lbs. pull with ¼" belt deflection.

Oldsmobile—Loosen pump to bracket attaching bolts and place tool J-5398 under pump pulley and over attaching bolts, With torque wrench, adjust drive belt tension to 30 ft. lbs. This adjustment corresponds to a belt deflection of 7/8" with 25 lbs. pull applied midway between pump pulley and fan.

Pontiac—Loosen pump to bracket bolts two full turns so pump falls of its own weight. Place pump belt tightener J-5574, over head of hinge bolt, and using a torque wrench perpendicular to tool, tighten belt to 58-65 ft. lbs. (new), 51-53 ft. lbs. (used). Tighten clamp bolt.

Studebaker—With spring scale at right angles to belt, pull on scale should be 4 lbs., with a belt deflection of 1/4" to 3/8". Slots are provided at mounting bracket screws in bracket to permit shifting pump body for proper tension.

HYDRAULIC PRESSURE TESTS

Disconnect hose at lower pump union (nearest engine). Install Gauge J-5176 (Lincoln Gauge No. 3500), with gauge valve closed. Connect hose to fitting on valve side of gauge. **Open gaug valv** and run engine at idle speed. Test as follows:

1) With gauge valve open and engine idling, turn steering wheel through entire travel from one end position to the other with the wheels on the ground *(CAUTION—* Do not hold steering wheel in extreme position for extended period). Oil pressure on gauge should not be less than indicated in table below. If pressure is less than indicated in table, test as outlined in **(2)** below.

Car	Engin RPM	①Pump Pressur
Buick	450	700 lbs.
Cadillac (1954-55)	400	900 lbs.
Chevrolet	475	750 lbs.
Lincoln (1954-55)	425-450	700 - 900 lbs.
Oldsmobile	400	650 lbs.
Pontiac	375	650 lbs.

①—Maximum pressure should not be less than lowest indicated pressure.

2) If pressure low in test above, slowly close gauge valve and make quick test of pump pressure *(CAUTION—* Do not leave valve closed more than 15 seconds). If pressure increases to, or is greater than the pressures indicated in table (above), pump is alright and trouble is in steering gear or in oil lines. If pressure equally low in both tests (or not more than 50 lbs. increase in test **(2)**, trouble is in oil pump. If pressure increases more than 50 lbs. in test **(2)** but is still below normal, both pump and steering gear or oil lines are faulty.

TROUBLE SHOOTING

If operation not satisfactory, check as follows:

HARD STEERING (Particularly When Parking): Check to make certain that hard steering exists by measuring steering wheel pull under extreme conditions as follows: With car parked, apply brakes, idle engine, turn steering wheel from side to side to bring oil temperature up to 170°F. (similar to condition existing after excessive turning or on hot days). Use 15 lb.

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SAGINAW (NOT IN LINE) (C ntinu d)

spring scale (Tool J-5178) hooked to wheel rim at spoke to check pull required to rotate wheel steadily (measure pull at 90° to spoke). If pull exceeds 10 lbs., check following causes:

1) Pump drive belt loose or pump defective. Adjust drive belt and test pump pressure. See Testing Hydraulic Oil Pressure.
2) Low Oil Level in Reservoir. Check and fill reservoir to proper level. If oil level low, check entire system for evidence of leakage.
3) Air in Hydraulic System (may be noted by noisy pump action). Tighten valve cover screws and all hydraulic line connections. Bleed system.
4) Steering gear not properly lubricated or adjustments too tight. See Lubrication and Adjustment.
5) Steering tube misaligned or tight upper bearing. See Steering Gear alignment (under Adjustment).
6) Linkage too tight, bent, or misaligned.
7) Tires under-inflated.
8) Low oil pressure. See Testing Hydraulic Oil Pressure.

EXCESSIVE PLAY OR LOOSENESS (May cause Front Wh l Shimmy r wh el kickback):

1) Excessive lash in steering gear (between pitman shaft gear sector and ball nut or power rack) or in steering linkage. See Adjustment.
2) Loose worm thrust bearing adjustment (see Adjustment) or valve spool sticking in housing.
3) Air in hydraulic system (may be noted by noisy pump action). Tighten valve cover screws and all hydraulic line connections. Bleed system.

POOR CENTERING OF STEERING WHEEL OR RECOVERY FROM TURNS:

1) Binding of steering shaft due to misalignment or tight bearings. Check alignment and adjustments.
2) Valve spool sticking in valve housing or defective valve centering plunger springs.
3) One front tire under-inflated.

STEERING GEAR NOISY:

1) Loose pitman shaft adjustments (excessive lash at ball nut or power rack). See Adjustment.
2) Loose worm thrust bearing. See Adjustment.
3) Loose power piston-to-power rack pin.
4) Steering gear mounting loose (noisy on turns).

HYDRAULIC PUMP NOISY:

1) Air in system due to low oil level, loose intake hose connections, defective shaft or steering gear seals.
2) Pump drive belt too tight. See Belt Adjustment.
3) Oil hoses grounded against engine. Check and reroute hoses to provide clearance.
4) Reservoir air vent clogged, clogged intake line or filter, sludge or dirt in pump, oil too heavy. Clean out pump and reservoir and refill with correct oil.
5) Pump bearings, shaft, or other parts worn. Pump vanes sticking (Vickers Pump).
6) Relief valve chattering. Check for sticking valve, clean and free up valve.

LOW OIL PRESSURE: S T sting (f ll wing).

1) Drive belt loose or worn. See Belt Adjustment.
2) Oil level too low or wrong type oil (too light).
3) Pump worn or defective. Pump relief valve stuck open or spring weak. Flow control valve stuck open.
4) Oil filter clogged (cars with Eaton pump).
5) Internal or external oil leaks (following).

OIL LEAKAGE:

1) Defective "O" ring seals due to over-torquing, burrs in recesses, cocked seals, unclean bores, seals not protected from threads on shafts, sharp edges.
2) Loose connections or worn hoses.
3) Oil pump shaft seal installed backwards (install with two holes in seal casing toward front or outside of pump (pulley end).
4) Improper installation of plug and "O" ring (Vickers Pump). Must be installed to pump cover flow control valve from rear (chamfer end) until end of plug is just past snap ring groove.
5) Hydraulic oil leaking into steering gear housing; upper housing seal or cylinder adapter seal (piston rod seal) leaking.

LUBRICATION

Power Steering Hydraulic System: (Checking Fluid Level)—Check at 1000 mile intervals (2000 miles on Cadillac, 5000 miles on Studebaker).

Buick—Thoroughly clean area around filler plug in top of reservoir, remove filler plug (has dipstick underneath), insert dipstick in reservoir with **plug seated on edge of filler opening,** add oil as required to bring level up to mark on dipstick.

Cadillac, Chevrolet, Oldsmobile, Pontiac - Clean reservoir cover area, remove cover and gasket. Oil level should be at oil level mark on side of reservoir (1" below top edge of reservoir), Add oil as required. Torque cover screws to 20 ft. lbs. (On Pontiac replace cover and retaining ring).

Lincoln—With engine off, remove reservoir dipstick by turning counter-clockwise and pulling out. Level of fluid should be to the line marked "full" on the stick. *Do not overfill.*

Studebaker—Maintain fluid level at mark indicated on side of reservoir.

Recommended Oil—Use same oil as used in the automatic transmission on the car (Dynaflow Drive Fluid, Hydra-Matic Drive Fluid, or Automatic Transmission Fluid Type A with AQ-ATF No.).

Steering Gear (Worm & Ball Nut): Check at 1000 mile intervals (2000 on Cadillac, 5000 on Studebaker). Maintain lubricant level at filler plug hole. **Do not** use pressure gun to add lubricant (will damage worm and power piston rod seals). Use lubricants:

Buick & Studebaker—Multipurpose gear lubricant SAE 90 (same as for synchro-mesh transmission).

Lincoln—Ford Motor Company Specification M-4738 **or its absolute equivalent.**

Others—Approved steering gear lubricant.

BLEEDING HYDRAULIC SYSTEM: *Required whenever hydraulic system disturbed (by disconnecting lines, removal or installation of units, etc.).*

Buick—Fill reservoir to proper level (see Lubrication). On cars with Vickers (vane type) pump, remove pipe plug from top of pump manifold until oil begins to flow from this opening, then install plug just tight enough to prevent oil flowing out. Allow car to stand for 5 minutes. Start engine and run at approximately 1000 RPM for 2-3 minutes, then turn steering wheel from wheel from left to right extreme position to work air out of power cylinder. Repeat as necessary until all air worked out (pump will quiet down as air removed). Tighten plug in pump manifold, recheck oil level. Road test car with some parking and high speed driving, if possible.

Cadillac, Chevrolet, Oldsmobile, Pontiac - Fill reservoir. Let car stand for two minutes. Crank engine with ignition off and turn steering wheel at the same time to eliminate air pockets from power cylinder while maintaining oil level in reservoir. Start engine and run at idle speed for 2 minutes. Check oil level and inspect entire system for leaks. Increase engine speed to 1500 RPM and run it at this speed until air bubbles cease to appear in reservoir (turn wheels from side to side to assist process, lightly contacting stops). Recheck oil level and refill as required.

Lincoln—Fill oil reservoir to proper level (see Lubrication). Start engine and run at idle speed for two minutes. Recheck fluid level and inspect hoses and connections for leaks. Increase engine speed to 1000 RPM and turn wheels from right to left five or six times. DO NOT HIT STOPS. Recheck for leaks. Check oil level and refill as required.

Oldsmobile—Fill reservoir to proper level and maintain level during bleeding operation. Run engine at idle speed for 30 seconds, then increase speed to 1500 RPM for 1 minute. Raise front end of car and rotate steering wheel through its full travel several times to eliminate air from system. Recheck fluid level in reservoir.

REMOVAL & INSTALLATION

1954-55 BUICK

REMOVAL: Remove the battery and shield. Disconnect pressure and return line hoses from hydraulic pump and immediately install shipping caps on pump fittings to retain oil in pump. Drain hoses and install plugs in hose ends. Disconnect transmission shift rod from control shaft lower lever. On synchro-mesh cars only, remove selector lever from clamp on jacket by removing retainer and spring washer. Loosen bolt in clamp which secures column jacket to short tube in gear housing. Move front seal all the way back. Disconnect and remove horn cable connector from steering column jacket. On Dynaflow cars, disconnect wires from neutral safety switch and remove speed ratio dial light bulb holder from support on steering column jacket. On all cars, remove signal switch wires from fuse block under cowl. Cover steering column jacket with masking tape to prevent damage to finish. Remove steering wheel and upper bearing spring and spring seats. Cover the horn contact and threaded end of steering shaft with masking tape. Remove signal switch and transmission shift control levers. Detach the rubber insulator retainer from dash mat and pull it up about a foot on column jacket. Remove jute column pad. Measure vertical clearance between column jacket and lower surface of instrument panel and record this dimension so column can be installed in same position. Remove bolts hold-

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SAGINAW (NOT IN LINE) (Continued)

ing cap to steering column bracket and disconnect bracket from instrument panel, then pull upward on column jacket to free it from steering gear. Remove cranking motor splash pan from car frame. Remove steering gear to frame lower bolts and clamps, then loosen upper bolts enough so that gear can be tilted sideways to provide room for pitman arm puller. Remove pitman arm. With another man inside the car to guide column and prevent damage, carefully lift steering gear assembly up and forward out of engine compartment, leaving column jacket assembly in car.

INSTALLATION: Reverse the removal procedure and note the following: When installing column jacket assembly over steering shaft, place Bearing Protector J-5159 over serrated end of shaft to avoid damage to shaft upper bearing in jacket (slot in lower end of jacket must engage dowel pin in hydraulic valve cover). When mounting the gear and jacket assembly in brackets, make certain that column is properly positioned at instrument panel and tighten column bracket before tightening gear housing to frame, then check for bind as follows: Temporarily install steering wheel and use scale J-544-A to check pull required to turn wheel steadily through high point or no lash range. The pull should not be more than ¼ lb. more than before installation. If greater, check upper bearing in jacket. Connect pressure hose to lower union on pump, and return line hose to upper union.

STEERING WHEEL & HORN BUTTON REMOVAL: On solid spoke wheel, pry out horn button cap, remove contact cup, spring and contact plate (attached to wheel hub by three screws and spacer bushing). On Flexible wheel, pry off monogram and bezel assembly and remove horn operating wheel (attached by three screws). On all models, set direction signal in "off" position, then flatten steering wheel nut lockwasher tab and back off nut several turns, but do not remove nut. Use Puller J-1566 and adapter to pull wheel back to nut. *NOTE - If wheel hub is tight on shaft, apply moderate strain with puller, then tap end of puller screw to break hub loose from shaft.* To install wheel, reverse removal procedure.

1954 CADILLAC

REMOVAL: Place front of car on jack stands, then remove steering wheel (see below) and steering column upper and lower covers. Remove screws in support bracket at instrument panel and screws attaching horn contact assembly to jacket, then remove screws in column cover on toeboard. Remove heater blower motor and remove flexible air intake hose. Disconnect hoses at steering gear and plug all openings. Loosen steering column lower jacket clamp, then disconnect connecting rod at pitman arm. Remove left exhaust pipe at manifold, then remove three bolts attaching steering to frame side rail. *CAUTION - Save all shims found at these mounting bolts as they will be required when gear installed.* Carefully slide gear down and out of upper jacket and remove assembly from car. *CAUTION - Be very careful not to damage upper rubber bearing.*

INSTALLATION: Reverse removal procedure.

STEERING WHEEL & HORN BUTTON REMOVAL: Disconnect horn wire from horn contact assembly on upper steering cover, then depress horn button and turn counterclockwise to release locking ears. Remove button assembly and horn button spring. Remove steering wheel hub nut, then remove horn ring retainer, cushion and horn ring. Mark steering wheel hub and shaft for correction installation, then use Puller J-1859 and remove wheel. To install, reverse removal procedure and note the following: Tighten wheel hub nut to 45-50 ft. lbs. Measure gap between bottom edge of horn ring and upper edge of direction signal switch carrier and slide steering jacket up or down to secure 3/16" gap with horn button in released position.

1955 CADILLAC

REMOVAL: (Gear Assembly)—Disconnect hoses from valve body on gear housing. Cap ends of hose to prevent loss of oil. Remove return port (large) fitting from valve body. Raise front end of car and place jack stands near outer ends of lower suspension arms. Disconnect pitman arm from drag link. Remove lower flange to coupling screws. *(NOTE*—Scribe marks on coupling and flange to assure correct positioning of steering wheel at assembly). Remove gear housing to frame side bar screws and remove gear housing.

INSTALLATION: (Gear Assembly)—Place assembly on frame side bar, guiding the lower flange onto coupling, and install gear to frame screws. *(NOTE*—Make certain that scribe marks on coupling and upper steering tube flange are aligned). Install lower flange to coupling nuts. *(NOTE*—After installing gear, check the flexible coupling for distortion. The coupling must rest flat with no visible bend or twist. If it is distorted, remove the lower steering column cover and lower clamp to jacket screw. Loosen steering jacket clamp screws at instrument panel, and slide complete steering jacket assembly up or down as required. Redrill lower clamp and jacket if necessary to install screw). Connect pitman arm to drag link.

REMOVAL: (Upper Steering Shaft)—Remove steering gear assembly (above). Disconnect battery ground strap and remove neutral safety switch and horn contact. Remove horn button and spring and remove steering wheel hub nut. Remove horn retainer and horn ring. Remove steering wheel using Puller J-1859. Remove steering jacket tensioner spring and split ring. Loosen lower steering jacket clamp, pry lower bearing retainer out of steering jacket and remove upper steering shaft through bottom of jacket.

Upper Steering Shaft Lower Bearing Removal & Installation: With upper steering shaft removed, use a soldering iron, and remove upper tip on horn contact wire and remove plastic insulator. Pull the wire down through shaft and out opening at horn contact bushing. Remove bushing with wire from shaft. Slide bearing retainer from shaft and press bearing from retainer. To install, reverse removal procedure.

INSTALLATION: (Upper Steering Shaft)—Slide upper shaft into steering jacket, insert lower bearing retainer into jacket until retainer flange is tight against bottom of shaft, and temporarily tighten lower clamp. Install split ring and steering shaft tensioner spring over end of steering shaft. Install steering wheel over splines on shaft with punch marks lined up. Install horn ring retainer and horn ring in position on steering wheel. Install steering wheel hub nut and tighten to 45-50 ft. lbs. Stake nut to shaft. Install spring and horn button. Loosen lower steering jacket clamp and work lower bearing retainer flange down from end of jacket until 3/16" clearance is obtained between horn ring and directional signal switch carrier. *(NOTE*—To obtain clearance, insert a screwdriver between lower bearing retainer and jacket. Twist screwdriver to move retainer down). Hold lower bearing retainer in position while tightening lower jacket clamp, making certain that lower edge of clamp is as close as possible to lower end of jacket.

STEERING SHAFT UPPER BEARING REMOVAL: Remove neutral safety switch and horn contact from lower steering column. Remove cotter key, dust shield and horseshoe retainer at lower shift lever on steering jacket and then disengage shift lever from shifter tube. Remove steering wheel, tensioner spring and split ring, and direction signal switch (see Upper Steering Shaft Removal above). Remove capscrews holding upper bearing retainer to steering jacket. Remove steering column lower cover. Remove Hydra-Matic shift dial indicator. Pull shifter tube out of steering jacket until shift detent on bearing retainer clears jacket, then screw bearing retainer from shifter tube. Press upper bearing from retainer.

REMOVAL: (Steering Column Assembly)— *(NOTE—Removal of the complete steering column assembly is only necessary when both upper and lower bearings must be replaced or if lower shift lever must be replaced).* Disconnect battery ground strap and remove direction signal switch and horn contact from lower steering jacket. Remove brake pedal retaining screw. Raise car. Disconnect manual control rod from lower shift lever. Scribe marks on coupling and flange to assure correct positioning on assembly, then remove coupling to lower flange nuts. Remove brake pedal. Loosen carpet on left front side and pull back from steering column toe plate and remove plate to floor board screws. Remove stop light switch screws. Remove steering jacket lower cover and remove Hydra-Matic indicator pointer. Disconnect direction signal switch wires at connector. Remove the small screw at bottom of steering jacket-to-instrument panel clamp and remove the two instrument panel to steering column clamp nuts. Remove steering column assembly.

INSTALLATION: Reverse the removal procedure.

STEERING WHEEL & HORN BUTTON OR RING REMOVAL: *See "1954 Cadillac" above.*

1954 CHEVROLET

REMOVAL: Remove steering wheel, then remove upper control shaft clamp bolt from shaft connector and disconnect horn wire at connector under instrument panel near point where wire comes from mast jacket. Remove mast jacket toeboard grommet and seal. Remove instrument panel-to-mast jacket clamp. *CAUTION- Remove any spacers found between brackets and instrument panel as these must be installed when steering gear is installed.* Disconnect gearshift control upper support from mast jacket, then pull upper control shaft and upper

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SAGINAW (NOT IN LINE) (C ntinu d)

support up and out of engagement with shaft connector. Remove clamp retaining shifter housing to mast jacket, then rotate shifter housing with lower control shaft and control rods away from mast jacket. *CAUTION - Carefully not r lativ position of steering connecting rod parts b for disconnecting them.* Disconnect hoses at valve body unit and cap all openings. Remove nuts, bolts and lockwashers attaching steering gear housing to support bracket. Remove left air duct, then rotate gear assembly to clear fender skirt and raise it up and forward to remove from engine compartment.

INSTALLATION: Reverse removal procedure and note the following: Tighten steering gear housing to bracket nuts to 27-40 ft.lbs. after mast jacket is securely attached.

STEERING WHEEL & HORN BUTTON REMOVAL: Pry out horn button or ornamental cap, then remove steering wheel retaining cap. Remove wheel with Puller J-2927-A. To install, reverse removal procedure and tighten nut to 35-40 ft. lbs. *NOTE - With steering gear on "high spot" (wheels in straight ahead position), steering wheel spok should b horiz ntal.*

1954-55 LINCOLN

REMOVAL: *(NOTE–On cars with power brakes, remove clamp securing reservoir hose to power brake fitting on vacuum cylinder, and remove clamp securing power brake reservoir hose to fire wall. Pull hose to engine side of floor pan opening cover to provide sufficient clearance).* Remove front seat cushion. Remove steering wheel with tool No. 3600-D. Disconnect steering column electrical connections. Remove accelerator pedal from pushrod and remove brake pedal from pedal support bracket. Remove carpeting from floor pan opening. Disconnect speedometer drive cable from instrument panel and remove cover from floor pan opening. Remove support bracket from instrument panel. Disconnect shift rod from steering column shift arm. Loosen clamp on lower steering column at gear housing and raise column sufficiently to disconnect wires at neutral switch. Remove steering column tube from steering shaft through inside of car. Disconnect pressure and return hydraulic hoses at gear valve housing and place hoses in upward position to prevent leakage. Raise front of car and remove pitman arm using tool No. 3590. Disconnect steering gear assembly from frame side rail *(CAUTION–Remove shims, if any, locat d b tw en mounting bolts and frame side rail. Mark bolt hol s and number of shims required, and mark shims for identification with bolt holes).* With one man inside car and another under the car, remove the three bolts securing gear assembly to frame side rail and remove the unit through passenger compartment.

INSTALLATION: Replace steering gear in car and install loosely to frame side rail with the three attaching bolts (longest bolt to rear). Connect hydraulic hoses to valve assembly. Slide steering column tube on steering shaft with column clamp in place (do not tighten clamp). Secure column support to instrument panel bracket with two bolts and tighten finger tight. Tighten bolts securing gear housing to frame side rail *(CAUTION–Replace shims, if any, in the exact position noted at time of removal).* Complete the installation by reversing removal procedure making sure that steering wheel is in center position with wheels straight ahead before pitman arm is installed.

1954-55 OLDSMOBILE

REMOVAL: Disconnect battery, then drain fluid reservoir on pump and disconnect hoses at gear and pump. Cap all hose openings. Loosen mast jacket-to-steering gear housing clamp, then remove steering wheel (see below). Mask steering column for about 2" above instrument panel bracket, then loosen steering column in bracket and remove floor mat and floor pan plate attaching screws. Pull mast jacket upward. Place a 2" block between left front shock absorber arm and frame and jack car up off floor about 10" (place a jack stand under frame). Remove left side filler plate and remove pitman arm from shaft. Remove starting motor and wire bracket and remove steering gear-to-frame bolts. Remove steering gear by pulling it down and out of mast jacket, carefully turning gear as it is removed so that all fittings and pipes clear frame and lower control arms.

INSTALLATION: Reverse removal procedure and tighten gear mounting bolts to 35-40 ft. lbs. *NOTE - Do not tighten gear-to-frame bolts until mast jacket is securely in place. Locate mast jacket to provide 1/4-3/16" clearance between wheel and collar.*

STEERING WHEEL & HORN BUTTON REMOVAL: Disconnect horn wire at relay. On standard wheel, insert sharp instrument under edge of horn button and pry upward. On deluxe wheel, use a small screwdriver to relieve spring tension on one end of spring clips holding horn button in place (accessible from underside of wheel). Remove steering wheel nut, contact plate and horn ring assembly, then pull wheel with a suitable puller.

1954-55 PONTIAC

REMOVAL: *(NOTE–If car is equipped with power brakes, remove power brake unit).* Hook front suspension in 5-passenger load position using tool J-5571 (front suspension hold down hook). Remove steering wheel using puller J-3044. Remove direction signal switch handle and gearshift lever and remove steering column to instrument panel bracket cap. Slide rubber grommet up column jacket. Roll back floor mat and remove pedal plates from floor. Remove neutral safety switch. Disconnect gearshift and selector rods, and direction signal wires. Disconnect oil lines at steering gear and secure lines high enough to prevent oil leakage. Raise car on hoist and remove starting motor, pitman arm, and left side tie rod end. Remove engine side apron on left side. Remove brake pedal hairpin spring retainer and slide pedal to right as far as it will go. If car is on a twin post hoist, it will be necessary to place stands under both front frame ends and lower front post approximately three feet to allow steering assembly to clear hoist. Push steering connecting linkage down and toward rear of car, remove steering assembly to frame attaching bolts, removing the upper bolt last, and lower assembly between lower control arm and steering connecting linkage *(CAUTION–Identify and r tain any shims found betw n gear h using and fram as these must be returned to the sam location for proper alignment of ste ring gear).*

INSTALLATION: Push steering connecting linkage down and toward rear and install steering gear assembly by guiding between lower control arm and connecting linkage. Remove hold down hook. Install front gear housing to frame bolt with lockwasher, finger tight *(CAUTION–Be sure to install shims in the same locations as removed from).* Install steering column lower bracket with lockwashers and bolts to upper bracket on instrument panel. Install two remaining gear housing to frame bolts, and tighten all three bolts. Check for correct shimming of steering gear housing to frame by seeing if steering column aligns with upper bracket when bracket bolts are loosened. If alignment is correct, tighten steering column bracket bolts *(NOTE–If misalignment exists, it will be necessary to change housing to frame shims to correct alignment).* Complete installation by reversing removal procedure.

STEERING WHEEL & HORN BUTTON OR RING REMOVAL: Remove deluxe horn ring button by turning counter-clockwise. Remove standard horn button by pressing down on one side, inserting screwdriver underneath opposite edge of button, and prying upward. Remove locknut, washer, horn ring, horn insulator and contact assembly. Remove steering wheel using puller J-3044. To install, reverse above procedure, making sure wheel is in straight ahead position (spokes horizontal and mark on steering shaft upward). Tighten steering wheel nut to 25-30 ft. lbs. Tighten locknut finger tight plus 1/4 turn.

1954 & LATER STUDEBAKER 1958 PACKARD

REMOVAL: Disconnect and remove battery (on coupe and hardtop, remove battery box). Remove steering post collar screws and slip collar up out of the way. Disconnect horn wire and on automatic transmission cars, disconnect quadrant light and starter cutout switch cables. Disconnect direction signal cables and shift lever rods. Loosen jacket clamp bolt at lower end of jacket. Remove steering wheel using puller J-5473, and remove jacket spring. Loosen jacket to instrument panel bracket clamp screw and remove jacket to instrument panel bracket screws and shims (if shims are used). Slip jacket off column. Remove the four steering post coupling nuts, separate coupling, keeping collector ring and insulators intact, and remove post assembly. Tape coupling studs to prevent damaging threads when removing the unit. On sedan and station wagon models, remove the left hand valve rocker arm cover. Disconnect tie rod from pitman arm and remove the pitman arm clamp bolt. Move fender gravel deflector out of the way and remove the three steering gear housing to mounting bracket bolts. On sedan models it may be necessary to shift the unit against the fender apron for clearance to remove pitman arm, then remove pitman arm. Disconnect hoses at pump and tape all openings. Shift unit rearward, inserting top end of unit through opening in firewall. Lift lower end of unit, turn it as necessary to gain clearance past fender apron and battery box, and lift unit out of car.

INSTALLATION: Reverse removal procedure and note the following: With gear in mid-position (high-spot)

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SAGINAW (NOT IN LINE) (C ntinu d)

punch mark on end of worm shaft should be at top and "T" stamped on coupling should also be at top, with wheels in the straight ahead position.

STEERING WHEEL & HORN BUTTON OR RING REMOVAL:

Champion & Commander (Custom & Deluxe): Remove horn button assembly by pushing down on button and at same time turning button 1/3 of a turn. Remove wheel retainer and lockplate. Place puller center adapter in end of steering post and remove steering wheel with puller J-5473. To install, reverse removal procedure, tightening nut to 23-27 ft. lbs.

Champion & Commander (Regal), President: Remove button from steering wheel by inserting knife blade under edge of button and forcing button up and out. Remove horn ring retaining screws and remove ring and rubber shock pad. Remove steering wheel retaining nut and lockplate. Place puller center adapter in end of steering post and remove steering wheel with puller J-5473. To install reverse removal procedure, tightening nut to 23-27 ft. lbs.

STEERING GEAR OVERHAUL

OVERHAUL: Steering Gear Disassembly–Thoroughly clean steering gear (mast jacket removed). Place steering gear on holding fixture, then proceed to disassemble as follows:

1) Remove plugs (if hoses removed) from gear housing and attach hoses. Place ends of lines in container and drain gear as much as possible by turning steering wheel two or three times through full range. Remove oil lines between power cylinder and hydraulic control valve housing. Remove small bleed line between power cylinder and hydraulic control valve housing, then the two flexible hoses. (NOTE–Unless "O" ring seals are to be replaced, do not loosen swivel fittings, since they will aid when reassembling oil lines). Remove filler plug with vent.

2) Mark power rack cover and housing, then remove FOUR CORNER BOLTS from guide cover assembly (DO NOT REMOVE THE TWO CENTER BOLTS). Remove cover and guide assembly with all shims.

3) Mark side cover for ease when reassembling, then remove four side cover bolts. Then, tapping on end of pitman shaft with soft hammer, remove pitman shaft, side cover, and gasket as an assembly.

4) On Buick, measure from end of hydraulic valve cover to nearest edge of horn cable contact. On all cars except 1955 Cadillac, remove horn wire and contact from steering column. Turn steering gear to a horizontal position, mark control valve cover, control valve housing and gear housing to facilitate reassembly. Remove steering wheel, place special tool over threads of steering shaft to protect seal in valve cover when removing cover. On 1955 Cadillac, remove coupling flange-to-steering shaft dowel pin, supporting flange from below to prevent shock damage to thrust bearings. Remove flange from splined shaft. Remove felt washer.

5) Remove three valve cover attaching bolts. Carefully slide valve cover from steering shaft. Except on 1955 Cadillac, remove special tool from threads on steering shaft.

6) Mark power cylinder and housing for assembly purposes, then remove four power cylinder-to-housing attaching bolts. Remove power cylinder with gasket.

7) Straighten bent-over tangs on worm bearing adjusting nut lock. Use steering wheel on steering shaft to hold shaft and loosen worm bearing adjusting nut and lock. (NOTE–Deep chamfered side of nut is toward lock). Remove steering wheel, worm bearing adjusting nut and lock.

8) With steering gear still in horizontal position, carefully remove the control valve assembly from steering shaft, using care to keep spool, plungers and centering springs from falling out. *(CAUTION–Do not lay control valve assembly where it is apt to pick up lint of dirt. Lay the control valve assembly on a piece of clean paper).* Remove control valve lower thrust washer assembly from shaft (NOTE–Thrust washer assemblies are interchangeable). Place special tool on threads of steering shaft to protect worm bearing seal in housing, while removing shaft.

9) Remove three end cover attaching bolts and then remove end cover and gasket from housing. Carefully slide steering shaft and ball nut assembly through housing. Holding on to upper end of shaft, to take weight off worm bearing seal, will help to protect seal.

Individual Unit Disassembly & Reassembly–Proceed as follows:

Pitman Shaft & Side Cover–*(NOTE–Lincoln adjusting screw endplay established at time of manufacture. Screw is fixed in end of pitman shaft and cannot be adjusted).* Turn adjusting screw down through side cover and remove side cover from pitman shaft. Remove adjusting screw and shim from slot in pitman shaft (except Lincoln). Clean all parts in suitable solvent. Inspect bushing in side cover for excessive wear. If damaged or worn excessively, replace side cover and bushing. Inspect pitman shaft sector teeth. If pitted, worn excessively or scored, or if pitman shaft serrations twisted, replace shaft. To reassemble (except Lincoln), check fit of pitman shaft adjusting screw shim in slot, in end of pitman shaft. With shim in place, screw head must be free to turn in slot, with no perceptible endplay to .002" loose. If endplay excessive, fit new shim (furnished in four thicknesses). Position adjusting screw, with selected shim, into slot in pitman shaft. (All Cars) Assemble side cover to shaft by turning adjusting screw counterclockwise until side cover seats firmly on housing. Start adjusting screw lock nut over threads of adjusting screw and leave finger tight.

Power Cylinder–Remove gasket and hold power cylinder in vise clamping power rack between brass jaws *(CAUTION–DO NOT place machined surfaces of rack in jaws).* Push power cylinder up to the rack and pull sharply away from rack to hammer adapter against piston (It may be necessary to repeat several times to break grip of rubber seals between adapter and cylinder). Remove safety nut, and piston with one spacer washer from each side of piston. Place Tool J-5293 (Lincoln 33568) over threads of piston rod to protect packing seal in adapter against damage. Remove adapter and large spacer washer from piston rod. (NOTE–Piston, rings, rod, pin and power rack are serviced separately. Adapter "O" Ring Seals are serviced separately or in kit with packing seal). Inspect power rack teeth for burrs, scores or excessive wear. Inspect power cylinder for scores. Inspect "O" ring seals and piston rings. Replace where necessary. Make sure that all parts are clean. Lubricate parts before reassembly. To reassemble, position large spacer washer over rod against power rack. With Tool J-5153 (Lincoln 33568) over threads on rod, install adapter. Install new "O" ring seals on adapter. Remove Tool J-5153 (Lincoln 33568). Install power piston (either side out) having one spacer washer on each side of piston, then install and tighten safety nut. Using ring compressor J-5186 (Lincoln 33569) to compress piston rings, install power cylinder over piston and adapter. It may be necessary to tap cylinder with soft mallet until flush with adapter flange.

Steering Shaft & Ball Nut–Remove clamp and ball return guides from ball nut. Remove sixty (60) steel balls, then carefully remove ball nut from shaft. Wash all parts in clean kerosene or other cleaning solvent. Inspect steering shaft for wear or brinelling in ball and needle bearing races (replace if worn or brinelled). Check shaft to make sure it is straight. Inspect teeth of ball nut and worm of steering shaft. If teeth pitted, worn or scored, replace part. Before reassembling be sure parts are absolutely clean and lubricated with clean engine oil. To reassemble, place steering shaft on bench with upper end to your right. Install ball nut on worm so that when teeth are facing up, deeper side of teeth are toward you. Install 21 or 22 steel balls in each circuit of the worm and ball nut. Install 8 or 9 steel balls in each guide. Holding halves of guide together to prevent the balls from falling out, push guides with balls over each circuit in ball nut. Install clamp and tighten in place. Run ball nut to upper and lower end of worm to check for freeness.

Valve Body–*(CAUTION–Spool and plungers are a very close fit in housing and must be removed and replaced carefully. They must be started carefully to avoid jamming and must not be forced into place).* Carefully remove spool, plungers and springs from valve body. Remove check valve *(CAUTION–Use care not to score or cut bore with screwdriver).* Inspect spool and plungers for scores, nicks, or burred edges. Test check valve by blowing through both ends. Ball should seat when blowing through small end, and allow air to pass when blowing through slotted end. Control valve body and spool are serviced as a unit. Plungers, springs and check valve are serviced separately. Replace damaged parts and make certain they are oiled before reassembly, so that spool and plungers slide freely in housing. To reassemble, install check valve in housing. Assemble spool into housing with counter-bored end up. Install compression springs and plungers.

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SAGINAW (NOT IN LINE) (Continu d)

Insp cti n & R c nditi ning of Steering Gear Housing & Covers–Clean machined surfaces of housing of all gasket material. Inspect mating surfaces for burrs, and remove any burrs with flat stone. Inspect bushings and bearings for scored or worn condition, and replace if required. The following procedures cover the replacement of all bushings, bearings and seals in housing and covers. To replace, proceed as follows:

Steering G ar H ùsing Worm Bearing & Seal–On Lincoln, place Worm Bearing and Seal Remover Tool-3517 through steering gear end cover opening and drive the seal, washer and bearing from housing. On other cars, remove worm bearing seal by carefully tapping an "offset" screwdriver between seal and shoulder in housing, then pry lightly around seal to remove. Roller bearing is removed with a punch and should not be removed unless replacement is necessary, as removal will damage bearing. To install bearing, use Tool J-5189 (Lincoln Tool 3517-A). Bearing should rest on Shoulder in housing. (NOTE–Stamped end of bearing is against shoulder of installing tool, unstamped end enters housing first). On Lincoln, place washer on bearing so that when seal is installed washer will be between seal and bearing. On all cars, place new seal with lip (spring end) outward toward Bearing Seal installing Tool J-5189 ("Seal" end) (Lincoln 33560) and drive into steering gear housing to point where seal seats on shoulder of housing. *NOTE*–Lubricate feather edges of seal before installing.

Steering Gear S ct r Shaft Bearing, Bushing & Seal–*(NOTE–P wer Steering Gears on Lincoln Cars built aft r January 4, 1954 will not have steering gear s ct r shaft bearing. F r those prior to above proceed as indicated bel w).* To replace bearing on Lincoln cars, turn shaft of Tool 3770-A counter-clockwise until jaws are flush with housing. Insert tool in steering gear housing and turn shaft clockwise until bearing is removed (NOTE–Be sure jaws of tool grip back of bearing). Inspect bearing for binds and freedom of movement. Lubricate bearing with M-4738 lubricant and place on Steering Gear Sector Shaft Bearing Installer Tool 3770, lettered end toward tool, and press carefully into steering gear housing. Recheck bearing for freedom of movement. To remove bushing and seal on Buick, Cadillac, Chevrolet, and Lincoln (On other cars, bushing and housing serviced as an assembly), support steering gear housing in an arbor press and press sector shaft bushing, seal (and retainer, if used) from housing using Tool J-1614 (Lincoln 3353.) Press new bushing into position using bushing driver J-1614 (Lincoln 3353 with adapter 3553-1). Soak new seal in oil, install in new packing retainer (if used) and press into housing (Lincoln use Tool 33587). On Lincoln, seal is installed with lip out. To replace packing or seal only, pry seal (and retainer, if used) out of housing. Soak new seal in engine oil, install in new retainer (if used) and press into housing.

Steering Gear End C ver W rm B aring–Make sure bore in end cover is absolutely clean and that roller bearing is clean. Grip end cover lightly in vise. Insert Removing Tool J-5190 (Lincoln 33551) into bearing and turn screw, which will expand two plates under bearing and will then force tool and bearing out of cover. Use Installing Tool J-5191 (Lincoln 33551-A, Oldsmobile J-5255) to install new bearing. This tool has shoulder to locate bearing at proper depth. Place stamped end of bearing against shoulder of tool so that unstamped end enters bore first. Lubricate bearing with clean automatic transmission fluid.

Hydraulic Valve Cover Seal–Remove seal from valve cover by carefully inserting an "offset" screwdriver between seal and shoulder in cover, and prying lightly around seal. Place a new seal on Tool J-5188 (Lincoln 33562, Oldsmobile J-5254–large end) having spring side (lip side) to shoulder of installing tool. Drive new seal down to shoulder in cover. NOTE–Always lubricate feather edges of seal with clean automatic transmission fluid to facilitate breaking-in the new seal.

Steering Gear Reassembly: Be sure all parts are absolutely clean and lubricated with clean engine oil during reassembly. Proceed as follows:

Lincoln–*(CAUTION–Before installing pitman shaft, tape serrated end of shaft to assure no damage to sector housing end seal.)* Install pitman shaft and cover assembly with new gasket, aligning side cover and steering gear housing marks scribed when disassembled. Secure with two capscrews and two Allen head screws. Loosen adjusting screw locknut. Turn sector shaft upper teeth (nearest side cover) as far as possible toward opening of the steering gear end cover. Turn steering shaft ball nut to top of ball nut race (nearest steering wheel end of shaft). Place Tool 33562-B on steering wheel end of shaft, and slide shaft through steering gear housing cover opening, holding up on shaft to take weight off seal while inserting. Insert first tooth of ball nut into first tooth showing on pitman shaft. Push lightly on ball nut end of steering shaft so as to turn teeth on pitman shaft, meshing them with teeth on ball nut. Install steering gear housing end cover and new gasket with two capscrews and two Allen head screws. (NOTE–If steering gear housing end cover fails to fit snugly against housing, turn shaft slowly to left and right to seat shaft in end cover bearing. DO NOT FORCE.) Install thrust bearing assembly with small race toward gear housing (Thrust bearing assemblies are interchangeable). Place new "O" ring seal in groove in face of housing. Turn holding fixture so that shaft is horizontal. Carefully install control control valve assembly with letter "B" marked on assembly toward housing. Turn steering gear to vertical position, move valve housing around to make sure thrust bearing balls are seated in race, then align marks on valve assembly and steering gear housing. Place Adapter Ring Tool 33577 over valve assembly and secure with three bolts. Center valve spool around worm shaft and tighten bolts evenly and securely. Install upper thrust bearing assembly with large race toward valve spool. Install new worm bearing tab lockwasher making sure inside lock tang slides freely in keyway of shaft, so lockwasher rests flat against upper thrust bearing race. Position locknut over shaft, having deeper chamfer toward tab lockwasher and start nut on threads just far enough so that it is left loose against face of tab lockwasher. Make worm bearing adjustment (see below).

Other Cars - 1) Run ball nut to upper end of worm.

2) On 1955 Cadillac, replace felt washer, reinstall flange on splined shaft, replace coupling flange-to-steering shaft dowel pin.

3) On other cars, place gear housing in horizontal position. Place tool over threads of steering shaft to protect worm seal in housing. Slide shaft through housing, holding up on shaft to take weight off feather edge of seal while shaft is passing through seal.

4) On all cars, install end cover with gasket, tightening in place with bolts and lockwashers.

5) Install lower thrust bearing assembly with large race outward (toward spool). Carefully install control valve assembly (NOTE–Hydraulic connection bosses on control valve housing are identified with embossed letters. The side with identification should be facing up toward steering wheel). Turn steering gear to vertical position, move valve housing around to make sure thrust bearing balls are seated in race, then align chalk marks. Install Adapter Tool J-5182 with valve cover bolts and tighten bolts to 15-20 ft. lbs. torque. Install upper thrust bearing assembly with large race toward valve spool. Install new worm bearing lock nut, and tanged washer (if used) making sure inside lock tang slides freely in keyway of shaft, so lock rests flat against upper race. Position locknut over shaft, having deep chamfer toward lock, and start nut on threads just far enough so it is left loose against face of lock (Nut must spin on threads freely without bind). Make worm bearing adjustment (see below).

Worm Thrust Bearing Adjustment–Temporarily install steering wheel (Studebaker Tool J-5563) after removing special tool from end of steering shaft (or tape from pitman shaft). Turn wheel counter-clockwise to extreme left (Chevrolet right) position so that valve centering plunger springs are fully compressed. Hold wheel in this position and tighten bearing locknut as follows:

►*NOTE:* On 1955 Cadillac, when making this adjustment, use flange and suitable lever to hold shaft stationary.

Buick–Tighten nut just enough to seat thrust bearings against valve spool. Pull at rim required to rotate wheel in off-center range steadily should be 1/2-3/4 lb.

Cadillac–Tighten locknut to 30 ft. lbs. torque, then back off 1/4 turn. Pull at rim required to rotate wheel steadily in off-center range should be 3/8-3/4 lb.

Ch vr l t–Tighten locknut firmly. Back off nut and retighten lightly. Pull at rim required to rotate wheel steadily in off-center range should be 1/4-1/2 lb.

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Lincoln—Tighten locknut firmly, then back off nut and retighten lightly. Release wheel (make sure nut exerts pressure against spring-loaded plungers). Adjust to get pull at steering wheel rim of 1/4-5/8 lb.

Oldsmobile—Tighten nut just enough to seat thrust bearings against valve spool, then back off nut 1/16-3/32" measured at one corner of nut hex. Pull at rim required to rotate wheel steadily through off-center range should not exceed 3/8 lb.

Pontiac—Tighten locknut firmly, then back off nut and retighten lightly. Release wheel so that plunger spring pressure is against retaining collar J-5182. Thrust bearing nut should have no lash. Adjust to get pull at steering wheel rim of 1/4-1/2 lb.

Studebaker—Tighten locknut firmly. Turn shaft back to relieve pressure on springs, then, while holding shaft, back off nut until outer race of upper thrust bearing can be turned with a heavy drag.

On all car models, lock the nut by staking nut into shaft keyway (or bend lockwasher tangs against nut flat) using care not to disturb nut position. Remove Adapter Tool. Install new "O" ring seal in cover, use protective thimble on steering shaft to prevent damage to cover seals, install valve cover making certain that aligning marks are lined up, tighten cover screws with torque wrench as follows:

Buick, Pontiac—Securely.
Cadillac—25-29 ft. lbs.
Lincoln—17-22 ft. lbs.
Chevrolet, Oldsmobile, Studebaker - 15 - 20 ft lbs.

NOTE—It is very important that all cover bolts be tightened as closely as possible to exactly the same torque.

Having completed worm thrust bearing adjustment proceed as follows:

Buick—Place adjusting screw and shim in slot of pitman shaft, install side cover with new gasket, and install lock nut finger tight on screw. Place gear assembly on left side, turn steering shaft until ball nut teeth are centered on pitman shaft bushings, and tilt nut slightly toward side cover opening. Hold pitman shaft with gear sectors straight down as it is installed in gear housing; use care to avoid damaging pitman shaft seal in gear housing as shaft is pushed through it. Install side cover and tighten bolts securely. Adjust pitman shaft as follows:

Buick Pitman Shaft High Point Adjustment—Install steering wheel and turn slowly through full range to check for free action, then turn wheel back to center position (2-3/4 turns) to center ball nut on central "high point" of pitman shaft sector. Turn pitman shaft adjusting screw clockwise until lash between ball nut and pitman shaft sector is just removed, tighten lock nut. Turn steering wheel two turns right or left from center. Pull at rim to rotate wheel in range where lash normally exists should be 1/2-3/4 lb. (1952-54), 1/2-7/8 (1955). Place wheel near center position, again check pull required to rotate wheel through "high point". This should be 1/2 - 3/4 lb. gr at r than pull in lash range. Turn adjusting screw as required to obtain this reading after locknut tightened. Record this reading for later use.

Cadillac, Ch vr let, P ntiac, Stud bak r—Place gasket on cylinder and guide power rack through opening in gear housing with teeth on rack pointing toward center of housing. With scribe marks on cylinder and housing aligned, install cylinder-to-housing mounting bolts and tighten securely. Install pitman shaft and engage tapered teeth with ball nut and power rack as follows:

Cadillac—Be sure scribed marks on ball nut and power rack are aligned. Engage teeth of gear with power rack and ball nut.

Chevrolet—Turn steering wheel right or left until center groove of ball nut is in line with center of pitman shaft bushing. Position power rack so that center groove (third groove from piston end) is in line with center of pitman shaft bushing. Install pitman shaft so that center tooth in each set of sector gear teeth meshes with center grooves of ball nut and power rack.

Pontiac—Turn steering wheel clockwise to run ball nut to upper end of its travel. Install pitman shaft in housing with tapered teeth contacting ball nut, engage first tooth of gear with first tooth of power rack and worm gear ball nut.

Studebaker—Same as Chevrolet above.

Lincoln—Proceed with pitman shaft high point adjustment as follows:

Lincoln Pitman Shaft High Point Adjustment—Install steering wheel. Turn steering wheel slowly through full range to check for freedom of movement, then turn wheel back to midway position to center ball nut on central high point of pitman shaft. Turn steering shaft 45° right or left from center. Pull at rim of wheel required to rotate wheel smoothly over center high spot should be 3/4—1 5/8 lbs. Adjust pitman shaft adjusting screw to bring pull within this range. Difference between worm bearing preload (see Worm Bearing Adjustment above) and total preload must not be greater than 1 lb. on 9" radius. Record this reading for use in Power Rack Adjustment below. Tighten adjusting screw locknut to secure adjustment. Recheck adjustment after tightening locknut.

Buick & Lincoln—On Buick, turn steering shaft clockwise to limit of travel. On Lincoln, turn steering wheel until lower pitman shaft teeth are turned completely toward power cylinder opening. On both cars, position power cylinder assembly and new gasket with power rack all the way in cylinder. Align power cylinder and steering gear housing scribe marks. On Buick, mesh end tooth of rack between two end teeth in pitman shaft sector. On Lincoln, mesh first tooth on pitman shaft into first groove on power rack. Torque power cylinder attaching bolts securely (Lincoln 17-22 ft. lbs.)

Oldsmobile—Install steering wheel and turn it right or left until center groove in ball nut is in line with center of pitman shaft bushing. Place pitman shaft with cover and gasket into housing. *CAUTION—T th that engage ball nut ar tapered.* Align center tooth of tapered sector with center groove of ball nut, tap side cover lightly until cover and gasket are flush against housing. Turn steering wheel clockwise all the way. Position power cylinder assembly, with marks aligned, into housing, engaging first tooth on rack into first groove (TOP GROOVE) on sector. Tighten power cylinder attaching bolts evenly and securely.

All Cars—Oil face of power rack and guide, then position power rack cover and guide assembly with all shims onto housing (CAUTION—Use care when holding shims in position to avoid any thin shims catching in bolt threads and face of housing). On Buick and Lincoln, install cover attaching bolts and tighten evenly and securely. On other cars, just start cover bolts with lockwashers through cover. These bolts must be left loose until Over-Center Adjustment has been checked and adjusted. See Over-Center Adjustment below.

Over-Center (Pitman Shaft-to-Ball Nut Lash—Cadillac, Chevrolet, Oldsmobil , Pontiac, Studebak r) Adjustment—With power rack cover bolts loose, turn steering wheel slowly through its full range to check for freedom of movement, then turn wheel back to midway position to center ball nut on central high point of pitman shaft. Turn steering wheel shaft 45° right or left of center. Place spring scale on spoke of wheel at rim and pull on scale, at a 90 angle to spoke, to turn steering wheel. Adjust pitman shaft adjusting screw so that pull on 9" radius to turn wheel smoothly over center high spot is:

Cadillac—1 1/8—1 3/4 lbs.
Chevrolet—1 1/8—1 1/2 lbs.
Oldsmobile—5/8 lb. greater than in lash range (1/2—1 1/4 lbs).
Pontiac—1—1 1/2 lbs.
Studebaker—1/2-1 lb.

Power Rack Guide (Pitman Shaft-t -P w r Rack Lash—All Cars) Adjustm nt—Tighten power rack cover bolts evenly and securely. Turn steering wheel slowly through its full range to check for freedom of movement, then turn wheel back to center position. Turn steering wheel shaft 45° right or left of center. Place spring scale on spoke of wheel at rim and pull on scale, at a 90° angle to spoke, to turn steering wheel. If power rack cover shims have been selected properly there will be a preload in addition to over-center or pitman shaft adjustment when column shaft is rotated past center high spot as follows:

Buick—1/4-1/2 lb. increase or 1 1/4—2 1/4 lbs. total.
Cadillac—1/8-1/4 lb. increase or 1 1/4—2 lbs. total.
Chevrolet—1/8 lb. increase or 1 1/4—1 5/8 lbs. total.
Lincoln—1/32-3/16 lb. increase or 25/32—1 13/16 lbs. total.
Oldsmobile—No increase or 1—1 3/4 lbs. total.
Pontiac—No increase or 1/2-1 lb. total.
Studebaker—1/8 lb. increase or 1 1/4 lbs. maximum.

This completes the overhaul. Reinstall horn wire and contact where necessary. Install steering gear in car (See Removal & Installation above).

HYDRAULIC PUMP: 1954-Early 1956 M dels - *Se "Eaton R t r Typ Pow r St ring Pump" r "Vickers Van Typ (3-Pi c Housing) Pow r St ring Pump".* **Late 1956-58 Models** - *Se "Saginaw Van Type Power St ering Pump".*

SAGINAW "IN LINE" POWER STEERING

Buick (1956-58) ℂ
Cadillac (1956-58)
Contin ntal (1956-58)
Eds l (1958)
Linc ln (1956-58)
Oldsm bile (1956-58)
Pontiac (1956-58)

ℂ - Also used in some early 1959 models

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 END COVER, ADAPTER AND VALVE MOUNTING SEAL PRODUCTION CHANGE* On later cars, the "O" ring seal has been increased in size and its position on the adapter has been changed slightly. Both the early and late type adapters are interchangeable provided the correct "O" ring seal is used.

►*POWER STEERING GEAR SEAL INSTALLATION CAUTION* Particular care must be exercised when installing seals in the 1956 gear housing because fluid under pressure exists throughout housing whenever steering effort is applied Extreme care must be exercised when installing the pitman shaft oil seal

►*1956 BUICK PITMAN SHAFT LASH ADJUSTING SCREW LOCK NUT CHANGE (To eliminate leakage at this point)* A new lock seal nut, Part No. 5684554 having a nylon seal embedded at crimped end of nut, is available for service replacement.

►*1956 CADILLAC POWER STEERING SQUEAK CORRECTION (This squeak is noticed during a turn to left or right)* The squeak is caused by a dry needle bearing in gear assembly end cover. Apply 10W oil to felt washers under worm shaft flange. A small hole is provided in the felt protector on upper worm flange.

►*1956 CADILLAC STEERING GEAR "CLUNKING" NOISE CORRECTION* This noise is heard on hard turns and when steering wheel is turned while car is standing still with engine running. This condition may be corrected by properly positioning the lower steering column seal seat between bearing and seal at lower end of steering shaft. Check to make sure a washer is located under the spring at lower end of steering shaft.

►*1956 CADILLAC POWER STEERING GEAR SIDE COVER & LASH ADJUSTER SCREW CHANGE (Air bleed screw has b en eliminated)* This is a change in partial production and affects cars between Serial No. 139856 to 140136 and 140277 to 140557. Provision has been made for automatic bleed of trapped air in upper area of housing. Bleeding of air from system is accomplished in the same manner as in the past.

►*1956 CADILLAC STEERING KNUCKLE ARM CHANGE* Starting at Engine No. 127270, steering knuckle arms, Part No. 1456119 (right hand), and 1456118 (left hand) are used on all models. When replacing a steering arm, make sure the correct type is installed to match the opposite arm.

►*1956 LINCOLN POWER STEERING HOSE INTERFERENCE WITH UPPER FRONT SUSPENSION CONTROL ARM* If interference is found at this point, rotate the "Banjo" pressure hose fitting to between 8 and 9 o'clock positions as view from left side of car.

►*1956 LINCOLN POWER STEERING CONTROL VALVE PRODUCTION CHANGE* Control valve assembly, Part No. LD-33577-A was used on approximately 9000 early cars. Part No. LD-33577-B is used in later production. Some of the detail parts of the assemblies are not interchangeable. The early type valve is identified by a brush mark of yellow paint across valve housing.

►*1956 STEERING COLUMN RATTLE CORRECTION* Install a new nylon upper steering column bushing, Part No. FDT-3517-A. Before replacing the bushing, Polish all burrs from the shaft.

►*1957 BUICK POWER STEERING PUMP MANIFOLD BREAKAGE NOTE* Excessive leakage at the cover attaching bolt accompanied by a heavy pump growl may be caused by a cracked or broken manifold in bottom of reservoir This condition is caused by overtightening of the cover bolt

►*1957 BALL NUT RETAINING SCREW PRODUCTION CHANGE* A new screw having a hex head socket is now being used in production. Early and late type screws are not interchangeable. *See "Overhaul" below.*

►*1957 CADILLAC PITMAN ARM SHAFT RETAINING NUT TIGHTENING CHANGE* Tightening specifications have been changed from 105-150 ft. lbs. to 100-125 ft. lbs.

►*1957 PONTIAC (EARLY) HIGH POINT MARK ON STEERING SHAFT CAUTION* Some early cars had the "high point" mark on upper end of shaft positioned toward the bottom with wheels in straight ahead position (mark should have been at top). Determine correct "high point" by turning wheel to its mid position by counting the turns from stop-to-stop.

►*1958 BUICK HIGH PRESSURE HOSE PRODUCTION CHANGE* New type hose Part No 5686919 used on later cars New hose does not have center restrictor and eliminates interference with brake line

►*1958 CADILLAC PUMP COVER SCREW TORQUE CAUTION:* Overtightening cover screw beyond 7 9 ft lbs will distort pump cover break seal and cause oil leak or it will distort manifold at bottom of reservoir causing manifold-to reservoir oil leak

►*1958 PONTIAC PUMP RESERVOIR COVER BOLT LEAK CORRECTION·* Remove and discard hose clip (mounted under bolt head) and install copper washer No 568506 in place of clip

DESCRIPTION· Hydraulically operated in-line power steering gear, which combines the recirculating ball type gear with a concentric hydraulic booster Hydraulic fluid is supplied to the steering gear by a constant displacement, belt driven type pump System is designed to give hydraulic assistance when effort required to turn wheels exceeds 2½ lbs at the rim of the steering wheel Maximum effort required to turn wheels, even under most difficult turning conditions, is limited to 5½ lbs at rim of steering wheel Manual steering is available at all times when engine is not running, or when turning effort at steering wheel is less than that required for power assistance

Control Valve Assembly: Located in valve housing directly above steering gear housing Control valve assembly is an open center three way valve containing a control valve mechanically connected by an actuator lever to the thrust bearing assembly on the worm shaft Control valve has two annular grooves which as the valve is moved fore or aft open or close connecting passages between valve body and gear housing In the neutral or straight-ahead position fluid flows from the pump through open center of valve and back to the pump reservoir When steering wheel is turned resistance between roadbed and wheels must be overcome at the point where the power rack cylinder and pitman gear mesh When the steering wheel is turned, this resistance if higher than the preload which is built in the gear will allow the wormshaft to move downward (right turn) or upward (left turn) causing thrust bearing to move downward (right turn) or upward (left turn) causing valve actuating lever to shift the control valve As the valve moves the connecting fluid passage between valve body and lower end (right turn) or upper end (left turn) is opened more fully to fluid from the pump and the connecting passages between valve body and the upper end (right turn) or lower end (left turn) of the cylinder is more fully closed Fluid from pump is then restricted in its flow back to pump reservoir and builds up pressure forcing piston rack upward (right turn) or down (left turn) and providing power assist for the turn Fluid in upper end (right turn) or lower end (left turn) of gear housing is forced back to pump reservoir through return line The greater the resistance between roadbed and wheels, the more the control valve is displaced "Feel of the road" is maintained through a reaction chamber built into the valve body A ball check valve in the valve body allows steering gear to be operated manually when engine is not running or pump is inoperative (fluid circulates within valve body and gear housing Return line to pump reservoir is open to assure a continuous flow of fluid)

Pump & Reservoir Assembly· Hydraulic pump is belt driven from engine crankshaft and supplies oil pressure for hydraulic assist Pump operates continuously when engine is running but a flow control valve recirculates oil within the pump when it is not needed for hydraulic assist A relief valve is provided to limit pump pressure Reservoir is mounted directly above pump and supplies oil as needed

ADJUSTMENT

PUMP BELT ADJUSTMENT: Buick – Tension should be set so that pulley will slip in belt when 40-45 lbs (new belt), 30-35 lbs (old belt) torque is applied to pulley nut

Cadillac (1956) - Loosen pump to mounting bracket screws then move pump outward until belt is tight and tighten screws With shift lever in "N" race engine while turning steering wheel If belt squeals it is too loose and must be retightened

Cadillac (1957-58) - With belt tensioner gauge J 6733 installed adjust belt tension until red line on barrel of gauge is even with the shoulder

Edsel (1958) - With torque wrench and socket on pump pulley bolt torque required to slip pulley against belt friction should be 14 16 ft lbs

Linc ln & Contin ntal (1956-58) - ½" belt deflection midway between pulleys with 5 7 lbs of force applied

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SAGINAW "IN LINE" (C ntinued)

Oldsmobile (1956) - Loosen pump to bracket attaching bolts Place Tool J-5398 under pump body and over pivot cap screw With a 0-50 ft lb torque wrench adjust drive belt tension to 30 ft lbs This corresponds to a belt deflection of 7/8" with a 25 lb pull applied midway between pump pulley and fan

Oldsmobile (1957-58) - Position Belt Tensioning Gauge No 33-70 on belt Loosen pump attaching clamp screws and move pump away from engine until pointers on gauge index with groove in gauge plunger Tighten Tighten clamp screws

Pontiac (1956-57) - Loosen pump to bracket bolts two full turns so pump falls of own weight Using Tool J-5574 over head of hinge bolt and torque wrench perpendicular to tool, tighten belt to 58-65 ft lbs (new belt) 51-53 ft lbs (old belt)

STEERING GEAR ADJUSTMENTS: Pitman Shaft Endplay Adjustment is the only adjustment that can be made on car. However, Ball Nut Preload and Thrust Bearing Preload should be checked before Pitman Shaft Endplay Adjustment is made. Disconnect pitman arm from pitman shaft or drag link, then proceed as follows

Thrust Bearing Preload Check: Buick - Disconnect pitman arm from intermediate tie rod. Attach Scale J-544-A to spoke of steering wheel at rim. While pulling at a 90° angle to spoke, pull required to turn steering wheel through range where lash normally exists (1/8 turn of wheel from either extreme position) should be ¼-½ lb.

Cadillac - Turn steering wheel two turns off center. Attach spring scale to spoke of wheel at rim. While pulling at 90° angle to spoke, pull required to turn wheel through a 1" arc should be 8-14 ounces.

Lincoln & Continental - Adjustments on car are not recommended, and should be performed when steering gear is removed for overhaul and during reassembly. *See "Overhaul" below.*

Oldsmobile - *(NOTE - Thrust Bearing Preload & Ball Nut Preload are checked in one operation as follows):* Remove pitman arm from shaft, then loosen pitman shaft adjusting screw locknut and thread adjusting screw out to limit of its travel. Attach Spring Scale J-544-A to spoke of wheel (at rim) and check and record pull required to move steering wheel through a 6" arc with steering gear on center position (2¼ turns from either end of steering wheel travel). *NOTE - This pull should be ¼-1¼ lbs.*

Pontiac - *(NOTE - Thrust Bearing Preload & Ball Nut Preload check not required).*

Ball Nut Preload Check: After Thrust Bearing Preload checked (see above), loosen pitman arm shaft adjusting screw locknut and turn adjusting screw a few turns to loosen it. With spring scale attached as for Thrust Bearing Preload Check, check Ball Nut Preload and record the pull.

Buick - Pull through "high point" (on center) should be ¼-¾ lb. higher than for thrust bearing preload.

Cadillac - With steering gear ½ to ¾ turn off center, the pull through an arc not exceeding 1" should be 2-9 ounces in excess of the Thrust Bearing Preload check.

Lincoln & Continental - Checking on car not recommended.

Oldsmobile - *See "Thrust Bearing Pr load Check" abov .*

Pontiac - Checking not required.

Pitman Shaft Endplay Adjustment: Adjust pitman shaft endplay adjusting screw so that pull required to move steering wheel through center (no lash) position is as follows:

Buick - ½-1 lb. higher than for ball nut preload. Total reading should be 1¼-1¾ lbs.

Cadillac - 8-16 ounces higher than for ball nut preload reading, but should not exceed 28 ounces total.

Lincoln & Continental - Adjustment on car not recommended.

Oldsmobile - ½-¾ lb. in excess of thrust bearing & ball nut preload. Total overcenter preload must not exceed 1¾ lbs.

Pontiac - Overcenter preload should be 1¼-1¾ lbs.

LUBRICATION

LUBRICATION: Buick, Cadillac, Oldsmobile, & Pontiac - Every 2000 miles remove cover on reservoir and add Automatic Transmission Fluid, Type "A" as required to bring level up to "Full" mark on side of reservoir. Tighten cover bolt to 7-9 ft. lbs. *CAUTION - Do not overtighten.*

Continental, Edsel, Lincoln - Check fluid level every 2,000 miles and add Auto. Trans. Fluid type "A" to bring level to ½" of top.

BLEEDING

Buick, Oldsmobile, Pontiac (1956): Remove cover fill to full mark on side of reservoir With front wheels off ground engine running and bleed screw in side cover loosened turn steering wheel through its entire range two or three times until there is no evidence of air in system Recheck oil level Tighten bleed screw and replace cover using a new gasket Tighten cover bolt to 8-10 ft lbs

Cadillac (1956): *NOTE - See "Cadillac Power Steering Gear Side Cover & Lash Adjuster Screw Change" above* Remove cover and fill to full mark on side of reservoir Allow fluid to remain undisturbed for about two minutes then crack open air bleed screw on housing side cover. Crank engine (coil wire disconnected) and maintain fluid level in reservoir At the same time, with front wheels off ground turn wheels from side to side Start engine and run at 1500 RPM then turn wheels from right to left a number of times (do not hit stops) Check fluid level and install cover using a new gasket Tighten cover bolt to 10-15 ft lbs

Buick, Cadillac, Oldsmobile, Pontiac (1957-58): Run engine at fast idle for two minutes while turning front wheels from right to left (do not hit stops) Check fluid level

Continental (1956-57): Fill reservoir to full mark, then replace star nut and washer (without cover) Loosen bleed screw in side of cover and start engine With wheels off ground turn steering wheel through its entire travel two or three times Tighten bleed screw, recheck oil level and replace cover

Lincoln (1956-57): Fill reservoir to full mark on dipstick Loosen bleed screw in side cover, then start engine Turn steering wheel through its entire travel several times with wheels off ground Tighten bleed screw recheck oil level and replace dipstick

C ntinental, Edsel, Linc ln (1958): Remove cover then add fluid to proper level Start engine and turn steering wheel through entire travel two or three times to bleed system Recheck fluid level

TESTING

HYDRAULIC PRESSURE TEST: Buick, Cadillac, Oldsmobile, Pontiac – Disconnect pressure line at oil pump, attach Gauge J-5176 to pump, and connect hose to end of gauge where valve is located. With engine at warm idle and gauge valve open, note oil pressure while turning steering wheel from one extreme position to the other. Especially note the maximum pressure which can be built up with the wheel held in either right or left extreme position. *(CAUTION – Do not hold wheel in extreme position for more than 15 seconds because it will drastically increase the oil temperature and cause undue wear on the oil pump).* With oil temperature between 150° F. and 170° F , as measured with a thermometer in the reservoir, the maximum pressure should not be less than 875 PSI (850 PSI on Pontiac) for satisfactory power steering operation. If less than specified, it indicates trouble in the pump, hoses, steering gear, or a combination of these parts.

► *1956 CADILLAC POWER STEERING PUMP PRESSURE REDUCTION (to eliminate a squealing noise) See "Changes, Cautions, Corrections" above.*

Continental & Lincoln – Remove pressure hose from pump and connect Gauge No. 3500 with adapter No. 3500-C between pressure fitting on pump and pressure hose that leads from pump to power unit. Let engine idle and turn wheel for a full right or full left turn. The gauge should read between 800 and 1000 lbs. If pressure is less than 800 lbs., close the valve at gauge and note pump pressure. If it is low with valve closed, it indicates that pump is not operating properly. If pump pressure goes up with valve closed, it indicates that the low pressure in system must be due to internal leakage in power unit, providing all connections are tight.

TROUBLE SHOOTING

TROUBLE SHOOTING: Hard St ering While Driving – Steering adjustment tight, linkage binding.

Hard Steering (Car receives mor assist in on direction than the other): This condition may be caused by either of the following Internal leaks at one or both of the white teflon seals. Correct by replacing seals. If this condition is not corrected by the above, align the valve body as follows. Loosen the three attaching bolts and allow the valve to seek its own location. Tighten the end bolt finger tight, then the two side bolts. Repeat bolt tightening sequence applying a final torque of 15-20 ft. lbs.

Poor Return of Steering Gear to Center: Tires not properly inflated, incorrect caster or toe-in, tight steering linkage, steering gear misalignment, tight sector to rack piston adjustment, sticky or faulty control valve, control valve improperly positioned on steering gear, ball nut and worm preload too tight, worm thrust bearing adjustment too tight, sticky valve actuating lever

Car Leads to On Side or the Other: Due to front end alignment and not to steering gear.

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SAGINAW "IN LINE" (C ntinu d)

Momentary Increas in Eff rt When Turning Wheel Fast to Right: Air in system

External Oil L aks (Wipe Gear Thoroughly and Make Sure Source of Leakage is Determined): Loose hose connection, damaged hose, housing end cover seal, housing end cover "O" ring seal, adapter "O" ring seal, side cover "O" ring seal, linkage cover "O" ring seals, valve to gear housing "O" ring seals, pitman shaft seal, valve end plug "O' ring seal.

Gear Noise (Rattle or Chuckle): Loose over-center adjustment *NOTE* – A slight rattle may occur on turns because of the increased lash off "high point" This is normal, and the lash must not be reduced below specified limits to eliminate this slight rattle

Gear N is (Hissing Sound): *NOTE* – There is some noise in nearly all power steering systems. One of the most common is a "hissing" sound most evident when at stand-still parking. There is no relationship between this noise and performance of the steering. Hissing may be expected when wheel at end of travel

Exc ssive Wheel Kick-back or Loose Steering: Lash in steering linkage, air in system excessive lash between pitman shaft sector and rack piston, loose worm thrust bearing adjustment

Hard Steering When Turning or Parking: Loose pump belt low oil level in reservoir, lack of lubrication in linkage or front suspension, tires not properly inflated, steering gear adjustments tight, insufficient oil pressure, low oil pressure due to steering gear seal leakage

STEERING WHEEL & HORN BUTTON REMOVAL & INSTALLATION

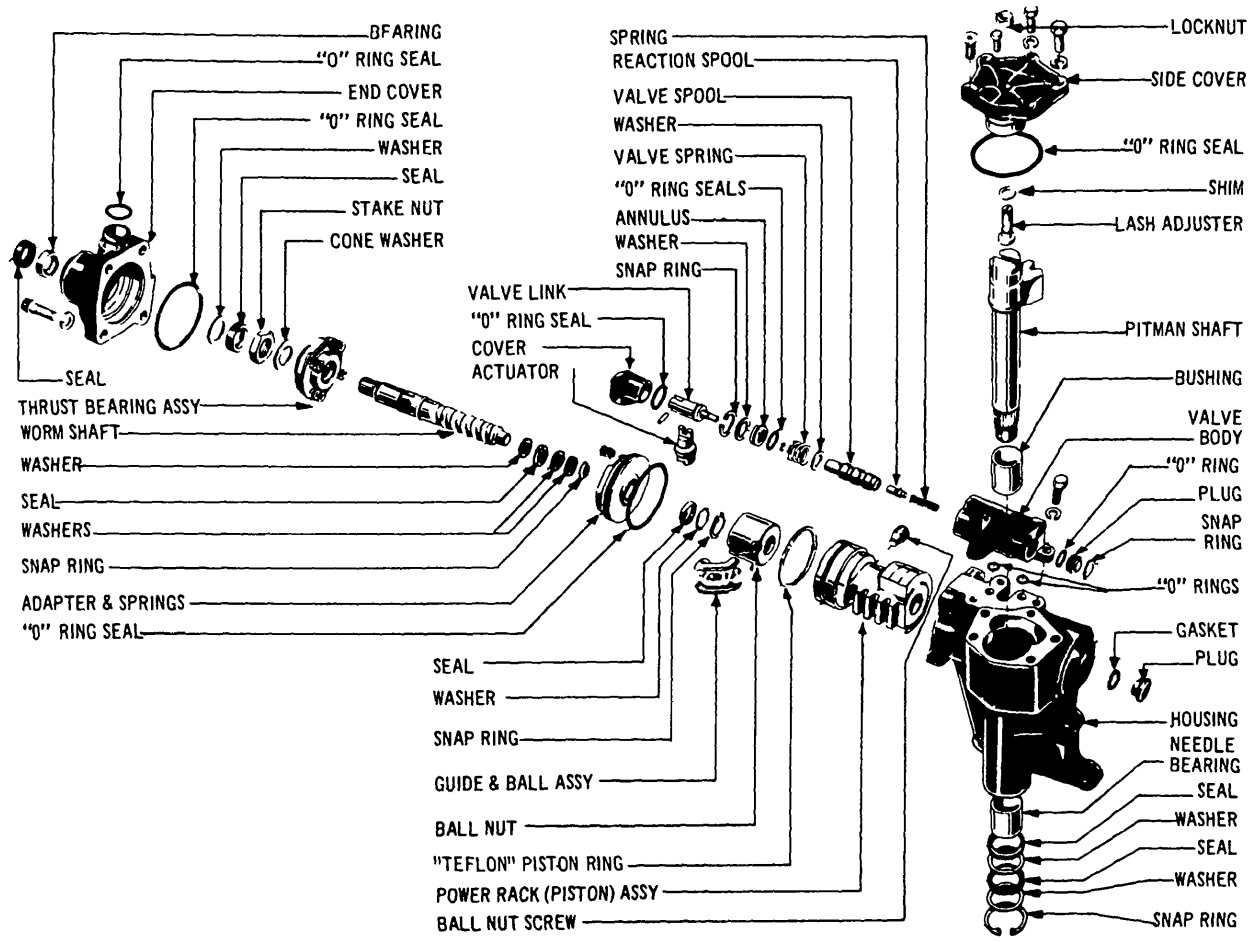
BUICK

Horn Button Rem val (1956-58 Series 40 Std.) - Pry cap out with thin bladed tool then remove contact cup and other parts by removing attaching screws and insulating spacer bushings To install reverse removal procedure

H rn Button & Ring Rem val (1956-57 Deluxe Steering Wheel) - Pry out monogram which is held by prongs of a retaining spring then remove adjusting nut contact plate and spring with insulators Remove operating ring with cushion and contact spacer *NOTE* - When adjusting nut is being installed turn it down until contact is made and horn blows then back nut off ½ turn to provide proper clearance between contact plate and spacer

H rn Button & Ring Removal (1958 Deluxe Steering Wh el) - Remove three cross-recess screws (from underneath) and remove horn operating ring then remove adjusting nut contact plate and spring (with two insulators) Remove steering wheel nut contact spacer and horn ring adapter To install reverse removal procedure *NOTE* Steering wheel nut does not have lockwasher (self locking type) Turn horn contact adjusting nut down until horn blows and back off ¼ turn at reassembly

St ering Wheel R m val (All Models) - Remove horn button or operating ring (see above), then reinstall steering wheel nut leaving it backed off several turns Set direction signal switch in "Off" position to avoid damage to switch operating mechanism Apply puller J-3274 and pull wheel back to nut *NOTE - If wheel hub very tight on shaft, apply a moderate pressure, th n tap nd of puller screw to break hub loose from shaft without distorting wheel hub* Remove puller nut, and steering wheel



SAGINAW "IN LINE" POWER STEERING GEAR (TYPICAL)

CADILLAC

Horn Ring Removal (1956-58) - Disc nnect horn wire from terminal underneath instrument panel on steering column Loosen Allen head screws on underside of horn ring (one on each side of direction signal carrier) and remove horn ring assembly To install reverse removal procedure

Steering Wheel Removal (1956-58) - Remove horn ring then remove steering wheel nut Remove wheel with Tool J-1859 To install position wheel over splines on shaft so punch marks line up Install hub nut and tighten to 45-50 ft lbs then stake nut to steering wheel Install horn ring

EDSEL

Horn Button & Ring Removal (1958) - Pushbutton Type - Disconnect battery then pry off trim plate medallion with a thin screwdriver Remove screws from plate and remove plate, then pull off pushbuttons Remove screws from inside horn ring hub and lift off ring and trim pad Remove nuts holding contact plate assembly and steering wheel to lower hub Remove contact plate assembly To install reverse removal procedure

Steering Wheel (1958) - Conventional Type - Pry emblem out of wheel hub and remove steering wheel nut Use Tool 3600-AA to pull wheel To install place wheels in straight ahead position and install steering wheel Tighten nut to 60-70 ft lbs

Steering Wheel (1958) - Pushbutton Type - Same as for "Horn Button & Ring Removal" above

LINCOLN & CONTINENTAL

Steering Wheel & Horn Ring Removal (1956-58) - Remove cap and emblem from wheel by inserting a flat instrument between steering wheel hub and horn ring and pushing up Remove steering shaft nut then pull wheel with Tool 3600-A Remove three screws from rear of steering wheel hub and remove horn ring and component parts To install reverse removal procedure

OLDSMOBILE

Horn Button Removal (1956-58) - Standard Wheel - Insert sharp instrument under edge of horn button and pry upward Remove steering wheel nut and contact assembly

Horn Butt n R m val (1956) - D lux Wh l - Two spring clips on ends of horn button engage horn ring

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hub and are accessible from underside of wheel To remove horn button, use a small screwdriver to relieve spring tension on one end and lift button from its seat Remove steering wheel nut to remove contact plate and horn ring To install reverse removal procedure

Horn Button Removal (1957) - Deluxe Wheel - Insert a sharp instrument under edge of cap and pry upward Remove steering wheel nut, then remove horn contact assembly To install reverse removal procedure

Horn Button Removal (1958) - Deluxe Wheel - Pry cap from shroud remove horn contact retainer-to-steering wheel hub screw, then carefully pull retainer assembly from hub until contact assembly can be removed To install reverse removal procedure

Steering Wheel Removal (1956-58) - Remove horn button, see above, then use Tool J-1262 to pull wheel from shaft To install, reverse removal procedure and tighten shaft nut to 25 ft lbs (minimum) and stake to steering wheel

PONTIAC

Horn Ring Removal (1956-58) - Standard Wheel - Press down on one side of button and insert a sharp instrument on other side. Pry button out Remove steering wheel nut and contact assembly.

Horn Ring Removal (1956) - Deluxe Wheel - Remove button by turning clockwise Remove locknut, nut, washer, horn ring, horn insulator and contact assembly To install, reverse removal procedure.

Horn Ring Removal (1957) - Deluxe Wheel - Remove screws retaining covers to bottom of horn ring. Remove horn ring side plates, horn ring adapter bushing screws and associated parts To install, reverse removal procedure

Horn Ring Removal (1958) - Deluxe Wheel - Pry up one end and remove ornament, then remove two plate nuts, washers, plate and insulator Lift off horn ring and remove contact (upper), spring and washer Remove lower contact insulator and support, then remove steering wheel locknut, wheel shaft nut and washer To install, reverse removal procedure

Steering Wheel Removal (1956-58) - Remove horn ring or button (see above), then use Tool J-3044 to pull steering wheel To install, reverse removal procedure and tighten nut to 25-30 ft. lbs

REMOVAL & INSTALLATION

Buick (1956): Place a cover over left front fender Disconnect pressure and return line hoses at steering gear and elevate ends of hoses higher than pump to prevent oil from draining out of pump Disconnect flexible coupling by removing two bolts which attach flexible coupling to steering shaft. Jack up car and remove pitman shaft nut, then remove pitman arm Remove four steering gear-to-frame bolts at outside of left frame rail. Remove steering gear. To install, reverse removal procedure Check toe-in

Buick (1957-58): Disconnect pressure and return hoses at steering gear and elevate ends to prevent oil draining from pump. Mark upper and lower steering shaft flanges for correct reassembly, then disconnect the flexible coupling. Raise front of car and remove pitman shaft nut and pitman arm. Remove steering gear to frame bolts and remove steering gear. To install gear, reverse removal procedure. Fill reservoir with oil, then start engine and operate pump, add additional oil until level remains constant. Rotate steering wheel through its entire range slowly a few times, then recheck oil level and replace cover on reservoir.

Cadillac (1956-58): Remove reservoir cover and syphon fluid from reservoir Disconnect pressure and return hoses at reservoir and pump, cap ends to prevent fluid drainage. Raise front of car and place stands near outer ends of lower suspension arms. Disconnect pitman arm from drag link. Remove upper flange-to-upper shaft retaining screw. Remove gear housing-to-frame side side bar screws, remove gear assembly. To install, reverse removal procedure Torque upper flange-to-shaft retaining screw to 25-30 ft lbs. *NOTE*–After installing gear, check flexible coupling for distortion Coupling must rest in flat plane with no visible bend or twist If distorted, remove lower steering column cover and lower clamp-to-jacket screw Then loosen steering jacket clamp screws at instrument panel and slide complete steering jacket assembly up or down as required.

Continental (1956): Working in engine compartment, remove ground cable from battery. Remove screws that retain steering column opening upper and lower cover plates to dash panel. Remove cover plates and insulator. Remove lock pin that retains shift rod to shift arm and remove shift rod from pin on shift arm. Remove spring from pin on shift arm. Working inside passenger compartment, cover front seat and back to protect upholstery. Remove steering wheel (see above). Remove two screws that retain dash panel trim pad to dash panel and remove trim pad: Remove sheet metal screws that secure instrument panel trim and remove trim panel. Disconnect turn signal wires at junction block. Disconnect neutral safety switch and back-up light wires attached to terminal block on steering column. Remove two Phillips head screws that secure upper steering column tube to instrument panel. Slide steering column tube from steering shaft. Raise car, using hoist or suitable jack. Remove nut that secures pitman arm to steering sector shaft. Remove pitman arm from shaft with Tool 3590-AA. Lower car to complete operation in engine compartment. Working in engine compartment, remove air cleaner and air duct as an assembly. Remove two nuts that secure exhaust flange pipe to exhaust manifold. Remove manifold capscrews and remove manifold. Remove number 7 & 8 spark plugs. Remove as much fluid as possible from reservoir with a suction gun. Place oil drain pan under car to catch oil drained from system. Disconnect hoses at power steering gear. Drain steering gear by turning from stop to stop several times. Remove capscrews that secure housing to frame Mark position of any shims found under screws to assure reassembly in same location. *(CAUTION*–Do not attempt to remove rolled pin out of steering shaft coupling at this time). Working in engine compartment, rotate steering shaft so that coupling slot is in a vertical position to facilitate removal of gear assembly. Tilt gear housing down and rearward so that sector shaft is facing up. Lift gear assembly up between fender apron and engine and remove from engine compartment. To install, reverse removal procedure. Secure gear assembly to frame torquing three capscrews to 40-50 ft. lbs., steering wheel to 40-50 ft. lbs , pitman shaft nut to 120-130 ft. lbs. Before attaching pitman arm, count number of steering wheel turns from one extreme to the other and turn wheel back one-half number of turns. With steering wheel and front wheels in straight-ahead position, install pitman arm.

Continental (1957): Disconnect battery cable, then remove steering column-to- dash panel upper and lower cover plates. Remove shift rod at shift arm. Remove steering wheel (see above). Remove dash panel trim pad, then remove trim panel. Disconnect turn signal wires at junction block and neutral switch and back-up wires at terminal block on steering column. Disconnect upper steering column tube from instrument panel and slide tube off shaft. Raise car and remove pitman arm from shaft with Tool 3590-AA. Lower car and remove air cleaner duct and air cleaner as an assembly. Remove exhaust manifold on left side of engine and take out the number 7 and 8 spark plugs. Remove as much fluid from power steering pump reservoir as is possible, using a suction gun. Disconnect hoses at steering gear and drain hoses. Drain steering gear by turning from stop to stop several times. Remove bolts holding gear to frame and note position of any shims found under bolts. *(CAUTION - Do not att mpt to r mov rolled pin out of steering gear shaft coupling at this tim).* Rotate steering shaft so that coupling slot is in a vertical position, then tilt housing down and forward so sector shaft is facing up. Lift steering gear up between fender apron and engine and remove from engine compartment. To install, reverse removal procedure and tighten pitman shaft nut to 120-130 ft. lbs. Bleed hydraulic system after filling reservoir with Automatic Transmission Fluid Type "A". *(See "Bl ding" ab v).*

Lincoln (1956): Working inside passenger compartment remove battery ground cable from battery and cover front seat and back to protect upholstery. Pull speaker lead out of receiver and remove two screws that retain speaker to dash panel. Remove radio speaker Remove steering wheel (see above). Disconnect speedometer cable at speedometer head. Disconnect accelerator rod at clevis pin connection. Remove brake pedal pad. Remove front carpet retaining screws and roll carpet away from steering column opening in dash. Remove clamp from steering column supports. Remove screws that retain supports to floor pan, and remove supports. Remove screws that secure access covers to floor pan and remove access covers. Remove lock pin that retains shift rod to shift arm and remove shift rod from pin on shift arm. Disconnect turn signal wires at junction block. Disconnect neutral safety switch and back-up light wires at terminal block. Remove two Phillips head screws that secure steering column clamp and steering column-to-brake pedal support, and remove steering column from steering shaft. Working through floor pan opening, remove rear manifold cap screw. Raise car using hoist or suitable jack. Remove nut that secures pitman arm to steering sector shaft. Remove pitman arm from shaft with Tool 3590-AA. Remove two nuts that secure muffler inlet to manifold. Remove two forward capscrews that secure steering

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gear to frame side rail. Leave remaining capscrew intact so that remaining operations can be performed. Lower car to complete operation in engine compartment. Remove manifold capscrews, remove manifold. Remove numbers 6, 7, and 8 spark plugs. Remove as much fluid as possible from reservoir with suction gun. Place drain pan under car to catch oil drained from system. Disconnect pressure and return line hoses at power steering gear. Drain steering gear by turning from stop to stop several times. Remove remaining bolt that secures steering gear to frame. Place steering gear with coupling slot in a vertical position to facilitate removal. Remove gear by tilting gear housing down and rearward until sector shaft can be removed first. To install, reverse removal procedure. Torque gear-to frame attaching capscrews to 40-50 ft. lbs. Torque steering wheel nut to 60-70 ft. lbs. Torque pitman arm-to-sector shaft nut to 120-130 ft. lbs. When installing steering column tube clearance between upper face of shifter dial and lower edge of horn rim hub should be approximately .18". Tighten steering column upper support-to-brake pedal support screws to 12-15 ft. lbs. Before attaching pitman arm, count number of steering wheel turns from one extreme position to the other and turn wheel back one-half number of turns.

Lincoln (1957): Disconnect cable from battery, then remove radio speaker assembly. Remove steering wheel (see above). Disconnect speedometer cable at speedometer head and accelerator rod at clevis pin connection. Roll carpet away from steering column opening in dash. Remove steering column supports and remove access covers in floor. Disconnect shift rod from shift arm at lower end of steering column. Disconnect turn signal wires at junction block and neutral switch and back-up light wires at terminal block on steering column. Remove steering column clamp and steering column-to-brake pedal support, then remove steering column from steering shaft. Remove rear exhaust manifold screw through hole in floor pan. Raise front of car and remove pitman arm from shaft using Tool 3590-AA. Disconnect exhaust pipe from muffler inlet pipe, then remove exhaust manifold. Remove No. 6, 7, & 8 spark plugs. Using a suction gun, remove as much fluid as possible from power steering reservoir. Disconnect hoses at power steering gear and drain gear by turning from stop to stop several times. Remove bolts securing steering gear to frame. Place steering shaft with coupling slot in a vertical position, then remove gear by tilting gear housing downward and rearward until shaft can be removed first. To install gear, reverse removal procedure and tighten pitman shaft nut to 120-130 ft. lbs. Fill pump reservoir and bleed system *(see "Bleeding" abov).*

Lincoln & Contin ntal (1958): Remove pressure and return hoses from power steering gear. Secure hoses above fluid level, then remove flexible coupling-to-steering gear flange bolts. Raise car and remove pitman arm with Tool 3590-AA. Remove exhaust pipe-to-manifold nuts. Turn front wheels to right turn position and remove steering gear assembly-to-underbody front side member and remove assembly.

Oldsm bil (1956-58): Scribe alignment marks on coupling flange and shaft flange. Disconnect hoses from power steering pump and cap pump and hose fittings. Remove pitman arm from shaft using Tool J-5504-B or similar tool. Remove flexible coupling flange nuts and lock washers, then remove gear assembly-to-frame bolts and remove assembly. To install, reverse removal procedure making sure aligning marks match and gear housing alignment pin enters hole in frame, then tighten bolts to 50-60 ft. lbs. Tighten pitman arm nut to 90-120 ft. lbs.

Pontiac (1956): Remove power brake (if so equipped). Hook front suspension in five passenger load position using Tool J-5571 front suspension hold-down hook. Remove steering wheel (see above). Remove direction signal switch handle and gearshift lever. Remove steering column-to-instrument panel bracket cap. Slide rubber grommet up steering column jacket. Roll back floor mat and remove pedal plates from floor. Remove neutral safety and back-up light switch on Hydra-Matic equipped cars. Disconnect gearshift and selector rods. Disconnect direction signal wires. Disconnect pressure and return line hoses at gear and secure lines so ends are higher than reservoir to prevent leaking. Install plastic plugs or tape to cover gear and line openings. Protect all finished surfaces on steering column with masking tape. Raise car on hoist. Remove starter, pitman arm and left side tie rod end, drop linkage. Remove engine left side apron. Remove brake pedal hair pin spring retainer. Slide pedal to right as far as it will go. If car is on twin post hoist it will be necessary to place stands under both front frame ends and lower front post approximately three feet to allow steering assembly to clear hoist. Push steering connecting linkage down and toward rear of car, remove steering assembly-to-frame attaching bolts, removing upper front bolt last. Lower assembly between lower control arm and steering connecting linkage. *(NOTE -* Check number of shims and avoid loss of shims that are between steering gear housing and frame). Thoroughly clean exterior of steering gear. Steering gear oil can be drained into a container by turning control valve down and turning the worm through steering range several times, To install, reverse removal procedure. Torque pitman arm nut to 100-125 ft. lbs.

Pontiac (1957-58): Scribe alignment marks on steering shaft and worm shaft flanges at coupling above steering gear, then disconnect coupling. Disconnect pressure and return hose assemblies from valve body. Remove pitman arm, then remove gear housing to frame bolts and remove steering gear. To install, reverse removal procedure, making sure that shims found between frame and gear are replaced in their original positions. Tighten pitman arm shaft nut to 100-125 ft. lbs.

OVERHAUL

► *OVERHAUL NOTE: Service procedures are the same for all models except for the following differences:*
1957 & Later - (1) A new needle bearing replaces the former bronze bushing in gear housing at outer end of pitman shaft. (2) A new "Teflon" piston ring replaces the two cast iron rings formerly used on power piston. (3) A new hex head screw is used to retain ball nut assembly, replacing the former screwdriver slotted screw. The rack piston is slotted and hardened at the screw hole. Tighten the new screw to 30-35 ft. lbs. and stake in place, making sure that metal from screw head enters slots in piston. The hex head screw is not interchangeable with earlier type screw.

► *RECIRCULATING BALL INSTALLATION CAUTION:* If both light colored and black balls used, install equal numbers of each color in each of the ball nut guide holes.

► *1957-58 BUICK & PONTIAC PITMAN SHAFT SEAL REPLACEMENT NOTE:* This seal assembly may be replaced with steering gear installed in car as follows: Disconnect pitman arm from pitman shaft, clean end of shaft and tape splines using one layer of tape. Remove pitman shaft seal retaining ring, start engine and turn steering wheel to right until oil pressure forces seals out. When outside diameter of old seals are damaged, inspect housing bore for burrs and correct as necessary. Clean end of housing thoroughly, lubricate seals with petrolatum jelly and install with Tool J-6219 (Single seal first, then back up washer). Drive this seal in to obtain clearance for other seal, back-up washer, and retaining ring. *NOTE - **Inner seal must not bottom on end of counter bore.*** Install double lip seal and back-up washer (drive seal in just far enough to clear retaining ring). Fill reservoir. Check for leaks by running engine and turning wheel right and left. Install pitman arm.

► *1958 CONTINENTAL, EDSEL, LINCOLN SECTOR SHAFT SEAL NOTE:* Both seals can be replaced without removing steering gear from car as follows:
1) Raise car, remove sector shaft nut and remove pitman arm and sector shaft seal snap ring.
2) Clean sector shaft lower grease seal retaining washer and use small thin screwdriver to pry washer from shaft bore.
3) Use two round headed screws No. 10-32 x 1 7/8" (punch holes in seal to start screws) to force seals out.
4) Connect pitman arm (temporarily), place pan under gear, lower car, start engine and make full left turn until sector shaft upper seal and its retaining washer are blown free. Raise car and disconnect pitman shaft.
5) Install seal adapter 3576-J on shaft, position new upper seal over adapter and onto shaft and reinstall washer on shaft.
6) Use Tool 7000-AE to install washer and seal. Install lower seal and retaining washer with Tool 7000-AE. Remove adaptor tool and install snap ring. Tighten pitman arm nut to 120-130 ft. lbs. Check and refill system as necessary with Auto. Trans. Fluid type "A".

STEERING GEAR DISASSEMBLY: 1) Mark alignment of coupling flange and worm shaft. Drive out coupling flange retaining pin *(CAUTION -* Coupling must be supported to prevent damage to bearing in end cover.
2) With the valve body facing down, remove plugs from hydraulic hoses, then turn coupling flange 2 or 3 times through its full travel to drain oil from gear. Remove hoses from valve body. Turn unit so valve body faces upward and remove three valve body capscrews. Remove valve body and linkage cover by pulling straight out from the housing. Remove two valve body to housing "O" rings from housing.
3) Loosen pitman shaft adjusting screw locknut and remove the five side cover capscrews and rotate the cover ½ turn. Align pitman shaft gear with opening in

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SAGINAW "IN LINE" (C ntinu d)

housing. Tap pitman shaft with a plastic hammer and pull pitman shaft out of housing. Pull coupling flange. 4) Pull actuator from end of housing cover. Remove the four end cover attaching screws and pull end cover from housing. Pull out the worm shaft until centering ring springs are exposed, then remove the four centering springs from adapter. Pull rack-piston and worm assembly out of housing.

CONTROL VALVE: Disassembly – Pull linkage cover from valve body and remove "O" ring. Remove the large snap ring and pull valve assembly and washer from valve body. Remove washer and "O" ring from valve assembly. Remove valve body snap ring; then, using a wooden dowel, push plug from end of valve body. If disassembly of valve assembly is necessary, clamp end of spool valve in Tool J-6293, and using Tool J-6224 remove the valve link. Remove annulus, valve centering spring, and thrust washer from spool valve. Remove reaction control valve and spring from bore in spool valve. Remove inner "O" ring from annulus. If hose connections were leaking at connector seats, remove one or both connectors as follows: Thread a nut and place a washer over a 10-24 tap (for the small connector) or a 5/16" - 18 tap (for a large connector). Coat end of tap with petrolatum to prevent chips from falling into passage while tapping the connector. With valve body in a horizontal position, thread tap into connector not more than three turns. Tighten nut to remove connector by jacking tap and connector out of bore.

Cleaning & Inspection: Wash all parts in clean solvent, blow out all passages, and dry parts with compressed air. Check control valve body for scores, chips or other damage. Control valve must be free to move back and forth in control valve body. Any minor nicks or scratches may be removed with a fine hone.

R assembly: Install new "O" ring seal on valve body plug, coat "O" ring with Hydra-Matic oil, and install plug and snap ring in end of valve body. Clamp end of spool valve in Tool J-6293. Install reaction control spring and reaction control valve (open end out) into valve spool. Install inner and outer "O" rings on the annulus and coat with Hydra-Matic oil. Install thrust washer (bevel side down), valve centering spring, and annulus (narrow land next to spring) on spool valve. Thread link into spool valve and torque to 8-10 ft. lbs. To install new connectors, use Tool J-6217 to seat them in valve body. Carefully insert spool assembly into valve body *(CAUTION* - The spool and valve body are selective fits and have very little clearance. Spool must be properly started into valve body. Do not attempt to force it in). Place steel w a s h e r over link (chamfered side down), then install snap ring (with beveled side out) to retain valve assembly. Install new "O" ring on linkage cover and coat with Hydra-Matic oil. Install linkage cover and align valve link and linkage so that linkage slot is perpendicular with bottom of valve.

PITMAN SHAFT & COVER: Disass mbly – Remove pitman shaft adjusting screw locknut. Thread adjusting screw through pitman shaft cover, then remove cover, adjusting screw and selective shim. Remove "O" ring from cover.

Cl aning & Inspecti n: Wash all parts in clean solvent, blow out all passages, and dry parts with compressed air. Check pitman shaft upper and lower bushings for scoring or damage. Make sure that bearing surfaces of shaft are not nicked or rough. Check sealing surfaces of worm shaft and pitman shaft. Make sure they are free from roughness, nicks or d a m a g e. Minor nicks and scratches may be cleaned up with crocus cloth. Check teeth on pitman shaft and rack-piston for nicks, burrs, or other damage. The pitman shaft adjusting screw has a small nylon plug imbedded in the threaded area which prevents oil from working up threads. This screw with proper shim must be replaced upon reassembly.

Reassembly: Check the endplay of a new adjusting screw in slot of pitman shaft. The screw should rotate freely but not have more than .002" end clearance. Check endplay with a feeler gauge inserted between head of adjusting screw and slot in shaft. If endplay exceeds .002", select the proper shim to give desired endplay. Shims are available in .063", .065", .067", and .069" thicknesses. Thread the adjusting screw through side cover until side cover bottoms on pitman shaft. Install locknut, but do not tighten. Install a new "O" ring into recess in side cover and retain with petrolatum.

END COVER: Disassembly – Remove the two "O" rings. If necessary to replace needle bearing, drive out needle bearing washer and seal. If bearing removal is not necessary, remove seal and washer by driving them out with a screw driver and hammer.

Cleaning & Inspection: Wash all parts in clean solvent, blow out all passages, and dry parts with compressed air. All mating surfaces must be free from nicks and burrs. Remove irregularities with crocus cloth. Inspect actuating lever bore in end cover for wear. If badly worn, the end cover should be replaced.

Reassembly: If needle bearing and seal were removed: Install washer in oil seal recess in cover. Place a new seal over large end of Tool J-5254 with the lip facing shoulder of tool. Install seal so it sits against washer. Coat lip of seal with seal lubricant. Place a new needle bearing over large end of tool J-5254 with the markings against shoulder of tool and drive bearing into end cover until tool bottoms on cover. Make sure needle bearings are free. If seal only was removed, install in same manner as indicated above. Pack needle bearing with a fine fibre grease. Install "O" ring in end cover flange and in "O" ring groove on side of cover. Coat both "O" rings with Hydra-Matic oil.

STEERING GEAR HOUSING: Disassembly – Remove pitman shaft seal by removing snap ring, steel washer, dust seal, and steel washer, then pry out oil seal. If pitman shaft bushing replacement is necessary, drive bushing out with Tool J-6278. If the housing plug shows evidence of leakage, remove the staking with a hack saw, remove any burrs that could score the housing and drive plug into housing to remove it.

Cl aning & Inspection: Wash all parts in solvent, blow out all passages, and dry parts with compressed air. Check housing for scores and undue wear. All mating surfaces must be free from nicks and burrs. Any irregularities may be removed with a crocus cloth. Check housing cylinder for a shoulder condition at either end of ring travel. If shoulder exists due to excessive wear, replace the housing.

Reassembly: If pitman shaft bushing was removed Place Tool J-6278-2 over Tool J-6278, slide new bushing on tool and drive bushing into housing. With Tool J-6278-2 over Tool J-6278, slide seal on tool with lip of seal facing away from tool, and drive seal into housing. Coat lip of seal with seal lubricant. Install steel washer, dust seal, and steel washer, then install snap ring. If housing plug was removed, i n s t a l l a new "O" ring coated with Hydra-Matic oil on a new plug and tap plug into housing. Back up plug with another tool, and stake in 4 places, 90° apart.

RACK-PISTON, WORM SHAFT & BALL NUT ASSEMBLY: Disassembly – 1) Clamp assembly in vise and remove set screw with Tool J-6223. Turn ball nut 180° and pull worm shaft and ball nut assembly from rack-piston. Exercise care so that ball guides do not fall out of ball nut. Tape the end of a three-foot length of string onto the ball nut so that tape also retains ball guides. Tie other end of string to spring scale J-5178, then wrap string around ball nut 3 or 4 times. Slowly pull on spring scale and check over-center pre-load. Pre-load should be 1-6 lbs. *(NOTE* - If over-center pre-load is not within limits, a new set of balls must be installed upon reassembly. Note the size of ball which is stamped on end of the ball nut).

2) Remove the ball return guides. Rotate worm back and forth until all balls have dropped out of nut. Remove ball nut and adapter from worm. Remove adapter "O" ring. Remove Spiralox ring and push washer and seal assembly from the adapter. Cut and remove the worm shaft seal assembly, then remove the snap ring, retaining ring, bronze washer, and steel washer.

3) Tie a three-foot length of string on a thrust bearing centering spring and to spring scale J-544-A. Support the assembly in a vise, wrap string around center race two or three turns, and check pre-load by pulling slowly on string. Pre-load should be ¾-3 lbs. *(NOTE* - The above check will indicate one of three conditions With the pre-load within tolerance and bearing not rough, further disassembly is not necessary. If bearing is not rough but pre-load is outside tolerance, it will be necessary to remove the adjusting nut, install a new one and adjust pre-load to 1½ lbs. If pre-load reading is erratic, indicating a rough bearing, it will be necessary to remove bearing).

4) If bearing replacement is necessary, remove oil rings from rack-piston. Check plug in end of rack-piston. If loose, restake, or replace plug.

Cleaning & Inspection: Wash all parts in solvent, blow out all passages, and dry parts with compressed air. Check bearing assembly for excessive wear or brinnelling of the races. Check sealing surfaces of worm shaft

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SAGINAW "IN LINE" (C ntinued)

and pitman shaft. Make sure they are not rough and have no nicks or other damage. Clean up minor nicks and burrs with crocus cloth. All mating surfaces must be free of nicks and burrs. Inspect worm and ball nut grooves and all the balls for wear or scoring. If either the worm or ball nut need replacing, both must be replaced as a matched assembly. Make sure that ends of ball return guides are not damaged.

R assembly: 1) If removed, install oil rings on a rack-piston. If thrust bearing was removed, oil a new bearing assembly and install over worm shaft with springs facing away from splined end of shaft.

2) Install washer with tang in keyway and facing splined end of shaft. Install a new nut and adjust pre-load to 1½ lbs., as outlined under "Disassembly" above. Stake nut into keyway of shaft and recheck pre-load. Install new adapter oil seal assembly, then install steel washer and Spiralox ring.

3) Install a new "O" ring on adapter, then slide adapter over worm with holes in adapter facing bearing centering springs. Slide ball nut over worm with beveled side of ball facing the seal end of worm shaft.

4) Install 17 balls into ball nut and lubricate with Hydra-Matic oil *(NOTE - Worm shaft is cam ground (thicker at the center), and the balls can be installed more easily if ball nut is positioned near one end of worm).* Install 6 balls into return guide and retain in place with petrolatum, then install assembly into ball nut. Recheck pre-load as outlined under "Disassembly" above. Place tape over ball guides to retain them in place.

5) If over-center pre-load was not correct (1-6 lbs. pull required to rotate ball nut), as determined at disassembly, install the next larger size balls (if less than specification), or next smaller size balls (if more than specification). Balls are furnished for service replacement in 13 sizes (Exc. Cadillac). On Cadillac, if the pre-load is not correct, a complete worm and ball nut assembly must be installed.

6) Install the steel washer, seal assembly, (neoprene next to steel washer), bronze washer and retainer ring. While holding assembled parts, press worm shaft into snap ring, then force snap ring into groove. Remove tape from ball nut assembly and install worm and ball nut assembly into rack-piston with set screw holes aligned. Clamp rack-piston in a vise and install a new set screw using Tool J-6223. Tighten screw to 20-25 ft. lbs., then stake set screw so that rack-piston metal enters both ends of screw slot.

STEERING GEAR REASSEMBLY: 1) Thread worm out of ball nut as far as possible, position ring gaps opposite each other, and coat oil rings and adapter "O" ring with Hydra-Matic oil. Turn housing so that valve body side is facing up, then place ring compressor Tool J-6216 in recess in housing.

2) With rack-piston teeth facing the pitman shaft area, push rack-piston through ring compressor so that oil rings are just inside housing, then remove ring compressor. With notch in adapter facing machined side of housing, push adapter into housing recess. Install the four centering springs into shallow bores of the adapter.

3) With dowel hole in bearing assembly aligned with adapter dowel, push bearing assembly against the adapter. Place Tool J-6222 over splines of worm shaft, then install end cover and torque capscrews to 25-30 ft. lbs., remove Tool J-6222.

4) Saturate coupling flange wick with Hydra-Matic oil and place over worm shaft. Position coupling flange over worm shaft with alignment marks indexed, but do not install retaining pin. Turn coupling flange so that rack-piston teeth are centered in pitman shaft cover opening in housing. Make sure that rack-piston teeth are square with center-line of pitman shaft bushing.

5) Wrap a piece of masking tape around pitman shaft spline one turn so that tape starts and ends at same wide serration. Install pitman shaft and side cover assembly. The center tooth of pitman shaft must engage the center groove of rack. Install side cover capscrews and tighten the four 3/8" screws to 25-30 ft.lbs. Tighten the 5/16" screw to 15-20 ft. lbs.

6) Install actuator lever in end cover and engage lever with the "flat" on bearing assembly. Install the two "O" rings in housing. With actuator lever engaged with valve link pin, install valve body and torque capscrews to 15-20 ft. lbs. Make sure pitman shaft adjusting screw is backed all the way out.

7) Using Tool J-6281 and spring Scale J-544-A, check and record the combined ball nut and bearing pre-load with gear on center (2¼ turns from either end of travel) and not moving end of Tool J-6281 more than in a 6" arc. Thread pitman shaft adjusting screw in until pitman shaft gear touches rack-piston. While checking combined ball nut and bearing pre-load, adjust pitman shaft screw so that ½ to 1 lb. in excess of ball nut and bearing pre-load recorded above, is obtained. Tighten adjusting nut and recheck over-center pre-load.

8) Install oil hoses and drive in coupling flange pin while supporting worm shaft and flange. Make sure housing alignment pin extends approximately 5/8" from housing.

HYDRAULIC PUMP

Buick, Cadillac, Oldsmobile, Pontiac (1956-58): *See "Saginaw Vane Type" under "Power Steering Pumps".*
Lincoln & Continental (1956): *See "Eaton Rotor Type" under "Power Steering Pumps".*
Lincoln (1957): *See "Eaton Rotor Type" under "Power Steering Pumps".*
Continental (1957): *See "Vickers Vane Type (2-Piece Housing)" under "Power Steering Pumps".*
Edsel, Continental, Lincoln (1958): *See "Eaton Roller Type" under "Power Steering Pumps". NOTE - Used on some Edsel models.*
Edsel (1958): *See "Edsel & Mercury Crankshaft Mounted Type" under "Power Steering Pumps".*

REMOVAL: Buick, Cadillac, Oldsmobile & Pontiac - Disconnect hoses at unions on pump and secure ends in a raised position, or cap the ends to prevent drainage of oil. Install two caps at pump fittings. Remove drive pulley attaching nut and loosen bracket-to-pump mounting bolts. Remove pump belt. Slide pulley from shaft *(NOTE - Do not hammer pulley off the shaft).*

Continental & Lincoln: Remove washer seal, cover, and cover gasket and syphon or pump out as much oil as possible from reservoir. Loosen and move rearward, the clamp securing return hose to reservoir and remove hose from tube. Disconnect pressure hose at fitting on pump assembly and place in a raised position to prevent draining. Loosen pump adjustment capscrew and remove pump belt. Remove two pump adjusting bracket-to-pump support screws. Remove reservoir, pump and pump adjusting bracket as an assembly.

INSTALLATION: Buick, Cadillac, Oldsmobile & Pontiac- Position pump assembly on mounting bracket with holes lined up, and install bolts loosely. Slide pulley on shaft *(NOTE - Do not hammer on pulley).* Install pulley nut finger tight against pulley. Fill reservoir and bleed pump by turning pulley backward (counter-clockwise as viewed from front) until air bubbles cease to appear. Install pump belt over pulley. Move pump outward until belt is properly tensioned (See "Pump Belt Adjustment" above). Tighten pulley nut to 35-45 ft. lbs.

STEERING LINKAGE: *See "Steering Linkage".*

SAGINAW ROTARY VALVE POWER STEERING

Buick (1959-60)Ⓒ
Chevrolet Truck (1960)
Cadillac (1959-60)
Oldsmobile (1959-60)
Pontiac (1959-60)

Ⓒ - Saginaw (In-Line) Power Steering Gear used on some early 1959 models. *See "Saginaw (In-Line) Power Steering".*

►CHANGES & CORRECTIONS

►*1959-60 CADILLAC EXCESSIVELY HIGH POWER STEERING PUMP PRESSURE NOTE: See "Saginaw (Integral Reservoir) Vane Type Hydraulic Pump",*

►*1959 BUICK POWER STEERING PUMP LEAKAGE & NOISE CORRECTION:* A loose expansion plug (located directly under filler cap) may be causing this condition. Oil leaking past the expansion plug under pressure hits the filler cap causing the noise and leakage. To correct, drain oil from pump and hand stake the plug. Refill reservoir to correct level.

►*1959 OLDSMOBILE POWER STEERING HIGH PRESSURE HOSE PRODUCTION CHANGE:* The new high pressure hose, Part No. 5688337 (identified by two yellow tracers on hose) is used in later production cars and should be used for service replacement on all earlier models.

►*1959 PONTIAC POWER STEERING PUMP RESERVOIR FILLER CAP PRODUCTION CHANGE & OIL LEAKAGE CORRECTION:* A new filler cap, Part No. 5687648, identified by locking tabs being in line with ears on cap, is being used in production on all cars without air conditioning. The new cap should be used on previous cars without air conditioning to prevent leakage.

►*1959 PONTIAC ADJUSTER PLUG OIL LEAK CORRECTION:* To correct leakage at adjuster plug, install a new dust seal, Service Kit, No. 5687183, to replace the adjuster plug seal back-up washer. Remove any scores or scratches from stub shaft with crocus cloth before installing seal.

►*1959 PONTIAC POWER STEERING "HISSING" NOISE CORRECTION:* Remove very fine burrs from edge of control valve with crocus cloth. Use crocus cloth very lightly.

►*1959 PONTIAC POWER STEERING NOISE CORRECTION ("Swish" or "Growl" on Low Speed Turns):* If the noise cannot be eliminated by bleeding air from system, proceed as follows: Check positioning of safety drive pins at steering column coupling flange. The pins should be centered in their opening and extend through flange approximately 1/32" to 3/32" (slightly above being flush). If steering column jacket assembly is installed too far down (towards gear), it may be making a metal-to-metal contact and can be corrected by loosening steering column clamp at instrument panel and adjusting column for proper clearance. The clearance between head of lower coupling bolt and flange on steering shaft should be ¼".

►*1959 PONTIAC POWER STEERING PUMP "BUZZING" NOISE CORRECTION:* This noise usually occurs at 800-1000 RPM when engine is accelerated and is caused by clearance in pump shaft. To correct, remove pump rear support and place a thick washer over pump rear mounting studs, then reposition pump and tighten stud nuts to 20-35 ft. lbs. If noise continues, it will be necessary to replace pump shaft assembly.

►*1960 POWER STEERING RACK-PISTON PRODUCTION CHANGE:* A new rack-piston having an additional seal ring underneath the Teflon ring is being used in later production and may be used for service replacement. *NOTE - The new "O" ring, Part No. 5687959 and seal, Part No. 5687958 cannot be used on earlier type rack-piston.*

DESCRIPTION: 1959 Models - This hydraulically actuated unit combines a recirculating ball nut and a rack-piston operating in a power cylinder. A rotary type valve actuated by a torsion bar connected to steering shaft controls flow of high pressure fluid from a vane type pump to either end of rack-piston assembly depending on direction torsion bar is rotated. This system is designed to provide power assistance initially with a .3° of steering wheel rotation and one pound of effort at steering wheel rim. Manual steering is available at all times when engine is not running, or when turning effort at steering wheel is less than that required for power assistance. The hydraulic control valve assembly located at upper end of steering gear housing is an open center, rotary type, three-way valve containing a spool that is held in neutral position by a torsion bar. The spool is attached to one end of the torsion bar and the valve body to the other end. Twisting of the torsion bar allows spool to rotate in relation valve body, operating the valve.

1960 Models (Exc. Chevrolet Truck): Design is same as used on 1959 models except as noted below:

Coupling Flange Assembly (Exc. Oldsmobile) - Coupling flange assembly is positioned on stub shaft by a new method that eliminates necessity of scribing marks on these parts during removal.

Adjuster Plug Assembly - Stub shaft seal back-up washer has been replaced by a combination washer and dust seal.

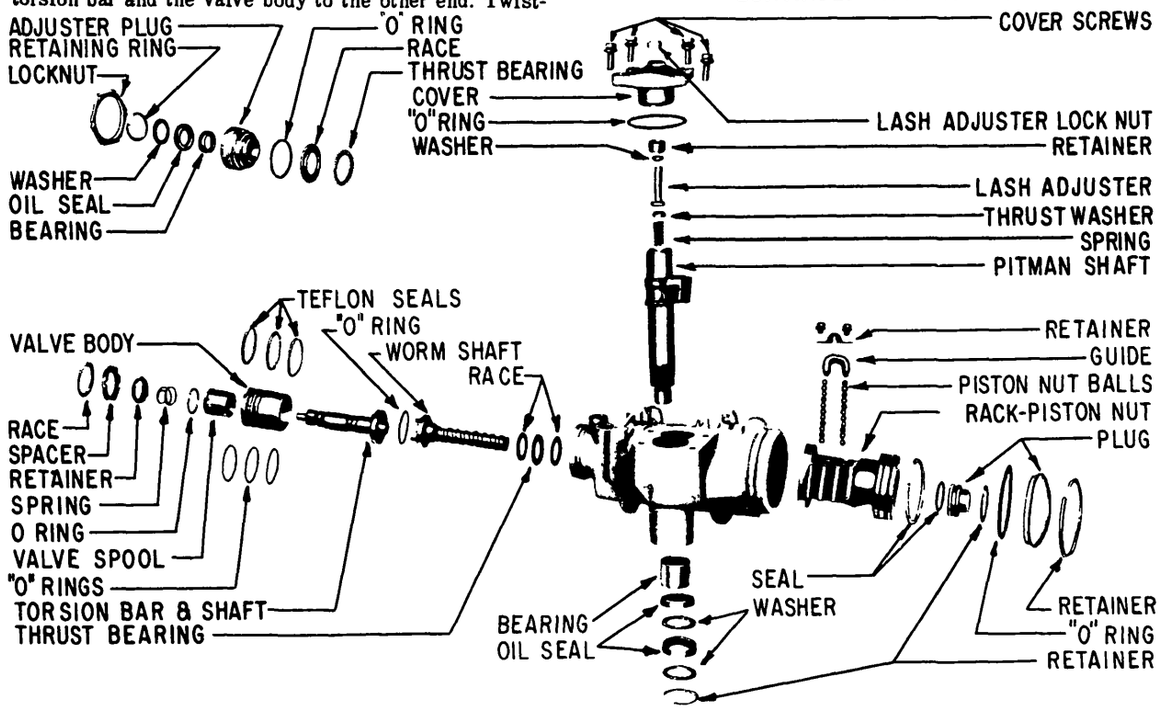
Rack-Piston Nut - A back-up "O" ring seal is used in addition to piston ring in rack-piston nut assembly.

1960 Chevrolet Truck: Control valve assembly of this linkage type power steering unit is located directly on steering gear and is similar to control valve assembly used on cars with "integral" type power steering. Service procedures are different. For steering gear overhaul procedures, *see "Saginaw Ball Bearing Worm & Nut Steering Gear".*

ADJUSTMENTS: Hydraulic Pump Belt (Buick) - Loosen power steering pump mounting bolts and rotate pump assembly to tighten belt until torque required to slip pulley on belt with a torque wrench applied to pulley nut is as follows: **Without Air Suspension** - 30-35 lbs. (Used Belt), 40-45 lbs. (New Belt).

Cadillac - Loosen screws securing pump to mounting brackets, then move pump inward and install Belt

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SAGINAW (ROTARY VALVE) POWER STEERING GEAR ASSEMBLY

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

Tensioner Tool J-6733 on drive belt Tighten belt until shoulder of gauge is opposite line on barrel of gauge. *CAUTION - Do not use pry bar to move pump.* Tighten pump mounting bolts to 25-30 ft. lbs

Ch vr l t Truck - Loosen power steering pump-to-mounting bracket attaching screws and pull pump outward until a 15 lb load applied midway between pump pulley and fan pulley will deflect belt ½" to ¾" Tighten attaching screws

Oldsm bil - Position Gauge 33-70 on pump belt, then loosen pump attaching bolts and adjust belt tension by moving pump away from engine until pointers on gauge index with groove in gauge plunger. Tighten attaching bolts to 20-28 ft. lbs. and recheck adjustment.

Pontiac - Loosen pump-to-bracket bolts two full turns, then loosen four strap bolts Tighten belt with power steering pump to obtain ¼" belt deflection when a 5-6 lb. load is applied midway between fan and power steering pump pulleys. *NOTE - On cars with Air Suspension, apply load midway between harmonic balancer and air compressor pulley*

Ste ring Gear (On Car): On Buick, Cadillac, & Pontiac, disconnect drag link at pitman arm On Oldsmobile, remove pitman shaft nut, then disconnect pitman arm from shaft using Puller J-5504-B On Oldsmobile & Pontiac, remove horn button, horn ring, or ornament from steering wheel, then install an inch-pound torque wrench on steering shaft nut Proceed as follows

Buick - (Thrust B aring Preload) - Turn steering wheel through its full travel to check for binding,tight spots, or uneven action Turn steering wheel to extreme right or left, then install Scale J-544-A, to a spoke at rim of wheel and pull scale at 90° to spoke Check pull required to turn wheel steadily in range where lash normally exists between rack-piston nut and pitman shaft sector (approximately 1/8 turn from either extreme position) Scale reading should be between ½ and 1¼ lbs *NOTE - Scale reading should be close to minimum specifications on a gear that has been in use On a new gear, the readings will be higher*

Ball Nut Pre-Load Ch ck - Loosen pitman shaft adjuster nut and turn lash adjuster counterclockwise a few turns Check pull required to turn wheel through "high-point" or no lash range This reading should be 1/8 to 5/8 pounds higher than previous reading

Pitman Shaft Endplay Adjustment - Turn pitman shaft clockwise as required to obtain a scale reading ½ to 1 pound higher than that obtained in "Ball Nut Preload Check" *NOTE - This reading taken when pulling wheel through "high point" Total reading should be between 1 1/8 to 2 1/2 lbs*

Cadillac (Thrust B aring Pr load): Turn wheel two turns "off center", then install Distributor Point Checking Scale to a spoke at rim of wheel and pull at 90° to spoke Measure the pull on steering wheel through an arc not exceeding 1" This reading should be between 8 and 14 ozs

Ball Nut Prel ad Ch ck - With scale attached (as above), measure pull on steering wheel through an arc not exceeding 1" wit h the gear ½ to ¾ turn off center The reading should be between 2 and 9 ozs greater than for "Thrust Bearing Preload" above

Pitman Shaft Endplay Adjustment - Adjust lash adjuster screw until pull "through center" on steering wheel is 8 to 16 ozs greater than the pull required for "Ball Nut Preload Check" above *NOTE - Total pull through center should not exceed 28 ozs.*

Oldsmobile (Pitman Shaft Endplay Adjustment): With inch-pound torque wrench installed on steering shaft nut, count number of turns of steering wheel to locate center of travel Check combined ball and thrust bearing preload by rotating wheel through center of travel in an arc not exceeding 20° Note highest reading Tighten adjusting screw until torque wrench reads 4 to 8 lbs higher than first reading This total reading should not exceed 16 inch pounds

Pontiac (Thrust Bearing Preload): Turn steering wheel one full turn off center high point, then attach inch-pound torque wrench to steering shaft nut Effort required to turn wheel should not exceed 10 inch-pounds If reading is below 3 inch-pounds, excessive lash in thrust bearing is indicated

Ball Nut Preload Check - With steering wheel one-half turn off center high point, effort to turn wheel should be ½ to 5 inch-pounds higher than that obtained in preload check above

Pitman Shaft Endplay Adjustment - Effort required to pull wheel through center high point should be 4 to 8 inch-pounds greater than that obtained in "Ball Nut Preload Check" above If reading is not within specifications, loosen pitman arm shaft gear lash adjuster and adjust lash as required Tighten locknut to 25-35 ft lbs *NOTE - Final adjustment should always be made in a clockwise direction (downward)*

LUBRICATION: Check fluid level in power steering pump reservoir every 1000 miles (Buick & Chevrolet Truck), 2000 miles (all others) with steering gear and fluid at normal operating temperature If necessary add recommended fluid (see below) to bring fluid level to mark on reservoir filler neck *NOTE - Use fluid indicated below.*

Buick, Caddil ac & Chevrolet Truck: Use Automatic Transmission Fluid

Oldsmobile (Without Air Suspension): Use Automatic Transmission Fluid

Oldsmobile (With Air Suspension): Use Special Fluid, Oldsmobile Part No 577080

Pontiac (All Models except cars with 2-Cyl. Air Suspension Compressor): Use Automatic Transmission Fluid

Pontiac (Cars with 2-Cyl. Air Suspension Compressor): Use Special Fluid, Pontiac Part No 532186

TROUBLE SHOOTING

HARD STEERING WHILE DRIVING: Frozen steering shaft bearings Lower coupling flange rubbing against adjuster Steering wheel rubbing against gearshift bowl Steering adjustment tight

POOR RETURN OF STEERING: Same as for "Hard Steering While Driving" above, and as follows Tires not properly inflated Front suspension alignment not properly adjusted Tight steering linkage Steering gear misaligned Tightness of suspension ball joints Steering adjustment tight Tight sector-to-rack piston adjustment Thrust bearing adjustment too tight Rack piston nut and worm preload too tight Sticky valve spool

CAR LEADS TO ONE SIDE OR THE OTHER: Front suspension alignment not properly adjusted Unbalanced or badly worn valve *NOTE - If a badly worn valve is the cause, steering effort will be very light in direction of lead and heavy in opposite direction*

MOMENTARY INCREASE IN EFFORT WHEN TURNING WHEEL FAST TO LEFT OR RIGHT: Low oil level in pump Pump belt slipping High internal leakage

GEAR NOISE (RATTLE OR CHUCKLE): Loose over-center adjustment *NOTE - A slight rattle may occur on turns because of increased lash off the "high point" This condit ion is normal and lash must not be adjusted below specified limits*

GEAR NOISE "HISSING" SOUND: Gear loose on frame *NOTE - A "hiss' may be expected when steering wheel is at end of travel or when slowly turning at standstill*

EXCESSIVE WHEEL KICKBACK OR LOOSE STEERING: Air in system Lash in steering linkage Excessive lash between pitman shaft sector and rack piston Loose thrust bearing adjustment. Ball nut and worm preload incorrect

STEERING WHEEL SURGES OR JERKS WHEN TURNING WITH ENGINE RUNNING, ESPECIALLY DURING PARKING: Loose pump belt

HARD STEERING WHEN PARKING: Low oil level in reservoir or loose pump belt Lack of lubrication in linkage or front suspension Tires not properly inflated Insufficient oil pressure Low oil pressure due to restriction in hoses

VALVE SQUAWK WHEN TURNING OR WHEN RECOVERING FROM TURN: Cut or worn dampener ring on valve spool Loose or worn rotary valve parts

NO EFFORT REQUIRED TO TURN: Broken torsion bar

REMOVAL & INSTALLATION
STEERING GEAR

BUICK (1959-60): Removal - Disconnect pressure and return line hoses at gear and elevate end of hose higher than pump to prevent oil draining from pump Disconnect two upper-to-lower flange bolts on coupling, then jack up car and remove pitman arm shaft nut and pitman arm Remove three frame-to-steering gear bolts at outside of left frame rail and remove steering gear

Installation: Reverse removal procedures *NOTE - When installing gear assembly in car, the riveted pins on lower flange and flexible coupling must be installed in center of their correct slots in upper flange (small pin small slot and large pin in large slot) The clip on loose end of horn ground wire must be installed on flange bolt between flexible coupling and upper flang*

CONTINUED ON NEXT PAGE

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

CADILLAC (1959-60): Removal - Syphon fluid from reservoir, then disconnect pressure and return hoses at rear of pump reservoir and secure hoses in a raised position to prevent loss of fluid. Cap pump fitting to prevent drainage of fluid from pump. Raise front of car and place jack stands near outer ends of lower control arms, then disconnect pitman arm from steering gear, using Puller, J-6593. Remove screw holding flexible coupling to upper steering shaft, then remove three screw holding gear housing to frame side rail and remove gear assembly.

Installation: Place steering gear in position on frame side rail, guiding the flexible coupling onto steering shaft, then install three gear housing to frame mounting bolts. Install flexible coupling to upper steering shaft retaining screw and tighten to 25-30 ft. lbs. *NOTE - After installing gear, check flexible coupling for distortion. The coupling must rest in a flat plane with no visible bend or twist.* If it is distorted, loosen screws securing flexible coupling to upper steering shaft and slide upper coupling flange up or down as required. If sufficient adjustment cannot be obtained in this manner, remove lower steering column cover and lower clamp to jack screw. Loosen steering column jacket mounting screws at instrument panel and slide complete steering column jacket assembly up or down as required. *CAUTION - Upper steering shaft and steering gear must be properly aligned.* Connect pitman arm to steering gear, then connect hoses to pump, check fluid level and bleed system.

CHEVROLET TRUCK (1960): Removal - Disconnect steering shaft from lower coupling, then remove hoses from valve. Remove pitman nut, lockwashers and pitman arm. Remove mounting bolts and steering gear.

Installation: Reverse removal procedure.

OLDSMOBILE (1959-60) & PONTIAC (1959): Removal - Scribe alignment marks on coupling flange and steering shaft flange, then remove two coupling flange attaching nuts and lockwashers. Remove horn ground wire from flange attaching bolt. Disconnect hoses from pump and cap pump and hose fittings. Raise car and remove pitman arm with Puller J-5504 or other suitable puller. Remove bolts attaching gear to frame side rail and remove gear with hoses attached,

Installation: Before installing gear assembly, apply a sodium soap fine fibre grease to gear mounting pads to prevent squeaks between gear housing and frame. Reverse removal procedure and note the following: Align coupling flange and steering shaft flange alignment marks so steering wheel will be positioned properly. Make sure alignment pin on gear housing enters hole provided in frame side rail. Before tightening gear to frame bolts, shift steering gear as necessary to place it in same plane as steering shaft so flexible coupling is not distorted. Tighten steering gear to frame bolts to 60-80 ft. lbs., and pitman shaft nut to 120 ft. lbs. Bleed air from hydraulic system.

PONTIAC (1960): Removal - Disconnect pressure and return hoses from gear housing, then disconnect and remove pitman arm from shaft with Puller J-5504. Remove gear housing-to-frame bolts and remove steering gear assembly.

Installation: Reverse removal procedure.

STEERING WHEEL & HORN BUTTON
1959 MODELS

BUICK: Removal - Disconnect wire at horn cable connector on steering column, then remove horn button or operating ring as follows: **Standard Steering Wheel** - Pry cap out with a thin bladed tool, then remove contact cup and other parts by removing attaching screws and insulating spacer bushings. **Deluxe Steering Wheel** - Remove monogram and bezel assembly by prying under bezel. Remove adjusting nut, then remove contact plate and spring with the two insulators. Remove steering wheel nut, contact spacer and cushion, then remove horn ring. With horn parts removed, back off steering wheel nut several turns (if previously removed, reinstall, leaving it backed off several turns). Install Puller J-3274 and pull wheel back to nut. *NOTE - If wheel is tight on shaft, apply a moderate strain with puller, then tap end of puller screw to break hub loose from shaft without distorting wheel hub.* Remove puller, nut, and steering wheel.

Installation: Reverse parts removal sequence.

CADILLAC: Removal - Disconnect horn wire from terminal on neutral safety switch beneath instrument panel on steering column. Remove Phillips screw securing horn ring cap and remove cap. Remove horn ring contact spring and retainer by depressing retainer and turning until retainer and spring snap out. Remove two Allen screws, one on under side of each spoke at steering column and remove spoke ring covers. Remove steering wheel hub and nut, then install Puller J-1859 and remove wheel. Remove horn ring from underside of steering wheel.

Installation: Reverse parts removal sequence.

OLDSMOBILE: Removal - Disconnect horn wire from wiring harness and proceed as follows: **Standard Steering Wheel** - Remove cap-to-steering wheel attaching screw and lockwasher, pull cap from wheel, then disconnect horn switch wire from contact assembly lead. **Deluxe Steering Wheel** - Pry cap and emblem assembly from shroud. With horn parts removed, remove steering wheel attaching nut and washer. Then use a suitable puller to remove steering wheel.

Installation: Reverse parts removal sequence and tighten steering wheel nut to 25 ft. lbs. Stake nut to steering shaft.

PONTIAC: Removal - Standard Steering Wheel - Press down on one side of horn button, then insert a screwdriver under opposite side and pry upward. **Deluxe Steering Wheel** - Pry upward on ornament, then remove plate and insulator. Remove horn ring, upper contact, spring and spring washer. Remove three screws and and insulators from lower contact and support and remove lower contact insulator and support. With horn parts removed, remove steering wheel locking nut and wheel-to-shaft nut and washer. Remove steering wheel with puller, Tool J-3044.

Installation: Reverse parts removal sequence and tighten steering wheel nut to 25-30 ft. lbs.

1960 MODELS

BUICK: Removal - Disconnect wire at horn cable connector on steering column, then remove horn button or pushbars as follows: **Standard Steering Wheel** - Pry out cap with a thin bladed tool and pull out contact spring and terminal. Remove steering wheel nut and remove contact cap assembly. **Deluxe Steering Wheel** - Remove emblem assembly from center of steering wheel by prying in recess at lower edge. Remove wing shaped shroud by removing two inner screws from front of and two outer screws from back of wheel. Pull horn wire terminal from center of steering shaft. On all models, loosen steering wheel nut several turns, then install Puller J-3274 and remove wheel.

Installation: Reverse removal procedure.

CADILLAC: Removal & Installation - See *"Cadillac (1959)"* above.

CHEVROLET TRUCK: Removal - Remove horn button and steering shaft nut and washer, then pull wheel with Puller J-2927.

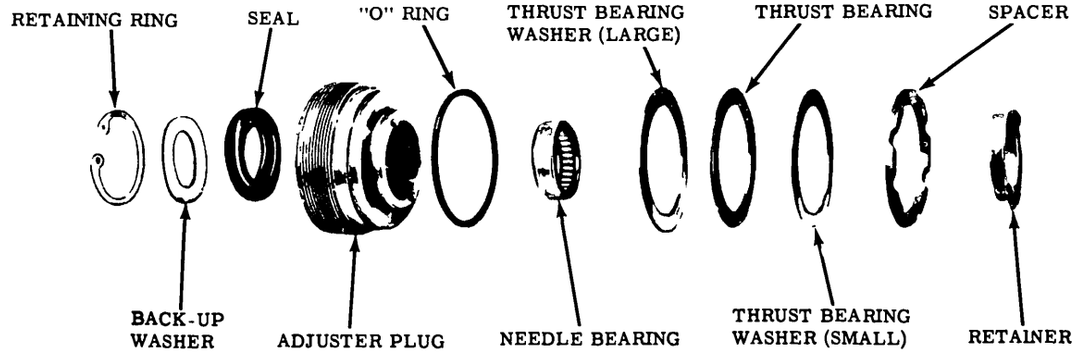
Installation: Reverse removal procedure.

OLDSMOBILE: Removal - Disconnect horn wire from wiring harness and proceed as follows: **Standard Steering Wheel** - Remove cap-to-steering wheel attaching screw and lockwasher and pull cap from wheel, then remove switch wire from contact assembly lead. **Deluxe Steering Wheel** - Pry cap and emblem assembly from shroud. On all models, remove steering wheel attaching nut and washer, then pull steering wheel from shaft with Puller 61-9.

Installation: Reverse removal procedure and tighten nut to 25 ft. lbs. and stake nut to shaft.

PONTIAC: Removal - Standard Steering Wheel - Press down on one side of horn button, then insert a screw-

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ADJUSTER PLUG ASSEMBLY

SAGINAW ROTARY VALVE POWER STEERING (C nt.)

driver under opposite side and pry out. **Deluxe Steering Wheel** - Twist ornament and lift off, then remove two nuts and washers from shaft. Remove spacer bushing screws and bushing and remove horn ring. Remove pivot ring, spring, insulator and contact plate. Remove contact assembly and insulator. On all models, remove steering wheel with Puller J-3044.

Installation: Reverse removal procedure and tighten steering wheel nut to 25-30 ft. lbs.

OVERHAUL

►*OVERHAUL NOTE:* Before disassembling unit, clean exterior with a suitable solvent and drain as much hydraulic fluid as possible. Assist draining by placing unit with control valve down and turning the worm through its entire range two or three times. When servicing steering gear assembly, remove only the major gear sub-assembly that requires service.

ADJUSTER PLUG: Removal - On all 1959 models and on 1960 Oldsmobile and Chevrolet Truck, scribe marks on stub shaft and coupling flange to make sure they are assembled in same position. On 1959 models and 1960 Oldsmobile and Chevrolet Truck, remove stub shaft-to-flange retaining screw and remove flange assembly. On other models, remove lower flange pinch bolt and remove flange from shaft. On all models, loosen and remove adjuster plug locknut and remove adjuster plug with Tool J-7624.

Disassembly - Remove thrust bearing retainer with a screwdriver, being careful not to score needle bearing bore. Discard retainer. Remove thrust bearing spacer, thrust bearing, and thrust bearing races. Remove adjuster plug "O" ring and discard, then remove stub shaft seal retaining snap ring. On Chevrolet Truck, remove seal back-up washer. On other cars, remove and discard dust shield. On all models, remove stub shaft seal by prying out with a screwdriver and discard. Inspect needle bearing in adjuster plug, and if rollers are broken or pitted, remove needle bearing from adjuster plug by pressing from thrust bearing end using Bearing & Seal Remover, Tool J-6221 (Buick & Cadillac), J-5254 (Oldsmobile), J-5188 (Pontiac), J-8524-2 & J-7079-2 (Chevrolet Truck), Discard the bearing.

Inspection - Inspect thrust bearing spacer for cracks, then inspect thrust bearing rollers for wear, pitting, scoring or cracking. If any of these conditions are found, replace both thrust bearing races and check thrust bearing spacer. Inspect thrust bearing races for wear, pitting, scoring, cracking, or brinelling. Replace if necessary. Check thrust bearing and thrust bearing spacer.

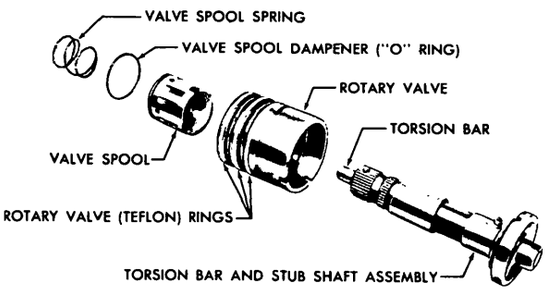
►*STUB SHAFT DUST SHIELD INSTALLATION NOTE: Rubber bonded face of shield should be installed toward the retaining ring. On early 1959 models without dust shields having the rubber bonded face, install the later type at reassembly. This shield is part of Seal Kit, Part No. 5687183.*

Reassembly - Install needle bearing by pressing from thrust end of adjuster plug against identification end of bearing using the same tool used for removal. *NOTE - End of bearing must be flush with bottom surface of stub shaft seal bore.* Lubricate stub shaft seal with automatic transmission fluid, then, on Chevrolet Trucks, install seal and back-up washer. On other models, install seal with spring in seal toward adjuster plug. *NOTE - Use Tool J-8524-1 (Chev. Truck); J-5188 (Buick, Cadillac, Pontiac); J-5254 (Oldsmobile) to install seal far enough in plug to provide clearance for retaining ring (Chev. Truck); dust shield (Other Models).* On Chevrolet Truck, install retaining ring. On other models, install dust shield (see note above) with bonded face toward retaining ring, then install retaining ring. Lubricate "O" ring seal with petroleum jelly and install on adjuster plug. Assemble large diameter thrust bearing race, thrust bearing, small thrust bearing race, and thrust bearing spacer on adjusting plug. Press bearing retainer into needle bearing bore with a brass or wooden dowel. *NOTE - Radial position of dimples is not important.*

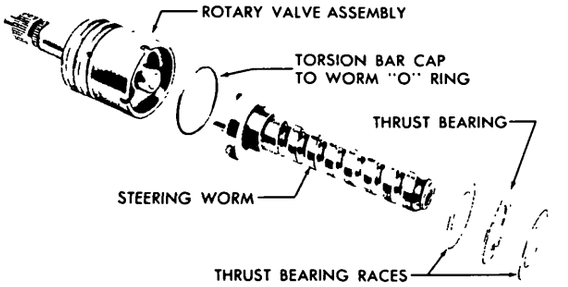
Installation - Install adjuster plug in end of housing just enough to make certain that all parts are properly seated in gear housing. Back adjuster plug off 1/8 turn and measure valve assembly drag, using a torque wrench. Use a spanner wrench and adjust thrust bearings so that preload of 1-3 in. lbs. (Cadillac, Oldsmobile, Chev. Truck); 3-4 in. lbs. (Buick & Pontiac) in excess of valve assembly drag. Total thrust bearing preload and drag should not exceed 8 in. lbs. (Cadillac, Oldsmobile, Chev. Truck); 10 in. lbs. (Buick & Pontiac). Hold adjuster plug firmly in position and install and tighten locknut. Install coupling shaft assembly on stub shaft (align marks made at disassembly on 1959 models and on 1960 Oldsmobile and Chevrolet Truck). On other models, align groove in lower flange with pin extending from stub shaft and install flange. On all models, center bolt hole in flange with groove on stub shaft. On 1959 models and on 1960 Oldsmobile and Chevrolet Truck, install coupling flange bolt and tighten to 20-25 ft. lbs. On other models, install lower flange pinch bolt and tighten to 20 ft. lbs.

VALVE ASSEMBLY: NOTE - *The complete valve assembly is hydraulically balanced during manufacture. If replacement of any part other than rings or seals is necessary, replace complete rotary valve assembly. DO NOT disassemble valve unless absolutely necessary. If valve spool dampener "O" ring requires replacement, remove valve spool, replace "O" ring and replace spool.*

►*CHEVROLET TRUCK VALVE ASSEMBLY NOTE: Overhaul procedures are the same as for other models with power steering except that free length of valve spool spring is .760-.790",*



ROTARY VALVE ASSEMBLY



TORSION BAR "O" RING LOCATION

Removal: Remove adjuster plug assembly (see above), then remove valve assembly by grasping stub shaft and pulling out.

Disassembly: Remove cap-to-worm "O" ring seal and discard, then remove snap ring from top of spool spring. Remove spring by prying small coil with a small screwdriver. Work spring onto bearing diameter of stub shaft and slide spring off shaft. Remove valve spool. *CAUTION - Clearance between valve body and spool may be as low as .0004" and the slightest cocking of spool may jam it in valve body. To remove valve spool, hold valve assembly in both hands with stub shaft pointing down. Place fingers under valve body and thumbs on valve body cap, holding it against valve body squarely. End of torsion bar should be rapped lightly against bench. This will expose spool far enough so that it may be withdrawn from valve body. Withdraw spool with a steady oscillating pull to prevent jamming. If slight sticking occurs, make a gentle attempt to reverse withdrawal procedure. If this does not free the spool, it has become cocked in valve body bore. Do not attempt to force spool in or out if it becomes cocked. Continue to disassemble valve assembly and return to spool as described later.* Remove stub shaft, torsion bar, and valve cap assembly by holding valve assembly in both hands as before, only with thumbs on valve body. Rap torsion bar lightly against bench. This will dislodge cap from valve body-to-cap pin. The stub shaft, torsion bar, and valve cap assembly can now be removed from valve body. If valve spool has become cocked (see above), it can now be freed. By visual inspection on a flat surface, it can be determined in which direction spool is cocked. A few very light taps with a soft plastic or rawhide mallet should align spool in bore and free it *CAUTION - Do not tap with anything metallic. If spool can be rotated, it can be removed.* Remove "O" ring dampener seal from spool and discard. Carefully cut valve rings and ring back-up seals. Remove and discard.

Inspection: If there is evidence that torsion bar "O" ring seal in stub shaft has been leaking, the entire assembly should be replaced. Check pin valve body that engages the cap. If it is severely worn, cracked, or broken, then entire valve assembly should be replaced. Check smaller of the two worm pin grooves in valve body. If it is severely worn, replace entire valve assembly. Check spool drive pin on stub shaft. If it is severely worn,

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SAGINAW ROTARY VALVE POWER STEERING (Cont.)

cracked, or broken, replace entire valve assembly. Check spool outer diameter and valve body inner diameter for nicks, burrs, or bad wear spots. If any are found, replace entire valve assembly. *NOTE - A slight polishing is normal on valve surfaces.* Check fit of spool in valve body before installing valve spool dampener "O" ring seal. When lubricated with transmission oil, the spool should rotate smoothly without binding or catching. If either occurs, the entire valve assembly should be replaced. Measure free length of valve spool spring. Free length should be approximately 3/4" to 7/8" (Buick); .82", measured with micrometer (Cadillac); 3/4" (Oldsmobile). *NOTE - If spring measures 11/16" or less (Buick & Oldsmobile), replace the spring.* Examine needle bearing diameter of stub shaft. If it is badly worn, brinelled or scored, replace entire valve assembly.

Reassembly: Lubricate three valve ring back-up "O" ring seals with transmission oil and assemble in three grooves in valve body. Do not allow seals to become twisted. Assemble valve rings in ring grooves over the "O" ring seals by carefully slipping rings over valve body. *NOTE - Rings may appear to be twisted in grooves, but heat of oil after assembly will cause them to straighten.* Install new valve spool dampener "O" ring seal in valve spool groove, then lubricate seals with transmission oil. Do not allow seals to twist in groove. Assemble stub shaft in valve body, aligning groove in valve cap with pin in valve body. Tap lightly on cap with a plastic hammer until cap is seated against shoulder in valve body with valve body pin in cap groove. Hold these parts together during rest of assembly. Lubricate valve spool with transmission oil and slide spool over stub shaft with notch toward valve body. Align notch with spool drive pin in stub shaft and carefully engage spool in valve body bore. *CAUTION - The same care taken in removing the valve spool must be taken when installing it.* Push spool evenly and slowly with a slight oscillating motion until spool reaches drive pin. Rotate spool slowly with pressure until notch engages the pin. Before pushing spool completely in, make sure the dampener "O" ring seal is evenly distributed in spool groove. Slowly push spool completely in, with extreme care taken not to cut or punch the "O" ring seal by inserting the spool beyond normal position. Slide spool spring snap ring over stub shaft and work spool spring and snap ring down with a screwdriver until snap ring is seated in stub shaft groove. Lubricate new cap-to-worm "O" ring seal with transmission oil and install in valve assembly. *CAUTION - If during assembly, the stub shaft cap assembly is allowed to slip out of engagement with valve body pin, the spool will enter too far into valve body, and dampener "O" ring seal will expand into valve body oil grooves, preventing withdrawal of spool. Attempt to withdraw the spool with a slight pull while rotating. If this does not free the spool after several tries, make sure spool is free to rotate. Place valve body on a flat surface with notched end up, and tap spool with wooden or plastic rod until the "O" ring seal is cut and spool can be removed. Replace dampener "O" ring seal and proceed with assembly as before. Make sure that all "O" ring chips are removed bef re assembling the valve.*

Installation: Align valve body drive pin on worm with narrow pin slot on valve body. Insert valve assembly into gear housing. *CAUTION - Do not push against stub shaft, as this might cause stub shaft and cap to pull out of valve body allowing the spool seal to slip into valve body oil grooves.* The valve assembly can be pushed in with one hand by pressing against valve body with finger tips, while pulling out on stub shaft with the palm. Be sure valve is properly seated before assembling adjuster plug assembly. The return hole in gear housing should be fully visible at this time. Install adjuster plug assembly (see above).

PITMAN GEAR SHAFT & SIDE COVER: *NOTE - For removal of pitman shaft seals with steering gear in car, see below.*

Removal & Disassembly: Rotate stub shaft until pitman shaft gear is in center position and remove side cover retaining screws. Tap end of pitman shaft with a soft hammer and slide pitman shaft out of housing. Remove side cover "O" ring seal from side cover and discard. Hold lash adjuster with an Allen wrench and remove lash adjuster nut. Discard adjuster nut. Remove side cover by screwing lash adjuster through cover, using an Allen wrench.

Inspection: Inspect pitman shaft bearing surface in side cover for excessive wear or scoring. If worn or scored, replace cover. Check pitman shaft sector teeth and bearing and seal surfaces. If badly worn, pitted, or scored, replace pitman shaft gear assembly. Check pitman shaft needle bearing in housing for wear. If any of the needle rollers are worn, pitted, or scored, replace the needle bearing. *NOTE - If needle bearing and/or pitman shaft seals in gear housing require replacement, they can be removed at this time (see "Rack Piston Nut & Worm Gear Housing" below).*

Assembly & Installation: Assemble side cover on pitman shaft gear assembly by screwing lash adjuster through side cover until side cover bottoms on pitman shaft and then backing off ½ turn. Lubricate new side cover "O" ring seal and install in groove in face of side cover. Turn stub shaft as necessary until middle rack groove in rack piston is aligned with center of pitman shaft needle bearing. Install pitman shaft gear so that center tooth in sector meshes with center groove in rack-piston. Make sure that side cover "O" ring seal is in place before pushing side cover down on gear housing. Install side cover screws and tighten to 25-30 ft. lbs. Install new lash adjuster locknut on lash adjuster without tightening. At this point, scribe marks on stub shaft and coupling flange to make certain they are assembled in the same position, then remove stub shaft to coupling flange retaining screw and remove flange assembly. Rotate stub shaft until gear is on center, then loosen adjuster plug locknut. Use a 25 inch lb. torque wrench and measure total preload through center on gear. *NOTE - This should be measured through an arc not exceeding 20° each side of center.* Adjust pitman shaft adjuster screw until total preload measured at stub shaft is 4-8 inch lbs. in excess of total preload recorded above, but not to exceed 16 inch lbs. Tighten adjuster plug locknut, then tighten pitman shaft adjuster screw locknut while holding screw with an Allen wrench. Install coupling flange assembly, making certain that scribe marks are lined up.

RACK PISTON NUT & WORM & GEAR HOUSING: Removal - Rotate end plug retainer ring so that one end of ring is over hole in housing. Spring one end of ring with a punch to allow a screwdriver to be inserted to lift ring out. Rotate stub shaft to left turn position and force end plug out of housing. *CAUTION - Do not rotate further than necessary or balls from rack and worm assembly will fall out.* Remove and discard housing end plug "O" ring seal. Remove rack-piston end plug retaining ring with snap ring pliers. Pull out rack-piston "O" ring seal and discard, then pull out rack-piston end plug. Remove pitmans shaft gear assembly (see above). Insert Ball Nut Bearing Arbor, Tool J-7539, into rack piston against end of worm. Turn worm to force rack-piston nut onto arbor and remove rack-piston from housing. Remove valve assembly (see above), then remove worm and lower thrust bearing and races.

Disassembly: Inspect piston ring. If damaged, remove it from rack-piston nut and discard. Remove return guide clamp screws and remove clamp. Place the assembly on a clean cloth and remove ball return guides, and tool J-7539. Make sure all 22 balls are caught on the cloth. Remove pitman shaft seal retaining ring from gear housing with snap ring pliers, then remove outer back-up washer. Insert a screwdriver between outer seal and inner back-up washer, pry out seal, and remove back-up washer. Insert screwdriver between inner seal and shoulder in gear housing and pry out the seal. *CAUTION - Be careful not to damage seal bore.* Discard seals. Remove needle bearing from gear housing bore by pressing from seal bore side of housing on stamped identification end of bearing with Remover & Installer, J-6657 (Buick & Cadillac), J-6278 (Oldsmobile & Pontiac).

Inspection: Inspect housing bore. If badly worn or scored, replace housing. Inspect high and low pressure line hose connectors in gear housing. If badly brinelled or scored, replace as necessary (see below). Inspect ball plug in valve body end of housing. If it is leaking or raised above the surface, it may be driven in flush to or 1/16" below the surface. The ball can be tightened by staking the housing. Inspect all retaining ring grooves and seal surfaces for defects. Inspect worm and rack-piston nut groove and all of the balls for excessive wear or scoring. If either worm or rack-piston nut need replacing, both must be replaced as a matched set. Inspect ball return guides, making sure that ends where balls enter and leave the guides are not damaged. Inspect lower thrust bearing and races for wear, pitting, scoring, or cracking. If any of these conditions are found, replace thrust bearing and races and check worm. Inspect rack-piston nut teeth for pitting, wear, and scoring. Inspect rack-piston nut outer diameter for wear, scoring, or burrs.

Reassembly: Clean all parts and lubricate them with automatic transmission oil. Install pitman shaft bearing in shaft bore with lettering on bearing facing up, then position bearing with same tool used for removal.

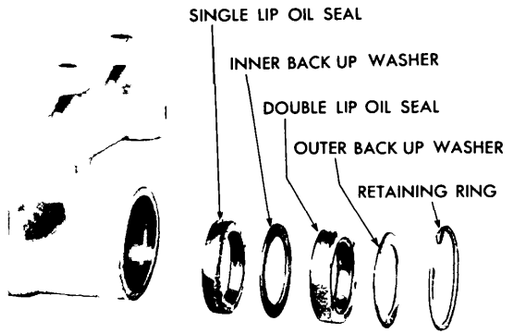
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SAGINAW ROTARY VALVE POWER STEERING (C nt.)

Upper edge of bearing should be approximately 020" below shoulder in bore Lubricate piston shaft bore and the single lip pitman shaft seal with petroleum jelly and install seal, lip down, into bore with Tool J-6219 (Buick & Cadillac), J-6278 (Oldsmobile & Pontiac) Do not drive seal more than 1/8" below lip of bore Remove tool and place steel washer on top of seal installer tool, and drive seal approximately ½" further into bore Lubricate double lip seal with petroleum jelly and install it into bore, driving it approximately 1/8" into bore with same tool used for inner seal (single lip) Remove tool and place steel washer over seal, then using the same tool, drive both seals down into bore until upper steel washer is just below snap ring groove Install snap ring *CAUTION - To prevent damage to lower seal, drive seals and washers only far enough to install snap ring* Install new piston ring on rack-piston, then insert worm into rack-piston to shoulder Align ball return guide holes with worm groove, then load 16 balls into guide hole nearest the piston ring while slowly rotating the worm counterclockwise to feed balls through the circuit Alternate the black balls with standard balls throughout the circuit Fill one of the ball return guides with the remaining 6 balls Place other guide over the balls and plug each end with heavy grease to prevent balls from falling out when installing guide into rack-piston Insert guides into guide holes of rack-piston (guides should fit loosely), then install return guide clamp over guides Tighten screws to 8-12 ft lbs *NOTE - Check worm preload at this point See "Worm Preload Ch ck" below* Remove valve assembly from worm, then insert Arbor, Tool J-7539, into worm and turn rack-piston onto arbor Do not allow arbor to separate from worm until rack-piston nut is fully in arbor

Worm Prel ad Check: *NOTE - Worm groove is ground with a high point in the center When rack-piston nut passes over this high point, a preload of 1 to 5 inch lbs should be obtained* With nut pointing up, lightly clamp rack-piston nut in a vise having brass jaws *CAUTION - Do not hold rack-piston in area of Teflon ring* Place valve assembly on ring (if not previously installed), engaging worm drive pin Rotate worm until it extends 1¼" from rack-piston nut to thrust bearing face (this is center position) Attach an inch-pound torque wrench with a ⅜" socket to stub shaft Turn wrench through an arc of approximately 60° in both directions several times and take a reading Torque should be 1 to 5 inch lbs If the reading is too high or too low, either replace the rack-piston nut and ball assembly or install next size smaller or larger balls and recheck

Installati n: Assemble thrust bearing and races on worm, then assemble valve to worm by aligning small slot in valve body with pin on worm (be sure to install "O" ring seal between body and worm head) Install valve assembly and worm in housing as an integral unit and install valve (see "Valve Assembly" above) Install Rack-Piston Seal Compressor, J-7576, in gear housing,



PITMAN SHAFT SEAL & WASHER

holding it tightly against shoulder in housing Insert rack-piston nut into housing until arbor engages the worm, then turn stub shaft clockwise, drawing rack-piston into housing When piston ring is into housing piston bore, remove Tool J-7539 and J-7576 Lubricate new "O" ring seal with transmission oil and install on rack-piston end plug (do not allow "O" ring seal to twist in groove) Install rack-piston end plug, tapping it into place with a mallet Install retaining ring with snap ring pliers and make sure it is bottomed in groove Lubricate new housing end plug "O" ring seal with transmission oil and install in gear housing Insert end plug into housing and seat it against "O" ring seal, tapping it into place if necessary Snap end plug retainer ring into place with fingers and bottom it securely in gear housing Install pitman shaft assembly (see above)

STEERING GEAR HOUSING HOSE CONNECTOR SEATS: *NOTE - This operation must be performed with steering gear disassembled to prevent metal chips becoming lodged in valve assembly*

Removal: Tap threads in connectors using a 5/16" - 18 tap, then thread a bolt with a nut and flat washer attached, into tapped hole To pull connector, hold bolt from rotating while turning the nut off the bolt This will pull connector from gear housing Discard connectors *NOTE - A No 4 screw extractor may also be used to remove connectors*

Installation: Clean housing thoroughly to remove all metal chips and dirt, then drive new connectors into place with Tool J-6217 *NOTE - This tool must be modified by grinding 1/16" off end of lower pilot to to prevent damage to poppet valve*

PITMAN SHAFT SEAL REPLACEMENT (STEERING GEAR IN CAR): Removal - Raise front of car and place jack stands near outer ends of lower control arms *NOTE - On Air Suspension cars, raise car to full rebound height by pulling out on "Air Lift" handle on instrument panel* Remove pitman arm retaining nut and lockwasher and remove pitman arm from shaft with a suitable puller Place a container under steering gear to catch fluid, then start engine and turn steering gear to full left turn position (oil pressure will force seals and back-up washers out of housing) Inspect seals for damage If outer diameter appears scored, remove burrs from housing before installing new seals

Installation: Clean end of pitman shaft bore, then wrap a single layer of tape around splines of shaft to prevent damage to seals as they are installed Install seals *(see "Rack-Piston Nut & Worm Gear Housing" above)* Replace pitman arm on pitman shaft and install lockwasher and pitman arm retaining nut Tighten nut to 100-125 ft lbs

HYDRAULIC PUMP: (Exc. Chev. Truck) - *See "Saginaw Vane Type (Integral Reservoir) Power Steering Pump". Chevrolet Truck - See "Chevrolet Power Steering Pump"*

Pump Pressure: As follows

Model	Pressur
Buick	1100-1200 lbs.
Cadillac	1075-1175 lbs.
Chevrolet Truck	① 950-1050 lbs.
Oldsmobile	② 1100 lbs.
Pontiac	③ 900 lbs.

① - At 590 RPM pump speed. ② - Maximum.
③ - Minimum pressure at engine idle speed of 500 RPM.

Pressure Test: Disconnect pressure line at pump and install pressure gauge and valve assembly (valve should be between gauge and steering gear), then install pressure line to gauge assembly. With engine at slow idle and gauge valve open, note pressure on gauge while turning steering wheel from one extreme position to the other. Note maximum pressure which is built up with wheel held in either right or left extreme position. *CAUTION - Do not hold at maximum pressur for an extended period of time.* With oil at normal operating temperature (150° to 170°F.), oil pressure should not be less than minimum pressure indicated in table (above). By closing the valve and quickly checking oil pump pressure, it can be determined if low pressure is caused by a faulty pump or leakage in steering gear.

POWER CYLINDER

CHEVROLET TRUCK

POWER CYLINDER: Disassembly - *NOTE - The only repair to make in the field on the power cylinder is to replace piston rod seals.* Before removing piston rod seal parts from rod end of power cylinder, clean the exposed portion of seal cavity with clean solvent, brush and compressed air. Remove snap ring To dislodge scraper, washer, dust seal, seal back-up washer and "U" cup seal, use air hose and apply pressure to cylinder port (right hand port looking down), and seal the left hand port. Remove seal parts from rod

Cleaning & Inspection: Clean all parts in solvent and dry with compressed air. *CAUTION - Do not use waste to wipe off spool or inside bore of valve housing* Protect spool edges and bore of valve housing from damage during disassembly and reassembly Inspect parts for nicks and burrs and excessive wear Check cylinder scraper washer for fit on piston rod, which should be 001-0035". Replace if worn.

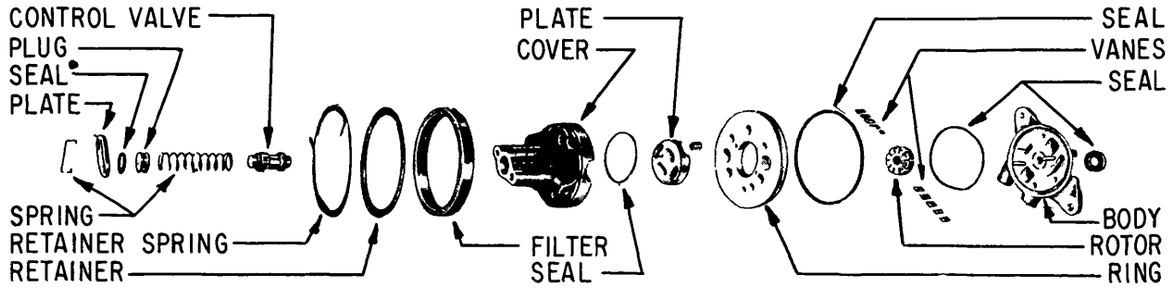
Reassembly: Assemble open side of "U" cup seal over the rod and into bearing cavity, seal back-up washer, dust seal (with open side away from seal cavity), and scraper washer Slide parts in place on rod and lock in place with snap ring.

1955-59 CHEVROLET

DESCRIPTION: Vane type pump mounted on commutator end frame of generator and driven by a splined extension of the special generator armature shaft. Pump contains a combination overload relief valve which is set to open at 750 lbs. at 170°F. and a flow control valve which recirculates oil within pump as required to regulate output volume between 1.1 gallons at idling speed and 1.8 gallons per minute at approximately 3600 RPM. Reservoir encloses pump cover assembly and provides a reserve supply of oil.

CHECKING PUMP PRESSURE: Disconnect pressure line at pump connection (smallest, top line), then install checking gauge J-5176 (with gauge valve closed) on pump and hose connection. *NOTE - Adapter Kit J-5900 must be used to connect pressure gauge to pump.* Open gauge valve and run engine at idle speed, then turn wheels (on ground) against stops. Pressure should not be less than 750 lbs. If pressure is less, slowly close gauge valve and check for pressure increase. If pump is in good condition, pressure will increase as valve is closed. *CAUTION - Do not leave valve closed for more than 15 seconds.* If pressure does not increase when valve is closed, pump is faulty. Remove gauge and replace hose.

PUMP OVERHAUL: Removal - On 6 Cyl. cars, loosen generator-to-bracket retaining bolts and remove fan belt. Pull generator all the way out from engine. On all models, place container under pump and disconnect hydraulic lines from pump allowing oil to drain out of reservoir into container. Remove retaining bolts from pump-to-generator and generator rear brace (V8 models), and remove pump. Complete draining remaining oil from pump reservoir before disassembly.



1955-59 CHEVROLET POWER STEERING PUMP ASSEMBLY

Disassembly: Remove retaining bolts and sealing washers from pump reservoir-to-pump cover assembly, and remove reservoir. Remove oil filter spring retainer from pump cover assembly. Remove cover plate spring and cover plate and then remove plug and "O" ring, flow spring and pressure relief valve assembly from pump cover assembly. Remove the three retaining bolts from pump cover assembly and remove pump cover from pump body. Remove oil filter and retainer. Remove cam ring, pump rotor and vanes. Remove and discard "O" rings from pump body, cover and cam ring. Remove and discard generator shaft oil seal from pump body.

Inspection: Wash all parts in solvent and dry with a lint free cloth. Check fit of vanes in rotor. Vanes must slide freely, but snugly in slots. Inspect flat face of pressure plate, cam ring, cover, rotor and pump body. If necessary, lap these parts for a good fit. Check surface of pressure relief valve and check fit of valve in pump cover. Correct slight irregularities by polishing.

Reassembly: Coat new "O" rings with Lubriplate and install in pump cover, cam ring and pump body. Install rotor and vanes in pump body with wear pattern or beveled edge of vanes against cam ring inner diameter. Install alignment sleeve in cam ring and install cam ring on pump body *(CAUTION–Wid r dg of cam ring should be installed toward pump body. B certain to align bolt holes in cam ring to body b lt hol s. Install rotor with rounded side of splin s toward gen rator end of pump).* Install pressure plate in pump cover and install filter retainer and oil filter. Install cover assembly to pump body, then install plunger and flow spring. Install plug and "O" ring assembly, cover plate, and retainer spring. Install filter retainer spring in cover assembly, and install reservoir, retaining bolts and sealing washers.

►*BRASS FITTING SEAT NOTE:* The seats of the brass fittings are the pressed in type and can be replaced in event of a fitting leak by tapping hole in the seat and then pulling the seat by using a bolt threaded into the tapped out seat and a flat washer and nut as an extractor. When installing new seats, align seat in its bore and press it into place by using the correct hose or tube fitting as a pressure tool.

Installation: Reverse removal procedure.

1960 CHEVROLET

Chevrolet Pass. Cars (1960)
Chevrolet Trucks (1960)

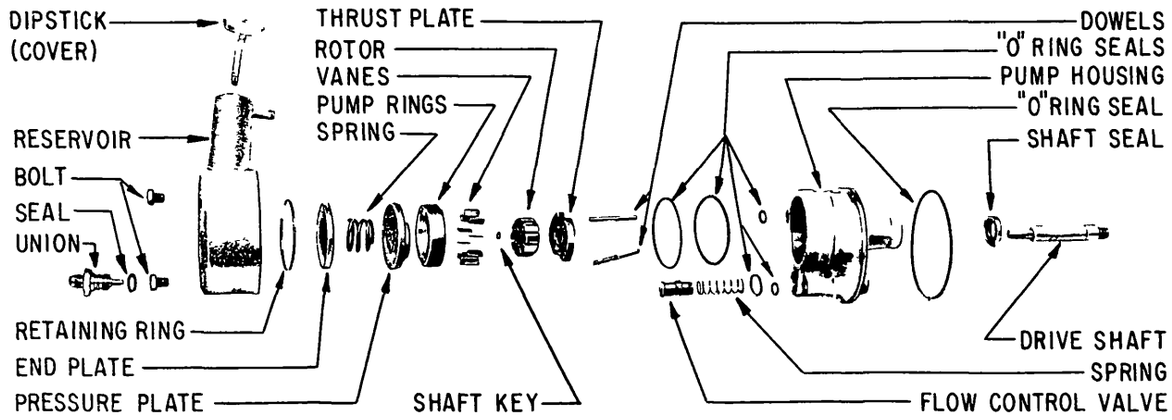
DESCRIPTION: New "Vane" type pump with integral reservoir and pressure regulator valve. The new pump is mounted at front of engine and is belt driven by crankshaft.

LUBRICATION: *See "Chevrolet Pass. Car Power Steering".*

REMOVAL & INSTALLATION: *See "Chevrolet Pass. Car Power Steering".*

DISASSEMBLY: *CAUTION - When clamping pump in vise, be careful not to exert excessive force on front hub of pump as bushing may be distorted.* Remove union and seal, then remove pump rear mounting bolts. On Pass. Cars, remove reservoir from housing by turning counterclockwise until reservoir can be lifted freely from housing. On trucks, rock housing back and forth to remove. Remove endplate retaining ring (depress ring using 1/8" diameter hole in pump housing, then pry out). Remove spring loaded end plate (rock slightly if stuck), then remove pressure plate spring (Pass. Cars); two springs (Trucks). Remove pump from vise and invert it, allowing flow control valve and spring to drop out. Remove end plate "O" ring, then with pump housing turned over, tap housing on a wooden block until pressure plate drops out. Remove pressure plate, pump rings and vanes, being careful not to drop these parts.

CONTINUED ON NEXT PAGE



1960 CHEVROLET POWER STEERING PUMP ASSEMBLY

1960 CHEVROLET (C ntinued)

Install housing in a vise and use a suitable tool to remove snap ring on end of drive shaft. Remove rotor and thrust plates, then remove shaft through front of housing.

REASSEMBLY: Clean all parts in clean solvent, except "O" ring seals and drive shaft seal. *NOTE - Install new "O" ring seals at all necessary points.* Insert shaft at hub end of housing (spline end entering mounting face side). Install thrust plate on dowel pins with ported face at rear of pump housing, then install rotor, which must be free on splines, on pump shaft over splined end. *NOTE - Assemble rotor with count rsunk side toward shaft.* Use a suitable tool and install shaft retaining ring. Install pump ring on dowel pins with direction of rotation arrow to rear of pump housing (rotation is clockwise). Install vanes in rotor slots with radius edge towards outside, then lubricate outside diameter and chamfer of pressure plate with vaseline and install on dowel pins with ported face toward pump ring. Use a 2¾" diameter tube to apply pressure to outer edge only and seat pressure plate by pressure on sleeve (use an arbor press). *CAUTION - Do not press or hammer on center of pressure plate as this will cause permanent distortion.* On passenger cars, install pressure plate spring in center groove of pressure plate. On trucks, install a pressure plate spring over each of the two dowels. On all models, install end plate "O" ring, then lubricate outside diameter and chamfer of end plate with vaseline and install in housing, using an arbor press. While pump is in arbor press, install end plate retaining ring, making sure it is properly seated in groove of housing. Install flow control spring and flow control plunger. *NOTE - End of plunger with hex head screws goes into bore first.* Position reservoir so filler tube is 30° counterclockwise of normal position, then drop into place and rotate clockwise to normal position, pressing down until reservoir seats on housing. Install studs, stud seals, union, union seal, and drive shaft key. Support shaft on opposite side of key when installing key.

PRESSURE TEST: See *"Chevrolet Pass. Car Power Steering".*

EDSEL, LINCOLN & MERCURY (CRANKSHAFT MOUNTED) TYPE

►CHANGES, CAUTIONS, CORRECTIONS

►*PUMP INLET TUBE ALIGNMENT CAUTION:* Misalignment of pump inlet tube with reservoir outlet tube can cause kinking or interference with water pump resulting in damage to hoses or pump.

DESCRIPTION: Constant displacement "vane" type rotary pump with a built in pressure control valve assembly. Pump is mounted on front of engine and is driven directly by engine crankshaft. Fluid reservoir is not integral with pump and is mounted on forward end of left hand cylinder block.

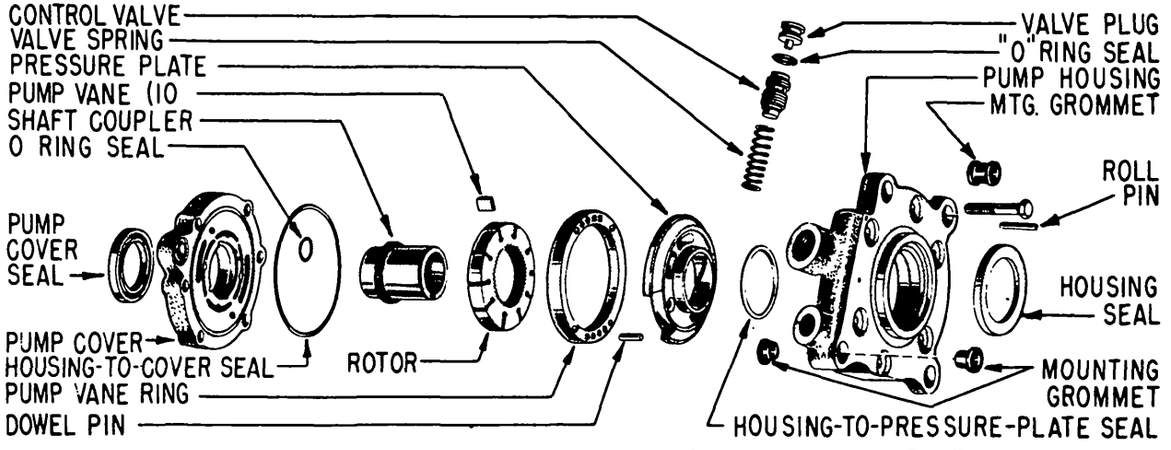
REMOVAL: Remove radiator, then loosen generator adjusting strap, and remove belts, fan, spacer, and pulley. Drain power steering system and disconnect hydraulic fittings. Remove crankshaft damper with Tool 6306-AG, then remove crankshaft key. Remove four attaching bolts and slide pump off crankshaft. *NOTE - If pump does n t slid off crankshaft easily, use Tool 6306-AG.*

DISASSEMBLY: Clean exterior of Pump thoroughly and drain all fluid from pump. Loosen screws securing cover to housing, then lay pump assembly on a bench and remove housing cover screws. Lift housing assembly from pump cover and lift pressure plate off dowel pins. Remove "O" ring from pressure plate. Remove coupling shaft, then remove pump ring from dowels in pump cover. Remove both large and small "O" ring seals from grooves in pump cover. Remove shaft seals by prying with a screwdriver. Remove roll pin retaining flow control valve in housing and remove plug, "O" ring, control valve, and spring. *NOTE - If plug or valve is stuck in pump housing cov r, it can be removed by tapping end of housing on a pi c of wood.* Remove "O" ring from plug.

INSPECTION: Wash all parts in clean solvent and blow dry with air. Inspect all parts for wear, scoring, nicks, or burrs. Replace necessary parts. Check vanes for fit in rotor slots. Vanes should slide freely, but snugly in slots. Replace rotor or vanes if excessively worn. Inspect surface of cam ring for wear or scoring. Replace ring, rotor and vanes if any one of the three components show wear or scoring. Inspect oil passages for obstructions. Check pressure plate and contact area on body for wear or scoring and replace necessary parts. Do not resurface these faces. Replace valve assembly if damaged. Do not disassemble valve. Check freedom of control valve in housing bore.

REASSEMBLY: Install spring in housing, then install control valve in bore with hole in control valve toward spring. Install new "O" ring on plug and install plug, retaining it in place with the roll pin. Check condition of bronze fitting seats in pressure and return ports. If damaged, remove them with an E-Z-Out and replace with new inserts. Lubricate all parts with Automatic Transmission Fluid Type "A" as they are installed. Install oil seals with lips inward, on body and cover, and press seals into housing and cover using Tool 33623-C. Install large "O" ring seal on face of cover and install small "O" ring in inlet oil passage in cover. Install dowel pins in cover, then install coupling shaft in cover, using Tool 33623-D. Place rotor on shaft with counterbored spline toward cover side and place vanes in rotor with rounded edge toward outside of rotor. Position cam ring on dowels with arrow on outer surface of ring pointing in direction of pump rotation. (Holes in ring must line up with kidney shaped holes in cover). Install "O" ring on rear of pressure plate and position pressure plate on dowel pins which extend through cam ring. Place housing over coupling shaft, using Tool 33623-D to prevent damage to seals. Install capscrews and tighten to 15-18 ft. lbs.

INSTALLATION: Reverse removal procedure and note the following: Tighten mo unting bolts to 10-13 ft. lbs., crankshaft damper bolt to 80-100 ft. lbs., and hose end nuts to 20-30 ft. lbs. Fill reservoir and bleed system.



EDSEL, LINCOLN, MERCURY (CRANKSHAFT MTD.) POWER STEERING PUMP

CHRYSLER, DE SOTO, DODGE, PLYMOUTH SINGLE ROTOR TYPE

DESCRIPTION: Single rotor type with an integral flow control valve. Pump is mounted on rear end of generator and is driven by generator shaft.

►*PUMP COUPLING NOTE:* Two different types of pump drive coupling have been used and special Pump and Generator must be used with each type coupling (special shaft used with each coupling).

1) Rubber Insulated Coupling–Oilite coupling flanges are pressed on generator and pump shafts and retained by special "thread locking" type capscrew and plain washer (lockwashers should not be used with these screws). A rubber insulator and insulator sleeve are installed between the coupling flanges to transmit the drive.

2) Metal Tongue Coupling–Tongue-and-slot type metal coupling. Coupling members are retained on shaft ends by a retaining ring and slide off after ring removed.

OVERHAUL OF PUMP: *CAUTION*–Cleanliness is extremely important when working on hydraulic pump. Pump should be thoroughly cleaned before disassembling, work bench should be covered with clean paper, and all parts should be kept in clean kerosene until reassembled to protect them from dirt and corrosion.

Removal of Reservoir From Pump:

1) Remove cover assembly from reservoir, lift out filter element and drain oil from reservoir.

2) Install the small tapered plug Tool C-3117 and the large tapered plug Tool C-3118, into the two holes that permit passage of oil to pump (this will prevent dirt entering pump).

3) Remove the four reservoir-to-pump attaching screws and lift reservoir from pump, being sure not to lose one large rubber "O" ring and five small rubber "O" rings which are used as gaskets between pump and reservoir.

Disassembly ("Single Rotor" type): Remove coupling lock screw, then remove coupling. Install pump in vise with protective copper jaws. Remove five body-to-cover attaching bolts, then remove cover. Remove shaft and rotor assembly, then "O" ring seal and "oilite" thrust washer in bottom of pump shaft hole.

Bushing & Seal Replacement–*NOTE*–New seal should always be installed whenever bushing replaced. Replace bushing and seals as follows:

Pump Cover Shaft Bushing–Place pump body in vise with protective copper jaws, install Tool C-3185, tap threads into bushing with outer section of tool, using an open end or adjustable wrench. After tool threaded into bushing sufficiently, screw T handle section of tool into hole until tool bottoms in cover, remove bushing. To install, drift bushing into place with Tool C-3233.

Pump Body Shaft Bushing–Place pump body in vise with protective copper jaws, mount pump cover to pump cover to pump body, install attaching bolts. Install Tool C-3185 in cover bushing hole, thread tool into housing bushing, remove bushing and seal. To install, mount bushing to Tool C-3235 and drift bushing into place.

Outer Rotor Babbitt Bushing–Remove pump cover from pump body. Thread Tool C-3214 into pump body using adapter Tool C-3234, remove bushing. To install, drift bushing into place with Tool C-3251.

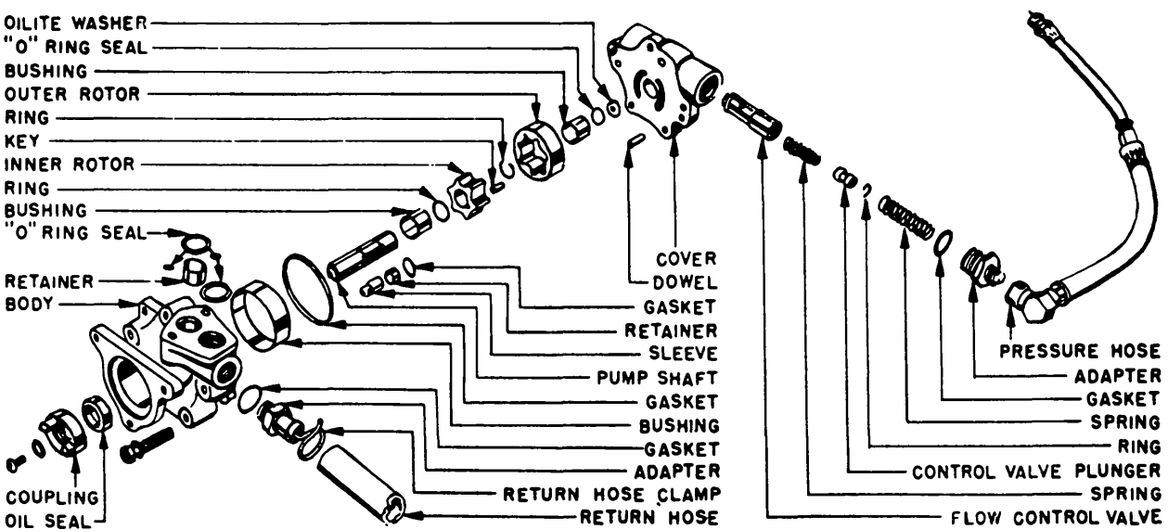
Pump Shaft Oil Seal Replacement–With pump body securely clamped in vise with protective copper jaws, mount seal to Tool C-3230, drive seal into place.

Cleaning & Inspection: Clean all parts thoroughly in solvent and blow dry with compressed air. Wash bearings in clean kerosene and dry by blowing air through bearing (*CAUTION*–do not spin bearing with air). Inspect bearings for wear or roughness and replace if they do not rotate freely. Inspect babbitt rings in pump body for wear or scoring. Inspect rotors and pump shaft for wear, scoring, or burrs (remove burrs with a fine stone or crocus cloth). Check end clearance of rotors by installing them in pump body and using a feeler gauge to measure clearance from rotor to straightedge placed on face of body. End clearance limits are .001-.0017". Check valve plunger.

►*NOTE:* If rotors badly scored, or worn beyond limits given above, install complete new pump assembly.

Reassembly ("Single Rotor" type): Use NEW "O" ring seals and gaskets. Lubricate all parts with clean SAE 10W engine oil, coat "O" ring seals with Lubriplate. Assemble pump as follows: Install flow divider valve (ported end first) into pump body. Insert small spring plunger and ring, using Tool C-3229. Install large spring, gasket and adapter. Tighten adapter to 45-50 ft. lbs. torque. Install shaft protector thimble Tool C-3228 in pump body until tool bottoms, install rotor shaft assembly, using care not to damage babbitt bushings when installing rotor. Position "O" ring seal in body. Place cover in position, installing attaching bolts and washers. Tighten bolts to not more than 17 ft. lbs. Install coupling flange on pump shaft, then special lock screw and washer. Hold coupling with Tool C-3227 and tighten to 10-12 ft. lbs. torque.

Installation of Reservoir on Pump: Install one large circular section "O" ring, and five (5) small "O" rings which are used as gaskets between reservoir and pump. Install small tapered plug, Tool C-3117 and large tapered plug, Tool C-3118, into the two passage holes in bottom of reservoir. Insert the two pilots, Tool C-3116, into matching screw holes of reservoir and pump and install reservoir to pump. Install the four attaching screws and tighten to 7-12 ft. lbs. torque.



HYDRAULIC PUMP (SINGLE ROTOR TYPE)

Form 58 A

CHRYSLER, DE SOTO, DODGE, PLYMOUTH, VALIANT "SLIPPER" TYPE

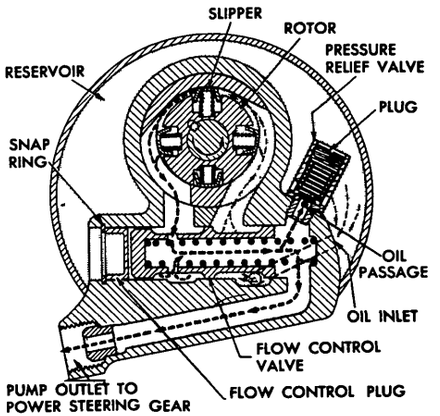
►CHANGES, CAUTIONS, CORRECTIONS

►*PUMP REPLACEMENT PARTS NOTE:* Parts for pumps having the "Load Reaction Belt Tensioner" are not interchangeable with conventional type pumps.

DESCRIPTION: Constant displacement rotary type, having spring loaded "slippers" operating in slots of rotor. A pressure relief valve in the pump limits maximum pressure to 850-950 psi.

REMOVAL: Remove drive belt, then drain reservoir and pump. Disconnect hoses and remove screws attaching pump bracket to water pump housing. Remove pump.

DISASSEMBLY: Clean exterior of pump assembly before starting disassembly, then drain all fluid from pump and reservoir. Remove front and rear brackets and carefully pry reservoir from pump. Reinstall front bracket to pump to be used as a holding fixture. *CAUTION - Use spacers between pump b dy and bracket so bolts do not bottom in pump h using.* Use Tool C-3615 and remove pulley. Remove relief valve assembly and gasket. *NOTE - Reli f valve is servic d only as an assembly.* If necessary to remove flow control valve, remove control valve snap ring, then remove flow control valve plug by threading a tap (Tool C-3655) into plug. With tap securely installed in plug, install tool spacer and nut over tap and tighten nut while holding tap from turning. Plug will be forced from housing. *CAUTION - Flow control valve is spring loaded and caution should be used when removing plug.* Thread puller portion of Tool C-3642 into oil seal to engage metal portion of seal and remove seal from pump insert. *NOTE - Further disassembly of pump is not recommended as component parts of pump other than reservoir, "O" ring and relief valve are not serviced separately.*



"SLIPPER" HYDRAULIC PUMP ASSEMBLY

INSPECTION: Clean all parts in clean solvent, discard body-to-reservoir "O" ring and pump shaft oil seal. Check flow control valve for burrs and scratches. *NOTE - Flow control valve must operate freely in bore. Small scratches can be carefully removed with crocus cloth. DO NOT round off edges of valve as th y must be square.* If bore of flow control valve is scratched or worn, replace complete pump assembly.

REASSEMBLY: Install flow control valve spring, valve and a new valve plug and snap ring. Drive valve plug with Tool C-3233 far enough into bore to install snap ring, then drive snap ring and plug with Tool C-3233 until snap ring seats in groove in housing bore. Install relief valve and gasket assembly. Install oil seal with Tool C-3640 (lip of seal must face toward pump body and top of seal must be flush with front insert). Support pump body in holding fixture, Tool C-3643 so that pressure will be absorbed by lower end of pump shaft, then install pulley with an arbor press until pulley hub is flush with end of shaft. Coat large "O" ring with lubriplate and install in outer groove in pump body. Install reservoir gasket, reservoir, and reservoir attaching screws. Tighten screws to 10 ft. lbs. and install pump brackets.

PUMP PRESSURE TEST: *See "Chrysler, DeSoto, Dodg , Plymouth (Constant Control) Power Steering".*

RAMBLER "SLIPPER" TYPE

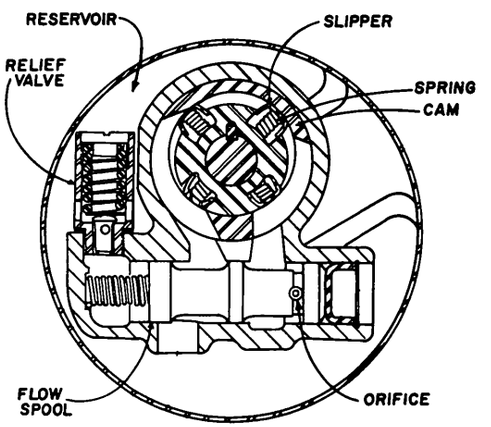
Rambl r Seri s 6001 & 6010 (1960)

DESCRIPTION: Constant displacement rotary type with spring loaded slippers operating in slots in rotor. An integral pressure relief valve in pump limits pressure to 850-950 lbs.

REMOVAL: Remove fan belt and place a suitable container under pump, then disconnect pressure and return hoses. *CAUTION - Cap hose fittings to prevent loss of oil from steering system.* Disconnect power steering pump bracket from engine and remove pump assembly.

DISASSEMBLY: Drain reservoir and pump, then clamp pump bracket in a vise. Mark position of reservoir in relation to pump body, then remove reservoir attaching screw and carefully pry reservoir off pump body. Remove pulley with a suitable puller, then remove relief valve and gasket. *NOTE - Relief valve is serviced nly as a complet assembly.* Thread puller portion of Tool J-8647 into shaft oil seal far enough to engage metal lip of seal, then hold puller body and turn center screw to force seal from pump insert. If outlet fitting requires replacement, remove with an "easy-out" (Tool J-8659). *NOTE - Furth r disassembly of pump is not recommended as pump components are not serviced separat ly.*

INSPECTION: Wash all parts in solvent and inspect casting and pump components for visible damage. Discard reservoir "O" ring seal, pump shaft oil seal, outlet fitting (if removed), and relief valve gasket.



RAMBLER HYDRAULIC PUMP

REASSEMBLY: Lubricate all parts with Automatic Transmission Fluid, then install relief valve and new gasket. Install pump shaft seal with Tool J-8648 (lip of seal towards pump body), then press on metal part of seal until top of seal is flush with front insert. Install pulley with a heavy duty arbor press while supporting lower end of pump shaft with Tool J-8649. *CAUTION - Make sure that pressure is absorbed by pump shaft.* Pulley should be pressed on until distance from center of groove (outer groove on double groove pulleys) to face of bracket mounting boss on pump is 1 19/32" (single groove pulley); 2 1/32" (double groove pulley). Lubricate large "O" ring seal and install in pump body groove. Position reservoir gasket on back of pump and hold it in place with a dab of grease, then install reservoir in previously marked position. Tap into place with a plastic hammer, then install screw and tighten to 10 ft. lbs. Insert outlet fitting in outlet hole using finger pressure only. *NOTE - When pressure hos is installed, hose fitting will press outlet fitting into place.*

INSTALLATION: Reverse removal procedures and adjust drive belt, then bleed system (see below)

BLEEDING SYSTEM: Fill reservoir to bottom edge of filler neck with Automatic Transmission Fluid Type "A", then start engine and run for ten minutes, maintaining an adequate supply of oil in reservoir. *CAUTION - Do not turn steering wheel during warm-up period.* Raise front wheels off floor, then turn steering wheel full right and full left several times. *CAUTION - Do not hold wheels against stops for any length of time.* Check and refill reservoir and inspect system for leakage.

PUMP PRESSURE TEST: *S "Monroe Linkag Typ P w r St ring".*

EATON ROTOR TYPE

►CHANGES, CAUTIONS, CORRECTIONS

►***OIL PUMP CAUTION—Always cap or plug all pump ports whenever oil lines disconnected and use extreme care to keep all pump parts clean.***

►1957-58 *EATON POWER STEERING PUMP NOTE:* Pump shaft is now carried on two bushings which replace the former ball bearing. Bushings in 1957 and later pumps are integral with the housing and cannot be replaced. If bushings become worn or scored, replace complete housing assembly.

EATON OIL PUMP: Disassembly. Thoroughly clean exterior of pump before removing plugs or disassembling parts. Then proceed as follows:

1) Remove reservoir cover and gasket, then drain reservoir. Remove filters, reservoir, then separate pump cover from pump body. *(CAUTION—*Before removing cover place pump with shaft end down to prevent falling out of rollers).

2) Turn pump body over and slowly rotate shaft so that rotors fall free, remove rotors and drive key from shaft. Remove "O" ring seals from pump body.

3) Remove bearing snap ring from recess in body using snap ring pliers, tap lightly on end of shaft, remove shaft and bearing assembly from pump body. Remove inlet fitting and seal from pump body and valve cap adapter seal and orifice plate from cover, then remove flow control valve spring and damper by depressing relief valve slightly and removing snap ring with snap ring pliers.

4) Remove spring, relief valve and flow control valve from cover.

Cleaning & Inspection: *CAUTION—*Do not wash shaft and bearing assembly in cleaning solvent which may wash lubricant out of sealed bearing (wipe bearing and shaft assembly with clean cloth only). Clean all other parts with clean kerosene or solvent, wipe dry with clean lint-free cloths. Inspect bearing in cover and replace if worn or noisy. Inspect shaft for wear and bearing for wear, roughness, or noisy operation (if either part requires replacement, press bearing off and on shaft in an arbor press). Inspect shaft seal in pump body for wear or damage (if seal requires replacement, drive old seal out with a punch, press new seal squarely into place with spring-loaded edge inward). Inspect valves for nicks, scores, or scratches and also inspect valve bores in pump cover (minor nicks may be removed by stoning). Check valve clearance in cover, valves should be free in bores and clearance must not exceed .0025". Inspect valve springs and replace if weak or distorted. Inspect cover and body for wear caused by rotors, replace if surfaces scored or worn. Inspect both rotors as detailed below and replace both rotors if either part worn or scored.

Inner & Outer Rotor Clearance—With one tooth of inner rotor fully meshed in outer rotor, measure clearance between rotors at opposite inner rotor tooth using a feeler gauge. Repeat this check for each rotor tooth. Replace rotors if clearance exceeds .006" (Packard), .008" (Others).

Outer Rotor Clearance in Pump Body—Insert outer rotor in pump body, check clearance between outer diameter and bushing in body with feeler gauge. Replace pump body if clearance exceeds .008".

Rotor Side Clearance—Install both rotors in pump body, place straightedge across face of pump, use feeler gauge to measure clearance between rotors and straightedge. Replace pump body if clearance exceeds .0025".

Spring Tension (Relief Valve) 32 lbs. at 1.18"

Spring Tension (Flow Control Valve)—16 lbs. pull plus or minus 1½ lbs. at 1.20".

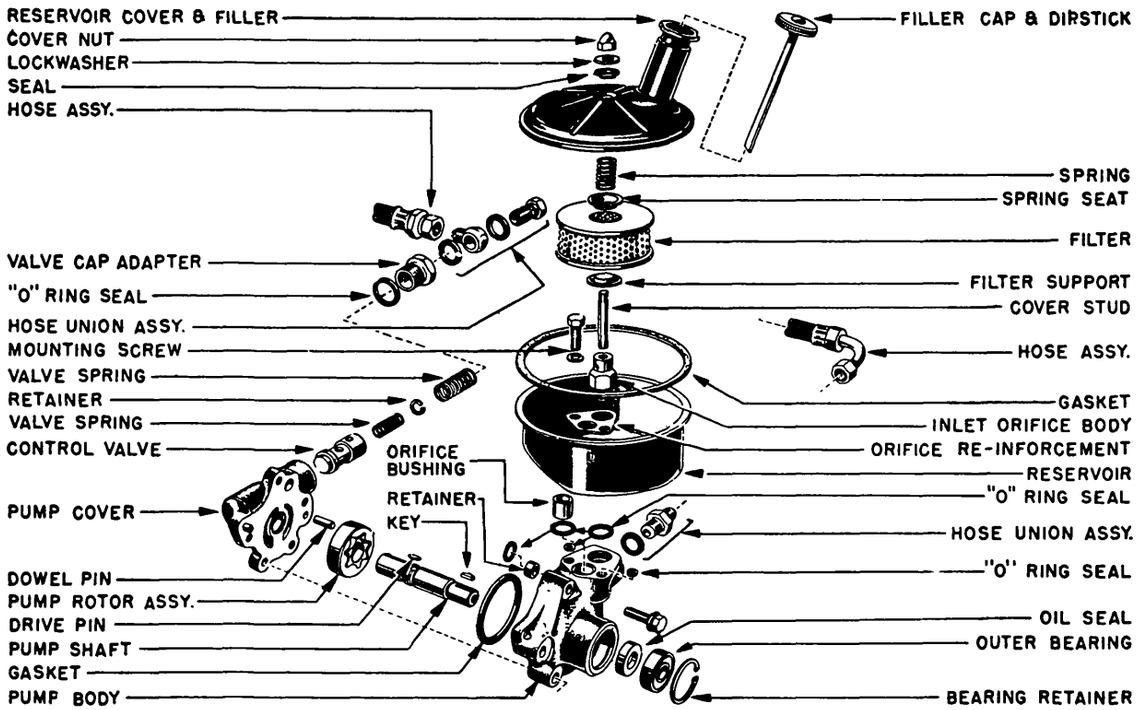
Reassembly—If removed, install new oil seal in pump body bore with lip toward rotors. If ball bearing removed from pump new bearing should be pressed on with arbor press until it butts against shoulder on pump shaft. Using all NEW seals and gaskets and lubricating all moving parts with Automatic Transmission Fluid Type A, proceed as follows:

1) Install assembly of pump shaft and bearing in pump body bore. Install ball bearing retainer. Position drive pin or key in pump shaft slot.

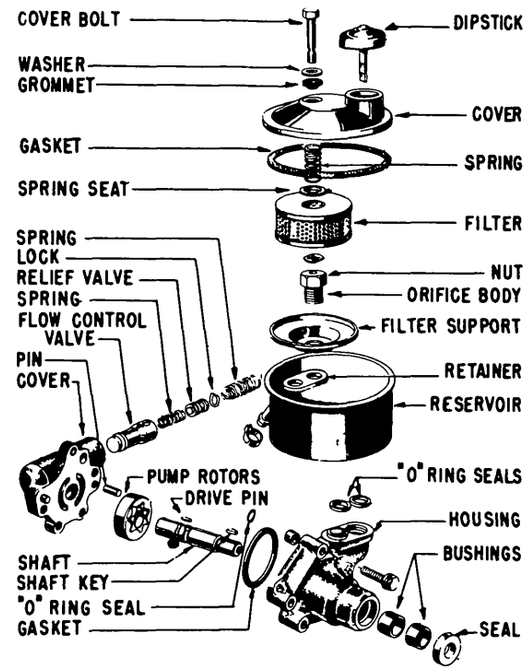
2) Install rotor assembly. If valve subassembly disassembled, install relief valve spring, relief valve, and retaining ring in flow control valve body. Compress assembly into body until there is sufficient room for installing ring in valve body groove, install retaining ring.

3) Install orifice plate in pump body bore. Install flow control valve spring. Install new gasket on hose adaptor valve cap, install and tighten cap. Install new gasket at pump body pressure port and a pump body-to-cover gasket.

4) Install pump cover on pump body. Install screws and torque tighten to 30-35 ft. lbs. (Nash & Packard 25-30 ft. lbs.) Install new "O" ring gaskets on top of pump body, install reservoir and filter.



EATON ROTOR TYPE PUMP (BALL BEARING TYPE)



EATON ROTOR TYPE PUMP
(INTEGRAL BUSHING TYPE)

EATON ROLLER TYPE

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 EDSEL & MERCURY PUMP NOTE: "Vane" type crankshaft mount d pumps also used on some models.*

►*1958 PUMP PRODUCTION CHANGE:* Internal design of pump was changed in early production for improved operation. Later pumps are marked with either a green or yellow stripe of paint across top of pump next to reservoir.

►*1958 EDSEL OIL RESERVOIR LEAKAGE CORRECTION:* Clean gasket surface, then apply Perfect Seal Compound, Part No. B6A-19554-A, sparingly to cover gasket surface and allow to partially dry. Install new gasket, Part No. AE-33535-A on cover, then position cover and gasket on reservoir in a straight down movement (do not rotate cover to seat gasket). Install washer and wing nut and tighten securely.

►*1958 LINCOLN RESERVOIR GASKET LEAKAGE CORRECTION:* Install a new "Texon" (fibre) gasket, Part No. B8A-33535-A in place of the former neoprene type gasket.

►*1958 FORD RESERVOIR COVER STUD LEAKAGE CORRECTION:* Remove reservoir cover and filter spring, then push Seal Ring, Part No. 372144-S down around stud until seal ring is on top of metal filter retaining washer. Install spring, cover, and flat washer.

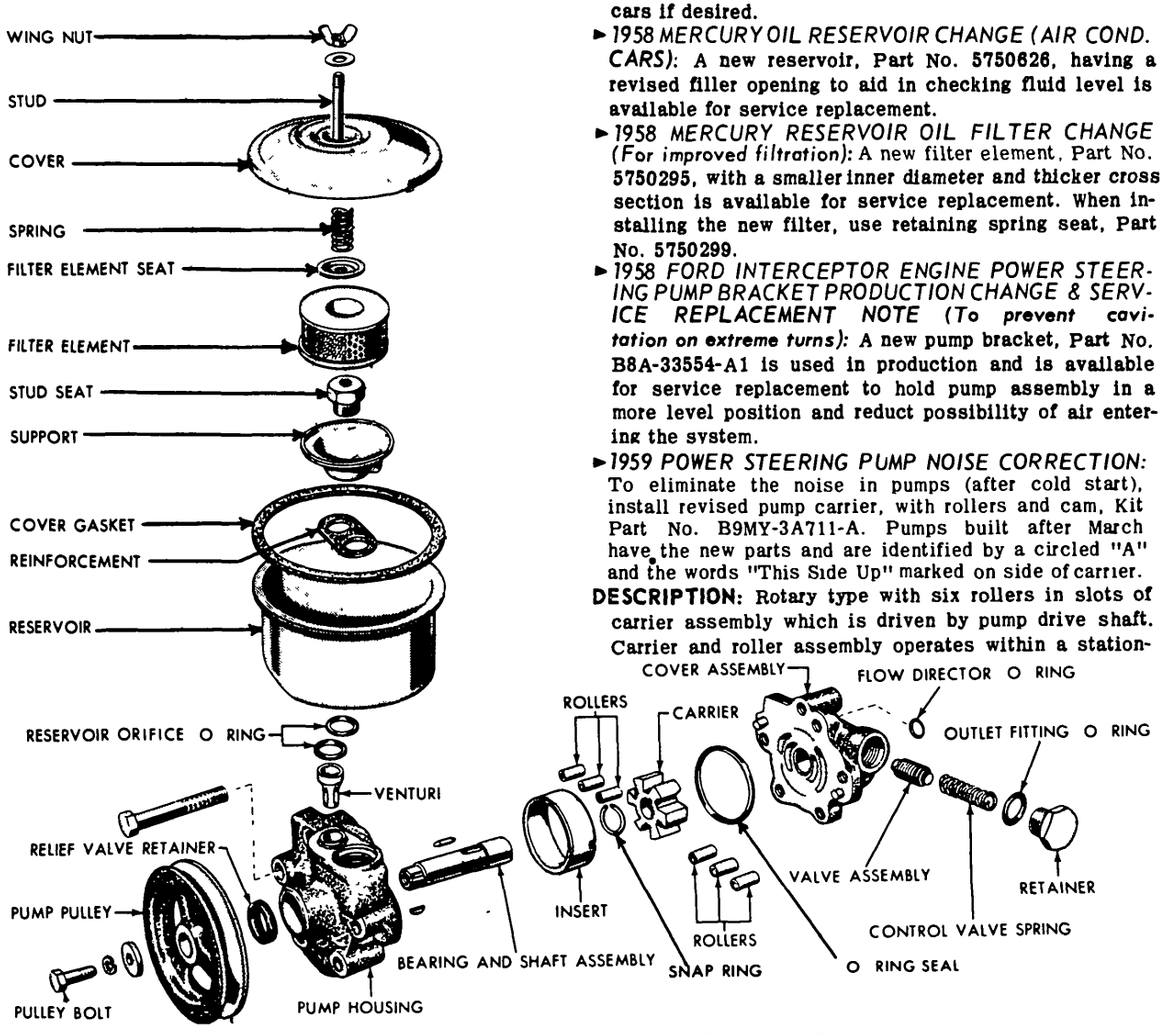
►*1958 LINCOLN & CONTINENTAL RESERVOIR FILLER CAP & FILTER PRODUCTION CHANGE:* The oil filler cap and reservoir oil filter have been eliminated in later production cars. Filter can be omitted on early cars if desired.

►*1958 MERCURY OIL RESERVOIR CHANGE (AIR COND. CARS):* A new reservoir, Part No. 5750626, having a revised filler opening to aid in checking fluid level is available for service replacement.

►*1958 MERCURY RESERVOIR OIL FILTER CHANGE (For improved filtration):* A new filter element, Part No. 5750295, with a smaller inner diameter and thicker cross section is available for service replacement. When installing the new filter, use retaining spring seat, Part No. 5750299.

►*1958 FORD INTERCEPTOR ENGINE POWER STEERING PUMP BRACKET PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To prevent cavitation on extreme turns):* A new pump bracket, Part No. B8A-33554-A1 is used in production and is available for service replacement to hold pump assembly in a more level position and reduct possibility of air entering the system.

►*1959 POWER STEERING PUMP NOISE CORRECTION:* To eliminate the noise in pumps (after cold start), install revised pump carrier, with rollers and cam, Kit Part No. B9MY-3A711-A. Pumps built after March have the new parts and are identified by a circled "A" and the words "This Side Up" marked on side of carrier.



EATON ROLLER TYPE HYDRAULIC PUMP ASSEMBLY

DESCRIPTION: Rotary type with six rollers in slots of carrier assembly which is driven by pump drive shaft. Carrier and roller assembly operates within a stationary eccentric insert causing a pump action similar to "vane" type rotary pumps.

DISASSEMBLY: Clean exterior of pump thoroughly before disassembly, then drain as much fluid as possible from pump and reservoir assembly. Clamp pump adjusting bracket in a vise, then on Ford 6 Cyl. models, remove reservoir adapter. On other models, remove cover and lift filter out of reservoir (if so equipped). Remove center stud, then remove support bolt (stud seat), and support, and remove reservoir. Remove 2 orifice "O" rings from top of pump. Remove pulley and pulley key from carrier shaft, then remove all bolts from pump. Separate bracket, pump housing, and housing cover and lift cover vertically from housing to prevent internal parts falling out. *NOTE - If necessary, tap parts gently with a s ft hammer to loosen them.* Remove "O" rings from flow director and carrier insert. Lay a straightedge across pump housing next to carrier shaft and measure carrier endplay with a feeler gauge. If endplay exceeds .0015", replace worn parts. Remove six rollers, then pull out the carrier and shaft very carefully to avoid damage to parts or oil seal. *NOTE - Carrier eccentric insert sh uld only be removed if it is to be replaced.* Remove carrier retaining ring from shaft, and remove pin. Remove relief valve retainer from cover and remove "O" ring from retainer. Remove valve assembly spring from bore in cover, then slide valve out of bore.

INSPECTION: Clean all parts with solvent and dry with a lint free cloth. Inspect pump housing and cover for wear caused by turning of rollers and carrier. Check bushings in housing and cover for wear or scores and replace housing or cover if necessary. Inspect other parts for wear or damage and replace necessary parts. *NOTE - Do not instdll a carrier, roller or the insert alone; these parts are furnished in a kit and all parts should be installed.* With valve and bore dry, insert valve in housing and check for free movement in bore. Remove any burrs from valve with crocus cloth. Inspect carrier shaft seal in housing and if necessary, remove seal with a punch (do not damage bushing). *NOTE - Do not remove seal except for replacement. If seal removed, a NEW seal must be installed.* To install a new seal, coat lip with lubriplate, then position seal in bore with lip facing toward carrier chamber. Press seal into housing until it seats firmly and evenly against shoulder in bore.

REASSEMBLY: Install key, pulley, washer, and retaining bolt on shaft and tighten bolt finger tight. Carefully insert shaft assembly through housing, being careful not to damage seal in cover, then install shaft pin and slide carrier onto shaft. Install retaining ring and rollers. Remove retaining bolt, washer, pulley, and key from shaft. *CAUTION - Be sure shaft does not move back and forth in housing as it will damage the seal.* Install valve assembly in bore and install a new "O" ring on pump valve retainer, then install retainer in pump housing cover. Tighten to 30-35 ft. lbs. Place a new "O" ring in groove around insert in pump housing.

CONTINUED ON NEXT PAGE

EATON ROLLER TYPE (Continued)

and install a new "O" ring (flow director) in face of housing. Fasten pump housing and cover together, then install pump on bracket. Install all bolts and tighten to 20-25 ft. lbs. Install key, pulley, washer, and retaining bolt on carrier shaft. Tighten retaining bolt to 15-20 ft. lbs. *CAUTION - Carrier shaft should turn freely when bolt is properly tightened.* Install new "O" rings in grooves on top of pump housing, then install reservoir adapter (Ford 6) and tighten nut to 30-35 ft. lbs. On other cars, hold reservoir on pump housing and install reinforcement in reservoir with ears of reinforcement facing upward over outer hole in reservoir. Install filter element support and bolt and tighten bolt securely. Place filter element on bolt (if so equipped), then install a new gasket around inside of cover. Install a new seal under head of cover retaining bolt. Install cover and tighten bolt securely. Make sure gasket is seated evenly and tightly around edge of reservoir.

INSTALLATION: Reverse removal procedures and note the following: On Lincoln & Continental, make sure there is 1/16" to 1/8" clearance between power steering pump bracket and engine front support bracket.

EATON "ROLLER" TYPE (CRANKSHAFT MOUNTED)

DESCRIPTION: Constant displacement "roller" type with an integral pressure control valve assembly. Pump assembly is mounted on front of engine and is keyed to engine crankshaft. The fluid reservoir is remotely mounted on forward end of left hand cylinder head, and is connected to pump by flexible hose.

►*HYDRAULIC PUMP IDENTIFICATION NOTE:* The later "Roller" type pumps can be identified by the pressure hose being connected to bottom of pump housing instead of to side of housing as on earlier "Vane" type pumps.

►*1960 "VANE" TYPE PUMP REPLACEMENT (WITH "ROLLER" TYPE) NOTE:* When replacing vane type pump with roller type it will be necessary to shim the water pump outward with spacers and replace the pressure hose with a currently used hose. Install water pump spacer between two gaskets at both sides of water pump-to-engine block mountings.

PRESSURE TESTING: Remove pressure hose from pump and install Adapter 3500-C in pump and in open end of hose, then connect Gauge, Tool 3500-E between adapters. Open shut off valve on gauge, then start engine and bring oil to normal operating temperature. With engine at idle speed, turn steering wheel to full right and full left and check pressure. *CAUTION - Hold wheels at stops only long enough to obtain pressure reading.* Gauge should read between 800-1075 lbs. (Mercury), 1000-1200 lbs. (Lincoln). If pressure is less than minimum, close valve at gauge and recheck pressure. If pressure is still low, pump is not operating properly. If pressure increases, internal leakage is indicated in steering system.

REMOVAL: Remove radiator and hoses, then remove generator belts. Drain power steering system and disconnect hydraulic fittings, then remove crankshaft damper and key with Tool 6306-AG. Remove two pump attaching bolts and slide pump off crankshaft. *NOTE - If pump does not slide off crankshaft easily, install two long bolts in pump body and pull pump from shaft with same tool used to remove damper.*

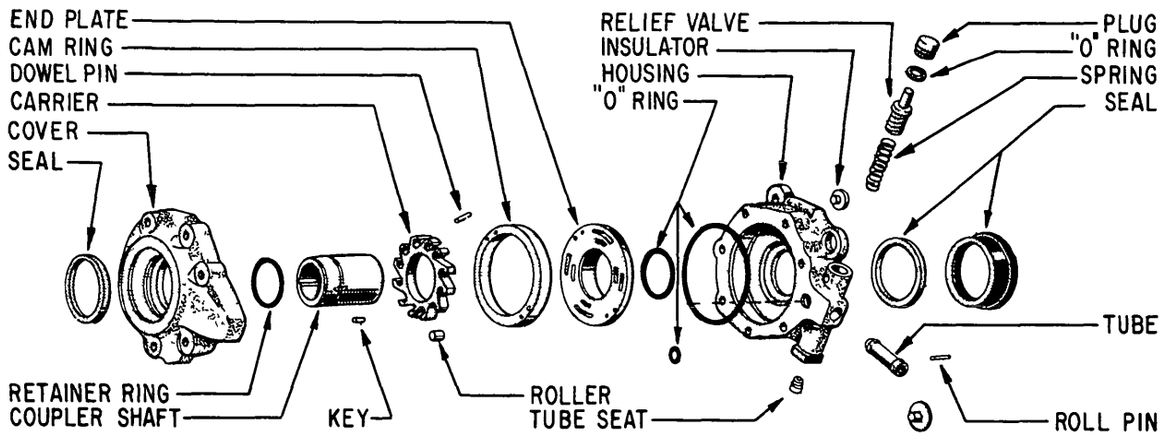
DISASSEMBLY: Drain oil from pump, then clamp pump in a vise and loosen capscrews securing cover to housing. Remove pump from vise and remove capscrews, then remove cover assembly from body. Remove "O" ring from cover assembly endplate and remove the two fillister head screws. Remove endplate from cover assembly and lift cam ring off dowel pins. Remove carrier and rollers from coupler shaft and remove drive key. Remove dowel pins from cover. *NOTE - Do not remove snap ring from coupler shaft unless ring is damaged.* Remove both large and small "O" rings from grooves in pump body and shaft seals from body and cover. *CAUTION - Do not disturb control valve unless trouble is indicated in this assembly.* If necessary to remove control valve, remove roll pin retaining flow control valve in pump body, then remove plug and "O" ring, control valve, and spring. *NOTE - If plug or valve are stuck in body, they can be removed by tapping end of body on a piece of wood. Remove "O" ring seal from plug.*

INSPECTION: Wash all parts in solvent and blow dry with air. Inspect faces of body and cover for nicks and burrs. Inspect coupler shaft for wear and make sure finished surfaces of shaft are free from scores, nicks or burrs. Replace shaft if damaged on outside diameter or if internal keyway is damaged. Inspect carrier, rollers, and cam ring for wear or scoring. *CAUTION - Carrier, rollers, and cam ring must be replaced as a complete unit if any part is worn or scored.* Inspect oil passages in cover for obstructions and check valving surfaces (area where carrier and rollers contact) for scoring and wear. Replace endplate assembly if necessary. Inspect valve for scores, nicks, or burred edges. Check for freedom of movement of control valve in body bore. Replace valve if damaged. *CAUTION - Do not disassemble control valve.*

REASSEMBLY: If control valve was removed, install spring in body bore, then install valve with small sensing hole toward spring. Install a new "O" ring seal on plug and install plug, retaining it in place with a roll pin. *CAUTION - Plug seal is only 1/8" smaller in diameter than the bypass seal. Do not interchange these seals.* If tube connection seat is damaged, replace with a new insert. *NOTE - As following parts are assembled, lubricate with Automatic Transmission Fluid.* Install oil seals with lips inward on body and cover, then install coupling shaft in cover (use Tool 33623-D to prevent damage to oil seal), then install drive key in shaft. Install dowel pins in cover, noting that spacing between dowel pin hole and screw hole is different on opposite sides of pump cover. Place carrier on coupling shaft with counterbored inner diameter toward cover so that it goes over shaft snap ring and is indexed with drive key. Place rollers in carrier, then position cam ring on dowel pins with chamfered edge up. Position endplate assembly on dowel pins and install the two fillister head screws and tighten to 20 inch pounds. Install "O" ring seal on cover and install large "O" ring seal in groove on face of body and the small "O" ring seal in groove at oil pump inlet hole. Place body assembly on coupling shaft (use Tool 33623-D to prevent damage to oil seal). Install capscrews and tighten to 15-20 ft. lbs.

INSTALLATION: Clean crankshaft and replace key if damaged or worn. Install rubber insulators in pump housing and check front cover seal for proper positioning, then slide pump on shaft. Install rubber insulators, mounting bolts and washers and tighten mounting bolts to 10-13 ft. lbs. Install pressure and inlet hoses on pump and tighten pressure hose nut to 20-30 ft. lbs. *NOTE - To prevent sound transmission, make sure hose does not touch body sheet metal.* Insert key in crankshaft and install pulley. Tighten pulley bolt to 70-90 ft. lbs. Install and adjust generator belt, then replace radiator and hoses. Fill reservoir and bleed system (see below).

BLEEDING SYSTEM: Start engine and run at idle speed. *NOTE - Do not turn steering wheel.* When reservoir is free of foam (inspect with a light), rotate steering wheel from stop to stop to remove air from hydraulic system, then refill reservoir. Replace cover and check system for leakage.



EATON ROLLER TYPE POWER STEERING PUMP (CRANKSHAFT MOUNTED)

SAGINAW VANE TYPE

DESCRIPTION: Constant delivery vane type pump with an integral flow control valve and a pressure regulator valve. Pump is belt driven from engine crankshaft.

►CHANGES, CAUTIONS, CORRECTIONS

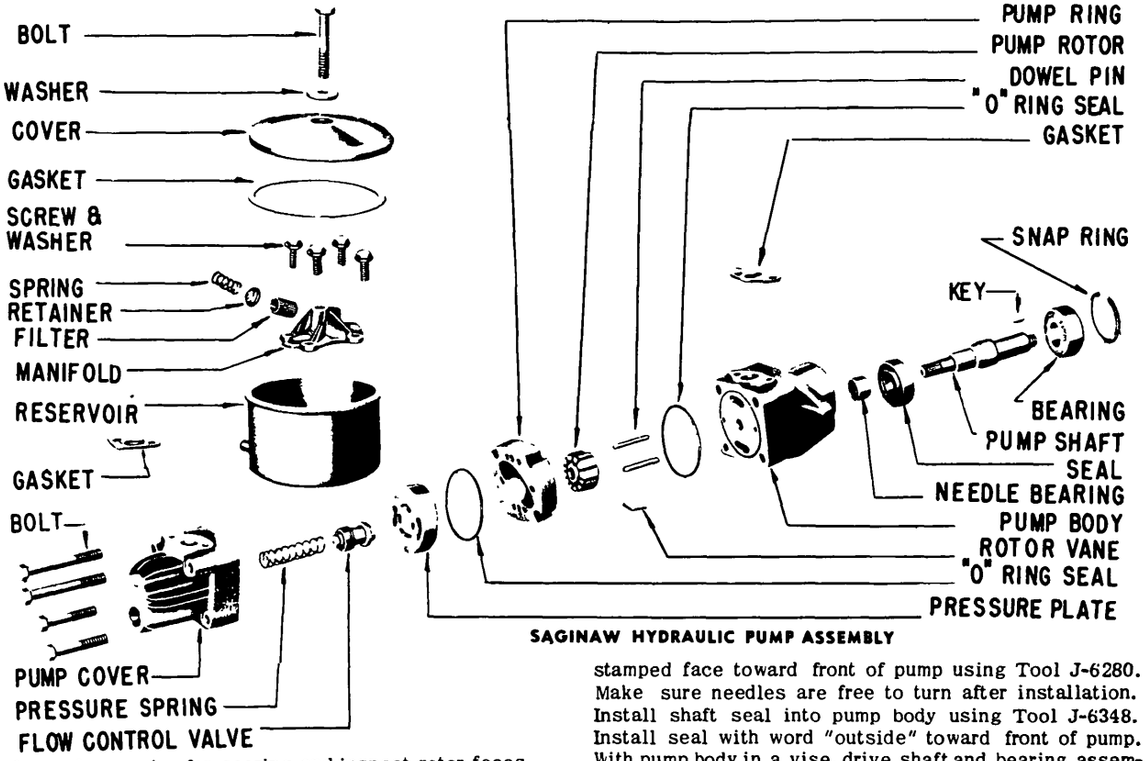
►*1956 BUICK POWER STEERING PUMP RESERVOIR VENT NOTE:* Aluminum and steel vent washers have both been used under the reservoir cover bolt. To prevent plugging the vent, the aluminum washer must be installed with the vent groove downward. The steel washer must be installed with the vent groove upward.

►*1956 CADILLAC PUMP SHAFT SEAL PRODUCTION CHANGE:* A new seal with same part number (5683898) has been released and is used in production beginning after Engine No. 021850. New seal has 30° angle on vacuum seal lip which reduces the possibility of the lip being torn, causing air leakage and a noisy pump.

►*1956 CADILLAC POWER STEERING PUMP PRESSURE REDUCTION (To eliminate a squealing noise):* Pressure has been reduced to 875-975 lbs. Pump pressure can be reduced in the field by installing a shim, Part No. 5683875 under the screw head on control valve. Each shim used will reduce the pressure approximately 100 lbs. Two shims may be used if necessary, however, check the pressure before and after installation to make sure that cut-out pressure remains above 750 lbs.

DISASSEMBLY (Saginaw): Remove reservoir cover bolt, flat washer, and reservoir cover with gasket. Remove filter screen, filter retainer and filter spring by pushing retainer back against spring. Remove four reservoir-to-pump bolts and remove reservoir and cork gaskets. Remove four pump cover-to-pump body attaching screws *(NOTE* - Do not clamp on front hub of pump as this may damage bearing housing). Lift pump cover with flow control valve assembly and spring from assembly (be careful that pump flow control assembly does not drop out). Mark position of pressure plate and remove plate from dowel pins. Mark position of pump ring in relation to pump body and remove ring from dowel pins *(NOTE* - Arrows on outer edge of pump ring point in direction of pump rotation). Remove ten pump vanes and remove pump rotor. Remove dowel pins from pump body. *(NOTE* - Any further disassembly should be avoided unless parts are dirty or repair operations are necessary on any of the remaining parts). Remove shaft bearing retainer snap ring from front hub of pump body using Tool J-4245. Remove drive shaft with large sealed bearing by lightly tapping on splined end. Remove oil seal from body with a long punch inserted through large hole in machined face of body. If it is to be replaced, remove inner needle bearing from pump body using Tool J-6279. Remove key from shaft. If outer bearing is to replaced, remove by pressing it from pump shaft.

CLEANING & INSPECTION: Wash all parts, except the drive shaft bearing (lubricant seal in bearing) in a solvent. Inspect "O" ring seals and gaskets. Replace seals if cut, or distorted. Inspect pump cover flow control valve bore for scores and wear. Inspect flow control valve for free movement in its bore. Inspect all passages in cover and body for obstructions or dirt. Inspect pressure plate for scoring. Inspect contour



SAGINAW HYDRAULIC PUMP ASSEMBLY

surface of pump ring for scoring and inspect rotor faces for metal pick-up or scoring. Check vanes for bind in slots of rotor. Inspect face of pump body for scoring or wear. Inspect drive shaft seal surface for scratches and wear. Inspect drive shaft inner and outer bearings for roughness or noisy operation.

►*FLOW CONTROL SERVICING NOTE:* If flow control valve is stuck, dislodge by jarring front of pump cover. If pump cover control valve bore is worn or scored, replace pump cover. If necessary to clean or repair pressure relief valve, grip flow control valve by small hub on end of valve and remove orifice screw, shims, ball, plunger and spring. If internal parts are found to be worn or scored, replace assembly. *NOTE* - The flow control valve assembly is calibrated at the factory and components of assembly cannot be serviced.

►*PUMP INTERNAL GROUND SURFACE NOTE:* If pressure plate, pump body, rotor or pump ring is scored, the following corrections can be made. Using a flat surface and lapping compound, lap the scored surfaces until they are smooth. *NOTE* - Thoroughly clean in solvent after lapping.

REASSEMBLY: *(NOTE - Before reassembling, make sure all parts are clean. Lubricate "O" rings and all moving parts as assembled).* Press large sealed bearing over threaded end of drive shaft with stamped face of inner race toward front of pump. Install key into shaft keyway, supporting shaft on opposite side when installing key. Install needle bearing into pump body with the stamped face toward front of pump using Tool J-6280. Make sure needles are free to turn after installation. Install shaft seal into pump body using Tool J-6348. Install seal with word "outside" toward front of pump. With pump body in a vise, drive shaft and bearing assembly into pump body. Install shaft bearing retainer snap ring. Install "O" ring in groove of pump body and install dowel pins. Tap lightly if necessary. Install rotor over splined end of drive shaft (Assemble rotor with countersunk side toward front of pump and be sure rotor is free on splines). Install vanes in rotor slots with radius edge toward outside. Install pump ring on dowels and position correctly according to scribed marks *(NOTE*- Arrow on outer edge of pump ring points to rotation of pump). Install pressure plate on dowel pins *(NOTE* - Pressure plate must be free with no binding on dowel pins). Install "O" ring around pressure plate. Install flow control valve and spring in pump cover. Be sure that end with screw goes into bore first *(CAUTION - If valve is installed backwards, the pressure regulator valve inside of the flow control valve will not op rat and pump will build up an increasingly higher pressur which would result in breakage of the adapter in g ar housing or failure at some other point in the syst m).* Position pump cover assembly over pressure plate being careful not to pinch "O" ring. Install four cover-to-body attaching screws and tighten alternately to 25-30 ft. lbs. Install gaskets on pump body and cover. Position reservoir on pump assembly with extrusions in reservoir bottom inside the smaller gasket holes and install four bolts. Tighten to 8-10 ft. lbs. Install filter spring, filter retainer, and filter. Be sure flared end of filter retainer is toward filter. Install reservoir cover with gasket, bolt and washer. Tighten cover bolt to 7-9 ft.lbs.

SAGINAW VANE TYPE (INTEGRAL RESERVOIR)

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 CADILLAC EXCESSIVE POWER STEERING PUMP PRESSURE CORRECTION: NOTE – This correction also applies to 1960 models with Air Conditioning.* Excessive pressure, indicated by a burst hose, blown seal, bent linkage, or by pump squeal and belt slippage, may be caused by a loose oil filter screen cartridge obstructing the bypass feed port. Check tightness by removing pressure hose from pump and inserting a screwdriver through central hole of fitting. Rotate screwdriver until slot in end of filter cartridge is located, then tighten as required. If excessive pressure is still evident, check pressure relief hole in flow control valve.

►*1959-60 POWER STEERING PUMP THRUST PLATE REPLACEMENT CAUTION:* Use Pump Thrust Plate, Part No. 5687321 for 1959 pumps and Part No. 5687785 for 1960 models. DO NOT USE 1959 plate in 1960 models as the drive shaft seal will be subjected to full pump pressure and will blow out.

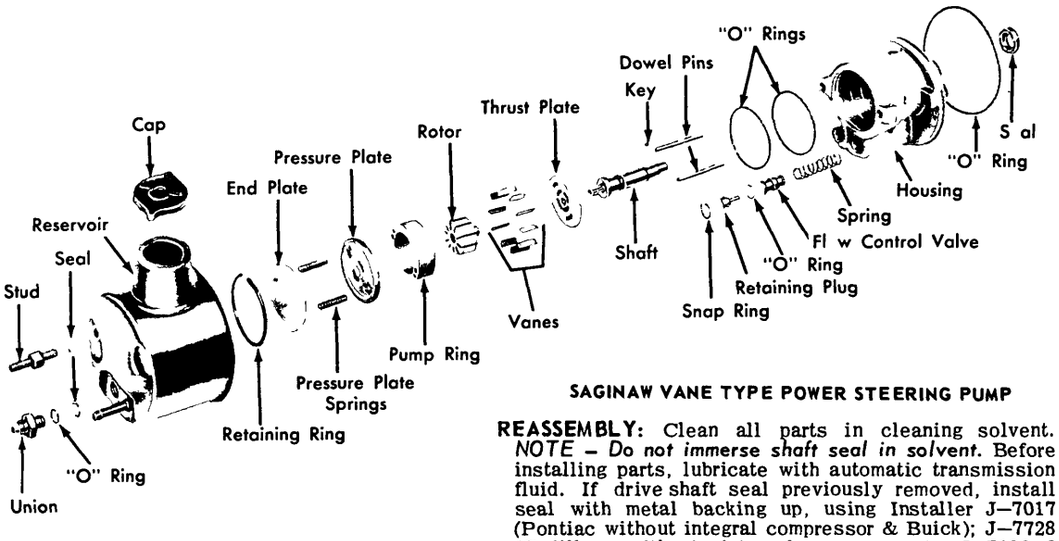
DESCRIPTION: Vane type pump mounted on engine and driven by a belt from engine crankshaft. On some models the pump is integral with the air suspension air compressor and is driven by the compressor shaft.

REMOVAL: *NOTE – On models with integral air suspension compressor, remove power steering pump and air compressor from engine as a unit.*

Buick: Remove belt from pulley and remove pulley nut, then pull pump pulley with a three jawed puller. Disconnect return and pressure lines from pump (cap or plug all openings). Remove nuts attaching pump to rear mounting bracket, then remove the one bolt attaching rear bracket to intake manifold and remove rear mounting bracket. Remove nut attaching pump brace to cylinder head and remove brace, then remove two bolts attaching pump to front mounting bracket and remove pump.

Cadillac: (Coil Spring Cars) – Syphon fluid from pump, then disconnect pressure and return hoses at rear of pump reservoir and raise hose to prevent loss of fluid. Remove pulley nut, then loosen bolts holding pump to front and rear mounting brackets and remove drive belt. Remove pulley from pump with a suitable puller. *CAUTION – Do not hammer pulley off shaft.* Remove bolts securing pump to front mounting bracket and bolt securing rear mounting bracket to exhaust manifold, and remove pump and bracket. Remove rear mounting bracket from pump.

Cadillac: (Air Suspension Cars) – Disconnect air hoses at compressor and oil inlet and return lines from bearing plate on compressor. Syphon fluid from pump, then disconnect pressure and return hoses at rear of pump and secure hoses in a raised position. Remove pulley with a suitable puller. *CAUTION – Do not hammer pulley off shaft.* Remove screw securing compressor front support bracket to exhaust manifold and two screws securing bracket to cylinder head. Remove nuts from support bracket at rear of pump reservoir and remove pump, compressor, and front support bracket as a complete assembly. Drain fluid from pump, then remove bracket from compressor and mounting studs and union from reservoir. Rock pump reservoir back and forth and remove reservoir from housing. Remove screws securing pump to compressor, then pull pump off splined shaft. Discard "O" ring seal.



SAGINAW VANE TYPE POWER STEERING PUMP

Oldsmobile & Pontiac: Disconnect holes from pump and secure ends in a raised position, then cap pump fittings. Remove pulley attaching nuts, then remove rear bracket attaching nuts and the bracket-to-manifold bolt. Loosen pump-to-front bracket attaching bolts and remove belt and pulley. *CAUTION – Do not hammer pulley off shaft.* Remove pump from front mounting bracket.

►*PONTIAC NOTE: On models with integral air suspension air compressor; remove pump and compressor in same manner as indicated for "Cadillac (Air Suspunsion Cars)" above.*

DISASSEMBLY: If not previously done, clamp pump in a vise and remove pump rear mounting stud and seal. *NOTE: In clamping pump in vise, do not exert excessive force on front hub or pump flange as pump housing may be distorted.* Remove union and seal, then rock reservoir back and forth and remove from pump housing. Rotate end plate retaining ring with screwdriver until one end of ring is across hole in pump housing, then insert a center punch through hole in housing to push retaining ring out of groove and remove ring. Remove end plate. *NOTE – End plate is spring loaded and will generally sit above housing level. If sticking should occur, a slight rocking action will free plate.* Remove pressure plate springs, then remove pump from vise and remove woodruff key from drive shaft. Place shaft end on bench and press until shaft is free, then remove shaft, rotor and vanes, cam ring, pressure plate, thrust plate and dowels. *NOTE – On models with integral air compressor, the drive shaft is not an integral part of power steering pump. To remove pump rotary group (on models with air compressor), insert a ½" brass rod through shaft seal opening in housing, then invert housing and press on end of brass rod until rotary group free, then remove components.* Remove flow control retaining plug snap ring and remove plug. *NOTE – Depress plug to remove ring.* Remove flow control valve and spring. *CAUTION* – Do not attempt to disassemble flow control valve as this is serviced as a complete assembly. Remove and discard all "O" ring seals. Remove shaft seal only if defective by prying out with a screwdriver.

REASSEMBLY: Clean all parts in cleaning solvent. *NOTE – Do not immerse shaft seal in solvent.* Before installing parts, lubricate with automatic transmission fluid. If drive shaft seal previously removed, install seal with metal backing up, using Installer J–7017 (Pontiac without integral compressor & Buick); J–7728 (Cadillac without integral compressor); J–7132–2 (Oldsmobile); J–7111 (Cadillac & Pontiac with integral compressor). Insert drive shaft into housing (models with integral air compressor), using Pump Shaft Seal Protector J–7586, and make sure shaft is properly seated. Install dowel pins in pump housing, then install thrust plate on dowel pins with ported face to rear of pump housing. Install cam ring on dowel pins with direction of rotation arrow to rear of pump housing. *NOTE – Arrow on outer edge of cam ring should be up and in direction of pump rotation.* Install rotor over splined end of pump drive shaft with countersunk side toward shaft. Make sure rotor is free on shaft splines. To install pump rotor on models with integral air compressor, place rotor in position in cam ring with countersunk side toward front of pump. On all models, install vanes in slots in rotor with radius edges toward outside of rotor so they will ride against cam ring. Use a new "O" ring seal and install pressure plate on dowel pins with ported face toward cam ring. Make sure that pressure plate is properly seated by tapping lightly around outer circumference with a brass rod. Install pressure plate springs on dowel pins. Use a new "O" ring seal and position end plate in pump housing. Install end plate installer, Tool J–7663, over end plate to depress plate below retaining ring groove in pump housing. Install end plate retaining ring making sure that ring is completely seated in groove of housing. Install flow control spring, control valve (hex screw into bore first), then install retaining plug using a new "O" ring seal, and install snap ring. Install a new "O" ring seal on pump housing, then install reservoir, stud, seal, union seal and union. *NOTE – On models with integral air compr ssor, do not install reservoir until after pump is installed on compr ssor.* On models without integral air compressor, install woodruff key on drive shaft (support opposite side of shaft when installing key).

INSTALLATION: Reverse removal procedures, then fill unit with proper fluid and adjust belt tension. Bleed steering gear by running engine at fast idle for a few minutes and turning wheels from right to left (without hitting stops). Check fluid and refill as necessary.

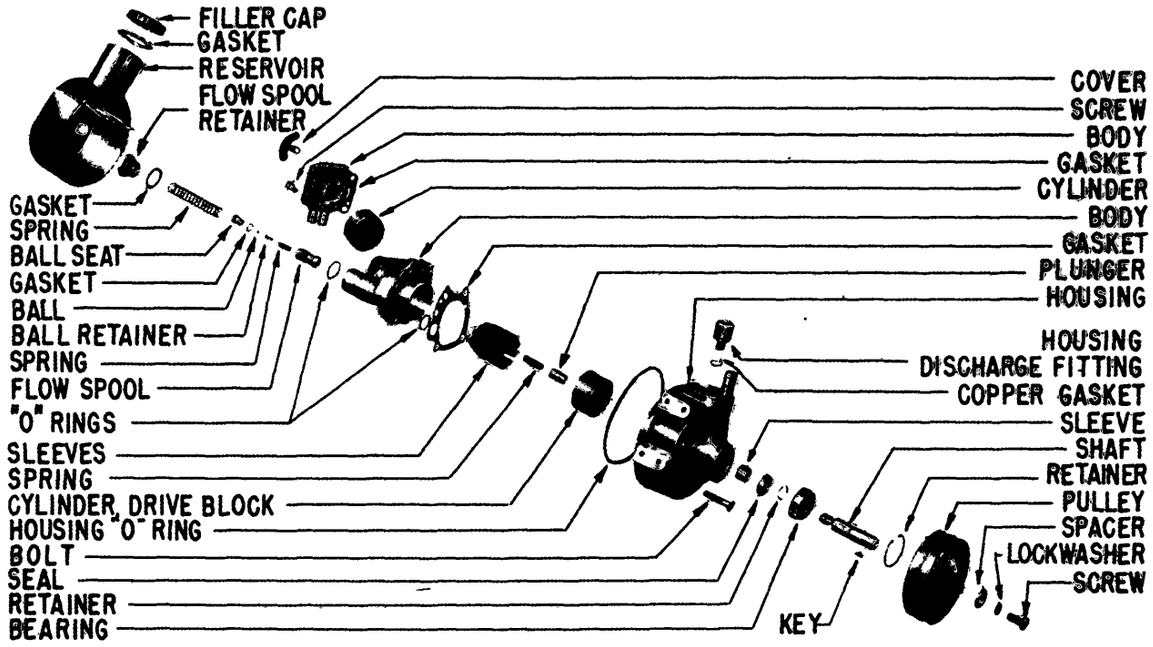
THOMPSON SLEEVE TYPE

DESCRIPTION: Sleeve type rotary reciprocating pump having nine cylinders operating in two cylinder blocks, one of which is diagonally offset in the pump body.

REMOVAL: Remove inlet and discharge hoses at pump and cap all openings to prevent entry of dirt or foreign matter. Loosen drive belt adjusting screw on pump bracket and remove belts. Remove pump from bracket.

DISASSEMBLY: Clean exterior of pump housing, then mount pump in a vise. Remove capscrew and reservoir and loosen the four capscrews at inlet end cap. Remove flow valve spring retainer *(CAUTION* - Flow and plunger springs are under pressure and caution should be used when removing cap and retainer to prevent spring and fitting from flying out). Remove flow valve and spring. Remove and disassemble both end caps from inlet cap body and pump housing. *(NOTE* - Plunger spring will tend to push cylinder blocks out of body, Use care when disassembling). Remove cylinder drive blocks and nine sleeves from body, as well as cylinder plunger spring. Remove ball bearing retainer ring from housing, using snap ring pliers, then remove shaft and bearing assembly. *(CAUTION - Bearing is pre-lubricated and must not be washed with solvent).* Inspect shaft for wear and ball bearing for roughness or noisy operation. If bearing must be replaced, remove shaft key and press bearing from shaft (away from splined or serrated end of shaft). Check retaining ring groove in housing. Replace bearing by supporting it on inner race, then press shaft through bearing until retainer ring stops against inner bearing race. *(NOTE* - The retaining ring must always be located between bearing and splined end of pump shaft).

INSPECTION: Check fit of sleeves in cylinder block bores and make sure they slide freely. If cylinder block is heavily scored, it must be replaced. Hairline markings on sleeves are normal. Check flow valve spool and valve liner. Slight hairline scratches are permissable, Burrs or heavy scratches can be removed with a smooth stone. *(CAUTION - Do not break the sharp edges of spool or liner).* Insert flow valve in valve body and move spool back and forth, rotating slightly on each pass. The spool must slide freely in all positions. If spool sticks or drags, check for dirt, nicks, and burrs. Remove nicks or burrs with a smooth stone. Check shaft seal in bearing cap and replace if worn or damaged. If necessary to replace, align seal properly, then press it in until shoulder stops against cap casting, using an arbor press. Check pressure relief valve *(NOTE* - Valve must not leak at any pressure below 750 lbs. and must open completely at 900 lbs.) Evidence of leakage will be seen at small holes in side of flow spool. If valve leaks, disassemble check valve seat for nicks or dirt. Replace valve seat if nicked or damaged. *(NOTE* - If valve pressure is too low, a 1/32" washer may be placed between spring and ball retainer. If too high, place the washer between valve seat and flow valve spool body). Check pump body for wear or damage. Scratches or burrs can be removed with fine emery cloth. If body is scored or damaged, a new pump should be used.



THOMPSON SLEEVE TYPE HYDRAULIC PUMP

REASSEMBLY: Clean all parts thoroughly. Press drive shaft and bearing assembly into housing and check rotation of shaft to make sure shaft turns freely. Place cylinder driven block (without splines) on fixture C-3602 and insert plunger spring, plunger and seven sleeves into driven block. Place pump body, square end down, over cylinder drive block and fixture locating pins. Use a probe to align sleeves to a uniform spacing, then install the other two sleeves. Position cylinder drive (with splines) over the sleeves. Sighting thru bores in drive block for alignment, lower the cylinder drive block until it engages the two sleeves in forward position. Use a probe and align sleeves in the 5 and 7 o'clock positions at the same time guiding cylinder block downward. Continue this procedure with the other sleeve positions until all sleeves are aligned and engaged. Push block all the way in. *(CAUTION* - Do not force block into position). Remove body and cylinder block assembly from fixture, using care to see that blocks are not forced out of body by plunger spring. Assemble a new end cap gasket on pump body, then install end cap and tighten screws finger tight. Insert a new "0" ring seal in counterbore at flow valve liner in body. Install a new pump body-to-housing gasket and install housing. *(NOTE* - It may be necessary to apply hand pressure on housing to get drive block down into body after housing is seated). Tighten the five capscrews finger tight, then check pump shaft to make sure it is freely rotating. Tighten capscrews to 25 ft. lbs. and recheck pump shaft for free rotation. Mount pump in a vise and install flow valve spool with the 3/16" land down. Place flow valve spring on top of flow spool. Replace "0" ring seal on flow spring retainer, then compress flow spring with fitting and screw fitting into place. Tighten to 20 ft. lbs. Install and align a new reservoir "0" ring seal on housing, then align reservoir so that indentation on back will mate with angular boss on suction end cap. *(NOTE* - Sighting through 9/32" hole in back of reservoir will aid in alignment). Replace copper gasket under head of reservoir capscrew, replace screw and tighten to 15 ft. lbs. *(CAUTION* - Do not attempt to align reservoir in place with the capscrew). Install shaft key, pulley and tighten pulley bolt to 20 ft. lbs. Refill pump with Automatic Transmission Fluid Type "A".

VICKERS VANE TYPE (3 PIECE HOUSING)

►*OIL PUMP CAUTION: Always cap or plug all pump ports whenever oil lines disconnected and use extreme care to keep dirt out of pump and to keep all pump parts clean*

DESCRIPTION: Constant flow vane type pump with an integral flow control valve and a separate cam (or rotor) ring housing. 1957 & later pumps have pressure plate of a slightly different design and a new "flow plate".

►*OVERHAUL NOTE:* The "flow plate" used in 1957 and later pumps is installed in pump cover assembly with the recess for pressure plate spring facing outward. Pressure plate must be installed with the spring recess facing the pump cover assembly.

VICKERS OIL PUMP: Disassembly. Thoroughly clean exterior of pump before removing plugs or disassembling parts. Then proceed as follows:

1) Remove reservoir cover and gasket, then drain reservoir. Remove four reservoir-to-pump mounting screws, then remove reservoir, gaskets, and spacers. Remove pump cover-to-body attaching bolts, then cover assembly with control valve assembly and spring. Discard cover "O" ring seal.

2) Remove pressure and return line unions with "O" rings from pump cover, discard "O" rings. Push spring retainer plug (between pressure and return line unions in cover) inward to remove. Discard "O" ring seal, remove plug snap ring. ***NOTE—It is not necessary to remove plug, "O" ring and snap ring to service remainder of pump. Remove only if evidence of leakage at this point.***

3) To disassemble control valve assembly, remove end screws with spacers, relief ball, relief spring guide and relief spring.

4) Lift pressure plate off dowel pins which extend through pump ring, remove pump ring from dowel pins in body. Remove rotor with vanes from body, discard "O" ring from groove in pump body. Remove bearing retainer snap ring from front face of pump body.

5) Remove drive shaft and outer bearing assembly from pump body, press outer bearing off drive shaft over threaded end of shaft, after removing woodruff key from shaft.

6) Using punch, tap drive shaft seal and inner bearing from pump body (*CAUTION*—Seal must be removed first to permit removal of bearing).

Cleaning & Inspection: *CAUTION*—Do not wash large sealed bearing in cleaning solvent which may wash lubricant out of bearing (wipe bearing and shaft assembly with clean cloth only). Clean all other parts with clean kerosene or solvent, wipe dry with clean lint-free cloths. Inspect both bearings for wear or roughness, inspect shaft for wear. Check fit of pump vanes in rotor slots (vanes should be snug but must slide freely in slots), replace rotor if vanes excessively loose, replace vanes if worn or scored. Inspect all ground surfaces of cam ring for roughness or wear (slight irregularities can be stoned out), replace ring if inner cam surface scored or worn. Inspect flat surfaces of pressure plate and body for wear or scoring (faces may be trued up by lapping until smooth and flat) *CAUTION*—all traces of lapping compound must be cleaned out. Inspect relief valve poppet and flow control valve plunger for wear or scoring paying particular attention to seating surfaces. Clean out all passages in pump cover and body.

Reassembly: Use all NEW seals and gaskets. Lubricate all moving parts with clean engine oil and install parts in reverse order of disassembly procedure (above) with particular attention to the following points:

Shaft Seal Installation—After the inner ball bearing is installed in pump body, install seal with the two 1/16" holes in casing toward outside and use a tube or shaft 1 3/4" in diameter to apply pressure on outer edge of seal to seat it in body.

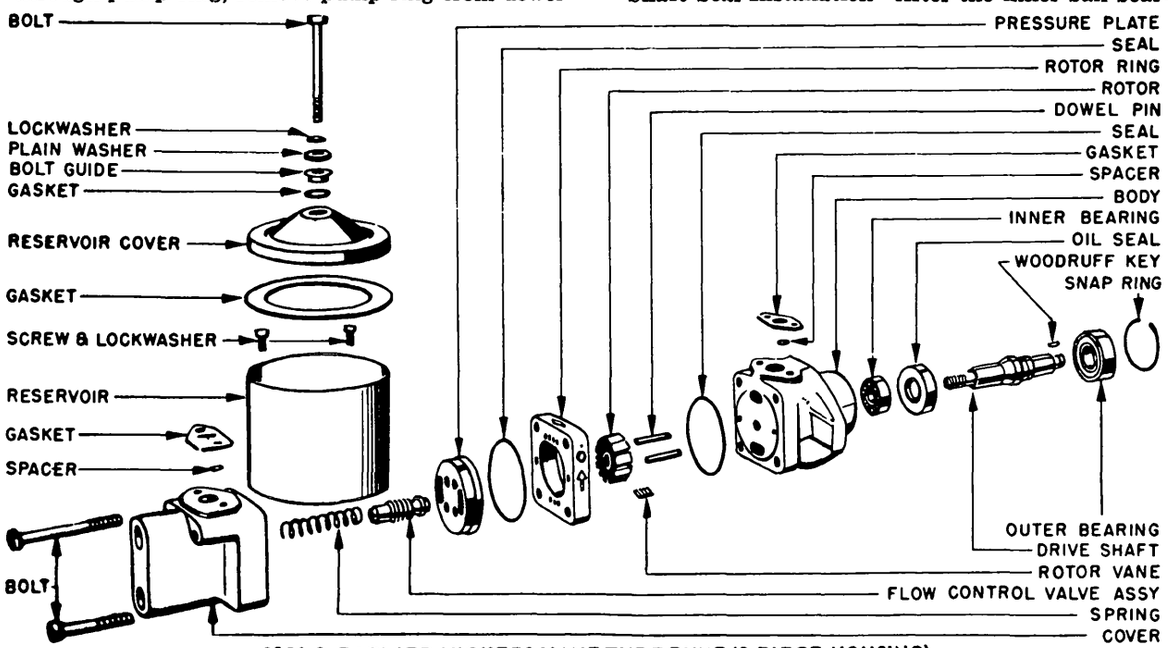
Bearing Installation—Large sealed bearing should be installed with stamped face of inner race toward threaded end of shaft, small bearing with stamped face of inner race toward splined end of shaft. Press on inner race only when installing bearings.

Cam Ring Installation Caution—Install ring with marks made during disassembly lined up and make certain that **arrows on ring point in direction of pump rotation** (clockwise viewed from front or shaft end of pump).

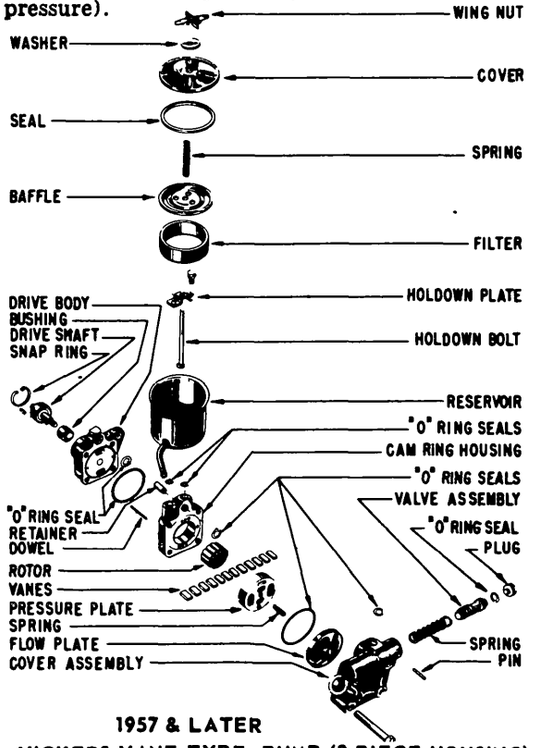
Rotor & Vane Installation—Install vanes with rounded (radius edge) outward toward cam ring.

Relief Valve Assembly Installation—Make certain that **all of the original shim washers** are re-installed in the valve plug (these shims control oil pressure). If any of the relief valve parts are replaced, valve operation must be tested and adjusted after pump installed on car as follows:

Relief Valve Testing & Adjustment—Use Gauge J-5176 to check pump pressure. See Testing Hydraulic Oil Pressure (above). Relief valve should start to open (will be indicated by slight buzzing noise in pump) at pressure of 700 lbs. or slightly higher and maximum pump pressure should not exceed 900 lbs. with engine speed increased above idle. If pressure not correct, adjust number of shims in relief valve plug for correct performance (add shims to increase pressure, remove shims to lower pressure).



1956 & EARLIER VICKERS VANE TYPE PUMP (3 PIECE HOUSING)



1957 & LATER VICKERS VANE TYPE PUMP (3 PIECE HOUSING)

VICKERS VANE TYPE (2 PIECE HOUSING)

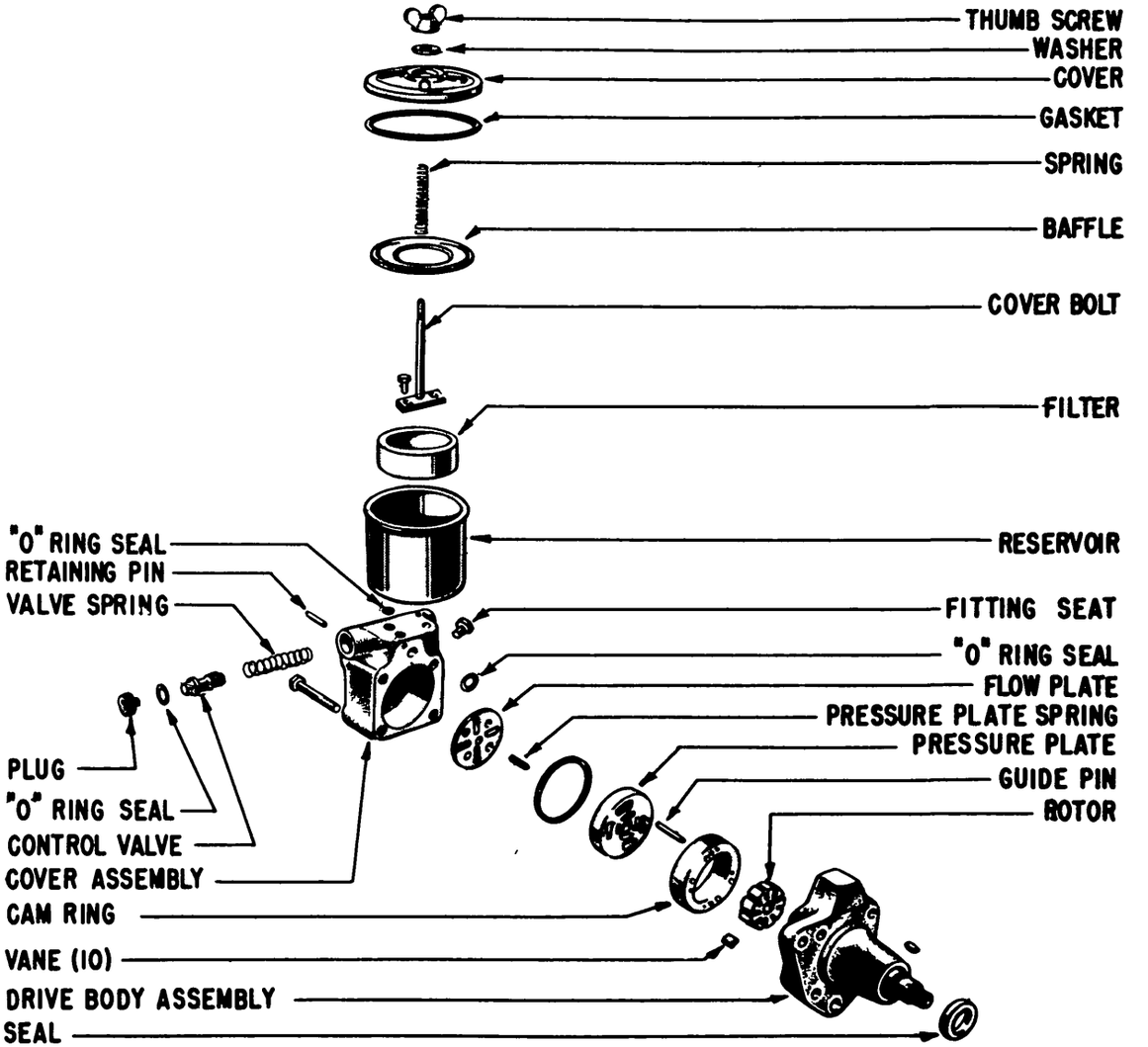
►*1957 DESOTO (EARLY) NOTE:* A "Three Housing" Vickers Vane type pump is used on these models. *See "Vick rs Thre H using Vane Type Pump."*

DESCRIPTION: This new pump consists of a two-piece housing (drive body & cover assembly). A new rotor cam ring is retained on pump drive body with two guide pins replacing the separate cam body on previous vane type pumps.

REMOVAL: Loosen pump drive belt adjusting screw and remove belt (or belts). Disconnect intake and discharge hoses and cap the openings. Remove pump from engine.

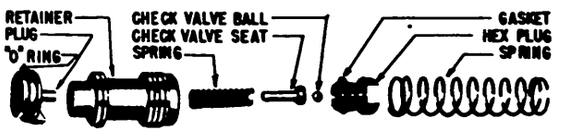
DISASSEMBLY: Drain pump and remove reservoir cover, baffle plate and filter. Remove reservoir retaining screws and remove reservoir and three "0" ring seals, Remove pump pulley, then remove screws attaching pump cover to drive body assembly and lift cover straight up from drive body. Drive retaining pin out of cover assembly and remove control valve assembly. *(CAUTION* - Control valve plug is spring loaded). Remove hex plug from end of control valve plunger and remove relief valve check ball, seat and spring. Remove flow plate and pressure plate spring from cover, then remove pressure plate, rotor cam ring, guide pins and rotor (with ten vanes) from drive body. Place pump body (with front end down) in end of a steel pipe which is large enough to clear forward end of drive body housing. Place drive body and pipe tool in an arbor press, and press at rear (splined) end of shaft to drive shaft, retainers, front bushing and seal out of housing. *(NOTE* - Some early pumps had a bronze retainer ring on shaft that may break when pressed out. If this happens, continue driving shaft completely out and then pry seal out with a screwdriver. Install new steel retaining rings at reassembly). Remove front bushing from body. *(CAUTION - D n t r m v rear bushing. If bushing is damag d, replac compl t drive body housing).* Check all parts for wear or damage and replace as necessary.

REASSEMBLY: Install new steel retainers around shoulder on pump shaft. Guide splined end of shaft through rear bushing and seat shaft and thrust washers against drive body casting. Slide a new front bushing over drive shaft and down against body casting. Be sure tapered end of bushing enters drive body evenly. Using a suitable tool (DeSoto C-3604) and an arbor press, press bushing into body until it seats against retainers. Be sure tool is in alignment with bushing to prevent damage to drive shaft shoulder. Coat a new seal with Lubriplate and install it over shaft and into position on drive body with lip of seal in and numbered side out. Drive seal into place using a suitable tool (DeSoto C-3603). Place drive body assembly in a vise and install rotor with ten vanes on splined end of shaft. *(NOTE - Vanes should be positi ned in rotor with rounded nd ut).* Insert guide pins in drive body and seat cam ring over pins. *(CAUTION - Cam ring must be installed so that arrow on outside of ring points in a counterclockwise direction when viewing rotor end of shaft).* Slide pressure plate over pins against cam ring with spring recess hole up. Position flow plate at bottom of cover body with spring recess side out. Install new "0" rings in drive body and insert pressure plate spring in center recess hole in plate. Position cover body on drive body and install bracket and attaching screws and tighten to 25 ft. lbs. Install relief valve spring in control valve plunger, then install check ball seat and ball. Hold in place and install hex plug and gasket. Install control valve spring in cover assembly and install control valve plunger, plug (with new "0" ring seal), and then drive in the retaining pin. Install three "0" ring seals on cover body and install reservoir, filter, baffle plate, and reservoir cover. *(NOTE* - Install cover washer under thumb screw, with the groove upward).



VICKERS VANE TYPE HYDRAULIC PUMP (2 PIECE HOUSING)

INSTALLATION: Reverse removal procedure and tighten pump belt.



VICKERS CONTR L VALVE ASSY.

GEMMER WORM & ROLLER (1955 & EARLIER)

Chrysler, DeSoto, Dodge (1954-55)
Ford Pass. Cars & Trucks (1954-55)
Hudson (1954-55)
Lincoln (1954-55)
Mercury (1954-55)
Nash (1954-55)
Packard (1954-55)
Plymouth (1954-55)
Rambler (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 FORD STEERING LINKAGE ALIGNMENT CAUTION (Victoria & Sunliner):* An 11/32" spacer is used between steering column bracket and instrument panel. If spacer omitted, binding or hard steering condition may result, due to misalignment.

►*1955 FORD PASS. CAR & COURIER STEERING WHEEL ATTACHING NUT INSTALLATION CAUTION:* Nut should be torqued to 40-60 ft. lbs. and staked once with prick punch to prevent nut from loosening.

►*1955 FORD PASS. CAR SECTOR SHAFT BEARING PRODUCTION CHANGE:* Since approximately June 27, 1955 a spacer (AD-3567-A) has been used in production to assure correct positioning of sector shaft bearings and should be installed on earlier production units whenever it becomes necessary to replace the bearings. Install spacer between the two bearings on the sector shaft Bearings should be installed with Tool T52L-3576-AAD.

►*1955 FORD F-100, 250 TRUCK DRAG LINK INSTALLATION CAUTION:* It is possible to install drag link in reversed position. When properly installed, offset end of drag link is attached to sector shaft arm, and the lubrication fittings will be on the bottom side of the link.

►*1954 RAMBLER INTERMITTENT OR LACK OF HORN OPERATION CORRECTION:* May be due to poor ground circuit between horn button retaining contact plate and chassis, through steering worm tube. To correct, remove horn button cap and spring. Strip 2" of No. 14 wire of insulation and twist strands together. Loosen one of Phillips head screws which hold lower spring retainer to wheel hub. Loop one end of bared wire under Phillips head screw and tighten it in place. Loosen steering wheel nut and loop other end of bared wire beneath it. Tighten steering wheel nut securely.

DESCRIPTION: Consists of "hour glass" type worm mounted on steering shaft and carried on roller bearings at top and bottom. Chrysler & DeSoto models are of "straddle" design with added bushing at adjusting screw end of shaft within side cover.

ADJUSTMENT: Before making adjustments, align steering gear as follows: Loosen gear-to-frame bracket bolts (on some models, also loosen dash bracket bolts). Allow gear to align itself, then tighten gear-to-frame bolts. If necessary, shim dash bracket, or elongate mounting holes so column will not be sprung when bracket bolts are tightened.

Worm Bearing Adjustment (In Car): Chrysler, DeSoto, Dodge, Plymouth—If excessive endplay exists, remove steering gear pitman arms, drain housing, and disconnect horn wire at connector between steering gear and horn. Remove capscrews holding grease retainer cover at bottom of housing. Remove shims of sufficient thickness to eliminate endplay in worm, but not enough to cause binding when cover is bolted tightly in place. Turn steering wheel from extreme right to left. If any stiffness exists, too many shims have been removed.

Ford (Pass.), Lincoln & Mercury—Disconnect sector shaft from steering arm to idler arm rod. Turn steering wheel two complete turns from straight ahead position (spokes in a horizontal position) with steering gear arm pointing directly forward). Hook a spring scale to steering wheel spoke at wheel rim and rotate wheel at least one complete turn, noting the pull required to keep wheel moving which should be 1/8 to 5/8 lb. If necessary to adjust, add or remove shims as follows: Remove screws securing steering gear housing upper cap to housing and work cap and column jacket upward to allow clearance (if additional working clearance required, remove steering wheel). To add a shim, split shim at one point, then install the shim with the split in the upward position (make sure that split ends do not overlap. To remove shims, separate shims from shim pack with a knife blade, passing knife blade all the way around shim pack being careful not to damage shim pack. Remove one shim at a time, checking bearing preload after each variation in shim pack. *NOTE*—Steering column and housing upper cap must be assembled on steering gear housing each time preload is checked.

Ford Trucks—Align steering gear assembly as indicated above. Reposition column tube if necessary so that 1/16" clearance exists between upper edge of steering column tube and shoulder of steering wheel. Disconnect pitman arm from sector shaft and loosen locknut on sector shaft adjusting screw. Turn adjusting screw counter-clockwise to remove load from worm. Turn steering wheel in one direction to limit of its travel, and using a scale, measure pull required at rim of wheel to keep the wheel rotating. The pull required should be ¼-¾ lb. (F-1, 2, 3, 100, 250, 350, ½ & ¾ Ton Trucks), ½-1 lb. (Other Trucks). Adjust preload by adding or removing shims from underneath steering gear housing end plate.

Hudson, Nash & Rambler - Turn steering wheel approximately one turn from straight ahead position and secure wheel to prevent movement. Shake front wheel sideways noting any end movement that may be felt between steering hub and jacket tube. *(CAUTION*—Be careful that movement noted is not caused by steering jacket tube bearing). Adjust endplay by loosening the four cover capscrews about 1/8". Add or remove shims as necessary *(NOTE*—Remove shims by separating with a knife being careful not to damage shim pack. Shims can be added by spliting shims and inserting in place with split toward the top).

Packard—Remove pitman arm from cross shaft. Turn steering wheel to extreme right or left and back up 1/8 turn. With spring scale attached to spoke of wheel at rim, pull required to turn wheel should not be less than ½ lb. or more than 1 lb. Add or remove shims in same manner as for Hudson, Nash, Rambler (above).

Worm & Roller Mesh Adjustment (In Car): Chrysler, DeSoto, Dodge, Plymouth—Remove pitman arm from shaft and install another arm for use during adjustments. Turn steering wheel to mid-position (high spot). Check movement of steering pitman arm back and forth to determine amount of backlash. If any backlash exists, adjust as follows: Remove roller tooth shaft adjusting screw locknut and slide lock plate off far enough to clear lock boss on roller tooth shaft cover. Tighten roller tooth shaft adjusting screw enough to eliminate freeplay between roller tooth shaft and worm, *but it must not bind.* Slide lock plate in position against roller tooth shaft cover and lock it. Install and tighten adjustment screw locknut, Check steering gear operation and adjust if necessary.

Ford Pass. Car, Ford Truck, Lincoln & Mercury—On Passenger Cars, disconnect sector shaft arm from steering arm to idler arm rod. On Truck Models, disconnect steering sector arm (pitman arm) from the sector shaft. Attach a spring scale to steering wheel rim and pull the wheel through the "high spot" (straight ahead position), and note reading on scale.

Ford Pass. Cars—Reading should be at least ½ lb. above worm bearing preload, but total reading must not exceed 1 5/8 lbs. To adjust, remove adjusting screw cover and locknut. Rotate adjusting screw clockwise while moving steering gear arm back and forth until all backlash has been removed.

Ford Trucks—Reading should be 1-2 lbs. (F-1, 2, 3, 100, 250, 350, 1/2 & 3/4 Ton) 1 1/2-2 1/2 lbs. (Others). To adjust, remove adjusting screw cover and locknut. Center steering wheel, turn adjusting screw in a clockwise direction until all endplay is removed from sector shaft.

Lincoln & Mercury—Reading should be 1-1 5/8 lbs. To adjust, turn sector shaft adjusting screw in if reading is less than 1 lb., loosen screw if reading is greater than 1 5/8 lb.

Hudson, Nash & Rambler - With pitman arm disconnected from shaft, place steering wheel in center position ("high spot"). If steering wheel removed, the wide flute on upper end of worm tube should be centered at the bottom. Shake pitman arm sideways to determine amount of clearance between worm and cross shaft roller. A movement in excess of 1/32" indicates adjustment required. Remove locking cap from external adjusting screw and remove star washer. Tighten the external screw, **but do not overtight n,** until sideplay is less than 1/32". Install star washer and locking cap.

Packard—With pitman arm removed from cross shaft and steering wheel in straight ahead position (on "high spot"), attach scale to rim of steering wheel and note pull required to move steering wheel through the "high spot". The pull should be ¾ lb., greater than that of worm bearing preload (see above), but not more than 2 lbs. To adjust, place steering wheel on the "high spot" and remove cross shaft adjusting screw locknut. Raise lockplate enough to clear jaws on cross shaft cover and turn adjusting screw until effort re-

CONTINUED ON NEXT PAGE

GEMMER WORM & ROLLER (C ntinued)

quired to pull steering wheel through "high spot" is 1½ to 2 lbs. Install locknut and tighten.

STEERING WHEEL POSITION: With steering at mid-point (roller on high point of worm), intermediate steering arm (when used) should be on center line of car, wheels should point straight ahead, and steering wheel position should be correct as noted below. Check steering wheel position as follows:

Chrysler, D S t , D dg , Plymouth: Steering wheel hub, gear arm, tube, and gear roller shaft are machined with master serrations to place wheels straight-ahead when steering wheel is in its center position. No attempt should be made to change relative position of these parts by altering master serrations. Improper positioning of steering wheel should be corrected only by adjusting tie rods.

Ford Pass. Cars: When steering wheel is on the high point, the front wheels should be in a straight ahead position, spokes of steering wheel horizontal and steering gear arm pointing directly forward. Check steering wheel spoke position while driving car straight ahead. If spokes not in horizontal position, adjust as follows: Set steering wheel spoke in horizontal position. Scratch a mark on each steering arm connecting rod sleeve and the spindle connecting rod tube, then loosen sleeve clamp bolts. If left-hand steering wheel spoke was below horizontal when checked, turn both connecting rod sleeves downward the same amount. One complete turn of sleeve equals approximately one inch of steering wheel rim travel. Turn connecting rod sleeves upward if left-hand wheel spoke was above horizontal. Tighten sleeve clamp bolts to 12-15 ft. lbs. torque.

Ford Trucks: Place front wheels in straight-ahead position, place steering wheel on steering shaft with single spoke facing straight down. Using a wood block, tap steering wheel in center of hub until firmly seated on steering shaft.

Hudson 6 & 8 (1954) - Notch in end of shaft should point straight down (visible with horn button and contact plate removed) and steering wheel spokes should be horizontal with roller on "high" point of worm. To adjust, shift shims from one ball seat to other in steering arm end of drag link.

Huds n (1955), Nash, Rambler: Steering wheel marked on underside of hub. Install steering wheel with this mark straight down and in line with wide serration on upper end of steering gear tube. In this position, steering gear roller should be on "high" mid-point of worm and front wheels should point straight ahead.

Lincoln & M rcury: To align steering wheel disconnect connecting link at steering gear arm, locate steering wheel in center position (turn wheel back ½ full travel from either end position) with steering gear roller on "high" mid-point of worm and wheel spokes horizontal, set front wheel in straight-ahead position. Adjust both tie rods equally until connecting link can be reconnected to steering gear arm without disturbing position of steering wheel and front wheels.

►*CAUTION:* Both tie rods must be adjusted equally (turn both adjusters equally in opposite direction) to avoid disturbing original toe-in setting. Recheck toe-in after adjustments have been made.

Packard: Place steering wheel in straight-ahead position and center steering gear on high spot. Adjust steering cross tube sleeves until wheels are in the straight-ahead position.

STEERING WHEEL & HORN RING OR BUTTON REMOVAL

►*INSTALLATION NOTE—Where installation instructions are omitted (below); reverse removal procedure. Special instructions are not required.*

Chrysler & DeSoto (1954-55) Except Hydraguide:

Horn Ring Removal—Disconnect battery and center steering wheel in straight ahead position. Press down on horn ring ornament and turn counter-clockwise. Lift out ornament retaining spring and pad. Disconnect horn wire from terminal on travel plate and insulator assembly. Remove bushing, travel plate, horn blowing contact ring spring and triangular ground plate. Curl and push wire into steering tube to make room for steering wheel puller pilot.

Steering Wheel Removal - Remove steering wheel with Puller C-612 (1954), C-3428 (1955).

Dodge (1954):

Horn Ring Removal—Disconnect horn wire at connector near bottom of steering column, push down on horn blowing ring medallion, turn clockwise and remove medallion, retainer spring and cushion Loosen and remove the three horn ring retainer screws and spacer bushings, then lift out horn ring, travel plate and insulator assembly, wire, contact spring plate and ground plate

Horn Button Removal (Some 6 Cyl. Models)—Disconnect horn wire at connector near bottom of steering column, turn horn button medallion retainer ⅛ turn counter-clockwise, lift off horn button, horn button retainer, contact spring and plate. Pull out horn wire and spacer bushing from center of steering tube. After removing steering wheel nut, lift out horn button contact cup, remove screw holding horn button retainer fastening plate and base to steering wheel

Installation—Be sure contact spring plate, on models with horn blowing ring, is installed with colored dot appearing on top side On all models, align master serration on steering tube with serration on steering wheel hub before installing.

Dodge, 1955 All Models:

Horn Ring Removal—Disconnect battery and center wheel in straight-ahead position Remove two screws from underside of the medallion and remove medallion. Disconnect horn wire from terminal on travel plate and insulator and remove horn ring, travel plate, and insulator assembly, contact spring and ground plate Push horn wire down into steering tube

Steering Wheel Removal (All Dodge Models)—Remove wheel nut and washer. Attach wheel puller Tool C-612 by means of the threaded holes in steering wheel hub and remove wheel *NOTE*—When installing steering wheel be sure that master serrations are in line and the direction signal cancelling cam on bottom of wheel is inserted between switch levers

F rd Pass. Cars (1954-55):

Horn Ring or Button Removal—Disconnect horn wire from connector at bottom of steering gear housing Remove horn button or ring by pressing down and turning counter-clockwise Lift spring from steering wheel hub Pull horn wire and contact assembly out of steering shaft.

Steering Wheel Removal—Remove steering wheel nut and remove wheel with Puller 3590-N

Installation—Align master splines, tighten nut to 50-60 ft lbs

Ford Trucks (1954-55): See Pass. Car instructions and note the following:

Steering Wheel Installation (Trucks)—Place front wheels in straight-ahead position, place steering wheel on shaft with single spoke facing down. Using wood block, tap steering wheel in center of hub until firmly seated Stake end of shaft to nut at one point

Hudson (1954):

Horn Button Removal—Push down on button and rotate to release from retainer. Pull wire up slightly and push wire sleeve into large opening of contactor. Lift out contact cup and remove horn wire.

Horn Ring Removal—Disconnect horn wire at horn relay. Pry ornament and ring assembly out of steering wheel spoke cover. Remove three screws attaching horn ring insulator to horn ring. Remove insulator ring, contact cup and wire.

Steering Wheel Removal—Place adapter Tool J-739-10 around jacket tube with small diameter of adapter under steering wheel hub. Position foot of puller J-739-B around outside diameter of adapter. With steering wheel nut partially threaded on the column tube, run puller screw down tight against the wheel nut to release steering wheel.

Steering Wheel Installation—Install wheel on shaft with two spokes horizontal and notch in steering shaft pointing straight down. On wheels with three spokes, third spoke should point down. Torque nut to 20-30 ft. lbs.

Hudson (1955): Same as for 1954-55 Nash & Rambler.

Lincoln (1954-55):

Horn Ring Removal—Remove cap and emblem assembly by grasping with the hand and pulling outward from steering wheel hub. Remove three screws holding horn ring securing plate to steering wheel. Remove horn ring securing plate, gasket and spring.

Steering Wheel Removal—Remove steering shaft nut. Install Tool 3600-D and remove steering wheel.

Mercury (1954-55):

Horn Ring Removal—Remove cap and emblem assembly from steering column head by rotating cap counterclockwise with palm of the hand. Remove three screws holding horn ring retainer plate to steering wheel. Remove horn ring, retaining plate and spring.

Installation Note—When installing horn ring spring, be sure that spring ends are properly seated in spring stops.

Steering Wheel Removal—See Lincoln, above.

Nash & Rambler (1954-55):

Horn Ring Removal—Rotate steering wheel medallion counter-clockwise to remove. Remove horn contact plate and insulators. Remove wheel (see

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GEMMER WORM & ROLLER (Con.inued)

below). Remove horn ring after wheel removed.
Steering Wheel Removal—Remove steering wheel nut and install steering wheel puller Tool J-2982.

Packard (1954-55):

Horn Ring Removal—Depress medallion slightly, rotate counter-clockwise until it pops up (do not pry up). Remove horn ring assembly and contact plates.

Steering Wheel Removal—Remove steering wheel nut and install steering wheel puller Tool J-2557 and remove wheel.

Plymouth (1954-55):

Horn Button or Horn Ring Removal—On models with a horn button, remove screws from underside of wheel and remove horn button retainer. Lift out button, spring base assembly. Contact cup can be removed after steering wheel removed. On models with horn ring assembly, two types are used. With the "one-piece" type, depress the ornament carefully and rotate it counter-clockwise. Remove ornament, spring and rubber grommet. Remove the three retainer screws and lift off ring. With the "two-piece" type, the ornament is held with four clips in hub cover. Pry hub cover upwards and remove the three retainer screws. Remove horn ring retainer and horn ring.
Steering Wheel Removal—Remove nut and install puller C-612 and pull wheel from steering tube.

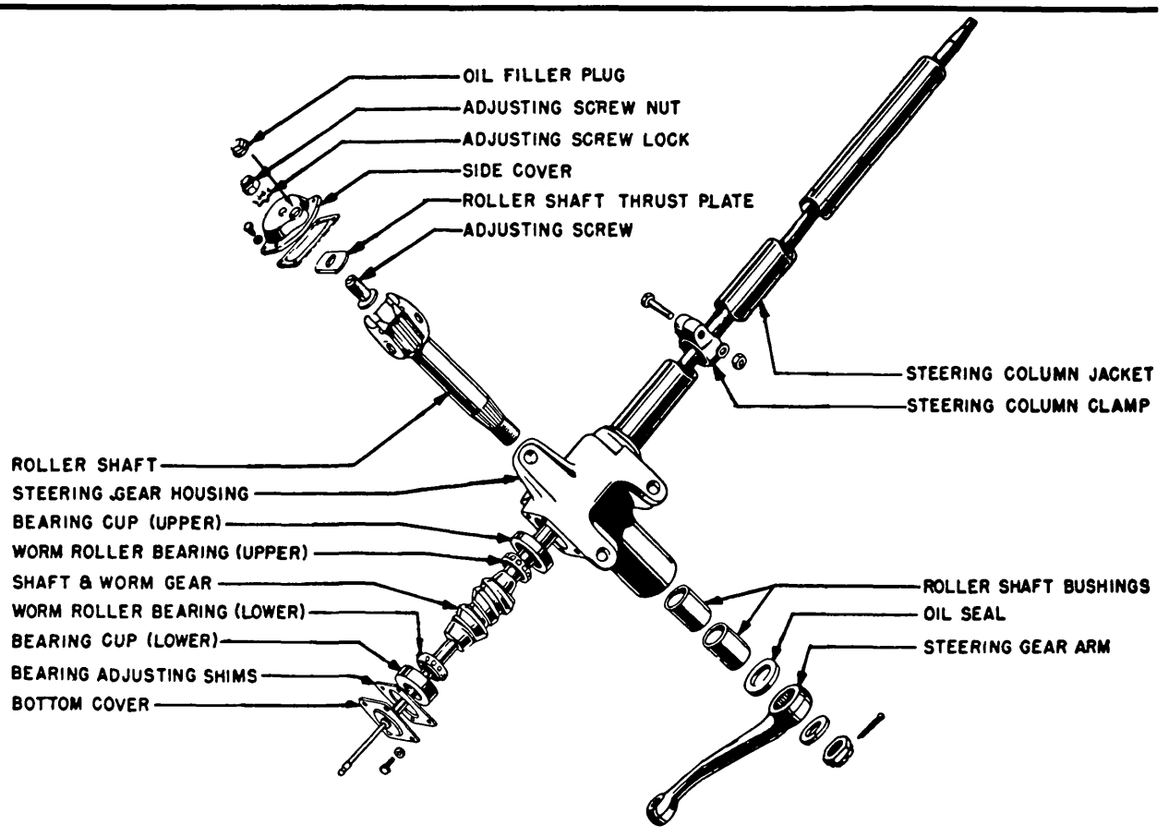
STEERING GEAR REMOVAL & INSTALLATION

►*INSTALLATION NOTE: Installation procedures are the reverse of those for removal.*

Chrysler & DeSoto (1954): Removal - Remove shroud from bottom of steering column jacket and handbrake, then remove parts as necessary to fold floor mat back out of way. Remove floor board and accelerator pedal and rod assembly. Disconnect rod from transmission cross-over lever, horn wire, and turn signal wires. Disconnect transmission rod from shaft lever control arm, then remove two top steering gear-to-frame bolts. Remove starting motor, steering arm, and drag link. Disconnect brake pedal from master cylinder, then remove lower steering gear-to-frame bolt (reach through from front compartment). Remove dash-to-steering column instrument panel stud nuts and remove steering gear assembly.

Chrysler & DeSoto, 1955: Removal—*(NOTE*—It is not necessary to remove the complete steering column and mast assembly from the car for servicing gear chuck and worm shaft). Remove steering wheel (see above). Loosen jacket bracket bolts at instrument panel. Remove dust pad retaining screws. Raise front of car and remove steering gear (pitman) arm from gear shaft. Loosen jacket-to-gear chuck clamp bolt. Remove gear chuck-to-frame attaching bolts and work gear chuck and shaft assembly out of jacket. Remove assembly from lower side of car.

Dodge (1954): Remove left front wheel, then remove steering wheel, front seat cushions, floor mat and pedal opening cover. Disconnect direction signal wires under instrument panel and remove transmission controls from steering column. Remove bolts holding steering gear to frame, then remove pitman arm. Remove steering gear post bracket cap at instrument panel and remove steering gear assembly from top side of car by lifting up as far as possible, and then withdrawing from right hand side of car.



GEMMER MODEL 305 & 335 STEERING GEAR

Dodge (1955): Same as for 1954 models except that steering gear is removed from below car. If steering column is to be removed, it must be removed from top side of car.

Ford Pass. Cars (1954-55), Except Thunderbird: Removal - Remove steering wheel, then disconnect steering column from instrument panel and gearshift lever from rods. Remove bracket securing gearshift tube to steering column tube, then remove gearshift tube pin and gearshift levers. Loosen steering column clamp and pull tube assembly off shaft. Disconnect drag link from pitman arm and remove pitman arm. Remove steering gear attaching bolts and remove gear.

Ford Thunderbird (1955): Removal—Disconnect wires at bottom of steering gear housing. Loosen the lower steering column clamp and remove the two screws from upper steering column bracket. Remove horn ring from steering wheel, and remove upper steering column, upper steering shaft, and steering wheel as an assembly from the car. Raise front of car and remove steering sector shaft arm from sector shaft, then remove bolts holding steering gear housing on frame side member. Remove lower steering gear assembly from car.

Ford Trucks (1954): Removal - Remove steering wheel, column and brake pedal plate, and steering gear pitman arm. Remove steering gear-to-frame attaching bolts and the clamp holding steering gear column tube to instrument panel. Remove steering gear from underneath truck. *NOTE - It may be nec ssary to raise front of truck.*

Hudson (1954): Removal - Remove left front wheel and fender shield, then remove left frame-to-cowl brace. Remove steering wheel, horn wire, bearing spring and and spacer, gearshift lever tube, and steering gear jacket tube. Remove steering gear-to-frame bolts and disconnect drag link from pitman arm. Slide gear forward and rotate until pitman arm is clear, then remove gear through opening in fender.

Hudson (1955): See 1955 Nash Ambassador & Statesman.

Lincoln & Mercury (1954-55): Removal—On models with Power Brakes, remove clamps that secure reservoir hose to fitting on brake booster cylinder and to the dash panel. Move the hose away from the steering column opening in the dash panel. On Lincoln, remove front seat cushion from vehicle and cover seat back to protect upholstery. On Mer-

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GEMMER WORM & ROLLER

(C ntinu d)

cury, move front seat to extreme rear position and cover seat and seat back to protect upholstery On all cars, remove steering wheel with Tool 3600-D Disconnect steering column electrical connections. Remove accelerator pedal from accelerator push rod Remove brake and clutch pedals. Pull floor covering away from dash panel opening. On Lincoln, disconnect speedometer drive cable from instrument panel and pull through lower floor pan opening cover On all cars, remove insulator and floor pan opening cover plates Remove two capscrews that secure steering column bracket to instrument panel and pedal support bracket Remove cotter pin(s) and release shift rod(s) from steering column shift arm(s). Loosen clamp on lower steering column at steering gear housing Raise column sufficiently to disconnect wires at neutral switch on Automatic Transmission equipped models only Remove steering column tube from steering shaft through inside of vehicle. Raise front of car and remove nut securing pitman arm to steering sector shaft Remove steering gear arm (pitman) from sector shaft, using Tool 3590 Loosen three bolts that secure steering gear assembly to frame side rail *(CAUTION—Remove shims, if any, located between mounting bolts and frame side rail. Mark bolt holes and number of shims required, to facilitate assembly. Mark shims for identification with bolt holes).* With helper in passenger compartment and another under vehicle, remove the three bolts that secure steering gear assembly to frame side rail, and remove unit through passenger compartment CAUTION—Mask lower portion of instrument panel for protective purposes when removing unit

Nash Ambassad r & Stat sman (1954): Removal - Remove pitman arm, then disconnect shift rods from levers and steering gear body from side rail. Remove horn ring and steering wheel and disconnect all wires attached to steering column jacket tube. Fold up floor mat, then loosen capscrews attaching pedal shafts to levers and remove pedal shafts Disconnect jacket tube from instrument panel, then loosen clamp bolt at end of jacket tube and slide steering gear assembly from jacket tube,

Nash (Ambassador & Statesman) 1955: Removal—Disconnect shift rods at shift levers and pitman arm from shaft Remove mounting bolts at steering gear housing and disconnect at the instrument panel bracket Remove steering wheel Disconnect all wires under dash that are connected to jacket tube Remove complete assembly through access opening in toeboard

Rambler (1954-55) R moval - Remove steering wheel, then disconnect pitman arm from linkage Drain cooling system and remove radiator-to-water pump hose. Loosen clamp on lower end of steering jacket tube and bolts attaching gear to frame sill Remove gear assembly from under car.

Packard (1954-55): Removal - Disconnect direction signal switch wires at connector and windshield wiper control cable at wiper motor, then remove steering wheel. Disconnect shift lever at pivot pin, then turn back floor mat and remove pedal cover plate. Disconnect shift rods at lower end of steering column, then remove gear-to-frame attaching bolts Remove pitman arm from shaft and steering column-to-instrument panel bracket cap. Lift column and shroud assembly up through opening in floor board and remove steering gear from under hood

Plymouth (1955): Removal - Remove steering wheel Loosen toe-board assembly, then remove lower half of instrument panel bracket and loosen jacket clamp. Disconnect pitman arm and remove housing bolts at frame. Hold column jacket and slide gear assembly out from below, leaving jacket and shift controls inside car

STEERING GEAR OVERHAUL

OVERHAUL (STEERING GEAR ASSEMBLY): Clean the outside surfaces of steering gear assembly thoroughly. Then mount assembly in vise, clamping the housing so both shaft and roller cover and the housing end cover are accessible

Disassembly (Shaft and Roller Assembly): Remove shaft and roller adjusting screw, locknut and lockplate, then remove bolts attaching shaft and roller cover plate to housing Turn adjusting screw clockwise to raise cover away from housing to allow adjusting screw to slide out of slotted end of shaft and roller assembly Remove cover screw and gasket and disassemble adjusting screw and thrust washer from cover Push upward on lower end of roller shaft and lift shaft and roller assembly from housing. *CAUTION—Do not try to disassemble roller from shaft as these parts are replaceable only as an assembly.*

Housing Cover Plate and Shims—Remove housing cover attaching bolts and take off cover, and shims used to adjust worm bearing *(Check total thickness of shims with a micrometer so it will be possible to use same thickness when assembling steering gear).*

Worm and Bearings—Remove lower worm bearing cup, lower bearing, and the worm and steering column assembly, and upper bearing (The lower bearing cup can be loosened by tapping lightly on end of steering shaft with hammer). Remove upper bearing cup from housing by carefully driving it out with a brass drift Remove roller shaft oil seal only if it needs replacement or if the roller shaft bushings are to be replaced

Cleaning and Inspection—Clean all lubricant from parts and housing, using a stiff brush to clean bearings and worm and roller teeth Check all parts for wear, pitting, chipping or scoring Replace parts as necessary Check fit of roller shaft in housing bushings The shaft must not be loose, but it must not bind in bushings Check shaft for roughness or wear. (See Bushing replacement below). Check condition of shaft and roller adjusting screw thread With the adjusting screw and thrust washer inserted in slotted end of roller shaft, clearance between head of screw and bottom of slot should not exceed 002" Replace adjusting screw and or thrust washer to obtain right clearance Roller on shaft must rotate freely If rotation is rough, if roller is loose or if there is endplay, shaft and roller assembly must be replaced Be sure there is no indication of twisting or distortion of roller shaft. Steering column (shaft) run-out at upper end should not be greater than 250".

Bushing Removal and Replacement—Press old bushings from housing and install new bushings, pressing them into the same position as old bushings Line ream bushings after installation to 1.125-1 1255". Check roller shaft in bushings to make sure it is free Install a new roller shaft oil seal with correct side toward outside of housing.

Reassembly (Worm and Bearings): Install upper worm bearing cup, driving it carefully into counterbore in housing, wide face of cup toward bottom of counterbore Do not cock in counterbore and make sure it is seated fully Apply steering gear lubricant to worm bearings, bearing cups and on the worm threads before installing in housing Fit upper worm bearing into place over end of steering column shaft and onto bearing surface at end of worm Install worm and shaft into housing so that bearing fits into bearing cup Fit lower bearing onto bearing surface on ower end of worm and install the lower bearing cup in housing, with tapered part of cup toward worm bearing

Housing Cover Plate and Shims—Select shims totalling same thickness as previously used, or use old shims if in good condition (Shims 002". 005" 010" are available as service parts) Install shims and cover on housing and tighten bolts to 10-15 ft lbs torque Steering column shaft should rotate freely and smoothly without binding and without endplay (See Adjustment below)

Shaft and Roller Assembly—Lubricate roller, roller shaft, and bushings with steering gear lubricant Then install assembly in steering gear housing being careful not to damage oil seal when passing shaft through seal Turn steering column shaft to mesh teeth of roller at center of worm Assemble thrust washer on roller shaft adjusting screw and turn screw into roller shaft cover Install this assembly and cover gasket on steering gear housing, fit head of adjusting screw and thrust washer into slot in roller shaft Turn screw counter-clockwise to seat cover against housing Install cover bolts and tighten securely

STEERING LINKAGE: *See "Steering Linkage"*

1956-59 GEMMER WORM & ROLLER

Chrysler (1956-59)
DeSoto (1956-59)
Dodge (1956-59)
Ford Pass. Cars (1956-57) ①
Ford Trucks (1956-59) ②
Hudson (1956-57) ①
Mercury (Early 1956) ①
Nash (1956-57) ①
Packard (1956) ①
Plymouth (1956-59)
Rambler, Exc. American (1956-57) ①
Rambler American (1958-59)

① - For adjustment specifications and procedures, see *1955 & Earlier "Gemmer Worm & Roller" Steering Gear.*

② - Saginaw Recirculating Ball Type steering gears used on some models.

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 FORD & MERCURY STEERING GEAR PRODUCTION CHANGE:* In later production cars a steering gear having a three tooth roller supported on ball bearings is used. Service procedures are the same as for previous models.

►*1956 FORD STEERING COLUMN CLAMP BREAKAGE CORRECTION:* To prevent possible breakage of the steering column clamp, the tightening torque of the attaching bolt has been changed from 35-40 ft. lbs. to 25-30 ft. lbs.

►*1956 MERCURY STEERING GEAR PRODUCTION CHANGE:* Later production cars have a Saginaw Worm & Nut type steering gear. *See "Saginaw Ball Bearing Worm & Nut Steering Gear.*

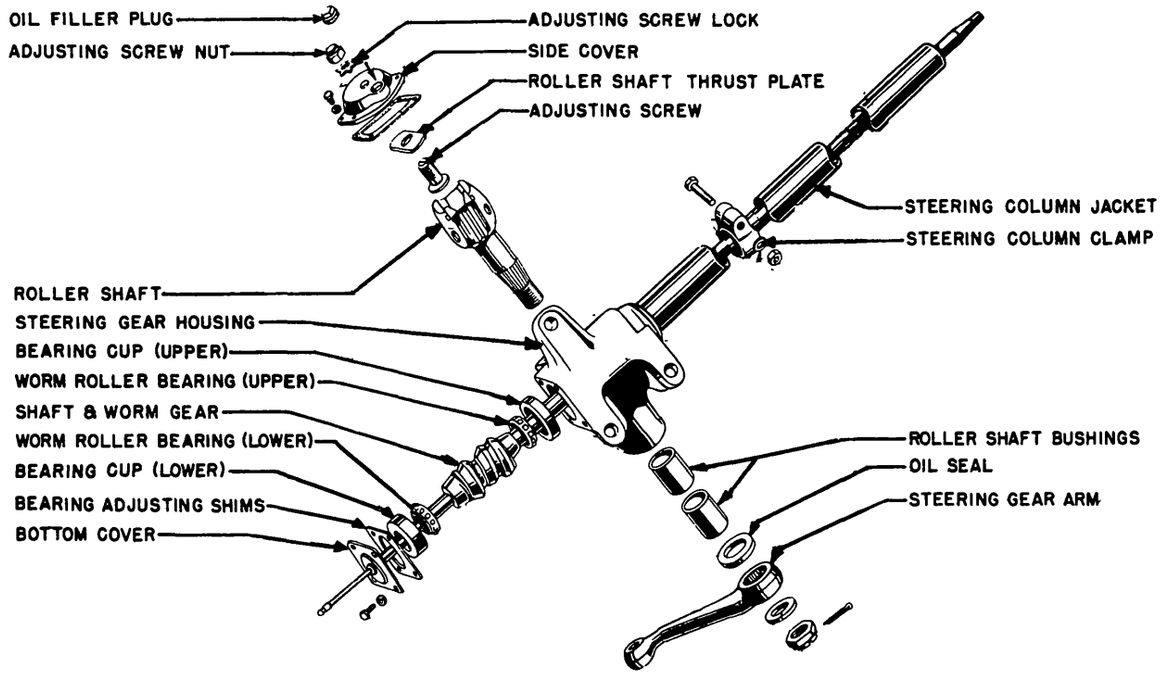
►*1956 NASH AMBASSADOR SPECIAL V8 STEERING GEAR FILLER PLUG REMOVAL:* Because of the lack of clearance, the following suggested procedure is recommended: With car on hoist, a 5/8" socket and ratchet can be used to remove plug. Add lubricant with a hand gun having a long flexible nozzle.

►*1957-58 FORD TRUCK IDLER ARM LUBRICATION FITTING NOTE:* Idler arm lubrication fitting located inside left hand frame side rail. Lack of lubrication at this point will result in hard steering.

►*1959 CHRYSLER WINDSOR & DESOTO FIRESWEEP MANUAL STEERING GEAR MOUNTING PRODUCTION CHANGE & ALIGNMENT PROCEDURE CHANGE:* A new steering gear housing, Part No. 1946588 is being used in production and may be used for earlier 1959 cars to provide an improved method of aligning the the steering gear to frame side rail. In addition to the new housing, a new pivot bar and adjusting wedge is located between steering gear and frame, and a new spherical washer used on each of the three mounting bolts. *See "Steering Gear Alignment" below for new procedures.*

►*1959 PLYMOUTH MANUAL STEERING GEAR ALIGNMENT PROCEDURE (TO PROVIDE SMOOTH & EASY STEERING):* *See "Steering Gear Alignment" below.*

DESCRIPTION: Design is similar to that used on previous models. Beginning with 1959 models, a new roller shaft adjusting screw, secured in end of roller shaft with a snap ring, is used on some models.



GEMMER WORM & ROLLER STEERING GEAR

ADJUSTMENT: Before making adjustments, align steering gear as follows: Tighten body bolts, loosen steering gear at frame and dash bracket (to allow gear to move in relation to frame). **On Plymouth,** remove steering Wheel, *See "Steering Wheel & Horn Button Removal" below.* Remove steering column upper bearing spacer, then move steering column until it is tight against instrument panel, and steering gear until gear tube is centered in steering column upper bearing. **On all models,** insert metal shims between steering gear and mounting surface to eliminate bind. Tighten mounting bolts to 45-50 ft. lbs. **On Plymouth,** replace upper bearing spacer and steering wheel. **On Ford Trucks,** adjust steering column to obtain 1/16" clearance between top of column and steering wheel-hub, then tighten lower clamp.

Worm Bearing Adjustment: *NOTE* - There should be no vertical movement of steering shaft when wheels turned in both directions. To adjust worm bearings, remove steering gear arm, drain housing and disconnect horn wire at connector. Add or remove shims at lower grease retainer to eliminate endplay or to remove any bind in steering shaft. Adding shims increases endplay, removing shims reduces endplay.

Cross-shaft Endplay Adjustment: After making "Worm Bearing Adjustment" above, remove steering gear arm. Turn steering wheel back and forth to note any backlash between worm and gear. When backlash present, remove roller shaft adjusting screw locknut and tighten adjusting screw enough to eliminate backlash. Tighten locknut. *NOTE* - Be sure roller shaft and worm do not bind.

Roller Tooth & Worm Mesh Check: After completing above adjustments, install spring scale on steering wheel (at right angle to spoke) and check pull required to turn wheel through high point (half way from full right to full left turn). See table below for model specifications.

Model	① High Pull
Chrysler, DeSoto (1956-59)	1-2 lbs.
Dodge (1956-57)	7/8-1 5/8 lbs.
Dodge (1958-59)	② 10-18 inch lbs.
Ford Pass. Cars (Man. Strg.) (1956-59)	1-1 5/8 lbs.
Ford Pass. Cars (Pow. Strg.) (1956-59)	7/8-1¼ lbs.
Ford Trucks F-100, 250 (1956-59)	1-2 lbs.
Ford Trucks F-350 through F-600 (1956-59)	1¼-2 lbs.
Hudson & Nash (1956-57)	③
Packard (1956-57)	③
Plymouth (1956)	1-2½ lbs.
Plymouth (1957-59)	7/8-1 5/8 lbs.
Rambler (1956-57)	③
Rambler American (1958-59)	③

① - See OVERHAUL for worm bearing preload.

② - Inch Pound torque wrench on steering wheel nut.

③ - See "1955 & Earlier Gemmer Worm & Roller" Steering Gear for adjustment specifications and procedures.

STEERING WHEEL POSITION: *With steering at midpoint* (roller at high point on worm), intermediate steering arm (when used) should be on center line of car, wheels should point straight ahead, and steering wheel position should be correct as noted below.

Chrysler, DeSoto, Dodge, Plymouth: Master serrations on steering wheel hub, steering gear arm, steering tube and

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1956-59 GEMMER WORM & ROLLER (C ntinu d)

steering gear roller shaft, control steering wheel position for straight ahead front wheel position.

F rd Trucks: Install steering wheel with lower spoke straight down and steering gear on high spot of worm.

Rambl r Am rican: Install steering wheel (for straight ahead position) on steering shaft with mark on end of shaft at top center.

STEERING WHEEL & HORN RING REMOVAL & INSTALLATION: *NOTE - Wh r installation data is omitted b l w, r v rs r m val proc dure.*

Chrysl r, D S to: Disconnect battery, turn ornament counterclockwise and remove it. Disconnect horn wire from terminal, remove horn ring screws and bushings. then remove horn ring. Remove horn contact ring switch from steering wheel hub. Loosen steering wheel nut and pull steering wheel with Tool C-3428 or C-612.

D dge, Plym uth: Disconnect battery, center steering wheel in straight ahead position. Remove medallion screws (from under side of medallion) and remove medallion. Disconnect horn wire, remove horn ring, travel plate and insulator assembly, contact spring plate and ground plate. Remove steering wheel nut and pull wheel with Tool C-612

F rd Trucks: Disconnect horn wire at lower end of steering gear housing (Conventional models), disconnect horn wire at connector under instrument panel just beyond horn brush (Tilt Cab models). Remove horn button by pressing down and turning it counterclockwise. Remove horn button spring, button contact, and index spring. Remove steering wheel nut and index spring support. Install Puller Tool 3600-N (use holes tapped in steering wheel hub and with socket over horn wire for protection of wire), so pressure is against end of steering shaft and pull wheel from shaft. To install, be sure upper bearing and spring are in position at top of steering shaft, then press steering wheel on shaft.

Rambler American: Remove emblem or horn button, and pull steering wheel with Tool J-5290. To replace steering wheel, turn steering shaft until mark on shaft is at top center, then place wheel on shaft with steering wheel spokes equal distance from horizontal.

STEERING GEAR REMOVAL & INSTALLATION: *NOTE - Installation proc dur s ar the reverse for those for r moval.*

Chrysl r, D Sot (1956): *NOTE - It is not necessary to remov complete ste ring column and mast assembly.* Disconnect battery, then remove steering wheel and horn ring Loosen jacket bracket bolts at instrument panel and remove dust pad retaining screws Raise front of car and remove pitman arm from gearshaft. Loosen jacket to steering gear housing clamp bolt, then remove steering gear housing to frame side rail attaching bolts and carefully work steering gear column tube out of jacket tube Remove steering gear assembly from underside of car

Chrysl r, D Sot (1957-58): Disconnect battery ground cable Remove steering wheel, then disconnect horn and turn signal wires at instrument panel Remove jacket tube clamp at instrument panel, then remove dust shield at firewall and floor opening panel Remove pitman arm with Tool C-3402 Remove steering gear mounting bolts On Chrysler, slide steering gear jacket tube and remote control units rearward through drivers compartment as an assembly and remove brake pedal pad Remove steering gear from engine side of firewall On DeSoto, slide steering gear, jacket tube and remote control units rearward and remove them through drivers compartment

Dodge (1956-59), Plymouth (1957-59): Raise car and remove left front wheel Remove front seat cushion and floor mat, after sliding draft pad up column Remove steering column opening cover Disconnect direction signal control wires if so equipped *NOTE - With battery ground disconnected, tie a pull wire to control wires before removing them from jacket tube and leave pull wire to reinstall control wires* Remove transmission shifting mechanism at steering column (if so equipped) Remove bolts holding gear to frame and remove pitman arm with Tool C-3402 Remove steering gear and jacket cap at instrument panel Remove steering gear assembly through opening in floor pan

Ford Truck (Except Tilt Cab): Remove battery ground cable and disconnect horn wire at lower end of steering gear housing. Remove wire from clips on frame side member and fender apron. Loosen steering column lower clamp and slide it down. Disconnect transmission control rods at levers and remove steering wheel. *See "Steering Wheel & Horn Button Removal" above.* Remove steering column upper bushing spring and bushing. Disconnect turn signal wires and remove them from clip at instrument panel bracket. Remove steering column bracket clamps and rubber sleeve. On floor mounted gear shift lever trucks, pull steering column tube off shaft. On Fordomatic or remote-type gear shift lever trucks, remove steering shields from floor pan. On clutch equipped trucks, disconnect clutch retracting spring. Remove hydraulic cylinder bolts and move cylinder out of way. Remove steering gear sector arm (pitman arm) and remove steering gear housing mounting nuts and bolts. On floor mounted gear shift lever trucks, remove steering gear assembly from under truck. On Fordomatic or remote-type gear shift lever trucks, remove assembly through passenger compartment.

Ford Truck (Tilt Cab): Remove horn wire brush from steering column bracket just below instrument panel bracket. Remove upper universal joint retaining nut and bolt. Turn wheels to right and remove sector arm (pitman arm) retaining nut, bolt and arm. Remove housing to frame nuts and bolts, then remove steering gear with universal joint attached.

Hudson, Nash, Packard, Rambler (Exc. Rambler American): *See "1955 & Earlier Gemmer Worm & Roller" for removal procedures.*

Plymouth (1956): Remove steering wheel, then remove lower half of instrument panel bracket and loosen steering column jacket clamp Disconnect pitman arm and remove housing bolts at frame Hold steering column jacket and slide gear assembly out from below, leaving jacket and gearshift controls inside car

Rambler American: Remove steering wheel. *See "Steering Wheel and Horn Button Removal" above.* Loosen jacket tube clamp. Remove mounting bolts and remove steering gear without removing jacket tube.

STEERING GEAR ALIGNMENT (CHRYSLER, DESOTO, DODGE, PLYMOUTH): Different procedures as follows

1957-59 Chrysler, DeSoto, Dodge (Exc. Later 1959 Chrysler Windsor & DeSoto Firesweep With Later Typ Housing): Loosen steering gear at frame and at dash bracket or support to allow steering gear to move in relation to frame, then tighten mounting bolts to 45-50 ft lbs Position center of steering column in center of instrument panel or support If this cannot be done without moving the frame bracket, add metal washer shims between frame and frame bracket to eliminate all bind

1959 (Late) Chrysler Windsor & DeSoto Firesweep With Later Type Housing & Mounting: *NOTE - See "Changes, Cautions, Corrections" above* With steering gear installed in car, align steering gear and column jacket assembly to instrument panel jacket support, then install jacket support and tighten screw to 50 inch-pounds Install wedge between steering gear housing and frame at rear mounting bolt and tighten nut sufficiently to hold wedge in place Tighten steering gear housing to frame bolts to 50 ft lbs , alternately tightening rear and front mounting bolts gradually so that steering gear alignment is not disturbed Check complete unit for binding and for free movement

Plymouth (1957-59): To check gear alignment, remove steering wheel and remove steering column upper bearing spacer Turn front wheels from extreme right to extreme left and note rotation of steering tube in upper bearing *NOTE - It is not necessary that steering tube be in exact center of bearing, however, if tube is resting against bearing in any position, there should not be more than a ten lbs (spring scale) direct pull required to center the tube* If adjustment required, loosen steering column jacket clamp to-instrument panel nuts three or four turns Loosen the three steering gear-to-frame bolts sufficiently to allow free movement of steering column, then move steering column jacket upward until it is tight against instrument panel Move steering gear chuck until steering gear tube is centered in steering column upper bearing in a vertical direction Tighten steering gear-to-frame bolts to 50 ft lbs Move upper end of steering column jacket horizontally until steering gear tube is centered in steering column upper bearing If there is insufficient clearance at instrument panel to move steering column jacket horizontally, it will be necessary to shim between steering gear and frame as required to obtain sufficient horizontal adjustment Retighten steering column jacket clamp-to-instrument panel nuts Steering gear tube should now be centered in bearing Reinstall bearing spacer and steering wheel

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1956-59 GEMMER WORM & ROLLER (C ntinued)

OVERHAUL (STEERING GEAR ASSEMBLY): Disassembly - Mount unit in vise and remove gear shaft adjusting screw locknut, shaft cover, and gasket. Remove steering gear shaft and roller tooth assembly. Remove gear shaft oil seal from housing. Remove cover and shims from bottom of housing, then remove tube and worm assembly, bearing cups and cages.

Assembly - *NOTE - DO NOT lubricate any parts until unit is reassembled.* Replace all worn or damaged bearings and use new oil seals. On Chrysler and De Soto the housing is serviced with bushings. On Dodge and Plymouth, replace worn bushings. Bushings should be flush with ends of bore and the shorter bushing at outer end of housing. Ream new bushings to 1.250" for proper cross shaft fit. On Ford Truck, install bushings with Tool T57T-3567-A, and upper bearing cup with Tool T57L-4616-A2. Then insert worm and tube in housing with bearings and cups. Install shims and lower housing cover making sure bearings are seated. Tighten cover screws and install spring scale on temporarily installed steering wheel and check preload of worm bearings. See table below. Change shims as necessary. Install sector shaft. Turn adjusting screw on cover all the way out and install cover. Center steering wheel on high point and check high point (over-center) pull. See "Adjustments" above for specification. Turn adjusting screw in or out as required and secure locknut.

Model	Turning Pull
Chrysler, De Soto	3/8-3/4 lbs.
Dodge	① 3 1/2-7 inch lbs.
Plymouth	Remove all endplay without bind
Ford Trucks	1/4-3/4 lbs.

① - Inch Pound torque wrench on steering wheel nut.

1960 GEMMER WORM & ROLLER

Checker Superba (1960)
Chrysler (1960)
DeSoto (1960)
Dodge (1960)
Ford Trucks (1960)
Plymouth (1960)
Rambler American (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*CHRYSLER, DESOTO, DODGE, PLYMOUTH STEERING GEAR PRODUCTION CHANGE:* A new type steering gear is used on later production cars beginning approximately Jan. 20, 1960. The new type unit incorporates a flexible coupling between steering gear worm shaft and steering wheel shaft. Removal, installation and alignment procedures are different than for previous type units. See below.

►*1960 HARD STEERING OR GEAR BINDING CORRECTION:* The cross shaft adjusting screw retaining snap ring may have become unseated due to an oversize radius in bottom corners of snap ring groove which would prevent snap ring from seating properly. To correct, replace Shaft & Roller Tooth, Cross Shaft Cover, and Upper Bearing Assembly. *NOTE - This condition also applies to 1959 models.*

►*1960 CROSS SHAFT NEEDLE BEARING BREAKAGE CORRECTION:* Inspect steering gear housing cross shaft bore for concentricity. The correct diameter of housing bore is 1.4992-1.5002". If dimensions are not within these limits, replace steering gear housing. Clean and inspect all parts for damage and replace as necessary.

DESCRIPTION: Steering gear design is similar to that used on previous models. A new type roller shaft adjusting screw, secured in end of roller shaft with a snap ring is used on some models.

ADJUSTMENT: *NOTE - Adjustments must be made in the following sequence.*

Worm Bearing (Except Ford Trucks): Turn steering wheel about one turn from straight ahead position and secure wheel to prevent any movement. Determine endplay by shaking front wheels sideways noting any movement that may be felt between steering wheel hub and steering jacket tube. If endplay is present, adjust worm bearing by loosening the four bottom cover bolts about 1/8", then separate top shim with a knife blade and remove. *CAUTION - D n t mutilat r maining shims r gask t.* Tighten cover and recheck for endplay. *NOTE* - Remove only one shim at a time to prevent obtaining too tight an adjustment.

F rd Trucks - On all models, disconnect pitman arm from drag link (from control valve ball stud on models with power steering). On Tilt Cab models, remove lower universal joint retaining bolt and nut and raise steering shaft assembly off steering gear, then install a four inch block of wood between steering wheel and upper steering column tube flange. Bend a piece of light strap iron (10" long) so a 1" section is at right angles to longer section, then use a heater hose clamp and fasten strap iron to worm shaft so longer section of shaft forms a lever. Turn worm shaft two complete turns from straight ahead position and measure pull required to keep worm shaft moving at a constant rate for at least one complete turn, using a spring scale hooked to lever at a point 8½" from outer diameter of steering shaft. If pull required to turn shaft is not within specifications in table, adjust as indicated below. On other models, turn steering wheel two or three complete turns from straight ahead position, then install an inch-pound torque wrench on steering wheel nut and measure torque required to keep wheel moving at a constant rate for at least one complete turn. If torque or preload is not within specifications in table, adjust as indicated below. To adjust, disconnect horn wire at bullet connector just below steering column housing (except Tilt Cab models). Remove bolts attaching endplate to steering gear housing, then remove or install one gasket at a time to obtain the proper preload. Gaskets are available in thicknesses of .002", .005", .010". *NOTE - Removal of gasket will increase preload and installation of gasket will decrease preload.* To remove a gasket, separate outer gasket from pack by passing a knife blade all around inner face of gasket being careful not to cut or tear remaining gaskets in pack. Install endplate and recheck preload. *NOTE - On Parcel Delivery models the steering gear and column must be loosened before endplate can be removed for installation of gasket.*

Ford Truck Worm Bearing Setting

Model	Preload Setting
F-100, 250	2½-6¾ lbs.
F-350, 500, 600, B-500, 600	4½-9 lbs.
4-Wheel Drive	4½-9 lbs.
P-350, 400, 500	2¼-6¾ lbs.
C-550, 600	5-10 lbs

Cross Shaft Roller & Worm Mesh: Chrysler, DeSoto D dg , Plym uth - Disconnect pitman arm at link, then rotate steering wheel to mid position and check for backlash by moving pitman arm back and forth. If backlash exists, loosen roller shaft adjustment screw locknut and tighten adjusting screw enough to eliminate free play. Rotate steering wheel to one end of its travel and apply a spring scale at rim of steering wheel. A pull of 1-2 lbs. should be required to turn wheel. Tighten adjusting screw locknut while holding adjusting screw from turning.

Ford Trucks - With bearing preload adjustment completed (see above), check effort required to pull steering wheel, or lever through center (high point). If turning effort is not within specifications (see below), place steering gear on "high point", then, on medium or heavy duty trucks, loosen adjusting screw locknut at engine side of steering housing. On light duty models, remove locknut and star washer, then adjust worm and roller mesh by turning adjusting screw clockwise to tighten mesh, or by turning it counterclockwise to loosen the mesh. On light duty models, replace locknut and washer. On all models, tighten locknut, then recheck turning effort.

Ford Truck Pitman Shaft Setting

Model	Pr load Setting
F-100, 250	9-18 lbs.
F-350, 500, 600, B-500, 600	13½-22½ lbs.
4-Wheel Drive	13½-22½ lbs.
P-350, 400, 500	11¼-18 lbs.
C-550,600	13½-22½ lbs.

STEERING WHEEL & HORN BUTTON REMOVAL: Chrysler & DeSoto - Disconnect battery, then press down on center steering wheel ornament and turn ¼ turn to remove. Disconnect horn wire and remove three screws, bushings, horn blowing ring, rubber insulator and horn terminal plate. Loosen steering wheel nut three turns and use puller, Tool C-3428 to loosen steering wheel. Remove tool, wheel nut and wheel.

Dodge & Plymouth: Disconnect battery ground cable, then remove steering wheel ornament by removing the screws from underside of wheel. Remove stationary plate, bushings, horn ring and attaching sorews. Disconnect horn wire at stationary plate, then loosen steering wheel nut three turns and use puller, Tool C-3428 to loosen wheel.

Ford Trucks: Disconnect horn wire at bullet connector below steering gear housing (under instrument panel on Tilt Cab models), then remove horn button by pressing down and turning it counterclockwise. Remove horn button spring, button contact, and index spring. Remove steering wheel nut and index spring support. Install Puller 3600-N in tapped holes of steering wheel hub, then place an adaptor over end of horn wire so that pressure of puller is against end of steering shaft

CONTINUED ON NEXT PAGE

1960 GEMMER WORM & ROLLER (C ntinu d)

and not on horn wire fibre washer and remove steering wheel.

Rambl r Am rican: Remove horn button or horn ring and pull steering wheel with Tool J-5290. To replace steering wheel, turn steering shaft until mark on shaft is at top center, then place wheel on shaft with steering wheel spokes equal distance from center.

STEERING GEAR REMOVAL, INSTALLATION & ALIGNMENT: Note the special alignment procedures outlined below.

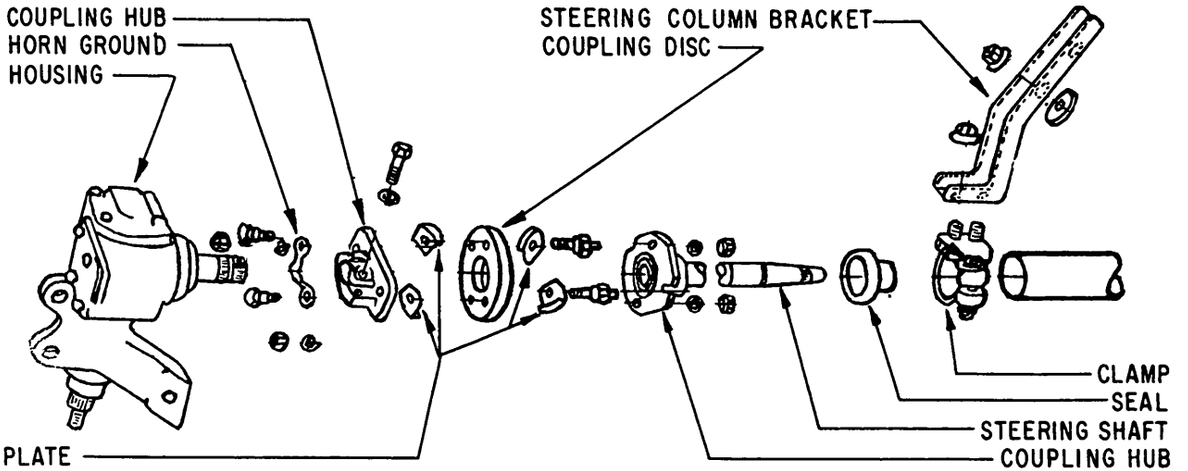
Chrysler, D S t , D dg , Plymouth (Early Type Unit With ut Fl xibl Coupling): Removal - Disconnect battery ground cable, then remove steering wheel. Disconnect directional signal indicator and horn wires at connectors. On Chrysler and DeSoto, remove directional signal switch. On Dodge and Plymouth, remove directional signal indicator lever (threaded in). On all models, remove screws attaching steering jacket tube clamp at instrument panel and remove clamp, then raise carpet and move rubber grommet up on jacket. Remove screws attaching steering jacket tube clamp at steering housing. Disconnect pitman arm from sector shaft with Tool C-3646, then disconnect hydraulic brake line at master cylinder and brake tee and remove line. Slide steering gear jacket tube rearward and remove it through drivers compartment. Remove tapered retainer and spring from column tube, then remove steering gear housing to frame bolts and slide gear to rear of car and at same time raise lower end of gear up. Remove steering gear through hood assembly.

Installati n & Alignm nt - Install steering gear assembly in engine compartment and through opening in floor panel, then install housing bolts with rounded "D" bar between frame and forward mounting pad of housing. *NOTE - Flat sid of round d "D" bar must be toward fram .* Install flat washers, spherical washers and nuts, but do not tighten. *NOTE - Convex side of spherical wash r must b against gear housing.* Install bearing spring and tapered retainer on column tube, then slide jacket tube down against shoulder on housing. Raise tube 1/8" and tighten bolts to 15 ft. lbs. Install jacket tube clamp at instrument panel and tighten screw to 50 inch pounds. Connect directional signal wires and horn wire at connectors, then install turn signal switch (Chrysler & DeSoto). Install steering wheel and tighten nut to 40 ft. lbs. On Dodge and Plymouth, install directional signal lever. On all models, measure distance between steering column jacket tube and steering wheel. If distance is less than 1/8", loosen clamp bolt and adjust column jacket to obtain proper clearance. Install horn assembly (see above), then tighten jacket tube to instrument panel clamp screws and install dust shield. Tighten front upper and lower gear housing to frame attaching bolts to 20 ft. lbs., then install a wedge over rear bolt between housing and frame so that tapered surfaces match, tapping it lightly into place, and tighten the three attaching bolts to 50 ft. lbs. alternately. Install pitman arm and tighten nut to 125 ft. lbs. Reinstall brake line between master cylinder and brake tee and bleed brakes as necessary.

Chrysl r, D Sot , D dg Plym uth (Lat Typ Unit With Fl xibl C upling): R m val - Remove pitman arm from sector shaft with Tool C-3646, then remove flexible coupling to steering gear worm shaft attaching bolt and washer. Remove steering gear to frame side rail attaching bolts and slide gear assembly forward to disengage flexible coupling from worm shaft. Raise gear and remove through engine compartment.

Installation - Place steering gear worm shaft on exact center of travel (high point). Mark master spline in outer row of serrations on worm shaft, then install gear in engine compartment. Align index mark on outside of flexible coupling hub with master spline on worm shaft. Slide coupling on worm shaft and install gear housing to frame attaching bolts and tighten bolts evenly to 50 ft. lbs. Position flexible coupling bolt hole in line with groove on worm shaft and install bolt and lock washer and tighten to 30-35 ft. lbs. Install pitman arm and tighten nut to 125 ft. lbs.

Alignment - Check steering tube for alignment in steering column seal. If tube is not centered, proceed as follows: *NOTE - Steering tube must be centered in steering column seal, also lip of seal which contacts tube must be well lubricated with wheel bearing lubricant.* Loosen steering column clamp bolts at instrument panel, then loosen lower column clamp bolt and support bracket at both firewall and at column clamp. Hold steering column so it is centered on tube while aligning column support bracket to fireawll and lower column clamp. When properly located, tighten support bracket stud nuts at firewall and at column clamp to 50 inch pounds. Tighten steering column to instrument panel clamp bolts to 15 ft. lbs., then tighten lower steering column clamp bolt to **200 inch pounds.**



CHRYSLER, DESOTO, DODGE, PLYMOUTH STEERING GEAR (WITH FLEXIBLE COUPLING)

Ford Trucks (Exc. Tilt Cab & Parcel Delivery Models): Disconnect battery ground cable, then disconnect horn wire from bullet connector below steering gear housing and remove wire from clips on frame and fender apron. Loosen steering column lower clamp and slide clamp down. Disconnect transmission shift control rod or rods at shift levers. Remove steering wheel (see above), then remove steering column upper bushing spring and bushing. Disconnect turn signal wires, and remove from retaining clip at instrument panel bracket. Remove steering column bracket clamps and rubber sleeve. If truck has a floor mounted gear shift lever, pull steering column tube off shaft. On a truck with automatic transmission or a remote type gearshift lever, remove steering column shields from floor pan. If truck has a V8 engine, remove engine oil filter. On a clutch equipped truck, disconnect clutch retracting spring, remove clutch hydraulic cylinder retaining bolts, and move cylinder out of way. Remove steering gear pitman arm. Disconnect steering gear from frame side rail. On a model with floor mounted gearshift, remove steering assembly from under the truck. On models with automatic transmission or a remote type gearshift, remove assembly through passenger compartment. If steering column tube has not been removed, loosen lower clamp and remove tube. To install, reverse removal procedure.

Ford Trucks (Tilt Cab Models): Remove the horn wire brush from steering column just below instrument panel bracket. Remove universal joint upper retaining nut and bolt, then turn wheels to right and remove pitman arm. Remove steering gear housing to frame bolts and remove steering gear with universal joint attached. Install by reversing removal procedures.

Ford Trucks (Parcel Delivery Models): Remove the steering wheel (see above), then remove steering column bracket bolts from instrument panel. Raise front of truck and install stands, then remove pitman arm. Loosen steering column lower clamp, and disconnect horn wire. Move steering gear to left and remove it from beneath truck.

Rambler American: Removal - Remove steering wheel (see above), then loosen jacket tube clamp. Remove pitman arm from steering shaft. Remove steering gear mounting bolts and remove steering gear without removing jacket.

Installation - Reverse removal procedures.

OVERHAUL: *See "1956-59 Gemmer Worm & Roller" and note the following:*

R ll r Shaft Adjusting Scr w: On some steering gear models, the adjusting screw is secured in end of roller shaft with a snap ring. To remove screw, remove snap ring.

ROSS CAM & TWIN LEVER

Stud bak r, All Mod ls (1954-56) ①
Studebaker, 6 Cyl. Models (1957-60) ②
Willys Utility (1954-60)

① - Saginaw Worm & Roller also used.
② - Ross Model SL-54 used on some models.

DESCRIPTION:—Consists of a worm-shaped cam mounted on the steering column shaft engaging two tapered studs mounted on the inner end of the cross-shaft lever. Cross-shaft is mounted on plain bushings and is adjustable for end-play. Cam is mounted on ball thrust bearings at upper and lower ends and bearing clearance or endplay is adjustable. Stud track in cam is grooved deeper at ends to provide minimum clearance at each stud in 'straight ahead' position. All adjustments must be made with wheel in straight ahead position.

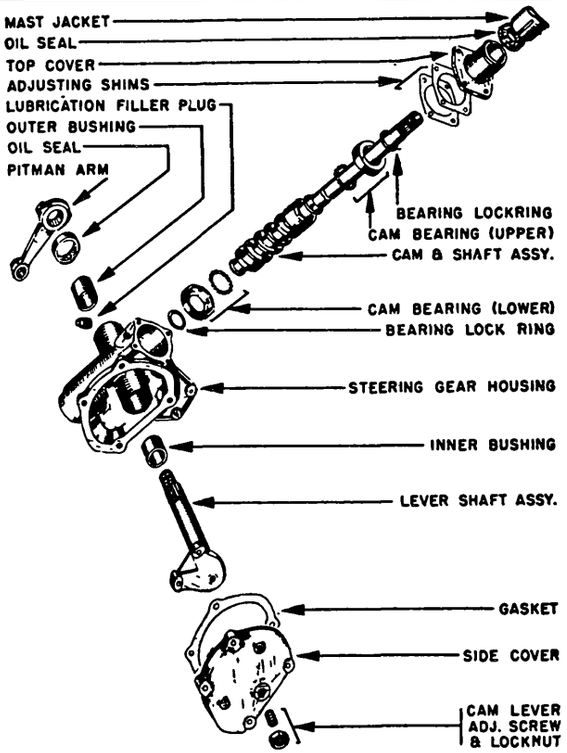
ADJUSTMENT

ADJUSTMENT:—Before making adjustments, free steering gear from load by jacking up front wheels or disconnecting drag link. Check the gear alignment. If stiffness evident with instrument panel bracket clamp tight, align steering gear as follows: Loosen steering gear frame bracket bolts to allow gear to shift on frame, retighten frame bolts. Loosen instrument panel bracket bolts to allow bracket to shift into alignment with steering column, tighten bracket bolts (if bracket position not adjustable, shim or otherwise change bracket position so that column not sprung when bracket bolts tightened).

Cam Endplay Adjustment—Check up-and-down movement of steering wheel and shaft in steering column jacket. If adjustment required, first loosen locknut and back off adjusting screw on housing side cover to relieve bearings of side thrust. Then remove four retaining screws in top cover on upper end of steering gear housing, move cover up on column jacket as far as possible (about ¼"), clip and remove a thin shim in shim pack under cover (shims are installed between paper gaskets and are .003", .010", .030" or .002", .003", .010" thick), using extreme care not damage remaining shims and paper gaskets. Re-install cover, tighten cover screws, check adjustment. Wheel should turn with barely perceptible drag (4-7 ozs. pull on steering wheel rim) and should have no up-and-down movement. Then adjust Cam and Lever Backlash.

Cam and Lever Backlash—Check end-play or lost-motion of lever shaft at pitman arm with steering gear turned to center position with lever studs on high points of cam. If play evident, adjust by loosening locknut on steering gear housing side cover and turning adjusting screw in until play just taken up and steering wheel turns freely throughout entire range with drag at center high point 16-24 ozs. at steering wheel rim. Hold adjusting screw and tighten locknut.

►*CAUTION*—This adjustment must be made only with lever studs on high points of cam (straight ahead position). If adjusted in any other position, gear will bind at this center point.



ROSS CAM & TWIN LEVER STEERING GEAR

STEERING WHEEL & HORN RING OR BUTTON REMOVAL

Studebaker (All Models): Removal - Proceed as indicated below.

Models With Horn Button - Push down on button and rotate one-third turn, then remove retaining nut and plate and remove wheel with Puller J-5473.

Models With Horn Ring - Pry cap out of wheel, then remove ring retaining screws and insulators. Remove wheel retaining nut and lock plate and remove wheel with Puller J-5473.

Installation (All Models) - Align marks on wheel hub and on shaft and install wheel. Tighten wheel nut to 23-27 ft. lbs., then complete installation by reversing removal procedure.

Willys (1954-60): Removal - Disconnect horn wire at slip connection just below steering gear housing. Remove steering wheel hub cover by turning clockwise 1/8 turn to disengage it. Remove flat spring from slots in horn ring cup and pull up horn wire sufficiently to remove contact button, sleeve, spring and cup. Remove steering wheel nut, then install Puller W-227 and remove wheel.

Installati n - Reverse removal procedure.

STEERING GEAR REMOVAL & INSTALLATION

Stud bak r (1954): Remove horn button and steering wheel, then remove front seat cushion. Remove battery and, if equipped with automatic transmission, disconnect shift panel light and starter safety switch cable. Disconnect shift lever rods, then loosen jacket clamp bolt and remove jacket from steering post. Disconnect pitman arm at drag link and remove bolts holding gear to frame. Tip upper end of steering post down and remove steering gear assembly from engine compartment.

Installation - Reverse removal procedure.

Studebaker (1955): Disconnect battery and disconnect horn switch wire at connector. On Commander & President models, also disconnect battery cable at starter switch. On Commander and President Convertible (Hardtop) and Coupe models, remove battery and battery box. Remove steering wheel and steering post jacket assembly (*NOTE*—Steering gear housing, steering post jacket, and steering wheel can be removed as an assembly. However, on Commander & President Convertible (Hardtop) and Coupe models, it will be necessary to remove left front engine support cushion and raise left front corner of engine approximately 2"). Remove pitman arm using puller J-5664, then remove steering gear housing-to-frame bolts and remove steering gear through hole in dash and into car. Wrap a cloth around steering gear housing top cover to prevent spilling lubricant during removal. To install, reverse removal procedure. Before installing jacket and gearshift shaft assembly, install housing-to-frame bolts but do not tighten until jacket and jacket-to-instrument panel bracket bolts have been installed. Check alignment of housing mounting flange face with frame side rail, inserting washers as necessary to secure proper alignment and high spot adjustment.

Studebaker (1956-58): Removal and installation procedures are the same as for 1955 models except that battery and battery box must be removed on all Hawk Models.

Studebaker (1959-60): Disconnect and remove battery and disconnect horn wire at connector. Disconnect battery cable from starter. On Hawk models, remove battery box. Remove steering wheel and steering post jacket assembly. *NOTE - On all V8 mod ls except Hawk, remove left front engine support cushion stud nut and raise left front corner of engine 1½" (r move distributor cap to prevent damage).* Disconnect pitman arm at drag link, then remove bolts attaching steering gear to frame. Roll gear over so it is upside down and remove it through engine compartment.

Willys Utility Models (1954-55): On models with remote control, disconnect shift rods from levers on transmission. On all models, remove steering wheel, horn button, and steering post bracket, then on models with remote control, remove shift levers at lower end of steering column. Disconnect pitman arm from steering

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ROSS CAM & TWIN LEVER (C ntinu d)

connector rod and remove bolts attaching steering gear to frame. Remove steering gear assembly by dropping it down through floor pan and over outside of frame side rail. *NOTE - On Jeep models, remove left front fender.* To install, reverse removal procedure.

Willys Utility Mod ls (1956-60): Remove left front fender and disconnect transmission remote control rods (if equipped). Remove steering wheel (see above). Remove steering post bracket at instrument panel, remote control gearshift lever, and exhaust pipe from manifold. Remove cover plate on toe board. Remove screws holding remote control housing to steering column and disconnect horn wire, then remove remote control housing down through floor pan. Remove steering connecting rod from steering gear arm ball. Remove steering gear housing attaching bolts and remove assembly from below and over frame side rail. To install, reverse removal procedure.

Willys Forward Control Models (1957-60): Remove direction signal control assembly from steering column, then remove floor access panels at base of steering column. Disconnect clutch cable from pedal shaft and remove lower left panel from instrument panel. Remove steering column clamp, then loosen radiator screen and swing it down for access to steering gear. Disconnect pitman arm from connecting rod and remove steering gear mounting bolts. Disconnect horn wire and remove steering gear assembly by pulling it up and out of cab. To install, reverse removal procedure.

OVERHAUL (STEERING GEAR ASSEMBLY): Disassembly—Loosen cam lever adjusting screw locknut, back off adjusting screw two turns. Remove side cover screws and washers, remove side cover, drain lubricant from housing. Remove pitman arm, then cam lever shaft from housing. Remove upper plate cover screws, then remove cover, lower oil seal, and adjusting shims. Withdraw post and cam assembly from housing. Remove ring from lower end of cam to permit removal of lower cup and ball bearings. Remove upper bearing cup ring, bearing cup, and ball bearings. Remove oil seal and gasket from cam lever shaft bore and, using a suitable arbor, press inner and outer bushings out.

Reassembly: With suitable arbor, press bushings into place in cam lever shaft bore of housing. Bushings should be line-reamed to fit cam lever shaft. Assemble cam bearings, cup, and rings on cam and post assembly, install assembly in housing. Assemble top cover and shims on housing, check bearing adjustment, remove or add shims as required. Install cam lever shaft, housing cover gasket, and cover, tighten cover screws securely. Install lever shaft gasket and oil seal, install pitman arm.

STEERING LINKAGE: *See "Steering Linkage."*

ROSS MODEL SL-54

Packard (1957-58)
Stud bak r V8 (1957-60)
Stud baker 6 Cyl. (1958-60)Ⓒ
Ⓒ - Used on some models.

DESCRIPTION: Similar in design to Ross Cam & Twin Lever except for the single cam lever with tapered roller bearing mounted follower

Adjustm nt: The steering post and cam lever endplay adjustments are made in the same manner as for the Cam & Twin Lever Type. *See "Ross Cam & Twin L v r" St ering G ar.*

Disass mbly: Same as for the Cam & Twin Lever except as follows:

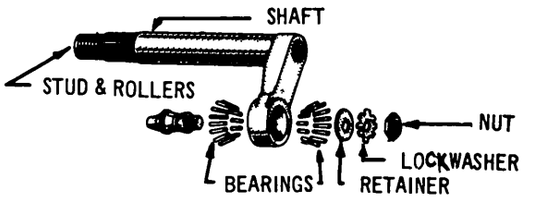
1) To remove follower from lever, bend down locking tang, remove the nut, lockwasher and plain washer. Then slip the bearings and follower out of the cam lever.

Reassembly: Same as for the Cam & Twin Lever except as follows:

1) To reassemble the cam lever, place lower set of bearings around the cam follower; hold them in place by means of heavy grease. Then carefully insert follower and bearings into the lever. Hold the follower in position and install the upper set of bearings. Install washer, lockwasher, and nut.

2) Adjust the cam follower bearing as follows: Hold cam follower and tighten the adjusting nut sufficiently so that cam follower can be turned by hand with a slight drag. This check should be done with the unit lubricated. Bend locking tang to hold adjusting nut securely in place.

Adjustment: The steering post and cam lever end play adjustments are made in the same manner as for the Cam & Twin Lever type.



CAM LEVER SHAFT ASSY.

SAGINAW WORM & ROLLER

Pontiac 6 & 8, All Models (1954)

►CHANGES, CAUTIONS, CORRECTIONS

DESCRIPTION: Hour-glass type worm and double tooth roller of same design used on previous models.

ADJUSTMENT

ADJUSTMENT: Disconnect steering connecting rod from pitman arm. Torque pitman arm nut to 110-125 ft. lbs. Loosen steering post bracket to be sure it is not sprung. If misaligned, shim at steering gear housing-to-frame bolts, tighten bracket.

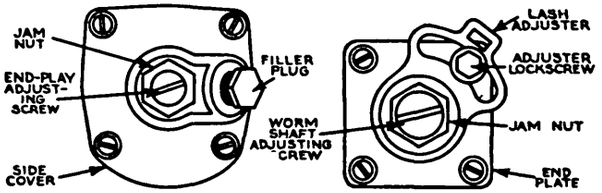
Roller Shaft Endplay: Tighten four side cover-to-housing bolts, loosen adjusting screw jam nut, turn steering wheel to end position, then tighten adjusting screw securely, using offset screwdriver. Back off adjusting screw until it is free, then again turn it in until screw can just be felt to be bearing against shaft. Keep screw from turning, tighten jam nut. Test for endplay. No endplay should be felt when attempting to move pitman arm in or out but arm should be free without bind when moved radially.

Worm Shaft Endplay: Tighten three bolts holding end plate to housing. Do not tighten adjuster lock bolt. Loosen worm thrust screw nut. With steering gear turned to end position, near but not against stops, tighten worm thrust screw to obtain a pull at steering gear rim as indicated in following table. Tighten lock nut.

Car Model	Worm Bearing Setting
Pontiac	3/8-5/8 lb.

Worm & Roller Backlash: Disconnect drag link from pitman arm. Loosen lash adjuster lock bolt (in the slot through adjuster). Center the steering gear so steering wheel in straight ahead position. Tap lash adjuster plate lightly to turn it in direction of arrow until a pull is secured at steering wheel rim as indicated in following table. CAUTION—Lash adjuster plate should not be moved more than 1/16" (in relation to lock bolt) at a time and in no case should a tighter adjustment than maximum limits in table below be made as damage to gear may result). Tighten lash adjuster lock bolt securely. Check adjustment. Move steering wheel through entire travel right and left to check for tight spots. If tight spots found on both sides of central position, loosen lash adjuster lock bolt, tap lash adjuster plate opposite direction of arrow just enough to bring pull at tightest point between limits indicated in table. If tight spot only on one side of wheel center position, adjust gear for maximum pull (see table)

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SAGINAW WORM-AND-R LLER TYPE ADJUSTMENTS

SAGINAW WORM & ROLLER (C ntinu d)

through tight spot. Then with wheel in center of the high spot, remove wheel and reinstall it with spokes in straight ahead position (must not vary more than 5 degrees from horizontal when front wheels straight ahead). Reconnect drag link to pitman arm keeping steering wheel in straight ahead position and worm on high spot. Place wheels in straight ahead position by adjusting the tie rods.

Car Model	Backlash Setting
Pontiac	1¼-1¾ lbs.

STEERING WHEEL & HORN RING OR BUTTON REMOVAL

Horn Button Removal (Plain Button Type). Press down on one side of button which will cause opposite side to rise. Insert screwdriver and remove button.

Horn Button Removal (Ring Type). Disconnect horn wire at relay. Remove horn button cap by lifting out of wheel, then remove steering wheel nut and washer. Remove horn sounding ring assembly from steering gear.

Installation—Assemble horn ring assembly in steering wheel by tilting the top end down so that upper rubber spacer engages retaining lug in steering wheel hub, then pull lower end of ring down into position by sighting through cap hole. Particular care should be taken to locate the pilot hole in contact onto shoulder provided in the insulated connector. Install steering wheel nut and lockwasher and push button cap into position. Connect horn button wire.

Horn Ring Removal (Deluxe Type) - Remove horn ring cap by turning slightly to left and lifting out. Remove steering wheel locknut and lift out horn ring assembly, then remove horn insulator and contact and spring assembly.

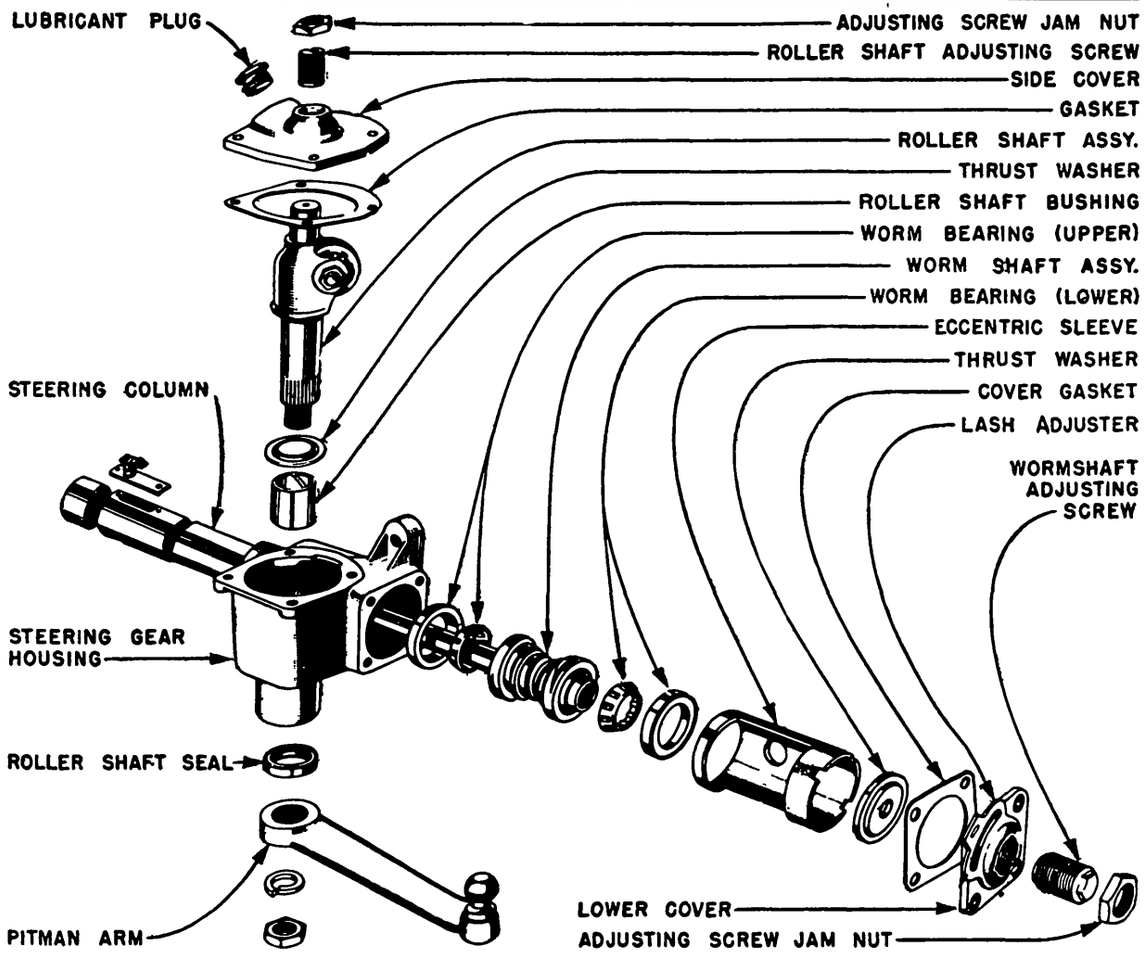
Steering Wheel Removal - Install Puller J-3034 and remove steering wheel.

Steering Wheel Installation: Reverse removal procedure. Torque wheel nut to 25-30 ft. lbs. and locknut finger tight plus ¼ turn.

STEERING GEAR REMOVAL & INSTALLATION

Removal: Remove steering wheel and disconnect direction signal wire harness at connector plug under instrument panel. Remove steering column and pedal upper and lower plates, then remove horn wire and neutral safety switch wire. Remove gearshift lever. Raise car and place supports under both lower control arms. Remove left hand side apron, then remove pitman arm from shaft with a suitable puller. Remove all steering gear attaching bolts except front upper bolt. Remove bolts holding steering column lower bracket to upper bracket on instrument panel and remove rubber grommet. Remove remaining steering gear attaching bolt and remove gear by bringing it down through floorboard and over linkage toward right front wheel. *NOTE - Be sure to save shims found between frame side rail and steering gear.*

Installation: Reverse removal procedure and note the following: Replace same shims (found when gear removed) between steering gear and frame.



SAGINAW WORM & ROLLER STEERING GEAR

STEERING GEAR OVERHAUL

Disassembly: Remove pitman arm using puller No. C-47. Remove side cover plate from housing and take out pitman shaft, then loosen "jam nut" and back out worm shaft adjusting screw from end of worm shaft. Remove endplate from housing and push worm and shaft assembly down through bottom of housing, removing eccentric sleeve, worm and bearings.

Inspection and Cleaning: Wash all parts in clean solvent and inspect for wear, pitting or roughness.

Reassembly: Assemble two tapered roller bearings on worm shaft and eccentric sleeve over bearings. Put lower thrust washer in place inside eccentric sleeve to hold bearings in place. Start worm shaft adjusting screw into endplate, then install endplate on housing and attach with four capscrews. (NOTE—Worm shaft adjusting screw should be screwed in just enough at this time to hold bearings in place. Proper adjustment will be made later). Slide pitman arm shaft in place and attach side plate to housing. Install endplay adjusting screw and locknut.

Testing & Adjusting on Bench: Secure steering gear in vise and place steering wheel on shaft. Turn steering gear from one extreme to opposite to make certain there are no unusual binds. Adjust steering gear as outlined under ADJUSTMENT above.

STEERING LINKAGE: *See "Steering Linkage".*

1954 SAGINAW (CHEVROLET) PASS. CARS

Chevrolet Pass. Cars (1954)

DESCRIPTION: Hour-glass worm and roller sector type with worm gear on steering column shaft meshing with double-tooth roller on cross-shaft (sector shaft).

ADJUSTMENT

ADJUSTMENTS: *NOTE*—Before disconnecting steering connecting rod from pitman arm, take care to note relative positions of steering connecting rod parts before disturbing them. Then proceed as follows:

Worm Shaft Endplay: Remove sheet metal splash guard covering steering gear housing, disconnect connecting rod from pitman arm (CAUTION—note relative positions of connecting rod end parts to insure correct reassembly). Loosen adjusting screw locknut on housing cover, back off lash adjuster screw several turns to provide clearance between worm and roller. Turn steering wheel to within one turn of either end position (turn wheel as far as possible, then turn wheel in opposite direction about one turn). Use spring scale (J-544-A Checking Scale) hooked to wheel spoke at rim to measure pull required to keep wheel in motion.

Bearing Pre-load—⅜-⅝ lb. turning pull (above).

Adjustment—Loosen large adjusting cup locknut on lower end of steering gear housing, turn adjusting cup in until worm shaft has no perceptible endplay. Check pull required to turn wheel (above), tighten locknut when turning pull of ⅜-⅝ lb. is secured. *CAUTION—Recheck pull after locknut tightened.*

Worm & Roller Mesh (Backlash): Place steering wheel in exact center of travel with roller on minimum-lash point of worm (count number of turns of wheel from one end position to the other, then turn wheel back ½ this number of turns, remove horn button and make certain that mark on end of shaft points upward, mark steering wheel for reference while making adjustments). Turn lash adjuster screw on housing cover clockwise until all lash removed from worm and roller (NOTE—this screw was loosened in making worm shaft endplay adjustment above), then tighten adjuster screw locknut to 10-15 ft. lbs. Check adjustment by turning wheel one half turn off center "high" spot, attach spring scale at wheel rim and note pull required to turn wheel through the center position.

Backlash Setting—⅞-1⅞ lbs. pull to turn steering wheel through center position (measured as above). **Adjustment**—With steering wheel turned one-half turn off center "high" position, loosen lash adjuster screw locknut, turn lash adjuster screw on housing cover clockwise to decrease backlash (and increase required pull), or counter-clockwise to increase backlash (and decrease required pull), tighten locknut, connect steering connecting rod. *CAUTION—Final steering gear setting must be within ⅞-1⅞ lbs. pull (measured as above).*

Horn Button Removal: On models equipped with horn button, pry off horn button or ornamental cap.

Horn Ring Removal: On models equipped with horn ring, remove screws holding pivot ring, then remove pivot ring, lock ring and horn blowing spring washer.

Steering Wheel Removal: Remove steering wheel nut and washer. Using steering wheel puller J-2927, thread puller anchor screws into threaded holes provided in steering wheel hub.

Steering Wheel Installation: With steering gear on high point, install steering wheel, with spokes horizontal. Install washer and nut, torque tighten to 25-30 ft. lbs.

STEERING GEAR REMOVAL

REMOVAL OF STEERING GEAR: Remove horn button or cap in center of steering wheel, remove wheel retainer nut and washer from upper end of shaft. If car equipped with horn blowing ring, take out screws holding pivot ring, remove pivot ring, lock ring, and horn blowing spring washer. Use Puller J-2927 (has anchor screws which thread into holes in wheel hub) to remove steering wheel. Remove upper control shaft clamp bolt from shaft connector, remove toeboard grommet and seal. Remove instrument panel mast jacket clamp by taking out nuts and lockwashers. Remove two clutch-head screws attaching gearshift control upper support to mast jacket, pull upper control shaft and support up to disengage shaft connector and remove these parts. Remove clamp bolt nuts and clamp retaining shifter housing on mast jacket, rotate shifter housing assembly away from mast jacket. Remove sheet metal splash guard over steering gear housing, remove steering gear mounting bolts. Remove air duct by taking out sheet metal screws attaching duct to left fender skirt. Rotate steering gear to clear fender skirt, then raise assembly up and forward and remove it from engine compartment.

►**Installation Note**—Reverse removal directions given above and note following points:

Steering Gear Mounting Bolts—Tighten housing to frame side rail bolts to 27-40 ft. lbs.

Steering Wheel Position—Turn shaft to center "high" point with mark on end of shaft upward, install steering wheel with spokes horizontal, tighten retainer nut on shaft to 25-30 ft. lbs.

STEERING GEAR OVERHAUL

Disassembly: Remove nut and lockwasher on end of sector shaft, use Puller J-1025 to remove pitman arm. Loosen lash adjuster screw locknut and turn adjuster screw several turns counter-clockwise, loosen worm bearing adjuster cup locknut and turn adjuster cup several turns counter-clockwise to remove load from bearings. Take out housing side cover attaching bolts, remove cover as an assembly with the sector shaft and roller (NOTE—If roller does not clear opening in housing, turn worm shaft by hand until roller lines up with notch). Remove worm bearing adjuster cup, withdraw lower bearing, pull worm and shaft out through lower end of housing (CAUTION—protect worm from damage). Remove locknut from lash adjuster screw, remove screw from side cover, slide screw out of slot in end of sector shaft.

Inspection & Repair: Wash all parts in cleaning solvent. Inspect roller bearings, bearing cups, worm, and roller for cracks, pits, roughness and wear.

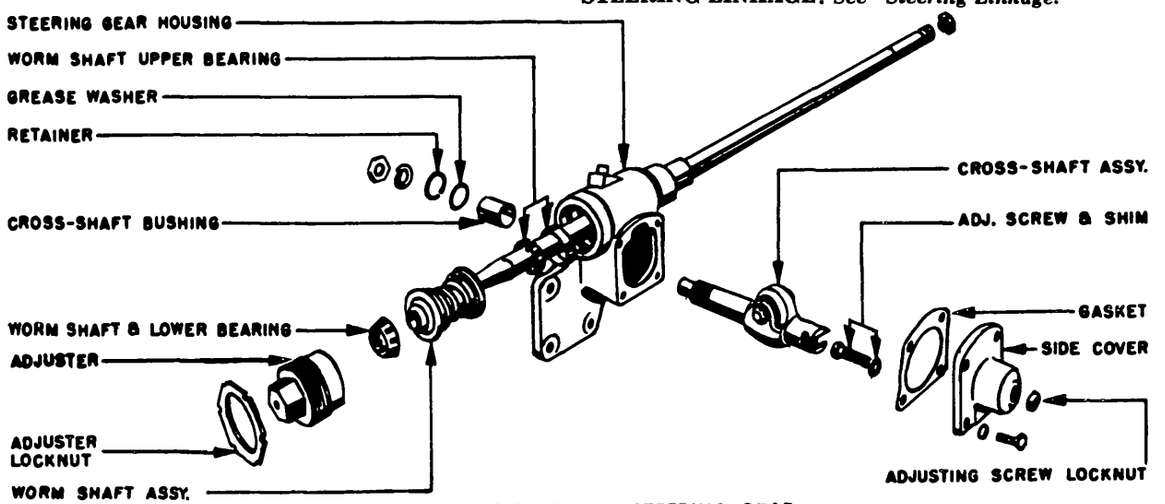
Sector Shaft Bushing & Packing Replacement—To replace bushing, press bushing, packing, and retainer out of housing in an arbor press using J-1614 driver. Press new bushing in place using same driver. Soak new packing in engine oil, install packing in retainer, press assembly into housing.

Wormshaft Bearing Cup Replacement—Use Mainshaft Bearing Cup Remover J-3183 to pull cup from steering gear housing and from worm bearing adjuster cup. Install new bearing cups with Bearing Cup Replacer J-3182 (install cup on tool and drive into place using great care not to crack cups).

Lash Adjuster Screw Clearance Adjustment—With screw and shim assembled in slot in end of sector shaft, check end clearance of screw in slot with a feeler gauge. If clearance greater than .002", adjust by installing shim of correct thickness.

Reassembly: Reverse disassembly directions given above.

STEERING LINKAGE: *See "Steering Linkage."*



CHEVROLET PASS. CAR STEERING GEAR

SAGINAW (STUDEBAKER) WORM & ROLLER

Studebaker, All Models (1954-56)

DESCRIPTION: Hour-glass worm and roller sector type with worm gear on steering column shaft meshing with double-tooth roller on cross-shaft.

ADJUSTMENT: Two adjustments required (complete procedure must be followed). Proceed as follows:

Worm Shaft Endplay: Disconnect steering reach rod from pitman arm, loosen steering post jacket bracket-to-instrument panel bolts. Loosen lock nut and turn adjusting screw a few turns counterclockwise to remove load from worm shaft bearings. Turn steering wheel gently in one direction until stopped by gear, then back away one turn. Attach spring scale to rim of steering wheel, measure pull required to turn wheel. Pull tangent to rim of wheel should be 6-10 ozs. To adjust shaft bearing, loosen lock nut, turn bearing adjuster clockwise to increase drag and counterclockwise to decrease it. Tighten lock nut, recheck adjustment. Then tighten jacket bracket-to-instrument panel bolts, recheck adjustment to be sure bind was not imposed.

Worm & Roller Mesh (Backlash): Turn steering wheel gently through entire range of travel, carefully counting number of turns. Turn wheel back exactly half way to center position. Turn adjusting screw clockwise to take all lash in gear teeth, tighten locknut. Check pull at wheel with spring scale. Pull tangent to rim of wheel should be 14-30 ozs. If necessary, readjust screw to get proper pull.

STEERING WHEEL POSITION: Steering wheel center spoke (3 spoke type) should point straight down, or spokes should be horizontal (2 spoke type) with steering gear in straight-ahead position and on center high point.

STEERING WHEEL & HORN RING OR BUTTON REMOVAL:

1952-55 Champion (Custom & Deluxe): Removal—Remove horn button or ring by holding steering wheel stationary and turning button or ring 1/3 turn. Remove steering wheel nut, install puller J-5473, remove steering wheel.

1953-55 Champion, Commander (Regal), President Models: Removal—Pry horn button out of wheel, remove three screws in horn ring, remove ring and sponge rubber pad. Remove steering wheel nut. Install adapter in end of steering post, install puller J-5473, remove steering wheel.

Installation (All 1953-55): Align mark on steering wheel hub and mark on end of steering shaft, install wheel. Tighten retaining nut to 23-27 ft. lbs.

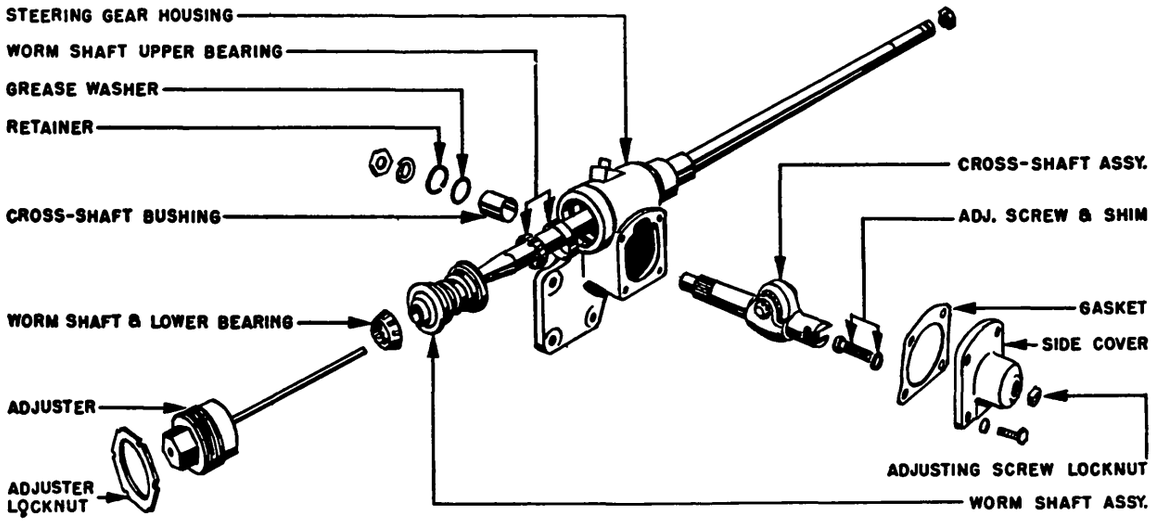
STEERING GEAR REMOVAL & INSTALLATION: Removal (1952-54)—Remove horn button assembly and steering wheel. Disconnect and remove battery, disconnect quadrant light cable and starter cut-out switch cables if equipped with Automatic Drive. Disconnect shift lever rod or rods, loosen jacket clamp bolt. Remove jacket bracket retaining bolts from instrument panel, loosen jacket bracket clamp screw and turn bracket to avoid hitting instrument panel when removing jacket. Slip steering jacket off steering post as an assembly into inside of car. Remove front seat cushion. Disconnect reach rod from pitman arm, remove steering gear housing-to-frame bolts. Tip upper end of steering post down, then remove steering gear assembly from engine side of cowl. Wrap cloth around top of housing to prevent spilling of lubricant. Lift housing end of assembly up and remove from chassis.

Installation—To install, reverse removal procedure.

Removal (1955)—Disconnect battery and disconnect horn switch wire at connector. On Commander & President models, also disconnect battery cable at starter switch. On Commander and President Convertible (Hardtop) and Coupe models, remove battery and battery box. Remove steering wheel and steering post jacket assembly. *(NOTE*—Steering gear housing, steering post jacket, and steering wheel can be removed as an assembly. However, on Commander & President Convertible (Hardtop) and Coupe models, it will be necessary to remove left front engine support cushion and raise left front corner of engine approximately 2"). Remove pitman arm using puller J-5664, then remove steering gear housing-to-frame bolts and remove steering gear through hole in dash and into car.

Installation—To install, reverse removal procedure.

OVERHAUL (STEERING GEAR ASSEMBLY): Disassembly—Remove pitman arm retaining nut and lockwasher from cross-shaft. Punch locating marks on pitman arm and end of crossshaft, remove pitman arm. Remove adjusting screw locknut, then turn adjusting screw out one or two turns thereby relieving bushings and bearing of loads. Remove four side cover retaining screws and lockwashers, pull side cover and cross-shaft assembly from housing. If there is interference between housing and cross-shaft roller, turn cross-shaft slightly so that roller wil clear housing. Remove cross-shaft assembly from side cover by screwing adjusting screw through cover. Slide adjusting screw out of slot in end of cross-shaft, remove shim from adjusting screw. Remove worm shaft bearing adjuster assembly and worm shaft lower bearing. Mark directional signal cam and worm shaft for reassembly. Loosen two set screws which hold directional signal cam to upper end of worm shaft, remove cam. Pull worm shaft out of housing, remove worm shaft upper bearing. Pry grease washer retainer out of housing, remove grease washer. With arbor press, press cross-shaft bushing out of housing.



SAGINAW (STUDEBAKER) WORM & ROLLER STEERING GEAR

Reassembly: With arbor, press cross-shaft bushing into housing until outer end of bushing is 1/32" below shoulder of housing bore. Install upper bearing cup with hard wood block or lead mallet (avoid tilting in bore), bottom cup against shoulder of bore. Soak new grease washer in engine oil, install it in new retainer, then press retainer and washer into housing until retainer bottoms on shoulder of bore. Place worm shaft upper bearing on worm shaft, slide worm shaft assembly into housing. Upper and lower bearings are interchangeable when new, old bearings should not be interchanged. Install worm shaft lower bearings and bearing adjuster assembly. Adjust bearings so there is no end play. Install bearing adjuster lock nut. Place adjusting screw shim on adjusting screw, slide head of screw into slot in end of cross-shaft. Check clearance between head of screw and bottom of slot. Clearance should not exceed .002". If clearance too great, add next thickest shim (available in sizes .063", .065", .067", .069"). When clearance adjusted, start crossshaft into cover. Insert screwdriver through adjusting screw hole in side cover, screw adjusting screw through side cover as far as cross-shaft will go. Place new gasket on side cover, assemble cross-shaft and side cover to housing. Make sure there is clearance between worm and roller, install and tighten side cover retaining screw and lockwashers. Adjust cross-shaft so there is no clearance between roller and worm when roller on high spot, install adjusting screw locknut. Install pitman arm on cross shaft (marks aligned). Install pitman arm retaining nut and lockwasher, tighten nut to 90-100 ft. lbs. torque. Install directional signal cam on upper end of worm shaft (marks aligned), tighten set screws.

STEERING LINKAGE: *See "Steering Linkage"*

SAGINAW BALL BEARING WORM & NUT

Buick (1954-60)
Cadillac Series 86 (1954)
Chevrolet Pass. Cars (1955-60)
Chevrolet Truck (1954-60)
Comet (1960)
Corvair (1960)
Edsel (1958-60)
Falcon (1960)
Ford Pass. Cars & Thunderbird (1958-60)
Ford Trucks (1959)
Mercury (1956-60)
Oldsmobile (1954-60)
Pontiac (1955-60)
Rambler, Exc. American (1958-60)
Valiant (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 BUICK STEERING COLUMN RATTLE CORRECTION:* Effective May 1954 production, a new anti-rattle spring, Part No. 561362, is being installed to eliminate shift tube rattles in steering column. This new, heavier spring, may be installed on earlier 1954 cars where these shift tube rattles have been noted.

►*1955 BUICK STEERING COLUMN RATTLES (Caused By Shift Control Linkage):* An anti-rattle spring, Part No. 1169208 has been released for service to eliminate this condition. To install spring, remove steering wheel and horn ring. Loosen directional signal wiring at lower steering column and remove switch and housing. Remove three bolts from mast jacket to control lever housing support. Place control lever in "Park" position and remove control lever. Remove support and install spring with large end of spring around control lever housing and small end of spring hooked around edge of mast jacket. *NOTE*–On some cars it may be necessary to remove die flash on control lever housing in order to install spring.

►*1955 OLDSMOBILE STEERING COLUMN RATTLE CORRECTION*–Check steering column upper bushing for looseness. Make sure that the three upper bearing retainer screws are tight before replacing bushing.

►*1956 MERCURY STEERING GEAR RATTLE CORRECTION:* May be caused by low lubricant level. Turn wheels to full left position and check lubricant, add lubricant and turn wheels to full right, then back to center. Recheck level to make sure it is up to proper level. If there is still a rattle, check steering sector adjustment, steering linkage & idler arm, ball nut preload or for play between sector shaft and sector adjusting screw.

►*1958 BUICK STEERING WHEEL QUIVER CORRECTION:* Caused by loose lower steering mast jacket clamp bolts. To correct, tighten bolts securely.

►*1958 CADILLAC STEERING COLUMN VIBRATION CORRECTION:* Caused by one or more of following items: Upper and lower steering column-to-toe board clamp bolts loose, or loose bolts at support bracket to firewall (All clamp bolts must be tightened securely after aligning steering column). Steering column to gear misalignment or flexible coupling grounding between shafts or flanges. There must be clearance between upper shaft flange and stop pins (reposition upper flange on column shaft if necessary).

►*1958 CHEVROLET TORQUE SPECIFICATION CAUTION:* Tighten lower coupling clamp bolt to 30 ft. lbs. DO NOT overtighten.

►*1958 EDSEL & MERCURY STEERING BIND OR ERRATIC STEERING CORRECTION:* In addition to normal maintenance procedures, make the following diagnosis and corrections for bent steering shafts or misaligned steering gear assemblies:

1) Remove battery ground cable at battery and remove steering wheel (use Tool 3600-AA). Remove upper bearing centering spring and bushing. *NOTE* - With solid type upper bushing, remove turn signal switch and upper bearing assembly.

2) Raise vehicle, and check run-out of steering shaft (by turning front wheels from full right to left positions), then mark maximum run-out point. Run-out should not exceed .250". If excessive, replace steering shaft assembly. If run-out is not excessive, but the shaft is not centered, check the effort required to pull shaft to a centered position. Use a spring scale such as Tool 3600-E and attach it to steering shaft so pull is against high (marked) spot. Pull required to center shaft should not exceed 8 lbs.

3) When pull required to center shaft is more than 8 lbs. realign steering shaft by placing the high (marked) spot at the four positions given below and then making the correction for each position.

(A) Place high (marked) spot at 6 O'clock position (in relation to column), then loosen steering gear mounting bolts. Raise steering gear and tighten bolts and recheck steering shaft run-out.

(B) Place high (marked) spot at 9 O'clock position (in relation to column), then loosen steering gear mounting bolts and add necessary shims (to center shaft) and retighten bolts. Recheck shaft run-out.

(C) Place high (marked) spot at 12 O'clock position (in relation to column), then loosen steering gear mounting bolts and lower steering gear. Retighten bolts and recheck run-out.

(D) Place high (marked) spot at 3 O'clock position (in relation to column), then loosen mounting bolts and remove shims as necessary (to center shaft) and retighten bolts and recheck run-out.

4) Lower vehicle, reverse items in **(1)** above.

►*1958 EDSEL GEAR LUBRICANT LEVEL NOTE:* Use a piece of 14 gauge wire (as dipstick) to measure fluid level (1½" below filler hole) with steering wheel at full right turn. *CAUTION* - Overfilling will force fluid up steering column.

►*1958 EDSEL STEERING SHAFT EXTENSION SLEEVE PRODUCTION CHANGE (San Jose Cars):* Cars with Serial Nos. W8R-705201 and later, have new sleeve installed and are identified by daub of yellow or blue paint.

►*1958 FORD & THUNDERBIRD STEERING COLUMN NOISE CORRECTION:* Caused by carbon brush contacting steering wheel ring. To correct, apply lubricant such as "Lubriplate Part No. B7A-19584-A" at this point.

►*1958 THUNDERBIRD CONNECTING ROD SLEEVE BOLT INTERFERENCE CORRECTION:* Rotate tie rod clamp bolts forward of tie rod and in vertical position.

►*1958 FORD STEERING GEAR LUBRICANT LEVEL & CAUTION:* To check level, remove filler plug and lower bolt from housing cover. Turn steering wheel to left (to move ball nut below hole) and fill gear with lubricant Part No. B8A-19578-A, until lubricant comes out lower bolt hole. DO NOT use "Multi-purpose" gear lubricant in 1958 type steering gears. Install plug and bolt. Tighten lower bolt to 12-20 ft. lbs.

►*1958 PONTIAC TIE ROD BOLT INSTALLATION NOTE:* To eliminate interference, the tie rod adjuster sleeve bolts must be positioned so center line of bolt will be at 45° angle from horizontal with nuts in up position. It is unnecessary to have clamp ends aligned with slots. in sleeve as in past models.

►*1958 RAMBLER (5810) STEERING LINKAGE PRODUCTION CHANGE (To Eliminate Road Shock):* Linkage change made starting with Serial No. D-420633 (except Serial Nos. D-423300 to D-423789), to provide spring load on pitman arm ball stud seat. To correct road shock on earlier cars, install Kit, Part No. 3209508, consisting of Spring Retainer Clip No. 3200889, Spring No. 3200890, and Spacer No. 3200891. The new spacer is 3/64" shorter. The cup replaces washer and accomodates the additional spring. Assemble new items, tighten end plug to 40-45 ft. lbs. and back off 1½ turns plus 1/8 minus 0. Tighten plug at idler arm to 40-45 ft. lbs. and back off at least 1/8 to 3/8 turns maximum. *NOTE* - In production, retaining cup not used, original washer is relocated in tube, spring is not used, new springs are alike, and spacer is 2-11/16" long.

►*1959 EDSEL STEERING GEAR BALL NUT REPAIR KIT:* A new kit, Part No. MJK-3647-A, containing 60 .281" diameter balls is available for repair of steering gears on 1958-59 Edsel models.

►*1959 FORD STEERING GEAR SECTOR SHAFT COVER BUSHING PRODUCTION CHANGE:* The sector shaft cover bushing has been eliminated from the cover assembly.

►*1959 MERCURY STEERING WHEEL SHAKE & STEERING SHAFT RATTLE CORRECTION:* Check thrust loading spring, located between flange of steering assembly and steering shaft flange and insulator, for proper thrust load as follows: Loosen setscrew on flange and insulator assembly, then move insulator down against force of thrust loading spring by prying on upper flange. *NOTE - This will preload steering shaft bearing, eliminating looseness.* While prying downward, tighten setscrew. *CAUTION - Flange and insulator assembly should be moved just enough so that deformation of steering shaft flange assembly is held to a minimum.*

►*1959 MERCURY STEERING SHAFT BEARING PRELOAD ADJUSTMENT CHANGE:* The worm preload (steering shaft bearing) and total center preload (pitman shaft endplay), have been changed. *See "Adjustment" below.*

►*1960 CORVAIR STEERING SHAFT-STEERING GEAR COUPLING BOLT CAUTION:* This coupling is clamped together by two special bolts, Part No. 6256938. These bolts have a special bearing surface for the portion that is in the coupling. DO NOT use standard bolts for this application because of the safety factor involved.

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SAGINAW WORM & NUT (C ntinu d)

►*1960 MERCURY STEERING GEAR LUBRICATION (CHECKING & FILLING) PROCEDURE CHANGE.* Turn steering wheel to full left turn position and remove filler plug and the lower sector cover attaching bolt from steering gear housing Agitate lubricant with a screwdriver through filler plug opening. **Fluid level should be even with edge of lower sector cover attaching bolt hole.** When filling steering gear, leave sector cover bolt out to provide an air bleed. Cycle gear through a full right turn and back to full left turn position and recheck fluid level Install cover bolt and filler plug

DESCRIPTION: Recirculating ball nut type Nut mounted on worm and driven through steel balls which circulate in helical grooves in both worm and nut Return guides attached to nut serve to recirculate the two sets of balls through grooves Gear teeth on nut mesh with sector teeth on cross-shaft so that cross-shaft (and steering gear pitman arm) rotate as steering wheel is turned causing nut to move up and down

ADJUSTMENT

ADJUSTMENT: Adjust in following sequence.

►*1959 FORD F-500 & F-600 TRUCK ADJUSTMENT*

NOTE Adjustment procedures are the same as for other steering gears except that worm shaft endplay and preload are controlled by a shim pack between steering gear housing and bearing end plate An adjustment screw, located on top of housing is provided to add side support to the ball-rack After adjusting worm preload and sector mesh, loosen adjusting screw locknut and turn screw until it just touches the ball-rack, then back screw off 1/8-1/4 turn Tighten the locknut

St ring Gear Alignment: Before any adjustments are made to steering gear check for binding at frame bracket mounting bolts and at instrument panel bracket Note clearance between steering gear and frame or bracket. If clearance exists loosen mounting bolts to permit steering gear to shift on frame to align with column bracket, or shim bracket.

St ring Gear Shaft Bearing Preload Adjustment (All Models): With relay rod disconnected from pitman arm and pitman arm properly tightened on steering gear pitman shaft, loosen pitman shaft adjusting screw to obtain a slight backlash between ball nut and pitman shaft Loosen worm thrust bearing adjuster locknut (located at upper end of worm shaft on Ford, Edsel, Mercury & Valiant and at lower end of worm shaft on all other models) and turn adjuster until a slight load is felt (with steering wheel at extreme right or left positions), then tighten locknut Install a spring scale at right angles to spoke or install an inch-pound torque wrench *(see "Worm Bearing Setting" table below for th prop r m thod to us in ch cking pr load)* Note spring scale or torque wrench reading required to keep steering wheel moving (when off high point) Rotate adjusting nut as necessary to obtain correct reading on spring scale or torque wrench (see table below)

Pitman Shaft Endplay Adjustment: With bearing preload adjustment completed (see above), check effort required to pull steering wheel through center (high point) of gear If turning effort is not within specifications (see below), turn pinion shaft adjusting screw clockwise to increase turning effort and counterclockwise to decrease turning effort With locknut tightened, recheck turning effort and adjust as necessary

►*PITMAN SHAFT ENDPLAY ADJUSTMENT CAUTION: This is a push-pull type adjustment and controls pitman shaft endplay as well as gear mesh*

STEERING WHEEL & HORN BUTTON AND RING REMOVAL & INSTALLATION

NOTE–Proceed as follows for each model Reverse removal procedure for installation except as noted

Buick 1954:

Horn Button Removal (Solid Spoke Wheel) - Pry button carefully out of wheel, then remove other horn button parts by removing the three attaching screws and insulator spacer bushings

Horn Button Removal (Flexible Spoke Wheel) - Insert a small screwdriver in notch in cap base and pry against bezel Remove operating ring and wheel base assembly by removing the three screws attaching wheel base to steering hub

Steering Wheel Removal - With horn button assembly removed, back off steering shaft nut several turns. Place direction signal switch in "off" position, then install Puller J-1566 and pull wheel back to nut

WORM BEARING SETTING TABLE

Car Model	Worm Bearing Setting
Buick (1954-56)	①7/8-1 1/8 lbs
Buick (1957-58)	①1/2-7/8 lb
Buick (1959)	①3/8-7/8 lb
Buick (1960)	①1/4-3/4 lb
Cadillac (1954)	①1-1 1/4 lbs
Chevrolet Pass Cars (1955-60)	①3/8-5/8 lb
Chevrolet Trucks, All Models (1954-59)	①1-1 1/2 lbs
Chevrolet Trucks, Series 10 - 40 (1960)	①1/4-3/4 lb
Chevrolet Trucks, Series 50 & 60 (1960)	①1 1/2-2 lbs
Comet (1960)	② 3-6 lbs
Corvair (1960)	② 2-6 lbs
Edsel (1958)	①1/4-3/4 lb
Edsel (1959-60)	② 3-6 lbs
Falcon (1960)	② 3-6 lbs
Ford Pass & T-Bird (1958)	①1/4-3/4 lb
Ford Pass Exc T-Bird (1959)	①1/4-3/4 lb
Ford Thunderbird (1959-60)	② 3-6 lbs
Ford Pass Exc T-Bird (1960)	② 3-6 lbs
Ford Truck (1959)	①1-1 1/2 lbs
Mercury (1956-58)	①1/4-3/4 lb
Mercury (1959-60)	①1/4 lb
Oldsmobile (1954-60)	①1/2-7/8 lb
Pontiac (1955-60)	①3/8-7/8 lb
Rambler (1958)	①1/2-3/4 lb
Rambler (1959-60)	①1/4-3/4 lb
Valiant (1960)	②2-4 lbs

① - With spring scale installed on steering wheel (at right angles to spoke)
② - Inch-pounds With inch-pound torque wrench on steering wheel nut

Buick 1955-59:

H rn Butt n Rem val (Seri s 40) - Pry cap out with a thin instrument, remove attaching screws, then remove contact cup and insulating spacers.

Horn Button Removal (Other Series) - Pry out monogram, then unscrew and remove adjusting nut, contact plate and spring (with insulators). Remove steering wheel nut and remove operating ring with cushion and contact spacer .

Steering Wheel Removal - With horn assembly removed, back off steering shaft nut several turns. *NOTE - If nut removed, install it and tight n to within s v ral turns of fully tight position.* Install Puller J-3274 and pull wheel back to nut, then remove steering wheel *NOTE - Direction signal must be in " ff" p sition when r moving or installing wheel.*

Buick 1960:

Horn Button Removal - Disconnect wire at horn cable connector on steering column, then remove horn button or push-bars as follows **Standard St ring Wh l** - Pry out cap with a thin bladed tool and pull out contact spring and terminal Remove steering wheel nut and remove contact assembly **D luxe St ring Wh l** - Remove emblem assembly from center of steering wheel by prying in recess at lower edge Remove wing shaped shroud by removing two inner screws from front of wheel and two outer screws from back of wheel Pull horn wire terminal from center of steering shaft

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PITMAN SHAFT ENDPLAY SETTING TABLE

Car Model	Backlash Setting
Buick (1954-56)	①2-2 1/4 lbs
Buick (1957-58)	①1 1/2-2 lbs
Buick (1959)	①1 1/4-2 lbs
Buick (1960)	①7/8-1 1/2 lbs
Cadillac (1954)	①1 1/2-2 lbs
Chevrolet Pass Cars (1955-60)	①7/8-1 1/2 lbs
Chevrolet Trucks (1954-59)	①2-2 1/2 lbs
Chevrolet Trucks, Series 10 - 40 (1960)	①7/8-1 1/2 lbs
Chevrolet Trucks, Series 50 & 60 (1960)	①2 3/4-3 1/4 lbs
Comet (1960)	②8-13 lbs
Corvair (1960)	②7-12 lbs
Edsel (1958)	①1-1 5/8 lbs
Edsel (1959-60)	②8-13 lbs
Falcon (1960)	②8-13 lbs
Ford Pass Cars (1958-59)	①1/2-1 1/2 lbs
Ford Pass Cars (1960)	②8-13 lbs
Ford Thunderbird (1958)	①1/2-1 1/2 lbs
Ford Thunderbird (1959-60)	②8-13 lbs
Ford Trucks (1959)	①1-1 1/2 lbs
Mercury (1956-58)	①7/8-1 1/2 lbs
Mercury, Man Strng (1959-60)	①1 1/2 lbs
Mercury, Pow Strng (1959-60)	①1 lb
Oldsmobile (1954-60)	①1 1/2-2 lbs
Pontiac (1955-60)	①1-2 lbs
Rambler (1958-59)	①7/8-1 1/2 lbs
Rambler (1960)	①7/8-1 1/4 lbs
Valiant (1960)	②5-8 lbs

① - With spring scale installed on steering wheel (at right angles to spoke)
② - Inch-pounds With inch-pound torque wrench on steering wheel nut

SAGINAW WORM & NUT (C ntinued)

Steering Wheel Rem val - With horn assembly removed, back off steering shaft nut several turns. *NOTE - If nut previ usly r moved, reinstall nut and tighten to within s v ral turns f fully tightened position.* Install Puller J-3274 and remove wheel.

Cadillac 1954:

H rn Button & H rn Ring Removal—Disconnect horn wire from terminal at lower end of steering column, depress horn button, turn counter-clockwise until locking ears are released, remove button and horn button spring. Remove steering wheel nuts, then remove horn ring retainer, cushion, and horn ring.

St ring Wh l R moval—Remove horn button, then wheel nut. Install Puller J-1859 and remove wheel.

Chevrolet Pass. Cars 1955-56:

Horn Button R moval - Pry off horn button or ornamental cap and remove horn parts.

Steering Wheel R m val - Remove horn assembly parts, then remove nut from end of steering shaft. Use Puller J-2927-A to remove steering wheel.

Ch vr let Pass. Cars 1957-60):

H rn Button Rem val - Remove one screw from underside of each steering wheel spoke and remove ornament. Horn mechanism can then be removed.

St ring Wheel R m val - With horn assembly parts removed, remove steering shaft nut and pull steering wheel from shaft with Puller J-2927-A. Remove spacer from end of shaft.

Chevrolet Trucks 1954-60:

H rn Butt n R m val - Insert a thin instrument between horn button and wheel and pry button out. If wheel has an ornament, remove one screw from underside of each spoke and remove ornament. Remove horn assembly mechanism.

St ring Wheel Removal - Same as for passenger car above.

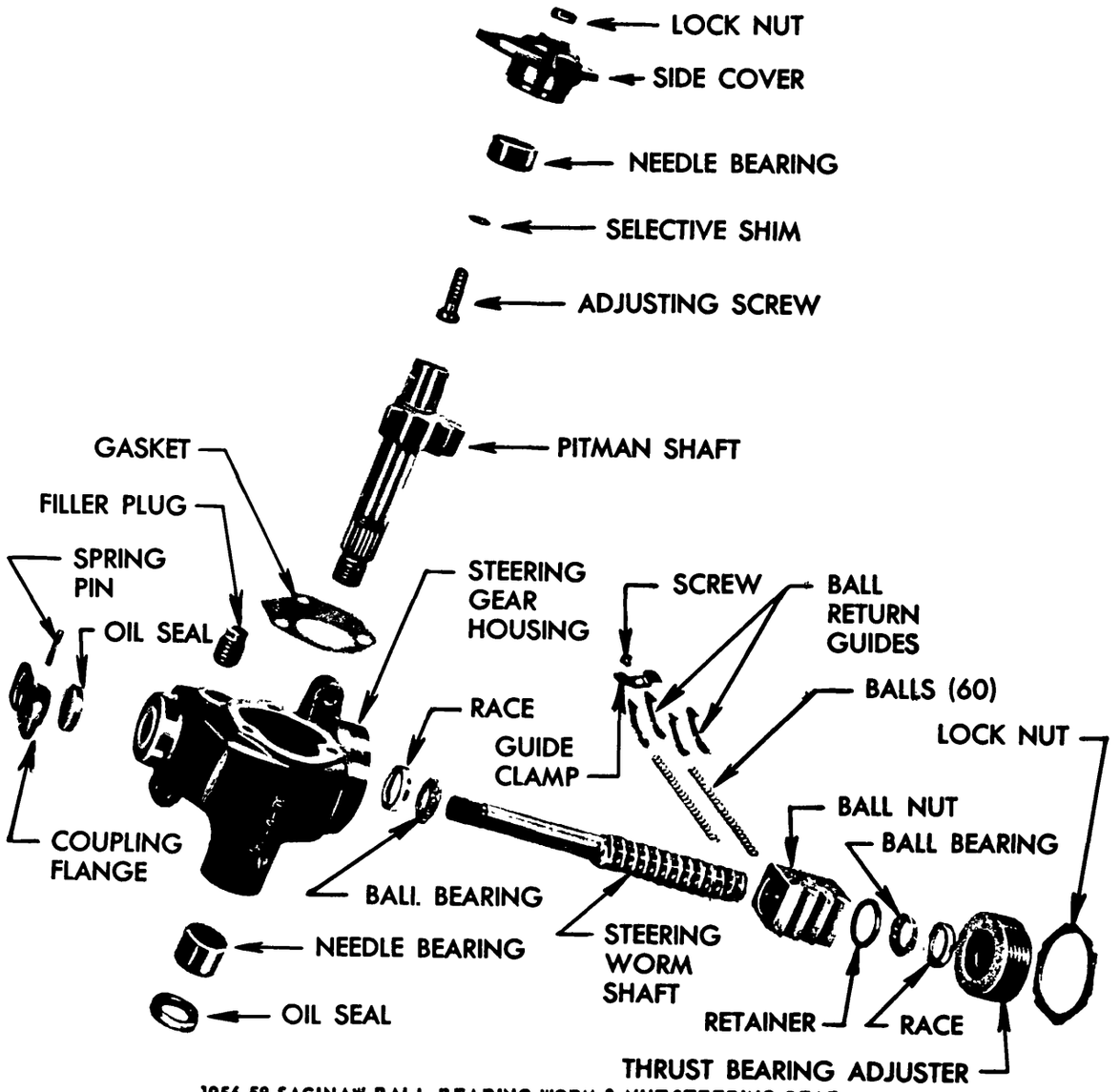
C m t & Falc n 1960:

H rn Button R moval - Disconnect horn wire under instrument panel at left side of steering column, then press down on horn button or ring and turn counter-clockwise until it lifts out of steering wheel. Remove horn button and spring, then remove steering wheel (see below). Remove turn indicator lever and indicator mechanism retaining screws, and lift mechanism to one side. Remove screws retaining horn button contact and pull wire and contact from steering column.

St ring Wh l R m val - Remove horn button or ring (see above), then remove steering wheel nut and pull wheel from shaft with Puller 3600-AA or 3826 (Comet), 3600-N (Falcon).

Edsel 1958:

H rn Button R m val - On conventional cars, use a thin bladed tool to pry emblem out of steering wheel hub and remove steering wheel (see below). Remove horn ring assembly, spring, contact plate and insulator. On Push-button Shift models, unsnap medallion from center of trim plate, then remove trim plate. Pull off pushbuttons, remove horn ring screws and lift off ring. Remove three horn contact and steering wheel retaining nuts, then remove plate assembly and steering wheel.



1956-58 SAGINAW BALL BEARING WORM & NUT STEERING GEAR (EXCEPT FORD, EDSEL, MERCURY)

Steering Wheel Removal - On conventional models, pry emblem out of steering wheel hub, then remove steering wheel nut and install Puller 3600-AA. Place wheels in straight ahead position and remove steering wheel. On Push-button Shift models, remove horn assembly and remove steering wheel.

Edsel 1959-60:

H rn Button Removal - Disconnect horn wire at bullet connector under instrument panel, then remove horn ring by pressing down on ring and turning it counterclockwise until it lifts out. Remove direction signal control lever, then remove wiring cover which is clipped on left side of steering column. Remove contact plate, "C" washer and coil spring from turn signal switch plate, then remove switch plate with spring washer. Remove two screws at bottom of steering column upper flange and lift turn signal switch and bracket assembly up slightly. Push out horn contact plate and grommet from switch bracket, then remove contact plate and wiring assembly.

CONTINUED ON NEXT PAGE

SAGINAW WORM & NUT
(C ntinu d)

Steering Wheel Removal - With horn ring and contact assembly removed (see above), remove wheel with Puller 3600-AA.

F rd 1958-60:

Horn Button Removal - Disconnect horn wire at bullet connector under instrument panel, then push down on horn ring assembly and turn it counterclockwise until it lifts out. *NOTE - On 1960 models (except Fairlane) remove two screws from underside of steering wheel and remove horn ring.* Remove horn ring spring and horn ring contact brush, then remove steering wheel (see below). Remove wire cover on left side of steering column, then remove two contact retaining screws and remove contact and wire assembly.

Steering Wheel Removal - With horn ring, spring and horn contact brush removed (see above), remove steering wheel with Puller 3600-N.

F rd Thunderbird 1958-60:

Horn Button Removal - Remove steering wheel (see below), then remove turn indicator cam and contact ring. Remove three retaining screws and remove horn contact assembly.

Steering Wheel Removal - Remove steering wheel hub cover and remove steering wheel nut. Use Puller 3600-N to remove wheel from shaft.

F rd Trucks 1959:

Horn Button Removal - Disconnect horn wire at bullet connector below steering gear housing (under instrument panel on Tilt Cab models), then remove horn button by pressing it down and turning it counterclockwise. Remove horn button spring, button contact, and index spring.

Steering Wheel Removal - Remove horn button assembly (see above), then remove steering wheel nut and index spring support, then install Puller 3600-N and remove wheel.

Mercury 1956-60:

Horn Button Removal - Remove cap and emblem assembly from steering gear hub, then remove steering wheel (see below). Remove turn signal indicator cam from wheel hub and remove snap ring. Remove four screws securing control plate and insulator to horn ring. *Horn control components can now be removed.*

Steering Wheel Removal - With cap and emblem assembly removed from steering wheel hub, remove steering wheel nut and pull wheel from shaft with Puller 3600-AA.

Oldsmobile, All Series 1954-56: Disconnect horn wire at relay, then proceed as follows:

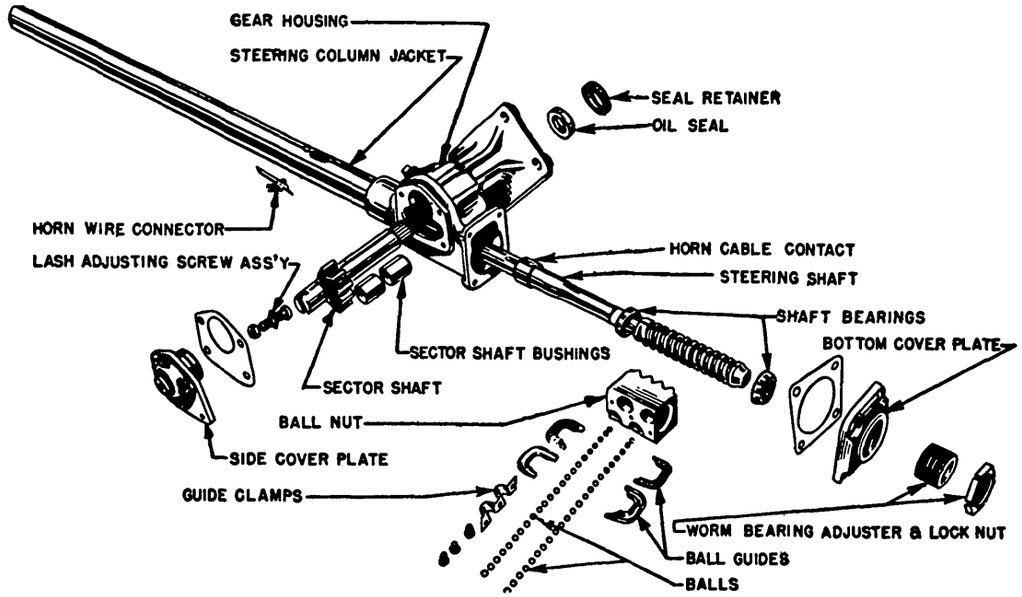
Horn Button Removal (Std.)–Insert sharp instrument underneath edge of horn button, pry button upward and out. Remove steering wheel nut, then contact assembly.

Horn Ring Removal (DeLuxe)–Two spring clips on ends of horn button engage horn ring hub. To remove horn button use small screwdriver to relieve spring tension on one end, lift button from seat. Remove wheel nut, then contact plate, horn ring.

Steering Wh el Removal–Install puller J-1262, remove steering wheel.

Oldsm bile, All Series 1957-58:

H rn Button Rem val (Std.) - Disconnect horn wire at relay, then insert a sharp instrument under edge of cap and pry upward. Remove steering wheel nut and remove horn contact assembly.



1954-55 SAGINAW BALL BEARING WORM & NUT STEERING GEAR

Horn Button Removal (1957 Deluxe) - Disconnect horn wire at relay, then remove screw from undersize of cap. Remove steering wheel nut and remove horn contact assembly.

Horn Button Removal (1958 Deluxe) - Pry cap from shroud with a sharp instrument, then remove screw attaching horn contact retainer to steering wheel hub and carefully pull retainer assembly away from hub until contact assembly can be removed.

Oldsmobile, All Series 1959-60:

Horn Button Removal - Disconnect horn wire from harness. On standard type wheel, remove cap-to-steering wheel attaching screw and lockwasher, then pull cap from wheel. Disconnect horn switch wire from contact assembly. On deluxe wheel, remove setscrew if present, then pry cap and emblem assembly from shroud. On all models, remove steering wheel (see below). On deluxe wheel, disconnect horn switch wires from contact assembly lead, then remove the four shroud attaching screws and shroud. Remove staking from wheel hub and remove contact assembly from steering wheel.

Steering Wheel Removal - With cap and emblem removed, remove steering wheel nut, then pull wheel with Tool 61-9.

Pontiac 1955-56:

Horn Button Removal - Remove deluxe horn ring by turning counterclockwise. On standard wheel, press down on one side of horn button and pry button out from opposite side. Remove steering wheel locknut and nut, washer, horn ring, horn insulator and contact assembly.

P ntiac 1957:

H rn Button R m val - Remove deluxe horn ring by removing four screws retaining covers to bottom of horn ring, then remove horn ring side plates, horn ring, horn ring adapter bushing screws and associated parts. Remove standard button by pressing down on one side and prying button out from opposite side.

Pontiac 1958-59:

Horn Button Removal - Remove deluxe steering wheel ornament by prying up on end. On standard wheel, press down on one side of horn button and pry button out from opposite side. Remove two nuts and washers from plate, then remove plate and insulator. Remove horn ring, upper contact, spring and washer, then remove three screws and insulators from lower contact and support and remove these parts.

Pontiac 1960:

Horn Button Removal - Twist steering wheel ornament to remove, then remove two nuts and washers from shaft and remove spacer bushing screws and bushing. Remove horn ring, pivot ring, spring, insulator and contact plate, contact assembly and insulator.

Pontiac 1955-60:

Steering Wheel Removal - Remove horn button assembly, then remove steering wheel nut (if not previously removed) and pull wheel with Puller J-3044.

Rambler 1958-60:

Steering Wheel & Horn Butt n R moval - Remove horn ring or button and pull wheel from shaft with Tool J-5290.

Valiant 1960:

Horn Button Removal - Disconnect negative ground cable from battery, then rotate horn button ¼ turn counterclockwise and remove button. Remove three screws and bushings from horn button base and remove horn ring. Disconnect wire from horn switch and remove base or switch.

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SAGINAW WORM & NUT (C ntinued)

St ring Wheel R moval - Remove steering wheel nut and pull wheel from shaft with Tool C-612

STEERING GEAR REMOVAL & INSTALLATION

►*STEERING GEAR INSTALLATION NOTE: To install st ering g ar ass mbly, reverse removal procedures,*

Buick 1954-56 (R m val): Disconnect transmission shift rod from control shaft lower lever & selector lever (synchro-mesh only), then loosen bolt in clamp which secures column jacket to short tube in gear housing Disconnect and remove horn cable connection from steering column jacket Move front seat all the way back and cover seat and back Cover steering column jacket with masking tape. Remove steering wheel and the upper bearing spring and spring seat Cover horn contact and threaded end of steering shaft with masking tape. Remove signal switch and transmission shift control levers. Disconnect wires from neutral safety switch and disconnect wires (signal) from fuse block Detach rubber insulator retainer from dash mat and pull it a foot up on column jacket. Remove jute column pad. Measure and record vertical distance between column jacket and lower surface of instrument panel so column can be reinstalled in same position. This dimension affects steering wheel height, which may have been changed from normal height to suit driver of car. Remove bolts holding cap to steering column bracket, disconnect bracket from instrument panel, then pull upward on column jacket to free it from steering gear Remove starter splash pan from car frame. Remove steering gear-to-frame lower bolts and clamps, then loosen upper bolts enough so that gear can be tilted sideways to provide room for pitman arm puller Remove nut and lockwasher, then remove pitman arm from pitman shaft, using suitable puller With another man inside car to guide steering column and prevent damage to column jacket and front seat, carefully lift steering gear assembly up and forward out of engine compartment, leaving column jacket assembly in body.

Buick 1957-60 (R moval): Mark upper and lower steering gear shaft flanges for correct reassembly, then disconnect flexible coupling Raise car and remove pitman arm Remove three steering gear-to-frame bolts at outside of left frame side rail and remove steering gear from under car

Cadillac 1954 (R m val): Raise front of car, then remove steering wheel and anti-rattle spring under wheel Remove upper and lower column covers, then remove horn wire from terminal at lower end of column Loosen clamp holding lower steering jacket to upper jacket Tap clamp down over lower jacket Disconnect pitman arm from drag link and remove bolts holding gear to frame side rail Remove and save any shims found at upper housing mounting bolts Strike housing with a lead hammer to drive lower steering column jacket down out of upper jacket, then remove gear, lower jacket and steering column from below car

Chevrolet Pass. Car 1955-57 (Rem val): Disconnect all electrical connections and remove back-up light switch (when installed), from mast jacket *(NOTE* - A combination Neutral Safety & Back-up Light Switch is used on Powerglide models) Remove two rubber cover fasteners from inside of dash panel at mast jacket opening Pry off horn button and remove steering wheel Slide rubber seal away from covers, and remove lower cover retaining screw and washer and lower and upper covers. On Auto. Trans. models only, disconnect ends of indicator rod from indicator lever and shifter tube and remove rod Remove neutral safety switch, and remove transmission control selector plate from lower end of steering column On all models, remove clamp bolt from dash panel attaching bracket Disconnect transmission control linkage from shift levers at swivels and remove swivels Remove clamp and rubber shims from bottom of instrument panel From inside car, pull mast jacket assembly off steering shaft, rotating as necessary to clear dash clamp Work shift levers through seal by stretching seal to clear levers Remove pitman arm from sector shaft using Puller J-5504 (see Puller J-5504 Rework for use on Early Cars, below) On Power Steering models, remove the generator-to-support and generator brace bolts and move generator and pump assembly out of position (without disconnecting hoses) to obtain clearance to remove steering gear assembly Remove nuts and lockwashers from steering gear to frame bolts, shims (where installed), and steering gear Remove the four felt seals from mainshaft of steering gear assembly

Chevrolet Pass. Car 1958 (Removal): Place car on hoist or jackstand and remove pitman arm with Tool J-6632 or J-5504. Remove seven front splash pan attaching bolts and remove pan, then remove nuts and bolts attaching steering gear to frame. *CAUTION - Note number and location of any shims found between gear and frame.* Remove coupling clamp bolt between upper and lower shafts and remove steering gear from car.

►**Puller Tool J-5504 Rework (For use on Early Cars):** Grind off 5/16" lip of tool to permit installation between pitman arm and gear housing

Installation—Reverse the removal procedure and note "Steering Wheel Position" and "Steering Gear Alignment" above

Chevrolet Pass. Car 1959-60 (Removal): Place car on jacks and remove pitman arm (Tool J-6632 or J-5504) Remove splash pan, then remove steering gear-to-frame bolts and shims Remove coupling clamp bolts and withdraw steering gear and shaft from under car To install, reverse removal procedure being sure to have mark on worm shaft aligned with slot of coupling clamp (with steering wheel in normal straight ahead position)

►*CHEVROLET LOWER COUPLING REPLACEMENT NOTE:* If lower coupling is to be removed, it will be necessary to either lower the steering gear from its original position, or the mast jacket, upper steering gear shaft, coupling and intermediate shaft must be loosened and pulled up far enough to permit coupling to be removed from worm shaft.

Chevrolet Trucks 1954-59 (Conventional Models): Removal-

1. Disconnect horn wire remove wire retainer from steering mast jacket Remove horn button and steering wheel, then remove steering mast jacket-to-instrument panel bolts, bracket and grommet

2 On ½ and ¾ ton trucks disconnect gearshift upper control shaft support from mast jacket, then separate upper steering control shaft from lower shaft by removing lower bolt from both shaft clamps.

3. Remove sheet metal screws attaching steering mast jacket toe-board grommet and seal to toe-board plate. Slide toe-board grommet and seal up mast jacket, remove toe-board plate

4. On Forward Control models, hoist front end of vehicle, remove mast jacket opening cover

5. On ½ and ¾ ton trucks, remove bolts and clamp attaching gearshift control housing to steering column mast jacket

6. Disconnect pitman arm, using puller J-1025, then

7. On Forward Control models, remove steering gear by moving forward, down and out of vehicle. On 1957-58 3100 Series, V8 engine models, remove exhaust crossover pipe.

8. On models other than Forward Control, from inside cab remove three bolts attaching rear of left front fender skirt to toe-board, remove six bolts attaching fender skirt to fender ledge, then remove fender-to-dash brace rod, disconnect horn wire

9. Working under fender pry rear of fender skirt forward and outward until it rests on outside toeboard flange, then, working over fender, pry fender skirt outward along frame at steering gear housing to provide proper clearance between frame and opening in fender skirt

10. Slide steering gear assembly slightly upward toward toe-board, then rotate until attaching flange is up Raise slightly and slide forward, removing assembly over front of front fender

Chevrolet Trucks 1955-59 (Cab-Over-Engine & Low Cab Forward Models): Removal -

1. Remove steering wheel and disconnect dash mounting bracket Remove left hand floor pan and steering column grommet Disconnect horn wire Remove fender skirt bolts and remove skirt

2. Remove pitman arm using Tool J-1025, and remove steering gear to frame mounting bolts

3. Move gear back to clear radiator grille side baffle assembly It will then be possible to drop gear down through fender skirt opening, pulling the steering column through opening in floor

Chevrolet Trucks 1960 (All Models): Removal - Loosen bolt attaching lower end of intermediate shaft to steering gear, then disconnect pitman arm from steering shaft, using Puller J-6632 Remove all steering gear-to-frame mounting bolts and remove steering gear

Comet & Falcon 1960: Removal - Raise front of car and place on stands, then remove pitman arm from sector shaft Remove steering gear bolts from underbody and disconnect transmission shift rods at shift levers Pull rubber seal up on steering column and fold mat aside Move dash panel insulation out of way, then remove retaining screws from steering column weather seal on dash panel and remove column cover plates and gasket Remove steering wheel (see above) On automatic transmission cars, remove neutral switch wires Remove upper bearing sleeve and spring, then remove turn indicator lever Remove steering column clamp-to-instrument panel bolts and remove clamp (upper and lower halves) and remove insulator Slide steering col-

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SAGINAW WORM & NUT (C ntinu d)

umn tube assembly from steering shaft, guiding shift levers up through rubber seal at dash panel. Remove steering gear and shaft assembly out toward front through engine compartment.

Corvair 1960: Removal - Remove pitman arm with Tool J-6627, then disconnect coupling, remove gear attaching bolts, and remove gear by sliding it forward and down.

Edsel 1958 (Removal): Stub Shaft Gear Type - Disconnect direction signal wires from connectors under instrument panel to left of steering column. Remove terminal block from lower side of steering column tube. Remove steering column upper bracket cap and move column and wheel assembly upward and rearward to remove from car. Use Tool 3590-E to remove sector shaft arm, then remove steering gear-to-frame bolts and remove steering gear.

L ng Shaft Type - Remove steering wheel assembly. *See St ering Wheel and Horn Ring Removal above.* Disconnect turn indicator wires under instrument panel and automatic transmission neutral switch wires if so equipped. Slide rubber seal up steering column and fold back floor mat. Disconnect speedometer cable at speedometer and remove clutch pedal release rod, equalizer shaft, bushing and bracket assembly. Remove floor panel cover plate and remove steering column bracket to instrument panel screws. Remove sector shaft arm with Tool 3590-E and disconnect transmission or gear shift rods from levers on steering column. Remove steering gear housing-to-frame bolts and remove steering gear through passenger compartment.

Edsel 1959: Removal - Remove steering wheel *(see "Steering Wheel Removal" above),* then disconnect wires under instrument panel. Remove two screws that fasten steering column bracket to instrument panel, then remove turn indicator lever and gear shift lever from steering column. Remove screws from steering column weather seal on engine compartment wall and fold floor mat away from steering column. Disconnect speedometer cable from instrument panel, then remove right hand cover plate and feed cable through cover plate. Disconnect clutch pedal release rod at clutch pedal, and remove cover plate from rod. Disconnect clutch return spring and disconnect gear shift linkage at steering column bracket. Remove pitman arm retaining nut and remove arm from shaft. Remove steering gear housing bolts from frame side rail and remove steering gear through engine compartment. On cars with automatic transmission, remove selector dial indicator cover and control selector indicator. Disconnect neutral switch wires at bottom of steering column. To install the assembly, reverse removal procedures and note the following: Position pitman arm on shaft so that it points straight forward with steering worm at midpoint of travel, tighten pitman arm nut to 110–150 ft. lbs.

Edsel 1960: Removal - Remove steering wheel *(see "St ring Wheel R m val" above)* and disconnect the turn indicator wires under instrument panel. On automatic transmission cars, remove selector dial indicator cover and selector indicator. Remove two screws attaching steering column to instrument panel. Pull rubber seal up on column and fold mat away from column. Remove retaining screws from steering column weather seal, then disconnect speedometer cable at speedometer, remove steering column cover plates and route cable through weather seal and gasket. Disconnect manual control linkage at steering gear and disconnect clutch equalizer bar. On automatic transmission cars, disconnect neutral switch wires at bottom of steering column. Raise car and remove pitman arm from sector shaft. Remove steering gear housing attaching bolts and remove steering gear through inside of car. Install by reversing removal procedures and note the following: Tighten pitman arm retaining nut to 110-150 ft. lbs. Tighten steering gear housing attaching bolts to 28-43 ft. lbs. Tighten steering column bracket-to-instrument panel screws to 5-7 ft. lbs.

Ford 6 & Y-V8 1958-59: Removal - Remove steering wheel *(see "Steering Wheel Removal" above),* then disconnect the turn indicator wires from under instrument panel and remove steering column-to-instrument panel screws. Remove turn indicator lever and gear shift lever from steering column and fold back floor mat out of the way. Remove retaining screws from steering column weather seal on engine compartment wall and disconnect speedometer cable at instrument panel. Remove right hand cover plate. Disconnect clutch pedal release rod at clutch pedal and remove cover plate from rod. Disconnect clutch return spring and disconnect gear shift linkage at steering column bracket. Remove sector shaft arm retaining nut and remove arm with Tool 3590-AA. Remove steering gear housing bolts from frame side rail and remove steering gear through engine compartment.

Ford 1958-59 (Exc. 6 & Y-V8): Removal - Remove steering wheel. *See "Steering Wheel & Horn Ring Removal" above.* Disconnect turn indicator wires from under instrument panel. On Auto. Trans. cars, remove selector dial indicator cover and control selector indicator. Remove steering column-to-instrument panel screws and pull rubber seal up steering column and fold floor mat out of way. Remove steering column weather seal screws, disconnect speedometer cable at speedometer, and remove steering column opening cover plates and pull cable through weather seal and gasket. Disconnect manual control linkage at steering gear and disconnect clutch equalizer bar. On Auto. Trans. cars, disconnect neutral safety switch wires at bottom of steering column. Place car on jacks and remove sector shaft arm nut and pull arm with Tool 3590-AA. Remove steering gear-to-frame side rail bolts and remove steering gear through insi of car.

Ford 1960 (S.M. Transmission): Removal - Disconnect clutch pedal release rod at pedal, then disconnect clutch equalizer bar from clutch pedal rod by removing lower adjusting nut and pushing equalizer bar forward. Raise car and disconnect clutch release lever spring and remove release rod. Remove equalizer bracket and equalizer bar. Remove pitman arm, then remove steering gear attaching bolts and lower car to floor. Remove steering wheel (see above), then move steering column grommet up and disconnect speedometer cable at speedometer. Disconnect horn and turn signal wires. Push clutch pedal about halfway to floor, remove bumper bracket, and carefully allow pedal to retract. *CAUTION - Pedal is spring loaded and must b controlled.* Remove steering column tube retaining bolts at instrument panel and remove tube and attaching parts from steering shaft. Remove steering gear through passenger compartment.

F rd 1960 (Aut . Transmission): Removal - Raise the car on a hoist and remove pitman arm from sector shaft, then remove steering gear housing attaching bolts and lower car to floor. Disconnect neutral switch wires at bottom of steering column, and manual control linkage at steering gear. Pull rubber seal up on column and fold floor mat out of way. Remove retaining screws from steering column weather seal, remove cable from speedometer, and remove steering column opening covers. Remove selector dial indicator cover and control selector indicator. Disconnect turn indicator and horn wires under instrument panel and remove steering wheel (see above). Remove two screws fastening steering column-to-instrument panel bracket to instrument panel, then remove steering column tube, neutral switch, and selector lever as an assembly. Remove steering gear through inside of car.

Thunderbird 1958-60: Removal - Remove steering wheel *(see "Steering Wheel Removal" above).* Disconnect parking brake handle and bracket and remove cowl side trim panel and left vent control handle. Disconnect hood lock release cable bracket. On Cruise-O-Matic Cars, remove starter-neutral switch and disconnect horn wire. Disconnect wiring assembly from steering column and remove instrument panel lower panel retaining screws. Move lower panel to one side. Pull steering column cover plate insulation to one side and disconnect parking brake bracket from cover plate. Remove steering column cover plate and parking brake handle, then remove steering column retaining bracket from instrument panel. On Conventional or Overdrive cars, disconnect clutch linkage, as necessary, to provide clearance for gear removal and disconnect gear shift levers near steering column. Raise car and remove sector shaft nut and remove sector shaft arm with Tool 3600-N. Remove steering gear attaching bolts from underbody and remove gear through inside of car.

Ford Trucks 1959 (Exc. Tilt Cab M dels): R moval - Disconnect battery, then disconnect horn wire from bullet connector and remove steering wheel. Loosen steering column lower clamp and slide clamp down. Disconnect transmission shift control rods at shift levers (if so equipped). Remove steering column upper bushing spring and bushing, then disconnect turn signal wires, and remove them from retaining clip at instrument panel. Remove steering column bracket clamps and rubber sleeve. If truck has a floor mounted gearshift lever, pull steering column tube off shaft. If truck has a Fordomatic or a remote gearshift lever, remove steering column shields from floor pan. Remove engine oil filter. On a clutch equipped truck, disconnect clutch retracting spring, then remove clutch hydraulic cylinder out of the way. Remove pitman arm, then remove steering gear assembly from under truck (floor mounted gearshift), through cab (Fordomatic or remote type gearshift). If steering column tube not removed, loosen lower clamp and remove tube.

Ford Trucks 1959 (Tilt Cab Mod ls): R moval - Remove horn wire brush from steering column just below instrument panel bracket, then remove upper universal joint retaining nut and bolt. Turn wheels to right and remove pitman arm. Remove steering gear housing from frame

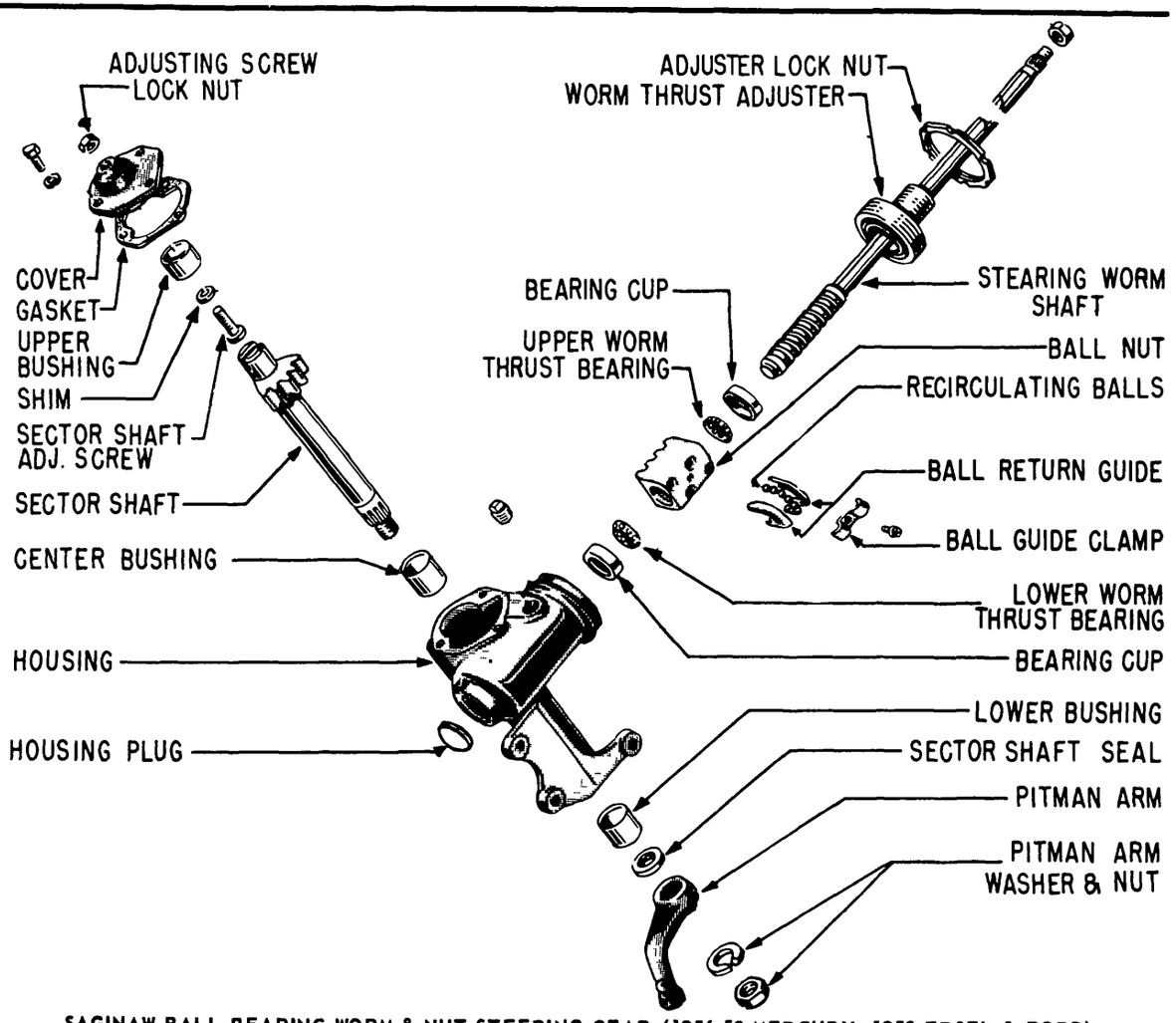
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SAGINAW WORM & NUT
(C ntinued)

side rail (with universal joint attached). If woodruff key falls out of steering shaft, save it for installation. Remove universal joint from worm shaft.

Mercury 1956 (Rem val): On models with power brakes, remove clamp securing reservoir hose to brake booster cylinder, and to dash panel. Move hoses away from opening in dash panel. On all models, remove steering wheel (see above). Disconnect electrical connection at junction block near lower positi n of steering column and also at backup lamp and neutral safety switches. Remove accelerator pedal from pushrod. On synchro-mesh cars, remove brake and clutch pedals and pull carpet away from dash panel opening. Remove insulator and floor opening cover plates. *NOTE - There are two cover plat attaching capscrews in engine compartment.* Remove screws securing steering column bracket to instrument panel and pedal support bracket. Disconnect shift rods from steering column shift arms. Loosen clamp on lower steering column at gear housing, then remove column tube through inside of car. Raise front of car and remove gearshift linkage splash shield, then remove pitman arm with Tool 3590-AA. Remove bolts securing steering gear housing to frame side rail and remove gear assembly through passenger compartment. *CAUTION - Note location and number of shims found b tween mounting bolts and frame side rail (if any).*

M rcury 1957-58 (R m val): Disconnect battery, raise car and remove sector shaft nut and sector shaft arm, with Tool 3590-E. Remove three steering gear to frame bolts and note position and number of shims at each bolt hole. Remove muffler inlet pipe to exhaust manifold bolts, then lower car and remove air cleaner and air cleaner intake duct. On Conventional & Overdrive cars, remove gear shift arms from rods and push rods to center of car. When back-up light switch is mounted on steering column, disconnect leads at switch and swing leads clear of bottom of power brake booster. Remove back-up light switch and bracket assembly. Disconnect clutch rod and remove exhaust manifold and No. 8 spark plug. Remove steering wheel. *See "Steering Wheel & Horn Ring R moval" ab v .* Disconnect turn signal and horn electrical connections (wires and junction block will hang free). Disengage accelerator pedal from push rod and pivot pedal toward rear. On Conventional & Overdrive Cars, remove clutch pedal and rod assembly, then remove brake pedal assembly. Turn back floor mat to clear area and attaching parts (for right and left column cover plates), remove left plate and slide right plate along speedometer cable. Remove steering column opening seal and remove column bracket cover plate directly above steering column in lower portion of instrument panel, then remove steering column bracket. The steering gear and shaft assembly can now be turned through opening in dash panel. To install, reverse removal procedure, install shims as removed and tighten gear-to-frame bolts to 40-50 ft. lbs., steering wheel nut to 40-50 ft. lbs. Adjust column tube to steering wheel clearance to 1/8". Tighten instrument panel screws to 10-13 ft. lbs. Torque steering gear nut to 120-130 ft. lbs.



SAGINAW BALL BEARING WORM & NUT STEERING GEAR (1956-58 MERCURY, 1958 EDSEL & FORD)

Mercury 1959-60: Removal - Disconnect steering shaft from gear assembly at flexible coupling, then raise car and remove pitman arm with Tool 3590-E. Loosen manifold outlet pipe clamp and loosen hanger at forward end of muffler. Remove muffler outlet pipe. *NOTE - On dual exhaust systems, remove crossover pipe, then remove left hand outlet pipe only.* Remove gear assembly-to-frame bolts and remove gear assembly. To install unit, reverse removal procedure and tighten pitman arm to 110-140 ft. lbs.

Oldsmobile, All Series 1954-59: Removal - Disconnect horn wire at relay and remove steering wheel assembly. Remove floor mat. On 1951-56 models, loosen upper and lower mast jacket cover attaching screws or clamps. On 1957-58 models, remove upper mast jacket clamps and disconnect shift linkage from lower end of mast jacket. On all models, raise car and remove pitman arm and steering gear mounting bolts. On 1951-56 models, drop gear down and pull it out of mast jacket. On 1957-58 models, remove gear and mast jacket assembly by pulling it up through opening in floor.

Oldsmobile, All Series 1959-60: Removal - Remove steering wheel assembly (*see "Steering Wheel & Horn Button Removal" above*). Remove upper bearing spring and seat. Turn back floor mat and remove mast jacket cover plate screws, then remove upper mast jacket clamps. Disconnect shift linkage from lower end of mast jacket. Remove pitman arm with Tool J-5504-B and remove steering gear mounting bolts. Remove gear and mast jacket assembly by pulling it up through opening in floor. Loosen lower clamp and remove mast jacket from gear. To install, reverse removal procedure and

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SAGINAW WORM & NUT (C ntinu d)

tighten steering gear-to-frame bolts to 50-60 ft. lbs. and pitman arm nut to 90-120 ft. lbs.

P ntiac, All Models 1955-57 (Removal):

1. Remove steering wheel. If car is equipped with power brakes, remove power brake unit. Disconnect direction signal wires at connector under instrument panel. Remove signal lever.
2. Remove steering column lower finish plate and remove steering column and pedal plate, felts, and retainer plate.
3. Disconnect horn wire and neutralizer switch. Remove gearshift lever and disconnect selector rods from levers on steering column.
4. Raise car on hoist and remove engine side apron. Remove pitman arm with Puller J-5504 and remove steering gear housing to frame bolts, leaving the forward bolt in place to support steering gear. Remove steering column lower bracket to upper bracket bolts.
5. Remove remaining steering gear housing to frame attaching bolt and remove steering gear by bringing it through floor board and over steering linkage toward right fender. Save shims found between housing and frame.

P ntiac, All Models 1958 (Removal): Remove steering wheel and disconnect directional signal wiring harness at connector under the instrument panel. Remove the directional signal lever. Remove the steering column and lower finish plate and roll back floor mat and remove steering felt and felt retainer plate. Disconnect horn wire and starter neutral switch wire. Remove gear shift levers, disconnect gearshift selector rods from steering column, remove splash apron, starter motor, turn signal wires, and pitman arm. Remove bolts holding steering column lower bracket to upper bracket on instrument panel and remove steering gear housing-to-frame bolts. Disconnect lower control arm and remove coil or air spring to remove steering gear from front of car. To install, reverse removal procedure and install shims in same locations.

Pontiac 1959: Removal - Remove steering wheel. *See "Steering Wheel & Horn Ring Removal" above.* Remove direction signal wiring harness at connector under instrument panel, then remove direction signal lever. Remove steering column lower finish plate and roll back floor mat, then remove felt and felt retainer plate. Disconnect horn wire and starter neutral safety switch wire. Remove gearshift levers and disconnect selector rods from steering column. Remove splash apron, starter motor, turn signal wires, and pitman arm. Remove bolts holding steering column lower bracket to upper bracket on instrument panel and remove steering gear housing-to-frame bolts. Disconnect lower control arm and remove coil or air spring in order to remove steering gear from front of car. *CAUTION - Retain and note location of shims found between steering gear housing and frame side rail. These must be replaced when steering gear installed.*

Pontiac 1960: Removal - Remove steering wheel. *See "Steering Wheel & Horn Ring Removal" above.* Disconnect direction signal wires at connector under instrument panel and remove direction signal lever. Remove steering column lower finish plate, then roll back floor mat and remove felt and felt retaining plate. Disconnect horn wire and neutral safety switch wire. Disconnect gearshift selector rods from steering column and remove floor pan cover. Remove back-up lamp and switch wires, and turn signal wires. Remove pitman arm, then remove steering gear housing-to-frame bolts and remove steering gear. *CAUTION - Retain shims found between gear housing and frame for installation at same locations.*

Rambler 1958-60: Removal - Disconnect battery and remove steering wheel *(see "Steering Wheel Removal" above).* Remove toe board plate screws and loosen lower-to-upper jacket tube screws. On Series "10" & "20", remove pitman arm with Tool J-5566-03. Support engine at front and remove engine front crossmember, then mark location of turning radius stop plate and remove plate. Remove steering gear housing-to-mounting plate screws and lower gear. On Series 80, remove left wheel, mark position of turning radius stop plate, then remove plate and pitman arm nut, loosen steering gear housing attaching screws and pull pitman arm with Tool J-5566-03. Remove left exhaust manifold. Support engine at front and remove left front engine support mounting bracket. Remove front crossmember with attached stabilizer bar. Remove three steering gear housing screws and lower the steering gear. To install, reverse removal procedure and replace any shims found in removal.

Valiant 1960: Removal - Raise car and remove pitman arm, then remove bolts attaching steering gear to frame. Remove bolt from coupling clamp at upper end of steering worm shaft, then support steering gear and tap coupling assembly upward with a mallet until it is free from shaft splines. Remove steering gear.

STEERING GEAR OVERHAUL

STEERING GEAR OVERHAUL: Disassembly—With steering gear removed, remove the pitman arm with a suitable puller (CAUTION—Do not drive pitman arm from cross shaft as damage to worm and ball nut will result). Loosen adjusting screw lock nut, then remove housing side cover with pitman shaft attached, remove gasket. Separate pitman shaft from side cover by unscrewing the adjusting screw. Loosen lock nut and back off worm thrust bearing adjuster several turns, then remove housing end cover and gasket. Remove lower thrust bearing, steering shaft, and upper bearing from housing. (NOTE—Manufacturer recommends that ball nut NOT be disassembled; however, if it is necessary to disassemble ball nut, proceed as follows): Remove ball return guide clamps and guides from ball nut, turn ball nut over to remove balls (Caution—Hold shaft and ball nut assembly over a wide pan while disassembling to retain all balls. It is very important that balls be counted, and the same number of balls reinstalled when gear is assembled). Remove ball nut from steering shaft.

Reassembly: (Ball Nut)—Place worm shaft flat on bench and slip nut over worm with ball guide holes up and shallow end of rack teeth to left from steering wheel position. Align grooves in worm and nut by sighting through guide holes. Count out one-half the number of balls removed at disassembly, and drop them into one of the guide holes while turning the worm gradually away from the hole, until guide hole is full from bottom of one guide hole to the bottom of the other (in cases where balls are stopped by end of worm, hold down the balls already dropped into hole and rotate worm back and forth). Lay one-half of guide, groove up, on the bench and place remaining half of balls in it. These remaining balls should fill it. Close this half of guide with other half. Hold both halves of guide together and plug each end with vaseline to hold balls in place. Push guide into holes of nut, completing one circuit. Repeat same operation with other circuit. Then assemble ball guide clamp to nut with lockwashers under clamp screws and tighten screws securely.

Steering Gear—Place worm shaft and nut assembly into housing and place upper roller bearing over worm shaft. Place new housing end cover gasket over end of worm shaft, make sure horn wire is through opening in mast jacket, then slide housing end cover over worm shaft and assemble it to housing. Install lower roller bearing, worm bearing adjuster and lock nut in lower end of housing. Assemble lash adjuster with shim in slot in end of sector shaft. Check end clearance which should not be greater than .002". Adjust end clearance with shims as required. Start sector shaft pilot into bushing in side cover. Then, using a screwdriver through hole in cover, turn lash adjuster in counter-clockwise direction to pull sector shaft pilot into its bushing as far as it will go. Rotate worm shaft by hand until ball nut is at center of travel. Place a new gasket on side cover, then push side cover assembly including sector shaft into place. After making sure there is some play between rack and sector teeth, assemble and tighten side cover bolts. Install steering gear in car (see instructions below), and adjust steering gear. See ADJUSTMENTS above.

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

1954-60 BUICK TWIN TURBINE & VARIABLE PITCH DYNAFLOW DRIVE

Buick (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Place shift control lever in "N" (Neutral) position until car reaches a speed of 15 MPH, then move control lever to "L" (Low) position and continue to increase speed until engine starts at approximately 25 MPH. After engine starts, return lever to "N" (Neutral) position for engine warm-up.

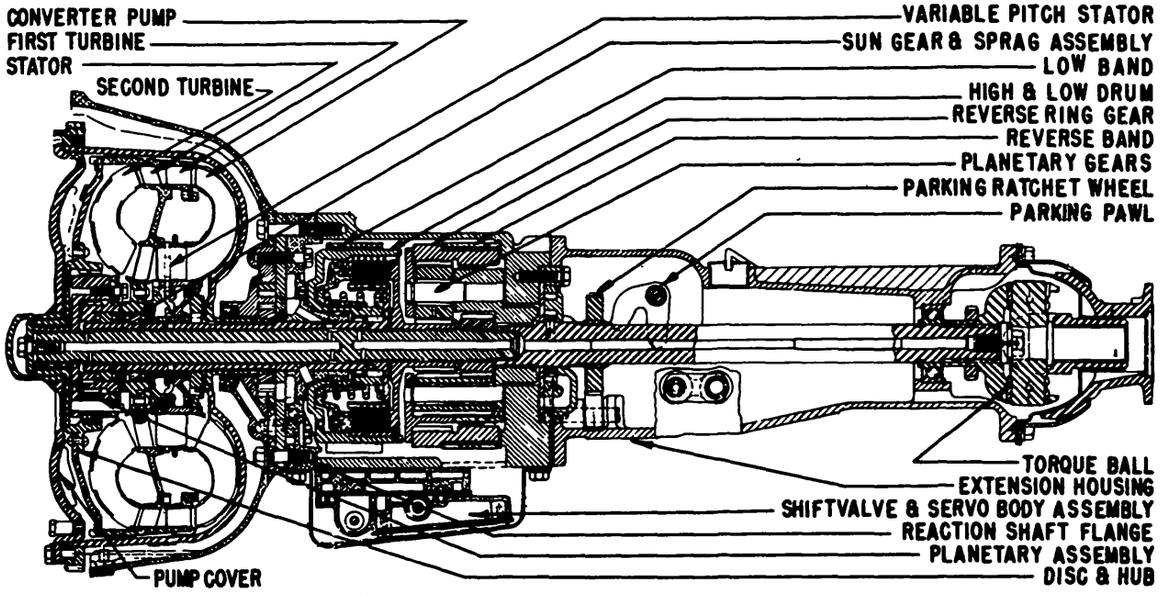
►*TOOL MODIFICATION NOTE (REACTION SHAFT BUSHING INSTALLER TOOL J-5816):* Shoulder of tool must be ground off sufficiently to allow reaction shaft bushing to be driven deep enough so that it is located between the two snap ring grooves inside reaction shaft.

►*1956 TORQUE CONVERTER PUMP PRODUCTION CHANGE & SERVICE CAUTION:* Late 1956 cars will have two types of converter pump assemblies used interchangeably in production. The new converter pump is a steel stamping and is identified by an orange "X" on converter pump and also on top of bellhousing. The earlier conventional aluminum pump will also be used. When removing and replacing torque converter-to-flywheel and cover bolts the square head bolt, Part No. 1171053 must be used with the steel converter pump and the "D" shaped bolt head must be used with the aluminum casting pump. Transmission equipped with the steel torque converter pump will require one more pint of transmission oil than transmissions having the aluminum pump.

►*1956 DYNAFLOW TRANSMISSION OIL LEAKAGE CORRECTION (OIL BLOWING OUT OF BREATHER PIPE):* See *"Overhaul" below.*

►*1956 DYNAFLOW FRONT PUMP SEAL SERVICE REPLACEMENT (NEW TYPE SPRING LOADED CARBON SEAL FOR USE WITH TRANSMISSIONS HAVING ALUMINUM PRIMARY PUMP):* The new carbon seal is designed to seat against flat face of primary pump hub, making it possible to use the seal on pumps which would normally be replaced because of scored hub in area of the present seal. It is suggested the new seal be installed in transmissions having primary pump which would ordinarily be replaced because of sealing difficulties. See *"Overhaul" below, for installation procedures.*

►*1957 (EARLY CARS) STATOR CONTROL VALVE STICKING CORRECTION:* Stator control valve may stick in the down position and allow stator blades to remain in high angle position at all times. If this condition exists, engine speed during part throttle in drive range will be abnormally high and there will be no evidence of increased engine RPM when accelerator is pressed to floor. Adjust stator control linkage (see *"Throttle Linkage Adjustment" in car model page*). If this does not correct the condition, check to see if there is a belleville type washer (dished washer) between valve operating lever and bearing nut. If one is found at this location, remove and discard it, leaving the flat washer. If stator control valve continues to stick, replace the valve assembly with Part No. 1179828. During reassembly of the high accumulator, adjust stator operating rod as follows: With crank against actuating valve and valve in extreme upper position, lever should be tight against stop pin when lock nut is tightened.



BUICK VARIABLE PITCH DYNAFLOW DRIVE (SECTIONAL VIEW)

►*1957 VALVE BODY & VALVE PRODUCTION CHANGE:* The later valve body prevents oil being dumped above the screen as ports in the valve body have been changed. The later valve body is identified by absence of ports in valve boss. Valve is identified by a groove in valve land adjacent to actuating lever end. These parts are interchangeable; however, the adjusting procedure is different when later type valve body is used. See *"Valve & Servo Body Installation" under "Overhaul" below.*

►*1957 (EARLY CARS) TRANSMISSION OIL BYPASSING VALVE BODY SCREEN CORRECTION:* When oil pan is removed, check to see if there are openings between screen frame and valve body at the six corners of frame. If so, install an "O" ring, Part No. 1336936 (front pump "O" ring seal) by loosening oil screen screws and pressing the "O" ring under screen frame at all six corners. Tighten screws. Later type screen has been changed to eliminate the openings.

►*1957 LOOSE SHIFT CONTROL LEVER NOTE:* If the shift lever can be moved from "R" to "P" position without lifting lever, and no definite stops are noticed at any point between these two positions, the stop pin at end of shift lever is worn or broken and the shift lever should be replaced. To install shift lever, proceed as follows: Remove shift lever to housing pin retainer and drive out pin. Pull lever out toward steering wheel and remove lever (*CAUTION - When removing lever, take care to keep lever return spring from flying loose*). Position lever return spring on lever with closed end of spring engaged in groove of lever and open ends of spring pointing downward. Insert a Phillips screwdriver through spring coils and hole in lever, then insert lever into housing. Using needle nosed pliers, rotate each end of return spring into lever housing. When spring is in housing, push lever inward until screwdriver makes contact with housing, then remove screwdriver and push lever in until lever retaining pin can be driven into position. Install pin retainer by rotating it on lever housing to lock it in position.

►*1957 DYNAFLOW OIL PAN BOLT TIGHTENING CHANGE:* To prevent overtightening of oil pan bolts and damage to oil pan gasket, resulting in oil pan leakage, tighten the bolts to 10-12 ft. lbs. This supersedes previous specifications of 15-18 ft. lbs.

►*1957 SHIFT LINKAGE RATTLE CORRECTION:* Install an anti-rattle spring washer, Part No. 1180307, between clevis and control shaft lever at bottom of steering column.

►*1957 DYNAFLOW VALVE BODY PRODUCTION CHANGE & SERVICE NOTE:* To prevent the possibility of air being drawn into the hydraulic system during cornering, the valve body vent hole has been relocated to a position in the rear pump suction passage. Whenever the oil pan is removed on early 1957 cars, the control valve should also be removed and the original 1/8" vent hole should be plugged with a self tapping screw. A new hole should be drilled in the rear oil pump passage. See *"Overhaul" below.*

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DYNAFLOW DRIVE (C nt.)

►*1957 DYNAFLOW FRONT PUMP OIL SEAL PRODUCTION CHANGE* A new silicone-rubber seal is being used in production and for service replacement. When installing the new seal, care must be taken to prevent tearing or damage. The retaining spring around sealing element must be in toward pump when installed.

►*1958 STATOR CONTROL VALVE (IN HIGH ACCUMULATOP) REPLACEMENT CAUTION:* When replacing stator control valve in high accumulator; if accumulator is marked "oversize" (stamped on top side next to stator control valve stop), it will be necessary to replace complete accumulator assembly as "oversize" control valve is not available for service replacement.

►*1958 SHIFT CONTROL VALVE STOP (IN VALVE & SERVO BODY) PRODUCTION CHANGE:* On later production transmissions not having a control valve stop pin (located adjacent to "low servo" on valve body), adjust control valve as follows: Move shift lever to "D" (Drive) position and note position of valve. Groove in first land of valve should be flush with boss on valve body. If valve is not properly positioned in valve body, loosen lock and bolt and shift the adjusting lever on valve lower operating lever as required to obtain specified setting. Tighten bolt and nut on levers, making sure that adjustment does not change.

►*1959 DYNAFLOW SECOND TURBINE CARRIER & SUN GEAR PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Second turbine front thrust washers used with early and later type assemblies are different. If replacement of the thrust washer is necessary, use the same type as removed.

►*1959 DYNAFLOW TURBINE ASSEMBLY PRODUCTION CHANGE:* Beginning with Transmission Code No. W-045, a new turbine assembly consisting of a first turbine, first turbine support, and first stator is being used in production. The new parts are not interchangeable separately with earlier 1959 transmissions but may be used as a complete unit. Service procedures for assembling and disassembling the twin turbine assembly having the new parts is different as indicated below.

►*1959 LOW ACCUMULATOR CHANGE (IMPROPER ASSEMBLY CAN CAUSE HARSH ENGAGEMENT OF LOW BAND): NOTE - The new type accumulator may also be found on some late 1958 models.* Metered oil flow to low servo is provided by the space around the pin in the new type accumulator as compared to the drilled metering orifice in previous accumulators. It is important that the pin be installed, otherwise harsh engagement of the low band will result.

►*1959 DYNAFLOW TRANSMISSION SUPPORT REMOVAL & INSTALLATION CAUTION:* Before any service operation requiring the removal of transmission support is performed, the original location of the support must be marked so it can be reinstalled in exactly the same location and at the same angle. Improperly installed support will cause drive line stress and roughness.

►*1959 DYNAFLOW CASE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Later type cases without an expansion plug at the low brake band anchor hole in case require a longer low brake band anchor. When installing a later type case to replace the earlier case, it is necessary that a new anchor, Part No. 1191861, be installed.

►*ACCUMULATOR BODY CAP LEAKAGE CORRECTION (1959 & EARLIER TRANSMISSIONS):* A new .020" thick gasket, Part No. 1193781 is being used in production after Transmission Code W-179 and may be used on all earlier transmissions to prevent exterior leakage. If the earlier gasket, Part No. 1333485 is used, it is suggested that two gaskets be used rather than one.

►*1960 TWIN TURBINE TRANSMISSION CODE NUMBER NOTE:* A code number is stamped on lower edge of reaction shaft flange directly to rear of high (left) accumulator and should be used as identification when ordering parts or for service procedure changes. The 1960 starting number is "A 001".

►*1960 TWIN TURBINE TRANSMISSION CASE PRODUCTION CHANGE:* A new transmission case, having the reverse ring gear pads machined to a larger diameter (to accommodate a new bronze reverse ring gear slipper), is being used in later production cars. The new slipper, Part No. 1190344, has tangs to engage mating slots in transmission case. If necessary to replace a reverse ring gear assembly in later units with the bronze slipper ring, ring gear Part No. 1196045 must be used. The new ring gear may be used for service replacement in earlier transmissions (without the slipper ring).

►*1960 STATOR SHIFT VALVE & SPRING PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* Beginning with transmission Code "A 058" a new stator valve, Part No. 1196885, and spring, Part No. 1199089, is being used in production. The new parts are not interchangeable with parts used on earlier transmissions. *Stator valve setting in the accumulator or stator control linkage adjustments are not changed.*

DESCRIPTION: Two-speed hydraulically operated planetary type transmission and torque converter. *NOTE* - Different types of torque converters used as noted below. Manual selector lever on steering column controls operating range of transmission (Low, Drive, Reverse, Neutral, or Park), providing definite gear ratios (in addition to varying ratios of torque converter).

Torque Converters: Except for stator assemblies (see below) torque converter assemblies are similar for all models.

First Turbine—Located directly forward of the converter pump and has narrow band of vanes which receive all oil flow from pump. This turbine is mounted on a disk and hub assembly bearing on the turbine carrier hub and is geared to the second turbine (internal gear of planetary gear set is mounted on the disk hub).

Second Turbine—Located within first turbine case with broad band of vanes which receive all oil flow from first turbine and directs the oil flow back into the stator. This turbine is bolted to a turbine carrier which is splined on the input shaft. The planet pinions of the turbine gears are mounted on carrier and mesh with the internal gear on the first turbine disk hub and with the sun gear which is mounted on a bearing on the input shaft and coupled to stator free-wheel cam (gears are always in mesh but operate only when sun gear and stator are held stationary for torque converter action). With the stator unlocked and free-wheeling (when torque converter operating as a fluid coupling, sun gear is likewise free to rotate which allows all units to rotate at nearly the same speed as the converter pump.

1954 Stator - Located directly behind inner end of second turbine vanes. Receives oil from second turbine and redirects oil back to pump. Stator is mounted on reaction shaft by means of a free wheeling unit. The free wheeling cam is coupled to sun gear of turbine planetary gear set and controls the geared action of first and second turbines.

1955-60 Stator (Variable Pitch) - The single variable pitch stator is located directly behind inner end of second turbine vanes and receives oil from second turbine and redirects it back into pump. Stator is mounted on a reaction shaft by means of a free wheeling unit similar to previous models. Each of the twenty stator blades is on an individual control crank which is free to turn in its bearing in stator carrier. The carrier contains a piston which actuates blades through the control cranks when oil pressure is applied to one or both sides of piston. It is by this means that stator changes to "high" or "low" angle for normal cruising or for rapid acceleration.

LUBRICATI N

Check oil level at 1000 miles intervals and add oil as required. Drain and refill at 25,000 mile intervals.

►*CAUTION: Oil must be warm and engine must be idling when checking oil level. Warm up ngine b f re draining.*

Checking Oil Level: With oil warm and engine idling with control lever in "P" (Parking), position, check oil level as indicated on dipstick in filler tube in engine compartment (on right side between battery and engine). If level is more than 1" below FULL mark on rod, add recommended oil to bring level up to FULL mark *(CAUTION - Do not fill above FULL mark).* Distance between ADD OIL and FULL marks on dipstick is equal to approximately 1 pint of oil.

►*CAUTION: If oil level is consist ntly low wh n checked (indicating loss of 1 pint or mor p r 1000 miles), check transmission thoroughly for oil leaks.*

Draining & Refilling: With oil warm, drain transmission case, then drain torque converter (loosen one plug, then turn torque converter until second plug is downward and remove this plug). After complete draining, reinstall plugs. Install three quarts of recommended fluid through filler opening in case. Start engine and allow it to idle with selector lever in "P" (Park) position, then add fluid to bring level up a point 1¾" below FULL mark on dipstick. After transmission is at normal operating temperature, recheck fluid level. Oil should be at FULL mark on dipstick.

►*CAUTION: DO NOT FLUSH transmissi n wh n changing oil.*

Capacity (1954-56) - 10 qts. (refilling after draining). Install an additional 1¾ pts. (after overhaul). *NOTE - Some 1956 cars may require an additi nal quart f fluid (after draining) because of a d sign chang in torque converter.*

Capacity (1957) - 11 qts. (cars with early "Looped Handle" dipstick; 11½ qts. (cars with later "Right

CONTINUED N NEXT PAGE

DYNAFLOW DRIVE (C nt.)

Angle Handle" dipstick. Install an additional 1¾ pts. (after overhaul).

Capacity (1958-60) - 12 qts. (refilling after draining). Install an additional 1¾ pts. (after overhaul).

Rec mmend d Fluid - Use only Automatic Transmission Fluid Type "A", having an AQ-ATF number embossed on can.

LINKAGE ADJUSTMENT

1954 MODELS

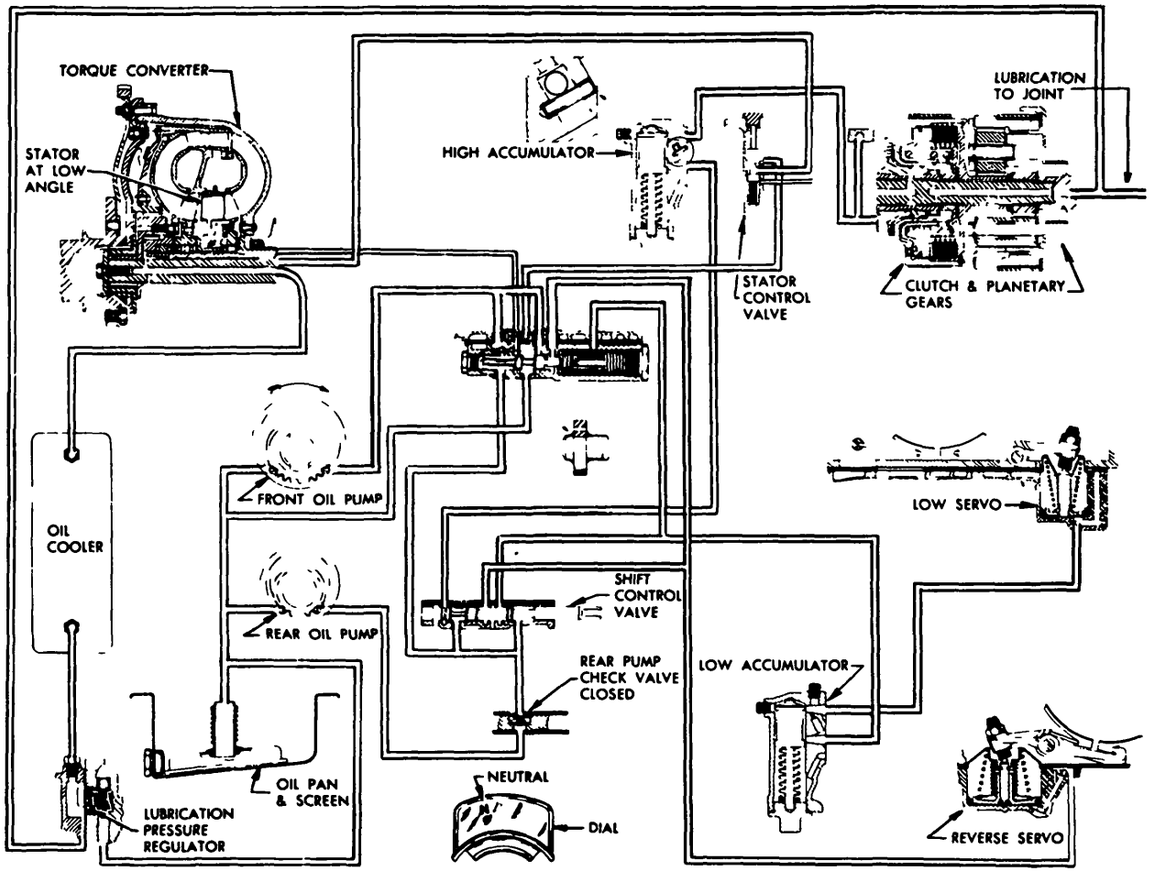
Thr ttl Linkag & Stat r Control Linkage Adjustment: Se CARBURETOR on Car Model pages.

Manual Control Linkagé: Transmission must be thoroughly warmed up (driven approximately 20 miles under traffic conditions with frequent starts and stops) and oil level must be correct. Then proceed as follows:

(1) Place shift control lever in Neutral "N" with detent plunger centered in detent notch, move lever until stop pin is against stop in dial housing, note movement of dial pointer. Repeat this operation in Low "L" position. Dial pointer movement should be approximately equal in both positions. If not, loosen control detent mounting bolts on steering column jacket, shift detent until dial pointer travel is equal. Place lever in Low "L" position, carefully bend dial pointer, if necessary, so pointer is in line with "L" on dial.

(2) Check parking mechanism by placing car on ramp or steep grade with control lever in Parking "P". Parking lock should hold securely. Place control lever in Neutral "N" and allow car to roll. If "clicking" ratchet noise heard, or if parking lock did not hold car on grade, adjust as follows: Place control lever in Parking "P" position, disconnect shift rod from shift idler lever on steering column, pull forward on rod and move car slightly to make certain locking pawl fully engaged (CAUTION—do not jerk on rod). Check movement at lower end of shift lever on left side of transmission case by pressing forward on lever (against spring tension) until definite stop is felt. This movement should be 1/8-3/16" beyond the parking "P" position. If spring travel not within these limits, control valve is out of adjustment (requires removal of torque ball). If spring travel correct, pull shift rod forward against stop, adjust shift rod clevis until clevis pin can just be entered in hole in idler lever with control detent engaged in Parking "P" position, then **lengthen rod by unscrewing clevis 3 full turns,** connect rod temporarily (may require readjustment in next step).

(3) Place shift control lever in Neutral "N" position with detent fully engaged. With transmission warm and engine idling at 600 R.P.M., move control lever from Neutral "N" to Drive "D" position slowly. Clutch should engage (noted by immediate decrease in engine speed) when tip of dial pointer is midway between "N" and "D" on speed ratio dial. Move control lever from Drive "D" to Neutral "N" position slowly. Clutch should disengage (noted by immediate increase in engine speed when tip of pointer is midway between "D" and "N" on dial. If clutch engagement and disengagement points not correct, readjust clevis on shift rod at shift lever (see (2) above), being careful not to disturb Parking adjustment. Do not connect shift rod permanently until adjustment (4) completed.



TWIN TURBINE DYNAFLOW HYDRAULIC CIRCUITS (TYPICAL)

►*CAUTION—When making above adjustment, do not change shift rod length so much that parking lock fails to hold or pawl contacts ratchet wheel in Neutral (check as directed in (2) above).*

(4) Check operation in Low "L" and Reverse "R" positions. Detents should be engaged and shift points should occur when tip of dial pointer is midway between "D" & "L" (Low), midway between "L" & "R" (Reverse). If shifts do not occur at correct points, check for bent transmission shift lever, bent valve operating upper lever ,or lever loose or incorrectly seated on shaft.

(5) After above adjustments completed, tighten clevis nut on shift rod clevis and permanently install clevis pin with plain washer and spring washer on each side of clevis.

►*CAUTION—Neutral Safety Switch and Back-up Light Switch must be checked after changing control detent and shift rod adjustments.*

Neutral Safety Switch Adjustment: With manual control linkage properly adjusted, ground primary terminal of distributor so that engine can be cranked without firing. Fully apply parking brake and place transmission control lever in "N" (Neutral) position. Place a narrow strip of masking tape on speed ratio dial so that upper end of dial pointer is visible. Make two marks on masking tape at ⅛" and 3/16" from center of pointer. Move control lever to "D" (Driving) position, turn ignition on and depress accelerator pedal to close accelerator vacuum switch. Slowly move dial pointer from "D" to "N" and note position of center of pointer at instant cranking motor just starts to operate. Release accelerator pedal. The center of the pointer should be between the two marks made on masking tape. If switch does not cut in within the specified limits, loosen switch mounting screws and move switch sideways as required for proper timing. Tighten mounting screws.

►*BACKING SWITCH NOTE*—No separate adjustment required (switch operation will be correct when neutral safety switch properly adjusted).

1955 MODELS

Throttle Linkage & Stator Control Linkage Adjustment: See CARBURETOR on Car Model pages.

Manual Shift Control Linkage Adjustment: 1) With shift control lever released, the stop screw in con-

CONTINUED ON NEXT PAGE

DYNAFLOW DRIVE (Cont.)

trol shaft lower lever must be flush (±.010") with upper surface of stop plate. Adjust as required.

2) With shift control lever in "D" (drive) position, .035-.050" clearance must exist between lower lever stop screw and upper edge of large opening in stop plate (since this clearance cannot be readily checked, because of location, it may be assured by carefully performing the following adjustment).

(a) Disconnect lower shift rod clevis from idler lever and make sure that transmission shift lever is firmly held by detent in "D" position.

(b) With shift control lever on steering column in "D" position, push upward on the lever to hold stop screw in contact with stop plate, then adjust clevis in shift rod so that clevis pin will freely enter clevis and lever.

(c) Shorten length of rod by turning clevis 2 to 3 turns up on rod, then install clevis pin with anti-rattle washers and tighten clevis locknut. The number of turns at the clevis provides a specified clearance at the stop pin.

3) Park car on ramp or other slight grade with the control lever in "P" (parking) position to determine whether parking lock holds securely. Then let car roll with control lever in "N" (neutral) position and listen for a clicking or ratchet noise which indicates that the parking lock pawl is contacting the parking lock ratchet wheel. If parking lock fails to hold or ratchet noise exists, jack car up so that a wheel may be turned to rotate propeller shaft.

4) Loosen linkage adjusting lever lock bolt on side of rear bearing retainer. With transmission in "N" (neutral), tap rear end of lever upward until a slight ratchet noise is heard when propeller shaft is turned, then tap lever down just enough to eliminate the noise. Tighten lock bolt securely making certain that lever does not change position.

5) Set parking brake to prevent rear wheels from turning then start engine, with car still safely jacked up.

6) With transmission warmed up and engine idling at approximately 600 RPM, slowly move control lever from "N" to "D" position. The clutch should engage, as indicated by an immediate decrease in engine speed when center of dial pointer is midway between "N" and "D" on dial.

7) Slowly move control lever from "D" to "N" position. Clutch should disengage, as indicated by an immediate increase in engine speed, when center of dial pointer is midway between "D" and "N" on dial.

8) If points of clutch engagement and disengagement are not as specified, and all preceding linkage adjustments have been made correctly, it will be necessary to remove transmission oil pan, suction screen, and adjust position of shift control valve as described in "Valve & Servo Body Installation" under "Reassembly" below.

Neutral Safety Switch Adjustment: With manual control linkage properly adjusted, ground primary terminal of distributor so that engine can be cranked without firing. Fully apply parking brake and place transmission control lever in "N" (Neutral) position. Place a narrow strip of masking tape on speed ratio dial so that upper end of dial pointer is visible. Make two marks on masking tape at ⅛" and 3/16" from center of pointer. Move control lever to "D" (Driving) position, turn ignition on and depress accelerator pedal to close accelerator vacuum switch. Slowly move dial pointer from "D" to "N" and note position of center of pointer at instant cranking motor just starts to operate. Release accelerator pedal. The center of the pointer should be between the two marks made on masking tape. If switch does not cut in within the specified limits, loosen switch mounting screws and move switch sideways as required for proper timing. Tighten mounting screws.

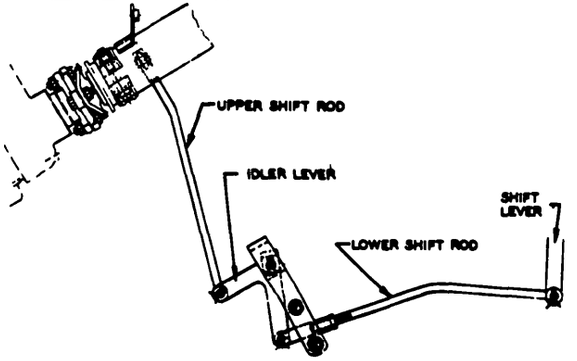
►*BACKING SWITCH NOTE*—No separate adjustment required (switch operation will be correct when neutral safety switch properly adjusted).

Switch Wiring—Check wire connections on switch terminals for correct wiring (incorrect wiring may allow starter to crank with lever in other positions than Neutral or Park—may engage when shifting from Low to Drive during heavy pull), or backing lights may operate with shift lever in other than Reverse.

1956 MODELS

Throttle Linkage & Stator Control Linkage Adjustment: *See CARBURETOR on Car Model pages.*

Manual Shift Control Linkage Adjustment: Warm transmission to normal operating temperature and make sure transmission oil is at proper level. With lower shift rod disconnected from idler lever and manual control lever on steering column in "D" (Drive) position, adjust the stop screw at lower end of steering column into slot of spring until the spring is deflected .030-.035". Carefully move lower shift rod forward and backward to determine when it is in center of slotted hole in transmission shift lever (approximately .060" movement is possible). Adjust clevis until pin enters hole in idler lever without moving rod in slotted hole in transmission shift lever. Remove pin and assemble anti-rattle washers, clevis pin and cotter pin. Park car on ramp or other grade with control lever in "P" (Parking) position to determine whether parking lock holds securely. Then let car roll with control lever in neutral position and listen for a clicking or ratchet noise which would indicate that parking lock pawl is contacting parking lock ratchet wheel. If parking lock fails to hold or ratchet noise exists, jack up car so a wheel may be turned to rotate propeller shaft. Loosen linkage adjusting lever lock bolt on side of transmission rear bearing retainer. With transmission in neutral, tap rear end of lever upward until a slight ratchet noise is heard when propeller shaft is turned, then tap lever down just enough to eliminate the noise. Tighten lock bolt securely. With engine idling at 600 RPM (engine warm), slowly move control lever from "N" (Neutral) position to "D" (Drive) position. The clutch should engage, as indicated by an immediate decrease in engine speed when the center of dial pointer is midway between "N" and "D" on speed ratio dial. Slowly move control lever from "D" (Drive) position to "N" (Neutral) position. Clutch should disengage, as indicated by an immediate increase in engine speed, when center of speed ratio pointer is midway between "D" and "N" on speed ratio dial. If points of clutch engagement and disengagement are not as specified and all preceding linkage adjustments have been made correctly, it will be necessary to remove transmission oil pan and adjust position of the shift control valve. *See "Valve & Servo Body Installation" under "Reassembly" below.*



DYNAFLOW MANUAL LINKAGE

Neutral Safety Switch Adjustment: With manual control linkage properly adjusted, ground primary terminal of distributor so that engine can be cranked without firing. Fully apply parking brake and place transmission control in "N" (Neutral) position. Place a narrow strip of masking tape on speed ratio dial so that ends of letters "D" and "N" are visible. With transmission control firmly engaged in neutral detent, make pencil mark on masking tape at **right edge** of pointer, then make two marks on tape at 1/8" and 3/16" to right of first mark. Move control lever to "D" position, turn ignition on and depress accelerator pedal to close accelerator vacuum switch. Slowly move dial pointer from "D" to "N" and note position of **right edge** of pointer at instant the cranking motor just starts to operate. Release accelerator pedal. The **right edge** of pointer should be between the two marks made on masking tape at 1/8" and 3/16" out of neutral. If neutral safety switch does not cut in within specified limits, move it sideways on column jacket as required to obtain proper timing. Tighten mounting screws.

1957-60 MODELS

Throttle Linkage & Stator Control Linkage Adjustment: *See CARBURETOR on Car Model pages.*

Manual Shift Control Linkage Adjustment: 1) Move manual control lever carefully until transmission is shifted into its "D" (Drive) detent position (manual lever will seem to catch). Now move manual control lever toward "N" (Neutral), without lifting toward steering wheel, and notice how far it moves before contacting stop.

2) Move manual control lever until transmission is in "L" (Low) detent position. Then move manual control lever toward "R" (Reverse) and notice how far it moves before it contacts stop.

3) If movement from "D" detent to stop is the same as movement from "L" detent to stop, shift control linkage is correctly adjusted. If the above check indicates linkage to be incorrectly adjusted, adjust linkage as follows:

4) With manual control lever in "D", raise car and loosen adjusting clevis locknut on lower shift rod. Remove clevis pin, cotter key and spring washer. Make sure transmission is in "D" detent (center position of five possible detents).

5) Move idler lever so that upper shaft rod is forced upward as far as possible. Then turn clevis until clevis

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DYNAFLOW DRIVE (Cont.)

pin will just slip in place without moving transmission shift lever. Shorten lower shift rod by turning clevis four complete turns. Install clevis pin spring washer and cotter key.

6) Lower car and check adjustment at manual control lever as indicated above. If movement of lever is not correct, readjust lower shift rod clevis slightly until movement is even.

7) Park car on a ramp or other grade with control lever in "P" (Park) position to determine whether parking lock holds securely. Then let car roll with control lever in "N" (Neutral) position and listen for a clicking or ratchet sound which indicates that parking lock pawl is contacting parking lock ratchet wheel.

8) If parking lock fails to hold or ratchet noise exists, jack car up so a wheel may be turned to rotate propeller shaft. Loosen linkage adjusting lever lock bolt on side of transmission rear bearing retainer. With transmission in "N" (Neutral), tap rear end of lever upward until a slight ratchet noise is heard when propeller shaft is turned, then tap lever down just enough to eliminate the noise.

9) With transmission warmed up and engine idling at approximately 600 RPM, slowly move control lever from "N" to "D" position. The clutch should engage, as indicated by an immediate decrease in engine speed when center of dial pointer is midway between "N" and "D" on speed ratio dial. Slowly move control lever from "D" to "N" position. Clutch should disengage, as indicated by an immediate increase in engine RPM, when center of speed ratio pointer is midway between "D" and "N" on speed ratio dial.

10) If points of clutch engagement and disengagement are not as specified, and all preceding linkage adjustments have been correctly made, it will be necessary to remove transmission oil pan and adjust position of shift control valve. *See "Valve & Servo Body Installation" under "Reassembly" below.*

11) After adjusting shift control linkage, make sure that dial pointer lines up with letters on face of dial. If necessary, adjust as follows:

Control Dial Pointer Position Adjustment: Place manual control lever in "N" position. Remove dial by prying between dial and housing until dial snaps out. Loosen nut holding pointer to transmission shaft. Correct pointer alignment leaving 3/16" to 1/4" between pointer and back plate. Tighten nut. Snap dial back in place and recheck pointer alignment.

Neutral Safety Switch Adjustment: Check and adjust shift control linkage. Place shift control lever in "N" (Neutral) position. Insert a 3/32" drill through gauging hole in operating lever and through gauging hole in switch body *(CAUTION - Be careful not to move shift control lever out of neutral position).* If gauging drill is now parallel with centerline of steering column jacket, switch timing is correct. If gauging drill will not go through holes or is not parallel, loosen two switch mounting screws and move switch sideways until gauge is parallel. Tighten screws. To check adjustment, turn on ignition switch, place shift control lever in "R" (Reverse) position, and make sure back-up lights are lit. Then set parking brake, place shift lever in "N" (Neutral) and make sure engine will start.

BAND ADJUSTMENT

►*BAND ADJUSTMENT NOTE: Bands cannot be adjusted with transmission installed in car. Adjustment is ordinarily required only at time of overhaul.*

Low & Reverse Band Adjustment: Remove band adjusting cover, then loosen locknut and turn adjusting screw clockwise until considerable resistance is felt indicating that band is in full contact with drum (low) or ring gear (reverse). Back off screw until just a trace of play can be felt by prying up on locknut with a screwdriver. From that point, back off screw 6 complete turns and tighten locknut finger tight. Note position of adjusting screw slot, then tighten locknut to 20-25 ft. lbs. Remove torque wrench and check to make sure that adjusting screw did not turn. Install band adjusting cover with a new gasket.

TESTING

If performance not satisfactory, make following tests with transmission thoroughly warmed up and at operating temperature:

Oil Level: Check oil level, add fluid as necessary to bring level up to FULL mark on dipstick, recheck performance with correct oil level. If car has been losing oil at rate of 1 pint or more each 1000 miles, make thorough check for oil leaks.

Manual Control Linkage: Check and adjust manual control linkage. See Linkage Adjustment.

Hydraulic Control System Pressures: Use Transmission Oil Pressure Gauge J-2575. Support rear end of car solidly with wheels off floor so that transmission can be operated. Remove transmission cover in floor pan for access to pressure take-off points.

Connect gauge and make tests as follows:

Front Oil Pump - Connect pressure gauge at pipe plug opening on left side of transmission case. Run engine at 500 RPM, check pressure with selector lever in Low, Drive, and Reverse ranges. Repeat tests at 1000 RPM, and at 1800 RPM in Low and Reverse only. See table below for correct pressures. Low or erratic pump pressures indicate air leaks in suction lines, improper pressure regulator valve action, or excessive pump clearances.

Front Pump Pressures

Selector Lever -	Low	Drive	Reverse
500 RPM	120 lbs.	90 lbs.	©120 lbs.
1000 RPM	180 lbs.	90 lbs.	
1800 RPM	180 lbs.	90 lbs.	

© - 100 lbs. on 1954 models.

Rear Oil Pump (1954-58 Models) - *NOTE - Not required on 1959-60 models.* Connect pressure gauge at pipe plug opening in lower flange at front end of rear bearing retainer. Run engine at 500 RPM, check pressure with selector lever in Low & Drive Ranges. Repeat test at 1000 RPM and at 1800 RPM. See table below for correct pressures. Low or erratic pump pressures indicate air leaks in suction lines (this will effect both pumps), improper pressure regulator valve action, excessive pump clearances or leaks in valve and servo body passages between pump and regulator valve.

Rear Oil Pump Pressures

Selector Lever -	Low	Drive
500 RPM	90 lbs.	90 lbs.
1000 RPM	180 lbs.	90 lbs.
1800 RPM	180 lbs.	90 lbs.

High & Low Accumulator - Connect pressure gauge at pipe plug opening on top of accumulator body (High - left side of car; Low - right side of car). Place selector lever in Drive Range (High Accumulator Test); Low Range (Low Accumulator Test). Run engine and check pressures at speeds indicated in table below. Low accumulator pressure may be caused by leakage past accumulator body gasket. If accumulator pressure is more than 10 lbs. lower than front pump pressure, check for leakage between accumulator and multiple disc clutch and for restricted or plugged metering orifice in accumulator dump valve.

Accumulator Pressures

Selector Lever -	Low	Drive
500 RPM	115 lbs.	80 lbs.
1000 RPM	175 lbs.	85 lbs.
1800 RPM	175 lbs.	85 lbs.

Stator (1955-60 Models) - Connect pressure gauge at pipe plug opening on left end of reaction shaft flange. Test pressure in Drive Range at 500 RPM, 1000 RPM, and 1800 RPM

Stator Pressures

1955 Models

Selector Lever -	Drive
500 RPM	70 lbs.
1000 RPM	75 lbs.
1800 RPM	75 lbs.

1956-60 Models

Selector Lever -	Drive
500 RPM	10 lbs.
1000 RPM	70 lbs.
1800 RPM	75 lbs.

TROUBLE SHOOTING

►*EXCESSIVE DYNAFLOW WHINE CORRECTION: (This condition is usually the result of excessive clearance between input shaft and bearing in the reaction shaft).* If transmission is to be disassembled to correct whine, perform the following:

1) Remove converter cover, twin turbine assembly, and sun gear, then mount dial indicator on end of input shaft with indicator button contacting reaction shaft. Position indicator button 90° to left of top center (facing end of shaft) then move input shaft away from and toward indicator while noting the gauge reading. Repeat this check at 45° to left of top center. If dial reading exceeds .005", excessive clearance exists between input shaft and bearing in reaction flange. 2) Before replacing bearing, remove reaction flange assembly and input shaft and observe the following: (a) Inspect bearing surface on input shaft. If surface appears abnormally rough or scored, replace input shaft; if not, polish journal area with crocus cloth. (b) Inspect the two oil seal rings toward rear of input shaft and the mating surface in the reaction shaft for scoring or other damage. If reaction shaft or input shaft shows evidence of scoring or other damage, replace worn or damaged parts.

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DYNAFLOW DRIVE (C nt.)

3) If inspection reveals that condition of reaction shaft and input shaft are satisfactory, replace only the input shaft bearing (see Overhaul data).

4) If input shaft, reaction flange, or the bearing requires replacement, it will be necessary to replace the converter sun gear and planet pinions. *NOTE* - When installing reaction flange service bushing, be sure the assembly is supported on rear end of reaction shaft to prevent distortion of aluminum reaction flange.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With selector in any Range (rear wheels free). If car will not move for 1-8 minutes after standing over night - Check front pump oil pressure (see Testing) after allowing car to stand for several hours. If zero pressure noted, check pump for excessive clearances allowing pump to lose its prime. Check alignment of of bell housing and converter primary pump hub.

►*CAUTION: If this condition found, inspect Clutch and Bands for excessive wear due to slippage caused by low oil pressure.*

If car will not move after extended operation in Reverse - Check for air leaks in pump suction line (at rear oil pump gaskets), or excessive clearance in front pump (at pump gears and covers). Check alignment of bell housing and converter primary pump hub.

2) With selector in any Range (rear wheels locked). Parking lock engaged. Broken parts in transmission or rear axle. Parking brake applied.

3) With selector in Drive Range. Check front oil pump pressure and High Accumulator pressure. If OK, check for sticking Low Band Anchor Piston, remove and inspect Clutch-for worn or sticking clutch plates, leaking clutch seal rings. If High Accumulator pressure pressure low, also check rear pump Check Valve for correct installation and proper seating, check for leaks at accumulator body gasket, reaction flange gasket, clutch piston outer seal and clutch ball check valve, and leaks at sealing rings on reaction shaft flange and low drum.

4) With selector in Reverse Range. Check reverse band for displaced operating strut caused by too loose adjustment, improper installation, or broken band anchor (indicated by free up and down movement of band operating lever). If band assembly OK (no free movement of lever), check servo operation by running engine and shifting into Reverse. Remove Valve & Servo Body and check for reverse servo piston seal leaks.

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, or poor acceleration).

1) In all Speed Ranges. Low oil level. Incorrect manual control linkage adjustment. Air leak in oil pump suction pipe at oil screen sealing ring. Low front oil pump pressure caused by wear or excessive clearances in in pump. Leaks at front pump cover or reaction shaft flange, pressure regulator valve. Valve & Servo Body gasket. Pressure regulator valve defective.

2) In Drive Range. Incorrect manual control linkage adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, check for leaking clutch sealing rings, sticking clutch piston, worn or sticking clutch plates.

3) In Low Range. Incorrect manual control linkage adjustment. Incorrect low band adjustment. Low band and drum worn or scored. If Low Accumulator pressure low, check for leak at accumulator body gasket; if gasket OK, remove Valve & Servo Body and check for gasket leaks or leaks at low servo piston seal.

4) In Reverse Range. Incorrect manual control linkage adjustment. Reverse band out of adjustment, strut out of place, or anchor broken. If front oil pump pressure low, remove Valve & Servo Body and check for gasket leaks and leaking reverse servo piston seal.

CAR CREEPS (Forward or Backward).

1) Creeps forward with selector in Neutral. Incorrect manual control linkage adjustment. Sticking low servo piston (check by removing low band adjustment cover). Sticking clutch caused by warped, binding, or incorrectly assembled clutch plates (not stacked properly with "dish" in same direction).

If Car Creeps only when engine accelerated to 2500 RPM - Check clutch vent ball checks in clutch piston and reaction shaft flange.

2) Creeps forward with selector in Reverse or backward with selector in Low. Incorrect manual control linkage adjustment.

SHIFTS ARE ROUGH

1) Low-to-Drive Shift. Incorrect Low Band adjustment. If High Accumulator pressure low, check for leak at accumulator body gasket and for dump valve or accumulator piston sticking down (top land of piston should be visible through top port in body). Sticking low band anchor piston (remove Valve & Servo Body to check), or incorrect piston location (see piston shimming data in-Valve & Servo Body Reassembly). Valve & Servo Body gasket leaks. Clutch plates worn or binding.

EXCESSIVE CHATTER OR CLUNK ON STARTING

►*CAUTION: Slight "clunk" when shifting into Low or Reverse is normal, and slight chatter when car starting to move in reverse (disappearing as soon as car in motion) is also normal.*

1) In Low & Reverse Range. Incorrect Low or Reverse Band adjustment. Engine and transmission mountings loose or incorrectly adjusted, thrust pad at transmission mounting broken (see Engine Mountings in Buick Special Data). Clutch plates warped, sticking, or incorrectly assembled (not stacked properly with "dish" in same direction). Reverse ring gear bushing worn. Planet pinion needle bearing rough.

NOISE IN TRANSMISSION.

►*CAUTION: Hum or low whine in Neutral or Parking is normal (due to free rotation of all planetary gears) and slight hum in Low and Reverse may be expected.*

1) Buzzing Noise. Low oil level. Front pump check valve hanging up on edge of gasket between valve and servo bodies. If noise noticed in Parking or Neutral, pressure regulator valve clearance in body may be excessive or orifice in valve land oversize (correct by replacing valve and body).

2) Clicking Noise. If noticed in all ranges, may be caused by foreign material in converter. If noticed only when car in motion, may be caused by parking lock pawl contacting ratchet wheel due to incorrect manual control linkage adjustment.

3) Abnormal Hum or Whine (see Caution above). If noted in all ranges, may be caused by worn parts or excessive front pump clearances (front pump noise will increase in Low and decrease at car speeds above 45 MPH. in Direct Drive). Check front pump for excessive clearances by testing for low pump pressure. If noise noted in all ranges except Direct Drive, may be caused by trouble in planetary gears (gears locked out in Direct Drive).

4) Squaling or Screeching following installation of Front Oil Pump. Pump driving gear installed backward.

►*CAUTION: Above condition must be corrected WITHOUT FURTHER OPERATION OF TRANSMISSION or severe damage will result.*

REMOVAL & INSTALLATION

1954-56 MODELS

Removal: *NOTE - Transmission and torque converter are removed and installed as an assembly.*

1) Raise car so that frame side rail is at least 20" off floor and place stands at front and rear to support car.

2) Disconnect torque tube from torque ball and move rear axle back to disengage propeller shaft from universal joint. Remove cranking motor splash pan, bell housing cover and bell housing hand hole cover.

3) Drain converter and transmission. Mark position of converter on flywheel to assure installation in same position and remove bolts attaching converter to flywheel. Disconnect pipes from oil cooler and disconnect cooler from transmission from rear mounting thrust plate. Remove cooler. Disconnect oil filler pipe at rubber hose and disconnect exhaust pipe hanger at right accumulator. Disconnect shift rod and speedometer cable at transmission.

4) Support transmission with a jack or hoist and remove four bolts attaching thrust plate to rear bearing retainer, then remove two nuts and plate which attach mounting pad to transmission support.

5) Raise engine and transmission just enough to relieve load on transmission support. Remove bolts attaching both ends of support to frame, then remove support and thrust plate as an assembly. *CAUTION*—If shims are found at this point, note their number and location so they can be reinstalled in the same position.

6) Support engine at rear end of lower crankcase so it will be supported while transmission is removed. ***CAUTION—Do not use bar with hooks placed over frame side rail. Brake lines will be damaged.***

7) On cars with air-conditioning, disconnect discharge and suction lines at compressor. This will avoid damaging flexible couplings when engine is raised and lowered.

8) Lower the transmission just enough so that bell housing bolts can be reached, then remove bell housing to crankcase bolts. Move transmission rearward to disengage hub of converter pump from crankshaft, lower transmission and remove it from beneath car.

Installation: With transmission and torque converter completely assembled, install unit in reverse order of removal procedure and note the following important points:

Alignment of Parts - Make sure that flywheel, converter primary pump, and converter cover positioned so that

CONTINUED ON NEXT PAGE

DYNAFLOW DRIVE (Cont.)

paint marks (as made for removal) will be aligned when transmission installed.

►*CAUTION: This alignment necessary to maintain converter assembly balance.*

Shift Rod Installation - Check and adjust linkage when installing shift rod. See *LINKAGE ADJUSTMENT.*

Filling Transmission - See *LUBRICATION.*

Bell Housing Mounting Bolt Installation - Adjust lifting equipment so that bell housing meets engine crankcase squarely and engages the two dowels, then install all bell housing bolts with lockwashers. Tighten all bolts to 45-55 ft. lbs.

Transmission Support & Thrust Pad Installation - See *ENGINE MOUNTING in Buick Special Data.*

Converter Mounting Bolt Installation - Use the shank of an 11/32" drill to align bolt holes in flywheel and converter. Install bolts and tighten to 25-30 ft. lbs.

1957-58 MODELS

Removal: Transmission and converter are removed as an assembly as follows:

►*TRANSMISSION REMOVAL & INSTALLATION CAUTION:* Before removing transmission or disconnecting it from engine disconnect exhaust pipes from manifolds and loosen front muffler joints. After transmission is installed reassemble the exhaust system making sure that pipes are centered in frame member holes and that system is free from binds.

1) Raise car so that frame side rail is at least 20" off floor and place stands at front and rear to support car.

2) Disconnect torque tube from torque ball and move rear axle back to disengage propeller shaft from universal joint. Remove converter housing cover. Turn flywheel until one converter drain plug can be loosened sufficiently to provide an air vent, then turn flywheel until opposite drain plug is straight down. Remove plug and drain oil from converter. Drain oil from transmission.

3) Remove bolts attaching converter to flywheel. Disconnect and remove oil cooler lines. Disconnect speedometer cable, shift rod from shift lever, and stator operating control rod from lever on high accumulator.

4) Place transmission jack or hoist in position and adjust it to securely support transmission. Remove four bolts that attach thrust plate to rear bearing retainer, then remove two nuts and plate which attach mounting pad to transmission support.

5) Raise engine and transmission just enough to relieve load on transmission support, remove bolts attaching each end of support to frame, then remove support and thrust plate as an assembly *(CAUTION - Shims may or may not be used to fill space between transmission support and frame. If shims are present note the number and location of shims so they can be installed in their original positions).*

6) Place suitable jack under rear end of engine lower crankcase so engine will be safely supported while transmission is removed. *(CAUTION - Do not use bar or hooks placed over frame side rails as brake pipe on top of left side rail will be damaged).* Lower transmission just enough so that converter housing bolts can be reached.

7) With engine and transmission supported by separate jacks, disconnect converter housing from engine crankcase. Move transmission rearward to disengage hub of converter pump from crankshaft, lower transmission and remove from car.

Installation: 1) Turn flywheel so that one hole for converter attaching bolt is straight up and wide flange is down. Raise transmission into place with same equipment used for removal. Align converter attaching bolt holes with holes in flywheel before moving transmission forward against cylinder crankcase. Then with converter pump in correct position *(see "Converter Cover Installation" under "Bell Housing & Torque Converter Assembly Installation" above),* adjust lifting equipment so converter housing meets engine crankcase squarely and engages the two dowels. Install all converter housing bolts with lockwashers and tighten to 45-55 ft. lbs.

2) Raise transmission just enough to install transmission support and thrust plate, installing shims in their original positions between support and frame. Attach mounting pad to support with plate and nuts, and attach thrust plate to bearing retainer with four bolts and lockwashers.

3) Remove transmission hoist and engine support jack. Check converter drain plugs for tightness, then install converter housing cover. Attach oil filler pipe to oil pan and install oil cooler pipes. Connect torque tube to torque ball (tighten bolts after car is on floor).

4) Connect speedometer cable to driven gear sleeve and connect shift rod to shift lever on transmission, Connect stator operating rod to lever on high accumulator. Wipe all oil from outside of transmission and lower car to floor. Tighten torque ball bolts to 30-35 ft. lbs.

5) Fill transmission to proper level *(see "Draining & Refilling" above).* Check adjustment of control linkage *(see "Linkage-Adjustment" above).* Check adjustment of stator operating controls and throttle linkage *(see CARBURETOR on car model page).* Road test car and check for oil leaks.

1959-60 MODELS

Removal: 1) Raise car and place on jack stands so it is at least 20" off floor, then disconnect shock absorbers at axle end, track bar at axle, brake cable at equalizer, and brake pipe at torque tube bracket. Remove rear exhaust pipes. Disconnect torque tube from torque ball and move rear axle back to disengage propeller shaft from universal joint.

2) Remove torque converter housing cover and drain oil from converter, then drain oil from transmission. Disconnect converter from flywheel and disconnect speedometer cable. Disconnect shift rod from shift lever, and disconnect stator operating control rod from lever on high accumulator.

3) Place a transmission jack or hoist in position and adjust it to securely support transmission. Carefully mark transmission support and frame at each end of support so support may be reinstalled in same fore and aft position and at the same angularity.

4) Remove four bolts attaching thrust plate to rear, bearing retainer, then remove two nuts and plate attaching mounting pad to transmission support. Raise engine and transmission just enough to relieve load on support, then remove bolts attaching each end of support to frame and remove support and thrust plate as an assembly. *CAUTION - Shims may or may not be used to fill space between transmission support and frame. If shims are present, note number and location so they may be reinstalled in their original position.*

5) Place a suitable jack under rear end of engine lower crankcase so engine will be safely supported while transmission is being removed. *CAUTION - Do not use bar with hooks placed over frame side rails because brake pipe on top of frame left side rail will be damaged.* Lower transmission slightly and disconnect cooler pipes.

6) Lower transmission just enough so converter housing bolts can be reached, then with engine and transmission supported by separate jacks, disconnect converter housing from engine crankcase. Move transmission rearward to disengage hub of converter pump cover from crankshaft, then lower transmission and remove it from car.

Installation: 1) Turn flywheel so one hole for converter attaching bolt is straight up and wide flange is down, then raise transmission into place with same equipment used for removal. Align converter attaching bolt holes with holes in flywheel before moving transmission forward against engine crankcase. See illustration for location of driving bolt holes.

2) Adjust lifting equipment so converter housing meets engine crankcase squarely and engages the two dowels, then install all converter housing bolts with lockwashers. Tighten bolts to 45-65 ft. lbs. uniformly. Connect cooler pipes and raise transmission just enough to install transmission support and thrust plate. *CAUTION - Be sure to install any shims found between support and frame during removal of transmission. Locate support in its correct fore and aft position (as marked at removal) before tightening attaching bolts.*

3) Attach mounting pad to support with plate and nuts and attach thrust plate to bearing retainer with four bolts and lockwashers. *See "Buick Special Data" in car model section for engine mount adjustment.*

4) Install three flywheel-to-ring gear bolts and lockwashers. *NOTE - These bolts are 300M steel and bolts of lesser quality MUST NOT be used at this location. 300M steel bolts are identified by six radial marks on head.* Tighten bolts to 30-35 ft. lbs. Remove transmission hoist and engine support jack.

5) Check converter drain plugs for tightness, then install converter housing cover and install oil filler pipe on oil pan. Line up blind spline of propeller shaft with blank spline in universal joint and move axle assembly forward to engage propeller shaft and universal joint splines. Complete transmission installation by reversing removal procedure, then fill transmission with fluid and adjust control linkage.

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DYNAFLOW DRIVE (C nt.)

OVERHAUL

TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

1954 MODELS

Converter & Bell Housing Removal: (1) Remove large hex plug and gasket from hub of converter pump cover, then remove the socket head set screw and lockwasher located in hub, using a hex wrench 5/16" across flats).

2) Remove all nuts, plain washers, and bolts attaching cover to converter pump. Insert a punch through bell housing hand hole and into a drive bolt hole to hold pump from turning.

3) Remove cover from pump, tapping or prying against edge to loosen it. Check seal for damage or evidence of oil leakage before removing cover.

4) Insert a screw driver into a hole in the first turbine disk to aid in removing the twin turbine assembly from input shaft. Push inward on shaft to avoid withdrawing it. Remove bronze thrust washer from turbine hub.

5) Remove retaining ring from groove in input shaft, using snap ring pliers, then remove bronze thrust washer and the sun gear.

6) Remove retaining ring from groove in reaction shaft and slide converter stator and free wheel roller race from reaction shaft. Remove stator bearing from reaction shaft if it did not come out with stator.

7) Pull converter pump forward from reaction shaft and immediately check for evidence of leakage. Radial streaks of fresh oil on back of pump and fresh oil streaks on face of pump body indicate leakage past oil pump seal. Before removing bell housing, check to see that all attaching bolts are tight. Loose bolts may be cause of oil leakage at this point.

8) Place transmission so that bell housing is over edge of bench. Take out bell housing attaching bolts, remove bell housing, check rubber oil seal for uniform compression (if seal not compressed uniformly, check around oil pump and in bell housing opening for burrs or foreign material preventing uniform seal compression). ***See Overhaul data for disassembly of converter stators and pump.***

1955-60 MODELS

Converter & Housing: 1) Completely drain converter, then remove all bolts and washers attaching cover to converter pump and remove cover. *NOTE - Check cover seal for damage or evidence of oil leak before removing.*

2) Remove reverse band adjustment cover and gasket with Tool J-2655. Shift transmission in "P" (Park) and pry up on reverse band operating lever with a screwdriver to unlock input shaft while removing the bolt, lockwasher, retaining washer, and thrust washer from front end of input shaft. Remove bronze thrust washer from first turbine support hub.

3) Insert screwdriver in first turbine support hole and slide turbine assembly off input shaft. Install Tool J-5806 over input shaft with beveled end outward. Pull stator forward on reaction shaft, grasp spacer and needle bearing race behind stator to retain all free wheeling parts of stator, then slide the assembly forward upon tool and remove from input shaft.

4) Pull converter pump forward from reaction shaft and immediately check for evidence of oil leakage. *NOTE - Radial streaks of fresh oil on back of pump and fresh oil streaks on face of front oil pump body indicate leakage past oil pump seal.* Before removing converter housing, check to see whether all attaching bolts are tight (loose bolts may be cause of oil leakage at this point).

5) Place transmission so housing is over edge of bench and remove it. Check seal for indications of leakage.

1954-60 MODELS

Oil Pan, Valve & Servo Body Assembly: *NOTE - These units can be removed with transmission in car.*

1) Remove shift lever to avoid damage to operating linkage, then hold lever forward while removing retainer nut so that linkage will not be strained and remove lever from shaft. Remove band adjustment covers and gaskets with Tool J-2655 (if not previously done) and turn transmission bottom side up. Remove oil pan and gasket and remove oil screen.

2) Disconnect valve operating rod from lever (upper) by placing a screwdriver on rod close to lever and exerting slight pressure. A spring loaded socket on rod engages ball stud on lever. Slightly loosen all valve and servo bolts, then remove bolts and lockwashers. *CAUTION - Do not loosen or remove slotted safety nuts on valve-to-servo body studs.*

3) Lightly pry upward on the assembly to free gasket between servo body and transmission case. Push shift control valve and lower operating lever inward to align lower lever with opening in transmission case, then remove the assembly. *CAUTION - Do not grasp slotted end of control valve.* Remove gasket and check for oil leakage.

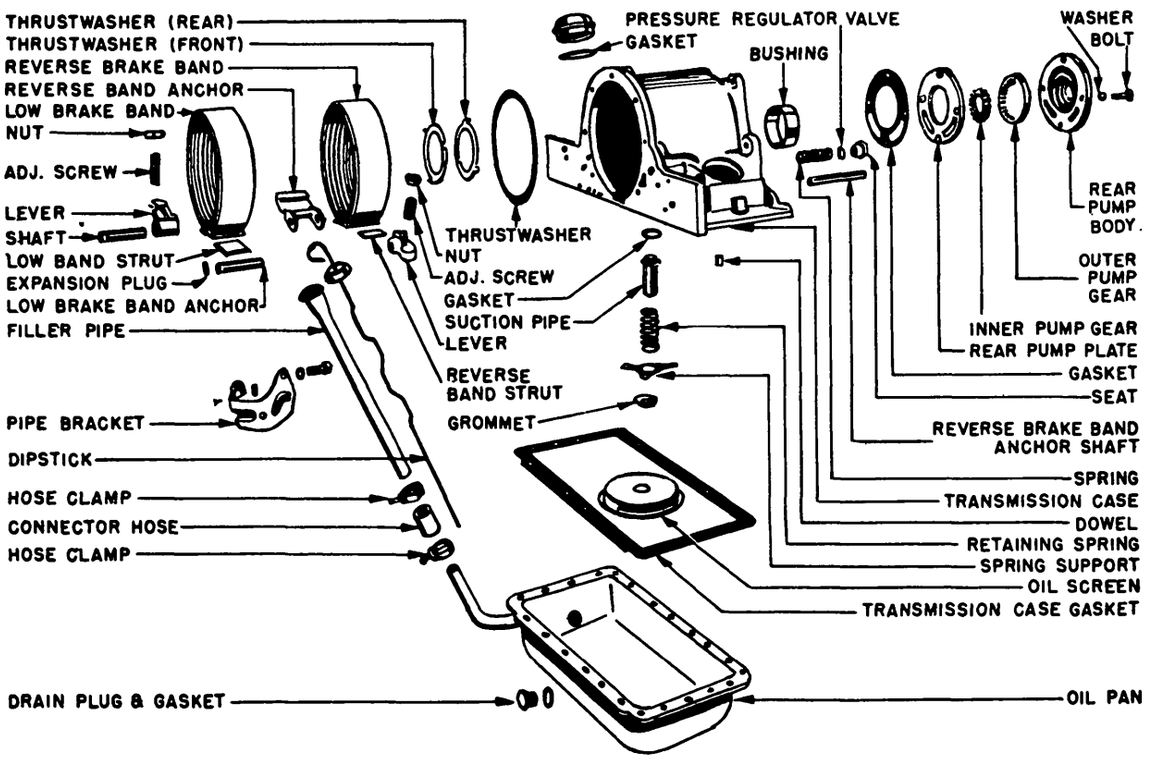
4) Remove reverse band operating strut by extending fingers through adjustment hole to prevent strut from falling into transmission case and then release the strut by raising operating lever.

Reaction Shaft Flange, Oil Pump, Accumulators & Clutch: 1) Remove retaining ring from groove in input shaft, then loosen but do not remove caps on both accumulators. Remove bolts which attach accumulators and oil pump cover but do not remove stud nuts which attach these parts. Tap very lightly on rear of accumulator bodies with a soft mallet to loosen reaction shaft flange, then remove the assembly and gasket. Leave input shaft in place in transmission.

2) *NOTE - Check reaction flange gasket for indications of oil leakage.* Pull input shaft and clutch hub front thrust washer from clutch assembly, then remove clutch assembly. Compress low band with the operating lever while applying band clip, Tool C-2595, across strut flanges of band. Release lever and remove band, then remove struts which will drop into case.

3) Remove low band operating lever by threading a ¼"-20 capscrew into lever shaft and pulling shaft out of case.

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VARIABLE PITCH DYNAFL W TRANSMISSI N CASE, IL PUMP, & SERV BAND ASSY.

DYNAFLOW DRIVE (C nt.)

T rqu Ball & Univ rsal J int: Remove attaching bolts, then remove torque ball, inner and outer retainers, reinforcement and gaskets. Remove speedometer driven gear and sleeve assembly, then place transmission shift lever on cross shaft and push lever forward while turning universal joint until locking pawl engages ratchet wheel. Remove universal joint bolt, then pull joint from output shaft with Tool J-682-A if joint cannot be removed by hand. Remove transmission shift lever.

R ar B aring R tain r, R ar Bearing & Parking Lock Ratchet Wh l: *NOTE - After removal of torque ball, univ rsal joint and oil pan, these parts may be removed with transmission in car.* Disconnect valve operating rod from lever (if not previously done), then remove retaining bolts and retainer. Check gaskets for oil leakage. Remove rear bearing horseshoe washer from output shaft, then remove snap ring from rear of rear bearing and tap out bearing. Remove ratchet wheel outer retaining ring and slide wheel from shaft, then remove inner retainer ring.

R ar Oil Pump & Lubricati n Oil Pressure Regulator Valv : *NOTE - Aft r r moval of rear bearing retainer, thes parts can b r moved with transmission in car.* Remove retaining bolts, then remove pump body and pump gears. Remove drive key, then use a pointed tool to remove rubber cushion located under drive key on output shaft. Remove rear pump plate and gasket if they can be removed without prying. If plate is stuck, it can be tapped out after removal of planetary gear set. Remove lubrication oil pressure regulator valve seat from transmission case, using a 3/8" Allen wrench. Remove valve and spring.

Planetary G ar Set, R v rs Ring Gear & Reverse Band: Remove planetary gear set through front of case, then remove reverse ring gear. If rear pump plate and gasket were not previously removed, tap them out with a hammer handle from inside case. Thread a ¼"-20 bolt into reverse band anchor shaft to pull it from transmission case, then remove operating lever. Rotate reverse band until anchor can be disengaged, then remove it from band. Compress ends of reverse band and apply band installing clip, Tool J-2595, across strut flanges and remove band. Remove reverse ring gear thrust washer from case.

TRANSMISSION UNIT OVERHAUL

►*1955 SHIFT CONTROL VALVE PRODUCTION CHANGE:* Three control valves have been used in production, all of which are interchangeable. The valves are identified as follows: First (no extension), Second (plain extension), Third (grooved extension).

►*1955 CONVERTER COVER PRODUCTION CHANGE:* A later type converter primary pump cover having three impeller blades replaces the forme r type having impeller ribs completely around the cover. Either type can be used for service replacement.

►*1955 REACTION SHAFT & FLANGE, INPUT SHAFT, AND FRONT END REACTION SHAFT BEARING PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A new needle bearing is used in later production cars in front end of the reaction shaft. The later type bearing has a larger inside and outside diameter and cannot be used for service replacement for the babbitt type bearing used in early production. The needle type bearing made necessary a change in reaction shaft and flange, and input shaft, In order to service a first type transmission to use the new bearing, it will be necessary to replace the above parts. *See "Disassembly of Components" below.*

►*1955 PRIMARY PUMP COVER SEAL NOTE:* Both a .120" and .135" diameter oil seal have been used in production. Either type may be used for service replacement.

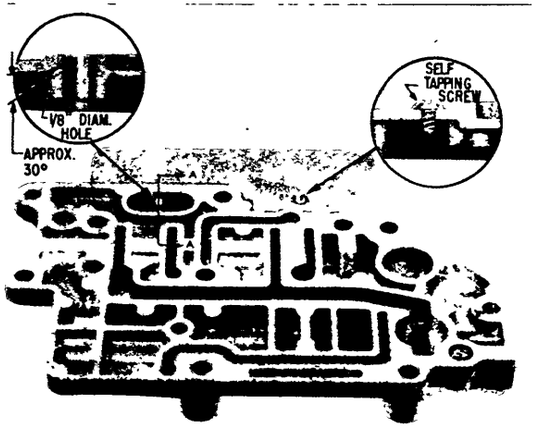
►*1956 DYNAFLOW TRANSMISSION OIL LEAKAGE CORRECTION (OIL BLOWING OUT OF BREATHER OPENING):* On transmissions having numbers "0-1" to "0-93", the above condition is caused by a 1/16" hole in output shaft (formerly used to lubricate rear bearing retainer) being uncovered by open end of horseshoe washer which is located in groove directly ahead of rear bearing retainer ball bearing *(NOTE- An unused groove will be found directly forward of the groove in which the 1/16" hole is located, and serves to identify shafts requiring correction. This unused groove can be observed through breather hole when transmission is removed).* To correct this condition with transmission in car, remove the rear axle assembly, torque ball assembly and universal joint. Flare one end of a 4" piece of 1/4" soft copper tubing until it fits snugly in the .290" diameter hole in end of output shaft. Cut off tube approximately 2" from flared end, then flare cut-off end to obtain a press fit in the .297" section of hole *(NOTE -* File flare outside diameter to obtain a suitable fit). Lightly tap copper tube in end of output shaft with suitable punch or 1/4" diameter rod, making certain that copper tube is fully seated with a snug fit *(CAUTION - Excessive or hard blows may collapse copper tube and restrict oil passage through tube).* Reinstall torque ball, universal joint, and rear axle assembly *(NOTE - The above procedure may also be used when transmission is removed from car for service not requiring removal of rear bearing retainer).* When transmission is removed and removal of rear bearing retainer is required, proceed as follows: Insert a 1/16" diameter welding rod approximately 1" long into oil hole until it bottoms, then insert a 1/4" diameter rod or punch in end of output shaft and tap with hammer to bend end of welding rod. Leave punch in place in shaft and snip off end of welding rod flush with output shaft outside diameter, upset this end with a cold chisel to lock plug in place. Install horseshoe washer on shaft so that welding rod plug is at open end of washer (this will allow washer to seat in groove). *NOTE - To indicate that the output shaft has been modified, as indicated above, use a chisel and make a dash (–) in front of the "O" of transmission code number.*

►*1956 DYNAFLOW FRONT PUMP SEAL SERVICE REPLACEMENT (NEW TYPE SPRING LOADED CARBON SEAL FOR USE WITH TRANSMISSIONS HAVING ALUMINUM PRIMARY PUMPS):* The new carbon seal is designed to seat against flat face of primary pump hub, making it possible to use seal on pumps which would normally be replaced because of scored hub in area of present seal. It is suggested that new seal be installed in transmission having primary pump which would ordinarily be replaced because of sealing difficulties. Install seal as follows: After removal of old seal, inspect bore for burrs or damage. Correct any defects to be sure of a good press fit on seal outer diameter (leading edge of bore in pump body should have a slight radius). Clean up face of hub on primary pump with crocus cloth and inspect for burrs, dents or gouges. If deep marks are found, replace pump and install regular production seal. Coat outside diameter of seal with Permatex No. 3, then using crankshaft oil seal installer J-5250-1, press seal into pump body using an arbor press, drill press, or tap evenly into place with a mallet until flange of seal is down against face of pump body *(CAUTION - Do not mar or press on carbon face, and do not cock seal during installation as damage to seal will result. Also, under no circumstances should the carbon face seal be used with a steel primary pump).* Wipe both seal face and hub face on primary pump with a clean cloth to remove all traces of grit and other foreign material; then coat both faces with clean Dynaflow oil before assembling. When installing primary pump on transmission, use extreme care not to mar the carbon seal face with end of hub sleeve. When transmission is installed in car, the seal will automatically position itself and is constructed so as to compensate for normal play, deflection, and eccentricity.

►*1957 VALVE BODY PRODUCTION CHANGE:* The later valve body prevents oil being dumped above the screen as ports in the valve body have been changed. The later valve body is identified by absence of ports in valve boss. Valve is identified by a groove in valve land adjacent to actuating lever end. These parts are interchangeable; however, the adjusting procedure is different when later type valve body is used. *Se "Valve & Servo Bodies" below.*

►*1957 VALVE BODY PRODUCTION CHANGE & SERVICE NOTE:* To prevent the possibility of air being drawn into hydraulic system during cornering, the valve body vent hole has been relocated to a position in the rear pump suction passage. Whenever oil pan

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1957 VALVE BODY CHANGE

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is removed on 1957 cars (early), the control valve should be removed and the original 1/8" vent hole should be plugged with a self-tapping screw. A new hole should be drilled in the rear oil pump passage as shown in the illustration.

►*1957 DYNAFLOW SPRAG CLUTCH PRODUCTION CHANGE:* A new sprag clutch, Part No. 1179222, having two bronze drag strips on inner diameter to provide a bearing surface that rides on reaction shaft when freewheeling, is used in production and for service replacement. This later assembly is interchangeable with the assembly used in 1956 & early 1957 models.

►*1957 THRUST WASHER (BETWEEN PLANET CARRIER & CASE) NOTE:* There is no thrust washer (front or rear) at this location. DO NOT ATTEMPT TO INSTALL THEM.

►*1960 TWIN TURBINE TRANSMISSION CODE NUMBER NOTE:* See *"Changes, Cautions, Corrections"* above.

►*1960 TWIN TURBINE TRANSMISSION CASE PRODUCTION CHANGE:* See *"Changes, Cautions, Corrections"* above.

►*1960 STATOR SHIFT VALVE & SPRING PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* See *"Changes, Cautions, Corrections"* above.

1954 MODELS

Converter Stators & Pump: Disassembly—Pry retaining ring out of groove in first turbine, insert screw driver in hole in disc and lift disc and hub assembly out of first turbine. Lift second turbine and carrier assembly out of first turbine. Remove four bolts with lockwasher and pinion pin lock plate from second turbine. It is not necessary to lift turbine from carrier at this time. Remove pins, then remove the four planet pinions and thrust washers from turbine carrier. Remove bearing rollers (22) from each pinion. Remove ball bearing from rear side of converter stator, push the free wheel roller race out of free wheel cam in front side of stator, then remove all rollers, cups, and springs from the cam. Pry the pilot bearing retaining ring out of its groove in hub of converter pump cover, then push pilot bearing and bearing retainer out of the hub.

Inspection—Wash all parts in clean solvent and dry with air. Inspect all planetary gear teeth, thrust washers, bushings, and related bearing surfaces for excessive wear, scoring or other damage. Inspect free wheel roller springs for distortion and check rollers and race for nicks or burrs. Small nicks or burrs should be removed with an Arkansas stone and polished with crocus cloth. Inspect converter pump, turbines, and stator for damaged or cracked vanes. Inspect rear edge of first turbine hub (at ring gear) and the mating thrust surface on second turbine (around carrier) for wear, scoring or other damage. Inspect turbine carrier for excessive wear or other damage. ***(If second turbine or the carrier must be replaced, use care in separating them to avoid damage to the good part).*** Inspect converter pump hub for scores and for wear caused by the front pump seal.

►***INSPECTION CAUTION***—Converter oil leaks, oil pump body leaks, front oil pump noise, and excessive wear of front pump bushing and oil seal may be caused by (1) Excessive runout of converter pump hub; (2) Excessive runout of flywheel face; (3) Misalignment of bell housing. When any of these conditions are encountered and there is any doubt as to their true cause see Alignment of Converter and Bell Housing (below).

Assembly—***(CAUTION—If stator was replaced, make certain that new stator has correct number of vanes—12 vanes, Buick 40; 20 vanes, all others).***

1) Place input shaft pilot bearing retainer in hub of converter pump cover with shouldered side upward, push the pilot bearing into hub of cover until outer race bears against shoulder in hub, then install retaining ring.

2) Install springs and cups on free-wheel roller race in cam on front side of converter stator, then use a suitable thin blade to depress the cup and spring while inserting each of the free wheel rollers.

3) Install the ball bearing in rear side of stator, using care to start it squarely into place. The bearing must be fully seated in counter-bored recess and outer race must be free to turn.

4) If second turbine was separated from carrier, make sure that counter-bored recess in turbine and mating surfaces of carrier are free of burrs and clean, then apply a thin film of oil to these surfaces.

5) Support carrier on suitable blocks, install several pinion pins to serve as pilots, then place turbines in position so that carrier is started squarely into recess in turbine. Use a hammer and hardwood dowel or other soft punch to tap turbine down over carrier. ***Avoid distortion of turbine by using light blows applied midway between holes and alternated from side to side to keep parts square with each other.***

►***CAUTION—If turbine cannot be assembled on carrier with moderate force, remove it and check for burrs in counter-bored recess.***

6) With turbine and carrier supported on wood blocks, hub side down, assemble and install the four pinions as follows: Place planet pinion on thrust washer, install 22 needle bearing rollers in pinion and place a thrust washer on top of pinion. ***(NOTE—A loading tool can be made by using a piece of steel rod 3/8" in diameter by 11/16" long. Place tool in center of pinion and install needle bearings around tool).*** Place assembled pinion in carrier and install a pinion pin with notched end up. After loading tool is pushed out of carrier, slide block under pinion pin to hold it in place. Turn all pins so that notch faces center of carrier.

7) Install pinion pin lock plate so that it enters notches in all pins, then install the four turbine-to-carrier bolts with lockwashers. Place second turbine and carrier assembly in first turbine, then install first turbine disc and hub assembly over second turbine.

8) Rotate disc until ring gear meshes with carrier pinions, then align driving lugs on disc with notches in first turbine and push the assembly all the way into turbine.

9) ***CAUTION—Turbine disc retaining ring is installed exactly as follows:*** Place the ring in position with "dished" side upward so that the inner edge will bear firmly against disc when ring is engaged in groove in first turbine. Start one end of ring into grove in turbine, then twist ring upward in order to lay ring flat on disc so that it can be progressively entered into groove all the way around.

10) Make certain that ring is fully seated in groove and that inner edge bears against turbine disc. Tap inner edge down against disc if it has raised up,

1955-58 MODELS

►*1955 (LATE) VARIABLE PITCH STATOR PISTON CHANGE & REASSEMBLY NOTE:* The crank thrust washer and retaining ring were eliminated in late 1955 and succeeding production, making it necessary to use a special fixture (made locally) for reassembly. *See "Stator Fixture Note" below.*

Converter Twin Turbine & Sun G ar: Disass mbly - Pry retaining ring out of groove in first turbine, insert screwdriver in hole in disc and lift disc and hub assembly out of first turbine. Lift second turbine and carrier assembly out of first turbine. Remove tanged thrust washer (this washer may remain in carrier or be found on top of sun gear). Slide sun gear assembly off the first turbine being careful to hold sun gear bearing in place. Lift first stator assembly out of first turbine. Remove bronze thrust washer and sprag from sun gear. Lay first turbine on bench with narrow edge of vanes up. Pry off cupped thrust washer, then remove first stator bearing and sprag assembly. Using a brass drift, carefully tap first stator bearing to remove bearing and cupped thrust washer.

Converter Variable Pitch Stator: Disassembly—Remove stator thrust washer and selective spacers from rear side of stator, remove tool J-5806 (installed on input shaft when converter removed from transmission), then remove free wheel rollers and springs from the cam. Pry retaining ring from groove in stator blade rear carrier, and remove free wheel cam and three driving keys. Use screwdriver, tool J-5826 to remove stator blade front carrier screws and lockwashers, then remove front carrier which is also held to rear carrier by two dowels. Remove retaining ring and thrust washer (on early cars), from hub of stator piston. Remove stator blade carrier ring and all stator blades from rear carrier. Remove stator piston with sealing ring from rear carrier.

Inspection (All Converter Parts)—Wash all parts in clean solvent and dry thoroughly. Inspect converter pump hub for scores and for wear caused by front pump seal. (If pump is suspected of leaking oil, it may be tested as described below). Inspect converter pump and turbines for cracked or damaged vanes. Inspect turbine carrier, planetary gear teeth, thrust washers, bushings and related bearing surfaces for wear, scoring or damage. Inspect stator free wheel rollers and cam for nicks or burrs, which should be removed with an Arkansas stone, and polished with crocus cloth. Discard any roller springs that are damaged or distorted. Inspect stator blades for distortion, cracks, loose on cranks, or other damage. Inspect piston oil seal ring and bore of blade carrier for scoring or wear. If bushings of carrier are worn, they should be replaced, using installer tool J-5913. If second turbine or the carrier must be replaced, use care in separating

CONTINUED ON NEXT PAGE

DYNAFLOW DRIVE (C nt.)

them to avoid damage to the good part. With second turbine suitably supported, tap carrier free of counter-bore in turbine, using a hammer and a hardwood dowel or other soft punch. *CAUTION—Do not drive against surface of thrust boss in carrier.*

Variable Pitch Stator (First Type): Reassembly—1) Install oil sealing ring in stator piston, then tilt piston slightly to install it in bore of rear carrier, placing piston so that hub extends through flanged end of carrier. Mount piston on a suitable support (such as ring of spring compressor J-2590) so that piston is held up against flange of carrier.

2) With stator blade carrier ring resting on bench with holes upward, insert stator blades with concave sides upward and cranks toward center of ring. Blades should be in the nearly closed position. Carefully place the carrier ring with blades in position on rear carrier so that all cranks engage the groove in carrier. Install thrust washer over cranks and install retaining ring in groove of piston hub.

3) Place front carrier over rear carrier so that screw holes are aligned when dowels enter their holes, then install screws with countersunk external tooth lockwashers. After screws are turned down snug with screwdriver tool J-5826, check stator blades and piston for smooth operation. Blades should move throughout range without binding. If they do not, check for misalignment of cranks in carrier grooves. Tighten screws to 10-12 ft. lbs., and make sure that blades still operate freely.

4) Install free wheel cam with three driving keys and retaining ring in carrier. Check free wheel springs and alter length as necessary to assure equal length of all springs. Place free wheel rollers and springs in cam, with rollers at rounded ends of cam recesses.

5) Install tool J-5806 through free wheel rollers by turning it slightly clockwise so that flat end of tool is flush with rollers and cam. Make certain that surfaces of cam, spacers and thrust washer are free of grease and dirt, then install spacers and washer with tangs of washer extending through holes in spacers and cam.

Variable Pitch Stator (Second Type): Reassembly— ***NOTE—A special fixture which can be made locally is required for reassembly of the second type stator. See Stator Fixture Note below.***

1) Insert stator piston and oil seal in rear carrier and push it to the extreme forward position. Place rear carrier on center block of fixture to hold piston in position.

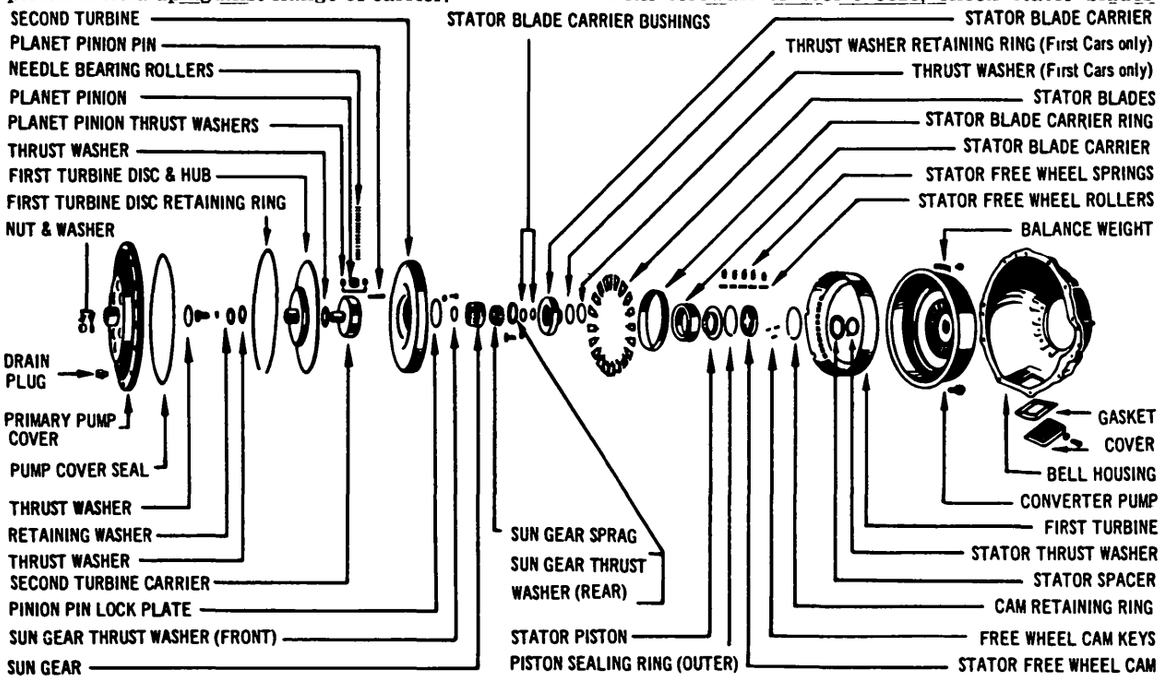
2) Place stator outer ring on two outer blocks of fixture, with crank pin up. Holding the blade in the approximate "low pitch" position insert the crank pin in the outer ring. Then rotate the blade to bring the crank throw into the piston groove. Hold the piston, blades, and outer ring together while installing the blades.

3) Install the remainder of the blades, working in a clockwise direction. To insert the last blade it will be necessary to tilt the adjacent three blades.

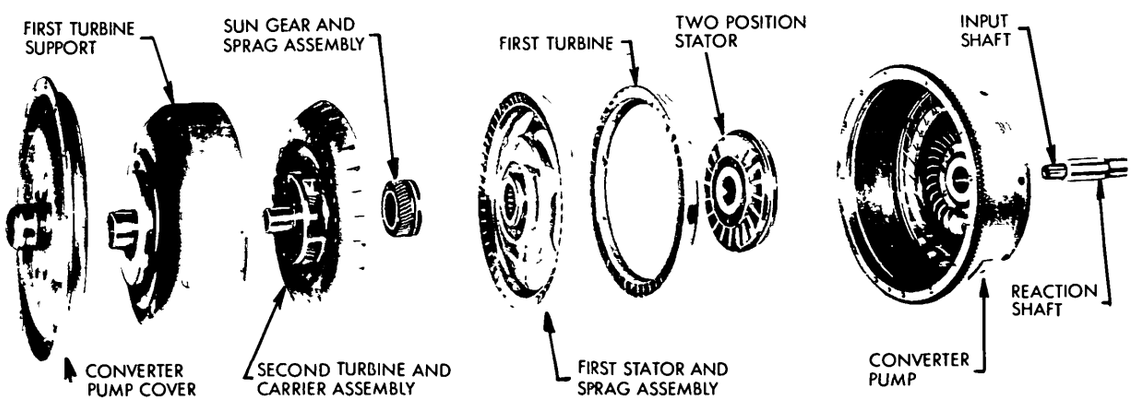
4) Install the front carrier and bolt into place. Be sure that blades operate freely in carrier. Complete the assembly of stator as indicated for first type stator (above).

►**Stator Fixture Note**—The fixture is composed of four blocks of wood as follows: One piece ¾" x 3½" x 11" (base piece). One piece ¾" x 3" x 2" (center piece). Two pieces 1⅛" x 3½" x 2¼" (end pieces). Place base piece on bench and position center piece in center of base piece so that each end of center

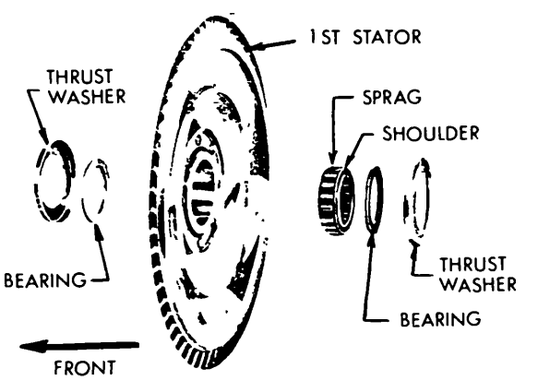
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1955-56 VARIABLE PITCH DYNAFLOW TORQUE CONVERTER & BELL HOUSING



TWIN TURBINE DYNAFLOW TORQUE CONVERTER ASSEMBLY



FIRST STATOR ASSEMBLY

DYNAFLOW DRIVE (C nt.)

piece is ¼" from edge of base. Position the two end pieces on extreme ends of base piece so they lay lengthwise across base piece flush with end and sides. Stator hub will rest on center piece and ring will rest on the two end pieces for installation of the blades.

Converter Twin Turbine & Sun Gear: Reassembly - 1) Install sprag in bore of sun gear with shouldered end toward outside then carefully press bearing into place. Check operation of sun gear sprag clutch by sliding sun gear assembly on reaction shaft with gear end toward front of transmission. When viewed from front of transmission sun gear must rotate freely clockwise and lock in a counterclockwise direction.

2) Lay first stator on bench with thin edges up. Place first stator sprag in hub of first stator with shoulder down. Install one bronze bearing and cupped thrust washer on each side of sprag. Check operation of first stator sprag clutch by sliding the first stator on reaction shaft with thin edges of blades toward front of transmission. The first stator must turn freely clockwise and lock in a counterclockwise direction when viewed from front of transmission.

3) If second turbine was separated from carrier, make certain that counterbored recess in turbine and mating surfaces of carrier are clean and free of burrs, and apply a film of oil to these surfaces. Support carrier on suitable blocks, install several pinion pins to serve as pilots, then place turbine in position so that carrier is squarely started into recess in turbine. Use a hammer and hardwood dowel to tap turbine down over the carrier. Avoid distortion of turbine by using light blows applied midway between holes and alternated from side to side to keep parts square with each other. *(CAUTION - If turbine cannot be assembled on carrier with moderate force, remove it and check for burrs in counterbored recess).* With turbine and carrier supported on wood blocks, hub side down, assemble and install the four pinions as follows:

4) Place planet pinion on a thrust washer, install 22 needle bearings in pinion and place a thrust washer on top of pinion. *(NOTE -* A loading tool can be made locally from a piece of 3/8" steel rod, 11/16" long which will simplify loading and installation of pinion). Place assembled pinion in carrier and install a pinion pin with notched end up. After loading tool is pushed out of carrier, slide a block under pinion to hold it in place. Turn all pins so that notches face center of carrier. Install pinion lock plate so that it enters notch in all pins, then install four turbine-to-carrier bolts with lockwashers.

5) Place first stator in first turbine with thin edge of blades up. Place sun gear assembly on first stator with gear end up. Place thrust washers (with tangs) in planet carrier. Use chassis lube to prevent washer from shifting during assembly. Place second turbine and carrier assembly in first turbine, making sure pinions mesh with sun gear. Place thrust washer on carrier, then install first turbine disc and hub assembly over second turbine. Rotate disc until ring gear meshes with carrier pinions, then align driving lugs on disc with notches in first turbine and the assembly all the way down into turbine.

6) Note that turbine disc retaining ring is "dished". Place ring in position with the "dish" upward so that inner edge will bear firmly against the disc when ring is engaged in groove of first turbine. Start one end of ring into groove in turbine, then twist ring upward in order to lay ring flat on the disc so that it can be progressively entered into groove all the way around. Make certain that ring is fully seated in groove and that inner edge bears against turbine disc. Tap inner edge down against disc if it has raised up.

1959-60 MODELS

Converter Twin Turbine & Sun Gear: Disassembly - Drive three roll pins, holding first turbine blades to turbine support, inward about ¼" using a 1/8" punch. *NOTE - It is not necessary to remove roll pins.* Make a tool locally (see "Tool Note" below) and attach tool to a slide hammer. Place edge of tool under edge of first turbine, then hammer first on one side, then on the other, to move first turbine straight up out of turbine support. Lift first stator assembly out of support and set aside, then lift second turbine out of support. Pry off cupped thrust washers and remove first stator bearings and sprag assembly from sun gear, then lift second turbine assembly out of first turbine support.

►*TOOL NOTE:* Use a piece of steel bar stock ¼"x1"x1½" and drill a hole in the middle, ¾" from one side, to accommodate the end of a slide hammer. Weld a nut (same threads as on end of slide hammer) over hole into which a slide hammer can be threaded.

Disassembly (Two Position Stator): Remove stator thrust washer and selective spacers from rear side of stator, remove Tool J-5806, then remove free wheel rollers and springs from cam. Pry retaining ring from groove in stator blade rear carrier and remove free wheel cam and three driving keys. Use Tool J-5826 and remove stator blade front carrier screws and lockwashers, then remove front carrier which is also held to rear carrier by two dowels. Tilt three or four blades toward low angle position and slide the crank pin ends clockwise around stator piston groove. The next blade and all succeeding blades will then have enough clearance for removal.

Inspection (Twin Turbine & Stator): Wash all parts and dry thoroughly, then inspect converter pump hub for scores and for wear caused by front pump seal. Inspect converter pump and turbine for cracked or distorted vanes. Inspect turbine carrier, planetary gear teeth, thrust washers, bushings and related bearing surfaces for excessive wear, scoring or other damage. Examine stator needle thrust bearing which is staked in converter pump. If damaged or worn, carefully drive back the other staking and remove bearing. *NOTE - Stake a new bearing assembly very lightly (just enough to keep it from falling out).* Inspect sprag bores in first stator and sun gear, also outer diameter of reaction shaft for brinelling, wear or burrs. Inspect sprags and sprag cages for distortion or excessive wear. Replace sprag if cage distorted. *CAUTION - If sprag clutches are dropped or handled in any manner which dislocates a sprag or distorts either cage, the assembly must be replaced.* Inspect stator free wheel rollers and cam for nicks or burrs whichshould be removed with an Arkansas stone and polished with crocus cloth. Discard any roller springs that are damaged or distorted. Inspect stator blades for distortion, cracks, loose on cranks, or other damage. Inspect piston oil seal ring and bore of blade carrier for scoring or wear. If bushings in carrier are worn, they should be replaced using Tool J-5913 to properly locate new bushings. If second turbine or carrier must be replaced, use care in separating them to avoid damage to the part not requiring replacement. With second turbine suitably supported, tap carrier free of counterbore in turbine using a hammer and a hard wood dowel. *CAUTION - Do not driv against surface of thrust boss in carrier.*

Reassembly (Two Position Stat r): *NOTE - A special wooden fixture which can be made locally is required for reassembly of the stator. See "Stator Fixtur Note" below.*

1) Insert stator piston and oil seal in rear carrier and push it to the extreme forward position. Place rear carrier on center block of fixture to hold piston in position.

2) Place stator outer ring on two outer blocks of fixture with crank pin up. Holding the blade in the approximate "low pitch" position insert the crank pin in the outer ring. Then rotate the blade to bring the crank throw into the piston groove. Hold the piston, blades, and the outer ring together while installing the blades.

3) Install the remainder of the blades, working in a clockwise direction. To insert the last blade it will be necessary to tilt the adjacent three blades.

4) Install the front carrier and bolt into place. Be sure that blades operate freely in carrier. Complete the assembly of stator as indicated for first type stator (above).

►*STATOR FIXTURE NOTE:* The fixture is composed of four blocks of wood as follows: One piece ¾"x3½" x11" (base piece). One piece ¾"x3"x2" (center piece). Two pieces 1 1/8" x 3 1/2" x 2 1/4" (end pieces). Place base piece on bench and position center piece in center of base piece so that each end of center piece is ¼" from edge of base. Position the two end pieces on extreme ends of base piece so they lay lengthwise across base piece flush with end and sides. Stator hub will rest on center piece and ring will rest on the two end pieces for installation of the blades.

Reassembly (Twin Turbine): 1) If second turbine separated from carrier, make sure that counterbored recess in turbine and mating surface of carrier are clean and free of burrs, then apply a film of oil to these surfaces. Support carrier on suitable blocks and install several pinion pins to serve as pilots, then place turbine in position so that carrier is squarely started into recess in turbine.

2) Use a hammer and hardwood dowel to tap turbine down over carrier. *CAUTION - Use light blows midway between holes and alternate from sid to side of carrier to keep parts square with each other and to avoid distortion. If carrier and turbine cannot be assembl d with moderate force, separate parts and check for burrs in counterbored recess.*

3) With turbine and carrier supported on blocks, hub side down, assemble and install four pinions as follows: With planet pinion on a thrust washer, install 22 needle bearings in pinion and place a thrust washer on top of pinion. *NOTE - A loading tool for this purpose can be made from a piece of steel rod(3/8" diameter by 11/16" long).* Place assembled pinion in carrier and install a

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DYNAFLOW DRIVE (Cont.)

pinion pin with notched end up. After loading tool is pushed out of carrier, slide a block under pinion pin to hold it in place. Turn all pins so that notches face center of carrier.

4) Install pinion pin lock plate so it enters notches of all pins, then install the four turbine-to-carrier bolts and lockwashers and tighten securely. Install sprag in bore of sun gear with shoulder out, then carefully press bearing in place. *NOTE - The sprag for the sun gear has a copper colored cage while the first stator sprag has a plain steel cage. DO NOT interchange these parts.*

5) Check operation of sun gear sprag clutch by sliding sun gear assembly on reaction shaft with gear end toward front of transmission. When viewed from front of transmission, sun gear must rotate freely clockwise and lock in counterclockwise direction. Place tanged thrust washer in second turbine carrier and install sun gear in second turbine assembly.

6) Place a tanged thrust washer on forward face of second turbine carrier. Hold in place with chassis lubricant, then lower second turbine assembly into first turbine support and ring gear assembly.

7) Lay first stator on bench with thick edge of blades up, then place first stator sprag in hub of first stator with shoulder up. Install one bronze bearing and one cupped thrust washer on each side of sprag. *NOTE - Sprag for first stator has a plain steel cage while sun gear sprag has a copper colored cage. DO NOT interchange thes parts.*

8) Check operation of first stator sprag clutch by sliding stator on reaction shaft with thin edges of blades toward front of transmission. Stator must turn freely clockwise and lock in counterclockwise direction when viewed from front of transmission.

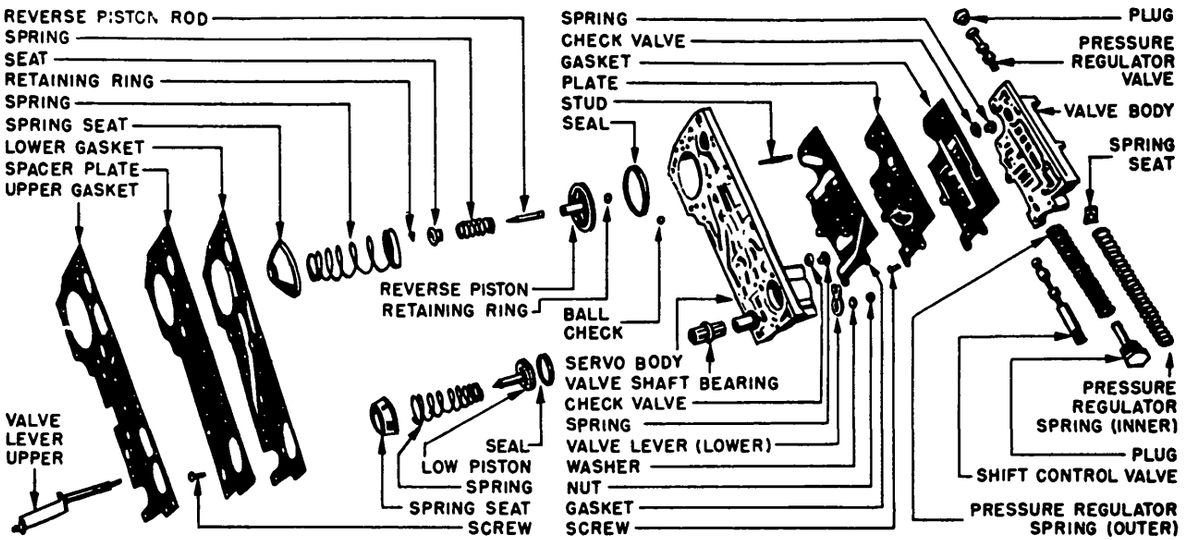
9) Lower first stator assembly into turbine support on top of second turbine assembly with wide edge of blades up. Place first turbine in position on turbine support paying particular attention that turbine is assembled in its original position. *CAUTION - Turbine and support are balanc d as an assembly.* Carefully drive turbine down into position by tapping with a wooden block, making sure that roll pin holes are lined up.

10) Use a pair of channel lock or other suitable pliers to force roll pins into engagement with first turbine support roll pin holes. Roll pins should not extend outside support more than 1/32".

1954-60 MODELS

VALVE & SERVO BODIES: Disassembly (Valve Body) - Remove lower valve operating lever and linkage adjusting lever from upper lever shaft. Remove safety nuts and washers from studs, then lift valve body and gasket from servo body. Remove shift control valve from valve body. Remove rear pump delivery check valve and spring from servo body, then remove the large pressure regulator valve plug from valve body. *CAUTION - There is heavy spring pressure behind plug.* Remove the two springs and spring seat. Remove small plug and remove pressure regulator valve from body. Remove valve body gasket, then remove front pump delivery check valve and spring.

Disassembly (Servo Body): Remove servo body spacer plate attaching screw at reverse servo which is in line with low servo, then place a 1"x1"x13" wooden



VARIABLE PITCH DYNAFLOW VALVE & SERVO BODY ASSEMBLY

block across the low and reverse servo spring seats. Hold block down firmly while removing the remaining spacer plate attaching screws, then carefully release pressure on block to allow servo springs to expand. *CAUTION - This operation must be done carefully to avoid springing the spacer plate or letting the servo springs fly out.* Remove low and reverse servo piston spring seats, springs and pistons. Remove check ball from reverse servo feed channel.

Inspection: Wash valve and servo bodies and parts with clean solvent and blow dry with air. Inspect bodies for cracks, damaged gasket surfaces, and scored piston and valve cylinders. Inspect valves and pistons for nicks, scores, scratches, or rounded shoulders (edges must be kept sharp to keep out foreign material which would cause sticking). Replace worn or damaged piston seals.

►*PISTON SEAL INSTALLATION CAUTION: Lip on seal must fit over SMALLER diameter land on piston.*

Reassembly (Servo Body): Oil and install low and reverse servo piston assemblies in servo body. *NOTE - To avoid curling or damaging edge of piston seal, start each piston into cylinder at an angle, then turn piston as it is straightened and pushed into cylinder.* Check pistons for free movement in cylinders. Install small return spring against low servo piston, then install large return spring with the large end against reverse servo piston. Place spring seats on upper ends of both springs. Place check ball in reverse servo feed channel. Install a new spacer gasket and place spacer plate in position over spring seats. Place the same wooden block used at removal across spring seats to compress springs while installing spacer plate screws. Tighten screws uniformly to avoid distorting spacer plate.

Reassembly (Valve Body): Place front pump delivery check valve spring in body with large end down and place check valve on spring with ridged side up. Install valve body plate and a new gasket, making sure that check valve is seated against plate and not caught under gasket. Place pressure regulator valve spring seat on inner spring, then install spring seat, inner and outer springs, and the large plug in valve body. Tighten plug to 20-25 ft. lbs. Install shift control valve with slotted end on same end of valve body as large pressure regulator plug. Install rear pump delivery check valve in its seat in servo body, ridged face inward, and place valve spring on valve with large end up. Install a new gasket and the valve body on servo body, using care to keep pump delivery check valve spring below the gasket, then install plain washers and safety nuts on two studs adjacent to control valve. Tighten stud nuts evenly to 11-15 ft. lbs. Insert valve operating upper lever shaft through bearing in servo body. With upper lever pointing toward reverse servo, place lower lever with linkage adjusting lever on shaft so that forked end of lower lever engages shift valve pin, then install lockwasher and nut.

REACTION SHAFT FLANGE & OIL PUMP: Disassembly - Remove high and low accumulators from reaction shaft flange. *CAUTION - Be careful not to lose retaining pin and check ball from high accumulator.* Inspect input shaft bushing in front end of reaction shaft. If bushing is damaged or excessively worn, remove outer retaining ring and remove bushing, using Tool J-5822 and a slide hammer. *NOTE - Oil pump must be in place to support reaction flange during bushing removal.* If inner retaining ring remained in place in shaft make sure it is firmly seated in its groove; otherwise replace it. Remove front oil pump body and gears, tapping body lightly with mallet to free it. Remove front oil pump cover and gasket from reaction shaft flange. If the ball check located in clutch feed passage of reaction shaft flange is free to drop out, remove ball. *NOTE - Do not remove if securely retained by peened edge of hole.*

Inspection (Front & Rear Oil Pumps): Wash parts in solvent and dry thoroughly, then check mounting faces of bodies, gears, front pump cover and rear pump cover plate for excessive wear. Inspect front pump bushing. If bushing is loose or excessively worn, replace pump assembly. *CAUTION - If front pump bushing is loose or*

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DYNAFLOW DRIVE (C nt.)

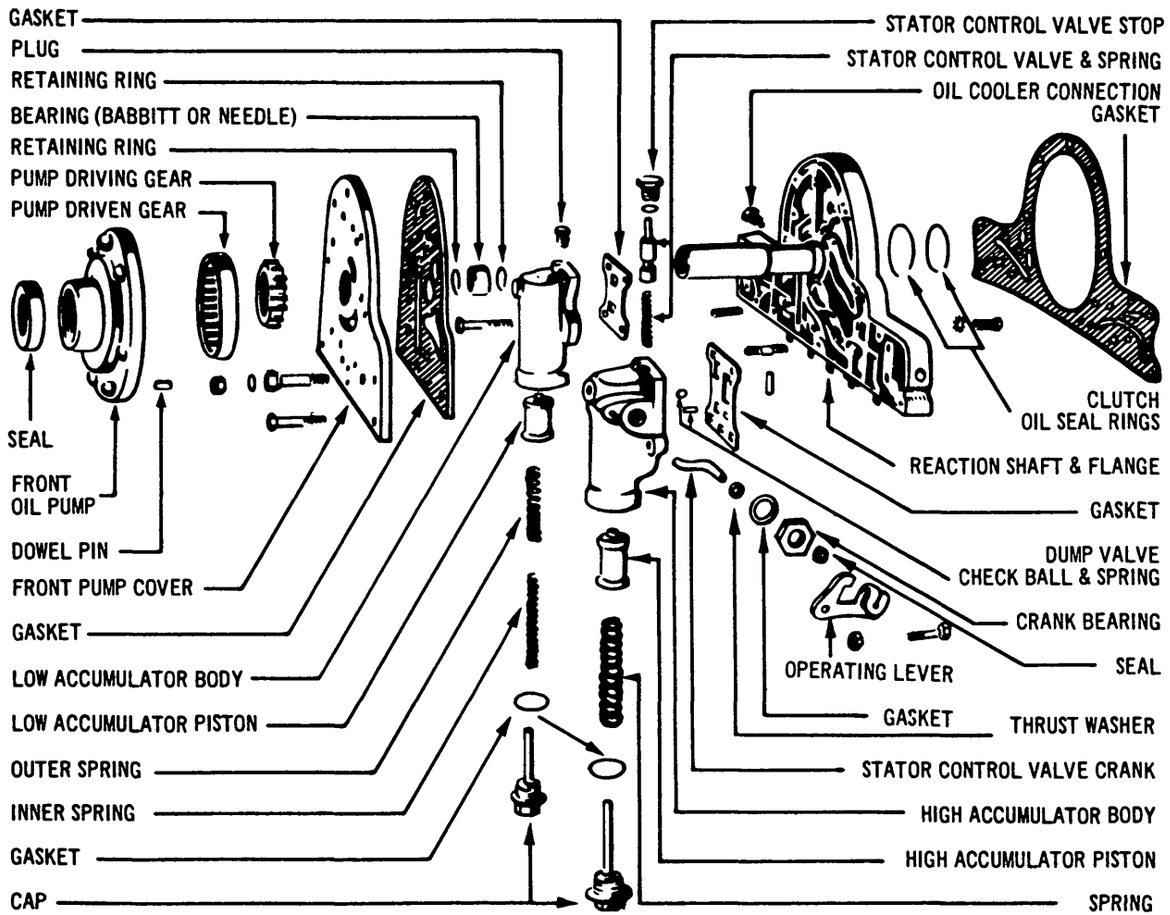
excessively worn, or pump was noisy, check for flywheel run-out, converter pump hub run-out, and misalignment of converter housing. Inspect front pump oil seal but replace it only if there is definite evidence of leakage or damage. To replace, drive out seal with a punch. Lightly coat new seal with Permatex No. 3, then start seal squarely into pump body with deep groove in seal retainer outward and tap into place with hardwood block and mallet. Remove excess Permatex.

Pump Gear End Clearance Check (Front & Rear Pumps) - Mount dial indicator on J-1013 (support), and place support on pump body so indicator button bears on body, then set indicator to zero. Rotate support and indicator, keeping support on pump body and indicate each pump gear. Indicator reading for front pump should be .001-.0025" and rear pump .001-.002". Insert a feeler gauge between crescent and **driven** gear to check clearance which should be .005-.009" on front pump and .0045-.007" on rear pump. Insert feeler gauge between crescent and **driving** gear to check clearance which should be .010-.016" on front pump and .006-.012" on rear pump. Check front pump cover and rear pump cover plate for depth of wear caused by gear. Replace part if depth of wear exceeds .001" or if surface is scored.

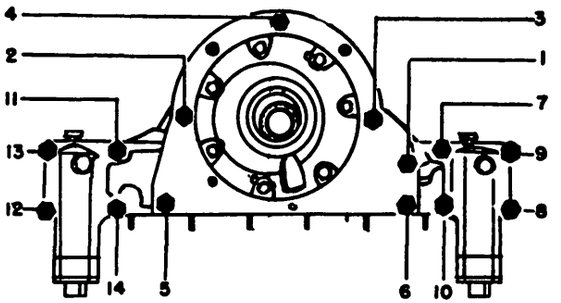
Inspection (Reaction Shaft Flange): Wash in solvent and blow out all passages, then dry thoroughly. Inspect surface of flange and transmission case for nicks or burrs and remove with a mill file. Inspect race for clutch drum roller bearings on rear end of reaction shaft. If bearing surface is worn excessively or scored, replace reaction shaft flange. *NOTE - If flange is replaced, stamp transmission identification number in lower edge of new part in same place as on original flange.* Check all studs for tightness and replace any with damaged threads. *NOTE - If stud threads are stripped in reaction flange, tap out hole for installation of "step studs". The 5/16" - 18 "Step studs" have a 3/8" - 16 thread on flange end, while the 3/8" - 16 "step studs" have a 7/16" - 14 thread on flange end.* Inspect oil sealing rings on hub of flange and replace if damaged.

Reassembly (Reaction Shaft Flange & Oil Pump): If old input shaft bushing was removed, make sure that inner retaining ring is firmly seated in groove in reaction shaft, then install a new bushing with Tool J-5816. Support shaft on wooden block and drive bushing into place with a light hammer until shoulder of tool con-

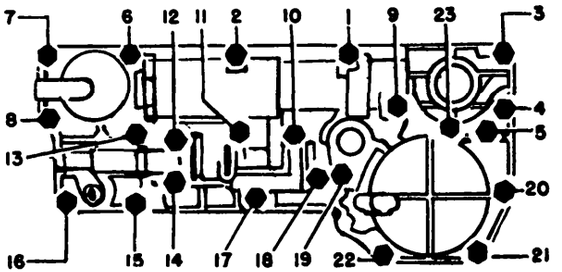
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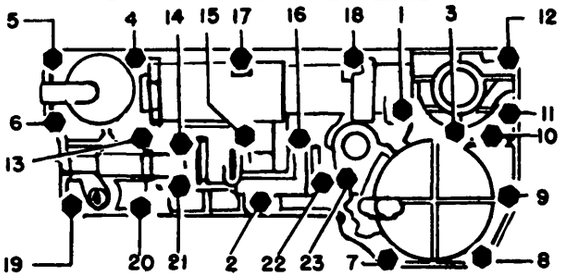
VARIABLE PITCH DYNAFLOW REACTION SHAFT FLANGE, ACCUMULATORS, & FRONT IL PUMP ASSY.



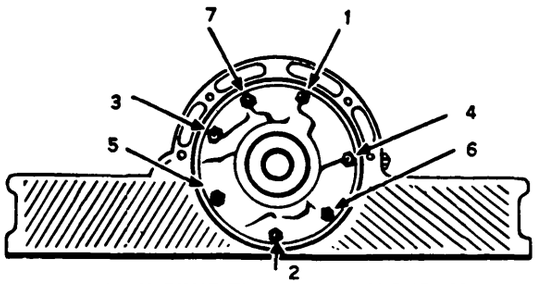
REACTION SHAFT FLANGE & ACCUMULATOR BOLT TIGHTENING SEQUENCE (1954-60)



1954-56 VALVE & SERVO BODY BOLT TIGHTENING SEQUENCE



1957-60 VALVE & SERVO BODY BOLT TIGHTENING SEQUENCE



FRONT IL PUMP TI HTENIN SEQUENCE

DYNAFLOW DRIVE (C nt.)

tacts reaction shaft. Install outer retainer ring. Install check ball in clutch feed passage if ball was removed, then install a new gasket and pump cover on reaction shaft flange. Lubricate and install gears in front pump body. *NOTE - Driving g ar must be installed with bev l d sid outward so it will be against cover when pump is install d. R v rsing this gear will damage transmission.* Install oil pump on cover so the two dowel pins and bolt holes line up with holes in cover, then install bolts with lockwashers and tighten to approximately 5 ft. lbs. in proper sequence (see illustration) and then tighten in same sequence to 25-30 ft. lbs. Bend a tang of each lockwasher up against flat of bolt head. Tighten cover attaching nut stud to 25-30 ft. lbs.

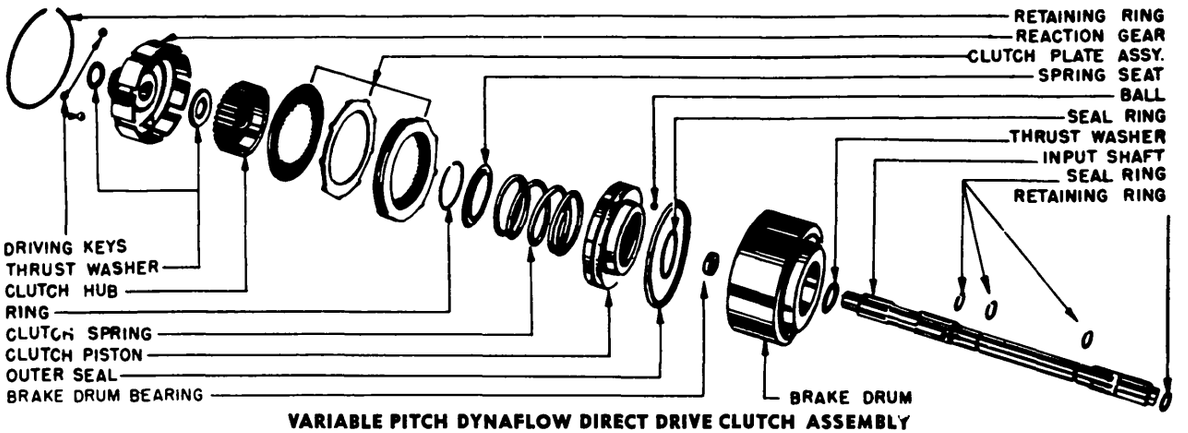
ACCUMULATORS: Disass mbly - Remove retaining pin and check ball from high accumulator (low accumulator does not have check ball). Remove pipe plug, cap, gasket, spring (2 in low accumulator) and piston from each accumulator body. *CAUTION - Keep parts separated so sam parts will be reinstalled in same accumulator body.* On high accumulator only, remove clamp bolt, lever, bearing with seal, gasket, thrust washer and control valve crank from body, then remove valve stop with gasket, control valve and spring.

►*1954 ACCUMULATOR DISASSEMBLY NOTE: Variable pitch stator control valv crank assembly (referred to abov) is not used on 1954 models.*

Insp cti n: Wash all parts in clean solvent and dry thoroughly, then blow out all passages with air. Examine all parts of each accumulator for excessive wear, scoring, or other damage. Remove all nicks and burrs from pistons or valves with an Arkansas stone. Be careful not to round the sharp edges of lands on pistons and valves. With parts clean and dry, install pistons and check for free sliding as body is tipped back and forth. Check mounting surfaces of body with a straight edge. *NOTE - If surface is uneven it may b tru d up by moving body in a circular motion over em ry cloth placed on a surface plate. Be sure to rem v all traces of m ry.* If body or piston is worn or damaged, or piston does not slide freely in body after all burrs are removed, replace accumulator assembly. *NOTE - Th body and piston are not furnished separat ly for s rvic r plac ment.*

K ass mbly: Lubricate each piston and install it in accumulator body from which it was removed. *CAUTION - Start piston squar ly into body. DO NOT tap or force it into body.* Install proper piston springs in each body. The high accumulator uses one heavy spring approximately 4 5/16" long. The low accumulator uses one short heavy spring and one inner spring. Install caps with new gaskets. *NOTE - Caps will be tightened lat r. DO NOT clamp accumulator in a vise to tighten cap.* On high accumulator only, install spring, control valve and stop, then install crank with thrust washer, bearing with new gasket and seal (grooved side inward), operating lever and clamp bolt. Adjust operating lever on crank so that lever contacts stop and the crank contacts valve with valve in extreme upper position, then tighten clamp bolt. Install pipe plugs in both accumulators and install check ball and retaining ring in high accumulator body.

MULTIPLE DISC CLUTCH: Disass mbly - Remove reaction gear flange retainer ring, then remove the six



VARIABLE PITCH DYNAFLOW DIRECT DRIVE CLUTCH ASSEMBLY

flange driving keys with a pointed tool. Remove low range reaction gear, thrust washer, clutch hub, and 12 clutch plates from drum. Install spring compressor Tool J-2590 in drum, placing slots in compressor ring over ends of spring seat retaining ring. Compress clutch spring sufficiently to remove retaining ring. Release pressure on clutch spring, making sure that spring seat does not engage retaining ring groove in drum, then remove spring compressor, spring seat, and spring. Remove piston from drum. If necessary, rap open end of drum against a block of wood to remove piston.

Inspection: Wash all parts in solvent and dry thoroughly. *CAUTION - Use only gasoline or kerosene to clean clutch plates and bands.* Inspect all plates and replace any that are scored, burned, warped or worn excessively. Check fit of any new internally splined plates on clutch hub to make sure they slide freely on hub. Inspect the clutch drum for cracks or scores. Inspect clutch drum seal and replace if damaged. Inspect clutch edges. Install a new seal with lip extending over smaller diameter land of piston. Make sure that small bleed hole in drum is open and that ball check is staked in place but free to move in recess. If needle bearing in drum is worn or scored, carefully remove it and install a new one with Tool C-5191. *NOTE - This tool will locate bearing flush with shoulder.* Place numbered end of bearing, which is hardened, toward shoulder of tool to avoid distortion of cage. Inspect low band and replace if grooves in band are not visible. Inspect input shaft splines, bearing surfaces and oil seals. Replace if necessary.

Reassembly: Apply light oil to piston outer seal and inside of drum, then install piston being careful to avoid distorting or turning lip of seal. When piston is fully installed in drum, top of piston will be approximately flush with shoulder on inside of drum. Place clutch spring in piston and place spring seat and seat the retaining ring on the spring. Install spring compressor, Tool J-2590, and compress spring until the retaining ring can be snapped into groove in hub of drum, then remove spring compressor. Place reaction gear on bench with flange upward, then install clutch hub thrust washer and clutch hub over hub of reaction gear with open end of clutch hub facing up. Separate internally splined (faced) clutch plates from externally splined (steel) clutch plates. *NOTE - Internally splined teeth plates are flat and may be installed in either direction. Externally splined plates are "dished" and all these plates must be installed with "dish" in same direction. "Dish" may be either up or down.* Check each plate for "dish" with a straight edge and stack so they are all "dished" in same direction. Install an internally splined clutch plate over clutch hub, next to gear flange, then install an externally splined plate. Alternately install remaining plates, making sure "dished" plates are installed in the same direction. If properly installed, top plate will be externally splined. Place drum and clutch piston assembly over reaction gear flange so that driving key recesses in drum and flange are approximately aligned, then press drum evenly into place over reaction gear flange. Complete alignment of driving key recesses by tapping the reaction gear flange, then install 6 driving keys and reaction gear flange retainer ring.

REAR BEARING RETAINER, TORQUE BALL & UNIVERSAL JOINT: Disassembly - Remove spring from detent roller lever and support inside the rear bearing retainer, remove adjusting lever on outside of retainer, then remove lever and support assembly. Disconnect parking brake lock operating rod from cross shaft by by unscrewing rod from lever. Push clip from valve operating rod to remove clip and rod from cross shaft. Screw a ¼" - 20 bolt into parking lock operating lever shaft and lock pawl shaft and pull these parts from bearing retainer, then remove lock pawl and lever assembly. Remove cross shaft bearing. *CAUTION - Us a box wrench. A socket which does not fully engag bearing, or an end wrench will distort bearing.* Remove cross shaft.

Inspection: Inspect valve operating cross shaft and bearing for excessive wear (remove rubber seal from bearing and discard it). Inspect bearing for roughness or wear. Inspect lock pawl and ratchet wheel for cracks and worn teeth. Inspect universal joint for wear and play. Check fit of universal joint yokes on output shaft and propeller shaft. Allowable backlash of rear yoke on propeller shaft is .0005-.0045". *NOTE - Front yok must be a tight fit rotativ ly on output shaft to prevent "snap".* Inspect rear yoke of universal joint.

CONTINUED ON NEXT PAGE

DYNAFLOW DRIVE (C nt.)

Rear yoke and bushing in torque ball must be free of scores and not worn excessively. Clearance between these parts should be .004-.006". Clean and inspect spherical surfaces of both retainers and rubber on torque ball. If these are scored, pitted, or torn, replace as necessary.

Reassembly: Install valve operating cross shaft and cross shaft bearing. Install a new seal in bearing with grooved side facing inward. Install parking lock pawl and lever assembly in rear bearing retainer, then install lock pawl shaft and operating lever shaft with tapped ends outward. Attach valve operating rod with retainer clip to cross shaft lever and snap clip into place on rod. Connect parking lock operating rod to cross shaft lever, using a lockwasher on threaded rod end. Install detent lever and support assembly with new seal in groove of shaft, then install linkage adjusting lever on shaft with nut and lockwasher. Attach adjusting lever to bearing retainer with bolt, plain washer and lockwasher, but do not tighten until detent adjustment is made. Temporarily install shaft lever on cross shaft and shift parking pawl into "P" (Park) position. Shift the linkage adjusting lever at slotted end until pawl lock contacts parking pawl, then tighten adjusting lever lock bolt, being sure to maintain contact between lock and pawl. Move shift lever back and forth to check detent adjustment. Parking lock must contact parking pawl when detent roller is in deepest portion of parking notch of detent lever and should break contact at same instant that detent roller starts to move toward neutral position.

PLANETARY GEAR SET: Disassembly - 1) Remove three planet carrier screws and special lockwashers (use 7/32" Allen wrench). *NOTE - A used universal joint yoke may be placed on output shaft and held with a bar while removing the screws.* Separate front and rear ends of carrier by tapping around front flange while holding unit clear of bench.

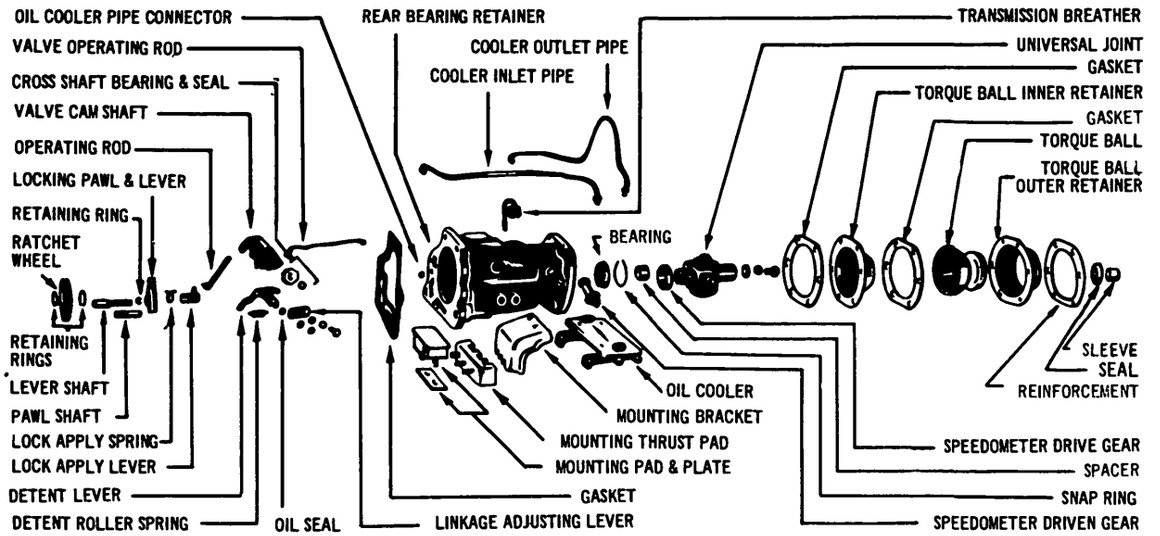
2) Remove sun gear thrust washer (may be either on sun gear or stuck in rear end of carrier), then remove reverse sun gear and needle thrust bearing.

3) Remove the three low planet pinion assemblies, each consisting of a pinion, shaft, and bearing rollers retained at each end by steel thrust washers. A retaining ring snapped into a groove in shaft will hold lower thrust washer in place as the shaft is tapped out of carrier. *NOTE - The shaft is prevented from turning in carrier by a 3/32" steel ball imbedded in end of shaft. Do not lose the steel ball.*

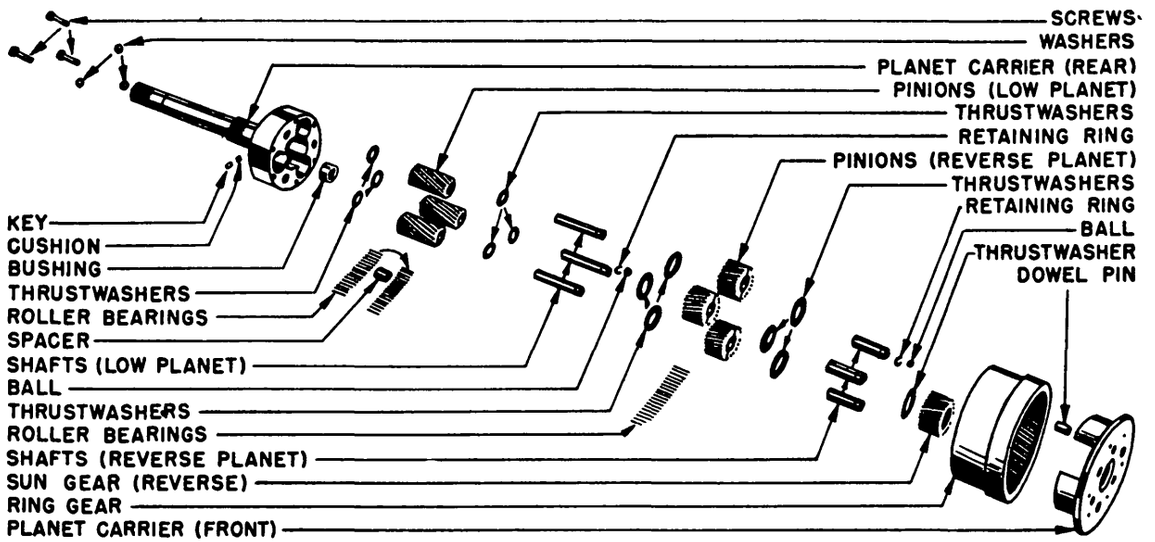
4) Remove the three reverse planet pinion assemblies in the same manner as for low planet pinion assemblies.

5) Remove thrust washers and shafts from pinions, then remove bearing rollers. *NOTE - Reverse planet pinions have a single set of rollers while low planet pinions have two sets of rollers separated by a spacer.*

Inspection: Wash all parts in solvent and dry thoroughly, then carefully inspect shaft and rollers for excessive wear. Inspect reverse ring gear, sun gear, and pinions for wear. Remove any nicks or burrs with Arkansas stone. Inspect bushing in rear end of planet carrier and replace if worn or scored. Use Tool J-3197 to remove bushing and Tool J-2996 to install new bushing. Reaming to size is not necessary and bushing can be installed with either end first. Inspect reverse band and replace if cracked or if lining is worn so that grooves are gone. Inspect band anchor for cracks.



VARIABLE PITCH DYNAFLOW REAR BEARING RETAINER & TORQUE BALL ASSY.



VARIABLE PITCH DYNAFLOW TRANSMISSION PLANETARY ASSEMBLY

Reassembly: 1) Reassemble planet pinions and shafts with bearing rollers and thrust washers. *NOTE - The bottom thrust washer goes between retaining ring on shaft and end of pinion. Each reverse planet pinion contains 24 rollers. Each low planet pinion contains 20 rollers separated by a spacer.* Place a thrust washer on upper end of each assembly to hold rollers in place. Make sure that steel ball is embedded in each shaft to prevent turning in carrier, then install planet pinion assemblies in front end of planet carrier using care to engage steel balls in notches in carrier.

2) Install reverse sun gear and place bronze thrust washer on top of gear and needle thrust bearing on bottom of gear (toward front of transmission).

3) Install rear end of planet carrier on assembled front end making sure that assembly marks on both parts are in alignment. *NOTE - These marks are numbers which are placed over the parting line during production of carrier.*

4) Install the three screws with special lockwashers and tighten to 25-30 ft. lbs. Install reverse ring gear on planetary gear set.

TRANSMISSION CASE: Inspection - Wash case thoroughly and blow out all passages. Inspect case for cracks, breaks, and stripped threads in bolt holes. Inspect all

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DYNAFLOW DRIVE (C nt.)

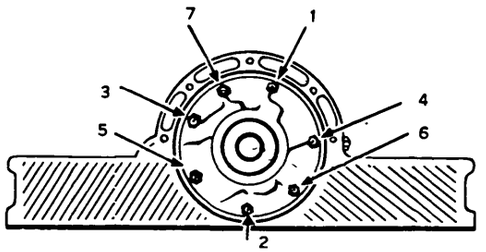
machined surfaces for nicks or burrs and smooth off with a mill file. Inspect bushing for wear and scoring. Insert planet carrier into bushing and check clearance with feeler gauge. If clearance is excessive due to wear of bushing, replace bushing. To remove old bushing, place case over an opening with rear end down and drive bushing from case with Tool J-3175-1. To install new bushing, place Tool J-3175-2 in rear oil pump recess of case to serve as a pilot, slip bushing over Tool J-3175-1 and drive bushing into case from front side until bushing is flush with front surface of wall which supports bushing. *NOTE - Bushing must be installed with wide d ep ends of oil grooves toward rear sid of case.*

TRANSMISSION UNIT INSTALLATION

Plan tary Gear Set: Install reverse ring gear thrust washer in case, then compress ends of reverse band with band installing clip Tool J-2595, and install in case. *NOTE - When installing band make sure that heavy side of band is in correct position so that it will attach to reverse anchor and not to strut.* Remove clip, then rotate servo band toward servo opening. Insert anchor through opening and engage with hooked end of band, then rotate band and anchor back to normal position. *NOTE - Reverse band does not have strut locating pins in ends (low band has pins).* Hold band operating lever (with offset end) in place with strut shoulder toward inside of case and insert anchor shaft through case, anchor, and lever. *NOTE - Tapped end of shaft must be outward. If adjustment screw is not centered in servo opening, the low band operating lever has been installed by mistake.* Install assembled planetary gearset.

R ar Oil Pump & Lubrication Oil Pressure Regulator Valves: Place gasket and rear oil pump plate in re ess in transmission case and align the bolt holes (bolt holes not evenly spaced). Install oil pump drive key cushion (rubber) and drive key in output shaft, then install driving gear to engage key. *NOTE - Install old gear in same position as before removal. Install a new gear either way.* Lubricate both pump gears and pump body, then install driven gear and body over the driving gear and align bolt holes. Install pump bolts with lockwasher, tighten evenly to 5 ft. lbs. in sequence (see illustration), then tighten in the same sequence to 25-30 ft. lbs. Turn output shaft to make sure pump operates freely. Install lubrication oil pressure regulator valve spring, valve, and valve seat in transmission case.

R ar B aring Retain r, R ar Bearing & Parking Lock Ratch t Wheel: Install a retaining ring in forward groove in output shaft, install ratchet wheel, then install retaining ring in rearward groove in output shaft. Install rear bearing horseshoe washer on output shaft, then install rear bearing and rear bearing snap ring in retainer. Install rear bearing retainer and gasket on transmission case. Use lockwashers on attaching bolts and tighten bolts evenly to 25-40 ft. lbs.



FRONT OIL PUMP TIGHTENING SEQUENCE

Low Band, Clutch & Input Shaft: 1) Install low band operating lever and shaft. *NOTE - Strut shoulder of lever must be toward inside of case and tapped end of shaft must be outward.* With the assembly standing on end of rear bearing retainer, install a wooden block 1"x2"x3½" in case, then set both low band struts in position on block, with plain ends engaging strut shoulder of operating lever and groove in anchor shaft and with notched ends together and about 3/16" from wall of case. Spread struts as far as possible.

2) Compress ends of low band with installing clip, Tool J-2595, then install band in case with ends between struts resting on wooden block. Apply operating lever to hold struts and band, remove clips and block, then press down until locating pins engage notches in both struts.

3) Install a thrust washer that measures between .114" and .117" against needle thrust bearing. *NOTE - Reaction gear selective thrust washers (steel) of four thicknesses are available for service replacement.* Install clutch assembly. If drum binds against low band so that clutch does not go all the way down, use a hooked wire to lift band on side opposite struts.

4) Place bronze thrust washer on front face of clutch hub, then use a flashlight to make sure that all four thrust washers and needle bearings are centrally located so that input shaft can be inserted. With ends of input shaft oil seal ring properly locked, install input shaft. *NOTE - It may be necessary to wiggle input shaft to get it through all four thrust washers and needle bearing.*

1954 MODELS

Reaction Shaft Flange, Front Oil Pump, & Accumulator Installation: Install special guide pin (see Guide Pin Note below) in accumulator bolt hole at each end of flange on transmission case. Install new gasket over guide pins so that all holes in gasket and case aligned (*CAUTION*—gasket can be installed incorrectly). Check oil seal rings on reaction shaft flange for correct installation with ends locked, install flange using care not to damage these seal rings. Install low accumulator (on same side as low band operating lever), and high accumulator (opposite side) making certain that holes in gasket and flange match. Coat accumulator bolt threads lightly with Permatex #3, install bolts and nuts with lockwashers but do not tighten, remove guide pins. Install three special bolts (⅜"-16 x 2") with plain washers in #2, 3, 4 positions (see Tightening Sequence illustration) for assembly purposes (these bolts removed after assembly completed), install regular pump cover bolts, nuts, and lockwashers at positions #1, 5, 6 (*CAUTION*—Coat #5 bolt threads with Permatex #3). Tighten all bolts and nuts (1-14) to 5 ft. lbs. torque in sequence shown in the illustration, then tighten #1 through #4 to 35-40 ft. lbs. and all remaining nuts and bolts to 20-25 ft. lbs. torque in the same sequence. Remove the three special bolts (#2, 3, 4). Tighten accumulator body caps to 40-50 ft. lbs. torque. Check flange gasket and trim lower edge flush with bottom face of transmission case if it projects.

►Guide Pin N te—These 5/16" guide pins can be made up from 5/16" round stock, 2½" long, with 5/16"-18 thread ½" long on one end and screwdriver slot on opposite end (chamfer this end slightly).

1955-60 MODELS

Reaction Shaft Flange, Front Oil Pump & Accumulator Installation: Install 5/16" guide pin in accumulator bolt hole at each end of flange on transmission case, then proceed as follows:

1) Place reaction shaft flange gasket in position on case so all holes in gasket are aligned with holes in case. Install tanged bronze high clutch thrust washer on reaction flange, using chassis lubricant to hold in position. Make certain that oil seal rings are on flange hub, then install flange assembly on case using care to avoid damage to oil seal rings.

2) Install three special bolts (3/8"-16x2") with plain washers in positions marked 2, 3, 4 in "bolt tightening sequence" illustration. (*NOTE - These bolts are for assembly purposes only*). Install regular pump bolts and lockwashers at positions marked 1, 5, 6. Coat threads of No. 5 & No. 6 bolts with Permatex No. 3. *NOTE - Bolts used at No. 5 & No. 6 locations ar special bolts with captive sealing washers.* Tighten bolts marked 1, through 4 to 35-40 ft. lbs. and bolts 5 & 6 to 20-25 ft. lbs. in numerical sequence.

3) Thread Endplay Gauge J-5804 into rear end of output shaft and thread Extension Rod J-5808 into a bolt hole in rear bearing retainer. Tighten both tools firmly. Use Clamp KMO-30-G and Sleeve KMO-30-K to mount dial indicator KMO-30-B and Extension J-5339 so that extension bears squarely against end of Gauge J-5804. Push Gauge J-5804 as far forward as possible, set dial indicator at zero, then pull gauge rearward toward indicator with sufficient force to remove all endplay from output shaft. Note indicator reading which should be between .020" and .040" if output shaft endplay is within limits. If endplay not within limits, remove reaction shaft flange, clutch assembly, and the thrust washer located between reaction gear and reverse sun gear.

4) Measure thickness of removed thrust washer and substitute another of proper thickness to bring output shaft endplay within the above limits. *NOTE - If endplay is less than .020" select a thinner washer. If more than .040" select a thicker washer.* Reinstall parts and recheck for correct endplay. Place accumulator gaskets in position so holes match holes in reaction flange. Install low accumulator on same side as low band operating lever and install high accumulator on opposite side of flange, first making sure that check ball and retaining pin are in place in high accumulator body.

5) Coat accumulator bolt threads with Permatex No. 3 and install bolts and stud nuts with lockwashers, but do not tighten. *NOTE - "O" ring seal used under flat washer at No. 9 position.* Tighten all bolts and nuts (1 through 14) to 5 ft. lbs. in numerical sequence. Following the same sequence again, tighten bolts (1 through 4) to 35-40 ft. lbs. and the remaining bolts and nuts to 20-25 ft. lbs. Remove three special bolts (2,3,4) and tighten accumulator body caps to 40-50 ft. lbs. If edge of flange gasket protrudes beyond bottom surface of transmission case, carefully trim it flush with a knife.

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DYNAFLOW DRIVE (C nt.)

1954-60 MODELS

Valve & Servo Body Assembly & Oil Pan: *NOTE - Valve body and shift control valve were changed in early 1957 production and the adjustment procedure for Late 1957-60 is different as indicated below. See "Late 1957-60 Shift Control Valve & Body Production Change Note & Adjustment Caution". For identification of later type parts, see "1957 Valve Body & Valve Production Change" above.*

Valve & Servo Body Assembly & Oil Pan: 1) With transmission lying bottom side up, raise reverse band operating lever and insert strut between shoulders on lever and end of band, with rounded ends against levers and band. *CAUTION - Do not lift the lever during following steps because band strut will fall into transmission.*

2) Install two 5/16" guide pins into case to guide each end of servo body and install servo body spacer plate gasket over guide pins. Push shift control valve and lower operating lever inward to align upper lever with opening in case and install valve and servo body on case. Engage pin in control valve with slot in operating lever.

►*GUIDE PIN NOTE: These 5/16" pins can be made up from 5/16" round stock, 2½" long, with 5/16"-18 threads ½" long on one end and screwdriver slot on opposite end. NOTE - Chamfer this end slightly.*

3) Install various length bolts with lock washers according to depth of holes through valve and servo bodies. *NOTE - Use copper washer on bolt No. 10 (1954), bolt No. 16 (1955-60). See tightening sequence illustration.* Tighten all bolts to 5 ft. lbs. in the numerical sequence indicated in tightening sequence diagram. Repeating the same sequence, tighten all ¼" bolts and nuts to 11-15 ft. lbs. and all 5/8" bolts to 15-20 ft. lbs. While tightening bolts and nuts adjacent to shift control valve, operate the valve to make sure it is not binding. *NOTE - It may be necessary to tighten some bolts to low limit of torque to prevent valve binding.*

4) Using Linkage Hook-Up Finger J-2591, position the socket of valve operating rod under ball of valve upper operating lever and pull upward until ball snaps into socket. Temporarily install shift lever on cross shaft and operate valve linkage to make sure it works freely. More lever toward front of transmission to engage parking lock pawl in ratchet wheel. Turn output shaft to make certain it is locked.

5) Move shift lever to direct drive position and note position of control valve. The groove in first land of valve should be flush with boss on valve body. If valve not positioned properly in valve body, loosen bolts attaching valve body to servo body and shift as required. *NOTE - Bolt holes permit some movement of valve body.* Tighten bolts to specifications *(see "Transmission Unit Overhaul" above).*

6) Spread a thin coat of Permatex No. 3 on transmission case only in area where case is cutaway under the oil pan gasket. *NOTE - This is adjacent to valve operating lever.*

7) Install a 5/16" guide pin *(see "Guide Pin Note" above)* at each end of transmission case and install a new oil pan gasket over guide pins. Install oil screen, then install oil pan and evenly tighten all bolts to 15-18 ft. lbs.

Universal Joint, Torque Ball & Speedometer Driven Gear: On 1954-55 models, make certain that joint retaining ring is fully seated in groove of output shaft before installing universal joint. Install plain washer, lockwasher, and bolt, and tighten bolt to 30-35 ft. lbs. *CAUTION - Make sure that oil passage in bolt is clear.* Install speedometer driven gear and sleeve assembly in rear bearing retainer. On later models, install speedometer driven gear, then install universal joint. Move shift lever to park position and install universal joint bolt, flat washer, and lockwasher, then tighten bolt to 50-55 ft. lbs. *CAUTION - Make sure that oil hole in bolt is clear.*

Torque Ball Installation & Adjustment (1954-55 Models): *See "Torque Ball Adjustment" in Buick Special Data in Car Model section.*

1954 MODELS

Bell Housing & Torque Converter Assembly Installation:

1) Install front oil pump seal ring around pump body against pump body. Install bell housing, using lockwashers on bolts and stud. Sparingly coat threads of lower right side bolt with Permatex #3 (bolt hole opens into transmission case). Tighten bolts and stud nut evenly to 35-40 ft. lbs. torque.

2) Install converter pump on reaction shaft, turning it until lugs on pump hub enter the slots in front oil pump driving gear. Make sure that the ball bearing is properly seated in converter stator, then install this unit on reaction shaft while pushing against the roller race to keep it from sliding out of place. Install stator retaining ring in groove in reaction shaft.

3) Install sun gear on input shaft and mesh it with free wheel cam in stator, then install bronze thrust washer on shaft. Place second retaining ring in groove in shaft, using Expander J-5338-2 on end of input shaft, and Driver J-5338-1 to push retaining ring over end of shaft.

4) Support twin turbine assembly so that all weight rests on a block placed under center of second turbine.

5) Attach Extension J-5339 to plunger of Dial Indicator KMO-30-B, then mount indicator on Support J-1013 with Sleeve KMO-30-K. Place indicator support on the protruding hub of turbine carrier, adjust dial indicator so that extension bears against ground surface on first turbine hub, then SET DIAL INDICATOR AT ZERO.

6) Support converter pump cover on blocks in a horizontal position, lightly tap the input pilot bearing down against shoulder in hub of cover, and place a bronze thrust washer in recess at center of pump cover.

7) Remove dial indicator and support from turbine assembly and set it firmly on the thrust washer on pump cover so that indicator plunger extension bears against inner race of pilot bearing. ***CAUTION —use care to avoid changing the zero setting of dial indicator.***

8) The dial indicator should read between .002" and .010" CLOCKWISE from ZERO because the distance measured in Step 7 must be .002" to .010" LESS than the distance measured in Step 5. This difference is required to give the first turbine proper endplay or operating clearance in its position between the pump cover and second turbine.

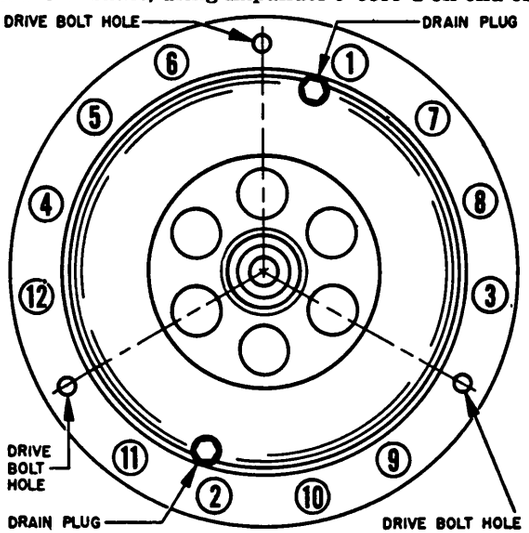
9) If indicator does not read within specified limits, select another washer of proper thickness, which are furnished in the following sizes:

Thrust Washers

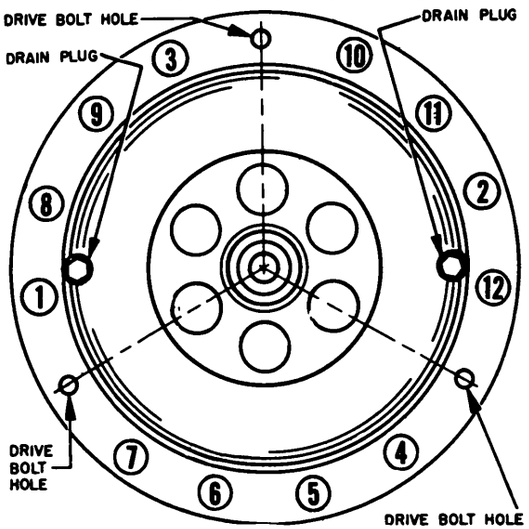
Part No.	Thickness	①Marked
1318799	.052-.055"	5
1318458	.060-.063"	6
1161654	.068-.071"	7

①—Thrust washer marked on flat surface.

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1954-56 CONVERTER PUMP COVER TIGHTENING SEQUENCE



1957-60 CONVERTER PUMP COVER TIGHTENING SEQUENCE

DYNAFLOW DRIVE (Cont.)

10) Install twin turbine assembly on output shaft, turning it as required to mesh planet pinions with sun gear.

11) Looking at front face of converter pump cover, select the three bolt holes that are aligned with the center of the hub and one of the counterbored recesses adjacent to hub (see illustration). Mark these holes for later installation of flywheel-to-pump driving bolts.

12) Install a new O-ring seal on pump cover, making sure that surfaces are clean and that seal has even tension all around and is not twisted.

13) Grease the selected thrust washer so it will adhere and place it in recess in cover, then install cover on pump so that the three marked driving bolt holes are not aligned with any hole in pump rim at which a balance weight is located.

14) Install bolts with plain washers and special nuts in all but the three driving bolt holes, insert shank of a 11/32" drill through one bolt hole to align all holes, then tighten bolts approximately 5 ft. lbs. torque in numerical sequence shown in illustration. Finally tighten bolts in same sequence to 25-30 ft. lbs. torque.

►***CAUTION—When tightening bolts, insert a wide screwdriver blade between flat side of bolt head and pump to prevent a corner of bolt from digging into pump casting.***

15) Screw the socket setscrew with lockwasher into input shaft through opening in pump cover hub.

16) Remove reverse band adjustment cover and shift into "P" (Parking). Pry up on reverse band operating lever with screwdriver to lock input shaft then tighten socket setscrew to 25-30 ft. lbs. torque. Install large hex plug with gasket in hub of pump cover and tighten securely. Install adjustment cover and gasket.

1955-60 MODELS

Bell Housing & Torque Converter Assembly Installation: 1) Install front oil pump seal ring around pump body against pump cover. Install bell housing, using lockwashers on bolts and stud. Sparingly coat threads of lower right side bolt with Permatex No. 3 (because bolt hole opens into transmission case). Tighten bolts and stud nut evenly to 35-40 ft. lbs.

2) Support converter pump firmly on blocks and carefully place stator in proper position, with original selective spacers and the thrust washer between stator and pump hub. ***CAUTION—Do not use grease to hold spacers in place.***

3) Place sun gear on stator with tanged thrust washer up, then carefully lower twin turbine assembly into place, making sure that planet pinions enter and mesh properly with sun gear. Install Converter Gauge J-5899 on converter pump flange, making sure that indicator post does not contact turbine. Loosen wing screw, firmly press gauge plunger down against first turbine hub and tighten wing screw.

4) Support converter pump cover firmly on blocks with inner side up and place bronze thrust washer in its recess. Remove Gauge J-5899 from pump, invert it, and center it on cover so that it rests squarely on the gasket surface.

5) Use Sleeve KMO-30-K to mount dial indicator KMO-30-B on the adjustable post of clearance gauge so that indicator button bears squarely against upper end of clearance gauge plunger.

6) Loosen plunger wing screw, firmly press plunger down against the thrust washer and note dial reading. The dial reading is clearance that will exist between turbine pump and pump cover when parts are installed, and should be .018-.029". If dial reading not within specified limits, change the total thickness of selective spacers located under the stator. *Increasing* spacer thickness will *decrease* clearance at cover and *decreasing* spacer thickness will *increase* the clearance.

Part No.	Spacers Thickness
1167710	.013-.010"
1167711	.023-.020"
1167712	.033-.030"

7) Install converter pump on reaction shaft, turning it until lugs on pump hub enter slots in front pump driving gear. Coat selective spacers and thrust washers with petroleum jelly so they will adhere to stator during installation. Make sure that all rollers and springs are in place and held in stator with tool J-5806.

8) While holding thrust washers and spacers to rear side of stator, slide stator off of installing tool onto the reaction shaft. Make certain that washer and spacers remain in place as stator is pushed back against converter pump. Install converter sun gear with the tanged thrust washer outward. If sprag is properly installed, the sun gear may be turned on reaction shaft in clockwise direction only.

9) Make sure that retaining ring is seated in groove of input shaft, then install the twin turbine assembly, turning it as required to mesh planet pinions with sun gear. Install selective thrust washer, retaining washer and bolt, with external tooth lockwasher on front end of input shaft. Shift into "P" (parking) and pry up on reverse band operating lever with a screwdriver to lock input shaft, then tighten bolt to 30-35 ft. lbs.

10) Check clearance between selective thrust washer and first turbine hub, using feeler gauges. Clearance should be .002-.009". If clearance not correct, substitute another thrust washer of proper size. Two sizes furnished for selective fitting (Part No. 1166113, .063-.060". Part No. 1166112, .070-.067").

11) Looking at front face of converter pump cover, select the three bolt holes used for pump to flywheel drive bolts (see illustration). Install a new "O" ring seal on pump cover, making sure that surfaces are clean and that seal has even tension all around and is not twisted.

12) On 1955 & 1956 Models, grease the selected thrust washer so it will adhere and place it in recess in cover, then install cover on pump so that the three marked driving bolt holes are not aligned with any hole in pump rim at which a balance weight is located. Install bolts with plain washers and special nuts in all but the three driving bolt holes, insert shank of an 11/32" drill through one bolt hole to align all bolt holes, then tighten bolts to approximately 5 ft. lbs. in numerical sequence (see illustration). Finally tighten bolts in same sequence to 25-30 ft. lbs. *NOTE - When tightening bolts, insert a wide screwdriver between flat side of bolt head and the pump to prevent a corner of the bolt from digging into casting.*

13) On 1957-60 Models, proceed as follows: Looking at front face of cover, turn converter cover so that drain holes are horizontally aligned, with seven bolt holes above a line through the drain plugs and eight bolt holes below (see illustration). In this position, the top center hole is a driving bolt hole as is the fifth hole from top in both directions. Mark these holes for later installation of flywheel-to-pump driving bolts. *NOTE - With converter in the above position, the triangular flywheel must be turned so that wide flange is down and horizontal to match converter driving bolt holes and clear drain plugs.* Install a new "O" ring seal on pump cover, making sure that seal has an even tension, is not twisted, and that all surfaces are clean. Grease selected thrust washer and install in recess in cover, then complete installation as outlined for 1955-56 models above.

ALIGNMENT

►*ALIGNMENT NOTE: Make the following alignment and runout checks if front pump is noisy, bushing and oil seal worn, or if oil leakage noted at Converter or Front Pump Body.*

Flywheel Runout: Mount a dial indicator on flywheel housing so stem of indicator rests against flat surface of flywheel at inner side of the bolt holes. Turn flywheel, making sure that crankshaft end thrust is held in one direction, and note runout of flywheel face which should not exceed .015". If runout exceeds .015", attempt to correct by tapping high side of flywheel with a mallet. If this does not correct runout, remove flywheel and check for burrs between flywheel and face of crankshaft flange, remove burrs, then recheck runout. If no burrs exist, install a new flywheel and recheck runout. If runout still exists, and is greater than .015", check runout of rear face of crankshaft flange.

Primary Pump Hub Runout: With converter primary pump and bell housing installed, mount dial indicator on bell housing so that it bears against primary pump hub. If runout exceeds .012" when flywheel turned, mark flywheel and primary pump, then remove and reinstall pump at a point 180° from first position. If pump runout still exceeds .012", install new primary pump and recheck runout. When a position is found where runout is less than .012", mark flywheel and pump with paint and align these marks when transmission is finally installed.

Bell Housing: Mount dial indicator on oil pump driving lug on rear end of converter primary pump hub *(CAUTION - Do not clamp indicator on bearing surface)* so that indicator bears against rear face of housing at 3¾" radius. Rotate flywheel while holding end thrust in one direction. Runout should not exceed .005". If runout of bell housing face exceeds .005", cement paper shims of proper thickness to rear face of crankcase to bring runout to .005" or less, with all bolts fully tightened.

Pilot Hole Runout: Mount dial indicator and Hole Attachment KMO-30-F to bear against inner edge of pilot

CONTINUED ON NEXT PAGE

DYNAFLOW DRIVE (C nt.)

hole in housing. Runout of pilot hole should not exceed .004". If runout greater, remove bell housing and remove the two dowels. Reinstall bell housing, leaving bolts just loose enough to permit shifting housing by tapping with a lead hammer. Set up dial indicator as indicated above and bring pilot hole of bell housing within .004" runout by tapping in required direction with a lead hammer. If it is not possible to move housing enough, remove housing and drill bolt holes with a ½" drill. When bell housing is placed so that runout is .004" or less, tighten all bolts securely. Ream the two dowel holes through housing and crankcase using Reamer J-2548-3 (17/32") until this reamer bottoms in hole, then finish with bottoming Reamer J-4710-6 to provide full size to bottom of hole. Remove bell housing and install oversize dowels in crankcase.

ENGINE BALANCING

►*IF VIBRATION NOTED AFTER INSTALLATION OF CRANKSHAFT, FLYWHEEL, OR OTHER ROTATING PARTS, CORRECT THIS UNBALANCED CONDITION AS FOLLOWS:*

►*CAUTION:* Procedure below will correct minor unbalance caused by replacement of individually balanced parts. Extreme vibration caused by parts abnormally out of balance, or different in weight from corresponding parts, should be corrected by replacement of these parts.

Critical Speed of Vibration - Determine speed at which vibration is most evident (use tachometer) and operate engine at this speed to check results from the following corrective procedures.

1) Remove bell housing cover and install one balance weight (.060" thick) under head of two converter pump cover bolts, and tighten bolts to 25-30 ft. lbs. *(CAUTION - Do not place a weight at a flywheel-to-converter driving bolt as these bolts are not long enough for addition of weights).*

2) Run engine at critical speed and carefully compare vibration with that obtained without the weight, then stop engine. Mark location of balance weight on converter pump, remove weight and tighten bolt to 25-30 ft. lbs. Install the weight at other converter pump cover bolts and compare vibration produced at critical speed.

3) At the point where balance weight produced greatest improvement in vibration, install weights of proper thickness to eliminate objectionable vibration. Balance weights are furnished in the following thicknesses:

Balance Weight Part Nos.

1954 Models

Thickness	Part No.
.0345"	1341420
.060"	1341419
.120"	1341418

1955-56 Models

Thickness	Part No.
.0345"	1166600
.060"	1166601
.120"	1166602

1957-60 Models

Thickness	Part No.
.009"	1178106
.018"	1178107
.0345"	1178108
.060"	1178109
.120"	1178110

BUICK FLIGHT PITCH DYNAFLOW

Buick (1958-59)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR (1958 MODELS): NOTE - 1959 models cannot be started by pushing due to limination of rear il pump.* Place control lever in "N" (Neutral) until car reaches approximately 30 MPH, then shift control lever into "G" (Grade Retard) position. Increase car speed until engine starts. After engine starts, return control lever to "N" (Neutral). *CAUTION - It is not saf to tow car to start it.*

►*TOWING FLIGHT PITCH DYNAFLOW DRIVE CARS:* With transmission selector lever in "N" (Neutral) position, the car may be towed at a speed not to exceed 35 MPH. *CAUTION - Do n t tow a Flight Pitch Dynaflow Driv car in any oth r rang .*

►*1958 REVERSE BOOSTER VALVE CHANGE (To provid a mor cushi ning ffect on reverse clutch application): Se "Overhaul" b l w.*

►*FILLER PIPE INTERFERENCE (Causing Vibration):* May be caused by a "Variable Pitch" Dynaflow filler pipe being installed. Check and replace with correct filler pipe if necessary.

►*1958 FLIGHT PITCH TRANSMISSION MOUNTS CHANGE:* New softer mounts, Part Nos. 1187700(right), 1187701 (left) are being used in production and for service replacement. The later type mounts are identified by the above numbers molded into the rubber, or by a daub of yellow paint. Earlier type mounts are identified by Part Nos. 1180351 (right), 1180351 molded into the rubber. *CAUTION - Do not use one early type and one lat r type m unt on the same car.*

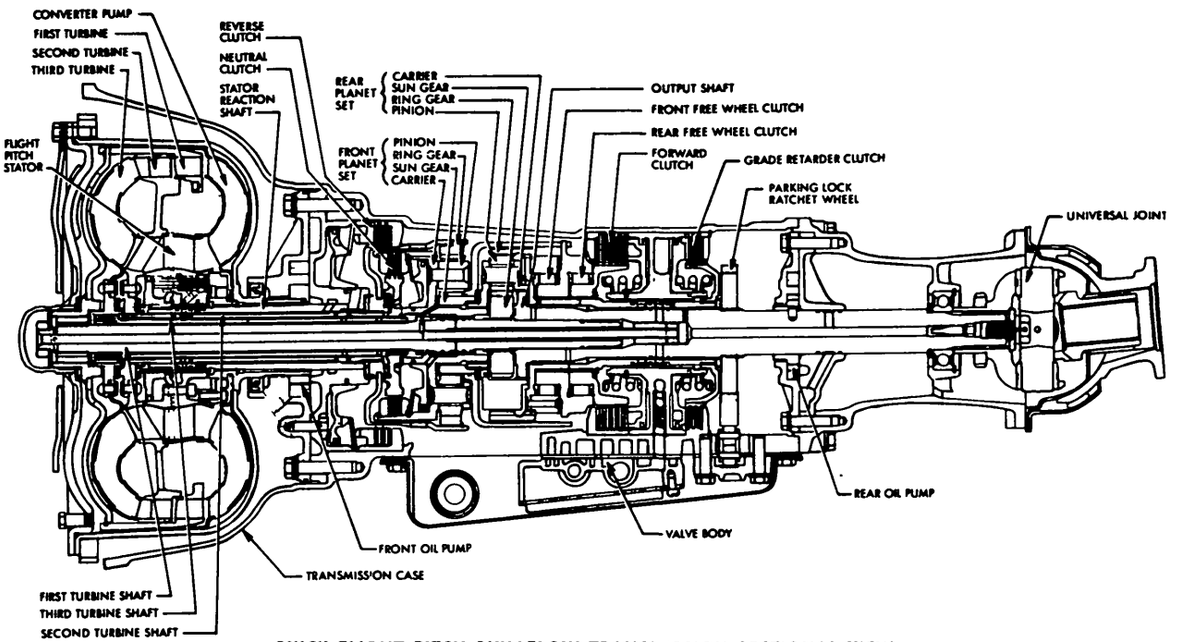
►*1958 TRANSMISSION OIL COOLER HOSE CLAMP CHANGE (T liminat l akage):* At each connection between hose and line, two clamps will be used (one "Wittek", with copper-plated screw for identification, and one "Corbin", dyed green). Part numbers are as follows: "Wittek" (274307); "Corbin" (272846).

►*1959 TRIPLE TURBINE TRANSMISSION SUPPORT REMOVAL & INSTALLATION. CAUTION:* Before any service operation requiring the removal of transmission support is performed, the original location of the support must be marked so it can be reinstalled in exactly the same location and at the same angle. Improperly installed support will cause drive line stress and roughness.

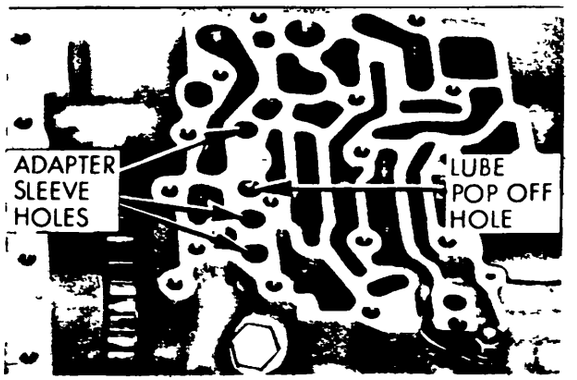
►*1959 TRANSMISSION OUTPUT SHAFT-TO-REAR SUN GEAR NEEDLE BEARING REPLACEMENT CAUTION (TO PREVENT FAILURE OF BEARING):* When replacing the needle bearing, it must be installed with the cage inside diameter radius toward the fillet radius of the output shaft. The split line of cage halves must be away from shaft flange.

►*1959 TRANSMISSION REVERSE CLUTCH SEAL FAILURE CORRECTION:* If the reverse piston seal fails, it may be due to a roughly machined surface on sealing surface of the reaction flange. To prevent repeated failure, smooth the sealing surface on reaction flange by polishing with fine crocus cloth.

►*1959 TRANSMISSION "BUZZING" NOISE AT IDLE CORRECTION:* This condition may be caused by the lubrication pressure regulator ball vibrating on its seat and can be corrected by positioning the lubrication regulator spring retainer approximately .060" further into the output shaft support as follows: Drain oil from pan and remove pan and valve body. Insert a 5/16" steel or copper tube in lubricating circuit "pop-off" hole (see illustration for location) until it contacts lube pressure regulator spring retainer, then scribe a line on tubing flush with case. Cut tubing 1/16" longer than scribed mark and drive tube into "pop-off" hole until it is flush with case. Leave tubing in position and reassemble valve body to case using a new gasket. Check adjustment of stator valve and manual shift valve *(see "Buick Flight Pitch Dynaflow Drive" in 1958 Annual Data or later Manual edition).* Install oil pan using a new gasket and install filler tube and fill transmission with fluid. Adjust stator linkage *(see "Linkage Adjustments" below).*



BUICK FLIGHT PITCH DYNAFLOW TRANSMISSION SECTIONAL VIEW



BUZZING NOISE CORRECTION

DESCRIPTION: *NOTE - Except for elimination of rear oil pump on 1959 models, 1958 & 1959 transmissions are the same.* This transmission is an automatic non-shifting, hydraulically controlled planetary transmission with a five unit torque converter having three turbines and a variable pitch stator assembly. These units are connected through two planetary units to the output shaft. The variable pitch stator, located between third turbine exit and converter pump entrance, is infinitely variable and is controlled through a hydraulic piston by the accelerator pedal. In addition to the two planetary units, four disc type clutches are provided for Neutral, Forward, Reverse, and Grade Retarder operation. Engagement and disengagement of these clutches is accomplished only by movement of transmission range selector lever. A parking lock pawl engages a gear which is integral with output shaft when range selector lever is placed in "P" (Park) position. Transmission clutches and torque converter variable pitch stator are hydraulically controlled by pressure supplied from front and rear oil pump (1958 Models); front oil pump (1959 Models). A valve body mounted on bottom of transmission and submerged in oil contains units to regulate oil pressure, control operation of clutches and provide manual selection of the operating ranges. When transmission is in "D" (Drive) range, torque multiplication is provided by "first turbine" for starting and low speed operation. The "second turbine" is used for intermediate speeds and acceleration purposes and comes into operation after the "first turbine". The "third turbine" is used for cruising and

CONTINUED ON NEXT PAGE

FLIGHT PITCH DYNAFLOW (C nt.)

high speed operation and comes into operation after the "second turbine". The actual point where each turbine provides torque to output shaft is dependent on car speed, engine speed, and throttle position.

OPERATION

NEUTRAL (Selector Lever in "N"): All four clutches are released and no drive is transmitted to transmission output shaft. Engine can be started in "N".

PARK (Selector Lever in "P"): All clutches are released (as in Neutral). The parking lock pawl is engaged with a gear on output shaft which prevents output shaft from rotating. Engine can be started with transmission in "P".

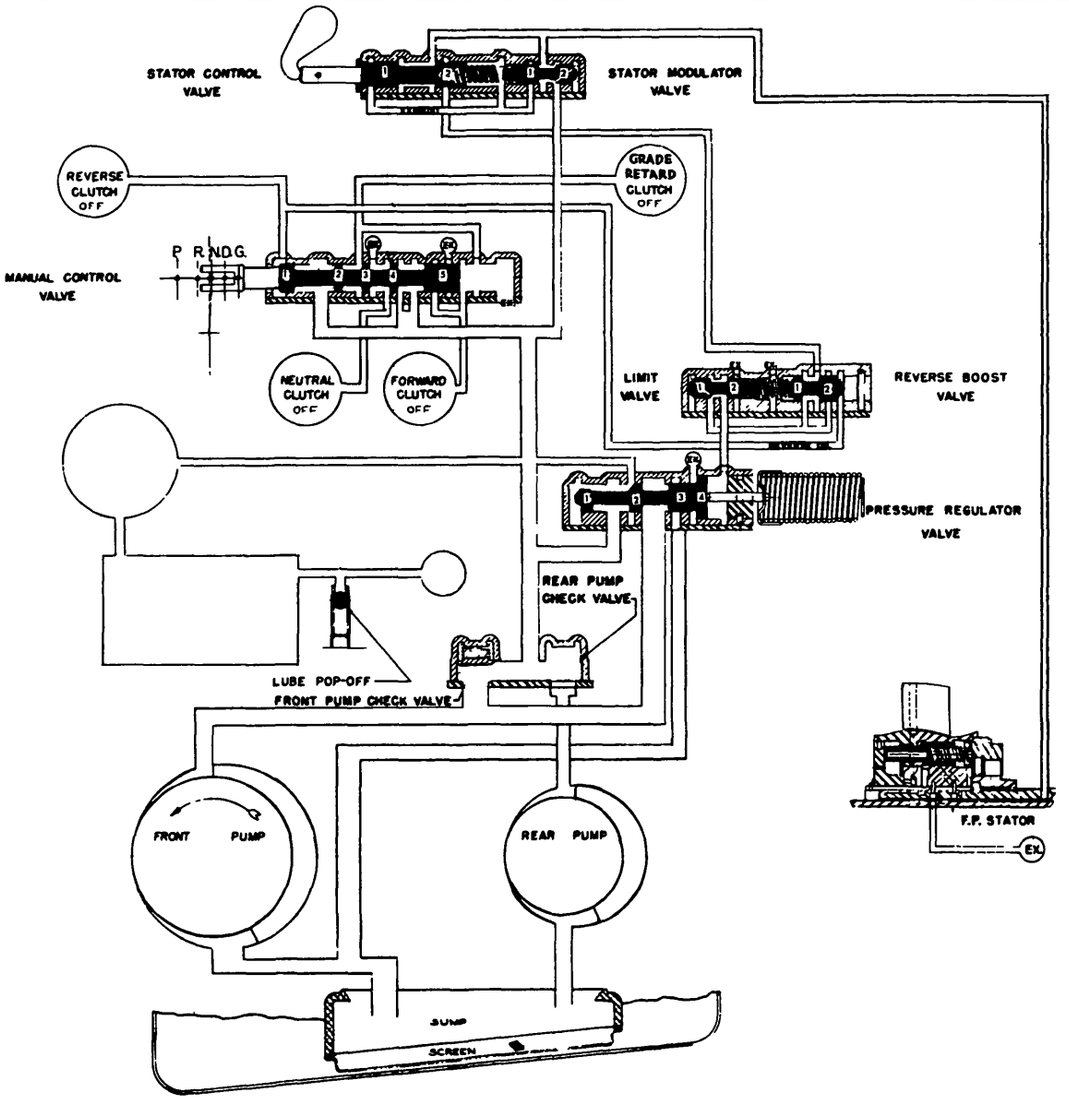
DRIVE (Selector Lever in "D"): Reverse clutch and grade retarder disc clutches are released. Neutral clutch and forward clutch are applied. Power transmission is through planetary units and putput shaft as indicated below. As each of the three turbines are directly connected to a component of the two planetary units, power transmission varies in relation to turbine or turbines in operation depending on engine speed and throttle position.

P wer Range: As accelerator is pressed to set car in motion, the engine drive pump starts, increasing with engine speed, and delivers nearly all of its output to first turbine. Motion of first turbine is transmitted to sun gear of rear planetary gear set, causing transmission shaft to be driven at reduced rate as the rear planetary gears are forced to "walk" around their ring gear. The ring gear cannot rotate backwards because of its one way clutch. In this phase of operation, greatest transmission torque multiplication is obtained. Transmission gear reduction is 2.86-1.

Acc leration Range: As car speed increases, angle of oil pumped by converter pump changes due to engine RPM and, because of the angle of first turbine blades, the oil starts to drive second and third turbine in a progressive and overlapping action while output of first turbine diminishes. Output of second turbine is transmitted to output shaft through the front planetary sun gear at a 1.54-1 reduction. Reduction in the front gear set is obtained by turning the ring gear which causes planet gears to "walk" around sun gear and transmit their speed to the output shaft. The sun gear is prevented from turning backwards by a one way clutch. When second turbine reaches maximum torque, the first turbine is released and freewheels in converter pump oil stream. Like the first turbine declining action, as engine speed continues to increase, less oil pressure plays on the second turbine vanes but more reacts on the third turbine. Because of its direct connection to output shaft, the third turbine is more favorable for high speed acceleration.

Cruising Range: When fluid coupling point of the torque converter is reached, the transmission is in cruising range. At this stage, work of the second turbine is completed and it is released by a clutch to freewheel in converter housing with the first turbine. All output is now from third turbine which is connected mechanically to output shaft at a 1 to 1 ratio.

Variable Pitch Stator: The above operations have occurred without reaching the half throttle position and the flight pitch stator blades have remained in the low angle "cruise" position. If accelerator pedal is depressed to the half throttle position or beyond, the stator blades will be shifted to a higher angle through the hydraulic control action. As the angle of stator blades is increased, the stall speed and torque multiplication of the converter are increased providing higher performance for rapid acceleration. Position of stator blades is infinitely variable between low angle and high angle and is entirely governed by throttle position (beyond the half throttle position). High stator blade angle is reached simultaneously with wide open throttle.



FLIGHT PITCH DYNAFLOW HYDRAULIC CIRCUITS

GRADE RETARDER: Grade Retarder clutch is applied and all other transmission clutches are released. Grade Retarder "G" range should not be entered at car speeds above 45 MPH. When grade retarder position is applied, the multiple disc clutch on rear planetary gear set ring gear is engaged and all other clutches are released. This drives the first turbine at 2.86-1 times output shaft speed, while the second and third turbines freewheel. The pumping action of the first turbine creates a turbulence in the converter which effectively brakes the car by increasing engine speed and by transferring energy into heat in the converter oil. The heat is then dissipated by engine cooling system.

CONTINUED ON NEXT PAGE

FLIGHT PITCH DYNAFLOW (C nt.)

REVERSE: The reverse multiple disc clutch holds ring gear of planetary gear set and second turbine stationary. The neutral clutch is also applied. As engine is accelerated, the first turbine moves, turning its shaft and rear planet set sun gear. This causes rear planet set pinions to revolve the ring gear opposite to pump rotation. The rear planet set ring gear freewheel clutch thus engaged rotates the front planet set sun gear freewheel clutch, and forward clutch hub opposite to pump rotation. This causes front planet pinions to turn and "walk" around the stationary ring gear, turning the planet carrier and output shaft opposite to pump rotation, and accomplishing the reverse operation.

LUBRICATION

Check oil level at 1000 mile intervals, drain and refill every 25,000 miles.

Capacity - 12.5 quarts. *NOTE - A completely dry transmissi n (aft r v rhaul) will require an additional 1 1/3 pints.*

Rec mmend d Oil - Special Buick Oil for Dynaflow Drive or Automatic Transmission Fluid Type "A" bearing an AQ-ATF number embossed on the can.

Checking Fluid Lev l: With transmission at normal operating temperature, transmission selector lever in "N", oil level should be at "Full" mark on dipstick. Add oil as necessary. *CAUTION - Do not overfill.*

Draining & R filling: With transmission at normal operating temperature, engine turned off, loosen one drain plug in converter housing and rotate converter 180°, then remove the opposite drain plug and drain converter. Remove filler pipe from side of transmission oil pan (or drain plug, if so equipped), and drain oil from transmission. To refill, install drain plugs in converter and tighten securely, then install filler pipe, or drain plug, to transmission oil pan. Add four quarts of Automatic Transmission Fluid Type "A" to transmission. Raise rear wheels and with transmission in "D" (Drive) range and engine idling, add 8½ quarts more. Place transmission selector lever in "N" and lower rear wheels to ground. Check oil level and add oil as necessary to bring level to "Full" mark on dipstick.

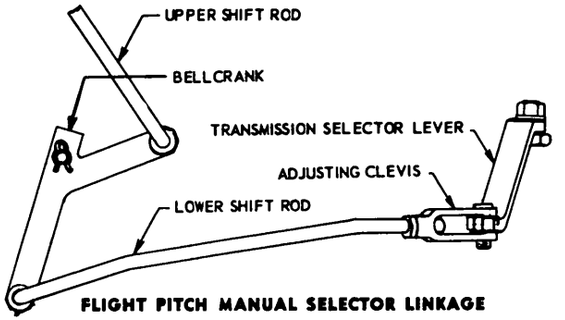
LINKAGE ADJUSTMENT

Thr ttl Linkage: *S "Carburetor" on Car Model pages.*

Manual Linkag : *CHECKING NOTE* - To check linkage adjustment, move manual control lever carefully until transmission is shifted into its "D" (Drive) range position (manual lever will seem to seat). Move manual lever toward "G" (Grade Retard) without lifting lever toward steering wheel, and note distance it travels before contacting the stop. Return lever to "N" (Neutral) position, then move the lever to "R" (Reverse) position and note how far it moves before it contacts stop. If movement from drive detent to stop is the same as movement from "N" (Neutral) detent to stop, manual linkage is correctly adjusted.

Adjustm nt - Loosen locknut on clevis at shift lever on transmission, then remove cotter pin, clevis pin, and spring washer. Lengthen or shorten lower shift rod by turning clevis until distance from "D" (Drive) detent to stop is the same as from "N" (Neutral) detent to stop. Check pointer on transmission selector dial; if dial is not properly adjusted, pry off dial, loosen nut and adjust pointer in Drive range. *(NOTE* - If external linkage has been checked and adjusted and transmission still does not shift properly, the transmission oil pan must be removed and internal linkage checked and adjusted).

Stator Linkage: With throttle in hot idle position, adjust upper stator rod so that ball joint at forward end will just slip freely into stator lever with both stator lever and stator rod pushed rearward. Shorten stator rod **one full turn** to provide clearance at stop inside transmission case. Reconnect ball joint to stator rod and tighten nut.



FLIGHT PITCH MANUAL SELECTOR LINKAGE

►*STATOR LINKAGE ADJUSTMENT NOTE:* If upper stator rod length cannot be adjusted to slip freely in stator lever with rod and lever pushed rearward, check to make sure that correct stator rod is installed on car.

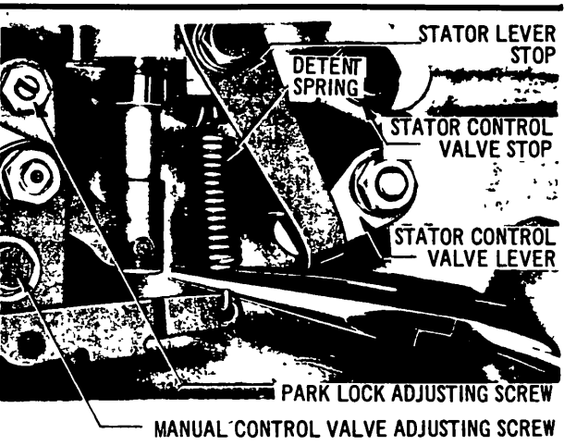
Neutral Safety Switch Adjustment: With transmission manual control linkage in proper adjustment, place shift control lever in "N" (Neutral) position. Insert a 3/32" drill through gauging hole in operating lever and through gauging hole in switch body. *CAUTION* - Do not move shift control lever out of Neutral position. If gauging drill is now parallel with centerline of steering column jacket, neutral switch timing is correct. If gauging drill will not go through holes or is not parallel with jacket, loosen two switch mounting screws and move switch sideways until gauge is parallel, then retighten screws. To check adjustment, turn on ignition switch, place shift control lever in reverse, and make sure back-up lights are operating. Set parking brake, place selector lever in "N" (Neutral) and make sure engine will start. Place shift lever in "P" (Park) and and check to see if engine will start.

CONTROL VALVE & PARKING LOCK ADJUSTMENT

►*ADJUSTMENT NOTE: Oil pan must be removed to make the following adjustments. See "Overhaul" below.*

Stator Valve Adjustment: Swing lever stop aside and slip a .040" feeler gauge into position between valve body and valve stop. Press stator valve stop toward valve body and hold in this position by tightening valve body bolt.

Stat r C ntr l L v r St p Adjustm nt: Position lever stop over stator control lever, then place a .005" feeler gauge between end of stator valve and lever. Hold lever "out" and lever stop against lever. Tighten lever stop clamp bolt in this position, then install detent spring.



CONTROL VALVE & PARK LOCK ADJUSTMENT LOCATIONS

Manual Shift Valve Adjustment: With transmission in "Park" position (detent plate rotated rearward to last notch), loosen manual control valve adjusting bolt and insert a 9/64" drill between inner edge of first land of manual valve and valve body. Hold valve "in" toward valve body, with drill in position, and at same time hold detent lever solidly in notch, tighten adjusting nut.

Parking Lock Adjustment: With transmission in "Park" position, loosen parking lock adjusting screw and insert a .015" feeler gauge between parking lock roller and slide cover. Turn eccentric screw to give .015" clearance between roller and slide cover. Hold screw in this position and tighten nut.

TROUBLE SHOOTING

TRANSMISSION OIL FOAMS AND RUNS OUT OF BREATHER OR FILLER PIPE: Transmission overfilled. Check the following:

1) Check for blackened condition of oil, indicating leakage of rear axle lubricant into transmission due to a defective propeller shaft seal. Correct cause of leakage and completely drain and refill transmission. Check for low oil level in rear axle housing.

2) If transmission oil is caramel colored, water in transmission is indicated and is caused by leakage in the oil cooler. Oil in top of radiator tank will also be noted. Correct cause of water leakage and completely drain and refill transmission.

CAR WILL NOT MOVE IN ANY RANGE (REAR WHEELS FREE):

1) Linkage incorrectly adjusted.

2) Low or no front pump pressure due to one or more of the following: Low oil level. Oil screen clogged. Worn or scored front pump and/or reaction flange. Case and/or valve body gaskets not sealing and allowing air to enter hydraulic circuits. Pressure regulator valve binding and hung up.

CAR WILL NOT MOVE FOR SEVERAL SECONDS AFTER STANDING OVERNIGHT (BEGINS TO MOVE SUDDENLY):

1) Front pump loses prime. Check pump clearances and examine pump body and gears for scoring. *S "Oil*

CONTINUED ON NEXT PAGE

FLIGHT PITCH DYNAFLOW (C nt.)

Pump Ov rhaul" below. If pump not within limits, replace pump.

CAR WILL MOVE ONLY SLOWLY FOR SEVERAL SECONDS AFTER STANDING OVER NIGHT (GRADUALLY BEGINS TO OPERATE NORMALLY):

1) Converter leakage or leak down. Check clearance between first turbine shaft-to-hub. This clearance should be .002-.009". Surface of first turbine hub where anti-leak down valve seats should be smooth to allow valve to seat properly. To check sealing of anti-leak down valve, assemble valve and spring into hub and set hub on bench to hold valve in position. Pour kerosene in any one of the four holes until level is visible, then note if level falls. Kerosene should be retained several minutes.

2) Check stator valve spring retainer which should fit tightly in bore of stator rear carrier. If a retainer can be forced down into bore with thumb pressure, it is too loose and should be replaced.

CAR WILL NOT MOVE IN ANY FORWARD RANGE:

1) Forward and neutral clutches not operating.
2) Rear sprag and neutral clutches not operating.
3) Reverse clutch stuck in applied position.

CAR WILL NOT MOVE IN REVERSE RANGE:

1) Reverse clutch not operating.
2) Forward clutch stuck in applied position.
3) Grade retard clutch stuck in applied position.
4) Front sprag not operating.

NO GRADE RETARD OPERATION:

1) Grade retard clutch not operating.
2) Will not shift into GR detent because of binding in parking pawl slide and roller.

EXCESS SLIPPAGE IN FORWARD AND REVERSE:

1) Low oil level or linkage not adjusted properly.
2) Forward and neutral clutches slipping, or low front pump pressure.
3) Front sprag not operating properly. Rear sprag not operating properly.
4) Stator control valve linkage not properly adjusted.
5) Converter drain check valve not operating properly (or missing), or pressure regulator valve stuck in bypass position.

EXCESS SLIPPAGE AT HIGH THROTTLE AND NO TOP SPEED IN FORWARD RANGE:

1) Neutral clutch not applying or neutral clutches slipping.
2) Stator control valve linkage not adjusted properly.

CAR CREEPS FORWARD IN NEUTRAL:

1) Linkage not properly adjusted.
2) Neutral clutch and/or forward clutch not releasing or not assembled properly.
3) Grade retard clutch not releasing or not assembled properly.

CAR WILL NOT HOLD IN PARK OR WILL NOT GO INTO PARK:

1) Linkage not properly adjusted.
2) Parking pawl slide and roller binding, or parking pawl broken.
3) Grade retard backing plate retainer ring not in groove or missing.

FORWARD CLUTCH DOES NOT OPERATE PROPERLY:

1) Low apply pressure due to: Valve body and/or case gaskets not sealing. "0" rings on adaptor sleeve damaged or missing. Piston outer seal and/or inner oil ring damaged or missing. Porous output shaft support. Modulator valve and/or limit valve hanging up due to burrs or dirt. Neutral clutch apply circuit has excessive leak.
2) Piston and/or output shaft support damaged or burred causing piston not to apply or release.
3) Piston outer seal lip turned over causing piston to hang.
4) Clutch plates warped, worn, or not properly installed.

NEUTRAL CLUTCH DOES NOT OPERATE PROPERLY:

1) Low or no apply pressure due to: Valve body and/or case gaskets not sealing. "0" rings on adaptor sleeve damaged or missing. The two rear oil rings on grade retard reaction shaft damaged or missing. The two front oil rings on output shaft damaged or missing. Any one of, or all, of first turbine shaft oil rings damaged or missing. Piston outer seal and/or inner oil ring damaged or missing. Forward clutch apply circuit has excessive leak.
2) Piston and/or front carrier damaged or burred causing piston not to apply or release.
3) Piston outer seal lip turned over causing piston to hang.
4) Clutch plates warped, worn, or clutch backing plate retaining ring not properly installed or missing.

REVERSE CLUTCH DOES NOT OPERATE PROPERLY:

1) Low or no oil supply due to: Valve body and/or case gaskets not sealing. Porous apply channel in case. Reaction flange gasket not sealing. Reaction flange and/or case mating surfaces irregular. Piston outer seal and/or inner oil ring damaged or missing. Reverse boost valve hanging up because of burrs or dirt.
2) Piston and/or reaction flange damaged causing piston to hang.
3) Piston outer seal lip turned over causing piston to hang.
4) Clutch plates warped, worn, or not properly installed.
5) Clutch pressure plate not properly installed.

GRADE RETARD CLUTCH DOES NOT OPERATE PROPERLY:

1) Low or no apply pressure due to: Valve body and/or case gaskets not sealing. Adapter sleeve "O" rings damaged or missing. Piston outer seal and/or inner oil ring damaged or missing. Porous output shaft support.
2) Piston and/or output shaft support damaged causing piston to hang up.
3) Piston outer seal lip turned over causing piston to hang.
4) Clutch backing plate retaining ring not properly installed or missing.
5) Clutch plates warped, worn, or not properly installed.

STATOR DOES NOT OPERATE PROPERLY:

1) Low or no apply pressure due to: Valve body and/or case gaskets not sealing. Porous apply channel in case. Reaction flange gasket not sealing, or flange and mating surfaces irregular. Second turbine shaft rear oil ring damaged or missing. The two front oil rings on second turbine shaft damaged or missing. Any one of three oil rings on reaction shaft damaged or missing. One or both of the front oil rings on second turbine shaft damaged or missing. Stator modulator valve or limit valve hanging up.
2) Stator piston ring damaged or missing or incorrect ring and gap.
3) Stator blades not rotating freely due to: Piston bound up in bore or carriers because of burrs or dirt. Stator blade ring damaged or stator blades damaged. Front and/or rear carrier damaged or dirty.
4) Stator piston retaining ring improperly installed or missing.
5) Stator piston control valve not gauged properly or shims below spring not lying flat in bore.
6) Stator piston control valve hanging up in either position due to roughness of rear carrier bore, burrs, or dirt.
7) Stator piston control valve retainer not in proper position or missing.
8) Stator free wheel rollers not properly installed or roller spring damaged or missing.
9) Linkage improperly adjusted or incorrect upper stator control operating rod.

TESTING

►*TESTING CAUTION: Before testing transmissi n, ch ck oil level and bring it to the full mark n dipstick (s LUBRICATION above).*

PRESSURE TEST: With engine and transmission at normal operating temperature, support car in a safe manner with wheels off the floor, and brakes off. Connect pressure gauge at point to be checked (see pressure test point illustration). Disconnect stator lever linkage to allow stator lever position to be changed without moving throttle. Connect a tachometer to engine, then with

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1958 Pressure Test Specifications

Selector Range	Engine RPM	Stator Lever Position	Pressures (Lbs.)					
			Stator	Front Pump	Rear Pump	Forward Clutch	R v rs Clutch	C l r R turn
Drive	500	Low Angle	0-10	① 40-80	0	① 40-80	0	5-30
Drive	1000	Low Angle	0-10	67-80	67-80	67-80	0	20-30
Drive	2000	High Angle	80-90	0-180	170-180	170-180	0	30-45
Reverse	1000	High Angle	80-90	② 170-180	0	0	② 170-180	5-45

① - Hot

② -190-210 lbs. on first cars without T-061 Reverse Boost Valve Spacer.

FLIGHT PITCH DYNAFLOW (C nt.)

engine running at the correct speed, take pressure reading (s "Pressur T st Sp cifications"

►*CAUTION: D n t driv car on road with stator linkage disc nn cted.*

STATOR OPERATION TEST: With engine and transmission at normal operating temperature, make sure stator linkage is properly adjusted, then connect a tachometer and start engine. Place transmission in "P" (Park) range and set engine idle speed at exactly 1500 RPM (high step of fast idle cam). Adjust fast idle if necessary. Block wheels, then have a helper firmly apply brakes and shift transmission to "D" (Drive) range. Engine speed should decrease to 1000 RPM ± 60 RPM. If engine speed does not decrease sufficiently, the stator blades are in high angle position or not fully in low angle position. If engine speed decreases to 1000 RPM, stator blades are in low angle position. Move stator control lever on carburetor forward to high angle position without disturbing throttle setting. In a few seconds, engine speed should increase approximately 150 RPM. If engine does not increase approximately 150 RPM, it is an indication that stator blades are not shifting fully to high angle position. If engine speed increases 150 RPM or more, stator blades are making a full shift from low to high angle.

REMOVAL.

Transmission and torque converter are removed as an assembly as follows:

1) On coil spring cars, raise car at front and rear and place jack stands under frame side rails so frame is approximately 20" off floor. Disconnect torque tube from torque ball and move rear axle back to disengage propeller shaft from universal joint.

2) On cars with Air Suspension, raise car by operating manual over-ride valve on instrument panel. Raise car at front and rear, solidly supporting front suspension and rear of frame. Support rear axle housing with a floor jack. Carefully and slowly loosen air lines from rear air springs to allow air in springs to discharge, then remove plungers from air springs. Disconnect rear height control valve links at torque tube radius rods, then disconnect stabilizer bar at axle end. Disconnect lower ends of rear shock absorbers. Disconnect parking brake cable at rear axle sheave and at bracket on torque tube. Disconnect brake hose from pipe at frame X member and remove yoke (cover hose and pipe ends). Install 3" guide pins in alternate bolt holes in torque ball, then remove remaining two torque tube flange bolts. Lower axle assembly and push back to clear torque ball.

3) On all cars, disconnect exhaust pipes at manifold and loosen pipe to muffler joint, then remove converter housing cover.

4) Turn flywheel until one converter drain plug can be loosened to provide an air vent, then turn flywheel until opposite drain plug is down. Remove this plug and drain oil from converter. Remove filler pipe from transmission and allow oil to drain from transmission.

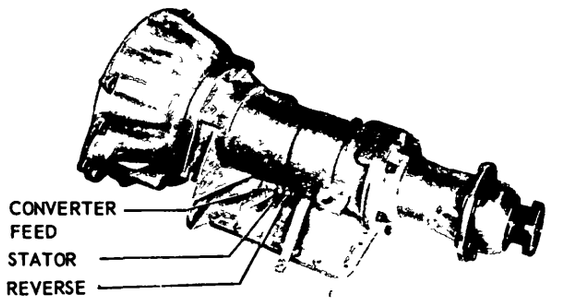
5) Remove converter to flywheel bolts, disconnect oil cooler pipes, and disconnect speedometer cable. Disconnect stator control rod at transmission lever, then disconnect lower shift rod at transmission lever and upper shift rod at idler lever. Leave lower rod, idler lever and bracket attached to crossmember.

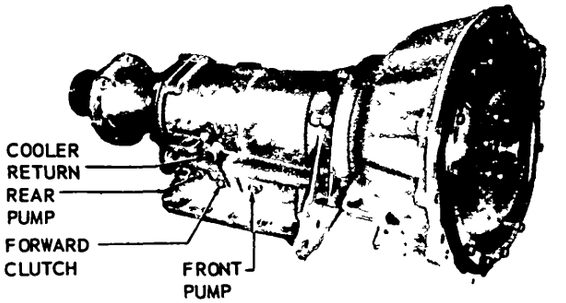
6) Support transmission securely and use jack to safely support engine. Remove two nuts and four bolts and nuts holding mounts to support then raise engine and transmission just enough to relieve strain on support. Remove eight attaching bolts and nuts and remove transmission support. *NOTE - If shims are found at support, note number and location so they may be installed in original position.* Lower transmission sufficiently to remove six transmission case to crankcase bolts.

7) With engine separately supported, move transmission to rear to disengage converter pump cover from crankshaft. Lower transmission and remove from car. *CAUTION - Do not tilt transmission forward as weight of converter may damage bushings in front planet carrier, and oil rings n first turbine shaft.*

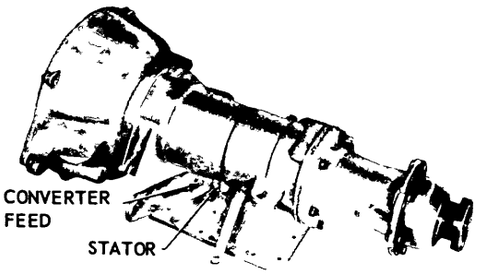
1959 Pressur T st Specifications

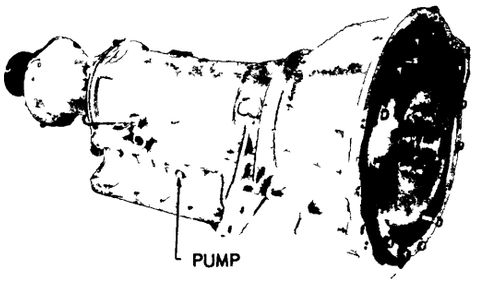
Sel ctor Range	Engin RPM	Stator L v r Positi n	Pressure (Lbs.) Stat r	Pump	Converter Feed
Drive.	500....	Low Angle.	0-10.....	75-90	20 min.
Drive	1000....	Low Angle...	0-10.....	80-90.....	60 min.
Drive.....	2000....	High Angle..	80 min..	180-190..	140-160min.
Reverse..	1000....	Low Angle..	0-10.....	80-90.....	60 min.





1958 OIL PRESSURE TEST POINTS





1959 OIL PRESSURE TEST POINTS

OVERHAUL

►*1958-59 TRANSMISSION OVERHAUL NOTE: Overhaul pr c dures f r 1958 and 1959 are the same exc pt for references made to rear oil pump. A rear oil pump is not used on 1959 models.*

►*CONVERTER CLEARANCE GAUGE (TOOL J-5899) REWORK FOR USE WITH FLIGHT PITCH TRANSMISSION TORQUE CONVERTER:* This gauge, designed for "Variable Pitch" and earlier Dynaflow transmissions can be reworked for use on "Flight Pitch" transmissions as follows: *CAUTION - Because of finish grinding and close tolerances of gauge plunger, it is very important that both the gauge body and plunger be marked to insure that it will be replaced in body in same position.* Remove plunger from gauge body and decrease outside diameter of one end of plunger to 2 3/8" ± 1/64" for a distance of 3/8".

►*TRANSMISSION HOLDING TOOL (J-7009) CAUTION:* To prevent case distortion and damage, tighten only two transmission attaching bolts on one side, leaving the other two bolts finger tight.

►*1958 REVERSE BOOSTER VALVE CHANGE (To provide a more cushioning effect on reverse clutch application):* A new Reverse Boost Valve Spacer, Part No. 1186397, is being used in production beginning with Transmission Code No. T061, and is recommended for installation on earlier transmissions. The purpose of this spacer is to provide a cushioning effect on reverse clutch application. See illustration for location of spacer. After installation of spacer, indicate the change by stamping an "X" near code number

►*1958 FIRST TURBINE HUB & SHAFT PRODUCTION CHANGE & SPECIAL TOOL NOTE:* Two changes have been made in production as follows· The first

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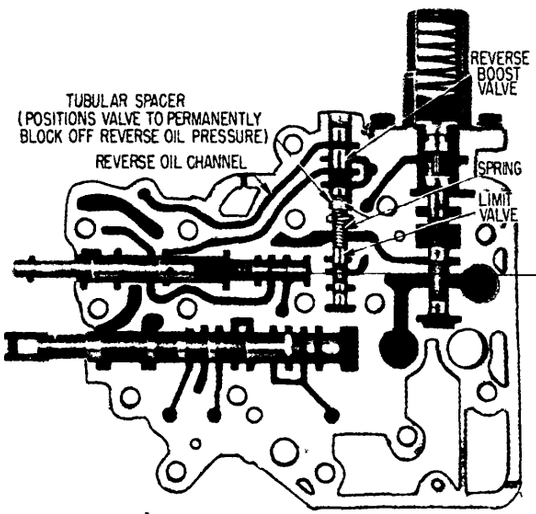
FLIGHT PITCH DYNAFLOW (C nt.)

change resulted in a reduction of clearance between turbine hub splines and splines of turbine shaft. The above reduction should provide a slip fit, however, an assembly may be found requiring force to disassemble and reassemble. The second change resulted in a definite press fit between turbine hub splines and splines of turbine shaft. Turbine shaft splines have been increased in size for the last 3/16" on shaft which means that turbine shaft should slip on hub until it reaches oversize spline and then it will have to be pressed into place. To disassemble, it will be necessary to pull disc and hub assembly from shaft using Tool J-7392. Assembly of these parts will require use of Tool J-7392-1 and J-7392-2.

►*1958 STATOR NEEDLE THRUST BEARING (STATOR CAM-TO-CONVERTER PUMP HUB) PRODUCTION CHANGE & REPLACEMENT PARTS CAUTION:* Approximately 500 cars at start of production were built with needle thrust bearings (stator cam to converter hub) having smaller diameter needles than on later production. Early production needle thrust bearings were matched with a bearing race .100" thick. Later thrust bearings, Part No. 1182993, are used with a thinner race. Part No. 1182992 which is .061" thick. Only later type bearings are available for service replacement and must be installed in sets.

►*1958 NEUTRAL CLUTCH FAILURE CORRECTION:* In cases of failure of neutral clutch, examine neutral clutch, backing plate retaining groove to determine if the groove is square. If groove is not square, retaining snap ring will be allowed to work out when pressure is applied, resulting in clutch slippage. If this condition exists, it will be necessary to replace Front Planet Carrier and Reverse Clutch Spring.

►*1958 STATOR REAR CARRIER CHANGE (To prevent stator pist n contr l valve sticking in bore):* Beginning Transmission No. V020 & T129, stator piston control valve bore in rear carrier has been changed to include an undercut at front side of bore. The undercut on stator piston control valve was eliminated when above change made *CAUTION - When replacing stator piston control valve, care must be taken to install the same type as removed. First type Stator Piston Control Valve, Part No. 1181096 (with undercut); later type Stator Piston Control Valve 1186407 (without undercut).*



FLIGHT PITCH DYNAFL W REVERSE B STER VALVE CHANGE

►*1958 TRANSMISSION BUSHING REPLACEMENT NOTE: Front Pump Bushing, Front Planet Carrier Bushing, and Output Shaft Support Bushing CANNOT BE REPLACED in transmission, due to being machined after assembly. All other bushings can be replaced*

►*1959 TWIN TURBINE TRANSMISSION PRODUCTION CHANGES:* The following changes have been made since the start of 1959 production:

Neutral Clutch Inner Seal - Beginning with transmission code number Z-021, the cast iron oil seal ring which is assembled to front planet carrier, Part No. 1388305, and acts as an inner seal for neutral clutch piston, Part No. 1180144, has been changed to a rubber type seal, Part No. 1182642. This seal is not interchangeable with earlier cast iron seal except when the following parts are also used.

Front Planet Carrier - A new carrier, Part No. 1185643 is being used to accommodate the later type rubber seal and is interchangeable with the previous type when used with the new seal (see above).

Neutral Clutch Piston - A new piston, Part No. 1180144 replaces the earlier type and can be used with either the cast iron seal or rubber seal.

Grade Retard Brake Piston Inner Seal - Beginning with transmission code number Z-011, the cast iron seal ring, Part No. 1180176, which is assembled to the center hub on each side of output shaft support and acts as an inner seal for forward piston and grade retard brake piston has been changed to a rubber oil seal ring, Part No. 1182640. The new seal is not interchangeable with previous cast iron seal.

Output Shaft Support - A new support, Part No. 1185645, is being used in production to accommodate the later type rubber seal ring (see above). This new support is interchangeable on earlier cars when used with the new rubber seal ring, Part No. 1182640.

Reverse Piston Inner Oil Seal - Beginning with transmission code number Z-021, the cast iron seal ring Part No. 1180178, (which is assembled on hub on back side of converter reaction shaft and acts as an inner seal for the reverse piston) has been changed to a rubber seal ring, Part No. 1182641. The later type rubber oil seal ring is not interchangeable with the cast iron ring except when installed with the new converter reaction shaft (see below).

Converter Reaction Shaft - A new converter reaction shaft, Part No. 1182616, is being used in production to accommodate the later type rubber seal ring (see above). The later type shaft is interchangeable on previous transmissions when used with the later type rubber seal ring.

TORQUE CONVERTER REMOVAL & OVERHAUL

R moval (Fr m Transmissi n): *NOTE - S e "First Turbin Hub and Shaft Production Chang & Special Tool N te" above, then proceed as follows:* With transmission installed in Holding Fixture, Tool J-7009 *(s "Holding Tool Caution" above),* remove twelve converter cover bolts. *NOTE - Converter pump and c v r ar a balanced assembly and parts must b reass mbled in sam position. A 1/8" drilled h l in bolting flang s rves as locating mark.* Pry up converter pump cover and remove it along with "O" ring (discard "O" ring). Remove select fit bearing races and needle thrust bearing (located between bearing hub and pump cover), then loosen first turbine shaft nut. *NOTE - Us a "U" typ holder between bolt hole in convert r bolting flange and hole in bell housing to hold c nv rt r fr m turning.* Remove nut and special washer and discard washer. Use two screwdrivers or other suitable tool to lift complete first, second, and third turbine assembly from converter pump. Lift converter pump until stator race is clear of splines on reaction shaft (approximately 2½"), then lower converter pump and remove stator. Remove needle thrust bearing and bearing race (stator cam to converter pump hub), then remove converter pump. *NOTE - If captive thrust b aring rac in converter hub is worn or scored, it should b r placed (it is not necessary to replace c nv rt r pump).*

Turbine Disassembly & Insp cti n: Remove needle bearing flanged bearing race, needle bearing, and .050" plain bearing race from second turbine hub *(NOTE - These parts may have remained on top of stat r).* Before disassembling first turbine disc and hub from first turbine, mark the turbine, disc, and hubs so they may be reassembled in same position. *CAUTION - It is important these parts be prop rly mark d as they are a balanced assembly. Servic parts of thes tw items are held to close balanc tol rance, making it unnecessary to replace both parts if on r the th r r - quire replacement.* Set assembly shafts down through hole in bench, then remove first turbine-to-disc and hub retainer ring using a thin bladed screwdriver at inner edge of ring to raise edge of ring. Press on outer edge of ring to slide ring up slope of screwdriver over step of first turbine disc and hub. Remove first turbine disc, hub, and .080" lead coated thrust washer (washer is located on third turbine hub). Lift out third turbine, flanged bearing race, needle bearing, and plain .050" bearing race. Examine third turbine front bushing and if worn or scored, cut out bushing with a chisel. Install new third turbine front bushing using Tools J-7013-1 and J-7273-25. Replace rear bushing in same manner if necessary. Lift out second turbine. Inspect and if necessary to replace oil rings, unhook and expand, then remove three second turbine shaft hooked oil rings. Inspect front and rear second turbine bushings and, if necessary, remove with a chisel. Install front bushing using Tools J-7013-1 (handle), J-7273-26 and J-7273-6 (with counterbore on J-7273-6 toward handle). Install rear bushing with Tools J-7013-1 (handle) and J-7273-26. Expand and install new hooked oil rings on second turbine shaft. Hook ends of rings by holding one end firmly in groove and working other end around to

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FLIGHT PITCH DYNAFLOW (C nt.)

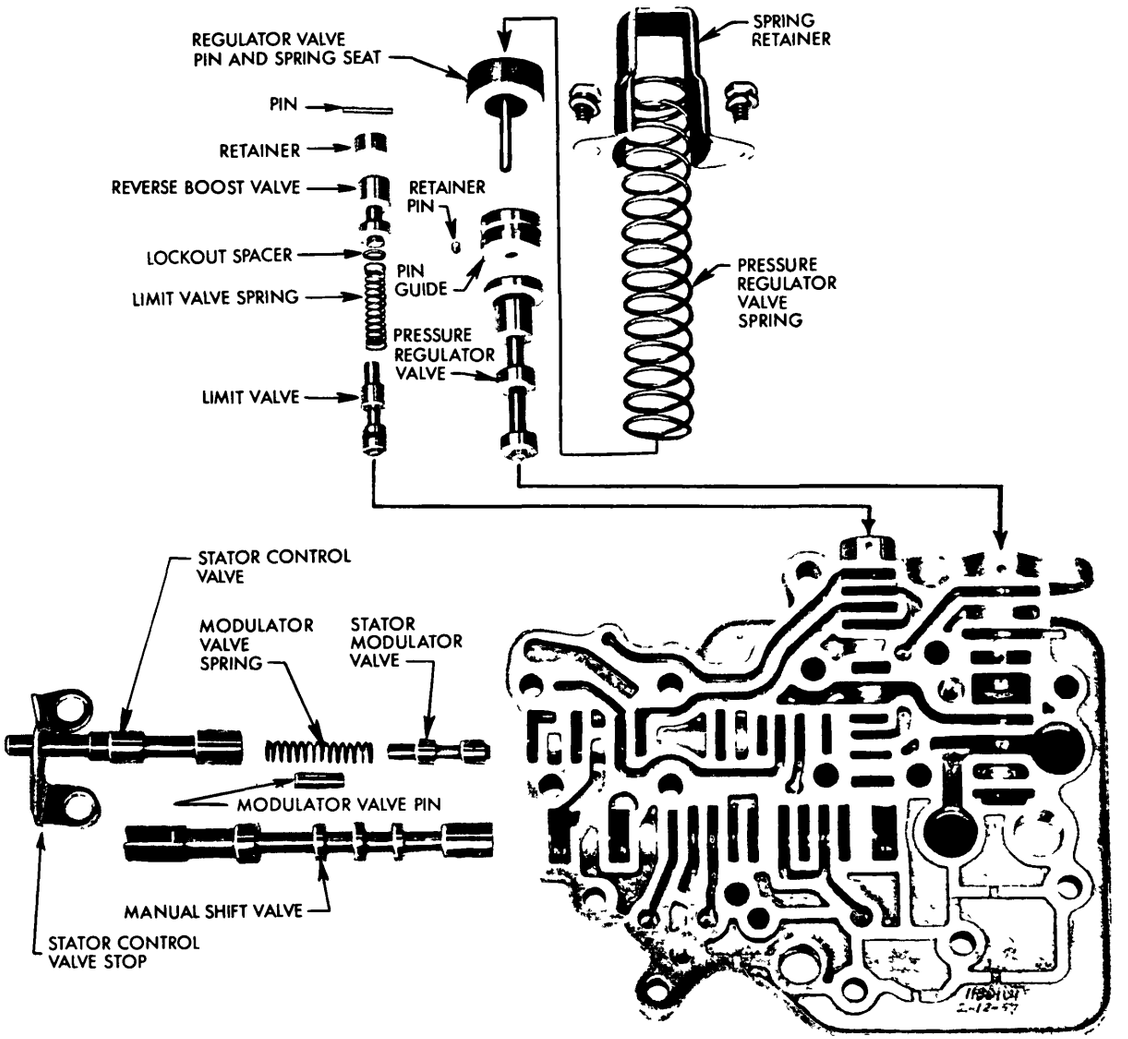
hook. *NOTE - S cond turbin shaft il rings ar slightly smaller (.050") than tw rings used on output shaft. DO NOT interchang th s rings.*

Turbin R ass mbly: With first turbine on bench, install second turbine (with oil rings in place) through hole in bench so it rests on first turbine. Inspect and, if necessary, install new flanged needle bearing race (flange upward), needle thrust bearing (1¾"x2½"), and plain bearing race (.050") on third turbine hub. Retain in place with heavy lubricant. *NOTE - Always measure n dl b arings and races. Some are within .010" thickn ss and 1/16" diameter of each other and can asily b ass mbl d incorrectly.* Insert third turbine shaft into second turbine shaft and lower into position. Inspect and, if necessary, place new .080" lead coated bronze thrust washer on hub of third turbine, and position first turbine disc and hub with tangs in slots of first turbine. Install first turbine disc and hub retaining ring so high edge will engage groove in first turbine and the inner lower edge forces down on first turbine disc and hub. Tap solidly into groove and check for proper installation. With assembly on bench (shafts up), inspect, and if necessary, install new flanged needle bearing race (flange up) on second turbine hub, then install needle bearing (1¾"x2½"), and .050" bearing race. *NOTE - If further work is being done on transmissi n, s t compl te turbine assembly aside. If c nv rt r is to be r assembled, refer to "Transmissi n Reass mbly" below.*

Flight Pitch Stat r Disassembly & Inspection: With stator removed from converter assembly, pull out freewheel race by rotating clockwise. Remove three special clutch head screws from stator cam-to-stator carrier using Tool 10-167-1, then pry up on freewheel and bronze washer with screwdriver using care to avoid damage to washer. Remove cam and washer. Remove five clutch head front-to-rear carrier screws using Tool 10-167-3. Invert assembly, expand and remove stator piston retaining ring from rear carrier-to-stator piston. Invert assembly and rotate all stator blades to extreme high angle position and remove stator rear carrier assembly from front carrier. Remove blades and stator blade ring from stator front carrier and piston assembly. Inspect stator rear carrier bushing. If worn or scored, remove bushing using Tool J-7013-1 (handle) and J-7273-12. To install new bushing, support carrier on a steel sleeve, then install bushing using Tools J-7013-1 (handle), J-7273-6 and J-7273-12 (counterbore on Tool J-7273-6 should be toward handle). Remove stator piston and ring from front carrier, then expand and remove ring from stator piston with snap ring pliers. If stator piston control valve is sticking or spring is weak, remove valve by supporting rear carrier, then rap sharply on valve with a plastic hammer.

►*1958 STATOR REAR CARRIER PRODUCTION CHANGE (T pr v nt stator piston control valve sticking in bore): S "Stat r R ar Carrier Production Change" above.*

Flight Pitch Stat r R ass mbly: If stator piston control valve was removed because of a sticking or weak spring, gauge position of valve as follows: Assemble stator piston (shoulder up), to rear carrier and press together, then insert valve in bore of rear carrier. Insert Gauge J-7116 in stator control valve. With piston held against carrier and tool in place, top of tool should be flush with boss of stator rear carrier. If gauge is below surface of rear carrier, add shims to bring gauge as close to flush with surface as possible (shims are available in .007" and .021" thicknesses). Total thickness of shims used should not exceed .042". If thicker shims required, rear carrier, piston, or stator valve may require replacement. After stator valve has been checked and shims added if necessary, assemble valve, **new service spring** and retainer to stator rear carrier. *NOTE - If it was necessary to add or remove ld shims, discard ld spring and r place with a new SERVICE SPRING, Part N . 1185532. N v r use old spring when shims ar to b add d or removed.* Make sure shims are lying flat, then tap valve retainer into stator carrier squarely and flush with carrier surface (not to exceed .010" below surface). Use a flat tool for driving retainer to prevent cocking. Insert stator piston ring in bore of stator front carrier (gap should be .090" ± .010"). *NOTE - This gap serves as a pist n bleed hole for stator piston.* Expand and install stator piston ring, then install piston and ring into front carrier by tilting and inserting gap side of ring first, then pressing in. Place stator front carrier assembly and piston on stator free wheel cam an pilot washer assembly to hold piston "in". Support edge of stator blade ring and insert blades into carrier and piston assembly. *NOTE - H l s in ut r stator blad ring must be d wn when blades install d.* To install last blade, crowd several adjacent blades together to make suf-



VALVE BODY ASSEMBLY

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FLIGHT PITCH DYNAFLOW (C nt.)

ficient room. With stator blades at extreme high angle (blades lying nearly flat), assemble rear stator carrier assembly to front assembly, noting position of dowels and dowel holes. Install five clutch head screws and lock washers and tighten to 10-12 ft. lbs., using Tool 10-167-3. Install stator piston retaining ring on stator rear carrier sleeve with tangs on retaining ring entering slots in sleeve. Move stator blades from high to low angle several times and check for free operation. If necessary to replace pilot washer on stator free wheel cam, support cam and drive washer out with a drift punch. Install new pilot washer using a plastic hammer and make sure washer is seated in bore of cam. Assemble free wheel cam and pilot washer assembly to stator rear carrier with three clutch head screws and tighten to 10-12 ft. lbs. using Tool 10-167-1. Note position of dowels and dowel holes. Insert stator free wheel clutch inner race (small diameter end up) into pilot washer and make sure inner race rotates freely in washer. Install free wheel clutch rollers and springs (roller toward narrow end of cam opening and spring at wide end). Check to see that inner race rotates freely in clockwise direction, and locks on counterclockwise rotation. Apply a heavy lubricant and install bearing race and needle thrust bearing (2¼" I.D. x 3" O.D.) on stator free wheel race (race next to free wheel rollers and spring). *CAUTION - Always assemble needle bearing race with same face toward rollers as when disassembled.*

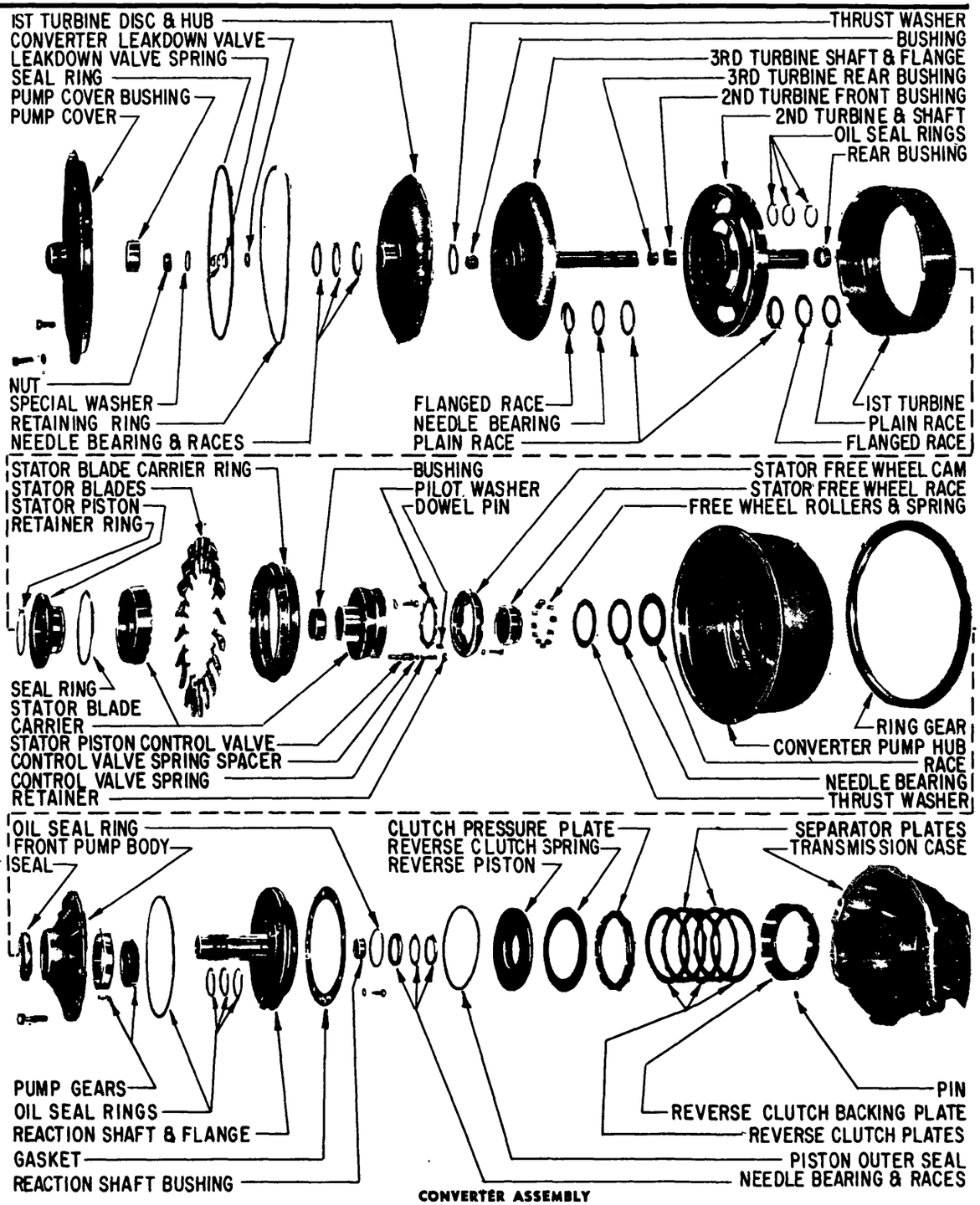
►*NOTE: If further work is being done on transmission, set complete stator assembly aside. If converter is to reassembled, refer to "Transmission Reassembly" below.*

TRANSMISSION DISASSEMBLY

FRONT PUMP: Removal - With torque converter removed and transmission horizontal, remove front pump seal using slide hammer and Tool J-7005 (thread tool into seal until threads are engaged with sheet metal portion of seal). *NOTE - To install a new seal at this point, use Tool J-7006. It is not necessary to remove planet sets, first turbine shaft, and output shaft assembly to remove and install front pump seal or complete front pump-reverse piston assembly.* Remove front pump-to-case bolts, then with transmission in vertical position, install two slide hammers (Tool J-7004) in tapped holes of pump body and hammer evenly to remove pump, stator reaction shaft and flange, and reverse clutch piston assembly. Remove slide hammers.

Disassembly & Inspection: Remove needle thrust bearing and flanged rear thrust bearing race (between reaction shaft and front planet ring gear assembly). Remove reaction flange to case gasket. *NOTE - This bearing and rear race may have stuck to front planet ring gear carrier.* Remove reverse clutch piston, using pliers to grip ribs of piston if piston sticks in bore, then remove piston seal. Inspect reverse piston oil ring and if necessary to replace, assemble Tool J-7100 on ring so ring is forced solidly in groove and movable arm of tool contacts ring approximately ¼" from end. Press in on movable arm and pry up on free end of ring with small screwdriver, then release arm. With ring un-

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CONVERTER ASSEMBLY

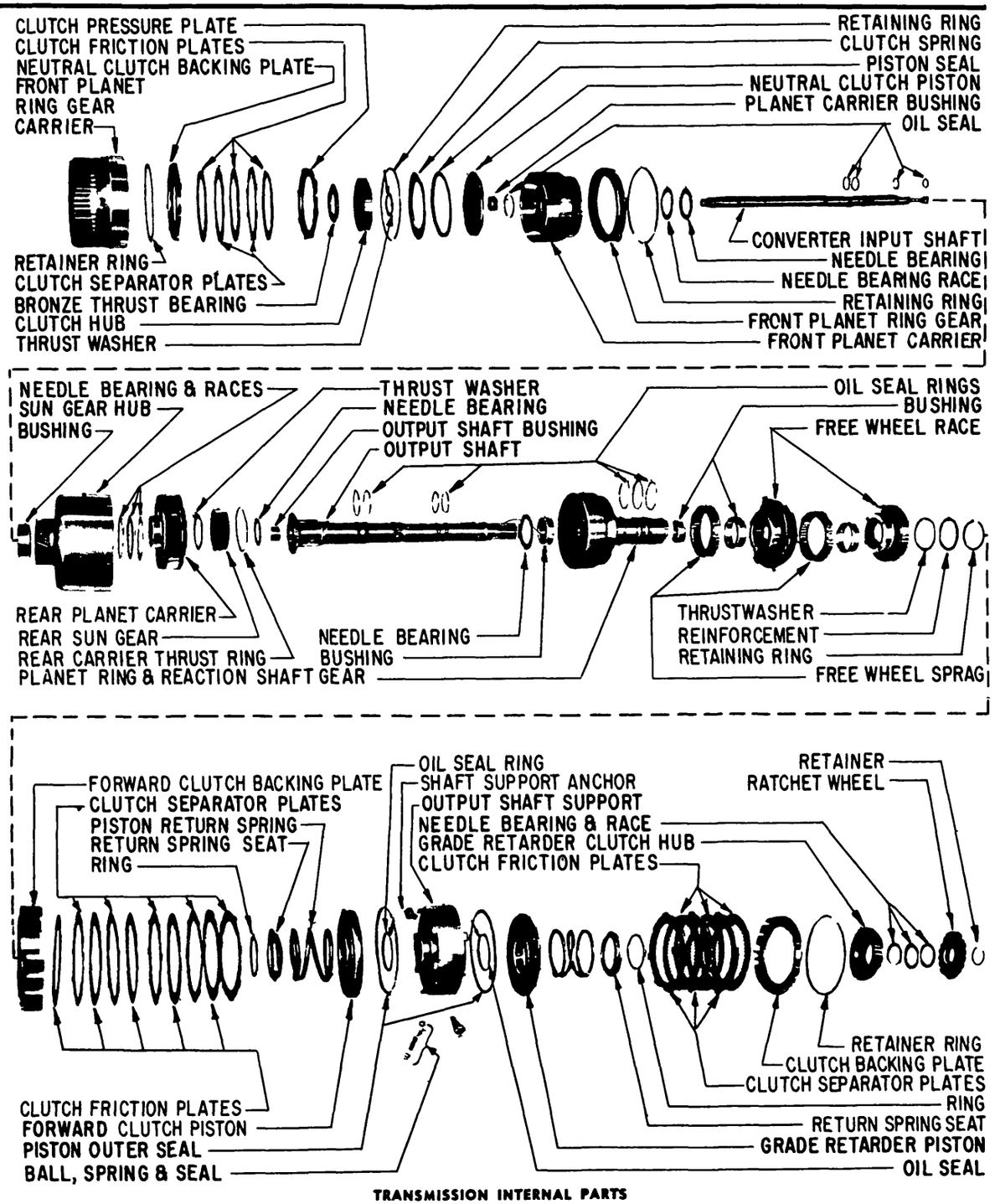
FLIGHT PITCH DYNAFLOW (C nt.)

hooked, expand ring and remove from flange hub. *NOTE - To install new ring, rev rs r m val pro- c dur .* Remove front pump body-to-case sealing ring (square section). Inspect flanged needle thrust bearing race (between stator reaction shaft and front planet ring gear assembly). *NOTE - Bearing race is hardened and v ry brittl . Us y protection if removing with a chis l.* To install new race, use Tools J-7013-1 (handle), and J-7013-21 (installer). Remove reaction flange-to-pump body bolts and separate pump body from reaction flange by tapping assembly on bench, shaft down. Inspect, and if necessary to replace, unhook and expand the three reaction shaft oil rings, then remove from shaft. Inspect second turbine shaft-to-reaction flange bushing. If worn or scored, collapse bushing with a chisel and remove. Install new bushing with Tools J-7013-1 (handle), and J-7013-22 (installer). Using snap ring pliers, carefully expand and install new reaction shaft oil rings in grooves. *NOTE - Hold one nd f hook d ring firmly in groove and work other end of ring into position. Rotate ring in groove to check for burrs or dirt that may b present.* Check pump gear end clearance using dial indicator. Pump gears should be .001-.0025" below face of pump body. Hold drive gear away from crescent and check gap between gear and crescent with a .009" feeler gauge and then a .017" feeler gauge. The .009" gauge should "go", and the .017" gauge should "not go". If clearance not within limits (.010" - .016"), replace pump. Hold pump driven gear away from crescent and check gap between gear and crescent with a .004" feeler gauge, then with a .010" feeler gauge. The .004" gauge should "go", the .010" gauge should "not go". If clearance not within limits (.005" - .009"), replace pump. Remove pump gears by lifting straight up. *CAUTION - Protect gears against nicks, burrs, and dirt. Check front pump bushing, and if badly w rn or scored, complete pump as- s mbly must b r plac d.*

►*FRONT PUMP SEAL NOTE:* If seal is to be replaced at this point, support pump body and drive seal out.

R ass mbly: Clean and lubricate pump gears and install in body by lowering straight down. Do not use force. *NOTE - Pump drive gear must be installed with notched driving flang up, and counterbored side toward front pump s al. If new pump being installed, check driv gear on converter to be sure of proper fit.* Lubricate with Dynaflow oil and carefully assemble pump assembly to reaction shaft flange assembly. Note position of dowel pins in pump body and holes in reaction shaft flange. Install reaction shaft flange-to-pump body bolts and tighten alternately and evenly to 14-18 ft. lbs. If necessary to install new front pump seal, support assembly and drive seal into body using Tool J-7006. Install new reverse piston seal with lip away from ribbed side of piston. Lubricate reverse piston seal and install piston assembly in bore of reaction flange by running a smooth edged feeler gauge around reverse piston to keep lip of seal down. Use care to prevent damage to seal. Install new front pump body-to-case sealing ring squarely in groove of pump body. *NOTE - If further work is b ing don on transmis-*

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TRANSMISSION INTERNAL PARTS

FLIGHT PITCH DYNAFLOW (C nt.)

sion s t compl te pump ass mbly asid . If transmission is b ing r ass mbl d, r f r to "Transmission Reassembly" below.

VALVE BODY: Removal - With transmission upside down, remove oil pan bolts, flange reinforcement, and oil pan. Remove five oil screen screws and remove screen. Remove detent spring with needle nosed pliers, then remove sixteen valve body bolts and lock washers. *NOTE - A special washer is used on stator control stop bolt.* Remove valve body assembly and gasket carefully to avoid dropping valves.

Disassembly: Remove pressure regulator valve spring retainer and spring seat and pin using Tool J-7007. Remove manual shift valve, then remove stator control valve and stop assembly. Remove stator modulator valve and springs by rapping valve body against hand. Remove two valve body cover plate screws with a Phillips screwdriver and remove plate and gasket. Remove front and rear pump check valves and springs. Remove pressure regulator guide retaining pin by rapping valve body against hand, then remove regulator valve pin guide in same manner. Slide pressure regulator valve out of body. While holding in on retainer, remove reverse boost valve retainer pin with needle nose pliers. *NOTE - Retainer and valve will pop out when pin is r moved. Catch valve and retainer to prevent damage.* Remove reverse boost valve retainer, then remove reverse boost valve, spring, and limit valve by rapping valve body against hand. Clean all parts thoroughly and inspect for wear, scores or burrs. Pay particular attention to small holes in limit, stator modulator, and pressure regulator valve.

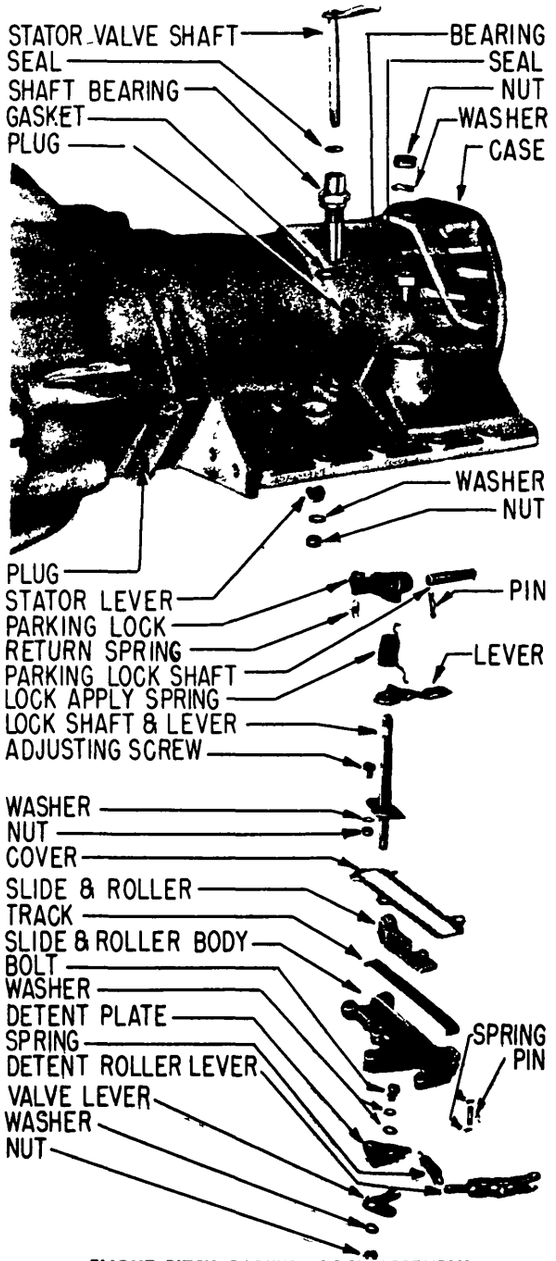
R assembly: Install limit valve with grooved land first, then shake valve body to seat limit valve in proper position. *NOTE - Limit valve and stator modulator valves are the same length and are interchangeable.* Install reverse booster valve spring (longer than stator modulator valve spring), then install reverse booster valve (narrow land first). Insert reverse booster valve retainer, then depress against spring tension and install reverse booster valve retainer pin flush with surface of valve body. Insert pressure regulator valve into valve body (small end first), then insert pressure regulator valve pin guide so end is flush with edge of valve body. Install pressure regulator valve pin guide retaining pin into valve body and groove of pin guide. Insert stator modulator valve into valve body (grooved land first), then shake valve body to seat valve in proper position. Install stator modulator valve springs into valve body (shorter than reverse booster spring), then install stator control valve and stop assembly. Install shift control valve (slotted end out), and insert pressure regulator valve pin and spring seat into pin guide. Install pressure regulator valve spring and spring retainer using Tool J-7007. Before tightening retainer bolts, check clearance between spring seat and retainer with a .010" feeler gauge. Spring and seat must rotate and move in retainer without touching retainer. Install check valve springs and check valves (step sides of valves toward springs). Make sure surface of valve body is clean and there are no burrs, then install new valve body plate-to-valve body gasket. *CAUTION - Mak sure pr ssur r gulator valv pin guid retaining pin is in plac .* Install valve body plate with two Phillips head screws, making sure that check valves are correctly positioned and operate freely. Check to see that valve body plate gasket lines up with holes in valve body. Pour a small amount of solvent on check valves. If valve leaks, it is burred or worn and should be replaced. *NOTE - If further work is being done on transmission, set valve body aside. If transmission is being reassembled, refer to "Transmission Reassembly" below.*

TORQUE BALL & UNIVERSAL JOINT: Removal - Remove torque ball retainer bolts, then remove outer torque ball retainer and remove torque ball. Remove sealing ring from outside of inner torque ball retainer, then remove inner retainer. Remove sealing ring from inside of retainer. Engage parking lock pawl and, using a ¾" thin wall socket, remove special drilled U-joint bolt, lockwasher, and plain washer. Remove U-joint and speedometer gear assembly.

MANUAL CONTROL & PARKING LOCK: Removal - Remove transmission lever shaft nut and remove lever. *CAUTION - Hold lever with hand while loosening or tightening nut to prevent damage to internal parts.* Remove parking lock pawl return spring using needle nose pliers, then remove parking lock and detent assembly bolts and remove the assembly. Pry selector shaft seal out of transmission housing.

Disassembly & Inspection: Parking Lock & Detent - Remove slide and roller with slide and roller cover, then remove slide and roller track. Remove manual control shaft lower nut and remove bolt holding detent plate to manual control valve operating lever. Remove shaft and parking lock lever assembly from parking lock slide body. Remove hair pin retainer from detent roller lever pin and remove pin and roller lever. Clamp lower flats of parking lock lever shaft in a vise, then rotate lever against spring tension and remove nut from parking lock lever adjusting screw. Remove screw. Rotate lever to release spring tension and pull pin from shaft. Remove spring and parking lock apply lever.

Reassembly: Parking Lock & Detent - Assemble spring on shaft with parking lock release lever positioned next to parking lock apply lever (offset of release lever should be toward apply lever), then install roll pin (hold shaft in soft jawed vise). Clamp lower flats (short end of shaft) in a vise, then raise and rotate release lever against spring tnesion and install parking lock lever adjusting screw, lockwasher, and nut (do not tighten). Assemble roller lever to slide body with pin and hairpin retainer. Assemble parking lock and shaft lever assembly to parking lock slide body. Assemble manual valve operating lever, then detent plate and shaft (bolt hole slot in detent lever must be closest to left side of detent plate). Install bolt, flat washer, and lockwasher (detent plate-to-manual control valve operating lever). Install lower nut and lockwasher on manual control shaft. Install slide and roller track in groove in slide body, then install slide and roller cover into slide body. Rotate shaft and move slide and roller so slot in lever engages pin of slide and roller. *NOTE - If furth r work is to b don on transmissi n, s t this ass mbly asid . If transmission is b ing r assembled, refer to "Transmission R ass mbly" below.*



FLIGHT PITCH PARKIN LOCK ASSEMBLY

assembled, refer to "Transmission R ass mbly" below.

►*PARKING LOCK PAWL & SHAFT NOTE:* If these parts require replacement, remove spring pin from parking lock pawl shaft and slide shaft rearward, then remove pawl.

CONTINUED ON NEXT PAGE

Form 60 A

FLIGHT PITCH DYNAFLOW (C nt.)

REAR BEARING RETAINER & REAR OIL PUMP: R - moval - Remove bolts retaining rear bearing retainer to transmission case. *CAUTION - A spacer and shim forward f r ar b aring ride on a shoulder of output shaft. This spac r and shim will fall off output shaft and lodg in r ar b aring r tainer between rear bearing ahd r ar oil pump if L ading Tool J-7012 is not used.* Insert Loading Tool J-7012 in end of output shaft and hold tool forward while sliding rear bearing retainer and rear oil pump assembly away from case. *NOTE - Shim and spac r will b transferred from output shaft to l ading tool in r ar b aring retainer.* Remove gasket. If rear bearing retainer and/or rear oil pump are not to be inspected or repaired, leave loading tool in place and set assembly aside.

Disass mbly: Remove rear oil pump to bearing retainer bolts, then remove Loading Tool J-7012 from bearing retainer assembly. Separate oil pump body from bearing retainer by supporting assembly by oil pump and striking rear flange of rear bearing retainer (do not strike gasket surface). Remove pump and gasket. *CAUTION - Fr nt face f r ar b aring retainer is a highly sensitive gask t surfac and must be carefully protected from nicks or scratch s.* Remove oil pump cover-to-body bolts and separate pump cover from body (rap two dowels with a drift if necessary), then lift pump gears straight out. Check all parts for wear, scores, or nicks. If rear pump body bushing is worn or scored, drive bushing out using Tool J-7013-1 (handle), and J-7273-8 (remover). Install new bushing in body using J-7013-1 (handle), and J-7273-6 and 11 (installer). Counterbore on J-7273-6 should be toward handle. Check rear pump end clearance with a dial indicator. Gears should be .001-.002" below surface of pump face. Use a feeler gauge and check clearance between crescent and gears. Clearance for drive gear should not be more than .006-.012"; and for driven gear, not more than .0045-.012". Replace pump if necessary. *NOTE - Reinstall g ars in pump body, align dowel holes and pins and ass mbl body to cov r. Tighten bolts to 20 ft. lbs.* Remove select fit shims and spacer from rear bearing retainer. Check rear bearing. If replacement required, pry out bearing lock, support bearing retainer web with chamfered edge of Tool J-7077 and drive out bearing with a hammer and drift (drive from front to rear). *CAUTION - R ar bearing races will be damaged during r moval and b aring must not be reused.* Install new bearing with Tool J-7013-1 (handle) and J-7013-24 (installer). Install rear lock by prying in on one end of ring in drain slot and forcing ring down into groove with another screwdriver. *NOTE - Do not install r ar oil pump until output shaft endplay has been ch ck d and adjust d within limits.*

►*REAR BEARING RETAINER REASSEMBLY NOTE: S "Transmission R assembly" below.*

MAIN DRIVE ASSEMBLY: Removal - Remove rear oil pump drive pin and if worn or damaged, discard it. Remove three adapter sleeves from control valve assembly mounting using Adapter Sleeve Tool J-6586 (retaining rings and "O" rings should be removed with adapter sleeves). Remove fourth adapter sleeve with "O" rings at cooler return pipe location next to anchor bolt location. *NOTE - Th r is n r taining ring on this adapt r.* Remove one output shaft support anchor bolt (forward of right machine locating pad on outside of case), then remove the other anchor bolt located forward of ratchet wheel inside of case. Remove retaining ring behind grade retard clutch backing plate using a screwdriver to pry ring out of groove in transmission case. To aid in removal, carefully pry front sun gear hub from front planet ring gear and carrier assembly. Install Slide Hammer, Tool J-2619-A, and Adapter, Tool J-8117, in rear end of output shaft and hammer sharply to start grade retard clutch, output shaft support, forward clutch, free wheel clutches, rear planet set and front sun gear out of transmission case. After assembly has been moved part way with slide hammer, remove slide hammer and lift from case. Remove first turbine shaft and front planet assembly (neutral clutch assembly). Remove needle thrust bearing and cupped race (front planet ring gear carrier-to-reaction flange hub). *NOTE - This bearing and race may have been removed with front pump assembly, and first turbine shaft may have been removed with output shaft.* Remove reverse clutch spring, pressure plate, and clutch plates. *CAUTION - Reverse clutch backing plate cannot be satisfactorily removed.*

Disassembly: Neutral Clutch & Front Planet Set - Slide first turbine shaft rearward out of neutral clutch and front planet set assembly (if it was not removed with output shaft). Examine, and if necessary, remove and replace four new oil rings (two butt type rings and two hooked rings) on first turbine shaft. *NOTE - The two butt type rings at rear of first turbine shaft, on early production cars, have been changed to hooked type rings on later cars. To prevent possibility of the cast iron sealing rings breaking during assembly on cars with early type input shaft, a locator ring, Part No. 1186536 has been released. This ring centralizes sealing rings in groove by not allowing them to drop down and catch during installation. Install rings in both grooves at rear end of shaft.* Remove front planet set ring gear retaining ring from groove in front ring gear carrier, then remove ring gear from carrier. Invert assembly and remove ring gear carrier from neutral clutch and front planet set assembly. Check clearance in neutral clutch pack using a dial indicator with Support, Tool J-1013, resting on hub. Set plunger of dial indicator on backing plate, then force plate down with fingers and note reading. Force plate pack up with screwdriver between neutral clutch spring snap ring and pressure plate and note clearance which should be .010-.060". Remove neutral clutch hub, needle thrust bearing assembly and tanged bronze thrust washer from neutral clutch and front planet assembly. If necessary to replace needle bearing assembly, pry out with a small screwdriver. To install a new needle bearing, use Tool J-7013-1 (handle), and J-7013-23 (installer). *CAUTION - Be sure thrust bearing is installed squarely and that it operates freely.* Remove retaining ring from neutral clutch backing plate-to-front planet set carrier by prying ring out of groove in carrier. Remove neutral clutch backing plate, clutch plates and pressure plate from planet set carrier. Remove retaining ring (neutral clutch-to-carrier) by prying it out of groove. *NOTE - This ring is th sam as neutral clutch backing plat r taining ring.* Remove neutral clutch spring from front planet carrier, then remove neutral clutch piston and seal assembly, and clutch piston rubber sealing ring. Check neutral clutch piston inner oil ring and replace if necessary. Remove needle thrust bearing and race from rear of front planet carrier. Check front carrier bushing, and if worn or scored, drive bushing out with Tool J-7013-1 (handle), and J-7273-13 (remover). Install new bushing using Tools J-7013-1 (handle), J-7273-6 (counterbore toward handle), and J-7273-14 (installer). Drive bushing out toward rear. To install, drive through front of carrier. If necessary to replace neutral clutch piston inner oil sealing ring, expand and install ring on hub of planet carrier. *NOTE - Front planet carrier and pinion assembly are servic d only as a complete unit.* Check pinions and bearings. If parts are worn or damaged, the complete unit will have to be replaced.

Reassembly: Neutral Clutch & Front Planet Set - Install new neutral clutch piston sealing ring with lip away from hub. Lubricate and install neutral clutch piston and seal in bore of front carrier using a smooth feeler gauge to aid entry of seal lip. Be careful not to damage seal during installation. Install neutral clutch spring on top of piston with outer "high" edge upward, then install clutch spring retaining ring by starting one end into groove (use plastic hammer and drift to force remainder of ring into groove). Install clutch plate pack with rounded face of pressure plate toward spring, then lubricate and install friction plate, separator plate, etc., until the three friction plates and two separator plates are installed, then install chamfered face of clutch backing plate "up" and on top. *NOTE - New clutch friction plates are .083-.087" thick.* After sticking bronze thrust washer to hub and needle bearing assembly with a heavy lubricant, line up grooves of friction plates and install hub in bore of front carrier (needle bearing up). When neutral clutch hub is correctly installed it will be below chamfered edge of neutral clutch backing plate. Install neutral clutch retaining ring in groove in front planet set carrier above backing plate, tapping it solidly into groove with a drift. Check clearance in neutral clutch pack by using a dial indicator with Support, Tool J-1013, resting on hub. Set plunger of dial indicator on backing plate, then force plate down with fingers and note reading. Force plate back up with screwdriver between neutral clutch spring snap ring and pressure plate, and note reading. Difference between the two readings should be between .010" and .060". Install front ring gear carrier over neutral clutch and carrier assembly, then invert the complete assembly. Mesh ring gear with carrier and install in carrier with tangs up. Install ring gear retaining ring and tap into groove of ring gear carrier. Apply a heavy lubricant to needle bearing race and needle bearing (1¾" I.D. x 2 7/16" O.D.) and insert race, then bearing into bore of front planet set. Press down to seat. *NOTE - There is no race on top of needle b aring as front sun g ar acts as rac .* Invert the assembly, then examine and if necessary, apply heavy lubricant to new cupped needle bearing race and install on front planet ring gear carrier. *NOTE - This*

CONTINUED ON NEXT PAGE

Form 50 B

FLIGHT PITCH DYNAFLOW (C nt.)

rac may hav r mained on r ar f stator ass mbly when transmission disassembled.

Disassembly: Output Shaft Assembly - Expand and remove parking lock ratchet wheel retaining ring, then slide grade retard clutch backing plate and clutch pack off clutch hub and output shaft. Remove parking lock ratchet wheel and grade retard clutch hub (needle thrust bearing and two bearing races will come off output shaft with grade retard hub). Slide output shaft support, forward clutch piston and grace retard piston assembly off output shaft. Slide forward clutch backing plate and clutch pack off forward clutch hub and output shaft, then separate front planet set sun gear and hub from tangs of front inner and rear outer free wheel race by prying with a screwdriver. Remove sun gear and hub. Remove needle thrust bearing (between rear sun gear and output shaft). *NOTE - Separate bearing races are not used at this point.* Slide output shaft forward through grade retard reaction shaft and remove needle thrust bearing. *NOTE - Separate bearing races not used at this point.* Inspect output shaft bushing and if worn or scored, pull bushing using Tool J-7373-15. Place output shaft in a vise with soft jaws, then slip puller into position in shaft and expand puller by holding shaft with ½" wrench and turning 5/8" nut on tool. Turn 1¼" nut on tool to pull bushing. To install new bushing, use Tool J-7013-1 (handle), and J-7273-19 (installer). If necessary to replace oil rings on shaft, unhook, then expand rings and remove. Install new rings in shaft grooves by expanding the rings. Blow compressed air through rear end of shaft to clean out small oil bleed hole and screen in shaft. If necessary to install needle thrust bearing (output shaft-to-grade retard reaction shaft), coat new bearing (1¾" I.D. x 2½" O.D.) with heavy lubricant and install on shaft.

Disassembly: Output Shaft Support - Use Tools J-2590-12 and J-2590-14 to compress forward clutch spring, then from side of output shaft support having eight lugs, remove forward clutch piston spring retainer ring with snap ring pliers. Remove tools, retainer ring, spring seat, and forward clutch piston from support. Remove rubber outer seal ring from forward clutch piston. Reinstall Tools J-2590-12 and J-2590-14 and compress spring. From side of output support having four lugs, remove grade retard spring retainer ring using snap ring pliers. Remove tools, retainer ring spring seat, spring, and grade retard piston. *NOTE - A wide chamfer in I.D. of forward clutch piston and no chamfer in I.D. of grade retard piston will identify these two parts at reassembly.* Remove rubber oil seal ring from grade retard piston. If necessary to replace forward clutch inner oil ring, assemble Tool J-7086 so forward clutch inner oil ring is forced solidly into groove. Press down movable arm of tool and pry free end of hooked oil ring out with screwdriver. Release movable arm of tool, then expand and remove oil ring from output shaft support. Install new oil ring using same tool as for removal. If inner oil ring in grade retard clutch piston must be replaced, use same procedure as for forward clutch piston. Use a hook made of stiff wire and pull lubrication pressure regulator spring retainer, spring, and ball from output shaft support. *NOTE - If output shaft bushing is xcessiv ly w rn r sc red, it will be nec ssary t replac th utput shaft supp rt ass mbly.*

Reassembly: Output Shaft Support - Inspect lubricating pressure regulator ball and replace if worn or scored. Install ball, spring, retainer (with small hole down) in hole of output shaft support. Drive retainer flush with surface of support to .010" below, with plastic hammer. Install new rubber sealing ring on forward clutch piston (piston has a wide chamfer in bore), then lubricate and use a smooth feeler gauge to hold lip of rubber ring down while inserting piston into support. Install a new rubber sealing ring on grade retard piston, then install piston in same manner as for forward forward clutch piston (above). Install forward clutch spring, retainer, and snap ring using Tool J-2590-12 and J-2590-14, and snap ring pliers. *NOTE - Grade retard retainer and snap ring are interchangeable with forward clutch spring, retainer, and snap ring.* Install grade retard clutch spring, retainer and snap ring in same manner.

►*FRONT PLANET SET SUN GEAR HUB BUSHING REPLACEMENT:* Remove and install bushing in hub with Tools J-7013-1 (handle), and J-7273-10 (remover). Counterbore on Tool J-7013-6 must be toward handle.

Disassembly: Rear Planet Set - Remove planet set carrier needle thrust bearing and bearing races from hub of carriers. Grasp carrier and slide carrier and planet assembly out of rear planet set ring gear. *NOTE - It may be necessary to pry assembly apart.* Pry rear carrier thrust ring out of groove in carrier and remove ring. Remove rear planet set sun gear and tanged bronze thrust washer (between rear sun gear and rear planet carrier). *NOTE - Rear planet carrier and pinion assembly is serviced only as a complete assembly.* Check planet pinions for scoring or chipping. Check planet pinion bearings for smooth operation. If gears or bearings are not serviceable, replace rear planet carrier assembly.

Reassembly: Rear Planet Set - Inspect and if necessary, replace planet set sun gear thrust washer. Apply heavy lubricant to thrust washer and position in carrier with tangs down into holes in carrier. Install sun gear with either end up, then install thrust ring solidly in groove above sun gear.

Disassembly: Free Wheel Clutch & Reaction Shaft - Expand and remove rear free wheel inner race-to-grade retard reaction shaft retaining ring, then remove rear free wheel clutch inner race thrust washer and spacer (between rear free wheel race and retaining ring). Rotate race clockwise and slide sprag and race out of rear free wheel outer race. Remove and inspect sprag. Inspect rear free wheel clutch inner race bushing and if worn or scored, drive bushing out using Tool J-7013-1 (handle), and J-7273-4 (remover). Install new bushing, using Tool J-7013-1 (handle), J-7273-5 and J-7273-6 (counterbore on J-7273-6 toward handle). Rotate front inner and rear outer free wheel clutch race clockwise and slide race and sprag out of rear planet ring gear (front free wheel clutch outer race). Remove and inspect sprag. *NOTE - Front wh l sprag has an inn r cag 1/32" long r than ut r cag and is n t int rchangeabl with r ar sprag.* Inspect front inner and rear outer free wheel clutch race bushing. If worn or scored, drive bushing out with Tool J-7013-1 (handle), and J-7273-4 (remover). Install new bushing with Tool J-7013-1 (handle), J-7273-4 and J-7273-6 (counterbore on J-7273-6 toward handle). If necessary to replace the three oil rings on grade retard reaction shaft, expand and remove rings, then install new rings in grooves and hook the ends. Inspect front grade retard reaction shaft bushing. If worn or scored, assemble Tool J-7003-1 (guide pin) to J-7273-9 (remover), then tilt tool and insert behind front bushing, using Tool J-7003-1 as a handle to hold Tool J-7273-9 in place across bushing. Insert J-7013-1 (handle) through rear of reaction shaft to enter J-7273-9 (remover) and drive out bushing. Install new bushing with Tool J-7013-1 (handle), J-7273-6 and J-7273-8 (counterbore on J-7273-6 toward handle). If rear bushing in grade retard reaction shaft is to be replaced, drive out bushing using Tool J-7013-1 (handle) and J-7273-7 (remover). Install new bushing with Tool J-7013-1 (handle), J-7273-6 and J-7273-7 (counterbore on J-7273-6 toward handle).

Reassembly: Free Wheel Clutch & Reacti n Shaft - Slip front sprag into front free wheel clutch outer race with shoulder of sprag up toward reaction shaft. *NOTE - Front free wheel clutch sprag has an inn r cag 1/32" longer than outer cage and n bronz drag strips. B careful not to interchang with rear sprag.* Insert front free wheel clutch inner race into sprag while rotating clockwise. Race must rotate freely on clockwise rotation and lock on counterclockwise rotation. When correctly installed, front inner free wheel race will be approximately 1/16" from front outer race. Insert rear free wheel clutch sprag into rear outer race with shoulder on sprag up toward reaction shaft. *NOTE - Rear free wheel clutch sprag has three bronz drag strips at lower edge.* Insert rear free wheel clutch inner race (forward clutch hub) into sprag while rotating clockwise. Inner race must rotate freely on clockwise rotation and lock on counterclockwise rotation. When correctly installed, rear free wheel inner race should contact front inner (rear outer) race. *CAUTION - If approximately 1/8" clearanc xists, r ar inn r rac may be hanging up on bronz strip at bott m f sprag assembly.* Assemble new free wheel clutch inner race thrust washer first, then reinforcement and retainer ring on grade retard reaction shaft. Expand and install retaining ring solidly in groove of reaction shaft.

Reassembly: Output Shaft Ass mbly - With needle thrust bearing in place on output shaft, slide free wheel clutch assembly over output shaft and into position against needle thrust bearing. *NOTE - Rac s n t us d at this location.* Apply heavy lubricant to output shaft-to-rear planet sun gear needle thrust bearing (1 3/16" I.D. x 1 7/8" O.D.) and set on forward end of output shaft. *NOTE - Races not us d at this l cation.* Insert rear planet sun gear assembly into rear planet ring gear assembly. Apply heavy lubricant to rear planet-to-front sun gear needle bearing and two bearing races and position on hub of carrier. Install front planet set sun gear and hub over front of rear planet set and free wheel clutch assembly. *CAUTION - D not lift ass mbly by nd f utput shaft as thrust washer and oth r parts may fall out of position. Mak this instal-*

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FLIGHT PITCH DYNAFLOW (C nt.)

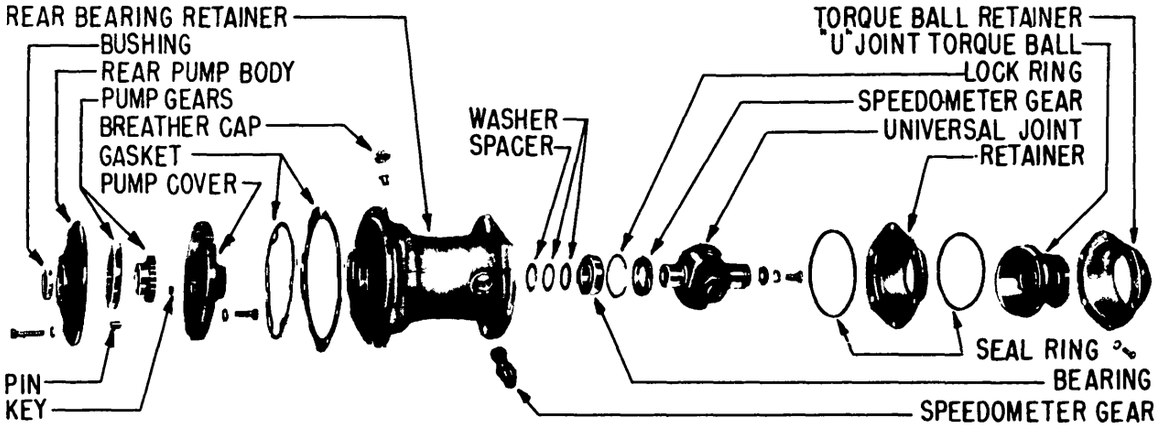
lation with ass mbly in horizontal position. Make sure front planet set sun gear hub extends beyond front inner (rear outer) free wheel clutch race tangs. *NOTE- Tangs f front inn r (r ar outer) race do not seat in b tt m f sl ts in sun g ar hub.* Install forward clutch backing plate over rear free wheel clutch inner race, then lubricate a friction plate with Dynaflow oil and install it next to backing plate. Engage tangs of separator plate in narrow slots of backing plate and continue to build-up by alternately assembling a friction plate and a separator plate. *NOTE - Align notches of tangs on s parator plat s in same NARROW slot of backing plat . N tch s must all be in same slot and must all be n sam sid f same sl t in backing plate.* Lubricate and install output shaft support assembly on output shaft (eight lugs down, and four lugs toward end of output shaft). Engage eight lugs in wide slots of forward clutch backing plate. Install grade retard clutch hub, needle thrust bearing (1½" I.D. x 2 3/16" O.D.) and two thrust bearing races (one on each side of needle thrust bearing). Slip on parking lock ratchet wheel and install retaining ring solidly in groove of output shaft.

TRANSMISSION REASSEMBLY

MAIN DRIVE ASSEMBLY: Reverse Clutch Pack - Check for direction of "dish" on both clutch separator plates. *NOTE - Friction plat s are .098" to .102" thick when new.* With transmission front end up, lubricate and install a reverse clutch friction plate in reverse clutch backing plate, then a separator plate (with "dish" in either direction), then another friction plate, followed by a separator plate (with "dish" in same direction as first separator plate), then install last friction plate. Install reverse clutch pressure plate (rounded edge up) and reverse clutch spring (with center high edge up).

Fr nt Pump (R action Shaft): Install new front pump-to-case gasket in transmission case, making sure that gasket holes line up properly. Install two 3/8"-16 Guide Pins, Tool J-7003 in transmission case, then lubricate rubber seal on front pump assembly with a heavy lubricant and slip front pump and reverse clutch piston assembly into transmission case so that the three closely spaced holes are at bottom of case. Tap assembly evenly and solidly into position with a brass drift and a plastic hammer. *CAUTION - Do not attempt to draw front pump assembly into position with front pump bolts as transmission case threads will almost certainly b stripped.* On early cars, install lockwasher, flat washer, and sealing washer on front pump-to-case bolts. *NOTE - On lat r cars, front pump bolts are equipped with captiv sealing lockwashers.* Install at least two front pump-to-case bolts and check reverse clutch pack clearance with feeler gauge between any two plates. Clearance should be .007-.055". If more than .055", friction plates should be replaced. Remove guide pins and install all bolts to 30-35 ft. lbs. after preliminary tightening by criss-crossing from one bolt to another.

N utral Clutch Ass mbly: With transmission upside down, apply a heavy lubricant and install needle thrust bearing (1¾" I.D. x 2½" O.D.) in cupped bearing race at rear of stator reaction shaft. Install neutral clutch assembly into case being certain cupped bearing race is in position on hub of front planet set ring gear carrier (front of neutral clutch assembly). *CAUTION - When installing neutral clutch assembly into reverse clutch pack, rotate neutral clutch assembly to line up splines and allow front planet ring gear carrier assembly hub to seat against needle thrust bearing. Hole in front ring gear carrier will be nearly even with edge of opening in transmission case when assembly is seated against needle thrust bearing.*



FLIGHT PITCH DYNAFLOW REAR BEARING RETAINER & TORQUE BALL ASSEMBLY

►*PARKING LOCK PAWL NOTE:* If parking lock pawl and shaft were removed, install these parts and retain in place with hairpin clip.

Output Shaft Assembly: Lubricate oil rings on first turbine shaft, then rotate shaft to line up splines and insert in output shaft assembly until last oil ring is inside front planet set sun gear. Start first turbine shaft and output shaft assembly (first turbine shaft first) into rear of transmission case. Guide front of first turbine shaft through neutral clutch assembly, then push into case until forward clutch backing plate is just entering rear of case. *NOTE - Check forward clutch backing plate to be certain it is in contact with output shaft support, and that clutch plates are properly positioned in slots of backing plate and that oil sleeve holes in support are lined up.* Check three grade retard clutch separator plates for "dish". *NOTE - Separator plates may be installed with "dish" in either direction but all must be installed the same way.* Install separator next to grade retard piston with center tang (of three tangs) between lugs of support, then friction plate, separator plate, and continue until three separator plates and three friction plates are installed. *NOTE - Grade retard clutch friction plates are .075-.080" thick when new.* Lubricate plates with Dynaflow oil, then install grade retard clutch backing plate with tangs of separator plates in NARROW slots and tangs of output shaft support in WIDE slots. Hold backing plate firmly in contact with output shaft support and slide assembly into position. *CAUTION - Maintain hand pr ssur forward on grad retard clutch backing plat at all times until assembly is correctly position d in cas and backing plate r tainer ring is install d. If backing plat is allowed to separate from support, clutch pack will fall out of position and complete assembly must be removed from case and reassembled.* While installing the assembly, it may be necessary to rotate front planet set ring gear or carrier with screwdriver to line up teeth on sun gear with front planet pinions. *NOTE - It is not necessary to force assembly into place. Assembly is correctly positioned in case when grade retard clutch backing plate retaining ring can be installed in groov in transmission case.* Install grade retard clutch backing plate retainer ring solidly in groove in case. Use a smooth punch inserted in anchor bolt hole to line up oil sleeve adaptor holes in support with holes in case. Do not use oil adaptor sleeves for this purpose. Lubricate and install three adaptor sleeves with new "O" rings into valve body portion of transmission case using Tool J-6586. Push down firmly to seat adaptor sleeves in output shaft support. Install retainer rings above the "O" ring sleeve assemblies using a screwdriver to seat retainer rings against sleeve assemblies. *NOTE - Center adaptor sleeve does not enter case as far as outer two.* Lubricate and install fourth adaptor sleeve with new "O" rings at oil cooler return line location using Tool J-6586 (sleeve retainer not used at this location). Install outer and inner anchor bolts and tighten to 35-40 ft. lbs., then install rear pump drive pin in output shaft.

Rear Bearing Retainer Reassembly: *NOTE - If rear oil pump was not removed from rear bearing retainer and loading tool was left in retainer, see "Rear Bearing Retainer" below.* If rear oil pump and loading tool were removed from rear bearing retainer, install .120" spacer on output shaft along with shims removed from output shaft when transmission was disassembled. Install two 3/8"-16 Guide Pins, J-7003, gasket, and rear bearing retainer (without oil pump). Check output shaft end clearance with rear bearing retainer bolted to case with at least two bolts and transmission upside down. Tap several times on output shaft to squeeze lubricant out of thrust bearings. Use Dial Indicator J-8001-3, Tool J-5804 threaded into output shaft and Tool J-5808 threaded into rear bearing retainer. Use a pry bar under

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FLIGHT PITCH DYNAFLOW (C nt.)

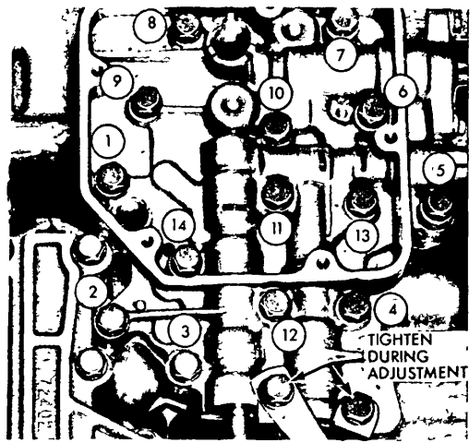
edge of Tool J-5804 to move output shaft. Endplay should be .015-.035". If less than .015", remove rear bearing retainer and install a thinner shim on output shaft. If more than .035", install a thicker shim. With endplay within limits, remove tools and rear bearing retainer from case. Insert Loading Tool J-7012 in rear of rear bearing retainer through retainer. Install two 5/16"-18 Guide Pins, Tool J-7001 in rear bearing retainer, then install new oil pump-to-bearing retainer gasket. Install oil pump, noting openings in pump and in rear bearing retainer, then install oil pump attaching bolts and tighten to 15-20 ft. lbs. *NOTE - Inspect front face of rear bearing retainer and mating surface at rear of transmission case carefully. Be sure there are no nicks or burrs that would prevent a good seal at this point.*

Rear Bearing Retainer: *NOTE - If rear oil pump was not removed from rear bearing retainer and loading tool was left in retainer, install retainer (see below), using two bolts, and check output shaft endplay (see "Rear Bearing Retainer Reassembly" above). If within limits, complete installation. If adjustment required, follow instructions outlined in "Rear Bearing Retainer Reassembly" above.* To install retainer assembly, install a new retainer-to-case gasket and assemble retainer to case making sure that slot in oil drive gear and driving pin in output shaft is lined up. *NOTE - If necessary to turn output shaft to line pin up with oil pump drive gear, turn parking lock ratchet wheel.* Hold loading tool forward while sliding bearing retainer onto output shaft to transfer spacer and shims onto shaft. Remove loading tool and install rear bearing-to-case bolts. Tighten alternately and evenly to 25-30 ft. lbs.

Parking Lock: Install properly assembled parking lock assembly to case with four bolts and tighten to 15-20 ft. lbs. then install parking lockpawl return spring.

T rque Ball & Universal Joint: Engage parking lock pawl and install universal joint and speedometer gear assembly with specially drilled universal joint bolt, lock washer, and plain washer using a 3/4" thin wall socket. Tighten to 50-55 ft. lbs. With transmission rear end upward, use heavy lubricant and install inner torque ball retainer sealing ring in groove of rear bearing retainer, then install torque ball retainer on rear bearing retainer. Install new sealing ring on outside of inner torque ball retainer, then liberally lubricate inside of torque ball and install over universal joint and inner torque ball retainer. Position torque ball with drain slot toward bottom of transmission case. Install outer torque ball retainer over torque ball and install bolts. *NOTE - Do not tighten bolts until transmission is installed in car.*

Valve Body: With transmission upside down, use a new gasket and carefully install valve body assembly. Engage slot in shift lever with slot and pin in manual control lever. Install bolts in valve body *(see "Valve Body Installati n Note" b low),* and install stator lever stop, using a special washer under head of attaching bolt. Tighten all valve body attaching bolts to 15-20 ft. lbs. in sequence indicated in illustration



VALVE BODY BOLT TIGHTENING SEQUENCE

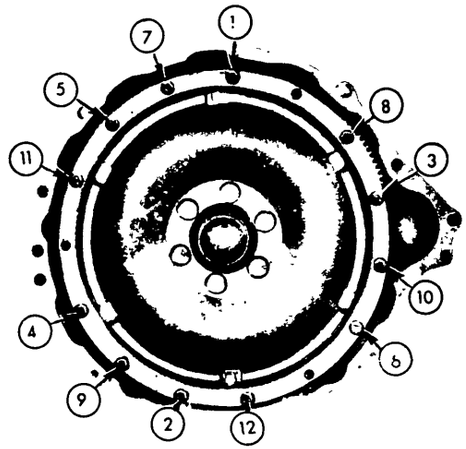
(except stator lever stop and stator control valve stop attaching bolts). Check for free operation of shift control valve. *See "Control Valve & Parking Lock Adjustment" above.*

►*VALVE BODY INSTALLATION NOTE:* Three different bolt lengths used. Refer to bolt tightening sequence illustration and install the different length bolts in holes as follows: 1¼" - (No. 1, 2, 3, 8, 9, 14). 1½" -(No. 4, 5, 6, 7, 10, 11, 12, 13 and at stator control valve stop attaching location). 1¾" -(Install in stator control lever stop attaching location).

Oil Screen, Oil Pan & Selector Lever: Install oil screen, then install new oil pan gasket, oil pan, oil pan flange reinforcement, and bolts. Tighten bolts to 10-12 ft. lbs. *NOTE - Oil pan gasket must be installed with "sharp" corner of gasket at right front edge of pan flange (transmission upside down and viewed from rear).* Install selector shaft seal and selector lever.

TORQUE CONVERTER REASSEMBLY & INSTALLATION

Reassembly & Installation: *NOTE - See "First Turbine Hub and Shaft Production Change & Special Tool Note" above, then proceed as follows:* Before assembling and installing converter assembly in transmission, check converter clearance as follows: Support converter pump on wood blocks (on bench), then install needle bearing race and needle bearing. Install thrust washer and stator assembly. Install flanged needle thrust bearing race, needle bearing, and .050" thick thrust bearing race on hub of second turbine, holding it in place with heavy lubricant, then install turbine assembly into place in converter pump. Install selective fit bearing race, needle bearing, and second selective fit race of turbine assembly hub. *NOTE - S l ctiv fit b aring rac s ar availabl in .030", .040", .050" thickn ss s.* Set Converter Clearance Gauge, Tool J-5899, in place with small diameter of sleeve upward



CONVERTER COVER BOLT TIGHTENING SEQUENCE

and loosen setscrew, then push sleeve down firmly to seat and tighten screw. *NOTE - S e "Conv rter Gaug Rework For Use With Flight Pitch Transmission Torque Converter" above.* Remove gauge from first turbine hub, then invert gauge and place on converter pump cover (support cover on wood blocks). Assemble dial indicator to post and place plunger of indicator on gauge sleeve. Loosen setscrew, push sleeve down. Reading on dial indicator is total converter clearance. If indicator reading is less than .004", change selective fit bearing races to a thinner size. If indicator reading is greater than .017" change selective fit washers to a thicker size. Remove tools, then disassemble converter. To reassemble and install converter in transmission case, turn transmission case so front end is upward, then carefully install converter pump (rotate pump to engage lugs of pump hub with front pump drive gear). Install needle thrust bearing race, needle bearing (2¼" I.D. x 3" O.D.), then install stator assembly on reaction shaft. Press down and rotate stator. Stator must rotate freely clockwise and lock on counter-clockwise rotation. Install flanged needle thrust bearing race, needle bearing, and .050" thick thrust bearing race on hub of second turbine and hold it in place with heavy lubricant. Carefully lower turbine assembly into place, rotating it as necessary to align splines. Install converter leakdown valve and spring on first turbine disc hub over first turbine shaft with large end of spring toward valve. Install new special washer on first turbine shaft making sure that converter leakdown valve spring is not caught between washer and first turbine shaft. Install first turbine shaft nut and tighten to 45-50 ft. lbs. Position two selective fit plain bearing races on first turbine hub with needle thrust bearing (1¾" I.D. x 2½" O.D.) between the races. Install new "O" ring on converter pump cover and install cover on pump in same position as when removed. Install bolts and tighten in sequence indicated in illustration to 25-30 ft. lbs.

CONTINUED ON NEXT PAGE

FLIGHT PITCH DYNAFLOW (Cont.)

TRANSMISSION INSTALLATION IN CAR

Torque Converter and transmission assembly are installed as a complete unit.

1) Turn flywheel so one hole for converter attaching bolt is straight up and wide flange is straight down. *CAUTION - Be sur drive lugs on converter pump do not dis ngage from front pump gear.* Raise transmission into place with same equipment used for removal, then align converter attaching bolt holes with flywheel holes before moving transmission forward against crankcase.

2) Adjust lifting equipment so transmission meets crankcase squarely, then move transmission assembly into crankcase. Install converter housing-to-crankcase bolts and tighten evenly to 45-55 ft. lbs. Install three flywheel-to-converter bolts and tighten to 25-30 ft. lbs., then check converter drain plugs for tightness and install converter housing cover.

3) Raise transmission just enough to install transmission support, installing any shims in their original position. Tighten bolts to 25-30 ft. lbs., then install the nuts and bolts holding the mounts to support and tighten to 25-30 ft. lbs. *NOTE - If transmission can not b mad to s at on support, front engine mounts should b loosen d and engin raised (by means of a pry bar) and pulled forward to remove bind from front mounts.* Remove engine jack and transmission hoist.

4) Connect upper shift rod to idler lever and lower shift rod to transmission lever, then connect speedometer cable. Complete engine installation by reversing removal procedure.

5) With car on floor, add four quarts of Dynaflow oil to transmission, then raise rear wheels and with transmission in "Drive" range and engine idling, add eight more quarts of Dynaflow oil. Place transmission selector lever in "Neutral", lower rear wheels to ground, then check oil level and add oil as necessary to bring proper level on dipstick.

FLYWHEEL ALIGNMENT & ENGINE BALANCING

►*IF VIBRATION NOTED AFTER INSTALLATION OF TRANSMISSION, CRANKSHAFT, FLYWHEEL, OR OTHER ROTATING PART; CHECK AND CORRECT FLYWHEEL ALIGNMENT. IF VIBRATION NOT CORRECTED, BALANCE ENGINE.*

FLYWHEEL ALIGNMENT: 1) Place car on jack stands (high enough to work under), then connect a tachometer to engine and operate engine with transmission in "Park" position. Increase engine speed gradually until the objectionable vibration is apparent and note engine speed; then stop engine. *NOTE - Critical speed should be around 2200 RPM.*

2) Remove bell housing cover and loosen one flywheel-to-converter attaching bolt and note position of the flywheel spoke in relation to converter cover. Spoke should just contact cover without applying pressure against it. If clearance is above .010" (between spoke and cover with attaching bolt removed), bend flywheel toward pump cover. *NOTE - To bend flywheel spoke, insert two round metal rods ¼" in diameter and 8" long between flywheel and converter cover; then install flywheel attaching bolt and tighten to 25-30 ft. lbs.* After bending, recheck clearance. If necessary to bend spoke away from flywheel, use a screwdriver under spoke. Repeat the above procedure for all three spokes.

CONVERTER PUMP: *NOTE - The following procedure will correct minor unbalance caused by replacement of individually balanced parts. Extreme vibration caused by parts abnormally out of balance, or difference in weight from corresponding parts, should be corrected by replacement of these parts.*

1) Determine speed at which vibration is most evident (use tachometer) and operate engine at this speed to check results from the following corrective procedures.

2) Install one balance weight, Part No. 1178109 (.060" thick) under head of two converter pump cover bolts and tighten to 25-30 ft. lbs. *CAUTION - Do not place weight at a converter-to-flywheel driving bolt because of lack of clearance at this location. If weight is required at flywheel attaching bolt location, weight should be divided and installed at the adjacent two bolts at each side of attaching bolt.*

3) Run engine through critical speed range of 1200-3500 RPM and carefully compare vibration with that obtained without the weight, then stop engine. Mark location of balance weight on converter pump, remove weight and tighten bolts to 25-30 ft. lbs. Install balance weight as near 180° from original position as possible and compare with vibration produced at critcal speed. If either of these positions show improvement, move weight around near that location for further gain. If not, try weight at remaining two positions to complete trials in four directions that are 90° apart and note at what point most gain is achieved.

4) At point where balance weight produces greatest improvement in vibration, install weights of different thickness to attempt to further improve the vibration. Balance weights are furnished in the following thicknesses:

Balance Weight Part Nos.

Thickness	Part N .
.0345"	1178108
.060"	1178109
.120"	1178110

►*CAUTION: A maximum weight thickness of 1/8" must not be exceeded due to limited clearance between bolt and crankcase.*

CRANKSHAFT PULLEY: Follow the same procedure as for converter pump (see above). The first trial should consist of three flat washers, Part No. 446363 (3/8" x 7/8" x .080") placed under one driving pulley attaching bolt. *NOTE - Standard pulley attaching bolts should be replaced with a 5/16" - 18 x 1¼" bolt, Part No. 186624.* At least four of the six positions should be tried for vibration improvement. After determining general position of greatest improvement, further gains may be made by distributing the washers between two bolts or by changing number of washers used. On crankshafts with two or three groove pulley, a wad of Perma Gum (approx. ½ oz.) may be placed inside pulley cavity on inner flat surface and engine run to determine effect on balance. Mark location of weight on pulley and move in same manner as outlined above. At point where greatest improvement is noted, add or subtract weight as required to obtain best balance, then remove pulley attaching bolt and Perma Gum and install comparable weight of washers, as outlined above, with longer bolt.

1954-57 CHEVROLET POWERGLIDE

Ch vr let Pass. Cars (1954-57)
Ch vr l t Corvette (1954-57)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR (Pushing recommended rather than towing):* Place selector lever in Neutral "N" position. When car reaches speed of approximately 16 MPH. (20 MPH if road wet or icy with resultant poor traction), move selector lever to Low "L" position to crank engine. After engine is started, move lever to "N" for engine warm-up.

►***1954 CORVETTE TORQUE CONVERTER-TO-FLYWHEEL DRIVE LUG PRODUCTION CHANGE:*** Three additional drive lugs have been added to torque converter for attaching converter to flywheel. This change entered production with Corvette Powerglide Transmission No. C-409-D. These additional drive lugs can be installed on earlier cars as follows:

1) Remove transmission, being careful not to drop torque converter. Loosely attach drive lugs, Part No. 3713602 to the converter cover under the converter cover attaching nuts. Remove flywheel from engine, or take flywheel from stock and fasten flywheel to converter, using all the drive bolts, and tighten bolts securely. Tighten lug retaining nut (converter cover nuts) and remove flywheel. ***NOTE—It is necessary to install flywheel to converter to assure centering of the drive lugs and the flywheel attaching bolt holes. Do Not disturb drive lugs after removing flywheel.***

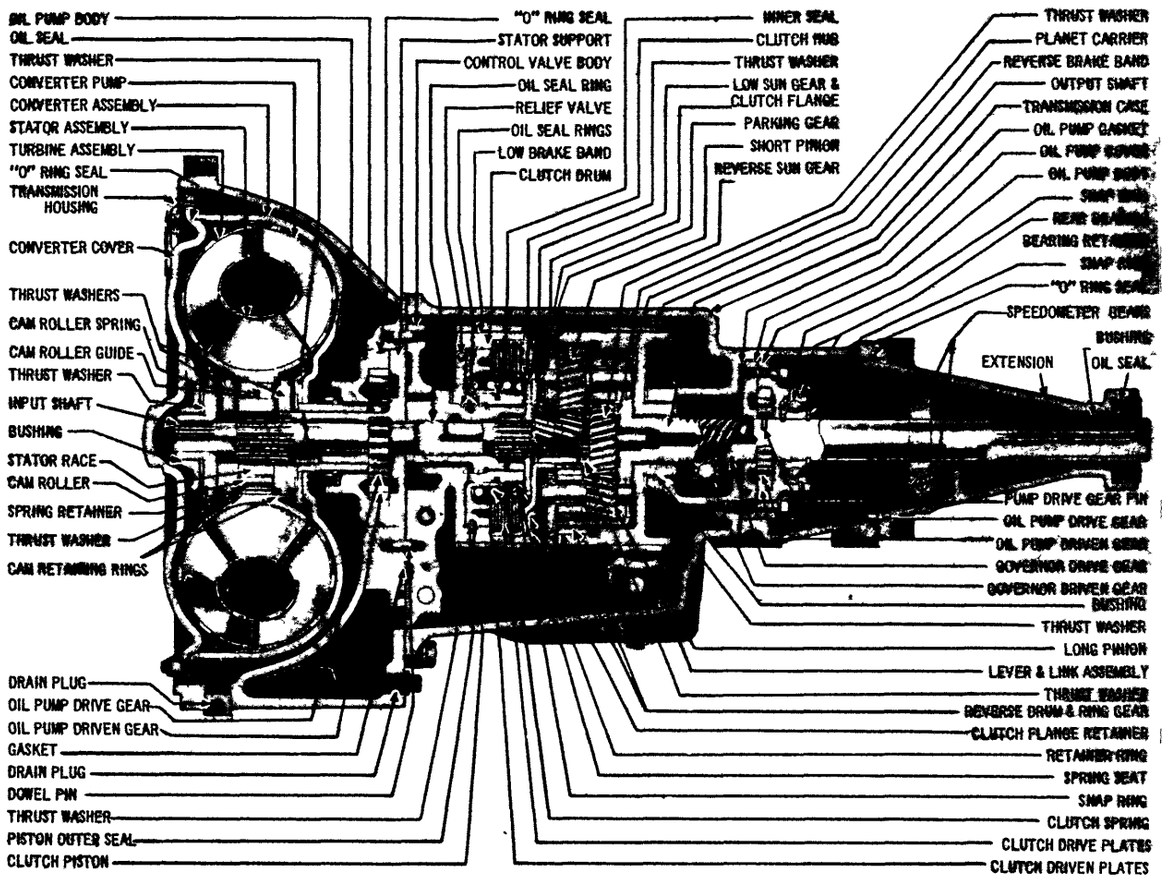
2) Reinstall flywheel to engine and transmission to car, making sure that "X" mark on converter cover and "X" mark on flywheel are aligned.

►*1955 CONTROL VALVE & GASKET PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To liminate a harsh closed throttle downshift):* A new control valve assembly, Part No. 3719934 *(see "Later Type Control Valve Identification Note" below),* entered production at Transmission Serial No. C-103-D. The later type control valve assembly is also furnished as a service replacement for earlier transmissions. *CAUTION - The later Valve Body & Case Gasket, Part No. 3719232, is not interchangeable with the early type gasket.*

►*LATER TYPE CONTROL VALVE IDENTIFICATION NOTE:* Transmissions with later type valve assembly are identified as follows: Between Transmission Serial No. C-103-D and C-128-N, an "X" will be stamped adjacent to casting No. 3709023 on rear surface. After Transmission Serial No. C-128-N, Casting No. 3719221 will be found on rear surface.

►*1955 CONTROL VALVE BODY & CASE GASKET CAUTION:* Early and late type gaskets are not interchangeable. These gaskets are identical except for an additional elongated hole in the later gasket.

►*1955 CLOSED & FORCED THROTTLE VALVE SPRING RETAINER PRODUCTION CHANGE (To prevent retainer breakage):* Spring retainers were increased in size from .134" to .148" beginning with Transmission Serial No. C-128-N. The larger retainers can be installed in valve bodies prior to the above serial number by drilling out the retainer hole with a 5/32" drill. Both retainers can be checked for being in proper position by removing the right hand side cover. *See "Trouble Shooting" for conditions resulting from broken valve spring retainers.*



POWERGLIDE TRANSMISSION SECTIONAL VIEW

►*1955 TRANSMISSION PLANET REVERSE RING GEAR & DRUM ASSEMBLY PRODUCTION CHANGE (To accomodate a new .020" steel thrust washer):* Beginning in production with Trans. Serial No. C-128-D, a new steel thrust washer is being used between planet carrier and reverse gear and drum to prevent galling of thrust surfaces. A Service Package, Part No. 3721564, consisting of a Planet Reverse Ring & Drum Assembly, Part No. 3720472, and an Output Shaft Thrust Washer, Part No. 3720474, is available for service replacement on early cars. *NOTE - This package can also be used on 1953-54 transmissions.*

►*1955 GOVERNOR PRESSURE TEST PLUG CHANGE:* Test plug on side of transmission has been eliminated in production on later cars.

►*1955 AIR CONDITIONED CAR TRANSMISSION FLUID LEVEL & FILLING NOTE:* A filler plug has been added to transmission side cover for use in checking fluid level and adding fluid to transmission.

►*1955 6 CYL. POWERGLIDE LINKAGE ADJUSTMENT CHANGE:* On later cars the part throttle upshift has been lowered to 12-18 MPH by changing the angle of transmission throttle control outer lever and shortening the throttle valve control rod. *See "Throttl Linkag Adjustment" on Car Model pages.*

►*TRANSMISSION OUTER LEVER POSITIONING GAUGE J-5906 REWORK FOR USE WITH 6 CYL. & V8 MODELS:* Remove bolt hole locating pin (larger pin) from gauge, pressing pin from back of lever leg to remove. Cut 5/16" from pin and replace pin in lever leg, pressing it into place to allow apex of pin to project ¾" above lever leg surface. Stake pin in place securely. Separate lever legs and place a 3/16" spacer between legs, then reassemble. In some cases it may be necessary to grind a beveled radius on outer end of bolt lever leg as required.

CONTINUED ON NEXT PAGE

POWERGLIDE (C ntinued)

DESCRIPTION

Powerglide transmission is a 2-speed (forward) automatic type consisting of a torque converter and a planetary transmission unit providing automatic operation in "D" (Drive) range. Car starts in 1st speed and upshifts to 2nd, with selector lever in "D" (Drive). Low, Reverse, Neutral, and Park ranges are manually controlled.

OPERATION

Starting in Drive Range—With the selector lever in Drive "D" position, the manual valve is positioned to direct oil pressure to apply side of the Low Servo and to the Low Drive Valve Body so that the car starts out in low range (torque converter plus planetary gear) providing an equivalent gear reduction of 2.2-1 (torque converter) plus 1.82-1 (gears). Depressing the accelerator pedal applies throttle valve pressure behind the shifter valve in the low drive valve body which assists the spring in keeping the shifter valve closed and the transmission in low range. As soon as the car begins to move, the rear pump begins to operate and to supply oil pressure to the governor which controls the upshift as follows:

Normal Upshift—When the rear pump pressure balances the force of the centrifugal weights in the governor, the governor valve directs oil pressure to the Shifter Valve in the low drive valve body and moves the valve to the drive position. This directs main line pressure to the clutch assembly and to the release side of the low servo piston (balancing of low servo pressures allows spring to release band). Application of the clutch and release of the band places the transmission in Drive Range (converter drops out independently when reversal of pressure on stator vanes causes stator to "free-wheel" so that torque converter acts merely as a fluid coupling). Upshift can be delayed by greater throttle opening as follows:

Delayed Upshift—The shift from Low to Drive Range is dependent on the extent to which the accelerator pedal is depressed and will occur at a higher car speed with greater throttle opening. In addition, if the accelerator pedal is depressed beyond the "detent point" (this point reached just before throttle is wide open and will be noted as a definite resistance to further movement of the accelerator pedal), this movement of the pedal compresses the detent spring in the low drive valve body and moves the Detent Valve which then directs throttle valve pressure to the large plunger which assists in holding the shifter valve in the low range position (see Forced Downshift operation below). This delays the upshift to drive range until the car speed reaches 42 MPH. when the governor pressure becomes great enough to move the shifter valve to the high position regardless of the accelerator pedal position (governor pressure increases with car speed until it equals main line pressure).

Normal Downshift—With closed throttle, transmission remains in drive range until car speed drops to approximately 9 MPH. and shifts down to low range at this point. However, transmission can be downshifted at will at higher car speeds to provide greater torque for rapid acceleration as follows:

Forced Downshift—At car speeds below 37 MPH., the transmission can be downshifted from drive to low range for rapid acceleration by depressing the accelerator pedal. The amount of pedal movement required, and the resulting action of the transmission control depends on car speed.

LUBRICATION

Check oil level at 1000 mile intervals, drain and refill transmission at 25,000 mile intervals.

► *CONVERTER DRAIN NOTE:* There is no drain plug on converter unit. Oil trapped in converter need only be replaced when transmission disassembled for overhaul.

Recommended Oil - Use only Automatic Transmission Fluid Type "A" (as furnished in containers bearing "AQ-ATF" number).

Capacity - Approximately 5 qts. (refill after transmission case drained), 11 qts. (after overhaul with transmission and converter dry).

►**Warming Up Transmission (For Checking or Draining)**—Drive car approximately 5 miles with frequent starts and stops OR warm up transmission in shop as follows: Run engine for 15 minutes at 750 RPM with selector lever in "Dr" position. ***CAUTION*** —Set hand brake tightly to prevent car moving.

Checking Oil Level—Check only with transmission warm and engine idling with selector lever in Neutral "N" position. Remove dipstick from filler tube in engine compartment on right side. Add oil only if level down to "ADD ONE QUART" mark on stick, fill only to "FULL" mark on stick. ***CAUTION—High oil level (above "FULL" mark) will cause foaming and loss of fluid.***

Draining & Refilling—Transmission must be warm. Remove drain plug in rear face of transmission housing under the case to drain the transmission. ***NOTE***—It is not necessary to drain converter. Replace and tighten drain plug. Install 5 qts. of new fluid through filler tube on right side of engine (see Oil Filler Notes above). Idle engine with selector lever in "N" until transmission warm, check fluid level and add additional fluid, as required, to bring level up to "Full" mark on dipstick. ***CAUTION—Do not overfill (will cause foaming).***

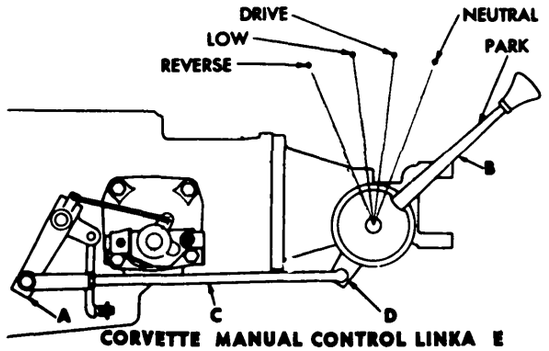
Filling (After Overhaul)—Install 3 qts. of fluid through filler tube, start engine and allow it to idle with selector lever in "N", install additional 8 qts. of fluid. Run engine until transmission warm and check fluid level.

LINKAGE ADJUSTMENT

► *THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on car model pages.*

Manual Control Linkage: 1954 Models - With selector lever in "R" (Reverse) position, clearance between reverse stop on control shaft lower support and lower lever should be .090". To adjust, loosen control rod swivel, making certain that manual control lever on left side of transmission case is in "R" (Reverse) position, then move selector lever as necessary for correct clearance. Tighten control rod swivel. *NOTE - Short connector rod (bellcrank-to-parking lock lever) on transmission must be correctly installed with arrow pointing up.*

1955-57 Models - Loosen shifter tube lever clamp nut sufficiently to allow upper control rod to move freely in swivel. Push control rod bellcrank (on left side of transmission case) toward front of car as far as it will go, placing transmission in "P" (Park) position. With both control rod bellcrank and selector lever held in "P" (Park) position, tighten shifter lever tube clamp nut securely.



CORVETTE MANUAL CONTROL LINKA E

1954-57 Corvette - Set control rod bellcrank "A" on transmission to reverse position (extreme rearward position). Place transmission selector lever "B" in reverse position (extreme forward position). Adjust rod "C" connecting lower end of selector lever with control rod bellcrank so that rod will enter hole in lower end of selector lever "D" freely.

Neutral Safety Switch (1954-56): Located on bracket on lower end of lower support assembly on steering column. To adjust, loosen two switch assembly mounting screws. Place selector lever in "N" (Neutral), making sure that switch clip is over flats on end of shifter shaft. Insert locating pin through holes in switch mounting bracket and locating plate. Tighten switch mounting screws and remove locating pin.

Neutral Safety Switch (1957): Mounted on steering column mast jacket back of instrument panel. To adjust, loosen mounting screws and place selector lever in "N" (Neutral). Install cotter pins in both holes on switch (each side of pointer) and rotate switch so that pointer is between holes. Tighten screws securely. *NOTE - Slot in switch must be set on center line of tang on shifter tube.* If starter will not operate with selector lever in "N" (Neutral), rotate switch as necessary, *Check to make sure starter will operate only with selector lever in "N" or "P" positions.*

BAND ADJUSTMENT

► *BAND ADJUSTING NOTE: Band adjustment not ordinarily required in service (bands adjusted when reass mbling transmission). Reverse band adjustment r quires removal of Servo Cover Assembly (see Disass mbly data).*

Low Servo Band - Adjusting screw located on left side of transmission case (under cover). To adjust band, remove adjusting screw cover. Use Tool J-4277 (see "Tool Modification Note" below), loosen adjusting screw locknut and tighten low band adjusting screw to 5-7 ft. lbs. *(NOTE - This procedure is new and supersedes th previous instructions which required that the scr w b tighten d firmly).* Back screw out four complete turns, and tighten locknut, taking care not to allow screw to turn. Replace adjusting cover.

C NTINUED ON NEXT PAGE

POWERGLIDE (C ntinued)

►**Tool J-4277 Modification (for Low Servo Band Adjustment)**—Adjusting screw has recessed head for ¼" Allen wrench. To use tool, remove screwdriver retainer and special screwdriver from tool, use ¼" Allen Wrench in place of the screwdriver in the tool.

Reverse Servo Band: 1954 Models - Adjusting screw located on right side of case **under servo cover.** With servo cover removed, install Tool J-4277 on adjusting screw and loosen locknut. Turn adjusting screw in slowly **and at same time** check endplay in linkage by pushing and pulling on servo return spring directly below adjusting screw. Continue to turn screw in until endplay is **just taken up.** *NOTE - At this point band must be free on drum so that drum can be rotated easily by hand.* Back off adjusting screw 1/8-1/4 turn, then tighten locknut being careful not to allow adjusting screw to turn. *CAUTION - Reverse band adjustment is very sensitive and must be done carefully.*

1955-57 Models - Adjusting screw located on right side of transmission **under servo cover.** With servo cover removed, install Tool J-4277 on adjusting screw, then loosen locknut. Rotate reverse drum to center it in reverse band, then tighten adjusting screw until all endplay between linkage and band is removed without compressing band. *NOTE - Reverse drum must be free to rotate after this adjustment.* If reverse drum is not free to rotate after adjustment, back off adjusting screw ¼ turn at a time until drum is free to rotate.

TROUBLE SHOOTING

SEVERE CLOSED THROTTLE DOWNSHIFT "CLUNK": May be caused by a broken closed throttle cushion valve spring retainer. Check this condition by removing right hand side cover and inspecting retainer. *See "Closed & Forced Throttle Valve Spring Retainer Production Change" above.*

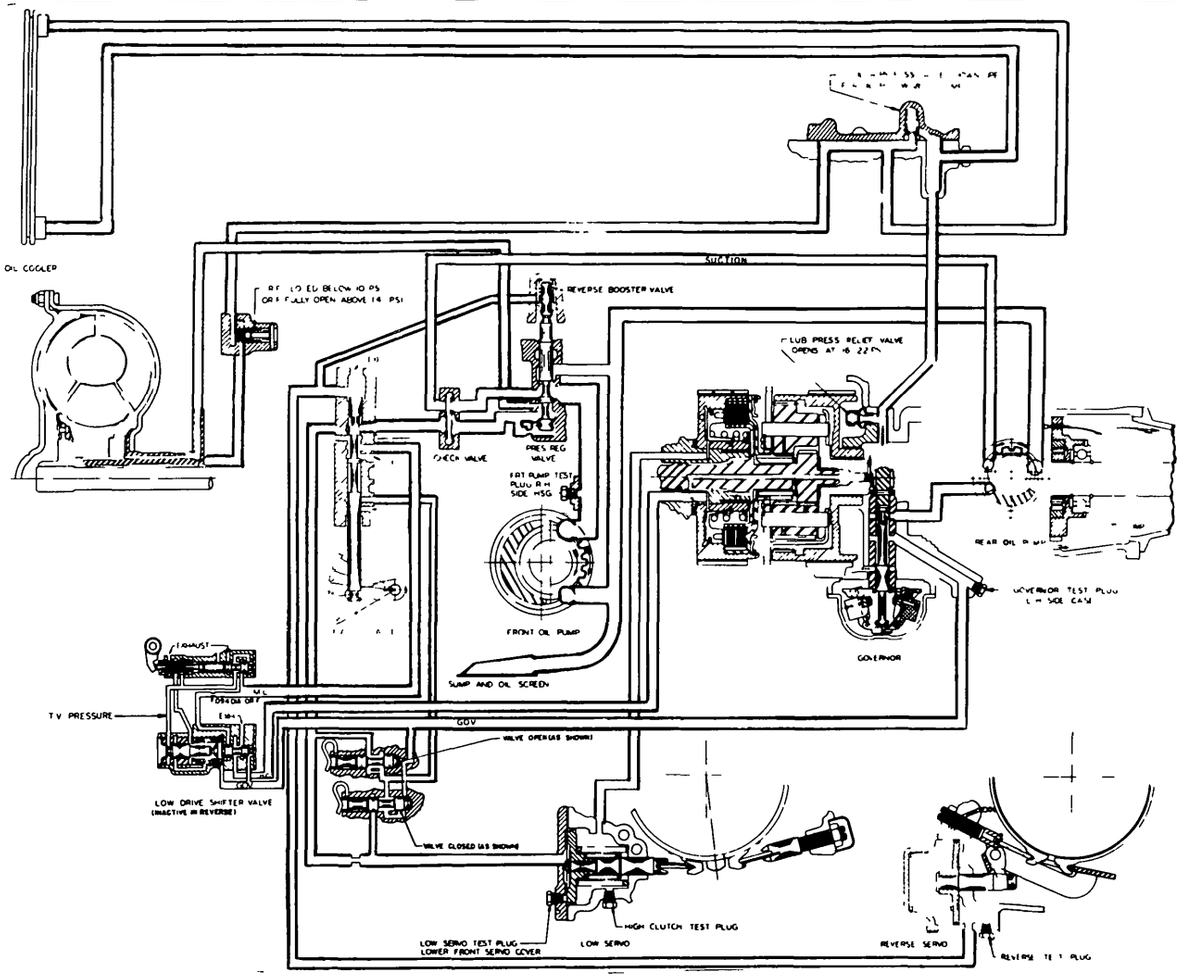
MOMENTARY RUN AWAY IN LOW UP TO 30 MPH (WIDE OPEN THROTTLE ACCELERATION): May be caused by a broken forced throttle cushion valve spring retainer. Check mainline pressure which will be lower just prior to shift, and the stall pressure will be low if the faulty transmission operation is caused by a broken retainer. *See "Closed & Forced Throttle Valve Spring Retainer Production Change" above.*

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, poor acceleration, or engine runs away on turns).

1) In all Speed Ranges—Low oil level. Incorrect control linkage adjustment. Air leak in oil pump suction pipe. Low front oil pump pressure.

2) In Drive Range—Incorrect control linkage adjustment. Damaged or leaking clutch piston seal (worn or burned clutch plates resulting from partially engaged clutch).

3) In Low Range—Incorrect control linkage adjustment. Low Band out of adjustment. Sticking accumulator valve, modulator lever, or modulator valve. Damaged or worn Low Servo Piston Ring resulting in poor band application or excessive oil leakage into clutch apply circuit causing partial clutch application and possibly burned clutch plates (check by connecting pressure gauges to Low Servo Apply and to High Clutch test points—there should be no pressure indicated at High Clutch point with selector lever in "L").



1955-57 POWERGLIDE TRANSMISSION HYDRAULIC CIRCUITS

CAR CREEPS (Forward or Backward).

1) With Control Lever in Neutral—Incorrect control linkage adjustment. Clutch piston vent valve stuck closed. Clutch plates sticking or incorrectly assembled (not "stacked" in correct order).

2) Creeps forward with Control Lever in Reverse or backward with Lever in Low—Incorrect control linkage adjustment.

CAR WILL NOT MOVE (Rear wheels may be locked or free).

1) With Control Lever in any range (rear wheels free). If this occurs at other times than after reversing car, see causes listed under **EXCESSIVE SLIPPAGE** above. If this occurs only after reversing car (indicating loss of front pump pressure) check: Rear pump air leakage into front pump suction line (causing front pump to lose its prime). Rear pump gasket leakage. Front pump clearance excessive.

2) With Control Lever in any range (rear wheels locked). Parking pawl lock engaged. Broken parts in transmission. Parking brake applied.

3) With Control Lever in Drive Range (rear wheels free). If engine runs away and transmission is hot, check for: Low radiator water level, clogged oil cooler, sticking thermostatic valve, or dragging Low Range Band (causing over-expansion of clutch parts due to excessive heat).

SHIFTS ARE ROUGH.

1) Low-to-Drive Shift (car in motion). Incorrect Low Band adjustment. Clutch plates worn or binding. Modulator control lever or piston sticking (will cause excessive pressures). Accumulator dump valve orifice plugged.

If engine speeds up during this shift—Check for incorrect low band adjustment and worn or binding clutch plates.

2) Drive-to-Low Shift. Incorrect Low Band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

CONTINUED ON NEXT PAGE

POWERGLIDE (C ntinu d)

3) **Neutral-to-Reverse.** Incorrect reverse band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).

CHATTERS WHEN STARTING.

1) **In Low Range.** Incorrect Low Band adjustment. Worn or rough band, scored drum. Clutch not disengaging properly due to distorted or binding plates, sticking clutch piston, sticking piston vent valve, or damaged or worn Low Servo Piston Ring allowing oil leakage into clutch apply circuit and causing partial clutch application (see tests for Excessive Slippage in Low Range above).

2) **In Drive Range.** Incorrect Low Band or Reverse Band Adjustment. Bands worn or rough, drums scored.

3) **In Reverse Range.** Incorrect Reverse Band adjustment. Worn or rough band, scored drum. Reverse ring gear and drum bushing worn or damaged.

REVERSE OPERATION JERKY OR DRAGGING.

1) Clutch plates are incorrectly assembled (not "stacked" properly) or sticking. Clutch piston vent valve stuck closed.

REVERSE CAN NOT BE ENGAGED WITH ENGINE RUNNING: If reverse can only be engaged when engine not running, check for accumulator snap ring being out of place (allowing accumulator valve and body to be forced against clamp nut on parking lock lever shaft and apply spring assembly, blocking shift into reverse). *NOTE*—Above condition will not prevent shift into Low Range).

DRIVE-TO-LOW r LOW-TO-DRIVE SHIFT DIFFICULT: May be caused by improperly drilled high clutch feed orifice in valve body resulting in slow clutch application in Drive Range and slow clutch release when shifting from Drive to Low (restricted orifice will cause slow oil flow). Check by connecting pressure gauges to Low Servo Apply and to High Clutch (low servo release side) and noting pressures as follows:

1) Move selector from Neutral to Drive with engine idling. If pressure builds up much more rapidly on Low Servo Apply gauge than on High Clutch gauge, a restriction in the passage (undersized orifice) is indicated.

2) Move selector from Drive to Low. Pressure in High Clutch gauge drops slowly, oil drainage from clutch is restricted. NOTE—This will result in slow Low Band application and clutch drag (may cause burned clutch plates).

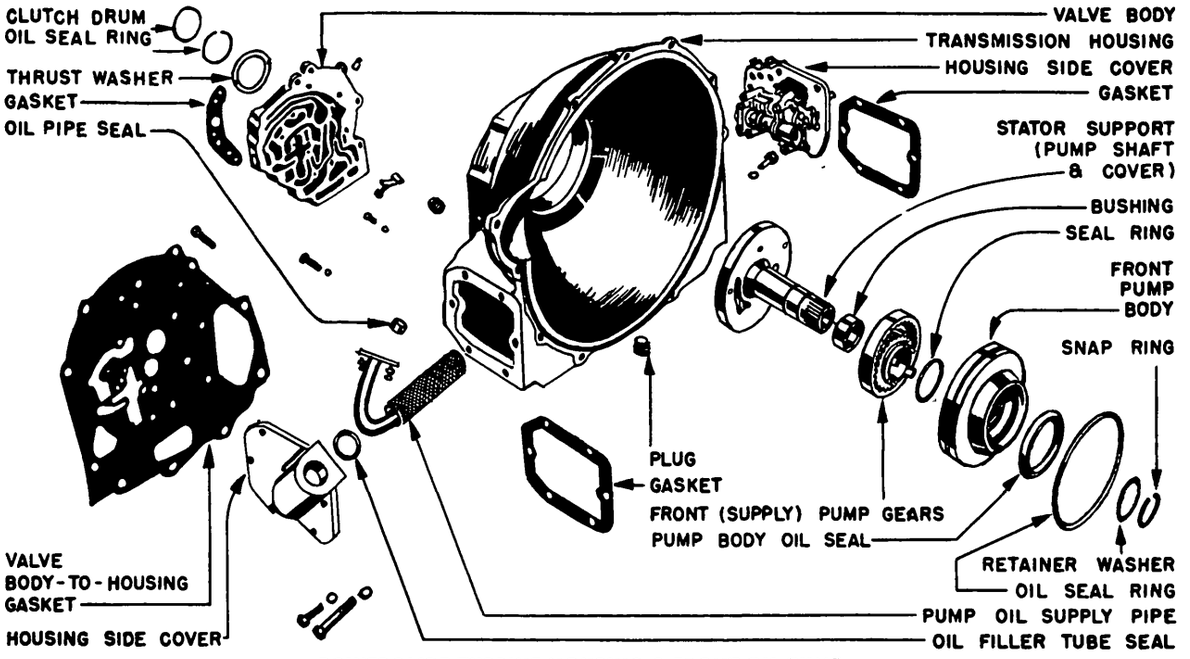
HIGH CLUTCH PLATES BURNED OR CLUTCH FAIL

►***CAUTION—When High Clutch failure noted, following tests should be mad before transmission removed, and transmission should also be carefully examined after removal and disassembly.***

1) Connect pressure gauges to Low Servo Apply, High Clutch (low servo release side), and to Reverse Servo points. Operate engine to supply oil pressure.

2) Place selector lever in Drive position and note pressure build-up in High Clutch gauge. Slow build-up indicates restriction in high clutch apply orifice resulting in clutch slippage and burned plates.

3) Place selector lever in Low position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage past Low Servo Piston Ring resulting in partial clutch application and burned clutch plates.



POWERGLIDE TURBINE HOUSING & FRONT OIL PUMP

4) **Place selector lever in Reverse position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage between the converter "out" and low servo "release" channels in valve body or damaged Housing-to-Valve Body gasket. This condition will cause partial clutch application and burned clutch plates.**

NOISE IN TRANSMISSION.

1) **Buzzing Noise (All Ranges).** Low oil level. Pump gear interference with crescent in pump. Pump check valve not seating.

2) **Ringing Noise in Converter.** Low oil level. Air leak in pump suction line (pump not seated properly) resulting in low oil level in converter. Pressure regulator valve stuck (closing converter inlet port). Leakage in oil line between front pump and regulator valve.

3) **Clicking Noise.** Incorrect manual linkage adjustment (causing interference between parking lock pawl and gear).

4) **Whining Noise.** Transmission gear teeth worn. Pump gear clearance excessive or pump gear bushings worn.

FUEL CONSUMPTION EXCESSIVE.

1) **Transmission Causes.** Converter stator freewheeling cams and roller incorrectly assembled. Clutch piston vent valve stuck open.

TRANSMISSION OIL BEING FORCED OUT OF FILLER PIPE: Caused by aeration and foaming of the oil due to one or more of the following:

NOTE—This condition may also cause Loss of Power and Lower Stall Speed (due to converter turbulence and lower pressures in control circuits).

1) Oil level too high allowing planet carrier to revolve in oil and aerate it. Correct by lowering oil level to correct point (see **LUBRICATION**) and driving car for 5 miles to work out air bubbles.

2) Oil suction pipe split, seal damaged, bore for suction pipe in housing too deep, or suction pipe retainer ears bent (preventing proper compression of the seal) resulting in air leaks in oil suction line.

3) Sand hole in suction bore of transmission case or housing or in suction cavity in valve body resulting in air leaks in oil suction line.

TESTING

►***TESTING CAUTION***—Transmission oil level must be checked and corrected (see **LUBRICATION**) and ***transmission must be warmed up before tests made.***

Warming Up Transmission: Transmission must be warmed up by road driving or in the shop exactly as follows before checking for oil leaks or trouble.

Road Warm-Up—Drive car for approximately 5 miles with frequent starts and stops to approximate heavy-traffic conditions.

Shop Warm-Up—Set hand brake tight to hold car, place selector lever in "D" range, start engine and run for 15 minutes at 750 RPM. At end of 15 minutes, transmission will be warmed up sufficiently for testing regardless of initial temperature.

►***CAUTION—Recheck oil level after warm-up and before making following tests.***

ROAD TEST: Road test car when endeavoring to determine the reasons for the following difficulties:

Clutch Slippage: Connect gauges to the test points of the low servo apply and high clutch (release side of low servo). Position selector lever in "D" range and when car starts to move on acceleration, carefully check the pressure readings. Before the upshift takes place, the gauge connected to the low

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POWERGLIDE (C ntinu d)

servo apply test point should record between 85 and 95 lbs. After a normal upshift takes place and the high clutch has time to become fully engaged, both gauges should record 85-95 lbs. If on this type of shift, the gauge on the high clutch (release side of low servo) test point records 85-95 lbs., and the clutch slips or does not fully engage, it indicates a mechanical fault in the clutch. If the gauges do not record between 50-60 lbs. with engine idling at 425 RPM, or from 85 to 95 lbs. upon acceleration, the following items will require checking as it indicates leakage in the oil circuits. (a) Pressure regulator valve stuck, (b) Leak at low servo piston ring (between bore and ring), (c) Leak at low servo piston rod (between bore and rod), (d) Leak at valve body to case gasket, (e) Leak between valve body and housing, (f) Front pump clearances not correct, (g) Leak at low drive valve body (check gaskets and shifter valve), (h) Check passages in transmission housing for porosity, (i) Loose suction screen connection.

Closed Throttle Downshift "Clunk": High engine idle speed, or Closed Throttle Downshift Cushion Valve stuck.

Harsh Abrupt Upshift Above 25 MPH: Forced downshift cushion valve stuck closed.

Improper Upshifts and Downshifts: Refer to "Shift Patterns" below. Connect gauges to throttle valve and governor test points *(NOTE—See "Governor Pressure Test Plug Production Change" above).* Throttle valve pressure ranges from 0 to 62 lbs., depending to what extent the accelerator is depressed. Governor pressure is governed by road speed. If difficulty is experienced with the "Shift Patterns" it is recommended that the governor pressure be checked first to determine whether the pressure is within proper range, for if not, it will effect the "Shift Patterns" and the governor assembly is the first thing that should receive attention. Throttle valve pressure is another thing that effects "Shift Patterns" and if governor pressure is correct it is indicative that trouble is in the low drive valve body provided the positive linkage and throttle valve linkage is in proper adjustment.

TRANSMISSION SHIFT POINTS ©

1954 MODELS (Exc. Corvette)

Throttle Position	②Upshift	③Downshift
Light Throttle ④	10-20 MPH	⑤ 8-10 MPH
To Detent	23-33 MPH	13-16 MPH
Through Detent	46-53 MPH	46-50 MPH

1954 CORVETTE

Throttle Position	②Upshift	③Downshift
Light Throttle ④	11.3-13.1 MPH	⑤ 6.7-8.7 MPH
To Detent	27.2-37.1 MPH	
Through Detent	50.8-57.8 MPH	35.3-40.3 MPH

1955-57 6 CYL. & V8 MODELS

Throttle Position	②Upshift	③Downshift
Light Throttle ④	12-14 MPH	⑤ 10-13 MPH
To Detent	30-45 MPH	14-18 MPH
Through Detent	48-53 MPH	45-50 MPH

© - Transmission in "D" (Drive) Range.
② - From Low to High. ③ - From High to Low.
④ - Light Throttle on Upshift.
⑤ - Closed Throttle on Downshift.

►*STALL TEST NOTE: Stall testing of transmission is not r comm nded.*

PRESSURE TESTS: Connect pressure gauges at the following points and make the tests listed below.

►*TEST GAUGE NOTE:* Five gauges are required. The four-gauge panel, No. J-4872, can be modified for use by installing an additional gauge furnished in conversion package No. J-5491 (reverse original gauges on panel, drilling additional hole to mount new gauge on lower edge of panel).

Gauge Connections—Connect gauge at each of the following points:

1) **Low Servo Apply Pressure**—Plug on lower front of servo cover on right side of transmission. *CAUTION—Do not confuse this plug with Modulator Pivot Pin Retaining Plug which is slightly to rear of this Low Servo Apply Plug.*

2) **Clutch Apply Pressure (Low Servo Release)**—On bottom of transmission case at center and adjacent to servo mounting flange.

3) **Reverse Servo Apply Pressure**—On bottom of transmission case at rear and adjacent to servo mounting flange.

4) **Throttle Valve Pressure**—At hex-head plug in center of Low and Drive Valve Body Cover on left side of converter housing.

►*GOVERNOR PRESSURE TEST PLUG PRODUCTION CHANGE: Test plug on side of left hand side cover has been eliminated beginning in production with Trans. Serial No. C-428-D. Earlier model side covers will retain this plug.*

5) **Governor Pressure**—At plug on side or at upper end of channel in Low and Drive Valve Body Cover on left side of converter housing (upper plug is between second and third top cover screws (counting from top front corner of cover).

6) **Main Line Pressure**—At plug on upper end of channel in Low and Drive Valve Body Cover on left side of converter housing (plug is between third and fourth top cover screws (counting from top front corner of cover).

7) **Clutch Apply or Main Line Pressure**—At plug at outer end of channel in Low and Drive Valve Body Cover on left side of converter housing (this plug is at lower rear corner of cover).

Test Pressures—*CAUTION—Representative pressures listed below may vary 5% (higher or lower).*

1954 MODELS

LOW RANGE (MANUAL)

Idling at 450 RPM.

Pressure Point	Pressure
Main Line (Frt. Pump)	140 lbs.

At 30 MPH.

Pressure Point	Part Throttle (Road Load)	Full Throttle (Thru Detent)
Low Apply	160 lbs.	190 lbs.
Governor①	60 lbs.	60 lbs.

DRIVE RANGE (AUTOMATIC)

Transmission in Low Range

Pressure Point	Light Throttle (10 MPH.)	Thru Detent (30 MPH.)
Low Apply	70 lbs.	115 lbs.
Clutch Apply	0	0
Governor①	10 lbs.	60 lbs.
Throttle Valve	0-5 lbs.	45 lbs.

Transmission in High Range

Pressure Point	Light Throttle (30 MPH.)	To Detent (40 MPH.)
Low Apply	55 lbs.	120 lbs.
Clutch Apply	55 lbs.	120 lbs.
Governor①	60 lbs.	75 lbs.
Throttle Valve	45 lbs.	58 lbs.

①—To check governor pressure only, vacuum line to modulator must be disconnected.

1955-57 MODELS

FRONT PUMP PRESSURE

	Pressure
Idle (425 RPM)	50-60 lbs
Above Idle	85-95 lbs.
Reverse (Idle 425 RPM)	50-60 lbs.
Reverse (Above Idle)	165-195 lbs.

DRIVE (AUTOMATIC)

Transmission in Low Range

	Light Throttle (10 MPH)	Through Detent (45 MPH)
Low Apply	85-95 lbs.	85-95 lbs.
Clutch Apply	0 lbs.	0 lbs.
Governor	8-13 lbs.	72½-76½ lbs.
Throttle Valve	①	①

Transmission in High Range

	Light Throttl (30 MPH)	To Detent (45 MPH)
Low Apply	85-95 lbs.	85-95 lbs.
Clutch Apply	85-95 lbs.	85-95 lbs.
Governor	52-56 lbs.	72½-76½ lbs.
Throttle Valve	①	①

①—Throttle valve pressure will vary from 0 to 62 lbs., depending on throttle position. At wide open throttle (through detent) pressure should read 61 to 63 lbs., on acceleration.

REMOVAL FROM CAR (EXCEPT CORVETTE)

Transmission & Torque Converter are removed as an assembly. *CAUTION—Torque converter is not retained in housing as on previous transmission and special holding tool must be used to prevent converter falling out when transmission assembly removed.*

1954 MODELS

CHEVROLET TRANSMISSION ASSY. REMOVAL:

1) Raise car and support securely on jack stands. Remove floor mat and toe pan plate.

2) Take out three top turbine housing attaching bolts (through toe pan hole).

3) Disconnect speedometer cable at transmission and hand brake rod from cross-shaft. Drop cross-shaft, brake cables, and spring.

4) Free universal joint collar by taking out cap screws on back of transmission case, slide ball and collar back on shaft. Support propeller shaft with jack, take out front universal trunnion bearing cap screws, split universal, lower front end of propeller shaft.

5) Take out two upper right transmission-to-converter housing bolts. Use Adapter No. J-5214 and Adapter Plate No. J-5526 mounted on a standard hydraulic floor jack to support transmission weight.

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POWERGLIDE (Continu d)

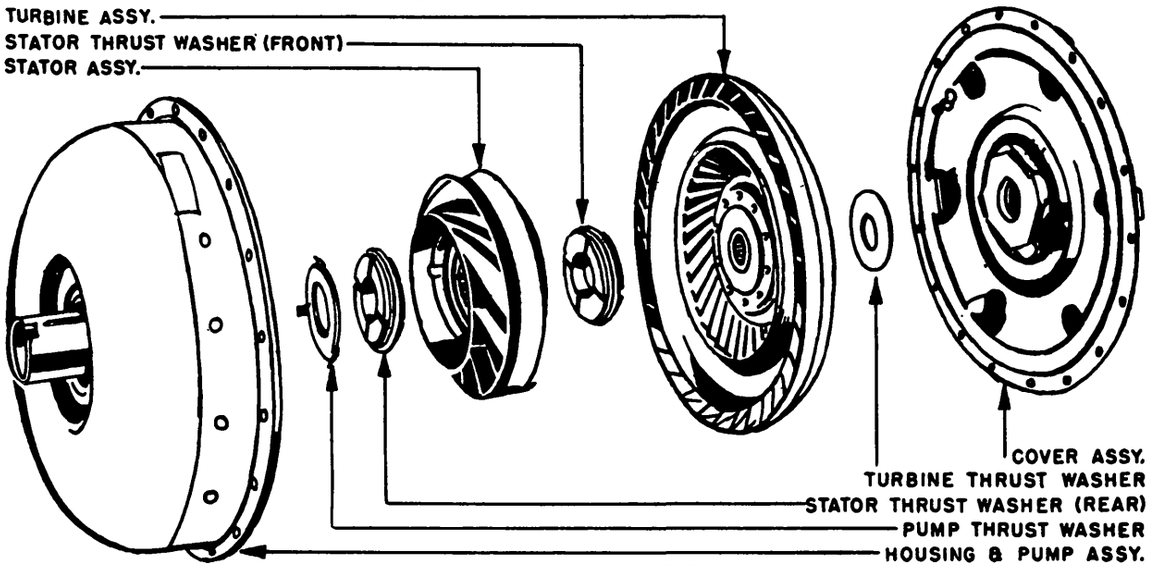
6) Drain transmission case (see Lubrication). Disconnect transmission oil cooler lines and vacuum line.
7) Take out two lower turbine housing attaching bolts. Remove flywheel cover and flywheel underpan extension.
8) Remove all spark plugs. Disconnect exhaust pipe at manifold, disconnect muffler support. Tie exhaust pipe and muffler to left frame side member out of the way.
9) Disconnect throttle control rod from control lever on left side of transmission case. Disconnect both long and short selector control rods from levers on left side of transmission, tie throttle control rod and long selector rod up out of the way. Remove bell crank lever and stud from transmission case.
10) Remove all six flywheel-to-converter bolts working through housing opening on left side (use tool J-4281 to turn engine crankshaft and align each bolt with housing opening for access).
11) Clean all dirt from around filler tube and dipstick fitting on transmission side cover, remove housing bolt holding filler tube, remove filler tube and dip stick.

►***CAUTION—Cover the filler tube opening with masking tape or plug with rubber stopper to keep out dirt.***

12) Support engine with a jack under the oil pan. Remove transmission-to-rear support bolts, remove the transmission support and cross-member.
13) Take out all remaining turbine housing bolts (lift or lower engine for access to bolts).
14) Move transmission straight back to clear flywheel pilot from flywheel. Install converter assembly holding tool J-5384 (attach tool with one converter turbine housing bolt). ***NOTE—this tool will prevent converter assembly falling out while transmission being removed.***

1955-57 MODELS

TRANSMISSION ASSEMBLY REMOVAL: (1) Raise car and install jack stands front and rear. Turn back floor mat and remove toe pan plate.
2) Remove spark plug wires on all models. Disconnect ground strap from battery and wires from starting motor solenoid on eight cyl. models only. Disconnect oil cooler lines retaining clip bolt from right side cover and disengage lines from retaining clip on engine. Move lines away from transmission and tie to right frame side rail.
3) Disconnect throttle valve control rod from throttle valve control outer lever and manual shift control rod (long rod) from bellcrank. Split rear universal joint. Then remove propeller shaft and front universal joint as an assembly by sliding it rearward until front joint is free of transmission output shaft.
4) Remove drain plug from rear of converter housing and drain transmission. Clean dirt from around filler tube, dipstick and transmission cover and remove side cover bolt retaining filler tube in position. Remove filler tube and dipstick. ***(CAUTION—Use masking tape or rubber stopper to cover filler tube opening.***
5) On V8 cars only, remove starter, and disconnect exhaust pipe from crossover pipe. On 6 Cyl. cars disconnect exhaust pipe from exhaust manifold.
6) Disconnect muffler from muffler support bracket and move the exhaust pipe and bracket as an assembly to the left and tie it to left frame side member.



POWERGLIDE TORQUE CONVERTER

7) Remove flywheel inspection hole cover and remove the three flywheel to converter attaching bolts through the opening that is adjacent to the starting motor, (opening on six cylinder cars is on left side of engine).
8) Remove all converter housing to flywheel housing attaching bolts except the top three. Install engine support bar or cradle to support engine. Position jack under transmission (using a suitable transmission handling device). Remove both rear engine mountings making sure that engine is properly supported before removing mountings.
9) Remove the three upper converter housing to flywheel housing attaching bolts through opening in toe pan. Move transmission to rear slightly and install converter holding tool J-5384. Lower transmission on jack and remove from under car.

DISASSEMBLY—TRANSMISSION

►**DISASSEMBLY & REASSEMBLY CAUTION:** ***CLEANLINESS IS EXTREMELY IMPORTANT when opening up transmission. Thoroughly CLEAN exterior of case first, CLEAN each part as removed with cleaning solvent or gasoline and dry with air—do not use wiping cloths which will leave lint on parts. Store all parts in clean storage bins.***

DISASSEMBLY OF TRANSMISSION (Into Major Units): 1) Place transmission on bench (use holding fixture J-3361) and remove all units as indicated below.
2) Remove converter assembly holding tool J-5384 from housing, remove converter assembly by pulling it straight out of housing.
3) Take out right side cover attaching bolts, remove side cover, gasket, and oil pump suction screen.
4) Take out Low & Drive Valve Body attaching screws on left side of transmission, remove valve drive body assembly and gasket. CAUTION—Do not remove outer lever assembly from valve body (this retains inner lever assembly in body).
5) Loosen all servo cover bolts slightly and break servo cover loose if it sticks to case (reverse servo spring and pressure regulator spring bear against cover) **using care not to allow cover to tip** which may damage or break tip of pressure regulator valve. Use guide bolts to maintain cover alignment or turn all cover bolts out evenly while exerting pressure on cover, then lift cover and gasket straight off until cover clears tip of pressure regulator valve. Remove reverse servo spring and pressure regulator springs, lift regulator valve out.

►***CAUTION—Handle valve carefully to prevent damag and store it by itself to avoid nicking or scratching of the polished surfaces.***

6) Remove low band adjusting screw cover, loosen low band adjusting screw locknut using tool J-4277 (see Tool Modification below), and tighten low band adjusting screw to hold clutch assembly in place.

►***CAUTION—Make sure low piston assembly does not fall out of bore and become damaged.***

►**Tool J-4277 Modification Note**—Low band adjusting screw has recessed head for Allen wrench. To use tool, remove screwdriver retainer and special screwdriver from tool, use ¼" Allen wrench in place of screwdriver in tool.

7) Working from inside of converter housing, remove the converter housing-to-transmission case self locking bolt. Remove the converter housing-to-transmission bolts and lockwashers and install two ⅜"—16 x 3¾" guide pins (part of Pilot Stud Set J-3387). Shift transmission into Reverse and then carefully separate transmission from converter housing. Remove valve body to transmission case gasket.

8) Remove manual valve from valve body on rear of converter housing, remove manual valve lever from housing, remove bronze thrustwasher from valve body oil delivery sleeve.

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POWERGLIDE (C ntinu d)

►***CAUTION—Handle manual valve carefully to prevent damage and store it by itself to avoid nicking or scratching of the polished surfaces.***

9) Take out all bolts and lockwashers attaching valve body to converter housing and front pump to valve body. Remove valve body and gasket.

►***CAUTION—Handle valve body and valves carefully to protect them from damage.***

10) Use Front Pump Driver Tool J-4263-5 to remove pump assembly from converter housing.

11) Loosen low servo band adjusting screw to free clutch assembly, remove input shaft, clutch assembly, and low sun gear thrustwasher from transmission case.

12) Remove low servo band, strut assembly, low servo piston and piston return spring from transmission case.

13) Remove speedometer driven gear assembly. Take out universal joint retainer bolt and lockwasher on rear end of output shaft, slide universal joint yoke off end of shaft.

14) Take out attaching bolts and remove governor cover on left side of transmission case, remove gasket. Remove governor assembly (allow governor to turn in clockwise direction while withdrawing it from case).

15) Use tool J-3383 to rotate parking lock pawl spring until end unhooked from case, remove spring and parking lock pawl. Remove parking lock lever and steel washer, parking lock lever shaft assembly, and oil seal from case.

16) On 1954 models, install Tool J-938 on rear face of transmission case and engage end of output shaft. Turn tool handle to force output shaft forward out of rear bearing. Remove tool, then remove planet carrier and output shaft through front of case.

17) On 1955 & later models, remove transmission oil seal using Tool J-5859, then remove transmission extension assembly and "O" ring seal. Remove speedometer drive gear from output shaft with Tool J-5814. *CAUTION - Do not attempt to remove planet carrier until transmission rear bearing locating snap rings, retainer and bearing are removed.* Remove rear bearing retainer and rear bearing locating snap ring from output shaft. Remove rear bearing from output shaft with Tool J-5814, then remove rear bearing front snap ring. Working from front of transmission, position arrow on face of external gear of planet carrier assembly at top center (this aligns drive pin in output shaft with "eyebrow" opening in rear oil pump cover). Planet carrier assembly can now be removed through front of case. *CAUTION - Do not lose rear oil pump drive pin.*

18) On all models, remove reverse drum and thrust washer. Using Tool J-4277, loosen reverse servo adjusting screw locknut, then back off screw and remove reverse brake band assembly and reverse servo piston. Remove rear pump attaching bolts and lockwashers and remove rear pump assembly and gasket. Remove lubricating pressure relief valve from case.

NOTE - For DISASSEMBLY of above units, see OVERHAUL data following.

VERHAUL

►*LOW BAND ANCHOR STRUT INSTALLATION CAUTION:* The guide stamping of the anchor strut assembly must be installed **toward** the band.

►*1957 POWERGLIDE LOW SUN GEAR THRUST WASHER PRODUCTION CHANGE:* The "roller type" thrust washer (078" thick) used in production at this location has been changed to a bronze thrust washer (095" thick). When servicing all 1957 Powerglide clutch assemblies installed in 1953-1957 cars where either the low sun gear thrust washer ("roller type or bronze type"), or the clutch drum thrust washer requires replacement it will be necessary to replace the washer at both of these locations. The service replacement clutch drum thrust washer (untanged) Part No. 3745897 is .061" thick. Replacement low sun gear thrust washers are furnished in the following thicknesses for selective fitting: Part No. 3719296 (095"); 3719297 (.120"); 3719298 (.145"). *See "Transmission Endplay Check & Adjustment Change" below.*

►*1957 POWERGLIDE TRANSMISSION ENDPLAY CHECK & ADJUSTMENT CHANGE:* The procedure for selecting and installing the service thrust washers in all transmissions using the 1957 clutch will be the same as for previous (1953 & later) transmissions except that the low sun gear-to-reverse gear clearance will be .025-.050". *See "1957 Powerglide Low Sun Gear Thrust Washer Production Change" above for correct thrust washers to use.*

►**"O" RING SEAL CAUTION:** ***These seals must be discarded when removed and a new seal installed exactly as directed below.*** "O" ring rubber seals are special design and are installed with side clearance in ring groove so that oil pressure on seal deforms the rubber and extrudes a portion of the rubber into the clearance space between the mating parts to provide a positive seal against loss of oil pressure. Seals **must not be re-used.**

"O" Ring Seal Installation—Make certain that parts are clean and that burrs and sharp edges are removed. Seal must be free of any twists (place ring on flat surface and allow it to assume natural position) and **must not be twisted during installation.** Engage one side of ring in groove, pull other side straight back until it can be fitted in groove without twisting. Work ring against trailing edge of groove (last side to enter when parts assembled) using flat tool entered between ring and leading edge of groove to move ring without twisting. Lubricate "O" ring and parts with transmission oil.

CONVERTER OVERHAUL (Unit on bench—after removal from transmission):

Disassembly: 1) Remove all converter cover attaching bolts and locknuts, use small punch to drive out split dowel pin in cover, lift cover off.

2) Remove turbine assembly, stator assembly, stator thrustwashers, and pump thrustwasher. Remove thrustwasher from turbine hub. Remove "O" ring seal from converter cover.

3) Remove stator race from stator assembly, remove snap ring and over-run cam retaining thrustwasher, remove cam rollers, springs, and guides (8 each).

►***CAUTION—Use care when separating parts so that cam rollers, springs, and guides do not fall out and become lost.***

4) Remove snap ring on opposite end of stator and remove over-run cam roller and spring retainer.

►***CAUTION—Use care to prevent damage to over-run cam and see that cam does not become disengaged from stator hub.***

Inspection: Wash all parts in cleaning solvent and dry with air. Inspect converter pump hub, turbine hub, and converter cover bushing for galling, scoring, or excessive wear. Inspect all thrustwashers for galling, scoring, or excessive wear. Check turbine vanes and stator vanes for looseness or damage. Inspect stator race and cam rollers for galling or scoring. Inspect cam springs for distortion. Check spring guides for wear or damage. Inspect over-run cam roller and spring retainer for wear or damage. If bushing in converter cover worn or damaged, install new bushing as follows:

Converter Cover Bushing Replacement: Precision type bushing, No. 3702079, furnished for field installation. Use bushing remover tool J-5381 to remove old bushing from cover. Place new bushing on pilot end of Bushing Replacer Tool J-5382 and press bushing into place in cover using an arbor press. ***NOTE—Bushing is finished to size and does not require reaming.***

Reassembly: 1) Install over-run cam roller and spring retainer in stator with retainer prongs pointing toward **rear** of stator. ***NOTE***—Stator has word "Front" cast in and stator vanes are thicker at front end.

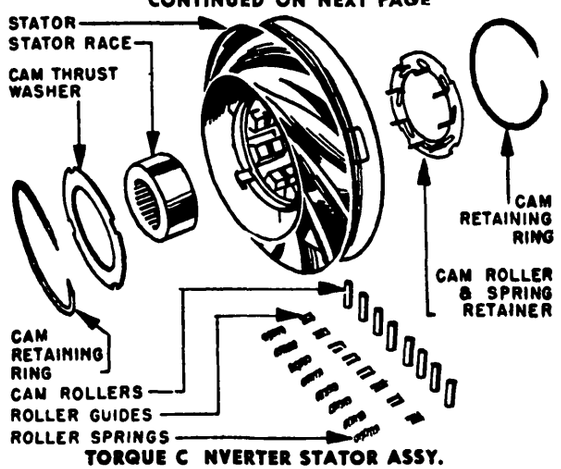
2) Assemble cam rollers, springs, and guides in cam pockets (***CAUTION***—Guides are curved and this curvature must follow curvature of cam). Install over-run cam thrustwasher and retaining snap ring.

3) Coat stator race and loading tool J-5930 with light film of oil, place stator race on pilot end of loading tool and carefully rotate the stator over the tapered end of the loading tool and the stator race (***CAUTION***—rotate stator in clockwise or freewheeling direction and use great care not to dislodge cam rollers). Check operation of stator. Stator should turn freely in clockwise direction viewed from front end.

4) Place converter pump on bench, open end up Install thrustwasher on converter pump hub making certain that tabs are engaged in the hub flange notches. Assemble **both** thrustwashers on stator and install stator assembly on converter pump.

►***CAUTION—Make certain that cut-outs in over-run cam roller and spring retainer are facing upward or toward converter turbine.***

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TORQUE C NVERTER STATOR ASSY.

POWERGLIDE (C ntinued)

5) Install thrustwasher on turbine hub and assemble turbine on converter pump.
6) Install NEW "O" ring seal on converter cover, align dowel pin holes in cover with dowel pins in converter pump, install cover assembly. Install all cover attaching bolts and lockwashers and tighten evenly to 15-20 ft. lbs.

TRANSMISSION OVERHAUL: *After removal from case, overhaul sub-assemblies or units as follows:*

Planetary Unit Clutch: Place unit on bench with clutch flange upward.

Disassembly—1) Remove clutch flange retainer ring, lift out clutch flange retainer. Remove clutch flange assembly from clutch drum. Remove clutch hub thrustwasher, hub, and all clutch plates from clutch drum.

2) Place clutch drum in bench press, install spring compresion tool J-5133 and compress spring enough to remove snap ring, use KMO-410 pliers to remove snap ring. Relieve spring pressure, remove tool, lift out clutch spring seat and spring.

3) Rap clutch drum face down on a wood block to dislodge clutch piston, lift piston out, remove outer seal ring from piston and inner seal ring from clutch drum hub.

Inspection—Wash all parts in cleaning solvent and dry with air. Inspect drum brake band surface for scoring or burning, check drum bushing for scoring or excessive wear. See that clutch flange does not have any appreciable play in drum slots. Check all clutch plates for burning or galling, see that composition plates are free fit on clutch hub and that steel plates are free fit in clutch flange. Check low sun gear for nicked or burred teeth. Inspect relief valve steel ball in clutch piston and make certain that ball is free to move in hole and that orifice to rear of piston is open. If necessary, replace ball as follows:

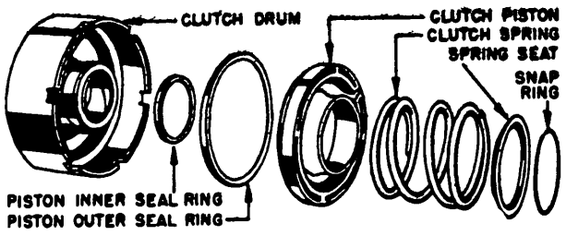
Relief Valve Check Ball Replacement—Remove staking and remove ball. Inspect hole and ball seat and make certain it is free from burrs or nicks, see that new ball seats perfectly. Insert ball and carefully stake around edges of hole so that ball cannot fall out. *CAUTION—Ball must be free to move in hole after staking completed.*

►***REPLACEMENT PARTS CAUTION: See Chevrolet Changes, Cautions, Corrections for clutch production changes and latest type replacement parts.***

Reassembly—1) Install new outer seal ring on clutch piston with lip of seal toward pressure side of piston *(CAUTION—use care not to stretch seal).* Install new inner seal ring on inner hub of clutch drum with lip of seal toward bottom of clutch pocket.

2) Lubricate inner diameter of clutch drum and both seals with transmission oil, carefully install piston in clutch drum using a piece of feeler stock to insure seating of outer seal ring in clutch drum.

3) Install clutch spring and spring seat, use tool J-5133 in an arbor press to compress spring *(CAUTION—Make certain spring does not hang up in snap ring groove which would damage spring seat and groove),* install snap ring. Release pressure, remove tool.



POWERGLIDE CLUTCH PISTON ASSY.

4) Install thrustwasher on clutch hub *(CAUTION—see that four tabs on washer fit into slots in clutch hub),* install clutch hub and thrustwasher on clutch flange with open side up. Install five steel and four composition clutch plates, starting with a steel plate and alternating plates *(NOTE—Steel plates are "waved" and can be installed either side up).* Install clutch drum assembly on clutch flange assembly, then invert entire unit, install clutch flange retainer and flange retainer ring.

5) Check endplay using a feeler gauge inserted between clutch flange drive lug and drive slot in drum. This endplay must not exceed .013". Adjust by installing retainer ring of correct thickness to provide correct endplay. *NOTE*—Retainer ring furnished .055", .064", .073" thick.

Modulator (1954 Models): Disassembly - Carefully lift out hydraulic pistons and place in safe position so they will not be damaged. Take out cover attaching screws **while holding cover down** against spring pressure, then remove cover, diaphragm spring and diaphragm.

Inspection - Wash all parts in cleaning solvent, blow out all passages, then dry with air. Check modulator cover for cracks, check diaphragm for wear or cracks. Check spring for distortion or low tension. Inspect hydraulic pistons for nicks or wear and make sure they operate freely in modulator bores.

Reassembly - Place assembly Tool J-5389 in hydraulic piston bore in modulator, then assemble diaphragm and spring. Install two 10-24 x 3" guide pins (part of Pilot Stud Set J-3387) in modulator body and install cover over guide pins. Install attaching screws and tighten securely. Install hydraulic pistons with crowned end toward modulator lever and diaphragm.

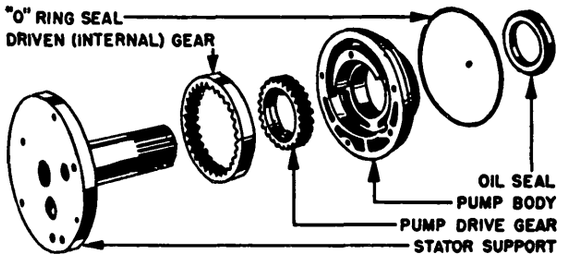
Servo Cover (1954 Models): Disassembly - Remove retaining screw, lubrication valve bi-metal strip and retainer. Remove lubrication bypass valve plug and copper gasket, then remove bypass ball spring and ball. *NOTE - Do not remove modulator control lever.*

Inspection - Wash all parts in cleaning solvent, blow out all passages and dry with air. Inspect cover for cracks, nicks or burrs on mounting face. Check bypass ball spring and valve bi-metal strip for distortion. See that modulator lever operates freely without binding. *CAUTION - Lever must not bind on guide pin.*

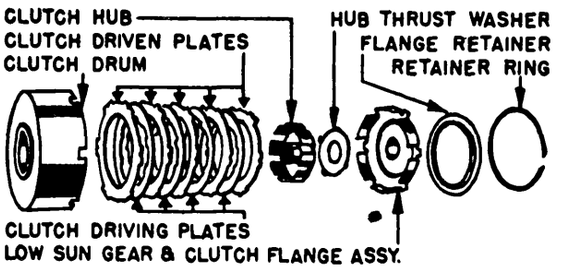
Reassembly - Install valve bypass ball, spring and plug (use new gasket), tighten plug to 17-20 ft. lbs. Install bi-metal strip retainer, bi-metal and retaining screw and tighten screw securely.

Serv Cover (1955-57 Mod ls): Disass mbly - Remove pressure regulator reverse booster valve, valve guide and seal assembly by holding servo cover in a stationary position and pulling on protruding end of booster valve. Remove booster valve, spring and seat.

Inspection—Inspect cover for nicks or cracks. Using a small punch or similar tool, and working through the opening in the by-pass disc seat, exert pressure on the disc to make sure disc and spring are free and that disc is seating properly *(NOTE—*Do not remove disc seat unless there is evidence of damage). Inspect pressure regulator reverse booster valve springs for distortion or damage. Inspect pressure regulator reverse booster valve for galling or scoring and make sure it operates freely in bore in guide. Inspect snap ring for loose fit in groove. Inspect bore in valve guide for galling or scoring and check seal for distortion or damage. Check valve guide bore in servo cover for roughness or burrs and make sure that valve spring and guide spring and seat will seat properly in bottom of bore.



POWERGLIDE FRONT OIL PUMP



POWERGLIDE MULTIPLE DISC CLUTCH

Lubrication By-Pass Valve Assembly Replacement—If during inspection it is evident that the lubrication by-pass valve assembly is not functioning properly, correct as follows: Using a suitable tool remove the nylon by-pass disc seat, then remove disc and spring. Inspect disc for burrs, and spring for distortion. Inspect wall of by-pass valve cavity for roughness, nicks or burrs. Insert by-pass disc in its cavity to make sure its movement is not restricted. Remove disc from cavity. Replace any part that is defective. Install by-pass spring in its cavity in servo cover and install by-pass disc. With servo cover inner surface facing upward, position a new disc seat over its opening in cavity and press into place using a socket of proper size. It should be flush to .005" below inner surface of servo cover. *CAUTION—Under no circumstances should the by-pass disc seat that was removed be re-installed.*

Reassembly—Install pressure regulator reverse booster valve spring seat in bottom of bore in servo cover, then install valve and valve guide springs. Assemble booster valve and valve guide with the double seat of guide toward special snap ring on

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POWERGLIDE (C ntinu d)

valve. Place valve and guide into bore in servo cover, then with thumb and finger, press valve guide and seal into bore until guide is flush with surface of cover or slightly below. *(CAUTION—Do not press booster valve guide too far below surface of servo cover as this would place heavy spring pressure on guide).*

Front Pump: Disassembly—Slide stator support out of pump body, lift out pump gears (CAUTION—use extreme care not to drop or nick gears), remove and discard "O" ring seal.

Inspection—Wash all parts in cleaning solvent and dry with air. Inspect pump gears for wear, nicks, or other damage. Inspect pump body and pump face of stator support for nicks and scoring. Inspect pump body oil seal for excessive wear, damage, or evidence of leaking (see Oil Seal Replacement below). Inspect pump body bushing for galling or scoring, check bushing wear or clearance as directed below. Check pump gear clearances as follows:

1) **Pump Gear Clearances** - Install clean, dry gears in pump body, check clearance with feeler gauge.

Driven Gear Clearance - .0025-.0055" clearance between outer diameter of gear and pump body.

Driving Gear Clearance - .003-.009" clearance between end of gear teeth and crescent.

Gear End Clearance - Place scale across face of pump body and measure clearance between scale and face of gears. This clearance should be .0005-.0015".

2) **Pump Body Bushing Clearance** - Temporarily install pump body on converter pump hub and measure bushing-to-hub clearance with a feeler gauge. This clearance should be .0005-.0015".

3) **Oil Seal Replacement** - Thread Oil Seal Removing Tool J-6793 into oil seal and attach sliding hammer to tool. Drive seal out of housing. Position a new seal, Part No. 3737894 in front pump and drive into place with Tool J-6839

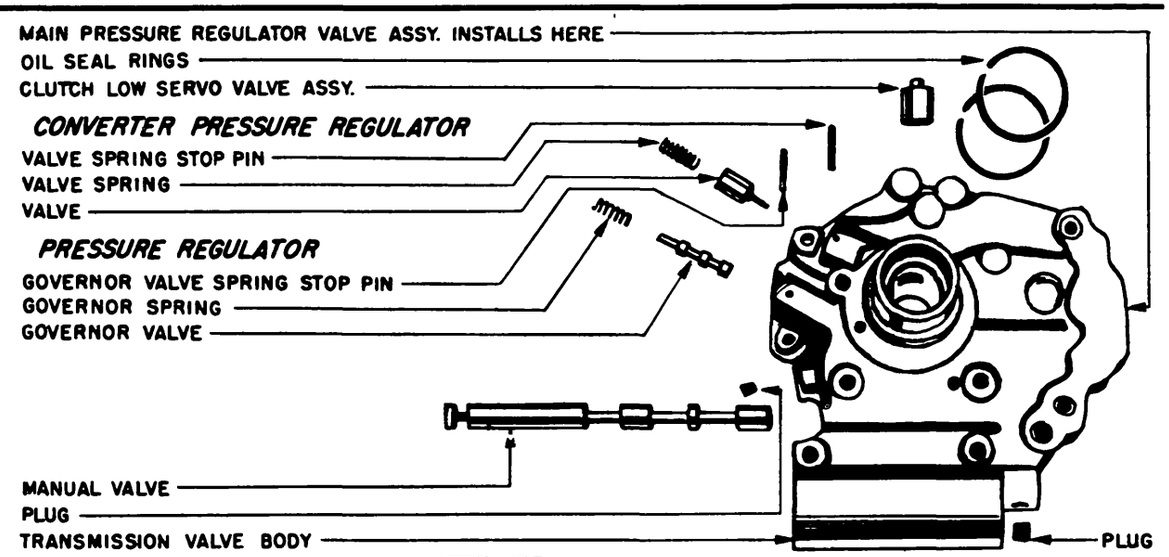
Reassembly—Install new "O" ring seal in pump body, oil pump gears thoroughly with transmission oil and install in pump body, install stator support through pump body and driving gear and line up attaching bolt holes.

Rear Pump: Disassembly—Take out two screws and remove pump body plate, lift out pump gears.

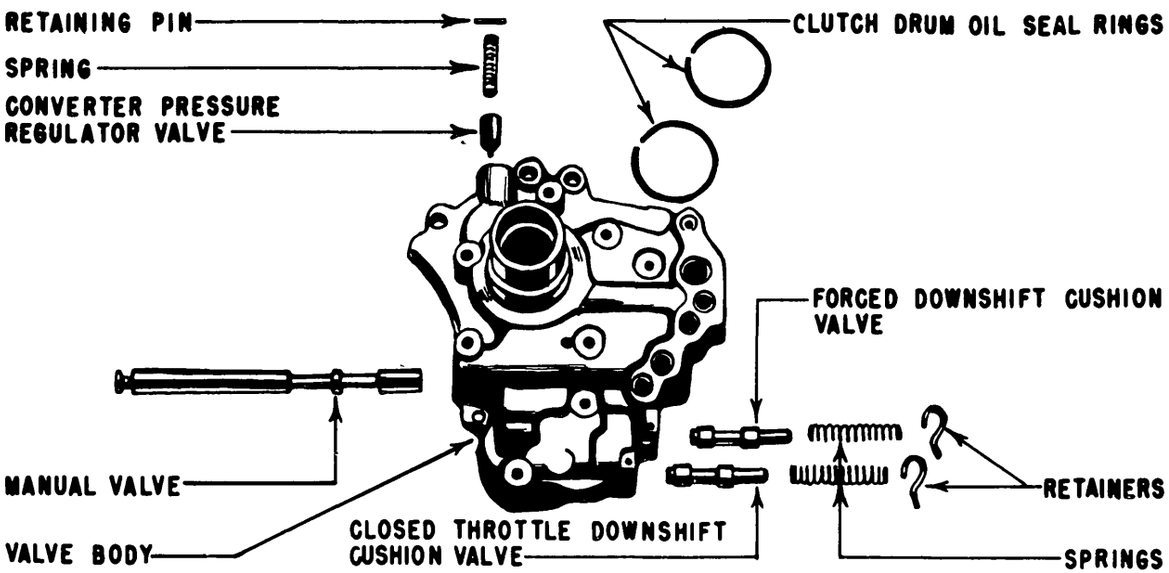
Inspection—Wash all parts in cleaning solvent, blow out all oil delivery holes, dry with air. Inspect pump body for nicks and scoring, inspect gears for wear, nicks, or other damage. Check gear clearances (clearances are same as for front pump—see Pump Gear Clearances above). Inspect rear bearing for roughness but do not remove bearing unless replacement required (see Bearing Installation below).

Pump Bearing Replacement—Remove three retaining capscrews, lockwashers, and lockplate. Drive old bearing out. Press new bearing in place, install lockplate and retaining screws and lockwashers, tighten screws securely.

Reassembly—Oil pump gears thoroughly with transmission oil and install in pump body. Install pump body plate and two slotted attaching screws, tighten screws to 3½-5 ft.lbs. torque.



1954 POWERGLIDE VALVE BODY ASSEMBLY



1955-57 POWERGLIDE CONTROL VALVE ASSEMBLY

Valve Body (1954 Models): Disassembly - Remove clutch low servo valve assembly (located in inner face of valve body), then support valve body on wooden blocks (face down). Use a small punch to drive out pressure regulator governor valve retaining pin from body, then remove pressure regulator governor valve spring and valve. Drive out converter pressure regulator valve retaining pin and remove converter pressure regulator valve spring and valve. Remove two clutch drum oil seal rings from oil delivery sleeve. Rings have interlocking ends.

Reassembly - Install all parts in reverse order of disassembly.

Valve Body (1955-57 Models): *CAUTION - See valve body production and service changes above.*

Disassembly—Using needle nose pliers remove the forced downshift cushion valve retainer from valve body and take cushion valve and spring from bore. Remove closed throttle downshift cushion valve in the same manner. Place valve body assembly, face down, on two wooden blocks of equal thickness and

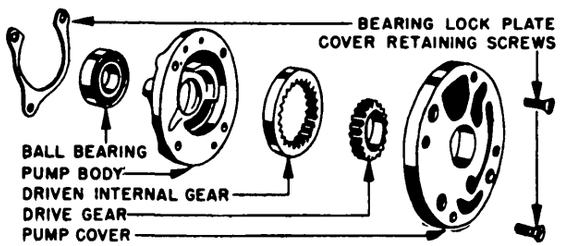
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POWERGLIDE (C ntinued)

with a small pin punch drive out the converter pressure regulator valve retaining pin and remove spring and valve from bore. Remove the two clutch drum oil seal rings from oil delivery sleeve. Remove front and rear oil pump check valve from valve body.

Inspection—Wash all parts in clean solvent and blow dry with air. **Do not use a rag to dry these parts.** Check all springs for distortion or damage, and all valves for nicks, scores, burrs or galling, and for free movement of valves in their respective bores. Check oil seal rings for nicks or burrs and make sure that they are free in the ring grooves. Install rings in clutch drum and make sure that hooked ring ends have clearance.

Assembly—Place valve body, face down, on wood blocks. Assemble converter pressure regulator valve spring in valve and then, as an assembly, install in valve body bore. Install retaining pin. Assemble forced downshift cushion valve spring to valve and then as an assembly, install in valve body *(CAUTION*—Do not confuse the forced downshift cushion valve spring with the closed throttle downshift cushion valve spring. *The forced downshift cushion valve spring is the shorter of the two and is made of heavier gauge wire).* Assemble and install closed throttle downshift cushion valve spring in the same manner. Install front and rear oil pump check valve in valve body making sure it is flush with or below valve body face. Install the two clutch drum oil seal rings in grooves of oil delivery sleeve.



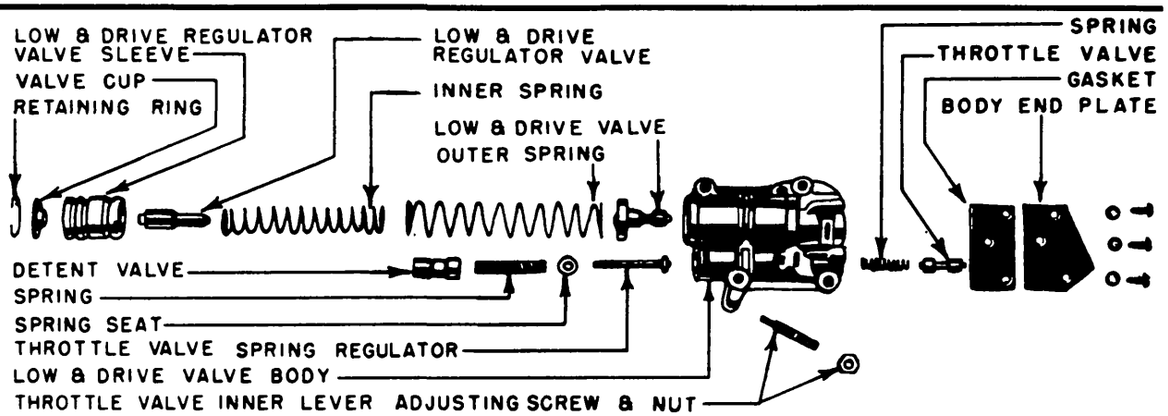
POWERGLIDE REAR OIL PUMP

Low-and-Drive Valve Body: ***CAUTION—Do not disturb Throttle Valve Adjustments (two adjusting screws—one in boss on valve body and one in throttle valve inner lever) unless required by installation of new parts. THROTTLE VALVE MUST BE ADJUSTED IF THESE SETTINGS DISTURBED (see Throttle Valve Inner Lever Adjustment).***

Disassembly—1) Remove valve body-to-side cover attaching bolts and lockwashers. While holding detent valve in place, use soft hammer to carefully tap inner face of side cover until it is free of the locating pins *(CAUTION*—Use care to keep parts from falling out and being lost or damaged while performing this operation).

2) Withdraw detent valve, spring, spring seat, and throttle valve spring regulator assembly from valve body. Remove throttle valve spring and throttle valve.

3) Use Pliers J-5403 to remove special snap ring retaining low-and-drive regulator valve cap, then remove the valve parts as follows: Valve Cap, Sleeve and Valve (as an assembly), Inner and Outer Springs, and Valve.



POWERGLIDE LOW & DRIVE VALVE ASSEMBLY (TYPICAL)

4) Take out two attaching screws and remove clutch exhaust cover plate ("L" shaped strip) from the side of the valve body.

5) Take out three attaching screws and lockwashers in end plate (CAUTION—exert pressure on plate while removing screws to prevent parts flying out), remove plate, remove valve parts as follows: Clutch Exhaust Secondary Control Valve, Spring, Stop (from upper valve bore), Clutch Exhaust Primary Control Valve Spring, Stop, Valve (from center valve bore), and throttle valve and spring (NOTE—some early cars used two springs, one inside the other).

6) Remove throttle valve outer lever assembly, shield, and inner lever assembly (CAUTION—do not disturb adjusting screw in inner lever unless required by parts replacement). Remove throttle valve lever shaft seal.

Inspection—Wash all parts in cleaning solvent, blow out all passages, dry with air. Inspect all valves for nicks, burrs, scoring, or galling. Check all valves for free operation in their respective bores. Inspect all vaive springs for distortion or damage. Inspect throttle lever assembly shaft for wear, scoring, or galling, see that shaft operates freely in side cover and that inner lever is tight on shaft. Inspect detent valve stop in side cover for distortion or damage, install new stop if necessary. Inspect locating pins in valve body and side cover for distortion or damage (one pin should be in side cover, other pin in valve body), replace pins if necessary. Inspect mating surfaces of valve body and side cover and make certain they are free of nicks or burrs.

Reassembly—1) Install low-and-drive valve in body bore (CAUTION—valve must be guided to prevent damage to the bore—use a piece of brake tubing inserted in valve shank bore at rear of valve body, engage nib on valve in end of tubing, move valve into position slowly). Install remaining low-and-drive valve parts in reverse order of disassembly (install regulator valve and cap on valve sleeve first and then install in valve bore as an assembly making certain inner spring is seated on sleeve). Compress assembly in valve bore while installing special snap ring, make certain ring properly seated in groove in valve body.

2) Install clutch exhaust secondary and primary valve assemblies (CAUTION—use care not to confuse these valve parts—primary control valve stop is the longer of the two stops, and primary control valve spring is the shorter of the two springs). Install throttle valve spring and valve in valve body, then install end plate and hold plate in position while tightening end plate attaching screws, tighten these screws to 2½-3½ ft.lbs. torque.

3) Install throttle valve spring regulator assembly in valve body and see that it is seated on throttle valve spring. Install detent valve spring seat, valve spring, and valve (thread pin of the throttle valve spring regulator assembly through the opening in the spring seat and valve).

4) Clamp side cover in a vise (face upward), align locating pin in side cover with hole in valve body, exert pressure on valve body to keep locating pin in the hole and at the same time compress detent valve in valve body bore and rotate valve body counter-clockwise until the locating pin in the valve body enters the locating hole in the side cover (CAUTION—make certain face of detent valve is resting against stop pin in side cover). Install attaching bolts and lockwashers, tighten bolts evenly to 3½-5 ft.lbs. torque.

5) Install throttle valve inner lever assembly in side cover, install new seal on shaft and into counterbore in cover, install shield. Install outer lever assembly on inner lever shaft, install outer lever attaching bolt from underside, tighten nut securely. ***If lever adjustments disturbed during overhaul, readjust throttle valve as follows:***

Throttle Valve Inner Lever Adjustment: Rotate throttle valve inner lever until it just contacts face of the detent valve. Hold lever in this position and turn adjusting screw until it just contacts flat surface of the step in the lever. Back off one complete turn and lock in this position by tightening adjusting screw lock nut securely.

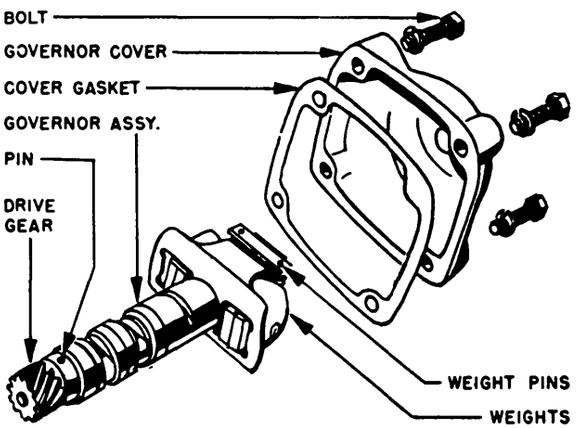
Governor: ***CAUTION—The only parts serviced for replacement are the governor assembly (complete), and driven gear. Governor should not require disassembly except for cleaning and removal of foreign material causing improper operation. See "Governor Driven Gear Replacement" below for disassembly & reassembly.***

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POWERGLIDE (C ntinu d)

Governor Driven Gear Replacement: A unit package containing a governor driven gear and pin, and two governor weight pins is available for service replacement. ***(CAUTION—The 1955 driven gear is not interchangeable with gears on previous models).*** Install new gear and pins in the following manner:

Installation—Cut off ends of governor weight pins and remove weights and governor valve. ***(NOTE***—Carefully protect governor valve to prevent damage. Weights are interchangeable from side to side). Drive out governor gear retainer split pin using a small punch. Support governor on 3/16" plates installed in exhaust slots of governor sleeve, place in arbor press and with a long punch, press gear out of sleeve. Carefully clean governor sleeve of chips and reinstall in arbor press. Position new gear in sleeve and with a suitable socket, press gear into sleeve until nearly seated. Then remove any chips that may have shaved off the gear hub and press gear in until it bottoms on shoulder. ***(CAUTION—It is important that a socket be used to prevent damage to thrust button on end of gear).*** Drill a new hole through sleeve and gear locating it 90° from existing hole, using a No. 24 (.152") drill. Install split pin retainer. Wash governor assembly thoroughly. Install governor valve and make sure that it operates freely. Install governor valve in bore of governor sleeve. Align governor weight pin holes in the governor thrust cap, governor weight assemblies and governor sleeve and install new pins. Crimp both pins to prevent them becoming dislodged. Check governor weight assemblies for free operation on pins.



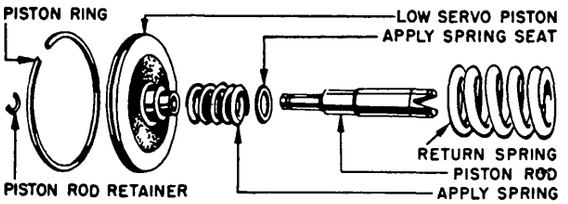
GOVERNOR ASSEMBLY

Low Servo Piston: Disassembly—Place piston assembly in bench press supporting notched end of shaft on wooden block, install tool J-3377 (same tool used for Reverse Servo) on top of piston, compress spring sufficiently to enable rod retainer "C" washer to be removed from end of rod, relieve spring pressure, remove piston, spring, and washer from piston rod. Remove piston ring from piston.

Inspection—Wash all parts in cleaning solvent, dry with air. Inspect all parts for wear or damage. Install piston ring in low piston bore and check ring gap with feeler gauge. Gap should be .005-.010".

Reassembly—Assemble all parts on piston rod, compress spring in bench press and install piston rod retainer making certain that it is properly seated in groove. ***CAUTION—Spring pressure is 150 lbs. and assembly must be handled carefully.***

Reverse Servo Piston: Disassembly—Place assembly in bench press with spring end up, install tool J-3377 on spring retainer, compress spring sufficiently to enable retainer key locks to be removed, relieve spring pressure, lift off retainer, springs, and piston. Remove piston ring from piston.



POWERGLIDE LOW SERVO ASSY.

Inspection—Wash all parts in cleaning solvent, dry with air. Inspect all parts for wear or damage. Install piston ring in reverse piston bore and check ring gap with feeler gauge. Gap should be .005-.010".

Reassembly—Assemble all parts on piston rod, compress spring in bench press and install retainer locks, make certain locks seated properly in rod groove.

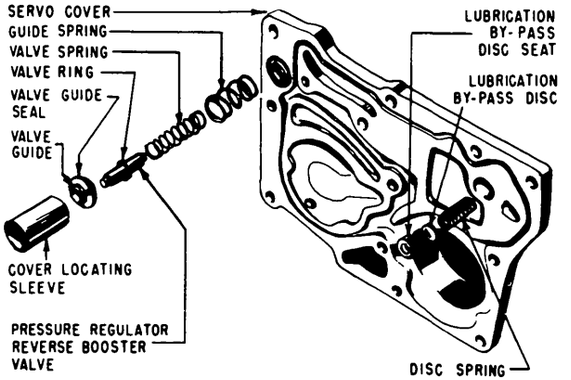
Planet Carrier Assembly: ***Should not be disassembled unless inspection below indicates overhaul required. See Planet Carrier Overhaul below.***

►*PLANET REVERSE RING GEAR AND DRUM ASSEMBLY PRODUCTION CHANGE (to accommodate a new .020" steel thrust washer):* Beginning with transmission serial number C-128-D, a new steel thrust washer is used between planet carrier and reverse gear and drum to prevent galling of thrust surfaces. A service package, Part No. 3721564, consisting of a Planet Reverse Ring & Drum Assembly, Part No. 3720472, and an Output Shaft Thrust Washer, Part No. 3720474, is available for service replacement on 1953-54 & Early 1955 cars.

Inspection—Wash in cleaning solvent, blow out all passages, dry with air. Inspect all gear teeth for nicks, scoring, or other damage. Check end clearance of planetary pinions with feeler gauge inserted between ends of pinion and thrustwasher. This clearance should be .006-.030". Check reverse sun gear rear thrustwasher for wear or damage. Inspect drum bushing for wear, scoring, or damage; inspect outer diameter of drum for scoring or burning. Check output shaft bearing surfaces for wear, nicks, or scoring. Check input pilot bushing for wear or scoring.

Planet Carrier Overhaul: ***If inspection (above) indicates that parts require replacement, proceed as follows:***

Disassembly—Place assembly in holding fixture or clamp in a vise with front end upward. Mark each pinion shaft and also mark planet carrier (use prick punch or other means) so that shafts can be



POWERGLIDE SERVO COVER ASSEMBLY

re-installed in same position ***(CAUTION***—pinion shafts are selective fit in carrier and location must not be changed). Then proceed as follows:

1) Remove pinion shaft lockplate screws, rotate plate counter-clockwise until it is free and remove the plate.

2) Starting with one short planet pinion, use a soft steel drift to drive on lower end of pinion shaft until shaft raised above the press-fit area of the output shaft flange, then insert tool J-4599 (one piece only —second piece of tool set used for reassembly) into short planet pinion from lower end and push shaft out until tool is centered in the pinion and shaft is removed. Remove short planet pinion from assembly. Remove tool from pinion, remove needle bearings and needle bearing spacer ***(CAUTION***—use care not to lose any of the needle bearings).

3) Remove **adjacent** long planet pinion (paired to the just-removed short pinion by using same thrustwashers) by repeating procedure in step (2) above. Then remove the pinion upper and lower thrustwashers.

4) Remove all remaining planet pinions **in pairs** (short pinion first, followed by long pinion) by following procedures in steps (2) and (3) above.

5) Remove reverse sun gear and sun gear thrustwasher.

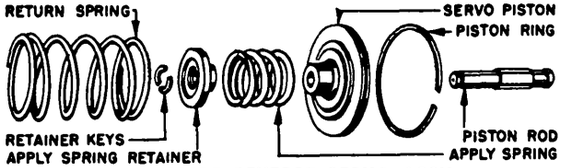
Inspection—Wash all parts in cleaning solvent and dry with air. Inspect all pinion gears and reverse sun gear for nicked or otherwise damaged teeth, inspect all thrustwashers for wear, nicks, or scores. Inspect needle bearings for wear and replace **all** needle bearings if worn excessively.

Reassembly—***CAUTION—Pinion shafts must be reinstalled in accordance with marks made before disassembly (shaft is selective fit in particular hole in carrier).*** Assemble and install parts as follows:
1) Install tool J-4599 in one long planet pinion, assemble needle bearing spacer and needle bearings in pinion (20 at each end) using cup grease to hold needle bearings in position.

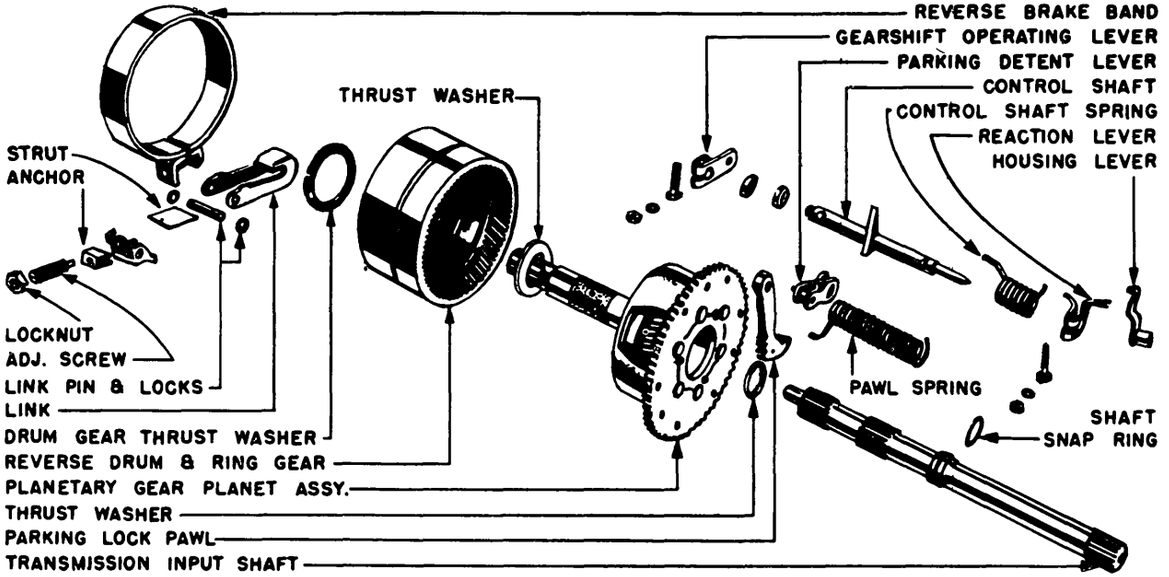
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POWERGLIDE (C ntinu d)

2) Install pinion assembly in planet carrier with tool centered in assembly and with thrustwasher at each end of pinion. *NOTE*—Long pinions are located opposite closed portion of carrier, short pinions are located opposite carrier openings. Feed the second part of tool J-4599 in from the top of the planet carrier *(CAUTION*—make certain tool picks up thrustwasher) and push first part of tool down and out at the lower end *(CAUTION*—make certain this tool picks up thrustwasher as it is pushed down). Lubricate correct pinion shaft (see Reassembly Caution above) and install it from top pushing the assembling tools out ahead of it. Turn shaft so that slot in upper end faces toward center of assembly, tap shaft down with a brass or soft steel drift until lower end is flush with lower face of carrier.



POWERGLIDE REVERSE SERVO ASSY.



POWERGLIDE PLANET CARRIER, REVERSE BAND, & PARKING LOCK

3) Assemble and install **adjacent** short planet pinion (paired with just-installed long planet pinion by using same thrustwashers) by repeating procedure in steps (1) and (2) above.
4) Install reverse sun gear thrustwasher and reverse sun gear.
5) Install all remaining planet pinions in **pairs** (long pinion first, followed by short pinion) by following the procedure in steps (1), (2), (3) above.
6) Check end clearance of planet pinions using feeler gauge inserted between end of pinion and thrustwasher. This clearance should be .006-.030".
7) Install pinion shaft lock plate with extended portions in line with pinion shaft slots, rotate plate clockwise until plate locks all pinion shafts and attaching screw holes line up. Install lock plate attaching screws and tighten to 2½-3 ft.lbs.

Input Shaft: Inspect shaft splines for wear, nicks, or other damage. Check spline fit in clutch hub, reverse sun gear, and converter hub. Inspect oil seal ring for wear and free fit in groove, remove ring (compress one end, push other end outward to free locked ends) and install ring in valve body bore to make certain hooked ends have clearance, then reinstall ring on shaft. Check snap ring in groove at forward end of shaft (this ring first used in 1953 transmissions and prevents shaft floating forward), replace if worn or damaged using snap ring pliers KMO-410.

Transmission Cas & Rear Bushing: Check case for cracks, inspect rear bushing for wear or damage and replace if necessary.

Bushing Replacement—Place transmission case in an arbor press with rear end up. Using a cape chisel, cut bushing and remove from bore in case. Install rear bearing in its bore in rear oil pump assembly and install rear oil pump in case to serve as a pilot when installing new bushing. Place transmission case in an arbor press with front end up. Place new bushing on bushing installer J-4276, with the square end of bushing against shoulder of installer. Insert in case, entering pilot of tool into rear bearing, and press bushing into place. Bushing is precision type and does not require reaming.

Low & Reverse Brake Bands: Inspect bands for wear, cracks, and scored or burnt lining. Lining is bonded to band. Inspect linkage for wear.

REASSEMBLY

AFTER ALL MAJOR UNITS REASSEMBLED (See Overhaul above), install units as directed below using ALL NEW GASKETS AND SEALS and tightening all parts evenly to SPECIFIED TORQUES.

CONVERTER HOUSING ASSEMBLY: *Install units:*

Valve Body: First install suction screen in oil sump *(CAUTION*—screen must be thoroughly cleaned), see that sealing ring is in place. Install two ¼—20 x 3½" guide pins (part of Pilot Stud Set J-3387) in two valve body attaching bolt holes, place new valve body gasket in position over guide pins, install valve body assembly. Install all attaching bolts *(CAUTION*—lower left bolt over accumulator bore is special self-locking type and must be installed in this position), tighten all bolts evenly in a criss-cross pattern to 7½-10 ft.lbs. torque. **Check manual valve and pressure regulator valve for free operation after all bolts tightened.**

Front Pump: Align holes in stator support with mounting holes in pump body, install two ¼—20 x 3½" guide pins (part of Pilot Stud Set J-3387) in pump mounting holes, use Driver J-4263-5 to install pump in converter housing *(CAUTION*—line up suction and oil delivery holes on left side of pump). Install five self-locking bolts through valve body and into pump, tighten all bolts evenly to 7½-10 ft.lbs. torque. *CAUTION—Check pressure regulator valve for free operation after bolts tightened and make certain that pump operates freely.*

Low-and-Drive Valve Body: Install two 5/16—18 x 3" guide pins (part of Pilot Stud Set J-3387) in two valve body mounting bolt holes on left side of converter housing, place new gasket in position over guide pins, install valve body assembly. Install attaching bolts and lockwashers, tighten bolts evenly to 12½-15 ft.lbs. torque.

TRANSMISSION CASE ASSEMBLY: Install units:

Rear Pump: Install two 5/16—18 x 3" guide pins (part of Pilot Stud Set J-3387) in pump attaching bolt holes, place new gasket in position over guide pins, install pump *(CAUTION*—align oil suction and delivery holes), tighten pump mounting bolts evenly to 12½-15 ft.lbs. torque.

Lubrication Pressure Relief Valve: Make certain that valve is clean and openings free from obstructions, see that valve disc and spring operate freely. Install relief valve in mounting hole in rear of transmission case and tighten securely.

Reverse Servo Piston, Band, & Drum: Compress piston ring with Ring Compressor J-3365, install servo piston in case with notch in shaft toward front of case. Install reverse brake band and strut assembly with thin end of band away from piston, thread adjusting screw in until it indexes with hole in anchor. Install bronze thrustwasher on reverse drum hub, install drum in case and into brake band. ***DO NOT adjust band at this point.***

Planet Carrier Assembly (1954 Models): Rotate rear pump so that drive lug is at top of pump, then install planet carrier assembly in case aligning slot on carrier shaft with pump drive gear lug *(CAUTION - Shaft must protrud out of rear bearing a minimum f 7/8" indicating proper s ating of drive lug in carri r shaft slot).*

CONTINUED ON NEXT PA E

POWERGLIDE (C ntinued)

Install Tool J-938 on rear of transmission case (thread shaft tool into rear end of output shaft and bolt tool yoke on rear face of case), then turn tool handle to seat output shaft in rear bearing and remove tool. Install universal joint front yoke, washer, lockwasher and bolt. Tighten bolt to 25-30 ft. lbs.

Planet Carrier Assembly (1955-57 Models): Rotate rear pump drive slot to top of pump, then fill drive pin hole in output shaft with cup grease and install drive pin. Install planet carrier assembly in drum positioning arrow on face of external gear of planet carrier at top center. *NOTE - On Late 1955-57 transmissions, a steel thrust washer is used between planet carrier and reverse ring gear and drum. See "Planet Reverse Ring Gear and Drum Assembly Production Change" above.* Install rear bearing locating snap ring in its groove in output shaft and install rear bearing using Tool J-5814. *NOTE - Groove in outer diameter of rear bearing should be toward rear of transmission.* Install rear bearing retainer in groove in outer diameter of rear bearing and attach to rear oil pump with screws and lockwashers. Tighten to 7-8½ ft. lbs. Install rear bearing rear locating snap ring in its groove in output shaft. Using Tool J-5814, install speedometer gear on output shaft. Center raised ground surface of output shaft so that it will mesh properly with speedometer driven gear. Install new "O" ring seal on speedometer driven gear fitting, then assemble driven gear in fitting and install as an assembly in bore in extension housing. Install retainer, attaching screws and lockwashers and tighten to 3½-5 ft. lbs.

Reverse Band Adjustment: Adjust band at this point. *See BAND ADJUSTMENT.*

Transmission Endplay Check & Adjustment: After planet carrier assembly installed in case, the correct thickness of the low sun gear-to-reverse sun gear thrustwasher must be determined for the correct transmission endplay of .007-.035" as follows:

►*1957 POWERGLIDE LOW SUN GEAR THRUST WASHER PRODUCTION CHANGE:* The "roller type" thrust washer (.078" thick) used in production at this location has been changed to a bronze thrust washer (.095" thick). When servicing all 1957 Powerglide clutch assemblies installed in 1953-57 cars where either the low sun gear thrust washer ("roller type" or "bronze type"), or the clutch drum thrust washer requires replacement, it will be necessary to replace the washer at both of these locations. The service replacement clutch drum thrust washer (untanged) Part No. 3745897 is .061" thick. Replacement low sun gear thrust washers are furnished in the following sizes for selective fitting: Part No. 3719296 (.095"); 3719297 (.120"); 3719298 (.145"). *See "Transmission Endplay Check & Adjustment Change" below.*

►*1957 POWERGLIDE TRANSMISSION ENDPLAY CHECK & ADJUSTMENT CHANGE:* The procedure for selecting and installing the service thrust washers in all transmissions using the 1957 clutch will be as indicated below for 1955-57 transmissions except that the low sun gear-to-reverse gear clearance will be .025-.050". *See "Thrust Washer Production Change" above.*

(1) Use Tool J-4260 to measure distance from face of transmission case flange to face of reverse sun gear in planetary unit (place tool bar against case flange, extend tool stem until it contacts gear face), **tighten thumbscrew to retain this tool setting.**

(2) Install bronze thrustwasher and clutch assembly temporarily on oil delivery sleeve.

(3) Without disturbing tool setting obtained in step 1 (above), place .120" steel washer over tool pilot (short plug on tool bar), install tool over clutch assembly with tool pilot entered in low sun gear and tool stem against gasket on rear face of housing. Use feeler gauge to measure clearance between face of low sun gear and steel washer on tool pilot. If clearance not within .007-.035", repeat this procedure with .095" or .145" steel washer on tool pilot.

(4) When correct clearance of .007-.035" secured in step 3 (above), note thickness of steel washer used on tool and **select bronze thrustwasher of same thickness** for installation on input shaft splines at final installation (below). Remove clutch assembly and thrustwasher from oil delivery tube.

►**Thrustwasher Note**—This bronze thrustwasher furnished in three thicknesses as follows: Part No. 3694467—.095", No. 3694468—.120", No. 3694469—.145".

Parking Lock Mechanism: Install parking lock lever shaft assembly in case, install seal over end of parking lock lever shaft and into counterbore in case **with lip seal toward inside of case.** Install flat washer and parking lock lever on end of shaft, push lever on shaft for clearance of .000-.010" between lever and washer, tighten clampscrew to 8-12 ft.lbs. Install parking lock pawl over pawl support rod, install parking lock pawl spring, wind up pawl spring (tool J-3383) until spring catches on case.

Input Shaft & Clutch Assembly: Install input shaft in clutch unit. Install bronze thrustwasher **selected in "Transmission Endplay Check & Adjustment" (above)** on reverse sun gear splines of input shaft *(CAUTION*—flat side of washer must be toward reverse sun gear). Install assembly in case indexing input shaft pilot with pilot in output shaft and mesh low sun gear with short planetary pinions.

Low Servo Piston & Band Assembly: Install release spring on servo piston rod, use Ring Compressor J-3365 to compress piston ring and install assembly in transmission case. Install low brake band over the drum. Install apply strut guide spring over piston rod, engage apply strut in piston rod slot and engage opposite end of strut in the band. Engage anchor strut assembly in band groove and locate opposite end of anchor over the adjusting screw. ***DO NOT adjust the band at this point.***

Governor: Install governor assembly in bore in transmission case *(CAUTION*—Governor must be allowed to rotate counter-clockwise as gear teeth mesh and care must be taken not to damage gear teeth). Install two 5/16—18 x 3" guide pins (part of Pilot Stud Set J-3387) in governor cover mounting holes, place new gasket in position over guide pins, install governor cover, attaching bolts and lockwashers. Tighten cover bolts evenly to 6½-8½ ft.lbs. torque.

Extension Housing (1955-57 Mod ls): Position new "O" ring seal on transmission extension, then carefully install extension on transmission case. Tighten screws to 12-15 ft. lbs., then install oil seal with Tool J-5154.

TRANSMISSION & CONVERTER HOUSING ASSEMBLY:

1) Install manual valve in valve body and manual valve inner lever in converter housing. Index lever pin with pick-up slot in valve, set manual valve so that it protrudes 1 11/16" out from face of valve body. This places valve in Reverse position.

2) Install new valve body-to-transmission case gasket.

►*CAUTION:* Two different valve body-to-case gaskets are used with the early and late type valve bodies. THESE GASKETS ARE NOT INTERCHANGEABLE. *See "Control Valve & Gasket Production Change and Service Replacement Note" above for control valve identification and gasket differences.*

3) Place transmission manual valve lever in top detent position *(NOTE*—this is Reverse position and will align reaction lever so that it will index with manual drive inner lever in converter housing).

4) Place clutch drum thrustwaher in position on oil delivery sleeve.

5) Install two ⅜—16 x 3¾" guide pins (part of Pilot Stud Set J-3387) in two opposite converter housing mounting bolt holes, carefully bring transmission case and converter housing together making certain that reaction lever indexes properly with manual valve inner lever. Install all case-to-housing bolts and tighten evenly to 25-30 ft.lbs. Install special self-locking bolt through front face of converter housing and tighten this bolt to 25-30 ft.lbs.

6) Install two 5/16—18 x 3" guide pins (part of Pilot Stud Set J-3387) in two servo cover attaching bolt holes, place new gasket in position over guide pins. Install pressure regulator valve and inner and outer valve springs (see Note below) through servo and into case, install reverse servo return spring. Install servo cover over guide pins *(CAUTION*—see that pressure regulator springs and reverse servo spring seat properly in pockets in cover), maintain pressure on cover while installing and tightening cover bolts, tighten bolts evenly to 12½-15 ft.lbs.

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POWERGLIDE (C ntinu d)

7) Adjust Low Servo Band. *See Band Adjustment.*

►*NOTE: On 1954 models, install modulator cov r and a new gask t and tight n attaching bolts to 12½-15 ft. lbs.*

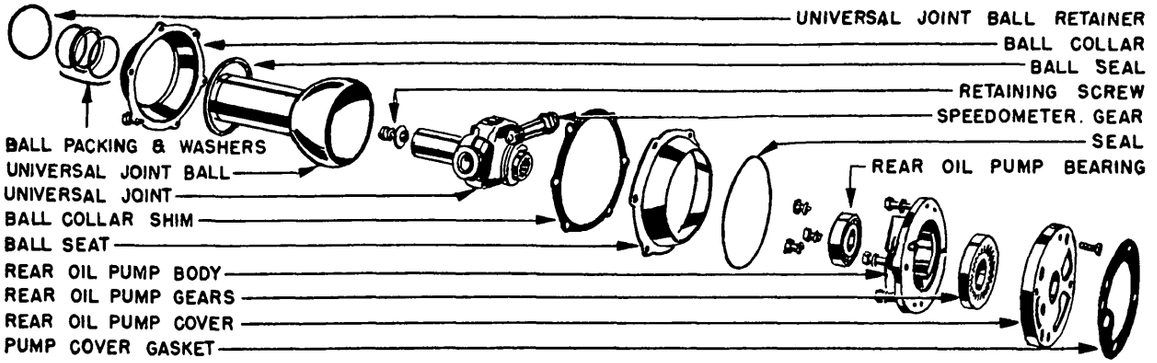
8) Install converter assembly in converter housing making certain that front pump drive lugs aligned with slots in converter pump hub. Install converter holding tool J-5384 using one housing bolt to hold tool (tool will prevent converter falling out while being installed on engine).

9) Check and adjust position of throttle valve outer ever. *See Throttle Linkage Adjustment.*

INSTALLATION IN CAR

1954 MODELS

1) Lubricate flywheel pilot with Lubriplate.
2) Raise transmission in place under car while lifting up on rear end, use pry bar if necessary to gain clearance at servo cover. ***Use extreme care not to bump or damage flywheel pilot.***
3) Turn torque converter until "X" mark on turbine cover is lined up with "X" mark on flywheel as nearly as possible (to nearest bolt hole). ***CAUTION—Alignment of marks is necessary to maintain balance.***
4) Remove converter holding tool. ***CAUTION—After tool removed, use extreme care not to allow converter to move forward which would disengage pump drive lugs from converter hub slots.***
5) Using guide pin installed in converter cover (pin can be made up by cutting head off a 5/16" or 3/8" bolt), carefully enter guide pin in flywheel hole, raise or lower transmission to align flywheel pilot, enter pilot in flywheel. ***CAUTION—DO NOT force transmission in place. guide transmission by hand until pilot enters and housings come together.***
6) Install transmission housing-to-bell housing bolts and tighten securely.
7) Remove guide pin and install flywheel-to-turbine bolts using 5/16"-24 or ⅜"-24 bolts as required. *See Flywheel & Converter Caution above.*
8) Install universal ball seat on rear of transmission case using a new "O" ring seal, connect universal joint, slide universal ball and collar forward on propeller shaft and fasten to case **using shim thickness determined in "Universal Joint Ball Adjustment" above** (under CHEVROLET UNIVERSAL JOINT BALL ASSEMBLY).



REAR OIL PUMP, UNIVERSAL JOINT, & JOINT BALL (CHEVROLET)

9) Connect linkage and other attachments. Fill transmission with lubricant (see LUBRICATION), adjust linkage (see LINKAGE ADJUSTMENT).

1955-57 MODELS

TRANSMISSION ASSEMBLY INSTALLATION: 1) Install assembly in handling fixture on hydraulic jack and roll into position under car. Raise transmission until converter housing is in approximate alignment with flywheel housing.

2) Remove converter assembly holding tool from converter housing. Then carefully align "X" mark on converter cover with "X" mark on flywheel.

►***CAUTION—After removing converter holding tool be careful that converter does not move forward causing disengagement of the pump hub drive slots from lugs of the front pump drive gear.***

3) Install one 5/16"—24 guide pin in converter cover. Rotate converter assembly until guide pin is in alignment with opening in flywheel housing. Maneuver transmission assembly until converter housing-to-flywheel housing bolt holes are in alignment and the flywheel pilot enters flywheel.

4) Install all but the uppermost three converter housing-to-flywheel housing attaching bolts. Through the opening in flywheel housing, remove guide pin from converter cover and install three flywheel-to-converter bolts, rotating flywheel as necessary. Tighten bolts to 25-30 ft. lbs.

5) Install filler tube and measuring dipstick. Install flywheel inspection hole cover. Install rear engine mountings (both sides). Remove engine support bar or cradle. Disconnect hydraulic jack handling fixture from transmission and remove jack.

6) On V8 cars, install starting motor. On all models, connect oil cooler lines and engage them in retaining clip on right side cover. Connect throttle valve control rod to throttle valve control outer lever and manual shift control rod (long rod) to bellcrank. On V8 cars, install breather pipe in cylinder block.

7) Engage internal splines of front yoke of front universal joint with external splines of transmission output shaft. Then slide front universal joint and propeller shaft as an assembly forward enough to connect rear universal joint.

8) Connect speedometer cable to transmission. On V8 cars, connect exhaust pipe to exhaust crossover pipe. On 6 Cyl. cars, connect exhaust pipe to exhaust manifold. Connect muffler to muffler support.

9) Lower car to floor and install the three remaining upper converter housing-to-flywheel housing attaching bolts through opening in toe-pan. Restore floor mat to its original position. Install spark plugs on all models. On V8 cars, connect battery ground strap and wires to starter solenoid.

10) Fill transmission with Automatic Transmission Fluid Type A. *See "Lubrication" above.*

1958-60 CHEVROLET POWERGLIDE

Ch vr let Pass. Cars (1958-60)
Chevrolet Corvette (1958-60)
Chevrolet Trucks, Series C10 & C20 (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR (Pushing recommended rather than towing):* Place selector lever in Neutral "N" position. When car reaches speed of approximately 16 MPH. (20 MPH if road wet or icy with resultant poor traction), move selector lever to Low "L" position to crank engine. After engine is started, move lever to "N" for engine warm-up.

►*1958 LOW SERVO PISTON ASSEMBLY PRODUCTION CHANGE:* Starting with Transmission Serial No. C-1209-D, a new type low servo piston entered production. The later type piston assembly has separate piston head and shaft to permit incorporation of a "captive" cushion spring beneath piston head. Early type piston has the shaft pressed into piston head and a cushion spring is not used. With servo body cover removed, later type piston assembly can be identified by a pin retaining piston head to shaft which will be visible on piston head. Adjustment of low band is different for the two types of pistons. *See "Low Band Adjustment" below.*

►*1958 & LATER LOW BAND ADJUSTMENT CAUTION:* Adjustment of low band is different on later cars having the new type low servo piston assembly (see above). *For adjustment procedure, see "Band Adjustment" below.*

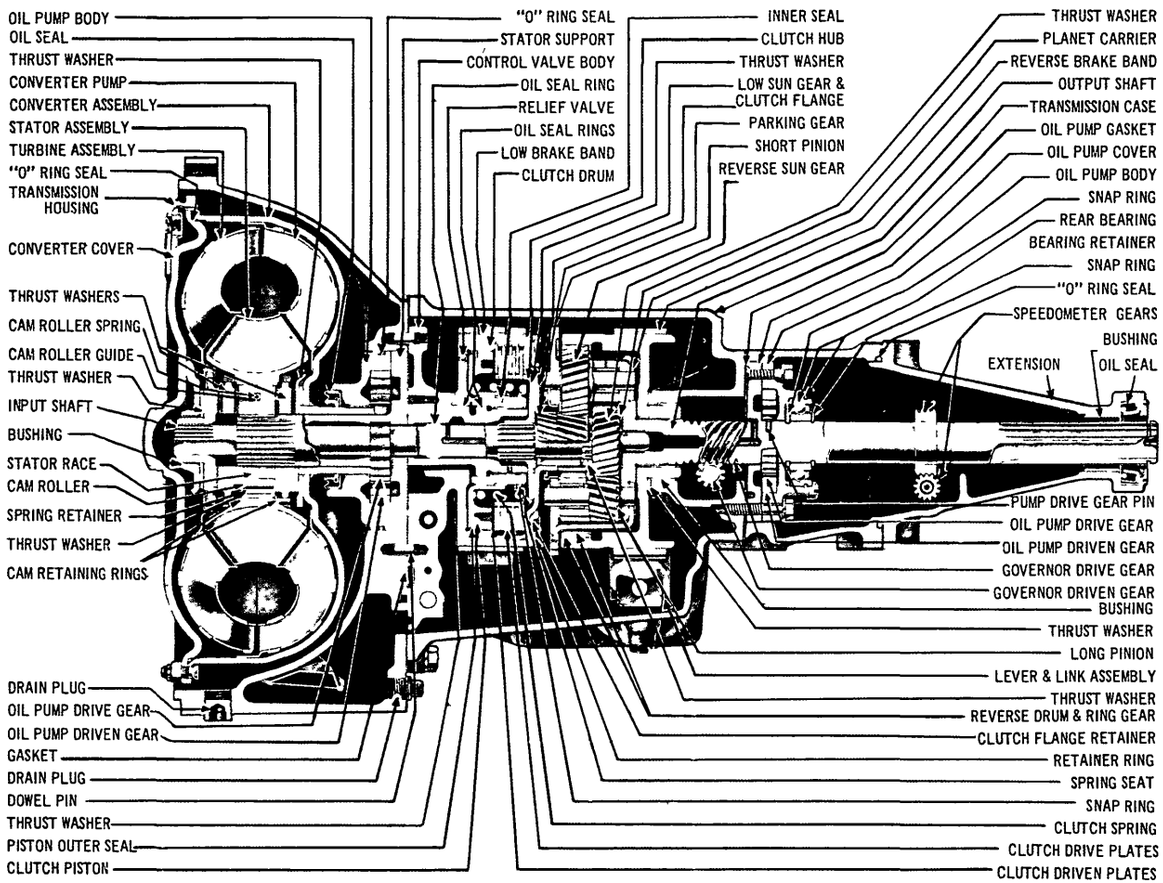
►*1958 REVERSE BAND LINKAGE PRODUCTION CHANGE:* Beginning with Transmission Serial No. C-108D, new Reverse Band Strut, Link & Pin Unit, Part No. 3756726 entered production. When a transmission built prior to above serial number is disassembled for any reason, the later type link, pin, and strut assembly should be installed.

►*1958 & EARLIER REVERSE BAND LINK OR PIN BREAKAGE CAUTION:* If breakage occurred with original reverse band pin or link, the transmission reverse oil pressure should be checked. Reverse servo apply pressure at 1000 RPM should be 240-275 lbs. (V8), 167-191 lbs. (6 Cyl.). If pressure is found to be excessively high, reverse booster valve assembly and pressure regulator valve should be checked for proper operation.

►*1958 V8 MODEL PRESSURE REGULATOR VALVE PRODUCTION CHANGE:* Beginning with Transmission Serial No. C-630D, a new pressure regulator valve which includes a dampener spring entered production. Installation procedures for later type valve are same as for previous type.

►*1958 PUMP-TO-CASE ATTACHING BOLT PRODUCTION CHANGE:* New "hollow" type bolt is used on later cars to replace the top rear pump-to-case attaching bolt. This bolt provides a vent which allows a more accurate dipstick reading when oil is added to transmission.

►*1960 TORQUE CONVERTER NOTE: Both "W ld d" and "Bolt d" typ convert rs are used in production. "W ld d" typ conv rters cannot be disass mbl d for ov rhaul.*



POWERGLIDE TRANSMISSION SECTIONAL VIEW

DESCRIPTION

Powerglide transmission is a 2-speed (forward) automatic type consisting of a torque converter and a planetary transmission unit providing automatic operation in "D" (Drive) range. Car starts in 1st speed and upshifts to 2nd, with selector lever in "D" (Drive). Low, Reverse, Neutral, and Park ranges are manually selected and controlled. This transmission is similar in design to previous models except that a vacuum modulator valve is included in control valve assembly and is operative only when transmission is in "D" (Drive) range. 1959 & 60 transmissions have a two-piece design low sun gear thrust washer; damper valve in pressure regulator valve assembly; vacuum modulation in "R" (Reverse) range; and reversible type clutch driven plates (not marked as with former plates).

LUBRICATION

Check oil every 1000 miles. ***NOTE - It is not necessary t chang il very 25,000 mil s as specified for previous models.*** **Engine and transmission must be at normal operating temperature, and selector lever in "N" (Neutral). DO NOT OVERFILL.**

►*CONVERTER DRAIN NOTE:* There is no drain plug on converter unit. Oil trapped in converter need only be replaced when transmission disassembled for overhaul.

Recommended Fluid - Use Automatic Transmission Fluid Type "A" (Suffix "A") as furnished in containers bearing AQ-ATF-A number. *NOTE - If necessary, Automatic Transmission Fluid Typ "A" can b used.* **Capacity** - 3½ qts. (1958-59); 4½ qts. (1960 Pass. Cars & Trucks) refill after transmission case drained. 10½ qts. (1958-60 Pass. Cars); 10 qts. (1960 Trucks) after overhaul with transmission and torque converter drained. *CAUTION - Above sp cifications ar approximate. Final fluid level must be checked with dipstick.*

►***OIL FILLER NOTE*—Use of Oil Filler Tube & Funnel No. J-4264 recommended to facilitate filling. This assembly is vented (transmission not vented and may blow-back causing oil spillage if vented filler not used).**

►***LOW OIL LEVEL CAUTION—If oil level in transmission found consistently low, check for internal and external oil leaks. See "OIL LEAKAGE OR HIGH OIL CONSUMPTION" in TROUBLE SHOOTING.***

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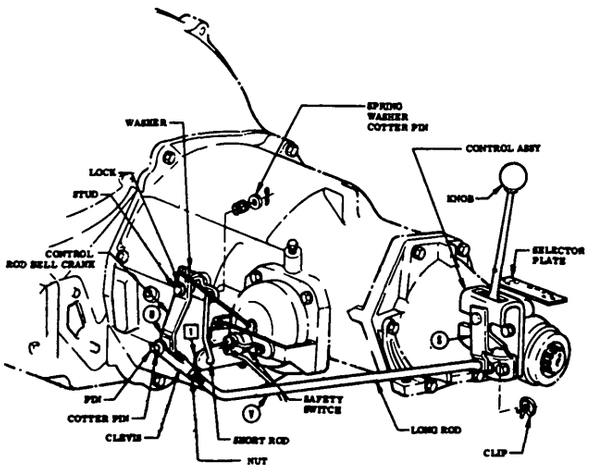
POWERGLIDE (C ntinued)

Draining & R filling: *NOTE - Draining & refilling is n t r commend d xcept at time of overhaul.* With transmission at normal operating temperature, remove transmission drain plug. *NOTE - It is not necessary to drain converter.* To refill transmission, install drain plug and install recommended amount of fluid (see "Capacity" above). Operate engine with transmission in "N" (Neutral) until oil warms up, then add sufficient oil to raise level on dipstick to FULL mark. *DO NOT OVERFILL.* If converter was emptied, follow procedure above and add necessary amount of additional fluid.

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR n car m del pages.*

Manual C ntr l Linkage (Except Corvette): Place gear selector lever in "D" (Drive) position, then disconnect swivel on shift control rod at shift control lever on steering column mast jacket in engine compartment. Position shift lever on transmission in "D" (Drive) position. Adjust position of swivel on shift control rod for free entry into shift lever on steering column mast jacket, then install nut and tighten. Check transmission shifts in all ranges.



C RVETTE MANUAL CONTROL LINKAGE

Manual C ntrol Linkage (Corvette): Place control rod bellcrank (U) in "Park" position, then set control shaft lever (S) in "Park" position. With both bellcrank and lever held in "Park" position, assemble control rod (V) to lever (S), then adjust clevis on rod (V) for easy entry into lever (U).

Neutral Safety Switch (Except Corvette): Located on steering column mast jacket under instrument panel. Place selector lever in "N" (Neutral) position and loosen two screws securing neutral safety switch retainer. While holding ignition switch in "Start", adjust position of neutral switch until engine starts cranking. Hold switch in this position and tighten retaining screws. Check adjustment by testing for cranking with selector lever in "N" and in "P" positions.

N utral Safety Switch (Corvett): Located on left side of transmission case and linked to transmission manual control lever. Adjust switch so engine will start only with transmission selector lever in "N" or "P"

BAND ADJUSTMENT

►*BAND ADJUSTING NOTE: Band adjustment not ordinarily required in service (bands adjusted when reassembling transmission). Reverse band adjustment requires removal of Servo Cover Assembly (see Disassembly data).*

►*1958 LOW SERVO BAND ADJUSTING CAUTION:* Because of two different low servo pistons used during production *(see "1958 Low Servo Piston Assembly Production Change" above),* it will be necessary to identify the piston used to obtain correct adjustment. With servo cover removed, identification of piston can be made by the pin which retains head on shaft (later cushion spring type); or piston head without pin (early type).

Low Servo Band: Adjusting screw located on left side of transmission case under adjusting screw cover. To adjust band, remove adjusting screw cover and tighten low servo adjusting screw to 5-7 ft. lbs., using a torque wrench, Tool J-5853 or equivalent. *NOTE - Rotate input and output shafts simultaneously to properly center low band on clutch drum.* Back adjusting screw off **4 turns** (except early 1958 models with low servo piston having shaft pressed into head and no cushion spring see *"1958 Low Servo Piston Assembly Production Change" above).* **3 turns** (Early 1958 Models). Tighten locknut securely and install adjusting screw cover. *CAUTION - The amount the adjusting screw should be backed off after tightening to 5-7 ft. lbs. is not an approximate figure; it MUST be exactly as specified.*

Reverse Servo Band: *CAUTION - Band adjustment must be verified by actual measurement of reverse piston travel.* Rotate reverse drum to center it in reverse band, then using Tool J-4277, tighten adjusting screw to 5-7 ft. lbs. **Back screw off 2½ turns.** Check for proper adjustment as follows: Measure distance from face of reverse piston outward to the side of case with piston in its retracted position (inboard) with a small scale, then record this dimension. Pull reverse piston outward to its full travel by grasping its hub with a pair of pliers, then again measure distance from face of piston to outboard side of case. The difference between the two measurements should be 5/32-7/32" (1958); 3/32-5/32" (1959-60). If travel is too great, tighten adjusting screw. If too little, loosen adjusting screw. Recheck piston travel after adjustment. Tighten adjusting screw locknut to 20-25 ft. lbs.

TROUBLE SHOOTING

CLOSE THROTTLE DOWNSHIFT "CLUNK": May be caused by: High engine idle speed. Faulty downshift timing valve (replace valve). High mainline pressure caused by; Vacuum hose to modulator leaking or disconnected. Modulator diaphragm ruptured. Sticking valve (pressure regulator booster valve, pressure regulator valve, or modulator valve).

MOMENTARY RUN AWAY IN LOW UP TO 30 MPH (WIDE OPEN THROTTLE ACCELERATION): May be caused by a broken forced throttle cushion valve spring retainer. Check mainline pressure which will be lower just prior to shift, and the stall pressure will be low if the faulty transmission operation is caused by a broken retainer. *See "Closed & Forced Throttle Valve Spring Retainer Production Change" above.*

EXCESSIVE SLIPPAGE (High engine speed in relation to car speed, poor acceleration, or engine runs away on turns).
1) In all Speed Ranges—Low oil level. Incorrect control linkage adjustment. Air leak in oil pump suction pipe. Low front oil pump pressure.
2) In Drive Range—Incorrect control linkage adjustment. Damaged or leaking clutch piston seal (worn or burned clutch plates resulting from partially engaged clutch).
3) In Low Range—Incorrect control linkage adjustment. Low Band out of adjustment. Sticking accumulator valve, modulator lever, or modulator valve. Damaged or worn Low Servo Piston Ring resulting in poor band application or excessive oil leakage into clutch apply circuit causing partial clutch application and possibly burned clutch plates (check by connecting pressure gauges to Low Servo Apply and to High Clutch test points—there should be no pressure indicated at High Clutch point with selector lever in "L").

CAR CREEPS (Forward or Backward).
1) With Control Lever in Neutral—Incorrect control linkage adjustment. Clutch piston vent valve stuck closed. Clutch plates sticking or incorrectly assembled (not "stacked" in correct order).
2) Creeps forward with Control Lever in Reverse or backward with Lever in Low—Incorrect control linkage adjustment.

CAR WILL NOT MOVE (Rear wheels may be locked or free).
1) With Control Lever in any range (rear wheels free). If this occurs at other times than after reversing car, see causes listed under **EXCESSIVE SLIPPAGE** above. If this occurs only after reversing car (indicating loss of front pump pressure) check: Rear pump air leakage into front pump suction line (causing front pump to lose its prime). Rear pump gasket leakage. Front pump clearance excessive.
2) With Control Lever in any range (rear wheels locked). Parking pawl lock engaged. Broken parts in transmission. Parking brake applied.
3) With Control Lever in Drive Range (rear wheels free). If engine runs away and transmission is hot, check for: Low radiator water level, clogged oil cooler, sticking thermostatic valve, or dragging Low Range Band (causing over-expansion of clutch parts due to excessive heat).

SHIFTS ARE ROUGH.
1) Low-to-Drive Shift (car in motion). Incorrect Low Band adjustment. Clutch plates worn or binding. Modulator control lever or piston sticking (will cause excessive pressures). Accumulator dump valve orifice plugged.
If engine speeds up during this shift—Check for incorrect low band adjustment and worn or binding clutch plates.
2) Drive-to-Low Shift. Incorrect Low Band adjustment. Accumulator piston stuck closed. Modulator control lever or piston stuck (will cause excessive pressure).
3) Neutral-to-Reverse. Incorrect reverse band adjustment. Accumulator piston stuck closed. Modu-

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POWERGLIDE (C ntinued)

lator control lever or piston stuck (will cause excessive pressure).

CHATTERS WHEN STARTING.

1) **In Low Range.** Incorrect Low Band adjustment. Worn or rough band, scored drum. Clutch not disengaging properly due to distorted or binding plates, sticking clutch piston, sticking piston vent valve, or damaged or worn Low Servo Piston Ring allowing oil leakage into clutch apply circuit and causing partial clutch application (see tests for Excessive Slippage in Low Range above).

2) **In Drive Range.** Incorrect Low Band or Reverse Band Adjustment. Bands worn or rough, drums scored.

3) **In Reverse Range.** Incorrect Reverse Band adjustment. Worn or rough band, scored drum. Reverse ring gear and drum bushing worn or damaged.

REVERSE OPERATION JERKY OR DRAGGING.

1) Clutch plates are incorrectly assembled (not "stacked" properly) or sticking. Clutch piston vent valve stuck closed.

REVERSE CAN NOT BE ENGAGED WITH ENGINE RUNNING: If reverse can only be engaged when engine not running, check for accumulator snap ring being out of place (allowing accumulator valve and body to be forced against clamp nut on parking lock lever shaft and apply spring assembly, blocking shift into reverse). *NOTE*—Above condition will not prevent shift into Low Range).

DRIVE-TO-LOW or LOW-TO-DRIVE SHIFT DIFFICULT: May be caused by improperly drilled high clutch feed orifice in valve body resulting in slow clutch application in Drive Range and slow clutch release when shifting from Drive to Low (restricted orifice will cause slow oil flow). Check by connecting pressure gauges to Low Servo Apply and to High Clutch (low servo release side) and noting pressures as follows:

1) Move selector from Neutral to Drive with engine idling. If pressure builds up much more rapidly on Low Servo Apply gauge than on High Clutch gauge, a restriction in the passage (undersized orifice) is indicated.

2) Move selector from Drive to Low. Pressure in High Clutch gauge drops slowly, oil drainage from clutch is restricted. NOTE—This will result in slow Low Band application and clutch drag (may cause burned clutch plates).

HIGH CLUTCH PLATES BURNED OR CLUTCH FAIL

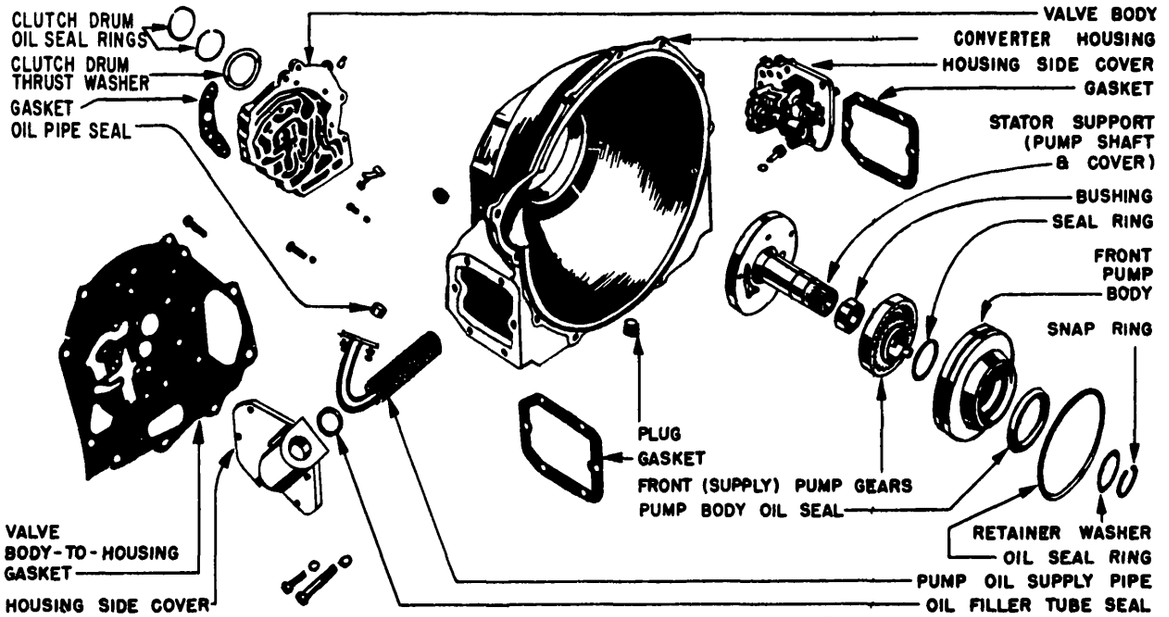
►*CAUTION—When High Clutch failure noted, following tests should be made before transmission removed, and transmission should also be carefully examined after removal and disassembly.*

1) Connect pressure gauges to Low Servo Apply, High Clutch (low servo release side), and to Reverse Servo points. Operate engine to supply oil pressure.

2) Place selector lever in Drive position and note pressure build-up in High Clutch gauge. Slow build-up indicates restriction in high clutch apply orifice resulting in clutch slippage and burned plates.

3) Place selector lever in Low position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage past Low Servo Piston Ring resulting in partial clutch application and burned clutch plates.

4) Place selector lever in Reverse position. High Clutch gauge should not show any pressure. Pressure at this point indicates leakage between the converter "out" and low servo "release" channels in valve body or damaged Housing-to-Valve Body gasket. This condition will cause partial clutch application and burned clutch plates.



POWERGLIDE TURBINE HOUSING & FRONT OIL PUMP

NOISE IN TRANSMISSION.

1) **Buzzing Noise (All Ranges).** Low oil level. Pump gear interference with crescent in pump. Pump check valve not seating.

2) **Ringing Noise in Converter.** Low oil level. Air leak in pump suction line (pump not seated properly) resulting in low oil level in converter. Pressure regulator valve stuck (closing converter inlet port). Leakage in oil line between front pump and regulator valve.

3) **Clicking Noise.** Incorrect manual linkage adjustment (causing interference between parking lock pawl and gear).

4) **Whining Noise.** Transmission gear teeth worn. Pump gear clearance excessive or pump gear bushings worn.

FUEL CONSUMPTION EXCESSIVE.

1) **Transmission Causes.** Converter stator freewheeling cams and roller incorrectly assembled. Clutch piston vent valve stuck open.

TRANSMISSION OIL BEING FORCED OUT OF FILLER PIPE: Caused by aeration and foaming of the oil due to one or more of the following:

NOTE—This condition may also cause Loss of Power and Lower Stall Speed (due to converter turbulence and lower pressures in control circuits).

1) Oil level too high allowing planet carrier to revolve in oil and aerate it. Correct by lowering oil level to correct point (see LUBRICATION) and driving car for 5 miles to work out air bubbles.

2) Oil suction pipe split, seal damaged, bore for suction pipe in housing too deep, or suction pipe retainer ears bent (preventing proper compression of the seal) resulting in air leaks in oil suction line.

3) Sand hole in suction bore of transmission case or housing or in suction cavity in valve body resulting in air leaks in oil suction line.

TESTING

►*TESTING CAUTION*—Transmission oil level must be checked and corrected (see LUBRICATION) and *transmission must be warmed up before tests made.*

Warming Transmission: Transmission must be warmed by road driving or in the shop as follows before checking for oil leakage or other trouble.

Road Warm-Up - Drive car for approximately 5 minutes with frequent stops and starts (to approximate heavy-traffic conditions).

Shop Warm-Up - Set hand brake tightly, place selector lever in "D" (Drive) range, start engine and run for 2 minutes at 750 RPM.

►*CAUTION: Recheck oil l vel after warm-up and b for making following tests.*

ROAD TEST: Road test car, to determine transmission shift points as indicated in table.

SHIFT PATTERNS ①

6 Cyl. Eng.

Throttle Position	②Upshift	③Downshift
Light Throttle ④	12-15 MPH	⑤ 10-13 MPH
To Detent	27-44 MPH	13-17 MPH
Through Detent	44-49 MPH	41-48 MPH

① - Transmission in "D" (Drive) range.
② - From Low to Drive. ③ - From Drive to Low.
④ - Light Throttle on Upshift.
⑤ - Closed Throttle on Downshift.

C NTINUED N NEXT PA E

POWERGLIDE (C ntinued)

283" & 348" V8 Engs. (3.36-1 Axl Ratio)

Thr ttl Positi n	②Upshift	③Downshift
Light Throttle④	12-15 MPH	⑤10-13 MPH
To Detent	37-50 MPH	13-17 MPH
Through Detent	50-56 MPH	47-53 MPH

283" & 348" V8 Engs. (3.08-1 Axl Ratio)

Thr ttl P siti n	②Upshift	③Downshift
Light Throttle④	13-16 MPH	⑤11-14 MPH
To Detent	40-55 MPH	14-19 MPH
Through Detent	56-61 MPH	51-58 MPH

348" V8 P lice Eng.

Thr ttl P sition	②Upshift	③Downshift
Light Throttle④	14-18 MPH	⑤12-15 MPH
To Detent	44-60 MPH	15-20 MPH
Through Detent	60-66 MPH	15-63 MPH

① - Transmission in "D" (Drive) Range
② - From Low to High ③ - From High to Low
④ - Light Throttle on Upshift
⑤ - Closed Throttle on Downshift

►*STALL TEST NOTE: Stall t sting of transmission is not recomm nded.*

PRESSUR E TESTS: Install pressure gauge hose connections at low servo apply (main line), clutch (release side of low servo), throttle valve, governor test points on transmission (see illustration) Gauge lines should be run into driving compartment by pushing aside steering column mast jacket seal, and connected to Gauge Set J-4872-A

Wid Open Thr ttl Upshift Pr ssure: This shift should occur at 82-90 lbs pressure (V8 Eng), 68-74 lbs pressure (6 Cyl Eng) as indicated on low servo (main line) gauge After shift is completed, pressures on both low servo apply and high clutch gauges should indicate similar readings If pressures are correct and clutch slippage is felt, mechanical trouble in clutch is indicated If high clutch pressure is more than 5 lbs lower, check for leak in high pressure line between low and drive valve body and high clutch

Idle Pressure in "Drive" Range: *NOTE - In addition to oil pressure gauges, a vacuum gauge is required for this test* With parking brake applied and shift selector lever in "D" (Drive) range, adjust engine speed until a steady 16" of vacuum is indicated on vacuum gauge Low servo apply (Main line) pressure should be 60-70 lbs (V8 Eng), or 55-65 lbs (6 Cyl Eng) If pressures not within this range, check the following Pressure regulator valve, Vacuum modulator valve, or Booster valve stuck Leak at low servo piston ring (between ring and bore) or at low servo piston rod (between rod and bore) Leakage at valve body-to-case gasket Leak between valve body and housing Front pump clearances not correct Leak at low drive valve body (check gasket and shifter valve) Check passages in transmission housing for porosity Loose suction screen connection

Manual Low Range Pressure: Connect a tachometer, place selector lever in "L" (Low) range, and adjust engine speed to 1000 RPM with car stationary Low servo apply (main line) pressure should be 114-127 lbs (V8 Eng), 70-80 lbs (6 Cyl Eng) Pressures not within this range indicate the following possibilities Partially plugged oil suction screen Broken or damaged ring in low servo Pressure regulator valve stuck Leak at valve body-to-case gasket Leak between valve body and housing Leak at servo center Front pump clearances not correct

Drive Range Overrun (Coast) Pressure: With car coasting in "D" (Drive) range at 20-25 MPH and engine vacuum at approximately 20", low servo (main line) pressure should be 47-53 lbs (V8 & 6 Cyl Engs)

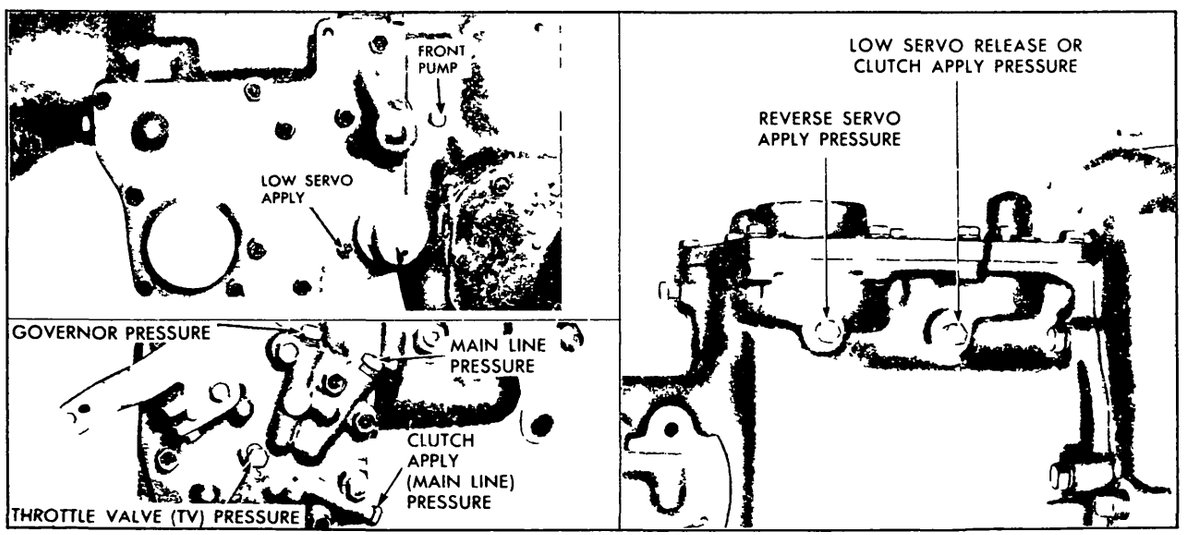
Throttle Valve Pressure: Pressures will range from 0-63 lbs (V8 Eng), 0-50 lbs (6 Cyl Eng), depending on accelerator position Improper throttle valve pressure is usually the result of trouble in low and drive valve body providing throttle valve linkage is properly adjusted

G v rn r Pressure: Governor pressure is relative to transmission output shaft speed and can be checked in terms of MPH by referring to following table

Governor Pressure

Car Speed (MPH)	Pressure	Car Speed (MPH)	Pressure
5	2-4 lbs	35	47½-53½ lbs
10	8½-13 lbs	40	55-62 lbs
15	21-27½ lbs	45	63½-71½ lbs
20	31½-34½ lbs	50	73½-82 lbs
25	35½-40 lbs	55	84-93½ lbs
30	41-46 lbs	60	95½-106 lbs

Reverse Pressure: With parking brake applied, place selector lever in "R" (Reverse) position and set idle speed at 1000 RPM Pressure reading on reverse servo apply (mainline) gauge should be 240-275 lbs (V8 models with early type pressure regulator valve), 215-245 lbs (V8 models with later type pressure regulator valve), 167-191 lbs (6 Cyl models) If pressures are within limits but operation in reverse is faulty, reverse band requires either adjustment or replacement (transmission overhaul required) If pressure is below limits, the following should be checked Partially plugged oil suction screen Broken or damaged reverse servo piston ring Pressure regulator valve or booster valve stuck Leak at valve body-to-case gasket Leak between valve body and housing Front pump clearances not correct Leak between piston rod and bore



POWERGLIDE PRESSURE TEST POINTS

REMOVAL FROM CAR (EXCEPT CORVETTE)

►*1959-60 POWERGLIDE DISASSEMBLY & REASSEMBLY*

CAUTION Before removing converter assembly from flywheel, scribe a line on both units so they may be installed in same position All flywheels are marked with a stripe of white paint to indicate "heavy" side of engine and all transmissions have a stripe of blue paint across ends of both converter housing and cover to indicate "light" side These paint markings must be aligned as closely as possible during assembly to obtain best balance conditions Flywheel assemblies used with automatic transmissions have six transmission attaching bolt holes instead of three The additional holes are used to permit accurate indexing of converter to flywheel Only three of the bolt holes will be used for actual attachment

Transmission & Torque Converter are removed as an assembly *CAUTION—Torque converter is not retained in housing as on previous transmission and special holding tool must be used to prevent converter falling out when transmission assembly removed.*

TRANSMISSION ASSEMBLY REMOVAL: Raise car on hoist (see "Jacking & Hoisting" in Suspension & Wheel Alignment Section), then proceed as follows

1) Drain transmission case, then remove transmission filler pipe Disconnect oil cooler lines, vacuum modulator hose, and speedometer drive cable fitting at transmission Disconnect body ground strap

2) Disconnect manual and throttle valve control lever rods from transmission, then disconnect propeller shaft at transmission Install suitable transmission lift to jack or other lifting device and attach to transmission

CONTINUED ON NEXT PAGE

POWERGLIDE (C ntinu d)

3) Disconnect engine rear mount on transmission extension, then remove transmission support crossmember. *CAUTION - Use care to remove any shims which may be installed between extension mounting b ss and crossmember. The same number of shims must be installed as these affect drive line angle.*

4) Remove flywheel cover, then using a jumper to turn the engine, remove flywheel-to-converter attaching bolts. Lower rear of ttansmission slightly so that the three upper transmission housing-to-engine attaching bolts can be reached (use a universal socket and approximately a 39" extension). Remove upper bolts. *CAUTION - Rear of transmission must not be lowered too far as distributor housing on engine may be forced against dash board.*

5) Support engine at oil pan rail with a jack, then remove remainder of transmission housing-to-engine attaching bolts. Remove transmission by moving slightly to the rear and downward. Install converter housing holding tool, J-5384, then remove transmission from beneath car. *CAUTION - Do not tilt front of transmission downward prior to installing Tool J-5384, as conv rt r may fall out of transmission.*

DISASSEMBLY—TRANSMISSION

►**DISASSEMBLY & REASSEMBLY CAUTION:** ***CLEANLINESS IS EXTREMELY IMPORTANT when opening up transmission. Thoroughly CLEAN exterior of case first, CLEAN each part as removed with cleaning solvent or gasoline and dry with air—do not use wiping cloths which will leave lint on parts. Store all parts in clean storage bins.***

►*1958-60 DISASSEMBLY CAUTION:* To prevent bending manual valve and manual valve inner lever, the manual valve should be moved into the position that places it as far as possible into its bore. Before separating the two case sections, place manual valve selector lever in "L" (Low) position.

DISASSEMBLY OF TRANSMISSION (Into Major Units): 1) Place transmission on bench (use holding fixture J-3361) and remove all units as indicated below.

2) Remove converter assembly holding tool J-5384 from housing, remove converter assembly by pulling it straight out of housing.

3) Take out right side cover attaching bolts, remove side cover, gasket, and oil pump suction screen.

4) Take out Low & Drive Valve Body attaching screws on left side of transmission case, remove drive body assembly and gasket. *CAUTION - Do not remove outer l ver assembly from valve body (this retains inner lever assemble in body).* Remove vacuum modulator and pushrod.

5) Loosen all servo cover bolts slightly and break servo cover loose if it sticks to case (reverse servo spring and pressure regulator spring bear against cover) **using care not to allow cover to tip** which may damage or break tip of pressure regulator valve. Use guide bolts to maintain cover alignment or turn all cover bolts out evenly while exerting pressure on cover, then lift cover and gasket straight off until cover clears tip of pressure regulator valve. Remove reverse servo spring and pressure regulator springs, lift regulator valve out.

►***CAUTION—Handle valve carefully to prevent damage and store it by itself to avoid nicking or scratching of the polished surfaces.***

6) Remove low band adjusting screw cover, loosen low band adjusting screw locknut using tool J-4277 (see Tool Modification below), and tighten low band adjusting screw to hold clutch assembly in place.

►***CAUTION—Make sure low piston assembly does not fall out of bore and become damaged.***

►**Tool J-4277 Modification Note**—Low band adjusting screw has recessed head for Allen wrench. To use tool, remove screwdriver retainer and special screwdriver from tool, use ¼" Allen wrench in place of screwdriver in tool.

7) Working from inside of converter housing, remove converter housing-to-transmission case self-locking bolt. Remove converter housing-to-transmission bolts and lockwashers and install two 3/8" - 16 x 3¼" guide pins (Part of Pilot Stud Set J-3387). Shift transmission into "Low" and then carefully separate transmission from converter housing. Remove valve body-to-transmission case gasket.

8) Remove manual valve from valve body on rear of converter housing, remove manual valve lever from housing, remove bronze thrustwasher from valve body oil delivery sleeve.

►***CAUTION—Handle manual valve carefully to prevent damage and store it by itself to avoid nicking or scratching of the polished surfaces.***

9) Take out all bolts and lockwashers attaching valve body to converter housing and front pump to valve body. Remove valve body and gasket.

►***CAUTION—Handle valve body and valves carefully to protect them from damage.***

10) Use Front Pump Driver Tool J-4263-5 to remove pump assembly from converter housing.

11) Loosen low servo band adjusting screw to free clutch assembly, remove input shaft, clutch assembly, and low sun gear thrustwasher from transmission case.

12) Remove low servo band, strut assembly, low servo piston and piston return spring from transmission case.

13) Remove speedometer driven gear assembly. Take out universal joint retainer bolt and lockwasher on rear end of output shaft, slide universal joint yoke off end of shaft.

14) Take out attaching bolts and remove governor cover on left side of transmission case, remove gasket. Remove governor assembly (allow governor to turn in clockwise direction while withdrawing it from case).

15) Use tool J-3383 to rotate parking lock pawl spring until end unhooked from case, remove spring and parking lock pawl. Remove parking lock lever and steel washer, parking lock lever shaft assembly, and oil seal from case.

16) Remove transmission oil seal using tool J-5859 and remove transmission assembly and "O" ring seal. Remove speedometer drive gear from output shaft with tool J-5814.

►***CAUTION—Do not attempt to remove planet carrier assembly until transmission rear bearing locating snap rings, retainer and bearing are removed.***

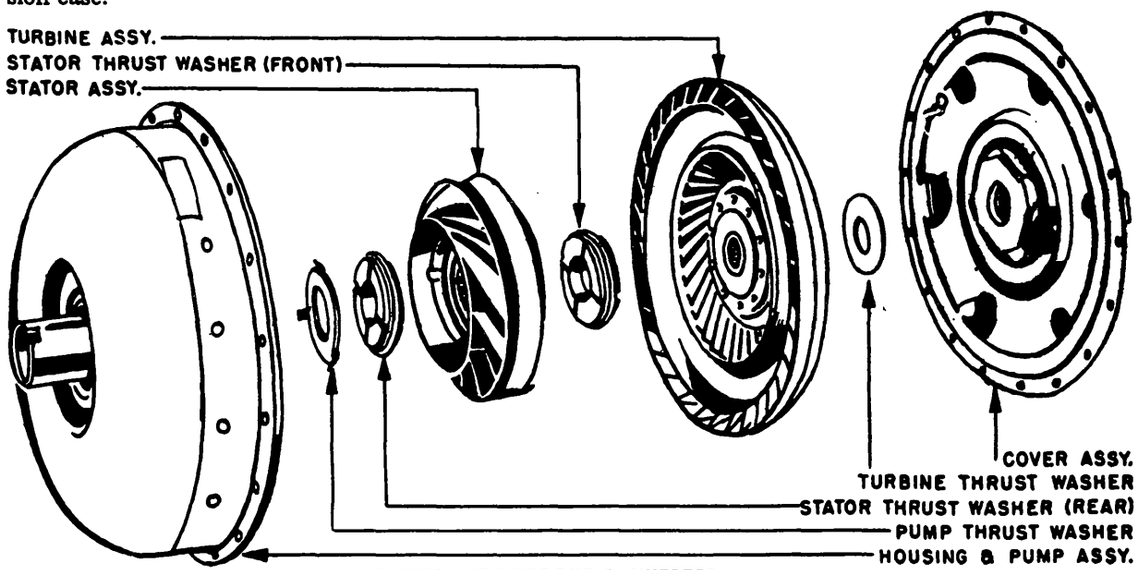
17) Remove the three bearing retainer screws and lockwashers and remove rear bearing retainer. Remove rear bearing locating snap ring from output shaft. Remove rear bearing from output shaft with tool J-5814, then remove bearing locating front snap ring from output shaft.

18) Working from rear of transmission case, position the "O" stamped on face of output shaft at top center. This aligns the drive pin in output shaft with "eyebrow" opening in rear oil pump cover. Planet carrier can now be removed through front of case. Do not lose rear oil pump drive pin.

►***CAUTION—Do not drive on end of output shaft.***

19) Remove reverse drum and thrust washer. Using tool J-4277, loosen reverse servo adjusting screw

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P WER LIDE TORQUE C NVERTER

POWERGLIDE (Continued)

locknut, back off adjusting screw and remove reverse brake band assembly and reverse servo piston. Remove rear pump attaching bolts and lockwashers and remove rear pump assembly and gasket. Remove lubrication pressure relief valve from transmission case.

►*For DISASSEMBLY of above units, see OVERHAUL data following.*

OVERHAUL

►**"O" RING SEAL CAUTION:** *These seals must be discarded when removed and a new seal installed exactly as directed below.* "O" ring rubber seals are special design and are installed with side clearance in ring groove so that oil pressure on seal deforms the rubber and extrudes a portion of the rubber into the clearance space between the mating parts to provide a positive seal against loss of oil pressure. Seals **must not be re-used.**

"O" Ring Seal Installation—Make certain that parts are clean and that burrs and sharp edges are removed. Seal must be free of any twists (place ring on flat surface and allow it to assume natural position) and **must not be twisted during installation.** Engage one side of ring in groove, pull other side straight back until it can be fitted in groove without twisting. Work ring against trailing edge of groove (last side to enter when parts assembled) using flat tool entered between ring and leading edge of groove to move ring without twisting. Lubricate "O" ring and parts with transmission oil.

CONVERTER OVERHAUL (Unit on bench—after removal from transmission):

Disassembly: 1) Remove all converter cover attaching bolts and locknuts, use small punch to drive out split dowel pin in cover, lift cover off.

2) Remove turbine assembly, stator assembly, stator thrustwashers, and pump thrustwasher. Remove thrustwasher from turbine hub. Remove "O" ring seal from converter cover.

3) Remove front cam retainer ring and remove stator thrust washer. *CAUTION - Use care when separating parts of stator so that cam rollers and springs (8 each) do not become lost.* Remove stator race, cam roller and springs and overrun cam from stator body.

4) Remove rear cam retainer snap ring and remove rear stator thrust washer.

Inspection: Wash all parts in cleaning solvent and dry with air. Inspect converter pump hub, turbine hub, and converter cover bushing for galling, scoring, or excessive wear. Inspect all thrustwashers for galling, scoring, or excessive wear. Check turbine vanes and stator vanes for looseness or damage. Inspect stator race and cam rollers for galling or scoring. Inspect cam springs for distortion. Check spring guides for wear or damage. Inspect over-run cam roller and spring retainer for wear or damage. If bushing in converter cover worn or damaged, install new bushing as follows:

Converter Cover Bushing Replacement: Precision type bushing, No. 3702079, furnished for field installation. Use bushing remover tool J-5381 to remove old bushing from cover. Place new bushing on pilot end of Bushing Replacer Tool J-5382 and press bushing into place in cover using an arbor press. *NOTE—Bushing is finished to size and does not require reaming.*

Reassembly: 1) Place stator body face down on bench and install rear stator thrust washer (front and rear thrust washers are the same), then install retaining snap ring, making sure snap ring is fully seated in groove in stator body. *NOTE - Front of stator can be identified by the word "Front" cast on stator and by the vanes being thicker at front than at rear.*

2) Reverse stator body and key overrun cam to stator body. Assemble cam rollers and springs in overrun cam, then install springs with open ends of springs toward hub. *NOTE - Springs are "zig-zag" flat type, and incorrect assembly can cause excessive wear between springs and race.*

3) Coat stator race and installing tool J-5390 with a light film of oil; then place stator race on pilot end of installing tool and carefully rotate stator over tapered end of tool and stator race. Be careful not to dislodge rollers. Install front stator thrust washer and retain with snap ring. Check operation of stator. Stator should freewheel in clockwise direction when viewed from front.

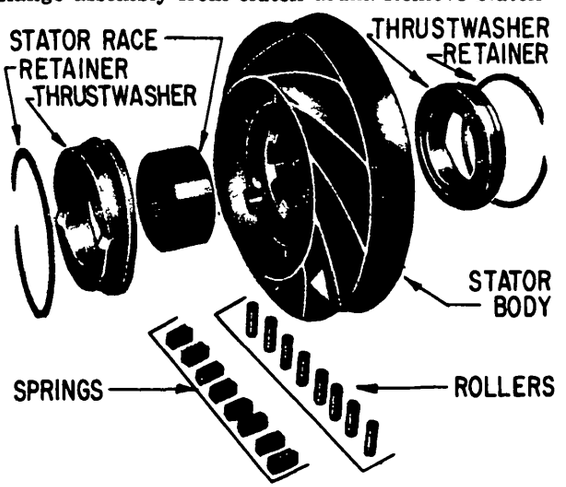
4) Place converter pump on bench, then install thrust washer to converter pump hub making sure tabs are engages in notches of hub flange. Install stator assembly with front toward converter pump cover.

5) Install thrust washer on turbine hub and assemble turbine assembly to converter pump. Install new "O" ring seal on converter cover, then align blue strip on converter cover with blue strip on converter pump and install converter cover. Install converter pump-to-converter cover attaching bolts and locknuts and tighten to 20-25 ft. lbs.

TRANSMISSION OVERHAUL: *After removal from case, overhaul sub-assemblies or units as follows:*

Planetary Unit Clutch: Place unit on bench with clutch flange upward.

Disassembly—1) Remove clutch flange retainer ring, lift out clutch flange retainer. Remove clutch flange assembly from clutch drum. Remove clutch hub thrustwasher, hub, and all clutch plates from clutch drum.



POWERGLIDE STATOR ASSY.

2) Place clutch drum in bench press, install spring compresion tool J-5133 and compress spring enough to remove snap ring, use KMO-410 pliers to remove snap ring. Relieve spring pressure, remove tool, lift out clutch spring seat and spring.

3) Rap clutch drum face down on a wood block to dislodge clutch piston, lift piston out, remove outer seal ring from piston and inner seal ring from clutch drum hub.

Inspection—Wash all parts in cleaning solvent and dry with air. Inspect drum brake band surface for scoring or burning, check drum bushing for scoring or excessive wear. See that clutch flange does not have any appreciable play in drum slots. Check all clutch plates for burning or galling, see that composition plates are free fit on clutch hub and that steel plates are free fit in clutch flange. Check low sun gear for nicked or burred teeth. Inspect relief valve steel ball in clutch piston and make certain that ball is free to move in hole and that orifice to rear of piston is open. If necessary, replace ball as follows:

►*RELIEF VALVE CHECK BALL NOTE:* If clutch relief valve check ball in clutch drum is loose enough to come out or too tight to rattle, replace the clutch drum as an assembly. Replacement or restaking of check ball should not be attempted.

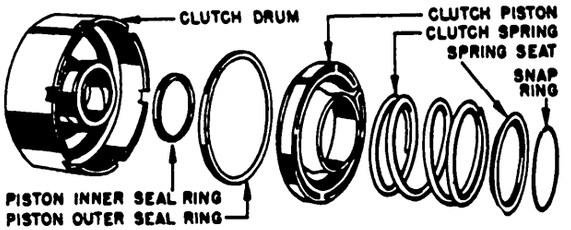
Reassembly—1) Install new outer seal ring on clutch piston with lip of seal toward pressure side of piston *(CAUTION*—use care not to stretch seal). Install new inner seal ring on inner hub of clutch drum with lip of seal toward bottom of clutch pocket.

2) Lubricate inner diameter of clutch drum and both seals with transmission oil, carefully install piston in clutch drum using a piece of feeler stock to insure seating of outer seal ring in clutch drum.

3) Install clutch spring and spring seat, use tool J-5133 in an arbor press to compress spring *(CAUTION*—Make certain spring does not hang up in snap ring groove which would damage spring seat and groove), install snap ring. Release pressure, remove tool.

4) Place clutch hub with thrust washer on clutch flange with open side of clutch up and install five steel and four composition plates alternately. *NOTE - When installing plates, start with a steel plate. 1958 type plates have an "O" stamped on them and this mark must be in same direction on all plates (later type plates or*

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POWERGLIDE CLUTCH PISTON ASSY.

POWERGLIDE (C ntinu d)

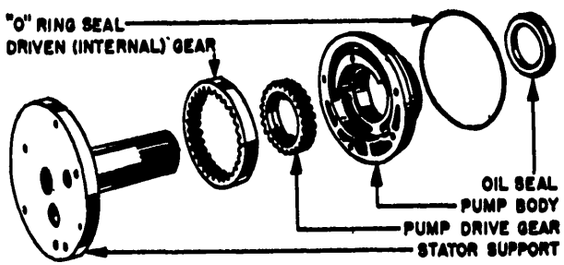
rev rsibl and unmarked). It is suggest d that driven plate nesting be verified on bench prior to stacking with drive plates in clutch drum. When clutch driven plates are correctly stacked, wave pattern on face will permit plates to nest tightly. If incorrectly stacked, intermittent openings will be visible between adjacent plates.

5) Check endplay using a feeler gauge inserted between clutch flange drive lug and drive slot in drum. This endplay must not exceed .013". Adjust by installing retainer ring of correct thickness to provide correct endplay. ***NOTE*****—Retainer ring furnished .055", .064", .073" thick.**

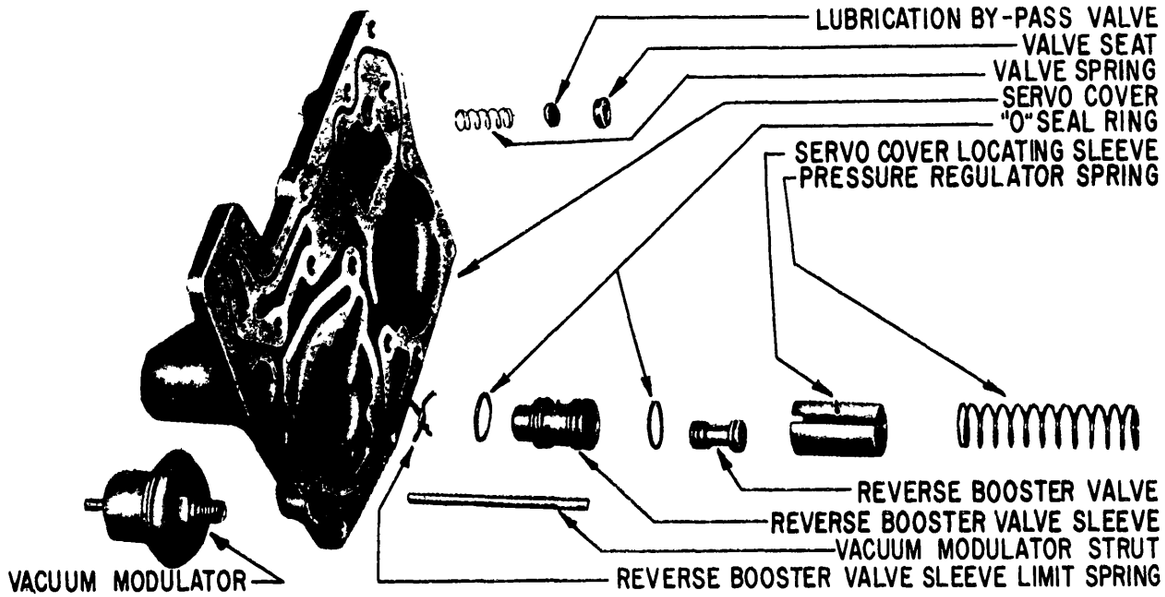
Servo Cover: Disassembly - Remove pressure regulator reverse booster valve only.

Inspection—Inspect cover for nicks or cracks. Using a small punch or similar tool, and working through the opening in the by-pass disc seat, exert pressure on the disc to make sure disc and spring are free and that disc is seating properly *(NOTE*—Do not remove disc seat unless there is evidence of damage). Inspect pressure regulator reverse booster valve springs for distortion or damage. Inspect pressure regulator reverse booster valve for galling or scoring and make sure it operates freely in bore in guide. Inspect snap ring for loose fit in groove. Inspect bore in valve guide for galling or scoring and check seal for distortion or damage. Check valve guide bore in servo cover for roughness or burrs and make sure that valve spring and guide spring and seat will seat properly in bottom of bore.

Reverse Booster Valve & Sleeve Replacement - If inspection indicates that valve is not free in valve sleeve and cannot be corrected by using a new valve, replace valve sleeve as follows: If valve is stuck tight in valve sleeve, apply air pressure to modulator passage (sleeve may be blown out with valve). To remove sleeve, form a hook end on a piece of 3/32" rod and insert hook into feed hole in large diameter bore. *NOTE - This operation will damage sleeve and sleeve should not be reused.* Use a pair of needle nose pliers and remove booster sleeve limit spring. *NOTE - This spring should not be reused.* Place new limit spring in bottom of servo cover bore with wide tabs seating on bottom of bore. Install "O" rings on new booster valve sleeve and push into bore so that end of sleeve is 0.4" (13/32") below finished face of servo cover. *CAUTION - Do not push sleeve in beyond the above dimension.* Install reverse booster valve.



POWERGLIDE FR NT IL PUMP



SERVO COVER ASSEMBLY

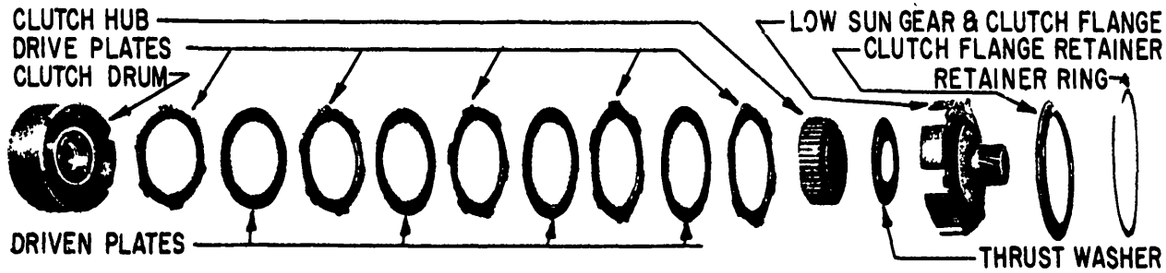
Lubrication By-Pass Valve Assembly Replacement—If during inspection it is evident that the lubrication by-pass valve assembly is not functioning properly, correct as follows: Using a suitable tool remove the nylon by-pass disc seat, then remove disc and spring. Inspect disc for burrs, and spring for distortion. Inspect wall of by-pass valve cavity for roughness, nicks or burrs. Insert by-pass disc in its cavity to make sure its movement is not restricted. Remove disc from cavity. Replace any part that is defective. Install by-pass spring in its cavity in servo cover and install by-pass disc. With servo cover inner surface facing upward, position a new disc seat over its opening in cavity and press into place using a socket of proper size. It should be flush to .005" below inner surface of servo cover. ***CAUTION—Under no circumstances should the by-pass disc seat that was removed be re-installed.***

Reassembly - Place new limit spring in servo cover bore with wide tabs seating on bottom of bore. Install "O" rings on booster valve sleeve and install in bore so that end of sleeve is 13/32" (.40625") below face of servo cover (19/32" on transmissions with pressure regulator dampner). Install reverse booster valve, then install servo cover locating sleeve in bore of cover until it just contacts booster valve sleeve. *CAUTION - Do not exert any downward force on reverse booster valve sleeve.* Install pressure regulator valve, damper valve assembly and spring, then install reverse servo spring. Use guide pins to assemble servo cover to transmission case. *CAUTION - Mak sure locating sleeve is in alignment with pressure regulator valve bore.* Check alignment of vacuum modulator hole in servo cover with hole in case.

Front Pump: Disassembly—Slide stator support out of pump body, lift out pump gears (CAUTION—use extreme care not to drop or nick gears), remove and discard "O" ring seal.

Inspection—Wash all parts in cleaning solvent and dry with air. Inspect pump gears for wear, nicks, or other damage. Inspect pump body and pump face of stator support for nicks and scoring. Inspect pump body oil seal for excessive wear, damage, or evidence of leaking (see Oil Seal Replacement below). Inspect pump body bushing for gall-

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P WERGLIDE MULTIPLE DISC CLUTCH

POWERGLIDE (C ntinued)

ing or scoring, check bushing wear or clearance as directed below. Check pump gear clearances as follows:

1) Pump Gear Cl arances - Install clean dry gears in pump body, check clearances with feeler gauge.

Driv n Gear Clearance - .0035-.0065" clearance between outer diameter of gear and pump body. .003-.009" clearance between inner diameter and crescent.

G ar End Cl arance - Place scale across face of pump body, measure clearance between scale and face of gears. This clearance should be .0005-.0015".

2) Pump Body Bushing - Temporarily install pump body on converter pump hub, measure bushing-to-hub clearance with a feeler gauge. This clearance should be .0005-.0015".

3) Oil Seal R plac m nt (Transmission Disassembled) - Pry out old seal and install a new one using Tool J-6839.

Transmission Not Disassembled - Seal can be replaced without disassembling transmission as follows: With converter removed, screw Tool J-6793 into bore of old seal and pull seal by driving it out with a slide hammer. Lightly hone any burrs in front pump bore, then position replacement front seal in bore, and drive seal into place with Tool J-6839. *NOTE - Outer diameter of s al should be coat d with non-hardening sealer before installation.*

R ass mbly - Install new "O" ring seal in pump body. Remove gears from pump body, oil thoroughly with automatic transmission oil and install in pump body. Assemble stator support through drive gear, aligning attaching holes.

Rear Pump: Disassembly—Take out two screws and remove pump body plate, lift out pump gears.

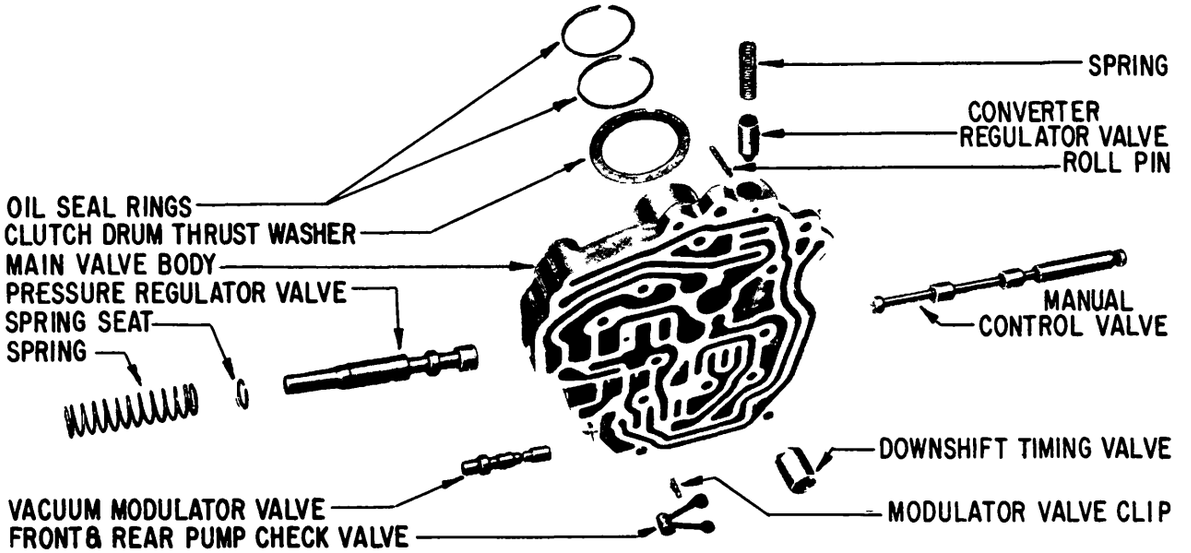
Inspecti n—Wash all parts in cleaning solvent, blow out all oil delivery holes, dry with air. Inspect pump body for nicks and scoring, inspect gears for wear, nicks, or other damage. Check gear clearances (clearances are same as for front pump—see Pump Gear Clearances above). Inspect rear bearing for roughness but do not remove bearing unless replacement required (see Bearing Installation below).

Pump Bearing Replacement—Remove tnree retaining capscrews, lockwashers, and lockplate. Drive old bearing out. Press new bearing in place, install lockplate and retaining screws and lockwashers, tighten screws securely.

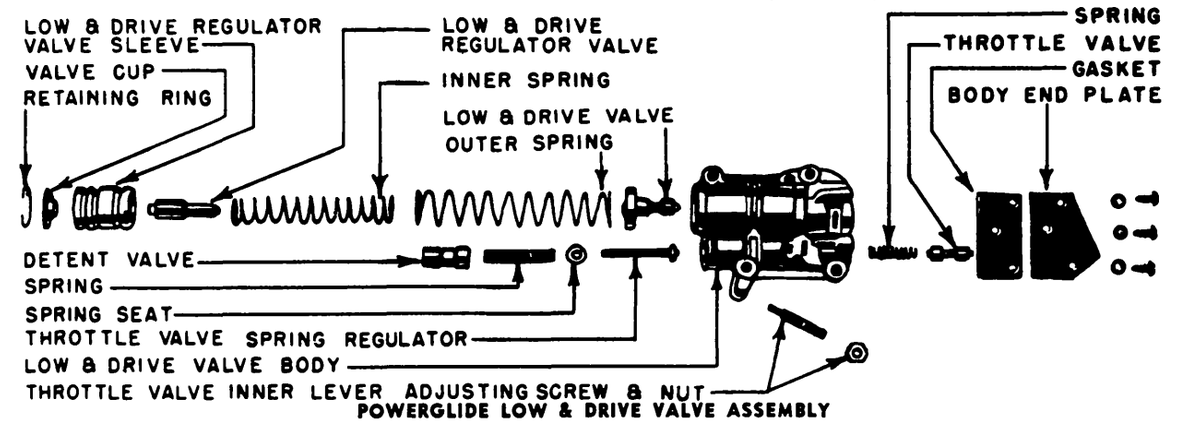
Reassembly—Oil pump gears thoroughly with transmission oil and install in pump body. Install pump body plate and two slotted attaching screws, tighten screws to 3½-5 ft.lbs. torque.

Valve Body: ***CAUTION—Handle all valves with care to avoid damage, keep valve and spring assemblies separate to avoid confusing or interchanging parts.***

Disassembly - Use needle nose pliers and remove hairpin retainer from vacuum modulator valve, then remove valve from body. Place valve body face down on two blocks of equal thickness, and with a small pin punch drive out converter pressure regulator valve retaining pin and remove spring and valve from bore. Remove two clutch drum oil seal rings from oil delivery sleeve, then remove front and rear oil pump check valve from valve body. *NOTE - Downshift timing valve must not be removed unless replacement is necessary as indicated by poor coast downshift.* Remove manual control valve.

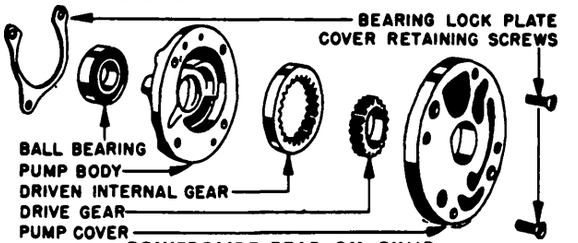


POWERGLIDE CONTROL VALVE ASSEMBLY (TYPICAL)



POWERGLIDE LOW & DRIVE VALVE ASSEMBLY

Inspection - Wash all parts in clean solvent and blow dry with air (blow out all passages). *CAUTION - Do not use rags to dry parts. Also, be sure that drilling immediately below vacuum modulator valve is plugged with a stamped metal plug.* Inspect all valves for nicks, scores, burrs or galling and make sure that all valves move freely in their respective bores. Check converter regulator valve spring for distortion or damage. Check oil seal rings for nicks or burrs and make sure they are free in ring grooves. Also, install rings in clutch drum bore and make sure hooked ring ends have clearance.



POWERGLIDE REAR OIL PUMP

Downshift Timing Valve Replacement - Pry out old valve assembly with a small pin punch using care not to damage bore in valve body. Using an arbor press and a 7/16" socket, press new downshift timing valve into valve body until tip on check ball end of valve assembly is flush to .015" below surface of valve body.

CONTINUED ON NEXT PAGE

POWERGLIDE (C ntinued)

R assembly - Place valve body face down on wood blocks, then assemble converter pressure regulator valve spring in valve and then, as an assembly, install in valve body bore. Install retaining pin. Install manual valve, then install vacuum modulator valve and attach retaining clip on valve groove. Install spring clip on pressure regulator valve and insert valve into bore in valve body. Install front and rear oil pump check valve in valve body making sure it is flush with or below valve body face. Install the two clutch drum oil seal rings in ring grooves in oil delivery sleeve. *NOTE - Interlocking type cast iron rings are used. These rings are removed and installed in their grooves by applying pressure to the ring with index finger and thumb. One end of ring must be pressed into ring groove while other end is pushed out away from groove to lock or unlock ring.*

Low & Drive Valve Body: *CAUTION - Do not disturb throttle valve adjustments (two adjusting screws-one in boss on valve body and one in throttle valve inner lever) unless required by installation of new parts. THROTTLE VALVE MUST BE ADJUSTED IF THESE SETTINGS DISTURBED (see "Throttle Valve Inner Lever Adjustment").*

Disassembly - 1) Remove attaching bolts, then hold low and drive valve body in one hand and with a soft hammer tap on inner side of cover until it is free of locating pins. *CAUTION - Exert pressure on detent valve when separating valve body from cover to prevent loss or damage of parts from falling.*

2) Remove detent valve, spring, spring seat and throttle valve spring regulator assembly. Remove throttle valve retainer clip, then remove throttle valve and spring. Use special snap ring pliers, Tool J-5403, and remove low and drive regulator cap retainer, then remove low and drive regulator valve cap, sleeve and valve as an assembly. Remove low and drive valve inner and outer springs, and low and drive valve.

3) Remove low and drive body end plate screws and lockwashers and remove body end plate and gasket. Remove throttle valve control outer lever assembly. Remove throttle valve lever shaft shield and throttle valve inner lever assembly. Remove throttle valve lever shaft seal from counterbore in cover.

Inspection - Wash all parts in cleaning solvent and blow out all passages with air. Inspect all parts for burrs, scoring, or nicks and make sure that all valves move freely in their bores. Check throttle valve spring regulator assembly for free operation in opening of detent valve. Inspect detent valve spring and throttle valve spring for distortion or damage. Inspect low and drive valve inner and outer springs for distortion or damage. Inspect throttle valve inner lever assembly shaft for scoring or galling and the lever for being tight on shaft. Check throttle valve inner lever assembly shaft for free operation in its bore in side cover. Inspect detent valve stop in side cover for distortion or or damage (replace with new stop if necessary). Inspect locating pins in valve body and side cover for distortion or damage and replace with new pins if necessary. *NOTE - One locating pin should be in valve body and the other in the side cover.* Inspect mating surfaces of valve body and side cover, making sure they are free of nicks and burrs.

Reassembly - 1) Install low and drive valve in valve body bore. *CAUTION - This valve must be guided into its bore in valve body to prevent damage to bore as follows: Insert a piece of brake tubing into valve shank bore in rear of valve body, engaging the tit on end of shank in opening in tubing, then slowly move valve into its proper position.* Install low and drive regulator inner and outer springs in valve bore. Assemble low and drive regulator valve and cap to low and drive regulator valve sleeve, then install as an assembly in valve body bore. Be sure inner spring is properly seated on seat of low and drive regulator sleeve. Compress low and drive valve assembly into body bore and install retainer, using special snap ring pliers, Tool J-5403. Be sure retainer is properly seated in its groove in valve body bore.

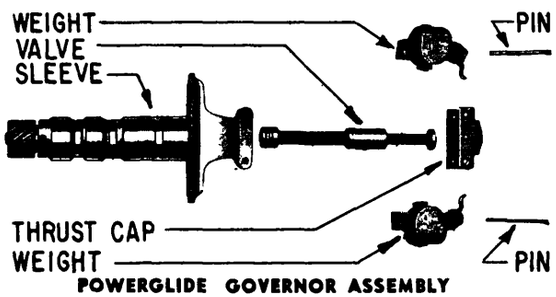
2) Install throttle valve spring and valve in valve body bore, then install throttle valve clip. Place low and drive body end plate and gasket in position and tighten attaching screws to 1½-2½ ft. lbs.

3) Install throttle valve spring regulator assembly in valve body bore, making sure it is seated on throttle valve spring. Install detent valve spring seat in valve body bore, threading the spring of throttle valve spring regulator assembly through the opening in detent valve.

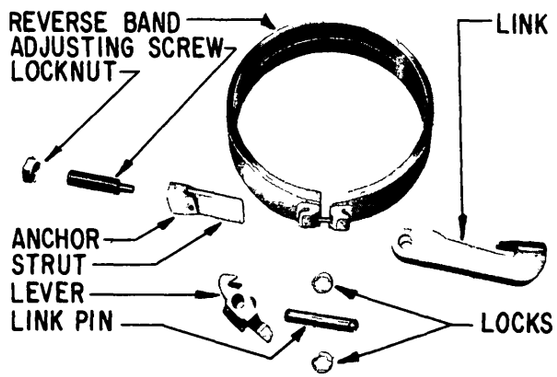
4) Place side cover in vise with face up. Align locating pin hole in low and drive valve body assembly and locating pin in side cover. Exert pressure on valve body to keep locating pin in locating hole, at sametime compress detent valve into valve body bore. Rotate valve body counterclockwise until locating pin in valve body enters locating hole in side cover. *CAUTION - Be sure that face of detent valve is r sting against d t nt valve stop pin in side cover.*

5) Tighten low and drive body attaching bolts to 3½-5 lbs. Install throttle valve inner lever assembly to side cover. Install new seal over shaft and into counterbore in cover, then install shield. Install throttle valve control outer lever assembly on inner lever shaft.

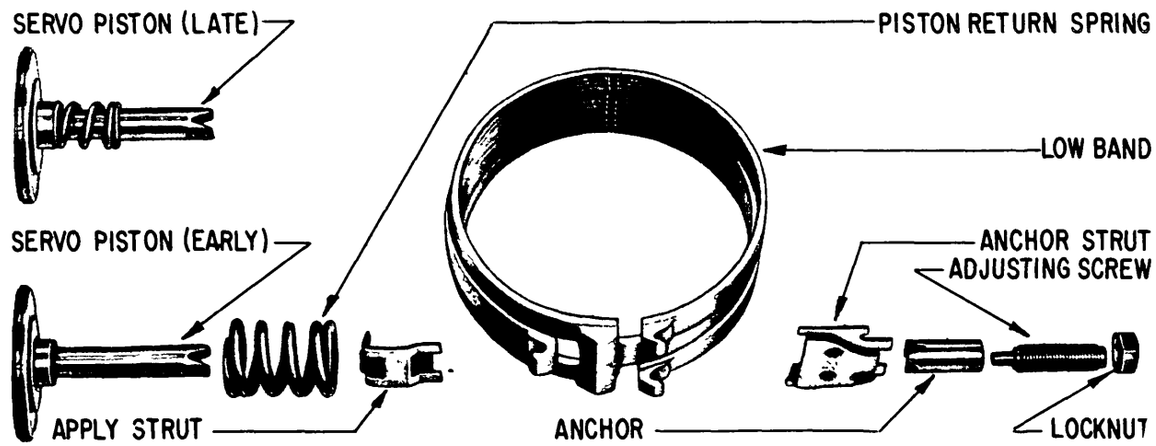
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POWERGLIDE GOVERNOR ASSEMBLY



POWERGLIDE REVERSE BAND ASSEMBLY



POWERGLIDE LOW BAND & SERVO PISTON ASSEMBLY

POWERGLIDE (C ntinued)

From underside, install outer lever attaching bolt and tighten securely.

Throttle Valve Inner Lever Adjustment: Rotate throttle valve inner lever until it just contacts face of the detent valve. Hold lever in this position and turn adjusting screw until it just contacts flat surface of the step in the lever. Back off one complete turn and lock in this position by tightening adjusting screw lock nut securely.

Gov rnor: *CAUTION - Th nly parts available for servic r plac ment or th governor assembly (complete), and driven gear. Gov rnor should not require disass mbly xc pt for cleaning and removal of foreign mat rial causing improper operation. See "Governor Driv n Gear R plac ment" below for disassembly and reass mbly.*

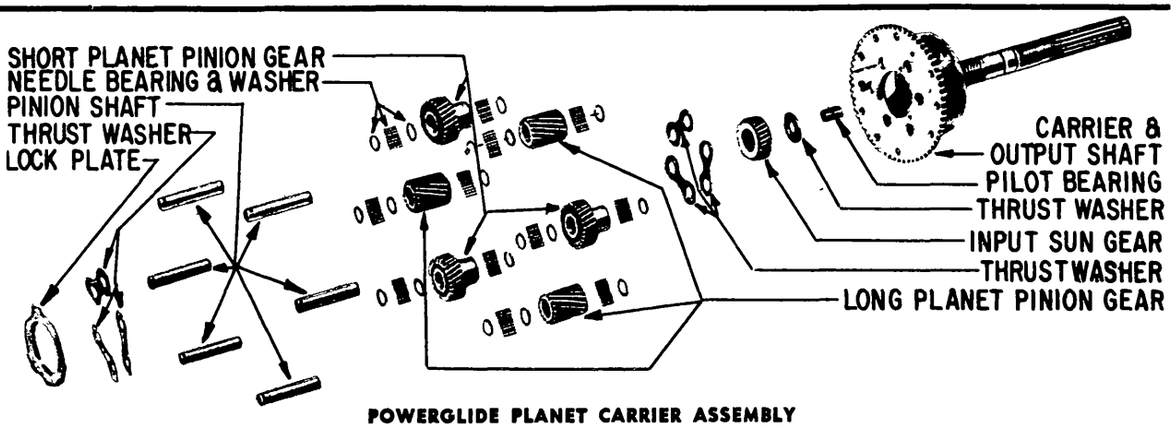
Gov rnor Driven Gear Replacement - A unit package containing a governor driven gear and pin, and two governor weight pins is available for service replacement. *NOTE - Th nylon g vernor gear used on current production and for s rvice replacement is interchangeabl with any nyl n gear on previous models. DO NOT us a brass gear to replac nylon gear.*

Installation—Cut off ends of governor weight pins and remove weights and governor valve. *(NOTE*—Carefully protect governor valve to prevent damage. Weights are interchangeable from side to side). Drive out governor gear retainer split pin using a small punch. Support governor on 3/16" plates installed in exhaust slots of governor sleeve, place in arbor press and with a long punch, press gear out of sleeve. Carefully clean governor sleeve of chips and reinstall in arbor press. Position new gear in sleeve and with a suitable socket, press gear into sleeve until nearly seated. Then remove any chips that may have shaved off the.gear hub and press gear in until it bottoms on shoulder. *(CAUTION—It is important that a socket be used to prevent damage to thrust button on end of gear).* Drill a new hole through sleeve and gear locating it 90° from existing hole, using a No. 24 (.152") drill. Install split pin retainer. Wash governor assembly thoroughly. Install governor valve and make sure that it operates freely. Install governor valve in bore of governor sleeve. Align governor weight pin holes in the governor thrust cap, governor weight assemblies and governor sleeve and install new pins. Crimp both pins to prevent them becoming dislodged. Check governor weight assemblies for free operation on pins. Check valve opening at entry and exhaust which should be .020" minimum. Adjust by bending tangs on governor weights.

R vers Serv Piston (1958-60): Remove reverse servo piston ring from piston and install in reverse piston bore. Check ring gap which should be .005-.010". Reassemble reverse servo piston ring on piston.

L w Serv Piston (Early 1958 - With Shaft Pressed Into Head): Cannot be disassembled. Check in same manner as for reverse piston (above).

L w Serv Pist n (Late 1958-60 - With Shaft R tain d in Head With Pin): Place low servo piston in an arbor press and support notched end of piston rod on a wood block. Use Tool J-3377 and compress piston spring and remove rod retainer. *CAUTION - This cushion spring is under 150 lbs. pressure.* Remove piston spring and washer from piston rod. Check ring gap which should be .005-.010". Assemble piston ring to piston and insert feeler gauge between side of ring and one wall of piston groove. Ring clearance should be .0005-.005". Assemble washer, spring and piston on piston rod, then place assemble in an arbor press and compress spring with Tool J-3377. Install retainer, making sure it is properly seated in piston rod groove.



POWERGLIDE PLANET CARRIER ASSEMBLY

Planet Carrier Assembly: ***Should not be disassembled unless inspection below indicates overhaul required. See Planet Carrier Overhaul below.***

Inspection—Wash in cleaning solvent, blow out all passages, dry with air. Inspect all gear teeth for nicks, scoring, or other damage. Check end clearance of planetary pinions with feeler gauge inserted between ends of pinion and thrustwasher. This clearance should be .006-.030". Check reverse sun gear rear thrustwasher for wear or damage. Inspect drum bushing for wear, scoring, or damage; inspect outer diameter of drum for scoring or burning. Check output shaft bearing surfaces for wear, nicks, or scoring. Check input pilot bushing for wear or scoring.

Planet Carrier Overhaul: If inspection (above indicates) that parts require replacement, proceed as follows:

Disassembly - Place assembly in holding fixture or clamp in a vise with front end upward. Mark each pinion and also mark planet carrier (use prick punch or other scribing tool) so that shafts can be replaced in the same location. *NOTE - Pinion shafts are no longer a selective fit, nowever, it is very important that pinion shafts be replaced in the same locations from which they were removed.*

1) Remove pinion shaft lockplate screws and rotate lockplate counterclockwise to remove it. Starting with a short planet pinion, and using a soft steel drift, drive out lower end of pinion shaft until pinion shaft is raised above pressed fit area of output shaft flange. Insert Tool J-4599 into short planet pinion from lower end and push planet pinion shaft ahead of it until tool centered in pinion and pinion shaft is removed from carrier. *NOTE - To l J-4599 comes in two pi ces, both alik . Only one piec is us d for removal, and two are used for reassembly.* Remove Tool J-4599, needle bearings, and three spacers from pinion. *CAUTION - Use care to prevent loss of needle bearings. Twenty bearings are used in each end and are separated by a bearing spacer in the center.* Follow above procedure and remove adjacent long pinion (paired to short pinion by thrust washers), then remove upper and lower thrust washers.

2) Remove and disassemble remaining planet pinions, in pairs, by first removing a short pinion, then the adjacent long pinion. Remove input sun gear and input sun gear thrust washer.

Inspection - Wash all parts in clean solvent and blow dry with air. Inspect all pinion gears and reverse sun gear for nicked or damaged teeth, inspect all thrust washers for wear, nicks, or scores. Inspect needle bearings for wear. Replace all worn or damaged parts. *NOTE - Needle bearings must be replaced in complete sets.*

Reassembly - *CAUTION - Pinion shafts must be replaced in accordance with marks made at disassembly (shaft is not a selective fit but should be replaced in same bore in carrier).* Assemble and install as follows:

1) Install Tool J-4599 in one long planet pinion, assemble needle bearing spacer and needle bearings in pinion (20 at each end) using cup grease to hold needle bearings in position.

2) Install pinion assembly in planet carrier with tool centered in assembly and with thrust washer (oil grooves in thrust washer toward gears) at each end of pinion. *NOTE - Long pinions are located opposite closed portion of carrier, short pinions are located opposite carrier openings.* Feed second part of Tool J-4599 in from top of planet carrier, making certain tool picks up thrust washer, and push first part of tool down and out of lower end. *NOTE - Tool must pick up second thrust washer as it is pushed down.* Lubricate correct pinion shaft (as marked at disassembly) and install it from top, pushing the assembly tools out ahead of it. Turn shaft so that slot in upper end faces toward center

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POWERGLIDE (C ntinu d)

of assembly, then tap shaft down with a brass or soft steel drift until lower end is flush with lower face of carrier.

3) Assemble and install adjacent short planet pinion (paired with the above long planet pinion by using same thrust washers) by repeating procedures for long pinion (above). Install input sun gear thrust washer and input sun gear.

4) Assemble and install remaining planet pinions, in pairs, by first installing the long planet pinion and then the adjacent short planet pinion.

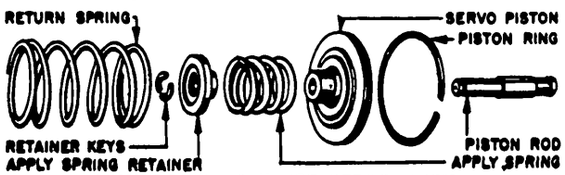
5) Check endplay of planet pinions using a feeler gauge inserted between end of pinion and thrust washer. This clearance should be .006-.030". Place pinion shaft lock plates in position, then with the extended portions of lock plate aligned with slots in planet pinion shafts, rotate lock plate clockwise until attaching screw holes are accessible. Install attaching screws and tighten to 2½-3 ft. lbs.

Input Shaft: Inspect shaft splines for nicks, wear, or other damage. Check spline fit in clutch hub, reverse sun gear, and converter hub. Inspect oil seal ring for wear and free fit in groove. Inspect input shaft pilot roller bearing installed in base of output shaft and if worn or damaged, pry out. Install new bearing by pressing in with pilot end of input shaft as a press tool.

Transmission Case & Rear Bushing: Check case for cracks, inspect rear bushing for wear or damage and replace if necessary.

Bushing Replacement—Place transmission case in an arbor press with rear end up. Using a cape chisel, cut bushing and remove from bore in case. Install rear bearing in its bore in rear oil pump assembly and install rear oil pump in case to serve as a pilot when installing new bushing. Place transmission case in an arbor press with front end up. Place new bushing on bushing installer J-4276, with the square end of bushing against shoulder of installer. Insert in case, entering pilot of tool into rear bearing, and press bushing into place. Bushing is precision type and does not require reaming.

Low & Reverse Brake Bands: Inspect bands for wear, cracks, and scored or burnt lining. Lining is bonded to band. Inspect linkage for wear.



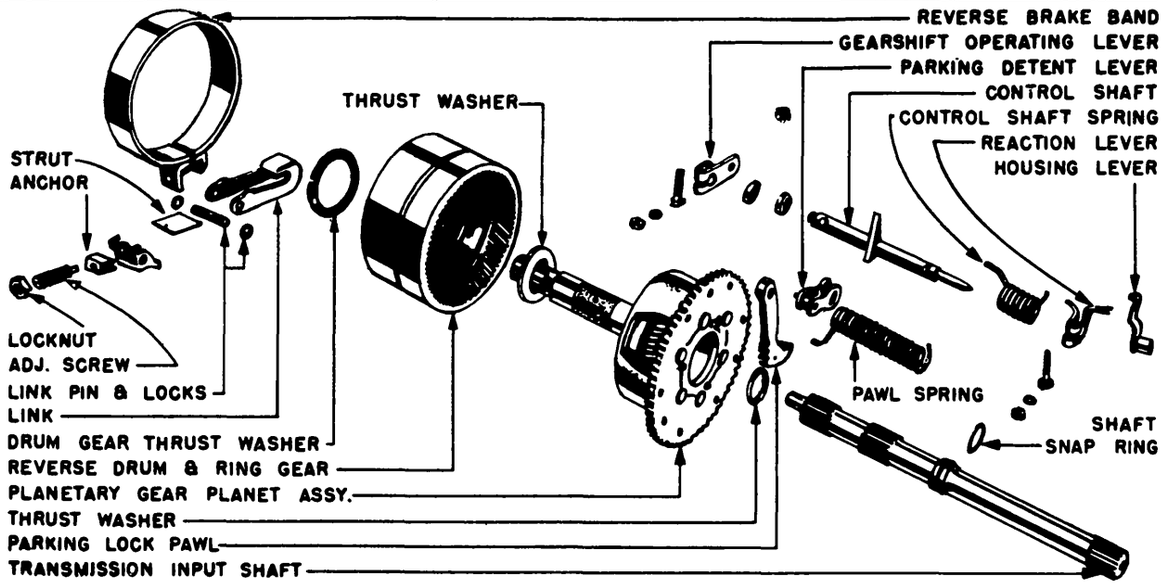
POWERGLIDE REVERSE SERVO ASSY.

REASSEMBLY

AFTER ALL MAJOR UNITS REASSEMBLED (See Overhaul above), install units as directed below using ALL NEW GASKETS AND SEALS and tightening all parts evenly to SPECIFIED TORQUES.

CONVERTER HOUSING ASSEMBLY: *Install units:*

Valve Body: First install suction screen in oil sump *(CAUTION*—screen must be thoroughly cleaned), see that sealing ring is in place. Install two ¼—20 x 3½" guide pins (part of Pilot Stud Set J-3387) in two valve body attaching bolt holes, place new valve body gasket in position over guide pins, install valve body assembly. Install all attaching bolts *(CAUTION*—lower left bolt over accumulator bore is special self-locking type and must be installed in this position), tighten all bolts evenly in a criss-cross pattern to 7½-10 ft.lbs. torque. Check manual valve and pressure regulator valve for free operation after all bolts tightened.



POWERGLIDE PLANET CARRIER, REVERSE BAND, & PARKING LOCK

Front Pump: Align holes in stator support with mounting holes in pump body. Install two ¼—20 x 3½" guide pins (part of Pilot Stud Set J-3387) in pump mounting holes, use Driver J-4263-5 to install pump in converter housing *(CAUTION*—line up suction and oil delivery holes on left side of pump). Install five self-locking bolts through valve body and into pump, tighten all bolts evenly to 7½-10 ft.lbs. torque. *CAUTION—Check pressure regulator valve for free operation after bolts tightened and make certain that pump operates freely.*

Low & Drive Valve Body: Install two 5/16" - 18 x 3" guide pins (part of Pilot Stud Set J-3387) in two valve body mounting bolt holes on left side of converter housing, place new gasket in position over guide pins, install valve body assembly. Install attaching bolts and lockwashers, tighten bolts evenly to 15-18½ ft. lbs.

TRANSMISSION CASE ASSEMBLY: Install units:

►*REAR PUMP-TO-CASE ATTACHING BOLT PRODUCTION CHANGE:* A new "hollow" bolt is used in later cars to replace the top rear pump-to-case attaching bolt. This bolt provides a vent which allows a more accurate dipstick reading when oil is added to transmission.

Rear Pump: Install two 5/16—18 x 3" guide pins (part of Pilot Stud Set J-3387) in pump attaching bolt holes, place new gasket in position over guide pins, install pump *(CAUTION*—align oil suction and delivery holes), tighten pump mounting bolts evenly to 12½-15 ft.lbs. torque.

Lubrication Pressure Relief Valve: Make certain that valve is clean and openings free from obstructions, see that valve disc and spring operate freely. Install relief valve in mounting hole in rear of transmission case and tighten securely.

Reverse Servo Piston, Band, & Drum: Compress piston ring with Ring Compressor J-3365, install servo piston in case with notch in shaft toward front of case. Install reverse brake band and strut assembly with thin end of band away from piston, thread adjusting screw in until it indexes with hole in anchor. Install bronze thrustwasher on reverse drum hub, install drum in case and into brake band. ***DO NOT adjust band at this point.***

Planet Carrier Assembly: Rotate rear pump drive slot to top of pump, then fill drive pin hole in output shaft with cup grease and install drive pin. *CAUTION - Make sure drive pin does not fall out of shaft during assembly.* Install planet carrier assembly, including steel thrust washer, on shaft in drum, positioning the "O" stamped on face of output shaft of planet carrier assembly at top center. Install rear bearing locating front snap ring in its groove in output shaft and install rear bearing using Tool J-5814. *NOTE - Groove in outer diameter of rear bearing should be to rear of transmission.* Install rear bearing retainer in groove in outer diameter of rear bearing and attach to rear oil pump with screws and lockwashers. Tighten screws to 9-11 ft. lbs. Install rear bearing rear locating snap ring in its groove in output shaft, then use Tool J-5814 and install speedometer drive gear on output shaft. Center raised ground surface of output shaft so that it will mesh properly with speedometer driven gear fitting. Assemble driven gear in fitting, then install as an assembly in bore of

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POWERGLIDE (C ntinu d)

extension Install retainer, attaching screw and lockwasher and tighten to 3½-5 ft lbs

Reverse Band Adjustm nt: *Adjust band at this point. See BAND ADJUSTMENT.*

Transmissi n Endplay Ch ck & Adjustment: After planet carrier assembly installed in case, the correct thickness of clutch drum thrust washer must be determined for correct transmission endplay of 025- 050"

►*GAUGING PROCEDURE CHANGE & TOOL J-4260 RFWORK (To provid a more accurate measurement)* The gauging procedure indicated below, supersedes procedure previously released Tool J-4260 must be reworked as follows in order to use the later procedure for gauging Press low sun gear pilot pins from tool bar, then remove spring and spring retainer from gauge rod Install a steel ball (similar to Rochester Carburetor pump outlet check ball) under end of gauge rod setscrew in tool bar Make a gauging collar (use a 2" length of a six cylinder engine valve guide, and solder a flat washer on one end to provide a larger surface for gauging, then thread a thumb screw through side of guide to permit locking on gauge rod) Slide gauge collar onto gauge rod between tool bar and knurled end of rod

Ch cking & Adjusting - Hold bar of Tool J-4260 solidly across front face of transmission case and push gauge rod into firm contact with front face of input sun gear Tighten setscrew in tool bar to lock gauge rod Slide gauging collar down rod until it seats on tool bar, then securely tighten thumb screw against rod Remove tool with setting retained *NOTF - The above tool setting was obtain d without the low sun gear thrust washer positioned against input sun gear* Place transmission main valve body assembly on a sheet of glass or a smooth table top, then install a clutch drum thrust washer on valve body and lower clutch assembly into place Center the low sun gear thrust washer on top of low sun gear *NOTE - If low sun gear thrust washer is "flanged" type, insert washer flange in I D of low sun gear* Using Tool J-4260, preset at dimension obtained (see above), place tool on top of low sun gear thrust washer, with gauge rod down through center of clutch and valve body so rod end rests on top of table (or glass) Loosen setscrew in tool bar and allow bar to drop down onto low sun gear thrust washer Using a feeler gauge, measure clearance betweer top side of bar and bottom face of gauging collar This dimension represents clearance in transmission and should be 025"- 050" If clearance is not within limits, substitute a thicker or thinner clutch drum thrust washer as necessary Clutch drum thrust washers aré available in three thicknesses as follows 078", stamped "2" (Part No 3737902), 106", stamped "3" (Part No 3737903), 134", stamped "4" (Part No 3737904) *NOTE - After checking and adjustment is completed, remove clutch assembly and thrust washer from oil delivery sleeve*

Parking Lock Mechanism: Install parking lock lever shaft assembly in case, install seal over end of parking lock lever shaft and into counterbore in case with seal lip toward inside of case Install flat washer and parking lock lever on end of parking lock lever shaft, pushing lever onto shaft to obtain 000- 010" clearance between lever and washer Connect short manual shift rod to parking lock lever Tighten clamp screw to 5-7 ft lbs Install parking lock pawl over pawl support rod and install parking lock pawl spring Wind up pawl spring using Tool J-3383, so that spring catches on inside of case

►*1958 INPUT SHAFT PRODUCTION CHANGE* A new low sun gear thrust washer, having no internal splines is used on later transmissions (beginning with Transmission Serial No C-407-D) The new thrust washer is used in conjunction with a new sun gear bushing added to input shaft Assembly procedures are different for the two types as follows

Input Shaft & Clutch Assembly: First Type - Install input shaft to clutch unit, then install thrust washer and locating snap ring on shaft Install unit assembly into case, indexing input shaft pilot with pilot in output shaft and low sun gear with short pinions in planet carrier

Later Type - Install input shaft to clutch unit, then install low sun gear bushing on input shaft spline, bottoming bushing against shoulder on shaft *NOTF - Wire type snap ring, used on input shaft with early type splined thrust washer, is not used on this later design* Assemble low sun gear thrust washer into planet carrier by tilting washer slightly to permit flange of washer to enter behind short planet pinions *NOTE - Use petroleum jelly to hold washer in place* Install clutch and input shaft assembly into case, aligning thrust washer on input shaft and indexing sun gear with short pinions in planet carrier

►*1958 LOW SERVO PISTON ASSEMBLY PRODUCTION CHANGE Two different piston assemblies have been used in production See production change above*

Low Servo Piston & Band Assembly: Install release spring on servo piston rod, use Ring Compressor J.3365 to compress piston ring and install assembly in transmission case. Install low brake band over the drum Install apply strut guide spring over piston rod, engage apply strut in piston rod slot and engage opposite end of strut in the band. Engage anchor strut assembly in band groove and locate opposite end of anchor over the adjusting screw. ***DO NOT adjust the band at this point.***

Governor: Install governor assembly in bore in transmission case *CAUTION - Governor must be allowed to rotate counterclockwise as gear teeth mesh, and care must be taken to prevent damage to teeth* Install two 5/16" - 18 x 3" guide pins (part of Pilot Set J-3387) in governor cover mounting holes, then place new gasket in position over guide pins and install governor cover, attaching bolts and lockwashers Tighten bolts evenly to 9-11 ft lbs

Extension Housing: Position new "O" ring seal on transmission extension Then carefully install extension on transmission case Install attaching capscrews and lockwashers and tighten to 12-15 ft lbs Install transmission extension oil seal using tool J-5154

TRANSMISSION & CONVERTER HOUSING ASSEMBLY:

1) Install manual valve in valve body and manual valve inner lever in converter housing Index lever pin with pickup slot in valve, set manual valve so it projects 1 11/16" out from face of valve body This places valve in "Low" position

2) Install new valve body-to-transmission case gasket, then raise transmission manual lever to top detent position (this is "Low" position and will align reaction lever so it indexes with manual valve inner lever in converter housing)

3) Place clutch drum thrust washer (selective washer of proper thickness as determined when transmission endplay checked above) over oil delivery sleeve Install two 3/8" - 16 x 3¾" guide pins (part of Pilot Stud Set J-3387) in converter housing, then push converter housing and case together, checking to see that reaction lever indexes with manual valve inner lever Install case-to-housing bolts and lockwashers and tighten t- 29-37½ ft lbs From front of converter housing install special self--locking bolt and tighten to 29-37½ ft lbs

4) Install two 5/16" - 18 x 3" guide pins (part of Pilot Stud Set J-3387) as guides for servo cover and install new servo cover gasket

5) Install servo cover locating sleeve in bore of servo cover *CAUTION - Be careful not to exert any downward force on reverse booster valve sleeve*

►*1958 PRESSURE REGULATOR VALVE ASSEMBLY PRODUCTION CHANGE· Beginning with Transmission Serial No C-630-D, a new pressure regulator valve which includes a dampening spring entered production Installation procedures for the later type valve are the the same as for previous type*

6) Install pressure regulator valve and spring, then install reverse servo return spring Install servo cover on guide pins, then apply pressure to cover to compress springs making sure that locating sleeve is in alignment with pressure regulator valve bore Install bolts and lockwashers, but do not tighten *NOTF - Us a non-hardening sealer under head of bolt installed directly above vacuum modulator*

7) Before servo cover bolts are tightened, the vacuum modulator hole in servo cover and the through hole in transmission case must be carefully aligned *CAUTION - If these holes are not properly aligned, modulator strut will bind, resulting in improper pressur s, harsh shifts, and possible clutch failure* To properly align holes, separate a used vacuum modulator at the diaphragm and screw the threaded half into modulator hole in servo cover Slide a standard 15/64" drill through both modulator hole and strut hole in case The drill should slide freely through both holes if align-

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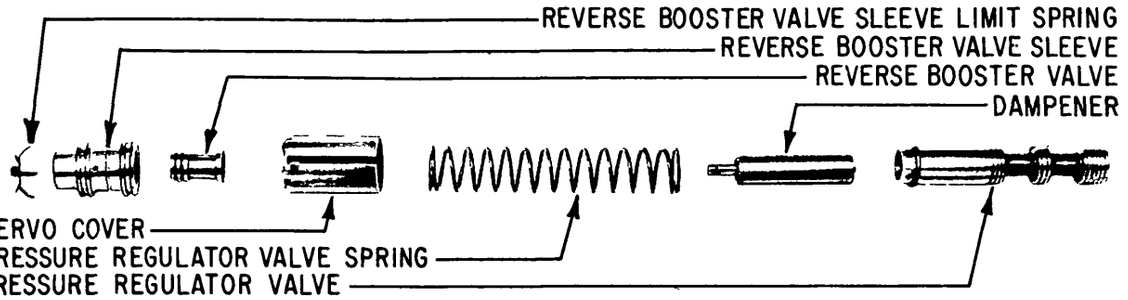
POWERGLIDE (C ntinued)

ment is correct. Align holes by tapping laterally or vertically on edges of servo cover with a soft hammer. With alignment correct, tighten all servo cover bolts to 15-18½ lbs., then remove half of vacuum modulator and 15/64" drill, and install strut and vacuum modulator. *NOTE - Be sure pressure regulator valve spring and reverse servo return spring are properly seated in servo cover.*

8) Adjust low servo band. *See "Band Adjustment" above.*

9) Install converter assembly in converter housing, aligning front pump drive gear lugs with drive slots in converter pump hub. *CAUTION - After converter is installed, check to insure engagement of converter pump hub drive slots in lugs of front pump drive gear. Hold a 6" straight edge against converter-to-flywheel mounting bracket and measure distance from straight edge to machined face of converter housing which should be 9/16". If distance is greater, converter pump hub drive slots are not properly engaged.*

10) Install Converter Holding Tool J-5384 to converter housing. This tool will prevent converter falling out when being installed in engine.



PRESSURE REGULATOR VALVE ASSEMBLY

INSTALLATION IN CAR

(EXCEPT CORVETTE)

TRANSMISSION ASSEMBLY INSTALLATION: Mount transmission on lifting device, then remove Converter Holding Tool J-5384. Proceed as follows:

1) Raise transmission into place and install transmission case-to-engine upper mounting bolts, then install lower and side bolts. *CAUTION - Be careful that converter does not move forward causing disengagement of pump hub drive slots from lugs of front pump drive gear.*

2) Remove support from beneath engine, then raise transmission to final position. Connect body ground strap. With flywheel cover removed, align flywheel bolt holes on converter and install converter-to-flywheel attaching bolts using a jumper to turn engine.

3) Reinstall transmission support crossmember. *NOTE - Two sets of holes are provided f r attachment of cr ssmember to frame as follows: L w r h les ar to be us d with Powerglide, Upper h l s used with Turboglid .* Be sure to reinstall exactly the same number (and thickness) of shims between extension mounting boss and crossmember as were removed. *NOTE - Thes shims maintain correct driv lin angl .*

4) Remove transmission lift equipment and support, then connect propeller shaft to transmission. Connect manual and throttle valve control linkage to transmission. Connect oil cooler lines, vacuum modulator hose, speedometer drive cable to transmission. Reinstall transmission oil filler tube and fill transmission. *S LUBRICATION above.*

5) Adjust all transmission linkage. *S LINKAGE ADJUSTMENT above.*

Form 61 A

CHEVROLET TURBOGLIDE TRANSMISSION

Ch vr let (1957) Opti nal with 283" Engin
Ch vr l t (1958) Opti nal with V8 Engines.

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 TURBOGLIDE TRANSMISSION PRODUCTION CHANGE* A number of transmission parts have been changed in production and are covered in OVERHAUL below

►*1957 TRANSMISSION SELECTOR LEVER INDICATOR CHANGE* Indicator lettering on face of speedometer dial has been changed from "HR" (Hill-Retarder) to "GR" (Grade-Retarder) to prevent misinterpreting "HR" position as "High-Range"

►*1957 THERMAL BYPASS VALVE PRODUCTION CHANGE*· In later transmissions, the thermal bypass valve has been eliminated and replaced by a new plug which acts as a relief valve in the event the oil cooler becomes plugged

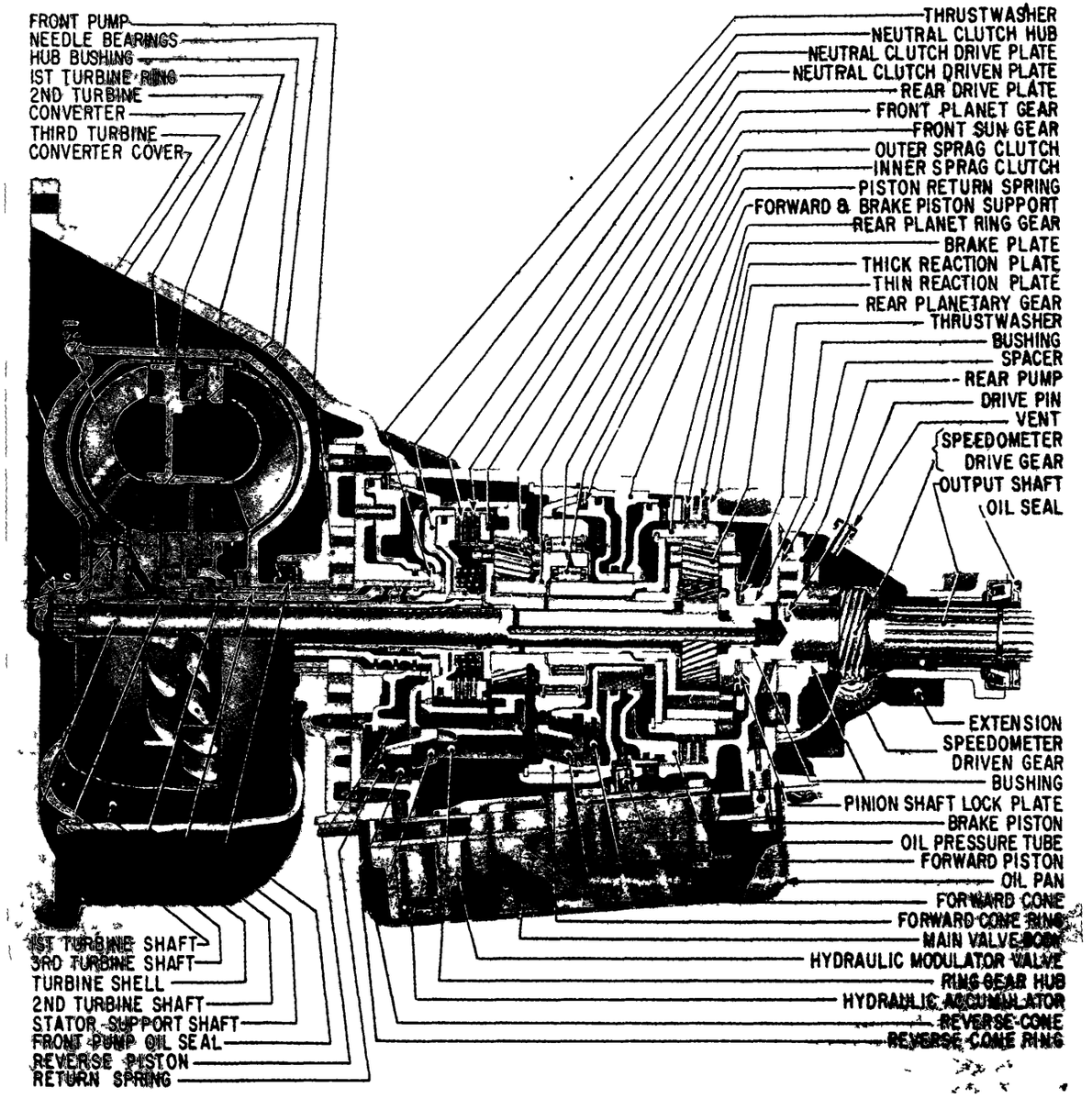
►*1957 VACUUM MODULATOR PRODUCTION CHANGE*· A new vacuum modulator, Part No 3745607, identified by a stripe of orange paint, replaces all previous vacuum modulators

►*1958 TURBOGLIDE TRANSMISSION REAR EXTENSION SEAL LEAKAGE CORRECTION (EARLY CARS):* On cars before Transmission Serial No. 1008, leakage around extension oil seal can be eliminated by using Chevrolet Gasket Paste on outer diameter of seal. The press fit at seal on later transmissions has been increased and gasket paste should not be required

►*1958 TURBOGLIDE EXTENSION HOUSING VENT LEAKAGE CORRECTION:* A condition can exist on early cars which makes it possible for the speedometer drive gear to throw oil (from rear pump) out of the extension housing vent. Beginning with Transmission Serial No. B1007, an oil deflector is installed on rear pump housing to prevent oil being thrown out of vent To install the new deflector, Part No. 3754075, on early cars, remove extension housing and two upper bolts securing rear oil pump body to transmission case. Install deflector on body and secure with the two upper bolts. If necessary, to prevent interference between bolts and extension housing when deflector is installed, grind approximately 1/16" from head of bolt.

►*STARTING ENGINE BY PUSHING CAR:* Place control lever in "N" (Neutral) range until car reaches 25-30 MPH. Turn key on and move control lever to "HR" (Hill Retarder) position. After engine starts, move control lever to "N" (Neutral) for engine warm-up. Towing is is not recommended to start car.

►*TOWING TURBOGLIDE CARS:* Cars must not be towed with rear wheels on the ground except with transmission in "N" (Neutral) position and should not be towed in excess of 30 MPH. If car is to be towed a long distance, drive shaft should be removed. *NOTE* – If car has been damaged and transmission cannot be placed in "N" with selector lever, disconnect long rod from idler lever on left side below mast jacket, then pull lever on transmission toward front of car as far as it will go. Move lever toward rear of car from the forward position to the third detent which is "N" (Neutral) position.



1958 CHEVROLET TURBOGLIDE TRANSMISSION (1957 SIMILAR)

DESCRIPTION

The new Turboglide transmission is a non-shifting, hydraulically controlled, planetary type transmission with a five unit torque converter having three turbines which are connected through two planetary units to the output shaft. Band or clutch engagement or disengagement (from standstill to top speed) is eliminated. In addition to the two planetary units, three cone clutches are provided for Neutral, Drive, and Reverse operation. A disc type clutch is used for control of Hill R tarder. A parking lock pawl engages a gear which is integral with the output shaft when selector lever is placed in

CONTINUED ON NEXT PAGE

Form 61 B

CHEVROLET TURBOGLIDE TRANSMISSION (Cont.)

"P" (Parking) position. Transmission clutches and torque converter variable pitch stator are hydraulically controlled by oil pressure supplied by front and rear oil pumps. A valve body mounted on the bottom of the transmission and enclosed in oil contains units to regulate oil pressure, control operation of clutches and provide manual selection of the operating ranges. When transmission is in "D" (Drive) position, torque multiplication is provided by the "first turbine" for starting and low speed power requirements. The "second turbine" is used for intermediate speeds and acceleration purposes and comes into operation at approximately 30 MPH (at full throttle operation). The "third turbine" is used for cruising and high speed operation and comes into operation at approximately 60 MPH (at full throttle). The actual point at which each turbine provides torque to the output shaft is dependent on car speed, engine speed, and throttle position. Oil pressure in the transmission is regulated and controlled in relation to engine torque by means of a diaphragm operated valve which is exposed to engine vacuum and maintains a pressure no higher than is required to hold clutches stationary. Oil temperature is controlled by a thermostatic valve which receives oil leaving the converter. When oil temperature reaches 180°F. the valve completely closes and directs oil through the heat exchanger installed in bottom of car radiator.

OPERATION

NEUTRAL (Selector Lever in "N"): All clutches are released and no drive is transmitted to transmission output shaft. Engine can be started with transmission in "N".

PARK (Selector Lever in "P"): All clutches are released (as in Neutral). The parking lock pawl is engaged with a gear on output shaft which prevents output shaft from rotating. Engine can be started with transmission in "P".

DRIVE (Selector Lever in "D"): Reverse clutch and hill retarder clutch are released. Neutral clutch and forward clutch are applied. Power transmission is through planetary units and output shaft as indicated below. As each of the three turbines are directly connected to a component of the two planetary units, power transmission varies in relation to turbine or turbines in operation depending on engine speed, car speed, and throttle position.

Power Range: As accelerator pressed to set car in motion, the engine drive pump starts, increasing with engine speed, and delivers nearly all of its output to first turbine. Motion of first turbine is transmitted to sun gear of rear planetary gear set, causing transmission shaft to be driven at a reduced rate as the rear planetary gears are forced to "walk" around their ring gear. The ring gear cannot rotate backwards because of its one way clutch. In this phase of operation, greatest transmission torque multiplication is obtained. Transmission gear reduction is 2.67-1, and with torque converter reduction (stator in normal low angle position), the maximum reduction is 3.8-1 at 1700 engine RPM. With stator in high angle, maximum reduction is 4.3-1 at 2700 engine RPM.

Acceleration Range: As car speed increases, angle of oil pumped by converter pump changes due to engine RPM and, because of the angle of first turbine blades, the oil starts to drive the second and third turbine in a progressive and overlapping action while output of first turbine diminishes. Output of second turbine is transmitted to output shaft through the front planetary sun gear at a 1.63-1 ratio. Reduction in the front gear set is obtained by turning the ring gear which causes planet gears to "walk" around sun gears and transmit their speed to the output shaft. The sun gear is prevented from turning backwards by a one way clutch. When second turbine reaches maximum torque, the first turbine is released and freewheels in converter pump oil stream. Like the first turbine declining action, as engine speed continues to increase, less oil pressure plays on the second turbine vanes but more reacts on the third turbine. Because of its direct connection to transmission output shaft, the third turbine is more favorable for high speed acceleration.

Cruising Range: When fluid coupling point of the torque converter is reached, the transmission is in cruising range. At this stage, work of the second turbine is completed and it is released by a clutch to freewheel in converter housing with the first turbine. All output is now from third turbine which is connected mechanically to output shaft at a 1 to 1 ratio.

Variable Pitch Stator: At speeds below 60 MPH, additional torque multiplication is available by depressing accelerator through its detent beyond full throttle position. Stator blades are changed to their high angle, which provides a greater redirection of oil entering the pump, to increase torque multiplication and permits engine speed to increase for greater power output to converter. Above speeds of 60 MPH, at full throttle, the stator freewheels regardless of blade angle, and converter ceases to multiply torque.

Hill Retarder: Hill Retarder clutch is applied and all other clutches are released. The hill retarder may be applied up to 40 MPH to control car forward speed when descending grades. When hill retarder position is applied, the multiple disc clutch on rear planetary gear set ring gear is engaged and all other clutches are released. This drives the first turbine at 2.67 times output shaft speed, while the second and third turbines freewheel. The pumping action of the first turbine creates a turbulence in the converter which effectively brakes the car by increasing engine speed and by transferring energy into heat in the converter oil. The heat is then dissipated by the engine cooling system.

REVERSE: Reverse cone clutch holds ring gear of front planetary gear set and the second turbine stationary and the drive range cone clutch connecting the third turbine to output shaft is also applied. Starting from a standstill in reverse, the reaction within the torque converter is same as for drive range. Inertia of the car tends to hold rear planetary carrier stationary. This causes the planet gears to drive ring gear in reverse. The rear ring gear then turns front planetary sun gear which forces front planetary gears to "walk" around locked ring gear and drive planet carrier and output shaft in reverse.

LUBRICATION

Check oil level at 1000 mile intervals, drain and refill every 25,000 miles.

Capacity - Approx. 3½ qts. (refill), 9½ qts. (after overhaul).

Recommended Oil – Use only Automatic Transmission Fluid Type A (as furnished in containers bearing "AQ-ATF" number).

Checking Fluid Level (Exc. Air Conditioned Cars): With transmission at normal operating temperature, transmission selector lever in "D" (Drive) position, and engine idling. Remove gauge rod located under right side of hood. Wipe with a clean cloth and check oil level. Add sufficient oil to bring level in transmission to the "Full" mark. *CAUTION - Do not overfill.*

Checking Fluid Level (Air Conditioned Cars): With transmission at normal operating temperature, transmission selector lever in "N" (Neutral) position, raise car on a hoist. Remove cap from oil level tube located at rear of transmission oil pan. Add oil to bring level in transmission to top of tube, as follows: Remove speedometer fitting and speedometer drive gear. Add Automatic Transmission Fluid Type "A" through speedometer gear hole.

Draining & Refilling: With engine and transmission at normal operating temperature, stop the engine and remove transmission oil pan drain plug. *(CAUTION – Do not run engine while draining transmission).* After completing draining, replace drain plug and install 3½ quarts of Automatic Transmission Fluid Type A, through the oil dipstick tube (use Funnel J-4264). Start engine and allow to run a few minutes as idle speed, then check oil level. If necessary, add oil to bring level up to "FULL" mark on dipstick.

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on car model pages.*

Manual Control Linkage: Loosen shifter tube lever clamp nut sufficiently to allow upper control rod to move freely in the swivel. Move parking lock and range selector lever on left side of transmission case toward front of car to the "N" (Neutral) detent (3rd position forward). Place shift control lever on steering column in "N" (Neutral) position. With the parking lock and range selector lever and the shift tube lever held in the "N" (Neutral) position, tighten the shifter tube lever swivel clamp nut securely. Check linkage operation to insure the "R" and "D" stops of the transmission control selector plate (mast jacket gate) do not prevent positioning of the selector *(CAUTION – Lever position must be established by transmission Neutral detent and not by the "R" and "D" stops of the control selector plate on the mast jacket).* If necessary, reposition control selector plate to permit normal operation in "R" and "N". *CAUTION* – Improper adjustment of linkage will result in partial pressures on the cone clutches resulting in slippage and ultimate failure of the transmission.

Neutral Safety Switch: Loosen switch assembly mounting screws. Place selector lever in "N" (Neutral) position. Install cotter pin or similar aligning pin in each of the

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CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

two holes in switch (one on each side of pointer). Rotate switch to place pointer between holes. Tighten screws securely and remove pins (*NOTE* – Slot in neutral safety switch must be set on center line of tang on shifter tube). If engine will not turn over, loosen screws and rotate switch in the direction necessary until it does. Make sure selector lever is in "N" (Neutral) position when changing switch position.

TROUBLE SHOOTING

DRIVE POOR AT LOW SPEEDS (NO REVERSE, GRADE RETARD NORMAL): Inner overrun clutch assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD: Both overrun clutches assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD AND REVERSE: Outer overrun clutch assembled backwards. Forward and neutral clutch not applied due to severe leakage in forward clutch hydraulic circuit.

CAR DRIVES VERY SLIGHTLY IN "NEUTRAL" (REVERSE NORMAL): Neutral clutch not released.

CAR DRIVES NORMAL IN "NEUTRAL" AND "DRIVE" AT LOW SPEEDS (NO REVERSE): Forward clutch not released.

NO DRIVE IN ANY SELECTOR POSITION: Front pump is assembled backwards.

TRANSMISSION WILL NOT SHIFT TO HIGH STATOR ANGLE: Stator control linkage out of adjustment. Converter charging pressure low for one of the following reasons: (a) Leakage which will reduce line pressure enough to cause pressure regulator valve to shut off converter in line. (b) Leakage in converter circuit. (c) Stator control pressure leaking to converter out across front oil seal ring or second oil seal ring on second turbine shaft.

UNABLE TO PUSH START: Rear oil pump drive pin broken or missing.

CLUTCH SLIPPAGE ON WIDE OPEN THROTTLE STARTS: Low oil pressure due to leakage (especially check forward pressure tube "O" ring). Mechanical interference which will prevent forward or neutral piston to fully apply. Neutral or forward clutch facing bond failure.

SECOND TURBINE SEAL RING LANDS INTERFERING WITH I.D. OF STATOR SHAFT: Case locating dowels on engine or dowel holes in case misaligned. Check by indicating front pump bore in case from crankshaft.

GRADE RETARD SLOW TO APPLY: Control linkage out of adjustment, preventing manual valve getting into grade retard position. Leakage to grade retard clutch (check pressure tube "O" ring seal and other sources). Mechanical interference in grade retard piston. Glazed grade retard plates (check neutral clutch for release). If neutral clutch does not release during grade retard, grade retard plates can be damaged.

NO DRIVE, REVERSE NORMAL, NO GRADE RETARD: Reverse clutch not disengaged.

GRADE RETARD BRAKES VIOLENTLY, STATOR PRESSURE READS HIGH ON CHECKING: Vacuum hose disconnected.

SHIFTS FROM STANDSTILL VERY SLOW: Check linkage to ascertain that shift lever is positioned by transmission detents. Accumulator control valve stuck closed. Leakage in hydraulic system (Check pressure tube "O" rings and other seals and gaskets).

SHIFTS FROM STANDSTILL VERY FAST AND HARSH: Accumulator control valve spring too strong or valve stuck open.

TESTING

►*TESTING CAUTION: Do not stall test this transmission at wide open throttle.*

►*TESTING CAUTION: Before testing transmission, check oil level and bring it to the "FULL" mark on dipstick (See LUBRICATION above). Warm transmission to normal operating temperature as outlined below. Adjust engine idle speed to 425 RPM with transmission selector lever in "D" (Drive) range. Adjust throttle linkage (see CARBURETOR on car model pages).*

TRANSMISSION WARM-UP: (In Shop) – Connect tachometer to engine, set parking brake and start engine. Place selector lever in "D" (Drive) range and adjust carburetor idle speed to approximately 750 RPM. Operate engine at this speed for 15 minutes, then readjust engine idle speed to 425 RPM with transmission selector lever in "D" (Drive) range.

On Road – Drive car for approximately 5 minutes with frequent starts and stops. Make sure engine idle speed is 425 RPM with transmission selector lever in "D" (Drive) range. Check fluid level (see LUBRICATION above). *CAUTION* – If fluid level too high, lower the level to "FULL" mark, then drive car five minutes to work bubbles out of fluid.

PRESSURE TEST: Shop – Connect pressure gauge to test point on left side of transmission adjacent to torque converter housing.

Drive Range: Adjust engine idle speed to 425 RPM, selector lever in drive range. Check idle stator pressure, which should be 45-60 lbs.

Reverse Range: With selector lever in "R" Range, stator pressure should be 45-60 lbs.

Grade Retard Range: With selector lever in "GR" ("HR" on early models), and foot on brake, accelerate engine to 700-900 RPM, stator pressure should be 45-60 lbs.

Park Range: With selector lever in "P" range, accelerate engine to 800-1000 RPM, stator pressure should be 80-90 lbs.

Neutral Range: Test in same manner as for "P" range.

PRESSURE TEST: Road – Disconnect stator control from throttle. Connect pressure gauge to test point on left side of transmission adjacent to torque converter housing. Connect vacuum gauge to engine.

1) With selector lever in "D" range, pressure should be 45-60 lbs.

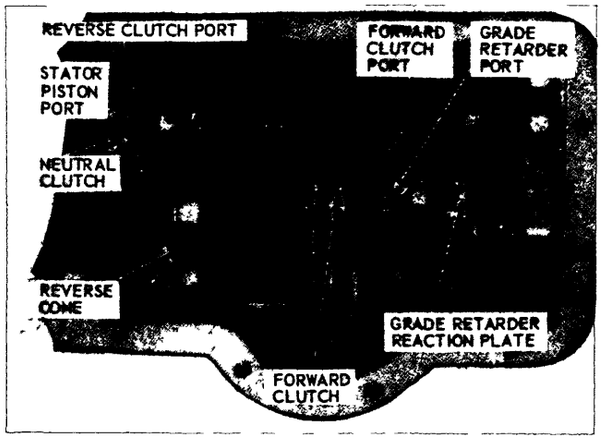
2) With selector lever in "D" range and at a car speed of approximately 30 MPH depress accelerator to wide open position, throttle pressure will rise to 135-145 lbs. at 0" of vacuum. At any speed, with foot off throttle, stator pressure should be 50-65 lbs., with engine vacuum reading of 16-25" of vacuum.

3) **Stator Operation** – Reconnect stator control rod to the throttle, place selector lever in "D" range and drive car at 20 MPH. Open throttle quickly, going through detent. Pressure will then drop to 0 lbs., and engine speed will rise when stator is working correctly. *(NOTE – At wide open throttle, stator pressure sh uld read 0 lbs. at any car speed).*

4) With selector lever in "D" range, traveling at 40 MPH, and foot off the throttle, stator pressure should read 50-65 lbs. With selector lever in "HR" range at 40 MPH, and foot off throttle, stator pressure should rise to 85-95 ft. lbs.

►*NOTE:* If engine tachometer is being used, the engine speed will drop (during manual shift from "D" to "HR") and then when hill retarder pressure reaches 85-95 lbs., the clutch will set down and engine speed will increase.

►*CAUTION: Make sure vacuum hose is properly connected to transmission vacuum diaphragm.*



1957-58 TRANSMISSION AIR TEST POINTS

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Drain oil from transmission and remove converter cover pan, transmission oil pan, and main valve body. Install oil pressure tubes in Forward Clutch and Grade Retarder apply ports (see illustration). Use Tool J-4353-1 and an air source of 100 lbs. pressure. Proceed as follows for the five air pressure checks:

Reverse Clutch: Apply pressure to reverse clutch port (see illustration) and visually check that reverse cone moves rearward. Listen for air leaks. If reverse cone does not move, determine whether front pump-to-transmission case gasket is incorrectly installed and blocking oil passages, or if reverse piston is cocked or bound. If air leaks are heard, check for damaged front pump-to-transmission case gasket or for damaged seals in reverse piston.

Stator Pist n: Apply air to stator piston port (see illus-

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CHEVROLET TURBOGLIDE TRANSMISSION (Cont.)

tration), and listen for air leaks. If air leaks are detected, check for a mispositioned or damaged front pump-to-transmission case gasket, broken or warped seal rings on second turbine shaft, defective stator piston seal, or damaged or worn brass seal in the inside diameter of stator support. Should it be determined that stator support brass seal is at fault, the stator support must be replaced as brass seal cannot be replaced separately.

Neutral Clutch: With air applied to neutral clutch port (see illustration), listen for application of clutch and air leaks. If no clutch application is heard, determine if the front pump-to-transmission case gasket is incorrectly positioned and blocking oil passages; otherwise disassemble neutral clutch and check for a locked-up or binding condition. If air leaks are heard, possible causes are a torn or distorted front pump-to-transmission case gasket, warped or broken oil seal rings on second or third turbine shafts, defective brass seal in the inside diameter of second turbine shaft. If brass seal is faulty, replace front ring gear hub and shaft assembly.

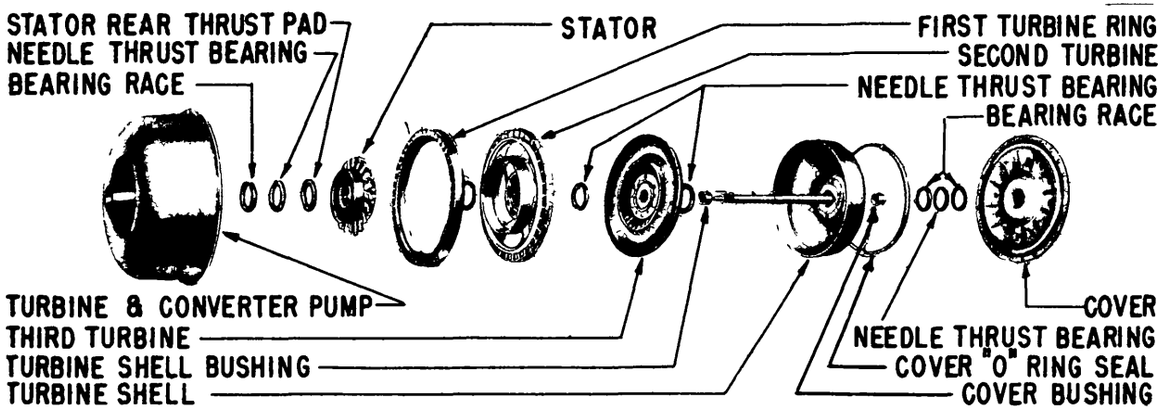
Forward Clutch: With oil transfer tube installed, apply air pressure to tube and observe that forward clutch applies. Listen for air leaks. Failure of clutch to apply can be the result of a wedged forward piston or Grade Retarder piston, probably caused by cocked piston "O" rings. A blockage of oil feed orifice in forward and brake piston support could also prevent clutch application. The first place to check if air leaks are found is the "O" ring seals on oil pressure tube in forward clutch port; otherwise, check forward piston-to-support seals.

Grade Retarder Piston: Apply air to grade retarder piston port with oil pressure tube installed (see illustration). Check Grade Retarder application by watching for movement of grade retarder reaction plate which will occur as the brake plates are forced against it by piston moving backward. If grade retarder piston does not move, check for cocked "O" ring seals in both the grade retarder and forward pistons or check for blocked orifice in piston support. Leakage could only occur at either the oil pressure tube "O" ring seal or brake piston "O" ring seal.

TRANSMISSION REMOVAL & INSTALLATION

1957 MODELS

REMOVAL: Place car on jack stands, and remove toe pan plate (under floor mat). Remove spark plugs and disconnect battery ground strap from battery. Disconnect wires from starting motor solenoid and remove starter. Remove underpan mounting bolt retaining oil filler tube clamp and remove filler pipe. *(NOTE - Use masking tape to cover opening in transmission).* On early cars with a thermal by-pass valve, disconnect oil cooler lines and vacuum hose at thermal valve on transmission case. On later cars, disconnect oil cooler lines at plug (replaces vacuum manifold valve). Move lines away from transmission and tie to right frame side rail. Disconnect manual and throttle control rods at transmission levers. Split rear universal joint, then remove propeller shaft and front universal joint as an assembly by sliding complete assembly rearward until free of transmission output shaft. Drain transmission. Disconnect exhaust pipe from crossover pipe and muffler from muffler support bracket. Move exhaust pipe and muffler as an assembly to left and tie to frame member. Remove converter underpan. Install engine support bar or cradle to support engine. Remove the six converter-to-flywheel bolts and nuts. Position hydraulic jack under transmission and attach handling equipment. Remove rear engine mounts from transmission *(CAUTION - Be sure engine is properly supported before removing mounts).* Remove all transmission-to-engine block attaching bolts, then lift accelerator bracket assembly toward front onto the block. Move transmission to rear slightly and install converter holding Tool J-5384. Move transmission to rear off of dowels on engine block and lower transmission from under car.



1957-58 TURBOGLIDE TORQUE CONVERTER ASSEMBLY

INSTALLATION: Raise transmission with proper handling equipment until converter housing is in line with flywheel housing. Remove converter assembly Tool J-5384 from converter housing, then carefully align the "X" mark on converter cover with "X" mark on flywheel *(CAUTION - After removing converter holding tool, be careful that converter does not move forward causing disengagement of the pump hub drive slots from lugs of front pump drive gear).* *(NOTE - "X" marks must be aligned. These marks are not visible after assembly has been completed).* Align bolt holes in flywheel and converter, then enter transmission case into dowels on engine and assemble one bolt on right side of center near the top. Assemble throttle bellcrank bracket on left side of case and assemble two bolts holding case and bracket to engine. Install transmission case-to-engine bolts and tighten to 25-30 ft. lbs. Install converter-to-flywheel bolts and nuts and tighten to 15-20 ft. lbs. Install underpan on case. Install rear engine mountings (both sides) and remove engine support bar or cradle. Complete the installation by reversing removal procedure (above).

1958 MODELS

REMOVAL: 1) Raise car on hoist (see "Jacking & Hoisting" in Suspension & Wheel Alignment Section), then proceed as follows:

2) Drain oil from transmission, then remove oil filler pipe. Disconnect oil cooler lines and speedometer drive cable fitting at transmission (tie lines out of way).

3) Disconnect manual and throttle valve control lever rods from transmission, then disconnect propeller shaft from transmission. Install suitable transmission lift equipment to hoist or jack and attach to transmission.

4) Disconnect engine rear mount on transmission extension, then remove transmission support crossmember. Remove flywheel cover, then use a jumper to turn engine, and remove flywheel-to-converter attaching bolts. *CAUTION - Use care to prevent any shims which may be installed between extension mounting boss and crossmember. The same number of shims must be installed as these affect drive line angle.*

5) Lower rear of transmission slightly so three upper transmission housing-to-engine attaching bolts can be reached using a universal socket and approximately a 39" extension. Remove upper bolts. *CAUTION - Care must be taken not to lower rear of transmission too far as distributor housing may strike fire wall.*

6) Support engine at oil pan rail with a jack, then remove remainder of transmission housing-to-engine attaching bolts. Remove transmission by moving it slightly to rear and downward, then remove from beneath car. *CAUTION - Keep front of transmission upward to prevent converter from falling out. Install Converter Holding Tool J-5384 immediately after transmission removal.*

INSTALLATION: 1) Mount transmission on lifting device. then remove Converter Holding Tool J-5384, then raise transmission into place and install transmission case-to-engine upper mounting bolts. Install lower and side bolts. *CAUTION - Be careful that converter does not move forward causing disengagement of pump hub drive slots from lugs of front pump drive gear.*

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CHEVROLET TURBOGLIDE (C nt.)

2) Remove support from beneath engine, then raise transmission into position. Connect body ground strap.
3) With flywheel cover removed, align flywheel balance mark "X" and small drilled balance hole on converter, then install converter-to-flywheel attaching bolts using a jumper to turn engine.
4) Reinstall transmission support crossmember. *NOTE - Two s ts of hol s ar provided for attachment of cross-m mb r to frame as follows: Lower holes are to be used with P w rglide. Upp r holes used with Turboglide.* Be sure to reinstall exactly the same number (and thickness) of shims between extension mounting boss and crossmember as were removed. *NOTE - These shims maint in corr ct drive line angle.*
5) Remove transmission lift equipment and support, then connect propeller shaft to transmission. Connect manual and throttle valve control linkage to transmission. Connect oil cooler lines, vacuum modulator hose and speedometer drive cable to transmission. Reinstall oil filler tube and fill transmission. *See LUBRICATION abov .*
6) Adjust all transmission linkage. *See LINKAGE ADJUSTMENT abov .*

TRANSMISSION DISASSEMBLY

► *TRANSMISSION OVERHAUL CAUTION: Before dis-ass mbling transmissi n, clean outside of case thor-ughly to pr v nt dirt getting into transmission parts. As ach part is r mov d, clean it with cleaning solvent and blow dry with air. DO NOT USE WIPING CLOTH (which may l av lint on parts).*

1957-58 MODELS

DISASSEMBLY (Int Maj r Units): 1) Remove converter assembly from transmission *(CAUTION - Prevent dam-ag to c nv rter utput shaft during removal as the out-put shaft bushing may be misaligned which would make replacem nt of torus shell and shaft assembly neces-sary).* Remove oil pan and gasket. Remove capscrew and retaining clip holding speedometer gear housing in extension and remove housing. Remove extension hous-ing from transmission, noting the square type seal ring on rear pump body.
2) Remove speedometer drive gear from output shaft, using Puller J-5814. Remove rear oil pump body and seal ring, then remove driven gear. Remove drive gear and pin from output shaft *(CAUTION - Drive pin can fall ut if hol on bottom of shaft).* Remove parking pawl spring with needle nose pliers. Remove four bolts retaining valve body assembly to transmission case. *(NOTE -* All three units of valve body will come off as an assembly. Bolts are two different sizes. Rear bolt is hollow to permit oil pressure to valve body).
3) Remove oil pressure tubes between valve body assembly and case *(NOTE -* Tubes are interchangeable and the "O" ring seals are the same). Remove front and rear gasket on valve body.
4) Place transmission with input shaft facing upward, then remove front oil pump cap screws, pump, stator support and reverse piston assembly *(NOTE -* Install Puller J-6585 in threaded holes of front pump housing to remove this assembly). Remove reverse cone and spring from case and place transmission horizontally on bench.
5) Remove neutral clutch and front ring gear assembly, which includes turbine shaft assembly, neutral shaft, and neutral clutch piston. Remove reverse cone ring (tanged to case), with soft drift and hammer. Remove front planet carrier. Remove front sun gear and free-wheel assembly (gear section forward). Remove forward cone retaining ring which holds forward cone in place. Remove forward cone ring and forward cone *(NOTE -* By exerting slight pressure on output shaft, both ring and cone can readily be removed). Remove forward and brake pistons and support as an assembly.
6) Remove rear unit ring gear and output shaft and rear planet carrier as a unit. Also remove both brake clutch plates and aluminum separator. Disassemble rear ring gear from rear planet carrier by removing retaining ring, and remove two races and needle bearings from exten-sion of carrier. Remove caged needle bearing assembly from output shaft.
7) Remove hairpin clip and remove detent control lever which is splined to shaft *(NOTE -* Do not lose the seat and washer from shaft). Remove manual selector lever. Remove parking brake bracket from case (two bolts), then remove parking lock actuator assembly. Remove parking brake pawl, pin, and "O" ring. Pin must be re-moved by driving on front of pin. On early cars with a thermal by-pass valve, remove valve and square seal ring *(CAUTION - Thermal by-pass valve cover is under spring tension).* Remove vacuum diaphragm by holding valve body and removing retainer nut from inside trans-mission case (valve strut will come off with retaining nut). On later cars, remove the plug which replaces thermal by-pass valve.

► *DISASSEMBLY NOTE: For disassembly of the above units, see OVERHAUL following.*

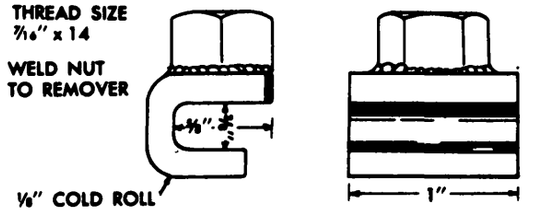
TRANSMISSION OVERHAUL

► *OVERHAUL NOTE: After removal from case, overhaul sub-assemblies or units as follows:*

1957-58 MODELS

TORQUE CONVERTER (Disassembly): Mount converter in a support to avoid damage to turbine output shaft. *(CAUTION - Scribe a mark on converter housing and cover for alignment and balance).* Remove bolts from cover, then remove cover from converter pump. Remove square seal from cover. Remove first, second, and third turbines as an assembly. Remove stator assembly. Re-move stator rear thrust pad, needle thrust bearing and thrust bearing race.
Turbine - Place converter turbine assembly on bench and drive out three drive pins enough to remove first turbine from turbine shell (a small punch should be used to drive pins through the inside of first turbine shell to protrude from first turbine ring). Remove first turbine ring from turbine shell with Tool J-6585, and first turbine ring remover (see illustration). *(NOTE - First turbine ring remover must be fabricated locally).* Remove second and third turbine from turbine shell.

Stator - Remove clutch head retaining screws and front thrust pad, then remove stator freewheel cam, rollers



FIRST TURBINE RING REMOVER TOOL

and springs. Remove stator freewheel race, then remove stator blade front carrier by pushing on rear extension of front carrier. Two dowel pins hold the front carrier from turning. Remove 20 stator blades, stator piston and retaining ring, then remove stator piston from blade rear carrier and remove ring from piston *(CAUTION - B careful not to break cast iron seal ring on stator piston).*
Inspection: Wash all parts in cleaning solvent and blow dry with air *(CAUTION - Do not use rags to dry parts).* Inspect converter pump hub outer surface, and pump thrust washers for galling or scoring. Check converter pump vanes and turbine vanes for looseness or damage. Inspect turbine hubs, turbine thrust washers, stator race and cam rollers for galling or scoring. Inspect converter cover bushing for galling, scoring, or excessive wear. Inspect cam springs for distortion. Inspect stator for galling or scoring and for loose vanes or damage. In-spect loose needle thrust bearing assembly and races for damage.
Converter Cover Bushing Replacement: Use precision type converter cover bushing, Part No. 3737261 for field service replacement (this bushing does not require reaming). Install bushing as follows: Remove thrust washer, needle thrust bearing assembly with a sharp instrument. Remove bushing with a chisel or sharpened tool, taking care not to damage thrust surfaces in bottom of bushing hole. Place new bushing on pilot end of con-verter cover bushing replacer, Tool J-6583, and press bushing into place. Replace thrust washer and needle thrust bearing assembly.
First Turbine Hub Bushing Replacement: Remove needle bearing assembly, then remove bushing with a sharp chisel, being careful not to strike turbine hub. Using Tool J-6561, place pilot bushing, Part No. 3732200 (which requires no reaming), on end of tool and press into hub of first turbine. Install new needle bearing assembly with Tool J-6561.
Reassembly: Stator - Install cast iron seal ring in stator piston and install stator piston in rear blade carrier, being careful not to break cast iron seal ring. Install stator piston retaining ring and install the 20 stator blades. *(NOTE - Trailing or sharp edge of blades should point downward after installation in stator. Neck f stator piston must be pushed fully through rear carrier to install stator blades).* Install stator front blade carrier, indexing the dowel pins in holes in rear blade carrier. Install stator freewheel cam in stator front blade carrier, aligning holes for retaining screws. Install freewheel race, springs and cam rollers with springs in large end of ramp slots of freewheel cam. Install front thrust pad

CONTINUED ON NEXT PAGE

CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

and retain with five screws. Tighten screws to no more than 3-4 ft. lbs.

Turbine - Install needle thrust bearings with Tool J-6561, in the three turbines (needle thrust bearing assembly is the same for each of the three turbines). Support third turbine with suitable bushing while installing thrust bearing *(CAUTION - Do not strike or drive needle bearing on thrust surface. The needle bearing should be installed only by applying force to outer edge of bearing).* Install third turbine in turbine shell with vanes up. Install second turbine in turbine shell with flange upward. Align balance marks, then install first turbine inner ring with inner flat surface facing up in turbine shell. Locating three drive pins in shell with their respective holes in the inner ring can be accomplished with a small drift having the diameter of the pin. Complete installation by seating pins in place with a small "C" clamp.

Converter - Install steel spring ring into thrust bearing opening in pump and invert pump and converter assembly on stand and install needle bearing race (thinner washer) in pump. Install needle bearing assembly in pump, then install stator rear thrust pad (heavier of two washers). Install stator assembly into pump with bolts on stator facing up. Mount pump on stand face up, and index converter turbine shaft through pump and stator assembly. Install new square ring seal on converter cover. Place thrust washer, needle bearing, and another thrust washer on face of hub. Install converter cover and align balance marks on converter cover and pump. Install bolts on each side of scribe mark, omitting each fourth bolt, then tighten nuts finger tight. Tighten converter bolts as follows: Tighten every third bolt to 8-12 ft. lbs., (in rotation). Tighten remaining bolts to 8-12 ft. lbs., (in rotation), then tighten all bolts to 13-18 ft. lbs., (in rotation).

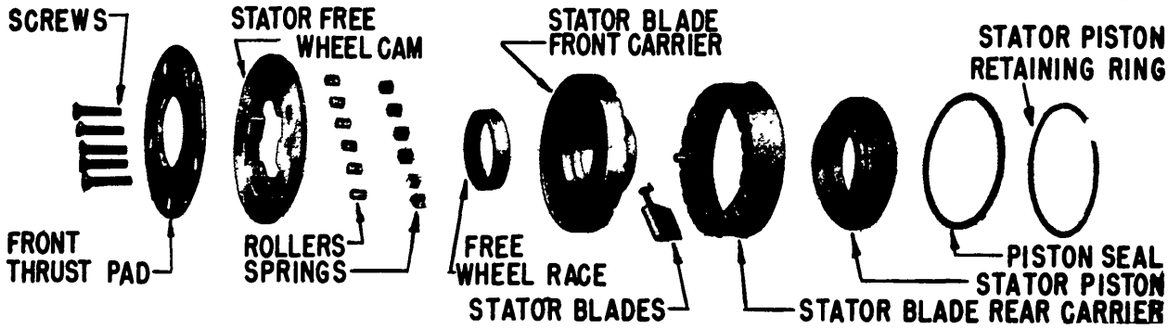
1957-58 MODELS

PLANETARY UNITS (FRONT & REAR): Front and rear units are similar and service procedures are nearly identical. Front unit does not have a sun gear or sun gear thrust washers.

►*FRONT PLANETARY UNIT PRODUCTION CHANGE:* Early units had four planetary gears. Later units have only three. On later units, planet pinion shafts are held in place with a lock plate, and are not held in place by staking as on the earlier units.

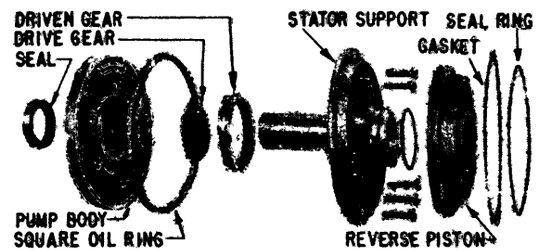
►*REAR PLANETARY UNIT PRODUCTION CHANGE:* Rear planet carrier pinion pins are held in place on later units with a lock plate identical to the one used on later front planetary units. On transmissions disassembled for service in which the old pressed-in type pins are found, the pins should be removed and discarded. Carefully file out staking burrs in pinion shaft holes in carrier and output shaft. Reassemble, using a new pinion shaft, Part No. 3746468, and lock plate, Part No. 3746470.

Disass mbly: Place planet carrier in a vise (having protected jaws), then mark gear and output shaft for identification and alignment at reassembly. Remove three



1957-58 VARIABLE STATOR ASSEMBLY

hex head lock bolts from bottom of carrier (rear unit); four Allen head bolts (three on later units) from top of carrier (front unit), and install Tool J-6559 to top of assembly, retaining it in place with the lock bolts. Install assembly in an arbor press with the output shaft downward, then install a suitable drift in hole in carrier and press on sun gear (rear unit), flange of output shaft (front unit) until output shaft is away from carrier and planetary gear shafts are freed from carrier *(NOTE - On later transmissions, the pinion shaft lock plates must be removed).* When carrier is separated from output shaft, all parts of the assembly can be removed. Be careful to keep planet pinions on pinion shafts so as not to lose pinion needle bearings *(CAUTION - On early cars with pinion shafts staked in carrier and output shaft, do not attempt to remove pinion shafts by breaking the four way stake. Pinion shafts must be removed by disassembly of planet carrier only).* Remove Tool J-6559 from carrier. Install the part containing pinion shafts into a vise and remove needle thrust bearing assembly, thrust bearing retainer, needle bearing race, and on rear unit, remove sun gear and sun gear thrust washer. Place a dummy shaft (old pinion shaft or a wooden dowel the same size as pinion shaft) to end of pinion shaft and slide a knife blade between lower thrust washer and



1957-58 FRONT PUMP & REVERSE PISTON ASSEMBLY

pinion shaft holder. Lift up on knife and slide lower bearing thrust washer onto dummy shaft. Remove other two (three on early type front units) pinion assemblies in the same manner. On units with early type front and rear units, pinion shafts may be removed by knocking shaft out of holder (carrier or output shaft) with a drift no larger than the inner circle formed by staking marks *(CAUTION - Damaging the staking marks will ruin retaining quality of carrier or utput shaft and nec ssitat replacement of these parts).*

Inspection: Wash all parts in solvent and blow dry with air. Check planetary pinion gears and sun gear for nicks or other tooth damage. Check thrust washers for wear or scoring and replace all worn or damaged parts. *(NOTE - The output shaft bushing is pr cision bor d in place during assembly, and is not r plac abl).* Inspect planetary needle bearings closely and if excessive wear shows, replace all the bearings in that pinion. Check pinion shafts and replace if worn (install new pinion shafts in output shaft half of the assembly).

Reassembly: *(NOTE* - If pinion shafts have been installed in output shaft, install output shaft in vise, if pinion shafts are not removed, install carrier in vise for installation of pinion gears). Using a dummy shaft, assemble needle bearings, and spacer (17 in each end), in one of the planet pinion gears (use cup grease sparingly to aid in assembling and holding needle bearings in place). Install pinion thrust washer over pinion shaft with tang indexed to small lock hole in output shaft (or carrier). Index dummy shaft with pinion gear assembly, to pinion gear shaft, and slide pinion gear assembly over shaft. Repeat operation for other pinion assemblies. Install sun gear rear thrust washer into output shaft with tang of thrust washer down and into lock hole in output shaft. Install sun gear. Install thrust bearing retainer in rear planet carrier. Install sun gear needle bearing race and needle thrust bearing assembly in rear planet carrier (use a slight amount of lubricant to retain in position). Install pinion thrust washers with tangs up. *(CAUTION - Make sure that no metal is shav d from pinion shafts during assembly as false clearanc r adings will b obtained).* Align alignment marks on carrier to alignment marks on output shaft and insert dowels of carrier into their respective holes in output shaft *(CAUTION -* While installing carrier to output shaft, align tangs of thrust washers to lock holes in carrier). To accomplish mating of carrier and output shaft, install assembly in arbor press in same manner as that used for disassembly, and press into position. Install the lock bolts and tighten to 18-22 ft. lbs. Check clearance of planet gears between washer and pinion (do not check between washer and carrier), this clearance should be .006-.030".

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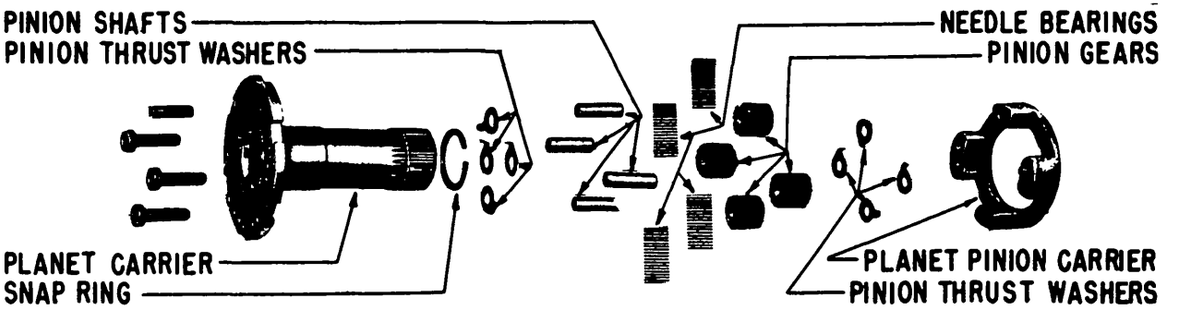
CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

1957-58 MODELS

FRONT OIL PUMP & REVERSE PISTON: Disassembly - Remove gasket and the square oil seal ring. Remove reverse cone piston by using air pressure and applying nozzle approximately ½" from reverse port in stator support. Remove square seal ring from outer diameter of reverse piston, and square seal from stator support hub. Remove five hex bolts holding stator support to front oil pump body and remove oil pump body from stator support. Remove oil pump drive gear and driven gear. *(NOTE* - Lug on drive gear is installed to front of pump body. This lug mates with slot in converter housing hub).

Inspection: Wash all parts in solvent and blow out all oil passages *(CAUTION - Do not use rags to wipe parts).* Inspect all parts for nicks or scores. Inspect seals for wear, hardness, damage, or evidence of oil leakage. If pump body oil seal is damaged, pry out and install new seal using Tool J-6584. Inspect splines on stator shaft for wear, and check both ends of shaft inner diameter for wear. Inspect facing material on reverse piston and ring for cracks or flaking and replace if found questionable. Inspect reverse cone and replace if excessive heat indicated. Inspect pump body bushing for galling or scoring. Check clearance between pump body bushing and converter pump hub. Maximum clearance should be .005". With parts clean and dry, install pump gears and check clearance between O.D. of driven gear and body. This clearance should be .0025-.0055". Check clearance between internal gear and crescent. This clearance should be .003-.009". With scale and feeler gauge, check gear end clearance by placing scale across gears and housing. Clearance between scale and gears should be .0005-.0015".

R assembly: Remove gears from pump after checking and lubricate with automatic transmission fluid, then reinstall gears in pump body *(NOTE* - Drive gear is installed in pump body with lug toward body. Lug mates with slot in converter housing. If drive gear is installed improperly, pump will not operate). Assemble stator support through drive gear and align attaching bolt holes. Install the five lock bolts but do not tighten. Install Concentricity Gauge J-6560 over front extension of stator support to align stator support to pump body, then tighten the five lock bolts to 18-22 ft. lbs., and remove gauge.



TYPICAL FRONT PLANET CARRIER (NOTE - THREE PLANET PINIONS USED IN LATER PRODUCTION)

Install square seal to stator support hub (lubricate seal with automatic transmission fluid), install outer square seal ring. Guide piston over dowels and press with fingers to seat in place (dowels are off center to facilitate correct mating of parts). Install square seal to outer edge of support. Install gasket on oil pump housing *(NOTE - Reverse cone spring is not installed at this time due to operation for selection of correct size thrust washer, during which spring is removed).*

REAR PUMP: Disassembly - Remove pump gears and wash parts with solvent. Blow out all oil passages and check parts for visible damage. Install gears and check all clearances which are the same as for the front pump (see above). *NOTE* - Use output shaft in place of converter to make check for clearance between output shaft and pump bushing.

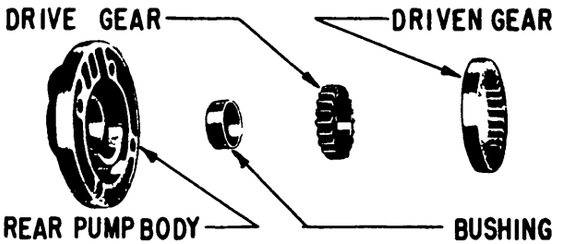
Rear Pump Body Bushing - Use precision bushing, Part No. 3727490, which requires no reaming, for service replacement. Cut bushing with a chisel and remove from pump body. Press new bushing into pump body with Tool J-6582. Bushing should be flush with neck of pump body on the inside, and flush to .010" below front surface of pump body.

Reassembly: Lubricate all parts with automatic transmission fluid. Reverse the disassembly procedure.

1957-58 MODELS

FRONT SUN GEAR FREE WHEEL ASSEMBLY: Disassembly - Remove needle thrust bearing assembly in opening in the rear of sun gear. Remove snap ring in outer cam from rear of assembly with a screwdriver. Remove forward cone freewheel sprag assembly, and outer bearing from sun gear (sun gear may have to be rotated clockwise to freewheel out of cam). Remove sprag assembly from outer cam *(NOTE* - The sprag assembly should not be disassembled. An arrow stamped on outer cage of sprag assembly designates front of transmission). Remove sheet metal retainer from sun gear, using pliers and bending retainer at staking points. Remove ring gear freewheel sprag assembly and bearings.

Inspection: Wash all parts in solvent and blow dry with air *(CAUTION - Do not use rags to wipe parts).* Inspect

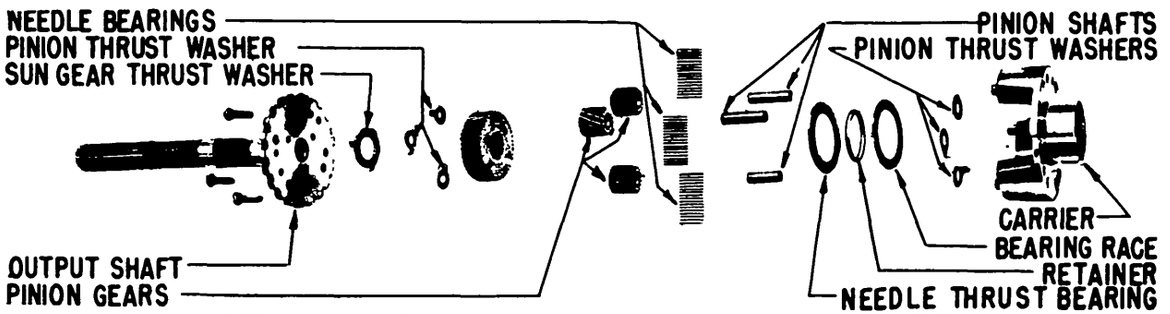


1957-58 REAR PUMP ASSEMBLY

inner race (sprag bearing surface) of cam for excessive scoring or burning. Also check lugs on outer perimeter of cam for nicks or burrs. Check bushings in sun gear for looseness or bushing scoring. Replace if necessary. *(NOTE* - Bushings must be replaced in pairs with sun gear removed from freewheel unit). Inspect front sun gear teeth for nicks and burrs and for fit of sun gear into front planetary unit. Inspect internal and external races (sprag bearing surfaces) of sun gear for excessive scoring or burning. Inspect sprag bearing for excessive wear. Check sprag assemblies and if wear is indicated, replace the assembly.

Front Sun Gear Bushing Replacement - Use precision bushings, Part No. 3727244, which require no reaming, for service replacement. *(CAUTION - Do not attempt replacement of these bushings with freewheel unit assembled).* Remove old bushings with Tool J-6581, using removal end of tool. *(CAUTION - Before installing bushings, note position of oil grooves in bushings. These grooves must point outward to maintain oil reservoir in sun gear).* Using Tool J-6581, mount sun gear in press and press bushings into place.

R assembly: Install front retainer, then large sprag front bearing (brass) into cam. Install sprag into cam *(NOTE* - Stamped arrow on outer cage of sprag assembly indi-



TYPICAL REAR PLANETARY CARRIER & OUTPUT SHAFT ASSEMBLY

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CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

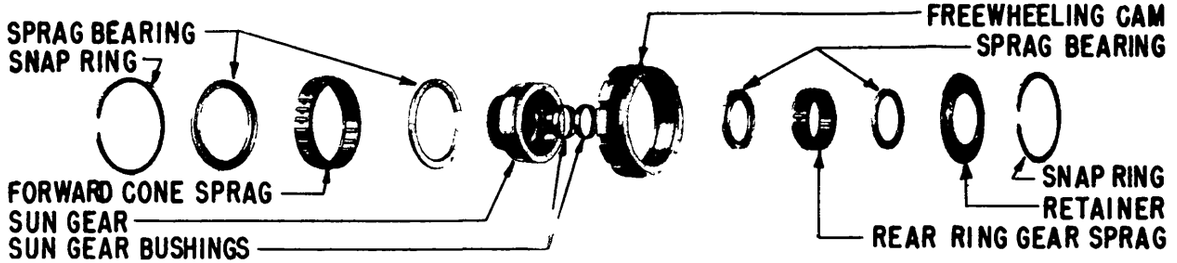
cates front of transmission), compress unit into cam with fingers (do not force). Install large sprag rear bearing (brass) into cam, then set aside for further assembly. Install front bearing (brass) into rear of sun gear. Install sprag, then install rear bearing (brass) into sun gear. Index tang of new seal retainer into hole in rear of sun gear and clamp in vise, using a steel block and wood block, and stake retainer into place using a staking tool which must be sharp and give a "fingernail" impression *(CAUTION - Shield retainer must be held snug to rear of sun gear while staking operation is performed. Be very careful not to bend shield).* Index sun gear into forward cone sprag, twisting counterclockwise to enable sprag cams to twist, allowing sun gear race to seat under sprags while twisting. Install rear bearing into cam. *(NOTE - Sprags are assembled correctly if units will slip while holding outer cam stationary and turning sun gear clockwise as viewed from front).*

1957 MODELS

►*NEUTRAL CLUTCH PISTON & SPRING PRODUCTION CHANGE:* A new piston is being used in production and two release springs are being used in place of the former single spring. These springs are the same as the single original spring but must always be replaced in pairs from the same source and have the same die mark to assure proper nesting. Matched springs are furnished in service package, Part No. 3746425. When installing springs, the ends should be toward piston and the gaps of both springs must line up.

►*NEUTRAL CLUTCH CONE RING PRODUCTION CHANGE:* Transmissions bearing a date of Feb. 1, 1957 or later have a new clutch cone ring to which a .045-.035" step has been added to rear face. Slots in clutch hub have been increased .040" in depth to permit removal and installation of the ring retainer. Special procedures are required for disassembly and reassembly of unit using the new rings, as follows: In order to fully depress cone ring, install a small "C" clamp on each side of clutch hub assembly so that the adjustable foot of clamp is seated partly on step of cone ring and partly on clutch cone. Cone ring retainer can then be either removed or installed.

NEUTRAL CLUTCH & FRONT RING GEAR: Disassembly - Remove converter turbine shaft oil seal ring from front of ring gear hub shaft. Remove three turbine shaft oil seal rings and lift converter turbine shaft ring gear thrust washer off shaft *(NOTE* - This washer is a selective fit for proper clearances within transmission). Remove front planet ring gear retainer ring with a sharp instrument and remove ring gear from hub. Remove hub from turbine shaft and neutral clutch assembly. Remove oil seal rings from turbine shaft. Remove race, needle thrust bearing assembly and rear race from turbine shaft. Remove neutral cone ring retainer ring from neutral clutch assembly *(See "Neutral Cone Ring Production Change" above),* then remove cone ring, cone and cone piston return springs (or spring). Remove neutral clutch piston by putting air pressure into ball check hole in hub (Piston is doweled to hub and will not rotate independently of hub). Remove neutral cone piston outer square seal ring, and stator support square seal ring from stator support hub. *NOTE* - Ball check in hub is not removable.



1957-58 SUN GEAR FREE WHEELING UNIT

Inspection: Wash all parts in solvent and blow dry with air. *(CAUTION - Do not use rags to wipe parts).* Inspect splines in hubs for nicks or burrs and check hub for fit into third turbine. Inspect ball check for looseness. If leakage is suspected, hub may be checked by filling cavity with oil and noting any leakage at ball check. Inspect inner race of hub for excessive scoring or burring (surface on which piston moves must be microsmooth to eliminate possibility of oil ring breakage). Check all ring lands for nicks or burrs which may restrict ring movement. Check bushing in center of hub. If bushing is scored or loose, or inner race is damaged, replace hub and shaft assembly. Check neutral cone piston for burred or nicked groove for piston outer seal, or inner race being scored or pitted. Any surface roughness in contact with rubber seals will cause seal failure. Inspect neutral cone inner and outer facings for cracks or flaking. If questionable, replace as necessary. Check all tangs and keyways for proper engagement (the smallest burr or tang will hamper assembly). Inspect neutral cone surface and if excessive heat is indicated, replace the part.

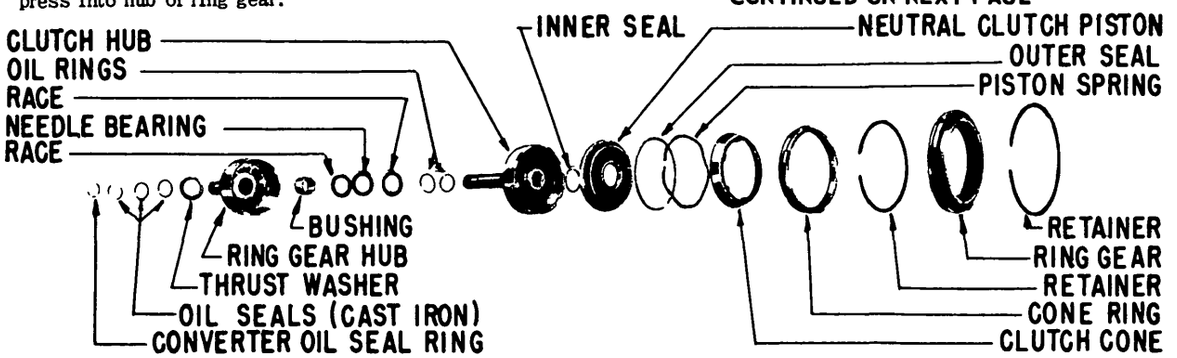
Front Ring Gear Hub Bushing Replacement - Use precission bushing, Part No. 3727301, which requires no reaming, for service replacement. Mount hub in vise (with jaws protected). Remove bushing with chisel *(CAUTION - Do not strike hub of ring gear).* Mount hub in arbor press and using Tool J-6643, pilot bushing on end of tool and press into hub of ring gear.

Reassembly: *(NOTE - Lubricat rubb r s als with aut - matic transmission fluid b f r assembling).* Install neutral cone piston inner square seal ring to center raised portion of hub. Install neutral piston outer square seal ring on piston. Install neutral clutch piston into hub, indexing hole in piston to fit dowel in hub. Apply hand pressure evenly around piston to facilitate installation. Install neutral cone piston return spring, neutral cone and cone ring, indexing lugs to keyways in hub. Install neutral cone ring retainer ring in groove in hub, seating it fully in groove. Place unit on bench with turbine shaft up and install needle thrust bearing race, needle bearing assembly and front race over turbine shaft of neutral cone hub. Install two piston hub oil seal rings (cast iron) on turbine shaft. Install front ring gear hub over neutral piston and turbine shaft assembly *(CAUTION - Be careful not to break il s al rings during installation).* Lift the assembly, keeping units together, and mount in vise. Key front planet ring gear to ring gear hub with large tapered portion of ring gear upward, or retainer cannot be installed. Install front ring gear retainer ring in hub and make sure it seats in bottom of groove. *NOTE - Oil s al rings and sel ctiv thrust washers are not install d at this tim as it would be necessary to remove them for s l cting prop r thrust washer during reassembly.*

1958 MODELS

NEUTRAL CLUTCH & FRONT RING GEAR: Disassembly - Remove converter turbine shaft oil seal ring from front of ring gear hub shaft. Remove three turbine shaft oil seal rings and lift converter turbine

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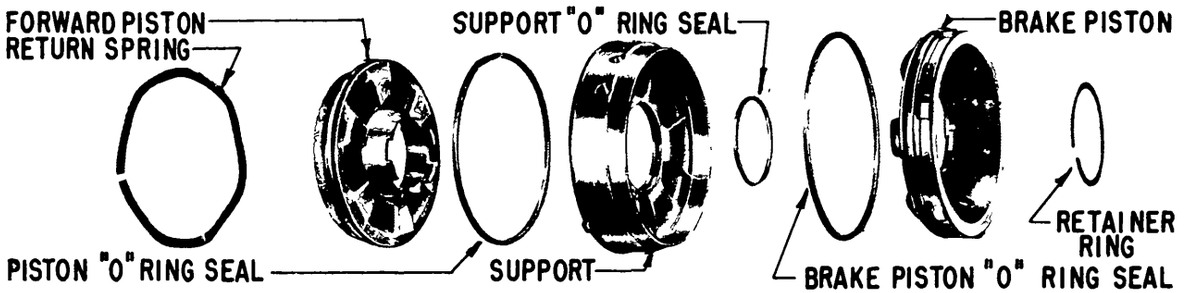
1957 NEUTRAL CLUTCH & RING GEAR ASSEMBLY (FIRST TYPE)

CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

shaft ring gear thrust washer off shaft- *NOTE - This wash r is s l ctiv fit for proper clearances within transmission.* Remove front planet ring gear retainer ring with a sharp instrument and remove ring gear from hub. Remove hub from turbine shaft and neutral clutch assembly. Remove two third turbine shaft seal oil rings from turbine shaft, then remove plate retaining snap ring and lift out rear drive plate, clutch drive plates, and driven plates. *NOTE - Plate retaining snap ring is staked in place. Remove staking by driving on snap ring with a punch and hammer.* To remove spring retainer snap ring, place neutral clutch assembly in an arbor press and compress springs with Tool J-5133 and J-7150, then remove snap ring and slowly release press. Lift off spring retainer and remove 16 springs. To remove neutral piston apply air to check ball (piston will blow out). Remove neutral piston outer seal and piston hub seal. *NOTE - Ball ch ck in n utral clutch hub must be free to move off s at .030" minimum and hole should be free of chips and dirt. Ball ch ck is n t removable.*

Fr nt Ring G ar Hub Bushing Replacement - *CAUTION - Th f llowing procedure applies only to early 1958 cars. On lat r units, the front ring gear hub must b r plac d as a c mpl te assembly if bushing requir s r plac ment.* Use precision bushing, Part No. 3727301, which requires no reaming, for service replacement. Mount hub in vise (with jaws protected). Remove bushing with chisel. *CAUTION- Do not strike hub of ring g ar.* Mount hub in arbor press and using Tool J-6643, pilot bushing on end of tool and press into hub of ring gear.

R ass mbly: *NOTE - Lubricate rubber seals with automatic transmissi n fluid before assembling.* Install neutral clutch piston hub seal ring to center raised portion of hub, then install neutral clutch piston outer seal on piston. Install neutral clutch piston into clutch hub (apply hand pressure evenly around piston to aid in piston installation). Arrange 16 piston springs on neutral clutch piston in a circle in piston spring groove, then place spring retainer on springs. Place assembly in an arbor press, then install snap ring in approximate position and compress springs with Tool J-5133 and J-7150. Make sure snap ring is properly seated, then remove neutral clutch from arbor press. Install externally tanged drive plates and internally splined driven plates alternately in neutral clutch hub starting with a drive plate. Install rear drive plate and secure all plates with snap ring. Stake retainer plate against snap ring in three places. Install ring gear hub bushing, then two third turbine shaft seal rings. Insert neutral clutch hub into front ring gear hub being careful not to break seal rings on third turbine shaft. Key front ring gear to ring gear hub (larger tapered portion of ring gear must be up or snap ring cannot be installed). Install front ring gear retainer ring in hub, making sure it seats fully in bottom of ring groove. *NOTE - Oil seal rings and selective washers are not installed at this time as it would be necessary to remove them for selecting proper thrust washer during assembly.*



1957-58 FORWARD & BRAKE PISTON & SUPPORT ASSEMBLY

1957 MODELS

FORWARD PISTON, BRAKE PISTON & SUPPORT: Disassembly - Remove return spring from forward piston, making sure that facing material is not chipped from piston cone surface. Remove retainer holding brake piston to forward piston. Mount assembly into Holding Fixture J-6580-1 indexing tang of support to keyway in holding fixture, then place in arbor press. Index Tool J-6580 into spline of hub of forward piston and press piston out of support and brake piston. Remove support from holding fixture and remove forward piston. Reverse support and install with brake piston down into holding fixture, then press out brake piston in the same manner as for forward piston. Remove parts from holding fixture and remove "O" rings from support, and square seal rings from forward and brake pistons.

Inspection: Wash all parts in cleaning solvent and blow dry with air. Inspect splines of hub for nicks or burrs and check hub of brake piston for fit into hub of forward piston. Inspect all surfaces contacting oil seal ring surfaces for scoring or burning, and check seal rings for damage. Inspect forward cone ring and piston for cracks or flaking in facing material. If condition of material is questionable, replace the necessary parts. Inspect forward cone surface and replace if excessive heating is indicated. Inspect hill retarder composition plates and replace if damaged.

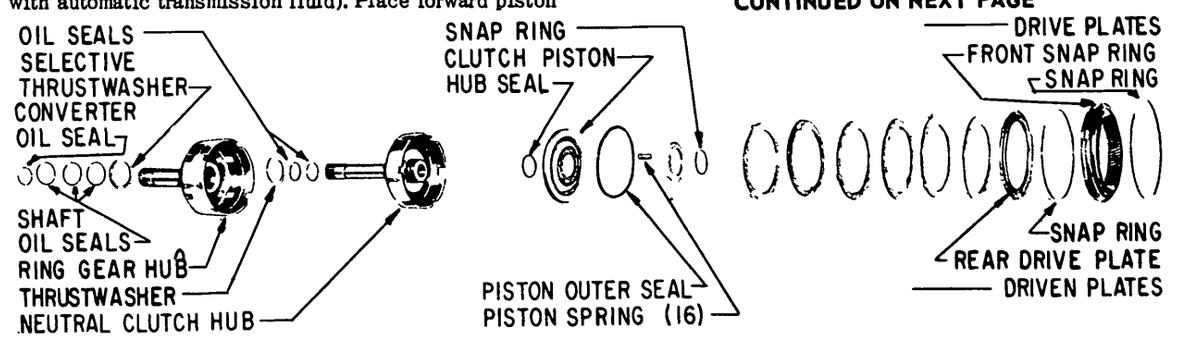
Reassembly: Install new "O" ring in support and square seal rings on brake and forward piston (lightly lubricate with automatic transmission fluid). Place forward piston on bench with splines facing up. Index support over hub of forward piston and hand press together, noting position of raised ribs of piston to mate with cavities in support. Key the splines of hub on hill retarder piston to splines of forward piston and align tang with hill retarder piston between pressure tube holes in support, then press together evenly to avoid damage to seals (rear piston must be down far enough to enable retainer to be installed and fully seated). Install return spring to forward piston taking care not to chip off facing material. *(CAUTION* - Make sure spring is indexed properly with notches in forward cone ring). Install forward cone ring and align tang of ring to tang of support.

1958 MODELS

FORWARD PISTON, BRAKE PISTON & SUPPORT: Disassembly - Disassembly is the same as for 1957 models (see above).

Reassembly: Install new "O" ring in support and the square seal rings on brake and forward piston (lightly lubricated with automatic transmission fluid). Install brake piston into support, centering any one of the six lugs between the two pressure tube holes in support. Align lugs and supports of forward piston and brake piston and install forward piston. Use Tool J-6580 to to press the two pistons together if necessary. Install retainer ring in forward piston hub, making sure it is fully seated. Install return spring to forward piston. Tangs of spring must be toward front of transmission, and gap of spring should be centered over pressure tube hole that is most counterclockwise as viewed from front of transmission. Install forward cone and cone ring,

CONTINUED ON NEXT PAGE



1957 (SECOND TYPE) & 1958 NEUTRAL CLUTCH & RING GEAR ASSEMBLY

CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

indexing spring tang to cone ring notches and tang of cone ring to tang support.

1957-58 MODELS

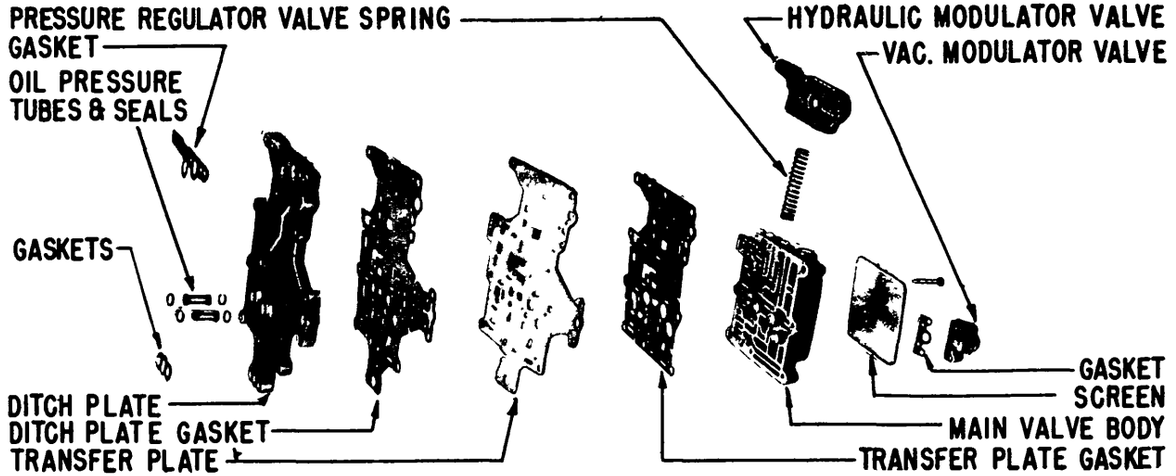
TRANSMISSION CASE REAR BUSHING REPLACEMENT: The case rear bushing, Part No. 3732210 is a precision type and requires no reaming after installation. Place transmission case on bench with rear portion facing up, then cut bushing with a cape chisel and remove from case. *(CAUTION - Be careful not to damage the aluminum transmission case).* Install bushing into case using Tool J-6582, from inside of case.

1957 MODELS

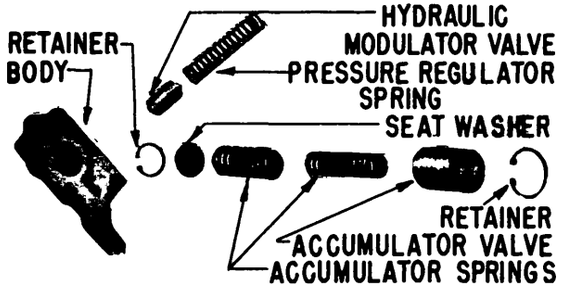
►*CONTROL VALVE BODY PRODUCTION CHANGES:* A new main valve body, Part No. 3746447, including the hydraulic modulator valve assembly is being used in production to increase line pressure from 60-170 lbs., to 90-200 lbs. The valve body transfer plate has been replaced by a new plate, Part No. 3745601, which has the .13" x .50" orifice for stator feed oil reduced in size to .062". Two ditch plate straps, Part No. 3747241, and 3747242 are used to prevent oil leakage with the increased oil pressure. New bolts with a torque specification of 8-12 ft. lbs. are being used. The stator detent spring and the manual detent spring have also been changed.

CONTROL VALVE BODY: Disassembly - Remove both oil pressure tubes (if they did not stay on support). Remove valve body screen and manual valve. Remove both gaskets between valve body and transmission case. Remove vacuum modulator valve body and gasket. Remove modulator valve body *(NOTE* - Hold valve body securely while removing bolts as this unit is spring loaded by pressure regulator valve spring). Remove accumulator valve by installing hydraulic modulator valve body in a vise (or use a "C" clamp) to depress the accumulator valve while the accumulator valve snap ring is being removed *(CAUTION* - This valve is under about 90 lbs. pressure). Then remove seat and inner and outer springs and accumulator piston. Remove hydraulic modulator valve from body. Remove pressure regulator spring, valve, and spring seat washer. Remove main valve by removing screw retaining parking pawl spring strut, then remove other valve body locating screw holding valve body to ditch plate. Reverse valve body and remove seven bolts holding ditch plate to valve body. Separate ditch plate (aluminum) from transfer plate (steel) and valve body. Remove gasket between ditch plate and transfer plate, remove transfer plate, then remove gasket between transfer plate and valve body. Remove front and rear pump check and lubrication relief valve and springs *(NOTE* - Front and rear check valve springs are interchangeable. Lubrication relief valve spring is different and is not interchangeable. The three valves are interchangeable). Remove accumulator check valve from ditch plate, then remove accumulator control valve plug roll pin, plug, valve and spring. Remove accumulator valve snap ring (in end of valve body), spring seat, inner and outer springs and accumulator piston. Remove the seven socket head pipe plugs from valve body. Remove detent roll pin, spring, and detent ball.

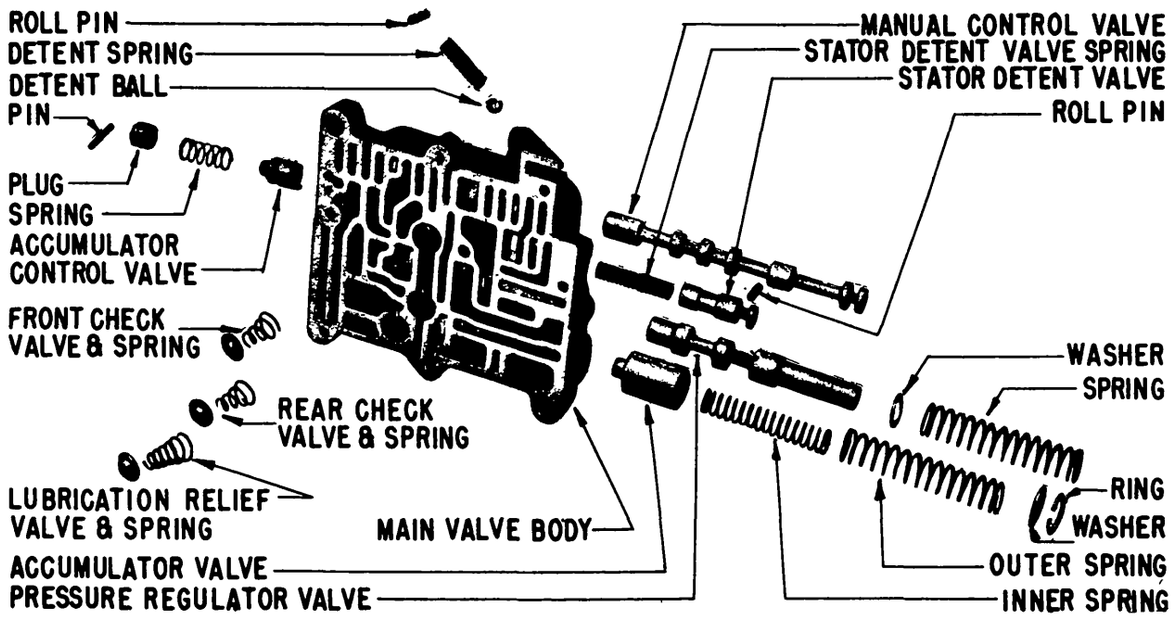
Inspection: Wash all parts in solvent and blow dry with air *(CAUTION - Do not use rags to wipe parts).* Inspect all springs for distortion or damage and all valves for nicks, burrs, galling, or scoring. Check valves and pistons for free operation in their respective bores. Inspect lands of manual valve for wear or scratches. In-



EARLY 1957 CONTROL VALVE BODY ASSEMBLY



1957-58 HYDRAULIC MODULATOR VALVE ASSEMBLY



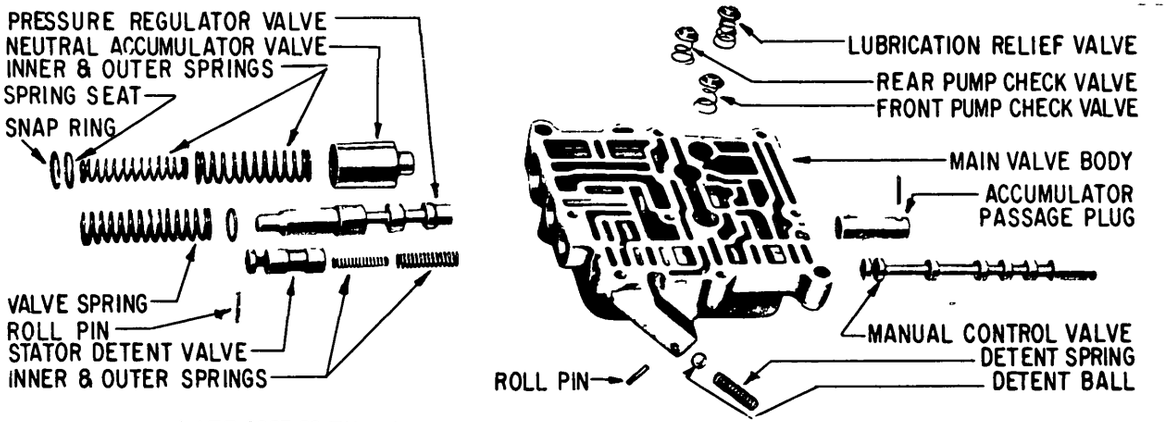
EARLY 1957 CONTROL VALVE MAIN BODY ASSEMBLY

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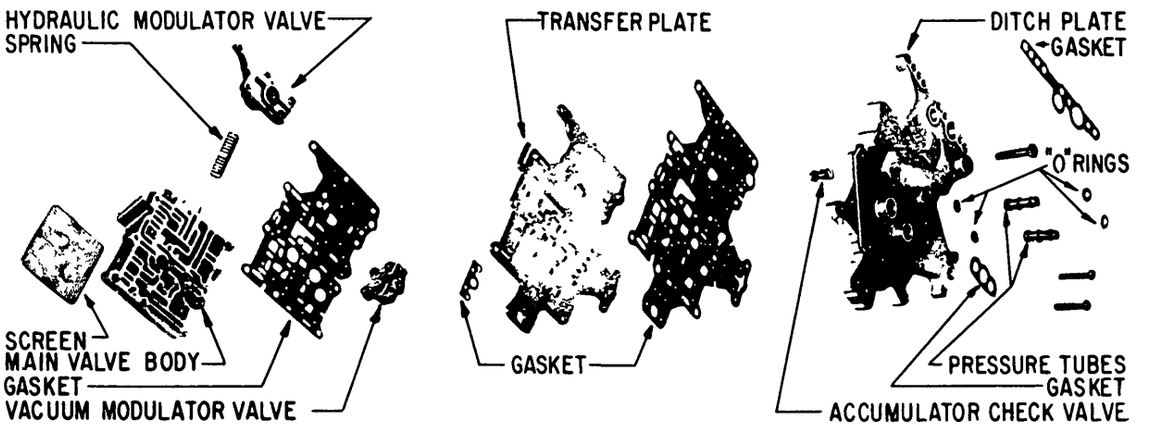
CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

spect valve bodies for cracks, scoring, or galling. Clean sump screen and inspect rubber by-pass valve.

Reassembly: Install the seven pipe plugs in valve body. Install detent ball and spring, then install new roll pin to retain detent ball and spring. Install inner and outer springs into accumulator piston and install this assembly into valve body *(NOTE - This is not the accumulator valve located in hydraulic modulator body).* Hold spring seat over springs and compress, then install retaining snap ring into groove in bore *(CAUTION - Do not confuse pressure regulator spring with accumulator outer spring. The pr ssure regulator spring is heavier with a free length f 3¼").* Install stator detent valve spring in valve body, then install detent valve with hollow end indexing over spring. Hold valve in and press roll pin to engage in groove in end of valve. Do not install pin too deep (end of spring should not touch bottom of groove). Check freedom of the assembly. Install accumulator control valve with tangs of valve inward, then install spring and plug. Compress spring by pushing in on plug, then install retaining pin. Install accumulator check valve spring onto accumulator check valve, then install assembly into respective hole in aluminum ditch plate (set aside for further assembly). *(NOTE* - Accumulator check valve spring is lightest spring in the valve assembly, and check valve has a hole in the center. Valve and spring are not interchangeable with other valves or springs in valve assembly). Install large hollow bolt through rear hole in ditch plate to aid in alignment of gaskets and parts. Install gasket on ditch plate, then install transfer plate. Invert valve body and install front and rear pump check valve, lubrication relief check valve and springs. Install gasket on valve body. Install transfer plate and ditch plate assembly on valve body, indexing holes in transfer plate with valves in valve body *(CAUTION - Mak sure that valve seats and gask ts ar not damag d).* Hold ditch plate down and start three bolts to hold plate to valve body *(NOTE* - On later valve bodies with ditch plate straps, install straps). Turn bolts completely down to overcome tension of valve springs. Install shortest bolt in center hole of valve body (this hole is used for the bottom bolt and for the screw retaining sump screen). *(NOTE* - Installation of wrong length bolt in this hole will prevent sump retaining screw installation). Install and tighten remaining bolts to 8-12 ft. lbs. Reverse valve body and install pressure regulator valve, washer, and spring into valve body. Install accumulator valve into hydraulic modulator valve body with piston boss facing down. Install both springs, then install spring cover with raised portion of cover away from spring, and compress (using a vise or "C" clamp) sufficiently to install snap ring *(CAUTION - Approximat ly 90 lbs. pressure is exerted by accumulator springs and care must be taken to prev nt damage to parts during valve installation).* Install modulator valve into hydraulic modulator valve body (valve can be installed either way). Place regulator valve spring into counterbore of modulator valve in modulator valve body, compress spring and install bolts. Install long bolt through valve body to ditch plate. Install vacuum modulator valve and gasket to valve body assembly and tighten screws. Install manual valve and sump screen. Install parking brake spring clip and bolt and tighten to 8-12 ft. lbs.



LATE 1957-58 TURBOGLIDE MAIN VALVE BODY ASSEMBLY (TYPICAL)

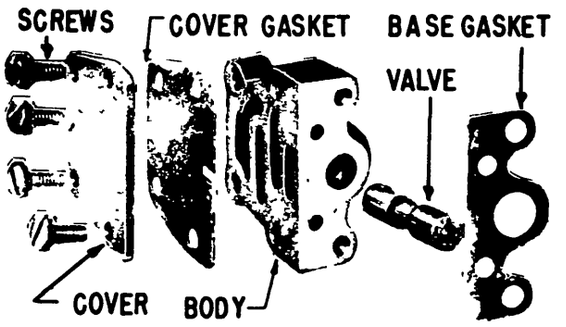


LATE 1957-58 TURBOGLIDE CONTROL VALVE ASSEMBLY (TYPICAL)

1958 MODELS

CONTROL VALVE BODY: Disassembly - Remove both oil pressure tubes (if they did not stay on support). Remove valve body screen and manual valve. Remove both gaskets between valve body and transmission case. Remove vacuum modulator valve body and gasket. Remove hydraulic modulator valve body. *NOTE - Hold valve body securely while removing bolts as this unit is spring loaded by pressure regulator valve spring.* Remove screw retaining parking pawl spring strut, then remove other valve body locating screw holding valve body to ditch plate. Invert valve body assembly and remove seven bolts holding ditch plate to valve body, then remove ditch plate reinforcing straps. Separate ditch plate from transfer plate and valve body, then remove gasket between ditch plate and transfer plate and remove transfer plate and gasket. Remove vacuum modulator accumulator check valve (with orifice in head) and remove vacuum modulator check valve (without orifice in head). Remove front and rear pump check valves, and lubrication relief valve, with their springs. *NOTE - Front and rear pump check valve springs ar*

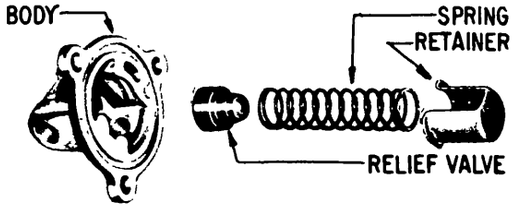
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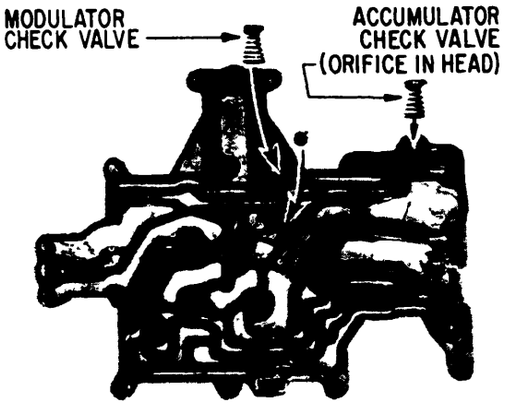
1957-58 VACUUM MODULATOR VALVE ASSEMBLY

CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

interchangeable. Lubrication relief valve spring is heavier and is not interchangeable. The three valves are interchangeable. Remove manual control valve. Remove stator detent valve roll pin, then remove stator detent inner and outer springs and valve. *NOTE - Later valve bodies use a single heavier spring with the detent valve.* Remove accumulator valve snap ring, then remove spring seat washer, springs, and neutral accumulator valve. Remove detent ball roll pin, spring, and detent ball. Remove pressure regulator valve and spring seat washer. Remove roll pin, then remove accumulator passage plug. Remove seven socket head pipe plugs from valve body.



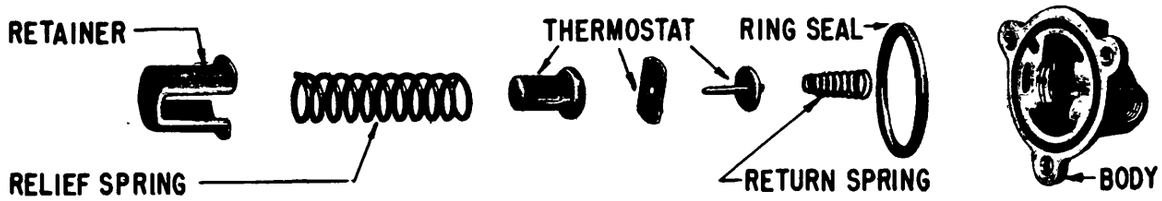
LATE 1957-58 THERMAL BYPASS VALVE



CHECK VALVE POSITIONS IN DITCH PLATE

Vacuum Modulator Valve - Remove cover screws and lift off cover and gasket, then remove valve and base plate. To reassemble, insert modulator valve into valve body, then install cover using a new gasket. Tighten screws evenly, then install a new base gasket.

Hydraulic Modulator Valve - Remove valve from valve body, then depress accumulator valve with a narrow hammer handle and remove retainer ring. Slowly release pressure on accumulator valve to prevent springs and valve from flying out, then remove valve and two accumulator springs. Remove accumulator valve retainer ring, and seat washer from opposite side of valve body. Inspect all parts for wear, nicks, or burrs, then



EARLY 1957 THERMAL BYPASS VALVE

reassemble as follows: Install one retainer ring in bottom of hydraulic modulator valve body and install seat washer. Place accumulator valve inner and outer springs in valve body and place accumulator valve on top of springs. *CAUTION - Do not confuse the pressure regulator spring with accumulator outer spring. Pressure regulator spring is heavier and shorter (.072" wire diameter with 3¼" free length).* Holding second retainer ring in snap ring pliers ready to install, depress accumulator valve deep into its cylinder with a hammer handle and install snap ring. *CAUTION - Be sure ring is fully seated before releasing pressure on accumulator valve.* Install hydraulic modulator valve. *NOTE* - Pressure regulator spring is not installed until final assembly of main valve body.

Reassembly: Install socket head pipe plugs in valve body, then install accumulator passage plug and secure with a roll pin. Install detent ball and spring in valve body, then install new roll pin to retain detent ball spring. Install neutral accumulator springs in accumulator piston and install piston into valve body. Hold spring seat over springs and compress, then install retaining snap ring into groove in accumulator piston cylinder wall. Install stator detent valve springs into valve body, then install detent valve with hollow end indexing over springs. *NOTE - Later valve bodies have a single, heavier spring with the detent valve.* Hold valve in and tap roll pin to engage in groove in end of valve. Do not install roll pin too deep (end of pin should touch bottom of groove). Check freedom of valve in bore. Install pressure regulator valve with spring seat washer installed in valve body, then install manual valve. Install front and rear pump check valves and lubrication relief valve. Refer to "Valve Location" illustration and install vacuum modulator valve (without orifice in head) in ditch plate, then install vacuum modulator accumulator check valve (with orifice in head) in ditch plate. *NOTE - This valve is closer to rear of plate from valve installed above.* Install large hollow bolt through rear hole in ditch plate to aid in alignment of gaskets and parts. Install gasket on ditch plate, then install transfer plate on gasket. Install transfer plate gasket on main valve body, then install transfer plate and ditch plate on main valve body indexing valves of valve body to holes in transfer plate and making sure valve seats and gaskets are not damaged. Hold ditch plate down and start three bolts to hold ditch plate to valve body, then turn bolts completely down to overcome spring tension of valves. *CAUTION - Be sur that b lt being installed at each location is the same l ngth as b lt pr viously removed from that locati n.* Install shortest bolt into center hole of valve body (this hole is common hole for bottom bolt and for screw retaining sump screen). *CAUTION - Installation of wr ng bolt at this l cati n will prevent sump screen r taining scr w installati n.* Position ditch plate reinforcing straps, then install and tighten remainder of bolts to 8-10 ft. lbs. Place pressure regulator valve spring into counterbore of modulator valve in hydraulic modulator valve body and compress spring to enable bolts to be installed. Install pressure regulator spring guide sleeve over end of pressure regulator valve spring (on units so equipped). Install long bolt through valve body to ditch plate, then, using a new gasket, install vacuum modulator valve body to valve body assembly and secure with two screws. Install sump screen. Install parking brake spring clip and bolt and tighten to 8-10 ft. lbs.

1957-58 MODELS

REAR EXTENSION HOUSING REAR OIL SEAL REPLACEMENT: Place extension housing on a wooden surface and remove oil seal using a cape chisel or punch (*CAUTION - Be careful not to damag aluminum case*). Using Installing Tool J-5154, install seal in extension housing.

► *EXTENSION HOUSING BUSHING NOTE: This bushing is precision bored in position and is not replaceable.*

TRANSMISSION REASSEMBLY

REASSEMBLY: 1) Install parking pawl and parking pawl shaft with "O" ring in transmission case. Index manual control lever into manual control rod and park lock pawl rod (bullet type), and secure with bolt and nut (*NOTE* - Shaft is serrated to permit installation in one position only). Install stator lever through control lever and install detent control lever plate, then install hairpin clip (*NOTE* - Stator lever is serrated to permit installation in one position only). Install parking lever bracket and tighten bolts to 7-9 ft. lbs.

2) Install rear race, needle bearing assembly, and front race on front of output shaft carrier. Install caged needle thrust bearing assembly on rear of output shaft (hold in place with lubricant). Install rear ring gear onto rear planet carrier and output shaft, using grease sparingly, to hold bearing in place. Install output shaft and rear ring gear assembly into case from the front. Install

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CHEVROLET TURBOGLIDE TRANSMISSION (C nt.)

brake drive plate (composition) by indexing rear ring gear, then index brake reaction plate (aluminum) to case. Finally, index the other brake drive plate (composition) to rear ring gear.

3) Install forward cone on forward piston, then install forward cone ring over spring on forward piston, making sure that notches of ring fully engage outer tangs on edge of spring *(CAUTION - Be careful when placing spring on forward piston so that the indexing is proper for installation of ring to case and indexing of ring to the return spring).*

4) Install forward and brake pistons and support in case (outer forward cone ring may have to be tapped gently to compress spring in forward piston to provide enough space to install retainer. *(NOTE - Retainer must be s at d in groov in transmission case or failure may result, causing s rious damage to transmission).*

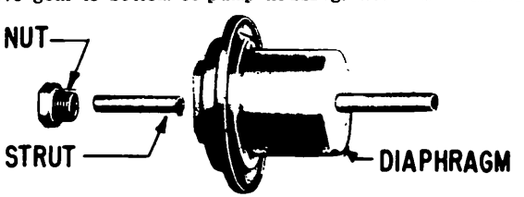
5) Install needle thrust bearing race over extension of front planet carrier, then install needle thrust bearing assembly over race. Install tanged washer on front end of planetary (use a small amount of lubricant to retain in position during assembly). Hold the neutral clutch assembly in one hand with the shaft pointing upward, then lift front planetary, with tanged washer installed, and index keyways on front planetary housing to cone lugs in neutral clutch assembly. *(CAUTION - Improper mating f th se parts will pr v nt transmission being assembl d).* After planetary assembly is installed, rest shaft of neutral clutch on bench and install freewheel sprag assembly over rear extension of planetary. Twist sprag assembly to mate sun gear to planetary gears. Install needle thrust bearing over extension of front planetary gear extending through freewheel unit.

► *REVERSE CONE RING SELECTION (For Proper Running Cl arance During Forward Drive Range Operation and Contact Area for Positive Holding in Reverse):* (1) Before installing the neutral clutch and freewheel units in the transmission case, temporarily install the reverse cone ring, cone, spring, and front pump and reverse piston assembly (be sure that cone is seated evenly in reverse cone ring). Secure front pump with at least four bolts. (2) Clamp a dial indicator onto side of transmission case, using an indicator tip 1¼" long, so that tip of indicator is against reverse piston (set tip on a flat area of piston to prevent slippage during piston travel). Set dial indicator at zero, then turn front end of transmission case downward, and, while watching dial indicator, apply air pressure to reverse piston passage in control valve mounting boss (second hole in boss, from control lever side of transmission case). If cone ring is within limits, indicator reading will be between .059-.085". If piston travel is over the high limit, repeat the test using a new **green** cone ring, Part No. 3740892, or a **blue** cone ring, Part No. 3740891, in that order. If travel is below the limits, repeat test, starting with the **green** cone first, then the **yellow** cone ring, Part No. 3740893.

6) Install neutral clutch and freewheel sprag assembly into case, twisting shaft to engage lugs of freewheeling assembly outer cam to forward clutch assembly mounted in transmission case (forward cam is loose and can be turned to align with lugs of freewheeling cam).

7) Turn transmission so input shaft is facing up and install reverse cone ring in case (tapered portion forward with tang fitted into case and oil return groove at bottom). Check for correct selective washer thickness as follows: With gasket installed on front pump assembly, install dial indicator on Tool J-6557 with indicator set at zero and touching contact arm on tool. Mount gauge and tool assembly to rear hub of front pump so that contact arm is resting on mounting flange of pump. Gauge several points around mounting flange and record the highest reading obtained. Remove gauge and dial indicator assembly and mount in transmission case over input shaft so that gauge arm contacts thrust washer pad of neutral clutch and front ring gear assembly. Record highest reading obtained at this point, then subtract reading from the reading taken on front pump assembly. The difference will indicate correct thrust washer thickness. Thrust washers are available in the following three sizes: .068" (Part No. 3727319), .085" (3727321), & .103" (3727320). Select the thrust washer which will provide a clearance of .008-.028".

8) Install four oil seal rings to extension on front ring gear hub. Install reverse cone into case, meshing tangs with slots in neutral clutch and front ring gear assembly. Install reverse cone spring into case. Install two guide studs, J-3361-10 in case to guide the pump assembly and avoid damage to oil seal rings. Install stator support gasket to case, then install square type seal ring on outer lip of stator support. Align tang of oil pump drive gear to bottom of pump housing. With front end of transmission case facing upward, index front pump on guide studs and carefully guide pump over oil seal rings on front ring gear hub shaft (tap housing lightly to fully seat in case). Remove guide studs and install capscrews retaining pump to case, and tighten to 15-18 ft. lbs.



1957-58 VACUUM DIAPHRAGM

9) Install converter assembly (driving lug of pump to mate with keyway of front pump drive gear) rotating converter as necessary to complete mating of splines.

► *CHECKING CAUTION: A minimum distance of ¾" from front of transmission case to front of converter at flang , measured with a straightedge assures that all parts ar properly engaged. If this distance is less, check transmission for improper assembly.*

10) Install Torus Holding Tool J-5384 in position and place transmission in a horizontal position. Turn output shaft to locate drive pin holes to top of transmission, and install drive pins *(CAUTION - Make sure that drive pins do not fall out of transmission during assembly).* Position rear pump output shaft indexing drive gear to drive pin. Install bolts through pump into rear of case and tighten to 7-9 ft. lbs. Install square seal ring over pump.

11) Install thermal by-pass and tighten to 7-9 ft. lbs., and install vacuum diaphragm outside of case along with vacuum modulator strut and attaching nut. Install "O" rings in support and then install "O" rings on oil pressure tubes in support (tapered end of support) through case, making sure that seal rings are seated. Install valve body gaskets, using a small amount of lubricant to retain gaskets in position for assembly.

12) Place stator control or detent lever in "down" position and install valve body in case, guiding detent plate into groove, manual lever to manual valve detent valve, and carefully pick up manual valve, oil pressure tubes and vacuum modulator strut. Install special drilled bolt at rear of valve body to rear case (hole in bolt carries lube pressure to drilled passage in case to output shaft, from valve body). Tighten hollow bolt to 18 ft. lbs. Install remaining bolt in valve body and tighten to 8-10 ft. lbs.

13) Index spring in parking pawl lock, then index into clip on rear bolt of valve body. Install speedometer gear on output shaft with Tool J-5814. Install in extension housing and install extension housing on transmission case. Tighten bolts to 23-26 ft. lbs.

► *EXTENSION HOUSING INSTALLATION NOTE:* After tightening extension housing bolts, install universal joint yoke on output shaft and rotate freely. If yoke is tight, remove rear extension and tap rear oil pump body with plastic hammer to center output shaft with rear extension bushing and seal.

14) Install driven speedometer gear in extension housing and install transmission oil pan gasket and oil pan.

CHEVROLET TURBOGLIDE TRANSMISSION

Chevrolet Pass. Cars (1959-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 TURBOGLIDE CONVERTER COVER INSTALLATION NOTE & ALIGNMENT MARK PRODUCTION CHANGE:* Later production converter covers and converter pump housings do not have the 5/32" hole in outer flange of both parts. To align these parts at reassembly, index the identical notch in outer rim of both cover and converter pump housing.

►*TURBOGLIDE REVERSE CLUTCH PLATE REPLACEMENT CAUTION:* It is important that when a reverse clutch plate is installed, a new reverse clutch piston return spring be installed at the same time. *NOTE* - The old spring may appear to be normal but will be "dished" in the opposite direction to a new one. This condition will result in clutch failure.

►*1960 TURBOGLIDE HYDRAULIC MODULATOR VALVE BODY PRODUCTION CHANGE & 1959-60 SERVICE REPLACEMENT NOTE:* A new hydraulic modulator valve body, Part No. 3779625, without the vacuum modulator accumulator valve is being used in production and may be used for service replacement on 1959-60 transmissions to replace the former valve body, Part No. 3759834. Early and later type valve bodies are interchangeable and either may be used for service.

►*STARTING ENGINE BY PUSHING CAR:* Place control lever in "N" (Neutral) range until car reaches 25-30 MPH. Turn key on and move control lever to "GR" (Grade Retarder) position. After engine starts, move control lever to "N" (Neutral) for engine warm-up. Towing is not recommended to start car.

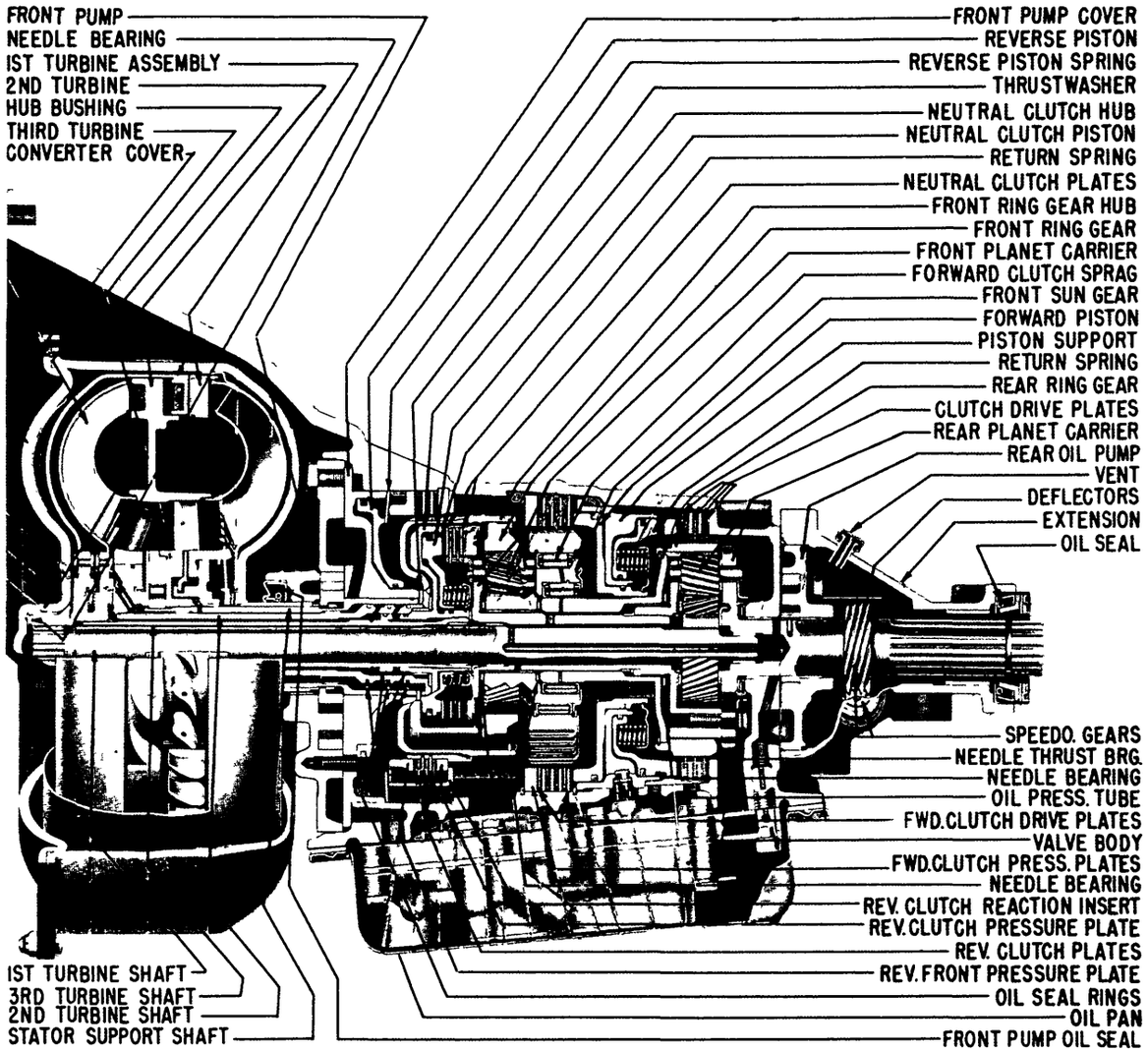
►*TOWING TURBOGLIDE CARS:* Cars must not be towed with rear wheels on ground except with transmission in "N" (Neutral) position and must not be towed in excess of 30 MPH. If car is to be towed a long distance, drive shaft should be removed. *NOTE* - If car has been damaged and transmission cannot be placed in "N" with selector lever, disconnect long rod from idler lever on left side below mast jacket, then pull lever on transmission toward front of car as far as it will go. Move lever toward rear of car from the forward position to the third detent which is "N" (Neutral) position.

DESCRIPTION: Design is similar to 1957-58 Turboglide transmissions except as noted below.

Clutches: Multiple plate type clutches have replaced the former "cone" type clutches at the forward and reverse clutch locations.

Second Turbine: A five spoke second turbine is being used. The second turbine shaft is heavier and a bushing has been added to prevent interference between second turbine shaft and the stator shaft bore.

Main Valve Body: Valve body reinforcing strap, accumulator passage plug, and the two check valves in modulated oil circuit have been eliminated. A second spring and a spring cap between the pressure regulator valve and the hydraulic modulator valve have been added. A single short heavy spring replaces the two springs formerly used with the hydraulic modulator accumulator.



CHEVROLET TURBOGLIDE TRANSMISSION (SECTIONAL VIEW)

Front Planetary Gearset: Six planet gears replace the three formerly used. *NOTE - Because of pinion alignment, the front planetary set is serviced only as a unit. DO NOT attempt disassembly.*

LUBRICATION

Check oil level every 1000 miles. *NOTE - Draining and refilling of transmission is not recommended other than for transmission repairs.*

Capacity - 2 quarts (refill), 9½ quarts (after overhaul).

Recommended Oil - Use Automatic Transmission Fluid Type "A", Suffix "A". If this type fluid not available, use Automatic Transmission Fluid Type "A".

Checking Fluid Level: With transmission at normal operating temperature, transmission selector lever in "N" (neutral), check oil level on dipstick located in engine compartment on right side.

Draining & Refilling: *NOTE - Draining & refilling of transmission is not recommended other than for transmission repairs.* Remove drain plug (early cars), filler tube (later cars). To refill, replace drain plug or filler tube, then install 2 qts. of recommended fluid. Start engine and allow to run a few minutes at idle speed, then check oil level. If necessary, add oil to bring level up to "FULL" mark on dipstick. *NOTE - If torque converter was drained, approximately 9½ qts. of fluid will be required to fill transmission and converter.*

CONTINUED ON NEXT PAGE

CHEVROLET TURBOGLIDE (C nt.)

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on car model pages.*

Manual C ntr l Linkag : Place selector lever in "D" (Drive) position, then disconnect swivel on shift control rod at its attachment to shift control lever on mast jacket in engine compartment. Position shift lever on transmission in "D" (Drive) position (second detent forward, from full rear position). Adjust swivel on shift control rod for free entry into shift lever on mast jacket. Secure swivel nut attachment to mast jacket shift lever, then test transmission shifts in all ranges.

N utral Saf ty Switch: Place selector lever in "N" (Neutral) and loosen screws attaching neutral safety switch retainer. While holding ignition switch in "START" position, adjust position of switch until engine turns over. Hold switch in this position and tighten retainer screws. Check adjustment by testing for cranking in both "N" (Neutral) and "P" (Park).

TROUBLE SHOOTING

DRIVE POOR AT LOW SPEEDS (NO REVERSE, GRADE RETARD NORMAL): Inner overrun clutch assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD: Both overrun clutches assembled backwards.

NO DRIVE EXCEPT IN GRADE RETARD AND REVERSE: Outer overrun clutch assembled backwards. Forward and neutral clutch not applied due to severe leakage in forward clutch hydraulic circuit.

CAR DRIVES VERY SLIGHTLY IN NEUTRAL (REVERSE NORMAL): Neutral clutch not released.

CAR DRIVES NORMAL IN NEUTRAL AND DRIVE AT LOW SPEEDS (NO REVERSE): Forward clutch not released.

TRANSMISSION WILL NOT SHIFT TO HIGH STATOR ANGLE: Stator control linkage out of adjustment. Converter charging pressure low for one of the following reasons: (a) Leakage which will reduce line pressure enough to cause pressure regulator valve to shut off converter in line. (b) Leakage in converter circuit. (c) Stator control pressure leaking to converter out across front oil seal ring or second oil seal ring on second turbine shaft.

UNABLE TO PUSH START: Rear oil pump drive pin broken or missing.

CLUTCH SLIPPAGE ON WIDE OPEN THROTTLE STARTS: Low oil pressure due to leakage (especially check forward pressure tube "O" ring). Mechanical interference which will prevent forward or neutral piston to fully apply. Neutral or forward clutch facing bond failure.

SECOND TURBINE SEAL RING LANDS INTERFERING WITH I.D. OF STATOR SHAFT: Case locating dowels on engine or dowel holes in case misaligned. Check by indicating front pump bore in case from crankshaft.

GRADE RETARD SLOW TO APPLY: Control linkage out of adjustment, preventing manual valve getting into grade retard position. Leakage to grade retard clutch (check pressure tube "O" ring seal and other sources). Mechanical interference in grade retard piston. Glazed grade retard plates (check neutral clutch for release). If neutral clutch does not release during grade retard, grade retard plates can be damaged.

NO DRIVE, REVERSE NORMAL, NO GRADE RETARD: Reverse clutch not disengaged.

GRADE RETARD BRAKES VIOLENTLY, STATOR PRESSURE READS HIGH ON CHECKING: Vacuum hose disconnected.

SHIFTS FROM STANDSTILL VERY SLOW: Check linkage to ascertain that shift lever is positioned by transmission detents. Accumulator control valve stuck closed. Leakage in hydraulic system (Check pressure tube "O" rings and other seals and gaskets).

SHIFTS FROM STANDSTILL VERY FAST AND HARSH: Accumulator control valve spring too strong or valve stuck open.

TESTING

►*TESTING CAUTION: Before testing transmission, check oil level and bring it to the "FULL" mark on dipstick (See LUBRICATION above). Warm transmission to normal operating temperature as outlined below. Adjust engine idle speed to 425 RPM with transmission selector lever in "D" (Drive) range. Adjust throttle linkage (see CARBURETOR on car model pages).*

►*TESTING CAUTION: Do not stall-test Turboglide Transmission.*

TRANSMISSION WARM-UP: (In Shop) – Connect tachometer to engine, set parking brake and start engine. Place selector lever in "D" (Drive) range and adjust carburetor idle speed to approximately 750 RPM. Operate engine at this speed for 15 minutes, then readjust engine idle speed to 425 RPM with transmission selector lever in "D" (Drive) range.

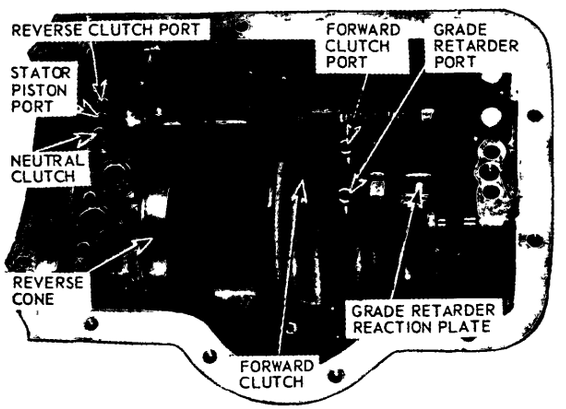
On Road – Drive car for approximately 5 minutes with frequent starts and stops. Make sure engine idle speed is 425 RPM with transmission selector lever in "D" (Drive) range. Check fluid level (see LUBRICATION above). *CAUTION –* If fluid level too high, lower the level to "FULL" mark, then drive car five minutes to work bubbles out of fluid.

PRESSURE TEST: Road - Connect pressure gauge to test point on left side of transmission case and connect a tachometer and a vacuum gauge to engine. With engine and transmission at normal operating temperature and oil level in transmission at "FULL" mark, proceed as follows: Place selector lever in "D" (Drive) position and bring car speed to approximately 30 MPH. Push accelerator to wide open position. Engine speed should increase to 700-900 RPM if stator is functioning and the pressure should rise to 190-210 lbs. at 3" manifold pressure. *NOTE - At any car speed, with foot off throttle, pressure gauge should read 80-90 lbs. with 18-25" of engine vacuum (pressures in "R", reverse, should be the sam as in "D", drive).* With selector lever in "D" (Drive) and at a road speed of 45 MPH, foot off throttle, pressure gauge should read 80-90 lbs. Place selector lever in "GR" (Grade Retarder) range at 45 MPH, and pressure should drop to zero. *NOTE - Engine speed may drop momentarily (during manual shift from "D" to "GR") and then the Grade Retarder clutch will apply and the engine speed will increase.*

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Drain oil from transmission and remove converter cover pan, transmission oil pan, and main valve body. Install oil pressure tubes in Forward Clutch and Grade Retarder apply ports (see illustration). Use Tool J-4353-1 and an air source of 100 lbs. pressure. Proceed as follows for the five air pressure checks:

Reverse Clutch: Apply pressure to reverse clutch port (see illustration) and visually check that reverse cone moves rearward. Listen for air leaks. If reverse cone does not move, determine whether front pump-to-transmission case gasket is incorrectly installed and blocking oil passages, or if reverse piston is cocked or bound. If air leaks are heard, check for damaged front pump-to-transmission case gasket or for damaged seals in reverse piston.

Stator Piston: Apply air to stator piston port (see illustration), and listen for air leaks. If air leaks are detected, check for a mispositioned or damaged front pump-to-



TRANSMISSION AIR TEST POINTS

transmission case gasket, broken or warped seal rings on second turbine shaft, defective stator piston seal, or damaged or worn brass seal in the inside diameter of stator support. Should it be determined that stator support brass seal is at fault, the stator support must be replaced as brass seal cannot be replaced separately.

Neutral Clutch: With air applied to neutral clutch port (see illustration), listen for application of clutch and air leaks. If no clutch application is heard, determine if the front pump-to-transmission case gasket is incor-

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CHEVROLET TURBOGLIDE (Cont.)

rectly positioned and blocking oil passages; otherwise disassemble neutral clutch and check for a locked-up or binding condition. If air leaks are heard, possible causes are a torn or distorted front pump-to-transmission case gasket, warped or broken oil seal rings on second or third turbine shafts, defective brass seal in the inside diameter of second turbine shaft. If brass seal is faulty, replace front ring gear hub and shaft assembly.

Forward Clutch: With oil transfer tube installed, apply air pressure to tube and observe that forward clutch applies. Listen for air leaks. Failure of clutch to apply can be the result of a wedged forward piston or Grade Retarder piston, probably caused by cocked piston "O" rings. A blockage of oil feed orifice in forward and brake piston support could also prevent clutch application. The first place to check if air leaks are found is the "O" ring seals on oil pressure tube in forward clutch port; otherwise, check forward piston-to-support seals.

Grade Retarder Piston: Apply air to grade retarder piston port with oil pressure tube installed (see illustration). Check Grade Retarder application by watching for movement of grade retarder reaction plate which will occur as the brake plates are forced against it by piston moving backward. If grade retarder piston does not move, check for cocked "O" ring seals in both the grade retarder and forward pistons or check for blocked orifice in piston support. Leakage could only occur at either the oil pressure tube "O" ring seal or brake piston "O" ring seal.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: 1) Raise car on a hoist *(see "Jacking & Hoisting" in Suspension & Wheel Alignment Section)*, then proceed as follows:

2) Drain oil from transmission *(see "Draining & Refilling" above)*, then disconnect oil cooler lines and speedometer drive cable fitting at transmission (tie lines out of way). Remove crankcase ventilator tube clamp bracket bolt from transmission.

3) Remove vacuum modulator hose from vacuum modulator and from clamped attachment at side of transmission. Disconnect manual and throttle valve control lever rods from transmission, then disconnect propeller shaft from transmission.

4) Install suitable transmission lift equipment to jack or other lifting device and attach on transmission. Disconnect engine rear mount on transmission, then remove transmission support crossmember. *NOTE - Crossmember is attached to frame bracket at upper attaching holes. Use care to remove any shims which may be installed between extension mounting boss and crossmember. It is very important that exactly the same number of shims be installed when transmission is replaced in car.* Remove flywheel cover and scribe a line to establish relationship between flywheel and converter, then using a jumper to turn engine, remove flywheel-to-converter attaching bolts.

5) Lower rear of transmission slightly so three upper transmission housing-to-engine attaching bolts can be reached using a universal socket and approximately a 39" extension. Remove upper bolts. *CAUTION - Care must be taken not to lower rear of transmission too far as distributor housing may strike firewall.*

6) Support engine at oil pan rail with a jack, then remove remainder of transmission housing-to-engine attaching bolts. Remove transmission by moving it slightly to rear and downward, then remove from beneath car. *CAUTION - Keep front of transmission upward to prevent converter from falling out. Install Converter Holding Tool J-5384 immediately after transmission removal.*

INSTALLATION: 1) Mount transmission on lifting device. then remove Converter Holding Tool J-5384. then raise transmission into place and install transmission case-to-engine upper mounting bolts. Install lower and side bolts. *CAUTION - Be careful that converter does not move forward causing disengagement of pump hub drive slots from lugs of front pump drive gear.*

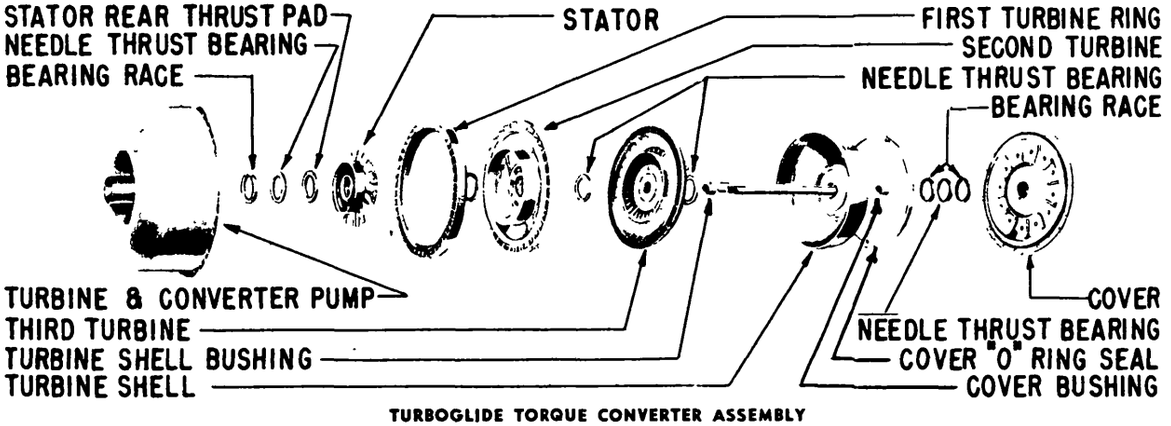
2) Remove support from beneath engine, then raise transmission into position. Connect body ground strap.

3) Through transmission underpan opening, align as closely as possible the "white" flywheel balance mark stripe and the "blue" painted stripe on end of converter housing. If scribed during removal, align scribe marks on flywheel and converter cover. Install converter-to-flywheel attaching bolts and tighten to 15-20 ft. lbs.

4) Reinstall transmission support crossmember. *NOTE - Two sets of holes are provided for attachment of crossmember to frame as follows: Lower holes are to be used with Powerglide. Upper holes used with Turboglide.* Be sure to reinstall exactly the same number (and thickness) of shims between extension mounting boss and crossmember as were removed. *NOTE - These shims maintain correct drive line angle.*

5) Remove transmission lift equipment and support, then connect propeller shaft to transmission. Connect manual and throttle valve control linkage to transmission. Connect oil cooler lines, vacuum modulator hose and speedometer drive cable to transmission. Reinstall oil filler tube and fill transmission. *See LUBRICATION above.*

6) Adjust all transmission linkage. *See LINKAGE ADJUSTMENT above.*



TURBOGLIDE TORQUE CONVERTER ASSEMBLY

TRANSMISSION DISASSEMBLY

►*TRANSMISSION OVERHAUL CAUTION: Before disassembling transmission, clean outside of case thoroughly to prevent dirt getting into transmission parts. As each part is removed, clean it with cleaning solvent and blow dry with air. DO NOT USE WIPING CLOTH (which may leave lint on parts).*

DISASSEMBLY (Into Major Units): 1) Remove converter assembly from transmission *(CAUTION - Prevent damage to converter output shaft during removal as the output shaft bushing may be misaligned which would mak replacement of torus shell and shaft ass mbly necessary).* Remove oil pan and gasket. Remove capscrew and retaining clip holding speedometer gear housing in extension and remove housing. Remove extension housing from transmission, noting seal ring in rear pump body. Remove speedometer gear oil deflector, then remove speedometer drive gear from output shaft with Tool J-5814. Remove oil pump, seal ring, and driven gear, then remove pump drive gear, drive pin, and wear plate from output shaft. *CAUTION - When gear is removed, drive pin can fall out if hole is on bottom of shaft and shaft is horizontal.*

2) Remove parking pawl spring and remove four bolts retaining valve body assembly to case *(NOTE - All three units of valve body will come off as an assembly).* Bolts are two different sizes. Rear bolt is hollow to permit oil pressure to valve body.

3) Remove two oil pressure tubes between valve body assembly and case *(NOTE - Tubes are interchangeable and the "O" ring seals are the same).* Remove vacuum modulator plunger.

4) Place transmission with shaft facing upward, then remove seven front oil pump bolts. Remove front oil pump and reverse piston assembly (includes stator shaft and support, square seal ring and gasket), using Tool J-6585. *NOTE - There are two threaded holes to mount puller, Tool J-6585, in front pump body.* Remove reverse piston spring, neutral clutch and front ring gear assembly and reverse front pressure plate, three drive

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CHEVROLET TURBOGLIDE (C nt.)

plates, and two steel reaction plates by grasping the second turbine shaft and pulling out of case. Separate the spring and clutch pack from neutral clutch unit. *NOTE - The reverse front pressure plate is selective. The selective washer on front ring gear hub of neutral clutch unit will be removed during disassembly of neutral clutch and front ring gear.*

5) Remove reverse rear pressure plate and reverse clutch reaction insert. Remove front planet carrier thrust washer, front planet carrier and neutral clutch hub assembly. Remove the race, needle bearing, and thrust ring from carrier extension. Remove front sun gear freewheel assembly (overrunning sprag clutch unit) and needle thrust bearing. Remove forward clutch retainer ring from transmission case by prying out with a screwdriver.

6) Remove forward clutch pack consisting of a pressure plate, four drive plates and four steel reaction plates. Remove retainer ring securing forward and brake piston, and support by prying out at case slots with a screwdriver (note position of ring gap in case).

7) Remove ring gear assembly and the forward and brake piston and support assembly as a unit by grasping the ring hub to extract from case. Separate the two assemblies. Remove rear planet carrier assembly and race, needle bearing and race on hub of carrier. The front race may adhere to rear ring gear previously removed. Also remove caged needle bearing from rear of carrier or case.

8) Remove grade retarder plates which consist of four steel reaction plates (two thicknesses) and three drive plates.

9) If required, remove remainder of case components as follows: Remove "C" retainer from shaft at inner throttle valve lever and remove throttle valve control outer lever assembly with shaft. Throttle valve inner lever will be free of shaft and should be removed.

10) Loosen screw and nut securing parking lock and range selector inner lever to outer lever and remove both levers. If necessary, disassemble parking lock actuator rod from inner lever by removing "C" retainer. Remove parking lock bracket, parking lock pawl shaft, "O" ring seal and pawl. Remove bypass valve assembly and square seal ring. *CAUTION - Spring under cover in bypass valve is under tension and care should be tak n when cover removed.*

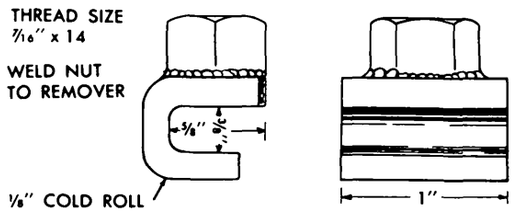
11) Remove vacuum modulator assembly by unscrewing from case, then lift out vacuum modulator and remove gasket.

CONVERTER OVERHAUL

►*OVERHAUL NOTE: After removal from case, overhaul sub-assemblies or units as follows:*

TORQUE CONVERTER (Disassembly): Mount converter in a support to avoid damage to turbine output shaft. *(CAUTION - Scribe a mark on converter housing and cover for alignment and balance).* Remove bolts from cover, then remove cover from converter pump. Remove square seal from cover. Remove first, second, and third turbines as an assembly. Remove stator assembly. Remove stator rear thrust pad, needle thrust bearing and thrust bearing race.

Turbin - Place converter turbine assembly on bench and drive out three drive pins enough to remove first turbine from turbine shell (a small punch should be used to drive pins through the inside of first turbine shell to protrude from first turbine ring). Remove first turbine ring from turbine shell with Tool J-6585, and first turbine ring remover (see illustration). *(NOTE - First turbine ring remover must be fabricated locally).* Remove second and third turbine from turbine shell.



FIRST TURBINE RING REMOVER TOOL

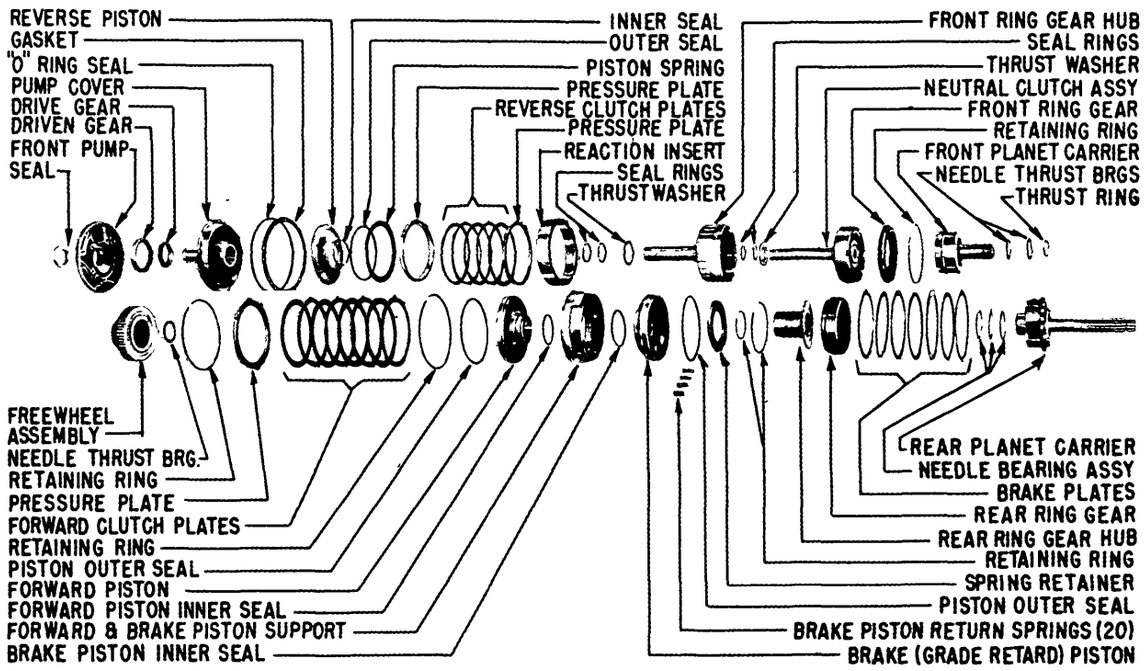
Stator - Remove clutch head retaining screws and front thrust pad, then remove stator freewheel cam, rollers and springs. Remove stator freewheel race, then remove stator blade front carrier by pushing on rear extension of front carrier. Two dowel pins hold the front carrier from turning. Remove 20 stator blades, stator piston and retaining ring, then remove stator piston from blade rear carrier and remove ring from piston *(CAUTION - Be careful not to break cast iron seal ring on stator piston).*

Inspection: Wash all parts in cleaning solvent and blow dry with air *(CAUTION - Do not us rags to dry parts).* Inspect converter pump hub outer surface, and pump thrust washers for galling or scoring. Check converter pump vanes and turbine vanes for looseness or damage. Inspect turbine hubs, turbine thrust washers, stator race and cam rollers for galling or scoring. Inspect converter cover bushing for galling, scoring, or excessive wear. Inspect cam springs for distortion. Inspect stator for galling or scoring and for loose vanes or damage. Inspect loose needle thrust bearing assembly and races for damage.

Converter Cover Bushing Replacement: Use precision type converter cover bushing, Part No. 3737261 for field service replacement (this bushing does not require reaming). Install bushing as follows: Remove thrust washer, needle thrust bearing assembly with a sharp instrument. Remove bushing with a chisel or sharpened tool, taking care not to damage thrust surfaces in bottom of bushing hole. Place new bushing on pilot end of converter cover bushing replacer, Tool J-6583, and press bushing into place. Replace thrust washer and needle thrust bearing assembly

►***FIRST TURBINE HUB THRUST (NEEDLE OR SOLID TYPE) BEARING NOTE: Either a needle type or a solid type bearing is used. Removal and installation procedures are similar.***

First Turbine Hub Bearing or Bushing Replacement: Remove needle or solid bearing, then remove bushing with a sharp cape chisel, being careful not to strike turbine hub. Use Tool J-6561 and pilot the bushing on end of tool, then press into hub of first turbine. *NOTE - Bushing is precision type and does not require reaming.* Install a new needle bearing assembly (or solid bearing) with Tool J-6561 (end opposite that used for bushing). *CAUTION - Do not cock b aring during installation.*



CHEVROLET TURBOGLIDE INTERNAL COMPONENTS (EXPLODED VIEW)

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CHEVROLET TURBOGLIDE (C nt.)

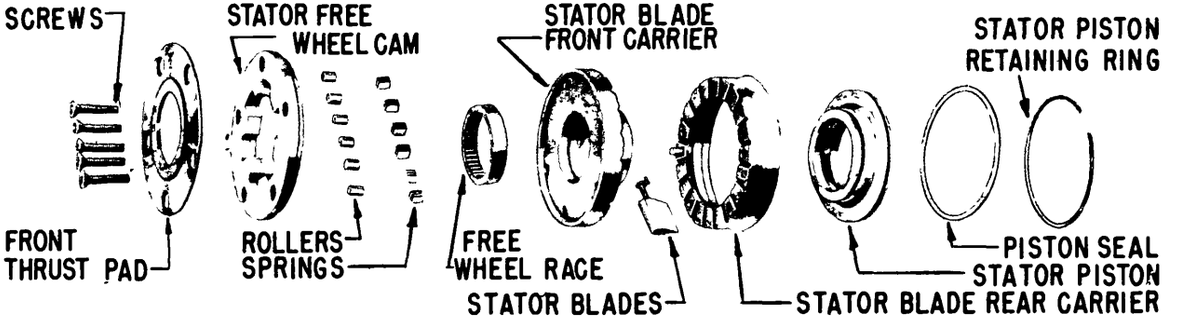
Sec nd & Third Turbin Hub Bearing R plac ment: These bearings are replaced in the same manner as for first turbine. *NOTE - All three turbines use the same bearing assembly.*

Reassembly: Stator - Install cast iron seal ring in stator piston and install stator piston in rear blade carrier, being careful not to break cast iron seal ring. Install stator piston retaining ring and install the 20 stator blades. *(NOTE - Trailing or sharp edge of blades should point downward after installation in stator. Neck of stator piston must be pushed fully through rear carrier to install stator blades).* Install stator front blade carrier, indexing the dowel pins in holes in rear blade carrier. Install stator freewheel cam in stator front blade carrier, aligning holes for retaining screws. Install freewheel race, springs and cam rollers with springs in large end of ramp slots of freewheel cam. Install front thrust pad and retain with five screws. Tighten screws to no more than 3-4 ft. lbs.

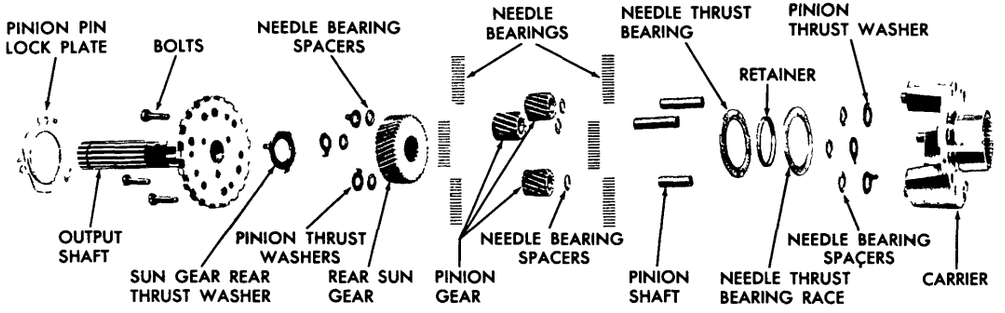
Turbine - Install needle thrust bearings with Tool J-6561, in the three turbines (needle thrust bearing assembly is the same for each of the three turbines). Support third turbine with suitable bushing while installing thrust bearing *(CAUTION - Do not strike or drive needle bearing on thrust surface. The needle bearing should be installed only by applying force to outer edge of bearing).* Install third turbine in turbine shell with vanes up. Install second turbine in turbine shell with flange upward. Align balance marks, then install first turbine inner ring with inner flat surface facing up in turbine shell. Locating three drive pins in shell with their respective holes in the inner ring can be accomplished with a small drift having the diameter of the pin. Complete installation by seating pins in place with a small "C" clamp.

Converter - Install steel spring ring into thrust bearing opening in pump and invert pump and converter assembly on stand and install needle bearing race (thinner washer) in pump. Install needle bearing assembly in pump, then install stator rear thrust pad (heavier of two washers). Install stator assembly into pump with bolts on stator facing up. Mount pump on stand face up, and index converter turbine shaft through pump and stator assembly. Install new square ring seal on converter cover. Place thrust washer, needle bearing, and another thrust washer on face of hub. Install converter cover and align balance marks on converter cover and pump. Install bolts on each side of scribe mark, omitting each fourth bolt, then tighten nuts finger tight. Tighten converter bolts as follows: Tighten every third bolt to 8-12 ft. lbs., (in rotation). Tighten remaining bolts to 8-12 ft. lbs., (in rotation), then tighten all bolts to 13-18 ft. lbs., (in rotation).

PLANETARY UNITS: R ar Unit Disass mbly - Bend tabs of pinion lockplate away from bolt heads, then mark or scribe edges of carrier and output shaft flange for correct reassembly. Back out bolts so approximately ½" of bolt length extends toward output shaft, then with output shaft held downward, support assembly in a press so as to press on the extended bolts. Using a suitable tool, press on sun gear with the press arbor until carrier separates from output shaft. Remove bolts to free carrier. *NOTE - Pinion shafts will normally remain in output shaft. If pins hang at start of separation of carrier from output shaft, drive pins out of carrier from carrier side so that they may all remain in output shaft. Be careful not to lose any of the planet pinion needle bearings.* Using a drift, tap edge of lock plate to free it from grooves in pinion shaft and remove lockplate. Install output shaft (containing pinion shafts and remaining gear set components) in a vise with shaft pointing downward, then remove needle bearing assembly, needle thrust bearing race, sun gear and sun gear thrust washer. *CAUTION - Thrust washer retainer should not be removed unless replacement is required.* Place a dummy shaft (old pinion or a wooden dowel the same size as pinion shaft) on end of pinion shaft and slide a knife blade between lower thrust washer and pinion shaft holder. Lift up on knife and slide lower pinion thrust washer, pinion with needle bearings, and upper pinion thrust washer onto dummy shaft. Remove remaining pinion assemblies in the same manner. *NOTE - Pinion shafts may be removed, if necessary, by knocking them out of output shaft with a drift (drive toward output shaft on nd opposite lock plate groove).*



VARIABLE STATOR ASSEMBLY



REAR PLANETARY GEAR SET

Insp ction: Wash all parts in solvent and blow dry with air. Check planetary pinion bears and sun gear for nicks or other tooth damage. Check thrust washer for wear or scoring and replace all worn or damaged parts. *NOTE - The output shaft bushing is precision bor d during assembly and is not replaceable.* Inspect planetary needle bearings closely and if excessive wear shows, replace all bearings in that pinion. Check pinion shafts and replace if worn (install new pinion shafts in output shaft half of the assembly).

Rear Unit Reassembly: Install locking plates so they fully seat in grooves in pinion shafts, then install output shaft in vise, shaft downward, using a dummy shaft. *CAUTION - Two b aring arrang m nts may be found in production transmissions. In one, 17 needle bearings separated by a spac r are installed in each end of the pinion. In other installations a single row of 17 longer type bearings are installed in ach pinion, eliminating the use of a spac r.* When assembling bearings, use petroleum jelly to hold bearings in place. Install pinion thrust washer over pinion shaft with tang indexed to small lock hold in output shaft. Index dummy shaft with pinion gear assembly on pinion gear shaft and slide pinion gear assembly over shaft. Repeat operation for remaining pinion assemblies. Install sun gear rear thrust washer into output shaft with tang of thrust washer positioned downward and into lock hole in output shaft, then install sun gear. *NOTE - If thrust bearing retainer replacement was necessary, press a new retainer into carri r until retainer bottoms.* Install sun gear needle thrust bearing race and thrust bearing assembly in rear planet carrier (use petroleum jelly to

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CHEVROLET TURBOGLIDE (C nt.)

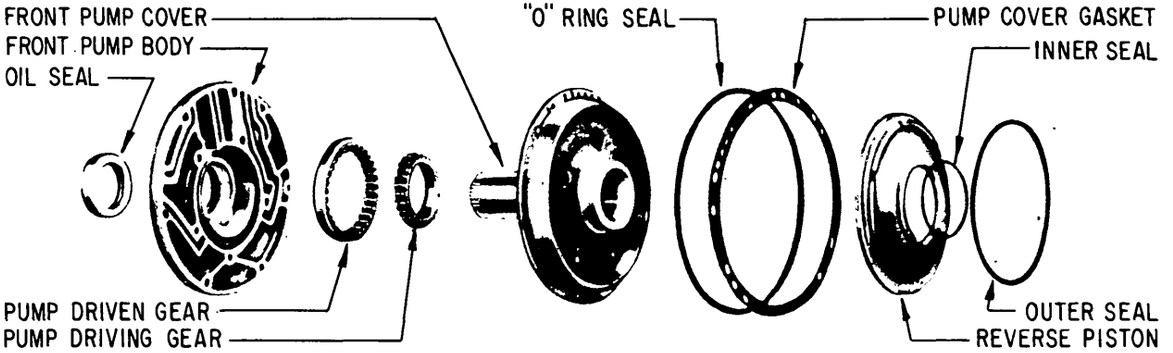
keep pieces located during assembly). Install pinion thrust washers with tange upward. Align scribe marks on carrier with marks on output shaft and insert carrier dowels into respective holes in output shaft. While assembling carrier to output shaft, align tangs of thrust washers to lock holes in carrier. With output shaft downward, press on carrier with arbor press until halves are are fully together. Install three bolts and tighten to 18-22 ft. lbs. Check end clearance of planet gears between thrust washer and flange. *CAUTION - Reading must be taken in this area.* If clearance is greater than .006-.030" and thrust washers are not worn, check to see that carrier has been fully pressed to output shaft. When correct clearance has been obtained, bend lockplate tabs onto bolts.

Front Unit & N utral Clutch Hub: *NOTE - Component parts of this unit are not serviced. If worn or damaged, the entire carrier unit must be replaced as an assembly.* Inspect this unit in same manner as for rear unit (above). End clearance of planet gears should be .006-.030".

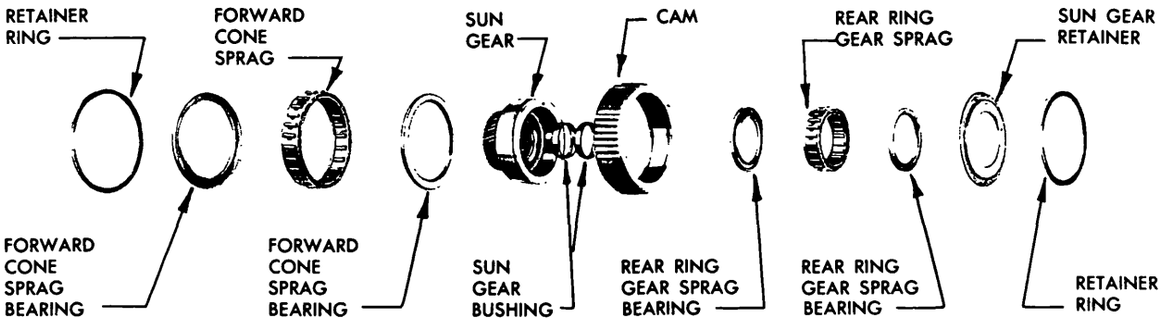
FRONT PUMP & REVERSE PISTON: Disassembly - Remove gasket and square oil seal ring. Remove reverse piston by using air pressure and applying air to reverse port in pump cover (stator support). Remove square oil seal ring from inner diameter of reverse piston, then remove five hex lock bolts holding pump cover to front oil pump body and remove oil pump body from cover. Remove both pump gears. *NOTE - Two lugs on drive gear are installed toward front of pump body and mate with slots in converter housing hub.*

Inspection: Wash all parts in solvent and blow out all oil passages *(CAUTION - Do not use rags to wipe parts).* Inspect all parts for nicks or scores. Inspect seals for hardness, wear, damage or evidence of oil leakage. If pump body oil seal is damaged, pry out and install new seal with Tool J-6584. Inspect splines on stator shaft for wear and check both ends of shaft inner diameter for wear. Inspect reverse piston for damage and inspect reverse drive, reaction and pressure plates for wear or heat. Replace if necessary. Inspect pump body bushing for galling or scoring. Check clearance between pump body bushing and converter pump hub. Maximum clearance should be .005". Inspect reverse piston spring for heat damage. With all parts clean and dry, install pump gears and check as follows: Clearance between outside diameter of driven gear and body should be .0025-.0055". Clearance between driven gear and crescent should be .003-.009". With scale and feeler gauge, check gear end clearance which should be .0005-.0015".

R assembly: Remove gears from pump body after checking and lubricate with automatic transmission fluid, then reinstall gears in pump body. *NOTE - Drive gear is installed in pump body with lugs toward body (lugs mate with slots in converter housing). If installed backward, pump will not operate.* Assemble pump cover (stator support) through drive gear and align attaching bolt holes. Install hex lock bolts but do not tighten. Install concentricity gauge J-6560 over front extension of pump cover to pump body, then tighten the hex lock bolts to 18-22 ft. lbs. and remove gauge. Install square seal ring in inner diameter of reverse piston (lubricate with transmission oil before installation), and install square seal ring to outer diameter of reverse piston. Position reverse piston to front pump cover and press into place with fingers. Install square seal ring to outer edge of pump cover, then place gasket on rear face of cover.



FRONT PUMP & REVERSE PISTON ASSEMBLY



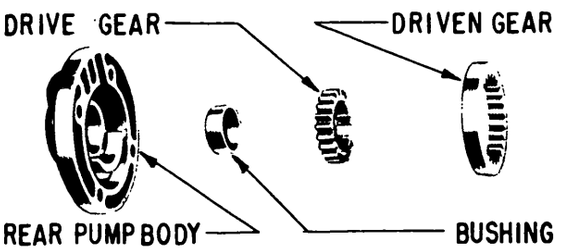
SUN GEAR FREEWHEEL ASSEMBLY

REAR PUMP: Disassembly - Remove pump gears and wash parts with solvent. Blow out all oil passages and check parts for visible damage. Install gears and check all clearances which are the same as for the front pump (see above). *NOTE* - Use output shaft in place of converter to make check for clearance between output shaft and pump bushing.

Rear Pump Body Bushing - Use precision bushing, Part No. 3727490, which requires no reaming, for service replacement. Cut bushing with a chisel and remove from pump body. Press new bushing into pump body with Tool J-6582. Bushing should be flush with neck of pump body on the inside, and flush to .010" below front surface of pump body.

Reassembly: Lubricate all parts with automatic transmission fluid. Reverse the disassembly procedure.

FRONT SUN GEAR FREE WHEEL ASSEMBLY: Disassembly - Remove needle thrust bearing assembly in opening in the rear of sun gear. Remove snap ring in outer cam from rear of assembly with a screwdriver. Remove forward clutch freewheel sprag assembly and outer bearing from sun gear (sun gear may have to be rotated clockwise to freewheel out of cam). Remove sprag assembly from outer cam. *NOTE - The sprag assembly*



REAR PUMP ASSEMBLY

should not be disassembled. An arrow stamped on outer cage of sprag assembly designates front of transmission. Remove sheet metal retainer from sun gear using pliers and bending retainer at the staking points. Remove ring gear freewheel sprag assembly and bearings.

Inspection: Wash all parts in solvent and blow dry with air *(CAUTION - Do not use rags to wipe parts).* Inspect inner race (sprag bearing surface) of cam for excessive scoring or burning. Also check lugs on outer perimeter of cam for nicks or burrs. Check bushings in sun gear for looseness or bushing scoring. Replace if necessary. *(NOTE* - Bushings must be replaced in pairs with sun gear removed from freewheel unit). Inspect front sun gear teeth for nicks and burrs and for fit of sun gear into front planetary unit. Inspect internal and external races (sprag bearing surfaces) of sun gear for excessive

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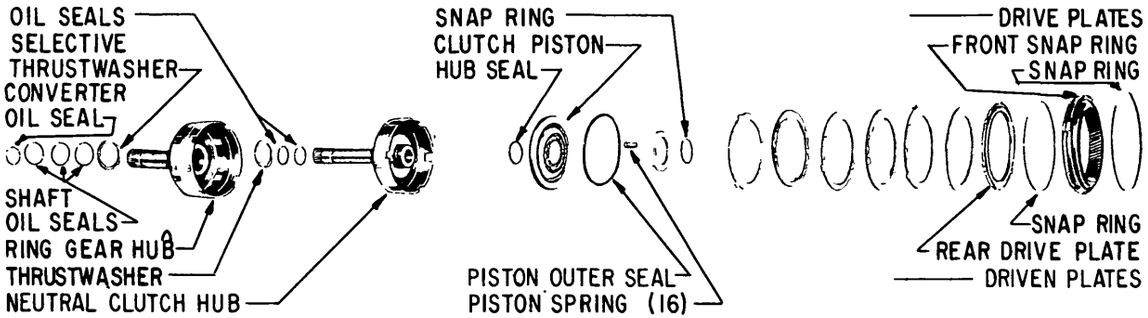
CHEVROLET TURBOGLIDE (C nt.)

scoring or burning. Inspect sprag bearing for excessive wear. Check sprag assemblies and if wear is indicated, replace the assembly.

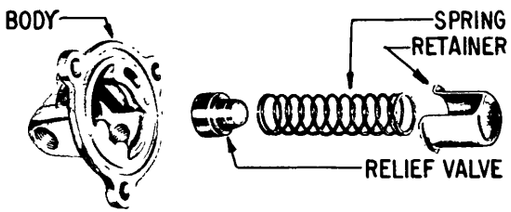
Front Sun Gear Bushing Replacement - Use precision bushings, Part No. 3727244, which require no reaming, for service replacement. *(CAUTION - Do not attempt replacement of these bushings with freewheel unit assembled).* Remove old bushings with Tool J-6581, using removal end of tool. *(CAUTION - Before installing bushings, note position of oil grooves in bushings. These grooves must point outward to maintain oil reservoir in sun gear).* Using Tool J-6581, mount sun gear in press and press bushings into place.

R assembly: Install front retainer, then large sprag front bearing (brass) into cam. Install sprag into cam *(NOTE - Stamped arrow on outer cage of sprag assembly indicates front of transmission),* compress unit into cam with fingers (do not force). Install large sprag rear bearing (brass) into cam, then set aside for further assembly. Install front bearing (brass) into rear of sun gear. Install sprag, then install rear bearing (brass) into sun gear. Index tang of new seal retainer into hole in rear of sun gear and clamp in vise, using a steel block and wood block, and stake retainer into place using a staking tool which must be sharp and give a "fingernail" impression *(CAUTION - Shield retainer must be held snug to rear of sun gear while staking operation is performed. Be very careful not to bend shield).* Index sun gear into forward clutch sprag, twisting clockwise to enable sprag cams to twist, allowing sun gear race to seat under sprags while twisting. Install rear bearing into cam. *NOTE - Sprags are assembled correctly if units will slip while holding outer cam stationary and turning sun gear clockwise as viewed from the front.*

NEUTRAL CLUTCH & FRONT RING GEAR: Disassembly - Remove converter turbine shaft oil seal ring from front of ring gear hub shaft. Remove three turbine shaft oil seal rings and lift converter turbine shaft ring gear thrust washer off shaft- *NOTE - This washer is selective fit for proper clearances within transmission.* Remove front planet ring gear retainer ring with a sharp instrument and remove ring gear from hub. Remove hub from turbine shaft and neutral clutch assembly. Remove two third turbine shaft seal oil rings from turbine shaft, then remove plate retaining snap ring and lift out rear drive plate, clutch drive plates, and driven plates. *NOTE - Plate retaining snap ring is staked in place. Remove staking by driving on snap ring with a punch and hammer.* To remove spring retainer snap ring, place neutral clutch assembly in an arbor press and compress springs with Tool J-5133 and J-7150, then remove snap ring and slowly release press. Lift off spring retainer and remove 16 springs. To remove neutral piston apply air to check ball (piston will blow out). Remove neutral piston outer seal and piston hub seal. *NOTE - Ball check in neutral clutch hub must be fr to move off seat .030" minimum and hole should be fr of chips and dirt. Ball check is not removabl .*



NEUTRAL CLUTCH & RING GEAR ASSEMBLY

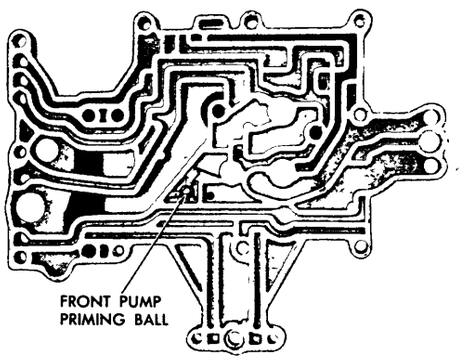


THERMAL BYPASS VALVE

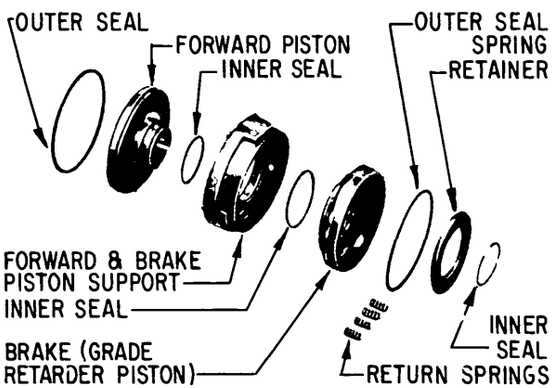
Front Ring Gear Hub Bushing Replacement - Front ring hub is not serviced separately. If bushing fails, replace complete front gear hub assembly.

Reassembly: *NOTE - Lubricate rubber seals with automatic transmission fluid before assembling.* Install neutral clutch piston hub seal ring to center raised portion of hub, then install neutral clutch piston outer seal on piston. Install neutral clutch piston into clutch hub (apply hand pressure evenly around piston to aid in piston installation). Arrange 16 piston springs on neutral clutch piston in a circle in piston spring groove, then place spring retainer on springs. Place assembly in an arbor press, then install snap ring in approximate position and compress springs with Tool J-5133 and J-7150. Make sure snap ring is properly seated, then remove neutral clutch from arbor press. Install externally tanged drive plates and internally splined driven plates alternately in neutral clutch hub starting with a drive plate. Install rear drive plate and secure all plates with snap ring. Stake retainer plate against snap ring in three places. Install ring gear hub bushing, then two third turbine shaft seal rings. Insert neutral clutch hub into front ring gear hub being careful not to break seal rings on third turbine shaft. Key front ring gear to ring gear hub (larger tapered portion of ring gear must be up or snap ring cannot be installed). Install front ring gear retainer ring in hub, making sure it seats fully in bottom of ring groove. *NOTE - Oil seal rings and selective washers are not installed at this time as it would be necessary to remove them for selecting proper thrust washer during assembly.*

FORWARD PISTON, BRAKE PISTON & SUPPORT: Disassembly - Position the assembly on press bed with retaining ring upward, then use Tools J-7782 & J-5133



FRONT PRIMING BALL LOCATION



FORWARD & BRAKE PISTON

to compress spring seat and remove retaining ring, spring seat, and twenty coil springs. Remove forward piston and brake piston from support by blowing air under pressure into forward and brake piston pressure ports. Remove the two seals from forward piston outer diameter and seals from outer and inner diameters of brake piston.

Inspection: Wash all parts in solvent and blow dry with air. Inspect all parts for indications of heat damage. Inspect all surfaces contacting seal rings for scoring

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CHEVROLET TURBOGLIDE (C nt.)

or burning, then check fits of forward and brake piston into support. Inspect inside diameter of forward piston which mates with ring gear for nicks or burrs.

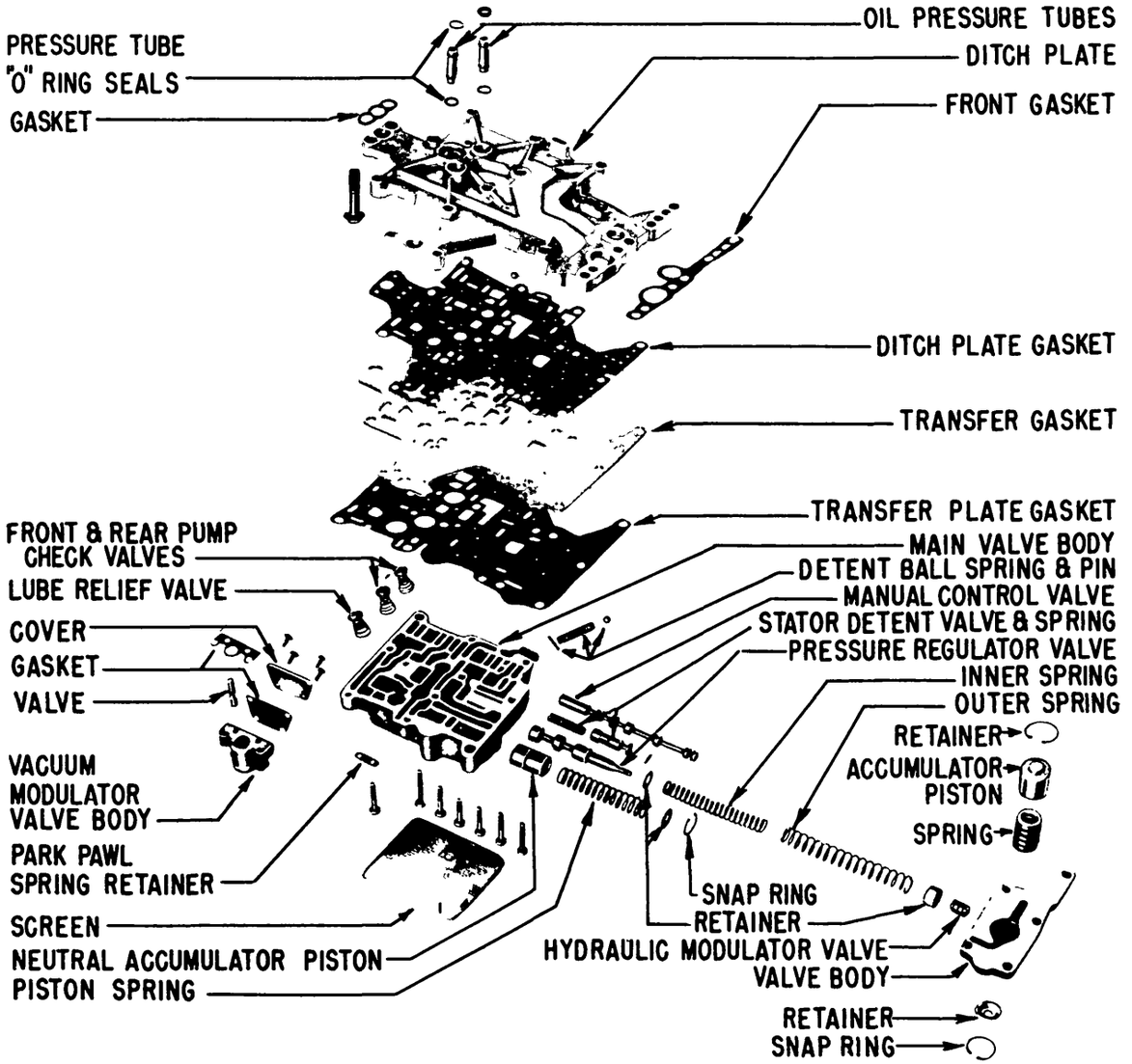
R ass mbly: Assemble new seals to outside diameter of forward piston and to outside and inside diameters of brake piston. Lubricate seals and carefully install forward piston in support using extreme care to avoid damage to seals as they enter support. Fully seat forward piston in support. Position Tool J-7781 on support hub to protect seal on inside diameter of brake piston, then carefully guide brake piston into support over seal protector using care not to damage large seal on brake piston as it enters support at slightly chamfered edge. Set unit in a press, forward piston end down, and assemble 20 springs to brake piston. Place spring seat over springs, then use Tools J-7782 and J-5133 in arbor press and compress seat and springs and install retainer.

TRANSMISSION CASE REAR BUSHING REPLACEMENT: *NOTE - This bushing is a precision type and does not require reaming or finishing after installation.* Place transmission case on bench with rear of case upward, then use remover end of Tool J-7562 and press or tap bushing from case (from rear of case to front). To install the bushing, use opposite end of tool and press ortap bushing from outside of case toward the front until tool stop is reached. *NOTE - Open nds of bushing oil groove must be toward rear of case.*

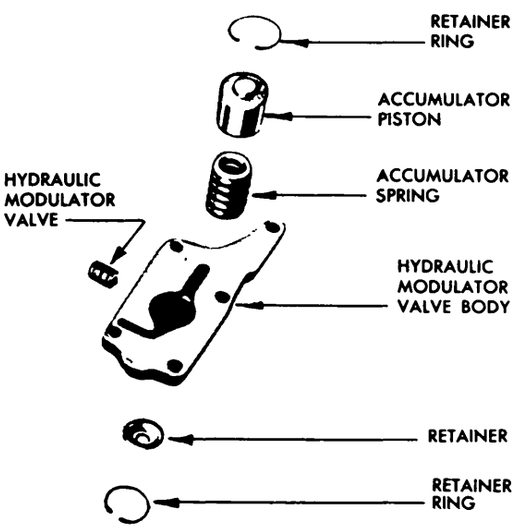
CONTROL VALVE BODY: Disassembly - *NOTE - Note locations of various lengths of bolts as they are removed.* Remove manual valve, then remove valve body screen and vacuum modulator assembly. Remove two attaching bolts securing hydraulic modulator valve body assembly to ditch plate (while holding valve body against spring pressure), then remove valve body assembly, inner and outer pressure regulator spring, and spring retainer. Remove parking pawl spring retainer and the remaining screw on oil screen side of assembly which holds main valve body to ditch plate. Invert valve body assembly and remove nine bolts holding ditch plate to main valve body assembly. Separate the ditch plate from transfer plate and main valve body. Remove gasket between ditch plate and transfer plate, then remove front pump priming ball from cavity in ditch plate. Remove gasket between transfer plate and main valve body. Remove front and rear pump check valves and lube relief valve with their springs. *NOTE - Front and rear pump check valve springs are interchangeable. Lube relief valve spring is heavier and is not interchangeable. The three valves are interchangeable.* Check stator detent valve for freedom of operation. If valve requires removal, then remove roller pin, valve and spring. Remove neutral accumulator piston spring seat snapring with Tool J-5403, then remove seat, spring and piston. If required, remove detent ball pin, spring, and detent ball. Remove pressure regulator valve and spring seat washer. If required, remove seven socket head pipe plugs from valve body.

Vacuum Modulator Valve - Remove cover screws and lift off cover and gasket, then remove valve and base plate. To reassemble, insert modulator valve into

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VALVE BODY ASSEMBLY



HYDRAULIC MODULATOR

CHEVROLET TURBOGLIDE (C nt.)

valve body, then install cover using a new gasket. Tighten screws evenly, then install a new base gasket.

Hydraulic Modulator Valve - Remove valve from valve body, then compress piston and spring and check for free movement. If disassembly is required, depress accumulator piston with a narrow hammer handle and remove retainer ring with Tool J-5403. Slowly release pressure on accumulator piston, then remove piston and spring. Remove retainer ring and retainer from opposite side of valve body. To reassemble, install one retainer ring in bottom of valve body with Tool J-5403, then install retainer. Install accumulator piston spring and piston, then depress accumulator piston into bore with a hammer handle and install retainer ring, making sure ring is fully seated before releasing pressure on accumulator valve. Install hydraulic modulator valve.

R assembly: Install the seven pipe plugs in valve body, then install detent ball, spring, and roll pin. Install neutral accumulator piston, spring, and seat into main valve body, then hold seat over spring and compress and install snap ring into groove. If removed, install stator detent valve spring in main body, then install detent valve with hollow end positioned over spring. Depress valve and tap in roll pin to engage groove in end of valve. *NOTE --Do not install pin too deeply as end of pin should not touch bottom of groove.* Check valve for freedom of movement after installation of pin. Install spring seat washer to pressure regulator valve and install valve and seat in valve body. Install front and rear pump check valves and lube relief valve. *NOTE - Lube relief valve has heavier spring. Front and rear pump check valve springs are interchangeable. All three valves are interchangeable.* Install front pump priming ball in ditch plate (see illustration). Install large hollow bolt through rear hole in ditch plate to aid in alignment of gaskets and components. Install gasket on ditch plate, then install transfer plate to gasket. Install gasket on main body and install transfer plate and ditch plate to valve body by grasping assembly and indexing lube relief valve and front and rear pump check valves of main body with holes in transfer plate. *CAUTION - Be sure gaskets are not torn or damaged during installation.* Hold ditch plate down and install nine shorter bolts finger tight to ditch plate side of assembly. *NOTE - Excluding the two smaller vacuum modulator attaching bolts, the eleven shorter bolts are installed to ditch plate side of the assembly and are all the same size. Nine of these bolts attach ditch plate and transfer plate to main valve body and two attach hydraulic modulator body to ditch plate. The two longer valve body to ditch plate bolts are installed to main valve body side of the assembly.* Install inner and outer pressure regulator valve springs in pressure regulator bore of valve body and install spring retainer on end of springs. Position hydraulic modulator body assembly so that pressure regulator springs enter hydraulic modulator valve bore in body, then compress springs and install two remaining shorter bolts finger tight to secure hydraulic modulator unit to ditch plate. Tighten all bolts on ditch plate side to 9-12 ft. lbs. working outward from the center. Invert the assembly and install parking pawl spring retainer and longer bolt through main valve body side and tighten to 9-12 ft. lbs. Install diagonally opposite longer bolt through main valve body and tighten to 9-12 ft. lbs. Use a new gasket and position vacuum modulator assembly on ditch and transfer plates, then install attaching screws and tighten securely. Install valve body screen and slotted head bolt, then install manual valve.

REAR EXTENSION HOUSING REAR OIL SEAL REPLACEMENT: Place extension housing on a wooden surface and remove oil seal using a cape chisel or punch *(CAUTION - Be careful not to damage aluminum case).* Using Installing Tool J-5154, install seal in extension housing.

► *EXTENSION HOUSING BUSHING NOTE: This bushing is precision bored in position and is not replaceable.*

of neutral clutch on bench and install freewheel sprag assembly over rear extension of planetary. Twist sprag assembly to mate sun gear to planetary gears. Install needle thrust bearing over extension of front planetary gear extending through freewheel unit.

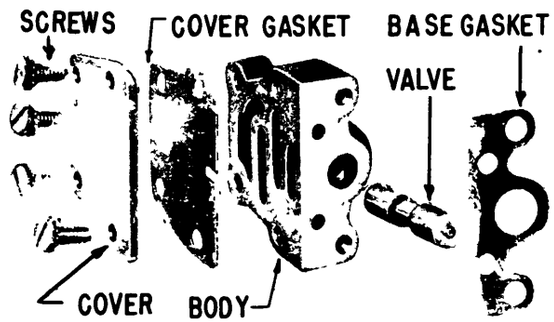
TRANSMISSION REASSEMBLY

REASSEMBLY: 1) Install vacuum modulator gasket and modulator assembly, then install square seal ring and bypass valve assembly. Tighten bolts to 7-9 ft. lbs. Install parking lock pawl and pawl shaft with new "O" ring seal in case.

2) Install parking lock bracket to case with two screws and lockwashers and tighten to 7-9 ft. lbs. Assemble parking lock actuator assembly, parking lock and range selector inner lever and secure with "C" retainer. Install parking lock and range selector outer lever and shaft through case, then assemble inner lever to outer lever shaft and tighten screw and nut.

3) Install throttle valve control outer lever with washer and new "O" ring seal installed to shaft through center of parking lock and range selector lever shaft. *NOTE - Washer must be positioned so inner lip will enter seal.* Assemble inner throttle valve lever to outer lever shaft and secure with "C" retainer.

4) Lubricate and install needle thrust bearing race and bearing on front hub of rear planet carrier. Dip caged needle thrust bearing in transmission oil, assemble over output shaft of rear planet carrier and stick to carrier with petroleum jelly. Lubricate all gears and friction surfaces before installing.



VACUUM MODULATOR VALVE ASSEMBLY

5) Lubricate and assemble rear ring gear unit to rear planet carrier assembly with bearings installed. Hold up parking lock pawl and insert entire unit into case (support output shaft during installation). Install brake (grade retarder) clutch pack in following sequence: **Thin** steel reaction plate, faced brake plate, **thick** steel reaction plate, faced brake plate, **thick** steel reaction plate, faced brake plate, and **thin** steel reaction plate. *NOTE - The three steel reaction plates are internally tanged and engage in grooves in rear ring g ar hub. The four reaction plates are externally tang d for engagement into grooves in transmission case. Align all internal notched tangs on faced brake plates.*

6) Install forward and brake piston and support assembly. Seat assembly by tapping with brass drift. *NOTE - Pressure tube ports point toward valv body or bottom of transmission and align with holes in cas when seated.* Install forward and brake piston support retainer ring in case. *NOTE - Do not position ring gap at grooves in case.* Lubricate and install needle thrust bearing into rear cavity of front sun gear freewheel assembly (overrun sprag clutch unit) and install assembly in case. *NOTE - Races not used with this bearing.*

7) Lubricate and install forward clutch pack in the following sequence: Steel reaction plate, then a faced brake plate, repeating this sequence to complete the pack of four steel reaction plates and three faced brake plates. Finally install the thick steel pressure plate. *NOTE - Notched tangs on reaction plates must be in alignment.* Install forward clutch retainer ring in case. *NOTE - Do not position ring gap at case groov s.*

8) Assemble new "O" rings in top groove of each oil pressure tube and in the brake (grade retarder) and forward clutch orifices, making sure they are fully seated, then install tapered ends of pressure tubes into "O" rings in orifices and check forward and brake pistons for leakage.

9) Apply a small amount of petroleum jelly and locate tanged thrust washer on front end of front planet carrier. Also lubricate and install needle bearing race and and bearing over front planet carrier extension. Install thrust ring in groove on front planet extension. Lubricate and install front planet carrier in case.

10) Install neutral clutch and front ring gear assembly over front planet carrier, then hold front ring gear shaft while turning the outer shaft to engage neutral clutch plates with front planet carrier. Lubricate and install reverse clutch reaction insert and rear pressure plate in case. Alternately install faced plates and steel reaction plates in insert, then complete assembly by installing the original selective reverse front pressure plate. Install reverse piston spring with coned side of spring facing front of transmissions.

11) Install new square seal ring on outer lip of stator support. Align tangs of oil pump drive gear to top and bottom of pump housing. *NOTE - Transmission must be in a vertical position with front end facing upward to avoid damage to oil seal rings on second turbine shaft during front pump and conv rter installation. Align oil seal ring gaps for as of installation.* Install two guide studs J-3387-10 in case to guide front pump to avoid damaging oil seal rings on front ring gear hub shaft.

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CHEVROLET TURBOGLIDE (C nt.)

12) Install front pump gasket on case, then lubricate four oil seal rings on second turbine shaft with petroleum jelly and center rings on shaft. Index pump on guide studs and carefully guide pump over oil seal rings. If necessary, tap pump housing to seat it in case. Check second turbine shaft for free rotation. If shaft binds, remove assembly and check for broken seal rings. Install four of the front pump mounting bolts and tighten to 15-18 ft. lbs. and recheck second turbine.

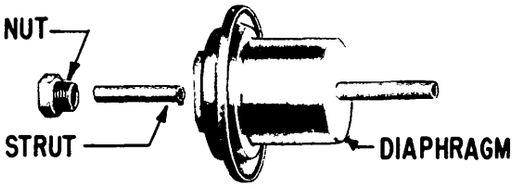
13) Check for correct selective reverse front pressure plate running clearance as follows: Position transmission so output shaft is horizontal, then using feeler gauges, measure clearance between selective reverse pressure plate and the adjacent faced plate. *CAUTION - B car ful to measure only the clearance, making sure that clutch pack plat s are not being compressed by ins rtion of the feeler gaug s.* Clearance should be .025-.050". If clearance not within limits, disassemble reverse clutch pack and install a thicker or thinner selective reverse plate as required. Three sizes of reverse pressure plates are available as follows:

R v rs Pr ssure Plates

Thickn ss ℄	Id ntification ②	Part No.
.5971"	1	3759803
.5814"	2	3759804
.5657"	3	3759805

℄ - Plus or minus .003".
② - Number of depressions in plate.

14) To check for correct thickness of washer on front ring gear hub, position transmission so output shaft is down, then mount dial indicator so plunger of indicator is resting on end of neutral clutch hub. Push upward on output shaft and note total indicator movement. Clearance should be .008-.028". If clearance is within limits, remove guide studs, then coat all front pump bolts with non-hardening sealer and install. Tighten bolts to 15-18 ft. lbs. If clearance is not within limits, remove front pump and reverse piston assembly and change the selective washer. Washers are available in thicknesses of .068", .085", .103". Recheck second turbine shaft for free movement after reassembly.



VACUUM DIAPHRAGM

15) Install converter assembly engaging the two slots in converter pump hub with lugs in front pump drive gear. *NOTE - Lift converter up and down while turning slightly to engage pump lugs. The converter will drop approximately ½" further when engagement with front pump lugs is attained.* Measure from front of case to front of converter. If measurement is a minimum of ¾", all parts are properly engaged. Install converter Holding Tool J-5384, then turn transmission parallel to floor, bottom side upward. Air check stator piston for air leakage.

16) Turn output shaft to locate drive pin hole at top of output shaft, then install wear plate and rear pump drive pin. Position rear pump on output shaft, indexing drive gear to drive pin, then install two lower oil pump bolts which are not used to secure oil deflector. Tighten bolts snugly. Install speedometer drive gear with Tools J-5814 and J-5814-15. *NOTE - Front face of driv gear should be ¼" from rear pump.* Install oil deflector and remaining two rear oil pump bolts and tighten bolts snugly. Install seal ring around pump body and against rear face of case. *CAUTION - Converter assembly must be in transmission before rear oil pump bolts are tightened.* Install transmission extension and bolts and tighten securely.

17) Using a universal joint slip yoke, check for free movement of output shaft. If there is binding, center rear oil pump by tapping on extension with soft hammer until shaft turns freely. When output shaft turns freely, carefully remove extension to avoid shifting oil pump. Tighten rear oil pump bolts to 7-9 ft. lbs. Install extension and tighten the five mounting bolts to 23-26 ft. lbs. Install slip yoke and recheck for free rotation of output shaft. If removed, install speedometer driven gear in extension, position retainer and tighten capscrew to 3½-5 ft. lbs.

18) Install vacuum modulator plunger, then install new new gaskets on front and rear of valve body or case. Position valve body on case, making sure that selector inner lever engages with manual valve and detent ball and that pressure tubes and vacuum modulator plunger enter valve body. Install and tighten front bolts to 8-10 ft. lbs., and rear hollow bolt to 18-21 ft. lbs. Install parking pawl spring to pawl retainer on rear of valve body. Install oil pan gasket and oil pan. Tighten capscrews to 3-4 ft. lbs.

CORVAIR TRANSAXLE

C rvair (1960)

DESCRIPTION: The Transaxle consists of either an integral differential (rear axle) assembly and synchro-mesh transmission; or a differential (rear axle) assembly and a Powerglide transmission as follows:

Differential (Rear Axle) Assembly: Straddle mounted hypoid gear type of new design with transmission input & output shafts running axially through differential pinion shaft. This unit which is contained in a separate carrier housing is located between transmission (either Synchro-mesh or Powerglide) and the engine assembly.

Synchro-mesh Transmission: Three-speed synchro-mesh type integral with rear axle differential carrier. Because of attachment to differential carrier, a hollow mainshaft is used to permit passage of the clutch shaft to front of transmission for engagement of clutch gear with countergear. *NOTE - Except for counter-g ar and clutch gear, all transmission gears are interchangeable with the conventional Chevrolet 3-Speed synchro-mesh transmission.*

P werglide Transmission: Three element torque converter and a hydraulically operated two-speed type automatic shift transmission integral with rear axle differential carrier. Converter torque from the welded type torque converter assembly located between differential carrier and engine is transmitted to transmission through two hollow shafts running through the hollow differential pinion shaft. One shaft runs from converter cover hub to transmission front pump and the other from the turbine to transmission input sun gear.

LUBRICATION

Check fluid level in all units every 1000 miles. Drain and refill every 10,000 miles (Rear Axle & Synchro-mesh Trans.). *NOTE - Draining and refilling of Powerglide Trans. not recommended except at time of overhaul.*

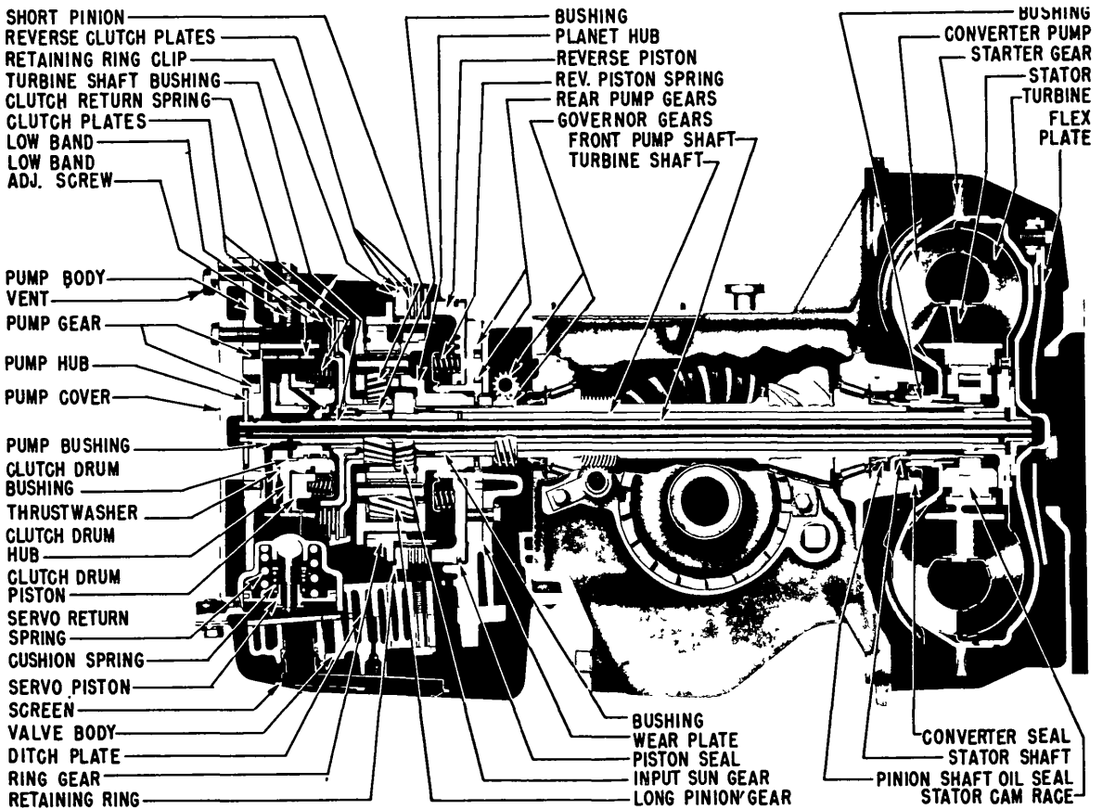
Recommended Oil (Rear Axle & Synchro-mesh Trans.) - SAE 80 "Multi-Purpose" gear lubricant. *CAUTION - Do not use "Mineral Oil" gear lubricants or any "active surphur soap" lubricants.* Differential carrier & transmission are connected by internal passages.

Powerglide Trans. - Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - Automatic transmission is sealed off from differential carrier.*

Checking Fluid Level: Rear Axle & Synchro-mesh Trans. - With unit at normal operating temperature, check fluid in differential carrier first (plug is adjacent to rear axle universal joint on left side of transmission case). If level is low in differential carrier, also check level in transmission. *NOTE - With unit at operating temperature, fluid should be level with bottom of filler plug hole. If unit is cold, fluid should be ½" below filler plug hole.*

Powerglide Transmission - With transmission at normal operating temperature and transmission selector lever in "N" position, engine idling, check fluid level on dipstick in filler tube at right side of engine near firewall. Add fluid as necessary to bring level to "Full" mark on dipstick, using recommended fluid.

Draining & R filling: R ar Axl - Drain carrier housing and replace drain plug. Refill housing with 3.1 pints of recommended fluid.



CORVAIR POWERGLIDE TRANSMISSION SECTIONAL VIEW

Rear Axle & Synchro-mesh Trans. - Remove drain plug in transmission housing and in differential carrier housing. *NOTE - Transmission drain plug is on left side adjacent to idler arm on side of transmission case.* Refill by adding lubricant to both units (5 pints total). Check level at both units after refilling.

Powerglide Trans. - *NOTE - Not required except at time of transmission overhaul.* Drain oil by loosening filler tube attaching nut in oil pan. Tighten filler tube nut and add 4 pints of recommended fluid using filler tube and funnel J-4264. Start engine and allow to idle 3-5 minutes in "N", then add sufficient fluid to bring level to "Full" mark. Capacity is 6 pints (approximately) for normal refill. 13 pints (approximately) with transmission and torque converter dry.

ADJUSTMENT

Transmission Shift Linkage (Synchro-mesh Trans.): Loosen universal joint clamp nut at transmission end of shift shaft, then move manual shift shaft on transmission so transmission is in first speed position. Hold selector lever and tighten universal joint clamp bolt. Check shift in all positions.

Transmissi n Thr ttl Linkag (P w rglid Trans.): *Se "Accel rator Control Linkag Adjustm nt" under CARBURETOR on car model page.*

Manual Linkag (P w rglid Trans.): Drain transmission oil and remove oil pan. Place transmission selector lever in "D" (Drive) range, then insert Tool J-8365 into manual valve bore (end opposite linkage) with tab of gauge upward so it engages forward port of valve body. With tool in place, push forward on manual valve levers. If valve is properly adjusted, tool will be held in place horizontally without being supported. If adjustment is necessary, loosen lockscrew in manual valve linkage (inside transmission) and push manual valve levers forward so Tool J-8365 is held in a horizontal position. Recheck adjustment. Install oil pan and fill transmission with fluid.

Neutral Starter Switch Adjustm nt (P w rglid Trans.): Loosen two switch mounting screws and place transmission selector lever in "N" (Neutral) position. Turn ignition switch to "Start" position, then move Neutral Switch fore and aft until engine cranking begins. Secure switch in that position. Recheck to make sure engine will not start with transmission selector lever in any position other than "N" (Neutral).

Low Band: Remove parcel shelf behind rear seat and remove plug covering access hole in floor. Loosen locknut and tighten the square head adjusting screw to 40±5 inch pounds, **then back ff adjusting scr w 4 full turns xactly.** Hold adjusting screw stationary and tighten locknut.

CONTINUED ON NEXT PAGE

CORVAIR TRANSAXLE (C nt.)

►*ADJUSTING TOOL NOTE:* A wrench for turning the adjusting screw locknut can be made by welding two ¾" tubular steel spark plug wrenches together (end-to-end) so wrench can be installed over adjusting screw locknut. A square socket wrench can be inserted through this tool to engage adjusting screw.

TROUBLE SHOOTING

NO DRIVE IN ANY SELECTOR LEVER POSITION (CANNOT LOAD ENGINE): Low oil level. Clogged oil suction pipe screen. Broken or disconnected manual cable. Defective pressure regulator valve. Defective line pressure limit valve. Defective front pump. Rear pump check valve and rear pump priming ball not seating (both must occur for possible malfunction). Front pump shaft disengaged at either converter or pump gear. Front pump priming ball not seating.

ENGINE SPEED FLARES ON STANDSTILL STARTS BUT ACCELERATION LAGS: Low band only partially applied caused by one or more of the following conditions: Low oil pressure. Clogged pickup pipe screen. Improper band adjustment. Servo piston apply passage blocked. Servo piston ring broken or leaking. Band facing worn. Low band apply linkage disengaged or broken. Converter stator not holding.

ENGINE SPEED FLARES ON UPSHIFT: Low oil level. Clogged oil suction screen or pipe. High clutch partially applied (blocked feed orifice). Clutch plates worn. Clutch seals leaking. Clutch piston hung up. Clutch drum relief ball not seating. Vacuum modulator hose collapsed.

TRANSMISSION WILL NOT UPSHIFT: Low band not releasing due to one of the following conditions: Stuck low-drive valve. Defective governor. No rear pump output (stuck priming ball, drive pins not engaged, or defective pump). Throttle valve stuck or improperly adjusted. Improperly adjusted manual valve lever.

HARSH UPSHIFT: Incorrect carburetor-to-transmission throttle valve rod adjustment. Improper low band adjustment. Vacuum modulator hose broken or disconnected. Vacuum modulator diaphragm leaks. Vacuum modulator valve stuck. Hydraulic modulator valve stuck.

CLOSED THROTTLE HARSH DOWNSHIFT: Improper low band adjustment. Vacuum modulator hose disconnected or broken. Vacuum modulator diaphragm ruptured. Vacuum modulator valve stuck. Engine idle speed too high. Sticking pressure regulator or hydraulic modulator valves in valve body.

CAR CREEPS EXCESSIVELY IN DRIVE: Idle speed too high.

CAR CREEPS IN NEUTRAL: Incorrect manual valve lever adjustment. High clutch or low band not released.

NO DRIVE IN REVERSE: M .ual valve lever adjustment not correct. Cable linkage adjustment not correct. Reverse clutch piston stuck. Reverse clutch plates worn out. Reverse clutch leaking excessively. Blocked reverse clutch apply orifice.

IMPROPER SHIFT POINTS (see "Shift Speed" table b low): Incorrect accelerator control linkage adjustment. Throttle valve incorrectly adjusted. Governor defective. Rear pump priming ball stuck.

OIL FORCED OUT OF FILLER TUBE: Oil level too high. Oil pickup pipe split or not sealed causing air entrainment.

UNABLE TO PUSH START: Rear pump drive gear not engaged with drive pins on planet carrier hub. Rear pump defective. Rear pump priming ball not seating.

TESTING

►*TESTING NOTE: Transmission must b at normal operating temp rature, fluid level at "F" mark on dipstick, and manual and throttle linkage adjustments must be correct.*

:OAD TEST: Road test car to determine transmission shift points as indicated in table below.

Transmission Shift Speeds

	MPH
UPSHIFTS:	
Minimum Throttle	10–12½
Full Throttle	41–47
Part Throttle (Detent Touch)	34–41
DOWNSHIFTS:	MPH
Closed Throttle	8–12
Full Throttle	38–44
Part Throttle (Detent Touch)	23–30
Manual Low (Inhibited)	41–46

PRESSURE TESTS: *NOTE – Pressure tests can be made by raising rear wheels 3–5" off floor on jack stands.*

Front Pump: Remove plug located at "6 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. With engine at idle speed (approx. 16" of vacuum), pressures should be as follows with selector lever in the indicated range: 81–98 lbs. (Reverse); 47–57 lbs. (Neutral & Drive); 71–82 lbs. (Low). Disconnect vacuum hose at balance tube, then with engine at idle speed, check pressure which should be: 140–157 lbs. (Reverse); 71–82 lbs. (Neutral, Drive & Low). If there is no pressure in front pump, check for stuck pressure regulator, broken or disengaged front pump shaft, or missing plug from front end of front pump shaft. Moderately low front pump pressures in all ranges indicate a restricted front pump inlet. Failure of pressure to raise when vacuum hose disconnected (or high pressures with vacuum hose connected) indicates a stuck vacuum modulator valve, defective vacuum modulator, or a collapsed hose.

Rear Pump: With gauge connected as for "Front Pump" (rear wheels raised), place selector lever in "D" (Drive) and accelerate engine. Front pump pressure should drop to approximately 0–5 lbs. at 20 MPH. If pressure does not drop, rear pump is disengaged or clogged or rear pump check ball is not seating.

Throttle Valve: Remove plug located at "8 o'clock" position in front pump cover (accessible through engine front mount) and connect pressure gauge. Disconnect throttle valve rod at carburetor and vacuum hose at balance tube, then with engine at idle speed, depress accelerator to wide open position. *NOTE – By disconnecting throttle valve rod at carburetor, engine remains at idle speed throughout test.* Pressures should be as follows with selector lever in the indicated range: 0 lbs. (Reverse & Neutral); 52–54 lbs. (Drive); 66–77 lbs. (Low). If pressures not as specified, they can be corrected by adjusting the position of the jam nut located on end of detent valve assembly (part of throttle valve assembly inside transmission case). Insert an Allen wrench in end of adjusting screw and hold screw from turning, then turn jam nut as necessary. To raise pressure, back off jam nut (one full turn is equal to 3 psi). Tightening the nut lowers pressure.

REMOVAL & INSTALLATION

POWER TRAIN (ENGINE, TRANSMISSION & REAR AXLE): This complete assembly must be removed as a unit. See *"Engine" in Corvair Special Data.*

SYNCHRO-MESH TRANSMISSION: Rem val - With "Power Train" removed from car, support Transaxle assembly with a chain fall or suitable lift and sling, then drain transmission and differential carrier. Remove starter and the two screws securing clutch pull rod dust seal assembly, then remove pin attaching pull rod to clutch fork. Separate Transaxle from engine by removing attaching bolts securing differential carrier to clutch housing. Pull Transaxle away horizontally to prevent damage to clutch fork. Remove clutch shaft (transmission input shaft). Remove clutch fork and clutch release bearing from differential carrier. *NOTE - Fork is attached to carrier by a ball and socket and spring retainer.* Separate three-speed transmission from differential carrier by removing the four attaching bolts and disengaging transmission output shaft from splines in differential carrier.

Installation: Use a new gasket (hold in place with petrolatum), then couple transmission to differential carrier, being sure to engage splines of transmission mainshaft to internal splines of pinion in differential carrier. Secure transmission to carrier with four bolts (install two bolts on right side from transmission end and the two on left side from carrier end). Tighten bolts to 24-32 ft. lbs. Install clutch release bearing and clutch fork on differential carrier. *NOTE - Clutch release bearing slips over shaft and the fork has a spring retainer and socket which attaches to ball stud on carrier.* Install clutch shaft in Transaxle, then check distance from end of clutch release bearing shaft to end of clutch shaft. If fully engaged, the dimension should be 2 9/16"±1/32". Support Transaxle with a chain fall or other suitable lift and sling, then align attaching bolt holes in carrier and clutch housing. Pilot clutch shaft splines into clutch, then install attaching bolts and tighten securely. Connect clutch pushrod to clutch fork with pin, then position and secure clutch pushrod dust seal assembly. Install starter and fill transmission and differential carrier.

POWERGLIDE TRANSMISSION: Removal - With "Power Train" removed from car, drain transmission, then disconnect hose connecting modulator tube to carburetor balance tube. Remove engine front shield and remove starter. Disconnect converter from engine flex plate by removing the three attaching bolts through the access hole (at 12 o'clock position) in converter housing. Support Transaxle with a chain fall or suitable lift and sling, then remove attaching bolts and lockwashers securing differential carrier to converter housing. Pull Transaxle away from engine and remove converter assembly. Pull turbine shaft out of Transaxle assembly. Place Transaxle on a flat surface and remove screws securing governor assembly and remove governor. Remove three bolts securing transmission to carrier, then carefully pull transmission straight away from carrier to prevent pump shaft from damaging bushings in transmission and pinion shaft. Remove gasket from carrier, then remove governor gear and selective spacers from pinion shaft of carrier.

Installation: *CAUTION - Before connecting Powerglid transmission and differential carrier, determine thickness of thrust washers required at front face of governor gear. See "Rear Selective Thrust Washer" below.* After determining proper size thrust washer, install a new gasket to either carrier or rear face of transmission (hold in place with petrolatum). Align carrier and transmission on a flat surface and carefully guide the pump shaft through differential carrier so as not to damage

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CORVAIR TRANSAXLE (Cont.)

bushing in pinion, then engage splines of pinion shaft with planet carrier internal splines in transmission Install governor, then secure the transmission-to-carrier with four bolts Drive the two bolts from carrier side first (to minimize chance of cocking mating surfaces), then tighten bolts to 24-32 ft lbs Install turbine shaft, being careful not to damage its bushings as it is inserted over pump shaft splines *NOTE - Be sure to engage the two sets of splines (forward splines engage clutch drum and the rear set engage into sun gear in planet gearset)* DO NOT tip rear of Transaxle downward after installation unless converter holding plates are used Position Transaxle adjacent to engine on a chain fall or similar lift, then remove converter holding plates if installed Align converter with flex plate, then pilot converter hub onto crankshaft Align mounting holes in differential carrier and converter housing, then secure top left bolt (11 o'clock position) Install flex plate to converter bolt accessible at the "1 o'clock" position to prevent accidental turning of converter or flex plate and loss of attaching hole alignment Drive remaining converter housing-to-differential carrier mounting bolts, then install starter Drive the two remaining converter-to-flex plate bolts through the access hole in converter housing Install engine front shield, then reinsert filler tube through front shield and connect it to oil pan Connect vacuum modulator to carburetor balance tube with a short length of hose Refill transmission *(See "Draining & Refilling" above)*

Rear Selective Thrust Washer: *CAUTION - Any time repairs are made that require the separation of Powerglide transmission and differential carrier, the proper thickness of thrust washer to be used at front face of* governor gear *must be determined as follows* Install dial indicator on Support J-8364 and install a 3" indicator extension Without gasket, place support on rear pump cavity surface of transmission case (transmission front end down) so that dial indicator tip rests on planet carrier hub Adjust indicator as required to permit maximum indicator travel, then set dial to zero *NOTE - Transmission must face downward when indicator is zeroed* Slowly lift indicator and support off rear pump cavity and note its range of needle deflection from zero position *NOTE - If indicator is properly positioned on support, indicator should not deflect more than .050" (one-half turn) when removed, otherwise raise or lower dial indicator on support post as required and again "zero" gauge* Place support and dial indicator on governor gear on differential carrier pinion shaft (support J-8364 will fit over pinion shaft), then slowly lower support (indicator tip of dial indicator against machined face of differential carrier housing) so that revolutions of dial indicator can be counted *NOTE - Measurement starts once the indicator needle reaches "zero"* Fully depress support on governor gear and note indicator reading, then refer to following table for thickness of spacers to be installed on governor gear

►*NOTE After selected spacers are installed on governor gear, recheck measurement If spacer stack is correct, indicator reading will now be between .011-.038" If not, add or remove spacers until reading is within this range*

Thrust Spacer Chart

Indicator Reading	② Spacer Thickness
.011-.038" ①	None
.039-.053"	.016"
.054-.068"	.031"
.069-.083"	.046"
.084-.098"	.062"
.099-.113"	.077"
.114-.128"	.092"
.129-.145"	.108"
.146-.155"	.124"

① - If initial indicator reading is below .011", replace .088" thrust washer at clutch hub (front pump) with .076" or .050" thrust washer, then repeat entire rear thrust spacer selection procedure

② - Thrust spacers are furnished in the following thicknesses .016" (Part No 6256827), .031" (Part No 6256828), .046" (Part No 6255664) Note that spacer thicknesses required are obtainable with combinations of the three thrust washers furnished for service

DIFFERENTIAL CARRIER: Removal & Installation - *See instructions above for "Synchro-mesh" or "Powerglide" Transmissions*

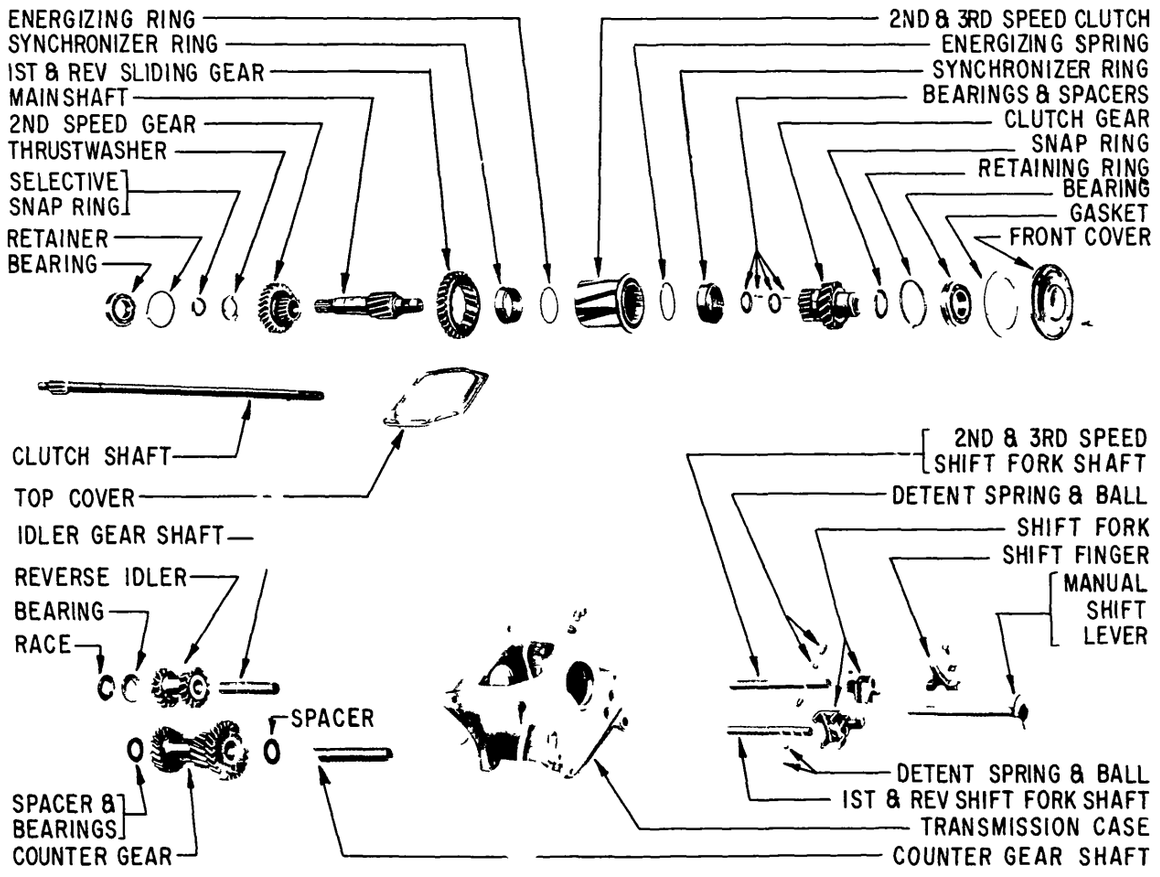
SYNCHRO-MESH TRANSMISSION OVERHAUL

DISASSEMBLY: With transmission removed from differential carrier, proceed as follows

1) Mount transmission in Holding Fixture J-7896, then remove front cover plate and clutch gear bearing snap ring

2) To remove clutch gear and bearing, disassemble Tool J-8361 and install the adapter and screw assembly in slot in clutch hub Place dome over adapter and screw, being sure to index dome locating pins into screw holes in transmission case Loosen screws securing bearing snap ring fingers on dome assembly and place fingers between open ends of snap rings, then fully open snap rings with pliers Tighten finger screws to retain screws fully expanded *CAUTION - Before*

CONTINUED ON NEXT PAGE



CORVAIR SYNCHRO-MESH TRANSMISSION (EXPLODED)

SYNCHRO-MESH (Continued)

opening snap ring, be sure ends are fairly well centered in recess in case. If ring is expanded when ring ends are against either side of recess, the snap ring radius can "hang" in bearing groove and result in a broken case when bearing is pulled. Pull bearing and clutch gear by turning nut while holding screw on puller. *NOTE - Needle bearings will fall out when clutch gear removed.*

3) Remove case top cover and gasket, then remove snap ring from mainshaft groove (snap ring is immediately behind mainshaft bearing). Drive or press mainshaft out of case. Remove thrust washer, second speed gear, sliding gear, and second and third speed clutch from case.

4) To remove mainshaft bearing from case, fully expand its snap ring and tap bearing out by driving on outer race. Remove countergear by driving out countershaft with Tool J-5777 from hole in front of case.

5) If reverse idler is to be replaced, drive idler shaft lockpin into shaft, then drive shaft out of case with a drift from the "through hole" at rear of case. *NOTE - The expansion plug at front of case will be driven out by reverse idler shaft.* Remove caged needle bearing and thrust washer used at rear of reverse idler.

6) Remove detent cover and remove second and third gear detent spring and ball. Drive out roll pin securing second and third shift fork to shaft, then tap out shaft with a drift to remove both fork and shaft. Remove interlock from detent cavity with a magnet, then remove first and reverse shift fork and shaft in same manner as second and third fork. Remove first and reverse detent ball and spring, then remove two capscrews and lock tabs securing shift finger to manual shift rod and pull rod from case.

Clutch Sl v s & Synchronizer Rings (Disassembly & R ass mbly): Remove first and reverse sliding gear, then turn synchronizer ring in clutch sleeve until ends of ring retainer can be seen through slots in clutch sleeve. Use Tool J-0932 and expand retainer into counterbore in clutch sleeve, then slip synchronizer ring out of sleeve. Check cones for wear or for being loose in clutch sleeve. *NOTE - If cones are damaged it will be necessary to replace clutch sleeve assembly and both synchronizer rings. Replace clutch sleeve if ther is more than .030" endplay between cone and snap ring.* Inspect rings for smoothness, then place rings in synchronizer cones and check with thumbs to see that rings do not rock. Install synchronizing ring retainers in counterbores in end of clutch sleeve, then use Tool J-0932 in slot in clutch sleeve and expand each retainer in counterbore. Lubricate each synchronizer ring with light oil and install in clutch sleeve. *CAUTION - Make sure retainers seat in groove all the way around rings so rings will turn freely.* Install first and reverse sliding gear on clutch sleeve.

INSPECTION: Wash all parts in clean solvent and blow dry with air. Check bearings for roughness and replace if necessary. Inspect case for cracks and inspect machined surfaces for burrs. Dress burrs off with a flat file. Inspect all gears and replace any that are worn or damaged. Make sure first and reverse sliding gear slides freely on clutch sleeve and that clutch sleeve slides freely on mainshaft. *NOTE - If reverse idler gear bushings are worn or damaged, replace entire assembly. Gear and bushing are not serviced separat ly.* Proper clearance between idler gear bushing and shaft is .002-.004".

►*SYNCHRONIZER ENERGIZING SPRING CAUTION:* If these springs have been removed, new springs must be installed. Assemble each spring in its groove in clutch gear and second speed gear with offset or locking end of spring between the third and fourth teeth of either of the two banks of teeth on these gears, thus keeping spring from turning in its groove. *CAUTION - Spring must be carefully installed so as not to expand it greater than the diameter of the gear teeth as spring will take a "set".*

REASSEMBLY: 1) Oil manual control shaft and insert through seal in case, then position actuating finger and secure to shaft with two lock tabs and capscrews. Bend lock tabs onto heads of screws. Install detent spring and ball in detent cavity, then tap ball and spring to make sure spring is resting on bottom of cavity.

2) Insert first and reverse fork shaft through case, slip fork on shaft and secure fork to shaft with roll pin. Install interlock in detent cavity, then insert second and third fork shaft through case and slip fork onto shaft. Twist shaft so its interlock groove is 90° from interlock, then fully insert shaft and twist shaft so interlock notch is engaged by interlock. Secure shift fork to shaft with a roll pin. Insert detent ball and spring for second and third shift fork, then install detent cavity cover and gasket.

3) Install 25 needle bearing rollers in each end of countergear, holding them in place with cup grease, then install Tool J-5777 in countergear. Lubricate bearing thrust washers and place one at each end of countergear, positioning it so tab on washer will align with notches in case. Install countergear in case and allow it to rest on the bottom. Lubricate and insert countergear shaft in case, then align countergear with shaft being sure thrust washer tabs engage case notches and tap shaft through, pushing assembly Tool J-5777 out of case. Countershaft is a slight press fit at front of case. *NOTE - Final installed position of "flat" on shaft is not important.*

4) Lubricate thrust washer and needle thrust bearing with grease and position them on reverse idler gear (needle bearing against end with chamfered teeth). Lubricate bushings, then place gear assembly in position in case so thrust bearing is toward rear. Install idler shaft from rear, making sure lockpin hole in shaft lines up with hole in case at the same angle. Drive a new lockpin in so it is approximately 1/16" beyond flush with case.

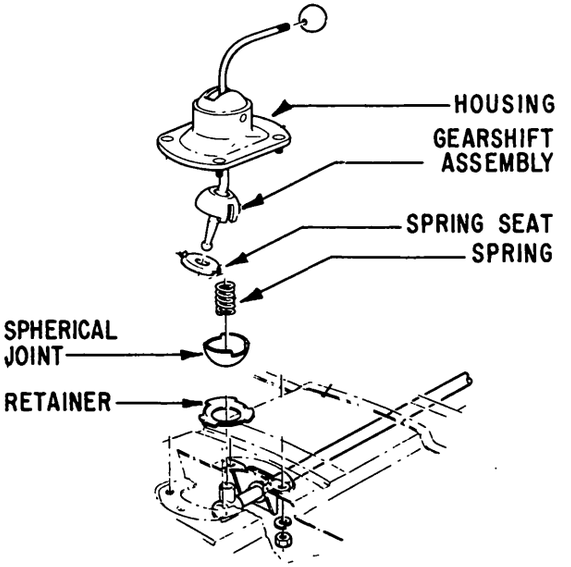
5) Install mainshaft rear bearing in case by tapping on outer diameter of bearing until it contacts retainer ring in case, then expand retainer and tap bearing until retainer ring seats in bearing groove. Install sliding gear on second and third speed clutch, then install second speed gear in second and third speed clutch. Place this assembly in case, then from the front, insert mainshaft through bores of second and third speed clutch and second speed gear. Install thrust washer on mainshaft with its oil grooves toward gear. Tap front of mainshaft until ring groove is accessible behind rear bearing and install snap ring.

6) Check fit of snap ring at front of mainshaft (previously installed) by inserting feeler stock between snap ring and bearing inner race. Final end clearance must be .004" maximum. If endplay is not within limits, thrust washer on mainshaft must be changed to obtain correct endplay. *NOTE* - Washers are available in four thicknesses ranging from .086" to .097".

7) Place cup grease in mainshaft pilot hole of clutch gear and install roller bearings and small spacer, then install large spacer and remaining roller bearings. Align synchronizer lands with clutch gear blank teeth, then install smaller snap ring in clutch gear. Tap clutch gear bearing into case, then open retainer ring and fully seat bearing as indicated by seating of retainer ring in bearing groove. Install front cover plate and gasket and tighten the screws. Install top cover. Install expansion plugs in case openings at rear of manual shaft and reverse idler gear shaft.

GEARSHIFT LEVER ASSEMBLY: Removal - Remove tunnel front plate, then remove four nuts securing gearshift lever assembly to floor pan. *NOTE - Two r ar nuts also secure shift control shaft front mounting bracket.* From the driver's compartment, lift gearshift lever assembly up until its studs clear floor pan, then remove unit by lifting floor mat at center of seat.

Disassembly: Remove knob, then clamp housing in a vise. Use a length of 1½" pipe or Tool J-5590 and depress retainer plate and rotate until its three lugs clear lands in gearshift housing, then remove retainer. Remove lower spherical joint, spring, and seat, then pull lever out of housing.



SYNCHRO-MESH GEARSHIFT LEVER ASSY.

Reassembly: Apply Lubriplate generously to all working surfaces, then place retainer plate on lower spherical joint and place housing in a vise. Place seat on gearshift lever with tab to right side of housing, then compress retainer and rotate laterally to engage its lugs in housing (use same tool or 1½" pipe used at disassembly). Install knob.

Installati n: Reverse removal procedure.

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SYNCHRO-MESH (Continued)

SHIFT CONTROL ROD: Removal - With tunnel cover removed, fold back rubber boot covering control shaft U-joint to expose connecting pin. Remove cotter pin, then remove connecting pin by pushing out with channel lock pliers. Separate control shaft U-joint from transmission shifter shaft by pushing control shaft toward front of car. Complete removal of control shaft by removing two nuts attaching control shaft front mounting bracket, then remove control shaft, U-joint, and mounting bracket as an assembly.

U-Joint Replacement: To insure maintaining shift control adjustment, scribe the control shaft adjacent to end of U-joint, then loosen clamp bolt and remove old U-joint and rubber boot. Insert new U-joint, with rubber boot installed, in shift control shaft until end of U-joint is aligned with mark scribed at removal. Rotate U-joint so attaching pin hole at transmission end is vertical, then tighten clampscrew.

Mounting Bracket or Bushing Replacement: Remove U-joint, then slide bracket off control shaft. Nylon bushing in bracket is "push-in" type. Reinstall bracket with reinforced side toward rear of shaft, then install U-joint.

Installation: Center shift lever ball, position and align control shaft front bracket with rear shift lever stud, then insert bracket on its studs simultaneously with insertion of control shaft ball socket onto shift lever ball. *NOTE - Control shaft socket should be well coated with lubriplate before installation.* Secure shaft bracket in position with two nuts. Align control shaft U-joint with transmission shifter shaft, then pull U-joint over shifter shaft and install connecting pin and secure with cotter pin. Snap boot of shifter shaft seal into place in tunnel rear plate.

POWERGLIDE TRANSMISSION

►*1960 CORVAIR REAR PUMP CHECK VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new rear pump check valve assembly, Part No. 3783780, having a spring loaded poppet valve is being used in later production and should be installed in earlier transmissions at time of overhaul. The new type check valve eliminates momentary no-drive conditions resulting from loss of rear pump prime when car is backed up.

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

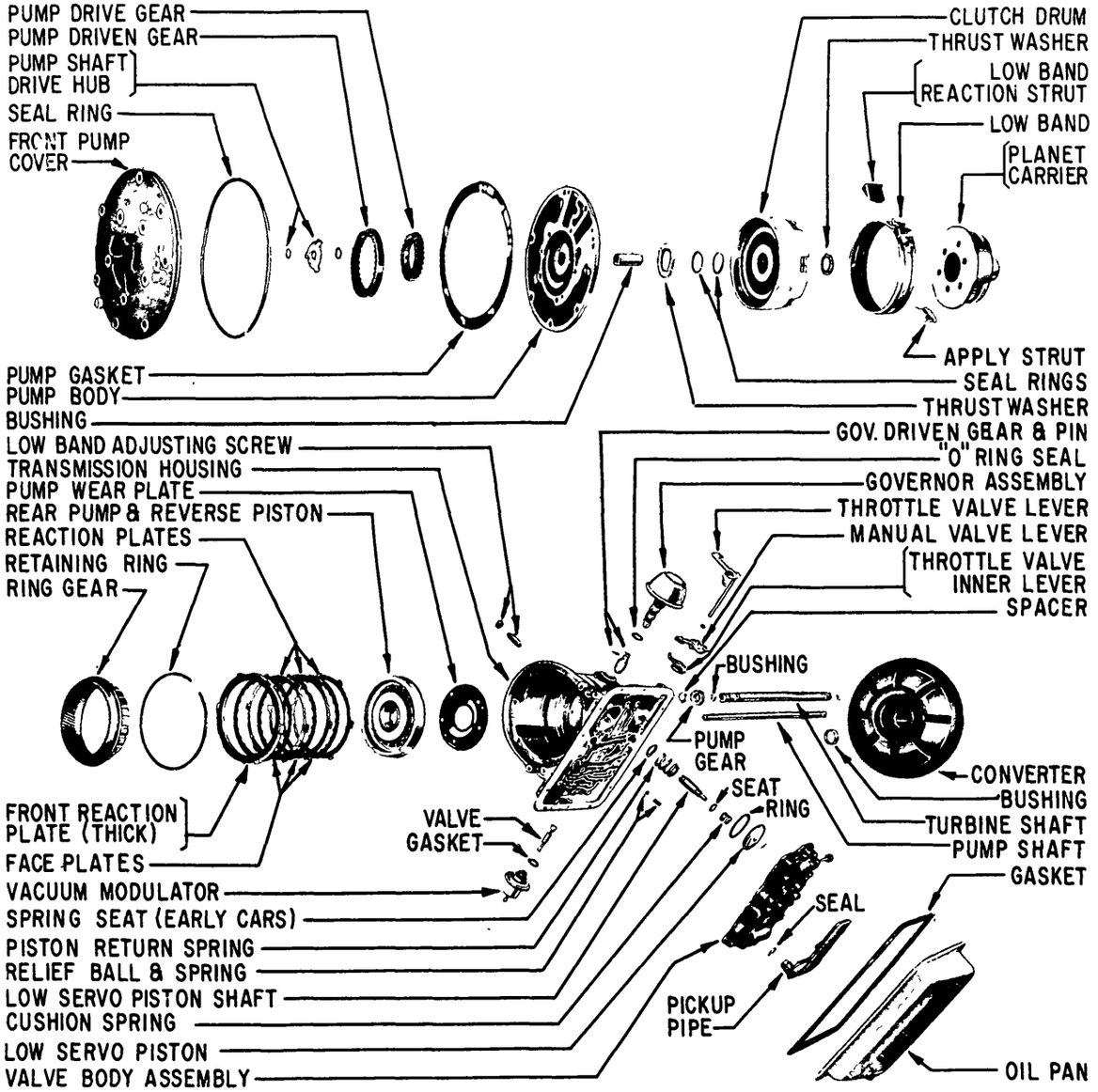
►*NOTE: The following units can be removed with transmission in car.*

CONTROL CABLE (MANUAL SHIFT): Removal - Disconnect control cable from range selector by removing the "E" retainer. Remove nut securing control cable to its attaching bracket on range selector and free cable from selector. Remove tunnel covers, then, at front of car, remove cable from multiple clip at toe-pan and remove upper toe pan clip. Remove cable from clips in tunnel, then remove grommet plate at rear of tunnel. Free cable sheath from plate and remove clip in underbody kick-up area. Disconnect throttle rods from lever on transmission. Complete cable removal by rotating transmission throttle valve lever its full limit counterclockwise to free cable ball from the inner manual valve lever slot in transmission and withdraw cable. Bow cable towards center line of car to guide cable through hole in engine front support.

►*CABLE REPLACEMENT NOTE: Cable assembly (with its two captive grommets) is serviced only as a complete unit.*

Installation: With tunnel covers removed, lay cable out beneath car in its correct relationship, then insert front of cable up into passenger compartment. *CAUTION - Cable must be routed UNDER the parking brake cable and OVER the brake pipe to prevent brake cable riding against shift cable.* Connect shift cable to range selector by inserting it into its mounting bracket, then while holding sheath nut with a wrench, install sheet metal nut on threaded portion of sheath to secure cable to bracket. *CAUTION - Be sure that the flat on cable sheath is flush when cable is installed.* Shift range selector to "D", then attach cable upper clip in toe-pan and secure cable in multiple clip at base of toe-pan. Be sure rubber protector is installed on clip. Secure cable with three clips installed in tunnel, then bow cable towards center line of car to guide cable through hole in engine front support. On cars with early type design cable-to-case installation, rotate throttle lever on transmission to its full counterclockwise limit and

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POWERGLIDE TRANSMISSION INTERNAL PARTS (EXPLODED)

POWERGLIDE (Continued)

insert cable ball into slot of transmission manual lever while guiding cable sheath stop into slot. Insert and tighten sheath nut to 8-10 ft. lbs. *CAUTION - Overtightening can crack case at this area.* On cars with later type design cable-to-case installation, install "O" ring seal on cable and lubricate lightly with Lubriplate. Rotate throttle valve lever to its full limit counterclockwise and insert cable ball into slot of manual valve lever. Fully seat "O" ring and secure installation by installing capscrew and washer. To check installation, exert a slight hand pressure in counterclockwise direction and check that the hole in notched arm of throttle valve lever is BELOW the transmission oil pan rail. If hole is above pan rail, cable installation is not correct. When installation is correct, install cable rear grommet in grommet plate, then install grommet plate in rear of tunnel. Install clip on cable at rear kick-up area, then check operation of shift linkage.

VACUUM MODULATOR: Located on right side of transmission and serviced from beneath car.

Removal: Remove hose at vacuum modulator, then unscrew modulator using channel lock pliers or a thin 1" wrench.

▷*NOTE: Vacuum modulator is not repairable and must be replaced as an assembly.*

Installation: Reverse removal procedure making sure that a new gasket is used and that it is held in a centered position during installation.

GOVERNOR: Located on left side of transmission and serviced from beneath car.

Removal: Remove governor tab lockscrew and pull governor from case.

▷*NOTE: The driven gear is the only part that is replaceable on governor. To remove gear, drive out pin with a punch and pull out old gear. To install, drill a new hole 90° from original hole, then insert new gear and install roll pin.*

Installation: Install new "O" ring seal, then reverse removal procedure.

VALVE BODY & LOW SERVO: Removal - Disconnect throttle valve rod from transmission lever, then remove oil pan and remove oil pick-up pipe. Improvise a sheet metal strap to fit across the corner of transmission case in the area of the low servo and secure in position with one pan screw. Remove bolts securing valve body to transmission, then tap body lightly with a soft hammer to loosen it from dowels in case. Carefully lower valve body about 1/16", then rotate improvised strap into position so it spans the servo piston hub and secure strap with a second pan screw. *NOTE - This will eliminate possibility of servo piston slipping down out of its bore and the loss of low band engagement with its apply components.* To remove low piston, pull downward on hub of piston shaft with a screwdriver. *CAUTION - Do not remove piston in car without fully tightening low band screw.*

Disassembly, Inspection & Reassembly: *See "Valve Body & Low Servo" under "Overhaul" below.*

Installation: Install low servo piston and return spring in bore in transmission and engage notch in piston shaft with low band apply strut, loosening low band screw slightly to permit piston ring to seat in case bore. If low band was fully tightened to permit removal of low servo, install valve body in transmission while simultaneously loosening low band screw until it is possible to index valve body on dowels in case. If only valve body was removed and an improvised strap was employed, raise valve body almost onto mating surface in case, then rotate improvised strap out of way and secure valve body. If manual valve is installed, index it with manual valve lever in case, then secure the valve body with 20 bolts and tighten to 9-11 ft. lbs. Install "O" ring seal in valve body, then install oil pick-up pipe and secure with screw. Use a new gasket and install transmission oil pan, tightening screws to 3-4 ft. lbs. Tighten filler tube attaching nut and refill transmission. *NOTE - If low band adjustment was disturbed, adjust band (see "Adjustment" above).*

OVERHAUL
(TRANSMISSION OUT OF CAR)

▷*TRANSMISSION OVERHAUL NOTE: All of the following operations, except those covering the Reverse Clutch Assembly, can be performed with "Power Train" removed from car but not separated into individual units.*

DISASSEMBLY

▷*NOTE: Instructions below cover removal of subassemblies from transmission case. See "OVERHAUL OF UNITS" for disassembly, inspection, and reassembly of these units.*

1) If transmission is separated from power train, mount transmission in holding fixture J-7896. If assembled to power train, drain transmission and remove filler pipe. Remove oil pan, pick-up pipe, control valve and servo, vacuum modulator, and governor assembly (for removal procedures, *see "Transmission Unit Removal & Installation - Transmission in Car" above). NOTE - If transmission is installed on power train, loosen low band adjusting screw locknut and FULLY tighten the adjusting screw.* Remove front pump-to-case bolts, then use slide hammer J-6585 and adapters J-8365 and free pump from case. *NOTE - Adapters may be installed in any of the five inner mounting bolt holes.*

2) Remove front pump cover, then remove pump shaft, being careful not to damage bushings in front pump body and turbine shaft with pump shaft splines. Remove pump body from case, being careful not to drop gears, then remove gasket.

3) To remove clutch drum, loosen low band adjusting screw and remove low band, apply strut, and reaction strut, then remove drum. *CAUTION - If transmission is connected to power train, care should be taken not to disengage the ring gear from reverse clutch face plates unless replacement of either ring gear or reverse clutch plates is anticipated. Engagement of reverse plates and ring gear while in a horizontal position is difficult and should not be attempted unnecessarily.*

4) Remove planet carrier from ring gear and remove turbine shaft. *NOTE - Turbine shaft removed previously if transmission is separated from power train.*

5) *NOTE - The remaining disassembly procedures can only be performed with transmission separated from power train.* Remove ring gear from its engagement with rear clutch plates, then remove clip mounted on thick reverse reaction plate between ends of reverse clutch snap ring, then remove snap ring. Remove thick reaction plate, three faced drive plates, and the thin steel reaction plates.

6) Remove rear pump and reverse piston mounting bolts which are accessible from rear (differential side) of transmission case. Remove rear pump and reverse piston assembly by pulling forward with a twisting action. Remove rear pump wear plate from rear of transmission case.

TRANSMISSION UNIT OVERHAUL

TRANSMISSION CASE: Inspection - Inspect all mating surfaces of case for nicks or burrs and repair as necessary. Check for cracks, being especially careful to check area around manual shaft cable (early design case) as overtightening of cable nut could possibly crack the case at this point. Check case bores for wear and grooves.

CONTROL VALVE: Disassembly - 1) Remove two clutch head screws attaching hydraulic modulator valve body and separate modulator body from main body. *CAUTION - Modulator body is under spring tension.* Remove pressure regulator valve spring retainer, spring, and pressure regulator valve.

2) Remove rear pump priming ball, front and rear pump check valves and springs and the modulator valve from modulator valve body. Drive roll pin from hydraulic modulator valve with a pin punch and remove pressure limiting valve spring and valve.

3) Remove two remaining clutch head screws and separate transfer plate and gasket from main body. To remove low drive shift valve components, remove retaining ring with Truarc pliers while exerting a downward pressure, then release pressure and remove low drive regulator valve sleeve, regulator valve, spring seat and inner and outer springs. Lightly tap main body with a plastic hammer to remove low drive valve from its bore.

4) To remove throttle valve components, remove retaining pin by wedging a thin screwdriver between its head and surface of main body, then remove detent valve assembly and throttle valve spring. Complete disassembly by removing the "E" ring from throttle valve, then remove throttle valve from main body bore by tapping body with a plastic hammer.

Inspection: Clean all parts thoroughly, then check valves and their operating bores for burrs or other deformities.

Reassembly: 1) Drop line pressure limiting valve into its bore, then install spring. Compress spring slightly and secure in place by installing roll pin. Install hydraulic modulator valve in its bore in modulator valve body, then place rear pump priming ball and front and rear pump check valves into modulator body.

2) Carefully lower transfer plate onto assembled units in hydraulic modulator valve body so as not to knock front and rear pump check valves from their springs, then secure transfer plate to modulator valve body with two clutch head screws. Tighten screws to 38-50 inch pounds.

3) Install low drive shift valve components into main valve body. Place low drive shift valve into its main body bore, then assemble the inner and outer drive springs and place them in the bore, Insert low drive regulator valve into regulator valve sleeve, then place spring seat over open end of regulator valve sleeve, and insert this assembly into bore in main valve body, compressing the inner and outer springs. Secure in position by installing retainer ring with Truarc pliers.

4) Install throttle valve into its bore in main valve body, then install locating ring in groove in throttle

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POWERGLIDE (C ntinu d)

valve. *CAUTION - Be sure throttle valve is fully seated in its bore as locating ring must be installed in throttle valve through the third port from left of valve (as viewed in illustration).* Place throttle valve spring and detent valve assembly in throttle valve bore, then depress detent valve assembly and secure to valve body by tapping retaining pin into main valve body.

5) Apply a light coat of petrolatum to main valve body and install a new gasket. Install pressure regulator valve in main valve body with spring and spring retainer. Fully compress pressure regulator valve spring so that spring retainer enters bore of main valve body, then position main valve body onto transfer plate (assembled to modulator body) and align mounting screw holes. Install two remaining clutch head screws and tighten to 38-50 inch pounds. Install manual valve in main valve body, then check shift cable (linkage) adjustment.

LOW SERVO PISTON: Disassembly - Remove hairpin retainer securing piston to piston rod and separate all components. Remove piston ring from piston and install it in low servo bore of transmission case, then measure end gap of ring. Gap should be .002-.012". Assemble ring to piston and measure clearance between ring and one wall of piston groove. This clearance should be .0005-.005".

R assembly: Place spring seat on piston shaft, then install cushion spring. Compress cushion spring slightly with piston and secure to shaft with hairpin retainer.

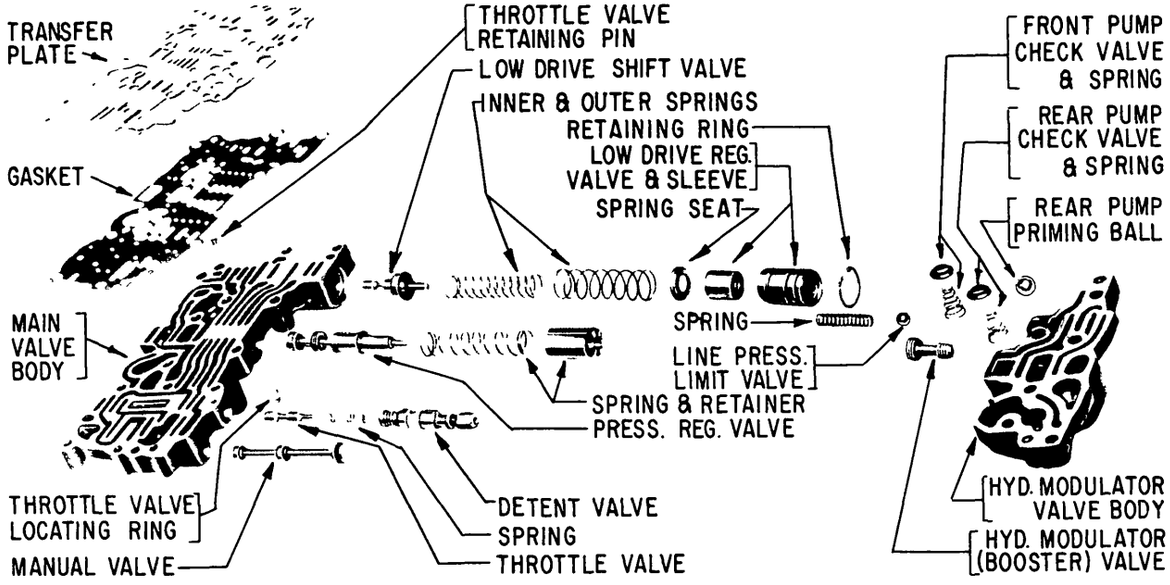
FRONT PUMP: Inspection - Wash all parts in solvent and blow out all passages. *CAUTION - Do not use rags to dry parts.* Inspect pump gears for nicks or damage. Check for wear at gear bearing surfaces on inner diameter where it mates with pump journal. Inspect cover and body for nicks or scoring. Install pump gears and check following clearances: Between outer diameter of driven gear and body which should be .0025-.005". Between driven gear and crescent which should be .003-.009". Use a scale and a feeler gauge and check gear end clearance which should be .0005-.0015". Inspect pump drive gear teeth for interference between tops of teeth and crescent in pump. Replace gasket and square cut seal ring in outer diameter of pump cover. Make sure cast iron seal rings on pump body hub are in good condition. Replace if necessary. Check condition of pump body bushing. If worn or damaged, replace bushing.

Fr nt Pump Body Bushing Replacement: Remove bushing with a chisel, being careful not to damage pump body. Install a new bushing with Tool J-8360-5 and an arbor press.

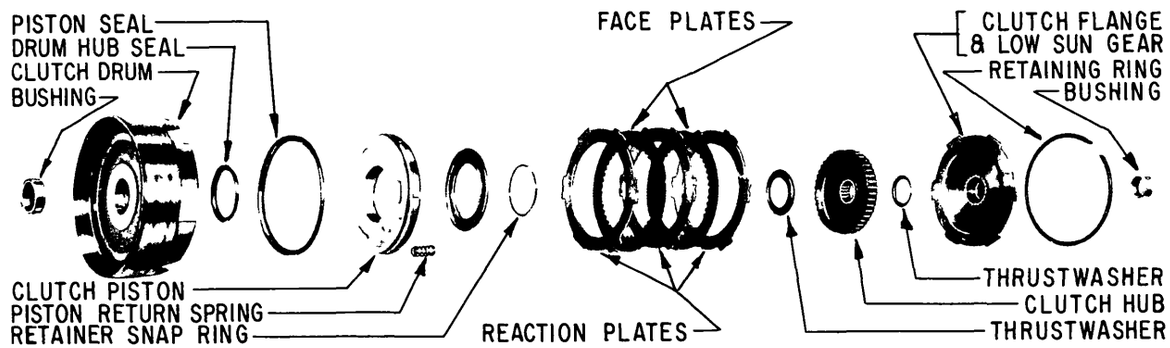
CLUTCH DRUM: Disassembly - 1) Remove retainer ring securing low sun gear and clutch flange assembly to clutch drum. Remove low sun gear and clutch flange, and hub rear thrust washer. Lift out clutch hub, then remove the nested drive and reaction plates and hub front thrust washer.

2) To remove spring retainer, place clutch drum in a press and compress springs using Tool J-7782 (adapter ring) and J-5133. Remove snap ring with Truarc pliers. Carefully release pressure on press, then remove spring retainer and springs.

3) To remove clutch piston, pull upward with a twisting motion on center, then remove piston seal. Remove piston inner seal from hub on clutch drum.



CORVAIR POWERGLIDE VALVE BODY ASSEMBLY



CORVAIR POWERGLIDE CLUTCH DRUM ASSEMBLY

Inspection: Wash all parts in solvent and blow dry with air. *CAUTION - Do not use rags to dry parts.* Inspect drum brake band surface for scoring or burning and check drum bushing for scoring or excessive wear. Check steel ball in clutch drum that acts as a relief valve. Be sure that it is free to move in hole and that orifice leading to front of drum is open. *NOTE - If relief ball is loose enough to come out or not loose enough to rattle, replace clutch drum as an assembly. DO NOT attempt to replace or restake the ball.* Check fit of clutch flange in drum slots. There should be no appreciable play betwen these two parts. Check low sun gear for nicks or burrs and bushing for wear. Check clutch plates for burning, pitting or metal pickup. Check to see that plates (faced) are a free fit over clutch hub and that steel plates are a free fit in clutch flange. Check for excessive wear on friction facing or drive plate teeth. Check condition of clutch hub splines and mating splines on faced plates.

Clutch Drum Bushing Replacement: Remove old bushing with a chisel being careful not to damage bushing bore. Install new bushing with Tool J-8360-2.

Low Sun Gear Bushing Replacem nt: Remove old bushing with a chisel being careful not to damage bushing bore. Install new bushing with Tool J-8360-3.

Reassembly: Install piston inner seal in hub of clutch drum. *NOTE* - Make sure seal lips are downward or toward front of transmission. Install new piston seal in clutch piston (seal lips toward clutch drum when installed). Lubricate both seals, then install clutch piston in clutch drum with a twisting motion. Place the 15 return springs in position on clutch piston, then place spring retainer on springs. Place clutch drum in an arbor press, position snap ring on clutch drum hub, then compress springs using Tool J-5133 and J-7782. With springs fully compressed, install snap ring in

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POWERGLIDE (C ntinu d)

groove on clutch drum with Truarc pliers, Install hub front thrust washer with its lip toward clutch drum, then install clutch hub, Install three reaction plates and two faced drive plates alternately, starting with a steel reaction plate. Install hub rear thrust washer with its flange toward low sun gear, then low sun gear and clutch flange assembly and secure in place with retainer ring. *NOTE - Finally installed, openings of retainer ring should be adjacent to one of the lands of clutch drum.* Check the assembly by turning clutch hub to be sure it is free to rotate.

PLANET CARRIER: Service by replacing as a complete assembly.

TURBINE SHAFT: Insp ction - Check shaft for nicks and cracks and check splined area for wear. Check to make sure that the two lubrication holes are open. Inspect bushings and, if necessary, replace.

Bushing R plac m nt: *NOTE - The two bushings are id ntical, howev r the d pth to which they are installed is diff rent.* To remove old bushing, cut it out with a chisel being careful not to damage the bore. Install front bushing with Tool J-8360-6, and rear bushing with J-8360-7.

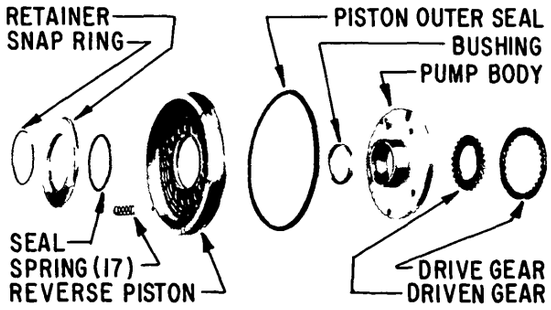
PUMP SHAFT: Inspection - Check splines at converter end of shaft for wear or damage. Inspect bronze faced drive lugs for peened edges and wear of its splined connection to shaft by twisting to check for looseness. Make sure drive hub is tightly retained by snap ring. *NOTE - If bronz driv hub is worn, remove top snap ring and r plac hub.*

REAR PUMP & REVERSE PISTON ASSEMBLY: Disassembly - Remove drive gear and driven gear from pump body, then place the assembly in a press with pump body on wood or other soft material and compress spring retainer with Tool J-7782 and J-5133. With spring retainer compressed until springs bottom, remove snap ring. Carefully release pressure, then remove spring retainer and return springs. In order to remove reverse piston, it is necessary to fill groove for snap ring in hub of rear pump body with string, a small rubber band, or a similar size "O" ring. With groove filled, rear pump body can be pushed out of reverse piston bore. Remove square cut piston inner seal and piston outer seal. *NOTE - Install new seals at reassembly.*

Insp cti n: Wash all parts in clean solvent and blow dry with air. Check fit of rear pump drive and driven gears in same manner as for front pump (*see "Front Pump" abov*). Inspect pump body for scores and leakage. Check hub of pump body for smoothness. Check for broken piston return springs and make a comparative check of spring heights by standing all of the springs in a row. If there is an appreciable difference in spring heights, replace springs. Check condition of rear pump body bushing and replace if scored or worn.

Rear Pump B dy Bushing R placement: Remove old bushing with a chisel being careful not to damage bore. Install new bushing with Tool J-8360-4 and an arbor press.

R ass mbly: Install piston inner seal in reverse piston, then install outer seal in piston with lip of seal toward pump body (opposite from spring seats in piston). Install reverse piston on rear pump body (it is not necessary to fill groove on pump body hub for installation). Position 17 return springs in their seats on reverse piston, then place spring retainer on springs. Place



POWERGLIDE REAR PUMP & REVERSE PISTON

unit in a press with wood between press bed and rear pump body. Place snap ring on hub of rear pump body and compress springs using same tools and procedure used at disassembly. With springs fully compressed, install snap ring in its groove in pump body. Install drive gear and driven gear in their respective bores in pump body. *NOTE - Apply a small amount of petrolatum to pump gears to prevent their being dropped from body.*

CONVERTER: Inspection - *NOTE - It is not necessary to drain converter as it is a welded unit and cannot be repaired.* Check starter gear for worn or broken teeth and for broken welds at its attachment to converter assembly. If starter gear is not damaged but welds are loose or broken, reweld as necessary. Check converter seams for stress or breaks and either replace converter or repair welds as required. *NOTE - If welds are repaired, keep added material to a minimum by carefully chipping off all scale and filing away any unnecessary weld to retain converter balance as close to original as possible. Replace converter if roughness due to unbalance is noticed after installation on engine.*

Converter Bushing Replacement: Remove old bushing with a chisel, then install new bushing with Tool J-8360-1, driving it into place with a hammer.

REASSEMBLY

1) With transmission installed in holding fixture, install two improvised pins (5/16" - 18, about 2½-3" long) in rear pump bolt holes, then install rear pump wear plate on guide pins. *NOTE - Use a small amount of petrolatum to hold plate in place.* Insert rear pump and reverse piston with guide pins into case, then insert a length (½" to ¾" wide) of shim stock, .010-.015" thick, between piston outer seal and case. With rear of case downward, running the shim stock around entire diameter of seal will seat seal quickly. Remove guide pins and install five rear pump mounting bolts and tighten to 9-11 ft. lbs.

2) Install reverse clutch drive and reaction plates alternately starting with a reaction plate (steel) and finishing with a drive plate (faced). *NOTE - The notched lug in each steel reaction plate is installed so it is at the TOP of the groove at the "4 o'clock" position in the case.* Then install the thick reaction plate retainer ring in such a manner so that open ends of ring are at the "12 o'clock" position. Install retainer ring clip on thick reaction plate between ends of snap ring.

3) With rear of transmission case downward, align internal lands and grooves of reverse face plates. Engage ring gear to reverse drive plates. *NOTE - Engagement must be made by "feel" while jiggling drive plat s laterally.*

4) On overhaul being done with transmission installed on power train, install the turbine shaft making sure splines of turbine shaft are fully engaged with splines in converter turbine. Install planetary unit with a slight twist to engage planet gears with ring gear. Be sure to engage the two rear pump drive lugs on planet hub with grooves in rear pump drive gear.

5) Install thrust washer on captive input sun gear in planetary gear set with flange of thrust washer toward front of transmission. *NOTE - If necessary, use a small amount of petrolatum to keep thrust wash r centered, especially if assembly is being done with transmission installed on power train.* Install clutch drum assembly using a slight twist to engage low sun gear to planet gears on planetary gear set.

6) If overhaul is being done with transmission disconnected from power train, turn transmission to a horizontal position. Install low band, apply strut, and reaction strut and when in proper position, tighten low band adjusting screw to prevent struts falling out of place. Jiggle clutch drum slightly to center band and linkage.

►*TRANSMISSION OVERHAUL CAUTION:* If transmission is being overhauled while attached to power train, determine the correct thickness of selective thrust washer to be installed on front pump hub. *See "Front Selective Thrust Washer" below.* If transmission is separated from power train, install the original (unless necessary to replace) thrust washer on front pump hub without gauging. Final endplay adjustment will be made at rear selective thrust washer. *See "Rear Selectiv Thrust Washer" under "Powerglide Transmission R - moval & Installation" above.*

►*FRONT SELECTIVE THRUST WASHER: CAUTION - This procedure is absolutely limited to overhauls performed while transmission is assembled to power train.* Insert pilot of Tool J-8371 into bore of clutch drum and secure to case with two front pump mounting bolts. Tighten bolts fully to compress pilot spring. Check that plunger on tool is fully seated, then note plunger position in relation to face of tool. If plunger is **below flush,** a .076" thrust washer is required. If plunger is **flush or above,** a .050" thrust washer is required. Remove tool and install selected thrust washer on front pump hub. Complete reassembly as follows:

7) Install a new front pump gasket, then install front pump body, being careful not to break cast iron rings on pump body hub when they are indexed to clutch drum. Install front pump drive shaft. *CAUTION - Be careful when inserting pump shaft not to damage bushings of transmission components already installed.*

8) Install a new square cut seal ring in front pump cover, then position front cover and install mounting bolts loosely. *NOTE - Dip heads of mounting bolts in a non-hardening sealer.* Tighten outer bolts in a criss-cross pattern to 18-20 ft. lbs., then tighten five inner bolts to 18-20 ft. lbs. Adjust low band by first tightening adjusting screw to 40±5 inch pounds, then back off 4 full turns exactly. Hold adjusting screw and tighten locknut. Install governor assembly, vacuum modulator, control valve and servo, pick-up pipe, and oil pan (for installation procedures, s *"Transmission Unit R - moval & Installation - Transmission in Car" above).*

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DIFFERENTIAL CARRIER

►*DIFFERENTIAL CARRIER COMPONENT SERVICING NOTE: The following differential carrier components can be serviced with the carrier in its installed position in car.*

AXLE SHAFT: Removal - *See "Rear Axle" on Car Model page.*

Bearing Replacement: Place axle shaft in a press with Tool J-5741 puller plate **below** the puller ring, then remove oil deflector, bearing and puller ring. *NOTE - Reinforcing ribs on Tool J-5741 should be upward for removal operation.* To install a new bearing assembly, place a new puller ring, bearing assembly, and oil deflector on axle shaft. *NOTE - To prevent damaging bearing assembly during installation, place the old puller ring with its flat side against bearing inner race.* Press the new puller ring and bearing assembly onto axle shaft using Tool J-5741 and an arbor press. Remove old puller ring and install oil deflector with closed side of deflector toward bearing.

Axle Shaft Installation: Reverse removal procedure and note the following: If universal joint yoke cannot be tapped onto end of axle shaft, install a 300M steel bolt (3/8-16 x 1½") and original flat washer in shaft and draw joint yoke onto shaft with screw. When screw bottoms, replace 1½" long bolt with a 1" bolt and continue tightening until bolt bottoms. Remove 1" bolt and secure yoke to shaft with original bolt, flat washer, and lock washer.

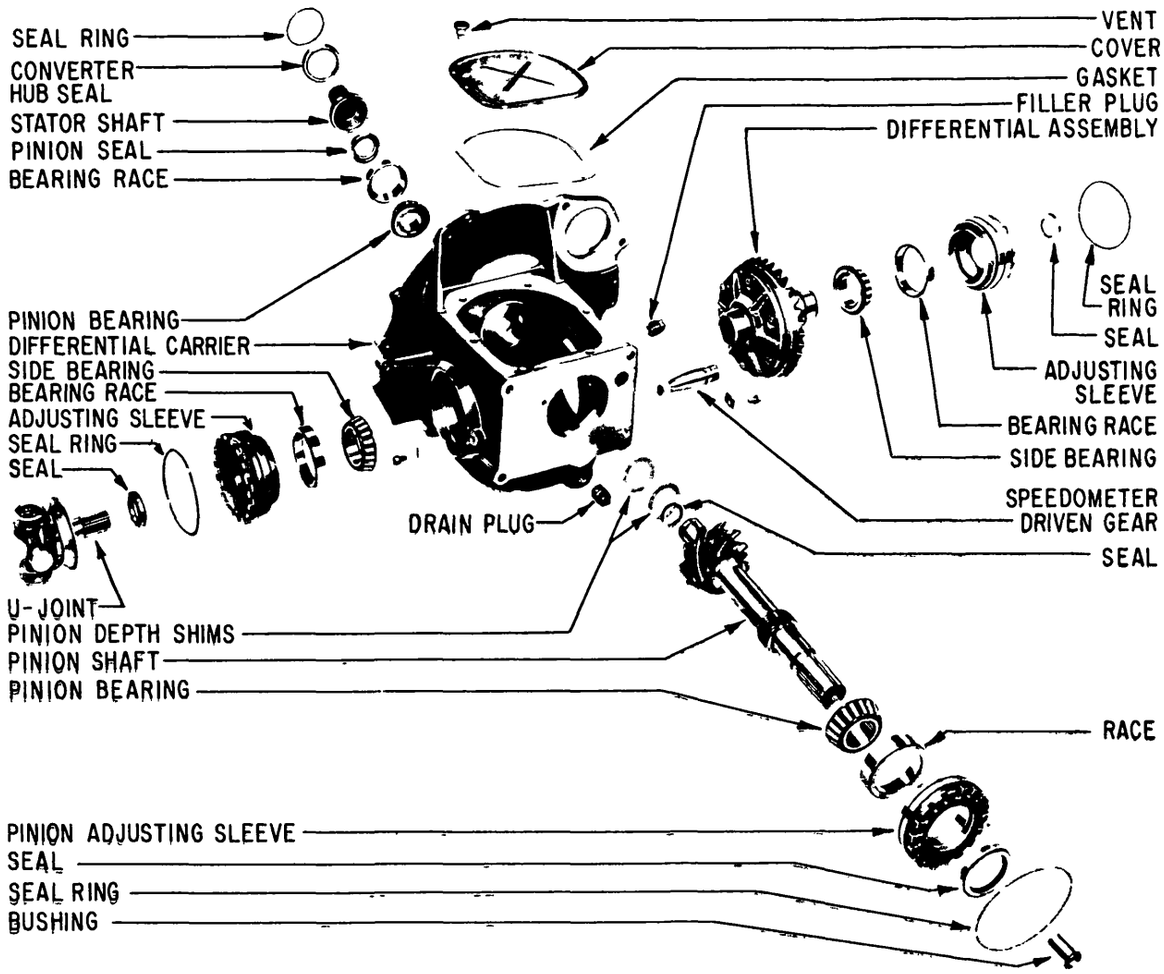
SIDE BEARING ADJUSTING SLEEVE OIL SEAL REPLACEMENT: Remove universal joint from side bearing adjusting sleeve, then pry out original seal and install a new seal with any flat object (seal mounts flush). *NOTE - Lip of seal must be inward.*

OVERHAUL

CARRIER DISASSEMBLY: 1) With differential carrier removed from power train and transmission removed from carrier (see above), drain oil from carrier, then mount carrier in holding fixture J-3289-01. Loosen locking tab and remove speedometer driven gear assembly.
2) Remove carrier cover from case, then remove capscrew securing locking tab to differential side gear adjusting sleeves with Tool J-8342. To remove pinion adjusting sleeve, remove locking tab and unscrew adjusting sleeve with Tool J-972.
3) Remove pinion drive gear with bearings attached by lifting upward and then removing through cover hole. Remove differential carrier by shifting differential to one side of carrier and then turning 90°. Remove through cover hole.

INSPECTION: Inspect all bearing cups, races and rollers for scoring, chipping or excessive wear. Inspect large end of rollers for wear. On automatic transmission axles, inspect oil seal in stator support and at converter hub for wear or damage. Inspect pinion splines for wear and inspect ring gear and pinion teeth for scoring, cracking or chipping. Check fit of differential side gears in case. Check fit of side gear and universal joint splines. Inspect pinion shaft for scoring or wear and differential carrier for cracks or crossed threads.

OVERHAUL: *Except as noted, the following procedures apply to both three-speed and automatic transmission differential carrier assemblies.*



CORVAIR DIFFERENTIAL CARRIER ASSEMBLY (EXPLODED)

Pinion and/or Bearing Replacement: Remove front and rear pinion bearings with Tools J-8331 and J-358-1 and an arbor press, then remove shims found between pinion rear bearing and pinion. *NOTE - If it is necessary to replace pinion bearings and/or ring gear and pinion, the shim pack required between rear bearing and pinion gear will have to be determined (see "Pinion Setting" below).* Install proper shim pack between rear bearing and pinion gear and install bearing by driving it into place with Tool J-5590 and a hammer. Install front bearing in the same manner.

Pinion Rear Bearing Race and/or Clutch Release Bearing Shaft Replacement (Synchro-mesh Cars): Place differential carrier in an arbor press and press out both clutch release shaft and pinion rear bearing race. *NOTE - If a new clutch release bearing shaft is being installed, first install a new inner seal. See "Clutch Release Bearing Shaft Seal Replacement" below.* Install a new seal ring in groove on outer diameter of bearing shaft and lubricate with petrolatum. Support differential carrier only on boss at clutch release bearing location with a cylinder (Tool J-971), then place bearing race on clutch release bearing shaft and press both into carrier with Tool J-7137. Press until cup is flush with adjacent surface inside carrier.

Pinion Rear Bearing Race and/or Stator Shaft Replacement (Automatic Trans. Cars): Remove stator shaft and pinion bearing rear cup from carrier by placing carrier in a press and pressing downward on end of shaft. *NOTE - If a new stator shaft is being installed, install a new pinion rear oil seal, see "Pinion Shaft Rear Oil Seal (Auto. Trans. Cars) Replacement" below.* Install a new oil seal ring on outer diameter of stator shaft and lubricate with petrolatum. *NOTE - Seal not used on later production stator shafts.* Align notch in stator shaft with drain back passage boss in carrier, then

CONTINUED ON NEXT PAGE

Form 62 A

DIFFERENTIAL CARRIER (Cont.)

place bearing race on stator shaft and press race and shaft into housing with Tool J-7137. *CAUTION - Carrier must be supported only at stator shaft boss. Use Tool J-971 or other suitable tool as bottom support.*

Pinion Front Bearing Race Replacement (Synchro-mesh & Automatic Trans. Cars): Remove old race from pinion adjusting sleeve with a pin punch. *NOTE - On automatic transmission cars, remove the seal.* Install new race in pinion adjusting sleeve with Tool J-7137 and J-7079-2 handle. On automatic transmission cars, install a new seal with Tool J-8340.

Pinion Shaft Bushing Replacement (Automatic Trans. Cars): Remove old bushing from inside diameter of shaft with a chisel or other suitable tool. Make sure bushing mating surfaces in pinion shaft are not damaged. Install a new bushing and drive it into place with Tool J-8333 and a hammer. *NOTE - A stop is provided on tool so bushing is driven to proper depth.*

Pinion Setting: Position carrier housing so pinion rear bearing is downward. *NOTE - If new bearing is being installed, make sure the new bearing race is installed in housing.* Place pinion rear bearing to be used in the assembly in carrier housing and rotate several times to make sure it is seated in bearing race. Insert Adapter Plug J-6266-25 into bore of stator shaft or clutch bearing shaft, then place gauge plate J-6266-5 on rear bearing and insert clamp bolt through gauge plate and adapter plug holes and lightly tighten nut. Hold Adapter Plug J-6266-25 and shift gauge plate fore and aft and then side-to-side to "feel" when clamp screw is as nearly perfectly centered in adapter plug bore as possible. When properly centered tighten clamp nut to 6 ft. lbs. *CAUTION - Gauge plate hole must be properly centered in rear bearing bore before clamp nut is tightened as bearing may cock when clamp nut is tightened.* Place Gauge Cylinder Adapter J-6266-18 in unthreaded portion of side bearing adjusting sleeve bore, then insert Gauge Cylinder J-6266-10 in adapter with plunger and mounting post horizontal. Oscillate gauge body to insure that adapter crescents and body are fully seated in side bearing bores. Place Gauge J-6266-19 on gauge plate so that it is centered beneath gauge body. Loosen clamping screw in gauge and slide plunger back and forth slightly so that it is exactly centered between low point of gauge cylinder and gauge plate. When this position is obtained, tighten screw in plunger and remove plunger. Use a 2" micrometer and measure from bottom of gauge to top of plunger. Record this reading. Check pinion marking stamped on front face of pinion gear and the pinion plunger reading (obtained above) with "Pinion Setting Shim" chart. As an example, if gauge and plunger reading is 1.255" and the pinion gear is marked "15", the figure found in the column marked "15", horizontally opposite the the figure "1.255" in first column will be "15", indicating that .015" thick shim pack is required between bearing and pinion gear. *NOTE - Shims are identified by notches in edge as indicated in table.*

SHIM IDENTIFICATION CHART

Identification Notches	Shim Thickness	Chart Indication
NONE	.006"	6
1	.009"	9
2	.012"	12
3	.015"	15
4	.018"	18

PINION SETTING SHIM CHART

Micrometer Reading	Pinion Marking										
	10	11	12	13	14	15	16	17	18	19	20
1.250	6	6	9	9	9	12	12	12	15	15	15
1.251	6	9	9	9	12	12	12	15	15	15	18
1.252	9	9	9	12	12	12	15	15	15	18	18
1.253	9	9	12	12	12	15	15	15	18	18	18
1.254	9	12	12	12	15	15	15	18	18	18	15+6
1.255	12	12	12	15	15	15	18	18	18	15+6	15+6
1.256	12	12	15	15	15	18	18	18	15+6	15+6	15+6
1.257	12	15	15	15	18	18	18	15+6	15+6	15+6	18+6
1.258	15	15	15	18	18	18	15+6	15+6	15+6	18+6	18+6
1.259	15	15	18	18	18	15+6	15+6	15+6	18+6	18+6	18+6
1.260	15	18	18	18	15+6	15+6	15+6	18+6	18+6	18+6	18+9
1.261	18	18	18	15+6	15+6	15+6	18+6	18+6	18+6	18+9	18+9

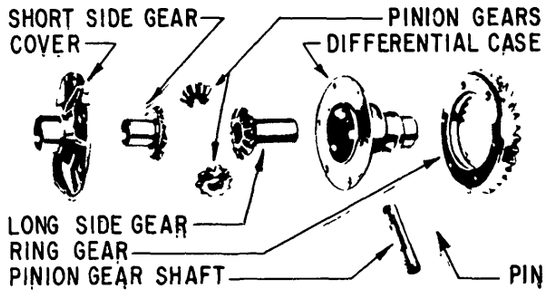
Clutch Release Bearing Shaft Seal Replacement (Synchro-mesh Cars): Remove split ring and oil seal from clutch release bearing shaft by prying out with a punch. Install a new seal, open side inward, using a suitable socket (approx. ¾") and socket extension. Drive seal in until it bottoms, then install split ring in shaft.

Pinion Shaft Front Oil Seal and/or Converter Hub Oil Seal Replacement (Automatic Trans. Cars): Pinion shaft front oil seal and converter hub seal are located opposite each other in fore and aft ends of carrier housing. Installation for the two seals is the same, using the same tool which is designed to install pinion front seal to a prescribed depth and to install converter hub seal which is installed flush. Remove old seal by prying it out with a punch, then coat outer diameter of new seal with non-hardening sealer and drive it into position with Tool J-8340.

Pinion Shaft Rear Oil Seal Replacement (Automatic Trans. Cars): Drive out old seal with punch inserted through access holes in stator shaft. Drive new seal into position with Tool J-5747. Seal must bottom in stator shaft.

Side Bearing Adjusting Sleeve Seal Replacement: Pry out old seal, then install a new seal with lips inward using a flat object as a driver.

Side Bearing Adjusting Sleeve Bearing Race Replacement: Punch mark side bearing adjusting sleeve at two places 9/16" outboard from seal bore 180° apart. Use a 3/16" drill and drill through adjusting sleeve at punch mark locations until drill is stopped by bearing race. Drive out bearing race with a punch. Install new bearing race in sleeve with Tool J-8148 or a suitable flat face for a driver, driving it in flush. Seal drilled holes with lead balls of at least .225" diameter. *NOTE - These balls are available for carburetor repair kits.*



DIFFERENTIAL CASE (EXPLODED)

Differential Gear Assembly Overhaul: Disassembly - Remove differential side bearings with Puller J-7112 and Pilot J-8107-2. *NOTE - Bearing and bearing race should be replaced in sets only.* Remove bolts and lockwashers securing ring gear and differential cover to case and remove cover, short side gear and thrust washer. Tap edges of ring gear with a soft hammer to remove. Drive out roll pin securing differential pinion shaft to case, then tap pinion out of case and remove pinion gears, thrust washers, and long side gear with its thrust washer.

Inspection - Inspect case and cover for cracks. Inspect side gears for fit in case and cover and for evidence of spline damage, broken, scored, or worn teeth. Inspect pinion gears for cracked and chipped teeth and fit on pinion shaft. Inspect all thrust washers for wear. Replace defective parts.

Reassembly - Install side bearings on case and cover with Tool J-5768. *NOTE - Note bearings cannot be installed with this tool after differential is assembled.* Place long side gear and thrust washer in case, position two pinion gears and thrust washers, and insert

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DIFFERENTIAL CARRIER (Cont.)

pinion gear shaft through case and pinion gears. With flat on pinion shaft upward, install roll pin through case and pinion shaft. Position short side gear, with thrust washer installed on its hub, on pinions and place differential cover on case. Align punch marks on edges of case and cover, then install two improvised guide pins in ring gear and tap gear into place with a plastic hammer. Remove guide pins and install bolts and lockwashers. Tighten to 40-60 ft. lbs. in an alternate pattern.

CARRIER REASSEMBLY: 1) With differential carrier case in holding fixture, insert differential assembly into carrier with side bearing cones installed on differential hubs. While differential is loose in case, install pinion into carrier through cover hole, then engage pinion with ring gear and position pinion rear bearing in race. *CAUTION - On automatic transmission cars, be careful not to damage seal when pinion is installed.*
2) Install new "O" ring seals in side bearing adjusting sleeves, coat adjacent threads with non-hardening sealer, then loosely install adjusting sleeves in carrier with side bearings positioned in sleeves.
3) On automatic transmission cars, install a new "O" ring seal in pinion adjusting sleeve. On all cars, position pinion so that its front bearing will pick up bearing race in adjusting sleeve, then loosely install adjusting sleeve in carrier. *CAUTION - Be careful not to damage seal lips on automatic transmission cars when inserting pinion shaft over adjusting sleeve.*
4) Tighten both side bearing adjusting sleeves and pinion adjusting sleeve to point of contact between bearings and races. At this point there should be no preload on any of the bearings and ring gear-to-pinion gear backlash should be just enough so that pinion and differential can be rotated easily and smoothly. Adjust ring gear and pinion bearings and ring gear-to-pinion backlash (see below). After these adjustments, proceed as follows:
5) Engage speedometer drive gear with gear on pinion shaft, then secure the assembly in carrier by tightening locking tab. Install differential carrier cover and a new gasket. Tighten cover bolts to 11-19 ft. lbs. Fill Carrier with 3 pints of recommended lubricant *(see "Lubrication" above).*

DIFFERENTIAL SIDE BEARING ADJUSTMENT: Lubricate bearings with axle lubricant, then tighten right side bearing adjusting sleeve while rocking differential assembly until there is no backlash between ring gear and pinion. Mark this point with a crayon, then back off adjusting sleeve three to four full notches to eliminate "O" ring wind-up. Retighten adjusting sleeve to one notch loose from the "zero backlash" crayon mark. Tighten left side bearing sleeve while moving differential laterally until all lash is eliminated. *NOTE - This point is determined when right side bearing rollers begin to turn when contact is made.* Mark both the adjusting sleeve and carrier with a crayon, then back off sleeve three or four full notches to release any "O" ring wind up, then tighten adjusting sleeve until **marks realign plus a minimum of two additional notches and a maximum of three additional notches** to align sleeve notches for locking tab installation, then install tabs.

PINION BEARING PRELOAD ADJUSTMENT: Tighten pinion bearing adjusting sleeve with Tool J-972 until pinion bearings are in contact with their races, then tighten pinion sleeve two additional notches. Measure pinion turning torque with Tool J-8362 (adapter) and an inch-pound torque wrench. Turning torque should be 4-6 inch-pounds (used bearings), 9-11 inch-pounds (new bearings). If turning torque is not within the above limits, move adjusting sleeve one notch at a time to obtain correct turning torque. When correct, install adjusting sleeve locking tab.

RING GEAR BACKLASH ADJUSTMENT: Mount a dial indicator on differential carrier and position indicator tip against back side of a ring gear tooth. Move ring gear to one end of its lash range, zero the dial indicator, then measure total backlash which should be .003-.010" (.005-.008" preferred). To reduce backlash, move ring gear toward pinion. When changing position of ring gear, side bearing adjusting sleeves must be moved the same number of notches to maintain side bearing preload. *NOTE - Turning adjusting sleeve one notch changes backlash approximately .003". Adjustments of one-half notch (.0015") can be made by reversing the adjusting sleeve locking tabs.*

POWERFLITE (CHRYSLER, DE SOTO, DODGE, PLYMOUTH)

Chrysler, DeSoto, Dodge, Plymouth (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Pushing recommended rather than towing. Turn ignition switch "on," place selector lever in "N." When car speed of approximately 25 MPH. reached, move selector lever to Low "L" position and car will crank engine.

►*TOWING POWERFLITE CARS:* Following procedure recommended:

Transmission Operating—Place selector lever in "N" and secure in this position by wiring lever in the gate on the lower end of the steering column. Tow car at moderate speeds. NOTE—For long distance towing (100 miles or over), propeller shaft should be removed.

Transmission Inoperative—Tow the car with rear end lifted or remove propeller shaft.

►*1954 THROTTLE CONTROL CHANGE NOTE:* Two types of throttle controls have been used and different throttle linkage adjustments are necessary. *See "Throttle Linkage Adjustment" below.*

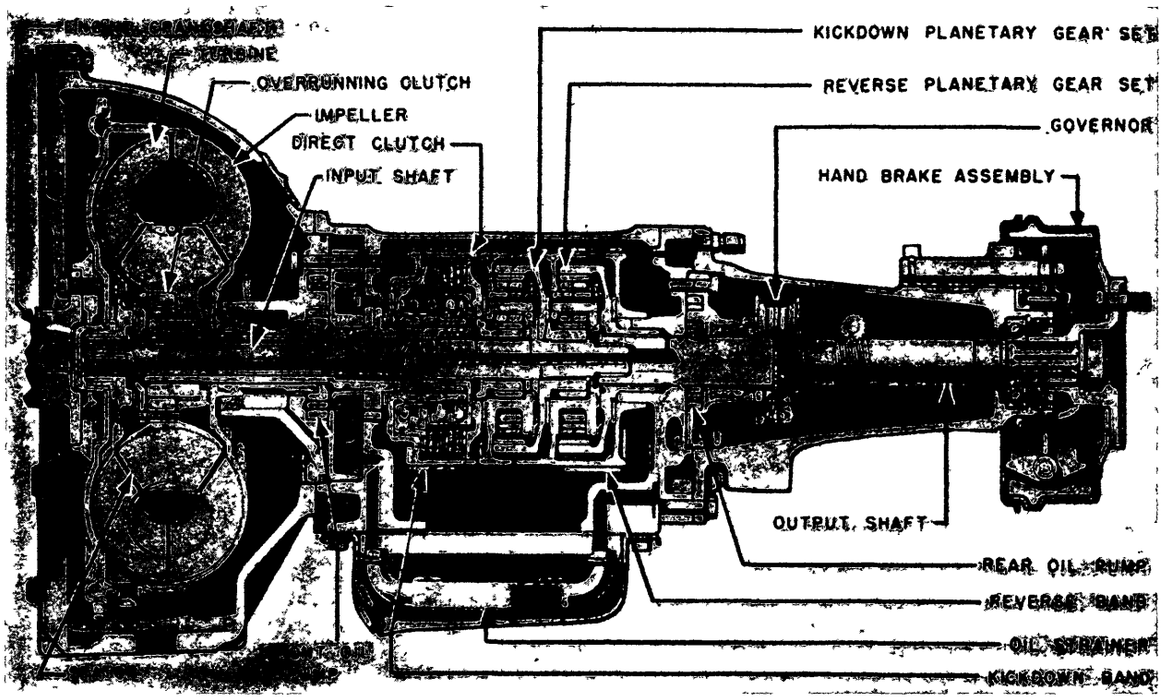
►*1954 GOVERNOR PRODUCTION CHANGE:* A later type governor which provides a lower wide open throttle upshift and lower kickdown limit entered production approximately April 26, 1954. Shift patterns with the new governor are changed as indicated in "Transmission Shift Pattern" tables below. The later type governor can be installed on earlier cars and is available in replacement kits, Part No. 1450993 (6 Cyl. Cars), No. 1450994 (8 Cyl. Cars). *NOTE—Also see "1955 Governor Production Change"*

►*1954 DIRECT CLUTCH PRESSURE TESTING POINT PRODUCTION CHANGE:* a ⅛" take-off plug has been added to the bottom of the kickdown servo boss which can be used for checking direct clutch pressure. *See "Hydraulic Pressure Tests & Trouble Shooting" below.*

►*1954 SHUTTLE VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A later type shuttle valve, Part No. 1643118 is used for production and can be used for service replacement. *CAUTION*—The adjustment screw is pre-set at the factory and MUST NOT BE CHANGED IN THE FIELD. *When replacing the older type valve with the later one, DO NOT install the old spacer and spring.*

►*1954 TRANSFER PLATE COVER PRODUCTION CHANGE:* A cast iron cover replaces the aluminum cover formerly used. This change was made to prevent possible warpage due to heat. The new cover plate, Part No. 1559108 can be installed on all previous transmissions.

►*1955 TORQUE CONVERTER OUTLET VALVE PRODUCTION CHANGE (To prevent loss of torque converter pressure under severe operating conditions):* A later type valve, Part No. 1630871 located in forward end of oil passage on left side of transmission case above line pressure take-off plug prevents loss of torque converter pressure. This valve can be installed on all early transmissions. *NOTE*—When installing the valve, make sure that the ball end of the valve is toward center of transmission. *Also see "Regulator Valve Body Production Change" below for later changes affecting the torque converter outlet valve.*



POWERFLITE TRANSMISSION SECTIONAL VIEW

►*1955 REGULATOR VALVE BODY PRODUCTION CHANGE (Converter pressure regulated at input, not at outlet):* The torque converter outlet valve has been eliminated by a change in the regulator valve body, the torque converter control valve and spring. The later type regulator valve body is identified by a letter "D" at end of the part number. The later Regulator Valve Package, Part No. 1643243 can be installed on early transmissions. *CAUTION*—The Torque Converter Outlet Valve must be removed to insure proper lubrication when the later type Regulator Valve is installed.

►*1955 INPUT SHAFT PRODUCTION CHANGE (To provide better sealing and bearing support):* A later type input shaft having a large area bushing (integral with shaft) replaced the former input shaft (three seal rings) at Transmission No. J-14-54 (stamped on lower right front corner of transmission case). The large area bushing is a press fit on the output shaft and is not serviced separately. When installing the later shaft in earlier transmissions, it will also be necessary to install a new reaction shaft.

►*1955 PLYMOUTH GOVERNOR PRODUCTION CHANGE (3-stage type replacing the 2-stage type):* A later type governor, Part No. 1653463 (V8 Cars), 1653464 (6 Cyl. Cars) provides a closer control of shift speeds The wide open throttle upshift limit is decreased and the low kickdown limit is increased (see "Transmission Shift Speeds" below). The later type governor can be used on earlier transmission for service replacement provided the complete package is installed. *NOTE*—Transmissions equipped with the new governor are identified by the letter "H" following the part number.

►*PLYMOUTH DIRECT CLUTCH DISC & PLATE REPLACEMENT CAUTION:* Six discs and six plates are included in Disc & Plate Package, Part No. 1450209 (for use on all PowerFlite Transmissions). On Plymouth 6 Cyl. & V8 Models, use only 5 discs & 5 plates. Installation of six of each part will not provide adequate clearance and may burn the discs and plates.

DESCRIPTION

DESCRIPTION: PowerFlite transmission consists of a torque converter and a two-speed hydraulically controlled planetary gear type automatic transmission. The entire transmission has a single independent oil system (front and rear pumps in transmission circulating oil through transmission, converter, and oil cooler with oil carried in transmission case oil pan). Hydraulic control consists of valve assemblies in the transmission and a hydraulic governor on the output shaft within the transmission extension housing which control the operation of the planetary gear sets (see OPERATION following). Torque converter is similar to unit used previously in "Fluid-Torque" Drive and operates independently.

Torque Converter: Provides a torque converter ratio of 2.6-1 for starting, acceleration, or heavy pulling whenever a torque gain is required. At cruising speeds above 45-50 MPH., the torque converter acts

CONTINUED ON NEXT PAGE

POWERFLITE (C nt.)

as a fluid coupling with no torque multiplication.

Planetary Gears: Consist of a "Kick-down" (Low Range) planetary gear set providing a gear ratio of 1.72-1, and a Reverse planetary gear set providing a reverse drive with a gear ratio of 2.39-1. The actual effective gear ratio depends on selector lever position and car speeds as follows:

OPERATION

OPERATION: Transmission operation in each position of the selector lever is outlined below. In Drive "D" position (normal driving position), operation varies in accordance with the car speed and operating conditions. *See Shifting Speed tables below.*

Drive "D" Position: This is normal driving position.

Breakaway (Starting & Accelerating)—Transmission is down-shifted so that kick-down (low range) planetary gear set is in operation. The car starts and accelerates with both the torque converter providing a torque increase of 2.6-1 and the gears providing a torque increase of 1.72-1 for a total ratio of 4.47-1. At a car speed of 15-75 MPH. (depending on throttle position), the transmission automatically upshifts (locking out the planetary gears) so that all torque multiplication is provided by the torque converter. See Direct Drive.

Direct Drive—After the transmission upshifts, the only torque multiplication is provided by the torque converter (2.6-1) and this gradually diminishes as the car speed increases until at approximately 50 MPH. the ratio is 1-1 and the torque converter operates as a fluid coupling.

Kickdown (Forced Downshift)—At car speeds below 45-60 MPH., depressing accelerator pedal to the wide-open position will cause the transmission to downshift and drive through the kick-down planetary gear set. This provides the same torque multiplication as in "Breakaway" above. When the accelerator pedal is partially released, or when the car speed reaches 60-75 MPH., the transmission automatically upshifts (kick-down not operative above 60-75 MPH.).

Low "L" Position: Operation is the same as in Drive "Breakaway" above except that no upshift occurs and the planetary gear ratio of 1.72-1 remains in action regardless of the car speed.

Reserve "R" Position: This engages the reverse band (kick-down band and direct clutch disengaged) so that the engine drives through the torque converter and the reverse planetary gear set to provide a reverse drive with a torque multiplication of 2.6-1 (torque converter) and 2.39-1 (reverse planetary).

Neutral "N" Position: The transmission is completely disengaged (both bands and direct clutch disengaged) so that there is connection between the engine and the rear wheels. The Starter Neutral switch contacts are closed which permits the starter to operate to crank the engine.

LUBRICATION

Checking Fluid Level (Engine Hot)—With engine idling oil level should not be above the "full" mark on dipstick after car has been driven sufficiently to bring engine and transmission up to operating temperature. If oil is slightly below desired level, add a little oil at a time and recheck. *Do not add a full quart unless check indicates that it is required.*

Checking Fluid Level (Engine Cold)—Start engine, set hand brake and shift selector lever through all ranges. Allow engine to run approximately two minutes. Move selector lever to "N" (neutral) and check oil level with engine idling. Oil level should not be higher than ½" above the "low" mark on dipstick, and it should not be below the "low" mark on dipstick.

Draining & Refilling—Drain transmission case by removing drain plug from oil pan. Drain torque converter by removing drain plug from converter housing (remove access plate from bottom of flywheel housing, rotate torque converter until drain plug is down). Replace both drain plugs using new gaskets, if necessary, tighten oil pan plug to 20-25 ft. lbs. and torque converter plug to 45-50 ft. lbs. Install 5 qts. new fluid through transmission filler tube. Start engine and add approximately four quarts more while engine is running. Allow engine to idle for two minutes, then shift selector lever through all positions and return it to neutral. Add sufficient fluid to bring fluid level to "low" mark on dipstick (approx. 1 quart).

Recommended Fluid—Automatic Transmission Fluid Type A.

LINKAGE ADJUSTMENT

1954 CHRYSLER, DESOTO, DODGE

Gearshift Linkage: Place manual control lever at the transmission in "D" position which is the third detent from front of car (Chrysler & DeSoto); "N" position which is the second detent from rear of car (Dodge). Check angle of gearshift control bellcrank upper lever in relation to frame line. This should be 24-29° (Chrysler & DeSoto); 40-45° (Dodge) to the horizontal above the frame line and pointing slightly toward rear of car. If not at the correct angle, adjust as follows:

1) Disconnect front and rear gearshift control rods at gearshift control bell crank. Locate gearshift control bell crank as described above and adjust the rear gearshift control rod to the required length for a free fit in the bell crank lower lever, reinstall rod.

2) Place selector lever pointer in the "N" (neutral) position on the indicator dial at the top of steering column. Check clearance between the gearshift tube lever gate neutral stop land at bottom of steering column and the gearshift tube lever. This clearance should be .015" to .017" with .015" to .030" clearance between the gate and the wide flat face portion of the lever (see illustration), with gearshift tube in its normal fully returned position. To adjust, loosen the three attaching screws (on Chrysler & DeSoto), clamp (on Dodge) and move the gate to the desired position for correct clearance. Tighten attaching screws or clamp.

3) Make sure selector lever is in "D" position (Chrysler & DeSoto); "N" position (Dodge) and adjust the front gearshift rod to the desired length for a free fit to the upper lever of bellcrank. Reinstall rod.

4) Operate lever through all detent positions and check position of pointer on indicator dial.

►*CAUTION: If control does not operate properly or indicator does not indicate correctly, recheck the assembly and adjustment. DO NOT FORCE movement of selector lever.*

1954 PLYMOUTH

Gearshift Linkage: Measure distance between center of gearshift selector lever bearing bolt and gearshift rod bracket on steering column with a steel scale. Adjust to 49/64" (to get an accurate scale reading it may be necessary to force quadrant slightly away from rod bracket). Adjust as follows:

1) Remove steering column bracket assembly at selector lever and the bracket cap at the dash. Lower column enough to gain access to the cross head screw beneath selector lever. Remove lever, spring, and pointer.

2) Slide bracket assembly down on gearshift rod far enough to rotate and adjust bracket sleeve to 49/64" distance from center of hole to edge of bracket. This will provide approximately 3/16" minimum steering gear gearshift rod lever overlap on gate at lower end of steering column for "N" and "D" positions. Reinstall lever, spring, and pointer, then bracket assembly and bracket cap. Adjust gearshift rod lever stud to center of gearshift rod lever slot.

3) Raise car on hoist. Loosen the two nuts holding gearshift control rod to the swivel block attached to gearshift control bell crank mounted on transmission. Remove swivel block and control rod from bell crank. Move manual control lever on the transmission toward rear of car to place transmission in reverse gear, then move it one detent toward front of car which will place transmission in "N" (neutral). Reinstall swivel block in bell crank, leaving the control rod nuts still loose. Hold gearshift rod lever on steering column in "N" (neutral) position and draw up the front nut on the control rod to within 1/16" of the swivel block. Tighten nut to rear of swivel block, locking assembly in position.

4) Shift transmission through all gears and check for full engagement, making sure that the gearshift rod lever does not ride against control gate in any position. Readjust if necessary. Lower car and check position of selector lever pointer at "D" position. If necessary, bend pointer to locate it exactly at center of the letter.

1954 ALL MODELS

Throttle Linkage & Throttle Pressure: *CAUTION—Transmission throttle oil pressure must be checked and carefully adjusted when the throttl linkage is adjusted. This is important for proper peration.*

Chrysler, DeSoto & Dodge—

1) Check accelerator pedal released position. Included angle from face of pedal to floor at rear of pedal should be 118° (Chrysler & Dodge), 120° (DeSoto). Adjust length of accelerator bell crank to carburetor rod at carburetor throttle lever for correct pedal position.

Plymouth—

1) Measure distance between two anchor points of the throttle return spring. This distance should be 5⅝". To obtain the correct length, adjust throttle rod between carburetor lever and bell-crank.

All Models—Proceed as follows:

2) Operate linkage through entire travel to make certain there is no bind in any position, see that carburetor throttle valves closed with accelerator in released position and that pedal has sufficient travel to fully open throttle valves and operate

CONTINUED N NEXT PAGE

POWERFLITE (C nt.)

kick down valve (opening of valve should be felt just as the wide open throttle position is reached).
3) Set engine idle at 475-500 RPM., with engine at normal operating temperature and with selector lever in "N" (neutral) position. ***CAUTION—Correct engine idle speed setting is very important when adjusting linkage and accurate tachometer should be used.***
4) With engine not running, remove Throttle Pressure Take-off Plug on right side of transmission case (⅛" pipe plug between reverse and kick down servos), connect 100 P.S.I. Pressure Gauge (Tool C-3292) at this point.
5) Start engine and place selector lever in "D" position ***(CAUTION—Set hand brake firmly).*** Disconnect the throttle linkage at transmission throttle control lever and operate the throttle valve several times by hand. Observe pressure reaction to lever movement to make sure throttle valve is not sticking.

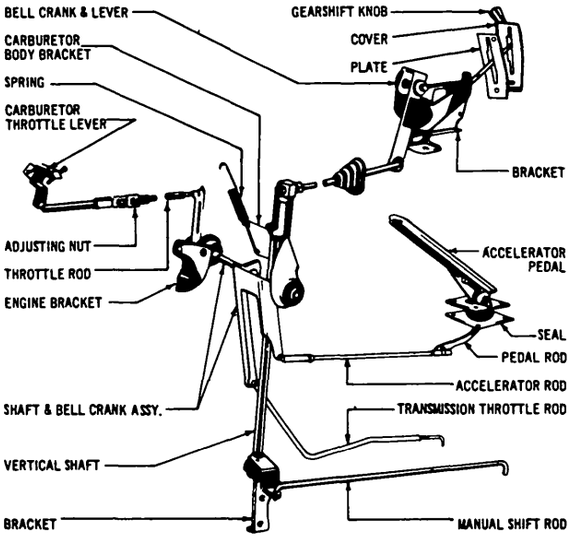
►***THROTTLE CONTROL CHANGE NOTE:*** Two types of throttle controls have been used. The first type has no return spring on throttle lever and no positive stop for the throttle valve cam. The second type has a return spring located on transmission throttle lever and a positive stop for the throttle valve cam. These two types are not interchangeable and different adjustment procedures are required as follows:

6) Position throttle control lever so it is approximately 30° toward front of car from a right angle to the transmission center line (this procedure is not necessary on the second type control valve having the return spring, as the positive stop within the transmission positions control valve at the closed throttle position). Check throttle oil pressure which should be 13-15 P.S.I. If not within this range, adjust throttle pressure by removing throttle valve adjusting screw plug (on left side of transmission slightly forward and below Back-Up Light Switch). ***Approximately one quart of fluid will drain out when plug removed.*** Using Throttle Screw Adjusting Wrench C-3279, adjust throttle pressure to 14 P.S.I. Turn screw counter-clockwise to increase pressure and clockwise to decrease pressure. Replace plug and tighten to 20-25 ft. lbs.

7) Reconnect throttle linkage to throttle valve lever on transmission. To check throttle linkage adjustment pull slightly on accelerator pedal lever from below car. The throttle pressure should read 14 P.S.I. at idle speed and **rise 8 P.S.I. immediately** when accelerator depressed. If pressure rise not immediate with throttle opening, proceed as follows:

►**Cars With First Type Control Valve—**

8) Loosen lock screw on throttle control rod swivel, disconnect clip from throttle control rod and move swivel and throttle lever as far forward as possible. Next, slowly move throttle and swivel rearward until a slight resistance is felt. At this point, with very slight additional travel of lever toward rear, the throttle oil pressure should suddenly rise 8 P.S.I.
9) Holding swivel and throttle lever at exact position where the slight resistance noted, push slightly forward on the throttle rod to remove free play in connections, and while holding the rod and swivel in this position, connect swivel clip and tighten lock screw, securing swivel to correct position on



1955 POWERFLITE LINKAGE (TYPICAL)

throttle control rod. Recheck adjustment as in (7) above. Remove pressure gauge, replace throttle oil pressure take-off plug and torque to 10-12 ft. lbs.

►**Cars With Second Type Control Valve—**

8) Disconnect throttle control linkage at transmission throttle lever. Operate lever several times by hand. With control lever pointing toward front of car, move it rearward until a slight resistance is felt. Pressure at this point should suddenly rise 6 to 8 lbs. Return lever to a position approximately 1/16" toward front of car. With lever held in this position, install control rod, clamp and nut. Tighten nut just enough so rod can be moved through the clamp by tapping the lever slightly. Pull the accelerator pedal lever until engine speed just begins to indicate rise on tachometer. At this point tap transmission throttle lever into position which will allow the throttle pressure to rise from the 14 lb. mark. With slight additional throttle lever travel, the oil pressure should suddenly rise approximately 8 lbs. When pedal lever is released the throttle pressure should return to 14 lbs. Tighten the nut at point where the pressure starts to rise.

1955 CHRYSLER, DESOTO, DODGE

Gearshift Linkage Adjustment: Hold lever in gate (between neutral "N" and drive "D" positions) under tension (which is adjustable by a bracket to which it is attached behind instrument panel). With spring scale, tool C-394, pull out from selector lever knob. This should require 1-2 lbs., pull to break contact between selector lever and gate. If it does not, then adjust by loosening bracket attaching screws and sliding bracket to obtain the proper tension. Tighten screws and recheck tension ***(NOTE*** —If correct tension cannot be obtained by adjusting bracket, it can be corrected by removing the selector lever and mounting bracket assembly and bending the tension spring. Bend tension spring away from gate to ***decrease*** and toward to ***increase*** tension). Raise hood and inspect selector lever to torque shaft rod for interference where it goes through firewall. If necessary, bend rod to provide clearance at this point. Disconnect selector lever to torque shaft control rod at upper torque shaft rod (adjustment end). Make sure manual control lever located on side of transmission is in the neutral detent position (second detent from rear, all the way to rear and then one notch forward) by shifting it out of neutral and in again. With selector lever in neutral "N" position, push control rod toward firewall until instrument panel selector lever strikes the neutral stop land on gate. Adjust control rod swivel to a free fit in torque shaft upper lever. Clamp swivel in place with the two locknuts and check for free fit. Shift selector lever through all ranges ***CAUTION—The selector lever must go into gate without interference when shifting. Do not use force. Recheck assembly and adjustment.***

►***EARLY 1955 DESOTO THROTTLE LINKAGE ADJUSTMENT CAUTION:*** Approximately the first 2000 cars had a throttle control the same as the late 1954 models, and requires a different throttle linkage adjustment than later cars. The first type control can be identified by throttle Control Lever (on transmission) not having a positive stop at 30° forward movement of throttle lever. Adjust throttle linkage and throttle pressure on early cars in same manner as for late 1954 models. ***See "1954 Throttle Linkage Adjustment" above.***

Throttle Linkage & Throttle Pressure: ***CAUTION—Transmission throttle oil pressure must be checked and carefully adjusted when the throttle linkage is adjusted. This is important for proper operation.*** With engine at operating temperature, remove air cleaner and check choke valve for wide open position. Connect tachometer leads to coil and ground and adjust engine idle speed to 475-500 RPM, with selector lever in "N" (neutral). Stop engine. Loosen throttle linkage adjusting screw (located on accelerator-to-carburetor rod) and move rear portion of accelerator shaft shaft-to-carburetor rod rearward until it butts against stop. (Preload lightly.) With rods in line and rear portion of rod lightly preloaded, lock throttle linkage adjustment screw by tightening it to 10-15 ft. lbs. Start engine and recheck idle setting. With transmission in "N" (neutral) and hand brake set, raise car on hoist. Remove throttle oil pressure take-off plug (⅛" pipe plug) located between reverse and kick down servos on right side of transmission case. Connect 100 lbs., pressure gauge C-3292. Shift manual lever on left side of transmission case to "D" (drive) range and check throttle pressure which should be 13-15 lbs. (if necessary to readjust, set pressure to 14 lbs.). ***(NOTE—When manual control lever is moved into "D" range, the engine speed will drop approximately 50 RPM).*** If pressure is not within specifications remove throttle valve adjusting screw plug (⅜" pipe). ***(NOTE***—About one quart of transmission fluid will drain out). Insert adjusting screw wrench C-3279A or C-3279 and adjust throttle pressure to 14 lbs. Turn screw OUT to increase pressure and IN to decrease pressure. Open and release throttle several times to check for proper setting. Throttle pressure should return to 14 lbs. Replace throttle valve adjusting screw plug and tighten to 25 ft. lbs. With accelerator fully released and engine at 475-500 RPM, the pressure should read 14 lbs. Very slowly

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POWERFLITE (C nt.)

move the accelerator pedal or lever from underneath. With throttle and pressure properly adjusted, the throttle pressure should rise immediately with an increase in RPM *(NOTE—Do not use throttle rod when making this check)*. Remove oil pressure gauge and install pipe plug. Tighten to 12 ft. lbs. *(CAUTION—Replace any fluid that drained out during the adjustment)*.

Checking & Adjusting Accelerator Pedal Height: At wide open throttle the tip of the pedal must be approximately ⅛" from the floor mat. To adjust, disconnect accelerator rod from bellcrank under the floor pan. Loosen locking nut and screw the connector counterclockwise on the shaft to raise pedal and clockwise to lower pedal. Reconnect rod to pedal bellcrank, lock with nut and turn down the connector nut.

1955 PLYMOUTH

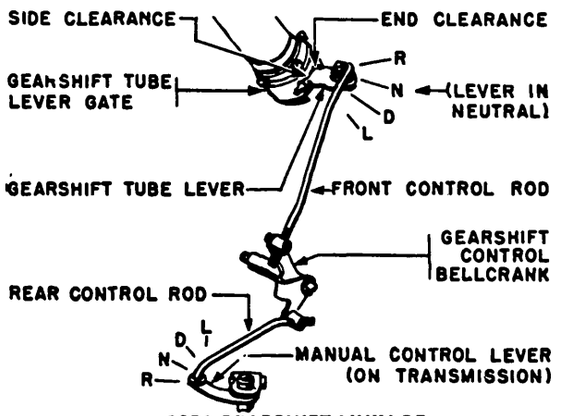
Gearshift Linkage Adjustment: There should be 1/32" clearance between selector lever and the gate at instrument panel, with transmission in neutral. Adjustment is made at end of gearshift lever rod on engine side of firewall. Loosen adjusting nuts and place the transmission shift lever in neutral position. Tighten front adjusting nut to provide clearance on the instrument panel, then tighten rear nut. Check for full detent engagement at transmission.

Throttle Linkage & Pressure Adjustment: *(NOTE—To obtain correct relationship between throttle linkage and engine speed, throttle pressure as well as throttle linkage should be checked. Check linkage for possible binding and make sure lever returns to its stop)*. With selector lever in neutral "N" position, start engine and bring to normal operating temperature. Make sure carburetor is not on fast idle. Adjust engine idle speed to 475-500 RPM. in Neutral. Stop engine. Install tachometer leads for use under the car, start engine, then raise car on a hoist. Remove throttle oil pressure take-off plug (⅛" pipe plug) located between reverse and kickdown servos on right side of transmission. Connect the 100 lbs., pressure gauge C-3292. Move gearshift control lever on transmission one detent toward front of car to put transmission into "D" (drive) range. Disconnect throttle linkage at transmission throttle control lever and operate the throttle control lever several times by hand. Pressure should return to 13-15 lbs., with throttle lever returned to its stop. If it does not, adjust as follows: Remove the ⅜" pipe plug throttle valve adjusting screw plug on left side of transmission case (about one quart of fluid may drain out). Using throttle adjusting screw wrench C-3279A adjust the throttle pressure to 14 lbs. (Turn screw counterclockwise to increase pressure, clockwise to decrease). Shift transmission several times between "N" (neutral) and "D" (drive). Pressure should return to 14 lbs., when lever is returned to "D" (drive). Reinstall plug and tighten to 20-25 ft. lbs. *NOTE*—After throttle pressure is adjusted, adjust throttle control linkage:

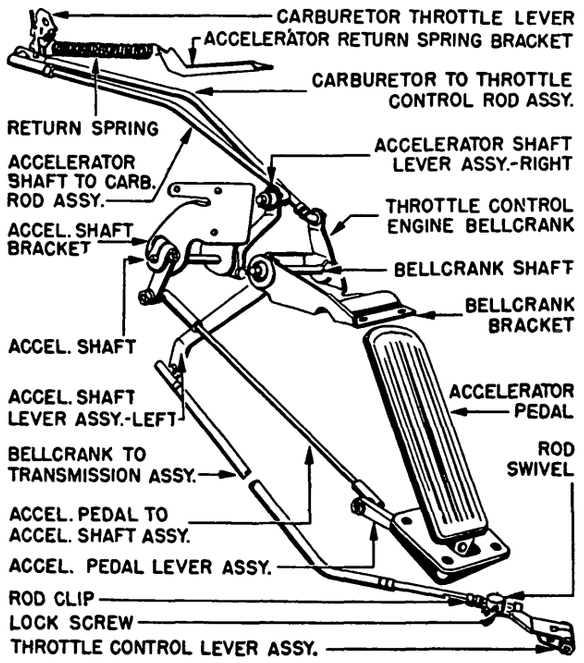
V8 Engine Models—Loosen the clamp nut on throttle control rod (midway between carburetor throttle lever and cross shaft lever), and slide rear part of rod toward rear of car to take up all slack. Tighten clamp nut and make sure that carburetor is off fast idle.

6 Cyl. Engine Models—Loosen vertical clamp bolt at rear of engine and adjust the carburetor throttle lever rod to provide 5 7/16" distance between the anchor points of the throttle return spring. Then, with engine idling (off fast idle), take up slack at the vertical rod and tighten clamp nut.

On All Models—After adjustment is made, move gearshift control lever on transmission one detent toward rear of car to put transmission into "N" (neutral). Remove pressure gauge and reinstall plug. Tighten to 10-12 ft. lbs.



1954 GEARSHIFT LINKAGE



1954 THROTTLE LINKAGE

(CHRYSLER & DESOTO SHOWN—DODGE & PLYMOUTH SIMILAR)

BAND ADJUSTMENT

BAND ADJUSTMENT: *Kick-down (Front) Band can be adjusted externally, Reverse (Rear) Band adjustment requires removal of transmission case oil pan.*

Kick-down (Front) Band: *NOTE—Some models do not have band adjusting access hole in front floor pan (on left side of tunnel adjacent to accelerator pedal) and adjustment must be made differently from beneath car.*

Adjustment using Tool C-3291 (Cars with access hole in front floor). Remove accelerator pedal from hinged section of accelerator assembly, remove floor mat and access hole cover (on left side of tunnel immediately adjacent to accelerator pedal location). Then proceed as follows: Use Tool C-3291 (combination wrench and counter) to loosen adjusting screw locknut, check to see that adjusting screw is free in transmission case. Use **Inch-pound** reading torque wrench (Tool C-3380 or C-685) to tighten band adjusting screw to 60-72 In. Lbs. torque, then using counter on tool, **back off the adjusting nut exactly 3 turns,** hold the adjusting screw stationary and tighten the locknut securely.

Adjustment (cars without access hol in front floor)—Tool C-3291 cannot be used. Working from underneath car use a box wrench to loosen the band adjusting screw locknut (adjusting screw located on upper left side of transmission case in front of control lever assembly), back off locknut 4 turns (Chrysler & DeSoto), 9 turns (Dodge & Plymouth). Check to see that adjusting screw is free in transmission case. Use **Inch-Pound** reading torque wrench (Tool C-3380 or C-685) to tighten band adjusting screw to 60-72 In. Lbs. torque, mark adjusting screw position for reference and **back adjusting screw off exactly 3 turns,** hold adjusting screw stationary and tighten locknut securely.

Reverse (Rear) Band: Drain transmission case and remove oil pan. Remove locknut from reverse band adjusting screw (in reverse band lever at right rear within transmission case). Use Inch-Pound reading torque wrench (Tool C-3380 or C-685) to tighten adjusting screw to 20-25 In. Lbs. torque, then back **adjusting screw off 10 turns.** Install adjusting screw locknut, hold adjusting screw stationary and tighten locknut to 30-35 Ft. Lbs. Replace oil pan and refill transmission with fluid (see **LUBRICATION**).

ROAD TESTING TRANSMISSION: If transmission operation not satisfactory, following complete procedure is recommended to check performance and diagnose trouble:

FIRST—Make certain that engine properly tuned, idle speed correctly set at 475-500 RPM. with engine at normal operating temperature and selector lever in Neutral "N" position, and that transmission fluid level is correct. *CAUTION*—If throttle linkage disturbed in tuning engine, linkage must be adjusted before making following tests.

1) Move selector lever through all positions and check pointer with reference to gate and transmission detent positions. See LINKAGE ADJUSTMENT.

2) Start engine. Increase engine speed up to 800 RPM. checking for gear noise and dragging.

3) Move selector lever to "R" and check the shift for speed and smoothness. Back the car and check

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for gear noise and dragging. ***CAUTION—do not use wide open throttle in Reverse.***

4) Make a Stall Test to check for band slippage (see STALL TEST below). If band slippage indicated, adjust bands before proceeding with the test (see BAND ADJUSTMENT).

NOTE—Refer to "Transmission Shifting Speed" data for correct upshift and downshift speeds when making the following tests:

5) Accelerate car with very light throttle. Note speed at which upshift occurs and check smoothness of the shift. Slow the car to approximately 15 MPH. and rapidly accelerate to wide-open throttle **without going into the kick-down position.** Check for clutch slippage. Transmission should not downshift.

6) With car operating 15-20 MPH., make a kick-down shift by opening throttle to kick-down position, then release accelerator to approximately the half-throttle position so that transmission upshifts. Check smoothness of each shift.

7) With car operating at 35-40 MPH., make a kick-down shift by opening throttle to kick-down position, then release accelerator to closed-throttle position. Check smoothness of each shift.

8) With car operating at 45 MPH., make a kick-down shift by opening throttle to kick-down position, then accelerate car with transmission kicked down until transmission upshifts. Check this shift speed and smoothness of both shifts.

9) Slow car speed to 65 MPH. (Chrysler & DeSoto), 50 MPH. (Dodge & Plymouth) and attempt to make a kick-down shift at this speed. Transmission should not downshift (this speed is above kick-down limit).

10) Slow car to 40-50 MPH., move selector lever to "L." Transmission should downshift. Check for gear noise.

11) Increase car speed to approximately 20 MPH. and move selector lever to "D." Transmission should upshift. Coast car to a stop and check speed at which transmission downshifts. Check smoothness of shift.

TESTING

TRANSMISSION SHIFT SPEEDS

1954 Chrysler 6 & 8

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	60-75	10-14
Light	15-20	10-12
Kickdown Limit		45-60

1955 Chrysler C-67

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open ①	52-69	
Wide Open ②	51-61	
Light	13-16	10-12
Kickdown Limit		42-58

1955 Chrysler C-68, C-70

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open ①	56-74	
Wide Open ②	55-65	
Light	15-18	10-12
Kickdown Limit		45-63

1955 Chrysler C-69

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open ①	54-71	
Wide Open ②	53-63	
Light	14-17	10-12
Kickdown Limit		43-60

①—With 2-stage governor. See *Production Change* above.
②—With 3-stage governor. See *Production Change* above.

1954 DeSoto 6

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	49-63	
Light	13-18	
Closed		9-11
Kickdown Limit		34-48

1954 DeSoto 8

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	60-75	
Light	15-20	
Closed		10-12
Kickdown Limit		45-60

1955 DeSoto S-21

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	62-69	
Light	17-20	
Closed		10-12
Kickdown Limit		42-58

1955 DeSoto S-22

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	43-66	
Light	17-20	
Closed		9-11
Kickdown Limit		40-55

1954 Dodge 6 & 8

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	58-71	9-14
Light	14-19	9-11
Kickdown Limit		43-48

1955 Dodge 6

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	31-54	9-16
Light	12-15	9-11
Kickdown Limit		28-43

1955 Dodge 8

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	51-68	9-17
Light	13-16	9-11
Kickdown Limit		41-58

Early 1954 Plymouth ①

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	48-61	
Light	13-18	9-13
Kickdown Limit		33-46

Late 1954 Plymouth ①

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	43-55	
Closed	13-18	9-13
Kickdown Limit		28-40

Early 1955 Plymouth 6 ②

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	39-54	9-16
Closed	12-15	9-11
Kickdown Limit		28-43

Late 1955 Plymouth 6 ③

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	41-46	9-16
Closed	12-15	9-11
Kickdown Limit		34-44

Early 1955 Plymouth 8 ②

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	50-67	9-17
Closed	13-16	9-11
Kickdown Limit		40-56

Late 1955 Plymouth 8 ③

Throttle Position	Upshift (MPH)	Downshift (MPH)
Wide Open	50-59	9-17
Closed	13-16	9-11
Kickdown Limit		40-56

①—*See 1954 Governor Production Change above.*
②—With early type 2-stage governor. See *Production Change* above.
③—With later type 3-stage governor. See *Production Change* above.

STALL TEST: Use an accurate tachometer to check the engine speed. With engine idling, move selector lever to "D" and note smoothness and speed of the shift. Set hand brake firmly and apply foot brakes to hold car, accelerate engine to wide-open throttle and check engine speed. Speed in excess of maximum RPM as indicated below may be caused by band slippage. See "Band Adjustment."

1954 Stall Performance ①

Car Model	②Engine RPM
Plymouth, Dodge 6, DeSoto 8	1275-1375
Dodge 8	1400-1500
Chrysler C-63-2 & C-64	1400-1500
Chrysler C-63-1	1450-1550
Chrysler 6	1200-1300
DeSoto 6	1150-1250

1955 Stall Performance ①

Car Model	②Engine RPM
Chrysler C-67	1380
Chrysler C-68, C-69, C-70, C-300	1540
DeSoto S-21	1585
DeSoto S-22	1490
Dodge 6 Cyl	1330
Dodge Royal	1450
Dodge Custom Royal	1465
Plymouth 6 Cyl	1330
Plymouth 157 HP V8	1395
Plymouth 167 HP V8	1435

①—Wide open throttle, selector lever in "D" range, at sea level
②—Plus or minus 50 RPM

►***CAUTION—When making stall test do not hold throttle wide-open for more than a few seconds. If engine speed excessive and is not corrected by band adjustment, make additional checks as listed below.***

If excessive engine speed not due to incorrect band adjustment, check for: incorrect Gearshift Linkage or Throttle Linkage Adjustment; leakage at Valve Body mating surfaces; defective Throttle Valve, Shuttle Valve, or Valve Body End Cover Plug; defective Kick-down Servo parts (piston, guide, band, lever, strut, etc.).

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HYDRAULIC PRESSURE TESTS & TROUBLE SHOOTING: *CAUTION—Pressure difference from 15 lbs. to 250 lbs., will be found in making following tests and correct pressure gauge must be used.*

C-3292 (100 P.S.I.) Gauge—Use for Throttle Pressure, Governor Pressure and Lubrication Pressure checks.

C-3293 (300 P.S.I.) Gauge—Use for Line Pressure check.

Line Pressure: Remove ⅛" pipe plug from line pressure take-off hole (front left side of transmission case), install C-3293 (300 P.S.I.) pressure gauge at this point. Check Reverse oil pressure first (brakes off), then apply brakes to hold car and check the other points. Run engine at speed indicated in table below, check line pressure for each selector lever position as indicated.

Line Pressure

Gearshift Position	Engine RPM.	Pressure (P.S.I.)
R	1600	225-275
N	800	85-95
D	800	85-95
L	800	85-95

If line pressure not correct, check for: Low oil level or clogged oil strainer; defective Regulator Valve and Spring, Manual Valve and Lever, Throttle Valve, Cam, and Spring; Oil Leakage at Valve Body or Regulator Body mating surfaces; defective Kickdown Piston and related parts; defective Reverse Piston and related parts; Worn Front Pump or defective pump drive sleeve or pinion.

Direct Clutch Pressure: *(NOTE—Check line pressure before checking direct clutch pressure as any deviation in line pressure will affect direct clutch pressure).* Remove ⅛" pipe plug from direct clutch pressure take-off hole located at bottom of kickdown servo boss on right side of transmission (directly above filler tube connection on side of transmission). Connect a 300 lb. pressure gauge at this point. With rear wheels raised and free to turn, accelerate engine slowly until an upshift occurs. During the upshift, the pressure should rise rapidly from 0 to 90 lbs. pressure in 1½-2 seconds. With an engine speed of not less than 650 RPM, and transmission upshifted, the direct clutch pressure should read within 10 lbs. of line pressure. ***If direct clutch pressure not correct,*** refer to "Shift Quality" and "Excessive Engine Speed on Upshifts" in "Trouble Shooting & Diagnosis" below.

Throttle Pressure: Remove ⅛" pipe plug from throttle pressure take-off hole (right center of transmission case between the servos), install C-3292 (100 P.S.I.) gauge at this point. Apply brakes to hold car, place selector lever in "D" position, run engine at speed indicated in table below and note throttle pressure at each speed.

Throttle Pressure

Throttle Opening	Engine RPM.	Pressure (P.S.I.)
Closed	Idle	13-15
Wide-open	Stall	80-90

►***CAUTION—When making above test do not hold throttle wide-open for more than a few seconds. If engine speed exceeds 1500 RPM. (indicating band slippage), refer to STALL TEST above for recommended checks.***

If throttle pressure not correct, check Line Pressure (above), and also check for: incorrect Throttle Linkage adjustment; leakage at Valve Body mating surfaces; defective Throttle Valve, Cam, and Spring; defective Throttle Pressure Check Ball or Kick-down Valve Ball and Rod; defective kickdown piston or related parts.

Governor Pressure: Remove ⅛" pipe plug from governor pressure take-off hole on lower left side of output shaft support (plate between transmission case and extension housing), install C-3292 (100 P.S.I.) gauge at this point. Support car securely with rear wheels off the floor so that they are free to turn, place selector lever in "D" position, run engine at car speed indicated (as noted on speedometer), note governor pressure in each speed range.

Governor Pressure

1954 Chrysler

Car Speed (MPH)	Pressure P.S.I.
14-17	15
24-27	45
58-65	60

1955 Chrysler C-67

Car Speed (MPH)	Pressure P.S.I.
13-15	15
23-32	45
51-61	60

1955 Chrysler (Except C-67)

Car Speed (MPH)	Pressure P.S.I.
14-16	15
25-34	45
55-65	60

1954 DeSoto S-20

Car Speed (MPH)	Pressure P.S.I.
12-14	15
22-26	45
46-53	60

1954 DeSoto S-19
1955 DeSoto S-21 & S-22

Car Speed (MPH)	Pressure P.S.I.
14-17	15
24-27	45
56-63	60

1954-55 Dodge

Car Speed (MPH)	Pressure P.S.I.
13-16	15
23-26	45
55-62	60

Early 1954 Plymouth①

Car Speed (MPH)	Pressure P.S.I
14-17	15
24-27	45
58-65	60

Late 1954 Plymouth②

Car Speed (MPH)	Pressure P.S.I.
12-14	15
19-23	45
41-48	60

①—With early type governor. See Production Changes above.
②—With later type governor. See Production Changes above.

1955 Plymouth 6

Car Speed (MPH)	Pressure P.S.I.
12-14	15
19-23	45
41-48	60

1955 Plymouth 8

Car Speed (MPH)	Pressure P.S.I.
13-16	15
23-26	45
55-62	60

If governor pressure not correct, check for: leakage at Valve Body mating surfaces or Output Shaft Support gaskets, defective Governor assembly, defective Rear Pump.

Lubrication Pressure: Check only when there is reason to suspect that it is incorrect. Connect gauge in oil cooler return line as follows: Disconnect cooler return line from flared tube connector fitting at upper left side of output shaft support (between transmission case and extension housing), install a ⅛" short pipe nipple and ⅛" pipe tee at this point, connect the flared tube connector fitting which was removed from the transmission into the tee, connect C-3292 (100 P.S.I.) gauge to the other side of the tee, connect oil cooler return line to the flared tube fitting *(CAUTION*—always place a flared tube nut in the flared tube fitting when screwing it in or out to prevent crushing the fitting). Run the engine at 800 RPM. with selector lever in "N" and note lubrication pressure which should be 10-20 P.S.I.

If lubrication pressure is not correct, **check for: leakage at Regulator Body mating surfaces or at Output Shaft Support gaskets; defective Converter Control Valve; defective Front Pump Drive Sleeve; defective Reaction Shaft seals or worn reaction shaft bore; defective Input Shaft seal rings; plugged lubrication holes.**

TROUBLE SHOOTING & DIAGNOSIS

EXCESSIVE SLIPPAGE:

All Ranges—Inspect oil level. Adjust gearshift linkage. Check oil pressure; if low, inspect regulator valve and torque converter control valve for sticking. Inspect valve body in transmission case mating surfaces for evidence of oil leakage.

Kickdown—Readjust throttle linkage and kickdown band. Inspect valve body to transmission case mating surfaces for evidence of oil leakage. Check operation of throttle valve and note wear of valve bore and cam. Check spring. Check valve body end cover for oil leakage. Check shuttle valve for free movement. Inspect kickdown piston and guide for binding. Inspect spring. Inspect band lining for wear and band lever for free movement.

Kickdown (Over 25 MPH)—Inspect valve body end cover for oil leakage. Inspect shuttle valve and plug for free movement. Inspect spring.

Direct—Inspect valve body to transmission case mating surfaces for evidence of oil pressure leakage. Check kickdown piston for binding. Check shaft seal rings and clutch retainer bushing for wear. Check clutch discs, piston and clutch check valve.

Reverse—Check reverse band adjustment. Inspect transmission case to valve body mating surfaces for evidence of oil pressure leakage. Inspect

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reverse servo assembly for wear or binding Inspect reverse lever and linkage for free movement

Hill Climbing—Insufficient oil will result in low pressures to kickdown servo or direct clutch if oil level is low

SHIFT PATTERN:

No Upshift—Check oil level and gearshift linkage adjustment Check governor and throttle pressure If there is no pressure rise when accelerating engine in direct drive, governor valve may be stuck closed Check valve body to transmission case for parallelism Check manual valve and lever for correct detent engagement Check shift valve for free operation and shift valve spring for breakage Check kickdown piston assembly Check rear pump drive pinion Drive pinion ball may be cracked or broken, permitting pinion gear to slip Inspect clutch ball check for proper operation Ball check valve must operate freely and seat properly

No Shift in "D" (Drive) Range and an Upshift In Low Range—The cause is the governor valve sticking open This can be verified by checking governor pressure (see "Governor Pressure Test" above) If governor pressure exceeds the pressures indicated in table governor valve is possibly stuck and in most cases can be corrected in the following manner Clean off area around governor pressure take-off plug and remove plug Cover oil filler tube with a cloth or plug and hold firmly to prevent air from forcing transmission oil out through filler tube Screw a piece of 1/8" pipe into hole to help direct air into unit Apply clean filtered air to pipe in short blasts, tapping parking brake drum at same time with a rubber hammer just enough to jar governor After applying air pressure, recheck governor pressure and see if valve has been freed up In cases where governor pressure is still to high, it will be necessary to remove transmission extension case for further inspection

Low Upshift Pattern—Readjust throttle linkage Check governor pressure Governor valve may be binding or sticking Inspect the rear pump assembly Check valve body to transmission case for parallelism Check operation of throttle valve and inspect cam and spring Check shift valve for free operation and spring for breakage

Low Upshift Pattern at Heavy Throttle—Inspect regulator valve, throttle valve, and governor for burrs or dirt which may cause binding or sticking Inspect the regulator spring

High Upshift Pattern—Readjust throttle linkage and check both throttle and governor pressures Adjust throttle pressure if necessary If throttle pressure does not rise according to speeds on chart (see "Throttle Pressure" above), throttle valve may be sticking Inspect for dirt or burrs Inspect throttle cam for wear Check valve body to transmission case for parallelism Check shift valve spring If governor pressure does not correspond to pressures indicated in "Governor Pressure" table above, remove governor and inspect valve for sticking Check rear pump gears for wear, broken teeth or excessive clearance Inspect pump drive pinion ball

All Upshifts Below 14 MPH—Inspect throttle valve, cam and spring Check throttle pressure check ball Check governor valve for sticking

Erratic Shifting—Check oil level Inspect valve body to transmission case for parallelism Check action of shift valve Inspect governor support gaskets for oil leakage

No Downshift—Check governor pressure High initial pressure indicates valve is stuck open Remove governor and inspect Inspect shift valve action, check spring

Low Downshift Speed—Governor valve is stuck open Remove and clean and check for burrs and dirt

High Downshift Speed—Readjust gearshift linkage Inspect valve body to transmission case for parallelism Inspect manual valve and lever Inspect kickdown valve and ball

No Kickdown—Adjust throttle linkage Inspect valve body to transmission case for parallelism Inspect throttle valve, cam and spring Also inspect kickdown valve and shift valve components

Low Kickdown Limit—Check governor pressure Governor valve may be sticking due to dirt Inspect regulator valve and spring for proper operation Inspect rear pump gears and drive pinion ball Check valve body cover plate for parallelism

SHIFT QUALITY:

Harsh Shift from Neutral to Reverse—Adjust engine idle speed Readjust rear band Inspect condition of the reverse band, strut and linkage Inspect the reverse servo piston, spring valve and rings

Harsh Shift from Neutral to Drive—Adjust engine idle speed Adjust throttle linkage Inspect kickdown servo pistons, springs, guide, rod and piston rings

Delayed Shift from Neutral to Drive—Adjust kickdown band Inspect condition of band, strut, lever and lever shaft

Excessive Engine Speed Increase on Upshifts—Check oil level and adjust throttle linkage Inspect regulator valve and spring and check operation of valve in regulator body Check valve body mating surface for parallelism Inspect throttle valve, cam and spring Check operation of valve in valve body Inspect kickdown piston components Check mating surfaces of regulator valve body and transmission for parallelism Inspect reaction shaft seal ring for deterioration Inspect input shaft oil seal rings for wear or breakage and condition of reaction shaft bore Inspect clutch retainer bronze bushing If worn below bronze surface, replace retainer Inspect condition of reaction shaft oil seal rings for wear or broken ends Inspect condition of clutch plate and condition of friction material on seal ring Check clutch check valve ball

Excessive Engine Speed Increase on Upshifts at Light Throttle—Check line pressure Inspect front oil pump gears for wear and excessive clearance

Harsh Upshift—Adjust throttle linkage Inspect regulator valve and spring Check for sticking shuttle valve Check valve body mating surfaces for parallelism Inspect throttle valve, cam and spring Inspect kickdown piston components Check regulator valve body mating surfaces for parallelism Inspect direct clutch spring, spring retainer, and snap ring

Harsh Lift Foot Shift—Adjust throttle linkage Check valve body mating surface Check operation of throttle valve Inspect valve, valve bore, cam and spring Inspect servo pressure bleed valve for dirt Check operation of shuttle valve Inspect shuttle valve, plug, inner and outer springs, and guide pin

Excessive Engine Speed Increase on Downshift at Part Throttle—Check oil level and adjust throttle and gearshift linkage Check valve body mating surface Check operation of manual valve and valve lever Inspect servo restrictor valve and operating plug Check plug for free operation Check valve spring for distortion or looseness

Harsh Downshift—Adjust engine idle speed and throttle linkage Inspect valve body mating surface Inspect throttle valve, cam and spring for proper operation Inspect for dirt, burrs or wear, or breakage Inspect servo restrictor valve for proper operation Inspect clutch plates and disc friction material Inspect the piston for wear or scoring Check seal for wear or deterioration which would result in leakage Inspect thrust washers for excessive wear

Excessive Increase in Engine Speed on Kickdown—Readjust kickdown band Check regulator valve and spring for proper operation Inspect for dirt wear, or breakage Check valve body mating surface for nicks, burrs and trueness, which would cause leakage Check operation of servo restrictor valve and shuttle valve Inspect valve and plug for dirt, burrs or wear Inspect all parts of kickdown piston assembly Inspect piston rings for excessive wear or broken ends Check governor valve for wear, dirt binding or sticking Inspect rear pump gears for excessive wear or broken teeth Check pump clearance, drive pinion gear and pinion ball

Harsh Kickdown—Adjust kickdown band Inspect regulator valve and spring Inspect for dirt, burrs or breakage Inspect servo pressure bleed valve for dirt Check operation of shuttle valve Check valve and plug for burrs, dirt or excessive wear Inspect all parts of kickdown piston assembly Inspect piston rings for scoring, wear or broken ends Inspect regulator valve body mating surface for nicks, burrs and trueness which would cause leakage Inspect reaction shaft neoprene seal for deterioration Inspect governor valve for free operation Check for dirt which would cause sticking Inspect rear pump gears for excessive clearance, worn or chipped teeth Inspect drive pinion gear and drive pinion ball Inspect the input shaft seal rings for excessive wear or broken ends, and reaction shaft bore for scoring Inspect all parts of the direct clutch assembly

OIL PRESSURE:

No Governor Pressure—Governor valve may be stuck in closed position due to dirt To free valve, apply a short spurt of high air pressure (90 lbs) to governor pressure take-off hole and at same time tap transmission extension housing with a rubber mallet Before applying air pressure, cover filler tube with a cloth In addition, drain two or three quarts of oil from transmission oil pan After air is applied, reinstall governor pressure take-off plug and run transmission in Reverse a few seconds Recheck governor pressure This corrective procedure may not be permanent If valve becomes stuck again, remove governor for servicing If pressures do not correspond to those indicated in "Governor Pressure" table above, the governor may need service However, before servicing governor, check the other points in the transmission that could

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cause low pressure as follows: Check the valve body mating surface for trueness, nicks or burrs. These could cause oil leakage. Check both output shaft support gaskets for evidence of internal leakage. Check operation of governor valve and inspect for foreign matter. Check the rear pump gears for broken teeth, wear, and excessive clearance. Check the mating surface of output shaft for trueness burrs or nicks.

High Initial Governor Pressure—High governor pressure at low engine speeds is due to the governor valve being stuck in the open position, usually caused by dirt *(see "No Governor Pressure" above)*, for clearing with air pressure.

Line Pressure—If line pressure does not correspond to pressures indicated in "Line Pressure" table above, it will be necessary to investigate and make the following adjustments or corrections: Check transmission oil level. Inspect regulator valve for free operation, dirt or burrs, and condition of valve spring. Check valve body mating surface for trueness, nicks or burrs. Check operation of manual valve and lever. Inspect front pump gears for worn or chipped gears. Check clearance between gears and face of housing.

Throttle Pressure—If throttle pressures do not correspond to pressures indicated in "Throttle Pressure" table above, check line pressure and make the following adjustments and corrections: Adjust throttle linkage. Inspect operation and condition of regulator valve and spring. Check valve body mating surfaces for nicks, burrs and trueness. Check operation and condition of throttle valve, cam and spring. Check throttle pressure check valve ball for nicks and dirt. Inspect condition of kickdown rod and ball.

Direct Clutch Pressure—Direct clutch pressure should be approximately 10 lbs. lower than line pressure with transmission upshifted and engine speed not lower than 650 RPM. If not, refer to "Excessive Engine Speed on Upshifts" above. A pressure drop between line pressure and direct clutch pressure as high as 25 lbs. may be due to broken or damaged seal rings in the direct clutch circuit. These are: three interlocking type input shaft seal rings; the direct clutch piston retainer seal ring, direct clutch piston neoprene seal ring, the neoprene reaction shaft seal ring, and the two interlocking type reaction shaft seal rings.

Lubrication Pressure—Lubrication pressure is checked at the upper left side of the output shaft support, Remove the ⅛" pipe plug and use 100 lbs., pressure gauge C-3292 to check pressure. Lubrication pressure should be 35 to 50 lbs. pressure with transmission in neutral and engine speed at fast idle. If pressure readings are incorrect, check line pressure and inspect torque converter control valve. Low pressures may be due to internal oil leakage at the following points: drive sleeve seal ring, regulator valve body mating surface, reaction shaft seal ring, output shaft support gaskets, input shaft seal rings, and reaction shaft bore. Low oil pressure may also be caused by plugged lubrication lines.

IMPROPER RESPONSE TO GEARSHIFT SELECTOR LEVER POSITIONS:

Moves Forward in "N" (Neutral)—Adjust gearshift linkage. Adjust kickdown band. Inspect manual valve lever assembly. Check valve body mating surface for nicks, burrs and trueness which would cause leakage. Check operation of manual valve. Inspect all parts of kickdown piston. Check regulator body mating surface for nicks, burrs and trueness. Check clutch discs and plates for warpage which would cause dragging. Inspect clutch ball check.

Car Moves Forward in "N" (Neutral) at High Engine Speed—Clutch check valve ball bleed hole may be plugged causing centrifugal oil pressure to partially engage the direct clutch. A slight surge which is not continuous is normal.

Car Moves Backward in "N" (Neutral)—Readjust gearshift linkage and inspect manual valve and valve lever for proper engagement. Adjust reverse band, levers, strut, and shaft. Check for binding, dirt, excessive wear.

MISCELLANEOUS DIAGNOSIS PROCEDURES:

Starter Will Not Energize—Adjust gearshift linkage. Test neutral starter switch. Inspect manual valve lever for proper engagement.

Hard Shifting Into "N" (Neutral)—Check operation of neutral starter switch and inspect manual valve lever.

Hard Shifting Into "R" (Reverse)—Check operation of backup light switch and manual valve lever.

Oil Foams From Filler Tube—Check fluid level in transmission. Inspect transmission breather vent.

PARTS REMOVAL & INSTALLATION (TRANSMISSION IN CAR)

►***NOTE: Transmission must be removed from vehicle for the removal and replacement of parts other than those listed below.***

Oil Pan: Remove oil pan filler tube, drain transmission and remove oil pan attaching screws and oil pan. When installing pan, tighten screws evenly and torque to 12-17 ft. lbs.

Governor Servicing: ***NOTE—It is necessary to remove transmission extension to remove governor assembly. See "Transmission Overhaul" below for Extension Housing Removal, Governor Removal, Overhaul & Installation.***

Valve Body & Transfer Plate Assembly (Removal): Remove oil pan and disconnect throttle and manual control lever linkage from levers. Loosen throttle and manual control lever assembly locking screws. Slide throttle valve operating lever assembly off shaft and remove throttle valve camshaft felt retainer and felt. Slide manual valve lever assembly off shaft and remove valve lever shaft seal cover. Remove the two oil strainer support screws and washers and take the strainer assembly off valve body and plate assembly. Remove transfer plate screws and lock washers and remove valve body and transfer plate assembly. For overhaul. *See "Valve Body Overhaul" below.*

Installation—Clean mating surfaces and check for burrs on both transmission case and valve body transfer plate. Place valve body and transfer plate assembly into position and install plate screws and lockwashers *(CAUTION—The two 1⅝" screws go through transfer plat cover on valve body. The three 1⅛" ar used in the other holes)*. Tighten evenly to 12-17 ft. lbs. torque. Make sure the two oil strainer tube seals are in position over oil strainer and place oil strainer assembly into position on transfer plate. *(CAUTION—Check to see that oil tubes on strainer properly enter valve body)*. Install the two oil strainer support screws and torque to 12-17 ft. lbs. Place manual lever shaft seal cover over manual valve lever shaft and slide into position on transmission case. Install manual lever (arm side of lever against cover) on manual valve lever shaft, and tighten locking screw. Place throttle valve camshaft felt and retainer over throttle valve shaft. Install throttle valve lever assembly on throttle camshaft and tighten locking screw. Check operation of control by shifting into all positions. Check kickdown operation and manual lever contact on neutral safety and back-up light switches. Install oil pan and adjust throttle linkage and gearshift linkage.

Manual Control Valve Lever Shaft Oil Seal Removal & Installation: Remove oil pan, valve body and transfer plate assembly. Using a suitable brass drift, drive seal out of transmission case from below. To install, use tool C-3277. Start seal squarely into bore and tighten tool C-3277 until it is flush with the case. This properly positions seal. Install valve body and plate assembly and oil pan.

Kickdown Piston (Removal): Remove oil pan, valve body and transfer plate assembly. Loosen kickdown band adjusting screw locknut and back adjusting screw out sufficiently to permit kickdown band strut to be removed by compressing band ends. With kickdown band lever hanging down, install tool C-3289 on transmission case. Apply sufficient pressure on kickdown rod guide to permit easy removal of the snap ring. Loosen compressing portion of tool and remove piston rod guide, piston spring and kickdown piston rod assembly (the kickdown piston cushion spring will fall out of piston when rod assembly is removed). Using snap ring pliers, inserted inside of kickdown piston, remove piston from transmission case. *See "Overhaul" below, for disassembly and inspection.*

Installation—Make sure the two interlocking seals are locked in position and all seals are coated with Lubriplate, then place kickdown piston into transmission case. With one hand apply pressure to piston and at the same time carefully compress bottom seal and push piston into case. *(CAUTION—*After bottom seal has entered, piston will seem to hang at two different locations while being pushed into case. This is due to seals entering cylinder, do not use extreme force. If any rings should be broken when piston assembly is being installed, transmission will not operate properly.) Slide piston spring over kickdown piston rod assembly then balance piston cushion spring on rod assembly (Lubriplate may be used to help hold cushion spring in position on rod assembly), and install in piston. Holding it in this position, install kickdown piston rod guide assembly on piston rod assembly. Using tool C-3289, and extreme care, compress the kickdown piston spring to the point that piston guide seal slightly binds on transmission case. Work seal into position and gradually compress spring until seal enters case and snap ring can be installed. Install kickdown piston rod guide snap ring, making sure it is properly seated. Loosen compression portion of tool and remove tool from transmission case.

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With one end of band fit over adjusting screw, compress the other end sufficiently to install the kickdown band strut between kickdown band and band lever *(CAUTION*—Make sure band strut slot engages with kickdown band strut pin in band end). Install valve body, plate assembly and oil pan. Adjust kickdown band.

Reverse Servo (Removal): Remove oil pan, valve body and transfer plate assembly. Loosen reverse servo adjusting screw locknut and back adjusting screw out sufficiently to permit reverse band strut to be removed by compressing band ends. Remove reverse servo piston sleeve. Mount tool C-3289 on transmission case and compress reverse piston spring retainer. Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring and loosen compressing part of tool (Spring retainer may require guiding out of transmission case). Remove spring retainer, spring, reverse servo piston and valve assembly from transmission case. Using C-3229 pliers, remove the reverse servo piston valve spring snap ring, and remove spring and valve from piston. *See "Overhaul" below, for disassembly and inspection.*

Installation—Place reverse servo piston valve and spring in reverse servo piston (shaft on valve protruding through hole in bottom of piston). Using snap ring pliers C-3229, install reverse servo piston valve spring snap ring, making sure it is properly seated. Coat reverse servo piston ring (neoprene) with Lubriplate. Insert reverse servo piston and valve assembly into transmission case in a cocked position, then by rotating piston, the ring will enter case without being damaged. Place reverse servo piston spring over piston and position spring retainer over spring. Using tool C-3289, compress spring sufficiently to install snap ring. Make sure retainer is correctly installed, and snap ring seated. Remove tool C-3289 from transmission case and install reverse servo piston sleeve. Make sure piston sleeve slides freely on piston by working it up and down. Hook one end of reverse band assembly in reverse link assembly, compress other end sufficiently to install reverse strut in slots of reverse band assembly and reverse band lever assembly. Adjust reverse band. Install valve body, transfer plate and oil pan.

Speedometer Pinion (Removal & Installation): Disconnect speedometer cable and housing from sleeve assembly on transmission, and remove speedometer pinion and sleeve. When installing sleeve and pinion assembly, torque it to 40-45 ft. lbs.

Neutral Safety and Back-Up Light Switch Removal & Installation Note: It is not necessary to drain transmission to remove these switches. A small amount of lubricant will drain from transmission when these switches are removed. When installing, tighten switches to 15-20 ft. lbs.

Transmission Output Shaft Rear Bearing Oil Seal (Removal): Disconnect the front universal joint and secure shaft to frame out of the way. Apply hand brake and remove propeller shaft flange nut and washers. Release hand brake and install puller C-452. Remove propeller shaft flange and drum assembly. Remove transmission support grease shield spring (small one). Remove brake support grease shield from extension housing *(CAUTION—If screwdriver or sharp instrument used to remove shield, do not damage the neoprene sealing surface at bottom of shield).* Install puller C-748 and remove rear bearing oil seal.

Installation—Install rear bearing oil seal with tool C-3205. Install brake support grease shield on extension housing *(CAUTION—Indent on grease shield must match groove in housing for correct positioning. Install grease shield far enough on housing to permit installation of spring).* Install brake support grease shield spring with opening in spring toward adjusting sleeve. Make sure spring is properly seated in groove. Make sure brake adjustment is backed off and install drum assembly (In some instances it may be necessary to use tool C-496 to press drum assembly on output shaft). Install propeller shaft flange washer, shakeproof washer and nut. Adjust hand brake. Apply hand brake and torque propeller shaft flange nut to 140-160 ft. lbs. Connect front universal joint.

Transmission Regulator Valve Assembly (Removal): Remove transmission regulator valve spring retainer, gasket, and spring. Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve.

Installation—Place valve in position in valve body. Install regulator valve spring, gasket, and retainer and tighten to 45-50 ft. lbs. torque.

Torque Converter Control Valve Assembly (Removal): Remove control valve spring retainer, gasket, and spring. Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve.

Installation—Reverse removal procedure.

Oil Cooler (Removal): Drain radiator, remove battery and battery pan. Remove lower radiator-to-cooler hose. Remove inlet and outlet oil tubes. Remove oil cooler to water pump flange bolts.

Installation—Clean mating flanges thoroughly and install new flange gasket. Install cooler to water pump and tighten flange bolts. Install inlet and outlet oil tubes. Install lower radiator-to-cooler water hose. Install battery and battery pan. Refill radiator and start engine. Check carefully for water and oil leaks.

TRANSMISSION REMOVAL

1) Disconnect battery and raise car off floor. Drain transmission and torque converter. When fluid has drained, replace drain plug. Disconnect oil pan filler tube from oil pan. Disconnect front universal joint and secure shaft to frame out of the way.

2) Remove adjusting screw cover plate and cable clamp bolt from hand brake support. Disconnect speedometer cable from transmission extension. Disengage ball end of cable from hand brake operating lever and remove cable from brake support.

3) Disconnect neutral safety and back-up light switch wires at switches and unclip wires from crossmember. Disconnect manual and throttle control linkage from levers. If car equipped with oil cooler, disconnect cooler lines from transmission case and remove bracket holding lines to cylinder block. On all models remove screws holding exhaust pipe bracket to transmission case.

4) Remove bracket holding oil cooler lines to cylinder block. Remove nuts and lockwashers holding engine rear support insulator to cross-member, leaving insulator attached to transmission.

5) Install engine support fixture tool C-3245, insert hooks of fixture firmly into holes in side of frame member with support ends up; against the underside of oil pan flange. Adjust fixture to support weight of engine. Raise engine slightly, remove cross-member to frame bolts and remove crossmember.

►*CAUTION—When using tool C-3245, do not lower engine more than three inches from floor boards to avoid disrupting the set position of water hoses and other engine attachments.*

6) Remove the two upper transmission-to-adapter screws and lockwashers and install guide studs C-3276. Remove the lower screws and slide transmission straight back to avoid damage to converter driving sleeve, then lower transmission to floor.

7) If front oil pump drive sleeve remained in the torque converter hub when transmission removed, remove the sleeve and inspect. Check driving lugs and machined surfaces for burrs and wear. Check ring for broken ends and freeness in ring groove.

TRANSMISSION INSTALLATION

1) Install guide studs C-3276 in the two upper transmission case-to-adapter screw holes. Lubricate front oil pump drive ring sleeve and bearing surface with Lubriplate and install in torque converter hub making sure drive lugs are properly engaged. Note position of driving lugs on front oil pump drive sleeve, then position front oil pump pinion in same way to aid in proper engagement when transmission installed.

2) Slide transmission over guide studs and into position. Make sure drive lugs on front oil pump drive sleeve properly engage front oil pump pinion. *(CAUTION—To avoid damage to front oil pump, do not attempt to use transmissoin-to-adapter screws to bring transmission and adapter together. If oil pump drive sleeve and input shaft have been properly aligned, the transmission should slide into position relatively easy. DO NOT FORCE.)*

3) Install the two lower transmission-to-adapter screws and lock washers, do not tighten. Remove guide studs and install the two upper transmission case-to-adapter screws and lock washers, then draw all four down evenly and tighten to 45-50 ft. lbs. torque.

4) Place cross-member into position and install crossmember-to-frame bolts, tightening them to 50-55 ft. lbs. torque. Lower engine and at same time align mounting holes in extension of transmission with holes in crossmember. Install the two nuts and lockwashers that hold engine rear support insulator to crossmember and tighten to 30-35 ft. lbs. torque. Remove support fixture from side of frame member.

5) From this point, reverse the removal procedure as indicated above. Refill transmission and adjust manual and throttle control linkage. *See "Manual & Throttle Control Linkage" above.*

TORQUE CONVERTER REMOVAL

1) With transmission removed, turn front wheels to extreme right and remove starter motor. Remove the transmission case adapter screws and lockwashers and remove transmission from car. Remove Remove lower half of flywheel housing.

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►*NOTE:* If torque converter being removed because of excessive runout damage, check by using dial indicator on hub and mark the highest point of runout on both converter and crankshaft flange. The reason for this is so it may be determined later if runout was caused by the converter or crankshaft, after crankshaft has been checked in the same manner.

2) Using tool C-811, remove the eight torque converter stud nuts and lockwashers from crankshaft flange. Remove torque converter from crankshaft.

►*NOTE*—Check crankshaft flange runout. Maximum is .002".

STARTER RING GEAR REPLACEMENT (REMOVAL): Support torque converter assembly in a vise and carefully remove staking lugs, retaining ring gear to torque converter, with a file *(CAUTION*—Be careful when supporting torque converter in vise to avoid distortion). Place torque converter on blocks of wood, and using a blunt chisel or drift, tap around ring gear until it comes off converter.

Installation of Ring Gear—Remove burrs or raised spots on torque converter with a file, being careful not to remove more metal than is necessary. Any of the following methods for expanding the ring gear can be used in the manner outlined.

Oven—Set temperature at 150° and allow ring gear to remain for 15 to 20 minutes.

Boiling Water—Place ring gear in shallow container, add water and heat for approximately two minutes.

Flame—Place ring gear on a flat surface. Using a medium size tip, direct a slow flame around inner rim of gear, being careful not to direct flame onto teeth of ring gear. Place a few drops of water on face of gear at short intervals during heating process. When gear is hot enough to boil the drops of water, installation of gear to torque converter can be made.

When gear properly expanded, proceed as follows: Place starter ring gear over flange surface of torque converter, making sure that rear face of gear contacts flange on torque converter evenly around the entire diameter. Reweld ring gear to torque converter, ***using extreme care to place as nearly as possible the same amount of metal in exactly the same locations as original assembly.*** This is necessary to maintain proper balance of the unit. Place weld alternately on opposite sides of the converter to mimimize distortion. Clean thoroughly before installing in car.

►*RING GEAR WELDING NOTE:* Use a welding current of 200 amps. and 5/32" Fleet-Weld No. 27, or General Electric No. W28 rod, or their equivalent.

►*WELDING CAUTION:* To prevent burning through the torque converter, the arc should be directed at the intersection of gear and housing from an angle of approximately 45° from the face of the gear. DO NOT GAS WELD.

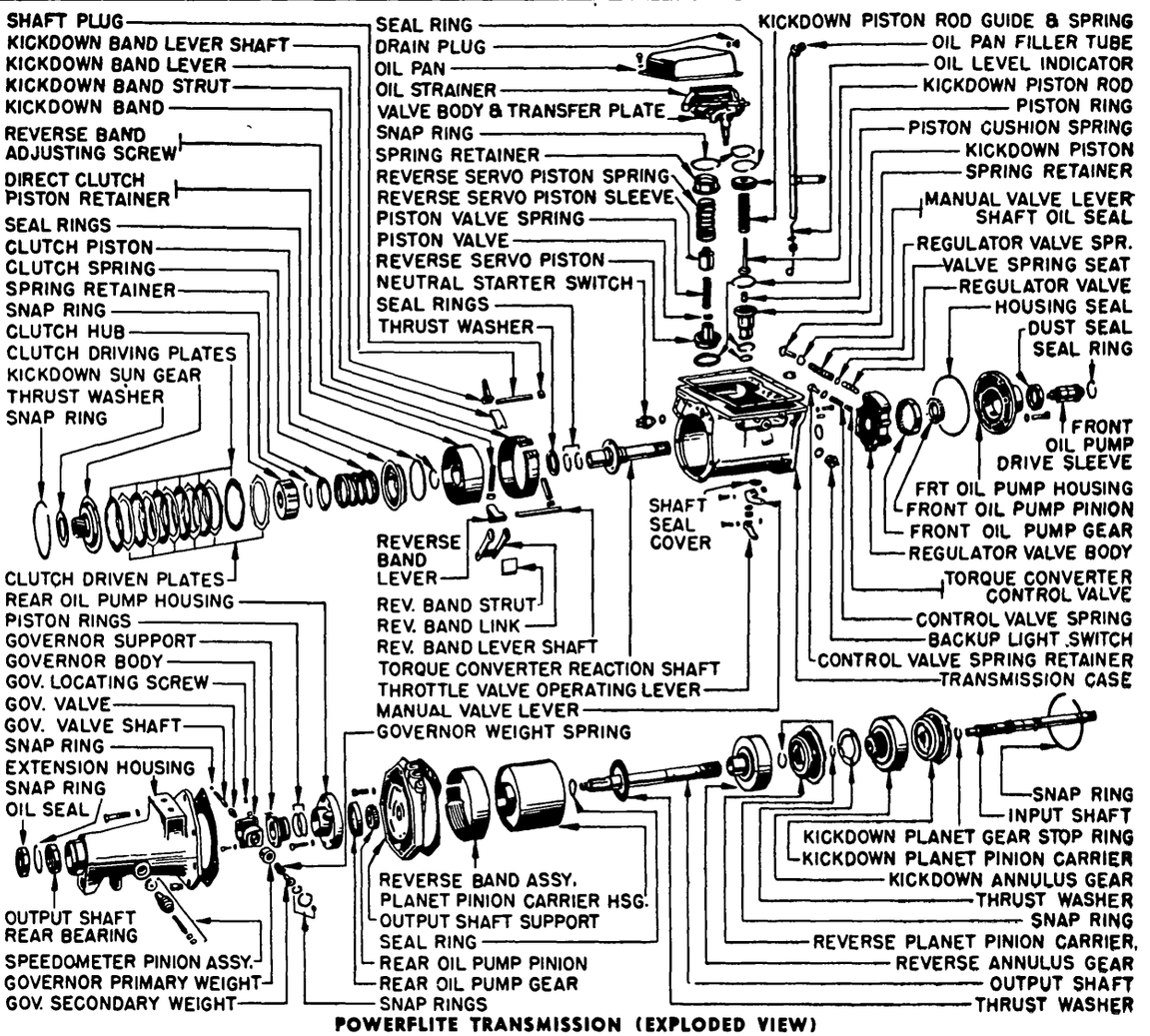
TORQUE CONVERTER INSTALLATION

►*TORQUE CONVERTER HUB RUNOUT NOTE:* When torque converter assembly is removed for any reason from crankshaft drive flange, the converter assembly runout should be checked when reinstalled. There are two methods for adjusting the hub runout. *See "Torque Converter Hub Runout Adjustment" below.*

1) Inspect mating surfaces of torque converter and crankshaft flange for burrs and dirt. Install torque converter on crankshaft flange. Install eight torque converter stud nuts and draw down evenly and tighten. Install lower half of flywheel housing and starter motor.

2) Install transmission case adapter on flywheel housing and tighten to 25-30 ft. lbs. torque. Install transmission (see above). Refill torque converter as follows:

3) Fill transmission with Automatic Transmission Fluid (Type A) to "full" mark on dipstick. This will take approximately 5 qts. Run engine at idle speed in neutral for approximately two minutes, then add 8 qts. of fluid to bring oil level to "full" mark on dipstick. Allow engine to run until normal operating temperature is reached. Set handbrake and shift selector lever through all ranges and return it to "N", recheck level and add fluid to bring level to "full" mark. *CAUTION—Fluid should NOT BE ABOVE THE FULL MARK.*



POWERFLITE TRANSMISSION (EXPLODED VIEW)

TORQUE CONVERTER RUN- UT ADJUSTMENT

►*NOTE—Two methods, as follows, can be used to adjust torque converter run-out.*

Heat Method: *(CAUTION—When using this method, extreme caution must be used to prevent burning the metal and causing irreparable damage. Sufficient heating of this unit, to cause the necessary drawing of metal required, is accomplished in just a few seconds. DO NOT OVERHEAT).* Remove transmission, torque converter housing and dust shield. Mount Torque Converter Hub Alignment Indicator C-430 on adapter plate. Rotate converter through 360° and mark high point on converter with chalk, then rotate converter to move the high point to the top. Apply heat 180°

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from the high point at opposite side of converter shell at **high point of radius**. Use a No. 3 acetylene torch burner, moving the flames at all times in a circular motion about the size of a dime. When the spot begins to change color remove the flame and quench the converter with a water soaked rag. Change rags several times (the more quickly converter is cooled, the greater the drawing on the metal). Before checking hub runout make certain that both sides of the converter are the same temperature. If runout exceeds .004" at the same point, repeat operation. *(CAUTION*—It is possible to draw the metal excessively, thus causing runout at opposite side. If this occurs, reheat converter 180° from original point).

Shim Method: Determine hub runout in the same manner as for "Heat Method" above. Loosen converter drive flange nuts sufficiently to insert shims of proper thickness 180° from indicated high point. The thickness of shims used should equal half the total indicator reading, shim thickness not exceeding .008". New shims are furnished in the following sizes. Part No. 1610442 (.002"), 1610443 (.003), No. 1610444 (.005").

TRANSMISSION OVERHAUL DISASSEMBLY

1) Place transmission assembly in stand C-3280 and turn upside down. Remove oil pan and gasket. Loosen throttle and manual control lever locking screws and slide levers off shafts. Remove throttle valve camshaft felt retainer and felt and manual valve lever shaft seal cover. Inspect these parts for wear.

2) Remove oil strainer support screws and remove oil strainer assembly. Inspect ring seals located at both outlet sides of strainer. Remove transfer plate screws and take off valve body and transfer plate assembly. *See "Valve Body & Transfer Plate Overhaul" below.*

►*CAUTION: Mating surfaces are machined and extreme care must be used to avoid damage to these parts.*

3) Remove neutral safety switch and back-up light switch and gaskets.

4) Check transmission end clearance with a dial indicator or feeler gauge by prying direct clutch assembly toward rear and measuring the distance between direct clutch and carrier housing. Pry direct clutch forward and again measure the distance between direct clutch and carrier housing. Clearance should be .043-.069". If not within limits, record the measurement for reference at reassembly.

Hand Brake Assembly: Using tool C-3281 to hold transmission to flange, remove transmission flange nut and washers. Attach puller C-452 and remove brake drum assembly. Inspect oil sealing surfaces, and lining surfaces on drum for scoring or wear. Remove transmission brake support grease shield spring (NOTE—this spring acts as a guide for the brake shoes and retains the brake support grease shield to transmission extension housing). Place a rubber band around brake shoes to hold them in position and remove brake shoe return spring. Remove brake anchor shoe washer and brake shoe guide. Remove both brake shoe assemblies, adjusting sleeve, nut, screw and brake shoe operating lever link. Remove brake support grease shield from extension housing. *(CAUTION*—If a screwdriver or sharp instrument is used to remove the shield, care must be taken not to damage neoprene sealing surface at bottom of shield). Slide brake support assembly from rear extension housing and anchor. Inspect neoprene spacer for deterioration and note the steel sleeve used between spacer and extension housing.

Transmission Extension: Remove speedometer drive pinion. *(CAUTION—Nylon gear can be damaged if extension housing is removed without first removing the speedometer drive pinion).* Using puller C-748, remove the output shaft rear bearing oil seal and remove any burrs from counterbore of extension housing. Remove the transmission-to-extension screws and lockwashers. Install guide studs C-3283 and attach puller C-3282. Pull extension housing from output shaft support assembly and remove extension gasket. *(CAUTION*—Use care when removing extension housing to prevent damage to governor housing). Inspect extension housing for cracks in casting and remove burrs from gasket surface. Clean output shaft rear bearing and dry with compressed air. Check bearing for rough spots but do not remove from housing unless it is found to be defective. Using a pair of long nose pliers, remove output shaft rear bearing snap ring. Using driver C-3275, drive output shaft rear bearing out rear of extension housing. Remove vent from top of extension housing and make sure it is clear of foreign matter and is open.

Governor: Using a sharp instrument, remove either of the governor valve snap rings. Remove governor valve shaft and valve from governor body. With snap ring-pliers, remove governor weight assembly snap ring (large), and remove governor weight assembly from governor body. Using C-3229 pliers, remove governor secondary weight snap ring. *(CAUTION*—Keep thumb pressure against secondary weight when removing snap ring as it is spring loaded). Remove secondary weight and spring. Inspect all parts for burrs or wear. Check secondary weight for free movement in primary weight by placing secondary weight in primary weight without spring. Primary weight should fall freely when both parts are clean and dry. Check spring for distortion. Remove governor locating screw from governor body and output shaft *(make sure that screwdriver used fits slot in screw perfectly to avoid damage to governor body).* Slide governor body and support from output shaft. Remove the two governor support piston rings and inspect closely. *(CAUTION*—Governor support has pressed in steel sleeve which routes oil through the support. Make sure these passages are open. Do not attempt to replace sleeve if damaged, replace support). Clean passages with air and inspect valve and governor body for slight scores. Remove the four governor body-to-support screws and lockwashers and separate body from support.

Rear Oil Pump: Remove oil pump housing-to-output shaft support screws and lockwashers and remove housing and oil pump gear. Use prussian blue to mark front side of gear in housing *(DO NOT USE A SCRIBE).* Inspect machined surfaces for nicks and burrs, oil pump gear and housing for being scored or pitted, and pump housing plug for leaks. Remove rear oil pump pinion from output shaft and mark front side with prussian blue *(CAUTION*—Oil pump pinion keyed to shaft by a small ball. Use care when removing pinion not to lose ball). Check pinion keyway and ball pocket for pitting or scoring. Using tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. Clearance limits are from .001-.003".

Center Assembly (Output Shaft Support, Planet Pinion Carriers, and Direct Clutch Assemblies): Remove output shaft support-to-transmission case screw and washer. With one hand, work output shaft up and down, and at the same time apply pressure with the other hand to the input shaft. Slide output shaft rear support assembly, planet gear housing assembly and gasket from rear of transmission case. If rear support is stuck to transmission case and cannot be removed as just described, then proceed as follows: Install one of the oil pan screws into transmission case and with the aid of a pry bar, pry against support sufficiently to separate support from case. Remove direct clutch piston retainer assembly from torque converter reaction shaft. Remove direct clutch piston retainer thrust washer from torque converter reaction shaft. This washer is a select fit and controls end clearance between direct clutch assembly and carrier housing. Inspect washer for cracks, burrs and wear.

►*1955 INPUT SHAFT PRODUCTION CHANGE: Seal rings not used in late production. See Production Change above.*

Planet Pinion Carrier Removal from Housing Assembly: Place unit in an upright position in tool C-3285. Using a feeler gauge, check clearance between kickdown planet pinion carrier housing snap ring and kickdown planet pinion carrier assembly. This clearance should be .012-.038". If within these limits, then identify each thrust washer as it is removed. Using a screwdriver, remove transmission kickdown planet pinion carrier housing snap ring. Identify snap ring to aid in assembly (ring is not a selective fit). Proceed as follows:

1) Remove input shaft, kickdown planet pinion carrier assembly and kickdown annulus gear from carrier housing. Remove reverse planet pinion carrier thrust washer and inspect for cracks, burrs and wear. Remove kickdown annulus gear snap ring. Remove kickdown annulus gear from input shaft and inspect for worn, cracked or broken teeth.

2) Remove kickdown planet pinion carrier assembly from input shaft and carefully inspect stop ring on end of shaft which controls position of annulus gear on input shaft. Check all oil passages in both gear and shaft for obstructions. Inspect splines and bearing surfaces for burrs and wear. On early cars, inspect the three seal rings on input shaft for broken ends and make sure they are free to rotate in grooves.

3) Inspect planet pinion carrier for scores on thrust surfaces, broken and worn teeth. Using a feeler gauge, check end clearance on individual planet gears, clearance should be .006-.017". Inspect pinion shafts for tight fit in carrier and make sure pinions are free to rotate on shafts. Check oil holes in gears and shafts for obstructions. Inspect oil holes in the thrust washer of the kickdown carrier to make certain they are open *(NOTE—Do not replace planet pinion carrier assembly unless the above inspection indicates that it is necessary. This assembly is serviced only as a complete unit).*

4) Remove reverse planet pinion carrier assembly from planet pinion carrier housing. Inspect in the same manner as for planet pinion carrier (3 above).

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Remove output shaft and reverse annulus gear assembly from carrier housing and output shaft support. Remove reverse annulus gear snap ring and remove annulus gear from shaft. Inspect thrust surfaces, journals and inner bushings for scores. Check annulus gear for worn or broken teeth. Inspect ring grooves for burrs and ring for broken ends. Inspect splines on both shaft and gear for burrs and wear. Check speedometer pinion gear and gear output shaft, and shaft bushing for burrs, wear and scoring.

5) Remove planet pinion carrier housing thrust washer and check for cracks or wear. Remove planet pinion carrier housing from output shaft support and inspect driving lug slots inside of housing for wear. Inspect bearing and thrust surfaces for scores and burrs. Closely inspect band contacting surface for burned spots and scoring, especially if lining has worn excessively. Inspect all oil passages in output shaft and support for obstructions. Check rear oil pump mating surface for burrs and scores, and check for stripped threads in support.

Direct Clutch Piston Retainer: 1) Using a screwdriver remove kickdown sun gear snap ring. Identify this ring so it can be returned to the same position (selective fit). Lift out sun gear assembly. Check for clutch material obstructing oil passages and slinger and remove any metal pickup which might have accumulated on front side. Inspect for cracked or broken teeth.

2) Lift out direct clutch hub from center of direct clutch piston retainer. Inspect driving lugs for wear and remove any metal pickup accumulated on either side of hub. Invert the direct clutch piston retainer and remove clutch plates (steel) and driving disc assemblies (five or six of each used, depending on car model), noting position in which these parts were assembled. *(CAUTION*—If assembly was started with cork portion on outer top, the same sequence will follow all through the assembly and when unit is reassembled the same sequence should be followed to assure smooth operation). Inspect driving discs for evidence of wear, burning, glazing, and flaking off of facing material. Check discs by scratching with finger nail and if material collects under nail, replace discs. Inspect splines in discs, replacing any that are damaged. Inspect steel plates for burning, scoring, or damaged splines.

3) Using tool C-3302, compress direct clutch spring sufficiently to unseat clutch spring retainer snap ring. Release tool C-3302, and remove direct clutch spring retainer snap ring, spring retainer and spring from direct clutch piston retainer. Using a twisting motion remove direct clutch piston assembly from clutch retainer. Air pressure may be used to blow piston out if it is tight.

4) Inspect ball check in clutch retainer housing to make sure it is free. The bearing used in direct clutch piston retainer is a steel back bronze type and is **not replaceable.** If torque converter reaction shaft seal rings have worn or grooved the bearing so that bronze is no longer visible at that point replace the direct clutch piston retainer. Inspect band contacting surfaces for deep scores and burns, especially if band lining is worn to point where steel band has been contacting direct clutch piston retainer.*(CAUTION—Do not turn clutch piston retainer in lathe to remove score marks).* Inspect steel clutch plate contacting surfaces for deep scores, replace as needed. Make sure clutch driving lugs will slide freely into retainer. Inspect inside bore for score marks, and if light, remove with crocus cloth, if heavy, replace piston.

5) With tool C-3286, unlock direct clutch piston retainer seal ring and remove from retainer. Inspect for wear and broken ends. Remove direct clutch piston seal ring (neoprene) from piston. Inspect for deterioration and hardness.

Reverse & Kickdown Band Assemblies: Mark reverse band for installation purposes, then compress ends of band sufficiently to remove reverse band strut. Unhook reverse band assembly from link assembly and remove by rotating band ends through rear opening in transmission case. Repeat with kickdown band, noting that strut is grooved to act as a guide to strut pin on band end. Remove from case in same manner as for reverse band. Inspect linings for wear and bonding to metal band. If lining is worn to point where grooves are no longer visible, replace band. *(CAUTION—Do not attempt to reline bands.)* Check bands for distortion and cracked ends.

Reverse & Kickdown Band Lever Assemblies: *(CAUTION—Inspect these link assemblies and levers for cracks or wear, making sure they have side clearance and are free to turn on shafts. Do not remove these assemblies unless inspection reveals that it is necessary).* If necessary to remove, proceed as follows: Insert finger in back of reverse band and link assembly lever shaft, and holding the reverse band lever and link assembly with the other hand, push shaft out rear opening in transmission case. Remove kickdown band lever shaft plug in front of transmission case and remove kickdown band lever in same manner as for reverse band, except that shaft is removed from front of transmission case.

Front Oil Pump: 1) Remove transmission regulator valve spring retainer, spring, gasket and valve. Remove torque converter control valve spring retainer, spring, gasket and valve.

2) Remove front oil pump-to-transmission case screws and washers (discard aluminum or copper sealing washers, new ones must be used at reassembly). Remove housing by tapping gently with a fibre hammer (if front pump housing has two threaded holes, attach puller C-3287 and guide studs C-3288 and pull housing and gears from transmission case). Use prussian blue to mark front side of gears *(CAUTION—Do not scribe gears for identification).*

3) Remove front oil pump housing seal (large neoprene) from housing, and inspect for deterioration and hardness. Using a brass drift, drive housing dust seal out front of housing. Inspect housing bushing for scores. Remove light scores with crocus cloth and if bushing scored heavily, replace housing (bushing is not replaceable). Check housing and gears for scores.

4) Using tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. Clearance limits are from .0012-.0022". Make sure all oil passages are clear by blowing out with compressed air.

Regulator Valv Body: Using the two holes provided in regulator valve body, attach puller C-3287, and install guide pins C-3288. Pull regulator body off torque converter reaction shaft. Place body and both valves in pan containing clean solvent, wash thoroughly and dry with compressed air. Check valves for free movement in body, these valves should fall in and out of bores when both valves and body are dry. *(CAUTION*—If crocus cloth is used to polish valves, care must be taken not to round off the sharp edges of valve.) Check for all passages for obstructions and all mating surfaces for burrs or distortion. If body has a slight nick or raised portion on a mating surface, it can be removed with a surface plate and crocus cloth. Check regulator valve spring seat (snap ring) for proper seating. Wrap valves and body in separate cloths until ready for installation.

Reverse Servo Piston: Lift out reverse servo piston sleeve. Inspect inside bore, lever, and contacting surface on piston sleeve for scores and wear. Make sure the two bleeder holes are open. Install tool C-3289 on transmission case and compress reverse piston spring retainer. Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring, and loosen compressing portion of tool. Remove spring retainer, spring, servo piston and valve assembly. Remove servo piston ring (lip type neoprene) from piston and inspect for distortion and hardness. Remove reverse servo piston valve snap ring. Remove spring and valve from piston. Inspect servo bore for scores and remove light scores with crocus cloth.

Kickdown Piston: Using tool C-3289, apply sufficient pressure on kickdown piston rod guide and remove the snap ring. Loosen compressing portion of tool and remove tool from transmission case. Remove piston rod guide, piston spring, kickdown piston rod assembly, and kickdown piston cushion spring. Inspect riveting of kickdown piston rod to kickdown piston spring retainer. Remove seal ring from guide and inspect for light scores and wear on piston rod and guide. Using C-484 pliers, remove kickdown from transmission case. Remove the three snap rings (two locking and one open type) from kickdown piston. Inspect rings for scores or broken ends, and piston for wear.

Torque Converter Reaction Shaft: *(CAUTION—Inspect shaft seal rings (interlocking type) for broken ends and make sure they are free to rotate in grooves. Inspect inside of shaft for burrs, and splines for burrs and wear. Check thrust surfaces for wear and slight scores. Do not remove reaction shaft from case unless inspection reveals that it is necessary).* If shaft must be removed, proceed as follows: Remove shaft seal (neoprene). Using a suitable brass drift, remove shaft dowel pin from shaft flange and transmission case. Remove transmission case-to-reaction shaft screws and using tool C-3297, press shaft out of transmission case. Remove the two shaft seals (interlocking).

Manual Control Valve Lever Shaft Oil Seal: Drive seal out of case with a suitable drift.

Kickdown Band Adjusting Scr w: Loosen locking nut and remove kickdown band adjusting screw and locknut. *CAUTION—When locknut is loosened, the adjusting screw must be finger free. If not, inspect screw and nut for pulled threads or foreign material on threads. Freeness of this screw is very important to adjustment.*

Transmission Case Inspection: Inspect case for cracks, sand holes and stripped threads. Check for burrs on mating surfaces. Blow compressed air

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POWERFLITE (C nt.)

through all passages to make sure they are open. Check oil hole plugs for tightness.

REASSEMBLY

Kickdown Band Adjusting Screw: Install adjusting screw in transmission case until there is approximately 1" of screw left outside case. Do not lock screw into position at this time.

Manual Control Valv Lever: Using tool C-3277, start seal squarely and tighten until seal is flush with case.

Torque Converter Reaction Shaft: ***(NOTE—Reaction shaft should only be removed if inspection indicates that it is faulty).*** Heat front face of transmission case to 170-190°, using sun lamps for the purpose.

1) Coat the two shaft interlocking seal rings with Lubriplate and install on shaft and lock in place. Make sure the rings are free to rotate in lands. Coat the portion of shaft that presses into case with Lubriplate and position shaft into front of transmission so holes in shaft line up with screw holes in case.

2) Place a 5/16" (.308-.311" outside diameter in unthreaded section), 2¼" long bolt through dowel guide pin holes in case and reaction shaft to act as guide, install nut. Using tool C-3297 press shaft into place. Do not remove 5/16" bolt at this time. Start the three transmission case-to-reaction shaft screws and washers and tighten slightly, but do not torque.

3) Remove 5/16" bolt from dowel hole and install the reaction shaft dowel from inside case. Torque the case-to-reaction shaft screws to 10-15 ft. lbs. Coat neoprene reaction shaft seal and install on shaft.

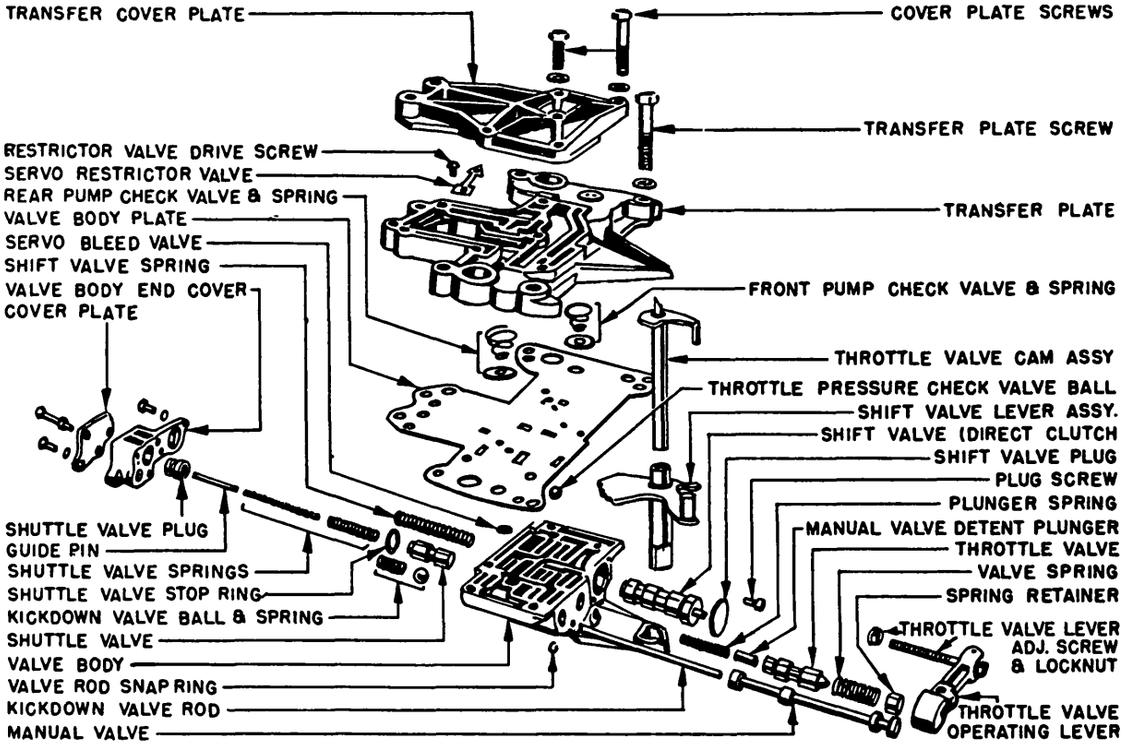
Kickdown Piston: 1) Coat the three kickdown piston rings (two locking and one open type) with Lubriplate and install on piston. Lock into position and make sure they are free to rotate in lands. Place kickdown piston assembly into transmission case, compress bottom ring with a brass rod (flatten end), and push piston into place.

►***CAUTION: After bottom ring has entered, piston will seem to hang at two different locations while being pushed into case. This is due to rings entering cylinder. If any of the rings should be broken when piston assembly is being installed, transmission will not operate properly.***

2) Place cushion spring in piston and install tool C3289 on transmission case. Place piston rod assembly in piston and slide piston spring over piston rod assembly. Coat piston rod guide seal ring with Lubriplate and install on rod guide. Make sure ring rotates in groove.

3) Place piston rod guide assembly on piston rod assembly and using extreme care, compress the kickdown piston spring to the point where piston guide seal ring slightly binds on case. Using a piece of brass rod (flattened on end), work seal into position, gradually compressing spring until seal ring enters case and snap ring can be installed. Install snap ring, making sure it is properly seated.

R verse Servo Piston: 1) Place reverse servo piston valve and spring in reverse servo piston, with shaft protruding through hole in bottom of piston. Using pliers C-3229, install reverse servo piston valve spring snap ring and make sure it is seated.



EARLY 1954 POWERFLITE VALVE BODY & TRANSFER PLATE ASSEMBLY

2) Coat servo piston ring with Lubriplate and install on piston. Insert piston and valve assembly into transmission case in a cocked position, then by rotating piston, the piston ring will enter case without damage.

3) Place servo piston spring over piston and position spring retainer over spring. Compress spring with tool C-3289 sufficiently to install snap ring, making sure it is seated. Inspect interior of servo sleeve for burrs, then place sleeve over piston, making sure sleeve slides freely on piston by working it up and down. Remove installing tool from transmission.

Regulator Valve Body: 1) Inspect regulator valve body and valves to make sure that no damage has occurred since disassembly and blow out passages with air.

2) Coat reaction shaft seal (neoprene) with Lubriplate if not already done, and place regulator valve and torque converter control valve in regulator valve body. Install guide studs C-3288 in front transmission case.

3) Place regulator valve body assembly, with oil passages to rear, over reaction shaft and onto guide studs ***(CAUTION—When reaction shaft seal enters regulator body use care to prevent shaft screws damaging passages on regulator body)***, seat firmly to front of transmission case.

Front Oil Pump: 1) Position front oil pump housing dust seal in oil pump housing with metal portion of seal down. Using driver C-3278, bottom seal in housing. Coat housing seal (large neoprene seal) with Lubriplate and install on housing.

2) Place front oil pump gear and pinion (driving lugs on pinion facing up, and prussian blue marks made at time of disassembly toward front) in pump housing. ***(CAUTION—Oil pump pinion must be installed correctly or damage will result when installed in transmission.)*** Lubricate pump gears with transmission fluid.

3) Place pump housing assembly over reaction shaft and slide into position over guide studs until pump housing seal is flush with transmission case. Using new aluminum or copper washers on screws, start five of the screws and **draw housing down evenly** until it is seated into transmission case. Remove guide studs and install two remaining screws and washers. Torque all screws to 12-17 ft. lbs. ***NOTE—After all screws have been installed and torqued, engage driving lugs of oil pump pinion to determine if pinion turns freely. Use the oil pump drive sleeve for this check. If not free, remove pump and check for foreign matter between gears and housing.***

4) Using a new gasket, install torque converter control valve spring and retainer. Torque to 35-40 ft. lbs. Install regulator valve spring and retainer, using a new gasket, and torque to 45-50 ft. lbs.

Reverse Band, Kickdown Band & Lever Assemblies: ***NOTE—If lever assemblies were not removed, omit the operations covering their installation.***

1) Place kickdown band lever assembly in trans-

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mission case and slide band lever shaft into position from front of case, making sure it operates freely. Install band lever shaft plug and torque to 30-35 ft. lbs. Place kickdown band assembly into transmission case by rotating ends of band through opening in case. Fit proper end of band over adjusting screw and compress band sufficently to install band strut between other band end and band lever. ***CAUTION—Make sure band strut slot engages with kickdown band strut pin in band end.***

2) Place reverse band lever assembly in reverse band link assembly and position into transmission case, aligning holes in lever and link assemblies to holes in transmission case. Slide band lever shaft into position from rear of transmission case. Shaft is held in position by rear output shaft support.

3) ***(NOTE—If new reverse band is to be installed, back adjusting screw out until approximately 1" of screw is above lever on locknut side.)*** Place reverse band assembly into transmission case by rotating ends of band through rear opening in case. Hook correct end of band (previously identified when band removed) in link assembly. Compress band sufficiently to install band strut in slots of reverse band and band lever assembly.

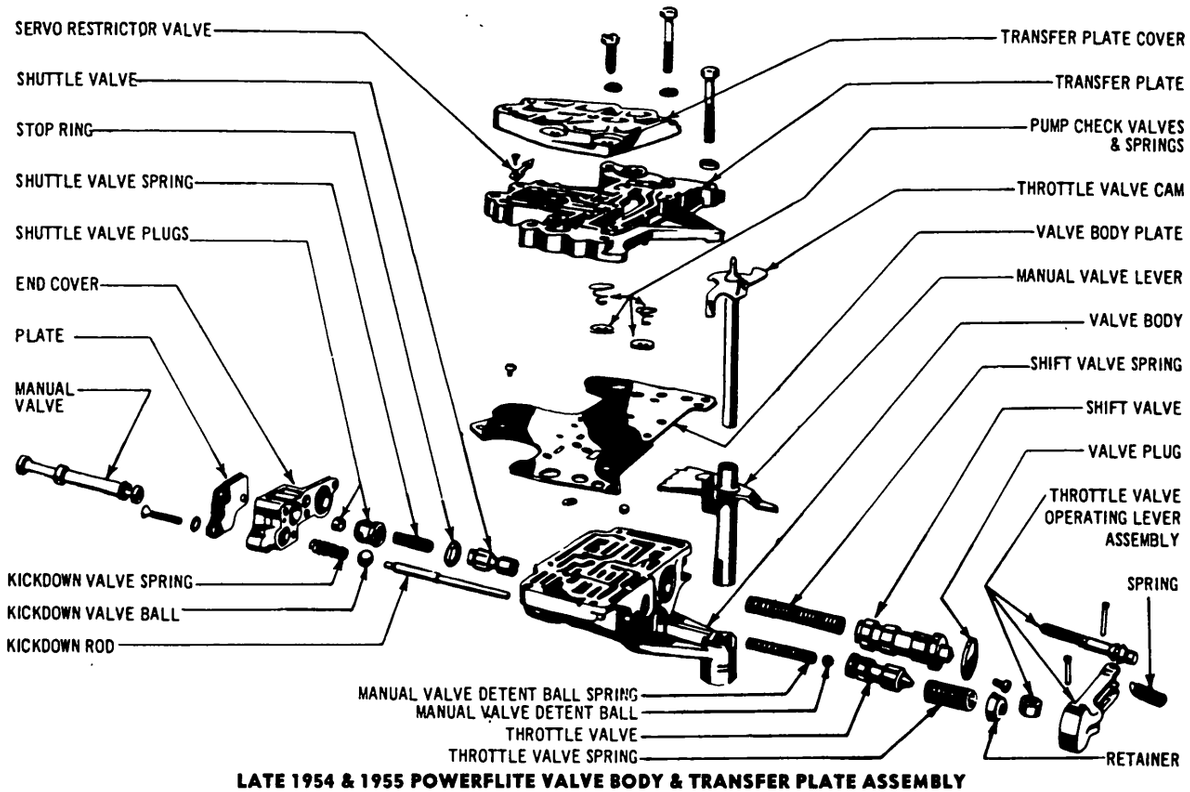
Direct Clutch Piston Retainer: 1) Coat direct clutch seal ring with Lubriplate and install on piston, with lip of ring facing away from the flange. Coat clutch piston retainer seal ring with Lubriplate and install on retainer hub. Using tool C-3286, lock seal into position and make sure it is free to rotate in lands. Place piston assembly in clutch retainer, and with a twisting motion, seat piston in bottom of retainer, being careful not to damage lip of seal.

2) Seat clutch spring into piston retainer and position spring retainer and snap ring on spring. Using tool C-3302, compress clutch spring sufficiently to seat the snap ring. *NOTE*—Piston spring retainer may require guiding past the snap ring grooves. Make sure snap ring properly seated.

3) Place clutch hub in center of clutch piston retainer. Lubricate all clutch plates and driving discs with automatic transmission fluid and assemble by placing one of the clutch plates in clutch piston retainer, followed by a driving disc. ***(NOTE—Install discs in the same manner they were removed. If first driving disc was installed with cork portion on outer top, then the remaining discs must be installed in the same manner, or vice versa. Repeat this procedure until all six discs and plates have been installed.)***

4) Place kickdown sun gear assembly in direct clutch piston retainer and install snap ring (this ring is a selective fit and must be checked as follows): Using a feeler gauge, check clearance under kickdown sun gear snap ring. Clearance limits should be as close to zero as possible. Rings are furnished in three sizes for selective fitting. Part No. 1327729 (.059-.061"), No. 1327730 (.062-.064"), No. 1327731 (.065-.067").

Planet Pinion Carriers: 1) Place output shaft support in tool C-3285 with bearing surface up. Lubricate bearing surface of planet pinion housing and place bearing surface of housing over output shaft support bearing surface. Place reverse annulus gear on output shaft and install snap ring. (Output shaft may be placed in vise, providing vise is clean and equipped with brass jaws). ***(CAUTION—Reverse annulus gear must be tight fit on shaft. End clearance is controlled by various snap rings which are furnished in the following three thicknesses: Part No. 1329608 (.078-.080"), No. 1329609 (.082-.084"), No. 1329610 (.086-.088"). Make sure that snap ring is properly seated.)***



LATE 1954 & 1955 POWERFLITE VALVE BODY & TRANSFER PLATE ASSEMBLY

2) Coat output shaft seal ring with Lubriplate and install on shaft. Lock into position and make sure ring rotates freely in groove. Coat planet pinion carrier housing thrust washer with Lubriplate, slide over output shaft and into position in reverse annular gear. Place output shaft and reverse annulus gear in position in carrier housing and through output shaft support, being careful not to damage shaft seal ring as it enters shaft support. ***Check to see that planet pinion carrier thrust washer seats properly between annular gear and carrier housing.***

3) Lubricate thrust surfaces and gear teeth of reverse planet pinion gear and carrier assembly, and place carrier assembly in reverse annulus gear. ***(CAUTION—Make sure driving lugs on carrier assembly properly engage slots in planet pinion housing.)***

4) On early cars, coat input shaft seal rings with Lubriplate and lock into position, making sure rings rotate freely in lands. (Later cars have a large bearing area (bushing) on shaft replacing the three seal rings. ***See "Input Shaft Production Change" above for installation of later type shaft in early cars). (CAUTION—Inspect stop ring for proper position in input shaft groove).*** Lubricate thrust surfaces and gear teeth on kickdown planet pinion gear and carrier assembly. Slide assembly with collector ring up, carefully down on rear end of input shaft and over stop ring. Lubricate teeth and thrust surfaces and install kickdown annular gear onto input shaft, down to stop ring. Install kickdown annulus gear snap ring and make sure it is seated (Input shaft can be installed in vise providing it is clean and equipped with brass jaws).

5) Engage teeth of kickdown planet pinion gears with teeth on kickdown annulus gear. Slide pinion gear and carrier assembly into position in kickdown annulus gear. Coat reverse planet pinion carrier thrust washer with Lubriplate and install on kickdown annulus.

6) Place kickdown planet pinion carrier assembly, annulus gear and input shaft into position in planet carrier housing. Make sure planet pinion carrier thrust washer remains on annulus, and driving lugs on carrier assembly properly engage slots in planet pinion housing. Install planet pinion housing snap ring (not selective fit), making sure it is positioned and seated properly. Lubricate gears and splines.

7) Using a feeler gauge, check clearance between kickdown planet pinion carrier housing snap ring and the kickdown planet pinion carrier assembly. Limits are .012-.038". If not within these limits disassemble and recheck reverse planet pinion carrier and planet pinion carrier housing thrust washers.

Center Assembly (Output Shaft Support, Planet Pinion Carriers, and Direct Clutch Assemblies): 1) Coat kickdown planet pinion thrust washer with

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Lubriplate, place over kickdown sun gear and on to thrust surface of direct clutch piston retainer assembly. Place direct clutch piston retainer assembly over input shaft, engaging sun gear with kickdown planet pinion gears and engaging splines of input shaft with direct clutch hub. Make sure kickdown planet pinion carrier thrust washer remains in position.

►*DIRECT CLUTCH PISTON RETAINER THRUST WASHER CAUTION:* This thrust washer controls transmission endplay clearance and is a selective fit. After transmission is reassembled, except for hand brake assembly, the endplay clearance must be checked and corrections made in the washer thickness as necessary. *See "Checking Transmission Endplay" below.*

2) Coat direct clutch piston retainer thrust washer with Lubriplate and install on torque converter reaction shaft inside transmission case. Use care when sliding washer over rings to prevent damage.

3) Install guide studs C-3283 in rear of transmission case, position new output shaft support gasket over guide studs and on to case. Place tool C-3306 over splines on front of input shaft.

4) Insert input shaft, with direct clutch assembly, planet pinion carrier housing, output shaft support and output shaft attached, through rear of transmission case and through transmission reaction shaft. Then guide assembly through bands and over guide studs into position in transmission case. Remove tool C-3306 from front of input shaft.

►*CAUTION: Do not force assembly into case. Avoid damage to seal rings on torque converter reaction shaft.*

5) Install one output shaft support-to-transmission case screw and lockwasher finger tight.

Rear Oil Pump: 1) Coat oil pump pinion ball with Lubriplate and insert in ball pocket in output shaft. Lubriplate oil pump drive pinion, place over shaft and slide into position, aligning keyway in pinion with ball in shaft. *Make sure pinion is installed with side marked with prussian blue at disassembly, is toward front.*

2) Slide pump housing assembly over output shaft and into position against output shaft support. Install five rear oil pump housing-to-output shaft support screws and lockwashers. *(CAUTION—There are two extra holes in housing which are used for vents. Make sure screws are not installed in these holes. Check each screw hole before installing screws).* Draw screws down evenly and tighten to 15-20 ft. lbs. torque. When screws have been properly tightened, check output shaft for free rotation of pump gears. If not free, disassemble pump to determine cause.

Governor: 1) Coat the two governor support piston rings with Lubriplate and install on governor support. Stagger rings and make sure they are free. Position governor body on support, install the four screws and lockwashers *but do not tighten at this point.*

2) Slide governor support and body assembly over output shaft and into position in rear pump housing, compressing governor support piston rings with fingers as support enters oil pump housing.

3) Align locating hole in output shaft to locating screw hole in governor body and install governor locating screw, tighten to 3½-4 ft. lbs. torque. *NOTE—Holes can be easily aligned by turning output shaft and holding governor body. Make sure screw driver attachment fits the screw slot when tightening locating screw.*

4) Tighten the four governor body screws to 5-10 ft. lbs. torque.

5) Dry governor parts with compressed air but do not lubricate when assembling. Place governor weight spring over secondary weight and position both in primary weight, making sure springs seat properly. Guide secondary weight, and compress governor weight spring sufficiently to install snap ring. Make sure ring is properly seated. Place governor weight assembly, with secondary weight snap ring up, into governor body and install snap ring, making sure it is seated.

6) Slide governor valve, with small end up, over governor valve shaft. Slide governor shaft into governor body through output shaft and governor weight assembly, at same time positioning valve into body. Install governor shaft snap ring and make sure it is securely locked to shaft. Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

Transmission Extension: *NOTE—If output shaft rear bearing was not removed, omit operation covering its installation.*

1) Using driver C-3204, install output shaft rear bearing in extension housing. Make sure it is properly seated then lubricate with automatic transmission fluid. Install output shaft bearing snap ring, bevel side up, making sure it is properly seated.

2) Replace extension breather and tighten to 10-12 ft. lbs. torque. Install new transmission extension gasket over guide studs and into position against output shaft support. *Do not use sealing material on gasket.* Using care not to damage governor housing, place extension housing over output shaft and onto guide studs. Using tool C-496 with adapter C3284, press extension housing into position against output shaft support.

3) Start the seven transmission extension-to-case screws and lockwashers, then draw down evenly and tighten to 25-30 ft. lbs. torque. Tighten output shaft support-to-case screw to 25-30 ft. lbs. torque. *Check to see that output shaft turns freely.*

4) Coat nylon gear and threads on speedometer drive pinion with Lubriplate and install in extension. Tighten to 40-45 ft. lbs. torque.

Checking Transmission Endplay: Using dial indicator C-430 or feeler gauge, measure the distance between direct clutch assembly and carrier housing when clutch is in **rearward** position. Using a screwdriver inserted between the direct clutch assembly and carrier housing, carefully pry direct clutch **forward**. Remove screwdriver and measure again. The difference in measurements is the end clearance and must be .043-.069". If it does not fall within these limits, proceed as follows:

1) Remove the seven screws and lockwashers from transmission extension and install guide studs C-3283. Then remove the one output shaft support-to-case screw and washer, and remove extension housing, output shaft, support, and planet pinion carrier housing assembly as a unit.

2) Slide direct clutch piston retainer from torque converter reaction shaft and remove direct clutch piston thrust washer. Using a micrometer, measure thickness of the washer and then select a washer to give correct clearance. These washers are available in the following five thicknesses: Part No. 1406442 (.125-.130"), No. 1406443 (.135-.140"), No. 1406444 (.145-.150"), No. 1406445 (.155-.160"), No. 1406446 .164-.170").

3) To install, reverse removal procedure. Using driver C-3205, install output shaft rear bearing oil seal.

Hand Brake Assembly: 1) With brake support spacer in position on back of brake support and spacer sleeve in center of support, slide brake assembly over rear extension housing and anchor pin. Make sure spacer sleeve remains in center of support. Install brake support grease shield on extension housing. *NOTE—Indent in shield for correct positioning on extension housing. Shield must be located on housing far enough to permit installation of spring later.*

2) Place both anchor brake washers on brake shoe anchor and install locking washer. Place both shoe assemblies with adjusting sleeve nut and screw into position on anchor. Make sure brake shoes are between the anchor washers. Use a rubber band around shoes to help hold them in position.

3) Install operating link (marked for correct installation), and brake shoe support grease shield spring (with opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove. Slide brake shoe return spring behind grease shield spring and hook into position in holes in brake shoes.

4) Make sure adjustment is loose enough and install brake drum assembly. If necessary, use tool C-496 to press brake drum on output shaft. Install transmission flange washer, shakeproof washer and nut, and tighten to 140-160 ft. lbs. torque.

Kickdown Band Adjustment: Turn transmission on side and using tool C-3291, loosen locknut and tighten kickdown adjusting band adjusting screw to 60-72 inch lbs. torque. With the counter on C-3291, **back adjusting screw out 3 turns,** then holding adjusting screw stationary with short handle, tighten locknut securely. *Use extreme care to assure correct adjustment.*

Reverse Band Adjustment: Remove reverse band adjusting screw locknut and tighten adjusting screw to 20-25 inch lbs. torque, then back out adjusting screw 10 turns. Holding adjusting screw in this position, replace adjusting screw locknut and tighten to 30-35 ft. lbs.

Valve Body & Transfer Plate: 1) Install neutral safety switch, back-up light switch and gasket, and tighten to 15-20 ft. lbs. torque. Clean mating surfaces and check for burrs on transmission case and valve body. Place valve body and transfer plate into position on transmission case and install five transfer plate screws and lock washers *(Install the two 1⅝" long screws through transfer plate cover on valve body),* tighten to 12-17 ft. lbs. torque. Make certain the two oil strainer tube seals are in position on oil strainer, and place oil strainer in position on valve body. Install oil strainer support screws and lock washers and tighten to 12-17 ft. lbs.

2) Place manual valve lever shaft seal cover over manual shaft and install manual control lever with arm side of lever against cover, on manual valve shaft. Tighten locking screw. Place throttle valve camshaft felt and retainer over throttle valve shaft. Install lever assembly on throttle camshaft, and

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POWERFLITE (C nt.)

tighten locking screw. Check operation of controls by shifting manual control into the four operating positions.

3) Check throttle cam position in throttle operating lever assembly and throttle camshaft assembly for kickdown operation. Visually check manual lever contact on neutral safety and back-up light switches.

4) Install oil pan, using a new gasket, and tighten attaching screws to 12-17 ft. lbs., drawing screws down evenly. Tighten drain plug to 20-25 ft. lbs. torque.

VALVE BODY OVERHAUL

Valve Body & Transfer Plate Disassembly: *(NOTE—Two different throttle valve assemblies used in production. Overhaul procedures are the same except as noted below).*

►*1954 SHUTTLE VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A later type shuttle valve, Part No. 1643118 is used for production and can be used for service replacement. *CAUTION—* The adjusting screw on the later type shuttle valve is pre-set at the factory and *MUST NOT BE CHANGED IN THE FIELD.* When replacing the older type valve with the later one, DO NOT install the spacer and spring.

►*OVERHAUL CAUTION:* Place valve body and plate assembly in holding fixture C-3294. *DO NOT USE VISE TO HOLD TRANSFER PLATE ON VALVE BODY.*

1) Remove two of the long transfer plate cover screws and lock washers and install guide studs C-3295. Keeping finger tight pressure against transfer plate, remove the three remaining transfer plate cover screws, (two long & one short), and remove transfer plate cover. Using care not to lose the servo restrictor valve operating plug from transfer plate, remove transfer plate from valve body plate. *NOTE—Rear pump check valve has metering hole in it. Note position of this valve in relation to the front pump check valve (without metering hole).*

2) Remove valve body plate from valve body, noting position of throttle pressure check valve ball, and servo bleed valve (servo bleed valve may stick to valve body plate). Remove these parts and place in clean container. On later type valve assemblies remove throttle valve cam spring from cam and operating lever. On early and later type assemblies, compress the throttle valve operating lever assembly against throttle valve spring and slide throttle valve cam assembly from manual lever assembly. *(CAUTION—Remove any burrs from throttle valve camshaft and manual valve lever shaft before sliding them from valve body).*

3) Swing throttle valve operating lever out of way and remove throttle valve spring and retainer from throttle valve. Remove throttle valve from valve body core. Check distance from valve body to end of throttle valve operating lever adjusting screw. This distance should be 1 11/16". Using tool C-3279, remove throttle valve adjusting screw, lock nut and throttle valve operating assembly. *NOTE—It is not necessary to remove throttle valve operating assembly unless parts are to be replaced.*

4) Remove the four (three long and one short) valve body end cover plate screws and lock washers and remove valve body end cover plate. Remove valve body and cover screw, keeping pressure against cover to avoid losing the four springs (early type), three springs (late type) behind it. Carefully remove valve body cover so as not to lose any of the springs or kickdown valve ball. Remove shuttle valve plug *(CAUTION—Later type shuttle valve assembly has an adjustment screw. DO NOT CHANGE THIS ADJUSTMENT as it is pre-set at the factory).* Remove kickdown valve ball from body. Remove shuttle by using shuttle valve spring, and related parts (see illustration for parts in early and late type assemblies).

5) Remove direct clutch shift valve spring from valve body. Mark the direct clutch shift valve plug with prussian blue (in order to reinstall with right side out), then loosen plug screws sufficiently to allow removal of plug by pushing on open end of shift valve with finger. Remove shift valve, and remove valve body from tool C-3294. Place valve body on clean paper. On early type assemblies, remove kickdown rod snap ring and kickdown rod from valve body. On later type assemblies, remove kickdown rod from cover end of valve body.

►*MANUAL VALVE AND LEVER ASSEMBLY NOTE—It is not necessary to remove this assembly unless damaged parts are to be replaced. If assembly must be removed, proceed as follows:*

6) Place manual control valve lever on lever assembly and turn it counter-clockwise until manual control valve is in low range position (last detent). Using a screwdriver, compress detent plunger and spring and continue to turn manual valve lever assembly until manual valve becomes disengaged from manual valve lever assembly. Remove manual valve from valve body bore. Remove manual control lever and slide manual lever assembly from valve body. Remove manual valve lever detent plunger and spring from valve body.

Valve Body & Transfer Plate Inspection: Wash all parts in clean solvent and dry with compressed air. Check all passages for obstructions and check for porous coating. Inspect all mating surfaces for burrs and scratches. Light scratches and burrs can be removed with crocus cloth. With a light, check bores in valve body for pits and scores. Check springs for distortion and collapse. Check mating surfaces on a surface plate for distortion. Check all moving parts for free operation, and valves for freeness in body bores. Inspect servo restrictor valve in transfer plate to make sure it is seating properly. If valve is defective, carefully remove drive screw. Install new valve and new drive screw, making sure drive screw is tight, and being very careful not to distort transfer plate when installing drive screw. Check all points in valve for wear and replace defective parts.

Valve Body & Transfer Plate Reassembly: *CAUTION—When assembling valve body and transfer plate assemblies, handle parts carefully to avoid damage, such as nicks, etc., to mating surfaces. Use a twisting motion when placing valves in their respective bores.*

1) Place manual valve lever detent plunger spring and plunger into place in valve body. Slide manual valve lever assembly into valve body. Using a twisting motion place manual valve into valve body sufficiently to engage manual valve with manual valve lever pin. Then using valve lever assembly, turn slowly in clockwise direction and at the same time using a twisting motion, guide manual valve into valve body to low range position. Make sure detent plunger is seated.

2) Place kickdown rod (small end toward end cover) into valve body, making sure it is properly seated. Place valve body in tool C-3294 and install direct clutch shift valve. Place direct clutch shift valve into position (same as when removed, and with marks made at disassembly in correct position) in valve body. Draw the two screws down evenly and torque to 24-30 inch lbs. Install direct clutch shift valve spring in valve.

3) Install shuttle valve in valve body. Coat stop ring lightly with Lubriplate and place into recess in valve body. On early type assemblies place shuttle valve spring guide pin in shuttle valve and install both inner and outer spring over guide pin. On later type assembly place shuttle valve spring in valve. On both assemblies, install kickdown valve ball into valve body.

4) Place valve body end cover plate on end cover. Install one short screw and lock washer. Tighten securely. Place shuttle valve plug into position in end cover, and install kickdown valve spring. Install valve body end cover onto valve body. *CAUTION—* Make sure direct clutch shift valve, shuttle valve and kickdown valve spring are in correct position and properly seated when cover is being installed. Install valve body end cover screw and lock washer, but do not tighten.

5) Install the three (long) valve body end cover plate screws and lock washers. Draw down evenly and tighten to 24-30 inch lbs. Tighten valve body end cover screw and the remaining end cover plate screw to 24-30 inch lbs.

6) Using tool C-3279, install throttle valve adjusting screw, locknut and throttle valve lever assembly. Adjust to where there is approximately 1 11/16" distance between valve body and end of throttle valve operating adjusting screw. Install throttle valve (point outward) in valve body. Place throttle valve spring and retainer over throttle valves. Swing throttle valve operating lever over spring and retainer. Compressing the throttle valve lever assembly against throttle valve spring, slide throttle valve cam assembly into manual lever assembly, indexing cam portion on throttle valve in slot of operating lever. On later type assemblies, install throttle valve cam spring to cam and operating lever.

7) Install servo bleed valve and throttle pressure check valve ball into position in valve body and install guide studs. Position transfer plate cover on transfer plate and install the center screw (short) and lock washer finger tight. Install the servo restrictor valve operating plug (long end first) into transfer plate.

8) Make sure pump check valves and springs are properly positioned in transfer plate. The pump check valve with the metering hole should be toward the rear of transmission. Place valve body plate flush into position on transfer plate by compressing pump check valve springs. *CAUTION—Be sure pump check valves enter transfer plate, otherwise valve body plate will be damaged when assembly drawn down.*

9) Keep sufficient pressure on transfer plate and valve body to hold them together. Place over guide studs and into position on valve body, and install two of the transfer plate cover screws and lockwashers (one on each side) finger tight. Recheck to see that pump check valves remained in position in valve body plate. Remove guide studs and install two remaining transfer plate cover screws and lock washers. Draw transfer plate down evenly and torque all five screws to 45-50 inch lbs. torque.

POWERFLITE (CHRYSLER DE SOTO, DODGE, PLYMOUTH)

Chrysler (1956)
D Sot (1956-60)
D dg (1956-60)
Plym uth (1956-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*PUSHING CAR TO START ENGINE:* Pushing is recommended rather than towing. With the "N" (Neutral) button pushed in, turn the key to "ON" position. When car reaches a speed of approximately 25 MPH, push in the "L" (Low) button. This will allow the transmission to crank the engine.

►*TOWING POWERFLITE CARS:* Following procedure recommended.

Transmissi n In perativ – Disconnect propeller shaft or tow car with rear end raised.

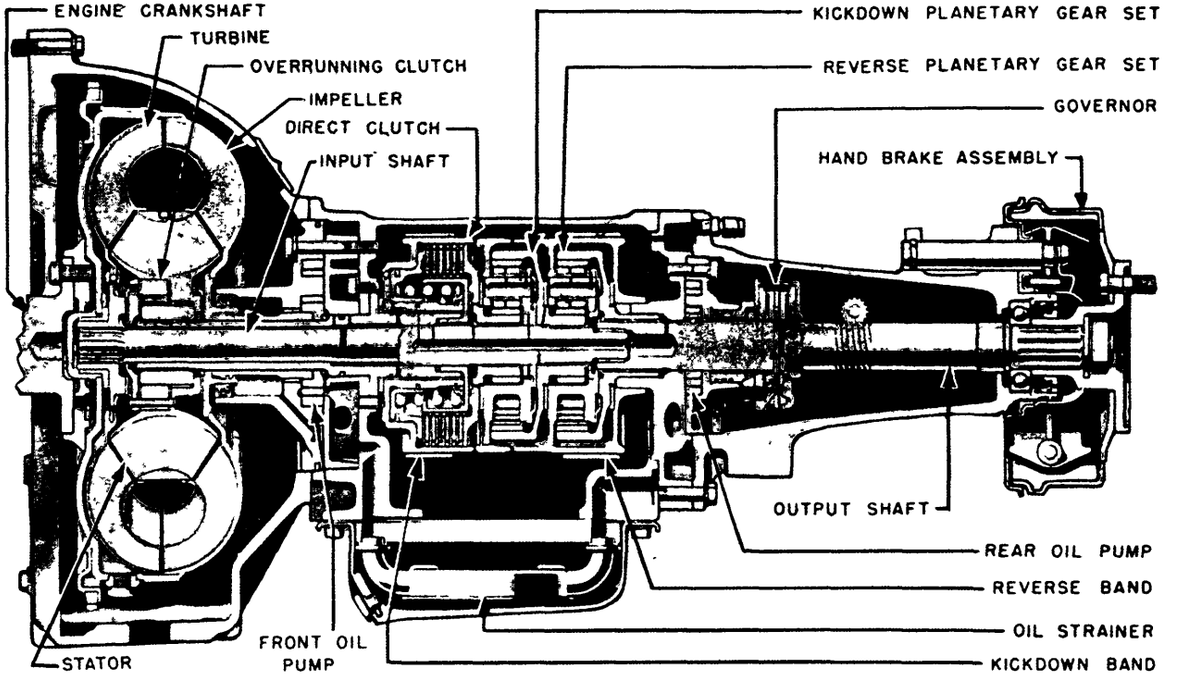
Transmissi n Op rating – The car may be safely towed at moderate speeds with the "N" (Neutral) button pushed in. For long distance towing (over 100 miles), the propeller shaft should be removed.

►*1956 NEUTRAL STARTER SWITCH PRODUCTION CHANGE:* On later production cars, the neutral starter switch contact plunger spring tension has been reduced (the effort required to depress spring on the new switch is 8 ozs., at .030" depression). To determine if switch is later type, check with finger pressure. An "O" ring seal and cupped washer is used with the new switch and the transmission case has been changed by having a 60° (included angle) countersink in switch assembly hole. The later type switch must be used only on transmission cases having the angle countersink in switch hole. *NOTE* – The "O" ring seal and washer may be used on early type switches in transmission case not having the countersink provided the tolerance stack-up permits proper adjustment of the switch without exceeding 75 ft. lbs. torque, in which case the original washer should be used. *S "Neutral Starter Switch Adjustm nt" und r "Manual Cable Adjustment" below.*

►*1956 POWERFLITE TRANSMISSION DRAIN PLUG ELIMINATED:* On later production cars, the drain plug has been eliminated. When necessary to drain the transmission, remove the filler tube connector at the oil pan.

►*1956 POWERFLITE DATE CODE NOTE:* Transmission building date is indicated by a code stamped on lower right side of case immediately after the transmission part number. Months are indicated by letters beginning with "A" (January), date and year by number.

►*1956 POWERFLITE PLANET PINION CARRIER (AND RELATED PARTS) PRODUCTION CHANGE:* On transmissions having a date code C-7-56 and later, aluminum planet pinion carriers are being used. The following parts are not interchangeable with previous transmissions: Kick-down Planet Pinion Carrier, Reverse Planet Pinion Carrier, Kick-down Annulus Gear, Reverse Annulus Gear, and Planet Pinion Carrier Housing. The Kick-down Annulus Gear used with aluminum pinion carriers can be identified by ¼" letters "A-L" stamped on flange. The later type Planet Pinion Carrier Housing is identified by a flat rear surface on housing (early type had a ridge machined on the rear, outer large diameter of the assembly). Dimensions of Reverse Annulus Gear are different from early type, and there are no special identifying marks on gear.



POWERFLITE TRANSMISSION SECTIONAL VIEW

►*1956 PLYMOUTH POWERFLITE TORQUE CONVERTER HOUSING & ADAPTER PLATE PRODUCTION CHANGE:* Dimensions have been changed on torque converter housings and adapter plates starting with Engine No. P-28-56973 and P-29-151148. Early and late type housings and adapters are not interchangeable The following table indicates dimensions for early and late types.

Part	Early	Late
Adapter Plate	① 3/4" thick	② 1 1/8" thick
Housing	③ 7 19/64"	③ 6 15/16"

① – Part No. 1613713 (P-28); 1613712 (P-29).
② – Part No. 1630850 (P-28); 1630841 (P-29).
③ – Measured from face-to-face.

►*1956 POWERFLITE THROTTLE VALVE AND SPRING PRODUCTION CHANGE (To Eliminate Valve Buzz or Flutter on Downshift):* A new throttle valve and spring (Service Pkg. No. 1752242) is being used in production and is available for service replacement. A chamfer on the reaction surface of valve, with a heavier valve spring eliminates valve buzz or flutter on downshift.

►*1956 POWERFLITE FRONT PUMP DRIVE SLEEVE & SEAL PRODUCTION CHANGE AND SERVICE REPLACEMENT NOTE:* A new front pump drive sleeve, Part No. 1630808, and drive sleeve seal, Part No. 1630809 is being used in production on transmission having a date code of A-23-57 and later (a letter "E" after the transmission part number also identifies this change). The later type "O" ring seal replaces the former metallic seal ring, and must be used in conjunction with the later type sleeve. It is preferable to use the early type drive sleeve and seal on transmissions built before the above date code.

►*1956 DESOTO ENGINE VALVE BENDING IN SERVICE (On cars having transmissions with date codes bef r B-9-56):* Valve bending results when the transmission downshifts at high speeds (above approximately 75 MPH). At the instant the downshift occurs, engine RPM is momentarily increased to a point where valve "pump-up" is encountered with consequent valve bending. To correct this condition, remove the rear pump housing and enlarge the .090" governor oil feed hole to 5/32" (governor oil feed hole is located in the smaller of the two depressions at ends of baffle under the pump gears). Check governor weight and valve for scoring and make sure governor has free movement after assembly. Adjust and correct push button control and manual shift lever. Check engine valve spring tension and replace springs not within specifications.

►*1956 POWERFLITE CLUTCH PLATE REPLACEMENT CAUTION:* The number of clutch plates and discs have been changed on some models. When replacing plates and discs, the same number should be used for replacement as those originally installed in transmission.

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POWERFLITE (C nt.)

►*1956 DESOTO HISSING OR WHISTLING NOISE CORRECTION (In neutral or in forward driving ranges up to approximately 30 MPH):* Remove and disassemble valve body and transfer plate assembly. Remove rear pump check valve (one with small orifice in center) and discard the valve. Replace with a FRONT PUMP check valve in which a .030" square notch has been filed in the ridge on face of valve (a 32 tooth hacksaw blade can also be used to cut the notch). Use extreme care that only one notch is cut in the valve.

►*1956 PUSH BUTTON CONTROL ASSEMBLY PRODUCTION CHANGE:* Early type control with locking pawl replaced in production and for service with a later type having slide locks attached to slides, and no locking pawl. The later unit prevents possibility of releasing any one button until a newly selected gear range push button is completely engaged.

►*1957 POWERFLITE REVERSE SERVO PISTON PRODUCTION CHANGE:* All transmissions code dated C-5-57 and with the letter "B" preceding the part number will have a new reverse servo which incorporates a spring cushion instead of the hydraulic cushion previously used. New reverse band adjustment specifications are also used with the later type servo. See *"Reverse Band Adjustment Production Change" below.*

►*1957 REVERSE BAND ADJUSTMENT CHANGE (TRANSMISSIONS WITH LATER TYPE REVERSE SERVO PISTON ASSEMBLY):* See production change above. On transmissions having a code date of C-5-57 and with the letter "B" preceding the part number, adjust the reverse band as follows: Loosen locknut and tighten adjusting screw to 20-25 inch-pounds, then back off the adjusting screw **exactly 12 turns** (previous adjustment was 10 turns). Hold adjusting screw and tighten locknut to 30-35 ft. lbs.

►*1957 POWERFLITE REAR OIL PUMP PRODUCTION CHANGE:* A plastic rear oil pump gear and a revised oil pump housing are now being used in production. Transmissions having a code date L-19-56 and the letter "A" preceding the transmission part number stamped on lower side of case will have the later type pump assembly. The new pump parts (Gear, Part No. 1672315 & Housing Assembly, Part No. 1823666) are interchangeable with the previous parts if both the pump gear and housing are replaced together. The new plastic gear cannot be used in the old housing, and the old steel gear cannot be used with the later type housing.

►*1957 PLYMOUTH POWERFLITE TORQUE CONVERTER IDENTIFICATION:* Torque converters used on the 6 cyl. engine have a smooth surface at rear of converter (side nearest transmission). The V8 engine converter is identified by a 1 8" wide groove cut on the rear "donut"

►*1957 POWERFLITE RUNNING AWAY DURING PART THROTTLE DOWNSHIFT CORRECTION:* If this condition cannot be corrected by correct throttle linkage and kickdown band adjustment, remove main control valve assembly and examine throttle pressure lever for endplay between spherical surface of adjusting screw and positioning tab on throttle lever. If there is clearance at this point, bend tab against spherical surface of screw to eliminate all clearance *(CAUTION* - Be sure that lever moves freely on screw after bending tab). Examine servo restrictor valve (in valve body transfer plate), and replace if bent. Check servo restrictor valve plug for free movement.

►*1958 POWERFLITE TRANSMISSION THROTTLE VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To decrease possibility of engine running away during part throttle downshift):* Effective with transmission Date Code L-6-57 (transmissions also identified by a letter "F" preceding part number on right side pan rail), a new throttle valve and spring is being used in production and for service replacement. For transmissions before the above date code, install Throttle Valve and Spring Service Package, Part No. 1879506. *NOTE - Throttle pressure on all transmissions having the new type valve and spring must be adjusted to 13-15 lbs. (see "Throttle Pressure Adjustment" below).*

►*1958 ENGINE RUNNING AWAY DURING PART THROTTLE DOWN-SHIFT CORRECTION:* On transmissions having a date code before L-6-57, install Throttle Valve & Spring Package, Part No. 1879506 (see production change above). On all transmissions, correctly adjust throttle linkage and kickdown band, then if trouble is still not corrected, remove main control valve assembly and examine throttle pressure lever for endplay between spherical surface of adjusting screw and positioning tab on throttle lever. If there is clearance at this point, bend tab against spherical surface of screw to eliminate all clearance. *CAUTION - Be sure that lever moves freely on screw after bending tab.* Examine servo restrictor valve (in valve body transfer plate), and replace if bent. Check servo restrictor plug for free movement. Adjust throttle pressure to 13-15 lbs. *See "Throttle Pressure Adjustment"*

►*1958 FRONT OIL PUMP LEAKAGE CORRECTION:* Leakage around front pump bolt holes on transmissions built before April 14, 1958 (bolt holes not spot faced) should be corrected as follows: Dress area around holes with a file, then install new aluminum washers, pasting bottom of washers and area of hole with Permatex No. 2 Tighten bolts to 15 ft. lbs.

►*1959 POWERFLITE TRANSMISSION LUBRICANT PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* Automatic Transmission Fluid Type "A", Suffix "A" should be used when draining and refilling transmission.

►*1959 POWERFLITE DRAINING & REFILLING INTERVAL RECOMMENDED CHANGE:* Drain & refill transmission with the recommended fluid every 10,000 miles. This supersedes the previous recommendation of 20,000 miles.

►*1959 DODGE & PLYMOUTH HARSH OR ERRATIC SHIFT CORRECTION:* This condition may be caused by a loose fitting accelerator shaft lever assembly (located on right side of bellcrank bracket on firewall). If a loose lever cannot be tightened by tightening the attaching nut, proceed as follows: Remove lever from accelerator shaft and bracket assembly and spread lever slot to 5/32". Install a .020-.030" thick by 5/16" wide shim between flat on shaft and flat on lever. Reinstall and tighten to 10-12 ft. lbs.

DESCRIPTION

DESCRIPTION: Torque converter and hydraulically controlled two-speed planetary gear type transmission similar in design to 1954-55 models. For detailed description, **see 1954-55 PowerFlite Transmission".**

OPERATION

OPERATION: Same as for 1954-55 PowerFlite Transmission.

LUBRICATION

1956-58 MODELS

►*TRANSMISSION FLUID LEVEL & CHECKING PROCEDURE CHANGE:* To avoid overfilling and trouble under high speed and high temperature operating conditions, it is recommended that the following checking procedure be used and that the recommended fluid level not be exceeded. *This supersedes previous recommendations.*

►*NOTE:* It is recommended that the fluid level be checked with transmission "Cold" (after being parked for a considerable time and before being driven several miles). If necessary to check transmission "Hot" (after car driven for several miles), observe the special hot fluid level given below.

Checking Fluid Level (Cold Transmission) - Run engine at idling speed with parking brake applied. Operate all push buttons in turn (leave in each position momentarily), then check fluid level with "N" (Neutral) button pushed in. Note level indicated on dipstick, add or remove oil as follows: **Level between "L" mark and ½" below "L" mark** - Do not add oil - this level is satisfactory. **Level below ½" below "L" mark** - Add oil to bring level up to between "L" mark and ½" below "L" mark. **Level above "L" mark** - Remove oil until level has been lowered to between "L" mark and ½" below "L" mark.

Checking Fluid Level (Hot Transmission) - Proceed as for cold check above. Add or remove oil in accordance with fluid level on dipstick as follows: **Level between "F" mark and ½" above "L" mark** - Do not add oil - this level is satisfactory. **Level below "L" mark** - Add oil to bring level up between the "L" mark and ½" above the "L" mark. **Level above "F" mark** - Remove oil until level is between "F" mark and ½" below "F" mark. *NOTE* - On cars with first type dipstick (1 5/8" between "F" and "L" marks), maintain level at ½" below "F" mark.

1959 MODELS

Checking Fluid Level: Check fluid level in transmission every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. With engine idling and transmission in neutral, check fluid level on dipstick. Fluid level should be between the "Add 1 Pint" mark and the

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POWERFLITE (C nt.)

"Full" mark. If fluid level is below "Add 1 Pint" mark, add Automatic Transmission Fluid Type "A", Suffix "A" to bring level between the marks but never above the "Full" mark. If level is above "Full" mark, remove fluid to bring to proper level. *NOTE - When transmission and torque converter are drained and refilled, the lev l should be ¾" below the "Add 1 Pint" mark since the new fluid is not at op rating temperature.*

1960 MODELS

Ch cking Fluid Level: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to netural after button is pushed in. Fluid level should be at "F" mark or slightly below (never above "F" mark). Add or remove fluid as necessary.

►*NOTE: If fluid l vel is checked with transmission cold, fluid l v l should b at "L" (Low) mark or slightly b low.*

1956-60 MODELS

Draining & R filling: Drain transmission every 10,000 miles (supersedes previous recommendation of every 20,000 miles). Remove oil filler tube to drain transmission, then remove converter access plate and drain converter. Add five quarts of oil through oil filler tube, then start engine and add approximately three (Chrysler, DeSoto, Dodge), four (Plymouth) more quarts. Stop engine and completely fill transmission by following procedure for checking fluid level. See "Checking Fluid Level" for proper model (above).

R c mmended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity: See following table. *NOTE - The following capaciti s are appr ximat . Total fluid required should b d termined by measuring with dipstick. See "Checking Fluid L v l" above.*

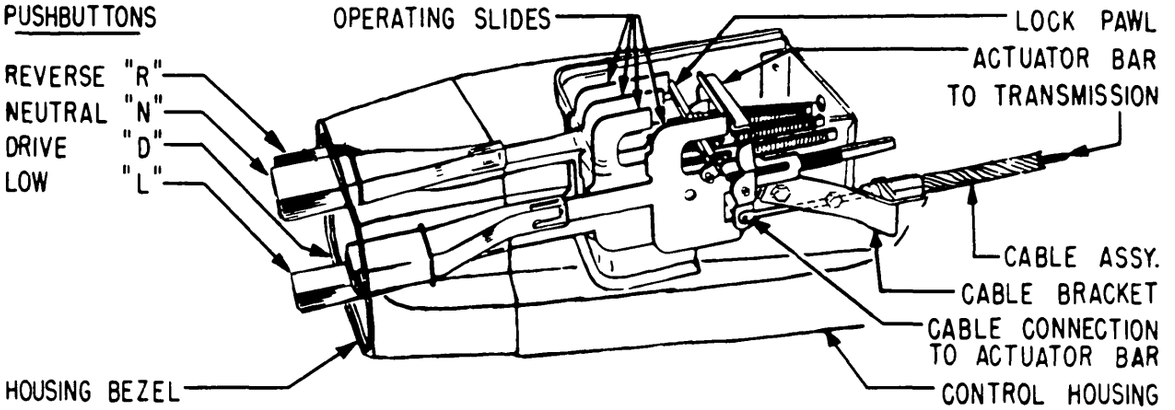
	Capacity (Quarts)				
M d l	1956	1957	1958	1959	1960
Chrysler (Exc. C-71)	11				
Chrysler (C-71)	10.2				
DeSoto	10.2	10	10	10	11
Dodge	10	10	10	10	11.5
Dodge Dart					10
Plymouth	10	10	10	10	10

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See "Carbur tor" on car mod l pages.*

►*PUSH BUTTON CONTROL ASSEMBLY PRODUCTION CHANGE: Two typ s of control units have been used in production. S e "Push Button Control Assembly Production Chang " above.*

Manual Control Cable Adjustment: Remove neutral safety starting switch from side of transmission. Loosen adjustable mounting bracket capscrew and move cable and bracket assembly (manually) as required, to position the manual valve lever in neutral position. Hold the "N" (Neutral) button tightly in at full travel (the neutral starting switch cam should then be practically centered in neutral starting switch mounting hole). Use a free fitting flat-faced shaft inserted through the neutral mounting switch hole, and apply very light pressure against the manual valve lever to maintain the neutral detent position of lever. *(NOTE* - If tool is not available, lever may be held by finger pressure). Carefully move cable assembly "in" and "out" **without moving** the manual lever, to determine total free-play travel of cable. Locate the cable midway in the free-play range, release pressure against the manual lever and tighten mounting bracket securely. *Do not allow cable to move when tightening the bracket.* Install neutral starting switch and check transmission fluid level.



POWERFLITE "PUSH BUTTON" CONTROL ASSY. (FIRST TYPE SHOWN)

Throttle Pressure Adjustment: With throttle linkage properly adjusted and tachometer attached to engine, start engine and adjust idle speed to 475-500 RPM (with transmission in "N" and hand brake set). Stop engine and raise car on a hoist, then remove throttle pressure take-off plug located between reverse and kickdown servos on right side of transmission case. Connect Gauge, Tool C-3292, then start engine and push in the "D" (Drive) button on instrument panel. Engine speed will drop 50 RPM and pressure reading on gauge should be 13-15 lbs. (Exc. early 1958 models - See "Throttle Valve Production Change" above); 15-17 (Early 1958 models with first type throttle valve and spring). If pressure is not within specifications, remove throttle valve adjusting screw access hole plug (approximately 1 quart of fluid will drain out) and insert Adjusting Screw Wrench, Tool C-3279. Adjust pressure as necessary. *NOTE - Turn screw OUT to increase pressure and IN to decrease pressure.* Replace throttle valve adjusting screw access hole plug and tighten to 25 ft. lbs. Recheck throttle pressure. Move accelerator pedal very slowly. If throttle pressure and throttle linkage properly adjusted, pressure will rise 6-8 lbs. the instant engine RPM is increased. *NOTE - Do not use throttle rod when making this check; instead use accelerator pedal lever located on under side of floor pan.* Stop engine and remove oil pressure gauge and install plug. Tighten to 120 inch pounds. If necessary, replace fluid that drained out.

N utral Start r Switch Adjustm nt (1956-57): *NOTE - See "1956 Neutral Starter Switch Production Chang " above.* The early type switch can be adjusted by using an extra washer, Part No. 1113113, and reducing its thickness as required to secure proper switch contact. On later type switches (having an "O" ring seal and dished washer) attach an electrical contact indicator light to switch outer terminal and to transmission case, tighten switch until initial electrical contact is made, then tighten switch an additional 1/3 to 1/2 turn.

Neutral Starter Switch Adjustment (1958-60): Install mounting washer on switch so that concave side is away from switch, then place rubber "O" ring sealon switch and install switch in transmission case. Turn switch in until washer contacts case, then tighten switch an extra 1/3 to 1/2 turn. Connect wire and recheck switch operation.

BAND ADJUSTMENT

BAND ADJUSTMENT: *Kick-down (front) band can be adjusted externally. Reverse (rear) band adjustment requires removal of transmission case oil pan.*

Kickdown (Front) Band: Working from underneath car, loosen kickdown band adjusting screw locknut (located on left side of transmission case). Check freeness of adjusting screw in transmission case. If free, use inch-pound torque wrench, Tool C-3380 and tighten adjusting screw to 72 inch pounds. *NOTE - If Extension, Tool C-3583, used with torque wrench, tighten adjusting screw to 40-43 inch pound reading on torque wrench.* Use a reference mark of chalk or colored pencil on a corner of adjusting screw square and the transmission case. Using extreme care, back adjusting screw out **2¾ turns** (Exc. 1956 Dodge & 1956-59 Plymouth); **3 turns** (1956 Dodge & 1956-59 Plymouth). Hold adjusting screw with a wrench and tighten locknut.

Reverse (Rear) Band: Drain transmission and remove oil pan, then loosen band adjusting screw locknut and tighten adjusting screw to 20-25 inch pounds. Mark a reference point and back off adjusting screw **10 turns** (1956 & Early 1957 with first type servo piston - *Se "1957 PowerFlite Reverse Servo Piston Production Change" above);* **12 turns** (Later 1957-60 models). Hold adjusting screw and tighten locknut to 30-35 ft. lbs.

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POWERFLITE (C nt.)

TESTING

Transmission Shift Speeds (MPH)

1956 Chrysler C-71

Throttle Position	Upshift	Downshift
Wide Open	51-61	10-17
Closed	13-16	10-12
Kickdown Limit		42-58

1956 Chrysler C-72

Throttle Position	Upshift	Downshift
Wide Open	55-65	10-19
Closed	15-18	10-12
Kickdown Limit		45-62

1956 Chrysler C-73

Throttle Position	Upshift	Downshift
Wide Open	53-63	10-19
Closed	14-17	10-12
Kickdown Limit		43-60

1956 Chrysler C-70

Throttle Position	Upshift	Downshift
Wide Open	55-65	10-19
Closed	15-18	10-12
Kickdown Limit		45-63

1956 DeSoto S-23

Throttle Position	Upshift	Downshift
Wide Open	49-58	9-16
Light	17-20	9-11
Kickdown Limit		40-56

1956 DeSoto S-24

Throttle Position	Upshift	Downshift
Wide Open	51-61	10-17
Light	17-20	9-11
Kickdown Limit		42-58

1956 Dodge 6 Cyl.

Throttle Position	Upshift	Downshift
Wide Open	41-46	9-16
Light	13-18	9-11
Kickdown Limit		34-44

1956 Dodge V8

Throttle Position	Upshift	Downshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-57

1956 Plymouth 6 Cyl.

Throttle Position	Upshift	Downshift
Wide Open	41-46	9-16
Closed	12-15	9-11
Kickdown Limit		41-46

1956 Plymouth V8

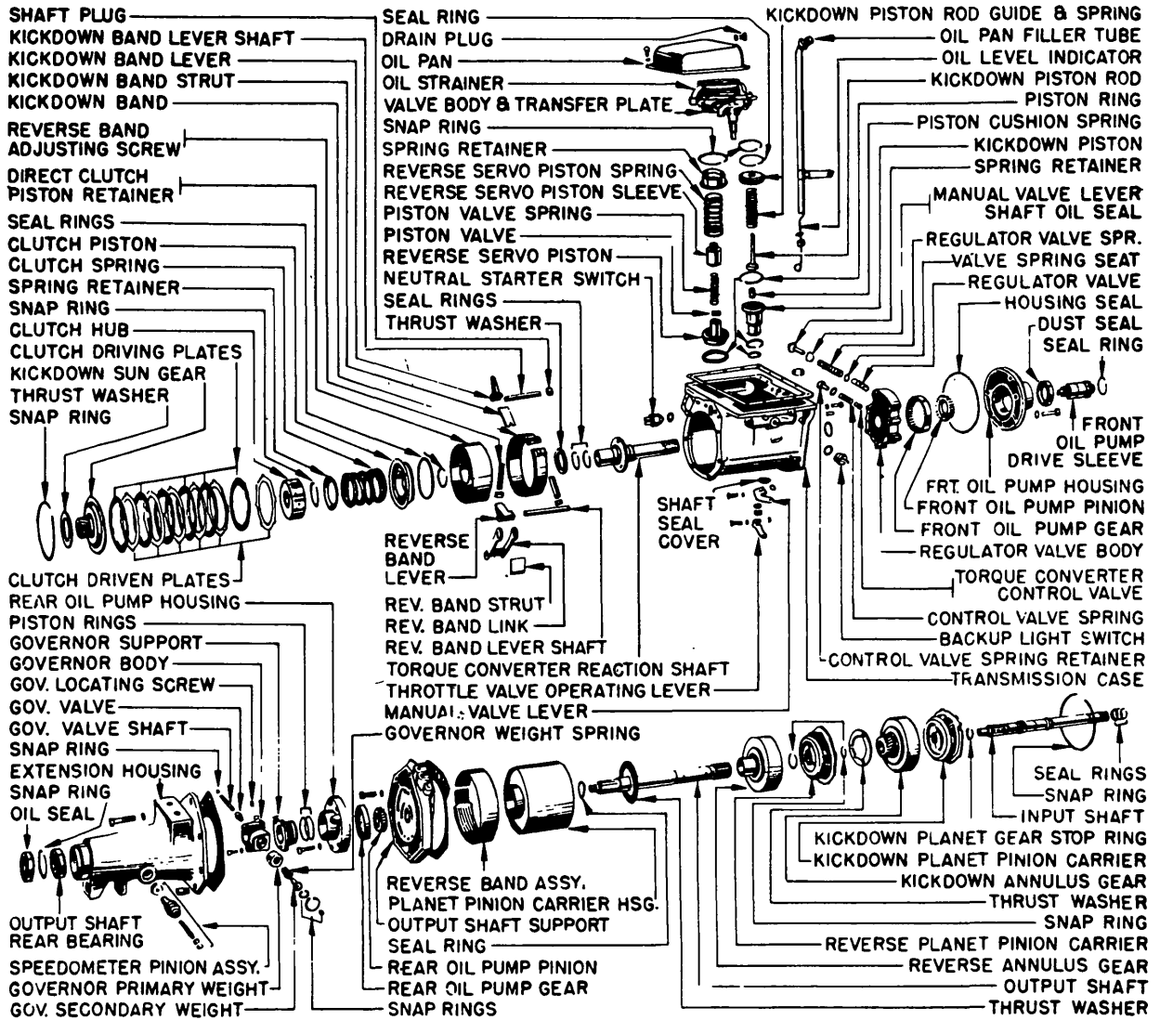
Throttle Position	Upshift	Downshift
Wide Open	50-59	9-17
Closed	13-16	9-11
Kickdown Limit		50-59

1957-58 DeSoto

Throttle Position	Upshift	Downshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-47

1957-58 D dg 6 Cyl.

Thr ttl P sition	Upshift	D wnshift
Wide Open	41-46	9-16
Light	13-18	9-11
Kickdown Limit		34-44



POWERFLITE TRANSMISSION (EXPLODED VIEW)

1957-58 Dodge V8

Throttle Position	Upshift	Downshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-57

1957-58 Plymouth 6 Cyl.

Throttle Position	Upshift	Downshift
Wide Open	41-46	9-16
Closed	12-15	9-11
Kickdown Limit		41-46

1957-58 Plym uth V8

Throttle P sition	Upshift	Downshift
Wide Open	50-59	9-17
Closed	13-16	9-11
Kickdown Limit		50-59

1959 DeSoto & D dg V8

Throttle Position	Upshift	D wnshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-47

1959 Dodg 6 Cyl.

Throttle Position	Upshift	D wnshift
Wide Open	41-46	9-16
Light	13-18	9-11
Kickdown Limit		41-47

1959 Dodg V8

Thr ttl P siti n	Upshift	D wnshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-47

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POWERFLITE (C nt.)

1959 Plym uth 6 Cyl.

Thr ttle P siti n	Upshift	Downshift
Wide Open	41-46	9-16
Light	12-15	9-11
Kickdown Limit		41-46

1959 Plymouth V8

Throttl P siti n	Upshift	Downshift
Wide Open	50-59	9-17
Light	13-16	9-11
Kickdown Limit		50-59

1960 All Models

Thr ttle P sition	Upshift	Downshift
Wide Open	51-61	9-17
Light	14-19	9-11
Kickdown Limit		41-47

ROAD TESTING TRANSMISSION: If transmission operation not satisfactory, following complete procedure is recommended to check performance and diagnose trouble.

1) Move selector push buttons through their positions. Check for binding or hanging, or insufficient travel. Do not operate engine in reverse at wide open throttle.

2) Attach an electric tachometer to engine. Push in "D" (Drive) selector button. Check speed and smoothness of engagement. Apply both hand brake and foot brake and check for band slippage at wide open throttle *(CAUTION - D n t h ld thr ttle wide open more than a few s conds).* See "Stall Speed Table" below. Check for kickdown band adjustment before proceeding with road test.

3) Accelerate engine at very light throttle. The transmission should upshift at speeds given in "Shift Speed Table" above. Check quality of shift.

4) Slow car to 15 MPH, and go quickly to wide open throttle (without going into kickdown). Check for possible clutch slippage. The transmission should not downshift at this time.

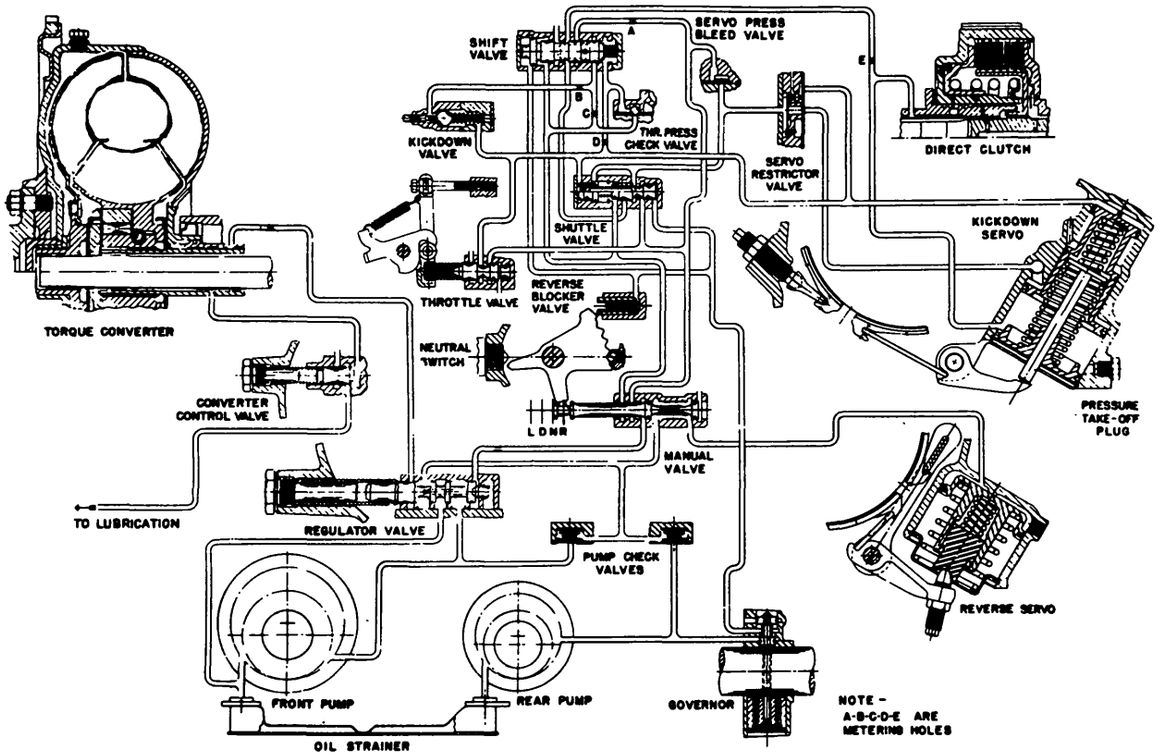
5) Make a kickdown at 15 to 20 MPH and check quality of shift. Release accelerator to approximately half throttle so that transmission upshifts at 25 to 30 MPH. Check quality of shift.

6) Make a kickdown, between kickdown limits as indicated in "Shift Speed Table" above, and check the quality of shift. Release accelerator to closed throttle and check quality of "lift foot" shift.

7) Make a kickdown at 45 MPH and check quality of shift. Accelerate in kickdown, at wide open throttle, until transmission upshifts. The shift should occur at speeds indicated in "Shift Speed Table" above. Check quality of shift.

8) Slow down to 40 to 50 MPH and push in "L" (Low) selector button. The transmission should downshift. Push in "D" (Drive) button at approximately 20 MPH. The transmission will upshift. Coast to a stop. The transmission should downshift as indicated in "Shift Speed Table" above. Check for smoothness of shifts.

STALL TEST: Use an accurate tachometer to check engine speed. With engine idling, push in the "D" (Drive) selector button and note smoothness of shift. Set hand brake firmly and apply foot brakes to hold car. Accelerate engine to wide open throttle and check engine speed. Speed in excess of maximum RPM as indicated below may be caused by band slippage. *Do not hold engine at wide open throttle more than a few seconds.*



POWERFLITE TRANSMISSION HYDRAULIC CIRCUITS

Stall Speed Test ℄

Car Model	Engine RPM
1956 Chrysler C-71 (With Power Pack)	1920-2020
1956 Chrysler C-71 (Std.) & C-72	1580-1680
1956 Chrysler C-73 & C-70	1585-1685
1956-60 DeSoto	1400-1500
1956-60 Dodge	1400-1500
1956 Plymouth 6 Cyl. (125 HP)	1280-1380
1956 Plymouth 6 Cyl. (131 HP, Power Pack)	1280-1380
1956 Plymouth V8 (180 HP)	1620-1720
1956 Plymouth V8 (200 HP, Power Pack)	1675-1775
1956 Plymouth V8 (187 HP)	1640-1740
1957 Plymouth 6 Cyl.	1370
1957 Plymouth V8 (277" Engine)	1670
1957 Plymouth V8 (310" Engine)	1720
1958-59 Plymouth	1500
1960 Plymouth	1400-1500

℄ — Wide open throttle, "D" (Drive) selector button pushed in.

► *CAUTION — When making stall test, do not hold throttle wide open for more than a few seconds.* If engine speed excessive and is not corrected by band adjustment, make additional checks as follows: Check for incorrect manual control cable adjustment; leakage at valve body mating surfaces; defective throttle valve; defective shuttle valve or valve body and cover plug; defective kickdown servo parts.

HYDRAULIC PRESSURE TESTS: *CAUTION* - Pressure differences from 15 lbs. to 250 lbs. will be found in making following tests and correct pressure gauge must be used.

Gauge No. C-3292 (100 lbs.) — Use for throttle pressure, governor pressure, and lubrication pressure checks.

Gauge No. C-3293 (300 lbs.) — Use for line pressure check.

Line Pressure: Remove 1/8" pipe plug from line pressure take-off hole (front left side of transmission case), install C-3293 (300 lb.) pressure gauge at this point. Check reverse oil pressure first (brakes off), then apply brakes to hold car and check the other points. Run engine at speed indicated in table below, check line pressure for each selector button position.

1956 Line Pressure

Selector Button Engaged	Eng. RPM	Pressure
"R"	1600 ℄	225-275 lbs.
"N"	800	85-95 lbs.
"D"	800	85-95 lbs.
"L"	800	85-95 lbs.

℄ — 1400 RPM on Dodge models.

1957-60 Line Pressure

Selector Button Engaged	Eng. RPM	Pressur
"R"	1400	225-275 lbs.
"N"	800	85-95 lbs.
"D"	800	85-95 lbs.
"L"	800	85-95 lbs.

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POWERFLITE (C nt.)

►*NOTE:* If line pressure not correct, check for: Low oil level or clogged strainer; defective regulator valve and spring; manual valve and lever; throttle valve, cam and spring; oil leakage at valve body, or regulator body mating surfaces; defective kickdown piston and related parts; worn front pump or defective front pump drive sleeve or pinion.

Thr ttle Pressure: Remove 1/8" pipe plug from throttle pressure take-off hole (right center of transmission case between the servos), install C-3292 (100 lb.) gauge at this point. Apply brakes to hold car, push in the "D" (Drive) selector button, run engine at speed indicated in table below and note throttle pressure at each speed.

1956-60 Throttle Pressure
①(Except Early 1958 Models)

Thr ttle Opening	Eng. RPM	Pressure
Closed	Idle	13-15 lbs.
Wide Open	②	80-90 lbs.

① Early 1958 Throttle Pressure

Throttle Opening	Eng. RPM	Pressure
Closed	Idle	15-17 lbs.
Wide Open	②	80-90 lbs.

① - See "PowerFlite Transmission Throttle Valve Production Change" above.

② - See "Stall Speed Test" above for engine RPM of various models.

►*CAUTION: When making the above test, do not hold throttle wide open for more than a few seconds. If engin speed exceeds maximum as indicated in "Stall Speed Table" above (indicating band slippage), check the cause in the same manner as for "Stall Test".*

►*NOTE:* If throttle pressure not correct, check line pressure (above) and also check the following points: Incorrect throttle linkage adjustment; leakage at valve body mating surfaces; defective throttle valve, cam & spring; defective throttle pressure check ball or kickdown valve ball and rod; defective kickdown piston or related parts.

Gov rnor Pressure: Remove 1/8" pipe plug from governor pressure take-off hole on lower left side of output shaft support (plate between transmission case and extension housing), install C-3292 (100 lb.) gauge at this point. Support car securely with rear wheels off floor so that they are free to turn, push in the "D" (Drive) selector button and run engine at speed indicated (as noted on speedometer). Note governor pressure in each speed range.

①G vern r Pressur

Car Mod l	15 lbs.	45 lbs.	60 lbs.
1956 Chrysler C-71	13-15	23-31	51-58
1956 Chrysler(Exc.C-71)	14-16	25-33	56-64
1956 DeSoto S-23	12-14	22-29	48-55
1956 DeSoto S-24	13-15	23-31	51-58
1957-59 DeSoto	13-16	23-26	55-62
1960 DeSoto	13-15	24-32	51-60
1956-57 Dodge (All)	13-16	23-26	55-62
1958-59 Dodge 6	12-14	21-29	40-43
1958-59 Dodge V8	12-14	21-29	48-55
1960 Dodge (All)	13-15	24-32	51-60
1956-59 Plymouth 6	12-14	19-23	41-48
1956-59 Plymouth V8	13-16	23-26	55-62
1960 Plymouth (All)	13-15	24-32	51-60

① - Governor pressure at indicated MPH.

►*NOTE:* If governor pressure not correct, check for leakage at valve body mating surfaces or output shaft support gaskets; defective governor assembly; or defective rear pump.

Lubrication Pressure: Check only when there is reason to believe that it is incorrect. Remove pipe plug fitting at upper left side of output shaft support (Exc. 1956 Chrysler C-70, C-72, C-73 & 1956 DeSoto S-24) and install a 1/8" flared tube c nnector. On 1956 Chrysler C-70, C-71, C-73 & 1956 DeSoto S-24, disconnect oil cooler line at this point and install 1/8" flared tube connector. Connect gauge C-3292. With engine running at 800 RPM, transmission in "N" (Neutral) position, lubrication pressure should be 35-50 lbs.

►*NOTE:* If lubrication pressure is not correct, check for leakage at regulator body mating surfaces or at output shaft support gasket; defective converter control valve, defective front pump drive sleeve; defective reaction shaft bore; defective input shaft seal rings; plugged lubrication holes.

Clutch Pressure: Remove the 1/8" pipe plug fitting from pressure take-off hole tapped in kickdown servo (clutch pressure take-off plug on forward right hand side of transmission case) and install gauge C-3292. With rear wheels free to turn, accelerate the engine slowly until an upshift occurs. During the upshift, the pressure gauge attached to the kickdown servo should show a very rapid rise from 0 to final clutch or line pressure (see "Line Pressure Table" above). This rise should not take more than 1½-2 seconds. With engine speed not less than 650 RPM (trans. upshifted), the direct clutch pressure should not read lower than 10 lbs. below line pressure. Should a slow rise in clutch pressure be observed or a clutch pressure of more than 10 lbs. lower than line pressure be obtained, it is an indication of abnormal leakage.

►*NOTE* – If clutch pressure not correct, check oil level; throttle linkage adjustment; converter control valve; valve body mating surfaces; throttle valve, cam and spring; kickdown piston and guide; regulator valve body mating surfaces; front pump drive sleeve; clutch retainer bushing and reaction shaft seal rings; clutch discs and plates; clutch piston, seal rings and eheck valve ball.

►*1956 POWERFLITE DIFFICULT SHIFTING TO REVERSE RANGE CORRECTION:* Remove valve body and inspect reverse lockout valve, valve port and spring. Valve and valve ports must be free burrs, and spring action must be checked to make sure it does not take a set when compressed. If spring is faulty, replace with spring, Part No. 1672079. Check operation of governor valve (if valve is not operating freely, it may apply reverse blocker valve when in neutral and prevent manual shift lever from going into reverse). With engine off, attempt to place transmission in reverse through use of push buttons. If transmission will go into reverse with the engine off, it is evident that a "no reverse" with engine running is due to a sticking governor valve holding the blocker valve open. Remove governor pressure checking plug and try to free-up the governor by applying short blasts of air into governor circuit. If governor cannot be freed up in this manner, remove governor assembly and clean it. Inspect governor support seal rings for score or gap (ring must have no gap when compressed). The governor oil passage in rear pump housing must be located between the wear pattern caused by governor support seal rings (the forward seal ring prevents line pressure entering governor outlet passage located between the two seal rings). Check governor for looseness, excessive output shaft endplay, or improperly drilled rear pump housing and correct as necessary. Check to see that seal rings seal on each side of governor pressure outlet passage in pump housing. If not, measure from center line of governor pressure hole-to-inside face of pump housing. If the specification of .443" ± 1/32" are exceeded, replace the pump housing. Check governor body pressure relief holes for obstructions. Make sure all assemblies are clean before reassembly.

TROUBLE SHOOTING & DIAGNOSIS

EXCESSIVE SLIPPAGE:

All Ranges—Inspect oil level. Adjust gearshift linkage. Check oil pressure; if low, inspect regulator valve and torque converter control valve for sticking. Inspect valve body in transmission case mating surfaces for evidence of oil leakage.

Kickdown—Readjust throttle linkage and kickdown band. Inspect valve body to transmission case mating surfaces for evidence of oil leakage. Check operation of throttle valve and note wear of valve bore and cam. Check spring. Check valve body end cover for oil leakage. Check shuttle valve for free movement. Inspect kickdown piston and guide for binding. Inspect spring. Inspect band lining for wear and band lever for free movement.

Kickdown (Over 25 MPH)—Inspect valve body end cover for oil leakage. Inspect shuttle valve and plug for free movement. Inspect spring.

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POWERFLITE (C nt.)

Hill Climbing—Insufficient oil will result in low pressures to kickdown servo or direct clutch if oil level is low.

Direct—Inspect valve body to transmission case mating surfaces for evidence of oil pressure leakage. Check kickdown piston for binding. Check shaft seal rings and clutch retainer bushing for wear. Check clutch discs, piston and clutch check valve.

Reverse—Check reverse band adjustment. Inspect transmission case to valve body mating surfaces for evidence of oil pressure leakage. Inspect reverse servo assembly for wear or binding. Inspect reverse lever and linkage for free movement.

SHIFT PATTERN:

No Upshift—Check oil level and gearshift linkage adjustment. Check governor and throttle pressure. If there is no pressure rise when accelerating engine in direct drive, governor valve may be stuck closed. Check valve body to transmission case for parallelism. Check manual valve and lever for correct detent engagement. Check shift valve for free operation and shift valve spring for breakage. Check kickdown piston assembly. Check rear pump drive pinion. Drive pinion ball may be cracked or broken, permitting pinion gear to slip. Inspect clutch ball check for proper operation. Ball check valve must operate freely and seat properly.

No Shift in "D" (Drive) Range and an Upshift In Low Range—The cause is the governor valve sticking open. This can be verified by checking governor pressure (see "Governor Pressure Test" above). If governor pressure exceeds the pressures indicated in table, governor valve is possibly stuck and in most cases can be corrected in the following manner. Clean off area around governor pressure takeoff plug and remove plug. Cover oil filler tube with a cloth or plug and hold firmly to prevent air from forcing transmission oil out through filler tube. Screw a piece of ⅛" pipe into hole to help direct air into unit. Apply clean filtered air to pipe in short blasts, tapping parking brake drum at same time with a rubber hammer just enough to jar governor. After applying air pressure, recheck governor pressure and see if valve has been freed up. In cases where governor pressure is still to high, it will be necessary to remove transmission extension case for further inspection.

Low Upshift Pattern—Readjust throttle linkage. Check governor pressure. Governor valve may be binding or sticking. Inspect the rear pump assembly. Check valve body to transmission case for parallelism. Check operation of throttle valve and inspect cam and spring. Check shift valve for free operation and spring for breakage.

Low Upshift Pattern at Heavy Throttle—Inspect regulator valve, throttle valve, and governor for burrs or dirt which may cause binding or sticking. Inspect the regulator spring.

High Upshift Pattern—Readjust throttle linkage and check both throttle and governor pressures. Adjust throttle pressure if necessary. If throttle pressure does not rise according to speeds on chart (see "Throttle Pressure" above), throttle valve may be sticking. Inspect for dirt or burrs. Inspect throttle cam for wear. Check valve body to transmission case for parallelism. Check shift valve spring. If governor pressure does not correspond to pressures indicated in "Governor Pressure" table above, remove governor and inspect valve for sticking. Check rear pump gears for wear, broken teeth or excessive clearance. Inspect pump drive pinion ball.

All Upshifts Below 14 MPH—Inspect throttle valve, cam and spring. Check throttle pressure check ball. Check governor valve for sticking.

Erratic Shifting—Check oil level. Inspect valve body to transmission case for parallelism. Check action of shift valve. Inspect governor support gaskets for oil leakage.

No Downshift—Check governor pressure. High initial pressure indicates valve is stuck open. Remove governor and inspect. Inspect shift valve action, check spring.

Low Downshift Speed—Governor valve is stuck open. Remove and clean and check for burrs and dirt.

High Downshift Speed—Readjust gearshift linkage. Inspect valve body to transmission case for parallelism. Inspect manual valve and lever. Inspect kickdown valve and ball.

No Kickdown—Adjust throttle linkage. Inspect valve body to transmission case for parallelism. Inspect throttle valve, cam and spring. Also inspect kickdown valve and shift valve components.

Low Kickdown Limit—Check governor pressure Governor valve may be sticking due to dirt. Inspect regulator valve and spring for proper operation. Inspect rear pump gears and drive pinion ball. Check valve body cover plate for parallelism.

SHIFT QUALITY:

Harsh Shift from Neutral to Reverse—Adjust engine idle speed. Readjust rear band. Inspect condition of the reverse band, strut and linkage. Inspect the reverse servo piston, spring valve and rings.

Harsh Shift from Neutral to Drive—Adjust engine idle speed Adjust throttle linkage. Inspect kickdown servo pistons, springs, guide, rod and piston rings.

Delayed Shift from Neutral to Drive—Adjust kickdown band. Inspect condition of band, strut, lever and lever shaft.

Excessive Engine Speed Increase on Upshifts—Check oil level and adjust throttle linkage. Inspect regulator valve and spring and check operation of valve in regulator body. Check valve body mating surface for parallelism. Inspect throttle valve, cam and spring. Check operation of valve in valve body. Inspect kickdown piston components. Check mating surfaces of regulator valve body and transmission for parallelism. Inspect reaction shaft seal ring for deterioration. Inspect input shaft oil seal rings for wear or breakage and condition of reaction shaft bore. Inspect clutch retainer bronze bushing. If worn below bronze surface, replace retainer. Inspect condition of reaction shaft oil seal rings for wear or broken ends. Inspect condition of clutch plate and condition of friction material on seal ring. Check clutch check valve ball.

Excessive Engine Speed Increase on Upshifts at Light Throttle—Check line pressure. Inspect front oil pump gears for wear and excessive clearance.

Harsh Upshift—Adjust throttle linkage. Inspect regulator valve and spring. Check for sticking shuttle valve. Check valve body mating surfaces for parallelism. Inspect throttle valve, cam and spring. Inspect kickdown piston components. Check regulator valve body mating surfaces for parallelism. Inspect direct clutch spring, spring retainer, and snap ring.

Harsh Lift Foot Shift—Adjust throttle linkage. Check valve body mating surface. Check operation of throttle valve. Inspect valve, valve bore, cam and spring. Inspect servo pressure bleed valve for dirt. Check operation of shuttle valve. Inspect shuttle valve, plug, inner and outer springs, and guide pin.

Excessive Engine Speed Increase on Downshift at Part Throttle—Check oil level and adjust throttle and gearshift linkage. Check valve body mating surface. Check operation of manual valve and valve lever. Inspect servo restrictor valve and operating plug. Check plug for free operation. Check valve spring for distortion or looseness.

Harsh Downshift—Adjust engine idle speed and throttle linkage. Inspect valve body mating surface. Inspect throttle valve, cam and spring for proper operation. Inspect for dirt, burrs or wear, or breakage. Inspect servo restrictor valve for proper operation. Inspect clutch plates and disc friction material. Inspect the piston for wear or scor-

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POWERFLITE (C nt.)

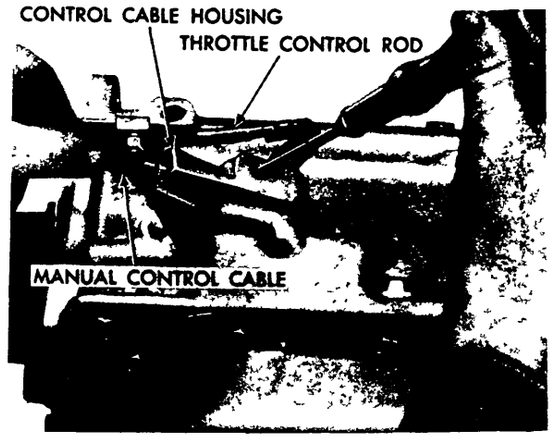
ing. Check seal for wear or deterioration which would result in leakage. Inspect thrust washers for excessive wear.

Excessive Increase in Engine Speed on Kickdown—Readjust kickdown band. Check regulator valve and spring for proper operation. Inspect for dirt, wear, or breakage. Check valve body mating surface for nicks, burrs and trueness, which would cause leakage. Check operation of servo restrictor valve and shuttle valve Inspect valve and plug for dirt, burrs or wear. Inspect all parts of kickdown piston assembly. Inspect piston rings for excessive wear or broken ends. Check governor valve for wear, dirt, binding or sticking. Inspect rear pump gears for excessive wear or broken teeth. Check pump clearance, drive pinion gear and pinion ball.

Harsh Kickdown—Adjust kickdown band. Inspect regulator valve and spring. Inspect for dirt, burrs or breakage. Inspect servo pressure bleed valve for dirt. Check operation of shuttle valve. Check valve and plug for burrs, dirt or excessive wear. Inspect all parts of kickdown piston assembly. Inspect piston rings for scoring, wear or broken ends. Inspect regulator valve body mating surface for nicks, burrs and trueness which would cause leakage. Inspect reaction shaft neoprene seal for deterioration. Inspect governor valve for free operation. Check for dirt which would cause sticking. Inspect rear pump gears for excessive clearance, worn or chipped teeth. Inspect drive pinion gear and drive pinion ball. Inspect the input shaft seal rings for excessive wear or broken ends, and reaction shaft bore for scoring. Inspect all parts of the direct clutch assembly.

OIL PRESSURE:

No Governor Pressure—Governor valve may be stuck in closed position due to dirt. To free valve, apply a short spurt of high air pressure (90 lbs) to governor pressure take-off hole and at same time tap transmission extension housing with a rubber mallet Before applying air pressure, cover filler tube with a cloth. In addition, drain two or three quarts of oil from transmission oil pan. After air is applied, reinstall governor pressure take-off plug and run transmission in Reverse a few seconds. Recheck governor pressure. This corrective procedure may not be permanent. If valve becomes stuck again, remove governor for servicing. If pressures do not correspond to those indicated in "Governor Pressure" table above, the governor may need service. However, before servicing governor, check the other points in the transmission that could cause low pressure as follows· Check the valve body mating surface for trueness, nicks or burrs. These could cause oil leakage. Check both output shaft support gaskets for evidence of internal leakage. Check operation of governor valve and inspect for foreign matter. Check the rear pump gears for broken teeth, wear, and excessive clearance. Check the mating surface of output shaft for trueness, burrs or nicks.



TRANSMISSION GEARSHIFT CONTROL (CABLE RELEASING PROCEDURE)

High Initial Governor Pressure—High governor pressure at low engine speeds is due to the governor valve being stuck in the open position, usually caused by dirt *(see "No Governor Pressure" above)*, for clearing with air pressure.

Line Pressure—If line pressure does not correspond to pressures indicated in "Line Pressure" table above, it will be necessary to investigate and make the following adjustments or corrections: Check transmission oil level. Inspect regulator valve for free operation, dirt or burrs, and condition of valve spring. Check valve body mating surface for trueness, nicks or burrs. Check operation of manual valve and lever. Inspect front pump gears for worn or chipped gears. Check clearance between gears and face of housing.

Throttle Pressure—If throttle pressures do not correspond to pressures indicated in "Throttle Pressure" table above, check line pressure and make the following adjustments and corrections: Adjust throttle linkage. Inspect operation and condition of regulator valve and spring. Check valve body mating surfaces for nicks, burrs and trueness. Check operation and condition of throttle valve, cam and spring. Check throttle pressure check valve ball for nicks and dirt. Inspect condition of kickdown rod and ball.

Direct Clutch Pressure—Direct clutch pressure should be approximately 10 lbs. lower than line pressure with transmission upshifted and engine speed not lower than 650 RPM. If not, refer to "Excessive Engine Speed on Upshifts" above. A pressure drop between line pressure and direct clutch pressure as high as 25 lbs. may be due to broken or damaged seal rings in the direct clutch circuit. These are: three interlocking type input shaft seal rings; the direct clutch piston retainer seal ring, direct clutch piston neoprene seal ring, the neoprene reaction shaft seal ring, and the two interlocking type reaction shaft seal rings.

Lubrication Pressure—Lubrication pressure is checked at the upper left side of the output shaft support, Remove the ⅛" pipe plug and use 100 lbs., pressure gauge C-3292 to check pressure. Lubrication pressure should be 35 to 50 lbs. pressure with transmission in neutral and engine speed at fast idle. If pressure readings are incorrect, check line pressure and inspect torque converter control valve. Low pressures may be due to internal oil leakage at the following points: drive sleeve seal ring, regulator valve body mating surface, reaction shaft seal ring, output shaft support gaskets, input shaft seal rings, and reaction shaft bore. Low oil pressure may also be caused by plugged lubrication lines.

IMPROPER RESPONSE TO GEARSHIFT SELECTOR LEVER POSITIONS:

Moves Forward in "N" (Neutral)—Adjust gearshift linkage. Adjust kickdown band. Inspect manual valve lever assembly. Check valve body mating surface for nicks, burrs and trueness which would cause leakage. Check operation of manual valve. Inspect all parts of kickdown piston. Check regulator body mating surface for nicks, burrs and trueness. Check clutch discs and plates for warpage which would cause dragging. Inspect clutch ball check.

Car Moves Forward in "N" (Neutral) at High Engine Speed—Clutch check valve ball bleed hole may be plugged causing centrifugal oil pressure to partially engage the direct clutch. A slight surge which is not continuous is normal.

Car Moves Backward in "N" (Neutral)—Readjust gearshift linkage and inspect manual valve and valve lever for proper engagement. Adjust reverse band, levers, strut, and shaft. Check for binding, dirt, excessive wear.

MISCELLANEOUS DIAGNOSIS PROCEDURES:

Starter Will Not Energize—Adjust gearshift linkage. Test neutral starter switch. Inspect manual valve lever for proper engagement.

Hard Shifting Into "N" (Neutral)—Check operation of neutral starter switch and inspect manual valve lever.

Hard Shifting Into "R" (Reverse)—Check operation of backup light switch and manual valve lever.

Oil Foams From Filler Tube—Check fluid level in transmission. Inspect transmission breather vent.

GEARSHIFT CONTROL UNIT REMOVAL & INSTALLATION

MANUAL CABLE ADJUSTMENT: *Se "Manual Cabl Adjustm nt" above.*

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POWERFLITE (C nt.)

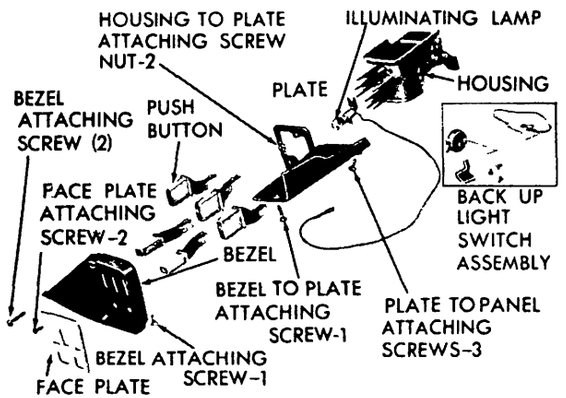
►*1956 PUSHBUTTON CONTROL ASSEMBLY PRODUCTION CHANGE: Two typ s used in production, see "Changes, Cautions, Corr ctions" above.*

1956-59 MODELS

CABLE ASSEMBLY: R m val (Transmission End) – Drain transmission fluid and remove oil pan. Remove neutral safety switch to provide access to cable lock spring and remove cable bracket and screw. Insert screwdriver through neutral safety switch hole and push gently against vertical projecting portion of cable lock spring and pull outward on cable. *(CAUTION – Move spring only a suffici nt amount to permit removal of cable as undu pressure will dislocate spring).*

Installati n: (Transmissi n End) – Move manual valve lever into reverse position which will place the cable adapter in close proximity with cable entrance hole in transmission case. Push in the "L" button on transmission control. Place "O" ring seal on cable ferrule *(NOTE –* Inspect "O" ring seal for cuts, abrasions, brittleness or cracking. If any of these conditions are present, replace "O" ring seal. Hold cable parallel to hole centerline in transmission case and push control cable in until spring lock engages groove in cable end. Position cable bracket and install bracket capscrew. Measure and adjust cable free play (See "Free Play Adjustment" below), being careful not to move manual lever *(NOTE –* Rubber sheath on cable must be pressed onto cable ferrule in order to prevent any possible leakage of oil at this point. On later model cable assemblies, the ferrule will be double grooved and the rubber sheath will be held to the ferrule by the crimped connector). Tighten cable bracket screw. Operate push buttons to check cable adjustment. Adjust as necessary *(CAUTION –* Make sure cable housing is not forced in or out during tightening procedure as backlash will be disturbed). Replace neutral safety switch and transmission oil pan. Refill transmission to correct level using Automatic Transmission Fluid Type "A".

Cabl Backlash Adjustm nt: *See Manual Control Linkage Adjustm nt under LINKAGE ADJUSTMENT.*



PUSHBUTTON CONTROL ASSEMBLY (LATER TYPE SHOWN)

1960 MODELS

CABLE ASSEMBLY: R m val (Transmissi n End) - Push in "R" (Reverse) button, then remove neutral safety starter switch from transmission case. *NOTE - Approximately one quart of oil will drain out.* Loosen cable-to-transmission adjustable mounting bracket screw, then place a screwdriver through neutral starting switch hole and push against cable lock spring. Withdraw cable assembly from case. Check cable ferrule "O" ring for roughness, shredding or deterioration and replace if necessary. Make sure slot in bracket fits just freely into ferrule groove to full depth of slot.

Installation: Push in "L" (Low) pushbutton and then place transmission manual valve lever in reverse detent by moving neutral switch contact part of lever full travel toward rear using a screwdriver inserted in neutral starting switch hole. With "L" (Low) button held tightly in (full travel), insert cable assembly into case engaging cable ferrule groove with lock spring in cable adapter. Make sure groove in cable properly engages lock spring. Replace adjustable mounting bracket and tighten capscrew finger tight. Refill transmission and adjust manual cable (see above).

1956-57 MODELS

PUSH BUTTON CONTROL UNIT: (Removal) – Remove three bezel retaining screws (one screw is located on underside of unit receiver), and remove bezel and push buttons. Remove the two hex head nuts and lockwashers holding push button control unit to instrument panel. Pull push button control unit from rear of instrument panel, down and toward front of car. Remove the two screws holding cable assembly bracket to control unit. Remove hairpin clip securing cable end to actuator bar and remove cable. (After cable is removed from transmission, see "Cable Assembly" above, pull cable through rubber grommet, or remove grommet on dash panel).

Installation: Reverse removal operations and adjust cable free play.

Control Unit Light Bulb Replacement: Remove the three bezel retaining screws (one screw is located on underside of unit receiver) and remove bezel and "D" push button. Install light bulb, replace push button, reinstall bezel and test operation of unit.

1958-59 MODELS

PUSHBUTTON CONTROL UNIT: Removal - Removal procedures are different for the various models as noted below.

DeSoto - Disconnect one battery cable, then at rear of instrument panel, disconnect back-up light switch (if car is so equipped) and control unit lamp leads. Remove two small cross-head screws from face plate to expose two of the bezel retaining screws (third screw is at bottom of bezel). Remove bezel, then remove cross-head screws retaining gearshift housing and plate assembly to instrument panel. Pull plate and gearshift housing straight out and down from instrument panel until control cable and bracket are exposed. *CAUTION - If housing is quipp d with back-up light switch, us car to avoid damag t switch when r moving plat .* Remove two retaining nuts securing plate to housing and remove plate. Remove two screws holding cable assembly bracket to gearshift control housing. Remove hairpin clip securing cable to actuator, then remove cable from gearshift housing. If necessary to remove pushbuttons from slides, slightly spread fingers on slides and withdraw buttons.

Dodge - Remove back-up light switch and lamp lead wires, then remove four screws holding gearshift control housing and plate assembly to instrument panel (one screw at top front of plate, one screw at front edge of plate and two screws at bottom rear of plate). Partially pull plate and gearshift control housing assembly straight out and down from instrument panel. If housing is equipped with back-up light switch, use care when removing plate so as not to damage switch. Remove two retainer screws securing plate to housing, then carefully remove plate by pulling plate away from pushbuttons. Remove two screws holding cable assembly bracket to control housing. Remove hairpin clip securing cable end to actuator and remove cable from housing. To remove pushbuttons, spread fingers on slide and withdraw buttons.

Plymouth - Remove three bezel attaching screws, then remove bezel and pushbuttons. Remove two hex nuts holding pushbutton unit to instrument panel and remove pushbutton unit from rear of instrument panel. Remove cable bracket from pushbutton unit and cable from actuator bar.

Installation: Reverse removal operations and adjust cable freeplay.

Control Unit Bulb Replacement: Remove face plate, then remove as many pushbuttons as necessary and remove bulb.

1960 MODELS

PUSHBUTTON CONTROL UNIT: Removal (All Models) - Disconnect battery cable, then disconnect back-up light switch wire at pushbutton control and illuminating lamp leads at rear of instrument panel. Remove screws of pushbutton face plate and remove pushbuttons by pulling them off button slides. Remove lamp bulb. Remove control housing stud nuts and remove control and cable from rear of instrument panel. Remove clip attaching control cable to actuator and the screw holding cable bracket to control housing.

Installation: Insert end of cable on actuator and install clip, then place cable bracket on control unit and install screws securely. Carefully guide unit from rear of instrument panel and install nuts. Install lamp bulb and pushbuttons. Replace front plate, then connect back-up switch wires and illuminating lamp wires. Connect battery cable.

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POWERFLITE (C nt.)

PARTS REM VAL & INSTALLATI N (TRANSMISSION IN CAR)

►***NOTE: Transmission must be removed from vehicle for the removal and replacement of parts other than those listed below.***

Oil Pan: Remove oil pan filler tube, drain transmission and remove oil pan attaching screws and oil pan. When installing pan, tighten screws evenly and torque to 12-17 ft. lbs.

Governor Servicing: ***NOTE—It is necessary to remove transmission extension to remove governor assembly. See "Transmission Overhaul" below for Extension Housing Removal, Governor Removal, Overhaul & Installation.***

Valve Body & Transfer Plate Assembly (Removal): Remove oil pan and disconnect throttle and manual control lever linkage from levers. Loosen throttle and manual control lever assembly locking screws. Slide throttle valve operating lever assembly off shaft and remove throttle valve camshaft felt retainer and felt. Slide manual valve lever assembly off shaft and remove valve lever shaft seal cover. Remove the two oil strainer support screws and washers and take the strainer assembly off valve body and plate assembly. Remove transfer plate screws and lock washers and remove valve body and transfer plate assembly. For overhaul. ***See "Valve Body Overhaul" below.***

Installation—Clean mating surfaces and check for burrs on both transmission case and valve body transfer plate. Place valve body and transfer plate assembly into position and install plate screws and lockwashers ***(CAUTION—The two 1⅝" screws go through transfer plate cover on valve body. The three 1⅛" are used in the other holes).*** Tighten evenly to 12-17 ft. lbs. torque. Make sure the two oil strainer tube seals are in position over oil strainer and place oil strainer assembly into position on transfer plate. ***(CAUTION—Check to see that oil tubes on strainer properly enter valve body).*** Install the two oil strainer support screws and torque to 12-17 ft. lbs. Place manual lever shaft seal cover over manual valve lever shaft and slide into position on transmission case. Install manual lever (arm side of lever against cover) on manual valve lever shaft, and tighten locking screw. Place throttle valve camshaft felt and retainer over throttle valve shaft. Install throttle valve lever assembly on throttle camshaft and tighten locking screw. Check operation of control by shifting into all positions. Check kickdown operation and manual lever contact on neutral safety and back-up light switches. Install oil pan and adjust throttle linkage and gearshift linkage.

Manual Control Valve Lever Shaft Oil Seal Removal & Installation: Remove oil pan, valve body and transfer plate assembly. Using a suitable brass drift, drive seal out of transmission case from below. To install, use tool C-3277. Start seal squarely into bore and tighten tool C-3277 until it is flush with the case. This properly positions seal. Install valve body and plate assembly and oil pan.

Kickdown Piston (Removal): Remove oil pan, valve body and transfer plate assembly. Loosen kickdown band adjusting screw locknut and back adjusting screw out sufficiently to permit kickdown band strut to be removed by compressing band ends. With kickdown band lever hanging down, install tool C-3289 on transmission case. Apply sufficient pressure on kickdown rod guide to permit easy removal of the snap ring. Loosen compressing portion of tool and remove piston rod guide, piston spring and kickdown piston rod assembly (the kickdown piston cushion spring will fall out of piston when rod assembly is removed). Using snap ring pliers, inserted inside of kickdown piston, remove piston from transmission case. ***See "Overhaul" below, for disassembly and inspection.***

Installation—Make sure the two interlocking seals are locked in position and all seals are coated with Lubriplate, then place kickdown piston into transmission case. With one hand apply pressure to piston and at the same time carefully compress bottom seal and push piston into case. ***(CAUTION***—After bottom seal has entered, piston will seem to hang at two different locations while being pushed into case. This is due to seals entering cylinder, do not use extreme force. If any rings should be broken when piston assembly is being installed, transmission will not operate properly.) Slide piston spring over kickdown piston rod assembly then balance piston cushion spring on rod assembly (Lubriplate may be used to help hold cushion spring in position on rod assembly), and install in piston. Holding it in this position, install kickdown piston rod guide assembly on piston rod assembly. Using tool C-3289, and extreme care, compress the kickdown piston spring to the point that piston guide seal slightly binds on transmission case. Work seal into position and gradually compress spring until seal enters case and snap ring can be installed. Install kickdown piston rod guide snap ring, making sure it is properly seated. Loosen compression portion of tool and remove tool from transmission case. With one end of band fit over adjusting screw, compress the other end sufficiently to install the kickdown band strut between kickdown band and band lever ***(CAUTION***—Make sure band strut slot engages with kickdown band strut pin in band end). Install valve body, plate assembly and oil pan. Adjust kickdown band.

Reverse Servo (Removal): Remove oil pan, valve body and transfer plate assembly. Loosen reverse servo adjusting screw locknut and back adjusting screw out sufficiently to permit reverse band strut to be removed by compressing band ends. Remove reverse servo piston sleeve. Mount tool C-3289 on transmission case and compress reverse piston spring retainer. Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring and loosen compressing part of tool (Spring retainer may require guiding out of transmission case). Remove spring retainer, spring, reverse servo piston and valve assembly from transmission case. Using C-3229 pliers, remove the reverse servo piston valve spring snap ring, and remove spring and valve from piston. ***See "Overhaul" below, for disassembly and inspection.***

Installation—Place reverse servo piston valve and spring in reverse servo piston (shaft on valve protruding through hole in bottom of piston). Using snap ring pliers C-3229, install reverse servo piston valve spring snap ring, making sure it is properly seated. Coat reverse servo piston ring (neoprene) with Lubriplate. Insert reverse servo piston and valve assembly into transmission case in a cocked position, then by rotating piston, the ring will enter case without being damaged. Place reverse servo piston spring over piston and position spring retainer over spring. Using tool C-3289, compress spring sufficiently to install snap ring. Make sure retainer is correctly installed, and snap ring seated. Remove tool C-3289 from transmission case and install reverse servo piston sleeve. Make sure piston sleeve slides freely on piston by working it up and down. Hook one end of reverse band assembly in reverse link assembly, compress other end sufficiently to install reverse strut in slots of reverse band assembly and reverse band lever assembly. Adjust reverse band. Install valve body, transfer plate and oil pan.

Speedometer Pinion (Removal & Installation): Disconnect speedometer cable and housing from sleeve assembly on transmission, and remove speedometer pinion and sleeve. When installing sleeve and pinion assembly, torque it to 40-45 ft. lbs.

Neutral Safety and Back-Up Light Switch Removal & Installation Note: It is not necessary to drain transmission to remove these switches. A small amount of lubricant will drain from transmission when these switches are removed. When installing, tighten switches to 15-20 ft. lbs.

Transmission Output Shaft Rear Bearing Oil Seal (Removal): Disconnect the front universal joint and secure shaft to frame out of the way. Apply hand brake and remove propeller shaft flange nut and washers. Release hand brake and install puller C-452. Remove propeller shaft flange and drum assembly. Remove transmission support grease shield spring (small one). Remove brake support grease shield from extension housing ***(CAUTION—If screwdriver or sharp instrument used to remove shield, do not damage the neoprene sealing surface at bottom of shield).*** Install puller C-748 and remove rear bearing oil seal.

Installation—Install rear bearing oil seal with tool C-3205. Install brake support grease shield on extension housing ***(CAUTION—Indent on grease shield must match groove in housing for correct positioning. Install grease shield far enough on housing to permit installation of spring).*** Install brake support grease shield spring with opening in spring toward adjusting sleeve. Make sure spring is properly seated in groove. Make sure brake adjustment is backed off and install drum assembly (In some instances it may be necessary to use tool C-496 to press drum assembly on output shaft). Install propeller shaft flange washer, shakeproof washer and nut. Adjust hand brake. Apply hand brake and torque propeller shaft flange nut to 140-160 ft. lbs. Connect front universal joint.

Transmission Regulator Valve Assembly (R moval): Remove transmission regulator valve spring retainer, gasket, and spring. Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve.

Installation—Place valve in position in valve body. Install regulator valve spring, gasket, and retainer and tighten to 45-50 ft. lbs. torque.

Torque Converter Control Valve Assembly (Removal): Remove control valve spring retainer, gasket, and spring. Using a mechanical retriever or a piece of welding rod inserted in end of valve, remove valve.

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Installation—Reverse removal procedure

Oil Cooler (Removal): Drain radiator, remove battery and battery pan Remove lower radiator-to-cooler hose Remove inlet and outlet oil tubes. Remove oil cooler to water pump flange bolts

Installation—Clean mating flanges thoroughly and install new flange gasket Install cooler to water pump and tighten flange bolts Install inlet and outlet oil tubes Install lower radiator-to-cooler water hose Install battery and battery pan Refill radiator and start engine Check carefully for water and oil leaks

TRANSMISSION REMOVAL

REMOVAL: Drain transmission and torque converter, (see "Draining & Refilling" above). When fluid drained, replace drain plugs and tighten. *NOTE - If transmission oil pan is not equipped with a drain plug, remove filler tube connected at oil pan).* Disconnect oil pan filler tube from oil pan. Disconnect front universal joint and secure to frame. Remove hand brake adjusting screw cover plate and cable bolt from hand brake support. Disengage ball end of cable from operating lever and remove cable from brake support. Disconnect speedometer cable housing from drive pinion. Disconnect neutral starter switch and back-up light wires from switches *(NOTE* - To avoid damage to switches, remove from transmission before removing transmission from car). Disconnect throttle linkage from lever at transmission. Remove push button control cable (see "Gearshift Control Unit" above). Remove oil cooler lines (if so equipped). Remove nuts and lockwashers from rear engine mount. Install engine support fixture, C-3487. Adjust fixture to support weight of engine and raise engine slightly. Remove cross member to frame bolts and remove cross member, leaving engine support adapter attached to transmission. Work carefully when removing cross member to avoid damaging brake line. *(CAUTION* - When using fixture, Tool C-3487, do not lower engine more than three inches from floor pan to avoid moving the set position of water hose and other engine attachments). Remove two upper transmission case to converter housing screws and lockwashers and install guide studs, Tool C-3276. Remove two lower transmission case to converter housing screws and lockwashers. Slide transmission straight back to avoid damaging front pump drive sleeve, and remove from under car.

TRANSMISSION INSTALLATION

INSTALLATION: Install guide studs, Tool C-3276, in the two upper transmission case to converter housing bolt holes. Lubricate front oil pump drive sleeve ring and bearing surface with transmission fluid. Install drive sleeve in front pump housing (if not previously installed), making sure that driving lugs are properly engaged in front pump pinion gear. Note position of driving lugs on front pump drive sleeve, and position accordingly, to aid in proper engagement with torque converter when transmission is installed. Slide transmission over guide studs and into position. To avoid damage to front oil pump, the transmission must be properly aligned. Do not attempt to use transmission to converter housing bolts to bring transmission and converter housings together. If oil pump drive sleeve and input shaft have been properly aligned, transmission should slide easily into position. *(CAUTION - Do not force it into position).* Install two lower transmission case to converter housing bolts and lockwashers, but do not tighten. Remove guide studs and install two upper transmission case to converter housing bolts and lockwashers. Draw all bolts down evenly and tighten to 45-50 ft. lbs. Complete installation by reversing removal procedure.

TORQUE CONVERTER REMOVAL

1) With transmission removed, turn front wheels to extreme right and remove starter motor Remove the transmission case adapter screws and lockwashers and remove transmission from car Remove lower half of flywheel housing

►*NOTE*: If torque converter being removed because of excessive runout damage, check by using dial indicator on hub and mark the highest point of runout on both converter and crankshaft flange The reason for this is so it may be determined later if runout was caused by the converter or crankshaft

2) Using tool C-811, remove the eight torque converter stud nuts and lockwashers from crankshaft flange Remove torque converter from crankshaft

►*NOTE*—Check crankshaft flange runout Maximum is 002"

STARTER RING GEAR REPLACEMENT (REMOVAL): Support torque converter assembly in a vise and carefully remove staking lugs, retaining ring gear to torque converter, with a file *(CAUTION*—Be careful when supporting torque converter in vise to avoid distortion) Place torque converter on blocks of wood, and using a blunt chisel or drift, tap around ring gear until it comes off converter

Installation of Ring Gear—Remove burrs or raised spots on torque converter with a file, being careful not to remove more metal than is necessary Any of the following methods for expanding the ring gear can be used in the manner outlined

Oven—Set temperature at 150° and allow ring gear to remain for 15 to 20 minutes

Boiling Water—Place ring gear in shallow container, add water and heat for approximately two minutes

Flame—Place ring gear on a flat surface Using a medium size tip, direct a slow flame around inner rim of gear, being careful not to direct flame onto teeth of ring gear Place a few drops of water on face of gear at short intervals during heating process When gear is hot enough to boil the drops of water, installation of gear can be made

When gear properly expanded, proceed as follows: Place starter ring gear over flange surface of torque converter, making sure that rear face of gear contacts flange on torque converter evenly around the entire diameter Reweld ring gear to torque converter, *using extreme care to place as nearly as possible the same amount of metal in exactly the same locations as original assembly* This is necessary to maintain proper balance of the unit Place weld alternately on opposite sides of the converter to minimize distortion Clean thoroughly before installing in car

►*RING GEAR WELDING NOTE* Use a welding current of 200 amps and 5/32" Fleet-Weld No 27, or General Electric No W28 rod, or their equivalent

►*WELDING CAUTION*. To prevent burning through the torque converter, the arc should be directed at the intersection of gear and housing from an angle of approximately 45° from the face of the gear DO NOT GAS WELD.

TORQUE CONVERTER INSTALLATION

►*TORQUE CONVERTER HUB RUNOUT NOTE*: When torque converter assembly is removed for any reason from crankshaft drive flange, the converter assembly runout should be checked when reinstalled There are two methods for adjusting the hub runout *See "Torque Converter Hub Runout Adjustment"*

1) Inspect mating surfaces of torque converter and crankshaft flange for burrs and dirt Install torque converter on crankshaft flange Install eight torque converter stud nuts and draw down evenly and tighten Install lower half of flywheel housing and starter motor

2) Install transmission case adapter on flywheel housing and tighten to 25-30 ft lbs torque Install transmission (see above)

3) Fill transmission with Automatic Transmission Fluid (Type A) to "full" mark on dipstick This will take approximately 5 qts Run engine at idle speed in neutral for approximately two minutes, then add 8 qts of fluid to bring oil level to "full" mark on dipstick Allow engine to run until normal operating temperature is reached Set handbrake and shift selector lever through all ranges and return it to "N", recheck level and bring level to "full" mark.

TORQUE CONVERTER RUN-OUT ADJUSTMENT

Heat Method: ***(CAUTION—When using this method, extreme caution must be used to prevent burning the metal and causing irreparable damage. Sufficient heating of this unit, to cause the necessary drawing of metal required, is accomplished in just a few seconds. DO NOT OVERHEAT).*** Remove transmission, torque converter housing and dust shield. Mount Torque Converter Hub Alignment Indicator C-430 on adapter plate Rotate converter through 360° and mark high point on converter with chalk, then rotate converter to move the high point to the top Apply heat 180° from the high point at opposite side of converter shell at **high point of radius** Use a No 3 acetylene torch burner, moving the flames at all times in a circular motion about the size of a dime When the spot begins to change color remove the flame and quench the converter with a water soaked rag. Change rags several times (the more quickly converter is cooled, the greater the drawing on the metal). Before checking hub runout make certain that both sides of the converter are the same temperature If runout exceeds 004' at the same point, repeat operation. *(CAUTION*—It is possible to draw the metal excessively, thus causing runout at opposite side.

Shim Method: Determine hub runout in the same manner as for "Heat Method" above Loosen converter drive flange nuts sufficiently to insert shims of proper thickness 180° from indicated high point. The thickness of shims used should equal half the total indicator reading, shim thickness not exceeding 008" New shims are furnished in the following sizes Part No 1610442 (002"), 1610443 (003), No 1610444 (005")

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TRANSMISSION OVERHAUL

DISASSEMBLY

1) Place transmission assembly in stand C-3280 and turn upside down. Remove oil pan and gasket. Loosen throttle and manual control lever locking screws and slide levers off shafts. Remove throttle valve camshaft felt retainer and felt and manual valve lever shaft seal cover. Inspect these parts for wear.
2) Remove oil strainer support screws and remove oil strainer assembly. Inspect ring seals located at both outlet sides of strainer. Remove transfer plate screws and take off valve body and transfer plate assembly. *See "Valve Body & Transfer Plate Overhaul" below.*

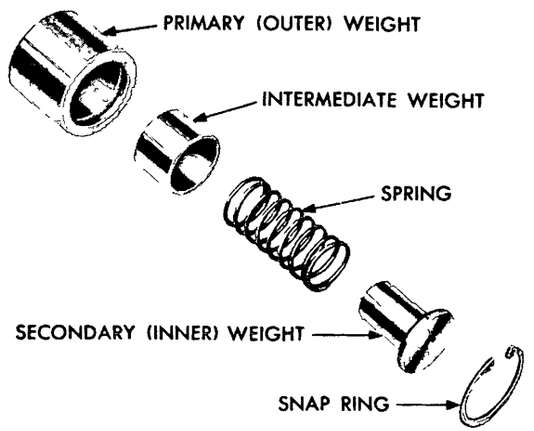
►***CAUTION: Mating surfaces are machined and extreme care must be used to avoid damage to these parts.***

3) Remove neutral safety switch and back-up light switch and gaskets.
4) Check transmission end clearance with a dial indicator or feeler gauge by prying direct clutch assembly toward rear and measuring the distance between direct clutch and carrier housing. Pry direct clutch forward and again measure the distance between direct clutch and carrier housing. Clearance should be .043-.069". If not within limits, record the measurement for reference at reassembly.

Hand Brake Assembly: Using tool C-3281 to hold transmission to flange, remove transmission flange nut and washers. Attach puller C-452 and remove brake drum assembly. Inspect oil sealing surfaces, and lining surfaces on drum for scoring or wear. Remove transmission brake support grease shield spring (NOTE—this spring acts as a guide for the brake shoes and retains the brake support grease shield to transmission extension housing). Place a rubber band around brake shoes to hold them in position and remove brake shoe return spring. Remove brake anchor shoe washer and brake shoe guide. Remove both brake shoe assemblies, adjusting sleeve, nut, screw and brake shoe operating lever link. Remove brake support grease shield from extension housing. *(CAUTION—If a screwdriver or sharp instrument is used to remove the shield, care must be taken not to damage neoprene sealing surface at bottom of shield).* Slide brake support assembly from rear extension housing and anchor. Inspect neoprene spacer for deterioration and note the steel sleeve used between spacer and extension housing.

Transmission Extension: Remove speedometer drive pinion. *(CAUTION—Nylon gear can be damaged if extension housing is removed without first removing the speedometer drive pinion).* Using puller C-748, remove the output shaft rear bearing oil seal and remove any burrs from counterbore of extension housing. Remove the transmission-to-extension screws and lockwashers. Install guide studs C-3283 and attach puller C-3282. Pull extension housing from output shaft support assembly and remove extension gasket. *(CAUTION—Use care when removing extension housing to prevent damage to governor housing).* Inspect extension housing for cracks in casting and remove burrs from gasket surface. Clean output shaft rear bearing and dry with compressed air. Check bearing for rough spots but do not remove from housing unless it is found to be defective. Using a pair of long nose pliers, remove output shaft rear bearing snap ring. Using driver C-3275, drive output shaft rear bearing out rear of extension housing. Remove vent from top of extension housing and make sure it is clear of foreign matter and is open.

Governor: Using a sharp instrument, remove either of the governor valve snap rings. Remove governor valve shaft and valve from governor body. With snap ring-pliers, remove governor weight assembly snap ring (large), and remove governor weight assembly from governor body. Using C-3229 pliers, remove governor secondary weight snap ring. *(CAUTION—Keep thumb pressure against secondary weight when removing snap ring as it is spring loaded).* Remove secondary weight and spring. Inspect all parts for burrs or wear. Check secondary weight for free movement in primary weight by placing secondary weight in primary weight without spring. Primary weight should fall freely when both parts are clean and dry. Check spring for distortion. Remove governor locating screw from governor body and output shaft *(make sure that screwdriver used fits slot in screw perfectly to avoid damage to governor body).* Slide governor body and support from output shaft. Remove the two governor support piston rings and inspect closely. *(CAUTION—Governor* support has pressed in steel sleeve which routes oil through the support. Make sure these passages are open. Do not attempt to replace sleeve if damaged, replace support). Clean passages with air and inspect valve and governor body for slight scores. Remove the four governor body-to-support screws and lockwashers and separate body from support.



3-STAGE GOVERNOR ASSEMBLY

Rear Oil Pump: Remove oil pump housing-to-output shaft support screws and lockwashers and remove housing and oil pump gear. Use prussian blue to mark front side of gear in housing *(DO NOT USE A SCRIBE).* Inspect machined surfaces for nicks and burrs, oil pump gear and housing for being scored or pitted, and pump housing plug for leaks. Remove rear oil pump pinion from output shaft and mark front side with prussian blue *(CAUTION—Oil* pump pinion keyed to shaft by a small ball. Use care when removing pinion not to lose ball). Check pinion keyway and ball pocket for pitting or scoring. Using tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. Clearance limits are from .001-.003".

Center Assembly (Output Shaft Support, Planet Pinion Carriers, and Direct Clutch Assemblies): Remove output shaft support-to-transmission case screw and washer. With one hand, work output shaft up and down, and at the same time apply pressure with the other hand to the input shaft. Slide output shaft rear support assembly, planet gear housing assembly and gasket from rear of transmission case. If rear support is stuck to transmission case and cannot be removed as just described, then proceed as follows: Install one of the oil pan screws into transmission case and with the aid of a pry bar, pry against support sufficiently to separate support from case. Remove direct clutch piston retainer assembly from torque converter reaction shaft. Remove direct clutch piston retainer thrust washer from torque converter reaction shaft. This washer is a select fit and controls end clearance between direct clutch assembly and carrier housing. Inspect washer for cracks, burrs and wear.

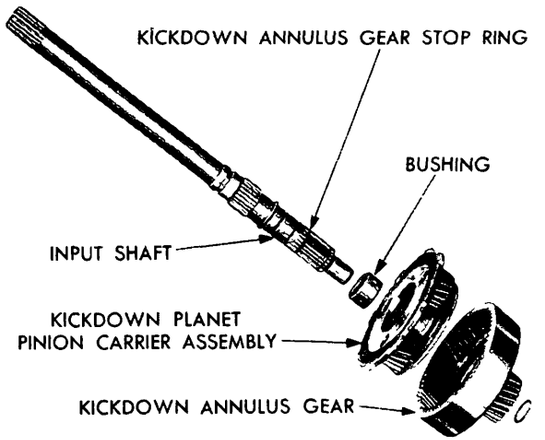
Planet Pinion Carrier Removal from Housing Assembly: Place unit in an upright position in tool C-3285. Using a feeler gauge, check clearance between kickdown planet pinion carrier housing snap ring and kickdown planet pinion carrier assembly. This clearance should be .012-.038". If within these limits, then identify each thrust washer as it is removed. Using a screwdriver, remove transmission kickdown planet pinion carrier housing snap ring. Identify snap ring to aid in assembly (ring is not a selective fit). Proceed as follows:
1) Remove input shaft, kickdown planet pinion carrier assembly and kickdown annulus gear from carrier housing. Remove reverse planet pinion carrier thrust washer and inspect for cracks, burrs and wear. Remove kickdown annulus gear snap ring. Remove kickdown annulus gear from input shaft and inspect for worn, cracked or broken teeth.
2) Remove kickdown planet pinion carrier assembly from input shaft and carefully inspect stop ring on end of shaft which controls position of annulus gear on input shaft. Check all oil passages in both gear and shaft for obstructions. Inspect splines and bearing surfaces for burrs and wear. On early cars, inspect the three seal rings on input shaft for broken ends and make sure they are free to rotate in grooves.
3) Inspect planet pinion carrier for scores on thrust surfaces, broken and worn teeth. Using a feeler gauge, check end clearance on individual planet gears, clearance should be .006-.017". Inspect pinion shafts for tight fit in carrier and make sure pinions are free to rotate on shafts. Check oil holes in gears and shafts for obstructions. Inspect oil holes in the thrust washer of the kickdown carrier to make certain they are open *(NOTE—Do not replace planet pinion carrier assembly unless the above inspection indicates that it is necessary. This assembly is serviced only as a complete unit).*
4) Remove reverse planet pinion carrier assembly from planet pinion carrier housing. Inspect in the same manner as for planet pinion carrier (3 above). Remove output shaft and reverse annulus gear as-

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POWERFLITE (Cont.)

sembly from carrier housing and output shaft support. Remove reverse annulus gear snap ring and remove annulus gear from shaft. Inspect thrust surfaces, journals and inner bushings for scores. Check annulus gear for worn or broken teeth. Inspect ring grooves for burrs and ring for broken ends. Inspect splines on both shaft and gear for burrs and wear. Check speedometer pinion gear and gear output shaft, and shaft bushing for burrs, wear and scoring.

5) Remove planet pinion carrier housing thrust washer and check for cracks or wear. Remove planet pinion carrier housing from output shaft support and inspect driving lug slots inside of housing for wear. Inspect bearing and thrust surfaces for scores and burrs. Closely inspect band contacting surface for burned spots and scoring, especially if lining has worn excessively. Inspect all oil passages in output



INPUT SHAFT ASSEMBLY

shaft and support for obstructions. Check rear oil pump mating surface for burrs and scores, and check for stripped threads in support.

Direct Clutch Piston Retainer: 1) Using a screwdriver remove kickdown sun gear snap ring. Identify this ring so it can be returned to the same position (selective fit). Lift out sun gear assembly. Check for clutch material obstructing oil passages and slinger and remove any metal pickup which might have accumulated on front side. Inspect for cracked or broken teeth.

2) Lift out direct clutch hub from center of direct clutch piston retainer. Inspect driving lugs for wear and remove any metal pickup accumulated on either side of hub. Invert the direct clutch piston retainer and remove clutch plates (steel) and driving disc assemblies (five or six of each used, depending on car model), noting position in which these parts were assembled. *(CAUTION*—If assembly was started with cork portion on outer top, the same sequence will follow all through the assembly and when unit is reassembled the same sequence should be followed to assure smooth operation). Inspect driving discs for evidence of wear, burning, glazing, and flaking off of facing material. Check discs by scratching with finger nail and if material collects under nail, replace discs. Inspect splines in discs, replacing any that are damaged. Inspect steel plates for burning, scoring, or damaged splines.

3) Using tool C-3302, compress direct clutch spring sufficiently to unseat clutch spring retainer snap ring. Release tool C-3302, and remove direct clutch spring retainer snap ring, spring retainer and spring from direct clutch piston retainer. Using a twisting motion remove direct clutch piston assembly from clutch retainer. Air pressure may be used to blow piston out if it is tight.

4) Inspect ball check in clutch retainer housing to make sure it is free. The bearing used in direct clutch piston retainer is a steel back bronze type and is **not replaceable.** If torque converter reaction shaft seal rings have worn or grooved the bearing so that bronze is no longer visible at that point replace the direct clutch piston retainer. Inspect band contacting surfaces for deep scores and burns, especially if band lining is worn to point where steel band has been contacting direct clutch piston retainer. ***(CAUTION—Do not turn clutch piston retainer in lathe to remove score marks).*** Inspect steel clutch plate contacting surfaces for deep scores, replace as needed. Make sure clutch driving lugs will slide freely into retainer. Inspect inside bore for score marks, and if light, remove with crocus cloth, if heavy, replace piston.

5) With tool C-3286, unlock direct clutch piston retainer seal ring and remove from retainer. Inspect for wear and broken ends. Remove direct clutch piston seal ring (neoprene) from piston. Inspect for deterioration and hardness.

Reverse & Kickdown Band Assemblies: Mark reverse band for installation purposes, then compress ends of band sufficiently to remove reverse band strut. Unhook reverse band assembly from link assembly and remove by rotating band ends through rear opening in transmission case. Repeat with kickdown band, noting that strut is grooved to act as a guide to strut pin on band end. Remove from case in same manner as for reverse band. Inspect linings for wear and bonding to metal band. If lining is worn to point where grooves are no longer visible, replace band. ***(CAUTION—Do not attempt to reline bands.)*** Check bands for distortion and cracked ends.

Reverse & Kickdown Band Lever Assemblies: ***(CAUTION—Inspect these link assemblies and levers for cracks or wear, making sure they have side clearance and are free to turn on shafts. Do not remove these assemblies unless inspection reveals that it is necessary).*** If necessary to remove, proceed as follows: Insert finger in back of reverse band and link assembly lever shaft, and holding the reverse band lever and link assembly with the other hand, push shaft out rear opening in transmission case. Remove kickdown band lever shaft plug in front of transmission case and remove kickdown band lever in same manner as for reverse band, except that shaft is removed from front of transmission case.

Front Oil Pump: 1) Remove transmission regulator valve spring retainer, spring, gasket and valve. Remove torque converter control valve spring retainer, spring, gasket and valve.

2) Remove front oil pump-to-transmission case screws and washers (discard aluminum or copper sealing washers, new ones must be used at reassembly). Remove housing by tapping gently with a fibre hammer (if front pump housing has two threaded holes, attach puller C-3287 and guide studs C-3288 and pull housing and gears from transmission case). Use prussian blue to mark front side of gears ***(CAUTION—Do not scribe gears for identification).***

3) Remove front oil pump housing seal (large neoprene) from housing, and inspect for deterioration and hardness. Using a brass drift, drive housing dust seal out front of housing. Inspect housing bushing for scores. Remove light scores with crocus cloth and if bushing scored heavily, replace housing (bushing is not replaceable). Check housing and gears for scores.

4) Using tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. Clearance limits are from .001" to .003". Make sure all oil passages are clear by blowing out with compressed air.

Regulator Valve Body: Using the two holes provided in regulator valve body, attach puller C-3287, and install guide pins C-3288. Pull regulator body off torque converter reaction shaft. Place body and both valves in pan containing clean solvent, wash thoroughly and dry with compressed air. Check valves for free movement in body, these valves should fall in and out of bores when both valves and body are dry. *(CAUTION*—If crocus cloth is used to polish valves, care must be taken not to round off the sharp edges of valve.) Check for all passages for obstructions and all mating surfaces for burrs or distortion. If body has a slight nick or raised portion on a mating surface, it can be removed with a surface plate and crocus cloth. Check regulator valve spring seat (snap ring) for proper seating. Wrap valves and body in separate cloths until ready for installation.

Reverse Servo Piston: Lift out reverse servo piston sleeve. Inspect inside bore, lever, and contacting surface on piston sleeve for scores and wear. Make sure the two bleeder holes are open. Install tool C-3289 on transmission case and compress reverse piston spring retainer. Using a screwdriver, remove the reverse servo piston and valve assembly spring retainer snap ring, and loosen compressing portion of tool. Remove spring retainer, spring, servo piston and valve assembly. Remove servo piston ring (lip type neoprene) from piston and inspect for distortion and hardness. Remove reverse servo piston valve snap ring. Remove spring and valve from piston. Inspect servo bore for scores and remove light scores with crocus cloth.

Kickdown Piston: Using tool C-3289, apply sufficient pressure on kickdown piston rod guide and remove the snap ring. Loosen compressing portion of tool and remove tool from transmission case. Remove piston rod guide, piston spring, kickdown piston rod assembly, and kickdown piston cushion spring. Inspect riveting of kickdown piston rod to kickdown piston spring retainer. Remove seal ring from guide and inspect for light scores and wear on piston rod and guide. Using C-484 pliers, remove kickdown from transmission case. Remove the three snap rings (two locking and one open type) from kickdown piston. Inspect rings for scores or broken ends, and piston for wear.

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POWERFLITE (C nt.)

Torque Converter Reaction Shaft: *(CAUTION—Inspect shaft seal rings (interlocking type) for broken ends and make sure they are free to rotate in grooves. Inspect inside of shaft for burrs, and splines for burrs and wear. Check thrust surfaces for wear and slight scores. Do not remove reaction shaft from case unless inspection reveals that it is necessary).* If shaft must be removed, proceed as follows: Remove shaft seal (neoprene). Using a suitable brass drift, remove shaft dowel pin from shaft flange and transmission case. Remove transmission case-to-reaction shaft screws and using tool C-3297, press shaft out of transmission case. Remove the two shaft seals (interlocking).

Manual Control Valve Lever Shaft Oil Seal: Drive seal out of case with a suitable drift.

Kickdown Band Adjusting Screw: Loosen locking nut and remove kickdown band adjusting screw and locknut. *CAUTION—When locknut is loosened, the adjusting screw must be finger free. If not, inspect screw and nut for pulled threads or foreign material on threads. Freeness of this screw is very important to adjustment.*

Transmission Case Inspection: Inspect case for cracks, sand holes and stripped threads. Check for burrs on mating surfaces. Blow compressed air through all passages to make sure they are open. Check oil hole plugs for tightness.

REASSEMBLY

Kickdown Band Adjusting Screw: Install adjusting screw in transmission case until there is approximately 1" of screw left outside case. Do not lock screw into position at this time.

Manual Control Valve Lever: Using tool C-3277, start seal squarely and tighten until seal is flush with case.

Torque Converter Reaction Shaft: *(NOTE—Reaction shaft should only be removed if inspection indicates that it is faulty).* Heat front face of transmission case to 170-190°, using sun lamps for the purpose.

1) Coat the two shaft interlocking seal rings with Lubriplate and install on shaft and lock in place. Make sure the rings are free to rotate in lands. Coat the portion of shaft that presses into case with Lubriplate and position shaft into front of transmission so holes in shaft line up with screw holes in case.

2) Place a 5/16" (.308-.311" outside diameter in unthreaded section), 2¼" long bolt through dowel guide pin holes in case and reaction shaft to act as guide, install nut. Using tool C-3297 press shaft into place. Do not remove 5/16" bolt at this time. Start the three transmission case-to-reaction shaft screws and washers and tighten slightly, but do not torque.

3) Remove 5/16" bolt from dowel hole and install the reaction shaft dowel from inside case. Torque the case-to-reaction shaft screws to 10-15 ft. lbs. Coat neoprene reaction shaft seal and install on shaft.

Kickdown Piston: 1) Coat the three kickdown piston rings (two locking and one open type) with Lubriplate and install on piston. Lock into position and make sure they are free to rotate in lands. Place kickdown piston assembly into transmission case, compress bottom ring with a brass rod (flatten end), and push piston into place.

►*CAUTION: After bottom ring has entered, piston will seem to hang at two different locations while being pushed into case. This is due to rings entering cylinder. If any of the rings should be broken when piston assembly is being installed, transmission will not operate properly.*

2) Place cushion spring in piston and install tool C3289 on transmission case. Place piston rod assembly in piston and slide piston spring over piston rod assembly. Coat piston rod guide seal ring with Lubriplate and install on rod guide. Make sure ring rotates in groove.

3) Place piston rod guide assembly on piston rod assembly and using extreme care, compress the kickdown piston spring to the point where piston guide seal ring slightly binds on case. Using a piece of brass rod (flattened on end), work seal into position, gradually compressing spring until seal ring enters case and snap ring can be installed. Install snap ring, making sure it is properly seated.

Reverse Servo Piston: 1) Place reverse servo piston valve and spring in reverse servo piston, with shaft protruding through hole in bottom of piston. Using pliers C-3229, install reverse servo piston valve spring snap ring and make sure it is seated.

2) Coat servo piston ring with Lubriplate and install on piston. Insert piston and valve assembly into transmission case in a cocked position, then by rotating piston, the piston ring will enter case without damage.

3) Place servo piston spring over piston and position spring retainer over spring. Compress spring with tool C-3289 sufficiently to install snap ring, making sure it is seated. Inspect interior of servo sleeve for burrs, then place sleeve over piston, making sure sleeve slides freely on piston by working it up and down. Remove installing tool from transmission.

Regulator Valve Body: 1) Inspect regulator valve body and valves to make sure that no damage has occurred since disassembly and blow out passages with air.

2) Coat reaction shaft seal (neoprene) with Lubriplate if not already done, and place regulator valve and torque converter control valve in regulator valve body. Install guide studs C-3288 in front transmission case.

3) Place regulator valve body assembly, with oil passages to rear, over reaction shaft and onto guide studs *(CAUTION—When reaction shaft seal enters regulator body use care to prevent shaft screws damaging passages on regulator body)*, seat firmly to front of transmission case.

Front Oil Pump: 1) Position front oil pump housing dust seal in oil pump housing with metal portion of seal down. Using driver C-3278, bottom seal in housing. Coat housing seal (large neoprene seal) with Lubriplate and install on housing.

2) Place front oil pump gear and pinion (driving lugs on pinion facing up, and prussian blue marks made at time of disassembly toward front) in pump housing. *(CAUTION—Oil pump pinion must be installed correctly or damage will result when installed in transmission.)* Lubricate pump gears with transmission fluid.

3) Place pump housing assembly over reaction shaft and slide into position over guide studs until pump housing seal is flush with transmission case. Using new aluminum or copper washers on screws, start five of the screws and draw housing down evenly until it is seated into transmission case. Remove guide studs and install two remaining screws and washers. Torque all screws to 12-17 ft. lbs. *NOTE—After all screws have been installed and torqued, engage driving lugs of oil pump pinion to determine if pinion turns freely. Use the oil pump drive sleeve for this check. If not free, remove pump and check for foreign matter between gears and housing.*

4) Using a new gasket, install torque converter control valve spring and retainer. Torque to 35-40 ft. lbs. Install regulator valve spring and retainer, using a new gasket, and torque to 45-50 ft. lbs.

Reverse Band, Kickdown Band & Lever Assemblies: *NOTE—If lever assemblies were not removed, omit the operations covering their installation.*

1) Place kickdown band lever assembly in transmission case and slide band lever shaft into position from front of case, making sure it operates freely. Install band lever shaft plug and torque to 30-35 ft. lbs. Place kickdown band assembly into transmission case by rotating ends of band through opening in case. Fit proper end of band over adjusting screw and compress band sufficently to install band strut between other band end and band lever. *CAUTION—Make sure band strut slot engages with kickdown band strut pin in band end.*

2) Place reverse band lever assembly in reverse band link assembly and position into transmission case, aligning holes in lever and link assemblies to holes in transmission case. Slide band lever shaft into position from rear of transmission case. Shaft is held in position by rear output shaft support.

3) *(NOTE—If new reverse band is to be installed, back adjusting screw out until approximately 1" of screw is above lever on locknut side.)* Place reverse band assembly into transmission case by rotating ends of band through rear opening in case. Hook correct end of band (previously identified when band removed) in link assembly. Compress band sufficiently to install band strut in slots of reverse band and band lever assembly.

►*DIRECT CLUTCH RETAINER & KICKDOWN BAND ASSEMBLY SERVICE REPLACEMENT NOTE:* A new Kickdown Band Assembly, Part No. 1854128, and a new cast iron Direct Clutch Retainer are used in production beginning with 1959 models. The later type Kickdown Band Assembly MUST be used with the cast iron Direct Clutch Retainer and may be used with the earlier type steel retainer. Both parts are interchangeable with previous models as a complete unit.

Direct Clutch Piston Retainer: 1) Coat direct clutch seal ring with Lubriplate and install on piston, with lip of ring facing away from the flange. Coat clutch piston retainer seal ring with Lubriplate and install on retainer hub. Using tool C-3286, lock seal into position and make sure it is free to rotate in lands. Place piston assembly in clutch retainer, and with a twisting motion, seat piston in bottom of retainer, being careful not to damage lip of seal.

2) Seat clutch spring into piston retainer and position spring retainer and snap ring on spring. Using tool C-3302, compress clutch spring sufficiently to seat the snap ring. *NOTE*—Piston spring retainer may require guiding past the snap ring grooves. Make sure snap ring properly seated.

3) Place clutch hub in center of clutch piston re-

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tainer Lubricate all clutch plates and driving discs with automatic transmission fluid and assemble by placing one of the clutch plates in clutch piston retainer, followed by a driving disc. ***(NOTE—Install discs in the same manner they were removed. If first driving disc was installed with cork portion on outer top, then the remaining discs must be installed in the same manner, or vice versa. Repeat this procedure until all six discs and plates have been installed.)***

4) Place kickdown sun gear assembly in direct clutch piston retainer and install snap ring (this ring is a selective fit and must be checked as follows) Using a feeler gauge, check clearance under kickdown sun gear snap ring Clearance limits should be as close to zero as possible Rings are furnished in three sizes for selective fitting Part No 1327729 (.059-.061"), No 1327730 (.062-.064"), No 1327731 (.065-.067").

Planet Pinion Carriers: 1) Place output shaft support in tool C-3285 with bearing surface up Lubricate bearing surface of planet pinion housing and place bearing surface of housing over output shaft support bearing surface Place reverse annulus gear on output shaft and install snap ring (Output shaft may be placed in vise, providing vise is clean and equipped with brass jaws) ***(CAUTION—Reverse annulus gear must be tight fit on shaft. End clearance is controlled by various snap rings which are furnished in the following three thicknesses: Part No. 1329608 (.078-.080"), No. 1329609 (.082-.084"), No. 1329610 (.086-.088"). Make sure that snap ring is properly seated.)***

2) Coat output shaft seal ring with Lubriplate and install on shaft Lock into position and make sure ring rotates freely in groove Coat planet pinion carrier housing thrust washer with Lubriplate, slide over output shaft and into position in reverse annular gear Place output shaft and reverse annulus gear in position in carrier housing and through output shaft support, being careful not to damage shaft seal ring as it enters shaft support ***Check to see that planet pinion carrier thrust washer seats properly between annular gear and carrier housing.***

3) Lubricate thrust surfaces and gear teeth of reverse planet pinion gear and carrier assembly, and place carrier assembly in reverse annulus gear ***(CAUTION—Make sure driving lugs on carrier assembly properly engage slots in planet pinion housing.)***

4) On early cars, coat input shaft seal rings with Lubriplate and lock into position, making sure rings rotate freely in lands (Later cars have a large bearing area (bushing) on shaft replacing the three seal rings. ***See "Input Shaft Production Change" above for installation of later type shaft in early cars). (CAUTION—Inspect stop ring for proper position in input shaft groove).*** Lubricate thrust surfaces and gear



GEAR TRAIN (PLANET PINION CARRIER)

teeth on kickdown planet pinion gear and carrier assembly. Slide assembly with collector ring up, carefully down on rear end of input shaft and over stop ring. Lubricate teeth and thrust surfaces and install kickdown annular gear onto input shaft, down to stop ring. Install kickdown annulus gear snap ring and make sure it is seated (Input shaft can be installed in vise providing it is clean and equipped with brass jaws).

5) Engage teeth of kickdown planet pinion gears with teeth on kickdown annulus gear Slide pinion gear and carrier assembly into position in kickdown annulus gear Coat reverse planet pinion carrier thrust washer with Lubriplate and install on kickdown annulus

6) Place kickdown planet pinion carrier assembly, annulus gear and input shaft into position in planet carrier housing Make sure planet pinion carrier thrust washer remains on annulus, and driving lugs on carrier assembly properly engage slots in planet pinion housing Install planet pinion housing snap ring (not selective fit), making sure it is positioned and seated properly Lubricate gears and splines

7) Using a feeler gauge, check clearance between kickdown planet pinion carrier housing snap ring and the kickdown planet pinion carrier assembly Limits are .012-.038" If not within these limits disassemble and recheck reverse planet pinion carrier and planet pinion carrier housing thrust washers

Center Assembly (Output Shaft Support, Planet Pinion Carriers, and Direct Clutch Assemblies): 1) Coat kickdown planet pinion thrust washer with Lubriplate, place over kickdown sun gear and on to thrust surface of direct clutch piston retainer assembly Place direct clutch piston retainer assembly over input shaft, engaging sun gear with kickdown planet pinion gears and engaging splines of input shaft with direct clutch hub Make sure kickdown planet pinion carrier thrust washer remains in position

►***DIRECT CLUTCH PISTON RETAINER THRUST WASHER (CAUTION:*** This thrust washer controls transmission endplay clearance and is a selective fit After transmission is reassembled, except for hand brake assembly, the endplay clearance must be checked and corrections made in the washer thickness as necessary. ***See "Checking Transmission Endplay" below***

2) Coat direct clutch piston retainer thrust washer with Lubriplate and install on torque converter reaction shaft inside transmission case Use care when sliding washer over rings to prevent damage

3) Install guide studs C-3283 in rear of transmission case, position new output shaft support gasket over guide studs and on to case Place tool C-3306 over splines on front of input shaft

4) Insert input shaft, with direct clutch assembly, planet pinion carrier housing, output shaft support and output shaft attached, through rear of transmission case and through transmission reaction shaft Then guide assembly through bands and over guide studs into position in transmission case Remove tool C-3306 from front of input shaft

►***CAUTION: Do not force assembly into case. Avoid damage to seal rings on torque converter reaction shaft.***

5) Install one output shaft support-to-transmission case screw and lockwasher finger tight

Rear Oil Pump: 1) Coat oil pump pinion ball with Lubriplate and insert in ball pocket in output shaft Lubriplate oil pump drive pinion, place over shaft and slide into position, aligning keyway in pinion with ball in shaft ***Make sure pinion is installed with side marked with prussian blue at disassembly, is toward front.***

2) Slide pump housing assembly over output shaft and into position against output shaft support Install five rear oil pump housing-to-output shaft support screws and lockwashers ***(CAUTION—There are two extra holes in housing which are used for vents. Make sure screws are not installed in these holes. Check each screw hole before installing screws).*** Draw screws down evenly and tighten to 15-20 ft lbs. torque. When screws have been properly tightened, check output shaft for free rotation of pump gears. If not free, disassemble pump to determine cause.

Governor: 1) Coat the two governor support piston rings with Lubriplate and install on governor support Stagger rings and make sure they are free. Position governor body on support, install the four screws and lockwashers ***but do not tighten at this point.***

2) Slide governor support and body assembly over output shaft and into position in rear pump housing, compressing governor support piston rings with fingers as support enters oil pump housing.

3) Align locating hole in output shaft to locating screw hole in governor body and install governor locating screw, tighten to 3½-4 ft. lbs. torque. ***NOTE—Holes can be easily aligned by turning output shaft and holding governor body. Make sure screw driver attachment fits the screw slot when tightening locating screw.***

4) Tighten the four governor body screws to 5-10 ft. lbs torque.

5) Dry governor parts with compressed air but do not lubricate when assembling. Place governor weight spring over secondary weight and position both in primary weight, making sure springs seat properly. Guide secondary weight, and compress governor weight spring sufficiently to install snap ring. Make sure ring is properly seated. Place governor weight assembly, with secondary weight snap ring up, into governor body and install snap ring, making sure it is seated.

6) Slide governor valve, with small end up, over governor valve shaft. Slide governor shaft into governor body through output shaft and governor weight assembly, at same time positioning valve into body. Install governor shaft snap ring and make sure it is securely locked to shaft. Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

Transmission Extension: ***NOTE—If output shaft rear bearing was not removed, omit operation covering its installation.***

1) Using driver C-3204, install output shaft rear bearing in extension housing. Make sure it is properly seated then lubricate with automatic transmission fluid. Install output shaft bearing snap ring, bevel side up, making sure it is properly seated.

2) Replace extension breather and tighten to 10-12 ft. lbs. torque. Install new transmission extension gasket over guide studs and into position against output shaft support. ***Do not use sealing material on***

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gasket. Using care not to damage governor housing, place extension housing over output shaft and onto guide studs. Using tool C-496 with adapter C3284, press extension housing into position against output shaft support.

3) Start the seven transmission extension-to-case screws and lockwashers, then draw down evenly and tighten to 25-30 ft. lbs. torque. Tighten output shaft support-to-case screw to 25-30 ft. lbs. torque. ***Check to see that output shaft turns freely.***

4) Coat nylon gear and threads on speedometer drive pinion with Lubriplate and install in extension. Tighten to 40-45 ft. lbs. torque.

Checking Transmission Endplay: Using dial indicator C-430 or feeler gauge, measure the distance between direct clutch assembly and carrier housing when clutch is in **rearward** position. Using a screwdriver inserted between the direct clutch assembly and carrier housing, carefully pry direct clutch **forward.** Remove screwdriver and measure again. The difference in measurements is the end clearance and must be .043-.069". If it does not fall within these limits, proceed as follows:

1) Remove the seven screws and lockwashers from transmission extension and install guide studs C-3283. Then remove the one output shaft support-to-case screw and washer, and remove extension housing, output shaft, support, and planet pinion carrier housing assembly as a unit.

2) Slide direct clutch piston retainer from torque converter reaction shaft and remove direct clutch piston thrust washer. Using a micrometer, measure thickness of the washer and then select a washer to give correct clearance. These washers are available in the following five thicknesses: Part No. 1406442 (.125-.130"), No. 1406443 (.135-.140"), No. 1406444 (.145-.150"), No. 1406445 (.155-.160"), No. 1406446 .164-.170").

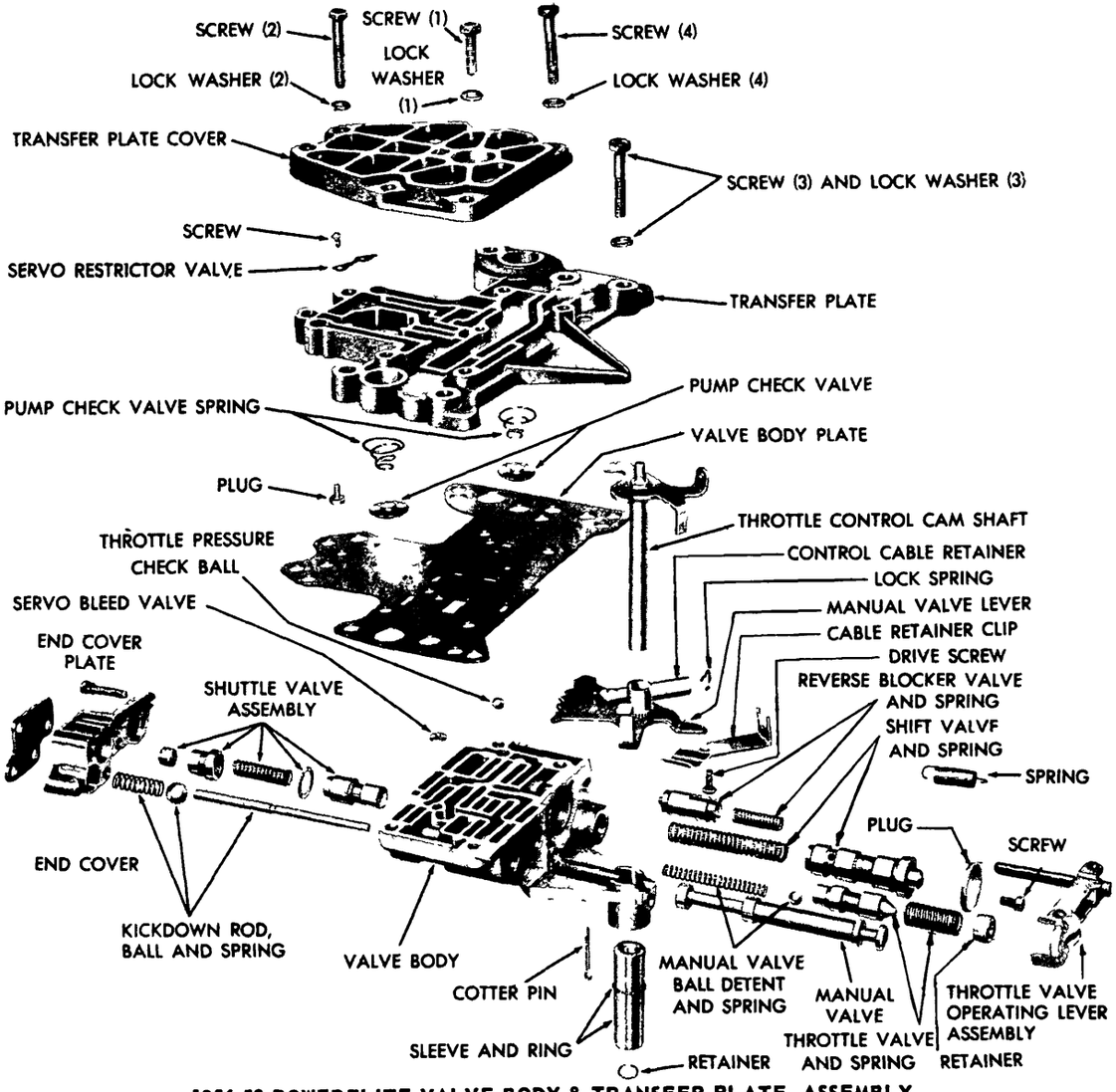
3) To install, reverse removal procedure. Using driver C-3205, install output shaft rear bearing oil seal.

Hand Brake Assembly: 1) With brake support spacer in position on back of brake support and spacer sleeve in center of support, slide brake assembly over rear extension housing and anchor pin. Make sure spacer sleeve remains in center of support. Install brake support grease shield on extension housing. ***NOTE—Indent in shield for correct positioning on extension housing. Shield must be located on housing far enough to permit installation of spring later.***

2) Place both anchor brake washers on brake shoe anchor and install locking washer. Place both shoe assemblies with adjusting sleeve nut and screw into position on anchor. Make sure brake shoes are between the anchor washers. Use a rubber band around shoes to help hold them in position.

3) Install operating link (marked for correct installation), and brake shoe support grease shield spring (with opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove. Slide brake shoe return spring behind grease shield spring and hook into position in holes in brake shoes.

4) Make sure adjustment is loose enough and install brake drum assembly. If necessary, use tool C-496 to press brake drum on output shaft. Install transmission flange washer, shakeproof washer and nut, and tighten to 140-160 ft. lbs. torque.



1956-58 POWERFLITE VALVE BODY & TRANSFER PLATE ASSEMBLY

Kickdown Band Adjustment: Turn transmission on side and using tool C-3291, loosen locknut and tighten kickdown adjusting band adjusting screw to 60-72 inch lbs. torque. With the counter on C-3291, **back adjusting screw out 3 turns,** then holding adjusting screw stationary with short handle, tighten locknut securely. ***Use extreme care to assure correct adjustment.***

Reverse Band Adjustment: Remove reverse band adjusting screw locknut and tighten adjusting screw to 20-25 inch lbs. torque, then back out adjusting screw 10 turns. Holding adjusting screw in this position, replace adjusting screw locknut and tighten to 30-35 ft. lbs.

Valve Body & Transfer Plate: 1) Install neutral safety switch, back-up light switch and gasket, and tighten to 15-20 ft. lbs. torque. Clean mating surfaces and check for burrs on transmission case and valve body. Place valve body and transfer plate into position on transmission case and install five transfer plate screws and lock washers ***(Install the two 1⅝" long screws through transfer plate cover on valve body),*** tighten to 12-17 ft. lbs. torque. Make certain the two oil strainer tube seals are in position on oil strainer, and place oil strainer in position on valve body. Install oil strainer support screws and lock washers

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and tighten to 12-17 ft. lbs.

2) Place manual valve lever shaft seal cover over manual shaft and install manual control lever with arm side of lever against cover, on manual valve shaft. Tighten locking screw. Place throttle valve camshaft felt and retainer over throttle valve shaft. Install lever assembly on throttle camshaft, and tighten locking screw. Check operation of controls by shifting manual control into the four operating positions.

3) Check throttle cam position in throttle operating lever assembly and throttle camshaft assembly for kickdown operation. Visually check manual lever contact on neutral safety and back-up light switches.

4) Install oil pan, using a new gasket, and tighten attaching screws to 12-17 ft. lbs., drawing screws down evenly. Tighten drain plug to 20-25 ft. lbs. torque.

VALVE BODY OVERHAUL

C ntr l Valv Ass mbly: A reverse blocker valve has been added to the control valve assembly. Remove the reverse blocker valve by removing the cotter pin and spring, then rotate valve out of its bore. Donot remove push button unit control adapter, lock spring, or cable adapter clip unless inspection indicates that it is necessary. See "Control Valve" illustration for removal and installation of valve components.

Valve Body & Transfer Plate Disassembly: Place valve body and transfer plate assembly in holding fixture C-3294. DO NOT USE VISE TO HOLD TRANSFER PLATE ON VALVE BODY.

1) Remove two of the long transfer plate cover screws and lock washers and install guide studs C-3295. Keeping finger tight pressure against transfer plate, remove the three remaining transfer plate cover screws, (two long & one short), and remove transfer plate cover. Using care not to lose the servo restrictor valve operating plug from transfer plate, remove transfer plate from valve body plate. *NOTE—Rear pump check valve has metering hole in it. Note position of this valve in relation to the front pump check valve (without metering hole).*

2) Remove valve body plate from valve body, noting position of throttle pressure check valve ball, and servo bleed valve (servo bleed valve may stick to valve body plate). Remove these parts and place in clean container. Remove throttle valve cam spring from cam and operating lever. Compressing the throttle valve operating lever assembly against throttle valve spring, slide throttle valve cam assembly from manual lever assembly *(CAUTION—Remove any burrs from throttle valve camshaft and manual valve lever shaft before sliding them from valve body).*

3) Swing throttle valve operating lever out of way and remove throttle valve spring and retainer from throttle valve. Remove throttle valve from valve body core. Check distance from valve body to end of throttle valve operating lever adjusting screw. This distance should be 1 11/16". Using tool C-3279, remove throttle valve adjusting screw, lock nut and throttle valve operating assembly. *NOTE—It is not necessary to remove throttle valve operating assembly unless parts are to be replaced.*

4) Remove the four (three long and one short) valve body end cover plat screws and lock washers and remove valve body end cover plate. Remove valve body and cover screw, keeping pressure against cover to avoid losing the three springs behind it. Carefully remove valve body cover so as not to lose any of the springs or kickdown valve ball. Remove shuttle valve plug *(CAUTION—This plug has an adjustment, but do not disturb this setting as it is adjusted during manufacture).* Remove kickdown valve ball from body. Remove shuttle valve by using shuttle valve spring (shuttle valve stop ring will come out with valve).

5) Remove direct clutch shift valve spring from valve body. Mark the direct clutch shift valve plug with prussian blue (in order to reinstall with right side out), then loosen plug screws sufficiently to allow removal of plug by pushing on open end of shift valve with finger. Remove shift valve, and remove valve body from tool C-3294. Place valve body on clean paper. Remove kickdown rod from cover end of valve body.

►*MANUAL VALVE AND LEVER ASSEMBLY NOTE—It is not necessary to remove this assembly unless damaged parts are to be replaced. If assembly must be removed, proceed as follows:*

6) Place manual control valve lever on lever assembly and turn it counter-clockwise until manual control valve is in low range position (last detent). Using a screwdriver, compress detent plunger and spring and continue to turn manual valve lever assembly until manual valve becomes disengaged from manual valve lever assembly. Remove manual valve from valve body bore. Remove manual control lever and slide manual lever assembly from valve body. Remove manual valve lever detent plunger and spring from valve body.

Valve Body & Transfer Plate Inspection: Wash all parts in clean solvent and dry with compressed air. Check all passages for obstructions and check for porous coating. Inspect all mating surfaces for burrs and scratches. Light scratches and burrs can be removed with crocus cloth. With a light, check bores in valve body for pits and scores. Check springs for distortion and collapse. Check mating surfaces on a surface plate for distortion. Check all moving parts for free operation, and valves for freeness in body bores. Inspect servo restrictor valve in transfer plate to make sure it is seating properly. If valve is defective, carefully remove drive screw. Install new valve and new drive screw, making sure drive screw is tight, and being very careful not to distort transfer plate when installing drive screw. Check all points in valve for wear and replace defective parts.

Valve Body & Transfer Plate Reassembly: *CAUTION—When assembling valve body and transfer plate assemblies, handle parts carefully to avoid damage, such as nicks, etc., to mating surfaces. Use a twisting motion when placing valves in their respective bores.*

1) Place manual valve lever detent plunger spring and plunger into place in valve body. Slide manual valve lever assembly into valve body. Using a twisting motion place manual valve into valve body sufficiently to engage manual valve with manual valve lever pin. Then using valve lever assembly, turn slowly in clockwise direction and at the same time using a twisting motion, guide manual valve into valve body to low range position. Make sure detent plunger is seated.

2) Place kickdown rod (small end toward end cover) into valve body, making sure it is properly seated. Place valve body in tool C-3294 and install direct clutch shift valve. Place direct clutch shift valve into position (same as when removed, and with marks made at disassembly in correct position) in valve body. Draw the two screws down evenly and torque to 24-30 inch lbs. Install direct clutch shift valve spring in valve.

3) Install shuttle valve in valve body. Coat stop ring lightly with Lubriplate and place into recess in valve body. Place shuttle valve spring in valve. Place kickdown valve ball into valve body.

4) Place valve body end cover plate on end cover. Install one short screw and lock washer. Tighten securely. Place shuttle valve plug into position in end cover, and install kickdown valve spring. Install valve body end cover onto valve body. *CAUTION—Make sure direct clutch shift valve, shuttle valve and kickdown valve spring are in correct position and properly seated when cover is being installed.* Install valve body end cover screw and lock washer, but do not tighten.

5) Install the three (long) valve body end cover plate screws and lock washers. Draw down evenly and tighten to 24-30 inch lbs. Tighten valve body end cover screw and the remaining end cover plate screw to 24-30 inch lbs.

6) Using tool C-3279, install throttle valve adjusting screw, locknut and throttle valve lever assembly. Adjust to where there is approximately 1 11/16" distance between valve body and end of throttle valve operating adjusting screw. Install throttle valve (point outward) in valve body. Place throttle valve spring and retainer over throttle valves. Swing throttle valve operating lever over spring and retainer. Compressing the throttle valve lever assembly against throttle valve spring, slide throttle valve cam assembly into manual lever assembly, indexing cam portion on throttle valve in slot of operating lever. Install throttle valve cam spring to cam and operating lever.

7) Install servo bleed valve and throttle pressure check valve ball into position in valve body and install guide studs. Position transfer plate cover on transfer plate and install the center screw (short) and lock washer finger tight. Install the servo restrictor valve operating plug (long end first) into transfer plate.

8) Make sure pump check valves and springs are properly positioned in transfer plate. The pump check valve with the metering hole should be toward the rear of transmission. Place valve body plate flush into position on transfer plate by compressing pump check valve springs. *CAUTION—Be sure pump check valves enter transfer plate, otherwise valve body plate will be damaged when assembly is later drawn down onto valve body.*

9) Keep sufficient pressure on transfer plate and valve body to hold them together. Place over guide studs and into position on valve body, and install two of the transfer plate cover screws and lockwashers (one on each side) finger tight. Recheck to see that pump check valves remained in position in valve body plate. Remove guide studs and install two remaining transfer plate cover screws and lock washers. Draw transfer plate down evenly and torque all five screws to 45-50 inch lbs. torque. *CAUTION—Avoid over tightening as this will cause valve body to warp which will result in sticky valves. Check operation of pump check valves to make sure they can be unseated by pressing down on them.*

TORQUEFLITE

Chrysler Imp rial (1956)
Chrysler & Imp rial (1957-60)
DeSoto (1957-60)
Dodge (1957-60)
Plymouth (1957-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR: (Towing car to start is not recommended because of sudden surge of power when engine starts).* Turn ignition switch on, then push the "1" (Low) button in and depress accelerator pedal slightly. After car attains a speed of 15 MPH, the transmission will start engine.

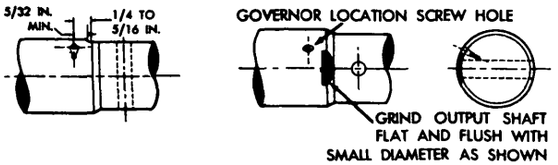
►*TOWING TORQUE-FLITE CARS: Following procedure is recommended:*

Transmission Operating Properly—Car may be towed safely in "N" (Neutral) position at moderate speeds. For long distance towing (over 100 miles), the propeller shaft should be disconnected.

Transmission Inoperative—Tow car with rear end raised or remove the propeller shaft.

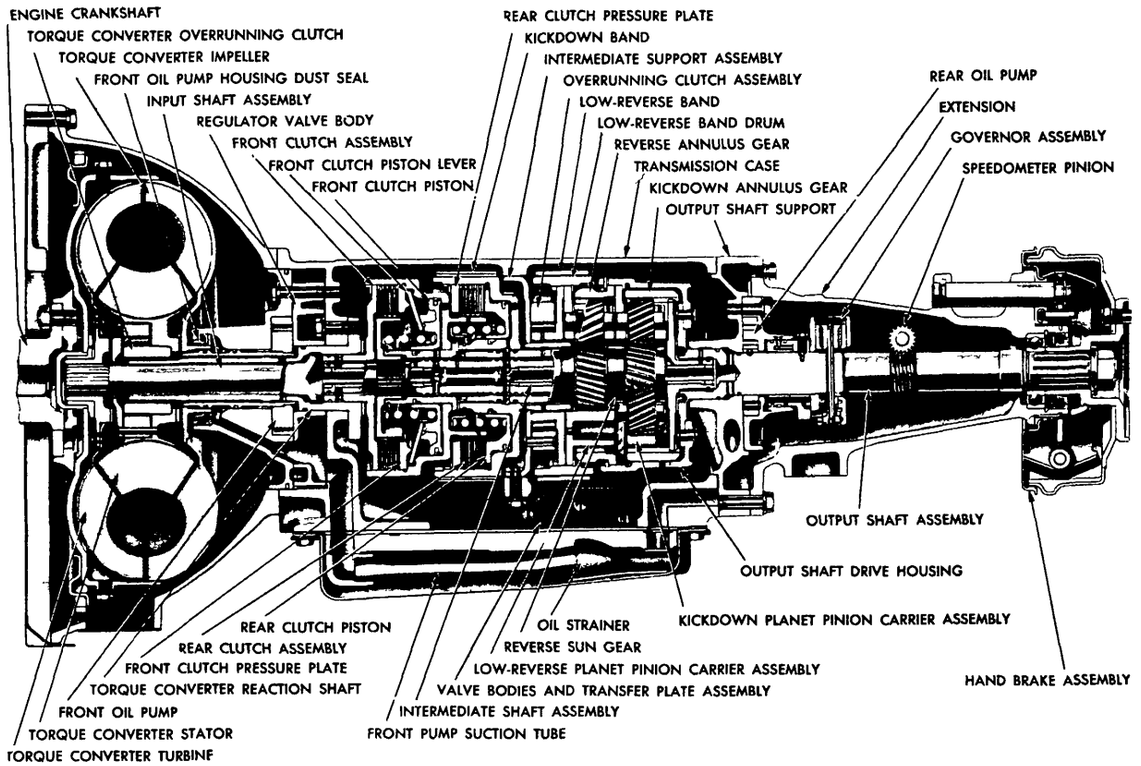
►*1957 TORQUEFLITE REVERSE SERVO PISTON "COCKING" CORRECTION & PRODUCTION CHANGE:* **If the reverse servo piston "cocks" over and misses the pilot hole on the reverse band lever, a "no reverse" condition would result. To prevent the above condition, a new reverse servo piston guide, Part No. 1824474, must be installed. This guide is installed in end of servo piston spring and is held in place by the spring retainer and snap ring. Transmissions having the code letter "F" and later, stamped on the pan rail on right side of case have been changed in production and it is not necessary to install the guide.**

►*1957 TORQUEFLITE ERRATIC SHIFT PATTERN & NO. 3-1 DOWNSHIFT CORRECTION (Reverse push-button cannot be pushed in with engine running):* **This condition may be caused by governor valve or weight sticking due to foreign matter in governor or by governor weight striking output shaft. Check governor pressure with selector lever in "N" position. If pressure is evident (there should be no pressure), inspect governor assembly for cause of sticking. To correct, remove large governor weight and inspect output shaft end for signs of mushrooming. Correct as follows: On all models, except DeSoto Adventurer and Plymouth Fury, grind a 45° chamfer around edge of output shaft end of large governor weight. Diameter of flat surface on end of governor weight must not be less than ¾" after chamfering. On DeSoto Adventurer & Plymouth Fury, the output shaft must be removed and a flat surface ground on shaft surface as indicated in illustration.**



GOVERN R STRIKING CORRECTI N

►*1957 TORQUEFLITE FRONT CLUTCH PRODUCTION CHANGE:* **The early "8 lever" front clutch assembly has been changed to a "4 lever" assembly on later cars. The "8 lever" clutch uses five bonded discs and four steel plates while the "4 lever" clutch uses four bonded discs and three steel plates**



TORQUEFLITE TRANSMISSION (SECTIONAL VIEW)

►*1957 TORQUEFLITE ACCUMULATOR SPRING NOTE:* In some transmissions, two springs, Part Nos. 1732030 and 1732031 were used in the accumulator while other transmissions have one spring, Part No. 1736228. Combined value of the two springs (1732030 & 1732031) are equal to the value of the single spring (1736228) and either may be used.

►*1957 REAR CLUTCH PRESSURE PLATE PRODUCTION CHANGE:* In later transmissions, the rear clutch pressure plate, Part No. 1732114 has been changed to the same plate as used in the front clutch assembly (Part No. 1736408). Later type plate may be used for service replacement in early transmissions. *CAUTION - The later type plate, Part No. 1736408 cannot be used for adjustment of front clutch clearance as previously recommended. See "Front Clutch Pressure Plate Travel Check & Adjustment" below for new procedures.*

►*1957 DESOTO THROTTLE PRESSURE ADJUSTING GAUGE:* This new gauge, Tool C-3610 is to be used only in the event throttle pressure adjustment is suspected of being incorrect (improper part throttle shift pattern, although governor pressure checks satisfactorily and throttle linkage adjustment is known to be correct). *See "Hydraulic Control Pr ssure Ch cks" below.*

►*1957 PLYMOUTH 1-2 UPSHIFT SLIPPAGE OR HARSH SHIFTING CORRECTION:* If this condition occurs, check line pressure *(Se "Hydraulic Control Pressure Tests" below),* and if found to be within specifications, proceed as follows: Attach a tachometer to engine, then with engine operating and transmission in "D" range, raise car on a hoist and attach a pressure gauge in take-off plug on top of kickdown servo. Move accelerator rod until engine reaches 850 RPM (pressure should read 32-34 lbs.). If pressure is not within this range, loosen link on throttle valve rod (adjacent to throttle lever on transmission), and adjust until the correct reading is obtained

►*1957 TORQUEFLITE SPACER WASHER (BETWEEN PLANET PINION CARRIERS) PRODUCTION CHANGE:* A new steel spacer washer, Part No. 1638667 is now being used between the aluminum planet pinion carriers to minimize scuffing.

►*1957 DESOTO S-27 "NO KICKDOWN" CORRECTION:* If this condition exists and throttle linkage cannot be

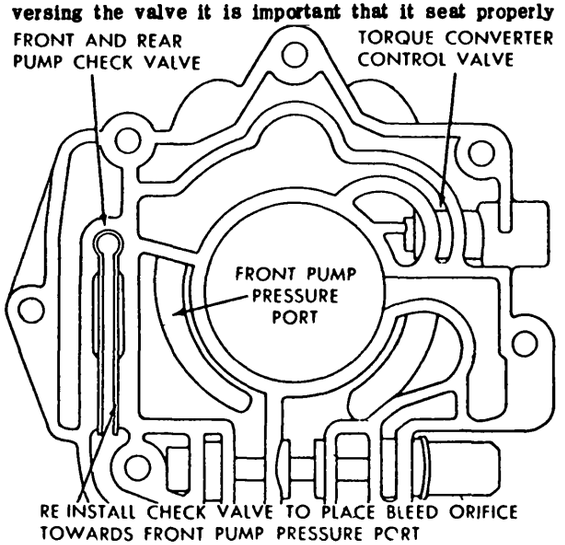
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TORQUEFLITE (C nt.)

adjusted properly, check to make sure the right bellcrank-to-transmission throttle rod is installed (DeSoto Part No. 1734979 which has a straight portion approximately 7½" long from bellcrank end to center of the bend). The corresponding part for PowerFlite is approximately 1" shorter. Adjust throttle linkage *(see "CARBURETOR" on car mod l page).*

►*1958 PLYMOUTH TORQUEFLITE GOVERNOR COMPENSATOR VALVE, VALVE BODY, AND TRANSFER PLATE PRODUCTION CHANGE:* Beginning with Transmission Serial No. 633519, a new valve body and transfer plate entered production. The governor compensator valve and related parts have been eliminated in the new body and plate assembly. *NOTE - Compensator valve not used on 1958 Chrysler, DeSoto or Dodge*

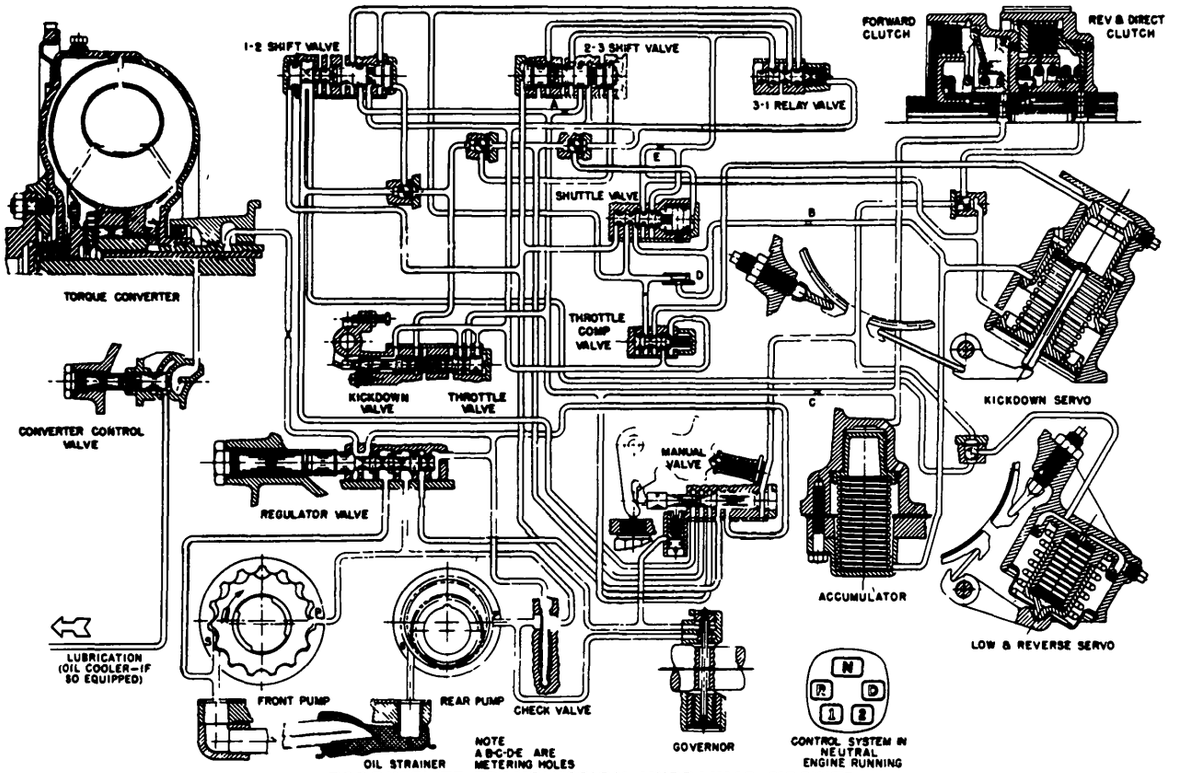
►*1958 REGULATOR VALVE BODY PRODUCTION CHANGE:* Effective with Transmission Serial No. 547000, the small bleed orifice in front & rear pump check valve was omitted. On transmissions before the above serial number, the position of front & rear pump check valve should be reversed in regulator body to position the small bleed orifice inward against front pump pressure port (low and idle speed line pressure will be improved for longer front clutch life). When reversing the valve it is important that it seat properly



T RQUEFLITE REGULATOR VALVE CHANGE

on both sides and not extend above regulator body surface. If check valve does not seat properly, replace it. *See illustration below.*

►*1958 TORQUEFLITE "BREAKAWAY" NOISE NOTE:* If excessive noise during "breakaway" with transmission in "D" (Drive) range, especially when coasting or decelerating, it may be caused by condition of needle roller thrust bearing, sun gear rear end thrust face, and front thrust surface of intermediate shaft flange. Inspect all parts for wear, scoring, nicks or pits and install new parts as necessary.



TORQUEFLITE TRANSMISSION HYDRAULIC CIRCUITS

►*1959 TORQUEFLITE HARSH OR ERRATIC SHIFT CORRECTION:* This condition may be caused by a loose fitting accelerator shaft lever assembly (located on right side of bellcrank bracket on firewall). If a loose lever cannot be tightened by tightening the attaching nut, proceed as follows: Remove lever from accelerator shaft and bracket assembly and spread lever slot to 5/32". Install a .020-.030" thick by 5/16" wide shim between flat on shaft and flat on lever. Reinstall and tighten to 10-12 ft. lbs.

►*1959 TORQUEFLITE CONTROL VALVE BODY, TRANSMISSION CASE, PUSH BUTTON CONTROL CABLE PRODUCTION CHANGE:* A new one-piece valve body is being used in later production. The changes incorporating the new valve body assembly also include a new "wheel type" push button control cable adjustment and a redesign of the transmission case. Valve body disassembly and reassembly procedures and push button control cable adjustments are different as noted below.

►*1959 TORQUEFLITE "BUZZING" NOISE CORRECTION:* This condition is noticeable when "R" (Reverse) button is depressed after car has been standing for several hours and can be eliminated by installing the later type torque converter control valve, Part No. 2124247.

►*1959 PLYMOUTH GOLDEN COMMANDO "395" (361") ENGINE KICKDOWN BAND ADJUSTMENT NOTE:* Because of interference with frame torsion bar and engine exhaust pipe, a new 6" extension, Tool C-3705 must be used with Tool C-3380 to adjust kickdown band. Band adjusting procedures and specifications are as noted below.

►*1959 TORQUEFLITE RATCHETING NOISE DURING 2-3 UPSHIFT CORRECTION:* May be caused by front disc of rear clutch slipping off edge of hub spline when piston is applied. This condition is only possible when the clutch pack is reversed in clutch retainer which improperly places clutch pressure plate next to the piston. When assembling the rear clutch make sure that pressure plate is installed at front of clutch pack next to the snap ring.

►*1959 TORQUEFLITE FRONT PUMP DRIVE SLEEVE RATTLE CORRECTION:* This rattle is most noticeable on acceleration in drive range up to approximately 50 MPH and may be confused with speedometer head or cable noises. To correct this condition, install Service Package, Part No. 2084321-P which contains a modified front pump rotor, drive sleeve, rubber "O" ring and a cast iron ring. These parts may be used with the original torque converter, front pump housing assembly, and outer rotor.

►*1959 TORQUEFLITE GOVERNOR ASSEMBLY PRODUCTION CHANGE (CARS WITH EXTRA PERFORMANCE ENGINE & TRANSMISSION):* The outer governor weight, Part No. 1823726 has been replaced with a heavier weight, Part No. 1636461 (same as used on

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TORQUEFLITE (C nt.)

standard performance transmissions). As a result of this change, the part thr ttl 1-2 and 2-3 upshift points will be about the same as in standard performance assemblies. **Full throttle** 1-2 and 2-3 upshift points will be about the same as that of the extra performance transmissions prior to the change. Governor pressure with the new governor weight will be different than for earlier models with the lighter governor weight.

►*1960 TORQUEFLITE 8 REAR CLUTCH ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* To reduce a "click-type" noise during 1-2 upshift, a new rear clutch assembly consisting of a new Rear Clutch Pressure Plate, Part No. 2124991 and a new Rear Clutch Piston Retainer, Part No. 2125009 is being used in production starting with Transmission Serial No. 1566318. To correct the above condition on early transmissions, install both new parts. *NOTE - New type pressure plate may be used with the old type retainer, however, if a new type retainer is used, the new type clutch plate must also be used.*

►*LATE 1959-60 TORQUEFLITE FAILURE TO GO INTO REVERSE CORRECTION:* This condition may be caused by reverse blocker not disengaging and can be corrected by installing Reverse Blocker Valve Spring, Part No. 2204493. *NOTE - The new spring may be identified by its increased length which is .150" longer than former spring. The new spring must be used only on "one-piece" valve bodies.*

►*INPUT SHAFT SEAL RING LEAKAGE NOTE:* **To prevent leakage at this point, the shaft seal rings should have proper clearance between ends of ring locks and should be perfectly round (when installed in position) so they seat firmly on inner diameter of reaction shaft. With seal rings in a free position and hooked ends engaged, end clearance should be a minimum of .030". If end clearance is less, install a new ring with correct clearance. Insert ring squarely in inner diameter of reaction shaft. Ring should be concentric with diameter of reaction shaft when in installed position, so that no space or gap shows between ring and shaft. If any gap exists, install a new seal ring.**

►*DELAYED UPSHIFT (AFTER REVERSF OPFRATION) CORRECTION:* **This condition results from rear pump, running in reverse direction, evacuating fluid from rear pump and governor control circuits of hydraulic control circuit. Then, when car is driven in forward direction, rear pump may require several blocks of driving to prime pump and charge governor circuit before an upshift will take place. To correct this condition, it is suggested that the regulator body be removed and check valve installed with bleed orifice toward rear pump port of regulator valve body. If check valve has no orifice, drill a 1/16" hole in center of area of valve which will be placed against rear pump port (away from transmission center).**

DESCRIPTION

DESCRIPTION: Torque-Flite Transmission consists of a wide range torque converter and a hydraulically controlled automatic planetary transmission. Two multiple disc clutches, an overrunning clutch, two bands and two planetary gear sets provide three forward ratios and one reverse ratio. The oiling system consists of two pumps (front & rear) which circulate oil through transmission, torque converter and oil cooler (where oil cooler is used), with oil supply carried in transmission case oil pan. Transmission speed range selection is controlled by a five button (push button) control located to left of steering wheel in drivers compartment. Beginning with 1959 models, the "4 lever" front clutch assembly was replaced with an "8 lever" type. A cast iron reaction shaft is used in place of an aluminum shaft. *NOTE - The later type cast iron shaft can be used on previous models providing a later type input shaft assembly, Part No. 1853673, is also used.* The former extension housing ball bearing has been replaced with a bronze bushing and the oil seal has been decreased in size. Output shaft support has been redesigned to accommodate the new tabbed thrust washer.

OPERATION

OPERATION: Transmission operation in each position of the push button control is outlined below. In "D" (Drive) position (normal driving position), operation varies in accordance with car speed and operating conditions. *See "Shift Speed Tables" below.*

"D" (Drive) Position–Breakaway: Power flow is from converter turbine through input shaft and front clutch retainer. Front clutch is applied and the drive continues through clutch hub to intermediate shaft and kickdown annulus gear. Kickdown annulus gear drives the kickdown planet gears, rotating them in the same direction. Kickdown planet gears are meshed with kickdown sun gear which is integral with the reverse sun gear. Both sun gears are forced to rotate in a reverse direction by reaction of the kickdown planet pinion carrier together with the reverse annulus gear, both of which are splined to the output shaft drive housing. The reverse planet pinion carrier is attached to and prevented from turning backward by an overrun clutch and becomes stationary in forward drive (overruns on coast). Therefore, the reverse carrier pinions are forced to rotate in a forward direction and force the reverse annulus to rotate in the same direction transmitting power flow to output shaft with the combined ratio of the kickdown and reverse planetary gear sets of 2.45-1.

"D" (Drive) – 2nd Speed, and "2" (Second) Position – 2nd Speed: Power flow is from torque converter turbine through output shaft to front clutch (which is applied). From front clutch through intermediate shaft to the annulus gear of the kickdown (rear) planetary gear set. Kickdown band is applied which holds the sun gear stationary. The annulus gear drives the kickdown planet pinions which rotate in the same direction as input and intermediate shafts. Kickdown planet pinions are meshed with the sun gear, therefore, they walk around this gear and exert force through kickdown planet pinion shafts to rotate the kickdown planet pinion carrier. The carrier, which is splined to output shaft drive housing, moves at a slower speed than the annulus gear, thus providing a gear ratio of 1.45-1.

"D" (Driv) P siti n – Dir ct: Power flow from converter goes directly through transmission because the planetary elements of the gear train are locked up by two multiple disc clutches and both bands are released. The torque converter provides all the torque multiplication. Gear ratio is 1.00-1.

Kickdown (Forced Downshift) in "D" (Drive) Position Below 25 MPH: This will force transmission to downshift and the power flow will be the same as "D" (Drive) Position – Breakaway.

"1" (Low) Position – Low Sp ed: In "1" (Low) position, the power flow is the same as "D" (Drive) position – Breakaway or "2" (Second) Position – Breakaway, with one exception, the low-reverse band is applied, locking the overrun clutch to provide engine braking.

"R" (Reverse) Position: Rear clutch and low-reverse band are applied; all other friction elements are released. The power flow is from torque converter turbine through input shaft to rear clutch hub (part of front clutch retainer). The rear clutch is splined to reverse sun gear. The carrier of reverse (front) planetary gear set is held stationary by the low-reverse band; therefore, the set acts as a simple reverse train through reverse planet pinions to reverse annulus (which is splined to output shaft drive housing) and provides a reverse ratio of 2.20-1.

LUBRICATION

1956-58 MODELS

►*FLUID LEVEL & CHECKING PROCEDURE CHANGE:* To avoid overfilling and trouble under high speed and high temperature operating conditions, it is recommended that the following checking procedure be used and the recommended fluid level not be exceeded. *This supersedes previous recomm ndations.*

►*NOTE:* It is recommended that fluid level be checked with transmission "Cold" (after being parked for a considerable time and before being driven several miles). If necessary to check transmission "Hot" (after car driven for several miles), observe the special hot fluid level given below.

Checking Fluid Level: It is recommended that fluid level be checked every 1000 miles, preferably with transmission "Cold" (after being parked for considerable time and before being driven several miles). If necessary to check transmission "Hot" (after car driven for several miles), observe special hot fluid level below.

Cold Transmission - Run engine at idling speed with parking brake applied. Operate all pushbuttons in turn (leave in each position momentarily), then check fluid level with "N" (Neutral) button pushed in. Note level on dipstick, add or remove fluid as follows: **Level between "L" mark and ½"b low "L" mark** - Do not add oil, this level is satisfactory. **L v l bel w ½" below "L" mark** - Add oil to bring level up to between "L" mark and ½" below "L" mark. **L vel abov "L" mark** - Remove oil until level has been lowered to between "L" mark and ½" below "L" mark.

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TORQUEFLITE (C nt.)

H t Transmission - Proceed as for cold check above. Add or remove oil in accordance with fluid level on dipstick as follows: **L vel between "F" mark and ½" abov "L" mark** - Do not add oil, this level is satisfactory. **L vel below "L" mark** - Add oil to bring level up to between "L" mark and ½" above "L" mark. **Lev l abov "F" mark** - Remove oil until level is between "F" mark and ½" below "F" mark.

1959 MODELS

Checking Fluid Lev l: Check fluid level in transmission every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. With engine idling and transmission in neutral, check fluid level on dipstick. Fluid level should be between the "Add 1 Pint" mark and the "Full" mark. If fluid level is below "Add 1 Pint" mark, add Automatic Transmission Fluid Type "A", Suffix "A" to bring level between the marks but never above the "Full" mark. If level is above the full mark, remove fluid to bring to proper level. *NOTE - When transmission and torque converter are drained and refilled, the level should be ¾" below the "Add 1 Pint" mark since the new fluid is not at operating temperature.*

1960 MODELS

Ch cking Fluid L vel: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. Fluid level should be at "F" (Full) mark or slightly below (never above "F" mark). Add or remove transmission fluid as necessary.

1956-60 MODELS

Draining & R filling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and add five quarts of recommended fluid through transmission oil filler tube. Start engine and add approximately three quarts while engine is idling. Allow engine to idle for two minutes, then operate all pushbuttons, pausing momentarily in each position, and ending with the "N" (Neutral) button pushed in. Check fluid level and add sufficient fluid to bring level to "L"(Low) mark on dipstick. Operate engine and transmission to bring fluid to normal operating temperature, then follow procedure for "Checking Fluid Level" (above).

Rec mm nded Fluid: Automatic Transmission Fluid Type "A" (Suffix "A").

Capacity: *NOTE - Foll wing capacities are approximate. Total fluid required should be determined by measuring with dipstick. Se "Checking Fluid Level" above.*

Chrysler, Exc. Windsor & Saratoga (1957-60) - 10½ qts.
Chrysl r, Winds r & Saratoga - 9 qts.
D Sot (1957) - 9 qts.
DeSot (1958-60) - 10½ qts.
D dg (1957-59) - 9 qts.
Dodg (1960) - 9 qts. (Phoenix); 10½ qts. (Exc. Phoenix).
Plym uth (1957-59) - 9 qts.
Plym uth (1960) - 9 qts. (Exc. Gold Comm.); 10½ qts. (Golden Commando).

►*CONVERTER FLUSHING NOTE:* Converter assembly can be flushed as follows: With transmission removed (converter attached to engine), drain converter and install drain plug. Reach through stator hub with a screw driver and lift on side of hub spline to turn stator counterclockwise. Sight through opening and make sure rectangular slots on rear face of stator are aligned vertically. Use a container with a long spout and slowly pour two quarts of clean kerosene into converter. Tape hub opening closed, then disconnect coil wire and rotate engine with starter for approximately 10 seconds. Drain converter and repeat the flushing procedure as necessary. To completely drain converter, remove drain plugs and use starter to rotate converter until all kerosene is thrown out of openings.

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See "Carburetor" on car model pages.*

►*1959 CONTROL CABLE PRODUCTION CHANGE: A new "Wheel Type" cable adjuster is used on late 1959 and 1960 models. Adjustment procedures are different as listed below.*

WITHOUT WHEEL TYPE ADJUSTER

Manual Control Cable Adjustment: 1) Push the "N" (Neutral) button in. Drain approximately 2 quarts of fluid from transmission. Loosen cable-to-transmission adjustable mounting bracket screw. Remove neutral starting switch. Place point of screwdriver through neutral starting switch opening in transmission case and against neutral starting switch cam of manual control lever to hold lever in neutral position.

2) While holding manual lever in reverse position, adjust control cable for free play by pushing in until cable stops. Mark position on cable in relation to adapter housing. Withdraw control cable to stop, and measure travel. Push control cable in adapter housing one-half of total travel. With cable in this position, install control cable adjusting clip, flat washer, lockwasher, screw, and tighten. Install neutral starter switch and wires.

3) To check for proper adjustment, push the various push buttons, return to neutral each time and check starter operation. A test light attached to starter neutral switch may be used instead of the starter for checking proper operation and adjustment. Refill transmission to proper level.

WITH WHEEL TYPE ADJUSTER

Manual Control Cable Adjustment: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse) pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lock screw at left side of transmission case.

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only two or three threads are showing behind the wheel on the guide. *CAUTION - Check wheel for free turning on guide and remove any burrs in threads that might interfere. Lubricate threads with a few drops of transmission fluid.*

3) Hold cable guide center in hole of transmission case and apply only enough inward force to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 30-50 inch pounds.

1957-60 MODELS

Neutral Safety Switch Adjustment: With concave spring (cupped) washer installed on neutral safety switch with cupped side of washer toward transmission case, install "O" ring seal up against the washer. Install switch into case until spring washer contacts case, then tighten **one-third of a turn.** Refill transmission to proper level and check operation of switch. Engine should start only when "N" push button is in depressed position or when transmission is in neutral.

BAND ADJUSTMENT

Kickdown (Front) Band: Kickdown band adjusting screw is located on left side of transmission case. With a ¾" wrench, back off locknut approximately 5 turns. Check freeness of adjusting screw in transmission case, then tighten adjusting screw to **70-75 inch pounds** using torque wrench (Tool C-3380). *NOTE - If Adapt r, C-3583 is used with torque wrench, tighten until reading on torque wrench is 47-50 inch pounds. Adapt r, Tool C-3583, must be used if band is adjusted with transmission in car.* Using a reference mark of chalk or colored pencil on corner of adjusting screw square and transmission case, **back the adjusting screw out xactly the number of turns indicated in table below.** While holding adjusting screw stationary, tighten locknut to 35-40 ft. lbs.

Low-Reverse (Rear) Band: Low-reverse band adjusting screw is located on right side of transmission case. With a ¾" wrench, back off locknut approximately 5 turns. Check freeness of adjusting screw in transmission case, then tighten adjusting screw to **70-75 inch pounds** using torque wrench (Tool C-3380). *NOTE - If Adapter, C-3583 is used with torque wrench, tight n until reading on torque wrench is 47-50 inch pounds. Adapter, Tool C-3583, must be used if band is adjusted with transmission in car.* Use a reference mark of chalk or colored pencil on corner of adjusting screw square and transmission case, then **back adjusting screw ut exactly the number of turns indicated in table bel w.** While holding adjusting screw stationary, tighten locknut to 35-40 ft. lbs.

►*FRONT & REAR REPLACEMENT BAND ADJUSTMENT NOTE: To compensate for initial wear-in, adjustment of n w band must b ¼ turn tighter than specificati ns given bel w.*

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TORQUEFLITE (Cont.)

Transmission Band Adjustment
(Back off Number of Turns Indicated)

Car Model	Kickdown	Low-Reverse
1956 Chrysler Imperial	2	2
1957 Chrysler (All)	3½	2 5/8
1958 Chrysler (All)	2¼	2 5/8
1959 Chrysler (All) ①	2¼	2 5/8
1959 Chrysler (Exc. 300E) ②	2½	2 1/2
1959 Chrysler (300E) ②	2	2 1/2
1960 Chrysler (Exc. Ram Eng.)	2½	2 1/2
1960 Chrysler (Ram Eng.)	2	2 1/2
1957 DeSoto (S-27)	3½	2 5/8
1957 DeSoto (S-25,26) ③	2	2
1957 DeSoto (S-25,26) ④	2¼	2 5/8
1958 DeSoto (All)	2¼	2 5/8
1959 DeSoto (All) ①	2¼	2 5/8
1959 DeSoto (Exc. Adven. Eng.) ②	2½	2 1/2
1959 DeSoto (Adventurer Eng.) ②	2	2 1/2
1960 DeSoto (Exc. Ram Eng.)	2½	2 1/2
1960 DeSoto (Ram Eng.)	2	2 1/2
1957-58 Dodge (All)	3½	2 5/8
1959 Dodge (Exc. 325" Eng.)	2¼	2 5/8
1959 Dodge (325" Eng.)	3½	2 5/8
1960 Dodge (318" Eng.)	2½	2 1/2
1960 Dodge (361" & 383" Engs.)	2	2 1/2
1957 Plymouth (All)	3½	2 1/4
1958 Plymouth (Exc. 350" Eng.)	3½	2 5/8
1958 Plymouth (350" Eng.)	2¼	2 5/8
1959 Plymouth (361" Eng.) ①	2¼	2 5/8
1959 Plymouth (Exc. 361" Eng.) ②	2½	2 5/8
1959 Plymouth (361" Eng.) ②	2	2 5/8
1960 Plymouth (318" Eng.)	2½	2 1/2
1960 Plymouth (361" & 383" Engs.)	2	2 1/2

① - Transmissions with early type control valve assembly. These transmissions do not have "Wheel Type" manual control cable adjusters.

② - Transmissions with later type control valve assembly. These transmissions have "Wheel Type" manual control cable adjusters.

③ - Early models with Transmission, Part No. 1671747.

④ - Late models and Adventurer with Transmission, Part No. 1736544 (S-25,26); Part No. 1823593 (Adventurer).

1956-59 MODELS

ROAD TESTING TRANSMISSION: If transmission operation not satisfactory, the following complete procedure is recommended to check performance and diagnose trouble.

►*ROAD TESTING NOTE:* Before road testing, engine must be properly tuned. Adjust idle speed to 400-450 RPM (Single 4-Barrel Carb. Cars); 650 RPM (Two 4-Barrel Carb. Cars), with engine and transmission at normal operating temperature and with transmission in "N" (Neutral) position. Bring transmission fluid level to correct mark on dipstick. If throttle linkage has been disturbed in tuning engine, linkage must be adjusted before making tests.

►*STALL TESTING CAUTION: DO NOT stall test the torque converter. To prevent damage to transmission, wide open throttle stall operation is not recommended.*

1) Push in "N" (Neutral) button and check for dragging up to an engine speed of 800 RPM.

2) Push in "R" (Reverse) button and note shift time and smoothness of the shift.

3) Push in "D" (Drive) button and note shift time and smoothness of engagement.

4) Accelerate car at very light throttle. The transmission should upshift into second at approximately 8-10 MPH and into direct speed at approximately 15-17 MPH. Check quality of the shifts.

5) Slow the car to approximately 15 MPH, then depress accelerator pedal quickly to wide open throttle (without going into kickdown). Check for slippage of front and rear clutches. The transmission should not downshift at this time.

6) At a car speed of approximately 20-22 MPH, depress accelerator pedal fully. The transmission should downshift to breakaway gear. Check quality of shift.

7) Release accelerator pedal and allow transmission to upshift. Accelerate car to 40 MPH. Depress accelerator pedal fully. The transmission should downshift to second gear. Check quality of shift.

8) Release accelerator pedal to closed throttle. Check quality of the "lift-foot" upshift.

9) Accelerate car to 60 MPH and depress accelerator pedal fully. The transmission should downshift to second gear. Check quality of the shift.

10) Accelerate car to kickdown (second gear) at wide open throttle until the transmission upshifts. The shift should occur at approximately 70 MPH. Check quality of the shift.

11) Slow car down to 30-40 MPH and engage the "2" (Second) button. The transmission should downshift to second gear. Check for gear noise.

12) Slow car to 15 MPH and depress accelerator pedal quickly to wide open throttle without going into kickdown. Check for kickdown band or front clutch slippage. The transmission should not downshift at this time.

13) Release accelerator pedal and push the "1" (Low) button. The transmission should downshift at approximately 25 MPH.

14) With accelerator pedal at light throttle, push the "D" (Drive) button at approximately 20 MPH (the transmission will upshift), coast to a stop. The transmission should downshift at approximately 8 MPH. Check quality of downshift.

1960 MODELS

ROAD TESTING TRANSMISSION: *NOTE - Before road testing, engine must be properly tuned and idle speed set to correct specifications.* With engine at normal operating temperature and fluid at proper level, all shifts and kickdowns should occur within the speed ranges given in "Shift Pattern" table below.

►*ROAD TESTING NOTE: All shift speeds may vary somewhat due to production tolerances, type of engine, rear axle ratios and tire sizes. All shifts, however, should be smooth, responsive and without noticeable engine runaway.*

HYDRAULIC CONTROL PRESSURE TESTS: *NOTE-Use Pressure Gauge C-3293 (300#) for all the following tests.*

Line Pressure: Remove the 1/8" pipe plug from line pressure take-off hole located on left side of transmission case (lower plug forward of control lever and cable connection). Install pressure gauge at this point and make the following tests:

1956 Line Pressure Tests

Push Button Position	Rear Wheels	Engine Speed (RPM)	Pressure
R	Free	1600	225
N		800	90
D	Locked	800	90
2	Locked	800	90
1	Locked	800	90

1957 Line Pressure Tests
(All Models)

Push Button Position	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	200-250
N		800	85-95
D	Free	800	90
2	Free	800	85 95
1	Free	800	85-95

1958 Line Pressure Tests
(All Models)

Push Button Position	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	② 200-240
N		1200 ①	85-95
D	Free	1200 ①	85-91
2	Free	1200 ①	85-95
1	Free	1200 ①	85-95

① - 800 RPM on Plymouth. ② - 200-250 lbs. on Plymouth.

1959 Line Pressure Tests
(All Models)

Push Button Position	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	200-240
N		1200	85-91
D	Free	1200	85-91
2	Free	1200	85-91
1	Free	1200	85-91
D	Free	3000	93-98

1960 Line Pressure Tests
(Cars Without Ram Manifold)

Pushbutton Depressed	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	200-240
N		1200	85-95
D	Free	1200	89-91
2	Free	1200	85-95
1	Free	1200	85-85
D	Free	3500	93-100

1960 Line Pressure Tests
(Cars with Ram Manifold)

Pushbutton Depressed	Rear Wheels	Engine Speed (RPM)	Pressure (Lbs.)
R	Free	1600	235-275
N		1200	100-110
D	Free	1200	104-106
2	Free	1200	100-110
1	Free	1200	100-110
D	Free	3500	108-115

►*NOTE: If line pressure not correct, see "Trouble Shooting & Diagnosis" below.*

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TORQUEFLITE (C nt.)

G v rnor Pr ssur : Remove 1/8" pipe plug from governor pressure take-off hole located on lower left side of transmission case (at rear of case in output shaft support). Install pressure gauge at this point and make the following tests:

1956 G v rn r Pressure Tests

Push Butt n Positi n	R ar Wheels	Car Speed (RPM)	Pressure
D	Free	8	2-3
D	Free	27	27-32
D	Free	38	44-47
D	Free	75	75-82

1957 G v rn r Pressure Tests

M d l	Axl Ratio	Governor Pressure (MPH) 15 lbs.	45 lbs.	75 lbs.
Chrysler C75, C76	3.18-1	17-19	32-39	66-71
Chrysler C75, C76	3.36-1	16-18	29-36	63-67
Chrysler C76	2.92-1	19-21	35-42	73-79
Imperial	2.92-1	19-21	36-43	74-80
Imperial	3.18-1	18-20	33-40	68-74
Imperial	3.36-1	17-19	31-37	64-70
DeSoto	All	16-18	29-35	61-66
Dodge	All	16-18	29-35	61-66
Plymouth	All	16-18	29-35	61-66

1959 G v rn r Pressure Tests ①
(All Models)

Engin RPM	Standard Cars	②High Performance Cars
1,000	25-31 psi	17-22 psi
1,600	46-52 psi	39-45 psi
2,400	63-71 psi	56-63 psi

① - Tests are made with transmission in "D" (Drive) range with wheels free to turn.
② - Except extra performance cars with modified governor (see "Changes, Cautions, Corrections" above). 25-30 psi (1000 RPM); 40-44 psi (1600 RPM); 56-62 psi (2400 RPM), extra performance cars with modified governor.

1958 G v rn r Pr ssur T sts

M d l	Axle Ratio	Govern r Pr ssur (MPH) 15 Lbs.	50 Lbs.	75 Lbs.
Chrysler LC-1, 2, 3	2.93-1	19-21	34-41	71-77
Chrysler LC-1, 2, 3	3.18-1	17-19	32-39	66-71
Chrysler LC-1, 2, 3	3.36-1	16-18	29-36	63-67
Chrysler LC-4	2.93-1	24-26	54-60	80-87
Chrysler LC-4	3.15-1	22-24	50-56	74-81
Chrysler LC-4	3.31-1	21-23	48-53	71-77
Chrysler LC-4	3.54-1	19-22	45-50	66-72
Chrysler LC-4	3.73-1	18-21	42-47	63-69
Chrysler LY-1	2.93-1	19-21	36-43	74-80
Chrysler LY-1	3.18-1	18-20	33-40	68-74
Chrysler LY-1	3.36-1	17-19	31-37	64-70
DeSoto LS-1	3.18-1	16-18	29-35	61-66
DeSoto LS-2, 3	3.18-1	16-18	30-36	62-67
DeSoto Adventurer	2.93-1	23-26	53-58	78-85
DeSoto Adventurer	3.15-1	21-24	49-54	73-79
DeSoto Adventurer	3.31-1	20-23	47-52	69-75
DeSoto Adventurer	3.54-1	19-21	44-48	65-70
DeSoto Adventurer	3.73-1	18-20	41-46	61-67
Dodge	3.31-1	16-19	37-43	61-68
Plymouth	3.36-1	16-18	29-35	61-66

1960 Governor Pressure Tests ①
(Chrysler & DeSoto)
(Cars Without Ram Manifold)

Pushbutton Depressed	Car Speed (MPH) Chrysler	DeSoto	Imperial	Governor Pressure
D	② 18-22	15-20	19-24	15 psi
D	③ 41-50	37-44	45-54	50 psi
D	④ 69-77	61-68	75-83	75 psi

① - Tests are made with rear wheels free to turn
② - All models
③ - Windsor. 43-51 (Exc. Windsor)
④ - Windsor 72-80 (Exc Windsor).

1960 Governor Pr ssure Tests ①
(Chrysl r & D S t)
(Cars With Ram Manif ld)

Pushbutt n Depressed	Car Sp d (MPH) Chrysler	DeSoto	G v rn r Pressur
D	21-24	20-24	15 psi
D	36-43	35-41	50 psi
D	55-62	53-60	75 psi

① - Tests are made with rear wheels free to turn.

1960 Governor Pressure Tests ①
(Dodge & Plymouth)
(Cars Without Ram Manifold)

Pushbutton Depressed	Std. Governor	Hi-Perf. Governor	Governor Pressur
D	690-790 ②	690-790 ②	15 psi
D	1250-1510 ②	1680-1860 ②	45 psi
D	2560-2790 ②	2850-3070 ②	75 psi

① - Tests are made with rear wheels free to turn.
② - Engine RPM.

1960 Governor Pressure Tests ①
(Dodge & Plymouth)
(Cars With Ram Manifold)

Pushbutton Depressed	Engine RPM	Governor Pressure
D	860-970	15 psi
D	1830-2100	65 psi
D	2550-2800	85 psi

① - Tests are made with rear wheels free to turn.

►*GOVERNOR PRESSURE TEST NOTE: Tests are mad with transmission in "D" (Drive) range with wheels free to turn.*

►*NOTE: If governor pressure not correct, and does not correspond to car speed, see "Trouble Shooting & Diagnosis" below.*

Lubrication Pressure: Remove 1/8" pipe plug from lubrication pressure take-off hole located on left side of transmission case (middle plug forward of

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1960 SHIFT PATTERN TABLE (MPH)

SHIFT CONDITION	CHRYSLER					DESOTO		DODGE & PLYMOUTH		
	Windsor	Saratoga	New Yorker	Imperial	New Yorker C-300 ①	Fireflite & Adventurer	Ram Manifold	Std.	High Performance	Ram Manifold
Closed Throttle 1-2 Upshift	8-15	8-15	9-15	9-16	11-15	8-13	10-15	9-13	9-13	11-16
Closed Throttle 2-3 Upshift	12-18	12-19	12-19	13-20	13-20	10-16	14-19	13-17	13-17	16-21
Wide Open Throttle 1-2 Upshift	31-46	31-47	32-48	33-49	38-44	29-41	37-42	31-44	44-54	40-47
Wide Open Throttle 2-3 Upshift	67-83	68-84	69-86	72-90	61-75	61-74	60-74	66-80	73-88	67-81
3-2 Kickdown Limit	63-80	64-82	66-83	69-87	58-67	58-71	57-65	63-78	71-85	62-72
3-1 Kickdown Limit	30-43	31-44	32-45	33-47	37-43	28-39	36-42	31-42	36-52	39-46
Closed Throttle Downshift	6-13	6-13	6-13	7-14	8-13	6-11	8-12	7-12	7-12	7-12

① - Ram Manifold

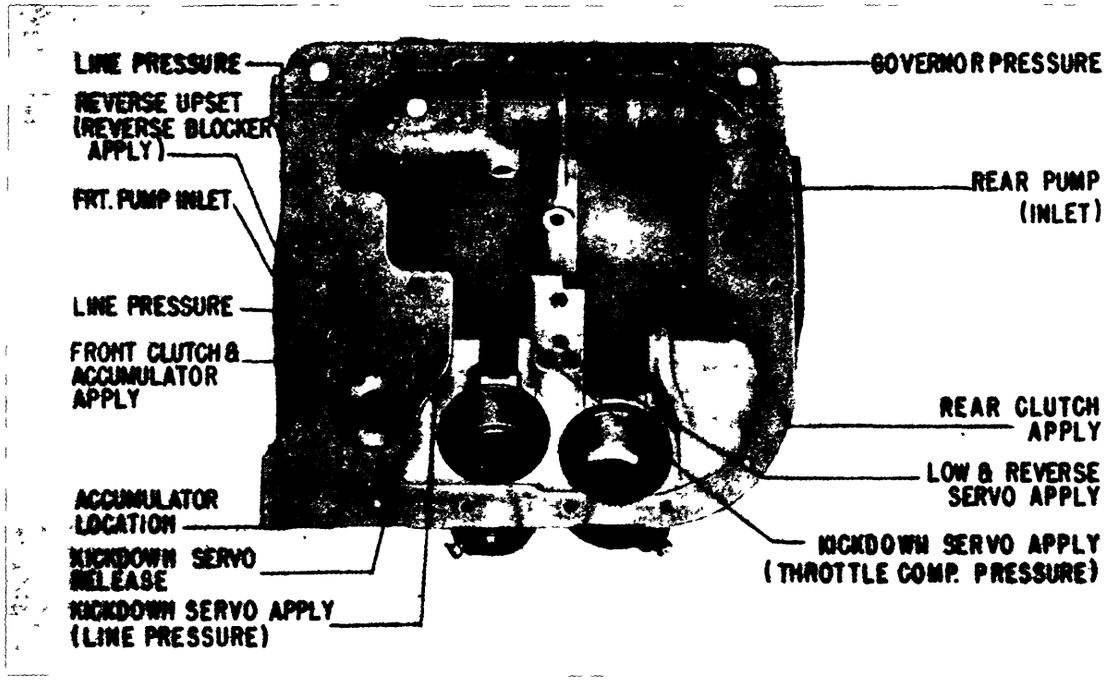
TORQUEFLITE (Cont.)

control lever and cable connection). Install pressure gauge at this point and proceed as follows: With engine running at 800 RPM in "N" (Neutral), lubrication pressure should be approximately 10-30 lbs. If pressure is incorrect, check line pressure and see "Trouble Shooting & Diagnosis" below. If pressure is extremely high (above 50 lbs.) it is an indication of a restriction due to dirt or foreign matter in lubrication passages.

Front Servo Release & Rear Clutch Apply Pressure: The front servo release and rear clutch apply pressure can be checked simultaneously with line pressure or immediately after line pressure has been determined. Remove the 1/8" pipe plug from front servo release and rear clutch apply pressure take-off hole located on lower right side of transmission (in servo boss just above transmission lower flange). Install the pressure gauge at this point. The pressure should not be less than 15 lbs. lower than line pressure in the "D" (Drive) position – **in direct only.**

Throttle Pressure: With car off floor and wheels free to turn, install a 100 lb. pressure gauge (Tool C-3292) at throttle pressure take-off plug at top of kickdown servo on right side of transmission. Disconnect bell-crank-to-transmission throttle linkage at transmission, then start engine and place transmission in "D" (early cars without "Wheel Type" control cable adjuster); in "2" (second) position (later cars with "Wheel Type" control cable adjuster). While holding transmission lever **toward closed throttle position** (against internal stop) increase engine speed slowly (using accelerator or suitable throttle control fixture) to approximately 1500 RPM (early cars without "Wheel Type" control cable adjuster); to approximately 850 RPM (later cars with "Wheel Type" control cable adjuster) to obtain an upshift into direct ratio (early cars); into second speed (later cars). After shift takes place, compensated throttle pressure should read 26-32 lbs. (early cars without "Wheel Type" control cable adjuster); 10-16 lbs. (later cars with "Wheel Type" control cable adjuster). As throttle lever at transmission is advanced toward full throttle, compensated throttle pressure should begin to rise after approximately 5° of movement. If compensated throttle pressure rises immediately when lever is moved, or if pressure is incorrect or fails to rise after approximately 5° movement, install a new throttle valve body assembly (early cars without "Wheel Type" control cable adjuster); adjust throttle valve pressure as indicated below (later cars with "Wheel Type" control cable adjuster). Before stopping engine, advance throttle control lever at transmission slowly, then return to closed position. Compensated throttle pressure should rise to approximately 80-90 lbs. and then fall smoothly without hesitation and should always return to a consistent reading at closed throttle. Failure to do this indicates faulty throttle compensator valve or throttle valve operation which requires cleaning of valve body assembly.

Throttle Valve Pressure (Later Cars With "Wheel Type" Control Cable Adjuster and Later Type Valve Assembly): Adjust throttle valve link at slotted end to obtain correct throttle valve pressure. *NOTE - To aid in future adjustments, it is recommended that the throttle valve stopscrew inside transmission be correctly set as follows: Push in "N" (Neutral) button, then block carburetor choke valve in wide open position. Drain transmission fluid and remove oil pan. Adjust transmission throttle valve stopscrew so that end of stopscrew just contacts throttle lever with the accelerator pedal released, then tighten stopscrew locknut. Install transmission oil pan and refill transmission.*



TORQUEFLITE OIL PASSAGES (IN TRANSMISSION CASE)

AIR PRESSURE TESTS: The front clutch, rear clutch, kickdown servo, and low and reverse servo may be checked by applying air pressure to their respective passages when valve body is removed *(CAUTION – Air supply must be free of all dirt and moisture).* Refer to "Oil Passages in Transmission Case" illustration for location of air passages.

1) Raise car on hoist, drain transmission fluid and remove transmission oil pan.

2) **Front Clutch**–Remove accumulator cover. Apply pressure to front clutch passage. Listen for a dull thud which indicates that front clutch is operating. Hold air pressure on for a few seconds and check for excessive oil leaks in system.

3) **Rear Clutch**–Remove valve body assembly and apply air pressure to rear clutch passage. Listen for a dull thud which indicates that rear clutch is operating. Check for excessive oil leaks.

4) **Kickdown Servo**–Apply air pressure to kickdown "apply" (line)) pressure passage. Observe operation of kickdown servo, lever and band when air pressure is applied. Apply air pressure to "apply" (compensated throttle) pressure passage and observe operation of kickdown servo.

5) **Low & Reverse Servo**–Apply air pressure to low & reverse servo passage and observe operation of servo, lever, and band.

6) **Governor**–Apply air pressure to "line pressure-to-governor" passage. Rotate propeller shaft slightly to bring governor flyweight down while applying the pressure. Operation of the governor will be indicated by a sharp click when air pressure is applied.

►*AIR PRESSURE TEST NOTE: If all the above units operate properly, "no drive", "erratic" and "no upshift" conditions are caused by trouble in the control valve assembly.*

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Except where noted, the following operations can be performed without removing the transmission from the car.*

LINE PRESSURE INCORRECT: Oil level incorrect. Check for stuck or scratched regulator valve or buckled spring. Check kickdown servo for broken seal rings, stuck piston or broken linkage. Check low & reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Check for possible leak at front pump suction tube, tube elbow or rear pump suction tube. Check for loose bolts, burrs or scratches on mating surfaces of valve body. Clean valve assembly and check for stuck valves, dirt, scratched valve or body, and burrs on valves. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front

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TORQUEFLITE (C nt.)

pump drive sleeve seal rings. Check regulator valve body for scratches and scoring on valve bores and face which bears against front pump housing. Examine regulator valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

GOVERNOR PRESSURE INCORRECT (Does not correspond to car specs): Clean governor assembly, and check weight assembly and valve for burrs, scratches or sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. Clean and inspect rear pump assembly for side or diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring.

LUBRICATION PRESSURE INCORRECT: Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter control valve or buckled spring. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Flush out converter and check converter-to-housing runout.

HARSH NEUTRAL-TO-DRIVE OR NEUTRAL-TO-REVERSE SHIFT: Check hydraulic control pressures. Adjust low and reverse band. Adjust engine idle speed. Check Low & Reverse servo for torn seal, stuck piston sleeve, broken band or broken linkage. Check accumulator cover screw torque and piston for broken rings. *Transmission must be removed for the following:* Clean and inspect front clutch discs, plates, drive hub, return spring and piston. Check front clutch circuit for leakage. Clean and inspect rear discs, plates, return spring and piston. Check rear clutch circuit for leakage.

DELAYED NEUTRAL-TO-DRIVE SHIFT: Check transmission oil level. Check hydraulic control pressures. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect front clutch discs, plates, drive hub, return spring and piston. Check front clutch circuit for leakage.

RUNAWAY ON UPSHIFT & 3-2 KICKDOWN: Check transmission oil level. Adjust throttle linkage *(see "Carburetor" on car model pages).* Check hydraulic control pressures. Adjust kickdown band. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage. Clean and inspect the overrunning clutch assembly for brinnelled rollers or cam, and improperly assembled rollers and springs.

HARSH UPSHIFT & 3-2 KICKDOWN: Adjust throttle linkage *(see "Carburetor" on car model pages).* Check hydraulic control pressures. Adjust kickdown band. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. *Transmission must be removed for the following:* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage.

NO UPSHIFT: Proceed as for "Runaway on Upshift & 3-2 Kickdown" above, and clean governor assembly and check weight assembly and valves for burrs, scratches and sticky operation. Examine governor valve shaft, shaft snap rings and seal rings.

NO KICKDOWN OR NORMAL DOWNSHIFT: Proceed as for "Runaway on Upshift & 3-2 Kickdown" above. Check control cable adjustment. Adjust low and reverse band. *Transmission must be removed for the following:* Clean and inspect overrunning clutch assembly for brinnelled rollers and cam, and improperly assembled rollers and springs.

SHIFTS ERRATICALLY: Check transmission oil level. Adjust throttle linkage *(see "Carburetor" on car model pages).* Check control cable adjustment. Check hydraulic control pressures. Check for stuck or scratched regulator valve or buckled spring. Check output shaft rear bearing for roughness or an unseated snap ring. Check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Test transmission units with air pressure (see above). Clean governor assembly and check weight assembly and valve for burrs, scratches and sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings.

SLIPS IN FORWARD DRIVE POSITIONS: Check transmission oil level. Check hydraulic control pressures. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure. *Transmission must be removed for the following:* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage. Clean and inspect the overrunning clutch assembly for brinnelled rollers or cam, and improperly assembled rollers and springs.

SLIPS IN LOW-REVERSE ONLY: Check hydraulic control pressures. Adjust low-reverse band. Check low-reverse servo for torn oil seal, stuck piston sleeve, broken band or linkage. Check control valve body for loose bolts, burrs, scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Test transmission units with air pressure. *Transmission must be removed for the following:* Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump. Examine valve body to determine if the secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

SLIPS IN ALL POSITIONS: Check transmission oil level. Check hydraulic control pressures. Check for a stuck or scratched regulator valve or buckled valve spring. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve assembly for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump. Examine valve body to determine if the secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

NO DRIVE IN ANY POSITION: Proceed as for "Slips in all Positions" above, and in addition, check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube.

NO DRIVE IN FORWARD RANGES: Check hydraulic control pressures. Adjust kickdown band. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. Check accumulator cover screw torque and piston for broken rings. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect front clutch discs, plates, drive hub, return spring and piston. Check front clutch circuit for leakage. Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage. Clean and inspect overrunning clutch assembly for brinnelled rollers or cam, and improperly assembled rollers and springs.

NO DRIVE IN REVERSE: Check hydraulic control pressures. Adjust low-reverse band. Check low-reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Test transmission units with air pressure (see above). *Transmission must be removed for the following:* Clean and inspect rear clutch discs, plates, drive hub, return spring and piston. Check rear clutch circuit for leakage.

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DRIVES IN NEUTRAL: Adjust gearshift control cable. Check control valve body for loose bolts, burrs or scratches on mating surfaces. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve body bolts to correct specifications. *Transmission must be removed for the following:* Clean and inspect front clutch disc, plates, drive hub, return spring and piston. Check front clutch circuits for leakage.

DRAGS OR LOCKS: Adjust kickdown band and the low-reverse band. Check handbrake for excessive drag. Check kickdown servo for broken seal rings, stuck servo piston or broken linkage. Check low-reverse servo for torn oil seal, stuck piston sleeve, broken band or linkage. *Transmission must be removed for the following:* Clean and inspect discs, plates, drive hub, return spring and piston of both front and rear clutches. Check front and rear clutch circuits for leakage. Clean and inspect planetary gear set for worn thrust washers, nicked or rough gear teeth, and excessive pinion clearance. Clean and inspect overrunning clutch assembly for brinnelled rollers and cam and improperly assembled rollers and spring.

GRATING & SCRAPING NOISES: Check handbrake for excessive drag. Check output shaft rear bearing for roughness or an unseated snap ring. Clean governor assembly, and check weight assembly and valves for burrs, scratches, or sticky operation. Examine governor valve shaft, shaft snap rings and seal rings. Clean and inspect rear pump assembly for side or diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support for scoring. *Transmission must be removed for the following:* Clean and inspect front pump assembly for side or diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect front and rear clutch discs, plate, drive hubs, return spring and pistons. Check front and rear clutch circuits for leakage. Clean and inspect planetary gear set for worn thrust washers, nicked or rough gear teeth, and excessive pinion clearance.

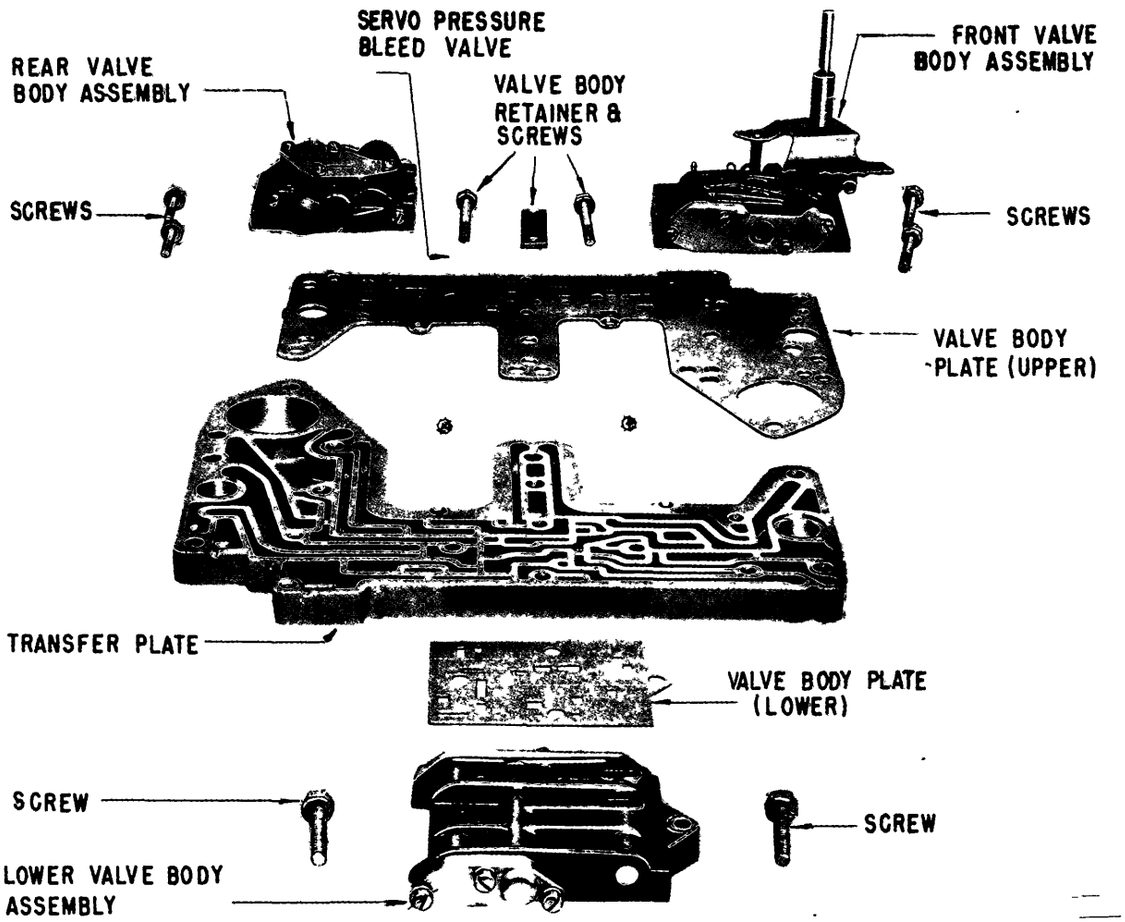
BUZZING NOISES: Check transmission oil level. Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter valve or buckled spring. *Transmission must be removed for the following:*. Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump housing. Examine valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

TRANSMISSION HARD TO FILL (Oil blow out filler tube): Check transmission oil level. Check for stuck or scratched regulator valve or buckled spring. Check for stuck or scratched converter valve or buckled spring. Check to determine whether tube is free of dirt. Check for possible air leakage at front pump suction tube, tube elbow or rear pump suction tube. *Transmission must b r moved for th following:* Clean and inspect front pump assembly for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal rings. Clean and inspect regulator valve body for scratches and scoring on valve bores and face which bears against front pump housing. Examine valve body to determine if secondary reaction orifice if free of dirt. Check gasket for uniformness of compression by valve body.

TRANSMISSION OVERHEATS: Check transmission oil level. Adjust kickdown band and low-reverse band. Check handbrake for excessive drag. Check regulator and converter valves for stuck or scratched valves or buckled springs. Check for mud, dirt, or other foreign material on screens or torque converter cooling fins. Clean and inspect rear pump assembly for side and diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring. *Transmission must be removed for the following:* Clean and inspect front pump and drive sleeve assembly for side and diametral appearance. Examine oil pump inner and outer rotor for scoring. Check drive sleeve seal rings. Check and inspect regulator valve body for scratches and scoring on valve bores and face which bears against the front pump housing. Examine the valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body. Clean and inspect front and rear clutch discs, plate, drive hubs, return spring and piston. Check front and rear clutch circuits for leakage.

IMPOSSIBLE TO PUSH CAR: Check hydraulic control pressures. Adjust low-reverse band. Check low-reverse servo for torn seal, stuck piston sleeve, broken band or linkage. Check valve body for loose bolts, burrs or scratches on mating surfaces. Clean valve body assembly, check for stuck valves, dirt, scratched valves or body, and burrs on valves. Tighten valve

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1956 - EARLY 1959 TORQUEFLITE VALVE BODY & TRANSFER PLATE ASSY.

TORQUEFLITE (C nt.)

body bolts to correct specifications. Clean and inspect rear pump assembly for side and diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring.

STARTER WILL NOT ENERGIZE: Adjust gearshift control cable. Adjust engine idle speed.

GEARSHIFT CONTROL UNIT

OPERATION: Mechanical connection between gearshift control unit on instrument panel and the transmission manual control valve is by a single push-pull cable. One end of wire cable is secured to cable actuator in push button control unit while other end enters control cable adapter housing on transmission case to engage manual control valve lever assembly. When button is pushed in, the operating slide contacts the cable actuator, causing it to pivot, and movement of actuator about its axis moves that attached wire cable. When push button reaches its limit of travel, a spring lock on the operating slide engages actuator shaft, holding the push button in an engaged position. When another button is pushed to select a different range, the top or bottom portion (depending on which button was pushed) of the slide contacts the actuator which releases the first push button from restraint of spring lock and allows it to return to the original position.

► *NOTE:* The back-up light switch is located on the push button control unit and is operated by the "R" (Reverse) push button slide.

1956 MODELS

PUSH BUTTON CONTROL UNIT: Removal - Remove three bezel retaining screws (one screw is located on underside of unit) and remove bezel and push buttons. Remove two hex nuts and lockwashers holding control unit to instrument panel casting. Pull gearshift control unit from rear of instrument panel, down and toward front of car. Remove two screws holding cable assembly bracket to control unit. Remove hairpin clip securing cable end to actuator bar and remove cable from control unit. Remove wires from back-up light switch.

Installation: Install end of control cable on actuator and install hairpin clip. Place cable bracket in position on control cable, install two screws and tighten securely. Connect wires to back-up light switch. Position control unit in instrument panel (with lamp socket assembly wire over top of upper stud and between control unit and mounting plate). Place lamp socket bracket over upper studs, install two nuts and lockwashers and tighten securely. Install push buttons in their respective operating slides (fingers of slide may be compressed slightly to aid in retaining button on slide). Center the bezel on buttons and install retaining screws. Adjust manual control cable.

1957 MODELS

PUSH BUTTON CONTROL UNIT: Removal - Remove four screws holding gearshift housing and plate assembly to instrument panel. Pull plate and gearshift control housing assembly straight out and down from instrument panel (*NOTE* - If housing is equipped with back-up light switch, be careful not to damage switch when removing plate). Remove two retaining screws securing gearshift housing to plate and remove plate by withdrawing from push buttons. Remove hairpin clip securing cable end to actuator. Remove two screws securing cable assembly bracket to gearshift control housing and remove cable assembly. Remove wires from back-up light switch. Remove illuminating lamp lead wire. Remove leads from starting motor switch (if so equipped). (*NOTE* - If necessary to remove push buttons from slides, withdraw by pulling on buttons. Do not spread the slide tangs or fingers).

Installation: Install end of control cable on actuator and install clip. Place cable bracket in position on gearshift control housing, install two screws and tighten securely. Reconnect back-up light switch wires (check wire routing as noted at disassembly). Reconnect starting motor switch leads. If push buttons were removed, slightly compress fingers on slides (if necessary) to aid in retention of push buttons. Place gearshift control housing in position on plate and secure with two retainer screws. Carefully guide plate and gearshift housing assembly back into position in instrument panel and secure with four screws. If housing is equipped with back-up light switch, exercise care during positioning of plate in instrument panel to avoid damaging switch. Adjust manual control cable.

1958-59 MODELS

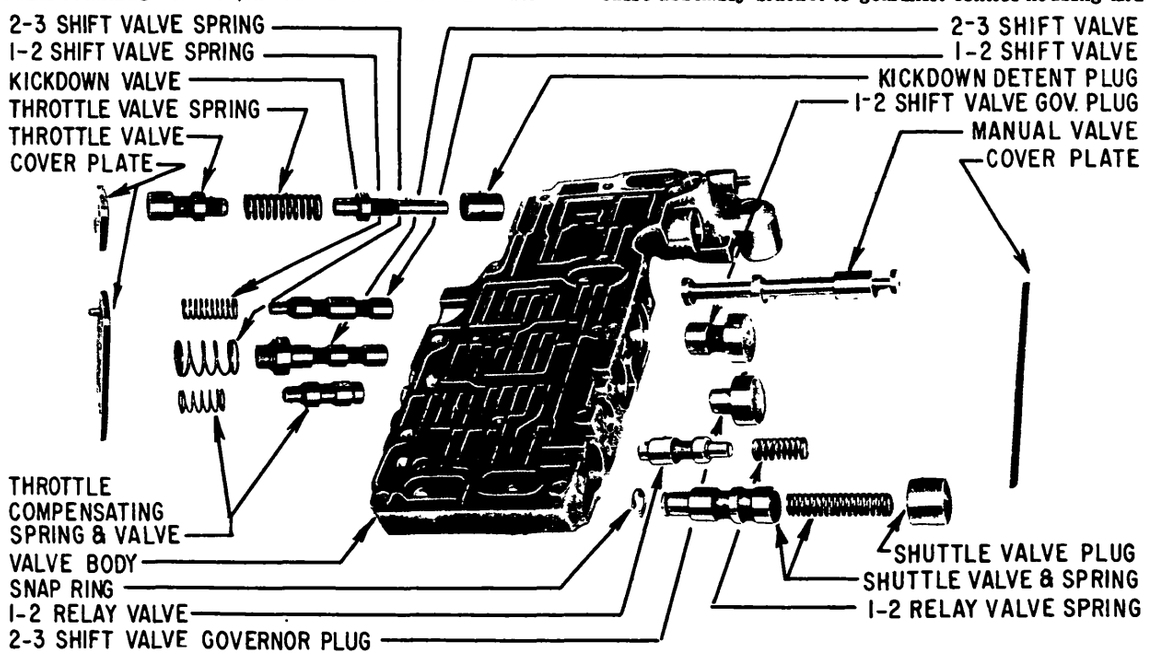
PUSHBUTTON CONTROL UNIT: Removal - Removal procedures are different for the various models as noted below.

Chrysler (Exc. Imperial) & DeSoto - Disconnect one battery cable, then at rear of instrument panel, disconnect back-up light, starter switch, and control unit lamp leads. Remove two screws from face plate to expose two of the bezel retaining screws (third screw is at bottom of bezel). Remove bezel. *CAUTION - Do not attempt to remove bezel and face plate as an assembly.* Remove cross-head screws retaining gearshift housing and plate assembly to instrument panel. Pull plate and gearshift housing straight out and down from instrument panel until control cable and bracket are exposed. *CAUTION - If housing is equipped with back-up light switch, use care to avoid damage to switch when removing plate.* Remove two retaining nuts securing plate to housing and remove plate. Remove two screws holding cable assembly bracket to gearshift control housing. Remove hairpin clip securing cable to actuator, then remove cable from gearshift housing. If necessary to remove push buttons from slides, slightly spread fingers on slides and withdraw buttons.

Imperial - Remove face plate to expose two gearshift housing to support retaining nuts, then remove nuts and pull gearshift housing rearward and down from back of instrument panel. Disconnect back-up light switch and starting motor switch leads. *NOTE - Lamp bulb and light conductor are fastened to gearshift housing support bracket and need not be removed with housing.*

Dodge - Remove back-up light switch, starter switch, and lamp lead wires, then remove four screws holding gearshift control housing and plate assembly to instrument panel (one screw at top front of plate,one screw at front edge of plate, and two screws at bottom rear of plate). Partially pull plate and gearshift control housing assembly straight out and down from instru-

CONTINUED ON NEXT PAGE



LATE 1959 & 1960 TORQUEFLITE CONTROL VALVE ASSEMBLY

TORQUEFLITE (C nt.)

ment panel *CAUTION - If h using is equipp d with back-up light switch, use care when removing plate to avoid damage to switch.* Remove two retainer screws attaching plate to housing, then carefully remove plate by pulling plate away from pushbuttons. Remove two screws holding cable assembly bracket to control housing. Remove hairpin clip securing cable end to actuator and remove cable from housing To remove pushbuttons, spread fingers on slide and withdraw buttons.

Plymouth - Remove three bezel attaching screws, then remove bezel and pushbuttons Remove two hex nuts holding pushbutton unit to instrument panel and remove push button unit from rear of instrument panel Remove cable bracket from pushbutton unit and cable from actuator bar

Installation: Reverse removal operations and adjust cable freeplay

1960 MODELS

PUSH BUTTON CONTROL UNIT: Removal (All Models) - Disconnect battery cable, then disconnect back-up light switch wire at push button control and illuminating lamp leads at rear of instrument panel *NOTE On Imperial, remove speedometer for access to rear of control unit* Remove screws of push button face plate and remove push buttons by pulling them off button slide Remove lamp bulb Remove control housing stud nuts and remove control and cable from rear of instrument panel Remove clip attaching control cable to actuator and the screws holding cable bracket to control housing

Installation: Insert end of cable on actuator and install clip then place cable bracket on control unit and install screws securely Carefully guide unit from rear of instrument panel and install nuts Install lamp bulb and pushbuttons Replace front plate, then connect back-up switch wires and illuminating lamp wires Connect battery cable On Imperial models reinstall speedometer

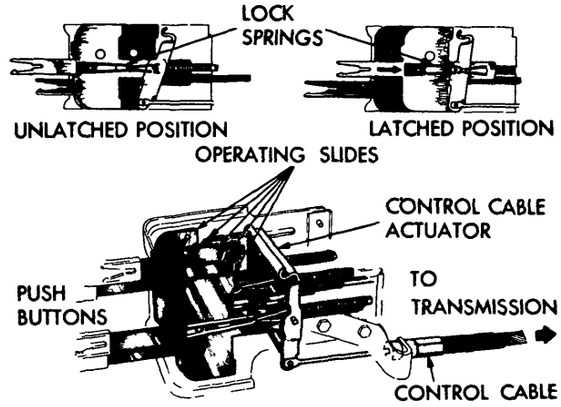
1956 MODELS

MANUAL CONTROL CABLE (Removal): Remove gearshift control unit from instrument panel. Remove control cable clip screw, lockwasher and clip on transmission. Remove control cable adaptor housing plug, insert screwdriver through hole and release the control cable spring lock. While releasing the spring lock, remove cable. Using the same screwdriver, insert through hole in adaptor housing and push lever rearward to last detent. Reinstall housing plug and tighten. From inside of car pull assembly through rubber grommet (or remove grommet) in dash panel.

Installation: From inside car, install transmission end of cable through rubber grommet in dash panel. Install gearshift control unit. Install control cable at transmission making sure spring lock engages cable. Adjust manual control cable. *(See "Manual Cable Adjustment" above).*

1957-60 MODELS

MANUAL CONTROL CABLE (With ut "Wh el Typ " Adjust r): R m val - Engage "1" button to place spring lock in line with control cable adapter plug hole in



PUSH BUTTON GEARSHIFT CONTROL UNIT

transmission case Remove gearshift control unit from instrument panel (see above) Remove cable adjustable mounting bracket on transmission Remove control cable adapter housing plug, insert screwdriver through hole and release control cable spring lock While releasing the spring lock, remove cable Using the same screwdriver, insert through cable hole in adapter housing and push lever rearward to last detent Reinstall housing plug and tighten From front of dash, pull cable assembly and grommet from dash panel

Installation: Place grommet on cable From front of dash, install control housing end of cable through dash panel, Install gearshift control unit (see above) Install cable grommet in dash panel Remove oil pan. Remove neutral starting switch from transmission case Position manual lever in "low" range detent Hold the "R" (Reverse) button in at full travel position Insert cable into transmission manual lever adapter until spring lock engages control cable securely Release the "R" button and hold "N" (Neutral) button in Adjust manual control cable (see above)

MANUAL CONTROL CABLE (With "Wheel Type" Adjuster): Removal - Drain approximately 3 quarts of oil from transmission, then engage the "R" (Reverse) push button Remove control cable adjustment wheel lockscrew, then remove neutral starter switch, cupped washer and seal With a screwdriver inserted through neutral starter switch opening, push gently against the upward projecting portion of control cable adapter lock spring and pull outward on cable to remove cable assembly from case

Installation: Have an assistant hold "R" (Reverse) button firmly depressed, then back adjusting wheel off on cable guide until two or three threads are showing behind wheel on guide Lubricate cable guide threads and "O" ring with a few drops of transmission oil Insert cable end in adapter, and slide cable assembly into case until manual lever assembly bottoms on reverse detent At this point, cable will lock to the adapter Pull out on cable assembly to make sure that adapter spring has engaged cable end Adjust cable, see "Linkage Adjustment" above Reinstall neutral starter switch and refill transmission to proper level

GEARSHIFT UNIT LAMP BULB REPLACEMENT:

1956 M d ls - Remove the three bezel retaining screws (one screw is located on underside of unit) and remove bezel and "D" (Drive) push button Replace defective bulb Replace push button, install bezel, and test operation of unit

1957-60 Models - Remove push button control housing and plate (see above), then remove one or more push buttons for clearance Replace bulb Replace control housing and plate assembly. Test operation of unit

BACK-UP LIGHT SWITCH REPLACEMENT: All M d ls - Remove push button control housing and plate (see above) Back-up light switch is fastened to control unit by four tabs Remove lead wires, then straighten tabs to remove switch To install, position switch and bend tabs to secure switch to housing Reconnect lead wires Check reverse slide action (slide should freely return for free travel) Install pushbutton control housing

1957-58 MODELS

STARTING MOTOR SWITCH REPLACEMENT (CHRYSLER & DODGE): Remove gearshift housing (see above). Remove starter motor switch by drilling out rivets. Mount replacement switch on housing assembly and secure by riveting or suitable screws. Be sure that sufficient clearance is maintained for free movement of operating slide ends if screws are used.

Adjustment: Depress "N" (Neutral) button to the neutral position only, then press only far enough beyond this point to remove all free movement from actuator. Clearance between slide and motor starting switch contact should be .010-.015". If clearance is not within specification, tab on neutral operating slide may be adjusted by carefully bending to bring within specifications *(CAUTION - Use care as op rating slid is f hardened material and may be broken during bending operati n).*

GEARSHIFT CONTROL UNIT TROUBLE SHOOTING & DIAGNOSIS

LOW & REVERSE BUTTONS REQUIRE HEAVY PRESSURE TO LOCK: Adjust manual control cable. *See "Manual Control Cable Adjustment" above.*

"CLUNKING" NOISE WHEN BUTTON RETURNS: Remove control unit and replace rubber bumper if missing or damaged.

PUSH BUTTON WILL NOT RETURN: Remove control unit and replace broken or defective return spring.

PUSH BUTTON WILL NOT LOCK: Replace operating slide.

PUSH BUTTON BINDS: Replace operating slides if warped. Align bezel so push buttons are centered. Position light lead wire as outlined under "Gearshift Control Unit Installation" above. Carefully relieve area where push button contacts felt. This can be done by inserting a .005" feeler gauge between push button cover and the felt mask. Gently moving the gauge in and out in this area will usually relieve the binding condition. Should it become necessary to replace or reglue the mask, use a suitable adhesive and place glue in an area where it will not interfere with operation of the push buttons.

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TORQUEFLITE (C nt.)

LOOSE PUSH BUTTON COVER: Remove bezel to expose push button. Using a small screwdriver, exert sufficient pressure to force tang into plastic recess on push button.

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

►*NOTE: Wh n units ar removed from transmission, ach unit must b insp ct d before assembly as outlined under "Transmission Overhaul".*

NEUTRAL STARTER SWITCH (Removal): Drain approximately two quarts of fluid from transmission and reinstall drain plug. Remove wire from switch and remove switch and gasket.

Installation: Reverse removal procedure and tighten switch to 15-20 ft. lbs.

REGULATOR VALVE ASSEMBLY (Removal): Remove regulator valve spring retainer, gasket and spring. Using a mechanical retriever or a piece of welding rod (5/32") inserted in end of valve, remove valve.

Installati n: Reverse removal procedure and tighten spring retainer to 45-50 ft. lbs.

TORQUE CONVERTER CONTROL VALVE (Removal): Remove torque converter control valve spring retainer, gasket and spring. Using a mechanical retriever or a piece of welding rod (1/8") inserted in valve, remove valve.

Installati n: Reverse removal procedure and tighten retainer to 35-40 ft. lbs.

OIL PAN (R m val): Drain transmission, install drain plug and tighten. Remove oil pan filler tube from pan and loosen support bracket screw. Remove oil pan.

Installation: Reverse removal procedure. Tighten pan screws to 12-17 ft. lbs. Tighten filler tube nut to 35-40 ft. lbs.

1956-EARLY 1959 MODELS
(Without "Wh l Type" Cable Adjuster)

VALVE BODIES & TRANSFER PLATE (Removal): Place push button control unit in "L" (Low) position (it is necessary that control adapter be in this position when removing cable). Remove oil pan. Disconnect throttle linkage from throttle lever on transmission. Remove all dirt and foreign material from around control cable housing. Loosen throttle control lever screw and remove lever assembly. Remove flat washer and felt oil seal from throttle lever shaft. Remove control cable adjustable mounting bracket. Remove control cable adapter housing plug, insert screwdriver through hole and release the control cable spring lock. While releasing control cable spring lock, remove cable. Insert screwdriver through cable opening in adapter housing and push lever rearward to last detent. Reinstall housing plug and tighten. Remove three control cable housing screws and washers and remove housing and gasket. Loosen manual control lever screw and slide lever off shaft. Remove the four oil strainer assembly screws and washers and remove oil strainer assembly. Loosen and remove the thre accumulator cover screws with washers. Remove cover and spring from transfer case. Remove transfer plate screws and washers and remove valve bodies and transfer plate assembly from transmission case.

Installati n: Clean mating surfaces and check for burrs on both transmission case and valve body transfer plate. Install valve bodies and transfer plate assembly on transmission case. Install transfer plate screws and washers and tighten to 16 ft. lbs. evenly *(CAUTION - Dished type washers should be installed on screws with dished portion facing away from screw head).* Install accumulator spring through transfer plate and position in piston. Install accumulator cover, screws, and washers. Draw screws down evenly. Place oil strainer in place on transfer plate assembly. Install four screws and lockwashers. Draw down evenly and tighten strainer and accumulator cover screw to 16 ft. lbs. Install oil pan, then install manual control lever with locking screw to rear on manual valve shaft. Position lever on shaft so there is 7/32" clearance between lever and transmission case (without gasket). If control cable adapter has been removed from manual valve control lever, reinstall by positioning in lever (end of spring lock up), and installing pin. Place manual valve control lever in reverse position (last detent to rear) and install gasket, control cable housing, and screws and washers. Draw down evenly and tighten to 16 ft. lbs. Install felt washer, flat washer, and throttle lever control assembly. Tighten clamping bolt. Connect throttle linkage to throttle lever on transmission. Install control cable in housing and adapter making sure spring lock engages cable. Replace cable adjustable mounting bracket. Adjust manual control cable (see above).

LATE 1959-60 MODELS
(With "Wheel Type" Cable Adjuster)

VALVE BODY & TRANSFER PLATE: Removal - *NOTE - It is not necessary to disconnect control cable at transmission to permit removal of valve body with transmission in car.* Drain transmission and remove oil pan, then engage the "R" (Reverse) push button. Disconnect throttle linkage and remove throttle valve lever and washer. Remove manual control lever-to-control cable adapter stud nut and remove oil strainer, transfer plate bolts, and lower valve body and transfer plate assembly.

Installation: Clean mating surfaces and check for burrs on transmission case and valve body transfer plate. Place manual lever in reverse position (all the way in), then install accumulator piston spring into recess in top of transfer plate and carefully guide the spring up into accumulator piston as transfer plate and valve body are placed up against transmission case. At the same time, index cable adapter stud into manual control lever. Install transfer plate bolts and washers (leave four holes open to attach oil strainer) and draw down evenly and tighten to 14-16 ft. lbs. Install oil strainer and tighten the four bolts in the same manner. Install cable adapter stud nut securely and tighten, then install throttle valve lever and washer and reconnect throttle linkage. Install oil pan and fill transmission with recommended lubricant. *See "Draining & Refilling" above.*

ALL MODELS

KICKDOWN PISTON (R m val): After removal of valve bodies and transfer plate (see above), loosen kickdown band adjusting screw locknut and back adjusting screw out sufficiently to remove anchor. Remove kickdown band strut. Install Tool C-3529 or C-3289 (modified), apply sufficient pressure on kickdown piston rod guide, and remove snap ring. (Oil will drain from servo when compression portion of tool is loosened). Loosen compression portion of tool and remove piston rod guide, piston spring and piston rod. Using pliers, Tool C-484, remove kickdown piston from transmission case.

Installation: Lubricate piston rings and place kickdown piston assembly into position, compress outer ring, and start assembly into case. With piston properly centered (so not to damage rings) tap lightly and bottom piston into transmission case. Slide piston spring over kickdown piston rod assembly and install in piston. While holding in this position, install the kickdown piston rod guide assembly on kickdown piston rod. Using Tool C-3529 or C-3289 compress the kickdown piston spring to the point that piston guide seal ring slightly binds on transmission case. Work seal ring into position and gradually compress spring until seal ring enters case and snap ring can be installed. Install kickdown piston rod guide snap ring, making sure it is properly seated. Loosen compressing portion of tool and remove tool from transmission. Place kickdown band strut in position in band and lever and compress band end sufficiently to install anchor over adjusting screw. Adjust kickdown band. Install valve bodies and transfer plate assembly.

ACCUMULATOR PISTON (Removal): Remove valve bodies and transfer plate (see above). Using pliers, Tool C-484, remove accumulator piston from transmission case.

Installation: Lubricate seal rings and place accumulator piston into position. Compress outer seal ring and tap lightly into transmission case. Install valve bodies and transfer plate assemblies.

OUTPUT SHAFT REAR BEARING OIL SEAL (Removal): Disconnect front universal joint. Apply hand brake and remove propeller shaft flange nut and Belleville washer. Release hand brake and install puller, Tool C-452 (if necessary). Remove propeller shaft flange and brake drum assembly. Remove transmission brake support grease shield spring (small one). Remove brake support grease shield from extension *(CAUTION - If screwdriver or sharp instrument is used in performing this operation, care must be taken to prevent damage to neoprene sealing surface at bottom of shield)*, Install puller, Tool C-748, and remove transmission output shaft rear bearing oil seal.

Installation: Using driver, Tool C-3205, install output shaft rear bearing oil seal (metal portion of oil seal facing in) until driver bottoms on extension. *(CAUTION - Indent on grease shield must match groove in extension for correct positioning. Also, shield must be located on extension far enough to permit installation of spring).* Install brake support grease shield spring (opening in spring toward adjusting sleeve). Make sure spring is properly seated in groove. Install propeller shaft flange, Belleville washer, and nut. Apply hand brake and tighten propeller shaft flange nut to 200 ft. lbs. Connect front universal joint and torque nuts to 33-37 ft. lbs. Refill transmission (if necessary).

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TORQUEFLITE (C nt.)

EXTENSION HOUSING (R m val): Drain approximately two quarts of fluid from transmission. Disconnect front universal joint. Apply hand brake and remove propeller shaft flange nut and Belleville washer. Release hand brake, and using puller, Tool C-452 remove propeller shaft flange and drum assembly. Remove brake adjusting screw cover plate and loosen cable clamp bolt on hand brake support. Disengage the ball end of cable from operating lever and remove cable from brake support. Disconnect speedometer cable and housing at transmission extension and remove speedometer drive pinion and sleeve assembly. Remove nuts and lockwashers holding engine rear support insulator to crossmember, leaving insulator attached to extension. Remove the two top extension to case screws and lockwashers. Using a suitable jack and extreme care to prevent damage to oil pan, raise transmission sufficiently for insulator on extension to clear crossmember. Remove four of the remaining extension to case screws and lockwashers and install guide studs, Tool C-3283. *(NOTE* - Due to interference of the insulator, it will be necessary to remove the bottom extension to case screw with the extension, that is, back out the screw as far as possible and slide extension back and continue loosening screw). *(CAUTION - Do not remove the one output shaft support to transmission case screw).* Remove extension and hand brake as one assembly. Remove extension gasket. *NOTE* - If care is used, it is not necessary to remove hand brake support and shoe assemblies from extension to replace output shaft rear bearing.

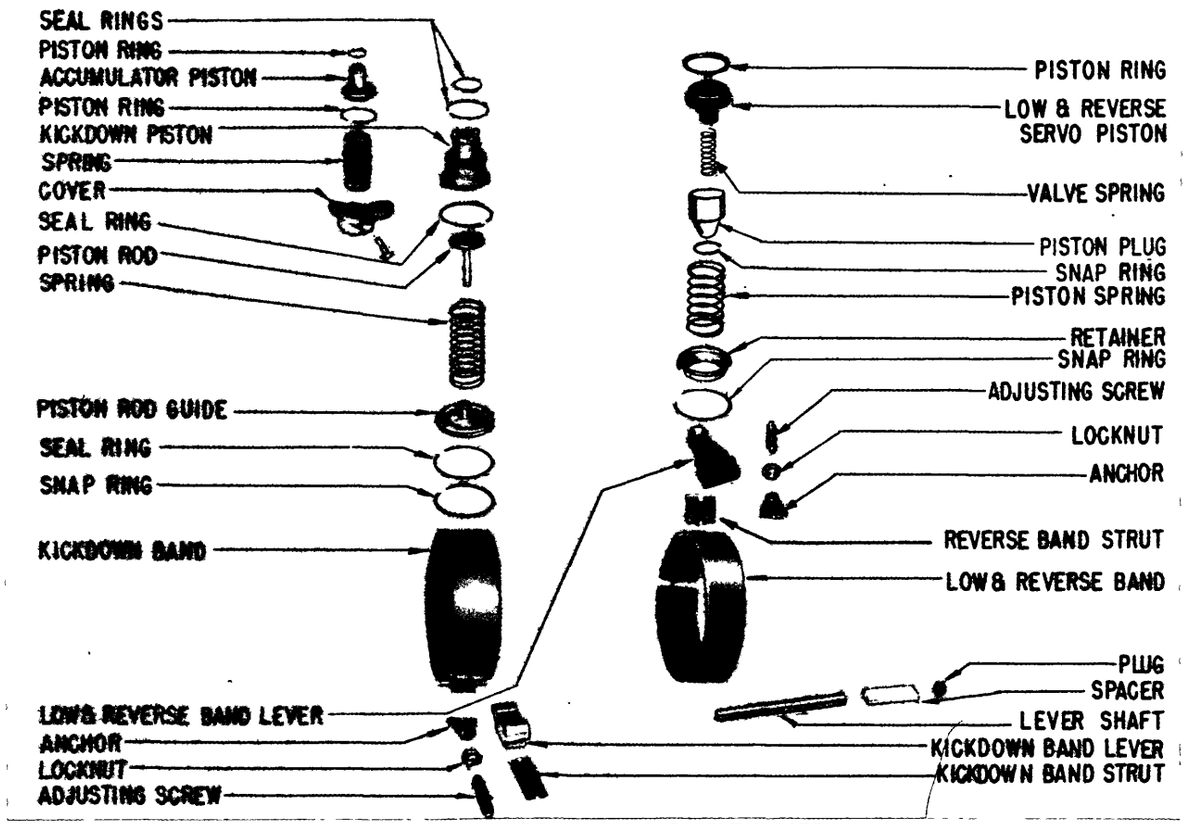
Installation: Reverse removal procedure and note the following: Start bottom extension to case screw as the extension is pushed into position against support. *(CAUTION - Do not attempt to pull extension in with aid of the screws; damage to extension may result).* Tighten extension to case screws to 25-30 ft. lbs. Tighten propeller shaft flange nut to 200 ft. lbs. Tighten universal joint nuts to 33-37 ft. lbs. Tighten speedometer pinion and sleeve assembly to 40-45 ft. lbs.

GOVERNOR (Removal): Remove extension housing, see above. Remove governor valve shaft and valve from governor body assembly. Using pliers, Tool C-3229, remove governor weight assembly snap ring (large) and remove weight assembly. *(NOTE* - The primary cause of governor operating failure is usually due to improper operation of governor valve which may be sticking in housing or travel restricted by chips or other foreign matter. If inspection indicates complete removal, proceed as follows): Remove governor support locating screw and remove governor and support assembly from rear oil pump housing. Normal servicing does not require removal of governor body from support. If condition warrants removal of governor body from support, when reassembling, do not tighten governor body screws until governor body support is located on output shaft.

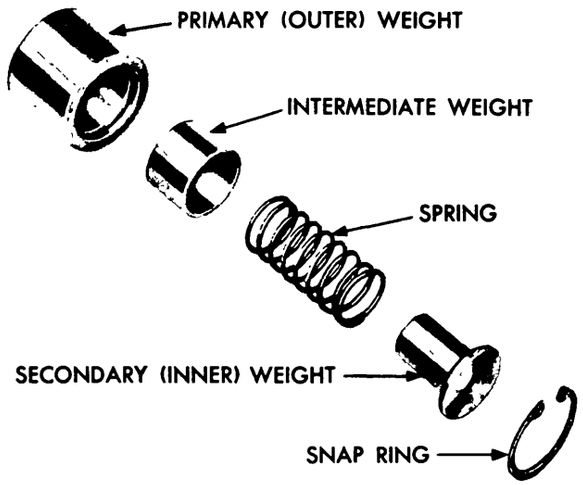
Installation: Slide governor body and support assembly into position in rear oil pump housing, using extreme care, compress governor support seal rings as support enters oil pump housing. DO NOT FORCE. Align locating hole in output shaft to locating screw hole in governor support and install screw. Tighten to 5-7 ft. lbs. Holes can be aligned by turning output shaft and holding governor body. If governor body has been removed and reinstalled, tighten the four governor body screws to 6-8 ft. lbs. Place governor weight assembly (secondary weight snap ring facing out) into governor body; and using pliers, Tool C-3229, install snap ring. Make sure snap ring seats properly. With governor valve (small end up) on governor valve shaft, slide shaft into governor body through the output shaft and governor weight assembly; at the same time position valve into body. Install governor valve shaft snap ring. Make sure it is locked securely to shaft. Replace snap ring if distorted *(NOTE* - After snap ring installation, apply sufficient pressure to both ends of valve shaft to force snap ring to outer portion of snap ring grooves). Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in valve body. Install extension housing.

REAR OIL PUMP (Removal): Remove extension housing, see above. Using a screw driver, remove governor valve shaft snap ring from weight assembly end. Remove governor valve shaft and valve from governor body assembly. Using pliers, Tool C-229, remove governor weight snap ring (large) and remove governor weight assembly

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TORQUEFLITE SERVO & BAND ASSEMBLIES



TORQUEFLITE GOVERNOR ASSEMBLY

TORQUEFLITE (C nt.)

from governor body. Remove governor locating screw from governor support. Remove oil pump-to-output shaft support screws and Belleville washers, and install guide studs, Tool C-3288. Remove pump housing, gear, and governor assembly from output shaft. Use prussian blue and mark pump gears in relation to pump housing face *(CAUTION - Do not scribe)*. When removing oil pump pinion, use care so as not to lose the small ball used as a key. Remove rear oil pump pinion from output shaft and mark in same manner. Remove governor assembly from oil pump housing.

Installati n: Install governor support and body assembly into position in rear pump housing. Compress governor support seal rings as support enters oil pump housing. DO NOT FORCE. Place rear oil pump pinion ball in ball socket in output shaft. Place rear oil pump pinion (as marked when removed) over output shaft and into position aligning keyway in pinion with ball in shaft. With rear oil pump properly positioned in pump housing (check marking), slide rear oil pump and governor assemblies over output shaft and guide studs into position against support. *(CAUTION - There are two extra holes in housing which ar us d for vents. Make definitely sure no att mpt is mad to install screws in these holes).* Remove guide studs and install pump housing-to-output shaft support screws and Belleville washers (install washers with dished portion facing away from head). Tighten screws evenly to 10-12 ft. lbs. Rotate output shaft to make sure pump gears are free to rotate. If not, remove pump to determine cause. Align locating hole in output shaft-locating screw hole in governor support. Install locating screw and tighten to 5-7 ft. lbs. Complete installation by following governor installation procedure outlined above.

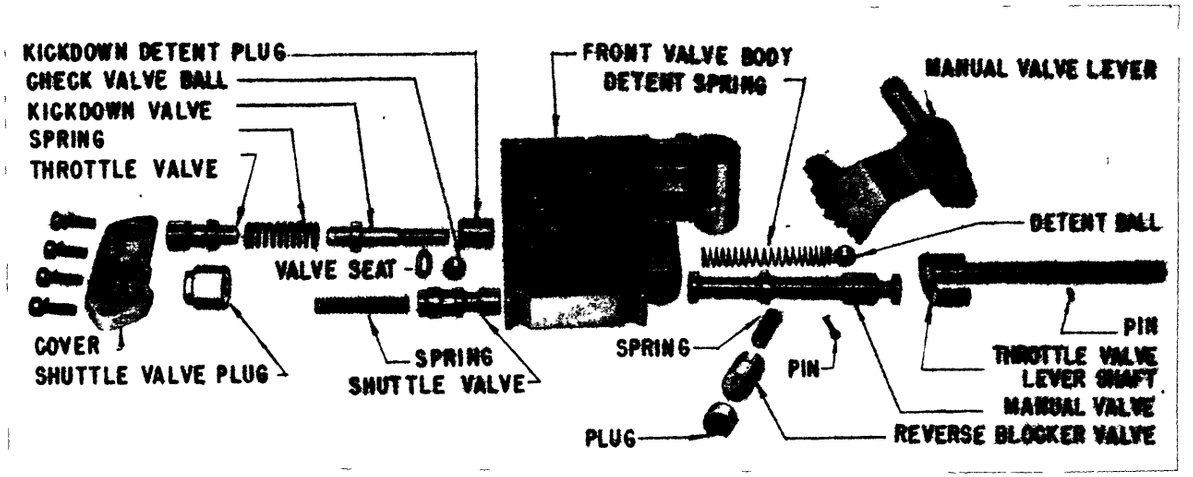
REMOVAL & INSTALLATION

1956-EARLY 1959 MODELS
(With ut "Wh l Typ " Cable Adjuster)

REMOVAL: 1) Disconnect battery. Push in the "1" (Low) button and raise car off floor *(NOTE - Push button must be in the "1" position to remove cable from adaptor housing on transmission)*. Drain transmission and torque converter (see "Draining & Refilling" above). Disconnect oil pan filler tube assembly from oil pan and loosen support bracket screw.

2) Disconnect the front universal joint and secure propeller shaft out of the way. Remove brake adjusting screw cover plate and loosen cable clamp bolt on hand brake support. Disengage the ball end of cable from operating lever and remove cable from brake support. Disconnect speedometer cable and housing at transmission extension. Disconnect neutral starter wire at switch. Unclip wires from crossmember.

3) Disconnect throttle control linkage from throttle lever on transmission. Remove gearshift control cable clip screw, lockwasher, and clip. Remove control cable adaptor housing plug, insert screwdriver through hole, and release control cable spring lock. While releasing control cable spring lock, remove cable from adapter housing. Using the same screwdriver, insert through cable opening in adaptor housing and push lever rearward to last detent. Reinstall housing plug and tighten.



1956 - EARLY 1959 TORQUEFLITE FRONT VALVE BODY ASSEMBLY

4) Disconnect the two oil cooler lines from transmission (if so equipped). Remove nuts and lockwashers holding engine rear support insulator to crossmember, leaving insulator attached to extension. Remove starter.

5) Install engine support fixture, Tool C-3487. Insert hooks of fixture firmly into holes in side of frame member with support ends up against underside of oil pan flange. Adjust fixture to support weight of engine. Raise engine slightly, remove crossmember-to-frame bolts and remove crossmember. *(CAUTION - Do not lower engine more than three inches from floor pan).*

6) Remove the two transmission case-to-torque converter housing screws and lockwashers from right side and install guide studs, Tool C-3276. With transmission supported, remove the two transmission case-to-converter housing screws and lockwashers from left side. Slide transmission straight back to avoid damage to front oil pump driving sleeve, then lower to floor.

INSTALLATION: 1) Install guide studs, Tool C-3276, in the two transmission mounting holes in right side of torque converter housing. With front oil pump drive sleeve lubricated, install, making sure driving lugs are properly engaged with oil pump pinion. *(NOTE - Main portion of drive sleeve will be flush with front of pump housing when properly installed)*. Note position of driving lugs inside torque converter hub, then position front oil pump drive sleeve on transmission accordingly, to aid on proper engagement when transmission installed. Slide transmission over guide studs and into position against converter housing. Make sure driving lugs on front oil pump drive sleeve properly engage torque converter.

► *CAUTION - To avoid damage to front oil pump, do not attempt to use torque converter housing screws to bring transmission and housing together. If oil pump drive sleev and input shaft hav be n prop rly aligned, the transmission should slid int p sition r lativ ly easy. DO NOT FORCE.*

2) Install the two transmission-to-torque converter housing screws and lockwashers in left side (do not tighten). Remove guide studs and install the two transmission-to-housing screws and lockwashers in right side, then draw the four down evenly and tighten to 45-50 ft. lbs. Place crossmember into position and install crossmember-to-frame bolts. Tighten to 50-55 ft. lbs.

3) Lower engine and at the same time align mounting studs in insulator with holes in crossmember. Install the two nuts and lockwashers holding engine rear support and insulator to crossmember and tighten to 30-35 ft. lbs. Remove support fixture from side of frame member.

4) Install bracket holding oil cooler lines to cylinder block (if so equipped) on transmission case and tighten. Connect neutral starter-to-switch wire. Install oil pan filler tube and tighten filler tube nut to 35-40 ft. lbs. Tighten support bracket screw.

5) Connect speedometer cable and housing at extension. Engage ball end of hand brake cable in operating lever and tighten cable clamp bolt. Install adjusting brake screw cover plate on hand brake support. Connect front universal joint and tighten nuts to 33-37 ft.lbs.

6) Connect throttle control linkage to throttle lever on transmission. Install gearshift control cable in adapter making sure spring lock engages cable. Install starter, connect battery, refill transmission and adjust throttle linkage and gearshift control cable.

LATE 1959-60 MODELS
(With "Wheel Type" Cable Adjuster)

REMOVAL: 1) Disconnect battery, then push in the "R" (Reverse) button on control panel and raise car on a hoist. Drain transmission and torque converter. After draining, replace converter drain plug and tighten.

2) Disconnect front universal joint and secure propeller shaft out of way. Remove brake adjusting screw cover plate and loosen cable clamp bolt on parking brake support. Disengage ball end of cable from operating lever and remove cable from brake support.

3) Disconnect speedometer cable and housing at transmission, then disconnect neutral switch wire and throttle control linkage from throttle lever. Remove push button

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TORQUEFLITE (C nt.)

control cable adjustment wheel locking screw and neutral starting switch.

4) Insert a screwdriver through neutral starting switch hole, contact top end of cable-to-adapter locking spring and while releasing the lock, pull out cable. Disconnect oil cooling lines from transmission.

5) Install engine support, Tool C-3487. *NOTE - On some models it may be necessary to remove starter to provide clearance for fixture.* Adjust tool to support engine, then raise engine slightly and remove crossmember to torsion bar bracket bolts. *CAUTION - When using Tool C-3487, do not lower engine more than three inches from floor pan.*

6) *NOTE - Rear motor support and bracket may be left on transmission extension during repairs.* Remove the two transmission case to torque converter housing screws and lockwashers from right side and install guide studs, Tool C-3276. With transmission supported, remove two transmission to torque converter housing screws and lockwashers from left side. Slide transmission straight back to avoid damage to front oil pump driving sleeve, then lower to floor.

INSTALLATION: 1) Install guide studs, Tool C-3276, in two transmission mounting holes in right side of torque converter housing, then with front oil pump drive sleeve lubricated, install it making sure the driving lugs are properly engaged with oil pump pinion. *NOTE - Main portion of drive sleeve will be flush with front of pump housing when properly installed.*

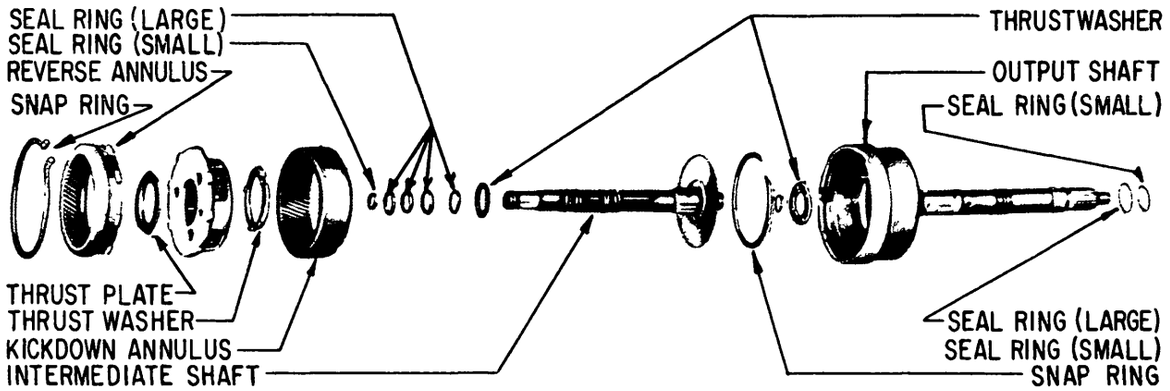
2) Note position of driving lugs inside torque converter hub, then position front pump drive sleeve on transmission accordingly, to aid in proper engagement when transmission installed. Slide transmission over guide studs and into position against converter housing. Make sure driving lugs on front oil pump drive sleeve properly engage torque converter. *CAUTION - To avoid damage to front oil pump, do not use transmission-to-torque converter housing screws to force transmission and housing together.*

3) Install two transmission-to-torque converter housing screws on left side but do not tighten. Remove guide studs and install the other two bolts on right side. Tighten all four bolts evenly to 40 ft. lbs.

4) Place crossmember in position and tighten crossmember-to-torsion bar bracket bolts securely. Lower the engine and at the same time align mounting bolts in insulator bracket with holes in rear spring mount plate. Install nuts and tighten to 35 ft. lbs., then remove Tool C-3276.

5) Install oil cooling lines and connect neutral starting switch wire. Install oil pan filler tube nut and tighten to 40 ft. lbs. Connect speedometer cable, then engage ball end of parking brake cable in operating lever and tighten cable clamp bolt. Install brake adjusting screw cover plate on parking brake support. Connect front universal and tighten nuts to 37 ft. lbs. Install starter (if removed).

6) Connect throttle control linkage to throttle lever on transmission, then install push button control cable in adapter, making sure spring lock engages cable. Adjust manual control cable (see above). Connect battery, refill transmission with fluid (see above), then adjust throttle linkage.



TRANSMISSION UNIT NO. 1

TORQUE CONVERTER REMOVAL

REMOVAL: Remove transmission, see above. Remove torque converter housing-to-adaptor screws and lockwashers. Remove torque converter housing. *(NOTE - If torque converter is being removed because of excessive runout damage, check runout by using a dial indicator on hub, and mark the highest point of runout on both converter and crankshaft flange. This will aid later in determining if runout is due to converter or crankshaft).* Using wrench, Tool C-589, remove the stud nuts and lockwashers from crankshaft flange. Remove converter from crankshaft. Check crankshaft flange runout which should be a maximum of .002".

CORRECTING HUB RUNOUT: Permissible converter hub runout, when mounted on the crankshaft is .004" total indicator reading. When mounting a new torque converter, make sure all foreign matter, raised metal around studs, burrs, chips and dirt are removed from converter and crankshaft drive flanges. Check crankshaft runout (maximum .002").

1) Check converter runout by mounting a dial indicator to adaptor plate or some other unit which is mounted rigidly to the engine block. Rotate converter 360° and determine converter hub, outside diameter, runout. If this exceeds .004" total indicator reading, then correct by using heat in the following manner: Mark position of hub low spot as accurately as possible on the impeller shell. Rotate converter so this mark is downward. Remove dust shield from front of adaptor plate. Using a piece of chalk, mark front cover radius directly opposite the hub low spot previously marked on impeller shell. The subsequent heating operation can now be done through the opening in adaptor plate. *(CAUTION - Drain converter housing before heating).* The size of the spot to be heated is governed by amount of hub runout and is usually 1/2" diameter for .008" total indicator reading. Using an acetylene torch having a No. 3 tip (set to maximum heat) apply to selected spot until it becomes a dull red. Rapid heating of the local area is essential and if the torch is adjusted properly, the spot will become red within a few seconds *(CAUTION - If sparks are noted, it is an indication that torch is too close and metal is starting to burn; move torch back slightly. Care should be taken to remove torch the instant the selected spot becomes a dull red to avoid overcorrection or damage to the unit).* The area is then quenched as rapidly as possible with cold water (hose or wet rags). It is suggested this be done by starting around the heated area and working in toward the spot. This prevents heat from spreading. *(NOTE -* The hub runout should not be rechecked until the converter has returned to a uniform room temperature). If the converter hub runout exceeds .016" total indicator reading, remove converter and recheck drive flanges for chips, burrs, etc. Check crankshaft flange runout (max. .002"). If runout remains in excess of .016", install a new converter.

STARTER RING GEAR (Removal): Support torque converter assembly in a vise and with a file carefully remove the staking lugs which retain ring gear to converter. *(CAUTION - Be car ful wh n supporting converter in the vise to avoid dist rtion).* Place converter on blocks of wood for support while removing. Using a blunt chisel or drift, tap around ring gear until it comes off torque converter.

Installation: Remove burrs or raised spots (left on gear contact surface of converter), with a file, being careful not to remove more metal from converter than is required to remove burrs and rough surfaces. Any of the following methods may be used to heat starter ring gear for installation on converter:

Oven - When available, use oven C-794 and set temperature at 150° F. Allow ring gear to remain in oven approximately 15-20 minutes.

Boiling Water – Place ring gear in a shallow pan, add water, and heat approximately 8 minutes after water has come to a boil.

Steam – Place ring gear on a flat surface and direct steam flow around gear for approximately two minutes.

Flame – Place ring gear squarely on a flat surface. Using a medium tip, direct a low flame around inner rim of gear, being careful not to direct flame onto teeth of ring gear. Place a few drops of water on face of gear at short intervals during the heating process. When gear is hot enough to boil the drops of water, installation of gear on converter can be made.

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TORQUEFLITE (Cont.)

Reweld ring gear to converter using extreme care to place as nearly as possible the same amount of metal in exactly the same location as original assembly. This is necessary in order to maintain proper balance of unit. Place welds alternately on opposite sides of converter to minimize distortion. In making the weld, use a welding current of 200 amps. Use a D.C. welder that is set at straight polarity or an A.C. welder. Use a 5/32" dia. Fleetweld No. 47, or General Electric No. W28 (or equivalent). *(CAUTION - To prevent burning through the converter, the arc should be directed at intersection of gear and housing from an angle of approximately 45° from face of gear. DO NOT GAS WELD).* Before installing converter, inspect all gear teeth and remove nicks where metal is raised, or welding splatter.

INSTALLATION: Inspect mating surfaces on converter and crankshaft flange for burrs and dirt. Install converter on crankshaft. Install torque converter stud nuts and lockwashers. Draw down evenly and tighten. Check converter assembly runout which should not exceed .004". Place torque converter housing over dowels and into position against adaptor. Install torque converter housing-to-adaptor screws and lockwashers, draw down evenly and tighten to 25-30 ft. lbs. Install transmission.

TRANSMISSION DISASSEMBLY

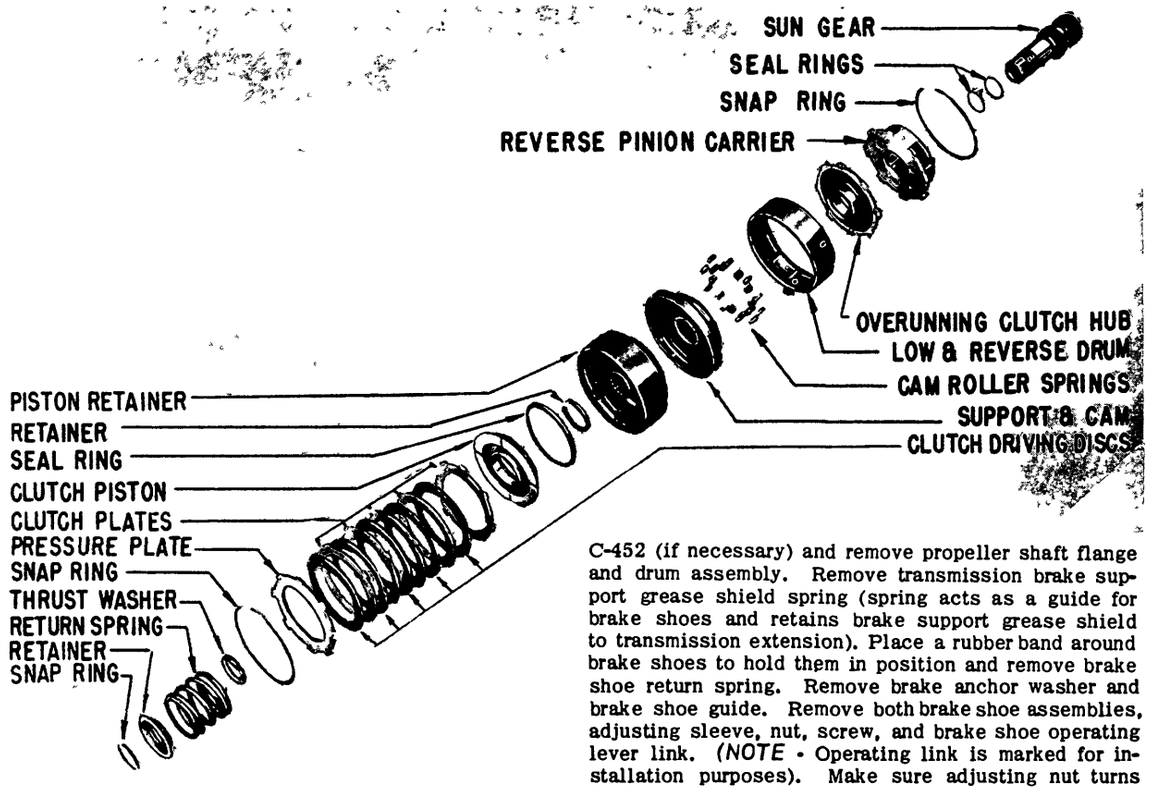
DRIVE SLEEVE & OIL PAN (Removal): Place transmission in stand, Tool C-3280 and invert. Remove drive sleeve and inspect front seal ring (neoprene) for nicks, deterioration and hardness. Inspect the interlocking seal ring for wear or broken locks, and make sure it turns freely in the groove. (It is not necessary to remove rings unless condition warrants). Inspect driving lugs for excessive wear, and bearing surface on outer diameter for nicks, burrs, or scratches. Remove oil pan and gasket.

1956-EARLY 1959 MODELS
(Without "Wheel Type" Cable Adjuster)

VALVE BODY & TRANSFER PLATE ASSEMBLY (Removal): Remove throttle control lever, flat washer, and felt washer from transmission. Remove gearshift control cable adapter housing bolts and washers and remove housing and gasket from transmission. *(NOTE - Manual valve must be moved to the reverse position before housing can be removed).* Loosen manual valve control lever bolt. Using caution to prevent loss of cable adapter pin, slide lever and cable adapter off shaft. Remove oil strainer assembly bolts and lockwashers, and remove oil strainer (one strainer is used for both front and rear oil pumps). Loosen (to relieve spring load) the three accumulator cover bolts with washers, and remove cover and spring from transfer plate. Remove transfer plate bolts and washers and remove valve bodies and transfer plate assembly from transmission case *(CAUTION - Use care not to damage mating surfaces).* Place valve body in stand, Tool C-3528. Remove neutral starting switch located in left side of transmission case.

LATE 1959-60 MODELS
(With "Wheel Type" Cable Adjuster)

VALVE BODY & TRANSFER PLATE ASSEMBLY (Removal): Remove throttle valve lever and flat washer, then remove cable adapter stud nut. Remove oil strainer. Remove attachment nut from cable adapter stud at manual lever and remove adapter. Remove transfer plate bolts and remove valve body assembly from transmission. *NOTE - Mating surfaces are machined and care should be used so as not to damage these surfaces.* Remove accumulator piston spring, then place valve body assembly in stand, Tool C-3528.



TRANSMISSION UNIT NO. 2 (TYPICAL)

FRONT CLUTCH END CLEARANCE CHECK: Before removal of propeller shaft flange and drum assembly, check end clearance of front clutch piston retainer assembly using dial indicator, Tool C-3339 mounted on case in such a manner as to have dial indicator plunger bearing against rear side of front clutch piston retainer assembly. Pry front clutch forward by inserting screwdriver between front and rear clutch. Remove screwdriver and with dial indicator point contacting edge of front clutch retainer, set dial to zero. Pry clutch assembly rearward against rear clutch, remove screwdriver and take indicator reading. This clearance should be .020-.050". *NOTE - If clearance exceeds the specified limits, particular attention should be paid to the condition of input shaft thrust washer when disassembling transmission.*

HAND BRAKE ASSEMBLY (Removal): Remove transmission flange nut and Belleville washer. Attach puller, C-452 (if necessary) and remove propeller shaft flange and drum assembly. Remove transmission brake support grease shield spring (spring acts as a guide for brake shoes and retains brake support grease shield to transmission extension). Place a rubber band around brake shoes to hold them in position and remove brake shoe return spring. Remove brake anchor washer and brake shoe guide. Remove both brake shoe assemblies, adjusting sleeve, nut, screw, and brake shoe operating lever link. *(NOTE* - Operating link is marked for installation purposes). Make sure adjusting nut turns freely on screw. Remove the other brake shoe guide from anchor pin. Remove brake support grease shield from extension being careful not to damage neoprene sealing surface at bottom of shield. Slide brake support assembly from rear extension and anchor. Inspect neoprene spacer on back of support plate for deterioration and note the steel sleeve used between neoprene spacer and extension.

EXTENSION HOUSING: Remove speedometer drive pinion and sleeve assembly (damage to nylon gear will result if drive pinion and sleeve assembly is not removed first). Inspect output shaft, rear bearing oil seal, and remove if necessary, using puller, Tool C-748. Remove transmission extension-to-case screws and lockwashers. Install guide studs, Tool C-3283, and remove extension from output shaft support assembly by tapping housing lightly with a soft hammer. Housing may be separated from support by using a pry bar between support screw and housing bracket. Remove gasket.

Inspection: Inspect extension housing for cracks in casting and remove burrs from gasket surfaces. Inspect vent in top of housing and make sure it is free of dirt. Clean output shaft rear bearing and dry with compressed air. Inspect bearing for rough spots. Do not remove from housing unless it is necessary to replace.

GOVERNOR & REAR OIL PUMP HOUSING (Removal): Using a screwdriver, remove governor valve shaft snap

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TORQUEFLITE (C nt.)

ring from weight assembly end. Remove governor valve shaft and valve from governor body assembly. Using pliers, C-3229, remove governor weight assembly snap ring (large) and remove governor weight assembly from body. Using a 5/16" socket, remove governor locating screw from governor support. Remove five rear oil pump-to-output shaft support screws (with Belleville washers). Remove pump housing, gear, and governor assembly from output shaft. Use prussian blue and mark face of pump gears in relation to pump housing. *(CAUTION* - Do not use scribe). Remove oil pump pinion, being careful not to lose ball used to key pinion to output shaft, from output shaft, and mark in same manner as for gears.

Inspection: Inspect pump housing plug for leaks and machined surfaces for nicks and burrs. Inspect gears for scoring or pitting. With gears cleaned and installed in housing (as marked) and using straightedge, Tool C-3335 and feeler gauge, check clearance between pump housing face and face of gears. Clearance should be .001-.0025".

OUTPUT SHAFT SUPPORT (Removal): Remove output shaft support-to-transmission case screw and washer. Slide output shaft rear support assembly and gasket from transmission case. If rear support is stuck to case, it can be loosened by tapping with a soft hammer. Remove guide stud from transmission case.

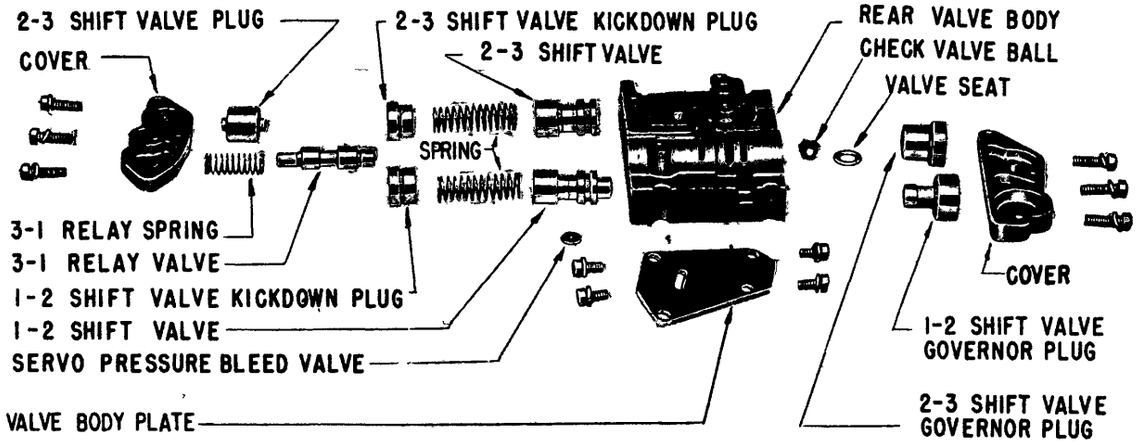
Inspection: Inspect all oil passages in support for obstructions. Remove pressure take-off plugs (governor and rear clutch supply) and clean passages with compressed air. Check rear oil pump mating surfaces for burrs and score marks. Check for stripped threads in support. Inspect gasket surfaces for burrs and score marks. Inspect inside bearing surface for wear or scoring.

POWER TRAIN UNITS (Removal): Unit No. 1 (Output Shaft, Kickdown Planet Pinion Carrier, and Intermediate Shaft Assemblies) – Remove by sliding unit out rear of transmission case being careful to support unit as much as possible to prevent damage to seal rings on intermediate shaft.

Unit No. 2 (Sun Gear, Reverse Planet Pinion Carrier, Overrunning Clutch, and Rear Clutch Assemblies) – Loosen locknuts on low-reverse and kickdown band adjusting screws, and back adjusting screws out 2 to 3 turns. Remove the three intermediate support locating screws and lockwashers (two outside of case and one inside). *(CAUTION - When removing unit, identify locating hole in intermediate support to correspond with the threaded locating hole inside of case, for installation purposes).* Keep unit centered as much as possible to prevent binding of intermediate support, and remove assembly from transmission case. *CAUTION - Make sure front clutch and sun gear thrust washers remain in position in front of unit.*

Unit No. 3 (Front Clutch Piston Retainer and Input Shaft Assemblies) – Keep unit centered as much as possible, and remove from transmission case. *CAUTION-* Use care when removing to prevent damage to seal rings on input shaft and sealing surface of reaction shaft.

LOW-REVERSE BAND ASSEMBLY (Removal): Mark low-reverse band assembly for installation purposes. Compress ends of band sufficiently to remove low-reverse band strut. Remove low-reverse band assembly by rotating band ends through rear opening in transmission case. Remove low-reverse band anchor from adjusting screw.



1956 - EARLY 1959 TORQUEFLITE RELIEF VALVE BODY ASSEMBLY

KICKDOWN BAND ASSEMBLY (Removal): Compress kickdown band ends sufficiently to remove band strut (note that strut is grooved to act as a guide). Remove kickdown band anchor from adjusting screw. Remove kickdown band assembly by rotating band ends over center support in transmission case, using care not to damage lining on edges of transmission case. *NOTE* - Both bands have bonded lining and no attempt should be made to reline them. Different material is used on kickdown and low-reverse bands.

BAND INSPECTION: Check for wear and bond to metal. If lining is worn to point where grooves are no longer visible, band assemblies must be replaced. Inspect bands for distortion or cracked ends. The low-reverse band is narrower than kickdown band. Mark for proper installation.

LOW-REVERSE & KICKDOWN BAND ADJUSTING SCREWS (Removal): Remove both band adjusting screws locknuts and remove adjusting screws. *CAUTION* -It is very important that adjusting screws fit freely into transmission case. When locknuts are loose, adjusting screws must be finger free. If not, inspect screws and nuts for pulled threads or foreign material in threads.

LOW-REVERSE AND KICKDOWN BAND LEVER ASSEMBLIES (Removal): Remove kickdown and low-reverse lever shaft stop plug at rear of transmission case. Using a pair of long nosed pliers, remove kickdown and low-reverse shaft lever spacer (flat). Thread guide stud, Tool C-3288 into shaft, and remove shaft from case. Remove kickdown and low-reverse servo levers.

Inspection: Inspect levers for being cracked or worn and make sure they are free to turn on shaft and have side clearance when installed. Inspect lever shaft for excessive wear.

LOW-REVERSE SERVO (Removal): Lift out low-reverse servo sleeve and install Tool C-3529, on transmission case and compress piston spring retainer. Using a screwdriver, remove low-reverse servo piston spring retainer snap ring. Loosen compression portion of tool and remove. Remove spring retainer, spring, servo piston, and valve assembly.

Inspection: Inspect inside bore of piston sleeve for burrs, scores and wear. Inspect bleeder hole in sleeve and make sure it is free of foreign matter. Inspect lever contact surface on sleeve for excessive wear. Remove and inspect piston seal ring for deterioration and hardness. Inspect seal ring groove for nicks or burrs. Inspect sleeve contacting surface for nicks, burrs and scoring (light scores may be removed with crocus cloth). Inspect servo piston valve for proper installation and operation. Long end of valve should protrude through bottom of piston. Valve should operate freely when compressed by hand. Make sure valve spring snap ring is properly seated in piston. Inspect servo piston return spring, retainer, and snap ring for distortion.

KICKDOWN SERVO (Removal): Install Tool C-3529. Apply pressure on the kickdown piston rod guide, and remove snap ring. Loosen compressing portion of tool and remove from transmission case. Remove piston rod guide, piston spring, and piston rod. Using pliers, Tool C-484, remove the kickdown piston from transmission case. Remove accumulator piston from case.

Inspection: (Kickdown Piston Assembly) – Inspect riveting of kickdown piston rod. Inspect guide contacting surface for nicks or burrs. Inspect seal ring on guide for wear and make sure it turns freely in groove. Check fit of guide on piston rod. Inspect the three rings (two interlocking) on piston for wear or broken locks. Make sure they turn freely in groove. *(NOTE* - It is not necessary to remove rings unless condition warrants. When replacing new rings, use care to avoid damaging interlocking portion of ring). Inspect piston for light scores and wear. Inspect piston spring and rod guide snap ring for distortion.

Inspection: (Accumulator Piston Assembly) – Inspect

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both piston seal rings (one interlocking) for wear or broken locks and make sure they turn freely in grooves. *(NOTE* - It is not necessary to remove rings unless condition warrants). Inspect accumulator piston for nicks, burrs, and excessive wear. Inspect accumulator spring for distortion.

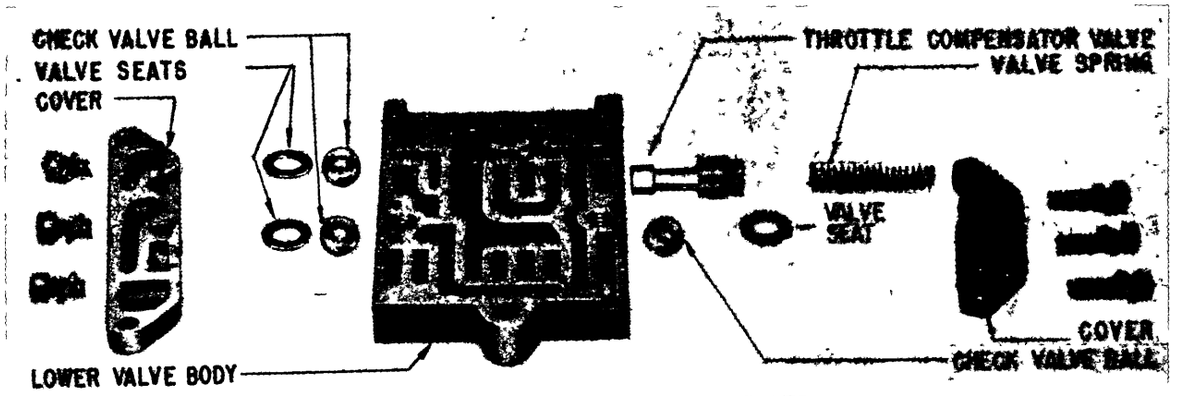
FRONT OIL PUMP (Removal): Remove transmission regulator valve spring retainer, spring, gasket, and valve. Remove torque converter control valve spring retainer, spring, gasket and valve (these valves can be removed with a mechanical retriever or a piece of welding rod, 5/32" for regulator, and 1/8" for torque converter, inserted in end of valve). Remove the front pump housing-to-transmission case screws and washers (sealing washers used under bolts are aluminum; discard if damaged). Remove oil pump housing assembly from transmission case by tapping with a soft hammer. Mark face of gears in relation with face of pump housing using prussian blue. DO NOT SCRIBE.

► *FRONT PUMP DUST SEAL NOTE:* Do not remove dust seal from housing unless inspection indicates that it is necessary. To remove dust seal, use a brass drift and drive seal out front of housing. To replace, position seal in housing (metal portion of seal down) and use driver, Tool C-3278. Drive seal in until tool bottoms on face of housing.

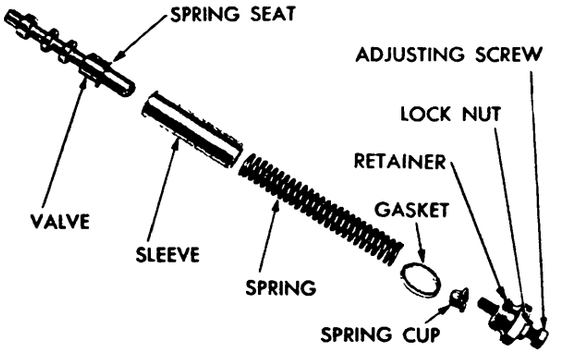
Inspection: Inspect drive sleeve seal ring contacting surface in housing for wear and scratches. Inspect steel back bronze bushing in hub for scratches or scoring and excessive wear, (bushing and housing is serviced as an assembly). Remove oil pump gears and inspect contacting surfaces for scratches, burrs or grooving. Inspect regulator body casting surface on pump housing face for nicks or burrs. Inspect housing passages and make sure they are free of dirt or other material. Clean and replace oil pump gears in housing noting marks made at disassembly. Using straightedge, Tool C-3335, and feeler gauge, check clearance between housing face and face of gears. Clearance limits are .001-.0025". Measure tip clearance between rotor lobes. Replace rotors if clearance exceeds .010". Measure clearance between outer rotor and pump housing bore. Replace rotors or pump housing if clearance exceeds .010". After checking clearance, lubricate with Automatic Transmission Fluid.

REGULATOR VALVE BODY (Removal): Install guide studs, Tool C-3288, and using two threaded holes provided in valve body, install guide studs and pull regulator valve body off torque converter reaction shaft and remove gasket. *CAUTION - Valve body is aluminum and should be handled with care to avoid damage.*

Inspection: Clean body and valves and dry with compressed air. Inspect reaction shaft seal ring surface in bore for scratches, nicks or burrs. Inspect both valves for free movement in valve body (they should fall in and out of bores when valves and body are dry). Crocus cloth may be used to polish valve (do not round the sharp edges of valve). Check all fluid passages for obstruction and inspect mating surfaces for burrs and distortion. If regulator valve has a slight nick or raised portion on mating surfaces, it may be removed by using a flat surface plate and crocus cloth. Inspect front and rear pump check valve for proper seating on both surfaces. If necessary to remove valve, use a pair of long nosed pliers.



1956 - EARLY 1959 TORQUEFLITE LOWER VALVE BODY ASSEMBLY



REGULATOR VALVE ASSEMBLY

TORQUE CONVERTER REACTION SHAFT (Removal): If inspection indicates necessity of removing torque converter reaction shaft, proceed as follows: Remove reaction shaft seal ring (neoprene). Remove the three transmission case-to-reaction shaft screws and washers. Using Tool C-3531, press reaction shaft out of case.

Inspection: Inspect inside of reaction shaft for burrs and inspect splines on shaft for burrs and wear. Inspect seal ring for deterioration and hardness. Inspect thrust surface for wear and slight scores.

TRANSMISSION CASE (Inspection): Inspect case for cracks, sand holes and stripped threads. Check for burrs on mating surfaces. Blow compressed air through all passages to make sure they are open. Check pressure takeoff plugs for tightness. Using a straightedge, Tool C-3335, inspect valve body mating surfaces on case for any burrs or irregularity in surface. Surface should be smooth and flat. Inspect servo and accumulator bores for any scores or scratches. Light scratches may be removed with crocus cloth. Check regulator valve body mating surface in front of case for any irregularities. *NOTE* - Disregard any scratches which may have been made by torque converter reaction shaft screw lockwashers.

OVERHAUL OF UNITS

VALVE BODY & TRANSFER PLATE DISASSEMBLY (EARLY TYPE): *NOTE - See "1959 TorqueFlite Control Valve Body, Transmission Case, Push Button Control Cable Production Change" above.* Place valve body and transfer plate assembly in stand, Tool C-3528.

► *CAUTION: Never clamp any portion of this assembly in vise or use force when removing or installing valves and plugs.*

► *CLEANING & INSPECTION NOTE:* After disassembly and each part has been cleaned and inspected, place on clean paper until ready for reassembly.

1) Wash all parts in clean solvent and dry with compressed air. Make sure all passages are free from obstructions. Check for porous castings.

2) Inspect all mating surfaces for burrs, nicks, or grooves. Small ones may be removed with crocus cloth; otherwise damaged parts must be replaced. Using a straightedge, check all mating surfaces for distortion. Using a light, inspect bores in valve body for scoring marks, pits and irregularities. Inspect all springs for distortion and collapsed coils.

3) Inspect all valves and plugs for burrs, nicks, or scores. Small ones may be removed with crocus cloth providing extreme care is used not to round off the sharp edge portion of valve. Check valves and plugs for free operation in bores; they must fall freely in bores when valves, plugs, and bores are clean and dry.

Lower Valve Body (Removal): Remove the two valve body screws from retainer plate located between front and rear valve bodies, and remove plate. Invert valve bodies and remove the two lower valve body screws and lockwashers. Remove lower valve body and plate from transfer plate *(CAUTION - Use extreme care to prevent loss of governor compensator valve plug retaining pin).*

Disassembly - Remove governor compensator valve plug retaining pin, retainer, and compensator plug. Remove the three screws from governor compensator cover

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(larger cover on valve body). Use care to prevent loss of the two check valve balls and seats, and remove cover. Invert valve body and remove governor compensator valve and spring. While holding throttle compensator valve cover in place (spring loaded), remove the three screws and lockwashers. Use care when removing cover to prevent loss of check valve ball and seat. Remove throttle compensator valve spring and valve. *NOTE* - Inspect ball contacting surface in valve seats and valve body for nicks and burrs. Inspect cover for flatness and porosity.

Reassembly – Place valve body in an upright position and install throttle compensator valve and spring. Make sure spring is properly seated in valve. Place ball and ball seat in position in valve body. Place throttle compensator valve cover in position over spring and body and install three screws and lockwashers. Draw down evenly and tighten. Place governor compensator valve spring on valve then install governor compensator valve into valve body (small end first). Place the two check valve balls and seats in position in valve body; then install governor compensator valve cover, screws and lockwashers. Draw down evenly and tighten. Install governor compensator valve plug (small end first) in valve body, then install retainer and pin.

Rear Valve Body (Removal): Remove the two rear valve body screws and lockwashers, and remove rear valve body from transfer plate assembly. Remove the servo pressure bleed valve to prevent loss. Invert valve bodies and transfer plate assembly and place on stand, Tool C-3528.

Disassembly - Hold pressure against kickdown plug cover and remove the bolts and lockwashers. *(CAUTION - Release pressure slowly on cover to prevent loss of small parts).* Remove 3-1 relay valve spring, 1-2 shift valve kickdown plug and 2-3 shift valve kickdown plug. Remove 1-2 shift valve spring and valve, and 3-1 relay valve. Remove 2-3 shift valve spring and valve, then remove the three governor plug cover bolts and lockwashers. *(CAUTION - When removing cover be careful not to lose check valve ball seat and ball).* Remove 1-2 shift valve governor plug from valve body. Remove 2-3 shift valve governor plug, then remove valve body plate.

Reassembly - Install the 1-2 shift valve (small end first), and 2-3 shift valve (spring pilot facing out), in valve body, then position the 1-2 and 2-3 shift valve springs in valves Place 2-3 shift valve kickdown plug (identified by large pilot) over the 2-3 shift valve spring. Compress spring sufficiently to seat plug in valve body and secure by placing a thin piece of metal (6" scale) behind plug Install 3-1 shift valve (large end first) in valve body and install spring on pilot Place 1-2 shift valve kickdown plug over the 1-2 shift valve spring Place the kickdown plug cover over 3-1 relay valve spring and 1-2 kickdown plug, then compress springs and guide the 1-2 kickdown plug into valve body Install cover screws and lockwashers and draw down evenly and tighten Remove metal strip securing 2-3 shift valve spring Install rear valve body plate then place 1-2 shift valve governor plug in valve body (small end first) Install the 2-3 shift valve governor plug (small end first) in valve body. Install check valve ball and seat, then install governor plug cover, bolts and lockwashers, and tighten securely.

Front Valve Body (Removal): Remove two front valve body to transfer plate screws and lockwashers and separate front valve body from transfer plate assembly. *(CAUTION – Do not disturb throttle valve stop screw setting).*

Disassembly – Keep thumb pressure against shuttle valve cover (spring loaded) and remove the four screws and lockwashers. Use caution when removing cover to prevent loss of front check valve ball seat and ball. While holding thumb over throttle valve, invert valve body and remove shuttle valve sleeve, plug, stop ring, spring and valve. Remove throttle valve, spring, kickdown valve, and detent plug, (it is not necessary to remove detent plug retaining screw and lockwasher). Remove cotter pin from valve body in outer end of reverse blocker valve. Remove reverse blocker valve plug, blocker valve, and spring. *NOTE* - Normally it is not necessary to remove the throttle valve lever shaft, manual valve lever assembly, or manual valve. However, if condition warrants, proceed as follows: Support throttle lever shaft on block of wood. Using a small punch and hammer with care, remove the throttle valve lever shaft pin (a rubber band may be used to hold manual lever in place while removing pin). Remove any burrs from throttle valve and manual valve lever shafts, and slide them from valve body. Slide throttle valve lever shaft out of manual lever assembly. Using caution to prevent loss of detent ball and spring, slide manual valve lever assembly out of valve body. Using a twisting motion, remove manual valve.

►*FRONT VALVE BODY INSPECTION NOTE:* Inspect manual valve detent ball and make sure it slides freely into valve body. Inspect riveting and wear on manual valve lever pin in lever assembly. Inspect the staking of manual lever and throttle cam to their respective shafts. Inspect the kickdown valve detent plug to make sure it slides freely on valve. Inspect check valve ball seat in valve body for faulty casting. Inspect manual valve lever needle bearing in valve body *(CAUTION - Do not remove, as body and bearing are serviced as an assembly).*

Reassembly – Place valve body on clean paper in an upright position, and using a twisting motion, install manual valve until it bottoms on paper. Place manual valve lever detent ball spring and ball in position in valve body. While compressing detent ball in position with right index finger, install manual valve control lever by sliding over detent ball and engage pin on lever with manual valve (hold this assembly in position with a rubber band). While holding manual lever assembly in position against valve body, install throttle valve lever assembly with flat portion on end of shaft facing away from valve body to allow maximum travel of lever. While holding levers in position in valve body with rubber band, support throttle lever on wooden block. Install shaft pin using a small punch and hammer. Remove rubber band. With reverse blocker valve spring in position in valve and with slots in valve aligned with pin, install reverse blocker valve in valve body. Install reverse blocker valve plug and compress spring sufficiently to install pin. Lock pin in position. Check kickdown detent plug stop screws for being tight, and install detent plug (large inner diameter first) on kickdown valve, and position kickdown valve (detent plug first) into valve body. Install throttle valve spring and throttle valve into valve body. Install shuttle valve and spring (small end of valve first) in valve body. Install shuttle valve stop ring (tangs out) into valve body. Install small end of shuttle valve plug into large end of sleeve, and seat plug properly in sleeve. Install plug and sleeve assembly over shuttle valve spring and into position in valve body. Place front check valve ball and seat in position in valve body. Place shuttle valve cover in position on valve body and install the four screws and lockwashers. Draw down evenly.

VALVE BODY & TRANSFER PLATE REASSEMBLY (EARLY TYPE): Place valve body transfer plate in an upright position on stand, Tool C-3528. Place steel plate (upper) over pilots on stand and into position on transfer plate.

Front Valve Body: Position front valve body on steel plate (upper) and install two screws and lockwashers in outer end of valve body and draw down finger tight.

Rear Valve Body: Invert transfer plate and replace on stand. With servo pressure bleed valve in place, hold rear valve body up in position against steel plate and install the two outer screws (short) with lockwashers through the transfer plate and into lower valve body. Draw up finger tight.

Lower Valve Body: To prevent loss of governor compensator valve retainer pin, position steel plate (lower) on lower valve body. Place valve body and steel plate into position on transfer plate. Install the two screws (intermediate length) and lockwashers. Tighten the two lower valve body and rear valve body screws to 50-60 inch lbs. Invert valve bodies and transfer plate and replace on stand. Install valve bodies retainer plate and two screws (long) with lockwasher and tighten retainer plate and front body screws to 50-60 inch lbs. Check manual valve to make sure it operates freely.

VALVE BODY & TRANSFER PLATE DISASSEMBLY (LATE TYPE): *NOTE - See "1959 TorqueFlite Control Valve Body, Transmission Case, Push Button Control Cable Production Change" above.* **1)** Place valve body and transfer plate assembly in stand, Tool C-3582, with operating lever shafts downward. *CAUTION - Do not clamp any portion of valve body assembly in a vise or use force when removing or installing valves and plugs.*

2) Remove reverse blocker valve retainer plate, blocker valve and spring, then remove cross recess screws holding valve body, valve body steel plate, and transfer plate together. *NOTE - While removing, hold valve body to prevent loss of any of the six ball checks. Note the location of these balls for proper installation. All check valve balls are the same size.*

3) Remove shuttle valve and governor plug cover plate, then remove shuttle valve plug and spring. Remove 1-2 relay valve spring, valve and governor plug. Remove

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2-3 shift valve governor plug, then remove manual valve and shuttle valve.

4) On opposite side of valve body, remove shift valve cover plate, then remove 1-2 shift valve springs, 2-3 shift valve spring, 1-2 shift valve, and 2-3 shift valve. Remove throttle compensating valve spring and valve. Remove throttle valve cover plate, throttle valve and spring. Remove kickdown valve and detent plug.

VALVE BODY & TRANSFER PLATE REASSEMBLY (LATE TYPE): Reassemble valve body by reversing disassembly procedure (see above), then set valve body steel plate and transfer plate over stand pilots, Tool C-3582. With all ball checks in place, position valve body up against transfer plate and valve body steel plate, then install attaching recess screws and washers. Tighten all screws evenly to 25-30 inchpounds. *CAUTION - If this plat is incorrectly positioned, gov rnor pressur leakage will result. When correctly install d th dg of plat will align flush with edge of valv body transf r plate, completely covering blocker valv bor and governor pressure passage in transf r plate.*

1956-58 MODELS

OUTPUT SHAFT REAR BEARING & SEAL (Removal): Remove rear bearing seal. Using pliers, Tool C-760, remove rear bearing snap ring (note that snap ring has a beveled edge). Inspect ring for distortion. Using driver, Tool C-3275, drive output shaft rear bearing out of rear extension.

Installation: Using driver, Tool C-3204, install bearing in extension making sure it is properly seated. Lubricate with automatic transmission fluid. Using pliers, C-760, install rear bearing snap ring with beveled side out. Make sure snap ring seats properly. Using driver, Tool C-3205, install shaft bearing seal with metal portion of seal facing in until tool bottoms on extension.

1959-60 MODELS

OUTPUT SHAFT REAR BEARING & SEAL (Removal): Remove seal and bushing as for bearing removal on 1956-58 models (above).

Installati n: *CAUTION - When positioning bushing in ext nsion housing, mak sure lubrication hole in bushing will ind x with lubrication hole in housing when bushing has been driv n into position. Pulling the tool out of bushing seats bushing properly and removes any slight irregulariti s. Do not ream bushing after installation.* Place a new bushing on Tool C-3692 and install in extension housing. Use driver, Tool C-3691 and install oil seal, with metal portion of seal facing in, until driver bottoms on extension. Install brake support grease shield with indent on shield matching groove in extension.

1956-60 MODELS

GOVERNOR (Disass mbly): Using pliers, Tool C-3229, remove snap ring from governor weight assembly (keep thumb pressure against secondary weight when removing snap ring). Remove governor secondary weight and spring. Inspect all parts for burrs and wear. Check secondary weight for free movement in primary weight by placing secondary weight in primary weight without spring. Primary weight should fall free when both parts are dry. Place secondary weight and spring in primary weight, compress spring and install snap ring. Slide governor body and support from rear oil pump housing. Remove the two governor support seal rings. Remove the four governor body-to-support screws and lockwashers and separate body from support. Inspect oil passages and make sure they are free from dirt or other material. Clean passages with compressed air. Inspect governor body for slight scores. Valve should travel freely in governor body.

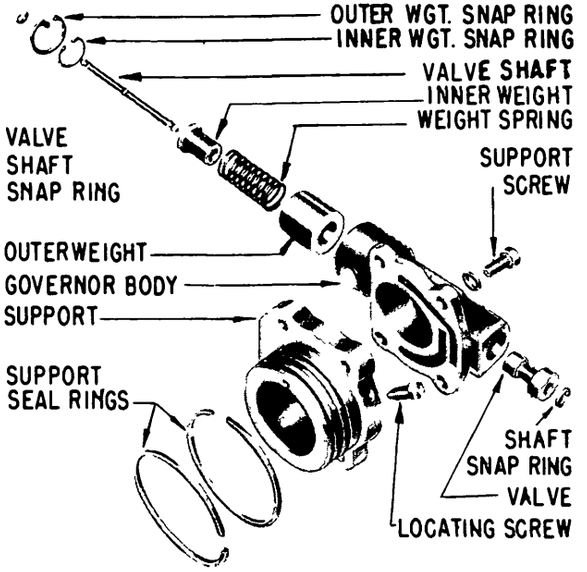
Reassembly: Lubricate the two governor support seal rings with automatic transmission fluid and install on governor support. Make sure seal rings are free to rotate in grooves. Position governor body on support and install the four screws and lockwashers (do not tighten screws at this time). Slide governor support and body assembly into position in rear pump housing. Compress governor support seal rings with fingers as support enters oil pump housing. DO NOT FORCE.

POWER TRAIN UNITS (Disassembly): Unit No. 1 (Output Shaft, Kickdown Planet Pinion Carrier, and Intermediate Shaft Assemblies) – *NOTE - Unit may be placed in the propeller shaft flange and hand brake drum assembly to aid in disassembly.* Using a screwdriver, remove output shaft drive housing snap ring. Remove reverse annulus gear from output shaft assembly. Remove intermediate shaft and kickdown shaft and kickdown carrier assemblies from output shaft assembly. Remove output shaft thrust washer located inside of housing. Remove kickdown planet pinion carrier assembly from intermediate shaft assembly *(NOTE - The kickdown planet pinion carrier assembly used in this unit is the same as the low-reverse planet pinion carrier assembly used in Unit No. 2. No attempt should be made to interchange these units).* Remove kickdown carrier thrust washer from carrier assembly. Remove sun gear roller thrust washer from intermediate shaft assembly. With a screwdriver, remove kickdown annulus gear snap ring and separate gear from intermediate shaft assembly.

Inspection (Output Shaft): Inspect all bearing and thrust surfaces for scoring or scratches. Blow compressed air through all oil passages: make sure they are open and free of dirt. Inspect the four large and two small interlocking seal rings for excessive wear, broken ends, and make sure they rotate freely in grooves. Intermediate shaft and clutch feed tubes are serviced as an assembly.

Inspection (Kickdown Planet Pinion Carrier): Inspect planet carrier for cracks and pinions for broken or worn gear teeth. Using a feeler gauge, check clearance on individual planet pinion gears (clearance should be .006-.017"). Inspect pinion shafts for fit in carrier and make sure pinions are free to rotate on shafts. Make sure shaft lock pins are installed. Inspect oil holes in carrier to make sure they are open. *(NOTE* - Do not replace carrier unless this inspection indicates it is necessary. The planet pinion carrier and pinions are serviced only as a complete assembly). Inspect kickdown thrust washer for scratches or excessive wear.

Inspection (Reverse and Kickd wn Annulus Gears): Inspect for worn, cracked or broken gear teeth. Check contacting surfaces of teeth for indications of binding. This condition will usually be evidenced by a brinelling condition. If "brinelling" is noticed, check thrust



TORQUEFLITE GOVERNOR ASSEMBLY (TYPICAL)

washer contacting surfaces and alignment of annulus gear on shaft. (Annulus gear teeth having slight cracks, or what appear to be cracks, should provide sufficient evidence to warrant replacement of gear). While burrs or slight obstructions on gear teeth can be safely removed with a hone, under no circumstances should broken areas of gear teeth be filed or ground. In this case the annulus gear should be replaced. Wash annulus gear and be sure to remove all metal pick-up from teeth.

Reassembly (Unit No. 1): *(NOTE* - To aid in reassembly, position output shaft in the propeller shaft flange and brake drum assembly for use as a holding fixture). With output shaft in an upright position, lubricate output shaft thrust washer with automatic transmission fluid and place into position in housing. Place kickdown annulus gear in position on intermediate shaft assembly and install snap ring (select fit). Using a feeler gauge, check clearance under kickdown annulus gear snap ring. Hold clearance as close as possible to .000". Snap rings are available in the following two thicknesses: .060-.062" (Part No. 1636357), .064-.066" (Part No. 1636358). *(NOTE* - When checking clearance, support annulus gear on edge of bench so intermediate shaft will seat properly in gear). Make sure snap ring seats properly. Place intermediate shaft assembly in output shaft housing. Lubricate kickdown carrier thrust washer with automatic transmission fluid and place in position in kickdown annulus gear (make sure thrust washer remains in position). Place reverse annular gear in position in housing and install output shaft drive housing snap ring, making sure it seats properly in housing. Lubricate and install sun gear thrust washer (roller type) over intermediate shaft and into position in carrier assembly.

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Disass mbly: Unit No. 2 (Sun G ar, Rev rs Plan t Pinion Carrier, Overrun Clutch, and Rear Clutch Piston R tainer Assemblies) – With unit in upright position, remove sun gear and front clutch thrust washer. Using two screwdrivers inserted between clutch and intermediate support, remove rear clutch retainer assembly from sun gear. Remove two clutch neoprene seal rings from sun gear. Remove reverse sun gear from overrun clutch and reverse planet pinion carrier assemblies. Install Tool C-3527, in intermediate support and cam assembly from overrun clutch hub. Using a screwdriver, remove snap ring from low-reverse band drum. Remove overrun clutch hub assembly from low-reverse band drum. Remove overrun clutch cam roller springs and rollers (ten of each) by removing Tool C-3527 from intermediate support and cam assembly *(CAUTION* - Place assembly over bench when removing tool so springs and rollers will not be lost).

Rear Clutch Piston Retainer Disassembly – Using screwdriver, remove snap ring (large) from rear clutch piston retainer assembly. Remove rear clutch pressure plate from retainer assembly. *(NOTE* - Rear clutch plates (steel) are dished and identified by a notch in one of the driving lugs. When removing the steel plates from clutch retainer, note that dished side of these plates is facing out. Check for dished side by using a straightedge across plate). Invert clutch piston retainer assembly and remove clutch plates and driving disc assemblies (either four or five of each will be found at this location). Using Tool C-3533, slightly compress the rear clutch piston return spring retainer, being careful not to damage retainer by compressing spring too far. Using pliers, Tool C-3301, remove piston return spring snap ring. Release Tool C-3533 and remove clutch return spring retainer and spring from clutch piston retainer assembly (spring retainer may require guiding past snap ring groove as tool is released). Using a twisting motion, remove clutch piston assembly from retainer. Remove rear clutch piston inner and outer seal rings.

Inspection (Clutch Driving Disc & Plate) – Inspect driving discs and plates for evidence of burning, glazing and flaking off of facing material. Check disc by scratching facings with finger nail. If material collects under nail, replace all driving discs. Replace driving discs if splines have become damaged. Inspect the steel clutch plates and pressure surface for evidence of burning, scoring, and damaged driving lugs. Replace if necessary.

Inspection (Piston & Seal Rings) – Inspect seal ring surfaces in piston retainer for nicks and deep scratches. Light scratches will not interfere with sealing of neoprene rings. Inspect inner and outer piston seal rings (neoprene) for deterioration, wear, and hardness. Inspect seal ring groove in piston for nicks or burrs. Inspect inside bore of piston for score marks; if light, remove with crocus cloth; if heavy, replace piston. Inspect piston spring, retainer and snap ring for distortion.

Insp cti n (Clutch Pist n R tain r) – Note ball check in clutch retainer. Make sure ball operates freely. Inspect the band contacting surface for deep scores and burns, especially if the band lining is worn to point where steel band has been contacting rear clutch piston retainer. *(CAUTION – Do not machine the piston retainer in an engine lathe to remove score marks).* Inspect steel clutch plate contacting surfaces for burrs or brinelling. Make sure clutch driving lugs on steel clutch plates travel freely into retainer. Remove any metal pick-up on hub of retainer.

Rear Clutch Piston Retainer Reassembly – Lubricate and install inner piston seal ring on hub of clutch retainer (seal lip must be facing down, and seal must be properly seated in groove). Lubricate and install outer seal ring on clutch piston (lip of seal facing away from flange). Place piston assembly in clutch retainer, and with a twisting motion, seat piston in bottom of retainer. Install piston return spring on hub and position spring retainer snap ring on spring. Using Tool C-3533, compress clutch spring sufficiently to seat the snap ring. Make sure snap ring is properly seated. Remove Tool C-3533. Lubricate all clutch plates and discs with automatic transmission fluid. Assemble by placing one rear clutch steel plate (identified by a notch on one of the lugs) with the dished side facing out, in the clutch retainer, followed by a driving disc. Repeat this procedure until all discs and plates *(NOTE - Either four discs and four plates or five discs and five plates may be found at this location)* have been installed. *CAUTION - All steel driving plates must be installed with dished sides facing same direction for proper travel of clutch pressure plate.* Install rear clutch pressure plate. Select and install snap ring making sure it is seated properly in clutch retainer. Using feeler gauge, check clearance between snap ring and pressure plate. Clearance limits are as close to .000" as possible. Snap rings are available in the following sizes: .060-.062" (Part No. 1636315); .064-.066" (Part No. 1636316).

Inspection (Reverse Sun Gear Assembly): Inspect gears for cracked or broken teeth. Inspect steel back bronze bushing for scoring or excessive wear. Bushing and reverse sun gear are serviced as an assembly. Inspect intermediate support bearing surface of gear for wear and slight scores. Inspect rear clutch seal ring grooves on gear for nicks or burrs. Inspect inner ring sealing surface in bore of sun gear for grooves or scratches. Inspect thrust area of sun gear for nicks, scratches, or burrs. Inspect neoprene seal rings for deterioration, wear, nicks, or hardness. Inspect front clutch and sun gear thrust washers for scratches or excessive wear.

Inspection (Support & Cam Assembly): Inspect riveting of cam to intermediate support. Inspect cam roller surface for brinelling. Inspect roller spring retaining tabs for being bent or distorted. Inspect bearing surface on hub for scoring. Inspect steel backed bronze bushing in hub for scratches or scoring and excessive wear. Bushing and intermediate support are serviced as an assembly. Inspect overrunning clutch cam rollers for being pitted or scored. Inspect overrunning cam roller springs for distortion. Replace if necessary.

Insp cti n (L w-R v rs Plan t Pini n Carri r): Inspect carrier for cracks and pinion for broken or worn gear teeth. Using a feeler gauge, check end clearance on individual planet pinion gears, clearance should be .006-.017". Inspect pinion shaft for fit in carrier and and make sure pinions are free to rotate on shafts. Make sure shaft lock pins are installed. *(NOTE* - Do not replace carrier assembly unless inspection indicates that it is necessary. The planet carrier and pinions are serviced as an assembly).

Inspection (Low-Reverse Band Drum): Inspect band contacting surface for deep scratches and burrs, especially if band lining is worn to point where steel band has been contacting drum *(CAUTION - Do not att mpt to machine drum in an engin lath t impr ve score marks).* Inspect driving lugs inside drum for excessive wear.

Inspection (Overrunning Clutch Hub): Inspect cam roller contacting surface for brinelling. Inspect steel back bronze bushing in hub for scratching or scoring and excessive wear. Bushing and hub are serviced as an assembly. Inspect lubricating hole and make sure it is free from foreign matter by cleaning with compressed air. Inspect reverse drum snap ring for distortion.

Reassembly (Unit No. 2): Install overrunning clutch hub assembly (hub first) into snap ring side of the low-reverse band drum. Place low-reverse planet pinion carrier assembly in position in low-reverse band drum. With drum supported, select snap ring to give minimum clearance. Snap rings are available in the following thicknesses: .060-.062" (Part No. 1636315); .064-.066" (Part No. 1636316); .068-.070" (Part No. 1636317). Place tool C-3527, in position in intermediate support and cam assembly and install cam springs and rollers. *(CAUTION - Make sure that cam springs and roll rs ar properly seated against cam; oth rwis , damag to springs will result when overrunning clutch hub is installed).* With intermediate support and cam assembly resting on bench, lubricate bushing and install low-reverse band drum assembly over hub. While holding the two assemblies together, remove Tool C-3527. Lubricate bearing surface on reverse sun gear and install intermediate support and planet pinion carrier assembly. Lubricate the two sun gear rear clutch seal rings (neoprene) with automatic transmission fluid, and install on reverse sun gear. Install rear clutch piston retainer assembly on reverse sun gear. *(CAUTION - To pr v nt injury, do not place fingers und r clutch r tain r ass mbly when installing).* Install front clutch and sun gear thrust washer (Lubriplate may be used to hold thrust washer in position).

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Disassembly: Unit No. 3 (Input Shaft & Fr nt Clutch Piston Retainer Assemblies) - Remove input shaft fibre thrust washer (select fit). To remove clutch assembly from piston retainer (front clutch cushion spring is under approximately 500 lbs. pressure), place the assembly in an arbor press with rear of piston retainer resting on a suitable support. Press the input shaft only far enough into retainer to permit removal of the snap ring with a screwdriver. *(NOTE* - If an arbor press is not available, use two large "C" clamps placed 180° apart and apply equal pressure, making sure that clamps are positioned so as not to damage the ball check located in back side of retainer). Slowly release pres-

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sure on arbor press, then remove retainer and input shaft from press. Remove input shaft assembly from clutch piston retainer. Invert piston retainer and remove retaining plate, cushion spring, driving discs and clutch plates (Early cars used five driving discs and four clutch plates. Later cars used four driving discs and three clutch plates). Remove pressure plate and clutch hub. Install compressor, Tool C-3575 and compress front clutch piston return spring retainer. Remove piston return spring snap ring, then release and remove Tool C-3575. Remove clutch piston return spring retainer and spring. Remove lever retainer and levers from clutch piston retainer. Using a twisting motion, remove piston assembly.

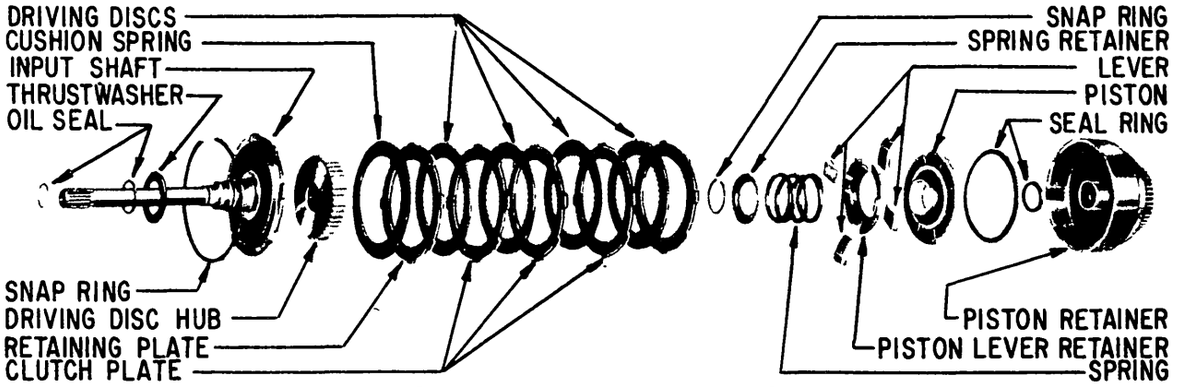
Insp cti n (Input Shaft): Inspect thrust washers for cracks or excessive wear. Inspect front clutch snap ring for distortion. Inspect interlocking seal rings for wear or broken locks. Make sure they turn freely in grooves. (*NOTE* - When replacing rings, use extreme care not to damage interlock portion). Make sure all passages are open by blowing air through them. Check splines and lugs for nicks or burrs. Inspect bearing and thrust surfaces for nicks or scratches. Inspect steel back bronze bushing for scratches, scoring or excessive wear (bushing and input shaft are serviced as an assembly).

Insp cti n (Clutch Driving Discs, Plates, and Hub): Inspect driving discs for evidence of burning or glazing, and flaking off of facing material. Check discs by scratching facings with finger nail; if material collects under nail, replace all driving discs. Replace driving discs if splines have become damaged. Inspect steel clutch plates and pressure plate surface for evidence of burning, scoring, and damaged lugs; replace if necessary. Inspect lever contacting surface on pressure plate for evidence of wear (oil passages in hub are to lubricate clutch plates). Make sure they are free of foreign matter.

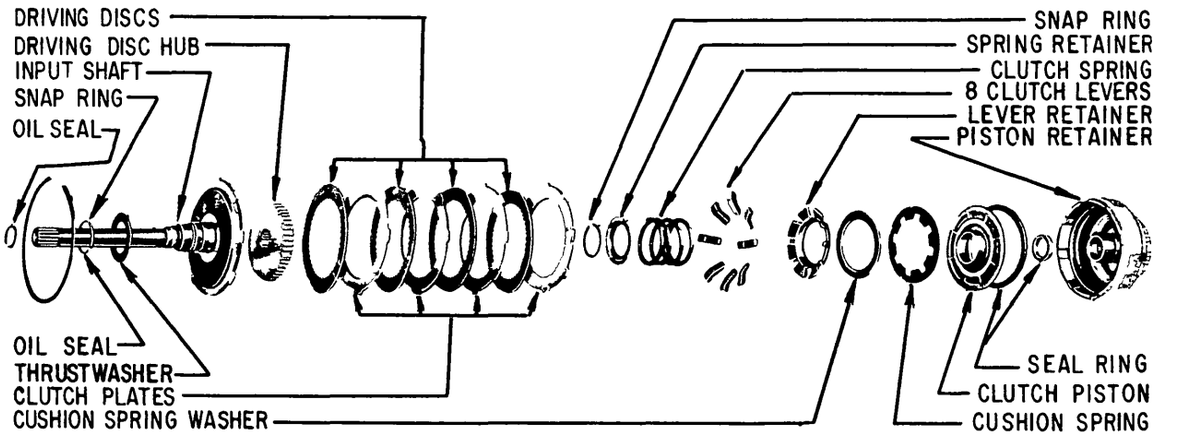
Insp cti n (Fr nt Clutch Piston, Seal & Levers): Inspect levers for wear or distortion. Remove and inspect inner and outer piston seal rings (neoprene) for deterioration, wear, and hardness. Inspect seal ring groove in piston for nicks or burrs. Inspect inside portion of piston hub for score marks. If light, remove with crocus cloth, if heavy, replace piston. Inspect lever ring for seating properly in groove on piston. Inspect lever retainer, return spring, spring retainer, and snap ring for distortion.

Insp cti n (Fr nt Clutch R tainer): Make sure check ball operates freely. Inspect seal ring surfaces in hub; if intermediate shaft seal rings have excessively worn or grooved this surface, replace the clutch piston retainer. Remove any metal pick-up on hub of retainer, and inspect seal ring groove for nicks or burrs. Inspect steel clutch plate contacting surfaces for scores or brinelling. Inspect thrust surface on rear of retainer for scratches or scoring. Make sure all clutch feed and lubricating passages are open and free of dirt.

R ass mbly (Unit N . 3): Lubricate and install neoprene oil seal ring on hub of clutch retainer (seat seal properly in groove with lip of seal facing down). Lubricate and install outer seal ring on clutch piston with lip of seal facing away from flange. With piston lever ring seated in piston, place piston assembly in clutch retainer, and with a twisting motion, seat piston in bottom of retainer. Place lever retainer in piston and install the levers (eight used on early cars, four used on later cars), making sure they are free and properly seated in slots in piston. Install clutch return spring over hub of clutch retainer and position spring retainer and snap ring on spring. Using compressor, Tool C-3575, compress clutch return spring sufficiently to seat snap ring with pliers, Tool C-3301, making sure snap ring is properly seated. Remove Tool C-3301. Install pressure plate with smooth side up, in retainer. Install discs and plates by placing one of the driving discs in clutch retainer followed by a steel plate. Repeat this procedure until all discs and plates have been installed, then check and adjust front clutch pressure plate travel (*see "Front Clutch Pressure Plate Travel & Adjustment" b l w*). After completing clutch travel adjustment, install front clutch hub, cushion spring (concave side toward retaining plate). Place front clutch and input shaft assembly in an arbor press with rear of piston retainer resting on a suitable support, then press input shaft into clutch retainer until retainer snap ring can be installed. (*NOTE* - It will require approximately 500 lbs. pressure to compress spring for assembly). Remove assembly from arbor press and install input shaft thrust washer.



1956-58 TRANSMISSION UNIT NO. 3



1959-60 TRANSMISSION UNIT NO. 3

1959-60 MODELS

Disassembly: Unit No. 3 (Input Shaft & Front Clutch Piston Retainer Assemblies) - 1) Remove select fit input shaft fibre thrust washer, then remove snap ring and remove input shaft from retainer. Invert retainer and remove driving discs, plates and pressure plate and hub.

2) Install Compressor Tool C-3575 and compress spring retainer, then use Pliers, Tool C-3301, and remove retainer snap ring. Slowly release spring pressure and remove compressor.

3) Remove spring retainer, spring, levers, lever retainer, cushion spring washer and cushion spring from retainer. With a twisting motion, remove piston from retainer.

Inspecti n: Same as for 1956-58 models. See above.

Reassembly (Unit N . 3): 1) Lubricate and install inner rubber seal ring on hub of retainer, making sure lip

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of seal is facing rear of retainer and seal is seated in groove. Lubricate and install seal ring on piston with lip of seal towards rear of piston. Place piston assembly in retainer using a twisting motion to seat piston in bottom of retainer. Install cushion spring with dished (concave) side facing piston, then place cushion spring washer with chamfer towards front of retainer. Place lever retainer over hub of piston and install levers. Install return spring over hub of retainer and position spring retainer and snap ring on spring. Use Compressor, Tool C-3533, and compress spring sufficiently to seat snap ring with snap ring pliers. Remove compressor tool and install pressure plate (smooth side up) in retainer. Install discs and plates by first placing one of the discs in piston retainer followed by a steel plate. Repeat this procedure until all plates and discs have been installed. Check and adjust clutch clearance (see below). Install driving disc hub, then install input shaft by placing input shaft and retainer assemblies in an arbor press with the rear of piston retainer resting on a suitable support. Make sure ball check at rear of retainer does not contact support during pressing operation. Press input shaft into retainer until snap ring can be installed. Remove assembly from arbor press and place thrust washer over input shaft and against thrust surface on input shaft flange.

1956-60 MODELS

Front Clutch Pressure Plate Travel Check & Adjustment: To check front clutch clearance, install Rear Clutch Pressure Plate Part No. 1732114 (Used in transmission prior to early 1957), or Rear Clutch Pressure Plate, Part No. 1824319 (Used in Dodge Trucks). *CAUTION - Front Clutch Pressure Plate, Part No. 1736408 (also used in Rear Clutch Assemblies after Late 1957) cannot be used to dheck front clutch clearance.* Hold this plate firmly in position and insert a feeler guage between plate and top disc in the assembly. Total clearance should be .020-.040". If measured clearance is not within these limits, the clutch discs should be replaced with any combination of new discs which are furnished in thicknesses of .060-.063", .073.,076", .087-.090" to provide for proper clearance. Remove rear clutch plate (used for checking) and install front clutch hub. Complete assembly as indicated above.

TRANSMISSION REASSEMBLY & INSTALLATION

TORQUE CONVERTER REACTION SHAFT (Installation): Using sun lamps, heat front of transmission case to approximately 170-190°F. Install guide studs, Tool C-3283, in front face of reaction shaft flange. Lubricate portion of reaction shaft flange (that presses into case) with automatic transmission fluid. Position torque converter reaction shaft into front of transmission case so that guide studs in shaft align with threaded holes in case. Using Tool C-3531, press reaction shaft into place. Remove guide studs and start the three transmission case-to-reaction shaft screws and washers. Draw down evenly and tighten to 10-15 ft. lbs. Coat torque converter reaction shaft seal with automatic transmission fluid, and install on shaft.

REGULATOR VALVE BODY (Installation): Install guide studs, Tool C-3288 in transmission case. Install valve body gasket over guide studs and into position on transmission case. With seal ring (neoprene) in position on reaction shaft, install regulator valve body and valves over guide studs and into position *(CAUTION - Hold valves in place to prevent damage while installing valve body).*

FRONT OIL PUMP (Installation): With inner and outer seals lubricated and pump gears in position in housing (counterbore in pinion gear facing down as identified when removed), place oil pump housing over studs and slide into position. Start five of the screws (with aluminum washers) and draw housing down evenly until it is seated in transmission case. Remove guide studs and install the two remaining screws and washers. Tighten the two long screws and five short screws to 14-16 ft. lbs. *(CAUTION - Improper tightening of these screws may cause pump gears to bind).* Lubricate and install front pump drive sleeve (bearing surface first), and engage the driving lugs of oil pump pinion to determine if oil pump gears turn freely (main body of driving sleeve should be flush with oil pump housing when properly installed). If gears do not turn freely, remove pump and check for foreign matter between pump gears and housing. Install torque converter control valve spring, retainer and gasket. Tighten to 35-40 ft. lbs. Install transmission regulator valve spring, retainer and gasket. Tighten to 45-50 ft. lbs.

ACCUMULATOR PISTON (Installation): Lubricate seal rings and place accumulator piston into position. Compress outer seal ring and tap lightly in transmission case.

KICKDOWN PISTON (Installation): Lubricate piston seal rings and place kickdown piston assembly into position, compress outer ring, and start assembly into case. With piston properly centered so as not to damage rings, tap lightly and bottom piston into case. Place kickdown piston rod assembly in piston and slide piston spring over kickdown piston rod. Install Tool C-3529, for kickdown piston installation. Compress spring sufficiently to install snap ring. Loosen compressing portion of tool and remove from transmission case. Place servo piston sleeve over piston. Make sure sleeve slides freely on piston by working it up and down.

LOW-REVERSE PISTON (Installation): Lubricate reverse servo piston seal ring and install in piston (with lip of seal facing end of piston). Install cushion spring and plug into servo piston and secure with snap ring. *(CAUTION - Make sure that snap ring seats properly).* Install piston assembly into transmission case, then place reverse servo piston spring over piston and position spring retainer over spring. Install Tool C-3529 or C-3289 compress spring and install snap ring.

KICKDOWN BAND (Installation): Install kickdown band assembly by rotating band ends over center support in transmission case *(CAUTION - Use care when installing bands so not to damage lining on edges of transmission case).* Install anchor on kickdown band adjusting screw.

LOW-REVERSE BAND (Installation): Install anchor on reverse band adjusting screw. Install band by rotating band ends through rear opening in transmission case.

LOW-REVERSE & KICKDOWN BAND LEVER ASSEMBLIES AND STRUTS (Installation): Place levers in position in case and slide shaft through levers from rear of transmission case. Remove guide stud, Tool C-3288, from threaded end of shaft and install shaft lever spacer (flat) and plug. Tighten plug to 30-35 ft. lbs. Position kickdown band over anchor and compress band sufficiently to install kickdown band strut. Place reverse band into position on anchor and compress band end; and with aid of a screwdriver, install strut.

POWER TRAIN UNITS (Installation): Unit No. 3 (Front Clutch Piston Retainer and Input Shaft Assembly) - If when transmission was disassembled, the end clearance was found to be incorrect, correction can be made at this time by selection of proper input shaft thrust washer. To accomplish this, use a micrometer and measure thickness of thrust washer which was removed. Select a thicker or thinner washer to give proper clearance *(NOTE - Front clutch end clearance should be .020-.050" with transmission fully assembled).* Thrust washers are available in the following sizes: .115-.117" (Natural color, Part No. 1637669); .097-.099" (Black, Part No. 1638670); .078-.080" (Red, Part No. 1638671). With input shaft thrust washer in position and input shaft seals lubricated, start unit through rear of transmission case. By supporting and keeping unit centered as much as possible, guide through bands and reaction shaft into position.

Unit No. 2 (Sun Gear, Reverse Planet Pinion Carrier, Overrunning Clutch, and Rear Clutch Assembly) - Start unit through rear of transmission case. Align identified locating hole in intermediate support with threaded locating hole inside of transmission case. By supporting and keeping unit centered as much as possible, guide through bands until it contacts hub on front clutch. While pushing in on assembly, rock sun gear to engage clutch plates of rear clutch on hub of front clutch *(CAUTION -* While rocking sun gear, make sure unit does not bind on bands or in intermediate support. Do not use excessive force when installing this unit so as to prevent damage to clutch discs in rear clutch). Use a drift punch to assist in alignment of intermediate support locating holes. Install the three intermediate support locating screws, lockwashers, and tighten to 25-30 ft. lbs. Use great care when installing the locating screw to prevent loss of lockwasher. Check input shaft and sun gear for turning freely.

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Unit N . 1 (Output Shaft, Kickdown Planet Pinion Carri r, and Int rm diat Shaft Assemblies) - Be sure reverse sun gear thrust washer (roller type) is in position in planet pinion carrier assembly. Lubricate seal rings and bearing surface on intermediate shaft, with automatic transmission fluid. Install unit by placing intermediate shaft in sun gear. Keeping unit centered as much as possible and slowly turning output shaft, slide into position (large seal ring on output shaft flush with rear of transmission case). *CAUTION* - Use care when installing to prevent damage to seal rings on intermediate shaft.

OUTPUT SHAFT SUPPORT (Installation): With guide studs, Tool C-3283 in rear of transmission case,place output shaft support gasket over guide studs and into position on rear of case. Lubricate output shaft seal rings. Install support over shaft and guide studs, and position against transmission case *(CAUTION* - Use care when installing support so not to damage ring sealing surfaces). Install the one (short) output shaft support-to-transmission case screw and lockwasher, and tighten finger tight.

REAR OIL PUMP & GOVERNOR ASSEMBLIES (Installati n): Place rear oil pump pinion ball in ball pocket in output shaft. Lubricate rear. oul pump drive pinion. Place over output shaft and slide into position aligning key-way in pinion with ball in shaft. *(CAUTION - Pinion was marked at disassembly. Make sure it is installed correctly).* Lubricate rear oil pump gear and position in pump housing. Make sure gear is installed correctly, check marking. Slide rear oil pump and governor assemblies over output shaft and into position against support. *(CAUTION* - There are two extra holes in housing which are used for vents. Make sure no attempt is made to install screws in these holes. Check each threaded hole before installing screws). Install the five oil pump housing-to-output shaft support screws. Draw screws down evenly and tighten to 10-12 ft. lbs. After screws have been tightened, turn output shaft to make sure pump gears are free to rotate. If not, disassemble pump to determine cause.

GOVERNOR WEIGHTS & VALVE ASSEMBLY (Installati n): Align locating hole in output shaft to locating screw hole rn governor support and install locating screw. Tighten to 5-7 ft. lbs. If governor body had been removed, and installed, tighten the four body screws to 6-8 ft. lbs. Dry governor weight assembly and valve with compressed air, but do not lubricate when assembling Place governor weight assembly (secondary weight snap ring facing out) into governor body, and using pliers, Tool C-3229, install snap ring, making sure it is properly seated in groove. With the governor valve (small end up) on governor valve shaft, slide shaft into governor body through output shaft and governor weight assembly, at the same time position valve into body. Install governor valve shaft snap ring (from weight assembly end). Make sure it is properly locked to shaft. After snap ring installation, apply sufficient pressure to both ends of valve shaft to force snap rings to outer portion of snap ring grooves. Check operation of governor weight assembly and valve by turning output shaft. Both should fall free in governor body.

EXTENSION HOUSING (Installation): Install new extension housing gasket over guide studs and into position against output shaft support. *(CAUTION - Do not use sealing material on gasket).* Place extension over output shaft and guide studs and into position against support *(NOTE* - Propeller shaft flange and drum assembly can be used, if necessary, to draw extension output shaft support). Install extension housing-to-case screws and tighten to 25-30 ft. lbs. Tighten output shaft-to-case screw to 25-30 ft. lbs. (Check output shaft to make sure it turns freely). Install speedometer drive pinion and sleeve assembly in extension housing and tighten to 40-56 ft. lbs.

HAND BRAKE (Installation): Make sure brake support spacer (neoprene) is in position on back of brake support and spacer sleeve is in center of support. Slide brake support assembly over rear of extension and anchor pin. Make sure spacer sleeve remains in center of support. Install brake support grease shield on extension housing (indent on shield is for correct positioning on extension, also, the shield must be located on extension far enough to permit installation of spring). Place both brake anchor washers on brake shoe anchor and install locking anchor washer. Place both shoe assemblies with adjusting sleeve nut and screw into position on anchor. Make sure brake shoes are between anchor washers. Use rubber bands around shoes to hold them in position. Install operating link. Note that link is marked for correct installation. Install the brake support grease shield spring (opening in spring toward adjusting sleeve) Make sure spring is properly seated in groove. Slide brake shoe return spring behind grease shield spring and hook into position. Install propeller shaft flange and drum assembly. Install shaft flange washer and nut. Tighten to 200 ft. lbs.

►*FRONT CLUTCH END CLEARANCE CAUTION* Recheck end clearance *(See "Front Clutch End Clearance Check" under "Removal & Inspection of Transmission Units" above).* If clearance not correct (.020-.050"), input shaft washer of proper thickness can be installed by removing the seven screws and lockwashers from extension housing. Install guide studs, Tool C-3233. Remove the one output shaft support-to-transmission case screw and washer, and remove the hand brake assembly, extension, output shaft support, and No. 1 unit as an assembly.

BAND ADJUSTMENT: Rotate hand brake drum in both directions to center bands on retainers prior to making band adjustment. *Se "Band Adjustment' above, for adjustment proc dure.*

1956-EARLY 1959 MODELS
(Without "Wh l Type" Cable Adjuster)

VALVE BODIES & TRANSFER PLATE ASSEMBLY (Installation): Clean mating surfaces of valve body assembly and place into position on transmission case. Install five (short) transfer plate screws, with Belleville washers. Draw down evenly and tighten to 14-16 ft. lbs. Install accumulator spring through transfer plate and position in piston Install accumulator cover, three screws with Belleville washers and draw down evenly. Place oil strainer in position over rear pump suction tube in transfer plate assembly. Check position of front pump suction tube in elbow (opening in suction tube should be facing oil pan). Slide front pump suction tube into strainer and position elbow on transfer plate. Install the two screws (with Belleville washers), draw down evenly and tighten elbow and accumulator cover screws to 14-16 ft. lbs. Install neutral starter switch and visually check manual valve lever contact with switch

LATE 1959-60 MODELS
(With "Wheel Type" Cable Adjuster)

VALVE BODY & TRANSFER PLATE ASSEMBLY (Installation): Clean mating surfaces of valve body, then place manual lever in reverse position (all the way in). Use a suitable guide such as a piece of welding rod, inserted through push button cable opening in transmission case, then slide cable adapter over end of guide with adapter attaching stud facing bottom of transmission case. Place valve body and transfer plate assembly into position on transmission case, and at the same time guide cable adapter stud into hole in manual control lever. Install cable adapter stud nut and tighten securely. Install transfer plate bolts (leaving four holes vacant to attach oil strainer), tighten evenly to 14-16 ft. lbs. With sealing washers on ends of strainer tubes, place strainer in position on transfer plate, then install remaining bolts and tighten to 14-16 ft. lbs. Install neutral safety switch and sealing washer and tighten to 15-20 ft. lbs. Make sure manual lever contacts switch plunger when in neutral position.

1956-60 MODELS

OIL PAN INSTALLATION: Install pan using a new gasket. Tighten screws evenly to 10-12 ft. lbs. (1956-58 Models); 12-17 ft. lbs. (1959-60 Models). Tighten oil pan drain plug.

1956-EARLY 1959 MODELS
(Without "Wheel Type" Cable Adjuster)

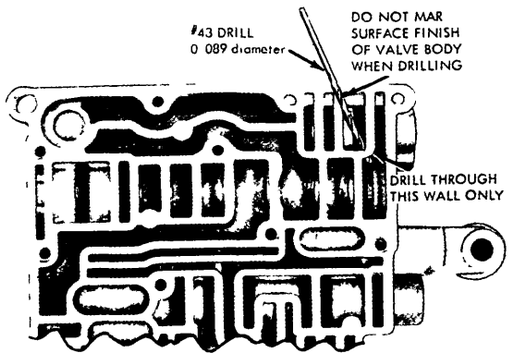
MANUAL CONTROL VALVE LEVER AND CONTROL CABLE ADAPTOR HOUSING (Installation): Install manual control lever (locking screw to rear) on manual valve lever shaft. Position lever so there is 7/32" clearance (without gasket) between bottom of lever and transmission case. Tighten locking screw securely. Place control cable adaptor (with spring lock in position) in lever and install pin. Place manual valve control lever in reverse position and install gasket, control cable housing, and three screws (with Belleville washers). Tighten evenly to 14-16 ft. lbs. Install felt washer, flat washer, and throttle valve lever assembly over shaft. Tighten clamp bolt.

DART, DODGE. PLYMOUTH. VALIANT TORQUEFLITE SIX

Dodge Dart 6 Cyl. (1960)
Plymouth 6 Cyl. (1960)
Valiant 6 Cyl. (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 DODGE DART & PLYMOUTH TRANSMISSION RATTLING NOISE IN REVERSE CORRECTION:* On transmissions with Serial No. 18,000 and earlier, this noise may be caused by a fluctuating torque converter control valve and may be noticed when accelerator pedal is worked with transmission in reverse. To correct, remove and disassemble control valve body, then drill a .090" (No. 40 drill) hole as indicated in illustration. Do not damage valve body mating surfaces when drilling. Clean valve body thoroughly before reassembly. Transmissions after Serial No. 18000 have this change made in production.



CONTROL VALVE BODY DRILLING

►*1960 TORQUEFLITE SIX TRANSMISSION "NO UPSHIFT" OR "NO DRIVE" CORRECTION:* Without removing transmission from car, drop front end of propeller shaft and measure transmission output shaft endplay with a dial indicator. If endplay exceeds .080", it may be assumed that the snap ring has come out of its groove at front end of output shaft. If this is the case, remove and disassemble transmission and install a new, heavier snap ring which is available for service replacement. *NOTE - This is a special snap ring and is available under Part No. 6022584.*

►*1960 TORQUEFLITE SIX TRANSMISSION PRODUCTION CHANGE (To Decrease Possibility of Wear):* Beginning with Transmission Serial No. 118379, a new fibre thrust washer, Part No. 2204369 is being installed between reaction shaft support assembly and front clutch piston retainer. The new thrust washer is .060" thick and the face of the front retainer has been reduced the same amount. The new thrust washer can be installed on earlier transmissions by also installing the new front clutch piston retainer assembly, Part No. 2125242.

DESCRIPTION: This new design planetary transmission is hydraulically operated and provides automatic shifting in three forward speeds. The sealed unit torque converter which is attached to engine crankshaft through a flexible driving plate is enclosed in a combined cast aluminum transmission case and torque converter housing. Converter cooling is accomplished by circulating the transmission fluid through an oil-to-water type cooler located in radiator lower tank. The new type control valve body contains all the transmission valves except the governor valve. Transmission speed range selection is controlled by five pushbuttons contained in a unit on instrument panel. On Valiant models, a parking pawl in transmission extension housing is actuated by a cable connected to a sliding lever below the pushbutton range selector unit on the instrument panel.

OPERATION: In drive range the transmission shifts through all three gear ratios automatically. Shift points are determined by throttle opening and car speed. If additional acceleration is required while in drive range, the transmission will downshift (depending on speed) to second gear automatically when accelerator pedal is completely depressed. When transmission is in intermediate or second position range, operation is in the first two gears only. The low, or first, position range keeps the transmission in first gear only.

LUBRICATION

Checking Fluid Level: Check fluid level every 1000 miles with transmission at normal operating temperature. Apply parking brake and idle engine, then depress each button, returning to neutral after button is pushed in. Fluid level should be between "Full" mark and 5/8" ABOVE "Full" mark. Add or remove transmission fluid as necessary.

Recommended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

►*CHECKING FLUID LEVEL NOTE:* The above specifications are new and supersede previous specifications. If fluid is checked with transmission COLD, fluid level should be at "Full" mark on dipstick,

Draining & R filling: Drain transmission every 10,000 miles. To drain, remove oil filler tube from transmission oil pan, then remove access plate at flywheel cover and drain torque converter by removing plug. After draining, replace converter plug and oil filler tube and add ten pints (5 qts.) of Automatic Transmission Fluid Type "A" (Suffix "A") through transmission oil filler tube. Start engine and add approximately three more pints with engine idling. Allow engine to idle for two minutes, then operate all pushbuttons, pausing momentarily in each position, and ending with the "N" (Neutral) button pushed in. Check fluid level and add sufficient fluid to bring level to "F" mark on dipstick.

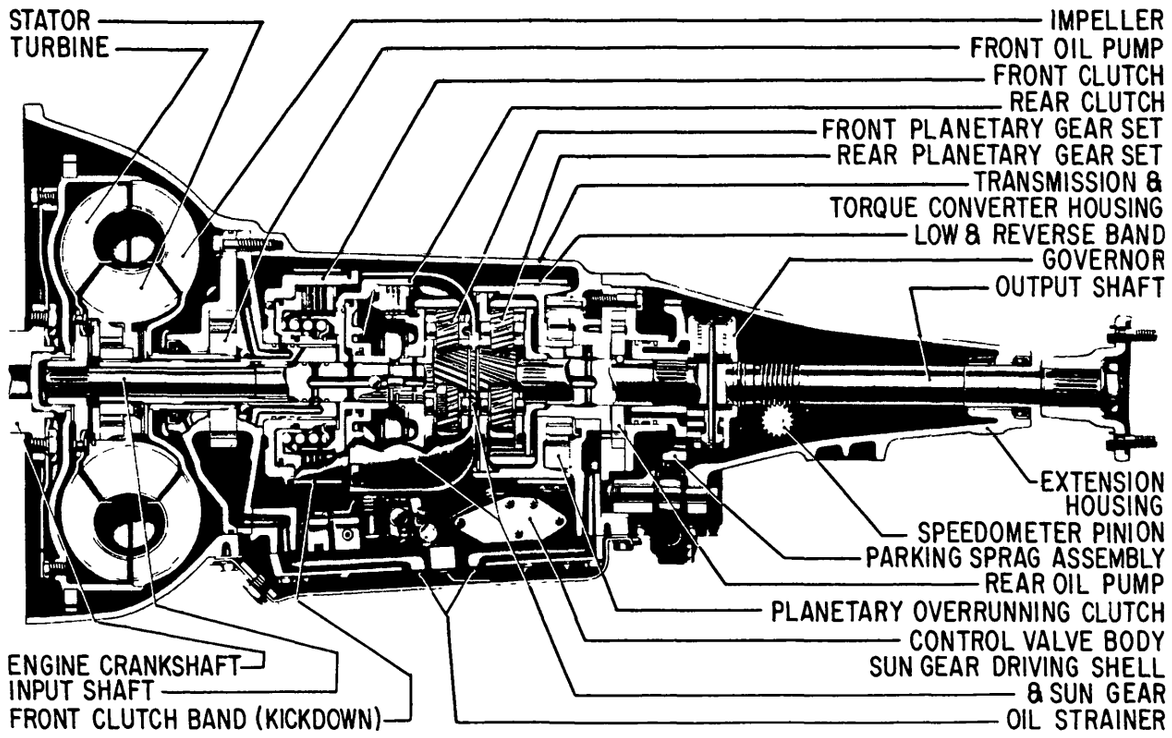
►*TRANSMISSION MAINTENANCE NOTE: It is recommended that when transmission is drained, oil pan should be removed and cleaned, oil screen cleaned, and transmission bands and linkage be adjusted.*

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See "Carburetor" on car model pages.*

Manual Control Cable Adjustm nt: 1) With car raised on a hoist, have an assistant fully depress "R" (Reverse) pushbutton and hold it down. Remove pushbutton control cable adjustment wheel lockscrew at left side of transmission case.

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TORQUEFLITE SIX TRANSMISSION SECTIONAL VIEW

TORQUEFLITE SIX (C ntinued)

2) Back adjustment wheel off on cable guide (turn counterclockwise) until only three or four threads are showing behind wheel on the guide. *CAUTION – Check wh l for fr turning on guide and remove any burrs in thr ads that might int rf re. Lubricate threads with a few drops of transmissi n fluid.*

3) Hold cable guide centered in hole in transmission case and apply only enough inward pressure to bottom the assembly at reverse detent. While holding cable bottomed, rotate adjustment wheel clockwise until it just contacts case. Turn wheel just enough clockwise to make next adjustment hole in wheel line up with screw hole in case.

4) Counting this hole as number one, continue turning the wheel clockwise until the fifth hole lines up with screw hole in case. Install lockscrew and tighten to 30–50 inch pounds.

N utral Saf ty Switch Adjustment: Raise car and drain approximately two quarts of fluid from transmission, then unscrew neutral safety switch and check to see that switch operating lever is aligned with center of switch opening in case. Place cupped washer and "O" ring over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and the other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3–½ turn. *NOTE* – Switch must be tight enough to prevent oil leakage. If not, add a thin washer and re-adjust the switch. Remove test lamp and connect wire to switch. Add fluid to transmission to bring up to proper level.

BAND ADJUSTMENT

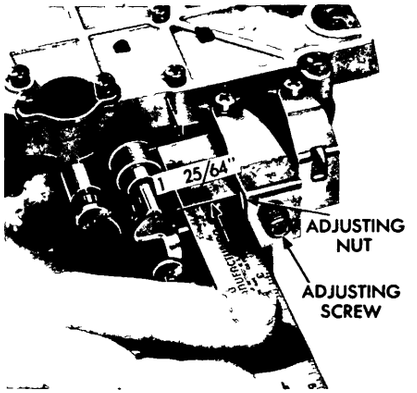
Kickd wn (Front) Band: Kickdown band adjusting screw is located on left side of transmission case near throttle shaft lever. Loosen locknut and back off approximately five turns. Check adjusting screw for freeness in transmission case, then tighten adjusting screw to a reading of **47–50 inch p unds** using Tool C–3380 with Adaptor Tool C–3790. Using a reference mark of chalk or colored pencil on corner of adjusting screw square and transmission case, back the adjusting screw out **xactly** 2 1/8 turns (Dodge & Plymouth); 2 5/8 turns (Valiant). While holding adjusting screw stationary, tighten locknut to 35-40 ft. lbs.

L w-R v rs Band: Drain transmission and remove oil pan, then loosen the adjusting screw locknut and back locknut off approximately five turns. *NOTE – Adjusting screw is located in l w-r v rse band lever.* Check adjusting screw for free turning in lever, then tighten adjusting screw to a reading of **47–50 inch pounds** using Tool C–3380 and Adaptor Tool C–3790. Back off adjusting screw exactly 5¼ turns (all models) and tighten locknut to 20–25 ft. lbs. *NOTE – Hold adjusting scr w from turning whil tightening locknut.*

TESTING

HYDRAULIC CONTROL PRESSURE TESTS: All of the following pressure tests must be made with the transmission at normal operating temperature.

Lin Pr ssur & Fr nt S rv Release Pressure: Install a tachometer on engine, then raise car and position the tachometer so it can be read under the car. Connect two 0–100 psi pressure gauges, Tool C–3292, to pressure takeoff points at top of accumulator and at front servo release (see illustration). With transmission selector lever in "D" (Drive) position, and wheels free to turn, speed up engine slightly until transmission shifts into direct drive. Reduce engine speed slowly to 800 RPM. Line pressure at this time must be 52–60 lbs., and front servo release pressure should be 45 lbs. or higher. Disconnect throttle linkage at transmission lever and hold transmission throttle lever at detent position. Increase engine speed to 3500 RPM with transmission in direct drive. At this point, line pressure should be 90–96 lbs. and front servo release pressure should be 80 lbs. or greater. *NOTE – Open transmission throttle lever when operating engine at speeds in excess of 1500 RPM.* If line pressure is not 52–60 lbs. at 800 RPM, adjust pressure (see below). *CAUTION – Do not adjust line pressure to correct reading at 3500 RPM.*



LINE PRESSURE ADJUSTMENT

Line Pressure Adjustment: Remove valve body assembly from transmission and adjust the "Allen" type screw in end of pressure regulator spring bracket so the measurement between valve body and inner edge of adjusting nut on end of spring is 1 25/64" (see illustration). *NOTE – The above adjustment can be varied to obtain specified line pressure. Turning screw counterclockwise increases pressure.*

Lubrication Pressure: Install a "tee" fitting between cooler return line fitting and fitting hole in transmission case at rear left side of transmission case. Connect a 0–100 psi pressure gauge, Tool C–3292, to "tee" fitting. At 800 RPM, with throttle lever in closed position and transmission in direct drive, pressure should be 5–25 lbs.

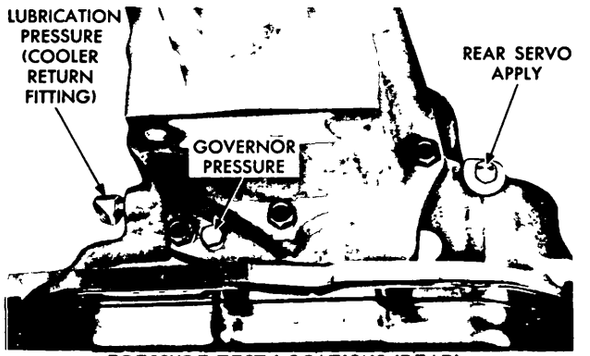
Rear Servo Apply Pressure: Connect a 0–300 psi pressure gauge, Tool C-3293, to apply pressure takeoff point at rear servo, then with transmission selector lever in "R" (Reverse) and engine speed at 1600 RPM, the reverse servo pressure should be 230–280 lbs. Not adjustable.

Governor Pressure: Connect a 0–100 psi pressure gauge, Tool C–3292, to governor pressure takeoff point at lower left corner of extension mounting flange. Governor pressure should be within the limits indicated in table below. Not adjustable. If pressures not correct, governor valve or weights are sticking.

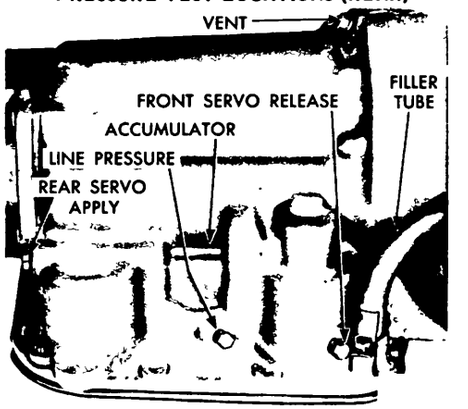
Governor Pressure

Engine Speed	Pressure Limits
320 RPM	2–4 lbs.
1000 RPM	28–32 lbs.
1400 RPM	40–45 lbs.
2800 RPM	73–83 lbs.

Throttl Pr ssur : *NOTE – No provision is mad to check throttle pressur . However, if pressure adjustment is made correctly, as indicated b low, pressure is assumed to be correct.*



PRESSURE TEST LOCATIONS (REAR)



PRESSURE TEST LOCATIONS (RIGHT SIDE)

Throttle Pressure Adjustment – Remove valve body assembly from transmission, then loosen throttle lever stop screw locknut and back off screw approximately five turns. Insert gauge pin of Tool C–3763 between throttle lever cam and kickdown valve. By pushing in on tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body. As force is being exerted to compress the spring, tighten throttle lever stop screw finger tight against throttle lever tang with throttle lever cam touching the tool and throttle valve bottomed. *CAUTION – Be sure the adjustment is made with spring fully compressed and valve bottomed in valve body.* Remove tool and tighten stop screw locknut securely.

AIR PRESSURE TESTS: Front clutch, rear clutch, kickdown servo, and low-reverse servo may be checked by applying air pressure to their respective passages after valve body assembly is removed. See illustration for location of passages.

Front Clutch: Apply air pressure to front clutch passage and listen for a dull "thud" indicating that front clutch is operating. Hold air pressure on for a few seconds and check system for excessive oil leakage.

Rear Clutch: Apply air pressure to rear clutch passage and listen for dull "thud" indicating that rear clutch is operating. Hold pressure on for a few seconds and check system for excessive oil leakage.

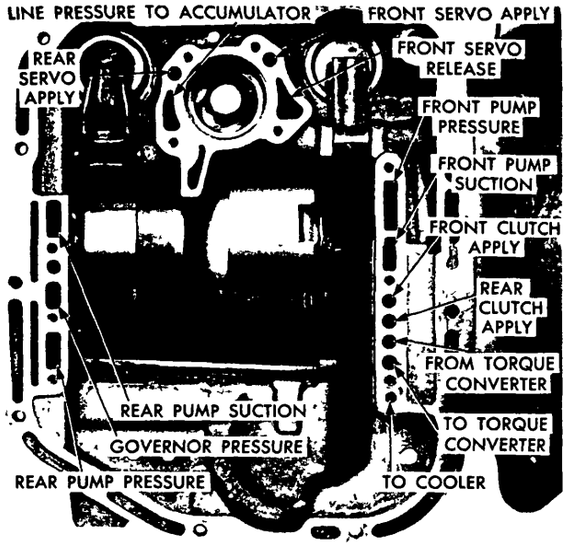
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TORQUEFLITE SIX (C ntinu d)

►*NOTE: If a dull "thud" cann t b h ard in th clutches, place finger tips on clutch housing and again apply air pressure. Piston movement can be felt as clutch is applied.*

Kickdown Servo: Direct air pressure into kickdown servo "apply" passage. Operation of servo is indicated by a tightening of front band. Spring tension on servo piston should release the band.

L w-Reverse Servo: Direct air pressure into low-reverse servo "apply" passage. Operation of servo is indicated by a tightening of rear band. Spring tension on servo piston should release band.



AIR PRESSURE CHECKS

►*AIR PRESSURE TEST NOTE: If all the above units operate properly, "no drive", "erratic" and "no upshift" conditions are caused by trouble in the control valve assembly.*

Transmission Shift Speeds (MPH)
(Dodge & Plymouth 6 Cyl.)

Throttle Position	1–2 Upshift	2–3 Upshift	Downshift
Closed	8–11	12–15	7–10
Wide Open	28–43	60–74	
3–2 Kickdown			57–70
3–1 Kickdown			27–40

(Valiant 6 Cyl.)

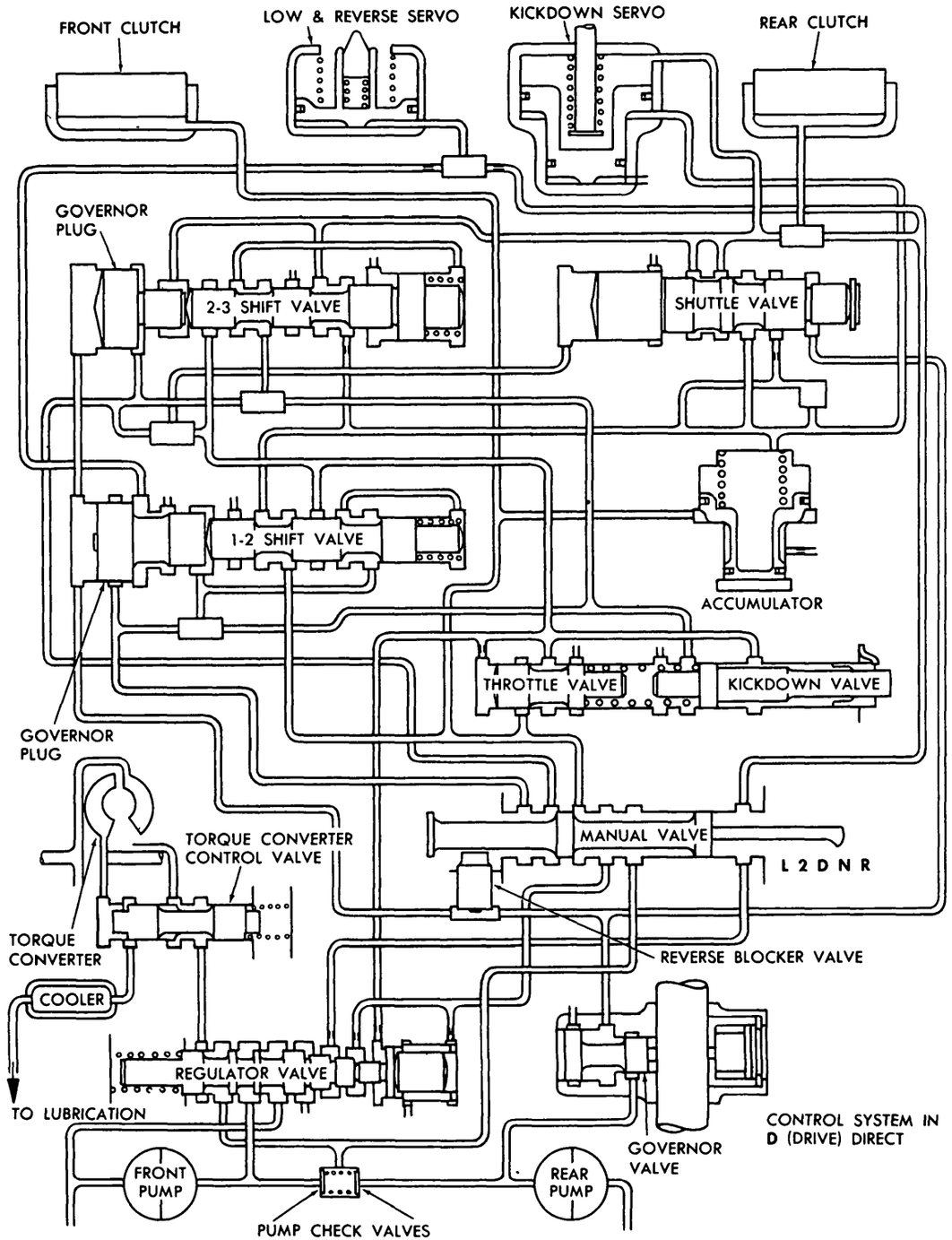
Throttle Position	1–2 Upshift	2–3 Upshift	Downshift
Closed	7–10	10–13	6–10
Wide Open	28–42	52–69	
3–2 Kickdown			50–66
3–1 Kickdown			26–40

GEARSHIFT CONTROL UNIT

PUSH BUTTON CONTROL UNIT: Removal - Procedures are different for the various models as indicated below.

D dg Dart & Plym uth (6 Cyl.): Disconnect one battery cable, then disconnect back-up light switch and illuminating lamp leads at rear of instrument panel. Remove

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TORQUEFLITE SIX HYDRAULIC CIRCUITS

TORQUEFLITE SIX (C ntinued)

screws of push button face plate and remove push buttons by pulling them off slides. Remove lamp bulb, then remove control housing stud nuts that are accessible. Remove control cable from rear of instrument panel, then remove hairpin clip securing cable to actuator and screws holding bracket to control housing.

Valiant: Disconnect negative (ground) cable from battery, then disconnect back-up lamp switch wire at push button control. Remove two screws from face plate and remove face plate and gasket. Remove parking brake handle from lever, then remove three screws securing control assembly to instrument cluster. Carefully work assembly rearward out of cluster. Remove push buttons by pulling them off slides, then remove mounting bracket from assembly. Remove hairpin lock securing control cable to actuator and screws holding cable bracket to control. Remove control cable, then disconnect parking brake cable and remove parking brake arm from control unit.

Installation: Reverse removal procedures and adjust cable.

MANUAL CONTROL CABLE: Removal - Drain 2 quarts of fluid from transmission, then depress "L" (Low) push button. Remove neutral starting switch and remove control cable-to-adjusting wheel lock screw. Insert screwdriver through neutral starting switch opening, then push screwdriver gently against upper projecting portion of cable lock spring and pull outward on cable to remove cable from adapter and transmission case.

Installation: Have an assistant hold the "R" (Reverse) button fully depressed, then back adjusting wheel off until two or three threads are showing behind wheel on guide. Lubricate cable guide with transmission lubricant, insert cable in transmission case, push inward on cable making sure lock-spring engages cable. Adjust control cable *(see "Adjustment" above)*, then fill transmission with recommended fluid.

LAMP BULB REPLACEMENT: Dodge Dart & Plymouth - Remove push button face plate and remove one or more of the center push buttons.

Valiant: Lamp is located between speedometer and control unit and can be replaced by pulling it out of socket from rear of speedometer housing.

BACK-UP LIGHT SWITCH REPLACEMENT: All Models - Remove push button control housing assembly, then straighten tabs securing switch to housing. Install switch and bend tabs to retain it in place. Install housing and connect switch and lamp wires.

TORQUE CONVERTER

►*TORQUE CONVERTER NOTE: This is a sealed unit and cannot b disassembl d for overhaul. In the event of parts failur in transmission, the torque converter should be flushed as described below.*

FLUSHING TORQUE CONVERTER: Reinstall converter assembly on engine crankshaft (after draining all fluid from converter). Insert a screwdriver into torque converter and turn large splined stator hub counterclockwise so that one of the 1/8" x 3/8" slots of this assembly are visible at top. *NOTE - A second opening directly b low provid s an adequat opening for kerosn if poured slowly.* Slowly pour two quarts of new clean kerosene into torque converter, using a long spouted can, then close hub opening with masking tape. Disconnect coil wire to prevent engine starting, then rotate converter for 10 seconds by cranking engine. Drain converter and repeat the operation as many times as required until kerosene drained out is clean. After flushing, rotate converter several times with drain plug removed. This will remove solvent and trapped dirt. Reinstall drain plug.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: 1) Disconnect negative (ground) cable from battery, then depress "L" (Low) push button. Remove starter motor assembly.

2) Raise car on a hoist or support on stands, then remove cover plate from in front of converter assembly. Drain torque converter and transmission. Disconnec wire from neutral starting switch and remove switch (see above), then disconnect and remove control cable from transmission (see above).

3) Loosen clampscrew and remove throttle link and lever assembly from throttle shaft. Disconnect oil cooler lines at transmission and remove filler tube. Remove speedometer pinion and sleeve assembly from transmission. Disconnect front universal joint and secure out of way.

4) On Dodge Dart & Plymouth, remove parking brake adjusting nut cover and loosen cable clamp bolt on brake support. Disengage ball end of cable from operating lever and remove cable from brake support.

5) On Valiant, loosen transmission parking pawl cable clamp bolt where cable enters cover, then remove housing cover lower plug. Insert screwdriver through hole, then gently exert pressure against projecting portion of cable lock spring and withdraw cable.

6) On all models, remove nuts and washers securing transmission extension housing insulator to crossmember, then install engine support fixture C-3806 and raise engine slightly.

7) On Valiant, disconnect rear wheel brake control cable from lever and crossmember. On all models, remove crossmember. Place transmission jack under transmission and support the assembly.

8) Mark converter and flex driving plate so they can be assembled in same relative position, then remove converter-to-flex plate mounting screws. Attach a small "C" clamp to edge of bell housing to hold converter in place during removal of transmission and converter assembly. Remove bell housing attaching bolts, then carefully work transmission assembly rearward off engine block dowels and disengage converter hub from end of crankshaft. Lower the assembly and remove from beneath car.

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

SPEEDOMETER DRIVE PINION: Removal - Remove screw and speedometer cable retainer and carefully work pinion and sleeve assembly out of transmission extension.

Installation: To replace pinion and/or oil seal, pry clip off pinion and slide pinion and seal assembly off cable. If transmission fluid is found inside cable housing, replace seal inside pinion bore, then slide pinion over end of cable and secure with spring clip. To install pinion, push pinion and sleeve assembly into extension housing so sleeve flange is tight against housing, then install retainer and screw. Tighten screw to 35-45 inch-pounds.

PARKING BRAKE ASSEMBLY (DODGE DART & PLYMOUTH): Removal - Disconnect propeller shaft at parking brake drum flange, then hold brake drum flange with Tool C-3281 and remove retaining nut and washer. Remove drum and flange assembly (use puller C-452 if necessary). Remove brake shoe adjusting nut cover plate and loosen cable guide clamp bolt on brake support. Disengage ball end of cable from operating lever and remove brake support. Remove support grease shield being careful not to damage neoprene sealing surface at bottom of shield. Use a suitable drift and remove lock pin securing brake shoe anchor pin in front lug of extension housing. Slide balance of brake assembly with anchor pin from extension housing. Remove neoprene spacer and steel sleeve from back of support plate.

Installation: Place neoprene spacer in position on back of brake support plate with steel sleeve in center of support. Position brake assembly and anchor pin on end of extension (Make sure spacer sleeve remains in center of support), then align anchor pin hole with hole in front lug and install lock pin. Install grease shield with flat of shield aligned with flat on extension housing. Install grease shield retainer spring with opening of spring toward brake shoe adjusting nut. Make sure spring is properly seated in groove. Slide brake shoe return spring behind grease shield spring and hook into position. Engage ball end of parking cable in brake shoe operating lever and tighten cable clamp bolt. Install cover plate on back side of brake support plate. Install brake drum and flange assembly, washer and nut, and tighten to 175 ft. lbs. Connect propeller shaft to flange.

OUTPUT SHAFT OIL SEAL: On Dodge Dart & Plymouth, remove parking brake assembly (see above). On Valiant, disconnect propeller shaft at transmission flange and hold flange with Tool C-3281 and remove nut and washer. Slide flange off output shaft (if necessary, use Tool C-452). On all models, screw taper threaded end of Tool C-3752 into seal, then tighten screw to remove seal. To install a new seal, slide protector sleeve, Tool C-3768, over output shaft splines and drive seal in (lip side facing in) with Tool C-3754. Complete installation by reversing removal procedure. Tighten flange nut to 175 ft. lbs.

EXTENSION HOUSING: Removal - On all models, remove speedometer drive pinion and sleeve assembly (see above). On Dodge Dart & Plymouth, disconnect front joint from companion flange, then disconnect parking brake cable *(see "Parking Brake Assembly" above)*. On Valiant, remove transmission companion flange *(see "Output Shaft Seal" above)*. On all models drain approximately two quarts of fluid from transmission. On Valiant, loosen transmission parking pawl cable clamp bolt where cable enters housing cover. Remove housing cover lower plug. Insert screwdriver through hole, then while exerting pressure against projecting portion of cable lock-spring, withdraw brake cable. On all models, remove nut and washers securing extension housing insulator to crossmember. Use a transmission jack and raise transmission slightly to clear crossmember. On Valiant, disconnect rear wheel brake control cable and housing at crossmember. On all models, remove the crossmember, then remove extension housing-to-transmission housing bolt. Tap housing lightly with a soft hammer to break it loose from transmission, then remove housing.

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TORQUEFLITE SIX (C ntinued)

Bushing Replac ment - Press or drive out old bushing with Tool C-3755. Slide a new bushing over ground end of Tool C-3751, then drive bushing into place with the tool. *CAUTION - Make sure oil hole in bushing aligns with slot in housing.* Install cup on tool, followed by the nut, then while holding screw from turning, tighten tool nut to draw burnisher through the bushing.

Installation: Reverse removal procedure and note the following: On all models, tighten extension housing-to-transmission bolts to 25-30 ft. lbs. Tighten insulator mounting bolts to 30-35 ft. lbs. On Valiant, insert parking brake cable in housing cover making sure spring lock engages cable, then gently pull out on cable housing to limit of its travel and tighten clamp bolt to 2-4 ft. lbs. Connect rear wheel brake control cable to lever and crossmember.

GOVERNOR: Removal - Remove extension housing *(see "Extension Housing" above)*, then carefully pry snap ring from weight end of governor with a screwdriver. Slide valve and shaft assembly out of governor housing. Remove large snap ring from weight end of governor housing and lift out weight assembly. Remove snap ring from inside governor weight, then remove inner weight and spring from outer weight. Remove snap ring from behind governor housing, then slide governor housing and support assembly off output shaft (Dodge Dart & Plymouth), slide governor housing and parking brake sprag assembly off output shaft (Valiant). If necessary, remove four screws and separate governor housing from support or from sprag.

Inspection: Remove rough surfaces with crocus cloth, then thoroughly clean all parts in solvent and check for free movement after assembly.

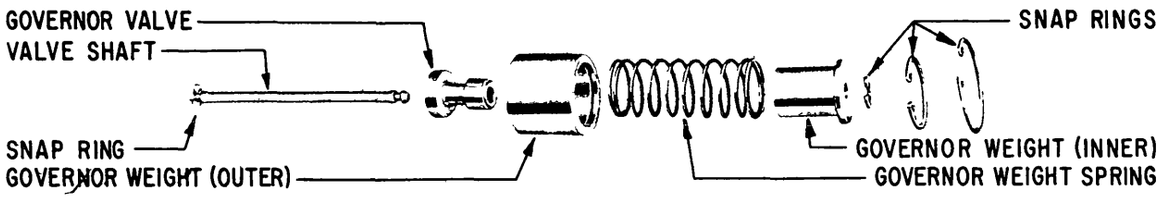
Installation: Reverse removal procedure.

REAR OIL PUMP: Removal - Remove extension housing, governor and support (see above), then remove rear pump cover. Mark a line across face of inner and outer pump rotors with dye so they may be installed in the same relation to each other. Slide inner rotor off output shaft. *CAUTION - Do not lose small ball which keys rotor to shaft.* Remove outer rotor from pump body. *NOTE - If rear pump body requires replacement, it will be necessary to disassemble the transmission as pump body must be driven rearward out of case.*

Inspection: Inspect body and cover machined surfaces for nicks and burrs. Inspect rotors for scoring or pitting. With rotors cleaned and installed in pump body, place a straightedge across face of rotors and pump body, then use a feeler gauge and check clearance between straightedge and face of rotors. This clearance should be .001-.0025".

Installation: Install outer rotor in pump body, then turn output shaft so inner rotor driving ball pocket is up. Install ball and slide inner rotor on output shaft in alignment with ball. Position outer rotor to align dye marks with inner rotor, then push inner rotor in mesh with outer rotor. Install oil pump cover with screws threaded in a few turns. Slide aligning fixture, Tool C-3762 all the way in until it bottoms against rotors, then tighten cover bolts evenly to 14-16 ft. lbs. Install governor and extension housing.

NEUTRAL STARTING SWITCH: R m val - Drain approximately two quarts of fluid from transmission, then disconnect wire from switch and unscrew switch from transmission case.



TORQUEFLITE SIX GOVERNOR VALVE ASSEMBLY

Installation: With control cable properly adjusted *(see "Adjustments" above)*, depress "N" (Neutral) push button and check to see that switch operating lever is aligned in switch opening in center of case. Place cupped washer and "O" ring over threads of switch, then screw switch into transmission case a few turns. Connect one lead of a test lamp to battery current and the other lead to switch terminal. Screw switch into transmission case until lamp lights, then tighten switch an additional 1/3 to 1/2 turn. *NOTE - Switch must be tight enough to prevent oil leakage. If not, add a thin washer and readjust switch.* Remove test lamp and connect wire to switch, then add recommended transmission fluid as necessary to bring to proper level *(see "Lubrication" above)*.

PARKING PAWL COMPONENTS (VALIANT): Removal - Remove extension housing (see above), then remove parking cable adapter cover from extension and remove cable adapter from lock lever. Slide shaft out of extension housing to remove lock lever and shim. Slide bushing sleeve out of housing to remove pawl and spring.

Installation: Position pawl and spring in housing and insert bushing sleeve. Make sure square lug on pawl is toward sprag and the spring is positioned so as to lift pawl away from sprag. Position lock lever and shim in housing and install lever shaft. *NOTE - Lever roller must be on top of pawl so as to push it into engagement with the sprag.* Attach cable adapter to lock lever, then insert a small punch through brake cable opening in adapter cover and into end of adapter. Carefully lower cover into position, feeding the adapter into cable opening in cover. Install cover retaining screws and tighten to 14-16 ft. lbs. Install extension housing and connect propeller shaft, then connect parking brake cable.

VALVE BODY ASSEMBLY & ACCUMULATOR PISTON: Removal - Drain fluid from transmission, then remove oil pan and gasket. Loosen clamp bolt and lift throttle lever, washer and seal off transmission throttle lever shaft. Shift manual control into "L" (Low) position to expose nut securing cable adapter to manual lever, then disengage cable adapter from manual lever. Place a drain pan under transmission, then remove ten valve body-to-transmission case bolts. *CAUTION - Hold valve in position while removing bolts.* Lower valve body assembly being careful not to cock throttle lever shaft in case hole or lose the accumulator spring. Withdraw accumulator piston from transmission case. Inspect piston for scoring and check rings for wear or breakage. For disassembly and reassembly of valve body, *see "Overhaul" below.*

Installation: Clean mating surfaces and check for burrs on transmission case and valve body transfer plate, then install accumulator piston in transmission case. Position accumulator spring over valve body, then carefully position valve body assembly into transmission case and start all the retaining bolts. Snug bolts down evenly, then tighten to 55 inch-pounds. Connect control cable adapter to manual valve and install retaining nut. Install seal, flat washer and throttle lever on throttle shaft and tighten clamp bolt. Install oil pan and a new gasket, then refill transmission *(see "Lubrication" above)*.

TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

TORQUE CONVERTER: Remove "C" clamp installed when transmission and converter assembly removed from car, then slide converter assembly off shaft.

VALVE BODY: Remove oil pan, then remove control cable adapter from valve body manual lever. Remove ten valve body retaining screws (hexhead). *CAUTION - Hold valve body in position while removing screws.* Lift valve body out of case, being careful not to cock throttle valve lever.

ACCUMULATOR & PISTON: Remove spring from piston, then withdraw piston from transmission case.

PARKING BRAKE ASSEMBLY (DODGE DART & PLYMOUTH): Hold brake drum flange with Tool C-3281 and remove retaining nut and washer, then attach puller, Tool C-452 and remove drum and flange assembly. Remove brake support grease shield and spring. *CAUTION - Be careful not to damage neoprene sealing surface at bottom of shield during removal.* Use a suitable drift and remove lock pin securing brake shoe anchor pin in front lug of extension housing, then slide balance of brake assembly from extension housing. Remove neoprene spacer and steel sleeve from back of brake support plate.

DRIVE TRAIN ENDPLAY CHECK: *CAUTION - Check endplay before removal of output shaft extension housing. This will indicate the spacer required between input shaft and output shaft to prop rly adjust endplay during reassembly (except when major parts are installed).* Attach a dial indicator to extension housing with its plunger seated against end of output shaft (forward side of companion flange). Move output shaft in and out to obtain endplay reading. *NOTE - If necessary, tap output shaft inward, and pry utward with a screwdriver.* Record the indicator reading for use at reassembly. Endplay limits are .024-.062".

EXTENSION HOUSING: On Valiant, hold transmission flange with Tool C-3281 and remove retaining nut washer, then slide flange off shaft (use Tool C-452 if necessary to pull flange from shaft). On all cars, remove housing retainer bolts, tap housing with a soft hammer to break it loose from transmission, then remove housing.

GOVERNOR: *NOTE - On Dodge Dart & Plymouth, th governor is removed with its support. On Valiant, the governor is removed with transmission parking sprag*

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Form 54 A

TORQUEFLITE SIX (C ntinu d)

assembly Carefully pry snap ring from weight end of governor valve shaft then slide valve and shaft assembly out of governor housing Remove snap ring from behind governor housing then slide governor housing and support or parking sprag assembly off output shaft

REAR OIL PUMP· Remove rear pump cover, then mark face of inner and outer pump rotors with dye so they may be installed in same relative position Slide inner pump rotor off output shaft *CAUTION Do not lose small ball which keys rotor to shaft* Remove outer rotor from pump body *NOTE - If replacement of rear pump is required, drive it rearward out of case with a wood block after transmission has been disassembled*

FRONT PUMP & REACTION SHAFT SUPPORT· Remove front pump retaining bolts then attach Tool C 3752 (two slide hammers) to flange holes at the "11 o'clock" and "4 o'clock" positions then tap outward evenly on the two weights and withdraw pump and reaction shaft support assembly from case

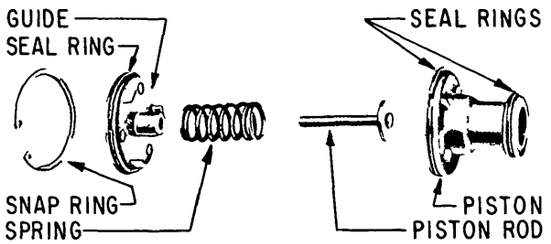
FRONT BAND & FRONT CLUTCH· Loosen front band adjuster remove band strut and slide band out of case Slide front clutch assembly out of case

INPUT SHAFT & REAR CLUTCH Slide input shaft and rear clutch assembly out of case *CAUTION Do not lose the thrust washer located between rear end of input shaft and forward end of output shaft*

PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL, LOW & REVERSE DRUM: While supporting output shaft and driving shell, carefully slide the assembly forward and out through case *CAUTION - Be careful not to damage ground surfaces on output shaft during removal*

REAR BAND: Loosen rear band adjuster and band strut, then remove band

OVERRUNNING CLUTCH: *CAUTION - Note position of ov rrunning clutch rollers and springs before disassembly* Carefully slide clutch hub out and remove rollers and springs, then remove low and reverse drum thrust washer from inside overrunning clutch case



KICKDOWN SERVO ASSEMBLY

KICKDOWN SERVO: Remove snap ring securing piston rod guide in case, then remove rod guide, spring, and piston rod from case Be careful not to damage rod or guide during removal Insert Tool C484 inside piston and withdraw piston from transmission case

LOW & REVERSE SERVO: Use a suitable tool to depress piston spring retainer and remove snap ring, then remove spring retainer, spring and servo piston and plug assembly from case *NOTE - The screw portion of "Power Steering Worm Housing Bearing Cup P mov r Tool C-3322" may be used to depress piston*

TRANSMISSION UNIT OVERHAUL

VALVE BODY: Disassembly - *CAUTION - DO NOT clamp any part of valve body or transfer plate in a vise When removing or installing valves or plugs, slide them in or out carefully Do not use force*

1) Place valve body assembly on a stand, Tool C-3749 then remove oil screen While holding spring retainer bracket against spring force, remove three bracket retaining screws Remove spring bracket, torque converter control valve spring, and the regulator valve spring with line pressure adjusting screw assembly *CAUTION - Do not alter setting of line pressure adjusting screw and nut*

2) Slide regulator valve and spring retainer ring out of valve body then slide torque converter control valve out of valve body Remove transfer plate screws (14) and carefully lift transfer plate and steel plate assembly off valve body Invert transfer plate assembly and remove stiffener plate Remove screws retaining steel plate to transfer plate and carefully lift off steel plate Remove rear pump check valve and spring

3) Remove reverse blocker valve cover and remove spring and valve Note location of six steel balls in valve body (one ball is larger than the other five and is in the larger chamber) Remove all steel balls and the front pump check valve and spring

4) Invert valve body and lay it on a clean cloth or paper, then remove "E" clip from throttle lever shaft Remove any burrs from shaft, then while holding manual lever detent ball and spring in bore with Tool C-3765 or similar tool, slide manual lever off throttle shaft and remove detent ball and spring Remove manual valve by sliding it out of valve body with a rotating motion Remove throttle lever and shaft from valve body

5) Remove shuttle valve cover plate, then remove "E" clip from exposed end of shuttle valve Remove throttle lever stopscrew assembly, being careful not to disturb setting any more than is necessary Remove kickdown detent, valve, throttle valve spring, and throttle valve Remove governor plug end plate, then tip throttle valve body to allow shuttle valve throttle plug, spring, shuttle valve, and shift valve governor plugs to slide out *NOTE - 1-2 shift valve plug is identified by its longer stem*

6) Remove shift valve end plate and slide out the two springs and valves Remove regulator valve end plate, then slide regulator valve line pressure plug, sleeve, and the regulator valve throttle pressure plug out of valve body

Inspection· Wash all parts in clean solvent and blow dry with air, then make sure all passages are clean and free of obstructions Inspect all mating surfaces for burrs nicks, and scratches *NOTE - Minor blemishes may be removed with crocus cloth, using a very light pressure* Use a straightedge (Tool C-3335) and check all mating surfaces for warpage or distortion Correct slight distortion on a surface plate Inspect manual and throttle valve operating levers for bends wear or looseness If a lever is loose on its shaft, it may be **silver soldered** only, or the assembly should be replaced Check all valve springs for distortion and collapsed coils Inspect all valves and plugs for burrs, nicks, and scores Small nicks and scores may be removed with crocus cloth providing care is taken not to round off sharp edges Check all valves and plugs for freedom of operation in bores *NOTE - When bores, valves and plugs are clean and dry, valves and plugs should fall freely in bores*

R ass mbly: **1)** Install rear pump check valve and spring in transfer plate, then position steel plate on transfer plate and while holding rear pump check valve with a thin steel scale, install steel plate retaining screws Make sure bolt holes in steel plate and transfer plate are aligned, then tighten screws evenly to 25 inch-pounds Check rear pump check valve for free movement in transfer plate, then install stiffener plate and tighten screws to 25 inch-pounds

2) Turn transfer plate over and install reverse blocker valve spring and valve, then rotate valve until it seats through steel plate Hold valve down and install cover plate and tighten retaining screws to 25 inch-pounds Place 1-2 and 2-3 shift valve governor plugs in their bores, then install shuttle valve spring and shuttle valve throttle plug Install governor plug end plate and tighten retaining screws to 25 inch-pounds Install "E" clip on end of shuttle valve and install cover plate Tighten screws to 25 inch-pounds

3) Install 1-2 and 2-3 shift valves and springs, then install end plate and tighten retaining screws to 25 inch-pounds Install regulator valve throttle pressure plug, sleeve (undercut on sleeve toward end plate), and line pressure plug Install end plate and tighten retaining screws to 25 inch-pounds

4) Install throttle valve and spring Slide kickdown detent on kickdown valve (counterbore side of detent toward valve), then install assembly in valve body Install throttle lever stopscrew and tighten locknut finger tight Install manual valve in valve body, then install throttle lever and shaft Insert detent spring and ball in its bore, then depress ball and spring with Tool C-3765 or suitable tool and slide manual lever over throttle shaft so that it engages manual valve and detent ball Install "E" clip on throttle shaft

5) Position valve body assembly on holding stand, then place the six steel balls in valve body chambers with large ball in large chamber Place front pump check valve and spring in valve body Position transfer plate assembly on valve body while holding front pump check valve with a thin steel scale Tighten retaining screws (14) to 25 inch-pounds *NOTE - When tightening screws, start at center and work outward*

6) Install torque converter valve and the regulator valve and spring retainer pin Position torque converter valve spring and regulator valve spring over ends of their respective valves Place line pressure adjusting screw assembly on end of regulator valve spring with long dimension of nut at right angles to valve body Install spring retainer bracket, making sure converter valve spring is engaged on tang in bracket Tighten bracket retaining screws to 25 inch-pounds Install oil strainer and tighten retaining screws to 25 inch-pounds, *NOTE - Before installing valve body, adjust line and throttle pressures (see "Testing" above) unless pressures were satisfactory before disassembly*

ACCUMULATOR SPRING & PISTON: Inspection - Inspect seal rings for wear and makr sure they turn freely in piston grooves *NOTE - It is not necessary to remove rings unless inspection warrants* Inspect piston for nicks, burrs, scores and wear Check piston bore for scores and other damage Check piston spring for distortion

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Form 64 B

TORQUEFLITE SIX (C ntinued)

EXTENSION HOUSING BUSHING & SEAL REPLACEMENT: *See "Transmission Unit Removal & Installation (Transmission in Car)" and note the following:* Drive oil seal out of housing with a punch. To install, use Tool C-3754 and drive seal in until tool bottoms.

PARKING PAWL & LEVER (VALIANT): Disassembly - Remove parking brake cable adapter cover from bottom of extension housing and remove adapter from lock lever. Slide shaft out of extension housing to remove lock lever and shim. Slide bushing sleeve out of housing to remove pawl and spring.

Inspection: Check bushing sleeve and shaft for scores and free movement in housing and in pawl and lever. Check roller for nicks, burrs and free turning. Inspect square lug on pawl for broken edges or other damage.

R assembly: Position parking pawl and spring in housing and insert sleeve. Make sure square lug on pawl is toward the sprag, and the spring is positioned so as to lift pawl away from sprag. Attach cable adapter to lock lever. *NOTE* - Make sure adapter is properly attached. Insert small punch through cable opening in adapter cover and into end of adapter. Carefully lower cover into position, feeding the adapter into cable opening in cover. Install cover retaining screws and tighten to 14-16 ft. lbs.

GOVERNOR & SUPPORT (PARKING SPRAG): Disassembly - Remove large snap ring from weight end of governor housing and lift out weight assembly. Remove snap ring from inside governor weight, then remove inner weight and spring from outer weight. On Valiant, if lugs on parking sprag are damaged, remove four screws and separate sprag from governor.

Inspection: Inspect all parts for burrs and wear. Check inner weight for free movement in outer weight, and outer weight for free movement in governor housing. Weights and valve should fall freely when clean and dry. Remove rough surfaces with crocus cloth. Check governor weight spring for distortion. Inspect lugs on sprag for broken edges or other damage.

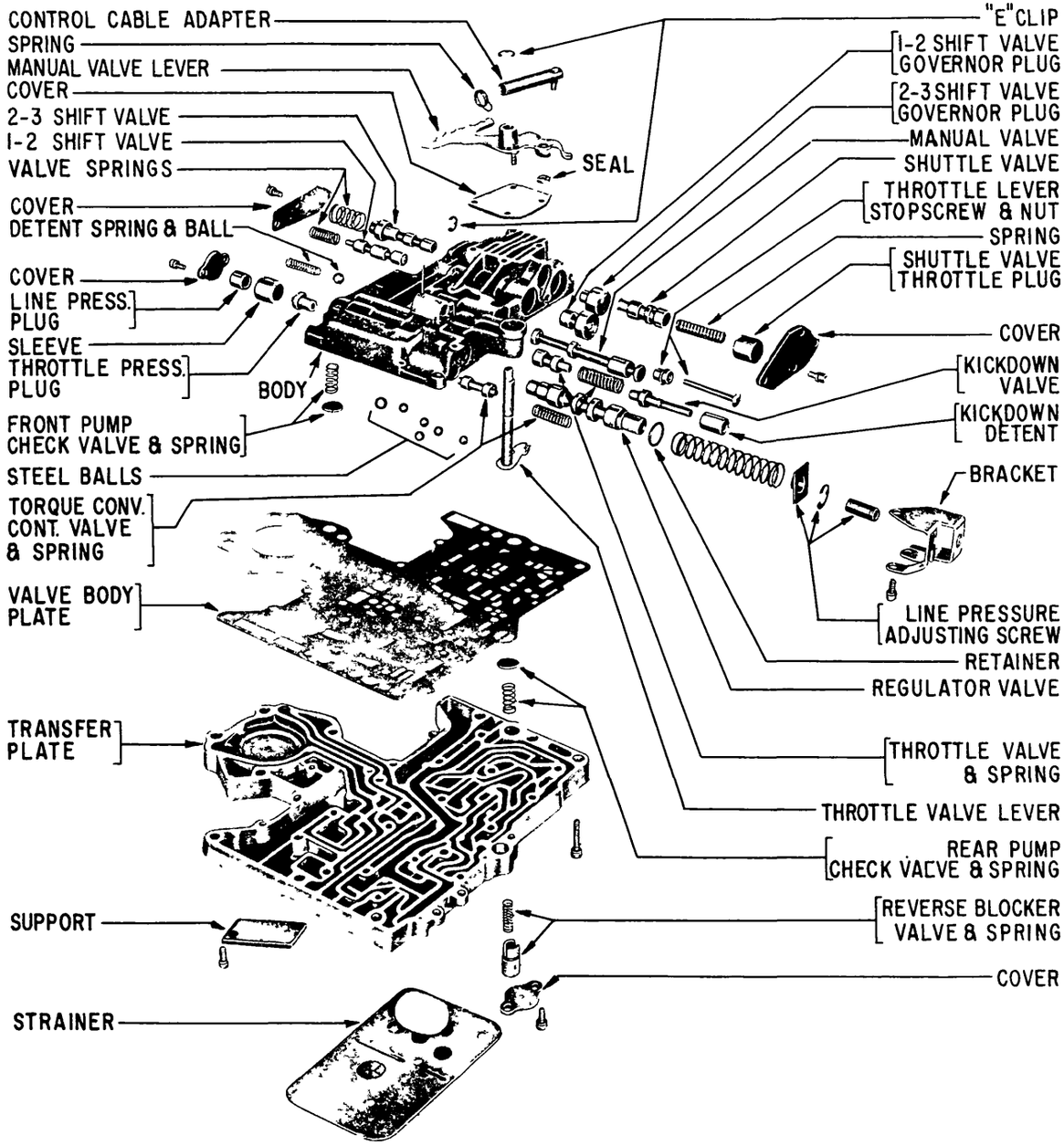
R assembly: If parking sprag on Valiant was separated from governor housing, assemble and tighten screws finger tight. *CAUTION - Make sure oil passages of governor housing align with passage in sprag, then tighten screws.* Assemble governor weights and springs, and secure with snap ring inside of large governor weight. Place weight assembly in housing and install snap ring.

REAR OIL PUMP: Inspection - Inspect oil pump body and machined surfaces of cover for nicks and burrs. Inspect rotors for scoring or pitting. With rotors cleaned and installed in pump body, place straightedge (Tool C-3335) across face of rotors and pump body, then use a feeler gauge and check clearance between straightedge and face of rotors. This clearance should be .001-.0025".

FRONT OIL PUMP SEAL REPLACEMENT: *NOTE - This seal can be replaced without removing front pump and reaction shaft support assembly from transmission case.* Screw seal remover, Tool C-3758, into seal, then tighten screw portion of tool to withdraw seal. To install seal, place seal in opening of pump housing (lip side inward). Using Tool C-3757, drive seal into housing until tool bottoms.

FRONT OIL PUMP & REACTION SHAFT SUPPORT: Disassembly - Remove bolts from rear side of reaction shaft support and lift support off pump. Mark face of inner and outer rotors with dye so they may be reassembled in same relation to each other, then remove rotors. Remove rubber seal ring from front pump body flange and drive out seal with a punch.

Inspection: Inspect interlocking seal rings on reaction shaft support for wear or broken locks and make sure rings turn freely in grooves. *NOTE - Do not remove rings unless condition warrants.* Inspect machined surfaces on oil pump body and reaction shaft support for nicks and burrs. Inspect rotors for scoring or pitting.



TORQUEFLITE SIX VALVE BODY ASSEMBLY

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TORQUEFLITE SIX (C ntinu d)

With rotors cleaned and installed in pump body check clearance in same manner as for rear pump (above).

R ass mbly: Place reaction shaft support in Tool C-3759 with hub of support resting on bench, then screw two pilot studs, Tool C-3283, into threaded holes of reaction shaft support flange. Assemble rotors with dye marks aligned and place rotors in center of support. *NOTE - The two driving lugs inside rotor must be next to face of reaction shaft support.* Lower pump body over pilot studs, then insert Tool C-3756 through pump body and engage with pump inner rotor. Rotate rotors with tool to center them in pump body, then with pump body firmly against reaction shaft support, tighten clamping tool securely. Invert front pump and reaction shaft support assembly with clamping tool intact, then install support-to-pump body bolts and tighten to 14-16 ft. lbs. Remove clamping tool, pilot studs, and rotor alignment tool. Place a new oil seal in opening of front pump housing (lip of seal facing inward). Use Tool C-3757 to drive seal in until tool bottoms.

FRONT CLUTCH: Disass mbly - Remove large snap ring securing pressure plate in clutch piston retainer, then remove pressure plate and clutch plates out of retainer. Install compressor, Tool C-3575, over piston spring retainer, compress spring and remove snap ring, then slowly release tool until spring retainer is free of hub. Remove tool, retainer and spring. Invert clutch retainer assembly and bump on a wood block to remove piston. Remove seal rings from piston and clutch retainer hub.

Insp cti n: Inspect driving discs for burning, glazing and flaking off of facing material. Scratch facings with fingernail, if material collects under nail, replace all discs. Check driving disc splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burning, scoring, or damaged driving lugs. Check steel plate lug grooves in clutch retainer for scores. Make sure ball check in clutch retainer moves freely. Inspect seal ring surfaces in clutch retainer for nicks or deep scratches. *NOTE - Light scratches will not interfere with sealing of neoprene ring.* Inspect inside bore of piston for score marks; if light, remove with crocus cloth. Check seal ring grooves for nicks and burrs. Inspect neoprene seal rings for deterioration, wear, and hardness. Check piston spring, retainer, and snap ring for distortion.

R ass mbly: Lubricate and install inner seal ring on hub of clutch retainer with lip of seal facing down and properly seated in groove. Lubricate and install outer seal ring on clutch piston with lip of seal toward bottom of clutch retainer, then place piston assembly in retainer and, with a twisting motion, seat piston in bottom of retainer. Place spring on piston hub and position spring retainer and snap ring on spring. Compress spring with Tool C-3575 and seat snap ring in hub groove. Remove compressor tool. Lubricate all clutch plates, then install one steel plate, followed by a lined plate, until all plates are installed. Install pressure plate and snap ring (make sure snap ring is properly seated). With front clutch assembled, insert feeler gauge between pressure plate and snap ring. Clearance should be .056-.104". If not, install a snap ring of proper thickness to obtain specified clearance. Snap rings are available in .060-.062", .068-.070", .076-.078" thicknesses.

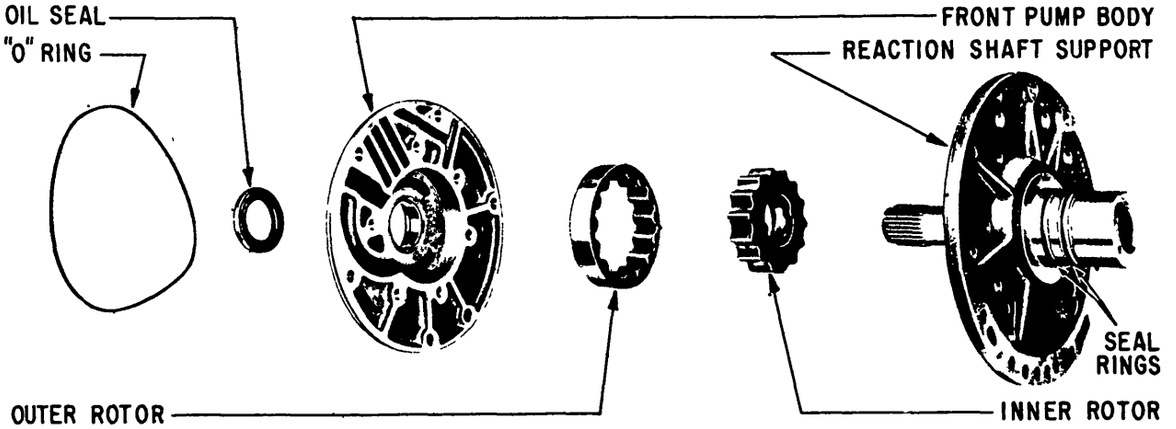
REAR CLUTCH: Remove large snap ring securing pressure plate in clutch piston retainer, then lift pressure plate, clutch plates and inner pressure plate out of retainer. Install compressor, Tool C-3760, over piston spring and compress spring just enough to clear snap ring and remove ring. Remove compressor and piston spring, then invert clutch retainer assembly and bump on a wood block to remove piston.

Inspection: *See "Front Clutch Inspection" above.* Do not remove interlocking seal rings on input shaft unless condition warrants.

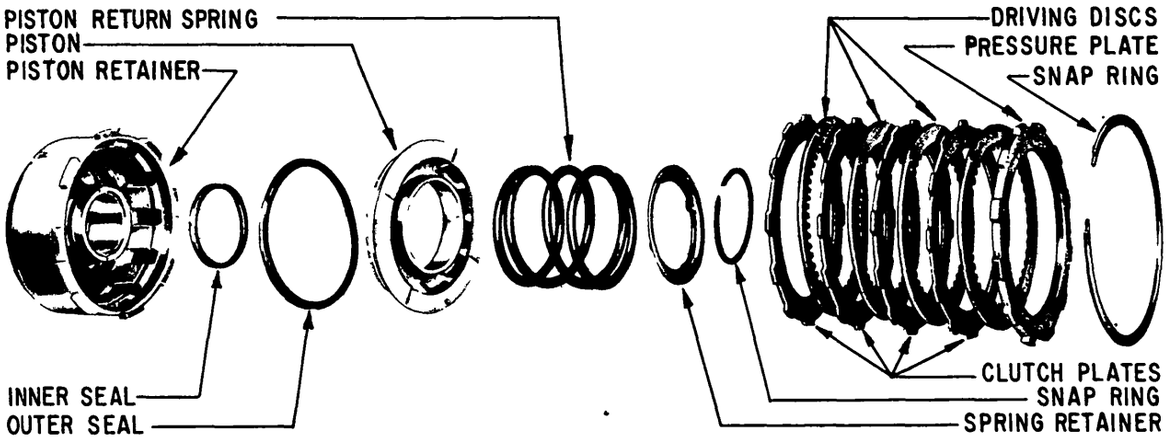
Reassembly: Lubricate and install inner and outer seal rings on clutch piston. Make sure lips of seals face toward head of piston retainer and are properly seated in piston grooves. Place piston assembly in retainer and, with a twisting motion, seat piston in bottom of retainer. Place spring over piston with outer edge of spring positioned below snap ring grooves. Install compressor, Tool C-3760, over spring and compress spring just enough to install snap ring. Remove compressor. Install inner pressure plate in clutch retainer with raised portion of plate resting on spring. Lubricate all clutch plates, then install one lined plate, followed by a steel plate, until all plates are installed. Install outer pressure plate and snap ring. With rear clutch completely assembled, insert feeler gauge between plate and snap ring and measure clearance which should be .018-.036". If not, install a snap ring of proper thickness to obtain specified clearance. Snap rings are available in .060-.062", .068-.070", .076-.078" thicknesses. *NOTE - Selective snap rings are the same as used in front clutch.*

PLANETARY GEARS, SUN GEAR, DRIVING SHELL, LOW & REVERSE DRUM: Disassembly - Remove thrust washer and snap ring from forward end of output shaft, then slide planetary assembly off shaft. Remove snap ring and thrust washer from forward hub of front gear assembly, then slide front annulus gear and support off planetary gear set. Remove thrust washer from rear side of planetary gear set, then if necessary, remove snap ring from front of annulus gear and separate support from annulus gear. Slide sun gear, driving shell, and rear planetary assembly with low and reverse drum off output shaft. Lift sun gear and driving shell off the rear planetary assembly. Remove snap ring and steel washer

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TORQUEFLITE SIX FRONT OIL PUMP & REACTION SHAFT SUPPORT ASSEMBLY



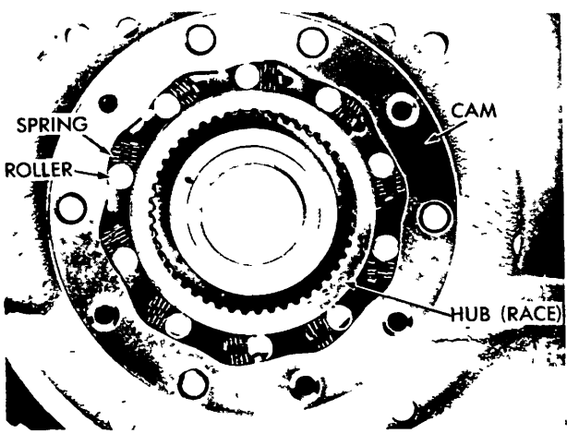
TORQUEFLITE SIX FRONT CLUTCH ASSEMBLY

TORQUEFLITE SIX (C ntinued)

from sun gear (rear side of driving shell), then slide sun gear out of driving shell and remove snap ring and steel washer from opposite end of sun gear. Remove thrust washer from forward side of rear planetary and snap ring from front side of low and reverse drum, then slide rear planetary assembly out of drum. If necessary, remove snap ring from rear of annulus gear to separate support from gear.

Inspection: Inspect bearing surfaces on output shaft for nicks, burrs or scores. *NOTE - Light scratches, small nicks, or burrs can be removed with crocus cloth or a fine stone.* Check speedometer drive gear for nicks or or burrs and remove with a sharp edged stone. Make sure all passages in shaft are open and clean. Check bushings in sun gear for wear or scores. If damaged, replace sun gear assembly. Inspect all thrust washers for wear or scores. Check lock rings for distortion. Inspect annulus gear and driving teeth for damage. Inspect planetary gear carrier for cracks, and pinions for broken or worn gear teeth.

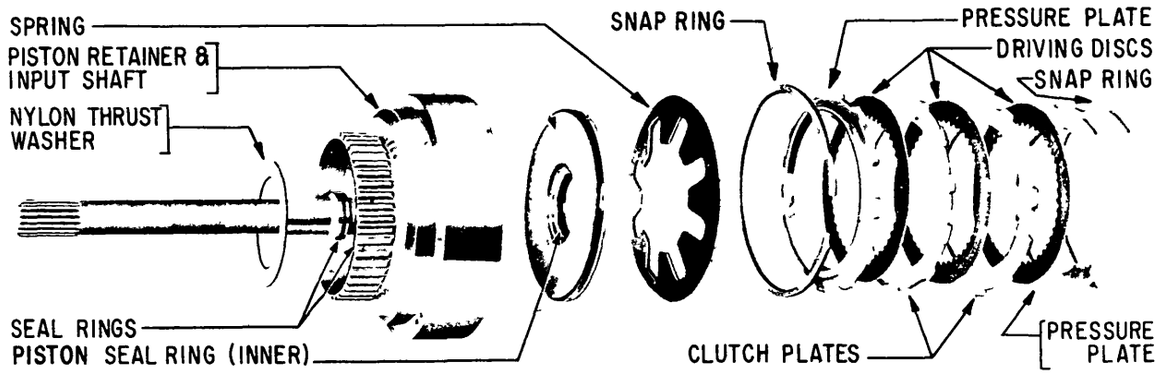
R assembly: Place rear annulus gear support in gear and install snap ring. Position rear planetary unit in annulus gear, then slide the assembly into low and reverse drum and secure with snap ring in edge of drum. Position thrust washer on front side of planetary assembly. Insert output shaft in rear opening of drum, then carefully work the shaft through annulus gear support and planetary gear assembly. *CAUTION - Make sure shaft splines are fully engaged in splines of annulus support.* Install steel washer and snap ring on one end of sun gear and insert sun gear through front side of driving shell, then install rear steel washer and snap ring. Carefully slide driving shell and sun gear assembly on output shaft, engaging sun gear teeth with rear planetary pinion teeth. Place front annulus gear support in annulus gear and install snap ring. Position front planetary gear unit in annulus gear and place thrust washer over planetary gear assembly hub, then install snap ring. Position thrust washer on rear side of planetary gear unit. Carefully work front planetary and annulus gear assembly on output shaft, meshing planetary pinions with sun gear. With all components properly positioned, install retaining ring on front end of output shaft.



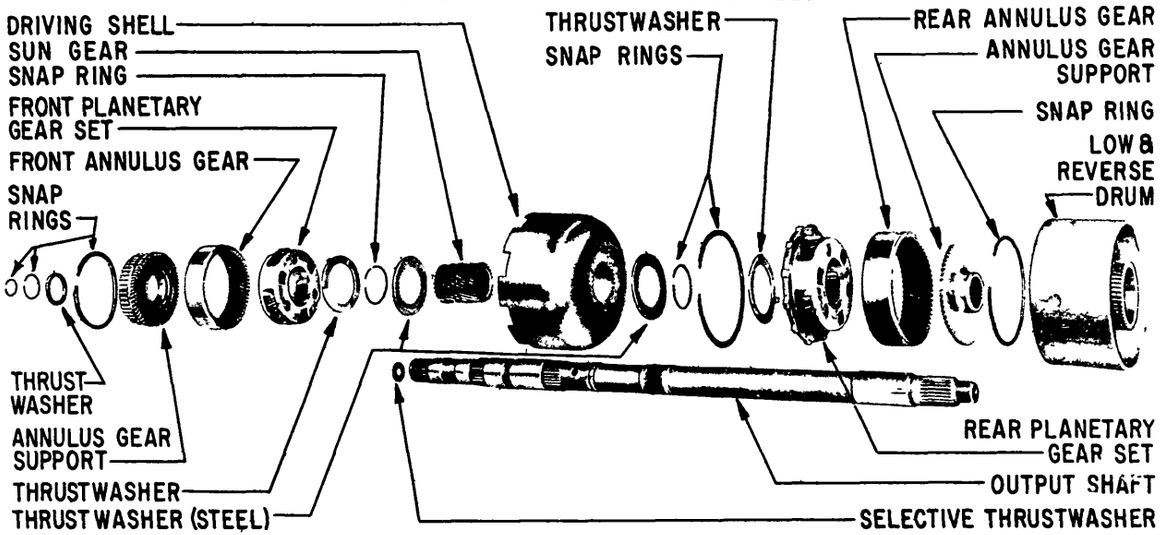
OVERRUNNING CLUTCH ASSEMBLY

OVERRUNNING CLUTCH: Inspection - Inspect clutch rollers for smooth round surfaces. Make sure they are free of flat spots and chipped edges. Inspect roller contacting surfaces in the cam and race for brinneling. Check roller spring for distortion, wear or other damage. Inspect low and reverse drum thrust washer (behind overrunning clutch hub) for wear or scores.

KICKDOWN SERVO & BAND: Inspect piston and guide seal rings for wear and make sure they turn freely in grooves. *NOTE - It is not necessary to remove seal rings unless condition warrants.* Inspect piston for nicks, burrs, scores and wear. Check piston bore in case for scores or other damage. Check fit of guide on piston rod and check spring for distortion. Check band lining for wear and bond of lining to band. If lining is worn so grooves are not visible at the ends or any portion of the band, replace band. Inspect band for distortion or cracked ends.



TORQUEFLITE SIX REAR CLUTCH ASSEMBLY



TORQUEFLITE SIX PLANETARY GEAR ASSEMBLIES

LOW & REVERSE SERVO & BAND: Disassembly - Remove snap ring and remove piston plug and spring.

Inspection: Inspect neoprene seal ring for deterioration, wear and hardness. Check piston and plug for nicks, burrs, scores and wear. *NOTE - Pist n plug must operate freely in piston.* Check piston bore in case for scoring or other damage. Check springs for distortion. Check band lining for wear and bond of lining to band. If lining is worn so grooves are not visible at ends or any portion of the band, replace band. Inspect band for distortion or cracked ends.

Reassembly: Lubricate and insert piston plug and spring in piston. Secure in place with snap ring.

TRANSMISSION UNIT INSTALLATION (TRANSMISSION OUT OF CAR)

REAR OIL PUMP: *CAUTION - To pr v nt oil pump body distortion, install xactly as utlin d.* Cut a piece of .002-.003" thick wrapping paper slightly smaller than

CONTINUED ON NEXT PAGE

TORQUEFLITE SIX (Continu d)

outer diameter of outer rotor for use as a shim during installation. Chill pump body to approximately 0°F. in a deep freeze or with dry ice. Quickly place pump body in case, and install inner and outer rotors. Place a daub of grease on faces of rotors and center paper shim on face of rotors, then install pump cover and tighten retaining bolts firmly. After pump body has warmed to room temperature, remove pump cover, paper shim and rotors.

OVERRUNNING CLUTCH: With transmission case in an upright position, place low and reverse drum thrust washer in overrunning clutch housing, then place clutch hub (race) on thrust washer. Install springs and rollers as shown in illustration.

LOW & REVERSE SERVO & BAND: Work servo piston assembly into case with a twisting motion, then place spring, retainer, and snap ring over piston. Using the tool employed at disassembly, depress piston spring and install snap ring. Position rear band in case, install short strut, then connect long lever and strut to band. Screw in band adjuster just enough to hold struts in place.

KICKDOWN SERVO: Carefully push servo piston into case bore. Install piston rod, spring and guide, then depress guide and install snap ring.

PLANETARY GEAR ASSEMBLIES, SUN GEAR, DRIVING SHELL, LOW & REVERSE DRUM: While supporting the assembly in the case, insert output shaft through overrunning clutch hub, then carefully work the assembly toward rear, engaging drum splines with splines of overrunning clutch hub, *CAUTION - Be careful not to damage ground surfaces on output shaft during installation.* Apply a coat of grease to selective thrust washer and install washer on front end of output shaft. *NOTE - If drive train endplay was not within specifications (.024-.062"), when checked at disassembly, replace the thrust washer with one of proper thickness.*

INPUT SHAFT & REAR CLUTCH: Invert transmission and support in an upright position with output shaft downward. Align rear clutch plate inner splines, then lower input shaft and clutch assembly into position in case. Carefully work clutch assembly in a circular motion to engage splines of clutch over splines of kickdown annulus gear support. Coat one side of fibre thrust washer with heavy grease, then position thrust washer in recess on front face of rear clutch retainer.

FRONT CLUTCH: Align front clutch plate inner splines, then lower clutch assembly into position in case. Carefully work clutch assembly in a circular motion to engage clutch splines over splines of rear clutch piston retainer. Make sure front clutch driving lugs are fully engaged in slots in driving shell.

FRONT BAND: Slide band over front clutch assembly, then install band strut and screw in the adjuster just enough to hold strut in place.

FRONT OIL PUMP & REACTION SHAFT SUPPORT: Screw two pilot studs, Tool C-3288 in front oil pump opening in case. Place a new rubber seal ring in groove on outer flange of oil pump and make sure seal ring is not twisted. Insert aligning tool (C-3756) through pump body and engage with inner rotor. Install the assembly in transmission case, tapping it lightly with a soft hammer. Install four bolts, then remove pilot studs and install remaining bolts. Pull all bolts down evenly and tighten to 14-16 ft. lbs. Rotate pump rotors with Tool C-3756 until the two small holes in handle of tool are vertical (this will locate inner rotor so converter impeller shaft will engage inner rotor lugs during installation).

REAR OIL PUMP: Place outer rotor in pump body, then turn output shaft so inner rotor driving ball pocket is up. Install ball and slide inner rotor on output shaft in alignment with ball. Position outer rotor to align dye marks with inner rotor, then push inner rotor in mesh with outer rotor. Install oil pump cover with bolts threaded in a few turns. Slide aligning sleeve, Tool C-3762 all the way in until it bottoms against rotors, then tighten pump cover bolts evenly to 14-16 ft. lbs.

GOVERNOR: Align master spline of support or parking sprag assembly with master spline on output shaft and slide the assembly into place. Install snap ring behind governor housing, then tighten housing-to-support or sprag screws to 6-8 ft. lbs. Place governor valve on valve shaft and insert the assembly into housing and through governor weights. Install valve shaft retaining snap ring.

EXTENSION HOUSING: Install a new gasket and slide extension housing into place. Install retaining bolts and tighten to 25-30 ft. lbs. On Valiant, install flange, washer, and nut and tighten to 175 ft. lbs. *NOTE - At this point on all models, recheck drive train endplay (see above).*

PARKING BRAKE ASSEMBLY (DODGE DART & PLYMOUTH): Place neoprene spacer in position on back of brake support plate with steel sleeve in center of support. Position brake assembly and anchor pin on end of extension, making sure steel sleeve remains in center of support. Align anchor pin hole with hole in front lug and install lock pin. Install grease shield with flat on extension housing, then install grease shield retainer spring with opening of spring toward brake shoe adjusting nut. Make sure spring is properly seated in groove. Slide brake shoe return spring behind grease shield spring and hook into position. Install brake drum and flange assembly, washer and nut. Tighten nut to 175 ft. lbs.

►*REASSEMBLY NOTE: For installation of remaining transmission components, see "Unit Removal & Installation - Transmission in Car" above.*

1954-55 FORDOMATIC, MERCOMATIC & TURBO-DRIVE

Ford Pass. Cars, All Models (1954-55)
Ford Thunderbird (1955)
Ford Trucks F-100, F-250, F-350, P-350 (1954-55)
Lincoln, All Models (1955)
Mercury, All Models (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION IDENTIFICATION NOTE:* Transmission Model No. and Serial No. on name plate on left side of transmission case must be used to identify individual units for parts replacement etc.

►*STARTING ENGINE BY TOWING OR PUSHING CAR:* Pushing is recommended. Place selector lever in Neutral "N" position. When car reaches 20 MPH speed, turn on ignition, move selector lever to "LO", depress accelerator pedal to half throttle position until engine begins to run. *NOTE—On ice or snow where traction not good, move selector lever to "DR" position to crank engine.*

►*TOWING CAR CAUTIONS: Do not tow at speed greater than 40 MPH and observe following precautions:*
If Transmission Operating Properly—Place selector lever in Neutral "N" position. Car can be towed normally for distances not to exceed 12 miles. **For greater distances, use same procedure as for inoperative transmission.**
If Transmission Inoperative—Tow car with rear wheels lifted off road, or disconnect and remove propeller shaft and protect rear end of transmission from entry of dirt (U-joint Knuckle, Part No. 1M-4841 can be installed and wired in place for this purpose).

►*TRANSMISSION "BUZZING" SOUND:* May be caused by undersize or worn bleed flats on Main Oil Pressure Regulator Valve Assembly. Correct by rotating the valve 90° in its bore. *See "Minor Repairs (Transmission in Car)" for disassembly directions.*

►*1954 FORDOMATIC PRODUCTION CHANGE (PARTIAL PRODUCTION) & PARTS INTERCHANGEABILITY CAUTION:* Special transmission assemblies were installed in some production cars manufactured at the Dearborn Plant starting in August 1954. These assemblies are identified by the Model No. IP-7003-T and Serial No. Prefix 23D. A black stripe, 1" wide, located 4¾" from end of extension housing shield also identifies the assembly. The following parts are NOT INTERCHANGEABLE with parts in the regular production transmission: Primary Sun Gear Assembly (B5A-77530-C); Planet Assembly (B5A-77162-C); Output Shaft Thrust Washer (B5A-77067-E,F,G,H); Output Shaft Assembly (B5A-77059-C); Drum & Secondary Sun Gear Assembly (B5A-77502-A).

►*1954 FORDOMATIC WHISTLING NOISE CORRECTION:* This whistling noise may be noticed during normal operation and can be corrected as follows: Inspect converter housing casting for metal flash at junction of inner surface of housing with exhaust air passage. Grind metal flash from casting until surface is smooth. Check diameter of front opening on casting against specified diameter of 15.13". If diameter is less, grind front of opening adjacent to lower cover plate and air inlet on right side, smoothly to specified diameter. Check lower left inspection cover retaining bolt hole. In some cases this hole has been drilled completely through the housing where it should actually be a blind hole. Correct by replacing the ½" long screw with a 1" long screw. In some cases it may be necessary to run a 5/16" tap through to clean the threads.

►*1954 FORDOMATIC INDICATOR DIAL BREAKAGE CORRECTION:* This breakage may be due to a binding condition between selector lever tang and plastic indicator dial. Correct by grinding approximately 1/16" off tang at point on corner of tang nearest pivot pin. Length of grind should be approximately halfway between lower edge of tang and shift lever. Check for clearance between tang and indicator dial.

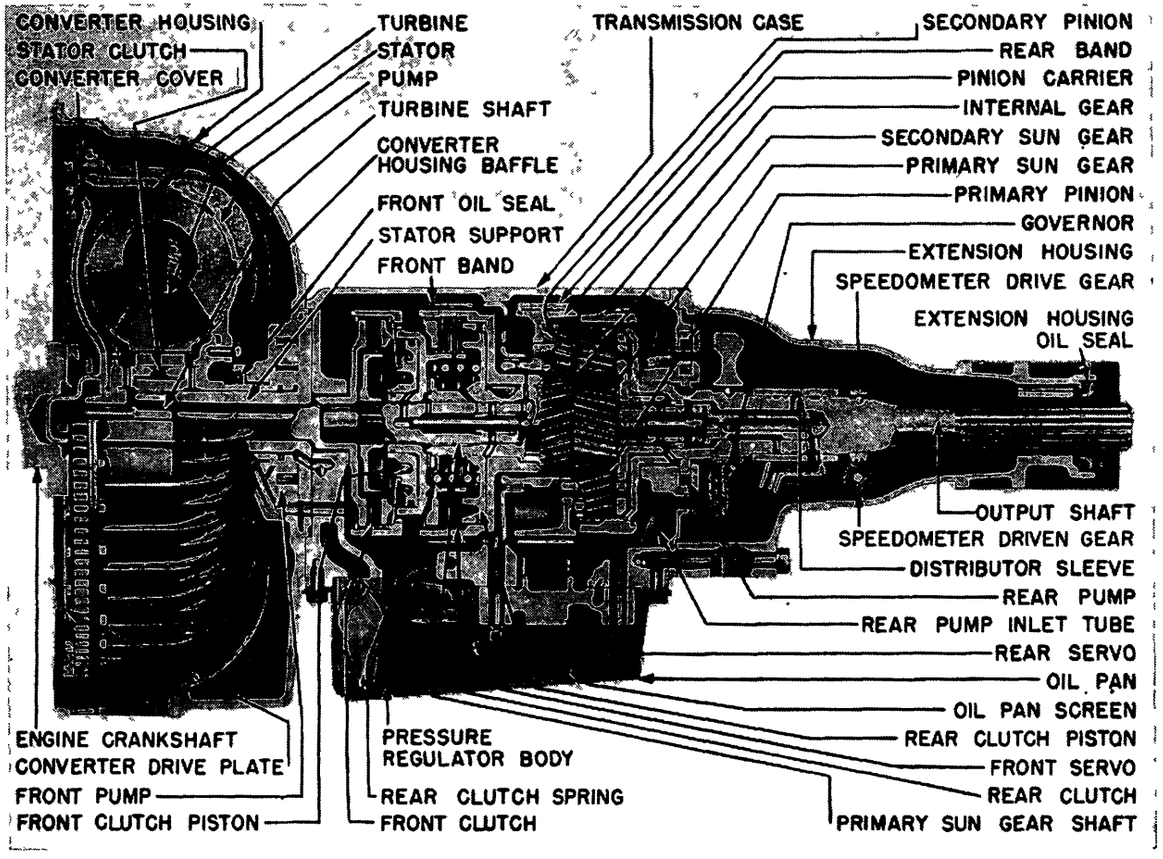
►*1954 FORDOMATIC BINDING OR STICKING IN "PARK" POSITION CORRECTION:* Check for a burr or step in the park detent of manual control detent lever assembly (located inside transmission). To correct, remove detent lever from transmission and grind or hone burr or step from lever *(CAUTION—Lever is case hardened to a depth of .008-.012" and care must be taken when grinding or honing).* Check the surface finish of the parking pawl and if found to be rough, grind or hone to a smooth finish.

►*1955 FORDOMATIC LOW SPEED (UNDER 28 MPH) LOW & HIGH "LOCK-UP" CORRECTION:* May be caused by improper torquing of control valve body bolts. *See "Control Valve" in Transmission Overhaul.*

►*1955 F-100 TRUCK FORDOMATIC OIL COOLER PRODUCTION CHANGE:* The oil cooler assembly and attaching parts have been discontinued on later 1955 production trucks. A by-pass tube is being used in place of the oil cooler.

►*1955 FORDOMATIC MAIN CONTROL ASSEMBLY PRODUCTION CHANGE-EXC. POLICE INTERCEPTOR & SPECIAL 8 CYL. CARS—(To eliminate "slipping" or "long servo fill-up time" in manual shift from Drive or Neutral to Low):* A new Main Control Assembly, Part No. B5A-77700-E, incorporating a new transition valve spring, replaced the early assembly, Part No. B5A-77700-C. *NOTE*—Control Assembly, Part No. B5A-77700-C will continue to be used on the Police Interceptor and the Special V8, and for identification

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FORDOMATIC, MERCOMATIC, & TURBO-DRIVE (SECTIONAL VIEW)

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

purposes, the part number will be changed to B5A-77700-D, with the letter "M" stamped on the lower valve body cover.

►*1955 FORDOMATIC "SLIPPING" IN MANUAL SHIFT FROM "N" OR "D" TO "LOW" CORRECTION (EXCEPT POLICE INTERCEPTOR & SPECIAL V8):* On cars and trucks having the early type Main Control Assembly Production Change above), a new transition valve spring, Part No. B5A-77741-A has been released for service replacement (this spring is incorporated in later type main control assembly, Part No. B5A-77700-E). If changing the main control assembly or installing the later type transition valve spring does not correct the "slipping" condition, check the main pressure regulator spring free length of 4.08", and spring shut length of 1.84" with a 20.75 to 21.75 pound load.

►*1955 FRONT CLUTCH ASSEMBLY PRODUCTION CHANGE (ALL TRANSMISSIONS):* To prevent gear noise or clutch "roll over" during manual shift from "D" to "N", Front Clutch Plate (Bronze), Part No. B5A-77519-A is used to replace two of the original four bronze plates. Install one later type plate, identified by additional grooves on both sides, next to clutch pressure plate, and the other installed on top of the balance of plates. These later type plates can be used to correct the above condition in early 1955 transmissions.

►*1955 FORDOMATIC SELECTOR LEVER INDICATOR VISIBILITY IMPROVEMENT:* Cover front edge and both sides of indicator with red reflective tape. Align indicator in "LO" range, adjusting position of indicator as necessary to provide clearance between it and the dial.

►*1955 MERCOMATIC & TURBO-DRIVE BAND OR CLUTCH FAILURE CORRECTION (When caused by improp r control valv assembly operation):* Thoroughly clean and inspect control valve assembly making sure that all passages and orifices are clean and free of foreign material. Check length of Shift Valve which should be 3 3/16" long. Check Transition Valve and be sure that hole in valve is deep enough to accomodate entire spring when compressed. *See "Trouble Sh ting" f r ther p ssible causes.*

►*1955 MERCOMATIC THROTTLE LINKAGE ADJUSTMENT CHANGE (T improve the 2-3 upshift in the 20-30 MPH range):* The Mercomatic Throttle Linkage has been changed and is recommended for all 1955 cars, superseding the previous specifications. *See "Throttle Linkag Adjustment" below.*

►*1955 MERCOMATIC & TURBO-DRIVE PRESSURE REGULATOR VALVE SPRING SEAT & SPACER INSTALLATION CAUTION:* It is extremely important that the spring seat and spacer be installed so that the cupped end fits over the end of the control pressure valve, and the stem fits down through the control pressure spring. Two types of spacers are used in production, one having the small diameter end closed, and the other with the end open. Install either spacer as indicated above.

►*1955 MERCOMATIC & TURBO-DRIVE ROUGH 3-2 DOWN SHIFT AT CLOSED THROTTLE CORRECTION & PRODUCTION CHANGE:* A lighter Shift Valve Outer Spring, Part No. B5A-77721(Mercury); B5A-77721-A (Lincoln) is used in production and for service replacement. The new spring is identified by a wire thickness of .042" (earlier spring had a wire thickness of .049").

►*1955 MERCOMATIC & TURBO-DRIVE MAIN CONTROL ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To eliminate slip in manual shift from "Drive" to "Low"):* A new Main Control Assembly, Part No. B5A-77700-F which has a new Transition Valve Spring, Part No. B5A-77741-A is used in production and for service replacement on early 1955 transmissions. The later type Transition Valve Spring can also be used to service early 1955 Main Control Assemblies to eliminate complaints of this slipping condition.

►*1955 MERCOMATIC TRANSMISSION THROTTLE CONTROL INNER LEVER PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To eliminate excessive endplay):* Throttle Control Inner Lever, Part No. B5A-77283-A, identified by the letter "0" stamped on lever is used in production and can be used for service replacement on 1954-55 transmissions. When installing the later type lever, the letter "0" must be installed toward inside of transmission.

DESCRIPTION

Fordomatic, Mercomatic, & Turbo-Drive Automatic Transmissions consist of a hydraulic torque converter and an automatic transmission which provides automatic operation in "DR" range, and additional "LO", "R", & "P" ranges which are controlled manually.

Torque Converter: Mounted in a housing and connected to rear end of crankshaft in place of the conventional flywheel, and consists of the Torque Units listed below. Torque converter is fully automatic in its operation, acting as torque converter for low speed and starting operations (when input torque is less than output torque), and as a fluid coupling at higher car speeds (when input and output torque are equal). The change from torque converter to fluid coupling and the operating phases of the torque converter unit is governed by the car operating conditions and do not occur together or at any particular time.

Pump (Driving Member)–Mounted on engine crankshaft and bolted to converter cover. Pump rotates at engine speed to transmit engine power to turbine through the medium of converter oil.

Turbine (Driven Member)–Splined to output shaft forward of converter pump and driven by oil flow from converter pump. Turbine transmits power to the planetary gears (Low, Intermediate & Reverse) and to the propeller shaft (Driving Range).

Stator–Consists of reaction blades and a one way clutch mounted on the converter cover hub. The stator redirects the fluid flow to turbine, increasing torque for low and starting speeds (when input torque is less than output torque) being held from rotating in a direction opposite to pump and turbine by the one way clutch. At higher speeds (when input torque equals output torque) the Stator rotates in the same direction and at the same speed as the pump and turbine causing the torque converter to automatically become a fluid coupling.

Planetary Transmission: Hydraulically controlled planetary transmission employs a gearset of the compound type consisting of long and short pinions, two sun gears and a single internal gear, providing three forward speeds and one reverse. Controlling bands, multiple disc clutches and servo mechanisms are within the transmission case.

Planetary Pinion Assembly–Consists of three Primary Pinions (short) and three Secondary Pinions (long) mounted in a pinion carrier. The Primary Pinion is driven by the Primary Sun Gear and drives the Secondary Pinion which is meshed with the Secondary Sun Gear and the Internal Gear. The pinion carrier is controlled by the Rear Servo and the Rear Band.

Primary Sun Gear–Integral with Primary Sun Gear shaft which is splined to the driven flange of the Front Clutch unit. Power is transmitted through this gear to the Pinion assembly (Low & Intermediate Range).

Secondary Sun Gear–Located forward of the Primary Sun Gear and in mesh with the Secondary (Long) Pinions. Mounting is on a hub connected to the driven flange of the Rear Clutch. Power transmitted from the Rear Clutch to Secondary Pinions (Reverse).

Front Clutch–Front (input) member of clutch is integral with Turbine Shaft and is splined to Front Clutch drum. The Front Clutch drum is formed so that it is also the inner (input) member of the Rear Clutch. Front Clutch hub (output) is splined to the Primary Sun Gear Shaft. The Front Clutch is engaged by a hydraulic piston within the clutch drum and locks the Primary Sun Gear Shaft to the Turbine Shaft. Clutch is engaged for all forward speeds and is disengaged by an internal spring for neutral and reverse.

Multiple Rear Clutch–Clutch Drum (output) is integral with the Secondary Sun Gear and is provided with a brake band and operating servo. Clutch Hub (input) member is integral with the front clutch drum. When clutch is engaged, the Secondary Sun Gear is locked to the Turbine Shaft. Clutch engagement is by a hydraulic piston within the unit. A coil spring between the hub and the drum provides the release.

Front Brake Band and Servo Assembly–Band holds the Secondary Sun Gear stationary when it is applied on the clutch drum by the Servo which consists of a hydraulic piston linked to bank. One end of the band is held stationary by a strut and anchor which has an adjusting screw for band adjustment. Servo is fluid applied and spring released.

Rear Brake Band and Servo Assembly–Band holds planet carrier stationary when it is applied by the rear Servo which consists of a hydraulic piston linked to one end of the brake band. The opposite end is held stationary by a strut and anchor.

Oil Pumps: Two pumps used to supply oil pressure for hydraulic controls, oil supply for converter and transmission lubrication.

Fr nt Pump–Internal-External gear type mounted between the transmission and torque converter and

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

driven by the converter pump through a tongue and slot coupling This pump has a large capacity and begins to operate as soon as the engine is started, supplying oil to the torque converter and for transmission lubrication and hydraulic controls

Rear Pump—Internal-External gear type mounted at the rear of transmission and driven by the output shaft Pump operates whenever rear wheels are turning and supplements the front pump volume When car reaches sufficient speed, two ball check valves open and allow the oil from the rear pump to enter the hydraulic system

Hydraulic Controls: Consist of manual and hydraulic valves, controlling the operation of the transmission servos and clutches

Control Pressure Regulator—As pump speed varies, spring loaded valve maintains constant pressure Excess volume is returned to oil pan

Manual Valve—Control pressure is directed to manual control valve for proper distribution to accomplish the performance desired Valve is actuated from the selector lever on the steering column

Throttle Valve—Actuated by the accelerator through linkage Control Pressure is directed to the throttle valve from the Control Pressure Regulator Valve As the accelerator is depressed, moving the Throttle Valve towards the open position modifies the Control Pressure in proportion to the degree of throttle opening

Shift Valve—Automatically changes the speed from Intermediate to High Valve is spring loaded and is controlled by Governor Pressure and Throttle Pressure

Hydraulic Governor—Mounted on output shaft at rear of transmission Rotation of the Governor Valve causes centrifugal force to act on the valve plunger and regulate the pressure in direct proportion to the car speed

Front Servo Apply Regulator Valve—Provides for smooth changes between Intermediate and High speed, by controlling the flow of oil to the Front Servo Valve is controlled by throttle pressure

2-1 Shift Valve (1955 Models)—Provided for starting in "Low" ratio for rapid acceleration, with selector lever in "DR" position. This shift will occur only with car speed below approximately 16 MPH., and with accelerator pedal fully depressed

3-2 Control Valve (1954 Models)—Provided for downshifting from "High" to "Intermediate" on either open or closed throttle.

Downshift Valve (1955 Models)—Operated by accelerator pedal. Allows for speed change from "High" to "Intermediate" ratio by depressing the accelerator pedal past its fully open position with car speed above approximately 16 MPH.

OPERATION

Torque converter automatically provides a torque multiplication ranging from 2 1-1 (maximum for starting and acceleration) to 1 0-1 (normal driving range with torque converter acting as a fluid coupling) This torque multiplication is supplemented by the planetary gears when selector lever placed in "DR", "LO", and "R" ranges Transmission operates in each range as follows

N utral Rang—Front and Rear Clutches fully released, and Front and Rear Brake Bands fully released so that gears are free to turn Drive is not transmitted through transmission "N" range is used to start and warm up engine

Drive Range—Car starts in Intermediate Gear (except when accelerator pedal depressed to floor when car will start in Low gear) with a gear ratio of 1.48 1 (1954 Models), 1.467-1 (1955 Ford), 1 46-1 (1955 Mercury & Lincoln), with Front Clutch applied locking the Primary Gear to the Turbine Shaft, and the Front Band applied, holding Secondary Sun Gear stationary. The power flow at this point is from Turbine Shaft through Front Clutch to Primary Pinion, to Secondary Pinion, to Internal Gear, to Output Shaft. As car speed increases (depending on throttle pressure) to a certain point, the Front Band is released and the Rear Clutch is applied, automatically causing transmission to change to direct (1.0-1) drive. The power flow in "High" gear is from the turbine shaft through the Front and Rear Clutches to the Planetary Gears which are locked together and rotate as a unit, causing the Output Shaft to rotate at engine speed.

Low Range—Front Clutch applied, locking the Turbine Shaft to Primary Sun Gear, and the Rear Band applied, holding Pinion Carrier stationary The flow of power is from the Turbine Shaft through the Front Clutch, to Primary Pinions to Secondary Pinions, to Internal Gear and out the Output Shaft at a ratio of 2.44-1 (1954). 2.40-1 (1955).

Reverse Range—Rear Clutch applied, locking the Turbine Shaft to Secondary Sun Gear, and the Rear Band applied, holding the Pinion Carner stationary The flow of power is from the Turbine Shaft through the Rear Clutch, to Secondary Sun Gear, to Secondary Pinions, to Internal Gear The Stationary Pinions acting as idlers on a stationary axis drive the Internal Gear in a reverse direction at a ratio of 2 0-1

LUBRICATION

►*CAUTION. Transmission oil level should be checked at 1000 mile intervals and should be changed at 15,000 mile intervals*

Recommended Oil—Automatic Transmission Fluid Type "A" only

Capacity—Approximate capacities are as follows

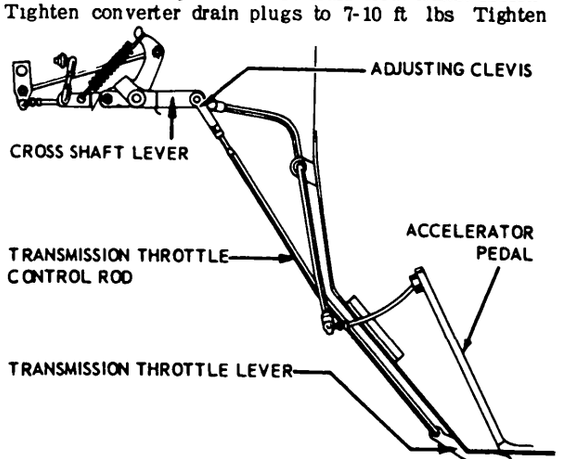
1954 Ford & Mercury (All Models)—9 qts.
1955 Ford (6 Cyl. Pass. Cars & All Trucks)—9 qts.
1955 Ford 8 Cyl Pass. Cars exc. those listed below)—9½. qts.
1955 (Ford Thunderbird & Police Interceptor)—10½ qts.
1955 Lincoln (All Models)—10 qts.
1955 Mercury (All Models)—10½ qts.

Checking Fluid Level—Apply hand brake, place selector lever in Neutral "N" position, run engine at idle speed for approximately four minutes, then move selector lever to Park "P" position When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure fluid distribution throughout transmission, return lever to "P" position Raise engine hood, clean all dirt from around filler cap at right rear corner of engine Check fluid level on dipstick in filler tube *(CAUTION*—make certain dipstick pushed all the way down in the filler tube when checking fluid level) Add fluid as necessary to bring level up to "F" full mark on dipstick

►**Check for Oil Leaks**—Inspect the bottom of the floor pan at the rear of the transmission for evidence of fluid If fluid is found here, the rear extension housing seal is leaking between the two sections of the telescopic shield Replace the seal Check the speedometer cable connection at the transmission and replace the rubber seal if necessary Check the governor inspection plate and install a new gasket if necessary Leaking around the oil pan gasket generally can be stopped by tightening the attaching screws to proper 10-13 ft lbs torque If necessary install a new gasket Check filler tube connection at transmission oil pan If leakage is evident, tighten the connection If leakage is evident at either the throttle lever shaft or manual lever shaft, replace either of the seals Inspect the two hexhead pipe plugs at each side of the transmission case at the front If either plug shows leakage, tighten to 7-15 ft lbs torque Inspect the discharge air duct for evidence of fluid. If transmission fluid is found, make certain that converter cover bolt nuts tightened to 15-28 ft lbs (Fordomatic), 25-28 ft lbs (Mercomatic & Turbo-Matic), and drain plugs tightened to 7-10 ft lbs torque.

►*CAUTION Fluid found in the discharge air duct may be engine oil that has leaked past the rear main bearing Be sure to determine which type of leak xists*

Drainage and Refilling—Remove converter housing lower plate and drain converter by removing one drain plug, then rotate the engine 180° and remove the second drain plug Disconnect filler tube from transmission oil pan to drain fluid from transmission Tighten converter drain plugs to 7-10 ft lbs Tighten



1955 FORD 6 CYL. PASS. CAR LINKAGE

filler tube connection Install 5 quarts of automatic transmission fluid, start engine and allow to idle four minutes Add 4 qts, of fluid and bring transmission to

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

to operating temperature. Place selector lever in parking (P) position and check oil level. If level is not up to dip stick level mark, add additional fluid as required.

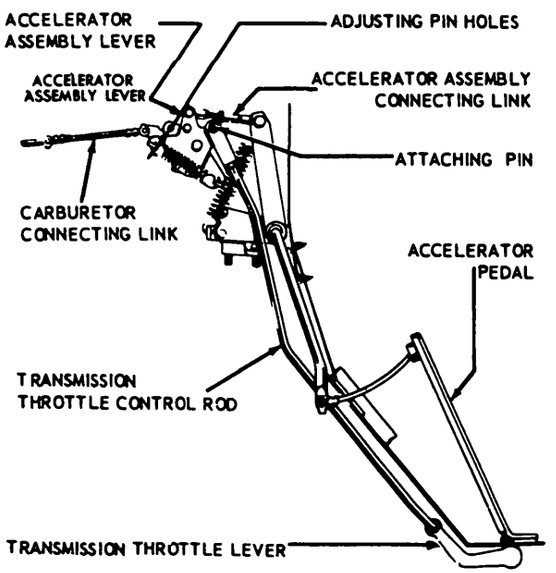
►*CAUTION–Correct fluid l vel should be determined by dipstick r ading rath r than actual number of qts. install d.*

LINKAGE ADJUSTMENT

►*FORD THROTTLE LINKAGE ADJUSTMENT CAUTION: Diff r nt typ linkag s used on the various models. Se sp cial procedur for ach model.*

ANTI-STALL DASHPOT ADJUSTMENT (ALL CARS & TRUCKS): After engine idle speed adjusted and with engine at normal operating temperature and with transmission selector lever in "N" (Neutral) position, loosen dashpot adjusting screw locknut. Hold throttle in closed position and turn dashpot adjusting screw out (counterclockwise) until head of screw pushes dashpot rod up to the end of its travel. Turn dashpot adjusting screw in (clockwise) 1½-2 turns to obtain a clearance of .045-.064" between rod and screw head. Tighten adjusting screw locknut.

►*1955 FORD INTERCEPTOR & SPECIAL 8 CYL. FORDOMATIC CONTROL LINKAGE CHANGE (To impr v "kickd wn" fr m "High" to "Intermediate" and fr m "Int rm diate" to "Low"):* New Shaft & Bracket Assembly, Part No. B5A-77230-G; Bellcrank-to-Carburetor Rod, Part No. B5A-9772-C; and Accelerator-to-Transmission Rod, Part No. B5A-9784-G are being used in production and can be used for service replacement on earlier cars. *NOTE–When using these parts n cars b for May 1955, all the parts listed must be us d.*



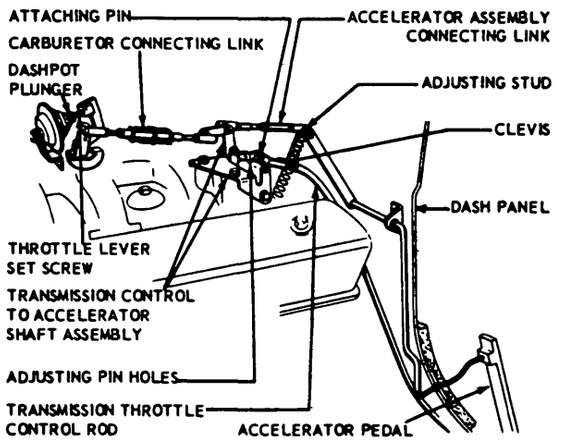
1955 FORD V8 PASS. CAR LINKA E

Ford 6 Cyl. Pass. Cars (1954-55) Thr ttl Linkag : With selector lever in "N" and engine at normal operating temperature, set engine idle speed to 440-460 RPM (1954); 450-475 RPM (1955). Adjust Anti-Stall Dashpot, then turn engine off. Remove clevis pin from upper end of transmission throttle control rod (at cross shaft). Pull upward gently on throttle control rod to hold transmission lever against its internal stop. Rotate rod clevis for free entry of clevis pin into holes in clevis and cross shaft lever. Lengthen control rod by rotating clevis 2½ turns (1954); 3 turns (1955) counter-clockwise. Connect control rod to cross shaft lever. Road test car and if band or clutch slippage is evident, **increase rod length to 3 turns (1954); 3½ turns (1955) of clevis but do not exceed 3½ turns (1954); 4 turns (1955).** Check transmission for kickdown action and if found to be incorrect, disconnect accelerator connecting link from cross shaft lever and adjust pedal height by turning the threaded trunnion on connecting link until top surface of accelerator pedal is 4 5/16" (1954); 4 9/16" (1955) from floor pan.

Ford 8 Cyl. Pass. Car (1954) Throttle Linkage: Adjust engine idle speed to 445-455 RPM with engine at normal operating temperature and transmission selector lever in "N". Adjust Anti-Stall Dashpot, then turn engine off. Position Throttle Lever Adjusting Tool T54L-77230-A on surface of accelerator shaft and bracket assembly (on engine). The upper pin of the tool should enter gauge hole (a hole directly below connecting hole for accelerator link on flat accelerator lever). If pin does not enter hole in lever, loosen the carburetor connecting link barrel lock nut. Rotate barrel until pin enters hole freely (make sure carburetor idle adjustment screw is against its stop). Tighten connecting link barrel locknut and remove adjusting tool. Remove clevis pin from upper end of throttle control rod and accelerator assembly lever, then pull up gently on rod to hold transmission lever against its internal stop. Rotate clevis until clevis pin freely enters holes in clevis and accelerator assembly lever. **Lengthen the throttle control rod by rotating the clevis 2½ turns counter-clockwise.** Assemble throttle control rod to accelerator assembly lever and tighten locknut. Road test car and if clutch or band slippage evident, increase length of throttle rod to 3 turns, but do not exceed 3½ turns. Check transmission for kickdown action and if found to be incorrect, loosen accelerator cross shaft-to-accelerator assembly lever connecting link locknut and rotate barrel as necessary to provide a distance of 3 13/16" from floor pan to center of accelerator pedal rod ball.

Ford 8 Cyl. Pass. Cars (1955), (Except Thunderbird) Throttle Linkage: With selector lever in "N" position and engine at operating temperature, set idle speed to 450-475 RPM (Exc. Interceptor), 475-500 RPM (Interceptor). Adjust Anti-Stall Dashpot, then turn engine off. Disconnect transmission throttle control rod from accelerator assembly lever on engine and insert a locking pin (¼" drill rod) through adjusting holes in lever and assembly. Adjust length of link between assembly and carburetor throttle valve lever to close lever against its stop. Adjust accelerator assembly connecting link (assembly-to-cross shaft link) to obtain a pedal height of 3 11/16" (Exc. Interceptor & Special), 3 9/16" (Interceptor & Special). Remove locking pin and pull up gently on transmission throttle control rod to hold transmission lever against its internal stop. Rotate clevis on upper end of rod until clevis fits freely on pin on accelerator assembly lever, then lengthen rod by turning clevis 3 turns counter-clockwise. Install throttle control rod on lever. Hold lever in alignment to prevent binding, and tighten locknut. Road test car and if band or clutch slippage evident, **increase rod length to 3½ turns of clevis but do not exceed 4 turns.** *NOTE–* Connecting link between cross shaft and lever must be parallel to centerline of engine. Adjust as necessary by rotating adjusting screw in lever.

Ford Thunderbird Throttle Linkage: With selector lever in "N" position and engine at normal operating temperature, set engine idle speed at 475-500 RPM. Adjust Anti-Stall Dashpot, then turn engine off. Disconnect



1955 THUNDERBIRD LINKAGE

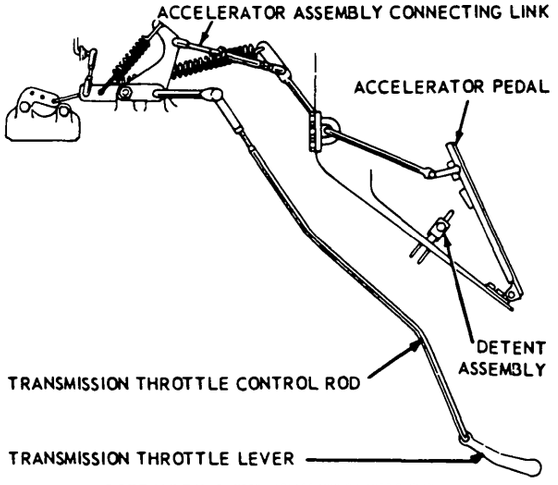
transmission throttle control rod from accelerator assembly lever on engine and insert a lock pin (¼" drill rod) through adjusting holes in lever and assembly. Adjust length of link between assembly and carburetor throttle valve lever to close lever against its stop. Adjust accelerator assembly connecting link (assembly-to-cross shaft link) to obtain a pedal height of 4¼". Remove lock pin and pull up gently on transmission throttle control rod to hold transmission lever against its internal stop. Rotate clevis on upper end of rod until clevis fits freely on pin on accelerator assembly lever, **then lengthen rod by turning clevis 3 turns counter-clockwise.** Install throttle rod on lever. Hold lever in alignment to prevent binding and tighten locknut. Road test car and if band or clutch slippage evident, **increase rod length to 3½ turns of clevis but d not exceed 4 turns.** *NOTE–*Connecting link between cross shaft and lever must be parallel to centerline of engine. Adjust as necessary by rotating adjusting screw in lever.

F rd 6 Cyl. Truck (1955) Thr ttl Linkage: With selector lever in "N" position, engine at operating temp-

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

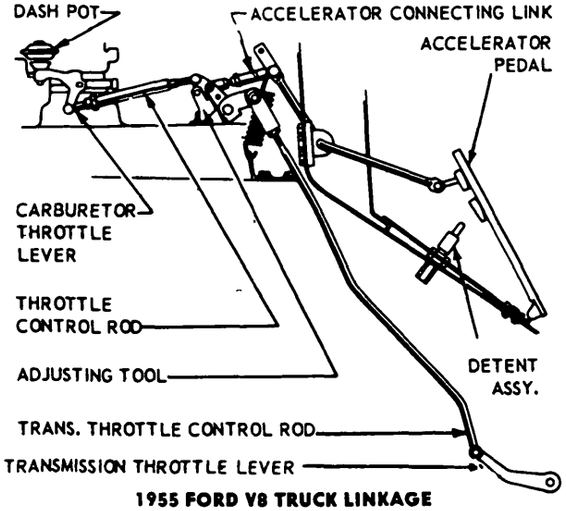
erature, set engine idle speed at 450-475 RPM. Adjust Anti-Stall Dashpot, then turn engine off. Remove clevis pin from upper end of transmission throttle control rod (at cross shaft). Pull gently upward on throttle control rod to hold transmission lever against its internal



1955 FORD 6 CYL. TRUCK LINKAGE

stop. Rotate rod clevis for free entry of clevis pin in holes in clevis and cross shaft lever. **Lengthen control** rod by rotating clevis 3 turns counter-clockwise.

Connect control rod to cross shaft. Adjust accelerator pedal height so that pedal just touches detent stem on floorboard when throttle lever on carburetor hits its wide open stop. Road test car and if band or clutch slippage is evident, **increase rod length to 3½ turns of clevis, but do not exceed 4 turns.**



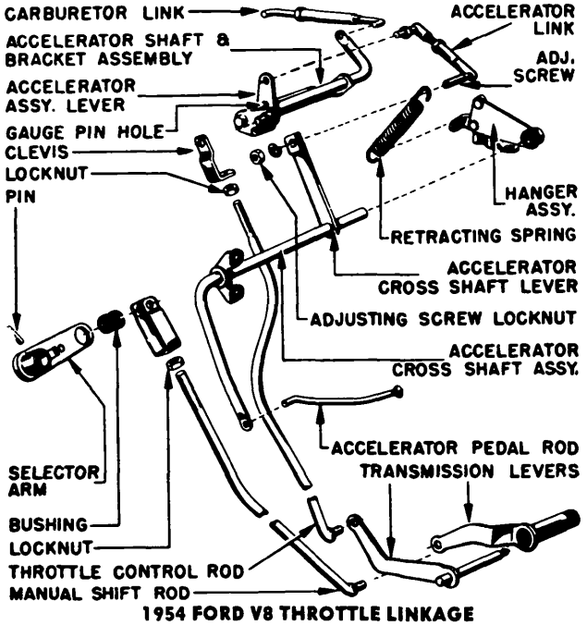
1955 FORD V8 TRUCK LINKAGE

Ford 6 & 8 Cyl. Trucks (1954) Throttle Linkage: The throttle linkage adjustment is the same as for passenger cars except as noted below:

Accelerator Pedal Height—Check transmission for kickdown action. If there is no action, loosen the accelerator stop bolt lock nut located under the accelerator pedal and adjust the stop bolt height until kickdown action is obtained.

See MANUAL LINKAGE ADJUSTMENT below.

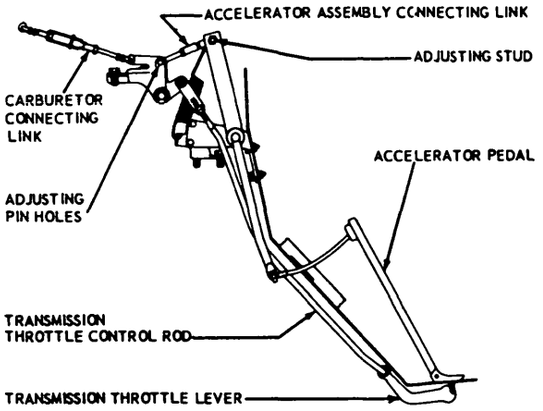
Ford 8 Cyl. Trucks (1955) Throttle Linkage: Adjust idle speed and Anti-Stall Dashpot. Position Throttle Linkage Adjusting Tool T54L-77230-A on surface of accelerator mounting bracket. Lower pin of tool should freely enter hole in accelerator assembly lever. If pin does not enter hole in lever, loosen carburetor connecting link barrel locknut and rotate barrel until pin enters hole freely (with carburetor throttle valve lever



1954 FORD V8 THROTTLE LINKAGE

against its stop). Tighten link barrel locknuts. Remove clevis pin from upper end of transmission throttle control rod at cross shaft. Pull gently upward on throttle control rod to hold transmission lever against its internal stop. Rotate rod clevis for free entry of clevis pins into holes in clevis and cross shaft lever. **Lengthen control rod clevis 3 turns counter-clockwise.** Connect control rod to cross shaft. Road test car and if band or clutch slippage evident, **increase rod length to 3½ turns of clevis but do not exceed 4 turns.** *NOTE*—Connecting link between cross shaft and lever must be parallel to centerline of engine. Adjust as necessary by rotating adjusting screw in lever.

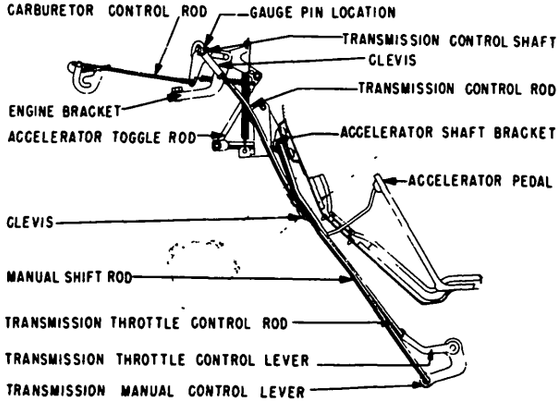
Lincoln Throttle Linkage: Disconnect carburetor to throttle rod at carburetor. Adjust engine idle speed to 425-450 RPM with selector lever in "DR" position then turn ignition off. Adjust Anti-Stall Dashpot. Re-



1955 FORD V8 INTERCEPTOR & SPECIAL LINKAGE

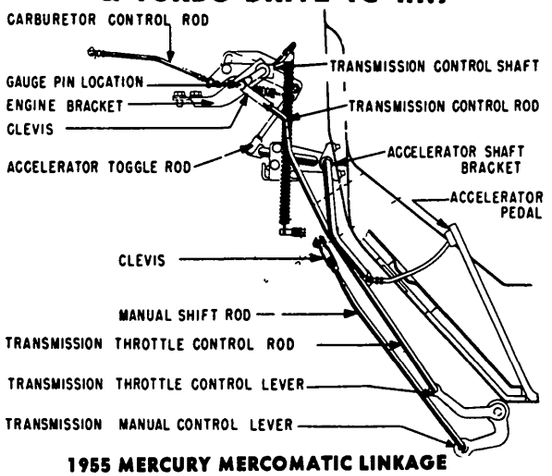
move clevis pin securing transmission control rod to transmission control shaft. Insert gauge pin Tool 77230-MB through control rod and shaft bracket. With engine at operating temperature and on slow idle, adjust carburetor to control shaft rod so that it enters hole in carburetor freely. If rod is too long shorten one full turn and assemble into hole in carburetor. Remove positioning gauge pin. While holding carburetor throttle in slow idle position, hold the control shaft to transmission rod up against its stop, and adjust length of rod to allow a free entry of clevis pin in hole in shaft of transmission control shaft, **then length rod by turning clevis three complete turns in accurate-clockwise direction.** Install clevis pin and tighten locknut. (*NOTE*—If, after making this adjustment, clutch or band slippage is still indicated, the rod may be lengthened another complete turn, **but the complete adjustment must never exceed a total of four turns from "Stop" position).** With ignition off and accelerator pedal depressed, adjust the length of the toggle rod assembly so that nylon bushing has a clearance of .100" from top of slot in accelerator shaft assembly (see Throttle Linkage illustration).

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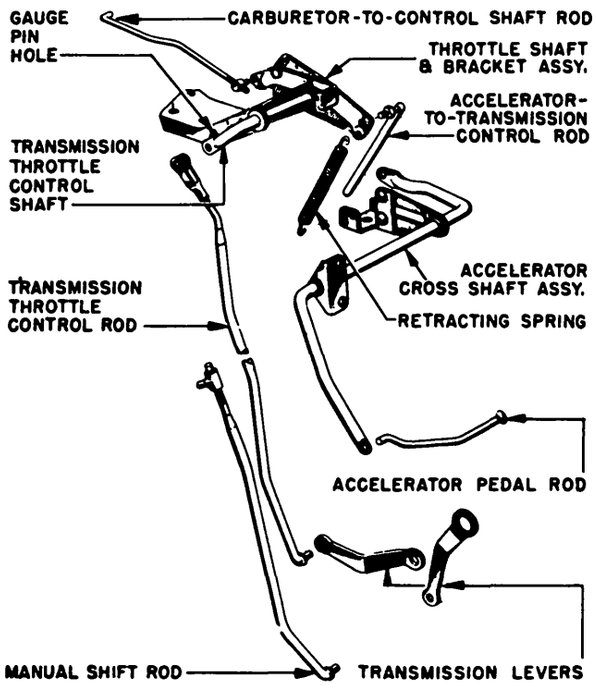
1955 LINCOLN TURBO-DRIVE LINKAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

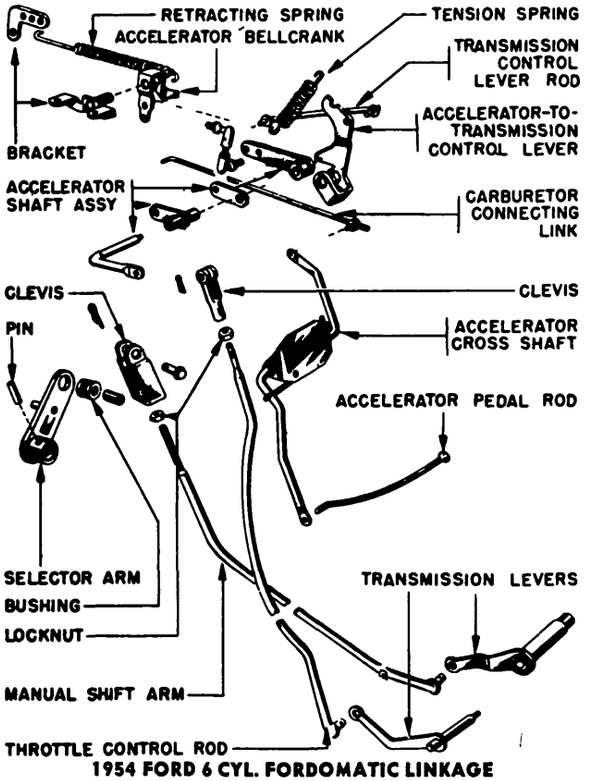


1955 MERCURY MERCOMATIC LINKAGE

Mercury (1954-55 Throttle Linkage): Disconnect carburetor-to-control shaft rod at carburetor. Adjust engine idle speed to 425-450 RPM with selector lever in "Dr" position, then turn engine off. Adjust Anti-Stall Dashpot. Remove clevis pin securing transmission control rod to transmission control shaft. Insert Gauge Pin Tool 77230-MB through control rod and shaft bracket. With engine at normal operating temperature and on slow idle, adjust carburetor-to-control shaft rod so it enters hole in carburetor rod freely. On 1955 Models, Lengthen rod two full turns. Remove positioning pin. While holding carburetor throttle in the slow idle position, hold control shaft-to-transmission rod up against its stop and adjust length of rod to allow free entry of clevis pin in hole in clevis and hole in transmission control shaft. **Lengthen rod by turning clevis three full turns in a counter-clockwise direction.** If it is not possible to obtain a forced downshift with this adjustment, control shaft should be lengthened an additional 1½ turns. Install clevis pin and tighten clevis locknut.



1954 MERCURY MERCOMATIC LINKAGE



1954 FORD 6 CYL. FORDOMATIC LINKAGE

Manual Linkage Adjustment (All Models): Disconnect upper end of manual shift rod from selector arm. Position selector lever, with the indicator in the quadrant down against its stop in the "DR" position. Place manual lever at transmission in the drive "DR" detent (second from bottom). Rotate manual shift rod clevis until clevis pin fits freely into holes in clevis and selector arm. Lengthen rod assembly 2 complete turns (Ford, All Models), 1 complete turn (Lincoln & Mercury), counter-clockwise. Install clevis pin and check pointer alignment in all positions.

STARTER NEUTRAL SAFETY SWITCH: *(NOTE–Neutral Safety Switch is located at lower end of steering column (1954-55 Ford, 1954 Mercury), on steering column, inside passenger compartment (1955 Lincoln & Mercury).*

BAND ADJUSTMENT

►*Band Adjustment is recommended to be made at 15000 mile intervals when transmission fluid is changed (pan should be removed and cleaned at this time).*

FRONT BAND ADJUSTMENT: Drain fluid from pan using a drain can with a fine mesh screen, remove pan. Remove fluid screen from transmission and loosen the front servo adjusting screw locknut TWO FULL TURNS, using a 9/16" wrench. Using front band adjusting tool No. 7225, insert gauge block between servo piston and adjusting screw and tighten adjusting screw until wrench overruns. Back off adjusting screw exactly ONE COMPLETE TURN and remove gauge block. While holding adjusting screw stationary, tighten locknut clockwise (20-25 ft lbs.). Install fluid screen and install pan using new gasket. Install the drain plug and refill transmission to "Full" mark using fluid drained from transmission unless fluid being changed. Check fluid level (see LUBRICATION).

►*CAUTION–Severe damage may result if adjusting screw not backed off exactly 1 full turn.*

REAR BAND ADJUSTMENT: Fold back floor mat to expose right side of floor pan and remove access hole cover on right side of transmission floor pan. Using rear band adjusting tool No. 7195, loosen rear band adjusting screw locknut. Using "T" handle of tool No. 7195, tighten rear band adjusting screw until wrench overruns (If screw was found to be tighter than wrench capacity (10 ft lbs.), loosen several turns and retighten until wrench overruns). Back off adjusting screw exactly 1½ COMPLETE TURNS. While holding adjusting screw stationary, tighten adjusting screw locknut to 35-40 ft lbs.

►*CAUTION–Severe damage may result if adjusting screw not backed off exactly 1½ turns.*

TESTING

►*1955 FORD INTERCEPTOR & THUNDERBIRD, MERCURY & LINCOLN PRESSURE TAKE-OFF HOLE RELOCATION* Later cars will have the pressure take-off hole located on the rear face at the left hand corner near bottom of case (looking toward front of case).

►*CAUTION While making the Stall Test never hold the throttle open longer than 5 seconds.*

STALL TEST: The stall test is made in "D", "LO" & "R" ranges to determine if bands or clutches are slipping. Connect a tachometer to engine and set it to read on the "high" scale. Make sure engine is idling properly at normal operating temperatures. Start engine, then firmly apply parking brake and service brake. Place selector lever in "D" range, then press accelerator slowly all the way to the floor without going into "low gear" kickdown. The engine speed should be as indicated in the "Stall Speed Table" below. If engine speed is below minimum limit, tune the engine and repeat test. If engine speed exceeds maximum limit, release accelerator immediately because front band or clutch slippage is evident. To determine whether the front band or front clutch is causing slippage, move lever to "LO" range and repeat the test. If slippage

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

is evident in "LO" range also, the front clutch is slipping. If slippage is found in "DR" range, but not in "LO" or "R" ranges, the front band is causing the the slippage. If engine exceeds the maximum limit with selector lever in "R" range, the rear band or rear clutch is slipping. To determine which of the two is faulty, move selector lever to "LO" range. If slippage is evident in "LO" and "R" ranges, but not in "D" range, the rear band is slipping. When slipping is noted in "R" range but not in "LO" or "D", the rear clutch is causing the slippage.

ENGINE STALL SPEEDS

Car Model	Low Limit - Engine RPM -	High Limit
1954 Ford, All Models	1365	1565
1954 Mercury, All Models	1400	1600
1955 Ford 6 Pass. Car	1380	1580
1955 Ford V8 Pass. Car①	1450	1650
1955 Ford Thunderbird	1550	1750
1955 Ford Interceptor	1510	1710
1955 Ford 6 Truck	1380	1580
1955 Ford V8 Truck	1440	1640
1955 Lincoln	1525	1725
1955 Mercury②	1510	1710
1955 Mercury Montclair	1550	1750

①—Special 182 HP V8 Engine included.

②—Except Montclair.

SHIFT TESTS: Select a smooth road for tests. Make tests as outlined below and see 1954 or 1955 "Shift Point Table" for correct speed where shifts should occur.

2-3 Upshift (Minimum Throttle): Place selector lever in "DR" range, and starting from a standstill, apply accelerator lightly but steadily.

3-2 Downshift (Minimum Throttle): Permit car to decelerate (from speed attained in above test) until downshift occurs from high to intermediate.

3-2 Downshift (Forced): Reduce car speed below 45 MPH (Ford), 50 MPH (Mercury & Lincoln). Press accelerator pedal to floor. Transmission should shift from high to intermediate. This shift should occur only with car in high gear.

2-3 Upshift (Maximum Throttle): Place selector lever in "DR" range, and starting from a standstill, press accelerator to the floor. Full throttle upshift should occur as indicated in 1954 or 1955 "Shift Point Table".

2-1 Downshift (Forced)—1955 Models Only: With selector lever in "DR" range and car speed below 18 MPH (Ford), 19 MPH (Mercury & Lincoln), quickly press accelerator fully to floor. This action shifts transmission from high, to intermediate, or low.

1-2 Upshift (Maximum Throttle)—1955 Models Only: With accelerator pressed to floor for above test (2-1 Downshift, Forced), transmission should upshift from low to intermediate when car speed indicated in 1955 "Shift Point Table" is reached. The 2-3 Upshift will occur at the speed indicated in table.

"DR" to "LO" Manual Shift: With car speed between 40-45 MPH (Ford), 45-50 MPH (Mercury & Lincoln), Manually shift selector lever from "DR" to "LO" Instead of shifting to low gear, the transmission should shift from high to intermediate. When car speed is reduced within the range indicated in 1954 or 1955 "Shift Point Table", the transmission should shift into low range.

"R" Shift: Bring car to a stop and place selector lever in "R" range. The car should move in reverse direction smoothly, upon light throttle pressure.

OPERATING PRESSURE TEST: Set parking brake firmly and raise rear wheels off floor. Disconnect throttle at outer throttle lever on transmission.

Pressure Gauge Installation: *NOTE—See "1955 Ford Interceptor & Thunderbird, Mercury & Lincoln Pressure Take-off Hole Relocation" above.* Remove pipe plug from side of transmission near throttle lever (or on rear face of transmission case), then connect pressure gauge No. 77820 so it can be read from under car.

Throttle Lever Protractor Gauge Installation (1954 Models): Position throttle lever protractor gauge No. 77270-A (Ford); 77270 (Mercury) on the throttle lever shaft, locating the large elongated hole in gauge over the large shaft to rear of control lever. Set gauge indicator to 0° and lock in place with knurled thumbscrew. Hold throttle lever against stop (up), insert gauge pin 7000-B-1 through the small elongated hole in gauge and the hole in throttle lever. If gauge pin enters these two holes freely the throttle mechanism has not been distorted and need not be replaced. **Replace the throttle control mechanism if it has been distorted.**

Throttle Lever Protractor Gauge Installation (1955 Models): Position gauge T55L-77270-C (Ford); 77270-C (Mercury & Lincoln) over throttle lever shaft. Rotate gauge on shaft until gauge pin passes through hole in oil pan flange and contacts bottom machined surface of transmission case. Tighten gauge set screw to hold gauge firmly on throttle lever shaft. Rotate throttle lever up against its internal stop in transmission, then insert gauge pin through small elongated hole in gauge and hole in throttle lever. Check position of protractor gauge pointer. If pointer is at zero, the throttle mechanism is not distorted. **If throttle lever distorted, replace it with a new one.**

Pressure Rise Point ("R" Reverse Range) 1954 Models: With throttle lever pin through the elongated hole in gauge and hole in throttle lever, advance the throttle fully (down). The lever should travel 28° to 33°. Connect a tachometer and set engine idle speed at 600 RPM with selector lever in "R" (reverse) range. Observe pressure at 0° throttle lever position. The pressure should be 60-80 lbs. (Ford); 76-96 lbs. (Mercury). From underneath the car advance throttle lever slowly and observe the angular reading at the point where pressure starts to rise. Pressure rise should begin between 3½-4½° throttle advance. Continue to advance throttle lever slowly until maximum pressure is indicated, which should be 140-165 lbs. (Ford); 154-186 (Mercury), and observe angular reading which should be 4½-7½°. If above points not correct, adjust by changing throttle valve stop position (see Throttle Valve Stop Adjustment below).

Pressure Rise Point ("R" Reverse Range) 1955 Models: With pin through the elongated hole in gauge and hole in throttle lever, advance the throttle lever fully (down). The lever should travel 28° to 33°. Connect a tachometer and set engine idle speed at 600 RPM with selector lever in "R" (reverse) range. Observe pressure at 0° throttle lever position. The pressure should be 50-63 lbs. (All cars & trucks except 6 Cyl. Pass. Car), 47-60 lbs., (Ford 6 Cyl. Pass. Cars). From beneath car, advance throttle lever slowly and note angular reading at moment pressure begins to rise (3½° to 4½°). Continue to advance throttle lever slowly until maximum pressure is indicated on gauge. This pressure should be 175-190 lbs., (All cars & trucks except Ford 6 Cyl. Pass Cars), 166-182 (6 Cyl. Pass. Cars). Maximum pressure should occur at 9½° to 11½° throttle lever advance.

Pressure Rise Point ("DR" Range) 1954 Models: Move selector lever to "DR" (drive) range and repeat the above procedure. Maximum pressure should occur at 7° to 10½° throttle advance. Maximum pressure should be 120-145 lbs.

Pressure Rise Point ("DR" Driv Range) 1955 Models: Move selector lever to "DR" (drive) range and repeat the above procedure. Maximum pressure should be 130-150 lbs. (All Cars & Trucks except 6 Cyl. Pass. Cars). 122-142 lbs.

►*NOTE—If pressure regulation is not within above specifications, leave gauge attached (for a recheck after repairs) and adjust pressure as indicated below.*

Throttle Valve Stop Adjustment: This adjustment requires draining transmission and removing oil pan. Use bending tool No. 77763 to bend the throttle valve stop within transmission case as follows:

If pressure Rise Start is Over 4½° (in Reverse Range)—Hold throttle outer lever against its stop, clamp protractor gauge on lever and set to read 0°, then advance lever to maximum travel. Install bending tool over throttle valve stop, bend stop toward valve body to advance the stop position the number of degrees to bring the pressure rise to 4° in "R" range. Check by returning the lever to stop position and reading protractor gauge (reading will indicate change in stop position).

►*CAUTION: Do not attempt to correct the stop setting if the pressure rise point is more than 4° out of limits, since extreme bending of the stop can distort valve body plate and result in leakage. Replace stop plate (upper valve body front plate).*

If Pressure Rise Point is Under 3½° (in Reverse Range)—Hold throttle lever against its stop and note protractor gauge reading. Advance throttle lever to maximum travel and place throttle valve stop bending tool over stop. Bend stop away from valve body far enough to bring pressure rise to 4° in "R" range. (For example: If pressure rise point was 2°, the required correction is 2°. To make this correction, bend the stop an estimated amount, then remove tool and move

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

throttle lever against its stop. Subtract previously noted protractor gauge reading from present reading to determine amount of change). Repeat procedure as necessary to bring pressure rise to 4° Install oil pan and fill transmission with Automatic Transmission Fluid type A.

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan, and control valve assembly. Proceed as follows

Fr nt Clutch: Apply pressure to front clutch and governor input passage (see illustration) Listen for dull thud which indicates that clutch is operating Keep air pressure in passage for several seconds to check for leaks in this part of system

G v rn r Valv : Remove governor inspection cover Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward

R ar Clutch: Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating Check for leaks in same manner as for front clutch (above)

R ar Band & S rv : Apply pressure to rear servo oil passage (see illustration), and observe band application

Fr nt Band & S rv : Apply pressure to front servo apply tube (rear tube), and observe band application

►*TESTING NOTE: If s rvos, bands, clutches, and governor op rate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of the troubl . See "Control Valve" in OVERHAUL BELOW.*

TROUBLE SHOOTING & DIAGNOSIS

HIGH UPSHIFT (Int rm diate-to-High): Throttle linkage is too short or throttle lever is bent. Valves sticking in governor or improper valve travel (check with air pressure). Governor oil delivery pipe leaking at connections (air pressure will indicate leak). Valve sticking in control valve assembly.

LOW UPSHIFT (Int rm diate-to-High): Throttle linkage too long or throttle lever bent. Valves sticking in control valve assembly. Internal leak in control valve assembly (possible loose screws or mating surfaces require lapping).

ROUGH UPSHIFT (Int rmediate-to-High): Throttle linkage not correct length or throttle lever bent Bands require adjusting to factory specifications Hydraulic operating pressures not correct Valve sticking in control valve assembly Internal leak in control valve assembly (possible loose screws or mating surfaces require lapping)

SLIPS (Light Thr ttl Upshifts): Throttle linkage too long, or bands out of adjustment

SLIPS (H avy Throttl Upshifts): Throttle linkage too long or throttle lever bent Bands out of adjustment Hydraulic operating pressure not correct Valves sticking in control valve assembly Internal leak in control

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1954 TRANSMISSION SHIFT SPEEDS

	SHIFT SPEED (MPH)				MANUAL SHIFT (MPH)	
SHIFT	2-3		3-2		3-2	3-1
THROTTLE	MIN.	MAX.	MIN.	MAX.		
MODEL Ford	14-19	64-69	7-3	Below 55 MPH	Above 23-27 MPH	Below 23-27 MPH
Mercury	15-20	57-67	11-3		Above 21-27 MPH	Below 21-27 MPH

1955 TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	TIRE SIZE	SHIFT SPEEDS (MPH)						①MAN. SHIFT (MPH)	
SHIFT			2-3		3-2		2-1	1-2	3-2 & 2-1	2-1
THROTTLE			MIN.	MAX.	MIN.	FORCED	FORCED	MAX.	MAX.	MIN.
MODEL Ford 6 Cyl. Pass. Car	3 55-1	670x15	13-18	53-63	10-4	59-19	17-15	26-32	21-27	22-16
		710x15	13-18	53-64	10-4	60-19	17-15	26-32	21-27	22-16
	3 30-1	670x15	14-19	56-67	10-4	62-20	18-16	28-34	22-28	23-17
		710x15	14-19	57-68	10-4	63-20	18-16	28-34	22-28	23-17
Ford 8 Cyl. Pass. Car. Thunderbird & Police Interceptor	3 55-1	670x15	13-18	55-66	9-4	61-20	17-15	27-33	21-27	23-17
		710x15	14-19	59-71	10-4	62-21	17-15	27-33	21-27	23-17
	3.30-1	670x15	14-19	58-70	10-4	65-21	18-16	28-34	22-28	24-18
		710x15	13-18	59-71	11-4	62-21½	18-16	29-35	23-29	24-18
Ford F-100 Truck	3 92-1	600x16	12-17	50-60	8-3	57-18	16-14	24-29	21-25	21-16
		650x16	12-17	50-60	8-3	57-18	16-14	24-29	21-25	21-16
Ford F-250 Truck	4 86-1	650x16	9-14	33-39	8-3	37-13	12-10	17-21	14-18	15-11
		700x16	9-14	35-42	8-3	39-14	13-11	18-22	15-20	16-12
		750x16	10-15	36-43	8-3	40-15	14-12	18-23	15-20	17-12
		700x17	11-16	38-45	8-3	42-15	14-12	19-24	16-21	18-13
		750x17	11-16	39-46	8-3	43-16	15-13	20-25	17-22	19-14
Ford F-350 Truck	5.14-1	700x16	9-14	34-41	8-3	38-13	12-10	17-21	15-19	15-11
		750x16	9-14	35-42	8-3	39-14	13-11	18-22	15-20	16-12
		700x17	10-15	36-43	8-3	49-15	14-12	18-23	15-20	17-12
		750x17	11-16	37-44	8-3	41-15	14-12	19-24	16-21	18-13
Ford P-350 Truck	4 86-1	700x16	9-14	36-43	8-3	40-15	13-11	18-23	15-20	17-20
		750x16	10-15	37-44	8-3	41-15	14-12	19-24	16-21	18-13
		700x17	11-16	38-45	8-3	42-15	14-12	19-24	16-21	18-13
		750x17	11-16	39-46	9-3	43-16	15-13	20-25	17-22	19-14
Lincoln	All	All	15-21	65-77	11-3	66-20	②	30-36		25-19
Mercury	All	All	15-20	58-70	11-3	62-20	②	27-33		23-17

①—If manual shift mad abov speed indicated, transmissi n will shift fr m high t int rmediat . If mad b l w thes sp ds, transmissi n will shift fr m high t int rmediat or l w.

②—19 MPH or b l w.

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

valve (possible loose screws or mating surfaces require lapping)

SLIPS (2-3 Upshift): Same possible conditions as for "SLIPS (Heavy Throttle Upshifts)" above

ROUGH 3-2 DOWNSHIFT (Closed Throttle): Same possible conditions as for "SLIPS (Heavy Throttle Upshifts)" above

NO FORCE DOWNSHIFT: Throttle linkage too long, or throttle lever bent Accelerator pedal height not correct Valves sticking in control assembly

NO 2-1 KICKDOWN SHIFT (1955 MODELS): Throttle linkage too short Throttle lever bent Valves sticking in control valve assembly

SLIPS 3-2 FORCED DOWNSHIFT: Bands out of adjustment

NO 2-3 UPSHIFT: Valve sticking governor (check with air pressure) Governor oil delivery pipe leaking at connections (check with air pressure) Valves sticking in control valve assembly Rear clutch inoperative (check with air pressure)

ROUGH REVERSE START· Engine idle incorrect Throttle linkage not of correct length or throttle lever bent Bands out of adjustment Hydraulic operating pressures not correct Valve sticking in control valve assembly Internal leak in control assembly (possible loose screws or mating surfaces require lapping)

SLIPS IN INTERMEDIATE RATIO: Throttle linkage not adjusted properly Bands out of adjustment Hydraulic pressures not correct Improper front servo travel (check with air pressure) Internal leak in control valve assembly (possible loose screws or mating surfaces require lapping)

SLIPS IN LOW OR REVERSE RATIO: Same as for "SLIPS IN INTERMEDIATE RATIO" above, except that rear servo travel should be checked with air pressure

NO DRIVE IN "DR" RANGE: Bands out of adjustment. Front servo not releasing (check with air pressure) Front clutch not operating properly (check with air pressure)

NO DRIVE IN "LO" RANGE: Bands out of adjustment Rear servo not operating correctly (check with air pressure) Front clutch not operating properly (check with air pressure) Valves sticking in control valve assembly

NO DRIVE IN "R" RANGE· Same as for "NO DRIVE IN LO RANGE" above

NO DRIVE IN ANY RANGE: Fluid level incorrect Shift linkage not adjusted correctly Hydraulic pressure not correct A broken or improperly assembled front clutch will cause loss of drive in all positions except Reverse Improperly assembled control valve assembly

LOCKS UP IN REVERSE: Front clutch not releasing (check with air pressure) Shift linkage not adjusted correctly or not operating properly Leak in rear servo apply passage (check with air pressure and make certain servo applies and releases freely without tendency to stick or chatter)

LOCKS UP IN "LO" OR "DR": Rear clutch is applied and not releasing (check with air pressure)

UNABLE TO START ENGINE BY PUSHING: Rear pump inoperative or a defective pressure regulator valve

ROUGH 2-1 FORCED DOWNSHIFT (1955 MODELS): Rear servo sticking Rear servo accumulator sticking

ROUGH 1-2 UPSHIFT, THROUGH DETENT (1955 MODELS): Engine idle incorrect Throttle linkage too short Rear servo accumulator sticking or broken spring Valves in valve body sticking

MINOR REPAIRS (TRANSMISSION IN CAR)

The following transmission units can be removed for repair without removing transmission assembly from car Raise car on hoist for these operations, then drain fluid from transmission and remove oil pan

►*NOTE For Disassembly & Overhaul of the following units, see OVERHAUL (TRANSMISSION UNITS) below.*

Governor Removal: Remove governor inspection cover from extension housing Rotate the drive shaft to bring governor body in line with inspection hole Remove the two screws that secure governor body to sleeve Remove governor

►*CAUTION Use care not to drop bolts or governor valve into housing.*

Installation–Lubricate governor valve with transmission fluid and install valve in governor body *(CAUTION–*valve must move freely in body) Install governor body on counterweight with the **side plate forward** *(CAUTION–*fluid passages in governor body and counterweight must be aligned), install governor body attaching screws Install inspection cover with NEW gasket tighten cover screws to 4-6 ft lbs torque.

►**NOTE:** For the following operations remove transmission fluid level indicator Remove transmission filler tube and drain the fluid into clean container using a fine mesh wire screen for straining (Fluid may be re-used) Then remove transmission oil pan and screen

Front Servo Removal: Loosen lubrication tube from pressure regulator and rear pump and remove (NOTE– If necessary tap tube with soft hammer to remove. *CAUTION–*Do not bend or distort tube) Loosen control valve body attaching bolts Remove servo attaching bolt and while holding servo strut with fingers, remove servo assembly

Installation–Position servo band forward in case with band ends down Position servo strut with large end indexing with servo actuating lever and small end indexing with band end Rotate band, strut and servo into position, indexing tubes from valve body to servo, and anchor end of band with anchor in case Install attaching bolt, tightening to 30-35 ft lbs Tighten control valve attaching bolts to 8-10 ft lbs Install lubrication tube and adjust servo band See "Front Band Adjustment" Install screen install oil pan using NEW gasket, tighten oil pan screws to 10-13 ft lbs Connect filler tube Fill transmission to correct level (old fluid can be re-used), recheck fluid level with transmission at operating temperature

Rear Servo Removal: Remove lubrication tube from rear pump and regulator.(*NOTE–*If necessary tap tube with soft hammer to remove) Remove rear pump intake tube Remove front servo (see above) Take out rear servo attaching bolts, hold actuating and anchor struts with the fingers, remove rear servo assembly

Installation–Position servo anchor strut and rotate servo band to engage strut Hold in position with fingers Position actuating lever strut and install servo, install servo attaching bolts(*CAUTION–*Longer attaching bolt must be installed in forward bolt hole), tighten attaching bolts to 40-45 ft lbs torque. Install front servo (see above) Install rear pump intake tube and lubrication tube Adjust rear band (see BAND ADJUSTMENT) Install oil pan with NEW gasket, tighten oil pan screws to 10-13 ft lbs Connect filler tube. Fill transmission to correct level (old fluid can be re-used), recheck fluid level with transmission at operating temperature

Control Valve Body Removal: Remove two "U" tubes from pressure regulator and control valve body Loosen front servo attaching bolt three turns Take out three valve body attaching bolts, lower the valve body and pull it off the servo tubes

►*CAUTION–Use extreme care when removing valv body to prevent damage to body and attach d parts.*

Installation–Align servo tubes with holes in control valve body, position manual lever in neutral, position inner throttle lever between stop and downshift valve and at the same time push the throttle valve in to clear the transmission case **making certain that manual valv engages actuating pin manual d t nt l v r.** Install control valve body attaching bolts but do not tighten the bolts Install two "U" tubes in pressure regulator and control valve body Tighten control valve body attaching bolts to 8-10 ft lbs torque Tighten front servo attaching bolt to 35-40 ft. lbs torque Adjust front and rear bands (see BAND ADJUSTMENT). Install oil screen, install oil pan using NEW gaskets, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid may be re-used) recheck fluid level with transmission at normal operating temperature

Pressure Regulator Removal: Remove lubrication tube Remove control pressure tube and compensator tube from valve body and regulator. Remove pressure regulator spring retainer *(CAUTION–*Maintain pressure on retainer to prevent springs flying out) Remove the control pressure and converter pressure valves Take out pressure regulator attaching bolts and washers, remove regulator

►*MAIN OIL PRESSURE REGULATOR VALVE INSTALLATION CAUTION* If regulator removed to correct transmission "buzzing" noise, examine valve for undersize bleed flats and rotate valve 90° in bore from original position when re-installing it. This should correct the noise

Installati n–Install regulator body and attaching bolts and tighten to 17-22 ft lbs Install converter pressure and control pressure valves and make certain valves

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

operate freely in bore, then install valve springs and retainer Install large control pressure tube, small compensator tube, and lubrication tube Install oil screen, install oil pan using NEW gaskets, tighten pan screws to 10-13 ft lbs Connect filler tube. Fill transmission to correct level (old fluid may be re-used), recheck fluid level with transmission at normal operating temperature

Manual & Throttle L v r Seal Replacement: Remove control valve body (see above), disconnect manual and throttle linkage rods at transmission levers. Remove nut on inner throttle lever shaft and remove inner throttle lever Remove outer throttle lever and shaft, remove throttle shaft seal from counterbore in manual lever shaft. Take out cotter pin in each end of parking pawl torsion lever rod and remove the rod, rotate manual lever shaft until detent lever clears detent ball (*CAUTION*—do not allow detent ball to fly out), remove detent ball and spring Remove manual lever shaft nut, remove detent lever, remove outer manual lever and shaft assembly Remove manual shaft seal

►*1955 MERCOMATIC TRANSMISSION THROTTLE CONTROL INNER LEVER PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To eliminate ex c ssiv ndplay)·* Throttle Control Inner Lever, Part No B5A-77283-A, identified by the letter "0" stamped on lever is used in production and can be used for service replacement on 1954-55 transmissions When installing the later type lever the letter "0" must be installed toward inside of transmission

Installati n—Coat outer diameter of new seal with Permatex No 3, install seal in case using tool No 77288 Install outer manual lever and shaft, rotate shaft until manual lever points downward, place detent lever on inner end of shaft, install attaching nut and tighten nut to 35-40 ft lbs torque Place detent spring and ball in hole in case (use piece of thin wall tubing to depress ball and spring), rotate detent lever until detent ball is held in place Install parking pawl torsion lever rod and cotter pins Install new throttle shaft seal, outer throttle lever and shaft, inner throttle lever and attaching nut, tighten nut to 25-28 ft lbs. Connect manual and throttle rods to outer levers Check linkage for free movement Install control valve assembly and other parts *See Control Valve Assembly Installation (above)*

TRANSMISSION & CONVERTER REMOVAL

►*TRANSMISSION & CONVERTER REMOVAL NOTE. Transmissi n and converter can be removed as an assembly, or transmissi n can be removed separately (on m st models) without disturbing converter*

1954 FORD 6 & V8

1) Raise car on hoist or place on jack stands with wheels at least 10" off the floor Fold back floor mat then remove the two rubber plugs covering the floor access holes Remove the two top converter housing-to-engine bolts On V8 models, remove the starter On V8 models, remove the starter On 6 cyl models remove the access plate Remove one of the converter drain plugs Rotate converter 180° and remove the other drain plug *(NOTE—Converter can be drained after removal from car if desired)*

2) On 6 cyl models remove all the lower converter housing-to-engine bolts except one located over the starter and the one located over the exhaust pipe Remove transmission linkage splash shield Remove converter air duct assembly then disconnect throttle and manual control rods from transmission Remove starter assembly drain transmission, then remove drive shaft assembly

3) On V8 models disconnect the fluid filler tube at transmission oil pan and drain transmission Remove converter housing upper cover (V8) then remove the six converter-to-flywheel drive plate bolts *(CAUTION—Take precautions to prevent converter from slipping out of housing when transmission removed)*

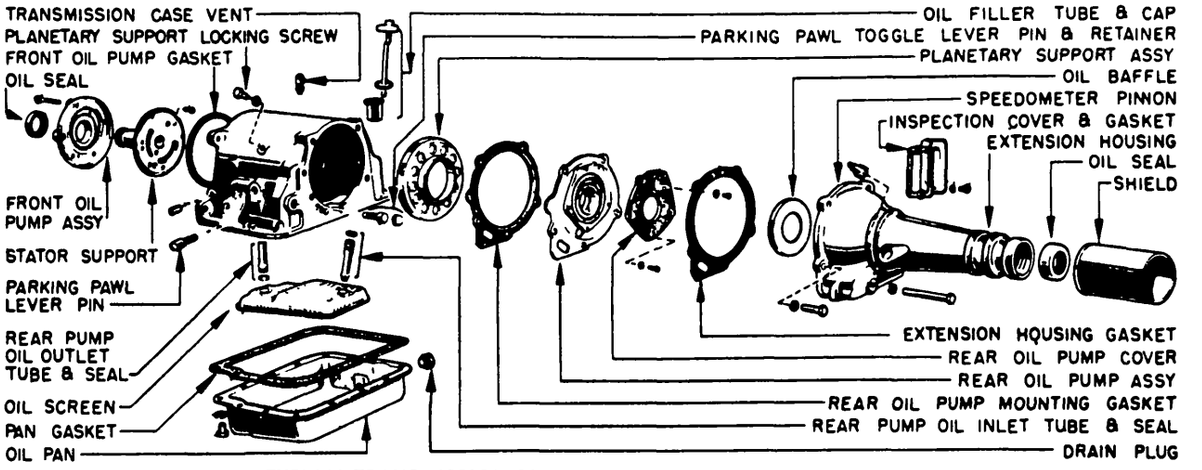
4) Position engine support bar to permit lowering the V8 engine ¾" below normal position Disconnect throttle and manual linkage at transmission levers Disconnect accelerator pedal shaft at cross shaft Disconnect drive shaft at rear axle and remove drive shaft Remove speedometer cable then disconnect parking brake assembly at cross member and move equalizer to one side

5) Remove the two engine rear support-to-transmission bolts Position a transmission jack under transmission and raise transmission slightly to take weight off crossmember Remove crossmember Lower transmission until engine is supported firmly on support bar With the transmission resting on transmission jack, remove remaining converter housing-to-engine attaching bolts

6) On 6 cyl models remove the oval cover on engine rear plate Remove six flywheel-to-converter cover bolts Install engine support bar and adjust tightly to oil pan flanges Remove the two remaining converter housing-to-engine attaching bolts

7) On V8 models move the jack supporting the transmission and converter assembly toward the rear sufficiently to clear the converter pilot Remove the six flywheel-to-engine crankshaft flange attaching bolts then remove flywheel assembly

8) On 6 cyl models tilt the converter and transmission assembly slightly and remove transmission assembly toward rear sufficiently to remove the six flywheel-to-engine crankshaft attaching bolts Remove flywheel to provide sufficient clearance then lower converter and transmission assembly



TYPICAL TRANSMISSION CASE & EXTENSION HOUSING ASSEMBLY

1955 FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD)

1) Place car on hoist On truck models, drain radiator, fold front of floor mat back and remove covers from converter housing access bolt holes Loosen water inlet and outlet hose clamps at oil cooler and pull hoses off cooler On all cars and trucks, remove the two upper converter-to-engine bolts and lockwashers then raise vehicle with the hoist

2) Disconnect oil filler tube at oil pan and drain transmission Remove converter housing front plates (8 Cyl) or the access plate (6 Cyl.) Remove one of the converter housing drain plugs Rotate converter 180°, then remove second drain plug Drain converter

►*NOTE Converter may be drained after it is removed from car.*

3) Disconnect drive shaft at rear axle and remove shaft. On F-250, F-350, or P-350 trucks, remove the four bolts attaching drive shaft coupling yoke at parking brake assembly

4) Remove the six flywheel-to-converter drive plate bolts. Position the drive plate horizontally, and install the lower converter housing front plate (8 Cyl), or wedge the converter from sliding out of housing when transmission is removed

5) Disconnect starter cable at starter, then disconnect transmission-to-frame ground cable at transmission and remove starter. On truck models, remove bolts attaching oil cooler to support brackets, dis-

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

connect oil cooler inlet and outlet hoses at transmission and remove oil cooler. Remove converter air duct and linkage splash shield (cars) or the exhaust duct shield (trucks).

6) Disconnect manual and throttle linkages at transmission. Disconnect speedometer cable at transmission. On Pass. Cars, remove the two engine rear support-to-transmission bolts. Position a transmission jack under transmission and raise it slightly to take weight off crossmember. On trucks, with the transmission jack in place remove the converter housing crossmember bolts. On all vehicles, then remove the two lower converter housing-to-engine bolts.

7) Tilt rear of converter and transmission assembly upward slightly, then move assembly toward rear of vehicle sufficiently to remove the six engine crankshaft flange-to-flywheel attaching bolts. Remove flywheel to provide sufficient clearance, then lower converter and transmission assembly.

Torque Converter Removal (from Transmission): *See "Torque Converter Overhaul" below.*

THUNDERBIRD

►*NOTE: The converter and transmission assembly cannot be removed with engine in the car. Either the engine can be removed first, or transmission, converter and engine can be removed as an assembly.*

1) Remove engine *(see "Engine Removal" in Ford Special Data).* If converter and transmission have been removed with the engine, they can be removed from the engine by removing the six converter-to-flywheel drive plate bolts, then removing the four converter housing to engine attaching bolts.

2) To remove converter and transmission after the engine has been removed separately, remove the two transmission extension housing-to-rear engine support attaching bolts. Remove speedometer cable at transmission. Disconnect the manual shift control lever at transmission. Move transmission forward and remove forward drive shaft, then remove converter and transmission from car.

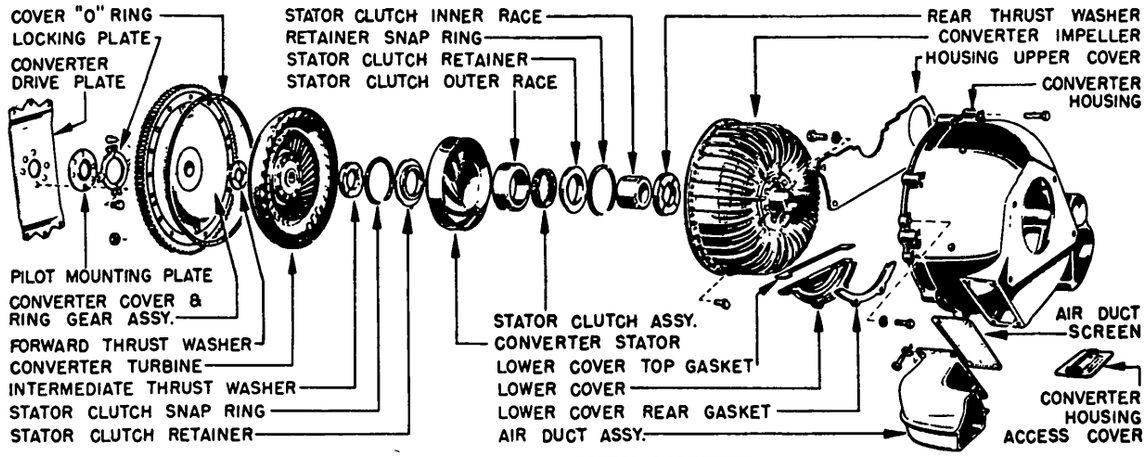
Torque Converter Removal (from Transmission): *See "Torque Converter Overhaul" below.*

1954-55 LINCOLN & MERCURY

1) Remove ground strap from battery. Remove bolts and nuts securing throttle linkage bar bracket to engine and body. Place car on support stands with all four wheels approximately 12" off ground. On Mercury models with single exhaust pipe, remove nuts securing muffler inlet and cross over pipe to exhaust manifolds. Remove manifold outlet pipe from mounting bracket at rear of manifold and move exhaust system away from working area.

2) Disconnect manual linkage and throttle linkage at transmission. Disconnect speedometer cable at extension housing. Disconnect drive shaft at rear universal joint and remove drive shaft from transmission output shaft. Remove air duct from converter housing.

3) Remove splash deflector, and converter housing lower plate. Drain converter by removing one drain plug, then rotate engine 180° and remove second drain plug.



1954 TORQUE CONVERTER ASSEMBLY

Drain fluid from transmission.

4) Remove engine rear mount-to-frame crossmember bolts. Position transmission lift under transmission and raise engine and transmission sufficiently to install support tool. Remove rear engine mount from transmission. On 1954 Mercury & 1955 Lincoln, remove the detachable frame crossmember (1955 Mercury models have a tubular crossmember with brackets welded to the crossmember). Lower lift under transmission to allow engine to rest on support tool. Reposition transmission lift under transmission assembly and raise lift just enough to relieve weight of transmission on engine.

5) Remove starter and upper converter housing plate with seal. Remove six bolts securing converter to flexible drive plate. Remove the bolts securing converter housing to engine block.

6) Remove transmission and converter assembly by sliding assembly toward rear of car sufficiently to disengage converter housing dowels and converter cover pilot. Secure converter to converter housing to prevent damage to converter. Lower the assembly and remove from under car.

Torque Converter Removal (from Transmission): *See "Torque Converter Overhaul" below.*

TRANSMISSION REMOVAL (WITHOUT CONVERTER)

►*NOTE: On most cars and trucks, the transmission can be removed without removing the converter assembly.*

1954 FORD 6 & V8

1) Place car on hoist or support car securely on jack stands with all wheels approximately 12" off the floor. Drain transmission case by disconnecting filler tube at transmission oil pan connection. Disconnect manual control rod and throttle control rod from levers on transmission case. Disconnect speedometer cable. Disconnect parking brake cable assembly at crossmember and move cable and equalizer to one side

2) Disconnect propeller shaft at rear universal joint flange, remove shaft assembly by pulling it to rear to disconnect forward end from transmission. Remove engine rear support-to-transmission bolts, install jack under transmission and raise engine and transmission just enough to install engine support bar under rear end of crankcase.

3) With engine weight on support bar, raise transmission just enough to remove weight from crossmember, take out attaching bolt at each end and remove crossmember.

4) With transmission securely supported by jack, remove four transmission-to-converter housing bolts and slide transmission straight back to disengage the turbine shaft, then lower transmission and remove it from beneath car.

1955 FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD & SUNLINER)

1) Raise vehicle with a hoist and drain fluid from transmission. Disconnect drive shaft at rear axle and remove drive shaft.

2) On trucks, disconnect oil cooler-to-transmission fluid inlet and outlet lines at transmission. Remove bolts holding oil cooler on support brackets, then move cooler to one side.

3) Remove converter air duct from pass. cars, and remove exhaust duct splash shield from trucks.

4) Disconnect manual control and throttle linkage at transmission. Disconnect speedometer cable at extension housing. On pass. cars, remove the two rear support-to-transmission bolts. Position a transmission jack under transmission and raise it slightly to take weight off crossmember. Remove crossmember bolts and crossmember.

5) On all vehicles, with transmission jack in place, remove the four transmission-to-converter housing attaching bolts. On trucks, remove oil cooler from front support bracket. Tilt rear of transmission slightly upward and move assembly toward rear, with a jack, until clear of turbine shaft. Lower assembly and move it from under vehicle.

1954-55 MERCURY 1955 LINCOLN

1) Place car on support stands with all four wheels

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

approximately 12" off floor On Mercury models with single exhaust pipe, disconnect muffler pipes at exhaust manifold and the outlet pipe at support bracket, and move complete exhaust system away from work area

2) Drain fluid from transmission and disconnect manual and throttle linkage at transmission Disconnect speedometer cable at extension housing. Disconnect drive shaft at rear universal joint and remove drive drive shaft from transmission output shaft

3) Remove rear engine mount to frame crossmember bolts (Mercury models have a tubular crossmember with brackets welded to crossmember) Position lift under transmission and raise engine and transmission and raise engine and transmission sufficiently to install engine support tool Remove rear engine mount from transmissions On 1954 Mercury & 1955 Lincoln, remove the detachable crossmember from frame (1955 Mercury models have a tubular crossmember with brackets welded to the cross member)

4) Lower lift under transmission and allow engine to rest on support tool Reposition transmission lift to relieve the weight of transmission Remove four bolts securing transmission to converter housing

5) Remove transmission by sliding assembly toward rear of car sufficiently to disengage the turbine shaft. Lower the assembly and remove from under car

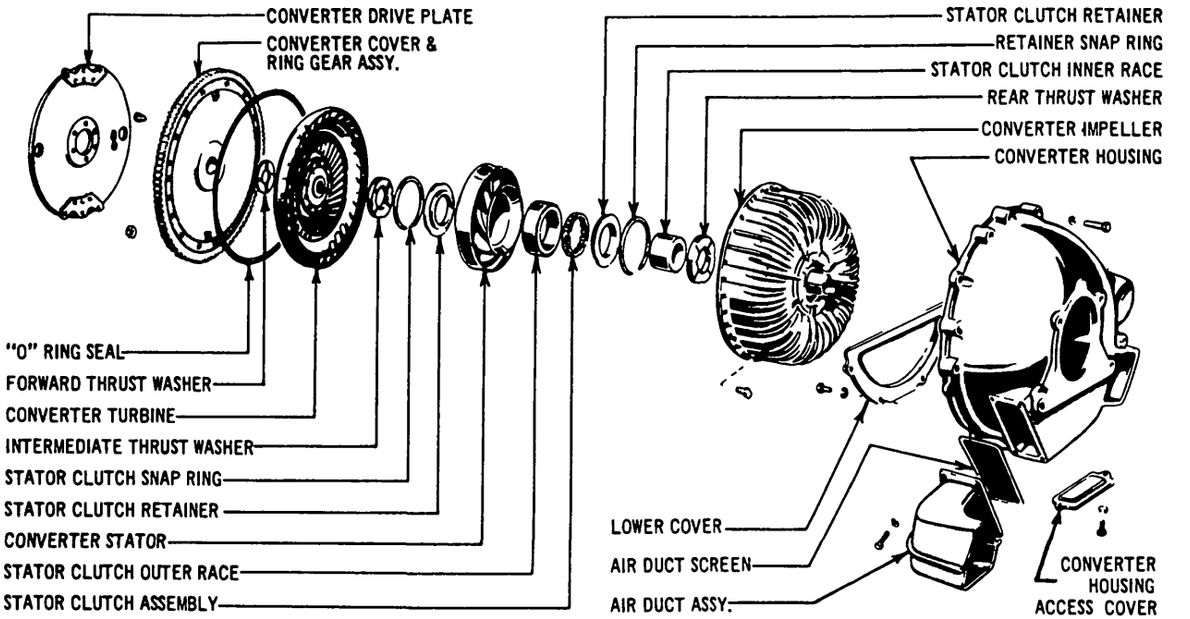
TORQUE CONVERTER OVERHAUL

►*DISASSEMBLY & REASSEMBLY CAUTION. CLEANLINESS IS EXTREMELY IMPORTANT WHEN OPENING UP TRANSMISSION. Thoroughly clean outside of case first, cl an each part as removed*

►*1955 FORDOMATIC CONVERTER BALANCE MARK IDENTIFICATION* Balance marks are identified by a metal strap on the impeller cover and an inked stamp on the impeller casting After car has been in service the inked mark may be difficult to see, therefore, it is recommended that before the cover is removed from the impeller, both parts should be marked with aligned dots of prussian blue *(CAUTION–Do not prick punch)*

TORQUE CONVERTER REMOVAL (From Transmission): Grasp converter cover with both hands and pull straight out *(CAUTION–*To prevent damage to front seals, do not rock assembly from side to side) Remove converter housing attaching bolts and remove housing from transmission

DISASSEMBLY: Remove converter cover attaching bolts and nuts Remove cover and "O" ring seal Remove bronze thrust washer from turbine and remove turbine Remove stator from pump housing *(CAUTION–Check and locat th balancing marks on cover and stator so th y may be replaced in the exact same position)* Remove thrust washer from pump hub and from turbine hub. Remove sprag clutch inner race and remove snap ring retaining outer hub to stator *(CAUTION–Do not burr snap ring groove)* Remove outer hub, sprag assembly, outer race and inner hub as an assembly Separate hubs and sprag assembly from outer race Remove snap



1955 TORQUE CONVERTER ASSEMBLY

ring retaining inner hub to stator

INSPECTION: Inspect converter blades for looseness, and check thrust surfaces for scores and splines for burrs and wear Inspect seal surfaces and front pump driving lugs for wear Inspect sprag assembly for worn or broken sprags or broken or distorted spring Inspect bushings for wear or scoring (if bushings worn, polish bearing surface of journal with crocus cloth to eliminate possibility of wear having been caused by rough bearing surface)

REASSEMBLY: Install stator inner hub and snap ring Turn assembly over, install outer race in stator Install sprag assembly in outer race making sure that sprags are pointed in the right direction Install outer hub and outer hub snap ring Insert Tool No 7946 tapered side first, into sprag assembly while rotating tool counter-clockwise to position sprags Install inner race with spline section up Guide tool No 7946 with hand while pushing inner race into position. Check stator for clockwise rotation while holding the inner race Install new seal in pump hub and install hub in pump Tighten hub capscrews to 8-10 ft lbs Install thrust washer into hub of converter pump and install stator with the word "front" (stamped into face of stator) upward Install thrust washer in hub of turbine and install turbine Install bronze thrust washer on turbine hub Position converter cover on pump housing with new "O" ring seal and properly align balance marks on cover and housing *(CAUTION–Cover and housing must be installed in the same position noted when these parts disassembled)* Install all converter bolts and tighten to 25-28 ft lbs in the sequence indicated below Install converter housing on transmission case and tighten attaching bolts to 40-45 ft lbs Install converter assembly and press it firmly into position on turbine shaft *(CAUTION–Do not "rock" converter assembly while installing it on shaft (will damage oil seals)*

►*COVER BOLT TIGHTENING SEQUENCE (To prevent leaks)*· Tighten two nuts directly opposite each other just snug, tighten two nuts 90° from first two similarly, tighten two nuts 45° from first four nuts similarly, Continue this sequence until all nuts have been tightened **just snug,** then torque all nuts in same sequence to 25-28 ft lbs torque

TRANSMISSION DISASSEMBLY

►*DISASSEMBLY & REASSEMBLY CAUTION: CLEANLINESS IS EXTREMELY IMPORTANT WHEN OPENING UP TRANSMISSION. Thoroughly clean outside of case first. CLEAN each part as removed with cleaning fluid or gasoline and dry with air–wiping cloths will leave lint on parts.*

DISASSEMBLY OF TRANSMISSION (Into Major Units): With transmission on bench fixture, (tool No 7000-C-D recommended for holding transmission), remove all transmission units as follows·

1) Remove pan and gasket and take out fluid screen.

2) Remove pressure regulator spring retainer, regulator springs, control pressure and converter pressure regulator valves

►*CAUTION: Maintain pressure on retainer to prev nt valve springs from flying out.*

3) Loosen pressure regulator and valve body attaching bolts, and remove lubrication tube from pressure

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

regulator and rear pump. NOTE—If necessary tap tube with soft hammer. *CAUTION—do not bend or distort tube.*

4) Remove rear pump intake tube, being careful not to bend or distort it.

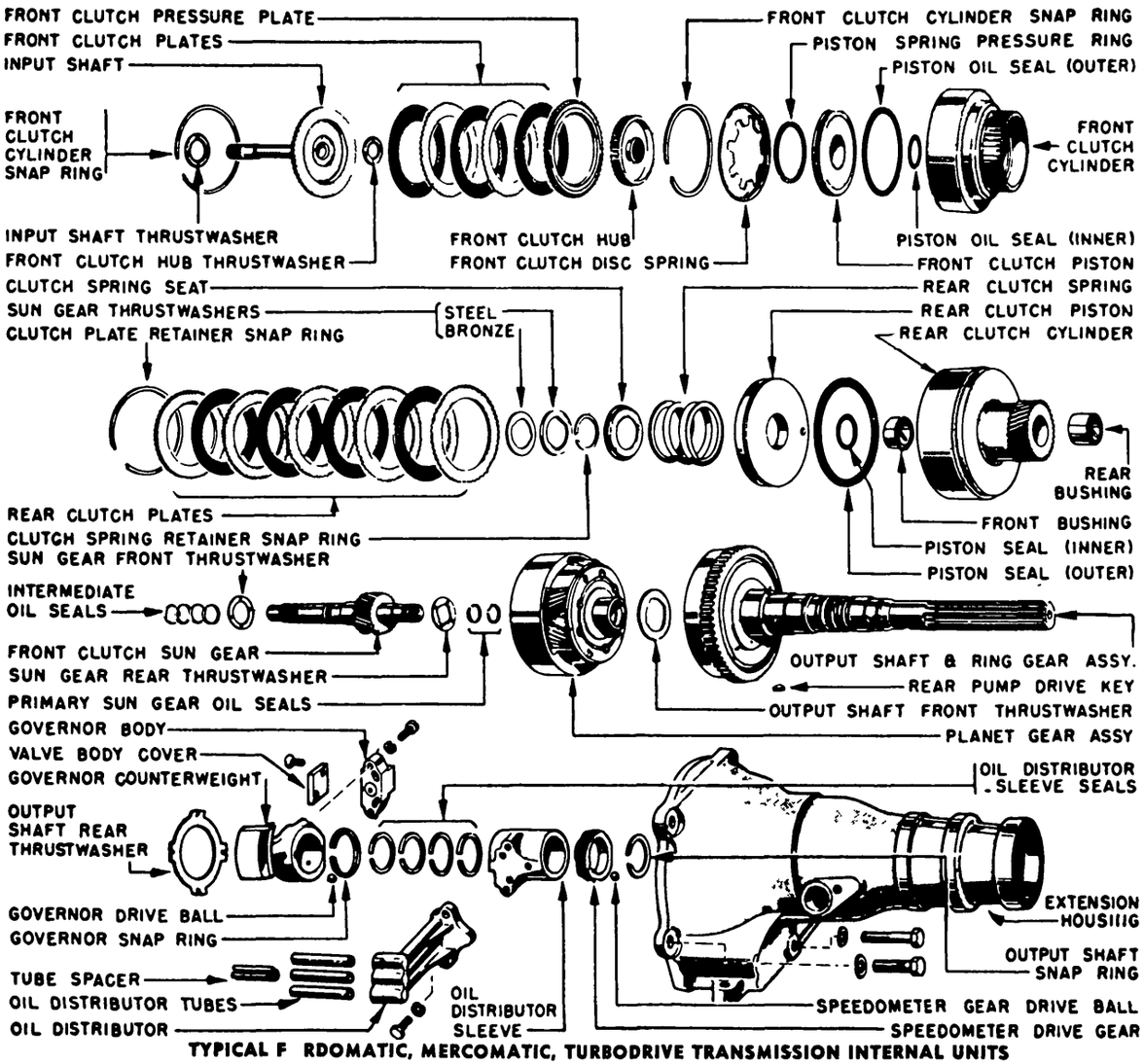
5) Remove compensator pressure tube (small) and control pressure tube (large) from pressure regulator and valve body. NOTE—If necessary, tap tube with a soft hammer. *CAUTION—do not bend or distort tube.*

6) Remove pressure regulator spring retainer, pressing it inward toward regulator to release. Remove pressure regulator springs, control pressure and converter pressure regulator valve. Remove regulator body attaching bolts and washers and remove body from case. NOTE—After removing regulator body from case, replace valve in body to protect them.

7) Loosen front and rear servo band adjusting screws five turns and loosen front servo attaching bolts three turns. Remove valve body attaching bolts and raise valve body to clear case and disengage valve body to clear case and disengage valve body to servo tubes and remove valve body.

8) Remove front servo apply and release tubes by twisting and pulling tubes. Take out front servo attaching bolt, hold front servo strut with fingers, lift servo out.

9) Remove rear servo attaching bolts and while holding actuating and anchor struts with fingers, lift servo from case *(CAUTION—Do not allow struts to drop into cas).*



TYPICAL F RDOMATIC, MERCOMATIC, TURBODRIVE TRANSMISSION INTERNAL UNITS

10) *CHECK TRANSMISSION ENDPLAY b for proceeding with disassembly, as follows:* Remove one front pump attaching bolt and mount dial indicator & support tool No. 77067 in this bolt hole so that contact button rests on end of turbine shaft. Install Extension Housing Seal Replacer 7657 (1954); 7657-D (1955) on output shaft to provide support for shaft. Pry front clutch cylinder toward rear of transmission using a large screwdriver, and set dial indicator to zero while maintaining a slight pressure on clutch cylinder. Remove screwdriver and pry units forward (toward front of transmission) by inserting screwdriver between large internal gear and case. Record indicator reading (endplay) for use in step 17 (below). This endplay should be .010-.029". Remove dial indicator and support and remove tool from output shaft.

11) Remove front pump attaching bolts and remove front pump assembly. (NOTE—If pump is tight in case, use soft hammer to loosen pump). Remove pump to case gasket. *CAUTION—Pull pump ff shaft car fully to avoid damaging oil seal.*

12) Remove five extension housing-to-transmission bolts (these bolts also hold rear oil pump on case), withdraw extension housing carefully while holding rear pump in place. *CAUTION—Pull housing off utput shaft carefully to avoid damaging r ar oil s al.*

13) Remove speedometer drive gear snap ring from output shaft and take off the speedometer drive gear. *(CAUTION—*Do not lose drive ball).

14) Remove fluid distributor attaching bolts and slide distributor and tube from transmission. Remove distributor sleeve from output shaft. Carefully remove the four seal rings from the output shaft with the fingers *(CAUTION—*use care not to damage these rings).

15) Remove governor snap ring from shaft and slide governor assembly from output shaft. *(CAUTION—*Use care so as not to damage seal rings on output shaft. Do not lose governor drive ball).

16) Remove rear pump discharge tube using tool 77869 and remove pump from case. Remove extension housing and pump gaskets. Remove rear pump drive key from output shaft. Remove bronze thrust washer from output shaft. (NOTE—Washer may come off with pump). Hold rear drum forward and remove the output shaft.

17) Remove selective thrust washer from rear of pinion carrier. If endplay as recorded in step 10 (above) was not within limits of .010-.029", replace this washer with one of proper thickness to give desired endplay. This washer furnished in following sizes: .063-.061", .069-.067", .076-.074", .083-.081".

18) Remove two seal rings from primary sun gear shaft. *CAUTION—use care not to distort rings.*

19) Remove pinion carrier from case and remove bronze thrust washer.

20) Mark rear band position so that it can be assembled in the same position. Remove band by squeezing ends together and tilting band forward.

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

21) Remove two center support bolts (on outside of case-one on each side). Press on end of turbine shaft to force clutch units toward rear of transmission and remove center support from case.

22) Remove rear and front clutch assemblies from transmission case as a unit. Install clutch assembly into bench fixture, tool No. IP-77530 and remove thrust washer from front of turbine shaft. Remove the front band from case. Lift front clutch assembly from primary gear shaft. *(CAUTION–*Do not rock assembly while lifting to prevent damage to seal rings)

23) Remove bronze and steel thrust washers from primary sun gear shaft and then remove the front clutch seal rings from primary sun gear shaft. Lift rear clutch assembly from shaft. *(CAUTION–*Do not rock assembly while lifting to prevent damage to seal rings). Remove rear clutch seal rings and thrust washers from shaft.

TRANSMISSION OVERHAUL (TRANSMISSION UNITS)

►*DISASSEMBLY & CLEANING CAUTION:* Handle all parts with care to avoid nicking or burring bearing surfaces and mounting faces. Clean all parts with clean solvent and dry with air. DO NOT use wiping cloths which might deposit lint and interfere with proper operation of transmission. Minor scores or burrs may be removed with crocus cloth. *CAUTION–When polishing valv s use extreme care not to round edges of valve lands.*

►*REASSEMBLY CAUTION Use all new gaskets when assembling or installing units in transmission. Lubricate all int rnal parts with Automatic Transmission Fluid Type "A" (vaseline may be used to retain gaskets and thrust wash rs). Tighten all bolts, nuts, and screws to corr ct torqu*

PRIMARY SUN GEAR SHAFT (Disassembly): Remove rear clutch seal rings by applying pressure on one end and at back of ring forcing ring into groove at these two points. Other end will spring out and free the hook. Remove thrust washer from thrust face of primary gear.

Insp cti n: Inspect all thrust surfaces and journals for wear or scores. Inspect sun gear for broken, chipped, or worn teeth. Inspect shaft splines and ring grooves for wear or burrs. Check all fluid passages for evidence of leakage and make certain passages are clean and free from obstructions. Check seal rings for wear by installing rings in bore and measuring end gap which should be .002-.009", check rings for free fit in groove (must not bind) If front clutch lubrication valve not operating properly, repair it by installing a new kit.

R ass mbly: Install bronze thrust washer against thrust face of primary sun gear, install seal rings in shaft grooves. Seals can be installed in the same manner in which they were removed (see Disassembly above)

REAR CLUTCH (Disass mbly): Using arbor press and tool No. 77515, remove clutch release spring snap ring *(CAUTION–*Guide spring retainer while releasing press to prevent retainer interfering with snap ring groove. Remove retainer, release spring, pressure plate snap ring, and pressure plate. Remove the four bronze and four steel clutch plates (Ford & Mercury), Five bronze and Five steel plates (Lincoln), from the drum. Place splined end of primary sun gear shaft in clutch piston bore, entering it as far as it will go, apply air pressure to hole in end of shaft which will force clutch piston out of cylinder *(CAUTION–*Hold hand over piston to prevent it flying out and being damaged) Remove outer seal ring from groove in piston and inner seal ring from clutch drum. Discard these seals (do not re-use).

Inspection: Inspect drum band surface, the bushing, and thrust surfaces for scores. Remove minor scores with crocus cloth. Replace badly scored parts. Inspect needle bearings for worn or loose rollers. Inspect gear teeth for burrs or wear. Inspect clutch piston bore and piston inner and outer bearing surfaces for scores. Check fluid passages for obstructions, making sure that they are free and clear. Inspect clutch plates for scores, and check plates for fit on clutch hub serrations. Replace all plates that are worn or do not fit properly *(CAUTION–*Front clutch plates differ from rear clutch plates and are not interchangeable). Check coning of the steel plates. Position plates on a flat surface, then check coning with a feeler gauge. Plates are coned to .010" clearance and should be checked on the inside diameter. Inspect clutch pressure plate for scores on clutch plate bearing surface. Replace plate if deeply scored. Check clutch release spring for distortion and discard if badly bent.

Reassembly: Lubricate all parts with Automatic Transmission Fluid Type "A". Install clutch piston inner seal ring in groove in drum. Install a new outer seal ring on piston and install piston in clutch drum. Install four steel and four bronze clutch plates (Ford & Mercury), five steel and five bronze (Lincoln), alternately, starting with steel plate, convex side up (Ford & Early 1954 Mercury), concave side up (Late 1954 Mercury & 1955 Lincoln & Mercury) Install clutch pressure plate with bearing surface down, and install snap ring. Make sure snap ring is fully seated in groove. Install clutch release spring, then position retainer on spring Position the clutch assembly in an arbor press using Tool No 77515 positioned on spring retainer and compress clutch spring. Install snap ring. *CAUTION–While compressing the spring, guide retainer to avoid interference with snapring groove Make sure snap ring is fully seated in groove*

FRONT CLUTCH: Disassembly–Remove clutch cover snap ring and remove turbine shaft (input shaft) from clutch drum Remove thrust washer and clutch hub Remove three bronze and two steel clutch plates (1954), four bronze and three steel (1955) and pressure plates Using arbor press and tool No 77565 depress clutch release spring and remove snap ring Release spring pressure, remove clutch release disc spring from drum Using air pressure and a piece of 3/16" tubing, (bend at end for entry into hole in clutch bore) force piston out of cylinder *(CAUTION–Hold hand ov r piston to pr vent damag)* Remove piston inner seal from clutch cylinder and remove piston outer seal from groove in piston

Insp cti n: See "Rear Clutch Inspection" above and follow the same procedure except that all front clutch plates are flat. *CAUTION–Front and r ar clutch plat s ar not interchangeable.*

►*FRONT CLUTCH ASSEMBLY PRODUCTION CHANGE (ALL TRANSMISSION):* To prevent gear noise or clutch "roll over" during manual shift from "D" to "N", Front Clutch Plate (bronze). Part No. B5A-77519-A is used to replace two of the original four bronze plates. Install one later type plate identified by additional parallel grooves on both sides, next to clutch pressure plate, and the other installed on top of the balance of the plates. These later type plates can be used to correct the above condition in early 1955 transmissions

Reassembly: Install a new piston inner seal ring in clutch cylinder and a new outer seal ring in piston groove. Install piston in clutch housing. *(CAUTION–Make certain that steel bearing ring is in place on piston).* Position release spring in cylinder with **concave side up,** place spring compressor tool on spring and compress spring in an arbor press to enable installation of snap ring, make sure that snap ring is fully seated in groove. *NOTE–Complete reassembly of front clutch after rear clutch assembly has been installed on primary sun gear shaft as indicated below.*

PRIMARY SUN GEAR SHAFT & CLUTCH (Reassembly): After individual units assembled (Shaft and Front & Rear Clutches), place primary sun gear shaft assembly in bench fixture and install rear clutch assembly on sun gear shaft *(CAUTION–Center seal rings on shaft to prevent breakage as clutch assembly installed).* Install steel and bronze thrust washers on shaft in that order. Install two seal rings in shaft grooves. Install two seal rings in shaft grooves. Install front clutch housing on primary gear shaft while rotating clutch units to mesh rear clutch plates with serrations on clutch hub being careful not to damage seal rings as clutch assembly being installed. Install clutch hub in clutch cylinder with deep counterbore down. Install bronze thrust washer on clutch hub. Install pressure plate in clutch cylinder with bearing surface up then install three bronze and two steel (1954), four bronze and three steel (1955), clutch plates alternately, starting with a bronze plate *(CAUTION–Lubricat all plates with Automatic Transmission Fluid Typ "A" as they are installed)* Install turbine shaft in clutch cylinder and install snap ring in groove, making sure that it is fully seated Install bronze thrust washer on turbine shaft Assembly is now ready for installation in transmission case *See "Transmission Reassembly" below*

FRONT PUMP (Disassembly): Remove pump cover attaching screws and remove cover with stator support. Mark the driven gear with Prussian Blue to assure correct assembly and remove drive and driven gears from pump body. To remove seal from pump body, mount the pump body on transmission case, use tool No. 1175-AB to remove seal

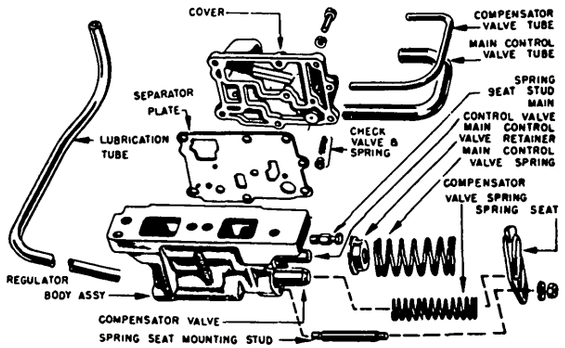
►*CAUTION: Extrem car must b tak n n t to scratch or mar pump g ars r b aring surfac s*

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

Inspection: Inspect bushing, gear pockets and crescent for scores. Inspect front cover, pump body, gear teeth and stator support splines for burrs. Check pump for evidence of contact between outside diameter of drive gear and crescent. REPLACE PUMP if such contact noted. Check bushing for wear and scoring

R assembly: Use tool No. 77837 to install new seal in pump body *(CAUTION–coat outside diameter of seal with Permatex No. 3 before installation to prevent fluid seepage).* Install pump driven gear in pump body in accordance with marks made before disassembly, install drive gear. Install pump cover, attaching screws, lockwashers, and tighten cover screws evenly to 1-3 ft. lbs. Check pump for free movement.



1954 PRESSURE REGULATOR ASSEMBLY

REAR PUMP: (Disassembly): Remove screws and lockwashers securing pump cover to pump body and remove cover. Using Prussian Blue, mark pump drive and driven gears to assure correct assembly, and remove gears from body.

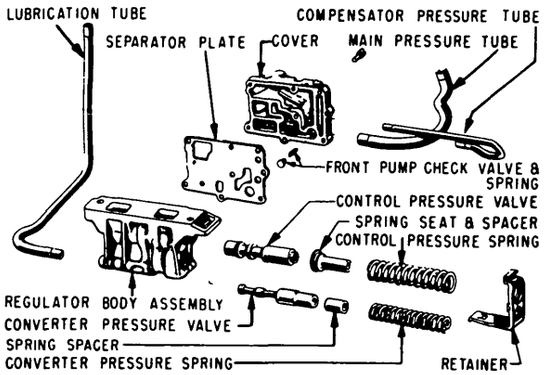
►*CAUTION–Handle pump parts with care to avoid scratching or marring*

Inspection: Inspect all pump parts for excessive wear, score, or burrs Check fluid passages for obstructions. Check pump for evidence of contact between outside diameter of drive gear and crescent. REPLACE PUMP if such contact noted Check bushing for wear or scoring.

R assembly: Install pump driven gear into pump body, positioning gears as marked on disassembly. Install drive gear into position as marked. Install pump cover, install cover screws with lockwashers, tighten screws evenly to 50-60 inch lbs. (¼"), 20-30 inch lbs.,(10-24 screws). Check pump for free movement of gears.

PRESSURE REGULATOR BODY (Disassembly): Remove valves from body. Take out cover attaching screws, remove cover and separator plate

Inspection: Inspect regulator body and cover mating surfaces. Check fluid passages in body and fluid passages in separator plate for obstructions. Inspect valves and valve bores for scoring and check freedom of valves in valve bores. Check regulator valve springs for distortion. Wash thoroughly in clean solvent and blow dry with air.



1955 PRESSURE REGULATOR ASSEMBLY

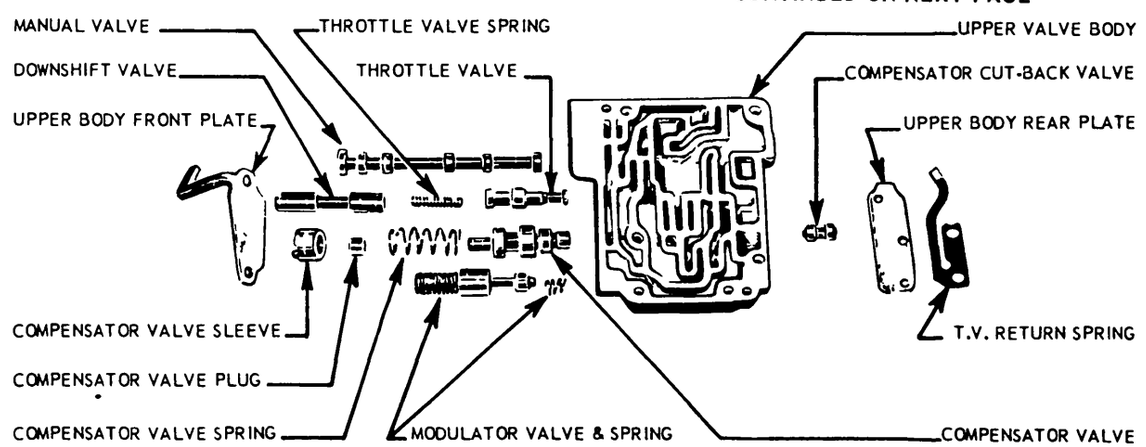
Reassembly: Install check valve spring in regulator cover and position valve on spring *(see "Pressure Valve Installation Caution" below)* Position separator plate on regulator cover Hold regulator and cover together and check for free movement of valve. Place regulator body in position on separator plate and install attaching screws *NOTE–Do not install valves at this time as they should be installed after regulator assembly is installed in transmission. See "Transmission Reassembly" below.*

►*MERCOMATIC & TURBO-DRIVE PRESSURE REGULATOR VALVE SPRING & SPACER INSTALLATION CAUTION.* It is extremely important that the spring seat and spacer be installed so that the cupped end fits over the end of the control pressure valve, and the stem fits down through the control pressure spring. Two types of spacers are used in production, one having the small diameter end closed, and the other with the end open. Install either spacer as indicated above.

CONTROL VALVE (Disassembly): 1954 Models–Remove manual valve Take out one screw attaching separator plate to valve body Remove upper body front plate *(NOTE–Plate is spring loaded, apply pressure to plate while removing attaching screws)* Remove compensator sleeve, plug, compensator spring, compensator valve, modulator valve spring and valve, downshift valve and spring Take out two screws attaching throttle valve return spring to upper body, remove the spring Take out remaining screw attaching upper valve body rear plate and remove the plate *(CAUTION–Plate is spring loaded, apply pressure whil removing screws).* Remove 3-2 control valve and spring, low inhibitor valve and spring and governor plug Remove the end body *(CAUTION–End body is spring loaded, apply pressure while removing screws)* Remove low regulator plug and shift valve plug from end body, then remove end body plate Remove shift valve inner and outer springs and shift valve, low regulator valve and transition valve. Remove attaching bolts and separate valve bodies Remove cover end body Remove front servo apply regulator valve from cover. Remove separator plate from upper body Remove check valve seat

CONTROL VALVE (Disassembly): 1955 M d ls–During disassembly of valve avoid damage to valve parts and keep valve parts clean. Place valve assembly on a clean cloth while performing the disassembly operation. *(NOTE–Do not separate the valve bodies until after valves have been removed).* Remove manual valve and remove one screw attaching separator plate to lower valve body. Remove upper body front plate *(NOTE–The plate is spring load d. Apply pressure to plate while removing the attaching scr ws).* Remove compensator spring and plug, remove valve spring and valve. Remove modulator valve retainer, both large and small springs and valve. Remove downshift valve and spring. Remove two screws attaching throttle valve return spring to upper body, then remove spring. Remove the remaining screw attaching upper valve body rear plate to valve body, then remove plate. Remove throttle valve, then the compensator cut back valve. Remove lower body side plate *(apply pressure to plate while removing as it is spring loaded).* Remove the 2-1 shift valve spring and valve, low inhibitor valve and spring, then remove the 2-3 shift valve

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1955 CONTROL VALVE UPPER BODY ASSEMBLY

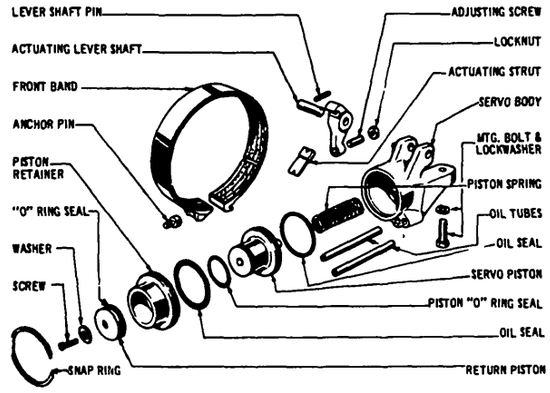
FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

and governor plug. Remove the end body *(End body is spring loaded. Apply pressure while removing attaching screws)*. Remove orifice control valve plug and 2-3 shift valve plug from end body and remove end body plate. Remove 2-3 shift valve outer and inner springs, then remove shift valve. Remove orifice control valve and transition valve and spring. Remove attaching bolts and screws and separate bodies. Remove separator plate from upper body and remove check valve seat, valve and spring from lower body.

Inspection: *(CAUTION–Handle all parts carefully to avoid scoring, burrs and distortion)*. Clean all parts thoroughly in clean solvent and blow dry with air. DO NOT USE CLOTH FOR WIPING PARTS (lint left by a cloth may cause poor valve operation). Inspect all mating surfaces for burrs, scratches, and flatness. Check all passages for obstructions. Inspect all valves and valve bores for scoring and check valves for free movement in bores (valves should slide in bore of own weight). Valves can be polished with crocus cloth.

►*CAUTION–Do not round the sharp edges of valves and plugs.*

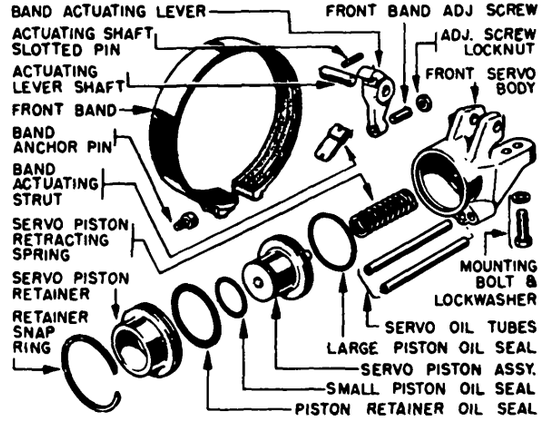
Reassembly (1954 Models): *(NOTE–Arrange parts in correct position. Rotate valves and plugs when inserting them in bores, to avoid shearing of soft body castings)*. Install separator plate on upper valve body, install but do not tighten separator plate screws. Install check valve seat in lower valve body, install front servo apply regulator valve in cover and plug in cover end body. Install cover end body on cover but do not tighten attaching screws. Position lower body on upper body, install lower body cover and attaching bolts.



TURBODRIVE FRONT SERVO & BAND ASSY.

Tighten the bolts evenly to 4-6 ft. lbs., tighten separator plate screws to 20-30 inch lbs. *(CAUTION–Excessive tightening of these bolts may distort valve body and cause valves or plugs to stick)*. Tighten cover and body screws to 20-30 inch lbs. Check for free movement of front servo apply regulator valve by shaking valve body. Install plate on lower end body and make certain that countersunk head screw installed in correct hole. Install low regulator and shift valve plugs in end body. Install transition valve, low regulator valve, and shift valve in lower body. Install shift valve inner and outer springs. Install end body on lower body, install governor plug in lower body. Install low inhibitor valve spring and valve, 3-2 control valve spring and valve, then install lower body side plate. Install modulator plug in upper body, install throttle valve, position upper body rear plate on upper body with plate between end lands of throttle valve, install one screw in hole next to throttle valve, position throttle valve return spring on plate and install remaining plate-to-valve body screws. Install compensator valve and spring, downshift spring and valve, and modulator valve and spring. Install plug in compensator valve sleeve (castellated end out) and install assembly in body. Install upper body front plate, install separator plate-to-lower body screw, install manual valve.

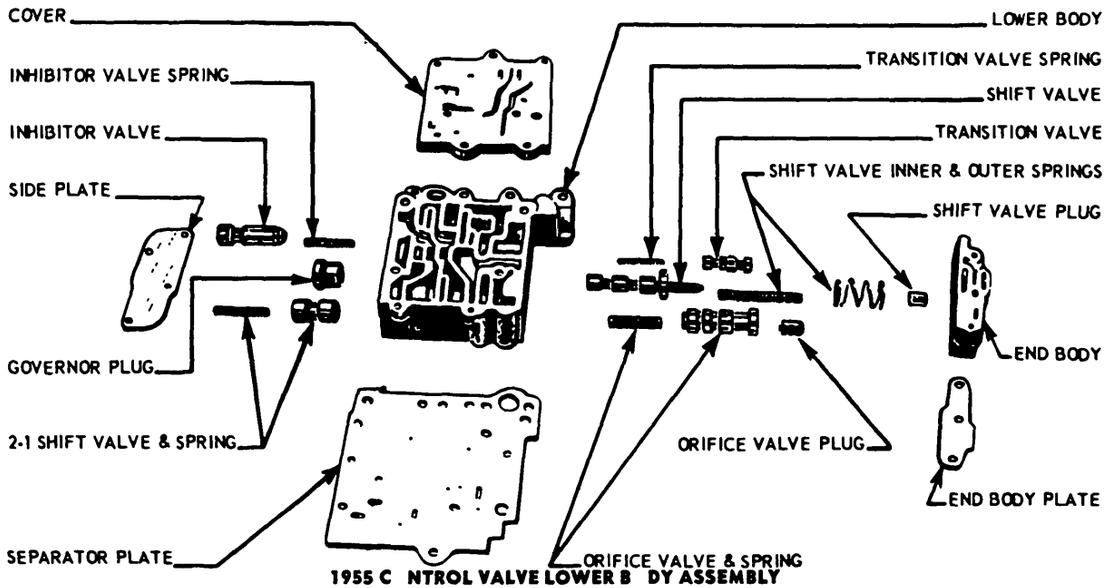
Reassembly (1955 Models): *(NOTE–Arrange parts in correct position. Rotate valve and plugs when inserting them in bores, to avoid shearing of soft metal castings)*. Install separator plate on upper body (do not tighten screws). Install check valve spring, valve, and seat in lower body. Position lower body on upper body. Install lower body cover and tighten attaching bolts finger tight. Align the valve body attaching bolt



TYPICAL FORDOMATIC & MERCOMATIC FRONT SERVO & BAND ASSEMBLY

holes in the separator plate and lower body. Tighten the four valve body bolts to 4-6 ft. lbs. *(CAUTION–Excessive tightening of these bolts may distort valve bodies, causing valves or plugs to stick)*. Install the three lower cover to lower body screws and tighten to 20-30 inch lbs. Install the plate on lower end body and tighten attaching screws. Install orifice control and shift valve plugs in end body. Install transition valve and spring, the orifice control valve and spring, 2-3 shift valve in lower body. Install shift valve inner and outer springs, and install end body on lower body, *(CAUTION–Make sure that inner spring is piloted on shift valve regulator plug)*. Install governor plug in lower body. Install low inhibitor valve spring in valve, and install spring and valve. Install 2-1 shift valve spring in valve, and install valve and spring. Install lower body side plate. Install compensator cut-back valve in upper body. Install throttle valve and position upper body rear plate on upper body with the plate between end lands of throttle valve. Install one plate to body screw in hole next to throttle valve. Position throttle valve return spring on plate, and secure plate in place with the remaining plate to valve body screws. Install compensator valve and spring and downshift

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1955 CONTROL VALVE LOWER BODY ASSEMBLY

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

spring and valve. Install modulator small spring, valve, spring, and retainer as an assembly. Install the plug in the compensator valve sleeve, castellated end out, and install assembly in body, with smooth end toward body. Install upper body front plate. Install separator plate to lower body screw and install manual valve.

GOVERNOR (Disassembly): Remove governor body side plate attaching screws, remove plate. Remove governor body attaching screws and remove body from counterweight. Remove governor valve from body.

Inspection: Inspect valve and valve bore for scores and check free movement of valve in bore. Inspect all fluid passages for obstructions. Inspect mating surfaces for burrs and distortion.

R assembly: Install governor valve in bore of governor body and install body cover plate and attaching screws. Mount governor body on counterweight, making sure that fluid passages line up with passages in counterweight. Install body attaching screws. Tighten body-to-counterweight screws.

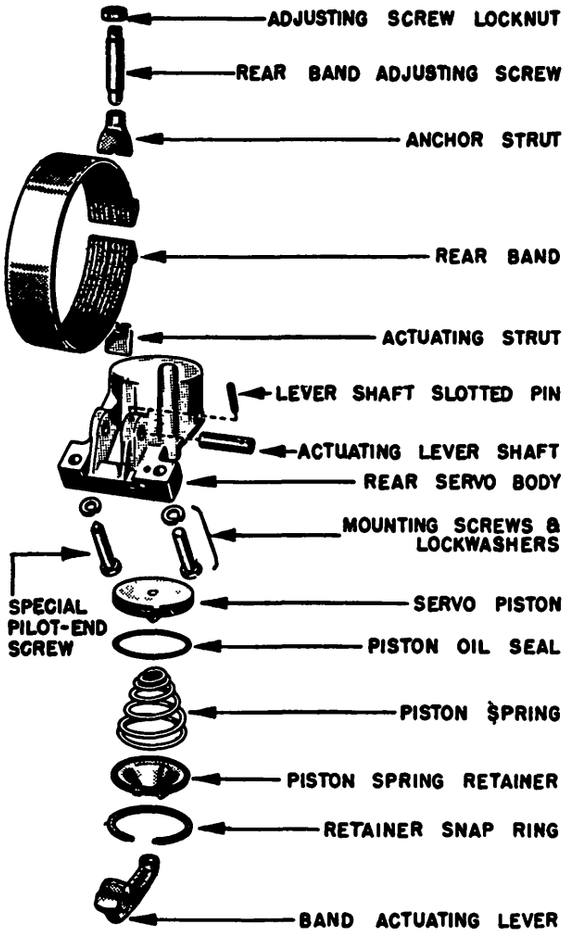
FRONT SERVO (Disassembly–Ford & Mercury): Remove piston retainer snap ring *(CAUTION–Servo piston is spring loaded. Apply pressure to piston when removing snap ring).* Remove servo piston and retainer from servo body (NOTE–If necessary, tap servo piston guide lightly with soft hammer to remove from servo body). Remove servo spring, and remove retainer from piston and seal from retainer.

Disassembly (Lincoln): Proceed as with Ford & Mercury (above), then loosen to one half its length the screw that secures servo piston release piston to servo piston stem. Tap screw head with soft hammer until stem is forced from release piston. Separate release piston, piston retainer and piston. Remove seal from release piston. Remove "O" ring seals from piston.

Inspection: Inspect servo body for cracks. Inspect piston and piston bore for scores. Check fluid passages for obstructions. Check actuating lever for free movement and inspect for wear. (NOTE–If necessary to replace actuating lever or shaft, remove retaining pin and push shaft out of bracket). Inspect threads in lever and on adjusting screw. Check servo spring and servo band for distortion. Inspect servo band lining for excessive wear and bond to metal band. (NOTE–Band should be replaced if worn to a point where grooves are not evident). Inspect bands for cracks and distortion.

R assembly (Ford & Mercury): Install new "O" ring seals on piston, and new oil seal on piston retainer. Lubricate seals and install retainer on piston. Position servo spring in servo body. Lubricate and install piston and retainer assembly in servo body. Press retainer into servo body and install snap ring. *(CAUTION–Make sure snap ring is fully seated in groove).* Install adjusting screw and locknut in actuating lever if previously removed. Check operation by applying air pressure to apply hole.

R ass mbly (Linc ln): Install new "O" ring seals on piston, and install new seal on piston retainer. Lubricate seals and install retainer on piston. Install new oil seal on release piston and retainer piston and



1954 REAR SERVO & BAND ASSEMBLY

piston retainer. Install new "O" ring seals on piston. Install piston in retainer and move piston to full release position in retainer. Place piston release piston in position, concave side toward stem and press into place. Install screw retaining release piston to piston stem. Complete reassembly in same manner as for Ford & Mercury (above).

REAR SERVO (Disassembly): *(NOTE–Ford & Mercury Rear Servo is smaller in diameter than that used on Lincoln).* With a 1/8" pin punch, remove servo actuating lever shaft retaining pin, and remove shaft and operating lever *(CAUTION–Use care when removing actuating lever to avoid losing needle bearings).* While pressing down on servo spring retainer, remove snap ring (release pressure on retainer slowly). Remove retainer and servo spring. Hold hand over piston to prevent damage and force piston from servo body with air pressure. Press down on accumulator piston and hold in this position while removing "cir-clip" type lock ring with lock ring pliers. With lock ring removed, gradually release accumulator piston until all tension has gone from spring. Remove piston seal ring from servo piston.

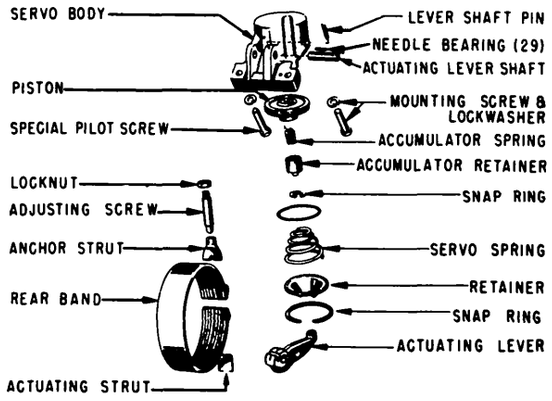
Inspecti n: Inspect servo body for cracks, and piston bore for scores. Inspect servo body-to-transmission case mating surface for burrs. Check fluid passages for obstruction and passage plugs for tightness in body. Inspect piston stem for scores. Inspect accumulator bore and piston for scores and wear, and accumulator spring for distortion. Inspect actuating lever, socket, and shaft for scores and wear. Check needle bearings for wear and distortion. Inspect servo spring for distortion. Inspect servo band lining for excessive wear and bond to metal band. (Band should be replaced if worn to point where grooves are not clearly evident). Inspect band and struts for distortion and band ends for wear.

Reassembly: Install new seal ring in servo piston. Install accumulator spring and piston in servo piston and retain with lock ring. Install piston in servo body (lubricate parts to facilitate assembly). Install servo spring with small end against servo piston and install retainer. Compress spring and install snap ring, making sure that snap ring is fully seated in groove. Place needle bearings in actuating lever shaft hole. With a pencil, position needle bearings around hole. Lock bearings in place by placing thumb over bearings and rotating clockwise. Install actuating lever with socket in lever bearing on piston stem. Needle bearing retainers at each side of actuating lever shaft hole must be installed with actuating lever. Install actuating lever, aligning the retaining pin holes and bearing retainers, and install pin. Check lever for free movement and then check operation of servo by applying air pressure to apply hole.

DISTRIBUTOR SLEEVE (Insp cti n): Inspect all passages for obstructions. Inspect sleeve bore for scores or excessive ring wear. Inspect mating surfaces for burrs and flatness. Check fit of fluid tubes. *NOTE–* Make sure spacer is on center tube.

PINION CARRIER (Inspecti n): Inspect servo band surfaces for scores. Inspect inner bushing for scores. Check free movement of pinions on pins and inspect

CONTINUED ON NEXT PAGE



1955 REAR SERVO & BAND ASSEMBLY

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

for worn or broken teeth. Check pinion endplay (.010-.020"). Pinion pins must be a tight fit in carrier. Check all fluid passages. Check journal bushing for scores. *NOTE*–Planet carrier is serviced only as an assembly.

OUTPUT SHAFT (Insp cti n): Inspect thrust surfaces and journals for scores. Inspect internal gear for broken or worn teeth. Inspect aluminum sleeve for scores and check ring grooves for burrs. Inspect keyway and drive ball socket for wear. Inspect splines for burrs or wear. Inspect external parking gear teeth for damage and speedometer drive gear for burrs.

EXTENSION HOUSING (Inspection): Inspect housing for cracks and drive shaft slip yoke bearing surface for scores. Inspect gasket surface for burrs. If inspection reveals it necessary to remove rear seal, use tool No. 1175-AB. (NOTE–Rear seal may be replaced without removing transmission from car). Use tool No. 7657 (1954); No. 7657-D (1955) and install new seal in extension housing. Remove inspection cover and gasket and check fluid baffle for tight fit in housing.

TRANSMISSION CASE LINKAGE (Disassembly): Remove throttle lever nut and take off inner and outer throttle levers. Remove throttle lever shaft seal from counterbore in manual lever shaft. Remove parking mechanism actuating rod, detent ball and spring. Remove manual lever shaft nut, detent and outer manual lever and shaft. Remove torsion lever retainer clip and take off torsion lever assembly. Disassemble torsion lever assembly by rotating lever while holding spring. Disengage pawl return spring from toggle link pin and remove pin. Remove pawl pin by working pawl fore and aft until pin protrudes from case. Remove toggle pin retainer clip, toggle pin, pawl return spring, spring retainer and link. Remove toggle lever pin by tapping lever toward rear of case, then remove plug, toggle lever pin and lever (NOTE–toggle lever pin is held in place by the plug). Remove manual shaft seal and transmission vent from case.

Insp cti n: Inspect each part of parking mechanism for wear, distortion or other damage.

R ass mbly: Assemble toggle lever, link, pawl return spring and pawl and install assembly in transmission case. Install toggle lever and pawl pins. Install torsion lever assembly. (NOTE–Use screwdriver to position spring on torsion lever). Install washer and retainer clip. Coat outer diameter of new manual shaft seal with Permatex No. 3 and use Tool 77288 to install seal in case. Install manual lever and shaft in case, mount detent lever and tighten attaching nut to 35-40 ft. lbs. torque. Install detent spring and ball *(NOTE–* use a piece of thin tubing to depress ball and spring while rotating detent). Position ends of parking pawl torsion lever rod in detent lever and torsion lever and secure with cotter pins. Install new seal on throttle lever shaft, install outer throttle lever and shaft in case, install lever on inner end of shaft and tighten attaching nut to 35-40 ft. lbs. Check linkage for free operation without binding.

TRANSMISSION CASE (Insp cti n): Inspect case for cracks and stripped threads. Inspect all gasket and mating surfaces for burrs. Inspect all bearing surfaces for wear, scores, and burrs.

TRANSMISSION REASSEMBLY

►*REASSEMBLY CAUTION: Use Automatic Transmission Fluid Type "A" only to lubricate parts for assembly. DO NOT use any other form of lubricant. Use all new gaskets and tighten all bolts and screws to correct torque specifications. DO NOT USE FORCE WHEN ASSEMBLING PARTS. If parts do not assemble freely, examine parts for cause of difficulty.*

CLUTCH ASSEMBLIES: Install front band in transmission case so that anchor end aligned with anchor in case. Install clutch assemblies into transmission case from the rear *(CAUTION–Do not allow clutches to separate)*, while positioning servo band on drum. Hold units together while making installation. Position center support in case, aligning hole in center support with hole in right hand side of case. Install right and left hand center support outer bolts and external tooth lockwashers *(CAUTION–Lockwashers must be installed with the rolled edge toward transmission case to insure tight seal).*

PINION CARRIER & OUTPUT SHAFT: Position rear servo band in transmission case, with the strut ends up. Place anchor end (identified by a depression in center of strut retainer), toward adjusting screw. Install a bronze thrust washer on thrust face inside pinion carrier. To install pinion carrier assembly, position rear band over drum while meshing the planet pinions. Install two seal rings on primary sun gear shaft, and check rings for free movement in grooves. Install selective thrust washer on rear of planet carrier, retaining it in place with the transmission fluid. *(NOTE–If endplay was not within specifications, when checked prior to disassembly, replace washer with one of proper thickness).* Install output shaft, carefully meshing internal gear with pinions.

REAR PUMP: Position rear pump drive key in keyway on output shaft. Position new front and rear gaskets on pump body, retaining gaskets with transmission fluid. Install thrust washer on pump body with the bronze side up. Align thrust washer tangs with bosses on pump body, then install the rear pump *(CAUTION–* Be sure drive key is aligned with keyway in pump drive gear).

GOVERNOR: Position governor drive ball in the pocket in output shaft. Retain ball with transmission fluid. Install governor assembly aligning groove with ball in output shaft. Install governor snap ring. *NOTE–Install governor with the governor body plate toward front of transmission.*

DISTRIBUTOR: Place the four seal rings in distributor sleeve, and check ring gap. Check fit of seal rings in grooves of output shaft. Install distributor sleeve on output shaft, chamfer forward (lubricate parts to aid assembly). Install distributor and tubes on sleeve, making sure passages in sleeve and distributor are aligned. Install attaching bolts and lockwashers. Tighten bolts finger tight. Insert distributor tubes in transmission case, until spacer on center tube is against case; then tighten distributor attaching bolts to 8-10 ft. lbs. Install a new seal on rear pump outlet tube and install tube in transmission case and rear pump body.

EXTENSION HOUSING: Position speedometer drive gear ball in pocket in output shaft, retaining it with fluid. Install speedometer drive gear, and gear snap ring. Insert extension housing oil seal replacer and pilot in housing, then install extension housing on transmission case. Install attaching bolts and external tooth washers. *(CAUTION–Washers must be installed with rolled edge toward transmission case to insure a tight seal).* Tighten extension housing attaching bolts to 28-30 ft. lbs. Install governor inspection cover and a new gasket on housing.

FRONT PUMP: Position a new front pump gasket in counterbore of transmission case. Install front pump, aligning pump bolt holes with holes in case. Install three of the pump attaching bolts and tighten them to 17-22 ft. lbs.

TRANSMISSION ENDPLAY (Checking): Mount a dial indicator support on front pump bolt hole. Mount dial indicator on support so that contact rests on end of turbine shaft. Use a large screw driver to pry front clutch drum toward rear of transmission. Set dial indicator to zero. Remove screw driver and pry units toward front of transmission case by inserting the screw driver between large internal gear and transmission case. Note indicator reading. Endplay should be .010-.029". Remove indicator and remove tool from extension housing. Install the one remaining front pump attaching bolt and tighten it to 17-22 ft. lbs.

FRONT SERVO: Position front band forward in case with band ends up. Position servo strut with the slotted end aligned with servo actuating lever and the small end aligned with band end. Rotate band, strut, and servo into position engaging anchor end of band with anchor end in case. Locate servo on dowel in case, then install attaching bolt (or bolts), tightening them only two or three turns. Install servo tubes.

REAR SERVO: Position servo anchor strut, then rotate rear band to engage the strut. Position servo actuating lever strut with a finger, then install servo and attaching bolts. Tighten bolts to 40-45 ft. lbs.

PRESSURE REGULATOR BODY: Install pressure regulator body and attaching bolts and tighten bolts to 17-22 ft. lbs. Install control and converter valve guides and springs and install spring retainer. Install a new seal ring on rear pump intake tube, then install tube in case. *NOTE–On 1955 models when installing spring retainer be sure that both tangs attach at th same time.*

CONTROL VALVE BODY: Install control valve assembly, using care to align servo tubes with control valve. Align the inner throttle lever between throttle lever stop and downshift valve, and at the same time push the throttle valve in to clear transmission case. *(CAUTION–Align manual valve with actuating pin in the manual detent lever. Do not tighten attaching bolts).* Install the large control pressure tube in valve body and regulator. Install small control pressure compensator tube in valve body and regulator. Install lubrication tube in rear pump and regulator body.

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

Tighten control valve body attaching bolts to 8-10 ft. lbs. Tighten front servo attaching bolts or bolt to 30-35 ft. lbs.

ADJUSTMENT (Front Servo): Loosen front servo adjusting screw locknut, then back nut off three turns. Loosen adjusting screw five complete turns. Using the front band adjusting wrench, tool No. 7225, insert a ¼" spacer between lever and stem, then tighten the screw until ratchet overruns. **Back the adjusting screw on complete turn,** then tighten locknut to 20-25 ft. lbs.

ADJUSTMENT (Rear Servo): Loosen adjusting screw locknut three turns with a ¾" socket of the rear band adjusting wrench. Back off the adjusting screw until free travel is obtained. Using tool No. 7195, tighten adjusting screw until ratchet overruns, then back off the adjusting screw 1½ turns. Hold rear servo adjusting screw stationary, and tighten the locknut to approximately 40 ft. lbs.

FLUID SCREEN & PAN: Position fluid screen over rear pump inlet tube then over front pump inlet tube. On 1955 models press screen down firmly and install screen retaining clip. In trucks, position the oil cooler (if so equipped) to sump discharge tube in case. Place a new gasket on transmission case, then install the pan Install attaching bolts and lockwashers and tighten to 10-13 ft. lbs.

TRANSMISSION & CONVERTER INSTALLATION

1954 FORD 6 & V8

1) Position converter assembly in transmission housing *(CAUTION–Make sure that converter does not slip from housing during installation).* Raise assembly on a jack until transmission extension housing can slide back over frame crossmember (on 6 cyl. models) Install flywheel assembly on engine crankshaft flange and tighten bolts to 75-85 ft lbs

2) Remove all dirt, grease and burrs from converter pilot bore in flywheel Apply a heavy film of white lubricant evenly on converter bearing surface *(NOTE–Excessive lubricant in pilot bore will prevent proper entry of converter pilot into bore, and will force converter rearward, scoring the front pump)*

3) Move the assembly forward and properly align converter pilot and housing dowel holes Install the four lower converter housing-to-engine attaching bolts **but do not tighten at this time.** Align both of the flywheel access holes with drain plugs in converter cover then tighten the converter housing-to-engine attaching bolts to 40-45 ft lbs *(CAUTION–If converter housing-to-engine bolts are tightened when converter cover and flywheel are not properly aligned, it will be n cessary to check flywheel for distortion, and housing and impeller flange for cracks or damage Front pump will also have to be checked for damag).* Check converter assembly for binding by shifting the assembly back and forth by hand If no binding exists, install the six flywheel-to-converter bolts and tighten them to 25-28 ft lbs. If a binding condition exists, converter and housing must be realigned.

4) Raise engine and replace the crossmember, then install the crossmember bolts Lower the assembly onto crossmember and install engine rear support bolts. Remove engine support bar. Apply a coating of Automatic Transmission Fluid to universal joint knuckle, and install drive shaft Install parking brake and speedometer cable

5) Connect manual and throttle linkage to transmission levers Install the converter housing cover (V8 models) or the access plate (6 cyl. models). Then install the starter Install the fluid filler tube to transmission oil pan and tighten securely Install remaining converter housing-to-engine attaching bolts Lower car to floor

6) Install the two top converter housing-to-engine bolts and tighten to 40-45 ft. lbs., and replace the two rubber access hole plugs. Fill transmission with Automatic Transmission Fluid Type "A" Check converter and transmission assembly for fluid leakage, then adjust the manual and throttle linkages.

1955 FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD & SUNLINER)

1) If converter has been removed from converter housing, position converter in housing, then install converter housing lower cover plate (8 Cyl.), or wedge converter in places (6 Cyl.) to prevent converter slipping out of housing. Rotate converter until drive plate bolt holes are in horizontal position (8 Cyl.), or in the vertical position (6 Cyl.). Position flywheel on crankshaft fl nge, then install attaching bolts

2) Move converter and transmission assembly forward into position, using care not to damage converter drive plate and converter pilot. Install lower converter housing to engine bolts and tighten them to 40-45 ft. lbs. Install crossmember on pass. cars. Lower transmission until extension housing rests on crossmember and install extension housing to crossmember bolts.

3) On trucks, install converter housing to crossmember bolts. On all vehicles position flywheel drive plates, and install drive plate attaching bolts. Tighten drive plate bolts to 28 ft. lbs. Install converter drain plugs and access plates. On trucks, position the oil cooler on support brackets, then install cooler. Connect oil inlet and outlet lines to transmission.

4) Coat universal joint knuckle with transmission fluid, then install drive shaft. Connect speedometer cable at transmission. Connect manual linkage at transmission manual lever. Install converter air duct and the linkage splash shield (pass. cars), exhaust duct shield (trucks).

5) Install starter motor and connect transmission to frame ground strap at transmission. Connect fluid filler tube to oil pan. Lower hoist, then position water inlet and outlet lines on oil cooler. Tighten hose clamps securely. Install the upper two converter housing to engine bolts and tighten to 40-45 ft. lbs. Replace covers on converter housing access holes and floor mat. Fill radiator with water.

6) Fill transmission with Automatic Transmission Fluid Type "A" *(see "Lubrication" above).* Check transmission and converter assembly for fluid leaks, adjust manual and throttle linkages *(s e "Linkage Adjustment" above)*

THUNDERBIRD

►*INSTALLATION NOTE: Converter and transmission assembly must be installed before engine installed in chassis. The converter and transmission assembly can be installed in the chassis separately befor engine is installed, or converter, transmission, and engine may be installed together as a unit*

1) To attach converter and transmission to engine before assembly into chassis as a unit, first align converter pilot, housing dowel holes, and drive plate holes. Remove all foreign material from converter pilot bore in crankshaft. Apply a heavy film of lubricant evenly on converter pilot bearing surface. *(CAUTION–Excessive lubricant in pilot bore will prevent proper entry of converter pilot into bore, forcing converter rearward and scoring front pump)*

2) Install pilot studs in two of the converter housing to engine bolt holes. Remove converter housing lower front cover plate. Move converter and transmission forward into position using care not to damage converter drive plate and converter pilot. Install four converter housing to engine bolts, remove pilot studs, then tighten bolts to 40-45 ft. lbs

3) If engine has been removed separate from converter and transmission assembly, mount transmission on a transmission floor jack and position assembly in car. Connect drive shaft to transmission output shaft. Install the two extension housing to rear engine support bolts. Connect speedometer cable and manual linkage at transmission. Install engine lifting sling and lower engine carefully into engine compartment, starting converter pilot into crankshaft. Make sure studs on manifold are aligned with holes in muffler inlet pipe, and dowels in block engage holes in converter housing. Raise car and position jack stands. Install engine front insulator bolt, and right and left hand insulator support bolts. Connect exhaust pipe to manifold and lower car to floor

4) Install two lower converter housing to engine bolts and tighten them to 40-45 ft. lbs. (Tighten bolts slowly and evenly to avoid binding on dowel pins). Install converter housing to engine bolts and tighten them to 40-45 ft. lbs. Align flywheel and drive plate bolts with converter. Install the six bolts and tighten them to 25-28 ft. lbs. Complete engine installation.

1954-55 MERCURY 1955 LINCOLN

1) Position transmission and converter assembly under car, raise it into position and move it forward to engage converter pilot with hole in crankshaft *(CAUTION–*Guide assembly carefully to avoid damage to flexible drive plate and converter pilot).

2) Install converter housing attaching bolts and tighten to 40-45 ft. lbs. Install six bolts securing converter to flexible drive plate and tighten to 25-28 ft. lbs. (On 1954 Mercury & 1955 Lincoln, install detachable frame crossmember to "X" member) Install engine rear mount to transmission Remove engine support tool, lower engine and install rear engine mount to crossmember bolts and remove lift Connect speedometer cable at extension housing

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

3) Connect throttle and transmission manual linkage to transmission levers. Adjust linkage (see "Linkage Adjustment" above). Install converter housing upper plate with new seal. Install starter, converter drain plugs, and place fluid filler tube on pan and tighten filler hex nut to 40-50 ft. lbs.

4) Install converter housing lower plate. Install duct on converter housing and deflector between frame and housing. Install drive shaft, (lubricate front universal slip yoke to aid installation). (On 1955 Mercury with single exhaust, install exhaust system). Check operation of neutral switch. Install throttle linkage bracets to engine and body using original nuts and bolts. Install battery ground cable. Fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above).

TRANSMISSION INSTALLATION (WITHOUT CONVERTER)

1954 FORD 6 & V8

1) Install two special guide pins in the top transmission-to-converter housing attaching bolt holes. mount transmission jack and position it under car. Rotate the engine to position front pump drive lugs on converter pump assembly in a vertical position. Rotate front pump to position the slots in the pump assembly in a vertical position. Apply lubriplate to seal the surface on converter pump cover hub. Raise transmission and move it toward front of car.

2) *(CAUTION–B sur to align turbine shaft splines with turbin hub splin s and the converter pump lugs with sl ts in fr nt pump drive gear).* Install the two lower transmission-to-converter housing attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Tighten bolts to 40-45 ft. lbs.

3) Raise engine and install frame crossmember, then install crossmember bolts. Lower engine onto crossmember and install engine rear support-to-transmission bolts. Remove engine support bar and install drive shaft. Install parking brake assembly and speedometer cable. Connect manual & throttle linkage to transmission levers.

4) Install transmission drain plug. Fill transmission with Automatic Transmission Fluid Type "A". Check transmission for indications of leakage.

1955 FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD & SUNLINER)

►*NOTE: On Thunderbird and Sunliner it is not possible to remove the transmission (without converter) due to limited clearance.*

1) Install guide pins in the two top transmission to converter housing bolt holes. Mount transmission on jack and position it under vehicle. Rotate engine to position the front pump drive lugs on converter impeller housing in a vertical position. Rotate front pump to position slots in front pump drive gear in a vertical position. Apply lubriplate to seal the surface on the converter impeller cover hub. (If a new transmission is being installed, position a new rubber extension housing duct shield over end of housing).

2) Raise transmission and move it toward front of vehicle *(CAUTION–*Be sure to align the turbine shaft splines with turbine hub splines and the converter impeller lugs with slots in front pump drive gear).

3) On trucks, position the oil cooler front support bracket on case. On all vehicles, install the lower transmission to converter housing attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Tighten bolts to 40-45 ft. lbs.

4) On cars, install the frame crossmember and bolts. Lower transmission onto crossmember and then install engine rear support to transmission bolts. On trucks, position the oil cooler on the support bracket and install attaching bolts. Connect oil cooler to transmission oil lines at transmission. Tighten fittings securely. Install universal joint yoke onto transmission output shaft and connect drive shaft

5) On F-250, F-350 & P-350 trucks, coat universal joint knuckle with transmission fluid. Install the four bolts attaching drive shaft coupling yoke at the parking brake assembly, then connect drive shaft at rear axle. Connect speedometer cable at extension housing.

6) Connect manual linkage and throttle linkage to transmission levers and adjust the linkage (see "Linkage Adjustment" above). Connect fluid filler tube to oil pan and tighten fitting securely. Lower vehicle to floor and fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above).

1954-55 MERCURY

1955 LINCOLN

1) Install guide pins, tool No. ST-0711 into top transmission to converter housing attaching bolt holes. Mount transmission on lift and position under car. Rotate engine to position front pump drive lugs on converter pump housing in a vertical position. Rotate transmission front pump to position slots in pump drive gear in a vertical position. Apply lubriplate to seal surface on converter pump cover hub.

2) Raise transmission and move toward front of car *(CAUTION–*Use care to index turbine shaft splines with turbine hub, and lugs on converter pump with slots in front pump drive gear). Install two lower transmission to converter housing attaching bolts. Remove the two guide pins and install two upper attaching bolts and tighten to 40-45 ft. lbs.

3) On 1954 Mercury & 1955 Lincoln, install detachable crossmember to "X" member. Install rear engine mount to transmission.

4) Raise engine and transmission sufficiently to remove engine support fixture. Lower unit to crossmember and install rear engine mount to crossmember bolts. Install drive shaft. (Lubricate front universal joint yoke with transmission fluid to aid assembly).

5) Connect speedometer cable at extension housing. Connect manual and throttle linkage to transmission levers. Adjust linkage (see "Linkage Adjustment").

5) On 1955 Mercury with single exhaust system, install exhaust system. Place fluid filler tube in position on pan and tighten filler tube hex nut to 40-50 ft. lbs. Remove support stands and lower car to floor. Fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above). Road test car.

FORDOMATIC, MERCOMATIC & TURBO-DRIVE TRANSMISSION

F rd Pass. Cars (1956-57)
F rd Trucks F-100, 250, 350, P-350, 500 (1956-57)
F rd Trucks P-400 (1957)
Lincoln & Continental (1956-57)
M rcury (1956-57)

►CHANGES, CAUTIONS, CORRECTIONS

►*POOR ACCELERATION OR LACK OF POWER ON HILLS NOTE:* This condition may be caused by converter clutch slippage due to improperly installed clutch sprags. To determine if converter clutch is at fault, perform a stall test *(see "Stall Test" below).* A slipping converter clutch will cause a decrease of 300-400 RPM in specified stall speeds. Inspect sprags as one or more may be turned 180° which would prevent clutch locking up. See "Torque Converter Overhaul" below.

►*AUTOMATIC TRANSMISSION FLUID COLOR CHANGE:* Fluid having a red dye in it may be found in 1957 transmissions. This color is being added to aid in detecting oil leakage. Uncolored fluid may be mixed with colored fluid.

►*1956 PRESSURE TAKE-OFF LOCATION CHANGE (THUNDERBIRD & INTERCEPTOR):* These models now have the pressure take-off plug located at left rear of transmission case just above oil pan.

►*1956 LOCK-UP CONDITION (BELOW 18 MPH IN INTERMEDIATE RANGE) CORRECTION:* This condition is caused by cross leakage in the front servo piston. Check front servo piston carefully for radial cracks that might cause leakage.

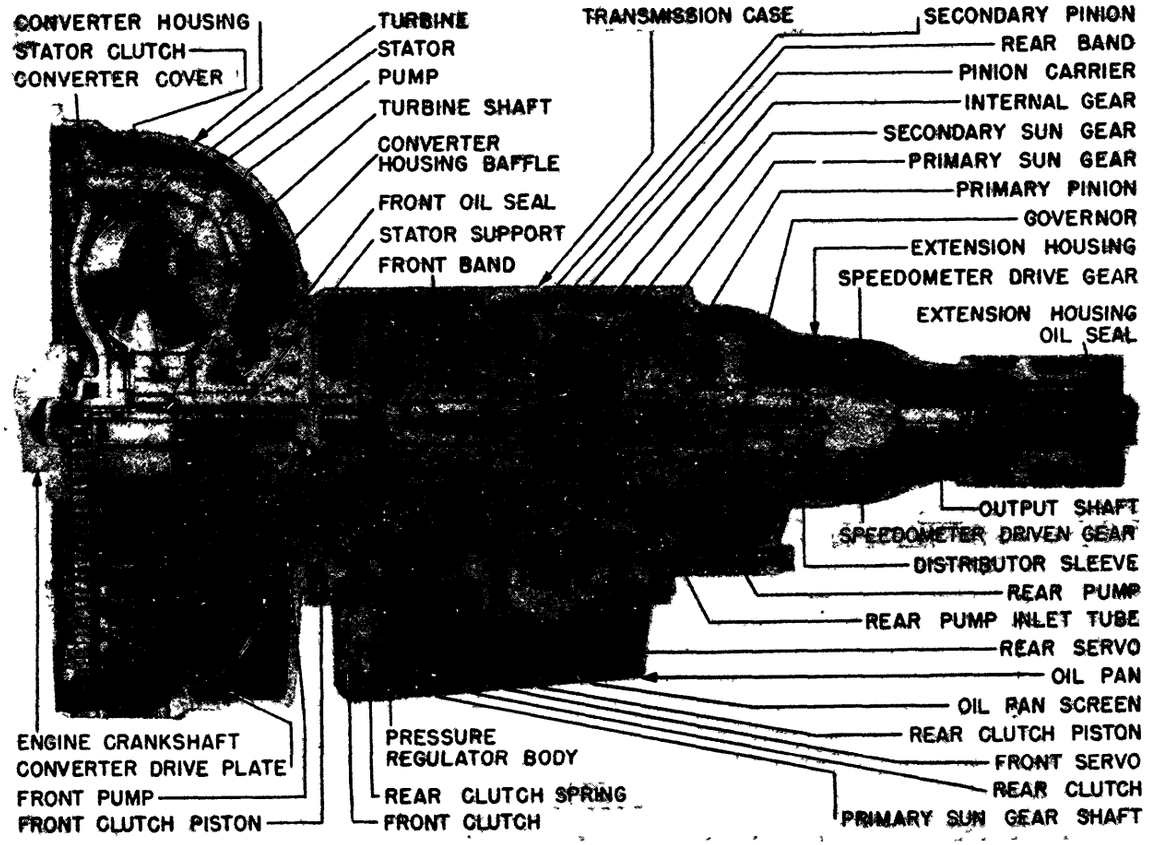
►*1956 FORDOMATIC CONVERTER STATOR CLUTCH PRODUCTION CHANGE:* A new 16 sprag stator clutch, Part No. B6A-7940-A, replaces the former 20 sprag clutch. When installing the later type clutch, the flanged edges must face front of transmission

►*1956 FORDOMATIC CONTROL VALVE ASSEMBLY IDENTIFICATION:* Three different control valve assemblies which are identified by a letter located on lower valve body as follows:

Model	Identification Letter
6 Cyl. Cars & Trucks	"S"
8 Cyl. Cars (272" Eng. & 2-Bbl. Carb.)	"S"
8 Cyl. Cars (272" Eng. & 4-Bbl. Carb.)	"E"
8 Cyl. Trucks	"E"
8 Cyl. Pass. Cars (292" Eng.)	"F"
Thunderbird & Police Interceptor	"T"

►*1956 FORDOMATIC TORQUE CONVERTER ASSEMBLY PRODUCTION CHANGE & REPLACEMENT PARTS (V8 MODELS):* Beginning approximately Jan. 15, 1956 a new steel impeller housing and a redesigned turbine is used. The later type turbine, Part No. B6A-7920-A can be used to replace the earlier turbine, however, the earlier turbine, Part No. B5A-7920-A, must not be used with the steel type impeller.

►*1956 FORDOMATIC PRESSURE REGULATOR ASSEMBLY PRODUCTION CHANGE (On cars with the n w ste l impell r):* Pressure Regulator, Part No. B6A-77440-E is used on 8 Cyl. models (except Thunderbird and Interceptor) and is identified by a white colored main regulator spring. Pressure Regulator, Part No. B6A-77440-F is used on Thunderbird & Interceptor, and is identified by a red main regulator spring.



FORDOMATIC, MERC-O-MATIC & TURBO-DRIVE TRANSMISSION SECTIONAL VIEW

►*1956 FORDOMATIC & MERCOMATIC REGULATOR REPLACEMENT CAUTION (Cars with aluminum type impeller):* The later type regulator used with the steel impeller converter, must not be used on cars having an aluminum impeller housing as serious damage would result. The converter for use with the steel impeller converter can be identified by the omission of the .280" diameter hole under the intake regulator body cover.

►*1956 FORDOMATIC "RAPPING" OR "THUMPING" NOISE CORRECTION (Cars with steel converter):* Correct by installing a low pressure regulator valve, Part No. B6A-77464-A (converter pressure). The new valve can be identified by either a "flat" or "groove" in center land of valve. All transmissions that are equipped with the steel torque converter and have the later type valve installed, are identified by a daub of white paint adjacent to name plate. *CAUTION - Do not att mpt to machine th arlier typ valv as th short intermediate land would prev nt transmission lubricating system from receiving proper amount of lubricant.*

►*1956 FORDOMATIC & MERCOMATIC TRANSMISSION SERVICE REPLACEMENT CASE NOTE:* The transmission case, Part No. B6A-7005-A, used for service replacement has two tapped holes for attachment of fluid cooler lines. When this case is installed on cars not having the fluid cooler, the holes should be plugged with 1/8" pipe plugs.

►*1956 FORDOMATIC STEEL TORQUE CONVERTER UNBALANCE CORRECTION:* This unbalance occurs when converter is filled with fluid and will appear as engine vibration during a standing engine run-up between 900-1000 RPM; 1500-1700 RPM; and 2000 RPM and over. Correct by removing converter and rotating its mounting position 180°.

►*1956 FORDOMATIC & MERCOMATIC REAR CLUTCH PLATE NOTE:* Ford Thunderbird & Interceptor models and all Mercury models have five bronze and five steel clutch plates in rear clutch assembly. A thinner clutch piston is also used with these assemblies which must not be used on models having the four bronze and four

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

steel clutch plate assemblies.

►*1956 FORDOMATIC TORQUE CONVERTER BOLT INTERFERENCE CORRECTION:* On early transmissions with steel torque converter, interference between converter bolts and starter seal can be eliminated by using the shorter converter bolts, Part No. B6A-7964-B.

►*1956 TURBO-DRIVE & MERCOMATIC THROTTLE CONTROL INNER LEVER ENDPLAY CORRECTION & PRODUCTION CHANGE:* A new inner lever, Part No. B5A-77283-A has been released for service replacement to correct excessive endplay. The lever is stamped with the letter "O" and should be installed with the "O" toward inside of transmission.

►*1956 TURBO-DRIVE & MERCOMATIC PRESSURE TAKE-OFF PLUG LOCATION NOTE:* The take-off hole is located in rear wall of transmission case, and oil pressure is directed from control valve assembly through a hole in bottom gasket surface, near rear of case on name plate side, to the take-off hole. If the 1956 type case is used with a 1955 main control assembly, Part No. PMB-77700-A, B, C, D, it will be necessary to use PMB-77715-D separator plate, or drill a hole in the existing plate comparable to the hole in PMB-77715-D plate.

►*1956 TURBO-DRIVE & MERCOMATIC FRONT SERVO CAUTION:* The front servo is redesigned and the parts are not interchangeable with 1955 parts.

►*1956 MERCOMATIC CONVERTER HUB FAILURE CAUTION:* In case of converter hub driving lug failure, check and make sure the engine-to-converter housing locating dowels are present. If these dowels are missing, the resulting misalignment could cause additional lug failure.

►*1956 MERCOMATIC TORQUE CONVERTER ASSEMBLY PRODUCTION CHANGE:* A new water cooled torque converter having a steel impeller housing and a redesigned turbine are now being used in production. This later torque converter is identified by the omission of openings for air intake, baffles and exhaust.

►*1956 MERCOMATIC "THUMPING" NOISE CORRECTION (Cars with ste l converter):* Install Pressure Regulator Assembly, Part No. B6A-77440-F having the later type converter pressure regulator valve. The later type valve is identified by either a machined "flat" or "groove" in the intermediate land.

►*TORQUE CONVERTER REASSEMBLY (STEEL CONVERTER) CAUTION:* When the impeller is attached to converter cover, with the new square head bolts, it is important that the balance marks stamped "O" on cover and etched "O" on impeller housing be in alignment.

►*1957 FORDOMATIC, MERCOMATIC & TURBO-DRIVE TORQUE CONVERTER STATOR CLUTCH PRODUCTION CHANGE:* A new converter stator clutch assembly Part No B7A-7940-B having two brass drag strips replacing the "T" bar on the inner cage insures positive engagement of the sprags The new clutch assembly which replaces Part No B7A-7940-A & PAR-7940-B has fourteen sprags compared to 16 sprags in the earlier assemblies When installing the new assembly inner race into stator clutch, care must be taken to prevent bending the drag strips. The stator clutch sprag assembly must be assembled into outer race so that the flange on the cages will face toward the front of car and drag strips face toward rear. *CAUTION- To prevent repeat failures in service, DO NOT race engine in neutral, or stall test immediately after an overhaul. DO NOT operate car at full throttle until car has been driven 5-10 miles after overhaul.*

►*1957 FORD V8 FLYWHEEL PRODUCTION CHANGE:* A new one-piece flywheel, Part No. B7A-6375-A is being used on all Fordomatic Cars. When installing converter to flywheel, align converter drain plugs with flywheel drain plug slots. A reinforcing plate, Part No. B7A-6383-A is used between crankshaft bolts and the new flywheel

►*1957 MERCURY REVERSE AND PARK INHIBITOR SWITCH PRODUCTION CHANGE:* On later cars, the switch mechanism formerly mounted on the transmission is now mounted in the drivers compartment. A two-piece speedometer cable provides the drive for the switch and for the speedometer. When replacing the early type switch, use Kit, Part No. MHK-15824-A. Installation instructions are included with the kit. *NOTE* - When replacing the switch on air conditioned cars, it should be mounted to the left of steering column to prevent interference with air conditioner plenum chamber.

►*1957 FORD "DOWNSHIFT CLUNK" CORRECTION:* If a 3-2 downshift "clunk" is evident when coasting to a stop, with no throttle applied, and a linkage adjustment will not correct the condition, rear clutch plates, Part No. B6A-77519-A, should be installed. These plates can be identified by eight oil grooves on each side of plate.

►*1957 FORD SPEEDOMETER DRIVEN GEAR CORRECTION (GEAR FALLS INTO TRANSMISSION):* Remove drive gear and retainer and bend retainer so that distance between legs at center is .330-.350". Position driven gear on the cable to its full depth, making certain that inner core is fully seated in square hole of gear. Insert retainer clip through slots of driven gear to secure gear to cable with closed end of clip riding against gear.

►*1955-57 LINCOLN & CONTINENTAL MANUAL DETENT LEVER & SPRING CHANGE (To minimize effort in shifting selector quadrant lever):* A new manual valve detent lever, Part No. PAN-77280-A, and lever spring, Part No. PAN-77276-A, are available for service replacement. These parts are interchangeable individually with the parts formerly used.

►*1957 MERCURY CONVERTER HOUSING LOWER COVER SERVICE REPLACEMENT NOTE:* Converter housing lower cover, Part No. 77979-A, may be used to service either the cast iron or aluminum converter housing. When used on aluminum housing, the retaining tang must be bent down toward cover to provide a tight fit.

►*1957 MERCURY "NO DOWNSHIFT" CORRECTION (EARLY CARS):* If kickdown cannot be obtained with properly adjusted linkage, install a new adjustable type accelerator rod, Part No. MG-9784-B, as follows: Set new rod to shortest overall length and install it in position. Adjust rod 2 or 3 turns until proper kickdown obtained. When rod is properly adjusted, distance between accelerator pedal and bare floor pan will be about 4" *(CAUTION* - Excessive adjustment will cause accelerator shaft to ride on engine block).

►*1957 LINCOLN & MERCURY (WITH 368" ENGINE) CONVERTER STATOR REAR THRUST WASHER CHANGE:* A new steel backed bronze thrust washer, Part No. PAN-7937-D has been added between the stator and impeller because of the increased thrust. A new aluminum thrust washer PAN-7937-C is used in conjunction with PAN-7937-D, replacing the former washer. When wear is found on rear converter stator thrust washer in early production cars, the new washers should be installed.

►*1957 MERCURY PARK HANDLE LOOSE ROLL PIN CORRECTION:* Install a new, longer roll pin, Part No. 353660-S2 in park slide handle. Spread the slot in the new pin slightly to insure a good fit and then install with slot facing rear of car.

►*1957 MERCURY ERRATIC OR IMPROPER SHIFT PATTERN:* This condition may be caused by improper installation of transmission main control assembly. S *"Transmission Reassembly" below.*

►*1951-57 MERCURY MANUAL CONTROL LEVER REPLACEMENT NOTE:* Two types of manual control lever assemblies are furnished for service replacement and both have the same part number. On one type, the lever is "staked" to shaft, and on the other, the lever is brazed to shaft. When using the staked type, spacer Part No. PAR-77351-A must also be used.

►*1957 MERCURY PARKING PAWL LINKAGE PRODUCTION CHANGE:* The following parking pawl parts are being used in production. Do not intermix these parts with previous parts as the later type parts must be used together. Brake Pawl, Part No. PBA-77311-B; Toggle Lever Link Pin, Part No. PBA-77317-B; Toggle Link Pin, Part No. PBA-77318-B; Toggle Link, Part No. PBA-77316-C.

►*TRANSMISSION IDENTIFICATION NOTE:* Transmission Model No. and Serial No. on name plate on left side of transmission case must be used to identify individual units for parts replacement etc.

►*STARTING ENGINE BY TOWING OR PUSHING CAR:* Pushing is recommended. Place selector lever in Neutral "N" position. When car reaches 20 MPH speed, turn on ignition, move selector lever to "LO", depress accelerator pedal to half throttle position until engine begins to run. *NOTE—On ice or snow where traction not good, move selector lever to "DR" position to crank engine.*

►*TOWING CAR CAUTIONS: Do not tow at speed greater than 40 MPH and observe following precautions:*

If Transmission Operating Properly—Place selector lever in Neutral "N" position. Car can be towed normally for distances not to exceed 12 miles. **For great r distances, use same procedure as for inoperativ transmission.**

If Transmission Inoperative—Tow car with rear wheels lifted off road, or disconnect and remove propeller shaft and protect rear end of transmission from entry of dirt (U-joint Knuckle, Part No. 1M-4841 can be installed and wired in place for this purpose).

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

DESCRIPTION

Fordomatic, Merc-O-Matic, & Turbo-Drive Automatic Transmissions consist of a hydraulic torque converter and a three speed planetary type transmission which provides automatic operation in "DR" range, "LO", "R", & "P" ranges are controlled manually. Transmission oil coolers are provided on all models except Ford 6 Cyl. Pass. Cars. A new "Key Board" type transmission range selector is used on all Mercury models. The selector head contains a "push-pull" lever for applying and releasing the transmission parking pawl, a parking brake release bar (to release foot operated parking brake), and four transmission control buttons. A combination neutral safety, back-up light, and starter switch is attached to rear of the selector assembly. Depressing the "N" (Neutral button past the neutral position, engages the starter switch. A reverse inhibitor switch located on back of selector assembly, is controlled by a speedometer cable driven centrifugal switch mounted on the transmission (early cars), in drivers compartment (later cars), and prevents shifting transmission into "Park" or "Reverse" when car speed is greater than 5 MPH.

OPERATION

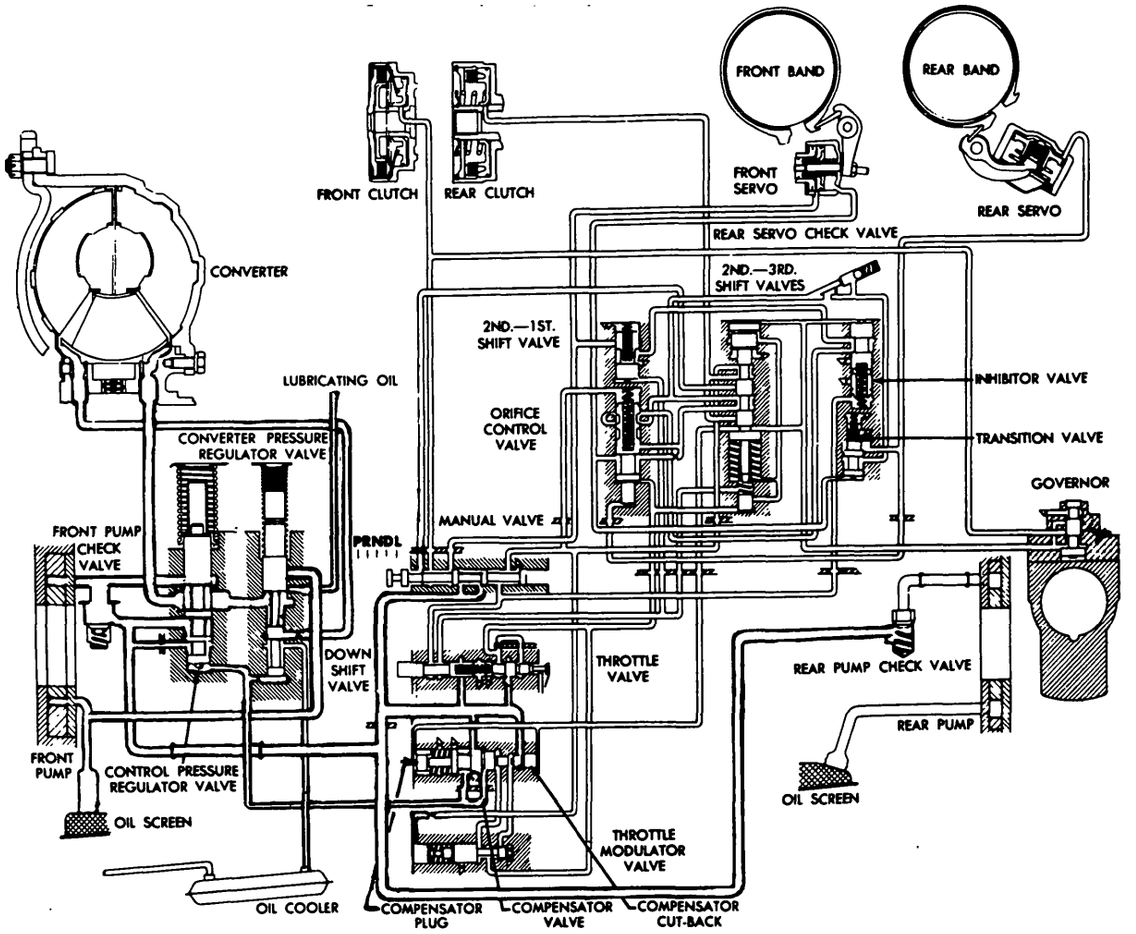
Torque converter automatically provides a torque multiplication ranging from 2.1-1 (maximum for starting and acceleration) to 1.0-1 (normal driving range with torque converter acting as a fluid coupling). This torque multiplication is supplemented by the planetary gears when selector lever placed in "DR", "LO", and "R" ranges.

Drive Range–Car starts in Intermediate Gear (except when accelerator pedal depressed to floor when car will start in Low Gear) with a gear ratio of 1.467-1 (Ford), 1.46-1 (Lincoln & Mercury), with Front Clutch applied locking the Primary Gear to the Turbine Shaft, and the Front Band applied, holding Secondary Sun Gear stationary. The power flow at this point is from Turbine Shaft through Front Clutch to Primary Pinion, to Secondary Pinion, to Internal Gear, to Output Shaft. As car speed increases (depending on throttle pressure) to a certain point, the Front Band is released and the Rear Clutch is applied, automatically causing transmission to change to direct (1.0-1) drive. The power flow in "High" gear is from the Turbine Shaft through the Front and Rear Clutches to the Planetary Gears which are locked together and rotate as a unit, causing the Output Shaft to rotate at engine speed.

Low Range–Front Clutch applied, locking the Turbine Shaft to Primary Sun Gear, and the Rear Band applied, holding Pinion Carrier stationary. The flow of power is from the Turbine Shaft through the Front Clutch., to Primary Pinions. to Secondary Pinions, to Internal Gear and out the Output Shaft at a ratio of 2.40-1.

LUBRICATION

► *OIL COOLER HOSE CONNECTION CAUTION: When reconnecting oil cooler hoses after installation of radiator, care must be taken to connect hoses to correct fitting on radiator. When removing hoses, connections should be marked for correct assembly.*



FORDOMATIC, MERC-O-MATIC & TURBO-DRIVE TRANSMISSION HYDRAULIC CIRCUITS

► *AUTOMATIC TRANSMISSION FLUID COLOR CHANGE:* Fluid having a red color may be found in 1957 transmissions. This color is being added to aid in detecting oil leaks. Uncolored fluid may be mixed with colored fluid. Be sure and use Automatic Transmission Fluid Type "A".

► *CAUTION: Transmission oil level should be checked at 1000 mile intervals (Ford Pass. Cars & Trucks); 2000 mile intervals (Lincoln, Continental, & Mercury). Drain and refill every 25,000 miles (Ford Pass. Cars), 15,000 miles (Ford Trucks), 16,000 miles (Lincoln, Continental, & Mercury).*

Recommended Oil - Automatic Transmission Fluid Type "A".

Oil Capacity

Model	Capacity
1956 Ford 6 Pass. Cars	9 qts.
1956 Ford V8 Pass. Cars Ⓒ	9½ qts.
1956-57 T-Bird & Police Interceptor	10½ qts.
1956 Ford Trucks	9 qts.
1957 Ford 6 & V8 Pass. Cars Ⓒ	9½ qts.
1957 Ford Trucks	9½ qts.
1956 Lincoln & Continental	10 qts.
1957 Lincoln & Continental	11.3 qts.
1956-57 Mercury	10½ qts.

Ⓒ - Except T-Bird & Police Interceptor.

Checking Fluid Level–Apply hand brake, place selector lever in Neutral "N" position, run engine at idle speed for approximately four minutes, then move selector lever to Park "P" position. When engine and transmission have reached normal operating temperature, move selector lever through all positions to assure

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

fluid distribution throughout transmission, return lever to "P" position Raise engine hood, clean all dirt from around filler cap at right rear corner of engine. Check fluid level on dipstick in filler tube *(CAUTION–* make certain dipstick pushed all the way down in the filler tube when checking fluid level) Add fluid as necessary to bring level up to "F" full mark on dipstick

Drainage and Refilling–Remove converter housing lower plate and drain converter by removing one drain plug, then rotate the engine 180° and remove the second drain plug Disconnect filler tube from transmission oil pan to drain fluid from transmission Tighten converter drain plugs to 7-10 ft lbs Tighten filler tube connection Install 5 quarts of automatic transmission fluid, start engine and allow to idle four minutes Add 4 qts, of fluid and bring transmission to to operating temperature Place selector lever in parking (P) position and check oil level If level is not up to dip stick level mark, add additional fluid as required

►*CAUTION–Corr ct fluid l vel should be determined by dipstick r ading rather than actual number of qts. install d*

LINKAGE ADJUSTMENT

Thr ttl Linkag Adjustm nt (Pressure Method): *NOTE - This m thod should be used in addition to regular throttle linkage adjustment procedures (see Car Model pages), aft r transmission ov rhaul* With transmission at normal operating temperature, adjust engine idle speed, anti-stall dashpot, manual linkage, neutral safety switch and throttle linkage (see Car Model pages), then proceed as follows Set hand brake securely Raise car on hoist and install pressure gauge (300 lbs) in 1/8" pipe plug hole on transmission case Lower the car to floor and install a tachometer on engine Position pressure gauge so it can be read from driver's seat Place selector lever in "DR" (Drive) range and increase engine speed to 1000 RPM. Note pressure reading on gauge which should be the same as specifications in Line Pressure Range Table *(see "Testing" below)* If pressure is less than specified, rotate throttle rod clevis to lengthen rod If more than specified, shorten rod as necessary to bring pressure within limits Check pressures at idle and stall speeds Pressures should be as indicated If idle pressure is above specifications and linkage cannot be shortened further, the throttle lever internal stop must be bent away from valve body If idle pressure or stall speed is not within specifications, perform Shift Test & Stall Test and refer to "Trouble Shooting and Diagnosis"

►*CAUTION Do not operate car for long periods under stall or partial stall conditions*

FORD, LINCOLN, CONTINENTAL

Manual Linkag Adjustm nt (Except Mercury): Disconnect upper end of manual shift rod from selector arm Position selector lever with indicator in the quadrant down against its stop in "DR" position Place manual lever at transmission in the "DR" detent (second from bottom) Rotate manual shift rod clevis until clevis pin fits freely into holes in clevis and selector arm Lengthrod assembly 2 complete turns (1956-57 Ford Pass Cars & Trucks, 1956 Thunderbird), 1 complete turn (1956-57 Lincoln & Continental, 1956 Mercury & 1957 Thunderbird) counterclockwise Install clevis pin and check pointer alignment in all positions

1957 MERCURY KEYBOARD CONTROL ADJUSTMENT

Manual Selector Cable Adjustment (Mercury): Raise car remove splash shield and remove pipe plug from left side of transmission case Remove park release cable from lever and clamp *(NOTE - Fark release cable must not be connected to adjusting bracket or park release lever while making manual selector lever adjustment)* Loosen control cable mounting bracket retaining screw and washer leaving it finger tight Hold "D" button on transmission keyboard selector in the FULLY DEPRESSED position, then move adjusting bracket downward to limit of travel Install Tool 77270-F in place of pipe plug in transmission case Pull upward on selector cable and housing assembly until pin in gauge seats in the locating slot of selector cable connector sleeve Leaving Tool 77270-F in place torque control cable mounting screw to 18-22 ft lbs Remove tool and replace pipe plug Check for correct keyboard control operation of all buttons before proceeding with park cable adjustment

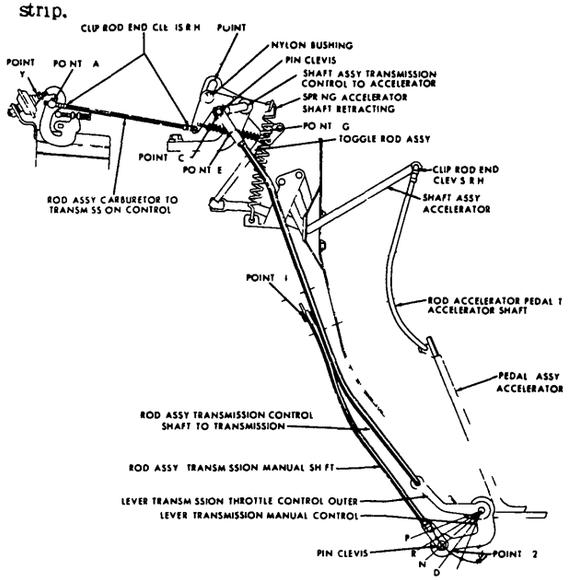
Park Cable Adjustment (Mercury): *(NOTE - Manual selector cable must be adjusted before park cable adjustment is made)* Install park cable on the pin of park release lever and install clamp and screw on adjusting bracket Fully depress park bar on keyboard selector Install gauge Tool 77270-E over torsion lever support pin in transmission case and the pin on park release lever Remove cable slack by pulling cable housing toward rear of car then while holding cable in this position tighten cable clamp screw *(NOTE-* No external park release lever retracting spring is used on later transmissions) Remove Tool 77270-E Install washer and retaining pin in park release lever pin Checkoperation of all control buttons and park bar

STARTER NEUTRAL SAFETY SWITCH: *(NOTE Neutral Safety Switch is located at lower end of steering column (Ford, all models), on steering column, inside passenger compartment (Lincoln & Continental), at back of "keyboard" control (Mercury)*

Adjustment: Loosen switch attaching screws and position switch so starter circuit is closed when selector lever is in "N" (Neutral) *NOTE - The circuit must be open in all positions except neutral*

► *1956 FORD ACCIDENTAL STARTING (Cars with Back-Up Lights)* This condition may occur with ignition switch off and headlight switch on, and is caused by foreign material closing the circuit between back-up light switch and solenoid terminal in neutral safety switch, causing the engine to start. Correct by connecting the longest lead (beyond taped portion of harness) to the neutral safety switch 'A" terminal. Connect shorter lead to "B' terminal. When replacing neutral safety switch, connect as indicated above.

► *1956 LINCOLN SELF-CRANKING & CONTINUOUS OPERATION OF BACK-UP LIGHTS CORRECTION·* Install later type insulator assembly, Part No. FDK-15827-B which is identified by two ridges approximately .020" high on each side, and parallel to brass strip.



TURBO-DRIVE THROTTLE LINKAGE

BAND ADJUSTMENT

►*Band Adjustment is recommended to be made at 15000 mile intervals when transmission fluid is changed (pan should be removed and cleaned at this time)*

FRONT BAND ADJUSTMENT: Drain fluid from pan using a drain can with a fine mesh screen, remove pan. Remove fluid screen from transmission and loosen the front servo adjusting screw locknut TWO FULL TURNS, using a 9/16" wrench Using front band adjusting tool No 7225, insert gauge block between servo piston and adjusting screw and tighten adjusting screw until wrench overruns Back off adjusting screw exactly ONE COMPLETE TURN and remove gauge block. While holding adjusting screw stationary, tighten locknut clockwise (20-25 ft lbs) Install fluid screen and install pan using new gasket Install the drain plug and refill transmission to "Full" mark using fluid drained from transmission unless fluid being changed Check fluid level (see LUBRICATION).

►*CAUTION–Severe damage may result if adjusting scr w not backed off exactly 1 full turn*

REAR BAND ADJUSTMENT: Fold back floor mat to expose right side of floor pan and remove access cover on right side of transmission floor pan Using rear band adjusting tool No. 7195 or 7195-B *(NOTE* - See note below for adjusting rear band on air conditioned cars), loosen rear band adjusting screw locknut Using "T" handle of tool No. 7195, tighten rear band adjusting screw until wrench overruns (if screw found to be tighter

CONTINUED ON NEXT PAGE

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

than wrench capacity (10 ft. lbs.) loosen screw several turns and retighten until wrench overruns) Back off adjusting screw exactly 1½ COMPLETE TURNS While holding adjusting screw stationary, tighten adjusting screw locknut to 35-40 ft. lbs.

►*CAUTION· Severe damage may result if adjusting screw not backed off exactly 1½ turns*

►*REAR BAND ADJUSTMENT NOTE (AIR CONDITIONED CARS)* To avoid interference on air conditioned cars when using band adjusting tool No. 7195, substitute a sliding handle for the stationary type handle of tool Using a piece of steel rod 7'16"x 6½", (with threads on each end of rod), slide rod into the original handle hole of tool and install nuts on ends of rod The later tool No. 7195-B can be used by loosening the handle attaching screw and sliding the handle as required to clear air conditioning unit.

TESTING

►*CAUTION: While making the Stall Test never hold the throttle open longer than 5 seconds.*

STALL TEST: The stall test is made in "D", "LO" & "R" ranges to determine if bands or clutches are slipping. Connect a tachometer to engine and set it to read on the "high" scale Make sure engine is idling properly at normal operating temperatures. Start engine, then firmly apply parking brake and service brake. Place selector lever in "D" range, then press accelerator slowly all the way to the floor without going into "low gear" kickdown The engine speed should be as indicated in the "Stall Speed Table" below If engine speed is below minimum limit, tune the engine and repeat test If engine speed exceeds maximum limit, release accelerator immediately because front band or clutch slippage is evident To determine whether the front band or front clutch is causing slippage, move lever to "LO" range and repeat the test. If slippage is evident in "LO" range also, the front clutch is slipping If slippage is found in "DR" range, but not in "LO" or "R" ranges, the front band is causing the the slippage. If engine exceeds the maximum limit with selector lever in "R" range, the rear band or rear clutch is slipping To determine which of the two is faulty, move selector lever to "LO" range. If slippage is evident in "LO" and "R" ranges, but not in "D" range, the rear band is slipping When slipping is noted in "R" range but not in "LO" or "D", the rear clutch is causing the slippage

ENGINE STALL SPEEDS
1956 Models

CAR & MODEL	Low Limit	ENGINE RPM	High Limit
Ford 6 Cyl. (223" Eng.)	1380		1580
Ford V8 (272" Eng.)	1460		1660
Ford V8 (292" Eng.)	1440		1740
Ford V8 (312" Eng.)	1590		1790
Continental	1550		1750
Lincoln	1550		1750
Mercury (Exc. Montclair)	1590		1790
Mercury Montclair	1610		1810

1956 TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEED (MPH)						Ⓒ MAN. SHIFT (MPH)	
SHIFT		2 – 3		3 – 2		2 – 1	1 – 2	2 – 1	2 – 1
THROTTLE		MIN.	MAX.	MIN.	FORCED	FORCED	MAX.	MAX.	MIN.
Ford 6 Cyl. Pass. Cars	3.55-1	13-15	52-60	12-8	16-58	17-15	28-33	28-24	23-20
	3.22-1	14-16	55-64	13-9	17-62	19-16	30-35	29-25	25-21
Ford V8 Pass. Cars	3.55-1	13-15	54-62	12-8	16-61	17-15	29-34	28-24	24-20
272" & 292" Engines	3.22-1	14-16	58-66	13-8	17-65	19-16	32-36	30-26	26-21
Thunderbird & Interceptor	3.54	14-16	55-62	13-8	20-61	16-15	34-39	28-24	24-19
	3.30	15-17	58-66	14-9	22-65	17-16	36-42	30-26	25-21
Ford F-100 Truck	3.92	12-15	49-59	12-7	15-58	17-14	27-33	27-22	23-18
Ford F-250 Truck	4.88	8-11	34-45	9-5	10-44	13-9	18-25	20-15	17-12
Ford F-350 Truck	5.14	9-11	37-43	8-6	11-42	12-10	20-23	19-16	16-13
Ford P-350 Truck	4.88	8-11	36-45	9-5	11-44	13-10	20-25	20-16	17-13
Ford P-500 Truck	6.8	7-9	29-35	4-7	9-35	10-8	16-19	16-13	14-11
Lincoln & Continental	All	15-20	61-75	16-10	23-74	0-20	38-48	–	22-29
Mercury	All	14-19	55-71	15-8	20-69	0-18	29-41	–	19-28

Ⓒ If manual shift made above speed indicated, transmission will shift from high to intermediate, if made below these speeds, transmission will shift from intermediate to low.

ENGINE STALL SPEEDS
1957 Models

Car & Model	Low Limit	– Engine RPM –	High Limit
Ford 6 Cyl. (223" Eng.)	1380		1580
Ford V8 (272" Eng.)	1460		1660
Ford V8 (292" Eng.)	1550		1750
Ford V8 (312" Eng.)	1620		1820
Lincoln & Continental	1820		2020
Mercury (312" Eng.)	1620		1820
Mercury (368' Eng.)	1820		2020

SHIFT TESTS: Select a smooth road for the tests. Make test as outlined below and see "Shift Point Table" for correct speed where shifts should occur

2-3 Upshift (Minimum Throttle): Place selector lever in "DR" range, and starting from a standstill, apply accelerator lightly but steadily

3-2 Downshift (Minimum Throttle): Permit car to decelerate (from speed attained in above test) until downshift occurs from high to intermediate

3-2 Downshift (Forced): Reduce car speed below 45 MPH (Ford), 50 MPH (Mercury & Lincoln) Press accelerator pedal to floor Transmission should shift from high to intermediate This shift should occur only with car in high gear

2-3 Upshift (Maximum Throttle): Place selector lever in "DR" range, and starting from a standstill, press accelerator to the floor Full throttle upshift should occur as indicated

2-1 Downshift (Forced): With selector lever in "DR" range and car speed below 18 MPH (Ford), 19 MPH (Mercury & Lincoln), quickly press accelerator fully to the floor This action shifts transmission from high, to intermediate, or low

1-2 Upshift (Maximum Throttle): With accelerator fully pressed to floor for above test (2-1 Downshift, Forced), transmission should upshift from low to intermediate when car speed indicated in table is reached The 2-3 Upshift will occur at same speed as for 2-3 Upshift (Maximum Throttle)

"DR" to "LO" Manual Shift: With car speed between 40-45 MPH (Ford), 45-50 MPH (Mercury & Lincoln), Manually shift selector lever from "DR" to "LO". Instead of shifting to low gear, the transmission should shift from high to intermediate When car speed is reduced within the range indicated in table, the transmission should shift into low range

"R" Shift: Bring car to a stop and place selector lever in "R" range The car should move in reverse direction smoothly, upon light throttle pressure

CONTROL PRESSURE TESTS: *(NOTE - The Throttle Lever Protractor Gauge formerly used in testing the transmission is no longer required)* Install Pressure Gauge No. 77820-A (300 lbs.) in pressure take-off hole in transmission (located either near throttle lever or at rear of transmission case), and position it so it may be read from the driver's seat. Install tachometer to engine and adjust engine to correct idle speed. Set hand brake and allow engine and transmission to reach normal operating temperature. Proceed as follows *(NOTE - See*

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (Cont.)

"Line Pressure Range" table below for pressure specifications):

1) With selector lever in "DR" (Drive) range, check idle pressure which should be within specifications.

2) Increase engine speed to 1000 RPM and note control pressure. If pressure is not within specifications, adjust throttle rod (see *"Throttle Linkage Adjustment"* above).

3) With selector lever in "DR" (Drive) range, increase engine speed to a stall condition. Pressure must be within specifications.

4) Move selector lever to "R" (Reverse) range and repeat the pressure tests at idle speed, 1000 RPM, and stall. Pressures should be within specifications.

► *CONTROL PRESSURE DIAGNOSIS NOTE: If pressures for the above tests are not within specification as outlined in "Line Pressure Range" table below, perform Shift Test & Stall Test as indicated above. Refer to "Trouble Shooting & Diagnosis".*

LINE PRESSURE RANGE TABLE

Ford Pass. Cars & Trucks

Engine Speed	Lever Position	223" Engine ①	272" & 292" Engine ①	312" Engine ①
Idle	DR	49-63	51-69	50-70
1000 RPM	DR	80-85	80-85	80-85
Stall	DR	124-155	133-165	147-180
Stall	R	173-195	181-205	194-216

① - Lbs. Pressure.

Lincoln, Continental, & Mercury

Engine Speed	Lever Position	Pressure
Idle	All	56-70 lbs.
1000 RPM	D	80-85 lbs.
Stall Ⓒ	R	197-215 lbs.
Stall Ⓒ	D-L	152-180 lbs.
Stall Ⓔ	D	152-180 lbs.

① - To detent. ② - Through detent.

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan, and control valve assembly. Proceed as follows:

Front Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of system.

Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

Rear Clutch: Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).

Rear Band & Servo: Apply pressure to rear servo oil passage (see illustration), and observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

1957 TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEED (MPH)						MAN. SHIFT
SHIFT		2 – 3		3 – 2		1 – 2	2 – 1	①
THROTTLE		MIN.	MAX.	MIN.	FORCED	MAX.	FORCED	
Ford 6 Pass. Cars	3.10-1	12-21	57-60	14-8	67	33-41	19-15	27-18
	3.56-1	11-18	50-60	12-6	58	30-37	17-13	27-15
Ford V8 Pass. Cars, 272" & 292" Engines	3.10-1	12-21	59-70	14-8	68	34-43	19-15	27-18
	3.56-1	11-18	52-61	12-6	60	30-38	17-13	24-15
Ford V8 Pass. Cars & Thunderbird, 312" Engine	3.10-1	12-21	59-70	17-10	68	36-44	19-15	27-18
	3.56-1	11-18	52-61	14-9	60	31-39	17-13	24-15
Ford Truck, F-100	All	11-14	50-60	10-6	58	30-36	16-13	22-14
Ford Truck, F-250	4.88-1	11-14	42-52	10-5	50	25-34	15-10	22-14
Ford Truck, F-350, P-350, P-400	5.14-1	8-11	33-41	9-6	42	20-26	11-9	16-13
Ford Truck, F-500, P-500	6.80-1	6-11	29-35	8-5	34	17-22	10-8	14-10
Lincoln	All	15-20	60-70	16-10	28-78	41-48	16-21	24-30
Continental	All	16-20	60-70	16-10	26-70	41-48	15-19	24-30
Mercury	All	16-20	59-76	15-9	24-75	36-47	0-21	23-30

① - If manual shift made above speed indicated, transmission will shift from High to Intermediate; if made below these speeds transmission will shift from Intermediate to Low (Ford); High to Low (Lincoln, Continental & Mercury).

► *TESTING NOTE: If servos, bands, clutches, and governor operate with air pressure, the no drive problems, erratic shift, and upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" in OVERHAUL BELOW.*

TROUBLE SHOOTING & DIAGNOSIS

► *TROUBLE SHOOTING & DIAGNOSIS NOTE: Make corrections in sequence shown, testing operation of transmission after each correction.*

SEVERE ENGAGEMENT ("Lo", "Dr", or "R" Range): Check engine idle speed and throttle linkage adjustments. Adjust rear band. Perform a control pressure test. Remove and clean main control valve assembly and pressure regulator valve.

2-3 SHIFT IS LOW, HIGH, OR ERRATIC: Check fluid level. Adjust throttle and manual linkage. Check governor operation. Perform a pressure control test. Remove and clean main control valve assembly and pressure regulator valve.

SEVERE 2-3 SHIFT: Adjust throttle linkage. Adjust front band. Remove and clean main control valve assembly and pressure regulator valve. Remove and inspect front servo.

ENGINE OVERSPEEDS (2-3 SHIFT): Adjust front band. Remove and clean main control valve assembly.

NO 2-3 SHIFT: Remove and inspect governor. Remove and clean main control valve assembly. Rear clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

NO FORCED DOWNSHIFT (3-2 SHIFT): Adjust throttle linkage. Perform control pressure check. Remove and clean main control valve assembly. Check operation of inner and outer throttle levers.

SEVERE 3-2 DOWNSHIFT (CLOSED THROTTLE): Check engine idle speed and throttle linkage. Remove and clean main control valve assembly.

SLIPPAGE OR CHATTER IN 2ND SPEED: Check fluid level. Adjust throttle linkage. Adjust front band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front servo not performing properly. Front clutch slipping. Leakage in hydraulic system.

SLIPPAGE OR CHATTER IN 1ST SPEED: Check fluid level. Adjust throttle linkage. Adjust rear band. Clean main control valve and pressure regulator assemblies. Check inner and outer throttle levers. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

SLIPPAGE OR CHATTER IN REVERSE: Check fluid level. Adjust throttle linkage. Adjust rear band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "DR" RANGE: Adjust front band. Clean main control valve assembly. Make an air pressure check. Front clutch slipping. Leakage in hydraulic system. Fluid distributor in output shaft faulty.

NO DRIVE IN "R" RANGE: Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Make an air pressure check. Rear clutch not opera-

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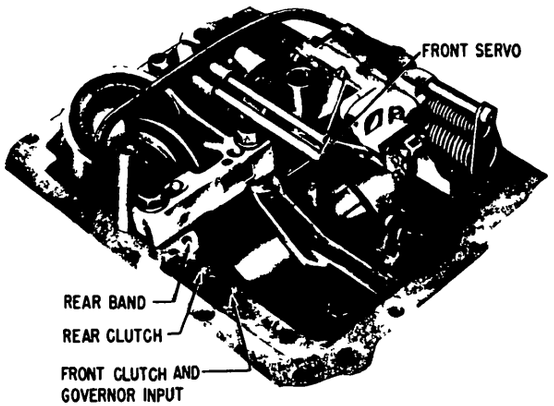
FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

ting. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "LO" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN ANY RANGE: Check fluid level. Adjust manual linkage. Check control pressure. Clean main control valve and pressure regulator assemblies. Make an air pressure check. Leakage in hydraulic system.

LOCKUP IN "DR" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.



TRANSMISSION TEST POINTS

LOCKUP IN "R" RANGE: Adjust front band. Front servo not operating properly. Front clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "LO" RANGE: Adjust front band. Front servo not operating properly. Clean main control valve assembly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

PARKING LOCK BINDS OR WILL NOT HOLD: Adjust manual linkage. Check parking linkage.

UNABLE TO START ENGINE BY PUSHING: Check fluid level. Adjust manual linkage. Clean main control and pressure regulator valve assemblies. Rear pump not operating. Leakage in hydraulic system.

TRANSMISSION OVERHEATING: Converter cooling air passages blocked. Oil cooler and connections faulty. Clean pressure regulator assembly. Converter one-way clutch slipping or faulty.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Adjust front band. Clean main control valve and regulator valve assembly. Front servo not operating properly. Leakage in hydraulic system.

MAXIMUM SPEED BELOW NORMAL (POOR ACCELERATION): Converter one-way clutch not operating properly.

NO 2-1 DOWNSHIFT: Adjust throttle linkage. Clean main control valve assembly. Rear servo not operating properly.

NOISE IN NEUTRAL: Clean and inspect pressure regulator. Engine rear oil seal faulty. Front clutch not releasing properly. Front pump faulty.

NOISE IN 1ST, 2ND OR REVERSE SPEEDS: Clean and inspect pressure regulator. Fault in planetary assembly Front or rear clutch faulty. Front pump faulty.

NOISE IN PARK RANGE: Clean and inspect pressure regulator. Front pump faulty

NOISE WHEN COASTING IN NEUTRAL (20-30 MPH) WITH ENGINE OFF: Rear pump faulty

MINOR REPAIRS (TRANSMISSION IN CAR)

The following transmission units can be removed for repair without removing transmission assembly from car. Raise car on hoist for these operations, then drain fluid from transmission and remove oil pan.

►*NOTE: For Disassembly & Overhaul of the following units, see OVERHAUL (TRANSMISSION UNITS) below.*

Governor Removal: Remove governor inspection cover from extension housing. Rotate the drive shaft to bring governor body in line with inspection hole. Remove the two screws that secure governor body to sleeve. Remove governor.

►*CAUTION: Use care not to drop bolts or governor valve into housing.*

Installation–Lubricate governor valve with transmission fluid and install valve in governor body (*CAUTION*–valve must move freely in body). Install governor body on counterweight with the **side plate forward** (*CAUTION*–fluid passages in governor body and counterweight must be aligned), install governor body attaching screws. Install inspection cover with NEW gasket, tighten cover screws to 4-6 ft. lbs. torque.

►**NOTE:** For the following operations, remove transmission fluid level indicator. Remove transmission filler tube and drain the fluid into clean container using a fine mesh wire screen for straining. (Fluid may be re-used). Then remove transmission oil pan and screen.

Front Servo Removal: Loosen lubrication tube from pressure regulator and rear pump and remove. (NOTE–If necessary, tap tube with soft hammer to remove. *CAUTION*–Do not bend or distort tube). Loosen control valve body attaching bolts. Remove servo attaching bolt and while holding servo strut with fingers, remove servo assembly.

Installation–Position servo band forward in case with band ends down. Position servo strut with large end indexing with servo actuating lever and small end indexing with band end. Rotate band, strut and servo into position, indexing tubes from valve body to servo, and anchor end of band with anchor in case. Install attaching bolt, tightening to 30-35 ft. lbs. Tighten control valve attaching bolts to 8-10 ft. lbs. Install lubrication tube and adjust servo band. See "Front Band Adjustment". Install screen, install oil pan using NEW gasket, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid can be re-used), recheck fluid level with transmission at operating temperature.

Rear Servo Removal: Remove lubrication tube from rear pump and regulator. (*NOTE*–If necessary tap tube with soft hammer to remove). Remove rear pump intake tube. Remove front servo (see above). Take out rear servo attaching bolts, hold actuating and anchor struts with the fingers, remove rear servo assembly.

Installation–Position servo anchor strut and rotate servo band to engage strut. Hold in position with fingers. Position actuating lever strut and install servo, install servo attaching bolts (*CAUTION*–Longer attaching bolt must be installed in forward bolt hole), tighten attaching bolts to 40-45 ft. lbs. torque. Install front servo (see above). Install rear pump intake tube and lubrication tube. Adjust rear band (see BAND ADJUSTMENT). Install oil pan with NEW gasket, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid can be reused), recheck fluid level with transmission at operating temperature.

Control Valve Body Removal: Remove two "U" tubes from pressure regulator and control valve body. Loosen front servo attaching bolt three turns. Take out three valve body attaching bolts, lower the valve body and pull it off the servo tubes.

►*CAUTION–Use extreme care when removing valve body to prevent damage to body and attached parts.*

Installation–Align servo tubes with holes in control valve body, position manual lever in neutral, position inner throttle lever between stop and downshift valve and at the same time push the throttle valve in to clear the transmission case **making certain that manual valve engages actuating pin manual detent lever.** Install control valve body attaching bolts but do not tighten the bolts. Install two "U" tubes in pressure regulator and control valve body. Tighten control valve body attaching bolts to 8-10 ft. lbs. torque. Tighten front servo attaching bolt to 35-40 ft. lbs. torque. Adjust front and rear bands (see BAND ADJUSTMENT). Install oil screen, install oil pan using NEW gaskets, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid may be re-used) recheck fluid level with transmission at normal operating temperature.

Pressure Regulator Removal: Remove lubrication tube. Remove control pressure tube and compensator tube from valve body and regulator. Remove pressure regulator spring retainer. (*CAUTION*–Maintain pressure on retainer to prevent springs flying out). Remove the control pressure and converter pressure valves. Take out pressure regulator attaching bolts and washers, remove regulator.

►*MAIN OIL PRESSURE REGULATOR VALVE INSTALLATION CAUTION:* If regulator removed to correct transmission "buzzing" noise, examine valve for undersize bleed flats and rotate valve 90° in bore from original position when re-installing it. This should correct the noise.

Installation–Install regulator body and attaching bolts and tighten to 17-22 ft. lbs. Install converter pressure and control pressure valves and make certain valves operate freely in bore, then install valve springs and retainer. Install large control pressure tube, small compensator tube, and lubrication tube. Install oil screen, install oil pan using NEW gaskets, tighten pan

CONTINUED ON NEXT PAGE

Form 65 A

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid may be re-used), recheck fluid level with transmission at normal operating temperature.

Manual & Throttl L v r Seal Replacement: Remove control valve body (see above), disconnect manual and throttle linkage rods at transmission levers. Remove nut on inner throttle lever shaft and remove inner throttle lever. Remove outer throttle lever and shaft, remove throttle shaft seal from counterbore in manual lever shaft. Take out cotter pin in each end of parking pawl torsion lever rod and remove the rod, rotate manual lever shaft until detent lever clears detent ball (*CAUTION*—do not allow detent ball to fly out), remove detent ball and spring. Remove manual lever shaft nut, remove detent lever, remove outer manual lever and shaft assembly. Remove manual shaft seal.

Installation—Coat outer diameter of new seal with Permatex No. 3, install seal in case using tool No. 77288. Install outer manual lever and shaft, rotate shaft until manual lever points downward, place detent lever on inner end of shaft, install attaching nut and tighten nut to 35-40 ft. lbs. torque. Place detent spring and ball in hole in case (use piece of thin wall tubing to depress ball and spring), rotate detent lever until detent ball is held in place. Install parking pawl torsion lever rod and cotter pins. Install new throttle shaft seal, outer throttle lever and shaft, inner throttle lever and attaching nut, tighten nut to 25-28 ft. lbs. Connect manual and throttle rods to outer levers. Check linkage for free movement. Install control valve assembly and other parts. *S e Control Valve Assembly Installation (abov).*

TRANSMISSION & CONVERTER REMOVAL

FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD)

►*TRANSMISSION OR CONVERTER REMOVAL NOTE: Transmission and conv rt r can be removed as an assembly, or transmissi n can be removed separately (without disturbing c nvert r) as follows:*

1) Place car on hoist. On truck models, drain radiator, fold front of floor mat back and remove covers from converter housing access bolt holes. Loosen water inlet and outlet hose clamps at oil cooler and pull hoses off cooler. On all cars and trucks, remove the two upper converter-to-engine bolts and lockwashers then raise vehicle with the hoist.

2) Disconnect oil filler tube at oil pan and drain transmission. Remove converter housing front plates (8 Cyl.) or the access plate (6 Cyl.). Remove one of the converter housing drain plugs. Rotate converter 180°, then remove second drain plug. Drain converter.

►*NOTE: C nv rt r may b drained after it is removed from car.*

3) Disconnect drive shaft at rear axle and remove shaft. On F-250, F-350, P-350, P-400 or P-500 trucks, remove the four bolts attaching drive shaft coupling yoke at parking brake assembly.

4) Remove flywheel-to-converter bolts. Install the lower converter housing front plate (V8) or wedge the converter in place (6-Cyl.) to prevent converter from sliding out of housing when transmission is removed.

5) Disconnect starter cable at starter, then disconnect transmission-to-frame ground cable at transmission remove starter. On truck models, remove bolts attaching oil cooler to support brackets, on all models with oil cooler, disconnect oil cooler inlet and outlet hoses at transmission. On truck models, remove oil cooler. On air cooled models, remove converter air duct and linkage dust shield, (cars), or the exhaust duct shield (trucks).

6) Disconnect manual and throttle linkages at transmission. Disconnect speedometer cable at transmission. On Pass. Cars, remove the two engine rear support-to-transmission bolts. Position a transmission jack under transmission and raise it slightly to take weight off crossmember. On trucks, with the transmission jack in place remove the converter housing crossmember bolts. On all vehicles, then remove the two lower converter housing-to-engine bolts.

7) Tilt rear of converter and transmission assembly upward slightly, then move assembly toward rear of vehicle sufficiently to remove the six engine crankshaft flange-to-flywheel attaching bolts. Remove flywheel to provide sufficient clearance, then lower converter and transmission assembly.

Torque Converter Removal (from Transmission): *See "Torque Converter Overhaul" below.*

THUNDERBIRD

►*NOTE: I he converter and transmission assembly cannot be removed with engine in the car. Either the engine can be removed first, or transmission, converter and engine can be removed as an assembly.*

1) Remove engine *(see "Engine Removal" in Ford Special Data).* If converter and transmission have been removed with the engine, they can be removed from the engine by removing the six converter-to-flywheel drive plate bolts, then removing the four converter housing to engine attaching bolts.

2) To remove converter and transmission after the engine has been removed separately, remove the two transmission extension housing-to-rear engine support attaching bolts. Remove speedometer cable at transmission. Disconnect the manual shift control lever at transmission. Move transmission forward and remove forward drive shaft, then remove converter and transmission from car.

Torque Converter Removal (from Transmission): *Se "Torque Converter Overhaul" below.*

LINCOLN & MERCURY

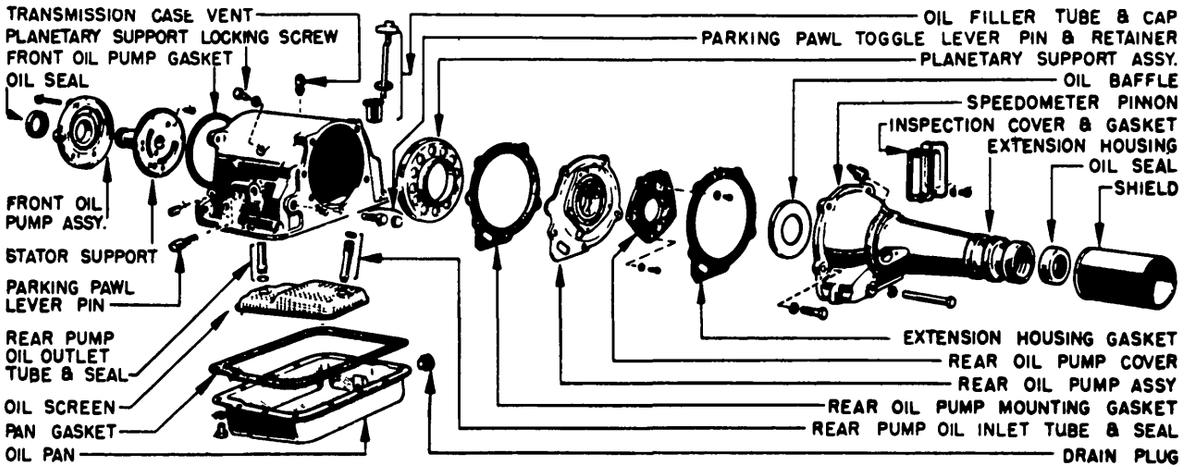
1) Remove ground strap from battery. Remove bolts and nuts securing throttle linkage bar bracket to engine and body. Place car on support stands with all four wheels approximately 12" off ground. On Mercury models with single exhaust pipe, remove nuts securing muffler inlet and cross over pipe to exhaust manifolds. Remove manifold outlet pipe from mounting bracket at rear of manifold and move exhaust system away from working area.

2) Disconnect manual linkage and throttle linkage at transmission. Disconnect speedometer cable at extension housing. Disconnect drive shaft at rear universal joint and remove drive shaft from transmission output shaft. On models with water cooled torque converter, remove inlet and outlet hoses at transmission. On models with air cooled torque converter, remove air duct from torque converter housing.

3) Remove splash deflector, and converter housing lower plate. Drain converter by removing one drain plug, then rotate engine 180° and remove second drain plug. Drain fluid from transmission.

4) Remove engine rear mount-to-frame crossmember bolts. Position transmission lift under transmission and raise engine and transmission sufficiently to install support tool. Remove rear engine mount from transmission. On Lincoln, remove the detachable frame crossmember from frame "X" member (the Mercury models have a tubular crossmember with brackets welded to the crossmember). Lower lift under transmission to allow engine to rest on support tool. Reposition transmission lift under transmission assembly and raise lift just enough to relieve weight of transmission on engine.

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TRANSMISSION CASE & EXTENSION HOUSING ASSEMBLY

Form 55 B

FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

5) Remove starter and upper converter housing plate with seal Remove six bolts securing converter to flexible drive plate. Remove the bolts securing converter housing to engine block

6) Remove transmission and converter assembly by sliding assembly toward rear of car sufficiently to disengage converter housing dowels and converter cover pilot Secure converter to converter housing to prevent damage to converter. Lower the assembly and remove from under car

Torque Converter Removal (from Transmission): *See "Torque Converter Overhaul" below*

TRANSMISSION REMOVAL (WITHOUT CONVERTER)

FORD PASS. CARS & TRUCKS

►*NOTE: On most cars and trucks, the transmission can be removed without removing the converter assembly.*

1) Raise vehicle with a hoist and drain fluid from transmission Disconnect drive shaft at rear axle and remove drive shaft

2) On trucks, disconnect oil cooler-to-transmission fluid inlet and outlet lines at transmission Remove bolts holding oil cooler on support brackets, then move cooler to one side

3) Remove converter air duct from pass. cars, and remove exhaust duct splash shield from trucks

4) Disconnect manual control and throttle linkage at transmission Disconnect speedometer cable at extension housing. On pass. cars, remove the two rear support-to-transmission bolts Position a transmission jack under transmission and raise it slightly to take weight off crossmember Remove crossmember bolts and crossmember

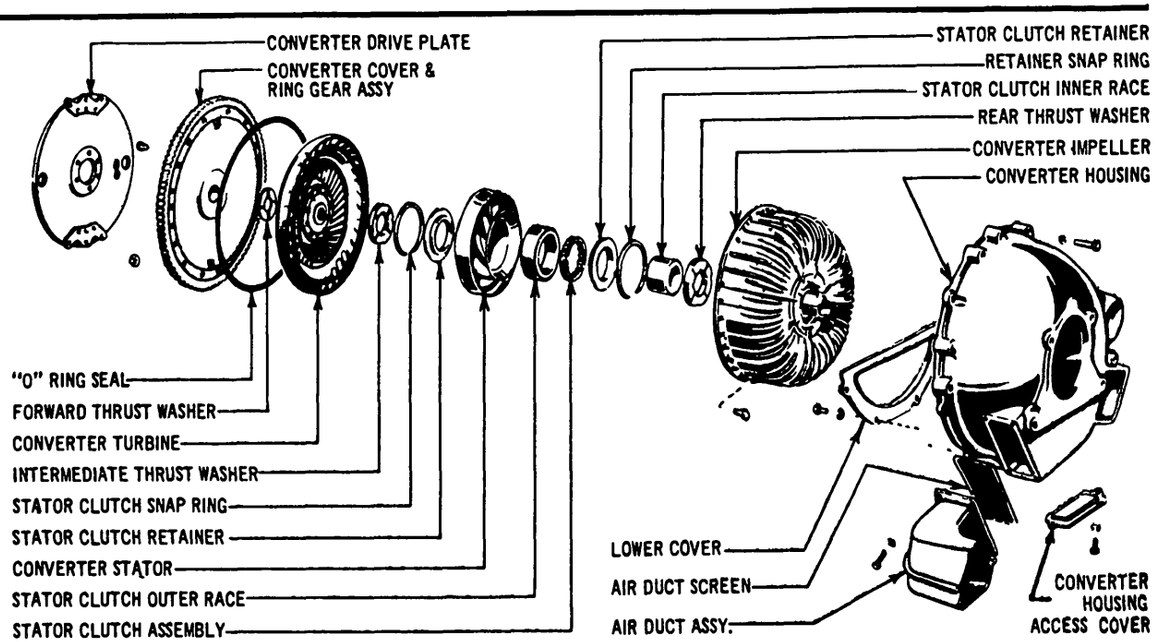
5) On all vehicles, with transmission jack in place, remove the four transmission-to-converter housing attaching bolts On trucks, remove oil cooler from front support bracket Tilt rear of transmission slightly upward and move assembly toward rear, with a jack, until clear of turbine shaft Lower assembly and move it from under vehicle

LINCOLN & MERCURY

1) Place car on support stands with all four wheels approximately 12' off floor On Mercury models with single exhaust pipe, disconnect muffler pipes at exhaust manifold and the outlet pipe at support bracket, and move complete exhaust system away from work area

2) Drain fluid from transmission and disconnect manual and throttle linkage at transmission Disconnect speedometer cable at extension housing. Disconnect drive shaft at rear universal joint and remove drive drive shaft from transmission output shaft

3) Remove rear engine mount to frame crossmember bolts (Mercury models have a tubular crossmember with brackets welded to crossmember) Position lift under transmission and raise engine and transmission and raise engine and transmission sufficiently to install engine support tool Remove rear engine mount from transmission On Lincoln, remove the detachable crossmember from frame "X" member



TORQUE CONVERTER ASSEMBLY

4) Lower lift under transmission and allow engine to rest on support tool Reposition transmission lift to relieve the weight of transmission Remove four bolts securing transmission to converter housing.

5) Remove transmission by sliding assembly toward rear of car sufficiently to disengage the turbine shaft. Lower the assembly and remove from under car.

TORQUE CONVERTER & TRANSMISSION OVERHAUL

Overhaul procedures are the same as 1955 Model transmissions *See '1954-55 Fordomatic, Merc-O-Matic & Turbo-Drive Transmission'*

TRANSMISSION & CONVERTER INSTALLATION

FORD PASS. CARS & TRUCKS (EXCEPT THUNDERBIRD & SUNLINER)

1) If converter has been removed from converter housing, position converter in housing, then install converter housing lower cover plate (8 Cyl.), or wedge converter in places (6 Cyl.) to prevent converter slipping out of housing Rotate converter until drive plate bolt holes are in horizontal position (8 Cyl), or in the vertical position (6 Cyl) Position flywheel on crankshaft flange, then install attaching bolts

2) Move converter and transmission assembly forward into position, using care not to damage converter drive plate and converter pilot Install lower converter housing to engine bolts and tighten them to 40-45 ft lbs. Install crossmember on pass cars. Lower transmission until extension housing rests on crossmember and install extension housing to crossmember bolts

3) On trucks, install converter housing to crossmember bolts. On all vehicles position flywheel drive plates, and install drive plate attaching bolts. Tighten drive plate bolts to 28 ft. lbs Install converter drain plugs and access plates. On trucks, position the oil cooler on support brackets, then install cooler. Connect oil inlet and outlet lines to transmission.

4) Coat universal joint knuckle with transmission fluid, then install drive shaft. Connect speedometer cable at transmission. Connect manual linkage at transmission manual lever. Install converter air duct and the linkage splash shield (pass. cars), exhaust duct shield (trucks)

5) Install starter motor and connect transmission-to-frame ground strap at transmission. Connect fluid filler tube to oil pan. Lower hoist, on trucks, position water inlet and outlet lines on oil cooler. Tighten hose clamps securely. Install the two upper converter housing-to-engine bolts and tighten to 40-45 ft. lbs. Replace covers on converter housing access holes, and floor mat. Fill radiator with water.

6) Fill transmission with Automatic Transmission Fluid Type "A" *(see "Lubrication" abov).* Check transmission and converter assembly for fluid leaks, adjust manual and throttle linkages *(s "Linkag Adjustment" above)*

THUNDERBIRD

►*INSTALLATION NOTE: Conv rt r and transmission assembly must be installed b fore engin install d in chassis. The converter and transmission ass mbly can be installed in the chassis separately b fore ngin is installed, or converter, transmission, and ngin may be installed tog ther as a unit*

1) To attach converter and transmission to engine before assembly into chassis as a unit, first align con-

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FORDOMATIC, MERCOMATIC & TURBO-DRIVE (C nt.)

verter pilot, housing dowel holes, and drive plate holes. Remove all foreign material from converter pilot bore in crankshaft. Apply a heavy film of lubricant evenly on converter pilot bearing surface. *(CAUTION–Excessive lubricant in pilot bore will prevent proper entry of conv rter pilot into bore, forcing converter rearward and scoring front pump)*

2) Install pilot studs in two of the converter housing to engine bolt holes Remove converter housing lower front cover plate Move converter and transmission forward into position using care not to damage converter drive plate and converter pilot. Install four converter housing to engine bolts, remove pilot studs, then tighten bolts to 40-45 ft. lbs

3) If engine has been removed separate from converter and transmission assembly, mount transmission on a transmission floor jack and position assembly in car. Connect drive shaft to transmission output shaft. Install the two extension housing to rear engine support bolts. Connect speedometer cable and manual linkage at transmission. Install engine lifting sling and lower engine carefully into engine compartment, starting converter pilot into crankshaft. Make sure studs on manifold are aligned with holes in muffler inlet pipe, and dowels in block engage holes in converter housing. Raise car and position jack stands. Install engine front insulator bolt, and right and left hand insulator support bolts. Connect exhaust pipe to manifold and lower car to floor

4) Install two lower converter housing to engine bolts and tighten them to 40-45 ft. lbs. (Tighten bolts slowly and evenly to avoid binding on dowel pins). Install converter housing to engine bolts, and tighten them to 40-45 ft lbs. Align flywheel and drive plate bolts with converter. Install the six bolts and tighten them to 25-28 ft. lbs. Complete engine installation.

LINCOLN & MERCURY

1) Position transmission and converter assembly under car, raise it into position and move it forward to engage converter pilot with hole in crankshaft *(CAUTION–*Guide assembly carefully to avoid damage to flexible drive plate and converter pilot).

2) Install converter housing attaching bolts and tighten to 40-45 ft. lbs. Install six bolts securing converter to drive plate and tighten to 25-28 ft. lbs. (On Lincoln, install detachable frame crossmember to "X" member). Install engine rear mount to transmission. Remove engine support tool, lower engine and install rear engine mount to crossmember bolts and remove lift. Connect speedometer cable at extension housing.

3) Connect throttle and transmission manual linkage to transmission levers. Adjust linkage (see "Linkage Adjustment" above). Install converter housing upper plate with new seal. Install starter, converter drain plugs, and place fluid filler tube on pan and tighten filler hex nut to 40-50 ft. lbs.

4) Install converter housing lower plate. On air cooled torque converters install duct on converter housing and deflector between frame and housing. On water cooled torque converters, install inlet and outlet hoses. Install drive shaft (lubricate front universal slip yoke to aid installation). On Mercury models with single exhaust, install exhaust system. Check operation of neutral switch. Install throttle linkage brackets to engine and body using original nuts and bolts. Install battery ground cable. Fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above).

TRANSMISSION INSTALLATION (WITHOUT CONVERTER)

FORD PASS. CARS & TRUCKS

►*NOTE: On Thunderbird and Sunliner it is not possible to remove the transmission (without converter) due to limited clearance.*

1) Install guide pins in the two top transmission to converter housing bolt holes. Mount transmission on jack and position it under vehicle. Rotate engine to position the front pump drive lugs on converter impeller housing in a vertical position. Rotate front pump to position slots in front pump drive gear in a vertical position. Apply lubriplate to seal the surface on the converter impeller cover hub. (If a new transmission is being installed, position a new rubber extension housing duct shield over end of housing)

2) Raise transmission and move it toward front of vehicle *(CAUTION–*Be sure to align the turbine shaft splines with turbine hub splines and the converter impeller lugs with slots in front pump drive gear)

3) On trucks, position the oil cooler front support bracket on case. On all vehicles, install the lower transmission to converter housing attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Tighten bolts to 40-45 ft. lbs.

4) On cars, install the frame crossmember and bolts. Lower transmission onto crossmember and then install engine rear support to transmission bolts On trucks, position the oil cooler on the support bracket and install attaching bolts. Connect oil cooler to transmission oil lines at transmission. Tighten fittings securely. Install universal joint yoke onto transmission output shaft and connect drive shaft

5) On F-250, F-350 & P-350 trucks, coat universal joint knuckle with transmission fluid. Install the four bolts attaching drive shaft coupling yoke at the parking brake assembly, then connect drive shaft at rear axle Connect speedometer cable at extension housing.

6) Connect manual linkage and throttle linkage to transmission levers and adjust the linkage (see "Linkage Adjustment" above). Connect fluid filler tube to oil pan and tighten fitting securely. Lower vehicle to floor and fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above).

LINCOLN & MERCURY

1) Install guide pins, tool No ST-0711 into top transmission to converter housing attaching bolt holes. Mount transmission on lift and position under car. Rotate engine to position front pump drive lugs on converter pump housing in a vertical position. Rotate transmission front pump to position slots in pump drive gear in a vertical position. Apply lubriplate to seal surface on converter pump cover hub.

2) Raise transmission and move toward front of car *(CAUTION–*Use care to index turbine shaft splines with turbine hub, and lugs on converter pump with slots in front pump drive gear). Install two lower transmission to converter housing attaching bolts. Remove the two guide pins and install two upper attaching bolts and tighten to 40-45 ft. lbs.

3) Install rear engine mount to transmission

4) Raise engine and transmission sufficiently to remove engine support fixture. Lower unit to crossmember and install rear engine mount to crossmember bolts. Install drive shaft (Lubricate front universal joint yoke with transmission fluid to aid assembly).

5) Connect speedometer cable at extension housing. Connect manual and throttle linkage to transmission levers. Adjust linkage (see "Linkage Adjustment")

6) Place fluid filler tube in position on pan and tighten filler hex nut to 40-50 ft lbs Remove support stands and lower car to floor Fill transmission with Automatic Transmission Fluid Type "A" (see "Lubrication" above) Road test car

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION

FORDOMATIC
- Ford Pass. Cars (1958-59) Ⓒ
- Ford Trucks F-100, 250, 350, 400, 500 (1958)
- Ford Trucks F-100 (1959-60)

CRUISE-O-MATIC
- Ford Pass. Cars, With Interceptor Engine (1958)
- Ford V8 Pass. Cars (1959-60)
- Thunderbird (1958-60)
- Ford Trucks F-250, 350, P-350, 400, 500 (1959-60)

MERC-O-MATIC
- Mercury (1958)
- Mercury 312" & 383" Engs. (1959)
- Mercury 312", 383" & 430" Engs. (1960)

MULTI-DRIVE
- Mercury, Exc. Medalist (1958)
- Mercury 383" & 430" Engs. (1959-60)

EDSEL AUTOMATIC (Single Range)
- Edsel (1958)

DUAL-POWER
- Edsel 292" & 361" Engs. (1959)
- Edsel 352" Eng. (1960)

TURBO-DRIVE
- Lincoln & Continental (Early 1958)

TWIN-RANGE TURBO-DRIVE
- Lincoln & Continental (Late 1958)
- Lincoln & Continental (1959-60)

Ⓒ - This transmission used in limited production on some early 1959 models. Identified by letter "C" stamped in transmission code space on car patent plate.

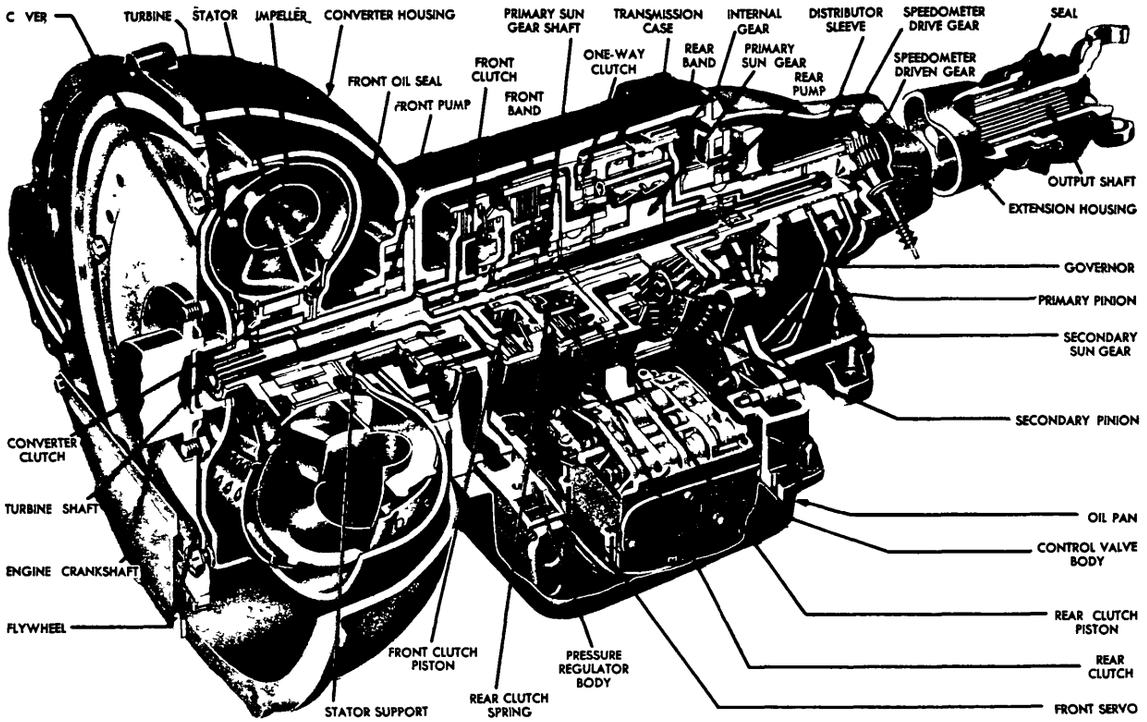
►*SINGLE-RANGE & TWIN-RANGE TRANSMISSION NOTE: Fordomatic, Merc-O-Matic, Turbo-Drive & Edsel Automatic transmissions are "Single-Range" type with five selector lever positions. Cruise-O-Matic, Multi-Drive, Dual-Power, & Twin-Range Turbo-Drive are "Twin-Range" type with six selector lever positions.*

►*TRANSMISSION IDENTIFICATION NOTE: A number of different transmission models are used on the various cars as indicated in following tables. For identification, refer to model number stamped on plate located n transmission case.*

1958 MODELS
Transmission Identification

Car Model	Engine	Trans. Type	Trans. Model No.
Lincoln (Early) ①	430"	⑨	PBB-7000-A
Lincoln (Late) ②	430"	⑩	PBB-7000-E
Lincoln (All)	430" ③	⑩	PBB-7000-J
Mercury ④	430" ③	⑪	PBB-7000-G
Mercury Park Lane	430"	⑪	PBB-7000-H
Mercury ⑤	383" ⑥	⑪	PBE-7000-H
Mercury ⑤	383" ⑥	⑫	PBE-7000-A & G
Mercury ⑦	383" ⑧	⑪	PBL-7000-N
Mercury ⑦	383" ⑧	⑫	PBL-7000-A & M
Mercury Medalist	312"	⑫	PBM-7000-E

① - Before Dec. 1, 1957. ② - After Dec. 1, 1957.
③ - High Torque Engine. ④ - All models except Medalist.
⑤ - Montclair, Voyager & Colony Park.
⑥ - Full Torque Engine. ⑦ - Monterey & Commuter.
⑧ - Low Torque Engine or Full Torque Engine when equipped with single exhaust.
⑨ - Turbo-Drive. ⑩ - Twin-Range Turbo-Drive.
⑪ - Multi-Drive. ⑫ - Merc-O-Matic.



"TWIN-RANGE" TRANSMISSION SECTIONAL VIEW

1959 MODELS
Transmission Identification

Model	Engine	Transmission	Transmission Serial Prefix
Ford	292"	Twin-Range	PAZ-L or N
Ford	332"	Twin-Range	PBM-J
Ford	352"	Twin-Range	PBL
Ford	430"	Twin-Range	PBB
Edsel	292"	Twin-Range	PAZ-L
Edsel	361"	Twin-Range	PBL
Mercury	312"	Single-Range	Ⓒ PBL-AD
Mercury	312"	Single-Range	PBM-S
Mercury	312"	Single-Range	② PBM-G
Mercury	383"	Single-Range	Ⓒ PBL-AC
Mercury	383"	Single-Range	PBL-K
Mercury	383"	Single-Range	PBL-S
Mercury	383"	Twin-Range	② PBL-L
Mercury	383"	Twin-Range	② PBL-T
Mercury	430"	Twin-Range	PBB-F
Mercury	430"	Twin-Range	Ⓒ PBB-T
Lincoln	430"	Twin-Range	PBB-E
Lincoln	430"	Twin-Range	Ⓒ PBB-U

Ⓒ — Later type units with various changes to obtain upshifts at a maximum of 3900 RPM. These units can be identified by serial number prefix or by color of the governor weight which is black phosphate coated. Governor weights on transmission having upshifts at maximum of 4200 RPM (Early Type) are plain steel. Shift speeds are different for early and late units. *See "Adjustm nt" below.*

② — These units, in later production, have been changed to obtain upshifts at a maximum of 3900 RPM. Serial number prefix has not been changed and is the same as units having upshifts at maximum of 4200 RPM. Later type units have governor weights which are black phosphate coated. Early type units have governors of plain steel. Shift speeds are different for early and late units. *See "Adjustm nt" b low.*

1960 MODELS
Transmission Id ntification

Car	Engin	Serial Prefix
Edsel	352"	Ⓒ PBL-AG
Ford Pass	292"	Ⓒ PAZ-Y
Ford Pass	Ⓘ 352"	Ⓒ PBM-U
Ford Pass	② 352"	Ⓒ PBL-AG
Thunderbird	352"	Ⓒ PBL-AH
Thunderbird	430"	Ⓒ PBB-M
Ford Truck F-100	223"	④ PBC-J
Ford Truck F-100	292"	④ PBW-F
Ford Truck F-250	223"	Ⓒ PBC-K
Ford Truck F-250	292"	Ⓒ PBW-G
Ford Truck F-350	223"	Ⓒ PAU-J
Ford Truck F-350	292"	Ⓒ PBY-E
Ford Truck P-350, 400, 500	223"	Ⓒ PAU-K
Ford Truck P-350, 400, 500	292"	Ⓒ PBY-F
Lincoln & Continental	430"	Ⓒ PBB-AD
Mercury	312"	④ PBM-Y
Mercury	383"	④ PBL-AJ
Mercury	430"	④ PBB-AC
Mercury	383"	Ⓒ PBL AK
Mercury	430"	Ⓒ PBB AE

Ⓘ - 2-Bbl Carb ③ - "Twin-Range" transmission
② 4-Bbl Carb ④ - "Single-Range" transmission

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION

►*MANUAL RANGE SELECTOR POSITION NOTE:* "D1" & "D2" ranges referred to in the following text indicates transmission selector lever positioned or pushbutton engaged as follows: "D1" is equivalent to "D1" (Ford), "D1" (Lincoln), "Performance" (Mercury). "D2" is equivalent to "D2"(Ford), "D2" (Lincoln), "Cruising" (Mercury).

►*ENGINE OVERSPEEDING CAUTION: Do not operate engine at speeds in excess of 2500 RPM while transmission selector lever is in "N" (Neutral), "P" (Park), or "R" (Reverse). Force of oil in front clutch will cause a build-up of hydraulic pressure which can result in partial clutch application with damage to clutch parts.*

►CHANGES, CAUTIONS, CORRECTIONS

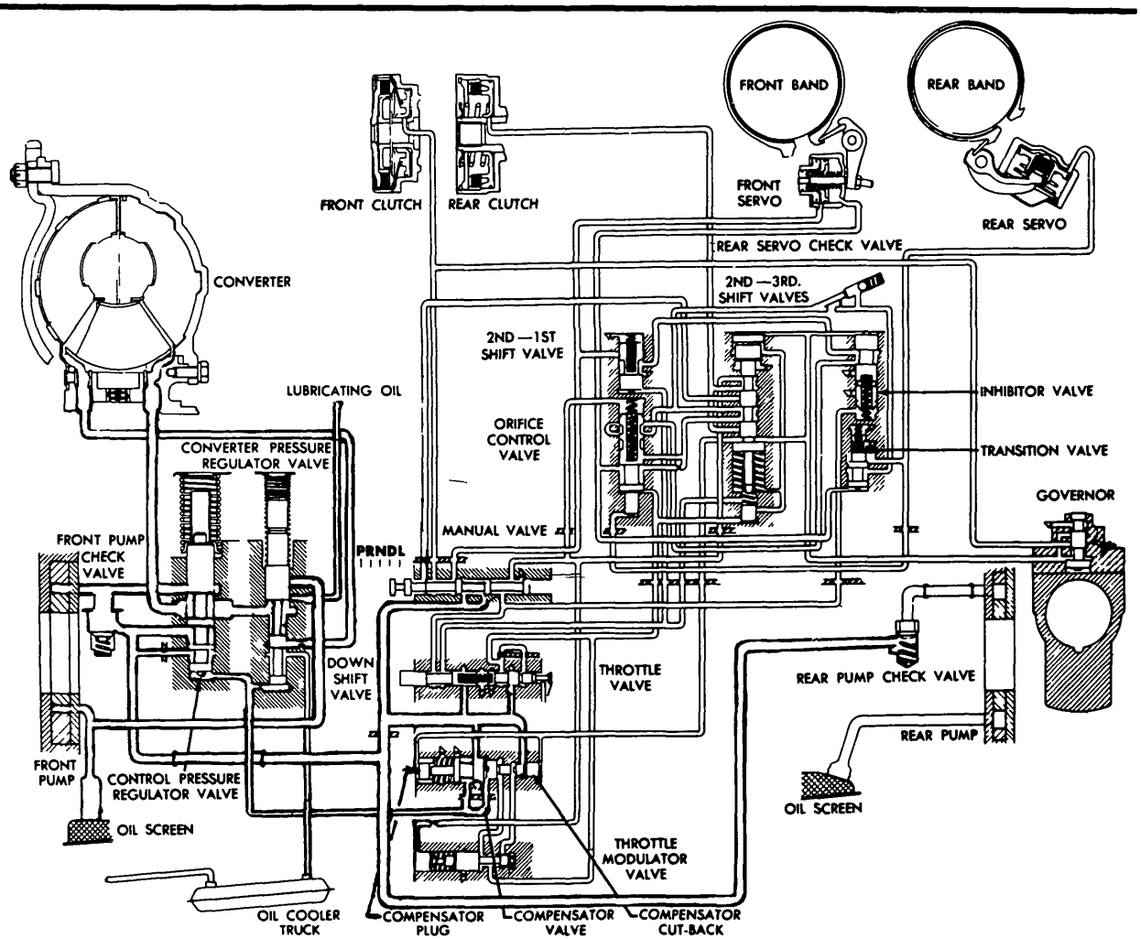
►*FAST IDLE OPERATION (FOR SUSTAINED PERIOD) CAUTION:* To prevent transmission overheating, do not operate car with transmission in Neutral or Park for periods longer than 10 minutes unless fluid level, manual and throttle linkage, and parking brake adjustments are within specifications. It is suggested that the car be raised and properly supported, and operated in gear if long periods of operation at fast idle are required.

►*GOVERNOR INSTALLATION CAUTION (CARS WITH 383" or 430" ENGINES):* When positioning governor in this transmission model, it must be positioned all the way forward against governor retaining shoulder. If governor is not in this position, the retaining snap ring may be mistakenly installed in grinding relief groove at front of distributor sleeve journal instead of snap ring groove. If retaining ring not in correct groove, governor feed and discharge passages may be partially restricted, causing upshifts to be delayed or not occur at all.

►*1958 FORDOMATIC 2-3 UPSHIFT SLIPPAGE CORRECTION:* Adjust throttle linkage using "pressure method" (see CARBURETOR on car model pages). Adjust linkage if necessary to obtain proper pressure reading of 80-85 lbs. at 1000 RPM **but do not lengthen throttle rod in excess of 6 turns to obtain correct pressure.** If pressure readings are erratic, do not meet specifications, or require more than 6 turns when adjusting linkage, replace the control valve assembly. If necessary, adjust front band to specifications. On cars with 352" engine, replace rear clutch piston (use Part No. B8S-77514-B, identified by a blue stripe on face of piston) if pressure readings are within specifications and the 2-3 slippage continues to occur.

►*1958 FORDOMATIC CLOSED THROTTLE 2-3 UPSHIFT "BUZZ-UP" CORRECTION (CARS WITH 352" ENGINE):* Install main control valve assembly, Part No. B8A-77700-D, identified by numeral "7" on valve body. Adjust throttle linkage using the "pressure method". Check all linkage to make sure there is no bind.

►*1958 FORDOMATIC & CRUISE-O-MATIC TRANSMISSION FRONT PUMP FAILURE AT LOW MILEAGE CORRECTION:* Remove transmission and converter assembly, then inspect converter front pump drive lugs for damage, distortion, or wear, particularly in pump drive lug area. If hub is damaged, replace converter. If undamaged, check pilot hub and crankshaft counterbore for nicks, burrs or interference. Clean any roughness with emery cloth. *CAUTION - Do not remove excessive amount of metal as clearance between converter hub and crankshaft counterbore must not exceed .003".*



"SINGLE-RANGE" TRANSMISSION HYDRAULIC CIRCUITS

►*LATE 1957 & 1958 FORDOMATIC & CRUISE-O-MATIC TRANSMISSION REAR CLUTCH & DRUM BEARING CAUTION:* Loose type needle bearings are used in rear clutch hub and drum. When a transmission containing loose bearings is disassembled, it is recommended that all needles be replaced using the correct size and number of bearings as originally installed.

►*1958 FORDOMATIC & CRUISE-O-MATIC CONVERTER ATTACHMENT CAUTION (ALL V8 MODELS):* Four flat washers, Part No. 370444-S are required when securing converter drive studs to engine flywheel assembly. Omission of the washers can cause locknuts to bottom on end of stud thread without properly securing converter assembly to flywheel and cause the converter assembly to "float" and result in driveline noise and vibration.

►*1958 6 CYL. FORDOMATIC CONVERTER STATOR THRUST WASHER SERVICE REPLACEMENT NOTE:* A new Kit, Part No. B8A-7937-A containing a steel backed bronze thrust washer and a thinner aluminum stator thrust washer for installation on rear side of stator (stator front thrust washer is not changed). The steel backed bronze thrust washer will prevent contact between the aluminum thrust washer and the steel impeller thrust washer. When installing, the polished side of the impeller thrust washer must face bronze side of the new stator thrust washer. *NOTE - The above Kit may be installed on 1951-57 cars, 1953-57 trucks, and 1955-57 Thunderbirds (6 Cyl. & V8).*

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (Cont.)

►*1958 FORDOMATIC & CRUISE-O-MATIC REAR CLUTCH PISTON PRODUCTION CHANGE & SERVICE REPLACEMENT ON EARLIER TRANSMISSIONS (To prevent rear clutch application when in the released position):* A new clutch piston having a ball check is available for service replacement on 1951-Early 1958 models.

►*1958 THUNDERBIRD CRUIS-O-MATIC HARD SHIFTING CORRECTION:* To correct hard shifting, install a new longer manual selector lever, Part No. B8S-7210-E.

►*1959 FORDOMATIC PLANET GEAR SPACER PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* New sintered iron planet gear spacers, Part No. B9A–77182–A (previous spacers were steel), are being used in production and for service replacement. Sintered iron spacers are identified by their silver metallic color (steel spacers are almost black). Because of the difference in weight of the two type spacers, they should not be intermixed in one transmission. Make sure all spacers are of the same type.

►*1958–59 FORDOMATIC & CRUISE-O-MATIC (WITH 332" & 352" ENGINES) PLANET ASSEMBLY & SUN GEAR–TO–REAR BRAKE DRUM THRUST WASHER REPLACEMENT CAUTION:* Needle bearing type thrust washer, Part No. B8T–77548–A, and race, Part No. B8A–77549–A, must be used when installing planet gear assemblies, Part No. B8T–77162–A (1958 332" Eng. Fordomatic), Part No. B8A–77162–F (1958 352" Eng. Fordomatic), B9D–77162–A (1959 332" Eng. Cruise-o-Matic), B8S–77162–B (1958–59 352" Eng. Cruise-o-Matic). *Do not use needle bearing type thrust washers with planet assemblies having a shallow thrust pocket.*

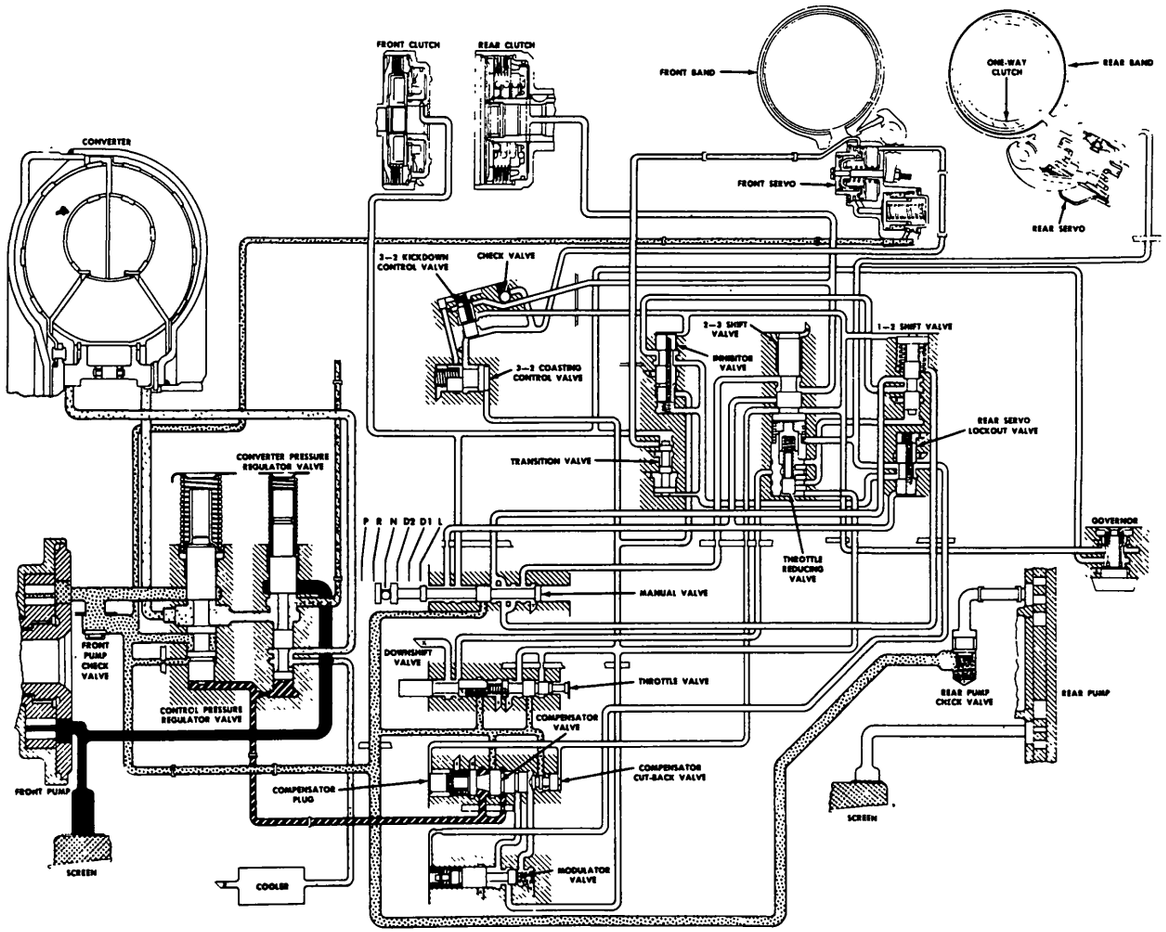
►*1959 FORD TRUCK (HEAVY DUTY CRUISE-O-MATIC) FRONT SERVO OIL TUBE NOTE:* The accumulator type front servo is not included in the transmission. Front servo release oil tube is bored deeper than the apply tube pocket and it is important that oil tubes be installed in their proper position when replacement of front servo or control valve assembly is necessary. The longer release oil tube must be installed in the deeper pocket.

►*1958 EDSEL FAILURE TO OBTAIN FORCED DOWNSHIFT CORRECTION:* If unable to obtain proper clearance of 4.09" between accelerator pedal and floor, remove accelerator pedal rod assembly, then remove clevis and locknut from rod. Use a 1/4" - 20 threading die and cut an additional 3/4" of threads on rod. Reinstall pedal rod and adjust pedal height to 4.09". *NOTE - If threaded end of rod binds against clevis pin, remove clevis and cut approximately 1/2" from threaded end of rod.*

►*1958 EDSEL AUTOMATIC TRANSMISSION 2-3 UPSHIFT SLIPPAGE CORRECTION: See "Fordomatic 2-3 Upshift Slippage Correction" above.*

►*1958 EDSEL AUTOMATIC TRANSMISSION CONVERTER ATTACHMENT CAUTION: See "Fordomatic & Cruise-O-Matic Attachment Caution" ab v .*

►*1958 EDSEL AUTOMATIC TRANSMISSION REAR CLUTCH FAILURE CORRECTION:* Rear clutch failure during sustained high speed low gear operation may be caused by seepage of oil into rear clutch cylinder faster than it can bleed out of piston orifice. To correct on earlier cars not having a ball check in orifice of rear clutch piston, enlarge the orifice in rear clutch piston to .055" by running a No. 54 drill through the orifice. Later pistons having the ball check do not require a correction.



"TWIN-RANGE" TRANSMISSION HYDRAULIC CIRCUITS

►*EDSEL AUTOMATIC TRANSMISSION FRONT PUMP FAILURE AT LOW MILEAGE CORRECTION: See "Fordomatic & Cruise-O-Matic Transmission Front Pump Failure at Low Mileage Correction" above.*

►*1958 EDSEL, LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE TRANSMISSION DIFFICULT "PARK" POSITION ENGAGEMENT & DISENGAGEMENT CORRECTION (EARLY CARS):* On some early cars, an interference may exist between toggle lever pin retainer and transmission case which causes difficult engagement or disengagement in "Park" position. In some cases, the hairpin clip may disengage and allow toggle lever pin to slip out, and result in "no park" position. To correct, remove main control assembly and replace hairpin clip with a new "C" type retainer, Part No. 370084-S7.

►*1958 LINCOLN & CONTINENTAL SINGLE RANGE TYPE TRANSMISSION 2-3 UPSHIFT SLIPPAGE CORRECTION (Prior to Transmission Serial No. 10572):* Properly adjust throttle linkage *(see CARBURETOR on car model page),* then adjust manual control linkage *(see "Linkage Adjustment" b low).* If correct pressure of 80-85 lbs. at 1000 RPM cannot be obtained by lengthening control rod not to exceed 5½-6 turns, replace main control valve assembly. *NOTE - Lengthening the control rod above specified 3 turns will have no adverse effect on transmissions built prior to serial numb r list d abov .*

►*1958 LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE TYPE TRANSMISSION CLOSED THROTTLF*

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

2-3 UPSHIFT "BUZZ-UP" CORRECTION: If this condition is encountered, it is recommended that the carburetor-to-bellcrank rod be adjusted two turns long, then adjust idle speed and dashpot to specifications (see CARBURETOR on car model pages). Correct any binding condition in throttle linkage. If the condition exists after making above adjustments, check the identification number located on main control valve body. If the number is either "1" or "6", replace the main control valve assembly with Part No. PBL-77700-D which is identified by the numeral "7" on valve body.

►*1958 LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE & TWIN RANGE TRANSMISSION FRONT PUMP FAILURE CORRECTION: See "Fordomatic & Cruise-O-Matic Transmissi n Front Pump Failure at Low Mil ag Correction" abov .*

►*1958 MERCURY SINGLE RANGE TRANSMISSION 2-3 UPSHIFT SLIPPAGE CORRECTION (PBE-7000-A Transmissi ns between Serial Nos. 10, 001-10, 140, and PBL-7000-A Transmissions between Serial Nos. 10, 001-10, 029):* Properly adjust throttle linkage *(see CARBURETOR n car model page),* then adjust manual control linkage (see "Linkage Adjustment" below). If correct pressure of 80-85 lbs. at 1000 RPM cannot be obtained by lengthening control rod not to exceed 5½-6 turns, replace main control valve assembly. *NOTE - L ngthening throttl c ntrol rod above specified 3 turns will hav n adv rse effect on transmissions built pri r t serial numb rs listed above.*

►*2-3 UPSHIFT SLIPPAGE NOTE (MERCURY MODELS WITH "PBL" SINGLE-RANGE TRANSMISSIONS):* If 2-3 upshift slippage continues to occur after all adjustments and corrections (see "Mercury 2-3 Upshift Slippage Correction" above) have been made, replace rear clutch piston with either Part No. B8A-77514-A or PBL-77514-A. These later type pistons are identified by a blue stripe across face of piston.

►*1958 LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE & TWIN RANGE TRANSMISSION REAR BAND FAILURE CAUTION:* In case of rear band failure, it is recommended that the main control valve assembly rear servo check valve be checked for restrictions while the main control is removed. This valve is located in cover of lower body and has a .060" orifice on face of valve cover between the two second largest slots in cover.

►*1958 LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE TRANSMISSION FRONT BAND ADJUSTING NOTE:* It is possible that the front band adjusting screw length may not be sufficient to provide proper adjustment through complete life of the front band. If this condition occurs, the number of threads left on locknut end of screw would not be sufficient to provide full contact with all threads of locknut when adjustment is made. To correct the condition, move the locknut from slotted end of adjusting screw to opposite side of servo actuating lever. *CAUTION - Do not us th above method on "Twin-Rang " transmission.*

►*1958 LINCOLN, CONTINENTAL & MERCURY SINGLE RANGE & TWIN RANGE TRANSMISSION REAR CLUTCH FAILURE CORRECTION: See "Edsel Automatic Transmission Rear Clutch Failure Correction" above.*

►*1959 LINCOLN & MERCURY TRANSMISSION PRODUCTION CHANGE & SERVICE PARTS REPLACEMENT CAUTION:* Later transmissions have been changed, as noted below, to obtain wide open throttle upshifts at a maximum of 3900 RPM, rather than 4200 RPM as specified for early type units. *See "Transmission Identification Note" above and note the following:*

"PBB-T" & "PBB-U" Transmissions – The special parts required for these transmissions are as follows: Governor Assembly, Part No. B9MP-77130-A; Governor Body Assembly, Part No. B9MP-77131-A; Front Servo Release Piston, Part No. PBB-7366-D; Front Servo Piston Retainer, Part No. B9PM-77364-B; Front Servo Release Piston "O" Ring, Part No. B8E-77497-A. *DO NOT INTERMIX THESE PARTS with parts for earlier 4200 RPM transmissions.*

"PBB-E" & "PBB-F" Transmissions – These are 4200 RPM (early) models and can be converted to 3900 RPM (later) model by installing all of the special parts listed above for "PBB-T" & "PBB-U" transmissions. *DO NOT INTERMIX PARTS.*

"PBL-AC" & "PBL-AD" Transmissions – The special parts required for these transmissions are as follows: Governor Assembly, Part No. B9MP-77130-A; Governor Body Assembly, Part No. B9MP-77131-A; Main Control Valve Assembly, Part No. B9MP-77700-A. *DO NOT INTERMIX THESE PARTS with parts for earlier 4200 RPM transmissions.*

"PBL-K" & "PBL-S" Transmissions – These are 4200 RPM (early) models and can be converted to 3900 RPM (later) model by installing all of the special parts listed above for "PBL-AC" & "PBL-AD" transmissions. *DO NOT INTERMIX PARTS.*

"PBL-L", "PBL-T" & "PBM-G" Transmissions – *NOTE - Serial number prefix has not been changed to indicate later type 3900 RPM transmissions. See "Transmission Identification" above.* Special parts required for these transmissions are as follows: Governor Assembly, Part No. B9MP-77130-A; Governor Body Assembly, Part No. B9MP-77131-A. To convert early type 4200 RPM transmission to later type, install the new governor assembly as indicated above.

►*1959 LINCOLN & MERCURY TRANSMISSION SHIFT SPEED CHANGE: Shift speeds are different for 3900 RPM type and 4200 RPM type transmissions. See "Testing" below.*

►*1959 LINCOLN & MERCURY "PBB" TRANSMISSION WHINE AT 30-45 MPH CORRECTION (WHEN CAUSED BY REAR PUMP):* This noise may be similar to rear axle whine except that it will be fairly constant under all driving conditions between 30-45 MPH (rear axle noose will vary under "drive", "float" or "coast" conditions). Disassemble and inspect rear pump and remove any nicks or burrs on gear teeth. If tips of gear teeth are grooved or worn because of contacting crescent in pump body, stone lightly to remove irregularities. Check to make sure there is a **slip fit** between drive key and slot in pump drive gear. Dress down key to insure a proper fit. If the pump is still noisy after performing the above, replace pump with a new assembly, Part No. B9LP-7A149-A which has a new design cover containing a 3/8" wide oil relief slot near the discharge port.

►*1959 MERCURY "PBB" TRANSMISSION VENT TUBE ASSEMBLY CHANGE (To r duc pr ssur build-up in transmission):* A new vent tube assembly, Part No. B9LP-7A245-A is being used in production (after Jan. 21, 1959) and may be used on all 1958-59 models with "PBB" or "PBE" transmissions.

►*1958-60 LINCOLN & CONTINENTAL SHIFT LEVER IMPROPER INDEXING WITH TRANSMISSION MANUAL LEVER CORRECTION:* This condition is caused when steering column rotates as transmission selector lever is moved. If steering column rotation is excessive drill a 1/8" diameter hole through lower steering column clamp and outer steering column tube *NOTE - It is not necessary to remove clamp from instrument panel.* Install a No 10 24 x 3, 8" self tapping metal screw through the drilled holes using a shake proof washer on screw

►*1960 LINCOLN & CONTINENTAL ERRATIC TRANSMISSION SHIFT POINT CORRECTION:* If this condition is caused by excessive side-to-side movement of cross shaft in the accelerator linkage bellcrank bracket, position the cross shaft bushing in bellcrank bracket and push cross shaft toward right side of car. Insert a long screwdriver between override kickdown arm and the welded spacer tab that contains the gauge pin alignment hole Bend spacer tab toward bellcrank bracket to minimize shaft movement and hold nylon bushings in place. After straightening spacer tab, adjust throttle valve pressure. *See "Throttle Linkage Adjustment" on car model page.*

►*1960 AUTOMATIC TRANSMISSION GOVERNOR REPLACEMENT NOTE & OVERHAUL CAUTION:* Replacement governors that are color-coded "Yellow" or are "Unmarked", can be disassembled for cleaning and inspection. Governors that are color-coded "Blue" cannot be disassembled as the governor sleeve is staked in the bore.

►*1960 TWIN RANGE TRANSMISSION THROTTLE CONTROL ROD CHANGE:* A swivel type adjustment is being added to throttle control rod on later cars to permit more accurate setting of transmission control pressures.

►*1960 LINCOLN & MERCURY 430" ENGINE AUTOMATIC TRANSMISSION MAIN CONTROL VALVE PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* Main control valve assemblies, identified by number "57A" on valve body are being used in production and may be used in complete assemblies for service replacement on earlier cars. The later type assembly has a .0455" thick separator plate and a revised lower valve body. The earlier control valve assembly separator plate is .105" thick. *Do not intermix thick and thin separator plates and lower body covers.* Earlier type control valve assemblies are identified by the number "57" on valve body.

►*1958 MERC-O-MATIC & MULTI-DRIVE TRANSMISSION OIL COOLER OUTLET LINE REPLACEMENT CAUTION:* **A number of Edsel lower radiator tank assemblies have been used in production and as the tank fittings are 12" apart (Mercury tank fittings are 10" apart), a longer oil cooler outlet line, Part No. MK-77879 must be used. During installation, make sure that oil cooler line is installed at the proper drain hole location.**

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

►*1958 MERC-O-MATIC TRANSMISSION SUPPORT ASSEMBLY SERVICE REPLACEMENT NOTE:* During 1958 production, a number of Merc-O-Matic transmissions have been released with the Multi-Drive transmission "machined" type support assembly, in place of the "stamped" type assembly normally used. These parts are interchangeable in Merc-O-Matic transmissions, however only the "stamped" type, Part No. B5S-77190-A should be used for service replacement on Merc-O-Matic transmissions.

►*1958 MERC-O-MATIC & MULTI-DRIVE TRANSMISSION DETENT LEVER REPLACEMENT CAUTION:* Detent levers for the two transmissions are different and must not be interchanged. Use of the wrong lever can cause transmission failure. Part No. PBL-77280-A, identified by the letters "PBL-A" stamped lever, and a groove in lever shaft adjacent to end of spring must be used on Multi-Drive transmissions. Part No. PBA-77280-D, identified by a plain shaft and a single hole in detent plate must be used on Merc-O-Matic transmissions.

►*1959 MAIN CONTROL VALVE INSTALLATION CAUTION:* The procedure for installation of main control valve has been changed to prevent improper engagement of detent lever pin with manual valve. See *"Transmission Overhaul" below.*

►*1959 ERRATIC SHIFT CORRECTION (WHEN CAUSED BY DIRT OR FOREIGN MATTER IN GOVERNOR HYDRAULIC CIRCUIT):* The following procedure should be used to properly clean the governor and governor circuit. Raise vehicle so rear wheels are off ground, then shift transmission to "R" (Reverse) and accelerate engine to approximately 15—20 MPH. Repeat this several times. Place selector lever in "L" (Low) and accelerate the engine. Remove vehicle from hoist and road test to check shift. If shift is still erractic, again raise car, then remove governor inspection plate and governor and reinstall inspection plate only. Place selector lever in "D" (Drive) or "DL" (Drive 1) and allow rear wheels to turn for 10 seconds at idle speed. Shift into "N" (Neutral) and turn off engine Remove inspection plate, then disassemble, clean, and install governor and inspection plate. Road test for shift quality.

►*1959 REAR PUMP DRIVE KEY (CARS WITH 383" & 430" ENGS.) PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* To insure full engagement with pump drive gear, install a new drive key, Part No. 372187—S, in place of the previous drive key, Part No. 74144—S.

►*STARTING ENGINE BY TOWING OR PUSHING CAR:* Pushing is recommended Place selector lever in Neutral "N" position. When car reaches 20 MPH speed, turn on ignition, move selector lever to "LO", depress accelerator pedal to half throttle position until engine begins to run. *NOTE—On ic or snow where traction not good, mov sel ctor l v r to "DR" position to crank ngin .*

►*TOWING CAR CAUTIONS: Do not tow at sp d gr at r than 40 MPH and obs rv following precautions:*

If Transmissi n Op rating Pr p rly—Place selector lever in Neutral "N" position Car can be towed normally for distances not to exceed 12 miles. **For greater distances, use same procedure as for inoperative transmission.**

If Transmission Inoperative—Tow car with rear wheels lifted off road, or disconnect and remove propeller shaft and protect rear end of transmission from entry of dirt (U-joint Knuckle, Part No. 1M-4841 can be installed and wired in place for this purpose).

DESCRIPTION

DESCRIPTION: Fordomatic, Merc-O-Matic, Turbo-Drive, Edsel Automatic (single range transmissions), Cruise-O-Matic, Multi-Drive, Twin-Range Turbo-Drive (twin-range transmissions), consist of a torque converter and a three speed planetary type automatic transmission that provides automatic operation in "Dr" range (single range transmissions), "Dr-1" & "Dr-2" ranges (twin-range transmissions). "Lo", "R", & "P" ranges ranges are controlled manually. Single range transmissions and twin-range transmission are similar in design to previous Fordomatic, Merc-O-Matic, & Turbo-Drive transmissions. Twin-range transmissions, however, differ from single range transmissions in hydraulic control system design and operations, and has one additional manually selected driving range. A transmission oil cooler is provided on all models except Ford 6 Cyl. Pass. Cars. Manual gear selection is made by a selector lever located on steering column except as follows: A "Keyboard Pushbutton" control located on instrument panel is standard equipment on 1958 Mercury models. An electrically operated "Teletouch" control located in center of steering wheel is optional on 1958 Edsel models.

OPERATION

OPERATION: Same as for 1956-57 models except as noted below. On "twin-range" type transmissions, with selector lever in "Dr-1" range, the car starts in first gear and upshifts to 2nd, then to 3rd gear. With selector lever in "Dr-2" range, the car starts in second gear (same as single-range transmission) and upshifts to 3rd gear. Power flow through "twin-range" type transmission is the same as for single-range type transmissions except that with selector lever or push button in "Dr-1" range, the pinion carrier is held against rotation by a one-way sprag clutch instead of by the rear band First gear in "Dr-1" range is the only gear that uses the one-way clutch.

►*TRANSMISSION DRAINING & REFILLING NOTE: 16,000 miles (1958-59 Lincoln, Mercury, Edsel & Ford Trucks); 24,000 miles (all other models). It is recommended that oil pan and screen be removed and cleaned at time of draining and refilling.*

Recommended Fluid - Automatic Transmission Fluid Type "A" (Suffix "A").

Transmission & Converter Capacity (Approximate)

Model	Single Range ③	Twin-Range ④
1958 Ford Pass. ①	9 qts.	
1958 Ford Pass. ②	10 qts.	10 qts.
1958 Ford Truck	9 qts.	
1958 Ford Thunderbird	10 qts.	10 qts.
1959 Ford Pass.		10 qts.
1959 Ford Truck	9 qts.	9½ qts.
1959-60 Thunderbird ⑤		10 qts.
1959-60 Thunderbird ⑥		10½ qts
1958-60 Edsel	10 qts.	10 qts.
1958-60 Lincoln	10½ qts.	10½ qts
1958 Mercury	10½ qts.	10½ qts.
1959-60 Mercury	10 qts.	10 qts.

① - With 6 Cyl & 292" V8 Eng.
② - With Interceptor V8 Engines.
③ - Fordomatic, Merc-O-Matic, Turbo-Drive & Edsel Automatic.
④ - Cruise-O-Matic, Multi-Drive, Twin-Range Turbo-Drive & Dual-Power.
⑤ - With "PBL" Transmission.
⑥ - With "PBB" Transmission.

LUBRICATION

Checking Fluid Level: Apply hand brake, place selector lever in "N" (Neutral), or depress "N" (Neutral) push button, then run engine at idle speed for approximately four minutes. Place transmission in "P" (Park) position and allow engine to reach normal operating temperature. Move selector lever through all positions or depress all push buttons in turn, then return lever to "P" position or depress "P" push button. Check fluid level and add Automatic Transmission Fluid Type "A" (Suffix "A"), as required to bring level to "F" mark on dipstick.

Draining & Refilling: Remove converter housing lower plate and drain converter by removing one drain plug, then rotate engine 180° and remove second drain plug. Disconnect oil filler tube from transmission oil pan and drain fluid from transmission. Tighten converter drain plugs to 20-28 ft. lbs. (steel), 15-25 ft. lbs. (brass), then tighten oil filler connection. Install 5 qts. of Automatic Transmission Fluid Type "A" (Suffix "A"), then start engine and allow to idle for four minutes. Add 4 qts. (if 9 qts. capacity); 5 qts. (if 10 or 10½ qts. capacity), then bring engine and transmission to normal operating temperature. Place transmission in "P" (Park) position and check fluid level. Add fluid as necessary to bring level up to "F" mark on dipstick. *CAUTION - Correct fluid level should be determined by dipstick reading rather than actual number of quarts of fluid installed.*

LINKAGE ADJUSTMENT

►*EDSEL SELECTOR MOTOR LINKAGE ADJUSTMENT (CARS WITH TELETOUCH TRANSMISSION CONTROL): See "Edsel Teletouch Transmission Control".*

►*MERCURY PUSHBUTTON TRANSMISSION CONTROL ADJUSTMENT: See "Mercury Keyboard Transmission Control".*

Throttle Linkage Adjustment: *See CARBURETOR (car model page).*

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

FORD (ALL MODELS)
EDSEL MANUAL SHIFT

Manual Linkag Adjustm nt: Disconnect upper end of manual shift rod from selector lever at lower end of steering column. Position selector lever so pointer is down against steering column stop in "D" position (single range transmissions), in "D1" position (twin-range transmission). Shift manual lever on transmission to the second detent from bottom ("D" range, single range transmission, or "D1" range, twin-range transmission). Rotate clevis on manual shift rod until it can be easily inserted in selector lever insulator. **On 1958 Eds l m d ls, lengthen rod one full turn of cl vis. On 1959-60 Thunderbird, lengthen rod three full turns f cl vis. On 1959-60 Ford Trucks, lengthen rod tw full turns of cl vis.** *NOTE - All other models should hav rod install d with a free fit.* On all models, lock clevis pin in position and connect rod and clevis to selector shaft lever. Check alignment of pointer at all positions.

LINCOLN & MERCURY

Manual Linkag Adjustment: Disconnect lower end of manual shift rod from lever on transmission, then position lever on transmission in second detent from bottom ("D" range, single range transmission), in third detent from bottom ("D2" range, twin-range transmission). Position selector lever on steering column so indicator is against stop in "D" range (single range transmission), "D2" range (twin range transmission). Adjust manual shift rod clevis so clevis pin enters clevis and detent lever freely, then **lengthen rod one full turn f cl vis and reassemble.** Check position of pointer in each range.

NEUTRAL SAFETY SWITCH ADJUSTMENT
1958 MODELS

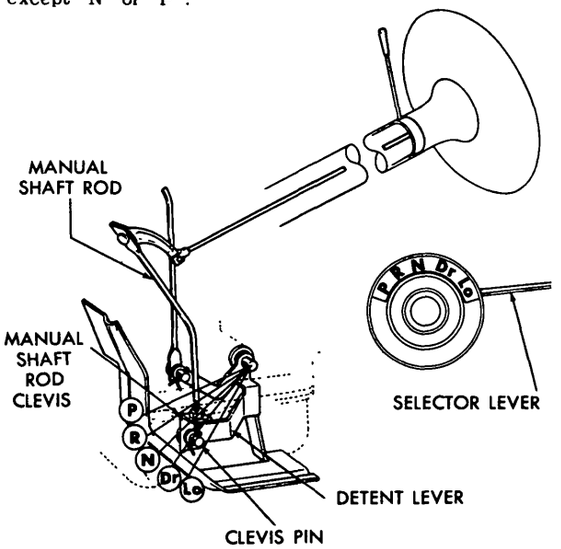
F rd Pass. Cars, Thunderbird, Ford Truck, Lincoln, C ntin ntal, & Eds l (With Manual Transmission Contr l): Switch is located at lower end of steering column (Ford, all models except Thunderbird), on lower side of steering column jacket (Lincoln, Continental & Thunderbird), upper side of steering column jacket (Edsel), under instrument panel. Check starter circuit in all selector lever positions. The circuit must be open in all positions except "N" (Neutral), and "P" (Park). To adjust, loosen neutral safety switch attaching bolts, then position switch so starter circuit is closed when selector lever is in "N" (Neutral) or "P" (Park).

Eds l (With T l t uch Transmission Control): In Teletouch controls. No adjustment required.

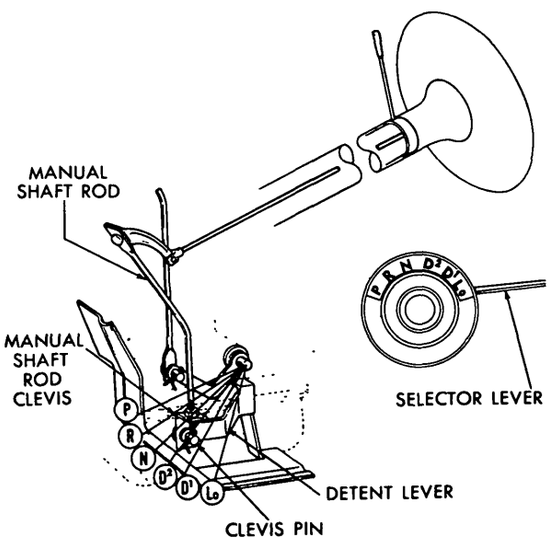
Mercury: Combination starter and neutral switch on back of keyboard control. To adjust, remove battery ground cable, then remove keyboard assembly and lower it below instrument panel. Loosen two switch-to-keyboard control assembly screws and position switch so neutral-start slide positions treadle bar in neutral before it contacts the neutral switch plunger. Check keyboard selector to make sure engine will start only when "NS" button is depressed.

1959-60 MODELS

Ford Pass. Cars (Exc. Thunderbird): Loosen neutral switch to steering column attaching screws at lower end of steering column, then shift selector lever to "N" (Neutral) position. Move switch in the elongated mounting holes until a .060" gauge pin can be inserted through hole in switch housing and into switch plate. With gauge pin in place, tighten attaching screws, then remove gauge pin. Check starter circuit in all lever positions The circuit must be open in all positions except "N" or "P".



"SINGLE-RANGE" TRANSMISSION LINKAGE



"TWIN-RANGE" TRANSMISSI N LINKAGE

Eds l & F rd Trucks: Loosen screws attaching switch to bracket at lower end of steering column, then position switch so that starter circuit is closed when selector lever is at "N" or "P". Circuit must be open at all other positions. Tighten attaching screws and check operation in all lever positions.

Lincoln, Mercury & Thunderbird: Switch is located on under side (Lincoln & Thunderbird), top side (Mercury) of the steering column (inside passenger compartment). To adjust, remove steering column shroud (Lincoln). On all cars, loosen switch to steering column attaching screws and position switch so that starter circuit is closed when selector lever is in "N" or "P" positions, then tighten attaching screws *NOTE – Start r circuit must be open in all positions except "N" or "P".* On Lincoln, install steering column shroud.

BAND ADJUSTMENT

►*BAND ADJUSTMENT NOTE: Adjust bands every 12,000 miles (All Ford Models), 15,000 miles (Other Models).*

FRONT BAND ADJUSTMENT: Drain fluid from pan using a drain can with a fine mesh screen, remove pan. Remove fluid screen from transmission and loosen the front servo adjusting screw locknut TWO FULL TURNS, using a 9/16" wrench. Using front band adjusting tool No. 7225, insert gauge block between servo piston and adjusting screw and tighten adjusting screw until wrench overruns. Back off adjusting screw exactly ONE COMPLETE TURN and remove gauge block. While holding adjusting screw stationary, tighten locknut clockwise (20-25 ft. lbs.). Install fluid screen and install pan using new gasket. Install the drain plug and refill transmission to "Full" mark using fluid drained from transmission unless fluid being changed.

►*CAUTION–Severe damage may result if adjusting scr w not backed off exactly 1 full turn.*

REAR BAND ADJUSTMENT: Fold back floor mat (remove front console on Thunderbird), to expose right side of floor pan and remove access cover. Use Rear Band Adjusting Tool No. 7195 (Ford Pass. Cars & Trucks), No. T58L-7195-A (Thunderbird), No. 7195-C (Other Models) and loosen rear band adjusting screw locknut. Tighten adjusting screw until tool overruns (to 10 ft. lbs. with torque wrench used with tool on Thunderbird). *NOTF - If screw is found to be tighter than wrench capacity (10 ft. lbs.), loosen screw several turns and retighten until wrench overruns. Back off adjusting screw exactly 1½ turns.* While holding adjusting screw stationary, tighten adjusting screw locknut to 35-40 ft. lbs.

►*CAUTION: Severe damage may result if adjusting screw not backed off exactly 1½ turns.*

TESTING

►*TWIN RANGE TRANSMISSION STALL TEST NOTE:* Stall test procedures for the "Twin Range" transmission are the same as for "Single Range" (below), except that "Twin Range" transmission will not downshift in D1 or D2 when car is standing still.

►*CAUTION: While making the Stall Test never h ld the throttle open longer than 5 seconds.*

STALL TEST: The stall test is made in "D", "LO" & "R" ranges to determine if bands or clutches are slipping. Connect a tachometer to engine and set it to

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (Cont.)

read on the "high" scale Make sure engine is idling properly at normal operating temperatures. Start engine, then firmly apply parking brake and service brake. Place selector lever in "D" range, then press accelerator slowly all the way to the floor without going into "low gear" kickdown The engine speed should be as indicated in the "Stall Speed Table" below. If engine speed is below minimum limit, tune the engine and repeat test If engine speed exceeds maximum limit, release accelerator immediately because front band or clutch slippage is evident. To determine whether the front band or front clutch is causing slippage, move lever to "LO" range and repeat the test. If slippage is evident in "LO" range also, the front clutch is slipping If slippage is found in "DR" range, but not in "LO" or "R" ranges, the front band is causing the the slippage. If engine exceeds the maximum limit with selector lever in "R" range, the rear band or rear clutch is slipping. To determine which of the two is faulty, move selector lever to "LO" range. If slippage is evident in "LO" and "R" ranges, but not in "D" range, the rear band is slipping When slipping is noted in "R" range but not in "LO" or "D", the rear clutch is causing the slippage

1958 MODELS
ENGINE STALL SPEEDS
(Single Range Transmission)

Car & Model	Low Limit	Engine RPM	High Limit
Ford Pass (223" Eng)	1370		1570
Ford Pass (292" & 332" Fng)	1530		1730
Ford Pass (352" Fng)	1430		1700
Ford Truck (6 Cyl)	1400		1600
Ford Truck (V8)	1500		1700
Lincoln	1690		1890
Mercury (312" & 383" Fng)	1640		1840
Edsel (400 Eng)	1540		1740
Edsel (475 Fng)	1640		1840

(Twin Range Transmission)

Car & Model	Low Limit	Engine RPM	High Limit
Ford Pass (332" & 352" Fng)	1430		1700
Lincoln (Farly)	1610		1810
Lincoln (Late)	1690		1890
Mercury (383" Eng)	1640		1840
Mercury (430" Eng.) ①	1690		1890
Mercury (430" Eng) ②	1610		1810

① - Low Torque Engine ② - High Torque Fngine

1959 MODELS
ENGINE STALL SPEEDS

Car & Model	Engine RPM
Edsel	1350–1700
Ford Pass Cars	1350–1700
Thunderbird (352" Eng)	1440–1640
Thunderbird (430" Eng)	1720–1820
Ford 6 Cyl Trucks ①	1400–1600
Ford V8 Trucks ②	1500–1700
Mercury (Exc 430" Fng) ③	1640–1840
Mercury (430" Eng)	1690–1890
Lincoln	1690–1890

① – Single Range Trans ② – Twin-Range Trans
③ – Single Range & Twin Range Trans

1960 MODELS
ENGINE STALL SPEEDS

Car & Engine	Engine RPM
Edsel 223" Eng	1370-1570
Edsel 292" Eng	1590-1790
Edsel 352" Eng	1640-1840
Ford Pass 292" Eng	1510-1710
Ford Pass. 352" Eng ①	1610 1810
Ford Pass 352" Eng ②	1690 1890
Thunderbird 352" Eng	1690-1890
Thunderbird 430" Eng	1590 1790
Ford Truck 223" Eng (Single Range)	1400-1600
Ford Truck 223" Eng (Twin Range)	1380-1580
Ford Truck 292" Eng (Twin Range)	1500 1700
Lincoln & Continental	1590 1790
Mercury 312" Eng	1590 1790
Mercury 383" Eng	1500 1700
Mercury 430" Eng	1590 1790

① 2-Bbl Carb ② 4 Bbl Carb

SHIFT TESTS (Single Range Transmission): Select a smooth road for tests Make test as outlined below and see "Shift Point Table" for correct speed where shift should occur

2-3 Upshift (Minimum Throttle): Place selector lever in "DR" range, and starting from a standstill, apply accelerator lightly but steadily

3-2 Downshift (Minimum Throttle): Permit car to decelerate (from speed attained in above test) until downshift occurs from high to intermediate

3-2 Downshift (Forced): Reduce car speed below 45 MPH (Ford), 50 MPH (Mercury & Lincoln) Press accelerator pedal to floor Transmission should shift from high to intermediate This shift should occur only with car in high gear

2-3 Upshift (Maximum Throttle): Place selector lever in "DR" range, and starting from a standstill, press accelerator to the floor Full throttle upshift should occur as indicated

2-1 Downshift (Forced): With selector lever in "DR" range and car speed below 18 MPH (Ford), 19 MPH (Mercury & Lincoln), quickly press accelerator fully to the floor This action shifts transmission from high, to intermediate, or low.

1-2 Upshift (Maximum Throttle): With accelerator fully pressed to floor for above test (2-1 Downshift, Forced), transmission should upshift from low to intermediate when car speed indicated in table is reached The 2-3 Upshift will occur at same speed as for 2-3 Upshift (Maximum Throttle).

"DR" to "LO" Manual Shift: With car speed between 40-45 MPH (Ford), 45-50 MPH (Mercury & Lincoln), Manually shift selector lever from "DR" to "LO". Instead of shifting to low gear, the transmission should shift from high to intermediate When car speed is reduced within the range indicated in table, the transmission should shift into low range

"R" Shift: Bring car to a stop and place selector lever in "R" range The car should move in reverse direction smoothly, upon light throttle pressure

SHIFT TESTS (Twin Rang Transmissi n): Select a smooth road for tests Make test as outlined below and see "Shift Point Table" for correct speed where shift should occur

1-2, 2-3 Upshift (Minimum Thr ttl): Place selector lever in D1 range and starting from a standstill, transmission should start in first gear and shift to second, then at a higher speed shift to third

3-1 Downshift (Minimum Thr ttl): Permit car to decelerate from approximately 30 MPH in third gear The shift should occur between 6 MPH & 11 MPH (see "Shift Point Table") *NOTE - In first gear, D1, the transmission will free wheel if drive shaft spe d in first gear is relatively higher than engine speed*

3-2, 2-1 Downshift (Maximum Throttl): With transmission in third gear, depress accelerator pedal through detent If car speed is above 36 MPH, the transmission should shift from third to second If car speed is below 24 MPH, the transmission should shift from third to first

►*NOTE Other shift tests are the same as for "Single Range" transmission (above)*

►*1959 LINCOLN & MERCURY PRESSURE TAKE-OFF EXTENSION PIPE NOTE:* Approximately 500 cars of each make have been released with the automatic transmission pressure tap located in engine compartment Steel tubing is used from the transmission case to the vicinity of the accelerator bellcrank bracket on rear of engine A Schrader valve and valve cap is installed on end of tubing If necessary to make adjustments on cars having this extension disconnect tubing at rear of transmission to allow installation of pressure gauge Adapters will be made available at a later date to allow pressure readings to be made in engine compartment

►*1960 LINCOLN & MERCURY PRESSURE TAKE-OFF EXTENSION PIPE NOTE.* The automatic transmission pressure tap is located in engine compartment adjacent to throttle lever bellcrank at rear of engine and is connected to transmission with steel tubing A Schrader valve and valve cap is installed on upper end of tubing

CONTROL PRESSURE TESTS: *(NOTE - The Throttl Lever Protractor Gaug form rly us d in t sting the transmission is no long r r quir d)* Install Pressure Gauge No. 77820-A (300 lbs.) in pressure take-off hole in transmission (located either near throttle lever or at rear of transmission case), and position it so it may be read from the driver's seat. Install tachometer to engine and adjust engine to correct idle speed. Set hand brake and allow engine and transmission to reach normal operating temperature. Proceed as follows *(NOTE - S "Line Pressure Range" table b low for pr ssure sp cifications)*·

1) With selector lever in "DR" (Drive) range, check idle pressure which should be within specifications

2) Increase engine speed to 1000 RPM and note control pressure If pressure is not within specifications, adjust throttle rod *(see "Throttl Linkag Adjustm nt" above)*

3) With selector lever in "DR" (Drive) range, increase engine speed to a stall condition Pressure must be within specifications

4) Move selector lever to "R" (Reverse) range and repeat the pressure tests at idle speed, 1000 RPM, and stall Pressures should be within specifications

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (Cont.)

► *CONTROL PRESSURE DIAGNOSIS NOTE: If pressures for the above tests are not within specification as outlined in "Line Pressure Range" table below, perform Shift Test & Stall Test as indicated above. Refer to "Trouble Shooting & Diagnosis".*

1958 MODELS
LINE PRESSURE RANGE TABLE
Ford Pass. Cars & Trucks
(Single Range Transmission)

Engine Speed	Lever Position	223" Engine	292" & 332" Engines	352" Engine
Idle	All	51-61 lbs	52-67 lbs	55-65 lbs
1000 RPM	Dr	80-85 lbs	80-85 lbs	80-85 lbs
Stall ℂ	Dr or Lo	129-148 lbs	137-157 lbs	150-170 lbs
Stall ℂ	R	174-195 lbs	184-204 lbs	196-216 lbs

ℂ - At detent

Lincoln & Mercury
(Single Range Transmission)

Engine Speed	Lever Position	312" Engine	383" & 430" Engines
Idle	All	52-67 lbs	56-70 lbs
1000 RPM	Dr	80-85 lbs	80-85 lbs
Stall ℂ	Dr & Lo	137-157 lbs	152-180 lbs
Stall ℗	Dr	137-157 lbs	152-180 lbs
Stall ℂ	R	184-204 lbs	197-215 lbs

ℂ - To detent ℗ - Through detent

Edsel
(Single Range Transmission)

Engine Speed	Lever Position	400 & 475 Engines
Idle	All	55-65 lbs
1000 RPM	Dr	80-85 lbs
Stall ℂ	Dr or Lo	150-170 lbs
Stall ℗	Dr	150-170 lbs
Stall ℂ	R	196-216 lbs

ℂ - To detent ℗ - Through detent

Ford, Lincoln & Mercury
(Twin Range Transmission)

Engine Speed	Lever Position	Ford & Thunderbird	Lincoln & Mercury
Idle	All	56-68 lbs	55-70 lbs
1000 RPM	D1 or D2	80-85 lbs	80-85 lbs
Stall ℂ	D1 or D2	149-169 lbs	150-170 lbs
Stall ℗	L	196-216 lbs	195-215 lbs
Stall ℂ	R	196-216 lbs	195-215 lbs

ℂ - To detent ℗ - Through detent

1959 MODELS
LINE PRESSURE RANGE TABLE
Ford Trucks
(Single Range Transmission)

Engine Speed	Lever Position	Pressure
Idle	All	52—67 lbs
1000 RPM	Dr	80—85 lbs
Stall ℂ	Dr or Lo	137—157 lbs
Stall ℂ	R	184—204 lbs

ℂ — At detent

CONTINUED ON NEXT PAGE

1958 SINGLE RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)						MAN. SHIFT
SHIFT		2 - 3		3 - 2		1 - 2	2 - 1	ℂ
THROTTLE		MIN.	MAX.	MIN.	FORCED	MAX.	FORCED	
Ford 6 Pass. Cars	3.10-1	10-19	58-72	7-10	54-68	36-46	12-21	15-24
	3.56-1	8-16	50-63	6-8	47-49	31-40	10-18	13-21
Ford V8 Pass. Cars 292" & 332" Engines	3.10-1	10-19	60-74	6-9	56-69	37-48	12-21	15-24
	3.56-1	8-16	52-64	6-8	49-60	32-42	10-18	13-21
Ford V8 Pass. Cars 352" Engine	2.91-1	10-19	63-76	7-10	60-72	40-15	13-21	16-25
Ford Truck F-100	All	8-16	49-61	8-5	58-46	30-40	17-10	20-12
Ford Truck F-250	All	7-13	40-50	6-4	47-38	25-33	14-8	16-10
Ford Truck F-350 & P-400	All	7-13	41-52	7-4	49-39	26-34	15-8	17-10
Ford Truck P-350	All	7-13	42-53	7-4	50-39	26-34	15-8	17-10
Ford Truck P-500	All	6-11	35-45	6-4	42-33	21-29	13-7	15-9
Lincoln & Mercury (Exc. Medalist)	All	10-20	60-80	7-10	25-75	40-55	0-25	15-30
Mercury Medalist	All	10-20	60-70	6-9	25-65	35-45	0-20	15-30
Edsel (All Models) 8.00x14 Tires	2.91-1	10-19	64-76	7-10	60-72	40-51	13-21	16-25
	3.22-1	9-17	57-69	7-9	54-65	36-46	12-19	15-22
Edsel (All Models) 8.50x14 Tires	2.91-1	11-20	66-79	7-10	62-74	42-52	13-22	17-26
	3.22-1	10-18	59-71	7-9	56-67	38-47	12-20	15-23

ℂ - If manual shift made above speed indicated, transmission will shift from High to Intermediate, if within these speeds, transmission will shift from High to Low

1958 TWIN RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)								MAN. SHIFT
RANGE		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	Lo
THROTTLE		Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	
SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1	3-2	2-1
Ford Pass. Cars 332" Engine	2.69-1	10-14	43-54	14-25	68-81	7-10	62-75	27-36	7-10	20-28
	2.91-1	9-13	40-50	13-23	63-75	6-10	57-71	27-33	6-10	19-26
Ford Pass. Cars 352" Engine	3.10-1	8-12	37-46	12-22	59-70	6-9	54-65	24-31	6-9	17-24
Thunderbird	2.91-1	9-13	40-50	13-23	63-75	6-10	58-71	26-33	6-10	19-26
	3.10-1	8-11	37-47	12-22	59-70	6-9	55-66	24-30	6-9	17-25
Lincoln & Mercury	All	10-15	40-55	15-25	65-85	11-7	60-80	25-40	11-7	20-30

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

Mercury (Single Range Transmission)

Engine Speed	Lever Position	Pressure 312" Eng.	383" Eng.
Idle	All	52—67 lbs.	56—70 lbs.
1000 RPM	Dr.	80—85 lbs.	80—85 lbs.
Stall ①	Dr. or Lo.	137—157 lbs.	152—180 lbs.
Stall ②	Dr.	137—157 lbs.	152—180 lbs.
Stall ①	R	184—204 lbs.	197—215 lbs.

① — To detent. ② — Through detent.

Edsel, Ford, Lincoln & Mercury (Twin-Range Transmission)

Engine Speed	Lever Position	Ford, Edsel & T-Bird	Lincoln & Mercury
Idle	All	56—68 lbs.	55—70 lbs.
1000 RPM	D1 or D2	80—85 lbs.	80—85 lbs.
Stall ①	D1 or D2	149—169 lbs.	150—170 lbs.
Stall ②	L	196—216 lbs.	195—215 lbs.
Stall ①	R	196—216 lbs.	195—215 lbs.

① — To detent. ② — Through detent.

1960 MODELS
LINE PRESSURE RANGE TABLE

Ford Trucks (Single Range Transmission)

Engine Speed	Lever Position	Pressure
Idle	All	52—67 lbs.
1000 RPM	Dr.	80—85 lbs.
Stall ①	Dr. or Lo.	137—157 lbs.
Stall ①	R	184—204 lbs.

① — At detent.

Mercury (Single Range Transmission)

Engine Speed	Lever Position	Pressure
Idle	All	56-72 lbs
1000 RPM	D	80-85 lbs
Stall	D or L	150-170 lbs
Stall	R	196-216 lbs.

All Models (Twin-Range Transmission)

Engine Speed	Lever Position	Pressure
Idle	All	56-72 lbs
1000 RPM	D1 or D2	80-85 lbs
Stall	D1 or D2	150-170 lbs
Stall	L & R	196-216 lbs.

AIR PRESSURE TESTS (WITH TRANSMISSION IN CAR): Raise car on hoist and remove transmission oil pan, and control valve assembly. Proceed as follows:

Front Clutch: Apply pressure to front clutch and governor input passage (see illustration). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of system.

Governor Valve: Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

R ar Clutch: Apply air pressure to rear clutch oil passage (see illustration). Listen for a dull thud to indicate clutch is operating Check for leaks in same manner as for front clutch (above).

CONTINUED ON NEXT PAGE

1959 SINGLE RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)						MAN. SHIFT
SHIFT		2-3		3-2		1-2	2-1	①
THROTTLE		MIN.	MAX.	MIN.	FORCED	MAX.	FORCED	
Ford 6 Cyl. Truck	3.89-1	8-15	49-58	5-7	46-55	30-38	10-16	12-19
Ford V8 Truck (292" Eng.)	3.70-1	8-16	52-61	6-8	49-58	32-40	10-17	13-20
Mercury 312" Eng. "PBM-S" & "PPM-G" ①	All	10-20	60-70	6-9	25-65	35-45	0-20	15-30
Mercury 312" Eng. "PBM-G" ②	All	10-20	56-69	6-9	52-65	34-45	11-21	14-24
Mercury 312" & 383" "PBL-AC" & "PBL-AD" ②	All	11-23	60-78	6-11	55-74	37-52	12-24	15-27
Mercury 383" Eng. "PBL-K" & "PBL-S" ③	All	10-20	60-80	7-10	25-75	40-55	0-25	15-30

① - 4200 RPM (Maximum). ② - 3900 RPM (Maximum).
③ - 4200 RPM (Maximum) If converted to 3900 RPM (Maximum) use shift speed indicated above for "PBL-AC" ' "PBL-AD" Transmissions.
See *"1959 Lincoln & Mercury Transmission Production Change & Service Parts Replacement Caution"* above.

1959 TWIN RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)								MAN. SHIFT
RANGE		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	L
THROTTLE		Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	
SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1	3-2	2-1
Edsel 292" Eng.	All	9-12	37-46	12-22	60-71	5-9	66-53	24-31	5-9	
Edsel 361" Eng.	All	10-14	43-54	14-25	68-81	7-10	62-76	27-36	7-10	20-28
Ford Pass. Cars.	2.69-1	10-14	43-54	14-25	69-81	7-10	63-76	28-36	7-10	20-28
Ford Thunderbird	2.91-1	9-13	40-50	13-23	63-75	6-10	58-71	26-33	6-10	19-26
Ford Thunderbird	3.10-1	8-12	37-47	12-22	59-70	6-9	54-67	23-30	6-9	18-25
Ford Truck F-250	4.88-1 4.56-1	6-9	25-34	7-14	40-51	3-6	36-48	16-22	3-6	12-17
Ford Truck F-350, P-400	5.14-1 4.86-1	6-9	26-34	7-15	41-51	3-6	37-48	17-23	3-6	12-18
Ford Truck P-350	4.88-1 4.56-1	6-9	26-35	7-15	41-52	3-6	37-49	17-23	3-6	12-18
Ford Truck P-500	6.8-1 6.2-1	5-8	22-30	6-13	34-45	3-5	31-42	14-20	3-5	10-15
Lincoln "PBB-E" Trans. ①	All	10-15	40-55	15-25	65-85	7-11	60-80	25-40	7-11	20-30
Lincoln "PBB-U" Trans. ②	All	10-16	40-51	12-25	63-76	5-10	58-71	25-35	5-10	18-28
Mercury "PBL-L" ① & "PBL-T" Trans.	All	10-15	40-55	15-25	65-85	7-11	60-80	25-40	7-11	20-30
Mercury "PBL-L" & "PBL-7" Trans. ②	All	9-16	38-53	12-26	60-80	5-11	56-74	25-36	5-11	18-29
Mercury "PBB-F" Trans. ①	All	10-15	40-55	15-25	65-85	7-11	60-80	25-40	7-11	20-30
Mercury "PBB-T" Trans. ②	All	9-16	38-53	12-26	60-80	5-11	56-74	25-36	5-11	18-29

① - 4200 RPM (Maximum). ② - 3900 RPM (Maximum).
See "1959 Lincoln & Mercury Transmission Production Change & Service Parts Replacement Caution" above.

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

R ar Band & S rvo: Apply pressure to rear servo oil passage (see illustration), and observe band application.

Fr nt Band & S rv : Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If s rvos, bands, clutches, and governor op rate with air pr ssure, then the no drive problems, rratic shift, or no upshift conditions indicate that the control valv assembly is the cause of the troubl . S e "Control Valv " in OVERHAUL BELOW.*

TROUBLE SHOOTING & DIAGNOSIS

►*TROUBLE SHOOTING & DIAGNOSIS NOTE: Make corr ctions in s qu nc shown, testing operation of transmission aft r ach corr ction.*

SEVERE ENGAGEMENT ("Lo", "Dr", or "R" Ranges): Check engine idle speed and throttle linkage adjustments. Adjust rear band. Perform a control pressure test. Remove and clean main control valve assembly and pressure regulator valve.

1-2, 2-3 SHIFT POINTS LOW, HIGH, OR ERRATIC: Check fluid level. Adjust throttle and manual linkage. Check governor operation. Perform a pressure control test. Remove and clean main control valve assembly and pressure regulator valve.

SEVERE 2-3 SHIFT: Adjust throttle linkage. Adjust front band. Remove and clean main control valve assembly and pressure regulator valve. Remove and inspect front servo.

ENGINE OVERSPEEDS (2-3 SHIFT): Adjust front band. Remove and clean main control valve assembly.

NO 1-2 OR 2-3 SHIFTS: Remove and inspect governor. Remove and clean valve assembly. Rear clutch slippage. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

NO FORCED DOWNSHIFTS: Adjust throttle linkage. Perform control pressure check. Remove and clean main control valve assembly. Check operation of inner and outer throttle levers.

SEVERE 3-2 OR 3-1 SHIFTS (CLOSED THROTTLE): Check engine idle speed and throttle linkage. Remove and clean main control valve assembly.

SLIPPAGE OR CHATTER IN 2ND SPEED: Check fluid level. Adjust throttle linkage. Adjust front band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front servo not performing properly. Front clutch slipping. Leakage in hydraulic system.

SLIPPAGE OR CHATTER IN 1ST SPEED: Check fluid level. Adjust throttle linkage. Adjust rear band. Clean main control valve and pressure regulator assemblies. Check inner and outer throttle levers. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft is faulty.

SLIPPAGE OR CHATTER IN REVERSE: Check fluid level. Adjust throttle linkage. Adjust rear band. Check control pressure. Clean main control valve and pressure regulator assemblies. Front clutch slipping. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty

1960 SINGLE RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)						MANUAL SHIFT
SHIFT		2-3		3-2		1-2	2-1	
THROTTLE		MIN.	MAX.	MIN.	FORCED	MAX.	FORCED	
Ford Truck F-100	All	7-18	45-65	5-8	43-61	28-42	8-19	11-22
Mercury 312" Eng.	All	10-29	54-68	6-9	50-64	34-45	11-21	14-24
Mercury 383" & 430" Engs.	All	11-23	59-78	6-11	55-74	37-52	12-24	15-17

1960 TWIN RANGE TRANSMISSION SHIFT SPEEDS

	AXLE RATIO	SHIFT SPEEDS (MPH)								MAN. SHIFT
RANGE		D1	D1	D1 or D2	D1 or D2	D1	D1 or D2	D1	D2	Lo
THROTTLE		Min.	Max.	Min.	Max.	Min.	Max.	Max.	Min.	
SHIFT		1-2	1-2	2-3	2-3	3-1	3-2	2-1	3-2	2-1
Edsel 352" Eng.	All	9-14	40-51	13-25	64-79	5-10	58-73	25-33	5-10	19-28
Ford Pass. Cars	3.56-1	7-11	32-42	11-20	52-64	4-8	46-60	20-27	4-8	15-23
Ford Pass. Cars	3.10-1	8-13	37-48	12-24	59-74	5-9	53-69	23-31	5-9	17-26
Ford Pass. Cars	2.91-1	9-14	40-51	13-25	64-78	5-10	58-73	25-33	5-10	19-28
Thunderbird	2.91-1	9-14	40-59	13-24	64-76	5-10	58-71	25-32	5-10	19-27
Thunderbird	3.10-1	8-13	38-45	12-23	60-72	5-9	54-67	24-30	5-9	17-25
Ford Truck F-250	All	6-11	27-40	9-20	43-62	3-8	39-58	17-27	3-8	12-22
Ford Truck F-350, P-350, P-400	All	5-11	22-40	7-20	35-62	3-8	31-58	14-27	3-8	11-22
Ford Truck P-500	All	5-9	22-32	7-16	35-50	3-6	31-46	14-22	3-6	10-18
Lincoln & Mercury	All	9-16	38-53	12-26	60-80	5-11	56-74	25-36	5-11	18-29

NO DRIVE IN "DR" OR "D2" RANGE: Adjust front band Clean main control valve assembly. Make an air pressure check. Front clutch slipping. Leakage in hydraulic system. Fluid distributor in output shaft faulty.

NO DRIVE IN "D1" RANGE: Adjust manual linkage Rear pump not operating properly. Planetary one-way clutch not operating properly.

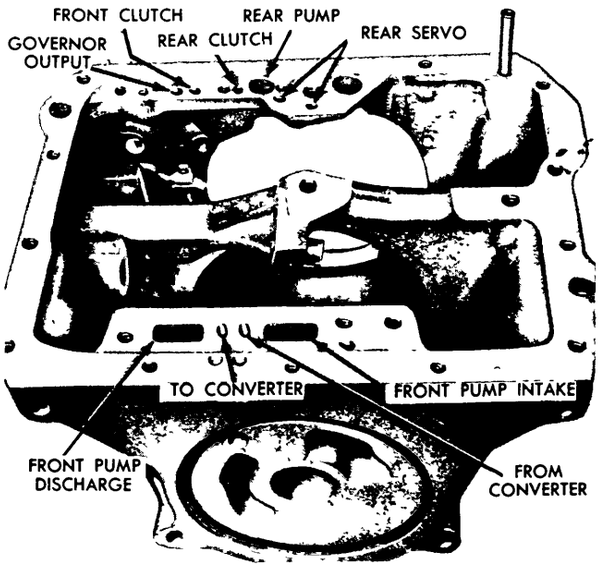
NO DRIVE IN "R" RANGE: Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Make an air pressure check. Rear clutch not operating. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN "LO" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Clean main control valve assembly. Leakage in hydraulic system. Fluid distributor sleeve in output shaft faulty.

NO DRIVE IN ANY RANGE: Check fluid level. Adjust manual linkage. Check control pressure. Clean main control valve and pressure regulator assemblies. Make an air pressure check. Leakage in hydraulic system.

LOCKUP IN "DR" RANGE: Adjust manual linkage. Adjust rear band. Rear servo not operating properly. Front servo not operating properly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

CONTINUED ON NEXT PAGE



TRANSMISSI N TEST POINTS

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

LOCKUP IN "R" RANGE: Adjust front band. Front servo not operating properly. Front clutch slipping. Check parking linkage. Leakage in hydraulic system.

LOCKUP IN "LO" RANGE: Adjust front band. Front servo not operating properly. Clean main control valve assembly. Rear clutch slipping. Check parking linkage. Leakage in hydraulic system.

PARKING LOCK BINDS OR WILL NOT HOLD: Adjust manual linkage. Check parking linkage.

UNABLE TO START ENGINE BY PUSHING: Check fluid level. Adjust manual linkage. Clean main control and pressure regulator valve assemblies. Rear pump not operating. Leakage in hydraulic system.

TRANSMISSION OVERHEATING: Converter cooling air passages blocked. Oil cooler and connections faulty. Clean pressure regulator assembly. Converter one-way clutch slipping or faulty.

ENGINE RUNAWAY ON FORCED DOWNSHIFT: Adjust front band. Clean main control valve and regulator valve assembly. Front servo not operating properly. Leakage in hydraulic system.

MAXIMUM SPEED BELOW NORMAL (POOR ACCELERATION): Converter one-way clutch not operating properly.

NO 2-1 DOWNSHIFT: Adjust throttle linkage. Clean main control valve assembly. Rear servo not operating properly.

NO 3-1 DOWNSHIFT: Adjust engine idle speed and throttle linkage. Remove and clean main control valve assembly.

NOISE IN NEUTRAL: Clean and inspect pressure regulator. Engine rear oil seal faulty. Front clutch not releasing properly. Front pump faulty.

NOISE IN 1ST, 2ND OR REVERSE SPEEDS: Clean and inspect pressure regulator. Fault in planetary assembly. Front or rear clutch faulty. Front pump faulty.

NOISE IN PARK RANGE: Clean and inspect pressure regulator. Front pump faulty.

NOISE WHEN COASTING IN NEUTRAL (20-30 MPH) WITH ENGINE OFF: Rear pump faulty.

MINOR REPAIRS (TRANSMISSION IN CAR)

The following transmission units can be removed for repair without removing transmission assembly from car. Raise car on hoist for these operations, then drain fluid from transmission and remove oil pan.

►*NOTE: For Disassembly & Overhaul of the following units, see OVERHAUL (TRANSMISSION UNITS) below.*

Governor Removal (1958-59 Models): Remove governor inspection cover from extension housing. Rotate drive shaft to bring governor body in line with inspection hole, then remove two screws attaching governor body to sleeve and remove governor.

►*CAUTION: Be careful not to drop bolts or governor body into housing.*

Installati n - Lubricate governor valve with transmission fluid and install in body (*CAUTION - Valve must b fre to move in body*). Install governor body on counterweight with the **sid plat f rward** (*CAUTION - Fluid passages in governor body and count rw ight must be aligned*). Install attaching screws. Tighten cover screws to 4-6 ft. lbs.

G vern r R m val (1960 M d ls): Remove inspection cover from extension housing, then remove two screws retaining governor body to counterweight and remove governor assembly through inspection opening.

Installation - Position governor assembly on counterweight with cover **toward rear of car** (opposite to previous models), then install attaching screws and tighten evenly to 50-60 inch pounds. Install inspection cover plate and tighten screws to 50-60 inch pounds.

►**NOTE:** For the following operations, remove transmission fluid level indicator. Remove transmission filler tube and drain the fluid into clean container using a fine mesh wire screen for straining. (Fluid may be re-used). Then remove transmission oil pan and screen.

Front Servo Removal: Loosen lubrication tube from pressure regulator and rear pump and remove. (NOTE–If necessary, tap tube with soft hammer to remove. *CAUTICN*–Do not bend or distort tube). Loosen control valve body attaching bolts. Remove servo attaching bolt and while holding servo strut with fingers, remove servo assembly.

Installation–Position servo band forward in case with band ends down. Position servo strut with large end indexing with servo actuating lever and small end indexing with band end. Rotate band, strut and servo into position, indexing tubes from valve body to servo, and anchor end of band with anchor in case. Install attaching bolt, tightening to 30-35 ft. lbs. Tighten control valve attaching bolts to 8-10 ft. lbs. Install lubrication tube and adjust servo band. See "Front Band Adjustment". Install screen, install oil pan using NEW gasket, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid can be re-used), recheck fluid level with transmission at operating temperature.

Rear Servo Removal: Remove lubrication tube from rear pump and regulator. (*NOTE*–If necessary tap tube with soft hammer to remove). Remove rear pump intake tube. Remove front servo (see above). Take out rear servo attaching bolts, hold actuating and anchor struts with the fingers, remove rear servo assembly.

Installation–Position servo anchor strut and rotate servo band to engage strut. Hold in position with fingers. Position actuating lever strut and install servo, install servo attaching bolts (*CAUTION*–Longer attaching bolt must be installed in forward bolt hole), tighten attaching bolts to 40-45 ft. lbs. torque. Install front servo (see above). Install rear pump intake tube and lubrication tube. Adjust rear band (see BAND ADJUSTMENT). Install oil pan with NEW gasket, tighten oil pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid can be re-used), recheck fluid level with transmission at operating temperature.

Control Valve Body Removal: Remove two "U" tubes from pressure regulator and control valve body. Loosen front servo attaching bolt three turns. Take out three valve body attaching bolts, lower the valve body and pull it off the servo tubes.

►*CAUTION–Us xtreme care when removing valv body to pr v nt damag to body and attach d parts.*

Installation - Align servo tubes with holes in control valve body, position manual detent lever in "low", then position valve body, with detent lever pin between the correct lands on manual valve. Install control valve-to-case bolts loosely. DO NOT TIGHTEN. Move control valve body as far as possible toward rear servo to insure maximum engagement of detent lever pin in manual valve. Tighten control valve body-to-case bolts to 8-10 ft. lbs. Move manual selector lever to each selector position and check for binding between detent lever pin and manual valve by rotating manual valve in each position. *NOTE - If manual valve binds in any p siti n, loosen control valve-to-cas bolts and mov control valve away from rear servo only enough t r liev binding condition.* Tighten front servo attaching bolt to 35-40 ft. lbs. Adjust front and rear bands (see BAND ADJUSTMENT). Install oil screen, then install oil pan using new gaskets, and tighten oil pan screws to 10-13 ft. lbs. Connect filler tube and fill transmission to correct level. Recheck fluid level after transmission has been brought to normal operating temperature.

Pressure Regulator Removal: Remove lubrication tube. Remove control pressure tube and compensator tube from valve body and regulator. Remove pressure regulator spring retainer. (*CAUTION*–Maintain pressure on retainer to prevent springs flying out). Remove the control pressure and converter pressure valves. Take out pressure regulator attaching bolts and washers, remove regulator.

Installation–Install regulator body and attaching bolts and tighten to 17-22 ft. lbs. Install converter pressure and control pressure valves and make certain valves operate freely in bore, then install valve springs and retainer. Install large control pressure tube, small compensator tube, and lubrication tube. Install oil screen, install oil pan using NEW gaskets, tighten pan screws to 10-13 ft. lbs. Connect filler tube. Fill transmission to correct level (old fluid may be re-used), recheck fluid level with transmission at normal operating temperature.

Manual & Throttle Lever S al Replac ment: Remove control valve body (see above), disconnect manual and throttle linkage rods at transmission levers. Remove nut on inner throttle lever shaft and remove inner throttle lever. Remove outer throttle lever and shaft, remove throttle shaft seal from counterbore in manual lever shaft. Take out cotter pin in each end of parking pawl torsion lever rod and remove the rod, rotate manual lever shaft until detent lever clears detent ball (*CAUTION*–do not allow detent ball to fly out), remove detent ball and spring. Remove manual lever shaft nut, remove detent lever, remove outer manual lever and shaft assembly. Remove manual shaft seal.

Installation–Coat outer diameter of new seal with Permatex No. 3, install seal in case using tool No. 77288. Install outer manual lever and shaft, rotate shaft until manual lever points downward, place detent lever on inner end of shaft, install attaching nut and tighten nut to 35-40 ft. lbs. torque. Place detent spring and ball in hole in case (use piece of thin wall tubing to depress ball and spring), rotate detent lever until detent ball is held in place. Install parking pawl

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

torsion lever rod and cotter pins Install new throttle shaft seal, outer throttle lever and shaft, inner throttle lever and attaching nut, tighten nut to 25-28 ft lbs. Connect manual and throttle rods to outer levers Check linkage for free movement Install control valve assembly and other parts. *See Control Valve Assembly Installation (above)*

Ext nsion Housing Bushing & Seal Replacement: Disconnect drive shaft from transmission *NOTF - On Lincoln models, mark front universal joint and output shaft for correct reassembly* Remove bushing and seal with Tool T57-P-7697-A (Ford), Tool 7000-AD (Lincoln, Mercury & Fdsel) If seal only is to be replaced remove seal with Tool 1175-AE and sliding hammer

Installation - Before installing bushing or seal inspect sealing surface of universal joint yoke for scores Replace yoke if necessary Inspect counterbore of housing for burrs and clean as necessary with crocus cloth Install new bushing with Tool T57P-7697-B (Ford), Tool 7000-J (Lincoln, Mercury & Fdsel) Coat new seal with sealing compound and drive new seal into place with Tool T57L-7657-A (Ford), Tool 7657-D (Lincoln Mercury & Edsel) Install drive shaft On Lincoln models align marks on universal joint yoke and output shaft

TRANSMISSION & CONVERTER REMOVAL
FORD PASS. CARS (EXCEPT THUNDERBIRD) 1958-60 MODELS

1) Place car on hoist but do not raise Pull back floor mat and remove converter access hole covers, then remove two upper bolts attaching converter housing to engine

2) Raise car, and remove cover from lower front side of converter housing then drain converter and transmission *(see "Draining & Refilling" above)*

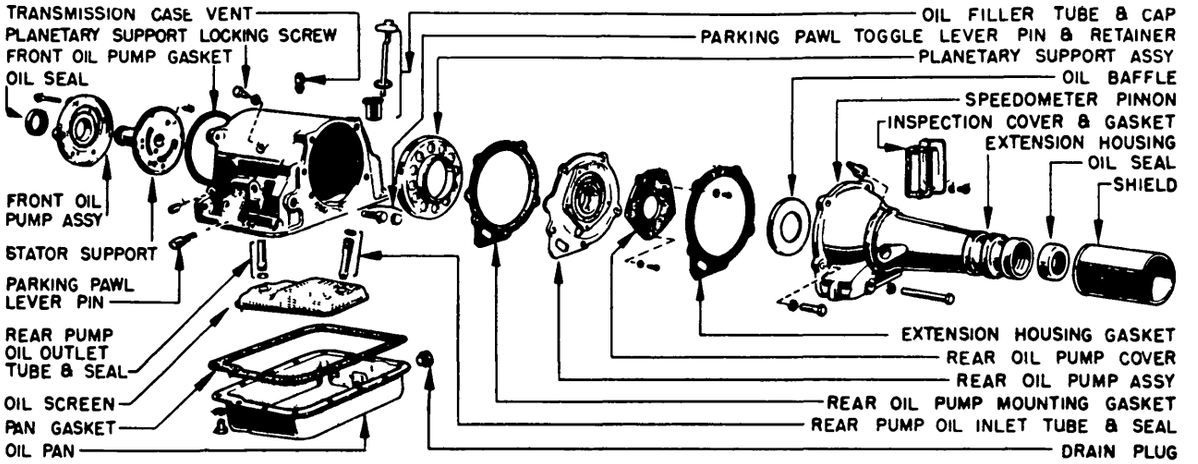
3) Remove flywheel to converter bolts On V8 models install converter housing front plate to hold converter in place when transmission is removed On 6 cyl models wedge converter in place

4) Disconnect starter cable from starter, and transmission to body ground cable from transmission then remove starter

5) On 6 cyl models, remove converter air duct and linkage splash shield On V8 models, disconnect oil cooler lines from transmission On all models, disconnect manual and throttle linkage from transmission levers

6) Disconnect speedometer cable from extension housing, and remove drive shaft Remove remaining converter housing-to-engine attaching bolts Remove two engine rear support-to-transmission bolts and raise transmission slightly to take weight off crossmember, then remove crossmember

7) On V8 models with single exhaust, loosen and drop exhaust system to allow converter to clear muffler inlet pipe



TRANSMISSION CASE & EXTENSION HOUSING ASSEMBLY

8) If clearance needed to remove transmission and converter assembly from car tilt rear of assembly upward slightly and to rear of car (enough to allow removal of flywheel-to-crankshaft bolts) Move assembly to rear and remove it *NOTF - If there is enough clearance, remove flywheel-to-converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft*

►***SINGLE RANGE TRANSMISSION REMOVAL NOTE:*** **To prevent dropping torque converter assembly during transmission removal, install a chain or wire across front of converter, connecting it between bolt holes on each side of converter housing.**

Torque Converter Removal (From Transmission): See *"Torque Converter Overhaul" below.*

FORD TRUCKS 1958-60 MODELS

1) Place truck on hoist, but do not raise Remove converter access hole convers in floor pan and remove two upper converter housing-to-engine bolts Raise truck on hoist and remove cover from lower front side of converter housing Drain transmission and converter, *(see "Draining & Refilling" below)*

2) Remove flywheel-to-converter bolts On V8 models, install converter housing front plate to hold converter in place during transmission removal On 6 cyl models, wedge converter in place

3) Disconnect starter cable at starter, then disconnect body ground cable at transmission Remove starter On 6 cyl models, remove linkage splash shield On trucks with oil cooler, disconnect water hoses at cooler

4) Disconnect manual and throttle linkage from transmission levers, then disconnect speedometer cable from extension housing Remove drive shaft

5) Remove both engine rear support bolts, then raise engine and transmission high enough to remove engine rear supports Lower engine against floor stand or engine support bar so converter housing is clear of crossmember when all weight is off transmission jack Remove remaining converter housing-to-engine attaching bolts

6) On V8 models with single exhaust system, loosen and drop exhaust system, to allow converter to clear muffler inlet pipe

7) If clearance is needed to remove assembly, tilt rear of assembly upward slightly and to the rear (enough to allow removal of the six flywheel-to-crankshaft bolts) Move assembly to the rear *NOTF If there is enough clearance, remove flywheel-to-converter attaching bolts, then move assembly toward rear and lower it, leaving flywheel attached to crankshaft*

Torque Converter Removal (From Transmission): *Se 'Torque Converter Overhaul below*

THUNDERBIRD (430" ENG.) 1960 MODELS

►*NOTE On Thunderbird models with 430' engine, th torque converter and transmissi on have to be remov d as an assembly because of two converter housing-to-transmission case bolts located behind torque converter assembly On models with 352' engine, transmission and torque converter must be removed as separate assemblies*

1) Before raising car on a hoist remove upper (4) converter housing-to-engine block bolts then remove the two upper starter mounting bolts Raise car and drain transmission *(see "Draining & Refilling' above)*

2) Disconnect muffler front inlet pipes at both exhaust manifolds, then separate front inlet pipe assembly from rear inlet pipes Remove starter and converter housing lower cover, then drain converter

3) Remove converter to flywheel stud nuts Disconnect drive shaft and speedometer cable then disconnect throttle and manual linkage at transmission Disconnect oil cooler lines at transmission then remove parking brake equalizer rod from lever and brake cable housing from its retainer

4) Remove two bracket-to-engine rear support member bolts On each bracket remove upper bracket bolts and

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

push bolts out of brackets Raise transmission with a jack so engine rear support member is clear of brackets and remove two lower bracket to underbody nuts and remove brackets

5) Lower transmission until engine rests on tubular crossmember and remove the two remaining converter housing to-engine bolts Move converter housing away from engine and at same time move converter away from flywheel *CAUTION Secure converter to converter housing* Lower transmission and remove it from under car

6) Remove converter from transmission and remove the two bolts which go through converter housing and thread into transmission case, then remove converter housing from transmission case

LINCOLN 1958-59 MODELS

1) Drain Transmission and converter *(see 'Draining & Refilling above)* Disconnect drive shaft *NOTF Mark front and rear universal joints, companion flange, and output shaft before removal of drive shaft to be sure of correct installation*

2) Support engine and remove rear mount then remove parking brake equalizer and rear cables Disconnect speedometer cable at transmission Install a 1" x 3" x 5" block between No 2 crossmember and pan then remove support stand

3) Remove four flywheel to converter nuts and flat washers Remove Multi-Luber if car is so equipped Remove starter then remove exhaust crossover pipe Disconnect resonator inlet pipes from exhaust manifolds (with engine raised to maximum) Disconnect oil cooler lines from transmission and remove splash shield

4) Disconnect manual and throttle linkage from transmission levers then position transmission jack and support transmission Remove six converter housing-to-engine attaching bolts and remove transmission

Torque Converter Removal (From Transmission) See *'Torque Converter Overhaul below*

LINCOLN 1960 MODELS

►*NOTE Transmission and torque converter must be removed as an assembly because of two converter housing-to-transmission case bolts located behind torque converter assembly*

1) Disconnect accelerator linkage (downshift rod) from bellcrank, then remove two upper bolts and one bolt from right side of converter housing to engine block Remove one inner (upper) bolt attaching starter to converter housing

2) Raise car and disconnect engine stabilizer bar bracket from converter housing, and remove converter housing lower plate Drain converter and transmission *(see "Draining & Refilling" above)*

3) Remove exhaust crossover pipe, then disconnect oil cooler lines from transmission Disconnect and remove driveshaft. *CAUTION - Mark rear universal joint flange and universal joint shaft can be installed in the same location*

4) Disconnect parking brake cables and return spring from brake equalizer bar and remove bar Remove two remaining bolts from starter to converter housing, disconnect starter cable from power box, then slide starter motor over frame crossmember and secure in place

5) Remove control linkage splash shield and disconnect manual and throttle control linkage from transmission levers Disconnect speedometer cable from transmission then remove nut and washer from engine rear mount lower stud

6) Position transmission jack under transmission and raise transmission off rear mount crossmember Disconnect rear mount from extension housing and rear mount crossmember from underbody brackets Remove rear mount from crossmember and remove crossmember by sliding it over left exhaust pipe to left of rear mounting bracket

7) Lower transmission jack slightly and remove remaining three converter housing to engine block bolts Move transmission toward rear lower and remove from under car Remove converter from housing, then remove six bolt attaching converter housing to transmission case remove housing

MERCURY 1958-60 MODELS (EXC. 1960 "PBB" TRANS.)

►*1960 "PBB" TRANSMISSION REMOVAL NOTE: Removal procedures for this transmission are different. See below.*

1) Raise car on hoist and drain converter and transmission *(see Draining & Refilling above)* Disconnect drive shaft then disconnect speedometer cable from extension housing

2) Install an engine support on frame then remove the two capscrews securing engine rear support to extension housing Use the engine support and raise engine just enough to take weight off crossmember Remove exhaust outlet and crossover pipe assembly then remove crossmember Remove parking brake equalizer assembly with the crossmember and lay it to one side

3) Disconnect oil cooler lines (on 1958 cars with push button control, remove reverse inhibitor tube) On all models, disconnect throttle rod from throttle lever, then disconnect manual selector rod from lever on transmission On 1958 models with push button control, disconnect park cable and manual selector cable from levers on transmission Remove splash shield

4) Remove four nuts attaching converter to flywheel *CAUTION Do not pry on converter studs to rotate converter* Disconnect cable from starter then remove starter

5) Lower engine as far as possible to gain access to converter housing attaching bolts then place a transmission jack under transmission and remove converter housing-to-engine attaching bolts Slide transmission away from engine and lower 4" Tilt front of assembly upward and remove from under car

Torque Converter Removal (From Transmission) See *Torque Converter Overhaul below*

MERCURY 1960 MODELS (WITH "PBB" TRANS.)

►*NOTE: Transmission and torque converter must be removed as an assembly because of two converter housing-to-transmission case bolts located behind torque converter assembly*

1) Disconnect accelerator linkage at bellcrank on engine, then disconnect transmission pressure tube from bellcrank bracket Remove two upper bolts and one bolt from right side of converter housing to engine block *NOTE* - On air conditioned cars, these bolts may be removed from under car Remove one upper starter attaching bolt and raise car on hoist.

2) Drain converter and transmission *(see 'Draining & Refilling" above)* Disconnect and remove exhaust pipe "Y", then disconnect oil cooler lines from transmission Disconnect throttle pressure tube from rear of transmission and remove tube Disconnect and remove driveshaft. *NOTE - Mark rear universal joint and axle flange so they can be reinstalled in the same position*

3) Remove nuts and washer attaching converter to flywheel and remove the two lower bolts from starter motor Slide starter forward and wire in place Remove control linkage splash shield and disconnect manual and throttle linkage from transmission levers, then disconnect speedometer cable from extension housing

4) Disconnect engine rear mount from extension housing and position a transmission jack under transmission, then raise transmission off crossmember Disconnect parking brake cables from equalizer bar and remove rear crossmember and equalizer assembly.

5) Lower jack slightly and remove remaining converter housing-to-engine block bolts Move transmission toward rear, lower, and remove from under car Remove converter assembly from transmission and remove two bolts which go through converter housing and thread into transmission case, then remove converter housing from transmission case

EDSEL 1958 MODELS

1) Place car on a hoist then on Corsair & Citation models remove scuff plate from each side of car Fold floor mat forward for access to crossmember body bolts and remove inner bolt from each side of car On Station Wagons Ranger and Pacer models remove two upper bolts attaching converter housing to cylinder block (through access hole in floor pan)

2) Raise car on hoist and drain transmission and converter *(see Draining & Refilling above)* Disconnect rear universal joint at rear axle and remove drive shaft Disconnect parking brake equalizer rod from lever then disconnect speedometer cable from extension housing

3) Install an engine support on frame and remove screws securing engine rear support to extension housing, then raise engine just enough to take weight off crossmember On Corsair and Citation models disconnect exhaust pipes from manifold and muffler rear insulators from support brackets Lower each pipe and muffler to permit removal of crossmember

CONTINUED ON NEXT PAGE

EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

4) On all models remove crossmember and parking brake assembly, and lay it to one side. Disconnect oil cooler tubes and reverse inhibitor switch wir from transmission. Disconnect throttle rod and manual or selector motor control rods from levers on transmission.

5) On models equipped with teletouch control, remove screws attaching shifter motor shield to transmission housings and remove shield, then disconnect electric shift motor from converter housing and lay motor to one side.

6) Disconnect steering idler arm bracket from right frame side rail and lower steering linkage. Remove Remove converter dust shield, then remove four nuts attaching converter to flywheel. Remove starter motor and rubber gasket. *CAUTION: Do not use converter studs to rotate converter.*

7) Lower engine support as far as possible for access to converter housing attaching bolts, then place transmission jack under transmission and disconnect converter housing from engine. Slide transmission assembly away from engine and lower approximately four inches. Tilt front end of transmission upward, then lower complete assembly and remove from under car.

T rqu C nv rt r R m val (From Transmission): *See "Torque Converter Overhaul" below.*

EDSEL
1959 MODELS

1) Place car on a hoist, then on *Corsair* models, remove scuff plates from each side of car and fold floor mat forward. Remove inner crossmember body bolts from each side of car. On Station Wagons and Ranger models, remove two upper bolts attaching converter housing to cylinder block (through access hole in floor pan). Raise car on hoist and drain transmission and converter *(s "Draining & Refilling" above).*

2) Disconnect rear universal joint at rear axle and remove drive shaft. Disconnect parking brake equalizer rod from lever, then disconnect speedometer cable from extension housing.

3) Install an engine support on frame and remove screws securing engine rear support to extension housing, then raise engine just enough to take weight off crossmember. On Citation models, disconnect exhaust pipes from manifold and muffler rear insulators from support brackets. Lower each pipe and muffler to permit removal of crossmember.

4) On all models, remove crossmember and parking brake assembly and lay it to one side. Disconnect oil cooler tubes from transmission Disconnect throttle and manual rods from levers on transmission.

5) Disconnect steering idler arm bracket from right frame side rail and lower steering linkage. Remove converter dust shield, then remove four nuts attaching converter to flywheel. Remove starter motor and rubber gasket. *CAUTION – D not use converter studs to rotat c nv rt r.*

6) Lower engine support as far as possible for access to converter housing attaching bolts, then place transmission jack under transmission and disconnect housing from engine. Slide transmission assembly away from engine and lower approximately four inches. Tilt front end of transmission upward, then lower complete assembly and remove from under car.

EDSEL
1960 MODELS

►*1960 EDSEL TRANSMISSION & TORQUE CONVERTER REMOVAL NOTE: See "Ford Pass. Cars (Exc. Thunderbird), 1958-60 Models" above.*

TRANSMISSION REMOVAL (WITHOUT CONVERTER)
FORD PASS. CARS & TRUCKS
1958-60 MODELS

►*NOTE: Transmission and torque converter must be removed as an assembly on Sunliner & Skyliner models.*

1) Raise car or truck on a hoist and drain transmission and torque converter. On V8 Pass. Cars disconnect oil lines at transmission. On 6 Cyl. Pass. Cars, remove converter air duct. On Trucks, disconnect water hoses from oil cooler.

2) Remove linkage splash shield, then disconnect manual and throttle linkage from transmission levers. Disconnect speedometer cable from extension housing.

3) On passenger cars, remove engine rear support-to-transmission bolts. On all cars and trucks, position a transmission jack under transmission. On passenger cars, raise jack slightly to take weight off crossmember, then remove crossmember. On all models, with transmission jack in position, remove four transmission to converter housing bolts.

4) Tilt rear of transmission assembly slightly upward, and with a jack, move assembly toward rear of car until input shaft is clear, then lower assembly and remove.

THUNDERBIRD
1958-60 MODELS

►*1960 THUNDERBIRD WITH 430" ENGINE TRANSMISSION REMOVAL NOTE: Torque converter and transmission must be removed as an assembly. See "Transmission & Torque Converter Removal" above.*

►*NOTE: Transmission and converter must be removed as separate assemblies as follows:*

1) Raise car on hoist and drain transmission and converter *(see "Draining & Refilling" above).*

2) Disconnect drive shaft at pinion and remove drive shaft, then install seal replacer, Tool T57-7657-A. Loosen muffler inlet pipe front support clamp bolt, and slide clamp off support, then disconnect inlet pipes from exhaust manifold. Disconnect inlet pipes from rear support and remove lower half of muffler rear clamp. Lower exhaust pipes for access.

3) Disconnect parking brake equalizer rod from lever, then disconnect cooler lines from transmission. Disconnect manual and throttle control rods at transmission levers. Disconnect speedometer cable at extension housing.

4) Remove two engine rear support-to-transmission bolts, then position a transmission jack under transmission and raise it slightly to take weight off crossmember. Remove crossmember.

5) With jack in position remove four transmission-to-converter housing bolts. Tilt rear of transmission slightly upward, then move assembly to rear and remove assembly to rear and remove from car.

LINCOLN
1958-59 MODELS

►*1960 LINCOLN TRANSMISSION REMOVAL NOTE: Transmission and torque converter must be removed as an assembly. See "Transmission & Torque Convert r Removal" above.*

1) Raise car on hoist and drain converter and transmission *(see "Draining & Refilling" below).* Disconnect drive shaft. *CAUTION - Mark front and rear universal joints, companion flange and output shaft to insure correct installation.* Support engine and remove rear mount, then remove one engine mount bracket.

2) Remove parking brake equalizer and rear cables and disconnect speedometer cable at transmission. Remove exhaust crossover pipe and disconnect inlet pipes from manifolds.

3) Disconnect oil cooler lines at transmission and remove splash shield. Disconnect manual and throttle linkage from transmission levers.

4) Position transmission jack and support transmission. Remove transmission-to-converter housing bolts, then slide transmission to rear until input shaft clears converter and remove transmission.

MERCURY
1958-60 MODELS
(EXC. 1960 "PBB" TRANS.)

►*1960 "PBB" TRANSMISSION REMOVAL NOTE: Transmission and torque converter must be removed as an assembly. See "Transmission & Torque Converter Removal" above.*

►*NOTE: Transmission and converter must be removed as a complete assembly on convertible models.*

1) Raise car on hoist and drain transmission and converter *(see "Draining & Refilling" above).* Disconnect drive shaft, then disconnect speedometer cable at extension housing.

2) Install engine support on frame, then remove screws securing rear support to extension housing, and raise engine just enough to take weight off crossmember. Remove crossmember.

3) Remove parking brake equalizer with crossmember and lay to one side. Disconnect oil cooler lines (on 1958 models with push button control, remove reverse inhibitor tube).

4) Disconnect throttle rod and manual control rod from levers on transmission (on 1958 models with push button control, disconnect throttle rod park cable, and manual selector cable from levers on transmission). Place transmission jack under transmission, then remove transmission-to-converter housing bolts. Slide transmission to rear until input shaft clears converter, then lower jack and remove transmission.

EDSEL
1958 MODELS

1) Place car on hoist. On Corsair & Citation models, remove scuff plate from each side of car. Fold floor mat

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

forward and remove crossmember body inner bolt from each side of car.

2) On all models, raise car on hoist and drain transmission *(see "Draining & Refilling" above)*. Disconnect universal joint at rear axle and remove propeller shaft. Disconnect parking brake equalizer rod from lever and disconnect speedometer cable at transmission.

3) Install engine support on frame, then remove screws securing engine rear support to extension housing. Raise engine, with engine support to take weight off crossmember.

4) On Corsair & Citation models, disconnect exhaust pipes from manifolds and muffler rear insulators from support brackets. Lower muffler and pipe assemblies for removal of crossmember.

5) On all models, remove parking brake mechanism and crossmember and lay to one side. Disconnect oil cooler tubes from transmission.

6) Disconnect throttle rod, manual control, or selector motor rod from levers on transmission. Place transmission jack under transmission, then remove transmission-to-converter bolts. Slide transmission back until shaft clears converter housing, then lower jack and remove transmission.

EDSEL 1959 MODELS

1) Place car on hoist On Corsair models, remove scuff plate from each side of car, then fold floor mat forward and remove crossmember body inner bolt from each side of car.

2) On all models, raise car on hoist and drain transmission (see "Draining & Refilling" above). Disconnect universal joint at rear axle and remove propeller shaft. Disconnect parking brake equalizer rod from lever and disconnect speedometer cable at transmission.

3) Install engine support on frame, then remove screws securing engine rear support to extension housing. Raise engine with engine support to take weight off crossmember.

4) On Corsair models, disconnect exhaust pipes from exhaust manifolds and muffler rear insulators from support brackets. Lower muffler and pipe assemblies for removal of crossmember.

5) On all models, remove parking brake linkage and crossmember and lay to one side. Disconnect oil cooler lines from transmission.

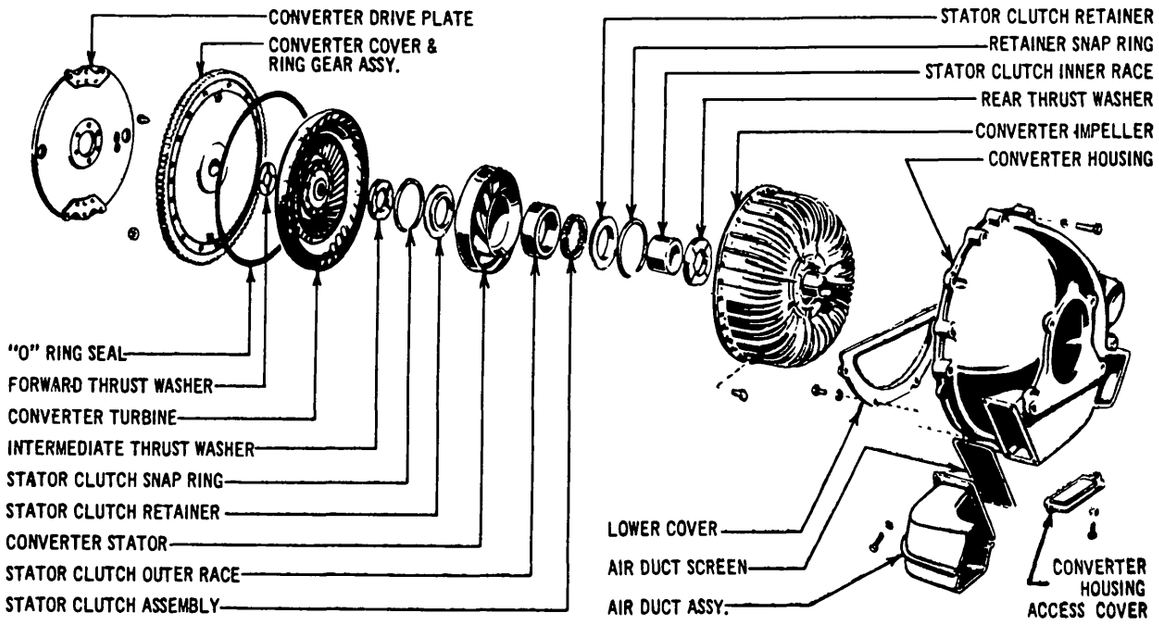
6) Disconnect rods from transmission levers, then place transmission jack under transmission and remove transmission-to-converter bolts. Slide transmission back until shaft clears converter housing, then lower jack and remove transmission.

EDSEL 1960 MODELS

►*1960 EDSEL TRANSMISSION REMOVAL NOTE: See "Ford Pass. Cars (Exc. Thunderbird), 1958-60 Models" abov .*

TORQUE CONVERTER OVERHAUL

►*NOTE: C nvert r ass mbly n all models, xc pt Ford 6 cyl. Pass. Cars & Trucks, is of w lded c nstructi n and cannot be disassembled for service. The only service required is the inspection of one-way clutch and converter endplay (converter thrust washer inspection) as noted below:*



TORQUE CONVERTER ASSEMBLY (6 CYL. MODELS)

►*DISASSEMBLY & REASSEMBLY CAUTION: Cleanliness is extremely important when opening up transmission. Thoroughly clean outside of case first, and clean each part as removed.*

ALL MODELS

TORQUE CONVERTER REMOVAL (From Engine): Remove transmission (see above), then remove stud nuts attaching converter to flywheel. Replace converter housing lower front cover to prevent converter from falling when housing is removed. *NOTE - On Ford 6 cyl. models, wedge converter in place to prevent it falling.* Remove starter motor, then remove converter housing-to-engine bolts. Work converter off engine dowel pins and remove housing and converter.

TORQUE CONVERTER INSTALLATION (On Engine): Place converter in housing, and retain it there by installing lower front cover. *NOTE* - On Ford 6 cyl. models, wedge converter in place. Raise housing and converter into position and start housing on engine dowel pins. Start the converter housing-to-engine bolts. Remove converter housing front cover and position converter on flywheel. Install converter-to-flywheel stud nuts and tighten to 20-25 ft. lbs. Tighten converter housing-to-engine bolts to 40-45 ft. lbs., then install converter front cover. Install transmission.

FORD 6 CYL. PASS. CARS & TRUCKS

TORQUE CONVERTER REMOVAL (Fr m Transmissi n): Grasp converter cover with both hands and pull straight out. *(CAUTION–*To prevent damage to front seals, do not rock assembly from side to side). Remove converter housing attaching bolts and remove housing from transmission.

DISASSEMBLY: Remove converter cover attaching bolts and nuts. Remove cover and "O" ring seal. Remove bronze thrust washer from turbine and remove turbine. Remove stator from pump housing *(CAUTION–Check and locate the balancing marks on cover and stator so they may be replaced in the exact same position).* Remove thrust washer from pump hub and from turbine hub. Remove sprag clutch inner race and remove snap ring retaining outer hub to stator *(CAUTION–Do not burr snap ring groove).* Remove outer hub, sprag assembly, outer race and inner hub as an assembly. Separate hubs and sprag assembly from outer race. Remove snap ring retaining inner hub to stator.

INSPECTION: Inspect converter blades for looseness, and check thrust surfaces for scores and splines for burrs and wear. Inspect seal surfaces and front pump driving lugs for wear. Inspect sprag assembly for worn or broken sprags or broken or distorted spring. Inspect bushings for wear or scoring (if bushings worn, polish bearing surface of journal with crocus cloth to eliminate possibility of wear having been caused by rough bearing surface).

REASSEMBLY: Install stator inner hub and snap ring. Turn assembly over, install outer race in stator. Install sprag assembly in outer race making sure that

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

sprags are pointed in the right direction. Install outer hub and outer hub snap ring. Insert Tool No. 7946, tapered side first, into sprag assembly while rotating tool counter-clockwise to position sprags. Install inner race with spline section up. Guide tool No. 7946 with hand while pushing inner race into position. Check stator for clockwise rotation while holding the inner race. Install new seal in pump hub and install hub in pump. Tighten hub capscrews to 8-10 ft. lbs. Install thrust washer into hub of converter pump and install stator with the word "front" (stamped into face of stator) upward. Install thrust washer in hub of turbine and install turbine. Install bronze thrust washer on turbine hub. Position converter cover on pump housing with new "O" ring seal and properly align balance marks on cover and housing *(CAUTION–Cover and housing must be install d in the same position noted wh n thes parts disass mbled).* Install all converter bolts and tighten to 25-28 ft. lbs. in the sequence indicated below. Install converter housing on transmission case and tighten attaching bolts to 40-45 ft. lbs. Install converter assembly and press it firmly into position on turbine shaft. *(CAUTION–Do not "rock" converter assembly whil installing it on shaft (will damag oil seals).*

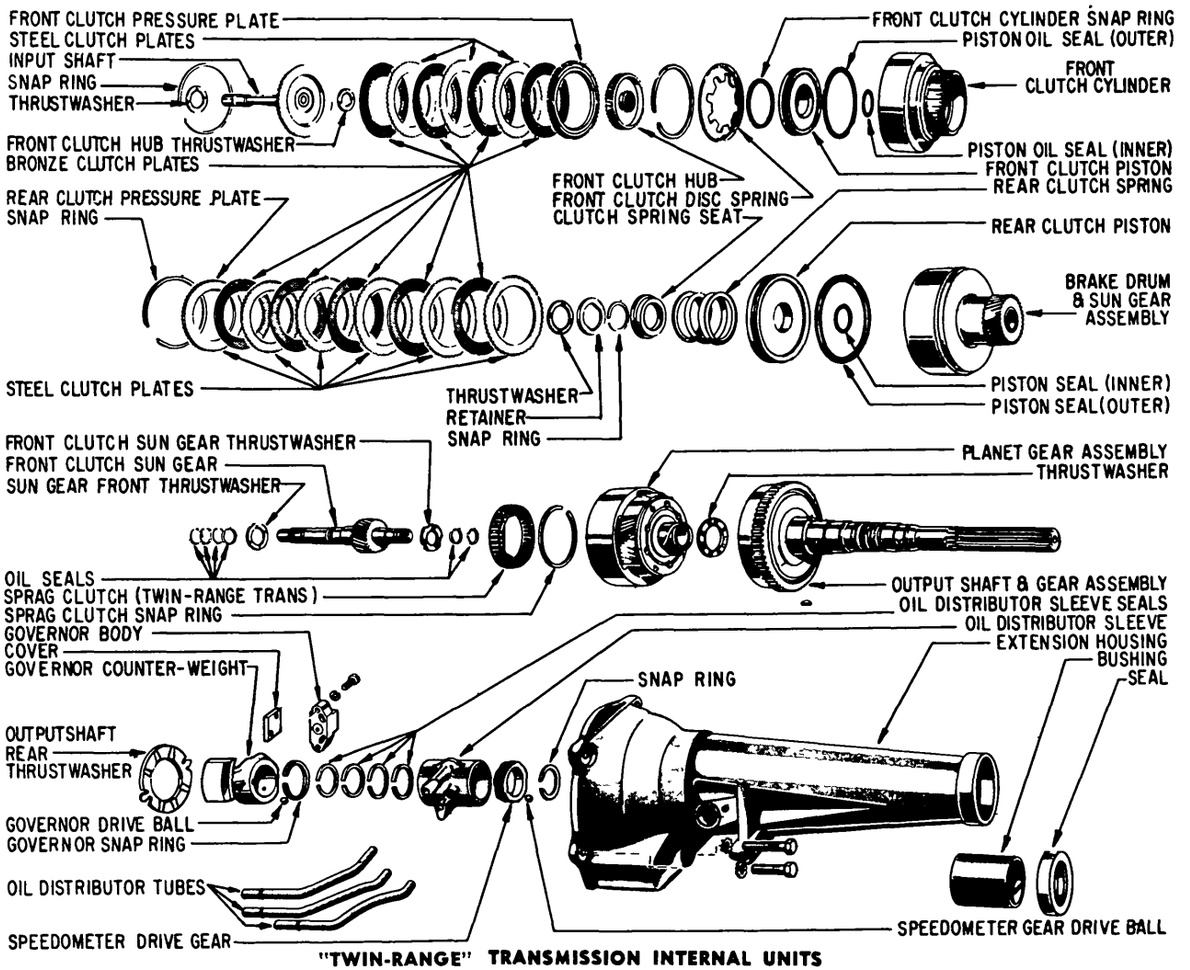
►*COVER BOLT TIGHTENING SEQUENCE (To prevent leaks):* Tighten two nuts directly opposite each other just snug, tighten two nuts 90° from first two similarly, tighten two nuts 45° from first four nuts similarly, Continue this sequence until all nuts have been tightened **just snug,** then torque all nuts in same sequence to 25-28 ft. lbs. torque.

FORD V8 CARS & TRUCKS, MERCURY, LINCOLN, EDSEL

TORQUE CONVERTER REMOVAL (From Transmission): Same as for Ford 6 cyl. models (above).

CONVERTER ONE-WAY CLUTCH INSPECTION: Ford V8 Cars & Trucks - Install stator outer race holding tool in one of the four holes provided in stator, then install Tool T58L-7902-A in converter pump drive hub. (As tool enters converter, Allen screw heads will enter stator clutch inner race splines). Place a torque wrench on tool. Tool (and stator inner race) should turn freely cl ckwis (from pump drive hub side of converter). It should lock up and hold a 10 ft. lb. pull when wrench is turned counterclockwise. Try clutch for lockup and hold in at least five different locations around converter. If clutch fails to lockup and hold 10 lb. torque, replace converter unit.

Linc ln, M rcury & Eds l - Install Tool 7946-A in converter hub, then install torque wrench on tool. Rotate torque wrench in a clockwise direction (viewed from rear). Tool should rotate freely. If tool cannot be rotated, overrunning clutch is binding and converter must be replaced. Swing tool so steel rod positions against opposite pump drive lug. Apply 10 ft. lbs. torque while attempting to rotate counterclockwise (converter viewed from rear). Rotate tool clockwise and attempt to turn converter counterclockwise at least five times. If tool fails to hold on any attempt to turn converter counterclockwise, the one-way clutch is slipping and converter must be replaced. *NOTF: One-way clutch inspection can be performed with converter installed on engine, if transmission has been removed.*



"TWIN-RANGE" TRANSMISSION INTERNAL UNITS

CONVERTER ENDPLAY CHECK: Ford V8 Cars & Trucks - Install Tool T58L-7902-A into converter pump drive hub until it bottoms, then install guide over converter pump drive hub. Expand split fiber bushing in turbine spline by tightening adjusting nut until tool is securely locked in spline. Attach a dial indicator to tool and position indicator button on converter pump drive hub lug, then set dial indicator to zero. Lift tool upward as far as it will go and note indicator reading. If total endplay exceeds .060", replace converter unit.

Linc ln, Mercury & Edsel: Install Thrust Washer Check Tool (Endplay Checking Tool), Tool 7937-A into converter pump drive hub. Tap lightly on end of tool to drive it forward to eliminate end thrust movement. Install dial indicator on rod so indicator lever rests against outside surface of converter. Pull tool toward rear of converter and note movement on dial indicator. If movement exceeds .060" replace converter assembly. *NOTF - Converter endplay can be checked with converter installed on engine, if transmission removed.*

TRANSMISSION DISASSEMBLY

►*DISASSEMBLY & REASSEMBLY CAUTION: CLEANLINESS IS EXTREMELY IMPORTANT WHEN OPENING UP TRANSMISSION. Thoroughly clean outside of case first. CLEAN each part as removed with cleaning fluid or gasoline and dry with air–wiping cloths will leave lint on parts.*

DISASSEMBLY OF TRANSMISSION (Into Major Units): With transmission on bench fixture, (tool No. 7000-C-D recommended for holding transmission), remove all transmission units as follows:

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

Oil Pan & Oil Tubes: Remove pan and gasket and take out fluid screen Remove lubrication tube from pressure regulator and rear pump passage in case If necessary, tap tube with a soft hammer *CAUTION - Do not bend or distort tube* Remove rear pump intake tube Remove compensator pressure tube from pressure regulator and control valve body Remove the control pressure tube

Pressure Regulator & Control Valve: Remove pressure regulator spring retainer and springs Remove regulator body attaching bolts and separate regulator body from case *NOTF - Front servo accumulator line (Twin-Range transmissions) may come loose with regulator body Remove line from body* Loosen front and rear servo band adjusting screws and front servo attaching bolts several turns Remove control valve attaching bolts, then raise control valve body enough to clear transmission case Disengage valve body to servo tubes and remove valve body

Front & Rear Servos: Remove front servo attaching bolts, then remove servo strut *NOTE - On Mercury "PBL" transmissions, release band from anchor on case and move toward front of case* Hold front servo strut with fingers and rotate band counterclockwise until servo assembly can be removed from case Remove rear servo attaching bolts, then while holding actuating lever and strut, lift servo from case *CAUTION - Do not allow strut to drop into case*

►*TRANSMISSION ENDPLAY NOTE*· Before disassembling transmission, further check endplay as follows· Remove one front pump attaching bolt and mount a dial indicator so button of indicator rests against end of input shaft Insert rear extension housing seal replacer on output shaft to provide support for shaft Use a large screwdriver and pry front clutch cylinder to rear of transmission and set dial indicator to zero Remove screwdriver and pry units toward front of transmission by inserting large screwdriver between large internal gear and case Record indicator reading for reference at reassembly *NOTE - Endplay should be .010"-.029"*

Front Pump & Rear Extension Housing: Remove front pump and gasket from transmission case Remove extension housing attaching bolts and pull housing from transmission case *CAUTION - Use care to prevent damage to oil seal*

Speedometer Drive Gear, Distributor, Governor & Rear Pump: Remove speedometer drive gear snap ring, then slide speedometer gear off output shaft *CAUTION - Do not lose gear drive ball* Remove distributor sleeve and tubes from output shaft by tapping on sleeve with a soft hammer Remove four seal rings and spacer washer from output shaft *NOTE - If tubes are distorted during diassembly they must be replaced* Remove governor snap ring and slide governor off output shaft, then remove governor drive ball Remove rear pump discharge tube using Tool 77869 (Exception Lincoln & Mercury "PBB" and "PBE" transmissions, which have the oil passage in transmission case) Remove rear pump from case and remove extension housing and pump gaskets Remove rear pump drive key from shaft Remove bronze thrust washer, then hold rear drum forward and remove output shaft Remove selective fit washer from rear of pinion carrier *NOTF - If endplay was not within specifications, replace selective washer with one of proper thickness, at time of assembly* Selective washers are available in the following thicknesses .063-.061", .069-.067", .076-.074", .083-.081" Remove two oil seal rings from primary sun gear shaft *CAUTION - Seal rings are broken very easily Use care when removing from shaft*

Planet Carrier, Front & Rear Clutches, & Center Support: Remove planet carrier through rear end of case, then remove bronze thrust washer from primary sun gear shaft (this washer may come out with planet carrier) Note rear band position for reference in assembly *NOTF - End of band next to adjusting screw has a depression (dimple) in center of boss* Expand rear band (use servo strut as spacer), then remove center support bolts and slide clutch assemblies and center support out through rear of case *NOTF - On Mercury "PBL" and Ford transmissions, rear band must be removed through rear of case before center support and clutches are removed* Install clutch assemblies in bench fixture, Tool 77530 Remove thrust washer from front end of turbine shaft, then remove front band from case Lift front clutch from primary sun gear shaft *CAUTION - Do not rock front clutch assembly while lifting, to prevent damage to seal rings* Remove bronze and steel thrust washers from primary sun gear shaft, then remove front clutch seal rings from shaft *CAUTION - Use care when removing seal rings as they are easily broken* Lift rear clutch assembly from sun gear shaft using care not to lose needle bearings *CAUTION - Do not rock the assembly while lifting, to prevent damage to seal rings*

TRANSMISSION OVERHAUL (TRANSMISSION UNITS)

►*DISASSEMBLY & CLEANING CAUTION*· Handle all parts with care to avoid nicking or burring bearing surfaces and mounting faces. Clean all parts with clean solvent and dry with air. DO NOT use wiping cloths which might deposit lint and interfere with proper operation of transmission. Minor scores or burrs may be removed with crocus cloth. *CAUTION– When polishing valves use extreme care not to round edges of valve lands.*

►*REASSEMBLY CAUTION Use all new gaskets when assembling or installing units in transmission Lubricate all internal parts with Automatic Transmission Fluid Type "A" (vaseline may be used to retain gaskets and thrust washers) Tighten all bolts, nuts, and screws to correct torque*

PRIMARY SUN GEAR SHAFT (Disass mbly): Remove rear clutch seal rings by applying pressure on one end and at back of ring forcing ring into groove at these two points Other end will spring out and free the hook. Remove thrust washer from thrust face of primary gear.

Inspection: Inspect all thrust surfaces and journals for wear or scores. Inspect sun gear for broken, chipped, or worn teeth Inspect shaft splines and ring grooves for wear or burrs. Check all fluid passages for evidence of leakage and make certain passages are clean and free from obstructions Check seal rings for wear by installing rings in bore and measuring end gap which should be .002-.009", check rings for free fit in groove (must not bind) If front clutch lubrication valve not operating properly, repair it by installing a new kit.

Reassembly: Install bronze thrust washer against thrust face of primary sun gear, install seal rings in shaft grooves. Seals can be installed in the same manner in which they were removed (see Disassembly above)

PLANET CARRIER (Disassembly): *NOTE - Planet carrier is serviced only as an assembly and cannot be disassembled except for removal of "one-way" clutch on 'Twin-Range" type transmissions* Remove "one-way" clutch from planet carrier, then remove snap ring

Inspection: Inspect servo band surfaces, inner and outer bushings and thrust surfaces for scores Inspect pinions for broken or worn teeth and for pinion free movement on pins Check pinion endplay with a feeler gauge (endplay should be .010-.020") Inspect pinion pins for tight fit in carrier If carrier assembly is faulty, replace complete unit On "Twin-Range" type transmissions, inspect "one-way" clutch outer race surface in planet carrier and inner race surface on center support for scores or wear Inspect each sprag of clutch for freeness, scores pitting, or signs of overheating Make sure no sprags are out of position in relation to other sprags Check bronze drag strips for distortion or damage *CAUTION - If clutch assembly did not come out when planet carrier was removed, it will b necessary to replace clutch*

Reassembly: The only reassembly required is the installation of the "one-way" clutch snap ring in planet carrier ("Twin-Range" transmission) Make sure snap ring seats properly in groove *NOTE - Sprag clutch will be reassembled when center support and planet carrier are installed in transmission case*

REAR CLUTCH· Disassembly - Remove clutch pressure plate snap ring, then remove pressure plate from drum and remove bronze and steel clutch plates *NOTE - These steel plates are not int rchangeable with front clutch steel plates* Use an arbor press and Tool 77515-A, then remove clutch release spring snap ring *CAUTION - Guide spring retainer while releasing the press to prevent retainer from interfering with snap ring groove* Remove retainer and release spring, then using air pressure and a piece of tubing, force clutch piston out of bore Remove clutch piston inner seal ring from drum and outer seal ring from groove in piston

Inspecti n· Inspect drum band surface, the bushing, and thrust surfaces for scores. Remove minor scores with crocus cloth. Replace badly scored parts. Inspect

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

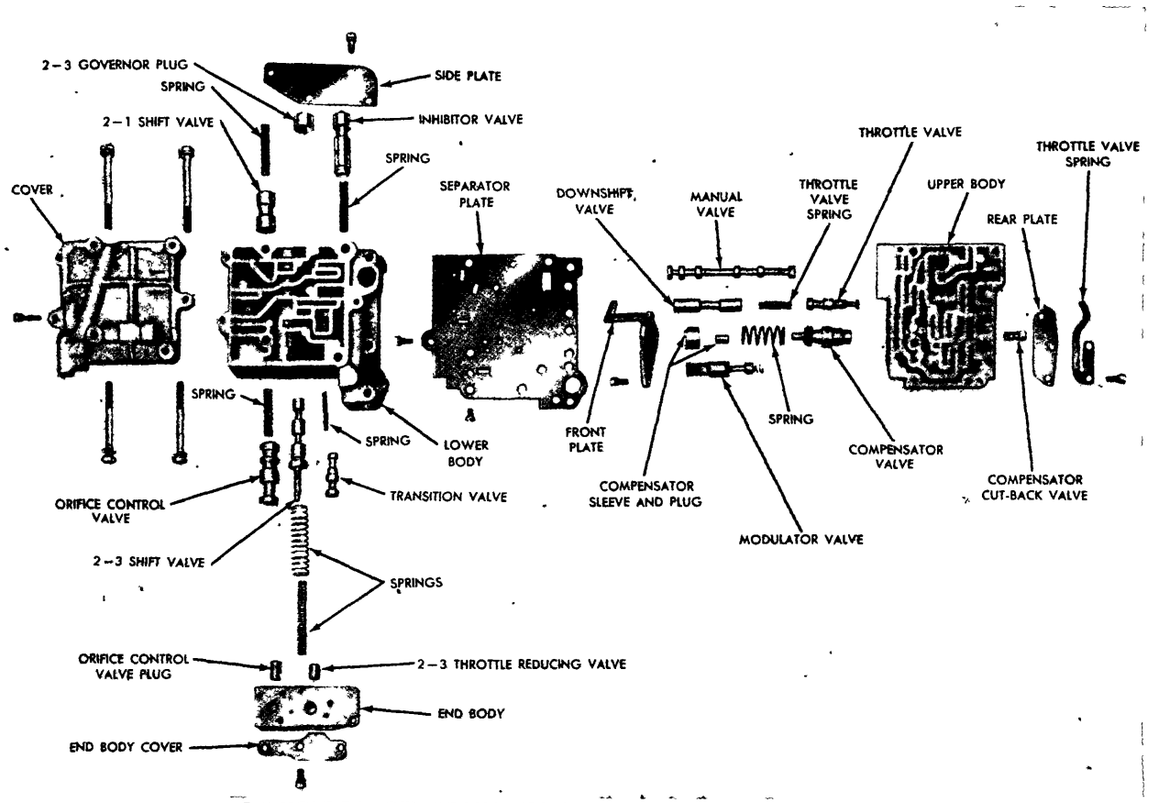
needle bearings for worn or loose rollers. Inspect gear teeth for burrs or wear. Inspect clutch piston bore and piston inner and outer bearing surfaces for scores. Check fluid passages for obstructions, making sure that they are free and clear. Inspect clutch plates for scores, and check plates for fit on clutch hub serrations. Replace all plates that are worn or do not fit properly (*CAUTION*–Front clutch plates differ from rear clutch plates and are not interchangeable). Check coning of the steel plates. Position plates on a flat surface, then check coning with a feeler gauge. Plates are coned to .010" clearance and should be checked on the inside diameter. Inspect clutch pressure plate for scores on clutch plate bearing surface. Replace plate if deeply scored. Check clutch release spring for distortion and discard if badly bent.

R ass mbly: Lubricate all parts with Automatic Transmission fluid. Install clutch piston inner seal ring in groove in drum, then install new outer seal ring on piston and install piston in clutch drum. Install same number of bronze and steel clutch plates as removed, alternately starting with a steel plate, concave or convex side up (Ford); concave side up (Edsel, Lincoln & Mercury). *CAUTION - All steel clutch plates must face in same dir ction.* Install clutch pressure plate with bearing surface down, and install snap ring. Make sure snap ring is fully seated in groove. Install clutch release spring, then position retainer on spring. Position clutch assembly in an arbor press using Tool 77515 positioned on spring retainer, and compress clutch spring. Install snap ring. *CAUTION - While compressing spring, guide retainer to avoid interference of retainer with snap ring groove. Make sure snap ring is fully seated in groove.*

FRONT CLUTCH: Disass mbly - Remove clutch snap rings, then remove turbine shaft from clutch drum. Remove fiber washer from hub, then remove bronze and steel clutch plates and pressure plate. On Mercury "PBL", "PBM" & Ford transmissions, use an arbor press and Tool 77565 to compress Bellville spring so clutch release spring can be removed. *NOTF - Tool 77565 is not required on other transmissions.* Remove clutch release spring. Use air pressure and a piece of tubing and force clutch piston out of cylinder. Remove piston inner seal from cylinder and outer seal from piston, then remove clutch hub.

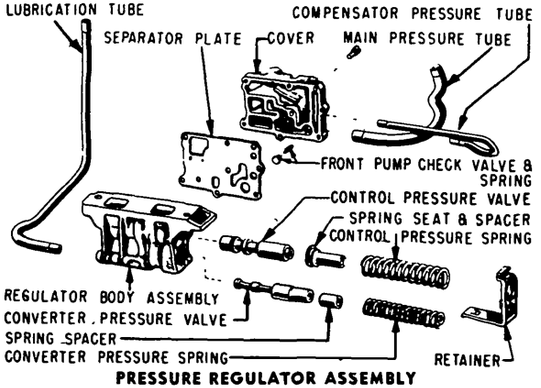
Inspecti n: See "Rear Clutch Inspection" above and follow the same procedure with the exception that front clutch plates are flat. *CAUTION - Front and rear clutch plates are not interchangeable.*

R ass mbly: Install new piston inner seal ring in clutch cylinder and a new outer seal in groove in piston. Install piston in clutch cylinder--*NOTF - Make sure steel bearing ring is on piston.* Install release spring with concave side up, then with Tool 77565 and an arbor press compress release spring, making sure it is centered in counterbore, and install snap ring. Make sure snap ring is fully seated in groove. *NOTF - Further reassembly will b made when above assembly is installed on primary sun gear shaft. See "Primary Sun Gear Shaft Reassembly" below.*



"SINGLE-RANGE" TRANSMISSION CONTROL VALVE ASSEMBLY

PRIMARY SUN GEAR SHAFT REASSEMBLY (FRONT & REAR CLUTCHES): Place shaft in holding fixture, then check fit of seal rings in grooves and in their respective bores: a clearance of .002-.009" should exist between ends of rings. Install rings on shaft and check for free movement in grooves. If front clutch lubrication valve is not operating properly, install a new kit. Install bronze thrust washer against thrust face of primary sun gear (flat surface of thrust washer toward planet carrier). To complete the assembly, proceed as follows:



PRESSURE REGULATOR ASSEMBLY

Ford, Edsel, Lincoln & Mercury (Exc. "PBB" & "PBE" Twin-Range Transmissions): Install rear clutch assembly on sun gear shaft (lubricate all parts as they are installed). *NOTE - Two types of bearings are used in rear clutch drum. One type has bearings fixed in race. Second type has loose bearings. If drum has loose bearings, coat bearing race with lubricant to retain bearings in place, then install 28 bearings.* Install steel and bronze thrust washers on primary sun gear shaft with bronze washer up. Install two front clutch seal rings in grooves in shaft and check rings for free movement. Install front clutch cylinder (previously assembled) on sun gear shaft by rotating the clutch units to mesh rear clutch plates with serrations on front clutch drum. *CAUTION - Place oil ring open edges deep in groove and "jiggle" the assembly while installing, to avoid breaking rings.* Install clutch hub with deep counterbore down, then install fibre washer on clutch hub. Install pressure plate with flat side up, then install four bronze and three steel clutch plates

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

alternately, starting with a bronze plate Lubricate plates as they are installed Install turbine shaft and snap ring making sure snap ring is firmly seated in groove Install bronze thrust washer on turbine shaft

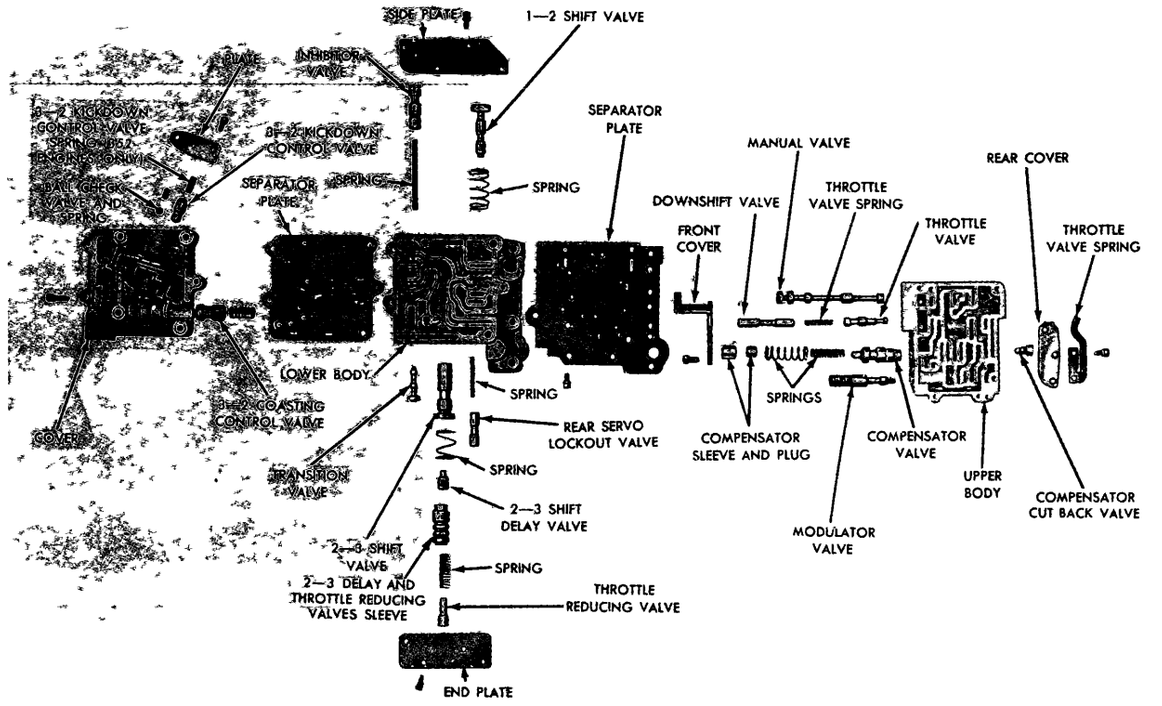
F rd, Lincoln & Mercury (With "PBB" & "PBE" "Twin-Range" Transmissions): Install rear clutch assembly on sun gear shaft (lubricate all parts), then carefully invert the assembly on the bench fixture Lay center support on bench with one-way clutch inner race up Install one way clutch over center support with drag strips toward center support (use fingers to slide drag strips over center support) *NOTE - Use care to avoid bending or distorting drag strips* Place a rubber band around sprags of one-way clutch Place center support over rear clutch and primary sun gear assemblies Start the planet carrier on the one-way clutch and make sure all sprags are started into planet carrier evenly Depress the "T" bar with a small punch or screwdriver and allow planet carrier to slide over one-way clutch until it is firmly seated Remove rubber band from around sprags and turn planet carrier to seat sprags Carefully invert entire assembly on bench fixture Install bronze and steel thrust washers with bronze washer up Install two front clutch oil seal rings in grooves of primary sun gear shaft, then install front clutch cylinder assembly (previously assembled) on primary sun gear shaft, by rotating clutch units to mesh rear clutch plates with serrations on front clutch drum *NOTF - Place oil ring open edges deep in grooves and "jiggle" the assembly while installing it on sun gear shaft to avoid breaking oil rings* Install clutch hub with deep counterbore down Be sure clutch hub is all the way down Install fiber thrust washer on clutch hub, then install pressure plate with flat side up Install four bronze and three steel clutch plates alternately, starting with a bronze plate (lubricate plates as they are installed) Install turbine shaft and turbine shaft snap ring, making sure ring is fully seated in groove Remove assembly from fixture and install output shaft and endplay thrust washer

FRONT PUMP (Disassembly): Remove pump cover attaching screws and remove cover with stator support. Mark the driven gear with Prussian Blue to assure correct assembly and remove drive and driven gears from pump body. To remove seal from pump body, mount the pump body on transmission case, use tool No. 1175-AB to remove seal

►*CAUTION Extreme care must be taken not to scratch or mar pump gears or bearing surfaces*

Inspection· Inspect bushing, gear pockets and crescent for scores. Inspect front cover, pump body, gear teeth and stator support splines for burrs. Check pump for evidence of contact between outside diameter of drive gear and crescent. REPLACE PUMP if such contact noted. Check bushing for wear and scoring

Reassembly: Use tool No. 77837 to install new seal in pump body *(CAUTION–coat* outside diameter of seal with Permatex No. 3 before installation to prevent



"TWIN-RANGE" TRANSMISSION CONTROL VALVE ASSEMBLY

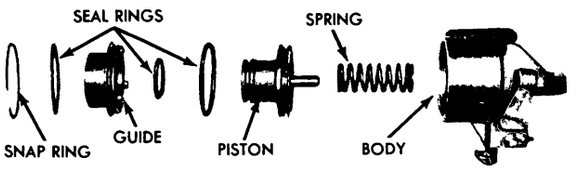
fluid seepage) Install pump driven gear in pump body in accordance with marks made before disassembly, install drive gear. Install pump cover, attaching screws, lockwashers, and tighten cover screws evenly to 1-3 ft. lbs. Check pump for free movement.

REAR PUMP: (Disassembly): Remove screws and lockwashers securing pump cover to pump body and remove cover. Using Prussian Blue, mark pump drive and driven gears to assure correct assembly, and remove gears from body.

►*CAUTION–Handle pump parts with care to avoid scratching or marring*

Inspection: Inspect all pump parts for excessive wear, score, or burrs. Check fluid passages for obstructions Check pump for evidence of contact between outside diameter of drive gear and crescent. REPLACE PUMP if such contact noted Check bushing for wear or scoring.

Reassembly: Install pump driven gear into pump body, positioning gears as marked at disassembly Install



FR NT SERVO ASSEMBLY (6 CYL. PASS. CARS & TRUCK)

drive gear into position as marked Install pump cover, cover screws and lockwashers and tighten screws evenly to 80-90 inch-pounds (1/4") 25-35 inch pounds (10-24) Check pump for free movement of gears

PRESSURE REGULATOR BODY (Disassembly): *NOTE - Regulator body for 'Twin-Pange" transmission has one additional tube which supplies control pressure to front servo accumulator piston* Remove valves from body Take out cover attaching screws, then remove cover and separator plate

Inspection: Inspect regulator body and cover mating surfaces. Check fluid passages in body and fluid passages in separator plate for obstructions Inspect valves and valve bores for scoring and check freedom of valves in valve bores. Check regulator valve springs for distortion. Wash thoroughly in clean solvent and blow dry with air.

Reassembly· Install check valve spring in regulator cover and position valve on spring (*see "Pressure Valve Installation Caution" below*) Position separator plate on regulator cover Hold regulator and cover together and check for free movement of valve Place regulator body in position on separator plate and install attaching screws *NOTE–Do not install valves at this time as th y should be install d after regulator assembly is installed in transmission. See "Transmission Reassembly" below*

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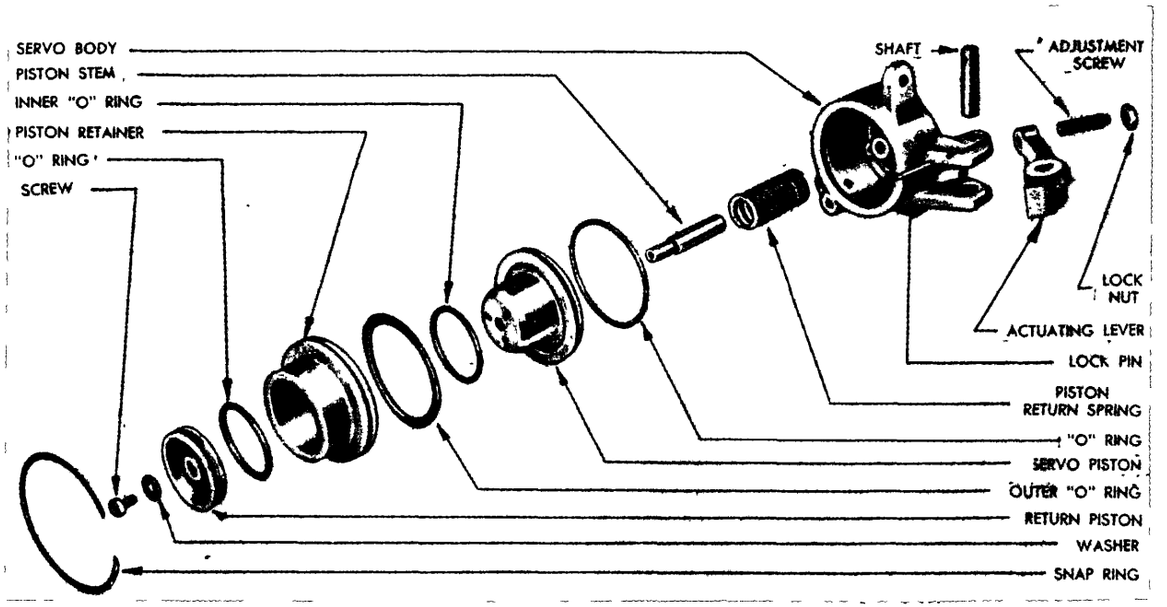
EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (Cont.)

CONTROL VALVE (SINGLE RANGE TRANS.): Disassembly - During disassembly of valve avoid damage to parts and keep parts clean. Place valve assembly on a clean cloth while performing disassembly operation. *(NOTE–Do not separate the valve bodies until after valves have been removed).* Remove manual valve and remove one screw attaching separator plate to lower valve body. Remove upper body front plate *(NOTE–The plate is spring loaded. Apply pressure to plate while removing the attaching screws).* Remove compensator spring and plug, remove valve spring and valve. Remove modulator valve retainer, both large and small springs and valve. Remove downshift valve and spring. Remove two screws attaching throttle valve return spring to upper body, then remove spring. Remove the remaining screw attaching upper valve body rear plate to valve body, then remove plate. Remove throttle valve, then the compensator cut back valve. Remove lower body side plate *(apply pressure to plate while removing as it is spring loaded).* Remove the 2-1 shift valve spring and valve, low inhibitor valve and spring, then remove the 2-3 shift valve and governor plug. Remove the end body *(End body is spring loaded. Apply pressure while removing attaching screws).* Remove orifice control valve plug and 2-3 shift valve plug from end body and remove end body plate. Remove 2-3 shift valve outer and inner springs, then remove shift valve. Remove orifice control valve and transition valve and spring. Remove attaching bolts and screws and separate bodies. Remove separator plate from upper body and remove check valve seat, valve and spring from lower body.

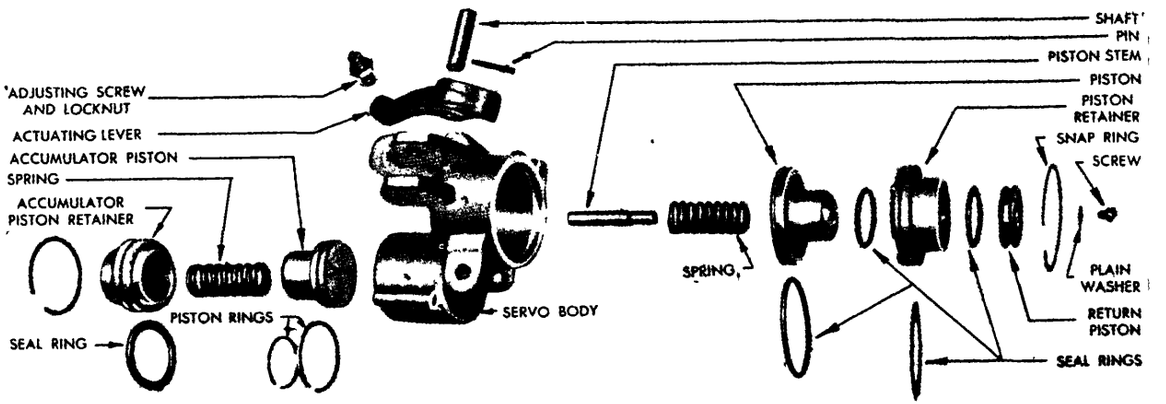
Inspection: *(CAUTION–Handle all parts carefully to avoid scoring, burrs and distortion).* Clean all parts thoroughly in clean solvent and blow dry with air. DO NOT USE CLOTH FOR WIPING PARTS (lint left by a cloth may cause poor valve operation). Inspect all mating surfaces for burrs, scratches, and flatness. Check all passages for obstructions. Inspect all valves and valve bores for scoring and check valves for free movement in bores (valves should slide in bore of own weight). Valves can be polished with crocus cloth.

►*CAUTION–Do not round the sharp edges of valves and plugs.*

Reassembly: *(NOTE–Arrange all parts in their correct position. Rotate valves and plugs when inserting them in their bores, to avoid shearing of soft body castings).* Install separator plate on upper body (do not tighten screws). Install check valve spring, valve, and seat in lower body. Position lower body on upper body. Install lower body cover and tighten attaching bolts finger tight. Align the valve body attaching bolt holes in the separator plate and lower body. Tighten the four valve body bolts to 4-6 ft. lbs. *(CAUTION–Excessive tightening of these bolts may distort valve bodies, causing valves or plugs to stick).* Install the three lower cover to lower body screws and tighten to 20-30 inch lbs. Install the plate on lower end body and tighten attaching screws. Install orifice control and shift valve plugs in end body. Install transition valve and spring, the orifice control valve and spring, 2-3 shift valve in lower body. Install shift valve inner and outer springs, and install end body on lower body, *(CAUTION–Make sure that inner spring is piloted on shift valve regulator plug).* Install governor plug in lower body. Install low inhibitor valve spring in valve, and install spring and valve. Install 2-1 shift valve spring in valve, and install valve and spring. Install lower body side plate. Install compensator cut-back valve in upper body. Install throttle valve and position upper body rear plate on upper body with the plate between end lands of throttle valve. Install one plate to body screw in hole next to throttle valve. Position throttle valve return spring on plate, and secure plate in place with the remaining plate to valve body screws. Install compensator valve and spring and downshift spring and valve. Install modulator small spring, valve, spring, and retainer as an assembly. Install the plug in the compensator valve sleeve, castellated end out, and install assembly in body, with smooth end toward body. Install upper body front plate. Install separator plate to lower body screw and install manual valve.



"SINGLE-RANGE" FRONT SERVO ASSEMBLY



"TWIN-RANGE" FRONT SERVO ASSEMBLY

CONTROL VALVE (TWIN RANGE TRANS.): Disassembly - Remove manual valve, then remove one screw

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

attaching separator plate to lower valve body. Remove upper body front plate. *CAUTION - Plate is spring loaded. Apply pressure while removing screws.* Remove compensator sleeve and plug, then remove compensator valve springs and compensator valve. Remove modulator valve assembly. Remove downshift valve and throttle valve spring. Remove two screws attaching throttle valve return spring to upper body, then remove spring. Remove upper valve body rear plate. Remove throttle valve, then compensator cut back valve. Remove lower body side plate. *CAUTION - Plate is spring loaded. Apply pressure while removing screws.* Remove 1-2 shift valve spring and valve, then remove inhibitor valve and spring. Remove lower body end plate. *CAUTION - Plate is spring loaded. Apply pressure while removing screws.* Remove rear servo lockout valve and spring, then remove 2-3 throttle reducing valve and spring, 2-3 shift valve sleeve and 2-3 delay shift valve. Remove 2-3 shift valve spring and valve, then remove transition valve. On valve body cover, remove 3-2 kickdown control valve and check valve cover. Remove check ball spring and ball, kickdown control valve and spring, and 3-2 coasting control valve spring retainer from cover. Remove valve and spring. Remove four through bolts and three screws, then separate bodies. Rear pump check valve sleeve, valve and spring may now be removed from lower body.

Inspection: Same as for "Single Range" transmission (above).

Reassembly: Install separator on upper valve body (do not tighten screws). Install check valve spring, valve and seat in lower body, then position lower body on upper body and start, but do not tighten attaching screw. Position cover and separator plate on lower body and start the four through bolts. Align valve body attaching bolt holes in separator plate and lower body. Tighten the four valve body bolts equally, to 4-6 ft. lbs. *CAUTION - Excessive tightening may distort valve bodies, causing valves or plugs to stick.* Install three cover to lower body screws and tighten to 28-30 inch pounds. Tighten the other screws. Install 3-2 kickdown control valve and spring and the ball check valve and spring in cover, then install plate. Install 3-2 coasting control valve, spring and spring retainer in cover. Install transition valve in lower body. Install 2-3 shift valve, spring, sleeve, shift delay valve, inner spring, and throttle reducing valve. Install rear servo lockout valve spring and valve, then install lower body end plate. Install inhibitor valve spring and valve in lower body. Install 1-2 shift valve spring and valve, then install lower body side plate. Install throttle valve and compensator cut-back valve in upper body, then install upper body rear plate and throttle valve return spring. Install throttle valve spring and downshift valve and modulator valve assembly. Install compensator valve, inner and outer springs, and the compensator sleeve and plug. Install upper body front plate, then install manual valve.

GOVERNOR (Disassembly): *NOTE - Some early 1960 production governors, identified by a daub of blue paint, were built with the governor sleeve staked into governor body. Units of this type cannot be disassembled for complete inspection, however, they should be cleaned by removing cover and plug and washing passages and bores with solvent.* To disassemble units that are not staked, remove governor plug, sleeve, slotted washer, valve and spring assembly from body. Remove spring retaining clip from valve. *CAUTION - Do not distort or stretch spring.* Remove spring from valve, then remove valve body cover from governor. Inspect all parts for burrs and scores and inspect valve and governor plug for free movement in their respective bores.

Reassembly: Install cover on body and tighten screws to 20-30 inch pounds, then place spring on valve stem and install retaining clip. Lubricate all parts with transmission fluid and install valve in valve body. Install slotted washer, then install governor sleeve so that legs on sleeve enter slots in washer and seat against body. *NOTE - When properly installed, legs on exposed end of sleeve will be below governor body-to-counterweight mating surface.* Install governor plug in sleeve.

FRONT SERVO: *NOTE - Disassembly and reassembly procedures are the same for "Single-Range" & "Twin-Range" transmissions front servo assemblies except for servo accumulator used on "Twin-Range" servos. See "Servo Accumulator" (below).*

Disassembly: Remove servo piston guide snap ring. *CAUTION - Servo piston is spring loaded. Apply pressure to piston when removing snap ring.* Remove servo guide and piston from servo body. If necessary, tap servo piston guide lightly with a soft hammer to remove it from servo body. Remove servo spring. Remove guide from servo piston, then remove seal ring from guide. Remove rings from servo piston.

Inspection: Inspect body for cracks and piston bore and servo piston stem for scores. Check fluid passages for obstructions. Check actuating lever for free movement, and check for wear. If necessary to replace actuating lever or shaft remove retaining pin and push shaft out of bracket. Inspect adjusting screw threads and threads in lever. Check servo spring and band strut for distortion. Inspect servo band lining for excessive wear and body to metal band. *NOTE - Band should be replaced if worn to point where grooves are not clearly evident.* Inspect band ends for cracks and check band for distortion.

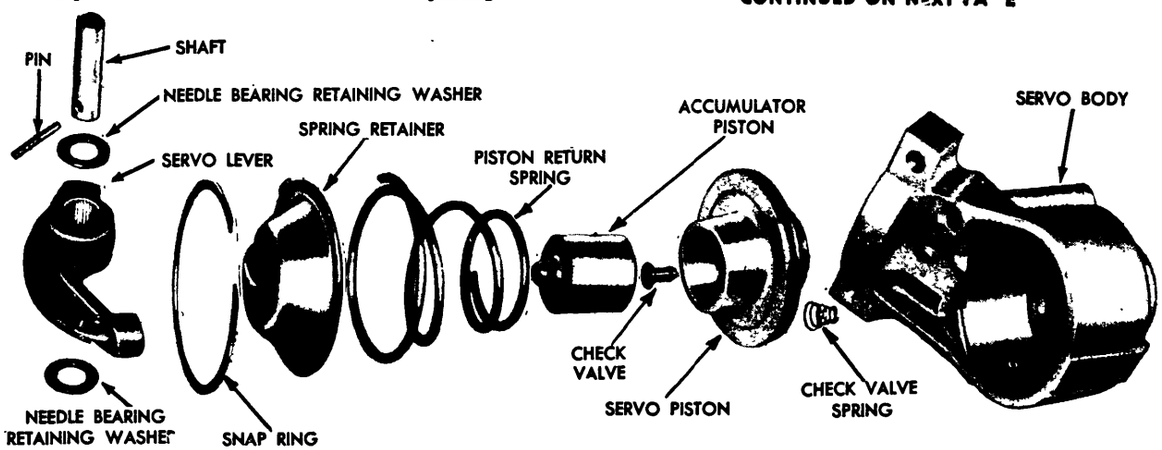
Reassembly: Install servo spring in body, then install large and small seal rings on servo piston. Install a new seal ring on servo guide, then install guide on servo piston. Install piston and guide assembly in servo body. Press cover down, then install snap ring. Install adjusting screw and locknut in actuating lever, if not previously removed.

Servo Accumulator: Remove snap ring which retains accumulator spring retainer in servo body, then remove spring retainer, spring, and accumulator piston from servo body. *NOTE - Air pressure applied to apply passage will force piston out.* Install new seal rings on piston and spring retainer. To reassemble, reverse disassembly procedure.

REAR SERVO: Disassembly - Remove servo actuating lever shaft retaining pin with a 1/8" punch, then remove shaft and operating lever. *CAUTION - Use care when removing lever to avoid losing needle bearings.* Press down on servo spring retainer and remove snap ring (release pressure on retainer slowly to prevent spring from flying out). Remove retainer and servo spring, then force piston out of servo body with air pressure. *CAUTION - Hold hand over piston to prevent damage.* Remove piston seal ring, then remove accumulator piston from servo piston.

Inspection: Inspect servo body for cracks, and piston bore for scores. Inspect servo body-to-transmission case mating surface for burrs. Check fluid passages

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"SINGLE-RANGE" & "TWIN-RANGE" TRANSMISSION REAR SERVO ASSEMBLY

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for obstruction and passage plugs for tightness in body. Inspect piston stem for scores. Inspect accumulator bore and piston for scores and wear, and accumulator spring for distortion. Inspect actuating lever, socket, and shaft for scores and wear. Check needle bearings for wear and distortion. Inspect servo spring for distortion. Inspect servo band lining for excessive wear and bond to metal band. (Band should be replaced if worn to point where grooves are not clearly evident). Inspect band and struts for distortion and band ends for wear.

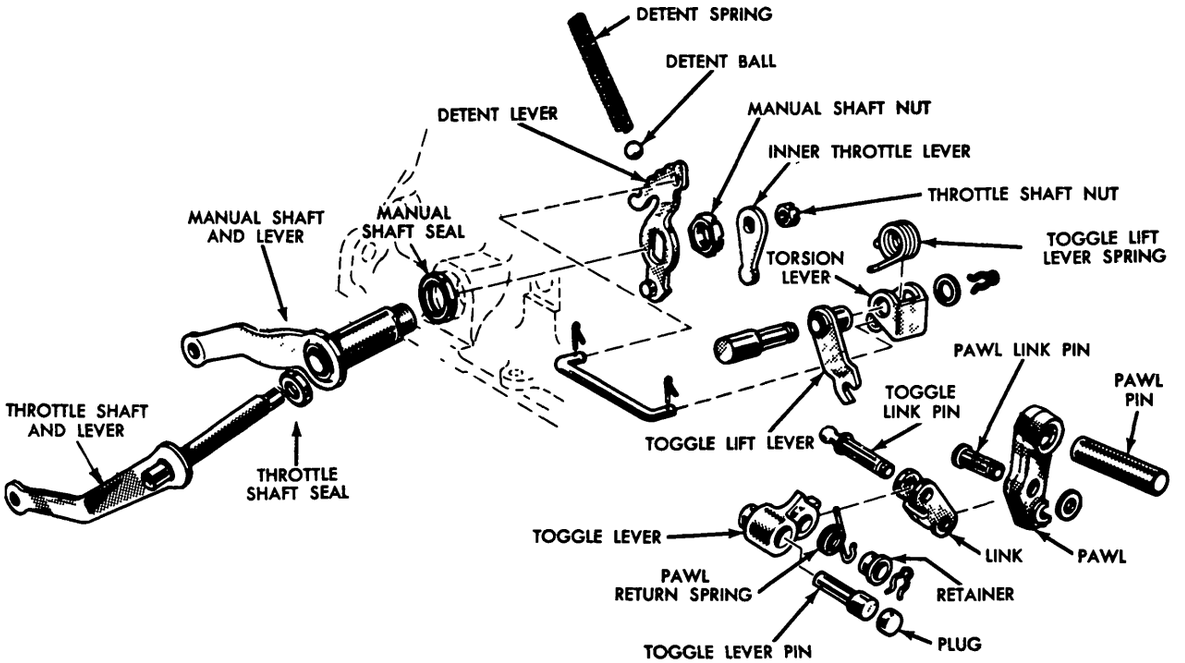
Reass mbly: Install new seal ring in servo piston. Install accumulator spring and piston in servo piston and retain with lock ring. Install piston in servo body (lubricate parts to facilitate assembly). Install servo spring with small end against servo piston and install retainer. Compress spring and install snap ring, making sure that snap ring is fully seated in groove. Place needle bearings in actuating lever shaft hole. With a pencil, position needle bearings around hole. Lock bearings in place by placing thumb over bearings and rotating clockwise. Install actuating lever with socket in lever bearing on piston stem. Needle bearing retainers at each side of actuating lever shaft hole must be installed with actuating lever. Install actuating lever, aligning the retaining pin holes and bearing retainers, and install pin. Check lever for free movement and then check operation of servo by applying air pressure to apply hole.

DISTRIBUTOR SLEEVE (Inspection): Inspect all passages for obstructions. Inspect sleeve bore for scores or excessive ring wear. Inspect mating surfaces for burrs and flatness. Check fit of fluid tubes. *NOTE*– Make sure spacer is on center tube.

OUTPUT SHAFT (Inspecti n): Inspect thrust surfaces and journals for scores. Inspect internal gear for broken or worn teeth. Inspect aluminum sleeve for scores and check ring grooves for burrs. Inspect keyway and drive ball socket for wear. Inspect splines for burrs or wear. Inspect external parking gear teeth for damage and speedometer drive gear for burrs.

EXTENSION HOUSING (Insp ction): Inspect housing for cracks and drive shaft slip yoke bearing surface for scores. Inspect gasket surface for burrs. If necessary to replace seal or bushing, see *"Extension Housing Bushing & S al Replac m nt" above.*

TRANSMISSION CASE LINKAGE (Disassembly): Remove throttle lever nut and take off inner and outer throttle levers. Remove throttle lever shaft seal from counterbore in manual lever shaft. Remove parking mechanism actuating rod, detent ball and spring. Remove manual lever shaft nut, detent and outer manual lever and shaft. Remove torsion lever retainer clip and take off torsion lever assembly. Disassemble torsion lever assembly by rotating lever while holding spring. Disengage pawl return spring from toggle link pin and remove pin. Remove pawl pin by working pawl fore and aft until pin protrudes from case. Remove toggle pin retainer clip, toggle pin, pawl return spring, spring retainer and link. Remove toggle lever pin by tapping lever toward rear of case, then remove plug, toggle lever pin and lever (NOTE—toggle lever pin is held in place by the plug). Remove manual shaft seal and transmission vent from case.



"SINGLE-RANGE" & "TWIN-RANGE" TRANSMISSION PARKING LINKAGE (TYPICAL)

Inspection: Inspect each part of parking mechanism for wear, distortion or other damage.

Reassembly: Assemble toggle lever, link, pawl return spring and pawl and install assembly in transmission case. Install toggle lever and pawl pins. Install torsion lever assembly. (NOTE—Use screwdriver to position spring on torsion lever). Install washer and retainer clip. Coat outer diameter of new manual shaft seal with Permatex No. 3 and use Tool 77288 to install seal in case. Install manual lever and shaft in case, mount detent lever and tighten attaching nut to 35-40 ft. lbs. torque. Install detent spring and ball (*NOTE*– use a piece of thin tubing to depress ball and spring while rotating detent). Position ends of parking pawl torsion lever rod in detent lever and torsion lever and secure with cotter pins. Install new seal on throttle lever shaft, install outer throttle lever and shaft in case, install lever on inner end of shaft and tighten attaching nut to 35-40 ft. lbs. Check linkage for free operation without binding.

TRANSMISSION CASE (Insp cti n): Inspect case for cracks and stripped threads. Inspect all gasket and mating surfaces for burrs. Inspect all bearing surfaces for wear, scores, and burrs.

TRANSMISSION REASSEMBLY

►*REASSEMBLY CAUTION: Use Automatic Transmission Fluid Type "A" (Suffix "A") to lubricate parts for reassembly. DO NOT USE any other form of lubricant. Use all new gaskets and tighten all bolts and screws to specified torque. DO NOT USE FORCE WHEN REASSEMBLING PARTS. If parts do not assemble freely, examine for wear, scores, and burrs.*

CLUTCH ASSEMBLIES: *NOTE - Installation procedur s are different for various transmissions as indicated below.*

Ford, Edsel, Lincoln & Mercury (Exc. "PBB" & "PBE" Twin-Range Transmissions): Install front band in transmission case so that anchor end is aligned with anchor in case. On Edsel Corsair and Citation models, install rear band in case and make certain that detent is toward rear band adjusting screw. On all models, lift clutch assemblies out of bench fixture (do not permit units to separate) and install in transmission case from rear. On "Single-Range" transmissions, position center support in case, aligning hole in center support with hole in right side of case. Install right and left hand center support outer bolts and lockwashers. *NOTE - Lockwashers must be installed with rolled edge toward transmission case.* On "Twin-Range" transmissions, install one-way clutch on center support (on bench), with flanged side of cage rings upward. Carefully compress each drag spring as it is started on the inner race. After all drag stripes are started on race, rotate clutch to tilt the sprags, then push clutch all the way down on center support. Place a strong rubber band around

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

sprag outer ends, then install center support and clutch in transmission case. Install pinion carrier in case and start carrier front pilot in center support bushing. De press "T" bar and work carrier forward until sprags are started on outer race. Remove rubber band, then work carrier forward to point that one-way clutch is barely visible. Rotate pinion carrier clockwise (from the rear) and note whether clutch rotates with pinion carrier or remains stationary with center support. *NOTE - One-way clutch is designed to rotate with pinion carrier. If it does not, replace the clutch.* On all transmissions, position rear servo band in transmission with strut ends up (if not previously done). Place anchor end with depression toward adjusting screw. Install a bronze thrust washer on thrust face inside pinion carrier. To install pinion carrier (if not previously done), position rear band over drum while meshing the planet pinions. Install two seal rings on primary sun gear shaft, and check rings for free movement in grooves. Install selective thrust washer on rear of pinion carrier (retain in place with transmission fluid). *NOTE - If endplay was not within specifications when checked at disassembly, replace washer with one of proper thickness.* Install output shaft, carefully meshing internal gear with pinions.

Ford, Lincoln, & Mercury (With "PBB" & "PBE" "Twin-Range" Transmissions): Install front band and make sure anchor is seated against support in case. Install rear band through bottom of transmission case, then place rear band strut crossways between band ends of rear unit (this will provide enough clearance for center support when clutches and planet carrier are installed). Carefully lift (hold clutch assemblies together, do not pick up by turbine shaft alone) the entire clutch and planet gear assembly off bench fixture and insert it in transmission case from the rear. *NOTE - Do not try to align center support bolt holes at this time.* After assembly is firmly seated forward in case, turn planetary assembly clockwise until center support bolts are aligned. Install center support bolts and tighten to 28-33 ft. lbs.

REAR PUMP: Install oil seal rings on primary sun gear shaft (if not previously installed), check for free movement in grooves and make sure ring ends are locked. If not previously done, install selective thrust washer on rear of pinion carrier. *NOTE - If endplay was not within specifications when checked at disassembly, replace washer with one of proper thickness.* Install thrust washer on pump body indexing tangs on washer with bosses on pump. *CAUTION - Use care to index key with keyway in pump drive gear.*

GOVERNOR: (1958-59 Models) - Lubricate governor valve with transmission fluid and install in body *(CAUTION - Valve must be free to move in body.* Install governor body on counterweight with the **side plate forward.** *CAUTION- Fluid passages in governor body and counterweight must be align d.* Install attaching screws. Tighten cover screws to 4-6 ft. lbs.

1960 M dels: Position governor assembly on counterweight with cover t ward r ar f car (opposite to previous models), then install attaching screws and tighten evenly to 50-60 inch pounds. Install inspection cover plate and tighten screws to 50-60 inch pounds.

DISTRIBUTOR: Install four oil rings in groove of output shaft, then install distributor sleeve on shaft with chamfered end toward front of transmission. Lubricate parts as they are installed. Position distributor tubes in distributor, then slide distributor forward as far as it will go. At same time, insert tubes in transmission case. Position speedometer drive gear ball in pocket of shaft and retain in place with transmission fluid. Install speedometer drive gear and gear snap ring.

EXTENSION HOUSING: Use Tool 7657-D and install extension housing on transmission case and tighten bolts finger tight. On Mercury "PBL" & "PBM"transmissions, install a new seal ring on rear pump discharge pipe, then install discharge tube, using Tool 77869. Make sure it is in position and below upper surface of transmission case. Tighten extension housing bolts to 28-33 ft. lbs., then install governor inspection cover, using a new gasket.

FRONT PUMP: Position a new front pump gasket in counterbore of transmission case. Install front pump, aligning pump bolt holes with holes in case. Install three of the pump attaching bolts and tighten them to 17-22 ft. lbs.

TRANSMISSION ENDPLAY (Checking): Mount a dial indicator support on front pump bolt hole. Mount dial indicator on support so that contact rests on end of turbine shaft. Use a large screw driver to pry front clutch drum toward rear of transmission. Set dial indicator to zero. Remove screw driver and pry units toward front of transmission case by inserting the screw driver between large internal gear and transmission case. Note indicator reading. Endplay should be .010-.029". Remove indicator and remove tool from extension housing. Install the one remaining front pump attaching bolt and tighten it to 17-22 ft. lbs.

FRONT SERVO: On all transmissions except Lincoln & Mercury "PBB" & "PBE", position front band forward in case with band ends up. Position servo strut with slotted end indexing with servo actuating lever and the small end indexing with band end. Rotate band, strut and servo into position, engaging anchor end of band with anchor pin in case. *NOTE - Lincoln & Mercury "PBB" & "PBE" transmission band cannot be rotated.* Locate servo on case and install attaching bolts. Tighten bolts only two or three turns, then install servo tubes.

REAR SERVO: Position servo anchor strut, then rotate rear band to engage the strut. Position servo actuating lever strut with a finger, then install servo and attaching bolts. Tighten bolts to 40-45 ft. lbs.

PRESSURE REGULATOR BODY: Install pressure regulator body and attaching bolts and tighten bolts to 17-22 ft. lbs. Install control and converter valve guides and springs and install spring retainer. Install a new seal ring on rear pump intake tube, then install tube in case. *NOTE-Wh n installing spring r tain r be sur that both tangs attach at th same tim .*

CONTROL VALVE BODY: Install control valve assembly, using care to align servo tubes with control valve. Align the inner throttle lever between throttle lever stop and downshift valve, and at the same time push the throttle valve in to clear transmission case. *(CAUTION-Align manual valv with actuating pin in the manual detent lever. Do not tighten attaching bolts).* Install the large control pressure tube in valve body and regulator. Install small control pressure compensator tube in valve body and regulator. Install lubrication tube in rear pump and regulator body. Tighten control valve body attaching bolts to 8-10 ft. lbs. Tighten front servo attaching bolts or bolt to 30-35 ft. lbs.

ADJUSTMENT (Front Servo): Loosen front servo adjusting screw locknut, then back nut off three turns. Loosen adjusting screw five complete turns. Using the front band adjusting wrench, tool No. 7225, insert a ¼" spacer between lever and stem, then tighten the screw until ratchet overruns. **Back th adjusting scr w one complete turn,** then tighten locknut to 20-25 ft. lbs.

ADJUSTMENT (Rear Servo): Loosen adjusting screw locknut three turns with a ¾" socket of the rear band adjusting wrench. Back off the adjusting screw until free travel is obtained. Using tool No. 7195, tighten adjusting screw until ratchet overruns, then back off the adjusting screw 1½ turns. Hold rear servo adjusting screw stationary, and tighten the locknut to approximately 40 ft. lbs.

FLUID SCREEN & PAN: Position fluid screen over rear pump inlet tube then over front pump inlet tube. Press screen down firmly and install screen retaining clip. In trucks, position the oil cooler to sump discharge tube in case. Place a new gasket on transmission case, then install the pan. Install attaching bolts and lockwashers and tighten to 10-13 ft. lbs.

TRANSMISSION & CONVERTER INSTALLATION

FORD PASS. CARS (EXCEPT THUNDERBIRD) 1958-60 MODELS

►*SINGLE RANGE TRANSMISSION INSTALLATION*

NOTE: To prevent dropping torque converter assembly during transmission installation, install a chain or wire across front of converter, connecting it between holes on each side of converter housing.

1) If converter has been removed from converter housing, position converter in housing, then install converter housing lower front cover plate (V8), or wedge converter in place (6 cyl.) to prevent converter from slipping out of housing.

2) Rotate converter until flywheel bolt holes are in vertical position. Position flywheel on crankshaft flange, then install six attaching bolts and tighten to 75-85 ft. lbs.

3) Move converter and transmission assembly forward into position using care not to damage flywheel and converter pilot. Install lower converter housing-to-engine bolts and tighten to 45-50 ft. lbs., then install crossmember.

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

4) Lower transmission until extension housing rests on crossmember, then install extension housing-to-crossmember bolts.
5) Position flywheel, then install attaching bolts and tighten to 25-28 ft. lbs. Install converter drain plugs and access plates. Connect oil cooler inlet and outlet lines at transmission case.
6) Coat universal joint knuckle with transmission fluid, and install drive shaft. Connect speedometer cable, then connect manual and throttle linkage at transmission levers. On 6 cyl. models install converter air duct and linkage splash shield.
7) Install starter motor and connect transmission-to-frame ground cable. Connect fluid filler tube to oil pan.
8) Lower car and install the upper two converter housing-to-engine bolts and tighten to 45-50 ft. lbs. Install access hole covers and position floor mat.
9) Fill transmission with Automatic Transmission Fluid Type "A" *(see "Draining & Refilling" above)*. Check complete assembly for leakage, then adjust manual and throttle linkage.

FORD TRUCKS
1958-60 MODELS

1) If converter has been removed from housing, position converter in housing, then install housing lower front cover (V8), or wedge converter in place (6 cyl.) to prevent converter from slipping out of housing.
2) Rotate converter until flywheel bolt holes are vertical. Position flywheel on crankshaft, then install six bolts and tighten to 75-85 ft. lbs. Move converter and transmission assembly forward into position using care not to damage flywheel and converter pilot.
3) Raise engine and transmission with transmission jack, and remove support stand or support bar. Place engine rear supports in position on crossmember, then lower engine against supports, and at same time install support bolts.
4) Position flywheel, then install attaching bolts and tighten to 25-28 ft. lbs. Install converter drain plugs and access plates. Connect water inlet and outlet lines at oil cooler.
5) Coat universal joint knuckle with transmission fluid and install drive shaft. Connect speedometer cable. Connect manual and throttle linkage to transmission levers, then install splash shield (6 cyl.).
6) Install starter motor and connect transmission-to-frame ground cable to transmission. Connect fluid filler tube to oil pan.
7) Lower hoist, then install upper two converter housing-to-engine bolts and tighten to 45-50 ft. lbs. Install access hole covers, and position floor mat.
8) Fill transmission with Automatic Transmission Fluid Type "A" *(see "Draining & Refilling abov)*. Check complete assembly for leakage, then adjust manual and throttle linkage.

(THUNDERBIRD (430" ENG.)
1960 MODELS

Install transmission by reversing removal procedures and note the following: Tighten converter housing-to-engine block bolts to 40-45 ft. lbs. Tighten converter-to-flywheel stud nuts to 20-25 ft. lbs.

LINCOLN
1958-59 MODELS

1) Place transmission in position and install six converter housing bolts, then raise engine to the maximum and install starter seal and cable. Reinstall Multi-Luber if it was removed.
2) Install four converter-to-flywheel nuts and washers and tighten to 20-25 ft. lbs. Install resonator inlet pipes on exhaust manifolds, tighten nuts to 34-42 ft. lbs. Install crossover pipe, then install converter inspection cover and tighten bolts to 10-13 ft. lbs.
3) Install engine rear mount, then remove block from No. 2 crossmember, and lower the engine. Install speedometer cable, then install drive shaft. *NOTF - Make sure drive shaft is installed in same position as marked at removal.*
4) Install parking brake cables and equalizer assembly. Connect oil cooler lines and tighten to 12-15 ft. lbs., then install fluid filler tube and tighten to 40-45 ft. lbs.
5) Install manual and throttle linkage on transmission levers and install splash shield. Lower car to floor and fill transmission with Automatic Transmission Fluid Type "A" *(see "Draining & Refilling" above)*. Adjust manual and throttle linkage.

LINCOLN
1960 MODELS

Install transmission by reversing removal procedures and note the following: Tighten converter housing-to-engine block bolts to 40-50 ft. lbs. Tighten engine mounts and bracket bolts and nuts to 22-28 ft. lbs. Tighten converter-to-flywheel nuts to 20-25 ft. lbs. Tighten oil cooler line fittings to 10-15 ft. lbs.

MERCURY
1958-60 MODELS
(EXC. 1960 "PBB" TRANS.)

1) Rotate flywheel so drain plug access holes are in a vertical position, then raise transmission and converter assembly and move it forward into position. Make sure the four converter studs enter holes in flywheel. Install converter housing to cylinder block bolts and lockwashers and tighten to 40-45 ft. lbs.
2) Install starter and seal, then connect cable to starter. Install four converter-to-flywheel nuts and washers and tighten to 20-25 ft. lbs. Install inspection cover and tighten nuts to 10-13 ft. lbs.
3) Install crossmember, then lower transmission and install extension housing-to-crossmember bolts. Install reverse inhibitor tube, then connect throttle rod to lever on transmission. Install park cable and manual selector cable and adjust *(see "Mercury Keyboard Transmission Control")*.
4) Install linkage splash shield, then connect oil cooler lines and tighten to 12-15 ft. lbs. Install exhaust outlet pipe assembly, using new gaskets and tighten nuts to 34-42 ft. lbs.
5) Install speedometer cable, then connect parking brake equalizer arm on equalizer assembly. Install drive shaft. Install fluid filler tube and tighten it to 40-45 ft. lbs.
6) Lower the car and fill transmission with Automatic Transmission Fluid Type "A". Adjust throttle valve linkage.

MERCURY
1960 MODELS
(WITH "PBB" TRANS.)

Install transmission by reversing removal procedures and note the following: Tighten converter housing-to-engine block bolts to 40-50 ft. lbs. Tighten converter housing-to-transmission bolts to 40-50 ft. lbs. Tighten crossmember and engine mounting bolts to 22-28 ft. lbs. Tighten converter-to-flywheel nuts to 20-25 ft. lbs. Tighten oil cooler line fittings to 10-15 ft. lbs.

EDSEL
1958 MODELS

1) Rotate flywheel so drain plug access holes are vertical, then rotate converter so drain plugs are in vertical position. Install a guide pin on each side of cylinder block in the lower holes, then raise transmission and converter assembly and align with engine. *CAUTION - Be careful not to drop converter.*
2) Slide converter housing onto guide pins, making certain that converter studs enter holes in flywheel. On Corsair & Citation models, install the top three converter housing-to-cylinder block bolts and lockwashers and tighten to 40-45 ft. lbs. *NOTF - On Station Wagon, Ranger & Pacer models, the two top bolts will be installed through access holes in floor pan after car has been lowered to floor.* On all models, remove the two guide pins, and install and tighten oil converter housing-to-cylinder block bolts (except top two on Station Wagon, Ranger & Pacer models).
3) Install starter motor and connect cable. Install converter-to-flywheel nuts and tighten to 20-25 ft. lbs., then install converter dust shield.
4) Position frame crossmember on frame side rails and secure it to extension housing, then install and tighten crossmember-to-frame bolts at each side. Remove engine support.
5) On cars with Teletouch Control, secure selector motor to converter housing, then connect reverse inhibitor switch wire to switch located on left side of transmission. Install shift motor shield on converter housing and transmission.
6) On all models connect throttle rod to throttle lever on transmission. On cars with manual shift, connect manual control rod to manual selector lever on transmission.
7) On Corsair & Citation models, connect both exhaust pipes to manifolds, then connect muffler rear support to brackets on frame side rails On all models connect steering idler arm bracket to frame side rail.
8) Install speedometer cable, then connect parking brake equalizer rod to lever, then install drive shaft. Connect oil cooler lines to transmission and connect oil filler tube.

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C nt.)

9) Lower the car. On Station Wagon, Ranger & Pacer, install the two top converter housing-to-eylinder block bolts through access holes in floor pan. On all models fill transmission with Automatic Transmission Fluid Type "A". *(See "Draining & Refilling" above).* Adjust manual and throttle control linkage.

EDSEL
1959 MODELS

1) Rotate flywheel so drain plug access holes are vertical, then rotate converter so drain plugs are in vertical position. Install a guide pin on each side of cylinder block in the lower holes, then raise transmission and converter assembly and align with engine. *CAUTION - Be careful not to drop converter.*

2) Slide converter housing onto guide pins, making certain that converter studs enter holes in flywheel. On Corsair models, install the top three converter-housing-to-cylinder block bolts and lockwashers and tighten to 40—45 ft. lbs. *NOTE – On Station Wagon and Ranger models, the two top bolts will be installed through access holes in floor pan after car has been lowered to floor.* On all models, remove the two guide pins and install and tighten converter housing-to-cylinder block bolts (except top two on Station Wagon and Ranger models).

3) Install starter motor and connect battery cable. Install converter-to-flywheel nuts and tighten to 20—25 ft. lbs., then install converter dust shield.

4) Position frame crossmember on frame side rails and secure it to extension housing, then install and tighten crossmember-to-frame bolts at each side. Remove engine support.

5) On all models connect throttle and manual rods to levers on transmission. On Corsair models, connect exhaust pipes to manifolds, then connect muffler rear support to brackets on frame side rails. On all models connect steering idler arm bracket to frame side rail.

6) Install speedometer cable, then connect parking brake equalizer rod to lever, then install drive shaft. Connect oil cooler lines to transmission and connect oil filler tube.

7) Lower the car. On Station Wagon and Ranger models, install the two top converter housing-to-cylinder block bolts through access holes in floor pan. On Corsair models, install the two inner body bolts from inside car and install scuff plates. On all models fill transmission with correct type fluid *(see "Lubrication" above).* Adjust manual and throttle control linkage.

EDSEL
1960 MODELS

►*1960 EDSEL TRANSMISSION & TORQUE CONVERTER INSTALLATION NOTE: See "Ford Pass. Cars (Exc. Thunderbird), 1958-60 Models" above.*

TRANSMISSION INSTALLATION (WITHOUT CONVERTER)

FORD PASS. CARS & TRUCKS
1958-60 MODELS

1) Install guide pins in the two top transmission-to-converter housing bolt holes, then mount transmission on a jack and position it under the car. *NOTE - Be sure to align turbine shaft splin s with turbin splin s and converter impell r lugs with slots in front pump drive gear.*

2) Raise transmission and position it on converter housing, then install transmission-to-converter housing, lower attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Tighten all bolts to 40-45 ft. lbs.

3) On passenger cars, install frame crossmember, then lower transmission and install engine rear support-to-transmission bolts.

4) Connect oil cooler-to-transmission lines (V8 Pass. Cars); water hoses to oil cooler (Trucks) and tighten fittings securely.

5) Install drive shaft, then connect speedometer cable. Connect manual and throttle linkage to transmission levers and adjust linkage. Check operation of Neutral Safety Switch and adjust if necessary.

6) Connect fluid filler tube to transmission, then lower car to floor and fill transmission with Automatic Transmission Fluid Type "A". *(See "Draining & Refilling" above).*

THUNDERBIRD
1958-60 MODELS

►*1960 THUNDERBIRD WITH 430" ENGINE TRANSMISSION INSTALLATION NOTE: Torque converter and transmission must be installed as an assembly. See "Transmission & Torque Converter Installation" above.*

1) Install guide pins in the two top transmission-to-converter housing attaching bolt holes, then mount transmission on a jack and position it under the car. *NOTE - Align turbine shaft splines with turbine splines and the converter impeller lugs with slots in front pump drive gear.*

2) Raise transmission and install it on converter housing, then install transmission-to-converter housing lower attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Tighten all bolts to 40-45 ft. lbs.

3) Install frame crossmember and bolts, then lower transmission and install engine rear support-to-transmission bolts. Connect oil cooler-to-transmission lines and tighten fittings. Install drive shaft and connect speedometer cable.

4) Connect manual and throttle control linkage to transmission levers and adjust linkage. Install converter drain plugs and converter lower cover. Install exhaust pipes, then connect fluid filler tube to oil pan.

5) Lower car to floor and fill transmission with Automatic Transmission Fluid Type "A". *(See "Draining & Refilling" above).*

LINCOLN
1958-59 MODELS

1) Position transmission on converter. *NOTE - Align turbine shaft splines with turbine splines and the converter impeller lugs with slots in front pump drive gear.* Install transmission-to-converter housing bolts and tighten to 40-45 ft. lbs. Install resonator inlet pipes on exhaust manifolds and tighten nuts to 34-42 ft. lbs. Install crossover pipe.

2) Install converter inspection cover and tighten bolts to 10-13 ft. lbs. Install one engine rear mount bracket, then install engine rear mount, and lower the engine. Connect speedometer to transmission.

3) Install drive shaft. *NOTE - Align marks made at disassembly.* Install parking brake cables and equalizer assembly. Connect oil cooler lines and tighten to 12-15 ft. lbs. torque.

4) Install oil filler tube and tighten to 40-45 ft. lbs. Install manual and throttle control linkage assemblies, then install splash shield.

5) Lower car and fill transmission with Automatic Transmission Fluid Type "A" *(See "Draining & Refilling" above),* then adjust manual and throttle control linkage.

LINCOLN
1960 MODELS

►*1960 LINCOLN TRANSMISSION INSTALLATION NOTE: Transmission and torque convert r must be installed as an assembly. See "Transmission & Torqu C nvert r Installation" above.*

MERCURY
1958-60 MODELS
(EXC. 1960 "PBB" TRANS.)

►*1960 "PBB" TRANSMISSION INSTALLATION NOTE: Transmission and torque converter must b install d as an assembly. See "Transmission & Torqu Conv rt r Installation" above.*

1) Position front pump drive gear so lugs are in a straight ahead position, then rotate crankshaft until front pump drive lugs are in a horizontal position. Position transmission on converter, then install transmission-to-converter housing bolts and tighten to 40-45 ft. lbs.

2) Install crossmember, then lower transmission and install extension housing to crossmember bolts. Install reverse inhibitor tube, then connect throttle rod to lever on transmission. Install park cable and manual selector cable and adjust *(see "Mercury K yboard Contr l").* Install splash shield.

3) Connect oil cooler lines and tighten to 12-15 ft. lbs. Install speedometer cable, then install parking brake equalizer arm on equalizer assembly. Install drive shaft.

4) Install fluid filler tube and tighten to 40-45 ft. lbs. Lower car and fill transmission with Automatic Transmission Fluid Type "A" *(se "Draining & R filling" above).* Adjust throttle valve linkage.

EDSEL
1958 MODELS

1) Install guide pins in the two lower transmission housing attaching bolt holes. Position front pump drive gear lugs in a vertical position, then rotate engine until front pump drive lugs on impeller are in a horizontal position.

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EDSEL, FORD, LINCOLN, MERCURY AUTOMATIC TRANSMISSION (C ntn)

2) Raise transmission on a jack and at same time move it toward engine. Tip and raise jack as necessary until input shaft is in alignment with converter hub, then move transmission forward until two guide pins enter lower holes in transmission case.
3) Seat transmission against converter housing and install the two top bolts and lockwashers. Remove guide pins and install remaining bolts and lockwashers and tighten all bolts to 40-45 ft. lbs.
4) Position crossmember on frame side rail and install attaching bolts on each side. Lower the engine support and disconnect it from frame side rails then install engine rear support to extension housing.
5) Connect parking brake equalizer rod to lever, then install speedometer cable. On cars with Teletouch Control install reverse inhibitor switch wires to switch on left side of transmission case.
6) Install drive shaft, then connect oil cooler lines to transmission. Connect throttle rod and manual control rod or selector motor rod to levers on transmission.
7) On Corsair and Citation models, connect exhaust pipes to manifolds, then connect each muffler rear support to brackets on frame side rails.
8) Lower car and fill transmission with Automatic Transmission Fluid Type "A" (*see "Draining & Refilling" above*). On Corsair & Citation models, install the two body inner bolts, floor mat, and scuff plates. On all models, adjust manual and throttle control linkage.

EDSEL 1959 MODELS

1) Install guide pins in the two lower transmission housing attaching bolt holes. Position front pump drive gear lugs in a vertical position, then rotate engine until front pump drive lugs on impeller are in a horizontal position.
2) Raise transmission on a jack and at same time move it toward engine. Tip and raise jack as necessary until input shaft is in alignment with converter hub, then move transmission forward until two guide pins enter lower holes in transmission case.
3) Seat transmission against converter housing and install the two top bolts and lockwashers. Remove guide pins and install remaining bolts and lockwashers and tighten all bolts to 40-45 ft. lbs.
4) Position crossmember on frame side rail and install attaching bolts on each side. Lower the engine support and disconnect it from frame side rails then install engine rear support to extension housing.
5) Connect parking brake equalizer rod to lever, then install speedometer cable. Install drive shaft, then connect oil cooler lines to transmission. Connect throttle rod and manual control rod to levers on transmission. On Corsair models, connect exhaust pipes to manifolds, then connect each muffler rear support to brackets on frame side rails.
6) Lower car and fill transmission with correct type fluid (*see "Lubrication" above*). On Corsair models, install the two inner body bolts, floor mats, and scuff plates. On all models, adjust manual and throttle control linkage.

EDSEL 1960 MODELS

►*1960 EDSEL TRANSMISSION INSTALLATION NOTE:* *See "Ford Pass. Cars (Exc. Thunderbird), 1958-60 Models" above.*

EDSEL "TELETOUCH" TRANSMISSION CONTROL

Eds l, All M d ls (1958)

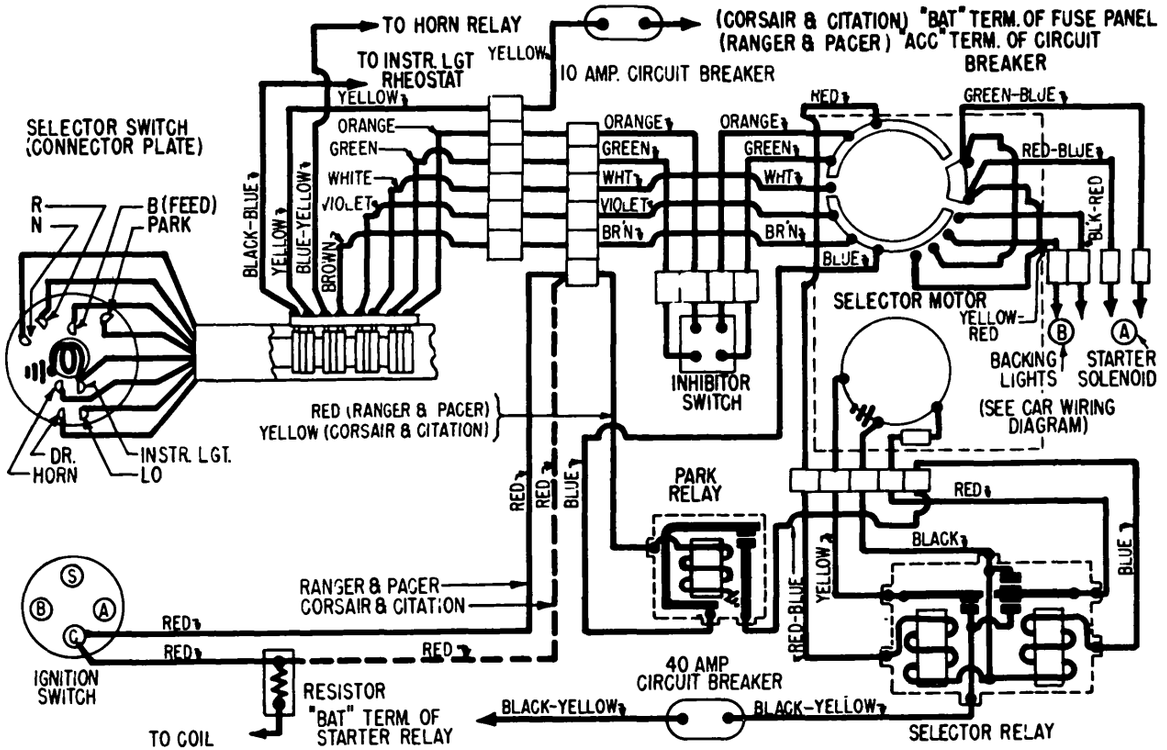
►CHANGES, CAUTIONS, CORRECTIONS

►*SHIFT MOTOR FAILURE (Failure to shift transmission or rratic shifts) NOTE:* This condition may be caused by sticking brushes and can be corrected as follows: Disconnect two wires from end of motor and remove the two through bolts, then remove end plate and brush assembly from housing. Check for wear or burned contract surfaces, and if necessary, replace brushes. Spread brush holder to allow free brush movement Sand armature commutators with No. 00 sandpaper. Before reassembling, apply a coat of rubber cement, Part No. B8E-19563-A between all joints, under screw heads, around wires that enter the unit, and other points where water might enter.

►*INHIBITOR SWITCH PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* In later production cars, the inhibitor switch has been relocated to second bolt from rear on intake manifold, adjacent to left cylinder bank (Ranger & Pacer); and to upper right converter housing-to-engine bolt (Corsair & Citation). When replacing the switch on early models, install switch in the new location. The new location will prevent salt spray and water from damaging switch.

►*STARTER ENERGIZED DURING NEUTRAL TO REVERSE SHIFTS CORRECTION:* To check for this condition, connect a test lamp from red wire with blue terminal to ground. With ignition switch on, depress "N", then the "R" button. If test lamp lights, there is current to starter relay. To correct this condition, reverse the two back-up light wires at their bullet type

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EDSEL "TELET UCH" WIRIN DIA RAM

EDSEL "TELETOUCH" TRANSMISSION CONTROL (Cont.)

connectors adjacent to master brake cylinder. If the condition is not corrected by the above change, it will be necessary to replace the shift control motor assemoly.

DESCRIPTION: This control system consists of five buttons (cars with "D" position), six buttons (cars with "D-1" & "D-2" positions) located in hub of steering wheel for selecting the various drive ranges in the transmission. These selector buttons operate manual shift lever on transmission by means of a selector motor mounted on converter housing and mechanical linkage between motor and transmission manual lever. Other components of the control system are as follows:

S lector Switch: Located in upper end of steering column below steering wheel. This switch is connected to the wire tube assembly and is maintained in a stationary position by a set of planetary gears driven through steering gear hub.

Wire Tube Assembly: Located in steering column tube in conjunction with an external set of selector rings which transmits electrical power between selector switch and the terminal block at lower end of steering column tube. The wire tube which is mounted to the selector switch is stationary, therefore, an external set of selector rings is provided on the steering shaft. These rings rotate with the shaft and are in contact with the terminal block and selector rings on wire tube assembly.

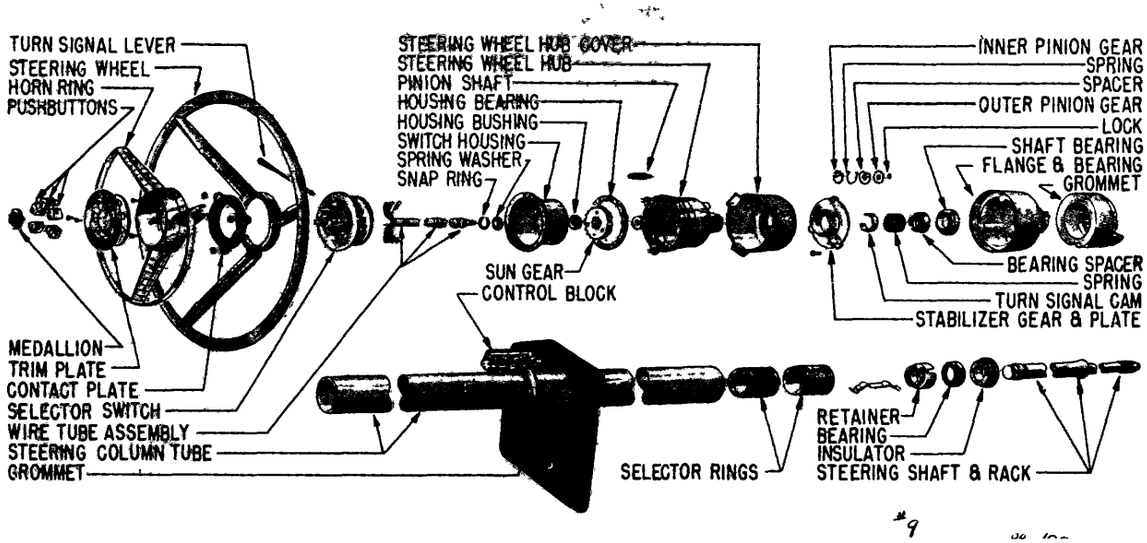
Selector Motor: This is a reversible type motor mounted on the left side of transmission converter housing, which operates the manual lever on transmission through mechanical linkage. A rotary switch is provided in the selector motor that stops the motor when manual lever on transmission engages its selected position. This rotary switch also functions as a transmission neutral safety and back-up light switch. The starting circuit is completed when manual lever on transmission is in "N" (Neutral or "P" (Park) positions. The back-up light circuit is completed when manual lever is in "R" (Reverse) position.

S lector Relay: Dual contacts are used in this relay. One set of contacts p rovide clockwise rotation and the other set provide counterclockwise rotation.

Ignition Relay: The ignition relay is a safety device which prevents movement of transmission lever out of the "P" (Park) position when ignition is OFF. *NOTE* - Transmission lever can be moved only toward the "P" position with ignition key turned OFF.

R verse & Park Inhibitor Switch: This switch is located on the left side of transmission case and prevents transmission from being placed in "P" (Park) position above 3 MPH, or in "R" (Reverse) above 15 MPH. The switch is actuated by transmission hydraulic pressure.

ADJUSTMENT: Selector Motor Linkage - Place car on a hoist; then turn ignition switch to "ON" and depress the "N" (Neutral) button. Turn ignition switch "OFF". Raise car on hoist, then remove cotterpin, flat washer and clevis pin and disconnect selector motor control rod from manual lever on transmission. Move transmission manual lever to rear or front of transmission until it contacts the stop. Move lever to center of its travel



EDSEL "TELETOUCH" TRANSMISSION CONTROL (EXPLODED VIEW)

(three detents). Lo osen selector motor control rod locknut, then turn clevis until pin can be inserted freely through clevis and manual lever on transmission. Tighten the locknut, Install control rod to lever with clevis pin, spring washer, flat washer, and cotter pin.

TROUBLE SHOOTING

WILL NOT SHIFT IN ANY POSITION: Check 30 amp. circuit breaker on left hand cowl and 40 amp. circuit breaker in engine compartment. Check battery feed-to-steering column wire (yellow). This wire should be "hot". With ignition "on", check park relay feed wire (red). Wire should be "hot". Check operation of park relay and shift relay. Check for defective push button switch by testing with a test wire and lamp for "P", "R", "N", "D" & "L" terminals on column block to ground by depressing the respective push buttons. If any terminals are dead, remove terminal block and make contact to the slip rings at respective positions with test lamp to ground. If any slip rings are dead, replace column. If all are "hot", check spring contacts on terminal block (contacts should be all the same height). *NOTE - Jumper must be used from "B" terminal on removed block to respective slip ring when checking shift slip rings.* Check for defective shift motor switch or motor. Check shift linkage for missing parts and check transmission for binding.

WILL NOT SHIFT TO PARK OR REVERSE: Check inhibitor switch for open circuit.

ENGINE WILL NOT START IN NEUTRAL OR PARK: Starter solenoid and/or shift motor is defective.

PUSH BUTTON LAMP NOT OPERATING: With headlights on, feed wire (blue-black) to "I" terminal on column block should be "hot". Check lamp and socket terminal.

PUSH BUTTONS STICKING: Trim plate may be out of position. Push button rods may be bent. Check for defective pushbutton switch.

TRANSMISSION ERRATIC IN SHIFT SELECTION AND MAY NOT REMAIN IN SELECTED POSITION: Adjust transmission shift lever rod. Check for defective transmission shift motor switch. Transmission may be defective

HARD STEERING: Loosen steering column to frame bolts, then realign gear to column and shim as necessary. Tighten bolts and recheck.

OVERHAUL

REMOVAL: Disconnect battery from ground cable, then disconnect turn signal switch wires from harness under instrument panel. Remove the three screws that attach selector switch terminal block to lower end of steering column, and move terminal to one side. Remove clamp securing steering column to instrument panel, then lower column slightly to disengage it from dowel on instrument panel and lift assembly from car.

DISASSEMBLY: Remove medallion from selector button trim plate with a small screwdriver. *NOTE -Th re is a notch on underside of medallion to ins rt scr wdriv r.* Remove screws attaching trim plate to support and remove trim plate, then pull selector buttons off switch. Remove horn ring, then remove contact plate and steering wheel. Remove three screws attaching selector switch to housing and lift selector switch and wire tube assembly from housing as an assembly. Disconnect wires connecting wire tube and selector switch, then remove two screws attaching tube to switch and separate the two parts being careful not to lose the spring. Remove snap ring securing selector switch housing to steering shaft and remove spring washer and switch housing from shaft. Remove ball bearing from steering wheel lower hub, then remove nut and washer

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EDSEL "TELETOUCH" TRANSMISSION CONTROL (C nt.)

attaching lower hub to steering shaft and pull hub from shaft with Tool 3826. Remove turn indicator switch handle from switch plate and remove stabilizer plate and gear. Compress switch plate spring and remove spring retainer and spring, then remove switch plate from tube flange, being careful not to lose spring washer located on switch plate pivot stud. Remove turn indicator switch and wires from steering column tube flange. Remove steering shaft bearing spacer spring and spacer from shaft. *NOTE - If nylon bearing space. is used, it may b n c ssary to insert a small screwdriv r in sl t and spr ad it to free it from shaft.* Remove capscrews attaching steering shaft lower bearing retainer to steering column tube flange, then remove steering shaft, lower bearing retainer, and bearing from lower end of steering column tube as an assembly. Pull spring retainer from between steering shaft and selector rings with pliers. Lift selector rings from slots in shaft, then slide them off shaft.

INSPECTION: Replace wire tube assembly if rings are rough or damaged or if tube is cracked or bent. Clean selector rings if dirty or corroded. Replace selector rings if brushes are damaged or if insulator rings are cracked or worn. Check brushes for sticking and coat lightly with Lubriplate. Replace selector switch if any part is damaged. Replace frayed or cracked wires and clean switch thoroughly. *NOTE* - Coat all moving parts with a small amount of Lubriplate.

REASSEMBLY: Slide selector rings on steering shaft and make sure that brush bosses engage slots in shaft then secure rings on shaft with spring clips. Install lower bearing retainer, bearing, selector rings and steering shaft in lower end of steering column tube. Install and tighten bearing retainer capscrews. Slip steering shaft bearing spacer and spring on upper end of shaft, then thread the turn signal switch wires through column tube and secure switch in place with two screws. Place spring washer on pivot stud of turn indicator switch plate. Position switch plate in steering column and secure with spring and retainer. Install stabilizer plate and gear in column tube flange, and secure in place with three screws, then install turn indicator switch handle. Align master spline in steering wheel hub with blank on steering shaft, then position lower hub on shaft. Install lockwasher and nut on steering shaft and tighten to 45-55 ft. lbs. Install selector switch housing bearing in lower hub, then position selector switch housing in lower hub so one of the mounting holes is at the 12 o'clock position to obtain correct alignment of selector switch. Secure selector switch housing to steering shaft with spring washer and snap ring. Assemble spring, and wire tube assembly to selector switch with two screws, then connect wires from tube to their respective terminals on selector switch. Insert wire tube assembly in steering shaft and correctly position switch assembly in housing. Tighten switch attaching screws securely. Position steering wheel and horn contact plate on the three studs in lower plate, and secure them in place with three screws. Starting at lower left selector button pedestal, position "P", "R", "N", "Dr", and "Lo" buttons in place on switch. Place trim plate over selector buttons and secure in place with two screws. Snap medallion into place on trim plate.

INSTALLATION: Slip steering column into position on steering gear, making sure that master spline is aligned. Engage dowel in instrument panel with hole in steering column, then secure column in place with attaching clamp. Position selector switch terminal block in place at lower end of steering column tube. Make sure that contacts are aligned with selector rings, then secure block to column. Connect turn indicator switch wires to their respective terminals on wiring harness under instrument panel. Connect battery cable.

MERCURY "KEYBOARD" TRANSMISSION CONTROL

M rcury (1958)

►**CHANGES, CAUTIONS, CORRECTIONS**

►*"PARK" SLIDE HANDLE INTERFERENCE CORRECTION:* If interference exists between slide handle, park cable and bottom of instrument panel opening, remove keyboard assembly and grind a clearance in instrument panel opening at interference area. Interference may also be found on some units between right side of park handle and keyboard die-cast housing. Correct by grinding right side of park handle so it is flush with edge of attaching flange.

►*ENGINE STARTING WHEN IGNITION SWITCH IS TURNED ON(WITHOUT ACTUATING NEUTRAL PUSH BUTTON) CORRECTION:* This condition may be found on early cars and is caused by plunger in neutral switch being depressed too deeply and becoming snagged behind switch case. To correct, adjust neutral switch position on keyboard. *See "Adjustments" below.* Switches on later cars have a built-in stop which prevents the above condition.

►*ENGINE STARTING WITH TRANSMISSION IN GEAR WHEN NEUTRAL STARTING SWITCH IS DEPRESSED: Corr ct by adjusting p sition of switch. See "Adjustments" b l w.*

►*KEYBOARD CONTROL LIGHT NOTE:* On early cars, the keyboard control light was controlled by the ignition switch. On later cars, it is controlled by the headlight switch. If it is desired to change the light control to the later type, fabricate a connecting wire 24" long from No. 18 insulated wire by attaching a bullet type terminal, Part No. 01A-14461, to each end. At end leading to keyboard light, attach a bullet connector, Part No. B-14487, to bullet terminal. Disconnect battery terminal, then lower the left fresh air duct. Disconnect keyboard control light wire (blue-red band) and insert it into bullet connector on connecting wire. Route connecting wire through main wiring harness clip and plug bullet terminal on connecting wire into double connector (with blue-red band wire) which is an existing connector located above the ignition switch. Reinstall fresh air duct, then connect battery terminal and test operation of instrument panel and keyboard lights.

►*SHORTED INHIBITOR SWITCH CORRECTION:* On some early cars, the parking brake cable may be rubbing against inhibitor switch terminal causing it to ground out, thus activating the keyboard mounted solenoid and preventing "Reverse" or "Park" operation. To correct, rotate parking brake cable toe-pan clip 180° to provide clearance. Additional grounding out of inhibitor switch may be caused by moisture between switch housing and terminal outlet. Correct by drying thoroughly and coating area over terminal and housing with sealer, Part No. 8M-19560-B.

►*DIFFICULT "PARK" POSITION ENGAGEMENT & DISENGAGEMENT CORRECTIONS (EARLY CARS):* An interference may exist between toggle lever pin retainer and transmission case which causes difficult engagement or disengagement in "Park" position. In some cases, the hairpin clip may disengage and allow toggle lever to slip out and result in "no park" position. To correct, remove main control assembly and replace hairpin clip with a new "C" type retainer, Part No. 370084-S7.

►*REVERSE INHIBITOR SWITCH PRODUCTION CHANGE:* A new hydraulic reverse and park inhibitor switch and one-piece speedometer cable entered production approximately Feb. 12, 1958. The new switch is mounted on the left rear intake manifold bolt and has a formed metal tube which connects the switch to governor pressure passage on transmission case.

DESCRIPTION: This keyboard type transmission control assembly is mounted on instrument panel and is connected to transmission manual control lever and parking pawl linkage by flexible cables. The selector assembly on instrument panel contains four (Merc-O-Matic), five (Multi-Drive) transmission range selector push buttons, a parking brake release push button (to release foot operated parking brake), and a "push-pull" handle to engage and disengage the transmission parking pawl. A combination "Neutral-Starter" switch is mounted on rear of selector assembly and is controlled by the "NS" (Neutral-Start) push button. Depressing the "NS" button to the detent, places transmission in neutral. Depressing it past the detent to its full travel, engages the starter switch. A "Reverse Inhibitor" solenoid which is energized by a centrifugal switch (driven by the speedometer cable) or by a hydraulic pressure switch located on transmission, is also mounted on rear of selector assembly. The inhibitor switch prevents going into reverse or park above 5 MPH. *NOTE - If car is quipp d with back-up lights, the back-up light switch is m unt-*

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MERCURY "KEYBOARD" TRANSMISSION CONTROL (C nt.)

ed on rear of selector assembly and is controlled by the "R" push button.

ADJUSTMENT

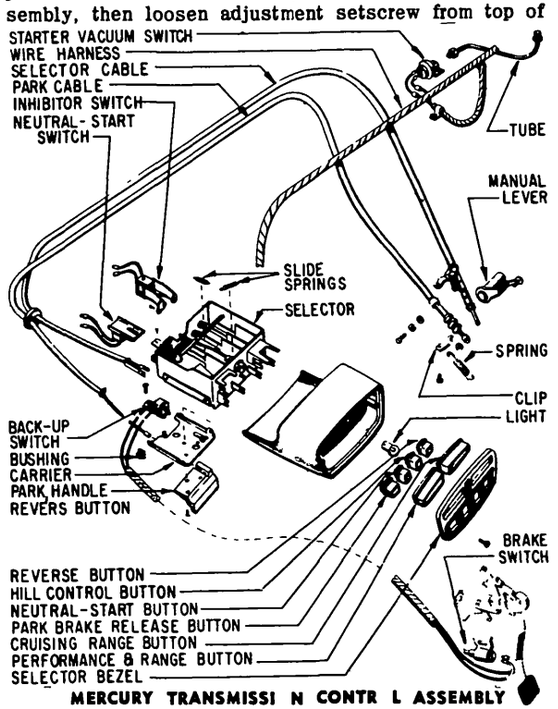
MANUAL SELECTOR CABLE: Raise car, remove splash shield and remove pipe plug from left side of transmission case. Remove park release cable from lever and clamp. *NOTE - Park release cable must not be connected to adjusting bracket or park release lever while making selector lever adjustment.* Loosen control cable mounting bracket retaining screw and washer, leaving it finger tight. Hold "D" (Merc-O-matic), "Cruising" (Multi-Drive) button in the fully depressed position, then move adjusting bracket downward to limit of its travel. Install Tool 77270-F in pipe plug hole in side of transmission. *NOTE - Be sure tool is threaded into case far enough to allow gauge pin to contact cable connector sleeve.* Pull upward on selector cable and housing assembly until gauge pin seats in locating slot of selector cable connector sleeve. Leave gauge in place and tighten selector cable mounting screw to 18-22 ft. lbs. With gauge in place, pull pin out and hold it so it clears selector cable connector sleeve, then depress the "NS" (Neutral-Start) button. Depress "D" (Merc-O-Matic), "Cruising" (Multi-Drive) button. Release gauge pin and check to see that pin seats in locating slot of selector cable connector sleeve. Pull pin out so that it clears the connector sleeve. Depress "L" (Merc-O-Matic), or "HC" (Multi-Drive) button and repeat the check. The gauge pin must seat in locating slot each time "D" (Merc-O-Matic) or "Cruising" (Multi-Drive) button is depressed. If pin fails to seat in slot, selector cable must be readjusted. After adjustment is completed and checked, remove gauge and replace pipe plug in transmission case.

PARK CABLE: *NOTE - Manual selector cable must be adjusted before making park cable adjustment.* Install park cable on pin of park lever and install clamp and screw on adjusting bracket. Fully depress park bar on selector keyboard. Install parking cable adjusting gauge Tool 77270-G ("PBE" and "PBB" transmissions), Tool 77270-J ("PBL" transmissions), over torsion lever support pin in transmission case and pin on park release lever. Reduce cable slack by pulling cable housing toward front of car, then hold cable in this position and tighten cable clamp adjusting screw securely. Remove gauge and install washer and retaining pin on park lever pin. Release and engage park bar on keyboard several times, then reinstall gauge with transmission in park position. The gauge must slip over pins on lever and case freely. If gauge cannot be reinstalled, perform complete cable adjustment again. Release park bar on keyboard control and rotate the drive shaft. Parking pawl must not ratchet on ring gear. Start engine and check operation of keyboard in all ranges, including park bar. Install splash shield and lower car.

NEUTRAL-START SWITCH: Remove battery ground, then remove keyboard assembly from instrument panel and lower it below the panel. Loosen two switch-to-keyboard assembly screws and position switch so neutral-start slide positions treadle bar in neutral before it contacts the neutral-start switch plunger. Check keyboard selector to make sure engine will not start when any button, except "NS" button, is depressed.

KEYBOARD SLIDE-TO-TREADLE BAR CLEARANCES: Remove keyboard selector assembly and press each button until securely engaged or latched. Measure clearance between the individual slide and treadle bar with a feeler gauge between end of slide and treadle bar. The gauge should enter freely without compressing rubber on treadle bar. Clearances between all slides except "NS" & "Park", should be .020-.070". Between "NS" & "Park" slides, the clearance should be .015-.070". *NOTE -On Merc-O-Matic selector heads, a check should be made on each side of the drive slide. If either end of slide does not conform to specified tolerance, the unit should be replaced.*

►*EARLY KEYBOARD SELECTOR NEUTRAL-PARK SLIDE ADJUSTMENT:* Some early assemblies may have an adjustable type neutral park slide. On these units the neutral park slide can be adjusted to obtain .015" if all of the other slide-to-treadle bar clearances are within specifications. Units with this adjustment have the rubber cut off the treadle bar in neutral park slide contact area. Measure clearance from slide to metal portion of treadle bar. To adjust, remove keyboard assembly, then loosen adjustment setscrew from top of keyboard and adjust by turning adjusting screw through hole in front face of keyboard until .015" clearance is obtained with neutral park slide latched.



MERCURY TRANSMISSI N CONTR L ASSEMBLY

►*PARK SLIDE OPERATION CHECK:* Remove park handle and check the effort required to engage and disengage park slide. If more than 16 lbs. are required to operate the slide, replace the keyboard selector assembly. The power steering spring scale, Tool 3600-AC may be used for this check.

TROUBLE SHO TING

SLIDE CONTACTS TREADLE BAR: Check cable for kinks, binding and routing. Check setscrew to insure that it is locking adjusting screw (if so equipped). Check neutral park slide to treadle bar clearance dimension. (Correct or replace as necessary). Check for distortion of neutral park slide dog which contacts park slide plate.

PUSH BUTTONS FAIL TO HOLD IN DEPRESSED POSITION: Check keyboard lock bar for binding or wear. Check lock bar spring for distortion. Check lock tab on each slide for wear or distortion. Check spring tension on lock bar.

PUSH BUTTONS CANNOT BE DEPRESSED: Check cables for kinks, binding or routing. Check for binding condition in lock bar and treadle bar. Check alignment of slides in slots at rear of keyboard. Check operation of park bar release. Check springs on lock bar.

PARK BAR HANDLE CANNOT BE DEPRESSED: Check alignment of slide plate in rails. Check neutral pari slide for freeness. Check dog on bottom of neutral park slide for distortion. Check locking spring at rear of keyboard for correct position. Check solenoid switch and inhibitor switch operation. Check connections at side of transmission case.

REVERSE PUSH BUTTON CANNOT BE DEPRESSED: Check cable routing and connections on transmission case. Check slide alignment in keyboard assembly. Check operation of solenoid switch and inhibitor switch.

PARK HANDLE CANNOT BE RELEASED. Check park slide dog, at rear of keyboard, for alignment with lock bar lever. Check lock bar for freeness. Check cable routing and connections.

DIFFICULT ENGAGEMENT OR NO ENGAGEMENT OF SELECTOR POSITIONS (PARTICULARLY "PARK" POSITION): Check following conditions for conformity to specifications. Any combination of variations from these specifications will result in selector engagement problems. Manual and park cables must be free of kinks and properly routed, clamped and adjusted. Also, manual and park cable attaching brackets must be positioned on keyboard assembly to maintain alignment and avoid any binds. Park handle and cable must be free and must not interfere or bind with instrument panel or keyboard housing openings. Park slide must not bind in keyboard and effort required to apply or release should not exceed 16 lbs., with park cable disconnected from slide. Clearances between various shift slides and the keyboard treadle bar must be within specifications. S *"K yb ard Cl aranc s" ab v .*

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION

COMET DRIVE
C m t, All Models (1960)
FORDOMATIC
Falcon, All Mod ls (1960)
Ford Pass. Cars. Exc. 430" Eng. (1959-60) ①
MILE-O-MATIC
Edsel, All Mod ls (1959-60)

① - Fordomatic (3-Speed) transmission also used in limited production during 1959. Cars with 3-speed transmission can be identified by letter "C" stamped in transmission code space on car patent plate.

Transmission Identification ①

Car Model	Engine	Carb.	Serial Prefix
1959 Ford	223"	1-Bbl.	PBP-A
1959 Ford	292"	2-Bbl.	PBR-A
1959 Ford	332"	2-Bbl.	PBS-A
1959 Ford	352"	2-Bbl.	PBS-B
1959 Edsel	223"	1-Bbl.	PBP-A
1959 Edsel	292"	2-Bbl.	PBR-A
1959 Edsel	332"	2-Bbl.	PBS-A
1959 Edsel	361"	2-Bbl.	PBS-A
1960 Comet	144"	1-Bbl.	PBZ-D
1960 Falcon	144"	1-Bbl.	PBZ-D
1960 Ford	223"	1-Bbl.	PBP-B
1960 Ford	292"	2-Bbl.	PBR-B
1960 Ford	352"	2-Bbl.	PBS-C
1960 Ford	352"	4-Bbl.	PBS-D
1960 Edsel	223"	1-Bbl.	PBB-B
1960 Edsel	292"	2-Bbl.	PBR-B
1960 Edsel	352"	4-Bbl.	PBS-D

① - For identification, refer to serial number prefix stamped on plate located on tramsmission case.

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 MAIN CONTROL VALVE ASSEMBLY PRODUCTION CHANGE:* Beginning approximately April 1, 1959, new main control valve assemblies as indicated below will be used in production.

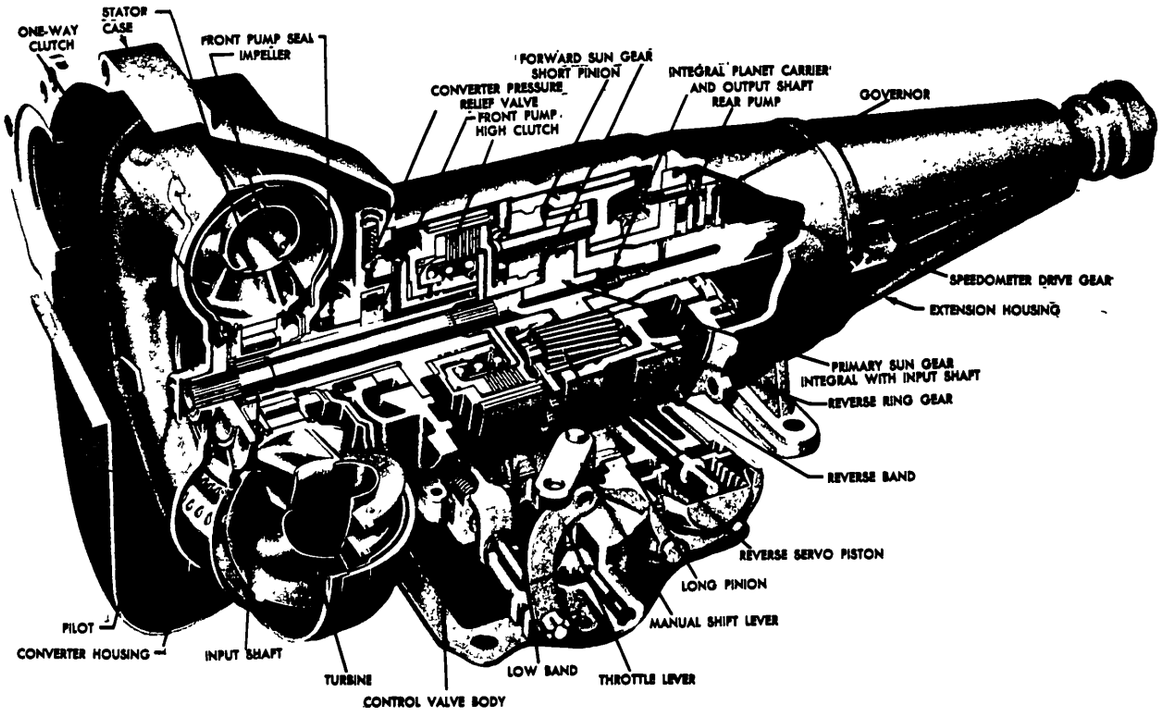
223" Eng. - B9AP-77700-S, identified by "29" stamped on lower body.

292" Eng. - B9AP-77700-T, identified by "30" stamped on lower body.

332" Eng. - B9AP-77700-U, identified by "31" stamped on lower body.

361" Eng. - B9AP-77700-V, identified by "32" stamped on lower body.

The following new parts are included in the new valve assembly: Rear pump check ball, Part No. 372587-S *(CAUTION - Do not install new rear pump check ball in previous control valve assemblies).* Rear pump check valve, Part No. B9AP-7A127-B and spring, Part No. B9AP-7A205-A *(CAUTION - New valve and spring must be used together and only in conjunction with new rear pump check ball).* Fibre front pump check valve, Part front pump check valve, Part No. B9AP-7A202-A and spring, Part No. B9AP-7A205-A *(NOTE - New check valve and spring may be used together in earlier control valve assemblies to prevent damag to main control valve separator plate).* Main oil pressure regulator valve, Part No. B9AP-7A135-B, identified by .080" long step added on inner end of large land, and spring, Part No. B9AP-7A270-A *(NOTE - New valve and spring may be used in earlier control valves to correct "rumble" or "marble" noise in transmission. DO NOT use independent of each other).*



2-SPEED TRANSMISSION SECTIONAL VIEW

►*1959 TRANSMISSION "RUMBLE" OR "MARBLE" NOISE CORRECTION:* To correct this noise in transmission with early type main control valve assembly (see above), install new type main oil pressure regulator valve, Part No. B9AP-7A135-B and spring, Part No. B9AP-7A270-A.

►*1959 TRANSMISSION FRONT OIL PUMP LEAKAGE CORRECTION:* A new bolt assembly, Part No. 372590-S, consisting of a bolt, Bellville type washer, and a vinyl sealing material should be installed. Tighten the new bolt to 17-22 ft. lbs. *CAUTION - Do not re-use the new type bolt once it has been removed from case.*

►*1959 ERRATIC SHIFT CORRECTION (WHEN CAUSED BY DIRT OR FOREIGN MATTER IN GOVERNOR HYDRAULIC CIRCUIT):* The following procedure should be used to properly clean the governor and governor circuit. Raise car so rear wheels are off floor, then shift transmission to "R" (Reverse) and accelerate engine to approximately 15-20 MPH. Repeat this several times. Place selector lever in "L" (Low) and accelerate the engine. Remove car from hoist and road test to check shift quality. If shift is still erratic, again raise car and remove governor inspection plate and governor, then install inspection plate only. Place selector lever in "D" (Drive) or "D1" (Drive 1) and allow rear wheels to turn for 10 seconds at idle speed. Shift into "N" (Neutral) and turn off engine. Remove inspection plate, then disassemble, clean and install the governor and inspection plate. Road test car for shift quality.

►*1959 TRANSMISSION FRONT & REAR SERVO COVER LEAKAGE CORRECTION:* New, thicker gaskets, Part No. B9A-77357-A1 (223" Eng.); B9A-77357-B1 (292" Eng.); B9A-77357-C1 (332" & 352" Engs.) should be installed in front servo. Install Part No. B9A-77407-A1 (All Models), in front servo.

►*1959 PLANET GEAR SPACER PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A new sintered iron spacer (silver metallic color), Part No. B9A-77182-A replaces the former steel spacer (black) in production and for service replacement. As there is a difference in weight between the early steel spacer and later sintered iron spacer, it is very important that these spacers not be mixed in any one transmission. All spacers in a transmission must be the same material.

►*1959 DELAYED REVERSE GEAR ENGAGEMENT (WHEN CAUSED BY REAR SERVO PISTON STICKING IN BORE CORRECTION):* To lessen the possibility of of the rear servo piston dragging in its bore, install seal ring, Part No. B9A-77362-BUP (same seal as used in front servo of the "PBR-A" transmission used with 292" Engines). *NOTE - B ginning with transmission serial numb r 32425, the smaller diam ter s al ring will be us d in production.*

CONTINUED ON NEXT PAGE

Form 66 B

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (Continued)

►*1959 TRANSMISSION CONVERTER ASSEMBLY PRODUCTION CHANGE (223" & 292" ENGINES):* A new converter, Part No. B9AP-7902-A, identified by letter "C" stamped on outside of impeller housing is being used in later production. The new converter has an aluminum thrust washer and a bronze faced steel back thrust washer at rear of stator in place of the two aluminum thrust washers formerly used.

►*ENGINE OVERSPEEDING CAUTION: Do not operate engine at speeds in excess of 2500 RPM while transmission selector lever is in "N" (Neutral), "P" (Park), or "R" (Reverse). Force of oil in front clutch will cause a build-up of hydraulic pressure which can result in partial clutch application with damage to clutch plates.*

►*1960 (EARLY) FALCON HARD OPERATING ACCELERATOR PEDAL CORRECTION & DASHPOT ADJUSTMENT CHANGE:* On cars built before Nov.16, 1959, install spring, Part No. CODD-9737-D to correct this condition. Later cars have the spring installed in production. On later cars and all early cars on which the new spring has been installed, increase the anti-stall dashpot clearance from .060-.090" to .130-.150".

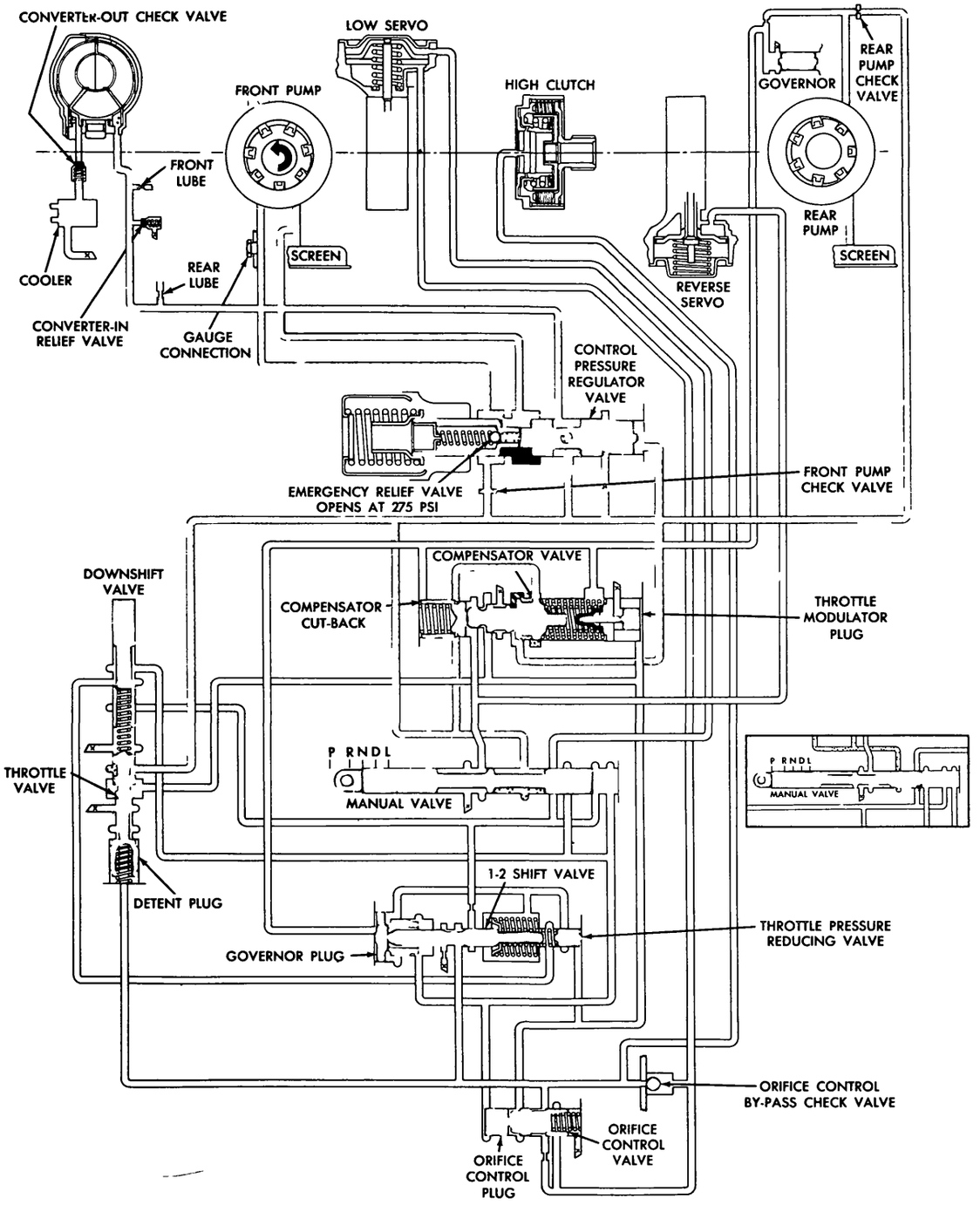
►*1960 FRONT PUMP CHECK VALVE & SPRING PRODUCTION CHANGE (To Correct grooving of Main Control Valve Separator Plate):* A new fibre front pump check valve, Part No. B9AP-7A202-A and spring, Part No. B9AP-7A205-A, are being used in production on main control assemblies identified by the numbers "29", "30", "31" & "32" and may be used on previous assemblies to prevent grooving of the separator plate caused by the previous steel check valve. When installing the new valve, it will not be necessary to replace the separator plate unless grooves in plate are directly across the port. Remove all burrs and high spots when installing check valve.

►*1960 COMET AUTO. TRANS. NO. 1-2 UPSHIFT CORRECTION:* This condition may be caused by an improperly seated clutch check ball resulting from burrs and/or distortion in relief ball bore. To correct, install a new clutch piston assembly, Part No. CODP-7A262-A identified by a January or later date. *NOTE - This replacement should be made only after regular diagnosis procedures have ruled out other possible causes for 1-2 upshift failure.*

►*1960 COMET DELAYED INITIAL ENGAGEMENT CORRECTION:* Check front pump stator to determine that a "drain-back" valve is included in the assembly by inserting a wire through the 5/32" diameter hole adjacent to pump rotor and feeling for spring tension. The spring coils will also be visible through rear lube hole in support. To correct, install a new front pump stator support. *NOTE - Make sure the new support has a check valve installed.*

►*1960 FRONT PUMP SLIPPER SPRING INSTALLATION CAUTION:* Two different front pump rotors are used in production, each of which requires different slipper springs as follows: On rotors with slipper spring pockets, use the longer slipper spring (25/32" free height), Part No. B9A-77827-A. On rotors without slipper spring pockets, use the shorter spring (.630" free height), Part No. COAP-7A498.

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2-SPEED AUTOMATIC TRANSMISSION HYDRAULIC CIRCUITS

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (C ntinued)

►*1960 REAR PUMP PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* In later production rear pumps, two slippers were omitted. This change does not affect operation of rear pump or transmission and it is not necessary to install the omitted slippers at time of overhaul. When assembling a pump having omitted slippers, make sure that slippers are placed on rotor so open pockets in rotors are approximately 180° apart.

DESCRIPTION

These two-speed automatic transmissions consist of a torque converter and a 2-speed planetary type transmission that provides automatic operation in "D" range. Other ranges are controlled manually. A single multiple disc clutch and two servo operated bands provide "high", "low", and "reverse" control of the transmission. With selector lever in "P" (Park) position, a manually operated pawl engages teeth in planet pinion carrier and locks output shaft against rotation. Transmission fluid is directed through an oil cooler located in lower end of radiator on Edsel & Ford models. Transmissions on other models are air-cooled.

OPERATION

With transmission selector lever in "D" (Drive) range (car stopped), the "low" band is applied and transmission is in first speed. As car speed is increased, rear pump pressure increases and causes the "low" band to release and the "high" clutch to apply, placing the transmission in second speed. At speeds below 55 MPH, the transmission can be downshifted (Kickdown) from second to first by depressing the accelerator pedal to the floor. When selector lever is placed in "R" (Reverse) position, both the "low" band and "high" clutch are released, and the "reverse" band is applied, causing the car to move rearward. *CAUTION - There are no automatic inhibitors for "L" or "R" in the transmissi n which means it is possible to shift to either "L" or "R" at any sp ed. Accidental shifts are prev nted by gate typ stops requiring the lifting of sel ctor l v r prior to shifting to either of these positions.*

LUBRICATION

Check fluid level every 1000 miles, drain and refill every 24,000 miles.

R c mmended Fluid - Automatic Transmission Fluid Type "A" or Automatic Transmission Fluid Type "A" suffix "A".

Checking Fluid L v l: With parking brake applied, engine at normal operating temperature, and car standing on a level floor, shift selector lever through all positions, then place selector lever in "P" (Park) position. Check fluid level on dipstick. Add sufficient fluid through filler tube to bring level to "F" (Full) mark on dipstick. *CAUTION - Do not overfill transmission.*

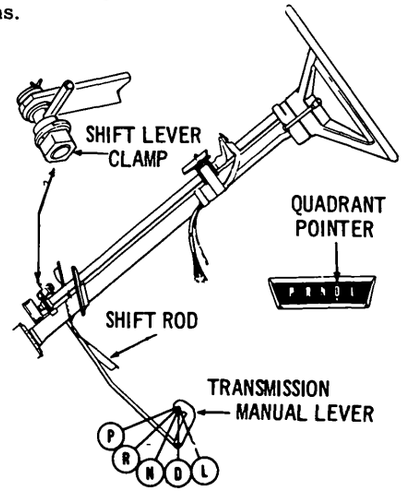
Capacity - 6¼ qts. (Comet & Falcon); 10½ qts. (1959 Edsel & Ford 332", 352" & 361" Engs.); 10 qts. (1959 Edsel & Ford 223" & 292" Engs.); 9 qts. (1960 Edsel & Ford 223" & 292" Engs.); 10 qts. (1960 Edsel & Ford 352" Eng.).

Draining & Refilling: Remove cover from lower front side of converter housing and remove one converter drain plug. Rotate converter 180° and remove other plug, then remove drain plug from oil pan. After draining is completed, remove and clean oil pan and screen. Reinstall oil pan and screen using a new gasket. Tighten oil pan drain plug to 10-15 ft. lbs. Install drain plugs in converter and tighten to 20-28 ft. lbs., then install converter cover. Add 4 qts. of Automatic Transmission Fluid Type "A" and run engine at idle speed for about 2 minutes, then add 2 qts. (Comet & Falcon); 4 qts. (Others) more fluid. Run engine at fast idle (1200 RPM) until normal operating temperature is obtained. Shift selector lever through all positions, then place in "P" (Park) position and check fluid level on dipstick. Add sufficient fluid to bring level to "F" (Full) mark on dipstick. *CAUTION - Do not overfill transmission.*

ADJUSTMENT

LINKAGE ADJUSTMENT: Throttle Linkage Adjustment - *See CARBURETOR on car model pages.*

Manual Linkage: With engine stopped, loosen shift lever clamp at lower end of steering column so that shift rod is free to slide in clamp. Position selector lever so pointer lines up over "D" (Drive). *NOTE - Lever must be held against quadrant stop (between "D" & "L") during linkage adjustment.* Position transmission detent lever on transmission into "D" (Drive) detent position (second from rear), then tighten clamp on shift rod. Check pointer alignment for all selector lever detent positions.



MANUAL LINKAGE ADJUSTMENT
1959-60 FORD
1959 EDSEL

NEUTRAL SAFETY SWITCH ADJUSTMENT: Check starter circuit in all selector lever positions. The circuit must be open in all positions except "N" (Neutral) & "P" (Park). To adjust, loosen switch-to-steering column attaching screws, then shift selector lever to "N". Rotate switch as far as it will go in either direction, then insert a .060" pin through switch housing at gauge pin hole. *NOTE - This hole will be located at end of switch housing or on the upper side of housing depending upon type of switch used.* Hold pressure against gauge pin and rotate switch in the free rotation direction until pin engages hole in plate. With gauge pin through housing and into plate, tighten attaching screws and remove gauge pin. Check starter circuit in all selector lever positions. Starter must operate with selector lever in "N" (Neutral) or "P" (Park).

1960 COMET, FALCON & EDSEL

NEUTRAL SAFETY SWITCH ADJUSTMENT: Check starter circuit in all selector lever positions. The circuit must be open in all positions except "N" (Neutral) and "P" (Park). To adjust, loosen screws securing switch to mounting bracket on lower end of steering column and rotate switch as required to obtain starter operation in "N" or "P" positions. Tighten switch screws.

BAND ADJUSTMENT: Adjust bands every 24,000 miles (Ford), check each time oil pan is removed and adjust when necessary (Edsel).

Front Band (Low Range): Loosen locknut on adjusting screw on left front side of transmission case, then tighten adjusting screw with Tool T59P-7730-A (Ford) or Tool 7345 (Edsel) until tool handle snaps (breaks) over center. *NOTE - These tools are pre-set torqu wrenches which overrun when torque on screw reaches 10 ft. lbs.* Back off the adjusting screw **exactly tw turns.** Hold adjusting screw at this position and tighten locknut to 35-40 ft. lbs.

Rear Band (Reverse Range): Drain transmission and remove oil pan and screen. Loosen rear servo piston rod locknut and adjusting nut, then install tool as follows: If Ford Tool T59P-77409-A used, place tool on rear servo rod so two forks straddle band apply lever. *NOTE - The inner fork must engage flat on servo pist n rod. The outer fork is a ¼" spacer and must be inserted between piston rod seat and adjusting nut.* If Edsel Tool 7355-A used, insert tool between adjusting nut and piston rod-to-actuating lever seat, with opposite end of tool resting on raised boss on control valve assembly. With wrench T59P-77423-A (Ford), or No. 7355-B (Edsel), tighten adjusting nut until wrench handle snaps (breaks) over center. *NOTE - These tools are pre-set torque wrenches which overrun when torque on screw reaches 45-50 inch pounds.* Back off adjusting nut **exactly tw turns.** Hold adjusting nut at this position and tighten locknut to 15-18 ft. lbs. Remove tools from servo piston rod. Install oil pan and screen using a new gasket. Fill transmission with Automatic Transmission Fluid Type "A".

TESTING

STALL TEST: With engine at normal operating temperature, install tachometer to engine and place it so it can be read from drivers seat. Apply service and parking brakes, then place transmission selector lever in either

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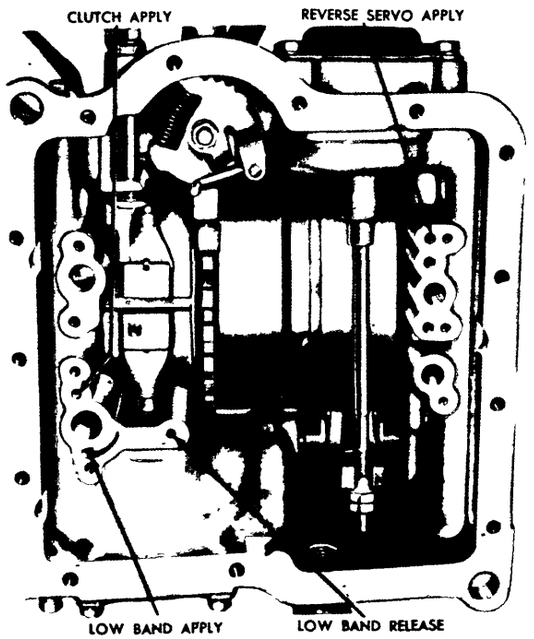
COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (Continued)

"D", "L" or "R" ranges. Depress accelerator pedal to floor with a steady pressure. *CAUTION - Hold accelerator at wide open position only long enough for tachometer to stabilize. Between tests, allow at least 2 minutes at 1200 RPM with transmission in "N" (Neutral).* Tachometer reading should be as indicated in table below. To determine if front or rear band is slipping, place selector lever in "D" or "L" position, then repeat stall test. If stall test is normal, band is not slipping. Repeat this test with selector lever in "R" range. Slippage will be indicated by an increase in engine RPM.

ENGINE STALL SPEEDS

Engine	Low Limit - RPM -	High Limit
1959 Edsel & Ford 223" 6 Cyl.	1390	1590
1959 Edsel & Ford 292" V8	1620	1820
1959 Edsel & Ford 332" V8	1560	1760
1959 Ford 352" V8	1660	1860
1959 Edsel 361" V8	1710	1910
1960 Comet 144" 6 Cyl.	1660	1860
1960 Falcon 144" 6 Cyl.	1740	1940
1960 Ford & Edsel 223" 6 Cyl.	1370	1570
1960 Ford & Edsel 292" V8	1590	1790
1960 Ford 352" V8 ①	1625	1825
1960 Ford 352" V8 ②	1645	1845
1960 Edsel 352" V8	1640	1840

① - 2-Bbl. Carb. ② - 4-Bbl. Carb.



AIR PRESSURE TEST POINTS

AIR PRESSURE TESTS (With Transmission in Car): Raise car on hoist, then remove transmission oil pan and control valve assembly. Proceed as follows:

Clutch Apply: Apply pressure to front clutch passage (see illustration). A dull thud indicates that clutch is operating. Retain air pressure in passage for several seconds to check for leakage.

Low & Reverse Servos: Apply pressure to "Low Band Apply" and "Reverse Band Apply" holes in case (see illustration). Band operation can be observed.

SHIFT TEST: Shift points and low gear operation should be as indicated in table below. *NOTE - These speeds are approximate.*

CONTROL PRESSURE RISE TEST: With engine and transmission at normal operating temperature, connect Pressure Gauge T57L-77820 (300 lbs.) or equivalent in pressure take-off hole on left side of transmission case (Exc. 1960 Edsel & Comet), at pressure checking tube at rear of engine adjacent to firewall (1960 Edsel & Comet). Apply brakes and proceed as follows: **1)** In the "D", "L", and "R" selector lever positions, control pressure should rise from 48-75 lbs. at engine idle speed to 170-205 lbs. at wide open throttle (1959 Models); from 46-56 lbs. to 77-84 lbs. at 1000 RPM (1960 Ford & Edsel); from 40-48 lbs. to 135-155 lbs. (1960 Comet); from 46-56 lbs. to 170-192 lbs. at wide open throttle (1960 Falcon). If pressure rises do not occur, the probable causes are: Throttle linkage, throttle and compensator pressures, pump capacity, or excessive internal leakage. *NOTE - B for control valve body or transmission is removed for inspection, check the following:*

2) Check pressure rise in "D", "L" and "R". If pressure rise is normal in any one position, the throttle linkage, throttle compensator pressure, and pump capacity are probably normal. The probable cause of no pressure rise is leakage in hydraulic system upstream from the manual valve.

3) To check throttle linkage, disconnect throttle compensator rod clevis from accelerator shaft and place transmission selector lever in "P" (Park) position. Adjust engine speed to 1000 RPM, then pull upward (Comet & Falcon), push downward (Ford & Edsel) on throttle control rod and check pressure. Pressure should rise to 170-205 lbs. (1959 Edsel & Ford); 170-192 lbs. (1960 Falcon, Ford & Edsel); 135-155 lbs. (Comet). If control pressure rises as indicated, pump capacity, main system linkage, throttle and compensator pres-

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GOVERNOR PRESSURE SPECIFICATIONS 1959 MODELS

SHIFT THROTTLE	AXLE RATIO	SHIFT SPEED (MPH) 1-2 Minimum	1-2 Thru Detent	2-1 Thru Detent	2-1 Closed
332" & 352" Engs.	2.91-1	16-18	55-60	50-55	6-14
361" Eng.	2.91-1	16-18	55-60	50-55	6-14
292" Eng.	3.10-1	16-18	52-56	46-51	6-13
332", 352" & 361" Engs.	3.10-1	15-17	52-56	47-51	6-13
223" & 292" Eng.	3.56-1	14-16	45-49	41-44	5-11
361" Eng.	2.69-1	16-18	55-60	50-55	6-14

GOVERNOR PRESSURE SPECIFICATIONS 1960 MODELS

SHIFT THROTTLE	AXLE RATIO	SHIFT SPEED (MPH) 1-2 Minimum	1-2 Thru Detent	2-1 Thru Detent	2-1 Closed
Comet 144" Eng.	3.56-1	10-15	40-50	40-50	5-15
	3.56-1	10-16	41-47	40-45	6-12
Falcon 144" Eng.	3.10-1	12-18	48-54	46-52	7-14
Ford 223" & 292" Engs.	3.56-1	13-16	48-52	42-47	5-11
Ford 292" Eng.	3.10-1	15-18	55-60	48-54	6-13
Ford 352" Eng.	3.10-1	15-17	50-57	46-53	6-13
Ford 352" Eng.	2.91-1	16-18	53-58	51-57	6-14
Edsel 6 Cyl.	All	13-16	48-52	Below 45	5-11
Edsel V8	All	15-18	50-60	Below 55	6-14

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (C ntinued)

sures, and throttle linkage are normal. If pressure does not rise as throttle rod is moved, raise and lower throttle rod and feel for compression of throttle valve spring. Check for loose throttle levers on shaft by pulling (Comet & Falcon); pushing (Edsel & Ford) rod firmly against stop inside transmission.

►*NOTE: If car is driven with pressure gauge attached, th gaug reading will suddenly fall off from about 70 lbs. to less than 5 lbs. at 50 MPH. This pressure drop is normal.*

GOVERNOR PRESSURE TEST: Attach Pressure Gauge T57L-77820-A at connection on left side of transmission case, then place gauge so it can be read inside the car. Check gauge reading at stall (see table for pressure limits). Check control pressure on the road at speeds indicated in table, **at full throttle.** *NOTE - Hold car to the exact speed indicated by applying service brakes.* Allow sufficient time between tests for transmission, engine, and brakes to cool. If gauge readings do not drop with road speed, the governor or compensator valve may not be operating properly. *NOTE - If readings were normal (car standing) at idle and stall, the compensator valve is operating properly and the trouble is indicated to be lack of governor pressure at compensator valve.*

SHIFT SPEED SPECIFICATIONS 1959 MODELS

ENGINE	AXLE RATIO	GOVERNOR (Control) PRESSURE (At Wide Open Throttle)		
		10 MPH	20 MPH	30 MPH
223" & 292"	3.56-1	159 lbs.	96 lbs.	71 lbs.
	3.10-1	164 lbs.	116 lbs.	71 lbs.
332" & 352"	3.10-1	163 lbs.	116 lbs.	77 lbs.
	2.91-1	165 lbs.	123 lbs.	77 lbs.

SHIFT SPEED SPECIFICATIONS 1960 MODELS

CAR & ENGINE	AXLE RATIO	Governor (Control) Pressure (At Wide Open Throttle)		
		10 MPH	20 MPH	30 MPH
Comet & Falcon 144"	3.10-1	160 lbs.	104 lbs.	72 lbs.
	3.56-1	154 lbs.	82 lbs.	72 lbs.
Ford & Edsel 223"	All	157 lbs.	97 lbs.	67 lbs.
Ford & Edsel 292"	All	163 lbs.	117 lbs.	67 lbs.
Ford & Edsel 352"	All	165 lbs.	124 lbs.	72 lbs.

TROUBLE SHOOTING & DIAGNOSIS

HARSH INITIAL ENGAGEMENT IN "D", "L", OR "R": Check engine idle and fluid level.

SLIPS OR CHATTERS IN "D" OR "L": Check fluid level, throttle linkage, control pressure, low band adjustment. Make an air pressure check. Inspect for loose or worn engine or transmission mounts. Check operation of low servo and band. Check for leakage in low servo apply circuit.

SLIPS OR CHATTERS IN "R": Check fluid level, throttle linkage, control pressure, reverse band adjustment. Make an air pressure check. Inspect for worn or loose engine mounts. Check operation of reverse servo. Check for leakage in reverse servo apply circuit.

CREEPS EXCESSIVELY IN "D": Engine idle speed too fast.

ENGINE OVERSPEEDS DURING 1-2 SHIFT: Check fluid level. Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment, control pressure, low band adjustment. Make an air pressure check. Check control valve body for malfunction. Check for leakage in clutch apply or low servo release circuit. Check planetary gears.

MOMENTARY LOCKUP DURING 1-2 SHIFT: Check fluid level, throttle linkage, control pressure and low band adjustmeht. Low servo and band not operating properly. Check high clutch for malfunction. Check for possible broken low servo return spring.

SEVERE 2-1 SHIFT DURING COAST-DOWN: Check engine idle speed and throttle linkage. Check control valve body for malfunction. Make a control pressure check.

NO 1-2 SHIFT IN "D": Check fluid level. Check fluid odor for possibly burned clutch plates. Check manual linkage adjustment. Check for improperly operating governor. Check for leakage in control pressure main circuit. Check high clutch and low servo and band for improper operation.

DELAYED 1-2 UPSHIFT: Check throttle linkage. Check for improperly operating governor. Check for leakage in control pressure main circuit.

SLIPS CONTINUOUSLY AFTER 1-2 SHIFT: Check fluid odor for possibly burned clutch plates. Check throttle linkage adjustment and fluid level. Make a control pressure check and an air pressure check. Check high clutch for improper operation and for leakage in clutch apply or low servo release circuit.

NO 2-1 FORCED DOWNSHIFT (KICKDOWN): Check throttle linkage adjustment. Check control valve body for malfunction. Check for leakage in control pressure main circuit.

NO 2-1 SHIFT DURING COAST-DOWN: Check for malfunction in control valve body or governor.

FLUID FORCED OUT FILLER TUBE OR VENT: Check fluid for contamination by engine coolant. Transmission external vent plugged. Check fluid for aeration.

TRANSMISSION OVERHEATS: Check control pressure. Check oil cooler flow.

ACCELERATION NORMAL (MAXIMUM SPEED APPROXIMATELY 45 MPH): Converter one-way clutch not operating properly.

ACCELERATION VERY POOR (OPERATION ABOVE 30 MPH AT STEADY THROTTLE IS NORMAL): Converter one-way clutch not operating properly.

ENGINE DOES NOT START BY PUSHING CAR: Check fluid level and manual linkage adjustment. Check for malfunction in control valve body. Rear pump not operating properly. Check for leakage in control pressure main circuit.

PARKING LOCK DOES NOT HOLD OR BINDS: Check manual linkage adjustment. Check parking linkage.

MINOR REPAIRS (TRANSMISSION IN CAR)

Control Valve Body: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove six bolts attaching control valve body to transmission case, then lower control valve body and work the manual shift valve link out of manual valve.

Installation - Position control valve assembly in transmission case, then connect manual valve shift link to manual valve, and position the throttle valve lever between downshift valve and the stop plate on upper valve body. Install control valve attaching screws and tighten to 8-10 ft. lbs. Install fluid screen and oil pan, using a new gasket. Tighten attaching bolts to 10-13 ft. lbs. Install drain plug and tighten to 10-13 ft. lbs. Refill transmission with recommended fluid and adjust throttle linkage and manual linkage.

Front Servo Piston Assembly: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove fluid screen retaining clip and screen. Remove main control valve assembly (see above), and disconnect fluid filler tube from transmission case. Remove two opposing bolts from front servo cover, then install two longer bolts (5/16" - 18 x 2") and nuts to hold cover in position against servo spring tension while removing remaining servo cover bolts. Remove servo cover by slowly unscrewing nuts on long bolts until all servo spring tension is released from cover. Remove the long bolts, nuts and servo cover. *NOTE - Before removing s rvo cover, note position of front band actuation struts. This will aid in reassembly in case struts are dislodg d.* Remove servo piston assembly and servo spring from transmission case and remove servo piston seal ring from piston.

Installation - Inspect front servo piston for nicks, burrs and a warped or bent condition. Inspect servo piston bore for burrs, wear, and scoring. Install new seal ring on servo piston and install servo piston spring and piston assembly in servo bore with air bleed hole toward top of case. Clean servo cover and mounting face and position new "O" ring seal on cover, then place servo cover on servo piston. Retain servo cover in place with the two long bolts used at disassembly (5/16" - 18 x 2"), and nuts. Pull servo cover partially into position by turn the nuts on long bolts to compress servo spring. Install regular cover attaching bolts in the open threaded holes. Remove both long bolts and nuts and install remaining two cover attaching bolts. *NOTE - Check position of front band actuating strut while tightening servo cover bolts to assure that s rvo piston rod enters actuating strut properly. If struts hav be n dislodged, loosen front s rvo band adjusting scr w and position them correctly.* Tighten servo cover

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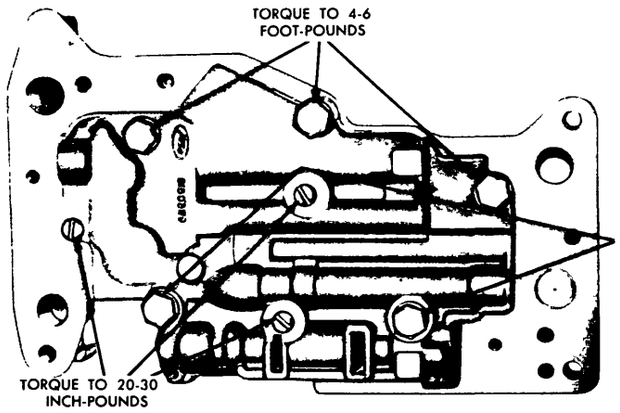
COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (Continued)

attaching bolts evenly to avoid distorting cover, then when cover is firmly seated, tighten bolts to 12–15 ft. lbs. *CAUTION - Use care when positioning "O" ring seal and servo cover to prevent future leakage.* Install main control valve assembly, then connect manual shift valve link to manual valve and position throttle lever between downshift valve and stop plate on upper valve body. Tighten control valve attaching bolts to 8-10 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install fluid screen and transmission oil pan and refill transmission (see "Draining & Refilling" above). Adjust throttle and manual linkage.

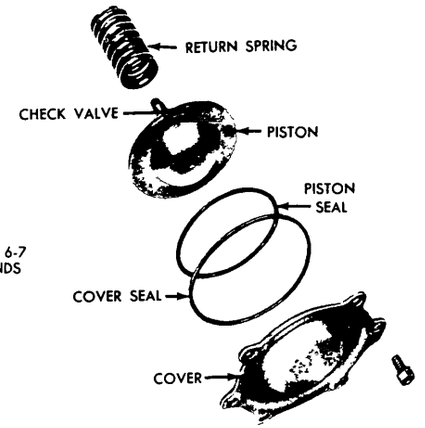
►*FRONT SERVO COVER GASKET REPLACEMENT:* Remove low band adjusting screw locknut and tighten adjusting screw with wrench, Tool T59P-77370-A (Ford), Tool 7345 (Edsel) until wrench overruns. Loosen cover capscrews approximately two turns each, then tighten band adjusting screw until wrench overruns. Repeat this procedure until servo cap is removed (low band strut will be seated against bottom of servo casting and will be held in place). To install cover, use two 5/16" - 18 x 1¼" hex head bolts in place of the regular bolts, then place servo cover over piston and start the two bolts. Tighten bolts snugly to bring cover into contact with piston and to position piston stem in band strut (piston stem will be back in position in cup face of band strut). Loosen band adjusting screw two turns, then tighten servo cover capscrews approximately two turns or until they are snug (band will again be tight against drum). Repeat this procedure until cover is drawn close enough so that regular cover capscrews can be installed in rest of cover holes, then remove the two temporary bolts and replace them with regular bolts. Continue to repeat the above procedure until cover is fully installed. Install low band adjusting screw locknut and adjust the band (see "Adjustments" above).

Rear Servo Piston Assembly: Removal - Disconnect accelerator pedal connecting rod, then raise car and remove transmission oil pan, fluid screen and main control valve. Remove four bolts and remove rear servo cover, "O" ring seal, and servo piston spring. *CAUTION - Servo cover is spring loaded.* Remove locknut, adjusting nut, and half-ball rod seal from rear servo piston rod. Remove rear engine mount from under transmission housing, then lower extension onto frame crossmember. Remove piston rod from transmission case. Remove servo piston and seal ring from piston bore. *NOTE - Push outward on piston stem from inside transmission case or apply air pressure to reverse servo apply passage in transmission case to remove piston.* Remove seal ring from piston.

Installation - Inspect piston, stem and rod for nicks or burrs. Check rod for wear or for a bent or warped condition. Inspect piston bore, for burrs, wear and scoring. Install new seal on piston, then install piston assembly into bore in case. Push piston to bottom of bore. Install piston rod through piston, then position band operating lever and install the half-ball rod seal, adjusting nut, and locknut loosely. Raise transmission from frame crossmember and install rear engine mount. Install new "O" ring seal on servo cover, then install servo cover, maintaining pressure against cover while tightening the attaching bolts. Tighten bolts slowly and evenly until cover is firmly seated, then tighten bolts to 12-15 ft. lbs. Adjust front and rear bands (see "Adjustments" above). Install main control valve assembly, fluid screen, transmission oil pan, and drain plug. Refill transmission (see "Draining & Refilling" above). Connect accelerator rod and adjust pedal to 3½" above floor. Adjust throttle and manual linkage (see "Adjustments" above).



VALVE BODY TIGHTENING TORQUES

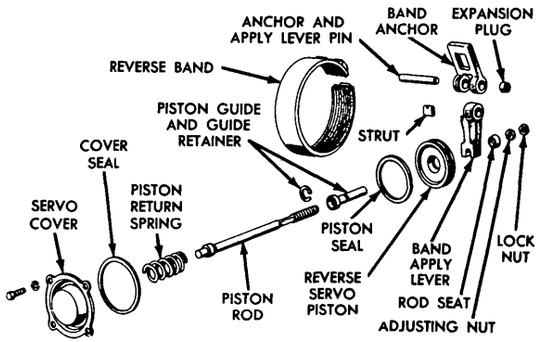


FRONT SERVO ASSEMBLY

EXTENSION HOUSING & GOVERNOR: Removal - Raise car and drain fluid from transmission, then disconnect driveshaft at rear universal and remove driveshaft. Remove bolts attaching rear engine support to transmission, then use a transmission jack and raise transmission until extension housing clears rear engine support and frame crossmember. Remove extension housing from transmission case. To remove governor, remove snap ring from output shaft and remove governor and governor drive ball. *NOTE - Replace output shaft seal if worn or damaged.*

Installation - Reverse removal procedure.

Extension Housing Bushing and/or Seal Replacement: With drive shaft and universal joint assembly removed from transmission, proceed as follows: Remove bushing and seal together with Tool 7000-AF (Comet); T60K-7691-A (Falcon); T52L-7000-GAE (Ford); 7000-G (Edsel). *CAUTION - Do not damage spline seal when tool is installed.* Install new bushing with Tool 7657-F (Comet); T60K-7697-G (Falcon); T52L-7000-HAE (Ford); 7000-HF (Edsel) To remove seal only, use seal puller 1175-AE or W (All models). To install seal, use Tool 7657-G (Comet); T60K-7657-A (Falcon); T57P-7657-A (Ford); 7657-F (Edsel). Coat outer diameter of seal with a non-hardening sealing compound



REAR SERVO & BAND ASSEMBLY

TRANSMISSION REMOVAL & INSTALLATION FORD & EDSEL 1959 MODELS

REMOVAL: Transmission and converter are removed as an assembly.

1) Place car on a hoist (do not raise), then pull back floor mat and remove the two upper converter housing-to-engine attaching bolts. Raise car and remove cover from bottom of converter housing.

2) Drain converter and transmission (see "Draining & Refilling" above). Disconnect drive shaft at pinion flange and remove drive shaft. Disconnect manual and throttle linkage at transmission and speedometer cable at extension housing.

3) Disconnect oil cooler lines at transmission, then loosen the cooler line clamp at engine block and remove lines from clamp. Disconnect oil filler tube at transmission case. Remove starter cable from starter, then remove starter and starter seal from converter housing.

4) Disconnect parking brake cable at equalizer. Remove two engine rear support bolts from extension housing, then remove support clamp. Position a transmission

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COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (C ntinued)

jack under transmission and raise it slightly to take weight off crossmember, then support rear of engine in this position with a support bar or stand.

5) Remove crossmember and remove the three bolts attaching converter to flywheel. Remove remaining converter housing-to-engine block bolts. Secure converter to transmission so it will not fall out when transmission is separated from engine, then work transmission off engine block dowels and toward the rear until crankshaft is clear of converter pilot. Remove transmission from car.

INSTALLATION: Install converter in transmission housing and retain in place to prevent it falling out during installation of the assembly.

1) Mount transmission on a jack and position under car, then raise transmission and guide converter housing onto engine block dowels. Install two converter housing-to-engine block bolts. *NOTE - As these bolts are tightened, be certain converter pilot enters crankshaft bore and that the converter drive lugs are aligned with flywheel bolt holes.* Install remaining bolts (except two at the top).

2) Install frame crossmember and engine rear support, then remove engine support bar or stand and lower transmission onto engine rear support and install support bolts.

3) Install starter seal and starter motor and connect starter cable. Install converter housing inspection cover and connect oil cooler lines and filler tube.

4) Connect manual and throttle linkage at transmission and connect speedometer cable. Connect and adjust parking brake cables. Lubricate front universal joint yoke and install drive shaft.

5) Lower car and install two converter housing-to-engine block upper bolts. Fill transmission (see "Draining & Refilling" above), then adjust manual and throttle linkage (see "Adjustments" above).

FORD & EDSEL 1960 MODELS

REMOVAL: Transmission and converter are removed as an assembly.

1) Raise car and drain transmission and converter, then disconnect drive shaft at pinion flange and remove shaft. Install extension housing seal replacer in extension housing seal (s "*Extension Housing Bushing and/or Seal R placem nt*" above for tool number).

2) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable from extension housing. Disconnect oil cooler lines at transmission, then remove lines from clamp at engine block. Disconnect oil filler tube at transmission case. On Edsel, disconnect pressure checking tube at transmission.

3) Remove starter from converter housing and disconnect parking brake cables at the equalizer. Remove two engine rear support bolts from extension housing and remove support clamp.

4) Position a transmission jack under transmission and raise it slightly to take weight off crossmember. Support rear of engine in this position with an engine support bar or stand, then remove crossmember.

5) Remove bolts attaching converter-to-flywheel and remove converter housing-to-engine block bolts. Secure converter to transmission so it will not fall out when transmission is separated from engine, then work transmission off engine block dowel pins and toward rear until converter pilot clears crankshaft. Lower transmission and remove it from car.

INSTALLATION: Reverse removal procedure and note the following: Tighten insulator-to-crossmember bolts to 23-29 ft. lbs. Tighten converter-to-flywheel stud nuts to 23-28 ft. lbs. With transmission completely installed, and filled with fluid, run engine at idle speed and shift selector lever from "N" to "D" and from "D" to "N" at least 10 times to fill low servo release cavity with fluid. Adjust manual and throttle linkage.

COMET & FALCON 1960 MODELS

REMOVAL: Transmission and converter are removed as an assembly.

1) Place car on a hoist (do not raise), then pull back floor mat and remove the two upper converter housing-to-engine attaching bolts. From under the hood, remove bolts attaching throttle linkage bracket to converter housing, then remove starter.

2) Raise car and drain converter and transmission. *CAUTION : Do not attempt to turn flywheel with a wrench on converter-to-flywheel stud nuts.* Disconnect driven shaft at rear axle pinion flange and remove drive shaft. Install extension housing seal replacer in extension housing *(see "Extension Housing Bushing and/or Seal Replacement" above for tool number).*

3) Disconnect manual and throttle linkage at transmission, then disconnect speedometer cable at extension housing. Disconnect oil filler tube (on Comet, disconnect pressure checking tube at transmission).

4) Remove two lower stud nuts attaching rear support insulators to support crossmember, then disconnect parking brake cable rod at equalizer lever. Position a transmission jack under transmission and raise it slightly to take weight off support member, then remove support member.

5) Lower transmission and support rear end of engine, then remove converter-to-flywheel stud nuts and move converter away from flywheel as far as it will go. Remove the two lower converter housing-to-engine block bolts and work converter housing off engine block dowel pins, then work converter pilot out of engine crankshaft. Secure converter to converter housing and lower transmission from car.

INSTALLATION: *See "Ford & Edsel (1960 Models)" above.*

TRANSMISSION DISASSEMBLY

►*DISASSEMBLY & REASSEMBLY CAUTION: Thoroughly clean outside of transmission before disassembly, then clean each part as it is removed, using cleaning solv nt or gasoline. Dry all parts with air, do not use wiping cloths.*

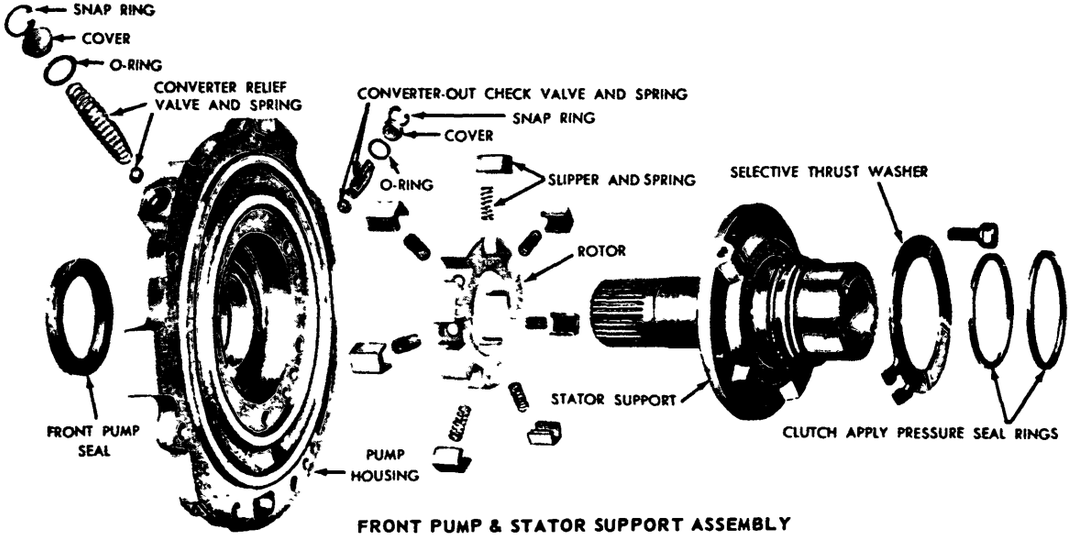
1) Remove converter assembly, then install transmission assembly in a holding fixture.

2) Remove oil pan, fluid screen and main control valve assembly. Loosen the front (low) and rear (reverse) band adjustments 4 turns each, then check transmission endplay.

►*TRANSMISSION ENDPLAY CHECK:* Mount a dial indicator on transmission case so plunger of indicator rests on end of primary sun gear (turbine) shaft. Install extension housing seal replacer or a front universal joint yoke on output shaft spline to align the output shaft. Pry reverse band drum forward with a large screwdriver, and while maintaining a slight forward pressure on ring gear, set dial indicator to zero. Pry clutch drum to rear and record the endplay reading which should be between .020" and .030". Remove dial indicator and tool.

3) Remove extension housing and gasket, then remove rubber spline seal and stop ring from output shaft. Remove governor snap ring, governor, drive ball and oil seal rings from output shaft.

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FRONT PUMP & STATOR SUPPORT ASSEMBLY

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (Continued)

4) Remove front pump and stator support assembly from transmission case, then use a pair of snap ring pliers to remove converter seal ring from primary sun gear (turbine) shaft. Remove clutch assembly from transmission case and remove actuating struts from front band. Align ends of the band with opening in case, then compress band slightly and remove it.

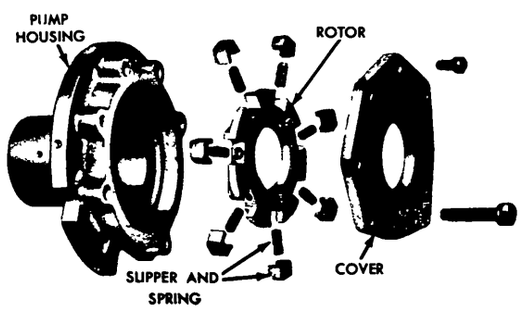
5) Remove primary sun gear and turbine shaft, planetary gears and carrier, and output shaft from transmission case as a single unit. Remove rear drum (internal gear) and thrust washers from case.

6) Remove locknut, adjusting nut, and half-ball rod seat from rear servo rod. Remove rear band actuating strut, then rotate rear band to disengage it from operating linkage and remove it from front of case. Remove rear servo cover, servo spring and rear band operating rod from case. *NOTE - Servo cover is spring loaded. Hold cover against case while removing bolts.* Remove rear servo piston from its bore by applying air pressure to fluid passage in transmission case.

7) Remove two opposite attaching bolts from front servo cover, then temporarily install two longer bolts (5/16"-18 x 2") and nuts. Tighten nuts down against servo cover, then remove remaining servo cover bolts. Loosen nuts on long bolts until servo spring tension is relieved, then remove temporary bolts and nuts. Remove front servo cover, servo piston and spring from bore.

8) Disassemble and remove inner and outer throttle levers, conical spring and "O" ring seal from case. Remove nut and lockwasher from manual lever shaft, then remove detent plate, parking pawl cam plate and connecting spring from shaft. Remove detent plunger, spring, manual lever and shaft, and "O" ring seal from case. Release parking pawl return spring tension and remove parking pawl shaft, parking pawl and return spring.

9) If it is necessary to remove reverse band apply linkage, proceed as follows: Drill a 5/16" hole through center of apply lever shaft expansion plug, then insert a ¼"-20 bolt through drilled hole and thread the bolt into the apply lever shaft. Pull apply lever shaft and expansion plug from case, then remove apply lever and anchor from case.



REAR PUMP ASSEMBLY

TRANSMISSION UNIT OVERHAUL

►*TRANSMISSION BUSHING REPLACEMENT NOTE: The only bushing that is replaceable in the transmission assembly is the extension housing bushing. If excessive bushing wear is found, the part containing the worn bushing must be replaced.*

Front Pump & Stator Support: Disassembly - Disassemble stator support shaft from front pump housing, then inspect clutch drum journal for roughness and wear. Check clearances between clutch apply pressure seal rings and their respective grooves. Clearance should be .0035-.0045". Remove seal rings from clutch drum journal and position them in clutch drum. Check ring gap which should be .002-.009". Inspect clutch drum thrust washer (selective fit) and sun gear shaft bushing in stator support for wear or roughness. Remove pump rotor, slippers, and springs from front pump housing. Inspect housing and slippers for wear. *NOTE - Slipper springs may be replaced individually, if required. Pump body, rotor, and slippers are a select fit and must be replaced as a complete unit.* Remove converter pressure relief valve and converter drain check valve from pump housing. Inspect converter hub bushing and oil seal in front housing. To install oil seal, use Tool T59P-77837-A.

Reassembly - Place rotor in pump housing with flat side up. As the slippers and slipper springs are installed between rotor and pump housing, make sure each spring bottoms in spring holes in slipper and rotor. Place stator support in pump housing and install the five bolts. Tighten to 12-15 ft. lbs. Check pump for rotation by placing it on converter pump drive hub in normal running position and turning the pump housing.

Rear Pump: Disassembly - Remove cover plate, rotors, slippers, and springs. Inspect output shaft support bushing for wear. Inspect inside of housing for wear in governor pressure seal ring area. Position oil seal rings in housing and check ring end gap which should be .001-.006". Check governor pressure orifice (.054" diameter) for obstruction. Inspect slippers and pump housing for wear. *NOTE - Slipper springs may be replaced individually if required. Pump body, rotor, and slippers are a select fit and must be replaced as an assembly.*

Reassembly - Place rotor in pump housing with flat side up, then rotate rotor so that flat surface on inside diameter is toward bottom of pump housing. Install slippers and springs between rotor and housing with marked side of each slipper upward. Place cover on pump housing and tighten screws to 50-60 inch pounds. Install pump on output shaft in its normal running position and check for free rotation by turning pump housing. *CAUTION - Before removing pump from output shaft, make sure that flat surface on pump rotor inside diameter is toward bottom of pump housing.*

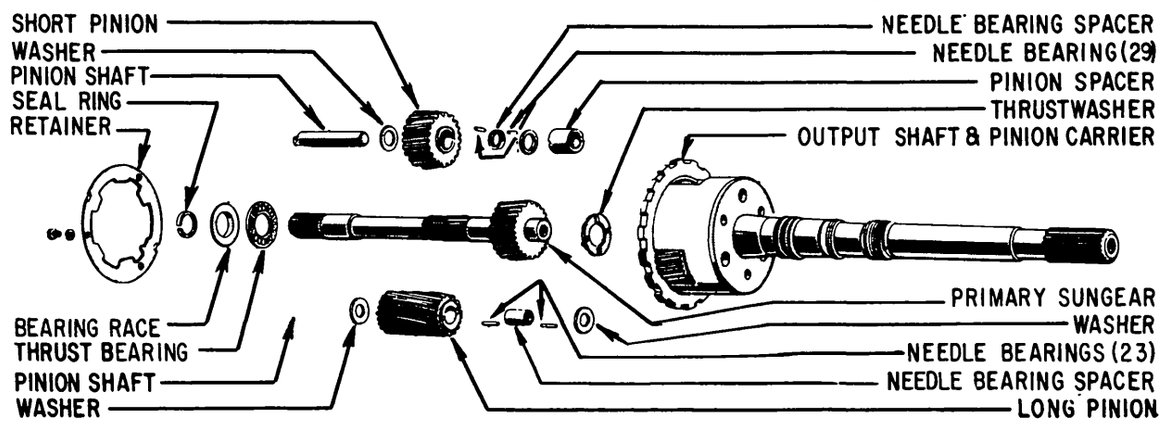
Governor: Disassembly - Remove screws attaching governor end plate, then remove end plate and governor valve from housing. Inspect governor valve and bore for nicks, burrs, and wear. *NOTE - Crocus cloth may be used to polish the valve. DO NOT round sharp edges of the valve.*

Reassembly - Install governor valve in bore and check for free movement (valve should fall of its own weight when dry). Install end plate on housing and tighten screws to 20-30 inch pounds.

High Clutch: Disassembly - Remove snap ring retaining forward sun gear and flange in clutch drum and remove gear and flange. Remove clutch hub and clutch plate pack, then compress clutch return spring with Tool 77515-A in an arbor press, and remove retaining snap ring, spring retainer, and spring. Place clutch drum on the completely assembled stator support shaft and front pump housing. Apply air pressure to clutch apply passage to force piston from clutch drum. Remove clutch piston outer and inner seal rings. Inspect clutch plates (composition and steel) for wear, damage, or distortion. *NOTE - All clutch plates should be flat. If there is any perceptible dish they should be replaced.* Inspect bushing in clutch drum for wear. If excessive wear is apparent, replace clutch drum assembly.

Reassembly - Install new inner and outer clutch piston seal rings in clutch drum and on piston. Lubricate seal rings with transmission fluid and install piston in clutch drum. Position return spring and spring retainer on

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PINION CARRIER & PRIMARY SUN GEAR ASSEMBLY

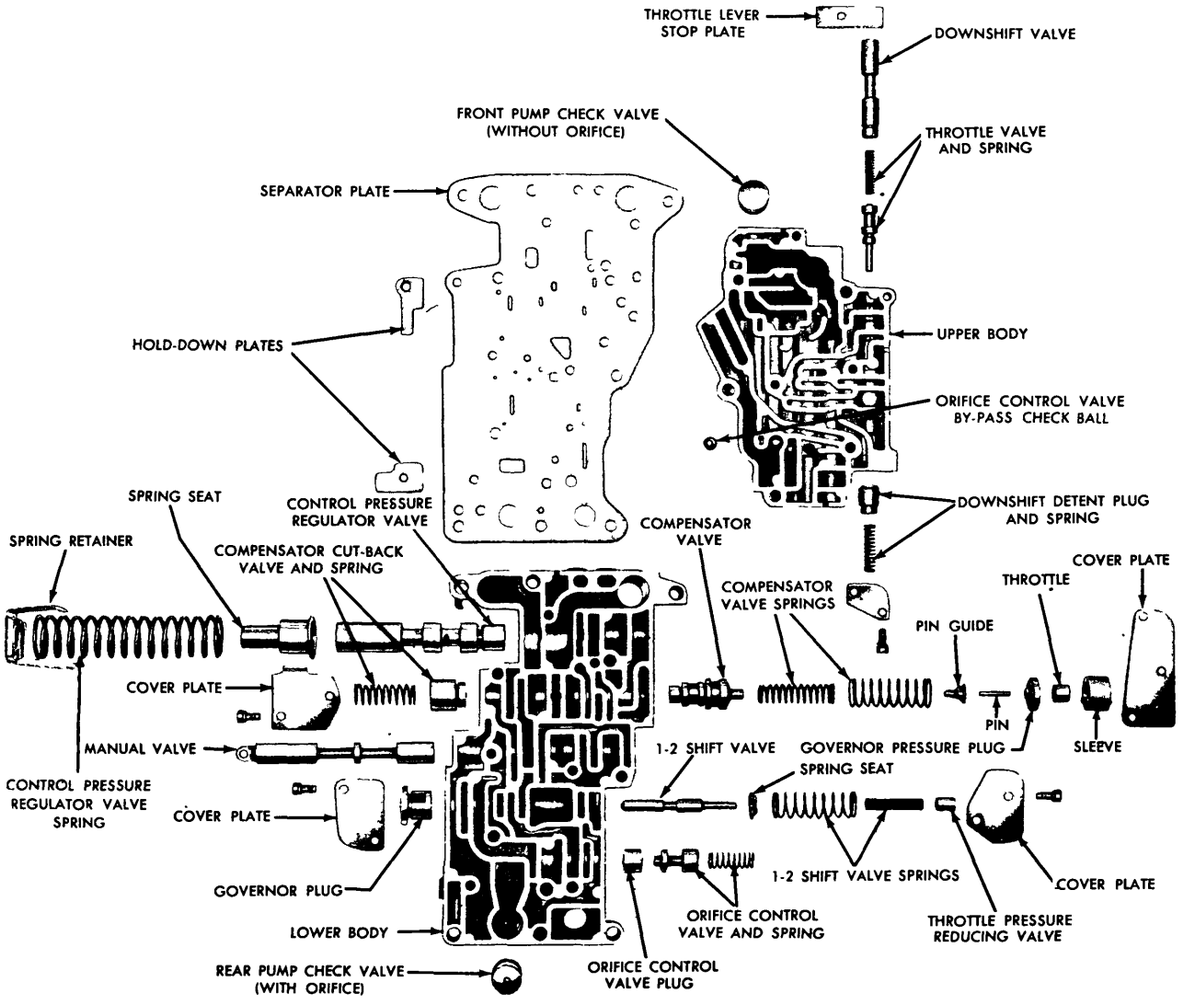
COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (C ntinu d)

piston and compress the return spring using arbor press and same to be used at disassembly, then install snap ring. Install same number of steel and composition plates as removed at disassembly, alternately in clutch drum, starting with a steel plate. When properly installed, the last clutch plate (top of pack) should be a composition plate. After correct number of plates have been installed, align internal teeth and install clutch hub. Position integral forward sun gear and flange in clutch drum and install retaining snap ring.

Pini n Carri r: Disass mbly - *NOTE - Primary sun gear must be r mov d from carrier to inspect primary sun gear front thrust bearing and race, rear thrust washer, and sun g ar pilot bushing. To remove sun gear from carrier, the short pinions must be removed from housing.* 1) Mark pinion shafts for reassembly in the same location, then remove screws attaching pinion shaft retainer ring to carrier (parking gear). Turn retainer clockwise until shafts are unlocked and remove ring. 2) Install short pinion pilot (dummy shaft), Tool T59P-77059-A (Ford & Falcon), Tool 77184 (Edsel & Comet), into pinion carrier from rear (output shaft side), then push short pinion shaft out front of carrier until pilot tool is centered in pinion gear. Remove pinion gear, front and rear needle bearing thrust washers, spacer, and pinion gear shaft from carrier. Retain needle bearings and spacer in pinion by pushing pilot tool out with the removed shaft. Remove two remaining short pinions and spacers, using the same procedure. 3) Remove integral primary sun gear and shaft, then remove long pinion shafts in same manner as for short pinions, using Tool T59L-77059-A (Ford & Falcon), Tool 77184 (Edsel & Comet).

Insp ction - Inspect pilot journal on sun gear shaft and pilot bushing in outpu. shaft. Inspect sun gear rear, bronze thrust washer and .ront thrust bearing and bearing race. Inspect converter-out pressure seal ring groove (machined in sun gear shaft at clutch hub spline). Excessive leakage at this point will permit converter-out fluid to bypass the cooling system and return to sump through clutch and planetary gears. Inspect thrust washers which contain needle bearing end thrust. Inspect needle bearings for wear. Inspect planet carrier for excessive wear at thrust washer locations. Inspect pinion shaft for wear and roughness and inspect all gears for burrs, nicks or cracks. Inspect teeth in carrier that are engaged by parking pawl. Inspect governor pressure seal ring grooves in output shaft.

Reassembly - 1) Position a needle bearing spacer in long pinion gear, then insert pilot tool (same as used for disassembly) through pinion and spacer. Insert a row of needle bearings (23) at each end of pinion (use a small amount of petroleum jelly to retain bearings in place), then place a thrust washer on each end of gear. 2) Position long pinion gear assembly and pilot tool in carrier, then select proper pinion shaft and insert it from front (parking gear) side. Push pilot tool out rear of carrier. Repeat this procedure to install the remaining two gears.



2-SPEED AUTOMATIC TRANSMISSION CONTROL VALVE ASSEMBLY

3) Position sun gear front thrust bearing and bearing race on sun gear shaft, then position rear thrust washer over pilot at rear of sun gear, retaining washer in place with a small amount of petroleum jelly. Position sun gear assembly in pinion carrier. *NOTE - Concave side of dished washer must be toward rear of transmission.* 4) Position a needle bearing spacer in a short pinion, then insert pilot tool through pinion and spacer. Insert a row of needle bearings (29) and install a thrust washer at each end of gear (retain bearings and washer with petroleum jelly), then position a pinion spacer, pinion gear assembly, and pilot tool in pinion carrier. Select the proper pinion shaft and insert it from the front (parking gear) side, then push pilot tool out of pinion carrier. Repeat this procedure for the two remaining pinion gears. 5) Align locking slots in all six pinion gear shafts and install pinion shaft retaining ring. Turn ring clockwise to lock. Install attaching screws and tighten to 20-30 ft. lbs.

Control Valve: Disassembly - 1) Remove manual valve, then remove control pressure regulator valve spring retainer, spring, spring seat, and regulator valve. Remove hold-down plate near compensator cut-back valve cover, then remove cover, compensator cut-back valve, spring and valve from lower body. 2) Remove 1-2 valve governor plug cover and plug. At opposite side of lower body, remove compensator and control pressure regulator cover plate. *CAUTION - Hold pressur on this cover until all screws are remov- d, then r leas slowly.*

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COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (Continued)

3) Remove throttle pressure plug and sleeve, governor pressure plug, throttle pressure plug pin, and pin guide. Remove compensator valve spring or springs (two springs used in some models) and compensator valve. Install hold-down plate and screw to hold separator plate to upper body.

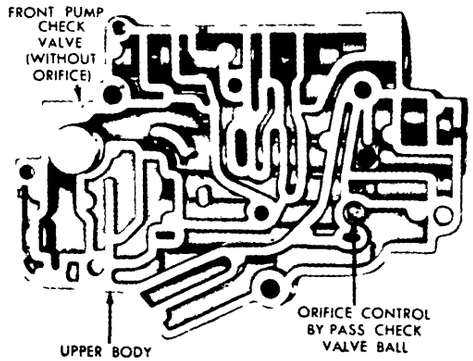
4) Remove 1-2 shift valve and orifice control valve cover plate. Remove throttle reducing valve and spring from lower body. Remove orifice control valve spring, valve, and orifice control valve plug. From the upper body, remove throttle lever stop plate, downshift valve, throttle valve spring and throttle valve.

5) From opposite end of upper body, remove hold-down plate, and then remove cover plate for downshift detent plug. Remove downshift detent plug spring and plug. Remove three screws and five bolts which hold upper body, separator plate, and lower body together, then lift upper body and separator plate from lower body. Remove rear pump check valve from lower body. *CAUTION - Lower pump check valve has an orifice in center of the valve plate. DO NOT interchange with the front pump check valve, which does not have an orifice.*

6) To remove 1-2 valve from lower valve body, compress the 1-2 valve outer spring in the direction of throttle reducing valve, then remove spring seat with needle nose pliers. With spring seat removed, 1-2 valve can be removed from throttle reducing valve bore. Remove 1-2 valve outer spring.

7) Turn upper body and separator plate over so that separator plate is "up", then remove hold-down plate and screw and remove separator plate from upper body. From upper body, remove front pump check valve and the orifice control valve bypass check ball.

Inspection - Clean all parts in solvent, then blow dry with air. Inspect all valve and plug bores for scores. Check all fluid passages for obstructions and check valves for free movement. Inspect all mating surfaces for burrs or distortion. Inspect all plugs and valves for burrs and scores. *NOTE - Crocus cloth can be used to polish valves and plugs if care is taken to prevent rounding the sharp edges of valves and plugs.* Inspect all springs for distortion. Check all valves and plugs for free movement in their respective bores. Valves and plugs, when dry, must fall from their own weight in their respective bores.



UPPER VALVE BODY CHECK VALVES

Reassembly: *NOTE - The following assembly procedure is such that each valve is installed in its respective bore with the upper and lower valve bodies attached together at normal torque. The one exception to this is the 1-2 valve which must be installed before the bodies are bolted together. This valve should be checked for proper fit after the bodies are assembled by inserting a pencil (eraser end) into governor plug bore and moving the 1-2 valve.*

1) Place orifice control valve bypass check ball in upper body (see illustration for location), then install front pump check valve and spring (this valve does not have an orifice). Place separator plate on upper body and retain it in its proper position by installing hold-down plate and screw.

2) Position large 1-2 valve spring in lower body, then insert the 1-2 valve into its bore. Compress valve spring and install valve seat over outer stem of 1-2 valve so valve is retained in bottom of its bore. *CAUTION - Be sure spring seat is installed over outer stem of 1-2 valve and not on center land.*

3) Install rear pump check valve and spring in lower body (this valve has an orifice in center of valve). Place upper control valve body and separator plate on lower body and install 5 bolts which attach upper and lower valve bodies. Install the 3 screws which also attach upper and lower valve bodies. Tighten the two short bolts (7/8" long) to 4-6 ft. lbs., and the three longer bolts to 6-7 ft. lbs. Tighten the three screws to 20-30 inch pounds. *CAUTION - Do not interchange bolt location (see illustration).*

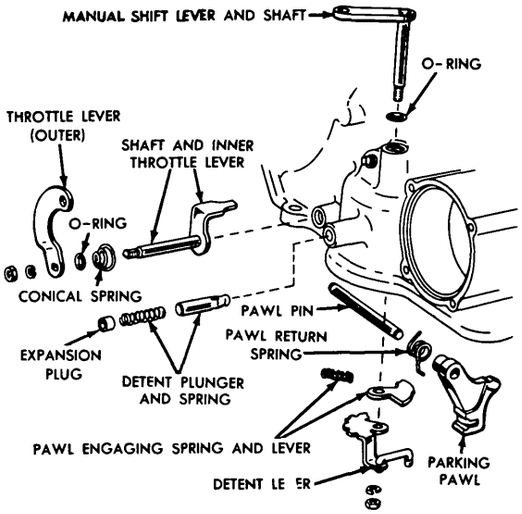
4) With upper and lower control valve bodies at normal assembled torque, check the 1-2 valve for free movement (through governor plug bore). In the upper body, install downshift detnet plug and spring, and cover plate. Install hold-down plate and screw, then tighten plate and cover screws to 20-30 inch pounds.

5) At opposite end of upper body install throttle valve and spring, and the downshift valve, then install throttle lever stop and tighten screw to 20-30 inch pounds. In lower valve body, install 1-2 shift valve governor plug, then install cover plate and tighten screws to 20-30 inch pounds.

6) Install compensator cut-back valve and spring, then install cover plate and tighten screws to 20-30 inch pounds. Install control pressure regulator valve, spring seat and spring, then compress spring and install spring retainer.

7) On opposite side of lower body, install compensator valve and spring or springs (two springs used on some models). Install throttle pressure plug pin and guide, governor pressure plug, throttle pressure plug sleeve, and throttle pressure plug. Install cover and hold it against lower body until cover plate screws are tight. Tighten screws to 20-30 inch pounds.

8) Install 1-2 shift valve inner spring and the throttle pressure reducing valve. Install orifice control valve plug, orifice control valve and spring. Install cover plate for the throttle reducing valve and orifice control valve. Tighten screws to 20-30 inch pounds.



2-SPEED FORDOMATIC THROTTLE & MANUAL LINKAGE

TRANSMISSION REASSEMBLY

►*TRANSMISSION CASE THREAD REPAIR NOTE: If threads in aluminum case or damaged during disassembly or reassembly, install steel thread inserts. See "Transmission Case Thread Repair" below.*

1) If throttle linkage in transmission case was removed, place the conical spring on throttle lever shaft with large end of spring against inner throttle lever. Insert throttle lever shaft into case. Install outer lever on shaft, then install lockwasher and nut and tighten nut to 17-20 ft. lbs.

2) If manual linkage was removed, place a new "O" ring in manual lever shaft hole counterbore, then install manual lever and shaft in case. Place parking pawl engaging lever on shaft. Place detent spring and plunger in case, then install detent lever on shaft. Install lockwasher and nut and tighten to 17-20 ft. lbs. Compress pawl engaging lever to detent lever spring and install it between the levers. Place parking pawl and spring in position in case and insert pawl pin. Hook spring to pawl.

3) Position reverse band apply lever and anchor in case, then insert apply lever shaft and install a new expansion plug.

4) Place a new "O" ring seal on front servo cover, then place servo cover against piston and temporarily install the two bolts used at disassembly through opposing holes in cover. Pull cover partially into position by turning the nuts down on temporary bolts to compress the spring. Install regular servo cover retaining bolts in the open bolt holes, then tighten bolts evenly to avoid distorting cover. Remove temporary bolts and install remaining two regular bolts. Tighten all bolts evenly until cover is firmly seated, then tighten all bolts to 12-15 ft. lbs. *CAUTION - Use care when positioning the "O" ring seal and servo cover.*

CONTINUED ON NEXT PAGE

COMET, EDSEL, FALCON, FORD 2-SPEED AUTOMATIC TRANSMISSION (C ntinued)

5) Install rear pump in case and install, but do not tighten, pump attaching bolts. Install a new seal ring on servo piston and install rear servo piston in case, pushing the piston to bottom of its bore. Position rear band in case with notched ear up, then rotate band in in case until solid ear engages band anchor. Compress band and install strut between band apply lever and band. Insert rear band actuating rod through rear servo piston, then position band apply lever and install the half-ball seat, adjusting nut and locknut on rear band actuating rod. Do not tighten adjusting nut.

6) Position rear thrust washer and Planetary internal gear (rear drum) inside rear band and on the rear pump hub. Position pinion carrier rear thrust washer on output shaft, then install governor pressure oil seal rings on output shaft.

7) Turn rotor in rear oil pump until drive flat is horizontal and toward bottom (oil pan side) of case. Align one of the flats on output shaft with flat in rear pump rotor and install gear train and output shaft in case. Mesh pinion carrier gears with internal gear and bottom the complete assembly in case.

8) Compress front band and install it through front of case, then position end of band containing strut guide pin toward front servo. Position the clutch assembly on primary sun gear (turbine shaft), then mesh forward sun gear with the short pinion gears and bottom it in pinion carrier. Install converter pressure oil seal ring on primary sun gear shaft. Install front band actuating struts.

9) At this point, refer to endplay reading taken at time of disassembly and select the proper selective thrust washer. Endplay must be .024-.039". *NOTE - Selective thrust wash rs ar available in thicknesses of .067-.069", .074-.076", .083-.085", .092-.095".*

10) Install clutch apply pressure oil seal rings on stator support (front pump inner hub). Place a new gasket on front pump housing, then install pump in case. Install the four upper oil pump attaching bolts and discard the three lower bolts (nearest the oil pan). Install three special (new) seal bolts, Part No. 372590-S, in lower attaching holes, regardless of type of bolts used in original assembly. Tighten the four upper bolts to 12-15 ft. lbs. and the three lower bolts to 18-22 ft. lbs. *CAUTION - DO NOT re-use special s al bolts. Tightening the bolts deforms vinyl seal and d str ys s aling charact ristics.*

11) Tighten rear pump attaching bolts to 12-15 ft. lbs. *CAUTION - As bolts are tightened, turn output shaft to ch ck pump for fr rotation.* Install a new "O" ring seal on rear servo cover, then install servo return spring and cover. Hold cover against case and install attaching bolts and tighten to 12-15 ft. lbs.

12) Install governor drive ball, governor assembly, and snap ring on output shaft. Install extension housing on case, using a new gasket, and tighten bolts to 23-38 ft. lbs. Install extension housing oil seal installing tool, T57L-7657-A (Ford); T60K-7657-A (Falcon); 7657-D (Edsel); 7657-G (Comet) to align the output shaft, then check transmission endplay (see "Transmission Disassembly" above). If endplay is not within limits of .024-.039", remove front oil pump assembly and install a selective washer that will bring endplay within limits.

13) Adjust front and rear bands (see "Adjustments" above). Position main control valve assembly in case, then connect manual shift valve link to manual valve and position throttle lever between the downshift valve and the stop plate on upper valve body. Install attaching bolts and tighten to 8-10 ft. lbs. Install fluid screen and retaining clip. Install oil pan with a new gasket and tighten attaching bolts to 10-13 ft. lbs.

CONVERTER CHECKING

Torque converters are enclosed in welded housings and cannot be disassembled for service. To check converter, proceed as follows:

One-Way Clutch Check: Install Tool T59L-7902-A (Ford); T59P-7902-B (Falcon); 7937-B (Edsel & Comet) with lockpin inserted to lock stator to turbine hub. Use a torque wrench to rotate tool in a clockwise direction. Tool should rotate freely. If tool cannot be rotated, the one-way clutch is binding and converter must be replaced. Apply 10 ft. lbs. torque to tool in a counterclockwise direction. It should lock up and hold the 10 ft. lbs. pull. Try clutch for lock up and hold in at least five different locations around converter. If clutch fails to lock up and hold a 10 ft. lbs. torque, replace converter unit.

Turbine & Stator Endplay Check: Insert Tool T59L-7902-A (Ford); T59P-7902-B (Falcon); 7937-B (Edsel & Comet) into converter pump drive hub until it bottoms, then install guide over converter pump drive hub. Expand the split fibre bushing in turbine spline by tightening the adjusting nut. Tighten adjusting nut until tool is securely locked to turbine spline. Attach a dial indicator to tool and position indicator button on a converter pump drive hub lug, then set indicator to zero. Lift tool upward as far as it will go and note indicator reading. If total endplay exceeds .060", replace converter unit.

Stator-to-Impeller Interference Check: Place a front pump assembly on a bench with stator shaft pointing up, then mount converter on the pump so splines on one-way clutch inner race engage mating splines of stator support, and the converter hub engages pump drive gear. While holding pump stationary, try to rotate converter counterclockwise. The converter should rotate freely without any signs of interference or scraping within converter assembly. If there is an indication of scraping, the trailing edges of the stator blades may be interfering with leading edges of impeller blades. In such cases, replace converter.

Stator-to-Turbine Interference Check: Position converter, pump side down, on bench. Install front pump assembly to engage mating splines of stator support and stator, and pump drive gear lugs. Install input shaft, engaging splines with turbine hub. While holding pump stationary, attempt to rotate turbine with input shaft. The turbine should rotate freely in both directions without any signs of interference or scraping noise. If interference exists, the stator front thrust washer may be worn, allowing stator to hit turbine. In such cases. replace converter.

TRANSMISSION CASE

Transmission Case Thread Repair: *NOTE - Three ste l thread inserts ("Heli-Coil") are installed in start r mounting holes in converter housing. In the event other "all-aluminum" threads in case become damaged, the same type insert can be installed, using a thread service kit manufactured by Heli-Coil Corporation. Kits contain special taps, installation tools, coil extractor tool, and the inserts.*

1) Drill out damaged threads, using same size drill as thread outside diameter. Select proper "special" tap, and tap the drilled hole. *NOTE - Tap is marked for size of thread being repaired. The special tap marked 5/16-18" will not cut the same thread as a standard 5/16"-18 tap, but will cut a thread large enough for th insert.*

2) Select the proper coil inserting tool (tools marked with thread size being repaired), then place insert on tool and adjust sleeve to length of the insert being used. Press insert against face of tapped hole and turn tool clockwise and wind insert into hole until insert is ½" below the face. Working through the insert, bend insert tang up and down until it breaks off at notch.

3) If inserts are not properly installed, they can be removed with the extractor tool. Place extractor tool in insert so that blade rests against top coil ¼" to ½" away from end of coil. Tap tool sharply with a hammer so that blade cuts into insert. Exert downward pressure on tool and turn it counterclockwise until insert is removed.

DUAL-RANGE HYDRA-MATIC

Cadillac (1954-55)
Chevrolet Trucks (1954-55)
Hudson (1954-55)
Lincoln (1954)
Nash (1954-55)
Oldsmobile (1954-55)
Pontiac (1954-55)
Rambler (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

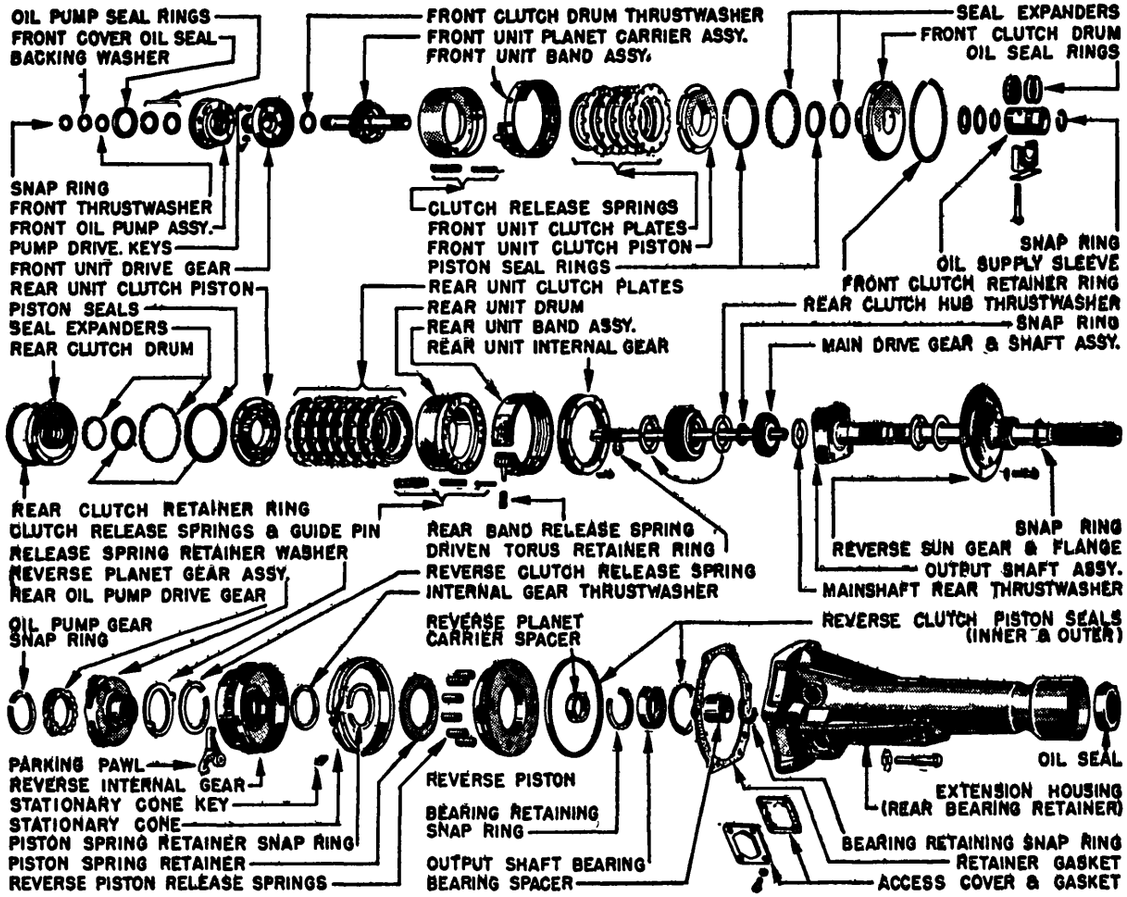
►*1955 CADILLAC FRONT & REAR CLUTCH PRODUCTION CHANGE (Cars With Eldorado Engine):* Beginning with transmission Serial No. CE-6336, front and rear clutch drive and driven discs are thinner and an extra driving disc has been installed in both units. Due to this change, new front and rear clutch annular pistons are also used. If the later type discs are to be installed in transmissions before the above serial number, all clutch discs must be replaced and the new type annular piston must be used. The later type parts are as follows: Driven Disc (No. 8615593). Drive Disc (No. 8617317). Front Clutch Annular Piston (No. 8617332). Rear Clutch Annular Piston (No. 8615377).

►*1955 CADILLAC ROUGH SHIFTING CORRECTION (Usually encountered when accelerator pedal is pressed as the 3-2 shift occurs):* If correct throttle linkage adjustment and correct internal band adjustment fails to correct the condition, install a more flexible rear servo accumulator check valve, Part No. 8617281, with rivet, heavier rear servo spring, Part No. 8617217, and front servo unit booster spring, Part No. 8617274.

►*1955 HUDSON & NASH REVERSE OIL FEED SEAL PRODUCTION CHANGE:* In addition to the rear bearing retainer gasket, a new rubber "0" ring seal, Part No. 3117223, has been added to the rear of the transmission case to eliminate possibility of an oil leak at the reverse oil feed passage. Transmission case requiring this "0" ring seal can be identified by the counterbore around reverse oil feed hole in side of transmission. See "Pressure Test Point" illustration for location of hole.

►*1955 HUDSON & NASH ROUGH 2-3 UPSHIFT CORRECTION:* After correct linkage and band adjustment, the rough 2-3 upshift condition remains, install Service Spring, Part No. 3119206 in the front servo body 4-3 downshift valve *(NOTE*—On Wasp models, it is also necessary to replace the pressure regulator spring, Part No. 3115705 which is identified by blue paint).

►*1955 TRANSMISSION LEVER PRODUCTION CHANGE & 1954 REPLACEMENT PARTS NOTE:* A new "stamped" manual shift lever, Part No. 567316 is used in production and for service replacement on 1954-55 transmissions. A new "stamped" throttle lever is used in production and for service replacement on 1955 transmissions after Serial No. 55-R-76159. Do not use on transmissions before the above serial number as a longer throttle shaft is required for use with this lever.



1954-55 DUAL-RANGE HYDRA-MATIC TRANSMISSION

DESCRIPTION

DESCRIPTION: Four-speed hydraulically operated automatic transmission and fluid coupling. Two selector lever positions are provided in "D" (Drive) range. The left hand position is for normal driving, allowing the transmission to upshift from first speed to fourth speed. The right hand position is for city (or performance) operation, allowing the transmission to operate in the first three speeds (first speed to third speed).

LUBRICATION

LUBRICATION INTERVALS: Check fluid level every 1000 miles (Hudson, Lincoln, Nash, & Oldsmobile); every 2000 miles (Cadillac & Pontiac); every day (Chevrolet Truck). Drain and refill every 25,000 miles (all models).

Recommended Lubricant: Automatic Transmission Fluid Type "A" or Automatic Transmission Fluid Type "A" (Suffix "A").

CHECKING FLUID LEVEL: With engine at normal operating temperature, idle engine and place selector lever in "N" (All models exc. Lincoln); in "Dr" (Lincoln), fluid level should be at "F" (Full) mark on dipstick.

►*CAUTION: Do not fill transmission abov "F" (Full) mark on dipstick.*

DRAINING & REFILLING: With transmission at normal operating temperature, remove drain plug in transmission or disconnect oil filler tube from transmission if there is no drain plug, then remove flywheel housing lower cover and drain fluid coupling. Replace plugs and filler tube and install 8 qts. (1954-55 Cadillac, Lincoln, Nash Ambassador & 1954 Hudson, Oldsmobile, Pontiac); 5 qts. (1954-55 Nash Statesman, Chevrolet Truck & 1955 Hudson Hornet, Hudson Wasp, Oldsmobile, Pontiac). Run engine for 1½ minutes at a speed equivalent to to 20 MPH with selector lever in "N" (Neutral), then return engine to slow idle speed and check fluid level. Add sufficient fluid to bring level to "F" (Full) mark on dipstick.

CONTINUED N NEXT PA E

DUAL-RANGE HYDRA-MATIC (C ntinu d)

LINKAGE ADJUSTMENT

1954-55 CADILLAC

Thr ttl Linkag Adjustment: *See CARBURETOR on Car Mod l pag s.*

Manual C ntrol Linkag : Disconnect manual control linkage rod from control lever on transmission, then move control lever to drive position (move lever fully forward, then toward rear until first detent positi n is reached). Place selector lever on steering column in "DR-4" position against stop. Adjust clevis on transmission end of rod until clevis can just be entered freely through clevis and lever, then connect control rod.

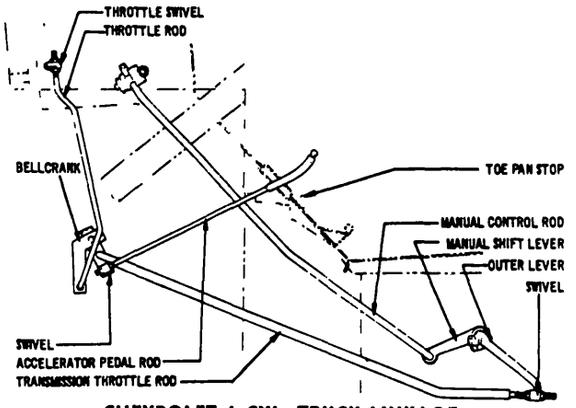
N utral Saf ty Switch Adjustment: Adjust position of switch on steering column so that switch is "off" when manual selector lever is in a position to move car. *CAUTION - Do not mov switch so far in neutral direct n that trav l of lower lever reverse direction is limit d by switch arm.*

1954-55 CHEVROLET TRUCKS

Manual Control Linkage: (All Models)—Move shift control lever from "N" position to first detent that is felt. In this position indicator should line up with symbol "1-4." Check control lever in each of the other positions for indicator alignment. If adjustment is not satisfactory, proceed as follows: If gearshift control shaft upper support bracket is loose, tighten the clamp screw while holding control lever firmly against stop between "1-3" position and "1-2." While holding lever in "1-3" against the stop which prevents accidental shift into "1-2," loosen gearshift control rod swivel. Make sure transmission outer lever is in the three speed drive position "1-3" (third position from front or rear). With control lever in "1-3" position and held against stop, and with transmission outer lever in the three speed drive position, tighten gearshift control rod swivel.

Neutral Safety Switch Adjustment: Place control lever in "1-4" position. With ignition off, operate starter control. Starter **should not operate.** If it does, check the other positions in the same manner. If starter operates in any position except "N," adjust as follows: Loosen two switch assembly mounting screws. Place selector lever in "N," and with clip over flats on end of shifter shaft, insert pin into mounting bracket of switch and locating plate. Tighten screws to secure switch in this position and remove locating screws.

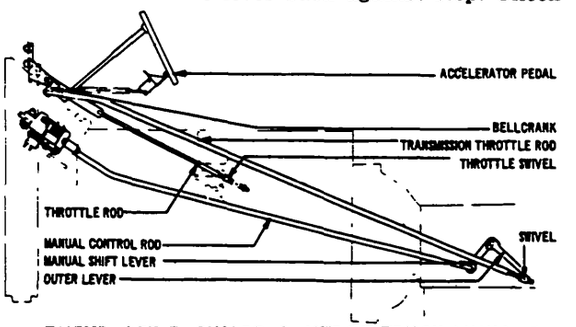
Throttle Linkage Adjustment: (6 Cyl. Hydra-Matic Drive Trucks, except Forward Control)—With engine at normal operating temperature and idle speed set at 400-450 RPM, remove lower end of carburetor throttle lever-to-bell crank rod from lever on bell crank. Install Lever positioning Gauge J-5609 in hole in lever and gauge hole in pan rail of engine block (hole is located toward rear of bell crank position), and leave gauge in this position. Remove swivel from bell crank-to-transmission outer lever at transmission and move transmission outer lever back against stop. Check distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using tool J-5260



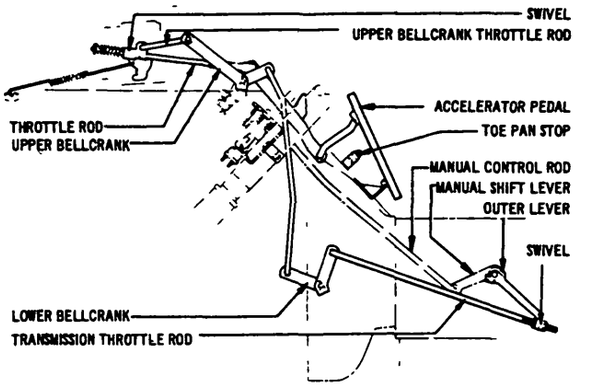
CHEVROLET 6 CYL. TRUCK LINKAGE (EXCEPT FORWARD CONTROL)

(CAUTION—Do not apply force to stops at either end of lever travel). Hold outer lever back against stop and adjust swivel position on bell crank-to-transmission rod so it just enters hole in transmission lever. Remove Positioning Gauge from bell crank and reinstall throttle rod Recheck engine idle speed with idle screw against stop on carburetor, and adjust carburetor throttle-to-bell crank rod so swivel at upper end freely enters hole in throttle lever. At this point, **shorten** bell crank-to-transmission outer lever by turning swivel lock nuts **two full turns.** Remove bell crank-to-carburetor throttle rod upper swivel from lever and pull rod upward until linkage is stopped by forward stop in transmission. Hold in this position and adjust accelerator-to-bell crank rod swivel until accelerator pedal is against floor stop, then shorten rod **one full turn.** Replace upper end of throttle-to-bell crank rod in throttle lever.

Throttle Linkage Adjustment: (Hydra-Matic Drive Forward Control Models)—With engine at normal operating temperature and idle speed set at 400-450 RPM, remove accelerator pedal-to-bellcrank rod and install Carburetor Control Lever Adjusting Gauge J-5629 with slotted end resting on inside shoulder of hex head brass fitting on intake manifold and pin end in rod hole in lever on bell crank. Leave gauge in this position. Remove swivel from bell crank-to-transmission outer lever rod at transmission and move lever back against stop. Check



CHEVR LET F RWARD C NTROL TRUCK LINKA E



CHEVROLET V8 TRUCK LINKAGE

distance from hole in outer lever to back of transmission with Gauge J-2545-C. Bend lever as necessary for free entry of gauge in lever hole using tool J-5260 *(CAUTION*—Do not apply force to stops at either end of lever travel). Hold outer lever back against stop and adjust swivel position on bell crank-to-transmission rod so it just enters hole in transmission lever, then **shorten** bell crank-to-transmission outer lever rod **two full turns.** Recheck engine idle speed with idle screw against stop on carburetor. Adjust carburetor throttle-to-bell crank rod so swivel at lower end freely enters hole in throttle lever. Remove Positioning Gauge from bell crank lever. Remove carburetor throttle-to-bell crank rod from throttle lever and pull bell crank-to-transmission outer lever rod up toward floorboard until linkage is stopped by forward stop in transmission. Hold rod in this position and install accelerator pedal-to-bell crank rod in bell crank lever, and adjust swivel so accelerator pedal is against toe board stop. Install carburetor throttle-to-bell crank rod, then **shorten** accelerator pedal-to-bell crank rod **one full turn.**

Throttle Linkage Adjustment: (V8 Hydra-Matic Drive Trucks)—Back out throttle valve adjusting screw so throttle valve is in the tightly closed position and swivel on end of throttle rod is against lug on upper bellcrank throttle rod. Remove swivel from transmission throttle lever and move lever back against its internal stop. Check distance from hole in lever to rear face of transmission case with Throttle Lever Checking Gauge J-2545-C. Bend transmission lever with Tool J-5260, if necessary, to allow entry of gauge into hole ***(CAUTION—Do not apply force against stop at either end of lever travel).*** Adjust length of transmission throttle rod so swivel just enters hole in transmission throttle lever. Adjust engine idle speed to 425 RPM with selector lever in "N" position. This adjustment will move transmission throttle lever off its internal stop. Depress accelerator pedal to obtain 5/8" distance between toe pan stop and bottom of pedal, then adjust length of throttle rod to give full open throttle. Depress pedal until transmission throttle lever is tight against forward stop on transmission and turn screw on toe pan stop up against accelerator pedal. Release pedal and turn screw upward **two full turns** and secure screw with jam nut

CONTINUED N NEXT PAGE

DUAL-RANGE HYDRA-MATIC (C ntinu d)

(transmission throttle lever will be moved slightly off forward stop on transmission)

1954 HUDSON

LINKAGE ADJUSTMENT: ***Adjust exactly as follows:***

Transmission Throttle Lever Adjustment—On all models, check position of outer throttle lever on transmission as follows: Install Checking Gauge J-2195 flat against back surface of transmission case (CAUTION—clean back surface of transmission case and machined surface to insure correct seating of gauge) with leg of gauge extending forward along side cover. Hold transmission throttle lever back against its stop in rear position. Hole in outer end of lever should center on small diameter of gauge pin and inner face of lever should just touch large diameter of gauge rod. **Do not force lever against its stop. Bend lever as required using Bending Tool J-3310.** Reconnect throttle rod to lever.

Throttle Control Linkage: ***NOTE—Adjustment of Transmission Throttle Lever should be made BEFORE transmission throttle control levers are adjusted. See Transmission Throttle Lever Adjustment above.***

Engine Idle Adjustment—On all models, adjust engine idle speed to 490-510 RPM with engine at normal operating temperature, transmission warm and selector lever in "N" (Neutral) position.

Models 4C, 4D, 5C, 5D With Single Carbs.—With Carburetor throttle idle screw against its stop and carburetor off fast idle, adjust throttle bell crank-to-carburetor rod so that gauge pin J-2544 will freely enter gauge pin holes in throttle bell crank and the slotted hole in throttle control bell crank support bracket. After making adjustment, remove gauge pin. Adjust throttle bell crank operating rod (rod between upper and lower bell cranks) until gauge pin will freely enter seat in accelerator pedal link bell crank lever and gauge hole in cylinder block, (located at end of starter motor). Tighten jam nut. With gauge pin remaining in place in lower bell crank, disconnect transmission throttle rod at accelerator bell crank lever. Lightly push transmission throttle valve lever rearward against its stop, and adjust the throttle rod so that the trunnion pin will slide freely into accelerator pedal bell crank lever. Install trunnion pin, flat washer and cotter pin. With trunnion pin in position, loosen rear adjusting nut approximately 1¾ turns or until a 1/16" shim can be installed between rear lock nut and trunnion; remove shim and tighten locknut (front) without turning rear lock nut. This will pull throttle lever forward off stop. Remove gauge pin.

Models 4C, 4D, 5C, 5D With Twin Carbs.—Insert gauge pin J-2544 through lower bell crank lever and into hole in cylinder block. Adjust length of throttle shaft operating rod (rod between lower and upper bell crank) so distance between center of clevis pin hole in throttle shaft lever (this lever connects with rod actuating throttle valve on carburetor) and top of cylinder block (machined surface) is 1.789". With gauge pins still in position, and with throttle return springs attached, adjust length of each throttle rod (rod between operating shaft and carburetor) so clevis pin slides freely through clevis and bell crank lever. Tighten jam nut securely. With gauge pin still in position, move transmission lever to rear stop, then adjust transmission throttle rod (rod between transmission throttle lever and lower bell crank) so that it is 1/16" shorter than the actual distance between trunnion (on lower bell crank) and clevis pin hole in transmission lever. Lock trunnion jam nuts. Remove gauge pin and adjust length of accelerator-to-bell crank rod assembly, to give a full throttle, with 1/64" to 1/16" clearance between accelerator pedal and pedal stop.

Model 7C & 7D With Single Carb.—With carburetor throttle idle screw against its stop and carburetor off fast idle, adjust accelerator cross-shaft, operating rod trunnion nuts (located adjacent to bracket on left side of cylinder head) until gauge pin J-2544 can be installed freely into accelerator pedal bell crank lever (ahead of starter on left side of engine crankcase), and the hole in cylinder block boss. Tighten trunnion nuts securely. Disconnect transmission throttle rod trunnion from accelerator pedal link bell crank lever. With gauge pin still in position in bell crank, hold transmission throttle lever back against its stop, then adjust transmission throttle rod so trunnion pin will slide freely into accelerator pedal link bell crank lever. Install trunnion pin, flat washer and cotter pin, and with trunnion pin in position, loosen rear adjusting nut (nearest transmission) approximately 1¾ turns or until a 1/16" shim can be installed between rear lock nut and trunnion. Remove shim and tighten front lock nut without turning rear lock nut. Remove gauge pin. Hold throttle wide open, and with accelerator pedal against its stop, adjust lower lock nut on accelerator pedal-to-bell crank rod until it touches trunnion, then increase adjustment ¼" further. This will give approximately 1/16" clearance between accelerator and stop.

Model 7C & 7D With Twin Carbs.—Throttle linkage adjusted in same manner as for models with Single Carburetor, except that both carburetor rods (from operating shaft to carburetor) must be adjusted alike.

Manual Control Linkage: Disconnect transmission shift rod at manual control lower lever on steering column. Position transmission shift lever on side of transmission case in "DR-3" by moving lever to rear as far as it will go (Reverse position) and then moving lever forward two detents (to third or middle position). Move selector lever on steering column to "DR-3" position (move lever toward reverse as far as possible without lifting selector lever). Adjust shift rod by turning clevis on forward end of rod until clevis pin holes line up with hole in manual control lower lever, then lengthen rod by turning clevis one full turn on rod, connect rod and tighten clevis locknut. Operate selector lever in all positions to make certain that lever indexes properly with indicator dial.

Neutral Safety Switch: Place selector lever in Neutral "N" position, loosen mounting screw in safety switch mounting bracket, adjust switch to close approximately midway between "N" and "DR" on indicator dial, tighten mounting screw securely. Check to make certain that starter operates only when selector lever in "N" position.

1955 HUDSON (EXC. RAMBLER)

Throttl Linkage Adjustm nt: *S e CARBURETOR on Car Model pages.*

Manual Control Linkage: Place selector lever in "D-3" position and set operating lever against stop on housing bracket Remove clevis pin from gear shift control rod at side of transmission case and remove clevis from shift lever Place transmission lever in "D-3" position and adjust clevis so pin passes freely through hole in clevis and in lever *NOTE - B sur that operating lever is against stop on housing bracket* After adjustment has been completed, **lengthen c ntr l r d two full turns** and replace clevis and cotter pin

Neutral Safety Switch Adjustm nt: Place selector lever in "N" (Neutral) position, then loosen mounting screw in safety switch mounting bracket and adjust switch so starter will operate Tighten mounting screw securely Check to make sure that starter operates only with selector lever in "N" (Neutral) position.

1954-55 NASH & RAMBLER

Throttle Linkage Adjustment: *Se CARBURETOR on Car Model pages.*

Manual Control Linkage: Place selector lever in "D-3" position and set lever against stop on starting switch bracket. Remove clevis pin from gear shift control rod at side of transmission and remove clevis from shift lever Place transmission shift lever in "D-3" position and adjust clevis so pin passes freely through hole in clevis and lever, then **length n c ntr l rod tw full turns** and replace clevis pin and cotter pin

Neutral Safety Switch Adjustm nt: With selector lever in "N" (Neutral) position, check alignment of operating plunger on control lever (lower end of steering column) with switch plunger Plunger must be depressed by operating plunger when selector lever lifted upward in "N" (Neutral) Adjust switch to align plunger by loosening switch bracket mounting screws and shifting switch on bracket

1954 LINCOLN

Throttle Linkage Adjustment: *S CARBURETOR on Car Model pages*

Manual Control Linkage: Disconnect manual control rod from lever on steering column, then position manual lever on transmission case in second position from top Position selector lever in "Dr" position against its stop, then adjust manual control rod by turning adjusting trunnion on forward end until sleeve enters grommet hole freely, then **lengthen rod by turning trunnion n full turn.** Connect rod and check position of selector lever in all positions

Neutral Safety Switch Adjustm nt: Loosen switch mounting screws and adjust switch so starter is operative with transmission selector lever in "N" (Neutral) or "P" (Park) positions only, then tighten mounting screws

1954-55 OLDSMOBILE

Throttle Linkage Adjustment: *See CARBURETCR on Car Model pages*

Manual Control Linkage: Loosen jam nut on shift rod clevis and neutral safety switch, then remove clevis pin from shift rod Move manual control lever at side of transmission all the way forward into "N" (Neutral)

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position, then raise and hold shift lever beyond "N" position against side of opening in jacket. Adjust shift rod clevis so that end of clevis contacts outside diameter of bushing in lower shift lever. Return lower shift lever to "N" position, insert clevis pin through clevis and bushing, and assemble cotter pin to clevis pin.

Neutral Saf ty Switch Adjustment: Place transmission in "N" (Neutral) detent. With switch assembled to steering column and link connected to shift lever, insert .090" pin through switch lever and bracket. Tighten mounting bolt and withdraw .090" pin. Check setting by applying hand brake firmly, placing shift lever in "DR" position, and turning ignition switch to "Start". While holding switch on "Start", slowly move shift lever toward "N" until engine cranks and starts. Without moving shift lever after engine starts, accelerate to determine whether transmission is in gear. If switch is properly adjusted, transmission will not be in gear and car will not move.

1954-55 PONTIAC

Thr ttle Linkag Adjustment: *See CARBURETOR on Car Mod l pag s.*

Manual Contr l Linkag : Place selector lever in "D" (right) position against stop which prevents accidental shift into low range. Loosen both front and rear trunnion locknuts and remove trunnion from transmission outer lever. Make sure transmission outer lever is in "D" (right) which is second detent from front. Install trunnion, with locknuts loose, in outer shift lever, then tighten front locknut against trunnion finger tight to remove clearance in linkage, **then tighten front locknut n c mplete turn to lengthen rod.** Tighten rear locknut.

N utral Saf ty Switch Adjustment: Place selector lever in "D" (left) position, then loosen switch mounting screw and adjust switch bracket to aposition where starter will not operate when ignition key is turned to "start" position. Place manual control lever in "N" (Neutral) position. Make certain that switch arm does not touch stop on switch bracket. Tighten mounting screw and check to make sure starter operates only with selector lever in "N" position.

BAND ADJUSTMENT

►*BAND ADJUSTMENT: Int rn al band adjustment must be mad on th foll wing models: 1954-55 Cadillac, 1954-55 Oldsm bile & 1955 Pontiac. Extern al adjustm nts may be made on all other models.*

EXTERNAL ADJUSTMENT

►*ADJUSTING TOOL NOTE: DO NOT make an external adjustment unless Adjusting Tool, J-2681 or J-2681-A, and an accurate tach m ter are available.*

1) Block front wheels securely and set hand brake firmly to prevent car moving while adjusting.

2) Remove front floor mat and adjusting hole cover over adjusting screws on left side of transmission.

3) Run engine until temperature is normal and engine idles at hot or slow idle speed of 375-400 RPM.

4) Connect and adjust tachometer for accurate recording of engine speed.

5) Place selector lever in "Dr" position ("Dr. 4").

6) Adjust carburetor throttle stopscrew so that engine idles at exactly 700 RPM. Then adjust bands:

Front Band (After steps 1 through 6):

7F) Install the adjusting tool on front band adjusting screw, loosen adjusting screw locknut (turn long handle while holding short handle stationary).

8F) Loosen band adjusting screw (turn short handle) until engine speed increases to 900-1000 RPM., (800-900 Hudson. This makes it unnecessary to back adjusting screw all the way out).

►*NOTE*—If no increase in engine speed noted when adjusting screw loosened, band has probably been slipping in service. Remove oil pan and inspect band and drum. With pan off, adjust bands as directed in ADJUSTMENT—WITH PAN OFF below and disregard following steps.

9F) Tighten band adjusting screw slowly until engine speed drops to 700 RPM., loosen adjusting screw until engine speed increases, then tighten adjusting screw until engine speed again drops to exactly 700 RPM., watch tachometer for 30 seconds to note any increase in engine speed. If increase noted, tighten adjusting screw 1/10 turn. Repeat this procedure until engine speed remains at 700 RPM. for at least 30 seconds.

10F) Set counter on adjusting tool to "OO". Hold locknut stationary and tighten adjusting screw exactly 7.7 turns (6.5 turns Chev. Truck). Hold adjusting screw from turning and tighten locknut.

Rear Band (After steps 1 through 6):

7R) Install the adjusting tool on rear band adjusting screw, loosen adjusting screw locknut (turn long handle while holding short handle stationary).

8R) Loosen band adjusting screw (turn short handle) until engine speed increases to 900-1000 RPM., (800-900 Hudson. This makes it unnecessary to back adjusting screw all the way out).

NOTE—If no increase in engine speed noted when adjusting screw loosened, band has probably been slipping in service. Remove oil pan and inspect band and drum. With pan off, adjust bands as directed in ADJUSTMENT—WITH PAN OFF below and disregard following steps.

9R) Tighten band adjusting screw slowly until engine speed drops to 700 RPM., loosen adjusting screw until engine speed increases, then tighten adjusting screw until engine speed again drops to exactly 700 RPM., watch tachometer for 30 seconds to note any increase in engine speed. If increase noted, tighten adjusting screw 1/10 turn. Repeat this procedure until engine speed remains at 700 RPM. for at least 30 seconds.

10R) Place selector lever in "N" position.

11R) Set counter on adjusting tool to 00.Hold locknut stationary, **tighten band adjusting screw exactly 2 turns until tool counter reads 2.0**

12R) Return selector lever to "Dr" position. Hold band adjusting screw from turning, tighten locknut securely.

Idle Speed Adjustment (After Bands Adjusted): *See Car Model pages for settings and procedure.*

INTERNAL ADJUSTMENT

►*ADJUSTING TOOL NOTE: DO NOT mak internal adjustm nt unless Front Servo Adjusting Gaug s J-1693 or J-1693-A and Rear Band Adjusting Gaug s J-1460-A or J-5071 ar availabl .*

Front Band Adjustment (Gauges J-1693, r J-1693-A):

1) Loosen locknut and back off front band adjusting screw approximately 5 turns. Make certain that band is centered on drum.

2) Remove pipe plug from bottom of front servo.

3) Loosen hexagonal headed adjusting screw on gauge by hand until approximately ⅛" of adjusting screw threads are exposed above gauge body. Screw gauge into pipe plug hole in front servo by hand.

4) Tighten hexagonal adjusting screw on gauge by hand until gauge stem is felt to just touch piston in servo, then continue to tighten adjusting screw with a wrench **exactly five full turns** from point where stem first contacted piston.

5) Tighten front band adjusting screw until knurled washer on gauge (at upper end of hexagonal adjusting screw) is just free to turn. Hold band adjusting screw from turning and securely tighten adjusting screw locknut.

6) Loosen gauge adjusting screw **at least six turns,** remove gauge from servo. Install pipe plug in servo and tighten securely.

Rear Band Adjustment (Gauges J-1460-A, or J-5071):

1) Place the gauge on the finished surface of the Accumulator body with leg of gauge resting on rear servo stem.

2) Loosen locknut and back off rear band adjusting screw until face of actuating lever (which contacts servo stem) is well away from the face of the gauge.

3) Tighten band adjusting screw until face of band actuating lever just contacts gauge.

►***CAUTION—If adjusting screw turned too far when making this adjustment, back screw off SEVERAL TURNS and repeat adjustment.***

4) Hold band adjusting screw from turning and tighten adjusting screw locknut securely. Remove gauge.

TROUBLE SHOOTING & DIAGNOSIS

►***NOTE—Most Hydra-Matic troubles can be corrected by external adjustments and correct oil level. See following table for trouble and possibe causes. See also "HYDRA-MATIC OVERHAUL."***

LIGHT THROTTLE SHIFT POINTS HIGH: (With Full Throttle Shift point normal)—Throttle linkage adjusted incorrectly. Adjust throttle linkage and check for worn or loose control rods.

FULL THROTTLE SHIFT POINTS: (Either too high or too low or do not occur)—Governor valves not operating properly, leakage at governor assembly, broken oil rings. Governor ring lands might be worn. Correct by freeing valves, check for warped surfaces. Replace parts as necessary.

NO THROTTLE DOWNSHIFT IN "Dr" RANGE: (From 4th to 3rd above 20 M.P.H.)—Insufficient accelerator travel due to interference of throttle linkage or at floor carpet. Throttle controls improperly adjusted or lever bent or loose on shaft. Spring lock in downshift valve may be missing.

TRANSMISSION DOES NOT RESPOND TO SHIFT LEVER, POSITION: Pin which picks up manual valve in valve body is not operating in groove in manual valve. To check, shift selector lever into reverse. If severe clashing results or if lever goes into reverse but car locks up and fails to move back-

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wards, pickup pin is not operating manual valve. Remove side cover and engage pin.

TRANSMISSION FAILS TO DRIVE CAR: Usually caused by failure of one or both bands to be applied. Check for low oil pressure. Front or rear band adjustment incorrect. Manual valve mispositioned, or torus check valve sticking. Front oil pump inoperative. See Oil Pressure Tests.

NO 3RD. OR 4TH. SPEED DRIVE (Drive normally in 1st. & 2nd. Speed): Rear clutch not applying due to: Leakage in line to clutch or in valve body, hole in transmission case to oil delivery sleeve or sleeve passage clogged, oil delivery sleeve incorrectly installed or oil rings broken, clutch oil seal leaking or clutch piston sticking.

SLIPS IN 1ST. 3RD, & REVERSE (Operation normal in 2nd. & 4th. Speed): Front band slipping due to: Leakage in valve body, passages in case, or in servo. Servo pistons sticking. Band incorrectly adjusted. Valves in valve body sticking. Throttle linkage incorrectly adjusted or not operating correctly.

SLIPS IN 1ST. OR 2ND. SPEED (Operation normal in 3rd. 4th., & Reverse): Rear band slipping due to: Leakage in valve body, passages in case, or in servo. Servo piston sticking. Band incorrectly adjusted. Valves in valve body sticking. Throttle linkage incorrectly adjusted or not operating correctly.

SLIPS IN "LO" RANGE (Operation normal in Reverse): Rear band slipping or not operating (see causes in 1st. & 2nd. Speed Slip above).

SLIPS OR CHATTERS ON 3-2 DOWNSHIFT: Rear band slipping or not operating (see causes in 1st. & 2nd. Speed Slip above). Rear servo operation incorrect due to: weak or broken servo springs or accumulator check valve stuck closed. Insufficient compensator pressure due to: Throttle linkage operating incorrectly or compensator valve stuck.

THROTTLE DOWNSHIFT FROM 3RD. SPEED DELAYED OR REQUIRES EXCESSIVE THROTTLE OPENING (May not occur until car stopped, usually occurs when transmission cold): Governor or valves in valve body sticking.

CLOSED THROTTLE 3-2 DOWNSHIFT OCCURS AT EXCESSIVELY HIGH SPEED (with severe "clunk"): Rear servo check valve not operatng correctly, accumulator piston rings stuck or broken, valves in valve body sticking, rear clutch piston binding on its pilot, governor operation incorrect, governor oil seal rings broken, or oil leak at governor assembly.

LIGHT THROTTLE DOWNSHIFT TO 3RD. SPEED OCCURS ABOVE 20 MPH. IN DRIVE RANGE (Or transmission "hunts" between 4th. & 3rd. Speeds): Throttle linkage adjustment incorrect or valves in valve body sticking.

UPSHIFTS ERRATIC OR MISSING (Starts in 3rd. or 4th. Speed in "Dr" Range, Starts in 2nd. Speed in "Lo" Range, May shift to 3rd. Speed in "Lo" Range r miss 3rd. Speed in "Dr" Range, May operate only in 2nd. Speed or only in 3rd. & 4th. Speeds in "Dr" Range): Governor valves sticking or valves in valve body sticking.

NO 4TH. SPEED UPSHIFT (2nd. & 3rd. Speed Upshifts normal): Governor valves sticking or valves in valve body sticking.

LIGHT THROTTLE UPSHIFT SPEEDS EXCESSIVELY HIGH (with violent band application when shifting from "N" to "Dr" when car standing): Governor valves sticking or valves in valve body sticking.

TRANSMISSION JUMPS OUT OF REVERSE: Manual control linkage rod adjusted too short.

SHIFT OUT OF REVERSE DIFFICULT: Inside manual cam lever surface rough or detent plunger rough.

ERRATIC RESPONSE TO SHIFT LEVER: Inner manual control valve lever loose on shaft. Replace lever assembly.

HUNTING: Adjust throttle linkage, check valve assembly and clean thoroughly and reface.

ALL SHIFTS ROUGH: Adjust throttle linkage and servo bands. Clean and reface valve assembly. Check transmission passages for leaks. Check oil pressure.

CREEPS FORWARD WHEN IN "R" POSITION: Rear unit not operating correctly. Excessive drag in rear clutch.

NO DRIVE WHEN ENGINE IS FIRST STARTED: Check fluid coupling and front pump. Test oil pressure.

CREEPS EXCESSIVELY IN "Dr": Engine idle speed too high.

CAR WILL NOT BACK UP: (Unless throttle is opened excessively)—Rear band not released due to low oil pressure caused by leakage or compensator valve auxiliary plug pin missing.

BANDS APPLIED VIOLENTLY, ENGINE SPEEDS UP: Low oil pressure or level. Pressure regulating valve sticking. Front pump may not be operating properly or there is a bad oil leak in the system. Check oil pressure and oil level. Free up pressure regulator valve or install new valve.

NO DRIVE IN REVERSE: This condition will occur if front servo exhaust body spacer is installed in reverse. Under this condition oil pressure does not increase when selector lever is placed in Reverse position. Pressure will increase to 150-170 lbs. when transmission shifts from 1 to 2.

SLIPPING IN REVERSE ONLY: Check for Low Oil Pressure in Reverse, Inoperative Front Servo Exhaust Valve, Key missing or defective in stationary cone, Stationary Cone or Cone Clutch Piston worn excessively, Front Servo & Band operation not operating properly, Valve Body Assembly dirty (sticking valves or oil leaks), Stationary cone distorted by handling when disassembled.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Check for: Governor G-1 weight stuck wide open or broken governor ring (separating main line pressure from G-1 pressure to reverse blocker piston), Governor ring groove or gap clearances incorrect, Governor sleeve defective, Parking Pawl Crank bent, Detent Plunger in inner control lever stuck, Reverse Blocker Piston sticking or piston spring weak or broken.

EXCESSIVE SQUAWK IN REVERSE (May occur when selector lever out of Reverse if reverse unit not fully disengaged): Check for low oil pressure and galling of stationary cone and cone clutch piston. If reverse not fully disengaged also check for: Check Valve in detent plunger retainer in valve body plugged, Reverse Clutch Spring inoperative or weak, High spot or galling of stationary cone and cone clutch piston, cone clutch piston release springs defective or weak, Rear Bearing Dowels too high.

LOW OIL PRESSURE, SLIPPAGE, DELAYED AND ERRATIC UPSHIFTS: These conditions will exist when one or the other of the two ¼" cup shaped plugs are missing from the parking bracket. (CAUTION—These plugs are not service parts and should never be removed). If plugs are loose or missing, replace assembly.

REVERSE CONE ENGAGES WHEN IN DRIVE: This condition can occur when there is excessive leakage into the reverse apply circuit. Check for leakage as follows:

1) Check front servo exhaust valve for proper fit in exhaust body. Clearance should be .002".

2) Inspect detent retainer spacer and valve body surfaces that contact spacer. Replace control valve if necessary.

3) Check Throttle Valve plug in Pressure Regulator for excessive clearance. If greater than .002" replace Regulator plug assembly.

4) Neoprene seal on Pressure Regulator Plug defective. Use extreme caution when installing plug not to damage seal (remove all sharp corners or burrs in transmission case with round hone, place small amount of grease on seal before installing assembly, DO NOT use wrench to start pressure regulator plug in housing).

TESTING

►*"DUAL-RANGE" HYDRA-MATIC TESTING NOTE:* These transmissions have MODULATED PRESSURE and HYDRAULIC REVERSE and following test procedure will apply to all transmissions:

ROAD TEST: Operate the car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation: Hilly section to check full-throttle upshifts, slippage, and throttle downshifts; a level section to check closed throttle upshifts; and a quiet section to check for noise. *See Hydra-Matic Shift Point table for correct shift speeds.*

STALL TEST: Can be used to check engine and transmission performance. Connect accurate electric tachometer to check engine speed. Start engine and warm up engine and transmission to operating temperature. Apply foot brake firmly and set hand brake tight. Set selector lever in "Dr. 4" position. Depress accelerator pedal to the floor and NOTE ENGINE RPM. If engine speed not within limits shown in table, make further tests as indicated below.

►*CAUTION—Use extreme care in making this test and NEVER HOLD THROTTLE OPEN MORE THAN ONE MINUTE (15-20 seconds preferably). If engine speed exceeds maximum figur shown in table, CLOSE THROTTLE IMMEDIATELY to avoid possible damage to transmission.*

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STALL TEST LIMITS

Mdl	Min. RPM	Max. RPM
1952-55 Cadillac	1700	1900
1954-55 Chevrolet Truck	1400	1600
1952-54 Hudson Jet	1600	1900
1952-54 Hudson Six ①	1300	1600
1952-54 Hudson Six ②	1450	1750
1952-54 Hudson Six ③	1600	1900
1955 Hudson Wasp.	1600	1800
1955 Hudson Hornet	1700	1900
1952-54 Lincoln	1350	1600
1952-54 Nash Ambassador	1600	1800
1955 Nash Ambassador	1550	1650
1952-55 Nash Statesman	1600	1800
1954-55 Oldsmobile	1750	1875
1952-54 Pontiac	1400	1600
1955 Pontiac	1600	1800
1952-55 Rambler	1600	1800

①—232" Engine. ②—262" Engine.
③—308" Engine.

If engine speed below minimum—Engine requires tune-up, or front unit is locked up.

If engine speed abov maximum—Bands are slipping, Torus check valve leaking or missing, or torus members damaged. Localize the trouble by making the following tests before adjusting the bands:

Check to determine which band slipping—Repeat the stall test (above) with selector lever in Revere "R" position. If engine speed still excessive, Front Band or Front and Rear Bands are slipping. If engine speed within limits, Rear Band only is slipping. Adjust bands.

Check for Missing or Leaking Torus Check Valve: Set hand brake lever securely, start engine and run at speed of 20 MPH. for approximately 1½ minutes. Reduce engine speed to normal idle speed, check fluid level and make certain that it is at "Full" mark on dipstick. Shut off engine and allow car to stand for 10 minutes. Recheck fluid level without starting engine. If level has not raised more than ½", torus check valve is operating satisfactorily and slipping bands or damaged torus members are indicated.

MAIN LINE OIL PRESSURE: *GAUGE CAUTION*—It is recommended that new 300 lb. gauge (J-2540-A) be used for making these pressure checks. Gauge used on previous Hydra-Matic transmissions (J-2540—160 lb. gauge) will not handle oil pressures under all conditions on these transmissions.

Checking Main Line Oil Pressure—Connect gauge at main oil line plug hole on top of case between band adjusting screws (accessible by lifting floor mat and removing metal plate over band adjusting screw hole). Make the following tests on the road (or with car up on jacks so that engine can be run to simulate road performance) after engine has been run sufficiently so that engine and transmission at operating temperature:

Idling Oil Pressure—With engine running at normal idling speed, note gauge pressure with selector lever in each position. In general, pressure should be equal in N, Dr. 4, Dr. 3, and Lo (10 lbs. maximum variation), and higher in R (reverse). *See table for specified pressures.*

Zero Throttle Pressure—With selector lever in "Dr. 4" position operate car at speed higher than 30 MPH *(See Chevrolet Truck Note below)*, close throttle and note gauge reading just as car speed drops to 30 MPH. *See Pressure Table.*

Full Throttle Pressure—With selector lever in "Dr. 4" position operate car at approximately 25 MPH (17 MPH on Chev. Truck), depress accelerator pedal to point where resistance of detent is felt but DO NOT go through detent (4-3 forced downshift), note gauge reading just as car speed reaches 30 MPH (19-22 MPH on Chev. Truck). *See Pressure Table for Specified pressures.*

SHOP TEST NOTE—If above test being made in the shop (with car on stands), this full throttle position of the control valve can be secured by disconnecting throttle control rod at lever on side of transmission case and moving the lever to the full throttle position (DO NOT move lever through detent), then note gauge reading.

Reverse Pressure—With car standing, place selector lever in Reverse "R", apply foot brake firmly to hold car stationary, accelerate engine to half-throttle position, note gauge reading. *See table for specified pressures.*

1954 Main Line Oil Pressures
(Pounds Per Square Inch)

Car	Idl'g	Zero Thtl.	Full Thtl.	Rev.
Cadillac		64-72	84-105	145-210
Hudson	40-68	60-68	85-93	125 Min.
Lincoln	50 Min.	64-72①	90-98③	145-185④
Nash	45-72②	45-72	75-105	125 Min.
Oldsmobile	50 min.	60 Min.	80 Min.	
Pontiac	50 Min.	65-72	90-98	145-210

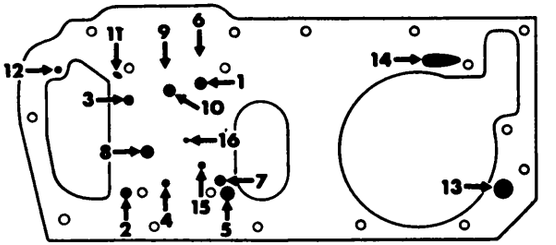
①—AT 1200 RPM. ②—At 375 RPM.
③—At 1200 RPM. (below 80 lbs. indicates slipping).
④—At 2000 RPM.

1955 Main Line Oil Pressures
(Pounds Per Square Inch)

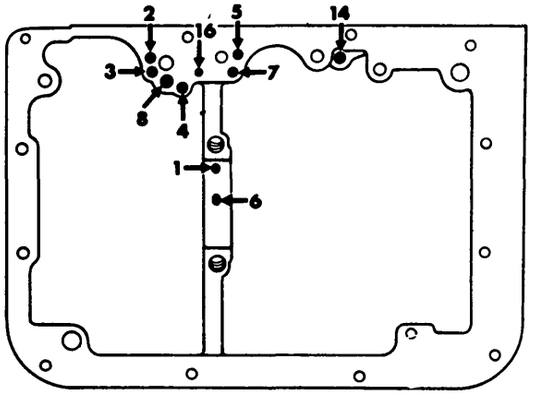
Car Model	Idling	Zero Thtl.	Full Thtl.	Rev.
Cadillac		64-72	104-112	145-210
Chev. Truck	50 Min.	60-68	85-93	135 Min.
Hudson	50 Min.①	60 Min	80 Min	125 Min.
Nash	50 Min.①	60 Min	80 Min.	125 Min.
Oldsmobile	50 Min.②	60 Min	85 Min.	150 Min.③
Pontiac	50 Min.	64-72	101-109	145-185
Rambler	50 Min.①	60 Min.	80 Min.	125 Min.

①—60 lbs maximum in all ranges
②—Idling at 400 RPM.
③—Idling at 600 RPM.

►*CHECKING REAR OIL PUMP*—Operation of rear pump alone can be checked by following procedure (Idling test above will check operation of front pump alone, road tests involve front and rear pumps together): Operate car on the road in 4th speed (selector lever in Dr.4) at speed shown in table below, move selector lever to Neutral, turn ignition OFF (this will stop front pump operating so that all pressure will be supplied by rear pump), note gauge reading (see table below). *CAUTION—IF REAR PUMP NOT WORKING (NO PRESSURE) DISCONTINUE TEST IMMEDIATELY.* If low oil pressure indicated when testing both pumps, oil leak in system is indicated. If one pump alone has low oil pressure, trouble in this pump is indicated.



PRESSURE TEST POINTS
(SIDE OF TRANSMISSION CASE)



PRESSURE TEST POINTS
(BOTTOM OF TRANSMISSION CASE)

Rear Oil Pump

Car	Operating Speed	Pressure
Cadillac	40-45 MPH	75 lbs. Min.
Hudson	45 MPH	60 lbs. Min.
Kaiser	45 MPH	60 lbs. Min.
Oldsmobile①	30 MPH. Min.	55 lbs. Min.

①—Selector lever in "Dr 3" position.

TESTING HYDRA-MATIC OPERATION WITH AIR PRESSURE: ***Following procedure can be used to check operation before disassembling transmission and can also be used after overhaul to insure proper operation before transmission installed in car.*** Drain transmission, remove oil pan and screen. Remove side cover, control valve assembly, and reverse oil pipe. Use air line fitted with special air nozzle (Tool J-4353-1 etc.) so that air can be applied to oil passage holes on side of transmission case. Use approximately 80 lbs. air pressure and make tests listed below.

►*See illustration for location of oil passage holes in transmission case.*

1) Front Clutch. Pressure at this point should actuate front clutch (piston movement will be audible if air applied intermittently, or can be felt if front drum held firmly by hand). *NOTE*—If large amount of air escapes around oil delivery sleeve area, recheck after servos removed to note point of leakage. If oil fog and large amount of air emitted from inside front end of front drum, faulty front clutch seal is indicated. Leakage from any other drilled passages inside case is indication of defective case or oil delivery sleeve.

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2) Front Band Apply. Pressure at this point should actuate servo and apply front band. No appreciable air escape should be noted at servo mounting face on case (small amount of leakage at 4-3 valve exhaust hole and also front band release hole is permissible) (front band release hole leakage should only be leakage past ring gap, not blow-by).

3) Front Band Release. Pressure at this point will not actuate servo (piston held in released position by retracting spring) but air escape between servo body and case, or around band release cylinder should only be normal leakage past piston ring gap.

4) Governor Pressure (G1 to 4-3 Valve). Pressure at this point will leak around 4-3 valve retainer wire. No air should be noted between servo body and transmission case or from any other passage (small amount of air from Front Band Apply and Compensator passages).

5) Rear Band Release. Pressure at this point will release rear servo and band with no large escape of air (small amount will escape through piston ring gaps but should not impede normal servo operation) and no appreciable amount of air should escape between servo mounting face and transmission case. No air escape should be noted from any other passage hole (except slight amount at Compensator hole—see item 7).

6) Rear Clutch. Pressure at this point should actuate rear clutch (piston movement will be audible if air applied intermittently, or can be felt if rear drum held firmly by hand). *NOTE*—If large amount of air escapes around oil delivery sleeve area, recheck after servos removed to note point of leakage. If oil fog and large amount of air emitted from inside rear drum assembly, faulty rear clutch seal or oil delivery sleeve rear ring is indicated. Leakage of air from any other passage hole on side of case indicates interconnected passages (defective case) or damaged oil delivery sleeve.

7) Compensator (to Front & Rear Servos). Pressure at this point should actuate rear servo to tighten rear band (band applied by spring) and to actuate front servo to apply band. No appreciable air escape should be noted (other than normal leakage through piston ring gaps) and no air should be noted at any other passage hole on side of case.

8) Main Line (Pump Feed): Pressure at this point should be an open blow-by due to fact that main line exhaust valve is in exhaust position.

9) Pressure Gauge Hole to Top of Case. Pressure at this point should produce NO evidence of air escape if pressure line plug (on top of case between band adjusting screw) is tight.

10) Exhaust (Port for Valve Body). Pressure at this point should blow freely through to inside of case. Make visual inspection of this hole to see that it is completely open for entire length (*CAUTION*—any obstruction of this hole will cause poor shifting).

11) T.V. Pressure to Regulator. Not necessary to check this passage (this is modulating pressure line to T.V. pressure plug in pressure regulator).

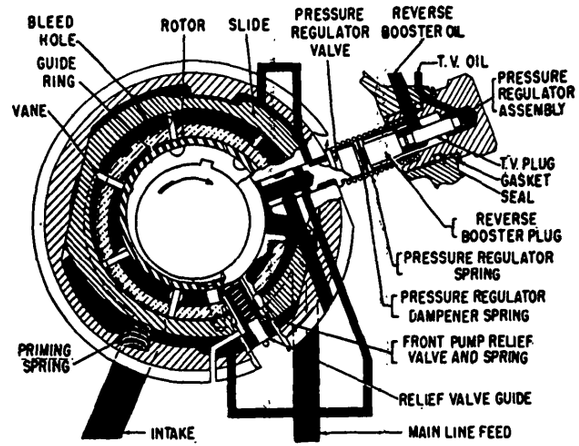
12) Reverse Booster to Pressure Regulator. Not necessary to check this passage (this is booster pressure line to reverse booster plug in regulator).

13) Reverse Pressure. Pressure at this point should actuate reverse cone clutch piston (piston movement should be audible if air applied intermittently, or can be felt if reverse internal gear grasped with the hand). If large amount of air escapes around cone clutch piston, outer and inner oil seal leakage in reverse cone assembly is indicated.

14) Governor Feed. Not necessary to check this passage (directs main line pressure to governor).

15) Line Exhaust. Not necessary to check this passage (passage exhausts main line pressure when engine is turned off and car is standing).

16) Low Range (Manual Low Oil). Not necessary to check this passage (passage directs main line pressure oil to fast dump valve in rear servo).



1954-55 DUAL-RANGE HYDRA-MATIC FRONT PUMP & PRESSURE REGULATOR

1954 DUAL-RANGE HYDRA-MATIC SHIFT POINTS

CADILLAC

3.07-1 AXLE

		1-2	2-3	3-4
UPSHIFTS:				
"Dr. 4"	(Min. Throttle)	5-8	11-16	21-26
	(At Detent)	14-18	33-38	68-75
	(Full Throttle)	20-23	36-41	73-79
"Dr. 3"	(Min. Throttle	5-8	11-16	73-79
	(At Detent)	14-18	33-38	73-79
	(Full Throttle)	20-23	36-41	73-79
"Lo"	(Min. Throttle)	5-8		⑯
	(At Detent)	14-18		⑯
	(Full Throttle)	20-23		⑯

		4-3	3-2	2-1
DOWNSHIFTS:				
"Dr. 4"	(Min. Throttle)	14-17	8-12	4-7
	(At Detent)	27-31	7-10	6-9
	(Full Throttle)	70-75	21-24	8-11
"Dr. 3"	(Min. Throttle)	70-77	8-12	4-7
	(At Detent)	72-79	7-10	6-9
	(Full Throttle)	72-79	21-24	8-11
"Lo"	(Min. Throttle)	⑰		4-7
	(At Detent)	⑰		6-9
	(Full Throttle)	⑰		8-11

CADILLAC

3.36-1 AXLE

		1-2	2-3	3-4
UPSHIFTS:				
"Dr. 4"	(Min. Throttle)	5-8	10-15	19-24
	(At Detent)	13-17	30-35	62-68
	(Full Throttle)	18-22	33-37	67-72
"Dr. 3"	(Min. Throttle)	5-8	10-15	67-72
	(At Detent)	13-17	30-35	67-72
	(Full Throttle)	18-22	33-37	67-72
"Lo"	(Min. Throttle)	5-8		①
	(At Detent)	13-17		①
	(Full Throttle)	18-22		①

		4-3	3-2	2-1
DOWNSHIFTS:				
"Dr. 4"	(Min. Throttle)	13-16	7-11	3-6
	(At Detent)	25-28	6-9	5-8
	(Full Throttle)	64-69	19-22	7-10
"Dr. 3"	(Min. Throttle)	64-70	7-11	3-6
	(At Detent)	66-72	6-9	5-8
	(Full Throttle)	66-72	19-22	7-10
"Lo"	(Min. Throttle)	㉓		3-6
	(At Detent)	㉓		5-8
	(Full Throttle)	㉓		7-10

CADILLAC

3.77-1 AXLE

		1-2	2-3	3-4
UPSHIFTS:				
"Dr. 4"	(Min. Throttle)	4-7	8-13	17-21
	(At Detent)	12-15	27-31	55-61
	(Full Throttle)	16-19	30-34	60-64
"Dr. 3"	(Min. Throttle)	4-7	8-13	60-64
	(At Detent)	12-15	27-31	60-64
	(Full Throttle)	16-19	30-34	60-64
"Lo"	(Min. Throttle)	4-7		㉔
	(At Detent)	12-15		㉔
	(Full Throttle)	16-19		㉔

		4-3	3-2	2-1
DOWNSHIFTS:				
"Dr. 4"	(Min. Throttle)	12-14	7-8	3-5
	(At Detent)	22-25	5-8	5-8
	(Full Throttle)	57-61	17-20	7-9
"Dr. 3"	(Min. Throttle)	57-63	7-8	3-5
	(At Detent)	58-64	5-8	5-8
	(Full Throttle)	58-64	17-20	7-9
"Lo"	(Min. Throttle)	㉕		3-5
	(At Detent)	㉕		5-8
	(Full Throttle)	㉕		7-9

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1954 DUAL-RANGE HYDRA-MATIC SHIFT POINTS (C ntinu d)

CADILLAC

4.27-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr. 4" (Min Throttle)	4-6	8-12	15-18
(At Detent)	10-13	24-28	49-55
(Full Throttle)	15-17	26-32	53-58
"Dr. 3" (Min Throttle)	4-6	8-12	53-58
(At Detent)	10-13	24-28	53-58
(Full Throttle)	15-17	26-32	53-58
"Lo" (Min Throttle)	4-6		㉖
(At Detent)	10-13		㉕
(Full Throttle)	15-17		㉖
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	10-13	6-9	3-5
(At Detent)	19-23	5-7	4-7
(Full Throttle)	51-55	15-17	6-8
"Dr 3" (Min Throttle)	51-56	6-9	3-5
(At Detent)	51-56	5-7	4-7
(Full Throttle)	51-56	15-17	6-8
"Lo" (Min Throttle)	㉗		3-5
(At Detent)	㉗		4-7
(Full Throttle)	㉗		6-8

HUDSON

UPSHIFTS:	1-2	2-3	3-4
"Dr. 4" (Min Throttle)	6-9	13-17	22-26
(Full Throttle)	17-20	⑱32-37	65-71
"Dr. 3" (Min. Throttle	6-9	13-17	70-76
(Full Throttle)	17-20	32-37	⑲72-78
"Lo" (Full Throttle)	17-20		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr. 4" (Min. Throttle)	17-14	11-8	8-4
(Full Throttle)	⑳27-23	㉑11-7	㉑ 8-5
(Forced)	62-56	25-21	10-7
"Dr. 3" (Min. Throttle	69-63	11-8	8-4
(Full Throttle)	78-72	㉒11-7	㉑ 8-5
(Forced)	78-72	㉒25-21	10-7
"Lo" (Forced			10-7

Lockout in "Lo"—4-2 or 3-2 shift, 46-42 MPH.

LINCOLN

UPSHIFTS: ⑭	1-2	2-3	3-4
"Dr. 4" (Min. Throttle)	6-9	11-13	19-22
(Full Throttle)	13-17	30-34	50-57
"Dr. 3" (Min. Throttle)	6-9	11-13	19-22
(Full Throttle)	13-17	30-34	50-57
"Lo" ⑮			
DOWNSHIFTS: ⑭	4-3	3-2	2-1
"Dr. 4" (Min. Throttle)	15-13	10-8	6-4
(Full Throttle)	27-23	9-8	8-6
"Dr. 3" (Min. Throttle)	15-13	10-8	6-4
(Full Throttle)	27-23	9-8	8-6
"Lo" (Min. Throttle)			10-8
(Full Throttle)			15-11
(Forced)			10-7

Lockout in "Lo"—4-2 Shift, 41-38. 2-1 Shift, 9-6

NASH AMBASSADOR

UPSHIFTS:	1-2	2-3	⑩3-4
"Dr" (Min. Throttle)	6-9	10-14	19-24
(Full Throttle)	17-21	31-37	62-69
"Lo" (Full Throttle)	17-21		
DOWNSHIFTS:	⑩4-3	3-2	2-1
"Dr" (Closed Throttle)	16-12	11-7	7-4
(Full Throttle)	21-16	10-6	10-6
(Forced)	62-16	20-16	
"Lo" (Full Throttle)			11-7

Lockout in "Lo"—4-2 Shift, 48-39 MPH.

NASH STATESMAN & RAMBLER

UPSHIFTS:	1-2	2-3	⑩3-4
"Dr" (Min. Throttle)	5-9	9-13	18-22
(Full Throttle)	13-17	27-32	55-61
"Lo" (Full Throttle)	13-17		
DOWNSHIFTS:	⑩4-3	3-2	2-1
"Dr" (Closed Throttle)	15-12	10-7	7-5
(Full Throttle)	19-13	9-5	9-5
(Forced)	55-15	19-15	
"Lo" (Full Throttle)			9-6

Lockout in "Lo"—4-2 Shift, 48-39 MPH.

OLDSMOBILE

UPSHIFTS:	1-2	2-3	3-4
"Dr." ③	④5-19	13-38	21-75
"S"	5-21	13-18	②
"Lo"	5-21		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr" (Closed Throttle)	15-13	10-8	6-4
(Full Throttle)	21-19	12-9	10-8
(Forced) ⑤	65-18	18-8	10-8
"S" (Closed Throttle)	②	10-8	6-4
(Full Throttle)	②	12-9	10-8
(Forced) ⑤		18-8	10-8
"Lo" (Closed Throttle)			6-4
(Full Throttle)			10-8

PONTIAC

UPSHIFTS:	1-2	2-3	3-4
Left "Dr" (Min. Throttle)	7-10	12-16	20-24
(Full Throttle)	19-23	35-40	69-75
Right "Dr" (Min. Throttle)	7-10	12-16	②
(Full Throttle)	19-23	35-40	②
"Lo" (Full Throttle)	19-23		
DOWNSHIFTS:	4-3	3-2	2-1
Left "Dr" (Closed Throttle)	17-14	12-9	8-5
(Full Throttle)	22-19	11-8	11-8
(Forced) ⑥	20-63	7-24	0-11
Right "Dr" (Closed Throttle)	②	12-9	8-5
(Full Throttle)	②	11-8	11-8
(Forced) ⑦		7-24	0-11
"Lo" (Full Throttle)			11-8
(Forced)			0-11

Lock ut in "Lo"—3-2 or 4-2 Shift, 53-48 MPH.

1955 DUAL-RANGE HYDRA-MATIC SHIFT POINTS

CADILLAC

3.07-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr. 4" (Min Throttle)	5-8	11-16	21-26
(At Detent)	14-18	33-38	68-75
(Full Throttle)	20-23	36-41	73-79
"Dr 3" (Min Throttle	5-8	11-16	73-79
(At Detent)	14-18	33-38	73-79
(Full Throttle)	20-23	36-41	73-79
"Lo" (Min Throttle)	5-8		⑯
(At Detent)	14-18		⑯
(Full Throttle)	20-23		⑯
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	14-17	8-12	4-7
(At Detent)	27-31	7-10	6-9
(Full Throttle)	70-75	21-24	8-11
"Dr 3" (Min Throttle)	70-77	8-12	4-7
(At Detent)	72-79	7-10	6-9
(Full Throttle)	72-79	21-24	8-11
"Lo" (Min Throttle)	⑰		4-7
(At Detent)	⑰		6-9
(Full Throttle)	⑰		8-11

3.36-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	5-8	10-15	19-24
(At Detent)	13-17	30-35	62-68
(Full Throttle)	18-22	33-37	67-72
"Dr 3" (Min Throttle)	5-8	10-15	67-72
(At Detent)	13-17	30-35	67-72
(Full Throttle)	18-22	33-37	67-72
"Lo" (Min Throttle)	5-8		①
(At Detent)	13-17		①
(Full Throttle)	18-22		①
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	13-16	7-11	3-6
(At Detent)	25-28	6-9	5-8
(Full Throttle)	64-69	19-22	7-10
"Dr. 3" (Min Throttle)	64-70	7-11	3-6
(At Detent)	66-72	6-9	5-8
(Full Throttle)	66-72	19-22	7-10
"Lo" (Min Throttle)	㉓		3-6
(At Detent)	㉓		5-8
(Full Throttle)	㉓		7-10

3.77-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	4-7	8-13	17-21
(At Detent)	12-15	27-31	55-61
(Full Throttle)	16-19	30-34	60-64
"Dr 3" (Min Throttle)	4-7	8-13	60-64
(At Detent)	12-15	27-31	60-64
(Full Throttle)	16-19	30-34	60-64
"Lo" (Min Throttle)	4-7		㉔
(At Detent)	12-15		㉔
(Full Throttle)	16-19		㉔
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	12-14	7-8	3-5
(At Detent)	22-25	5-8	5-8
(Full Throttle)	57-61	17-20	7-9
"Dr 3" (Min Throttle)	57-63	7-8	3-5
(At Detent)	58-64	5-8	5-8
(Full Throttle)	58-64	17-20	7-9
"Lo" (Min Throttle)	㉕		3-5
(At Detent)	㉕		5-8
(Full Throttle)	㉕		7-9

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1955 DUAL-RANGE HYDRA-MATIC SHIFT POINTS (Continued)

4.27-1 AXLE

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	4-6	8-12	15-18
(At Detent)	10-13	24-28	49-55
(Full Throttle)	15-17	26-32	53-58
"Dr 3" (Min Throttle)	4-6	8-12	53-58
(At Detent)	10-13	24-28	53-58
(Full Throttle)	15-17	26-32	53-58
"Lo" (Min Throttle)	4-6		㉖
(At Detent)	10-13		㉖
(Full Throttle)	15-17		㉖
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	10-13	6-9	3-5
(At Detent)	19-23	5-7	4-7
(Full Throttle)	51-55	15-17	6-8
"Dr 3" (Min Throttle)	51-56	6-9	3-5
(At Detent)	51-56	5-7	4-7
(Full Throttle)	51-56	15-17	6-8
"Lo" (Min Throttle)	㉗		3-5
(At Detent)	㉗		4-7
(Full Throttle)	㉗		6-8

CHEVROLET TRUCK

HALF-TON—3.09-1 AXLE

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	5-7	8-10	16-18
(At Detent)	10-13	22-25	43-48
"Dr 3" (Min Throttle)	5-7	8-10	
(At Detent)	10-13	22-25	
"Lo" (Forced)	12-16		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	11-13	6-8	3-5
(At Detent)	19-22	5-7	4-6
(Forced)	45-49	16-18	5-7
"Dr 3" (Min Throttle)		6-8	3-5
(At Detent)		5-7	4-6
(Forced)		16-18	5-7

¼ & 1-TON—4.5-1 AXLE

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	4-6	8-10	15-17
(At Detent)	8-11	20-23	39-44
"Dr 3" (Min Throttle)	4-6	8-10	
(At Detent)	8-11	11-13	
"Lo" (Forced)	11-13		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	7-10	5-7	2-4
(At Detent)	18-21	5-7	3-5
(Forced)	41-25	15-17	4-6
"Dr 3" (Min Throttle)		5-7	2-4
(At Detent)		5-7	3-5
(Forced)		15-17	4-6

¼ & 1-TON—5.1-1 AXLE

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	3-5	7-9	13-15
(At Detent)	7-10	18-21	35-40
"Dr 3" (Min Throttle)	3-5	7-9	
(At Detent)	7-10	18-21	
"Lo" (Forced)	10-18		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Min Throttle)	6-9	4-6	1-3
(At Detent)	16-19	4-6	3-5
(Forced)	36-40	13-15	3-5
"Dr 3" (Min Throttle)		4-6	1-3
(At Detent)		4-6	3-5
(Forced)		13-15	3-5

HUDSON HORNET

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	6-9	12-17	21-34
(Full Throttle)	21-25	36-39	66-76
"Dr 3" (Min Throttle)	6-9	12-17	
(Full Throttle)	21-25	36-39	76-81
DOWNSHIFTS:	4-3	3-2	2-1
"Dr. 4" (Closed Throttle)	17-14	10-17	6-3
(Full Throttle)	31-28	10-7	5-3
(Forced)	66-15	24-8	
"Dr 3" (Closed Throttle)	80-75	10-7	6-3

HUDSON WASP

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	3-7	10-13	18-21
(Full Throttle)	17-21	30-35	61-65
"Dr 3" (Min Throttle)	3-7	10-13	
(Full Throttle)	17-21	30-37	65-70
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Closed Throttle)	14-11	9-6	4-2
(Full Throttle)	55-21	9-7	4-2
(Forced)	55-12	21-7	
"Dr 3" (Closed Throttle)	68-63	9-6	4-2

NASH AMBASSADOR

	1-2	2-3	3-4
UPSHIFTS:			
"Dr 4" (Min Throttle)	6-9	11-15	19-24
(Full Throttle)	20-23	32-33	70-78
"Dr 3" (Min Throttle)	6-9	11-15	
(Full Throttle)	20-23	32-38	80-85
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Closed Throttle)	17-13	11-7	6-3
(Forced)	63-17	23-19	
"Dr 3" (Closed Throttle)	71-73	11-7	6-3
(Forced)		23-19	
"Lo" (Full Throttle)			11-7

Lockout in "Lo"—4-2 shift, 53-49 MPH

NASH STATESMAN

	1-2	2-3	3-4
UPSHIFTS:			
"Dr. 4" (Min Throttle)	5-9	9-13	18-22
(Full Throttle)	13-17	27-32	55-63
"Dr. 3" (Min Throttle)	5-9	9-13	
(Full Throttle)	13-17	27-32	68-73
DOWNSHIFTS:	4-3	3-2	2-1
"Dr. 4" (Closed Throttle)	12-8	8-4	5-3
(Forced)	55-15	19-15	
"Dr. 3" (Closed Throttle)	67-71	8-4	5-3
(Forced)		19-15	
"Lo" (Full Throttle)			9-6

Lockout in "Lo"—4-2 shift, 50-41 MPH.

OLDSMOBILE

	1-2	2-3	3-4
UPSHIFTS:			
"Dr." ③	④5-19	13-38	21-75
"S"	5-21	13-18	⑤
"Lo"	5-21		
DOWNSHIFTS:	4-3	3-2	2-1
"Dr" (Closed Throttle)	15-13	10-8	6-4
(Full Throttle)	21-19	12-9	10-8
(Forced) ⑥	65-18	18-8	10-8
"S" (Closed Throttle)	⑨	10-8	6-4
(Full Throttle)	⑨	12-9	10-8
(Forced) ⑥		18-8	10-8
"Lo" (Closed Throttle)			6-4
(Full Throttle)			10-8

PONTIAC

	1-2	2-3	3-4
UPSHIFTS:			
Left "Dr" (Min Throttle)	7-10	12-15	21-25
(Full Throttle)	20-23	36-40	68-73
Right "Dr" (Min Throttle)	7-10	12-15	71-76
(Full Throttle)	20-23	36-40	73-78
"Lo" (Full Throttle)			
DOWNSHIFTS:	4-3	3-2	2-1
Left "Dr" (Closed Throttle)	18-15	13-10	8-6
(Full Throttle)	31-18	13-10	13-10
(Forced)	66-31	26-13	13-10
Right "Dr" (Closed Throttle)	72-67	13-10	8-6
(Full Throttle)	78-73	13-10	13-10
(Forced)	78-73	26-13	13-10
"Lo" (Full Throttle)	59-54	53-48	
(Forced)			11-0

RAMBLER

	1-2	2-3	3-4
UPSHIFTS:			
"Dr. 4" (Min Throttle)	5-9	9-13	18-22
(Full Throttle)	13-17	27-32	55-63
"Dr. 3" (Min Throttle)	5-9	9-13	
(Full Throttle)	13-17	27-32	68-73
DOWNSHIFTS:	4-3	3-2	2-1
"Dr 4" (Closed Throttle)	12-8	8-4	5-3
(Part Throttle)	27-12		
(Forced)	55-15	19-15	
"Dr 3" (Closed Throttle)	67-71	8-4	5-3
(Forced)		19-15	
"Lo" (Full Throttle)			9-6

Lockout in "Lo"—4-2 shift, 50-41 MPH

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①—Upshifts 2-4 (38 MPH).
②—Occurs at very high car speeds only (75 MPH.).
③—Dependent on Throttle position.
④—5-22 MPH. with throttle in Detent Position.
⑤—Downshifts 4-2, 20-15 MPH. 3-1, 11-8 MPH.
⑥—3-1 Downshift, 11-8 MPH.
⑦—Downshifts 4-2, 20-10 MPH. 3-1, 10-7 MPH.
⑧—3-1 Downshift, 10-7 MPH.
⑨—In "Dr. 4" position only.
⑩—Downshifts 4-2, 18-12 MPH. 3-1, 9-7 MPH.
⑪—3-1 Downshift, 9-7 MPH.
⑫—Correct for 15x6.70 Tires & 3.31-1 Axle Ratio.
⑬—For cars with 3.07-1 Axle Ratio.
⑭—Starts in Second Speed. Possible to start in First Speed by depressing throttle fully to floor.
⑮—2-4 Upshift (42 MPH).
⑯—4-2 Downshift (42 MPH).
⑰—31-36 (J-53 Trans.). ⑱—79-85 (J-53 Trans.).
⑲—21-18 (J-53 Trans.). ⑳—10-7 (J-53 Trans.).
㉑—12-18 (J-53 Trans.).
㉒—Downshifts 4-2 (37 MPH).
㉓—Upshifts 2-4 (34 MPH).
㉔—Downshifts 4-2 (33 MPH).
㉕—Upshifts 2-4 (30 MPH).
㉖—Downshifts 4-2 (29 MPH).

DUAL-RANGE HYDRA-MATIC (C ntinu d)

REMOVAL & INSTALLATION

►*REMOVAL & INSTALLATICN NOTE· Procedures on all cars ar gen rally the sam , however, special points to be not d on each car ar listed under the necessary r moval proc dur steps*

REMOVAL: Support vehicle securely on four jack stands so wheels are at least 12" off floor (or use twin-post type hoist) On all Nash & Rambler models and 1955 Hudson models, place rear jack stands under body sills and support rear axle with a jack

1) Perform the following operations noting special procedures for each car model listed

Cadillac - Disconnect battery and remove starter, then remove slush deflector from lower flywheel housing On models with oil cooler, hoses at cooler must first be disconnected and hose ends plugged When removing oil pan, use care when disconnecting oil pump feed line from cooler valve in oil pan

Hudson (1954) - Disconnect battery and remove starter, oil breather pipe and two upper floor opening covers, then remove upper flywheel housing bolts From below car, remove rear stone guard assembly on left side of engine Disconnect hand brake cable at pull·rod slide link, then free cable at clip on No 3 crossmember and pull cable through crossmember toward front of car

Hudson, Exc. Rambl r (1955) - Disconnect hand brake cable at bellcrank and brake cable housing at bellcrank bracket

Nash Statesman with 12" Torus & Ambassador (1954) - Disconnect hand brake cable at bellcrank bracket, then remove brake hose bracket from floor pan

Nash Stat sman & Rambler with 11" Torus (1954) - Disconnect throttle rod at bellcrank, then disconnect hand brake from bracket below voltage regulator Turn bracket toward front of car and position hand brake cable below steering gear housing Remove distributor cap and oil filler dipstick

Nash Exc. Rambl r (1955) - Disconnect hand brake cable at bellcrank and brake cable housing at bellcrank bracket

Oldsm bil - Disconnect starter cable assembly from junction block, then disconnect purple lead from safety switch and black lead from main harness Free starter cable from clip in fender

Pontiac (1954) - Remove accelerator pedal and front compartment mat, then remove two upper hole covers in floor for access to upper flywheel housing bolts Remove crankcase ventilator pipe and loosen exhaust pipe bracket, then remove flywheel housing bottom cover Disconnect hand brake cables at cross lever and remove lever On cars with underseat heater, drain radiator and engine block, then remove clamp in X-member holding heater-to-radiator rear tube and defroster-to-heater tube Remove heater-to-radiator tube

Rambl r (1955) - Support rear of car at body sill, then disconnect rear shock absorbers at axle, and hand brake at yoke

2) Drain transmission and remove flywheel housing lower cover, then drain torus Disconnect speedometer cable at transmission On transmissions with underhood filler tube, disconnect tube at oil pan Disconnect propeller shaft at rear universal joint and remove shaft Note the following

Hudson (1954) - Disconnect propeller shaft at front and rear universals, then remove bolt attaching center bearing housing to support Slide propeller shaft to rear to allow clearance for transmission removal

Hudson, Exc. Rambler (1955) - Disconnect torque tube from rear bearing retainer, then move rear axle and torque tube assembly to rear and separate by sliding universal joint off transmission shaft

Nash Statesman with 12" Torus & Ambassador (1954) - Disconnect torque tube from rear bearing retainer on transmission and slide universal joint to rear off transmission shaft

Nash Statesman & Rambler with 11" Torus (1954) - Disconnect torque tube at rear of transmission, then remove rear spring clamps from axle Lower rear axle far enough to withdraw front universal joint from transmission shaft

Nash, Exc. Rambler (1955) - Disconnect torque tube from rear bearing retainer, then move rear axle and torque tube to rear and separate by sliding universal joint off transmission shaft

Pontiac (1955) - Loosen exhaust pipe at crossover pipe flange

Rambler (1955) - Remove rear spring front bracket attaching nuts and lower rear axle assembly Slide rear axle and propeller shaft assembly to rear Disconnect throttle and manual control rods from transmission levers, then remove throttle control lever from transmission Support engine, then remove rear engine support crossmember

3) Disconnect throttle rod and manual control rods from levers on the transmission, remove the throttle control lever from transmission Support rear of engine, then use a transmission hoist to lift transmission just enough to remove engine weight from rear supports, and remove crossmember

Cadillac - Disconnect engine rear support at extension housing and remove crossmember bracket on which crossmember is mounted

Hudson (1954) - Remove engine rear support bolts at No 3 crossmember and remove mounting screws at each end of crossmember

Hudson, Exc. Rambler (1955) - Remove engine rear support crossmember and bracket

Nash & Rambler (1955) - Remove engine rear support crossmember and bracket

Oldsmobile (1955) - Disconnect engine mounts from crossmember and remove crossmember

Pontiac (1955) - Disconnect both engine rear mounts and reinforcing plates, then remove crossmember

4) Make sure that torus cover and flywheel is marked to insure installation in same position *NOTE - Some models have one large and one small dowel so that cover can be installed in one position only* Remove torus cover-to-flywheel bolts, then push cover back to clear flywheel dowels Lower engine and transmission just enough to provide clearance for access to flywheel housing upper bolts *CAUTION - On Oldsmobile, do not low r ngine more than 1½' without removing upper radiator hos and loosening exhaust pip to manifold connection*

5) Remove upper flywheel housing bolts (unless previously done) *NOTE - On 1954 Hudson, lower right hand bolt cannot be removed and should be left in bolt hole* Move transmission and flywheel housing to rear as a unit until transmission shaft clears pilot bushing in flywheel, then lower transmission assembly to floor. *CAUTION - To prevent end of mainshaft striking flywheel mounting bolts when lowering transmission, turn flywheel so end of mainshaft passes between two bolts*

►*FLYWHEEL HOUSING DOWEL DISENGAGEMENT NOTE· Housing can be freed from dowels in front housing by threading two 9/16"-12 bolts in center holes on each side of rear housing (directly above dowel pins) and turning these bolts in evenly until housing is fre , then remove bolts*

INSTALLATION: Reverse removal procedures (see above) and note the following torus cover tightening procedures

Cadillac - Install one screw adjacent to each dowel pin and tighten until just snug, then install screws 90° from these screws and tighten just snug Install remaining torus cover screws and tighten evenly to 40 ft lbs After transmission is completely installed, run engine up to 3500 RPM and retighten all cover screws

Hudson, Nash, Pontiac - Tighten two bolts adjacent to dowel pins to 12-15 ft lbs , then tighten two bolts 90° from dowels to 12-15 ft lbs Tighten all bolts in rotation to 20-25 ft lbs , then finally tighten all bolts in rotation to 30-35 ft lbs

Lincoln - Install cover screws adjacent to each dowel pin and tighten just snug, then install screw 90° from each of these screws and tighten just snug Install remaining cover screws and tighten all screws evenly to 20-25 ft lbs

Oldsmobile - Tighten all screws snugly, then tighten all screws evenly to 30 ft lbs

OVERHAUL

DISASSEMBLY OF TRANSMISSION

►***TRANSMISSION DISASSEMBLY NOTE: Instructions below cover removal of sub-assemblies from transmission case. See "OVERHAUL OF UNITS" for disassembly, inspection, and reassembly of these sub-assemblies.***

Torus, Torus Cover, & Flywheel Housing: Remove oil level indicator (breather cap) from top of transmission case. With transmission on the bench, proceed as follows:

1) Move manual control lever on side of transmission case to Reverse (rear) position.
2) Straighten lockplate lip on mainshaft nut using a chisel and light hammer, remove mainshaft nut.
3) Slide torus driven member off front end of shaft. *CAUTION*—If torus member sticks, tap end of shaft with rawhide hammer while pulling on torus hub.
4) Remove driving torus snap ring, then remove torus driving member from shaft.

►***CAUTION—DO NOT attempt to remove driving torus and cover as a unit.***

5) Remove torus cover by working cover hub back through oil seals gently and then pulling cover off with quick jerk.

►***CAUTION—DO NOT pull or push on cover in rough manner which may cause broken or damaged oil seal ring.***

CONTINUED N NEXT PA E

DUAL-RANGE HYDRA-MATIC OVERHAUL (Continued)

6) Remove four capscrews and lockwashers holding flywheel rear housing on transmission case, remove housing and gasket.

Manual Lever, Oil Pan, Oil Screen, & Side Cover: 1) Move shift lever on side of transmission case to "Lo" (next detent position forward from "R").

2) Loosen clamp bolt retaining shift lever on shaft, remove lever.

3) Remove snap ring from groove at forward end of mainshaft using snap ring pliers.

4) Take out oil pan capscrews and lockwashers, remove oil pan and gasket. Lift oil pan screen and front pump intake pipe straight off as a unit (pipe will come out of front pump body and screen will pull off rear pump intake pipe).

5) Take out all side cover capscrews, remove side cover and gasket.

Control Valve & Parking Brake Bracket: Place inner detent lever in "Lo" position, loosen locknuts and back off front and rear band adjusting screws 5-6 turns. Then proceed as follows:

1) Remove pressure regulator reverse oil pipe by prying ends out evenly from control valve and case *(CAUTION*—use light pressure to avoid bending pipe).

2) Remove parking brake pawl support bolt (one of the rear bearing retainer mounting bolts on back of case), position pawl down in case as far as possible *(NOTE*—pawl cannot be removed at this time).

3) Unhook parking brake release spring from pin at front of parking brake bracket and remove spring.

4) Loosen two bolts mounting parking brake bracket on side of transmission case but DO NOT remove bolts at this time. *NOTE*—Lockplate on lower mounting bolt also serves as parking blocker piston pin retainer.

5) Take out four bolts mounting control valve assembly on side of transmission case, work control valve assembly toward front of case sufficiently to disengage two governor pipes and reverse clutch pipe *(CAUTION*—Governor pipes may remain in either part but should be removed to prevent their being damaged), lift control valve assembly out. Remove reverse clutch oil delivery pipe by pulling rear end out of hole in case.

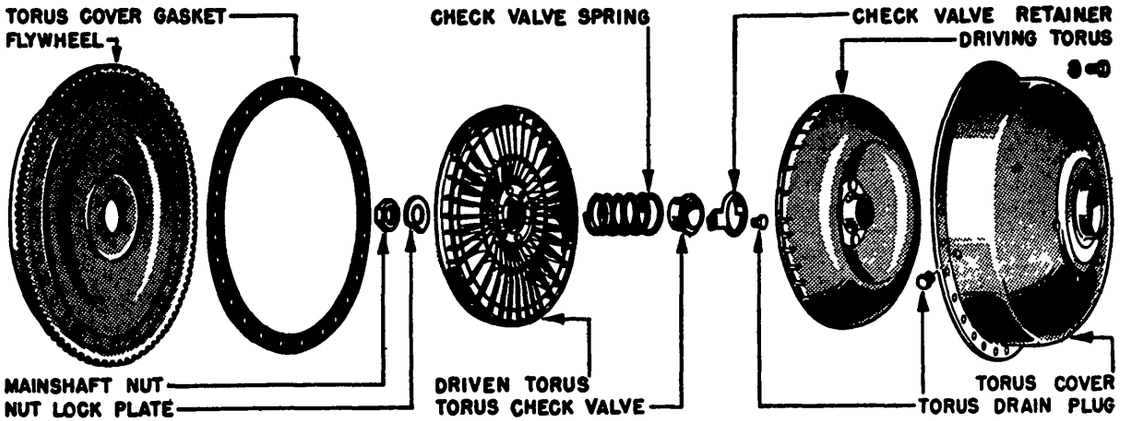
►***CAUTION—Control valve assembly should be kept wrapped in clean cloth or paper to prevent dirt entering valve body passages.***

6) Remove the two parking bracket mounting bolts (these bolts loosened in step 4 above), remove bracket by carefully sliding sleeve off governor *(CAUTION*—Use extreme care not to damage governor oil rings when removing sleeve). Do not lose roller from end of reverse shifter crank.

7) Lift parking brake pawl out of case.

Front & Rear Servos: ***CAUTION—Front and rear band adjusting screws must be backed off approximately 5-6 turns to relieve s rv spring tension befor servos can be removed.***

1) Remove governor oil delivery pipe by carefully prying both ends up evenly out of front servo and governor.



DUAL-RANGE HYDRA-MATIC TORUS ASSEMBLY

2) Take out front and rear servo mounting bolts, lift out both servos as a unit *(CAUTION*—rear pump discharge pipe will rotate in front fitting and slide free as units lifted off), separate servos at oil transfer pipe leaving the pipe in one unit. Servos can be removed separately as follows: Move rear servo toward rear to disengage oil transfer pipe, lift servo off, then lift front straight up to disengage it from front pump oil delivery pipe. Remove rear pump discharge pipe and front pump oil delivery pipe by pulling pipe straight out.

Governor & Rear Oil Pump: If these parts not to be removed, check governor run-out to make certain it is within limits. ***See Transmission Reassembly data for procedure.*** To remove assembly, proceed as follows (run-out is checked when unit re-installed):

1) Position governor so that large round governor weight is toward front of transmission, position reverse drive flange so that one attaching bolt is directly up.

2) Take out two bolts and lockwashers mounting assembly on transmission case.

3) Lift the assembly out by moving it toward the control valve side of the case and lifting pump end up to clear the case.

►***MAINSHAFT ENDPLAY CHECK CAUTION—Mainshaft endplay should be checked at this point BEFORE removing drive units from transmission case to determine correct thrustwasher to be used when reassembling transmission. Check endplay as follows:***

Mainshaft Endplay Check—Install mainshaft endplay guide J-2587 (1952-53), J-2587-B (1954-55) over forward end of mainshaft and front planet carrier. Use special mounting fixture tool J-1465 to mount dial indicator on front of transmission case so that it contacts front face of guide tool. Insert a screwdriver between front clutch drum and center bearing cap to hold front planet unit forward, *(CAUTION*—Place screwdriver at an angle to avoid damage to oil delivery sleeve). Move mainshaft back and forth and record endplay as noted on dial indicator for use in selecting correct thrustwasher when assembling transmission. Endplay should be .004-.018". *See "Mainshaft Endplay Change" above.*

CAUTION—DO NOT force mainshaft when measuring endplay which will give inaccurate reading (the FREE endplay is the desired measurement).

Pressure Regulator: ***CAUTION—This assembly is under spring pressure and should be held in while being unscrewed to prevent parts flying out.*** Loosen regulator valve plug, unscrew plug by hand while holding pressure against outer end. Remove plug and valve assembly (plug, reverse booster plug, T.V. plug, spring, and valve should withdraw as an assembly).

Front Oil Pump & Drive Gear: Remove snap ring from front end of front planet carrier shaft, remove steel and bronze thrustwashers *(CAUTION*—these are special washers with smaller O.D. and should be kept separately to insure re-installation at this point). Take out two front pump mounting screws (in front face of case at edge of pump cover), remove locating washer from screw hole counterbore. Remove front pump, gasket and drive gear as an assembly *(NOTE*—tap rear of pump with light hammer and brass drift if necessary).

Reverse Assembly & Mainshaft Removal: Remove oil seal from rear bearing retainer. Take out six reverse center gear-and-drive flange attaching bolts *(NOTE*—drive flange can be held from turning by wedging screwdriver under one drive flange bolt head). Install screwdriver between center bearing cap and rear clutch drum to prevent drum moving forward *(CAUTION*—place screwdriver at an angle to avoid damage to oil delivery sleeve), take out all rear bearing retainer-to-transmission bolts, carefully withdraw bearing retainer and reverse assembly from rear end of case (if assembly sticks, tap on front end of mainshaft using rawhide or other soft hammer). Remove mainshaft endplay thrustwasher *(CAUTION*—this washer may stick to mainshaft in case or remain in output shaft counterbore). Remove stationary cone lock key (this key fits in keyway in cone and keyway in case). Remove mainshaft through rear end of case, remove bronze thrustwasher from rear clutch hub (this washer may come out on mainshaft). Install rear hub retainer tool J-2174 on rear face of rear clutch hub (use one reverse drive flange attaching bolt to hold tool in place). Remove screwdriver from in front of rear unit.

Fr nt & Rear Unit Removal: ***CAUTION—Make certain rear hub retainer tool J-2174 installed on rear unit to prevent parts coming out while units being removed.***

C NTINUED N NEXT PA E

DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinu d)

Straighten lockplate ears at center bearing cap attaching bolts using a chisel and light hammer, remove bearing cap bolts and lockplate (NOTE—if necessary, use blunt screwdriver between bearing cap or front and rear drum to equalize drum distances and permit socket wrench to be used on bearing cap bolts). Remove rear band and strut assembly (CAUTION—do not lose rear band release spring located between ends of band), wire ends of front band together to retain band on drum (brake wheel cylinder clamp can be used for this purpose). Lift entire assembly out of transmission case. Remove front band from front unit drum. Front and rear units can be separated for overhaul as follows:

Front & Rear Unit Disassembly—*Holding Fixture J-2187 will facilitate work on these units* (fixture engages front end of intermediate or planet carrier shaft and holds assembly vertical on bench). Remove rear clutch hub rear snap ring from groove at rear end of shaft, lift rear unit assembly off shaft. Remove rear clutch hub front snap ring from groove in shaft. Remove center bearing cap from oil delivery sleeve, lift sleeve and oil ring assembly off shaft. Remove snap ring from recess in front unit *(CAUTION*—hold snap ring open while removing it from shaft so that it does not score or otherwise damage bearing surface on shaft). Lift front unit assembly off shaft, remove bronze and steel thrustwashers from recess in front unit. *See OVERHAUL data (following) for disassembly of each unit.*

DISASSEMBLY & REASSEMBLY OF UNITS

FRONT PLANETARY UNIT: Disassembly. Place front unit in arbor press with ram resting on block on front cover, apply just enough pressure to enable cover retaining snap ring to be removed from clutch drum, remove ring, remove unit from press. Separate drums by tapping front face of center gear using a rawhide or other soft hammer, remove front cover. Remove front clutch annular piston from cover by bumping front face of center gear on soft wood block. Remove clutch spring (six outer and six inner springs) and clutch plates (composition drive plates and steel driven plates—number varies on different transmissions) from the drum. Remove rubber piston seals and brass expanders from annular piston and clutch drum piston *(1955 CADILLAC NOTE*—Outer clutch piston seal is cast iron and can be removed by expanding slightly), using a blunt screwdriver to avoid damaging these parts.

Inspection: Clean all parts thoroughly. Inspect clutch drive pins and replace drum and drive pin assembly if pins scored, loose, distorted, or worn excessively (pins not furnished separately). Inspect drum for deep grooves or scoring on band surface or clutch plate surfaces; check piston bore, oil delivery sleeve bore and oil seal grooves for scoring; inspect gear teeth and thrust surfaces for wear or damage. Inspect clutch release springs for distortion or collapsed coils (free length should be 2 15/64"—slight wear as indicated by bright spots on side of outer springs where springs have contacted drums is permissible). Inspect clutch drive plates for damaged or loose facings (discoloration is permissible but plates should be replaced if flakes of facing material can be removed by scratching with the thumbnail), worn teeth, or lack of waving (these plates must be waved). Inspect clutch driven plates for scored or warped surfaces (these plates must be flat), or excessive wear. Inspect annular clutch piston for scoring and make certain oil seal grooves are thoroughly clean. Inspect planet carrier gears for damaged teeth or excessive roller bearing wear, inspect bearing surfaces of planet carrier shaft. Inspect all thrust washers for wear or damage.

Reassembly: *NOTE*—Clutch parts can be installed in front drum with drum on bench (driving pins upward) but assembly will be facilitated if planet carrier assembly placed vertically in fixture and front drum placed on planet carrier so that drum flange rests on pinion gears with drive pins upward. Install parts in following order:

1) Install driving (composition faced) and driven (steel) clutch plates alternately in that order *(CAUTION*—Engage square notches of driven plates over drum pins) and apply hydra-matic fluid to face of each plate as it is installed.

►*FRONT CLUTCH ANNULAR PISTON REPLACEMENT CAUTION*—Annular piston used with three composition and three steel plate clutch assembly is THICKER than piston used on four composition and four steel plate assembly. **Do not interchange pistons between the two types of assemblies.**

►*CLUTCH PLATE NOTE*—Clutch plate assemblies (equal number of drive and driven plates) differ on individual transmissions as follows:

►*1955 CADILLAC ELDORADO CLUTCH PLATE PRODUCTION CHANGE:* Thinner plates used after Transmission Serial No. CE-6336, and one additional drive plate has been added. *See "Cadillac Front & Rear Clutch Production Change" above, for installation of later type plates in early transmissions.*

Front Clutch—

3 Drive & 3 Driven Plates—Hudson (Exc. Hornet and 1954 Super Wasp); Kaiser; Nash (Exc. 1955 Ambassador); Rambler; and Willys.

4 Drive & 4 Driven Plates—Cadillac *(See 1955 Cadillac Eldorado Note above)*; Hudson Hornet, 1954 Hudson Super Wasp; Lincoln; 1955 Nash Ambassador; Oldsmobile; and Pontiac.

2) Install six outer and six inner clutch release springs through plates and into spring holes in drum (install outer springs first).

3) Install new inner brass expander in ring groove in clutch drum with **expanding lips down**, then work new inner piston rubber seal into ring groove with lip down over brass expander *(CAUTION*—work expander well back into position so that brass edges are not exposed). Check installation by installing piston into clutch drum to insure proper seating of the seal and expander, inspect inner seal after piston removed.

4) On models with rubber outer seal on annular piston, place new rubber seal over annular piston with **lip up** so that it is beyond the seal groove, install new large brass expander in piston groove with **lips up**, work rubber seal up into groove and over brass expander, finally work expander well down into position under seal so that brass edges are not exposed. On models with cast iron outer seal on annular piston, slightly expand seal and slip into groove of piston. *(CAUTION*—Before installing seal on piston, check ring gap by inserting oil seal squarely into clutch drum assembly and checking with a feeler gauge. Clearance should be .001-.006" at O.D. of ring, and should not exceed .007" at I.D. of ring. File ring ends as necessary for correct gap).

5) Install annular piston and seal assembly on clutch drum by placing piston on drum so that it rests on outer seal (on pistons with cast iron seal ring, use Ring Compressor J-5608 to compress seal ring until assembly is positioned in clutch cover). Align square notches in piston with holes in drum, then apply slight hand pressure to piston and guide seal into drum with the flat side of a blunt screwdriver.

6) Install clutch drum and piston assembly in front drum with gear end in *(CAUTION*—make certain that springs enter recesses in annular piston). Place the assembly in a press with ram resting on block on top face of clutch drum, press clutch drum down to fully expose snap ring groove. Install snap ring in drum with open ends equally spaced between two drive pin holes *(CAUTION*—ring must be fully seated in groove). Release pressure slowly so that clutch drum seats solidly against snap ring, remove unit from press. Tap front face of center gear lightly with rawhide hammer to insure clutch drum seating properly against snap ring.

7) Install planet carrier assembly in drum assembly by rolling the drum assembly on the bench while pressing planet carrier firmly in place (NOTE—this will align clutch drive plate teeth and hub teeth). Place entire assembly in holding fixture which will support it vertically on bench with clutch drum end upward.

8) Install bronze thrustwasher and steel thrustwasher (in that order) on planet carrier shaft and seat the washers in the clutch drum recess (CAUTION—locating lug on steel washer must fit over flat portion of shaft). Install snap ring in ring groove on shaft directly above steel washer.

►*CAUTION—Use snap ring pliers to keep ring open while moving it down over shaft. DO NOT allow ring to score bearing surface of planet carrier shaft.*

9) Assembly is then ready for installation of rear unit assembly. *See Front & Rear Unit Assembly below.*

OIL SLEEVE & OIL RING: Inspection. Inspect oil sleeve and babbitt bearing for scored surfaces or excessive wear, see that oil passages in sleeve are clean and not restricted. Check oil seal ring gaps with rings installed in bore of clutch drum. Gaps should be .001-.007".

REAR PLANETARY UNIT: Disassembly. Remove rear clutch hub retainer tool J-2174 (as used to hold parts together during removal from transmission case), lift out rear clutch hub and bronze thrustwasher. If rear internal gear to be replaced, take out two fillister-head screws retaining gear on rear drum and remove gear *(NOTE*—gear need not be disturbed unless replacement necessary). Place rear unit in arbor press with ram resting on wood block on clutch drum, apply just enough pressure to enable snap ring to be removed from groove in drum, remove snap ring, relieve pressure and remove unit from press. Remove clutch drum from rear drum by inserting wood block through clutch and against rear thrust face of clutch drum and tapping on block lightly *(CAUTION*—use care not to damage clutch plate gear teeth). Remove clutch release

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DUAL-RANGE HYDRA-MATIC OVERHAUL (Continued)

springs and spring guide pins (six outer and six inner springs with guide pin in each spring group). Remove all clutch plates (composition drive plates and steel driven plates—number varies on different transmissions). Remove annular piston from clutch drum by tapping rear thrust face of drum on block of wood, remove rubber piston seals and brass expanders *(1955 CADILLAC NOTE*—Outer clutch piston seal is cast iron and can be removed by expanding slightly), from annular piston, and clutch hub drum.

Inspection: Clean all parts thoroughly. Inspect as for front planetary unit parts (see above) and also make following additional inspections: Inspect babbitt bushing in clutch drum for wear or scoring. Check spring guide pins for distortion and correct length (1⅝" ± .010"). Blow out drilled passages in clutch hub and see that they are not restricted.

Reassembly: If rear internal gear has been removed, install gear on drum with dowel pin properly engaged and tighten attaching screws securely. Place drum on bench with driving pins upward, install parts:

1) Install driving (composition faced) and driven (steel) clutch plates alternately in that order *(CAUTION*—Engage square notches of driven plates over drum pins) and apply hydra-matic fluid to face of each plate as it is installed.

►*REAR CLUTCH ANNULAR PISTON REPLACEMENT CAUTION*—Pistons are different for the four types of clutch assemblies, and are **not interchangeable.**

►*CLUTCH PLATE NOTE*—Clutch plate assemblies (equal number of drive and driven plates) differ on individual transmissions as follows:

►*1955 CADILLAC ELDORADO CLUTCH PLATE PRODUCTION CHANGE:* Thinner plates used after Transmission Serial No. CE-6336, and one additional clutch plate is used. *See "Cadillac Front & Rear Clutch Plate Production Change" above for installation of later type plates in early transmissions.*

Rear Clutch—

5 Drive & 5 Driven Plates—Hudson Jet; Nash Statesman; Rambler; and Willys.

6 Drive & 6 Driven Plates—Hudson (Exc. Jet, Hornet, and 1954 Super Wasp); Kaiser; and 1952-54 Nash Ambassador.

7 Drive & 7 Driven Plates—Hudson Hornet and 1954 Super Wasp; 1955 Nash Ambassador; and Pontiac.

8 Drive & Driven Plates—Cadillac (See 1955 Cadillac Eldorado Note above); Lincoln; Oldsmobile.

2) Install six outer clutch springs, six inner springs, and six guide pins through rounded slots in clutch plates and into holes in drum.

3) Position new rubber seal with **lip down** on inner piston of clutch drum just above groove, install new brass expander in groove with **expanding lips down,** work rubber seal into groove with lip down over the expander and work expander well back under seal so that brass edges are not exposed.

4) On models with rubber outer seal on annular piston, place new rubber seal over annular piston with **lip up** so that it is beyond the seal groove, install new brass expander in piston groove with **lips up,** work rubber seal up into groove and over brass expander, finally work expander well down into position under seal so that brass edges are not exposed. On models with cast iron outer seal on annular piston slightly expand seal and slip into groove of piston.

5) Install annular piston and seal assembly on clutch drum by placing piston on drum so that it rests on outer seal (on pistons with cast iron seal ring, use Ring Compressor J-5608 to compress seal ring until assembly is positioned in clutch cover) Align square notches in piston with holes in drum, then apply slight hand pressure to piston and guide seal into drum with the flat side of a blunt screwdriver.

6) Install clutch drum and piston assembly over drive pins in rear drum. Place assembly in a press with ram resting on wood block on top of face of clutch drum, press clutch drum down until snap ring groove fully exposed. Install snap ring in drum with open ends equally spaced between two drive pin holes *(CAUTION*—ring must be fully seated in groove). Release pressure slowly so that clutch drum seats slodily against snap ring, remove unit from press. Tap front face of clutch drum (use light hammer on wood block inserted through internal gear and clutch assembly) to insure clutch drum seating properly against snap ring.

7) Install front bronze thrustwasher in deep counterbore of rear clutch hub (use vaseline to retain washer), install hub in drum assembly by rolling the drum on the bench while pressing hub firmly in place *(NOTE*—this will align clutch plate teeth and hub teeth).

8) Install holding tool J-2174 on drum to hold hub in place (use one reverse flange attaching screw to attach tool to drum).

9) Assembly is then ready for installation on front unit assembly. *See Front & Rear Unit Assembly (following).*

Front & Rear Unit Assembly: With front unit assembled on intermediate shaft (front planet carrier shaft) and mounted vertically in fixture, proceed as follows: Install oil rings on oil delivery sleeve *(CAUTION*—space oil ring gaps 180° apart to minimize oil leakage), install sleeve over intermediate shaft with **long bearing upward,** use Ring Compressor Tool J-1537 to compress lower oil rings and tap sleeve down into bore of front unit clutch drum using a rawhide or other soft hammer. Install rear unit clutch hub front snap ring in **second** groove of intermediate shaft. Compress upper oil rings with tool J-1537, install rear unit assembly over shaft (withdraw ring compressor after rings enter bore of rear unit clutch drum). Install rear unit clutch hub rear snap ring in groove in shaft. Assembly is then ready for installation in transmission case.

►*CAUTION—Both front drum and rear drum should rotate freely when slight force applied. If either drum binds, disassemble unit and correct trouble before installing assembly in transmission.*

REVERSE UNIT: *NOTE—Various types of rear bearing retainers or extension housings (part of reverse unit assembly) used on these transmissions but data below applies to all types:*

Disassembly: Remove speedometer driven gear and sleeve assembly, remove retainer gasket and stationary cone lock key (flat key in cone gap). Remove oil seal from rear end of rear bearing retainer or extension housing, if not removed previously (use special puller). Remove snap ring from output shaft at rear of ball bearing within bearing retainer (on extension housing types, snap ring is "open" type and accessible through access cover opening on side of housing). On all models except Oldsmobile, remove bearing retainer or extension housing from output shaft by lifting on retainer while tapping end of shaft with rawhide hammer *(See OLDSMOBILE CAUTION below).* Compress reverse stationary cone by hand and remove internal gear and stationary cone. On all models except Oldsmobile, remove rear bearing snap ring from within bearing retainer, remove bearing by tapping it out. Use Clutch Spring Compressor Tool J-4670 or J-4670-A mounted on front face of bearing retainer to compress clutch release springs, remove large snap ring from groove in end of retainer hub, relieve spring pressure, remove tool. Remove spring retainer and lift out the six clutch release springs. Lift reverse piston straight out *(CAUTION*—piston is located by four dowels and cannot be turned). Remove outer oil seal ring from reverse piston and inner oil seal ring from hub (remove inner ring by lifting lip up with the fingers and then using needle-nosed pliers). Lift large bronze thrustwasher from reverse internal gear. Remove reverse stationary cone from internal gear cone by expanding stationary cone slightly with snap ring pliers *(CAUTION*—do not expand cone more than necessary for removal), remove reverse clutch flat spring retainer and waved release spring by lifting straight out of reverse internal gear (to avoid damaging retainer tangs). Remove snap ring holding reverse planet carrier on output shaft (not used on all transmissions), remove carrier from shaft, remove planet carrier locating snap ring from shaft, then remove following parts: Sun gear and drive flange, steel thrustwasher, bronze thrustwasher.

►*OLDSMOBILE REAR BEARING RETAINER REMOVAL CAUTION*—To avoid damage to bronze bushing, remove output shaft from rear bearing retainer as follows: Remove small snap ring from output shaft and large snap ring from groove in bearing retainer back of rear bearing. Tap output shaft out toward front of retainer **until planet pinions just disengage from internal gear** *(CAUTION—do not tap shaft any further from retainer).* Remesh planet pinions in reverse gear and tap or push shaft back into retainer until bearing is moved back flush with retainer counterbore. Hold assembly vertically with bearing up and remove bearing with tool J-5139 (hooked wire which can be inserted in splines to engage bearing inner race). Remove lower snap ring from output shaft, **re-install bearing on output shaft** to protect bronze bushing, compress stationary cone and carefully remove retainer from reverse unit and output shaft, remove bearing from retainer.

Inspection: Clean all parts thoroughly. Oil the ball bearing and check for roughness by rotating it by hand *(CAUTION*—do not spin bearing with air). Inspect reverse internal gear for damaged teeth (including parking teeth), scored or damaged inside bearing surface, scored or burned cone surface Inspect planet carrier for worn or damaged teeth worn roller bearings, worn or damaged splines. Inspect bronze oil pump drive gear for excessive wear or damaged teeth, see that gear is tight on carrier and that drive ball is in place. Inspect reverse cen-

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DUAL-RANGE HYDRA-MATIC OVERHAUL (Con.inued)

ter gear and flange assembly for damaged teeth or worn bushing *(NOTE—these parts must be replaced as an assembly)*. Inspect output shaft assembly for scored or worn thrust and bearing surfaces, nicked or burred splines, worn or damaged speedometer drive gear teeth (cut directly in shaft). Inspect all thrustwashers for excessive wear and scoring. Inspect clutch release spring and retainer for damage or burning. Check stationary cone for burning, excessive wear or worn keyway. Inspect reverse piston for scores, burned cone surface, see that oil seal grooves are clean, inspect piston seal inner and outer rubbing surfaces for scoring or roughness. Check piston guide pins in bearing retainer for distortion, looseness, and scores, inspect bushing for scoring or excessive wear and make certain that oil holes in retainer are clean and open. Inspect mainshaft for damaged gear teeth and worn or scored thrust surfaces. Check piston release springs for distortion or collapsed coils (free length of springs should be 1 11/32").

Reassembly: ***CAUTION—Parts must be installed exactly as follows and clearances checked as indicated:***

1) Hold reverse center gear with drive flange up, install steel and bronze thrustwashers in that order in drive flange recess, then insert output shaft through drive flange and center gear so that planet carrier bottoms on thrustwashers, **hold assembly tightly together** to keep thrustwashers from slipping out of place and invert assembly on the bench so that it rests on carrier with shaft upward.

►***CAUTION—Do not pick up this unit until it has been completely assembled and is being installed in rear bearing retainer (step 8 below) to prevent thrustwashers slipping out of place.***

2) Install reverse planet carrier locating snap ring in groove in shaft, install planet carrier over shaft with bronze pump drive gear **down** and mesh pinions with the sun gear *(CAUTION—make certain carrier bottoms against snap ring)*. On Cadillac and Lincoln, install small spacer on shaft. On all other models, install snap ring in shaft groove to position carrier (this snap ring not used on Cadillac and Lincoln).

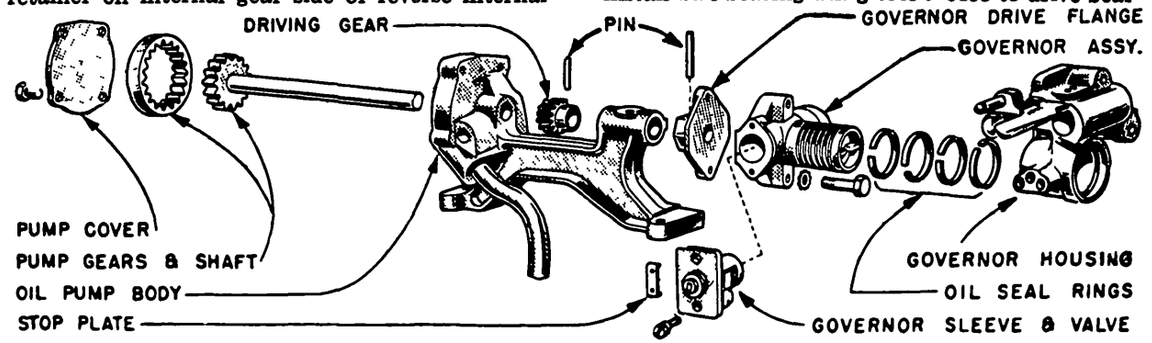
3) Install clutch release wave spring and spring retainer on internal gear side of reverse internal gear, install stationary cone on internal gear cone using large snap ring pliers to spread cone just enough to permit installation *(CAUTION—do not spread cone more than necessary and see that small dowel on cone points toward gear teeth)*. Install large bronze thrustwasher over collar of reverse internal gear.

4) Install piston inner seal in groove in hub of bearing retainer or extension housing with lip inward, and outer seal in groove on outer rim of piston with lip down away from cone. Apply light coat of hydra-matic fluid to outer surface of seals.

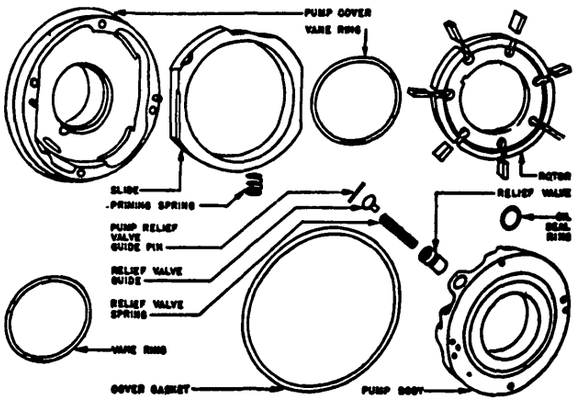
5) Install the clutch piston in rear bearing retainer or extension housing so that it rests on the dowel pins *(CAUTION—do not align piston holes with dowels)*, insert Outer Seal Compressor Tool J-4752 (.025" shim stock) around seal and down against ledge in counterbore in retainer, rotate piston until holes line up with dowel pins and push piston into retainer using extreme care to avoid damage to seal, remove tool. Install six piston release springs and spring retainer, compress springs with Tool J-4670 or J-4670-A, install retainer snap ring, remove tool. Check for correct assembly and seating of the piston as follows:

Piston Assembly Check—Place a straightedge across the face of the piston and measure distance from straightedge to face of rear bearing retainer or extension housing on each side. This distance should be 3/8" to 13/32". **If less than 3/8"**, dowel pins are too short and unit should be replaced. **If more than 13/32"**, disassemble unit and make certain dowel pins pressed in fully (check in an arbor press). If height still greater than 13/32" when reassembled, replace rear bearing retainer.

►***OLDSMOBILE REASSEMBLY CAUTION:*** On these models, disregard steps 6 through 9 and use special reassembly procedure as follows: Install reverse internal gear and stationary cone assembly in rear bearing retainer, compressing stationary cone by hand and positioning cone keyway so that it will line up with keyway in case when assembly is installed later (CAUTION—use care that thrustwashers do not slip out of place). Position ball bearing in retainer counterbore to act as a guide, install rear bearing retainer over output shaft (CAUTION—use extreme care to prevent shaft damaging bushing and bearing in retainer). Remove ball bearing from retainer (use tool J-5139). Install inner snap ring in LOWER groove of output shaft, reinstall ball bearing using tool J-5138 to drive bearing in solidly against snap ring, install large snap ring in retainer groove to retain bearing, on 1952-54 models install outer snap ring in groove in output shaft back of bearing. On 1955 models place "O" ring around sleeve and slide sleeve on output shaft just past the snap ring groove in shaft; then using a small bladed screwdriver slide "O" ring from sleeve. Remove sleeve and push "O" ring against inner race of bearing. Slide sleeve into position over "O" ring *(NOTE—If sleeve not a free slide fit, tap sleeve into position using Tool J-5138. Install snap ring into groove in output shaft next to sleeve. Then proceed with step 10 below.*



DUAL-RANGE HYDRA-MATIC REAR OIL PUMP & GOVERNOR



DUAL-RANGE HYDRA-MATIC FRONT OIL PUMP ASSY.

6) On all models except Oldsmobile, install ball bearing in rear bearing retainer or extension housing using special installing tool to tap bearing in so that it is fully seated. Install NEW special snap ring in retainer to retain bearing.

7) On all models except Oldsmobile, install reverse internal gear and stationary cone assembly in rear bearing retainer, compressing the stationary cone by hand and positioning keyway in cone so that it will line up with keyway in transmission case when the assembly is installed later ***CAUTION—use care that thrustwashers do not slip out of place while installing this assembly.***

8) On all models except Oldsmobile, carefully install output shaft assembly in rear bearing retainer or extension housing, meshing the reverse planet gears with the internal gear and that bearing is fully seated on output shaft.

►***CAUTION—Use extreme care not to damage bushing and bearing when inserting output shaft through these parts.***

9) On Cadillac and Lincoln, install rear bearing spacer over end of ouput shaft so that it seats against bearing inner race, install open type snap ring in groove in output shaft to retain spacer and bearing (work through access opening on side of housing—then install gasket and cover to close this opening). On all other models except Oldsmobile, install special snap ring in output shaft groove directly back of bearing (no spacer used on these models).

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DUAL-RANGE HYDRA-MATIC OVERHAUL (Continued)

10) Install NEW rear oil seal in rear end of rear bearing retainer or extension housing using special tool to seat the seal (seal not used on all models). Install speedometer gear assembly. Place new gasket on mounting face of retainer. Install key in stationary cone keyway using Lubriplate to hold key in position until assembly installed in transmission case.

FRONT PUMP: ***CAUTION—If pump rotor found to be broken when disassembled, completely disassemble and thoroughly clean transmission to remove all metal particles (may cause breakage of rear pump, parking brake bracket, and governor) and use NEW oil screen when reassembling transmission (all particles of metal cannot be removed from old screen).***

►***PRIMING SPRING (FRONT PUMP) NOTE:*** Two priming springs are used, replacing the single spring previously used. When overhauling earlier vane type pumps, replace single spring with later type springs.

Disassembly: Remove front pump from drive gear (tap gear out with rawhide hammer if necessary), remove gasket from pump cover. Take out four pump cover-to-body screws using J-2184-A pump holder ***(CAUTION—Do not clamp pump in vise)***, carefully lift front pump cover from body, using care not to drop any of the internal parts. Mark face of rotor with prussian blue to be sure it will be reassembled properly. Remove upper vane ring and rotor, and remove vanes. Remove lower vane ring, slide, and two springs. Remove intake pipe rubber seal from pump body using a sharp awl. Compress pump relief valve spring with a screwdriver and remove retaining pin. Remove pump relief valve guide, spring and valve.

Inspection: Clean entire unit and make certain that all passages are clean and free from obstructions (run tag wire through two bleed holes in slide to make certain they are open). Check parts for scoring. See that slide is free in pump cover and does not bind. Check key in drive gear and key slot in rotor for burrs or wear. Check vanes for free movement in rotor slots and make certain they are not scored or burred. Check pump body bushing for scoring, flaking, or excessive wear (slight wear permissible). Check oil seal ring in pump cover to make certain it is free in groove and not broken or worn. Check oil seal in cover hub for wear or distortion. Make certain that relief valve and pressure regulator valve are free in pump body.

Reassembly: Reverse the disassembly sequence (above) and note the following important points:

Oil Seal Ring Replacement—If ring in groove on cover hub requires replacement, check gap of new ring in bore of torus cover before installing ring on pump cover. Gap should be .001-.007" with ring installed in torus cover.

Oil Seal Replacement—If oil seal in cover hub requires replacement, remove old seal with a small chisel, use special tool to install new seal with **spring-loaded lip toward rear.** Permatex #3 or similar sealer may be used to seal area between seal and cover.

►***OIL SEAL CAUTION***—Two types used optionally. Seals differ in appearance but either type may be used and must be installed with **lip toward rear.**

Priming Spring & Slide—Spring must be properly installed under slide so that slide bottoms against lower stop in cover when spring compressed.

Rotor Vanes—Vanes should be installed in rotor after one guide ring and rotor installed (CAUTION —install rotor in accordance with marks made during disassembly). Install vanes with full polished edge facing slide (opposite edge will be polished only at points where vane contacts guide rings). Check rotor clearance with both guide rings installed by using feeler gauge between each vane and inside diameter of slide with vanes on opposite side contacting slide. Clearance must not exceed .003" (0-.003"), replace pump if excessive.

Pump Cover & Body Assembly—Lubricate all parts in cover with Hydra-Matic fluid before installing pump body. Body should fit freely over dowel pins in cover. Use holding tool J-2184-A and tighten cover-to-body screws to 12-15 ft.lbs. torque.

Final Assembly Check—With pump completely assembled, move rotor by hand to make certain that rotor, vanes and slide move freely. Priming spring should return slide to priming position after slide moved down to compress spring.

Drive Gear Assembly—Pump should be assembled to drive gear before assembly installed in transmission. Index rotor key slot with key on drive gear and slide pump on drive gear. ***DO NOT FORCE PUMP ON DRIVE GEAR.***

REAR OIL PUMP & GOVERNOR: ***GOVERNOR CHANGE NOTE***—Both die-cast and cast-iron governors have been used. Both types interchangeable but cast-iron type should be used for replacement.

►***DISASSEMBLY CAUTION—Mark edge of governor body and drive flange before removing governor to insure re-installation in same position.***

Disassembly: Remove governor assembly from drive flange (two screws in governor body). **Do not disassemble governor further** except for cleaning or Oil Ring Replacement ***(NOTE***—Governor serviced as complete unit except for Oil Rings). Remove pump cover (four screws), remove pump outer gear from body. This completes disassembly unless replacement of governor drive flange, pump and governor driven gear or shaft, or pump body is necessary in which case proceed as follows:

Replacement of Governor Drive Flange, Pump & Governor Drive Gear or Shaft, or Pump Body—Grind off end of lock pin in governor drive flange and in driven gear, drive pins out (use tool J-2183-1 clamped in vise to support shaft), remove burrs from shaft at pin holes, remove shaft through gear and body. Assemble parts in same manner using tool J-2183-1 to support shaft and peening tool J-2183-2 to peen ends of new locking pins to fill holes in shaft and gear or drive flange ***(CAUTION*** —height of peened end of pins must not exceed .070"). ***See Transmission Reassembly data for governor drive flange run-out check (run-out must not exceed .002").***

Governor Disassembly (for cleaning or Oil Ring replacement)—Remove oil seal rings from governor body. Withdraw G1 and G2 stop plates from slots in body casting ***(CAUTION***—do not attempt to remove G1 or G2 valves from body casting).

Inspection: Check governor G1 and G2 valves for free operation (if valves cannot be freed by operating them with governor immersed in cleaning fluid, replace governor assembly). Check governor oil rings for free movement in grooves, inspect ring lands and replace governor assembly if lands worn or damaged. Make certain all passages in governor body are clean and open. Check governor mounting face for nicks, burrs, or warped surface which would prevent securing oil-tight joint. Check pump body and cover for scoring or wear, check pump gears for wear or damaged teeth.

Reassembly: If new governor oil seal rings being installed, check ring gaps with rings installed in bore of parking bracket assembly. Gap should be .001-.007" and ring clearance in groove should be .001-.003". Install rings in governor grooves carefully. Install G1 and G2 stop plates in governor body grooves ***(CAUTION***—valves must be correctly positioned so that stop plates enter freely without striking and damaging shoulders on valves). Install governor on drive flange with locating marks lined up, tighten two body-to-flange screws to 6-8 ft.lbs. Install oil pump driven gear in pump body, install cover and tighten cover screws securely.

FRONT SERVO: ***(NOTE—1952 servos are not interchangeable with later type servos because of the addition of a Line Exhaust Valve & Overrun Control Valve Body. Some early 1953 models may have the same type servo as used in 1952 models).***

Disassembly: (1952-54 All Models, 1955 Chevrolet Truck, Hudson, Kaiser, Nash Rambler, & Willys)—Remove release cylinder to servo body attaching screws and lockwashers. Remove release cylinder, booster spring, retracting spring retainer, retracting spring and apply piston assembly. Remove release piston from cylinder. Remove three valve body to front servo body attaching screws and lockwashers and remove valve body. ***(CAUTION***—Use care not to lose rear pump ball check spring from valve body). Remove rear pump ball check spring from servo. Remove 4-3 downshift valve by turning servo body over and catching valve in hand. Work overrun control valve pin out with needle nose pliers. Use care when removing pin to avoid losing overrun control valve spring plug. Remove spring and overrun control valve. Depress line exhaust valve spring and slide retainer out of valve body. Remove spring and line exhaust valve.

Disassembly: (1955 Cadillac, Oldsmobile & Pontiac)—Remove front band adjusting screw. Remove valve body to front servo attaching bolts and remove valve body and spacer plate. Remove front servo valve body cover plate attached to valve body by three screws. Remove 4-3 downshift valve and spring, and control valve and spring from valve body. With aid of needle nose pliers remove line exhaust valve retaining pin from servo body and remove spring and valve. Remove screws and lockwashers holding front servo apply cylinder. Remove servo retracting spring, retainer, booster spring and ban release piston. Remove piston assembly from apply cylinder.

Inspection: Inspect servo body and front band release cylinder for wear and scoring. See that all passages in servo body are clean and not obstructed and that two steel plugs which seal oil passages are tight and staked in place. See that servo piston locating pin in servo body is in place and tight and that outer end of pin is just below face of servo body. Check 4-3 valve and over-run control valve for wear and

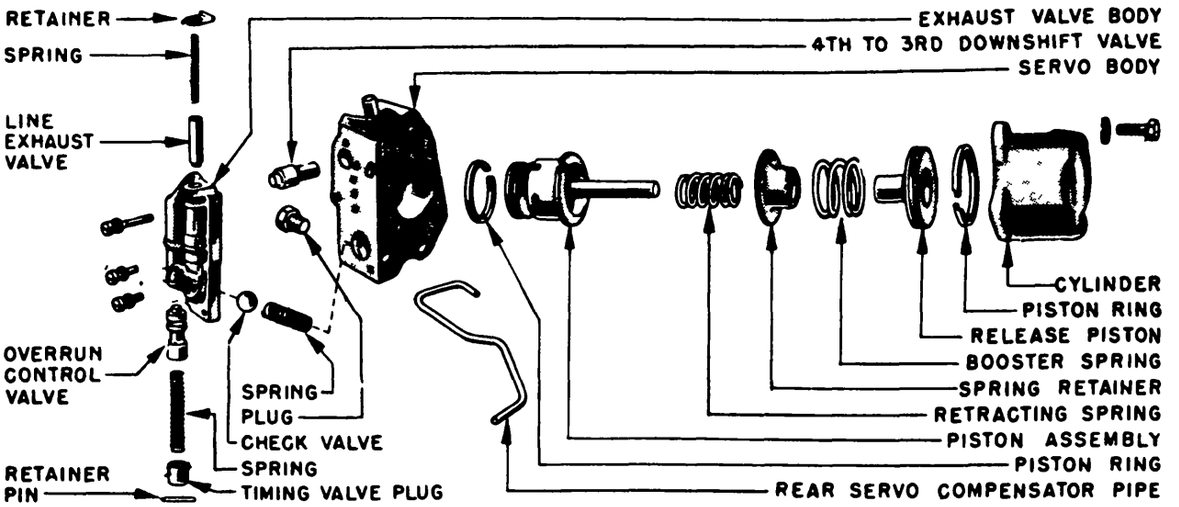
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DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

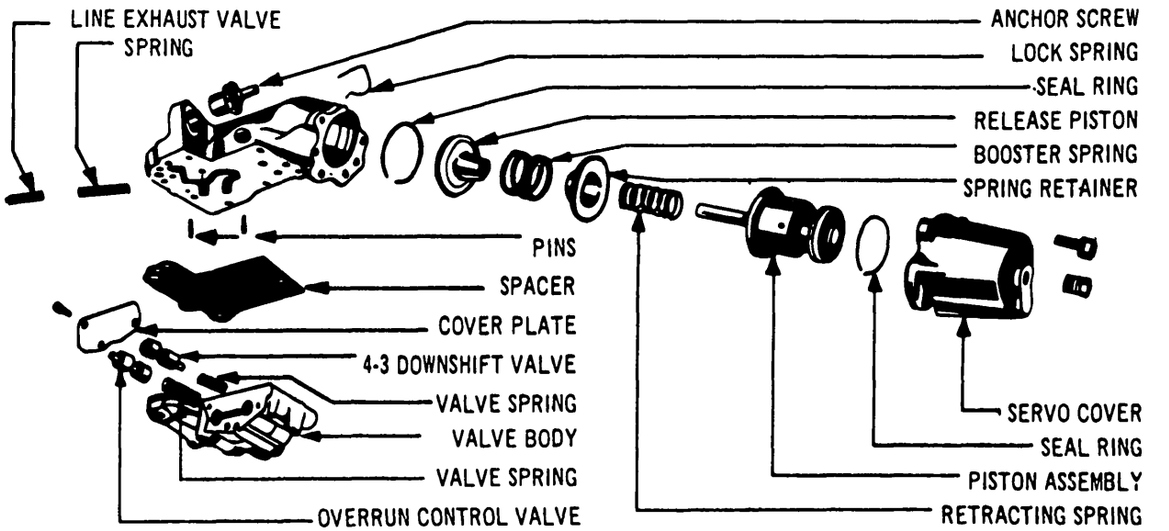
scoring and make certain valves are free in bore. Orifice in 4-3 valve must be clean and not obstructed. Inspect servo piston assembly for wear or scoring, obstructed passages, and worn or broken rings. Make certain rings are free in grooves and that compensator piston works freely in bore in servo piston. Check springs for distortion or collapsed coils by checking approximate free length. *See Control Valve Spring illustration.*

Reassembly: (1953-54 All Models. 1955 Chev. Truck, Hudson, Kaiser, Nash, Rambler, Willys—*NOTE—Lubricate parts as installed.* Install ⅛" plug in bore of front servo body. If oil transfer pipe was previously removed, reinstall pipe in servo body bore, tapping into place with a plastic hammer. Install oil rings on front servo piston and front band release piston. Insert stem of front servo piston assembly through bottom side (small hole) of band release cylinder. Stem of piston is to serve as a guide to install front band release piston in band release cylinder. Carefully compress oil ring on release piston; then install release piston in release cylinder over stem used as a guide. Push release piston and stem down evenly until piston is seated against bottom of cylinder. Remove servo piston and stem used as a guide. While carefully compressing oil seal ring on front servo piston, work piston into front servo body. Be sure groove in piston sleeve locates on positioning pin in servo body. Position retracting spring, release spring retainer, and booster spring over stem of front servo piston. Align drilled bosses in band release cylinder with tapped holes in servo body, then carefully guide band release cylinder down over piston stem, booster spring, spring retainer and retracting spring. Make sure band release cylinder seats squarely on servo body. Install three bolts and lockwashers. Tighten to 6-8 ft. lbs. Insert 4-3 valve in bore in servo body, small diameter of valve into body first. Install overrun control valve, spring and plug in bore of front servo valve body; then while compressing overrun control valve spring with a blunt screwdriver, press against plug and install new overrun control valve retainer pin. Install line exhaust valve in valve body. Compress spring and slide line exhaust valve spring retainer into slot in valve body. Position rear pump check valve ball in seat, and spring in bore of servo body. Make sure 4-3 valve is in bore of servo body; then align front valve body and check valve ball with servo body and check valve spring. Install and tighten three front valve body to servo body attaching screws.

Reassembly: (Cadillac, Oldsmobile, & Pontiac)—Install front servo piston assembly into front servo apply cylinder. Be sure to align slot in sleeve over the small dowel pin in cylinder. Install front servo band release piston into front servo valve body, being careful not to damage ring. Install booster spring over front band release piston. Place retracting spring retainer over piston stem, down onto booster spring. Place retracting spring in retainer. Position front servo apply cylinder and piston assembly on servo body and tighten in place with attaching screws and lockwashers. Install line exhaust valve, spring and pin retainer into servo body. Install 4-3 downshift valve and spring. Overrun control valve and spring, into respective bores in servo valve body. Attach valve body and plate to servo body. Install band adjusting screw into servo body.



TYPICAL FRONT SERVO UNIT (1953-54 ALL MODELS; 1955 ALL MODELS EXC. CADILLAC, OLDSMOBILE & PONTIAC)



TYPICAL FRONT SERVO UNIT (1955 CADILLAC, OLDSMOBILE & PONTIAC)

►***RELEASE CYLINDER-TO-SERVO BODY GASKET CAUTION***—Use a gasket at this point on ALL transmissions (this gasket not used on first transmissions but should be installed whenever servo disassembled to reduce oil leakage between machined surfaces of servo).

REAR SERVO: ***CAUTION—Servo must be disassembled and reassembled in arbor press to control spring pressures.***

Disassembly: Place servo in arbor press with spring retainer up, bring ram down to rest on retainer. Take out two screws and lockwashers holding retainer on servo body, release press slowly until servo spring pressure relieved, remove assembly from press. Remove spring retainer, accumulator spring,

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DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

compensator piston, spring, and accumulator body and piston assembly from servo body. Remove gasket, exhaust valve, and spring from accumulator body, then rest accumulator body on vise with copper jaws, tap accumulator piston through spring and body. Remove booster piston and spring from servo body. Take out cotter pin in each end of band actuating lever pivot pin on servo body bracket, push pin out *(CAUTION*—use care not to lose bearing needle rollers from lever), remove lever and needle bearings.

Inspection: Wash all parts in cleaning solvent and dry thoroughly with compressed air. Inspect parts and check clearances as follows:

Spring Retainer—Check for bending or distortion indicating severe strain, reshape retainer as required.

Compensator Piston—Piston clearance in accumulator piston bore should be .003-.005". Check with feeler gauge. Inspect compensator piston for wear, scores, nicks, or burrs which might interfere with free operation or cause oil leakage.

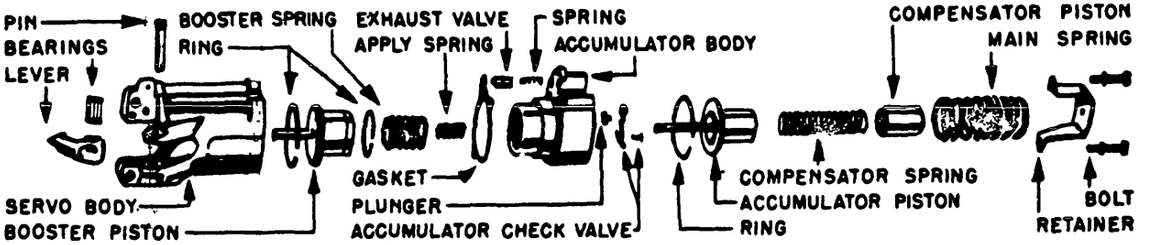
Servo Body & Accumulator Body—Inspect for nicks, burrs, scoring, wear, obstructed passages, and all conditions which might cause oil leakage or prevent free operation. Inspect accumulator check valve and make certain that rivet is tight, valve seats flat on accumulator body, hole in valve is open, and that check valve plunger is free. If required, replace check valve as follows:

Check Valve Replacement—Drive out rivet, remove check valve and plunger from accumulator body. Clean body and passages. Install plunger and check valve (engage plunger groove in notch in valve) so that bleed hole in valve is directly over hole in body, insert rivet through valve and into body. Support rivet head on steel bar clamped in vise and peen rivet securely. Make certain that plunger and valve work freely.

Accumulator Piston & Piston Rod—Inspect piston and rod for nicks, burrs, scoring, wear which might cause oil leakage or sticking. Check piston clearance in accumulator body with feeler gauge (with oil ring removed). Clearance should be .005-.009". Check piston ring gap (ring inserted in body) and side clearance in ring groove. Gap should be .010" maximum and side clearance .0005-.0025".

Booster Piston—Check piston clearance in accumulator body (use micrometer and telescopic gauge), and clearance in servo body (remove oil ring, insert piston in servo body, use feeler gauge to check clearance). Both clearances should be .006-.010". Check large piston ring gap (with ring inserted in servo body) and ring side clearance in groove (with ring installed on piston). Gap should be .010" maximum and side clearance .0005-.0025". Check booster piston rod for free operation in servo body.

Servo Exhaust Valve—***NOTE—Two types used but valves are interchangeable*** (later type has shoulder at "Lo" oil apply end to eliminate possibility of valve hanging up on servo body gasket). Inspect valve and valve bore in accumulator body for scoring, make certain that valve operates freely. Check valve spring for distortion or collapsed coils.



1954-55 TYPICAL REAR SERVO ASSEMBLY

Servo Springs—Inspect all springs for damage, distortion, or collapsed coils. *NOTE*—Double compensator springs (inner and outer) used on some models.

Reassembly: Lubricate pistons and rings with clean hydra-matic fluid before installing and use extreme care not to damage oil rings when inserting pistons in bore of accumulator and servo bodies. Install all parts in reverse order of disassembly sequence (above) and note following important points:

Servo Lever Needle Bearing Assembly—Use heavy grease to hold needle rollers in lever while installing lever and pivot pin.

Booster Piston Springs—Install smaller booster spring (accumulator apply spring) on accumulator piston rod with smaller tapered end of spring toward accumulator body and tap spring on rod until small end seats against shoulder.

Final Assembly—After all parts installed in servo and accumulator bodies, install gasket on accumulator body (use petrolatum to hold gasket) and position accumulator assembly on servo body in an arbor press with ram resting on spring retainer, compress spring to enable retainer screws to be tightened.

►*SERVO EXHAUST VALVE CAUTION*—If first type valve used (without shoulder at "Lo" oil apply end), make certain that gasket aligned so that valve will not hang up on edge of gasket when servo assembled.

PARKING BRAKE BRACKET: Disassembly—Compress the parking blocker piston spring and remove retaining pin with needle nose pliers *(CAUTION*—use care that spring does not fly out), withdraw spring and parking blocker piston. Round off peened head of reverse blocker piston stop pin with a file, pull pin out of bracket *(CAUTION*—use care that spring does not fly out), withdraw spring and reverse blocker piston. This completes disassembly (do not disturb welded crank assembly).

Inspection: Clean all parts thoroughly. Inspect both blocker pistons for scores, burrs, or excessive wear. Check fit of pistons in bores (slight vacuum should be created when piston pulled out with oil hole to sleeve closed by a finger). Check piston springs for distortion or collapsed coils (see spring specifications below). Check bracket mounting face for nicks, burrs, or warped surface which would allow oil leakage, make certain that ¼" plugs are in place in drilled blocker piston passages and that center hole of oil delivery sleeve is plugged and that plug is tight. Make certain governor feed passage is clean and open by running tag wire through passage. Check oil delivery sleeve for scoring or excessive wear. Inspect bracket and crank assembly for free operation of the crank without excessive wear, check crank roller and parking pawl for wear, check for cracks at point where pawl is welded.

Reassembly: Install both blocker pistons and springs (slotted end of piston out), peen both ends of reverse blocker piston stop pin securely. *NOTE*—do not peen end of parking blocker piston retaining pin (this pin retained by pin retainer on lower mounting bolt when unit installed in transmission, pin retainer also seals off oil pressure in bolt hole).

CONTROL VALVE: ***(DISASSEMBLY & REASSEMBLY NOTE): Service procedures on all control valves are similar. Refer to notes and production changes below for differences.***

►***1954 & LATER CONTROL VALVE NOTE: "O" ring type seal used on throttle shaft.***

►***1955 CADILLAC, HUDSON, NASH CONTROL VALVE NOTE:*** 1-2 regulator plug spring has been eliminated and a 1-2 shift valve spring has been added to the control valve assembly.

►***1955 CADILLAC, OLDSMOBILE, PONTIAC CONTROL VALVE NOTE:*** The 3-2 detent plug is located between front valve body and inner valve body and is not accessible by removing the detent plug plate as on other models.

Disassembly: ***See illustration for identification and location of valve parts.***

1) Remove two screws holding inner and outer valve body together. Remove washer on manual control shaft. Separate inner and outer valve bodies and remove spacer plate. Place outer valve body on bench with inside face up. Remove timing valve body assembly from inner valve body by removing two screws and lockwashers.

2) Compress spring and remove timing valve retainer pin, plug, spring and valve. Remove three governor end casting retaining screws and remove end casting, and separator plate. Compress overcontrol valve spring and remove retainer, spring and valve from governor end casting.

3) Remove 2-1 detent plug, 2-3 governor plug, sleeve, and auxiliary valve and the 3-4 governor plug. Remove front valve body plate (regulator plug end casting plate), "T" oil ball check valve and spring. (*CAUTION*—Front valve plate on some early production cars required **four attaching screws**, one being 1/16" shorter. Note location of this shorter screw, as a longer screw in its place will interfere with front valve body to inner valve body attaching screw, causing a leak).

4) Remove detent plug retaining plate from regulator plug end casting and remove the 2-3 detent plug, 2-3 shift valve spring and guide pin (On 1952-53 Oldsmobile and Cadillac, loosen the three regulator plug end casting screws approximately

CONTINUED N NEXT PAGE

DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

3/16" to allow installation of Tool J-5157 over separator plate to hold springs compressed, then complete removal of regulator and casting. Remove tool by pressing down on spacer plate and sliding tool off to allow springs to expand gradually). On other cars remove three screws holding front valve body assembly to inner valve body and remove front valve body assembly and separator plate.

5) Remove following parts from inner valve body: 3-4 shift valve spring, 3-4 lockout valve assembly, 3-4 auxiliary shift spring, 3-4 shift valve, 1-2 regulator plug spring, 1-2 shift valve, 2-3 shift valve spring, 2-3 spring guide pin, 2-3 shift valve, 2-3 governor sleeve and 2-3 auxiliary valve (push these two parts out with pencil or wooden rod).

6) Remove manual valve from outer valve body. Remove detent plunger retainer from outer valve body (three screws), remove retainer plate. Then remove following parts from outer valve body: "T" valve, throttle valve spring, throttle valve, and double transition valve (NOTE—Double transition valve spring not used on 1953-55 Cadillac & Oldsmobile, 1955 Chevrolet Truck, & Pontiac.

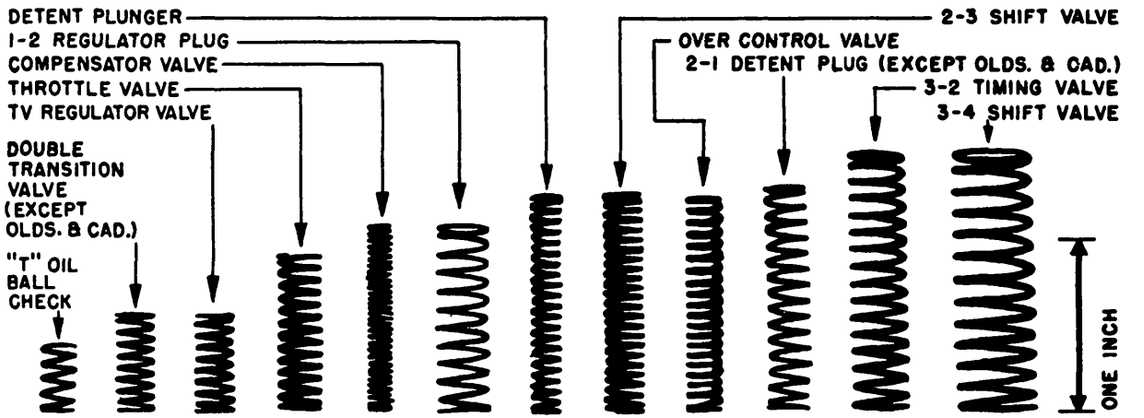
7) Remove front plate from outer valve body (three screws, and remove compensator valve, spring and detent plug. Remove compensator auxiliary plug stop pin (needle bearing roller) holding compensator auxiliary plug in outer body. Remove compensator auxiliary plug by inserting ⅛" welding rod in hole in plug and using another rod, push plug from body. *CAUTION*—Because plug is short, be very careful not to drop it from between rods and have it become lodged in valve body.

Inspection: Clean valve body castings and valve parts in clean solvent *(CAUTION*—clean each valve singly using care not to nick or burr the valves). Inspect all valves carefully for burrs, scores, scratches, and wear. Burrs can be removed with a fine stone or crocus cloth *(CAUTION*—use care not to round off edges, these valves have sharp edges to prevent dirt wedging between valve and body). Inspect valve body castings for nicks, scratches, or warped mating surfaces (check for flatness on surface plate). Check valves and plugs for clearance in body by inserting in proper bore in body (both parts must be clean and dry). Valves should fall through bore of own weight when body tilted and shaken slightly. Check all valves springs for distortion *(NOTE—see illustration for identification of springs)*. Check throttle valve inside lever and shaft for correct fit in hub of inside detent control lever on outer valve body. If shaft excessively worn, binds on shaft, or if oil seal damaged, replace parts.

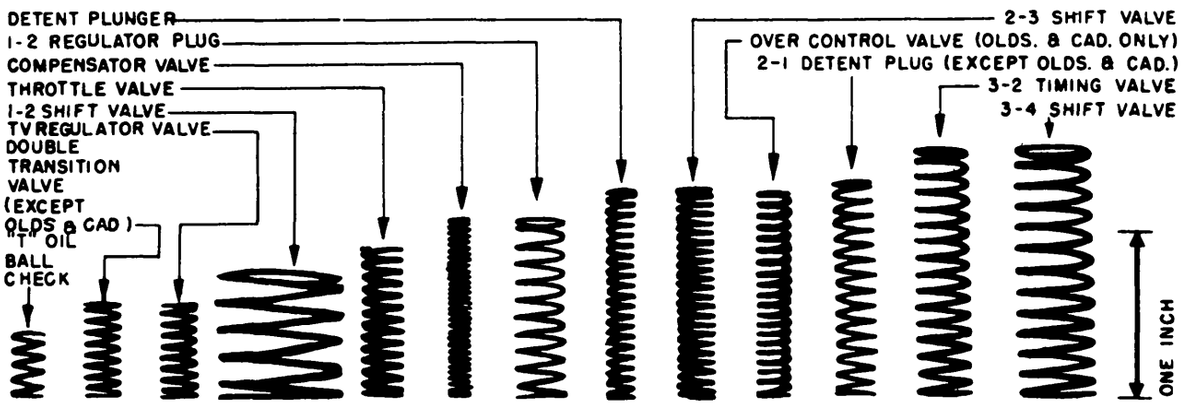
➤*REPLACEMENT VALVE NOTE—Only the manual valve is furnished for service. If other valves or body casting being replaced, install new Control Valve Assy.*

Reassembly: 1) Install compensator auxiliary valve in outer valve body using ⅛" punch or rod to guide valve into place (*CAUTION*—use extreme care not to allow valve to drop down and lodge in body casting). Install pin to hold valve in place.

2) Insert compensator valve, spring, and detent plug in outer valve body, install front plate and secure with three attaching bolts.



1954 DUAL-RANGE HYDRA-MATIC CONTROL VALVE SPRINGS



1955 DUAL-RANGE HYDRA-MATIC CONTROL VALVE SPRINGS

3) Insert double transition valve, transition valve spring (spring not used on 1952-55 Cadillac & Oldsmobile, 1955 Chevrolet Truck & Pointiac), throttle valve, throttle valve spring, and "T" valve in outer valve body, install plate and detent plunger retainer and secure with three attaching screws.

4) Insert manual valve in outer valve body and detent spring and plunger in retainer, align manual valve with inside detent control lever and rotate control lever clockwise to index plunger on detent control lever assembly with groove in manual valve. Install manual shaft inner seal washer with small inside diameter over manual control shaft, dish up. Install manual shaft outer washer with large inside diameter over manual control shaft, dish down. Install rubber manual shaft seal over shaft with lip extending into inside of outer washer. Check to see that by-pass valve on inside of outer valve body seats against spacer plate. Visually perform this by placing plate on edge over by-pass valve.

5) Install following parts in inner valve body: 2-3 auxiliary valve and 2-3 governor sleeve *(CAUTION* —work valve stem into bore carefully so that it does not hang up on sleeve counterbore, check by shaking body assembly to make certain valve is free in bore), 3-4 governor plug (use brass rod in plug hole to assist in installation), 2-3 governor plug, 2-1 detent spring (not used on all transmissions), and 2-1 detent plug. On models with over-control valve, insert the over-control valve and spring in rear valve body. and install retainer clip. On all models, install spacer plate and rear valve body on inner valve body and secure with three attaching screws. *CAUTION—Detent plug can be held in position against the spring tension with the spacer plate while starting the attaching screws.*

6) Complete assembly of inner valve body parts as outlined below. Assembly Clamp, Tool J-5157, will facilitate assembly as follows:

With Tool J-5157—Insert 2-3 shift valve, 1-2 shift valve, 3-4 shift valve, 3-4 auxiliary spring, 3-4 lockout valve, and 3-4 shift valve spring. Depress 3-4 shift valve spring and install tool J-5157 over inner valve body, insert front valve body separator plate under tool tangs and carefully position plate on inner valve body. Insert 2-3 shift valve spring and

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DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

spring guide pin, and 1-2 regulator plug spring through holes in separator plate. Assembly is then ready for front valve body installation (step 9).

Without using Tool J-5157—Insert 2-3 shift valve, spring, and spring guide pin; 1-2 shift valve and spring, 3-4 shift valve, 3-4 auxiliary shift valve spring, 3-4 lock-out valve, and 3-4 shift valve spring. Lay assembly on clean flat surface until front valve assembly has been completed.

7) Insert 3-2 detent plug in front valve body. On control valve assemblies with 3-2 detent plug plate, install plate and attach with two screws, making sure plate is installed correctly to cover bore in valve body.

8) Insert following parts in front valve body: "TV" regulator spring and valve, 1-2 regulator plug, 3-4 regulator plug, "T" oil ball check and spring, install cover plate and secure with three screws (CAUTION—Front valve plate on some early cars had **four attaching screws**, one being 1/16" shorter. This short screw must be installed in the one middle hole closest to center of control valve body, otherwise it will interfere with front valve body to inner valve body attaching screw directly below it and cause a leak). If Tool J-5157 not used, install separator plate on front valve body and insert three screws which attach front valve body to inner valve body. These two assemblies are now ready for joining as follows:

9) Place front valve assembly on clean flat surface in line with inner valve body assembly (see step 6 above) and bring the two assemblies together, aligning the springs protruding from the inner valve body with corresponding plugs in front valve body, start the attaching screws into the inner valve body to maintain alignment. If tool J-5157 being used, slide the tool off the inner valve body at this point. Tighten screws alternately to bring the two valve body assemblies together evenly.

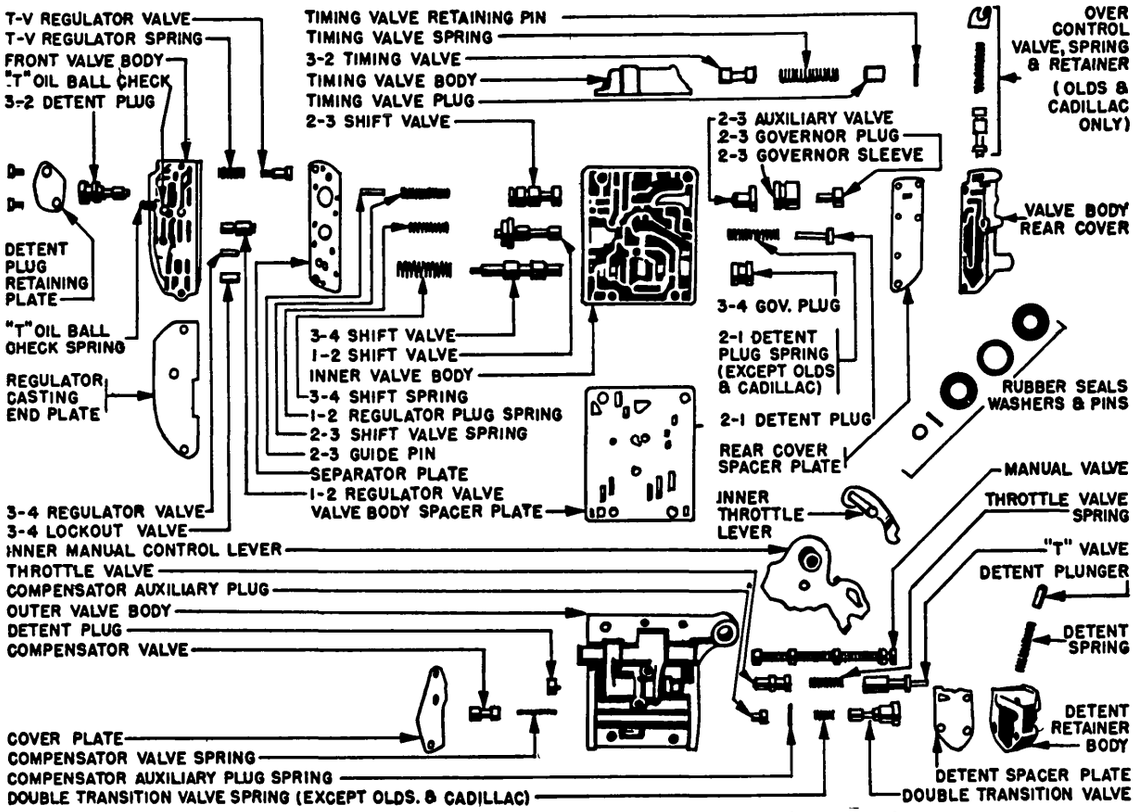
►***CAUTION—Make certain that 3-4 lock-out valve enters inner valve body and that all springs line up with their respective valves and plugs before tightening the screws. Tighten screws alternately and evenly to secure good alignment and contact of the valve bodies.***

10) Insert following parts in timing valve body: 3-2 timing valve, timing valve spring, and timing valve plug. Compress assembled parts and install plug retainer pin. Install timing valve body assembly on inner valve body assembly and secure with two attaching screws.

11) Install spacer plate and outer valve body assembly on inner valve body assembly. Align these parts by inserting four control valve-to-transmission mounting bolts, install and tighten the two attaching screws in the valve body assembly to 3-4 ft.lbs. Remove mounting bolts.

12) Install washers and seal on manual shaft in following order: Inner Spring Washer (washer with large hole—dished side out), Outer Spring Washer (washer with smaller hole—dished side in), Shaft Seal (lip in toward washers).

PRESSURE REGULATOR VALVE: *See Front Pump & Pressure Regulator illustrations for identification of valve parts.*



1954-55 DUAL-RANGE HYDRA-MATIC CONTROL VALVE (TYPICAL)

Disassembly: Separate regulator valve, plugs, and spring from regulator plug.

Inspection: Inspect reverse booster plug and T.V. pressure plug for nicks or scores and see that these plugs have free movement in regulator plug. Check regulator spring for distortion or collapsed coils. Check pressure regulator plug seal and gasket and replace if damaged or worn. Blow out passages in regulator plug with air to make certain these passages clean and open.

Reassembly: Install regulator valve in regulator spring with **small end of spring fitting in groove on valve.** Install T.V. pressure plug and reverse booster plug (chamfered end in) in regulator plug spring and install valve assembly in plug.

Inspection: Inspect valve and valve bore in case for nicks or scores, check to make certain valve works freely in bore of case. Inspect valve sleeve for damage or distortion resulting from sleeve removal. Inspect valve spring for distortion or collapsed coils and make certain spring is correct type for valve (see spring data above).

Reassembly: ***CAUTION—Install same type valve and spring as used originally (see Change Caution above).*** After transmission case has been inspected (below), install valve spring and valve in valve bore in case, make certain that valve works freely and bottoms in valve bore by using ⅛" rod to work valve up and down. Install exhaust valve sleeve with flat on sleeve toward servo side of case (to provide clearance for servo attaching bolt) and tap sleeve in with a clean soft hammer until it bottoms in bore with edge of sleeve just below machined surface of case.

►***CAUTION—DO NOT force sleeve in deeper than bottoming shoulder in case (will interfere with valve operation).***

LINE EXHAUST VALVE (1953-55 CARS): Valve is located in valve body attached to front servo unit.

TRANSMISSION CASE: Inspection—First remove band adjusting screws and oil pressure line plug on top of transmission case, clean case thoroughly with clean solvent. Blow out all oil passages (from underside of case to outside of case). Inspect case for cracks, restricted oil passages, nicked or burred mounting surafces. Check fit of oil delivery sleeve in center bearing cap (sleeve must be tight when bearing cap bolts tightened).

►*See "Pressure Test Point" illustration in TESTING for location of oil passages in case.*

FRONT & REAR BANDS: ***CAUTION—DO NOT pry bands open or distort them in any manner. Bands are surface-ground for drum fit and will be damaged by rough treatment.***

CONTINUED N NEXT PA E

DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

Inspection—Inspect both bands for worn or burned linings, distorted or cracked bands, broken welds at anchor ends, or misaligned strut (rear band only—strut furnished as assembly with band and must pivot freely). Check band adjusting screws and screw hole in case for damaged threads, check adjusting screw locknuts for damage.

TORUS CHECK VALVE: ***This assembly located in hub of driven torus.***

Disassembly (1954-55): *NOTE*—Torus check valve retainer and attaching screws no longer used.

Inspection: Clean all parts thoroughly. Inspect face and inside bearing diameters of check valve for scoring or nicks and make certain valve works freely on driven torus hub. Check valve spring for distortion or collapsed coils. Check end of planet carrier shaft for nicks or burrs that would restrict valve operation.

Reassembly (1954-55): Slide torus check valve over driven hub to check freeness, then remove Torus Check Valve and Spring. Install Torus Check Valve onto mainshaft and at the same time locate Torus Check Valve Spring over hub of driven torus. Locate driven torus against snap ring and install lock plate and locknut. Tighten locknut to 50-60 ft. lbs.

TORUS COVER: ***REPLACEMENT CAUTION—Before replacing cover to correct ring wear in torus cover neck, check the amount of w ar as directed below.***

Inspection: Inspect inner and outer diameter of oil seal hub in cover for scoring, inspect grooved gasket surface for nicks or burrs (two continuous ridges should appear on sealing surface). Inspect splines in torus hub for wear or damage. Check for ring wear in hub, and check hub run-out as follows:

Torus Cover Ring Wear Check—Install a set of NEW front pump oil rings in the torus cover. If end gap of these new rings is NOT MORE THAN .025", cover is serviceable and can be re-installed.

Torus Cover Hub Run-out Check—Mount torus cover on flywheel without gasket using four attaching bolts evenly spaced (two adjacent to dowels and two between these points and 180° apart). Mount dial indicator so that indicating button contacts hub approximately ¼" from edge. Rotate flywheel and check run-out which should not exceed .005". If run-out greater than .005", rotate torus cover 180° on flywheel and recheck. If run-out still excessive, check flywheel run-out (if flywheel run-out less than .005", install new torus cover.

REASSEMBLY F TRANSMISSION (INSTALLATION OF UNITS)

AFTER SUB-ASSEMBLIES OVERHAULED (above) reassemble units in transmission cas in following order:

Front & Rear Units: With front band installed on front unit drum (band can be retained with wire or brake cylinder clamp), install assembly in case by lowering front end of planet carrier into case first. *CAUTION*—Center hole in oil delivery sleeve must be centered between center bearing cap bolt holes and pointing upward. Remove clamp from front band and position anchor end of band over front adjusting screw. Install rear band on rear unit drum and position anchor end of band over rear adjusting screw. Install center bearing cap over oil delivery sleeve with dowel registering with dowel hole in sleeve, use new lockplate and tighten bearing cap bolts to 40-50 ft.lbs., secure bolts by bending lockplate up against bolt head (CAUTION—DO NOT pry lockplate corners up with a screwdriver which may damage edges of case).

►*CENTER BEARING CAP PRODUCTION CHANGE:* Dowel pin hole has been drilled all the way through and dowel is press fitted so that upper end is flush with top of cap. If dowel pin is not indexed with hole in oil delivery sleeve, the dowel pin will push through rather than damage oil delivery sleeve when cap is tightened. *CAUTION*—Bearing cap lockplate must be flat with top of bearing after cap tightened. If it raised up (over dowel pin), dowel pin is not indexed with oil delivery sleeve.

Mainshaft Installation & Endplay Adjustment: Install correct thickness selective washer in counterbore of output shaft. If mainshaft had correct endplay of .004-.015" as measured before disassembly (see disassembly data), use washer of same thickness as removed from this point. If mainshaft endplay was not correct, select washer (see table below) which will provide correct endplay of .004-.015". Use vaseline to retain washer. Install mainshaft in output shaft and mesh center gear with planet pinions.

Mainshaft Selective Washer

Mark	Size	Mark	Size
1	.055-.059"	5	.087-.091"
2	.063-.067"	6	.095-.099"
3	.071-.075"	7	.103-.107"
4	.079-.083"	8	.111-.115"

Reverse Unit & Mainshaft Assembly Installation: Remove rear hub holding tool J-2174 from rear face of rear unit. Install rear clutch hub rear thrustwasher in counterbore of rear hub (use vaseline to retain this washer). Install special tool or wedge screwdriver between center bearing cap and rear clutch drum to prevent drum moving forward *(CAUTION*—insert screwdriver at an angle to prevent damage to oil delivery sleeve). See that new gasket in place on mounting face of rear bearing retainer or extension housing (gasket can be retained by vaseline) and that key is in place in keyway of stationary cone (key can be retained with lubriplate). Install the reverse unit and mainshaft assembly in rear end of transmission engaging the stationary cone key in keyway in case and meshing rear planet gears in rear unit (NOTE—revolving output shaft will facilitate meshing the gears). Align rear bearing retainer bolt holes with holes in case and just start the six bolts to align the assembly. Install the six reverse flange attaching bolts and lockwashers (remove wedging screwdriver after bolts finger-tight), tighten these bolts evenly to 10-13 ft.lbs. *(CAUTION*—use care not to distort flange and check for binding by holding output shaft and turning mainshaft). Tap or push rear bearing retainer solidly against case, tighten five rear bearing retainer bolts evenly to 28-33 ft.lbs. *(NOTE*—bolt which mounts parking pawl in case need not be torqued at this point). Check entire assembly for free operation by turning mainshaft, output shaft, and front and rear unit drums.

►***MAINSHAFT ENDPLAY CAUTION—Check mainshaft endpay at this point BEFORE proceeding with reassembly:***

►*NASH ENDPLAY GUIDE TOOL REWORK (For use with Statesman & Rambler 11" Torus)*—Revise the Endplay Guide Tool J-2587 for use with all Nash Transmissions as follows: Shorten tool 23/32" (from 5" to 4 9/32") by cutting off the necessary amount from mainshaft-bore end of tool, then deepen bore to 1 3/32", and chamfer sharp outer edge of tool.

Mainshaft Endplay Check—Install special tool or wedge screwdriver between center bearing cap and front clutch drum to hold front unit forward *(CAUTION*—insert screwdriver at an angle to prevent damage to oil delivery sleeve). Install mainshaft endplay guide J-2587 over forward end of mainshaft and front planet carrier. Use special mounting fixture tool J-1465 to mount dial indicator on front of transmission case so that it contacts front face of guide tool. Move mainshaft back and forth *(CAUTION*—do not force shaft) and note endplay. If endplay correct (.004-.018"), remove tool and install snap ring in forward end of shaft. If endplay not within limits, remove reverse unit assembly and change selective washer. ***See Mainshaft Installation & Endplay Adjustment above.***

Front Pump & Drive Gear: Make certain that bronze thrustwasher in place on intermediate shaft against front planet carrier. Position front oil pump "O" ring seal in case and install pump and drive gear assembly on intermediate shaft (CAUTION—Align pump cover locating slot with locating washer counterbore in case), install locating washer in counterbore, install attaching bolts and tighten to 10-13 ft. lbs. Cover should protrude .003-.015" out of case. If pump cover protrudes less than .003", remove pump and add one of the earlier type gaskets (gaskets were replaced by "O" ring seals in 1954 transmissions). Install special bronze and steel thrust washers in that order over intermediate shaft and against front end of front drive gear, install snap ring to retain these washers.

Rear Pump & Governor Assembly Installation: Position reverse drive flange so that one attaching bolt is straight up, turn governor so that large round weight is forward, slide assembly into place in transmission entering governor end first through bottom of case and meshing driven gear with bronze

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DUAL-RANGE HYDRA-MATIC OVERHAUL (C ntinued)

drive gear on reverse planet carrier. Install attaching bolts and lockwashers and tighten to 15-18 ft.lbs. Check governor run-out (see below), then loosen attaching bolts (to assist in aligning governor and oil delivery sleeve during parking brake bracket installation below).

Governor Run-out Check—Mount dial indicator on side of transmission case so that indicating button contacts oil delivery sleeve approximately ¼" from end. Rotate transmission driven shaft by hand and note governor run-out. If run-out is less than .005", installation is OK. If run-out exceeds .005", remove governor assembly and check run-out at face of drive flange. If drive flange run-out is less than .002", re-install governor with body rotated 180° from previous mounting location and recheck governor run-out. If run-out still excessive, replace governor and sleeve. If drive flange run-out exceeds .002", one or more of following parts require replacement: governor drive flange, gear set, or complete rear oil pump assembly.

Parking Brake Bracket Installation: Remove rear bearing retainer bolt which mounts parking pawl (do not re-install this bolt until later), install parking pawl and position pawl as far down in case as possible. Turn rings so that gaps are aligned and pointing up. Install two oil delivery pipes in parking brake bracket and install assembly by rotating it back and forth as it is pushed on governor. *(CAUTION—Use care not to damage oil rings on governor).* Start bracket to case screws but DO NOT tighten screws at this point.

►**Parking Brake Bracket Shims**—Shims used between transmission case and parking brake bracket on some early 1953 cars to insure correct alignment. DO NOT INSTALL SHIMS IF ORIGINAL TRANSMISSION CASE REPLACED.

(CAUTION—special parking blocker piston retainer must be used on lower screw). Install roller on parking brake pawl crank, raise pawl in position and install pawl support bolt with special lockplate under bolt head, tighten this bolt to 23-28 ft.lbs. and bend lockplate against bolt flat. Install parking pawl return spring *(CAUTION*—spring must be placed OVER inside oil delivery pipe to provide additional spring tension on manual lever when in reverse position). Install reverse clutch pipe with "L" end of pipe in rear of transmission case. Install special Governor Alignment Tool J-4731 between governor and sleeve and tighten the bracket screws (15-18 ft.lbs.) and rear pump attaching bolts (15-18 ft.lbs.) while turning the aligning tool to check for binding. Tool should turn freely and governor should rotate freely (within backlash limits). Check alignment at four points (turn output shaft to rotate governor shaft ¼ turn each time). If governor or tool binds at any point, loosen bracket and pump attaching screws and repeat tightening procedure. If free operation cannot be secured, check governor and drive flange run-out (above).

Control Valve Assembly Installation: Engage control valve on oil delivery and reverse clutch pipes by sliding valve assembly forward on transmission case. Set inner detent lever in "Lo" range, install four attaching bolts and lockwashers and tighten to 6-8 ft.lbs. Install pressure regulator reverse oil pipe in control valve and case.

Pressure Regulator Assembly Installation: Use new gasket on pressure regulator plug (install gasket with seam toward threaded end of plug) and new neoprene rubber seal, insert assembly in transmission case using extreme care not to damage rubber seal, tighten plug to 40-50 ft.lbs. If oil pressure line pipe plug not previously installed in hole between band adjusting screws, install plug using sealing compound (Permatex #3 etc.) on plug threads.

Front & Rear Servo Installation: Install front pump delivery pipe in front pump body and rear pump discharge pipe in hole in rear pump. Position front servo with piston stem in socket on end of front band, engage servo on front pump delivery pipe, insert end of rear pump discharge pipe in servo, lower servo into position on case, insert attaching screws and lockwashers *(CAUTION*—do not turn screws in more than 2-3 threads at this time). Install rear band release spring (between ends of rear band). Place rear servo in position on case, entering transfer pipe in servo and engaging actuating lever with rear band strut. Install two rear servo attaching bolts, then tighten all front and rear servo bolts evenly to 23-28 ft.lbs. Adjust front and rear bands *(see BAND ADJUSTMENT).* After servos installed, tighten front pump attaching bolts to 10-13 ft.lbs. torque. Install front pump intake pipe (this pipe can be installed with oil screen later).

Side Cover & Outer Shift Lever Installation: Install side cover with new gasket over manual shaft, install side cover attaching screws and washers using NEW COPPER WASHERS on lower screws, tighten screws finger-tight, shift cover as necessary to centralize manual shaft in hole, then tighten screws to 10-12 ft.lbs. Install outer shift lever and tighten clamp bolt to 10-13 ft.lbs. *NOTE*—Outer throttle control lever will be installed after transmission installed in car.

Oil Screen & Oil Pan Installation: Install oil screen and front pump intake pipe as an assembly, entering pipe through "O" seal ring in front pump body and positioning screen on rear pump intake pipe. Install oil pan with new gasket, enter all oil pan screws to line up pan, tighten screws to 10-13 ft.lbs. Install drain plug with new gasket and tighten plug to 35-45 ft.lbs.

Torus Member Assembly & Rear Flywheel Housing Installation: Position rear flywheel housing on front of transmission case and tighten attaching bolts to 40-50 ft.lbs. torque. Install torus cover with splines in torus hub aligned with splines on front drive gear, push torus cover evenly into place *(CAUTION*—do not rock cover or handle it roughly which will damage oil seal rings). Install drive torus, aligning splines with splines on front planet carrier, install snap ring. Install driven torus on main shaft and make certain that it seats against snap ring. Use NEW lockplate under mainshaft nut, place shift lever in Reverse "R" position (extreme rear position), tighten nut to 50-60 ft.lbs. (except Cadillac 30-35 ft.lbs.), bend lockplate ears up against nut flats. Install oil filler cap (or breather where separate filler pipe used).

DUAL-RANGE HYDRA-MATIC

Chevrolet Trucks (1956-60)
Hudson, Series 40 & 60 (1956)
Nash, Series 40 & 60 (1956)
Oldsmobile, Series 88 (Early 1956)
Pontiac, Series 860 & 870 (Early 1956)
Rambler, Series 5610 (1956)

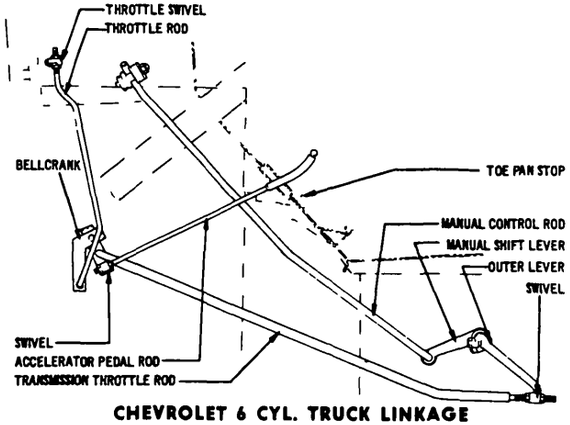
►CHANGES, CAUTIONS, CORRECTIONS

►*HUDSON, NASH & RAMBLER REAR BEARING RETAINER OIL SEAL INSTALLATION CAUTION:* Two types of oil seals are furnished for service replacement. While the construction of the seals is slightly different, both types must be installed in transmission so the felt portion of seal is toward rear of transmission.

►*1956 HUDSON & NASH JUMPING OUT OF REVERSE CORRECTION:* This condition may be caused by improper manual control linkage adjustment, or back-up light switch (if so equipped). On cars with back-up lights, do not adjust control linkage until switch adjustment is checked. Loosen or disconnect the switch at manual control lever on side of transmission. Operate car in reverse several times to determine condition. If loosening up or disconnecting the back-up light switch corrects the condition, readjust switch to proper spring tension as follows Place control lever in reverse and adjust switch cable just enough to allow spring to pull switch rod to the contact position.

►*1956 RAMBLER JUMPING OUT OF REVERSE CORRECTION.* This condition may be caused by improper adjustment of back-up light switch (see above), or a binding condition at clevis to throttle valve lever while in a reverse position. If clevis is binding, remove clevis and increase the slot 1/16" by filing both sides. If the condition continues to exist, proceed as follows: Remove transmission side pan. Remove detent plunger retainer and reverse oil delivery pipe *(NOTE* - Place finger over detent plunger while removing it and the oil delivery pipe). Install a 3/16" ball bearing, Part No. G-169067, in detent plunger retainer and replace the spring and plunger (this will increase spring tension holding inside detent control lever in reverse position). Reinstall plunger, retainer plate, and reverse oil delivery pipe. Install side pan and levers. Position shift lever on transmission in "D-3" position and adjust the clevis with steering gear shift operating lever against stop on starter switch housing. Remove clevis pin and **length in rod by turning clevis two full turns.** Install Hydra-Matic fluid.

►*1956 RAMBLER 3-4 DELAYED (LIGHT THROTTLE) UPSHIFT (Cars before Serial No. D-331043 having the "E-56" Hydra-Matic Transmission)* Replace accelerator shaft, Part No. 3145969, with Part No. 3149854 on which the throttle valve bellcrank rod lever has been relocated from 7° below center line of shaft to 33° above center line. Replace throttle valve bellcrank adjusting upper rod, Part No. 3146947, with Part No. 3149922 which is a straight rod with a 90° bend on one end. Replace accelerator rod, Part No. 3146821, with Part No. 3149851. Replace accelerator rod clip, Part No. 3131561, with Part No. 3131562. Install accelerator rod, with clip so upper end of rod enters accelerator shaft lever from the rear. Adjust throttle valve linkage (see "Carburetor" on Car Model pages). *NOTE* - The above parts are furnished as a kit, Part No. 3200110, and are also furnished separately.



CHEVROLET 6 CYL. TRUCK LINKAGE (EXCEPT FORWARD CONTROL)

DESCRIPTION

DESCRIPTION: Fluid coupling and hydraulically operated planetary transmission of same design used on previous models *See "1954-55 Dual-Range Hydra-Matic".*

OPERATION

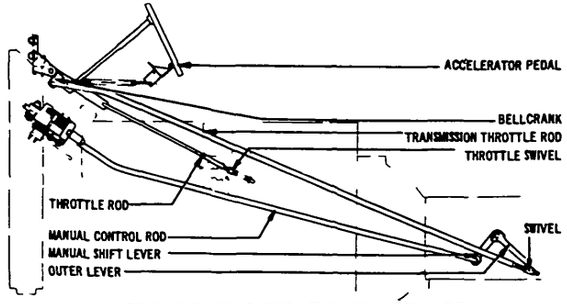
Planetary units and controls operate in same manner as on previous models

LUBRICATION

Lubrication Intervals: Check fluid every 1000 miles (Hudson, Nash, Oldsmobile, Rambler). 2000 miles (Pontiac), every day (Chev. Truck). Drain and refill every 25,000 miles.

Oil Level Indicator or Vent Air Cleaner – Clean the mesh type air cleaner (in cap on right top side of transmission case) every 10,000 miles or twice each year.

Checking Fluid Level: Check fluid level with engine warm and idling at slow idle speed (choke valve open, fast idle inoperative). With transmission oil hot, run engine for at least two minutes with selector lever in "N" (Neutral) position (to insure fluid coupling being filled). Check fluid level on dipstick located under hood on right hand side of engine, all cars except Chevrolet truck. On Chevrolet truck the oil filler and dipstick are located under access opening in center floor pan. Add fluid as required to bring level up to "F" mark on dipstick. *NOTE* - Approximately 1½ to 2 pints required to raise level from "L" to "F".

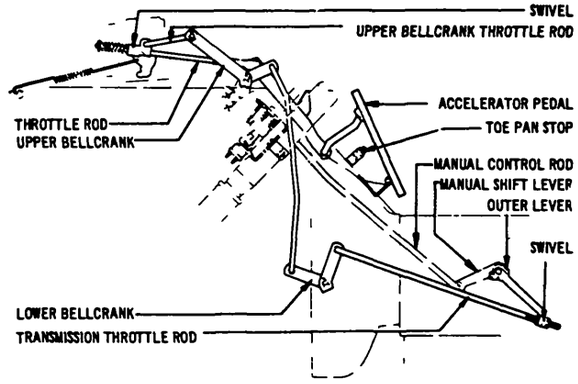


CHEVROLET 6 CYL. TRUCK LINKAGE (FORWARD CONTROL)

►*CAUTION· Do not fill above "F" mark on dipstick (may cause foaming when oil is hot).*

Draining & Refilling: Drain oil only when transmission is warm (after normal operation). Remove flywheel housing lower cover (or hand hole cover) turn fluid coupling until drain plug in torus cover points downward. Remove plug and drain coupling. Remove drain plug at rear of transmission oil pan and drain transmission case. Replace both drain plugs and tighten securely. Install 8 qts. (Oldsmobile), 5 qts. (Chev. Truck), 5 to 7 qts. (Hudson, Nash & Rambler), 9½ qts. (Pontiac), of Automatic Transmission Fluid Type "A", bearing an AQ-ATF number on container. Start engine and run it at a speed equivalent to 20 MPH for at least 1½ minutes with selector lever in "N" to fill fluid coupling. Return engine speed to slow idle and recheck transmission fluid level. Add sufficient fluid to bring fluid level up to "F" mark on dipstick.

Fluid Capacity (Refill): 8½ qts (1956 Chev Truck, without cooler), 9 qts (1957-58 Chev Truck, without cooler), 9½ qts (1956 Chev Truck, with cooler), 10 qts (1957-58 Chev Truck, with cooler), 11 qts (Hudson Hornet & Nash Ambassador), 8½ qts (Other Hudson & Nash models, and Rambler), 9¾ qts (Oldsmobile), 9½ qts (Pontiac)



CHEVROLET V8 TRUCK LINKAGE

LINKAGE ADJUSTMENT

►*THROTTLE LINKAGE ADJUSTMENT NOTE: See CARBURETOR on Car Model pages.*

CHEVROLET TRUCKS

Manual Control Linkage: (All Models)—Move shift control lever from "N" position to first detent that is felt In this position indicator should line up with symbol "1-4" Check control lever in each of the other positions for indicator alignment If adjustment is not satisfactory, proceed as follows If gear-

CONTINUED ON NEXT PAGE

DUAL-RANGE HYDRA-MATIC (C ntinu d)

shift control shaft upper support bracket is loose, tighten the clamp screw while holding control lever firmly against stop between "1-3" position and "1-2." While holding lever in "1-3" against the stop which prevents accidental shift into "1-2," loosen gearshift control rod swivel. Make sure transmission outer lever is in the three speed drive position "1-3" (third position from front or rear). With control lever in "1-3" position and held against stop, and with transmission outer lever in the three speed drive position, tighten gearshift control rod swivel.

N utral Safety Switch Adjustment: Place control lever in "1-4" position. With ignition off, operate starter control. Starter **should not operate.** If it does, check the other positions in the same manner. If starter operates in any position except "N," adjust as follows: Loosen two switch assembly mounting screws. Place selector lever in "N," and with clip over flats on end of shifter shaft, insert pin into mounting bracket of switch and locating plate. Tighten screws to secure switch in this position and remove locating screws.

HUDSON (EXCEPT RAMBLER)

Manual Control Linkage: (All Models)—Place selector lever in "D-3" position and set operating lever against the stop on housing bracket. Remove clevis pin from gear shift control rod at side of transmission case and remove clevis from shift lever. Place transmission lever in "D-3" position and adjust clevis so pin passes freely through hole in clevis and in lever *(NOTE*—Be sure that operating lever is against stop on housing bracket). After adjustment has been completed, lengthen the control rod two full turns and replace clevis and cotter pin.

NASH (EXCEPT RAMBLER)

Manual Control Linkage: (All Models)—Place selector lever in "D-3" position and set lever against stop on starting switch bracket. Remove clevis pin from gear shift control rod at side of transmission case and remove clevis from shift lever. Place transmission shift lever in the "D-3" position and adjust clevis so pin passes freely through hole in clevis and in lever. *(NOTE*—Be sure that operating lever is against stop on housing bracket). After adjustment has been completed, lengthen the control rod two full turns and replace clevis and cotter pin.

OLDSMOBILE

Manual Control Linkage (All Models): Loosen jam nut on shift rod clevis and neutral safety switch. Remove clevis pin from shift rod. Move manual control lever at side of transmission all the way forward into "N" position. Then raise and hold shift lever beyond "N" position against side of opening in jacket. Adjust shift rod clevis so that end of clevis contacts outside diameter of bushing in lower shift lever. Return lower shift lever to "N" position, insert clevis pin through clevis and bushing, assemble cotter pin to clevis pin.

Neutral Safety Switch Adjustment: Set transmission in "N" detent. With switch assembled to steering column and link connected to shift lever, insert .090" pin through switch lever and bracket. Tighten mounting bolt and withdraw .090" pin. Check setting by applying hand brake firmly, placing shift lever in "DR" position, and turning ignition switch to "Start." While holding switch on "Start," slowly move shift lever toward "N" until engine cranks and starts. Without moving shift lever after engine starts, accelerate to determine whether transmission is in gear. If switch properly adjusted transmission will not be in gear and car will not move.

PONTIAC

Manual Control Linkage: Place selector lever in "D" (right) position against stop which prevents accidental shift into low range. Loosen both front and rear trunnion locknuts and remove trunnion from transmission outer shift lever. Make sure that transmission outer shift lever is in "D" (right), which is second detent from front. Install trunnion (with locknuts loose) in outer shift lever, tighten front locknut against trunnion finger tight to remove clearance in linkage, tighten front locknut **one** complete turn to lengthen rod. Tighten rear locknut.

Neutral Safety Switch Adjustment: Place selector lever in "D" (left) position. Loosen switch mounting screw and adjust switch bracket to a position where starter will not operate when ignition key is turned to the start position. Place manual control lever in "N" position. Make certain that switch arm does not touch stop on switch bracket. Tighten mounting screw.

RAMBLER

Manual Throttle Linkage: Place selector lever in "D-3" position and set lever against stop on starting switch bracket. Remove clevis pin from gear shift control rod at side of transmission case and remove clevis from shift lever. Place transmission shift lever in "D-3" position and adjust clevis so pin passes freely through hole in clevis and in lever. *(NOTE*—Be sure that operating lever is against stop on housing bracket). After adjustment has been completed, lengthen the control rod two full turns and replace clevis and cotter pin

BAND ADJUSTMENT

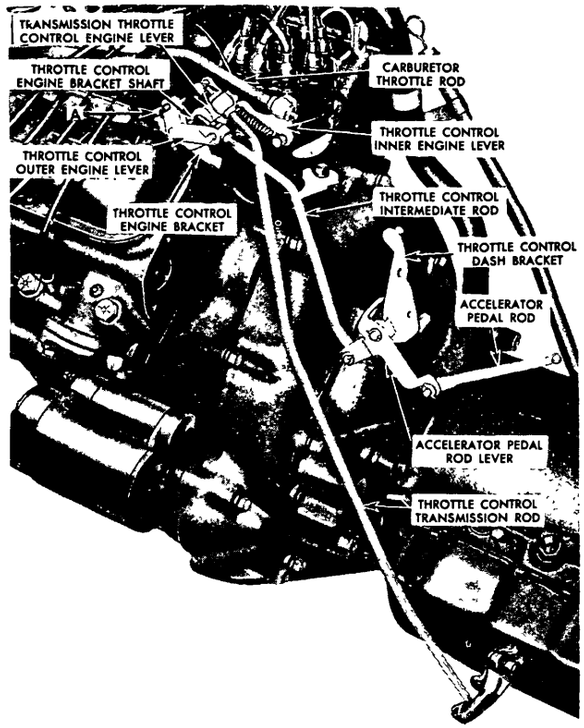
►*OLDSMOBILE, PONTIAC & 1957-58 CHEV. TRUCK FRONT & REAR BAND ADJUSTMENT CAUTION: Do not adjust bands externally. Internal adjustment must be made in all instances. See procedure below.*

EXTERNAL BAND ADJUSTMENT (Not used on Oldsmobile & Pontiac); Adjusting tools and an accurate tachometer as indicated below, must be used.

►*BAND ADJUSTMENT CAUTION:* Do not attempt to adjust bands externally (without removing oil pan) unless adjusting tool J-2681 (Hudson No. J-2681A) and an accurate tachometer are used. Otherwise, remove oil pan and use special servo gauges.

1) Block front wheels securely and set hand brake firmly to prevent car moving while adjusting. Remove floor mat and adjusting hole cover over adjusting screws on left side of transmission. Run engine until temperature is normal and engine is at normal idle speed. Connect and adjust tachometer for accurate recording of engine speed.

2) Place selector lever in "Dr" position. ("Dr 4"). Adjust carburetor throttle stopscrew so that engine idles



PONTIAC HYDRA-MATIC LINKAGE

at exactly 700 RPM. Adjust front band as follows: Install adjusting tool on front band adjusting screw, loosen adjusting screw locknut (turn long handle while holding short handle stationary). Loosen band adjusting screw (turn short handle) until engine speed increases to 900-1000 RPM *(NOTE* - If no increase in speed is noted when adjusting screw loosened, band has probably been slipping in service. Remove oil pan and inspect band and drum. With pan off, adjust bands as directed in "Adjustment - With Pan Off" below and disregard following steps).

3) Tighten band adjusting screw slowly until engine speed drops to 700 RPM (front drum now stopped). Loosen band adjusting screw until engine speed increases and tighten again slowly until engine speed returns to 700 RPM *(NOTE* - The object in loosening and retightening the screw is to locate exact point at which the band stops the drum from spinning). At this point wait 30 seconds. If engine speed increases, tighten screw 1/10 turn. Wait 30 seconds and if engine speed again increases, tighten screw 1/10 turn more. Repeat this procedure until engine speed remains at 700 RPM for at least 30 seconds.

4) Set counter on tool to 00. While holding locknut stationary with long handle of tool, tighten adjusting screw exactly 7.7 turns (Exc. Chev. Truck); 6.5 turns (Chev. Truck) as indicated on counter. Hold adjusting screw from turning and tighten locknut.

CONTINUED ON NEXT PAGE

DUAL-RANGE HYDRA-MATIC (C ntinu d)

5) Adjust rear band as follows: Install the adjusting tool on rear band adjusting screw and loosen locknut. Loosen band adjusting screw until engine speed increases to 900-1000 RPM *(NOTE* - If no increase in engine speed noted when band adjusting screw loosened, band has probably been slipping in service. Remove oil pan and inspect band and drum. With pan off, adjust bands as directed in "Adjustment - With Pan Off" below, and disregard following steps).

6) Tighten band adjusting screw until engine speed drops to 700 RPM, loosen adjusting screw until engine speed increases, then tighten adjusting screw until engine speed again drops to exactly 700 RPM, wait 30 seconds and if engine speed increases, tighten adjusting screw 1/10 turn. Repeat this procedure until engine speed remains at 700 RPM for at least 30 seconds.

7) Place selector lever in "N" position. Set counter on adjusting tool to 00. Hold locknut stationary, tighten band adjusting screw **exactly 2 turns** as indicated on tool counter. Return selector lever to "Dr" position. Hold band adjusting screw from turning and tighten locknut securely. After both bands adjusted, reset engine to correct idle speed as indicated below.

Idl Speed Setting

Car M d l	Idl Speed	Selector Lever
Chev. Truck	425 RPM	"N"
Hudson	490-510 RPM ℂ	"N"
Nash	450 RPM ②	"N"
Oldsmobile	400 RPM ℂ	"DR"
Pontiac	450-470 RPM ℂ	"N"
Rambler	475 RPM ②	"N"

ℂ — Compressor must be running on cars with air conditioning.

② — 500 RPM, with compressor running on cars with air conditioning.

INTERNAL BAND ADJUSTMENT (Use on Oldsmobile, P ntiac, and 1957-58 Ch vrolet Trucks at all times, and on th r cars wh n il pan removed for other work): Drain transmission oil pan and remove pan. Remove floor mat and floor hole cover over band adjusting screws.

Fr nt Band (Gaug J-1693): Loosen locknut and back off front band adjusting screw approximately 5 turns. Make certain that band is centered on drum. Remove pipe plug from bottom of front servo. Loosen hexagonal headed adjusting screw on gauge by hand until approximately 1/8" of adjusting screw threads are exposed above gauge body. Screw gauge into pipe plug hole in front servo by hand. Ti ghten hexagonal adjusting screw on gauge by hand until gauge stem is felt to just touch piston in servo, then continue to t i g h t e n adjusting screw with a wrench **xactly five full turns** from point where stem first contacted piston. Tighten front band adjusting screw until knurled washer on gauge (at upper end of hexagonal adjusting screw) is just free to turn. Hold band adjusting screw from turning and securely tighten adjusting screw locknut. Loosen gauge adjusting screw at least six turns, remove gauge from servo. Install pi pe plug in servo and tighten securely.

R ar Band (Gaug J-5071): With band centered on drum, tighten band adjusting screw until actuating lever contacts face of gauge (gauge positioned on servo with short leg gauge hooked over accumulator body and long leg resting on servo piston stem). *(CAUTION* - If adjusting screw is accidentally turned beyond adjustment, loosen two or three turns and repeat adjustment). Hold band adjusting screw and tighten adjusting screw locknut to 40-50 ft. lbs.

TESTING

►***"DUAL-RANGE" HYDRA-MATIC TESTING NOTE:*** **These transmissions have MODULATED PRESSURE and HYDRAULIC REVERSE and following test procedure will apply to all transmissions:**

ROAD TEST: Operate the car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation: Hilly section to check full-throttle upshifts, slippage, and throttle downshifts; a level section to check closed throttle upshifts; and a quiet section to check for noise. *See Hydra-Matic Shift Point table for correct shift speeds.*

STALL TEST: Can be used to check engine and transmission performance. Connect accurate electric tachometer to check engine speed. Start engine and warm up engine and transmission to operating temperature. Apply foot brake firmly and set hand brake tight. Set selector lever in "Dr. 4" position. Depress accelerator pedal to the floor and NOTE ENGINE RPM. If engine speed not within limits shown in table, make further tests as indicated below.

►***CAUTION—Use extreme care in making this test and NEVER HOLD THROTTLE OPEN MORE THAN ONE MINUTE (15-20 seconds preferably). If engine speed exceeds maximum figure shown in table, CLOSE THROTTLE IMMEDIATELY to avoid possible damage to transmission.***

If engine speed below minimum—Engine requires tune-up, or front unit is locked up.

If engine speed above maximum—Bands are slipping, Torus check valve leaking or missing, or torus members damaged. Localize the trouble by making the following tests before adjusting the bands:

Check to determine which band slipping—Repeat the stall test (above) with selector lever in Revere "R" position. If engine speed still excessive, Front Band or Front and Rear Bands are slipping. If engine speed within limits, Rear Band only is slipping. Adjust bands.

Check for Missing or Leaking Torus Check Valve: Set hand brake lever securely, start engine and run at speed of 20 MPH. for approximately 1½ minutes. Reduce engine speed to normal idle speed, check fluid level and make certain that it is at "Full" mark on dipstick. Shut off engine and allow car to stand for 10 minutes. Recheck fluid level without starting engine. If level has not raised more than ½", torus check valve is operating satisfactorily and slipping bands or damaged torus members are indicated.

STALL TEST LIMITS

Car Model	Minimum RPM	Maximum RPM
Chev. Truck	1400	1600
Hudson Hornet	1700	1900
Hudson Wasp	1600	1800
Nash Ambassador	1550	1650
Nash Statesman	1600	1800
Oldsmobile	1750	1875
Pontiac	1800	2000
Rambler	1600	1800

MAIN LINE OIL PRESSURE: *PRESSURE GAUGE NOTE*– It is recommended that a 300 lb. gauge (J-2540-A) be used for making pressure tests.

Checking Main Line Oil Pressure – Connect gauge at main line oil plug hole on top of case between band adjusting screws (accessible by lifting floor mat and removing metal plate over band adjusting screw hole). Make the following tests on the road (or with car up on jacks so that engine can be run to simulate road performance) after engine has been run sufficiently so that engine and transmission are at operating temperature.

Idling Oil Pressure – With engine running at normal idle speed, note gauge pressure with selector lever in each position. In general, pressure should be equal in "N", "Dr4", "Dr3", and "Lo" (10 lbs. maximum variation), and higher in "R". *See table below for specified pressures.*

Zero Throttle Pressure – With selector lever in "Dr4" position, o p e r a t e car at speed higher than 30 MPH (Exc. Chev. Truck), 19-22 MPH (Chev. Truck), close throttle, note gauge reading just as car speed drops to 30 MPH (Exc. Chev. Truck); 19-22 MPH (Chev. Truck). *See pressure table.*

Full Throttle Pressure–With selector lever in "Dr4" position, operate car at approximately 25 MPH (Exc. Chev. Truck); 17 MPH (Chev. Truck), depress accelerator pedal to point where detent resistance is felt but DO NOT go through the detent (this would result in forced 4-3 downshift), note gauge reading just as car speed reaches 30 MPH (Exc. Chev. Truck); 17 MPH (Chev. Truck). *See table b e l o w for specified pressures.*

► *SHOP TEST NOTE:* If above test being made in the shop (with car on stands), this full throttle position of the control valve can be obtained by disconnecting throttle control rod at lever on side of transmission case and moving lever to the full throttle position (DO NOT move lever through detent), then note gauge reading.

Reverse Pressure – With car standing, place selector lever in "R", apply foot brake firmly to hold car stationary, accelerate engine to half throttle position, note gauge reading. *See table below for specified pressures.*

Main Line Oil Pressures

Car Model	ℂ Idling	Zero Thtl.	Full Thtl.	R v.
Chev. Truck		60-68	85-93	135 Min.
Hudson	50 ②	60 Min.	80 Min.	125 Min.
Nash	50 ②	60 Min.	80 Min.	125 Min.
Oldsmobile	50 ℂ	60 Min.	85 Min.	150 Min.
Pontiac	50	64-72	101-109	145-185
Rambler	50	60 Min.	80 Min.	125 Min.

ℂ – Minimum pressure.
② – 60 lbs. maximum in all ranges.
ℂ – Idling at 400 RPM
ψ – Idling at 600 RPM.

► *CHECKING REAR OIL PUMP·* Operation of rear pump alone can be checked by the following procedure (Idling test above will check operation of front pump alone,

CONTINUED ON NEXT PAGE

DUAL-RANGE HYDRA-MATIC SHIFT POINTS

CHEVR LET TRUCK

1956 HALF-TON - 3.09-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	5-7	8-10	16-18
(At Detent)	10-13	22-25	43-48
"Dr 3" (Min Throttle)	5-7	8-10	
(At Detent)	10-13	22-25	
"Lo" (Forced)	12-16		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Min Throttle)	11-13	6-8	3-5
(At Detent)	19-22	5-7	4-6
(Forced)	45-49	16-18	5-7
"Dr 3" (Min Throttle)		6-8	3-5
(At Detent)		5-7	4-6
(Forced)		16-18	5-7

CHEVROLET TRUCK

1956 3/4 & 1-TON - 4.5-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	4-6	8-10	15-17
(At Detent)	8-11	20-23	39-44
"Dr 3" (Min Throttle)	4-6	8-10	
(At Detent)	8-11	11-13	
"Lo" (Forced)	11-13		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Min Throttle)	7-10	5-7	2-4
(At Detent)	18-21	5-7	3-5
(Forced)	41-25	15-17	4-6
"Dr 3" (Min Throttle)		5-7	2-4
(At Detent)		5-7	3-5
(Forced)		15-17	4-6

CHEVROLET TRUCK

1956 3/4 & 1-TON - 5 1-1 AXLE

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	3-5	7-9	13-15
(At Detent)	7-10	18-21	35-40
"Dr 3" (Min Throttle)	3-5	7-9	
(At Detent)	7-10	18-21	
"Lo" (Forced)	10-18		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Min Throttle)	6-9	4-6	1-3
(At Detent)	16-19	4-6	3-5
(Forced)	36-40	13-15	3-5
"Dr 3" (Min Throttle)		4-6	1-3
(At Detent)		4-6	3-5
(Forced)		13-15	3-5

CHEVROLET TRUCK

1957-59 HALF-TON

UPSHIFTS:	1-2	2-3	3-4
"1-4" (Min Throttle)	5-8	8-11	15-19
(At Detent)	13-16	21-26	43-51
"1-3" (Min Throttle)	5-8	8-11	
(At Detent)	13-16	21-26	
"1-2" (Forced)	14-17		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"1-4" (Min Throttle)	11-14	6-9	3-5
(At Detent)	21-25	5-8	6-8
(Forced)	50-56	15-19	6-9
"1-3" (Min Throttle)		6-9	3-5
(At Detent)		6-8	6-8
(Forced)		15-19	6-8
"1-2" (Forced)			6-9

CHEVROLET TRUCK

1957-60 MODELS (EXC. HALF-TON)

UPSHIFTS:	1-2	2-3	3-4
"1-4" (Min Throttle)	3-6	7-11	12-18
(At Detent)	7-12	18-25	31-42
"1-3" (Min Throttle)	3-7	6-11	
(At Detent)	7-12	16-24	
"1-2" (Forced)	10-14		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"1-4" (Min Throttle)	6-11	4-7	2-4
(At Detent)	14-21	4-7	3-6
(Forced)	37-46	17-22	3-7
"1-3" (Min Throttle)		4-7	2-4
(At Detent)		4-7	2-6
(Forced)		15-22	3-7
"1-2" (Forced)			3-7

HUDSON HORNET

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	6-9	12-17	21-34
(Full Throttle)	21-25	36-39	66-76
"Dr 3" (Min Throttle)	6-9	12-17	
(Full Throttle)	21-25	36-39	76-81
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr. 4" (Closed Throttle)	17-14	10-17	6-3
(Part Throttle)	31-15		
(Full Throttle)	31-28	10-7	5-3
(Forced)	66-15	24-8	
"Dr 3" (Closed Throttle)	80-75	10-7	6-3

HUDSON WASP

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	3-7	10-13	18-21
(Full Throttle)	17-21	30-35	61-65
"Dr 3" (Min Throttle)	3-7	10-13	
(Full Throttle)	17-21	30-37	65-70
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Closed Throttle)	14-11	9-6	4-2
(Part Throttle)	25-11		
(Full Throttle)	55-21	9-7	4-2
(Forced)	55-12	21-7	
"Dr 3" (Closed Throttle)	68-63	9-6	4-2

NASH AMBASSADOR

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min. Throttle)	6-9	11-15	19-24
(Full Throttle)	20-23	32-33	70-78
"Dr. 3" (Min. Throttle)	6-9	11-15	
(Full Throttle)	20-23	32-38	80-85
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Closed Throttle)	17-13	11-7	6-3
(Part Throttle)	28-17		
(Forced)	63-17	23-19	
"Dr 3" (Closed Throttle)	71-73	11-7	6-3
(Forced)		23-19	
"Lo" (Full Throttle)			11-7

Lockout in "Lo"—4-2 shift, 53-49 MPH

NASH STATESMAN

UPSHIFTS:	1-2	2-3	3-4
"Dr. 4" (Min Throttle)	5-9	9-13	18-22
(Full Throttle)	13-17	27-32	55-63
"Dr. 3" (Min Throttle)	5-9	9-13	
(Full Throttle)	13-17	27-32	68-73
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Closed Throttle)	12-8	8-4	5-3
(Part Throttle)	27-12		
(Forced)	55-15	19-15	
"Dr 3" (Closed Throttle)	67-71	8-4	5-3
(Forced)		19-15	
"Lo" (Full Throttle)			9-6

Lockout in "Lo"—4-2 shift, 50-41 MPH

OLDSMOBILE

UPSHIFTS:	1-2	2-3	3-4
"Dr."⑤	④5-19	13-38	21-75
"S"	5-21	13-18	④
"Lo"	5-21		
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr" (Closed Throttle)	15-13	10-8	6-4
(Full Throttle)	21-19	12-9	10-8
(Forced) ⑤	65-18	18-8	10-8
"S" (Closed Throttle)	④	10-8	6-4
(Full Throttle)	④	12-9	10-8
(Forced) ⑤		18-8	10-8
"Lo" (Closed Throttle)			6-4
(Full Throttle)			10-8

PONTIAC

UPSHIFTS:	1-2	2-3	3-4
Left "Dr" (Min Throttle)	7-10	12-15	21-25
(Full Throttle)	20-23	36-40	68-73
Right "Dr" (Min Throttle)	7-10	12-15	71-76
(Full Throttle)	20-23	36-40	70-7b
"Lo" (Full Throttle)	19-23		41-45
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
Left "Dr" (Closed Throttle)	20-17	13-10	8-6
(Full Throttle)	31-17	13-10	13-10
(Forced)	70-31	26-13	13-10
Right "Dr" (Closed Throttle)	72-67	13-10	8-6
(Full Throttle)	78-73	13-10	13-10
(Forced)	78-73	26-13	13-10
"Lo" (Full Throttle)	59-54	53-48	
(Forced)			11-0

RAMBLER

UPSHIFTS:	1-2	2-3	3-4
"Dr 4" (Min Throttle)	5-9	9-13	18-22
(Full Throttle)	13-17	27-32	55-63
"Dr 3" (Min Throttle)	5-9	9-13	
(Full Throttle)	13-17	27-32	68-73
DOWNSHIFTS:	**4-3**	**3-2**	**2-1**
"Dr 4" (Closed Throttle)	12-8	8-4	5-3
(Part Throttle)	27-12		
(Forced)	55-15	19-15	
"Dr 3" (Closed Throttle)	67-71	8-4	5-3
(Forced)		19-15	
"Lo" (Full Throttle)			9-6

Lockout in "Lo"—4-2 shift, 50-41 MPH

DUAL-RANGE HYDRA-MATIC (C ntinu d)

road test involves both front and rear pumps) Operate car on road in 4th speed (selector lever in 'Dr4") at 30-45 MPH, move selector lever to "N", turn ignition "off" (this will stop front pump operating so that all pressure will be supplied by rear pump). Gauge reading should be 60-75 lbs. *(CAUTION - If rear pump not working (no pressure) stop road test immediately).* If low oil pressure indicated when testing both pumps, oil leak in system is indicated. If one pump alone has low pressure, trouble in this pump is indicated.

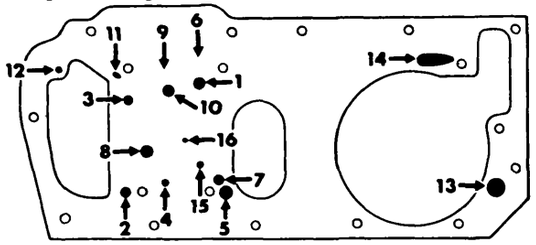
TESTING HYDRA-MATIC OPERATION WITH AIR PRESSURE: ***Following procedure can be used to check operation before disassembling transmission and can also be used after overhaul to insure proper operation before transmission installed in car.*** Drain transmission, remove oil pan and screen. Remove side cover, control valve assembly, and reverse oil pipe Use air line fitted with special air nozzle (Tool J-4353-1 etc.) so that air can be applied to oil passage holes on side of transmission case. Use approximately 80 lbs air pressure and make test listed below Refer to illustration for location of test points

1) Front Clutch. Pressure at this point should actuate front clutch (piston movement will be audible if air applied intermittently, or can be felt if front drum held firmly by hand). *NOTE*—If large amount of air escapes around oil delivery sleeve area, recheck after servos removed to note point of leakage If oil fog and large amount of air emitted from inside front end of front drum, faulty front clutch seal is indicated. Leakage from any other drilled passages inside case is indication of defective case or oil delivery sleeve

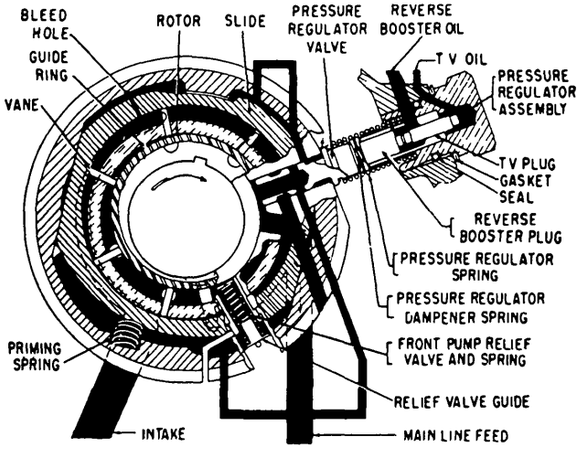
2) Front Band Apply. Pressure at this point should actuate servo and apply front band No appreciable air escape should be noted at servo mounting face on case (small amount of leakage at 4-3 valve exhaust hole and also front band release hole is permissible) (front band release hole leakage should only be leakage past ring gap, not blow-by).

3) Front Band Release. Pressure at this point will not actuate servo (piston held in released position by retracting spring) but air escape between servo body and case, or around band release cylinder should only be normal leakage past piston ring gap

4) Governor Pressure (G1 to 4-3 Valve). Pressure at this point will leak around 4-3 valve retainer wire No air should be noted between servo body and transmission case or from any other passage (small amount of air from Front Band Apply and Compensator passages).



PRESSURE TEST POINTS
(SIDE OF TRANSMISSION CASE)



DUAL-RANGE HYDRA-MATIC
FRONT PUMP & PRESSURE REGULATOR

5) Rear Band Release. Pressure at this point will release rear servo and band with no large escape of air (small amount will escape through piston ring gaps but should not impede normal servo operation) and no appreciable amount of air should escape between servo mounting face and transmission case. No air escape should be noted from any other passage hole (except slight amount at Compensator hole—see item 7)

6) Rear Clutch. Pressure at this point should actuate rear clutch (piston movement will be audible if air applied intermittently, or can be felt if rear drum held firmly by hand) *NOTE*—If large amount of air escapes around oil delivery sleeve area, recheck after servos removed to note point of leakage If oil fog and large amount of air emitted from inside rear drum assembly, faulty rear clutch seal or oil delivery sleeve rear ring is indicated Leakage of air from any other passage hole on side of case indicates interconnected passages (defective case) or damaged oil delivery sleeve

7) Compensator (to Front & Rear Servos) Pressure at this point should actuate rear servo to tighten rear band (band applied by spring) and to actuate front servo to apply band. No appreciable air escape should be noted (other than normal leakage through piston ring gaps) and no air should be noted at any other passage hole on side of case

8) Main Line (Pump Feed). Pressure at this point should be an open blow-by due to fact that main line exhaust valve is in exhaust position

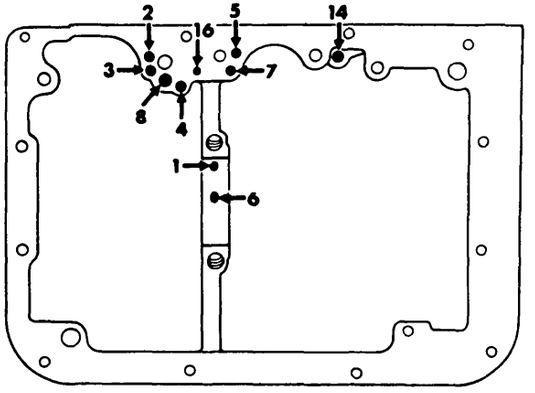
9) Pressure Gauge Hole to Top of Case. Pressure at this point should produce NO evidence of air escape if pressure line plug (on top of case between band adjusting screw) is tight

10) Exhaust (Port for Valve Body). Pressure at this point should blow freely through to inside of case Make visual inspection of this hole to see that it is completely open for entire length *(CAUTION—any* obstruction of this hole will cause poor shifting)

11) T.V. Pressure to Regulator. Not necessary to check this passage (this is modulating pressure line to T V pressure plug in pressure regulator).

12) Reverse Booster to Pressure Regulator. Not necessary to check this passage (this is booster pressure line to reverse booster plug in regulator).

13) Reverse Pressure. Pressure at this point should actuate reverse cone clutch piston (piston movement should be audible if air applied intermittently or can be felt if reverse internal gear grasped with the hand) If large amount of air escapes around cone clutch piston, outer and inner oil seal leakage in reverse cone assembly is indicated



PRESSURE TEST POINTS
(BOTTOM OF TRANSMISSION CASE)

14) Governor Feed Not necessary to check this passage (directs main line pressure to governor).

15) Line Exhaust Not necessary to check this passage (passage exhausts main line pressure when engine is turned off and car is standing).

16) Low Range (Manual Low Oil). Not necessary to check this passage (passage directs main line pressure oil to fast dump valve in rear servo).

TROUBLE SHOOTING & DIAGNOSIS: *See "1954-55 Dual-Range Hydra-Matic".*

REMOVAL & INSTALLATION
HUDSON, NASH & RAMBLER

REMOVAL: Raise car and place on jack stands, supporting rear of car at body side sills. Support rear axle assembly with a hydraulic jack. Drain fluid from transmission (see "Draining & Refilling" above) and remove oil pan. Disconnect hand brake cable at bellcrank and brake cable housing at bellcrank bracket. Disconnect speedometer cable and housing at transmission adapter. Disconnect throttle rod and manual control rod assemblies at levers on transmission. Remove rear brake hose bracket from floor pan to prevent damage to hose. Disconnect torque tube from rear bearing retainer, then move rear axle and torque tube assembly to rear and separate by sliding universal joint to rear, off splines of output shaft. Support rear end of engine to take weight off support crossmember. Remove support crossmember, cushion and bracket assembly. Remove plate from flywheel housing and drain fluid from torus cover. Remove throttle control lever from transmission to prevent bending it while removing and replacing transmis-

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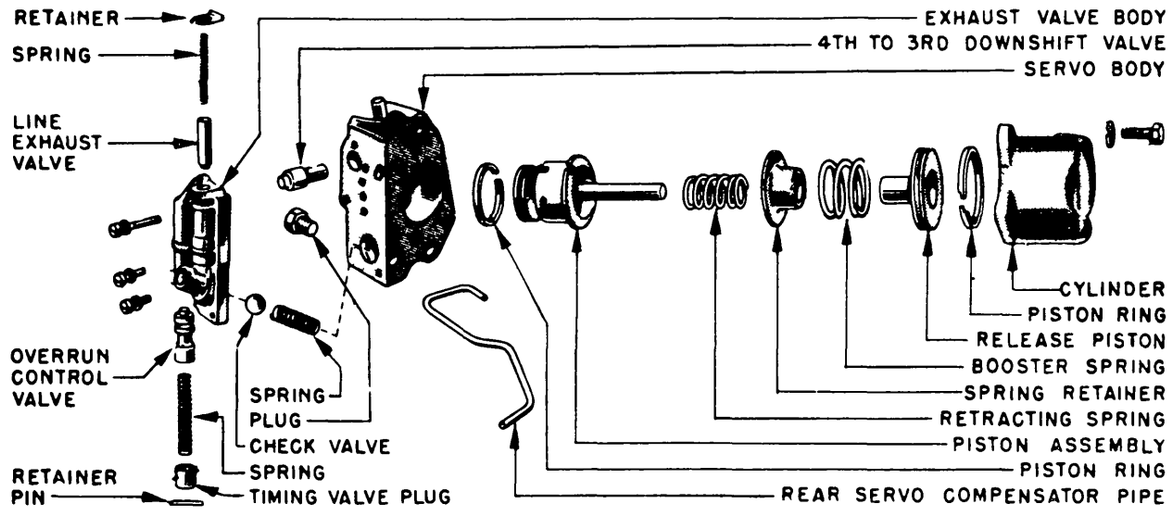
DUAL-RANGE HYDRA-MATIC (C ntinu d)

sion. Remove torus cover-to-flywheel attaching bolts and lockwashers (30). Lower engine slightly to remove flywheel housing attaching bolts. Place hydraulic jack, with tool J-2808 under transmission (jack handle toward rear), and lift transmission slightly to take strain off flywheel housing bolts (*CAUTION* - Tool J-2808 must be fastened securely to jack pad to prevent it slipping). Remove flywheel housing attaching bolts, nuts and lockwashers. Remove transmission assembly by moving transmission to rear of car and lower assembly after mainshaft has been withdrawn from crankshaft pilot bushing. *NOTE* - To prevent end of mainshaft striking flywheel-to-crankshaft bolts when lowering transmission, turn flywheel so end of mainshaft will pass between two bolts.

INSTALLATION: Reverse removal procedure and note the following. Guide sleeves of flywheel housing into corresponding holes in rear engine plate and dowels of flywheel in corresponding holes in torus cover. Install flywheel housing attaching bolts, lockwashers and nuts. Install torus cover-to-flywheel bolts with lockwashers and tighten finger tight. Finally tighten as follows Tighten two bolts adjacent to dowels to 12-15 ft. lbs. Tighten two bolts located 90° from dowels to 12-15 ft. lbs. Tighten all bolts in rotation to 20-25 ft. lbs. Re-tighten all bolts in rotation to 30-35 ft. lbs.

OLDSMOBILE

REMOVAL: Disconnect lower starter cable assembly from junction block, then disconnect purple lead from neutral safety switch, and black lead from main wiring harness. Loosen safety switch mounting bracket. Raise car on two-post hoist and drain transmission (see "Draining & Refilling" above). Remove left engine filler plate and remove starter with cable assembly attached. Remove crankcase ventilator. Support engine with unit-lift, raising it far enough to relieve weight from rear mounts, then remove capscrews from rear mounts-to-flywheel housing. Remove three bolts from each end of crossmember-to-frame and remove crossmember. Remove lower flywheel housing and install rear engine support bar BT-28, with pilots on support screws entering lower housing front attaching screw holes. (*NOTE* - Locate bar forward so it will not interfere with torus cover when lowering transmission). Remove unit-lift. Disconnect speedometer cable at transmission. Disconnect manual control rod from transmission lever. Remove throttle control rod lever. Disconnect propeller shaft from companion flange and slide rearward away from transmission Remove torus cover-to-flywheel attaching screws (30). Lower engine, not to exceed 1½", enough to permit removal of the two upper bellhousing-to-block capscrews. Again support transmission with unit-lift and secure with chain (if so equipped). Remove two remaining flywheel housing-to-block bolts. Remove transmission assembly toward rear of car, lowering it at the same time. *NOTE* - To prevent end of mainshaft striking flywheel-to-crankshaft bolts when lowering transmission, turn flywheel so end of mainshaft passes between two bolts.



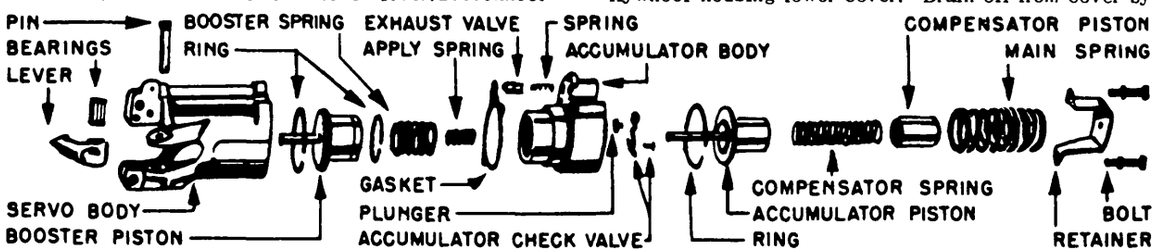
DUAL RANGE HYDRA-MATIC FRONT SERVO UNIT (TYPICAL)

INSTALLATION: Reverse removal procedure and note the following Use a new gasket and do not use shellac or sealer. Tighten torus cover-to-flywheel capscrews to 35-40 ft. lbs.

PONTIAC

REMOVAL: Raise car on hoist and drain transmission (see "Draining & Refilling" above). Disconnect filler pipe. Disconnect speedometer cable at transmission. Disconnect propeller shaft at differential flange and slide propeller shaft from transmission output shaft. Loosen exhaust pipe at crossover pipe flange. Remove flywheel housing lower cover. Drain oil from cover by removing pipe plug. Remove throttle control lever (outer) from shaft at side of transmission. Disconnect gear shift control rod assembly from shift lever at transmission. Remove torus-to-flywheel cover attaching bolts (30). Disconnect two rear engine mounting insulators at crossmember. Using Tool J-4732, raise back of engine until rear engine mountings are approximately ½" above crossmember (*CAUTION - Do not raise engine more than necessary to remove crossmember).* Remove six crossmember-to-frame side rail bolts and remove crossmember by tapping both ends of crossmember down until right end is resting on exhaust pipe. Then tap left end down until it clears frame side rail. Lift right end over exhaust pipe and remove (*NOTE* - Mark crossmembers so left side can be distinguished from right when installing). Lower engine below its normal position so rear flywheel housing upper attaching bolts are accessible with an 18" to 22" socket extension and universal socket. Position special transmission jack under transmission and lift transmission slightly to take strain off rear flywheel housing attaching bolts. Remove six rear housing-to-front flywheel attaching bolts and lockwashers. Remove transmission assembly by moving transmission toward rear of car and at same time lowering assembly to floor.

INSTALLATION: Reverse removal procedure and note the following Position torus cover so that grind marks, punch marks, or blue markings on flywheel dowel and torus cover correspond. To position frame crossmember, raise engine approximately ½" above its normal height. Tap crossmember into place between frame side rails, making sure it is installed in correct position (rear edge of crossmember is cut away slightly along bottom edge to give ample clearance for transmission oil pan).



DUAL-RANGE HYDRA-MATIC REAR SERVO ASSEMBLY (TYPICAL)

TRANSMISSION OVERHAUL

OVERHAUL: Disassembly, reassembly and overhaul procedures are the same as for previous models. *See "1954-55 Dual-Rang Hydra-Matic".*

DUAL-COUPLING HYDRA-MATIC

Cadillac (1956-58)
Hudson (1956-57)
Nash (1956-57)
Oldsmobile (1956-58) ℂ
Pontiac (1956-58) ℂ
Rambler V8, (1957)
ℂ - Dual-Range Hydra-Matic also used on some early 1956 models

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Move selector lever to "N" (Neutral) position and turn on ignition switch. When car reaches speed of 25 MPH (Exc. Cadillac); 30-35 MPH (Cadillac), move selector lever to either "D" (Drive) position on Cadillac, Hudson, Nash & Pontiac; or to "D" or "S" position on Oldsmobile.

►*TOWING HYDRA-MATIC DRIVE CARS:* Drive shaft must be removed or car must be towed with the rear wheels off the ground. Damage to transmission will result if these precautions not taken.

►*TRANSMISSION OIL COOLER NOTE (ALL MODELS):* In the event of serious damage to transmission, the oil cooler should be replaced as it is not possible to properly clean cooler in the field.

►*TRANSMISSION OIL FOAMING NOTE (ALL MODELS):* This condition may be caused by water leaking into transmission at the oil cooler. Check oil cooler for leaks as follows: Remove cooler and apply air pressure not exceeding 25 lbs., to either of the two cooler water pipes (plug other pipe). Submerge end of oil pipes in water and check for air bubbles in water. If bubbles appear, oil cooler is leaking and must be replaced. Before installing new cooler, remove transmission oil pan and clean thoroughly. Install clean transmission oil.

►*TRANSMISSION PRESSURE POINT CHANGE:* On later transmissions, a pipe plug will be found on the right side of the transmission just above and to rear of oil cooler pipe adapter, which will be used for checking Throttle Valve Pressure.

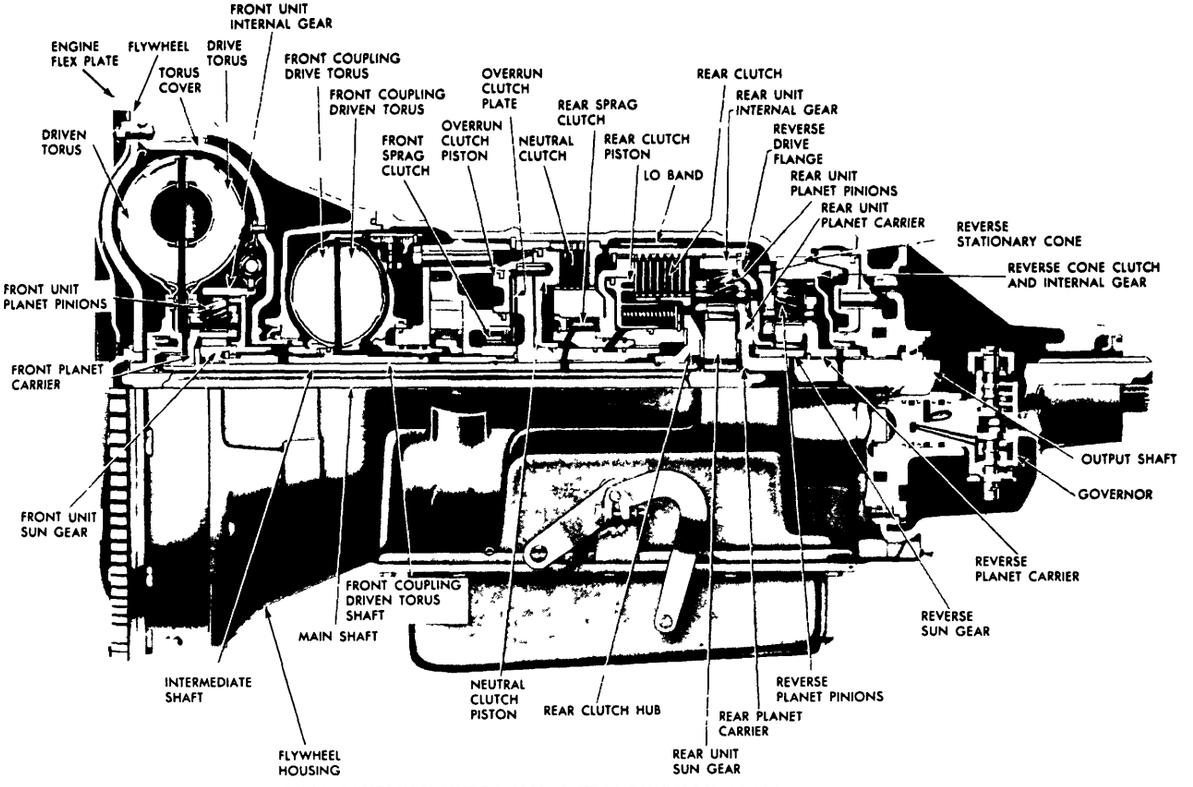
►*1956 CADILLAC TRANSMISSION "SQUEAK" CORRECTION:* A high shrill squeak, similar to a dry water pump squeak may occur in first and reverse gears, and in "Dr3" under full throttle. Correct by installing thrust washer, Part No. 8616526, between driving torus of front unit coupling and bushing of flywheel.

►*1956 CADILLAC ERRATIC SHIFT CORRECTION:* S "Ov rhaul" b l w.

►*1956 CADILLAC 1-2 OR 2-3 LATE SHIFT CORRECTION:* May be caused by improper throttle valve adjustment, dirt in control valve assembly, or interchanged valve springs. S e "Overhaul" below.

►*1956 CADILLAC SLIPPING SHIFT CORRECTION:* If slipping or long drawn out 2-3 shifts cannot be corrected by throttle valve rod adjustment or cleaning control valve and governor, install an inner accumulator spring, Part No. 8617469. S e "Ov rhaul" b low.

►*EARLY 1956 CADILLAC GOVERNOR CLICK CORRECTION:* S "Ov rhaul" b low.



DUAL-COUPLING HYDRA-MATIC TRANSMISSION (SECTIONAL VIEW)

►*1956 CADILLAC & PONTIAC TRANSMISSION OIL FILLER PIPE LEAKAGE CORRECTION:* Remove filler pipe and install Service Package, Part No. 861956 as follows: Install new "O" ring seal and new sleeve, tapping sleeve gently into case until snug against "O" ring seal. Lubricate filler pipe and insert into sleeve and through "O" ring seal (it may be necessary to remove pipe and drive sleeve down against seal to properly compress it for a tight fit). Make sure "O" ring seal is not damaged during installation.

►*1957 CADILLAC "WHISTLING" NOISE CORRECTION:* This condition, noticeable at shift points, is caused by wind action through a hole drilled in one side of external breather tube. If transmission is removed for other work, correct the above condition by drilling a hole through opposite side of tube. To make correction with transmission in car, collapse extreme lower end of tube with a pair of vise grip pliers, until outside narrow cross section of tube measures approximately ¼". Beginning with serial number C57-21596, CA57-2041, & CE57-2220, the condition was corrected in production.

►*1957 CADILLAC "BUZZING" NOISE CORRECTION:* A buzzing noise occuring during 1-2 & 3-4 shifts may be caused by lower end of front pump intake pipe seating on bottom of the screen, causing restriction of intake oil and flutter of pressure regulator valve. Correct by cutting a 3/16" notch in forward end of opening in pipe and filing or grinding off pipe to increase size of opening toward rear end of pipe. Installation of the earlier type pipe, Part No. 8616283 will also correct the condition. Transmissions affected by the above condition are between serial numbers, C57-26807 & 28919; CA57-2234 & 2434; CE57-2767 & 3163. Earlier and later transmissions used a different intake pipe.

►*1957 HUDSON, NASH & RAMBLER TRANSMISSION REMOVAL CAUTION:* If transmission is to be removed for correction of oil leakage at front of transmission, a special procedure must be performed to prevent recurrence of the leakage condition. See *TRANSMISSION REMOVAL* below.

►*LATE 1958 CADILLAC FRONT PUMP PRODUCTION CHANGE & 1956-EARLY 1958 FRONT PUMP REPLACEMENT NOTE:* Beginning at Transmission Serial No. C58-15891 (Series 60, 62); CB58-1091 (Eldorado Brougham); and at start of production (Series 75 & 86), a new front pump, Part No. 8618956 (Series 60, 62 & 70); Part No. 8618959 (Series 75 & 86), having a built in bypass orifice to supply a limited flow of oil to cooler at low engine speeds, entered production.

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

The later type pump should be used for service replacement on all 1956-Early 1958 models using the earlier type pump. *CAUTION - When replacing the earlier type pump on 1956-Early 1958 models, it is important that only the standard type cooler pipes be used. DO NOT USE Supplemental Cooling Kit piping which may be found on some cars.* When a late type pump isinstalled on earlier cars, it will also be necessary to install a line pressure plug, Part No. 444612. On 1956-57 models, the 1958 type front pump intake pipe Part No. 8618465 must also be used.

►*1958 CADILLAC TRANSMISSION PRODUCTION CHANGE & PARTS REPLACEMENT CAUTION:* New drive plates having an improved facing material are used in production beginning with Transmission Serial No. C-89867 & CA-3908. Note the following when working on transmissions before and after the above serial numbers:

1) *The following parts are NOT interchangeable on transmissions before and after the above serial numbers:* Clutch Drive Plate. Servo & Accumulator Body. Throttle Valve Accumulator Plug. Accumulator Piston Spring Kit. Accumulator Trimmer Valve Spring. Accumulator Valve. Channel Plate Spacer. Body Assembl' Coupling Valve. Throttle Valve Accumulator Stop Pi:. *CAUTION - Do not attempt to convert an early type transmission to later type by installation of the above parts.*

2) Clutch driven plates (steel) are waved and each plate has a .030" saw slot located off center in one of the driving lugs. Plates must be installed so that each slot is located one behind the other, in a straight line. Failure to use this procedure will result in inconsistent 2-3 shifts and slip tendency at medium throttle.

►*1958 CADILLAC EXTENSION HOUSING OIL SEAL CHANGE (To permit removal of seal without removing extension housing assembly):* A new extension housing seal, Part No. 8618702 of double lip design and having a flange that allows seal to be removed without removal of housing, is being used in production starting with Transmission Serial No. C58-62627, CA58-3162, CB58-1306. To replace this type seal, raise car, then remove propeller shaft assembly. Use a hammer and tap screwdriver under seal flange and carefully pry seal from housing. Remove any nicks or burrs, then install seal in housing using Tool J-1942-A.

►*1958 CADILLAC CLOSED THROTTLE 3-2 DOWNSHIFT NOISE CORRECTION:* During closed throttle 3-2 downshift, the transmission may make an "urp" or "groan" sound. This noise may also be heard after closing the throttle and placing selector lever in "N" (Neutral) after driving in third speed at approximately 15 MPH for several moments. Check to make sure noise noise is not being caused by transmission oil cooler lines "grounding out" against frame or other parts. If noise is still present after repositioning oil cooler lines, proceed as follows: Remove coupling valve body from control valve assembly and disassemble coupling valve body. Drill a 3/32" by-pass hole in coupling valve body as indicated in illustration. This hole should be drilled at least 1/8" below sealing face, using a 3/8" box wrench as a drill guide to prevent marring valve body. Thoroughly clean valve body before reassembly and installation.



CADILLAC 3-2 DOWNSHIFT NOISE CORRECTION

►*1957 HUDSON, NASH, RAMBLER & PONTIAC TORUS COVER OR FLYWHEEL REPLACEMENT NOTE:* Torus cover-to-flywheel dowels are located in the flywheel on 1957 models (in torus cover in 1956 models), and on service replacement flywheels. Two dowel pins will be serviced loose, as part of service replacement torus packages. When attaching 1957 service torus cover to 1956 flywheel, install both dowel pins *(NOTE - Be careful that dowels are placed in proper holes as the dimensions are different).* If a 1957 flywheel is attached to a 1956 cover, remove both dowel pins from original torus cover.

►*1958 OLDSMOBILE COUPLING VALVE BODY PRODUCTION CHANGE (To correct unintentional 4-3 downshift):* A new coupling valve body, Part No. 8618979 (identified by part number cast on body) is being used in production beginning with Transmission Serial No. 058-201298. The later type valve body has an improved transition valve and the overrun clutch valve has been eliminated. The new assembly is interchangeable with early type body and can be used for service replacement.

►*1956 PONTIAC 285 HORSEPOWER ENGINE TRANSMISSION THROTTLE VALVE CONTROL ROD & LEVER CHANGE:* This correction made to reduce the tendency of bunching the 1-2 and 2-3 shifts, and to improve the 2-3 shift. The later type throttle valve outer lever, Part No. 521523 is identified by its right angle shape (earlier type has a reverse curve). On the later type, the distance between centerline of throttle shaft hole and centerline of hole for throttle rod ball is 2-31/32" (3-7/8" on early type). A new throttle rod, Part No. 522789 is used with the new lever and is identified by a 4-5/32" length from rear ball stud to first bend (earlier rod is 3-1/16" at this location).

►*1956 PONTIAC 285 HORSEPOWER ENGINE TRANSMISSION SOFT OR SLIPPING 2-3 SHIFT CORRECTION:* If there is a soft or slipping 2-3 shift after installation of the later type throttle valve outer lever and throttle rod (see above), transmission accumulator springs can be changed. *Se "Ov rhaul" b low.*

►*1956 PONTIAC PRODUCTION CHANGE (TO IMPROVE 2-3 SHIFT) AND CENTER BEARING SUPPORT PRODUCTION CHANGE: See "Overhaul" b l w.*

►*1956 PONTIAC LOW SPEED "CLICKING" NOISE CORRECTION: See "Overhaul" below.*

►*1956 PONTIAC TRANSMISSION LOCKUP CORRECTION (When Shifting From Driv To R vers): S "Overhaul" below.*

►*1957 PONTIAC NOISE CORRECTION (Scraping Sound Heard When Operating in R v rs):* This noise may be caused by rear oil pump and can be corrected as follows: Install a Rear Pump Intake Pipe Kit, Part No. 8616978. Remove oil pan and remove rear pump intake pipe "0" ring seal and oil screen *(NOTE* - If the front pump intake pipe "0" ring seal is disturbed during oil screen removal, it should be replaced). Install bolt ½" into counterbored end of sleeve, then using bolt as driver, install sleeve into canted hole adjacent to rear pump intake hole, until sleeve is flush with or up to 1/16" below machined face of case. Remove bolt from sleeve and install steel retaining washer on pump end of pipe. Install new "0" ring seal next to retaining washer. Install cneck valve into pump end of pipe and install pipe assembly in case. Install retainer bolt and tighten to 5-6 ft. lbs. *NOTE* - Retainer must be installed with raised edge out and open end of retainer toward rear of transmission.

►*1957 PONTIAC FRONT PUMP STARVATION CORRECTION (Results in a "buzzing" s und wh n s l ctor l v r is in "DR" range, car standing, and up t speeds of 8 MPH):* Correct by adding a notch in the inlet end of front pump inlet pipe (within the screen) in three or four places. Notch should be approximately 1/8" square. Remove burrs and clean pipe thoroughly. Install a new "0" ring seal.

►*1957 PONTIAC IMPROPER 2-3 SHIFT CORRECTION (EARLY CARS):* In some early 1957 transmissions, the transition valve check ball was not used (same as late 1956). If the 2-3 shift has a tendency to shift from second-to-low-to-direct (with cold oil), the 1/8" ball can be installed (to prevent the transition valve moving too fast). Later 1957 transmissions have this check ball installed.

►*1957 PONTIAC BIND OR DRAG DURING REVERSE OPERATION CAUTION & CORRECTION:* May be caused by interlock plate on gearshift lower lever (at lower end of steering column) not having sufficient travel. If this condition exists, serious damage can be done to transmission. *See LINKAGE ADJUSTMENT b low.*

►*1958 PONTIAC ENGINF RUNAWAY OR INVOLUNTARY 4-3 DOWNSHIFT (AT 60-70 MPH) NOTF:* If this condition continues to exist with transmission oil level and pressure normal, replace the coupling valve body. An involuntary 4-3 downshift or engine runaway at speeds below 60-70 MPH indicates an internal leak in rear clutch apply circuit.

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DUAL-COUPLING HYDRA-MATIC (Continued)

►*1958 FUEL INJECTION PONTIAC 2-3 SHIFT SLIPPAGE CORRECTION & TRANSITION VALVE PRODUCTION CHANGE:* Starting with Transmission Serial No. PA-58-1520, a 3 lb. transition valve spring (in overrun clutch assembly) replaces the former 2½ lb. spring to correct a slipping condition between 2-3 shift.

►*1958 PONTIAC SLIPPAGE IN SECOND & FOURTH SPEEDS NOTE:* This condition could occur because of leakage or a restriction as noted below:

1) Leakage at front pump-to-front unit coupling cover seal. Check oil seal ring for free rotation in front pump cover ring groove, then remove ring from cover and insert squarely in coupling cover with ring hooks interlocked to make sure the ring is not undersize.

2) Restricted signal oil passage in front unit coupling. Check for leak in this area by applying approximately 100 lbs. pressure (air) at signal oil passage with coupling held in place by hand. If ring is sealing, it will not be possible to hold coupling in against air pressure. If coupling does not move and the sound of air escaping can be heard, then a leak in signal oil passage is indicated. Inspect coupling cover to make sure the two signal oil passages are drilled and plugged.

►*1958 PONTIAC TRANSMISSION RATTLE CORRECTION:* This condition may be corrected as noted below:

1) Rattle in third speed at approximately 9-13 MPH can be corrected by replacing torus cover dampener spring with Part No. 8618846. *NOTE - This later spring used in production beginning with Transmission Serial No. 58-P-166665.*

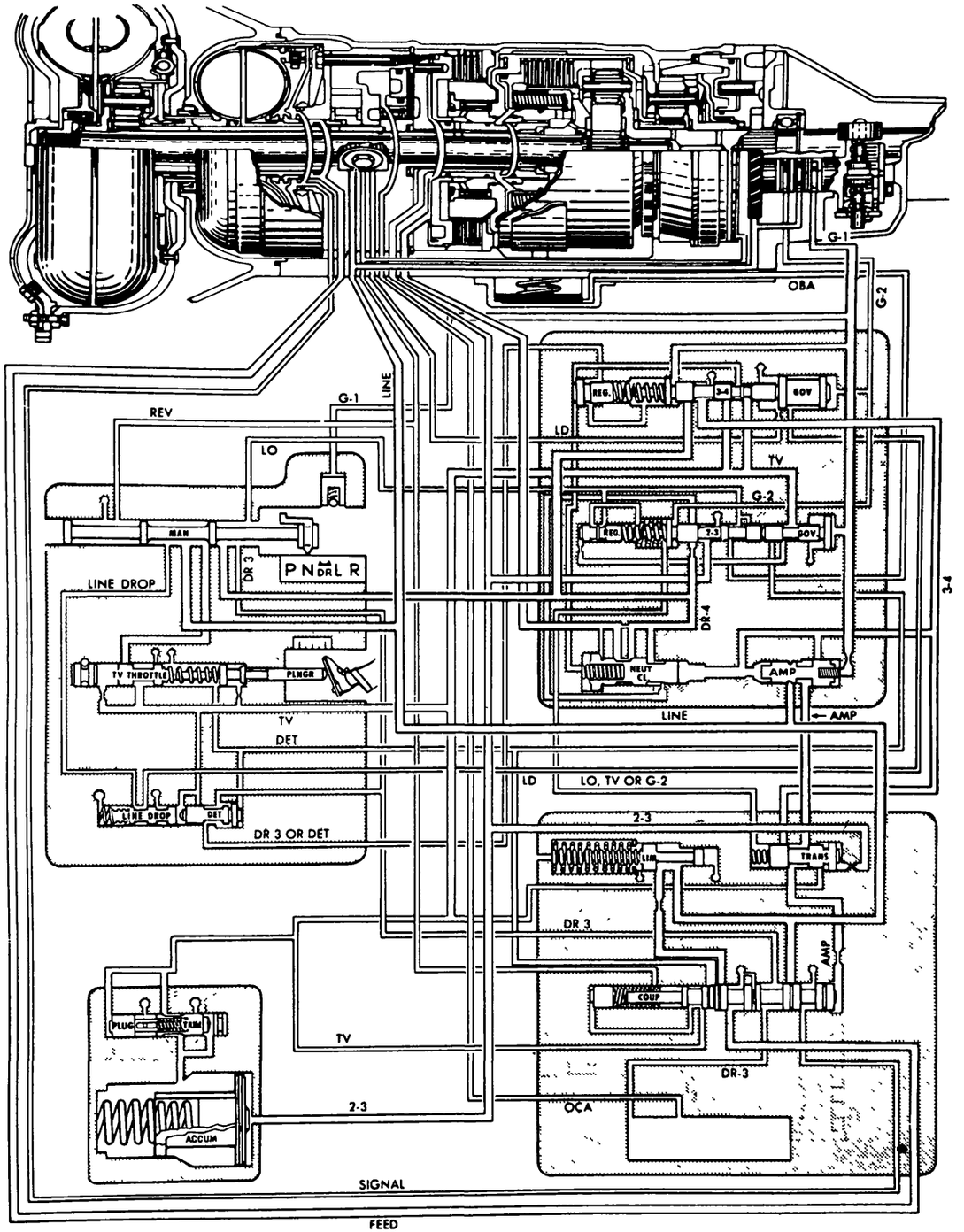
2) Rattle in fourth speed at approximately 11-16 MPH and accompanied with either a high pitch tone in area of torus cover member or a deep tone resembling tail pipe vibration against frame can be corrected in "P" type transmissions by replacing original 3-4 throttle valve spring with spring, Part No. 8618845 (copper plated). *NOTE - New spring used in production beginning with Transmission Serial No. 58-P-146285.*

3) On "PA" type transmission, rattle in fourth speed can be corrected by adding the new 3-4 shift valve spring, Part No. 8617537. The new spring is used in addition to present shift valve spring and is installed so original spring is within the new spring.

►*1958 PONTIAC SHIFT INDICATOR PRODUCTION CHANGE & DISENGAGEMENT CORRECTION:* A new gearshift indicator control rod retainer, Part No. 531775, has been released for service to prevent unhooking of control rod at lever on steering column shift tube. Install retainer with needle nose pliers so it fits over lever on tube and secures control rod in place. This retainer used in production on later cars.

►*1958 HYDRA-MATIC NEUTRAL CLUTCH OVERHAUL & REPLACEMENT PARTS CAUTION:* The neutral clutch piston is a selective fit in production and special

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HYDRA-MATIC HYDRAULIC CIRCUITS (TYPICAL)

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

precautions must be taken at time of overhaul or parts replacement to insure proper operation. The thinnest production piston and **the only available service piston** is identified by the number "3" stamped in relief on face of piston. Pistons with the numbers "4", "5", "6" are progressively thicker. When overhauling the neutral clutch, the replacement of neutral clutch drum, neutral clutch plates, or center bearing support, necessitates installation of the service type neutral piston (except when thinnest piston, stamped "3", is already in transmission).

►*1958 HYDRA-MATIC INTERMEDIATE SHAFT SNAP RING INSTALLATION CAUTION:* Only the latest type "Spiralox" snap ring, Part No. 8618738, or "Truarc" snap ring, Part No. 8618830, should be used in 1958 transmissions. When installing the "Truarc" snap ring, the convex, or rounded side, should contact hub of part being retained, so that sharp edge will engage opposite shoulder of snap ring groove.

►*1958 HYDRA-MATIC GOVERNOR "CLICK" CORRECTION:* This condition may be caused by coupling valve spring and may be corrected as follows: Remove control valve assembly, then remove coupling valve body from control valve assembly. Remove signal valve, coupling valve, and coupling valve spring. Place two washers, Part No. 8609585, on stem end of coupling valve, and place coupling valve spring against the washers. Reinstall coupling signal valve, washers, and spring as a unit, and assemble by reversing disassembly procedure.

DESCRIPTION

The Dual-Coupling Hydra-Matic is a four speed hydraulically controlled planetary type transmission which is connected to the engine crankshaft through a fluid coupling, and is composed of the following control assembly, parking assembly, and drive units.

Control Valve Assembly—The control valve assembly consists of four individual assemblies connected to one main assembly: Coupling Valve Body Assembly, Shift Valve Body, Reverse Blocker Body, and Manual Control Valve Body Assembly.

Parking Assembly—A pawl actuated by linkage of manual control lever drops into teeth on outer diameter of the reverse planet carrier which is splined to output shaft of transmission and which prevents the output shaft from turning.

Front Unit—Drive parts of the front unit are the controlled fluid coupling, planetary gear set, and front sprag clutch.

Rear Unit—Drive parts of the rear unit are the planetary gear set, multiple disc rear clutch, rear sprag clutch, and the neutral clutch.

Rev rse Unit—Drive parts of the reverse unit are the planetary gear set, reverse stationary cone, and reverse apply piston.

Overrun Clutch (Front Unit)—The overrun clutch is a single disc clutch connected to the front sprag clutch and is used to prevent the sun gear from rotating. This unit operates only when overrun braking is required in Dr. 3 range (1st & 3rd speed); Lo range (1st speed); and Reverse.

Lo Band (Rear Unit)—The Lo band is servo operated and is engaged only when transmission is in Lo range. Adjustment of this band is not required.

►*1958 HYDRA-MATIC TRANSMISSION CHANGE NOTE: The 1958 transmission is the same as 1956-57 models except for the following changes:*

Front Unit: The following changes have been made in front unit assembly:

1) Torus cover neck is thicker and has a larger outside diameter. Flywheel housing bushing has larger inside and outside diameter. Flange end of bushing has been removed.

2) Front seal is larger and flywheel housing has a larger inside diameter.

3) Steel thrust backing washer in front of front sun gear is now selective, eliminating the selective spacer.

4) Front unit driven torus shaft has a snap ring added.

5) Steel backing washer is changed to accomodate the needle bearing. This washer, on front side of needle bearing is positioned on coupling shaft and does not seat in recess in front internal gear.

6) Front unit bronze thrust washer (sun gear-to-internal gear) is replaced by a needle bearing thrust washer. Steel backing washer located on rear side of needle bearing and positioned in front unit internal gear.

7) Front unit driving torus-to-flywheel housing bushing washer is eliminated. Front unit drive torus shaft has driving splines in place of lugs. Front pump assembly has minor dimensional changes.

Mainshaft: Mainshaft has revised snap ring grooves and is also shorter (does not pilot in output shaft assembly). Pilot bushing in output shaft has been eliminated.

Torus Cover Seal Retainer: Retainer is changed to provide improved retention of seal.

Front & Rear Sprag Assemblies: Assemblies have larger cage "windows".

Front Pump Seal: New front pump intake pipe "O" ring seal is located in groove in front pump assembly.

Neutral Clutch Plates: Neutral clutch piston travel from released to applied position is being controlled between .070" and .100" in order to improve neutral-to-drive and reverse-to-drive shift. *See "Neutral Clutch Overhaul & Replacement Caution" above.*

Rear Unit Needle Bearing: A needle bearing of higher capacity is located between rear unit sun gear and a thrust retainer which cradles the bearing and provides a thrust face against output shaft.

Reverse Unit: The bronze washer in reverse unit is replaced by a fiber washer.

Parking Brake: A revised inner mechanism and relay hook-up reduces parking brake release force. The parts affected are: Parking brake link. Parking pawl. Parking brake lever assembly. Parking brake pawl lever. Bracket spacer (which is eliminated).

Shift Valv B dy Ass mbly: Shift valve body has been altered to provide for the additional Dr 4 passage, the additional passage to rear clutch, and the revised neutral clutch valve. A land has been added to neutral clutch valve to assist in regulation. A lighter neutral clutch valve spring is used to allow for new calibration of neutral clutch valve.

Coupling Valve Body Ass mbly: Coupling valve body has been altered to provide for elimination of transition ball. Transition valve has been changed to accomodate revised, shorter valve spring. Amplifier oil passage from coupling valve to overrun clutch valve has been deleted to eliminate clicking caused by amplifier pressure on coupling valve. Overrun clutch valve and spring were deleted at start of production on some cars and at a later date on other cars. Coupling valve rear end plate has been altered to position outer limit valve spring and the plate has been grooved so the spring bottoms in this groove.

Manual Valve Body Assembly: On Cadillac, valve body assembly has been changed to add an orifice in the passage for throttle pressure directed behind throttle valve. On Oldsmobile and later Pontiac (starting with Transmission Serial No. P-58-30276 and PA-58-1502), the body has been changed to provide for thermostatic throttle valve control element. Element and adjusting setscrew are added (throttle valve plug is eliminated).

Accumulator: Accumulator spring has been shortened and a spacer has been added to compensate for the shorter length. Accumulator spring has been altered to allow oil to flow around spring inside piston. The hole in side of piston previously used for this purpose has been eliminated.

Accumulator By-Pass Valve: This valve has been eliminated.

OPERATION

Transmission operation in each selector lever position is outlined below. In either "D" (Drive) position, operation varies with car speed and operating conditions.

Neutral Position: Front unit is in reduction (controlled coupling empty and sprag clutch holding). Rear unit is in neutral (neutral clutch released, rear clutch released and Lo band released). Reverse unit is in neutral (reverse cone clutch released).

Drive Left (Pointer to left of "D" n Cadillac & P ntiac. "Dr" on Oldsmobile. "D4" n Hudson, Nash, & Rambl r):

First Speed—Front unit is in reduction (controlled coupling empty, sprag clutch holding). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band released). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 3.97-1.

Second Speed—Front unit is in direct drive (controlled coupling is filled and sprag clutch released). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band released). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 2.55-1.

Third Spe d—Front unit is in reduction (controlled

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

coupling empty, sprag clutch holding). Rear unit is in direct drive (neutral clutch applied, rear clutch applied, sprag clutch released and Lo band released). Reverse unit is in neutral (cone clutch released). Total reduction is 1.55-1.

F urth Spe d—Front unit is in direct drive (controlled coupling is filled, sprag clutch released). Rear unit is in direct drive (neutral clutch applied, rear clutch applied, sprag clutch released and Lo band released). Reverse unit is in neutral (cone clutch released). No reduction 1.00-1.(Direct Drive).

Driv Right (P int r to right f "D" on Cadillac & Pontiac. "S" n Oldsmobil . "Dr3" on Hudson, Nash, & Rambler):

First Spe d—Front unit is in reduction (controlled coupling empty, sprag clutch holding, overrun clutch applied). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band released). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 3.97-1.

Sec nd Sp d—Front unit is in direct drive (controlled coupling filled, sprag clutch released, overrun clutch released). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band released). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 2.55-1.

Third Spe d—Front unit is in reduction (controlled coupling empty, sprag clutch holding, overrun clutch applied). Rear unit is in direct drive (neutral clutch applied, rear clutch applied, sprag clutch released and Lo band released). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 1 55-1.

L Rang (All M d ls):

First Sp d—Front unit is in reduction (controlled coupling empty, sprag clutch holding, overrun clutch applied). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band applied). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 3.97-1

S c nd Sp d—Front unit is in direct drive (controlled coupling filled, sprag clutch released, overrun clutch released). Rear unit is in reduction (neutral clutch applied, rear clutch released, sprag clutch holding and Lo band applied). Reverse unit is in neutral (reverse cone clutch released). Total reduction is 2.55-1.

R v rs Rang : Front unit is in reduction (controlled coupling empty, sprag clutch holding, overrun clutch applied). Rear unit is acting as reverse idler (neutral clutch released, rear clutch released, sprag clutch released). Reverse unit is in reduction (reverse cone clutch applied). Total reduction is 4.31-1.

LUBRICATION

LUBRICATION INTERVALS: Check fluid level every 1000 miles (Hudson, Nash, Oldsmobile, & Rambler), every 2000 miles (Cadillac & Pontiac). Drain and refill every 25,000 miles (except Cadillac), every 12,000 miles (Cadillac, normal driving), 6000 miles (Cadillac, heavy duty driving).

►*CADILLAC DRAIN & REFILL INTERVAL CHANGE: The above fluid change intervals supersede previous instructions on all 1956-57 models.*

Recommended Lubricant (Except Cadillac) Use GM Hydra-Matic Fluid or Automatic Transmission Fluid Type "A" with "AQ-ATF" embossed on top of fluid container

Recommended Lubricant (Cadillac): It is recommended that only Cadillac Hydra-Matic Fluid, Part No 1471380 (5 qt can) be used in 1956-58 Dual Coupling Hydra-Matic Transmissions

►*1958 CADILLAC HYDRA-MATIC FLUID PRODUCTION CHANGE Starting with 1958 Engine No 015500, all cars had improved type fluid (Cadillac Part No 1471380) installed in production All Series 75 and 86 cars had the new fluid installed from start of production*

CHECKING FLUID LEVEL: With selector lever in "N" or "P" position, run engine at normal idle speed (except Cadillac); approx. 20 MPH (Cadillac), for 1½ minutes and check fluid level on dipstick. With engine still running, add fluid to bring level up to within ¼" of "F" (full) mark on dipstick. *CAUTION—do not fill above "F" mark on dipstick as this will cause foaming when transmission oil is hot.*

►*NOTE: Fluid level should be ¼" below "F" mark when cold and at the "F" mark when hot.*

DRAINING & REFILLING: Remove transmission oil pan drain plug and drain plug from flywheel or torus cover *(NOTE* - To gain access to flywheel or torus cover drain plug, remove flywheel housing front cover (Cadillac, Hudson, Nash, & Rambler), flywheel inspection plate (Oldsmobile), flywheel housing lower plate (Pontiac) Allow old fluid to drain completely and then reinstall plugs. *(CAUTION - Care must be taken not to damage flywheel or torus drain plug)* Pour 11 qts. (Oldsmobile), 8 qts. (all others) of Automatic Transmission Fluid Type "A" into transmission through filler tube on right side of transmission (tube is located under hood and also houses the dipstick). Run engine at 800 RPM (Cadillac), normal idle speed (all others) for 1½ minutes with selector lever in "N" (neutral). Add fluid as required to bring level to within ¼" of "F" (full) mark on dipstick. On Cadillac, reduce engine to idle speed before adding fluid.

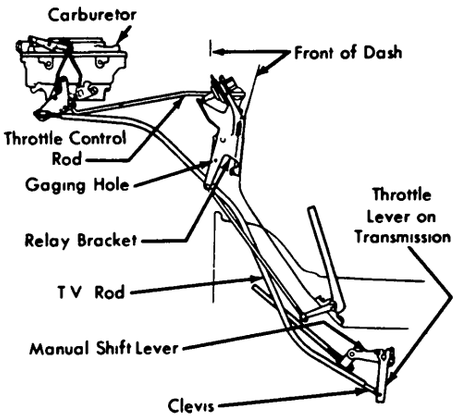
►*NOTE*·- Transmission oil capacity is approximately 12 qts. (Cadillac), 11½ qts (Hudson, Nash, & Rambler), 11 qts. (Oldsmobile), 9½ qts (Pontiac).

LINKAGE ADJUSTMENT

►*THROTTLE VALVE LINKAGE ADJUSTMENT NOTE See "Carburetor" on individual car model pages for throttle valve linkage adjustment.*

1956-58 CADILLAC

MANUAL LEVER LINKAGE ADJUSTMENT: Loosen the adjusting nuts on transmission manual rod and back off approximately 1" Place manual lever on transmission fully forward to "P" (Park) position. Place selector lever on steering column in "P" (Park) position. Slide clevis of manual lever along manual rod in direction of steering column until all slack in linkage is taken up *(NOTE*—If clevis contacts upper adjusting nut before all slack is taken up, nut should be backed off an additional amount). Tighten lower adjusting nut with fingers against clevis to further



CADILLAC LINKAGE

remove slack. Bring upper adjusting nut down to contact clevis and tighten with wrench. Check manual selector lever in car. It should be free to enter the "P" (Park) position and the "DR4" stop in the steering column should correspond to the "DR4" detent position in the transmission. Readjust if necessary. Check indicator pointer to see that it indexes to the "DR4" position when selector lever is at the "DR4" stop.

Neutral Safety Switch Adjustment (Combination Neutral Safety Switch, Back-up Light Switch): Located on steering column forward of instrument panel. Loosen attaching screw on switch and position it on jacket so starter is not operative in any position except "N" (Neutral) or "P" (Park).

1956-57 NASH, HUDSON & 1957 RAMBLER

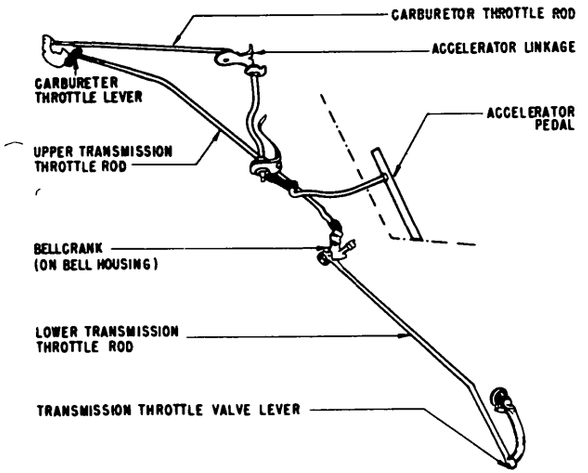
MANUAL LEVER LINKAGE ADJUSTMENT: Place selector lever in the "D-3" position and set operating lever against stop on starter switch bracket. Remove clevis pin from gear shift control rod at side of transmission case and remove clevis from shift lever. Place transmission outer shift lever in "D-3" position. Adjust clevis so that clevis pin passes freely through hole in lever with the operating lever against stop on starter switch bracket, then remove clevis and **lengthen the control rod two full turns** and replace clevis and pin.

1956-58 OLDSMOBILE

MANUAL LEVER LINKAGE ADJUSTMENT: Place transmission manual lever in neutral detent position. Disconnect manual rod from lower shift lever. Hold lower shift lever upward so selector lever is positioned against stop in upper steering column. Install pin in clevis and rotate clevis until pin enters bushing freely in lower shift lever. Install clevis and pin and tighten

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DUAL-COUPLING HYDRA-MATIC (C ntinu d)



HUDSON, NASH & RAMBLER LINKAGE

locknut. Move selector lever to "P" (Park) position and rock car to check for parking pawl engagement.

Neutral Safety Switch Adjustment: Located on steering column forward of instrument panel. Loosen attaching screws on mast jacket, and with selector lever in "N" (neutral) position, position the switch so that a .090" pin can be inserted through hole in switch arm and into hole in face of switch. Tighten switch attaching screws and remove pins. Check to see that starter will operate only in "P" (Park) and "N" (Neutral) positions, and that transmission is not in gear.

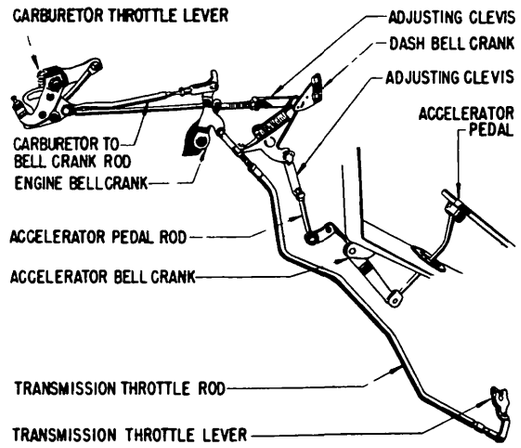
1956 PONTIAC

MANUAL LEVER LINKAGE ADJUSTMENT: Place gear shift selector in "Drive Right" position against stop which prevents accidental shift into low range. Loosen both front and rear trunnion lock nuts and remove trunnion from outer shift lever. Make sure that transmission outer shift lever is in "Drive Right" position (third detent from front). Install trunnion with locknuts loose, in outer shift lever. Tighten front locknut against trunnion finger tight to remove clearance in in linkage. Tighten rear locknut against trunnion.

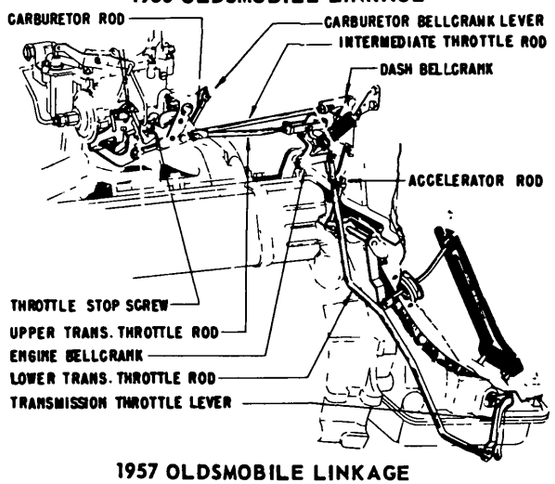
Neutral Safety Switch Adjustment: Located at lower end of steering column in engine compartment. Loosen switch mounting screw and adjust switch bracket to a position where starter will not operate when ignition key is turned to start position. Place manual control lever in "P" (Park) position. Make certain that switch arm does not touch stop on switch bracket. Check to see that engine starts when selector lever is in "P" (Park), or "N" (Neutral) positions. Tighten mounting screw securely.

1957-58 PONTIAC

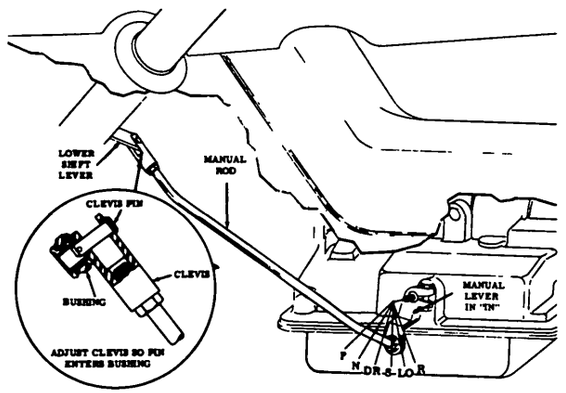
► *1957 PONTIAC BIND OR DRAG DURING REVERSE OPERATION CORRECTION:* This condition may be caused by improper travel of gearshift interlock plate in slot at lower end of steering column. If sufficient



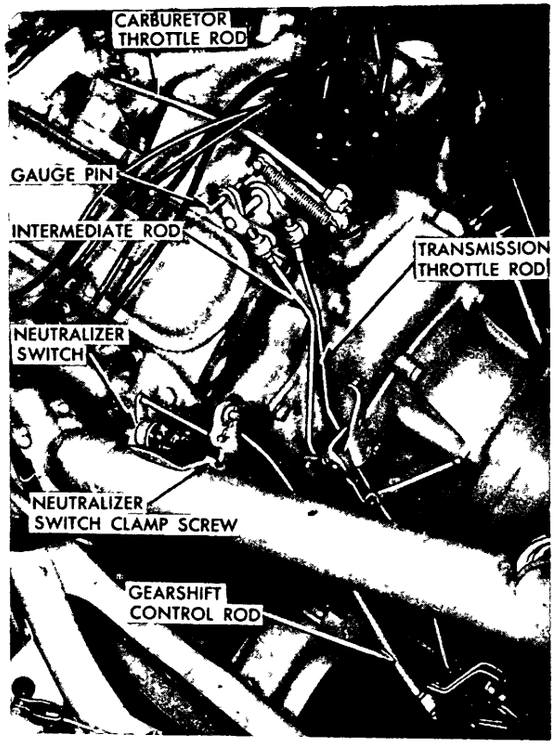
1956 OLDSMOBILE LINKAGE



1957 OLDSMOBILE LINKAGE



1958 OLDSMOBILE LINKAGE



PONTIAC LINKAGE

overtravel of lower shift lever beyond the reverse detent position is not allowed, and shift lever is not fully into the reverse detent, the neutral clutch exhaust will be blocked, preventing release and possible burning of neutral clutch plates. Check interlock plate for length of shift lever slot on reverse end of travel. Slot in plate should extend inside of jacket opening (jacket opening should limit the travel). If slot is not correct, check linkage for correct travel of steering column lower shaft lever as follows: Place upper shift control lever and transmission lever in "P" (Park) position. With outer transmission shift lever trunnion nuts backed off clear of trunnion, pull shift rod down toward transmission as far as possible; and, while holding in this position, run trunnion upper nut down to just contact trunnion. Hold shift rod and shift transmission into "R" (Reverse) using upper shift lever. Observe position of upper trunnion nut. If nut is short of trunnion, rework interlock and adjust linkage as indicated below. If upper nut is contacting trunnion, count the number of turns upper nut can be backed off and still contact trunnion. If less than two turns, rework interlock and adjust linkage as indicated below. If more than two turns, screw nut down from "just contact" position to original or starting position and tighten lower nut (linkage will be correct).

► *INTERLOCK REWORK FOR PROPER TRAVEL OF SHIFT LEVER: (See "Bind or Drag During Reverse Operation Correction" above).* Remove interlock plate

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

from steering column jacket and lengthen slot to within at least ¼" (3/16" allowable) from end of plate. Reinstall interlock plate.

MANUAL LEVER LINKAGE ADJUSTMENT: Place selector lever and transmission manual lever in "P" (Park) position; and with outer transmission shift lever trunnion nuts backed off clear of trunnion, pull shift rod down toward transmission as far as possible. While holding in this position, run the upper trunnion nut down to just contact trunnion. Hold the shift rod and shift transmission into "R" (Reverse), and observe position of upper trunnion nut **(This is important)**. If upper nut is short of trunnion, screw upper nut down to just contact trunnion, then turn down **two additional turns.** Tighten lower nut. If upper nut is contacting the trunnion, count number of turns nut can be backed off and still contact trunnion. If less than two turns, turn nut down **two turns** against trunnion from the "just contact" position, and lock lower nut. If more than two turns, turn upper nut down against trunnion from the "just contact" position to the original or starting position and lock lower nut. Check transmission parking lock with car on a grade or ramp for positive lock. *NOTE* - The shift indicator must not be off index more than .080" after linkage adjustment is completed.

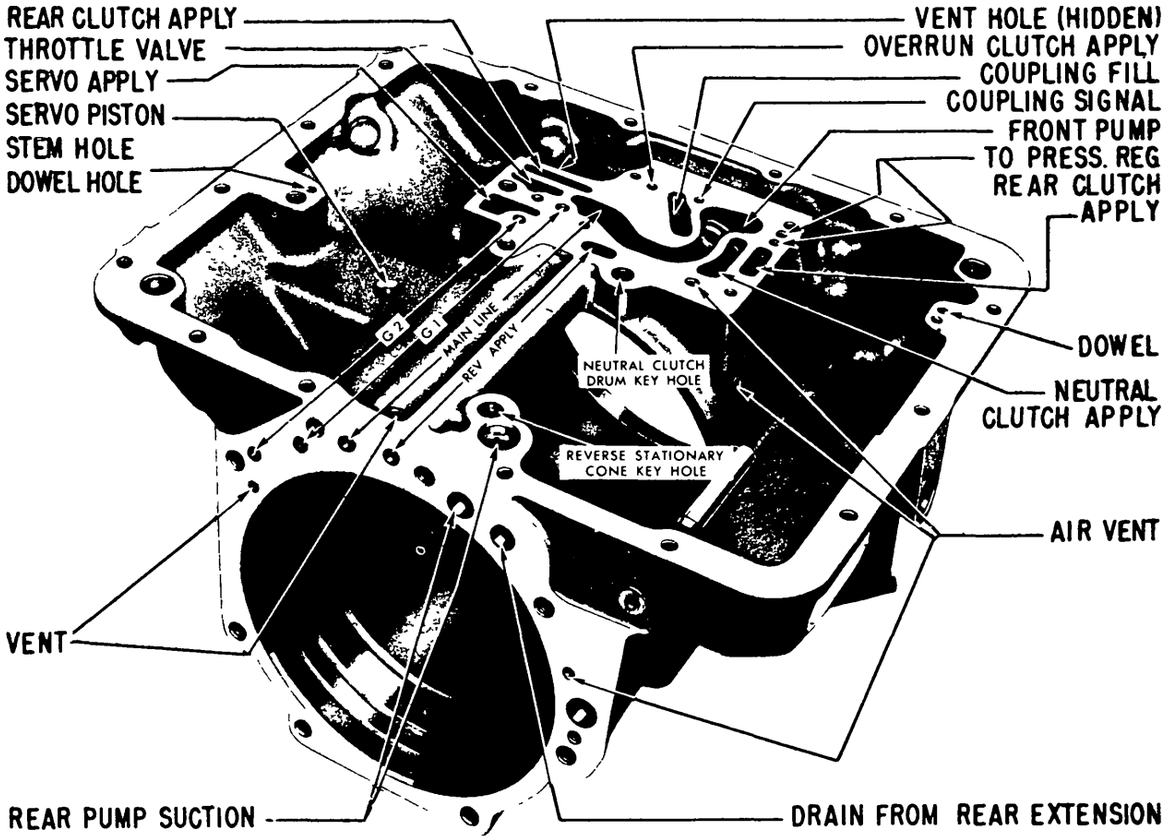
N utral Saf ty Switch Adjustment: Located at lower end of steering column in engine compartment. Loosen switch mounting screw and adjust switch bracket to a position where starter will not operate when ignition key is turned to start position. Place manual control lever in "P" (Park) position. Make certain that switch arm does not touch stop on switch bracket. Check to see that engine starts when selector lever is in "P" (Park), or "N" (Neutral) positions. Tighten mounting screw securely.

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *See "Dual-Coupling Hydra-Matic" Shift Point Table for correct shift speeds.*

►*1ST SPEED & REVERSE TEST NOTE: See "Stall T st" below.*

2nd Sp d T st: With selector lever in "Lo" range, make a full throttle start from a complete stop. The shift to 2nd speed should occur as indicated in "Shift Table" below, accompanied by a drop in engine RPM which then increases in second speed as full throttle opening is maintained. If a definite change from first to second speed is not noticed and engine speed does not drop but increases steadily, a malfunctioning front unit coupling is indicated. When the car is in second speed, permit the car to coast at zero throttle opening. If a definite engine braking effort is noticed, a malfunctioning overrun band is indicated. If transmission slips in second or misses second speed, the front unit coupling is not operating properly. If transmission slips in first and second on coast in "Lo" range, the overrun band is not operating properly.



TRANSMISSION AIR TEST POINTS

3rd & 4th Speed Test: Using the "Dr4" (Drive Left) range to obtain 40 MPH, move the selector lever to "Dr3" (Drive Right) range, forcing a downshift to third speed. Decrease car speed by use of the brakes while throttle is maintained in the open position and car speed is above 25 MPH. If engine RPM increases and the transmission has been satisfactory in reverse, first & second speeds, the rear unit clutch is slipping. If no excessive slip is felt, the rear unit clutch is operating correctly. The operation of the front unit clutch can be checked by bringing the car speed up to 30 MPH in "Dr4" range. With the car coasting in "Dr4" range, manually shift to "Dr3" range. If an immediate shift is felt which results in more braking effect on the car, then the overrun clutch is operating properly. If the manual lever is shifted from "Dr3" to "Dr4" range above 22 MPH with the car coasting and an immediate reduction of braking effort is obtained, then the clutch is releasing properly.

OIL PRESSURE TEST: Connect Oil Pressure Gauge J-2540 (Cadillac), J-2540-A (Hudson, Nash, & Rambler), J-4268-1 (Pontiac) to take off hole at bottom of rear pump using a hose and fitting. Drive car until transmission oil has reached normal operating temperature.

Zero Throttle Pressure (Hudson, Nash, Pontiac, & Rambler): Check pressure in all ranges. Pressure should be 50 lbs. minimum in all ranges with a maximum variation of 10 lbs., (may be higher in reverse).

Zero Throttle Pressure (Cadillac): With transmission in 4th speed, and car above 20 MPH, oil line pressure should be 60-70 lbs.

Drive Right Pressure (Hudson, Nash, Pontiac, & Rambler): With transmission selector lever in "Drive Right" position and car speed at approximately 25 MPH, pressure should be 90-100 lbs. *NOTE* - Pressure at any speed is constant regardless of throttle pressure as throttle valve pressure is not used to modulate line pressure.

Drive Left Pressure (Hudson, Nash, Pontiac, & Rambler): While driving at 25 MPH, move selector lever to "Drive Left" position so that transmission will shift into 4th speed. Oil pressure should drop to 60-70 lbs. in 4th.

Full Throttle Pressure Test (Cadillac): In any drive range, pressure should be at least 20 lbs. higher than zero throttle pressure test reading (see above).

R ar Pump Pr ssur Test (Cadillac): Drive car at 40-45 MPH in 4th speed, then shift to neutral and turn engine

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DUAL-COUPLING HYDRA-MATIC (C ntinu d)

off. Pressure should be at least 60 lbs.

R verse Pressure Test (Cadillac, Hudson, Nash, Pontiac, & Rambler): Place selector lever in "R" (Reverse) position and apply foot brake. Increase engine speed to half throttle. The pressure range under these conditions should be 160-200 lbs. (Cadillac), 145-190 lbs. (Hudson, Nash. Pontiac, & Rambler).

THROTTLE VALVE PRESSURE (PONTIAC): Remove pipe plug from throttle valve (located on right side of transmission). *NOTE - Pipe plug can be removed and pressure gauge can be installed by the opening provided in right hand side of floor pan tunnel. Lift cover and remove metal plate. When reinstalling, apply sealer around floor pan opening.* Install pressure gauge, Tool J-6695, then start engine and operate for a few minutes to warm transmission. With engine operating and car raised, disconnect throttle rod from outer throttle lever on transmission and move lever to rearmost position. While holding lever in this position, place throttle valve lever travel gauge, Tool J-6573 against side of transmission pan so that ball stud in lever is touching rear of slot. *NOTE - Center of ball should contact gauge. Bend lever as necessary to align ball with gauge.* Hold gauge firmly against side of pan and move throttle lever forward until ball stud in lever touches front of slot, then read throttle valve pressure on gauge, which should be 20-22 lbs. If pressure is not correct, stop engine, drain transmission and remove pan. Move throttle valve adjusting screw on control valve rearward to reduce pressure or forward to increase pressure. *NOTE - Moving screw .030" will change throttle valve pressure about 5 lbs.* Refill transmission and recheck pressure. If necessary, repeat adjustment until pressure is within limits.

TROUBLE SHOOTING & DIAGNOSIS

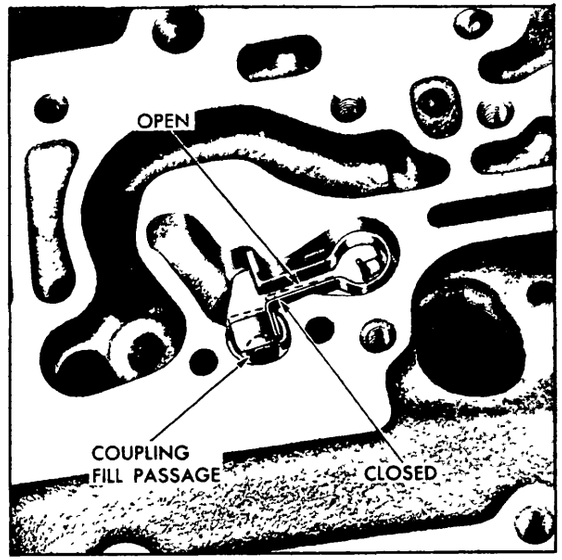
FORWARD DRIVE IN NEUTRAL: Manual linkage not adjusted correctly. Neutral clutch not releasing properly. Rear unit clutch not releasing properly. Overrun band not fully released.

REVERSE DRIVE IN NEUTRAL: Stationary cone sticking. Reverse piston not fully released.

NO DRIVE (Resulting in Neutral Condition): Front sprag clutch slipping. Front sprag clutch incorrectly installed. Rear sprag clutch slipping. Rear sprag clutch incorrectly installed. Neutral clutch apply restricted or leaking. Manual linkage incorrectly installed. Manual valve not engaged with valve pin. Low oil pressure.

NO DRIVE (R sulting in Stall C nditi n): Stationary cone sticking. Reverse piston not fully released. Front sprag clutch broken. Rear sprag clutch broken.

LOCKED-UP CONDITION IN REVERSE RANGE: Neutral clutch not releasing properly. Rear unit clutch not releasing properly. Overrun band not fully released. Rear sprag clutch incorrectly installed.



THERMOSTATIC COUPLING FILL VALVE (OLDSMOBILE & PONTIAC)

NEUTRAL CONDITION IN REVERSE RANGE: Reverse piston apply restricted or leakage. Stationary cone key missing.

NO REVERSE (Drive Slips): Reverse piston apply restricted or leaking. Low oil pressure. Manual linkage not adjusted correctly. Manual valve not engaged with valve pin. Front sprag clutch slipping or broken.

SELECTOR LEVER WILL NOT GO INTO REVERSE RANGE: Governor valves sticking or broken govenor oil seal rings. Reverse blocker piston stuck open.

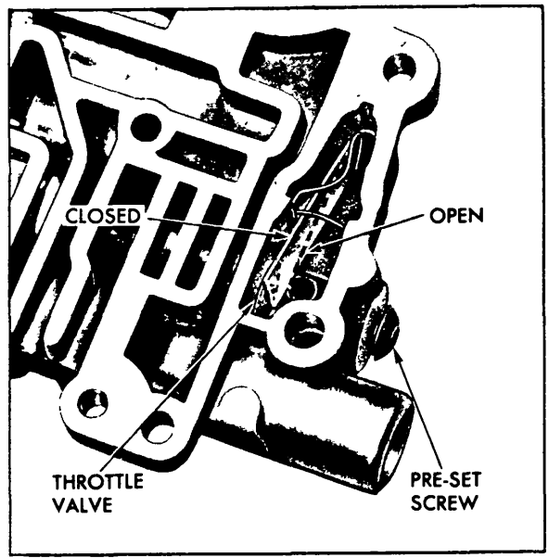
SLIPS IN 1ST & 3RD IN "DR4" RANGE: Front sprag clutch slipping or broken.

SLIPS IN OR MISSES 2ND & 4TH: Front unit coupling cover seals leaking. Front unit coupling cover exhaust valves sticking or missing. Front unit coupling cover feed restriction or leak. Front unit coupling cover signal restriction or leak. Low oil pressure. Coupling valve sticking. Sticking valve or dirt in valve body.

SLIPS IN 1ST & 2ND (All Drive Ranges): Neutral clutch slipping or burned. Neutral clutch apply restricted or leaking. Incorrect number of clutch plates. Rear sprag clutch slipping or broken. Low oil pressure.

SLIPS IN 3RD & 4TH (In Both "Dr4" & "Dr3"): Rear clutch unit slipping or burned. Rear unit clutch apply restricted or leaking. Incorrect number of clutch plates.

SLIPS IN 3RD (In "Dr3" n Coast): Overrun clutch slipping or burned. Overrun clutch apply restricted or leaking. Sticking valve or dirt in valve body.



THERMOSTATIC THROTTLE VALVE CONTROL (OLDSMOBILE & PONTIAC)

SLIPS IN 1ST & 2ND (In "L " n C ast): Servo apply restricted or leaking. Overrun clutch not anchored to case or broken. Servo piston binding in case or in servo and accumulator body. Overrun band facing worn or loose.

SLIPS IN 1ST (In all Drive Ranges): Front sprag clutch slipping or broken. Front sprag clutch incorrectly installed. Rear sprag clutch slipping or broken. Rear sprag clutch incorrectly installed. Neutral clutch slipping or burned. Neutral clutch apply restricted or leaking. Incorrect number of neutral clutch plates.

NO UPSHIFTS: Governor valves sticking. Broken governor oil seal rings. Sticking valve or dirt in valve body.

MISSES 2ND SPEED: Amplifier valve sticking. Transition valve sticking. Sticking valve or dirt in valve body.

MISSES 3RD SPEED: Transition valve sticking. Sticking valve or dirt in valve body.

ROUGH 2-3 UPSHIFT: Trimmer valve stuck. Accumulator piston stuck. Accumulator gasket broken or leaking. Restricted or leaking oil passages. Broken accumulator spring. Broken or leaking accumulator piston oil seal ring.

LOCKS UP IN 3RD & 4TH: Rear sprag clutch broken.

LOCKS UP IN 2ND & 4TH: Front sprag clutch broken.

UPSHIFTS HIGH: Governor valves sticking. Leaking or restricted main line feed to governor. Broken governor oil seal rings.

UPSHIFTS LOW: Governor valves sticking. Broken governor oil seal rings. Sticking valve or dirt in valve body.

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC SHIFT POINTS

1956 CADILLAC
3.07-1 AXLE (60S, 62 Series – Single Carb.)

UPSHIFTS:	1-2	2-3	3-4	DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	7-10	14-18	20-24	"Dr4" (Min. Throttle)	14-18	11-15	6-9
(At Detent)	20-24	40-43	68-75	(At Detent)	36-41	11-15	6-9
(Full Throttle)	20-24	39-44	68-75	(Full Throttle)	61-68	23-27	6-9
"Dr3" (Min. Throttle)	7-10	14-18	68-75	"Dr3" (Min. Throttle)	61-68	11-15	6-9
(At Detent)	20-24	40-43	68-75	(At Detent)	61-68	11-15	6-9
(Full Throttle)	20-24	39-44	68-75	(Full Throttle)	61-68	23-27	6-9
"Lo" (Min. Throttle)	7-10	52-58	68-75	"Lo" (Min Throttle)	61-68	41-47	6-9
(At Detent)	20-24	52-58	68-75	(At Detent)	61-68	41-47	6-9
(Full Throttle)	20-24	52-58	68-75	(Full Throttle)	61-68	41-47	6-9

1956 CADILLAC
3.36-1 AXLE (60S, 62 Series – Dual Carbs.)

UPSHIFTS:	1-2	2-3	3-4	DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	7-10	15-18	18-22	"Dr4" (Min. Throttle)	12-16	12-15	6-9
(At Detent)	19-22	37-40	62-69	(At Detent)	33-38	12-15	6-9
(Full Throttle)	18-22	37-40	62-69	(Full Throttle)	56-62	22-25	6-9
"Dr3' (Min. Throttle)	7-10	15-18	62-69	"Dr3" (Min. Throttle)	56-62	12-15	6-9
(At Detent)	19-22	37-40	62-69	(At Detent)	56-62	12-15	6-9
(Full Throttle)	18-22	37-40	62-69	(Full Throttle)	56-62	22-25	6-9
"Lo" (Min. Throttle)	7-10	47-53	62-68	"Lo" (Min. Throttle)	56-64	37-43	6-9
(At Detent)	19-22	47-53	62-69	(At Detent)	56-62	37-43	6-9
(Full Throttle)	18-22	47-53	62-69	(Full Throttle)	56-62	37-43	6-9

1956 CADILLAC
3.36-1 AXLE (75 Series. Optl. on 60S, 62 Series – Single Carb.)

UPSHIFTS:	1-2	2-3	3-4	DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	7-10	13-17	18-22	"Dr4" (Min. Throttle)	12-16	10-18	6-9
(At Detent)	19-22	36-39	62-69	(At Detent)	33-38	10-14	6-9
(Full Throttle)	18-22	35-40	62-69	(Full Throttle)	56-62	21-25	6-9
"Dr3" (Min. Throttle)	7-10	13-17	62-69	"Dr3" (Min. Throttle)	56-62	10-18	6-9
(At Detent)	19-22	36-39	62-69	(At Detent)	56-62	10-14	6-9
(Full Throttle)	18-22	35-40	62-69	(Full Throttle)	56-62	21-25	6-9
"Lo" (Min. Throttle)	7-10	47-53	62-68	"Lo" (Min. Throttle)	56-64	37-43	6-9
(At Detent)	19-22	47-53	62-69	(At Detent)	56-62	37-43	6-9
(Full Throttle)	18-22	47-53	62-69	(Full Throttle)	56-62	37-43	6-9

1956 CADILLAC
3.77-1 AXLE (86 Series)

UPSHIFTS:	1-2	2-3	3-4	DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	6-8	12-15	16-19	"Dr4" (Min. Throttle)	11-14	9-12	5-8
(At Detent)	16-19	32-35	55-61	(At Detent)	29-33	9-12	5-8
(Full Throttle)	16-20	31-36	55-61	(Full Throttle)	50-56	18-22	5-8
"Dr3" (Min. Throttle)	6-8	12-15	55-61	"Dr3" (Min. Throttle)	50-56	9-12	5-8
(At Detent)	16-19	32-35	55-61	(At Detent)	50-56	9-12	5-8
(Full Throttle)	16-20	31-36	55-61	(Full Throttle)	50-56	18-22	5-8
"Lo" (Min. Throttle)	6-8	42-47	56-62	"Lo" (Min. Throttle)	50-56	33-38	5-8
(At Detent)	16-19	42-47	55-61	(At Detent)	50-56	33-38	5-8
(Full Throttle)	16-20	42-47	55-61	(Full Throttle)	50-56	33-38	5-8

1957 CADILLAC
3.07-1 AXLE 60S, 62 Series (Single Carb.)

UPSHIFTS:	1-2	2-3	3-4	DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	6-9	13-16	20-24	"Dr4" (Min. Throttle)	14-18	11-15	0-5
(Full Throttle)	20-24	39-44	68-75	(Full Throttle)	61-68	23-27	0-5
"Dr3" (Min. Throttle)	6-9	13-16	68-75	"Dr3" (Min. Throttle)	61-68	11-15	0-5
(Full Throttle)	20-24	39-44	68-75	(Full Throttle)	61-68	23-27	0-5
"Lo" (Min. Throttle)	6-9	52-58	68-75	"Lo" (Min. Throttle)	61-68	41-47	0-5
(Full Throttle)	20-24	52-58	68-75	(Full Throttle)	61-68	41-47	0-5

1957 CADILLAC
3.36 AXLE
60S, 62 Series (Dual Carbs.)

UPSHIFTS:	1-2	2-3	3-4
"Dr4" (Min. Throttle)	6-9	13-16	17-21
(Full Throttle)	18-22	37-40	72-79
"Dr3" (Min. Throttle)	6-9	13-16	62-69
(Full Throttle)	18-22	37-40	62-69
"Lo" (Min. Throttle)	6-9	47-53	62-68
(Full Throttle)	18-22	47-53	62-69

DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	12-16	12-15	0-5
(Full Throttle)	60-66	22-25	0-5
"Dr3" (Min. Throttle)	56-62	12-15	0-5
(Full Throttle)	56-62	22-25	0-5
"Lo" (Min. Throttle)	56-64	37-43	0-5
(Full Throttle)	56-62	37-43	0-5

1957 CADILLAC
3.36 AXLE
75 Series Optl. on 60S, 62 Series (Single Carb.)

UPSHIFTS:	1-2	2-3	3-4
"Dr4" (Min. Throttle)	6-9	12-15	18-22
(Full Throttle)	18-22	35-40	62-69
"Dr3" (Min. Throttle)	6-9	12-15	62-69
(Full Throttle)	18-22	35-40	62-69
"Lo" (Min. Throttle)	6-9	47-53	62-68
(Full Throttle)	18-22	47-53	62-69

DOWNSHIFTS	4-3	3-2	2-1
"Dr4" (Min. Throttle)	12-16	10-18	0-5
(Full Throttle)	56-62	21-25	0-5
"Dr3" (Min. Throttle)	56-62	10-18	0-5
(Full Throttle)	56-62	21-25	0-5
"Lo" (Min. Throttle)	56-64	37-43	0-5
(Full Throttle)	56-62	37-43	0-5

1957 CADILLAC
3.77-1 AXLE
(86 Series)

UPSHIFTS:	1-2	2-3	3-4
"Dr4" (Min. Throttle)	5-8	11-14	16-19
(Full Throttle)	16-20	31-36	55-61
"Dr3" (Min. Throttle)	5-8	11-14	55-61
(Full Throttle)	16-20	31-36	55-61
"Lo" (Min. Throttle)	5-8*	55-61	56-62
(Full Throttle)	16-20	55-61	55-61

DOWNSHIFTS:	4-3	3-2	2-1
"Dr4" (Min. Throttle)	11-14	9-12	0-4
(Full Throttle)	50-56	18-22	0-4
"Dr3" (Min. Throttle)	50-56	9-12	0-4
(Full Throttle)	50-56	18-22	0-4
"Lo" (Min. Throttle)	50-56	33-38	0-4
(Full Throttle)	50-56	33-38	0-4

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC SHIFT POINTS

1958 CADILLAC
3.07-1 AXLE
60S, 62 Series

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Min. Throttle)	3-9	13-17	22-25
	(Full Throttle)	18-21	40-43	76-81
"Dr3"	(Min. Throttle)	3-9	13-17	76-81
	(Full Throttle)	18-21	40-43	76-81
"Lo"	(Min. Throttle)	3-9	48-54	76-81
	(Full Throttle)	18-21	48-54	76-81
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	17-14	12-8	7-3
	(Full Throttle)	74-68	26-22	13-9
"Dr3"	(Min. Throttle)	74-68	12-8	7-3
	(Full Throttle)	74-68	26-22	13-9
"Lo"	(Min. Throttle)	74-68	47-44	7-3
	(Full Throttle)	74-68	47-44	13-9

1958 CADILLAC
3.36-1 AXLE
75 Series (Optl. 60S, 62)

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Min. Throttle)	3-8	12-15	20-23
	(Full Throttle)	16-19	37-39	69-74
"Dr3"	(Min. Throttle)	3-8	12-15	69-74
	(Full Throttle)	16-19	37-39	69-74
"Lo"	(Min. Throttle)	3-8	44-49	69-74
	(Full Throttle)	16-19	44-49	69-74
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	16-13	11-7	7-3
	(Full Throttle)	67-62	24-20	12-8
"Dr3"	(Min. Throttle)	67-62	11-7	7-3
	(Full Throttle)	67-62	24-20	12-8
"Lo"	(Min. Throttle)	67-62	43-40	7-3
	(Full Throttle)	67-62	43-40	12-8

1958 CADILLAC
3.77 AXLE
86 Series

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Min. Throttle)	3-7	11-14	19-21
	(Full Throttle)	16-18	35-37	65-70
"Dr3"	(Min. Throttle)	3-7	11-14	65-70
	(Full Throttle)	16-18	35-37	65-70
"Lo"	(Min. Throttle)	3-7	42-47	65-70
	(Full Throttle)	16-18	42-47	65-70
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	15-12	10-7	6-2
	(Full Throttle)	64-59	22-19	11-8
"Dr3"	(Min. Throttle)	64-59	10-7	6-2
	(Full Throttle)	64-59	22-19	11-8
"Lo"	(Min. Throttle)	64-59	41-38	6-2
	(Full Throttle)	64-59	41-38	11-8

1956 HUDSON & NASH

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Light Throttle)	5-9	11-15	18-22
	(Full Throttle)	21-25	41-45	71-75
"Dr3"	(Light Throttle)	5-9	11-15	
	(Full Throttle)	21-25	41-45	70-74
"Lo"	(Light Throttle)	7-9		
	(Full Throttle)		45-49	70-74
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Max. Part Throttle)	34-31		
	(Max. Full Throttle)	67-63	22-18	10-6
	(Closed Throttle)	13-9		4-2
"Dr3"	(Max. Full Throttle)		22-18	10-6
	(Closed Throttle)			4-2
"Lo"	(Closed Throttle)			4-2

1957 HUDSON & NASH

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Light Throttle)	5-9	10-14	15-19
	(Full Throttle)	13-17	33-37	59-63
"Dr3"	(Light Throttle)	5-9	10-14	65-69
	(Full Throttle)	13-17	33-37	65-69
"Lo"	(Light Throttle)	5-9	46-50	65-69
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Full Throttle)	30-34	7-11	
	(Closed Throttle)	15-11	11-7	7-3
	(Max. Kickdown) ①	59-55	21-27	
"Dr3"	(Closed Throttle)	65-61	11-7	7-3
"Lo"	(Closed Throttle)	65-61	43-39	7-3

① - Maximum Part Throttle Kickdown (4-3) 34-30 MPH.

1956 PONTIAC

		1-2	2-3	3-4
UPSHIFTS:				
1 "Dr4"	(Min. Throttle)	7-9	14-16	19-22
	(Full Throttle)	19-23	37-40	70-74
2 "Dr3"	(Min. Throttle)	7-9	14-16	
	(Full Throttle)	19-23	37-40	70-74
"Lo"	(Min. Throttle)	7-9		
	(Full Throttle)	19-23	49-53	70-74
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
1 "Dr4"	(Closed Throttle)	17-15	13-10	8-6
	(Full Throttle)	38-17	13-10	8-6
	(Forced)	68-36	36-10	8-6
2 "Dr3"	(Closed Throttle)	68-64	13-10	8-6
	(Full Throttle)	68-64	13-10	8-6
	(Forced)	68-64	26-10	8-6
"Lo"	(Closed Throttle)	68-64	43-40	8-6
	(Full Throttle)	68-64	43-40	8-6
	(Forced)	68-64	43-10	8-6

1957 PONTIAC

		1-2	2-3	3-4
UPSHIFTS:				
"Dr. Left"	(Min. Throttle)	4-9	11-15	17-20
	(Full Throttle)	11-15	35-40	65-70
"Dr. Right"	(Min. Throttle)	4-9	11-15	
	(Full Throttle)	11-15	35-40	65-75
"Lo"	(Min. Throttle)	4-9		
	(Full Throttle)	11-15	42-52	65-75
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr. Left"	(Closed Throttle)	15-11	10-6	6-2
	(Full Throttle)	35-28	10-6	6-2
	(Forced)	70-60	25-20	6-2
"Dr. Right"	(Closed Throttle)	70-60	10-6	6-2
	(Full Throttle)	70-60	10-6	6-2
	(Forced)	70-60	25-20	6-2
"Lo"	(Closed Throttle)	70-60	45-39	6-2
	(Full Throttle)	70-60	45-39	6-2
	(Forced)	70-60	45-39	6-2

1958 PONTIAC

		1-2	2-3	3-4
UPSHIFTS:				
"Dr. Left"	(Min. Throttle)	4-9	11-15	17-20
	(Full Throttle)	11-15	35-40	65-70
"Dr. Right"	(Min. Throttle)	4-9	11-15	
	(Full Throttle)	11-15	35-40	65-75
"Lo"	(Min. Throttle)	4-9		
	(Full Throttle)	11-15	42-52	65-75
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr. Left"	(Closed Throttle)	15-11	10-6	6-2
	(Full Throttle)	35-28	10-6	6-2
	(Forced)	70-60	25-20	6-2
"Dr. Right"	(Closed Throttle)	70-60	10-6	6-2
	(Full Throttle)	70-60	10-6	6-2
	(Forced)	70-60	25-20	6-2
"Lo"	(Closed Throttle)	70-60	45-39	6-2
	(Full Throttle)	70-60	45-39	6-2
	(Forced)	70-60	45-39	6-2

1957 RAMBLER

		1-2	2-3	3-4
UPSHIFTS:				
"Dr4"	(Light Throttle)	5-9	10-14	15-19
	(Full Throttle)	13-17	30-34	59-63
"Dr3"	(Light Throttle)	5-9	10-14	59-63
	(Full Throttle)	13-17	30-34	59-63
"Lo"	(Light Throttle)	5-9	42-46	59-63
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Full Throttle)	28-32	16-20	
	(Closed Throttle)	15-11	11-7	7-3
	(Max. Kickdown) ①	60-56	20-16	
"Dr3"	(Closed Throttle)	59-55	11-7	7-3
"Lo"	(Closed Throttle)	57-53	41-37	7-3

① - Maximum Part Throttle Kickdown (4-3) 32-28 MPH.

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DUAL-COUPLING HYDRA-MATIC (C ntinu d)

REMOVAL & INSTALLATION

1956-58 CADILLAC

REMOVAL: 1) Place car on hoist or jack stands and drain cooling system. Disconnect battery and remove transmission filler pipe bracket from right cylinder head. Remove starter motor and slush deflector. Clean dirt away from pipe flange and slide filler pipe out of sleeve in transmission case. Remove lower flywheel front cover. Drain transmission at oil pan and flywheel.

2) Remove propeller shaft assembly. Remove intermediate frame crossmember below flywheel housing. Disconnect hoses at cooler and speedometer cable from extension housing. Remove throttle valve and manual levers from shafts: .

3) Remove nuts from flywheel-to-drive plate screws. Place a jack under rear of engine oil pan, using a wood block to prevent damage to oil pan. Place transmission jack under transmission and raise it just enough to take strain off rear engine support.

4) Disconnect engine rear support at transmission extension housing, and remove crossmember that carries support. Lower transmission and engine below normal position and use a 5/8" universal socket and a 2½ ft. long, 3/8" drive extension to reach the upper flywheel housing to cylinder block bolts.

►*NOTE:* The above engine removal procedure supersedes previous instructions requiring the removal of upper flywheel housing-to-block by removing the access holes in floor pan. These floor pan holes are provided for use only when a damaged bolt may not be accessible.

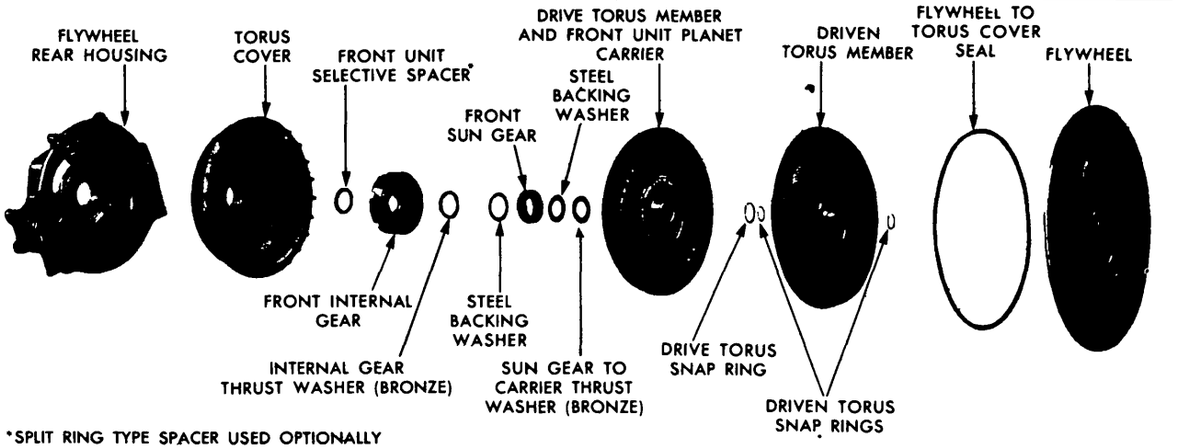
5) Remove four remaining screws holding flywheel housing to engine. Remove flywheel housing and transmission as a unit by moving assembly toward rear of car, disengaging flywheel housing from locating dowels on engine, then tilting front of unit downward to lower it from car. Remove washer from pilot hole in crankshaft and four spacer washers from flywheel-to-drive plate screws.

INSTALLATION: 1) Install spacer washer in pilot hole in crankshaft and install spacer washers on flywheel-to-drive plate screws. Raise transmission into position carefully with transmission jack. Align drive plate with four torus cover screws, and dowel holes in flywheel housing with dowels on engine.

2) Install four lower flywheel housing-to-crankcase screws (be sure that flywheel is as far forward as possible). Install four nuts attaching drive plate to flywheel and tighten to 15-20 ft. lbs. Be sure drain plugs in flywheel and oil pan are tight.

3) With transmission and engine in a lower than normal position (same position used for removal), install and tighten upper flywheel-to-cylinder block bolts. Raise engine and transmission about one inch above normal height and install engine rear support bracket on frame. Lower transmission carefully and install support screws. Remove jack and block from engine pan.

4) Install flywheel housing front cover and starter motor.



*SPLIT RING TYPE SPACER USED OPTIONALLY

DUAL-COUPLING HYDRA-MATIC FLYWHEEL REAR HOUSING & TORUS ASSEMBLY

Install transmission filler tube with support bracket properly positioned on cylinder head. Install manual and throttle valve levers making sure that serrations on levers lineup with serrations on their respective shafts. Tighten securely. Install slush deflector and install speedometer cable. Connect hoses to cooler and tighten securely.

5) Install frame crossmember below flywheel housing. Install propeller shaft assembly, then lower car to floor. Connect battery and install filler pipe bracket to cylinder head screw. Fill cooling system. Fill transmission (*see "Draining & Refilling" above*). Adjust manual and throttle valve linkage (*see "Linkage Adjustments" above*).

1956-57 HUDSON & NASH, 1957 RAMBLER

REMOVAL: Raise car sufficiently on car stands, supporting rear of car at side sills. Support rear axle with a hydraulic jack.

1) Drain flywheel and transmission oil pan (*see "Draining & Refilling"* above). Remove oil filler tube from oil pan. Disconnect oil cooler tubes at right side of transmission.

2) Disconnect hand brake cable at bell crank brake cable housing at bell crank bracket. Remove brake hose bracket from floor pan to prevent damage to hose. Disconnect speedometer cable and housing at transmission adapter.

3) Disconnect throttle rod assembly from throttle lever at transmission and bellcrank at bell housing. Disconnect manual control rod from lever at transmission.

4) Disconnect torque tube from rear bearing retainer, then move rear axle and torque tube assembly to the rear and separate by sliding universal joint to rear off splines of output shaft.

5) Support rear of engine to remove weight from rear engine support cross member. Remove plate from flywheel housing and remove six nuts retaining flywheel and torus assembly to engine flex plate, Place a hydraulic jack, with Tool J-6130 under transmission. Disconnect flywheel housing-to-engine attaching bolts.

6) Disconnect the cross member from rear engine supports and from body side sills. With jack handle toward rear of car, raise the jack slightly to remove strain or bind from bolts fastened to flex plate. Move transmission assembly to rear and lower assembly after six bolts have been withdrawn from engine flex plate.

INSTALLATION: Reverse removal procedure and note the following:

1) Coat torus pilot with lubriplate. Exercise caution when entering torus pilot into flywheel.

2) Line up the two torus covers with clearance holes in flywheel or flex plate when retaining nuts are tightened. *CAUTION* - If these dowels are not lined up, they can be forced out and damage the bell housing.

1956 OLDSMOBILE

REMOVAL: 1) Disconnect battery and remove transmission oil filler tube. Raise car with all four wheels off floor. Drain transmission and flywheel (*see "Draining & Refilling" above*). Disconnect speedometer cable at transmission.

2) Disconnect manual and throttle valve linkage and remove both levers from side of transmission. Remove crankcase breather outlet tube. Remove propeller shaft, and on cars with dual exhaust, remove left hand exhaust pipe. Remove starter motor.

3) Support transmission with unit lift and adapter (that will accomodate this transmission). Raise engine enough to relieve weight from rear engine mounts. Remove engine mount-to-cross member bolts. Remove cross bar to frame attaching bolts, then remove cross member.

4) Remove lower flywheel housing. Remove torus oil drain plug and drain torus. Reinstall plug and tighten to 6-7 ft. lbs.

5) Install engine support bar, Tool BT-28, with support screw pilots seated into lower flywheel housing front attaching screw holes. (*NOTE–Locate support bar forward on fram so it will not interfer wh n lowering transmission*). Lower unit lift until it is free of transmission oil pan.

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

6) Lower engine (using support bar adjusting screws) NOT TO EXCEED 1½" to permit removal of the two upper bell housing-to-block bolts. Disconnect oil cooler hoses from lines and cap lines immediately to prevent entrance of foreign material.

7) Remove the four flex plate-to-flywheel attaching nuts and remove the flywheel housing-to-block bolts. Move transmission rearward approximately 3/4" to clear dowels (3/8" standard thread holes are provided adjacent to dowels for installing bolts to push flywheel housing off dowels). Lower transmission from car.

INSTALLATION: Reverse the removal procedure and note the following Torque flex plate-to-flywheel attaching nuts to 20-25 ft. lbs. Torque oil pan drain plug to 35-45 ft. lbs. Torque throttle lever to 10-12 ft. lbs.

1957-58 OLDSMOBILE

REMOVAL· 1) Disconnect battery and remove transmission oil filler tube Raise car with all four wheels off floor Drain transmission *(see "Draining & Refilling" above)* Disconnect speedometer cable at transmission

2) Disconnect manual and throttle valve linkage and remove throttle lever Remove crankcase lever outlet tube Scribe a line from one propeller shaft center bearing support-to-frame bolts on frame member to aid in aligning center bearing support at installation

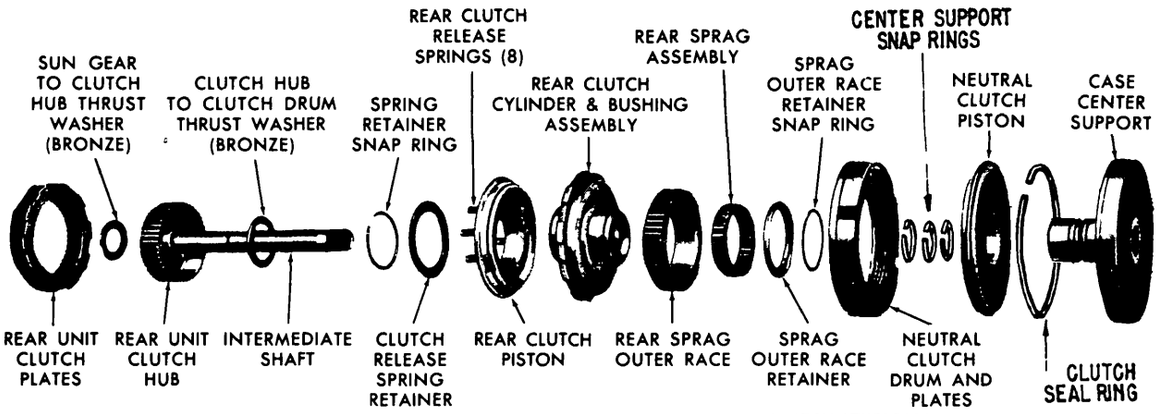
3) Remove propeller shaft center bearing support bolts and shims (mark shims for installation at the same location) Disconnect front universal joint at transmission Raise center bearing so it will clear frame member and slide front propeller shaft and bearing assembly approximately 2" to rear on slip joint (bearing mounting plate will rest on frame and keep propeller shaft from dropping down)

4) Remove starter and lower flywheel housing Support transmission with a transmission hoist and adapter Raise engine enough to relieve weight from rear engine mounts and remove engine mount-to-crossmember bolts Remove crossbar to frame attaching bolts and remove crossmember

5) Remove torus oil plug and drain torus, reinstall plug and tighten to 6-7 ft lbs Install engine support bar (Tool 30-13), with support screw pilots seated into lower flywheel housing front attaching screw holes *NOTE* - Locate support bar forward on frame so transmission will clear when it is lowered

6) Lower transmission hoist until it is free of transmissions then lower engine (using support bar adjusting screws), NOT TO EXCEED 1½", to permit removal of the two upper bell housing-to-block bolts Disconnect oil cooler hoses at lines and cap lines immediately

7) Raise transmission hoist to contact transmission supporting it slightly Remove the four flex plate-to-flywheel nuts (note position of flywheel dowels in relation to the flex plate) Remove remaining flywheel housing-to-block bolts Move transmission to rear approximately ¾" to clear dowels (standard thread holes adjacent to dowels are provided for installing bolts to push flywheel housing off dowels) Lower transmission from car



CENTER BEARING SUPPORT, NEUTRAL CLUTCH, & REAR UNIT CLUTCH (TYPICAL)

INSTALLATION: Reverse removal procedure and note the following

1) Lubricate crankshaft pilot bore and wick in pilot bore with Synthetic Oil Seal Lubricant, Part No 567196

2) To assemble flex plate to flywheel, align one dowel in flywheel with the small recess adjacent to small ear in flexplate then cross tighten flex plate-to-flywheel attaching nuts to 17-22 ft lbs Tighten oil pan drain plug

3) Use a 4" "C" clamp to hold bearing against spider journals and obtain clearance of bearing snap rings when installing front propeller shaft to companion flange on transmission Tighten "U" bolt nuts to 18-22 ft lbs

4) Refill transmission *See "Draining & Refilling" above*

1956 PONTIAC

REMOVAL: 1) Drain cooling system and remove transmission oil level indicator. Drain transmission oil pan (torus assembly can be drained at same time or it can be drained after transmission removed).

2) Disconnect rear universal joint from differential companion flange and slide propeller shaft from transmission output shaft. Disconnect speedometer cable from driven gear.

3) Remove flywheel housing bottom cover and crankcase ventilator outlet filter. If car is equipped with dual exhaust system, the right hand exhaust pipe must be removed (it is not necessary to disturb the exhaust system on cars with single exhaust).

4) Disconnect rear engine insulators from rear engine support cross member. Using Engine Fixture J-4732, raise rear of engine until insulators are about 1/2" above cross member *(CAUTION–Do not raise engine more than necessary to remove cross member).*

5) Loosen transmission filler pipe to cylinder head clamp. Remove transmission throttle control lever and disconnect manual control rod from transmission lever. Remove engine rear support cross member.

6) Remove nuts from six torus cover and flywheel-to-flex plate attaching bolts. Disconnect water hoses from oil cooler. Push transmission filler pipe upward out of transmission.

7) Lower engine about 1½" below its normal position and position special automatic transmission jack under transmission and raise transmission slightly to take load off rear flywheel housing attaching screws. Using 18" to 22" socket extension, remove screws attaching flywheel housing. Work transmission rearward to disengage dowels from front flywheel housing, then lower transmission from car.

►*FLYWHEEL & TORUS COVER ASSEMBLY PRODUCTION CHANGE:* A new torus cover using 12 attaching bolts will be used with a new flywheel having 12 bolt holes. Service replacement parts numbers will remain the same and both early and late types will be interchangeable. When using a 24 bolt type cover on a 12 hole flywheel, it is necessary to remove the 12 alternate bolts.

INSTALLATION: 1) With transmission on special automatic transmission jack, raise it under car until engine flex plate and transmission flywheel and torus cover are at the same level. Rotate torus cover until dowels in cover and flywheel are aligned with holes in flex plate (torus cover and flex plate can be fastened at either of two positions). Move transmission into position engaging flywheel dowels into flex plate and rear flywheel housing dowels into front flywheel housing.

2) Install rear flywheel housing attaching screws (NOTE—Check to see that flywheel and torus cover are free to move back and forth slightly. If pilot on flywheel entered end of crankshaft properly, some movement should be possible). Remove special transmission jack.

3) Raise engine (using Support Fixture J-4732) until transmission touches floor pan. Install engine rear support cross member and install bolts, lockwashers, and nuts and tighten securely. Lower engine into position and fasten insulators to cross member.

4) Install nuts retaining flex plate to flywheel plate torus cover and tighten to 20 ft. lbs. torque. Install crankcase ventilator outlet filter and flywheel housing bottom cover. Slide filler piper into place in transmission *(see "1956 Cadillac & Pontiac Transmission Oil Filler Pipe Leakage Correction" above).* Make sure shoulder on filler pipe is seated against sleeve which extends out of transmission case.

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

5) Connect cooler hoses to cooler water inlet and outlet pipes. On cars with dual exhaust, replace right hand exhaust pipe. Connect manual shift control rod to lever on transmission case and install transmission throttle control lever. Connect speedometer cable to driven gear. Install propeller shaft and lower car to floor.

6) Fasten transmission filler pipe clamp to cylinder head after making sure pipe is fully seated in transmission. Fill engine cooling system. Fill transmission with automatic transmission fluid *(see "Draining & Refilling" abov)*. Adjust transmission throttle valve and manual control linkage *(see "Linkage Adjustment" abov)*.

1957-58 PONTIAC

REMOVAL: 1) Drain cooling system and remove transmission oil level indicator. Drain transmission oil pan (torus assembly can be drained at same time or it can be drained after transmission removed).

2) Disconnect rear universal joint from differential companion flange and slide propeller shaft from transmission output shaft. Disconnect speedometer cable from driven gear.

3) Remove flywheel housing bottom cover and crankcase ventilator outlet filter. If car is equipped with dual exhaust system, the right hand exhaust pipe must be removed (it is not necessary to disturb the exhaust system on cars with single exhaust).

4) Disconnect rear engine insulators from rear engine support cross member. Using Engine Fixture J-4732, raise rear of engine until insulators are about 1/2" above cross member *(CAUTION–Do not raise engine mor than necessary to remove cross member)*.

5) Loosen transmission filler pipe to cylinder head clamp. Remove transmission throttle control lever and disconnect manual control rod from transmission lever. Remove engine rear support cross member.

6) Remove nuts from six torus cover and flywheel-to-flex plate attaching bolts. Disconnect water hoses from oil cooler. Push transmission filler pipe upward out of transmission.

7) Lower engine about 1½" below its normal position and position special automatic transmission jack under transmission and raise transmission slightly to take load off rear flywheel housing attaching screws. Using 18" to 22" socket extension, remove screws attaching flywheel housing. Work transmission rearward to disengage dowels from front flywheel housing, then lower transmission from car.

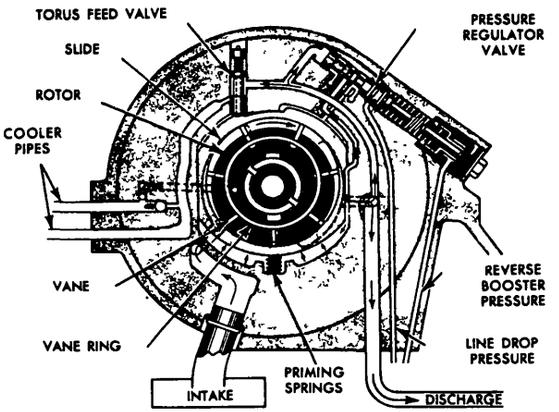
INSTALLATION: 1) With transmission on special automatic transmission jack, raise it under car until engine flex plate and transmission flywheel and torus cover are at the same level. Rotate torus cover until dowels in cover and flywheel are aligned with holes in flex plate (torus cover and flex plate can be fastened at either of two positions). Move transmission into position engaging flywheel dowels into flex plate and rear flywheel housing dowels into front flywheel housing.

2) Install and tighten two rear flywheel housing attaching screws *(NOTE* - Check to see that flywheel and torus cover are free to move back and forth slightly. If pilot on flywheel has entered end of crankshaft properly, some movement should be possible).

3) Rotate flywheel to position one flex plate mounting pad down. Push forward slightly on flywheel to seat it against crankshaft. Measure clearance between pad on flex plate and flywheel, using feeler gauges. Clearance should be .013-.024". If clearance is outside these limits, install shims as follows:

If Clearance Less Than .013" .- Move transmission away from engine and install a special spacer, Part No. 522975 over flywheel pilot which fits into crankshaft. Move transmission back into place, install and tighten flywheel housing attaching bolts. Recheck clearance (which will be greater than .024") and install correct shims as indicated below.

If Clearance More Than .024" - Insert shims, Part No. 523087 (.011"), and Part No. 523088 (.030") to reduce clearance between pad and flex plate to .013-.024", at



FRONT PUMP & REGULATOR VALVE (TYPICAL)

each of the six pads. Coat shims with petrolatum so they will remain in position. Do not install nuts until shims have been installed at each attaching pad as it will cock the assembly giving a false measurement of clearance at the other pads.

4) Remove plugs from oil cooler adapter and fasten adapter to transmission case. Remove special transmission jack. Raise engine until transmission touches floor pan (using Support Fixture J-4732). Install engine support rear crossmember. Install bolts, washers, and nuts and tighten securely. Lower engine into position and fasten insulators to crossmember.

5) Install nuts which retain flex plate to flywheel and torus cover and tighten to 15 ft. lbs. using torque wrench with adapter J-6498. Install crankcase ventilator outlet filter and flywheel housing bottom cover. Slide filler pipe into place in transmission, making sure shoulder on filler pipe is seated against sleeve which extends out of transmission case. On cars with dual exhaust, replace right hand exhaust pipe.

6) Replace outer shift lever and outer throttle lever. Connect speedometer cable to driven gear. Install propeller shaft, then lower car to floor. Fasten transmission filler pipe clamp to cylinder head after making sure pipe is fully seated in transmission. Fill transmission with automatic transmission fluid *(see "Draining & Refilling" above)*. Adjust throttle valve linkage and manual control linkage *(see "Linkage Adjustment" above)*.

TRANSMISSION OVERHAUL

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 TRANSMISSION PISTON SEALS (AND COMPONENT PARTS) PRODUCTION CHANGE:* Metal seal rings have been replaced by composition rubber seals at the following indicated points. Rubber type seals are not interchangeable with metal seals as the grooves in hubs and pistons have been redesigned and have a step to accommodate the seal lip (Reverse Clutch seal grooves for early and late types are similar and can be identified as noted below).

Overrun Clutch–In conjunction with the new seals, a new front pump assembly and overrun clutch piston assembly is used.

Reverse Clutch–A new clutch piston and rear pump assembly are used to accomodate the new seals. The ring grooves in early and late type reverse clutch pistons are similar and can be identified by a .040" chamfer (for rubber seals), and a .180" chamfer (for metal seals) on the inside diameter of the piston. *NOTE–Rubber and metal seals are not interchangeable.*

Neutral Clutch–A new neutral clutch piston and case center bearing support are used with the rubber seal rings. Grooves in piston are "stepped" for the rubber type seals. Also required is a new neutral clutch drum. *(CAUTION–*Clutch parts must be of the same type). If a late type front pump having the step type groove for rubber seals is installed in an early transmission, the late type overrun clutch piston and rubber type seal must be used. If a late type center bearing support is installed on an early transmission it is necessary to install a late type neutral clutch drum as well as the new piston and seals. *NOTE*–The later type neutral clutch drum can be identified by a small notch in rear face of drum, and the reinforcing bosses in rear face have been eliminated.

►*1956 CADILLAC 1-2 OR 2-3 LATE SHIFT CORRECTION:* This condition may be caused by improper throttle valve rod adjustment. If readjustment of valve rod does not correct the condition, check to see that the amplifier valve and the 1-2 & 2-3 shift valves are clean and free.

►*1956 CADILLAC ERRATIC SHIFT CORRECTION (Single Carburetor Cars before Engine No. 034367, Series 60S & 62; Engine No. 038764, Series 75 & 86):* If cleaning the governor or control valve assembly and properly adjusting the throttle valve control rod does not correct the condition, install kit, Part No. 3630753, containing an accumulator body, trimmer valve, manual valve body assembly, and carburetor throttle lever adapter plate. *NOTE*–Cars equipped with transmission beginning with Serial No. C56-32200 or CA56-2539 do not require the kit as the latest parts have been installed in production. Whenever the

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

kit is installed, the Throttle Valve Rod Adjustment should be changed from **three** turns to **four** turns and a daub of paint added to carburetor end of rod for identification.

►*EARLY 1956 CADILLAC GOVERNOR "CLICK" CORRECTION:* A kit, Part No. 8616949 containing a bumper plate and orifice plug for the coupling valve, and an "O" ring seal for front pump intake pipe is available to aid in eliminating a low speed governor click on early cars. Install the orifice plug in the oil hole adjacent to the coupling valve in coupling valve body (this hole is located in the depression in coupling valve body, next to coupling valve). The bumper plate should be installed between coupling valve body and coupling valve front end plate. This correction is not required on transmission after Serial Nos. CE-7630 and A-3651.

►*1956 CADILLAC REVERSE INTERNAL GEAR PRODUCTION CHANGE:* A new reverse internal gear, Part No. 8616843, and reverse carrier assembly, Part No. 8616845 are used in production beginning with Transmission Serial No. C56-2100, A56-1002, and CE56-1003. When replacement of either part is necessary on transmissions before the above serial numbers, both carrier and internal gear must be installed. The early and late type parts are not interchangeable except as an assembly.

►*1956 PONTIAC PRODUCTION CHANGE (TO IMPROVE 2-3 SHIFT), AND CASE CENTER BEARING SUPPORT REPLACEMENT NOTE:* On later cars, the clutch apply passage in case center support has been enlarged to obtain an improved 2-3 shift. Whenever the center support is removed, the rear clutch apply oil passage located in the wide groove between the two seal rings on support hub should be checked (this passage is drilled at right angles to the oil hole in groove and it will be necessary to bend a piece of wire having a diameter of .068" to check the hole diameter). If the wire will not enter passage, the center support is the early type and should be replaced.

►*1956 PONTIAC REAR SPRAG OUTER RACE AND REAR CLUTCH CYLINDER AND BUSHING ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* A pilot bushing has been added to the rear clutch cylinder and bushing assembly and a new rear sprag outer race and bronze rear sprag outer race retainer is used. *CAUTION*–The early type retainer must not be used with the later type outer race. The later type retainer, however, can be used with the early type outer race.

►*1956 PONTIAC (285 HP ENGINE) SOFT OR SLIPPING 2-3 SHIFT CORRECTION:* If there is a soft or slipping 2-3 shift after installation of the new throttle valve outer lever and throttle rod (see below), it may be improved by replacing the three accumulator springs with two accumulator springs, Part Nos. 8616833 and 8616834. *(NOTE–Th s springs are not used in production and should not be used except to correct a soft 2-3 shift).* If the above modification is made to a transmission the letter "A" should be stamped in front of the "P" in the transmission serial number.

►*1956 PONTIAC (285 HP ENGINE) TRANSMISSION THROTTLE VALVE CONTROL ROD & LEVER CHANGE (To Reduce Tendency of Bunching the 1-2 and 2-3 Shifts, and to Improve the 2-3 Shift):* The later type throttle valve outer lever, Part No. 521523 is identified by its right angle shape (early type has a reverse curve). The distance between centerline of throttle shaft hole and centerline of hole for throttle rod ball stud is 3-31/32" (3-7/8" on early type lever). A new throttle rod, Part No. 522789 is used with the new lever, and is identified by a 4-5/32" length from rear ball stud to first bend (early rod is 2-1/16" at this location).

►*1956 PONTIAC CONTROL VALVE ASSEMBLY PRODUCTION CHANGES:* Various changes made in production as follows:

Overrun Clutch Valve Body (First Change)–The original one-piece coupling valve has been replaced by two separate valves (Coupling Signal Valve & Coupling Valve) operating in the same valve bore.

Overrun Clutch Valve Body (Second Change)–Beginning with Transmission Serial No. P56-170202, two coupling valve springs are used and the plug diameter has been increased. *NOTE–When the second type Overrun Clutch Valve Body is installed in place of the first type, the second type Shift Valve Body must also be installed.*

Shift Valve Body (First Change)–The Governor Boost Valve has been modified and an orifice has been added in the passage carrying governor boost oil to end of coupling valve. Governor boost pressure exhaust has been changed to exhaust directly to outside of valve through slot in valve body (slot is located directly over governor boost valve and identifies the later Shift Valve Body). *NOTE–When the later type Shift Valve Body is installed on early cars, the later type spacer plate must also be used.*

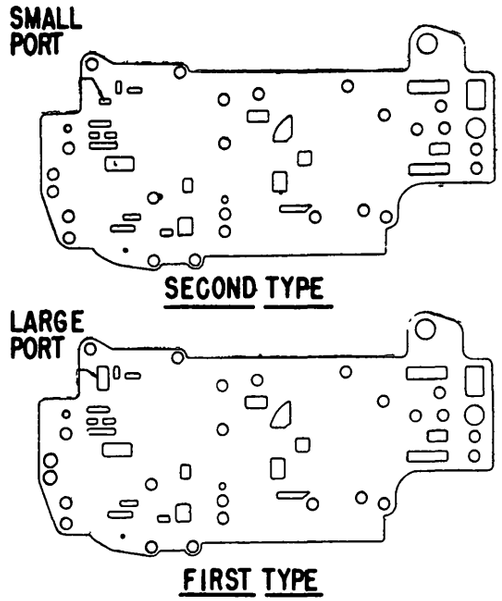
Shift Valve Body (Second Change)–Beginning with Transmission Serial No. P56-170202, a spring has been added in front of Governor Boost Valve which improves operation of the valve and assists in preventing 1-2 delayed shifts with cold oil. *NOTE–If the second type Shift Valve Body is installed on an assembly having the first type Overrun Clutch Valve Body, the spring must be removed from Governor Boost Valve so that proper pressure is obtained to operate the early type coupling valves.*

►*1956 PONTIAC LOW SPEED "CLICKING" NOISE CORRECTION:* Install Transmission Control Valve Body Repair Kit, Part No. 8616949 which consists of an orificed plug and a bumper plate. Orifice plug should be installed in governor boost passage in Overrun Clutch Valve Body. Remove end plate and install plug in passage located in depression to the left of coupling valve. Install bumper plate under the front plate of Overrun Clutch Valve Body so coupling valve will strike it instead of plate.

►*1956 PONTIAC TRANSMISSION LOCKUP CORRECTION (When shifting from driv to revers):* Remove control valve assembly and check for nicks or burrs on the passage lands of transmission case. Remove nicks or burrs by stoning. Check spacer plate and replace if it has been damaged.

►*1957 MANUAL VALVE BODY PRODUCTION CHANGE (EXCEPT CADILLAC & OLDSMOBILE):* The manual valve body and channel plate-to-case spacer has been changed to decrease neutral clutch apply oil in "Reverse". Only the later type parts will be available for service replacement. When installing a new manual valve body, the later type spacer plate must be used. The later type spacer plate can be used with either early or later manual valve bodies. See illustration for identification of channel plate-to-case spacer.

►*FRONT UNIT ENDPLAY CLEARANCE CAUTION: 1956-57 Endplay clearanc ch cking is differ nt than 1958 procedures, as noted below:*



CHANNEL PLATE-TO-CASE SPACER (EXCEPT CADILLAC & OLDSMOBILE)

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

►*REMOVAL OF TRANSMISSION UNITS NOTE: Th following transmission units may b r moved without removing transmission ass mbly fron car. Note th following points and see "Disass mbly" below, for removal procedure.*

MAIN CONTROL VALVE BODY (ALL MODELS): Remove in usual manner after removal of oil pan.

EXTENSION HOUSING (HUDSON, NASH & PONTIAC): *OLDSMOBILE NOTE*–While the extension housing cannot be removed from transmission, it can be moved rearward far enough to gain access to the following indicated units that would normally require extension housing removal.

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

GOVERNOR ASSEMBLY (EXCEPT CADILLAC): Remove extension housing. See Oldsmobile Note above.

REAR OIL PUMP (HUDSON, NASH & PONTIAC): On Oldsmobile, the rear oil pump can be moved rearward and rotated sufficiently to remove parking brake pawl bolt.

REVERSE PARTS (HUDSON, NASH & PONTIAC): After removing rear extension housing, reverse parts can be removed.

PARKING BRAKE LINKAGE (ALL MODELS): On Oldsmobile, see "Rear Oil Pump" above.

INSIDE DETENT & THROTTLE LEVERS· Requires removal of outside throttle control and manual levers and also of oil pan, oil screen and intake pipes.

REAR SEAL IN EXTENSION HOUSING (EXCEPT CADILLAC): On Pontiac, the slide hammer used for seal removal must be inserted through shaft tunnel in frame. When installing the seal, use an extension on the installing tool so it can be used through frame shaft tunnel.

ACCUMULATOR & SERVO (ALL MODELS): Can be removed without disturbing the main control valve assembly.

TRANSMISSION DISASSEMBLY

►*TRANSMISSION DISASSEMBLY NOTE. Instructions below cover removal of sub-assemblies from transmission case. See "OVERHAUL OF UNITS" for disassembly, inspection, and reassembly of these sub-assemblies.*

OIL COOLER, TORUS ASSEMBLY & FLYWHEEL REAR HOUSING: Disconnect oil cooler pipes from transmission cooler adapter plate, remove two bottom extension housing attaching screws and remove oil cooler

1) Mark flywheel and torus cover so flywheel can be reinstalled in same position and remove torus cover to flywheel attaching nuts and remove flywheel. Remove and discard the "O" ring seal from flywheel

2) Remove snap ring retaining driven torus to mainshaft, and remove driven torus member with check valve and spring. *NOTE*–If torus member sticks, tap end of mainshaft with soft hammer and at same time pull out torus member.

3) Remove inner snap ring locating driven torus member to mainshaft. Remove snap ring retaining drive torus member to intermediate shaft, and remove drive torus member. *CAUTION–Do not attempt to remove torus cover and driving torus member together.*

4) Remove front unit sun gear to drive torus hub bronze thrust washer and steel backing washer. Remove front unit sun gear from shaft of front unit coupling driven torus member. Remove sun gear to internal gear steel backing washer. Leave staked bronze thrust washer in internal gear Remove internal gear.

5) Remove torus cover assembly (*CAUTION*–Do not attempt to remove torus cover by pulling or pushing in a rough manner as this may result in a damaged oil seal. Work hub of torus cover back through oil seal, pulling torus cover out with even pressure)

6) Remove selective spacer washer from front unit drive torus hub (spacer may have remained in internal gear). Spacer may be either a solid or split ring.

7) Install Front Seal Protector J-6119 to protect front oil seal and bushing when removing flywheel housing. Remove flywheel housing from front of transmission case. *NOTE*–On Pontiac models, leave engine insulators attached to flywheel housing.

8) Remove Front Seal Protector and remove housing-to-case "O" ring seal.

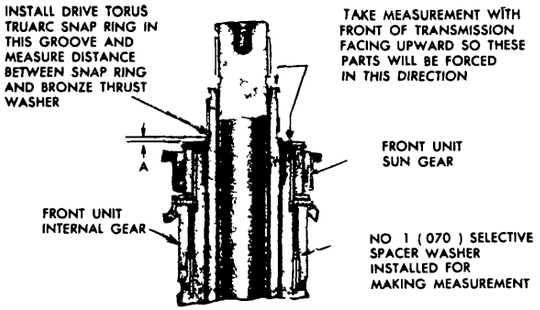
MAINSHAFT ENDPLAY CHECK: *NOTE–Check and record the mainshaft endplay as it is necessary for the selection of proper selective washer at reassembly.*

1) Install collar of Endplay Checking Fixture J-6127 on intermediate shaft and secure in position by installing snap ring on mainshaft. Install Dial Indicator Support J-6126 and a dial indicator.

2) Move mainshaft back and forth th check endplay of mainshaft. Record the amount of endplay.

►*NOTE:* In order to find the actual endplay of the rear unit, it will be necessary to measure endplay of sun gear on mainshaft after transmission has been disassembled. This dimension must then be subtracted from mainshaft endplay to determine proper selective washer to be used.

3) Remove dial indicator and endplay checking fixture.



1956-57 MAINSHAFT ENDPLAY CHECK

FRONT UNIT ENDPLAY CLEARANCE (1956-57) *NOTE- This measurement must be made with transmission in a vertical position with front end upward*

1) Install a No 1 (.0695-.0705") selective spacer washer over front unit driven torus hub in place of the washer at disassembly *CAUTION The No 1 washer must be used for gauging purposes* Install front unit internal gear over front unit driven torus shaft against spacer washer

2) Install bronze thrust washer and steel backing washer in front unit internal gear (steel washer has splines which engage splines of driven torus shaft). Install front unit sun gear and install steel and bronze thrust washers over intermediate shaft against sun gear. Install drive torus Truarc snap ring in groove on intermediate shaft nearest to bronze thrust washer.

3) Push intermediate shaft and sun gear firmly to rear of transmission to make sure all end play is taken up. Push snap ring down against bottom of groove and very carefully measure clearance between snap ring and bronze thrust washer using a set of feeler gauges. *CAUTION–Feeler gauge must be flat against the thrust washer to obtain an accurate reading.*

4) Compare measurement with feeler gauge with spacer washer chart (below) to determine the correct selective spacer washer to use. (For example. If measurement is found to be .067", a number "6" selective spacer washer should be used when transmission is reassembled). Check number on original spacer which was removed from transmission. It should be the same as the number found on the chart. If not, a new spacer washer must be used at reassembly. Record identification number of required spacer for use at reassembly.

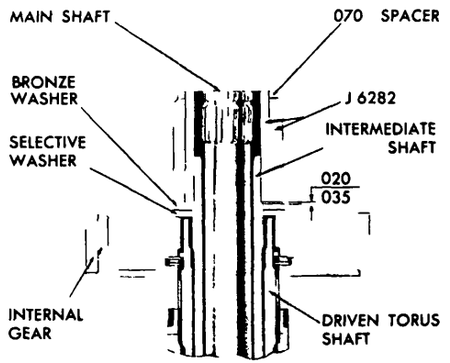
Selective Spacer Washer Chart

Spacer No.	Dimension "A" ①	Thickness
1	.024- 031"	.0695-.0705"
2	.032-.039"	.077-.079"
3	.040-.047"	.085-.087"
4	.048-.055"	.093-.095"
5	.056-.063"	.101-.103"
6	.064-.071"	.109-.111"
7	.072-.079"	.117-.119"
8	.080-.087"	.125-.127"
9	088-.095"	.133-.135"
10	.096-.103"	.141-.143"
11	.104- 111"	.149-.151"
12	112-.119"	.157-.159"
13	120- 127"	.165-.167"
14	.128- 135"	.173-.175"

① - See feeler gauge (Dim. "A") in illustration.

5) Remove Truarc snap ring, sun gear with bronze and steel thrust washers, internal gear with bronze and steel thrust washers, and .070" selective space washer.

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SELECTIVE WASHER IDENTIFICATION

NO	THICKNESS	NO	THICKNESS
1	045 047	7	123 125
2	058 060	8	136 138
3	071 073	9	145 151
4	084 086	10	162 164
5	097 099	11	175 177
6	110 112		

1958 HYDRAMATIC ENDPLAY CHECK

DUAL-COUPLING HYDRA-MATIC (C ntinued)

FRONT UNIT ENDPLAY CLEARANCE (1958): *NOTE - This measurement must be made with transmission in a vertical position with front end upward.*

1) Remove driven torus member front snap ring, then remove driven torus member. Remove driven torus member rear snap ring, and driving main torus snap ring. Remove driving main torus and front unit carrier assembly.

2) Rotate transmission in holding fixture so front end is up, then install Front Unit Endplay Gauge, J-6282, and a No. 1 (1956-57 style) selective spacer, Part No. 8616703, over intermediate shaft. Push down on tool to take up all clearances so that proper endplay can be measured.

3) If No. 1 selective spacer is flush with end of tool, front unit endplay is correct. If No. 1 spacer is not flush with end of tool, proceed as follows:

4) Remove No. 1 spacer and Endplay gauge. Remove bronze thrust washer and selective washer. Replace selective washer with a larger or smaller washer (see table below for thicknesses). Install bronze thrust washer, Front Unit Endplay Gauge, and No. 1 selective spacer, and check to make sure spacer is flush with end of gauge. If necessary, repeat above procedure until correct clearance is obtained.

FRONT UNIT COUPLING, PRESSURE REGULATOR & COOLER ADAPTER: 1) Rotate transmission to horizontal position with oil pan upward. Remove front coupling assembly from transmission case. Remove pressure regulator assembly from side of transmission. **2)** Remove oil cooler adapter, with gasket, from side of transmission case. Remove two oil cooler sleeves and seals by pulling from case.

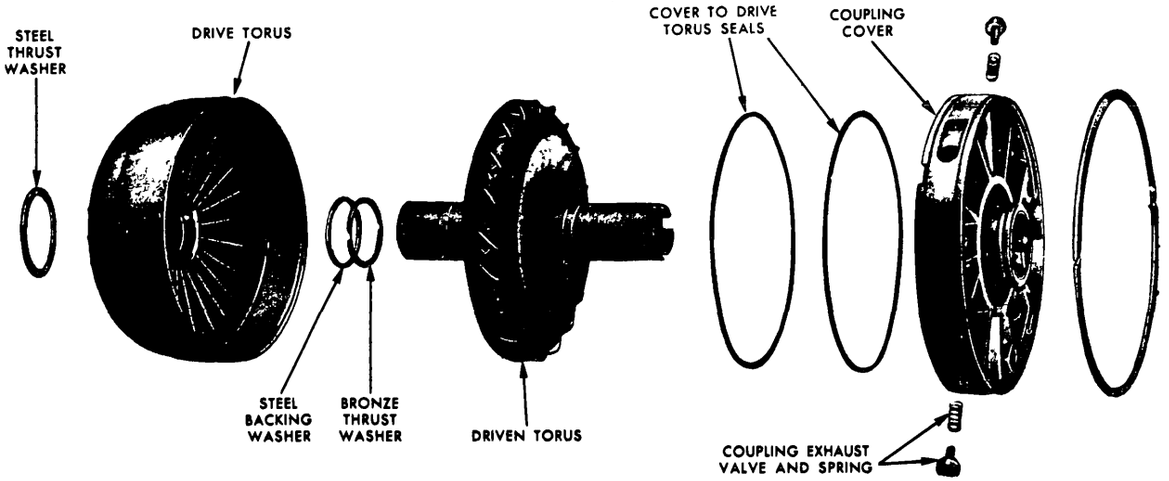
OIL PAN, OIL SCREWS & INTAKE PIPES: Remove oil pan and gasket. Remove screw holding front pump intake pipe clamp and remove pipe and clamp from pump screen. Remove "O" ring seal from pump. Remove oil screen and rear pump intake pipe and "O" ring seal.

CONTROL VALVE, SERVO & ACCUMULATOR: Remove screws holding servo and accumulator assembly to case *(NOTE–Servo piston is spring loaded)*, and remove servo and accumulator assembly and servo spring. Remove five remaining control valve assembly screws and remove control valve assembly. *CAUTION –Do not drop manual control valve.*

FRONT PUMP & OVERRUN CLUTCH: 1) Remove front pump locking screw and lockwasher located under control valve assembly.

►*1956 FRONT PUMP LOCKSCREW PPODUCTION CHANGE:* Lock washer has been eliminated and a new "washer head" screw is used in production. Whenever a lockscrew is found with a lockwasher, replace it with the later type screw, Part No. 8617869.

►*FRONT PUMP CLEARANCE CAUTION:* When front pump is removed, check clearance between pump bushing and front unit driven torus shaft. This clearance must not exceed .003", using a 1/2" wide feeler. If a .004" feeler can be inserted, the front unit driven torus member and the front pump should be replaced. If the inner sprag race is not the late type which can be identified by an "O" or "S" in the recess in tang end, it should be replaced.



DUAL-COUPLING HYDRA-MATIC FRONT UNIT COUPLING (TYPICAL)

2) Remove the two front pump cover-to-body screws and the three front pump-to-case support attaching screws. Install two Slide Hammers J-6125 into two opposite cover-to-body screw holes in front pump and remove front pump assembly from case. *NOTE*–Front sprag inner race may stick in pump. Be careful not to drop it when pump is removed

3) Remove overrun clutch release spring and front sprag inner race if it did not come out with pump. Remove clutch overrun plate and clutch thrust washer. Install Rear Unit Clutch Retainer J-6135 with set screw end toward front and lock securely.

CENTER BEARING SUPPORT, NEUTRAL CLUTCH & REAR UNIT ASSEMBLY: 1) Remove speedometer driven gear from rear extension housing. Remove large snap ring retaining center bearing support. Position transmission horizontally, bottom side up..

2) Remove extension housing and gasket. If housing sticks, tap lightly with a soft hammer. Remove governor assembly by pulling governor out of rear housing (Governor drive key may not remain with governor).

3) Remove breather pipe clamp screw from rear of transmission case and carefully pry breather pipe out of pump body. Remove rear pump locating screw (located to right of pump cover, facing pump, and is inset into pump body). Remove pump attaching screw (This screw is located to left of governor bore and is the center screw of the three in that area).

4) Remove rear bearing snap ring from output shaft. If necessary, remove two opposite rear pump cover screws and install Slide Hammers J-6125 and remove rear pump, and reverse clutch piston assembly and gasket. Remove special tools.

5) Remove large wave-type reverse piston release spring, reverse internal gear and tang-type reverse clutch release spring *(NOTE*–Tangs on reverse clutch release spring point outward toward rear of transmission.

6) Remove reserse planet carrier outer snap ring from output shaft. Remove reverse stationary cone (take care to prevent binding), and remove cone key from case. Remove reverse planet carrier while lifting up on output shaft.

7) Remove center bearing support locking screw from side of transmission case. Remove center bearing support, neutral clutch and rear unit as an assembly by sliding complete assembly toward front of transmission. If assembly is tight in case, use Slide Hammers J-6125 with adapters, to insert into center bearing support and pull entire assembly forward. Remove entire assembly and position into Clutch Unit Holding Fixture J-6116, with output shaft down.

PARKING BRAKE ASSEMBLY, OVERRUN BAND, NEUTRAL CLUTCH DRUM STATIONARY STOP KEY AND INSIDE DETENT AND THROTTLE CONTROL ASSEMBLY: 1) Remove stationary stop key from case. Unhook overrun band end from anchor inside of case and rotate band to horizontal position with band ends facing rear of case. Remove band through front of case.

2) Remove inside detent control and inside throttle control lever assembly as follows: Remove snap ring retaining detent control lever to case. Remove lever assembly and outer and inner washers. Remove "O" ring seal from case counterbore.

3) Disconnect parking brake lever spring and remove bracket and spring. Install 3/8" bolt into parking brake pawl pin and remove pin and spacer. Remove spacer, lever and pawl as an assembly.

OVERHAUL OF UNITS

PRESSURE REGULATOR: Disass mbly–Remove pressure regulator valve stop pin from reverse booster plug and remove booster plug from regulator plug. Remove "O" ring seal from pressure regulator plug.

Inspection: Inspect all passages for dirt or metal chips and all parts for burrs or other damage. Burrs can be

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DUAL-COUPLING HYDRA-MATIC C ntinued)

removed with crocus cloth and oil. Replace all damaged parts.

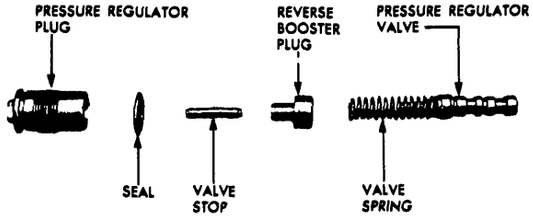
R ass mbly: Install new "O" ring seal and reverse disassembly procedure.

FRONT PUMP: Disassembly–1) Remove front sprag inner race if still in pump and remove pump cover from body. Remove retaining pin, torus feed valve, spring and retainer.

2) Remove front pump rotor along with top vane ring. Remove 7 vanes and bottom vane ring (vanes may remain in rotor). Remove slide by pushing slide toward priming springs, then lift out of body at opposite end. Note position. Remove inner and outer priming springs.

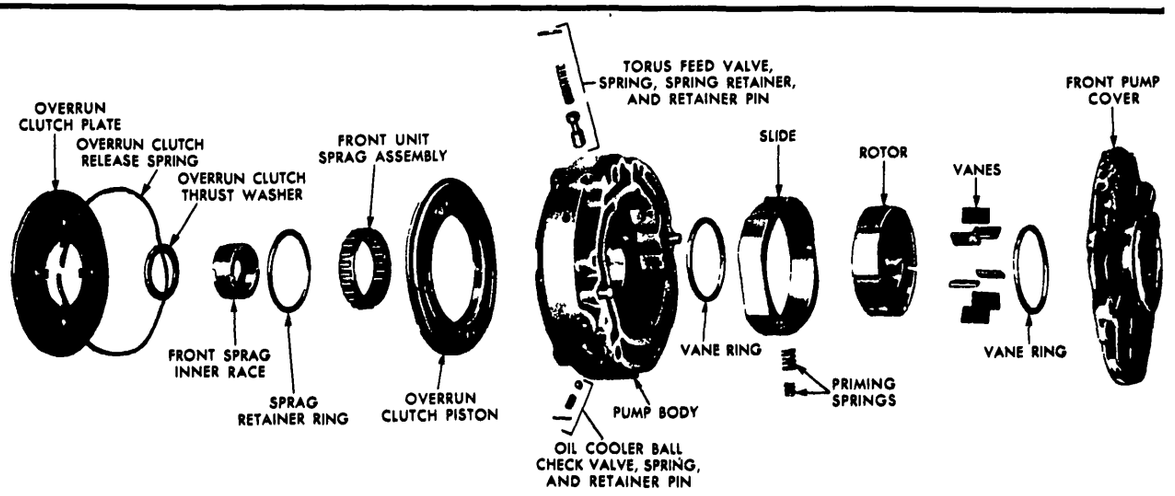
3) Turn pump body over and remove spiral type snap ring retaining front sprag to pump body and remove sprag assembly. *(NOTE–*If outer sprag is damaged, the oil pump assembly must be replaced). Mark overrun clutch piston and pump body for proper reassembly, and remove clutch piston from pump body. If piston sticks, use a soft hammer and tap around outer rear edge of pump body.

4) Remove interlocking oil seal ring from front pump cover.



PRESSURE REGULATOR VALVE

Inspecti n: Using a small diameter wire, inspect all passages for dirt or restrictions. Check slide for excessive wear or scoring and make sure that it moves freely in pump body. Check freeness of vanes in rotor slots (pump vanes will have a tendency to show a polished surface on the side bearing against the front pump slide, if not excessive, this is a normal condition). Check torus slide valve priming springs for free movement in bores. Check bushing for scores or flaking (a normal wear can be noticed on bushing surface which if not excessive is a normal condition). Examine pump body and pump cover slide surface contacts for smoothness. Clean all parts thoroughly before assembly.



FRONT PUMP AND OVERRUN CLUTCH ASSEMBLY (TYPICAL)

►*FRONT SPRAG CLUTCH FAILURE CORRECTION:* In the event of front sprag clutch failure it is recommended that in all cases the following parts should be replaced: Front Pump, Front Sprag Assembly, Front Sprag Inner Race, Front Unit Driven Torus Member Assembly. Inspect all other adjacent parts and replace where needed.

Reassembly: 1) Check location mark on pump body and overrun clutch piston, align and install piston into pump body (insert one side of oil seal ring and position in cavity). At same time, work around ring, compressing and seating it in pump cavity. Do not force clutch piston into cavity. If sticking occurs, dowels and holes are not correctly aligned.

2) Install sprag assembly into rear body with rim of sprag facing up, and check rotation of sprag by inserting inner race. Then remove inner race. Install spiral type snap ring retaining sprag assembly to body. Install interlocking oil seal ring on front pump cover.

3) Insert inner and outer priming springs in pump body. Position pump slide into pump body toward priming spring. Compress priming springs with slide and drop slide into cavity of pump.

4) Insert bottom vane ring, locating it concentrically with slide bore. Install rotor with drive slots up and install 7 vanes in rotor slots (make certain vanes fit between bottom vane ring and slide). *NOTE–*Check edges of vanes for wear pattern. One edge of vane will be polished full length. This edge should face the slide.

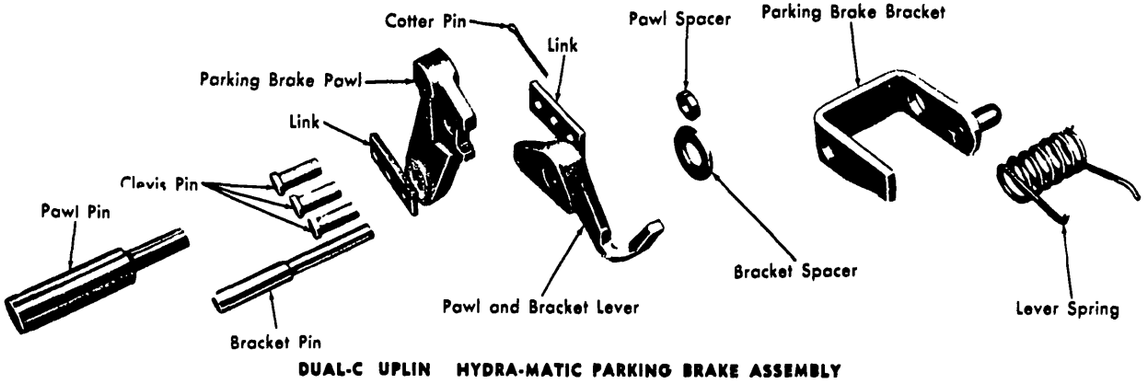
5) Install top vane ring on rotor, centering it between vanes. Install torus feed valve, spring, retainer and retainer pin. Make sure that valve moves freely. Check for free rotation of rotor and that all parts in pump are positioned correctly. Install check valve ball, spring and retaining pin and install cover to pump body. *NOTE–*Leave two opposite cover screws out for later insertion of slide hammers.

CONTROL VALVE: The control valve assembly consists of four individual assemblies connected to one main channel plate. Each individual part of the control valve assembly should be disassembled and reassembled separately to avoid confusion of component parts.

►*CONTROL VALVE DISASSEMBLY & REASSEMBLY*

CAUTION: The number of individual valves and springs in each of the control valve bodies may vary with th make of car. Following illustrations are typical of all makes and care should be exercised when disassembling to identify all parts in relation to their location in th valve body.

Coupling Valve Body: Removal & Disassembly - Remove coupling valve body making sure not to lose transition check ball *(NOTE* - Support valve assembly to prevent damage to channel plate case spacer). Remove coupling valve rear end plate being careful of limit valve spring tension. Remove inner and outer limit valve springs, coupling valve spring and plug, and limit valve and



DUAL-C UPLIN HYDRA-MATIC PARKING BRAKE ASSEMBLY

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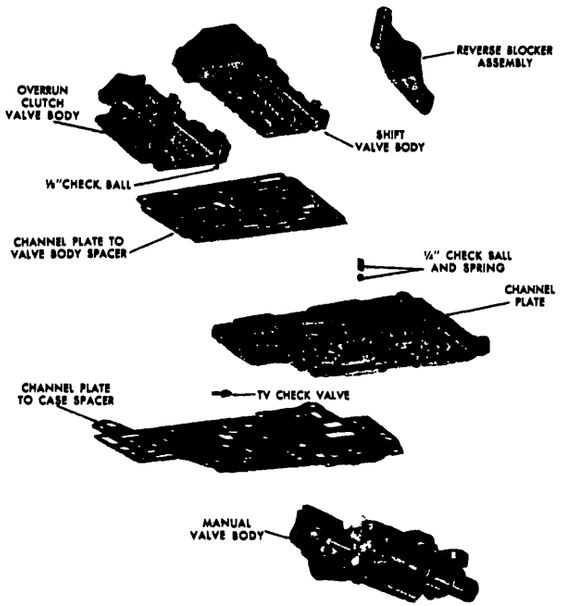
DUAL-COUPLING HYDRA-MATIC (C ntinu d)

washer. Remove coupling valve front plate and remove transition valve and spring, coupling valve (some assemblies may have two separate valves within the one bore) and overrun control valve and spring (some assemblies may not contain the spring).

► *INSPECTION NOTE: See "Control Valve Inspection" below.*

Reassembly & Installation - Insert overrun control valve (and spring if used) into large bore in body. Insert transition valve and spring into valve body. Install coupling valve (two valves and additional valve springs may be be used on some cars). Install coupling valve front end plate and install coupling valve spring (or springs). Install limit valve and washer and inner and outer limit valve springs. Position coupling valve plug on spring and install coupling valve rear end plate (*NOTE* - Make certain limit valve springs are aligned properly after tightening screws). Install coupling valve assembly to channel plate using petrolatum to hold transition ball check in place.

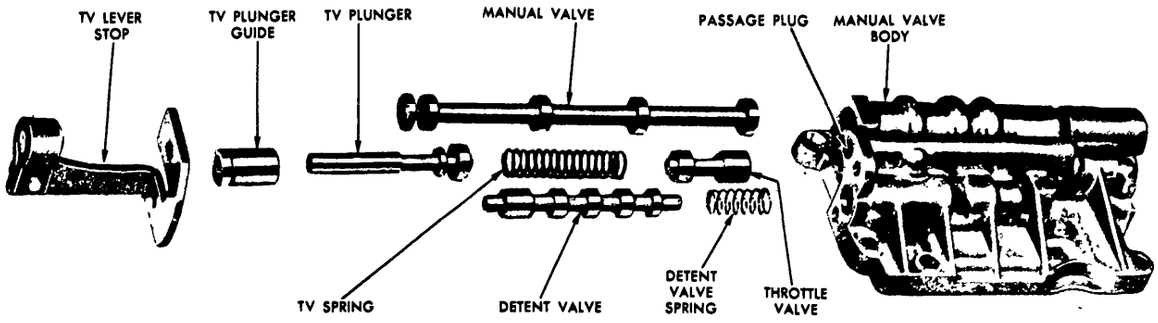
Shift Valve Body: Removal & Disassembly - Remove shift valve body. If coupling valve body has been removed, remove spacer plate (*NOTE* - When removing spacer plate be sure not to lose check ball and spring).



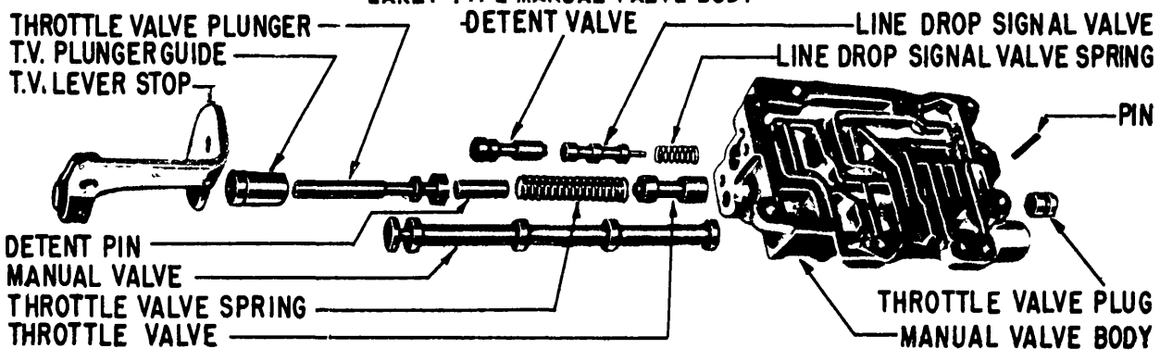
CONTROL VALVE ASSEMBLY (TYPICAL)

Remove shift valve body end plate, 3-4 governor valve, 2-3 governor valve, amplifier valve spring and valve. Remove regulator valve body plate and body. Remove 3-4 throttle valve regulator valve, and 2-3 throttle valve regulator valve, then remove regulator valve body cover. Remove neutral clutch valve and spring 2-3 throttle

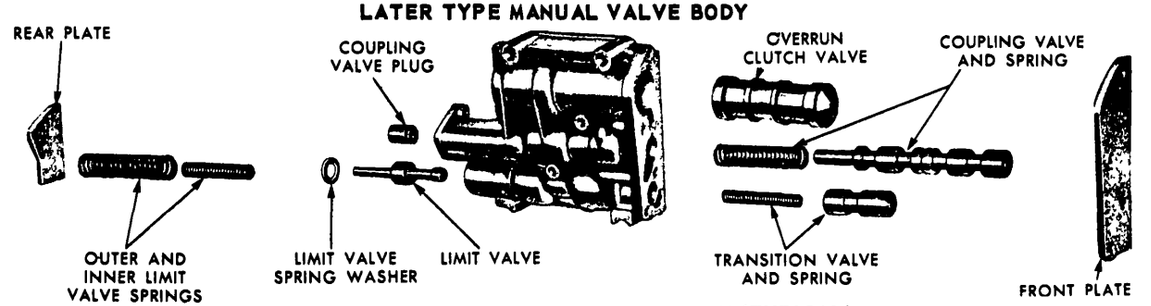
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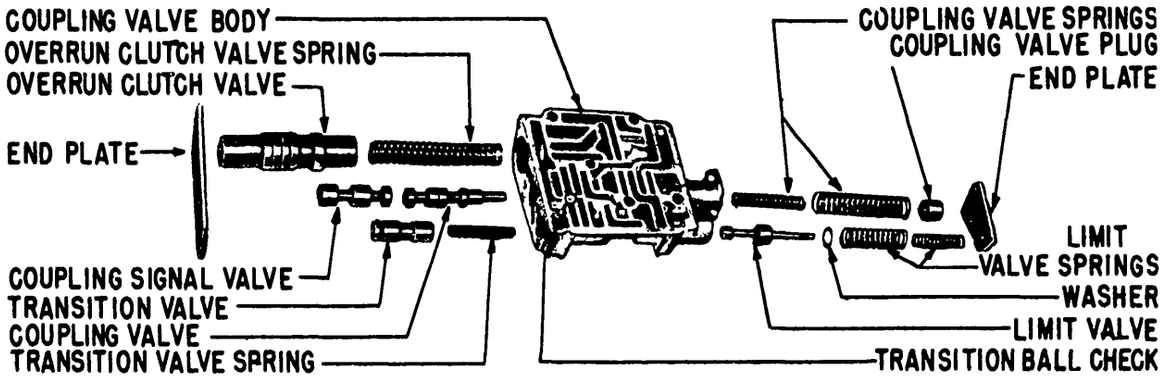
EARLY TYPE MANUAL VALVE BODY



LATER TYPE MANUAL VALVE BODY



EARLY TYPE COUPLING VALVE ASSEMBLY (TYPICAL)



LATER TYPE COUPLING VALVE ASSEMBLY (TYPICAL)

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

valve (inner) and shift valve (outer) springs. Remove 3-4 throttle valve regulator spring. Remove 2-3 and 3-4 shift valves.

►*INSPECTION NOTE: S "Control Valve Inspection" b low.*

R ass mbly & Installati n - Install 2-3 and 3-4 shift valves, neutral clutch valve, then install 3-4 throttle valve regulator valve spring, 2-3 throttle valve (inner) and shift valve (outer) springs. Install neutral clutch spring. Install 3-4 throttle valve regulator valve in regulator body and install 2-3 throttle valve regulator valve. Install regulator valve body plate on regulator valve body. Install assembly on shift valve body and install attaching screws. Install regulator valve body cover. Install 3-4 governor valve with large end inward. Install 2-3 governor valve, amplifier valve and spring, and shift body end plate. Install by-pass reed valve, then install shift valve body to control valve assembly.

R v rs Bl ck r B dy: Removal & Installation - Remove reverse blocker body from manual valve body. Remove hairpin clip retaining detent plunger and remove detent plunger and spring from body. Remove reverse blocker retaining pin (pin is peened and requires filing to remove). Remove reverse blocker spring and piston.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

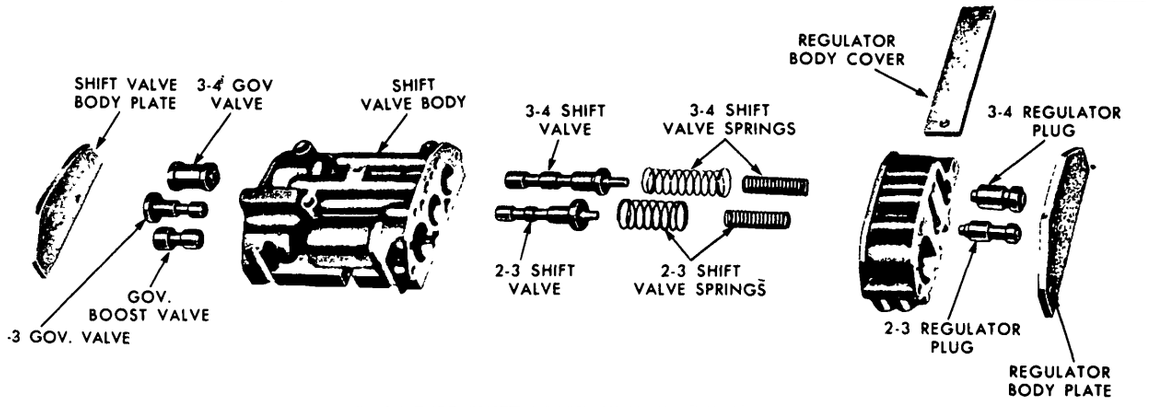
R ass mbly & Installati n - Install reverse blocker piston and spring into body. Install reverse blocker retaining pin and peen in place. Install detent plunger and spring. Install hairpin clip to retain detent plunger and install reverse blocker body to manual valve body.

Manual Valv B dy: R m val & Disassembly - Remove reverse blocker body from manual valve body if not already done. Remove manual valve body from channel plate. Remove manual valve. Remove throttle valve lever stop from body and remove throttle valve plunger and guide. Remove detent valve and line drop signal valve (these two valves may be combined) and spring. Remove detent pin (if used), throttle valve and spring. Remove throttle valve plug retainer pin and throttle valve plug.

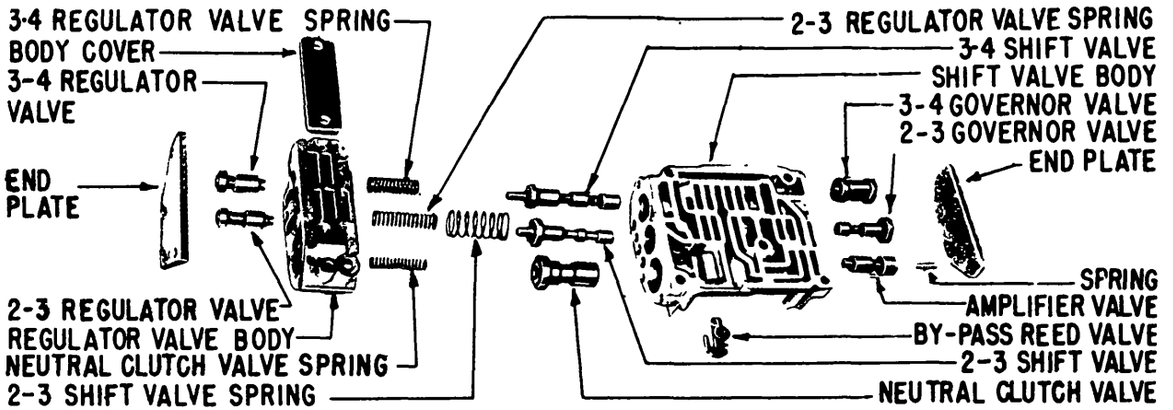
►*INSPECTION NOTE: See "Control Valve Inspection" below.*

R ass mbly & Installati n–Install throttle valve plug and retainer pin. Swedge over edge of retainer pin hole to keep pin in place. Install throttle valve, making sure valve is seated against plug and install throttle valve spring. Install throttle valve plunger guide on throttle valve plunger and install unit. Install pressure drop signal valve spring and valve, lining up spring to be sure it is fully positioned on bottom of bore. Install detent valve. Install throttle valve lever stop on manual valve body and install manual valve body to channel body. Install reverse blocker to manual valve body and install manual valve.

C ntrol Valve Inspecti n: Clean all parts thoroughly and do not allow valves to bump together, as this may cause nicks and burrs. Inspect all valves carefully to make sure they are free from dirt and are not damaged in any respect. If burrs are present, they should be removed with a fine stone or crocus cloth and light oil. All valves and plugs should be tested in their individual bores to make certain that free movement can be obtained. All valves should fall free of their own weight with a slight tapping action on the body. The manual valve is the only valve which may be serviced separately. If other valves are defective or damaged beyond repair, an individual assembly should be installed.



FIRST TYPE SHIFT VALVE BODY (TYPICAL)



LATER TYPE SHIFT VALVE ASSEMBLY (TYPICAL)

►*CONTROL VALVE ASSEMBLY NOTE:* If all the individual assemblies were removed at one time, proceed as follows: Position channel body separator plate on channel body. Install manual valve to channel body and install reverse blocker body to manual valve body, positioning one dowel pin. Install ball check and and spring in channel body (ball first, then spring). Install and align separator plate on channel body. Install shift valve body on channel body. Install coupling valve on channel body using petrolatum to hold transition ball check in place. Install manual valve in manual valve body.

FRONT UNIT COUPLING: Disassembly–*(CAUTION–The front unit coupling is balanced at the factory and any change in positioning of the cover will affect the balance. On early transmissions without an indexing point on driving torus shell, punch marks should be made on both cover and shell in line with the snap ring gap (using a very fine punch). On later transmissions the No. 1 exhaust valve is lined up with the snap ring gap and mark on driving torus cover).*

1) Remove steel thrust washer from recess at front of front unit drive torus if it did not come off with flywheel housing. Install front unit coupling assembly into Clutch Holding Fixture J-6116 with splined shaft down.

2) Remove large snap ring retaining coupling cover to drive torus shell (make sure that all parts are marked for correct reassembiy). Install two Coupling Valve Retainers J-6122 to hold exhaust valve in position when removing cover.

3) Remove coupling cover from coupling using Front Unit Coupling Cover Remover J-6121 as follows: Place cross piece of remover on end of torus shaft with end of shaft indexed in counterbore on underside of tool. Screw stud at end of each leg into holes in coupling cover until they bottom (nuts on studs should be backed off so they will not contact cross piece). Insert long stud of tool J-6121 through coupling and cross piece. Index bottom end with hole in holding fixture so it

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

cannot turn. Install washer and nut on upper end and tighten securely. Tighten nuts on four studs evenly and only a small amount at a time to pull cover out of unit.

4) Remove tool J-6121 and remove coupling cover from unit. Hold fingers over valve so they will not be ejected and remove Coupling Valve Retainers and exhaust valves and springs from cover. Remove rubber seal rings from outer diameter of cover.

5) Remove driven torus member by pulling up on shaft, and remove steel and bronze thrust washers *(NOTE-* It may be necessary to cut the bronze thrust washer). Remove drive torus member from holding fixture.

Insp ction: Check for burrs and scratches. Remove burrs with crocus cloth and oil.

R assembly: 1) Install driving torus into Rear Unit Holding Fixture J-6116. Install interlocking oil seal rings to hub and shaft of driven torus member. Install bronze and steel thrust washers into driving torus member, install one interlocking oil seal ring on driven torus member and install driven torus member into driving torus member.

2) Install two springs and exhaust valves in coupling cover and hold in place, using Front Unit Coupling Valve Retainers J-6122. Install two oil seal rings on cover hub. Install two square rubber ring seals on coupling cover, making sure that seals are square in their respective grooves and apply petrolatum to circumference of seals.

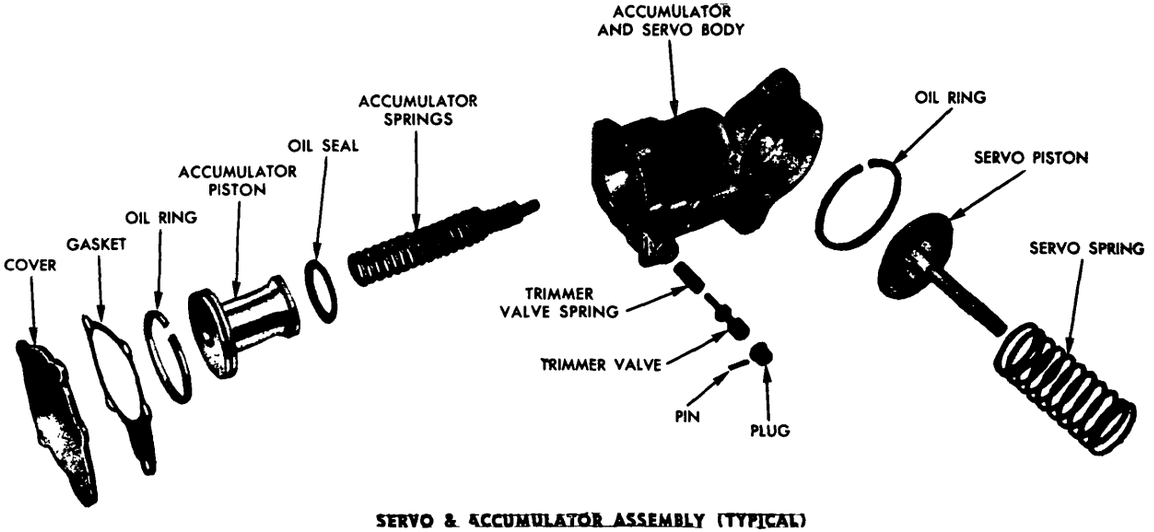
3) Install studs from Front Unit Coupling Cover Remover J-6121, into coupling cover and position cover in driving torus member, lining up marks made during disassembly *(CAUTION-*Cover must be inserted evenly to prevent cocking in drive torus member and damaging seals).

4) Install large snap ring retaining coupling cover to driving torus member. Remove studs from coupling cover and remove coupling assembly from fixture.

ACCUMULATOR & SERVO ASSEMBLY: Disassembly- Remove servo apply piston from assembly. Remove two opposite accumulator cover screws and install Accumulator Cover Remover & Installer J-6124. Remove remaining three cover to accumulator body attaching screws. Using extreme care remove cover, gasket and special tool. Discard gasket and remove accumulator piston assembly. Remove accumulator spring (more than one spring may be found at this location. See Production Changes & Corrections above). Remove pin retaining trimmer valve assembly in accumulator body. Remove plug, trimmer valve and spring.

Inspection: Inspect servo piston assembly for damaged oil seal ring, scores or burrs in ring land grooves. Inspect accumulator spring for collapsed or distorted coils. *(NOTE-*Slight wear "bright spots" on side of spring are permissable). Inspect accumulator body for restricted passages, scores or burrs. Inspect servo piston assembly for distorted pin, damaged oil seal ring lands or broken oil seal ring.

R ass mbly: Install trimmer valve spring, valve and plug in accumulator body. Install pin retaining trimmer valve assembly. Install accumulator spring (or springs) in accumulator body and install piston on outer accumulator spring. Align new gasket to accumulator cover and install Accumulator Cover Remover & Installer J-6124. Compress accumulator spring and install piston into body, making certain that aluminum piston ring is not binding. Install three screws retaining accumulator cover to body. Remove special tool and install the remaining two screws. Tighten all attaching screws and install servo piston into body.



SERVO & ACCUMULATOR ASSEMBLY (TYPICAL)

REAR PUMP: Disassembly-1) Remove vent pipe from rear pump body by carefully prying out of bore with screwdriver. Remove reverse piston from back of rear pump and remove oil seal ring. Remove rear pump cover by tapping pump body with plastic hammer.

2) Remove governor drive key from driven gear in rear pump. Mark top of drive and driven gears to insure correct reassembly, and then remove gears. Remove snap ring retaining rear bearing to rear pump body and remove rear bearing.

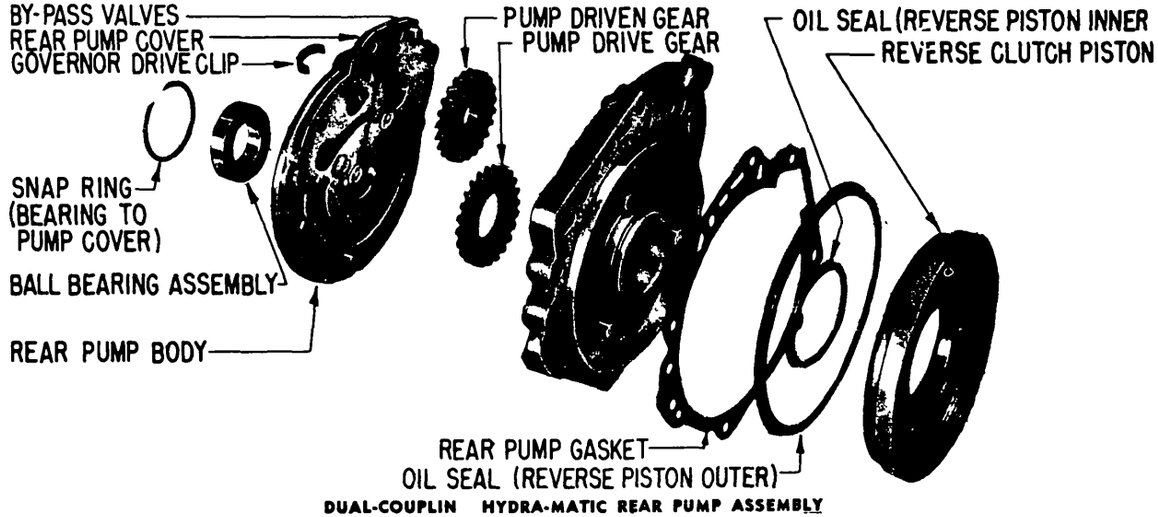
3) Remove reverse piston inner oil seal ring from pump body hub.

Inspection: Inspect all parts to make sure they are free of dirt, burrs, scoring or other damage. Remove burrs with crocus cloth and oil. Check oil seal ring grooves. Make sure vent pipe is not damaged and is free from restrictions.

Reassembly: 1) Install rear pump bearing into pump body and install snap ring retaining rear bearing. Install pump gears, noting the locating marks made at disassembly.

2) Install governor drive key into driven gear, making

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DUAL-COUPLIN HYDRA-MATIC REAR PUMP ASSEMBLY

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

certain key is properly seated. Install pump cover to body, positioning governor hole over drive gear in pump, indexing properly with dowels.

3) Install reverse servo piston in back of rear pump as follows: Install oil seal rings on pump body hub and on reverse piston. Insert piston into bore of rear pump, positioning on top of dowels. Compress large oil seal ring on piston with fingers at one end of gap. After the end is seated in the cavity, gradually work oil seal around, at the same time applying light pressure, forcing piston into cavity.

GOVERNOR: Disass mbly–Remove four oil seal rings and remove cover. Remove end cover plate retaining G-2 valve assembly. Remove valve and bushing assembly and remove valve from bushing.

Insp cti n: Inspect all parts to make sure they are free from dirt, burrs and other damage. Remove burrs with crocus cloth and oil. Test all valves in their respective bores for free movement. Inspect governor ring lands and oil seal rings for freedom in grooves. If lands are damaged or worn, replace complete governor assembly.

R ass mbly: Insert G-2 governor valve into bushing and install assembly in governor body. Install cover plate retaining G-2 valve assembly, making sure dowel in cover plate enters recess in governor body and governor valve bushing. Install governor cover to body. Install four oil seal rings in grooves which do not contain oil holes.

TORUS CHECK VALVE (Main Drive): Disassembly–Remove cotter key retaining check valve in fluid coupling driven torus member, and remove torus check valve and spring.

Inspection: Inspect parts for nicks, burrs and for collapsed spring.

R ass mbly: Install spring into check valve and install check valve and spring into driven torus member. Make sure spring seats properly and valve fits evenly. Install cotter key retaining check valve and spring. Make sure check valve can move freely.

PARKING BRAKE: Disassembly–Remove cotter pin retaining three clevis pins and parking brake links and separate pins, links, parking pawl and pawl lever.

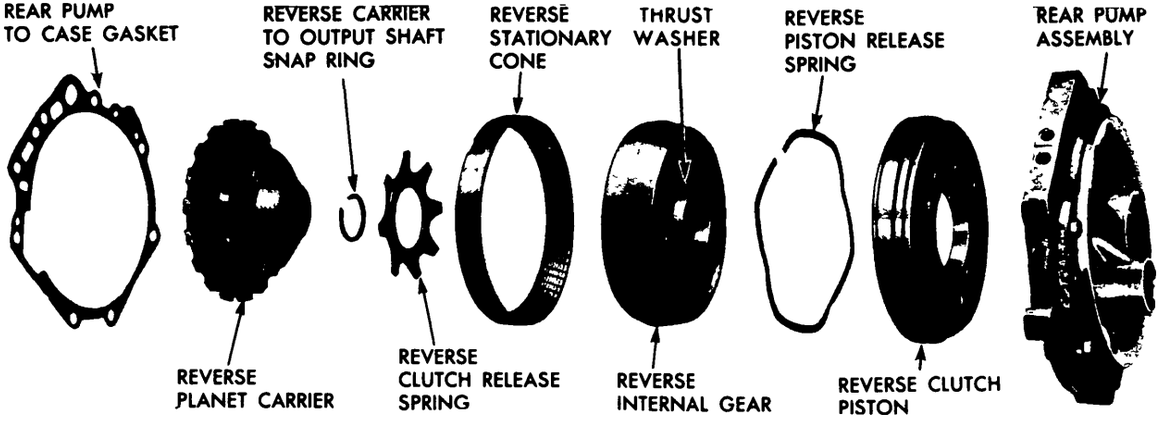
Inspection: Inspect parking pawl for cracks or signs of unusual wear. Check pawl pivot pin and linkage for wear.

Reassembly: Assemble parking brake links, clevis pins, pawl and pawl lever and insert cotter pin.

INSIDE CONTROL LEVER: Disassembly–Remove pin retaining throttle control shaft to inside detent control shaft and separate levers, washers and "O" ring oil seal.

Insp ction: Check fit of inside throttle control shaft in shaft of inside detent control shaft. If shaft binds, is excessively worn, or if splines are damaged, replace the defective parts.

R assembly: Install new "O" ring seal, washers, and throttle control shaft in manual control hub and insert retaining pin.



DUAL-COUPLING HYDRA-MATIC REVERSE ASSEMBLY

CENTER BEARING SUPPORT, NEUTRAL CLUTCH & REAR UNIT: Disassembly–1) Remove Rear Unit Clutch Retainer J-6135 *(CAUTION–Be sure to back off screw far enough to prevent damage to machined surface at front of intermediate shaft).* Remove hook-type oil seal ring from intermediate shaft by pushing one end toward center of shaft and other way from shaft. Remove case support and neutral clutch piston assembly.

►*1956 PONTIAC CENTER BEARING SUPPORT NOTE: See "1956 Pontiac Production Change (To improve 2-3 shift) and Case Center Bearing Support Replacement Note" above.*

►*1956 SEAL PRODUCTION CHANGE NOTE: See "Transmission Seal Production Changes" above.*

2) Remove oil seal rings from support hub and remove neutral clutch piston. Turn support over and bump on bench to remove piston *(NOTE–On late type assemblies with rubber lip seals, remove seals from piston hub and hub of support. Leave rings in place on piston and support of early type.*

3) Remove neutral clutch drum assembly which contains five composition clutch plates, four steel clutch plates and five release springs. Remove large snap ring from rear drum assembly with screwdriver.

4) Remove rear clutch cylinder and sprag assembly by lifting over intermediate shaft. Remove intermediate shaft and clutch hub, along with front clutch hub washer from rear unit assembly. *(NOTE–Intermediate shaft and clutch hub may be disassembled if parts replacement necessary).* Remove clutch hub front thrust washer from clutch hub.

5) Remove mainshaft assembly and rear unit sun gear from rear unit. Remove clutch hub thrust washer from sun gear.

►*REAR UNIT SUN GEAR CAUTION: Make sure the sun gear is marked properly for reassembly. On later type units, a drill mark is made on rear side of gear. Early type gears were not marked and it is very important that a mark be placed on the rear side to indicat side of g ar facing rear f transmission.*

6) Remove seven steel clutch plates and seven composition plates. Remove bronze thrust washer from rear unit carrier. Remove rear unit drum and output shaft assembly from holding fixture and set on bench with output shaft end up.

7) Remove large snap ring holding reverse drive flange to rear unit drum. Lift output shaft and reverse drive flange assembly out of rear unit drum.

8) If parts replacement is necessary, mark internal gear so it can be installed with the same side up. Remove internal gear and rear unit clutch backing plate from rear unit drum assembly together by tapping backing plate with soft hammer. Remove reverse planet carrier locating snap ring from output shaft and remove reverse drive flange and sun gear assembly from output shaft. Remove selective washer from reverse drive flange assembly or output shaft.

9) Remove spiral snap ring from rear unit sprag outer race, using small needle nose pliers or small screw driver. Insert tool into small hole in end of spiral ring and pull upward. Remove outer race, sprag and retainer by rotating counterclockwise and pulling upward *(NOTE–Do not attempt to disassemble sprag assembly).* Remove rear unit sprag retainer and sprag from neutral clutch hub.

10) Disassemble rear unit clutch piston assembly as follows: Place cylinder and piston assembly over tool J-6129 with spring end up. Set spring compressor J-4670 on top of spring retainer and start nut on stud of J-6129. *(NOTE–On models of J-4670 without hole in center, drill at 7/16" hole so J-6129 can be inserted through it).* Turn nut down to compress clutch springs until snap ring is free. Remove snap ring and compressor tool and release spring retainer from rear clutch springs. Remove eight clutch release springs. Remove rear clutch piston from cylinder by rapping piston end of cylinder assembly on wood block. Remove seals from piston and hub.

►*1956 PONTIAC NEUTRAL CLUTCH CAUTION:* On transmissions below serial number P-15234, neutral clutch should be checked to see if it has a 5/32-3/16" chamfer on inside leading edge of drum. If chamfer is less than 5/32", drum must be replaced.

Inspecti n: 1) Inspect center bearing support for burrs, damaged oil seal ring grooves, worn or damaged bushing

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DUAL-COUPLING HYDRA-MATIC (C ntinu d)

or damaged threads. Check to see that all passages are open and not interconnected, using either a fine wire or air pressure.

2) Inspect neutral clutch piston for scoring, burrs, or damaged oil seal groove. Check ring gap with feeler gauge (gap should be .002-.007"). If a new ring is installed, gap must be checked and ends of ring must be filed, if necessary, to provide proper gap.

3) Inspect neutral clutch drive plates for damaged surfaces or worn teeth. Plates must be flat. If flakes of facing material can be removed by scratching surface with thumb nail, plate should be replaced. Discoloration is not an indication of failure. Inspect release springs for distortion (springs have 5 waves).

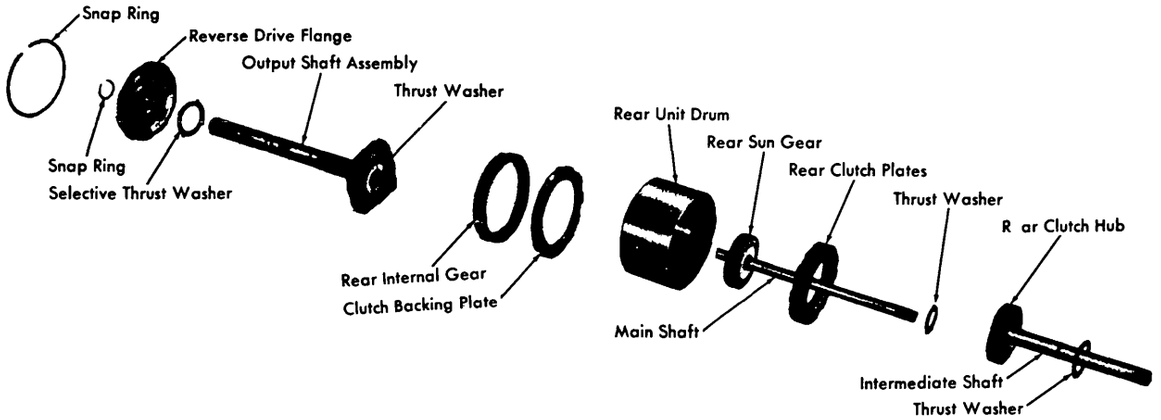
4) Inspect neutral clutch driven plates (steel) for scored surfaces or damaged lugs. Also make sure they have six equally spaced waves .008-.012" high when measured on a surface plate. Inspect clutch drum for scored or damaged surfaces. Inspect spiral snap ring for distortion or damage. Inspect rear unit sprag assembly for damaged shoulder, broken springs, or scored sprags. Inspect rear unit sprag outer race for damaged splines or scored sprag race.

5) Inspect rear clutch cylinder and bushing assembly for scoring, burrs, or damaged lugs. Inspect eight rear clutch springs for distortion or collapsed coils *(NOTE* - Slight wear "bright spots" on sides of release springs indicating slight contact with the piston assembly is permissible). Inspect rear clutch release spring retainer for cracks or damage. Inspect rear unit clutch cover-to-rear clutch hub bronze thrust washer.

6) Inspect intermediate shaft and rear unit clutch hub. Clutch hub and shaft can be separated if either needs replacement. Inspect rear unit sun gear-to-clutch hub bronze thrust washer. Inspect seven rear unit composition faced clutch drive plates for damaged surfaces. Plates should be flat. Check in same manner as for neutral clutch plates. Inspect seven driven plates (steel) for scored surfaces or damaged lugs. Driven plates must have six equally spaced waves (approx. .010" deep).

7) Inspect main shaft and rear unit sun gear for damaged splines, teeth or bearing surfaces. Gear and shaft can be separated for replacement if necessary. If shaft only is to be replaced, put old gear on new shaft with same side toward front.

8) Measure endplay of rear unit sun gear on mainshaft and determine correct selective washer to use in rear unit as follows: Clamp sun gear and mainshaft assembly in Holding Fixture J-6116 using "C" clamp and dial indicator. Be sure gear is firmly clamped on both sides so it cannot give. Set dial indicator to contact end of mainshaft. Move mainshaft straight up and down to measure endplay and record endplay. Subtract this endplay from the mainshaft endplay recorded before transmission was disassembled. The difference will be the actual endplay of the rear unit and should be .004-.018". If endplay is outside the limits of .004-.018", select the reverse drive flange-to-rear unit planet carrier thrust washer which will give the proper endplay. Selective washers are furnished in the following nine



REAR UNIT DRUM, MAINSHAFT, & OUTPUT SHAFT ASSEMBLY (TYPICAL)

sizes and are stamped with an identification number:

Identification No.	Size	Identification No.	Size
1	.055-.059"	6	.080-.084"
2	.060-.064"	7	.085-.089"
3	.065-.069"	8	.090-.094"
4	.070-.074"	9	.095-.099"
5	.075-.079"		

9) Inspect rear unit internal gear for tooth damage *(NOTE*–Internal gear and clutch backing plate can be separated from drum if replacement is necessary). If drum or backing plate is replaced, the gear should be reinstalled with the same side toward the front (the edges of the gear teeth are chamfered on the side which goes against the backing plate). Inspect output shaft to rear unit sun gear bronze thrust washer. Inspect output shaft for damaged pinions, splines, bearing surfaces or speedometer gear teeth.

10) Inspect reverse drive flange and sun gear assembly *(NOTE*–Reverse drive flange and sun gear are serviced as an assembly and should not be separated). Inspect rear unit selective washer for wear and damage.

Reassembly: **1)** Holding reverse drive flange and sun gear in left hand with drive flange up, install proper selective washer *(as determined by rear unit endplay check, see "Inspection" above)* in recess of drive flange with locating lugs indexed in flange. Use petrolatum to hold washer in place. Still holding reverse drive flange and sun gear in left hand, insert output shaft through the assembly until carrier bottoms on selective thrust washer. Hold unit tightly together and place on bench on carrier end. Install reverse planet carrier front ring on output shaft,

2) Insert Reverse Drive Flange Retainer J-6120 between snap ring and flange snug against rear unit carrier to prevent selective washer from dropping out of position *(NOTE*–When the selective washer used between reverse drive flange and planet carrier is at or near the upper limit of thickness, Retainer Tool J-6120 cannot be inserted between snap ring and flange. In this case, it is not necessary to use the retainer since there is not enough clearance to allow the thrust washer to drop out of place. Set rear unit drum on bench with long undercuts on lugs upward (or with internal gear up if it was not removed). Install clutch backing plate with flat surface down if it was removed (it may be necessary to tap plate into place with a soft hammer).

3) Install rear unit internal gear with mark upward (drill mark in rear face of gear or mark made at disassembly) if it was removed (gear teeth are beveled on side which goes against backing plate). Position gear against clutch backing plate. Install output shaft and reverse drive flange assembly into rear unit drum and secure with large snap ring. Set rear unit assembly into Holding Fixture J-6116 with shaft end down. As unit is lowered into fixture, lift up on drum and remove Drive Flange Retainer *(CAUTION–Do not lift n utput shaft after retainer is removed).* Position thrust washer in counterbore of output shaft and retain with petrolatum.

4) Apply Hydra-Matic Oil to faces of seven drive and seven driven plates and alternately install them in rear unit drum. Start with a drive (composition) plate and finish with a driven (steel) plate. Install all drive plates with same side upward. Assemble driven plates with lugs in rear unit drum slots so notches in lugs are all in line *(NOTE*–Indexing the notches will nest the plates together so waves are all in the same direction, and with no gaps between plates). Install mainshaft and sun gear assembly into output shaft in rear unit, meshing sun gear with planet pinions of output shaft.

5) Assemble rear unit clutch hub to rear end of intermediate shaft if it was removed (open side of hub toward front of shaft. End with longest spline and longest machined surface will be toward rear). Install two bronze thrust washers on rear unit clutch hub, one on each side and retain with petrolatum. Install intermediate shaft and rear unit clutch hub and thrust washers into rear drum *(NOTE*–Pick up clutch drive plates by rotating intermediate shaft). Do not drive or force rear unit clutch hub into rear unit drum.

6) Assemble rear clutch piston into rear clutch cylinder as follows: Install new inner seal on hub of clutch cylinder with lip down. Install new outer seal on piston with lip facing away from spring bore side. Install piston into cylinder using flat edge of screwdriver to start seal into cylinder. Install eight clutch release springs into bores in piston. Place spring retainers on springs with tangs facing upward. Compress springs

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DUAL-COUPLING HYDRA-MATIC

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using tool J-4670-B and J-6129. Install snap ring which holds release spring retainer. Remove compressor tools.

7) Install rear unit sprag assembly in rear unit outer race with shoulder side of sprag on counterbored side of outer race. Install sprag and outer race of rear unit inner race (push sprag part way down through outer race then rotate sprag counterclockwise to assemble). Install rear unit sprag retainer in outer race with large outer diameter upward. Push retainer down to expose snap ring groove. Install spiral snap ring on rear unit clutch hub. Install rear unit cylinder and sprag assembly into rear clutch drum with sprag side up. Secure cylinder and sprag assembly into rear clutch drum with large snap ring.

8) Install neutral clutch drum on rear unit with driven clutch plate lug slots upward. Apply Hydra-Matic Oil to five clutch drive plates (composition) and four driven plates (steel). Install plates alternately using a release spring between steel plates (start with a composition plate, release spring, then steel plate, and end up with composition plate and spring).

9) Install seal on second type neutral clutch piston with lip side facing side with dowel holes, or install ring on first type. Install seal on hub of second type center bearing support with lip facing bottom of piston cavity, or install oil ring on first type center bearing support. Install neutral clutch piston into center bearing support aligning notch in edge of piston with lockscrew hole in side of center bearing support. This alignment assures that dowels will enter dowel holes (seal or piston ring can be installed by compressing with fingers). Install two oil rings in grooves of center bearing support hub. Center rings around hub and install center bearing support assembly into neutral clutch drum in rear unit using care not to damage bushing when lowering support over intermediate shaft. If properly centered, oil rings on support hub will be compressed by taper on hub of rear clutch cylinder. Install hook type oil seal ring on intermediate shaft.

FLYWHEEL HOUSING SEAL INSTALLATION: Start seal into bore in flywheel housing with lip facing toward bushing *(NOTE–Do not use sealer).* Drive seal into place using Flywheel Housing Oil Seal Installer J-6118. Stake housing against seal in three places.

TRANSMISSION REASSEMBLY

PARKING BRAKE ASSEMBLY, OVERRUN BAND, NEUTRAL CLUTCH DRUM STATIONARY STOP KEY AND INSIDE DETENT AND THROTTLE CONTROL ASSEMBLY: 1) Install overrun band through front of case with the band ends facing rearward in a horizontal position (anchor support hole should face right hand side). When band is approximately halfway through transmission case, with band still horizontal, rotate band so that ends are in cavity in case above anchor pin and rotate band into position. Position band end on anchor in case.

2) Place parking brake pivot shaft spacer in recess in case. Position parking brake pawl and lever assembly in case with upper lever on pivot in case. Locate parking pawl at pivot shaft hole and insert parking pawl pivot shaft through case, pawl and spacer until end of shaft is flush with rear of case. Slide spacer washer onto pivot shaft against parking brake lever. Position parking brake lever spring in bracket with long end toward rear. Slide bracket and spring assembly onto pivot shaft with end of spring under parking brake lever. Hook other end of spring over pin at front of bracket.

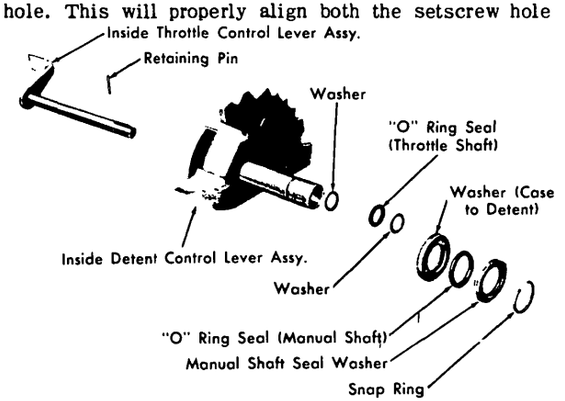
3) With throttle and detent levers assembled, place spacer washer over detent shaft against detent lever. Insert lever and shaft assembly through hole in case from inside with parking brake tang below pin in parking brake bracket. Install "O" ring seal and special washer which fits into bore on outside of case over detent lever shaft. Install snap ring to retain seal and washer.

4) Install neutral clutch stop key in case using petrolatum to hold it in place. Position rounded side toward front to provide lead for guiding neutral clutch drum over key.

CENTER BEARING SUPPORT, NEUTRAL CLUTCH & REAR UNIT ASSEMBLY: 1) Install rear unit, neutral clutch, and center bearing support assembly into case as follows: Insert output shaft end of assembly part way into front of case and then rest rear unit drum on case, while holding intermediate shaft. Rotate neutral clutch drum until groove for neutral clutch key is up.

2) Holding neutral clutch drum in this position, rotate center bearing support so that set screw hole in support is aligned with the second clutch plate slot counterclockwise from key slot in neutral clutch drum.

3) With parts aligned, slide assembly into case, engaging neutral clutch drum key with slot in clutch drum. Alignment can be checked by looking through lockscrew hole in side of case and observing that clutch plate slot in neutral clutch drum is aligned with set screw hole. This will properly align both the setscrew hole

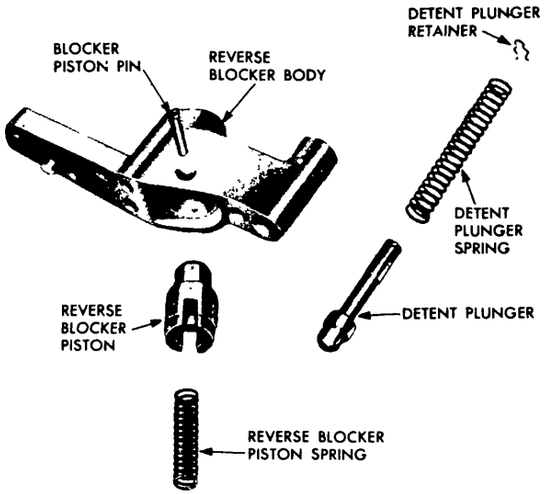


INNER CONTROL LEVER ASSEMBLY

in support and locking key groove in neutral clutch drum. When properly installed, snap ring groove in case will be visible at front edge of case support. *NOTE–* If unit fits tightly in case, assembly may be aided by pulling on output shaft. Also make sure low band does not cock on rear unit drum and hold unit.

4) Make sure case support locking screw hole is aligned and install snap ring which positions center bearing support in case. Tap snap ring as necessary with screwdriver and hammer to make sure it seats fully in groove. *(NOTE–*If necessary to align center bearing support after installation, install Slide Hammers J-6125 to act as handles). Install center bearing support locking screw from outside of transmission case.

REVERSE ASSEMBLY, REAR PUMP & GOVERNOR: 1) Install reverse planet carrier on output shaft, aligning splines and pinions. Install reverse planet carrier to to output shaft snap ring. Install reverse stationary cone key in case with rounded side toward rear and retain with petrolatum. Install stationary cone key making certain that cone aligns with key. If cone sticks, tap gently with plastic hammer until seated.



REVERSE BLOCKER ASSEMBLY

2) Install reverse clutch release spring on carrier. Tangs should be positioned away from carrier. Install reverse internal gear on carrier. Position reverse internal gear-to-pump hub thrust washer against internal gear. Install reverse clutch piston release spring over internal gear against shoulder in case and stationary cone.

3) Install new gasket on rear pump, and install the reverse piston and rear pump as an assembly into case aligning splines of pump drive gear and output shaft by rotating shaft. Install locking screw and rear pump-to-case attaching screw. Tighten attaching screw to 25 ft. lbs. and locating screw to approximately 6-8 ft. lbs.

4) Remove Rear Unit Clutch Retainer J-6135 from intermediate shaft. Install rear bearing over output shaft into pump cover. *(NOTE–*If rear bearing is tight on shaft, it will be necessary to tap bearing into place using Rear Bearing Installer J-6133. While tapping bearing into place hold a block of wood aginst front of the mainshaft to hold output shaft to rear until groove for snap ring can be seen behind the rear bearing). If bearing is a slip fit on output shaft install snap ring on shaft against bearing, then pull shaft rearward and push snap ring into groove.

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5) Install rear bearing snap rings on output shaft, if not previously installed, and in rear pump cover. Check mainshaft endplay as follows Install Dial Indicator Support J-6126. Install collar of Endplay Checking Fixture J-6127 and secure in position by installing Truarc snap ring on mainshaft. Attach fixture to collar by threading collar securely into fixture. Install dial indicator. Move mainshaft back and forth to check endplay of mainshaft. Be sure to get free mainshaft endplay. Forcing mainshaft will not give accurate reading. Subtract endplay of rear unit sun gear on mainshaft from mainshaft endplay Difference will be actual endplay of rear unit and should be .004-.018". If outside these limits it will be necessary to remove and disassemble the clutch unit so that correct selective washer can be installed between rear unit planet carrier and the reverse drive flange. *See "Center Bearing Support, Neutral Clutch & Rear Unit" under "Disassembly & Reassembly of Units" above.*

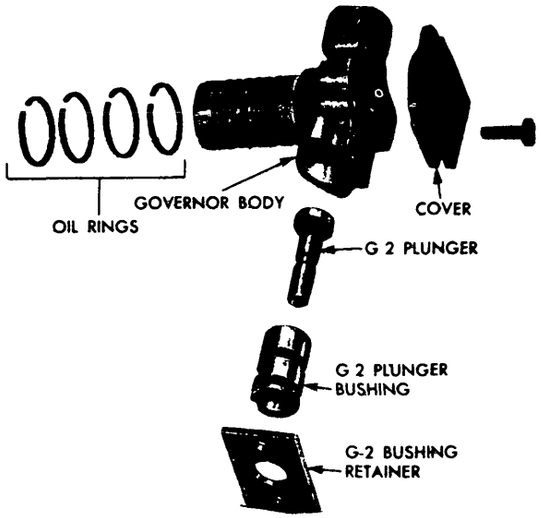
6) Remove endplay checking tool. Install governor into rear pump as follows Align snap rings so gaps will be upward when governor sleeve is aligned with drive key. Compress rings by hand and work governor into bore in rear pump. Rock governor back and forth to engage drive key. Check to see that governor turns when output shaft is turned.

7) Install new extension housing gasket on rear pump with petrolatum, and install extension housing on case with six attaching screws and washers. Tighten to 25 ft. lbs. torque Leave out bottom two screws which are used to fasten oil cooler Install speedometer driven gear in extension housing. Insert vent pipe into hole in top of rear pump and clamp pipe to case.

8) If rear oil seal was removed, coat new seal with Permatex and drive seal into housing using seal Installer J-5154-A. Felt portion of seal must be toward rear Seal should be driven in until it bottoms in housing.

FRONT PUMP & OVERRUN CLUTCH: 1) Install front pump and overrun clutch plate assembly over intermediate shaft and at the same time align intake pipe holes in front pump and case. These should be indexed properly before any attempt is made to install pump into transmission.

2) Install front pump into transmission case and tighten the three front pump-to-center bearing support bolts, then back off 1/4 turn. Apply air in the neutral clutch hole of transmission case to position center bearing support against snap ring. With air still applied, tighten case to front pump lock screw to 22-27 ft. lbs. Tighten pump-to-center bearing support screws to 25-30 ft. lbs.



GOVERNOR ASSEMBLY

FRONT UNIT COUPLING, PRESSURE REGULATOR & COOLER ADAPTER: 1) Make sure seals are in place on ends of oil cooler sleeves and insert sleeves in case with seal end first. Place oil cooler adapter with gasket on case over oil cooler sleeves, install two attaching screws with copper washers, and tighten securely.

2) With spring in place on regulator valve install valve and spring into case. Install pressure regulator plug assembly and tighten to 5 ft. lbs. *CAUTION–Overtightening of pressure regulator may push pump away from side of case causing an oil leak between passages in pump and case.*

3) Install front unit coupling cover first (with transmission vertical, and front end up), into transmission case. Rock drive torus shell to make sure drive hub engages front pump rotor and rock driven torus shaft to make sure lugs on shaft engages front unit sprag inner race. Driven torus shaft should turn clockwise freely, but should not turn counterclockwise as viewed from front.

CONTROL VALVE, SERVO & ACCUMULATOR: 1) Rotate transmission to horizontal position. Attach control valve assembly to transmission with five attaching screws, leaving out screw which will position front pump intake pipe retainer. *(NOTE–*The four outer screws have star washers and the center two have flat washers). Position detent lever so it will engage detent plunger and manual valve.

2) Install new front pump "O" ring seal in intake pipe at front of case. Install servo and accumulator assembly and servo spring. Install front intake pipe into case and secure with clip and valve body attaching screw.

3) Install rear pump "O" ring seal on rear pump intake pipe. Install oil screen on front pump intake pipe. Install rear pump intake pipe into screen and case. Install oil pan with new gasket and tighten attaching screws securely.

FLYWHEEL REAR HOUSING, TORUS ASSEMBLY & OIL COOLER: 1) Remove transmission from holding fixture and position on bench in a horizontal position, with pan down. Install steel thrust washer in recess in front unit drive torus shell. Position Flywheel Housing Bushing and Seal Protector J-6119 over intermediate shaft

2) Install rear flywheel housing-to-case "O" ring seal on flywheel housing. Install rear flywheel housing on case and attach with six screws. Tighten securely. Remove Bushing and Seal Protector.

3) Install proper selective washer on drive shaft of front unit as determined when checking front unit end clearance at disassembly. Install torus cover and push cover on evenly, without rocking, to prevent damage to seal and bushing.

4) Install internal gear assembly into cover, indexing with torus cover and front unit drive torus hub. Install bronze thrust washer then steel backing washer in internal gear. Steel backing washer must be indexed with splines of front unit drive torus shaft.

5) Install sun gear over front unit driven torus shaft, chamfered side first. Install steel backing washer and bronze thrust washer against sun gear. Install drive torus member on intermediate shaft indexing front unit planet carrier with sun gear and internal gear. Secure drive torus to intermediate shaft with Truarc snap ring.

6) Install driven torus rear Truarc snap ring on mainshaft. Install driven torus front Truarc snap ring on mainshaft to secure torus member.

7) Install flywheel "O" ring seal on flywheel and position flywheel against torus cover, indexing with dowels (flywheel can be installed in only one position since dowels are of different sizes) Install and tighten flywheel-to-torus cover nuts, leaving nuts off bolts required for attaching flywheel and torus cover to flex plate Tighten nuts to 20 ft lbs

8) Place oil cooler in position against bottom of rear extension housing and install attaching screws. Connect oil cooler pipes to adapter on side of transmission case.

DUAL-COUPLING HYDRA-MATIC

Cadillac (1959-60)
Oldsmobile (1959-60)
Pontiac (1959-60)

►*TRANSMISSION IDENTIFICATION NOTE: A serial number prefix stamped in serial number plate located at lower left hand corner on rear face of transmission case identifies the various transmissions as indicated in table below.*

Car Model	Serial Number Prefix
1959-60 Cadillac Series 60,62,63,64	"C"
1959-60 Cadillac Series 67,68	"CA"
1959 Oldsmobile Series 88	"0-59"
1959 Oldsmobile Series S88, 98	"0A-59"
1960 Oldsmobile Series 88	"0-60"
1960 Oldsmobile Series S88,98	"0A-60"
1959 Pontiac (Exc. Econ. Eng.)	"P-59"
1959 Pontiac (Econ. Engine)	"PE-59"
1960 Pontiac (Exc. Econ. Eng. & Spec.Pol.)	"P-60"
1960 Pontiac (Econ. Engine)	"PE-60"
1960 Pontiac (Spec. Police) ℂ	"PA-60"

ℂ - Use with 425A Engine or Triple 2-Bbl. Carburetors. Shift Valve Body Assembly, Part No. 8619957 and Governor Assembly, Part No. 8619958 must be used with this transmission.

►CHANGES, CAUTIONS, CORRECTIONS

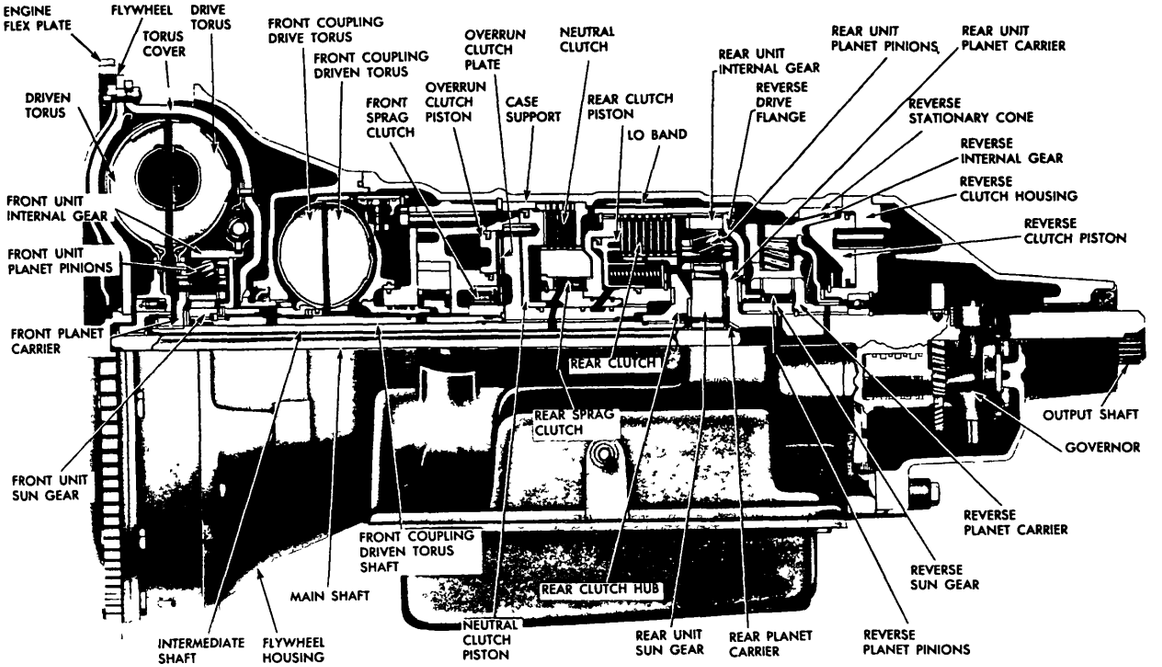
►*STARTING ENGINE BY PUSHING CAR NOTE: Due to the elimination of the rear pump in this transmission, it is not possible to start the engine by pushing, towing, or coasting the car.*

►*TOWING HYDRA-MATIC DRIVE CARS: Car may be towed at speeds up to 30 MPH for distances up to 50 miles if there is nothing wrong with the transmission. When towing at speeds above 30 MPH or if transmission known to be out of order, disconnect propeller shaft from transmission. CAUTION - After towing, check fluid level and if necessary, bring to proper level.*

►*1959 CADILLAC & PONTIAC ACCUMULATOR & SERVO ASSEMBLY PRODUCTION CHANGE:* This new assembly was used in partial production between Cadillac Eng. Nos. 100066 & 100563; Pontiac Transmission Nos. P59-193412 & P59-197197, and in full production beginning with Cadillac Transmission Nos. C59-109734 and Pontiac Transmission No. P59-210305. Service procedures are different for the new assembly (see "Overhaul of Units" below). Later type assembly is not interchangeable with early type.

►*1959 CADILLAC GROANING VIBRATION CORRECTION:* This condition occurs when 3-2 downshift is delayed to approximately 5-6 MPH instead of occuring at normal 10 MPH downshift point. The cause of this downshift delay is a sticking or binding 2-3 shift valve, due to burrs or scratches on valve. Remove valve body from transmission and clean 2-3 shift valve until it moves freely in bore.

►*1959 SLIPPING 2-3 SHIFT CORRECTION (WHEN CAUSED BY IMPROPER NESTING OF REAR UNIT CLUTCH DRIVEN PLATES):* Check to see that rear unit clutch plates are installed in rear unit drum with .030" saw slots lying one above the other in a straight line. Waves of plates must all be in the same direction and nest together properly.



1959-60 DUAL-COUPLING HYDRA-MATIC SECTIONAL VIEW (TYPICAL)

►*1959 CADILLAC & PONTIAC (EARLY) TRANSMISSION "BUZZ" OR ERRATIC SHIFT CORRECTION:* This condition is noticeable at low speed before transmission oil has reached operating temperature. To correct, install a new governor assembly, Part No. 8619903. Later production transmissions have the new type governor.

►*1959 OLDSMOBILE G-1 BOOSTER VALVE PRODUCTION CHANGE (TO ELIMINATE "BUZZ"):* A new G-1 Booster Valve, Part No. 8618192 is being used in production beginning with Trans. Serial Nos. 059-10929 & 0A59-18545. On transmissions before the above serial numbers, installation of the new valve will eliminate the "buzz" heard when car is standing still with engine at idle and selector lever in "N", "D", "S", or "L" position. *NOTE - By placing transmission selector lever in "P" or "R" position, the "buzz" will stop if noise originates from the early type booster valve.*

►*1959 CADILLAC & PONTIAC (EARLY) TRANSMISSION LOW SPEED "THUMP" CORRECTION:* A "thump" occurring between 3-5 MPH (transmission in first gear speed range) may be corrected by installing a new kit, Part No. 8619905 which contains a new type coupling and coupling signal valve.

►*1959 OLDSMOBILE "CLICKING" NOISE CORRECTION & PARTS PRODUCTION CHANGE:* A new Feed Valve and Coupling Feed Valve Spring is used in production beginning with Transmission Serial Nos. 059-4160 & 0A59-7080 to eliminate a "clicking" noise heard at approximately 2-6 MPH with transmission in first gear. The new parts are available in "Coupling Feed Valve & Spring Package", Part No. 8619945 and may be used on earlier transmission to eliminate the "clicking" noise.

►*1960 CADILLAC BUZZING NOISE CORRECTION:* On later cars, this condition may be noticed in fourth gear at light throttle at approximately 25-30 MPH and will disappear as slight pressure is applied on accelerator. To correct, replace manual valve body. *NOTE - The above applies only to manual valve bodies having a mark "DJ#3" and a "2-60" date code.*

►*1959-60 CADILLAC REVERSE STATIONARY CONE "CRACKING" NOTE:* A small hairline crack in the fibre glass cone, Part No. 8618736 will not affect its durability. The cone can be used if the break is "clean" and small particles of cone have not broken loose.

►*1960 CADILLAC HYDRA-MATIC "GROWL" OR "BUZZ" AT APPROXIMATELY 30-35 MPH CORRECTION (ON CARS BEFORE ENGINE NO. 020775):* This condition which occurs at the 3-4 shift point (and accentuated by cold fluid) can be minimized by installing a new softer rubber insulator, Part No. 1475806, in place of the old insulator at cooler pipe bracing location below generator at front frame crossmember. Make sure adequate clearance is maintained between cooler pipes and exhaust manifold or frame.

►*1960 CADILLAC HYDRA-MATIC DIPSTICK PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new transmission dipstick, Part No. 1475730 and tube, Part No. 1475732 is being used in production after Engine No. 040770 and may be used on earlier cars to prevent fluid spillage if dipstick is left partially out. *CAUTION - Do not intermix early and later type tubes*

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

and dipsticks as inaccurate fluid level readings would result.

►*1960 CADILLAC HYDRA-MATIC SHIFT VALVE BODY PRODUCTION CHANGE & SERVICE REPLACEMENT CAUTION:* On later type units, a filister head screw is used in place of the countersunk flathead screw to attach cover to shift valve regulator body. If a later type shift valve body is used with the older type channel plate, make sure there is no interference between screw and plate. If necessary, file channel plate slightly at point of contact. Excessive leakage will result internally if interference exists.

►***LATE 1960** CADILLAC HYDRA-MATIC REMAINING IN 3RD GEAR (WHEN CAR STOPPED) CORRECTION:* **On cars using a spacer in 2-3 Shift Valve Bore, install a later type 2-3 Shift Valve Spring, Part No. 8620807 which has redesigned end coils to eliminate possibility of spring hanging up on step of valve bore.**

►*1960 PONTIAC FLUID LEAKAGE AT HOSE CONNECTION ON LOWER TANK OF RADIATOR CORRECTION:* Replace existing "corbin" (wire) type clamps or the band type clamps with a screw type clamp, Part No. 111603.

►*1960 PONTIAC HYDRA-MATIC INCORRECT DIPSTICK NOTE & TRANSMISSION "BUZZING" NOISE CORRECTION:* Dipsticks with improperly located marks may have been used in some 1960 models. Fluid levels would be low on these units resulting in a "buzzing" noise or other transmission malfunctions. The correct dipstick should measure 18 27/32" from top of cup down to the center of the top-ball of level indicating "dumbbell". The incorrect dipstick will measure approximately 19 5/32". If a new dipstick is not available, fill transmission approximately 5/16" above full mark on the incorrect dipstick until a new dipstick, Part No. 536298 is installed.

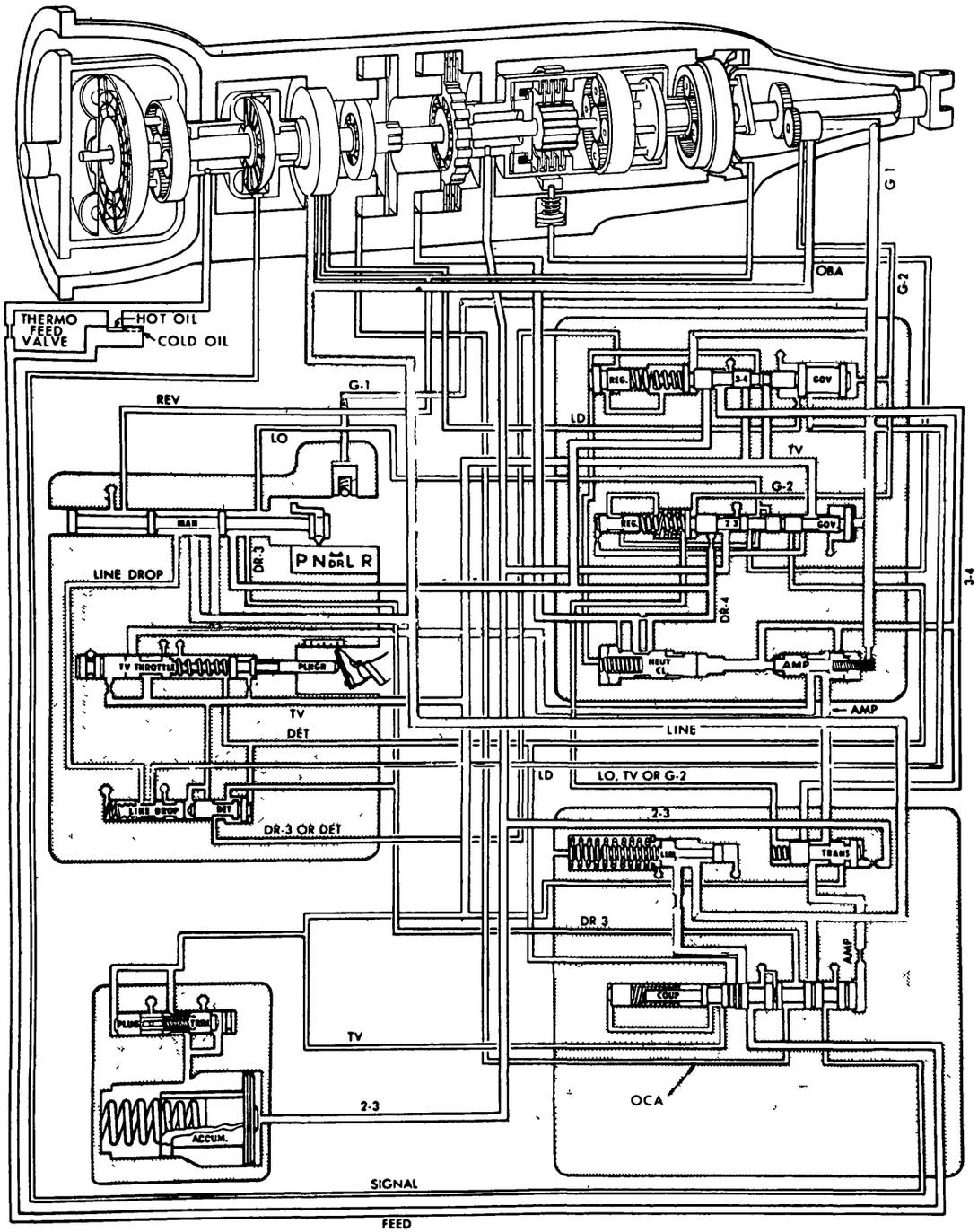
►*1960 PONTIAC ACCUMULATOR VALVE SPRING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new accumulator valve (trimmer) spring, Part No. 8619057 is being used in Model "P" transmission in place of Part No. 8618897 beginning with Transmission Serial No. 60 P 180827. The new spring should be used for service replacement to obtain a firmer 2-3 shift in mid-throttle range.

DESCRIPTION: Four-speed hydraulically operated planetary type automatic transmission and fluid coupling. Transmission design is similar to 1956-58 units except that rear oil pump was eliminated beginning with 1959 models, and transmission case was changed to reduce its overall size in 1960 models. Operationally the transmission is unchanged.

LUBRICATION

LUBRICATION INTERVALS: Check fluid level at every chassis lubrication (2000 miles, Oldsmobile & Pontiac). Drain and refill every 26,000 miles (Oldsmobile); 25,000 miles (Pontiac); 24,000 miles or 1 year (Cadillac, with original factory transmission fluid); 12,000 miles or 1 year (Cadillac, after original change at 24,000 miles or 1 year).

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1959-60 DUAL-COUPLING HYDRAULIC CIRCUITS (TYPICAL)

DUAL-COUPLING HYDRA-MATIC (C ntinued)

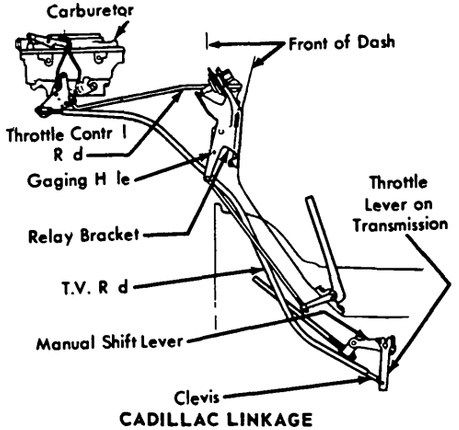
►*FLUID LEVEL CAUTION: Due to the smaller size of this transmission, it is extremely important that the prop r fluid level be maintained. DO NOT check or change the fluid level when transmission is extremely hot or cold because of fluid expansion and contraction.*

R c mm nd d Lubricant: Use Automatic Transmission Fluid Type "A" (Suffix "A"). *NOTE - On Pontiac, Automatic Transmission Type "A" may be used.*

CHECKING FLUID LEVEL: With transmission selector lever in "N" or "P" position and transmission at normal operating temperature (engine at idle speed), check fluid level on dipstick. Add oil with engine running to bring fluid up to within ¼" of "F" mark (1959 Models); to "F" mark (1960 Models). *NOTE - On 1959 Cadillac it requires approximately 1 qt. of fluid to raise level from "L" t "F" mark. On 1960 Cadillac & 1959-60 Pontiac, it r quires approximately 1 pt. of fluid to rais lev l fr m "L" mark to "F" mark (Cadillac); from "Add Oil H t" mark to "Full Oil Hot" mark (Pontiac). DO NOT OVERFILL TRANSMISSION.*

DRAINING & REFILLING: Remove transmission oil pan drain plug and drain plugs from flywheel or torus cover (remove flywheel cover or inspection plate). Allow fluid to drain. Pour 11 qts. (1959 Oldsmobile); 9 qts. (1960 Oldsmobile); 8 qts. (1959 Cadillac & 1959-60 Pontiac); 7 qts. (1960 Cadillac) into transmission through tube on right side of transmission (tube also houses the dipstick). Run engine at 800 RPM (Cadillac); normal idle speed (Pontiac & Oldsmobile) for 1½ minutes with transmission selector lever in "N" (Neutral) position. Add fluid as required to bring level to proper mark on dipstick (see "Checking Fluid Level" above). *NOTE - On Cadillac, reduce engine speed to idle b for adding fluid.*

Capacity (1959 Mod ls): R fill - Approx. 11 qts. (Cadillac & Oldsmobile); 9 qts. (Pontiac).
After Ov rhaul - Approximately 12½ qts. (Cadillac & Oldsmobile); 11½ qts. (Pontiac). *CAUTION - The transmission fluid capacity as indicated above is approximat . When refilling transmission, follow procedures outlined abov for "Checking Fluid Level".*



CADILLAC LINKAGE

Capacity (1960 Mod ls): R fill - 9 qts. (Cadillac & Pontiac); 9½ qts. (Oldsmobile).
After Overhaul - 10 qts. (Cadillac & Pontiac); 10½ qts. (Oldsmobile). *CAUTION - The transmission fluid capacity as indicated above is approximate. When refilling transmission, follow procedures outlined above for "Checking Fluid Level".*

LINKAGE ADJUSTMENT

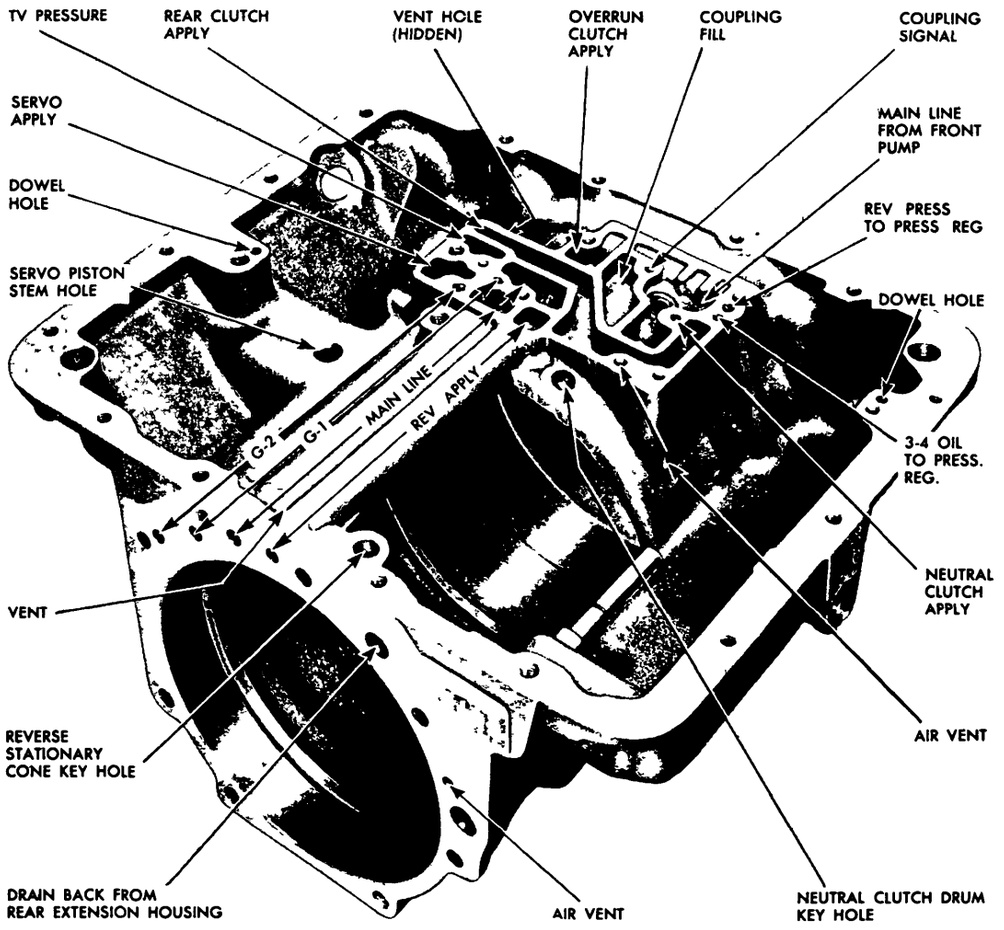
►*THROTTLE VALVE LINKAGE ADJUSTMENT NOTE: See "Carburetor" on individual car model pages for throttle valve linkage adjustment.*

CADILLAC

MANUAL LEVER LINKAGE ADJUSTMENT: Loosen the adjusting nuts on transmission manual rod and back off approximately 1". Place manual lever on transmission fully forward to "P" (Park) position. Place selector lever on steering column in "P" (Park) position. Slide clevis of manual lever along manual rod in direction of steering column until all slack in linkage is taken up (*NOTE*–If clevis contacts upper adjusting nut before all slack is taken up, nut should be backed off an additional amount). Tighten lower adjusting nut with fingers against clevis to further remove slack. Bring upper adjusting nut down to contact clevis and tighten with wrench. Check manual selector lever in car. It should be free to enter the "P" (Park) position and the "DR4" stop in the steering column should correspond to the "DR4" detent position in the transmission. Readjust if necessary. Check indicator pointer to see that it indexes to the "DR4" position when selector lever is at the "DR4" stop.

Neutral Safety Switch Adjustment (Combination Neutral Safety Switch, Back-up Light Switch): Located on steering column forward of instrument panel. Loosen attaching screw on switch and position it on jacket so starter is not operative in any position except "N" (Neutral) or "P" (Park).

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1959-60 DUAL-COUPLING HYDRA-MATIC OIL PASSAGES

DUAL-COUPLING HYDRA-MATIC (C ntinued)

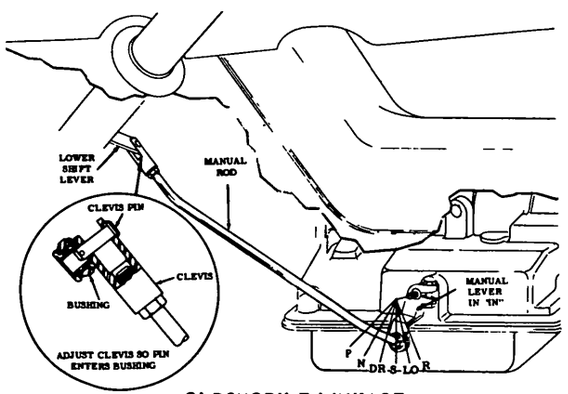
OLDSMOBILE

MANUAL LEVER ADJUSTMENT: Place transmission selector lever in "N" (Neutral) and transmission manual lever in neutral detent position, then disconnect manual rod from lower shift lever. Hold lower shift lever upward so selector lever is positioned against stop in upper steering column. Adjust manual rod end so pin will enter approximately 1/8" into lower shift lever bushing, with selector lever against stop. **Lengthen clevis 2½ turns.** Connect manual rod to lower shift lever and tighten clevis locknut.

N utral Safety Switch Adjustment: Located on steering column forward of instrument panel. Loosen attaching screws on mast jacket, and with selector lever in "N" (neutral) position, position the switch so that a .090" pin can be inserted through hole in switch arm an into hole in face of switch. Tighten switch attaching screws and remove pins. Check to see that starter will operate only in "P" (Park) and "N" (Neutral) positions, and that transmission is not in gear.

PONTIAC

MANUAL LEVER LINKAGE ADJUSTMENT: Place selector lever and transmission manual lever in "P" (Park) position; and with outer transmission shift lever trunnion nuts backed off clear of trunnion, pull shift rod down toward transmission as far as possible. While holding in this position, run the upper trunnion nut down to just contact trunnion. Hold the shift rod and shift transmission into "R" (Reverse), and observe position of upper trunnion nut **(This is important).** If upper nut is short of trunnion, screw upper nut down to just contact trunnion, then turn down **two additional turns.** Tighten lower nut. If upper nut is contacting the trunnion, count number of turns nut can be backed off and still contact trunnion. If less than two turns, turn nut down **two turns** against trunnion from the "just contact" position, and lock lower nut. If more than two turns, turn upper nut down against trunnion from the "just contact" position to the original or starting position and lock lower nut. Check transmission parking lock with car on a grade or ramp for positive lock. *NOTE* - The shift indicator must not be off index more than .080" after linkage adjustment is completed.



OLDSMOBILE LINKAGE

Neutral Safety Switch Adjustment: Located at lower end of steering column in engine compartment. Place selector lever in "N" (Neutral) position, then loosen switch mounting screws. Adjust switch to index with selector lever. *NOTE - Starter must not operate when ignition key is turned to start position with selector lever in "D" (Drive) position.* Test to see that engine starts when selector lever is in "P" (Park) or "N" (Neutral) position. Tighten switch mounting screws securely.

TROUBLE SHOOTING & DIAGNOSIS

NO UPSHIFTS OR ERRATIC: Governor valves stuck. Broken governor rings. Sticking valves or dirt in valve body. G-2 bushing turned. Front unit internal gear bushing seized on shaft.

MISSES 2ND SPEED: Governor boost valve stuck. Transition valve stuck away from plate. Sticking valves or dirt in valve body. Governor sticking.

MISSES 3RD, OR 2-4-3: Transition valve sticking. Sticking valves or dirt in valve body. Throttle valve adjustment too long. Rear clutch or transition valve spring faulty.

LOCKS UP IN 2ND AND 4TH: Front sprag clutch broken. Overrun clutch applied or sticking.

LOCKS UP IN 3RD OR 4TH: Rear sprag clutch broken. Low band not releasing.

ROUGH 2-3 SHIFT: Accumulator valve stuck or accumulator piston stuck. Accumulator gasket broken or leaking. Restricted or leaking oil passages. Broken accumulator spring. Broken or leaking piston oil seal rings. Control valve faulty or throttle valve adjusted improperly. Rear clutch pack faulty. Case passages restricted or leaking.

UPSHIFTS ROUGH: Throttle linkage adjusted short. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking or restricted main line feed to governor.

UPSHIFTS LOW: Throttle linkage adjusted long. Governor valves sticking. Broken governor rings. Sticking valves or dirt in valve body. Leaking throttle valve oil.

NO REVERSE, SLIPS OR LOCKS UP: Manual linkage incorrectly adjusted. Manual valve not engaged with drive pin. Reverse piston apply restricted or leaking. Low oil pressure. Overrun clutch apply leaking. Pressure regulator faulty. Neutral clutch not released. Flash restricting neutral clutch exhaust port or manual body.

SELECTOR LEVER WILL NOT GO INTO REVERSE: Governor valves sticking or broken governor rings. Reverse blocker piston stuck. Manual linkage interference.

REVERSE DRIVE IN NEUTRAL: Reverse stationary cone sticking.

DELAYED 1-2 SHIFT: Coupling valve sticking. Governor boost valve sticking. G-1 valve sticking. Wrong spring on coupler valve.

SLIPS IN 1ST AND 3RD: Front sprag clutch slipping. Front sprag clutch broken.

SLIPS IN OR MISSES 2ND AND 4TH: Front unit torus cover seals leaking. Front unit torus cover exhaust valves sticking or missing. Front unit torus cover feed restriction or leak. Front unit torus cover signal restriction or leak. Low oil pressure. Coupling valve sticking. Sticking valves or dirt in valve body. Coupling snap ring improperly installed, or missing. Limit valve faulty. Coupling passage restricted or leaking. Front unit torus vanes damaged.

SLIPS IN ALL DR RANGES: Manual linkage improperly adjusted. Neutral clutch clipping or burned. Neutral clutch apply restricted or leaking (case support or valve body). Incorrect number of neutral clutch plates. Low oil pressure. Control valve faulty. Torus members (check valve) faulty. Intake pipe "O" ring damaged or missing. Pressure regulator valve stuck in pump. Pump slide stuck.

SLIPS IN 1ST OR 3RD (DR RANGE): Rear sprag clutch slipping or improperly assembled. Rear sprag clutch broken. Neutral clutch burned, restricted or the piston is sticking.

SLIPS IN 3RD OR 4TH: Rear unit clutch slipping or burned. Rear unit clutch apply restricted or leaking. Incorrect number of clutch plates (rear). Accumulator faulty. Center support leakage at 2-3 passage. Low oil pressure. Accumulator valve stuck (3rd only).

SLIPS IN 3RD IN DR RIGHT ON COAST: Overrun clutch slipping or burned. Overrun clutch apply restricted or leaking. Sticking valves or dirt in valve body. Overrun clutch passages restricted or leaking.

SLIPS IN 1ST AND 2ND IN LO RANGE ON COAST: Low servo apply restricted or leaking. Low band not anchored to case or broken. Low servo piston and rod binding in case or servo and accumulator body. Band facing worn or loose. Anchor dowel pin loose or missing in case.

NO DRIVE IN DR RANGE: Manual linkage incorrectly adjusted or manual valve not engaged with drive pin. Low oil pressure (pressure regulator stuck). Front pump intake pipe improperly installed. Front sprag broken (front pump bushing or front unit drive torus shaft). Front and/or rear sprag not properly installed. Rear sprag broken. Front sprag inner race broken. Rear sprag outer race broken. Neutral clutch plates burned. Neutral clutch piston, control valve or front pump not operating properly.

DRIVE IN LO RANGE ONLY: Rear sprag broken. Neutral clutch not applying.

NO FORCED DOWNSHIFTS (4-3 OR 3-2): Control valve faulty or linkage not properly adjusted.

2-3 RUNAWAY OR 2-1-3 SHIFT: 2-3 passage in center bearing support restricted or leaking. Plug out of accumulator. Rear clutch burned. Valve body faulty (transition valve or case passages in the 2-3 circuit).

WILL NOT GO INTO PARK: Parking links broken. Mechanical interference. Manual linkage or parking pawl faulty.

STARTS IN 2ND SPEED: Valves sticking. Governor sticking or governor boost valve stuck.

DRIVES FORWARD IN REVERSE AND NEUTRAL: Neutral clutch piston stuck in applied position.

LUNGES FORWARD BEFORE BACK-UP WHEN PLACING SELECTOR IN REVERSE: G-2 plunger stuck in outward position. Restricted neutral clutch release oil supply.

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

TESTING

ROAD TEST: Operate car over a test route and note performance and shift speeds. Select a test route that will provide for all types of operation. *See "Dual-Coupling Hydra-Matic" Shift Point Table for correct shift speeds.*

OIL PRESSURE TEST: Connect oil pressure gauge, Tool J-2540-A to take-off hole at bottom of reverse clutch housing using a hose and fitting. Drive car until normal operating temperature is reached, then test as follows:

Z r Thr ttl Pr ssur (Oldsmobile & Pontiac): Check pressure in all ranges. Pressure should be 50 lbs. minimum in all ranges with a maximum variation of 10 lbs., (may be higher in reverse).

Z ro Thr ttl · Pr ssur (Cadillac): With transmission in 4th speed, and car above 20 MPH, oil line pressure should be 60-70 lbs.

Driv "Right" Pr ssur : With transmission selector lever in Drive "Right" position and car speed at approximately 25 MPH, pressure should be 90-100 lbs. *NOTE* - Pressure at any speed is constant regardless of throttle pressure as throttle valve pressure is not used to modulate line pressure.

Driv "L ft" Pr ssure: While driving at 25 MPH, move selector lever to Drive "Left" position so that transmission will shift into 4th speed. Oil pressure should drop to 60-70 lbs. in 4th.

Full Thr ttl Pr ssur T st (Cadillac): In any drive range, pressure should be at least 20 lbs. higher than zero throttle pressure test reading (see above).

R v rse Pr ssur T st (Cadillac): Place selector lever in "R" (Reverse) position and apply footbrake. Increase engine speed to half throttle. The pressure range under these conditions should be 160-200 lbs.

DUAL-COUPLING HYDRA-MATIC SHIFT POINTS

CADILLAC 60,62,63,64 SERIES
2.94-1 AXLE

UPSHIFTS:		1-2	2-3	3-4
"Dr4"	(Min. Throttle)	3-9	12-16	21-24
	(Full Throttle)	17-20	38-41	73-78
"DR3"	(Min. Throttle)	3-9	12-16	73-78
	(Full Throttle)	17-20	38-41	73-78
"Lo"	(Min. Throttle)	3-9	46-52	73-78
	(Full Throttle)	17-20	46-52	73-78
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	16-13	12-8	7-3
	(Full Throttle)	71-65	25-21	12-9
"Dr3"	(Min. Throttle)	71-65	12-8	7-3
	(Full Throttle)	71-65	25-21	12-9
"Lo"	(Min. Throttle)	71-65	45-42	7-3
	(Full Throttle)	71-64	45-42	12-9

CADILLAC 60,62,63,64 SERIES
3.21-1 AXLE

UPSHIFTS:		1-2	2-3	3-4
"Dr4"	(Min. Throttle)	3-8	11-14	19-22
	(Full Throttle)	15-18	35-37	66-71
"Dr3"	(Min. Throttle)	3-8	11-14	66-71
	(Full Throttle)	15-18	35-37	66-71
"Lo"	(Min. Throttle)	3-8	42-47	66-71
	(Full Throttle)	15-18	42-47	66-71
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	15-19	11-7	7-3
	(Full Throttle)	67-62	24-20	12-8
"Dr3"	(Min. Throttle)	64-59	11-7	7-3
	(Full Throttle)	64-59	24-20	12-8
"Lo"	(Min. Throttle)	64-59	41-32	7-3
	(Full Throttle)	64-59	41-32	12-8

CADILLAC 67 SERIES
3.36-1 AXLE

UPSHIFTS:		1-2	2-3	3-4
"Dr4"	(Min. Throttle)	3-8	12-15	20-23
	(Full Throttle)	16-19	37-39	69-74
"Dr3"	(Min. Throttle)	3-8	12-15	69-74
	(Full Throttle)	16-19	37-39	69-74
"Lo"	(Min. Throttle)	3-8	44-49	69-74
	(Full Throttle)	16-19	44-49	69-74
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	16-13	11-7	7-3
	(Full Throttle)	67-62	24-20	12-8
"DR3"	(Min. Throttle)	67-62	11-7	7-3
	(Full Throttle)	67-62	24-20	12-8
"Lo"	(Min. Throttle)	67-62	43-40	7-3
	(Full Throttle)	67-62	43-40	12-8

CADILLAC
3.77 AXLE
68 SERIES

UPSHIFTS:		1-2	2-3	3-4
"Dr4"	(Min. Throttle)	3-7	11-14	19-21
	(Full Throttle)	16-18	35-37	65-70
"Dr3"	(Min. Throttle)	3-7	11-14	65-70
	(Full Throttle)	16-18	35-37	65-70
"Lo"	(Min. Throttle)	3-7	42-47	65-70
	(Full Throttle)	16-18	42-47	65-70
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr4"	(Min. Throttle)	15-12	10-7	6-2
	(Full Throttle)	64-59	22-19	11-8
"Dr3"	(Min. Throttle)	64-59	10-7	6-2
	(Full Throttle)	64-59	22-19	11-8
"Lo"	(Min. Throttle)	64-59	41-38	6-2
	(Full Throttle)	64-59	41-38	11-8

PONTIAC

UPSHIFTS:		1-2	2-3	3-4
"Dr. Left"	(Min. Throttle)	4-9	11-15	17-20
	(Full Throttle)	11-15	35-40	65-75
"Dr.Right"	(Min. Throttle)	4-9	11-15	
	(Full Throttle)	11-15	35-40	65-75
"Lo"	(Min. Throttle)	4-9		
	(Full Throttle)	11-15	42-52	65-75
DOWNSHIFTS:		**4-3**	**3-2**	**2-1**
"Dr. Left"	(Closed Throttle)	② 15-11	② 10-6	② 8-3
	(Full Throttle) ℂ	70-28	25-14	12-3
"Dr. Right"	(Closed Throttle)	70-60	10-6	② 8-3
	(Full Throttle) ℂ	70-28	25-14	12-3
"Lo."	(Closed Throttle)	70-60	45-39	8-3
	(Full Throttle) ℂ	70-28	45-39	12-3

ℂ - Forced.
② - When this shift occurs, transmission will freewheel and it is not possible to observe shift with throttle closed. To check for shift, decelerate, with throttle closed to specified speed, then accelerate to determine which speed transmission is in.

TRANSMISSION REMOVAL & INSTALLATION

CADILLAC

REMOVAL: 1) Place car on a hoist or on jack stands and disconnect battery. Remove starter motor and slush deflector and lower flywheel cover front cover.
2) Drain transmission at oil pan and flywheel, then remove transmission filler pipe bracket bolt from right cylinder head. Clean dirt from pipe flange and slide filler pipe out of sleeve in transmission case.
3) Disconnect brake cables from parking brake relay lever, then remove retracting spring and remove relay from frame. Remove propeller shaft assembly and remove intermediate frame crossmember below flywheel housing. Disconnect speedometer cable from extension housing. Remove throttle valve and manual levers from shafts.
4) Remove four nuts from flywheel-to-drive plate screws, then place a jack under rear of engine oil pan (use a wood block to prevent damage to plan). Place transmission jack under transmission and raise it just enough to take strain off rear engine support. Disconnect engine rear support at transmission extension housing and remove crossmember that carries support.
5) Disconnect oil cooler pipes from adapter on transmission case and cap the lines to prevent leakage.
6) Remove six screws holding flywheel housing to engine then remove transmission and flywheel housing as a unit by moving assembly toward rear of car, disengaging flywheel housing from locating dowels on engine, and then tilting front unit downward to lower it from car. Remove washer from pilot hole in crankshaft. On 1959 models, remove four spacer washers from flywheel-to-drive plate screws.

INSTALLATION: 1) Install spacer in pilot hole in crankshaft, then on 1959 models, install spacer washers on flywheel-to-drive plate screws. On all models, raise

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinued)

transmission into position with transmission jack and align drive plate with torus cover screws and dowel holes in flywheel housing with dowels on engine. Install flywheel housing-to-crankcase screws, making sure that flywheel is as far forward as possible. Connect oil cooler lines and tighten securely.

2) Lift engine and transmission to about one inch above its normal height and install engine rear support bracket on frame. Tighten three bracket bolts on one side only. Install three bracket bolts on other side loosely. Lower transmission carefully and install two support screws. Remove block from engine pan and remove transmission jack.

3) Install four nuts attaching drive plate to flywheel and tighten to 15-20 ft. lbs. *CAUTION - Make sure drain plugs in flywheel and oil pan are tight.* Install flywheel housing front cover making sure to attach the two exhaust braces. Install starter motor.

4) Install filler tube in transmission with support bracket properly positioned on cylinder head. Install manual and throttle valve levers on transmission shaft, making sure that serrations on levers are lined up with serrations on their respective shafts and tighten securely. Install speedometer cable, and install slush deflector.

5) Wedge screwdriver in between frame and end of rear support bracket which was left loose, to spring frame slightly. Install frame crossmember below flywheel housing with six bolts. Remove screwdriver and tighten bolts. Tighten three remaining bolts on engine rear support bracket.

6) Install propeller shaft assembly, then install parking brake relay lever and retracting spring in position on frame. Connect brake cables to lever and adjust cable. Lower car to floor and connect battery.

7) Install filler pipe bracket to cylinder head screw, then fill transmission with fluid (*see "Draining & Refilling" above*). Adjust manual and throttle valve linkage. See *"Linkage Adjustments" above*.

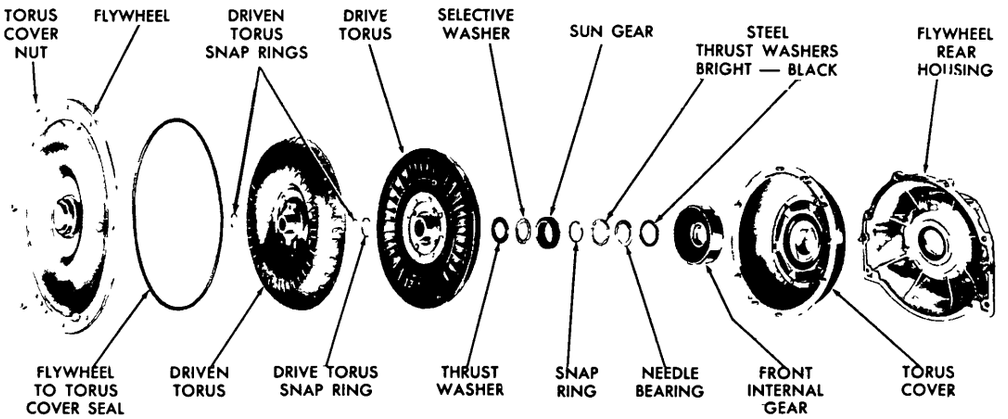
OLDSMOBILE

REMOVAL: 1) Disconnect battery and remove transmission oil filler tube. Raise car with all four wheels off floor. Drain transmission (*see "Draining & Refilling" above*). Disconnect speedometer cable at transmission.

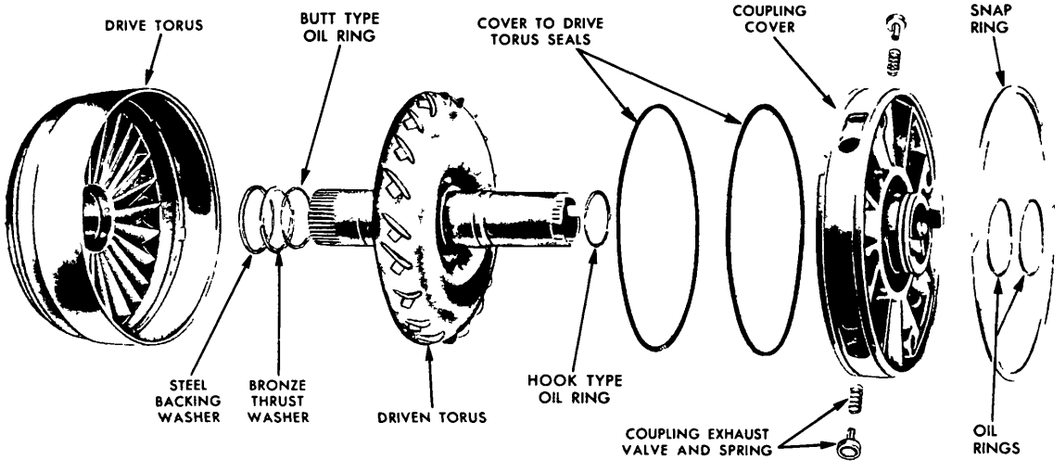
2) Disconnect manual and throttle valve linkage. On 1959 models, remove transmission throttle lever. On all models, remove crankcase breather tube, then scribe a line from one propeller shaft center bearing-to-frame bolt on frame member to aid in aligning center bearing support at installation.

3) Remove propeller shaft center bearing support bolts and shims (mark shims for installation at the same location). Disconnect front universal joint at transmission. Raise center bearing so it will clear frame member and, slide front propeller shaft and bearing assembly approximately 2" to rear on slip joint (bearing mounting plate will rest on frame and keep propeller shaft from dropping down).

4) Remove starter and lower flywheel housing. Support transmission with a transmission hoist and adapter.



1959-60 FLYWHEEL HOUSING & DRIVE TORUS ASSEMBLY



1959-60 FRONT UNIT COUPLING

Raise engine enough to relieve weight from rear engine mounts and remove engine mount-to-crossmember bolts. Remove crossbar to frame attaching bolts and remove crossmember.

5) Remove torus oil plug and drain torus, reinstall plug and tighten to 6-7 ft. lbs. Install engine support bar (Tool 30-13), with support screw pilots seated into lower flywheel housing front attaching screw holes. *NOTE* - Locate support bar forward on frame so transmission will clear when it is lowered.

6) Lower transmission hoist until it is free of transmissions, then lower engine (using support bar adjusting screws), NOT TO EXCEED 1½", to permit removal of the two upper bell housing-to-block bolts. Disconnect oil cooler hoses at lines and cap lines immediately.

7) Raise transmission hoist to contact transmission, supporting it slightly. Remove the four flex plate-to-flywheel nuts (note position of flywheel dowels in relation to the flex plate). Remove remaining flywheel housing-to-block bolts. Move transmission to rear approximately ¾" to clear dowels (standard thread holes adjacent to dowels are provided for installing bolts to push flywheel housing off dowels). Lower transmission from car.

INSTALLATION: Reverse removal procedure and note the following:

1) Lubricate crankshaft pilot bore and wick in pilot bore with Synthetic Oil Seal Lubricant, Part No. 567196.

2) To assemble flex plate to flywheel, align one dowel in flywheel with the small recess adjacent to small ear in flexplate, then cross tighten flex plate-to-flywheel attaching nuts to 17-22 ft. lbs. Tighten oil pan drain plug.

3) Use a 4" "C" clamp to hold bearing against spider journals and obtain clearance of bearing snap rings when installing front propeller shaft to companion flange on transmission. Tighten "U" bolt nuts to 18-22 ft. lbs.

4) Refill transmission. See *"Draining & Refilling" above*.

PONTIAC

REMOVAL: 1) Remove transmission oil level indicator and drain transmission by disconnecting filler pipe from

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinued)

right side of transmission case. *NOTE* - Torus assembly can be drained at the same time or after transmission is removed from engine.

2) Disconnect oil cooler adapter, with lines attached, and move away from transmission. Plug holes in adapter and transmission with corks to stop oil flow. Remove exhaust crossover pipe (cars with single exhaust).

3) To disconnect propeller shaft, unscrew center bearing bracket support bolts several turns, then remove "U" bolt nuts, lock plates, and "U" bolts from rear axle drive pinion flange. Use a rubber band to hold bearing onto journals if tie wire has been removed to prevent loss of needle bearings when rear joint is disconnected. Remove complete drive line assembly by sliding rearward out of tunnel to disengage from splines on transmission mainshaft and frame support bracket.

4) Disconnect speedometer cable from driven gear, then remove flywheel housing bottom cover and crankcase ventilator outlet filter. Disconnect outer throttle control lever and shift lever from tran smission.

5) Support rear of engine, then remove six torus cover and flywheel-to-flex plate attaching bolts. Position special automatic transmission jack under transmission and remove bolts attaching transmission to crossmember and insulator assembly. Remove transmission crossmember-to-frame bolts and remove crossmember and insulator assembly from frame.

6) Raise transmission slightly to take load off rear flywheel housing attaching screws, then remove rear flywheel housing attaching screws using a 7/16" socket and an 18" to 22" extension to reach screws. Work transmission rearward to disengage dowels from front flywheel housing, then lower transmission from car.

INSTALLATION: 1) Raise transmission until engine flex plate and transmission flywheel are at the same level, then rotate torus to align dowels in cover and flywheel with holes in flex plate. *NOTE - Torus cover and flex plate can be fast ned in either of two positions.* Move transmission position and engage rear flywheel housing dowels into front flywheel housing.

2) Install and tighten two rear flywheel housing attaching screws. *NOTE - If pilot on flywheel has entered nd of crankshaft properly, flywheel and torus cov r should mov back and forth slightly.* Rotate flywheel to bring flex plate mounting pad down to lowest position. Push flywheel forward lightly to seat it against crankshaft, then measure clearance between pad on flexplate and flywheel with feeler gauge. Clearance should be .015".

3) If clearance is less than .015", move transmissior. away from engine and install special spacer, Part No. 522975 over flywheel pilot. Reinstall transmission and tighten attaching bolts.

4) Attach transmission crossmember and insulator assembly to frame, then lower transmission and install two bolts through insulator and into extension housing. Remove transmission jack.

5) Install nuts retaining flex plate to flywheel and torus cover and tighten to 15 ft. lbs. Install crankcase ventilator outlet filter and flywheel housing bottom cover. Connect filler pipe to transmission oil pan and install oil level indicator.

6) Remove plugs from oil cooler adapter and attach adapter to oil pan. Install crossover pipe (single exhaust cars), then connect speedometer cable to driven gear. Install propeller shaft and fill transmission with transmission fluid *(see "Draining & Refilling" above).*

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

►*REMOVAL OF TRANSMISSION UNITS NOTE: The following transmission units can be removed without removing transmission assembly from car. See "Transmission Disassembly" below for removal procedure.*

1) Control Valve Body.
2) Accumulator and Servo.
3) Pressure Regulator Valve.
4) Speedometer Drive Gear.
5) Governor & Governor Drive Gear.
6) Parking Brake Bracket.
7) Extension Housing.
8) Reverse Stationary Cone, Piston, Planet Carrier and Internal Gear.

TRANSMISSION DISASSEMBLY

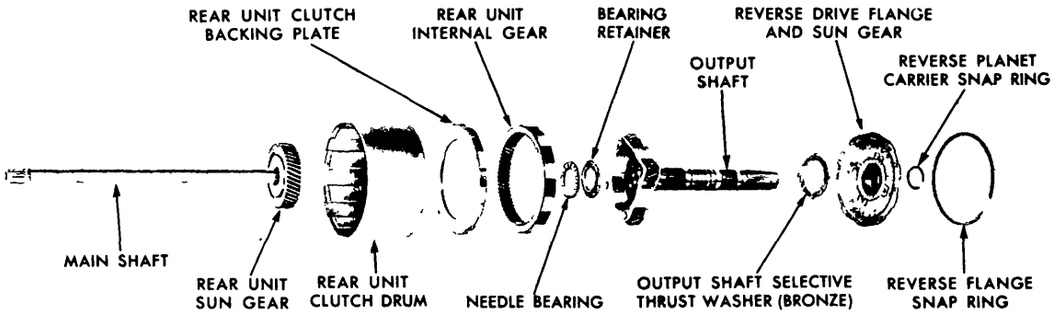
►*TRANSMISSION DISASSEMBLY NOTE: Instructions below cov r removal of sub-ass mbli s in th ir prop r order from transmission case. See "OVERHAUL OF UNITS" for Disassembly, Inspection, and reassembly of these units.*

FLYWHEEL, TORUS MEMBER, TORUS COVER & FLYWHEEL HOUSING: *NOTE - Fluid coupling cannot be removed as a unit.* 1) Remove attaching nuts and remove flywheel from torus cover, then remove flywheel-to-torus cover rubber oil ring seal and discard. Remove snap ring retaining driven torus member to mainshaft and and remove driven torus member with check valve and spring.

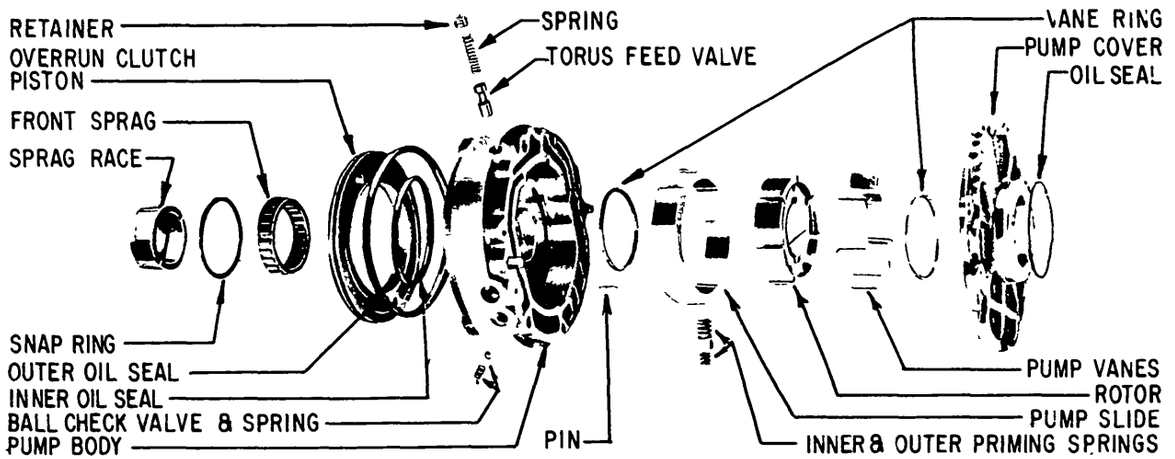
2) Remove inner snap ring locating driven torus member to mainshaft, then remove snap ring retaining driven torus member to intermediate shaft and remove driven torus member. *CAUTION - Do not attempt to remove torus cover and driven torus member together.*

3) Remove bronze thrust washer and steel selective washer from front unit sun gear, then remove front unit sun gear from shaft of front unit coupling driven torus member.

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1959-60 REAR UNIT DRUM, MAIN SHAFT & OUTPUT SHAFT ASSEMBLY



1959-60 OIL PUMP ASSEMBLY

DUAL-COUPLING HYDRA-MATIC (C ntinued)

4) Remove intermediate shaft snap ring and remove internal gear with steel thrust washer, needle bearing and second steel (black) washer. Remove torus cover. *CAUTION - Do not attempt to remove torus cover by pulling on cover in a rough manner as oil seal may be damaged. Work hub of torus back through oil seal and pull cover out with a quick motion.*

5) Install Flywheel Housing Oil Seal and Bushing Protector, Tool J.6119, and remove capscrews and flywheel housing. Remove special tool. Discard flywheel housing-to-case seal ring. Remove oil cooler pipe adapter screws, gasket and sleeves from side of transmission. Remove gaskets from oil delivery sleeves or from case. Remove front unit coupling from case.

MAINSHAFT ENDPLAY CHECK: *NOTE - Check and record mainshaft endplay before further disassembly as it is necessary for selection of proper selective washer at reassembly.* Install collar part of Tool J-6127, and secure in position by installing snap ring on mainshaft. Attach gauge part of tool to collar by threading end tight. Install dial indicator support and dial indicator. Move mainshaft back and forth and record amount of mainshaft endplay. *CAUTION - Do not force mainshaft.*

►*NOTE: In order to find actual endplay of the unit, it will be necessary to measure endplay of sun gear on mainshaft after transmission has been completely disassembled. This dimension must then be subtracted from mainshaft endplay to determine proper selective washer be used. See "Inspection" under "Case Support, Neutral Clutch & Rear Unit" below for procedures.*

OIL PAN, SCREEN & INTAKE PIPE (1959 MODELS): Remove oil pan attaching screws and remove oil pan and gasket. Pull oil screen rearward from retaining clip and pump intake pipe (do not bend clip), then remove front pump intake pipe clamp screw and remove pipe from pump.

OIL PAN, SCREEN & INTAKE PIPE (1960 MODELS): Remove oil pan attaching screws and remove oil pan and gasket. Loosen accumulator attaching bolt retaining intake pipe clip, then pull intake pipe and screen away from oil screen attaching clip. Remove intake pipe and screen from transmission, then remove pipe from screen.

SERVO, ACCUMULATOR & CONTROL VALVE: Remove screws holding servo and accumulator assembly to case (servo piston spring is loaded and care should be taken when removing), then remove assembly and spring. Remove five valve-to-case attaching screws. On 1959 models, remove manual valve from valve body. On all models, remove control valve assembly from case.

FRONT PUMP & OVERRUN CLUTCH: Remove pump locating screw from opening in control valve transmission case pad, then remove pressure regulator plug from side of transmission case and remove regulator spring and valve, using snap ring pliers. Remove three front pump-to-case support attaching screws (washer head). Withdraw front pump from case. *NOTE - Use Puller J-6125 if necessary to remove pump.* Remove overrun clutch release spring (may have remained in front pump), then remove front sprag inner race if it remained on intermediate shaft. Remove overrun clutch plate and bronze thrust washer. Slide rear unit clutch retainer, Tool J-6135 onto intermediate shaft against case center support and lock securely. *CAUTION - Retainer screw must be backed out of tool so it will not score shaft.*

CASE SUPPORT, NEUTRAL CLUTCH & REAR UNIT: Remove speedometer driven gear from rear extension housing. *NOTE - If seal in rear extension housing is to be replaced, remove with a screwdriver.* Remove clamp screw and breather pipe, then remove remaining rear extension housing-to-reverse clutch piston housing screws, and remove housing. Pull governor out of reverse clutch piston housing and remove governor drive gear retaining snap key, drive gear, drive gear key and second retaining snap ring. *NOTE - Key may fall out when gear is removed.* Remove rear bearing snap ring from output shaft and center support-to-case snap ring. On 1959 Models, remove case support locking screw on regulator plug side of transmission case. On all models, tap rear end of output shaft with a soft hammer to free shaft from rear bearing inner race, then slide rear unit, neutral clutch and case center support assembly out front end of case. Remove reverse internal gear release spring from output shaft and remove reverse planet carrier. Rest rear unit, neutral clutch, and case in a holding fixture with output shaft down, then remove neutral clutch drum locating key from transmission case.

REVERSE PARTS: Rotate transmission to a vertical position so reverse piston housing is up and remove reverse clutch piston housing attaching screw and lift housing from case. Remove and discard gasket. Remove reverse internal gear thrust washer and internal gear from case, then remove reverse stationary cone carefully from case, working it out with fingers. *CAUTION - Stationary cone is very brittle. Do not drive from case with a hammer or other tool.* Remove reverse stationary cone key. *NOTE* - If key sticks, tap it out using a 3/8" brass rod through key hole in bottom of case.

LOW BAND: With transmission case in horizontal position, unhook band end from anchor inside case and rotate band to a horizontal position in case. Turn bands so ends are facing rear of case and pull band out front of case.

INSIDE DETENT & THROTTLE LEVERS (1959 MODELS): *NOTE - These parts should not be removed unless to be replaced with new parts.* Remove outer shift lever from transmission detent manual lever shaft, then remove snap ring from detent manual lever shaft. Rotate detent lever to position which would engage parking pawl so that lever will clear parking bracket, then slide detent lever, throttle lever and inner steel washer toward center of case to remove. Remove steel washer and "O" ring from outer recess in case.

INSIDE DETENT & THROTTLE LEVERS (1960 MODELS): *NOTE - These parts should not be removed unless to be replaced with new parts.* Loosen inner throttle lever to throttle valve shaft clamp screw, then withdraw outer throttle valve lever and shaft and "O" ring from case. Remove inside throttle valve lever. Loosen inside detent lever screw, then withdraw outer shift lever, shaft, washer, and seal ring from case and remove inside detent lever.

PARKING PAWL & LINKAGE (1959 MODELS): *NOTE - These parts should not be removed unless to be replaced with new parts.* Use snap ring pliers or a 3/8" capscrew and withdraw anchor pivot shaft from rear end of case, then remove parking pawl spacer. Unhook parking pawl spring and remove hairpin clip, then slide spring and bracket from shaft. Rotate pawl upward and slide pawl and linkage from shaft.

PARKING PAWL & LINKAGE (1960 MODELS): *NOTE - These parts should not be removed unless to be replaced by new parts.* Remove parking pawl pivot shaft from transmission case by pushing on inside end of shaft with 1/8" brass rod. Remove parking pawl spacer washer from case, then unhook parking bracket spring from parking lever. Remove parking bracket and spring from pin. Rotate parking lever and pawl and remove from parking brake pin.

OVERHAUL OF UNITS

1959-60 MODELS

CASE SUPPORT, NEUTRAL CLUTCH & REAR UNIT: **Disassembly - 1)** Remove rear unit clutch retainer (installed when transmission disassembled). *CAUTION - Back off screw far enough to prevent damage to machined surface of intermediate shaft.*

2) Remove hook type oil ring from intermediate shaft, then remove neutral clutch piston and case support from intermediate shaft. Remove two oil rings from case support hub and remove neutral clutch piston. Turn case support over and tap on bench to remove piston. Remove seals from piston and hub of center support. Remove neutral clutch drum assembly (contains five composition plates, four steel plates and five release springs).

3) Remove large snap ring from rear drum with screwdriver and lift rear clutch cylinder and sprag assembly over intermediate shaft. Remove intermediate shaft and and clutch hub, including clutch hub front washer from rear drum. *NOTE - Rear clutch hub may be removed from intermediate shaft if replacement of shaft or hub is necessary, by removing snap ring retaining hub on shaft.*

4) Remove clutch hub front thrust washer from clutch hub, then remove main shaft and rear sun gear assembly from rear unit. Remove clutch hub thrust washer from sun gear. *NOTE - Sun gear may be removed from main shaft if replacement of shaft or sun gear is necessary. Check for drill mark on rear face of sun gear since it must be assembled on main shaft with drill mark to rear.*

5) Remove seven steel clutch plates and seven composition clutch plates, then remove needle bearing and retainer from counterbore of output shaft. Remove rear unit drum and output shaft assembly from holding fixture and rest on bench with output shaft end up.

6) Remove large snap ring holding reverse drive flange in rear unit drum and lift output shaft and reverse drive flange assembly out of rear drum. If replacement of rear unit internal gear or clutch backing plate is necessary, remove internal gear and plate together from rear unit drum by tapping backing plate with a soft hammer. *NOTE - Mark internal gear so that when reassembled, balance will be retained.*

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinued)

7) Remove snap ring from output shaft and remove reverse drive flange and sun gear assembly from output shaft. Remove selective washer from reverse drive flange or output shaft.

8) Remove spiral snap ring from rear unit sprag outer race, using a small needle nose pliers or screwdriver to start if necessary. Remove outer race, sprag, and retainer by rotating counterclockwise and pulling upward. Remove rear unit sprag retainer and sprag from outer race. *NOTE - Do not disassemble sprag.*

9) To disassemble rear unit clutch piston assembly. Place stud, Tool J-6129 on bench and lower cylinder and piston assembly over tool, with spring end up, then set spring compressor, Tool J-4670 on top of spring retainer and start nut on stud. *NOTE - If compressor, J-4670 has no hol in middle, drill a 7/16" hole so that stud can b ins rted through it.* Turn nut down on stud and compress clutch springs until snap ring is free, then remove snap ring. Remove compressor and release spring retainer from rear clutch springs. Remove eight clutch release springs and remove rear clutch piston from cylinder by rapping piston end of cylinder on wood block. Remove seals from piston and hub.

Insp cti n: 1) Inspect center bearing support for burrs, damaged oil seal ring grooves, worn or damaged bushing or damaged threads. Check to see that all passages are open and not interconnected, using either a fine wire or air pressure.

2) Inspect neutral clutch piston for scoring, burrs, or damaged oil seal groove. Check ring gap with feeler gauge (gap should be .002-.007"). If a new ring is installed, gap must be checked and ends of ring must be filed, if necessary, to provide proper gap.

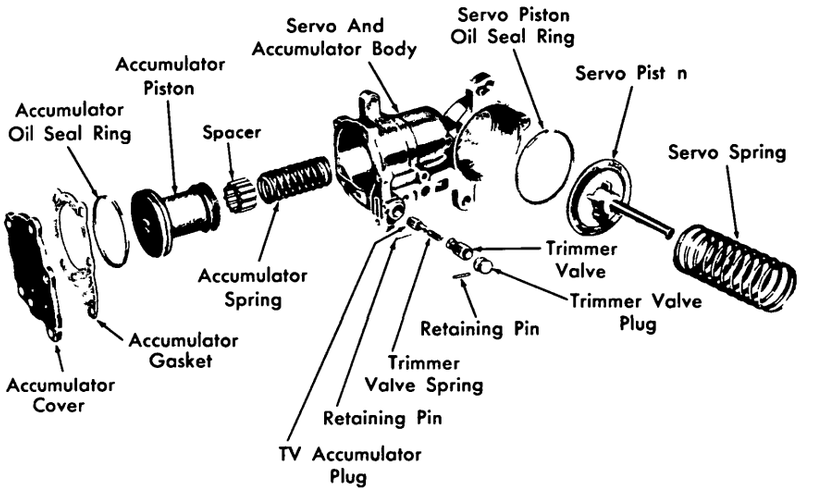
3) Inspect neutral clutch drive plates for damaged surfaces or worn teeth. Plates must be flat. If flakes of facing material can be removed by scratching surface with thumb nail, plate should be replaced. Discoloration is not an indication of failure. Inspect release springs for distortion (springs have 5 waves).

4) Inspect neutral clutch driven plates (steel) for scored surfaces or damaged lugs. Also make sure they have six equally spaced waves .008-.012" high when measured on a surface plate. Inspect clutch drum for scored or damaged surfaces. Inspect spiral snap ring for distortion or damage. Inspect rear unit sprag assembly for damaged shoulder, broken springs, or scored sprags. Inspect rear unit sprag outer race for damaged splines or scored sprag race.

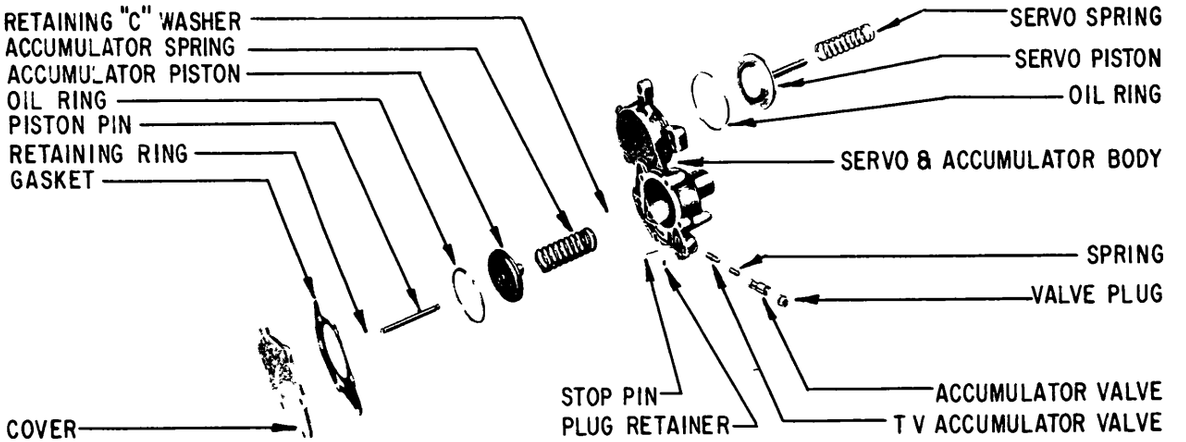
5) Inspect rear clutch cylinder and bushing assembly for scoring, burrs, or damaged lugs. Inspect eight rear clutch springs for distortion or collapsed coils (*NOTE* - Slight wear "bright spots" on sides of release springs indicating slight contact with the piston assembly is permissible). Inspect rear clutch release spring retainer for cracks or damage. Inspect rear unit clutch cover-to-rear clutch hub bronze thrust washer.

6) Inspect intermediate shaft and rear unit clutch hub. Clutch hub and shaft can be separated if either needs

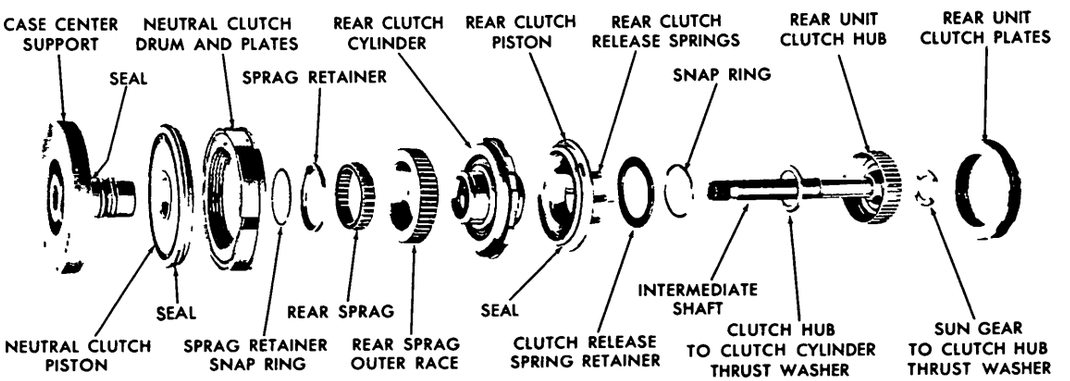
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FRONT SERVO & ACCUMULATOR (EARLY 1959 CADILLAC & PONTIAC, 1959 OLDSMOBILE)



FRONT SERVO & ACCUMULATOR ASSEMBLY (LATE 1959 CADILLAC & PONTIAC, ALL MODELS 1960)



1959-60 CASE CENTER SUPPORT, NEUTRAL CLUTCH & REAR UNIT CLUTCH

DUAL-COUPLING HYDRA-MATIC (C ntinued)

replacement. Inspect rear unit sun gear-to-clutch hub bronze thrust washer. Inspect seven rear unit composition faced clutch drive plates for damaged surfaces. Plates should be flat. Check in same manner as for neutral clutch plates. Inspect seven driven plates (steel) for scored surfaces or damaged lugs. Driven plates must have six equally spaced waves (approx. .010" deep).

7) Inspect main shaft and rear unit sun gear for damaged splines, teeth or bearing surfaces. Gear and shaft can be separated for replacement if necessary. If shaft only is to be replaced, put old gear on new shaft with same side toward front.

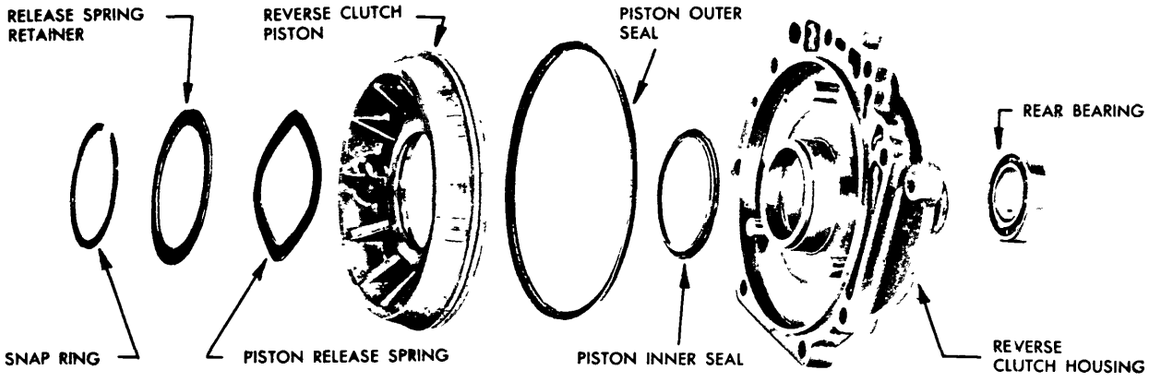
8) Measure endplay of rear unit sun gear on mainshaft and determine correct selective washer to use in rear unit as follows: Clamp sun gear and mainshaft assembly in Holding Fixture J-6116 using "C" clamp and dial indicator. Be sure gear is firmly clamped on both sides so it cannot give. Set dial indicator to contact end of mainshaft. Move mainshaft straight up and down to measure endplay and record endplay. Subtract this endplay from the mainshaft endplay recorded before transmission was disassembled. The difference will be the actual endplay of the rear unit and should be .004-.013". If endplay is outside the limits of .004-.013", select the reverse drive flange-to-rear unit planet carrier thrust washer which will give the proper endplay. Selective washers are furnished in the following nine sizes and are stamped with an identification number.

Identification No.	Size	Identification No.	Size
1	.055-.059"	6	.080-.084"
2	.060-.064"	7	.085-.089"
3	.065-.069"	8	.090-.094"
4	.070-.074"	9	.095-.099"
5	.075-.079"		

9) Inspect rear unit internal gear for tooth damage (*NOTE*–Internal gear and clutch backing plate can be separated from drum if replacement is necessary). If drum or backing plate is replaced, the gear should be reinstalled with the same side toward the front (the edges of the gear teeth are chamfered on the side which goes against the backing plate). Inspect output shaft to rear unit sun gear bronze thrust washer. Inspect output shaft for damaged pinions, splines, bearing surfaces or speedometer gear teeth.

10) Inspect reverse drive flange and sun gear assembly (*NOTE*–Reverse drive flange and sun gear are serviced as an assembly and should not be separated). Inspect rear unit selective washer for wear and damage.

Reassembly: 1) Holding reverse drive flange and sun gear in left hand with drive flange up, install proper selective washer (*as determined by rear unit endplay check, see "Inspection" above*) in recess of drive flange with locating lugs indexed in flange. Use petrolatum to hold washer in place. Still holding reverse drive flange and sun gear in left hand, insert output shaft through the assembly until carrier bottoms on selective thrust washer. Hold unit tightly together and place on bench on carrier end. Install reverse planet carrier front ring on output shaft.



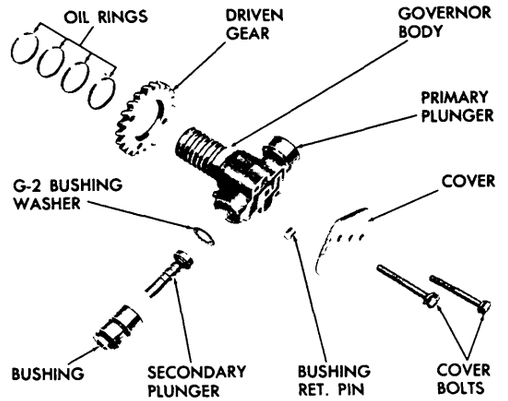
1959-60 DUAL-COUPLING HYDRA-MATIC REVERSE CLUTCH PISTON & HOUSING

2) Insert Reverse Drive Flange Retainer J-6120 between snap ring and flange snug against rear unit carrier to prevent selective washer from dropping out of position (*NOTE*–When the selective washer used between reverse drive flange and planet carrier is at or near the upper limit of thickness, Retainer Tool J-6120 cannot be inserted between snap ring and flange. In this case, it is not necessary to use the retainer since there is not enough clearance to allow the thrust washer to drop out of place. Set rear unit drum on bench with long undercuts on lugs upward (or with internal gear up if it was not removed). Install clutch backing plate with flat surface down if it was removed (it may be necessary to tap plate into place with a soft hammer).

3) Install rear unit internal gear with mark upward (drill mark in rear face of gear or mark made at disassembly) if it was removed (gear teeth are beveled on side which goes against backing plate). Position gear against clutch backing plate. Install output shaft and reverse drive flange assembly into rear unit drum and secure with large snap ring. Set rear unit assembly into Holding Fixture J-6116 with shaft end down. As unit is lowered into fixture, lift up on drum and remove Drive Flange Retainer (*CAUTION–Do not lift on output shaft after retainer is removed*). Position thrust washer in counterbore of output shaft and retain with petrolatum.

4) Apply Hydra-Matic Oil to faces of seven drive and seven driven plates and alternately install them in rear unit drum. Start with a drive (composition) plate and finish with a driven (steel) plate. Install all drive plates with same side upward. Assemble driven plates with lugs in rear unit drum slots so notches in lugs are all in line (*NOTE*–Indexing the notches will nest the plates together so waves are all in the same direction, and with no gaps between plates). Install mainshaft and sun gear assembly into output shaft in rear unit, meshing sun gear with planet pinions of output shaft.

5) Assemble rear unit clutch hub to rear end of intermediate shaft if it was removed (open side of hub toward front of shaft. End with longest spline and longest machined surface will be toward rear). Install two bronze thrust washers on rear unit clutch hub, one on each side and retain with petrolatum. Install intermediate shaft and rear unit clutch hub and thrust washers into rear drum (*NOTE*–Pick up clutch drive plates by



1959-60 GOVERNOR ASSEMBLY

rotating intermediate shaft). Do not drive or force rear unit clutch hub into rear unit drum.

6) Assemble rear clutch piston into rear clutch cylinder as follows: Install new inner seal on hub of clutch cylinder with lip down. Install new outer seal on piston with lip facing away from spring bore side. Install piston into cylinder using flat edge of screwdriver to start seal into cylinder. Install eight clutch release springs into bores in piston. Place spring retainers on springs with tangs facing upward. Compress springs using tool J-4670-B and J-6129. Install snap ring which holds release spring retainer. Remove compressor tools.

7) Install rear unit sprag assembly in rear unit outer race with shoulder side of sprag on counterbored side of outer race. Install sprag and outer race of rear unit inner race (push sprag part way down through outer race then rotate sprag counterclockwise to assemble). Install rear unit sprag retainer in outer race with large outer diameter upward. Push retainer down to expose snap ring groove. Install spiral snap ring on rear unit clutch hub. Install rear unit cylinder and sprag assembly into rear clutch drum with sprag side up. Secure cylinder and sprag assembly into rear clutch drum with large snap ring.

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinued)

8) Install neutral clutch drum on rear unit with driven clutch plate lug slots upward. Apply Hydra-Matic Oil to five clutch drive plates (composition) and four driven plates (steel). Install plates alternately using a release spring between steel plates (start with a composition plate, release spring, then steel plate, and end up with composition plate and spring).

9) Install seal on second type neutral clutch piston with lip side facing side with dowel holes, or install ring on first type. Install seal on hub of second type center bearing support with lip facing bottom of piston cavity, or install oil ring on first type center bearing support. Install neutral clutch piston into center bearing support aligning notch in edge of piston with lockscrew hole in side of center bearing support. This alignment assures that dowels will enter dowel holes (seal or piston ring can be installed by compressing with fingers). Install two oil rings in grooves of center bearing support hub. Center rings around hub and install center bearing support assembly into neutral clutch drum in rear unit using care not to damage bushing when lowering support over intermediate shaft. If properly centered, oil rings on support hub will be compressed by taper on hub of rear clutch cylinder. Install hook type oil seal ring on intermediate shaft.

1959-60 MODELS

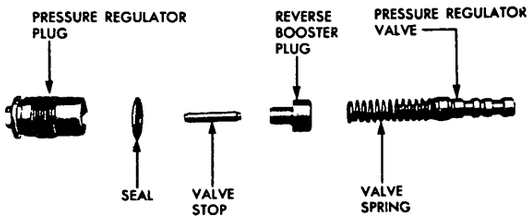
FRONT PUMP: Disass mbly–1) Remove front sprag inner race if still in pump and remove pump cover from body. Remove retaining pin, torus feed valve, spring and retainer.

2) Remove front pump rotor along with top vane ring. Remove 7 vanes and bottom vane ring (vanes may remain in rotor). Remove slide by pushing slide toward priming springs, then lift out of body at opposite end. Note position. Remove inner and outer priming springs.

3) Turn pump body over and remove spiral type snap ring retaining front sprag to pump body and remove sprag assembly. *(NOTE*–If outer sprag is damaged, the oil pump assembly must be replaced). Mark overrun clutch piston and pump body for proper reassembly, and remove clutch piston from pump body. If piston sticks, use a soft hammer and tap around outer rear edge of pump body.

4) Remove interlocking oil seal ring from front pump cover.

Inspecti n: Using a small diameter wire, inspect all passages for dirt or restrictions. Check slide for excessive wear or scoring and make sure that it moves freely in pump body. Check freeness of vanes in rotor slots (pump vanes will have a tendency to show a polished surface on the side bearing against the front pump slide, if not excessive, this is a normal condition). Check torus slide valve priming springs for free movement in bores. Check bushing for scores or flaking (a normal wear can be noticed on bushing surface which if not excessive is a normal condition). Examine pump body and pump cover slide surface contacts for smoothness. Clean all parts thoroughly before assembly.



1959-60 PRESSURE REGULATOR VALVE

►*FRONT SPRAG CLUTCH FAILURE CORRECTION:* In the event of front sprag clutch failure it is recommended that in all cases the following parts should be replaced: Front Pump, Front Sprag Assembly, Front Sprag Inner Race, Front Unit Driven Torus Member Assembly. Inspect all other adjacent parts and replace where needed.

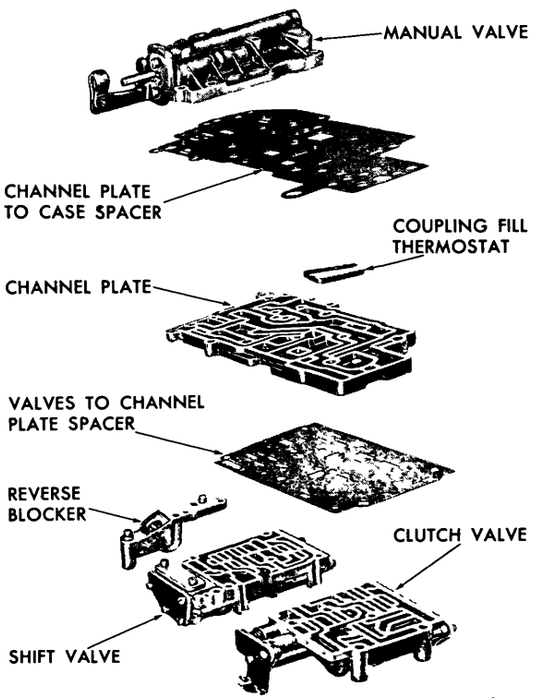
Reassembly: 1) Check location mark on pump body and overrun clutch piston, align and install piston into pump body (insert one side of oil seal ring and position in cavity). At same time, work around ring, compressing and seating it in pump cavity. Do not force clutch piston into cavity. If sticking occurs, dowels and holes are not correctly aligned.

2) Install sprag assembly into rear body with rim of sprag facing up, and check rotation of sprag by inserting inner race. Then remove inner race. Install spiral type snap ring retaining sprag assembly to body. Install interlocking oil seal ring on front pump cover.

3) Insert inner and outer priming springs in pump body. Position pump slide into pump body toward priming spring. Compress priming springs with slide and drop slide into cavity of pump.

4) Insert bottom vane ring, locating it concentrically with slide bore. Install rotor with drive slots up and install 7 vanes in rotor slots (make certain vanes fit between bottom vane ring and slide). *NOTE*–Check edges of vanes for wear pattern. One edge of vane will be polished full length. This edge should face the slide.

5) Install top vane ring on rotor, centering it between vanes. Install torus feed valve, spring, retainer and retainer pin. Make sure that valve moves freely. Check for free rotation of rotor and that all parts in pump are positioned correctly. Install check valve ball, spring and retaining pin and install cover to pump body. *NOTE* –Leave two opposite cover screws out for later insertion of slide hammers.



1959 CONTROL VALVE ASSEMBLY (TYPICAL)

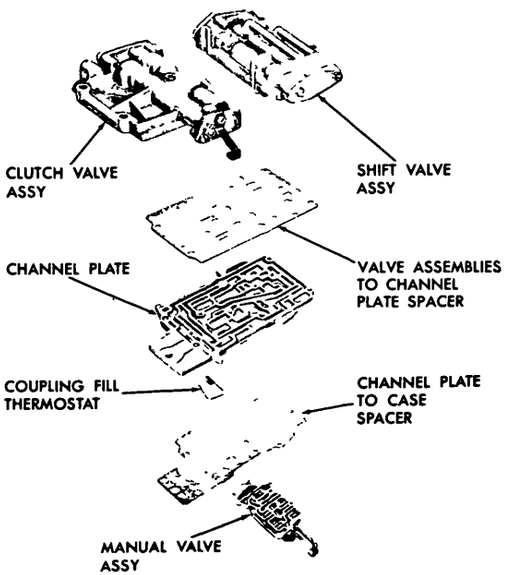
EARLY 1959 CADILLAC & PONTIAC 1959 OLDSMOBILE

►*EARLY 1959 CADILLAC & PONTIAC ACCUMULATOR & SERVO ASSEMBLY PRODUCTION CHANGE: Se "Changes, Cautions, Corrections" above.*

SERVO & ACCUMULATOR: Disassembly - Remove servo apply piston from the assembly, then remove cover and gasket. Remove accumulator piston assembly, accumulator spring and spacer. Remove pin retaining trimmer valve assembly in accumulator body, then remove plug, trimmer valve and spring, throttle valve accumulator plug and pin.

Inspection: Inspect servo piston assembly for damaged oil seal ring, scores or burrs in ring land grooves. Inspect accumulator spring for collapsed or distorted coils. *NOTE - Slight wear (bright spots) on side of*

CONTINUED ON NEXT PAGE



1960 CONTROL VALVE ASSEMBLY (TYPICAL)

DUAL-COUPLING HYDRA-MATIC (C ntinued)

spring indicating contact, is permissible. Inspect accumulator body for restricted passages, scores or burrs. Inspect servo piston assembly for distorted pin, damaged oil seal ring lands, or broken oil seal ring.

Reassembly: Install throttle valve accumulator plug with slotted end out, then install pin through accumulator plug. Install trimmer valve spring, valve and plug in accumulator body and install pin retaining valve assembly in body. Install accumulator spring. Position piston and spacer on accumulator spring, then align new accumulator cover gasket on body and position cover. Compress accumulator spring far enough so that the five cover screws may be installed, then use a screwdriver to compress accumulator piston ring while applying pressure to cover. When cover is fully seated, tighten the cover retaining screws. Install servo piston into servo body.

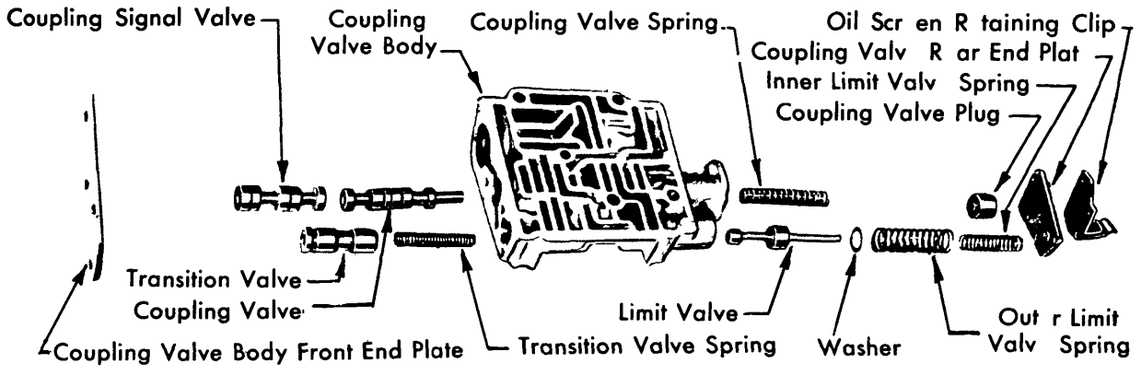
LATE 1959 CADILLAC & PONTIAC ALL MODELS 1960

SERVO & ACCUMULATOR: Disassembly - Pull servo piston from body, then remove accumulator cover and gasket. Remove accumulator stop pin and valve plug retainer, then remove accumulator valve plug, valve spring, and throttle valve accumulator plug. Tap body assembly into palm of hand until accumulator piston is free. Compress accumulator spring and remove "C" washer, retainer and spring. Remove accumulator piston pin from accumulator piston. *NOTE - It is not necessary to remove small retaining ring from piston pin.* Spread the seal ring slightly and remove ring from accumulator piston.

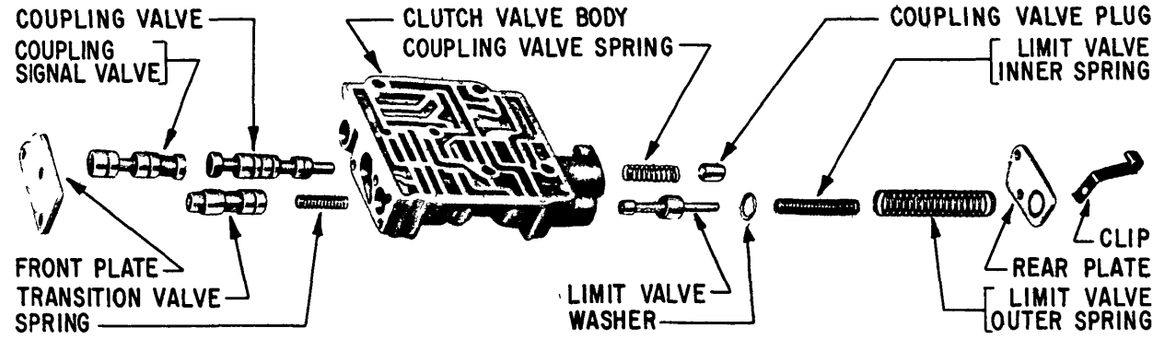
Inspection: Inspect servo piston assembly for damaged oil seal ring, scores or burrs in seal ring grooves. Inspect accumulator spring for collapsed or distorted coils. *NOTE - Slight wear spots (bright spots) on side of spring indicating contact, is permissible.* Inspect accumulator body for restricted passages, scores, or burrs. Inspect servo piston assembly for distorted pin, damaged oil seal ring lands, or broken oil seal ring.

Reassembly: Install oil seal ring on accumulator piston, then position accumulator spring over pin, compress spring and secure in position with "C" retaining washer. Install throttle valve accumulator plug, slotted end out, aligning slot in plug with vent passage into its bore. *NOTE - A small screwdriver should be used to align valve carefully in bore.* Position accumulator valve spring into accumulator valve and slide valve and spring, spring end first, into bore. Place throttle valve accumulator plug stop pin into vent passage and slot in plug. Install accumulator plug retainer into accumulator body and groove in plug. Position accumulator piston assembly into accumulator body, stem end first. *NOTE - Stem must be seated in recess in bottom of accumulator body. If seated properly, stem will be below top of piston with assembly install d.* Install accumulator cover and new gasket, then install servo piston and spring into its bore.

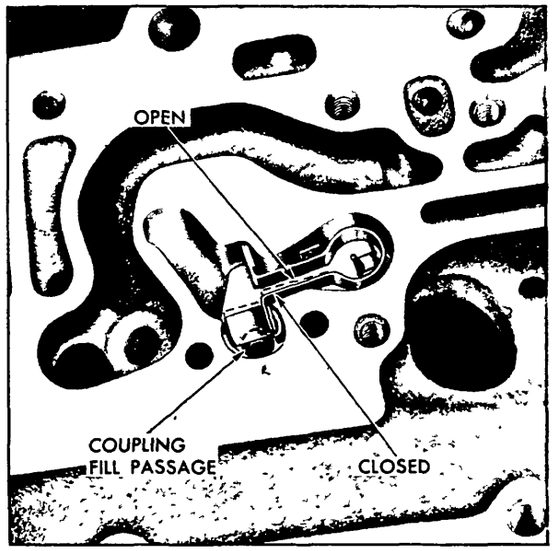
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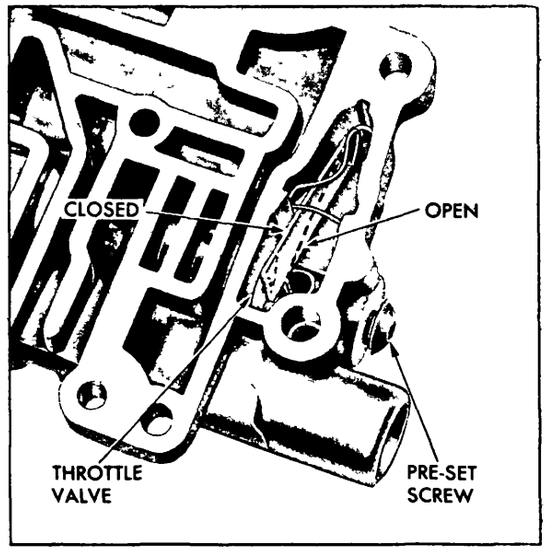
1959 FRONT CLUTCH VALVE BODY



1960 FRONT CLUTCH VALVE ASSEMBLY



1960 THERMOSTATIC COUPLING FILL VALVE



1960 THERMOSTATIC THROTTLE VALVE CONTROL (OLDSMOBILE & PONTIAC)

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

1959-60 MODELS

FRONT UNIT COUPLING: Disassembly - *CAUTION - Th front unit coupling is balanced at the factory and any chang in positioning the cover will affect the balanc . In production, the No. 1 exhaust valve in cover and gap in snap ring are aligned with a locating mark in driving torus sh ll. If this mark is not visible, scrib mark both cov r and shell in line with gap in snap ring.*

1) Remove steel thrust washer from recess at front of front unit drive torus if it did not come off with flywheel housing. Install front unit coupling assembly into Clutch Holding Fixture J-6116 with splined shaft down.

2) Remove large snap ring retaining coupling cover to drive torus shell (make sure that all parts are marked for correct reassembly). Install two Coupling Valve Retainers J-6122 to hold exhaust valve in position when removing cover.

3) Remove coupling cover from coupling using Front Unit Coupling Cover Remover J-6121 as follows: Place cross piece of remover on end of torus shaft with end of shaft indexed in counterbore on underside of tool. Screw stud at end of each leg into holes in coupling cover until they bottom (nuts on studs should be backed off so they will not contact cross piece). Insert long stud of tool J-6121 through coupling and cross piece. Index bottom end with hole in holding fixture so it cannot turn. Install washer and nut on upper end and tighten securely. Tighten nuts on four studs evenly and only a small amount at a time to pull cover out of unit.

4) Remove tool J-6121 and remove coupling cover from unit. Hold fingers over valve so they will not be ejected and remove Coupling Valve Retainers and exhaust valves and springs from cover. Remove rubber seal rings from outer diameter of cover.

5) Remove driven torus member by pulling up on shaft, and remove steel and bronze thrust washers *(NOTE-* It may be necessary to cut the bronze thrust washer). Remove drive torus member from holding fixture.

Insp cti n: Check for burrs and scratches. Remove burrs with crocus cloth and oil.

R ass mbly: 1) Install driving torus into Rear Unit Holding Fixture J-6116. Install interlocking oil seal rings to hub and shaft of driven torus member. Install bronze and steel thrust washers into driving torus member, install one interlocking oil seal ring on driven torus member and install driven torus member into driving torus member.

2) Install two springs and exhaust valves in coupling cover and hold in place, using Front Unit Coupling Valve Retainers J-6122. Install two oil seal rings on cover hub. Install two square rubber ring seals on coupling cover, making sure that seals are square in their respective grooves and apply petrolatum to circumference of seals.

3) Install studs from Front Unit Coupling Cover Remover J-6121, into coupling cover and position cover in driving torus member, lining up marks made during disassembly *(CAUTION-*Cover must be inserted evenly to prevent cocking in drive torus member and damaging seals)

4) Install large snap ring retaining coupling cover to driving torus member. Remove studs from coupling cover and remove coupling assembly from fixture.

1959-60 MODELS

REVERSE PISTON HOUSING ASSEMBLY: Disassembly - Remove large snap ring retaining piston release spring and retainer, then remove retainer and wave type release spring. Lift reverse piston from housing and remove and discard piston inner and outer oil seals. Remove bearing to housing snap ring and tap rear bearing out of housing.

Inspection: Inspect all parts to make sure they are free of dirt, burrs, scoring, or other damage. Remove burrs, if necessary, with fine crocus cloth and light oil. Replace all damaged parts. Inspect all oil grooves and be sure they are clean.

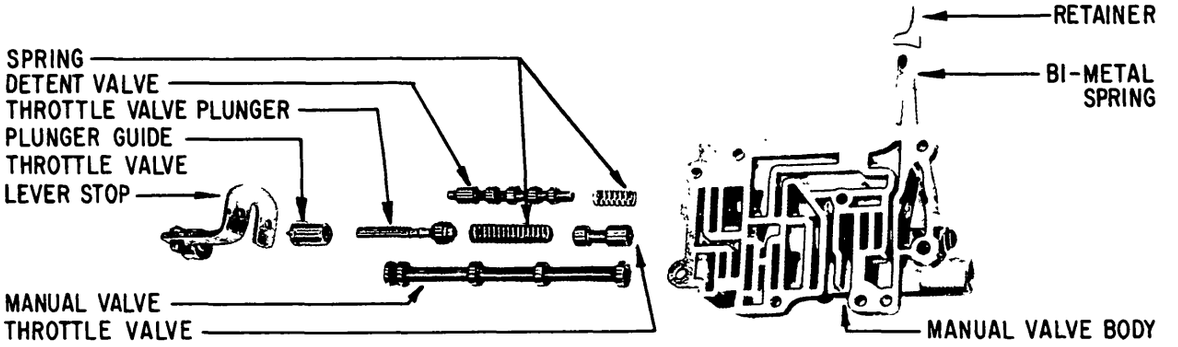
Reassembly: Place Reverse Piston Inner Seal Pilot, Tool J-7577, over inner hub of reverse piston housing, then install new inner and outer reverse piston oil seals with lips facing reverse piston housing. Install reverse piston overTool J-7577 and rotate piston onto dowel pins. Compress outer piston seal into bore of housing, being careful not to damage seals, thenremove tool. Place release spring and retainer on piston and install large snap ring. *NOTE - Rear bearing will be installed after housing is installed on transmission.*

1959-60 MODELS

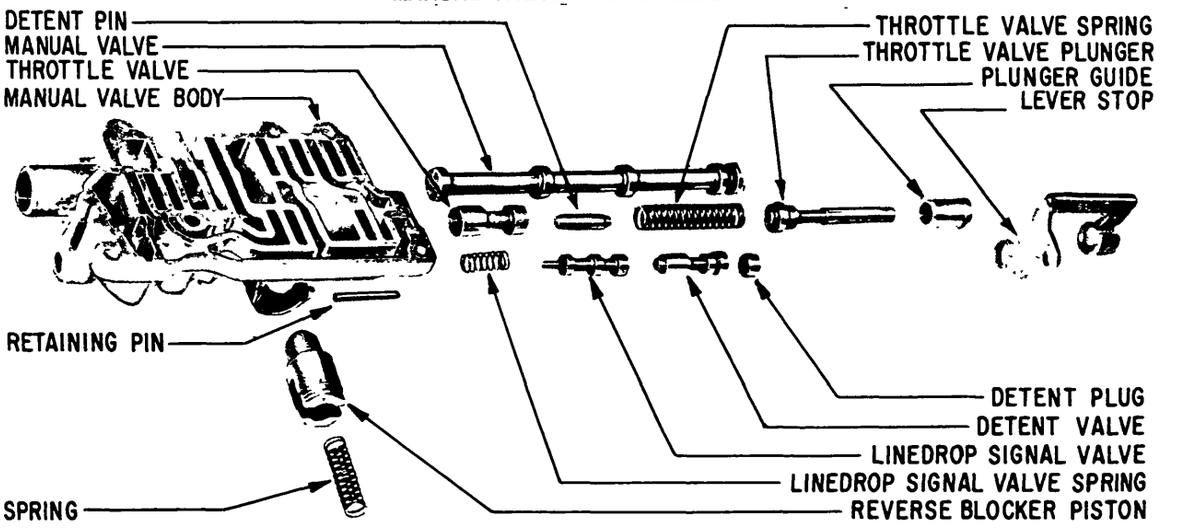
GOVERNOR: Disassembly - Remove four governor oil rings and the two cover-to-driven gear attaching screws, then remove driven gear and cover. Remove G-2 bushing retaining pin, G-2 bushing and valve assembly, and stop washer. Remove G-2 valve from bushing.

Inspection: Inspect all parts to make sure they are free from dirt. Inspect valves and bushings for burrs or other damage. If necessary to remove burrs, use fine crocus cloth and light oil. Test all valves and bushings in individual bores for free movement. *NOTE - If govern r valves still stick, replace complete assembly.* Inspect governor ring lands and oil seal rings fot freedom in

CONTINUED ON NEXT PAGE



1959 MANUAL VALVE BODY ASSEMBLY



1960 MANUAL VALVE BODY ASSEMBLY (CADILLAC)

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

grooves. If lands are damaged or worn, replace complete governor assembly. Inspect driven gear for burrs or other damage. *NOTE - Gear may be replaced separately if necessary.*

R assembly: Install G-2 stop washer, then install G-2 valve into bushing. Install bushing and valve assembly into governor body. Rotate bushing to align recess in bushing and install retaining pin. Install governor driven gear, then position cover plate on governor body being careful not to drop retaining pin or driven gear and install two attaching screws. Install four oil seal rings in grooves that do not contain oil holes.

1959 MODELS

CONTROL VALVE: The control valve assembly consists of four individual assemblies connected to one main channel plate. Each individual part of the control valve assembly should be disassembled and reassembled separately to avoid confusion of parts.

►*CONTROL VALVE DISASSEMBLY & REASSEMBLY CAUTION:* The number of individual valves and springs in each of the control valve bodies may vary with the make of car. Following illustrations are typical of all makes and care should be exercised when disassembling to identify all parts in relation to their location in the valve body.

Coupling Valve Body: Removal & Disassembly - Remove coupling valve body from control valve assembly, then remove two coupling valve plate screws while holding plate to keep springs compressed. Remove plate and oil screen retaining clip. Remove coupling valve plug, spring, limit valve inner and outer spring, limit valve and washer. Remove four coupling body front cover plate screws and cover plate, then remove transition valve, spring, coupling valve and coupling signal valve.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

Reassembly - Install coupling valve into center bore with stem end first. Install transition valve spring into transition valve and install transition valve, spring first, into coupling body. Install coupling signal valve (single land first) into center bore, then place cover plate on body and hold to compress the spring while installing screws. In the opposite end of clutch body, install limit valve with stem out and install limit valve washer. Install coupling valve spring, then position coupling valve plug on coupling valve spring and push plug and spring into bore. Install one screw into hole in center of plate but do not tighten screw. Rotate plate and install inner and outer limit valve springs. *NOTE - These springs have opposite wound coils.* Compress springs and rotate plate and retainer to hold springs. Align retainer and plate with screw hole and install remaining screw and tighten both screws. Make sure limit valve springs are aligned properly after tightening screws.

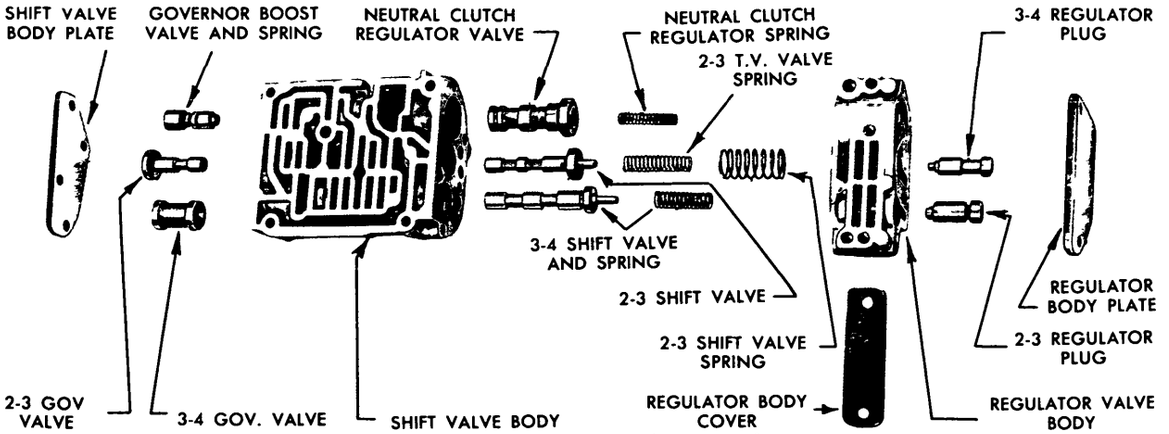
Installation (On Control Valv Ass mbly) - *See "Control Valve Assembly Note" below.*

Shift Valve Body: Removal & Disass mbly - Remove three attaching screws and remove shift valve body from channel plate, then remove separator plate from channel plate. Remove neutral clutch bypass valve from shift body, then remove shift valve body plate attaching screws and remove plate. Remove 3-4 governor valve, 2-3 governor valve, and governor boost valve. Remove one regulator valve body to shifter valve body attaching screw and loosen four regulator valve body and plate attaching screws, then, while holding body and plate against spring load, remove four screws to free parts from shift valve body. Remove 2-3 and 3-4 regulator plugs from regulator body and remove the 2-3 throttle valve spring and 2-3 shift valve spring from shift valve body. Remove 3-4 throttle valve spring, neutral clutch regulator valve spring, 3-4 shift valve, 2-3 shift valve, and neutral clutch valve. Remove the bypass reed valve (if so equipped).

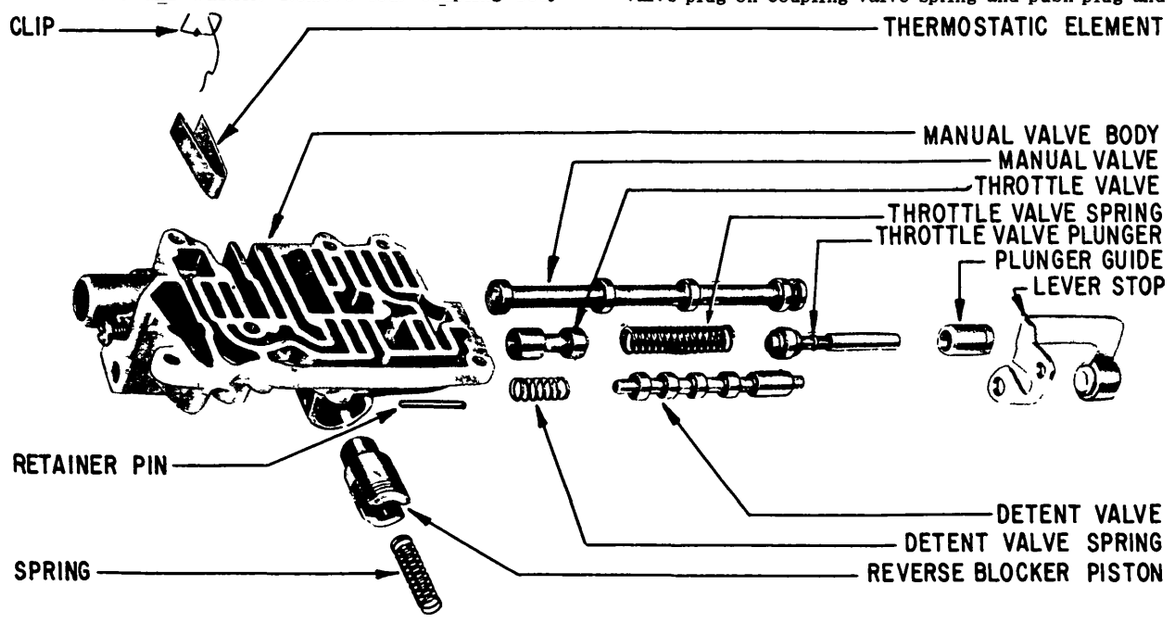
►*INSPECTION NOTE: See "Control Valv Insp ction" below.*

Reassembly - Install neutral clutch regulator valve and spring and install 2-3 shift valve with spring stem end out. Install 2-3 throttle valve spring, 2-3 shift valve spring and the 3-4 shift valve with spring stem out. Install 3-4 shift valve spring, then secure regulator body cover with two screws. Insert 3-4 regulator plug in regulator body, with small diameter first, then insert 2-3 regulator plug, spring stem end first, in regulator body. Attach regulator valve body and plate to shift valve body as follows: Lay plate on regulator body and insert screws through plate and body, using a ½" long

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1959 SHIFT VALVE ASSEMBLY (TYPICAL)



1960 MANUAL VALVE BODY ASSEMBLY (OLDSMOBILE & PONTIAC)

DUAL-COUPLING HYDRA-MATIC (Continu d)

screw at upper corner of plate adjacent to neutral clutch valve and a 1 3/8" screw to secure regulator body only at the same side as shift valve body. Place regulator valve body and plate assembly in position against shift valve body and start two end screws into shift valve body making sure springs are correctly aligned, then start remaining screws. Tighten all screws to 2-3 ft. lbs. and proceed as follows: Install 3-4 governor valve in shift valve body, with round end of valve toward the 2-3 shift valve. Install governor boost valve (amplifier valve) into shift valve body, then secure shift valve body plate to shift valve body with four attaching screws. Install bypass reed valve (if so equipped).

Installation (On Contr l Valve Assembly) - *See "Control Valve Assembly Note" below.*

R v rs Bl ck r B dy: R moval & Disassembly - Remove two reverse blocker body-to-manual valve body attaching screws and remove reverse blocker assembly. Remove hairpin clip retainer holding detent plunger and remove plunger and spring from body. Remove reverse blocker piston retaining pin, spring and piston.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

R ass mbly - Install reverse blocker piston into body, aligning slot with retaining pin hole, then install reverse blocker piston spring into piston. Compress spring and install blocker retaining pin from countersunk side. Install detent plunger spring into detent plunger bore and insert detent plunger through spring and into bore in body. Compress spring on detent plunger and install retainer on end of plunger.

Installati n (On C ntr l Valve Assembly) - *See "Control Valve Assembly Note" b low.*

Manual Valv B dy: Disass mbly - Remove manual valve from body, then remove five manual valve body-to-channel plate attaching screws and remove valve body and separator from channel plate. *NOTE - Attaching screw on manual valve side of body at throttle valve lever stop end has a flat head.* Remove two screws retaining throttle valve stop bracket to manual body. *CAUTION - Do not remove throttle valve lever stop. This stop is factory adjusted and must not be changed.* Remove throttle valve plunger and guide from center bore of body and separate, then remove throttle valve plunger spring and throttle valve. Remove detent valve and spring, then remove coupling fill bi-metal element from channel plate.

►*INSPECTION NOTE: S "Control Valve Inspection" below.*

R ass mbly - Install throttle valve bi-metal valve and retaining clip, then install throttle valve in middle bore with long land first. Install throttle valve plunger spring in center bore, then install throttle valve plunger guide on plunger, long land first, and install plunger and guide as a unit into middle bore of valve body (long stem out). *NOTE - Short land of plunger does not enter valve body.* Insert detent valve spring in bore, lining up spring to assure that spring is fully positioned in bottom of bore, then install detent valve with large end out. Attach throttle valve lever stop bracket to manual body with two screws.

C ntr l Valve Insp cti n: Clean all parts thoroughly and do not allow valves to bump together, as this may cause nicks and burrs. Inspect all valves carefully to make sure they are free from dirt and are not damaged in any respect. If burrs are present, they should be removed with a fine stone or crocus cloth and light oil. All valves and plugs should be tested in their individual bores to make certain that free movement can be obtained. All valves should fall free of their own weight with a slight tapping action on the body. The manual valve is the only valve which may be serviced separately. If other valves are defective or damaged beyond repair, an individual assembly should be installed.

►*CONTROL VALVE ASSEMBLY NOTE:* If all the individual assemblies were removed at one time, proceed as follows: Position channel body separator plate on channel body. Install manual valve to channel body and install reverse blocker body to manual valve body, positioning one dowel pin. Install ball check and and spring in channel body (ball first, then spring). Install and align separator plate on channel body. Install shift valve body on channel body. Install coupling valve on channel body using petrolatum to hold transition ball check in place. Install manual valve in manual valve body.

1960 MODELS

CONTROL VALVE: The control valve assembly consists of three individual assemblies connected to one main channel plate. Each individual part of control valve assembly should be disassembled and reassembled separately to avoid confusion of parts.

►*CONTROL VALVE DISASSEMBLY & REASSEMBLY CAUTION:* The number of individual springs in each of the control valve assemblies may vary with the make of car. Following instructions are typical of all makes and and care should be exercised when disassembling to identify all parts in relation to their location in valve body.

Front Clutch Valve: Removal & Disassembly - Remove two screws retaining clutch valve assembly to channel plate and remove the assembly. Remove front plate from valve body, then remove transition valve and spring. Remove coupling signal valve, coupling valve, coupling valve spring, and plug. Carefully remove the two screws retaining clutch body rear plate and remove plate and oil screen retaining clip. Remove inner and outer limit valve springs, then remove limit valve spring washer and limit valve.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

Reassembly - Install limit valve with stem out, then install washer, inner and outer springs. Attach rear plate and retainer clip to clutch valve body with one screw through the clip (leave screw loose). Rotate plate over limit valve springs while holding springs compressed and install other end plate screw. Tighten both screws. Insert coupling valve plug, spring, coupling valve and signal valve in valve body. Insert spring in transition valve, then install transition valve and spring (spring first) into clutch body. Attach clutch body front cover and tighten screws.

Installati n (On Contr l Valv Ass mbly) - *Se "Control Valve Assembly Not " b low.*

Shift Valv B dy: R m val & Disass mbly - Remove three attaching screws and remove shift valve body from channel plate. Remove neutral clutch bypass valve (reed valve), then remove regulator valve cover. Remove regulator valve body, end plate, and two valve plugs (2-3 valve plug and 3-4 valve plug). Remove neutral clutch spring, 2-3 shift valve springs, 2-3 throttle valve spring and 3-4 throttle valve spring. *NOTE - On Cadillac, remove the 3-4 throttle valve regulator spring (not illustrated).* Remove neutral clutch regulator valve, 2-3 shift valve, and 3-4 shift valve. Remove shift valve body plate, then remove governor boost valve, 2-3 governor valve, and 3-4 governor valve.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

Reassembly - Install 3-4 governor valve with round end facing out, then install 2-3 governor and governor boost valve. Attach shift valve body plate. Install neutral clutch regulator valve, 2-3 shift valve, and 3-4 shift valve. Insert neutral clutch valve spring, 2-3 throttle valve spring, 2-3 shift valve spring, and 3-4 shift valve spring. Install regulator valve body on shift valve body (using middle length screw), then install 2-3 throttle valve spring (and 3-4 regulator valve spring on Cadillac) in regulator valve body. Install 2-3 and 3-4 throttle valve plugs in regulator body with small ends toward shift valve body. Install regulator body end plate and body cover plate. *NOTE - Flat head screw goes in hole nearest regulator body boss.* Install neutral bypass (reed) valve in shift valve body.

Installation (On Control Valve Assembly) - *See "Control Valve Assembly Note" below.*

Manual Valve Body: Removal & Disassembly - Remove three screws securing manual valve assembly to channel plate and remove valve body. Remove throttle valve lever stop. *CAUTION - Do not tamper with factory adjusted throttle valve stop adjusting screw.* On Oldsmobile and Pontiac models, remove detent valve and spring. On Cadillac, remove detent plug, detent valve, line drop signal valve and signal valve spring. On all models, remove throttle valve plunger and guide and separate plunger from guide, then remove throttle valve spring and throttle valve. On Oldsmobile and Pontiac models, remove thermostatic element retaining clip and element. *CAUTION - Do not tamper with thermostatic element adjusting screw which is preset at the factory.* On all models, clip one end of reverse blocker retaining pin, then while holding thumb over reverse blocker piston bore, remove retaining pin. Remove reverse blocker piston spring and piston.

►*INSPECTION NOTE: See "Control Valve Inspection" below.*

Reassembly - Install reverse blocker piston with slotted end out, then insert spring and hold it compressed while installing a new retaining pin. Crimp end of pin to secure it in position. Install throttle valve thermostatic element and clip (Oldsmobile & Pontiac). Install throttle valve with large land first, then insert throttle valve spring. On Oldsmobile and Pontiac models, install detent valve spring in bore, then install detent valve with long land first. On Cadillac, install line drop signal valve spring and valve (line up spring to be sure it is fully positioned in bottom of bore), then install detent valve and detent plug. On all models,

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DUAL-COUPLING HYDRA-MATIC (C ntinued)

install throttle valve plunger in guide and install both parts into throttle valve bore. Install throttle valve lever stop.

Installation (On Control Valve Assembly) - *See "Control Valve Assembly Note" below.*

C ntrol Valve Inspection: Clean all parts thoroughly and do not allow valves to bump together, as this may cause nicks and burrs. Inspect all valves carefully to make sure they are free from dirt and are not damaged in any respect. If burrs are present, they should be removed with a fine stone or crocus cloth and light oil. All valves and plugs should be tested in their individual bores to make certain that free movement can be obtained. All valves should fall free of their own weight with a slight tapping action on the body. The manual valve is the only valve which may be serviced separately. If other valves are defective or damaged beyond repair, an individual assembly should be installed.

►*CONTROL VALVE ASSEMBLY NOTE:* If all the individual assemblies were removed at one time, proceed as follows: Position channel body separator plate on channel body. Install manual valve to channel body and install reverse blocker body to manual valve body, positioning one dowel pin. Install ball check and and spring in channel body (ball first, then spring). Install and align separator plate on channel body. Install shift valve body on channel body. Install coupling valve on channel body using petrolatum to hold transition ball check in place. Install manual valve in manual valve body.

TRANSMISSION REASSEMBLY

1959-60 MODELS

PARKING PAWL & LINKAGE: Place pivot shaft spacer in recess in case, then position parking brake pawl and lever assembly in case with upper lever on pivot in case. Locate parking pawl at pivot shaft hole and insert shaft through case, pawl and spacer until end of shaft is flush with rear of case (1959 Models); until shaft bottoms (1960 Models). Position parking brake lever spring in bracket with long end toward rear. Slide bracket and spring assembly onto pivot shaft with short end of spring under parking brake bracket. Hook long end of spring under parking brake lever.

1959 MODELS

INSIDE DETENT & THROTTLE LEVERS: With throttle and detent levers assembled, place spacer washer over detent shaft against detent lever, then insert lever and shaft assembly through hole in case from inside with parking brake tang below pin in parking brake bracket. Install "O" ring seal and special washer which fits into bore in outside of case over detent lever shaft. Install snap ring to retain seal and washer.

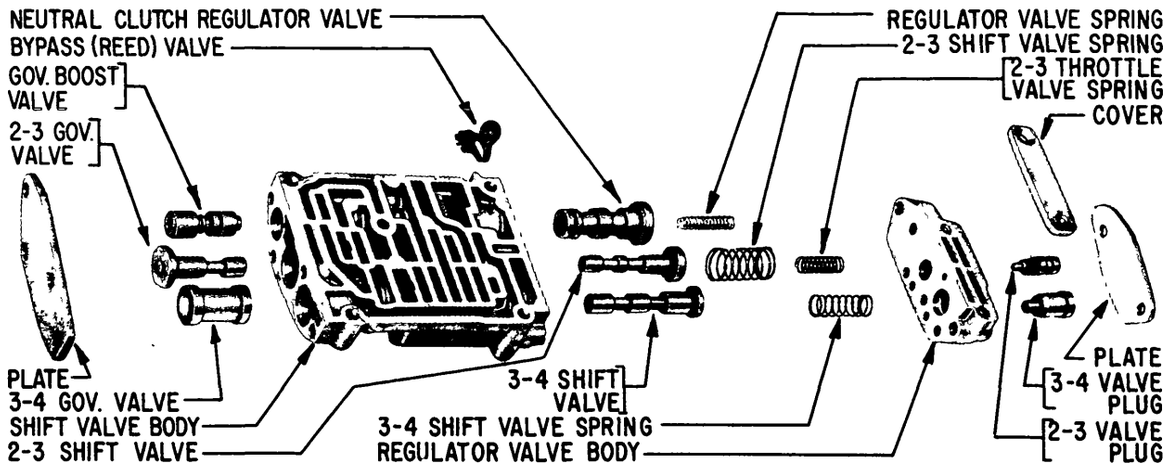
1960 MODELS

INSIDE DETENT & THROTTLE LEVERS: Install a new "O" ring seal on manual lever shaft, then place detent lever in position against detent roller so dowl pin on parking brake bracket is between lever and outside of case. Insert manual lever shaft through side of case, align serrations in detent lever with serrations on shaft and slide lever onto shaft as far as it will go, then tighten setscrew securely. Install a new "O" ring seal on throttle valve lever shaft and install shaft through manual shaft. Install inside throttle valve lever on shaft, aligning serrations on shaft with serrations in lever. *NOTE - Tang on inside throttle valve lever points toward side of case.* Press inside throttle valve lever on shaft as far as it will go, then back off slightly to provide .005-.010" clearance between inside throttle valve lever and inside detent lever. Tighten clamp-screw. *NOTE* - Pull on outside throttle valve lever to make sure inside lever is secure on shaft. Recheck clearance and adjust if necessary.

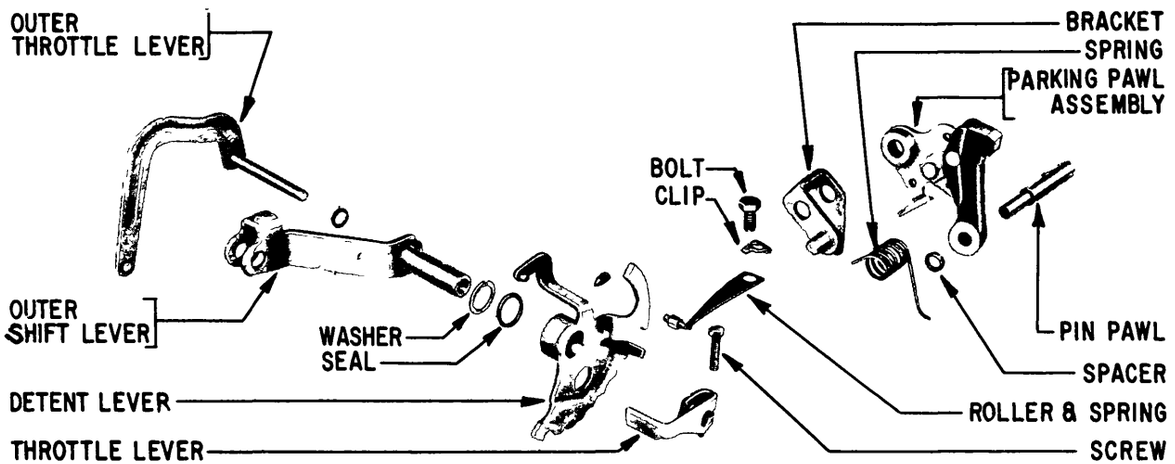
1959-60 MODELS

LOW BAND: Install band through front end of transmission case with band ends facing rearward in horizontal position (anchor support hole should face right side). When band is approximately half-way through transmis-

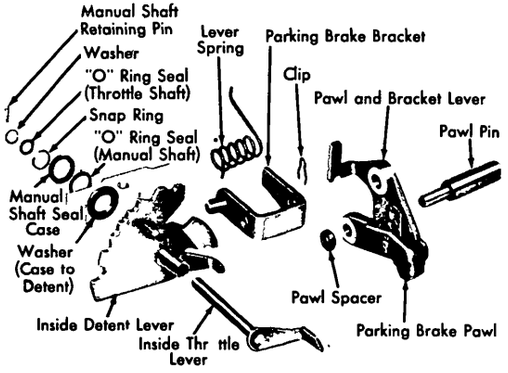
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1960 DUAL-COUPLING HYDRA-MATIC SHIFT VALVE ASSEMBLY (TYPICAL)



1960 DUAL-COUPLING HYDRA-MATIC PARKING PAWL ASSEMBLY



1959 PARKING PAWL ASSEMBLY

DUAL-COUPLING HYDRA-MATIC (C ntinu d)

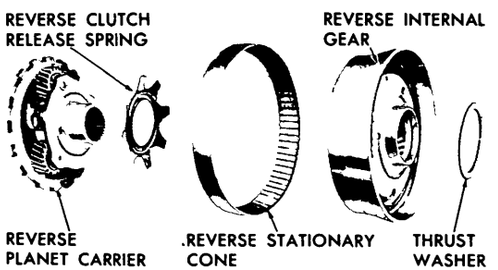
sion, with band still horizontal, rotate band so that ends are in cavity in case above anchor pin and rotate band into position. Position band end on anchor in case.

1959-60 MODELS

CASE SUPPORT, NEUTRAL CLUTCH & REAR UNIT: Install neutral clutch key in case using petrolatum to hold it in place, then position rounded side toward front to provide lead for guiding neutral clutch drum over key. Install rear unit, neutral clutch and case support assembly into case as follows: Insert output shaft end of assembly part way into front of case and then rest rear unit drum on case, while holding intermediate shaft. Rotate neutral clutch drum until groove for neutral clutch key is up. With parts aligned, slide assembly into case, engaging neutral clutch drum key with slot in clutch drum. *NOTE - Parts must be aligned so imaginary c nt r lin s through neutral clutch apply and r ar clutch apply ports in case center support intersect lik ports in transmission case.* When properly installed, snap ring groove in case will be visible at front edge of case support. *NOTE - If units fit tightly in case, ass mbly may b aid d by pulling on output shaft. Also mak sure low band does not cock on rear unit drum and h ld unit.* On 1959 models, install case center support locking screw from outside transmission case, then install snap ring which positions case support in case. Tap snap ring as necessary with screwdriver and hammer to make sure it seats fully in groove. On 1960 models, locate ring gap opposite oil passage (to eliminate any chance of gap ends damaging bore area in passages), then slide snap ring into transmission case against center support. Tap snap ring with screwdriver if necessary to insure it is fully seated in groove.

1959-60 MODELS

REVERSE PARTS: Install reverse planet carrier on output shaft, aligning splines and pinions. Install reverse stationary cone key in case with rounded side toward rear and retain with petrolatum. Install stationary cone making sure that cone aligns with key (tap very gently until seated if necessary). Install reverse clutch release spring on carrier (tangs away from carrier). Install reverse internal gear on carrier, then place reverse internal gear-to-reverse clutch housing hub thrust washer against internal gear. Place a new gasket on reverse clutch housing, holding it in place with petrolatum. Slide housing over end of output shaft and secure to case with one bolt. Remove rear unit clutch

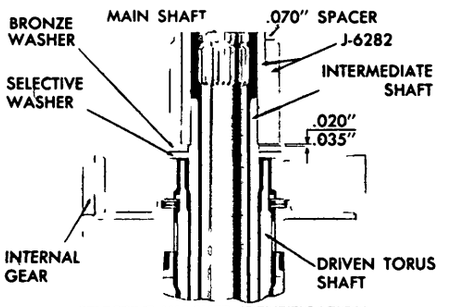


1959-60 REVERSE CLUTCH PARTS

retainer, Tool J-6135 from intermediate shaft, then drive rear bearing over output shaft using bearing installer J-6133-A until snap ring groove on output shaft can be seen behind rear bearing. If bearing is a slip fit on shaft, slide snap ring over shaft against bearing, pull shaft rearward and push snap ring into groove. *NOTE - If snap ring will not seat in groove, rotate unit to position output shaft down, then drive snap ring into place with installer J-6133-A.* With snap ring installed, install bearing retaining snap ring in reverse clutch housing. Attach extension housing to transmission case with bolt at each long ear, then recheck mainshaft endplay (*see "Mainshaft Endplay" under "Transmission Disassembly" above*). Remove extension housing and install governor drive gear front retaining snap ring. Install governor drive gear key in output shaft and slide governor drive gear on shaft, locating slot in gear over key. Install second snap ring to retain governor drive gear. Align gaps of rings on governor upward, then compress rings by hand and work governor into bore in reverse clutch housing. Place gasket on reverse clutch housing, holding it in position with petrolatum, and slide extension housing over output shaft against reverse clutch housing, then install extension housing bolts finger tight. *NOTE - Attach breather pipe clip in position under the proper bolt.* Tighten all bolts to 25 ft. lbs., then install speedometer driven gear assembly.

1959-60 MODELS

FRONT PUMP & OVERRUN CLUTCH: Screw two studs from Tool J-6121 into two of the three 3/8" x 16 tapped holes in case center support, then pilot pump and overrun clutch assembly over intermediate shaft and studs, making sure that intake pipe holes in pump and case are aligned. Secure pump to case with one screw, then remove pilot studs and install remaining screws. Tighten all screws and then back them off ¼ turn. *NOTE - If pump locking screw cannot be installed through case and into pump, the pump and center support can be rotated together as required using one of the pump screws to pry against.* Apply air pressure in neutral clutch apply hole with a blowgun to position case center support against snap ring, then with air pressure applied,



SELECTIVE WASHER IDENTIFICATION

NO.	THICKNESS	NO.	THICKNESS
1	.045"-.047"	7	.123"-.125"
2	.058"-.060"	8	.136"-.138"
3	.071"-.073"	9	.145"-.151"
4	084"-.086"	10	162"-.164"
5	.097"-.099"	11	175"-.177"
6	110"-.112"		

1959-60 FRONT UNIT ENDPLAY CHECK

tighten pump locking screw to 25 ft. lbs. Tighten pump-to-case support screws to 25 ft. lbs. *CAUTION - Pump locking scr w must b tightened first to draw pump tightly against case to ensure there is no leak between pump and case.*

1959-60 MODELS

PRESSURE REGULATOR & FRONT UNIT COUPLING: With spring assembled to pressure regulator valve, install valve and spring in transmission case, then install plug assembly and tighten to 5 ft. lbs. *CAUTION - Over-tightening of pressure regulator may push pump away from side of case causing an oil leak between passages in pump and case.* Install front unit coupling in case, cover end first. Rock driven torus shaft to engage splines on shaft and front sprag inner race, and rock drive torus to make sure hub engages pump rotor. Check rotation of front coupling after installation (driven torus must turn clockwise only, as viewed from front). *CAUTION - Install front coupling carefully so as not to break hook type oil rings on driven torus shaft.*

1959-60 MODELS

FRONT UNIT END CLEARANCE: Check this clearance using either of the two methods outlined below.

Feeler Gauge Method: Rotate transmission to a vertical position with mainshaft up, then install front unit internal gear. Install steel washer (black), needle bearing, and second steel thrust washer (bright) over coupling driven shaft and into recess in internal gear. Install snap ring in groove of driven torus shaft and slide front unit sun gear onto shaft of driven torus. Lay a No. 1 (.046") steel selective washer against sun gear followed by a bronze thrust washer, then install drive torus snap ring in groove next to bronze thrust washer. Push intermediate shaft and sun gear firmly to rear of transmission, then push snap ring down against rear of groove and very carefully measure clearance between snap ring and bronze thrust washer with a feeler gauge. *CAUTION - Feeler Gauge must be flat against thrust washer for an accurate reading.* To determine the correct spacer to install for a desired clearance of .020-.033" (1959); .020-.035" (1960), add the mean thickness of the No. 1 washer (.046") to feeler gauge reading. From this total, subtract the clearance desired (.028"), then refer to "Front Unit Selective Spacer Chart" in illustration and select a washer equal to the remainder. As an example: If feeler gauge measurement was .067", add .067" to .046" (No. 1 washer thickness), giving a total thickness of .113". From this figure, subtract .028" (desired clearance), leaving a remainder of .085" which is equal to the No. 4 washer (.084-.086"). Remove snap ring, sun gear with bronze washer and steel selective washer, snap ring and internal gear with spacers and roller thrust bearing. Remove front unit coupling.

Special Tool Method: Rotate transmission to a vertical position with mainshaft up, then install front unit internal gear over coupling driven shaft. Install steel washer (black), needle bearing, and second steel thrust washer (bright) over coupling driven shaft and into recess in internal gear. Install large snap ring over coupling driven shaft, then install front unit sun gear

CONTINUED ON NEXT PAGE

DUAL-COUPLING HYDRA-MATIC (C ntinued)

with recessed side over snap ring. Install steel selective spacer and bronze thrust washer against sun gear. Place endplay gauge J-6282 over intermediate shaft. Place a No. 1 selective washer, Part No. 8616703 on tool and check to see that washer is flush with inner sleeve of tool. *NOTE - Washer, Part No. 8616703 is used in 1956-57 transmissions and is required for gauging purposes.*

If washer is not flush, remove tool and bronze thrust washer and replace selective washer with one of proper size. Remove tool, washers, sun gear, snap ring, and internal gear with washers and bearing. Remove front unit coupling.

1959 MODELS

SERVO, ACCUMULATOR & CONTROL VALVE: With transmission in a horizontal position, check alignment of clutch valve body and shift valve body by inserting four valve body-to-case attaching screws in body. With attaching screws in place, tighten shift valve body, clutch valve body and manual body attaching screws. Attach control valve body assembly to transmission with five attaching screws (leaving out screw which will position front pump intake pipe clamp). *NOTE - Position detent lever so it will engage detent plunger and manual valve and make sure dowel pin in blocker body engages dowel hole in case.* Install new front pump "O" ring in intake pipe hole at front of case (if not previously done), then install servo and accumulator assembly and secure to case with three screws.

1960 MODELS

SERVO, ACCUMULATOR & CONTROL VALVE: With transmission in a horizontal position, install control valve assembly. *NOTE - Position detent lever so that pin indexes with manual valve. The dowel pin in manual valve body must index with hole provided in transmission case.* Install servo release spring and servo accumulator assembly and secure with two attaching screws. Make sure inlet pipe clip is under long bolt (leave this bolt loose until intake pipe is installed).

1959 MODELS

OIL PAN, SCREEN & INTAKE PIPE: Install front pump intake pipe in case and secure with clip and valve body attaching screw, then install oil screen on front pump intake pipe and screen retaining clip. Install oil pan with new gasket and tighten screws securely.

1959-60 MODELS

OIL PAN, SCREEN & INTAKE PIPE: Insert intake pipe (dimple end) into screen, being careful not to cut "O" ring. Insert other end of pipe in pump and align screen with retaining clip on clutch valve body. Rotate pipe retaining clip over pipe and tighten the long servo attaching bolt. Install oil pan with a new gasket and tighten screws securely.

FLYWHEEL, TORUS MEMBER, TORUS COVER & FLYWHEEL HOUSING: With transmission in a horizontal position, pan down, install front unit coupling, rotating drive torus as necessary to engage shaft splines in splines of front sprag inner race. Also rotate coupling to permit lugs to engage pump rotor. Place protector J-6119 over intermediate shaft, then lay new flywheel housing-to-case "O" ring in groove provided in housing. Pilot flywheel housing into position against case and secure with bolts, tightening them to 40-50 ft. lbs. Remove protector J-6119 and apply a coat of Hydra-Matic oil to hub of torus cover. Slide torus cover into place carefully so as not to injure flywheel housing seal. Install front unit internal gear in torus cover making sure lugs of gear engage those of front coupling drive torus. Install steel thrust washer (black), needle bearing and second steel thrust washer (bright) in internal gear. Secure needle bearing and washers by installing snap ring in groove in front coupling driven torus shaft. Install selective washer as previously determined by front end clearance check, then place bronze thrust washer against selective washer. Install drive torus member on intermediate shaft indexing front unit planet carrier with sun gear and internal gear. Secure drive torus to intermediate shaft with snap ring. Install driven torus rear (Truarc) snap ring on main shaft. Install driven torus member on main shaft with (Truarc) snap ring, then install "O" ring seal on flywheel and position flywheel against torus cover, indexing with dowels. *NOTE - Flywheel can be installed in only one position since dowels ar of different size.* Install and tighten flywheel-to-torus cover nuts, leaving nuts off bolts required for attaching flywheel and torus cover to flex plate. Tighten nuts to 15-20 ft. lbs. Assemble seals on oil cooler adapter sleeves, then insert sleeves in case, seal end first, and connect adapter to case. Install pipe plug in throttle valve pressure take-off tapped hole on right side of case if previously removed.

TWIN ULTRAMATIC DRIVE

Huds n H rnet V8 (1955-56)
Nash Ambassad r V8 (1955-56)
Packard (Late 1954, 1955-56)
Stud bak r Goldenhawk (1956)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 PACKARD TWIN ULTRAMATIC NOTE: Twin Ultramatic Transmission replaced previous type in production b ginning in August. The control valve ass mbly in th first 1954 cars with Twin Ultramatic differs from that us d in Late 1954 and 1955 cars. S "Control Valve" b low for identification and service proc dures.*

►*1954-55 TRANSMISSION SLIPPAGE OR DELAYED LOW RANGE BRAKE APPLICATION (after coming to a st p or aft r shifting t ither "D" or "L" positions):* May be caused by a distortion of the low range brake assembly cap. Part No. 6470266, Low Range Brake Housing Cap (made of heavy machined aluminum stock) replaced the earlier stamping. This change effective on Hudson & Nash at Transmission No. 5-A-11289. *S e "Troubl Sho ting" below for other causes of xc ssiv slippag .*

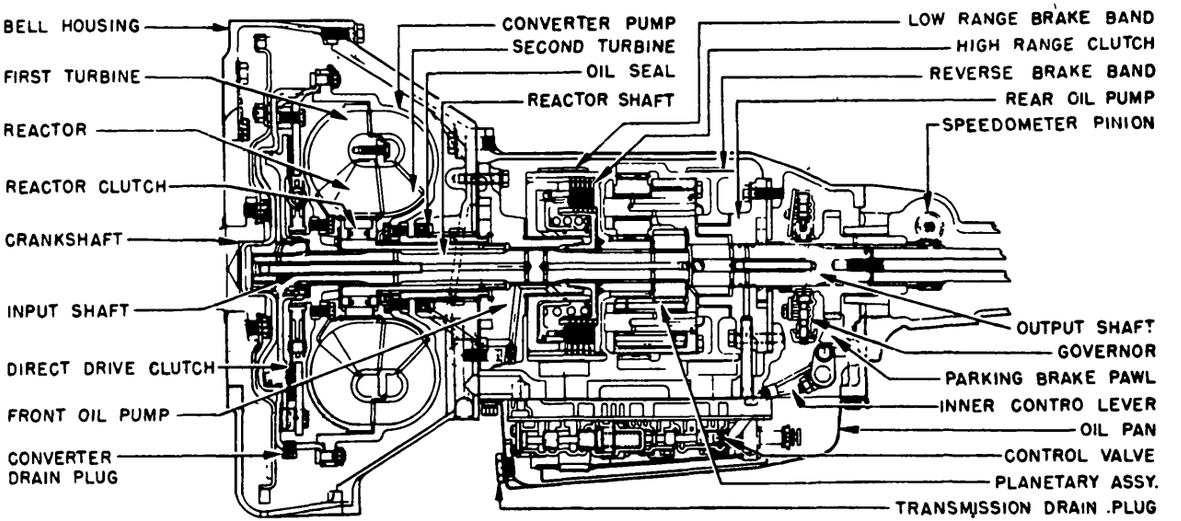
►*1956 HUDSON & NASH ULTRAMATIC REAR CIL PUMP PROD. CHANGE:* A new rear pump driver, Part No. 6489292, which pilots in both the rear pump rotor and on the planetary shaft (to prevent brinnelling of the shaft) was used in production starting with transmission serial No. P-6492. *NOTE* - The brinnelling marks found on the planetary shaft will not affect its operation. It is therefore not necessary to change the rear planetary assembly when the new driver is installed as it will prevent contact of the rotor drive lugs and shaft.

►*1956 ULTRAMATIC CONTROL VALVE BODY AIR LEAKAGE CORRECTION:* This condition can cause erratic shifting and a high pitch whine from either or both oil pumps. Correct as follows: Lap the mating surfaces using crocus cloth laid on a surface plate or plate glass. When installing control valve assembly in transmission, tighten the bolts as indicated in "Transmission Reassembly" in 1955 Annual Data or later Manual edition.

►*1956 STUDEBAKER ULTRAMATIC LOW RANGE BRAKE PRODUCTION CHANGES:* Starting with Transmission Serial No. S-2463, the inner spring was eliminated and a new separator plate, Part No. 6489478 entered production. This change was made to overcome possible occurrences of engine "flare-up" or "runaway" during transmission upshift from low range converter to high range converter. To correct this condition on cars before Serial No. S-2463, install the later type separator.

►*1956 STUDEBAKER ULTRAMATIC HARSH BAND APPLICATION (On Transmission between Serial Nos. S-2463 and S-4028):* If this condition is apparent on transmissions between these serial numbers, install the low range brake inner spring, Part No. 470183).

►*LATE 1956 STUDEBAKER ULTRAMATIC LOW RANGE PRODUCTION CHANGE:* Beginning with Transmission Serial No. S-4028, the inner low range brake spring was reinstated, and is used with the later type separator plate. See Production Changes above.



TWIN ULTRAMATIC DRIVE SECTIONAL VIEW

►*1956 STUDEBAKER ULTRAMATIC TRANSMISSION FRONT PUMP CHECKING CAUTION:* In cases where the high range clutch burns out prematurely, or there is an engine "runaway" on low range converter to high range converter upshift, check the front pump for restrictions, as follows: Place complete pump assembly in a shallow pan with pump plate upward. Use a small funnel with the end reworked to fit the high range oil circuit hole of the pump plate (this hole is the fourth hole to left of pump plate screw having the five closely spaced holes adjacent to it. The other plate screw has only two closely spaced holes adjacent to it). Using automatic transmission fluid (temp. 65° to 75°F), pour enough fluid in funnel to fill the high range passage in the pump. Allow fluid to drain down to a level slightly above the funnel spout. At this time, pour an additional ½ pint of fluid in the funnel and observe the time required for fluid to reach the predetermined level. If more than 2 minutes and 15 seconds is required for the level to come up, the passage is restricted and the pump should be replaced.

►*1956 STUDEBAKER ULTRAMATIC DIRECT CLUTCH PRESSURE PLATE ASSEMBLY PRODUCTION CHANGE:* Flat washers, No. 338405 are being installed under the heads of the direct clutch pressure plate bolts to prevent steel shavings (caused by bolt head digging into pressure plate) from falling into transmission. Install these washers at this location whenever work is performed on the direct clutch pressure plate assembly.

►*1956 STUDEBAKER ULTRAMATIC CONVERTER PUMP SHAFT AND TRANSMISSION FRONT PUMP ROTOR PRODUCTION CHANGE:* Beginning with Transmission Serial No. S-2463, a new converter pump shaft, (with splines controlled to provide an improved spline fit), and a new front pump rotor (with 40 splines instead of 20) were used. (*NOTE* - The early pump shaft had 40 splines, however, only 20 were used as the rotor had only 20 splines). When necessary to replace the early type front pump or a converter pump shaft, use Rotor Assembly and Pump Shaft Kit, Part No. 6484523, or Pump Assembly and Pump Shaft Kit, Part No. 6484524. On cars prior to Transmission Serial No. S-2463, use Converter, Part No. 6479085 when replacing only the converter.

►**TOWING TWIN ULTRAMATIC TRANSMISSION CARS:** Cars can be towed with selector lever in Neutral "N" position providing the Twin Ultramatic unit is not damaged and oil level in unit is normal. **Do not tow car at a speed greater than 30 MPH., or for any great distance.** If selector lever cannot be placed in Neutral, or if transmission oil level low, disconnect drive shaft at rear end and securely fasten to frame so it cannot move to the rear (*CAUTION*–Rearward movement will allow front end to slip off transmission main shaft splines and drop down).

►**STARTING ENGINE BY PUSHING CAR:** If this procedure required for Twin Ultramatic Cars, place selector lever in Neutral "N" position and turn on ignition. When car has attained a speed of 25 MPH., move selector lever to LEFT HAND "D" position. Engine will then crank.

DESCRIPTION

Twin Ultramatic Transmission consists of a torque converter, direct drive clutch, and a hydraulic operated planetary transmission. Transmission assembly components are as follows:

T rqu C nv rt r & Dir ct Sp d Clutch: This assembly is mounted on rear face of flywheel and consists of the units indicated below. Torque converter and direct

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TWIN ULTRAMATIC (C nt.)

speed clutch is automatic and is controlled by the hydraulic system *(see "Operation", and the Hydraulic Circuit Illustration below).*

Converter Pump (Driving Member)–Integral with rear section of torque converter case bolted directly on flywheel and driven at crankshaft speed. Pump is supported at rear end on hollow shaft carried in bearing in bell housing (front oil pump is splined on rear end of shaft and shaft is grooved to provide oil channel into converter).

Turbine (Driven Member)–Two-section type turbine. First section is bolted on a flange hub splined on forward end of converter shaft (direct speed clutch driven member also bolted to this flange hub). Second turbine bolted to first turbine with clearance between the two in which the Reactor is located.

Reactor (Stationary Member)–Reactor consists of a set of curved vanes placed between the first and second turbines and is mounted on a short tubular shaft with an overrunning clutch in the mounting flange at rear end of shaft. Reactor is locked or held stationary when unit is operating as a torque converter but the overrunning clutch allows reactor to free wheel or rotate freely at steady car speeds so the torque converter acts as a fluid coupling except when the direct drive clutch locks the entire unit for positive drive.

Direct Speed Clutch–Single plate clutch hydraulically operated located in forward section of torque converter housing. Clutch driven member is bolted to turbine mounting flange and clutch driving plates are locked in torque converter housing (lugs on plate engage slots in housing) so that torque converter pump and turbine are locked together for positive drive when clutch is engaged. Clutch is engaged hydraulically by admitting oil into housing in front of forward driving plate (plate acts as hydraulic piston).

Planetary Gear Unit: In transmission case directly behind torque converter and is controlled by driver through a selector lever. This assembly consists of the following units:

Sun Gears–Two helical gears in tandem on drive (input) shaft with a ball thrust bearing between the gears. Front Sun Gear (Low Range Reaction Gear) is integral with flange splined in Low Range Drum so that gear is locked to the shaft when the clutch is engaged (High Range) and is held stationary to serve as a reaction member for the short planetary pinions which mesh with it when the low range drum band is applied (Low Range). Rear Sun Gear (driving sun gear) is splined directly on the input shaft and meshes with the long planetary pinions.

Planetary Pinions–These pinions are three short (large diameter) gears and three long (small diameter) gears mounted alternately around planetary cage (in mesh with pinion on each side). The short pinions mesh with forward sun gear (Low Range Reaction Gear) and with the Planetary Ring Gear which is integral with the Reverse Drum. The long pinions mesh with the rear sun gear (Driving Sun Gear). Planetary cage is integral with the output shaft.

L w Rang Drum & High Rang Clutch Ass mbly–Mounted on input shaft directly in front of planetary pinion cage. Inner clutch member is splined on input shaft and rotates with shaft. Outer clutch member includes the Low Range Drum and front sun gear as well as the clutch engaging hydraulic piston and disengaging spring. Clutch driving plates (with facings) are waved to assist disengagement, and when clutch is disengaged, allows the spring controlled oil vents in the hydraulic piston to be uncovered.

Low Range Brake Band & Engaging Mechanism–This band holds Low Range Drum and front sun gear stationary when it is applied by the Low Range Brake Piston acting through a lever and strut engaging one end of the band. Opposite end of band is anchored by adjusting screw in side of case.

Reverse Drum Band & Engaging Mechanism–Same design as Low Range Band (above). Band holds reverse drum and Planetary Ring Gear stationary when applied.

Parking Brake Mechanism: Consists of a gear splined on transmission output shaft at rear of transmission case and a pawl which engages gear to prevent rotation of shaft when selector lever is placed in "P" parking position. Pawl is operated by a locking lever actuated by the control valve cross-shaft and lever in the transmission.

OPERATION

The torque converter assembly automatically provides a torque multiplication ranging from approximately 2-1/3 to 1 (for starting and heavy loads) to a 1 to 1 ratio (for steady driving and light loads) and is locked out by the Direct Speed Clutch at speeds above 15 MPH in High Range operation under normal driving conditions (can be "Kicked down" at car speeds under 60 MPH). Planetary unit is manually controlled and provides definite gear ratios (in addition to the varying ratios of the Torque Converter) depending on selector lever position. This control is effected through the hydraulic control system by means of oil pressure supplied by front and rear oil pumps in transmission case.

LUBRICATION

Check transmission fluid level every 1000 miles and add fluid as required to maintain level at FULL mark on dipstick. Drain and replace fluid at 25,000 mile intervals.

►*CAUTION: Fluid must only be checked at normal operating temperatures after 1 minute operation at 800 RPM with selector lever in "N" position.*

Checking Fluid Level–With fluid at normal operating temperature, place selector lever in "N" position, idle engine at 800 RPM to fill system, then run engine at low idle while level is being checked, using dipstick in engine compartment on left side.

►*NOTE:* If fluid level doubtful due to bent or distorted dipstick tube, check actual fluid level in transmission as follows: Place car on level floor and allow engine to run at idle speed for five minutes in "N" (Neutral). Place a pan under rear of transmission and remove plug in rear of transmission case. If no oil runs out of opening, add oil until it begins to run out, install plug, then ADD ONE QT. If oil does run out when plug removed at rear of transmission, allow to drain to level of hole, then ADD ONE QT.

Draining & R filling–Remove flywheel housing lower cover and turn flywheel to bring a converter drain plug to the bottom. Place a container under converter and transmission oil pan and then loosen but do not remove converter drain plug. Rotate flywheel to bring the other drain plug to the bottom and remove this drain plug and also the oil pan drain plug and drain fluid. Remove oil filler tube, oil pan, and strainer and thoroughly clean and dry these parts (use compressed air to dry). Reinstall strainer, pan, and tube using new gaskets. Reinstall and tighten converter and oil pan drain plugs (make sure that the drain plug previously loosened is also tightened securely). Install flywheel housing lower cover and tighten retaining screws to 15-18 ft. lbs. (1954 cars), 25-30 ft. lbs. (1955-56 cars). Pour seven quarts of automatic transmission fluid (Type "A") through filler tube in engine compartment. Start engine and allow to run at HIGH IDLE speed for 5 minutes with transmission selector lever in "N" (Neutral) position. Bring engine to slow idle speed and add approximately two to three quarts of fluid, then continue to add only enough to bring fluid level to FULL mark on dipstick.

►*CAUTION: Determine am unt of fluid install d by mark on dipstick rather than by number of qts. install d.*

Recommended Fluid–Packard Twin Ultramatic Transmission Fluid or any Automatic Transmission Fluid Type "A" having an AQ-ATF number and symbol embossed on the container.

LINKAGE ADJUSTMENT

►*ADJUSTMENT NOTE:* Before adjusting linkage, check transmission control and throttle linkage for free operation without binding or lost motion due to wear. Warm up engine and transmission. Adjust engine idle speed to 400 RPM with choke valve wide open and selector lever in a "D" (Drive) position (Block choke valve wide open with a piece of cardboard after engine is stopped to prevent linkage returning to fast idle position while adjustments are being made).

THROTTLE LINKAGE ADJUSTMENT: *S CARBURETOR on individual car mod l pages.*

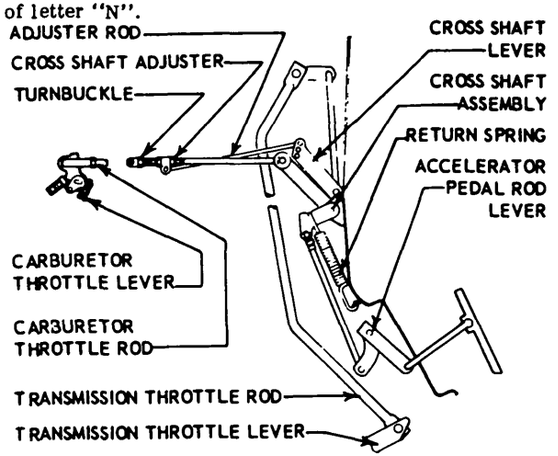
1955-56 HUDSON & NASH

Selector Control Linkage Adjustm nt (Huds n & Nash V8): Place selector lever in "R" (Reverse). Disconnect transmission control lever from control rod at rear of transmission. Move transmission control lever to rear as far as it will go (do not force lever as it may bend stop plate within transmission). Adjust clevis on transmission control rod so that clevis pin fits freely in hole of clevis and transmission lever. Replace cotter key and tighten locknuts on control rod. *NOTE*– If necessary to align selector lever point on steering column, place selector lever in "N" (Neutral) position (noting position of pointer). Remove shroud from jacket tube by removing retaining screw at lower end of shroud and sliding shroud downward and turning upper end toward the right. Lift out of jacket tube. Hold pointer shaft with pliers and move pointer toward

CONTINUED ON NEXT PAGE

TWIN ULTRAMATIC (C nt.)

right or left on shaft to line it up directly under center of letter "N".



1955 PACKARD THROTTLE LINKAGE

ball joint at carburetor throttle lever and hole in bellcrank where rod is attached. Tighten locknuts on turnbuckle.

N utral Saf ty Switch Adjustment: Adjust switch so starter is operative only in "N" and "P" position.

1954-56 PACKARD

S l ctor C ntr l Linkag Adjustment (All Packard): Disconnect forward end of transmission control rod at bellcrank (attached to frame side rail). Pull control rod to its full forward limit which will place the control manual valve in the reverse position. Pull lever at lower end of selector shaft downward to its full limit of travel so it contacts stop on lever bracket. Adjust turnbuckle in lower lever to bellcrank link so that the forward end of the control rod will enter bellcrank, and secure in this position.

N utral Safety Switch Adjustment: Adjust switch so starter is operative only in "N" and "P" position.

1956 STUDEBAKER GOLDENHAWK

Selector Contr l Linkag Adjustment: Disconnect clevis from forward end of control rod at bellcrank. Pull transmission rod to its full forward limit of travel by means of the bellcrank which will place manual valve in the reverse position. Pull control rod down to its full limit of travel. Adjust the clevis so the pin will freely enter clevis and bellcrank arm. Tighten clevis locknut and install cotter pin.

Neutral Safety Switch Adjustment: Switch is located at lower end of steering post jacket. Remove hand control-to-switch rod. Loosen screws attaching switch to jacket. Align pin hole in switch lever with corresponding hole in switch body. Install pin through holes to maintain alignment. Tighten attaching screws and install hand control-to-switch rod.

BAND ADJUSTMENT

ADJUSTMENT NOTE: Adjusting screw and locknut for each band are located on left side of transmission case (Low Range Band), right side (Reverse Band). Both bands are adjusted alike as follows:

Adjustment: Loosen locknut on band adjusting screw and use a torque wrench to tighten adjusting screw (clockwise) to 20 ft. lbs. torque, then **back off adjusting screw 1-3/4 turns.** Tighten locknut.

TROUBLE SHOOTING & DIAGNOSIS

CAR FAILS TO MOVE (Under conditions indicated below):

1) Car fails to move regardless of selector lever position.
(a) Insufficient oil or clogged inlet screen.
(b) Converter valve stuck or pump valve stuck.
(c) Selector control linkage disconnected.
(d) Transmission output shaft broken loose from planetary cage.
(e) Parking gear lever broken which may allow pawl to remain engaged in parking gear.
(f) Low and reverse bands adjusted too tight.
(g) Bushings or bearings seized in the transmission. Noise may or may not be present.

2) Car fails to move in "D" (Drive) range with selector lever in the gear starting position.
(a) Insufficient oil or clogged inlet screen. Loss of pressure to apply side of low range brake.
(b) Selector control linkage disconnected or out of adjustment.
(c) Low range brake band strut out of position or low range brake band badly worn.

3) Car fails to move in "D"(Drive) range with selector lever in high range clutch start position.
(a) Rubber lip seal on high range clutch piston out of position causing piston to leak.
(b) Shift regulator valve stuck or clutch plates worn or burned.
(c) Selector control linkage disconnected or out of adjustment.

4) Car fails to move with selector lever in "L" (Low) position.
(a) Selector control linkage disconnected or out of adjustment.
(b) Worn low range band or band strut out of position.
(c) Low range brake piston jammed or insufficient oil supply to apply side of low range brake.

5) Car fails to move with selector lever in "R" (Reverse) position.
(a) Selector control linkage disconnected or out of adjustment.
(b) Worn reverse brake band or strut out of position.
(c) Manual valve stop inside transmission not adjusted properly allowing the manual valve to over-travel.
(d) Lack of oil to apply side of reverse brake piston caused by a stuck reverse shuttle valve.
(e) Reverse brake piston stuck in housing.

6) Excessive slippage in all driving ranges.
(a) Insufficient oil or low front pump pressure due to sticking pump valve.
(b) Low front oil pump pressure due to ball plugs being out of low range and reverse brake housings, or worn or badly scored pump rotors.
(c) Low oil pressure to the converter caused by a stuck converter valve.

7) Exc ssive drag in "D" (Driv) range using high range clutch start. Als drags in reverse but is all right on "L" (L w) range.
(a) Low range brake band too tight, or low range brake piston stuck and holding brake partly applied.
(b) Transfer tube to release side of low range brake out of position.

8) Excessive drag in both "D" (Drive) ranges. All right in "R" (Reverse) range.
(a) Reverse brake band too tight, or reverse brake piston stuck holding brake partly applied.

9) Car creeps forward in "N" (Neutral).
(a) Low range brake band too tight, or High range clutch plates sticking on splines.
(b) High range clutch piston rubber lip seal out of position causing piston to stick and partly engage clutch.
(c) Low range brake piston stuck holding brake partly applied.

10) Car creeps excessively in any driving range with th engine idling.
(a) Engine idling too fast.

11) Car creeps forward when selector lever is in "R" (Reverse).
(a) Manual valve linkage out of adjustment.

12) Car does not move with the selector lever in "R" (Reverse) position.
(a) Reverse shuttle valve stuck preventing the oil above the reverse brake piston from venting.
(b) Reverse brake band strut out of position.

13) Chatter when starting in "D" (Drive) range using high clutch start.
(a) Low range band dragging, or reverse band dragging.
(b) Worn, burned, or distorted high range clutch plates. Could also be caused by sticking plates or piston.

14) Chatter when starting in "L" (Low) range.
(a) Low range brake band out of adjustment, or reverse range band dragging.
(b) Sticking high range clutch plates or pistons.

15) Chatter when starting in "R" (Reverse) range.
(a) Reverse brake band out of adjustment, or low range band dragging.
(b) Reverse drum (ring gear) bushing badly worn.

16) Drive Clutch fails to engage.
(a) Sticking high speed governor valve, low speed governor valve or direct shift valve. Could also be caused by direct shift throttle valve sticking.
(b) Direct drive clutch piston sticking.

17) Direct drive clutch "hangs on" or fails to releas on deceleration.
(a) Sticking direct shift valve or low speed governor valve.

18) Direct drive clutch engages late and disengages early.
(a) Direct shift valve spring "cocked" in valve bore.
(b) Direct shift throttle valve sticking open.

19) Direct drive clutch slips.
(a) Excessive slippage in direct drive clutch circuit.
(b) Sticking converter valve resulting in high converter pressure while in direct drive.

20) Transmission remains in low range using gear start "D" (Drive) position. Will not upshift from low rang converter to high range converter.
(a) Sticking low-high shift valve or sticking governor valves.
(b) Sticking throttle valve.

CONTINUED ON NEXT PAGE

TWIN ULTRAMATIC (C nt.)

21) Incorrect fr nt il pump pressure.
(a) Low oil level or sticking pump valve.
(b) Ball plugs missing in reverse brake housing.
(c) Sticking pump check valves, or incorrect valve spring. Sticking modulator valve.

22) Incorrect high range clutch pressure.
(a) Sticking shift regulator valve, or sticking low-high shift valve. Incorrect pump pressure.

23) Incorrect low range brake top pressure.
(a) Ball plug missing in low range brake housing.
(b) Sticking low-high shift valve, or incorrect pump pressure.
(c) Threaded plug missing in low range brake housing.

24) Incorrect converter "IN" pressure.
(a) Incorrect front pump pressure
(b) Sticking converter valve.
(c) Loss of pressure in the converter circuit caused by loose or worn bushings.

25) Incorrect direct drive clutch pressure.
(a) Sticking low or high speed governor valves.
(b) Worn or leaking direct drive clutch piston rings.
(c) Loss of pressure through direct drive clutch circuit caused by loose or worn bushings.

26) Incorrect governor pressure.
(a) Sticking low or high speed governor valves.
(b) Governor plate not properly installed

27) Incorrect throttle pressure.
(a) Throttle pressure adjusting screw not properly set.
(b) Throttle linkage not properly set or is binding
(c) Throttle valve sticking.

HYDRAULIC PRESSURE TESTS

►*NOTE.* Before making following tests, check fluid level in transmission. Road test car by driving under conditions simulating heavy traffic and highway operation (frequent stops and starts, low speed, medium speed, and accelerating). If transmission does not operate satisfactorily after engine and transmission thoroughly warmed up, make hydraulic tests as outlined below.

►*SPECIAL HYDRAULIC TESTING TOOL NOTE·* For Nash & Hudson, use Tool Set J-5975. For Packard models, use Tool Set PU-300, and Pan Adapter PK-23 These tool sets are comprised of gauges, fittings, flexible tubing, and special pan adapters.

TEST GAUGE INSTALLATION (HUDSON & NASH): Fold floor mat away from left side of front seat to uncover floor hole cover. Remove cover and insert flexible pressure gauge lines supplied with Tool J-5875 to the transmission Remove plug in transmission and connect line fitting to correct passage for desired hydraulic test (see Test Plug Location in illustration)

TEST GAUGE INSTALLATION (PACKARD): Remove flexible tubing from left hand fresh air duct and thread gauges through the fresh air grille, out of air duct and down to transmission Attach hoses to desired points on transmission (see Test Plug Location in illustration).

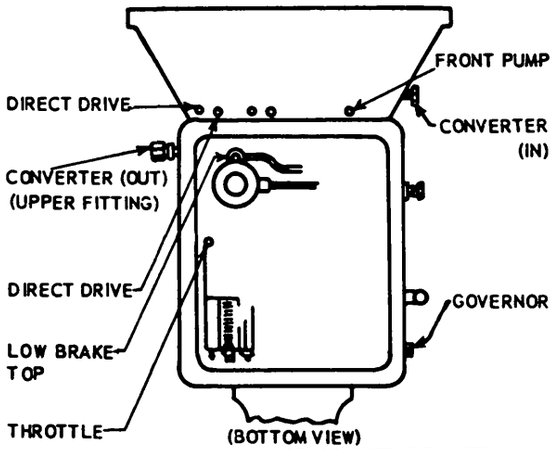
TEST GAUGE INSTALLATION (STUDEBAKER): Remove oil inspection hole cover in floor mat and thread hoses through hole

FRONT PUMP PRESSURE: Connect gauge to front pump test point at front of transmission case (left side). On all models, operate engine at 400 RPM. Normal oil pressure should be 80-95 lbs (1954 Packard), 80-110 lbs (1955 models), 90-120 lbs (1956 models) With selector lever in all positions

With Selector Lever in °D Range: Drive car at 15-20 MPH Maximum pressure should be 150-160 lbs (1954 Packard) 150-170 lbs (1955 models), 160-180 lbs (1956 models), at full throttle before Direct Drive Clutch engages

With Selector Lever in D° Range: Maximum pressure should be 140-150 lbs (1954 Packard), 80-120 lbs (1955 Packard), 140-160 lbs (1955-56 Hudson & Nash), 160-180 lbs (1956 Packard & Studebaker), at full throttle before Direct Drive Clutch engages

With Selector Lever in L Range: Drive car at 25 MPH Pressure should be 120-130 lbs (1955 Packard), 160-180 lbs (1956 Packard & Studebaker), at full throttle



TWIN ULTRAMATIC HYDRAULIC TEST POINTS

HIGH RANGE CLUTCH PRESSURE: *(NOTE–Leave gauge connected for "Front Pump Pressure" test above).* Connect another gauge to high range clutch pressure point at front of transmission (right side). In the following tests, High Range Clutch Pressure should be the same or not more than 10 lbs. under Front Pump Pressure.

With Selector Lever in °D Range· Operate engine at 400 RPM High Range Clutch Pressure should be 75-90 lbs (1954 Packard), 70-100 lbs (1955 Packard), 70-110 lbs (1955-56 Hudson & Nash), 80-100 lbs (1956 Packard & Studebaker) Front Pump Pressure should be 80-95 lbs (1954 Packard) 80-110 lbs (1955-56 Hudson & Nash), 90-120 lbs (1956 Packard & Studebaker)

With Selector Lever in °D Range· Drive car at 15-20 MPH (Converter Drive) High Range Clutch Pressure should be 145-155 lbs (1954 Packard), 145-165 lbs (1955 Packard, 1955-56 Hudson & Nash), 60-80 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Range : Operate Engine at 400 RPM High Range Clutch Pressure should be at Zero pressure Front Pump Pressure should be 80-95 lbs (1954 Packard), 80-110 lbs (1955 Packard, 1955-56 Hudson & Nash), 90-120 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Rang : Drive car at 20 MPH (Direct Drive) with a steady throttle High Range Clutch Pressure should be 55-65 lbs (1954-55 Packard, 1955-56 Hudson & Nash), 60-70 lbs (1956 Packard & Studebaker)

LOW BRAKE TOP PRESSURE: *(NOTE–Th pr ssure point for this test and for Throttle Pr ssur is located on the control valve assembly. A sp cial oil pan adapter is used and a special procedure is required. Connections for both tests sh uld be mad at th same time. See "Low Brake Top Pr ssur & Thr ttle Pr ssure Test Connection Note" below).* Pressure should be the same or not more than 10 lbs. under Front Pump Pressure.

With Selector Lever in °D Rang : Operate engine at 400 RPM Low Brake Top Pressure should be 75-90 lbs (1954 Packard), 70-100 lbs (1955 Packard, 1955-56 Hudson & Nash), 75-105 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Rang : Operate engine at 400 RPM Low Brake Top Pressure should be at Zero pressure Front Pump Pressure should be 80-95 lbs (1954 Packard), 80-110 lbs (1955 Packard, 1955-56 Hudson & Nash), 75-105 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Rang : Immediately after upshift, Low Brake Top Pressure should be 40-65 lbs (1954-55 Packard, 1955-56 Hudson & Nash), 65-85 lbs (1956 Packard & Studebaker)

CONVERTER "IN" PRESSURE: Connect gauge to converter "in" test point on left side of transmission converter housing

With Selector Lever in D° Rang : Operate engine at 400 RPM Pressure should be 60-70 lbs (1954 Packard), 30-50 lbs (1955 Packard, 1955-56 Hudson & Nash), 10-30 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Rang : Drive car at 15 MPH (before Direct Drive) Pressure should be 70-80 lbs (1954 Packard), 55-80 lbs (1955 Packard, 1955-56 Hudson & Nash), 45-70 lbs (1956 Packard & Studebaker)

With Selector Lever in D° Range: Drive car at a speed to engage Direct Drive Clutch Pressure should be 15-25 lbs (all models)

With Selector Lever in D° Rang : In "Kickdown" position, converter pressure should be 70-80 lbs (1954 Packard), 70-85 lbs (1955 Packard, 1955-56 Hudson & Nash), 90-100 lbs (1956 Packard & Studebaker)

CONVERTER "OUT" PRESSURE: To check converter "out" pressure a special tee connection is required (install and braze a 1/8" nipple into one end of the 1/8" tee). Remove upper oil cooler tube adapter from side of bell housing. Install oil cooler tube adapter in the tee and reconnect cooler tube. Connect gauge to tee connection.

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TWIN ULTRAMATIC (Cont.)

With Selector Lever in D° Range: Drive car at 15-18 MPH. "Out" (Converter Drive) pressure should be 30-40 lbs. (1954 Packard), 25-40 lbs. (1955 Packard, 1955-56 Hudson & Nash), 25-35 lbs. (1956 Packard & Studebaker).

DIRECT DRIVE PRESSURE: Connect gauge to direct drive test point at front of transmission (right side), and another gauge to front pump test point at front of transmission (left side). Direct drive pressure should be the same or not more than 10 lbs. under front pump pressure.

With Selector Lever in D° Range: Drive car at 15-18 MPH. Direct Drive Pressure should be Zero pressure before Direct Drive Clutch engagement. Front Pump Pressure should be 80-95 lbs. (1954 Packard), 70-100 lbs. (1955 Packard, 1955-56 Hudson & Nash), 70-100 lbs. (1956 Packard & Studebaker). After Direct Drive Clutch engagement, Front Pump Pressure should be Zero (all models), Direct Drive Pressure should be 55-65 lbs. (1954-55 Packard, 1955-56 Hudson & Nash), 60-70 lbs. (1956 Packard & Studebaker). After kickdown, Direct Drive Pressure should be at Zero. Front Pump Pressure should be 140-160 lbs. (1954-55 Packard, 1955-56 Hudson & Nash), 145-165 lbs. (1956 Packard & Stude-Studebaker).

GOVERNOR PRESSURE: Connect gauge to governor pressure test point on left side of transmission case (rear). Pressures should be as follows:

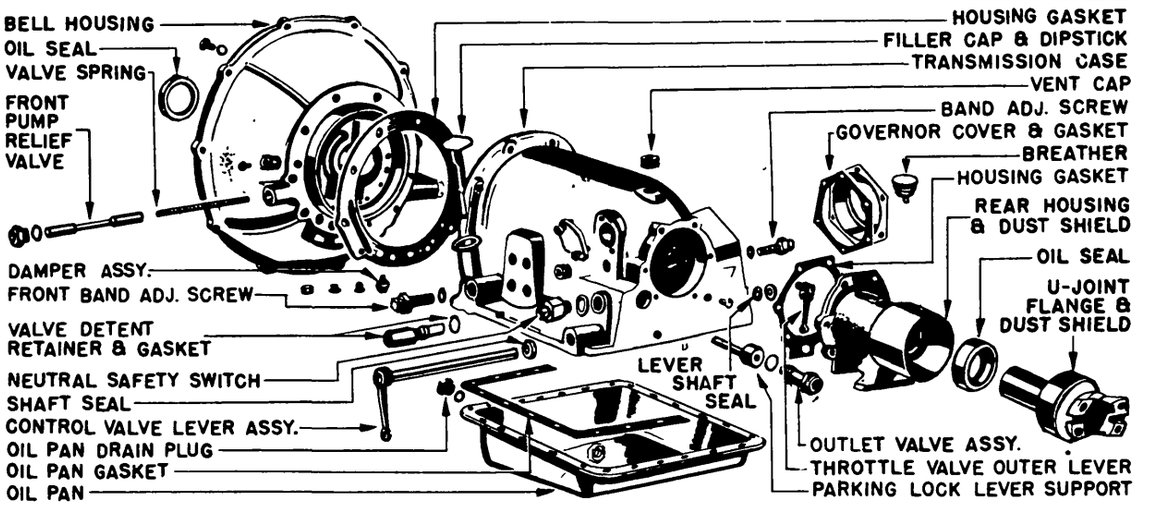
1954 Packard, 1955-56 Hudson & Nash - 15-20 lbs. at 13 MPH. 30-35 lbs. at 28 MPH. 55-65 lbs. at 56 MPH.

1955 Packard - 15-18 lbs. at 13 MPH. 35-40 lbs. at 28 MPH. 62-69 lbs. at 56 MPH.

1956 Packard & Studebaker - 11-14 lbs. at 13 MPH. 37-41 lbs. at 28 MPH. 47-54 lbs. at 56 MPH.

THROTTLE PRESSURE: *(NOTE-The pressure point for this test and for Low Brake Top Pressure is located on the control valve assembly. A special pan adapter is used and a special procedure is required. Connections for both tests should be made at the same time. See "Low Brake Top Pressure & Throttle Pressure Test Connection Note" below).* Operate engine at 400 RPM. Throttle pressure should be 20-25 lbs. (1954 Packard). 23-26 lbs. (1955 Packard, 1955-56 Hudson & Nash), 25-29 lbs. (1956 Packard & Studebaker). At full throttle, pressure should be 65-72 lbs. (1954-55 Packard, 1955-56 Hudson & Nash), 75-85 lbs. (1956 Packard & Studebaker). In "kickdown" (before downshift), pressure should be 80-95 lbs. (1954-55 Packard, 1955-56 Hudson & Nash), 120-140 lbs. (1956 Packard & Studebaker).

Throttle Pressure Adjustment: Before adjusting throttle pressure, check all of the throttle linkage adjustments (see "Throttle Linkage Adjustment" above). The throttle pressure adjusting screw can be reached from the right side of the transmission case with the Oil Pan Adapter, PK-23 (Packard), or Oil Pan Adapter, J-5975 (Nash & Hudson) in place as described in "Low Brake Top Pressure & Throttle Pressure Test Connection Note" below. Use two wrenches through



TWIN ULTRAMATIC TRANSMISSION CASE ASSEMBLY

opening. Loosen locknut and turn adjusting screw to obtain correct throttle pressure (see "Throttle Pressure" above). Be sure to recheck throttle pressure after locknut is tightened.

►*LOW BRAKE TOP PRESSURE & THROTTLE PRESSURE TEST CONNECTION NOTE:* These two connections are located on the throttle control valve assembly within the transmission oil pan. Drain transmission fluid and remove transmission oil pan and screen. Install special test pan adapter, PK-23 (Packard), J-5975 (Nash & Hudson), with the adapter tube on the left side and toward front of car. Thread two of the gauge hoses through elbow tube on the adapter. Remove the 1/8" pipe plug from bottom of low brake housing and install a 1/8" elbow. Connect gauge hose. Remove 1/8" pipe plug from throttle valve body, install a 1/8" elbow and connect other gauge hose. On Packard, install the two oil suction tube extensions to suction tubes, install oil pan and gasket and replace transmission fluid.

TRANSMISSION REMOVAL

1955-56 HUDSON & NASH

►*NOTE: The transmission and converter are removed from the chassis as an assembly.*

1) Raise car on lift or raise car at both ends and support it with jack stands under side sills. Drain fluid from transmission and converter assembly *(see "Draining & Refilling" above).*

2) Disconnect torque tube and propeller shaft from transmission. Disconnect throttle valve linkage and selector control linkage at transmission. Disconnect speedometer cable and cooler lines at transmission.

3) Support engine at rear using a support beam across frame channels or with a large block and hydraulic jack under rear end of engine oil pan. Raise engine and transmission just enough to take load off rear support under transmission rear housing. Remove the insulator to support nuts and washers and then remove the support to cross member bolts and remove support.

4) Place a transmission lift under transmission with the lift adapter properly positioned around oil pan. Pick up transmission load by slightly raising the lift.

5) Remove direct drive clutch housing to flywheel retaining nuts and slide converter assembly toward transmission. Remove the bell housing to flywheel capscrews and then move transmission rearward until the direct drive housing is clear of the flywheel. Wire converter assembly to bell housing so that it cannot accidentally slide off the input shaft.

6) Lower transmission lift and pull it from under car. Transfer transmission assembly to a reconditioning stand.

1954-56 PACKARD

►*NOTE: Transmission and converter are removed from chassis as an assembly.*

1) Raise car on lift or raise car at both ends and support with jack stands under side sills. *(CAUTION-Do not place jack or other lifting device under rear load arms or any other part of Torsion Level Suspension assembly).*

2) Disconnect propeller shaft at both ends and remove shaft. Disconnect throttle valve linkage and selector control linkage at transmission. Disconnect speedometer cable and cooler lines at transmission.

3) Support engine at rear using a support beam across frame channels or with a large block under rear of engine oil pan and a hydraulic jack. Raise engine and transmission just enough to take the load off rear support under transmission rear housing. Remove insulator to support nuts and washers and then remove the support to "X" member bolts and remove the support.

4) Place a transmission lift under transmission with lift adapter properly positioned around the oil pan. Pick up the transmission load by slightly raising the lift. Remove direct drive clutch housing to flywheel retaining nuts and slide converter assembly toward transmission.

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TWIN ULTRAMATIC (C nt.)

5) Remove the bell housing to flywheel housing capscrews and then move transmission rearward until the direct drive clutch housing is clear of flywheel. Wire the converter assembly to bell housing so it cannot accidentally slide off input shaft.

6) Lower transmission lift and pull it from under the car.

1956 STUDEBAKER GOLDENHAWK

1) Remove cable from positive battery terminal. Raise car on hoist to provide working clearance and remove left exhaust pipe. Disconnect wires from starter motor. Remove flywheel housing lower cover retaining capscrews and remove lower cover.

2) Rotate engine flywheel until one converter drain plug is at bottom and loosen, but do not remove the drain plug. Rotate flywheel 180° and remove other drain plug. Remove transmission drain plug. Replace and tighten all plugs after converter and transmission drained.

3) Disconnect front propeller shaft at transmission companion flange and tie to right side of frame out of the way. Disconnect throttle valve and manual valve linkage at transmission. Disconnect selector to bellcrank linkage by removing the cotter pin from clevis at bellcrank. Remove bolts and nuts holding bellcrank to transmission bracket, and to frame bracket and remove bellcrank. Disconnect speedometer cable and transmission cooler lines. Remove dipstick tube.

4) Support engine at rear using a support beam across frame channels or with a large block under rear end of engine oil pan and a hydraulic jack. Raise engine and transmission enough to take load off rear engine support cross member under the transmission rear housing Remove cross member retaining bolts and slide cross member to rear.

5) Remove body front pillar support cross member. Place transmission jack under transmission with saddle adapter J-6316, properly positioned around oil pan Take up transmission load slightly by raising jack. Remove direct drive clutch housing-to-flywheel retaining nuts and slide converter assembly toward transmission. Remove bell housing-to-flywhe el housing capscrews and then move transmission rearward until direct drive clutch housing is clear of flywheel. Wire converter assembly to bellhousing so that it cannot slide off the input shaft.

6) Lower transmission on jack and pull jack and transmission from under car. Remove bellcrank bracket from transmission. Remove converter and place on bench

TORQUE CONVERTER OVERHAUL

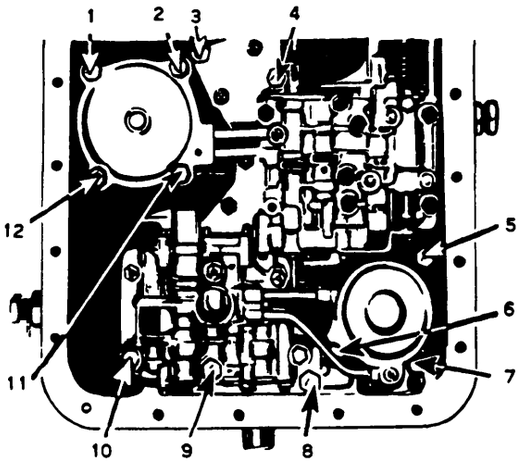
►*TORQUE CONVERTER OVERHAUL CAUTION: This unit is accurately balanced at the factory by welding lugs to the direct drive clutch housing. It is very important that the original balance be maintained at overhaul by marking the various parts of the converter during disassembly to insure their being installed in the same relative position at reassembly.*

►*SERVICE REPLACEMENT CONVERTER CLUTCH BALANCING NOTE:* These units are individually balanced and may or may not have balance lugs attached to the flange with drive screws. A new pump with a balance lug may be installed with the balance lug at any position in relation to the lug on the direct drive clutch housing without affecting converter assembly balance.

►*REACTION SHAFT ENDPLAY CAUTION:* Before disassembling torque converter, check the reaction shaft endplay to determine if a new thrust washer is needed for reassembly.

Reaction Shaft Endplay Check: With converter on bench, measure reaction shaft endplay. On Packard, use Dial Indicator and Special clamp, PK-306 along with Reactor Checking Tool PK-27. Insert tool PK-27 through reactor shaft and expand tool so it grips the first turbine hub. Attach clamp and indicator, then raise the checking tool and note indicator reading. Make a note of the indicator reading to be used as reference when reassembling the unit. The specified endplay is .010" to .017".

Disassembly: Scribe a line on converter pump and clutch housing. Remove converter pump to direct drive clutch housing nuts, washers and bolts. Tap the pump with a plastic tipped hammer to loosen it, then lift off pump and remove the reactor thrust spacer. Remove large rubber "O" ring from pump. Remove the second turbine to first turbine capscrews and washer and lift off second turbine. Remove the reactor thrust washer from shaft and lift out the reactor shaft and reactor as an assembly. Remove the reactor shaft front thrust washer. Lift out the first turbine and the first turbine hub thrust washer. Using a scratch-awl, scribe marks on the clutch housing and the pressure plate to insure reassembly in the same position, and then remove the plate retaining screws and lift out the pressure plate and driven plate. Scribe a mark on clutch piston to line up with the mark made on the clutch housing. Lift out four pressure plate spacers and lift out the clutch piston. Remove the four large piston rings from piston and also remove the small inner ring from hub



CONTROL VALVE ASSEMBLY RETAINING SCREW DIAGRAM

of clutch housing. Lift reactor shaft out of reaction clutch in hub of reactor. Remove reaction clutch bearing plate and a retaining ring. Remove reaction clutch bearing plates, washers, springs and sprags and then lift the reaction clutch outer race out of hub of reactor.

Cleaning & Inspection: Wash all parts in clean solvent and dry with compressed air. Inspect all contact and mounting surfaces for nicks, burrs, distortion, warping or low spots. Inspect all bolts and capscrews for worn threads and see that bolt holes not worn or cracked. Inspect machined area around vanes, torus ring, and turbine hub for wear or rubbing conditions indicating worn bearings or thrust plates. Check clutch driven plate for worn facing, loose springs, worn splines or thrust bearing. Inspect clutch movable plate and piston ring. Inspect all bearing surfaces for wear, pits, or scores. Clean and inspect all oil passages leading from input shaft bearing to direct drive clutch piston

Reassembly: 1) Install reaction clutch bearing plate and a retaining ring in hub of reactor at coned or forward end Place reactor on bench with coned end downward and insert the outer race. Place one of the washers in the race and then place one of the circular springs on top of the washer *(NOTE–Before installing the sprags check direction of groove as follows The centerline of the spring groove in the sprag is at an angle less than 90° in relation to the flat back portion of the sprag. In other words, the groove is pointing toward the left when viewed facing the flat back portion of the sprag. Sprags must be installed in the correct direction for proper operation).* Place the first sprag in the race at approximately the three o'clock position, with the bottom groove over the spring, the top groove pointing inward toward the left or center and the nose of the sprag pointing in a counter-clockwise direction. Follow this procedure to install the rest of the sprags *(CAUTION–The reactor must be in th b nch with the coned side down when installing th sprags as described above).* Install circular spring in the sprag grooves and place the large washer over the sprags. Install bearing plate and lock ring.

2) Insert the reactor shaft into the overrunning clutch with smooth bearing surface of shaft in contact with the sprags *(NOTE–If shaft cann t b ins rted into the clutch, one or more of th sprags hav b n installed incorrectly).* When shaft has been installed, hold the reactor and rotate the shaft. The shaft should turn freely when rotated clockwise and should lock up when rotated counter-clockwise.

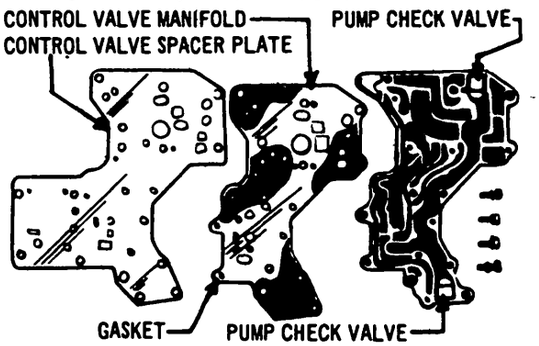
3) Insert the direct drive clutch piston inner ring into the piston bore and check the gap. Specified ring gap is .005-.010". Install the ring in its groove on the hub of the direct drive clutch housing and make certain it is free in the groove. Install the four piston outer rings on the piston and rotate them on installation so that the gaps are 90° apart. Centralize the inner ring in its groove in hub of the clutch housing and then push the piston into housing lining up the marks scribed at disassembly. Place the four spacers in the clutch housing locating them on the bosses provided. Place the driven plate on the piston lining up the marks scribed at disassembly (make certain that the spacers have not been knocked off the bosses). Install and tighten the retaining screws to 18-20 ft. lbs.

4) Place first turbine hub thrust washer on hub of direct drive clutch housing *(CAUTION–This thrust*

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TWIN ULTRAMATIC (Cont.)

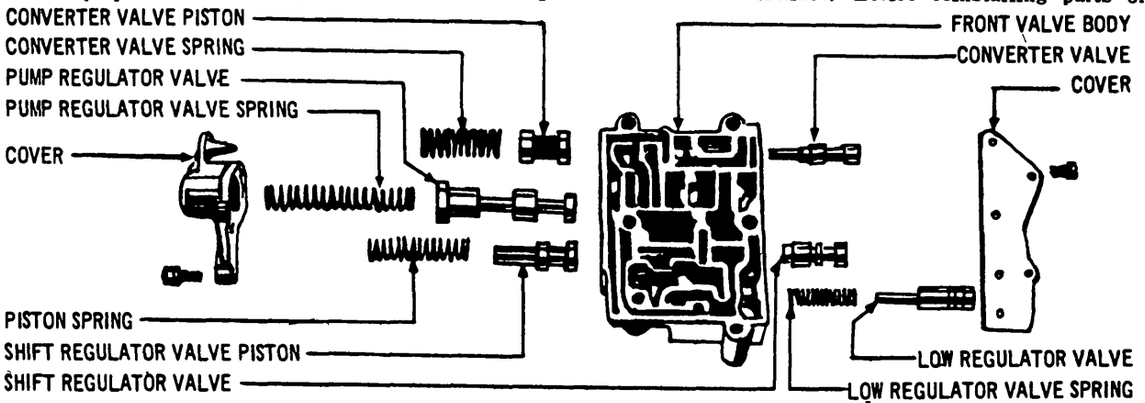
washer controls reactor shaft endplay. Seven thrust washer sizes are available in .008" graduations ranging from .062" to .110" in thickness. Refer to reactor endplay note made on disassembly and select a washer to provide .010" to .017" endplay). Centralize the driven plate in clutch housing and insert the first turbine splined hub into driven plate hub. Place reactor shaft front thrust washer on hub of first turbine and install reactor shaft and reactor as an assembly. Install second turbine, attaching screws and washers and tighten screws to 12-15 ft. lbs. Install reactor rear thrust washer. Place a new "O" ring around pump flange and install converter pump on clutch housing lining up the marks scribed in housing and pump at disassembly. Install four retaining bolts, nuts and washers approximately 90° apart and finger tighten the nuts. Using a wrench, tighten the nuts 1/4 turn at a time until pump flange is fully seated on the clutch housing flange *(NOTE–It is important that the above tightening procedure be followed to prevent undue stress being placed on pump flange at any one point).* Check reactor shaft endplay and if not within limits of .010-.017", a new first turbine hub thrust washer of the proper thickness must be installed to bring endplay within correct limits. When endplay is correct, install the remaining bolts, washers, and nuts and torque tighten evenly to 20-25 ft. lbs.



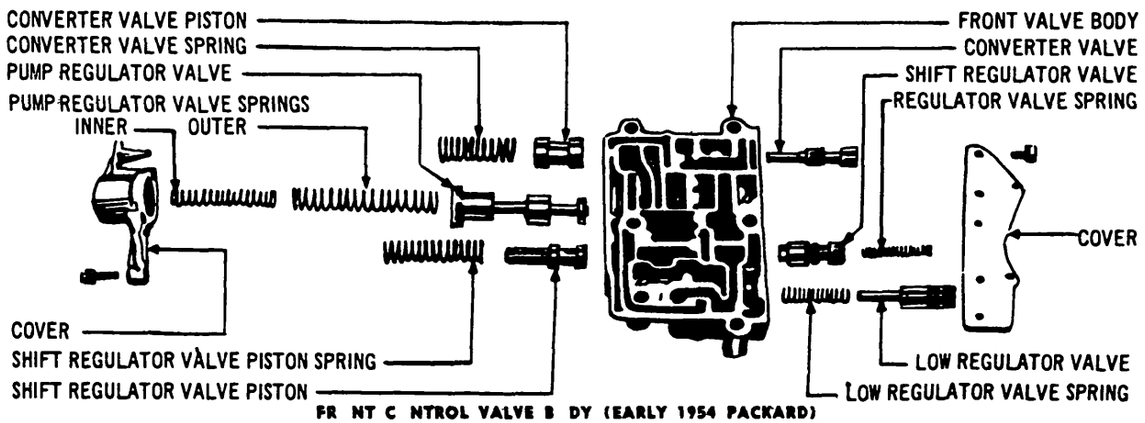
MANIFOLD BODY ASSEMBLY

TRANSMISSION DISASSEMBLY

►*TRANSMISSION CLEANING & INSPECTION CAUTION:* When a part of assembly is removed or disassembled it should be thoroughly cleaned in solvent and blown dry with compressed air. If a cloth is used it should be clean and lintless. Before reinstalling parts or reassembling units, all parts should be thoroughly inspected. When inspecting gears, pinions, or splined shafts, check all teeth for nicks or burrs and clean up as necessary, using an abrasive stone having a fine grit. Check the fit of all mating parts. Excessive clearance should not exist nor should parts be excessively tight. When inspecting any part having oil passages, blow compressed air through these passages. The friction facings and linings in clutch plates and brake bands should not be loose, have excessive wear, or be improperly bonded. Areas in contact with facings and linings should be inspected for scores or distortion. Check all castings for cracks or sand holes. Gasket contact area should be clean, smooth and free from deep scratches which would permit oil to pass gasket. Use new gaskets when reassembling transmission. Control valves should be very closely inspected for nicks and burrs and if necessary, cleaned up with a fine abrasive stone. Check to see that each valve moves freely of its own weight in its respective bore.



FRONT CONTROL VALVE BODY (LATE 1954 & 1955 PACKARD, HUDSON & NASH)



FRONT CONTROL VALVE BODY (EARLY 1954 PACKARD)

TRANSMISSION OVERHAUL (TRANSMISSION UNITS)

1) Invert transmission and remove oil pan. Remove oil cooler tube adapter and then extract oil transfer tubes from side of transmission housing. Remove the transmission to bell housing retaining bolts and remove bell housing and front oil pump assembly.

2) Place selector lever on side of transmission in "Park" position to lock output shaft then remove the long through bolt from end of output shaft. Remove the six rear housing to case retaining screws and washers and remove the rear housing assembly. Extract rear housing spacer from inside parking gear hub.

3) Rotate parking gear so that governors are in line with openings in case and then lift out parking gear and governors as an assembly. Loosen brake band screw lock nuts and then back out and loosen both the low and reverse band adjusting screws. Pull out the rear oil pump suction jumper tube.

4) Remove manual valve lever to link pin. Remove the five capscrews holding control valve assembly to case, and the seven screws holding the low range brake and reverse range brake to case. Lift control assembly and brakes out of case as an assembly.

5) Remove high range clutch assembly working it out through front of transmission case. Remove low range brake band through front of case. Using a dummy input shaft, lift the planetary assembly out through front of case and remove the reverse range brake band.

6) Extract rear oil pump governor jumper and discharge jumper oil tube from case with long nose pliers. Remove rear oil pump retaining screws and lock washers and lift out the pump noting the planetary ring gear thrust washer on pump hub. With a small punch, tap out the parking lock operating lever index pin.

7) Remove manual valve inner lever set screw locknut, remove stop plate, and then back out setscrew. Loosen manual valve outer lever setscrew locknut at end of shaft on outside of case, then back out setscrew and nut and remove lever. Using a long punch, tap inner end of manual valve lever shaft to start shaft and seal out of case. Hold inner lever, spring and operating

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TWIN ULTRAMATIC (C nt.)

lever and pull shaft, seal, washer, and retaining ring out of case.

8) If parking lock lever is to be removed, work through front of case and release lever support retaining ring using a pair of tru-arc pliers. With a long punch, tap front end of lever support to start it out of case and then remove the support, lever, and spring. Tap inner end of throttle valve inner lever to push seal out of case, and remove seal, washer and retaining ring. Slide lever out of case. Back out brake band adjusting screws and pull out anchor pins from inside of case. Remove breather from side of case.

CONTROL VALVE

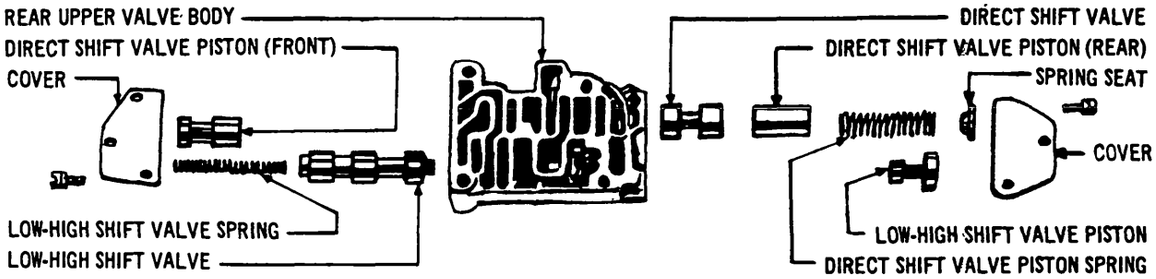
►*CONTROL VALVE ASSEMBLY NOTE:* Valve assemblies for the various models are different. Appearance and service procedures are similar, the difference being in the valve, valve springs and passages.

Disassembly: Remove front valve body assembly retaining screws, washers and lockwashers and remove body assembly. Remove rear lower body to rear upper body and to manifold screws, washers and lockwashers and remove the two body assemblies. Remove separator plate to manifold screws and washers and lift off plate and gasket (Note front & rear pump check valves in manifold).

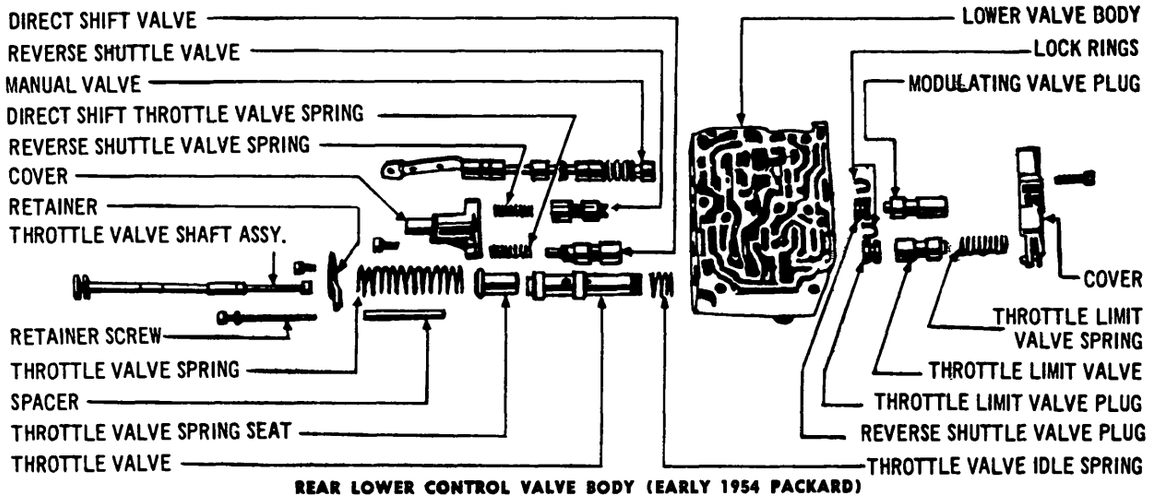
►*THROTTLE VALVE ADJUSTING SCREW CAUTION: The setting of this screw should never be changed and should be left intact in the detent housing when disassembling and assembling the control valve assembly. Special equipment is required to set the throttle pr ssure which must be adjusted with transmission in the car and operating. If adjustment made necessary by removal, see adjusting procedure outlined in "Hydraulic Pressure Test" above.*

►*NOTE:* It is not necessary to remove the Reverse Shuttle Valve Plug and Throttle Limit Valve Plug in Rear Lower Valve Body. These plugs are held in place with lock rings located in elongated holes.

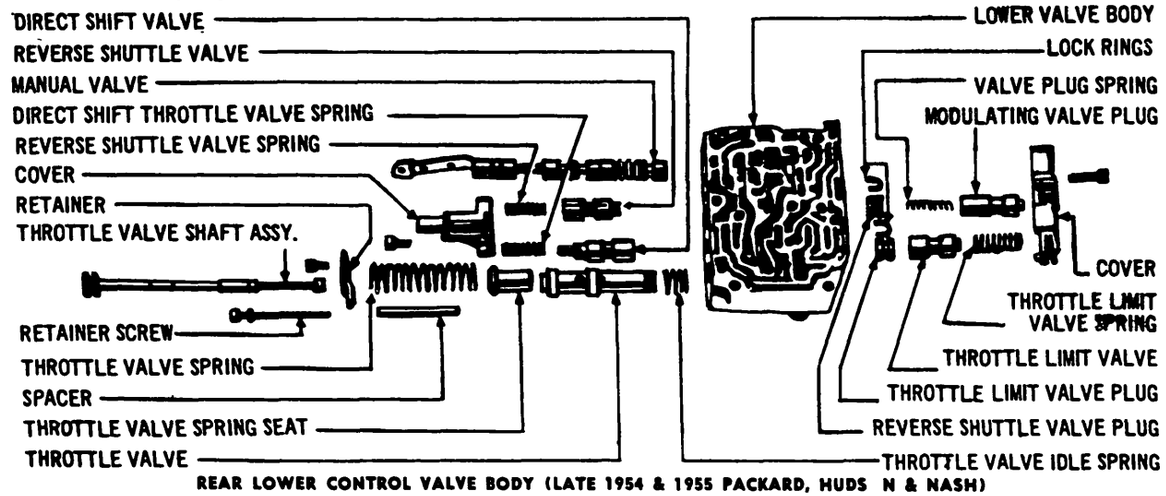
Valve & Valve Spring Removal (from the three valve housings): It is recommended that each control valve sub-assembly be disassembled, thoroughly cleaned, inspected and reassembled one at a time. To facilitate reassembly, the sub-assembly details should be placed on the bench in the order in which they were removed. See Control Valve Assembly illustrations for location of valves and springs.



REAR UPPER CONTROL VALVE BODY (LATE 1954 & 1955 PACKARD)



REAR LOWER CONTROL VALVE BODY (EARLY 1954 PACKARD)



REAR LOWER CONTROL VALVE BODY (LATE 1954 & 1955 PACKARD, HUDS N & NASH)

►*DIRECT SHIFT VALVE PISTON SPRING PRODUCTION CHANGE: The Direct Shift Valv Spring Part N . 6470186 replaced in production and for servic by Part No. 6470055.*

CONTROL VALVE ASSEMBLY SPRINGS: The springs used in the various valve housings are different and are identified as follows:

Late 1954 & 1955 Packard Rear Upper Valve B dy

Valve Spring	Fr L ngth	N . C ils	O.D.
Direct Shift Valve Piston	2-5/64"	16-1/2	.440"
Low High Shift Valve	2-5/64"	33	.250"

1955 Hudson & Nash Rear Lower Valv B dy

Valve Spring	Fr L ngth	N . Coils	O.D.
Reverse Shuttle	1-3/32"	13	.330"
Direct Shift Throttle	1-13/32"	13-1/2	.412"
Throttle Valve Idle	21/32"	5	.654"
Throttle Valve	2-25/32"	14	.784"
Throttle Limit Valve	1-7/32"	9-1/2	.550"
Modulating Valve	1-3/32"	13	.330"

CONTINUED ON NEXT PAGE

TWIN ULTRAMATIC (Cont.)

1955 Hudson & Nash Front Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Converter Valve	1-3/4"	11-1/2	.580"
Pump Regulator Valve	3-21/32"	19	.650"
Shift Regulator Valve Piston	2-3/16"	16	.477"
Low Regulator Valve	1-17/32"	16	.400"

1955 Hudson & Nash Rear Upper Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Direct Shift Valve (Early)	2-5/32"	17	.440"
Direct Shift Valve (Late)	1-27/32"	13-1/2	.440"
Low High Shift Valve	2-5/64"	33	.250"

1954 Packard (Early) Rear Lower Valve Body

Valve Spring	① Free Length	No. Coils	O.D.
Reverse Shuttle	1-3/32"	13	.330"
Direct Shift Throttle	1-17/32"	15	.400"
Throttle Valve Idle	21/32"	5	.654"
Throttle Valve	2-25/32"	14	.784"
Throttle Limit Valve	1-7/32"	9-1/2	.550"

1954 Packard (Early) Front Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Converter Valve	1-3/4"	11-1/2	.580"
Pump Regulator Valve ②	2-7/32"	19	.400"
Pump Regulator Valve ③	3-1/4"	19	.525"
Shift Regulator Valve Piston	2-3/16"	16	.477"
Shift Regulator Valve	1-1/2"	24	.250"
Low Regulator Valve	1-17/32"	16	.400"

① —Approx. ② —Inner Spring. ③ —Outer Spring.

1954 Packard (Early) Rear Upper Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Direct Shift Valve Piston	2-5/32"	17	.440"
Low High Shift Valve	2-5/64"	33	.250"

Late 1954 & 1955 Packard Rear Lower Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Reverse Shuttle	1-3/32"	13	.330"
Direct Shift Throttle	1-13/32"	13-1/2	.412"
Throttle Valve Idle	21/32"	5	.654"
Throttle Valve	2-25/32"	14	.784"
Throttle Limit Valve	1-9/32"	9-1/2	.550"
Modulating Valve	1-3/32"	13	.330"

Late 1954 & 1955 Packard Front Valve Body

Valve Spring	Free Length	No. Coils	O.D.
Converter Valve	1-3/4"	11-1/2	.580"
Pump Regulator Valve	3-21/32"	19	.650"
Shift Regulator Valve Piston	2-3/16"	16	.477"
Low Regulator Valve	1-17/32"	16	.400"

1956 Packard & Studebaker Rear Lower Valve Body

Valve Spring	Free Length	O.D.
Reverse Shuttle Valve	1 3/32"	.330"
Direct Drive Valve	1 3/8"	.418"
Throttle Valve Idle	1 37/64"	.654"
Throttle Limit Valve	1 15/64"	.550"
Throttle Valve	2 13/32"	.802"
Modulating Valve	1 3/32"	.330"

1956 Packard & Studebaker Rear Upper Valve Body

Valve Spring	Free Length	O.D.
Direct Shift Valve Piston	2 5/32"	.440"
Low High Shift Valve	2 5/64"	.250"

1956 Packard & Studebaker Front Valve Body

Valve Spring	Free Length	O.D.
Converter Valve	1 11/16"	.590"
Pump Regulator Valve	3 21/32"	.650"
Shift Regulator Valve Piston	2 3/16"	.477"
Low Regulator Valve	1 1/2"	.408"

Reassembly: Place check valves in the manifold (if removed) and then assemble gasket and separator plate to manifold. Assemble valve, plugs and springs to the valve bodies. Assemble valve bodies to manifold but do not tighten retaining screws at this time as they will be torqued when assembled to the transmission case.

REVERSE BRAKE

Disassembly: Remove brake housing cap retaining ring with a screw driver and lift out cap, piston, seal and guide pin as an assembly. If cap sticks in housing, invert and support assembly on blocks and lightly tap end of guide pin with a fibre or brass drift. Using a sleeve approximately 7/8" long and 1" inside diameter, clamp piston and guide pin in a vise to compress the spring washer and then remove retaining snap ring. Remove from vise and take out piston and ring assembly and dished spring washer.

Reassembly: Place piston seal or ring in housing bore and check ring gap (1954-55 Packard, .002-.007"), (1955-56 Nash & Hudson, 1956 Packard & Studebaker, .002-.014"). Drop the spring washer in housing with the concave or dished side upward. Place ring on piston and make certain the ring is free in ring groove. Install piston and ring in housing by tilting piston to compress ring while pushing piston downward. Using the same sleeve used for removal, compress spring washer in a vise and install retaining ring.

LOW RANGE BRAKE

Disassembly: Position Piston Remover & Replacer Tool PK25 (Packard), J-5977 (Hudson & Nash) so that open lower end of tool clears forward edge of bench. Drill two holes in bench and attach tool. Place low range brake in tool and secure it with the two special screws. Place cupped adapter on the center of brake housing cover turn down the adjusting screw making sure that the lower end enters hole in adapter. Tighten adjusting screw a turn or two to relieve the pressure on the retaining ring and then remove retaining ring with a screw driver. Slowly loosen adjusting screw taking particular note that brake piston cover raises as adjusting screw is loosened. If cover is sticking in brake housing, use a punch and hammer and tap lower end of piston shaft upward to loosen cover. Slowly loosen screw until brake piston and springs are free. Remove assembly from tool and take out cover, piston, seal, washer, shaft and inner and outer springs.

Reassembly: Place piston ring in housing bore and check the gap (1954-55 Packard, .002-.007"), (1955-56 Nash & Hudson, .002"), (1956 Packard & Studebaker, .002-.012"). Place the low range brake housing in tool and secure it in place with the two allen screws. Install the two springs in the housing and make sure they are level and on their seats. Place the ring compressor in top of brake housing and install piston, piston ring and rod assembly on top of springs. Place the cupped adapter on top of piston and turn down adjusting screw of tool, make sure that lower end enters hole in adapter. Slowly turn adjusting screw to compress springs, and guide piston and ring into ring compressor while tightening screw. Be careful when tightening the screw to make sure that lower end of piston shaft enters freely into small bore in brake housing. Tighten adjusting screw until springs are compressed and piston is at bottom of brake housing. Install brass clamp on the section of piston shaft extending below brake housing. Push clamp upward as far as it will go and securely tighten the clamp screw. This is important as the clamp holds the piston down while releasing the tool to install cover and retaining ring. Back off the adjusting screw and remove ring compressor. Install piston cover, place cupped adapter on top of cover and tighten screw to hold cover in place. Install retaining ring. After making sure retaining ring is properly installed, loosen screw in clamp and release piston. Remove brake assembly from tool.

HIGH RANGE CLUTCH

Disassembly: *(NOTE—A 1-1/2" hole drilled in a bench will facilitate servicing the high range clutch. If a vise is used, lead jaws should also be used to prevent marring the input shaft).* Remove planetary sun gear thrust bearing. Remove plate snap ring with a screwdriver and remove plate and sun gear assembly. Lift out the input shaft along with the clutch hub. Invert clutch housing to permit the clutch plates to drop out. Using Clutch Spring Compressor PK-304 (Packard), J-5943 (Hudson & Nash), compress clutch spring and release the spring retainer snap ring using expander snap ring pliers. Back off compressor screw stem and remove the tool, snap ring, retainer and spring. Sharply rap or drop the housing on the bench, open end downward to dislodge piston. In the event the rubber seal has swelled, it may be necessary to rap housing on bench more than once. Remove lip seal from piston and also remove piston inner ring from clutch housing hub. Clamp input shaft in a vise and remove clutch hub snap ring with snap ring pliers. Remove hub thrust washer, hub and rear snap ring.

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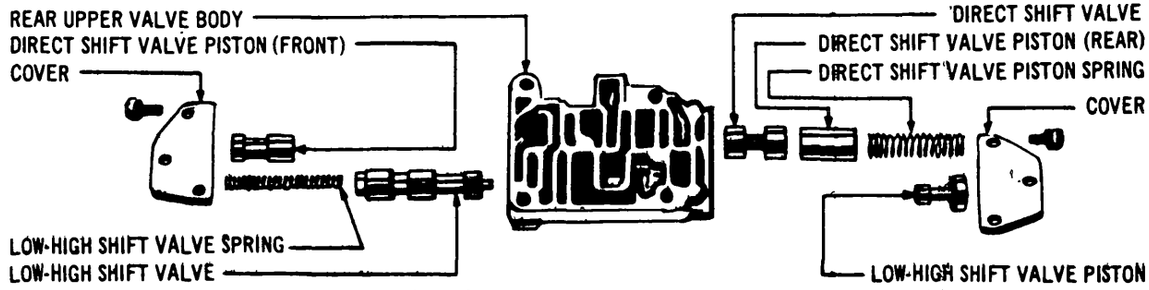
TWIN ULTRAMATIC (C nt.)

R ass mbly: Insert the piston inner ring into the bore of the piston and check the ring gap (Early 1954 Packard, .004-.018"), (Late 1954-55 Packard, .007-.015"), (1955-56 Hudson & Nash, .005-.0085"), (1956 Packard & Studebaker, .004-.018"). Place ring in groove in hub of clutch housing and make certain it is free in groove. Place a new piston lip seal on piston with the lip toward front face of piston. Centralize piston inner ring in its groove in hub of clutch housing. Lubricate lip seal and piston bore with Ultramatic oil and lower piston into housing. Push piston downward to start it over the inner ring and then use a feeler gauge to start lip seal into its bore while pushing downward on the piston. Care should be exercised so as not to tear or cut lip while performing this operation. Using Clutch Spring Compressor PK-304 (Packard), J-5943 (Hudson & Nash), install piston return spring, retainer and snap ring. Remove tool. Install clutch hub snap ring on input shaft and then slide hub on shaft with open end of hub toward snap ring. Slide clutch hub thrust washer on the shaft and against hub and then install the rear snap ring. Place the input shaft in the clutch housing and then install the driven and driving plates. When installing plates, first install a steel driven plate and then a waved, friction faced driving plate and continue installing the plates in this manner. Install sun gear and plate assembly and then lock the snap ring in place. Install planetary sun gear thrust bearing on shaft.

PLANETARY UNIT

Disassembly: With assembly on bench, shaft end upward, slowly lift off planetary ring gear *(CAUTION–This should be done slowly so that the three cage dampers and six damper springs are not scattered and lost).* Scribe alignment marks on the planetary cage and on the oil scoop. This must be done to insure installing scoop in its correct position on reassembly to maintain proper planetary balance. Remove planetary cage bolts then remove the end plate. Using a dummy planetary pinion pin, butt one end of the pin against a pin which carries a short pinion. Hold thrust washers the pinion and slide pinion, bearings and washers onto dummy shaft. Slide these parts off dummy shaft into a clean container exercising care not to lose any rollers. Remove the other two pinions in the same manner. Pull out planetary sun gear and lift out rear thrust washer. Remove the planetary long pinions following the same procedure outlined for removing the short pinions. Using a pointed tool, unhook interlocking ends of the oil ring and slide rings off the shaft. It is seldom necessary to remove the pinion shaft from the cage; however they can be removed by tapping the shaft and woodruff keys out toward splined shaft.

Reassembly: Slide planetary cage shaft oil rings on shaft and into ring grooves. To lock ends of rings, push one end down into groove and push upward on opposite side of ring to raise other end while pushing inward toward shaft. Assemble planetary pinions and bearing rollers and install on their shafts in cage. A dummy pinion shaft and a dummy long pinion bearing spacer can be used to aid assembly of rollers into pinions *(NOTE–38 bearing rollers are used in each pinion.* The long pinions have 19 rollers at each end separated by a spacer. No spacer is used with the short pinions in Early 1954 Series. Beginning in late 1954 (all models), some individual units have a spacer between the bearings in the short pinions while other units have no spacer. When a spacer is used in the short pinions, the bearings are not as long as when used without a spacer). Insert the dummy pinion shaft and two spacers into the long pinion and then insert 19 rollers. Install a small washer *(NOTE–There are a total of 12 washers required for the pinion shaft, 9 small size and 3 large size. Each long pinion uses a small washer at both ends. Each short pinion uses a small washer at the forward end of cage, and a large washer at rear or cage end).* After the 19 rollers have been installed, remove dummy spacer and insert 19 rollers. Add another small washer at this end. While holding the small washers against the ends of the pinion, butt end of dummy shaft against a long pinion shaft in cage and slide pinion, rollers, and washers onto pinion shaft *(NOTE–Beveled ends of pinion teeth should be toward the plate or cover end of the cage).* Assemble the two remaining long pinions in the same manner as described above. Place the rear sun gear thrust washer in the cage with oil grooves in washer toward front or open end of cage. Install rear sun gear in cage with the end of the sun gear having the teeth ground flush with the gear, toward front or open end of cage. Use the dummy shaft and spacer and insert 19 rollers in each end of the short pinions. A small washer is used at beveled end of pinion and a large washer is used at opposite end. Install short pinions with the beveled end toward plate or cover end of cage. Line up the alignment marks (small "O" on each part) on cage and end plate and install end plate onto pinion shafts. Position oil scoop on cage so that previously scribed marks on scoop and cage are in register. Start planetary cage into ring gear (note that planetary cage damper groove has a lip on one side). Place two damper springs into lip side of the groove. Tilt planetary cage and slide a damper into the groove and on top of the springs. Install remaining springs and dampers in the same manner. After all springs and dampers are installed, place the assembly on the bench, shaft upward and rotate the ring gear to engage pinions and seat the ring gear.



REAR UPPER CONTROL VALVE BODY (EARLY 1954 PACKARD, HUDSON & NASH)

GOVERNOR

Disassembly: Remove low speed and high speed governors from parking gear assembly using an Allen wrench. Remove high speed governor plate. Press inward and tilt spring seat to release it and remove spring and seat. NOTE–The low speed governor is serviced as an assembly and should not be disassembled if the valve works freely in the body. If valve is sticking because of dirt, remove plate, and wash out passages.

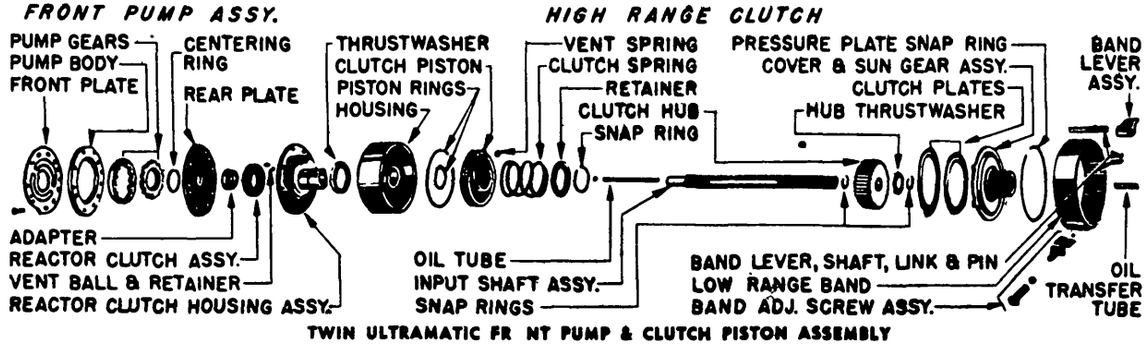
Reassembly: Slide high speed governor valve into its bore in body and make sure it moves freely. Install valve spring and seat and attach plate. Assemble governors to parking gear.

FRONT & REAR OIL PUMPS

Disassembly: Remove rear oil pump cover plate and rotors. Remove front oil pump cover plate, rotors, and outer rotor spacer ring. Also remove two oil rings from the high range clutch journal of front pump.

Reassembly: Place the rear oil pump rotors in the rear

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TWIN ULTRAMATIC FRONT PUMP & CLUTCH PISTON ASSEMBLY

TWIN ULTRAMATIC (C nt.)

pump body and check rotor tooth nose clearance (One side of rear pump inner rotor has an undercut and this should be installed toward front or hub end of pump body). Tooth nose clearance should not exceed .008". Check side clearance between outer rotor and the pump body bore. This clearance should not exceed .011". Check rotor end clearance using a straightedge placed across face of pump body. Clearance between straightedge and rotors should not exceed .006". If clearances not within these specifications, install a new pump assembly. Install the front pump rotors and spacer ring in front pump body and repeat the clearance checks that were made for the rear pump. Clearances are the same. Place rotors in the pump bodies in the same position in which clearances were checked and then install the cover plates. When assembling the front pump, install two oil rings on high range clutch journal.

REAR HOUSING

NASH & HUDSON

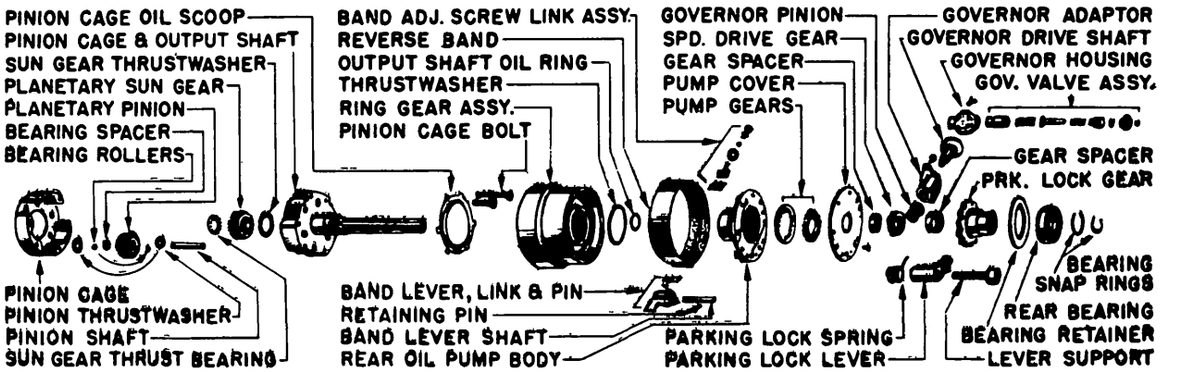
Disass mbly: Remove speedometer driving gear spring from forward end of output shaft. Remove speedometer adapter snap ring from transmission rear housing. then remove speedometer pinion gear and adapter assembly. Remove output shaft snap ring from rear of output shaft and remove shaft from rear ball bearing by tapping end of shaft with a plastic hammer. Remove speedometer drive gear from output shaft. Remove rear ball bearing snap ring from transmission rear housing using Tru-Arc pliers. Tap bearing out of housing with the handle end of plastic hammer. Remove transmission rear housing spider front bushing by tapping with hammer handle. Slide speedometer drive gear off splines of output shaft and remove snap ring.

R ass mbly: Install rear ball bearing and Tru-Arc snap ring with flat side of snap ring against bearing outer race. Install speedometer drive gear snap ring on output shaft. With a plastic hammer tap the output shaft in the ball bearing through front end of the housing, then install rear bearing snap ring and output shaft. Install rear housing oil seal using Oil Seal Installer J-1354. Tap front spider bushing retainer assembly in front end of housing. The transmission rear housing spider retainer has the word "top" cast on retainer: this end faces toward front of transmission and to top of case. Install speedometer drive gear and spring on front end of output shaft. Install the speedometer pinion and adapter lining up notch in adapter with index pin in housing. Install speedometer adapter retaining ring with ring gap toward top of housing.

PACKARD

Disassembly: Slip speedometer driving gear and spring from forward end of output shaft and remove adapter retaining ring with snap ring pliers. Remove adapter and speedometer pinion assembly. Install universal joint flange plate (part of Tool PK-22), place assembly in arbor press and press out the input shaft. Remove rear housing seal with Tool PK-352 and PK-361. Remove rear bearing retaining ring and press or knock out the rear bearing.

Reass mbly: Press rear bearing onto output shaft and press this assembly into rear housing. Install rear bearing retainer ring. Install a new rear housing oil seal and drive into place with Tool PK-367. Place the rear housing assembly in an arbor press with Housing Support (part of Tool PK-22) under housing. Start universal joint flange on output shaft splines. Place Installing Tool (part of Tool PK-22) and press flange onto output shaft. Install speedometer pinion and adapter, lining up notch in adapter with index pin in housing. Install speedometer adapter retaining ring with the ring gap toward top of housing. Install speedometer driving gear and spring on forward end of output shaft.



TWIN ULTRAMATIC PLANETARY & OUTPUT SHAFT ASSEMBLY

TRANSMISSION REASSEMBLY

1) Install breather in side of case with breather cap toward top of case. Place new "O" rings on brake band anchor pins and slide pins into case from inside and then start adjusting screws into case.

2) Install throttle valve inner lever and add the retainer ring and washer. Slide the oil seal over outer end of shaft with lip of seal toward case. Using a 1/2" socket, tap seal into case until it bottoms. Install outer lever but do not tighten clamp bolt nut.

3) Install parking lock lever with end of spring hooked over the operating lever stop pin and push lever support into case. Install lever support retaining ring. Install retaining ring and washer on outer end of manual lever shaft and then slide new oil seal onto shaft so that lip of seal will be toward case. Start shaft through case and add the parking lock lever, spring and manual valve inner lever. Tap operating lever index pin into shaft and then line up the setscrew in manual valve lever with the hole in the shaft and install setscrew, stop plate and locknut. Using a 11/16" deep socket, bottom the oil seal in the case. Attach manual valve outer lever to shaft so that the offset in lever is toward the case.

4) Place planetary ring gear thrust washer on hub of rear oil pump and place pump in case. Install rear pump retaining screws and washers with the long screw at upper left hand position on pump flange (looking through case from front to rear). Tighten capscrews to 15-18 ft. lbs. Install new "O" ring seals on rear oil pump governor jumper and discharge jumper oil tubes, lubricate seal rings with Ultramatic oil and press tubes into pump and case.

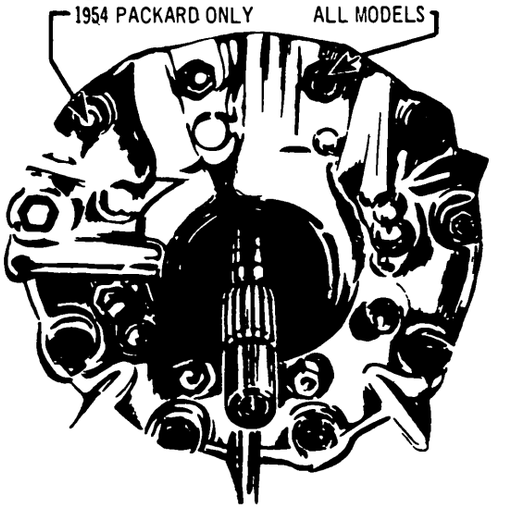
5) Place reverse brake band in case with the band strut with the notch in it on the same side as band operating lever. Engage band struts in operating lever and in the anchor pin and tighten adjusting screw just enough to hold band in place. Using a dummy input shaft, install planetary assembly. Exercise care to avoid breaking the planetary shaft sealing rings when they enter bore in rear pump.

6) Place low range brake band in case with the band strut with the notch in it on the same side as band operating lever. Engage band struts in operating lever and in anchor pin and tighten adjusting screws just enough to hold band in place. Install high range clutch assembly.

7) Assemble front oil pump to bell housing and tighten the retaining screws to 15-18 ft. lbs. Place high range clutch thrust washer on hub of pump with ball indentations in washer against rear face of pump.

8) Lightly apply clean cup grease in three or four

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TWIN ULTRAMATIC BELLH USIN TO TRANSMISSI N ATTACHING SCREWS

TWIN ULTRAMATIC (C nt.)

places around transmission case side of bell housing-to-case gasket. Line up capscrew holes in gasket with those in the case and stick gasket to case. Assemble bell housing and front pump assembly to case and tighten screws to 55-60 ft. lbs. *NOTE - On 1954 Packard, two self-locking screws are used. On later models, one self-locking screw is used. The remaining attaching screws are standard type with lockwashers. See illustration for location of self-locking screws.*

►*PARKING GEAR NOTE: If a new parking gear is to be installed, transfer the snap ring from inside of parking gear hub to the new gear.*

9) Insert parking gear lug ring into hub of parking gear and install parking gear and hub assembly on end of planetary gear shaft being sure to line up index pin in end of planetary shaft with missing tooth in parking gear hub. Rotate planetary cage shaft so that parking gear assembly can slide onto shaft when governors are lined up with openings in transmission case. Place rear housing spacer in hub of parking brake. Using a new gasket, assemble complete rear housing assembly to case and install and tighten two or three retaining screws. Insert long bolt into end of output shaft and tighten bolt.

10) Attach dial indicator to input shaft with the indicator against bell housing flange. Check high range clutch and planetary endplay by using a screwdriver behind high range clutch housing. Push input shaft toward the rear and set indicator dial and then pry clutch housing forward noting the endplay, which should be .023-.036". If endplay not within these specifications it will be necessary to change the rear housing spacer located in hub of parking gear assembly. Spacers are available in thicknesses ranging from .020" to .085" in .013" graduations. Select and install a spacer which will bring endplay within specified limits and recheck endplay.

11) Install all rear housing retaining screws and lockwashers and tighten screws to 15-18 ft. lbs. On Hudson & Nash tighten the long output shaft bolt to 35-40 ft. lbs. On 1945-55 Packard, remove the long output shaft bolt and inspect threaded end of bolt. If bolt does not incorporate a nylon plug, install a new bolt with nylon plug. Tighten bolt to 35 ft. lbs., then back off bolt one or two turns, then re-tighten it to 50 inch pounds.

12) Install control valve assembly to case and just start the five capscrews. Insert oil jumper tubes into their respective openings in valve bodies. Push reverse brake band operating lever down so that the jumper tubes can enter brake housing, then push the brake assembly into position and start the capscrews. Repeat the foregoing operation to attach low range brake assembly (NOTE—It may be necessary to slightly raise or tilt the control assembly to engage the jumper tubes when installing low range brake assembly.

13) Tighten the five capscrews in control valve assembly to **nine ft. lbs.**, and the remaining screws in the two brake assemblies to **five ft. lbs.** *CAUTION—It is very important that capscrews in the control valve assembly be tightened evenly and to nine ft. lbs. torque to prevent distortion of control valve assembly.*

14) Tighten both reverse and low range brake band adjusting screws to 20 ft. lbs., then back screws out 1-3/4 turns and tighten locknuts. Connect manual valve link to shaft inner lever. Lubricate "O" ring on rear oil pump suction jumper tube and install the tube. Install the oil strainer. Using a new gasket, install the oil pan and tighten retaining screws to 10-12 ft. lbs.

15) Install the front oil pump transfer tubes and tube adapters. The adapter with the small metering hole should be installed in the opening toward top of case. Using a screwdriver in the end of the throttle valve shaft, rotate shaft counter-clockwise until valve reaches its stop. With valve against its stop, use a straightedge to position angled end of lever flush with machined rear face of transmission case.

TRANSMISSION INSTALLATION

1955-56 HUDSON & NASH

1) Wire converter assembly to bell housing to prevent it from slipping off input shaft while moving transmission. Install transmission on lift or jack. Place under car and raise it until pilot at front of direct drive clutch housing is in a line with bore in crankshaft. Move transmission forward so that pilot enters crankshaft while at the same time the four studs on clutch housing enter holes in flywheel. Start two of the converter to flywheel retaining nuts and remove wire holding converter to bell housing.

2) Raise transmission until pilot around top of bell housing flange is right to top of flywheel housing. Install the lower flywheel housing cover and starting motor. Install all bell housing to flywheel housing retaining bolts and tighten to 25-30 ft. lbs. Install the other two converter to flywheel nuts and tighten to 25-30 ft. lbs.

3) Attach rear cross member to the engine supports and side sills. Connect torque tube and universal joint to rear transmission housing and output shaft. Remove the support from under engine and lower the jack from under transmission.

1954-56 PACKARD

1) Wire converter assembly to bell housing to prevent it from slipping off input shaft while moving transmission. Using a jack or other lifting device, place transmission under car and raise it until the pilot on front of direct drive clutch housing is in direct line with bore in crankshaft. Move transmission forward so pilot enters the crankshaft while at the same time the four studs on clutch housing enter holes in flywheel. Start two of the converter to flywheel retaining nuts and remove wire holding converter to bell housing.

2) On 1954 models, raise transmission until the pilot around top of bell housing flange is tight to the top of flywheel housing. On 1955 models, the dowel in the flywheel housing positions the bell housing properly in relation to flywheel housing. Install all bell housing to flywheel housing retaining bolts and tighten to 25-30 ft. lbs. Install the two remaining converter to flywheel retaining nuts and tighten to 25-30 ft. lbs.

3) Assemble flywheel housing lower cover to flywheel housing and tighten the bolts to 15-18 ft. lbs. (1954 Packard), 25-30 ft. lbs. (1955 Packard). Attach engine rear support to "X" members. Lower transmission lift and the jack supporting the engine and then install transmission rear housing insulator to support nuts and washers. Remove jack from under engine and the lift from under transmission.

1956 STUDEBAKER GOLDENHAWK

1) Install converter on input shaft of transmission and wire to bell housing to prevent it sliding off during installation. Place transmission on jack and adapter. Install bellcrank bracket on transmission. Move transmission under car and raise until pilot on front of direct drive clutch housing is in line with bore in crankshaft.

2) Move transmission forward so that pilot enters hole in crankshaft while at same time, the four studs on converter housing enter holes in flywheel. Start two of the converter-to-flywheel retaining nuts and remove wire holding converter to transmission.

3) Install all bellhousing-to-flywheel housing retaining capscrews and tighten to 25-30 ft. lbs. Install two remaining converter-to-flywheel retaining nuts and tighten all retaining nuts to 25-30 ft. lbs. Install oil filler tube on transmission and connect speedometer cable and cooler lines to transmission.

4) Install body front pillar support cross member and install engine support cross member. Lower engine and transmission and install rear engine support nuts and washers. Lower transmission jack and remove from car.

5) Connect front propeller shaft to transmission companion flange. Position selector bellcrank on transmission bracket and on frame bracket and install retaining nuts and bolts. Connect selector and throttle control linkage to transmission levers. Assemble flywheel front cover to flywheel housing and install capscrews. Tighten to 25-30 ft. lbs. Install left exhaust pipe. Lower car and fill transmission with Automatic Transmission Fluid. Adjust manual and throttle control linkage.

PUSH BUTTON CONTROL

Clipper (1956), Optional
Packard, Exc. Caribbean (1956), Optional
Packard Caribbean (1956), Standard

►CHANGES, CAUTIONS, CORRECTIONS

►*1956 ELECTRIC PUSH BUTTON CONTROL PRODUCTION CHANGE:* In later production, the Battery Relay is eliminated (see wiring diagrams).

►*MOVING CAR WITH ENGINE NOT RUNNING CAUTION:* With ignition off, transmission will be in "Park" position and rear wheels will be locked (Transmission goes into "Park" automatically when ignition turned off). To move car without starting engine, turn ignition ON, press "N" button, **leaving ignition on while moving car.**

DESCRIPTION

A "Six Button" control panel mounted on the steering column controls a reversible type motor and gear assembly which is mounted on the transmission and connected to the manual valve lever shaft. When a control panel button is depressed, the electric motor on the transmission automatically positions the manual valve in the transmission to the selected position. When ignition switch is turned off, transmission will automatically be in "Park" position and rear wheels will be locked. The engine cannot be started until "N" or "P" button is depressed.

ADJUSTMENT

The only adjustment required on the unit is the "Anti-hunt" feature. A rapid series of clicks, as the unit completes a shift will indicate necessity of adjustment. Adjusting screw located in end of actuator housing.

Adjustment: Back off armature thrust screw (small center screw) several turns (unit should hunt in any one of several positions). If hunting does not occur back off the outer adjusting screw (large) slightly and tap side of motor with a soft hammer while moving from "R" to "P" and "P" to "R". Continue to back out adjusting screw until hunting occurs. Gradually tighten the outer adjusting screw ¼ turn at a time until unit no longer hunts *(NOTE - Do not allow motor to hunt for long periods as it will become hot enough to affect the adjustment).* As proper adjustment is neared, unit will not hunt continuously out will make several oscillations at one or more positions. This is the proper adjustment on the bench. If unit is on the transmission, the proper adjustment is ¼ turn beyond point where unit does not oscillate. *(CAUTION - Do not over-adjust as an unnecessary load will be placed on the motor).* Lock jam nut firmly. Adjust armature endplay by screwing the center screw in until it is firmly against shaft, **then back screw out one full turn.**

TROUBLE SHOOTING

FAILURE TO START: With ignition on, connect test lamp between terminal No. 3 (red lead) of starter relay and ground. If lamp does not light, the lead from push button, or push button contact is open. Connect test lamp to No. 2 terminal (brown lead) and operate starter switch. If lamp does not light, the ignition switch or lead from ignition switch to relay is open. Connect test lamp to No. 1 terminal (brown lead) and operate starter switch. If lamp does not light, the relay is defective. If lamp lights, the starter switch or its lead is defective.

FAILURE OF BACK-UP LIGHTS: Check lamps and line fuse. Connect test lamp from dark green lead to ground and press "R" button. If lamp does not light, the dark green lead has an open circuit, loose connection or a poor contact in push button. If lamp lights, the wiring to back-up lights or their sockets is at fault.

FAILURE TO SHIFT TO "R", "N", OR "P": Pressure switch is open. Pull orange wires with Douglas terminals from pressure switch mounted on side of transmission near actuator. Connect these together (protect from ground). If the actuator performs normally, replace the pressure switch. If there is an open circuit in the orange lead, inspect for open or broken lead. This is most likely to occur at the cable connector near driver's side of firewall. Be certain that all terminals are pushed into the connector. Use a small screw driver to force any exposed brass terminal ends into place.

FAILURE TO SHIFT TO "H", "L" OR "D": Check the red wire with a white tracer. If there is an open circuit in this wire, check in the same manner as for orange wire (above).

OVERHAUL

PUSH BUTTON CONTROL UNIT & WIRING HARNESS:
Removal – Disconnect connector at rear side of firewall *(CAUTION - Mark location of wire terminals to insure installation in same location),* and remove wires and terminals from connector by pressing in on lip of the terminal with a small screwdriver and pulling wire and terminal through the connector. Remove all wires and terminals. Disconnect dark green, red, and black wires at steering column from individual bullet type connectors. Remove the four bolts clamping control housing to column and remove the two halves. Guide wires into lower openings in column and carefully pull them (one at a time) through the column.

Installation: Install wires through opening in steering column one at a time after lubricating each wire with lubriplate. A piece of stove pipe wire can be used to pull the individual wires through steering column and out through the opening. Be extremely careful when installing the halves of the switch housing on steering column so as not to pinch the wires when the four bolts are tightened. Install the wires in the connector at the same locations from which they were removed. Make sure the open side of the crimp on the connector terminal is next to the wide flat in the connector (the crimp section of the terminal is the part that crimps over the insulated part of the wire). Push the connector on the firewall connector. Connect the dark green, red, and black wires (at steering column) to their individual bullet type connectors. *NOTE* – To remove wires from the front half of the fire wall connector, release the terminal lock by inserting a small thin-bladed screw driver into connector and press down on lock while pulling on the wire. Make sure that wires are marked for installation in the same location in connector.

TRANSMISSION SHIFT ACTUATOR UNIT: Removal – 1) Disconnect tan and yellow leads from parking relay (this will prevent automatic shifting to "Park" when ignition is turned off). Turn on ignition and press the "R" button (this will position sector with the setscrew pointing downward). Turn off ignition. *(NOTE - If setscrew cannot be positioned downward because of faulty wiring, or other causes, it will be necessary to remove the shift control motor and turn worm gear shaft with a suitable tool). (CAUTION - When removing the motor, be careful and not allow the worm shaft to come out with the motor as the brake plates and thrust ball bearings will fall out of place).*

2) Remove wiring harness connector from forward side of firewall and disconnect leads from motor reversing relay. Disconnect green lead, orange lead, and red with white tracer lead from battery relay (if early production); from circuit breaker (if later production). Disconnect the two wires from pressure switch on side of transmission.

3) Remove plate from lower side of actuator gear housing. Loosen setscrew locknut and remove setscrew. Disconnect the front universal joint. Jack up rear of engine and remove transmission tail shaft and housing. Disconnect speedometer cable. Using a pry bar or jack, move rear of engine to the right as far as possible. Remove the capscrew holding actuator unit to side of transmission and slide assembly outward off valve lever shaft.

Disassembly & Inspection: Motor – Remove two through bolts and tap motor housing to free it from casting. Withdraw motor housing with care to prevent the slip joint coupling at end of motor shaft from sliding the worm gear shaft out of the gear box. Inspect inside of motor for signs of overheating such as excessive discoloration of the insulation or heavy deposits of varnish on metallic parts. Inspect brushes and commutator for wear and discoloration. Clean commutator and clean brushes as necessary. Connect an ammeter and voltmeter to the green and brown motor leads to measure amperage draw of right field coil. Repeat test on left coil by connecting green and grey motor leads. Replace field coils if draw is not within specifications or if they test grounded (see "Motor Test Specifications" below). Inspect armature for signs of open coils or damage *(NOTE - Do not test for shorts on growler as connections in the armature will cause it to show shorts on the usual growler test).*

Gear Box Unit – 1) Remove external cover plate. Fit the armature and its coupling on worm gear shaft and rotate shaft by hand. The shaft should turn freely and smoothly except at each end of segment stroke. A torque in excess of two inch-pounds or a feeling of stickiness is abnormal and the cause should be corrected. *(CAUTION - Do not turn armature far enough to allow contact fingers to leave end of contact segment).*

2) Inspect electrical switch assembly for signs of excessive wear or damage to contact fingers. Check for looseness of contact fingers and make sure insulation on wires is in good condition. If necessary to disassemble switch, remove screws retaining contact finger assembly. Fingers should be smooth and clean and all have the same shape. All fingers should be properly aligned in their slots.

3) To remove contact segment, remove snap ring and slide segment from shaft. The surface of outer rim of

CONTINUED ON NEXT PAGE

PUSH BUTTON CONTROL (C nt.)

contacts should be smooth and clean. The gap between segments should not exceed .078" and the radius of segment corners should not exceed .040".

4) Remove base plate with or without switch installed. If contact plate has been removed the sector gear will be left in the housing and can be inspected in the assembled position. The worm and sector should be coated with lubricant. There should be at least .010" backlash at worm. Turn sector gear to the right which should cause free motion against the spring. Rotation of the worm shaft should cause a limited motion of the fibre brake plate. Remove sector gear and wash in solvent.

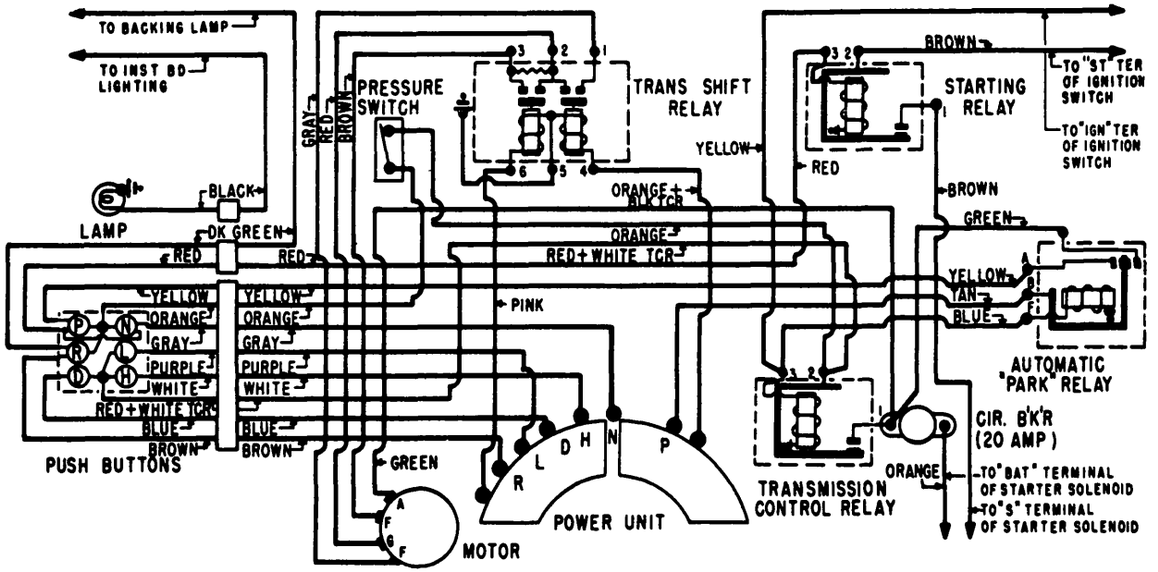
5) Remove worm shaft slowly being careful not to cause any damage to coupling end. This will allow the various components of "anti-hunt" system and worm to be removed. Wash parts in solvent. Inspect fibre brake plate for abnormal wear or scuffing. Examine the notch for broken ears or edges. Check for a free sliding fit on worm shaft. Place fibre in a cup of clean SAE 20 oil to allow to soak until ready for reassembly.

6) Inspect the steel brake washers. These should have a smooth polished surface. The internal lug should be free of burrs and the whole unit should slide freely on the worm shaft. Inspect worm, ball thrust bearing, thrust plates, and spring for wear or damage.

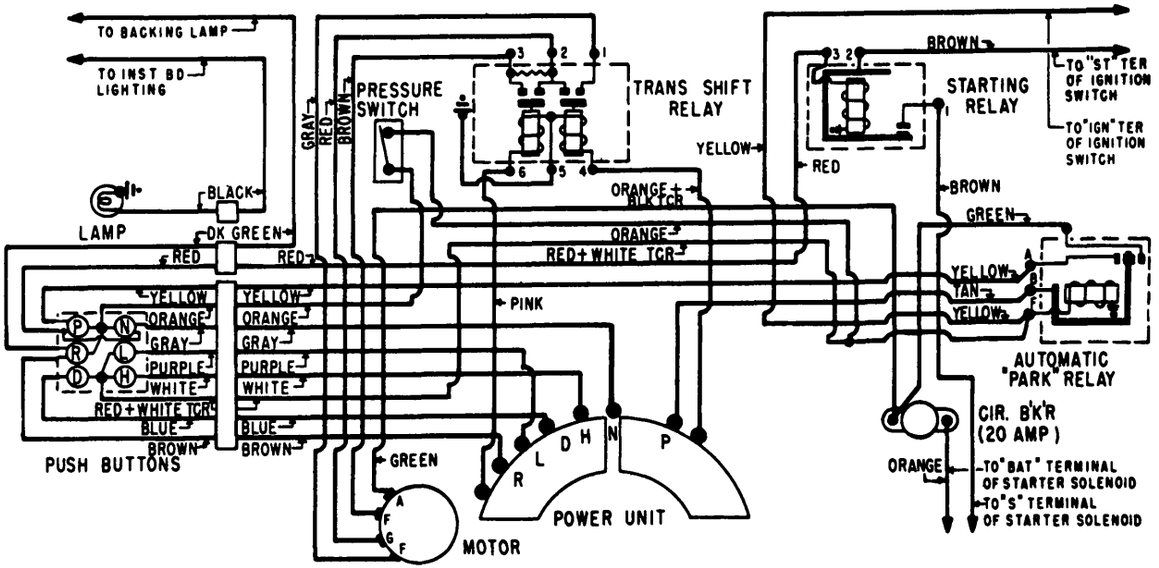
R assembly & Testing: Brake Assembly – Loosen jam nut and back out the outer adjusting screw at end of worm shaft until the end is about even with inside of housing. Insert the worm shaft partly into left bearing of casting. As the end is gradually moved into place, install the various components in the following order: Place spacer on shaft with its narrow diameter next to casting wall. Remove brake plate from oil and shake off excess oil. Place plate on shaft with notched end engaged on boss of casting. Install one of the 1/16" steel brake discs or two 1/32" discs on worm shaft so that lug engages keyway. Install the worm and its key. Slide thrust ball bearing, consisting of ball assembly between two thrust plates, in position on shaft. Place spring and its thrust washer on shaft and slide shaft into position.

Motor Unit – Place gasket in position on commutator end head. Install brushes in their holders and insert armature into commutator end bearing. Release brushes and inspect to see that they seat properly on commutator. Place commutator end head in position on frame. With gasket in place on shoulder of gear housing, move motor into position engaging first the armature coupling with worm shaft, then locating pin in the motor frame with slot in casting. Install through bolts and tighten securely. As the bolts are tightened, strike motor frame several sharp blows with a soft hammer to align motor and bearings.

Motor Testing – Screw armature thrust screw firmly against shaft, then back out one full turn. Do not screw the outer adjustment screw in as this will place tension on the brake. Connect motor for a no load test with an ammeter in series between green lead and a 12 volt battery, and ground brown and red leads. Connect a voltmeter from green lead to ground. The motor should operate clockwise at the drive end and its current and speed should be within specifications. Change hookup so that grey and red leads are grounded. The motor should turn counter-clockwise and be within specifications. If motor does not operate according to specifications it indicates faulty fields, armature, brushes, hookup, or drag on armature.



TWIN ULTRAMATIC PUSH BUTTON CONTROL WIRING DIAGRAM (FIRST TYPE)



TWIN ULTRAMATIC PUSH BUTTON CONTROL WIRING DIAGRAM (LATER TYPE)

M t r T st Sp cificati ns
(Aut -Lit EPR-4001)

Field Coil Draw – 3.5-3.8 amps. at 10 volts (each coil) at 70° F.

N L ad Draw – 12.0 volts, 45 amps., 1020 RPM (Min.).

Test with sector gear removed and with brake adjustment backed off to relieve tension. Test in both directions **Stall Test** – 12.0 volts, 65 amps. (Max.), 23 Oz. Ft. Torque (Min).

Motor Lubrication – Soak armature shaft bearings and felts in SAE 10 motor oil at overhaul. Pack gear chamber with 1½ ozs. clutch lubricant. Coat sector shaft and bearing with clutch lubricant.

CONTINUED ON NEXT PAGE

PUSH BUTTON CONTROL (C nt.)

Switch Assembly – Install sector gear with notched end of hub up and with approximate center of gear engaged with the worm. Rotate worm shaft to check for freedom of movement. Lubricate worm and sector gears with 1½ ozs. clutch lubricant. Install base plate and its gasket, holding it in place with the two topmost screws. Check for proper engagement with locating dowel pin. Use care to insure a good gasket seal. Mount contact segment on hub and lock in place with the snap ring. Carefully install contact finger assembly by inserting three screws through assembly. Slide assembly toward contact sector until contact fingers touch the sector. Cautiously align screws with holes and hold firmly while screws are tightened. Inspect carefully that the contact fingers are all lying across contact rim and that none have slipped out of place. Carefully tuck each wire under contact assembly so that none will rub against back of contact finger or be pinched by cover. Mount cover plate and gasket and tighten all screws evenly and securely. Make sure grommet fits into cover plate properly, and that base plate is correctly located on the dowel pins and that gasket is in place. Connect wires to connector and in correct positions.

Installation: Be sure actuator is in reverse position. Connect the leads as indicated in wiring diagrams, except leave the tan lead disconnected from parking relay. Turn on ignition and press the "R" button. Turn off ignition. Manually turn transmission shifter valve to the reverse position. Slide actuator unit into position and tighten the dog point screw. Be careful to set this screw as tightly as possible. Remove jam nut as necessary to secure full purchase on setscrew slot. When tight, lock securely with jam nut. Fasten inspection plate and gasket firmly in place. Engage the mounting stud with actuator and install mounting nuts. Before tightening the mounting nuts, turn on ignition and press "D" button. Rotate the actuator by hand until the center of "D" detent is felt then tighten and lock mounting nuts. Connect tan lead to parking relay. Check operation of actuator by pressing the various buttons at random, paying particular attention to any signs of laboring or hunting. Check angular adjustment of actuator by starting engine and operating at a fast idle. With the brake on press the various buttons and feel for correct shift. Shift "L", "H", "D", "H", "L". A distinct shift should be felt when actuator is correctly located with respect to detent.

Transmission Shift Relay Test Specifications
(Auto-Lite No. RAD-4004)

Contacts Close – 3.0-6.0 volts. Seals at 8.0 volts (max.).
Contacts Open – 1.0 volts (min.).
Resistor – .5-.6 ohms. (resistance of windings).

Pressure Switch Test Specifications
(Auto-Lite No. 14176A)

Contacts Open – 10 lbs. ± 2 lbs. per sq. in.

RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION

FLASH-O-MATIC
Rambler American, 01 Series (1958-60)
Rambler Six, 10 Series (1957-60)
Rambler V8, 20 & 80 Series (1958-60)
DRIV-ER-MATIC & DUAL RANGE
Checker Superba (1959-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING THE ENGINE BY PUSHING CAR: NOTE -* Pushing rather than towing is recommended (to avoid possibility of car ramming towing vehicle). Place selector lever in Neutral "N" position. When speed of 15-20 MPH is reached, turn ignition "on" and move selector lever to "D-1" or "D-2" position.

►*TOWING THE CAR:* If transmission inoperative, always tow car with rear wheels raised or with propeller shaft disconnected. If transmission operating properly car can be towed for **short distance** with selector lever in Neutral "N". Prolonged towing may cause damage to transmission.

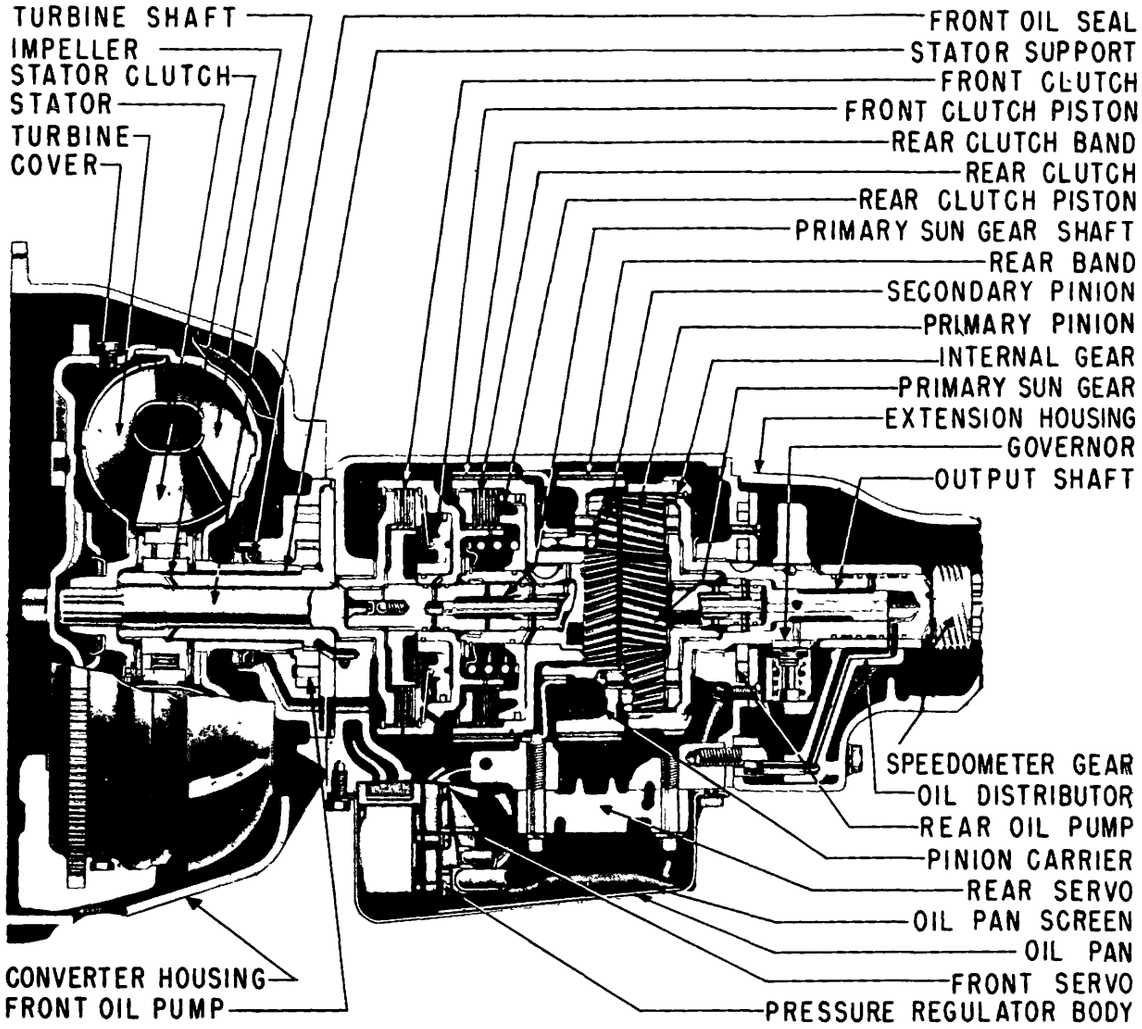
►*1957 FLASH-O-MATIC 1-2 SLIPPAGE OR 2-3 "PILE-UP" WITH LIGHT THROTTLE IN "D1" RANGE CORRECTION:* This condition may be caused by an unbalanced vacuum condition due to clogged vacuum ports or vacuum leakage at carburetor *(See "Carter AS Carburetor" in Carburetion Section).* Check adjustment of Vacuum & Solenoid Control Unit on transmission. *See "Throttle Control Adjustment" below.*

►*OIL LEAKAGE INTO VACUUM & SOLENOID CONTROL ASSEMBLY CORRECTION:* An improved type boot, Part No. 3151107 identified by a raised letter "W" on forward end of boot is available to correct oil leakage into control assembly. To install, remove vacuum and solenoid control assembly from transmission and clean thoroughly with carbontetrachloride or alcohol and dry with an air hose. Install new boot and a new "O" ring.

►*1958 SERIES 80 2-3 UPSHIFT SLIPPAGE CORRECTION:* On transmissions before Serial No. 15570, install control pressure regulator valve spring, Part No. 3155618 (grey-white color). Later type spring is installed in production beginning with the above serial number.

►*1958 RAMBLER AMERICAN & SERIES 10 VACUUM & SOLENOID CONTROL ASSEMBLY PRODUCTION CHANGE:* A new vacuum & solenoid control assembly. Part No. 3156455, operated by manifold vacuum is being used on later cars. The control assembly on early cars is operated by balanced vacuum from carburetor.

►*1959 SUN GEAR THRUST WASHER PRODUCTION CHANGE: A new sun gear thrust washer made of asbestos bas laminate material replaced th bronz wash r in producti n and will be supplied for s rvic . Th s parts are int rchangeable and will hav th sam part number.*



1957-60 FLASH-O-MATIC TRANSMISSION SECTIONAL VIEW

►*1960 RAMBLER SIX (EARLY CARS) DIFFERENTIAL SIDE GEAR BREAKAGE CORRECTION:* On early cars having automatic transmissions with Serial Numbers prior to 12606 (Series 6001), 127233 (Series 6010), install Kit Package, Part No. 3202486. *See "Rambler Six Transmission Front Clutch Production Change & Service Replacement Note" below.*

►*RAMBLER SOLENOID & VACUUM UNIT CORROSION NOTE:* To prevent corrosion of this unit when caused by salt or calcium chloride (used on streets as a snow melting agent), install an overdrive governor boot, Part No. 3131032, as follows: Cut a small hole in center of closed rear section to fit over the connector fitting, then pull boot over solenoid as far as possible. Do not seal boot completely as breather holes must be left open.

DESCRIPTION
RAMBLER

Flash-O-Matic transmission consists of a hydraulic torque converter and a hydraulically controlled automatic 3-speed planetary transmission which provides automatic operation in "D1" & "D2" ranges. Additional "L" (Low), "R" (Reverse), and "P" (Park) ranges are controlled manually. In "D1" range, the car starts in low and upshifts to intermediate and then to direct. In "D2", the car starts in intermediate, then shifts to direct. Downshifts follow the same pattern (in reverse) in relation to car speed and throttle position. On all series, throttle valve pressure is controlled by a vacuum and solenoid unit located at left rear of trans-

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RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (C nt.)

mission. This unit is operated by a vacuum line from carburetor or intake manifold (see Production Change above). A forced downshift (kickdown) from direct to intermediate can be made by fully depressing accelerator pedal. On 1957 Rambler Series 10 and 1958-60 Rambler American, a transmission range selector lever located on steering column and connected to transmission manual lever by linkage positions manual valve in transmission. Beginning with 1958 models (Except Rambler American), a push button transmission range selector control located at left of instrument panel is used. This control unit consists of five buttons operating a single cable connected to manual lever on transmission. On these models, a "Park" button mounted directly below push buttons operates a mechanical parking pawl which engages external teeth on rear internal gear. When "Park" button is pushed in, all buttons except "N" (Neutral) are locked and cannot be operated. With either of the forward or reverse buttons pushed in, "Park" button is locked and cannot be operated. A back-up light switch operated by the "R" button and a neutral switch operated by the "N" (Neutral) button are also located on the push button gear selector control assembly. Planetary transmissions on all models are similar except for the pinion carrier assembly used in transmissions on 1960 Series 10, and 1958-60 Series 20 & 80. The pinion carrier assembly on these models incorporates a sprag type clutch that performs the function of the rear band when transmission is in "D-1" range. A transmission oil cooler is incorporated in lower tank of radiator on Series 20 & 80.

CHECKER SUPERBA

Design of the Driv-er-matic & Dual-Range automatic transmissions used on these models is the same as used for Rambler American (see above), except that "Driver-matic" transmission is a single range type and does not have a "P" (Park) position. A transmission oil cooler is incorporated in lower tank of radiator.

LUBRICATION

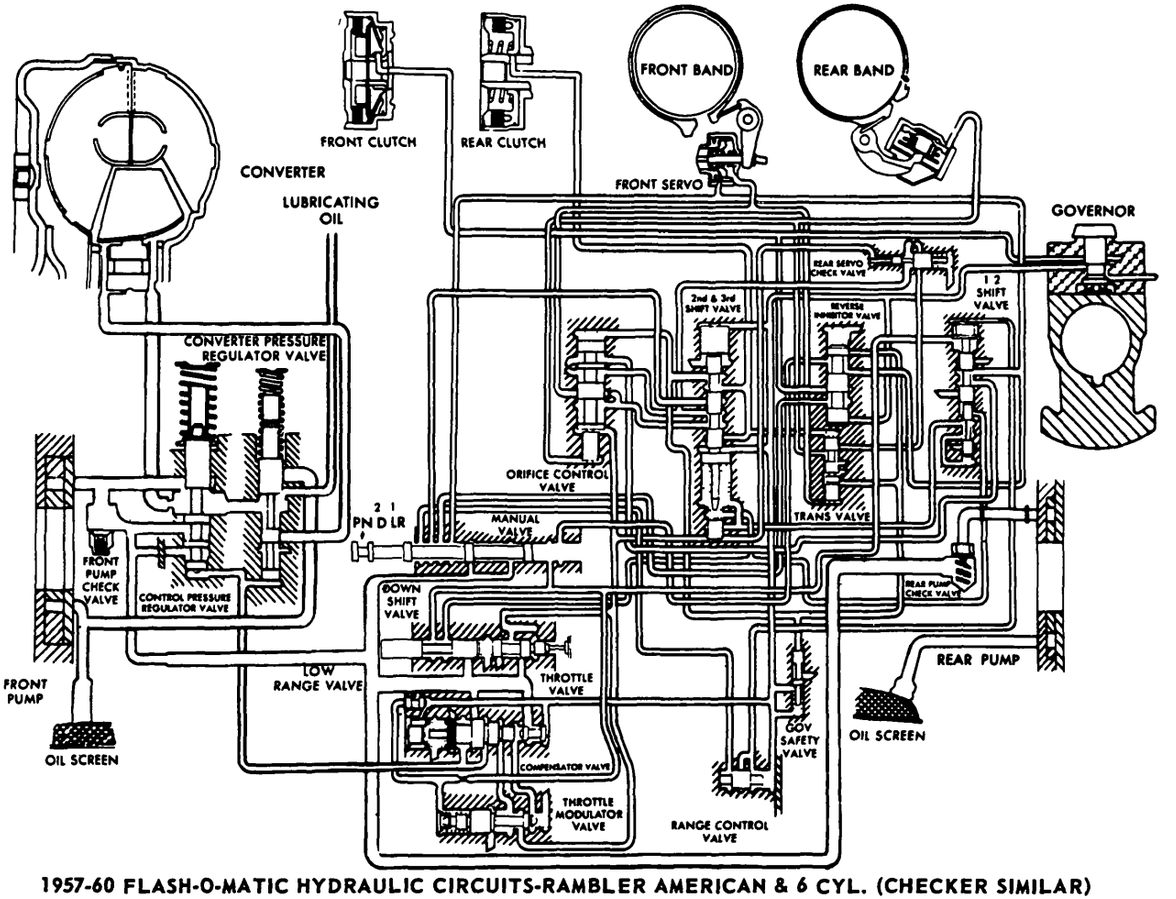
►*CAUTION: Check fluid at 1000 mile intervals. Drain and refill at 15,000 mil intervals, using Automatic Transmissi n Fluid Typ "A" (Suffix "A"). The dipstick is l cated on right rear of engine under hood.*

Capacity - (Drain & R fill) Approximately 8½ qts. (Rambler), 10 qts. (Checker Superba).

►*NOTE: Aft r ov rhaul, 10 qts. (Rambler, except Series 80), 11 qts. (Rambler Series 80), will be required to fill transmission.*

Checking Fluid Level - With engine and transmission at normal operating temperature and running at idle speed, operate transmission through all ranges. Place transmission in "N" (Neutral) on Rambler American, and in "D-2" range (other models), then check fluid level on dipstick and add fluid as required to bring level to "F" mark. *NOTE - Approximately 1½ pts. of fluid are requir d t raise fluid l vel fr m "L" to "F" mark.*

Draining & R filling - With transmission at normal operating temperature, rotate converter until one of the drain plugs is visible through square opening in converter bell housing. Remove plug and then turn converter 180° and remove second drain plug. Remove drain plug at rear of transmission oil pan. After draining, replace the drain plugs and tighten converter plugs to 7-10 ft. lbs. Install 5 qts. (Exc. Rambler Series 80), 6 qts. (Rambler Series 80), of Automatic Transmission Fluid Type "A" (Suffix "A"). Set hand brake and run engine with transmission selector lever in "N" position. Add 3½ qts. (Rambler Models), 4 qts. (Checker Superba) of fluid and move selector lever through all ranges. Check oil level, and if necessary, add sufficient fluid to bring level to "F" mark on dipstick. *CAUTION - Do not overfill transmission as this will cause foaming when transmission is warm.*



1957-60 FLASH-O-MATIC HYDRAULIC CIRCUITS-RAMBLER AMERICAN & 6 CYL. (CHECKER SIMILAR)

LINKAGE ADJUSTMENT

1957 SERIES 10

Manual Linkage Adjustment: Place transmission selector lever in "D-1" range, then disconnect clevis at transmission manual lever and place the lever in "D-1" position. Adjust clevis to transmission manual lever so that clevis enters hole in lever freely. Check selector pointer in all positions to be sure pointer is set correctly. *NOTE - If pointer does not line up properly, remove bottom half of jacket tube and adjust pointer to line up with center of "N".*

1958-60 RAMBLER AMERICAN

Manual Linkage Adjustment (Rambler American): Disconnect gearshift rod at transmission lever and place transmission lever in third detent from top (D-1 position). Place gearshift selector lever (on steering column) in "D-1" position. *NOTE - Make sure selector operating shaft lever at lower end of steering column strikes against stop gate located on bearing housing.* Adjust trunnion on gearshift rod to enter hole in lever on transmission freely, then remove trunnion from lever and **lengthen one turn.** Install trunnion in hole and install washer and cotter pin. If selector lever pointer does not line up with "1" on gear selector dial, use an Allen wrench and adjust pointer as necessary. Check lever pointer in all positions.

Neutral Saf ty Switch Adjustm nt: Place selector lever in "N" (Neutral) and set parking brake. Loosen nuts on operating lever-to-switch rod (at lower end of steering

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RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (C nt.)

column) and adjust switch contact arm to a point where switch contact is made when ignition switch is turned to start position. Engine should start. Locate selector lever in "D-2" position. Engine should not start. Tighten adjusting nuts.

CHECKER SUPERBA

Manual Linkage Adjustment: Disconnect manual shift rod from selector lever on steering column and from lever on transmission. Position transmission selector lever so indicator is down against stop in "D" (Drive) position. Place transmission manual lever in the "D" (Drive) detent (second from top of transmission), then adjust length of manual shift rod so it fits into ball joint on steering column and into shift lever on transmission without changing position of selector lever or transmission shift lever. Tighten ball joint nut at steering column and install washer and cotter pin at transmission lever. Move selector lever through all positions and check operation.

Neutral Safety Switch Adjustment: Starter circuit must be open in all positions except "N" (Neutral). To adjust, loosen neutral switch-to-steering column screws and position switch so starter circuit is closed when selector lever is at "N" (Neutral).

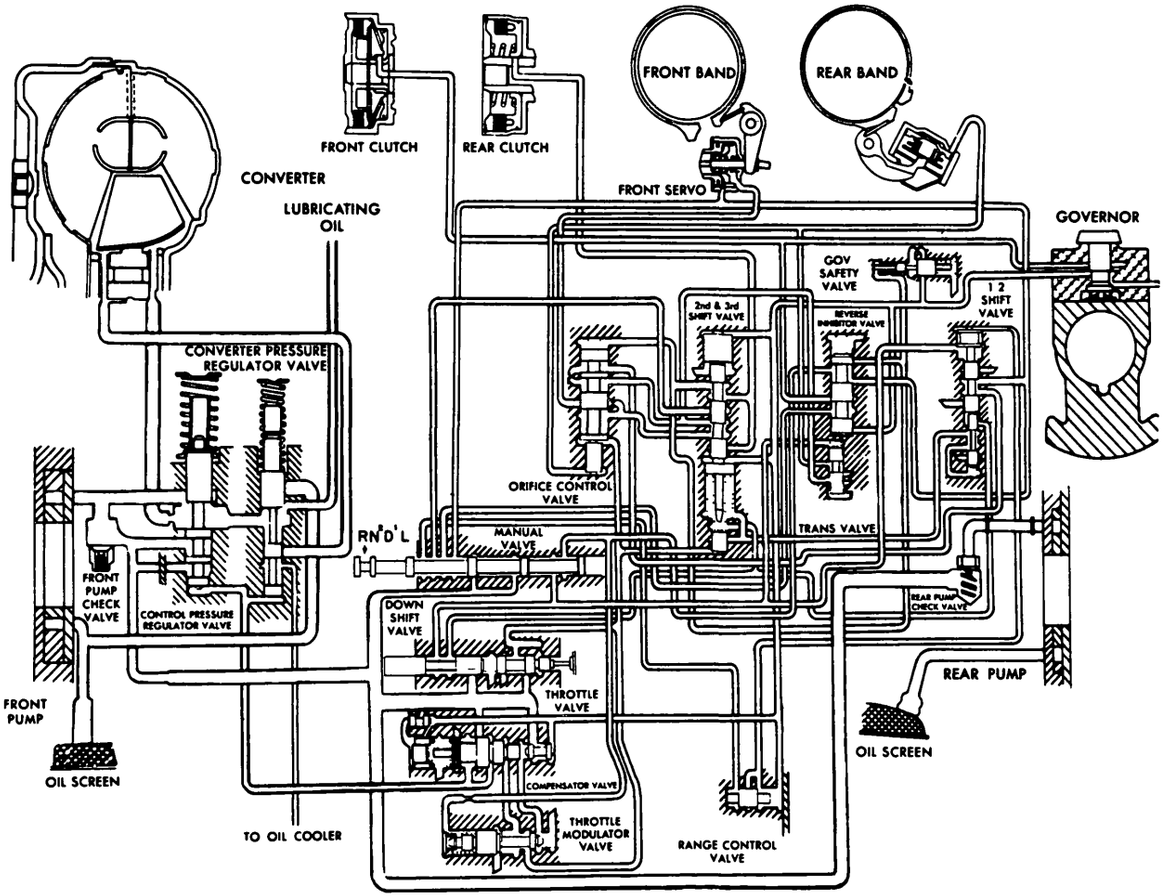
Kickdown Switch Adjustment: Loosen the two nuts on kickdown switch (one above and the other below toeboard) and rotate the upper nut to obtain a clearance of ¼" between switch and accelerator pedal when carburetor throttle valves are in a wide open position.

PUSH BUTTON CONTROL
1958-60 RAMBLER SERIES 10, 20 & 80

G ar Selector Pushbutton Control Adjustment: Disconnect cable at transmission lever, then push "L" (Low) button in and move selector lever on transmission all the way to rear. Adjust cable linkage at clevis to align holes in clevis and lever. Install clevis pin and washer and tighten clevis securely. Check adjustment in all five positions.

Parking Lever Adjustment: Pull "Park" lever handle out and disconnect cable at transmission (transmission outer lever will be in its off position and inner lever will lay against toggle lever pin). Adjust clevis on cable to index perfectly with hole in lever. Install clevis, pin and washer and tighten.

G ar Selector Assembly Removal: Disconnect battery, then disconnect back-up light wire at connector and from junction block at firewall. Disconnect control light bulb from connector under instrument panel, then disconnect neutral safety switch wire from junction block and relay at left wheelhouse panel and pull wires through wall. Remove gear selector escutcheon from instrument panel, then remove the three screws retaining gear selector control and move the unit forward to clear pushbuttons from instrument panel. Lower unit and move it toward rear and remove retainer nuts from both cable attaching pins. Pry cable outer looms from brackets of control unit. *NOTE - If saf ty switch or back-up light switch r quir r placing, bend pr ngs of switch up with a scr wdriv r. Wh n installing switch, bend prongs down car fully.* To install the assembly, reverse removal procedures.



1958-60 FLASH-O-MATIC HYDRAULIC CIRCUITS-RAMBLER V8

CONTROL UNIT ADJUSTMENT
RAMBLER

Adjustment: *NOTE - The following instructions supersede all previous testing procedures.* Remove pressure test plug at left front side of transmission and install the 1/8" pipe plug extension provided with Tool J-8773 (Vacuum & Solenoid Control Adjusting Kit), then connect an oil pressure gauge to the extension. Disconnect vacuum line at vacuum and solenoid unit and attach vacuum gauge to "T" fitting on test line. Start engine and bring to normal operating temperature with transmission in neutral. At engine idle speed of 475 RPM, transmission in neutral, turn needle valve on test line to lower vacuum reading on gauge to obtain a vacuum reading as follows: 8.6" HG (American with "L" head engine); 10.5 HG (American & Series 10 with Overhead Valve engine); 12.1 HG (Series 20); 13.8 HG (Series 80). With the correct vacuum reading, oil pressure reading should be as follows: 85 lbs. (American, 5710, 5810, Early 5910 Series, all without sprag clutch); 100 lbs. (Late 5910, 6010 Series, all with sprag clutch); 85 lbs. (1958-60 20 & 80 Series). *NOTE - Oil pressur s ar plus or minus 3 lbs.* If oil pressure readings are not correct, loosen vacuum and solenoid unit locknut and turn unit in toward case if pressure is too low; away from case if the pressure is too high. After making correct adjustment, cover the bleed holes provided in needle valve to stop atmospheric pressure entering test line. This will bring vacuum reading on test gauge to optimum engine vacuum and oil pressure gauge should then read 55-65 lbs. With rear wheels raised off floor, place transmission in "D-2" position, then cover bleed hole in needle valve. Accelerate engine until transmission shifts into direct drive. Pressure gauge should read 25-35 lbs.

SUPERBA

Adjustment: *NOTE - After unit is installed on transmission case, it should be initially adjust d by scr wing it in or out so the distanc b tw n front dg of unit and transmission case is 3/8".* Remove 1/8" pipe plug from lower left corner of transmission case and install a 300 lb. pressure gauge. Remove fitting at rear of vacuum solenoid unit and install a vacuum gauge using a "T" fitting. Install vacuum line so unit will op-

CONTINUED ON NEXT PAGE

RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (C nt.)

erate and vacuum gauge will register Connect a tachometer to engine, then start engine and run several minutes to bring to normal operating temperature Place selector lever in "D1" ("D" on Superba A1OL)and apply parking and service brakes Accelerate engine until a reading of 10 5" HG is obtained on vacuum gauge Reading on pressure gauge should be 90-105 lbs If pressure is below specifications, turn vacuum and solenoid unit inward to increase pressure,outward to decrease pressure When correct pressure has been obtained, tighten locknut *NOTE - It is recommended that vacuum and sol noid unit not be turned more than 1/2 turn ith r way from initial setting of 3/8"*

►*CAUTION· Wh n making the above tests, do not op- rat ngin for m r than 10 seconds at any one interval.*

BAND ADJUSTMENT

The quotient of this division will be the reading on torque wrench dial which will be required to obtain 9 ft lbs on rear band adjusting nut.

Front Band: Remove transmission oil pan, gasket, and screen Use Tool J-5880 (Rambler), Tool No 7195 (Checker Superba) and loosen adjusting screw, then insert gauge block (part of tool) between end of adjusting screw and servo piston rod. Turn screw in until it overruns and remove gauge block *NOTE* - It may be necessary to back adjusting screw off slightly to remove gauge block If so be sure to tighten screw the same amount after block is removed Tighten locknut to 20-25 ft lbs and install screen, gasket, and transmission oil pan Refill transmission

R ar Band (1957-59 M d ls, Exc. 1959 Series 20 & 80): Loosen locknut on adjusting screw located on left side of transmission case and install Tool J-6655 on adjusting screw Tighten screw with torque wrench to 7 ft lbs , then mark adjusting screw with a reference point and **back screw ff 1½ turns.** Tighten locknut securely

R ar Band (1959 Series 20 & 80, All 1960 Models): Loosen locknut on adjusting screw located on left side of transmission case and install Tool J-7847 on adjusting screw Tighten screw with a torque wrench connected to Tool J-7847, to 9 ft lbs (see "Torque Wrench Dial Reading Note" below) Mark adjusting screw with a reference point and **back off adjusting scr w 1½ turns.** Tighten locknut securely

►*TORQUE WRENCH DIAL READING NOTE* To obtain correct dial reading on wrench, compensate for the additional length of adapter Tool J-7847 as follows Multiply "9" (torque required on adjusting nut) by lever length of wrench (middle of handle to center of wrench socket drive) Record the product of this multiplication Add length of torque wrench to length of adapter, Tool J-7847 (6") Record sum of this addition Divide product of the multiplication by the sum of the addition

Ch ck r Sup rba - Remove cover plate from floor pan and position Tool No 7225 on adjusting screw and loosen locknut Using "T" handle of tool, tighten adjusting screw until wrench overruns (10 ft lbs), then **back off adjusting screw 1½ turns** Hold adjusting screw stationary and tighten locknut to 35-40 ft lbs

TESTING

STALL TEST: Connect tachometer to engine and place it where it can be easily read from driver's seat Set hand brake and start engine Place selector lever in "D1" position, apply service brakes and operate engine at full throttle. Note tachometer reading. *(CAUTION - Do not operate engine at high speed while selector lever is in one of the driving ranges, with rear wheels held stationary, for more than 10 seconds at a time to prevent overheating transmission)* Normal stall speeds are as indicated in table below If stall speed is greater than normal, slippage in transmission is indicated If stall speed is below normal, poor engine performance is indicated

Stall Speeds

Model	Engine RPM
American	1400
Series 10	1400
Series 20	1575
Series 80	1600

SHIFT SPEEDS
1958-60 Rambler American

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	10-14 MPH	25-29 MPH	36-40 MPH
2-3	15-19 MPH	45-49 MPH	56-60 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	12 MPH	23 MPH(Max)	53 MPH(Max)
2-1	8 MPH		19 MPH(Max)

1957 Series 10

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	7-9 MPH	22-26 MPH	36-38 MPH
2-3	15-19 MPH	46-50 MPH	57-59 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	10-12 MPH	24 MPH Max	53 MPH Max
2-1	5-7 MPH	8 MPH Max	18 MPH Max

1958-60 Series 10

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	10-14 MPH	26-30 MPH	41-45 MPH
2-3	18-22 MPH	49-53 MPH	65-69 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	9-13 MPH	23-27 MPH	59-63 MPH
2-1	5-9 MPH		22-26 MPH

1958-60 Series 20

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	6-10 MPH	21-25 MPH	32-36 MPH
2-3	24-26 MPH	47-51 MPH	62-66 MPH
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	10-14 MPH	26-30 MPH	54-58 MPH
2-1	5-9 MPH		17-21 MPH

1958-60 Series 80

Upshift	Light Throttle	Full Throttle	Kickdown
1-2	10-14 MPH	26-30 MPH	37-41MPH
2-3	21-25 MPH	46-50 MPH	64-68 MPH
D wnshift	**Cl s d Thr ttl**	**Full Throttl**	**Kickd wn**
3-2	16-20 MPH	28-32 MPH	58-62 MPH
2-1	6-10 MPH		25-29 MPH

1959-60 Ch ck r Superba

Upshift	Light Thr ttl	Full Thr ttl	Kickd wn
1-2	5-8 MPH	22-30 MPH	
2-3	10-13 MPH	41-50 MPH	
Downshift	**Closed Throttle**	**Full Throttle**	**Kickdown**
3-2	7-11 MPH		35-49 MPH
2-1	3-7 MPH		

AIR PRESSURE TEST (Transmission in Car)· Raise car on hoist and remove transmission oil pan and control valve assembly The front servo tubes should remain in front servo and the servo attaching screw must be tight *NOTE - When making air pressure tests, hold a clean towel over transmission opening to prevent xcessive oil spray*

Front Clutch· Apply air pressure to front clutch passage (on transmission case rear flange). Listen for a dull thud indicating clutch is operating. Retain air pressure in this passage for several seconds to check for leaks in this circuit.

Governor Valve Remove governor inspection hole cover and apply air pressure to front clutch passage (see above) Listen for a click and watch valve snap inward Replace inspection hole cover

Rear Clutch· Apply air pressure to rear clutch passage (on transmission case rear flange) Listen for a dull thud indicating clutch is operating Retain air pressure in this passage for several seconds to check for leaks in this circuit

Front Band & Servo· Apply air pressure to front servo apply tube (rear tube) and observe band application.

Rear Band & Servo· Apply pressure to rear clutch oil passage (transmission case rear flange), and observe band application

►*TESTING NOTE If servos, bands, clutches, and governor operate with air pressure, then the no-drive problems, erratic shift, or no-upshift conditions indicate that th control valve assembly and pressure regulator valve assembly is the cause of the trouble See "Control Valv " and "Pressure Regulator Valve" below*

TROUBLE SHOOTING & DIAGNOSIS

INITIAL ENGAGEMENT TOO ROUGH· Idle speed may be too high Control pressure may be too high caused by improper adjustment of throttle control vacuum unit. Regulator control valve may be dirty

INITIAL ENGAGEMFNT DELAYED: Check fluid level On Series 10 or Rambler American, adjust rear band as it may be loose Control pressure may be too low at idle speed Clean control valve assembly and pressure regulator assembly Check front pump for wear Check fluid circuits for leaks and correct as necessary

INOPERATIVE IN ALL RANGES· Check fluid level. Manual linkage may be disconnected No control pressure, which may be caused by trouble at front pump. Check rear band adjustment Check rear servo action with air pressure. Inspect and clean control valve assembly. Check engine stall speed, as converter may not be operating properly

NO DRIVE IN "D" OR "L" POSITION: Check fluid level Manual linkage not properly adjusted Control pressure may be low Adjust vacuum control unit Clean control

CONTINUED ON NEXT PAGE

RAMBLER & CHECKER SUPERBA AUTOMATIC TRANSMISSION (Cont.)

valve and pressure regulator valve assemblies. Check front clutch action with air pressure. On Series 10 and Rambler American, check rear servo and band with air pressure. Check transition valve in control valve assembly as it may be stuck.

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be too low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve assembly.

LOCKS UP IN "D" POSITION: Rear clutch or front band may be applied. Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failure.

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo or "one-way" clutch for mechanical failure. Check rear clutch. Clean control valve assembly assembly.

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band, or "one-way" clutch may be applied. Clean control valve assembly.

LOCKS UP IN "R" POSITION: Check front clutch and band and front servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Adjust vacuum control unit. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited; check for mechanical failure of band or servo. Check front clutch for mechanical failure. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Control pressure may be too high. Check and correct vacuum and solenoid adjustment. Check and adjust bands. Clean governor valve assembly.

1-2 UPSHIFT SLIPPAGE (LIGHT THROTTLE): This condition may be caused by an unbalanced vacuum condition due to clogged vacuum ports or vacuum leakage at carburetor *(See "Carter (AS) Carburetor" in Carburetor Section)*. Check adjustment of Vacuum & Solenoid Control Unit on transmission *(See "Throttle Control Aduustment" above)*.

1-2 UPSHIFT SLIPS: Adjust vacuum and solenoid unit. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air pressure. Check for fluid leakage.

NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check for stuck governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Adjust vacuum solenoid unit.

2-3 UPSHIFT ROUGH: Control pressure may be too high; adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for stuck governor valve.

2-3 UPSHIFT "PILE-UP" (LIGHT THROTTLE): *See "1-2 Upshift Slippag (Light Throttle)" above.*

2-3 UPSHIFT SLIPS: Control pressure may be too low; adjust vacuum solenoid unit. Clean control valve assembly and adjust front band. Check for internal leaks and stuck governor valve.

NO 2-3 UPSHIFT: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit. Adjust vacuum solenoid unit.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Orifice control valve may be stuck.

3-2 KICKDOWN (EARLY): Check for stuck governor valve.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust vacuum solenoid unit. Rear servo check valve may be stuck.

WILL NOT START BY PUSHING: Rear pump not operating. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust vacuum solenoid unit. Check for damaged internal linkage or pawl.

TRANSMISSION REMOVAL & INSTALLATION

RAMBLER

►*RAMBLER SERIES 20 & 80 (WITH SINGLE EXHAUST) TRANSMISSION REMOVAL NOTE: Disconnect crossover (right) exhaust pipe at manifold flange and "U" clamp connection at left exhaust pipe.*

REMOVAL: Disconnect battery cable, then raise car on a hoist and place jack stands under rear of car at body sills. Disconnect oil filler tube at oil pan and drain transmission. On Series 20 & 80, disconnect oil cooler lines at transmission. On all models, disconnect vacuum line and wire terminal at vacuum unit located at rear of transmission. Disconnect speedometer cable at transmission and rear brake hose bracket from floor panel. Disconnect manual shift linkage or cables from levers at transmission, then disconnect rear shock absorbers from rear axle. On Rambler American, disconnect rear spring front brackets from body floor pan, then slide rear axle to rear to disengage front universal joint from transmission shaft. On other models, disconnect torque tube, propeller shaft, and parking brake cable, then lower rear axle and move rearward to separate torque tube and propeller shaft from transmission. On all models, place a hydraulic hoist with a suitable cradle in position under transmission oil pan, then remove transmission case-to-converter housing upper capscrews. On all cars except Rambler American, remove shift cable bracket. On all cars, install two guide pins, Tool J-1434 into capscrew holes, then remove lower capscrews and lockwashers. With hydraulic hoist and cradle adjusted so transmission is in alignment with converter housing, pull transmission to rear to disengage it from housing and converter assembly. Lower assembly and remove from car.

►*TRANSMISSION, BELL HOUSING & CONVERTER ASSEMBLY REMOVAL NOTE:* These parts may be removed as an assembly as follows: In addition to transmission removal procedure (see above), remove the starter attaching bolts and remove starter. Support transmission and remove crossmember at side sill bolts. Lower engine and block engine on both sides from the top ledges of oil pan to side sill crossmember (these blocks should be 5" long and 2" square). Remove bell housing-to-engine bolts and bell housing lower mud pan. Remove six capscrews attaching torque converter to drive plate. Complete removal as outlined above.

INSTALLATION: Reverse the removal procedure and note the following: If transmission removed separately, position front pump drive tangs on converter in a horizontal position and position the front pump external tooth gear drive lugs in a vertical position. Tighten transmission-to-bell housing attaching bolts to 40-45 ft. lbs. If converter has been removed, converter-to-drive plate attaching capscrews must be tightened to 23-28 ft. lbs.

CHECKER SUPERBA

REMOVAL: Raise car and drain transmission fluid, then loosen tube clip capscrew at extension on starter motor and rotate filler tube out of the way. Disconnect vacuum line at vacuum unit (rear of transmission), then disconnect hand brake cable at drive shaft if chassis is so equipped. Disconnect manual shift linkage at shift lever on transmission, then disconnect the two oil cooler lines on right side of transmission (if so equipped). Disconnect propeller shaft at transmission companion flange and wire propeller shaft out of the way. Place a hydraulic hoist with a suitable transmission lift cable in position under transmission oil pan and adjust hoist to align cradle with oil pan flange, then hoist enough to support transmission. Remove transmission case to converter housing upper capscrews and lockwashers and install two pilot studs into screw holes. Remove lower transmission case to converter housing capscrews. Pull transmission straight toward rear of car to disengage it from converter housing and converter assembly.

INSTALLATION: Reverse removal procedure, being careful to align turbine shaft splines with turbine hub splines and the converter impeller lugs with slots in front pump drive gear.

TRANSMISSION OVERHAUL

►*CONVERTER OVERHAUL NOTE:* Torque converter is a sealed assembly (case is welded together during manufacture) and cannot be disassembled for service.

►*1960 RAMBLER SIX TRANSMISSION FRONT CLUTCH PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To Provide Smooth r Clutch Application):* Beginning with Transmission Serial No. 12606 (Series 6001), 127233 (Series 6010), two flat steel plates in front clutch have been replaced with the concave type which are identical to those used in rear clutch. Thickness of clutch pressure plate has been decreased (.030") to compensate for new type plates. Sintered metal plates have been changed for more effective cushioning. These parts are included in Kit, Part No. 3202486 for service on later cars and may be installed in 1960 transmissions before the above serial numbers. For proper installation, install pressure plate with smooth side upward, then install driven sintered metal plates and steel drive plates alternately, starting with a sintered metal plate. The two "Dished" concave plates must be installed with concave side in upward position facing the input shaft.

TRANSMISSION OVERHAUL: *See "Warner Automatic Transmission" in this section.*

RAMBLER PUSHBUTTON TRANSMISSION CONTROL

Rambler, Series 10, 20, 80 (1958-60)

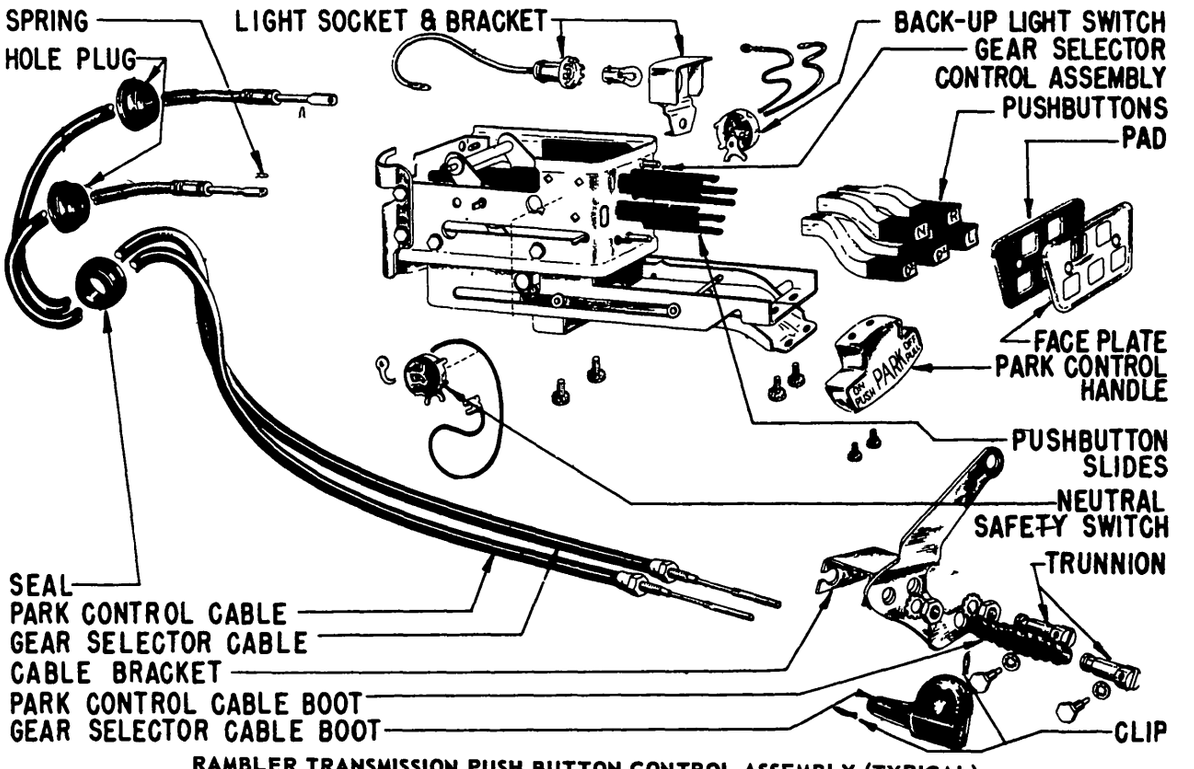
►CHANGES, CAUTIONS, CORRECTIONS

►*TRANSMISSION GEAR SELECTOR PUSHBUTTON ASSEMBLY FORWARD OR REVERSE BUTTON REMAINING IN FORWARD POSITION WHEN NEUTRAL BUTTON ENGAGED CORRECTION:* Install Clip, Part No. 3201142 on Neutral slide. Remove control assembly from instrument panel and install one clip on top and one clip on bottom of neutral slide. Check operation by depressing Neutral button. If button latches properly, reinstall control assembly. *NOTE - If Neutral button does not latch, remove clips, reinstall control assembly and PROPERLY adjust shift cable (see "Pushbutton Control Adjustment" below).*

DESCRIPTION: The transmission manual pushbutton gear selector control is located at left side of instrument panel and consists of five buttons operating a cable connected to selector lever on transmission. A "Park" lever located directly below the pushbuttons operates a mechanical parking pawl which engages external teeth of rear internal gear. When "Park" button is pushed in, all buttons except "N" (Neutral) are locked and cannot be operated. With either of the forward or reverse buttons pushed in, the "Park" lever is locked and cannot be operated. A back-up light switch, operated by the "R" (Reverse) button, and a neutral safety switch, operated by the "N" (Neutral) button are also located on the pushbutton gear selector control assembly.

ADJUSTMENT: Gear Selector Push Button Control - Disconnect cable at transmission lever, then push "N" (1958) "L" (1959-60) button in and move the selector lever on transmission all the way forward (1958), all the way to rear (1959-60). Move transmission selector lever rearward to first notch (1958). *NOTE - On later models, leave selector lever in "L" position.* Adjust cable linkage clevis, aligning holes in clevis and lever. Install clevis pin and washer and tighten clevis securely. Check adjustment in all five positions.

Park Lever Adjustment (1958-59): Push park lever all the way in and disconnect cable at transmission lever. Move transmission park lever toward rear, engaging parking pawl with internal teeth of rear internal gear. Adjust clevis on cable to align holes in clevis and lever, then install clevis pin and washer and tighten securely.



RAMBLER TRANSMISSION PUSH BUTTON CONTROL ASSEMBLY (TYPICAL)

Park Lever Adjustment (1960): Disconnect cable at transmission lever and pull park lever handle out (transmission lever will then lay free against inner parking pawl). Adjust clevis on cable to align with hole in parking lever, then install clevis pin and washer and tighten securely.

REMOVAL: Disconnect battery, then remove screws retaining parking lever handle and remove handle. Disconnect back-up light wires at relay or connector and at junction block and pull necessary wires through firewall. Disconnect control light bulb from connector under instrument panel. Remove gear selector escutcheon from instrument panel, then remove Phillips screws that retain gear control selector and move unit forward to clear push buttons from instrument panel. After unit is lowered, pull unit and cables toward you and remove hairpin clips from both cable attaching pins and pry cable outer looms from brackets of control unit. *NOTE - If safety switch or back-up light switch require replacing, bend prongs on switch upward with a screwdriver. When installing, bend prongs down carefully.*

INSTALLATION: Install outer cable looms to gear selector control brackets and install cable ends to attaching pins and retain with hairpin clips. Carefully install control assembly in instrument panel aligning all five pushbuttons through openings in instrument panel. Fasten control assembly with the four Phillips screws. Install light bulb and socket and connect neutral safety switch wires to junction block and connector. Insert back-up light wire through firewall and connect to relay connection on left wheelhouse panel. Install escutcheon plate and parking lever handle. Check all pushbutton controls and parking brake for proper setting, then connect battery terminal.

STUDEBAKER AUTOMATIC TRANSMISSION

Stud baker Champion (1954-55)
Studebaker Commander (1954-55)
Studebaker Landcruiser (1954)
Studebaker President (1955)
Hudson (1954)

►CHANGES, CAUTIONS, CORRECTIONS

►*AUTOMATIC TRANSMISSION MODEL IDENTIFICATION & APPLICATION (Different Transmission Models used as follows):*

Car Model	①Trans. Model
1954-Early 1955 Champion②	DG-150
1955 (Late) Champion③	DG-150M
1954-Early 1955 Commander④	DG-200
1955 (Late) Commander⑤	DG-200M
1955 Commander (2nd Series)⑥	DG-250M
1955 President	DG-250M
1954 Hudson	DG-200

①—On model plate on left side of transmission case.
②—Before 1955 Engine No. 1,147,699.
③—After 1955 Engine No. 1,147,699.
④—Before 1955 Engine No. V-318,899 (Early 1st Series).
⑤—After 1955 Engine No. V-318,899 (Late 1st Series).
⑥—1955 2nd Series. *See "Starting Engine Numbers" for 2nd Series on Car Model pages.*

►**STARTING ENGINE BY PUSHING CAR: Turn ignition key ON, depress and release accelerator pedal once (to set automatic choke), place transmission selector lever in Neutral "N" position. Push car until speed of 15-20 MPH. is reached, then move selector lever to Drive "D" or Low "L" position.**
CAUTION—Pushing to start engine recommended rather than towing (car may overtake tow car).

►**TOWING CARS WITH AUTOMATIC TRANSMISSION: Place transmission selector lever in Neutral "N" position and do not tow car in excess of 30 MPH.**

►**TRANSMISSION SERIAL NO. NOTE—Separate Torque Converter Nos. and Transmission Nos. used:**

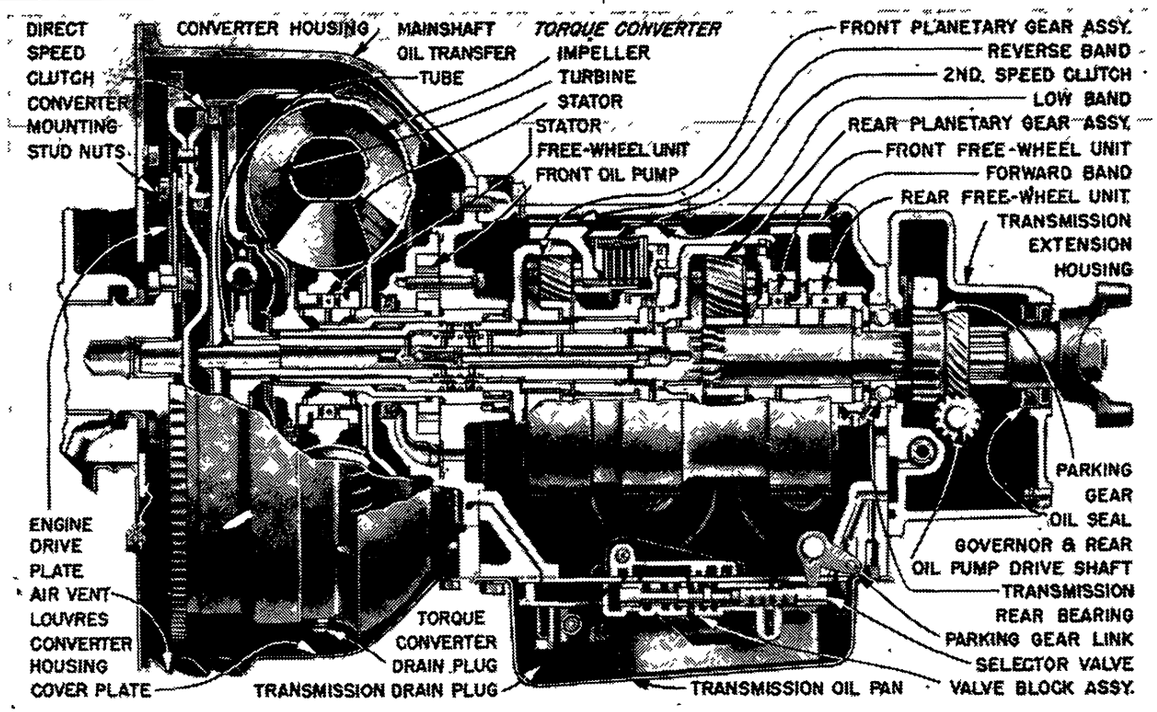
Torque Converter—Stamped on engine side of flywheel adjacent to flywheel ring gear.

Transmission—On metal plate on left side of transmission case below oil level gauge.

►***1955 SLOW REVERSE ENGAGEMENT CORRECTION (When shifting from either "D" or "L" range to "R" range):*** There are two possible causes for the condition, both of which require rework of valve block assembly. *See "Sub-Assembly Overhaul" below.*

►***1950-55 MULTIPLE DISC CLUTCH SERVICE REPLACEMENT CAUTION & 1955 PRODUCTION CHANGE:*** Sintered friction discs and flat separator plates are used in 1955 production and for service replacement on all 1950-55 models. Previously the separator plates were slightly "dished." The early type friction discs were thicker, therefore when installing the new type discs in early transmissions it is necessary that Spacer Plate, Part No. 537720 be used. When it is necessary to replace either a disc or a disc plate, all discs and plates should be replaced in complete sets.

►***1955 CONVERTER VALVE PRODUCTION CHANGE:*** Starting with the following transmission serial numbers, the converter valve was changed so that the shuttle valve is regulated by the multiple disc clutch pressure instead of direct drive clutch pressure. Serial numbers SCH-2101 (DG-150M Trans.), SP-10801 (DG-250M Trans.), this change made to provide a more positive shift from drive-intermediate into direct drive. The converter pressures with the later type valve is 50-70 lbs., in low gear, and 20-30 lbs., in drive-intermediate or direct drive.



STUDEBAKER AUTOMATIC TRANSMISSION SECTIONAL VIEW

►***1955 COMMANDER & PRESIDENT LOW UPSHIFT & LOW "KICK-DOWN" SPEED CORRECTION:*** If transmission has a low upshift speed (approx. 60 MPH) from drive-intermediate to direct drive at full throttle "kickdown" or a low maximum "kickdown" speed from direct drive to drive-intermediate (approx. 48 MPH) check accelerator-to-governor linkage adjustment and inspect governor spline shaft and governor valve for burrs or roughness, smoothing up parts as necessary. *NOTE*—If correction cannot be made as indicated above, install a new governor tension spring, Part No. 537066 (free length 2 21/32").

DESCRIPTION

Transmission consists of Torque Converter Assembly (torque converter and Direct Speed Clutch) and a planetary type transmission (3-speed and Reverse) which is hydraulically controlled. Transmission has a pawl-and-gear Parking lock mechanism (Studebaker models are fitted with an electrically controlled, solenoid operated "Anti-Creep" device by which the brakes are held "ON" while car is standing. This unit is operative whenever ignition switch turned on). Direct drive clutch is hydraulically operated, and consists of driven member, backing plate and a hydraulically operated pressure plate. Oil pressure to direct drive clutch, locks these three units together allowing engine torque to be transmitted directly to rear wheels.

OPERATION

Torque Converter Assembly automatically provides a torque multiplication ranging from 2.16-1 (maximum when turbine stationary and impeller turning at 1450 RPM. or normal stall speed) to 1-1 (when turbine and impeller speeds approximately equal. At car speed of 18 MPH. (depending on throttle position—see table), engagement of Direct Speed Clutch locks out the torque converter completely. The planetary transmission is controlled by the operator and provides the following gear ratios:

Neutral "N" Position—All bands and clutches are released so that no power is transmitted through transmission. Car can be moved freely if brakes not applied (will be held on by Anti-creep after they have once been applied but can be released by turning ignition off or by opening the throttle).

Low "L" Position (used primarily for extra power on steep grades, engine braking when descending grades, fast acceleration from standing start, or "rocking" car out of sand or snow). The Low and Forward bands are applied and power is transmitted through both planetary gear sets in tandem providing a total ratio of approximately 4.6-1 (converter torque multiplication of approximately 2-1 plus gear reduction of 2.3-1).

CONTINUED ON NEXT PAGE

STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

►*OPERATION CAUTION*—When Low used for engine braking on grades, **car speed should be brought below 40 MPH.** before moving selector lever to "L" position. When Low used for fast starts, selector lever should be moved to "D" position **before reaching car speed of 40 MPH, and without releasing accelerator.**

Drive "D" Position (Model DG-200 Trans.)—Provides two ratios depending on car speed and throttle position as follows: *(Intermediate)*—Forward Band & Multiple Disc Clutch applied so that forward planetary gear set is locked out and power is transmitted through rear planetary gear set providing a total ratio of approximately 2.9-1 (converter torque multiplication of approximately 2 to 1, plus gear reduction of 1.4-1). *(Direct)*—The Direct Speed Clutch engages and this locks out the Torque Converter and also the Planetary Gear unit to provide positive drive of 1 to 1. *(Direct-to-Intermediate Downshift)*—At car speeds below approximately 60 MPH, the transmission can be "Kicked-Down" from Direct to Intermediate for additional power for hill climbing on passing by fully depressing accelerator pedal. Transmission will remain in Intermediate until throttle released momentarily or Lockout Speed reached.

Drive "D" Position (Models DG-150 & DG-150M Trans.)—Provides for three automatic forward drive range as follows: *(Low)*—Forward Band applied, locking forward drive drum to transmission case. All other units free to rotate. *(Intermediate)*—Forward Band & Multiple Disc Clutch applied. *(Direct)*—Direct Speed Clutch engages and this locks out the Torque Converter and also the Planetary Gear unit to provide a direct drive. *(Direct-to-Intermediate Downshift)*—At car speeds below approximately 60 MPH, the transmission can be "Kicked-Down" from Direct to Intermediate for additional power by fully depressing the accelerator pedal. Transmission will remain in Intermediate until throttle released momentarily or Lockout Speed reached.

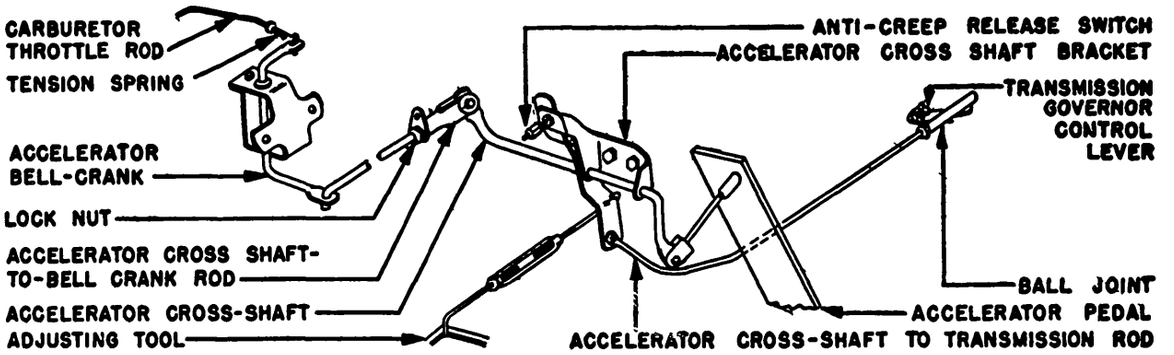
Drive "D" Position (Models DG-200M & DG-250M Trans.)—Provides for three automatic forward drive ranges as follows: *(Low)*—Forward Band & Low Band applied. *(Intermediate)*—Forward Band & Multiple Disc Clutch applied so that forward planetary set is locked out and power is transmitted through rear planetary gear set. *(Direct)*—Forward Band, Multiple Disc Clutch & Direct Drive Clutch applied locking out the Torque Converter and forward planetary set to provide a direct drive. *(Direct-to-Intermediate Downshift)*—At car speeds below approximately 60-64 MPH, the transmission can be "Kicked-Down" from Direct to Intermediate for additional power. Transmission will remain in Intermediate until accelerator pedal momentarily released or Lockout Speed reached. *(Low-to-Intermediate Downshift)*—At car speeds below 10-12 MPH, the transmission can be "Kicked-Down" from Intermediate to Low by fully depressing the accelerator pedal. Transmission will remain in Low until pedal momentarily released or car speed exceeds Lockout speed.

Reverse "R" Position—Reverse band is applied in two stages ("boosted" oil pressure of 200 lbs. on servo inner piston applies band, shuttle valve then directs oil pressure to servo outer piston also to assist band in absorbing the high reaction torque). Power is transmitted through both planetary units in tandem to provide reverse rotation and a total ratio of approximately 4-1 (converter torque multiplication of 2-1 plus gear reduction of 2-1). *(1954-55 Champion Note*—Shuttle valve not used. A restriction in reverse servo plate replaces the shuttle valve).

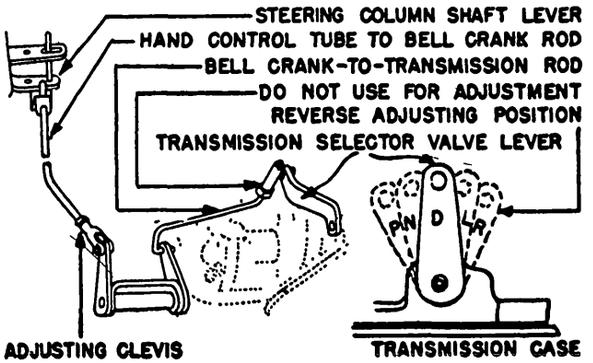
Parking "P" Position—Similar to neutral position (all bands and clutches released) and in addition the parking pawl (linked to selector lever) is engaged in parking gear on rear end of mainshaft so that propeller shaft and rear wheels locked.

►**Holding on Hills Note—With selector lever in Drive "D" Position and engine running, the transmission prevents rollback when car is stopped on normal upgrades. This is due to action of free-wheeling units which prevent reverse rotation of transmission main shaft when multiple disc clutch and forward band are engaged.**

Anti-Creep System—System consists of Solenoid valve (located on brake master cylinder), which holds pressure on rear wheel brake whenever anti-creep circuit is closed. A Pressure Control Switch (located on rear of transmission extension case), which is operated by rear pump pressure to open anti-creep circuit when car is moving forward and to close this circuit when car is stationary or moving in reverse. The anti-creep Release Switch (located in engine compartment, adjacent to throttle linkage), opens and closes anti-creep circuit as accelerator pedal is depressed or released.



CHAMPION ACCELERATOR LINKAGE



SELECTOR CONTR L LINKAGE (ALL M DELS)

LUBRICATION

Check transmission fluid every 1000 miles and add fluid as required to maintain level at "Full" mark on dipstick. Drain and refill every 15,000 miles.

►*FLUID LEVEL CHECKING NOTE (To obtain accurate level reading): To prevent oil spray and torque converter drain-back, causing inaccurate dipstick reading, fluid level must be checked as indicated below, immediately after engine stopped.*

Checking Fluid Level—With car on a level floor, set hand brake firmly. Place selector lever in "L" position and allow engine to warm up to normal operating temperature and then run engine at idle speed. Clean area around inspection hole and top of fluid level gauge. Remove gauge and wipe it dry. *Stop engine and immediately insert and withdraw gauge.* If any additional fluid is required, add it and then repeat the checking procedure. Use only Automatic Transmission Fluid Type "A," bearing an AQ-ATF symbol on container.

►*CAUTION: Under no circumstances should transmission be filled above "Full" mark on dipstick.*

Draining & Refilling—Oil must be warm (set parking brake, place selector lever in "L" position, idle engine until normal operating temperature reached). Stop engine, remove inspection hole cover in front floor carpet, clean all dirt from around inspection hole, remove oil level gauge dipstick. Drain transmission oil pan by removing drain plug at left front corner of pan. Remove converter housing lower cover plate, turn converter until drain plug down, drain converter by taking out this plug (draining facilitated by removing converter pressure take-off plug on left side of transmission case. If two plugs on case (early type), remove upper plug. If only one plug (later type) located at bottom of boss, remove this plug. Re-install all drain plugs, install converter housing plate. Install 5 quarts oil (all models), through the dipstick hole in top of transmission case. Start engine and allow to idle for approximately 1 minutes with selector lever in "L" position to fill converter housing, then add 3 additional quarts of oil, finally check oil level with engine idling and selector lever in "L" position, add oil to bring level up to FULL mark on dipstick.

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STUDEBAKER AUTOMATIC TRANSMISSION (Cont.)

Oil Pan & Oil Screen Removal & Installation: Drain transmission case (see above).

Removal & Cleaning—Remove parking brake bellcrank from crossmember under transmission case (not necessary on Champion). Remove all oil pan capscrews, remove oil pan. Remove spring clip holding oil screen in screen housing on bottom of valve block assembly, remove screen and clean with compressed air.

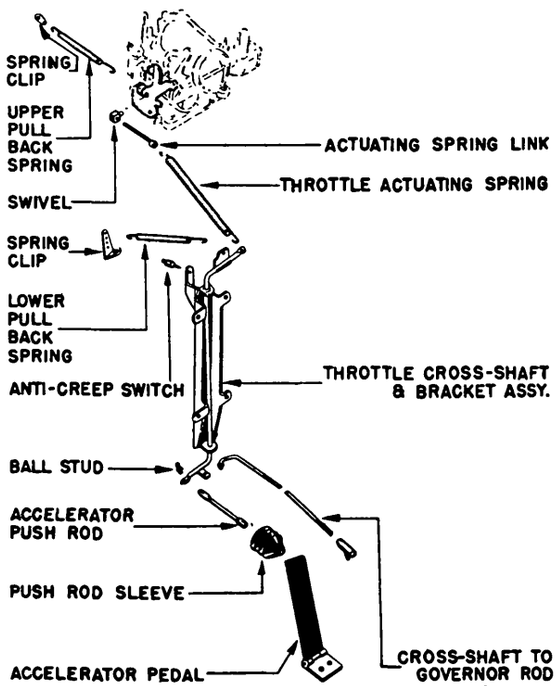
Installation—Install oil screen in housing and see that spring clip installed properly to hold screen in place. Use a new pan gasket but DO NOT use any type of sealing compound when installing pan (heavy mineral grease or Lubriplate may be used to hold gasket in place). Tighten all oil pan mounting screws to 10-13 ft.lbs. Install parking brake bellcrank.

LINKAGE ADJUSTMENT

►*LINKAGE ADJUSTMENT CAUTION—Champion and Commander Accelerator Linkage adjusted differently as follows:*

Accelerator-To-Carburetor Throttle Linkage Adjustment (Champion (1954-55): See *CARBURETOR on Car Model Pages.*

Accelerator-To-Carburetor Throttle Linkage Adjustment (Commander & Landcruiser 1954): Adjust engine idle speed to 500-550 RPM (engine at normal operating temperature with choke valve wide open and fast idle inoperative).



STUDEBAKER COMMANDER, LANDCRUISER & PRESIDENT THROTTLE LINKAGE

►*ACCELERATOR CROSS SHAFT-TO-CARBURETOR ACTUATING SPRING PRODUCTION CHANGE (To Correct Unintentional Engagement of Kickdown):* A new stiffer spring Part No. 534230 (painted green) will be used in production, and can be used on earlier models to assure proper "feel" of accelerator pedal and prevent unintentional kickdown. New spring has a load of 9-11 lbs., at 9" length.

1) Place the idle adjusting screw on the fourth step of the fast idle cam (the lowest step being the first step). Adjust throttle check screw until it just contacts the pad on the throttle shaft lever.

2) Disconnect anti-creep release switch wire at switch. Remove anti-creep release switch from accelerator bellcrank bracket. Leave all three springs attached.

3) Loosen the two threaded locknuts (for adjusting throttle actuating spring tension) several turns. Hold cross-shaft arm against bracket and at the same time tighten forward locknut on threaded rod until spring is taut. The idle adjusting screw will just start to break contact with lower step of fast idle cam. Back off forward threaded rod lock nut just enough to let the idle adjusting screw lightly contact low step of fast idle cam.

4) Install anti-creep release switch in cross shaft bracket. Turn it in until idle adjusting screw again starts to break contact with low step of fast idle cam. Back off anti-creep switch **3 complete turns** and secure with locknut.

5) Back off the forward threaded rod locknut **3 complete** turns. This will allow approximately ⅛" to 3/16" sag in throttle actuating spring. Tighten the rear threaded rod locknut.

6) Throttle valve must be held in the wide open position for Accelerator-to-throttle linkage adjustment (following). Use a piece of ½" x ¾" angle iron 15¼" long. Pull hand brake control handle out 4 or 5 inches. Position the angle iron between hand brake plunger, just forward of handle, and the accelerator pedal. Then slowly push hand brake in until carburetor throttle valve is just to its wide open position. This is the point where any further movement of accelerator pedal will only result in operating the overtravel spring. The angle iron will now hold linkage in this position while governor linkage is adjusted (following).

Accelerator-To-Carburetor Throttle Linkage Adjustment (Commander & President 1955): Disconnect anti-creep release switch wire at switch and remove switch from bracket (leave all three springs attached).

1) With selector lever in "P" or "N" position, adjust engine idle speed to 550 RPM with the choke valve wide open. Make sure throttle return check is operating correctly.

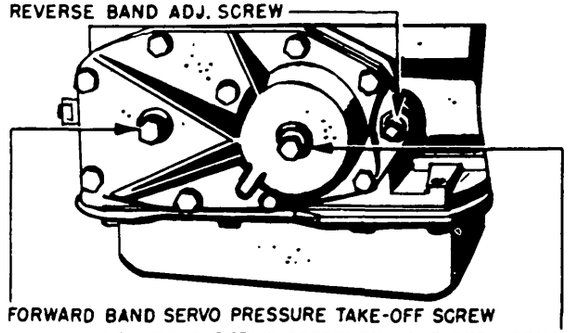
2) Install Anti-creep switch and adjust it in the bracket so throttle actuating spring is taut and the idle adjusting screw just breaks contact at the wide open choke position. Back off Anti-creep switch one-half turn.

3) Loosen throttle return check assembly locknut and adjust assembly in bracket until the plunger just breaks contact with tab on throttle lever. Mark position of the check assembly relative to the bracket, then turn the check assembly 1¾ to 2 complete turns toward the lever. Tighten locknut.

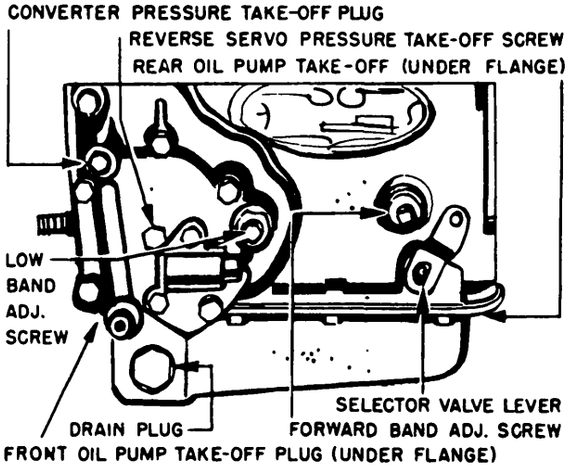
4) Throttle valve must be held in the wide open position for Accelerator-to-Governor Linkage Adjustment (following). Use a piece of ½" or ¾" angle iron 13½" long to hold throttle valve in its wide open position. Pull hand brake control handle out 4" or 5". Position angle iron between hand brake plunger, just forward of the handle, and accelerator pedal. Depress accelerator pedal to near the wide open position and at the same time slide the lower end of the angle iron up near top of accelerator pedal. Then slowly push hand brake in until the carburetor throttle valve is just to its wide open position (this is the point where any further movement of the accelerator pedal will result in operating the over-travel spring). The angle iron will now hold the linkage in this position while accelerator cross shaft-to-governor linkage is adjusted (following).

Accelerator-To-Governor Linkage Adjustment (All Studebaker Models): Disconnect accelerator rod ball joint from governor lever (note whether it is taken from inner or outer hole if lever has two holes). *CAUTION—Ball joint must be installed in OUTER hole on all models, except Commander models prior to 1951 Serial No. 8133626, where the inner hole is used.*

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LEFT SIDE OF TRANSMISSION CASE CHECKING & ADJUSTING POINTS



RIGHT SIDE OF TRANSMISSION CASE CHECKING & ADJUSTING POINTS

STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

1) Turn governor control lever (on transmission) forward or clockwise until resistance of the detent is felt, then check adjustment of the rod. If the linkage is correctly adjusted, the stud of the ball joint will easily slip into the proper hole of governor lever. If adjustment is required, loosen ball joint locknut and turn ball joint until stud is aligned with proper hole in lever. Make sure that lever is still at point where resistance of detent is felt. After making adjustment, tighten locknut securely. **Do not install ball joint stud at this time.**

3) Remove tool from accelerator pedal, then check linkage as follows:

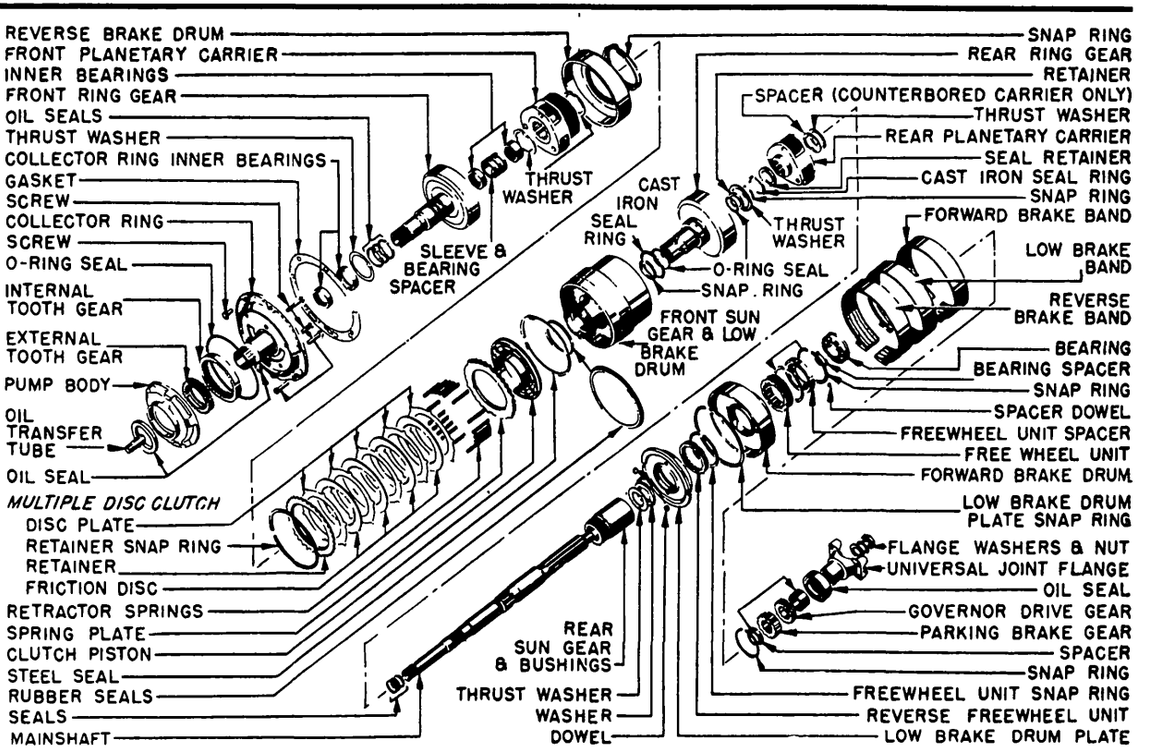
(a) With floor mat properly in place and accelerator pedal fully depressed (kickdown position), slip ball joint stud out of governor lever and check to make sure that governor lever is at end of its forward travel.

(b) With the accelerator fully released check to make sure there is at least ¼" of free travel of governor lever before spring pressure is felt as it is turned forward. If adjustment is correct, install and tighten ball joint stud.

(c) If full forward travel or the correct amount of free travel of governor control lever is not obtained, recheck linkage adjustment. If proper travel is still not obtained, check for and eliminate any bind, distortion or interference in linkage which would affect proper operation or adjustment. A possible point of interference could be between accelerator bellcrank-to-transmission rod and the car floor pan. Remove front splash pan from frame side rail by removing the small screw and loosening the body bolt, and check for this condition. Correct by bending floor pan out of the way; **do not bend linkage.** Check all linkage mounting bolts for tightness.

Accelerator-to-Governor Linkage Adjustment (Hudson): Set engine idle speed to 490-510 RPM. With carburetor linkage properly adjusted and with engine shut off, hold the throttle control bell crank operating rod so that throttle is wide open. This is point where any further movement would only result in operating the throttle rod over travel spring. Adjust length of governor control rod so when governor lever is held at detent, the trunnion pin will enter bell crank freely (this detent is located approximately 1½" of rod travel from the rear, the resistance felt at ¼" to ½" of travel is the governor spring pick-up and not the detent). Tighten lock nut securely, but do not install cotter pin at this time.

2) Hold accelerator pedal against its stop with pedal jack or other means. With governor control rod pulled forward until governor lever bottoms against its stop in transmission, adjust the accelerator pedal rod length until the governor rod trunnion pin can be entered freely into throttle bell crank. (NOTE—On some Hornet models, it may be necessary to release the accelerator to facilitate adjustment; however, final check should be made with accelerator pedal against its stop, at which time the governor control lever should be at maximum travel). Tighten all lock nuts securely and install cotter pins. Do not make any readjustment of the governor control rod trunnion to accommodate pedal rod adjustment.



TRANSMISSION INTERNAL PARTS ASSEMBLY

Selector Hand Control Linkage (All Studebaker Models 1953-55): Adjust as follows:

1) Disconnect hand control bellcrank-to-transmission rod from bellcrank and selector control shaft lever.

2) Measure the diagonal distance from center of cotter pin hole at the bellcrank end, to center of ball at the ball joint end. This measurement should be 10 13/16" (for all 2-Door, 4-Door, and Land Cruiser models); 14 7/16" (for all Hard Top Convertibles, and 5-Passenger Coupes). On cars equipped with power steering, measurement should be 10 9/16" (for all 2-Door, 4-Door, and Land Cruiser Models); 14 3/16" (for all Hard Top, and 5-Passenger Coupes). After rod is adjusted, tighten the locknut and install rod. Once set, adjustment of the rod must not be changed during subsequent linkage adjustments.

►***CAUTION—After rod length correctly set (above), DO NOT change rod length when making adjustments.***

3) Disconnect steering column tube-to-bellcrank rod by taking out clevis pin at bellcrank, move valve selector lever on transmission case to reverse (extreme rear) position. Adjust length of steering column tube-to-bellcrank rod by turning clevis on bellcrank end of rod until clevis pin enters hole in clevis and bellcrank freely (CAUTION—do not change length of bellcrank-to-transmission lever rod). Do not install clevis pin at this time.

4) Set selector lever on steering column in Parking "P" position, move valve selector lever on transmission case to park (extreme forward) position and check to see that parking pawl engaged (propeller shaft should be locked). Check adjustment by slipping clevis pin through clevis at rear end of steering column tube-to-bellcrank rod and bellcrank. If pin enters both holes freely, connect rod. If not, readjust as follows:

5) If adjustment not correct in parking position (4 above) after having been correctly set in reverse position (3 above), readjust rod by turning clevis not more than ½ turn in either direction for best possible compromise in both reverse and park position. If satisfactory setting not possible within these limits, check entire linkage for wear, looseness, or distortion.

Selector Hand Control Linkage Adjustment (Hudson): Check upper and lower control tube brackets and make sure they are securely tightened on steering column jacket tube and that selector lever tube is parallel with the jacket tube. Disconnect the transmission shift rod at the selector tube lower level. Place selector control lever against the stop in the "D" position on the quadrant and the selector control shaft outer lever at the transmission in the "D" position (No. 3 detent on the selector valve) and adjust the transmission shift rod until the clevis pin freely enters the clevis of the selector rod and the hole in the selector control lower lever

ANTI-CREEP ADJUSTMENT: For adjustments other than Release Switch (part of linkage adjustment above), *see "Anti-Creep" in Brake Section.*

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

►*ANTI-CREEP RELEASE SWITCH REPLACEMENT CAUTION—When switch is replaced for any reason, the accelerator-to-transmission control linkage must be checked and adjusted (see Adjustment above).*

BAND ADJUSTMENT

►*CLIMATIZER DUCT INTERFERENCE (Low Band Adjustment) NOTE*—If Band Adjusting Tool J-4285 cannot be used for low band adjustment, because of interference with Climatizer duct, make adjustments as follows: Loosen and back off low band adjusting screw nut. Using a small wrench approximately 5" long, turn adjusting screw in until snug. Then back screw out FOUR COMPLETE TURNS. Tighten adjusting screw locknut securely, making sure that adjusting screw does not turn.

BAND ADJUSTMENT: Check and adjust all bands (Forward, Low, Reverse) in same manner using Band Adjusting Tool J4285 (plug gauge) to check the band setting before making adjustments.

Checking Bands—Remove capscrew and copper gasket from pressure take-off hole in servo mechanism of band being checked (see illustration). Insert tool J4285 into the pressure take-off hole as far as it will go and exert slight pressure to start tool threads in hole (see Caution below if threads do not start readily), screw tool into the hole until tool shoulder rests against transmission case noting that indicator plug in tool handle moves outward as tool is turned in (if plug reaches a position flush with tool handle BEFORE tool turned in fully, see Caution below). Indicator should be FLUSH with end of tool handle when tool fully installed if bands correctly adjusted. If not, adjust bands as directed below.

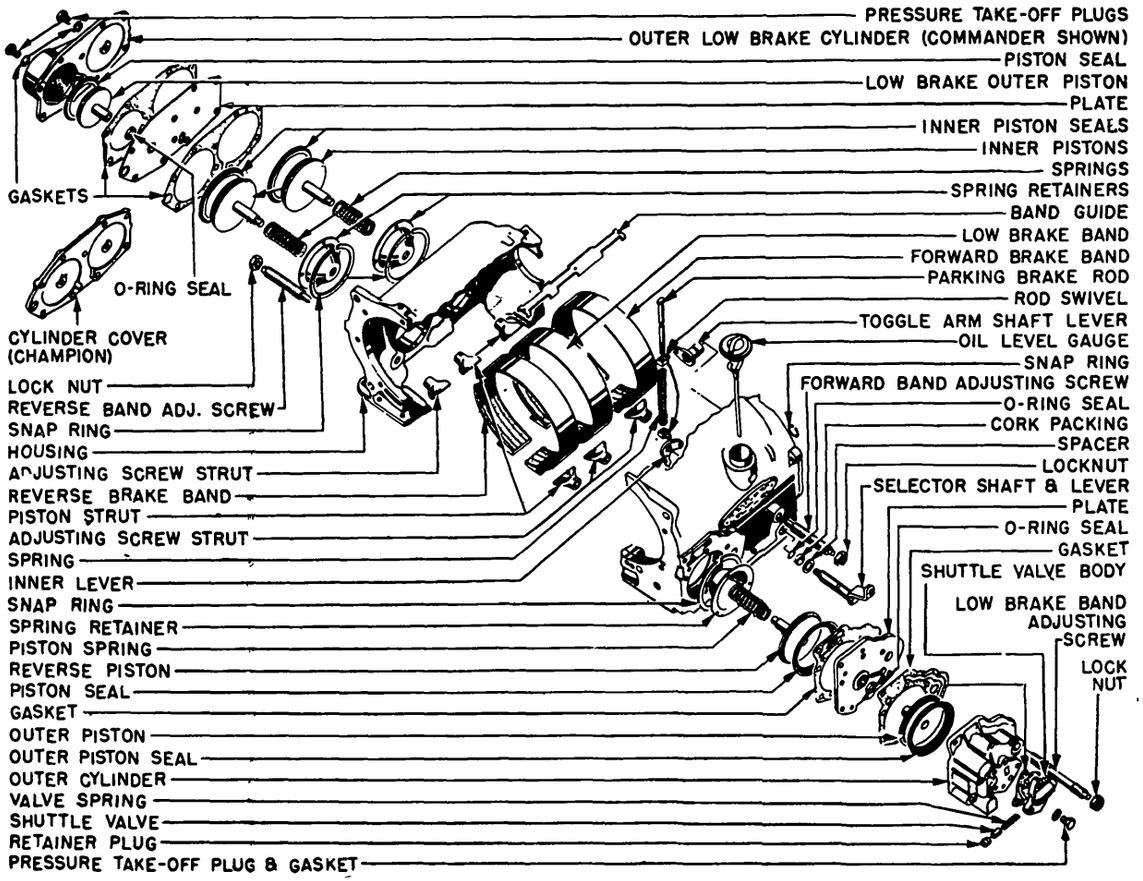
►*CAUTION*—If tool threads cannot be readily engaged in the Forward Band Servo pressure take-off hole, or if indicator plug reaches a position flush with tool handle before adjusting tool fully screwed into transmission case, **BACK OFF band adjusting screw on opposite side of case 2 turns** before screwing tool fully into position. This is an indication that the band adjustment was too tight and tool will be damaged if indicator plug forced out beyond end of tool handle.

Adjusting Bands—With adjusting tool in place to check band setting (above), loosen locknut on band adjusting screw (see illustration), turn adjusting screw in until indicator plug in adjusting tool handle is just flush with end of handle, tighten locknut being careful that adjusting screw does not turn. Remove adjusting tool and replace capscrew using new copper gasket under screw head.

►***CAUTION—Do not use any type of sealing compound on this capscrew.***

TESTING TRANSMISSION OPERATION

►*CAUTION—When testing with transmission selector lever in one of the driving positions, and with rear wheels held stationary, ENGINE MUST NOT BE OPERATED AT HIGH SPEED for mor than 10 seconds, or for a TOTAL time more than ONE MINUTE in any half hour period.*



AUTOMATIC TRANSMISSION CASE ASSEMBLY (EARLY 1954 CHAMPION & 1954 & EARLY 1955 COMMANDER)

Hand Control Linkage: With engine running at a speed slightly greater than idle speed, set the hand brake, then place selector lever in "D" position. Slowly move selector lever from "D" position to "N" position, noticing change in engine speed. The shift to neutral will be accompanied by a sudden increase in engine speed, and should take place just before selector lever reaches detent of "N" position. Shift lever to "L" position, then slowly move selector lever to "R" position. An increase in engine speed, indicating the shift out of low, should occur when selector lever has moved approximately two-thirds of distance from "L" to "R". Then, when selector moved slightly closer to "R" position detent, the shift into reverse should take place, accompanied by a decrease in engine speed. For adjustment see "Selector (Hand Control) Linkage" above.

Stall Speed Test: With engine in good operating condition, connect tachometer to engine. Set hand brake, start engine, then move selector lever to "D" position. Apply the service brakes, and operate the engine at full throttle and note tachometer reading. Repeat this procedure with selector lever in "L" position and in "R" position. ***(CAUTION—Do not operate engine with wheels held stationary and selector lever in one of the driving positions for more than 10 seconds at a time, or for a total time more than one minute in any half-hour period).*** With engine in good operating condition, normal stall speeds are as follows:

Stall Speeds

Car Model	Stall Speed
1954-55 Studebaker Champion	1500-1600 RPM
1954-55 Studebaker Commander	1550-1650 RPM
1955 Studebaker President	1550-1650 RPM
1954 Hudson 232" Eng.	1350-1600 RPM
1954 Hudson 263" Eng.	1450-1700 RPM
1954 Hudson 308" Eng.	1600-1900 RPM

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

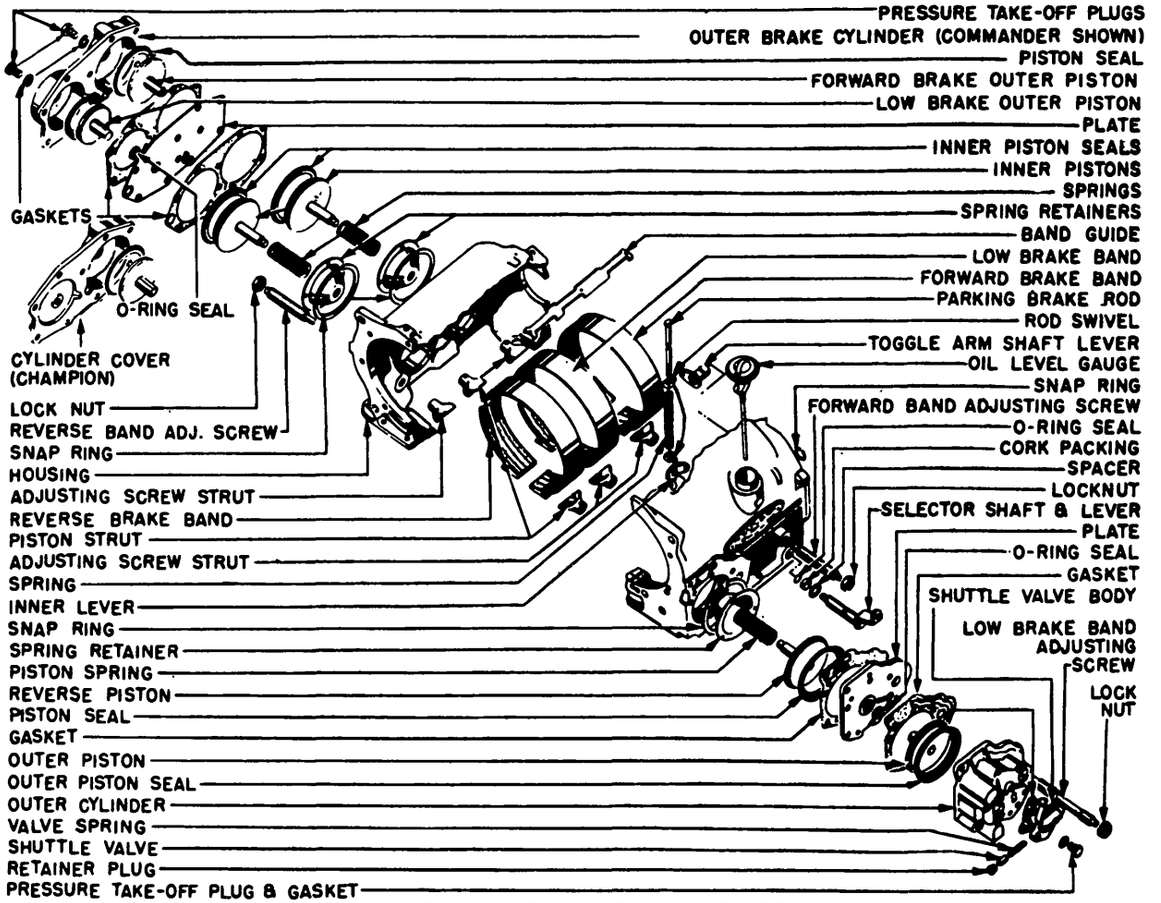
1954 Transmission Shift Speeds

Studebaker Champion			①2 to 3
Light Throttle Upshift			18-20 MPH
Full Throttle Upshift			36-38 MPH
Kickdown Upshift			57-60 MPH
Closed Throttle Downshift			15-17 MPH
Limit of Kickdown Downshift			49-50 MPH
Studebaker Commander			①2 to 3
Light Throttle Upshift			18-20 MPH
Full Throttle Upshift			39-41 MPH
Kickdown Upshift			67-70 MPH
Closed Throttle Downshift			13-15 MPH
Limit of Kickdown Downshift			57-60 MPH
Hudson (All Models)	②1 to 2		①2 to 3
Light Throttle Upshift	10-12 MPH		22-24 MPH
Full Throttle Upshift	31-34 MPH		48-52 MPH
Kickdown Upshift	43-46 MPH		70-75 MPH
Closed Throttle Downshift	20-19 MPH		8-7 MHP
Limit of Kickdown Downshift	65-60 MPH		72 MPH

①—Intermediate to Direct Drive.
②—First speed to Intermediate.

1955 Transmission Shift Speeds

Champion (DG-150 & 150M Trans.)	**MPH**
Light Throttle Upshift (1-2)	8-10
Light Throttle Upshift (2-3)	17-20
Full Throttle Upshift (1-2)	19-22
Full Throttle Upshift (2-3)	32-34
Kickdown Upshift (1-2)	33-35
Kickdown Upshift (2-3)	62-65
Closed Throttle Downshift (3-2)	15-17
Closed Throttle Downshift (2-1)	7-9
Kickdown Downshift Limit (3-2)	54-57
Part Throttle Kickdown Downshift Limit	30
Commander (DG-200 Trans.)	**MPH**
Light Throttle Upshift (2-3)	18-20
Full Throttle Upshift (2-3)	39-41
Kickdown Upshift (2-3)	67-70
Closed Throttle Downshift (3-2)	13-15
Limit of Kickdown Downshift (3-2)	57-60
Commander (DG-200M & 250M Trans.)	**MPH**
Light Throttle Upshift (1-2)	8-10
Light Throttle Upshift (2-3)	22-24
Full Throttle Upshift (1-2)	25-28
Full Throttle Upshift (2-3)	44-47
Kickdown Upshift (1-2)	37-40
Kickdown Upshift (2-3)	68-72
Closed Throttle Downshift (3-2)	18-20
Closed Throttle Downshift (2-1)	9-11
Kickdown Downshift Limit (3-2)	62-66
Kickdown Downshift Limit (2-1)	14-16
Part Throttle Kickdown Downshift Limit	35-38
President (DG-250M Trans.)	**MPH**
Light Throttle Upshift (1-2)	7-9
Light Throttle Upshift (2-3)	20-22
Full Throttle Upshift (1-2)	23-26
Full Throttle Upshift (2-3)	40-43
Kickdown Upshift (1-2)	34-37
Kickdown Upshift (2-3)	66-70
Closed Throttle Downshift (3-2)	17-19
Closed Throttle Downshift (2-1)	5-7
Kickdown Downshift Limit (3-2)	60-64
Kickdown Downshift Limit (2-1)	10-12
Part Throttle Kickdown Downshift Limit	31-34



AUTOMATIC TRANSMISSION CASE ASSEMBLY (DG-150, DG-150M, DG-250M)

TESTING HYDRAULIC UNITS

If transmission operation not satisfactory, check operation of oil pumps and control units by testing hydraulic control pressures.

Testing Tool Note—Pressure gauge and fittings for connecting gauge at various points on transmission are required for these tests. This equipment furnished as Tool No. J4270 (gauge & fittings).

►***CAUTION—When testing with transmission selector lever in one of the driving positions, and with rear wheels held stationary, ENGINE MUST NOT BE OPERATED AT HIGH SPEED for more than 10 seconds or for a TOTAL time more than ONE MINUTE in any half-hour period.***

Front Oil Pump Pressure: With engine stopped, remove Allen-head pipe plug in oil pan flange on front of transmission case, install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. Place selector lever in "P" or "N" position and bring speed up to 1000 RPM. At this speed gauge reading should be 60 lbs. min. (DG-150, 150M, 200, 200M transmissions). 15-25 lbs. (DG-250M transmission). On DG-250M transmission, apply parking brake and foot brake firmly. Move hand control lever to "D" or "L" position. At 1000 RPM, gauge should show 60-90 lbs. pressure. Place selector lever in "R," and at 1000 RPM, the gauge reading should be 160-250 lbs. pressure. Stop engine. Remove test equipment and reinstall plug. Tighten to 15-18 ft. lbs.

►***CAUTION—Do not use white lead or any type of sealing compound on these plugs.***

Forward Band Servo Pressure: With engine stopped, remove capscrew and copper washer from forward band servo coverplate (see illustration). Install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. With engine running, apply foot brake and hand brake firmly to hold car, move selector lever to "D" position. Gradually increase engine speed to 1000 RPM. At this speed gauge reading should be 60 lbs. (Studebaker), 70 lbs. (Hudson) minimum. Stop engine, disconnect gauge, replace capscrew, using a new copper gasket, tighten screw to 28-33 ft. lbs.

►***See TESTING CAUTION above.***

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STUDEBAKER AUTOMATIC TRANSMISSION (Cont.)

Reverse Band Servo Pressure: With engine stopped, disconnect bellcrank-to-transmission selector valve lever rod at bellcrank, move selector valve lever on transmission to reverse "R" position. Remove capscrew and copper washer from reverse band servo cover (see illustration), install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. Apply foot brake and hand brake firmly to hold car before starting engine. Start engine and increase speed to 1000 RPM. At this speed gauge reading should be 160 lbs. (Studebaker), 180 lbs. (Hudson) minimum. Stop engine, disconnect gauge, replace capscrew, using a new copper gasket, tighten screw to 28-33 ft. lbs.

►*See TESTING CAUTION above.*

Low Band Servo Pressure: With engine stopped, remove capscrew and copper gasket from low band servo cover (see illustration), install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. With engine running, apply foot brake and hand brake firmly to hold car, move selector lever to "L" position. Increase engine speed to 1000 RPM. At this speed gauge reading should be 60 lbs. (Studebaker), 70 lbs. (Hudson) minimum. Stop engine, disconnect gauge, replace capscrew, using a new copper gasket, tighten screw to 28-33 ft. lbs.

Multiple Disc Clutch Pressure (Studebaker)—With engine stopped, remove ⅛" pipe plug from mounting flange on rear end of extension housing on transmission case, install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. With engine running, apply foot brake and hand brake firmly to hold car, move selector lever to "D" position. Increase engine speed to 1000 RPM. At this speed, gauge reading should be 60 lbs. minimum. Stop engine, disconnect gauge, replace pipe plug, tighten plug to 15-18 ft. lbs.

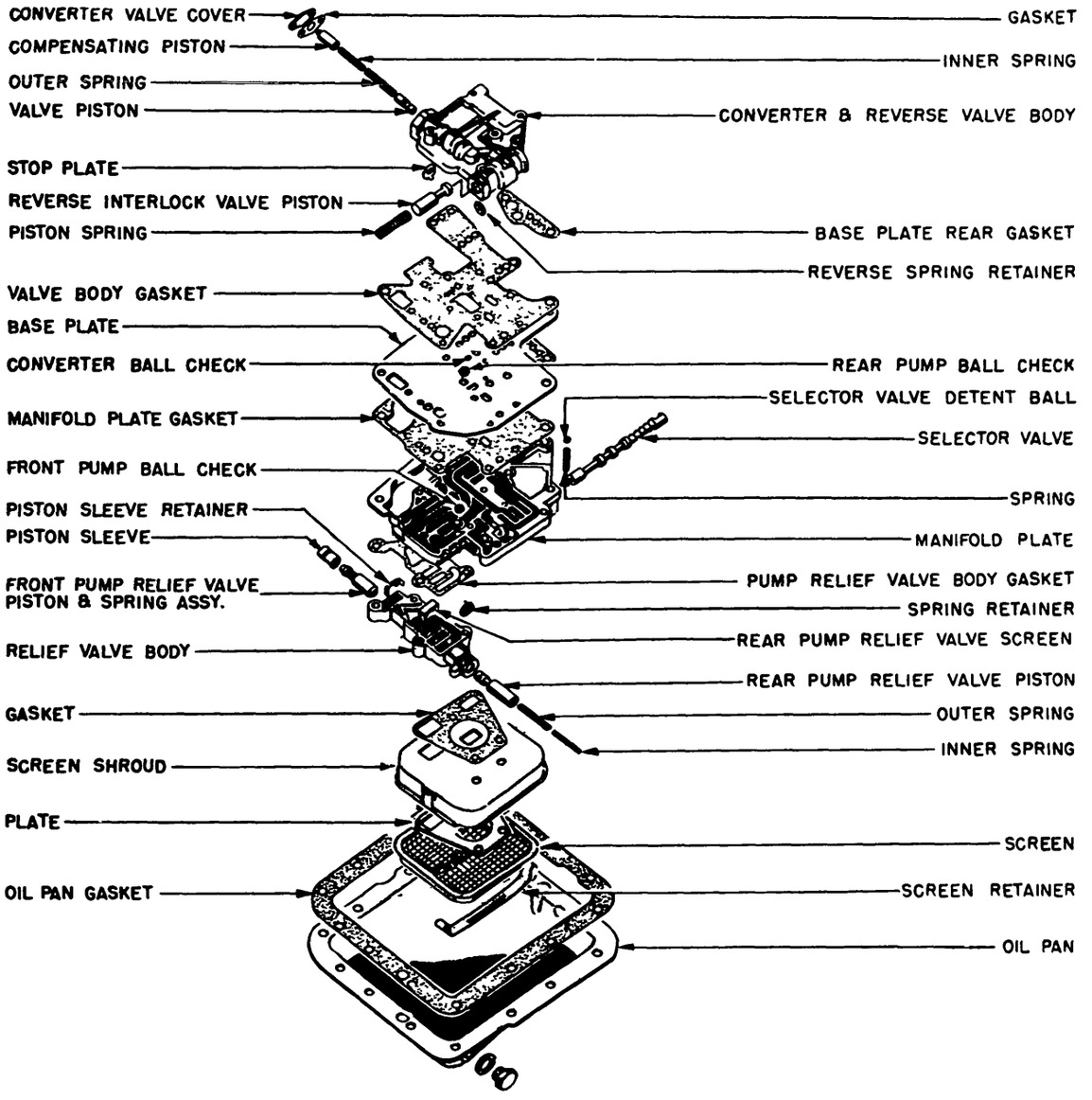
►*See TESTING CAUTION above.*

Multiple Disc Clutch Pressure (Hudson)—With engine stopped remove the ⅛" pipe plug from transmission extension case and install the pressure gauge fitting. Connect tachometer to engine. Place car on jacks and speed up to 15 MPH. At this speed, gauge reading should be 70 lbs. minimum. Stop engine, disconnect gauge, replace pipe plug and tighten to 15-18 ft. lbs.

►*See TESTING CAUTION above.*

►***1955 TORQUE CONVERTER VALVE & PRESSURE CHANGE:*** Beginning with the following transmission serial numbers, the converter shuttle valve is regulated by multiple disc clutch pressure instead of direct drive clutch pressure. Serial Numbers SCH-2101 (DG-150 Trans.), SP-10801 (DG-250M Trans.). This change was made to provide a more positive shift from drive-intermediate to direct drive. The converter pressures with the later type converter valve is 50-70 lbs. in low gear, and 20-30 lbs. in drive-intermediate or direct drive.

Torque Converter Pressure: With engine stopped, remove ¼" pipe plug at torque converter pressure take-off point (early transmissions have two plugs, later transmissions have one plug). On transmissions with two plugs connect to upper hole, and on transmissions with one plug located at bottom of boss, connect to this point. (NOTE—selector valve lever rod may be disconnected for ease in making this connection). Connect electric tachometer to engine. Place selector valve lever in neutral "N" position. Run engine at 1000 RPM. At this speed, gauge reading should be 25-35 lbs. For further check, jack up wheels so they are free to rotate, place selector lever in drive "D" position, run engine at 1500 RPM. At this speed, gauge reading should be the same (25-35 lbs.). Stop engine, disconnect gauge, replace pipe plug, tighten to 6-7 ft lbs.



AUTOMATIC TRANSMISSION CONTROL VALVE ASSEMBLY (DG-150, DG-200)

►***CAUTION—Do not use white lead or any type of sealing compound on these plugs.***

Direct Drive Clutch Pressure: With engine stopped, remove Allen-head pipe plug in oil pan flang on rear of transmission case, install pressure gauge fitting and connect gauge at this point. Connect electric tachometer to engine. Block up rear end of car securely so that wheels are free to rotate. Run engine at idle speed, place selector lever in "D"

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STUDEBAKER AUTOMATIC TRANSMISSION (Cont.)

position. Gauge reading should be 0 lbs. Increase engine speed to 1500 RPM. while watching the gauge. At approximately 1200 RPM., gauge should indicate rapid pressure rise (shift to direct drive) and gauge reading should be 60 lbs. (Studebaker), 70 lbs. (Hudson) minimum. Decrease engine speed and again watch gauge. When speedometer indicates 10-12 MPH, gauge reading should drop to 0 (downshift to intermediate drive). Stop engine, disconnect gauge, replace pipe plug, tighten plug to 15-18 ft. lbs.

►***CAUTION—Do not use white lead or any type of sealing compound when installing pressure switch.***

Rear Pump Pressure: With engine stopped, disconnect leads and remove Anti-Creep Pressure Switch (Studebaker), or remove ¼" pipe plug (Hudson) at rear of transmission. Install pressure gauge fitting and connect gauge at this point. Run engine with brakes set to hold rear wheels stationary. Gauge reading should be 0 lbs. with rear wheels not turning. Block up rear of car securely so that rear wheels are free to rotate. With engine idling, place selector lever in "D" position, increase engine speed while watching gauge. Pump pressure should build up steadily as indicated by increasing gauge pressure, and should be 60 lbs. (Exc. Hudson & DG-250M Trans.), 70 lbs. min. (Hudson & DG-250M Trans.), at 20 MPH. Stop engine, disconnect gauge, install Anti-Creep Switch.

►***CAUTION—Do not use white lead or any other type of sealing compound when installing pressure switch.***

TROUBLE SHOOTING & DIAGNOSIS

SLIPPING EXCESSIVELY (Or Not Operative, in All Ranges Below 25 MPH): 1) Low front oil pump pressure caused by: Sticking front pump relief valve. Leakage in valve block assembly. Excessive wear of front pump or damaged front pump drive fingers. Excessive oil leakage in passage from front pump-to-valve block oil passage. Rear oil pump check valve out of position. Blocked oil passage from valve block-to-front pump. 2) Broken fins in converter, indicated by noisy converter operation.

SLIPPING EXCESSIVELY (Or Not Operative, in Low & Intermediate Drive): 1) Forward band slippage caused by: Incorrect band adjustment. Damaged or worn lining. Low pressure at forward servo because of blocked passage. Stuck forward brake piston. Broken forward band. 2) Forward free-wheel unit slipping.

SLIPPING EXCESSIVELY (Or Not Operative, in Reverse): 1) Reverse band slipping caused by: Incorrect band adjustment. Damaged or worn lining. Low pressure at reverse servo because of blocked passage. Broken reverse band or stuck reverse brake piston. 2) Reverse free-wheel unit slipping (NOTE—Transmission will slip in reverse and will also lose its hill-holding characteristic.

NO ENGINE BRAKING (Deceleration in Low): Low band slipping caused by: Incorrect band adjustment or worn or damaged lining. Low pressure at low servo because of blocked passage. Stuck low brake piston or broken brake band.

SLIPPING EXCESSIVELY (During Acceleration in Intermediate Drive and Loss of Hill-Holding): Multiple disc clutch slipping caused by: Damaged or worn disc facings. Blocked oil passage to multiple disc clutch. Stuck multiple disc clutch piston. NOTE—Retractor spring retainer may have been used to replace retractor spring plate at rear of multiple disc clutch assembly when transmission overhauled.

FAILURE TO SHIFT TO DIRECT DRIVE (Or Slips After Direct Drive Clutch Is Engaged): 1) Improper governor operation caused by: Damaged governor. Governor sticking on governor shaft. Governor valve sticking closed. 2) High converter pressure preventing engagement of the direct drive clutch caused by: Sticking converter valve. Leaking direct drive clutch piston seals. Main shaft lubricator valve assembly loose and twisted out of correct location. Leaking transfer tube "O" ring seal. 3) Leakage in direct drive clutch passage. 4) Blocked direct drive oil passage in collector ring.

ENGINE WILL NOT START BY PUSHING (Also Reverse and Park Interlocks Inoperative): Rear pump pressure low caused by: Damaged or worn rear pump parts. Damaged rear pump drive gear. Sheared rear pump drive gear pin. Valve block assembly incorrectly assembled. Leaking valve block assembly gaskets. Porous valve block castings. Leaking extension case gaskets. Porous extension case castings. Blocked rear pump passage-to-valve block.

CAR ROLLS (With Selector Lever in "P" Position): 1) Parking pawl does not engage, caused by: Incorrect adjustment of hand control linkage or parking pawl linkage. Extension case misaligned on transmission case. Parking pawl interlock piston stuck in locked position. Parking pawl linkage binding or broken.

ENGINE STALLS OR LABORS (When Selector Lever Shifted to "D" Range): 1) Incorrect adjustment of accelerator-to-transmission control linkage. 2) Improper governor valve operation, caused by: Governor binding. Governor sticking on governor shaft. Governor valve sticking open because of governor control detent piston sticking or installed backwards, or by a blocked governor drain passage. Accelerator control plunger and linkage binding. Check governor sleeve for correct position in extension case. 3) Damaged main shaft oil seal rings or front planetary set ring gear oil seal rings.

ENGINE SHUDDERS OR STALLS (When Car Is Stopped While Selector Lever is in "D"): 1) Incorrect adjustment of accelerator-to-transmission control linkage. 2) Improper governor valve operation caused by: Damaged governor or governor sticking on governor shaft. Governor valve sticking open (This condition can be caused by governor control detent piston sticking or installed backwards—governor valve sleeve out of position—blocked governor drain passage—damaged main shaft oil seal rings or front ring gear oil seal rings—no groove on end of transfer tube or main shaft lubricator valve assembly out of position). 3) Sticking or damaged direct drive clutch plate or clutch piston.

NO DOWNSHIFT AT KICKDOWN (Or Kickdown Shift Speed Range Incorrect): 1) Incorrect accelerator-to-transmission control linkage adjustment. 2) Interference between ball joint nut at the governor control lever and extension case. 3) Improper governor valve operation (see "Engine Shudders or Stalls" above). 4) High oil level.

TRANSMISSION SHIFTS TO REVERSE (Immediately When Selector Shifted to "R", Above 5 MPH): 1) Rear pump inoperative. 2) Reverse interlock inoperative caused by: Blocked reverse interlock valve oil passage. Interlock valve sticking.

PARKING PAWL ENGAGES IMMEDIATELY (When Selector Lever is Shifted to "P", Above 10 MPH): 1) Rear pump inoperative. 2) Parking pawl piston inoperative, caused by: Oil passage to parking pawl interlock piston blocked or not drilled. Parking pawl interlock piston sticking.

ENGINE LABORING & TRANSMISSION OVERHEATING IN FORWARD RANGES (Reverse Operation Normal, but Car Creeps Rearward in Neutral When Anti-Creep Released): Reverse band dragging, caused by: Incorrect band adjustment. Leaking valve block assembly gaskets. Porous casting in valve block assembly. Reverse brake piston sticking or reverse band damaged or distorted.

ENGINE LABORING & TRANSMISSION OVERHEATING IN ALL RANGES EXCEPT "L" RANGE: Low band dragging, caused by: Incorrect band adjustment. Leaking valve block assembly gaskets or porous castings in valve block assembly. Low brake piston sticking or low band damaged or distorted. Leaks between Low and Forward brake cylinders in Low brake cylinder or Forward and Low brake cylinder cover. Leaks between Low and Forward brake cylinders in transmission case.

ENGINE LABORING & TRANSMISSION OVERHEATING IN REVERSE RANGE (Low & Forward Operating Normal, but Car Creeps Forward in Neutral When Anti-Creep Released): Forward band dragging, caused by Incorrect band adjustment Leaking valve block assembly gaskets or porous castings in valve block assembly. Forward brake piston sticking or forward band damaged or distorted.

ENGINE LABORING & TRANSMISSION OVERHEATING IN ALL RANGES EXCEPT "D" RANGE: Multiple disc clutch dragging caused by: Leaking valve block assembly gaskets or porous castings in valve block assembly. Multiple disc clutch piston sticking. Improper operation of main shaft assembly. Broken or damaged multiple disc clutch release springs.

NORMAL OPERATION IN DIRECT DRIVE (Poor Performance With Transmission Overheating, in Other Ranges—Low Stall Speed): Caused by torque converter free-wheel unit slipping.

NORMAL OPERATION AT LOW SPEEDS (Poor Performance with Transmission Overheating in Direct Drive): Torque converter free-wheel unit sticking.

TRANSMISSION NOISY (With Selector Lever in "D", "L", or "R", and Car Standing Still): 1) Low fluid level. 2) Fluid intake screen clogged. 3) Damaged front pump fingers, or worn or damaged front pump parts. 4) Air leaks in front pump intake passages in transmission case or front pump and collector ring assembly. 5) Improper valve action. 6) Broken connector fins. 7) Loose direct drive clutch backing plate or drive fingers on converter.

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STUDEBAKER AUTOMATIC TRANSMISSION (Cont.)

TRANSMISSION NOISY (When Car Is Moving): 1) Damaged or worn rear pump parts or drive gear. 2) Damaged or worn speedometer drive gear or pinion (not to be confused with drive line or rear axle noise). 3) Damaged or worn rear planetary gears (if only in low, front planetary gear is bad). 4) Damaged governor assembly.

FLUID LEAK (Between Torque Converter and Transmission): 1) Front pump oil seal damaged by front pump drive fingers. 2) Leaking collector ring gasket or leaking pump-and-collector ring assembly. 3) Leaking torque converter.

FLUID LEAK (At Brake Cylinders): Damaged gaskets, uneven or warped gasket surfaces. Sand holes in castings.

FLUID LEAK (At Extension Case): Damaged gaskets or warped or uneven gasket surfaces. Sand holes in castings. Improperly seated governor control shaft bushing. Leaking governor control cam stopscrew. Damaged "O" ring seal on parking pawl pivot pins.

FLUID LEAK (At Selector Control Shaft): Damaged control shaft "O" ring seal. Bore out-of-round or too large diameter. Damaged selector control shaft packing.

FLUID LEAK (At Transmission Oil Pan): Damaged gasket. Damaged or warped gasket surfaces. Interference between oil pan and pressure take-off plugs.

TRANSMISSION REMOVAL

1954-55 CHAMPION
1954 COMMANDER
1955 COMMANDER (FIRST SERIES)

►***CAUTION—Transmission Assembly and Torque Converter Assembly are removed SEPARATELY as follows:***

1) Drain oil from transmission case and torque converter housing. See LUBRICATION data.

2) Disconnect propeller shaft at front and rear ends by taking out bearing cup U-bolts (CAUTION—wire bearing cups in place to prevent them dropping off), and removing nuts from center bearing support-to-crossmember studs. Move entire propeller shaft assembly to the rear and out of the way.

3) On Champion, disconnect parking brake, cable clevis at parking brake bellcrank. On Commander, disconnect parking brake forward cable from bellcrank on cross member, disconnect bellcrank bracket by taking out mounting bolts, move bellcrank and cable assembly to rear and fasten up out of the way.

4) Disconnect transmission control rods by taking out clevis pins at selector valve lever and governor control lever on transmission case.

5) Remove speedometer cable and pinion assembly from transmission. Disconnect Anti-creep cables from solenoid switch on rear of transmission, free Anti-creep harness from clip on transmission case.

6) Remove converter housing lower cover plate. Remove nuts from two lower transmission case-to-converter housing studs (accessible from within converter housing with cover off).

7) Place transmission lift with adapter in position under transmission case (see NOTE). Do not disturb adapter adjustment knobs after saddle-to-transmission oil pan flange alignment has once been set.

Lift & Adapter Note—Two types available: Model 63 (Lift Type Hoist J4385 & Adapter J4287), and Model 27 (Floor Type Hoist J3389 & Adapter J4287). This tool essential to maintain transmission alignment during removal and installation and to handle transmission weight of approximately 220 lbs.

8) Take out two upper transmission case-to-converter housing capscrews, install Pilot Studs No. J4284 in these holes.

9) Slide transmission assembly to rear out of converter housing and torque converter, then lower transmission and remove from beneath car.

NOTE—If main shaft oil transfer tube (in forward end of transmission mainshaft) does not come out with transmission, remove tube from converter using a long-nosed pliers.

1955 COMMANDER (SECOND SERIES)
1955 PRESIDENT

►***CAUTION: Transmission Assembly and Torque Converter Assembly are removed SEPARATELY as follows:***

1) Drain transmission and torque converter assemblies. On 5 Pass. Coupe and Convertible models, remove body front pillar post cross-member assembly. Remove complete propeller shaft.

2) Disconnect hand control bellcrank-to-transmission rod from selector control shaft lever. Disconnect accelerator cross shaft-to-transmission rod ball joint from the governor control lever Remove speedometer cable retaining screw and remove cable and pinion.

3) Disconnect Anti-Creep cables from Anti-Creep Pressure Switch and remove wiring harness from clip holding the harness to transmission. Remove the two lower transmission case-to-converter housing stud nuts using tool J-5413.

4) Place transmission lift, with the transmission adapter as far forward in tracks as possible. Adjust knobs on the adapter to align the saddle to transmission oil pan flange.

5) Remove the two upper transmission case-to-converter housing capscrews. Remove transmission assembly by sliding it rearward on the saddle out of converter housing and torque converter assembly. If mainshaft oil transfer tube does not come out with the transmission, remove it from torque converter assembly with long nose pliers.

►*NOTE*—If converter is to be removed, remove pilot studs from converter housing.

1954 HUDSON

1) Raise car and drain transmission and converter. Remove cotter pin and disconnect governor control rod at governor control lever. Disconnect speedometer cable at speedometer gear housing and remove driven gear.

2) Remove attaching nuts, washers and "U" bolts and disconnect propeller shaft from transmission companion flange (wire propeller shaft to frame out of the way).

3) Place hydraulic hoist with transmission adapter in position under transmission oil pan and adjust fixture knobs on adapter to align the saddle-to-transmission oil pan flange so that the weight of the transmission case is supported by hoist.

4) Remove the two transmission case-to-converter housing upper bolts and install two pilot studs, J-4284 into capscrew holes. Remove the two lower transmission case-to-converter housing stud nuts. With hydraulic hoist cradle adjusted so transmission case is in alignment with converter housing, pull transmission with hydraulic hoist rearward to disengage transmission from converter housing and converter assembly. *CAUTION*—If transmission sticks to converter housing, do not rock the transmission case. A small pry bar between rear end of oil pan flange and converter housing can be used to carefully pry the two units apart.

5) The mainshaft oil transfer tube must be removed from the converter if it does not come out with the transmission.

TRANSMISSION INSTALLATION

ALL MODELS

1) Place transmission selector valve lever in "Neutral" position. Align splines on transmission shafts with Spline Alignment Fixture J-4283. Loosen fixture thumbscrew, install fixture over shaft splines on front end of transmission case, inserting fixture as far as possible into transmission and aligning positioning arm sector with one of the transmission lower mounting studs, move arm and shaft (turn universal joint companion flange) until positioning pin slips easily over mounting stud, tighten thumbscrew to lock positioning arm in place on sector. Remove fixture from transmission case carefully and **without moving shaft splines out of position.** Install oil transfer tube in end of mainshaft.

2) Align splines in Torque Converter Assembly by installing alignment fixture (after positioning arm has been set in (1) above), working the fixture into the converter until all splines are lined up on the fixture. Rotate torque converter members and spline alignment fixture until positioning pin slips easily into transmission mounting stud hole corresponding to same lower transmission case stud on which fixture was aligned in (1) above. Remove fixture carefully and without moving splines ut of position.

3) Install two Transmission Pilot Studs J4284 in upper transmission mounting screw holes in converter housing. Raise transmission assembly to correct height and angle (on special hoist), carefully slide transmission into place using pilot studs as a guide and using care not to disturb spline alignment (CAUTION—do not disturb universal joint companion flange position).

►*CAUTION:* Do not force transmission into converter by using transmission retaining screws to draw transmission into position as this may cause damage to converter or front pump. Make sure that transmission fits firmly against converter housing. If transmission stops at a distance greater than ¼" from converter housing, turn companion flange a little in each direction and at the same time apply pressure to rear of transmission. If transmission stops less than ¼" from converter housing, turn converter a little in each direction and at the same time apply pressure to rear of transmission.

4) Remove pilot studs and install two upper mounting capscrews, tighten to 23-28 ft. lbs. (Studebaker), 40-50 ft. lbs. (Hudson). Install nuts on lower mounting studs and tighten these to 23-28 ft. lbs. (Studebaker), 35-40 ft. lbs. (Hudson).

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

5) On Studebaker, install Anti-Creep wiring harness and connect wires to pressure switch on transmission. Install speedometer pinion and cable assembly. Install parking brake bellcrank on crossmember and connect parking brake cable. Install propeller shaft, connect front and rear universal joints and center bearing support stud nuts.

6) On Hudson, install speedometer driven gear and speedometer cable, making sure that cable is entered over the rear motor support, between support and converter housing. Move propeller shaft into position and attach to transmission companion flange, installing U-bolts and lockwashers and nuts.

7) On all cars, install transmission control rods (selector valve lever rod and governor control lever rod) and adjust linkage. *See LINKAGE ADJUSTMENT data.*

8) Fill transmission with oil. *See LUBRICATION.* Check transmission operation.

TORQUE CONVERTER REMOVAL
1954-55 STUDEBAKER

1) With transmission removed, proceed as follows: On Champion, remove converter housing bolt hole cover and remove housing-to-block screws, raise car. On other models, remove starter, then raise car.

2) Remove clevis pin holding hand control tube-to-bellcrank rod to bellcrank. On Commander & President, disconnect tail pipe support and remove U-bolt from exhaust pipe support at converter housing. Then disconnect rear exhaust pipe from front right exhaust pipe and pull muffler and pipe assembly rearward. After disconnecting pipe, move assembly to the side out of way. On Champion, disconnect exhaust pipe from engine manifold and loosen bolts and nuts from clamp holding exhaust pipe-to-converter housing bracket.

3) On all models the engine rear support must be removed to permit removal of torque converter housing, but before removing cross-member engine weight must be lifted off cross-member. Place engine support saddle (see below) under engine approximately 3-5" forward of rear engine plate, support engine weight with jack under support saddle (hydraulic jack should be used to permit engine lowering for converter removal).

►**Support Saddle Note**—Saddle can be made up from iron or wood block capable of supporting 600 lbs. Dimensions of wood saddle made from 4" plank: Width 14½", Height 9¼" at front edge, 8¾" at rear (top surface should slant down ½" from front to rear). Center cut-out 9" wide and 7" high (so that saddle clears oil pan and weight is carried on oil pan flanges).

4) Remove engine rear insulator stud nuts and raise engine just enough to have separation between insulators and cross-member. Remove engine rear support cross-member bolts.

5) On all models, remove converter housing-to-engine capscrews. On Champion, remove the filler plate. On Commander & President, remove converter housing front plate. Remove converter housing from dowels, taking care not to damage or distort converter housing dowels or converter blower. Lower rear of engine approximately 3" to provide clearance for converter housing removal.

►***CAUTION—Do not allow oil pan to strike steering bellcrank and tie rod ends. If additional clearance required, loosen nuts holding bellcrank to engine front crossmember, drop bellcrank down.***

6) Remove the nuts and plain washers holding torque converter assembly to crankshaft-to-converter drive plate and remove converter assembly.

1954 HUDSON

HUDSON TORQUE CONVERTER REMOVAL (With Transmission Removed From Car): 1) Install engine holding fixture J-4651, positioning the "U" shaped section around engine oil pan and enter one adjusting hook in the frame just below steering gear housing support and the other hook in the corresponding hole on the opposite frame side rail. This will place the fixture approximately 5" from rear end of engine oil pan. Raise engine so that rear motor supports are raised ½" above the brackets on No. 3 cross-member. Make sure that engine weight is supported by holding fixture. Remove nuts and washers attaching No. 3 cross-member to frame.

CAUTION—Cross-member will drop out when bolts removed.

2) With cross-member removed, lower engine approximately 1" by backing off engine holding fixture. This will make the upper converter housing bolts accessible from below car. NOTE—These upper converter housing bolts can also be removed from the front driving compartment by removing the two floor opening covers under the floor mat.

►***CAUTION—The amount the engine can be moved depends on the clearance between oil pan and center steering arm and tie rod ends. Do not allow weight to rest on center steering arm.***

3) Remove converter housing right hand lower bolt first, then with a ⅝" socket and universal with a 10" extension remove converter to engine bolts.

►***CAUTION—Converter housing is doweled to cylinder block and should be pulled rearward carefuly to avoid damage to dowels during removal.***

4) Remove converter drain plug and drain converter assembly (if not already done). Remove the six nuts and plain washers attaching converter assembly to flywheel.

TORQUE CONVERTER INSTALLATION

►**NEW TORQUE CONVERTER HOUSING INSTALLATION: If new housing installed, bore and face run-out must be checked and corrected BEFORE torque converter assembly installed. Install the housing on the dowels in the flywheel housing and tighten all mounting bolts and capscrews. Use Clutch Aligning Gauge J-2045 installed in end of crankshaft to mount a dial indicator, check and correct run-out as follows:**

Bore Run-out—Revolve crankshaft slowly and check total run-out. If run-out exceeds .004", housing must be repositioned and dowels relocated as follows: Remove housing, remove dowel pins, reinstall housing and tighten mounting bolts just enough to hold housing in position. Recheck bore run-out and use a lead hammer to shift housing, as required until run-out is less than .004", then tighten all mounting bolts and capscrews securely to hold this position and make final run-out check. If run-out within limits, drill a new dowel hole through the thin section of the flange near each production dowel hole using a 11/32" drill and then reaming holes to .376-.377". Install service dowels in these holes.

NOTE—Above instructions supersede earlier dowel installation data on Champion & Commander H Models.

Face Run-out—With housing installed on dowels and all mounting bolts and capscrews securely tightened, use Clutch Aligning Gauge J-2045 to mount dial indicator, check face run-out at a 4¼" radius throughout entire revolution of the crankshaft. If total indicated run-out exceeds .006", replace housing.

Torque Tightening—Tighten converter housing-to-engine bolt nuts and capscrews to 28-32 ft. lbs.

1954-55 STUDEBAKER

1) On all models, install converter assembly on crankshaft-to-converter drive plate and loosely install plain washers and nuts. Clean engine rear plate and the mating surface of converter housing and install converter housing, taking care not to damage dowels or the converter blower. Be sure converter housing is installed on dowels. Install lower capscrews in converter housing. If engine has been lowered, raise it to normal position.

2) Position Converter Aligning Flange J-4286 into bore of converter housing and over pump drive fingers on torque converter assembly. Install two transmission top capscrews to hold aligning flange in position and rotate torque converter through two complete revolutions to center torque converter assembly. Tighten converter-to-drive plate nuts to 28 ft. lbs. On Champion, install converter filler plate. On Commander & President, install converter housing front plate.

3) On all models, install the frame crossmember and connect hand brake control tube-to-bellcrank rod. On Champion, connect the exhaust pipe to engine manifold and tighten exhaust pipe to converter housing bracket bolts and nuts.

1954 HUDSON

1) Install torque converter assembly on flywheel and loosely install attaching plain washers and nuts. Clean cylinder rear support plate and machined faces of converter housing. Install converter housing and engage dowels, using care not to damage dowels or converter. Install right and left hand lower capscrews and tighten finger tight.

2) Position Converter Aligning Flange J-4286 into bore of converter housing and over converter hub (front pump drive fingers on converter assembly). Install the two transmission upper attaching bolts to hold aligning flange. With aligning flange in position, tighten converter-to-flywheel attaching nuts to 23-28 ft. lbs. Install remaining converter housing capscrews, and tighten all capscrews.

3) Install converter housing dust pan (if previously removed). Raise engine approximately 1" with Engine Holding Fixture J-4651. Position the No. 3 cross-member and install all attaching screws before tightening any screws to assure proper alignment. Then tighten all screws to 25-30 ft. lbs.

4) Lower engine and install rear engine support bolts at the No. 3 cross-member. Remove engine holding fixture.

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STUDEBAKER AUTOMATIC TRANSMISSION (Cont.)

OVERHAUL

►*1955 SERVO INNER & OUTER PISTON NOTE: Arrangement of servo pistons (double & single piston units) vary with the different transmission models. See Overhaul data below for removal & installation procedures for the different types.*

TORQUE CONVERTER: *CAUTION—Torque Converter (and Direct Drive Clutch) serviced as an assembly and cannot be disassembled for parts replacement.*

TRANSMISSION DISASSEMBLY: Install transmission in Transmission Holding Fixture J-5484, and proceed as follows:

►*TRANSMISSION DISASSEMBLY NOTE—Transmission sub-assemblies that can be removed and re-installed without removing complete transmission from car are indicated below.*

Front Pump & Collector Ring Removal: Place Ring gear Retaining Clip J-4668-3 on main shaft and secure it in place with a rubber band (clip prevents movement of gear and eliminates possibility of dislocating thrust washers in the gear train). Remove capscrews in the front pump flange, and tap front pump housing loose from transmission case and slide assembly forward off main shaft. Remove front ring gear front thrust washer from rear face of front pump-and-collector ring assembly.

Extension Case Removal: Remove universal joint flange, lock washer and tongued washer. Punch mark one spline of main shaft and corresponding groove of the flange to insure correct reassembly. Using Companion Flange Puller J-2046, remove flange. Shift selector control lever out of "Park" position. Place an oil drain pan under extension case and remove the six capscrews holding extension housing to transmission case, and slide extension housing rearward, being careful not to drop gears and spacers that may slide off main shaft during case removal.

►*CAUTION—Do not allow main shaft to move toward the rear which would cause dislocation of thrust washers in the gear train.*

Removal (With Transmission in Car)—Disconnect universal joint, drain oil, control arms and wiring, then proceed as above.

Valve Block Removal: Remove capscrews attaching oil pan to transmission case and remove oil pan and gasket. Remove the seven screws attaching valve block to transmission. Remove the valve block base plate rear gasket.

►*CAUTION—Care must be taken to see that selector valve is not moved out of its normal operating range.*

Removal (With Transmission in Car)—Drain oil from transmission case, then proceed as above.

Main Shaft Removal (Studebaker): Remove flange spacer, governor drive gear, parking brake gear, from main shaft, then remove main shaft rear bearing lock ring. Using Bearing Puller Plate J-1298 with Adapter Rings J-1298-3 and Universal Puller HM-925, remove rear bearing. Install J-2204-4 spacer and J-2204-3 sleeve on rear end of main shaft, and secure it in place with the universal joint companion flange, flat washer and nut. Make sure the Ring Gear Retainer Clip J-4668-3 is securely in place on front end of main shaft. Pull assembly forward, being careful not to disengage ends of bands from struts or dislodge bands from guide at top of transmission case. Any cocking of the bands will hinder removal of the assembly. Then remove assembly from case.

Main Shaft Removal (Hudson): Remove transmission companion flange spacer, governor drive gear, parking brake gear, and governor drive gear spacer from main shaft. Grasp mainshaft and front ring gear shaft and while holding the mainshaft assembly compressed, move the main shaft assembly towards front of case. The main shaft rear bearing should be removed with the main shaft assembly to assist in holding the main shaft together as an assembly. If bearing sticks in case bore, use a piece of pipe with a 1.195" I.D. and 1.500" O.D., 7" long. Drive against inner race of bearing to move bearing and main shaft forward and out of case bore. (*CAUTION*—Make sure Ring Gear Retainer Clip J-4668-3 is still in place on front end of main shaft). Pull main shaft forward and out of case, being careful not to disengage the ends of the bands from guide at top of transmission case, as any cocking of bands will restrict removal of main shaft assembly.

►*REAR BEARING REMOVAL NOTE—Rear bearing may be removed with transmission in car by first removing extension case. See "Extension Case Removal" above.*

Brake Band Removal: Remove brake anchor side strut from forward brake band by pulling the band shoe away from adjustment screw, disengaging pin from notch in strut, and then removing strut from end of the adjustment screw. Disengage other end of band from piston strut, and lift band out of band guide. Move band to rear of transmission case. Disengage low band in same manner as forward band and move it to rear of case. Disengage the reverse band shoe from anchor side strut and remove strut from screw. Disengage reverse band shoe from piston strut, turn the band 90°, spread it slightly, and slip end of band out of case and over flange, then roll top of band forward out of case. **Do not distort band during removal.** Remove low and forward brake bands in same manner as reverse band.

Brake Band Strut Removal: All three brake band struts are removed in the same manner. Loosen band adjustment screw locknut. Hold shoes of band together, being careful not to disengage band from piston strut, and back off adjustment screw until strut can be slipped off screw and past brake band shoe.

Removal (With Transmission in Car)—Drain oil from transmission unit only, remove oil pan, and remove valve block assembly, then proceed as above.

REVERSE SERVO UNIT: Located on left side of transmission and consists of inner and outer piston assemblies, remove as follows:

Outer Cylinder Removal: Hold low brake band adjustment screw and remove the adjustment screw locknut. Place a clean pan under the cylinder, and remove the seven capscrews holding unit to transmission case. Remove the low brake band outer cylinder from case, being careful not to damage threads of low band adjustment screw. Remove cylinder inner gasket from transmission case.

►*CAUTION—Do not allow the inner brake piston to come out of the inner cylinder and drop into transmission case.*

Removal (With Transmission in Car)—Clean off side of case thoroughly. Disconnect accelerator-to-transmission rod at governor lever. Disconnect bellcrank-to-transmission rod at selector control shaft lever. Remove clevis pin holding hand control tube-to-bellcrank rod to the bellcrank and then remove the bolts holding bellcrank to cross-member and remove bell crank. Complete the removal as indicated above. *(CAUTION—If inner brake piston drops into transmission case, it will b necessary to remov oil pan and valve block to recover piston).*

Reverse Brake Inner Piston Removal: Place thumb against piston spring retainer, and the fingers on top of piston to prevent dropping the assembly as it is removed. Then, with the thumb, push the assembly outward, disengaging the strut from brake band shoe, and remove piston assembly from transmission case. Lift piston seal out of groove in piston, then bring it over top of piston and pull it the rest of the way out of groove. Discard seal.

Removal (With Transmission in Car)—Drain fluid from transmission unit only, remove oil pan and gasket. Remove valve block assembly, and remove reverse brake outer cylinder assembly, then proceed as above.

Reverse Shuttle Valve Removal (Exc. 1954-55 Champion)—(With Transmission in Car): Place a clean pan under reverse brake outer cylinder to catch fluid as valve is removed. Remove three capscrews attaching shuttle valve to reverse brake cylinder and remove shuttle valve assembly and gasket. Remove valve cover plug with an Allen wrench, then remove valve and spring.

LOW & FORWARD SERVO UNIT: Located on right side of transmission case.

Low Brake Outer Cylinder Removal (Exc. 1950-54 Champion): Hold reverse band adjusting screw, then loosen and remove locknut. Remove nine capscrews attaching unit to transmission case and remove the unit, being careful not to damage threads of reverse band adjusting screw. Remove cylinder plate gasket.

Removal (With Transmission in Car)—Clean side of transmission case thoroughly. Drain transmission unit only, then proceed as above.

►*CAUTION—Do not allow forward brake piston or low brake inner piston to come out of the case. If this occurs, it will be necessary to remove oil pan and valve block assembly.*

Low & Forward Inner Pistons Removal: To remove low brake piston (1950-54 Champion) or low brake inner piston (other models), place thumb against piston spring retainer and the fingers over top of piston to prevent dropping the assembly as it is removed. Then with thumb, push assembly outward, disengaging strut from brake band shoe and remove assembly from case. Remove forward brake piston assembly in the same manner. Remove seals from both pistons by lifting seals from groove, then over top of piston. Discard seals.

Removal (With Transmission in Car)—Drain fluid from transmission, remove oil pan and valve block assembly. On 1950-54 Champion, remove low & forward brake cylinder cover. Complete removal as indicated above.

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Selector Control Shaft & Lever Removal: Remove nut, washer, and flat washer which hold selector control shaft inner lever to selector control shaft. Pull shaft outward and slip control shaft inner lever off shaft, then pull shaft assembly out of case. Remove the "O" ring seal from groove in selector shaft and then remove flat washer from shaft.

Removal (With Transmission in Car)—Drain fluid from transmission only, and remove oil pan. Disconnect hand control bellcrank-to-transmission rod from selector control shaft outer lever, then complete removal as indicated above.

Parking Brake Actuating Rod Removal: Remove snap ring from toggle shaft sleeve, slip toggle shaft sleeve out of case, then remove complete assembly.

Removal (With Transmission in Car)—Remove main shaft assembly. Disconnect control shaft inner lever from control shaft. Disengage forward brake band from the struts and move it forward. Complete removal as indicated above.

TRANSMISSION REASSEMBLY: Clean case thoroughly and blow out all oil passages with air, making sure they are open.

Parking Brake Actuating Rod Installation: Install with Selector Control Shaft & Lever (below):

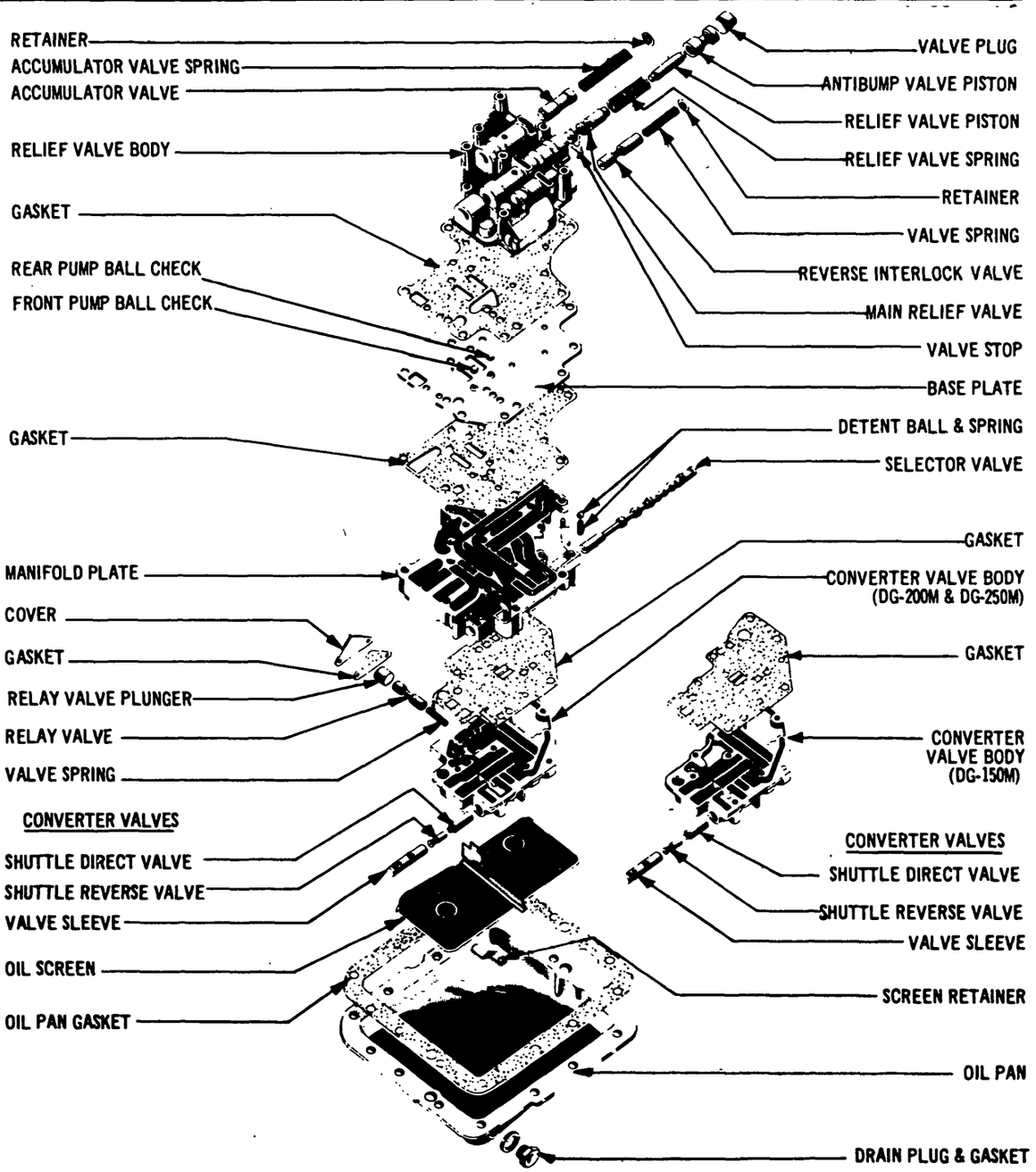
Installation (with Transmission in Car)—Insert toggle shaft sleeve in case, align flats of selector control shaft and inner lever, and install inner lever on shaft. Make certain that inner lever is in slot of selector valve. Install flat washer, lock washer, and nut and tighten nut securely. Install snap ring on toggle shaft sleeve. Install forward brake band in position in struts and band guide. Install main shaft assembly.

Selector Control Shaft & Lever and Parking Brake Actuating Rod Removal: Round off sharp corner of selector shaft bore at base of counterbore to prevent scuffing of "O" ring oil seal during installation. Clean selector shaft bore and lubricate with automatic transmission fluid, then install a new cork packing. Install the flat washer on selector control shaft, lubricate shaft and new "O" ring with automatic transmission fluid and install seal in groove of selector control shaft. Apply coat of fibre grease to shaft between "O" ring seal and outer lever. With a twisting motion, install selector control shaft outer lever so that it points toward top of transmission. Align flats of selector shaft and selector control shaft inner lever and install lever on shaft. Install flat washer, lock washer, and nut and tighten nut securely.

Installation (with Transmission in Car)—Proceed as above, then connect hand control bellcrank-to-transmission rod to selector control shaft outer lever. Install oil pan, with new gaskets, and tighten capscrews to 10-13 ft. lbs.

Low & Forward Servo Unit Installation: (Low & Forward Inner Pistons)—Install both pistons in same manner. Hold piston so offset notch of strut is to front and insert assembly in bore of case. Push assembly into bore, being careful not to turn seal over or damage lip of seal.

Installation (with Transmission in Car)—Proceed as above, except that notch in strut must be aligned with pin in brake band shoe before piston assembly pushed into bore.



AUTOMATIC TRANSMISSION CONTROL VALVE ASSEMBLY (DG-150M, DG-200M, DG-250M)

Low Brake Band Outer Cylinder Installation (Exc. 1950-54 Champion): Apply thin coat of petroleum jelly to transmission case and place a new brake cylinder plate gasket in position on case, making certain that holes in gasket are aligned with holes in case. Slip the low band cylinder assembly over reverse band adjusting screw, position it on case

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and install retaining capscrews. Tighten capscrews to 15-18 ft. lbs. Install reverse band adjusting capscrew locknut.

Low & Forward Brake Cylinder Cover Installation (1950-54 Champion): Install in same manner as plate for other models (above).

Reverse Servo Unit Installation: (Reverse Brake Inner Piston)—Install inner piston in same manner that Low & Forward Inner Pistons installed.

Reverse Brake Outer Cylinder Installation: Apply thin coat of petroleum jelly to transmission case and place a new cylinder plate gasket in position on case. Slip reverse brake outer cylinder assembly over low band adjusting screw. Position it in case and install retaining cap screws. Tighten the 5/16" x2¼" and 5/16"x1" capscrews to 15-18 ft. lbs. torque, and the 3" screws to 10-13 ft. lbs. torque. Install low band adjusting screw locknut.

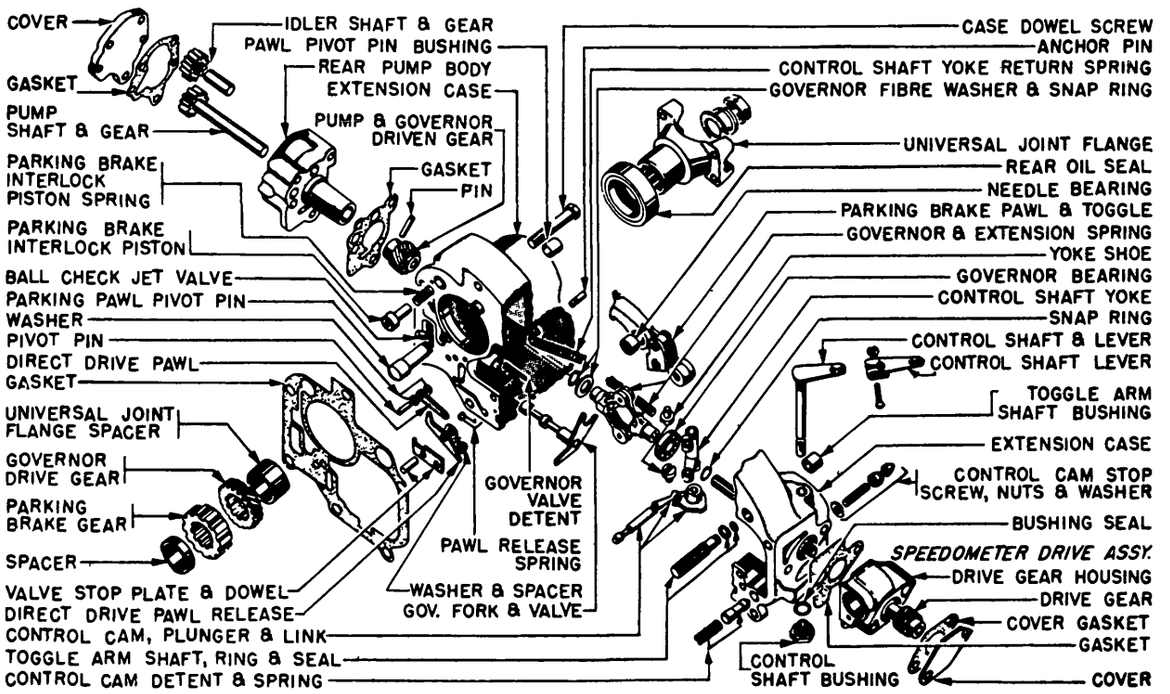
Installation (with Transmission in Car)—Proceed as above, then check adjustment of band and adjust if necessary. Retorque reverse cylinder retaining capscrews. Install bell crank on cross member and connect hand control tube-to-bell crank rod.

Brake Band Strut Installation: All three struts are installed in the same manner. Slip strut over end of adjustment screw, with adjustment screw backed off.

Installation (with Transmission in Car)—Hold ends of band together and slip struts over end of adjustment screws. Screw in adjustment nut and make sure that all struts are properly seated in ends of band.

Brake Band Installations: ***(NOTE—Low & Forward bands are lighter than the reverse band and are interchangeable. DO NOT INTERCHANGE REVERSE BAND WITH LOW OR FORWARD BAND.)*** To install bands, select one of the lighter bands and slip one end over flange of transmission case as during removal. Then turn band so that end of band which has the offset pin is toward the low & forward piston side of case. Move band to rear of case. Install the other light band in same manner and move it to rear of case. Install the reverse band in the same manner except that band must be turned so end of band having offset pin is toward reverse piston side of case. Place all three bands in position as follows: Set band into band guide strap at top of case. Engage band on piston side of case with the piston strut, making sure pin is in notch of strut. Pull shoes of band together, without disengaging piston strut and slip anchor side strut on end of adjustment screw. Then release band and allow shoe to engage anchor side strut. Make sure that all pins of the brake band shoes properly engage notches of their respective struts, and that guides are properly positioned in guide straps.

Main Shaft Installation (Studebaker): With Retaining Clip J-4668-3 in position on front end of main shaft, and that Spacer J-2204-4, and Sleeve J-2204-3, flat washer, and nut are securely in position on rear end of main shaft. Support main shaft assembly with one hand under low drum, insert the assembly in transmission case, thread it through brake bands, and seat bearing in bore of rear face of case. ***(CAUTION—Make sure brake bands and anchor struts have not been moved out of position).*** Remove Sleeve & Spacer Tools from end of main shaft. Make sure rear bearing spacer is in position on main shaft. Install rear bearing using J-2204-A Pusher Assembly, sleeve and spacer. (Do not remove the pusher at this time.) Install rear bearing snap ring, then push against rear face of case. Remove pusher tool. Install Extension Case (see instructions following).



TYPICAL EXTENSION CASE ASSEMBLY

Main Shaft Installation (Hudson): With Retaining Clip J-4668-3 in position on front end of main shaft and main shaft rear bearing in position on rear of main shaft, insert main shaft assembly into transmission case, threading it through bands and seating the rear bearing in bore of rear face of case. Install main shaft rear bearing lock ring, then push mainshaft forward until lock ring seats against transmission case. Install Extension Case. (See instructions following.)

►**NEW MAIN SHAFT ASSEMBLY INSTALLATION CAUTION**—With a new main shaft assembly, it will be necessary to check endplay and determine thickness of the front ring thrust washer. With main shaft installed in case, install universal joint companion flange and tighten nut to 60-80 ft. lbs. torque. Move mainshaft toward rear as far as possible, and install Endplay Gauge J-4668 over the main shaft and ring gear shaft and fit gauge to front of transmission case. Use three of the front pump retaining capscrews to hold gauge to face of case. Turn hub of gauge so indicator is over the start step. Rotate hub counterclockwise while pushing hub inward, maintaining a steady pressure on hub. The step, over which the indicator is stopped by the next higher step, represents the thrust washer to be used. Code number and thickness in thousandths, of thrust washer, is stamped on face of ring opposite the step. ***(CAUTION—If indicator stops over either the high "no-go" step, or the low "no-go" step, the mainshaft assembly cannot be used in that particular transmission case, and another mainshaft assembly must be tried.***

►*NOTE*—If indicator stops over the high "no-go" step, measure distance from end of ring gear shaft to end of main shaft. If measurement less than 3/16" check ring gear thrust washer to see if it has slipped out of place.

Extension Case Installation: Before installing extension case, check the following points and make the necessary corrections.

1) Ball check valve on machined surface of extension case, below main shaft bore, must be free and seating properly. NOTE—This valve will not be found on all extension cases.

2) Check both end brackets of governor assembly for free operation on governor shaft.

3) On models with direct drive pawl, check operation by positioning pawl so it locks governor. With a spring scale, check amount of pull required to release governor valve. If more than 9 ozs. pull required, make necessary corrections.

4) Check governor fork endplay in groove of governor end bracket. If clearance greater than .030", replace governor assembly.

►***NOTE*—If new extension case being installed, see below.** To install extension case, apply a thin coat-

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ing of petroleum jelly to machined face of transmission case and install a new gasket, making sure holes in gasket are aligned with holes in case. Shift selector control shaft lever on transmission to LOW position by pulling lever as far rearward as possible, then moving it forward one detent. Install governor drive gear spacer, parking brake gear, governor drive gear, and universal joint spacer flange, **in that order**, on main shaft ***CAUTION—beveled side of parking brake gear must be toward rear.*** Lubricate all parts with automatic transmission fluid type A, then turn toggle splined shaft so that its wide spline is to the left. ***(CAUTION***—On cars with direct drive pawl, position pawl against governor valve fork, holding governor valve in direct drive position. Be careful not to dislocate pawl during installation of extension housing). Lift extension case into position on shaft and engage splines of toggle arm shaft sleeve splines (move selector lever slightly to aid the engagement), and push case forward against transmission case. Install capscrews and tighten finger tight (so case can be centered with companion flange), and then push selector control shaft lever on transmission forward to PARK position. Align punch marks of universal join flange and main shaft and install flange. Install tongued washer, lock washer, and nut and tighten to 60-80 ft. lbs. torque. ***(CAUTION***—Correct torqueing is very important since endplay is controlled by companion flange). Tighten extension case-to-transmission case capscrews to 28-33 ft. lbs. torque.

►***NEW EXTENSION CASE INSTALLATION NOTE***—If extension case being replaced, remove parking brake interlock piston and spring from case being replaced and install them in new case. Insert spring in bore and slip stem of piston into spring and push piston into bore of case. Check fit of piston in bore to make sure it moves freely. Also, remove governor control detent spring and detent and install in new case with tapered end first, and place the spring in bore on top of detent.

►**Centering New Extension Case Caution**—A special capscrew is furnished with each new extension case, which must be installed in TOP HOLE of new case to insure proper centering.

Front Pump & Collector Ring Installation: Apply thin film of petroleum jelly to collector ring flange and install a new gasket. Align all holes and oil passages. Coat hub of collector ring and place front ring thrust washer on rear face of assembly, fully engaging tongues of washer in slots. **Steel face of wash r must be toward hub of assembly.** Inspect the three seal rings on mainshaft and replace if broken or damaged. Install a 1½" long starting stud in top hole of transmission case, then hold pump so elongated oil inlet hole and round oil outlet hole in flange are at bottom. Check to see that all oil passages are properly indexed with corresponding holes in case, then slip assembly on main shaft. Using the starting stud, position assembly on case and install retaining capscrews. Replace starting stud with capscrew and tighten all screws to 15-18 ft. lbs. torque. Remove ring gear retaining clip from main shaft, and make sure that main shaft assembly turns freely in both directions while holding ring gear shaft.

SUB-ASSEMBLY OVERHAUL

EXTENSION CASE DISASSEMBLY:

Governor Removal: Remove the two speedometer gear housing cover screws, cover and gasket (NOTE—The extension case may be equipped with either a one piece speedometer drive gear and governor shaft assembly, or the speedometer drive gear and governor shaft may be separate pieces with the gear splined to shaft). If equipped with the one piece assembly, pull gear housing away from extension case and withdraw governor shaft and gear assembly from governor assembly, then remove shaft and gear assembly from speedometer gear housing. If equipped with separate gear and shaft, slip gear off shaft and remove speedometer gear housing. Then remove shaft from governor assembly. Disengage governor end bracket from governor valve fork. Slide governor bearing out of governor control shaft yoke shoes and remove governor from case. Remove yoke shoes and governor spring.

Inspection—Inspect governor shaft and make sure it is free of burrs and that splines are not scored. (NOTE—Burrs on shaft can be caused by governor spring not seating properly in governor end brackets). Check governor valve for free operation within valve sleeve. Make sure that hydraulic detent piston is in place in governor valve sleeve (NOTE—If detent is the stepped type, the step end should be inserted in cylinder first, and the long plain end out). Check length of governor spring to make sure the proper spring is used, as follows:

►***LATE 1954-55 GOVERNOR SPRING CAUTION (Cars with "Low Speed Start" Except Early 1955 Champion):*** Two governor springs are used and it is very important to use the correct governor tension and booster springs to maintain the proper shift speeds. Booster and Tension springs must be in matched sets as indicated in Governor Spring Specification Table (below).

Governor Spring Specifications

Trans.	Booster Spring Part No.	Booster Spring Free Lgth.	Tension Spring Part No.	Tension Spring Free Lgth.
DG-150①			529969	3 1/32"
DG-150②	536484	1 7/8"	537422	3"
DG-150M③	537065	1 11/16"	537066	2 21/32"
DG-200⑤			529980	2 27/64"
DG-200⑥			⑨311682	2 1/2"
DG-200M⑦	537065	1 11/16"	537066	2 21/32"
DG-250M⑧	537065	1 11/16"	537066	2 21/32"

①—1950-Early 1954 Before Transmission Serial No. SCH-60,000. (With second gear start).

②—Early 1954 Champion After Transmission Serial No. SCH-60,000 and before Serial No. SCH-66,199 (with first gear start).

③—Late 1954-55 Champion (with first gear start).

⑤—1951-Early 1955 Commander (with second gear start).

⑥—1954 Hudson (with second gear start).

⑦—Late 1955 Commander, First Series (with first speed start).

⑧—1955 President & Late 1955 Commander, Second Series, (with first speed start).

⑨—Hudson Part No.

►***CAUTION—Under no circumstances cut or stretch a spring to obtain desired length.***

Governor Control Shaft & Lever Removal: Unhook governor return spring from governor adjusting yoke. Hold shaft in position using Wrench J-5482, loosen set screw, and withdraw shaft from the assembly. Remove governor control shaft yoke and governor control detent cam and plunger assembly (if so equipped), from case. If equipped with direct drive lockup, remove governor control detent cam and plunger assembly, swing cam and link toward governor return spring anchor pin, push plunger into case, and remove assembly.

Governor Control Direct Drive Lockup Mechanism Removal: To remove pawl, remove cotter pin and flat washer and slip pawl and spacer washer off pivot pin. Remove rocker arm spring by slipping the end out of hole in rocker arm and then removing other end from hole in case. To remove rocker arm remove retaining plate screw, retainer plate and spacer washer, then remove flat washer and rocker arm from pin. To remove plunger, follow procedure outlined under "Governor Control Shaft And Lever" above.

Governor Valve & Detent Piston Removal: Turn governor fork so end of fork is out of notch of direct drive rocker arm retaining plate and slide valve out of sleeve. Remove hydraulic detent piston. If detent piston is stuck in bore, position governor fork so that it contacts the stop on retainer plate. Cover the valve body-to-governor passage and the multiple disc clutch passage with fingers, then using compressed air, blow into direct drive passage. This will force piston out of bore against fork of governor valve.

Parking Brake Pawl & Toggle Removal: Using a small drift, loosen pivot pin and toggle shaft by tapping pin and shaft forward. Remove pawl & toggle assembly from case. (NOTE—On some transmissions, pivot pin and toggle shaft do not extend through case. Pivot pin is internally threaded and can be removed by inserting a screw, and pulling pin from case). Toggle shaft can be removed with a pair of pliers). ***(CAUTION—On some extension cases, a steel or fibre washer is used on toggle shaft back of the toggle lever. Do not interchange washers, use only the same type washer at reassembly.)*** Remove the "O" rings from toggle shaft and pivot pin. ("O" rings are used to prevent leakage where pin and shaft holes extend through case.)

Extension Case Rear Oil Seal Removal: Drive rear oil seal rearward out of case using a brass drift. Do not damage rear pump drive gear or bore of extension case.

Rear Oil Pump Removal: ***(CAUTION—Rear oil pump can be removed from extension case without removing case from transmission, if extension case is equipped with one-piece governor shaft and speedometer drive gear assembly. If equipped with the two-piece type, extension case must be removed. To distinguish between the two types, remove speedometer gear housing cover and check position of shaft. If shaft is flush with outer end of gear when gear is held in operating position in housing, it is a two-piece type. If shaft is ½" to ¾" short of being flush, it is one-piece assembly.)*** Remove the three screws (two at top, and one at bottom) attaching pump to case, and slip pump out of case. (If two-piece speedometer drive gear and shaft assembly used, hold shaft to prevent removing it with pump.)

Rear Oil Pump Gasket Replacement—Rear oil pump is serviced only as an assembly. If leak occurs between pump body and cover, the gasket can

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be replaced. Gaskets are available in five thicknesses. The three thinner gaskets are identified by color only: 002" (red), .003" (green or clear), .005" (blue). Sizes .006" & .009" are black and the size is stamped on face of gasket. There is also an extra ⅛" hole in long ear of the .009" gasket.

►*CAUTION—Always use a gasket of the same thickness as the one replaced.*

EXTENSION CASE REASSEMBLY:

Rear Oil Pump Installation: Apply a thin film of petroleum jelly to machined face of extension case and position a new gasket on case. Make sure gasket does not obstruct governor drain hole. Insert end of pump through opening in case, and install pump retaining screws. Tighten screws to 15-18 ft. lbs .torque.

Installation (With Transmission on Car)—Proceed as above, except that when pump is installed on case, hold face of pump parallel to face of case, push pump into case and engage splines of pump gear and governor shaft. It may be necessary to turn pump slightly to engage splines. If equipped with two-piece speedometer drive gear and shaft assembly, hold shaft to prevent moving governor assembly and yoke out of position.

Extension Case Rear Oil Seal Installation: Coat outer surface of seal with suitable sealer, and place seal in counterbore driver J-2038 (used with Handle J-270-1), with the felt part of seal (lettered side) toward driver. Using an arbor press, start seal into case making sure that seal is not cocked, and enters bore squarely. Remove handle and install it on other side for driver and press the seal in until it is flush with case.

Parking Brake Pawl & Toggle Installation: If "O" rings used, apply automatic transmission fluid to them and install on pivot pin and toggle shaft. Position pawl & toggle assembly in case with dog of pawl pointing **downward.** Align pivot pin hole of pawl with hole in case and install pivot pin. Swing end of pawl & toggle assembly into position in case, align wide splines of toggle shaft and toggle lever, and install toggle shaft. If equipped with a spacer washer between pawl & toggle assembly and rear of case, be sure this washer is installed and positioned correctly.

►*CAUTION—If necessary to replace the washer, use only same type washer as used originally. DO NOT INTERCHANGE STEEL AND FIBRE WASHERS.*

Governor Valve & Detent Piston Installation: *(CAUTION—Two types of pistons used; stepped type and straight type. It is very important that stepped piston is installed with the step end inserted in cylinder first.)* Apply automatic transmission fluid to governor valve and hydraulic detent and carefully insert valve and detent in sleeve and place end of the fork in position in notch of direct drive rocker arm retaining plate.

Governor Control Direct Drive Lockup Mechanism Installation: Install plunger by following procedure outlined under "Governor Control Shaft and Lever Installation." Place flat washer on rocker arm pivot pin and install rocker arm on pin. Place retainer plate on rocker arm over the pin, slip spacer washer between plate and case, align spacer washer and install retaining screw. Install rocker arm spring, making sure upper end of spring is in hole of rocker arm. Place flat washer on pawl pivot pin and install the pawl and another flat washer on pin and secure with a cotter pin. Check pawl to see that it will drop of its own weight.

Governor Control Shaft & Lever Installation: If extension case equipped for direct drive lockup, insert the plunger in hole in case (from inside case) slipping the rocker arm out of way to allow plunger to come through case. Make sure that key is properly installed in governor control shaft and insert end of shaft in case. Hold governor control shaft yoke in position and slip the shaft onto yoke. Align key in shaft with keyway in cam, and insert shaft in cam. Fully seat shaft in cam and tighten set screw securely. Hook governor return spring to governor control shaft.

Governor Installation: Insert one end of governor spring in governor, compress spring and install the other end. *(CAUTION—correct governor spring must be installed. See "Governor Spring Specifications" in "DISASSEMBLY" above.)* Install governor shaft yoke shoes. Align slots of shoes and slide governor bearing into position in shoes, then engage groove of governor inner bracket with governor fork. Apply a thin coating of petroleum jelly to machined surface on side of extension case and install a new speedometer housing gasket. If equipped with one-piece shaft, insert governor shaft and speedometer drive gear assembly into gear housing. Align the shaft and governor end bracket and insert shaft in governor. With the shaft through governor assembly, hold governor inner end bracket in on governor fork and engage shaft in splines of rear oil pump gear. If equipped with a two-piece assembly, insert the shaft in governor end brackets and insert shaft in rear oil pump gear. Install speedometer drive gear and housing. Align mounting holes of gear housing with holes in case. Position a new housing cover gasket, making certain that cover and gasket are aligned with housing. (The center opening in gasket is offset and improper installation will damage gasket). Install retaining screws and tighten to 10-13 ft. lbs. torque.

►**New Governor Installation Note**—If installing a new governor, check clearance **between** governor end brackets when governor valve is in its full open position and the governor control lever is in its full forward position. Clearance should be approximately .010". If clearance is not correct, remove acorn nut located on rear of extension case, loosen the locknut and turn screw (clockwise) until proper clearance is obtained.

►*CAUTION*—If after road testing car, and kickdown upshift speed is too high, turn screw (clockwise) a little at a time until proper kickdown upshift speed is obtained *(See "Transmission Shift Speeds" above).*

FRONT PUMP & COLLECTOR RING DISASSEMBLY: Remove the five capscrews attaching front pump to collector ring and remove front pump. Lift pump gear from housing and check them for wear or damage. If gears or casting are found to be worn, replace pump body and gears. Drive the oil seal out of housing using a drift punch. Be careful not to damage pump bushing.

FRONT PUMP & COLLECTOR RING REASSEMBLY: Clean oil seal bore of pump to remove all of the old sealer, then apply a thin coat of suitable sealer to oil seal and, using an arbor press, install seal in housing, with lettered side of seal toward outside. After making sure that interior of pump is clean, place the inner gear in position with the side of the gear having drive lugs toward outside. Lubricate gears with automatic transmission fluid Type A. Clean collector ring face and align front pump with collector ring. Install retaining capscrews and tighten to 10-12 ft. lbs. (¼"-20); 15-18 ft. lbs. (5/16"-18).

►*1955 SLOW REVERSE ENGAGEMENT CORRECTION (When shifting from either "D" or "L" range to "R" range):* There are two possible causes for the condition, one being insufficient diameter of the selector valve bleed hole, and the other being overtravel of the selector valve in the reverse position. Both causes result in slow bleed of low and forward servos. *NOTE*—The larger bleed hole entered production with Transmission Serial Nos. SP-24369 (DG-250M Trans.), SCH-3805 (DG-150M Trans.), ST-1547 (DG-250TM Trans.). It is suggested that both corrections be made when valve removed.

1) Remove valve block assembly and remove selector valve (be sure selector valve is turned so that detent ball does not stick in valve lever slot). Enlarge the present 7/64" bleed hole in selector valve housing to 5/32". Coat drill with petroleum jelly to trap aluminum chips.

2) Grind the detent flats (four) on selector valve down to the detent root diameter. The flats must be ground in the same plane as the previous flats and the selector lever milled slot. *CAUTION—Do not nick lands on the valve or touch them with the grinding wheel. Do not overheat valve while grinding.*

VALVE BLOCK DISASSEMBLY: (1) Remove the two capscrews holding relief valve body to valve block assembly and remove relief valve body and gasket. Remove rear pump relief valve screen, then remove valve block oil screen retainer and screen, and the three shroud-to-block capscrews, which permit removal of shroud reinforcing plate and shroud. Remove oil screen shroud gasket.

2) Turn valve block assembly over and remove capscrew holding control valve body to valve block, and very carefully lift converter valve body from base plate. *(CAUTION—Hold valve body level while removing converter valve body to avoid losing converter ball check and rear pump ball check).* Remove the two ball checks and converter valve body gasket from base plate. Separate base plate from valve block manifold and remove valve manifold plate gasket and front pump ball check. Remove the front pump relief valve sleeve retainer from valve manifold, then slip front pump relief valve piston sleeve and valve piston-and-spring assembly out of manifold.

3) Using the spring compressor of Valve Spring Unloader J-4547, compress rear pump relief valve springs, then position spring retainer tool of J-4547 between spring and spring retainer. Remove spring compressor and slip spring retainer out of manifold body. Install spring compressor again to remove retainer tool, then remove compressor and the two valve springs, and piston.

4) Remove converter valve cover plate screws and remove converter cover plate and gasket. Remove compensating piston, springs, stop plate, and valve piston. Using Valve Spring Unloader J-4547 in the

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

same manner as outlined for removal of rear pump relief valve spring retainer, remove reverse interlock valve spring retainer, then remove reverse interlock valve spring and valve piston.

5) Turn selector valve (in valve block manifold) so the milled slot is away from selector valve detent ball and spring housing. Push selector valve into valve block manifold past the detent ball and spring *(CAUTION—Hold hand over opening in manifold so that detent ball which is spring loaded, will not be lost)*, and remove ball and spring. Remove selector valve from either end of valve block manifold.

Inspection: Inspect all valve bores and valves in their respective valve bodies for scratches or scoring and for free movement. Small scratches may be polished out to provide free operation. If scoring or scratching is excessive, replace the valve body. Make sure passages in valve block manifold have no obstructions and are not porous. Front and rear pump ball check seats must be tight in manifold and plate. Clean rear pump relief valve intake screen.

VALVE BLOCK REASSEMBLY: Before reassembly, clean all parts of valve block in solvent and dry with air. Take all precautions to keep valve block clean during reassembly.

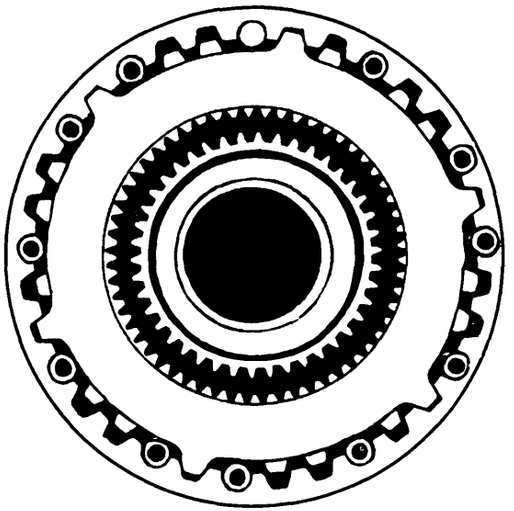
1) Install front pump relief valve piston and spring assembly, and sleeve in relief valve manifold. Install piston sleeve retainer, and retain it in position with petroleum jelly. Install rear pump relief valve piston and springs in manifold. Using the spring compressor of Valve Spring Unloader J-4547, compress the spring. Slip spring retainer tool in position, withdraw spring compressor, and install the spring retainer. Insert spring compressor, remove retainer tool, then remove compressor.

2) Install reverse interlock valve piston in converter valve body. Use Valve Spring Unloader J-4547 and install reverse interlock valve spring retainer in the same manner as for rear pump relief valve spring retainer. Install converter valve piston, stop plate, springs and the compensating piston. Place a new gasket in position and install cover plate and retaining screws.

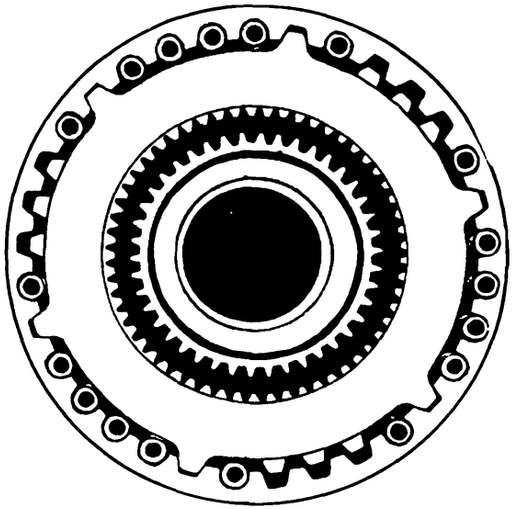
3) Install selector valve in valve block manifold, with the milled slot at the detent housing, and with valve slot away from detent housing. Position valve so that end of valve clears opening in detent housing, then install spring and detent ball. With a small screw driver, force ball down into opening, and carefully move selector valve over ball, pushing screw driver off ball. Move valve out until detent ball locks up in first groove of valve. Turn selector valve so that milled slot is toward valve block manifold .

4) Install front pump ball check in valve manifold (check ball check seat to make sure that it is tight). Place manifold plate gasket in position, making sure all holes are aligned, then carefully place the base plate over gasket.

5) Place converter control valve body in position on base plate ,and install converter ball check, and rear pump ball check in the proper holes (converter ball check is the larger of the two). Carefully place converter control valve body over the ball checks and position converter body on base plate. Install a capscrew in hole near valve-end of reverse interlock valve piston housing, and tighten finger tight (converter control valve body is also held to valve block by shroud retaining capscrews and relief body capscrews). It may be necessary when installing other parts of the assembly to shift converter valve body for alignment.



12 SPRING TYPE



18 SPRING TYPE

MULTIPLE DISC CLUTCH RETRACTOR SPRING ASSEMBLY

6) Turn valve block over and place relief valve gasket in position. Insert rear pump relief valve screen in passage, making sure that screen is fully seated and is flush with, or below surface of body. Place relief valve body on valve body and align mounting holes. Install two retaining capscrews (in holes toward inside of valve block), and shift relief valve body as far as possible away from end of selector valve housing, to side opposite selector valve housing. Tighten capscrews finger tight.

7) Place oil screen shroud gasket on valve block manifold, making sure all openings are aligned. Install shroud and shroud reinforcing plate, and the three 1¼" retaining capscrews, finger tight.

8) After making certain that all parts are properly positioned by inserting the valve block-to-transmission case screws in holes of valve body, tighten all capscrews to 6-8 ft. lbs. torque.

MAIN SHAFT DISASSEMBLY: *(NOTE*—To provide a means of holding main shaft assembly for overhaul, drill a 2½" hole in a piece of wood 2"x4"x24" and secure this to work bench with a large "C" clamp. The main shaft assembly can then be placed upright with end of main shaft through hole).

1) Slide front ring gear forward, disengaging it from front planetary carrier pinions ,and remove it from the shaft. Remove front ring gear thrust washer from planetary carrier.

►*RING GEAR OIL SEAL CAUTION—It is not necessary to remove ring gear oil seals unless they are to be replaced. If only one of the rings are broken, all rings ahead of the broken ring MUST BE REPLACED.*

2) To remove ring gear oil seal rings, turn ring so that split is at top, then hold ring tight in groove at one side and press against lower part of ring at other side, causing ring to raise, with end separated. Spread ring just enough to permit removal from groove.

►**Front Ring Gear Needle Bearings & Bushings Note**—Needle bearings and bushings are not serviced separately, but are available only as part of the ring gear assembly.

3) Remove reverse drum-and-front planetary carrier by sliding it forward off mainshaft. Remove front sun gear thrust washer from within front sun gear or from hub of front planetary carrier.

4) If necessary to remove planetary carrier from reverse drum, first remove the snap ring by inserting a small screw driver in the slot provided, lifting end of ring out of groove, and then pulling ring completely out of groove. Support drum on arbor press and press carrier out of drum.

►**Planetary Carrier & Pinion Note**—Serviced as an assembly only. Separate parts not available.

5) Remove sleeve and spacer of Tool J-2204 (installed for removal from transmission case), and remove rear bearing spacer. Slip the forward speed brake drum assembly rearward and remove from shaft. Using a small screw driver, remove the forward speed free wheel unit spacer snap ring, and remove spacer plate from drum. Remove spacer dowel, and the free wheel unit snap ring, then remove the forward speed free wheel unit from drum.

►**Forward Speed Brake Drum Bushing Note**—Bushing not serviced separately. Available only as part of forward speed drum assembly.

6) Remove rear sun gear rear spacer washer retainer, and thrust washer from main shaft. Move the low brake drum plate snap ring so that end of ring is above one of the plate slots. Using a small screw driver, lift end of ring and remove it from groove, then pick the two dowels out of plate slots. Remove plate assembly and rear sun gear as an as-

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

sembly. Slip rear sun gear out of reverse free wheel unit. Remove free wheel unit snap ring and lift free wheel unit out of plate.

►**Bushing Note**—Rear sun gear bushing and low brake drum plate bushing not serviced separately.

7) Pull main shaft rearward and remove main shaft and rear planetary carrier as an assembly from the low brake drum assembly. Remove rear planetary carrier front thrust washer, and carrier oil seal retainer snap ring. The rear planetary carrier is not pressed on splines of main shaft, but is held in position by planetary carrier oil seal ring retainer and snap ring. Place the assembly in an arbor press and press shaft out of seal retainer and carrier. Remove seal retainer, rear planetary carrier, and rear sun gear front thrust washer from main shaft.

►*REAR PLANETARY CARRIER CAUTION*—Two types used; one counter-bored at the thrust washer position, and the other not counter-bored. ***If carrier is counter-bored type, a steel spacer must be used in addition to thrust washer.***

►**Planetary Carrier Oil Seal Ring Note**—Same type as used on main shaft, and are removed in same manner.

8) Slide rear ring gear out of low brake drum, and with a sharp pointed tool, pick the inner "O" ring seal out of retainer and remove it from inside bore of ring gear. Pick outer "O" ring seal out of hub and slip it off hub of ring gear. If necessary, remove oil seal ring and planetary carrier snap ring.

9) Place the low brake drum assembly in an arbor press and place Multiple Disc Clutch Fixture J-5478 on multiple disc clutch retractor spring retainer. Place steel plate on fixture and then apply sufficient pressure to retainer to relieve pressure of retainer against snap ring. Remove snap ring with a small screw driver, then slowly release arbor press to gradually relieve retractor spring pressure. Remove retractor spring retainer, and retractor springs. Remove clutch disc plates, and discs, and retractor spring plate out of drum.

10) To facilitate removal of clutch piston, insert Piston Installing Pins J-5487 in grooves of drum, equally spacing the pins about five grooves apart. Pins will permit seal to slip past circular grooves inside drum. (CAUTION—To prevent damage to multiple disc clutch piston inner bore during removal of piston, place two layers of masking tape over teeth of front sun gear). Lift piston out of drum. To remove piston inner seal, squeeze seal to one side and pull it completely out of groove.

►*CLUTCH PISTON REPLACEMENT CAUTION—Champion clutch piston has rubber outer seal, while Commander models have a cast iron seal. If clutch piston having rubber seal is to be replaced, use CAST IRON RING SEAL KIT for repalcement.*

►*LOW BRAKE DRUM REPLACEMENT (1950-51 MODELS)*—Service replacement low brake drums have a centrifugal check (bleed) valve installed in back wall of multiple disc clutch cylinder in the low brake drum. Valve is adaptable for service replacement only when new low brake drum assembly installed.

►**Low Brake Drum Bushing Note**—Bushing is not serviced separately. Available only as part of low brake drum assembly.

Inspection: Inspect all carriers, pinion ring gear, and sun gear teeth, oil seal rings, and free wheel unit sprags for wear or damage. Check thrust washers for wear or scoring. Inspect the lining of multiple disc clutch friction discs, and check the clutch disc plates for "dishing." Place a plate on a flat surface, and using a feeler gauge, check clearance at inner diameter of disc plate. If dish is more than .010", plate must be replaced. Inspect brake drums for scoring, and make sure that check valve in multiple disc clutch cylinder is free. Test the tightness of lubrication valve in end of main shaft with Test Rod J-5481.

MAIN SHAFT REASSEMBLY: (1) Lubricate new clutch piston inner seal with Automatic Transmission Fluid Type A, and hold seal so that lip of seal is toward drum. Stretch seal just enough to slip it over sun gear and place it in groove.

2) Two different seals used on clutch piston, requiring different installation procedures. Coat inside of low brake drum and piston seal with Automatic Transmission Fluid Type A, then proceed as follows:

Cast Iron Piston Seal—Install seal in ring groove of piston, and place Piston Installing Pins J-5487 in grooves of drum as during piston removal. Compress clutch piston ring and slip piston into cylinder.

Rubber Piston Seal—Use a piece of .002"x3"x18" steel shim stock (hone all edges to prevent cutting rubber seal). Coat shim stock with transmission fluid and place shim stock around inside bore of multiple disc clutch cylinder (make sure that shim stock is down to bottom of clutch cylinder), then slip piston and seal assembly into sleeve formed by shim stock, and push piston down into position. Make sure piston is to bottom of cylinder, and remove shim stock.

►*1950-55 MULTIPLE DISC CLUTCH SERVICE REPLACEMENT CAUTION & 1955 PRODUCTION CHANGE:* Sintered friction discs and flat separator plates are used in 1955 production and for service replacement on all 1950-55 models. Previously the separator plates were slightly "dished." The early type friction discs were thicker, therefore when installing the new type discs in early transmissions it is necessary that Spacer Plate, Part No. 537720 be used. When it is necessary to replace either a disc or a disc plate, all discs and plates should be replaced in complete sets.

3) Slip multiple disc clutch retractor spring plate into drum with spring recesses upward. Lubricate clutch friction discs and plate with transmission fluid, and starting with a disc, place plates and discs alternately in the drum *(CAUTION*—Disc plates are dished, and can be installed with the dish to either front or rear, but **all disc plates must have dish in same direction**). Since lugs on disc plates are not evenly spaced, make sure that lugs are in the same grooves with master lugs of retractor spring plate. *(CAUTION—Studebaker Commander and Hudson Model transmissions multiple disc clutch has FIVE disc plates, and FOUR friction discs. Studebaker Champion has FOUR disc plates, and THREE friction discs).*

4) Center friction discs around sun gear and align teeth of the friction discs. *(CAUTION*—If centrifugal check valve in multiple disc clutch cylinder, **12 retractor springs are used.** If centrifugal check valve NOT used, **18 retractor springs are used.** SEE ILLUSTRATION FOR CORRECT PLACEMENT OF RETRACTOR SPRINGS.) Place retractor springs in groove as indicated in illustration, then place retractor spring retainer over the springs. Using an arbor press as used during disassembly, compress springs so retainer is just below snap ring groove in drum. Install snap ring making sure it is fully seated in groove, and remove assembly from arbor press.

►*RETRACTOR SPRING RETAINER CAUTION—A thinner retainer is used on Commander models than th retainer used on Champion models.*

5) Lubricate rear ring gear inner and outer "O" ring seals with automatic transmission fluid and install the seals *(CAUTION*—Do not stretch outer seal any more than is necessary to slip seal over ring gear shaft). If ring gear oil seal ring and the front planetary carrier snap ring were removed, use a pair of snap ring pliers and install parts on ring gear shaft. Coat oil seal ring and outer "O" ring seal with petroleum jelly and install rear ring gear in the low brake drum.

6) Place rear planetary sun gear front thrust washer on main shaft with the steel face of washer to front of shaft and engage washer with splines of shaft. If carrier is counter-bored, install carrier spacer washer in same manner *(spacer washer not used if carrier NOT counter-bored).* Slip rear planetary carrier on front end of main shaft, engage splines, and seat carrier against shoulder on splines. Install planetary carrier oil seal ring in the retainer and slip retainer on main shaft. Place assembly in an arbor press and press shaft into seal retainer just enough to install snap ring. *(CAUTION* —Care must be taken to press on the inner portion of retainer to prevent damage to seal lands, and binding of ring). Make sure ring is free in groove, and install retainer snap ring. If there is clearance between retainer and snap ring, press retainer back against snap ring.

7) Place rear planetary carrier front thrust washer over shaft and on rear planetary carrier with steel face of washer against carrier. Apply a light coat of petroleum jelly to hold it in place. Install main shaft-and-rear carrier assembly in rear ring gear and low brake drum assembly. Install reverse free-

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STUDEBAKER AUTOMATIC TRANSMISSION (C nt.)

wheel unit in low brake drum plate, making sure side of unit which has the ARROWS is upward. Install unit snap ring in groove. Lubricate rear sun gear bushings and outside of rear sun gear with automatic transmission fluid and install sun gear on shaft.

8) Place low brake drum assembly over end of sun gear with flat side of plate toward drum. Tilt assembly slightly and slip the free-wheel sprags down over edge of sun gear on one side. With a small screw driver, move each sprag outward, slipping it over edge of gear and at the same time holding free-wheeling unit against sun gear. Seat low brake drum plate in drum. Align slots of plate and drum and place the dowels in position in openings. Install snap ring making sure it is seated securely in groove. Place the forward free-wheel unit in forward brake drum, making sure that the side with ARROWS is downward, and install snap ring in groove.

9) Place forward brake drum assembly over rear sun gear. Tilt assembly slightly and slip free-wheel sprags down over edge of sun gear at one side. With a small screw driver, move each sprag outward, slipping it over edge of gear and at the same time holding free-wheel unit against sun gear. After all the sprags are outside edge of gear, rotate the unit clockwise and slide assembly down on sun gear. Slip the rear sun gear rear thrust washer on the shaft with bronze face of washer toward sun gear and place it on rear face of gear. Install spacer washer.

10) Insert the free-wheel unit spacer dowel in hub of forward brake drum and position the spacer within drum, then install spacer snap ring securely in groove of hub. Install rear bearing spacer on main shaft. Install Tools J-2204-4 (spacer), & J-2204-3 (sleeve), companion flange, flat washer and nut on rear end of main shaft and tighten securely.

11) Align splines of front planetary carrier and reverse brake drum. Using an arbor press, press the carrier into drum. Install snap ring, being careful not to distort snap ring. Coat front sun gear thrust washer with petroleum jelly and install the washer within front planetary carrier hub with the tangs in slots, and with steel face against hub.

12) Install reverse drum-and-front planetary carrier assembly. After engaging carrier splines with rear ring gear splines, it may be necessary to turn the assembly to engage the clutch friction disc teeth. **Do not force the assembly into position as this may result in damage to teeth of discs.** Apply petroleum jelly to front planetary carrier thrust washer and place it in position on rear ring gear shaft splines with steel face of washer against front planetary carrier.

13) If front ring gear or main shaft oil seal rings have been removed, install new rings. Spread the rings just enough to permit slipping it over shaft, and install it in groove. Then hold ring tight in groove at one side and press against lower part of ring at other side. This will cause end of ring to lift, then slide finger toward end of ring and lock ends of ring together. Coat main shaft oil seal rings with petroleum jelly and install the front ring gear. Install Retaining Clip J-4668-3 on front end of main shaft to hold assembly in position.

REVERSE SERVO OUTER CYLINDER DISASSEMBLY: Separate reverse brake cylinder plate from cylinder, lift plate off piston rod and remove it from cylinder. Remove reverse brake outer cylinder from gasket. Grasp reverse brake outer piston rod and pull piston out of cylinder. Use a pointed tool and pick the "O" ring seal out of groove in plate and discard seal. Lift piston seal out of groove on one side, then bring it over top of piston and pull it out of groove. Discard the seal.

Inspection: Clean all parts and check gasket surface of cylinder for warpage. Check cylinder plate for warpage, and bore of cylinder for pits or scoring.

REVERSE SERVO OUTER CYLINDER REASSEMBLY: Lubricate a new piston seal with Automatic Transmission Fluid Type A and slip edge of seal into groove of piston at one point, making sure that lip of seal is toward outer face of piston, away from piston rod. Work progressively around piston and seat seal in groove. *(CAUTION*—Avoid stretching seal any more than is necessary to install it on piston.) Lubricate a new "O" ring seal with automatic transmission fluid, and install seal in groove of cylinder plate. Holding piston at an angle, insert it in cylinder, being careful not to damage lip of seal. After top edge of piston is below bottom edge of cylinder, straighten piston and push it into cylinder. Apply a thin coat of petroleum jelly to machined surface of cylinder and place a new outer gasket in position on cylinder, making sure that holes of gasket and cylinder are aligned. Carefully slip cylinder plate over rod of outer piston and position plate on cylinder.

LOW SERVO OUTER CYLINDER DISASSEMBLY & REASSEMBLY: Commander models have two low servo pistons instead of the single piston used on Champion models. Disassembly and reassembly procedure is the same as for Reverse Outer Piston (above).

STUDEBAKER FLIGHTOMATIC

Studebaker, All Models (1956-60)
Packard Clipper (1957)
Packard, All Models (1958)

►CHANGES, CAUTIONS, CORRECTIONS

►*STARTING ENGINE BY PUSHING CAR:* Move selector lever to "N" (Neutral) position. When car speed reaches 20 MPH, turn the ignition switch on and move transmission selector lever to the "L" (Low) position. It is recommended that the car be pushed to start it rather than be towed.

►*TOWING CAR CAUTION:* Car can be towed for very short distances with the transmission selector lever in the "N" position. Prolonged towing will result in damage to the transmission unless the drive shaft is disconnected or the rear wheels are off the ground.

►*1956 INTERMEDIATE GEAR START (COMMANDER & PRESIDENT MODELS) PRODUCTION CHANGE:* Beginning with Transmission Serial Nos. 19001 (Commander); 24001 (President), the control valve assembly has been modified to provide an intermediate gear start (rather than a "low" gear start) in all throttle positions. *NOTE–Transmissions prior to the above serial numbers having the letter "B" as a suffix to the serial number, have the modification made to the control valve assembly.*

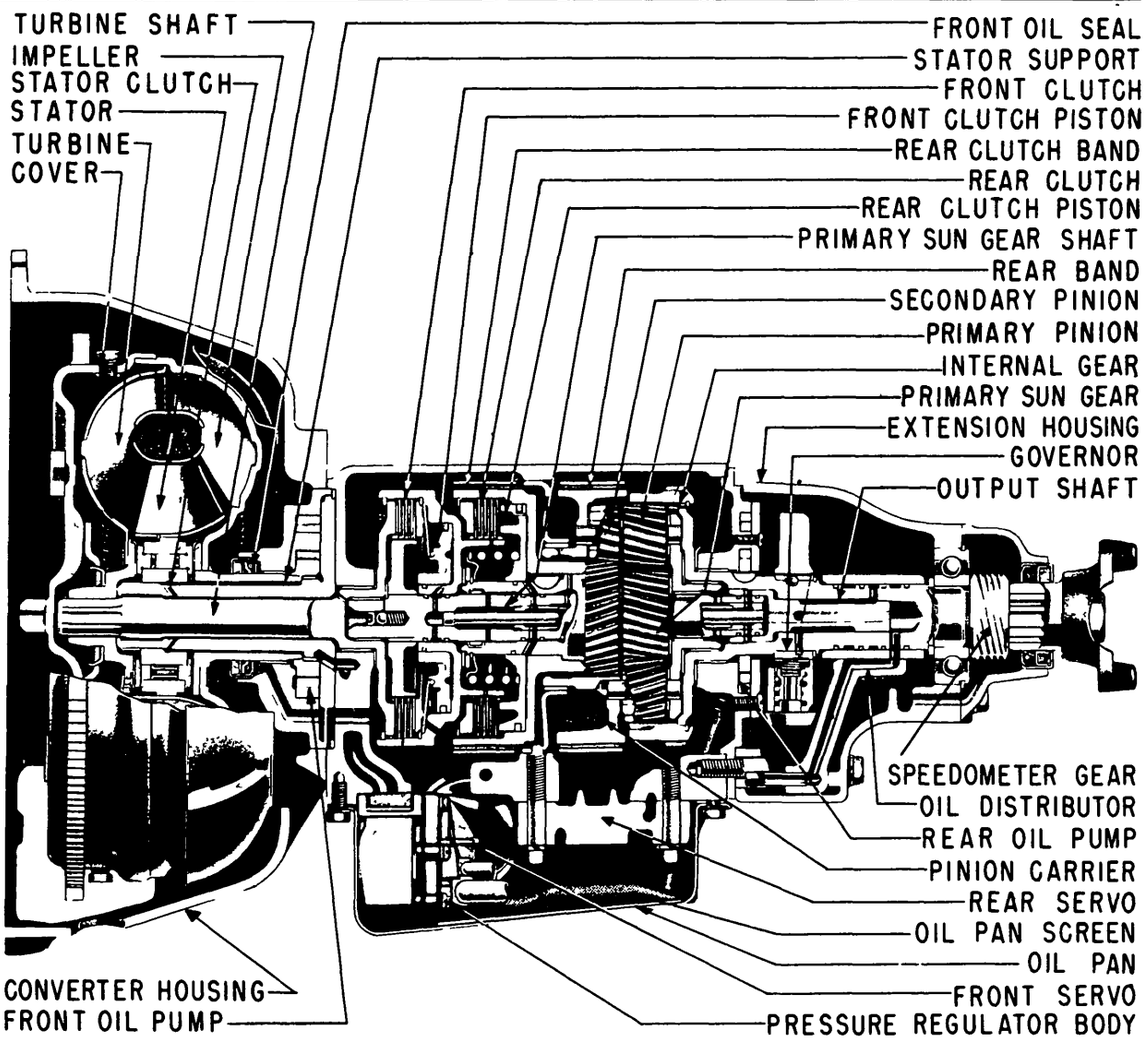
►*1956 LOW SPEED GEAR NOISE & IMPROVED SHIFT IN "D" RANGE CORRECTION (COMMANDER & PRESIDENT):* The control valve assembly can be modified to correct this condition and also to provide an intermediate gear start on transmissions prior to Nos. 19001 (Commander); 24001 (President), or transmissions not having the letter "B" suffix or transmission serial number. *See "Warner Automatic Transmission" in this section.*

►*1956 TORQUE CONVERTER ASSEMBLY PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (CHAMPION MODELS):* A new converter assembly, Part No. 1541550, identified by a daub of orange paint, and a Serial Number 1001CD, and up, is being used in production and for service replacement. Stall speeds, with the later type converter are reduced to 1400-1500 RPM.

►*1956 FRONT CLUTCH FRICTION DISC PARTIAL PROTION CHANGE & SERVICE REPLACEMENT CAUTION:* Sintered metal type (copper base) friction discs are being used in partial production and may be released for service replacement. Composition and sintered type discs are interchangeable in complete sets only and must not be mixed in the same clutch assembly.

►*1956 FRONT SERVO SPRING NOTE:* A front servo spring having closed coils and a flat ground seating surface at one end (other end is not closed or flat ground, but has an abrasive cut-off) is being used in partial production. While this spring may appear to be broken, it is entirely serviceable and is interchangeable with the original type spring.

►*1957 CONTROL VALVE ASSEMBLY IDENTIFICATION:* Different control valve assemblies used on Packard Clipper and Goldenhawk than on other models. A figure "1" stamped on lower body cover near front servo apply and release tubes identifies Part No. 1543076 used on Packard and Goldenhawk. The figure "2" identifies Part No. 1542992 used on other models.



STUDEBAKER FLIGHTOMATIC TRANSMISSION (SECTIONAL VIEW)

►*1957 GOVERNOR ASSEMBLY IDENTIFICATION:* A groove machined into smallest diameter of governor valve (sleeve) identifies the assembly used on Packard and Goldenhawk models. The valves used on other models do not have the groove.

►*1957 BAND SLIPPAGE & ERRATIC SHIFT PATTERN CORRECTION NOTE:* This condition may be caused by a loose control valve or regulator valve assembly moving off its seat enough to allow oil to escape. Make sure these parts are properly tightened to specified torque.

►*1956-57 COMMANDER & PRESIDENT MAIN CONTROL VALVE SEPARATOR PLATE CHANGE (To correct a condition of "No Reverse When Hot"):* This condition may be caused by sluggishness and inoperation of the 1-2 shift valve due to decreased and escaping pressure when oil is hot. If all other operations of transmission are normal, install a new separator plate, Part No. 1542984, having a relocated passage to the 1-2 shift valve. This later plate is identified by a notch adjacent to one of the capscrew holes.

►*1957 FLIGHTOMATIC OVERHEATING (HEAVY DUTY OPERATION) NOTE:* The following procedures should be observed for service on cars used for heavy duty operation such as police cars, taxi cabs, etc.

Band Adjustment - Adjust bands at 5000 mile intervals.

Control Pressure Check & Adjustment - Check control

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STUDEBAKER FLIGHTOMATIC (C ntinu d)

pressure and adjust to 85 lbs at 1000 RPM in "D" (Drive) range every 5000 miles.

Pr ssur R gulat r Change (to speed up oil flow) - Remove pressure regulator valve assembly and note if converter return passage is restricted to approximately 3/32" in valve body (converter return passage is the restricted opening in center of pressure regulator valve body attaching surface) If this passage has a restriction, disassemble unit and carefully enlarge orifice to 9/32" with a drill

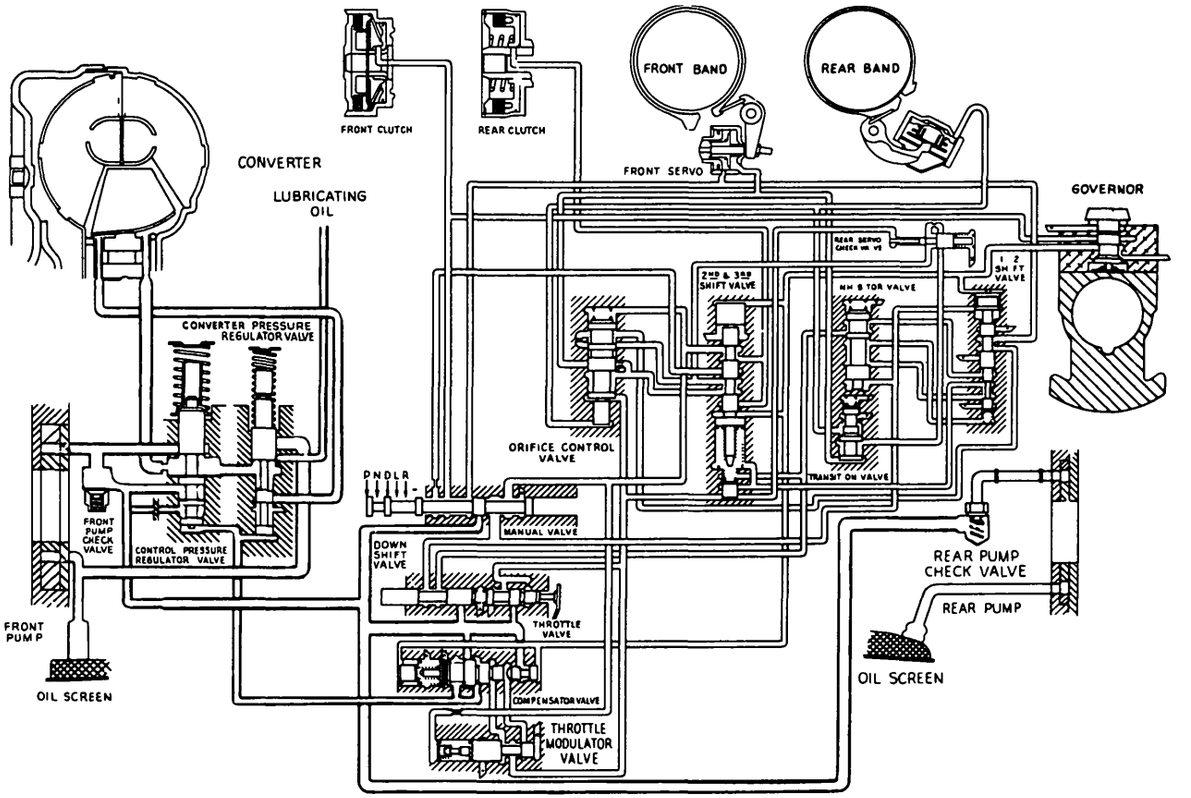
►*1958 GOLDEN HAWK & PACKARD HAWK TORQUE CONVERTER ASSEMBLY PRODUCTION CHANGE* A new torque converter, Part No 1547075, identified by a daub of yellow paint near drain plug or by a serial number which begins with 1001-FB, now being used in production and should be used for service replacement on the above models and on 1957 Golden Hawk and Packard Clipper The new torque converter has the impeller vanes copper brazed to the torus ring and to to impeller shell

►*1958 REAR EXTENSION HOUSING BUSHING REMOVAL NOTE:* If Tool J-4830-01 cannot be inserted into housing far enough to permit flange of tool to grip bushing, loosen extension housing capscrews a few turns and pull housing toward rear which will allow tool to enter deeper into housing Flange of tool can then grip bushing

►*1959 6 CYL AUTOMATIC TRANSMISSION PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE (To Improve Shift Qualities)* On all models (Exc Taxicab) a new control pressure primary regulator valve spring, Part No 1541000 is being used in production. The new spring increases the idle pressure 5 to 10 lbs over the earlier spring and minimizes application delay of rear servo and front clutch This spring may be used on earlier 6 cyl Flightomatic transmissions When installing spring on earlier cars the control pressure should be adjusted with a pressure gauge to 80-85 lbs at 1000 RPM, with transmission selector lever in "D" (Drive) range Transmissions after Serial No 28145 have the later type spring

►*1959 6 CYL 2 1 DOWNSHIFT SPIN-UP CORRECTION* If after installing the new control pressure primary regulator valve spring, (see above), the 2-1 Downshift "spin-up" still exists, install a new rear servo check valve spring, Part No 1549458 This new lighter spring allows the rear servo check valve to bypass the orificed position a little longer causing the rear servo to fill quicker This later spring is not to be used in taxicab models

►*1960 6-CYL FLIGHTOMATIC "SPIN-UP" DURING 1-2 & 2-3 UPSHIFTS WITH LIGHT TO MEDIUM THROTTLE CORRECTION* Adjust throttle linkage to obtain a control pressure of 87-92 lbs If "spin-up" is not eliminated or adequately decreased, control pressure may be adjusted to 95 lbs *See "Throttle Linkage Adjustment" on Car Model page*



1956-57 V8 & 1956-60 6 CYL. FLIGHTOMATIC TRANSMISSION HYDRAULIC OIL CIRCUITS

DESCRIPTION

Flightomatic transmission consists of a hydraulic torque converter and a hydraulically controlled automatic 3-speed planetary type transmission which provides automatic operation in "D" (Drive) range and additional "Lo" (Low) "R" (Reverse) and "P" (Park) ranges which are controlled manually In "D" position, the car starts in low gear (6 Cyl models and on all V8 models prior to 1956 Serial No 19001 Commander, 24001 President) progressing to intermediate and high On later V8 models, the car starts in intermediate and progresses to high as speed increases *See "Intermediate Gear Start Production Change" above* On some models, the transmission case has been modified to accommodate an oil cooler which is located in lower tank of radiator

LUBRICATION

Lubrication Intervals: Check fluid level every 1000 miles Drain and refill every 15,000 miles

Recommended Fluid: Automatic Transmission Fluid Type "A" (Suffix "A")

Capacity: 9 qts (Exc Taxicab & Models with Oil Cooler), 9½ qts (Taxicab & Models with Oil Cooler)

Ch cking Fluid L v l—Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission have reached normal operating temperature Roll up the floor mat from right side until oil level inspection hole cover in floor pan is accessible and remove cover Clean all dirt and foreign material from around transmission fluid dipstick Apply the parking brake and foot brake and move selector lever slowly from "P" position to "R" position and then back to "D" position Remove dipstick and wipe clean then install it in transmission and **turn clockwise to th lock position** Remove dipstick and check fluid level Add fluid through dipstick hole to raise level to the "F" mark on dipstick *NOTE*—The amount of fluid required to raise the level from "L" mark on dipstick to "F" mark is approximately 1½ pints

Draining & Refilling—Place transmission selector lever in "P" (Park) position and operate engine for approximately four minutes, or until engine and transmission are *at normal operating temperature* Stop engine and raise car on hoist Remove transmission dipstick *(see "Checking Fluid Level" above)* Remove transmission drain plug Rotate the converter until one of the drain plugs is visible through hole in converter housing, remove drain plug and quickly rotate converter 180°, and remove the other converter drain plug After fluid has drained from transmission and

CONTINUED ON NEXT PAGE

STUDEBAKER FLIGHTOMATIC (C ntinu d)

converter, install transmission drain plug using a new gasket, and the two converter drain plugs. Lower the car to floor and install three quarts of Automatic Transmission Fluid Type "A" (Suffix "A") through dipstick hole. Apply parking brake and foot brake, start engine and operate it with selector lever in "N" (Neutral) position. Slowly pour 4 qts. additional fluid into transmission, then move selector lever through all ranges. Check fluid level on dipstick *(see "Checking Fluid Level" above).*

LINKAGE ADJUSTMENT

Throttle Linkage Adjustment: *See CARBURETOR on Car Model Pages.*

Manual Linkage Adjustment: Disconnect shift lever-to-transmission manual valve lever rod at transmission manual valve lever by removing the ball joint assembly. Place selector lever in "D" (Drive) position and place the manual lever on transmission in the "D" (Drive) position (this is center of manual valve lever travel). Adjust the shift lever-to-manual valve lever rod until the ball joint stud will slip freely through the hole in the manual valve lever. Install ball joint stud locknut and lock to rod.

BAND ADJUSTMENT

Fr nt Band: Remove transmission oil pan, gasket and screen. Loosen the front servo adjusting screw locknut two full turns with a 9/16" wrench. Check the adjusting nut for free rotation in the actuating lever and free the adjusting screw if necessary. Install the gauge block of the adjusting tool (J-5880) between the servo piston rod and the adjusting screw. Place the Front Band Adjusting Tool J-5880, on the adjusting screw and tighten until the tool overruns. **Back off the adjusting screw one full turn,** and tighten locknut to 20-25 ft. lbs. Place the screen over the rear pump inlet first then over the front pump inlet, and install the screen retaining clip. Position a new oil pan gasket on transmission oil pan flange and hold it in place with petroleum jelly. Align oil pan on transmission flange and install capscrews and lockwashers. Tighten to 10-13 ft. lbs. Install drain plug and fill transmission *(see "Lubrication" above).*

R ar Band: Roll up floor mat from the right side until the oil level inspection hole cover in the floor is visible, and remove the cover. Clean dirt and all foreign material from around rear band adjusting screw and locknut, and oil the adjusting screw threads. Using Rear Band Adjusting Tool J-5883, tighten the screw until wrench overruns, **back off adjusting screw 1½ turns,** and tighten the locknut to approximately 35-40 ft. lbs. torque. *CAUTION–It is very important the adjusting screw be backed off 1½ turns to avoid damage to band and servo.*

Throttle Valve Stop: Remove oil pan and screen, then remove compensator tube and bellcrank-to-throttle valve lever rod from throttle valve lever Hold throttle valve lever against throttle valve stop and measure distance from center of hole in throttle valve lever to machined surface on rear of transmission case. This distance should be a minimum of 4 7/32" and not to exceed 4 5/8". If not within specifications, bend throttle valve stop as necessary. To bend the stop, remove compensating pressure tube from pressure regulator valve assembly and control valve assembly and bend stop with Tool J-5887.

TESTING

STALL TEST: Connect tachometer to the engine and place it where it can be easily read from the drivers seat. Set the hand brake and start the engine. Place selector lever in "D" (Drive) position, apply service brakes and operate the engine at full throttle. Note tachometer reading. Repeat this procedure with selector lever in "L" and "R" positions. *(CAUTION–Do not operate the engine at high speed while the selector lever is in one of the driving ranges, with the rear wheels held stationary, for more than 10 seconds at a time or for a total time greater than one minute in any half-hour period).* Normal stall speeds are as indicated below. If stall speed is greater than normal, slippage in transmission is indicated. If stall speed is between 900-1000 RPM (if engine is normal), slippage is indicated in torque converter stator free wheel unit.

Stall Speeds

Model	Engine RPM
1956 Champion ①	1500-1600
1956-58 Champion ②	1400-1500
1956-58 Commander	1550-1650
1956-58 President	1750-1850
1957 Goldenhawk & Packard Clipper	1750-1850
1958 Goldenhawk & Packard Hawk	1750-1850
1959 6 Cyl. Engine	1350-1450
1959 V8 Engine	1550-1650
1960 6 Cyl. Engine	1200-1300
1960 V8 259" Engine	1550-1650
1960 V8 289" Engine	1750-1850

① - With first type converter, *see "Production Change" above.*

② - With second type converter, *see "Production Change" above.*

ROAD TEST: A thorough test must be made to determine the shift speeds and transmission performance. The initial application of the various bands and clutches should be checked in all driving ranges by stopping the car and moving the selector lever to "D", "L" & "R" ranges. A driving test should be made in the "D" range to check the shift speeds. *See Shift Speeds below.*

FLIGHTOMATIC SHIFT SPEEDS

1956 MODELS

Light Throttle Upshift

Shift	Champion	①Comm. & Pres.	②Comm. & Pres.
1-2	5-11	5-11	
2-3	16-22	17-23	14-19

Maximum Throttle Upshift

Shift	Champion	① C mm. & Pr s.	② C mm. & Pr s.
1-2	30-40	33-43	35-41
2-3	53-63	57-67	56-69

Maximum Kickd wn

Shift	Champion	① C mm. & Pr s.	② C mm. & Pr s.
3-2	48-58	52-62	56-63
2-1	16-24	18-26	8-12

Closed Throttl D wnshift

Shift	Champion	① C mm. & Pr s.	② C mm. & Pr s.
3-2	8-17	9-18	8-12
2-1	4-7	4-7	

① - Cars with "Low" gear start.

② - Cars with "Intermediate" gear start.

1957 MODELS

Light Throttl Upshift

Shift	Champion	C mm. & Pr s.	Packard & G ld. Hawk
1-2	5-11		
2-3	16-22	14-19	11-16

Maximum Thr ttl Upshift

Shift	Champion	C mm. & Pr s.	Packard & G ld. Hawk
1-2	30-40	35-41	36-43
2-3	53-63	56-69	65-74

Maximum Kickd wn

Shift	Champion	C mm. & Pres.	Packard & G ld. Hawk
3-2	48-58	56-63	58-65
2-1	16-24	8-12	6-10

Closed Throttl Downshift

Shift	Champion	C mm. & Pres.	Packard & G ld. Hawk
3-2	8-17	8-12	6-10
2-1	4-7		

1958-60 MODELS

Light Throttle Upshift

Shift	6 Cyl. M dels	V8 M d ls
1-2	8-12 MPH	
2-3	17-23 MPH	12-18 MPH

Maximum Thr ttl Upshift

Shift	6 Cyl. M d ls	V8 M d ls
1-2	36-43 MPH	34-42 MPH
2-3	55-65 MPH	63-73 MPH

Maximum Kickd wn

Shift	6 Cyl. M dels	V8 M d ls
3-2	50-60 MPH	60-70 MPH
2-1	17-23 MPH	20-26 MPH
3-1	10-15 MPH	12-18 MPH

Closed Throttl D wnshift

Shift	6 Cyl. M d ls	V8 M d ls
3-2	9-14 MPH	3-8 MPH
2-1	4-7 MPH	

Maximum Closed Thr ttle Downshift (Selector Lever in "L")

Shift	6 Cyl. Models	V8 M dels
2-1	10-16 MPH	15-21 MPH

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STUDEBAKER FLIGHTOMATIC (C ntinu d)

FLUID PRESSURE TESTS: Fluid pressure tests should be made to ascertain whether or not the pressure regulator system is functioning correctly and to determine if there is fluid leakage in the clutch circuits. Remove the 1/8" pipe plug located near throttle lever and manual lever, and install pressure gauge hose (pressure gauge should be in drivers compartment). Connect a tachometer to engine and position it so it can be read from drivers compartment. Make the following tests:

1) Idl Pr ssur T st - With engine and transmission at normal operating temperature, and with engine at normal idle speed, move selector lever to "D", "L", & "R" positions. Pressure gauge should read approximately 50-80 lbs. (1956-57Champ., Comm., & Pres., 1958 Champ.); 52-95 lbs. (1957 Goldenhawk & Packard Clipper, 1958 V8 Models), in all ranges. If pressure is low in any one range, a fluid leak in that range circuit is indicated. If pressure is high, the throttle linkage should be checked and adjusted. *See CARBURETOR on Car Model pages.*

2) Pr ssur R gulati n Check - Move selector lever to "D" range and firmly set hand brake and foot brake. Run engine at 1000 RPM and read pressure gauge. Pressure should be approximately 80-85 lbs. (Exc. Goldenhawk, Packard Clipper & Packard Hawk); 95-100 lbs. (Goldenhawk, Packard Clipper & Packard Hawk). If pressure is less, it is an indication that throttle valve linkage is too long and must be adjusted. If pressure is greater, it indicates throttle valve linkage is too short.

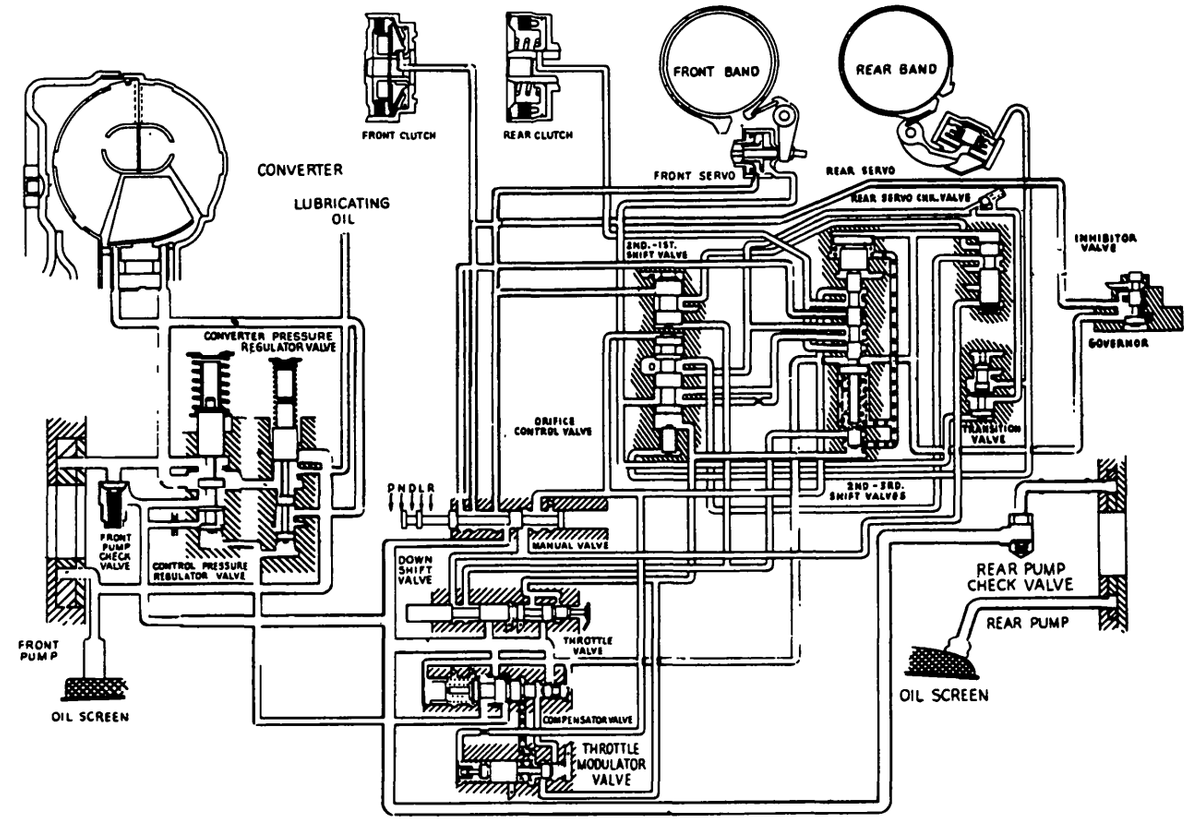
3) Stall Pr ssur T st - Firmly set hand brake and foot brake and operate engine at kickdown position. Move selector lever to "D", "L", & "R" ranges and read pressure gauge. The pressure in "D" & "L" positions should be 130-175 lbs. (Except Goldenhawk, Packard Clipper & Packard Hawk); 132-184 lbs. (Goldenhawk, Packard Clipper & Packard Hawk). In the "R" range, the pressure should be 170-190 lbs. (Except Goldenhawk, Packard Clipper & Packard Hawk); 184-203 lbs. (Goldenhawk, Packard Clipper & Packard Hawk). If pressure is not within limits, control valve assembly and pressure regulator valve assembly must be removed and cleaned.

AIR PRESSURE TEST (With Transmission in Car): Raise car on hoist and remove transmission oil pan and control valve assembly. Proceed as follows:

Fr nt Clutch: Apply pressure to front clutch and governor input passage (case rear flange). Listen for dull thud which indicates that clutch is operating. Keep air pressure in passage for several seconds to check for leaks in this part of the system.

G v rn r Valv : Remove governor inspection cover. Apply air pressure to the same passage as for front clutch (above). Listen for a click and also watch valve snap inward.

R ar Clutch; Apply air pressure to rear clutch oil passage (case rear flange). Listen for a dull thud to indicate clutch is operating. Check for leaks in same manner as for front clutch (above).



1958-60 V8 FLIGHTOMATIC TRANSMISSION HYDRAULIC OIL CIRCUITS

Rear Band & Servo: Apply pressure to rear servo oil passage (case rear flange), observe band application.

Front Band & Servo: Apply pressure to front servo apply tube (rear tube), and observe band application.

►*TESTING NOTE: If servos, bands, clutches and governor operate with air pressure, then the no drive problems, erratic shift, or no upshift conditions indicate that the control valve assembly is the cause of the trouble. See "Control Valve" below.*

TROUBLE SHOOTING

►*1959 TRANSMISSION SLOW ENGAGEMENT OF FRONT & REAR CLUTCH DIAGNOSIS:* This condition is noted at times when manual selector lever is shifted to a position that requires application of either front or rear clutch with car standing still, and at idle (transmission at normal operating temperature). Check as indicated below.

1) Perform "Initial Engagement Delay" below.

2) Check control pressure at 1000 RPM and at idle during time complaint condition is noticeable. Make comparative readings in all ranges.

3) Isolate rear clutch or rear band areas by adjusting rear band so it mechanically locks rear drum. If trouble is corrected, leakage within rear band servo is indicated. If complaint remains, it indicates that problem is in rear clutch circuit.

4) If the above procedures do not correct the complaint, but indicate a pressure leak in either front or rear clutch circuits, remove and disassemble transmission, then inspect all parts for nicks, scores and wear. Check all seal rings and grooves. Check all valves and valve bores.

►*CONTROL VALVE BUZZ (PARK & REVERSE RANGES) CORRECTION:* This condition may be due to highly aerated oil in the transmission which could be caused by a leak in the transmission. When abnormally severe valve buzz is encountered, remove the dipstick and check for indications of air bubbles in the oil. If air is present, check and correct as follows:

1) Sand holes or porosity in transmission case.

2) Leakage between pressure regulator valve assembly and the machined surface of case. This condition can be due to nicks or other damage on either of the mating surfaces, or by improper torqueing of the capscrews.

3) Leakage between front pump and transmission case due to damaged gasket or improper torqueing of capscrews.

4) Incorrect control pressures or sticking valves.

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STUDEBAKER FLIGHTOMATIC (C ntinu d)

INITIAL ENGAGEMENT TOO ROUGH: Idle speed may be too high. Control pressure may be too high caused by improper throttle valve linkage or dirt in control valve assembly or regulator valve assembly. Check throttle valve stop and reset if necessary.

INITIAL ENGAGEMENT DELAYED: Check fluid level. Adjust rear band as it may be loose. Control pressure may be too low at idle speed. Clean control valve assembly and pressure regulator assembly. Check front pump for wear. Check fluid circuits for leaks and correct as necessary.

INOPERATIVE IN ALL RANGES: Check fluid level. Manual linkage may be disconnected. No control pressure which may be caused by trouble at front pump. Check rear band adjustment. Check rear servo action with air pressure. Inspect and clean control valve assembly. Check stall speed (converter may not operate well).

NO DRIVE IN "D" OR "L" POSITION: Check fluid level. Manual linkage may be disconnected. Control pressure may be low. Adjust throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Check front clutch action with air pressure. Check rear servo and band with air pressure. Check transition valve in control valve for sticking.

NO DRIVE IN "R" POSITION: Check fluid level. Check and adjust manual linkage. Control pressure may be low. Check and adjust throttle valve linkage, and clean control valve and regulator valve assemblies. Check rear clutch action with air pressure. Check rear servo action with air pressure Check transition valve in control valve assembly.

LOCKS UP IN "D" POSITION: Rear clutch or front band may be applied. Clean control valve and governor valve assemblies. Check rear clutch and front band and servo for mechanical failures.

LOCKS UP IN "D" POSITION (2ND GEAR): Check rear band and servo, and rear clutch for mechanical failure.

LOCKS UP IN "D" POSITION (3RD GEAR): Front or rear band may be applied. Check bands and servo for mechanical failure. Clean control valve assembly.

LOCKS UP IN "R" POSITION: Check front clutch and band and front band servo for mechanical failure. Clean control valve assembly.

SLIPS IN "D" OR "L" POSITION: Check fluid level. Control pressure may be low. Check throttle valve linkage. Clean control valve and pressure regulator valve assemblies. Rear servo travel may be limited; check for mechanical failure of band or servo. Check front clutch for failure. Rear pump check valve may be sticking.

SLIPS IN "R" POSITION: Check fluid level. Check and adjust throttle control linkage. Clean control valve and regulator valve assemblies. Check rear servo for limited travel. Check front clutch for failure as it may be slipping. Rear pump check valve may be stuck open.

1-2 UPSHIFT ROUGH: Check and correct throttle control linkage as control pressure may be too high. Clean and adjust bands. Governor valve may be stuck.

1-2 UPSHIFT SLIPS: Check and adjust throttle control as control pressure may be too high. Adjust bands. Check for stuck governor valve. Check front servo piston for limited travel with air. Check fluid leakage.

NO 1-2 UPSHIFT: Check for stuck governor valve or 1-2 shift valve.

1-2 UPSHIFT TOO EARLY: Check governor valve.

1-2 UPSHIFT TOO LATE: Check for stuck governor valve or leak in governor circuit. Check and adjust throttle control linkage. Clean control valve assembly.

2-3 UPSHIFT ROUGH: Control pressure may be too high; adjust throttle control linkage and clean control valve assembly. Adjust front band. Check governor valve.

2-3 UPSHIFT SLIPS: Control pressure may be too low; adjust throttle control linkage and clean control valve assembly. Adjust front band. Check for internal leaks and for stuck governor valve.

NO UPSHIFT 2-3: Governor valve or 2-3 shift valve may be stuck.

2-3 UPSHIFT EARLY: Check for stuck governor valve.

2-3 UPSHIFT LATE: Check for stuck governor valve or leak in governor circuit. Adjust throttle control linkage.

3-2 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Orifice control valve stuck.

3-2 KICKDOWN (EARLY): Adjust throttle control linkage.

NO KICKDOWN: Adjust throttle control linkage.

2-1 DOWNSHIFT ROUGH (CLOSED THROTTLE): Adjust throttle control linkage. Rear servo check valve may be stuck.

WILL NOT START BY PUSHING: Rear pump not operating. Pressure regulator valve may be stuck.

NO PARK POSITION: Adjust throttle control linkage. Check for damaged internal linkage or pawl.

TRANSMISSION REMOVAL & INSTALLATION

REMOVAL: Raise car on hoist, and remove transmission drain plug and converter drain plug. On coupe and hardtop models, remove body front pillar support crossmember. On cars with dual exhaust system, remove the left hand exhaust system. Remove complete propeller shaft assembly. Disconnect shift lever-to-transmission manual valve lever rod from manual valve lever. Disconnect bellcrank-to-throttle valve lever rod at throttle valve lever. Remove speedometer cable retaining screw and remove pinion and cable. Place transmission lift with the saddle as far forward in the tracks as possible, in position on transmission oil pan flange and align saddle on oil pan flange. Remove the four transmission-to-converter bell housing capscrews. Install transmission-to-converter housing guide pins, Tool J-4284, into upper capscrew holes. Remove transmission assembly by sliding it rearward on saddle out of converter bell housing and converter.

INSTALLATION: Position front pump drive tangs on converter hub in horizontal position. Using a thin screwdriver, position the front pump external tooth gear drive lugs in vertical position. Install transmission-to-converter housing guide pins, Tool J-4284 (if they were removed). Raise transmission to proper height and angle and carefully slide transmission assembly into torque converter and bell housing, using the pilot studs as guides. Do not force transmission into converter by using transmission retaining screws to draw transmission into position, as this may damage converter or front pump. Make sure transmission fits snugly against converter bell housing. When transmission is in contact with bell housing, install the two lower transmission to-bell housing retainer capscrew and lockwashers. Remove guide pins and install remaining capscrews and lockwashers. Tighten capscrews to 40-45 ft. lbs. Remove transmission hoist and saddle. Install speedometer pinion and cable and install retaining screw. Install shift lever-to-transmission manual valve lever rod. Install bellcrank-to-transmission throttle valve lever rod. On coupes and hardtops, install the body front pillar support cross-member. On cars with dual exhaust, install left exhaust pipe. Install propeller shaft assembly.

TORQUE CONVERTER REMOVAL & INSTALLATION

REMOVAL: Remove transmission (see above), and starter. Disconnect tail pipe support and remove the "U" bolt from exhaust pipe support at converter housing. Disconnect rear exhaust pipe from front exhaust pipe and pull muffler and pipe assembly rearward. Move assembly to one side out of the way. Using a suitable support for engine (support must be shaped to support weight of engine at oil pan flanges and not under oil pan) and a hydraulic jack, remove rear insulator studs and raise engine just enough to have a separation between insulators and crossmember. Remove rear engine support crossmember. Remove converter bell housing-to-engine capscrews and remove bell housing, being careful not to damage dowels or distort converter blower. Lower rear of engine, being careful not to pull off water outlet nose (if additional clearance is required) drain cooling system and disconnect water outlet hose). Remove capscrews and washer holding converter assembly to the crankshaft-to-converter drive plate, and remove converter assembly.

INSTALLATION: Install converter assembly on the crankshaft-to-converter drive plate and loosely install retaining screws and lockwashers. Clean engine rear plate and mating surface on bell housing and install bell housing, taking care not to damage dowels or converter blower. Be sure bell housing is installed on dowels. Install bell housing retaining capscrews and tighten to 23-28 ft. lbs. If engine has been lowered, raise it to normal position. Position converter aligning tool, J-6310, into bore of bell housing and over pump drive fingers on torque converter assembly. Install the two upper transmission capscrews to hold aligning flange in position, and rotate converter assembly through two complete revolutions to center the torque converter assembly. Tighten converter-to-drive plate capscrews to 23-28 ft. lbs. Remove aligning tool. Install rear engine support crossmember. Install exhaust pipe, muffler and tail pipe assembly, making sure that proper alignment exists between assembly and the supports. Install transmission (see above), and starter.

TRANSMISSION OVERHAUL

CONVERTER OVERHAUL: Converter assembly is welded together and cannot be disassembled for servicing or overhaul.

TRANSMISSION OVERHAUL: *See "Warner Automatic Transmission" in this section.*

WARNER AUTOMATIC TRANSMISSION (CHECKER SUPERBA, RAMBLER PACKARD & STUDEBAKER)

DRIV-ER-MATIC & DUAL-RANGE
Ch ck r Sup rba (1959-60)
FLASH-O-MATIC
Rambl r American (1958-60)
Rambler 6 Cyl. (1957-60)
Rambler V8 (1958-60)
FLIGHTOMATIC
Stud baker (1956-60)
Packard (1957-58)

►*1957-58 PACKARD AUTOMATIC TRANSMISSION NOTE: All servic proc dures are the same as for Stud bak r V8 mod ls.*

►*WARNER AUTOMATIC TRANSMISSION NOTE: For information oth r than "Overhaul", see "Rambler & Ch cker Sup rba Automatic Transmission" or "Studebaker Flightomatic Transmission" in this section.*

TRANSMISSION UNIT REMOVAL (TRANSMISSION IN CAR)

OIL PAN, GASKET & SCREEN: Removal - Drain fluid from transmission, then remove oil pan and gasket. Remove screen retaining clip and Alnico magnet (Rambler). Remove screen by disengaging it from front pump inlet.

Installation: Reverse removal procedure and tighten oil pan capscrews to 10-13 ft. lbs. On Studebaker, tighten drain plug to 20-25 ft. lbs. On other models, tighten oil pan filler tube to 20-25 ft. lbs.

PRESSURE REGULATOR VALVE: Removal - With oil pan and screen removed, hold a constant pressure on spring retainer of valve assembly and remove the retainer tabs from bosses on valve assembly. Remove springs and spring pilots, then pull converter pressure regulator valve (smaller of two valves) out of base approximately ½" to drain converter. Remove lubrication pipe from valve assembly and rear pump, then remove large control pressure tube and smaller compensator tube from regulator valve and control valve assembly. Remove attaching screws and remove regulator valve assembly from transmission case. To disassemble and reassemble unit, s e *"Transmission Unit Overhaul" below.*

Installation: Reverse removal procedure and tighten capscrews to 17-22 ft. lbs. *CAUTION - Make sure valves and springs are properly seated in bores.*

CONTROL VALVE ASSEMBLY: Removal - With oil pan and screen removed, remove large control pressure tube and small compensator pressure tube. Loosen front servo retaining capscrew, then remove control valve assembly retaining capscrews. On Rambler and Checker Superba, remove vacuum and solenoid unit from transmission case. On all cars, align throttle lever and manual lever to permit removal of control valve assembly, then disengage front servo pressure tubes from control valve and lift the assembly from transmission case. To disassemble and reassemble unit, *see "Transmission Unit Overhaul" below.*

Installati n: Reverse removal procedures and tighten control valve assembly capscrews to 8-10 ft. lbs. Tighten servo retaining capscrew to 30-35 ft. lbs. On Rambler and Checker Superba, install and adjust vacuum and solenoid unit.

FRONT SERVO: R m val - Remove oil pan, screen and control valve assembly. Remove one capscrew and lockwasher attaching front servo to transmission case and, while holding actuating lever strut, disengage servo from dowel on transmission case, then remove servo. To disassemble and reassemble unit, *see "Transmission Unit Overhaul" below.*

Installation: Rotate band to engage anchor end of band with anchor in transmission case, then install actuating lever strut with thin end of strut in the band and hold in position with finger. Place servo on transmission case and engage actuating lever with strut. Engage servo body with dowel and install capscrew and lockwasher, but do not tighten. Install control valve assembly, then tighten front servo capscrew to 30-35 ft. lbs. Install oil pan, screen and gasket. Adjust front band, *see "Rambler & Checker Superba Automatic Transmission" or "Studebaker Flightomatic Transmission" in this section.*

REAR SERVO: Removal - Remove oil pan, screen and control valve assembly, then remove two capscrews and lockwashers attaching rear servo to transmission case. Hold actuating anchor strut, then lower servo from transmission and remove strut and servo. Remove servo anchor from adjusting screw. To disassemble and reassemble unit, *see "Transmission Unit Overhaul" below.*

Installation: Install anchor on adjusting screw and anchor strut on anchor, then rotate band with anchor strut. Install actuating lever strut and hold with finger. Place servo body on transmission case and engage actuating lever with actuating lever strut. Install servo retaining capscrews and lockwashers and tighten to 40-50 ft. lbs. Install control valve assembly, oil pan, gasket and screen, then adjust rear band. *See "Rambler & Checker Superba Automatic Transmission" or "Studebaker Flightomatic Transmission" in this section.*

THROTTLE VALVE SHAFT, INNER LEVER OR SEAL (STUDEBAKER): Removal - Remove oil pan, screen, pressure regulator valve assembly, and control valve assembly, then remove inner throttle valve shaft nut and lever and remove throttle valve shaft and outer lever from transmission case. Remove "O" ring seal from counterbore of manual valve shaft.

Installation: Reverse removal procedure and tighten throttle valve shaft inner lever nut to 17-20 ft. lbs.

MANUAL VALVE SHAFT, INNER LEVER OR SEAL (STUDEBAKER): Removal - Remove oil pan, gasket, screen, pressure regulator valve assembly, and control valve assembly. Remove retaining clip from parking pawl torsion rod at manual valve lever and remove rod. Remove throttle valve inner lever, and throttle valve shaft, then rotate manual shaft until detent lever clears detent ball and remove detent ball and spring. *NOTE - Hold detent ball to prevent it flying out of detent socket.* Remove manual valve shaft nut and detent lever, then remove manual valve shaft from transmission case. Pick the shaft oil seal out with a screwdriver.

Installation: Reverse removal procedure and note the following: Tap seal into place with lip of seal toward inside of transmission. Tighten manual shaft lever nut to 35-40 ft. lbs. *NOTE - Use a piece of 5/16" copper tubing 6" long to hold detent ball in position while rotating manual valve shaft lever ov r detent ball.*

MANUAL VALVE SHAFT, INNER LEVER OR SEAL (RAMBLER & CHECKER SUPERBA): R m val - Remove oil pan, gasket, screen, pressure regulator valve assembly, and control valve assembly. Remove detent ball and spring by holding detent ball down and move detent lever by moving manual lever shaft toward rear of transmission. Remove manual shaft lever nut and shaft from transmission case, then remove shaft "O" ring seal.

Installation: Reverse removal procedures.

GOVERNOR BODY: Removal - Remove governor inspection hole cover from extension housing, then rotate drive shaft until governor is in alignment with inspection hole and remove two retaining screws and lockwashers. *CAUTION - Do not drop screws or governor valve into extension housing.* To disassemble and reassemble unit, *see "Transmission Unit Overhaul" below.*

Installation: Reverse removal procedures and tighten capscrews to 50-60 inch pounds. *NOTE - Install governor with plate toward front of transmission.*

EXTENSION HOUSING REAR OIL SEAL (RAMBLER): Removal - Raise car and remove torque tube and/or propeller shaft from transmission, then remove rear oil seal with Puller J-2619 (sliding hammer) and Tool J-4830-01 (American & Series 10), J-2623 (Series 20 & 80).

Installation: Position seal in housing with felt of seal toward rear of housing, then install seal with Tool J-1354 (American & Series 10), J-4485 (Series 20 & 80). Install torque tube and/or propeller shaft.

EXTENSION HOUSING OIL SEAL AND/OR OUTPUT SHAFT BUSHING (STUDEBAKER): Removal - Completely tighten rear band to prevent movement of planetary assembly and dislocation of thrust washers on transmission shaft. Disconnect propeller shaft at rear axle assembly and slide sleeve of front universal off transmission output shaft. Insert Bushing & Seal Remover J-4830-2 in extension housing seal so tabs on tools are between metal flanges of seal and expand tool. Attach slide hammer and remove seal. Install Bushing & Seal Remover J-4830-01 in extension housing so tool goes in beyond bushing, then expand tool and attach a slide hammer. Remove bushing from housing.

Installation: Position a new output shaft bushing on Tool J-6403-01 and lightly coat bushing with lubricant. Position tool and bushing in extension housing and drive tool into position until tool bottoms on extension housing. Remove tool and install collar on Tool J-6403-01. Position a new extension housing oil seal on tool with lip of seal toward front of transmission, then position tool on transmission output shaft and drive seal into extension housing until tool bottoms on housing. Install propeller shaft and adjust rear transmission band.

EXTENSION HOUSING: Removal - Completely tighten rear band to prevent movement of planetary assembly and dislocation of thrust washers on transmission shaft. On Studebaker and Checker Superba, disconnect propeller shaft at rear axle assembly and remove propeller shaft. On Rambler, remove torque tube and/or propeller shaft from transmission. Remove capscrews attaching extension housing to transmission case and and slide extension housing off output shaft.

Installation: Reverse removal procedures.

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WARNER AUTOMATIC TRANSMISSION (Continued)

TRANSMISSION UNIT REMOVAL (TRANSMISSION OUT OF CAR)

►*TRANSMISSION UNIT REMOVAL NOTE:* For removal of oil pan, screen, pressure regulator valve, control valve assembly, front servo, rear servo and extension housing, see *"Transmission Unit Removal (Transmission in Car)" above then proceed as follows:*

TRANSMISSION ENDPLAY CHECK: Before proceeding further with disassembly, remove one of the front pump retaining capscrews and attach a dial indicator support and dial indicator so indicator contact button rests against end of input shaft. Use a large screwdriver and pry front clutch assembly to rear of case, then while holding the assembly in this position, zero the dial indicator. Insert a screwdriver between parking gear and transmission case and pry units toward front of case. Record dial indicator reading which should be .010-.029".

FRONT PUMP: Remove capscrews retaining front pump to transmission case, then tap screw bosses lightly with a plastic hammer and remove pump by moving it forward off input shaft.

SPEEDOMETER DRIVE GEAR: Remove drive gear retaining ring, then remove gear from shaft. *NOTE - Gear is driven by a ball set in recess in output shaft.* Remove drive ball.

DISTRIBUTOR (OIL): Remove spacer from transmission output shaft and slide distributor toward rear of transmission assembly. Note the tube spacer located on center tube.

GOVERNOR & COUNTERWEIGHT ASSEMBLY: Remove governor and counterweight snap ring from output shaft and slide the assembly off output shaft. *CAUTION - Be careful not to lose the governor assembly drive ball which is set in a recess in shaft.*

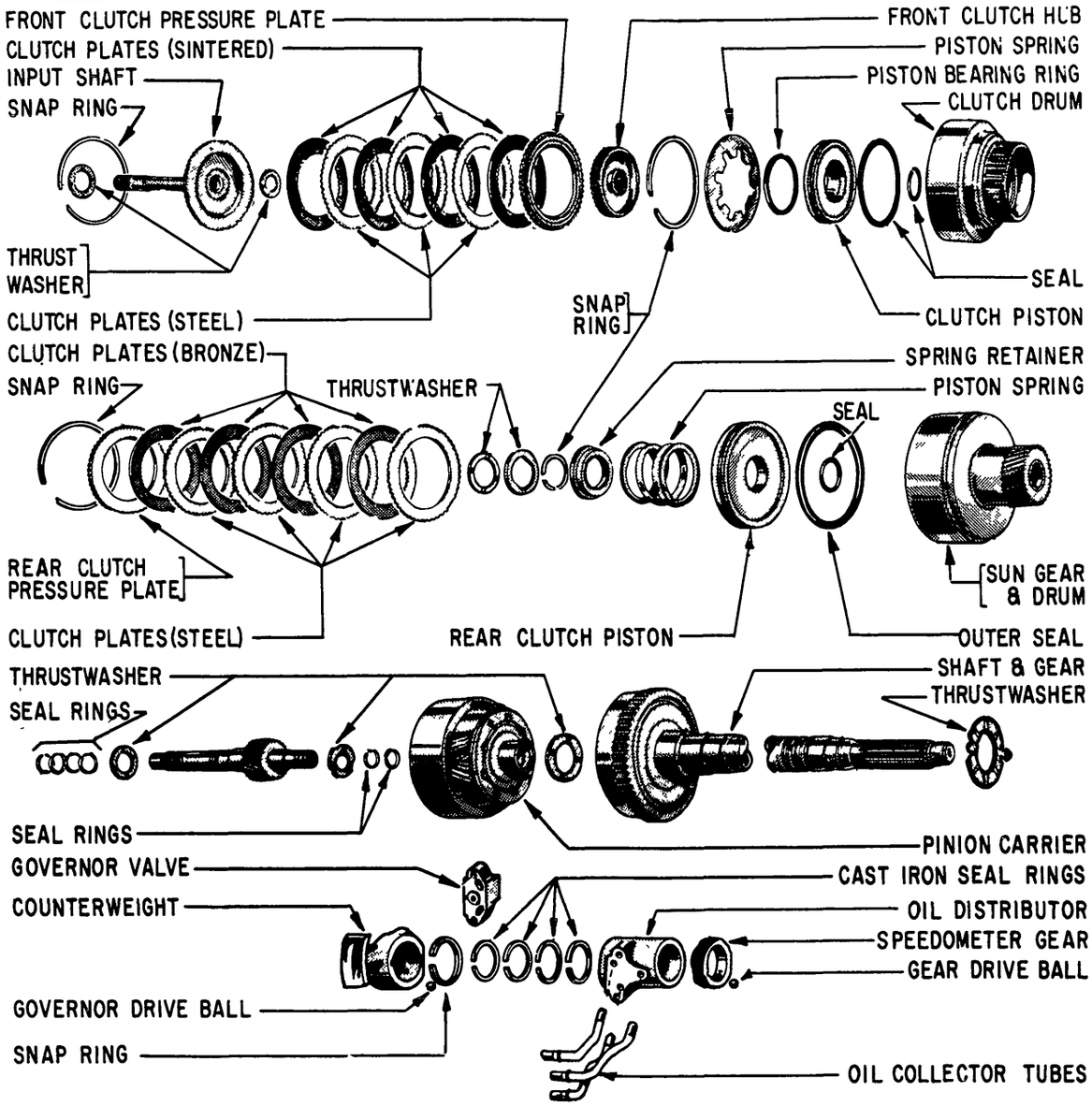
REAR PUMP: Remove rear pump inlet tube, then insert Tool J-5865 into rear pump discharge tube located in transmission case rear flange (in line with rear pump) and withdraw discharge tube from case. Slide pump off output shaft and remove drive key from shaft. Remove gasket and large thrust washer from front side of rear pump.

OUTPUT SHAFT & INTERNAL GEAR ASSEMBLY: Hold pinion carrier in position and slide output shaft and internal gear assembly out of transmission case toward rear. Remove thrust washer from pinion carrier. *NOTE - This thrust washer determines endplay of the transmission assembly and is supplied in various thicknesses for service replacement.*

PINION CARRIER: Hold pressure against primary sun gear shaft and remove pinion carrier by sliding it out rear of transmission case. Remove thrust washer from inside pinion carrier noting position of cone on inner diameter of the thrust washer.

REAR BAND: Rotate rear band so that band ends are toward top of transmission case and remove through rear of case. Remove anchor strut from transmission case on anchor side of band.

CENTER SUPPORT: Remove the two capscrews located on outside of transmission case which retain center support in position, then remove center support through rear of transmission case.



WARNER AUTOMATIC TRANS. INTERNAL PARTS (SPRAG CLUTCH USED ON RAMBLER & CHECKER)

FRONT CLUTCH, REAR CLUTCH & SUN GEARS: Remove front clutch, rear clutch and sun gears as an assembly through rear of transmission case while supporting assembly with one hand placed under turbine shaft. Remove thrust washer from front of front clutch, then separate front and rear clutches and remove thrust washer and counter thrust washer from between clutches.

FRONT BAND: Rotate and tilt front band and remove through bottom of transmission case.

TRANSMISSION UNIT OVERHAUL
1957-60 MODELS

CONTROL VALVE (RAMBLER): Disassembly - 1) Remove manual valve, then remove one screw attaching separator plate to lower body. Remove upper body front plate. *NOTE - Front plate is spring-loaded. Apply pressure to plate while removing attaching screws.*

CONTINUED ON NEXT PAGE

WARNER AUTOMATIC TRANSMISSION (C ntinu d)

2) Remove compensator sleeve and plug, then remove compensator valve inner and outer springs (single spring only on Series 20 & 80) and remove compensator valve. On Series 01 (Rambler American), remove the low range valve. Remove modulator valve retainer, outer spring, valve, and inner spring. *NOTE - Modulator valv ut r spring r tain r may be removed from valve by pr ssing utward on th three retaining flanges.*

3) Push downshift valve into its bore to remove vacuum control lever hook. If necessary,remove vacuum control lever by removing retainer and pin. Remove downshift valve and spring.

4) Remove screws attaching throttle valve return springs to upper body and remove springs. Remove remaining screw attaching upper valve body rear plate to body, then remove plate. Remove throttle valve and compensator cut-off valve. Remove lower body side plate. *NOTE - Sid plate is spring-loaded. Apply pressure to plat whil r moving attaching screws.*

5) Remove reverse inhibitor valve spring and valve, governor plug, and range control valve. Remove end body. *NOTE - End body is spring-loaded. Apply pressur to body while r moving attaching screws.*

6) Remove orifice control valve plug, 2-3 shift valve plug, and transition valve plug from end body. Remove end body plate. Remove 2-3 shift valve outer spring, inner springs and shift valve. Remove orifice control valve and spring, transition valve and spring, and governor safety valve and spring.

7) Remove cover end plate, 1-2 shift valve spring, rear servo check valve spring and valve. Remove attaching bolts and screws and separate bodies. Remove valve body plate and separator plate from upper and lower valve bodies. Remove rear pump check valve sleeve, check valve, and spring from lower body. *NOTE - Valv sl v can b r moved with snap ring pliers.*

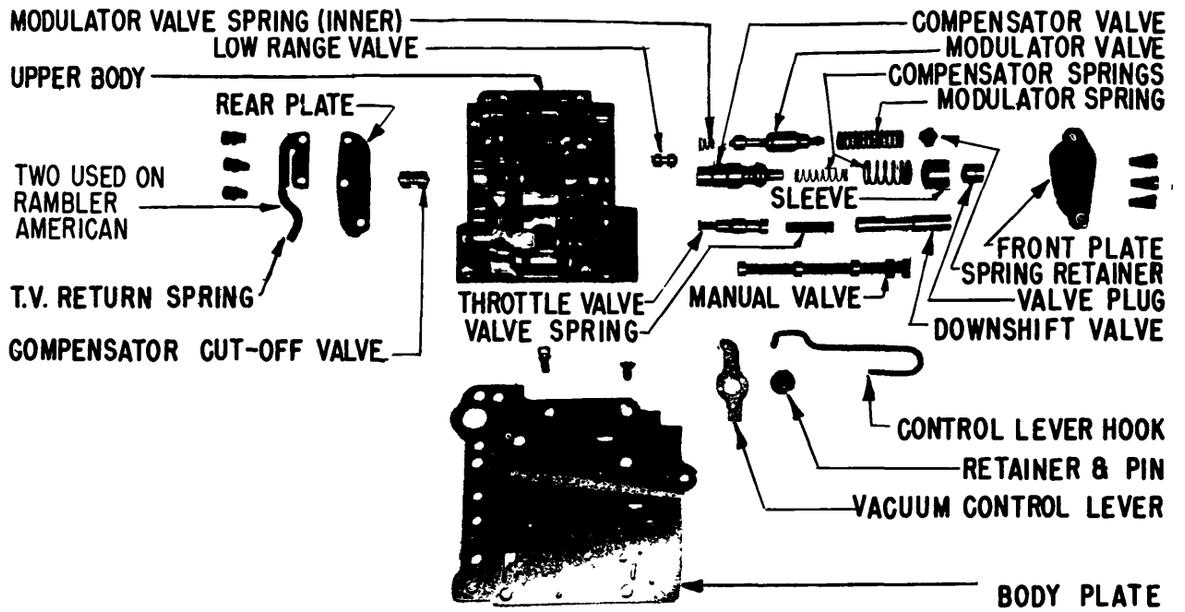
Insp cti n: *S "Insp ction" below.*

R ass mbly: *NOTE - Arrange all parts in their correct position. Wh n ins rting valves and plugs, rotate them to pr v nt sh aring f soft body castings.*

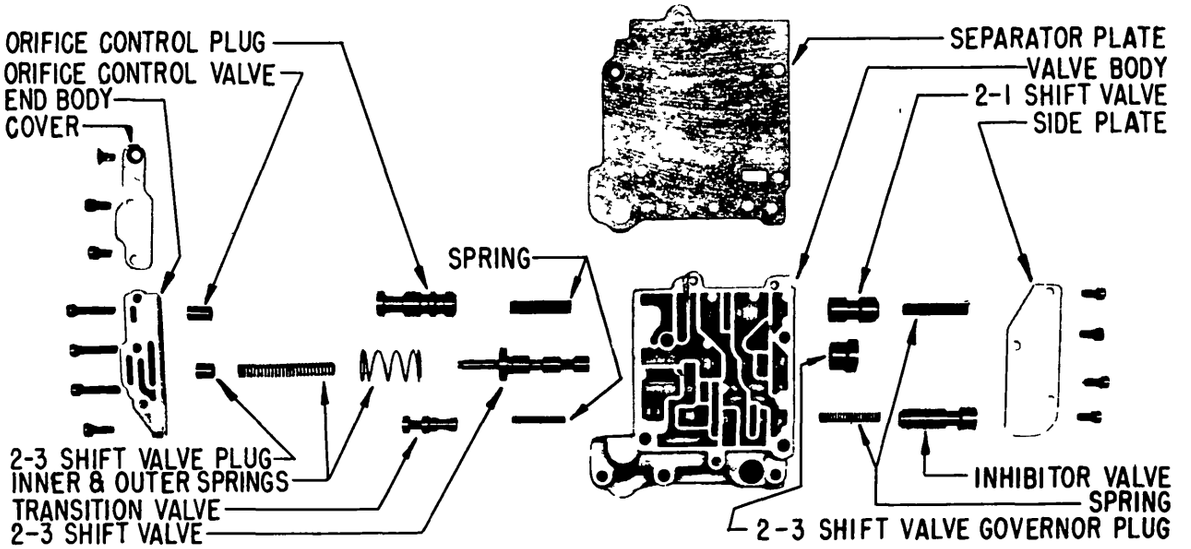
1) Install valve body plate on upper body (do not tighten screws), then install rear pump check valve, spring, valve and sleeve in lower body. Position lower body on upper body and place separator plate on lower body. Install lower body cover, then tighten attaching bolts finger tight.

2) Align valve body attaching bolt holes in valve body plate and lower body, then tighten the four valve body bolts equally to 4-6 ft. lbs. *CAUTION - Excessive tightening of thes bolts may distort valve bodies causing valv s or plugs to stick.* Install the two lower cover-to-lower body screws and tighten all cover and body screws to 20-30 inch pounds, Install plate on lower end body and tighten attaching screws.

3) *NOTE - Lubricate all valves and plugs with Automatic Transmission Fluid Type "A" before installing in their resp ctive bores.* Install orifice control valve plug, 2-3 shift valve plug, and transition valve plug in the end body. Install transition valve spring and valve, orifice control valve spring and valve, governor safety valve spring and valve, and 2-3 shift valve in lower body. *CAUTION - Make sure inn r spring is piloted on the 2-3 shift valve plug.*



CONTROL VALVE UPPER BODY ASSEMBLY (TYPICAL)



1958-60 V8 STUDEBAKER LOWER VALVE BODY ASSEMBLY

4) Install range control valve and governor plug in lower body. Install reverse inhibitor valve spring in valve and install valve. Install lower body side plate, then install 1-2 shift valve and spring in cover. Install governor safety valve and spring, then install cover end plate to cover.

5) Install compensator cut-off valve in upper body and install throttle valve. Position upper body rear plate on upper body with plate between end lands of throttle valve. Install one plate-to-body screw in hole next to throttle valve. Position throttle valve return spring on plate and secure plate in place with remaining screws.

6) Install compensator valve and springs (or single spring if so equipped), then install throttle valve

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WARNER AUTOMATIC TRANSMISSION (C ntinu d)

spring and downshift valve. Install modulator inner spring, valve, outer spring, and retainer as an assembly. *NOTE - Be sure both springs are fastened into position on valve before installation in upper body.*

7) Install plug in compensator valve sleeve, castellated end out, and install the assembly in valve body with smooth end toward body. Install upper body front plate and the screw attaching separator plate to lower valve body. If vacuum control lever was removed, reinstall lever with retainer and pin. While pressing downshift valve into its bore, insert vacuum control lever hook into downshift valve and control lever. Install manual valve.

1959-60 MODELS

CONTROL VALVE (CHECKER SUPERBA): Disassembly - *NOTE - Do not separate valve bodies until after valves have been removed.*

1) Remove manual valve, then remove one screw attaching separator plate to lower valve body, and remove upper body front plate. *NOTE - Plate is spring-loaded. Apply pressure while removing attaching screws.*

2) Remove compensator sleeve and plug, then remove spring and compensator valve. Remove modulator valve retainer, large spring, valve, and small spring, then remove vacuum control lever hook retaining ring and push downshift valve into its bore to remove control lever hook. Remove downshift valve and spring. Remove the two screws attaching throttle valve return spring to upper body and remove spring. Remove remaining screw attaching upper valve body rear plate to body and remove plate. Remove throttle valve and compensator cut-off valve, then remove lower body side plate *NOTE - Plate is spring-loaded. Apply pressure to plate while removing attaching screws*

3) Remove low inhibitor valve spring and valve, then remove governor plug. Remove end body. *NOTE - End body is spring-loaded. Apply pressure to body while removing attaching screws.* Remove orifice control valve plug and the 2-3 shift valve plug from end body, then remove end body plate.

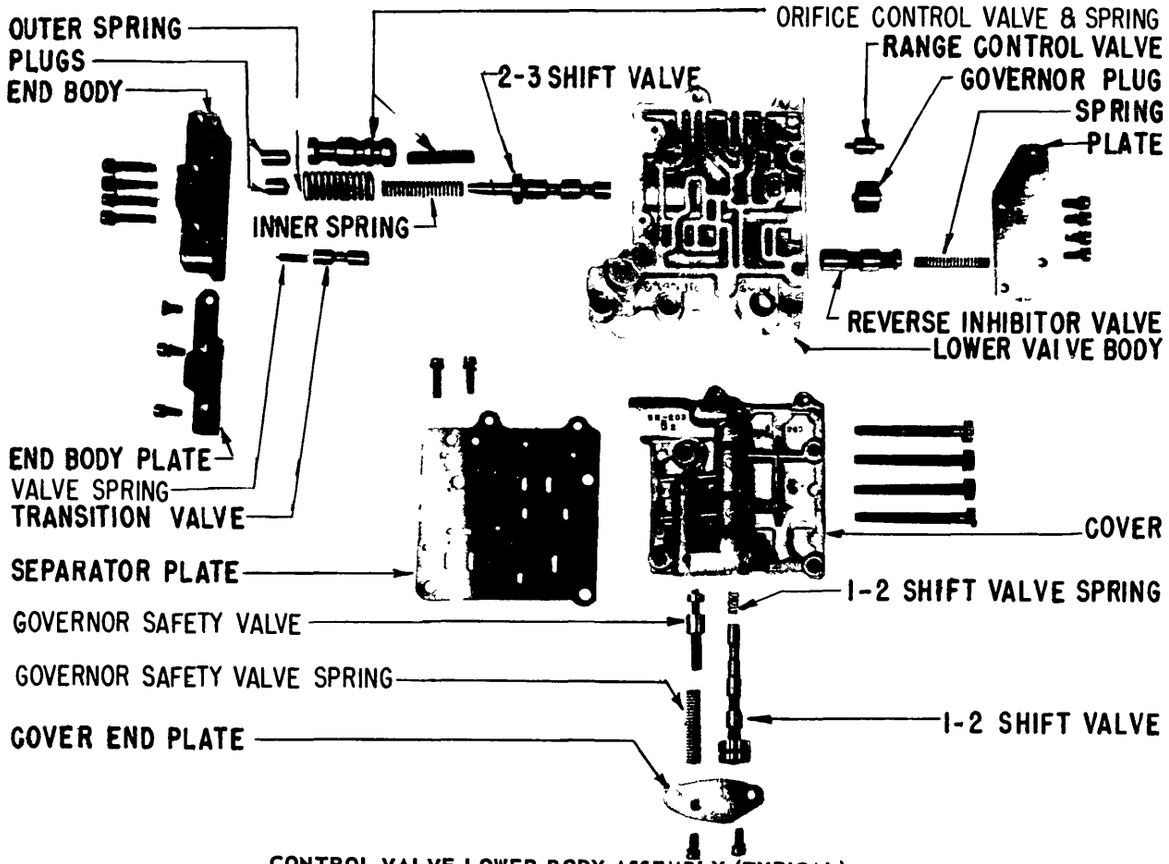
4) Remove 2-3 shift valve outer and inner springs and shift valve, orifice control valve, and transition valve and spring. Remove cover end plate, then remove 1-2 shift valve and spring, rear servo check valve and spring. Remove attaching bolts and screws and separate valve bodies.

5) Remove valve body plate and separator plate from upper and lower bodies, then remove rear pump check valve sleeve, check valve and spring from lower body.

Inspection: See *"Inspection" below.*

R assembly: *NOTE - Arrange all parts in their correct position. When inserting valves and plugs, rotate them to prevent shearing of soft body castings.*

1) Install valve body plate on upper body (do not tighten screws), then install rear pump check valve spring, valve, and sleeve in lower body. Position lower body on upper body and place separating plate on lower body. Install lower body cover, then tighten attaching bolts finger tight. Align valve body attaching bolt holes in valve body plate and lower body. Tighten the four valve body bolts equally to 4-6 ft. lbs. *CAUTION - Overtightening may cause valve body distortion.*



CONTROL VALVE LOWER BODY ASSEMBLY (TYPICAL)
(EXCEPT 1958-60 V8 STUDEBAKER)

2) Install the two lower cover to lower body screws and tighten to 20-30 inch pounds. Install plate on lower body, then tighten attaching screws. *NOTE - Lubricate all valves and plugs with Automatic Transmission Fluid Type "A" before installing in valve body.* Install orifice control and 2-3 shift valve plugs in end body, then install transition valve spring and valve, orifice control valve spring and valve, and 2-3 shift valve in lower body. Install shift valve inner and outer springs and install end body on lower body. *NOTE - Make sure inner spring is piloted on 2-3 shift valve plug.*

3) Install governor plug in lower body, then install low inhibitor valve spring in valve and install valve. Install lower body side plate. Install 1-2 shift valve and spring in cover, then install rear servo check valve and spring. Install end plate to cover, then install compensator cut-off valve in upper body.

4) Install throttle valve and position upper body rear plate on upper body, with plate between end bands of throttle valve. Install one plate-to-body screw in hole next to throttle valve. Position throttle valve return spring on plate, and secure in place with remaining plate-to-valve body screws. Install compensator valve and spring, throttle valve spring, and downshift valve.

5) Install modulator small spring, valve, spring and retainer as an assembly. Install plug in compensator valve sleeve, castellated end out, and install assembly in valve body, with smooth end toward body.

6) Install upper body front plate, then install manual valve. Press downshift valve into its bore and insert vacuum control lever hook into downshift valve and control lever. Install retaining ring on hook at vacuum control lever.

1956-60 MODELS

►*CONTROL VALVE OVERHAUL NOTE: For overhaul of 1956-57 V8 control valve assemblies, refer to 6 Cyl. models in text below.*

►*1956 STUDEBAKER COMMANDER & PRESIDENT LOW SPEED GEAR NOISE & IMPROVED SHIFT IN "D" RANGE CORRECTION:* To correct the above conditions and to modify control valve assembly for an intermediate gear start on transmissions prior to Transmission Serial Nos. 19001 (Commander); 24001 (President), or earlier transmissions not having the letter "B" suffix on serial number, install Shift Valve Spring Kit, Part No. 1541549 as follows:

CONTINUED ON NEXT PAGE

WARNER AUTOMATIC TRANSMISSION (C ntinu d)

1) Remove control valve assembly from transmission case. Remove the two screws from lower valve body cover end plate and remove end plate. Remove the 1-2 shift valve and shift valve spring. Discard spring.

2) Install the 1-2 shift valve in its bore in lower valve body cover. Install the conical spring from kit on the 1-2 shift valve with small end of spring piloting on stop shoulder of valve. Hold conical spring in shift valve bore with a piece of .020" feeler stock 1/2" wide, being certain that conical spring is completely in valve bore. Install end plate and end plate screws and tighten finger tight. Remove feeler stock by sliding from under end plate and tighten end plate screws securely.

3) Remove screws from end body assembly on lower valve body assembly and remove end body assembly. Remove the 2-3 shift valve inner and outer springs. Discard the springs. Install the 2-3 shift valve springs from kit on the 2-3 shift valve (springs from kit are shorter than springs removed from valve body).

4) Install the end body assembly on lower valve body, being certain the 2-3 shift valve inner spring enters shift valve plug bore. Install and tighten screws. Install control valve assembly on transmission

CONTROL VALVE (STUDEBAKER): Disassembly - 1) Remove four capscrews and lockwashers attaching lower body cover to control valve assembly, then invert control valve and remove screw attaching separator plate to lower valve body. Remove upper valve body and separator plate, then remove separator plate from valve body.

2) Remove throttle valve return spring, then remove rear plate. Remove compensator cut-off valve and manual valve. Remove front plate, then remove downshift valve, throttle valve and spring.

3) Remove compensator valve sleeve, plug, inner and outer springs, and compensator valve. Remove modulator valve and spring assembly but do. not separate modulator valve and spring.

4) On 6 Cyl. models, remove rear pump check valve seat, valve and spring, then remove lower valve body cover. Remove separator plate, then remove side plate. Remove inhibitor valve and spring, and 2-3 shift valve governor plug. Remove end body from lower body, then remove transition valve, spring, 2-3 shift valve inner and outer springs, 2-3 shift valve, and orifice control valve and spring. Remove 2-3 shift valve plug and orifice control valve plug from end body, then remove end body plate.

5) On V8 models, remove lower body side plate then remove 2-1 shift valve spring and valve. Remove 2-3 shift valve governor plug, and inhibitor valve and spring. Remove lower body end body, then remove orifice control valve, spring, inner and outer 2-3 shift valve springs, 2-3 shift valve, and transition valve and spring. Remove end body cover retaining screws and remove cover, then remove orifice control valve plug and 2-3 shift valve plug.

6) On 6 Cyl. models, remove lower valve body cover end plate, then remove rear servo check valve spring, rear servo check valve, and the 1-2 shift valve and spring.

7) On V8 models, remove lower valve body cover. *NOTE - There are no valves to service in the cover and it is only necessary to clean and inspect.*

Inspection: *See "Inspection" below.*

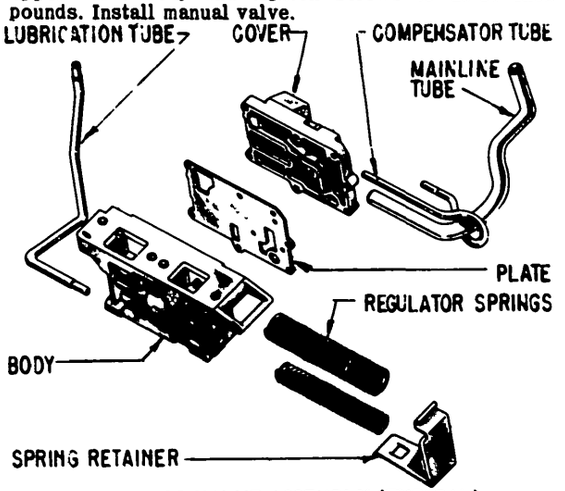
Reassembly: 1) On V8 models, install lower valve body cover on lower body and tighten screws to 20-30 inch pounds.

2) On 6 Cyl. models, install 1-2 shift valve spring and 1-2 shift valve, then install rear servo check valve. Position end plate on lower valve body cover and tighten screws to 20-30 inch pounds.

3) On V8 models, install orifice control valve plug and 2-3 shift valve plug in lower valve body end body and install plate and retaining screws. Install transition valve and spring, 2-3 shift valve and 2-3 shift valve inner and outer springs, orifice control valve spring and valve, then install end body and retaining screws. Install inhibitor valve spring and valve, 2-3 governor plug, and 2-1 shift valve and spring, then install valve body side plate and retaining screws.

4) On 6 Cyl. models, position end body plate on end body and tighten screws to 20-30 inch pounds. Install orifice control valve plug and the 2-3 shift valve plug. Install orifice control valve spring and valve, 2-3 shift valve and inner and outer springs, transition valve spring and valve. Position end body on lower valve body and tighten retaining screws to 20-30 inch pounds. Install 2-3 shift valve governor plug and the inhibitor valve and spring. Position side plate on lower valve body and tighten screws to 20-30 inch pounds. Install rear pump check valve spring, valve, and seat.

5) On all models, install modulator valve and spring assembly, compensator valve, compensator inner and outer springs, compensator valve plug and sleeve, throttle valve, throttle valve spring, and downshift valve, then install front plate and tighten attaching screws to 20-30 inch pounds. Install compensator cut-off valve, then install rear plate. *CAUTION - When installing the rear plate, the throttle valve must protrude from valve body to provide clearance for stop on rear plate.* Position throttle valve return spring on rear plate and install screws. Position separator plate on upper valve body and tighten screws to 20-30 inch pounds. Install manual valve.



REGULATOR VALVE ASSEMBLY (TYPICAL)

6) On all models, position upper valve body and separator plate on lower valve body and install retaining screw and lockwasher (do not tighten screw). Position separator plate and lower valve body cover on lower valve body (if not previously done), then install screws and lockwashers (do not tighten screws). Install four capscrews and lockwashers attaching lower valve cover to control valve assembly and tighten to 4-6 ft. lbs. Tighten all screws to 20-30 ft. lbs.

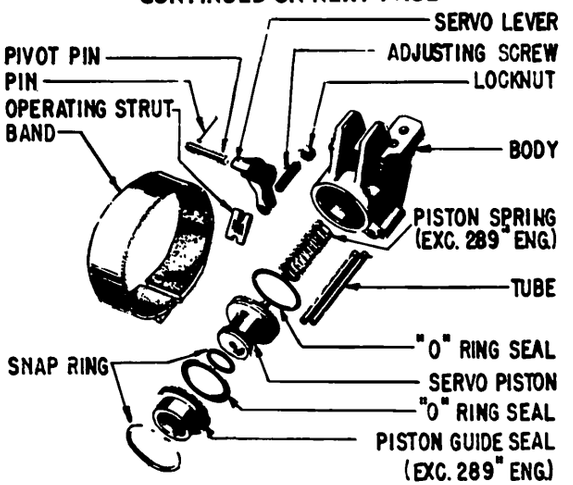
CONTROL VALVE INSPECTION: Clean all parts in solvent and blow dry with air. Inspect all valves and plug bores for scores and check all fluid passages for obstructions. Inspect check valves for free movement. Inspect all mating surfaces for burrs or distortion. Inspect all valves and plugs for burrs or scores. *NOTE - Crocus cloth can be used to polish valves and plugs. Be very careful not to round off sharp edges of valves and plugs.* Inspect all springs for distortion and check all valves and plugs for free movement in their respective bores. Valves and plugs must fall from their own weight in their respective bores with all parts dry.

PRESSURE REGULATOR (ALL MODELS): Disassembly - Remove control pressure regulator valve and converter pressure regulator valve from their respective bores. Remove cover, then remove front pump check valve and spring. Remove separator plate. Clean and inspect unit in same manner as for control valve assembly (above).

Reassembly: Install cover on regulator body and tighten screws to 20-30 inch pounds. Install control pressure regulator valve and converter pressure regulator valve in their respective bores.

FRONT SERVO: Disassembly - Remove servo pressure tubes from servo body. Hold pressure against servo piston, then remove snap ring and release pressure and remove servo piston and guide from servo body. *NOTE - It may be necessary to tap guide lightly with a plastic*

CONTINUED ON NEXT PAGE



FRONT SERVO & BAND ASSEMBLY

Form 70 B

WARNER AUTOMATIC TRANSMISSION (C ntinued)

hammer to aid in removal. Separate piston and guide and remove rubber seal from guide and large and small "O" ring seals from piston. Use a 1/8" drift and drive out the actuating lever roll pin from servo body. Push out actuating lever shaft and remove actuating lever.

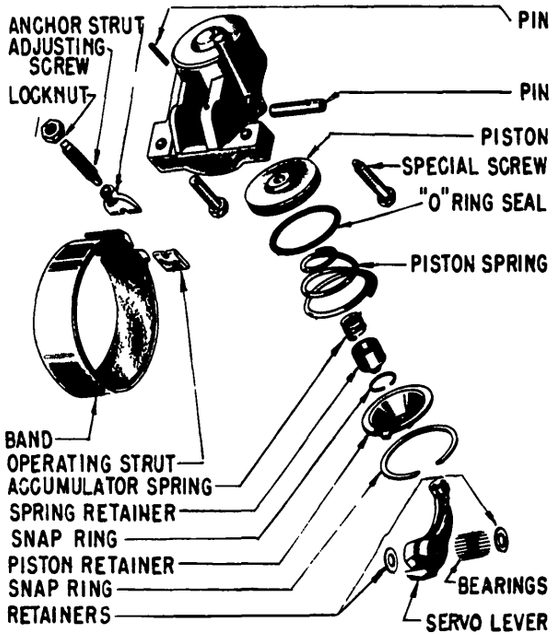
Inspection: Inspect servo body for cracks, burrs, and obstructed fluid passages. Inspect piston bore and piston stem for scores. Inspect actuating lever and shaft for wear and for freeness in servo body. Inspect adjusting screw threads and threads in actuating lever. Inspect servo band for wear and bonding of lining to band. Replace band if grooves in lining are worn even with rest of lining. Inspect band ends for cracks and distortion. Install piston and guide in servo body and check for freedom of travel. *NOTE - Minor burrs and scores can be removed with crocus cloth. Parts showing deep burrs, scores, cracks, or excessive wear must be replaced.*

Reassembly: Lubricate all parts with Automatic Transmission Fluid Type "A" before reassembling, then install servo spring in servo body. Install new seals on servo piston and guide and assemble piston and guide together, then install in servo body. Hold pressure against guide and install snap ring. Place actuating lever in position on servo body and install actuating lever shaft and roll pin. Install adjusting screw if it was removed. Install servo pressure tubes in servo body.

REAR SERVO: Disassembly - Use a 1/8" drift and drive actuating lever roll pin out of servo body, then remove actuating lever shaft, washers, needle bearings, and actuating lever. Mount servo in an arbor press and exert sufficient pressure to compress servo spring and remove snap ring. Release pressure and remove servo piston by forcing air into servo pressure hole and remove "O" ring seal from piston. Remove accumulator piston snap ring and remove accumulator piston and spring.

Inspection: Inspect servo body for cracks, burrs and obstructed fluid passages. Inspect piston bore and piston stem for scores. Inspect actuating lever and shaft for wear and freeness in servo body. Inspect needle bearings for wear and brinnelling. Inspect servo band for wear and tightness of lining on band. Replace band if grooves in lining are worn even with rest of lining. Inspect band ends for cracks and distortion. Install piston in servo body and check for freedom of travel. *NOTE - Minor burrs and scores can be removed with crocus cloth. Parts showing deep burrs, scores, cracks, r excessive wear must be replaced.*

R assembly: Lubricate all parts with Automatic Transmission Fluid Type "A" before starting assembly, then install accumulator spring and piston in servo piston and install snap ring. Install a new "O" ring seal on servo piston, then install piston in servo body and install servo spring with small end of spring against



REAR SERVO & BAND ASSEMBLY

servo piston. Position spring retainer on spring and place the assembly in an arbor press. Exert sufficient pressure to compress spring and uncover snap ring groove, then install snap ring. *NOTE - Tab on spring retainer must fit into slot in servo body.* Install needle bearings in actuating lever and position lever in servo body. Install actuating lever shaft, washers, and roll pin.

FRONT PUMP: Disassembly - Remove stator support, then mark top of internal and external tooth gears with crayon or pencil and lift gears from pump body. Use a small punch to drive front oil pump seal from pump body.

Inspection: Inspect body for excessive wear and scores. Inspect gears for scores, scratches, and excessive wear. Remove minor scratches and scores with crocus cloth.

Reassembly: Position a new seal in pump body with lip of seal toward pump gears. Press seal into position with Tool J-6069 (Rambler), J-6313 (Studebaker). Lubricate all parts of pump with transmission fluid, then install internal and external tooth gears in pump body with marks made at disassembly in upward position. Insert stator support on pump body and install the two attaching screws. Tighten screws to 25-35 inch pounds and check pump gears for free movement.

REAR PUMP: Disass mbly - Remove large thrust washer from face of pump, then remove pump cover from pump body. Mark internal and external tooth gears with crayon or pencil and lift gears out of body.

Inspecti n: Inspect pump cover for excessive wear and replace if cover shows wear adjacent to gears. Inspect gears for burrs and scratches. Inspect pump body for wear, burrs, and scratches, and inspect bushing in pump body for wear. Remove minor scratches or burrs with crocus cloth.

Reassembly: Position internal and external tooth gears in pump body with marks made at disassembly in an upward position. Align pump cover and install retaining screws and lockwashers. Tighten large screws to 50-60 inch pounds, and the small screws to 20-30 inch pounds. Install large thrust washer on front face of pump with tabs of washer in recesses in pump, then check pump for free movement of gears.

DISTRIBUTOR (OIL): Disassembly - Remove three tubes from distributor.

Inspection: Inspect distributor for burrs and obstructed fluid passages. Check fit of tubes in distributor and inspect sleeve for wear and scores in sleeve bore. Remove minor scores and burrs with crocus cloth.

Reassembly: Install tubes in distributor and tighten capscrews to 8-10 ft. lbs.

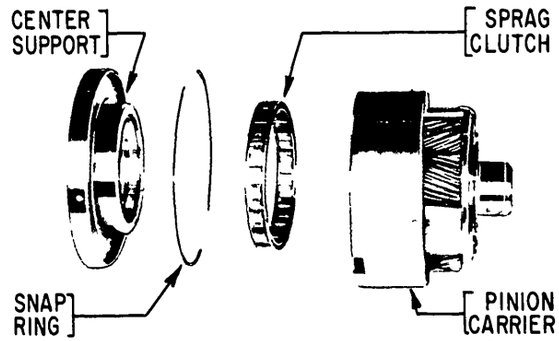
OUTPUT SHAFT & INTERNAL GEAR ASSEMBLY: Disassembly - Remove four piston ring type seals from output shaft. *NOTE - Rings must b remov d singly, starting with rearmost ring.* No further disassembly is required as this unit is serviced only as a complete assembly.

Inspection: Inspect internal gear and parking gear for broken teeth and burrs on thrust surfaces. Inspect output shaft for burrs and scores on bearing surfaces and ring grooves, and inspect rear pump drive keyway and governor drive ball socket for wear. Remove minor burrs and scores with crocus cloth.

Reassembly: Install four oil seal rings on output shaft, starting with foremost ring and working toward rear.

PINION CARRIER: *NOTE - This unit is s rvic d only as a complete assembly.*

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SPRAG CLUTCH ASSY. (RAMBLER & CHECKER)

WARNER AUTOMATIC TRANSMISSION (C ntinu d)

Inspection: Inspect band surface and inner and outer bushings for scores. Rotate pinions on their shafts to check for freedom of movement and worn or broken teeth. Use a feeler gauge to check pinion endplay which should be .010-.020". Inspect pinion shafts for tightness in pinion carrier.

SPRAG CLUTCH (RAMBLER & CHECKER SUPERBA): *NOTE - This unit is mounted within pinion carrier and consists f a sprag clutch assembly, outer race (held in plac in carri r with a snap ring), and an inner race which is part t transmission center support.*

R moval: With pinion carrier removed from transmission case, remove sprag assembly, then remove snap ring retaining outer race in carrier.

Inspection: Check sprag clutch rollers and races for nicks, burrs, scores, or excessive wear. With clutch assembly installed in pinion carrier, install center support, then try to rotate center support in both directions. Center support should rotate freely in one direction and lock up in the other. Center support, sprag clutch, outer race, and snap ring are available for service replacement.

CENTER SUPPORT: *NOTE - This unit is serviced only as an ass mbly.*

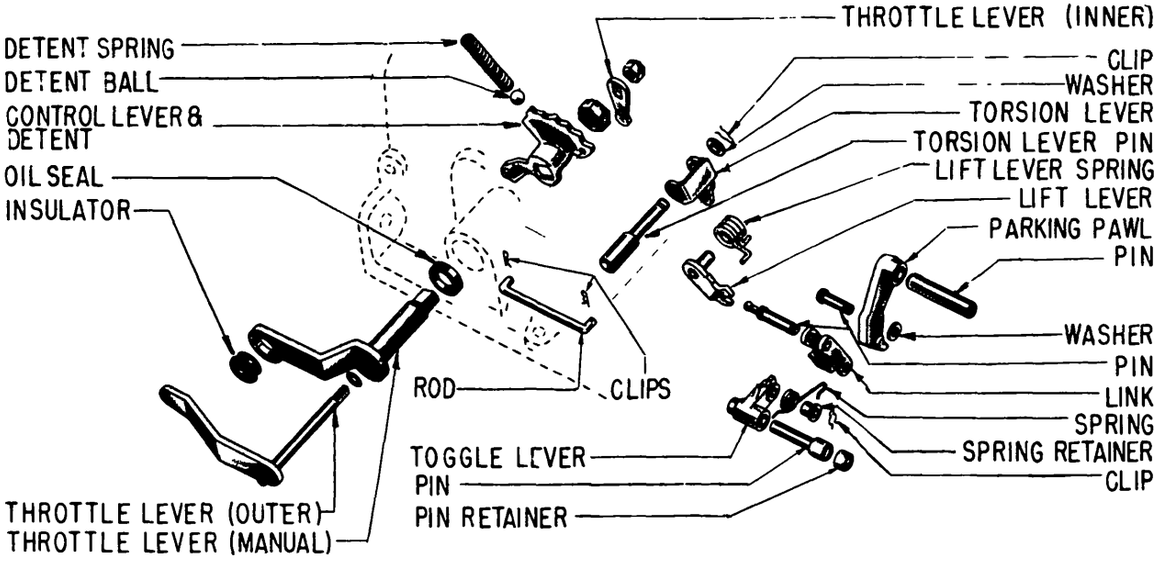
Inspecti n: Inspect support for burrs and distortion, and inspect bearing surfaces for scores and scratches.

GOVERNOR & COUNTERWEIGHT ASSEMBLY: Disassembly - Remove screws and separate governor assembly and counterweight, then remove governor valve body cover, governor valve assembly and flyweight. *NOTE - Tw typ s f gov rnor valves used. One type is a singl piec valv and the other is a three-piece ass mbly consisting f a governor valve, spring, and retain r. On units with a three-piece assembly, the flyweight in gov rnor valve is removable.*

Inspecti n: Inspect mating surfaces of governor valve assembly and counterweight for burrs and distortion. These surfaces must be flat. Inspect all fluid passages for obstructions and check governor valve for free movement in valve body.

Reass mbly: If flyweight is separate, install flyweight in governor body, then install governor valve, spring, and retainer. On both types of assemblies, install governor valve cover and tighten screws to 20-30 inch pounds. On assemblies with a single unit type governor valve, install valve in its bore. On all units, position valve assembly on counterweight so that fluid passages are aligned and plate is toward front of transmission. Tighten screws to 50-60 inch pounds.

FRONT CLUTCH: Disass mbly - Remove clutch cover snap ring and remove turbine shaft and fibre thrust



INNER CONTROL LEVER ASSEMBLY (TYPICAL)

washer from clutch hub. Remove sintered metal clutch plates and steel clutch plates (and clutch hub) from clutch drum. *NOTE - The number of each type of clutch plates used vary with the transmission model. Install only the same number and type plates as removed from unit at disassembly.* Remove clutch pressure plate, then position Tool J-5875 on clutch release spring, then exert sufficient pressure by turning tool nut to compress spring and remove the snap ring. *CAUTION - Front cover snap ring and release spring snap ring are of different thicknesses and are not interchangeable. The thicker spring is installed against clutch release spring.* Remove tool and remove clutch spring. Apply air pressure to clutch inlet hole and force piston out of clutch drum bore. Remove rubber outer piston seal from piston and remove piston metal wear ring. Remove "O" ring seal from hub inside clutch drum.

Inspection: Inspect turbine shaft and clutch hub for burrs on thrust surface, splines, and serrations. Inspect clutch piston for burrs, scores, or cracks. Inspect clutch drum for burrs on thrust surfaces and splines, and the clutch bore for scratches and scores. Inspect clutch release spring for cracks or distortion and clutch pressure plate for cracks and scratches. Inspect steel plates for burrs on serrations and for distirtion. Inspect lined plates for flatness. *NOTE - Replace lined plate when grooves in lining are no longer visible, or if plates are warped.* Remove minor burrs, scratches, or scores with crocus cloth.

Reassembly: Lubricate all parts with transmission fluid before assembly, then install a new "O" ring seal on clutch drum and a new seal on clutch piston, then install piston in clutch drum bore. Press piston down lightly until it bottoms in clutch bore, taking care not to damage outer piston seal. Install metal wear ring on piston. Install clutch spring on clutch piston with concave side upward. Position Tool J-5875 on clutch piston, then exert sufficient force by turning tool nut to compress spring and install the proper snap ring. Remove tool and install clutch pressure plate with smooth side upward. Install clutch hub in clutch drum bore with thrust surface upward. Align serrations of sintered metal plates and steel plates with serrations in hub and clutch drum, then install plates alternately starting with a sintered metal plate. *NOTE - Install th same number of sintered metal and steel plates as r - moved at disassembly.* Coat clutch hub fibre thrust washer with heavy grease to hold it in place and position it on clutch hub. Align serrations of clutch cover and turbine shaft with serrations in clutch drum and install cover and snap ring.

REAR CLUTCH & PRIMARY SUN GEAR ASSEMBLIES: Disassembly - Place rear clutch and primary sun gear assemblies in fixture J-5878 or position it in pinion carrier (if tool J-5878 is not available) with open end of clutch upward. Remove two piston ring type seals from primary sun gear shaft and remove the rear clutch assembly by lifting it off shaft. Remove primary sun gear thrust washer from sun gear shaft and remove two piston type seal rings from shaft. Remove sun gear shaft from fixture or from pinion carrier and remove the two remaining piston ring type seals. *NOTE - These seals are locking type.* Position rear clutch spring compressor J-5886 over clutch spring retainer and exert sufficient pressure by turning nut of tool to compress spring, then remove spring retainer snap ring. Carefully release pressure on clutch spring and tool, then remove tool, spring retainer and spring. Remove pressure plate retainer snap ring from clutch drum and remove clutch pressure plate and sintered metal and

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WARNER AUTOMATIC TRANSMISSION (C ntinu d)

steel clutch plates from drum. Invert clutch drum and tap lightly against bench to remove clutch piston. Remove clutch piston seal from piston and "O" ring seal from clutch drum hub.

Inspection: Inspect primary sun gear and shaft for burrs, scratches, worn ring grooves and broken teeth. Use an awl to check front clutch lubrication ball check valve in front end of sun gear shaft for freedom of movement. Inspect clutch drum for scores on band surface and in piston bore, also check drum for broken serrations, and check needle bearings and bushing for brinnelling and excessive wear. Inspect clutch piston and pressure plate for burrs, cracks, and scratches. Inspect bronze sintered metal plates for excessive wear and if grooves in plate are no longer visible, or if plates are not flat, replace them. Inspect steel plates for scratches or burrs, and check each plate for proper cone or "dish". *NOTE* - Each plate is coned or "dished" .010-.020". Replace any steel plate that does not have proper cone. *CAUTION - If necessary to replace any clutch plate, the entire pack should be replaced.* Inspect clutch release spring for distortion. *NOTE* - Rear clutch plates are different than front clutch plates and are not interchangeable.

Reassembly: Lubricate all parts with transmission fluid before assembly, then install a new clutch piston inner "O" ring seal on clutch drum hub and a new clutch piston outer seal on clutch piston. Install piston in clutch drum bore and press it down lightly until it bottoms in drum, being careful not to damage outer piston seal. Install clutch release spring and retainer and exert sufficient pressure with tool J-5886 to compress clutch spring and install snap ring. *CAUTION - Be sure snap ring is properly seated in groove before releasing pressure on spring.* Remove tool and install the same number of plates removed at disassembly. Start with a steel plate, concave side in upward position, and alternately install sintered plates and steel plates. Make sure serrations in steel plates are aligned with serrations in drum. Install clutch pressure plate with smooth side downward and install pressure plate retaining snap ring. Install two locking piston ring type seals on short end of primary sun gear shaft and place shaft in fixture or in pinion carrier (if fixture not available) with sun gear resting on fixture or pinion carrier. Install sun gear thrust washer, then install two piston ring type seals on sun gear shaft adjacent to sun gear, then position rear clutch assembly on sun gear shaft with open end of clutch upward. *NOTE - Be careful not to break seals on sun gear shaft during installation of rear clutch.* Install two remaining piston ring type seals on shaft.

TRANSMISSION CASE FRONT BUSHING (STUDEBAKER):
Removal - Use tool J-7180 and press bushing out of case toward front of transmission.

Installati n: Break the sharp edge of bushing hole in case, then install front pump assembly on case. Position a new bushing on replacer end of tool J-7180, with open end of bushing oil grooves toward front of transmission. Lubricate outside of bushing, then position bushing and tool in case and press bushing into place. *NOTE - Press bushing toward front of transmission case.*

TRANSMISSION CASE LINKAGE (STUDEBAKER):
Disassembly - Remove inner throttle shaft nut and lever and remove throttle shaft and outer lever. Remove "O" ring throttle shaft seal from counterbore in manual lever shaft. Remove retaining clips from both ends of parking pawl torsion rod and remove rod. Rotate manual lever until detent lever clears detent ball, then remove detent ball and spring. *NOTE - Hold down detent ball to prevent it flying from case.* Remove manual lever shaft nut and remove detent lever and manual lever shaft from case. Pick manual lever shaft oil seal from position in case. Remove torsion lever assembly retaining clip and washer and remove torsion lever assembly from pin in case. Disassemble the assembly by rotating torsion lever out of spring and toggle lift lever. Remove park pawl pin through rear of transmission case by working parking pawl back and forth. Tap toggle lever toward rear of case to remove toggle lever shaft plug, then tilt case to rear and tap case lightly with a plastic hammer to remove toggle lever shaft from case. Remove park pawl as an assembly. Disassemble parking pawl assembly by lifting closed end of park pawl return spring from park pawl link, then remove washer and park pawl pin. Remove retaining clip from toggle link pin and remove pawl return spring, retainer, and toggle link pin.

Inspection: Clean transmission case thoroughly and blow out all fluid passages. Inspect case for stripped threads, obstructed fluid passages, cracks, and the mating surfaces for burrs. Inspect case bushing for scores. Inspect torsion lever pin, torsion lever, toggle lever, inner throttle shaft, detent lever, park pawl pin, toggle lever pin, and park pawl for wear or distortion. Inspect toggle lift lever spring, park pawl return spring and detent spring for distortion.

Reassembly: Place link on park pawl and install pawl link pin and washer and secure in place by positioning closed end of pawl return spring around grooved end of pawl link pin. Assemble toggle lever to link by positioning toggle lever on link, then install toggle link pin, retainer and clip. *NOTE - Coils of pawl return spring should wrap around toggle link pin retainer.* Lift loose end of pawl return spring on top of toggle lever. Place the pawl assembly in transmission case and install pawl pin and toggle lever pin. Use a new toggle lever pin plug, and drive plug into transmission case until it bottoms on toggle lever pin. Place toggle lift lever spring in torsion lever and install lift lever. Rotate levers so that when assembled there is a constant spring pressure against toggle lift lever and torsion lever. Align holes in torsion lever and toggle lift lever and install on pin in transmission case, then install washer and clip. Use a new manual lever shaft seal and position it in transmission case with lip of seal toward inside of case. Tap seal into place with a plastic hammer, then install manual lever shaft in transmission case and position detent lever on manual lever shaft and install nut. Tighten nut to 35-40 ft. lbs. Place detent spring and ball in transmission case and hold pressure against ball while rotating manual lever shaft so lever covers ball. Lubricate a new throttle lever shaft "O" ring seal with transmission fluid and install in counterbore in manual lever shaft. Install throttle lever shaft in transmission case and position throttle inner lever on throttle shaft, then install nut and tighten to 17-20 ft. lbs. Position park pawl torsion rod in torsion lever and detent lever and install retaining clips.

TRANSMISSION CASE LINKAGE (RAMBLER & CHECKER SUPERBA): *NOTE - Linkage is similar to that used on Studebaker models exc pt for throttle linkage details. Parking lever details on Rambler models with Push Button Control are also similar except for the external parking lever.*

TRANSMISSION UNIT INSTALLATION (TRANSMISSION OUT OF CAR)

FRONT PUMP: Install a new pump gasket in counterbore of transmission case and install pump. Align capscrew holes in pump and transmission case and install capscrews. Tighten to 17-22 ft. lbs.

FRONT BAND: Tilt front band and install through bottom of transmission case, positioning band so anchor end is aligned with anchor in transmission case.

FRONT CLUTCH, REAR CLUTCH & SUN GEARS: Place primary sun gear in the bench fixture and install sun gear counter-thrust washer (steel) on rear clutch. Make sure that flats on inside diameter of counter-thrust washer and flats on rear clutch hub are aligned so that counter-thrust washer is fully seated. Install secondary sun gear thrust washer (bronze) on top of counter-thrust washer. Position front clutch on primary sun gear shaft and rotate front clutch to align serrations on bronze clutch plates of rear clutch to permit engagement with front clutch. Install turbine shaft thrust washer on turbine shaft, then install the complete assembly in transmission case. *CAUTION - Do not allow clutch assemblies to separat .*

CENTER SUPPORT: Position center support in transmission case so holes in support are aligned with holes in transmission case and install the two capscrews and lockwashers (these screws are located on outside of case and lockwashers must be installed with rolled edge toward case). Tighten screws to 20-25 ft. lbs.

REAR BAND: Install band in transmission case through rear opening and position band so anchor side of band (anchor side has a depression in it) is toward the adjusting screw.

PINION CARRIER: Install primary sun gear thrust washer on sun gear shaft with cone of inner diameter of washer toward pinion carrier. Align piston ring type seals on sun gear shaft to prevent breakage and install pinion carrier in transmission case. Install out-

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WARNER AUTOMATIC TRANSMISSION (C ntinued)

put shaft front thrust washer on rear of pinion carrier. *CAUTION - In the event transmission endplay was not within specifications (see above), a thinner or thicker washer must be used to obtain proper endplay.* Thrust washers are furnished in the following thicknesses: .061-.063", .067-.069", .074-.076", .081-.083", .092-.094", .105-.107".

OUTPUT SHAFT & INTERNAL GEAR ASSEMBLY: Install output shaft and internal gear assembly so internal gear meshes with pinion carrier pinions.

REAR PUMP: Place rear pump drive key in keyway on output shaft. Install a new rear oil pump gasket on transmission case (hold it in position with petrolatum), then align keyway in rear pump external gear with key on shaft and install pump.

GOVERNOR & COUNTERWEIGHT ASSEMBLY: Place governor and counterweight assembly drive ball in socket on output shaft, then align groove in counterweight with drive ball and install governor and counterweight. *NOTE - This ass mbly is installed with cover plate on valve toward front of transmission case.* Install retaining snap ring.

DISTRIBUTOR (OIL): Lubricate inside of sleeve with transmission fluid and place distributor on output shaft with chamfer in distributor sleeve toward front of transmission. Slide distributor toward front of transmission and compress each seal on output shaft as it enters distributor sleeve. Align three tube holes in transmission case with tubes and insert tubes in case. *NOTE - The steel tube spacer must be on center tube.* Install steel spacer on output shaft, then install speedometer drive gear ball in output shaft and install seal snap ring.

EXTENSION HOUSING: Install extension housing and a new gasket in position on transmission case and install capscrews and lockwashers with rolled edge of lockwashers toward housing. Tighten screws to 28-30 ft. lbs.

REAR SERVO: Install rear servo anchor on adjusting screw and anchor strut on anchor. Rotate band to engage with anchor strut. Install acutating lever strut in band and hold with finger. Place rear servo on transmission case and engage actuating strut with actuating lever. Install attaching capscrews and lockwashers. *NOTE - The attaching capscrew with pointed end is also used to anchor center support to case.* Tighten capscrews to 40-45 ft. lbs.

FRONT SERVO: Rotate front band to engage anchor end of band with anchor in transmission case. Install actuating lever strut with thin end of strut in band and hold with finger. Place front servo in transmission case and engage actuating lever with actuating strut. Engage servo body with dowel on transmission case and install attaching capscrew and lockwasher. Tighten the screw only two or three turns. *NOTE - On Stud baker Taxi models, install th additional fluid r turn tub .*

CONTROL VALVE ASSEMBLY: Install rear pump inlet and discharge tubes in transmission case. *NOTE - The rubber "O" ring on end of inlet tube is installed in rear pump while the rubber "O" ring on discharge tub is installed in transmission case.* Tap each tube lightly into position, being careful not to damage seals. Place control valve assembly on transmission case and insert front servo tubes in control valve. On Studebaker, align throttle valve inner lever and manual lever to engage throttle valve and manual valve, then install attaching screws and lockwashers. On other models, align manual lever to engage manual valve, then install attaching screws and lockwashers. Tighten all capscrews to 8-10 ft. lbs. Tighten front servo capscrew to 30-35 ft. lbs.

PRESSURE REGULATOR VALVE ASSEMBLY: Position regulator valve assembly on transmission case and tighten capscrews to 17-22 ft. lbs. Install large control pressure tube and small compensator in regulator assembly and control valve assembly. Install lubrication pipe in regulator assembly and rear pump, then install regulator valve springs and pilots. Engage tab on retainer with boss on regulator next to gasket flange on transmission case, then, with constant pressure exerted against retainer, engage other tab on retainer with other boss on regulator assembly. Make sure pressure regulator valve springs are properly seated in retainer.

1954-60 CAR MODELS (SYNCHRO-MESH TRANSMISSIONS)

1954-56 BUICK

Place transmission in neutral (in position for shifting into second or third gear), then raise or lower jacket clamp assembly until selector control lever pivot pin clears control shaft lever by 5/8". Tighten clamp securely. Adjust shift rod trunnion so lower control shaft lever is midway in mast jacket opening (transmission in neutral). Adjust selector rod clevis so that with selector rod held to rear, clevis pin will enter hole in selector control lever without moving lever. Check for proper shifting into each gear and check control shaft lever clearance in mast jacket opening.

1957-60 BUICK

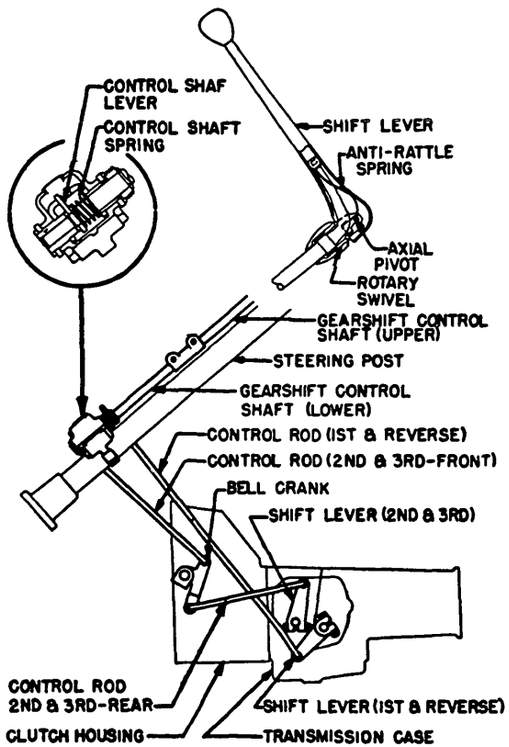
With transmission in neutral (in position for shifting into second or third gear), force adapter assembly against flexible coupling flange, then raise or lower jacket clamp until selector control lever pivot bushing clears control shaft lever by 7/16". Tighten clamp securely. Adjust shift rod trunnion so control lever is midway in jacket opening with transmission in neutral. Adjust selector rod trunnion so that with selector lever (on transmission) and selector rod **both** held to rear of car, trunnion pin will freely enter hole in selector lever, then **lengthen selector rod by rotating trunnion two turns.** Check for proper shifting into each gear and check control shaft lever clearance in mast jacket opening.

1954 CHEVROLET PASS. CARS
1954-60 CHEVROLET TRUCKS

Clearance between lower edge of gearshift lever and top of upper support should be 3/32-1/8" To adjust, remove upper bolt from upper and lower control shaft clamp and remove two screws holding upper support to steering gear housing and remove upper control shaft assembly Screw upper support up or down to proper clearance, then replace the assembly Check clearance between gearshift lever and lower edge of steering wheel rim This clearance should be 2¾"±⅛" (1954 Pass Cars), 2 13/16" ± 1/8" (1954-56 Trucks, except ½-Ton Forward Control), 2 9/16" ± 1/8" (1954-56 ¾-Ton Forward Control), 3¾" ± 1/8" (1957-60 Trucks) To adjust, loosen two gearshift control shaft and housing assembly clamp bolts and move housing assembly with upper and lower control shafts and gearshift lever as necessary for proper clearance, then tighten housing assembly clamp bolts Place transmission in neutral (gearshift lever should be horizontal) If not, loosen second and third speed control rod clamp and adjust as necessary Remove cover on housing and check to make sure that shifter gates in inner levers are aligned If necessary, loosen first and reverse speed control rod clamp and adjust to align shifter gates

1955 CHEVROLET PASS. CARS

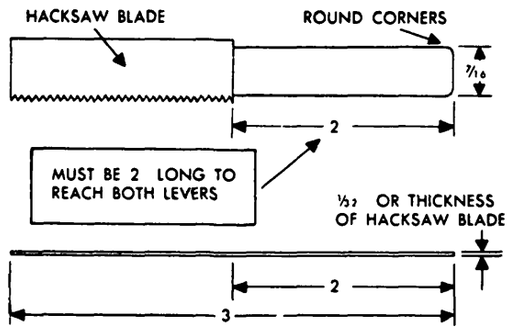
►*1955 CHEVROLET HARD SHIFTING CORRECTION:* **Install Transmission Control Conversion Kit, Part No. 3731061 in mast jacket and shifter shaft assembly, and install new type First & Reverse Gear, Counter Gear, and Reverse Idler Gear.** ***See "1955 Chevrolet Transmission" for installation of these new parts.***



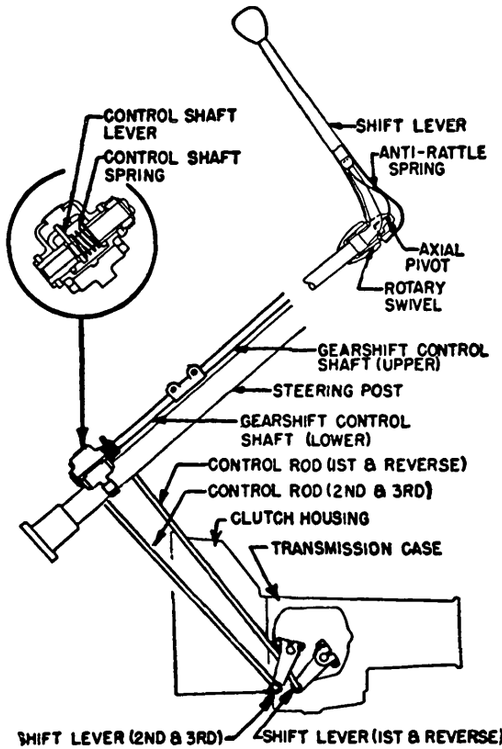
1954-60 CHEVROLET ½ & ¾ TON TRUCK TYPE

To adjust gearshift lever, slide shifter rods into their respective swivel fittings on levers at the control tube. Move shifter rods through swivel fittings until transmission is in neutral and first and reverse lever is at midpoint of its travel (center of slot). Align second and third shifter lever with first and reverse lever and tighten fitting nuts. ***CAUTION - Shifter tube levers must be in line or key will not enter key way in levers.***

►*1955 CHEVROLET SHIFT LEVER ALIGNMENT NOTE: Use special tool as indicated for alignment of 1956-57 shift levers (below).*



1956-57 CHEVROLET GEARSHIFT ALIGNING TOOL



1954 CHEVROLET PASSENGER CAR TYPE

1956-57 CHEVROLET PASS. CARS

Loosen swivel nuts and insert tool (see illustration) in keyway in adjusting ring at bottom of mast jacket, through first and reverse shift lever and second and high lever. Move both control rods until transmission is in neutral (neutral detents must both be engaged to make this adjustment correctly). To check, start engine with clutch disengaged, and release clutch slowly. Tighten swivel nuts and remove aligning tool. *NOTE - To adjust gearshift lever, see 1955 adjustment procedures (above).*

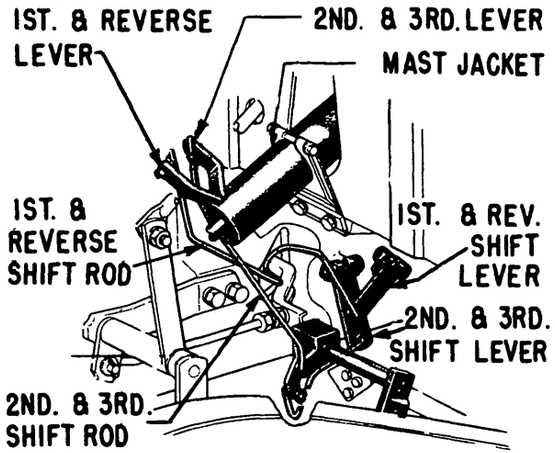
1958-60 CHEVROLET PASS. CARS 3-SPD. TRANSMISSION

Disconnect both control rods and place transmission in neutral (neutral detents in transmission must both be engaged). Check to be sure by starting engine with clutch disengaged, then slowly release clutch. Move selector lever to neutral position, then engage second and third shifter lever on tube with relay lever. Center levers in mast jacket by measuring from edge of slot in jacket to edge of slot in spacer at each side of lever. Adjust swivel on end of second and third shifter control rod until swivel enters hole in lever. Install swivel and insert retaining clip. Move first and reverse lever ontube until lug on lever lines up with slot in relay lever (pull relay lever to make sure lug mates with slot).

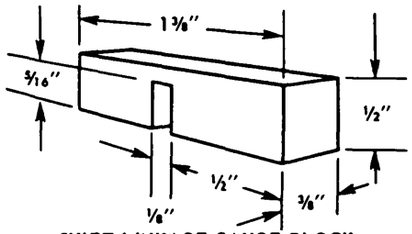
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1954-60 CAR MODELS (C nt.) (SYNCHRO-MESH TRANSMISSIONS)

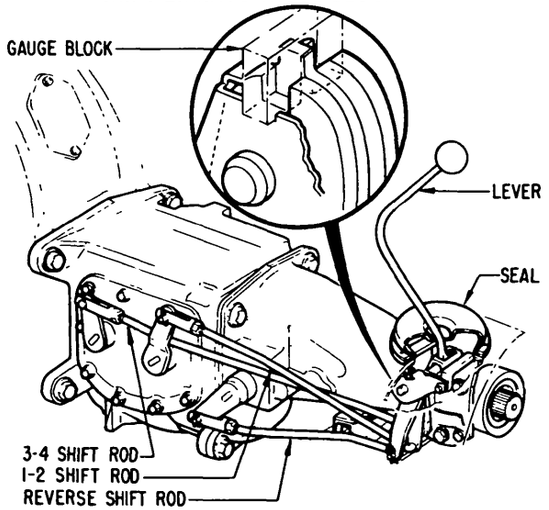
Adjust swivel on end of control rod until swivel enters hole in lever, then install swivel and retainer clip. Check selector lever in all positions for proper operation.



1955-57 CHEVROLET TRANSMISSION SHIFT LINKAGE



SHIFT LINKAGE GAUGE BLOCK



1958-60 CHEVROLET PASS. CARS & CORVETTE 4-SPD. TRANSMISSION

►*NOTE: The gauge block illustrated below will aid in adjustment, however, the adjustments can be made by having an assistant hold manual shift lever in neutral position.* Remove transmission gearshift lever seal from floor pan, then place transmission in neutral and install gauge block (see illustration). Remove cotter pin, anti-rattle washer and clevis pin at each shift lever. On each shift rod, adjust threaded clevis to permit free entry of clevis pin into hole in transmission shift levers. Reconnect clevises to shift levers, then remove gauge block and check shifts. If any roughness exists, determine which rod requires adjustment by sighting along slot in which gauge block used.

1960 CHEVROLET CORVAIR

Loosen universal joint clamp nut at transmission end of shift shaft, then move manual shift shaft on transmission so transmission is in first speed position. Hold selector lever and tighten universal joint clamp bolt. Check shift in all positions.

1960 COMET & FALCON

With transmission selector lever in neutral, remove cotter pins and felt washers from connecting rod adjusting sleeves, and pull sleeves out of gearshift levers. Loosen locknut on each sleeve, then slide sleeves up or down on rods until smooth crossover operation results when sleeves are attached to levers. Tighten both locknuts securely.

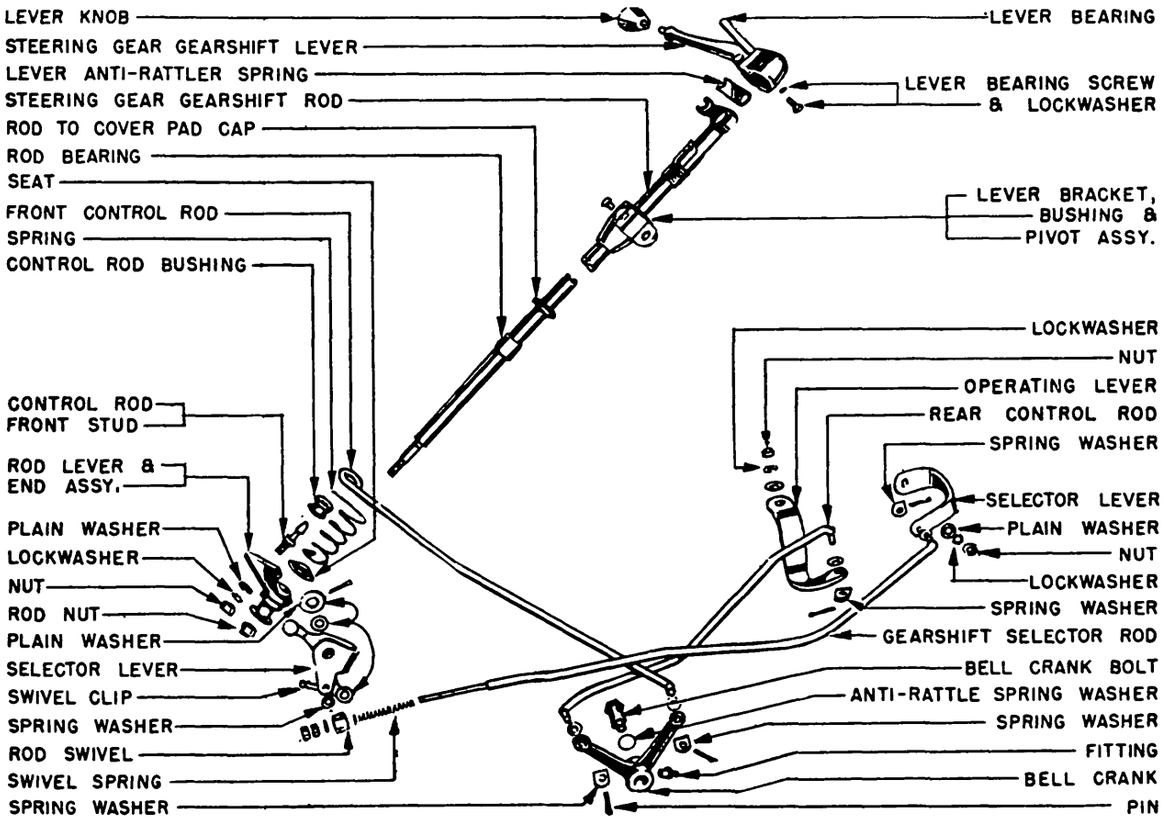
1954-56 CHRYSLER, DESOTO, DODGE & PLYMOUTH

Make sure transmission is in neutral position, then place gearshift rod or tube in its normal fully returned position. Adjust crossover linkage to secure 3/8-5/8" freeplay crossover movement of the gearshift knob when transmission is in high gear position. Adjust at selector rod and swivel so that selector rod swivel pivot end can be placed freely into selector lever hole (when selector lever is approximately 1/16" back from contact with the shift fork), with no tension or compression of selector rod. *NOTE - Transmission manual control shift lever should lie in a horizontal position when transmission gears are in neutral.*

1957-60 CHRYSLER, DESOTO, DODGE & PLYMOUTH

►*1959 PLYMOUTH TAXICAB TRANSMISSION SHIFT INTERLOCK PRODUCTION CHANGE (To prevent transmission lockup in low gear under abnormal operating conditions):* A new interlock on upper spool and

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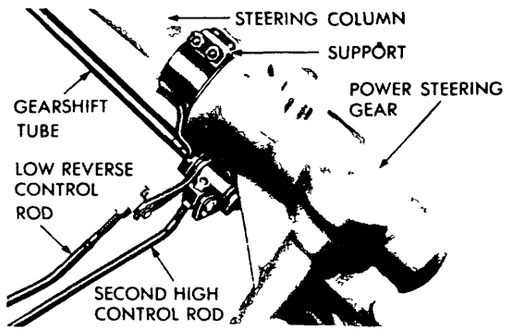
1954-56 CHRYSLER, DESOTO, DODGE, PLYMOUTH TRANSMISSION CONTROLS

1954-60 CAR MODELS (C nt.) (SYNCHRO-MESH TRANSMISSIONS)

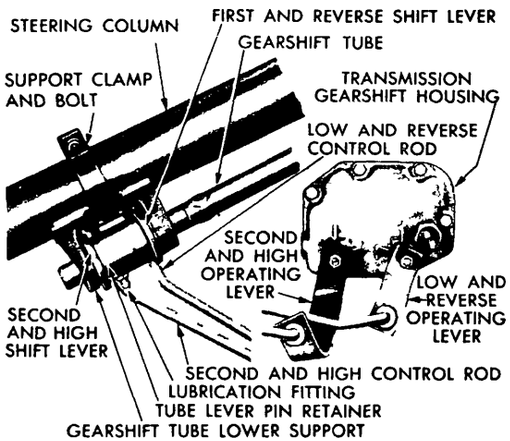
lever assembly (at lower end of steering column) will retain low and reverse shift lever in neutral position while shifting into second and high gear Adjust as follows

Interlock Linkage Adjustment - With engine idling, clutch engaged, and transmission in neutral, pull up and push down on first-reverse shift tube lever at swivel using about a 10 lb force If transmission gears clash while pushing down, the swivel block must be moved upward on shift rod If gears clash while pulling up, swivel block must be moved down If properly adjusted, there will be no gear clash

Crossover Adjustment - Adjust second-third shift rod to match lever pin slots to provide a smooth crossover feel During crossover, the transfer of crossover pin from second-third lever to first-reverse lever should be hardly noticeable



1957-60 CHRYSLER, DE SOTO, DODGE & PLYMOUTH GEARSHIFT CONTROL (POWER STEERING CARS)



1957-60 CHRYSLER, DE SOTO, DODGE & PLYMOUTH GEARSHIFT CONTROL (MANUAL STEERING CARS)

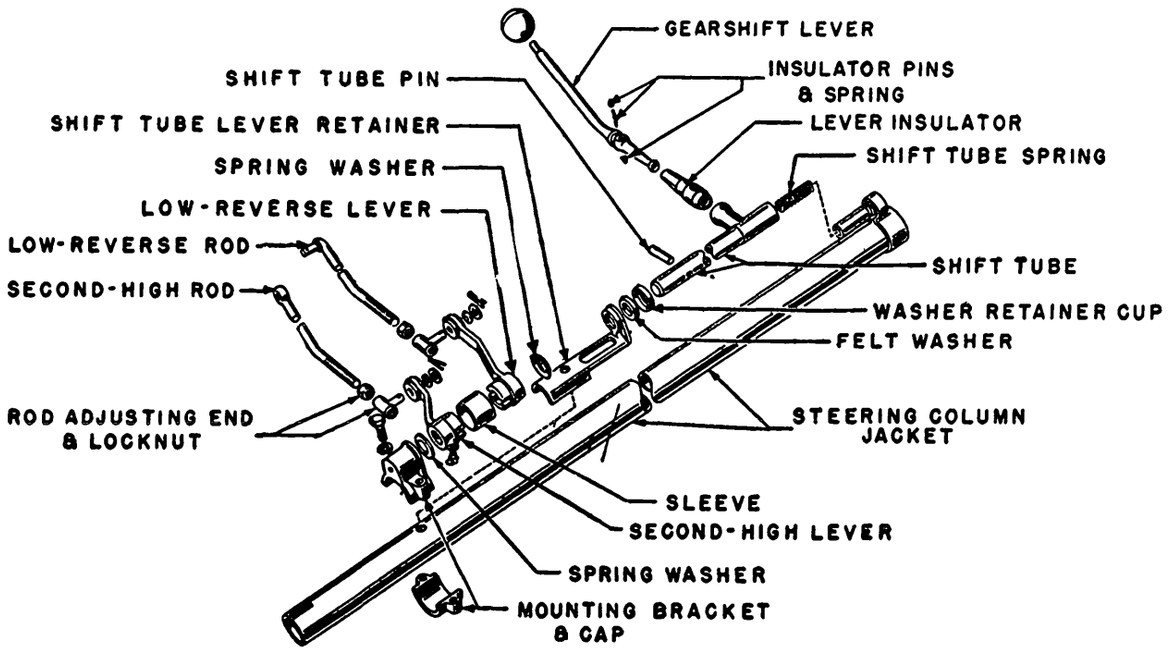
►*NOTE All adjustments must be made in the sequence indicated below*

Cr ss v r Adjustm nt: *NOTE - Before making this adjustment, the "second & high" and the "low & reverse" operating levers, located in transmission gearshift housing, must be positioned in their middle detents or their neutral positions* After removing lubrication fitting from tube lever pin retainer, rotate retainer until gearshift tube cross pin is exposed If a .040" round feeler gauge cannot be inserted between gearshift tube cross pin and bottom of slot in "second & high" shift lever hub, an adjustment at gearshift tube lower support must be made as follows Loosen gearshift tube lower support screws sufficiently to permit movement of support when support is lightly tapped with a plastic hammer Adjust support up or down as required to secure .040" clearance Tighten support clamping screws to 150 inch pounds (90 inch pounds for power steering equipped units) Rotate tube lever pin retainer to original position and install lube fitting *CAUTION - Be sure lube fitting is securely installed to 70 inch pounds Loss of fitting will permit tube lever pin retainer to rotate, resulting in loss of gearshift tube cross pin* After completing adjustment, approximate equal up and down free travel of gearshift lever should be provided in either "second & high" or "low & reverse" gear positions Check crossover adjustment at manual lever by making the crossover from "second & high" to "low & reverse" Crossover movement should be free of interference

Control Rod Adjustments (Plymouth): Position upper "second & high" control rod swivel adjusting nut so it is secured approximately 1 3/16" from threaded end of rod *NOTE - This is a basic adjustment and is most important in obtaining complete low g ar dis ngagement wh n transmission is fast shifted or compl te clutch disengagement is not provided wh n shift is made* Adjust "low & reverse" control rod swivel so that an entirely free up and down movement of gearshift lever is obtained When this point of complete free movement for cross pin has been determined, tighten "low & reverse" control rod swivel nuts slightly and then turn both upper and lower adjusting nuts clockwise approximately two turns Make certain all control rod swivel adjusting nuts are securely tightened, then road test for proper shifting operation

Control Rod Adjustment (Exc. Plym uth): With transmission in neutral, loosen and back off adjusting nuts at "second & high" gearshift control rod swivel Place knob end section of manual control lever (in car) in a horizontal plane Adjust nuts at swivel block to retain gearshift lever in a horizontal position, then tighten nuts to 70 inch pounds, making sure transmission remains in neutral Loosen and back off adjusting nuts at "low & reverse" gearshift control rod swivel, then position "low & reverse" gearshift lever in direct alignment with "second & high" gearshift lever (through center of swivel block pin) Tighten adjusting nuts to 70 inch pounds Again check crossover operation for interference *CAUTION - Failure to make this adjustment correctly will result in insufficient manual lev r-to-steering column clearance Incomplete ngagement of transmission may result, causing damage to gears*

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TYPICAL 1954-58 FORD PASS. CARS & 1954-60 F-100 TRUCK TRANSMISSION CONTROLS

1954-60 CAR MODELS (C nt.) (SYNCHRO-MESH TRANSMISSIONS)

1958 EDSEL 1954-58 FORD PASS. CARS 1954-60 FORD TRUCKS 1954-58 MERCURY 1955-57 THUNDERBIRD

With transmission selector lever in neutral, remove cotter pins and flat washers from shift rod ends and pull rods out of gearshift levers at lower end of steering column. Rotate rod ends as necessary to place gearshift levers in same plane when rod ends are assembled to levers Check gearshift selector lever for free movement.

1959-60 EDSEL

With transmission selector lever in neutral, loosen locknuts securing shift rods to shift levers, then insert a ¼" rod through holes in shift levers so both levers are in same plane With both transmission levers in neutral and both shift levers in same plane, tighten locknuts on shift rods, then remove ¼" pin *NOTE* - When linkage adjustments are correct, selector lever can be moved slightly forward or rearward without encountering a noticeable step or binding condition

1959-60 FORD

With selector lever and transmission gearshift levers in neutral, loosen both sleeves on connecting rods, then with selector lever in a horizontal position, tighten high and intermediate sleeve Tighten low and reverse sleeve in a position so that smooth crossover operation is possible

1959-60 MERCURY

Position transmission shift levers in neutral, then with transmission shift levers on steering column centered in steering column tube slot, rotate each clevis in or out until clevis pins freely enter holes in shift levers Install each clevis on shift rod *NOTE - With transmission in neutral, selector lever should move forward and backward without binding* Tighten locknut on shift rod ends, then install washers and hairpin retainers on gearshift lever studs

1958-60 THUNDERBIRD

Place gearshift levers in neutral position, then remove cotter pins and flat washers from connecting rod adjusting sleeves and pull sleeves out of gearshift levers Rotate sleeves as necessary so crossover movement is smooth when selector lever is moved to its various positions (with sleeves connected)

1954 HUDSON

With gearshift selector lever in neutral, back off trunnion locknuts on transmission shift rods at lower end of steering column. Insert a ¼" rod through holes in both shift levers, engaging slot in the control tube lower bracket (to lock levers in neutral position) Move the two outer shift levers on outside of transmission by hand to make sure the lock balls are fully seated in neutral detents of the shift shafts. Rotate trunnion locknuts on control rods until they contact each side of trunnion, then tighten nuts, being careful not to change position of rods or transmission shift levers

1955-57 HUDSON

►*NOTE For adjustment on these models, see "1954-57 Nash" below.*

1955-57 HUDSON 1954-57 NASH

With shift lever in neutral, lock shift levers at lower end of steering column by inserting J-1390 Aligning Tool through hole in mounting bracket and hole in each lever. Disconnect shift rods at levers on side of transmission case and check to see that transmission gears and shifter levers are in neutral. *NOTE - Determination of neutral position by full depth engaging notches of shifter shaft cams.* Adjust transmission end of each shift rod so that rods can be connected without changing position of levers. Reconnect rods and check operation of gearshift lever for smooth up and down action in neutral.

1954-56 OLDSMOBILE

►*NOTE: For proper adjustment, both the shift lever and the selector rod must be adjusted as follows·*

Shift Lever - Set transmission case shift lever in neutral position. Measure distance (horizontally) from center of gearshift selector lever knob to horizontal centerline of steering wheel. If this distance is not 1¼" (1951-53), 2" (1954), 2 11/16" (1955), adjust by removing clevis pin on forward end of shift rod and adjust clevis on rod.

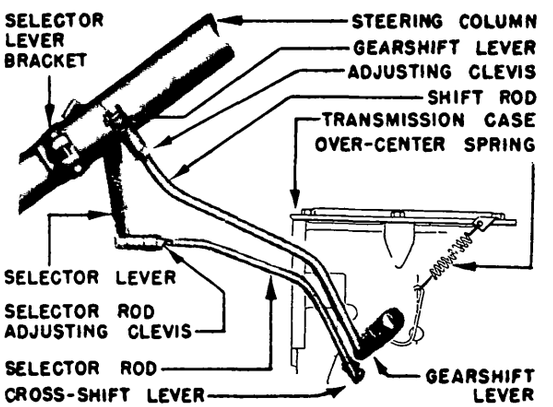
Selector Rod (Cross-shift) - Place gearshift lever in neutral position, then disconnect selector rod at cross-shift lever on steering column. *NOTE « Make sure that selector lever on transmission case is fully back against its rear stop.* Adjust clevis on forward end of selector rod so that clevis pin enters clevis and cross-shift holes freely, then lengthen rod by turning clevis three full turns. Connect rod to lever.

1957-60 OLDSMOBILE

Place transmission case outer shift lever in second gear position (outer lever forward, inner lever rearward), then disconnect shift rod from steering column shift lever Hold steering column shift lever upward against its stop in mast jacket and adjust clevis so that pin enters clevis and lever freely, **then shorten rod by three full turns (1957-58); 5½ full turns (1959-60).** Install clevis pin and cotter pin, then tighten clevis locknut

1954-57 PONTIAC

When gearshift lever is in neutral position, clearance between lever and steering wheel should be approximately 3 7/16" (1954), 3½" (1955), 3¼" (1956-57) To adjust, hold transmission selector rod in its rearward position (second & third normal position) and adjust selector rod trunnion for proper gearshift lever position Neutral position of gearshift lever should be 9° (1954), 18° (1955), 13° (1956-57) above horizontal To raise or lower lever, adjust length of gearshift control rod (trunnion connected to upper shift lever at bottom of steering column) as necessary



1954-58 OLDSMOBILE TRANS. CONTROL

1958 PONTIAC

Place both lower steering column shift levers in neutral position and both shift levers on transmission in the neutral detent. Adjust shifter rods by adjustment provided at shifter rod swivels until gearshift selector lever is approximately 13° above horizontal position.

1959 PONTIAC

Place Gauge J-7883 over lower guide support screws on steering column jacket (gauge holds both levers and upper gearshift lever.in proper position for rod adjustment) With shifter levers held on neutral position and transmission shift levers in neutral detent, adjust rods as necessary by rotating adjusting nuts at both sides of trunnions After removing gauge, check movement of gearshift lever in neutral A slight readjustment may be necessary because of clearances in linkage

1960 PONTIAC

Insert Gauge J-8638 between second-third shift lever and key (at lower end of steering column) to place tangs of both second-third and first-reverse levers in key slot and locate both levers in true neutral position in window of mast jacket End of notch in gauge should seat against tang of second-third shift lever and gauge must seat into window opening in mast jacket *NOTE - This gauge must be used to assure smooth movement of key slot from one lever tang to the other and to make sure levers will not bottom at top or bottom of window opening when shifts are made* Lubricate all linkage joints, then with gauge in place and transmission levers in full neutral detent, adjust second-third shifter rod trunnion at idler lever and first-reverse trunnion at transmission lever Tighten trunnion locknuts to 5-10 ft lbs and remove gauge Check shift pattern movement with engine not running, then start engine and make all shifts

1954-58 RAMBLER 1958-60 RAMBLER AMERICAN

With transmission selector lever in neutral, disconnect shift rods at swivel ends of rods and place a 3/16" diameter rod through holes in gearshift operating levers and grooves in bearing housing. With tool in position, adjust trunnions at lower end of rods to permit trunnion pins to enter grommet in transmission lever freely. Remove aligning tool and check for free operation of both levers.

1959 RAMBLER (EXCEPT AMERICAN)

Place gearshift in "High" position, then disconnect shift rods at transmission levers being careful not to move transmission out of "High" position Pull second-high shift rod to make sure gearshift operating lever is against bottom of bearing housing Hold rod in that position and adjust trunnion to align with holes in second-high transmission lever, **then lengthen rod by turning trunnion eight or more turns** to insure a full gear engagement without interference with other parts

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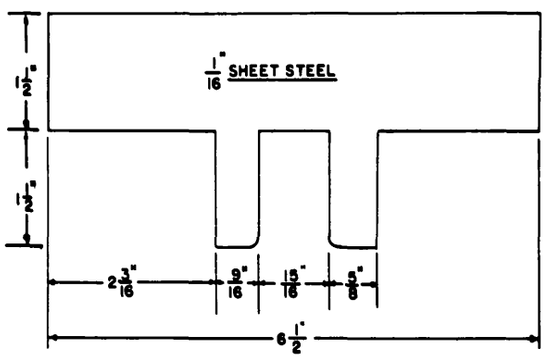
1954-60 CAR MODELS (C nt.) (SYNCHRO-MESH TRANSMISSIONS)

Lubricate trunnion and secure to transmission lever with cotter pin. Place second-high operating lever in neutral, then install a 3/16" pin in small holes in operating levers. With both transmission shift levers in neutral position, adjust trunnion on low-reverse gearshift rod to align with hole in transmission shift lever. Lubricate trunnion and secure in lever with cotter pin. Remove pin and check gearshift for smooth operation in all gears.

1960 RAMBLER (EXCEPT AMERICAN)

►*NOTE: Two types of controls used in production as follows:*

Amsworth Type - Shift levers are actuated by a shift gate slot engaging pin on shaft lever. To adjust, remove pins from gearshift rod trunnions and transmission levers and disconnect rods. Line up both levers at lower end of steering column and insert a 7/16" screwdriver blade between upper shift lever and shift gate, then pry gate downward to align lower lever pin with upper lever pin and lock both ends of lever pins in slot in shift gate. Insert Tool J-8698 between second-high shift lever and shift gate and remove screwdriver. Move operating levers and aligning tool down until bottom edge of tool contacts cutout section of jacket tube (this is neutral position). Adjust trunnions on rods so they freely enter into transmission shift levers (with shift levers in neutral). Install retaining washers and pins and lubricate trunnions with light oil, then remove tool and lubricate operating levers, lever spacer and nylon bushing at bottom of steering jacket tube.

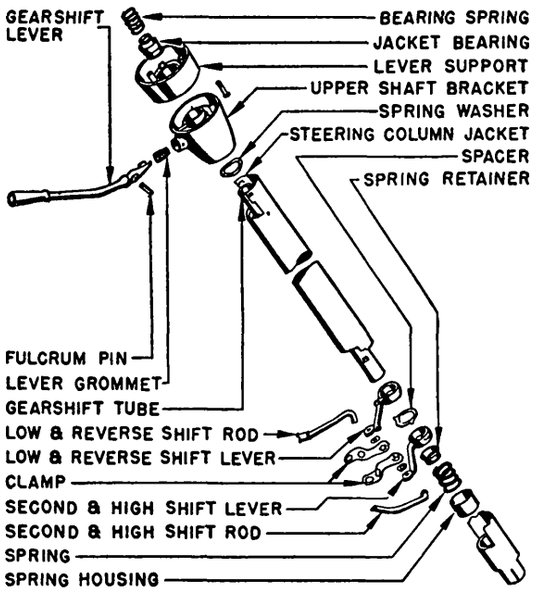


RAMBLER ADJUSTING TOOL (2ND TYPE CONTROL)

Douglas Typ - Shift levers are actuated by lugs on shifter tube engaging in shift levers. To adjust, raise car on a hoist and disconnect shifter rods at transmission levers, then place transmission levers in neutral detent position. Install Aligning Tool J-9230 (fabricate tool locally as indicated in illustration, bending it into a 2 1/8" circle to fit around jacket tube) on bottom of jacket tube to hold both operating levers in neutral position. Adjust trunnions on both shifter rods to line up with holes in transmission shift levers, then secure trunnions with flat washers and cotter pins. Remove tool and check shift lever operation.

1954-60 STUDEBAKER

Disconnect both transmission gearshift rods at transmission and place transmission shift levers in neutral position. Locate center of travel of gearshift selector lever and have an assistant hold the lever in this position with the low-reverse gearshift lever engaged (selector lever moved toward steering wheel while still in the center position). Adjust low-reverse rod so there is no freeplay in rod and clevis pin will enter shift lever with a slight drag on forward side of hole. Reconnect rods at transmission and tighten locknuts. If interference is noted at the crossover point, the low-reverse rod may be shortened one or two full turns.



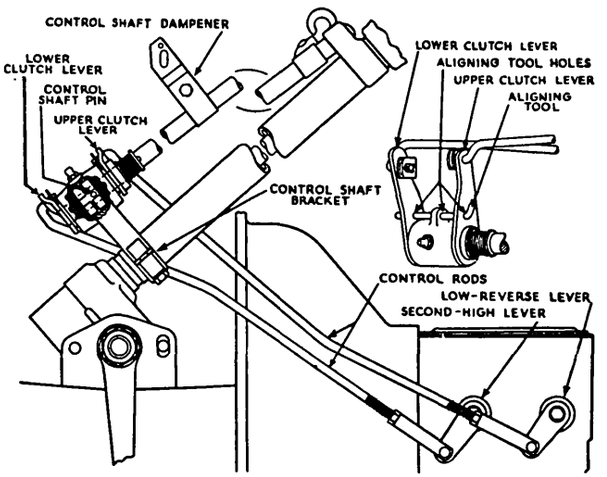
STUDEBAKER TRANSMISSION CONTROL (TYPICAL)

1954-60 WILLYS 2-WHEEL DRIVE MODELS

Place shift levers in neutral position and disconnect both control rods at transmission levers. On all models except those with 6-226 Engine, install a ¼" rod through aligning holes in steering column. On models with 6-226 Engine, position Tool W-259 on slot and insert a 3/16" rod through steering column shift levers and index rod in slot at top of gauge. On all cars, adjust steering column end of shift rods so that lower ends will enter transmission levers freely. If shift pin strikes edges of slot in lever clutches disconnect low-reverse control rod at transmission lever (rear lever) and lengthen or shorten rod slightly so pin will engage both slots freely.

1958-60 WILLYS FORWARD CONTROL MODELS

With gearshift lever in neutral, loosen jam nut at rear end of remote control rods, then remove rods from transmission shift levers. Make sure levers on transmission are in neutral position, then adjust length of control rods so they easily slip into holes in transmission shift levers. Replace cotter pins and tighten jam nuts and check shift for smooth operation.



WILLYS TRANSMISSION CONTROL (TYPICAL)

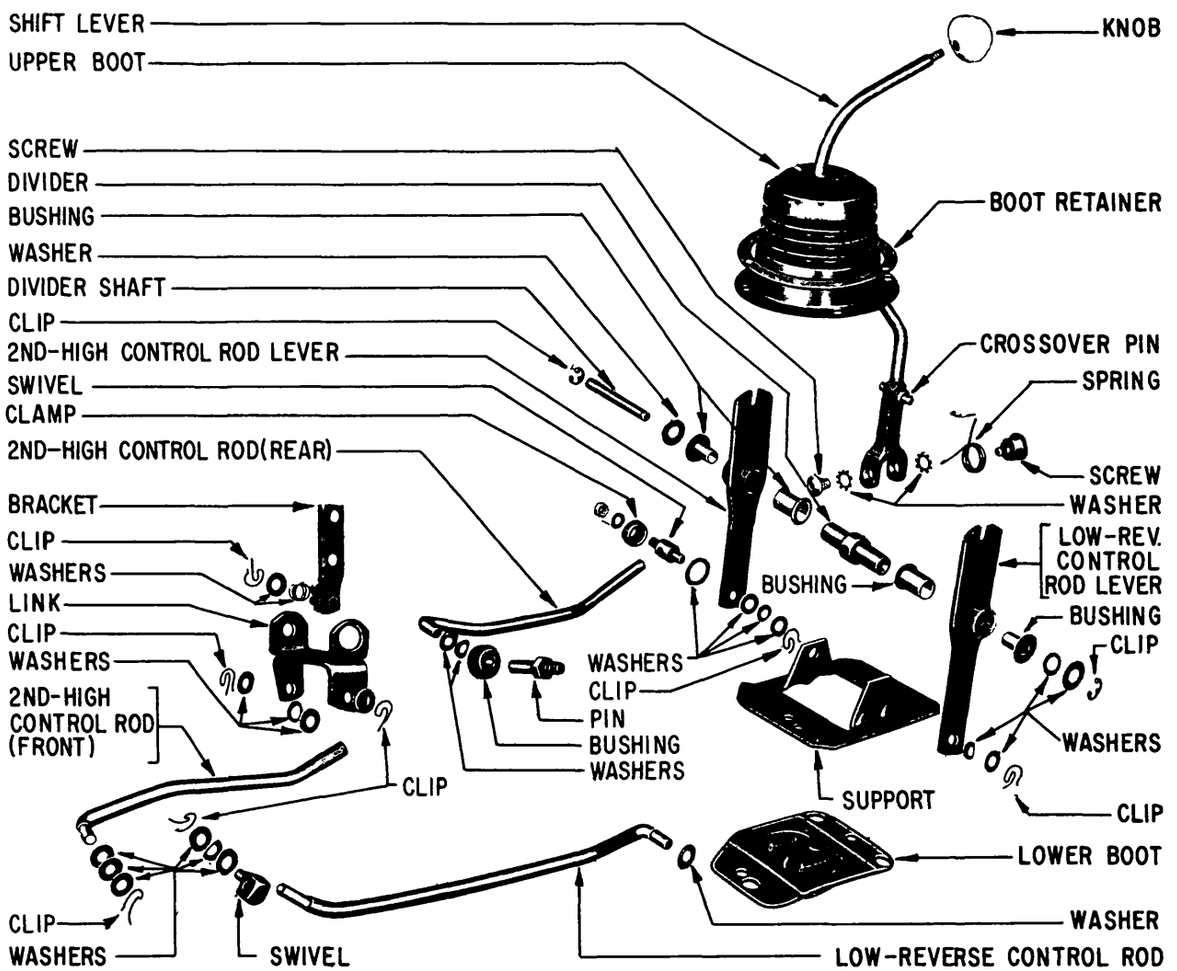
VALIANT SYNCHRO-MESH TRANSMISSION CONTROL

Valiant (1960)

VALIANT: Linkage Adjustment - Remove screws holding upper boot and retaining ring to floor pan, then remove retaining ring and slide boot up shift lever far enough to expose shift assembly. Disconnect shift rods from control rod levers by removing spring clips, flat washer and wave washer. Place transmission shift levers (on transmission) in neutral position, then slide a wedge between second and high control rod lever and gear shift fork to position cross-over pin partially in the first and reverse and second and high control rod levers. *NOTE - This will lock gear shift lever and control rod l v rs in n utral position.* Loosen swivel locknut on end of first and reverse shift rod and turn swivel block as necessary to position hand shift lever and control rod lever in neutral position. *NOTE - Control rod l ver should b at right angle to floor pan when in th corr ct n utral p sition.* Loosen clamp nut holding second and high shift rod in swivel block and slide block to front or rear on rod until stub shaft on block can be inserted into second and high control rod lever. Coat swivel stub shaft with Lubriplate, then install in lever and secure with flat washer and clip. After correct position of both first and reverse and second and high control rod levers has been obtained (right angle to floor pan), slide first and reverse shift rod into lever after lubricating with Lubriplate. Secure with wave washer, flat washer and spring clip. With levers on transmission in neutral, tighten clamp nut that holds second and high rod in swivel to 100 inch pounds. Remove wedge and replace boot and retainer ring. With linkage properly adjusted, the crossover action should be smooth, and shifting into gears should not bind.

OVERHAUL

REMOVAL & DISASSEMBLY: Disconnect both shift control rods from shift control levers (note position of wave type washers), then remove upper boot retainer and slide boot up shift lever. Remove bolts attaching gearshift assembly to floor pan and remove the complete assembly including lower boot from car. Slide lower boot off levers. Use a ¼" Allen wrench and remove torsion spring retaining screw. *CAUTION - This spring is und r spring t nsi n.* Slide star washer out from under spring, then use a screwdriver and pry lower end of spring out of hole in divider shaft. Disengage upper loop of spring from shift lever. Remove remaining Allen screw and lockwasher holding shifter fork to the divider. Slide gearshift lever fork from divider shaft and shift levers. Remove lock ring from each end of divider shaft and push divider shaft out of gearshift support. Pull levers, divider, and bushing assemblies from gearshift support. *NOTE - Flat washers between out r bushings and g arshift support will drop out at this time.* Separate levers from divider and remove nylon bushings.



VALIANT SYNCHRO-MESH TRANSMISSION CONTROL ASSEMBLY

REASSEMBLY & INSTALLATION: Check all parts for wear and damage and replace as necessary. Lubricate all parts that pivot with Lubriplate. Slide each lever on the divider with narrow shoulder (and nylon bushing bearing surface) down against shoulder. Slide outer bushings into position against outer shoulders, then place lever assembly in position in gearshift support bracket. Slide spacer washers between support bracket and nylon bushing shoulders, then align divider shaft hole. Slide divider shaft into support, through shift lever assembly and out of support, on other side, far enough to install retaining lock rings. Position shift fork screw holes (in the divider) parallel with centerline of divider shaft. Now, slide gearshift fork and shaft down into position on divider shaft with gearshift knob facing to rear and toward the three holes in support plate. Install shift fork retaining screw and lockwasher (front). Do not tighten at this time. Engage loop of torsion spring with gearshift fork shaft, then slide other end into hole at bottom of divider. Install spring retaining screw and lockwasher and tighten both screws securely. Slide lower boot up over shift levers, being sure screw holes are aligned. Slide a wedge between second and high shift lever and gearshift fork, then install the assembly in car. Install attaching bolts and tighten to 150 inch pounds. Adjust linkage (see above), then install upper boot and retainer.

1954-58 WARNER 3-SPEED TRANSMISSIONS

Hudson (1954-57)
Nash Ambassador (1954-57)
Packard (1957-58)
Rambler (1954-58)
Studebaker, All Models (1954-58)
Willys, All Models (1954-58)

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 STUDEBAKER CHAMPION HARD SHIFTING INTO REVERSE CORRECTION (CARS WITH OVERDRIVE TRANSMISSION):* This condition occurs when shifting into reverse when overdrive button is pushed "IN", and and can be corrected by installing Low & Reverse Outer Shift Lever, Part No. 1546796, and Low & Reverse Shift Lever Shaft Assembly, Part No. 1547-57. Do not use these new parts on earlier transmissions.

►*1958 STUDEBAKER TAXICAB GEAR CLASHING CORRECTION:* Gear clashing may be caused by insufficient travel of clutch, even though clutch pedal free freeplay is correct. To correct, install Clutch Operating Shaft & Lever Assembly, Part No. 1546329. This new part is used in production beginning with Car Serial No. G-1428648.

►*1958-60 AMBASSADOR TRANSMISSION CHANGE FOR IMPROVED SHIFTING:* To decrease shifting effort from Low to 2nd. Gear, longer shift lever (Second & High Gear Shift Lever Part No. 3155833) can be installed to replace original low and reverse lever. *NOTE* - This longer lever used in production on later cars.

►**"CENTERED RING GEAR" TYPE OVERDRIVE:** These units do not have driveshaft front bearing (see illustration for location of this bearing) and shaft is piloted at the planetary ring gear in a flange which is integral with overdrive case.

►**Willys 4-Wheel Drive Transfer Case**—Two-speed Spicer or Warner Transfer Case mounted on transmission with transmission mainshaft rear bearing mounted in transfer case housing. See "Warner & Spicer Transfer Case" for data.

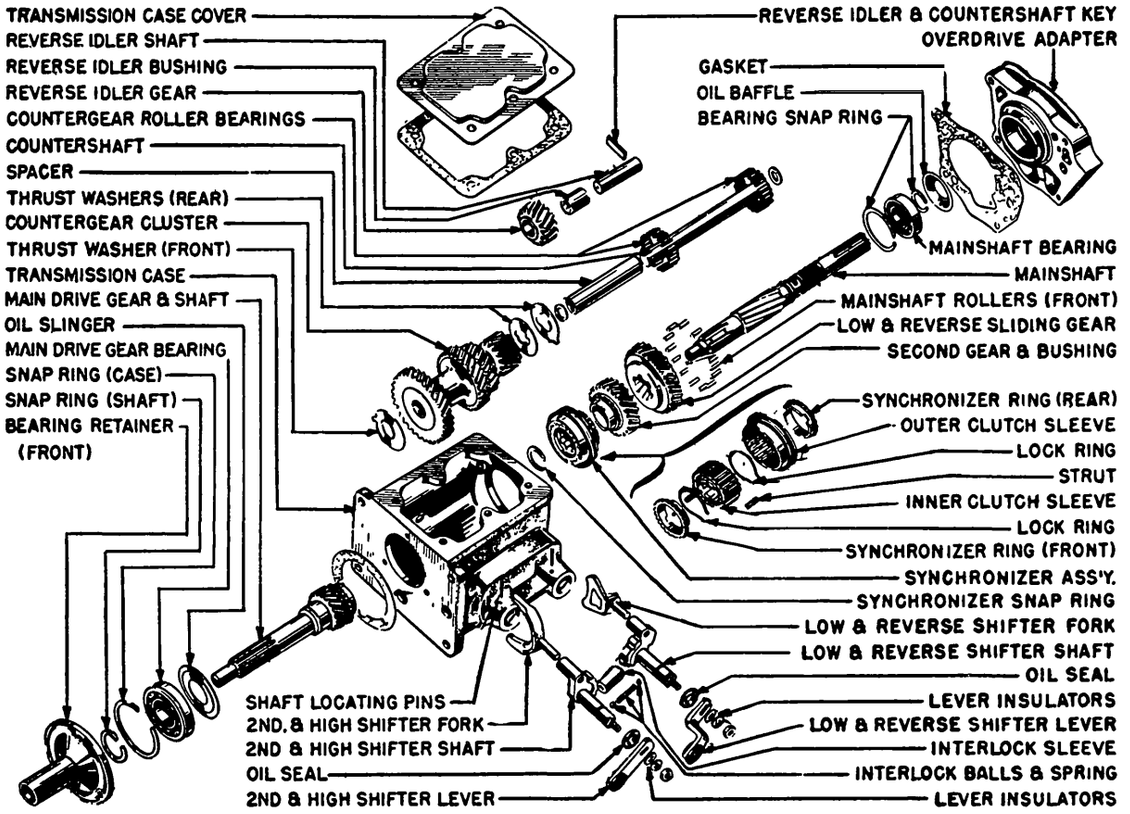
►***CAUTION—Transfer case must be partially dismantled before it can be removed from transmission.***

DESCRIPTION: 3-Speed, all helical gear type (except Willys 4-Whl. Dr. & Truck—See Note). Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Synchronizers are double blocker, double spring type.

Willys 4-Whl. Drive & Truck Note—Transmission has spur type sliding gear and floor-mounted gearshift (entire gearshift mechanism lifts off as unit with top cover). Transfer case is mounted on rear end.

REMOVAL OF TRANSMISSION: ***See "Transmission" on car model page.***

DISASSEMBLY OF TRANSMISSION (With Overdrive) Remove overdrive case ***(see "Warner R-10 Overdrive" following)***, and then proceed as outlined in DISASSEMBLY OF TRANSMISSION (Without Overdrive), below.



TYPICAL WARNER TRANSMISSION (WITH OVERDRIVE)

►**LOW & REVERSE SHIFTER FORK REMOVAL & INSTALLATION CAUTION**—Mark position of shifter fork to indicate if "offset" of fork is to front or rear, and install fork in transmission in same position at reassembly.

DISASSEMBLY OF TRANSMISSION (Without Overdrive): Take out cover screws, remove cover and gasket. Mark synchronizer parts (rings, sleeve, hub) to insure reassembly in same relative positions. Take out capscrews and remove bearing retainer on front of case. On Studebaker & Nash, take out bearing snap rings on bearing and shaft, install special Synchronizer Ring Protector J-3042 (Nash Ambassador), J-1525 (Stude. Champ. 1946), J-2040 (Nash Rambler 1952-58 & Stude. Champ 1952-58), J-2039 (Stude. Comm.) to prevent damage to synchronizer, use Puller HM-925 and Adapter Plate J-1298 (Studebaker), and Puller J-1298N (Nash) to remove bearing from shaft. (NOTE—on other cars, gear and bearing assembly can be removed after countergear cluster has been dropped to provide clearance). Take out rear bearing retainer capscrews, remove bearing retainer from shaft (on models where bearing mounted in recess in retainer, pry retainer out so that puller can be engaged, and use puller to remove retainer). Slide speedometer gear off main shaft (if gear does not come out with retainer and bearing assembly). Tip main shaft toward right as far as possible (on models where rear bearing mounted directly in case, move shaft to rear until bearing clears case), disengage Second & High Speed Shift Fork and Low & Reverse Shift Shoe ***(CAUTION—Mark Low & Reverse Shift Shoe so that "offset" in shoe can be installed in correct position at reassembly)***, and lift these parts out. On models where opening in rear of case permits, withdraw complete main shaft assembly through this rear opening. On other models, remove main drive gear and lift it through top of case if bearing removed previously (otherwise tap it out through front of case using a soft drift, being careful not to damage gear teeth). If main shaft can not be removed as an assembly, remove snap ring from groove at forward end of shaft, slide synchronizer assembly, second speed gear, and sliding gear off shaft (lift these parts out through top of case). Lift out counter-gear assembly. Drive reverse idler shaft out through rear of case, using brass drift, and lift gear and bushing out. To remove shifter shaft assemblies, remove levers on outer ends of shafts, drive out lockpins in shaft bosses on side of case, push shaft and lever assemblies through and remove from case. (CAU-

C NTINUED N NEXT PAGE

1954-58 WARNER 3-SPEED TRANSMISSIONS (Continued)

TION—do not lose detent balls, springs and interlock plunger located in boss in case

►**Nash Mainshaft & Bearing Retainer Disassembly Note**—To remove shaft from retainer (extension housing), remove bearing snap ring from groove in retainer, press shaft out toward front (bearing and speedometer gear will come out with shaft). To remove bearing from shaft, remove snap ring at rear of speedometer gear, remove gear, remove woodruff key from slot in shaft, then press bearing off shaft.

REASSEMBLY OF TRANSMISSION: Reverse the disassembly directions given above and note special data on all sub-assemblies as follows:

Shift Mechanism: Install complete detent and interlock assembly (plunger, spring, poppet balls, and spacer pin on Kaiser) in the boss in the case, insert shift shaft and levers from within, insert shift shaft lockpins loosely in holes in case to hold levers in place, check and adjust interlock plunger clearance (see below), then drive shaft lockpins down into place, install new oil seal on outer end of each shaft, install outer levers.

►*LOW & REVERSE SHIFTER FORK INSTALLATION*

CAUTION—Make sure that the Low & Reverse Shifter Fork is installed with the "offset" in the correct direction (as marked at removal).

Interlock Plunger Clearance—.001-.007" (Willys & Nash), .001-.005" (All Others) clearance between end of plunger and shift lever sector with one lever in neutral and other lever in any gear. To check, place one lever in neutral, move other lever to any gear position, use feeler gauge between end of plunger and lever sector. Adjust by installing plunger of correct length. Plunger furnished in five lengths and marked for identification as follows: Unmarked —1.299", A—1.295", B—1.291", D—1.303".

Reverse Idler Gear & Shaft: Position gear with offset (longer end of hub) toward front of case, drive shaft in until lockplate slot lines up with rear face of case.

Countergear Cluster: To assemble, install dummy shaft and spacer in gear cluster, install bearing rollers and bearing retainer washer in each end of gear, using grease to retain parts (see Willys note below), install bronze thrust washer on each end with tongue of front washer forward (to engage notch in case), tongue of rear washer forward (to engage notch in gear), install steel thrust washer on rear and install entire assembly in case. Drive countershaft in from rear (pushing dummy shaft out at forward end) until lockplate slot lines up with rear face of case. Check countergear endplay which should be .002-.006" (Kaiser), .006-.016" (Hudson), .004-.018" (Stude. Champ.), .005-.017" (Stude. Comm.), .012-.018" (Willys Jeep & Trucks). Install lockplate to retain counter shaft and reverse idler shaft.

Willys Jeep & 4-Whl. Dr. Truck Bearings—Countershaft has double bearings (two sets of bearing rollers in tandem) at each end of countergear. Install one set of bearing rollers, bearing washer, second set of rollers, second washer at each end.

Main Drive Gear Assembly: If removed and installed as an assembly, this assembly must be re-installed before countershaft inserted (countergear cluster at bottom of case to provide clearance). Use driver to install bearing on shaft. On Nash & Studebaker, install gear without bearing using Synchronizer Protector Ring J-3042 (Nash Ambassador), J-1525 (Stude. Champ. 1946), J-2040 (Stude. Champ. 1952-58, and Rambler 1952-58), J-2039 (Stude. Comm.) when driving bearing on shaft and into case. Select snap rings (large ring on bearing, small ring on shaft) for snug fit without endplay. Bearing snap rings furnished .086", .089", .092", .095" thick. With main drive gear installed in case select gasket of correct thickness (furnished in four thicknesses) so that retainer will be tight fit on case when installed.

►*CAUTION—Bearing must not have any endplay.*

Mainshaft Assembly: When installing mainshaft in case, make certain that pilot bearing rollers in place in recess of main drive gear (use cup grease to hold rollers until shaft inserted). Install sliding gear with shift fork channel toward rear (Studebaker Champion, Willys (Exc. 4-Whl. Dr.), Hudson Jet, Nash Rambler, and Henry J); toward front (All Others), engage shifter shoe in gear (shifter shoe offset should be toward front or rear in relation to gear channel above). Install second speed gear with clutch teeth toward front, install synchronizer (see data below) with clutch sleeve offset toward front, install snap ring in shaft groove to retain these assemblies. Engage second-high shifter fork in channel of synchronizer sleeve.

Synchronizer Assembly—If synchronizer dismantled, assemble parts according to marks made previously. Install spring in each end of hub with free end of each spring engaging the same strut and springs pointing in opposite directions. Make certain that struts engage slots in synchronizer rings. Install snap ring in groove at forward end of shaft. Check endplay of synchronizer and second speed gear assembly with a feeler gauge between back face of gear and shoulder on shaft. Endplay should be .003-.014" (Kaiser), .003-.010" (Nash), .003-.016" (Hudson & Studebaker Commander), .003-.012" (Studebaker Champion), controlled by snap ring thickness.

Transmission Mainshaft Rear Bearing—To remove mainshaft and rear bearing from adapter plate, remove bearing snap ring from groove in front face of adapter. Use a soft hammer on rear end of shaft to tap shaft and bearing out, lift off oil baffle, remove bearing snap ring from groove in shaft, use puller to remove bearing from shaft.

Mainshaft Installation: When installing mainshaft in case, make certain that pilot bearing rollers in place in recess in main drive gear (use grease to hold rollers until mainshaft inserted). Engage Low & Reverse Shifter Shoe in sliding gear with offset in same direction as channel in gear (see above), engage Second & High Shifter Fork in synchronizer sleeve channel.

Rear Bearing Retainer: On models where rear bearing mounted in retainer, bearing can be lifted out after snap ring removed (speedometer gear accessible with bearing out). Oil seal should be replaced with special driver. When reassembling, make certain that bearing snap ring is snug fit in groove (furnished .086", .089", .092", .095" thick). When installing retainer, use new gasket, tap retainer in place on shaft with special driver (see special Nash Note below), install universal joint companion flange, flat washer, lockwasher, and nut. Tighten nut securely (90-100 ft. lbs.—Hudson).

►*CAUTION—Speedometer drive gear will slip if companion flange nut not securely tightened.*

►**Nash Bearing Retainer Note**—Bearing retainer has extension housing with additional driveshaft bearing (Oilite bushing) in front of oil seal at rear end of housing. To replace bushing (with oil seal removed), assemble felt oil ring on bushing, press bushing in from rear end of housing until shoulder on bushing is ¼" from shoulder in bearing cap (CAUTION—this clearance necessary to prevent compressing oil ring). To assemble retainer, install bearing on mainshaft, install speedometer gear (CAUTION—see that woodruff key in place in shaft groove within gear), install snap ring in shaft groove selecting ring for snug fit so that bearing is tight on shaft. Install shaft assembly in bearing retainer and install snap ring to retain bearing selecting snap ring for snug fit so that shaft and bearing do not have any endplay in retainer.

Transmission Cover & Gasket Installation: Some transmissions are vented by means of holes in cover and gasket. Install these parts as follows:

►*CAUTION—Gasket and cover must be correctly installed to prevent lubricant loss through this vent.*

1959-60 WARNER 3-SPEED TRANSMISSIONS

Car & Model	Transmission Model
1959-60 Checker Superba	T-90
1960 Chrysler Windsor	T-85
1960 DeSoto Fireflite	T-85
1960 Dodge Plymouth (Heavy Duty)	T-85
1959-60 Rambler American (Series 01)	T-96
1959-60 Rambler Six (Series 10) Std.	T-96
1959-60 Rambler Six (Series 10) Hvy. Duty	T-86
1959-60 Rambler V8 (Series 20)	T-86
1959-60 Rambler V8 (Series 80)	T-89
1959-60 Studebaker 6 Cyl. (Exc. Taxi)	T-96
1959-60 Studebaker 6 Cyl. (Taxi)	T-90
1959-60 Studebaker V8 (Exc. Taxi)	T-86
1959-60 Studebaker V8 (Taxi)	T-89
1959-60 Willys 4-Wheel Drive	T-90
1959-60 Willys 4 Cyl. 2-Wheel Drive	T-96
1959-60 Willys 6 Cyl. 2-Wheel Drive	T-86

►CHANGES, CAUTIONS, CORRECTIONS

►*1958-60 AMBASSADOR TRANSMISSION CHANGE FOR IMPROVED SHIFTING:* To decrease shifting effort from Low to 2nd. Gear, longer shift lever (Second & High Gear Shift Lever Part No. 3155833) can be installed to replace original low and reverse lever. *NOTE* - This longer lever used in production on later cars.

►*RAMBLER SERIES 80 & STUDEBAKER 6 CYL. TAXI-CAB TRANSMISSION HOUSING NOTE:* The units of the transmission housing are similar in appearance to units used with overdrive transmission, however, only the transmission case (extension adapter also, on Rambler Series 80) is interchangeable

►*1960 STUDEBAKER 6 CYL. TRANSMISSION (WARNER T-96) MAINSHAFT REAR BEARING SNAP RING SERVICE REPLACEMENT NOTE:* A new mainshaft rear bearing small snap ring is being used in production (beginning Jan. 1960) and should be used for service replacement if snap ring breakage occurs or if snap ring comes out of groove. Before installing the new snap ring, Part No. 1550544, make sure groove in mainshaft is not damaged or worn, and do not over-expand snap ring during installation. *NOTE - This snap ring may be used on 1958 and later transmissions.*

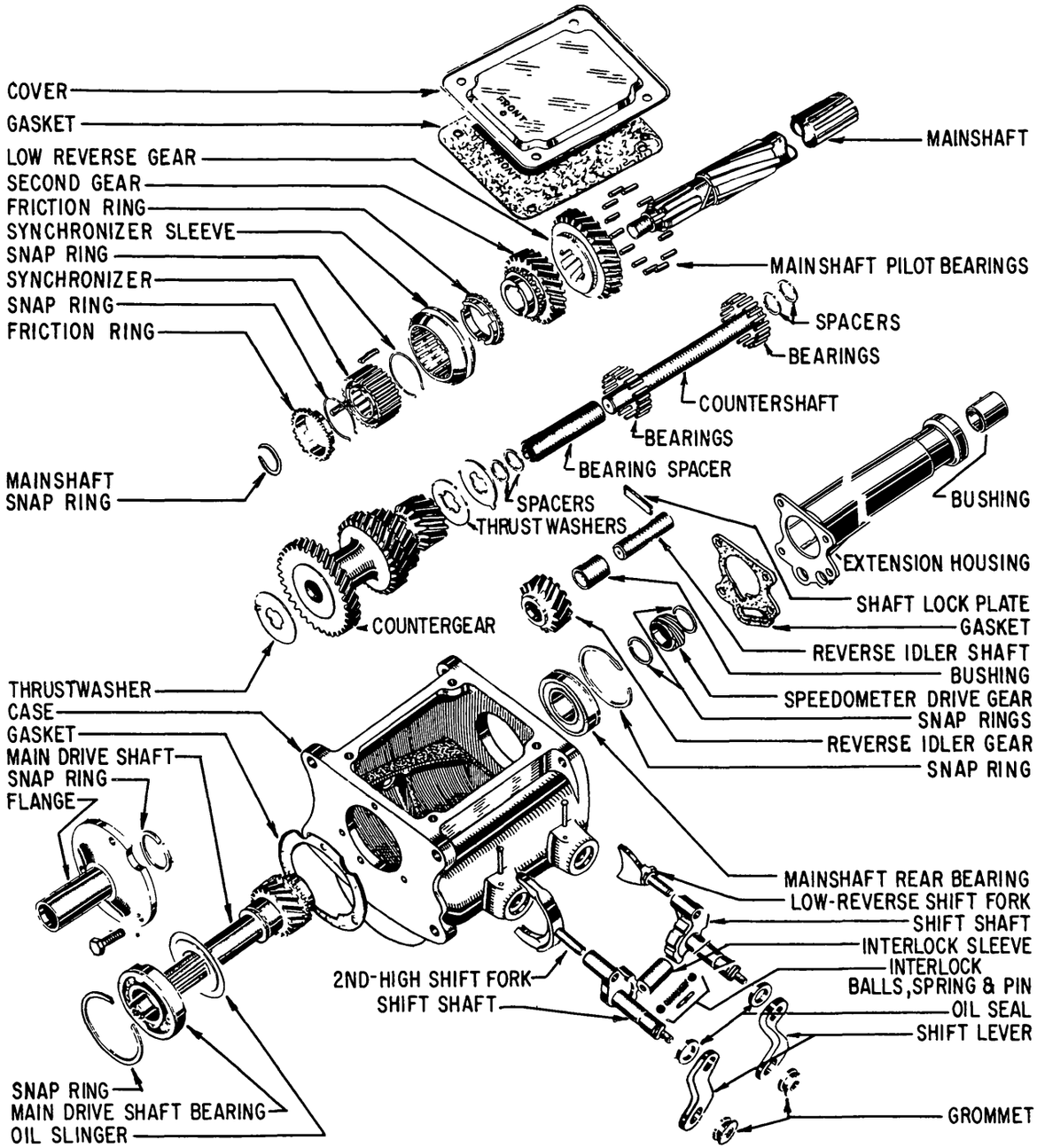
DESCRIPTION: Three-speed constant mesh, all helical gear (Willys 4-Wheel Drive & Studebaker Taxicab transmissions have "straight-cut" low & reverse sliding gear, reverse idler and reverse gear on cluster). Transmission shift levers are located on side of transmission case (except Willys 4-Wheel Drive models which have a floor mounted gearshift lever). A side cover is used on Chrysler, DeSoto, Dodge, Plymouth, Rambler Series 80 and Studebaker V8 Taxicab transmissions (shift levers located in side cover).

TRANSMISSION REMOVAL: *See "Transmission" on Car Model pages.*

OVERHAUL

►*OVERDRIVE TRANSMISSION DISASSEMBLY NOTE: For transmissions with overdrive, see "Warner R-10 Overdrive" for overdrive disassembly, then proceed in same mann r as for transmission without overdrive.*

►*WILLYS 4-WHEEL DRIVE TRANSMISSION (WITH TRANSFER CASE) DISASSEMBLY NOTE: To r mov transfer cas , s "Warner & Spic r Transf r Cas " in this secti n and n te following:* To prevent mainshaft from pulling out of transmission when transfer case is removed, install Tool W-194 (Mainshaft Retaining Plate). If tool is not available, loop a piece of wire around mainshaft directly back of mainshaft second speed gear, then install transmission cover right and left front attaching bolts part way into transmission case. Twist the wire and attach one end to each of the screws, then draw the wire tight.



WARNER 3-SPEED TRANSMISSION (WITH TOP COVER)

C NTINUED ON NEXT PAGE

1959-60 WARNER 3-SPEED TRANSMISSION (C ntinued)

DISASSEMBLY: Drain transmissions and proceed as follows:

Extensi n H using Rem val (Rear Bearing Retainer): Procedures are different for various models as noted below:

Chrysl r, D Sot , D dg & Plymouth - Extension housing is removed as an assembly with transmission mainshaft. *Se "Main Drive Shaft & Mainshaft Assembly (Chrysler, DeSoto, Dodge & Plymouth "T-85" Transmission)" below.*

Rambler S ries 01, 10 & 80 - On Series 01 & 10, remove extension housing oil seal with Tool J-4830-A and slide hammer, then remove extension housing from transmission case. On Series 80, remove extension housing adapter, then remove oil seal with Tool J-2626.

Rambl r Series 20 - Extension housing is removed as an assembly with transmission mainshaft.

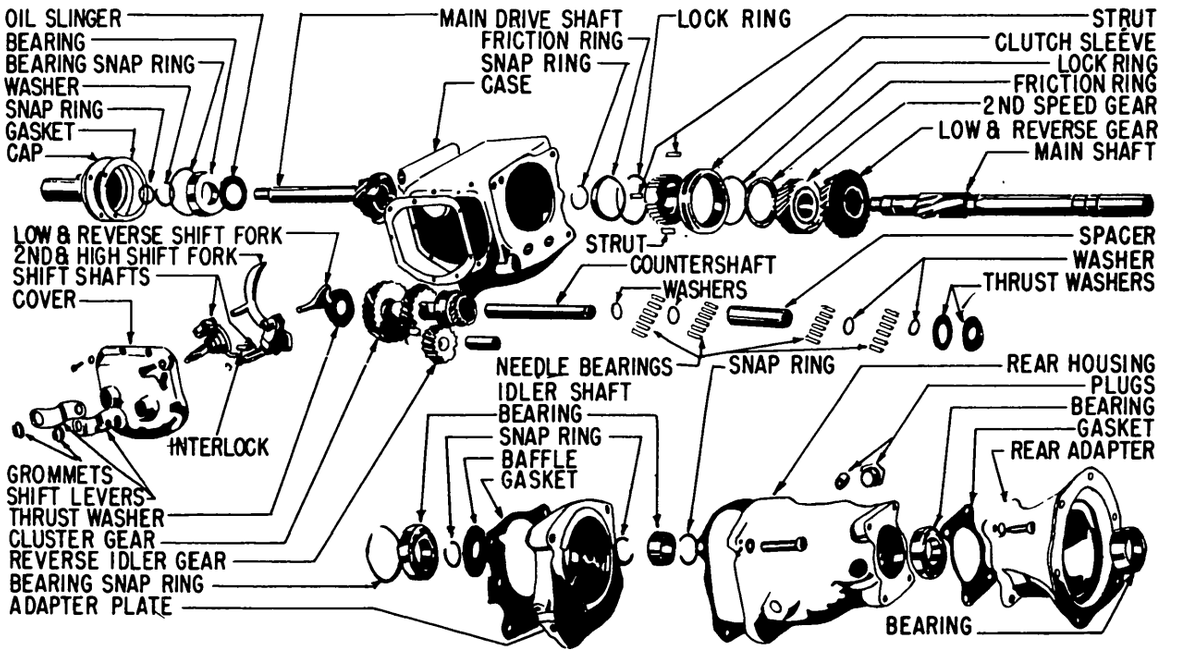
Stud baker (Exc. "T-89") - Loosen rear housing capscrews 3/16", then tap end of mainshaft (output shaft) with a plastic hammer to loosen rear transmission bearing in rear housing. Remove rear housing screws and, while holding pressure against output shaft, remove rear housing. *NOTE - On "T-90" model transmission (6 cyl. Taxi) separate rear housing at adapter plate (rear mainshaft bearing is secured in adapter plate).* Remove extension housing oil seal with Tool J-4830-02 (T-86, T-90 & T-96 Trans.), Tool J-7296 (T-89 Trans.), and a slide hammer.

Stud bak r (T-89 Transmission) - Extension housing cannot be removed separately. *See "Main Drive Shaft & Mainshaft Ass mbly (Studebaker "T-89" Transmission)" below.*

Willys 2-Wh l Driv - With transmission cover removed, install transmission mainshaft retaining plate, Tool W-194, to prevent mainshaft from pulling out of transmission case. If tool is not available, loop a piece of wire around mainshaft directly back of low speed sliding gear, then install transmission cover right and left front attaching screws in transmission. Twist wire and attach one end to each of the two screws. Draw wire tight. Remove nut attaching companion flange to mainshaft, then hold companion flange with Tool C-3281 and remove flange with puller, Tool W-172. Remove extension housing, then remove oil seal, speedometer drive gear, and rear shaft bearing from housing. Remove tool or wire.

Willys 4-Wheel Driv - *See "Willys 4-Wheel Drive Transmission (With Transfer Case) Disassembly Note" above.*

Main Drive Shaft & Mainshaft Assembly (Chrysler, DeSoto, Dodg & Plym uth "T-85" Transmission) - Remove transmission side cover (gearshift housing assembly) and discard gasket, then remove bolts attaching extension housing to transmission and slide extension housing and mainshaft assembly rearward out of transmission case. Remove spacer rings and rollers (14) from pilot bearing bore in main drive shaft, then remove main drive shaft bearing retainer from case. Use a suitable brass drift and remove countershaft (se "Count rshaft & Gear Ass mbly" bel w). Allow cluster gear to drop to bottom of transmission case. Remove bearing retaining snap ring from main drive shaft bearing and use a soft hammer to drive main shaft and bearing (with oil slinger) back into case. If necessary to remove bearing from main drive shaft, remove snap ring and press bearing off shaft using an arbor press. Remove cluster gear through opening at rear of case. Remove clutch gear snap ring from mainshaft and slide synchronizer assembly, second speed gear and first and reverse gear off mainshaft. Remove mainshaft bearing snap ring at front of extension housing and drive mainshaft and bearing forward out of extension housing. Remove rear bearing from mainshaft, then remove speedometer gear snap rings and slide gear and lockball off mainshaft. Remove inner snap ring from intermediate bearing and slide bearing off shaft. Remove rings from each end of clutch sleeve and slide clutch gear and struts out of sleeve.



WARNER 3-SPEED TRANSMISSION (WITH SIDE COVER)

Main Drive Shaft & Mainshaft Assembly ("T-86" & T-90" Transmissions): With transmission extension removed (exc. Rambler Series 20), remove transmission cover (and shift fork assembly on models with floor mounted gearshift). Remove main drive shaft bearing retainer. On Willys 4-wheel drive models, remove the two socket head screws from front of transmission case (these screws support the oil collector inside case). Remove snap ring from main drive shaft and large snap ring from main drive shaft bearing. Install a suitable protector on synchronizer to take up thrust and prevent damage to synchronizer. Install a suitable puller and remove main drive shaft bearing, then remove oil slinger and the synchronizer protector. Mark the two synchronizer blocking rings, synchronizer gears, synchronizer sleeve, mainshaft, and low and reverse sliding gears with a quick drying lacquer so parts may be installed in their original positions. Remove shift retaining pins and pull shift shafts outward as far as possible. Raise and rock mainshaft assembly to disengage shift forks, then separate mainshaft assembly and main drive shaft. Remove main drive shaft, then remove mainshaft assembly (including adapter plate on Studebaker 6 Cyl. Taxicabs, and extension housing on Rambler Series 20 models) through rear of case. Remove small snap ring from end of mainshaft and remove synchronizer assembly, second speed gear, and low and reverse sliding gear. On Studebaker Taxicab models, remove snap ring holding mainshaft bearing in adapter, then remove shaft and bearing and press bearing off shaft. On Rambler Series 20, remove snap ring from front end of extension housing and tap mainshaft and bearing out of housing with a plastic hammer. Remove mainshaft snap ring, speedometer drive gear and woodruff key, then press shaft out of bearing (*NOTE- If necessary to remove bushing in extension housing, drive it out toward rear).* On all other models, press bearing off mainshaft.

Main Drive Shaft & Mainshaft Assembly ("T-96" Transmission): With transmission extension removed, remove main drive shaft bearing retainer, then remove snap ring from main drive shaft and large snap ring from main drive shaft bearing. Install, a suitable protector on synchronizer to take up thrust and prevent possible damage to synchronizer. Install a suitable puller and remove main drive shaft bearing, then remove oil slinger and synchronizer protector. Mark the two synchronizer blocking rings, synchronizer gears, synchronizer sleeve,

CONTINUED ON NEXT PAGE

1959-60 WARNER 3-SPEED TRANSMISSION (Continued)

mainshaft, and low and reverse sliding gear with quick drying lacquer so parts may be installed in their original positions Raise main drive shaft gear and pull mainshaft assembly rearward, then remove main drive shaft from case and remove rollers from end of shaft Rock mainshaft assembly to the side as far as possible, then disengage and remove shifter forks Remove mainshaft snap ring, then support synchronizer and mainshaft gears by hand and pull mainshaft through gears and out of housing Remove speedometer gear and snap rings (if not already removed), then press mainshaft out of bearing

Main Drive Shaft & Mainshaft Assembly (Rambler Series 80 "T-89" Transmission): Remove bearing cap and gasket, then remove clutch shaft snap ring, spacer washer, and bearing lock ring Use Bearing Puller J-6654 and Thrust Yoke J-6652 (or other suitable puller) and remove front bearing from clutch shaft *NOTE - Clutch shaft cannot be removed from front of transmission case* With front bearing removed from clutch shaft, pull shaft as far forward as possible Separate mainshaft assembly from clutch shaft, then slide mainshaft assembly out through rear of transmission case Remove clutch shaft through rear of case and remove pilot bearings and oil baffle Remove synchronizer spacer washer and lock ring, then remove synchronizer, second speed gear, and first and reverse sliding gear from mainshaft If the large bearing in adapter plate requires replacement, remove snap ring in adapter and tap mainshaft and bearing from adapter Remove snap ring on mainshaft and press bearing off shaft

Main Drive Shaft & Mainshaft Assembly (Studebaker V8 Taxicab "T-89" Transmission): Remove side cover and shift fork assembly from case Remove rear extension housing retaining screws, then move rear extension rearward approximately ½" from case Rotate housing to expose end of countershaft and remove woodruff key at end of shaft Use a suitable drift and start countershaft out of case, then insert a dummy shaft and drive countershaft out rear of case *(NOTE - Dummy shaft should be 865" diameter and 8 1/8" long)* Countergears and dummy shaft will drop to bottom of case Place synchronizer sleeve in high gear position, raise front end of mainshaft assembly so synchronizer sleeve will pass over countergear assembly, and remove mainshaft assembly from case Remove needle bearings from end of main drive gear Remove main drive gear bearing retainer and gasket, then remove small snap ring and washer from main drive gear shaft Place the assembly in an arbor press and press main drive shaft out of bearing Remove large bearing snap ring and tap bearing out of case

Countershaft and Gear Assembly: Remove countershaft retaining plate (or woodruff key) and drive countershaft out of case with a dummy shaft (see table below for dummy shaft sizes) Leave dummy shaft in countergear assembly to retain needle bearings and spacers in position Remove thrust washers located at each end of countergear assembly

Car	Trans. Model	Dummy Countershaft Shaft Diam.	Shaft Length
Chry & DeSoto	T-85	7/8"	8 5/64"
Dodge & Ply	T-85	7/8"	8 5/64"
Rambler	T-96	677"	5 7/8"
Rambler	T-86	.750"	7 1/16"
Rambler	T-89	870"	8 1/16"
Studebaker	T-96	677"	5 7/8"
Studebaker	T-86	3/4"	7 5/64"
Studebaker	T-90	3/4"	7 5/64"
Studebaker	T-89	865"	8 1/8"
Willys ①	T-96	677"	5 7/8"
Willys ②	T-86	3/4"	7 5/64"
Willys ②	T-90	3/4"	7 5/64"

① - Tool W-193 ② - Tool W-166

Reverse Idler Gear: Remove idler shaft retaining plate (or woodruff key) if not previously removed, then drive shaft out of case with a brass drift *CAUTION - Note position of the thrust washers on idler gear shaft so they may be installed in correct location at reassembly*

Shift Shafts & Interlock (Exc. Willys 4-Wheel Drive Models): Remove outer shifter shaft levers, then remove shaft lock pin (lock pin not used on all models) Remove shifter shafts from inside transmission case slowly to catch the two interlock ball bearings as the shafts are being removed Remove interlock sleeve, spring, and pin (pin not used on all models) Remove shifter shaft oil seals from case

INSPECTION: Wash all parts in solvent and blow dry with air Check all gears for worn or chipped teeth (check wear of gear bore by sliding gear onto a new shaft, replace if found to be loose) *NOTE - If a transmission gear is replaced, the gear with which it meshes should also be replaced* Check bearings for cracked races, worn or scored balls Inspect synchronizer clutch and friction rings Install gears on mainshaft and check for a smooth fit without excessive play between splines Check fit of taper in cones of second speed gear and clutch shaft by installing the friction rings. Replace rings if there is excessive wear Check transmission case for wear and scoring of bearing recesses, cracks or other defects Check clutch housing for runout which should not exceed 005" total

REASSEMBLY: Use new gaskets and oil seals when reassembling transmission Reverse disassembly procedures and note the following

Shift Shafts & Interlock: Install new oil seals in transmission case or new "O" ring seals on shafts (depending on type of seal used) Insert one of the shift shafts in bore of transmission case or side cover, being careful not to damage the oil seal Install the shift lever, then insert the interlock sleeve and set shift shaft in neutral position Insert one of the interlock balls, interlock pin (if so equipped), and interlock spring in sleeve Start other shift shaft into transmission case or cover, then place the other interlock ball in position at end of sleeve Compress the spring and hold it in this position, then align neutral notch of shaft with ball and slip shaft inward to retain the ball Install other shift lever Shift one of the shafts into an "in-gear" position, and with one end of interlock sleeve against cam of shaft, measure the clearance between other end of sleeve and cam This clearance should be 001- 007" If clearance not within limits, replace interlock sleeve *NOTE - Sleeves are available in four lengths*

Snap Rings: To hold Main Drive Shaft and Mainshaft endplay to a minimum, install the thickest possible snap ring that will seat in the groove (at all snap ring locations)

Front Flange Installation: Place front flange on main drive shaft without a gasket and check clearance between flange and transmission case Allow 003" to 005" for gasket compression and select a gasket of proper thickness to maintain main drive shaft endplay of 000- 005" (000" preferred)

Main Drive Shaft Bearing Installation: When installing bearing, use a suitable synchronizer protector to take thrust of bearing installation.

Countershaft Gear Assembly Endplay: 004- 012" (Chrysler, DeSoto, Dodge & Plymouth), 003- 006" (Rambler), 004- 018" (Studebaker "T-96"), 005- 017" (Studebaker "T-86" & "T-90"), 012- 018"(All Willys modles) Endplay is controlled by thickness of thrust washer

WARNER 4-SPEED TRANSMISSIONS

Willys 4-Wheel Drive Models (1957-60)

DESCRIPTION: 4-Speed synchro-mesh (2nd, 3rd, & 4th), sliding gear (low & revefse). Low & reverse gears are spur type; others are helical type. *NOTE - 4-Speed can be identified by its length of 11 7/8".*

REMOVAL: *See "Transmission" on Car Model Page.*

DISASSEMBLY: Remove transmission-to-transfer case adapter plate and gasket, then remove oil seal from plate. Proceed as follows:

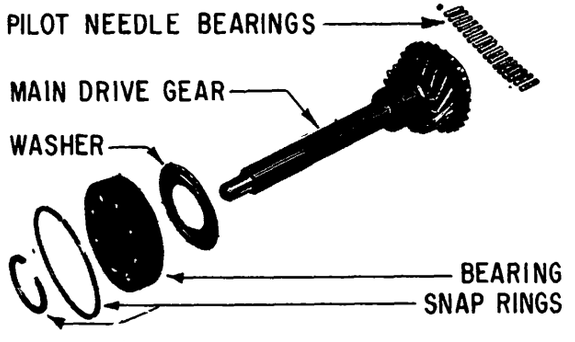
1) Remove control housing assembly from top of transmission case, then mark blocking rings, synchronizer gears, and synchronizer sleeves on both synchronizing units with lacquer or an electric pencil to insure installation in original positions. Remove transmission-to-bellhousing adapter plate and front bearing retainer.

2) Slide low speed gear toward rear of transmission case, then disengage reverse gearshift arm from reverse idler gear and remove arm from case mounting pin. Move low speed gear back into neutral position, then remove snap rings from forward end of main drive gear shaft and outer race of transmission front bearing. Remove front bearing with a bearing puller, and remove oil slinger.

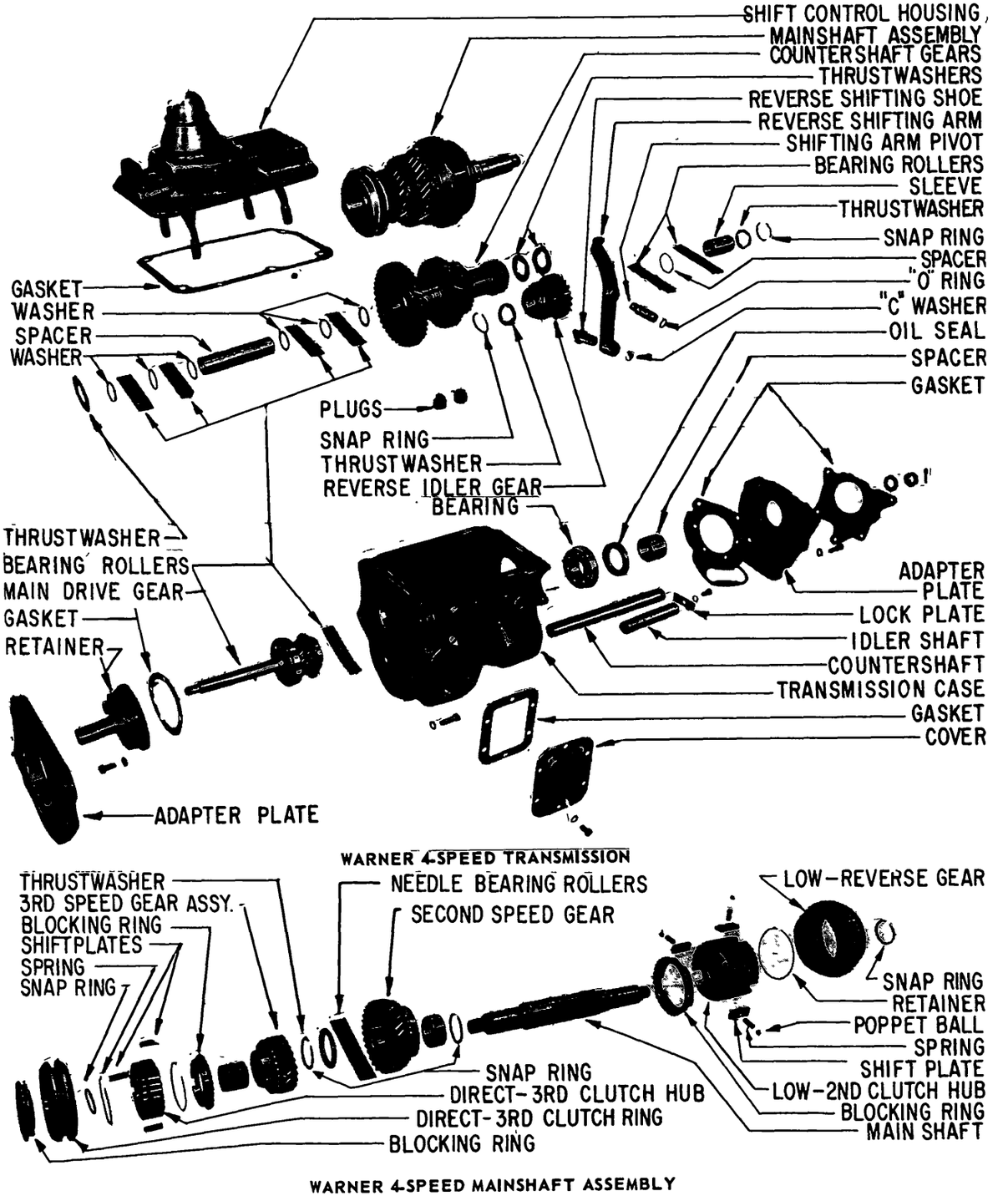
3) Remove snap ring from outer bearing race of transmission rear bearing, then drive main shaft rearward by striking end of main drive gear shaft with a lead hammer. Install bearing puller plates and remove rear bearing. Separate main drive assembly from main drive gear being careful not to lose any of the main shaft pilot rollers. Remove main shaft assembly out of case, then remove main drive gear from case and remove main shaft pilot rollers.

4) Mark relation between synchronizer gears and splines on main shaft, then remove snap ring which holds third and high synchronizer assembly on main shaft. Remove snap ring holding second speed synchronizer assembly on main shaft, then slide second speed synchronizer and second speed gear off shaft. *CAUTION - When sliding second speed gear off shaft, be careful not to lose any of the bearing rollers.* Remove two remaining snap rings, spacer and thrust washer from main shaft.

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MAIN DRIVE GEAR SHAFT ASSEMBLY



WARNER 4-SPEED MAINSHAFT ASSEMBLY

WARNER 4-SPEED TRANSMISSIONS (Cont.)

5) Remove two large lock rings holding synchronizer clutch hub in direct and third clutch sleeve and push hub out of sleeve. If second speed synchronizer assembly is to be disassembled, wrap the assembly in a cloth to prevent losing the lock balls and springs, then push gear out of sleeve in the direction opposite the shift fork groove. Remove cloth and lift balls, springs and plates out of the gear.

6) Remove lock plate for countershaft and idler gear shaft, then use a pry bar in slot of reverse idler gear shaft to loosen the shaft. Slip reverse idler gear shaft out of housing and gear and remove idler gear assembly from transmission case.

7) To remove countershaft, use a heavy brass drift and drive countershaft towards rear of case. When countershaft end is just about even with inside of transmission case, use a dummy shaft to force it the rest of the way. *NOTE - A dummy shaft can be made from a piece of 1 1/8" diameter rod cut to 9.850" long. Break sharp edges with a file.* Keep dummy shaft in contact with countershaft at all times to prevent dropping bearing rollers or thrust washers. With dummy shaft in position, place transmission case on its side and carefully roll countershaft gear cluster out of case.

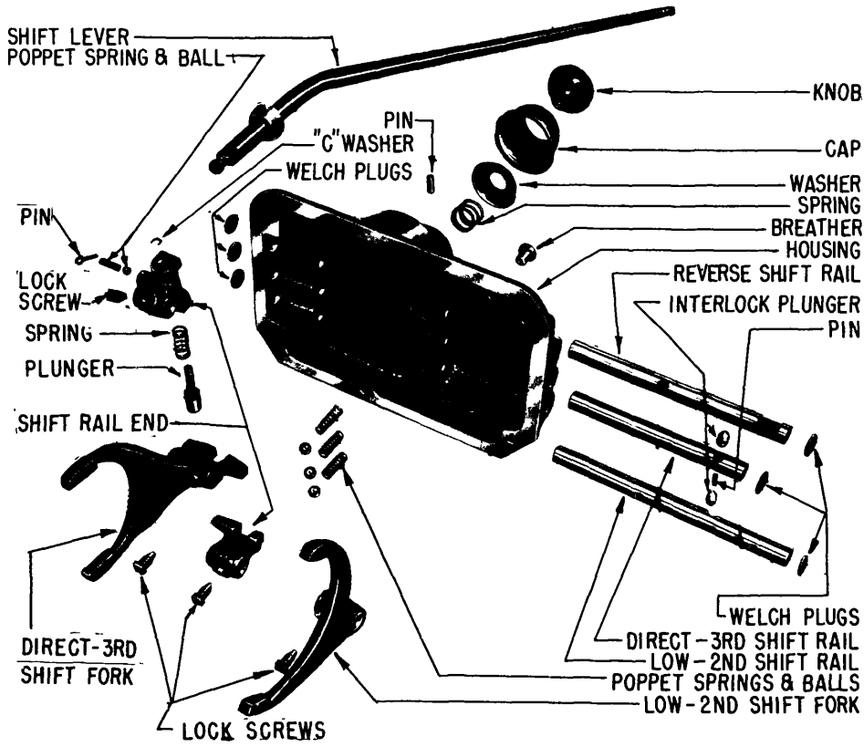
8) Complete disassembly by removing dummy shaft, thrust washers, four sets of bearing rollers, and spacer.

9) To disassemble reverse idler gear assembly, remove one of the snap rings and tap out the washer, both sets of bearing rollers, center spacer, and sleeve. Remove remaining snap ring.

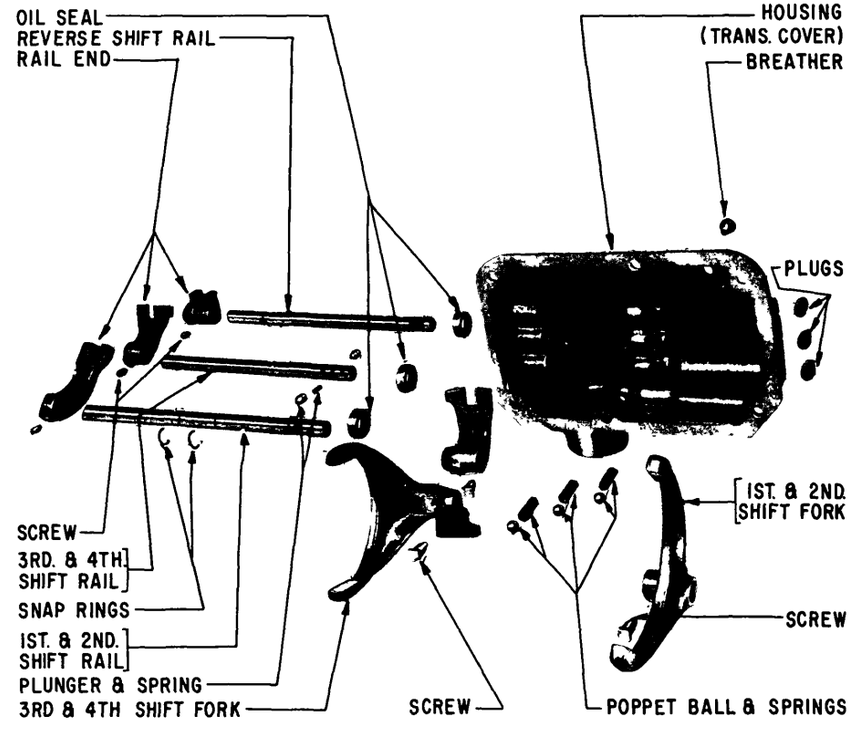
10) On floor mounted gearshift models if it is necessary to disassemble transmission control housing, proceed as follows: Remove screws from shifter forks, then remove expansion plugs from front and rear of gearshift lever base. Remove center (third & direct) shifter rail first, driving it out rear of lever base. As rail is withdrawn, remove interlock pin from crossover hole in rail, then, before rail is completely removed, place a finger over hole to prevent loss of poppet ball and spring. Remove low & second shift rail in same manner. Remove shifter rail lock balls and springs, then with a piece of wire, push two shifter rail interlocks out of pockets in center section of gearshift base. A spring loaded plunger located in end of reverse shifter rail prevents shifting into reverse accidentally. If necessary to replace this part, remove cotter pin from end of shifter rail assembly and at the same time hold finger over hole to prevent loss of spring. Shake out ball and spring and remove plunger. Compress spring until "C" washer groove just clears end of casting and remove "C" washer.

11) On Forward Control models if it is necessary to disassemble transmission control housing, proceed as follows: Place shift rails in neutral position and remove lock screws from both gearshift forks and the reverse shift rail end. Remove expansion plugs from rear of control housing, then remove snap rings from 1st and 2nd shift rail and drive shift rail out of housing. *NOTE - Before shift rail is removed from center section of housing, place a finger over the hole to prevent loss of poppet ball and spring.* Remove 3rd & 4th and reverse shift rails in same manner. Remove poppet balls and springs. With a piece of wire, push the two shift rail interlock plungers out of pockets in center section of housing.

REASSEMBLY: Reverse disassembly procedures.



FORWARD CONTROL MODELS



OTHER MODELS

WARNER 4-SPEED TRANSMISSION SHIFT ASSEMBLY

WARNER R-10 & R-11 OVERDRIVES

Huds n (1954-57)
Nash Statesman (1954-56) ℂ
Nash Ambassador (1954-57)
Packard (1954-58) ℂ
Rambler (1954-60)
Stud baker (1954-60)
Willys (1954-60)

ℂ - Used with "Nash Type" transmission.
ℂ - Warner "R11" Overdrive used on 1954-56 models. Warner "R10" Overdrive used on 1957-58 models.

►CHANGES, CAUTIONS, CORRECTIONS

►*1954-60 FORD, 1954-58 MERCURY & 1958-60 EDSEL OVERDRIVE: See "F rd, Edsel, Mercury (Warner R10) Ov rdriv ".*
►*1954-56 DESOTO & DODGE, 1954-58 PLYMOUTH OVERDRIVE: S "D S to, Dodge, Plymouth (Warner R10) Ov rdrive".*
►*1955-60 CHEVROLET OVERDRIVE: See "Chevrolet (Warner R10) Ov rdrive".*

DESCRIPTION: Solenoid operated planetary type overdrive with governor control and accelerator pedal operated "kickdown".

OVERDRIVE CONTROL: *Se "Warner R10 & R11 Overdriv C ntr l".*

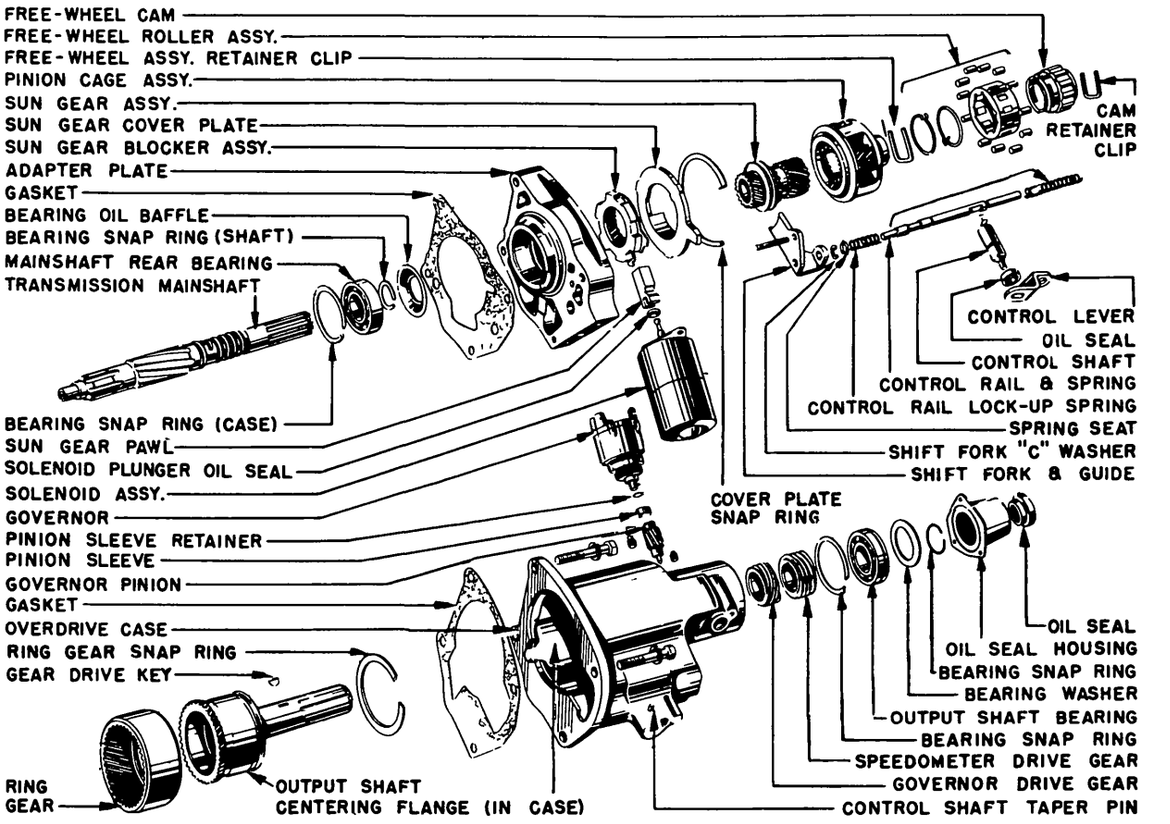
OVERDRIVE REMOVAL: Remove overdrive and transmission as an assembly. *See "Transmission" on Car M d l pag s.*

OVERDRIVE HOUSING REMOVAL: Procedures are different for the various models as indicated below.

1955-57 Hudson, 1954-57 Nash Statesman & Ambassador and 1954-60 Rambler: With transmission and overdrive assembly out of car, remove governor and solenoid. On Rambler Series 01, 10, 20 remove oil seal adapter with Tool J-2497. On other models, remove torque tube adapter, then remove oil seal with Tool J-2497 (Exc. Rambler Series 80); Tool J-2626 (Rambler Series 80).On all models, remove mainshaft snap ring (back of rear bearing) and spacer washer (if one is used). Drive out lockpin holding overdrive shift shaft in overdrive case, then pull shaft toward outside of case to disengage it from shift rail. *NOTE - D not remove shift shaft ass mbly fr m overdriv cas unless oil seal requires replac ment.* Remove capscrews holding overdrive case to transmission and separate overdrive from transmission at rear of adapter plate. *CAUTION - Do not separate adapter fr m transmissi n case as this will allow mainshaft pil t b arings t drop out of main drive shaft. As s on as ov rdriv housing is pulled far enough away fr m adapter, install a h lding bolt through adapter and b lt it t transmissi n.* As the overdrive case is removed, tap end of mainshaft with a soft hammer to prevent shaft coming out with the housing. The rear bearing which remained in overdrive housing can be removed by tapping it out toward rear of case. On Rambler Series 01, 10, 20, remove rear snap ring first, then remove front snap ring after bearing is removed.

1954 Huds n, 1954-58 Stud baker & 1954 Willys: With transmission and overdrive assembly removed from car, remove governor and solenoid, then remove nut on end of output shaft and remove universal joint companion flange with a suitable puller. Complete removal of overdrive housing as outlined for 1955-57 Hudson, 1954-57 Nash Statesman & Ambassador and 1954-60 Rambler (above).

1959-60 Studebaker: With transmission and overdrive assembly removed from car, remove governor assembly, then drive overdrive control lever retaining pin from case and disengage lever from overdrive shift shaft. Drive a sharp punch into welch plug on top of rear housing and remove the plug (when driving punch into plug, locate it well toward rear of plug). Remove overdrive to transmission capscrews, then while expanding the bearing snap ring (visible through welch plug hole), tap end of output shaft to loosen bearing in housing and remove housing. *NOTE - Hold pressure against output shaft while removing housing to prevent separation of output shaft from freewheel cam.* Remove bearing snap ring and gasket from housing.



WARNER R-10 OVERDRIVE ASSEMBLY

OVERDRIVE DISASSEMBLY: Remove rear bearing snap ring (if not previously removed), then remove shift rail retractor spring. *NOTE - If necessary, remove shift shaft oil s al.* Pull output shaft rearward while holding one hand under the assembly to catch freewheel rollers as shaft is removed. Remove large snap ring and remove ring gear from output shaft. Remove speedometer and governor drive gears from output shaft. *NOTE - Gears are retained on shaft with either a woodruff key, r snap rings and drive ball or key.* Remove remaining freewheel rollers from retaining cage, then remove clip at end of freewheel cam and remove cam and pinion case assembly from transmission mainshaft. Remove freewheel unit from pinion cage assembly by removing clip from pinion cage assembly. Remove sun gear and shift rail assemblies from shaft. If necessary to remove shift collar from sun gear, remove snap rings at ends of collar. Shift rail, fork and spring may be separated by removing snap ring between cupped washer and shift fork. Remove large snap ring from adapter and remove sun gear control plate and blocker ring out of adapter. If control plate blocker ring is to be replaced, they may be separated by pulling blocker ring off plate. Remove sun gear pawl from adapter. *NOTE - If necessary to replace transmission mainshaft bearing (in adapter plate), disassemble transmission. Adapter plate is removed with transmission mainshaft.*

INSPECTION: Inspect all parts for wear or damage and replace any defective part.

Bl ck r Ring & Hub: Push one end of ring toward the other. Ring should grip and hold to hub when installed

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WARNER R-10 & R-11 OVERDRIVES (C ntinued)

with flat surface of ring facing out. If not replace the ring. Push one end of ring away from opposite end and check frictional drag around hub as follows: Hold one lug of control plate in a soft jawed vise and hook a scale into notch of nearest blocker ring lug. Measure pull required to rotate the ring after it has started moving. The pull should be 3½-5½ lbs.

Fr ewheeling Cam: If cam flat surfaces show slight lengthwise indentations or if rollers show markings of any kind, replace the parts. Test tension of cam retaining springs (after assembly has been cleaned). Hold hub of cam and turn roller retainer counterclockwise, then release retainer. Retainer should snap back quickly. If action is slow, replace springs or complete assembly. *NOTE* - When installing springs be sure both springs are coiled in the same direction (clockwise when looking toward flanged end of retainer), with "S" end of springs hooked into holes in retainer and opposite ends hooked into holes in cam.

OVERDRIVE REASSEMBLY: Insert sun gear pawl in adapter with notched side up. If blocker ring was removed from control plate, position ring on plate with flat surface of ring facing out, then start assembly over transmission mainshaft with ring toward rear. Slide the assembly into position with slot in ring toward sun gear pawl. Slide control plate retainer over mainshaft against control plate and install snap ring in adapter. Install solenoid oil seal and solenoid. Start sun gear onto mainshaft and hold shift rail so arm of fork fits in collar on sun gear, then slide both assemblies forward so pin in adapter plate locates fork and sun gear engages plate. Install pinion cage assembly over mainshaft and sun gear, turning cage clockwise to engage sun gear. If freewheel cam and roller retainer were separated, assemble these parts by positioning springs so both are coiled clockwise when looking at flanged end of retainer, then place retainer over slotted end of cam. Hook free ends of springs into holes in cam, then turn retainer counterclockwise and push springs into place around cam. Slide cam and roller retainer assembly over mainshaft and pinion cage hub. Install "U" clips at each end of freewheeling cam. Insert freewheel rollers in slots of retainer using either heavy grease or a small rubber band to hold them in position. On Rambler and Willys, install output shaft bearing inner snap ring in case, then install bearing and outer snap ring. On other models, install bearing and bearing snap ring on output shaft. On all models, install speedometer and governor drive gears on shaft and retain with woodruff key, or snap rings and drive ball or key. Engage ring gear on teeth of output shaft and install the large snap ring in ring gear. On all models, except Chevrolet, start output shaft assembly on freewheel rollers, cocking shaft slightly to engage lower rollers first, then turn shaft counterclockwise to roll freewheel rollers off cam to the low position and slide shaft over rollers. On all models, reassemble overdrive housing by reversing disassembly procedures.

OVERDRIVE HOUSING INSTALLATION: Reverse removal procedures.

REAR OIL SEAL REMOVAL & INSTALLATION (Transmission in Car):

1954 Hudson, 1954-58 Studebaker, 1954-60 Willys: Disconnect front universal joint from companion flange or remove propeller shaft and slide joint off transmission output shaft. Remove companion flange (if necessary), then pry seal out of transmission housing with a sharp punch. To install, use a suitable tool to properly seat seal in housing.

1959-60 Studebaker: Disconnect propeller shaft at rear flange and slide front universal joint sleeve from transmission rear housing. Position Seal Remover, Tool J-4830-01 in rear housing so that lip of tool is between metal flanges of seal and expand the tool. Attach a slide hammer and remove seal. To install, position Bushing & Seal Replacer Collar, Tool J-6403-2, on Bushing & Seal Replacer, Tool J-6403, then position a new seal on tool with felt toward rear of transmission and drive seal into position in housing.

1955-57 Hudson, 1954-57 Nash Stat sman & Ambassad r, 1954-60 Rambler (All Seri s): Disconnect torque tube or propeller shaft from transmission (s *"Transmission" on Car Model pages).* On all models except Rambler Series 80, install Tool J-2619 and a slide hammer to remove seal from oil seal adapter in overdrive housing. On Rambler Series 80, remove oil seal from torque tube adapter with Tool J-2626. On all models except Rambler Series 80, install new oil seal with Tool J-1354. On Rambler Series 80, install seal in torque tube adapter with a suitable tool to seat it properly.

TRANSMISSION DISASSEMBLY & REASSEMBLY: S *"Warner 3-Speed Transmissions (1954-58)" or "Warner 3-Speed Transmissions (1959-60)".*

WARNER R10 & R11 OVERDRIVE CONTROL

Chevr l t (1955-60)
D S t (1954-56)
D dg (1954-56)
Eds l (1958-60)
F rd (1954-60)
Huds n (1954-57)
M rcury (1954-58)
Nash Statesman (1954-56)
Nash Ambassad r (1954-57)
Packard (1954-56) Ⓒ
Packard (1957-58)
Plym uth (1954-58)
Rambler (1954-60)
Stud bak r (1954-60)
Willys (1954-60)

Ⓒ - "R11" type overdrive.

►CHANGES, CAUTIONS, CORRECTIONS

►*OVERDRIVE LOCKOUT SWITCH NOTE: This switch may b found on some 1954-Early 1955 models. Later cars do not have a lockout switch. See "Overdrive Lockout Switch Replacement Note" following:*

►*WARNER R10 OVERDRIVE LOCKOUT SWITCH SERVICE REPLACEMENT NOTE:* If lockout switch defective on units where switch installed originally, both switch wires should be detached and connected together so that switch is eliminated from circuit. *CAUTION - Wir s should be soldered together and taped for prot ction from moistur and grease.* Leave switch installed to act as cover for switch mounting hole. If switch cannot be used for this purpose, make a sheet metal cover for installation over switch mounting hole.

►*1958-60 STUDEBAKER & 1958 PACKARD OVERDRIVE RELAY NOTE: Ov rdriv control relay is not used on th s models. See Wiring Diagram on Car Model pages.*

►***1955 FORD OVERDRIVE SOLENOID FAILURE NOTE:*** Solenoid failure may be caused by excessive resistance in wire leading to solenoid. To correct, parallel the existing 14 gauge wire from ignition switch to relay and from relay to solenoid with a 12 gauge wire. Attach both wires to a common terminal at ignition switch, "IGN" terminal of relay, and "SOL" terminal of relay. Replace the single "bullet" connector at solenoid with a double "bullet" connector and attach both the 14 gauge and 12 gauge wires.

►**Overdrive failure to engage or improper cut-in and cut-out speed Correction Caution:** Before replacing governor to correct this condition, make certain that **companion flange nut on rear end of overdrive mainshaft is tight** (looseness of this nut will allow governor drive gear to slip on shaft).

DESCRIPTION: Control units consist of a Governor (cut-in speed controlled by closing of governor contacts, cut-out speed controlled by opening of contacts), Solenoid (pushes pawl in to engage overdrive, return spring on solenoid plunger pulls pawl out to disengage overdrive), Throttle Kick-down Switch (switch breaks solenoid circuit when accelerator pedal fully depressed causing overdrive to disengage for "kick-down" direct drive), and a Control Relay. *NOTE - Control R lay not used on 1958-60 Studebaker and 1958 Packard.*

TROUBLE SHOOTING: Failure of the overdrive to operate satisfactorily may be caused by **mechanical** failure (of overdrive unit or control units), or by **electrical** failure (of control units and wiring).

OVERDRIVE DOES NOT ENGAGE

1. Mechanical Causes:
1) Dash control out-of-adjustment or not correctly positioned (control button on instrument panel should be ¼" out with shift lever on overdrive case in extreme rear position).

2) Shift Rail (in overdrive case) binding due to incorrect assembly or housing misalignment.

3) Balk ring faulty or incorrectly installed (may be indicated by spasmodic or harsh engagement). Check balk ring friction drag (see Disassembly data above). Make certain that sun gear plate and balk ring correctly installed with pawl in slot in balk ring (overdrive cannot engage if pawl rides on solid portion of ring).

4) Sun gear pawl broken, sticking or incorrectly installed. Remove solenoid (see Solenoid Testing) and check pawl for free operation.

5) Solenoid plunger sticking. See Solenoid Testing.

6) Governor drive pinion broken, driving gear on overdrive mainshaft loose.

2. Electrical Causes:
1) Fuse blown or open circuit between governor and relay, control wiring incorrect, loose connections or broken wires.

2) Governor, Relay, Lock-out Switch, or Kick-down Switch defective or plunger sticking.

3) Solenoid defective (pull-in or hold-in coil open, pull-in coil contacts sticking open). See Solenoid Testing.

OVERDRIVE DOES NOT DISENGAGE OR NO "KICK-DOWN"

1. Mechanical Causes:
1) Solenoid incorrectly installed (jamming pawl in overdrive position) or solenoid pawl rod sticking. Plunger spring weak or broken.
2) Sun gear pawl sticking, broken, or not properly engaged on pawl rod ball end. Remove solenoid and check pawl for free operation.

2. Electrical Causes:
1) Governor, Relay, or Kick-down Switch defective. Control wiring incorrect. Kick-down Switch out of adjustment.
2) Ignition cut-out or ground wire broken or disconnected (between Solenoid terminal #6 and kick-down switch, or between kick-down switch and distributor or ignition coil).

ENGINE STALLS ON "KICK-DOWN"

1. Electrical Causes:
1) Solenoid defective. Ignition ground contacts sticking closed or grounded.
2) Ignition cut-out or ground wire between Solenoid terminal #6 and kick-down switch.
3) Kick-down Switch defective (ignition cut-out terminals grounded).

ENGINE DOES NOT DRIVE CAR IN OVERDRIVE POSITION (Drives only when Overdrive locked out).

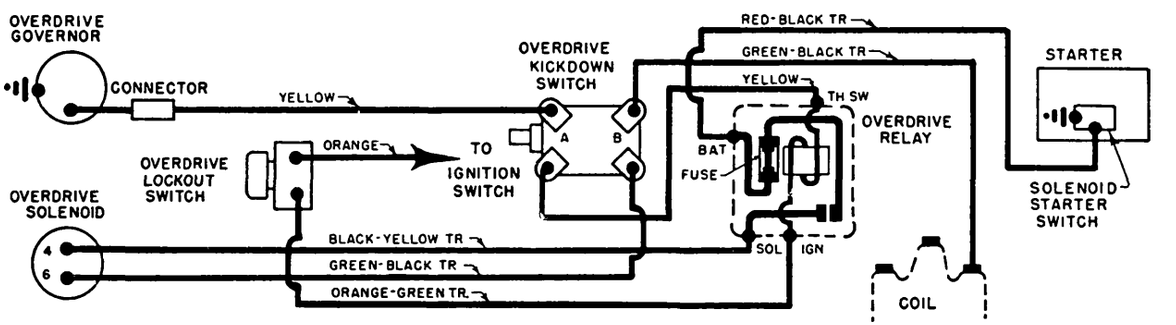
1. Mechanical Causes: Free-wheel clutch rollers broken, roller cage sticking in disengaged position, clutch cam or rollers worn.

TESTING & ADJUSTMENT OF CONTROL UNITS:

Control units should be serviced by replacement.
Governor: Governor should be replaced if operation unsatisfactory or cut-in and cut-out speeds not correct. See CAUTION below before replacing unit.

►***CAUTION—Before replacing governor*** **(if overdrive does not engage, or if cut-in and cut-out speeds not correct, make certain that universal joint companion flange nut on rear end of overdrive driveshaft is tight. Looseness of this nut will allow governor and speedometer drive gears to slip on overdrive shaft.**

CONTINUED ON NEXT PAGE



WARNER R11 OVERDRIVE CONTROL WIRING

WARNER R10 & R11 OVERDRIVE CONTROL (Cont.)

Overdrive Control Governor

Model	Governor No.
Chevrolet (1955-60)	Chev No 3712702
DeSoto (1954-56)	A-L No TGE-4010
Dodge (1954-56)	A-L No TGE-4010
Ford & Mercury (1954-60)	Ⓒ Ford & Merc No 8M-6943
Hudson (1954)	Hud No 307772
Hudson (1955-57)	Hud No 3112914
Nash (1954-57)	A-L No TGE-4005
Packard (1954-56)	A-L No TGA-4004
Packard (1957-58)	A-L No TGE-4012
Plymouth (1954-59)	A-L No TGE-4010
Rambler (Exc 1959-60 Series 80)	A-L No TGE-4001A
Rambler (1959-60 Series 80)	A-L No TGE 4001B
Studebaker Comm (1954-56)	A-L No TGE-4011
Studebaker Champ (1954-57)	A-L No TGE-4012
Studebaker V8 (1957)	A-L No TGE-4012
Studebaker 6 Cyl (1958-60)	A-L No TGE-4019
Studebaker V8 (1958-59)	A-L No TGE-4018
Studebaker V8 (1960)	A-L No TGE-4018A
Willys 4 Cyl (1954-60)	A-L No TGE-4002
Willys 6 Cyl (1954-60)	A-L No TGE-4005

Ⓒ - Replaces A-L Nos TGE-4006, 4013, 4014, 4015 & 4015A

Governor Testing—Governors can be tested by being driven on the bench and the RPM noted at which the contacts close (on acceleration) and open (on deceleration). Contact closing and opening RPM, should be correct and the difference between these two points must not be less than the "Min Diff." figure listed in the table below Parts are not furnished for service and defective governors should be replaced.

►***CAUTION—On some governors, one set of contacts open and second set of contacts close AT THE SAME RPM.***

Governor Specifications

Auto-Lite Model No.	Contacts Close (Max. RPM)	Contacts Open (Min. RPM)	Ⓒ Diff.
TGE-4001	632	463	90
TGE-4002, 3	840	680	90
TGE-4005	740	535	80
TGE-4006	531	410	63
TGE-4007	1055	780	90
TGE-4008, 9	625	477	90
TGE-4010, 18	575	440	90
TGE-4011	631	477	90
TGE-4012, 19	731	571	90

Ⓒ—Minimum difference between closing and opening

Solenoid: Various types used as listed below

►***SOLENOID REMOVAL CAUTION***—Solenoid must be disengaged from pawl for removal as follows: Take out two mounting capscrews, rotate solenoid clockwise ½-turn to disengage plunger from pawl (will align plunger flats with pawl slot), withdraw solenoid and plunger assembly.

Overdrive Solenoid

Model	Solenoid No.
Chevrolet (1955-60)	D-R No 1119795
DeSoto (1954-55)	D-R No 1118155
DeSoto (1956)	DeSoto No 1595336
Dodge (1954-55)	D-R No 1118155
Dodge (1956)	Dodge No 1595336
Ford (1954-55)	D-R No 1118168
Ford No (1956-60)	Ford No B6A-6916-A
Hudson (1954-55)	D-R No 1118164
Hudson (1956-57)	D-R No 1119772
Mercury (1954-55)	D-R No 1118168
Mercury (1956-58)	Mercury No B6A-6916-A
Nash (1954-55)	D-R No 1118164
Nash (1956-57)	D-R No 1119772
Packard (1954)	D-R No 1118155
Packard (1955-56)	D-R No 1119772
Packard (1957)	Studebaker No 450582
Packard (1958)	Studebaker No 1545215
Plymouth (1954-55)	D-R No 1118155
Plymouth (1956-59)	Plymouth No 1595336
Rambler (1954-55)	D-R No 1118155
Rambler (1956-60)	D-R No 1119772
Studebaker (1954-55)	D-R No 1118155
Studebaker (1956-57)	Studebaker No 450582
Studebaker (1958-60)	Studebaker No 1545215
Willys (1954-57) 6 Volt	D-R No 1118155
Willys (1957-60) 12 Volt	D-R No 1119772

Solenoid Testing—Solenoid can be tested on the bench (after removal from transmission) as follows:

Solenoid Winding—Connect battery to solenoid terminal #4, ground other battery terminal to solenoid mounting flange (meters can be used to check winding current draw—see specifications below). With solenoid energized, solenoid pawl rod should move out and hold in the outward position If pawl does not move out, coils are defective. If pawl chatters, hold-in coil is defective.

Ignition Grounding Contacts—With solenoid energized as for coil test (above), connect test lamp between battery terminal and solenoid terminal #6. Lamp should light indicating that ignition ground contacts are closed. Disconnect battery lead at solenoid #4 terminal Pawl rod should snap in and test lamp should go out (indicating that ignition ground contacts have opened).

Solenoid Specifications

(6 Volt)

Current Draw (Both Coils)—26 2-28 4 amperes at 5 volts

Current Draw (Hold-in Coil—Pawl rod in Overdrive Position)—1 2-1 4 amperes at 5 volts.

Contact Opening (on case and coil assy.)— 022-.040" with plunger against stop

(12 Volt)

Current Draw (Both Coils)—17 2-18 3 Amps at 10 volts

Current Draw (Hold-in Coil—Pawl Rod in Overdrive Position)— 81-85 amp at 10 volts

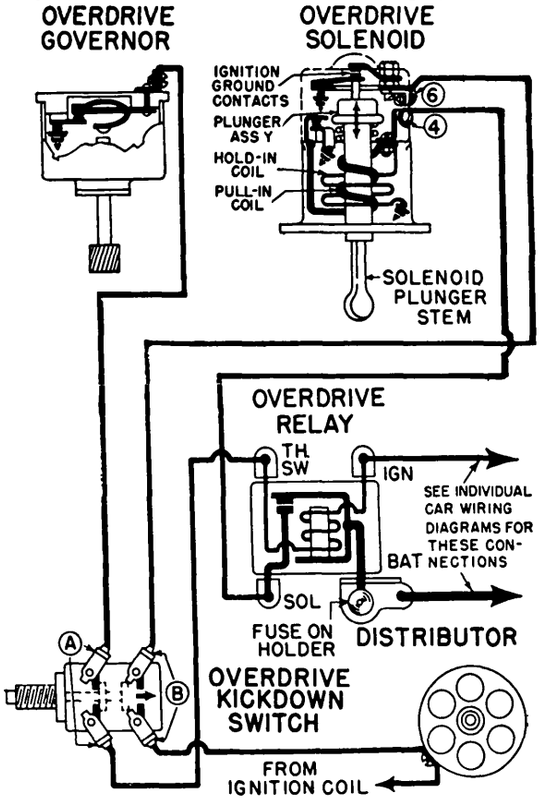
Overdrive Fuse: In cartridge type holder or on fuse block attached to control relay on all cars.

Fuse Capacity

Fuse Capacity - *See 'Miscellaneous Electrical' on Car Model pages*

Control Relay

Model	Relay
Chevrolet (1955)	D-R No 1116904
Chevrolet (1956)	D-R No 1116903
Chevrolet (1957-60)	D-R No 1116926
Chevrolet Corvette (1955-60)	D-R No 1116904
DeSoto (1954-55)	A-L No HRT-4001A
DeSoto (1956)	A-L No RAG-4001A
Dodge (1954-55)	A-L No HRT-4001A
Dodge (1956)	A-L No RAG-4001A
Ford (1954-55)	Ford No B1AZ-7A651-A
Ford (1956-Early 1959)	Ford No B6AZ-7A651-A
Ford (Late 1959)	Ford No B9AZ-7A651-A
Ford (1960)	Ford No C1AA-7A651-A
Hudson (1954)	Hud No 303107
Hudson (1955)	Hud No 5303107
Hudson (1956-57)	Hud No 3145512
Mercury (1954-55)	Mercury No B1AZ-7A651-A
Mercury (1956-58)	Mercury No B6AZ-7A651-A
Nash (1954-55)	Nash No 3136172
Nash (1956-57)	Nash No 3145512
Packard (1954)	Packard No 403940
Packard (1955-56)	Packard No 439826
Packard (1956-57)	Stude No 1542260
Studebaker (1954-55)	Stude No 523297
Studebaker (1956-58)	Stude No 1542260
Willys (1954-57) 6 Volt	Willys No 806939
Willys (1957-60)	Willys No 916721



WARNER R10 OVERDRIVE CONTROL WIRING

WARNER & SPICER TRANSFER CASE

Willys, All M d ls with 4-Whe l Driv

►*WARNER TRANSFER CASE NOTE—Both Warner and Spicer Transfer Cases used in production beginning in 1952. Design and repair procedures are similar.*

►*LUBRICATION CIRCULATION BETWEEN TRANSMISSION & TRANSFER CASE NOTE:* On models with three speed transmission, two 7/16" holes and two 1/4" holes are drilled on rear face of transmission case and two 7/16" holes are drilled on front face of transfer case to provide circulation of lubricant between transmission and transfer case. On 4-speed transmission models, there is no interchange of lubricant between cases. It is important that oil level in transmission and transfer case be checked separately on these models.

►***CAUTION—Correct gasket must be used to insure these lubrication holes being open.***

DESCRIPTION: Transfer case consists of an auxiliary transmission bolted on the rear face of the regular transmission and performing these functions:

1) Provides auxiliary speed range (Low & High) controlled by right hand shift lever (Low range useable only when Front Wheel Drive engaged).

2) Enables Front Wheel Drive to be engaged or disengaged (controlled by left hand shift lever).

3) Provides offset drive for front wheels to clear engine (drive for front and rear wheels taken from shaft at right of transfer case).

►***CAUTION—Manufacturer recommends that front-wheel drive not be used on dry hard-surfaced roads (will cause rapid tire wear and hard shifting of gears).***

REMOVAL: Transfer case is removed as a unit with transmission (see Transmission Removal data on car model page). Then separate transfer case from transmission as follows: Take out screws and remove rear cover, remove nut on end of shaft and pull gear off end of mainshaft, remove five transfer case mounting screws, pull transfer case off transmission while tapping on end of mainshaft with a soft hammer (CAUTION—Do not allow mainshaft to pull out of transmission case, this would allow transmission synchronizer parts to fall down in transmission case) leaving mainshaft and rear bearing in transmission, place transfer case on bench.

DISASSEMBLY: Take out four screws and remove rear propeller shaft universal yoke, hand brake assembly and brake linkage. Remove transfer case lower cover. Take out retaining screw and remove intermediate shaft lockplate (on rear face of case), drive intermediate shaft out toward rear of case, withdraw intermediate gear, thrust washers, and roller bearing from case. Take out plugs and remove detent poppet balls and springs from both shift rails, move front wheel drive shift rail to engaged (forward) position. Take out mounting screws and remove front output bearing cap and shaft assembly (see disassembly note below) taking care not to lose shift rail interlock plunger. Remove output shaft snap ring and thrust washer. Take out mounting screws and remove rear output bearing cap and shaft assembly (see disassembly note below) which will allow sliding gear and constant mesh gear to be removed from bottom of case. Remove setscrew in sliding gear shift fork, remove shift rail and lift out shift fork.

Front Output Bearing Cap Disassembly Note— Remove nut on end of shaft, pull universal joint yoke, remove oil seal. Take out setscrew in shift fork, remove front drive clutch gear and fork as a unit. Remove output shaft through rear of cap, pressing the shaft out of the bearing using care not to damage bearing. Remove bearing snap ring, remove bearing through rear of cap.

Rear Output Bearing Cap Disassembly Note— Remove nut on end of shaft, pull universal joint companion flange, remove oil seal. Remove speedometer driven gear assembly. Withdraw output shaft through inner end of cap. NOTE—Bearing cone is press fit on shaft and can be pressed off if necessary.

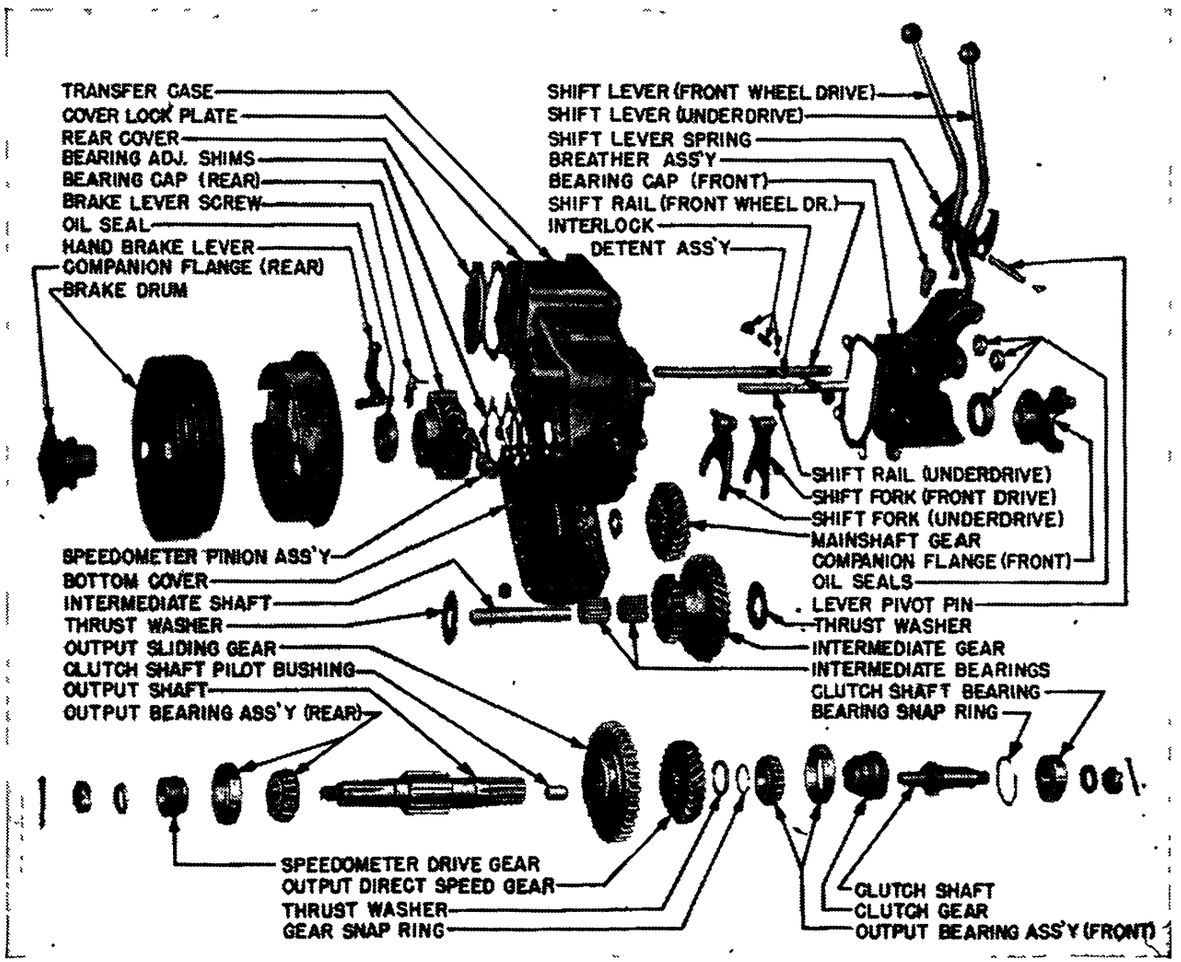
REASSEMBLY: Assemble parts in reverse order of disassembly directions given above and note the following points:

Output Shaft Bearing Adjustment— Install shims between rear output shaft bearing cap and transfer case, as necessary, so that shaft endplay is .004-.008" with front and rear bearing cap mounting screws tight.

Transfer Case Mounting on Transmission— Make certain that countershaft and reverse idler shaft lockplate (on rear face of transmission case) is properly positioned so that it fits into recess in front face of transfer case when transfer case installed.

Lubricating Hole Check— When replacing either transmission or transfer case, check for lubricating holes (see Lubrication Circulation Change above), use matching parts (drilled or undrilled) and correct gasket.

►***CAUTION—Gasket used with these drilled cases must have matching holes at these oil circulation holes.***



TYPICAL TRANSFER CASE (FOR FOUR WHEEL DRIVE)

CHEVROLET & FORD TRANSFER CASE

Chevrolet ½ & ¾-Ton Trucks (1957-59)
Ford F-100 & F-250 Trucks (1959-60)

DESCRIPTION: Manually shifted 2-speed transfer case used for control of power from engine and transmission to front and rear driving axles. Transfer case shift lever positions from front to rear are: 4L (low gear, all wheels), N (neutral), 2H (high gear, rear wheels), and 4H (high gear, all wheels).

DISASSEMBLY: 1) Remove both idler shaft bearing retainers, then use a soft hammer and tap idler shaft and bearing to rear until bearing is free of case. Remove idler shaft, two gears, and spacer, then remove idler shaft front bearing from case.

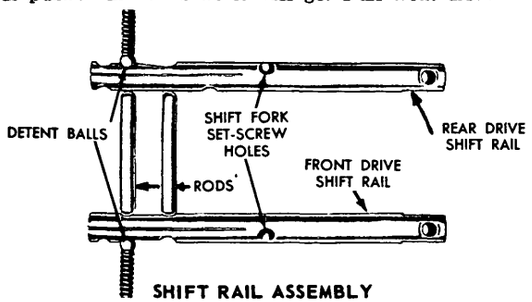
2) Remove flanges from all three shafts and remove bearing retainers. Tap front output shaft and rear bearing through the gears and case, then lift high speed gear from case. Remove setscrew retaining front drive shaft fork to shift rail and remove front output shaft sliding gear from case.

3) If input shaft oil seal is to be removed from case, use a puller and sliding hammer. Remove input shaft bearing retainer. Remove rear output shaft bearing retainer and remove speedometer drive gear assembly from retainer. Loosen rear output shaft assembly from case by driving on front end of input shaft with a mallet, then remove rear output shaft and bearing retainer as an assembly.

4) Tap input shaft through front bearing, through main drive gear, through sliding gear, and out of case. Lift main drive gear out of case, then drive input shaft front bearing from case with a mallet. Remove setscrew retaining rear drive shift fork to shift rail and remove rear output shaft sliding gear from case.

5) Remove shift rail link from the two shift rails, then remove retaining plug, detent spring, and ball that engages **front** drive shift rail detent rod. Remove retaining plug, detent spring, and ball that engages **rear** drive shift rail detent rod. Remove front drive detent rod access hole plug, then pull front drive shift rail to maximum outward position. Pull rear drive shift rail out far enough to allow the two detent rods to slide out of case, then remove front and rear drive shift rails and forks from case.

REASSEMBLY: 1) Install two new shift rail oil seals in transfer case, then install **front** drive shift rail all the way into case, and position shift fork on rail as rail goes into case. Install two detent rods into case. *NOTE - Position rails so detents are in locations indicated in illustration.* Install rear drive shift fork and hold detent rods and shift fork in place as the **rear** drive shift rail is pushed in as far as it will go. Pull **front** drive shift rail out to its next detent. This will permit **rear** drive shift rail to be pushed in to the full extent of its travel. After pushing **rear** drive shift rail all the way in, push **front** drive shift rail back to its extreme inward position.



SHIFT RAIL ASSEMBLY

2) Install rear drive shift rail detent ball, spring and retaining plug, then install access hole plug. Install front drive shift rail ball, spring and retaining plug. Secure the shift rail link in the two shift rails.

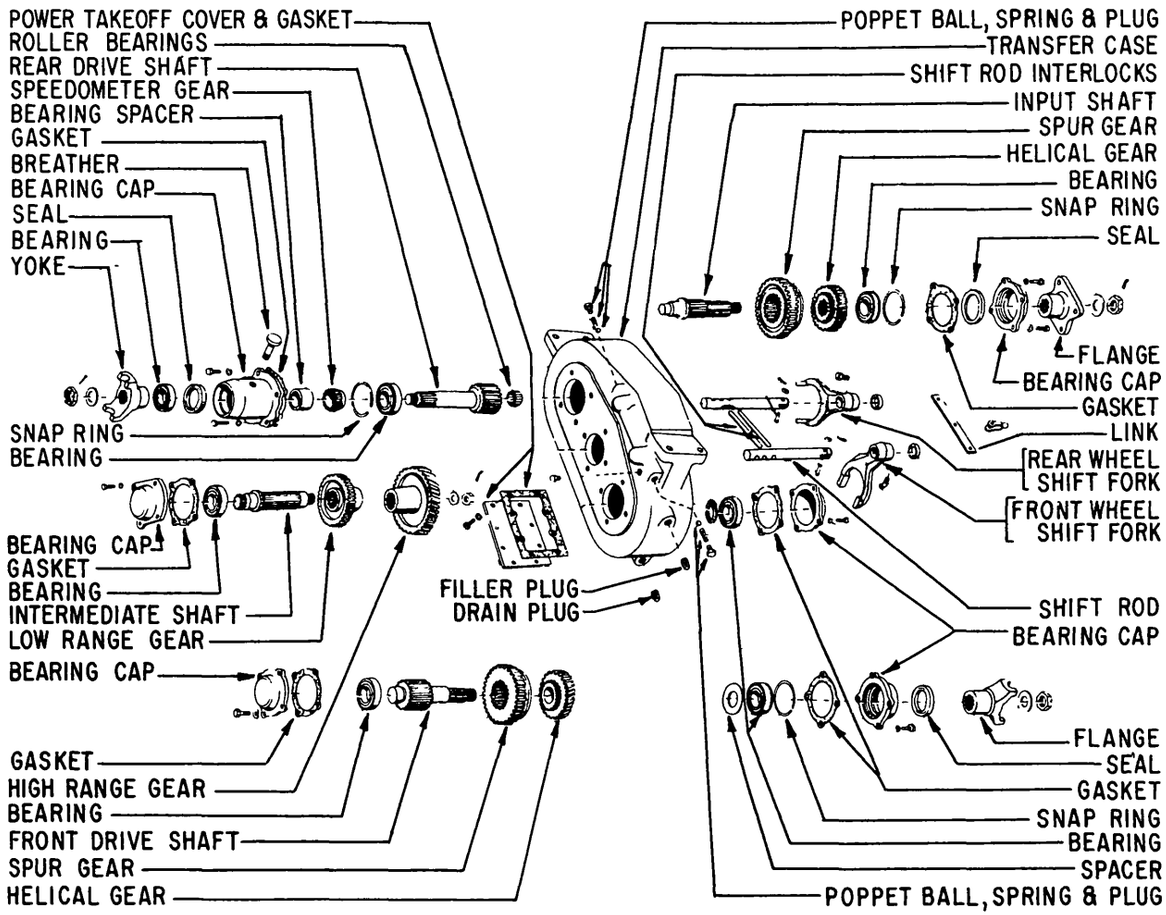
3) Position rear output sliding gear in shift fork and secure fork to rear drive shift rail with the setscrew and install safety wire. Install input shaft front bearing and retainer assembly, coating retainer and bolts with sealing compound.

4) Position main drive gear in case, then slide input shaft into rear of case through main drive gear, then through front bearing and retainer. Install roller bearings in splined hub of rear output shaft with petrolatum or grease, then install shaft and bearing retainer assembly, making sure that the output shaft is aligned with input shaft. Coat case, bearing retainer and bolts with sealing compound.

5) Position front output sliding gear in shaft fork and secure fork to front drive shift rail with the setscrew and install safety wire. While holding sliding gear and high speed gear in position, install front output shaft and rear bearing assembly through the two gears from rear of case. After coating retainer and bolts with sealing compound, install front output shaft rear bearing retainer and gasket.

6) Install washer and front bearing over front output flange at front of case, then install front bearing retainer and gasket. Coat retainer with sealing compound. Install flange, washer, flange retaining nut and cotter key on each of the three shafts and tighten nuts to 200-220 ft. lbs. *NOTE - Use a tool similar to T57-4851-A to hold shaft from turning whil tight ning nuts.*

7) Position idler shaft gears in case and install idler shaft and rear bearing assembly from rear of case. After applying sealing compound to plate and bolts, install rear bearing retainer plate. Position spacer on front end of idler shaft and install front bearing. Tap bearing lightly with a mallet into position, then install washer, retaining nut and cotter pin on front end of idler shaft. Coat plate and bolts with sealing compound, then install idler shaft front bearing retainer plate, and power take-off cover plate.



CHEVROLET & FORD TRUCK TRANSFER CASE ASSEMBLY

CHEVROLET TRANSFER CASE

Chevr l t Trucks (1960)

DESCRIPTION: Manual shift two-speed transfer case used on Four-Wheel Drive models to transmit power from engine to rear and front axle assemblies through a four speed transmission. A single control lever is used to shift transfer case from direct drive to low (four-wheel drive) at a ratio of 1.94-1.

DISASSEMBLY: Shift Rods - Remove transfer case cover and slide out interlock pin. Remove shift rod poppet balls and springs, then cut lock wires and remove shift fork setscrews from fork. Pull shift rods from case and remove forks from inside as rods removed.

Pr pell r Shaft Y k and Deflector: Remove cotter pin, nut and washer at each of the three universal joints and remove yokes using a suitable puller.

Idl r Shaft: Remove front and rear idler shaft bearing caps and adjusting shims. *NOTE - Tie shims to cap for use at reass mbly.* Press or drive idler shaft out of case, then remove input shaft constant mesh gear, spacer, and low speed gear from case. If inspection indicates wear, remove bearing cone from shaft and bearing cup from case.

Front Output Shaft: Remove front bearing cap and gasket from case, then pull front output shaft and bearing assembly from case. If necessary, remove bearing from shaft. Remove front sliding gear from case. Remove rear bearing cap and gasket from case, then remove snap ring from front output gear and slide spacer from gear. Drive gear inward out of bearing and remove from case, then remove bearing from case.

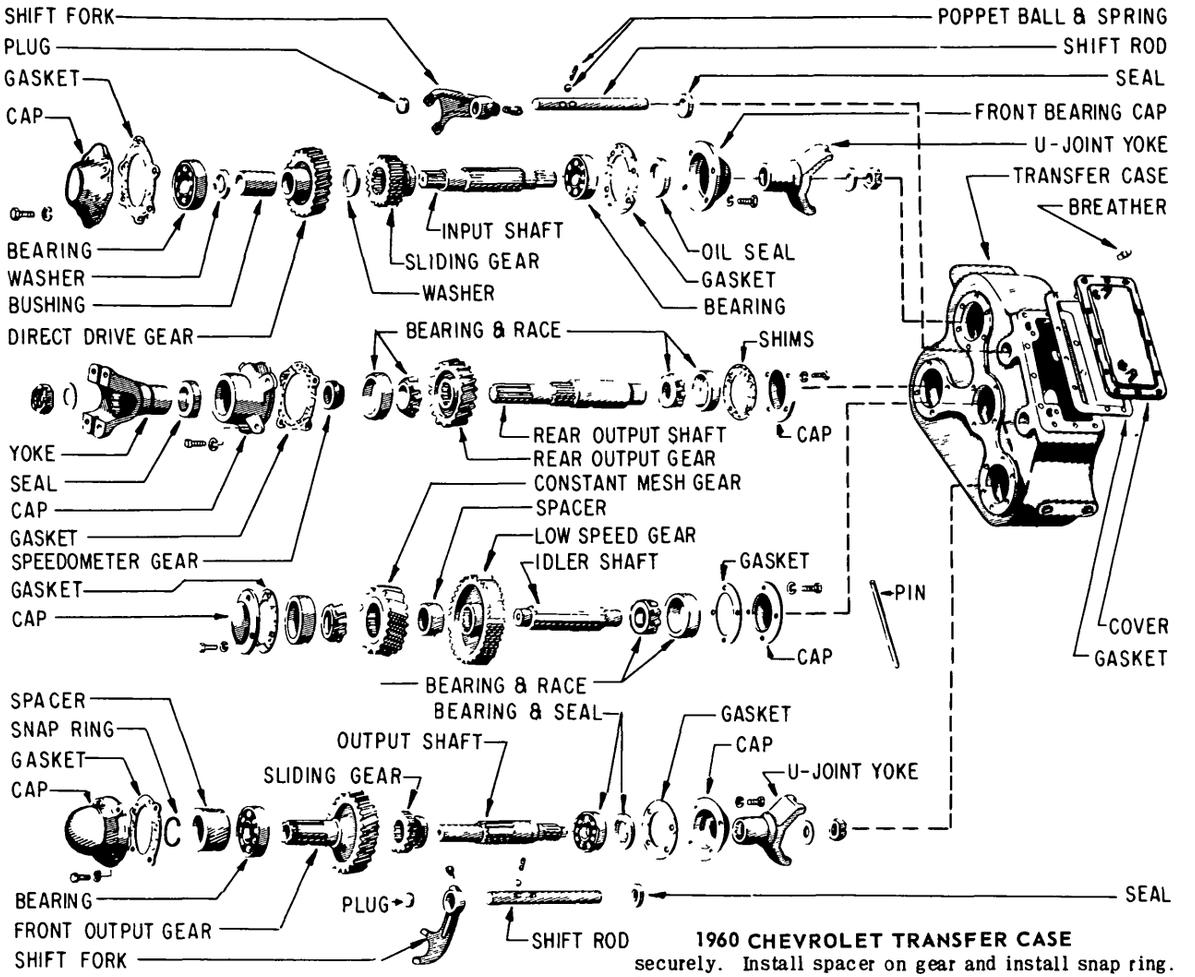
R ar Output Shaft: Remove front and rear bearing caps, gaskets and shims. *NOTE - Tag shims under front cap for use at reassembly.* Press or drive output shaft toward front of case until shaft and bearing are removed, then remove shaft gear and bearing from case. If necessary, remove bearing cone and cup from shaft or case.

Input Shaft: Remove front bearing cap, then remove assembly and shims. *NOTE - Tag shims for use at reassembly.* Remove rear bearing cap and gasket, then press or drive shaft toward front of case until removed. Remove direct drive gear, sliding gear, and thrust washer from inside case. Remove bearing and washer.

INSPECTION: Wash all parts thoroughly in solvent and blow dry with air. Inspect all bearings for chips, cracks or worn spots. Replace bearings if damaged. Inspect splines and gears for chips or excessive wear and replace as necessary.

REASSEMBLY: *NOTE - Make sure all parts are clean, then lubricate with proper transmission fluid before reassembly. Use new gaskets and lockwashers.*

Input Shaft: Press front bearing onto shaft with shielded side of bearing toward shoulder on shaft, then insert shaft through opening in front of case. As shaft is being moved into position, install sliding gear, washer, direct drive gear and washer. Install rear bearing on shaft with shielded side toward inside, then install rear bearing cap and gasket and tighten attaching bolts securely. Install front bearing cap using same shims as removed at disassembly. Check shaft endplay with a dial indicator. In endplay exceeds .015", change shim pack as necessary to obtain proper endplay. Install universal joint yoke, washer and nut, then tighten nut securely and install cotter pin.



1960 CHEVROLET TRANSFER CASE

Rear Output Shaft: If removed, press bearing cone onto rear output shaft. Locate rear output shaft gear inside case as shaft is installed through front of case and pressed into gear. Press or drive front bearing cup into case, then install bearing cap with adjusting shims. Install cap bolts and lockwasher and tighten securely. At rear of shaft, press bearing cone onto shaft, and bearing cup into case, then install speedometer drive gear. Install oil seal and bearing cap assembly and tighten capscrews securely. Install universal joint yoke, washer and nut and tighten nut securely. Check endplay of shaft with a dial indicator and remove or add adjusting shims at front bearing cap until endplay is as near "zero" as possible

Front Output Shaft: Locate front output gear inside case, then install bearing over gear hub and into position in case. If removed, press bearing onto output shaft. Output shaft is installed through opening in front of case and sliding gear must be located on shaft as shaft is pushed in to proper location. Install oil seal and bearing cap at front of case and tighten bolts securely. Install spacer on gear and install snap ring. Install rear bearing cap and gasket and tighten bolts

Idler Shaft: If removed, press bearing cone on front end of idler shaft. Start shaft into front side of case and install constant mesh gear, spacer, and low speed gear as shaft is pushed into position. Press front and rear bearing cups into case and over bearing cones. Install rear bearing cap and gasket and tighten bolts securely. Install front bearing cap and adjusting shims and tighten bolts securely. Check shaft endplay with a dial indicator, then add or remove shims as necessary until endplay is as near "zero" as possible.

Propeller Shaft Yoke & Deflector: Install yoke on shaft, then install washer and nut and tighten securely.

Shift Rods: If removed, install shift rod oil seals in case, then push rods into case being careful not to damage seals. Install shift forks on rods, then install and tighten setscrews. Thread a lock wire through setscrews to prevent loosening. Install poppet balls and spring into holes in case, then slide interlock pin into bosses on inner surface of cover and install cover and gasket. Tighten screws securely.

1954-60 BUICK, 1954-60 OLDSMOBILE, 1956-57 PONTIAC

Buick, Series 50 (1954-55)
Buick, Series 40 (1956-60)
Oldsmobile, Series 88 & 98 (1954-55)
Oldsmobile, Series 88 (1956-60)
P ntiac (1956-57)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 OLDSMOBILE TRANSMISSION LEAK CORRECTION:* **Leak at Front Face of Transmission**—Caused by transmission to clutch housing gasket not being compressed sufficiently. Correct by installing TWO gaskets, Part No. 1308193, at this point, and sealing around lip of the Main Drive Shaft Sleeve, where it contacts clutch housing. Use P.O.B. #2 sealer. **L ak Into Clutch**—This leak is caused by excessive clearance between mainshaft and bearing retainer sleeve and is noticed on cars driven at high speeds. check the clearance between Main Drive Shaft and Main Drive Shaft Sleeve by mounting a dial indicator on the case with indicator button contacting the sleeve, then move sleeve up and down. The clearance should not be greater than .012". Also check six points on sleeve (marked with chalk 30° apart) to determine if sleeve is out-of-round. If clearance not within limits at all points install a new sleeve, Part No. 560770, and seal around lip of retainer with P.O.B. #2 Sealer.

►*1957 BUICK & PONTIAC COUNTERGEAR THRUST WASHER CHANGE (To reduce Transmission Case W ar):* A new thrust washer, Buick Part No. 1180482) is used in production and for service replacement at rear of counterpin. A pin is embedded in the new thrust washer to index with slot in transmission case to prevent thrust washer from rotating. *NOTE - On some early transmissions it may be necessary to deepen the slot in transmission case.*

DESCRIPTION: Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Transmission shift levers mounted on side of case.

DISASSEMBLY: (1)—Remove transmission cover and gasket, shift lever, toggle spring, spring clip and spring extension. Remove speedometer gear (driven). **On Oldsmobile** remove rear bearing retainer and gasket. **On Buick 50** mark top edge of outer retainer so that it can be reinstalled in original position. Remove thrust plate and gasket, retainers, shims and torque ball from rear bearing retainer. Remove retaining bolt and washer, then pull universal joint from mainshaft, using Puller J-682A. To use puller, install pressure plug in transmission mainshaft, insert puller body in universal joint rear yoke and install "C" washer in groove in puller body on front side of yoke, turn screw handle clockwise. Remove universal joint spacer from mainshaft. Remove transmission rear bearings snap ring. Tap rear of mainshaft with soft hammer or hardwood block, remove mainshaft and bearing.

(2)—Shift transmission gears to second speed. Move mainshaft back until rear bearing clears case. Disengage shifter yoke from synchronizer. Lift front end of mainshaft up and slide synchronizer assembly from shaft.

(3)—Remove snap ring retaining 2nd speed gear on shaft. Line up small wire spacer ring in bottom of snap ring groove with thrust washer key and remove thrust washer and second speed gear. Remove snap ring retaining sliding gear, slide gear off shaft as shaft is withdrawn through rear of case.

(4)—Place transmission shift levers in neutral, remove set screws retaining shifter yokes and lever on shafts. Slide shifter lever and interlock away from second-and-high yoke shaft, and remove interlock retainer from groove in right end of selector shaft. Remove outer shift lever and lockwasher from left end selector shaft. With transmission shift mechanism in neutral drive shaft out through right side of transmission case using a soft hammer (welch plug in case will be driven out with shaft), taking care not allow shifter levers and interlock to drop into case.

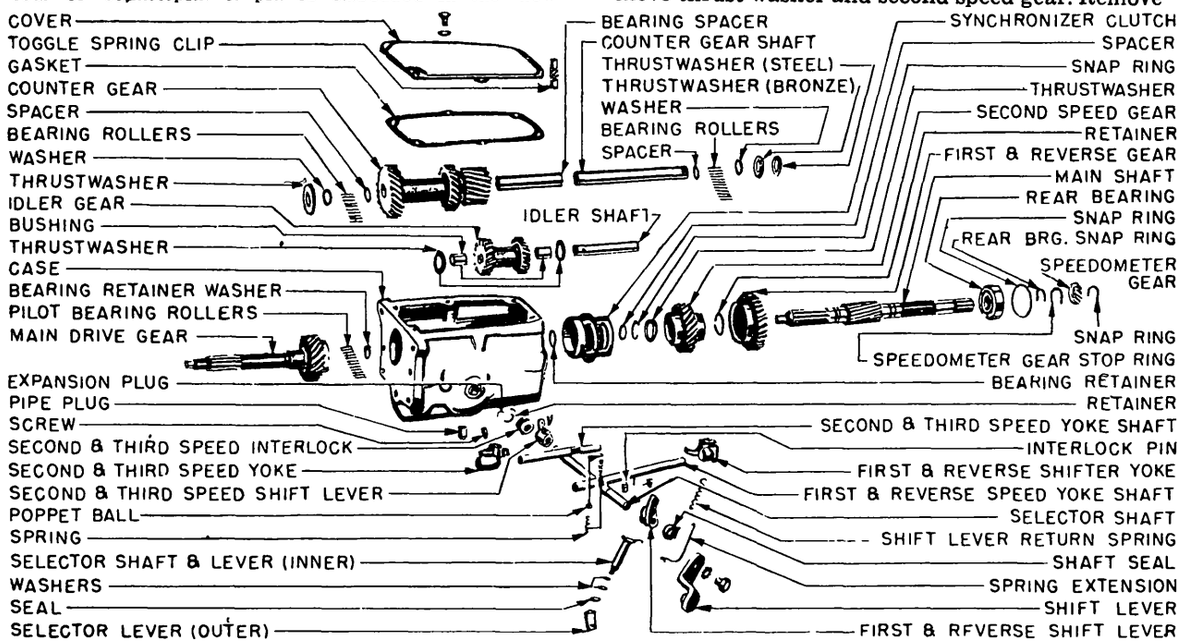
(5)—Push second-and-high shifter yoke shaft out through rear end of transmission case *(CAUTION—do not allow poppet balls and spring to fly out)*, lift out shifter yoke, poppet balls and spring. Remove low-and-reverse shifter yoke shaft similarly through rear end of transmission case.

(6)—Drive countershaft lock pin in until it is completely within shaft, use Bearing Loader Tool J-1001 to drive shaft out through rear of case *(CAUTION—*allow tool to remain within gear cluster to retain bearing rollers and thrust washers). Remove snap ring from main drive gear bearing, tap drive gear and bearing assembly into case and lift out.

(7)—Lift out counter gear assembly taking care not to lose washers and bearing rollers within gear cluster *(CAUTION—*note location of each type thrust washer to insure correct assembly). Remove nut and lockwasher and take off outer selector lever, remove inner lever and shaft (with spring washer and oil seal) from within case. Drive locking pin completely into idler gear shaft, remove shaft through rear of case, lift out idler and thrust washers.

OVERHAUL (Component Parts after Disassembly):
Countershaft Assembly—Remove countershaft removing Tool J-1001 and remove roller bearings, thrust washers, retaining washers and bearing spacer. To reassemble, place countershaft removing Tool J-1001 into cluster gear and install bearing spacer tube and bearing inner retainer washers over the tool. Assemble a sufficient number of bearings under end of tool so it is evenly spaced in bore of gear. Finish assembling a total of 26 bearings at each end of gear. Leave Tool J-1001 in place until gear is assembled in transmission case.
Main Drive Gear—Remove snap ring and washer holding main drive gear bearing to gear. Remove bearing by jarring shaft on block of wood. Remove wire lock ring, washer and 14 roller bearings from counterbore in gear. To replace, reverse removal procedure *(CAUTION—*Press on inner race of bearing when installing).
Main Shaft—Remove rear bearing snap ring. Remove speedometer using Tool J-4390 and remove gear spacer. (NOTE—If flange at inside diameter of each plate is too thick to slide easily between speedometer gear and bearing, grind down at this point to permit free movement). To assemble, install bearing up against shoulder (pressing on inner race). Install snap ring and speedometer gear on shaft. Press or tap speedometer drive gear on shaft against spacer, using Tool J-4390.
Rear Bearing Retainer Bushing (Oldsmobile)—Remove old bushing with Tool J-1450-4. Install new bushing using Tool J-1450-4 and Stop Guide Tool J-1450-5. Assemble reamer pilot into rear end of retainer housing. (NOTE—Pilot has two diameters;

CONTINUED N NEXT PAGE



BUICK, OLDSMOBILE, PONTIAC SYNCHRO-MESH TRANSMISSION

1954-60 BUICK, 1954-60 OLDSMOBILE, 1956-57 PONTIAC (C ntinu d)

select pilot diameter which fits tightly into housing). Place reamer J-1450 into housing and assemble Front Pilot J-1450-9 over shaft down into counterbore of housing. Tighten pilot in place with clamps J-1450-8. Ream inside diameter of bushing.

Rear Bearing Retainer Seal & Shield (Oldsmobile)—Remove seal from retainer. Line up new seal over bore in housing and tap lightly on outer edge to just start seal in place. Finish driving seal into retainer housing with Tool J-1354.

Synchronizing Clutch—Assembly cannot be dismantled and should be replaced as a unit. Synchronized springs are furnished and can be replaced as follows: Remove old springs by prying spring loose from gear and pushing it out of groove, then place new spring over clutch and pull synchronizer coupling up into place over spring.

REASSEMBLY: (1)—Install reverse idler gear, bronze thrust washer and shaft into transmission case. ***Note that set of teeth with chamfers at hub should be at rear of case when replaced.*** Make sure that end of shaft with larger diameter is at rear when replaced and that small hole in opposite end lines up with lock pin hole in transmission case. Install a new lock pin 1" below surface of boss on case.

(2)—Place spring washer, flat washer, and oil seal on selector shaft in order named, with crowned side of spring washer against flat washer. Apply lubriplate to shaft and assemble into transmission case. Install outer selector lever.

(3)—Lay countergear assembly (gear, bearings, spacer, and Bearing Loader Tool J-1001) into bottom of transmission case. Install small diameter bronze washer and a steel washer at rear of gear (with bronze washer next to gear) and a larger bronze washer at front.

(4)—Install main drive gear into front wall of transmission case and install snap ring. Mesh teeth of countergear with teeth on main drive gear and reverse idler gear. Drive countershaft into place from rear of transmission, being careful that it closely follows Bearing Loader Tool J-1001 so that bearings and washers are held in proper position. Be sure that larger end of shaft is in rear wall of transmission when assembled and that lock pin holes in shaft and transmission case are in line. Install new countershaft lock pin coated with white lead, drive pin in flush with surface of case.

(5)—Replace poppet ball and spring, interlock pin, and low-and-reverse shaft with yoke. Place both yoke shafts in neutral position (NOTE—Each yoke shaft is in neutral when notch for shifter lever is directly over selector shaft bore in case). Install a new welch plug (coat with white lead) in case.

(6)—Raise low-and-reverse interlock pin into groove in yoke shaft, then from left side of case install selector shaft. Place low-and-reverse shifter lever on shaft, making sure selector lever engages notch in bottom of shifter lever. Install second-and-high shifter lever and interlock on shaft. Install new second-and-high interlock retainer on shaft.

Torque Ball Installation & Adjustment (Buick)—*See Buick Special Data.*

1954-55 BUICK & PONTIAC SYNCHRO-MESH

Buick, Series 40 (1954-55)
Pontiac, All Models (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 PONTIAC MAINSHAFT PRODUCTION CHANGE.* A new mainshaft with a 1/32" wider second speed sleeve snap ring groove and a heavier snap ring is now used in production and for service replacement on all 1954 transmissions. The heavier snap ring, Part No. 1321312 must be used in conjunction with the new shaft, Part No. 1166418.

DESCRIPTION: Constant-mesh, synchro-mesh (2nd. & High), sliding gear (Low & Reverse), all helical gear type. Same design as used on preceding car models except for the following changes:

Shifter Mechanism—New cross-shift mechanism consisting of a vertical shaft on side of transmission case with inner lever at upper end engaging selector shaft so that movement of selector lever on transmission case (small forward lever) shifts the selector shaft sideways in the transmission to engage the Low-Reverse or Second-High shifter rail.

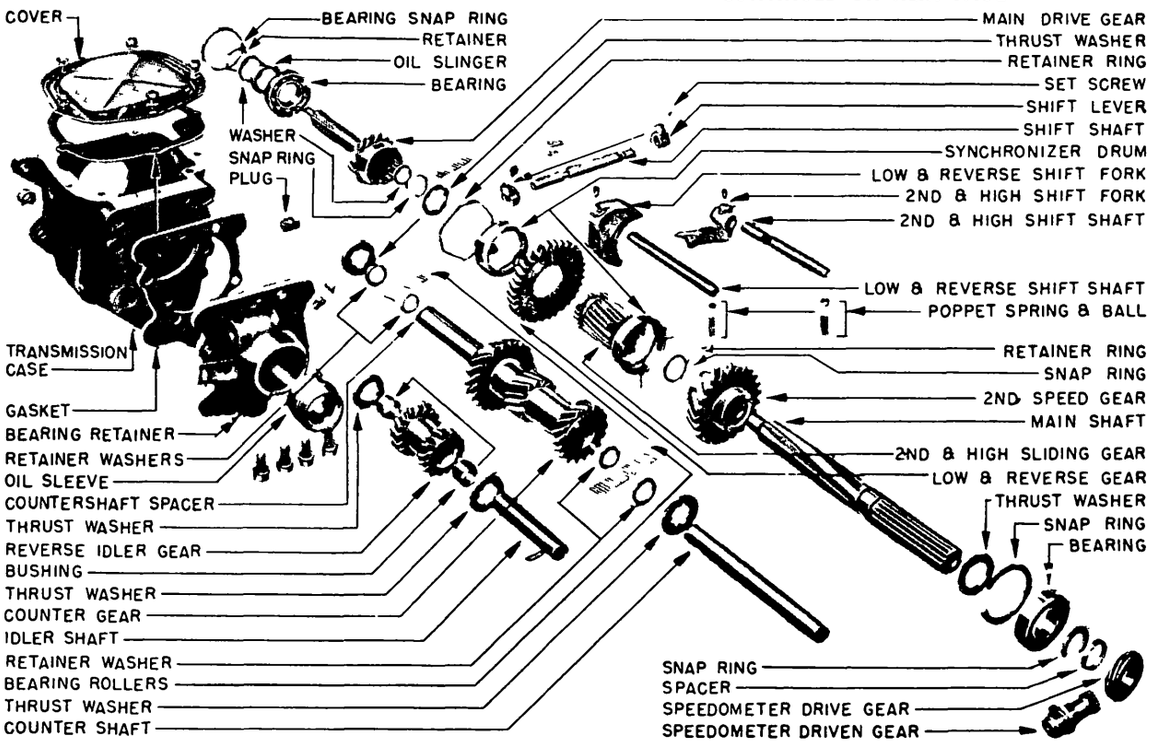
Countershaft Bearings—Countergear cluster now mounted on roller bearings (loose rollers) at either end with spacer on shaft between bearings. Special service tool (dummy shaft) must be used when removing countershaft to retain bearing rollers.

Synchronizer Cones & Gears (Buick only)—Synchronizing cones have 8° angle and must be used with new gears marked '8' (do not confuse these gears with gears used on previous models). Bronze cones must always be used with Second Speed Gear.

REMOVAL OF TRANSMISSION: ***See "Transmission" on car model page.***

DISASSEMBLY: Remove transmission cover and speedometer driven gear assembly. Disconnect spring on shifter lever on left side of case. Take out rear bearing retainer screws, set transmission in high gear position (to prevent sliding sleeve and low speed gear from dropping down into case), withdraw bearing retainer, second speed gear, and mainshaft assembly through rear of case. Remove setscrews from shifter forks and selector shaft cams (tool J-2895 or KMO-244), take out screw and remove lever from left end of selector shaft, remove lever from lower end of vertical shaft (necessary to permit inner lever on upper end of shaft to disengage from selector shaft), drive selector shaft out through right side of case (this is important to

CONTINUED ON NEXT PAGE



TYPICAL BUICK, OLDSMOBILE, PONTIAC SYNCHRO-MESH TRANSMISSION

1954-55 BUICK & PONTIAC SYNCHRO-MESH (Continu d)

prevent damage to oil seal on lever end of shaft), remove selector cams from case. Remove shifter rails at front of case (on Buick & Oldsmobile, plug at front end of Second-High rail must be removed—see Note), through rear of case (Pontiac), do not lose the detent balls and springs which are located under rails on all models. Lift out shifter forks, sliding sleeve and low speed gear. Use special tool (arbor or dummy shaft) J-1334 (Buick & Pontiac), J-1449 (Oldsmobile) to drive countershaft out through rear of case, leaving tool within counter gear cluster to retain bearing rollers until shaft is replaced. Remove snap ring on main drive gear bearing (on front of case), tap main drive gear and bearing through into case and lift out. Lift countergear cluster out being careful not to lose thrust washers on either end of cluster or bearing rollers. To remove reverse idler, drive locking pin into shaft, drive shaft out, remove gear.

►*BUICK SHIFTER RAIL NOTE:* Forks can be removed without entirely removing shifter rails by pushing rails toward back of case sufficiently to slip forks off (will not disturb poppet balls and springs or second-high rail welch plug).

REASSEMBLY: Reverse disassembly directions above and note following data on servicing of sub-assemblies.

Synchronizing Unit:—No detent springs used. Synchronizer drums are retained on gears by snap rings (remove by releasing snap rings).

Buick Note—Make certain that drum used on second speed gear is Bronze (aluminum drums used on some models for high gear).

Mainshaft & Rear Bearing Assembly: To disassemble parts, remove second speed synchronizing drum by prying retainer over shoulder on gear (leave retainer in drum). Remove snap ring from shaft, using Remover Tool J-1019 (Buick), J-1130 (Oldsmobile & Pontiac), remove thrustwasher and second speed gear. On Buick models, remove retaining bolt and washer on end of shaft and use Puller J-682-A to remove universal joint (install pressure plug in rear end of shaft, insert puller body in universal rear yoke and install "C" washer in puller groove ahead of yoke to take thrust). On all models, remove rear bearing snap ring, remove mainshaft and bearing from retainer or extension housing by tapping rear end of shaft with soft hammer or wooden block. To remove bearing from shaft, press or pull speedometer gear off shaft, remove spacer, use tool J-1041 to remove bearing rear snap ring ("C" type ring used on Oldsmobile and Pontiac only), press or pull bearing off shaft. Install bearing with shielded side forward or toward second speed gear. Bearing should be .0007" tight to .0002" loose on shaft and .0011" tight to .0005" loose in housing.

Pontiac Extension Housing - Housing has bronze-graphite bushing at rear end to support mainshaft. This bushing is located in housing directly in front of oil seal.

Rear Oil Seal (Pontiac)—Oil seal can be removed by prying with a screwdriver. Use tool J-1323 to install new oil seals (seal has extension rim which will be damaged if tool not used). Oil the felt of the new oil seal, and coat inner surface of housing and outer rim of seal with Permatex No. 3 or other sealer before installing it in housing.

Main Drive Gear & Bearing: Bearing can be removed from shaft after lock ring has been removed by tapping end of shaft on wooden block. When installing bearing, see that shielded side is toward gear. Bearing should be .0003" tight to .0007" loose on shaft and .0002" tight to .001" loose in case.

Pontiac Main Drive Gear Oil Slinger and Oil Seal - An oil slinger and spring washer are installed on main drive gear hub ahead of the bearing (retained by bearing snap ring). Install new felt seal (lubricate seal with engine oil) against shoulder on shaft directly forward of oil slinger each time transmission is installed in car.

Second Speed Gear: Gear clearance on mainshaft should be .001-.028" (Buick & 1951-54 Pontiac), .0015-.003" (1955 Pontiac). Gear endplay should be .000-.010" (Buick), .0001-.0231" (1951-54 Pontiac), .0061-.0261" (1955 Pontiac). When installing gear, coat thrust washer with lubricant and install against gear. Use Tool J-1130 to install retaining snap ring.

Countergear Assembly:—If rollers removed from gear cluster, use arbor as assembly tool, make certain that spacer and thrust washers assembled in gear cluster, then install rollers, using grease to retain them in place. Install assembly in case, making certain that small steel thrust washer installed next to bearing rollers and large bronze thrust washer between gear cluster and case at each end, insert countershaft from rear and push arbor out through front of case. See that lock ball in place in rear end of shaft and that ball engages groove in case to prevent shaft from turning. Countergear clearance should be .0005-.0024". Endplay should be .0176-.0296" (Buick) .0176-.0306" (Pontiac).

Reverse Idler Gear Assembly:—Remove old lockpin from reverse idler gear shaft and discard pin (use new pin for reassembly). Idler gear bushing clearance on shaft should be .0002-.0042". When installing gear, line up lock pin hole in shaft and case and install NEW lock pin as follows:

Lock Pin Installation - Use new lock pin and coat pin with white lead or sealing compound, then drive pin in until head of pin is 25/32" below surface of boss on case.

Shifter Mechanism: Selector shaft must be removed when transmission disassembled (see disassembly instructions above). To remove shaft, use KMO-244 or J-2895 tool to remove cam setscrews, remove lever on left end of shaft by taking out retainer screw, remove lever on lower end of cross-shift shaft (necessary to allow inner selector lever on upper end of shaft to disengage from selector shaft). Drive selector shaft out through right side of case (this is important to avoid damge to oil seal on lever end of shaft). With selector shaft out, inner selector lever and shaft can be lifted out. See that this shaft and hole in case are clean, lubricate with Lubriplate when shaft replaced, being certain that spring washer, plain washer and seal installed on upper end of shaft within case. Install selector shaft through left side of case and install new welch plug to close hole on right side (use white lead or other sealing compound to seal plug).

►***CAUTION*—When installing lever on selector shaft, hold shaft with wrench to avoid damaging selector cams. Make certain that lockwasher installed on lever retainer screw.**

1954 CHEVROLET 3-SPEED

Pass. Cars & S dan Deliv ry (1954)
Trucks, ½ & ¾-T n (1954-Early 1955)

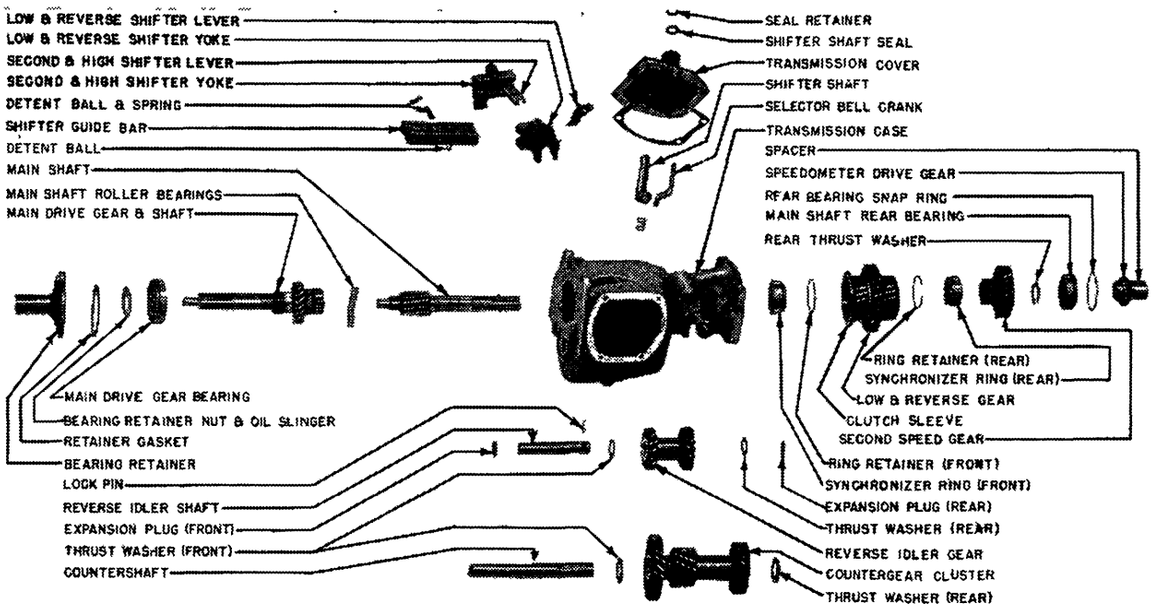
DESCRIPTION: Constant mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse). All helical gear type.

REMOVAL OF TRANSMISSION: *See "Transmission" on Car Model pag s.*

OVERHAUL: *S e "1955-60 Chevrolet & 1958-60 Pontiac 3-Speed" and not the following:*

G ar Shifter Assembly: Located in transmission side cover. Drain transmission and take out shift lever lock bolts, then pull lever off each shifter shaft. Remove cover from transmission and remove shifter interlock retainer nuts and locks, then remove shifter interlock retainer and shifter shaft and fork assemblies, shaft seals, poppets and springs (or interlock) from cover. Assemble by reversing disassembly procedures. To install cover, position cover so hump on side First-reverse shift fork is toward rear of transmission. Install cover with a new gasket (gears and shifter forks in neutral position), then install shift levers on shafts.

Univ rsal Ball J int Adjustment: *NOTE* - Check this adjustment each time propeller shaft is disconnected (before transmission installed). Remove ball housing from torque tube and clean ball with a suitable solvent. Check for roughness on mating parts of ball and housing and clean with emery cloth. Install a new torque tube ball retainer seal and packing, then assemble ball housing on back of transmission using four new shims for a trial fit, and tighten attaching capscrews securely. Check adjustment by moving rear end of ball housing. If adjustment is correct, torque tube ball will be a snug fit but should move with hand pressure. Add or remove shims for proper adjustment.



TYPICAL CHEVROLET 3-SPEED SYNCHRO-MESH TRANSMISSION

1955-60 CHEVROLET, 1958-60 PONTIAC 3-SPEED

Chevrolet Pass. Cars & S d. Del. (1955-60)
Corv tt (1955-60)
Chevrol t Truck, ½ & ¾-Ton (1955-60)
Pontiac (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*OVERDRIVE TRANSMISSION OVERHAUL NOTE: Transmissi n v rhaul is the same with or without overdriv . S e "Chevrol t Overdrive" for removal of overdriv unit.*

►*1955 PASS. CAR HARD SHIFTING CORRECTION:* Install the three new gears listed below, which have a greater tooth chamfer, and a new Transmission Conversion Kit, Part No. 3731061.

D scripti n	Old No.	New No.
1st & Reverse Gear	3845056	3725646
Counter Gear	3845051	3845201
Reverse Idler Gear	3845052	3845203

DESCRIPTION: Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse), all helical gear. *NOTE - 1957 and later transmissions are same as pr vious mod ls xc pt for a redesigned gearshift int rlock ass mbly.*

TRANSMISSION REMOVAL: *Se Car Model pages.*

TRANSMISSION DISASSEMBLY: 1) Remove capscrews from transmission side cover and remove cover and gasket. *NOTE–Under ordinary circumstances it is not necessary to disassemble cover assembly.*

2) Remove four clutch gear bearing retainer screws and shakeproof washers and remove the retainer. Install clutch gear and bearing puller J-937 by screwing the threaded sleeve (left hand thread) onto clutch gear shaft, and remove gear and bearing.

3) Remove 24 roller rear pilot bearings, 2 washers and 14 front roller bearings. Remove extension to transmission case bolts and lockwashers and pull extension and mainshaft out of transmission case, leaving second and third speed clutch assembly and first and reverse gears in case. Do not force mainshaft. Rotate mainshaft and second and third speed clutch gear to obtain alignment of clutching teeth and splines.

4) Remove second and third speed clutch sleeve assembly and first and reverse gear through side opening in transmission case. Remove counter-shaft by driving it from the front to rear of case, using a soft steel drift. Remove countergear rollers and front and rear thrust washers. *NOTE*–Countergear must be removed before removing reverse idler shaft.

5) Drive idler shaft lock pin into shaft (pin is shorter than diameter of shaft so shaft may be slipped out when pin driven in). Using a drift pin, tap rear of shaft to drive plug ahead of shaft *(CAUTION*–Do not rotate shaft while driving it out as lock pin may drop down between idler gear bushings). Remove reverse idler gear and thrust washers.

6) To remove mainshaft from extension, expand snap ring and tap rear of shaft with a soft hammer to bring shaft, speedometer gear, second speed gear and bearings as an assembly forward out of extension.

SUB-ASSEMBLY OVERHAUL: Wash all parts thoroughly. Inspect case for cracks and check front face of case for burrs. Check gears and shafts for wear or damage. Check first and reverse sliding gear for free movement on clutch sleeve. Check clutch sleeve for free movement on mainshaft.

Mainshaft, Rear Bearing, Second Speed Gear & Speedometer Gear: Disassembly–Press speedometer drive gear off mainshaft, using a suitable split plate in an arbor press. Remove bearing to mainshaft snap ring and press bearing off shaft. Remove second speed gear thrust washer, pull drive pin out of shaft and remove second speed gear.

Reassembly–Slide second speed gear on mainshaft, insert drive pin in shaft and install thrustwasher against gear. Install new bearing (groove in bearing toward second speed gear). Select one of four selective fit snap rings (see table below) so endplay of bearing on shaft is a maximum of .004" (this may be determined by installing successively larger rings. Use the thick-

CONTINUED ON NEXT PAGE

1955-60 CHEVROLET, 1958-60 PONTIAC 3-SPEED (C ntinu d)

est ring that will enter snap ring groove on shaft). Start speedometer drive gear on shaft with the chamfered inside diameter of gear toward bearing. Press gear on shaft until forward face of gear is 7/8" from rear face of bearing.

Rear Bearing Snap Rings

Thickness	Part No.
.086-.088"	3707188
.089-.091"	3707189
.092-.094"	3707190
.095"-.097"	3707191

Clutch Gear Bearing: Removal–Place clutch gear in a vise with soft jaws, and remove bearing retainer nut and oil slinger, using special wrench J-933. The retaining nut and oil slinger is a one-piece steel casting machined with a left handed thread and is locked in place on clutch gearshaft by being staked into a hole provided for that purpose. To remove clutch gear bearing place the special press plate J-936 over gear and against bearing. Using an arbor press, press shaft out of bearing. *CAUTION–Do not attempt to drive shaft out of bearing or bearing will be damaged.*

Installation–Using an arbor press, press clutch gear bearing on clutch gear with the locating ring toward front of the gearshaft so that bearing will enter case to maximum possible depth. Install combination clutch bearing retainer nut and oil slinger on clutch gearshaft and draw it up tight, using special wrench J-933. Lock the retainer nut oil slinger in place by staking it into hole with a center punch, being careful not to damage threads on shaft. *CAUTION–The bearing must turn as freely after it is installed on the shaft as it did before being placed on shaft.*

Clutch Sleeve & Synchronizer Rings: Disassembly–Remove first and reverse sliding gear. Turn synchronizer ring in clutch sleeve until ends of synchronizer ring retainer can be seen through slots in clutch sleeve. Using special pliers J-932, expand the retainer into counterbore in clutch sleeve. This raises the retainer from groove in ring so ring may be easily slipped out. Check synchronizer cones for wear or being loose in clutch sleeve. If cones are damaged, it will be necessary to replace the clutch sleeve assembly and both synchronizer rings. Inspect synchronizer rings for smoothness. Place rings in synchronizer cones and check with thumbs to see that rings do not rock. Excessive rocking indicates a poor fit between rings and cone, which will not permit proper synchronization of gears during shifting.

Reassembly–Install synchronizer ring retainers in counterbores in ends of clutch sleeve. Using special pliers J-932 in slot in clutch sleeve, expand each retainer in counterbore, lubricate each synchronizer ring with light oil and install clutch sleeve. (make sure retainers seat in groove all the way around rings so rings will turn freely). Install first and reverse sliding gear on clutch sleeve.

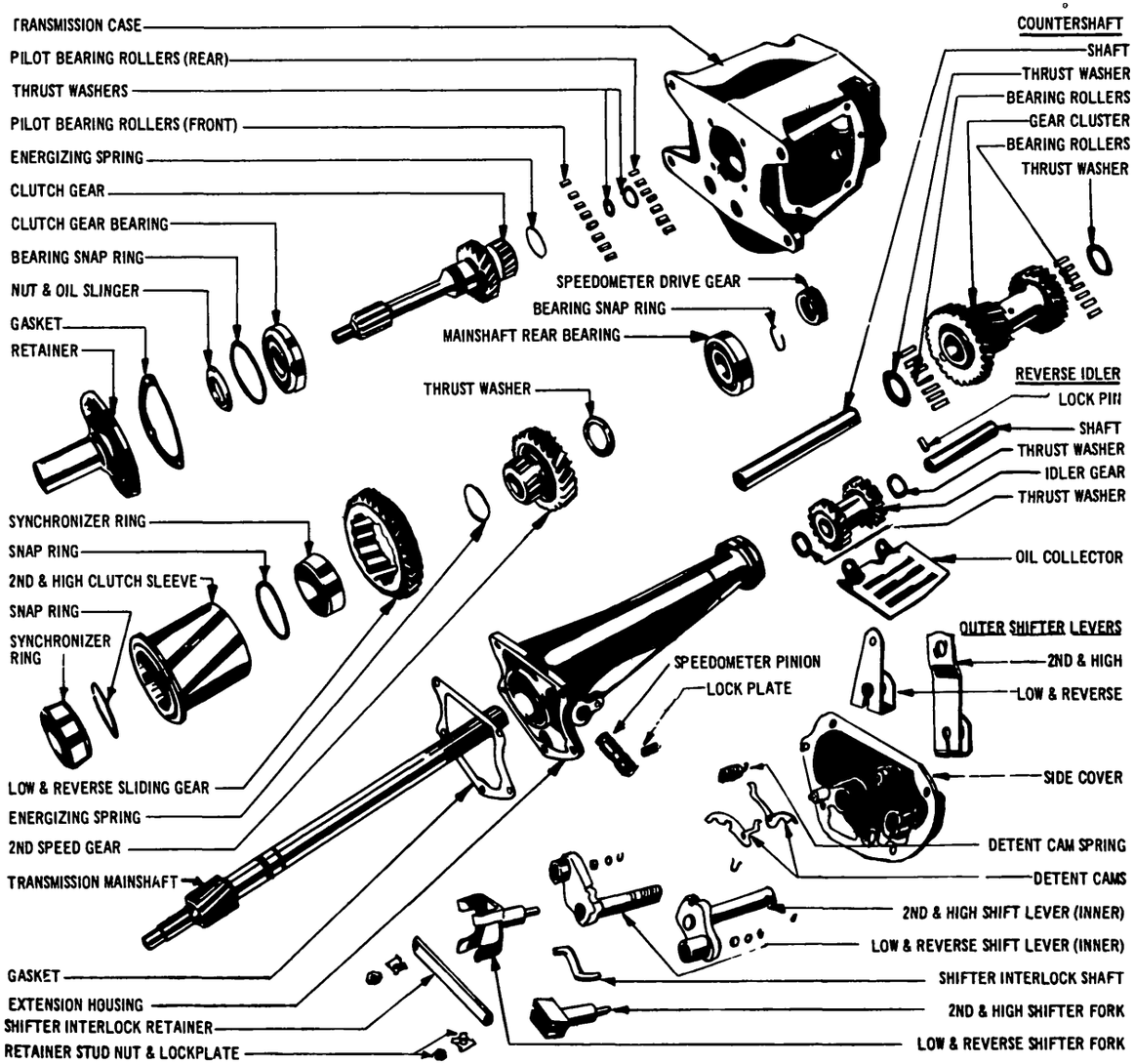
►*SYNCHRONIZER ENERGIZING SPRING REPLACEMENT CAUTION:* It will be noticed that one end of these springs is slightly offset. Each spring must be assembled in its groove in the clutch gear and the second speed gear with the offset or locking end between the third and fourth teeth of either of the two banks of teeth on these gears, thus keeping the spring from turning in its groove. It should not be necessary to replace these springs, however, if spring is removed, a new spring should be installed. The spring may be removed by slipping a thin blade under the spring and raising it sufficiently to slide it over clutch gear teeth.

CAUTION–In replacing either energizing spring, be very careful not to distort it when slipping it over clutch teeth.

►*REVERSE IDLER GEAR INSPECTION NOTE:* Check bushing for excessive wear by using a narrow feeler gauge between shaft and bushing. The proper clearance is .002-.004". *Reverse idl r g ar bushings ar not serviced separately.*

Side Cover & Shift Shafts (1955-56): Disass mbly - Remove cover assembly from transmission and remove outer shift lever clamp bolts. Pull levers from shafts. Remove nuts and locks and remove shifter interlock re-

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1957-60 3-SPEED TRANSMISSION ASSEMBLY (1955-56 SIMILAR)

1955-60 CHEVROLET, 1958-60 PONTIAC 3-SPEED (C ntinu d)

tainer. Remove shifter shaft and fork assemblies, poppets and springs, or interlock from cover.

Reassembly–*(CAUTION–Side cover must be removed t install shift r l v rs t shift fork shafts in side cover. If shift l vers ar installed with the side cover on on transmissi n, shift r forks will be forced against g ars causing hard shifting).* Install shifter interlock retainer. Install outer shifter levers on shafts and install clamp bolts. With transmission gears in neutral and shifter forks in neutral, install cover to transmission using a new gasket.

►*CAUTION: Th hump n the first and reverse shifter fork must b t ward r ar f transmission when installed.*

Sid Cover & Shift Shafts (1957-60): Disassembly - Remove side cover from transmission case, then remove outer shifter lever clamp bolts and pull levers from shafts. Remove nuts and locks and remove shifter interlock retainer. This will allow removal of shifter shaft and fork assembly and cam assembly, or interlock from cover.

R ass mbly - Replace necessary parts and install shifter interlock retainer. Install outer shifter levers on shafts and install clamp bolts. With transmission gears in neutral, install cover to transmission, using a new gasket. Tighten retaining screws tightly. *NOTE - Hump on first and reverse shifter fork must be toward r ar of transmission. Attach control rods to shifter l v rs, th n refill transmission.*

TRANSMISSION REASSEMBLY: 1) Lubricate the reverse idler thrustwashers and install gear and thrustwashers in transmission case with the gear having the chamfered teeth to rear of case. Install idler shaft, making sure that lockpin hole in shaft lines up with hole in case at same angle.

2) Using a new idler shaft lock pin, coat pin with Permatex and drive it in approximately 1/16" beyond flush-with-case position. Peen hole slightly to retain it in position. *(CAUTION–This lock pin must be a tight fit in case to prevent oil leaks).* Install idler shaft expansion plug in case, using a new plug when possible.

3) Place some cup grease on roller bearing area in each end of countergear and install the 25 rollers in each end, (the grease will hold rollers in place during installation). Install countergear assembly tool J-5777 in countergear. Lubricate thrustwashers with grease and place one at each end of gear. Insert countergear (with Tool J-5777) in transmission case and align tool with countergear holes in case. Lubricate countershaft and insert it in rear of case, pushing assembly tool out front of case. Turn countershaft so flat on end of shaft is horizontal and at bottom of shaft. Make sure front end of shaft is in line with hole in front of case and drive shaft in until flat on shaft is flush with rear of case.

►*CAUTION:* Flat on bottom of shaft must be horizontal and at BOTTOM or the transmission case extension cannot be assembled to transmission case. On OVERDRIVE equipped transmissions, flat must be horizontal and at TOP of shaft to engage overdrive adapter.

4) Install synchronizing clutch sleeve assembly, with first and reverse sliding gear, in transmission case. Install mainshaft assembly in transmission case or in overdrive adapter. Install transmission case gasket.

5) Align lugs on synchronizer rings with slots in mainshaft helical spline, and turn second speed gear on mainshaft so lugs on synchronizer rings slide in slots on gear. Push shaft into clutch sleeve until transmission case extension (or overdrive adapter) is tight against case. Install bolts and lockwashers.

6) Lubricate mainshaft pilot hole in clutch gear with cup grease and install the two groups of roller bearings (install the 14 group and small spacer, then the large spacer and the 24 group). After being assembled in pilot hole, these bearings will lock themselves in place and cannot fall out. Install clutch gear in transmission case.

7) Using a brass drift, tap outer race of clutch gear bearing until bearing locating ring seats against case, being careful to drive the assembly straight to prevent damage to mainshaft pilot and pilot bearing. *CAUTION–*During this operation make sure that synchronizer ring lugs line up with slots between clutch teeth on clutch gear.

8) Install clutch gear bearing retainer and gasket, making sure that oil slot in retainer lines up with oil slot in front face of case. Do not allow gasket to protrude beyond edge of retainer. Install retainer screws, using special shakeproof washers. Tighten retaining capscrews to 10-12 ft. lbs.

CHEVROLET (PASS. CAR) & PONTIAC 4-SPEED SYNCHRO-MESH

Ch vr let Pass. Cars (1957-60)
Chevrolet C rvette (1957-60)
P ntiac (1960)

DESCRIPTION: New 4-speed "close ratio" helical gear type (except reverse), with constant mesh, synchro-mesh in all forward speeds. Sliding gear (reverse).

REMOVAL: *Se "Transmission" on Car Model pages.*

OVERHAUL

SPEEDOMETER DRIVEN GEAR: *(NOTE - This gear may be r moved with transmission in car).*

R m val: Disconnect speedometer cable, remove lock plate-to-housing bolt and lockwasher, then remove lock plate. Insert screwdriver in lock plate slot in fitting and pry fitting, gear and shaft from housing. Pry "O" ring from groove in fitting.

Installati n: Install new "O" ring seal in groove in fitting and insert shaft. Hold assembly so slot in fitting is toward lock plate boss on housing and install in housing. Push fitting into housing until lock plate can be inserted into groove and attached to housing.

SIDE COVER: *(NOTE - Side cover can be removed with transmission in car after shift rods have been disconnect d and transmission drain d).*

Removal: Remove nine bolts from side cover and remove side cover, gasket, and shifter forks.

Disassembly: Remove outer shifter lever clamp bolts and pull levers from shaft. Carefully push shifter shafts into cover, allowing detent balls to fall free, then remove shifter shafts. Remove interlock sleeve, interlock pin, and poppet spring.

Reassembly: Install interlock sleeve and one shifter shaft. Place steel detent ball into sleeve followed by poppet spring and interlock pin. Start second shifter shaft into position and place second detent ball on poppet spring. Compress ball and spring with screwdriver and push shifter shaft fully in. With synchronizers in neutral and shifter forks in place, lower side cover into place. Install bolts (using sealer on lower right bolt), and tighten evenly.

MAINSHAFT OIL SEAL: *(NOTE - Seal may be removed with transmission in car).*

Re moval: Remove nuts and bolts retaining rear universal joint trunnion bearings to drive flange. Lower rear end of propeller shaft and slide front flange off mainshaft. Use Tool J-5859 to remove mainshaft oil seal.

Installati n: Press new seal into place in extension *(CAUTION - Do not forc seal against s at in xt nsion).* Install propeller shaft and connect rear universal joint.

TRANSMISSION CASE: Disassembly - Remove side cover (above), remove front bearing retainer bolts, remove retainer and gasket. Drive retainer pin from reverse shifter lever boss and pull shifter shaft out far enough to disengage shifter fork from reverse gear. Remove bolts attaching extension case to rear bearing retainer plate, then tap extension with a soft hammer, in a rearward direction. When reverse idler shaft is out as far as it will go, move extension to left so reverse fork clears reverse gear and remove extension case and gasket. Remove rear reverse idler gear and tanged thrust washer and front reverse idler gear and flat thrust washer. Remove speedometer gear, using a puller, and reverse gear. Remove self locking bolt attaching rear bearing retainer to transmission case, then carefully remove entire mainshaft assembly. Unload needle bearings from clutch gear and remove fourth speed synchronizer blocker ring. Remove clutch gear retaining snap ring and spacer, then press clutch gear out of bearing toward inside of case. Tap front bearing and snap ring out of case from inside. From front of case, press out countershaft, then remove countergear and thrust washers. Remove the 80 rollers, 6.050" spacer, and roller spacers from countergear.

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CHEVROLET (PASS. CAR) & PONTIAC 4-SPEED SYNCHRO-MESH (Continued)

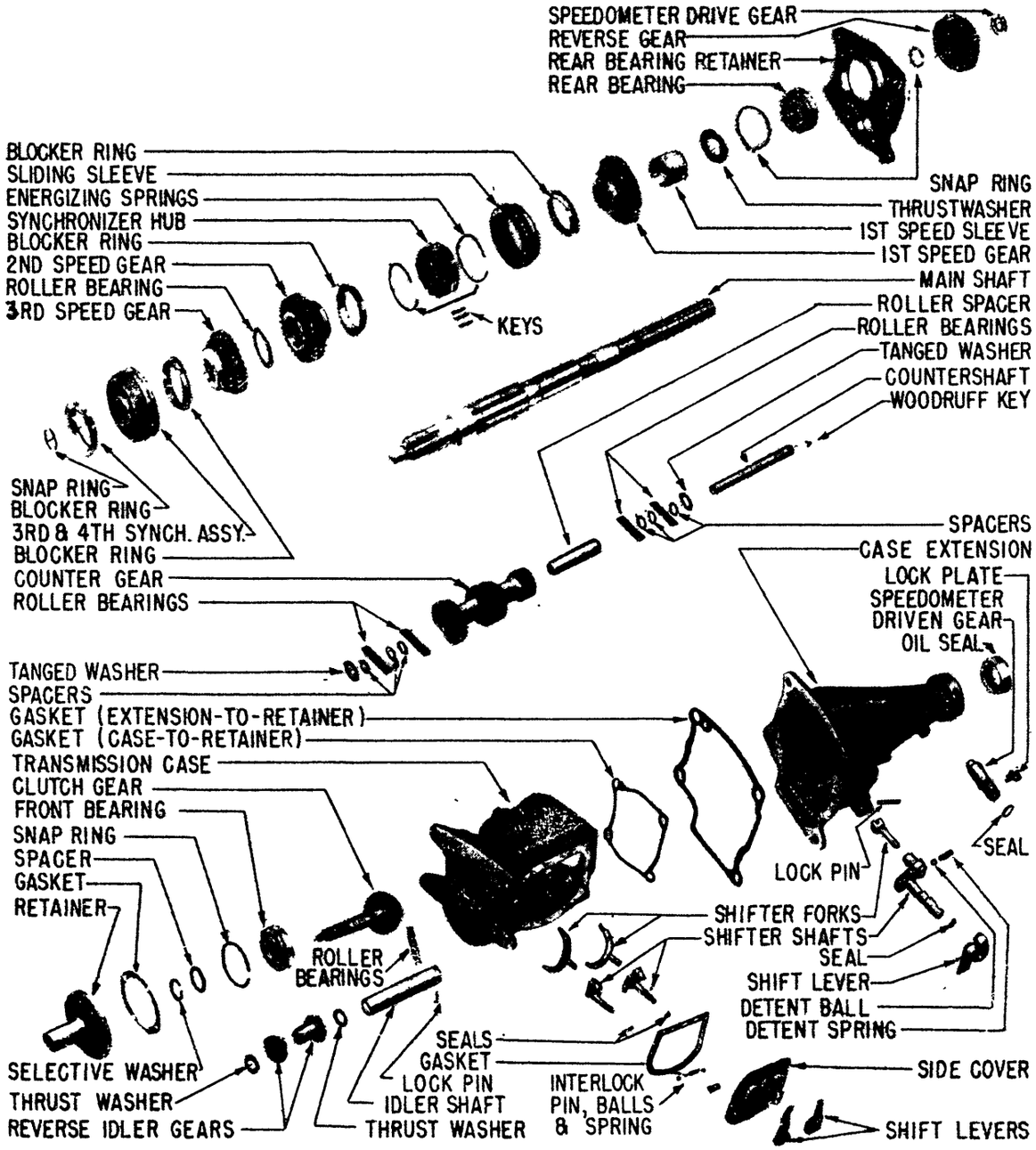
Cl aning & Inspection: Wash case inside and out with cleaning solvent and inspect for cracks. Inspect front face which fits against clutch housing for burrs. Remove any burrs with a fine cut mill file. Wash front and rear bearings in solvent and blow dry with air. Check for roughness, then oil them with light engine oil. Check clutch and countergear needle bearings and countershaft for wear.

EXTENSION CASE: Disassembly - Drive rear idler shaft lockpin into boss until it falls into clearance hole in shaft. Pry out extension plug at end of shaft and press shaft from extension. Remove shifter fork from shifter shaft, then drive shifter shaft into case, allowing ball detent to drop into case. Remove shaft and detent ball spring.

MAINSHAFT: Disassembly - Remove mainshaft front snap ring, third and fourth speed clutch synchronizer assembly, third speed gear and synchronizer blocker ring, second and third speed gear spacer (needle roller bearing), and second speed gear and blocker ring. Spread rear bearing snap ring and press off the retainer. Remove mainshaft rear snap ring. Support first and second speed synchronizer assembly and press on rear of mainshaft to remove rear bearing, first speed thrust washer, first speed gear and synchronizer blocker ring, second speed synchronizer assembly, and first speed gear sleeve.

►*SYNCHRONIZER ASSEMBLY CAUTION:* Synchronizer hubs and sliding sleeves are a selected assembly and should be kept together as originally assembled (the three keys and two energizing springs may be replaced if worn or broken). To remove keys and springs, push hub from sliding sleeve. The keys will fall out and the springs can be removed. Reinstall by placing the two energizing springs in position (one on each side of hub), so that tanged end of each spring falls into same keyway in hub. Place keys in position and hold them in place while sliding hub into sleeve.

R assembly: From rear of mainshaft, assemble first and second gear synchronizer assembly on mainshaft (tapered end of clutch sleeve toward first speed gear), use Tool J-5746 to press first gear sleeve on shaft in an arbor press. Install first speed gear synchronizer blocker ring so that notches in ring correspond with keys in synchronizer hub. Install first speed gear (with hub toward front) and first speed gear thrust washer (grooves in washer must face toward gear). Press rear bearing on shaft (snap ring groove toward front of transmission) using Tool J-5746. Choose the correct selective fit snap ring and install it in groove behind rear bearing *(CAUTION - Always use new snap ring when reassembling transmission and do not expand ring further than is necessary for assembly).* From front of mainshaft, install second speed gear synchronizer blocker ring so that notches in ring correspond to keys in synchronizer hub. Install second speed gear with hub of gear toward back of transmission, and install the second and third speed gear spacer (needle bearing). Install third speed gear with hub to front of transmission, and the third speed gear synchronizer blocker ring (notches to front of transmission). Install third and fourth speed gear synchronizer assembly (hub and sliding clutch sleeve taper toward the front) making sure that keys in synchronizer



CHEVROLET 4-SPEED CLOSE-COUPLED TRANSMISSION ASSEMBLY

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CHEVROLET (PASS. CAR) & PONTIAC 4-SPEED SYNCHRO-MESH (Continued)

blocker ring correspond to the notches in third speed gear synchronizer blocker ring. Install snap ring (.086-.088" thickness) in groove in front of the third and fourth speed synchronizer assembly *(NOTE* - With the correct size snap ring, the third speed gear will have correct amount of end play which will be .010-.015" maximum, with the third and fourth speed clutch hub forward against the snap ring). Install rear bearing retainer plate. Spread the selective snap ring (use largest ring which will fit in groove) on plate to allow it to drop around rear bearing, and press on end of mainshaft until snap ring engages groove in rear bearing. Install reverse gear with shift collar to rear. Press speedometer drive gear onto mainshaft using a suitable press plate. Position speedometer gear to get a measurement of 4½" from center of gear to flat surface of rear bearing retainer plate.

EXTENSION CASE: R assembly - Place ball detent spring into detent spring hole and start reverse shift shaft into hole in boss. Place detent ball on spring and, holding ball down with a suitable tool, push shifter shaft into place and turn until the ball drops into place in detent on shifter shaft detent plate. Install shifter fork *(NOTE - D not driv shifter shaft locking pin into place until xt nsion case has been installed on transmissi n case).* Line up locking pin hole in rear idler shaft with hole in boss. Install idler shaft and lock in place with pin. Install new expansion plug behind idler shaft, using sealing compound on plug.

TRANSMISSION CASE: R ass mbly - Install roller spacer (6.050" long) in countergear, then, using heavy grease to retain them, install 20 rollers in first gear end of countergear, two .050" spacers, 20 more rollers, and a .050" spacer on top of second race of rollers. Install the same amount of rollers and spacers in the same order in the other end of countergear. Rest transmission on its side with side cover opening upward. Place countergear tanged thrust washers in position, retaining them with heavy grease and making sure that tangs are resting in notches in case. Set countergear in place in bottom of case, making sure that tanged thrust washers are not moved out of position. Press front bearing onto clutch gear, with snap ring groove to front, using Tool J-5746. Install spacer washer and selective fit snap ring in groove on clutch gear ahead of front bearing. Install clutch gear and bearing assembly through side cover opening and into position in transmission front bore. Tap lightly into place with a plastic hammer. Place snap ring in groove in front bearing. Lift countergear, mating fourth speed gear of cluster with clutch gear, then install countershaft into position from rear of case *(NOTE* - Be sure thrust washers remain in place). Install woodruff key in end of countershaft and press shaft into place until shaft is flush with rear face of case. Attach a dial indicator to case so contact button of indicator rests against face of a gear on countergear cluster and check endplay of countergear which should not be in excess of .025". Install the f urteen pilot roller bearings into clutch gear, using heavy grease to retain them in place. Using heavy grease, place gasket into position on front face of rear bearing retainer. Install fourth speed synchronizer blocker ring on clutch gear with notches toward rear of transmission. With front face of transmission case facing down, install the mainshaft assembly into case, making certain that notches on fourth speed synchronizer blocker ring correspond to keys in synchronizer assembly. Install self locking bolt attaching rear bearing retainer to transmission case and tighten to 20-30 ft. lbs. Using heavy grease, install flat thrust washer onto rear face of rear idler thrust boss. Shift transmission into second gear and carefully install the small half of the reverse idler gear into place along side of thrust washer (notches toward rear). From rear of case, insert rear half of reverse idler gear, engaging notches of portion of gear within transmission case. Using heavy grease, place gasket into position on rear face of rear bearing retainer. Install remaining thrust washer into place on rear idler shaft, making sure that tang on thrust washer is in notch in idler thrust face of the extension. Retain thrust washer in place with heavy grease. With transmission facing downward, forward speed gears in neutral, and the reverse shifter shaft as far forward as possible, lower the extension case onto transmission case. Engage reverse shifter fork with the reverse gear flange and lower the extension case into position while moving reverse shifter shaft rearward. Install three extension and retainer-to-case attaching bolts and tighten to 35-45 ft. lbs. Install one extension-to-retainer bolt and tighten to 20-30 ft. lbs. Use a sealing compound on lower right hand attaching bolt. Move shifter shaft to line up groove in shaft with holes in boss and drive in the locking pin. Install shift lever. Install front bearing retainer, gasket and four attaching bolts, using sealing compound on bolts. Tighten to 15-20 ft. lbs. Install shifter fork in each synchronizer (first and second speed gear shifter fork must have its flat surface facing the reverse idler thrust boss). Place both synchronizers in neutral, then install side cover gasket and carefully lower side cover into place. Install attaching bolts and tighten evenly to avoid distortion of cover. *NOTE - Use a sealing c mpound on side cover lower right hand bolt.*

CHEVROLET OVERDRIVE

Chevr l t Pass. Cars & Sed. Del. (1955-60)
Corvett (1955-60)
Chevr l t Truck, ½ & ¾-Ton (1955-60)

►*OVERDRIVE TRANSMISSION OVERHAUL NOTE:* Transmission overhaul is the same with or without overdrive. *Se "1955-60 Chevrolet, 1958-60 Pontiac 3-Sp d" for transmission overhaul.*

DESCRIPTION: Solenoid operated type (no centrifugal pawls) with governor control and accelerator controlled "kickdown". Engagement and disengagement of overdrive is made by movement of the sun gear pawl. The solenoid plunger pushes the pawl in to engage sun gear for overdrive and withdraws the pawl for direct drive (direct drive below cut-in speed and "kick-down" direct drive). *S e "Chevrolet Overdrive Control".*

►*OVERDRIVE REMOVAL NOTE:* Due to interference of X-member on convertible models, transmission and overdrive must be removed as an assembly for repairs. On other models all repairs to overdrive except those involving transmission mainshaft, overdrive adapter, or transmission rear bearing, can be made under the car with overdrive housing removed.

OVERDRIVE HOUSING: Removal–1) Place car on jack stands, remove drain plugs and drain transmission and overdrive. Disconnect wires from solenoid and governor switch. Disconnect cable from speedometer driven gear fitting.

2) Remove nuts and U-bolt retaining rear universal joint trunnion bearings to drive flange. Lower rear of propeller shaft and slide shaft to rear to remove universal joint front flange from output shaft. Remove speedometer driven gear fitting, gear and shaft.

3) Disconnect control cable from control lever. Drive out control shaft tapered pin and pull control shaft out.

4) Remove bolts and lockwashers attaching overdrive housing to transmission case and adapter and pull overdrive housing including overdrive output shaft and ring gear assembly to rear *(CAUTION–Be careful to keep adapter from pulling away from transmission cas . If this happens, transmission mainshaft pilot bearings will drop out of clutch gear and necessitate disassembly of transmission).* As output shaft is pulled toward rear, catch the clutch rollers as they drop out of retainer.

5) Remove gasket from adapter and install one bolt removed from housing to hold the adapter plate to transmission housing.

OVERDRIVE DISASSEMBLY: 1) Remove governor and pinion if not previously removed. Pierce plug in rear bearing snap ring access hole in top of housing and pry out the plug.

2) Spread rear bearing snap ring with snap ring pliers and lightly tap end of shaft with a soft hammer to free bearing from snap ring, then pull shaft, including ring gear, speedometer drive gear and rear bearing from housing.

3) Remove shift rail retractor spring from housing and

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CHEVROLET OVERDRIVE (C ntinued)

output shaft rear bearing snap ring. Press bushing from rear of housing, using tool J-5778.

4) Remove ring gear snap ring (large) and slide ring gear off shaft, (the oil collector ring is spun to shaft to provide an oil tight seal). Remove speedometer snap ring (small) from output shaft.

5) Support front face of bearing and tap end of shaft to start speedometer drive gear off shaft. *If necessary to use arbor press to start gear do not press shaft more than 3/8" through bearing or woodruff key in shaft may damage bearing.* Remove woodruff key and slide bearing off.

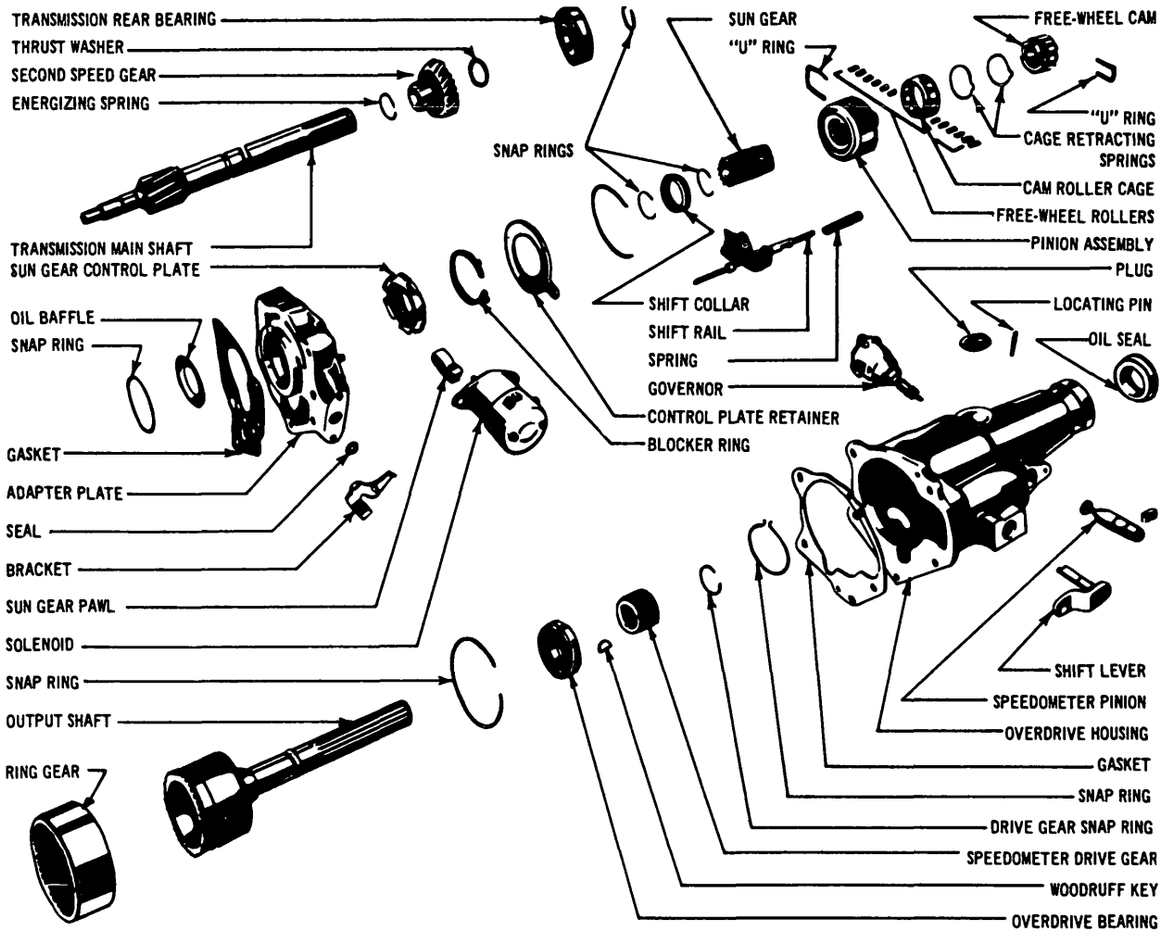
6) Disassemble parts remaining on transmission mainshaft as follows: Pull the "U" clips at each end of clutch cam and slide cam and roller retainer from pinion cage hub and transmission shaft. If roller retainer or cam is to be replaced, separate these pieces by pulling retainer out until hooked ends of spring can be pulled out of holes in cam.

7) Slide pinion cage assembly off sun gear and mainshaft. Remove sun gear and shift rail assemblies from shaft. Shift rail collar may be separated from sun gear by removing snap rings at either end of collar. Shift rail, fork, and spring may be separated by removing snap ring between cupped washer and shift fork.

8) Remove sun gear solenoid, oil seal and cable bracket. Remove large snap ring from adapter and remove sun gear control plate retainer. Then slide control plate and blocker ring out of adapter. If control plate or blocker ring is to be replaced they may be separated by pulling blocker ring off plate. Lift sun gear pawl out of adapter.

CLEANING & INSPECTION: Wash all parts thoroughly in solvent and blow dry with air. Inspect housing, shift rail retractor spring, snap rings, gears and bearings for cracks, defects or damage and substitute new parts where necessary. If clutch rollers show surface markings of any kind, they should be replaced. Inspect "U" clips, control plate retainer, control plate, blocker ring and pawl for defects or damage.

Blocker Ring Fit & Tension on Hub–Push one end of ring toward the other. The ring should grip and hold to the hub. If ring does not hold when correctly installed (flat surface of ring facing out), it should be replaced. Push one end of ring away from opposite end and check frictional drag required to slide ring around hub as follows: (a) Hold one lug of control plate in a soft jawed vise and hook a spring scale into the notch of the nearest blocker ring lug. (b) Measure pull required to rotate ring after it has started moving. The pull should be 4-6 lbs. on new parts, which will fall to 1-1½ lbs. when thoroughly broken in. While low friction may be corrected by squeezing the ring together for a tight fit, installation of new parts is recommended.



CHEVROLET OVERDRIVE (EXPLODED VIEW)

Clutch Cam–Inspect clutch cam and if the 12 flat surfaces show slight lengthwise indentations, replace the cam. If rollers show markings of any kind, they should all be replaced. Test tension of cam retaining springs after the assembly has been thoroughly washed. (*NOTE*–The springs are designed to twist the cam to return the rollers to high side of the cam). Hold hub of cam and turn roller retainer counter-clockwise, then release retainer. The retainer should snap back quickly. If the action is slow or retarded, replace springs or the complete assembly. (*CAUTION*–If spring tension is weak or retarded, the unit will free-wheel at all times). When installing springs be sure both springs are coiled in the same direction (clockwise when looking toward flanged end of retainer), with "S" of springs hooked into holes in retainer and opposite ends hooked into holes in cam.

OVERDRIVE REASSEMBLY: 1) Insert sun gear pawl in adapter with notched side up. If blocker ring was removed from control plate, position ring on plate with surface of ring facing out, then start assembly over transmission mainshaft with ring toward rear. Slide the assembly into position with slot in ring toward sun gear pawl.

2) Slide control plate retainer over mainshaft against control plate and install snap ring in adapter. Install solenoid oil seal, solenoid and cable bracket.

3) Start the sun gear onto mainshaft. Hold shift rail so arm of fork fits in collar on sun gear and forward end of shift rail enters opening in adapter and transmission case. Slide both assemblies forward so pin in adapter locates the fork, and sun gear engages control plate.

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CHEVROLET OVERDRIVE (C ntinued)

4) Install pinion cage assembly over mainshaft and sun gear, turning cage assembly clockwise to engage sun gear. If free wheeling cam and roller retainer were separated, assemble these parts by positioning springs so both are coiled clockwise when looking at flanged end of retainer then place retainer over slotted end of cam, hook free ends of springs in holes in cam, turn retainer clockwise and push springs into place around cam.

5) Slide cam and roller retainer assembly over mainshaft and pinion cage hub. Install "U" clips at each end of free wheeling cam.

6) To reassemble overdrive housing, slide rear bearing straight on shaft with snap ring slot in bearing closer to ring gear end of shaft. Install woodruff key in shaft, start speedometer drive gear onto shaft and align keyway in gear with key in shaft. Tap gear tight against bearing and install small snap ring.

7) Engage ring gear on teeth of overdrive shaft and install large snap ring in ring gear. Using tool J-5778, install bushing into housing so it is flush with bore for seal.

8) Install output shaft rear bearing snap ring in slot in housing. Install shift rail retractor spring inside housing and insert a long 3/8" drift pin through spring to align spring with holes in housing. Slide output shaft assembly into housing until rear bearing contacts snap ring. Spread snap ring and push shaft in until snap ring engages bearing. Install new plug in snap ring access hole in top of housing.

OVERDRIVE HOUSING: Installation-1) Snap a tight fitting rubber band around clutch cam roller retainer, insert rollers under rubber band in retainer and, with low gear of transmission engaged, turn retainer and rollers counter-clockwise until rollers are in their low position.

2) Remove the one bolt holding adapter to transmission case and install gasket on case. Position shift rail so flat for control shaft faces outward, then start housing, output shaft and ring gear assembly into place with shift rail entering spring in housing. Slide housing against adapter. Install seven bolts and lockwashers to adapter and case.

3) Install control shaft lever oil seal, shaft and lever and connect control cable to lever. Install governor assembly and speedometer driven gear, shaft and fitting. Install propeller shaft.

OVERDRIVE CONTROL: *See "Warner R10 & R11 Overdrive Control".*

CHEVROLET TRUCK & PONTIAC 3-SPEED (HEAVY DUTY)

Chevr l t Truck, ½, ¾ & 1-Ton (1954-60)
Pontiac (1958-60)

DESCRIPTION: Constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). *NOTE - All gears are helical design except Chevrolet truck low & reverse sliding gear.*

REMOVAL OF TRANSMISSION: *See "Transmission" on Car or Truck Model pages.*

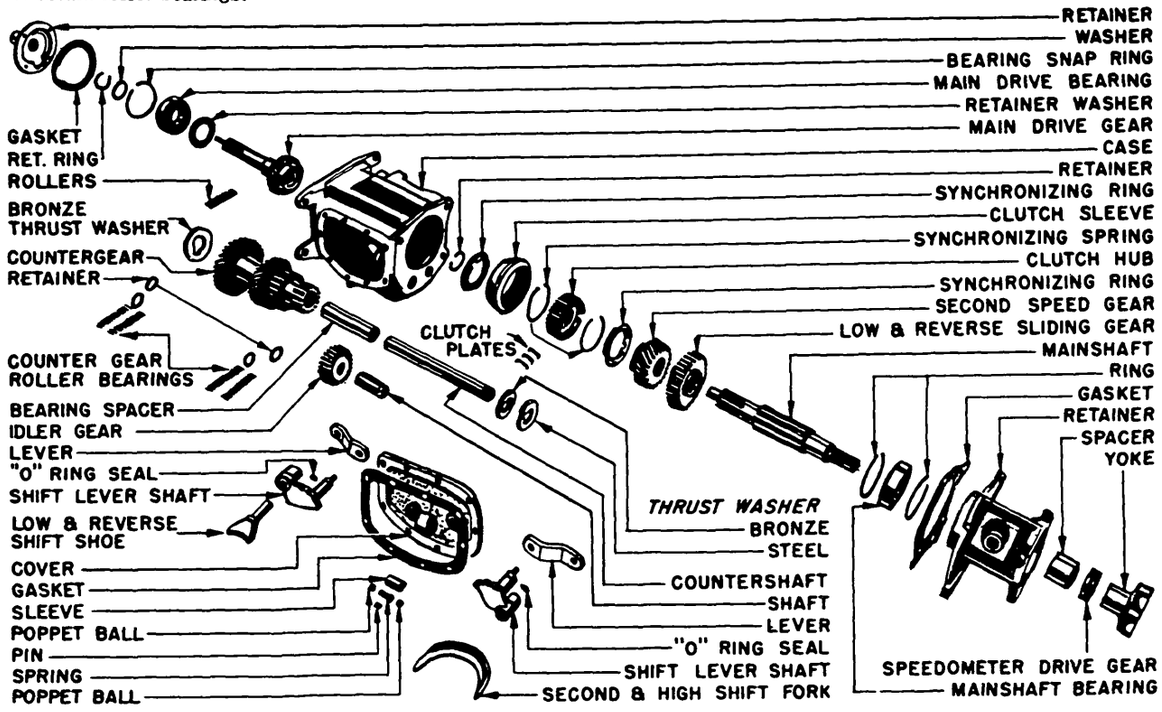
DISASSEMBLY: 1) Secure transmission in heavy vise and remove the screws attaching side cover assembly to case and remove cover, shifting forks and gasket. 2) Place transmission in two gears at once to lock mainshaft and remove universal joint or yoke retaining capscrew, lockwasher and on ¾ & 1-Ton models, special washer. Slide yoke, speedometer driven gear and spacer from mainshaft. On ¾ & 1-Ton models, remove bearing support and rear oil seal from rear extension. 3) Remove clutch gear bearing retainer screws and washers and remove retainer and gasket. Remove bolts from rear extension and move extension away from case approximately ½", then rotate rear retainer to permit removal of countershaft. 4) From front of transmission, drive countershaft to rear with tool J-5589 (NOTE—When rear end of countershaft clears case, remove the woodruff key to allow countershaft to clear rear bearing retainer). Remove countergear and leave tool J-5589 in the countergear to retain roller bearings.

5) Drop countergear down in case and remove rear bearing retainer, gasket and mainshaft assembly from rear of case. Remove snap ring from clutch shaft and press the clutch gear out of bearing. Remove oil retaining washer from clutch gear shaft, being careful not to lose the 14 roller bearings from gear end of clutch shaft. Remove snap ring from clutch gear bearing and tap bearing out through front of case.

6) Drive reverse idler gear to rear of transmission case and remove woodruff key, shaft and idler gear. Remove countergear assembly and thrust washers from case (CAUTION—Use care when removing countergear to prevent possible loss or damage of roller bearings). Remove roller bearings (80), bearing retainers and spacer from countergear.

Mainshaft & Rear Bearing Retainer Disassembly: Remove clutch hub retaining snap ring from end of mainshaft, and take off third speed synchronizer ring. Remove synchronizer sleeve from clutch hub and remove hub from mainshaft *(CAUTION—If relation of clutch hub and sleeve are not already marked, mark clearly to insur reassembly in the same location).* Remove the two synchronizer springs and the three clutch plates from hub. Remove synchronizer ring and second speed gear and low & reverse sliding gear from shaft. Remove mainshaft bearing snap ring and press shaft from bearing.

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CHEVROLET TRUCK & PONTIAC 3-SPEED (HEAVY DUTY) TRANSMISSION

CHEVROLET TRUCK & PONTIAC 3-SPEED (HEAVY DUTY) (C nt.)

►*REASSEMBLY NOTE:* Clean and inspect all transmission parts for wear or damage. If the second speed gear and idler gear bushings are worn or damaged, replace the complete assembly as the bushings are not furnished separately. Lubricate all parts before reassembly.

Mainshaft & Rear Bearing Retainer Reassembly: Press bearing on mainshaft with outer raised section of oil retainer toward front of shaft. Install bearing snap ring into rear retainer and install mainshaft and bearing assembly into rear retainer, securing it in position with the bearing front snap ring *(CAUTION– Make sure the front snap ring is a tight fit in groove. These snap rings are furnished in the following sizes for selective fitting: .088", .091", .094", .100").* Install speedometer gear spacer and speedometer driven gear. Install oil seal in rear bearing support with tool J-5154 and install bearing support to rear retainer on ¾ & 1-Ton models (oil slot in support goes toward bottom of retainer). Install sliding gear and second speed gear on mainshaft. Assemble synchronizer springs to hub with one end of each spring in same slot and outer end free. Install the three clutch plates to hub. Align marks made at disassembly on hub and sleeve and push synchronizer sleeve over clutch hub. Place synchronizer rings on the assembly, making sure slots are in line with the clutch plates, and place synchronizer assembly on the mainshaft. Install snap ring and check to see that gears rotate freely in synchronizer.

Side Cover Disassembly: Remove shifter forks from shift lever assembly and remove nut and lockwasher from each shift lever shaft. Remove outer levers and lightly tap shift lever shafts from assembly. Remove two steel balls, poppet springs, interlock pin and interlock sleeve from housing. Remove "O" ring seals from shift lever shafts.

Side Cover Reassembly: Install new "O" ring seals to shift lever shafts and install low and reverse shift lever to cover. Place shift lever in neutral position, middle detent, and install interlock sleeve, ball, poppet spring and interlock pin. Install remaining poppet ball and spring and then install second and third speed shift lever. Check clearance between end of interlock sleeve and shift lever cams when one lever is in neutral and the other is shifted into gear position. Clearance should be .001" to .007". Interlock sleeves are available in the following sizes to provide proper clearance: 1.0235", 1.0185", 1.0135" & 1.0085". Install outer shift levers to shafts with lockwashers and nuts and install forks to shift levers.

REASSEMBLY: 1) Insert spacer and countershaft assembly tool J-5589 into countergear. Install a double row of roller bearings (20 rollers in each row) and bearing retainers at each end of countergear. Place front and rear tabbed BRONZE washers on countergear. Place transmission in vise and install countergear in case through gearshift control housing opening (install large end first). Install a tabbed STEEL washer at rear of countergear between bronze thrust washer and case, and allow entire assembly to rest in bottom of case.

2) Install transmission case front bearing from front of case and install snap ring. Install the 14 roller bearings in mainshaft pilot recess in main driveshaft, retaining in place with a solidified lubricant. Install oil retainer washer next to gear on shaft, and install assembly into front case bearing by pressing or driving into place with tool J-5590. Install main drive gear special washer and snap ring on main drive shaft making sure that snap ring is a good fit in groove (six sizes of snap rings are available as follows for selective fitting: .086-..088"; .089-.091"; .092-.094"; .095-.097": .098-.100"; .101-.103").

3) From rear of case, install idler gear, shaft and woodruff key. Install complete mainshaft assembly *(CAUTION–When installing mainshaft assembly make sure the pilot bearings in main drive gear remain in place and that one is not forced up into lubrication hole in in gear).*

4) Turn transmission over in vise and install countershaft and woodruff key from rear of case, driving it into position in countergear, forcing countergear tool J-5589 out front of case. Use care to avoid damage to thrust washers on countershaft.

5) Install maindrive gear retainer on front of case and check clearance between retainer and case to determine thickness of gaskets necessary to seal retainer to case (front retainer gaskets are furnished in .010" and .015" thicknesses and may be used in combination to provide a seal). Align rear extension with case and install lockwashers and capscrews.

6) Place synchronizer assembly in neutral position and low and reverse sliding gear in neutral position. Install side cover to case and at the same time enter second & high shifter fork in groove of synchronizer sleeve, and low and reverse shifter shoe in groove of sliding gear. Install a couple of side cover capscrews and check shifting operation. If operation all right, install remaining capscrews and tighten.

CHEVROLET TRUCK 4-SPEED HELICAL GEAR (SYNCHRO-MESH)

1, 1½, 2-Ton Trucks (1954-60)

DESCRIPTION: Four speed type with helical constant-mesh, synchro-mesh gears (2nd, 3rd, 4th), sliding spur gears (1st & Reverse). Sliding 1st speed gear serves as the clutch member for engaging the 2nd Speed Gear.

REMOVAL OF TRANSMISSION: *See "Transmission" on car model page.*

TRANSMISSION DISASSEMBLY: Remove transmission cover assembly (with complete gearshift mechanism) by lifting straight up off case. Take out Reverse Shifter Lever (remove nut, screw bolt out of case, remove lever, bolt spacer, and large flat washer). Remove clutch gear bearing retainer on front end of case, remove clutch gear using J-2669 Remover (CAUTION—index cutout section of clutch gear with countershaft driven gear for clearance). Remove synchronizer ring and roller bearing spacer from end of mainshaft. Remove speedometer pinion from rear bearing retainer. Lock mainshaft by shifting into two gears at once, remove universal flange retaining screw, lockwasher, plain washer, and flange. Take out retaining screws and remove rear bearing retainer. Install J-2667 Remover on rear end of mainshaft and pull shaft to the rear until rear bearing is free of case, use J-1619 Remover to remove bearing from shaft, then remove shaft and gear assembly through top of case (tilt forward end of shaft up, move 1st speed gear as far forward on shaft as possible). Drive reverse gear shaft locking pin through into the shaft (use small punch), then drive shaft out toward rear of case, lift reverse idler gear out of case. To remove countershaft, drive punch through front bearing spacer and pry spacer out. Use brass drift on forward end of countershaft and drive shaft to rear until rear bearing is free of case. Take out rear bearing retainer screws, lift off lock plate and retainer, use TR-278-R (Differential Side Bearing Puller) to remove bearing and oil deflector from shaft. Raise front end of countershaft and remove assembly through top of case. Remove chip collector from bottom of case.

Main Drive Gear (Clutch Ge r) & Shaft: Lift out mainshaft pilot bearing rollers and roller retainer from recess in shaft. Mount shaft in vise, use special spanner wrench J-2670 to remove retaining nut, remove oil slinger and oil deflector. To remove bearing, use J-2228 press plate mounted in holder to press gear and shaft out of bearing. Install bearing with J-1453 press plate. CAUTION—Make certain oil deflector centered around retainer nut and stake nut after it has been securely tightened.

Mainshaft Assembly: To disassemble, remove retainer ring from pilot end of mainshaft, support assembly on 1st speed sliding gear in arbor press, press shaft out of gear cluster. Remove synchronizer key springs from synchronizer hub, remove outer sleeve from hub (CAUTION—do not lose the 3 keys). Remove synchronizer ring from 3rd speed gear, lift off gear, 2nd speed gear thrust washer, and 2nd speed gear. Remove synchronizing ring retainer from 1st speed gear, remove synchronizing ring. Wash all parts in cleaning solvent and inspect as follows:

Synchronizer—Outer sleeve should slide freely on hub but hub should be snug fit on shaft splines. Synchronizer rings and cones must not be scored, excessively worn, or damaged.

3rd Speed Gear—Gear should be running fit on bushing and bushing must be press fit on shaft. Thrust surfaces must not be scored or worn.

2nd Speed Gear & Thrustwasher—Washer and gear must not be scored or worn excessively on thrust surfaces. Replace synchronizer springs if broken or loose (use special rivets). Replace gear if

CONTINUED ON NEXT PAGE

CHEVROLET TRUCK 4-SPEED HELICAL GEAR (SYNCHRO-MESH) (Continued)

bushing worn excessively. Inspect synchronizing ring for wear and scoring.

1st Speed Gear—Gear must be sliding fit on mainshaft splines. Synchronizer cone in gear must not be scored or worn excessively.

Countershaft Assembly: Gears can be removed from shaft by removing lockring on forward end and pressing shaft out in an arbor press. Install gears on shaft as follows: 2nd Speed Gear (radius end toward rear or low speed gear end), 3rd Speed Gear (may be installed either way), Revere Gear (chamfered end of teeth forward or toward driven gear), Spacer, Driven Gear. Use new Countershaft Drive Pins when installing gears, after all gears in place, drive pins 1/32" past flush with shoulder on driven gear hub. Select lock ring of correct thickness and install on shaft to retain gears.

Countershaft Front Bearing—Press fit in case. To remove bearing for replacement, drive old bearing through into case using J-994 Differential Side Bearing Replacer. Drive new bearing in using same tool until it is flush with inner face of case.

Reverse Idler Gears: Replace bushings if worn. Remove old bushings with tool J-1614 (Pitman Shaft Bushing Remover). Press new bushings in (using same tool) until flush with ends of gear. Stake bushings in place with tool J-2680. (CAUTION—bushings are split type and may creep in service if not properly staked). Line ream bushings using J-2668 Reamer.

TRANSMISSION REASSEMBLY: Assemble in reverse order of disassembly, and note following:

Mainshaft Assembly: Install 1st speed gear on shaft with 2nd speed synchronizer forward (synchronizer ring must be held in gear hub by retainer ring), install 2nd speed gear with synchronizer springs toward synchronizer ring and prongs aligned with slots in gear hub, install thrust washer. Press 3rd speed gear bushing on shaft until it bottoms on thrustwasher. Check 2nd speed gear endplay which must be .012" plus or minus .003". Install synchronizer assembly (see data below), pressing clutch hub on shaft until it bottoms against shoulder on shaft. Check 3rd speed gear endplay which must be .012" plus or minus .002". Select lockring of correct thickness and install on forward end of shaft to retain assemblies. NOTE—This lockring furnished in four thicknesses and marked for identification as follows: .083",.087"—Red, .091"—Blue, .095"—Yellow.

Synchroniz r Assembly—Install outer sleeve on hub with taper on sleeve toward long shoulder on hub, slip three synchronizer keys in slots, install spring on each side of hub to hold keys out against sleeve (CAUTION—Both springs must be installed in same relative position so that even tension applied on keys). When installing assembly on mainshaft, long shoulder on hub should be out toward pilot end of shaft and synchronizer keys must index with slots in synchronizer rings.

Reverse Idler Shaft & Lockpin: Drive shaft in from rear, aligning lockpin hole in shaft with hole in case. Install lockpin to retain shaft.

Main Drive Gear Bearing Retainer: When installing gear, align cutout portion of clutch gear teeth for clearance with countershaft driven gear. Use new gasket under bearing retainer, use Permatex or other sealing compound on retainer screw threads and tighten these screws to 15-18 ft.lbs.

Mainshaft Rear Bearing Retainer: Use new gasket. Coat retainer screw threads with Permatex or other sealing compound, tighten screws to 20-25 ft. lbs.

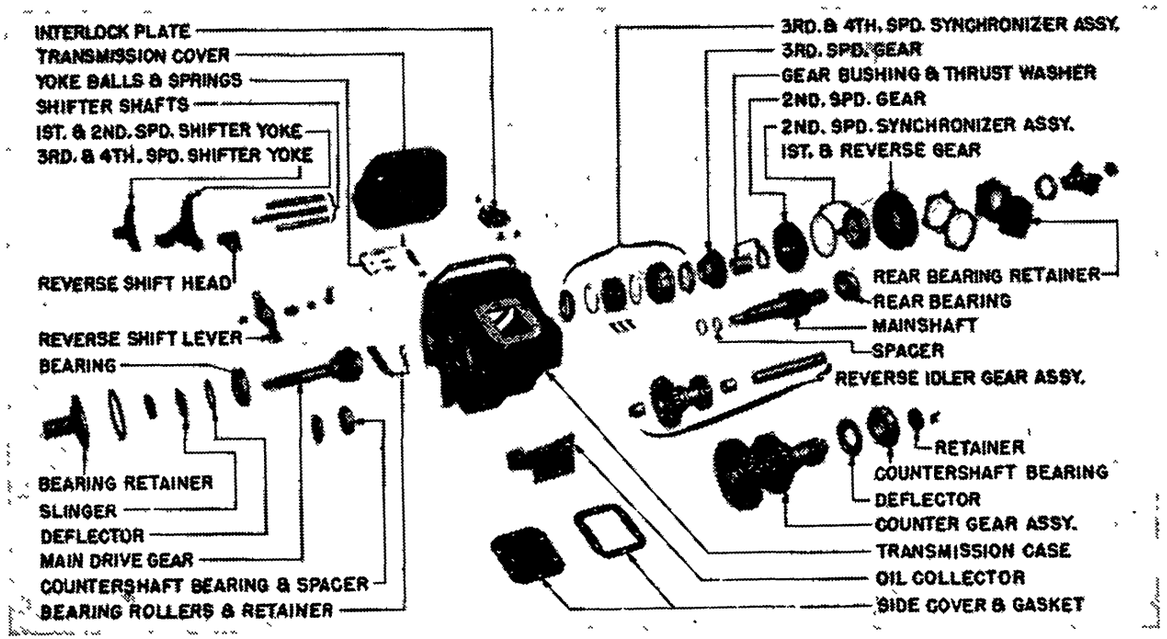
Reverse Shifter Lev r: Lever bolt has sleeve which acts as shoulder for lever to pivot on and must be installed as follows: Place reverse shifter lever in position, thread bolt with sleeve and flat washer through lever and into case from inside. Tighten bolt to 25-30 ft.lbs. in case, then install bolt nut and tighten nut to 60-65 ft.lbs.

GEARSHIFT LEVER & COVER ASSY.: Gearshift lever assembly and transmission cover can be removed without removing transmission as follows:

Gearshift Lever Removal: See Cab-Over-Engine Note below. On all models, slide open side of K-353 Gearshift Lever Remover & Replacer over the lever and engage lugs on tool in open slot of retainer. Press down on tool and rotate it to left to disengage lugs on retainer, lift lever out of cover. Install lever by reversing this procedure.

Cab-Over-Engine Truck Note—For access to lever, disconnect gearshift lever from top of engine cover, lower cloth boot wire and raise boot above transmission tower, remove nut from stub gearshift lever, raise lever link assembly from top of lever.

Transmission Cover Removal (Except C-O-E): Remove accelerator pedal, floor mat, and cover from body floor. On forward control models, remove front floor pan. Remove gearshift lever (see above). Take out capscrews and remove transmission cover.



CHEVROLET TRUCK 4-SPEED SYNCHRO-MESH TRANSMISSION

1954-56 CHRYSLER, DESOTO, DODGE, PLYMOUTH SYNCHRO-MESH

Chrysler, DeSoto, Dodge, Plymouth (1954-56)

►*1955 PLYMOUTH TRANSMISSION PRODUCTION CHANGE (Some P-26 & P-27 Models):* A three-speed transmission identified by the letters "CK" stamped on the left side of the case (following date) has different gear ratios for increased speed in second gear. ***NOTE—Some parts in this transmission are not interchangeable with the other model transmissions.***

►1956 PLYMOUTH LOW & REVERSE SLIDING GEAR PRODUCTION CHANGE: A new Low & Reverse Sliding Gear, Part No. 1672299 is being used in partial production. The later type gear has hardened splines for increased gear life. Transmissions having the later type gears are identified by stamped letters next to the date on transmission case as follows: CK-A (Std. Clutch); CK-ODA or CK-OD2-A (Overdrive); CK-10-A (10" or 11" Clutch). If gear replacement is required on cars built before Jan. 4, 1956, it is suggested that the later type gear be used.

DESCRIPTION: Own Make, constant-mesh synchro-mesh, all helical gear type (sliding gear for low-reverse).

REMOVAL OF TRANSMISSION: ***See "Transmission" on car model page.***

OVERDRIVE DISASSEMBLY NOTE: When used, overdrive adapter plate is fastened to overdrive case by special screws installed in recesses in front face of adapter plate. Overdrive and adapter must be removed as an assembly (after taking out capscrews mounting adapter on rear of transmission case) before adapter plate can be removed (use special wrench C-577 to remove the three screws which mount the adapter plate on the overdrive case. ***See Warner Overdrive for all Overdrive data.***

DISASSEMBLY OF TRANSMISSION: On cars with Power Shift, disconnect link and remove power shift assembly. Then remove speedometer drive pinion, remove nut on rear end of driveshaft. pull universal joint yoke flange and brake drum assembly. Take out two plugs on transmission side cover, remove detent balls and springs, remove cover and gear selector assembly. Unscrew shifter fork guide rail and remove guide rail through front end of case. See that gears in neutral, take out lockscrews holding shifter forks on shift rails, remove welch plug in lower shifter rail hole on front of case (collapse plug by striking in center with punch), remove shifter rails through front of case, lift out shifter forks (use care not to lose gear selector balls). Remove interlock plug on top of case (drive plug down into interlock hole), lift out the interlock plunger. Take out the four capscrews in extension housing on transmission case, remove extension and mainshaft assembly through rear of case using care that synchronizer assembly does not slide off shaft. Use special arbor C-578 and soft hammer to drive countershaft out toward rear of case (remove locking key from shaft as soon as it is exposed at rear of case), allowing counter gear cluster to drop down in case. Take out mounting screws and remove main drive gear bearing retainer from front end of case, pull main drive gear and bearing assembly out toward front. Lift counter gear cluster, thrust washers, and bearing rollers out of case. To remove reverse idler, drive shaft out toward rear using special arbor C-464 to retain bearing rollers in gear (remove locking key from shaft when exposed at rear of case), lift out idler gear thrust washers, and bearing rollers.

REASSEMBLY OF TRANSMISSION: Reverse disassembly directions (above) and note following data on servicing of sub-assemblies.

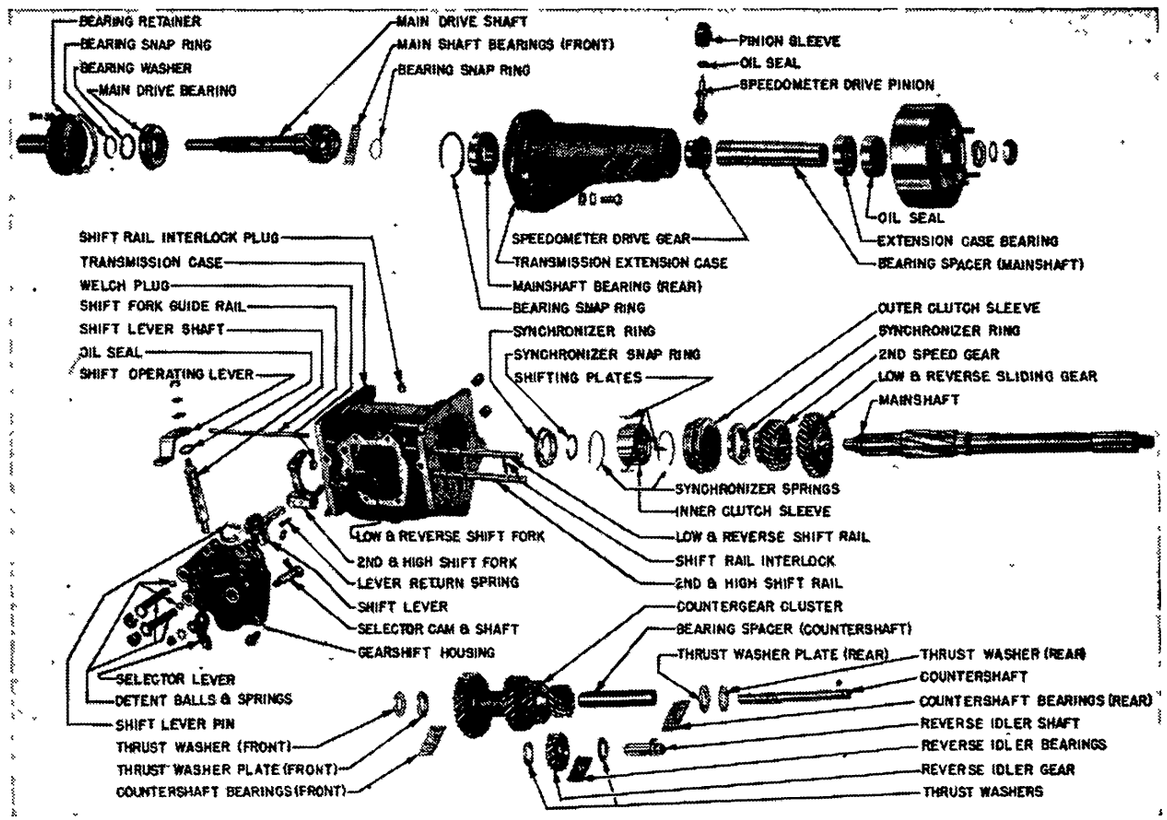
Mainshaft & Bearing Assembly:—To remove mainshaft from extension housing, take out snap ring at forward end of synchronizer unit, remove synchronizer assembly, second speed gear, and low speed gear from shaft. Remove snap ring in housing in front of bearing outer race, withdraw shaft from housing, then remove bearing, spacer, and speedometer drive gear from housing. Remove oil seal and bearing from rear end of housing (bearing is press fit in housing and is positioned by spacer on shaft—no snap rings used). When reassembling mainshaft, use new snap rings. If oil seal being replaced, soak leather in thin oil for 30 minutes and work leather with smooth bar. Seal must protrude 7/32" from end of case (use C-579 drift to install seal) to prevent damage to seal and bearing.

Pin-Type Synchronizer Assembly: Index etched mark on clutch gear with mark on clutch gear sleeve. (CAUTION—these parts selectively fitted and alignment necessary to insure free sliding fit). Install Stop Ring Inner Assembly with pins extending through holes in sleeve, then place assembly on transmission mainshaft with flat face of clutch gear toward second speed gear (opposite face has raised surface), install Stop Ring Outer Assembly with pins extending through the second set of holes in sleeve. When assembling transmission make certain that Spreader Spring is correctly installed.

Second Speed Gear:—Gear endplay on shaft should be .003" min., .008" max. To install gear, place gear on shaft, install synchronizer assembly, install snap ring in groove in shaft in front of synchronizer.

Main Drive Gear & Bearing:—Bearing retained on shaft by snap ring and can be removed after snap ring taken out and thrust washer removed. Use new snap ring when re-installing bearing. Mainshaft

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CHRYSLER, DE SOTO, DODGE, PLYMOUTH SYNCHRO-MESH TRANSMISSION

1954-56 CHRYSLER, DESOTO, DODGE, PLYMOUTH SYNCHRO-MESH (C ntinued)

pilot bearing rollers are retained in drive gear recess by snap ring. Use cup grease to hold rollers in position until mainshaft is installed.

Counter Gear Cluster:—When replacing this assembly, use arbor C-578 to position bearing rollers and pack rollers with cup grease to hold rollers in place. Install steel washer next to gear cluster at each end and bronze thrust washer between steel washer and case. Endplay should be .002" min., .008" max. Adjust by selecting washers of correct thickness (furnished in three thicknesses—'A' thinnest, 'B', 'C' thickest). Make certain that locking key is in place in slot in rear end of countershaft.

Reverse Idler Gear:—Use C-464 arbor to retain bearing rollers when idler gear being installed. See that thrust washer installed at each end of gear and that locking key is in place in rear end of shaft.

Oil Seal Replacement: Use Puller C-497 to remove old seal and special drift to install new seal. This drift will locate seal in correct position (protruding 7/32" from housing).

Gearshift Mechanism:—To assemble gearshift mechanism, hold shifter forks in position and insert guide rail through front end of case. Install lower shift rail, insert interlock plunger down through hole in top of case so that plunger engages groove in shift rail, then install upper shift rail (see Note below). Lock shifter forks to rails by installing lockscrews and locknuts, make certain that locking washers are crimped in place. Install welch plug in forward end of lower shift rail. CAUTION—This hole is below lubricant level and plug must be installed tightly to prevent lubricant loss. Install two C-590 cover locating pilots in cover screw holes on case, install cover and gear selector assembly, making certain that selector lever enters shifter fork slots. Install two cover capscrews, remove pilots, install remaining cover screws. Install detent balls and springs, tighten retaining plugs. Install new plug in interlock plunger hole (cup shaped plug), driving the plug in with a hammer.

See Chrysler Transmission Control articles for adjustment directions when transmission installed on car.

Shift Rail Note—Rails are similar in appearance but Low-Reverse rail has detent grooves farther apart. This rail should be installed on top.

1957-60 CHRYSLER, DE SOTO, DODGE & PLYMOUTH

Chrysl r C-75-1 (Early 1957)
Chrysler C-75-300 (1957)
D Soto S-25 & S-27 (1957)
DeSoto (1958-59)
D dge & Plym uth 6 Cyl. (1957-59)
D dg & Plym uth V8 (1957-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 PLYMOUTH HARD SHIFTING (REVERSE & LOW) CORRECTION:* On early cars, if a binding condition is encountered, remove the low-reverse gear and file a 45° chamfer approximately 1/16" long on end of each spline on front (large diameter) end of the gear. This chamfer has been added to gears in later production beginning approximately Dec. 1, 1957.

►*1957 PLYMOUTH HARD SHIFTING INTO REVERSE (OVERDRIVE CARS) CORRECTION:* This condition may be caused by a forging flash at the parting line on low and reverse gearshift lever cam. To correct, remove gearshift housing cover and grind off the flashing to provide sufficient clearance between cam and cover.

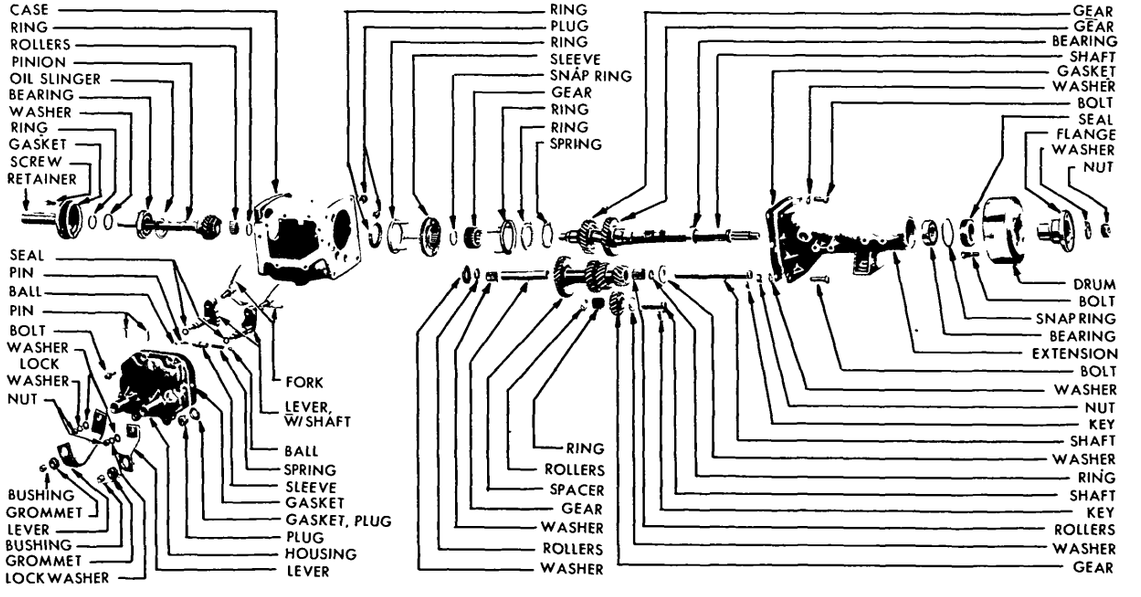
►*1957 PLYMOUTH SYNCHRONIZER SPRING PRODUCTION CHANGE (To Provide Easy Engagement of Gears When Shifting from First to Second and Second t Third):* A lighter synchronizer spring, Part No. 1823916 is used on transmissions stamped 3-21-57 and may be used on earlier transmissions for easier gear engagement.

►*1957 PLYMOUTH SECOND SPEED GEAR DISENGAGEMENT CORRECTION:* Adjust gear shift linkage to insure full engagement in all gear positions. Check and correct second speed gear endplay which must be .003-.008". Replace second speed gear or clutch gear (both if necessary), to eliminate parts with excessive tooth runout.

►*1957-58 TRANSMISSION PRODUCTION CHANGE:* Beginning approximately Feb. 21, 1958, an improved transmission entered production. The later type transmission is the same design as used previously except for use of a new transmission housing and cover, wider low and reverse and idler gears, new shift rods and levers and a revised gear ratio. The various transmission parts, rods and levers are not interchangeable with those used in earlier transmissions. The later transmissions are identified by letters stamped on machined surface on top of transmission case, just in front of cover as follows: "LA" (6 Cyl.Std.); "LC" (6 Cyl.Heavy Duty); "LD" (6 Cyl. Overdrive); "LB" (V8 Exc. Overdrive); "LD" (V8 Overdrive).

►*1959 TRANSMISSION SHIFT COVER ASSEMBLY PRODUCTION CHANGE:* Beginning with early 1959 production, redesigned cams within the shift cover eliminate the necessity of selectively fitting interlock sleeves to obtain .006-.010" clearance with each cam surface. Transmissions with later type shift cover assemblies are identified by the following part numbers

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1957-60 CHRYSLER, DESOTO, DODGE, PLYMOUTH SYNCHRO-MESH TRANSMISSION

1957-60 CHRYSLER, DE SOTO, DODGE & PLYMOUTH (C nt.)

stamped on transmission case: Part No. 1949443 (6 Cyl. Std.); 1949444 (V8); 1949452 (6 Cyl. H.D.); 1949458 (6 Cyl. & V8).

DESCRIPTION: **Own.** New design, three speed, constant-mesh, synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type. Gear shift housing (transmission side cover) has two shift operating levers with separate shafts and shifting fork assemblies. A positive interlock between shifting assemblies prevents engagement in two gears at once.

REMOVAL OF TRANSMISSION: *See "Transmission" on car model pages.*

OVERHAUL

DISASSEMBLY: **Gearshift Housing** - Remove capscrews attaching housing to transmission case and remove housing. Remove shifting forks from transmission if they were not removed with gearshift housing. Remove operating levers from their shafts by driving out the spring pins from lever shafts. Then, slowly withdraw operating shaft from housing. *(CAUTION* - Do not lose interlock ball (spring loaded) located on inner side of shift housing). Remove interlock sleeve, spring, pin, ball, and remaining operating shaft. *NOTE* - Do not remove steel expansion plug from side of gearshift housing unless leakage is noted.

Drive Pinion: Remove nut and bellville washer holding transmission brake drum and flange assembly. Remove main drive pinion bearing retainer and gasket (do not remove pinion at this time). Place transmission assembly in a fixture so forward end of transmission is upward. Remove drive pinion shaft assembly by lifting upward on shaft, tapping it lightly to aid removal. Remove main drive pinion bearing snap ring and bearing washer, then carefully press pinion shaft out of bearing. Remove oil slinger. Remove main drive pinion pilot bearing snap ring from cavity in end of shaft using a hook or flat blade. Remove washer and rollers.

Mainshaft: Remove extension housing-to-transmission case bolts and studs. Place a nut (½-5/8" thick) between synchronizer clutch gear sleeve and inner stop ring assembly *(NOTE* - The spacer nut (above) will minimize interference from synchronizer clutch gear sleeve when transmission case is removed from extension housing). Remove transmission case by lifting upward while guiding cluster gear second speed gear past synchronizer sleeve. Before further disassembly, check endplay of synchronizer clutch gear on mainshaft. Select a snap ring of proper thickness to eliminate all all endplay. Check endplay of second speed gear which should not exceed .008" (if greater, check for wear on thrust faces of second speed gear, clutch gear, and ends of mainshaft spiral splines). Check first and reverse sliding gear for free movement on mainshaft. *(NOTE* - Check spline backlash, and if found to be excessive, check shaft with a new gear before discarding old gear). Remove synchronizer clutch gear snap ring, using Tool C-484 or C-3301. Remove second speed gear and first and reverse sliding gear. Remove extension housing from fixture and remove brake drum and flange assembly, using Tool C-452. Remove oil seal with Tool C-748. Using a soft hammer, drive mainshaft out of extension housing by tapping rear end of shaft. Remove mainshaft rear bearing retainer snap ring with Tool C-760. Remove needle bearing by pressing bearing into extension housing. Drive ball bearing out of its bore with Tool C-3275, and remove needle bearing from rear of extension housing. *(NOTE* - Do not remove speedometer gear lubrication tube unless inspection indicates that it is necessary).

Reverse Idler: Using a brass drift, drive reverse idler gear shaft towards rear of transmission to expose key. Remove key, drive out shaft and remove reverse idler gear and bearing assembly.

Countershaft: Check endplay of countershaft which should be .004-.012". If greater, new thrust washers must be installed at reassembly. Using Tool C-578 (arbor), drive countershaft out rear of case. Remove shaft key, countershaft gear (with arbor installed), thrust washers, rollers, and spacer.

INSPECTION: Wash all parts and blow dry with air. Check bearings for looseness or noise and for fit on shafts and in housing bores. Inspect mainshaft splines for wear, galling, or scoring. Inspect bearing mounting surfaces and snap ring grooves. Slight nicks or burrs can be stoned smooth. Inspect gear teeth and threads on inner and outer synchronizer stop rings. Check gear teeth on clutch gear sleeve for chipped or excessively worn gear teeth. Make sure that synchronizer clutch sleeve slides freely on clutch gear. Check pins of inner and outer stop ring assembly for straightness and length (pins should be 1.570-1.580" long). If not within this specification, replace stop ring assemblies. Check all gears for broken, chipped, or worn teeth. Check rollers for chips and nicks and countershaft for wear. Replace worn thrust washers. Inspect mainshaft pilot rollers for play, pitting, or scoring. If roller bearings fall out during disassembly, they are too loose and should be replaced. Check gearshift housing and operating levers for wear, and replace worn or damaged rubber grommets. Check interlock sleeve for free movement in bores and where sleeve contacts operating lever shafts. Check operating shaft detents for wear, and replace shafts if necessary. Check shift shafts for free movement and wear.

REASSEMBLY: *NOTE - Before reassembly, lubricate each part with SAE 80 transmission fluid.*

Mainshaft: Drive mainshaft rear ball bearing into bore at rear of extension housing, using Tool C-3204 until bearing is seated against shoulder. Select and install a snap ring to eliminate all endplay at bearing (snap rings are available in two sizes), making sure snap ring is fully seated. Place needle bearing on extension and press on lettered side of bearing, using a suitable press, until bearing is flush with face of extension. Using Tool C-3105, install oil seal, driving until tool bottoms on extension housing. Position mainshaft into extension housing and tap forward end of mainshaft, using a soft hammer, until shoulder at rear of mainshaft seats firmly against inner race or rear ball bearing. Install brake drum and flange assembly on mainshaft, then place extension housing assembly on mounting fixture with forward end of mainshaft upward. Place first and reverse sliding gear on mainshaft with fork collar facing up. Install second speed gear, place spreader spring and then synchronizer inner stop ring on second speed gear *(NOTE* - Lightly grease threads on stop ring). Install synchronizer clutch gear on mainshaft and secure in place with snap ring to eliminate all endplay at clutch gear. Snap rings are available in the following thicknesses: .086-.088"; .089-.091"; .092-.094"; .095-.097". Properly seat snap ring. Place balance of synchronizer assembly on mainshaft. Lubricate outer snap ring.

Reverse Idler: Insert adapter arbor into reverse idler gear, then place 22 rollers into position in gear. *(NOTE* - A suitable adapter arbor can be made either of wood or metal by turning and cutting the stock to a length of 1.0625" and a diameter of .750"). Install thrust washer at each end of adapter arbor, retaining them in place with a small amount of grease. Place reverse idler assembly into transmission case (pointed end of teeth forward). Remove adapter arbor by driving reverse idler gear shaft through idler gear until key can be installed. Install key and continue to drive shaft into case until shaft is approximately 1/64" below mating surface on case.

Countershaft: Insert adapter arbor, Tool C-578 into countershaft gear. Place spacer over arbor and insert into cluster gear. After installing the 22 bearing rollers (on one end), place small thrust washer against end of rollers. Install remaining 22 rollers at opposite end of countershaft, and place small thrust washer at end of rollers. Add a small amount of grease to hold thrust washers in place *(NOTE* - Do not install large thrust washers at this time). Be sure transmission case is resting on a smooth surface, then position countershaft assembly into transmission, allowing adapter arbor to enter cluster gear shaft hole in rear of case. Install one of the large tabbed washers, making sure tab on washer engages groove in case (washers are available in two thicknesses, marked "A" & "B"). Select one to obtain .004-.012" total endplay of countershaft. Push adapter arbor into countershaft hole in front of transmission case, then turn transmission case so it rests on opposite end. Install remaining large thrust washer, making sure tab engages groove in case. Using the countershaft, push adapter arbor from cluster gear until shaft key can be inserted. Continue to drive shaft into case until it is approximately 1/64" below mating surface on rear of case. Lightly grease gasket surface of extension housing and install gasket. Install transmission case on extension housing. Place a nut between synchronizer clutch gear sleeve and inner stop ring assembly in same manner as used at disassembly. Install extension housing-to-case studs and bolts and tighten finger tight.

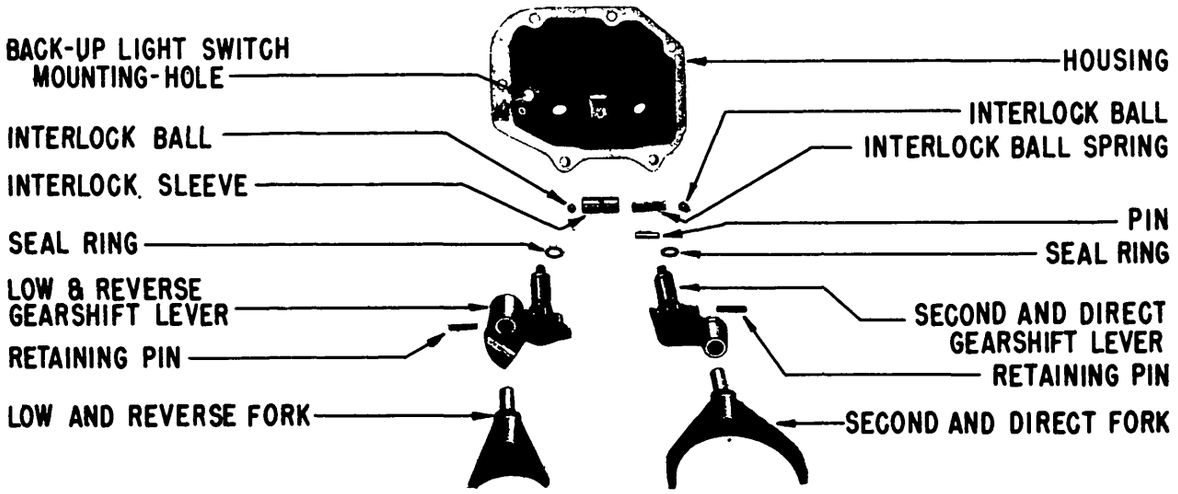
Drive Pinion: Place oil slinger (if removed) on pinion shaft, then press pinion shaft into ball bearing. *(CAUTION* - Make sure slinger does not hang up in bearing snap ring groove during pressing operation). Install keyed washer and secure with snap ring to eliminate all

CONTINUED ON NEXT PAGE

1957-60 CHRYSLER, DE SOTO, DODGE & PLYMOUTH (C nt.)

endplay (*NOTE - Snap rings are furnished in the following thicknesses: .086-.088"; .089-.091"; .092-.094"; .095-.097"*). Make sure snap ring is properly seated. If large snap ring on main drive pinion bearing was removed, replace at this time. Place shaft in vise equipped with soft jaws, and place 14 rollers in position in pilot pocket of drive pinion. Install washer against end of rollers and install snap ring. *Remove nut from synchroniz r clutch gear sleeve and inner stop ring.* Guide drive pinion shaft through front of case, engaging synchronizer outer stop ring with clutch gear on drive pinion (*NOTE - Pinion shaft bearing is fully seated when snap ring mak s full contact with front of transmission cas*). Slide pinion bearing retainer over pinion shaft and against transmission case. While holding retainer with hand pressure against case, measure the clearance between retainer and case, using a feeler gauge. Select a gasket about .005" thicker than the clearance to eliminate endplay on front bearing (*NOTE* - Gaskets are furnished in various thicknesses). Install retainer and tighten bolts. Remove transmission assembly from mounting fixture, and tighten bearing retainer screws to 15 ft. lbs., and extension-to-case bolts to 30 ft. lbs. Install mainshaft washer (convex side toward nut), and draw nut up snug against washer. Install drain plug and tighten to 20 ft. lbs.

G arshift H using: Place gearshift housing in vise equipped with soft jaws. Place "0" ring seal on second and high gearshift lever shaft and install assembly in housing. Secure shaft in place with retaining pin. Install interlock sleeve in its bore, then place one of the interlock balls in sleeve, followed by spring and pin. Place "0" ring seal on low and reverse gearshift lever shaft, and install assembly part way into housing. Place second interlock ball on top of interlock spring, and while depressing ball with a suitable tool, seat shaft in bore while allowing interlock ball to seat in detent in lever. Secure shaft with retaining pin. (*NOTE - Lever shafts must be placed in position to allow clearance for tool*). Install gearshift operating levers and tighten retaining nuts to 20 ft. lbs. Shift transmission into neutral and place shift forks in position in transmission case. Place operating levers in neutral, install gasket, and then install housing, engaging fork ends with the respective shafts. Tighten housing bolts to 20 ft. lbs. Install new steel expansion plug (if removed). Install back-up light switch and speedometer drive pinion.



CHRYSLER, DE SOTO, DODGE, PLYMOUTH SHIFT ASSEMBLY

6 CYL. DODGE, PLYMOUTH, VALIANT SYNCHRO-MESH

D dg 6 Cyl. (1960)
Plym uth 6 Cyl. (1960)
Valiant (1960)

DESCRIPTION: Own. New design, three-speed, constant-mesh, synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type. Gearshift housing is integral with side of transmission case. A positive interlock between shift lever assemblies prevents engagement of two gears at once.

REMOVAL OF TRANSMISSION: *See "Transmission" on car mod l pag s.*

DISASSEMBLY: Hold universal joint companion flange with Tool C-3281 and remove retaining nut and washer, then attach puller C-452 and remove brake drum and flange assembly (Dodge & Plymouth), flange only (Valiant).

Extensi n H using: Remove attaching bolts and stud nut retaining extension housing on transmission case and slide extension housing off mainshaft. If necessary to remove extension housing bushing, use Tool C-3755 and drive bushing out of housing. Remove cover from transmission case.

Driv Pini n: Remove pinion bearing retainer from front of transmission case, then use a suitable drift punch to drive seal out of retainer. Pull drive pinion assembly out front of transmission case (if necessary, tap shaft lightly to aid in removal). *CAUTION - Do not bind inner synchronizer ring on drive pinion clutch te th.* Remove snap ring locking bearing on pinion shaft, then remove bearing washer and press shaft out of bearing using an arbor press. Remove oil slinger, then remove pilot bearing snap ring from cavity in end of pinion gear and remove the 14 rollers.

Mainshaft: With transmission in reverse, remove outer center bearing snap ring (using a hook or a flat blade) and partially remove mainshaft. Cock the mainshaft, then remove clutch sleeve, outer synchronizer rings, front inner ring, and the 2-3 shift fork. Remove clutch gear retaining snap ring and slide clutch gear off end of mainshaft. Slide second speed gear, stop ring and synchronizer spring off mainshaft. Remove low and reverse sliding gear and shift fork as the mainshaft is completely withdrawn from rear of case.

Cluster Gear: *NOTE - Before removing cluster gear, check endplay of cluster gear and reverse idler gear with a feeler gauge. Endplay should be .004-.012".* Use Tool C-578 and drive countershaft rearward and out of case, then remove woodruff key from shaft. Remove cluster gear and thrust washer from case and remove 22 needle bearings from each end of gear. Remove bearing spacer.

Reverse Idler Gear: Use a suitable drift and drive reverse idler shaft toward rear and out of case. Remove woodruff key from end of shaft and remove idler gear and thrust washer from case. Remove 22 needle bearings from gear.

G arshift Assembli s: Remove external operating levers from both shafts, then drive tapered retaining pin from either of the two lever shafts and withdraw lever shaft from inside transmission case. *NOTE - Detent balls ar spring loaded and will drop to bottom of case as shaft is withdrawn.* Remove interlock sleeve, spring, pin and both balls from case. Drive out remaining tapered pin, then slide lever shaft out of transmission. Drive lever shaft oil seals out of case with a suitable drift punch.

INSPECTION: Wash all parts in solvent and blow dry with air. Check bearings for looseness, roughness, and wear. Check fit of bearings on shafts and in bores. Check all needle bearings for scoring and wear. Check bearing surfaces in cluster and reverse idler gear for scoring, pitting and wear. Check gear teeth on synchronizer clutch gear and sleeve. If teeth are chipped or excessively worn, replace parts as necessary. Check interlock sleeve and pin for free movement in their bores and inspect balls and pin for brinelling. If shift lever detents are excessively worn, install new lever and shaft.

REASSEMBLY: Gearshift Assemblies - Install new oil seals in shift shaft bores by driving them into position with Tool C-3766, then install seal protector C-3767 on low and reverse lever shaft and slide lever shaft into rear boss of transmission case. Install tapered pin and turn lever until center (Neutral) detent is in line with interlock bores. Slide the interlock sleeve in

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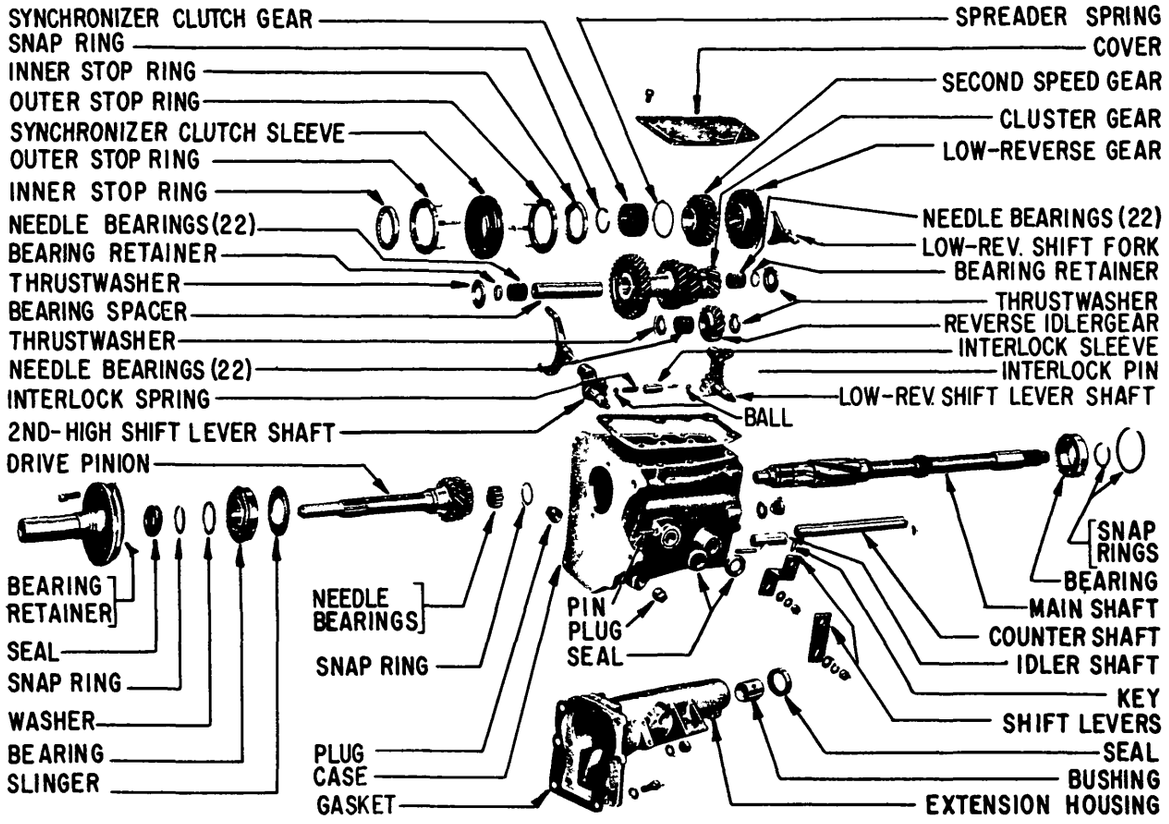
6 CYL. DODGE, PLYMOUTH, VALIANT SYNCHRO-MESH (Continu d)

its bore in case followed by an interlock ball. Install interlock spring and pin and place remaining interlock ball on top of interlock spring with Tool C-3765. *NOTE - Stick ball in recess of tool with grease, then use tool to position ball on detent spring.* Remove Tool C-3767 from low and reverse lever shaft and install it on second and high shifter shaft. Depress interlock ball with Tool C-3765 and at the same time install second and high shift lever shaft into the fully seated position, with center detent (Neutral) aligned with detent ball. Remove seal protector and secure shaft with tapered pin. Install external operating levers and tighten nuts to 180 inch pounds.

Reverse Idler Gear: Coat bore of gear with grease, then slide arbor, Tool C-464 into bore. Grease the 22 needle bearings and install them in the area around arbor. Install a new thrust washer (if endplay was not within limits as noted at disassembly) or original washer at each end of gear and over arbor (hold in place with grease). With beveled ends of teeth forward, slide gear down into position in case, then install gear shaft in its opening at rear of case. Install woodruff key and align with keyway. Raise idler gear slightly to align with shaft, then drive shaft into case, through thrust washer and gear, until end of shaft is approximately 1/64" below surface of case. Remove Tool C-464 from case.

Cluster Gear: Slide cluster gear needle bearing spacer over Tool C-578, then coat bore of gear with grease. Slide tool and spacer into gear bore. Grease the 44 needle bearings, then install 22 at each end of gear in the area around the arbor. Install bearing retainer rings at each end of gear, covering the bearings (add a small amount of grease to hold rings in place). Install thrust washers at each end of cluster gear. *NOTE - If endplay was not within specified limits of .004-.012" when measured at disassembly, install new thrust washers which are available in two sizes (marked "A" and "B") to provide proper endplay.* Install cluster gear in case, making sure the tabs on thrust washers slide into grooves in transmission case. Install countershaft and drive Tool C-578 forward and out of cluster gear until the woodruff key can be inserted. Continue to to drive shaft into case until approximately 1/64" below surface of case.

Mainshaft: If a new bearing is to be installed, press bearing on mainshaft and install retaining snap ring. Install low and reverse fork (with offset toward rear) and engage fork in low and reverse sliding gear, then position in case by shifting into reverse. Slide mainshaft into case and through low and reverse gear, then install second and high shift fork (with offset toward rear). Install second speed gear and spreader spring on mainshaft, then install second gear inner stop ring and second gear outer stop ring assembly. Engage synchronizer clutch sleeve with second and high shift fork. Slide clutch gear over end of mainshaft and down against second speed gear. Select a snap ring of proper thickness and install. *NOTE - This snap ring liminat s endplay and must b a snug fit. Check clearanc betw n clutch gear and s cond sp d g ar which sh uld be .003-.008".* Position mainshaft further in case by tapping on outer bearing race; bottoming the bearing.



DODGE, PLYMOUTH, VALIANT SYNCHRO-MESH TRANSMISSION (EXPLODED)

Install bearing snap ring in case. *NOTE - This snap ring is a select fit and is furnished in thicknesses of .086", .089", .092", .095".*

Drive Pinion: Slide oil slinger (if removed) over pinion shaft and down against gear. Slide bearing over pinion shaft, snap ring groove away from gear end, then seat bearing on shaft, using an arbor press. *CAUTION - Be sure oil slinger does not hang up in snap ring groove during pressing operation.* Install keyed washer, then secure bearing and washer with selected thickness snap ring. *NOTE - Snap rings are available in thicknesses of .088", .091", .094", .097".* Be sure snap ring is properly seated. If large snap ring around bearing was removed, install at this time. Place pinion shaft in a soft jawed vise, then install 14 rollers in pilot bore of drive pinion (hold rollers in place with grease). Install roller retaining ring in its groove. Install third gear outer stop ring and third gear inner stop ring, then guide drive pinion through front of case and engage inner stop ring with the clutch teeth. Fully seat pinion shaft bearing so snap ring is in full contact with transmission case. Install a new seal in pinion bearing retainer with Tool C-3801, then slide retainer (less gasket) over shaft and down against transmission case. Hold retainer against case with hand pressure and measure clearance between retainer and case with a feeler gauge. Select a gasket from .003-.005" thicker than the clearance. Install gasket of correct thickness, then reinstall bearing retainer and tighten attaching bolts to 200 inch pounds. *NOTE - Gaskets ar furnished in thicknesses of .009" and .0165".*

Extension Housing: Install a new rear mainshaft bushing (if required), using Tool C-3692. *NOTE - As this tool is being removed, it burnish s th n w bushing.* Install extension housing oil seal with Tool C-3691. Place Tool C-3768 in position on mainshaft splines to protect oil seal while installing extension housing. Lightly grease gasket surface of case and the seal protector tool, then install gasket. Slide extension housing over mainshaft and down against case, at the same time guiding shaft into oil seal. Tighten attaching bolts to 50 ft. lbs. On Dodge and Plymouth, install brake drum and flange assembly. On Valiant, install flange. Install a new washer and nut and tighten to 175 ft. lbs. Lightly grease cover gasket surface and install gasket and cover. Tighten attaching bolts to 180 inch pounds. Install drain plug and back-up light switch and tighten securely. Refill transmission with 5 pints of Multi-Purpose, SAE 80 lubricant. *NOTE - 5 pints of lubricant is requir d rather than the 2¾ pints previ usly r commend d. Lubricant l v l should be ¼" b l w filler plug p ning.*

DESOTO, DODGE, PLYMOUTH (WARNER R10) OVERDRIVE

D Sot (1954-56)
D dg (1954-56)
Plym uth (1954-59)

DESCRIPTION: Similar to other Warner R10 Overdrives.

►***DISASSEMBLY CAUTION—To disassemble overdrive, standard transmission must be disassembled to gain access to screws holding adapter plate to O.D. housing.***

REMOVAL: *See "Overdrive" on car model page.*

OVERDRIVE DISASSEMBLY: Remove handbrake drum, gearshift housing, shift forks, and rail guide from standard transmission. Remove governor, lockout switch, and speedometer pinion from overdrive housing. Remove four screws that hold overdrive unit and adapter plate to transmission. Tap adapter plate with rawhide hammer to loosen it from transmission. Drive tapered pin from overdrive housing. Pull control shaft out as far as possible to disengage it from shift rail. Rotate shaft ¼ turn counter-clockwise to hold it in position. Remove two recessed screws and lockwashers from front face of adapter plate. Tap end of overdrive mainshaft with soft hammer to free it from bearing. Separate overdrive unit assembly from overdrive case by carefully sliding housing from overdrive mainshaft to prevent spilling overrunning clutch rollers. Remove retractor spring and sleeve from housing. Disassemble units as follows:

Rear Bearing Oil Seal: Use Puller C-748 to remove seal from housing. Use Tool C-579 to install new seal. Seal must extend 9/32" from end of housing.

Rear Bearing: Remove front and rear snap ring, drive bearing from housing with driver C-3204. Install bearing open end first, with driver C-3204. Use new, selective fit, snap rings to eliminate endplay.

Control Shaft Oil Seal: Remove control lever from control shaft, pull shaft out from inside housing. Pry out seal, install new seal with tool C-3198.

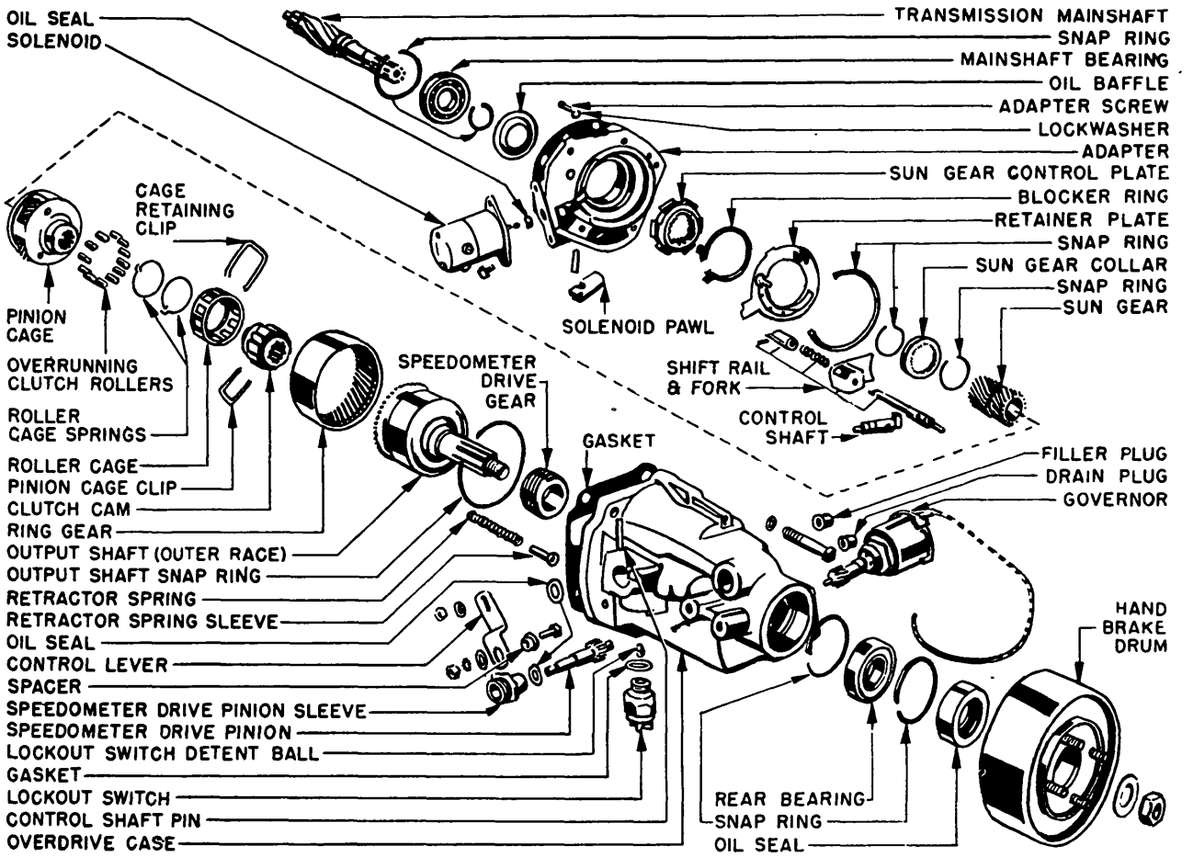
Mainshaft & Ring Gear Assembly: Carefully remove ring gear and shaft assembly from over-running clutch to avoid spilling rollers. If necessary to replace outer race or ring gear, pry off snap ring and remove ring gear from outer race.

Pinion Cage & Over-running Clutch: Remove clutch cam retaining clip, slide clutch and pinion cage assembly from transmission mainshaft splines. Pry off pinion cage retaining clip. If necessary to replace rollers, replace all (12). Replace clutch cam if any marks or indentations. Do not separate cam from retainer unless necessary for parts replacement. Pinion cage cannot be disassembled.

Pawl Rod Oil Seal: Remove old seal with screwdriver. Install new seal with driver C-3207.

Sun Gear & Manual Control Fork: Slide gear and fork from mainshaft at same time. Pry off forward snap ring, remove shift collar from sun gear.

Sun Gear Control Plate & Balk Ring: Remove adapter snap ring and retainer plate from adapter. Test balk ring spring tension by hooking scale on one finger of balk ring (should be 3½-5½ lbs. with ring moving). To install, place embossed face forward against control place. Install assembly in adapter plate. Control pawl should index exactly with notch in both fingers of balk ring.



DE SOTO, DODGE, PLYMOUTH OVERDRIVE ASSEMBLY

Adapter Bearing: Remove snap ring holding bearing in adapter plate. Remove mainshaft, bearing and oil baffle, then small snap ring. Press bearing from shaft. Install bearing with tool C-3194.

OVERDRIVE REASSEMBLY: Assemble as follows:

Adapter Plate: Install oil baffle in adapter with pressed out section toward rear. Install transmission mainshaft and bearing in adapter plate, secure assembly with selective fit snap ring (**loose bearing may result in partial engagement or interlocking gears**). Install interlock plunger in adapter and control pawl in cavity (notched side up) to engage plunger. Slide sun gear control plate and balk ring into position **with engaging end of locking pawl between open ends of balk ring.** Slide retainer plate over mainshaft into position in adapter **with ear of plate in slot provided.** Secure with new snap ring.

Sun Gear & Shift Fork: Slide gear on transmission mainshaft. Engage shift fork in sun gear shift collar. Guide shift rail into its hole in adapter and mesh sun gear with control plate.

Pinion Cage & Over-running Clutch: Assemble clutch cam and roller cage to pinion cage retaining clip. Slide assembly on splines of mainshaft, install clutch cam retaining clip. Be sure clip notches into groove at end of mainshaft. Apply grease to pockets of roller retainer, insert 12 rollers.

Mainshaft & Ring Gear Assembly: Hold mainshaft with one hand. With other hand turn shaft counter-clockwise, push ring gear into mesh with pinions.

CAUTION—Do not force mainshaft. Roller may be dislodged causing damage to unit.

Retractor Spring & Control Lever: Slide tool C-3195 into manual control shaft oil seal from outside case. Insert control shaft from inside case, cam pointing up. Push shaft into tool, through oil seal and out of case as far as possible. Remove tool, slide control lever on end of control shaft (offset away from case, pointing down). Install washer and nut. With control shaft pulled away from case as far as possible, install retractor spring and sleeve.

Overdrive Case: Install new gasket, guide case over end of mainshaft. Ease shift rail through hole in case and retractor spring. Line up gasket, secure assembly with adapter screws and lockwashers. Position control shaft, check shift rail for free operation (work manual lever). Drive retaining pin in from top.

OVERDRIVE CONTROL: *See Warner Type R10 & R11 Overdrive Control data.*

TRANSMISSION OVERHAUL: *See "Chrysler, DeSoto, Dodge, Plymouth Synchro-mesh Transmission" data.*

COMET & FALCON SYNCHRO-MESH TRANSMISSION

Comet (1960)
Falcon (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 INTERMEDIATE & HIGH GEAR CLASH CORRECTION:* Install new Synchronizer Blocker Ring, Part No. CODR-7107-B. The new ring is used in later production cars.

►*1960 FALCON HARD SHIFT & GEAR "JUMP-OUT" CORRECTION (EARLY CARS):* If either of these conditions are encountered, check gearshift levers at lower end of steering column to determine if they are "flat" or "offset" type. If the "flat" type is found, replace with the "offset" type. When installing, be sure that both connecting rod adjusting sleeves are located in front of levers.

DESCRIPTION: Three-speed constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type. Transmission gearshift levers and assemblies are integral with side of transmission case and a separate top cover is used.

REMOVAL OF TRANSMISSION: *See "Transmission" on individual car model pages*

DISASSEMBLY: 1) Mount transmission in a holding fixture and drain lubricant, then remove transmission cover and gasket. Remove outer shift levers.

2) Remove attaching bolts and remove transmission extension housing (and rear support bracket). *NOTE - To prevent output shaft from following the housing, tap end of output shaft with a soft hammer and withdraw extension housing.* Remove speedometer drive gear snap ring, drive gear, and drive ball from output shaft.

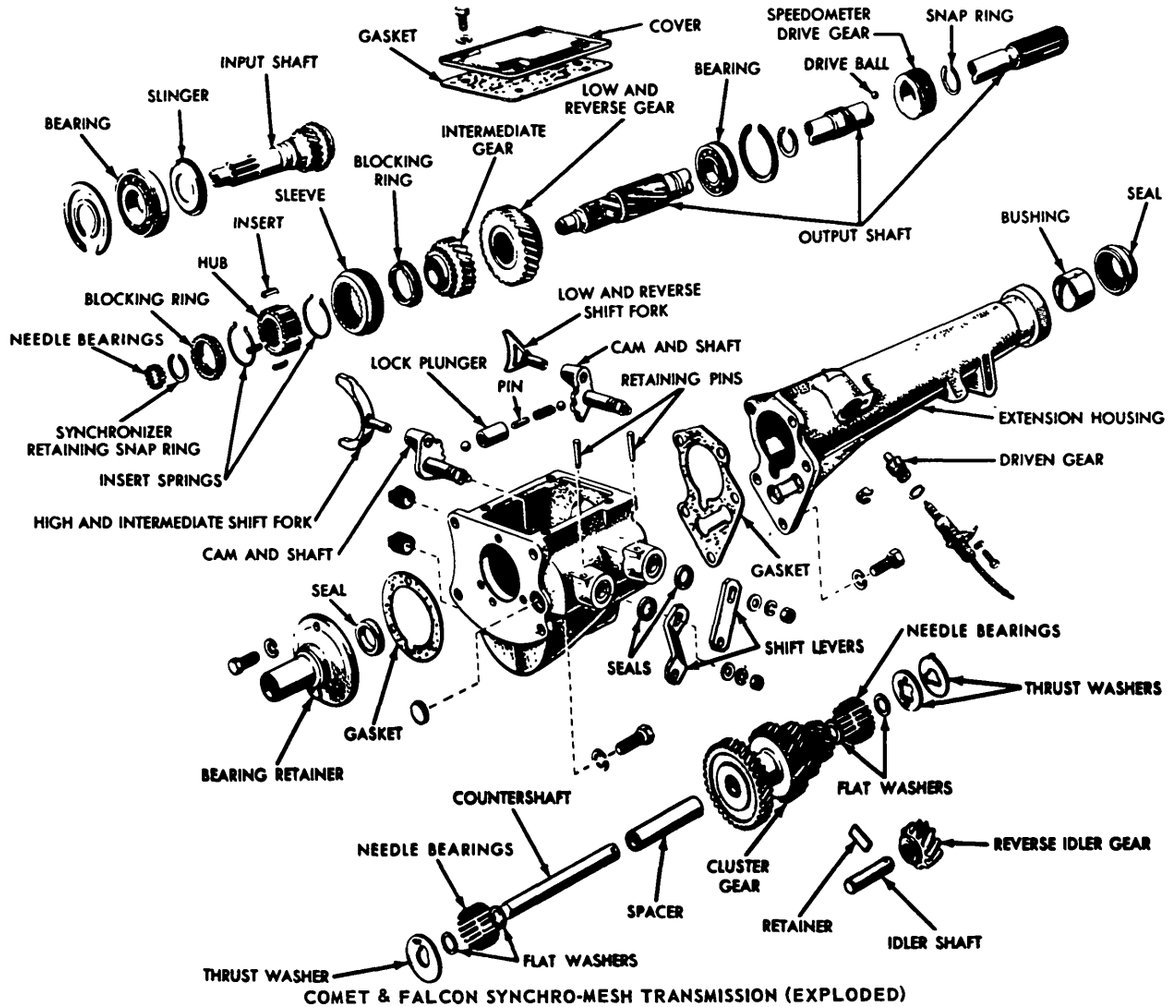
3) Remove idler and countershaft retainer. If necessary, tap front end of both shafts to free retainer. Use Tool 7111-F (Comet); T60K-7111-A (Falcon) and drive countershaft out of cluster gear and transmission case toward rear, leaving tool in cluster gear. Carefully lower cluster gear to bottom of case.

4) Remove input shaft bearing retainer and gasket, then remove oil seal from retainer. Remove input shaft assembly and front synchronizer blocking ring from transmission. Remove synchronizer retaining snap ring from output shaft, then, while holding synchronizer assembly together, pull output shaft out of transmission case.

5) Lift synchronizer assembly, intermediate gear, low and reverse sliding gears out of case and remove the two shift forks. *CAUTION - To assure proper assembly, mark end of synchronizer hub which faces front of transmission.*

6) Use a long thin brass drift and drive reverse idler shaft out of transmission case, then remove idler gear and cluster gears.

7) From underside of case, use a 1/8" pin punch and drive out tapered pins that hold shift shaft assemblies in case. *CAUTION - Use sharp, firm hammer blows to drive pins out. Do not tap lightly.* Use a plastic hammer and drive intermediate and high cam and shaft toward outside of case, then separate balls and spring from interlock plunger. Drive out both cam and shaft assemblies and remove interlock plunger. If necessary to remove shift shaft oil seals, use Tool 3552-H (Comet); T58L-101-A (Falcon) and a sliding hammer.



COMET & FALCON SYNCHRO-MESH TRANSMISSION (EXPLODED)

8) Remove snap ring securing input shaft bearing, and press input shaft out of bearing and oil slinger with Tool 4625-F or 7025-B (Comet); T53T-4621-B (Falcon). Remove ring securing output shaft bearing and press shaft out of bearing with Tool 4621-F (Comet); T57L-4621-B (Falcon), and an arbor press.

9) Remove synchronizer blocker rings, inserts, and insert springs from synchronizer hub. Remove thrust washers, dummy shaft, spacer, flat washers and needle bearings from cluster gear.

Extension Housing Seal and/or Bushing Replacement: Use Tool 1175-AE and sliding hammer to remove seal. Remove bushing with Tool 7000-AF (Comet); T60K-7697-A (Falcon). To install bushing, use Tool 7657-G with sleeve (Comet); T60K-7697-B (Falcon). Install seal with Tool 7657-G (Comet); T60K-7657-A (Falcon).

INSPECTION: Reinstall cluster gear and thrust washers in transmission case and check gear endplay between face of gear and thrust washers. Endplay should be .0045-.0185". If not within limits, replace thrust washers. Wash all parts thoroughly in solvent and blow dry with air, then inspect transmission case for cracks, worn or damaged bearing bores, or damaged threads. Remove any burrs from front and rear mounting surfaces that could cause misalignment. Inspect gears for excessive wear or tooth damage. If reverse idler gear bushing is worn, replace gear and bushing as an assembly. Inspect all shafts for spline and tooth damage and for wear. Inspect bearing races for cracks, balls and rollers for looseness, wear, endplay, or other damage. If necessary, replace oil seals.

REASSEMBLY: 1) Install oil slinger on input shaft and press bearing on shaft with Tool 4621-F (Comet); T53T-4621-B (Falcon), then install snap rings on shaft and bearing. Press bearing on output shaft with Tool 6059-B (Comet); T53T-4621-B (Falcon), then install snap rings on shaft and bearing.

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COMET & FALCON (C ntinu d)

2) Install new shift lever shaft seals in transmission case using Tool 7688 (Comet). Insert dummy shaft, Tool 7111-F (Comet); T60K-7111-A (Falcon) into cluster gear assembly, then install one flat washer, spacer, and the other flat washer on dummy shaft. Apply grease to needle bearings and assemble bearings around dummy shaft at each end of cluster gear. Apply a coat of grease to the other two flat washers and thrust washers and assemble at each end of cluster gear. *CAUTION - Tangs on thrust washers must be in a position to ngage slots in case.* Position gear assembly in transmission case with larger gear toward front of case.

3) Install low and reverse shift lever through case opening, then assemble spacer and spring in interlock plunger. Apply grease to each ball and position in each end of interlock plunger. Hold plunger in position and install intermediate and high shift lever in case, allowing balls to register in lever detents. Align cam and shaft slots with openings in shaft bosses, and install retaining pins from top of case.

4) Position reverse idler gear, and from outside case, insert shaft through case just far enough to hold the gear. After assembling the three inserts in synchronizer hub and securing them with two insert springs, insert hub assembly into synchronizer sleeve. Install one of the blocking rings on rear side of hub.

5) Use a coating of grease and insert needle bearings in end of input shaft, then install front synchronizer blocking ring on input shaft. Install shift forks in shift lever shaft assemblies, with the large fork in intermediate and high shaft assembly.

6) Start output shaft through rear opening of case, then place low and reverse sliding gear on shaft, followed by intermediate gear. Tilt output shaft just enough to allow rear shift fork to engage groove in rear of low reverse sliding gear. Position synchronizer assembly so that end of hub (previously marked at disassembly) is toward front of case and slide synchronizer assembly onto output shaft and engage synchronizer sleeve in intermediate and high shift fork. Install synchronizer hub snap ring.

7) Install input shaft and front synchronizer blocking ring, then install a new oil seal in input shaft retainer with oil seal replacer Tool 33565 (Comet); T60K-77047-A (Falcon). Install bearing retainer, with a new gasket and tighten retaining bolts to 12-15 ft. lbs. *CAUTION - B sure drain groov in r tain r is in lin with oil hol in transmission cas .*

8) Raise cluster gear and align dummy shaft with countershaft opening. Start countershaft into case, and carefully drive shaft into position. *NOTE - Align retainer slot in shaft as shaft nears end of its travel.* Align slot in reverse idler gear shaft and drive the shaft into position, then install retainer. Install speedometer drive gear and ball and secure with a snap ring.

9) Use a new gasket and install extension housing and engine rear support bracket. Tighten bolts to 37-42 ft. lbs. Install shift levers on shift shafts and check operation through all shift positions. Fill transmission to proper level and install transmission case cover and gasket. *CAUTION - Gasket vent holes must be toward rear, and the cover vent hole must be toward front. Tighten cover bolts to 10-13 ft. lbs.*

GEARSHIFT CONTROL ADJUSTMENT

With transmission selector lever in neutral, remove cotter pins and felt washers from connecting rod adjusting sleeves, and pull sleeves out of gearshift levers. Loosen locknut on each sleeve, then slide sleeves up or down on rods until smooth crossover operation results when sleeves are attached to levers. Tighten both locknuts securely.

EDSEL, FORD, MERCURY SYNCHRO-MESH

Eds l (1958-60)
Ford Pass. Cars (1954-60)
F rd Thund rbird (1955-60)
M rcury (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957-60 FORD SYNCHRO-MESH CONVENTIONAL TRANSMISSION OUTPUT SHAFT & LOW-REVERSE SLIDING GEAR REPLACEMENT PARTS CAUTION:* When installing Output Shaft, Part No. B9AR-7061-A, B, C; or Low-Reverse Sliding Gear, Part No. B9AR-7100-A, B, C, make sure that parts are identified by a stripe of orange paint on output shaft or by a dot of orange paint on gear. *DO NOT use any parts that are not identified by the orang paint.*

►***1954 FORD INTERMEDIATE GEAR PRODUCTION CHANGE:*** The design of the intermediate gear is changed eliminating the bushing used in earlier cars. The later gear, Part No. 1A-7102-A2 is interchangeable with the earlier type.

►***1955 FORD LOW GEAR JUMP-OUT OR PREMATURE LOW GEAR WEAR CORRECTION (Station Wagon, Thunderbird, & Sedan Delivery):*** This may be due to insufficient clearance between detent boss on transmission side cover and the low gear shift cam. Correct as follows: Remove side cover, and grind corner of detent boss to provide sufficient clearance between shift cam and detent boss.

►***1955 FORD PASS. CARS & F-100 TRUCKS INTERMEDIATE & HIGH GEAR JUMP-OUT NOTE:*** Before attempting to overhaul transmission to correct the above condition. Check alignment of transmission shift rods, wear at ends of rods and interference between clutch release rod and high and intermediate shift rods.

►*1956 FORD TRANSMISSION GEAR REPLACEMENT CAUTION:* The gears in 1956 models are "shot-peened" and may be used as service replacement on earlier transmissions. *Do not use earlier type gears in 1956 and later transmissions.*

►*1958 FORD HARD SHIFTING, PARTIAL DISENGAGEMENT, GEAR BREAKAGE & NOISE CORRECTION:* This condition may be caused by excessive play in gearshift linkage and can be corrected by installing the following parts. Gear Shift Rod Adjusting Sleeve, Part No. B7A-7353-A. Shift Lever Insulators, Part No. B7A-7341-A. Gear Shift Levers, Part Nos. B7A-7302-A & B7A-7302-B. Alignment holes have been added to the gearshift levers. When adjusting the crossover, adjust control rods so that a pin made from a ¼" drill rod will fit through holes in shift levers. *NOTE - All of the above parts must be installed as a group.*

►*1958 FORD 6 CYL. STANDARD TRANSMISSION PRODUCTION CHANGE:* A new transmission assembly, Part No. B8A-7003-G, identified by the letters "WAP-G" stencilled on transmission extension housing, replaces the transmission formerly used. The later transmission is the same design as formerly used, however, the parts are different and must not be interchanged. The transmission gear ratios have been changed for use with a new rear axle assembly having a ratio of 3.56-1.

►*1958-60 FORD (EXC. OVERDRIVE TRANS.) TRANSMISSION CASE WEAR CORRECTION:* If countershaft rear thrust washer has worn into transmission case and wear does not exceed .020", install a new countershaft (front) thrust washer, Part No. B5A-7119-B between rear of cluster gear and case. *NOTE - N w thrust washer must b modified as nec ssary by removing material from two ar as on out r circumference to allow washer to seat properly against transmission cas .*

DESCRIPTION: Three-speed constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). All helical gear type. Transmission cases are slightly different in design with two types having the shift levers integral with transmission side cover and the other type having transmission shift lever assemblies in side of transmission. A separate top cover is provided on the latter type transmission. Overhaul procedures are the same except as noted.

REMOVAL OF TRANSMISSION: *See "Transmission" on individual car model pages.*

►*SHIFT LEVER REMOVAL NOTE (TRANSMISSIONS WITH TOP COVER):* Shift shafts and cam assemblies are removed after transmission is disassembled by removing the pin located in boss of transmission housing, then pulling shaft assembly into inside of transmission case.

►*COUNTERSHAFT & IDLER GEAR SHAFT LOCK NOTE:* Countershaft and reverse idler shafts are secured in transmission case with either a pin or a woodruff key, depending on type of transmission case.

OVERHAUL
(TRANSMISSION WITHOUT OVERDRIVE)

DISASSEMBLY: 1) Mount transmission in a holding fixture, then remove gearshift housing and gasket. On all models except Thunderbird, remove bolts holding extension housing on transmission case and rotate extension housing until countershaft is accessible for removal. Drive countershaft out through rear of case with Tool 7111-C (Edsel & Mercury); T55P-7111-A (Ford) and allow cluster gear to drop to bottom of case. Remove extension housing and output shaft from case as a unit. *NOTE - Output shaft pilot rollers may fall to bottom of case. Do not lose any of the roll rs.* Remove input shaft bearing retainer, then tap input shaft out

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EDSEL, FORD, MERCURY SYNCHRO-MESH (Continued)

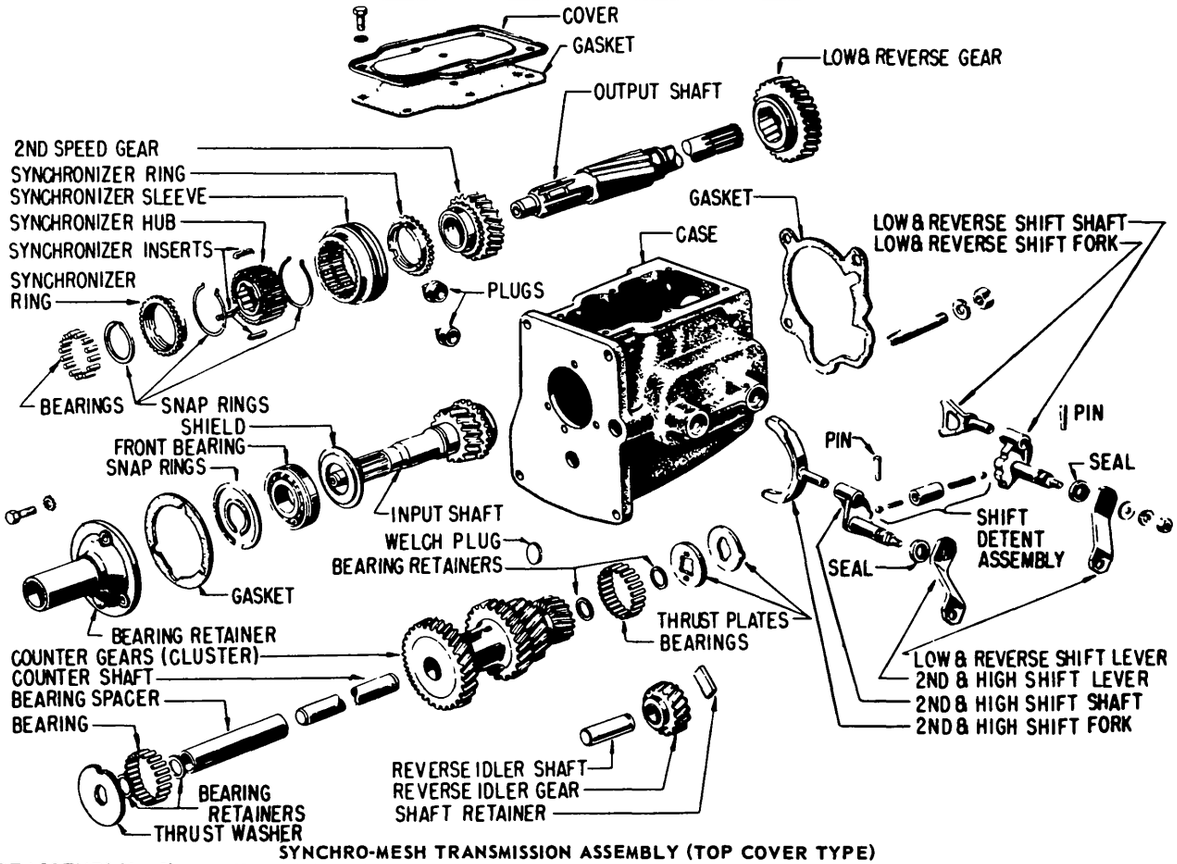
through front of transmission case. Remove any pilot rollers from inner end of input shaft.

2) On Thunderbird, remove input shaft bearing retainer, then remove snap ring and spacer washer from input shaft and remove snap ring from input shaft bearing. Remove bolts holding extension housing on transmission case, and pull housing toward rear of case. Pull input shaft forward, being careful not to lose any of the pilot rollers. Slide synchronizer sleeve forward, then tilt case and output shaft so that output shaft gears clear cluster gears, and remove output shaft with extension housing. Remove input shaft through gearshift housing opening, and remove rollers from input shaft. Use Tool T57L-7111-A and drive countershaft out of case, allowing cluster gear to drop to bottom of case, then remove woodruff key.

3) On all models, use a brass drift and drive reverse idler shaft out the rear of case. To disassemble output shaft, remove snap ring from forward end and slide synchronizer, intermediate gear, low-reverse gear off shaft. Disassemble the synchronizer by sliding the sleeve off hub and removing the three inserts and springs. Remove snap ring holding output shaft bearing in extension housing, then tap bearing and shaft out of extension housing. Remove speedometer gear snap ring, gear, and drive ball, then press bearing off output shaft with Tool 7025-B (Edsel & Mercury); T57L-4621-A (Ford & Thunderbird). Remove input shaft bearing snap ring and press bearing off shaft with Tool 7025-H (Edsel); T53T-4242-F11 (Ford & Thunderbird); 7025-G (Mercury), then remove baffle. To remove input shaft bearing retainer oil seal, use Tool 7600-E (Edsel & Mercury); T58L-101-A (Ford & Thunderbird). If extension housing bushing is to be replaced, remove old bushing with Tool 7000-AD (Edsel & Mercury); T52L-7000-GAE (Ford & Thunderbird). *NOTE - To remove seal only, use Tool 1175-AE (Edsel & Mercury); 1175-AB (Ford & Thunderbird).* Install bushing with Tool 7000-J (Edsel & Mercury); T57P-7697-B (Ford & Thunderbird). Install seal with Tool 7657-D (Edsel & Mercury); T57L-7657-A (Ford & Thunderbird).

4) On all models, if necessary to disassemble gearshift housing, drive tapered pins out of shift shaft bosses on housing (if so equipped). Remove external shift levers from cam and shaft assemblies and pull shifter forks and cams out of gearshift housing. Interlock balls, sleeve, pin, and spring will fall out of gearshift housing. Pull shifter forks out of cams, and remove seal rings from cams.

INSPECTION: Reinstall cluster gear and thrust washers in transmission case and check gear endplay between face of gear and thrust washers. Endplay should be .004-.018". If not within limits, replace thrust washers. Wash all parts thoroughly in solvent and blow dry with air, then inspect transmission case for cracks, worn or damaged bearing bores, or damaged threads. Remove any burrs from front and rear mounting surfaces that could cause misalignment. Inspect gears for excessive wear or tooth damage. If reverse idler gear bushing is worn, replace gear and bushing as an assembly. Inspect all shafts for spline and tooth damage and for wear. Inspect bearing races for cracks; balls and rollers for looseness, wear, endplay, or other damage. If necessary, replace oil seals.



SYNCHRO-MESH TRANSMISSION ASSEMBLY (TOP COVER TYPE)

REASSEMBLY: **1)** On all models, if gearshift housing was disassembled, install new oil seal rings in grooves in shifter cams, then place one cam assembly in position in housing and install retaining pin. Assemble interlock spring and balls in interlock sleeve and install assembly in gearshift housing. Install the other cam assembly in position and install retaining pin. *NOTE - Do not drive retaining pins into place. Wedge pins to obtain a secure fit only.* If seal was removed from input shaft bearing retainer, install a new seal by pressing it into place with an arbor press and Tool 7025-G-6B (Edsel & Mercury); T57P-77047-A (Ford & Thunderbird).

2) On all models, install input shaft bearing baffle on input shaft with dished side of baffle away from bearing, then press bearing into position with an arbor press and Tool 7025-6B (Edsel 223" & 292" Engs.); 4621-A (Edsel 352" Eng. & Mercury); T53T-4621-B (Ford & Thunderbird). Install snap ring on input shaft. *NOTE - On Thunderbird, install washer next to bearing before installing input shaft snap ring.* If output shaft bearing was removed, install bearing with an arbor press and Tool 4621-F (Edsel & Mercury); T53T-4621-C (Ford & Thunderbird). On Thunderbird, install snap ring next to output shaft bearing. On all models, position speedometer gear and retaining ball on shaft and hold in position with lubricant, then install snap ring retaining gear in place. Tap output shaft and bearing assembly into extension housing and install snap ring that holds shaft in housing. Coat output shaft with transmission lubricant and position low-reverse gear on shaft. *NOTE - On Thunderbird, shift fork groov must be plac d toward front of transmission. On oth r mod ls, groove must be placed toward rear of transmission.* On all models, position intermediate gear on output shaft, with synchronizer teeth and taper toward front. Assemble synchronizer by placing a spring at each end of hub, with ends of springs between the same two inserts. Position inserts in hub grooves, and slide the sleeve (with shift fork groove toward rear) onto hub. Slide synchronizer (with shoulder of hub forward) onto output shaft and install a snap ring. *NOTE - Us a snap ring that allows .003-.012" clearanc betw n rear sid f ring and synchronizer hub wh n hub is forc d as far back as possible.*

3) On all models, install same pilot tool (dummy shaft) used at disassembly, in transmission cluster gear and install bearing spacer sleeve. On Thunderbird models, install a set of 20 rollers, a spacer washer, another set of 20 rollers and a spacer washer at each end of cluster gear (four sets of rollers). On other models, install a spacer washer, a set of 25 rollers and another spacer

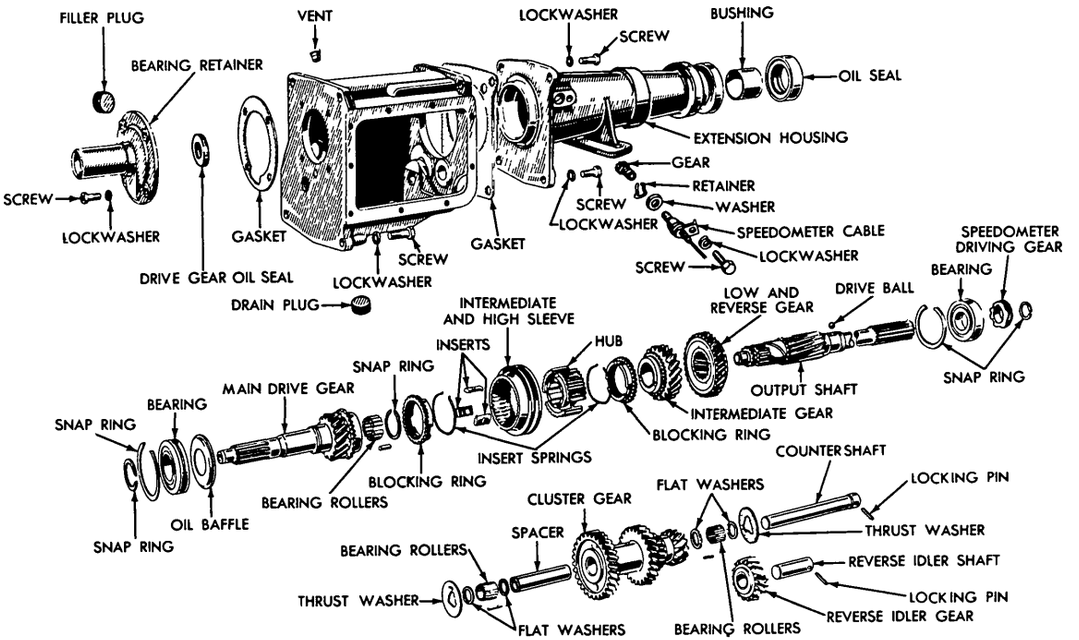
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EDSEL, FORD, MERCURY SYNCHRO-MESH (C ntinu d)

washer at each end of cluster gear (two sets of rollers). Retain spacer washers in position with grease. On Thunderbird, install front and rear tabbed thrust washers at each end of transmission case with tabs in slots of case. Place cluster gear rear inner thrust washer in gear pocket. On other models, install thrust washers at each end of cluster gear. Retain all washers in place with grease. On all models, install cluster gear assembly in transmission case. On Thunderbird, start countershaft into case rear bore. Center the gear on thrust washers and slide shaft into gear, pushing pilot shaft out forward end. Before rear of shaft enters case, place woodruff key in its slot and align it with keyway. Drive shaft in until it is flush or slightly inside case. Make sure thrust washer tabs are located in slots in case. On other models, install cluster gear assembly in bottom of transmission case. On all models position reverse idler gear in position with large shoulder toward rear (Thunderbird); with chamfered teeth ends toward front (other models), then install idler gear shaft and shaft retainer (key or pin).

4) On Thunderbird, position pilot rollers in end of input shaft and retain in position with grease, then install shaft and bearing assembly in case (through gearshift housing opening) and move it as far forward as possible. Place a new gasket on extension housing flange, then position output shaft and extension housing assembly through rear of transmission case, engaging pilot on output shaft with pilot bore of input shaft. Install input shaft bearing snap ring and move input shaft assembly as far as possible toward rear. Install input shaft bearing retainer with a new gasket, making sure that oil drain in retainer is lined up with oil hole in transmission case. Tighten attaching bolts to 10-13 ft. lbs. Install bolts attaching extension housing to transmission case and tighten to 37-42 ft. lbs. Install a new gearshift housing gasket, holding it in position with sealing compound, then shift high and intermediate sleeve and the low and reverse sliding gear to their neutral positions, then install gearshift housing and tighten bolts to 10-13 ft. lbs.

5) On other models, install pilot roller bearings in input shaft, then install input shaft and bearing in front of case. Install a new gasket on input shaft bearing retainer and install retainer, being sure to line up oil drain with hole in transmission case. Tighten bolts to 10-13 ft. lbs. Place a new gasket on extension housing flange, then install extension housing and output shaft assembly in transmission case. Be careful not to displace pilot roller bearings in end of input shaft. Turn extension housing for access to countershaft hole in case, then raise cluster gear into position and install countershaft from rear of case, pushing pilot tool (dummy shaft) out front of case. *NOTE - If a locking pin is us d, ins rt it in c untershaft and align it with h l in cas .* Drive countershaft in until it is flush or or slightly inside transmission case. Turn extension housing to its normal position and install attaching bolts. Tighten bolts to 37-42 ft. lbs. Install a new gearshift housing gasket and retain it in position with sealing compound. Shift high and intermediate sleeve and low and reverse gear to their neutral positions, then place shifting forks in neutral position. Install



SYNCHRO-MESH TRANSMISSION ASSEMBLY (SIDE COVER TYPE WITH EXTENSION HOUSING)

gearshift housing on case, entering forks into their grooves in synchronizer sleeve and in low-reverse sliding gear. Install attaching bolts and tighten to 10-13 ft. lbs.

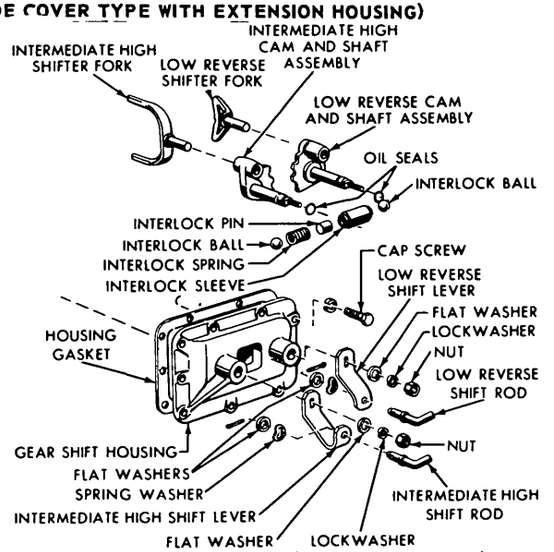
OVERHAUL (TRANSMISSION WITH OVERDRIVE)

►*OVERHAUL NOTE:* Transmissions used with overdrive on Thunderbird and Ford Interceptor are the same as the transmission used on Thunderbird without overdrive. Overdrive transmissions used on other models are similar to the standard transmissions except that shift lever assemblies are integral with side of transmission case. A top cover is also used on these models. For overhaul procedures, *see "Transmission Without Overdrive" above and note the following:*

DISASSEMBLY: Thunderbird & Ford Interceptor - Same as for Thunderbird standard transmission. After removal of overdrive assembly from transmission case, the overdrive adapter plate is removed as an assembly with transmission output shaft in the same manner as for a standard transmission extension housing.

Other Models: Same as for standard transmissions used on these models except that shift lever assemblies are removed from side of transmission case after transmission is disassembled. After removal of overdrive assembly from transmission case, the overdrive adapter plate is removed as an assembly with transmission output shaft in the same manner as for a standard transmission extension housing.

►*TRANSMISSION (WITH SHIFT LEVER ASSEMBLIESIN SIDE OF TRANSMISSION CASE) OVERHAUL NOTE:* After transmission input shaft is removed, remove shift lever shaft retaining pins from bosses in side of transmission case, then pull low and reverse shift lever out as far as it will go. Remove low and reverse shift



SHIFT LEVER ASSEMBLY (SIDE COVER TYPE)

lever fork from engagement with gear on output shaft and remove it from case. After transmission is disassembled, remove external shift levers from both shift shafts and remove shafts and cam assemblies from transmission case. Remove lock plunger, spring, pin and poppet balls. To install shift shaft assemblies, install intermediate and high shift shaft and cam assembly in case, then insert interlock sleeve, spring, and pin in

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EDSEL, FORD, MERCURY SYNCHRO-MESH (Continued)

bore of case. Install low and reverse shaft and cam assembly and install external levers on both assemblies. Install a poppet ball in sleeve at low and reverse end, then push low and reverse cam toward poppet ball far enough to hold ball in place in neutral notch (ball must seat in neutral notch of cam). Move intermediate and high cam toward side of transmission case and install second poppet ball in its sleeve, then pull cam back to its normal position. Install shaft retaining pins in transmission case bosses. Shift one cam to neutral position and the other to a simulated gear engagement position so poppet balls seat in their respective cam notches. Check clearance between cam ramp and sleeve with a feeler gauge. Clearance should be .001-.007". If not within limits install a sleeve of proper length. Sleeves are available in five sizes from 1.292" to 1.303" long.

EDSEL, FORD, MERCURY (WARNER) OVERDRIVE

Edsel (1958-60)
Ford Pass. Cars (1954-60)
Ford Trucks (1954-60)
Mercury (1954-58)

DESCRIPTION: Solenoid operated type similar in design to other Warner Type R10 Overdrives

REMOVAL OF OVERDRIVE: ***See "Overdrive" on car model page.***

DISASSEMBLY OF OVERDRIVE: Remove governor, then remove governor and speedometer drive pinion. Remove solenoid (rotate clockwise to disengage plunger from pawl). After removing bolts securing gearshift housing-to-transmission case (Exc. Ford Models with shift levers in side of transmission case), remove shifter housing and shifter forks. On early models, remove small rectangular cover plate on top of case. On later models, pierce and remove snap ring hole cover in top of case. Drive out manual control shaft lockpin from the bottom, then pull manual control out as far as it will go. Remove overdrive housing attaching bolts. Insert snap ring pliers in overdrive housing snap ring hole and spread snap ring that retains main shaft bearing. Remove overdrive housing. *CAUTION - Do not allow adapter plate to separate from transmission case.*

Overdrive Case & Control Mechanism: Remove reverse lock-up spring from case. Remove lever on end of control shaft, push shaft through and remove from within housing, remove shaft oil seal from case. Compress rear bearing snap ring (insert pliers through slot in case), remove ring. Bushing and oil seal at rear end of case are similar to regular transmission. ***See Extension Housing data in Ford-Lincoln-Mercury Transmission article.***

Driveshaft & Gear Assembly: Install one screw to retain adapter plate on transmission case, pull driveshaft off to rear (CAUTION—catch free-wheel rollers as they drop out). If bearing to be removed from shaft, take out snap ring and remove speedometer gear taking care not to lose woodruff key from gear (on Lincoln, remove both speedometer gear snap rings and additional snap ring at rear of bearing), remove bearing. Take out retaining clip ("C" washer) at rear of free-wheel cam, withdraw free-wheel unit and pinion assembly (these two parts can be separated by removing "C" washer ahead of free wheel cam). Remove overdrive sun gear and shift rail assembly as a unit by sliding them off rear of shaft.

Adapter Plate & Sun Gear Mounting: Remove large snap ring from adapter plate, withdraw sun gear cover plate, balk ring blocker assy., solenoid pawl. NOTE—Adapter plate is removed as a unit with transmission mainshaft. Do not disturb unless transmission being disassembled.

Checking Balk Ring Tension: Place balk ring and gear plate assembly in vise. Place hook of scale on shoulder of balk ring. Pull in direction of drag should be 3½-5½ lbs. Reading should be taken while balk ring turning as initial effort may give reading considerably higher than specified. Replace assembly if not within specifications.

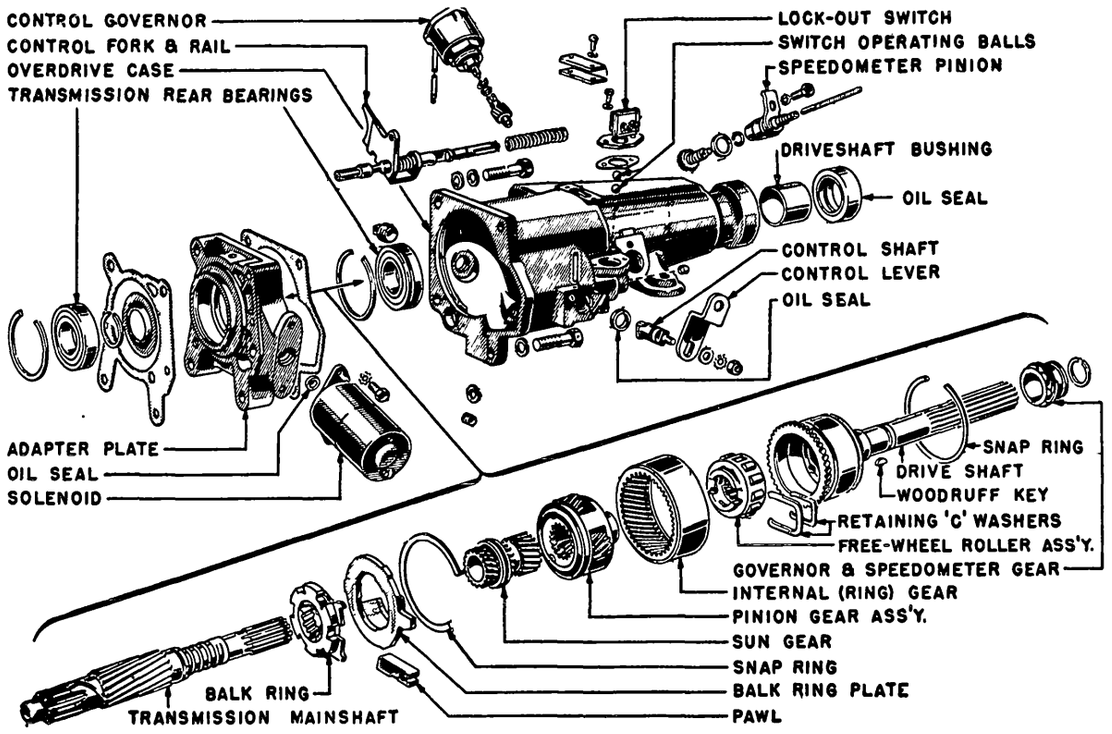
REASSEMBLY OF OVERDRIVE: Assemble in reverse order of disassembly. Note following:

Sun Gear Balk Ring, Pawl & Solenoid: After balk ring installed, insert pawl with notch on side downward (Ford), upward (Lincoln & Mercury—on Mercury, interlock plunger engages this notch), position cover plate with tongue over pawl, install large snap ring (this ring furnished in three thicknesses for selective fitting). When installing solenoid (after assembly completed), insert plunger stem with solenoid rotated clockwise 55° (85° on Convertible & Station Wagon) from mounted position to align plunger flats with pawl slot, then rotate solenoid counter-clockwise until mounting screw holes aligned.

Free-wheel Assembly: If free-wheel roller retainer and springs removed from cam, first note position of springs and replace in exact same positions. Springs must place tension on cam so that it is normally rotated counter-clockwise in retainer (viewed from rear) with rollers on "high" ends of cam ramps (outward or engaged position).

Overdrive Case & Control Mechanism: Install bearing outer snap ring in groove in case with lugs on ring toward slot in housing and expand ring with pliers inserted through slot while case is being pushed on over mainshaft. Insert control shaft in case before case installed on shaft but do not install shaft lockpin until after assembly completed and cam on shaft engaged in slot in shift rail. Install new oil seal on control shaft and position control lever upward (Ford & Lincoln), downward (Mercury).

OVERDRIVE CONTROL: ***See Warner Type R10 Overdrive Controls for complete data.***



EDSEL, FORD, MERCURY (WARNER) OVERDRIVE (TYPICAL)

FORD TRUCK 3-SPEED LIGHT & MEDIUM DUTY

1954-60 F-100 (Std.) ①
1956-60 F-250 (Std.) ② See Note Below.
① - Light Duty. ② - Medium Duty.

►*1956 F-250 TRUCK TRANSMISSION NOTE: The 3-Speed Medium Duty Transmission replaced the 3-Speed Heavy Duty Transmission as standard equipment on this model beginning March 1956.*

►***1955 TRUCKS (WITH 239" ENGINE) HARD SHIFTING CORRECTION:*** If hard shifting occurs with the truck standing and the clutch completely disengaged, the pilot bearing bore in the crankshaft may not be deep enough. To correct this condition, grind approximately ⅛" off the pilot bearing end of transmission input shaft to provide clearance between end of shaft and counterbore in crankshaft.

►*1957-59 OVERDRIVE TRANSMISSION LOW GEAR JUMP-OUT CORRECTION:* On trucks built before February 15, 1959, install a new transmission output shaft, Part No. B9TT-7061-D. The new output shaft has a relief, .004-.006" deep and 1 17/64" long, cut into "coast" side of first and reverse sliding splines.

DESCRIPTION: 3-Speed constant mesh, synchro-mesh (second & high), sliding gear (low & reverse). Light duty and medium duty transmissions are similar in design and repair procedures are the same except for two sets of needle bearings used at each end of countershaft (medium duty), one set (light duty). Countershaft and idler gear shaft is retained in place with a lock pin (light duty), lock plate (medium duty).

REMOVAL OF TRANSMISSION: ***See "Transmission" on truck model page.***

DISASSEMBLY: Remove gearshift housing and gasket. Remove screws which secure front bearing retainer to transmission case, tap retainer lightly, then slide retainer and gasket off main drive gear shaft. Remove lockpin securing countershaft and reverse idler gear shaft in case. Remove capscrews and lockwashers which attach extension to transmission case. Turn extension ¼ turn counter-clockwise to expose end of countershaft. Drive countershaft to rear until clear of front of case. Push countershaft out through rear of case with dummy shaft cut to length of countershaft cluster gear. Leave cluster gear and dummy shaft in case. Pull extension and mainshaft assembly out through rear of transmission case. Remove snap ring from main drive gear bearing. Tap gently on end of shaft with lead hammer until bearings free. Place one hand over gear end of main drive gear to prevent loss of or damage to main shaft pilot bearings, then lift main drive gear out of transmission case. Lift cluster gear assembly out of case, remove thrust washer and thrust plates located at each end of cluster gear. Remove two roller bearing (or needle bearing) assemblies and spacer from inside cluster gear. Drive reverse idler shaft toward front of case until free, then lift idler gear and shaft out of case.

Main Shaft: Remove snap ring that holds main shaft assembly in extension. Tap main shaft out of extension, using soft hammer. Remove transmission main shaft synchronizer snap ring, then pull or press synchronizer assembly and second speed gear off main shaft. Slide low and reverse gear off mainshaft. Remove snap ring that secures speedometer driving gear on main shaft, then remove gear. Press main shaft rear bearing off main shaft. Remove oil seal from transmission extension.

Synchronizer: Slide synchronizer hub assembly out of sleeve. Remove snap rings located on each side of hub, then remove inserts. NOTE—Blocker rings are removed separately from assembly. One ring is removed with second speed gear, and other is removed with main drive gear.

Main Drive Shaft: Remove synchronizer ring, then remove roller bearing assembly or needle bearings from inside drive gear. Remove snap ring from end of shaft. Using an arbor press or puller, remove bearing from shaft and take off oil baffle.

Gearshift Housing: Remove shift lever retaining pins and levers from camshaft. Pull shifter fork and cams out of gearshift housing. With cams removed the interlock balls, retainer, and spring will fall out of gearshift housing. Pull shifter forks out of shifter cam and shaft assemblies. Remove oil seals from shifter cam and shaft assemblies.

REASSEMBLY (Of Component Assemblies): All parts should be cleaned and inspected before assembly.

Main Shaft: Slide second speed gear onto front end of shaft. Coat synchronizer ring with grease, then install ring on shaft. Install synchronizer assembly on shaft, making sure the cutouts on synchronizer ring mate with inserts in hub, then install snap ring. Check endplay between second speed gear and shaft spline shoulder with a feeler gauge. Endplay should not exceed .020". Install first and reverse sliding gear on rear end of shaft. Press main shaft rear bearing on shaft. Install speedometer drive gear and snap ring. Press new oil seal in transmission extension on shaft until bearing is seated in bore of extension, then install bearing snap ring.

Synchronizer: Install inserts in hub, then position two snap rings on each side of hub. Slide hub assembly into sleeve.

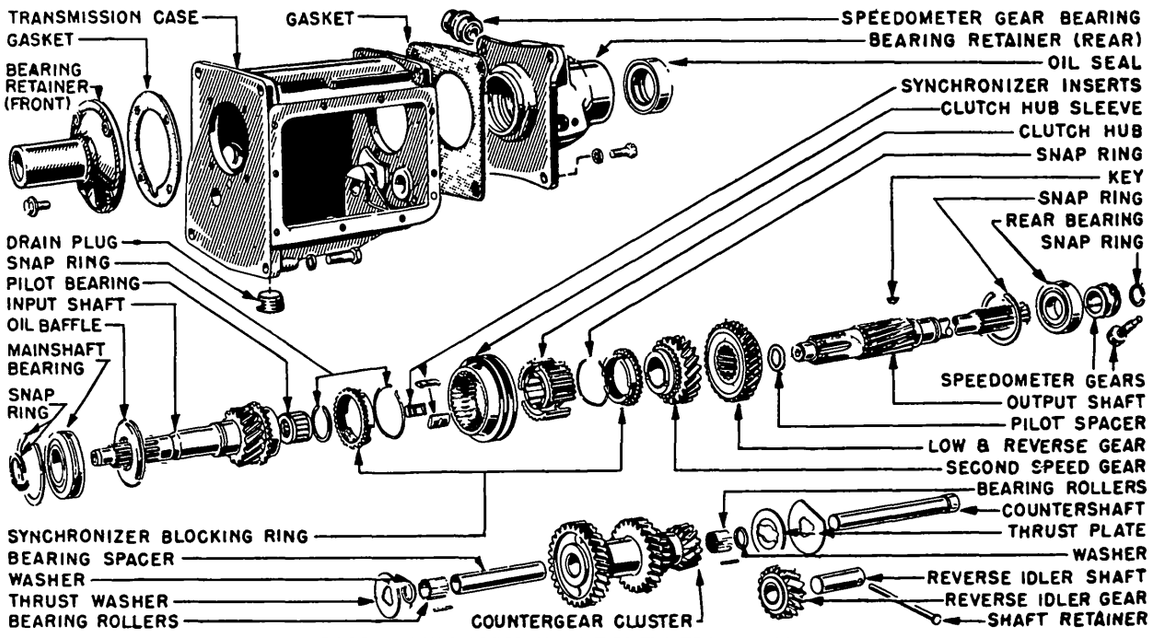
Main Drive Gear: Install oil baffle, bearing and bearing snap ring (small) on shaft. Coat cavity in rear end of shaft with grease, then install roller bearing assembly (or needle bearings).

Cluster Gear: Install spacer and front and rear roller bearing assemblies (or needle bearings) in cluster gear. Place thick coating of grease on thrust washer and thrust plates, then position two rear thrust plates on rear end of cluster gear.

Gearshift Housing: Install new oil seals on shifter cam and shaft assemblies. Place one shifter cam and shaft assembly in position in gearshift housing. Assemble interlock spring and balls in retainer, then install interlock assembly in gearshift housing. Place other cam and shaft assembly in position in gearshift housing. Install gearshift levers on camshafts, then install retaining pins. Assemble shifter forks in cam and shaft assemblies.

TRANSMISSION ASSEMBLY: Lubricate all parts with transmission lubricant. Position reverse idler gear in case, then install idler shaft. Drive idler shaft into case until retainer pin hole in shaft is aligned with hole in case. Install countershaft gear front thrust washer with tip on washer hooked into groove on inside of case. Position cluster gear assembly in case with larger gear toward front. Make sure thrust washer and plates remain in position. Coat synchronizer blocker ring. Place ring on front end of main drive gear, install main drive gear assembly in case. Install snap ring in groove on main drive gear bearing, making sure that snap ring is flush

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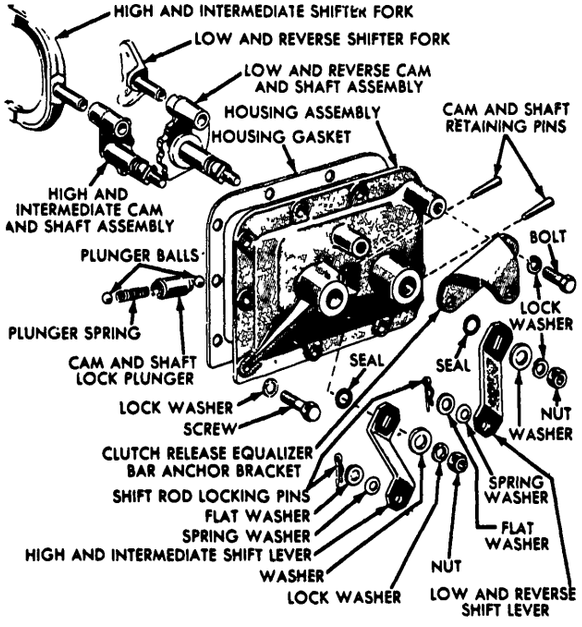
FORD TRUCK 3-SPEED (LIGHT DUTY) TRANSMISSION

FORD TRUCK 3-SPEED LIGHT & MEDIUM DUTY (Continued)

with side of case. Position new gasket on transmission case, then install main drive gear bearing retainer on case. Tighten capscrews securely. Position new gasket on extension, then position main shaft and extension assembly in transmission case. Raise cluster gear assembly until bore of gear is aligned with countershaft holes in transmission case. Make sure that thrust washer and plates are also in alignment. Insert end of countershaft in hole in rear end of case. Push shaft forward until retainer pin hole in shaft is aligned with retainer pin hole in case. Install retainer pin. Install capscrews and lockwashers which attach extension to case, then tighten screws securely. Position new gasket on case, then place shift forks in neutral position. Place housing assembly on case making sure shift forks are located in proper channels on sliding gear and synchronizer sleeve.

►***CAUTION—Position low and reverse fork with smooth side of fork toward gear, or transmission will not shift into first speed.***

Install capscrews and lockwashers that secure gearshift housing to case. Install drain plug. Turn main drive gear by hand to make sure the gears do not bind and that shift forks are in proper position.



3-SPEED (LIGHT & MEDIUM DUTY) SHIFT ASSEMBLY

FORD TRUCK 3-SPEED (HEAVY DUTY)

Ford Truck (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 TRUCKS (WITH 239" ENGINE) HARD SHIFTING CORRECTION:* If hard shifting occurs with the truck standing and the clutch completely disengaged, the pilot bearing bore in the crankshaft may not be deep enough. To correct this condition, grind approximately ⅛" off the pilot bearing end of transmission input shaft to provide clearance between end of shaft and counterbore in crankshaft.

►*1956 HARD SHIFTING CORRECTION:* On "F" Series Trucks, install revised shift rods, Part No. B6Y-7326-B and B6Y-7328-B. On "P" Series Trucks, install revised shift rods, Part No. B6J-7325-C and B6J-7327-C. Adjust length of rods to assure full transmission lever travel into the detent with a properly aligned cross-over. This control rod change can be made on 1953 to 1955 models also.

►*1956 SHIFT SHAFT NUT BREAKING OFF CORRECTION:* Remove transmission cover assembly and remove high and intermediate lever and the low and reverse lever assemblies. Replace these levers with the revised levers, Part No. B6Y-7285-A and B6Y-7290-A

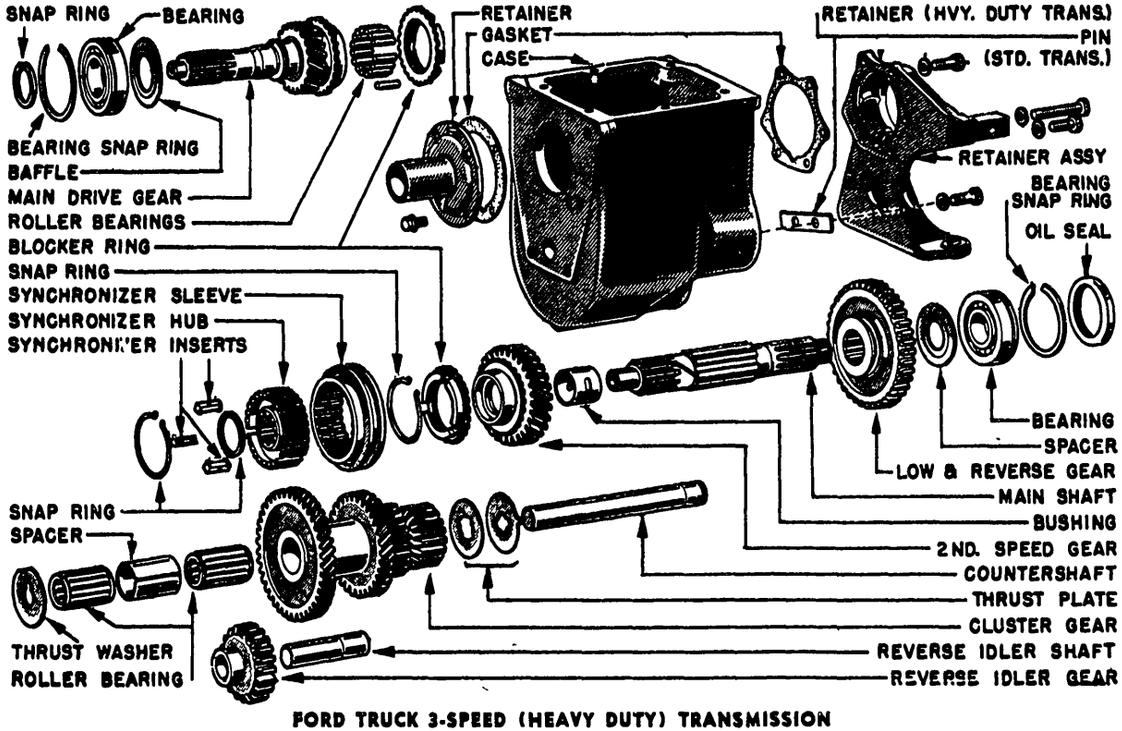
DESCRIPTION: Constant-mesh, synchro-mesh, helical gear (2nd & high), spur gear (low & reverse).

REMOVAL OF TRANSMISSION: *See "Transmission" on truck model page.*

DISASSEMBLY: Remove gearshift housing and gasket. Remove screws that secure front bearing retainer to transmission case, tap retainer lightly, then slide retainer and gasket off main drive gear shaft. Remove parking brake assembly, then remove screws, countershaft locking plate and gasket located at lower rear end of case. Remove mainshaft rear bearing retainer, slide speedometer driving gear and spacer off shaft, then remove snap ring from bearing. Using a puller, remove bearing from main shaft, and take off the oil baffle. Drive the countershaft out through rear of case with a punch or dummy countershaft. Pull main drive gear as far forward as possible and lift main shaft assembly out of case. Remove snap ring from main drive gear bearing. Tap gently on end of shaft with a lead hammer until bearing is free. Place one hand over gear end of shaft to prevent loss or damage of roller bearings, and lift main drive gear out of case. Lift cluster gear assembly out of case, and remove thrust washer and thrust plate at each end of cluster gear. Remove the two roller bearing assemblies and spacer from inside cluster gear. Drive reverse idler shaft toward front of case until shaft is free, and remove from case.

Main Shaft: Slide first and reverse sliding gear off

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FORD TRUCK 3-SPEED (HEAVY DUTY) TRANSMISSION

FORD TRUCK 3-SPEED (HEAVY DUTY) (C nt.)

main shaft. Remove snap ring from synchronizer end of shaft and slide synchronizer off shaft together with second speed gear.

Synchronizer: Slide synchronizer hub assembly out of sleeve. Remove snap rings located on each side of hub, then remove the inserts. NOTE—Blocker rings are removed separately from assembly. One ring is removed with second speed gear, and other is removed with main drive gear.

Main Drive Shaft: Remove synchronizer ring, then remove roller bearings from inside drive gear. Remove snap ring from end of shaft. Using an arbor press or puller, remove bearing from shaft and take off the oil baffle.

Floorboard Shift: Remove lock wires and screws attaching shifter forks to shifter shafts. Insert a drift in lockscrew hole of one of the shafts and gently tap shaft and expansion plugs out of housing. Repeat with other shaft *(CAUTION—While removing shaft, place one hand over plunger spring and ball hole to prevent these parts from flying out. Tag or mark each shaft and fork and side of housing as its position to assure correct reassembly).* Remove expansion plug at opposite end of housing from which shafts removed, remove plunger plug and plunger.

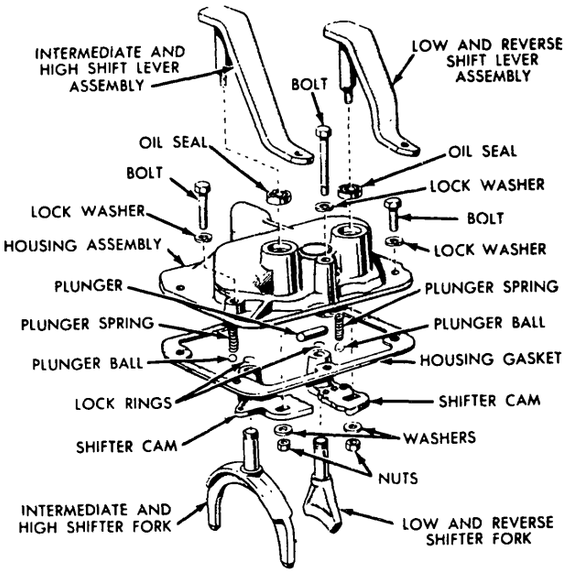
REASSEMBLY (Of Component Assemblies): All parts should be cleaned and inspected before assembly.

Main Shaft: Slide second speed gear on to front end of shaft. Coat synchronizer ring with grease, then install ring on shaft. Install synchronizer assembly on shaft, making sure the cutouts on synchronizer ring mate with inserts in hub, then install snap ring. Check endplay between second speed gear and shaft spline shoulder with a feeler gauge. Endplay should not exceed .020". Install first and reverse gear on rear end of shaft.

Synchronizer: Install inserts in hub, then position the two snap rings on each side of hub. Slide hub assembly into the sleeve.

Main Drive Shaft (Gear): Install the oil baffle, bearing and bearing snap ring (small) on end of shaft. Coat roller bearing cavity in rear end of shaft with grease and install bearing rollers.

Cluster Gear: Install spacer and the front and rear roller bearings in cluster gear. Place a thick coat of grease on thrust washer and thrust plates, then position two thrust plates on rear end of cluster.



3-SPEED (HEAVY DUTY) SHIFT ASSEMBLY

Floorboard Shift: Slide plunger in position in housing and install plunger plug. Drop a spring and ball into one of the holes in housing, then position the proper fork in place. Hold the ball down with a drift punch and slide the correct shaft into housing and shift fork. Install the capscrew to secure shaft on fork and secure with a lockwire. Install other shaft and fork in same manner. Install expansion plug at each end of each shaft.

Steering Column Shift (Parcel Delivery): Slide plunger into position in housing and install plunger plug. Install shifter shaft spring, shifter shaft inner lever and shifter shaft into housing. Press spring away from inner lever and insert key in inner lever, then force lever over key. Install one snap ring at each side of inner lever. Drop a shifter shaft lock plunger spring and ball through one of the housing holes, then place proper shift shaft in position. Move the ball down with a drift and slide correct shifter shaft into housing and shift fork. Install a shifter fork lockscrew, and secure screw with lockwire. Install remaining shaft in same manner. Install expansion plugs at each end of each shaft. Place selector lever assembly on stud in housing, then install spacer, lock washer, and nut. Position shifter shaft outer lever on shifter shaft, then install flat washer, lock washer and nut.

Steering Column Shift (F-1, F-100 Truck): Place one shifting cam in position in gear shift housing. Assemble interlock spring and balls in retainer and install interlock assembly in housing. Install oil seals in housing, then install gearshift levers on camshafts, install retaining pin. Assemble shifter forks.

Transmission: Lubricate all parts with transmission lubricant. Position reverse idler gear in case and install idler shaft, driving it into case until edge of lockplate notch in shaft is flush with rear face of case. Install countershaft gear front thrust washer with tip on washer hooked to groove on side of case. Position cluster gear assembly in case with larger gear toward front. Make sure thrust washer and plates remain in position. Coat synchronizer blocker ring with grease, and place on rear end of main drive gear, and install main drive gear in case. Install snap ring in groove, making sure that ring is flush with case. Position gasket on case, and install main drive gear retainer. Tighten capscrews securely. Place main shaft assembly in case, and install oil baffle or spacer on main shaft. Install snap ring in groove on rear bearing, then drive bearing on shaft until bearing snap ring is flush with side of case. Make sure synchronizer rings are free in synchronizer assembly. Raise cluster gear assembly until bore of gear is aligned with holes in case. Make sure thrust washers are in alignment, then insert end of countershaft through hole in rear end of case, pushing shaft forward until edge of notch in shaft is flush with case and notch is aligned with notch in idler gear shaft. Install locking plate and gasket, and parking brake assembly. Position new gasket on case, then place shifter forks in neutral. Place gearshift housing assembly on case, making sure shift forks are in proper channels on sliding gear and synchronizer sleeve.

CAUTION—Position low and reverse fork with smooth side of fork toward gear, or transmission will not shift into first speed. Install capscrews and lockwashers, securing gearshift housing to case. Install drain plug. Rotate main drive gear by hand to make sure gears free and shift forks properly installed.

FORD TRUCK 4-SPEED (SYNCHRO-MESH)

Ford Truck (1954-60)

DESCRIPTION: Four-speed constant-mesh, synchro-mesh, helical gears (Second, Third & Fourth). Sliding spur gears (First & Reverse). Synchronizer assemblies are friction ring-and-sleeve type.

TRANSMISSION REMOVAL: *See "Transmission" on truck model page.*

TRANSMISSION DISASSEMBLY: Remove parking brake assembly. Remove speedometer driven gear retaining nut and the driven gear. Remove rear bearing retainer and gasket (noting location of longest retainer-to-case bolt). Remove reverse idler shaft and countershaft retainer plate from rear of case. Slide speedometer drive gear and spacer off main shaft. Remove gear shift housing assembly and gasket. Unhook clutch release bearing return spring and remove release bearing and hub assembly. Remove capscrews from front bearing retainer and the nuts from clutch housing-to-case attaching bolts then remove clutch housing and retainer from case. Remove snap ring from main drive gear bearing and from main drive gear and then remove the bearing using Tool 7025-C (Puller). Remove oil

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FORD TRUCK 4-SPEED (SYNCHRO-MESH) (C nt.)

baffle and the snap ring from rear main shaft bearing and pull the bearing with Tool 7025-C. Drive countershaft from case, working from the front, using dummy shaft, Tool 7111-A. *(CAUTION*—Keep dummy shaft in contact with countershaft to avoid dropping needle bearings). Allow cluster to remain in bottom of case. Remove main drive gear through the front end of case, then remove synchronizer blocker ring and needle bearings from gear. Pull reverse idler shaft out of case, using Tool 7140. Slide reverse shifter fork off shaft and remove from case. Tilt main shaft assembly and remove through top of case. Take out reverse idler gear. Position case with power take-off side next to bench. Roll cluster gear assembly toward top of case until cluster gear small end can be pushed through main shaft bearing bore in case. Using extreme care not to disturb needle bearings, remove gear assembly out of case.

DISASSEMBLY OF COMPONENT PARTS:

Main Shaft: Remove third and high synchronizer snap ring from main shaft, then slide third and high speed synchronizer assembly and third speed gear off shaft. Remove second speed synchronizer snap ring and slide second speed synchronizer hub gear off synchronizer, using care not to lose balls, springs and plates. Pull synchronizer hub off shaft. Remove snap ring at rear of second speed gear and remove gear, spacer, rollers, and thrust washers.

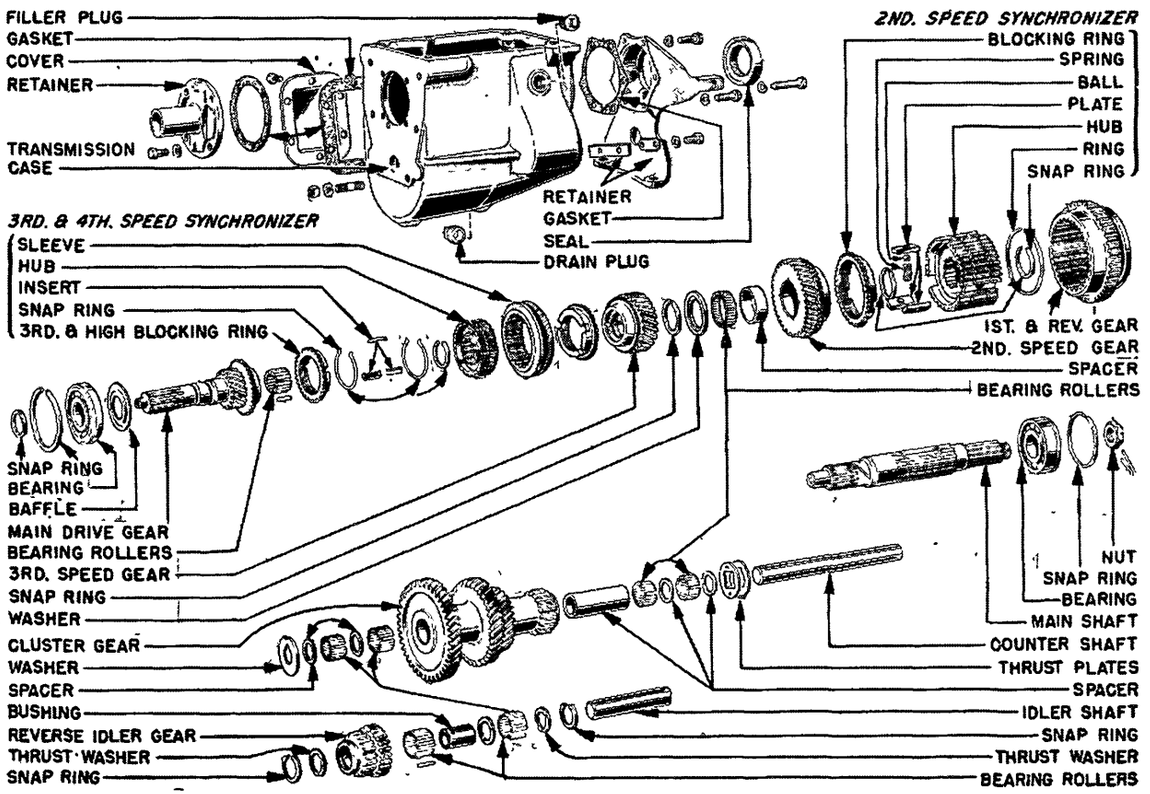
Cluster Gear: Remove dummy shaft, 88 bearing rollers, bearing spacer washers and bearing spacer.

Reverse Idler Gear: Install reverse idler gear on shaft, check gear for smooth, free rotation on shaft. If any roughness noted, disassemble gear as follows: Remove snap ring from one end of gear, then remove idler gear bearing rollers, thrust washers, bearing spacer, and idler gear bushing from gear. Remove remaining snap ring from gear.

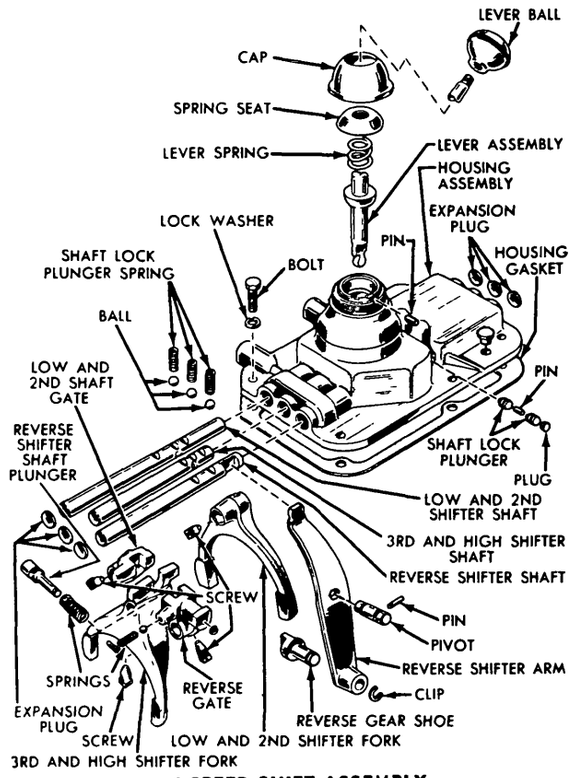
Gearshift Housing: Remove gearshift lever cap, then lift lever out of cover. Remove lock wires and lock screws, shifter forks and shifter shaft gates. Remove expansion plugs from front end of housing and tap shifter shafts out of housing while holding one hand over holes in housing to prevent loosing springs and steel balls. Remove two lock plungers.

REASSEMBLY OF COMPONENT PARTS:

Cluster Gear: Slide the long spacer into cluster gear and then insert dummy shaft into spacer. Hold cluster gear in a vertical position and install 22 bearing rollers. Install spacer washer on top of rollers and then install 22 bearing rollers and a spacer washer on top of rollers. Hold a large thrust washer against end of cluster gear to keep rollers from falling out, and invert the gear assembly. Install bearing rollers in opposite end (above).



F RD TRUCK 4-SPEED SYNCHRO-MESH TRANSMISSI N



4-SPEED SHIFT ASSEMBLY

Main Shaft: Install second speed gear thrust washer on main shaft. Hold shaft in vertical position and slide second speed gear on main shaft. Insert second speed gear bearing rollers in gear, then slide spacer into gear hub. Install spacer snap ring in groove of main shaft. *(CAUTION*—Do not invert shaft. Rollers will slide out of shaft). Press second speed synchronizer hub on shaft and install snap ring. Place main shaft in vertical position in a vice. Position synchronizer springs and plates in hub and place second speed synchronizer ring on hub. Hold ring above hub spring and ball holes and position one ball at a time in hub. Push down to depress ball into hole and slide ring down to retain ball in hub, then repeat the foregoing procedure and install remaining two balls. Remove main shaft from vice and install the third speed gear, and sychronizer blocking ring on shaft. Install a snap ring at each end of hub with spring openings staggered. Place synchronizer inserts on sleeve and slide the assembly onto main shaft, making sure slots in blocker ring in line with inserts. Install front snap ring.

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FORD TRUCK 4-SPEED (SYNCHRO-MESH) (C nt.)

Reverse Idler Gear: Install snap ring in one end of reverse idler gear. Set gear on end with snap ring on bottom. Position a bearing roller thrust washer in gear on top of snap ring, then install idler gear bushing. Insert a row (37) of bearing rollers between bushing and bore of gear. Install bearing spacer, then install second row (37) bearing rollers. Position remaining thrust washer on rollers, install snap ring.

Gearshift Housing: Place spring on reverse gate plunger and install plunger and spring in reverse gate. Press plunger through the gate and secure it with the clip. Place reverse gate plunger ball and spring in poppet hole. Compress the spring and install cotter pin. Place shifter shaft lock plunger spring and steel ball into reverse shifter shaft hole in housing. Press down on ball with a long, narrow drift, then position reverse shifter shaft so reverse arm notch does not slide over the ball, and insert shaft part way into housing. Slide reverse shaft gate onto shaft, and drive shaft into housing until ball snaps into groove of shaft. Install lock screw and lock wire to secure gate to shaft. Insert the two interlock plungers into pockets between shifter shaft holes. Place the spring and a steel ball into the first and second shifter shaft hole. Press down on steel ball, then insert shifter shaft part way into housing. Slide first and second gear shifter fork onto shaft so the offset of fork is toward rear of housing. Push shaft all the way into housing until ball snaps into place in groove. Install lock screw and wire to secure fork. Install third and high shifter shaft in same manner, then install expansion plugs in shaft bores.

TRANSMISSION REASSEMBLY: Lubricate all parts with transmission lubricant. Enter countershaft into hole in rear of case and tap shaft until forward end is flush with inside of case. Slot in end of shaft must be at rear and faced toward idler gear shaft. Position case with power take-off plate downward. Hold the two thrust washers at each end of cluster gear and install gear in bottom of case, then install the third thrust washer between case and rear washer. Position idler gear shaft into case with slot at rear and faced toward countershaft and while holding reverse idler gear in position, tap shaft until slot is aligned with rear face of case. Align cluster gear with holes in case and push the dummy shaft out through front of case with countershaft. *(CAUTION*—Be sure to keep cluster gear in contact with dummy shaft to prevent bearing from dropping into gear). Align slot in countershaft with rear edge of case. Install main shaft pilot bearing rollers in main drive gear, and position gear in front bearing bore, working from inside the case. Position the stop yoke Tool No. 2025-D to prevent jamming synchronizer rings. Install oil baffle and main shaft bearing on shaft and drive bearing into position with Tool 7065-A, install snap ring. Using same tool, drive rear bearing on shaft and into rear bearing bore, then install rear bearing snap ring. Install main drive gear snap ring on shaft. Install front bearing retainer and clutch housing on front of transmission. Install gear shift housing and gasket. Install idler and countershaft retainer plate, securing with two capscrews. Install rear bearing retainer and new gasket making sure the longest screw is installed in correct hole. Install speedometer drive gear and spacer on end of main shaft and install driven gear and retaining nut. Install flange and parking brake drum and tighten nut, locking in place with cotter pin.

NASH STATESMAN & RAMBLER SYNCHRO-MESH

Statesman (1954-56)
Rambler (1954-55)

►CHANGES, CAUTIONS, CORRECTIONS

►*1953 NASH RAMBLER TRANSMISSION PRODUCTION CHANGE*—At 1953 Car Serial No. D-150580, "Warner Type" Transmission replaced by "Statesman" Series Standard Transmission.

►*1953 TRANSMISSION SYNCHRONIZER PRODUCTION CHANGE*—"Nash Type" Synchronizer Clutch replaced "Warner Type" temporarily between Car Serial Numbers K-611840 & K-613887 (Statesman); D-152241 & D-172945 (Rambler). **"Nash Type" & "Warner Type" synchronizer clutch parts are not interchangeable.** If it is necessary to change from one type to the other, it will be necessary to also change the following parts: Clutch Shaft, Second Speed Gear, Shifter Fork (Second & High), Shifter Fork Shoe, and the complete synchronizer clutch.

►*1953 NASH RAMBLER TRANSMISSION PRODUCTION CHANGE:* At 1953 Car Serial No. D-150580. "Warner" type transmission replaced by Statesman Series Std. Transmission for a short period of time.

OVERDRIVE TRANSMISSION NOTE: These transmissions serviced in same manner as standard type (below) except for Overdrive (Warner R10B). *See "Warner R10 Overdrive."*

DESCRIPTION: Three-speed, all helical gear type with constant-mesh, synchro-mesh (Second & High), sliding gear (Low & Reverse).

REMOVAL OF TRANSMISSION: *See "Transmission" on car model page.*

TRANSMISSION DISASSEMBLY: Remove transmission case cover and gasket. Remove shifter shaft nut, washer, and lever from Low & Reverse shifter shaft, drive lockpin out to free shaft (drive pin up), drive shaft out of case as far as possible (use brass drift on inner end) to provide clearance for gear removal (NOTE—Not necessary to drive out Second & High shifter shaft). Remove capscrews in rear bearing retainer, move retainer, mainshaft and gear assembly to rear until synchronizer unit completely disengaged from shaft, remove low & reverse shifter fork, then withdraw retainer and shaft through rear of case (on overdrive transmissions, lower left stud must be removed to permit complete assembly to be withdrawn). Drive the countershaft lock out to free shaft. Use Countershaft Aligning Tool J-2632 to drive countershaft out through rear of case allowing countergear cluster to drop down on small diameter of aligning tool. Take out capscrews in bearing retainer on front of case, remove retainer, withdraw main drive gear assembly through front of case, lift out front synchronizer ring through top opening of case. Turn synchronizer assembly at right angles and lift it from case (CAUTION—Shifter shoes will drop out as synchronizer removed from fork—remove shoes from case). If reverse idler gear being removed, drive shaft out through rear of case using a long punch (CAUTION—do not damage shaft or gear), lift gear out. Remove forks from shifter shaft quadrants. Remove lever on outer end of Second & High shift shaft, drive out lockpin. Remove both shifter shaft assemblies from within case. Remove Second & High speed finder poppet (plunger & spring) from within case, Low & Reverse speed finder poppet from plug hole at bottom of case. Remove Interlock poppet from boss in case between shifter shaft holes. Lift out countergear cluster and thrustwashers. Dismantle and service sub-assemblies as follows:

Main Drive Gear: Remove snap ring from shaft groove in front of bearing, press bearing off shaft. Check mainshaft pilot bearing rollers in gear recess for wear (jar gear lightly on block of wood, if rollers fall out, install new rollers and make certain that retainer ring installed in recess). Press bearing on shaft with snap ring groove toward front, install ring in this groove (.076-.0785" thick, not variable). Install snap ring in shaft groove making certain that snap ring is snug fit in groove (selective fit—this ring furnished .092", .095", .098" thick).

Mainshaft & Gears: Remove clutch ring driver from front end of shaft, rotate 2nd. speed gear thrust washer until tongues on washer line up with spline grooves, remove washer, slide synchronizer ring, 2nd. speed gear, and low-reverse sliding gear off shaft. Remove snap ring from rear bearing retainer (in front of bearing), tap shaft and bearing out of retainer toward front using a brass drift. To remove bearing, remove snap ring from shaft at rear of speedometer gear, remove gear, lift out gear woodruff key, press bearing off. Inspect all parts for wear.

CONTINUED N NEXT PAGE

NASH STATESMAN & RAMBLER (C ntinued)

Mainshaft Rear Bearing—Press bearing on shaft with closed end forward and tight against shoulder on shaft. Install speedometer gear (and woodruff key) install snap ring in shaft groove, selecting ring for snug fit (this ring furnished .087", .090", .093" thick). Install shaft and bearing assembly in rear bearing retainer with bearing seated firmly in retainer recess, install snap ring in retainer groove, selecting ring for snug fit so that shaft has no endplay (furnished .062", .065", .068", .071" thick).

Low-reverse Sliding Gear—Shift collar must be toward rear and gear must slide freely on splines.

Second Speed Gear—Gear synchronizer cone must be forward and gear turn freely on shaft. Push thrust washer on shaft against gear, revolve washer until tongues engage groove in shaft splines so that washer is locked in place (washer will be held in place by clutch ring driver). Check gear endplay with feeler between rear face of gear and shoulder on shaft. Endplay should be .002-.010".

Synchronizer Assembly (1949 & Later): Hub and sleeve are marked by etched line to insure correct reassembly. If disassembled, install struts with open face toward inner clutch sleeve and with hooked end of each spring wire engaged in the same strut (free end of spring will be between this strut and next strut in a clockwise direction).

Rear Bearing Retainer Mainshaft Bushing & Oil Seal: Bushing and oil seal installed in rear end of retainer extension housing. Oilite bushing can be replaced with oil seal out as follows:

Bushing Replacement—Remove old bushing through rear of housing. Assemble felt oil ring on new bushing, press bushing in housing until shoulder on bushing is ¼" from shoulder in housing.

►*CAUTION*—Felt oil ring must not be compressed.

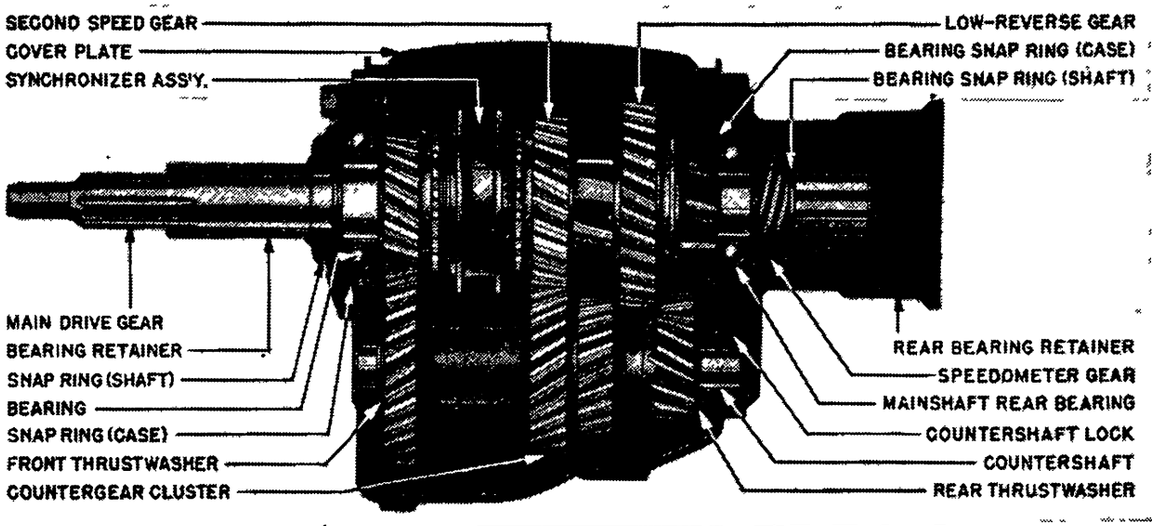
Oil Seal Installation—Use driver J-1556 to install oil seal in recess at rear of housing.

►*CAUTION*—Seal must be inserted with lip on leather toward front.

TRANSMISSION REASSEMBLY: After all sub-assemblies serviced as above, reassemble transmission by reversing disassembly directions and note the following important points:

Reverse Idler Gear: Beveled side of gear teeth must be forward. Drive the shaft in from rear until lock slot is flush with rear face of case (slot should face countershaft).

►*CAUTION*—Low & Reverse Shifter Shaft must be installed before reverse idler gear installed.



NASH & STATESMAN TRANSMISSION (NO OVERDRIVE)

Countergear Cluster: Use heavy lubricant on thrustwashers, insert gear cluster and front thrustwasher in case (lip on washer lined up with slot in case), install rear thrustwasher through hole in case, insert J-2632 aligning tool to retain parts while remainder of transmission assembled. After all parts installed, tap countershaft in through rear of case (take care not to damage thrustwashers) until lock slot flush with rear face of case, install lock plate in slots in countershaft and reverse idler shaft.

Shifter Shaft Assemblies: Inspect needle bearings in case before installing second-high shifter shaft, replace nedle bearings, if necessary, with special driver. After installing speed finder poppets and springs, and interlock poppet, insert shaft from inside case but do not install lock pins and levers until transmission completely reassembled. Install synchronizer assembly in second-high fork (use heavy grease to retain fork shoes).

Main Shaft & Rear Bearing Retainer: Place standard .010" shim (with gasket on each side) on face of rear bearing retainer, insert assembly through rear of case and work shaft through synchronizer assembly hanging in shift fork, being careful to **line up clutch hub recesses with clutch ring driver prongs.** Line up low & reverse shift fork with collar on low-reverse gear. After main drive gear installed, check mainshaft endplay (synchronizer ring clearance) and adjust as follows:

Mainshaft Endplay Adjustment—Controlled by shim thickness under rear bearing retainer. Check and adjust as directed below.

With 1949 & Later Type Synchronizer—Use special clearance gauge, Tool J-1410 (.075"). Clearance should be .060-.080". Checking and adjusting procedure same as for first type synchroinzer (above).

Main Drive Gear: When installing gear in case, line up synchronizer ring prongs with slots in clutch ring driver. Install bearing retainer with new gasket and line up oil return holes in retainer and case. When tightening capscrews, note whether retainer contacts bearing before contacting case and correct this condition by **installing additional gaskets under retainer.** Main drive gear endplay must not exceed .005" and should preferably be .000".

Shifter Fork Alignment: After assembly completed, shift transmission into Second Gear and make certain that gear fully engaged. Measure clearance between rear face of synchronizer clutch shift collar and front face of second speed gear which must not be less than .028". If less, shifter fork or quadrant has been distorted and should be replaced.

Transmission Cover Plate: Install gasket on case with vent hole to rear (mark FRONT forward), install cover with vent hole forward and see that this vent is clean and open.

PACKARD SYNCHRO-MESH

Packard (1954-56)

►*OVERDRIVE NOTE: Warner Type R11 used with this transmissi n. See "Warner R11 Overdrive" for data.*

DESCRIPTION: Constant-mesh, synchro-mesh (2nd. & High), constant-mesh (Low) helical gears, sliding spur gear (Reverse). Second-speed & Low-speed gears are mounted on special double-row ball bearings on mainshaft (furnished as assembly with shaft). Second and high are engeged by synchronizer unit on mainshaft, low speed gear by clutch teeth in sliding reverse gear which engage clutch teeth on low gear hub.

►**OVERDRIVE TRANSMISSION DISASSEMBLY:** *See Warner Overdriv data for disassembly of overdrive and note following important points:*

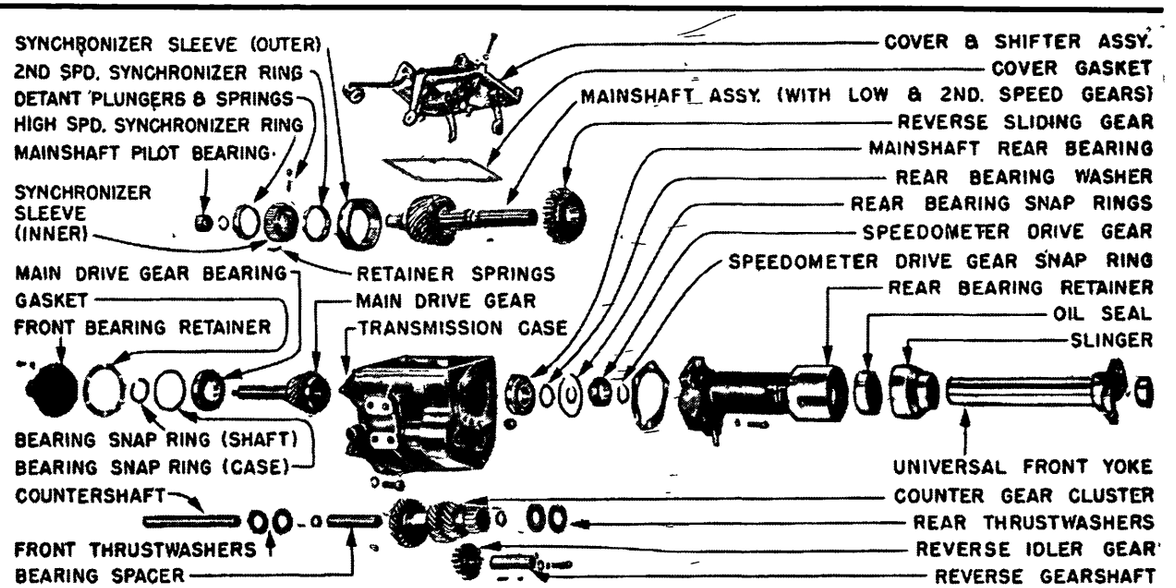
REMOVAL OF TRANSMISSION: *See "Transmission" on car model page.*

DISASSEMBLY OF TRANSMISSION: Take ..out mounting screws and lift off cover and shifter assembly. Remove nut on rear end of mainshaft at universal joint yoke and remove yoke from shaft (nut not used on later cars where yoke is free on mainshaft splines). Remove rear bearing retainer, take out snap ring and slide speedometer gear off Take out mounting screws and remove front bearing retainer. Drive countershaft out (see Note below), remove main drive gear and bearing through front of case. Move mainshaft assembly to rear until rear bearing free of case, tap bearing off shaft, then remove mainshaft through top of case. Lift counter gear cluster and thrustwashers out through top of case. To remove reverse idler gear, remove retaining capscrew and washers on rear end of shaft, drive shaft out through rear of case (use drift inserted through front of case), lift out reverse gear. Remove two countershaft thrust springs, use small punch to drive out thrust spring plugs.

Countershaft Note—Shaft must be driven out toward front (key in forward end of shaft engages slot in front end of transmission case). Use J-2559 countershaft assembly bar to drive shaft out and leave tool in counter gear cluster to retain bearing rollers until re-installed. Overdrive Model—Remove overdrive case drain plug (on rear end of case at bottom) and insert J-2559 tool through this hole to drive countershaft out.

OVERHAUL: Disassemble and overhaul all sub-assemblies as follows:

Synchronizer Unit: To disassemble, press outer sleeve off inner clutch hub by hand (CAUTION—use care not to lose detent plungers and springs which will fly out). Remove three retainer springs, lift out synchronizer rings. When reassembling, use Clamp J-2563 to hold plungers and springs in place, install synchronizer sleeve with wider shoulder of external groove on opposite end from extended hub of inner sleeve.



PACKARD TRANSMISSION

REASSEMBLY: After overhaul of sub-assemblies:

Synchronizer Travel Adjustment—Check clearance between lug on second-high shifter fork and stop on cover with shift lever in High Gear position. Clearance should be .005" min., .010" max. Adjust by bending lug. CAUTION—If clearance greater than .010", outer clutch sleeve may move too far forward which will allow synchronizer balls and springs to fly out (requiring removing cover & reassembling).

Mainshaft, Low & Second Speed Gear Assembly:—Both low and second speed gears are furnished as an assembly with the mainshaft and should not be removed. These gears are constant-mesh type and are mounted on double row ball bearings on shaft

Mainshaft Assembly: Install synchronizer on forward end of shaft with wider shoulder of external groove toward second speed gear, then install front bearing spacer on shaft. Install reverse gear on rear end of shaft with shifter groove toward rear or away from low speed gear.

Reverse Idler Gear: Align woodruff key in shaft with slot in case, tap shaft into case until it engages gear, install gear, drive shaft in until key is seated, secure shaft with plain washer, lockwasher, and capscrew.

Countergear Assembly: If roller bearings removed, first install assembly bar J-2559 in gear cluster, install bearing spacer, assemble 25 rollers in each end (use grease to retain rollers), install end plate and thrustwasher on each end of gear cluster. Install assembly in bottom of transmission case. **After main drive gear installed,** raise assembly up and insert countershaft through front of case aligning woodruff key with slot in case, drive shaft into place which will push assembly bar out at rear. Install two countershaft thrust springs in openings in case and install thrust spring plugs.

►***CAUTION***—Lips on countershaft thrustwashers must point upward and engage grooves in case.

Main Drive Gear Assembly: Install bearing and retaining ring on drive gear shaft, install snap ring. Install mainshaft pilot bearing in recess in rear end of gear.

Main Drive Gear & Mainshaft Installation: Place mainshaft assembly in case with rear end of shaft extending out through bearing hole, install rear bearing and retaining ring on shaft and tap bearing into place in case. Install main drive gear in case and enter mainshaft in front bearing. Install main drive gear bearing retainer using new gasket and aligning drain passage in cover with hole in case, tighten retainer capscrews. Install rear bearing plain washer, snap ring, speedometer drive gear (CAUTION—see that gear key in place), and gear snap ring.

►**Endplay Note**—Rear bearing and speedometer gear snap rings furnished in various thicknesses and should be selected to eliminate endplay.

Shifter Mechanism:—Yokes on horizontal shafts in cover engage synchronizer clutch sleeve (front shaft), low speed gear clutch and reverse gear (rear shaft) directly without intermediate linkage. Spring-loaded ball type detents are located in bracket on side of cover and engage sectors on shafts. Entire shifter mechanism located in cover and need not be dismantled when cover removed.

Interlock Assembly—If bracket removed, install parts as follows: Place interlock ball spacer and detent ball spring in bracket (interlock spacer toward center, detent ball spring toward outer edge of cover). Place cover on bench with top down, position forks so that center neutral grooves are in line, install bracket (CAUTION—hold detent and interlock balls in position in bracket, pull shoe ends of both forks together and push down on bracket at the same time so that balls engage center grooves. Install bracket retaining screw.

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IMPORTANT—Refer to the "Annual Data" for all data on car models later than 1960.

AIR CONDITIONING SERVICE CAUTIONS

HANDLING FREON: Though considered the safest and best refrigerant for use in Air Conditioning systems, the following precautions must be observed to avoid serious accidents or damage to the system

Drum: 1) Do not leave drum uncapped (metal cap furnished with drum is for protection of valve and safety plug) It should be replaced after each use of drum
2) Do not carry drum in passenger compartment of car Place drum in luggage compartment or, if in an open truck, cover drum to protect it from radiant sun heat If precaution not taken, resultant increase in pressure may cause safety plug to release or drum to burst
3) When charging system, do not subject drum to high heat Use water no warmer than 125°F (Hot rags will suffice) *Never place drum on radiator, stove, or use torches for heating during charging.* Keep drums upright
4) Never permit a drum to be dropped or strike another drum violently
5) Do not fill drum completely (when filling one drum from another) Leave space above liquid for expansion

P rsonal: 1) Do not discharge Freon into room with exposed flame because concentrations of this gas in contact with open flame will produce a toxic gas
2) Do not expose eyes to liquid, *USE GLASSES OR GOGGLES. Liquid Freon will freeze anything with which it comes in contact* If Freon should strike eyeballs, splash water to area of eye to gradually get temperature above freezing point, apply a few drops of sterile mineral oil to eyes as an irrigator If irritation continues, wash eyes with a weak solution of boric acid *DO NOT RUB EYES See an eye specialist at once*
3) Do not inhale large quantities of Freon vapor as it will act an an anesthetic
4) If Freon comes in contact with skin, injury should be treated for frostbite

HANDLING REFRIGERANT LINES: 1) Keep refrigerant lines dry and clean Whenever a connection or joint is broken, clean all dirt from joint or connection
2) Parts from stock are capped and dehydrated Caps should only be removed just prior to installation Lines removed from system to be used again, should be capped immediately, to prevent dirt and moisture from entering lines
3) Lines should be free of kinks, and should be carefully stored to avoid crushing or bending
4) Proper size wrenches should be used when tightening fittings Always use two wrenches to prevent twisting copper tubing
5) Tubing that is left free to vibrate will harden and crystallize the area of the tubing at flare sections so that it may become brittle and break
6) When using paint drying lamps, ovens, steam cleaners, or other heat producing devices avoid heating any part of system If sufficient heat applied, pressure will increase to a point where some part of system will rupture
7) When undercoating, use care to see that undercoating does not plug evaporator drain Do not coat air conditioning joints and connections
8) Keep gauge set and lines free of moisture
9) Compressor lubricant container must not be left open longer than necessary as the special oil is moisture free and will absorb moisture from air if left uncapped

AIR CONDITIONING LEAK TESTS

LEAK TESTING CONFINED AREAS: For leak testing confined areas, such as sections of evaporator and condenser a torch or flame type detector must be used Two types are available One type uses anhydrous methyl alcohol under pressure, for producing the testing flame The cylinder is refillable, and must be preheated to pressurize cylinder The other type uses propane gas, under pressure to produce the testing flame The cylinder is replaceable and comes already pressurized making it unnecessary to pre-heat cylinder in order to produce testing flame Instructions for use of the detectors are furnished with the detector

Leak Testing: With flame adjusted, explore for leaks by moving end of hose or sampling tube around all points where a leak may be Especially check around bottom of connections, since Freon is heavier than air and will be more apparent at bottom of fitting Color of flame will turn to a yellow-green when a small leak is detected Large leaks will be indicated by a change in color to bright or brilliant blue or purple When hose or tube is moved away from leak flame will clear to an almost colorless pale-blue or green *CAUTION*—Do not use lighted detector in any place where combustible or explosive gases, dust or vapors may be present Do not breathe fumes and black smoke that are produced if leak is a big one Before leak testing be sure car is thoroughly aired (particularly if Freon tank used or if system opened for any reason) and moved to a Freon-free area in order that false readings may be prevented

PIN-POINTING LEAKS: There are a number of fittings and places throughout the air conditioning unit where a leak detector solution or detergent may be used to pin-point leaks Apply solution to suspected area with swab that is attached to bottle cap Bubbles will form within seconds if there is a leak

AIR CONDITIONING TROUBLE SHOOTING

►*CAUTION Do not disconnect refrigerant lines, replace parts, or attempt adjustments without complete instructions See "Air Conditioning Service Cautions"*

POOR COOLING: 1) Blowers Not Operating—Fuse blown or faulty circuit breaker, switch in "Off" position, defective switch, switch resistors or blower rheostats inoperative, broken wire or loose connections, blower motor defective, blower fans or motor improperly installed
2) Restricted Air Flow—Filters clogged, dirt or other obstructions in air ducts, evaporator fins or coils clogged or restricted with frost or ice
3) Refrigerant Flow to Cooling Coils or Fins Incorrect—Expansion valve improperly adjusted or defective, power element or temperature bulb does not contact pressure line properly, restriction in liquid line between receiver and cooling coils or fins, power element or temperature bulb discharged, insufficient refrigerant, by-pass valve, thermostatic switch or solenoid (if so equipped) not properly set or inoperative, modulator valve (if so equipped) defective, break in any part of closed refrigeration system
4) Refrigerant Not Condensing Properly—Air flow through condenser, restricted high engine operating temperatures, air or excess refrigerant in system, restriction in high pressure side of compressor and condenser
5) Clutch (If So Equipped) Does Not Engage—Defective coil or relay, clutch plate lining worn or saturated with oil causing slippage, air conditioning "On" switch defective, thermostat inoperative, clutch adjustment incorrect
6) C mpress r—Belts not adjusted properly, worn, or broken, operating above normal pressures, disconnect pulley bolts not in place, valves faulty, service valves not fully open
7) El ctrical—Loose connections or broken wires between electrical units blown fuses or faulty circuit breakers

TOO COLD: 1) Clutch (If So Equipp d) Does Not Disengage—Thermostat inoperative, relay stuck closed, air conditioning "On" switch inoperative
2) Blower Speed Cannot be R duc d—Defective blower switch

VIBRATION—NOISE: 1) Blowers—Loose on shaft, striking housing, foreign material, motor bearings or mounts loose or worn
2) Compressor—Mounting brackets loose, loose internal parts, insufficient oil, too much refrigerant
3) Air Flow—Foreign material in air system, small slits or openings in ducts

INCORRECT OPERATING PRESSURE: 1) Excessive Pressure on High Pressure Sid—Air or excess refrigerant in system, air flow through condenser core restricted, kinks or restrictions in line on high pressure side, high engine temperature, shut-off valve on high pressure side of compressor not fully open, insufficient air flow through cooling coil, defective expansion valve or incorrect adjustment
2) Insufficient Pressure on High Pr ssur Sid—Shortage of refrigerant, defective expansion valve or incorrect adjustment, leaky or broken compressor valves
3) Excessive Pressure on L w Pr ssur Sid—Power element or temperature bulb not making correct contact with pressure line, expansion valve needle stuck open or leaking
4) Insufficient Pressure on Low Pr ssur Sid—Restriction in lines shortage of refrigerant, expansion valve needle stuck shut, expansion valve not open far enough plugged, or defective, dehydrator-filter (strainer-drier) plugged, power element or temperature bulb charge lost or line plugged, compressor valves faulty, blower fans inoperative, temperature control thermostat does not cut out, moisture or freeze-up

1954 CHRYSLER, DESOTO, DODGE AIRTEMP

Chrysl r, D Sot , D dg (1954)

DESCRIPTION

Compression process cycle type, using Freon as refrigerant. System consists of basic groups of elements as follows:

Refrigerating: Compressor—4 cylinder, V-type piston compressor, located at right front corner and above engine. Operated by wedge belt from pulley on water pump through idler pulley which provides for belt tension adjustment. Operation causes and maintains necessary high pressure in system needed to increase Freon vapor temperature.

Condenser—Split type. Upper section of condenser located in front of radiator, lower section fills entire space between bottom edge of radiator and front stone shield. Condenses and cools refrigerant vapor discharged from compressor, through action of fast moving air over metal surfaces of condenser.

By-Pass Valve—Automatic. Between the compressor and evaporator. By-passes hot refrigerant gas directly from compressor to evaporator when temperature falls to preselected minimum. By-passed hot gases raise temperature of evaporator coils and car cooling air; also prevents ice forming on coils when blowers stopped, and maintains sufficiently rapid circulation of refrigerant to carry entrained oil back to compressor. A thermal bulb, located in return air stream on right side of car, is the valve's sensing element through reaction to changing temperatures within car.

Receiver—Located at outside edge of car frame below right front door. Stores liquid refrigerant, more than that needed for normal operation, and assures an uninterrupted supply of liquid refrigerant to expansion valve.

Sight Glass—In evaporator-blower in trunk of car between receiver and strainer-dryer. Provides means for determining adequacy of refrigerant charge.

Strainer-Dryer—In evaporator-blower housing in trunk of car between sight glass and expansion valve. Filters and dehydrates Freon as it passes through system.

Expansion Valve—In evaporator-blower housing in trunk of car. Supplies liquid to evaporator coils at same rate that refrigerant is removed from it in a vaporous state.

Evaporator—In evaporator-blower housing in trunk of car. Container for refrigerant which readily absorbs heat from surrounding area when temperature of refrigerant liquid is reduced. In cooling coils of the evaporator refrigerant is changed from liquid to vapor.

Air Circulating: Blowers—In evaporator-blower housing in trunk of car. Consists of two centrifugal blowers driven by a single electric motor mounted between them. Force air from refrigerated area in evaporator-blower housing to interior of car.

Air Circuits—Warm air from inside car is drawn into evaporator-blower housing through grilles on either side of rear seat shelf, cooled air is delivered into car through a center outlet. Fresh air is drawn in from each side of car through 3 holes. All inlets and outlets are connected to evaporator-blower housing through ducts. Fresh air ducts are fitted with dampers to seal them off during cold weather.

Control: Single instrument panel control is switch located at extreme left below car light switch. Switch has four positions "OFF," "LOW," "MED.," and "HIGH." Its various positions regulate blower speed and hence rate at which cooling air is circulated through car. The automatic by-pass valve (see above) provides additional control of minimum interior temperatures.

OPERATION

With Air Conditioner Control Switch in any of the three "ON" positions and engine and compressor operating, heat laden, low pressure Freon is compressed by the compressor and discharged into condenser where it is cooled to remove the "sensible" heat of compression. The Freon is forced into the receiver under pressure when by-pass valve is closed. After passing through sight glass and strainer-dryer Freon enters the expansion valve. At orifice in expansion valve high pressure liquid Freon changes to low pressure liquid, then enters evaporator coils through distributor tubes. The "boiling" Freon, while in the evaporator coils, absorbs heat from the surrounding air and vaporizes. The vapor is drawn through the low pressure line to compressor where cycle is repeated.

PRECAUTIONS, LEAK TESTING & TROUBLE SHOOTING

See "Air Conditioning Service Cautions," "Trouble Shooting" and "Leak Tests."

ADJUSTMENTS

DRIVE PULLEY BELT: Two type belts used, single and double. Adjust as follows:

Single Type Belt: A deflection of ¼" should result when a load of 6 to 8 lbs. is applied at center of **longest** belt span (compressor to fan, or generator to fan).

Double Type Belt: A deflection of ¼" should result when a load of 9 to 11 lbs. is applied to each individual belt at the center of longest span (fan to idler).

TEMPERATURE: Temperature range can be varied 10 degrees either way by means of adjusting screw on automatic by-pass valve. Each full turn changes range 2½°.

FAST IDLE (If So Equipped): *See "Adjustments" under 1955 Chrysler, DeSoto, Dodge "Airtemp."*

DISCHARGING THE SYSTEM

1) Install Gauge Set Manifold C-3354. Fully backseat both discharge and suction service valves (counter-clockwise). Connect 6-foot test hose to manifold center fitting. Insert free end of hose into exhaust suction system and turn exhaust system blower on. *NOTE*—Although Freon is non-toxic unless released in or near an open flame, expelling Freon gas into the exhaust system is recommended as a safety precaution.

2) Open discharge and suction service valves ½ turn. Then, crack manifold gauge set discharge hand valve a fraction of a turn counter-clockwise to allow gas to escape. *CAUTION*—Opening manifold discharge hand valve too much in order to more quickly discharge system will draw compressor lubricant off with the Freon.

3) As pressure on manifold discharge gauge drops near zero, open manifold suction hand valve. *NOTE*—If brazing or some similar repair is to be made on system, leave system open to atmospheric pressure. After service work has been completed, the system must be evacuated, partially charged and leak tested before final charge.

EVACUATING & CHARGING THE SYSTEM

See 1955 Chrysler, DeSoto, Dodge "Airtemp" and note the following:

1) **FREON-22** is used in the 1953-54 systems.

2) Freon-22 capacity of 1953-54 systems is **5 lbs.**

3) **Do not** permit suction pressure to **EXCEED 90 lbs.** when controlling Freon-22 entry into system with Freon-22 tank valve.

CHECKING & LUBRICATION

See 1955 Chrysler, DeSoto, Dodge "Airtemp" and note the following:

1) Correct oil level should be 1⅛-1½" on 1953-54 systems.

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

COMPRESSOR: Removal—Start engine and operate at fast idle until compressor is warm. Shut off engine. Remove valve stem protective caps from both discharge and suction service valves. Close off both valves by rotating valve stems clockwise with Tool C-3361 until they are fully seated. Loosen port caps on both discharge and suction service valves two turns to gradually release Freon gas pressure from the compressor. Loosen oil filler plug on side of compressor to release gas pressure from compressor crankcase. *(NOTE*—It is not necessary to remove oil filler plug. Loosen about one full turn. This precaution will prevent dirt from entering crankcase). Remove compressor drive belt or belts. Clean dirt away from both discharge and suction service valves with a suitable solvent and blow dry with compressed air. Remove discharge and suction service valve attaching bolts. Gently move valves and tubes away from compressor. Cover ports in valves and compressor openings with masking tape. Tighten port caps and oil filler plug. Replace service valve protective caps to prevent air, moisture or dirt from entering system. *(CAUTION*—Care must be taken not to force valves and tubes out of alignment too far or the vibration eliminator may be damaged). Remove compressor-to-mounting bracket bolts and nuts. Lift compressor from engine and set it on bench with pulley hanging over side of bench. *CAUTION*—Never rest weight of compressor on pulley, otherwise shaft seal may become damaged.

Installation: Reverse removal procedure using new valve gaskets coated with Mopar Air Conditioning Compressor Oil. Torque all bolts evenly to 20 ft. lbs. Purge air from compressor as follows: Loosen oil filler plug one or two turns. Loosen discharge service valve port cap ½ turn, **slightly open** suction service valve with Tool C-3361 by turning stem counter-clockwise. Let gas drift slowly through

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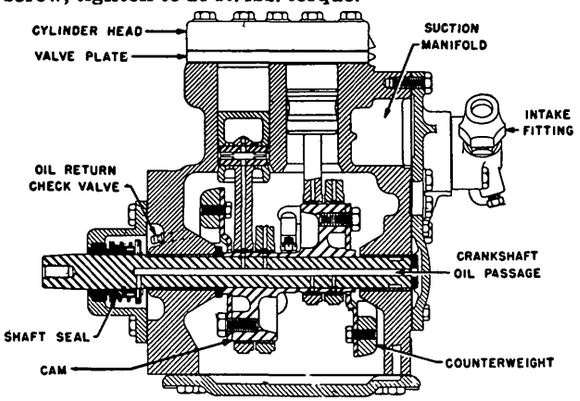
1954 AIRTEMP (Cont.)

compressor for about ten seconds. Tighten port cap and oil filler plug. Open both discharge and suction service valves all the way by turning stems counterclockwise until fully back-seated. Replace protective caps on discharge and suction service valves. Install compressor drive belts and adjust.

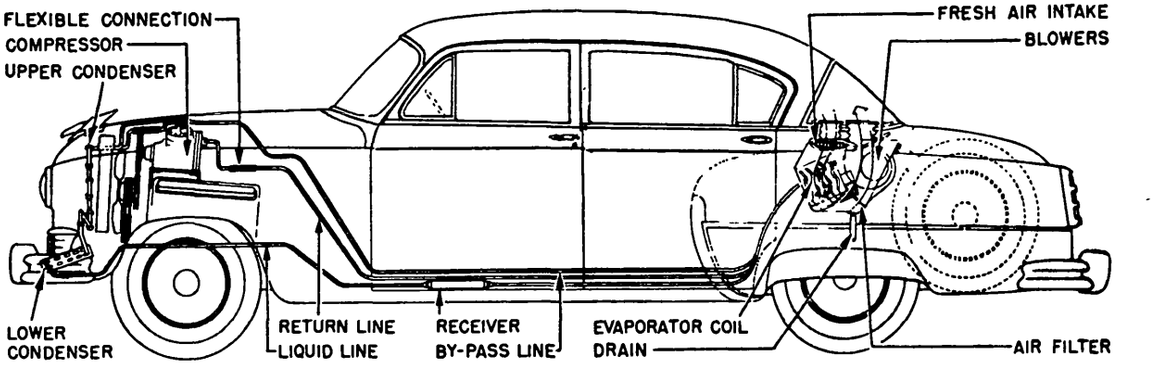
UPPER CONDENSER: Discharge system. Using flare nut wrench disconnect upper and lower flared fittings on upper condenser. ***(CAUTION—Use two wrenches on fitting when loosening to prevent damage to tubing.)*** Remove four upper condenser to radiator yoke screws and lockwashers, remove condenser. To install, reverse removal procedure. Charge system, test for leaks.

LOWER CONDENSER: Discharge system. Using flare nut wrenches, disconnect lower condenser inlet manifold tube flare nut located between upper and lower condensers, disconnect lower condenser outlet manifold tube connector on tubing located between lower condenser and receiver. Remove four front sway eliminator nuts, lockwashers and screws, move sway eliminator out of way. ***(CAUTION—Lower condenser mounting brackets held in position by sway eliminator mounting bolts.)*** Remove condenser. To install, reverse removal procedure. Charge system, test for leaks.

DRIVE PULLEY: Loosen drive belt idler pulley adjusting screws, remove belt from compressor pulley. Remove compressor pulley shaft screw and washer. Using Tool C-3351, remove pulley from crankshaft. NOTE—Pulley keyed to crankshaft by Woodruff key. Inspect keyway in crankshaft and pulley for wear. To install, place compressor pulley key into position in crankshaft. Align keyway in pulley with key in crankshaft, install pulley on shaft. Install compressor pulley shaft washer and screw, tighten to 20 ft. lbs. torque.



COMPRESSOR SECTIONAL VIEW



CHRYSLER, DE SOTO & DODGE AIRTEMP SYSTEM

►***CAUTION: The compressor oil seal and thrust bearings are made partly from a carbon-like material which is subject to damage from impact. Consequently, a hammer should never be used to loosen or remove the seal from the shaft as this shock may crack or shatter the carbon bearings. Always use a puller to remove the pulley from the shaft.***

CRANKSHAFT OIL SEAL: Remove compressor, and pulley from compressor (see above). Remove eight seal housing bolts, then seal housing from compressor. Press seal floating seat out of housing from pulley end of seal housing. Remove neoprene seal ring and bellows assembly. Assembly is held tightly to shaft by neoprene sleeve of seal. Pry it off in such a manner so as not to scratch shaft. Wash seal housing with solvent. Dry and coat counterbore with film of refrigerant oil. To install seal, coat sealing surfaces and neoprene rings with refrigerant oil. Start seal seat into counterbore of housing. Using thumbs only, press seal seat and ring to bottom of housing counterbore. Wipe shaft clean and apply coat of refrigerant oil, dip new shaft seal into refrigerant oil and press on shaft. Dip housing cover gasket in refrigerant oil, align its holes with compressor housing holes and smooth out any wrinkles. Hold seal housing with left hand, put right forefinger through opening in seal housing and against end of shaft. Using forefinger as guide, carefully slide seal housing into place without letting end of shaft touch capped surface. Install two bolts, center clearance between housing and shaft, tighten bolts to bring housing to compressor. Install remaining bolts and tighten finger tight. Check and align clearance between housing and shaft with feeler gauge or piece of paper to obtain equal clearance at all points. Tighten all housing bolts to 20 ft. lbs. Replace compressor pulley, check and add oil as required (compressor on bench) to bring level to 1⅛-1½" when measured with dipstick and compressor in normal operating position. Install compressor (see above).

RECEIVER FUSIBLE PLUG: *See "Parts Replacement" under 1955 Chrysler, DeSoto, Dodg "Airtemp."*

VALVE PLATE ASSEMBLY: Run engine a few minutes to warm compressor. Stop engine, remove caps from compressor discharge and suction service valves, close both valves by turning clockwise as far as they will go. ***(CAUTION—Do not run engine with valves closed.)*** Carefully loosen cap on service port fitting of discharge valve approximately ¼ turn to gradually relieve pressure in compressor, remove dirt from around cylinder heads. Remove ten cylinder head screws, carefully lift cylinder head from compressor, remove cylinder head gasket. Lift valve plate assembly from compressor, remove valve plate gasket. ***(CAUTION—Valve plate assembly is dowelled on compressor by four small pins. Pins also retain reed valves in position. Make sure reed valves do not fall into cylinders when valve plate assembly removed.)*** Clean gasket mating surfaces, make sure they are free from dirt, nicks, and burrs. NOTE—Valve plate serviced as assembly only. If any part damaged, entire valve plate assembly must be replaced. To install, reverse removal procedure. Tighten cylinder head screws to 15-20 ft. lbs.. Purge air from system (see above). Open both service valves by turning stems clockwise as far as they will go. Start engine and run for few minutes to warm compressor. Check Freon charge, then oil level (see above). Replace caps on discharge and suction service valves. Test for leaks (see above).

1955-56 CHRYSLER, DE SOTO, DODGE PLYMOUTH AIRTEMP.

Chrysler, Imperial, DeSoto, Dodge (1955-56) Plymouth (1956)

►CHANGES & CORRECTIONS

►*1955 COMPRESSOR SHAFT SEAL PRODUCTION CHANGE:* Replacement of new type seal for old type seal includes seal and bearing end plate. Replacement of new type seal with seal of same type requires seal only.

DESCRIPTION & OPERATION

Similar in design and operation to 1954 Airtemp Air Conditioning System. 1955-56 changes over previous models are as follows:

Refrigerant: Freon 12 used in all systems.

Compressor: 2 cyl. (1955) 2 & 4 cyl. (1956) reciprocating types used.

Condenser: A single unit condenser replaces two-unit condenser used previously.

Receiver & Strainer-Drier: Strainer-drier has been combined with receiver. Unit is located near bottom of condenser.

Control Units: A magnetic clutch has been added on some models, permitting pulley to free-wheel when system is not in operation. Some models also incorporate a fast idle device which operates when transmission control lever is in neutral. A temperature control switch connected in series with a thermal switch (attached to suction pressure line at evaporator outlet manifold) and the solenoid by-pass winding, regulates temperature of air delivered to passenger compartment.

PRECAUTIONS, TROUBLE SHOOTING & LEAK TESTING

See "Air Conditioning Service Cautions", "Trouble Shooting" and "Leak Tests"

ADJUSTMENT

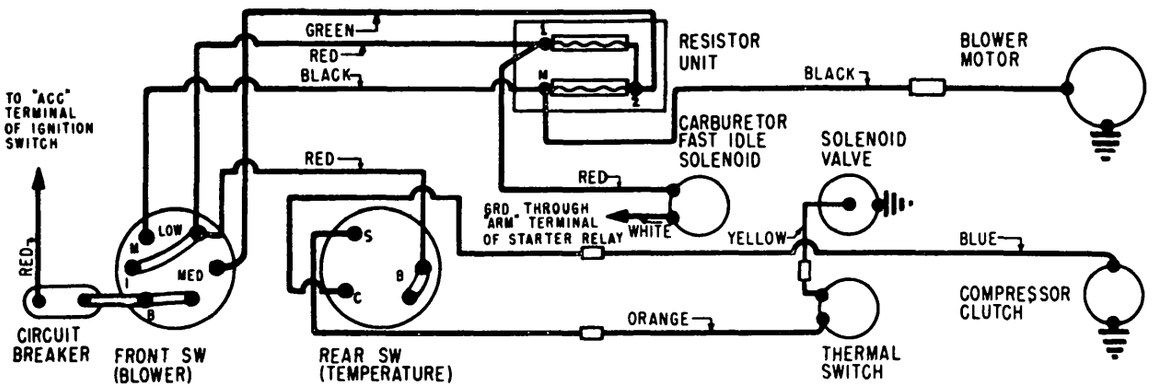
Compressor Belt: 1955-56 Models (Exc. 1956 Dodge) - Adjust tension of each compressor belt so that a pull of 9-12 lbs. at center of longest span will provide a ¼" deflection at that point.

Dodge 1956 - Adjust compressor drive belt tension to 15 ft. lbs. with Tools C-3379 & C-3005. Generator mounting bolts must be loosened and tension held at 15 ft. lbs. when bolts are retightened.

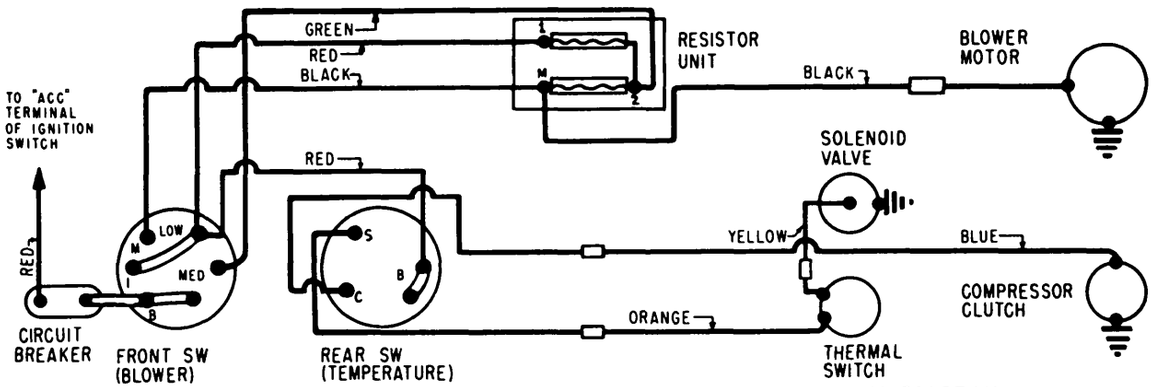
Fast Idle Device (If Equipped): Back off round adjusting nut on diaphragm shaft away from pawl. Start engine, attach tachometer, and with transmission control lever in "Neutral" position and engine at operating temperature, adjust engine idle to 475-500 RPM. Turn blower control switch to first position, and temperature control switch to second position. Adjust round adjusting nut on fast idle diaphragm shaft to increase engine RPM to 700-800 RPM. With hand brake on, move transmission control lever to "Drive" range and then back to neutral. Readjust fast idle if necessary. Lock round nut with hex nut.

Expansion Valve: No adjustment. Replace as necessary.

Magnetic Clutch (Warner - Used on some Chrysler Models With Compound Compressor): Clearance between field coil housing and driven member should be a minimum of .010-.015". When clearance is less than specified, it is probably due to misalignment of coil assembly, or from pulley being cocked on compressor shaft. Align pulley and/or coil assembly, and recheck for proper clearance.



1955 CHRYSLER, DESOTO DELUXE, DODGE AIR CONDITIONING CONTROL DIAGRAM (CARBURETOR FAST IDLE SOLENOID NOT USED ON DODGE)



1956 DESOTO, DODGE, PLYMOUTH STANDARD AIR CONDITIONING CONTROL DIAGRAM

Magnetic Clutch (Tecumseh Compressor): Measure gap between drive plate electromagnet and drive plate. Air gap should measure .025"-.035". To adjust, turn screws located in center of three hexagon headed nuts on front face of drive plate. Adjust all three screws to obtain evenly spaced air gap. Measure air gap with long feeler that will reach into gap at hub.

DISCHARGING THE SYSTEM

See 1954 Chrysler, DeSoto, Dodge "Airtemp".

EVACUATING & SWEEPING THE SYSTEM

Before evacuating the system, sweep system in order to remove as much moisture as possible. Proceed as follows:

SWEEPING THE SYSTEM: Charge discharged system with one lb. of Freon-12 (Freon-22 used in 1953-54 systems); or until a pressure of 100 lbs. registers on discharge gauge. Operate system for 5 minutes and again discharge.

EVACUATING THE SYSTEM: Connect Gauge Manifold Set C-3354 to compressor. Discharge system if not previously discharged, sweep the system (see above). *(CAUTION-*Be sure pressure has dropped to zero before attaching hose to vacuum pump.) Connect 6-foot test hose to center fitting of gauge set and to connection on vacuum pump (Tool C-3372). Open both discharge and suction service valves about one turn, rotating both valve stems clockwise. Open both gauge manifold set hand valves (counter-clockwise). Start vacuum pump and observe compound gauge. Operate pump until gauge registers 26 to 28 inches of vacuum for five minutes. *(NOTE-*Failure to obtain 26 to 28 inches of vacuum would indicate a leak in system. Close both gauge set manifold hand valves by turning clockwise. Turn off vacuum pump and remove long test hose from pump. Charge system with one lb. of Freon (see below). Start engine and adjust speed to 1200 RPM. Turn blower control to high and temperature control to cold. Operate in this manner for five minutes and test for leaks. Discharge system which will sweep out any remaining moisture.) Again evacuate system at 26 to 28 inches of vacuum for 30 full minutes. Recharge system.

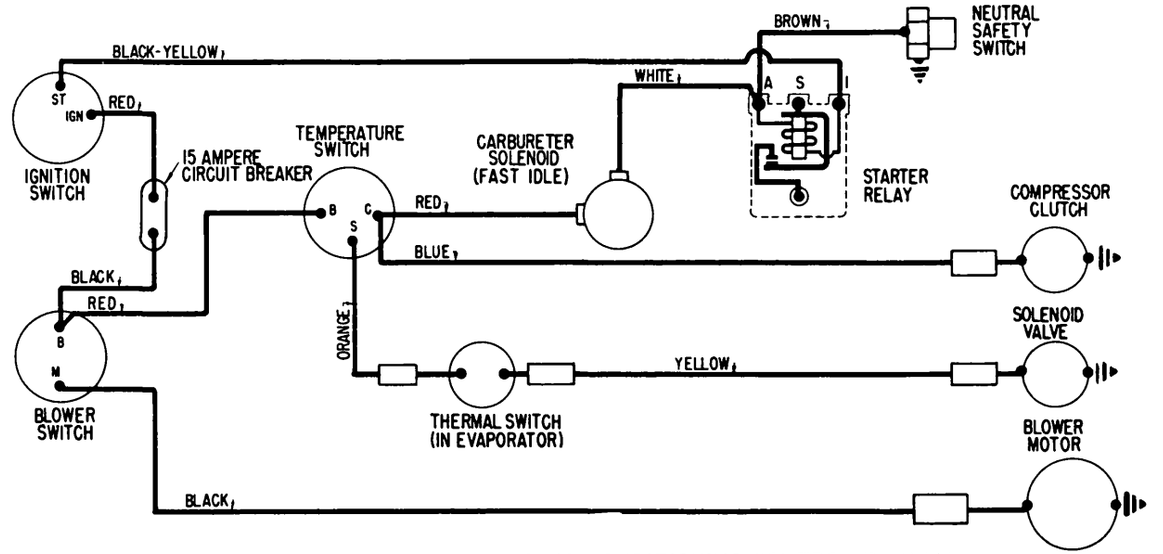
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1955-56 AIRTEMP (C nt.)

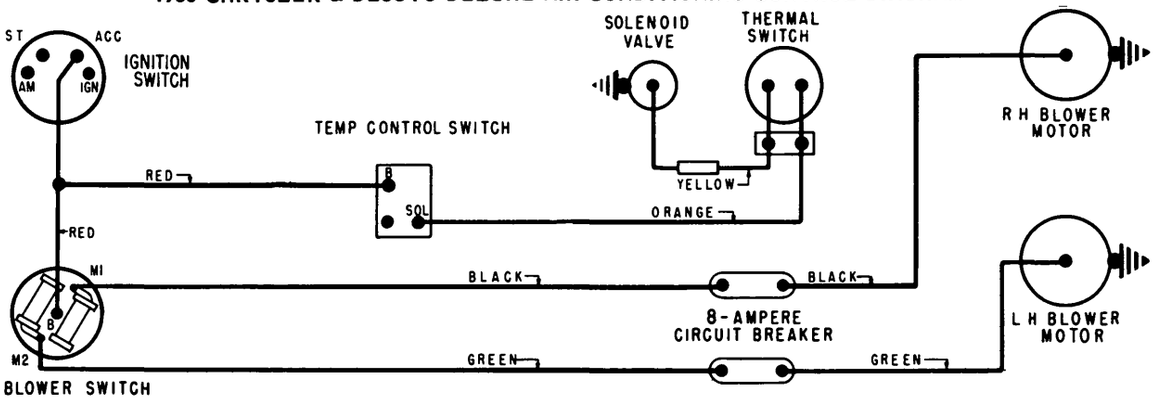
CHARGING THE SYSTEM

►*NOTE:* If only a partial charge of refrigerant is required, the following "Adding Partial Charge of Freon-12 (Using Gauge Set Manifold Tool C-3354)" method can be used providing unit is equipped with a sight glass. If not so equipped the entire system will have to be discharged, swept, evacuated and recharged with a full charge following directions given under "Adding Complete Charge of Freon-12 (Using Gauge Set Manifold Tool C-3354)". **The above is applicable to 1954 units except that Freon-22 is used. Freon-22 capacity is 5 lbs., and allowable pressure when controlling Freon-22 entry into system with Freon-22 tank valve is 90 lbs. instead of 60 lbs. Since there is no temperature control switch on 1954 units, blowers are operated on "High" when operating engine during the adding of a partial charge of Freon-22.**

ADDING PARTIAL CHARGE OF FREON-12 (Using Gauge Set Manifold Tool C-3354): Remove protective caps from compressor discharge and suction service valves. Using Tool C-3361, make sure both valves are completely back-seated (counter-clockwise). Remove protective caps from discharge and suction service ports. Install 4-foot test hose from 600 lb. gauge fitting on gauge manifold to discharge service port fitting. Install other 4-foot test hose from 300 lb. gauge fitting on gauge manifold to suction service port fitting. Turn both valve handles on gauge manifold clockwise as far as they will go. Connect 6-foot test hose to center fitting of gauge manifold and to connection on Freon-12 tank. Be sure both gauge manifold valves are fully closed (clockwise). Open valve on Freon-12 tank slightly and loosen 6-foot test hose at gauge manifold for about one second to purge air from hose. Close Freon-12 tank valve. Start engine and operate at 1200 RPM. Turn blower control to "Low" position and temperature switch to "Cold". Rotate both suction and discharge service valve stems one turn (clockwise). *(NOTE*—If discharge gauge hand fluctuates when engine and compressor are running, close discharge valve slowly (counter-clockwise) until gauge hand steadies). Open Freon tank valve ½ turn. Open suction valve on gauge manifold slightly (counter-clockwise). Control Freon entering system with this valve. *DO NOT ALLOW SUCTION PRESSURE TO EXCEED 60 LBS.* Carefully watch sight glass. The moment sight glass is clear of bubbles, close gauge manifold suction valve (clockwise). *(CAUTION*—Stopping flow of Freon into system as soon as sight glass is clear (free of bubbles) is important. Too much Freon in system can cause damage). Operate system for 5 minutes and again observe sight glass for presence of bubbles. If bubbles still evident carefully continue to charge until sight glass is clear, repeat 5 minute run. Where no bubbles are present after 5 minutes of operation, charge system with additional Freon for 10 seconds. Close Freon tank valve. Loosen hose connection at tank to gradually release Freon from hose. Disconnect hose after Freon has escaped. Back-seat suction and discharge service valves (counter-clockwise). Remove gauge manifold and install service valve and port protective caps



1956 CHRYSLER & DESOTO DELUXE AIR CONDITIONING CONTROL DIAGRAM



1956 DODGE DELUXE AIR CONDITIONING CONTROL DIAGRAM

►*ADDING COMPLETE CHARGE OF FREON (Using Gauge Set Manifold Tool C-3354): (NOTE*—When completely charging system on 1954 units do not operate blowers during operation, on 1955 units operate blowers on "Low" and set temperature switch to "Cold"). Follow preliminary steps for adding partial charge of refrigerant. Place Freon drum in pail of warm water (temperature not to exceed 125°F). Then set pail and Freon tank on accurate scale (bath scales not accurate below 100 lbs.) and weigh assembly. Open Freon tank valve ½ turn, and suction valve on gauge manifold slightly (counter-clockwise). Control Freon entering system with this valve. DO NOT allow suction pressure to exceed 60 PSI (1955 Freon-12), 90 PSI (1954 Freon-22). Be sure both the suction and discharge valves are open about one turn clockwise. Carefully watch scale and shut Freon tank valve off when system has absorbed 4 lbs. of Freon-12 (1955), 5 lbs. of Freon-22 (1954). Close suction valve on gauge manifold (clockwise). To disconnect Freon tank, loosen six-foot test hose and allow Freon in hose to escape slowly, then remove hose from tank.

CHECKING & LUBRICATION

►*NOTE:* There is no temperature control switch nor thermal switch on 1954 units.

CHECKING: Bubbles in Sight Glass—Connect a tachometer to engine, start and adjust engine speed to 1200 RPM. Turn blower control to full speed and temperature control to maximum cold. Open car windows and allow engine to operate at 1200 RPM to clear sight glass. Observe sight glass. Sight glass should be perfectly clear (no bubbles) within 3-5 minutes after system started operation (system not by-passing). If not, thermal switch and by-pass valve should be test-

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1955-56 AIRTEMP (C nt.)

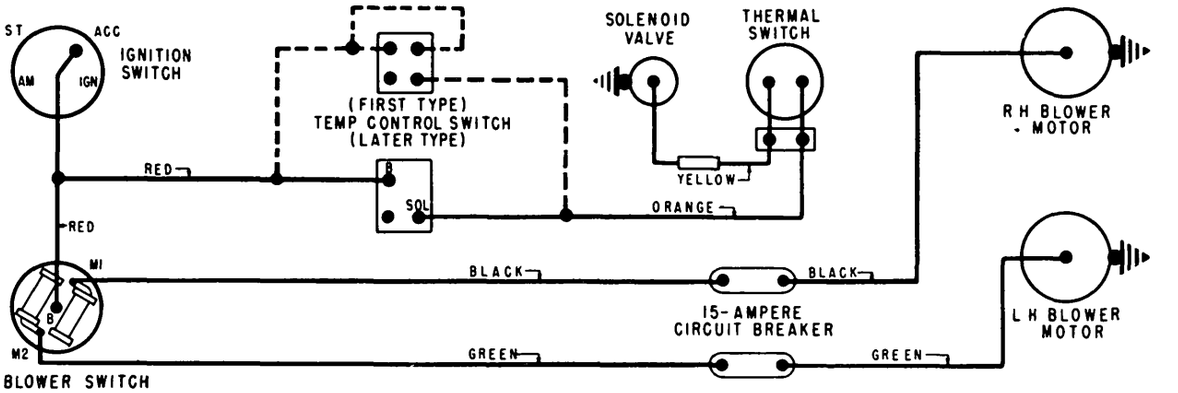
ed, and if found satisfactory system should be partially charged to remove bubbles (see below) *NOTE*–A system that is low on Freon-12 should be tested for leaks, leaks corrected and system charged

►*NOTE*. Correct oil level for 1954 units is 1 1/8–1½" and capacity is 32 ozs of 300 Saybolt refrigerant (1¾" on dipstick)

C mpr ssor Oil Lev l & Adding Oil: *(NOTE*–An oil sight glass is provided in compressor crankcase so that oil splash may be observed while compressor is in operation If a splash is observed while compressor is operating, it indicates **only** that there is oil in the compressor, and **n t h w much**) To check for proper oil level start engine and run at moderate speed (air conditioning turned on) until compressor is warm Stop engine, remove protective caps from compressor discharge and suction valves, close both valves by turning valve stems clockwise until they seat firmly *(CAUTION*–Never start engine with discharge valve closed drive belts connected to engine when magnetic clutch is engaged) Clean dirt away from compressor oil filler plug with solvent and blow dry with compressed air Carefully loosen cap on service port of discharge valve approximately ¼ turn and gradually release gas pressure from compressor When gas pressure in head decreases loosen, but do not remove oil filler plug on side of compressor This will allow pressure in compressor crankcase to drop *(NOTE*–If oil level is checked immediately after a trip–driven at high speeds–level will be slightly higher than normal) Remove oil filler plug and using a dry, clean plunger type rod (1/8" welding rod) measure oil level Correct level is ¾" to 1" After oil level has been checked, siphon off excess oil or add Mopar Air Conditioning Compressor Oil (300 Saybolt at 100°F), replace filler plug **but d not tight n at this time** To purge air out of compressor cylinder and crankcase make sure cap on discharge valve service port is loosened approximately ½ turn, and oil filler plug on side of compressor a full turn Slightly open suction service valve by turning valve stem counter-clockwise Let gas drift slowly through compressor for about 10 seconds First tighten filler plug and then cap on discharge service port Backseat both discharge and suction service valves by turning counter-clockwise, replace protective caps

►*REPLACEMENT COMPRESSOR OIL LEVEL CAUTION*

New compressors are fully equipped with exception of drive pulley and magnetic clutch assembly Compressors are charged with treated dry air to prevent moisture or dirt from entering, and contains 12 ozs of 300 Saybolt refrigerant (oil level at center of sight glass, compressor horizontal on bench) When compressor replac- for any reason, oil level in compressor must be corrected to proper amount Even though compressor had no oil when removed, some oil may still remain in system When old compressor is found to have no oil, or where oil level is very low or is too high, oil must be siphoned off to the minimum lever of ¾" After installation completed, system should be operated for 10 minutes, engine stopped and oil level rechecked and



1955 DE SOTO (STD.) AIR CONDITIONING CONTROL DIAGRAM

adjusted to ¾-1", if required Use suction gun if oil level too high Repeat procedure several times until level remains at ¾-1"

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

COMPRESSOR REMOVAL (To Work on Engine): *(NOTE*–On DeSoto split muffler bracket with hacksaw) Start engine, operate at fast idle until compressor is warm Remove valve stem protective caps from discharge and suction service valves Close both valves (clockwise) with Tool C-3361 Loosen port caps on both service valves about two turns to gradually release Freon gas, pressure from compressor Loosen oil filler plug a few turns Remove drive belts and belt tension adjusting strap from compressor Disconnect magnetic clutch electrical lead (if so equipped) Disconnect discharge tube flared connection at discharge (lower) muffler and cap tube nut and male connector Remove Allen screws from suction service valve Remove upper muffler bracket-to-compressor attaching bolt and gently lay the suction valve muffler and tube assembly to one side Do not bend vibration eliminator excessively or it may become damaged Cover suction port in compressor and suction valve with masking tape Remove compressor-to-mounting bracket and support bracket bolts, remove compressor

COMPRESSOR INSTALLATION: 1) Place compressor on mounting bracket and start bolts tightening them finger tight Remove masking tape from suction service valve and compressor port, being sure surfaces are clean Coat a new suction service valve gasket with refrigerant oil and place over valve port Install suction service valve and tighten Allen screws to 15-20 ft lbs Install muffler bracket bolt (DeSoto) and tighten to 15-20 ft lbs Tighten compressor mounting bracket-to-compressor and support bracket attaching bolts to 20-25 ft lbs

2) Remove caps from discharge tube nut and muffler connector Insert new copper washer and connect flared connection, tightening securely Install compressor rive belts and belt tension adjusting strap Adjust belts (see ADJUSTMENTS above) Install magnetic clutch electrical lead (if so equipped)

3) Install manifold gauge set (Tool C-3354) First remove valve stem protective caps from compressor discharge and suction service valves Using Tool C-3361, make sure both valves are completely back-seated (counter-clockwise) Remove protective caps from discharge and suction service port caps Install 4-ft test hose from 600 lb gauge fitting to discharge service valve port fitting Install other 4-ft test hose from 300 lb gauge fitting to suction service valve port fitting Turn both handles of manifold gauge clockwise as far as they will go Crack suction service valve open (counter-clockwise) and tighten oil filler plug Crack suction gauge hand valve **for an instant** to purge air from compressor and suction tube Close suction gauge hand valve and open discharge service valve (counter-clockwise) slightly Crack discharge gauge hand valve **f r an instant** to purge air from discharge side of compressor Rotate both gauge set hand valves (clockwise) until they are fully seated Rotate both discharge and suction service valve stems until they are fully backseated

4) Start engine and turn blower and temperature controls to "High" and "Cold". Operate engine for 5 minutes, stop engine, and test for leaks Test system for operation If satisfactory, remove gauge set and replace protective caps

CONDENSER REMOVAL & INSTALLATION: Discharge system (see above) Disconnect discharge and by-pass tubes from discharge valve and liquid line to receive and cap tubes Remove hood lock plate and support bracket Remove four bolts that attach condenser brackets to radiator support and lift condenser from car To install, reverse removal procedure Partially charge system, test for leaks, correct leaks, evacuate and charge system

RECEIVER STRAINER-DRIER REMOVAL & INSTALLATION: Discharge system (see above) Lift car with hoist Disconnect receiver flare connections at both ends of receiver *(CAUTION*–Wear goggles) Cap ends of receiver if unit to be used again Leave caps on connections until ready to make connections To install, reverse removal procedure Partially charge

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1955-56 "AIRTEMP" (C ntinu d)

system, check for leaks and correct as necessary, evacuate and charge system.

PARTS REPLACEMENT

RECEIVER FUSIBLE PLUG: A fusible plug is installed in receiver as a safety device. This plug has a standard pipe plug thread and contains a core of material which will blow at approximately 210°F. If the refrigeration unit is damaged or some component fails to function properly and a temperature is built up in the receiver sufficiently high to blow the fusible plug, the Freon charge will escape. *(NOTE*–Occasionally a fusible plug might blow if the system is subject to extreme conditions, such as prolonged idling of motor, or in very hot weather). Whenever plugs blow following steps should be taken to put system in operation: **1)** Locate and repair damage or improperly functioning part causing fusible plug to blow. Replace fusible plug in receiver. *NOTE*–A pipe joint sealer should always be used when replacing fusible plugs. Torque to 20 ft. lbs.

2) Discharge and recharge system, check for leaks and for sufficient oil supply in compressor.

3) Inspect condensers for cleanliness and plugged passages.

COMPRESSOR SHAFT SEAL: *(NOTE*–Two types used. Replacement of new type seal for old type seal includes bearing end plate. Replacement of new type seal with seal of same type requires seal only). Start engine and operate at fast idle with temperature control switch at "Cold" and blower switch set to "High" speed until compressor is warm. Shut off engine. Remore valve stem protective caps from both discharge and suction service valves. Close both valves by rotating valve stems clockwise (Tool C-3361) until they are fully seated. Gradually loosen oil filler plug a few turns to release pressure from compressor. Remove upper right-hand radiator fan shroud. Remove self-locking bolt and washer from compressor shaft at front center of magnetic clutch. While supporting pulley and clutch assembly with one hand, tap pulley with a soft hammer to jar hub from tapered shaft and remove assembly from compressor. *B careful n t to damag brush s when removing pulley and clutch assembly.* Remove brush holder assembly.

Neoprene Type Seal Removal: Push seal ring towards compressor and remove snap ring with snap ring pliers, Then pull seal assembly from shaft. It may be necessary to pry bellows from front bearing end plate with a screwdriver.

Metal Bellows Type Seal Removal: Remove compressor front bearing end plate screws. Install special puller C-3473. Screw in on alignment screws until inner steps on puller contact bellows evenly. Hold compressor shaft from rotating by placing screwdriver in shaft keyway slot and allow it to rest against puller leg while turning puller screw. When bellows have compressed far enough to clear the snap ring retainer, remove snap ring with snap ring pliers. Change puller screw in center of puller. Turn in on center screw and remove compressor front bearing end plate and seal assembly. Remove puller from end plate. Remove carbon seal and "0" ring from bearing end plate.

Metal Bellows Type Seal Installation: 1) Coat new bearing end plate and large "0" ring with refrigerant oil. Install "0" ring in front bearing end plate. Install gasket, end plate and two long screws at opposite sides of end plate. *Be sure that oil pocket is up.* Start end plate squarely, and tighten screws evenly finger tight. Install puller. While holding compressor shaft with a screwdriver, turn puller screw to pull bearing end plate into compressor housing. Remove puller and install end plate screws. Tighten screws evenly to 15-20 ft. lbs.

2) Coat carbon seal with refrigerant oil and place over shaft, positioning tangs on carbon in recesses in bearing end plate. Lubricate "0" ring in bellows with refrigerant oil and place bellows and snap ring over compressor shaft. Install puller. Compress bellows with puller and, at same time, rotate bellows assembly to insure proper alignment. This will prevent pinching "0" ring which would result in a leaky seal. Install snap ring retainer when bellows clear groove in shaft. Remove puller. Check snap ring to be sure that it is securely seated in shaft groove. Otherwise it may slip out and result in a leaky seal. Install brush holder assembly, pulley, and magnetic clutch assembly, lining up key and keyway. Push assembly over shaft and install washer and self-locking nut. Tighten bolt to 15-20 ft. lbs. Backseat both service valves and bleed air from compressor. Tighten oil filler plug. Install protective caps, check for leaks. *NOTE*–Leaks are more noticeable when new seals are first installed than after system has been in operation for a while and parts are worn in.

MAGNETIC CLUTCH: Service is limited to drive plate, pulley and electromagnet assembly, snap rings, bearing and brush holder assembly.

Clutch Assembly Removal: See "COMPRESSOR SHAFT SEAL" above.

Drive Plate Removal & Installation: Remove drive plate retaining snap ring hub with Tool C-3301. Place suitable sleeve against hub and remove drive plate by tapping against sleeve with a hammer. Inspect springs for loss of tension and cracks. Inspect lining on face of plate. Replace drive plate if liner is worn, springs are weak or broken, or if drive plate is warped. *(NOTE*–A sintered iron liner impregnated with fibrous material is bonded to the drive plate. If this liner is worn through, replace drive plate). Start drive plate hub squarely into inner bearing race. Place a brass drift against drive plate inner hub and tap plate hub into bearing by tapping on brass drift with a hammer. Install snap ring on drive plate hub. Adjust (see Adjustments).

Brush Assembly Replacement: Remove ground brush lead screw from compressor. Disconnect insulated lead from Wade connector. Remove screws attaching brush holder to compressor and remove brush holder assembly. Clean collector rings in clutch assembly with carbon tetrachloride and wipe surplus grease from around clutch bearing. Install new brush holder assembly. *Use care not to break brush s. If brush s ar allowed to snap to the end of their trav l, th y may break.*

►*ELECTROMAGNETIC COIL CAUTION:* Do not attempt to remove electromagnet coil from pulley assembly. The coil is held in place by a special adhesive material. Once this bond is broken coil cannot be reattached.

1957-59 CHRYSLER, DE SOTO, DODGE, PLYMOUTH

Chrysler, Imperial, DeSoto, Dodge, Plymouth (1957–59)

►CHANGES, CAUTIONS, CORRECTIONS

►*1957 "V2" COMPRESSOR NOISE (WHISTLING – PULSATING) CORRECTION:* This condition can be corrected by installing a new compressor oil pump relief valve ball (MoPar Service Package, Part No. 1843474). *See "Compressor" below for installation procedures.*

►*1957-58 AIR CONDITIONING OPERATING CAUTION: Engine cooling system must be protected by a permanent anti-freeze compound to a temperature of +20°F for summer operation*

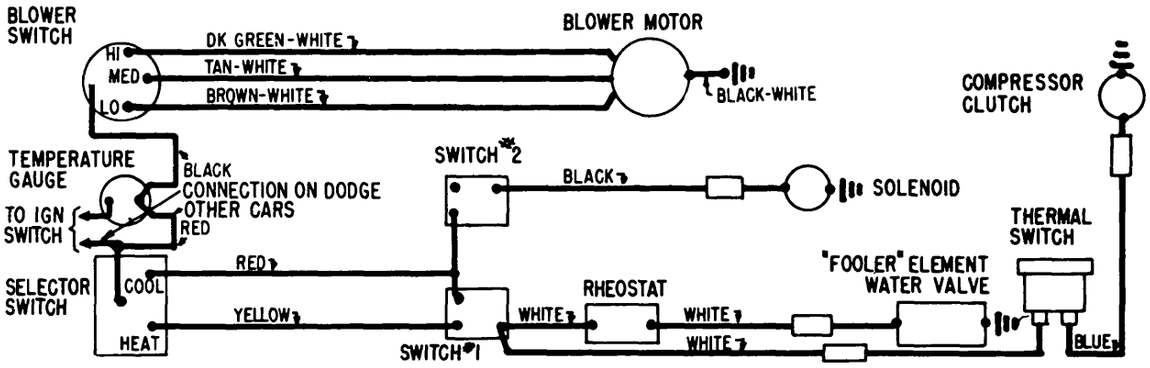
►*1958 COMPRESSOR DRIVE CLUTCH PRODUCTION CHANGE:* A new magnetic clutch having a higher operating torque than former clutch is now being used in production and is available for service replacement The new clutch assembly, Part No. 1886328 (and Brush Assembly, Part No. 1880049) can be identified by a triangular front plate Previous clutch had a round front plate *See "Overhaul" below for new specifications*

►*1958 DODGE EXCESSIVE HEAD PRESSURE CORRECTION & REFRIGERANT CAPACITY CHANGE:* The previously recommended refrigerant capacity of 3 lbs (front mounted units) may cause excessive head pressures and result in premature clutch failure. It is now recommended that the system be charged with 2 5/8 lbs of refrigerant ± 1/8 lb Front & rear combination units (optional on 1958 Station Wagons) requires 3 7/8 lbs ± 1/8 lb

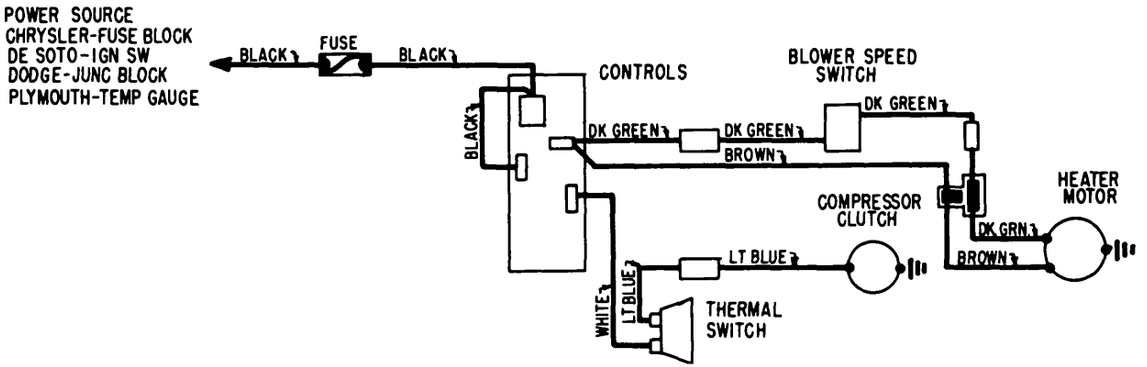
►*1959 AIP CONDITIONER COMPRESSOR CLUTCH (WITH CLUTCH DISENGAGED) "WHIRRING" OR "SPINNING" NOISE CORRECTION* If this condition cannot be corrected by adjustment of drive plate clearance, remove clutch from compressor and remove bearing from clutch assembly Check bearing for noise If bearing is noisy, install a new bearing, Part No 1769318-P Adjust clutch drive plate clearance, then install clutch and adjust drive belt

►*1959 AIR CONDITIONER ERRATIC OR NO COOLING CORRECTION* If cooling is erratic or there is no cooling after the engine is operated for a few minutes, inspect the insulation around the sensing bulb and suction line If the insulation is found to be a composition type, remove and replace with later type found in "Air Conditioner Refrigerant Tubing Insulation & Mounting Clamp Package", Part No 2084287 Before installing the insulation package, check sensing bulb to make sure it is fully inserted in the well and that the shim is properly located and exerts sufficient tension to hold bulb in firm contact with side of well *NOTE - The above package can be installed without disconnecting a line or losing refrigerant by splitting the foam rubber insulator its full length and fitting it around sensing bulb and suction line Reseal insulator with black weatherstrip adhesive and fasten securely with clamps*

►*1959 AIR CONDITIONER COMPRESSOR RUMBLE CORRECTION* Check crankshaft drive belt pulley for eccentricity or excessive runout and replace if necessary Replace compressor drive belts with a matched pair of drive belts, Part No 1738590 If rumble is still present after the above operations, install a new type suction hose, Part No 1972867 (with "front only" air conditioning), Part No 1972937 (with "dual" air conditioning) *NOTE - When suction hose is installed, also install Air Conditioning Refrigerant Tubing Insulation & Mounting Clamp Package, Part No 2084287, if asphalt cork insulation originally used on tubing*



1957-58 CHRYSLER CORP. AIR CONDITIONING CONTROL DIAGRAM



1959 CHRYSLER CORP. AIR CONDITIONING CONTROL DIAGRAM

►*1959 AIR CONDITIONER COMPRESSOR PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE* New improved compressors, Part Nos 1947807 and 1947808 are being used in production and may be used for service replacement Service procedures are the same as for the previous type compressor, however, some of the parts are different and care should be taken to insure the correct part is installed

►*COMPRESSOR REPLACEMENT CAUTION* After installation, turn compressor crankshaft by hand at least 10 times to allow trapped oil on top of pistons to flow out of reed valves Suction and discharge hoses must be connected and service valve must be open during this operation

►*AIR CONDITIONER OPERATING CAUTION (SUMMER)* Engine cooling system must be protected by the addition of permanent type anti-freeze equal to approximately 20% of coolant capacity, or the amount necessary to protect system from freezing + 16°F

►*1959 CHRYSLER AIR CONDITIONER FEED FUSE FAILURE CORRECTION:* **If the air conditioner main feed fuse blows out after one-half hour or more continous operation of air conditioner, replace the Fuse Block Male Terminal and Fuse Clip Assembly on the fuse block with Part No. 2197136.**

DESCRIPTION: This new unit is a combined heater-air conditioner system with all components located on dash panel and in engine compartment. Temperature control is obtained through a reheating process. During the cooling cycle, air is cooled as it passes through the evaporator coil and then is reheated to the desired temperature by the heater core. Air for this cycle may be brought from outside the car or it may be recirculated. During the heating cycle, outside air is introduced into the system through a permanently open vent in top of cowl section, and is drawn through both the cooling and heating coils by a centrifugal blower. The heated air is then forced into the duct for distribution. The air conditioner compressor is a two cylinder reciprocating type located on right side of engine and driven by a belt. A magnetic clutch on the compressor is actuated by a thermal switch and controls operation of the compressor in relation to requirements of the system. The Recirculating Door is operated by engine oil pressure through a power piston and is controlled by the main operating control lever on instrument panel 1957 & 1958 units are the same except for the following 1958 changes

CONTINUED ON NEXT PAGE

1957-59 CHRYSLER, DE SOTO, DODGE, PLYMOUTH (C ntinued)

C mbination Units: A second evaporator is available as optional equipment on some models. When installed on station wagons, the unit is mounted on roof panel. On 2 & 4 Door models, the unit is mounted in luggage compartment.

Sub-Cooler: This is a finned tube connected between air conditioning receiver-dryer and the expansion valve and is used to supplement the condenser in carrying off heat from refrigerant liquid.

SERVICE CAUTIONS: *Before disconnecting any part of air conditioning system or lines, see "Air Conditioning S rvice Cautions" at beginning of Air Conditioning Secti n.*

1959 NOTE – Except for new vacuum controls and pushbuttons, the heating and cooling cycle is similar to 1957 units. A second evaporator is available as an optional equipment on some models. When installed on station wagons, the unit is mounted on roof panel. On 2&4-door models, the second unit is mounted in luggage compartment.

LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing" & "Trouble Shooting" at beginning of Air Conditioning Section.*

COMPRESSOR REMOVAL (For service work on engine): Air conditioning compressor cannot be repositioned for service work on engine except by disconnecting and removing it from the engine compartment. *See "Compressor" below.*

ADJUSTMENT

COMPRESSOR BELT: Apply a 5 lb. force at center of belt and measure the deflection. See table below for specifications.

Belt Deflection

Model	Used Belt	New Belt
1957 Chrysler (All)	3/8"	5/16"
1958 Chrysler LC-1	3/8"	5/16"
1958 Chrysler (Others)	3/16"	1/4"
1957 DeSoto (All)	3/8"	5/16"
1958 DeSoto (All)	3/8"	1/4"
1957 Dodge (All)	3/8"	5/16"
1958 Dodge LD-2	1/2"	3/8"
1958 Dodge LD-3	3/8"	1/4"
1957 Plymouth (All)	5/16"	3/16"
1958 Plymouth 318" Eng. ①	5/16"	3/16"
1958 Plymouth 318" Eng. ②	3/32"	5/64"
1958 Plymouth 350" Eng. ①	3/8"	1/4"
1958 Plymouth 350" Eng. ②	1/8"	1/16"
1959 Chrysler (Windsor)	1/4"	1/8"
1959 Chrysler (Others)	3/8"	1/4"
1959 DeSoto (All)	3/8"	1/4"
1959 Dodge (All)	1/8"	1/16"
Plymouth (All)	1/4"	1/8"

① - Between compressor and generator.
② - Between idler pulley and water pump.

►*FAN BELT REPLACEMENT NOTE: Always r plac both compr ssor b lts. Do not run a new b lt with an old on .*

Th rmal Switch: Three positions are provided for adjustment at eccentric slot on side of switch. To adjust, turn in clockwise direction for "Cold" or counterclockwise for "Warm". When midway between these two points the temperature setting will be "Normal", which is standard factory setting.

Checking – Insert thermometer bulb through hole at lower left side of evaporator housing into well of suction line, then seal the opening with tape. Connect a test light lead to compressor circuit and the other lead to ground. Operate engine at 1200 RPM, control switch on "Cooling", and control lever at "Cold". Test light should light. Turn blower switch off. Close all windows and allow thermal switch to cycle a few times, indicated by test light going on and off. The following specifications indicate opening and closing of thermal switch (in relation to switch setting).

Thermal Switch Specifications

Adjustment	Switch Opens	Switch Closes
Normal Setting	34°F + 2°F	37°F + 2°F
Cold Setting	30°F + 2°F	34°F + 2°F
Warm Setting	42°F + 2°F	45°F + 2°F

Expansion Valve: Not adjustable. If unit is faulty, it must be replaced.

SERVICING

►*INTAKE & DISCHARGE VALVE NOTE:* Rotating the valve stems COUNTERCLOCKWISE until valves are fully open, is the operating position. This position also isolates the service ports for connecting gauge manifold set. Rotating valve stems CLOCKWISE, until valves are fully closed, isolates the compressor from the system. *CAUTION - Do not operate compressor with valves in CLOCKWISE position.*

COMPRESSOR OIL LEVEL: Checking & Filling – Place temperature control on "Cool", blower motor on "High", and toggle switch on "Cool". Operate engine at 1200 RPM for about 10 minutes to return any excess oil to compressor crankcase. Stop engine and remove protective caps from discharge and intake service valves. then close both valves by turning stem clockwise with Tool C–3361, until valve is firmly seated. *(CAUTION – Do not start engine with service valves in the closed (clockwise) position).* Clean area around compressor filler plug and discharge service valve port cap with solvent and blow dry with air. Carefully loosen the 1/4" flare cap fitting of discharge service valve 1/4 turn and gradually release or purge gas pressure from compressor. When completely purged, loosen (do not remove) oil filler plug on compressor enough to allow gas pressure (if any) to escape. When pressure is released, remove filler plug and use a clean dry dipstick (1/8" round or similar rod) to measure oil level. See table below for correct oil level. Add MoPar Air Conditioning Oil as required, or siphon off excess oil if necessary, then replace oil filler plug. Loosen discharge valve service port cap approximately 1/2 turn, then slightly open the intake service valve (counterclockwise) and let gas drift slowly through compressor for about 10 seconds. This will purge air from compressor. Tighten cap on discharge port and turn both valves fully counterclockwise. Replace protective caps and tighten securely.

Compressor Oil Capacity

Model	Height in Dipstick
1957 Chrysler & Imperial	2-2½"
1957 DeSoto	1 1/8-1 3/8"
1957 Dodge & Plymouth	¾-1"
1958–59 (All Models)	2–2½"

GAUGE SET (TOOL C–3354) INSTALLATION: Remove protective caps from intake and discharge valves. Using Tool C–3361, make sure that both valves are turned fully **counterclockwise.** *(NOTE* – This is the normal operating position). Remove protective caps from both service valve ports. Install 4 ft. test hose from 600 lb. gauge fitting on Tool C-3354 to discharge service valve. Connect a similar hose to 300 lb. and to intake service valve. Turn both valves on gauge set fully **cl ckwis .**

DISCHARGING THE SYSTEM: Install Gauge Set, Tool C-3354 (see above) and connect an 8 ft. test hose to gauge manifold center fitting. Open discharge and intake service valves one turn (clockwise from a full counterclockwise position). Crack gauge set manifold discharge valve a fraction of a turn counterclockwise and allow gas to escape. *(CAUTION– Op ning manifold valv t much will cause compressor oil to b drawn off with th gas).* As pressure on manifold discharge gauge drops near zero, open manifold intake valve.

EVACUATING THE SYSTEM: *(NOTE – Aft r air conditioning system has been open d to the atmosph r , it is absolutely essential that the system be evacuat d and swept with refrigerant to remov all air and moistur).* Connect gauge set to compressor and discharge system (see above). Connect an 8 ft. test hose to center fitting on manifold and to Vacuum Pump, Tool C-3372. Open both discharge and intake service valves about one turn (clockwise). Open both gauge set manifold valves (counterclockwise). Start vacuum pump and check compound gauge (vacuum & pressure). Operate pump until gauge registers 26-28 inches of vacuum. Continue evacuating at this vacuum for five minutes. *(NOTE – If vacuum of 26-28 inches cannot be obtain d, a leak is indicat d in the system and must be corr cted. S "L ak T sting" at beginning of Air Conditi ning S ction).* Close both gauge set manifold valves. Turn off vacuum pump and remove long gauge hose. Charge system with refrigerant gas *(See "Charging The Syst m" b low).* Start engine and operate at 1200 RPM for 5 minutes, with temperature control on "Cold", and blower on "High". Check for leaks, then discharge system *(s "Discharging The System" above).* Again evacuate the system at 26-28 inches of vacuum for 10 minutes. Recharge system with 3 lbs. of refrigerant (1957); 2-2½ lbs. (1958 models with one evaporator); 3 7/8 lbs. (1958 models with two evaporators). *See "Charging Th Syst m" below.*

CHARGING THE SYSTEM: With air conditioning system purged and evacuated (see above), proceed as follows: Attach "Drier" and "Dry-Eye" units to refrigerant tank (Refrigerant 12), then open valve on "Dry-Eye" unit and purge air from drier by opening valve on refrigerant tank for a few seconds. Close valve on "Dry-Eye" unit and install a 1/4" cap at end of valve. Check all connections for leaks, and correct as necessary. Open valve on refrigerant tank and allow "Drier" to absorb any moisture that may be present in the refrigerant. *(NOTE –Window on "Dry-Eye" unit should chang to a d p blu b fore proceeding further).* Remove cap from valve on "Dry-Eye" unit and connect an 8 ft. test hose between valve and center fitting on gauge manifold, making sure that both valves on gauge manifold are fully closed. Open valve

CONTINUED ON NEXT PAGE

1957-59 CHRYSLER, DE SOTO, DODGE PLYMOUTH (C ntinued)

at "Dry-Eye" unit and slightly loosen test hose at center fitting for a second or two to purge air from hose, then tighten hose and close valve. Start car engine and operate at 1200 RPM with blower control set to "High" and temperature control set at "Cold". Open both the discharge and intake valves at compressor one full turn (clockwise). *NOTE* – If gauge hand fluctuates, close discharge valve at compressor (counterclockwise) slowly until gauge hand steadies. Place refrigerant tank upright in a pail of warm water (maximum temperature 125°F), then set tank and pail on a scale and weigh the assembly. Make a note of the combined weight. Open intake valve on gauge manifold slightly (counterclockwise), and control the refrigerant entering system with this valve. *(CAUTION – Do not allow pressure to exceed 60 lbs.).* Carefully watch scale and shut refrigerant tank valve off when system has absorbed 3 lbs. (1957); 2-2½ lbs. (1958 models with one evaporator); 3 7/8 (1958 models with two evaporators), 2½–2¾ lbs. (Dash Unit only), 3¾–4 lbs. (Dash and Roof and Rear Unit) on 1959 Models. Close intake valve on gauge manifold (clockwise) and both valves on compressor (fully counterclockwise). Remove center hose from gauge manifold allowing pressure in hose to escape slowly. Remove test hoses from compressor valves.

COMPRESSOR: *NOTE - "V" type compressor used on 1957 Chrysl r & Imp rial and on all 1958 models. "In-Lin " c mpress r used on 1957 DeSoto, Dodge & Plymouth.*

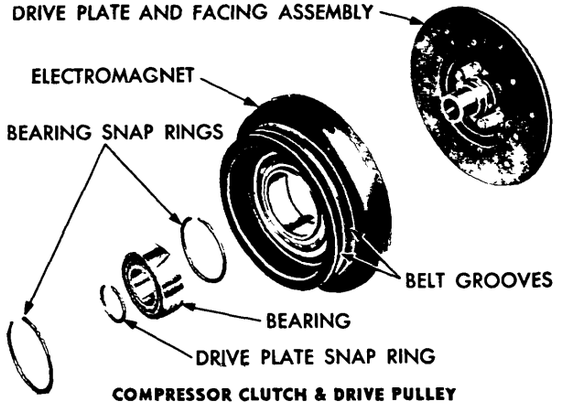
► *1957 COMPRESSOR REPAIR NOTE (DeSoto, Dodge & Plym uth):* Valve plate assemblies, intake & discharge service valves, cylinder head, gaskets, shaft seal and support brackets are the only parts available for service replacement. If pistons, cylinders, crankshaft or connecting rods are damaged, the complete assembly must be replaced.

► *1957 CHRYSLER "V" TYPE COMPRESSOR NOISE (WHISTLING – PULSATING) CORRECTION:* Install a new compressor oil pump relief valve ball (MoPar Service Package, Part No. 1843474) as follows: With compressor removed from engine (see below), secure right head of compressor in a vise in such a manner so compressor body mating line with oil sump is in a horizontal position (to prevent loss of oil when sump is removed). Remove oil sump-to-compressor bolts, making sure that outer surfaces of sump and crankcase are clean Slightly tap sides of sump with a plastic hammer to break seal to compressor. *(CAUTION – When breaking sump-to-compr ssor s al, do not allow sump to break loose quickly or with a sideways motion as the relief valve spring may be lost).* Remove oil sump and take out the oil pressure relief valve spring. Remove old gasket, being very careful to prevent any foreign material falling into crankcase. Make a small ball out of body sealing compound and place it on the end of a pencil point. Insert it into hole from which spring was removed and press down slightly. Steel relief valve ball will adhere to end of pencil and can then be removed. Place rubber replacement ball in hole and replace the spring. Dampen both sides of a new gasket with refrigerant oil and set it in place. Make sure mating surface of sump is clean. Using two of the longer bolts as guides, place sump onto compressor, compressing the relief ball spring. Install sump bolts and tighten to 22 ft. lbs. Reinstall compressor on engine and evacuate, sweep, test for leaks and charge system *(see above).*

Removal: On Chrysler & Imperial models, the air conditioning system must be completely discharged for compressor removal *(see "Discharging The System" above).* On other cars, start engine and operate at fast idle until compressor is warm, then shut off engine. Close intake and discharge service valves by rotating stems clockwise, using Tool C–3361, until both valves are fully seated. Loosen port caps on both valves a couple of turns to gradually release gas pressure. Loosen oil filler plug a few turns (do not remove). On all cars, remove drive belts. On DeSoto, Dodge & Plymouth, disconnect discharge flared connection at discharge valve fitting. Remove screws securing intake service valve to compressor (all models), and screws securing discharge service valve to compressor (Chrysler & Imperial). Remove compressor-to-support and mounting bracket attaching screws. *(CAUTION – Be careful not to bend vibration eliminator excessively or it will be damaged).* Remove compressor from engine, then cover all openings with masking tape.

Installation: Reverse removal procedure and note the following: On Chrysler & Imperial models, evacuate, sweep, test for leaks, then charge system *(see above).* On DeSoto, Dodge, & Plymouth, purge air from compressor by opening the intake service valve counterclockwise slightly and loosening the discharge service port cap a few turns for about 10 seconds. This will allow gas to drift through compressor and bleed air from system. Rotate both discharge and intake service valve stems counterclockwise until they are fully back seated. Start engine and turn on blower and temperature control switches to "High" and "Cold". Operate engine for 5 minutes, stop engine and test for leaks. Test operation of system, then remove gauge set.

COMPRESSOR VALVE PLATE REPLACEMENT (1957 DeSoto, Dodge & Plymouth): Remove compressor from car (see above). Remove cylinder head bolts and tap cylinder head with a plastic hammer. If, when lifting the cylinder head, the valve plate does not come off with it, separate head from plate by placing a brass rod against plate and head between cylinders at side of head and tapping it. *(CAUTION – Do not tap plate near finished surfac).* Remove head, valve plate, and gaskets. Examine valves. If valves are broken, and the parts have damaged top of piston or scored cylinder walls, replace the compressor. If compressor is not damaged, clean cylinder block top and cylinder head thoroughly. Be sure to remove all shreds from old gasket. Install cylinder head bolts in head, then place a piece of cardboard over bolt heads and turn assembly upside down. Lay on bench with bolts facing up. Dip new gaskets in clean refrigeration oil. Place cylinder head gasket, then valve plate, and last, the valve plate gasket over bolts. Lift the cardboard, turn assembly over and place the entire assembly on cylinder block and start the bolts. Tighten bolts evenly (from center out) to 15-20 ft. lbs. Install compressor.



COMPRESSOR CLUTCH & DRIVE PULLEY

COMPRESSOR CYLINDER HEAD REMOVAL & INSTALLATION (1957 Chrysler, 1958 Chrysler, DeSoto, Dodg & Plymouth): *See "Compressor Valve Plate Replacement (1957 DeSoto, Dodge & Plymouth)" above, and note the following:* Install cylinder head bolts and tighten each bolt alternately and evenly to 26 ft. lbs.

COMPRESSOR SHAFT SEAL REPLACEMENT (1957 DeSoto, Dodge & Plymouth): With compressor removed from car (see above), remove self-locking bolt from compressor crankshaft at front of pulley. Tap pulley and clutch assembly to free it from tapered shaft *(CAUTION – Do not damage brushes when removing or installing clutch. If brushes are allowed to snap to full travel, they will break).* Remove brush holder assembly. Remove compressor front bearing end plate, then install Puller, Tool C–3473, using the center screw that threads into end of compressor shaft. Install alignment screws in puller and screw them in until inner steps on puller contact the seal bellows evenly. Hold compressor shaft by inserting a screw–driver in shaft keyway and resting against puller leg while turning the puller screw. Compress bellows sufficiently to expose retaining snap ring, then remove snap ring. Change puller screw, using the one designed to press against center of compressor shaft, and install the two screws through puller plate, threading them into the holes provided in compressor end plate. Turn in on center screw and remove compressor front bearing end plate and seal assembly. Remove carbon seal and "O" ring from bearing end plate. To install seal, coat new bearing end plate gasket and large "O" ring with refrigeration oil. Install "O" ring in front bearing end plate. Install gasket and end plate, then insert two long screws on opposite side of plate. *(NOTE – Make sure that oil pocket is upward).* Start end plate squarely and tighten screws evenly finger tight. Install puller, using the center screw designed to be threaded into center of compressor shaft. Hold compressor shaft with screwdriver and pull bearing end plate into housing. Remove puller and install screws. Tighten evenly to 15–20 ft. lbs. Coat carbon seal with refrigeration oil and place over shaft with tangs in recesses of end plate. Lubricate "O" ring in seal with refrigeration oil, then slide end snap ring over compressor shaft. In-

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1957-59 CHRYSLER, DE SOTO, DODGE, PLYMOUTH (C ntinued)

stall puller and compress bellows (in same manner as for removal). While compressing bellows, rotate to insure proper alignment. Install snap ring, making sure that ring is seated in groove. Remove puller. Install brush holder assembly *(CAUTION – Be very careful not to damage brushes)*. Install magnetic clutch and pulley assembly over shaft, lining up keyway and key. Push assembly over shaft and install washer and self locking nut. Tighten to 15–20 ft. lbs.

MAGNETIC CLUTCH: *NOTE – Servicing on this assembly is limited to the drive plate, pulley, and electro-magnet assembly, snap rings, bearing and brush holder assembly.*

►*1958 MAGNETIC CLUTCH PRODUCTION CHANGE:* A new clutch assembly, identified by a triangular front plate (instead of round front plate on earlier models) is being used in later production. Overhaul procedures are the same as for earlier type. Air gap setting is .050-.070" (late type), .025-.035" (early type).

►*SERVICING CAUTION: D not attempt to r mov th l ctro-magn tic coil fr m pulley ass mbly. Th c il is h ld in plac with a special adh siv mat rial. Onc this bond is br k n, the coil cannot b reattach d.*

Current Draw: 1. 5–2. 0 amps. at 12.0 volts.

Removal: Loosen and remove the drive belts. On Chrysler, Imperial, & DeSoto, remove the upper right shroud section. Remove self locking bolt and washer from compressor shaft at center of clutch. On Chrysler & Imperial, support clutch assembly and remove pulley with a 5/8" cap screw, screwed into end of clutch shaft. On DeSoto, Dodge, & Plymouth, support clutch assembly with one hand and tap the pulley with a soft hammer and remove assembly from compressor.

Drive Plate Removal & Installation – Remove drive plate retaining snap ring hub with Tool C–3301. Place suitable sleeve against hub and remove drive plate by tapping sleeve with a soft hammer. Inspect springs for loss of tension and cracks, and inspect liner on face of plate. Replace drive plate if liner is worn, springs are weak or broken, or if drive plate is warped. Install drive plate by installing plate hub squarely into inner bearing race. Place a brass drift against drive plate inner hub and tap plate hub into bearing by tapping on brass drift with a hammer. Install snap ring on hub. Use a long feeler that will reach into gap at hub and measure air gap between drive plate and electro-magnet. Air gap should measure .025-.035" (early type); .050-.070" (late type). *NOTE - See "1958 Magn tic Clutch Production Change" above.* Adjust air gap by turning the three screws on front face of drive plate. Adjust all three screws to obtain an evenly spaced air gap.

Clutch Bearing Replacement – Remove driv plate (see above). Remove snap ring and grease slinger (at outer race of bearing) from pulley assembly. Tap bearing from pulley assembly.

Installation: Align key and keyway and push clutch assembly over shaft and key. Install self locking bolt and washer. Install upper right shroud section on Chrysler, Imperial, & DeSoto. Install drive belts.

1960 CHRYSLER, DE SOTO, DODGE, & PLYMOUTH

Chrysler, Imperial, DeSoto, Dodge, Plymouth (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 CHRYSLER & IMPERIAL MAGNETIC CLUTCH PRODUCTION CHANGE:* New stationary field type used in production effective with Serial No. 03145533 having prefixes 81, 82, 83, 84, 85, 87. See below for data covering both types.

►*AIR CONDITIONING TUBE SEALING NOTE:* A Tube Sealing Washer Replacement Package Part No. 2196341 is released to assist in sealing tubing and hoses.

►*COMPRESSOR REPLACEMENT CAUTION:* When replacing compressor assembly, turn crankshaft by hand at least two complete revolutions to clear oil accumulation from compressor head before clutch is energized to avoid damaging compressor reed valves.

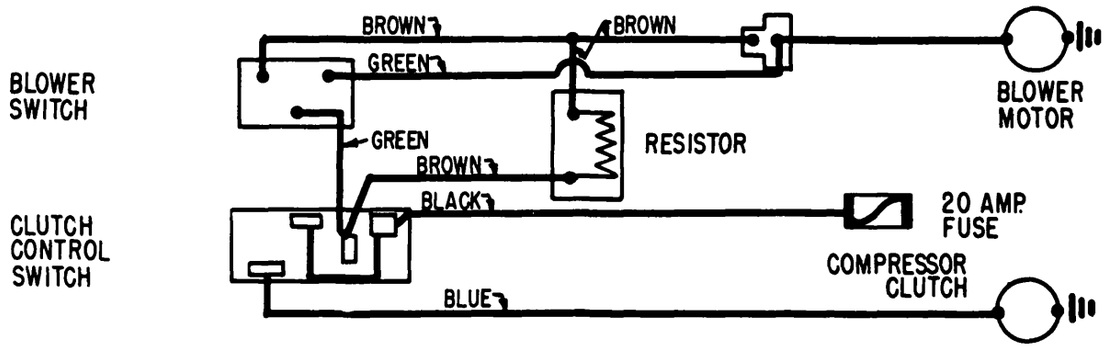
►*AIR CONDITIONER OPERATION CAUTION(SUMMER):* Engine cooling system must be protected to a temperature of 15°F above zero for summer operation.

DESCRIPTION: Three types of installation used.
1st. Option - A combination air conditioning and heating unit, dash mounted and operated by push-buttons.
2nd. Option - Dual installation with combination front unit with luggage compartment mounted evaporator unit.
3rd. Option (Suburban) - Consists of combination dash mounted unit and special roof mounted evaporator unit.
NOTE - 2nd. and 3rd. Options are not available as single units without front unit.

SERVICE CAUTIONS: Before disconnecting any part of air conditioning system or lines, *see "Air Conditioning Service Cautions" at beginning of Air Conditioning Section.*

LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning S ction.*

COMPRESSOR REMOVAL: 1) Discharge the system, see below. Measure and record oil level so that a replaced compressor will have the same oil level. If level not known, adjust level on replaced compressor to 2 5/8-2 13/16" for right hand mount, 3-3 3/16" for left-center mount.
2) Remove suction line from evaporator pressure regulator valve and disconnect discharge line from its adapter. *NOTE* - Plug or cap lines.
3) Disconnect magnetic clutch-to-control unit wire. Remove compressor belts. Remove compressor-to-bracket bolts and remove compressor.



CHRYSLER, DESOTO, DODGE, PLYMOUTH AIR CONDITIONING CONTROL WIRING DIAGRAM

SERVICING

COMPRESSOR BELT: Torque or deflection methods used. Use deflection method only when torque method is not available. *NOTE* - Any belt in use ½ hour is considered a used belt. Measure deflection midway between generator and compressor drive pulleys.

Belt Specifications

Model	(Torque Method) Used	New
Chrysler & DeSoto	35 lbs.	65 lbs.
Dodge & Plymouth (318")	40 lbs.	65 lbs.
Dodge & Plymouth (Other)	35 lbs.	65 lbs.

	(Deflection Method) Used	New
Chrysler& DeSoto	3/8"	1/4"
Dodge & Plymouth (318")	1/4"	1/8"
Dodge & Plymouth (Other)	3/8"	1/8"

EXPANSION VALVE: Not adjustable. If unit is faulty, replace it.

GAUGE SET MANIFOLD (TOOL C-3740) INSTALLATION: *NOTE - Use modificati n Kit C-3741 to convert previous Tool C-3627 f r t sting 1960 Air Conditioning System*
1) Connect "Suction Gauge" (left side of manifold) to suction port of compressor. When adapter installed and tightened, stem of valve opens service port valve.
2) Connect "Pressure Gauge" (center of manifold) to discharge service port of compressor. *NOTE* - Service port adapter needle valve used to dampen out gauge needle oscillations.

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1960 CHRYSLER, DE SOTO, DODGE, & PLYMOUTH (C ntinued)

3) Connect "Inlet Gauge" (right side of manifold) to compressor inlet service port by special adapter. *NOTE* - This gauge and Suction Gauge must be accurately calibrated with both needles at "O" before making tests.
4) Connect long service hose to "Manifold Outlet" when discharging system, using vacuum pump to "pull a vacuum" before charging system, and for connecting system with supply when charging system. *NOTE* - When making Compression Capacity Test, remove hose and install special test cap in its place.

DISCHARGING THE SYSTEM: Attach Gauge Set Manifold Tool C-3740 or equivalent, then attach suction test hose to suction port and discharge test hose to center connection of tool. Open gauge set manifold needle valve and close both of the gauge set manifold gauge valves. Adjust engine speed to 1250 RPM. Pull blower switch to "HIGH" position and move temperature control to "OFF" and push "FRESH COOL" button. Allow to operate at full capacity at at least 15 minutes, forcing compressor oil to crankcase. Open discharge (right-hand) gauge valve a small amount allowing refrigerant vapor to discharge slowly. *CAUTION - D not allow system to discharge rapidly which w uld draw s me oil out of crankcase.* Continue discharge until pressure registers zero. Open left hand valve to release any vapor trapped at the suction side of system.

SWEEP-TEST CHARGE: Used to pressurize system in order to make a leak test. Close both gauge set manifold valves and open gauge set needle valve. Attach free end of long hose discharging to refrigerant dispensing manifold. Attach a single can of Refrigerant 12 to dispensing manifold. Place refrigerant in 125° water. Operate engine at 1250 RPM (windows open, and "FRESH COOL" button pushed in and blower on high). Slowly open left-hand gauge set manifold valve to meter refrigerant into system. When full can has been metered into system close valve and refrigerant manifold valve. *NOTE - Make complete leak test if syst m has be n pen d for repair or replacement to mak sur system is s aled or when system has accidentally lost its charge.* Stop engine and disconnect test hoses and adapters from compressor service ports. To remove sweep-test charge, close refrigerant manifold valve to seal refrigerant in container, remove long test hose and insert free end of this test hose into an exhaust system outlet. Open right-hand gauge set manifold valve a fraction of a turn to let sweep-test charge escape slowly. Continue until pressure gauge registers zero then open left hand gauge valve to allow refrigerant trapped in suction side of system to escape.

EVACUATING THE SYSTEM: *NOTE - After air conditioning system has been open to the atmosphere, it is absolutely essential that the system be evacuated and swept with refrigerant to remove all air and moisture.* Proceed as follows: Connect gauge set manifold to compressor and long test hose from center connection to vacuum pump C-3652. Open both gauge set manifold valves and needle valve. Start vacuum pump and operate until evaporator suction gauge registers at least 26 inches of vacuum. Operate vacuum pump while registering 26-28 inches of vacuum for at least 5 minutes then close valves, turn off vacuum pump and remove test hose. Leave gauge set manifold connected to compressor. Charge system with proper amount of refrigerant. *NOTE - Less than 26 inches of vacuum indicates a leak in the system.*

CHARGING THE SYSTEM: *NOTE - All models with front air conditioning units only require three cans or 45 ounces of Refrigerant 12 while dual installations require 4 cans or 60 ounces.* Tool C-3740 permits charging three full cans of refrigerant at a time. On dual installations a single can must be added after the three cans have been charged into system. *CAUTION - Keep refrigerant manifold valves capped when not in use.* Have a supply of refrigerant can-to-refrigerant manifold gaskets on hand to eliminate overtightening of can or manifold nuts. To charge system proceed as follows: Attach center hose from gauge set manifold to refrigerant dispensing manifold then turn refrigerant manifold valves **counterclockwise** to full open position. Remove protective caps from refrigerant manifold. Screw refrigerant cans into manifold and tighten manifold nuts to 6-8 ft. lbs. Turn the three refrigerant manifold valves completely **clockwise** to puncture cans and close the manifold valves. Turn refrigerant manifold valve counterclockwise to full open and momentarily loosen charging hose at gauge set manifold to allow refrigerant gas to purge air out of charging hose. Place three cans of refrigerant into pan of 125°F water, adjust engine speed to 1250 RPM. Charge system through suction side of system by slowly opening left hand gauge set manifold valve (adjust pressure to 50 psi). Maintain temperature of water in pan. When three cans are completely empty close gauge set manifold valves and refrigerant manifold valves. On dual systems, attach a single can and charge into system using above procedure as for three cans.

MAGNETIC CLUTCH: *NOTE* - Rotary field type, same as previous models except "Current Draw" using a 0-10 amp. scale inserted in series (with a fully charged 12-volt battery) at insulated brush is 2.4-2.8 amperes. *For service information, see 1957 Annual Data or Later Manual edition.*

Stationary Filed Type - *NOTE - Used on late 1960 Chrysler Imperial models.*

Removal - Remove drive belts, disconnect field coil wire. Remove special locking bolt and washer from compressor crankshaft and use a 5/8"-11x2½" cap screw to remove clutch. Remove three field coil assembly mounting screws and lift off assembly.

Disassembly - Use Tool C-3128 to remove small snap ring from drive hub. Use Tool C-3787 to remove drive hub from bearing . Remove bearing snap ring from pulley assembly. *NOTE - Replace bearing at every disassembly.* Use 0-10 scale ammeter inserted in series (use fully charged 12 volt battery) to test current draw of field. If current draw is not within 2.5-2.9 amperes replace field coil.

Reassembly - Use Tool C-3807 and arbor press to install new bearing in pulley assembly with pulley side up. Invert pulley assembly, place Tool C-3807 against rear side of bearing. Start drive hub into inner bearing race and press hub and shoe assembly into position. Install snap rings in bearing and hub. *CAUTION* - Pulley and hub assemblies are mated parts and both items must be replaced as a unit.

Installation - Place the field assembly on boss of compressor bearing housing so that lead wire will be located between compressor cylinder heads. Tighten mounting screws to 17 inch lbs. Insert key in crankshaft and install clutch assembly. Tighten self-locking bolt to 20 ft. lbs. Connect lead wire, install belts and adjust to specified tension.

1954-EARLY 1955 PONTIAC AIR CONDITIONING

P ntiac (1954-Early 1955)①

①—See Production Changes below. For "Later 1955 Pontiac" see "1954-55 Frigidaire (G.M.)" Air Conditioning.

►CHANGES & CORRECTIONS

►*1954 PONTIAC COMPR. CLUTCH & PULLEY ASSEMBLIES PRODUCTION CHANGE:* After production of first 500 clutch and pulley assemblies, a change was made in the clutch plate and hub assembly. This change also made it necessary to change pulley, coil, and bearing assembly; and brush and bracket assembly. *New and old type parts are not interchangeable.* New type clutch plate can be identified by date stamped on clutch facing. New type pulley, coil, and bearing assembly has date stamped on coil. New brush and bracket assembly will be serviced in a dated bag. *Original or old type parts were not dated.*

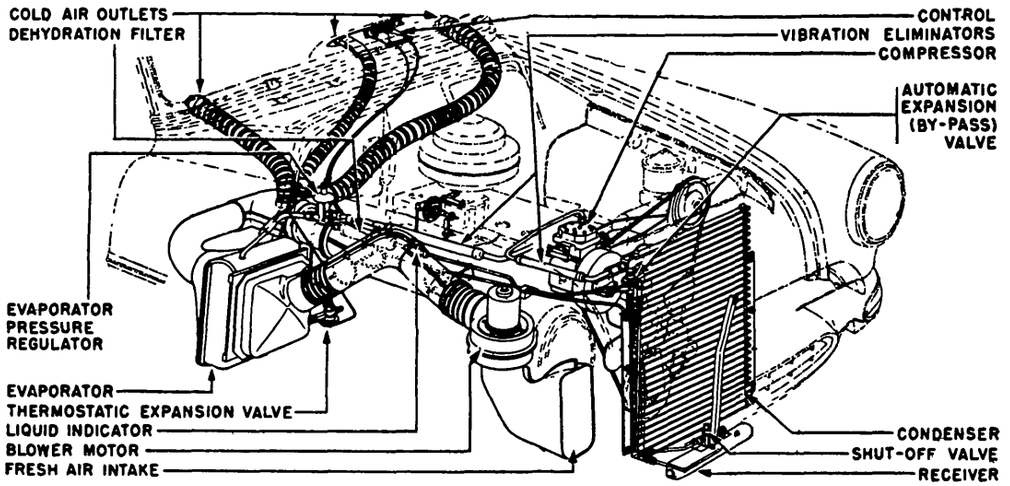
►*1954 PONTIAC HYDRA-MATIC IDLE SPEED CAUTION & CORRECTION:* With idle speed of 375 ± 10 RPM on cars equipped with Hydra-Matic and air conditioning, clutch plate has tendency to slip on pulley assembly which wears clutch plate facing and also heats up entire magnetic clutch assembly due to intermittent slippage because setting is not sufficient to operate compressor and still maintain a relatively smooth engine idle speed when the increased compressor head pressures are attained. To correct this condition, the idle speed should be set at 470 ± 10 RPM.

►*1954 PONTIAC CONDENSER CHANGE (To Eliminate Vibration):* New condenser is identical in design to that previously released except that condenser mounting support is now separated by rubber. Early and late type condensers are interchangeable except that new type mounting support (with rubber), Part No. 520219, must be used with late type condenser, Part No. 8522905.

►*1954 PONTIAC COMPR. CYLINDER HEAD PROD. CHANGE (To Dampen Compressor Pulsation and Smooth Out Operation of System):* A larger volume compressor cylinder head and some related parts have been released under Service Kit Package No. 3133304. It is necessary to install this kit on cars having the earlier type compressor cylinder heads. When installing the cylinder head spacer, during installation of the above kit, it is imperative that spacer be installed with smooth side up towards cylinder head. To reduce possibility of gasket leaks when installing kit, it is recommended that all gaskets used in kit be coated on both sides with refrigeration or compressor oil before installing. Use one of oils listed under Checking Compressor Oil Level & Adding Oil.

►*1954 PONTIAC COMPRESSOR CYLINDER HEAD TORQUE CHANGE:* Cylinder head bolts should be tightened to 25 ft. lbs. rather than 12-15 ft. lbs. originally specified.

►*1955 PONTIAC RECEIVER & DEHYDRATOR-FILTER PRODUCTION CHANGE:* A combination unit (after first 800 cars) replaces two units used previously. The combination unit has no shut-off valve at the receiver which changes certain service procedures. Freon capacity of system with combination type is 3¾ lbs. instead of 5¼ lbs. with early type unit with separate receiver. *For service procedures on later 1955 type see "1954-55 Frigidaire (G.M.)" Air Conditioning.*



1954 PONTIAC AIR-CONDITIONING INSTALLATION

►*1955 PONTIAC COMPRESSOR CHANGE:* A five cylinder, horizontal, reciprocating type compressor (Frigidaire), replaces the twin cylinder, vertical, reciprocating type used in 1954. *For service procedures on 1955 Compressor see "1954-55 Frigidaire (G.M.)" Air Conditioning.*

►*1955 PONTIAC OTHER CHANGES & CORRECTIONS: See "1954-55 Frigidaire (G.M.)" Air Conditioning.*

►*1955 AUTOMATIC FAST IDLE PRODUCTION CHANGE:* Automatic fast idle, which was actuated by placing selector lever in neutral, is not used in 1955.

►*1955 OUTSIDE AIR INTAKE PRODUCTION CHANGE:* Outside air is supplied to system through cowl air intake. All outside air passes through filter before entering evaporator, whether to be cooled or by-passed.

►*1955 AIR RECIRCULATION PRODUCTION CHANGE:* An air recirculation system has been included to increase cooling capacity or eliminate outside odors when necessary. Exclusive use of outside air or recirculation of air within car may be selected by movement of one push-pull control. When pulled out, air in the car and system is recirculated, with a small amount of outside air still being admitted to pressurize the inside of the car. Pressure prevents warm air from entering any openings in body. With control button pushed in, only outside air passes through system into car. Positions between full out and in will give mixed outside and recirculated air. Fan must be on full speed (switch fully down) when recirculation is used. Recirculation should only be used after car has started to cool.

►*1955 PONTIAC COMPRESSOR BELT MISALIGNMENT CORRECTION:* To correct, elongate the two front inner insulator bracket (Part No. 521086) bolt holes by ¼" back toward compressor mounting flange, then place a 1/16" thick flat washer at each of the two insulator bolts to space bracket out from rubber insulator. Bend outer end of front outer insulator bracket back and in towards compressor 1/8". Condition has in later production.

DESCRIPTI N

Compression process cycle type, using Freon-12 as refrigerant. System consists of following elements:

Refrigerating: Compressor—Located at top right front of engine is twin cylinder, vertical, reciprocating type with leaf type intake and discharge valves. Operation causes and maintains necessary high pressure in system needed to increase Freon vapor temperature.

►*NOTE: For Early 1955 Compr ssor, s "1955 Pontiac Compressor Change" above.*

Condenser—Located in front of radiator. Condenses refrigerant vapor discharged from the compressor, through action of fast moving air over metal surfaces of condenser.

Receiver—Located in front of radiator and beneath condenser. Stores liquid refrigerant. Stores liquid refrigerant and maintains supply more than needed normally.

Liquid Indicator—Located between receiver and dehydrator-filter. Provides means for determining adequacy of refrigerant charge.

Dehydrator-Filter—Located to rear of liquid indicator. Filters and dehydrates circulating Freon.

Thermostatic Expansion Valv -Located to left of evaporator. Supplies liquid to cooling core of evaporator at same rate that refrigerant is removed from it in a vaporous state.

Evap rat r (B il r)—Located in rear of right front

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fender baffle. Container for refrigerant which readily absorbs heat from surrounding air when temperature of refrigerant liquid is reduced. In core of evaporator refrigerant is changed to liquid.

Evap rat r Inl t Ass mbly: In front of evaporator. Provides means for removing dust and other foreign material from air passing through evaporator core into car. Can.be removed and cleaned.

Evap rat r Pressur Regulator Valve: Located above and forward of evaporator. Prevents evaporator pressure from falling below 30 psi. thereby keeping boiling temperature of Freon above 32° F.

By-Pass Valv –Located at top right of condenser. Provides automatic opening and closing of by-pass cycle. With evaporator pressure regulator valve closed, pressure in suction pipe drops rapidly until a pressure of 15 psi. is reached. At this point the by-pass valve opens permitting Freon flow to the compressor, and through system except that the evaporator is by-passed.

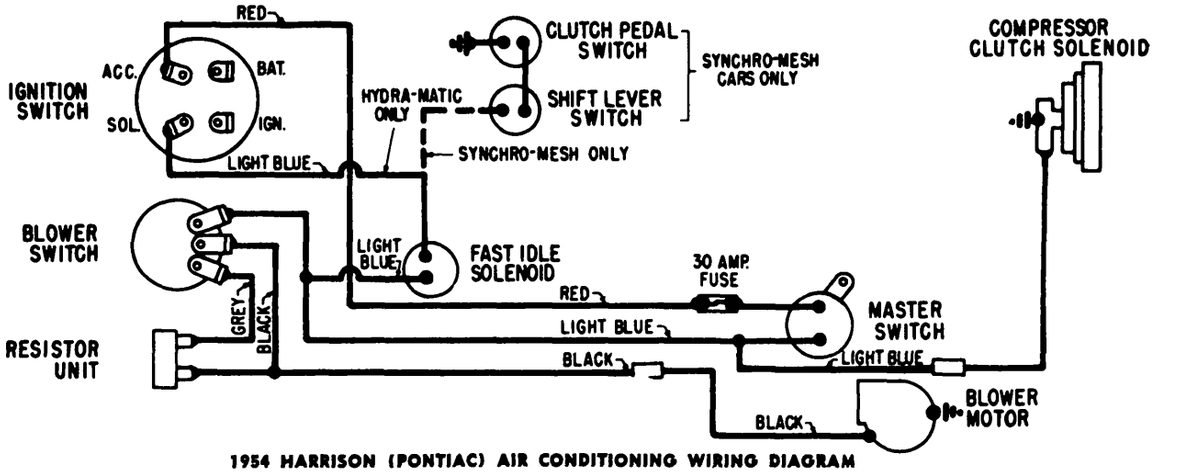
Vibrati n Eliminat rs–Enlarged flexible portions of compressor suction pipe and compressor-to-condenser pipe. Required because compressor is mounted on engine. The flexible portion of the compressor-to-condenser pipe also serves to reduce vibration caused by pressure pulsations of compressor. The vibration eliminator in compressor suction pipe is covered with rubber to prevent frosting which, if permitted to occur would cause serious damage to the copper bellows of the vibration eliminator.

Air Circulating: Bl w r–Located behind air intake at front of car. System can be operated without use of fan when car speed is sufficient to provide circulation.

Air Circuits–Warm air is drawn into car from outside through air intake at front of car, passes over evaporator core, and enters car through three adjustable air outlets mounted in dash of car.

Air Outl ts–There are three outlets located on the instrument panel of the car. Each of these outlets can be controlled to provide a direction of air flow desired. Center outlet contains a valve deflector plate which may be moved to shut off the air, or to change the vertical deflection of air flow. The others consist of adjustable nozzles mounted in ball sockets at each end of instrument panel.

C ntr l: R gulating–Mounted on instrument panel above heater controls. A sliding lever is the basic control. Movement of the control lever between "OFF" and "ON" activates a valve in the air duct permitting the entry of outside air. When position "ON" is reached, compressor is activated and circuit to blower is closed so that blower may be used if desired. Movement of the control lever between "ON" and "COLD" varies the amount of air traveling over the refrigerating coils of the evaporator, and as a result, varies the degree of cooling within the car according to the amount of cooled air mixed with uncooled air. A switch, marked "FAN", at right of control lever may be moved down to turn on the blower for forced ventilation. Two blower speeds are available—medium



1954 HARRISON (PONTIAC) AIR CONDITIONING WIRING DIAGRAM

when switch is horizontal, high when switch is full down.

►*NOTE: For Early 1955 Clutch, see "1954-55 Frigidaire" Air Conditioning.*

Compressor Clutch–Incorporated in compressor drive pulley assembly. When electrically energized by turning on the air conditioning, an electro-magnet in the pulley assembly locks the compressor drive plate to the pulley assembly. The drive plate which is fastened to the eccentric shaft then drives the compressor. When air conditioning is turned off, circuit to electro-magnet is broken and clutch releases. The compressor drive plate is pushed away from pulley assembly by release springs and thus, is no longer driven.

►*NOTE:* Fast Idle Diaphragm & Solenoid Assembly not used in 1955.

Fast Idle Diaphragm & Solenoid Assembly–An electrically controlled, vacuum operated mechanism that raises idle speed when car is in neutral and air conditioning is on. The fast idle mechanism is controlled so that it will operate only when transmission is in neutral with Hydra-Matic and only in neutral with clutch engaged with Synchro-mesh, and in both cases only when air conditioning control lever is open to, or past, the "ON" position. This control is accomplished by the starter neutralizer switch on Hydra-Matic. On Synchro-mesh cars two switches are required, a clutch pedal fast idle switch mounted on the dash-to-chassis frame brace directly under the clutch pedal, and a gear shift lower lever fast idle switch mounted at lower end of the steering column. When fast idle circuit is energized, fast idle solenoid opens vacuum passage to fast idle diaphragm. Diaphragm then moves inward and knurled adjusting nut on diaphragm stem contacts the carburetor throttle shaft lever, opening the throttle.

PERATI N

Freon gas under low pressure is drawn into the compressor, where it is compressed to high pressure. The process of compression also heats the gas. The hot Freon gas passes into the condenser where it cools by giving off heat to the air passing over the condenser surfaces. As the hot Freon gas is cooled it condenses into liquid at high pressure, and accumulates in the receiver below the condenser. Liquid Freon under high pressure passes to the expansion valve at the entrance to the evaporator. Freon passes through the expansion valve into the evaporator under a much lower pressure. Thus, due to the lowering of the pressure, Freon begins to boil, changing back to a gas. As the Freon passes through the evaporator, it continues to boil by absorbing heat from the air passing over the evaporator surfaces until by the time it leaves the evaporator, it is completely vaporized. From the evaporator the cool, low pressure Freon gas is drawn back to the compressor and the cycle repeated.

MAINTENANCE & INSPECTION

PRELIMINARY CHECK: Check compressor sight glass with compressor operating to see that compressor contains sufficient oil. Check compressor belt tension. Check operation of fast idle linkage. Check all air duct and hose connections for tightness. Operate system and check for correct operation in all control positions (*NOTE*–With control in "ON" position, clutch on front of compressor should engage). Check ambient air temperature and air temperature at outlets on instrument panel (See Table under Testing).

2,000 MILE INSPECTION: Check all connections for presence of oil which could indicate refrigerant leak. Check compressor belt tension and hose and air duct connections. Clean and recondition air filter. Check evaporator drain tube for dirt or restriction.

PERIODIC SERVICE: 1) Inspect condenser and radiator cores at 2000 mile intervals to be sure that they are not plugged with leaves or other foreign material.
2) Clean and recondition filter every 2000 miles or oftener in dusty areas.
3) Check evaporator drain tube for dirt or restrictions at 2000 mile intervals.

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4) Every spring and fall or 10,000 miles give air conditioning unit a complete operational test (See Operational Test following).

AIR FILTER: Every 2000 miles, or more often in dusty areas, the filter should be cleaned and reconditioned as follows: Remove 5 access cover attaching screws and remove access cover from bottom of evaporator inlet behind right front wheel. Pull filter down out of evaporator inlet. (*NOTE*–In extreme cases where filter is lodged in place by an excessive accumulation of mud, it may be necessary to remove the evaporator inlet assembly to get the filter out. In such cases, some mud may have accumulated in the evaporator core and this should be flushed out with water). *CAUTION–Do not use steam or hot water since excessive pressure could be developed in the refrigeration system).* Clean filter by washing in a solution of water and any laundry detergent to remove the dirt laden filter conditioner oil. Re-coat filter by spraying with Pontiac Filter Conditioner. Spray both sides to make sure all of filter element is coated. (*NOTE*–Only Pontiac Filter Conditioner is recommended by manufacturer). Check drain tube in bottom of evaporator housing and clean out any mud which may have accumulated. Replace filter and install access cover.

TESTING

OPERATIONAL TEST: Remove caps from compressor gauge fittings and valve stems. Connect gauge set to compressor suction and discharge valve gauge fittings, then open suction and discharge valve gauge fittings by turning valve stems 1/4 turn clockwise. Purge gauge lines by cracking gauge set low and high pressure valves. Start engine, move air conditioning control lever to "COLD", and turn blower on high speed (Engine should be running at 1200 RPM.). Continue to run engine for ten minutes before checking for proper operation. While system is operating, check ambient (surrounding air) temperature. Also place fan in front of car to direct a stream of air against condenser and blower intake. After system has operated for ten minutes make following checks:

1) Observe liquid indicator to see that there is adequate Freon-12 in system. Bubbles may appear while system is by-passing, but liquid indicator should clear up when system is not by-passing.

2) Observe high pressure gauge. Compare pressure on gauge with pressure given in table below for the ambient temperature recorded above. It should be kept in mind that the head pressure (high pressure gauge) will increase as the temperature in the condenser increases. Thus, the pressure will increase as the car is run, but after 10 or 15 minutes should stabilize.

3) Observe low pressure gauge. With ambient air temperature below approximately 85° F. the system will by-pass periodically. The lower the ambient air temperature is, the more frequently the system by-passes. The pressure when the system is not by-passing will be as shown in table below. *NOTE*–When system by-passes, compressor suction pressure should drop to betw en 0-15 psi. The suction pressure will fluctuate somewhat if ambient air temperature is below 85° F. If pressure goes below 0 psi., remove cap from adjusting screw on by-pass valve and turn screw clockwise slightly to increase pressure to 0-15 psi. If pressure remains above 15 psi. when by-passing, turn screw counter-clockwise to decrease pressure to 0-15 psi. Proper setting should be obtained when top of adjusting screw is 1 9/64" above adjusting screw cap gasket.

4) Insert bulb of thermometer 1" inside either nozzle inside car. Hold there until temperature no longer drops (Be sure to read thermometer while bulb is 1" inside nozzle). Compare temperature of air leaving nozzle with temperature specified in table below.

1954 System Pressures & Temperatures ①

Ambient Temp. (°F.)	70	80	90	100
Compr. Discg. PSI	92-113	110-149	143-181	175-203
Compr. Suction PSI	5-7	5-16	5-25	12-25
Nozzle Max. Temp.	40	43	47	50
Evaporator Pressure	30	30	31	32

1955 System Pressures & Temperatures ①

Amb. Temp. (°F.)	70	80	90	100
Comp. Disch. (PSI)	140-170	150-200	180-240	230-290
Comp. Suct. (PSI)	10-25	11-29	17-34	25-42
Evap. (PSI-System By-passing)	23-28	23-28	23-28	23-28
Noz. Max. Temp. ②(RH)	50	53	58	64
Noz. Max. Temp. ②(LH)	49	52	56	61

①–With engine operating at 1200 RPM, hood open, recirculation knob pushed in, and after 10 minutes operation. Test to be made in a garage where sun load is not a factor and with auxiliary fan in front of radiator.

②–°F. measured 1" inside opening.

TEST & ADJUSTMENT OF EVAPORATOR PRESSURE: (NOTE–This test should be made with system operating and only after 10 minutes of operation). Remove protective cap from Schrader valve on side of pressure regulator. Assemble adapter J-5420 to end of low pressure gauge hose. Attach hose with adapter to Schrader valve on evaporator pressure regulator. Screw adapter on quickly to avoid excessive loss of Freon (Gauge shut-off valve should be closed). Observe pressure on gauge. If pressure does not agree with that given in table above, remove adjusting screw cap from top of evaporator pressure regulator valve. Adjust valve by turning clockwise to increase evaporator pressure, counter-clockwise to reduce evaporator pressure. *NOTE*–It is impossible to adjust evaporator pressure when compressor suction pressure is above 30 psi.

►**EVAPORATOR PRESSURE REGULATOR VALVE ADJUSTMENT NOTES:** In making adjustments of the Evaporator Pressure Valve note the following:

Extremely Warm Weather Adjustment–In extremely warm weather, it may be necessary to adjust the evaporator pressure regulator valve when ambient temperatures are in the vicinity of 100° F. or more. If the evaporator pressure regulator is adjusted to 30 psi. at these high temperatures, the actual evaporator pressure may drop to 27 or 28 psi. when the ambient temperatures fall to approximately 80° F. It is true that adjusting evaporator pressure at 30 psi. at 100° F. would give a little greater efficiency, but operation in slightly cooler weather would require a resetting or adjustment of the evaporator pressure regulator valve. If this is not done evaporator surface temperatures would be below 32° F. which would cause moisture deposits on the evaporator cooling surfaces to freeze rather than drain off, causing complaint of warm and cold air coming from the nozzles. To correct condition follow relationships in table above.

Slight Variation of Nozzl T mp ratur (Evap rat r Freeze-Up)–Slight variation of the air temperature coming from the nozzles may be the result of a differential in the pressure between the chamber above the pressure regulator valve diaphragm (diaphragm to cap) and outside atmospheric pressure. This condition can be checked and corrected as follows: Attach low pressure gauge to the evaporator pressure valve, but **do not** remove the pressure regulator valve cap. Operate engine fast enough and long enough to insure the system is by-passing (blower motor must be set on low speed to perform this operational test). Check pressure reading and if pressure shows lower than 29 psi., watch gauge and remove cap over the adjusting screw. If no change in the gauge readings is noted, adjust pressure regulator valve in accordance with System Pressures & Temperatures table above. NOTE–In some cases removing the cap will correct the reading to 30 psi. (provided the valve was properly adjusted previously). This change in reading is the result of equalizing the pressure beneath the cap to that of atmospheric pressure. To guard against freeze-up condition, remove valve cap and drill a 1/16" diameter hole just off the center of the valve cap and also the valve cap gasket. (New valves presently in production now have this hole drilled in the cap and cap gasket.)

PRECAUTIONS, LEAK TESTING & TROUBLE SHOOTING

See "Air Conditioning Servic Cauti ns", "Troubl Shooting" and "Leak Tests".

ADJUSTMENTS N CAR

►*NOTE: For Early 1955 Adjustments, se "1954-55 Frigidaire (G.M.)" Air Conditioning*

COMPRESSOR BELT: Loosen two bolts retaining idler pulley support bracket (pump support bracket on power steering equipped cars). Insert torque wrench in square hole at end of bracket and apply 60 ft. lbs. torque to tighten belt. While holding 60 ft. lbs. torque, tighten retaining bolts securely.

FAST IDLE DIAPHRAGM & SOLENOID: Loosen lock nut on vacuum diaphragm stem. Set fast idle mechanism by turning knurled adjusting nut to give 750 RPM engine speed (hot) with transmission in neutral and air conditioning control lever in "COLD" position. Tighten lock nut.

FAST IDLE SWITCHES: On Hydra-Matic equipped cars the fast idle mechanism is controlled by the neutral-

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izer switch. On Synchro-mesh equipped cars the fast idle mechanism is controlled by a clutch pedal fast idle switch and a gearshift lower lever fast idle switch. For adjustment see Tune-Up on car model page.

CONTROL CABLES: Air Valve & Master Switch Control Cabl –Move air conditioning control lever to "OFF" position. Loosen clamp which retains air valve and master switch control cable housing to bracket. Clamp should be loose enough to allow cable housing to slide freely. With another man holding control lever in "OFF" position, pull cable and control housing with control lever attached as far to the rear as possible. While holding in this position, tighten cable clamp. This will insure complete closing of the air valve in the "OFF" position.

Air T mp ratur Valv Control Cable–Move air conditioning control lever to full "COLD" position. Loosen clamp which retains air temperature valve control cable housing to bracket. Clamp should be loose enough to allow cable housing to slide freely. With another man holding control lever in "COLD" position, pull cable and housing with control lever connected as far to rear as possible. While holding in this position, tighten cable clamp. This will insure complete opening of air valve in duct to evaporator and complete closing of air valve in duct to air distributor in the "COLD" position.

PUMPING D WN THE SYSTEM

When refrigeration pipes are to be disconnected on the low pressure side, the system can be pumped down to save the Freon. "Pumping Down" is the process of pumping all the Freon out of the low pressure side into the condenser and receiver, where it is stored while work is being performed. The evaporator pressure regulator valve, evaporator assembly, thermostatic expansion valve, dehydrator, liquid indicator, by-pass valve, and pipes connected to the above listed units can be removed after the system is pumped down. When compressor only is removed follow procedure outlined in "Pumping Down Compressor To Remove Compressor or Add Oil" below. To pump down system proceed as follows:

1) Close hand shut-off valves on gauge set by turning clockwise.

2) Remove caps from valve stems and gauge fittings on compressor suction and discharge valves. Connect hose from low pressure gauge to fitting on suction valve, and hose from high pressure gauge to fitting on discharge valve.

3) Open compressor discharge and suction valves by turning clockwise until they seat, then backing off one turn counter-clockwise. Use valve key J-5427.

4) Purge air from both gauge lines by cracking hand shut-off valves on gauge set. Close valves securely.

5) Remove valve cap and close valve on receiver outlet by turning clockwise.

6) Start engine, move air conditioning control lever to "COLD" and turn blower on (engine should be operating at 750 RPM). Operate air conditioning until low pressure gauge drops to "0" or below. Shut off air conditioning and observe low pressure gauge. Pressure will rise to some value and then stabilize. When low pressure gauge stops rising, move air conditioning control lever to "COLD" again (with engine running) and operate until pressure on low side again drops below zero. Shut off air conditioning and again allow pressure to rise until it stabilizes. Repeat this cycle until the pressure will no longer rise above zero. *CAUTION–Do not allow head pressure (high pressure gauge) to exceed 300 psi. If it does, shut off engine and wait for pressure to drop before proceeding.*

7) Shut off engine, immediately turn compressor suction and discharge valves clockwise as far as possible to close passage to suction and discharge pipes. The Freon has now been pumped into the receiver and condenser and is trapped in the high pressure side of the system. The low pressure side can be opened without loss of Freon.

8) Disconnect compressor clutch wire from connector on fender skirt so that compressor cannot be operated while system is pumped down.

PUMPING DOWN COMPRESSOR TO REMOVE COMPRESSOR OR ADD OIL: Operate engine at fast idle (750 RPM) and run air conditioning system for ten minutes. This will work Freon out of oil in compressor crankcase and stabilize system. After ten minutes stop compressor by disconnecting clutch wire at connector on fender skirt. Close suction valve on compressor by turning all the way clockwise. *(CAUTION–Engine should be turned off while closing valve to prevent possibility of injury and then started again).* Connect and disconnect compressor at 5 second intervals 4 times to pump all Freon out of compressor. That is; connect for 5 seconds, disconnect for 5 seconds, etc. Shut off engine and close compressor discharge valve by turning valve all the way clockwise. All Freon has now been pumped out of the compressor and it can be removed.

DEPRESSURIZING THE SYSTEM

When any of the units on the high pressure side of the system are to be replaced, it is necessary to release all the Freon from the system. The system must be depressurized to replace the compressor discharge valve assembly, compressor-to-condenser pipe, condenser, condenser-to-receiver pipe, and receiver. Proceed as follows: Remove caps from gauge fittings on compressor suction and discharge valves. Remove caps from valve stems. Crack both valves clockwise to allow slow escape of Freon from the system. If oil is noted around gauge fitting, Freon is escaping too rapidly. When hissing ceases (indicating all Freon has escaped) close off gauge fitting by turning discharge valve stem completely counterclockwise.

EVACUATING THE SYSTEM

When the system is opened for service, some air will enter the pipes regardless of how quickly the pipes or openings are capped. *(CAUTION–Und r no circumstanc s should alcohol b us d in th syst m in an attempt to remov moisture).* When system has been depressurized; the complete system should be evacuated. When only the low pressure side had been opened, and the system has been pumped down to preserve the Freon, only the low pressure side should be evacuated.

EVACUATING LOW PRESSURE SIDE ONLY: Proceed as follows:

1) With system still pumped down, connect gauge set to compressor and close gauge valves.

2) Turn compressor suction valve completely counterclockwise, then clockwise 1/4 turn to open passage to suction pipe. *CAUTION–Do not open compressor discharge valve or Freon will enter low side.*

3) Open high pressure valve on gauge set so that air pumped out of compressor discharge valve gauge fitting can pass out the center line of the gauge set. Place a clean, dry container under end of center line to collect any oil pumped out of compressor.

4) Start engine and turn on air conditioning system. Disconnect wire from fast idle diaphragm and solenoid assembly so engine will run at normal speed. Compressor will now evacuate the system, pumping the air out through the discharge valve gauge fitting and gauge set.

5) Observe low pressure gauge and operate compressor until gauge shows 26-28" vacuum. Continue to run compressor for 5 additional minutes. *NOTE*–If vacuum cannot be pulled to 26" or more, it indicates a leak in system or gauge connections, or a defective compressor. In this case it will be necessary to add a small amount of Freon to the low side of the system and check for leaks as follows:

a. Close high pressure valve of gauge set and turn off engine.

b. Open receiver shut-off valve momentarily to allow pressure to rise in low pressure side. *(NOTE*–Only a small amount of Freon should be passed into the low side to prevent wasting Freon).

c. Using leak detector J-5419, check all fittings in the low pressure side and on the gauge set for evidence of leakage. After leak has been found and corrected, evacuate the system again.

6) Close high pressure valve of gauge set and stop engine. Carefully check low pressure gauge to see that vacuum remains constant. If vacuum reduces, it indicates a leak in the system or gauge connections.

7) Check container placed under center line of gauge set to see that compressor has not pumped out an appreciable amount of oil. If more than one ounce of oil has been pumped out it should be poured back into the compressor following instructions for adding oil following.

8) If vacuum pulled down satisfactorily and held steady, (Steps 5 & 6 above), purge air from compressor head as follows: Open shut-off valve on receiver to allow Freon to enter low side. Open high pressure valve of gauge set for approximately 15 seconds to allow Freon to force air out of compressor discharge valve through gauge set. When air has been purged, close high pressure valve of gauge set.

9) Turn compressor discharge valve stem counterclockwise to outlet to discharge pipe. Leave valve 1/4 turn clockwise for operational test.

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10) Start engine, turn on air conditioning system and allow it to operate for ten minutes. While system is warming up, check for leaks with leak detector.
11) Check compressor sight glass to see that oil splashing is visible. If not, add oil.
12) After system has operated for ten minutes make operational test.

EVACUATING COMPLETE SYSTEM: Proceed as follows:
1) Connect gauge set to compressor the same as for pumping down system. Make sure shut-off valve on receiver is completely open (turned completely counter-clockwise).
2) Turn compressor suction valve 1-1/2 turns clockwise from full counter-clockwise position.
3) Turn compressor discharge valve all the way clockwise to seal passage to discharge pipe.
4) Open high pressure valve on gauge set so that air pumped out of compressor discharge valve gauge fitting can pass out center line of gauge set. Place a clean, dry container under end of center line to collect any oil pumped out of compressor.
5) Start engine and turn on air conditioning system. Disconnect wire from fast idle diaphragm and solenoid assembly so engine will run at normal idle speed. Compressor will now evacuate the system, pumping the air out through the discharge valve gauge fitting and gauge set.
6) Observe low pressure gauge and operate compressor until gauge shows 26-28" vacuum. Continue to run compressor for five additional minutes. *NOTE*–If vacuum cannot be pulled to 26" or more, it indicates a leak in the system or gauge connections, or a defective compressor. In this case it will be necessary to add a small amount of Freon to the low side of the system and check for leaks as follows:

a. Close high pressure valve of gauge set and turn off engine.

b. Connect flexible line from center of gauge set to Freon drum (drum should be at room temperature). See Step 2 under "Charging System" following for connecting Freon drum.

c. Open shut-off valve on drum and "crack" flexible line at center fitting on gauge set so that Freon will purge air from line. Retighten fitting when certain all air is purged from line.

d. Open both valves on gauge set. This will allow Freon to pass from the drum into the system. When pressure stops rising close both valves on gauge set (Since Freon drum is not heated, only a small charge will enter the system).

e. Using leak detector, check all fittings in the system for evidence of leakage. Also check compressor shaft seal. After leak has been corrected, evacuate the system again and charge as outlined under "Charging The System".

7) Close high pressure valve of gauge set and stop engine. Carefully check low pressure gauge to see that vacuum remains constant. If vacuum reduces, it indicates a leak in the system or gauge connections.
8) If vacuum pulled down satisfactorily above close valves tightly and turn off engine.
9) Check container placed under center line of gauge set to see that compressor has not pumped out an appreciable amount of oil. If more than one ounce of oil has been pumped out it should be poured back into compressor following instructions for adding oil following.
10) If vacuum remains constant after gauge valves are closed, purge air from compressor head as follows: With compressor discharge valve still turned completely clockwise, connect flexible line from center fitting of gauge set to Freon drum. Open valve on Freon drum and "crack" line at center fitting of gauge set to purge air from line. After air has been purged, tighten fitting. Open low pressure valve of gauge set to allow Freon to enter low side of system. When Freon stops entering system (only a small amount will enter since drum is not heated), close valve on Freon drum and low pressure valve of gauge set. Remove flexible line from Freon drum. Open high pressure valve of gauge set for approximately 15 seconds to purge air from compressor head (*NOTE*–Freon which has entered system will force air out of compressor head through compressor discharge valve gauge fitting and gauge set). When air has been purged, close high pressure valve on gauge set.
11) Turn compressor discharge valve stem completely counter-clockwise then clockwise 1 1/2 turns. System is now ready for charging. *NOTE*–System can be checked for leaks at this time by adding a small amount of Freon. This, however, will not eliminate the necessity of checking for leaks after system has been fully charged, since the low pressures obtained by adding a small amount of Freon at room temperature would show up only the relatively large leaks.

CHARGING THE SYSTEM

The system should be charged only after being evacuated as outlined above. To charge system proceed as follows:
1) See that both compressor valves are turned 1 1/2 turns clockwise and that both valves on the gauge set are closed.
2) Connect center flexible line of gauge set to Freon drum. It may be necessary to use reducer J-5462-4 with sealing washer J-5462-3 and fitting J-5462-9 to attach flexible line to Freon drum.
3) Place Freon in a pail of water which has been heated to 125° F. It may not be necessary to use hot water if a large drum is used (over approximately 100 lbs.) *Do not allow temperature to exceed 125° F. since high temperature will cause excessive pressure and possible softening of the fusible safety plugs in the Freon drum.*
4) Place Freon drum (in pail of water) on scales (bathroom or commercial scales) and weigh accurately.
5) Loosen line at center fitting on gauge set and "crack" valve on Freon drum to evacuate air from line. Retighten line at center fitting.
6) Open valve on Freon drum and both valves on gauge set to allow Freon to flow into system. Continue charging until scales show that 5 lbs. of Freon have been transferred from Freon drum to system. (*NOTE*–If full charge cannot be attained, close both valves on gauge set, start engine, and turn on air conditioning system to run compressor. Open low pressure valve on gauge set until full charge (5 lbs.) is taken in). *CAUTION–Observe high pr ssur gaug whil charging with compressor running, and do not l t pressure exceed 300 psi.*
7) Close both valves on gauge set (high pressure valve will already be closed if charge was completed by running compressor) and close valve on Freon drum.
8) Operate engine at approximately 750 RPM with air conditioning control lever at "COLD" and blower on high speed. After at least 5 minutes of operation, observe appearance of Freon in liquid indicator. If bubbles are observed, open low pressure gauge valve and valve on Freon drum to allow more Freon to enter system. Close valves when liquid indicator clears up. (*NOTE*–If room temperature is below 75° F. when this check is made, bubbles may appear even though the proper amount of Freon is in system). Room temperature must be 75° F. or above to make an accurate check. It should also be observed that if suction pressure drops to 15 psi., the by-pass valve will open, allowing system to by-pass. (*NOTE*–When system is by-passing, outlet pipe leaving by-pass valve will be cold.) This may cause bubbles to appear in liquid indicator, but does not indicate an under-charge. If in doubt, remove cap from adjusting screw on by-pass valve and turn screw counter-clockwise until free, counting the number of turns. (Do not remove screw completely.) If bubbles still appear, add Freon until liquid indicator clears up, then turn adjusting screw clockwise, back to its original position. (See Operational Test preceding for proper adjustment of by-pass valve.) In no case should system be charged with more than 5 1/2 lbs. of Freon.
9) When Freon has been installed, continue to operate system and test for proper operation as outlined under "Operational Test" preceding.
10) When satisfied that air conditioning system is operating properly, stop engine, turn suction and discharge valve counter-clockwise securely to close gauge fittings, and remove gauge set. *NOTE*–A considerable amount of Freon will collect in the high pressure gauge line. Since some of this Freon will have condensed into liquid Freon, it will require an appreciable amount of time to allow pressure to bleed off. Open high pressure gauge valve slowly and let Freon out through center gauge line so that oil which has collected in lines can be directed onto floor.
11) Using leak detector, check complete system for leaks.

ADDING PARTIAL CHARGE F REFRIGERANT

The following procedure should be used in adding small amounts of Freon that may have been lost due to leaks or while opening system for service. Before adding Freon to replace that lost by leaks, check compressor oil level and add oil if necessary (See Checking Compressor Oil Level & Adding Oil following). To add Freon proceed as follows:

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1) Remove caps from compressor suction and discharge valve gauge fittings and valve stems. Attach gauge set to gauge fittings.
2) Attach flexible hose from center fitting of gauge set to Freon drum. With both valves on gauge set closed, open valve on Freon drum. "Crack" flexible line at center fitting of gauge set to allow Freon to expel air from line. Tighten fitting when satisfied that all air has been removed.
3) Start engine, move air conditioning control lever to "COLD" and turn blower on high speed. Operate for ten minutes to stabilize system.
4) Operate compressor suction valve gauge fitting by turning valve stem 1-1/2 turns clockwise. Turn compressor discharge valve 1/4 turn clockwise so high pressure gauge can be observed.
5) Place Freon drum on scales, note weight, and open low pressure valve nly on gauge set.
6) With compressor operating, allow Freon to pump into system until liquid indicator clears up and immediately shut off valve on Freon drum. Check weight of Freon drum and pail of water. Then open valve on Freon drum and add 1/2 lb. of Freon if room temperature is below 85° F., or 1 lb. of Freon in temperature is above 85° F. Note total amount of Freon added.
7) Test for leaks and make operational check of system as outlined under "Operational Test" preceding.

CHECKING & ADDING OIL

The refrigeration system contains a total of 10 ozs. of oil. Originally all oil is in compressor, but after the system is once operated, a certain amount of the oil will circulate through the system with the Freon. For this reason it is impossible to merely drain the oil from the compressor and then add 10 ozs. of oil. The procedure outlined below must be used in order to assure the proper amount of oil in the compressor. It is never necessary to drain and refill the compressor since the system is sealed and therefore the oil cannot be contaminated. When adding oil use one of following refrigeration oils: Suniso 4G, Capella D, Ansul Chemical Co. #300, Frigidaire #300 or #300 LT. Refrigeration oil has an affinity for moisture and should be kept tightly capped when not in use to prevent absorption of moisture. No periodic check of oil level is necessary. As long as splashing of oil is visible in the sight glass, at each 2000 mile lubrication, no oil level check is necessary. Oil level should be checked at time Freon is added to system to replace that lost by leakage. This is necessary because some of the oil circulates through the system with the Freon and therefore, will be lost if a Freon leak develops. Always check oil level and add oil, if necessary, before adding Freon. To check oil level and add oil proceed as follows:

1) Operate engine and air conditioning system for ten minutes. This will remove Freon which mixes with oil in compressor crankcase when car is standing. If Freon is not pumped out of crankcase, it will boil out violently when oil filler plug is removed, causing excessive loss of oil.
2) Pump down compressor. See "Pumping Down Compressor To Remove Compressor or Add Oil " preceding.
3) Slowly remove oil filler plug from compressor. Any Freon left in compressor will escape when plug is being removed.
4) Insert a clean, black iron wire vertically in filler hole, until it bottoms in crankcase (Insert wire between compressor and suction pipe). Compressor shaft may be revolved to allow wire to clear oil slinger on shaft. Remove wire and measure height of oil from bottom of wire. Oil level should be 7/8" or more from bottom of compressor crankcase. If low, add recommended refrigeration oil to bring level to 7/8" from bottom of crankcase.
5) Install filler plug. While tightening filler plug, "crack" suction valve slightly to allow Freon to enter compressor. Freon, being heavier than air, will go to bottom of crankcase, expelling air through loose filler plug.
6) Turn compressor suction and discharge valve stems all the way counter-clockwise to open suction and discharge pipes and seal gauge fittings.
7) Replace valve stem caps. System is now ready for operation.

REMOVAL & INSTALLATION

►*NOTE: For 1955 Compressor Data, see "1954-55 Frigidaire (G.M.)" Air Conditioning.*

COMPRESSOR CLUTCH & PULLEY ASSEMBLY: Remove cap screw and lockwasher retaining clutch plate and hub assembly to compressor shaft. Slide clutch plate and hub assembly off shaft to remove. Remove retainer washer from hub of clutch plate *(NOTE–*if only clutch plate and hub assembly are to be replaced (which can be done only on dated assemblies), install new assembly as covered below). Loosen idler pulley or power steering pump retaining bolts to remove belt tension. Remove pulley, coil, and bearing assembly from compressor shaft. Remove clutch assembly spacer ring from compressor shaft, if it is to be replaced, and install new spacer ring. Install pulley, coil, and bearing assembly on compressor shaft, positioning belt on pulley as it is installed. Position retainer washer in hub of clutch plate, making sure it seats squarely against clutch hub (Be sure burred edge is against hub). Slide clutch plate and hub assembly onto compressor shaft. Make sure that retainer washer is still squarely in place against hub. Install plate and hub assembly to shaft retainer bolt with lockwasher and tighten securely. Rotate plate and hub assembly by hand to observe spacing between clutch plate and pulley. Clearance should be .015-.040". Adjust belt tension to 60 ft. lbs. torque.

COMPRESSOR BRUSHES: The positive (large) brush is available separately, but the ground brush is not since it is part of the brush and bracket assembly. Brushes should be replaced as follows: Remove compressor clutch plate and hub assembly as outlined above. Slide pulley, coil, and bearing assembly forward on shaft to provide access to brushes. Check to see if clutch plate and pulley are new type or old type. New type pulley and clutch plat must be installed when brushes are replaced. (See Changes, Cautions, Corrections). If brushes are dirty, but not worn excessively, clean brushes and contact surfaces on pulley with carbon tetrachloride or other suitable solvent. If brushes are worn, remove brush and bracket assembly, and install new assembly. NOTE–If only the positive (large) brush is worn, it can be removed from the bracket and replaced by unscrewing the plastic cap from the back of the bracket. Assemble brush and bracket assembly to compressor. Install pulley, coil, and bearing assembly and clutch plate and hub assembly as outlined under "Compressor Clutch & Pulley Assembly" above.

COMPRESSOR (TO PERFORM OTHER SERVICE): *(NOTE–*Do not use this procedure if new compressor is to be installed. See Installation of New Compressor following.) In order to remove engine cylinder head for various services, the compressor must be removed. To remove compressor and mounting bracket assembly, proceed as follows: *(CAUTION–Be sure all refrigeration fittings and connections are thoroughly cleaned before beginning to remove compressor.)* Pump down compressor to prevent loss of Freon or compressor oil. Loosen idler pulley attaching nuts and remove compressor belt. On cars equipped with power steering, remove power steering pump from bracket and lay on battery cover and fender skirt. Drain radiator core and remove upper radiator hose. Remove suction and discharge valves from compressor by removing two allen screws from each valve. Do not loosen pipe fittings on valves. Cover compressor and valve openings with masking tape. *(CAUTION–Loos n screws slowly in case there is pressure in crankcas . If pressure exists, allow pressure to bleed off slowly. Do not loosen screen from inlet beneath sucti n valve.)* Remove bolt from brace at bottom of compressor and bolt from brace at idler pulley end. Remove nuts holding compressor mounting bracket to cylinder head. Disconnect compressor clutch wire at connector on fender skirt. Remove compressor and bracket as an assembly. To install, reverse removal procedure using new gaskets on compressor suction and discharge valves (Make sure screen is in place in suction opening. CAUTION–Extreme care must be used to tighten valve attaching screws evenly to prevent distortion and resultant leakage between valve and seat.) Purge air from compressor as follows: After suction and discharge valves have been attached, open suction valve by turning all the way counter-clockwise. Loosen gauge fitting cap on discharge valve to allow air to escape. Air will pass out at this point since it is lighter than Freon. After air is purged approximately ten seconds, tighten gauge fitting cap. Open discharge valve by turning all the way counter-clockwise. Compressor is now ready for use.

INSTALLING NEW COMPRESSOR: New compressors are serviced with 10 ozs. of oil and charged with dry air. If all this oil is left in the compressor when it is installed, there will be an excessive amount of oil in the system. That is due to the fact that some of the oil from the original compressor has circulated in the system with the Freon. Even if system is de-

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1954-EARLY 1955 PONTIAC (Con.inued)

pressurized, oil will remain in system. Too much oil can cause damage to the compressor. To insure the proper amount of oil in the system use following procedure when replacing a compressor:

1) Pump down compressor unless low pressure side has been pumped down or system has been depressurized. (NOTE–If compressor is inoperative, it will be impossible to pump it down. In this case close passages to suction and discharge pipes by turning both compressor valves completely clockwise. Then bleed Freon from compressor by "cracking" gauge fitting caps on suction and discharge valves. Bleed pressure slow enough so that no compressor oil is lost).

2) Remove compressor with mounting bracket as outlined in "Compressor (To Perform Other Service)" above. This leaves suction and discharge valves attached to suction and discharge pipes.

3) Remove compressor from mounting bracket.

4) Remove oil filler plug and check oil level in compressor crankcase.

5) Remove drain plug from new compressor and empty enough oil from new compressor to provide same oil level as old compressor had (Oil should be poured into clean, dry container so it will be uncontaminated if some has to be poured back into the compressor). *NOTE*–If old compressor was known to have insufficient oil due to a Freon leak, pour sufficient oil into new compressor to bring level to 7/8" from bottom of compressor (See Checking Compressor Oil Level & Adding Oil). If old compressor was dry, and there was no evidence of leakage, proceed as follows:

a) Remove evaporator, dehydrator, receiver and compressor suction pipes.

b) Drain oil from each of above units. This will remove all oil from the system since these are the only units which can collect the oil which has been lost from the compressor.

c) Re-install evaporator, dehydrator, receiver and compressor suction pipes.

d) Since oil has been completely drained from the system by the above steps, leave all the oil in the new compressor when it is installed.

6) Position new compressor on mounting bracket, install mounting bolts with lockwashers and tighten securely.

7) Remove suction and discharge valves from new compressor and immediately cover openings in compressor with masking tape. Attach new valves to old compressor so that no oil will be lost and no moisture will enter compressor while it is being returned to factory.

8) Install compressor and mounting bracket and purge air from system as outlined under "Compressor (To Perform Other Service)" above. *NOTE*–If system has been pumped down or depressurized for other work in combination with compressor replacement, it will not be necessary to purge air from compressor. This air will be evacuated, in this case, when the system is evacuated.

9) After system has been operating for ten minutes, check compressor sight glass to see that oil splash is visible. If not, add oil as outlined previously.

EVAPORATOR ASSEMBLY: When evaporator is to be replaced, remove the evaporator and thermostatic valve as an assembly. (The system should be pumped down before removing the evaporator and thermostatic expansion valve assembly.) After the evaporator is removed, transfer the thermostatic expansion valve to the new evaporator (See "Thermostatic Expansion Valve" above). To remove the evaporator, it is necessary to remove the evaporator inlet assembly from the front of the fender baffle, and disconnect the baffle so it can be moved forward. Extreme care should be exercised when replacing and removing the evaporator assembly to prevent damage to the thermostatic expansion valve or capillary tube. When evaporator is removed, drain any oil it contains into clean, graduated beaker. Measure out an equal amount of new compressor oil and pour into compressor through filler hole (See "Checking Compressor Oil Level & Adding Oil" for recommended oils). After new evaporator has been installed, seal outside of evaporator outlet pipe to evaporator pressure regulator fitting with "Press Tight Perma Gum" or similar non-hardening mastic. Perma Gum should be packed around connection to provide a water tight seal. If any water is allowed to contact both aluminum evaporator outlet pipe and brass flare nut, rapid corrosion will result.

1954-55 FRIGIDAIRE & HARRISON

Buick (1954-55)
Cadillac (1954-55)
Chevrolet V8 (1955)
Oldsmobile (1954-55)
Packard (1954-55)
Pontiac (Later 1955)①

①–For first 800 cars in 1955 see "1954-Early 1955 Pontiac" Air Conditioning.

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 BUICK CLUTCH BEARING INSTALLATION CAUTION:* Compressor clutch bearings installed on compressors prior to Compressor No. 64MB060 were slip fit. Clutch bearings installed on later compressors were pressed on, due to increase in diameter of shaft to give a press fit of .002-.0005". It will be necessary to use a suitable puller to remove pulley from compressor.

►*1954-55 CLUTCH LUBRICATION CAUTION:* When assembling compressor clutch it has been found advisable to lubricate between outer bearing and pulley, between inner bearing and shaft, and between hub and spline. Use high pressure grease, preferably one with a melting point above 250°F. Apply grease sparingly to prevent transfer of grease to clutch plates, due to centrifugal force. It is suggested that lubricant be applied by first spreading it in a transparent film on a clean, flat surface, such as a piece of glass or paper. Then, wipe a brush over the film to pick up the lubricant and apply it to clutch parts. Be sure to wipe brush longitudinally on splines as any crosswise motion would deposit an excessive amount of lubricant.

►*1955 CHEVROLET THERMOSTATIC SWITCH ADJUSTMENT (To Provide Full Temperature Control):* An adjustment of the thermostatic switch is now included in adjustment procedures to correct frosting or icing condition in evaporator (results in poor or no cooling). See "Thermostatic Switch Adjustment (Chevrolet)" under ADJUSTMENTS below.

►*1954 EXPANSION VALVE PRODUCTION CHANGE:* Approximately June 1, 1954 a new smaller thermostatic expansion valve was incorporated in evaporator assemblies on air conditioning units in production. Evaporator assemblies beginning with Serial No. 511B852 will have new expansion valve. Part No. 5440860 will continue to be released for service until stock is exhausted, at which time new valve will be released for service replacement on both 1953 and 1954 models. The factory setting of the *new smaller expansion valve is approximately 5 turns counter-clockwise from fully closed position. Factory setting on early type is approximately ten turns from fully closed position.*

►*1954 CADILLAC FAN SHROUD VIBRATION CORRECTION:* A roaring noise may be noted on some early production air-conditioned cars (18-20 M.P.H. in second gear, 35 M.P.H. in third gear, or 50 M.P.H. in fourth gear) due to vibration of fan shroud. To correct, reposition fan shroud-to-radiator support bracer so that long, flat portion of spacer is below attaching screws, parallel to ground.

►*1954 CLUTCH SOLENOID GROUNDING CAUTION:* Clutch solenoid used on some early cars equipped with Air Conditioner has, in some instances, become inoperative due to inadequate grounding. To correct, install kit, Part No. 3630558, containing ground wire and lock nut.

►*1955 MAGNETIC CLUTCH PRODUCTION CHANGE:* Effective with Compressor, Serial No. 16XB275, tear drop depression on both clutch plates has been changed, and clutch activating coil has been redesigned (new plates identified by letter "O" stamped on inner face of each clutch plate, new coil by an orange ground lead). When necessary to replace either of two old type clutch plates, replace **both** old plates with new type and new coil (*NOTE*–New coil should always be used with new plates).

Part	New Part No.
Coil	5912343
Plate & Counterweight	5912346
Plate & Armature	5912345

►*1955 CLUTCH PLATE ACTUATING BALL REPLACEMENT CAUTION:* When replacing actuating balls in 1955 Compressors, be sure to use nylon type, Part No. 5917481 (1954 type was steel).

►*1955 CLUTCH ACTUATING COIL RETAINER PRODUCTION CHANGE (To Correct Compressor Noise & Failure of Clutch to Disengage):* Effective with Compressor, Serial No. 44XB653 a more positive means of retaining coil has been incorporated in production. Kit,

CONTINUED ON NEXT PAGE

1954-55 FRIGIDAIRE & HARRISON (Continued)

Part No. 5876681, contains parts necessary for service replacement on all 1955 compressors. To install kit, remove compressor, then compressor pulley. Remove and discard coil retainer and outer insulating gasket. Disconnect leads and remove coil, then discard inner insulating gasket. Drill three holes (No. 24 drill) in seal housing 9/64" down from outer face of housing. One hole must be diametrically opposite coil lead part, others at 120° intervals along diameter of housing. Place new inner gasket (one with holes) in bottom of seal housing. Replace actuating coil, connect leads, then place new outer gasket and retainer ring over coil. With two 3" C-clamps and two ½" lengths of 5/16" round rod as dowels (placed on outer edge of retainer ring) force coil and retainer ring snugly into seal housing applying pressure evenly on both C-clamps. While coil is held by C-clamps, insert the three self-tapping screws in holes drilled previously and tighten until heads snug against housing. Remove clamps and rods. Blow chips from tapped holes with compressed air. *CAUTION*–No portion of screw heads should extend beyond face of seal housing.

►*1955 COMPRESSOR DUST CAP (ON END OF COMPRESSOR SHAFT) PRODUCTION CHANGE:* Effective with Compressor, Serial No. 31XB936, compressor dust cap has been replaced by a washer assembly, Part No. 5912455. Torque for tightening bolt holding washer assembly is 5-7 ft. lbs. (previously 10-15 ft. lbs.).

►*1955 COMPRESSOR FREON OR OIL LEAK CAUTION:* Leaks between compressor head and shell flange **can n t** be corrected by tightening mounting bolts. Replace compressor.

►*1955 CLUTCH COIL INSULATOR INSTALLATION CAUTION:* Insulators, used on each side of clutch coil, should be located with glazed surface **away** from coil.

►*1955 CLUTCH SNAP RING INSTALLATION CAUTION:* Snap ring must be installed so radius on inner diameter of one side of ring faces compressor pulley to insure that it will not slip out of groove.

►*CAR UNDERCOATING CAUTION:* Make certain that undercoating does not plug evaporator drain.

►*1955 CADILLAC COMPRESSOR VIBRATION CORRECTION (Due to Incorrect Pulley Installation):* Splined end has one spline cut down to mate with corresponding spline in compressor pulley. Unless installed in this **on** position, it will throw compressor out of balance, resulting in vibration when compressor is operating.

►*1955 CADILLAC ROOF DUCT AIR NOZZLE BIND CORRECTION:* To correct, remove retaining spring and file off sharp edges.

►*1955 PONTIAC RECEIVER & DEHYDRATOR-FILTER PROD. CHANGE:* Combination unit (after first 800 cars in 1955) replaces two units used previously. Combination type has no shut-off valve. Freon capacity of system with combination type is 3¾ lbs. instead of 5¼ lbs. with early type unit with separate receiver.

►*1955 PONTIAC AUTOMATIC FAST IDLE CHANGE:* Automatic fast idle, which was actuated by placing selector lever in neutral, is not used in 1955.

►*1955 PONTIAC AIR RECIRCULATION PROD.CHANGE:* An air recirculation system has been included to increase cooling capacity or eliminate outside odors when necessary. Exclusive use of outside air or recirculation of air within car may be selected by movement of one push-pull control. When pulled out, air in the car and system is recirculated, with a small amount of outside air still being admitted to pressurize the inside of the car. Pressure prevents warm air from entering any openings in body. With control button pushed in, only outside air passes through system into car. Positions between full out and in will give mixed outside and recirculated air. Fan must be on full speed (switch fully down) when recirculation is used. Recirculation should only be used after car has started to cool.

►*1955 PONTIAC COMPRESSOR BELT MISALIGNMENT CORRECTION:* To correct, elongate the two front inner insulator bracket (Part No. 521086) bolt holes by ¼" back toward compressor mounting flange, then place a 1/16" thick flat washer at each of the two insulator bolts to space bracket out from rubber insulator. Bend outer end of front outer insulator bracket back and in towards compressor 1/8". Condition has in later production.

DESCRIPTION & OPERATION

Similar in design and operation to 1953 Frigidaire (G.M.) unit with changes over previous models as noted below:

1954 Cadillac: Temperature control lever, solenoid bypass valve, relay, shut-off valve at receiver, check valve, and by-pass line were eliminated. Blower switch rheostats were changed to provide slower blower speeds. Temperature control is maintained by varying blower speed. A magnetic clutch is used in conjunction with the compressor.

1955 Cadillac: Same changes as in 1954 except that temperature control lever and a new type temperature control thermostat and compressor are used.

1954 Buick, Oldsmobile, Packard: Shut-off valve at receiver and check valve were eliminated. Magnetic clutch is used in conjunction with compressor.

1955 Buick, Oldsmobile, Packard: New type temperature control thermostat and compressor used. On Oldsmobile, all elements of system are located on dash and in engine compartment.

1955 Chevrolet: Shut-off valve at receiver, solenoid valve, and check valve not used. Temperature control is maintained through a temperature control lever and magnetic switch. Magnetic clutch is used in conjunction with compressor. All elements of system are located on dash and in engine compartment.

1955 P ntiac (Aft r First 800 Cars): Similar in design and operation to 1954 Air Conditioning unit. Shut-off valve at receiver and fast idle diaphragm and solenoid have been eliminated.

PRECAUTIONS, TROUBLE SHOOTING & LEAK TESTING

See "Air Conditioning Service Cautions", "Troubl Shooting" and "Leak Tests".

MAINTENANCE & INSPECTION

MAINTENANCE & INSPECTION: Preliminary Check–High and low pressure shut-off valves at compressor must be fully open. Drive belts must be properly installed to prevent slippage. Make certain clutch is engaging and disengaging. Using leak detector, test entire system for leaks. If there is evidence of oil leaks, check oil level. Check operation of blower fans at all control positions. Check operation of temperature control lever or knob, relay, and thermostat.

Seasonal Operation: Winter–Close outside air intake ducts. *NOTE*–It is advisable to operate compressor for a few minutes each month during winter season.

Summer–Leak test entire system. If leaks found, check oil level. Check belts for proper tension. See that clutch engages and disengages. Make certain clutch is not slipping by observing dust cover or washer assembly bolt at center of pulley. Bolt should be turning at same speed as pulley. Operate system, with control set at maximum cooling, for 10 minutes at fast idle. Check sight glass for absence of bubbles which would indicate system has sufficient Freon charge. Open outside air intake ducts. Check blower fans for variable speeds.

2000 Mile Inspection: Check unit for evidence of leaks. If there is evidence of oil leakage, check compressor for proper oil level. Tighten compressor mounting brackets, check belt tension. Check sight glass for absence of bubbles indicating proper Freon charge (after running engine at fast idle for 10 minutes with Air Conditioning "ON" and compressor clutch engaged).

Filters: Air filters should be cleaned regularly during season of operation. This should be every two months, or 2000 miles, or more frequently in those areas which are extremely dusty. To clean filter, use solvent or soapy solution made with household detergent. After filter has been cleaned, rinse and blow dry with compressed air, then spray a light coating of SAE 30 detergent free, non-odorous, engine oil or RP filter coat on entire filter surface.

ADJUSTMENTS

COMPRESSOR BELTS: Adjust as follows:

Buick: Adjust drive belts to ½" deflection midway between fan and compressor pulleys.

Cadillac: Loosen generator pivot bolts and adjust strap screw, pull generator out until belt is just tight enough to drive generator and compressor without slip.

Chevrolet V8: Loosen compressor brace bolt and bracket pivot bolt. Check to see that lower brace bolt and compressor bracket-to-engine mounting bolts are drawn up tight. Assemble belt tensioning tool J-6212 to torque wrench J-4435 or similar 0-50 ft. lb. torque wrench. Position tool on seal and coil housing with lug on tool facing toward rear of car and inserted into unused hole

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1954-55 FRIGIDAIRE & HARRISON (Continued)

in compressor mounting flange on battery side of electrical connector (*NOTE*– It may be necessary to shift connector in clip slightly to obtain clearance for proper engagement of tool). Apply 30-40 ft. lbs. torque to compressor, tighten brace and bracket pivot bolts.

Oldsmobile: Loosen generator bolts, place tool J-4170 against generator between bracket and generator housing. Attach torque wrench to tool and apply a torque of 20 ft. lbs. Tighten attaching bolts while holding tension on belt.

Packard: Using tool J-5577 and a torque wrench, tighten belts to 58 ft. lbs. Tighten compressor-to-mounting bracket bolts while maintaining this 58 ft. lbs. torque.

Pontiac: Loosen three bolts retaining idler pulley to mounting bracket (pump support bracket on power steering equipped cars). (*NOTE*–Heads of bolts are behind pulley). Insert torque wrench in square hole at end of bracket and apply 60 ft. lbs. torque to tighten belt. While holding 60 ft. lbs. torque, tighten retaining bolts securely.

CLUTCH LEVER ADJUSTMENT (1954): Turn cooling switch "ON" to energize clutch solenoid. Loosen clutch lever adjusting nut jam nut, and adjust to obtain .015-.020" (.015-.025" on Buick) clearance between clutch lever and pin. Tighten jam nut. Start engine and check to be sure clutch drives compressor when solenoid is energized (switch on), and that clutch is fully released (pulley free-wheeling) when clutch is de-energized.

MAGNETIC CLUTCH (1955): Energize clutch coil from battery, check clearance between clutch plate armature (not rear pulley cover ring) and coil housing at three different positions. The clearance should be .025-.035". If clearance not correct, it will be necessary to remove pulley and add or remove shims accordingly. Shims are available in following sizes: .015", .020", .025". By proper selection of shims, .005" variance in clearance can be obtained.

VALVE ADJUSTMENTS: Proceed as follows:

Expansion Valve (Except Chevrolet & Pontiac): Remove cap nut from expansion valve making certain that expansion valve is supported by a second wrench to prevent damage to line and fittings. Use tool J-5426 (3/16" Valve Key), first close valve completely, then open counter-clockwise approximately 5 complete turns (4½-4¾ turns on Oldsmobile). If this does not eliminate ineffective cooling condition, replace expansion valve, assuming that remainder of system is in good operating condition.

Expansion Valve (Chevrolet & Pontiac): If refrigerant flooding through valve in abnormal quantity (heavy sweating or frosting may occur), close valve adjusting stem ½ turn clockwise. If insufficient refrigerant being supplied to cooling coils, open valve ½ turn counter clockwise. If necessary, repeat above operation by turning valve in ½ turn increments at a time (should not exceed one full turn).

Automatic By-Pass Valve (1955 Oldsmobile & Pontiac): Turn screw clockwise to increase pressure, counter-clockwise to decrease pressure (*NOTE*–By-pass valve should not open until low pressure or suction reading is below 15 PSI. and ambient (surrounding air) temperature is below approximately 85°F.).

THERMOSTATIC SWITCH (Chevrolet): If icing or frosting conditions exist in evaporator (results in poor or no cooling) thermostatic switch is probably set too cold. To adjust, remove fiber cover from end of switch assembly and turn adjusting screw one turn clockwise (raises temperature 3°F). Test operation of unit and check for icing, repeating adjustment as required. Reinstall fiber cover.

CONTROLS: Adjust as follows:

Chevrolet: Fast Idle–Adjust hand throttle wire guide stop to limit engine speed to 900 RPM with control pulled out and transmission in neutral. Check to see that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation.

Outside-Inside Air–Adjust cable so that door is open with control set at "Outside Air" or closed with control set at "Inside Air".

By-Pass (Air Duct): Adjust controls for maximum nozzle flow by pulling by-pass control to full out position and securing cable to door control rod with rod positioned at end of travel nearest driver's side of car.

Thermostatic Switch: If icing or frosting condition exists in evaporator (results in poor or no cooling) thermostatic switch is probably set too cold. To adjust, remove fiber cover from end of switch assembly and turn adjusting screw one turn clockwise (raises temperature 3°F). Test operation of unit and check for icing, repeating adjustment as required. Reinstall fiber cover.

Pontiac: Air Valve Control Cable - First move air conditioning control lever to "OFF" position. Loosen air valve control cable at hood hinge attaching screw. Clamp must be loose enough to allow cable housing to slide freely. Hold cable and housing so that cable cannot move inside housing and slide cable assembly through clamp toward center of car until valve is tightly closed. While holding cable in this position, tighten clamp.

Air Temperature Valve Control Cable–Move air conditioning control lever all the way to "COLD" position. Loosen air temperature valve control cable clamp on side of evaporator housing. Hold cable and housing assembly so cable cannot move inside housing and slide cable assembly toward rear of car to close valve against sealing lip. While holding in this position, tighten cable clamp. *NOTE*–Excessive tightening can force valve past its sealing lip.

Air Recirculation Valve Control Cable: Push recirculation knob all the way in to close recirculation valve, then pull out 1/8". Remove right kick pad to gain access to cable clamp. Loosen cable clamp. Hold cable and housing so that cable cannot move inside housing and move cable assembly down through clamp to tightly close valve (Recirculation is closed off when valve is vertical). While holding cable assembly in this position, tighten cable clamp.

CHECKING

BUBBLES IN SIGHT GLASS: Appearance of bubbles in sight glass when engine idling or by-passing (if equipped with by-pass valve) is not unusual and does not indicate a shortage of refrigerant. Operate engine at fast idle for at least five minutes with air conditioning "ON", blowers operating. If bubbles still appear, check lines for kinks and leaks. If no leaks found, **do not** add refrigerant. Check expansion valve power element for full contact with low pressure line. Be sure bulb does not contact liquid line or cover. Add insulating material when required. Adjust expansion valve. If bubbles remain after adjustment of expansion valve, it is an indication that there is a restriction or a mis-positioned pick-up tube in receiver. Replace receiver- dehydrator.

OPERATION OF COMPRESSOR DISCHARGE VALVE REEDS: Connect gauge set to compressor (see Installation of Gauge Set to "Check Operation of System" below). Connect jumper wire from positive battery post to magnetic clutch coil. Operate engine and compressor at slow idle for five minutes. Slowly close low side valve on compressor until low side gauge reads between 5-10 lbs. pressure. Stop engine and immediately close low side valve on compressor. Allow system to remain idle for approximately five minutes. At the end of this time, low side gauge should not show any rapid rise of pressure, nor should the low pressure gauge have equalized to the high side pressure. If this has occurred, it is evident that the discharge valve reeds are leaking and the compressor should be replaced. If the low side pressure did not show a rapid rise, the compressor can be considered satisfactory as the discharge reeds were holding properly. Open low side valve on compressor, remove gauge set from compressor.

GAUGE SET INSTALLATION

TO CHECK OPERATION OF SYSTEM: With gauge set valves closed, connect gauge line to high pressure Schrader type gauge fitting at compressor. (*NOTE*–Make certain center connection of gauge set is plugged). Open both valves on gauge set ¼ turn counter-clockwise, purging Freon and air from lines and, at same time, install low pressure gauge line to gauge fitting at compressor. Close gauge valves. Leak test all gauge connections. If no leaks are found proceed as follows: Position temperature control to extreme "Cold" position to energize clutch. Turn Air Conditioner switch "ON" and operate blowers at full speed. A check of the system pressures can now be made. After completing check, remove gauge lines and replace caps.

TO PURGE THE SYSTEM: Remove caps from high and low pressure gauge connection fittings at compressor. Connect gauge lines. Make certain gauge valves are closed tightly. Connect gauge line to center connection of gauge set, removing plug from end of line.

TO EVACUATE & CHARGE THE SYSTEM: Remove caps from high and low pressure gauge fittings at compressor. Connect gauge lines to fittings. Make certain gauge set valves and shut-off valve at vacuum pump are closed tightly. Remove valve caps from compressor hand shut-off valves and make certain valves are fully open.

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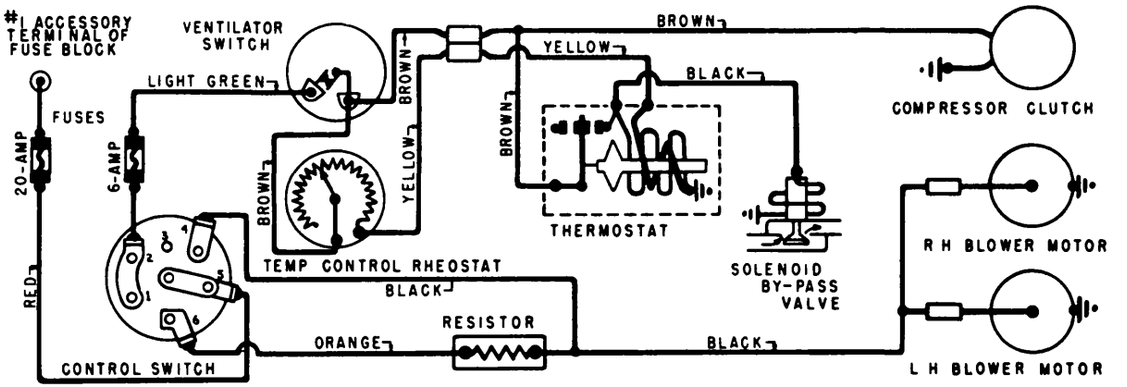
1954-55 FRIGIDAIRE & HARRISON (Continued)

PURGING THE SYSTEM

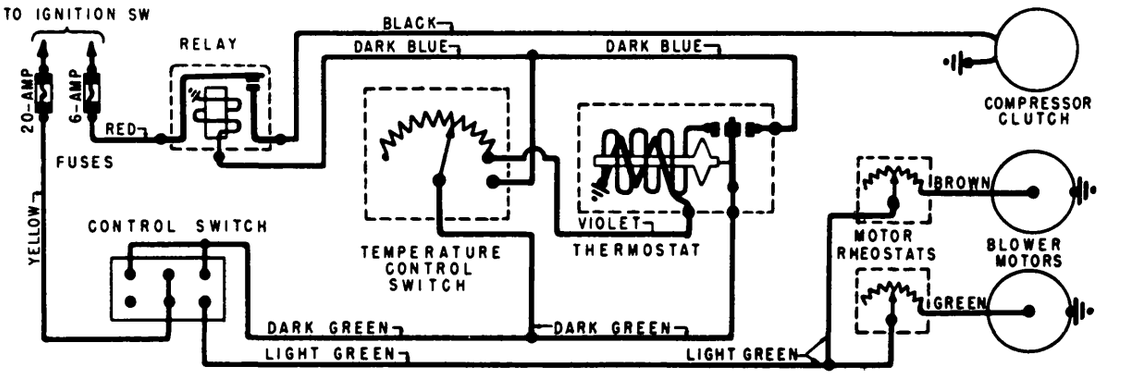
In replacing any of the air conditioning components (except compressor) the system must be completely drained of refrigerant. The purpose is to lower the pressure inside the system so that a component part can be removed safely. To purge system, connect gauge set to compressor (See "To Purge the System" above). Purge refrigerant from system through center connection of gauge set by first opening high pressure valve on gauge set. *(NOTE*–Do not open valve wide until pressure in system has been lowered, as refrigerant under pressure will force oil out of compressor). Close valve on gauge set from time to time for the purpose of allowing 1-2 lbs. of refrigerant pressure to remain in system, then close both valves on gauge set. *(NOTE*–Allowing 1-2 lbs. of refrigerant pressure to remain in the system will prevent air and dirt from entering system when a part is replaced). Leave gauge set connected in preparation for evacuating and recharging.

EVACUATING THE SYSTEM USING VACUUM PUMP

Whenever system is opened for any reason, it should not be put into operation again until it has been evacuated. For this operation use Vacuum Pump. Tool J-5428, to remove air and moisture which may have entered the system when it was opened to replace a part. Make sure dust cap on discharge side of vacuum pump has been removed. Check fluid level. This should be between the high and low screws in the side of the pump. Add Frigidaire viscosity 75 oil to bring to proper level *(NOTE*–Change oil in pump every 250 hours of operation by removing top and laying pump on side with discharge oil trap up. Hold rotor firmly in position to prevent its coming out while draining oil. A small amount of oil may be drawn into pump occasionally to insure protection of internal parts during periods of disuse). If pump should fail to start; check capacitor, relay, or remove the top and turn rotor by hand to relieve a temporary stuck condition. *(CAUTION*–Do not use vacuum pump as an air compressor as it will not receive proper lubrication under such usage. Keep suction and discharge fittings capped when not in use). Connect gauge lines (See "To Evacuate & Charge The System" above) if not installed previously. Open high and low pressure valves on gauge set. Connect and start vacuum pump. Slowly open the shut-off valve at the vacuum pump to avoid forcing oil out of pump. This will permit drawing of a vacuum on both the high and low pressure sides of system at same time. Operate to obtain approximately 28" of vacuum for ten minutes. If sufficient vacuum cannot be obtained, vacuum pump or gauge may be faulty. Close shutoff valve at pump and then stop pump. Check gauge to see if vacuum holds for at least three minutes. If not, open Freon drum valve and allow system to reach drum pressure. Close drum valve. Leak test complete system, including gauge fittings, with leak detector, Tool J-5419; if leak cannot be found, the vacuum pump or gauge may be faulty. *(NOTE*–If oil is blown out of vacuum pump, it should be filled to proper level with Frigidaire 75 oil). Correct all leaks, then operate pump to obtain vacuum of 28". Watch gauge and see if vacuum will hold for ten minutes. With all leaks eliminated, open Freon drum and bring system to drum pressure. Close drum valve. Evacuate the system again as previously described for purpose of picking up any air or moisture that may have remained in the system. Close gauge valves. System is now ready for a complete charge of refrigerant.



BUICK AIR CONDITIONING CONTROL DIAGRAM



CADILLAC AIR CONDITIONING CONTROL DIAGRAM

ADDING REFRIGERANT

Refrigerant should always be added to low pressure side of the compressor in a vaporous state and the amount added, under any condition, should not exceed that prescribed. Do not add a complete charge of refrigerant until system has been leak tested and properly evacuated. In order to charge refrigerant in a vaporous state, Freon-12 drum should be heated by placing drum in a container of hot water. The temperature of the hot water should not exceed 125°F. Since temperature of water and drum will decrease as the vapor leaves the drum, drum pressure may be reduced to a point where it will be necessary to replenish or reheat the water. Both Freon drum and container of hot water should be placed on suitable scales, with drum in upright position. Note scale reading before opening valve on drum so that it can be determined when a complete charge of refrigerant has been added to the system.

►*CAUTION: Always wear goggles whenever handling Freon-12, and when breaking line connections. The high pressure should not exceed 275 lbs. Drum pressure should not exceed 90 lbs.*

ADDING COMPLETE CHARGE: Evacuate complete system (see above). With gauge set connected as when evacuating system, open low pressure valve on gauge set. Open drum valve to obtain maximum pressure of 90 lbs. Freon vapor under pressure will flow into system without operating compressor. This amount should not exceed 2½ lbs. (Chevrolet), 3¾ lbs. (Oldsmobile & Pontiac), 5 lbs. (Others). *(NOTE*–If it is not possible to charge system with the total by the mothod just described, it is permissible after about 1 lb. has been forced into the system, to operate the engine and compressor at slow idle. Hand shut-off valve on

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1954-55 FRIGIDAIRE & HARRISON (C ntinu d)

high pressure side of gauge set should be closed. Continue to operate engine and compressor at slow idle until total has been charged into the system). Close drum valve and low pressure shut-off valve on gauge set. Operate engine at 1500 RPM with compressor clutch engaged to observe high and low pressure gauges as well as sight glass and general performance of system. Stop engine and remove gauge set.

►*NOTE:* Jumper wire between battery positive terminal and clutch coil will insure continuous operation of compressor during period engine and system are operating at maximum output (system stabilizing).

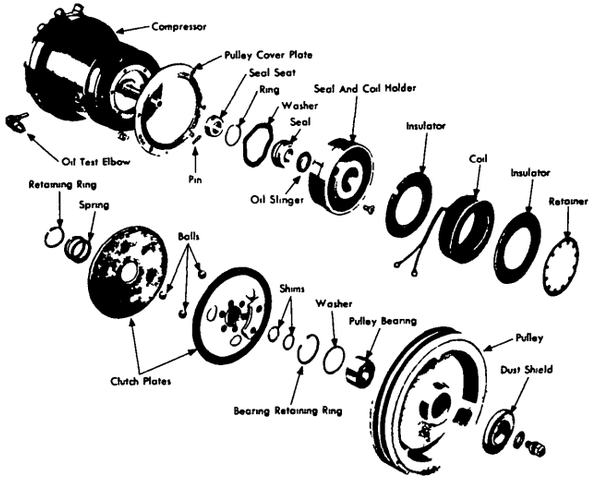
ADDING PARTIAL CHARGE OF REFRIGERANT: Remove caps from compressor suction and discharge valve gauge fittings and valve stems. Attach gauge set J-5725 to gauge fittings. Attach flexible hose from center fitting of gauge set loosely to Freon drum. Crack compressor suction and discharge valve stems slightly to purge gauge lines of air. Tighten fittings on Freon drum when all air has been removed from gauge lines. Close both hand shut-off valves of gauge set. Start engine, set controls to "COLD" and turn blower on high speed. Operate engine for 10 minutes at 1200 RPM to stabilize system. Open compressor suction valve gauge fitting by turning valve stem 1½ turns clockwise. Turn compressor discharge valve ¼ turn clockwise so high pressure gauge can be observed. Place Freon drum on scales, note weight, and open low pressure valve **only** on gauge set. With compressor operating, allow Freon to flow into system until liquid indicator clears and **immediately** shut off valve on Freon drum. Check weight of Freon drum and pail of water. Then open valve on Freon drum and add Freon-12 as follows: (Chevrolet) ½ lb., (Oldsmobile & Pontiac) ½ lb. if room temperature is below 85°F., or 1 lb. if room temperature is above 85°F., (Others) 1 lb. Note total amount of freon added. Close drum valve. Close low pressure valve on gauge set. Operate engine at fast idle, compressor clutch engaged (controls set for maximum cold or jumper wire attached to clutch coil from battery). Observe gauges, sight glass, and entire system for performance. After 5 minutes, should bubbles reappear at sight glass (system not by-passing), add same amount of Freon added above. If bubbles still appear, check operation of system. Adequate cooling may be obtained even when a few bubbles are evident. Remove gauge set, install gauge fitting caps. Remove jumper wire from clutch coil if installed above. *CAUTION*—Do not charge more than 2½ lbs. (Chevrolet), 3¾ lbs. (Oldsmobile & Pontiac), 5 lbs. (Others) into system at any time.

CHECKING & ADDING OIL

CHECKING & ADDING OIL (1954): *See "1953 Frigidair "*

CHECKING OIL LEVEL (1955): Operate the air conditioning system for 10 minutes at fast idle, then turn off engine. Remove nut and "dead head" assembly from oil test elbow on bottom of compressor. Depress Schrader valve core in oil test elbow for several seconds and allow Freon and oil to escape. Oil will invariably appear the first time valve is depressed, regardless of oil level. Again depress Schrader valve core. If oil continues to be ejected with Freon second time valve is depressed, oil level in compressor is satisfactory. (*NOTE*—A positive check for oil in vapor can be made by allowing vapor to come in contact with a clean white rag). If no oil escapes second time valve is depressed, oil level is low and oil will have to be added.

►*NOTE:* Compressors with Serial Nos. between 12XB756 and 14XB771 do not have a standpipe to permit oil level checking as above. In order to check oil level on these compressors, it will be necessary to remove compressor and follow procedure outlined for "Adding Oil—Major or Minor Loss (Without Gauge Set)" below.



FRIGIDAIRE COMPRESSOR ASSEMBLY

ADDING OIL (1955)-Major or Minor Loss (Without Gauge Set): Remove compressor (see below). Purge pressure from compressor by depressing Schrader valve at gauge fittings on compressor until low audible hiss is heard. Remove oil test elbow from compressor. Invert compressor and drain oil into clean container. (*NOTE*—Examine condition of oil to determine whether or not it is contaminated with any foreign material. If so, this oil should be discarded and new oil used. If excessive amount of water found, install a new liquid dehydrator-receiver assembly in high pressure liquid line). Pour nine ozs. of 525 viscosity Frigidaire oil into compressor at oil fitting opening (*NOTE*—Do not add oil at relief valve opening). Install oil test elbow. Install compressor, using new "O" ring seals at hand shut-off valves.

ADDING OIL (1955)—Minor Loss (Using Gauge Set J-5725):

►*EARLY 1955 PONTIAC ACCESS HOLE NOTE:* If compressor mounting bracket does not have access hole for oil test elbow, it will be necessary to cut a hole. Drill a 7/8" hole 3/16" in from engine side of bracket with centerline of hole in same plane as perpendicular line through center of oil test elbow. Drill another 7/8" hole 1/16" from the first (in same plane and on fender side of first hole). Cut web from between holes to form a slot-shaped hole.

1) Connect high pressure line from gauge set to high pressure fitting on compressor. Cap center connection on gauge manifold with gauge fitting cap from compressor discharge valve. Attach adapter J-5420 to low pressure line and start adapter on oil test elbow (*NOTE*—Do not screw on far enough to depress valve stem).

2) Crack open high pressure valve on gauge manifold and discharge valve on compressor. Slowly open low pressure valve on gauge manifold (This will purge air from low side line). While Freon is escaping from low side line, tighten gauge adapter J-5420 on compressor oil test elbow.

3) Close high and low pressure valves on gauge manifold. Close low pressure valve on compressor (turn until seated).

4) Attach ¼" oil charging tube to center connection on gauge manifold (*NOTE*—Oil charging line can be made from piece of clean, dry ¼" tubing by flaring one end and installing a flare nut (flared end of piece of brake line can be used together with a flare nut). Pipe should be long enough to reach bottom of oil bottle). Secure a **graduated** bottle of Frigidaire 525 viscosity oil. Leave capped until needed.

5) Crack open high pressure valve at gauge manifold to purge air from oil charging line. While vapor is still slowly escaping from oil charging line, insert tube to bottom of oil bottle and allow vapor to bubble slowly through oil. Close high pressure valve at gauge manifold. Leak test all connections that have been made. Position gauge manifold and oil charging line, while still inserted in bottom of bottle, so that they will not be disturbed during following procedure,

6) Operate engine at slow idle, observe low side gauge until approximately 10" vacuum is obtained. Stop engine and observe gauge to see if vacuum will still hold. There should not be any fast rise of pressure.

7) Open low pressure valve on gauge set about 1½ turns. Vacuum in compressor should now draw oil from bottle. Allow level of oil in bottle to reduce so that 2 ozs. are drawn into compressor. Close low pressure valve on gauge manifold, remove oil charging line from center connection on gauge manifold and replace cap (Loosen oil charging line while still in bottle so that oil from line will drain back into bottle).

8) Open high pressure shut-off valve on gauge manifold. Open low pressure shut-off valve slowly to allow high side pressure to force oil remaining in gauge manifold and low pressure gauge line into compressor. Also allow pressure to break the vacuum and pressurize compressor to approximately 5 lbs. Close both high and low pressure valves on gauge manifold. Remove gauge adapter connection from oil test elbow.

9) Recheck oil level. Continue to add oil in 2 oz. quantities until a satisfactory level is obtained. Open high and low pressure valves (fully counter-clockwise), remove high pressure gauge line, replace high pressure

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gauge fitting cap, valve stem cap, and oil test elbow nut and "dead head".

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

►*NOTE:* If it is necessary to remove parts other than the compressor (involving the breaking of refrigerant lines), it will be necessary to purge, evacuate, and completely recharge the system (see above).

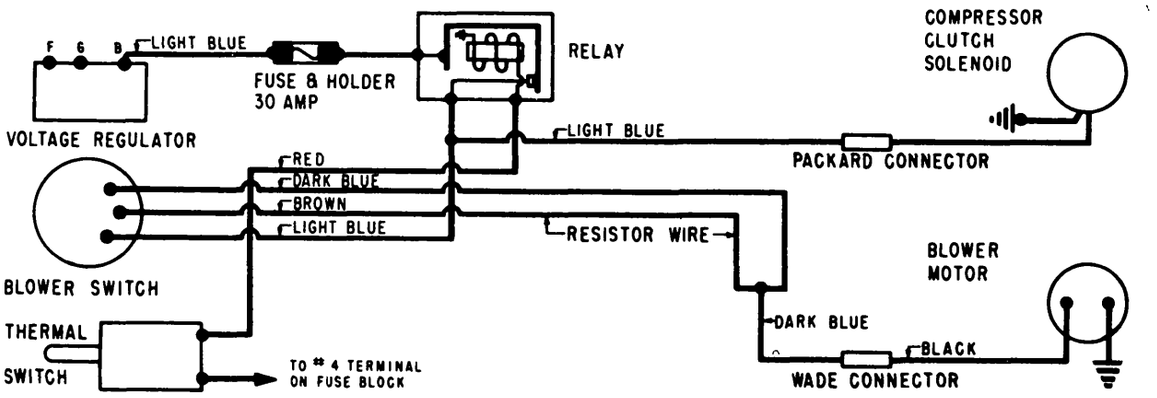
1954 BUICK, CADILLAC, OLDSMOBILE, PACKARD

COMPRESSOR REMOVAL & INSTALLATION: Same as "1955 Buick, Cadillac, Packard" below except high and low pressure valve fittings are held to compressor by two screws. Each pair of screws should be loosened about 7 turns and the valve fitting backed firmly against the head of the screws to permit automatic shut-off valve in compressor to close quickly.

1955 BUICK, CADILLAC, PACKARD

COMPRESSOR REMOVAL: Remove shut-off valve caps from ends of both pressure lines. Using Tool J-5427, close both hand shut-off valves at compressor. *(CAUTION–Do not op rate compressor with shut-off valves closed. REMOVE IGNITION KEY).* Remove high and low pressure valve fitting center bolt, remove fitting from compressor. *(NOTE–*A momentary release of vapor can be expected as fitting leaves bore. If vapor continues to escape, the spring-loaded automatic valve in compressor is not seating properly. If this is the case, purge Freon vapor pressure by depressing Schrader core in the high pressure gauge connection until a low audible hiss is heard. Any air in compressor must be forced out when unit is reinstalled). Cover pressure openings in both compressor and compressor line fitting with masking tape to keep out dirt. Disconnect clutch coil wires and drive belts. Remove compressor from mounting bracket.

COMPRESSOR INSTALLATION: Check clutch adjustment (see ADJUSTMENTS above). Install compressor on bracket. Place belt on pulley and adjust tension (see ADJUSTMENTS above). Connect clutch coil wires. Install new "O" rings and flange gaskets on high and low pressure line valve fittings. Apply a slight amount of Frigidaire oil to "O" ring before installing fitting into bore. Insert pressure line fitting into bore in compressor and tighten securely Use care to see that "O" ring seals are not damaged. Using ¼" key, Tool J-5247, open both high and low pressure line valves all the way (counter-clockwise). *(NOTE–*These valves open against a seal type seat, and must be turned open all the way against stops to prevent leaks). Depress Schrader valves to purge air from low and high sides of compressor. Test for leaks at all connections on compressor (Tool J-5419 or J-6084). If leaks are indicated, connection must be removed and "O" rings and gaskets replaced. *(CAUTION–*It is very important that all leaks be repaired. Under no conditions should compressor be run when a leak exists, as a complete loss of refrigerant would damage compressor). Connect gauge set and check clutch operation and general performance of system Remove gauge set and install caps on fittings.



PONTIAC AIR CONDITIONING CONTROL DIAGRAM

1955 CHEVROLET, OLDSMOBILE, PONTIAC

COMPRESSOR REMOVAL (OLDSMOBILE & PONTIAC):

Intake Manifold Not Removed: Remove power steering pump and bracket assembly with lines attached and lay it aside. Remove compressor from its mounting bracket, with lines attached, and lay it aside. Remove generator from mounting bracket and lower it onto upper control arm. Mounting bracket can then be removed from engine.

COMPRESSOR REMOVAL (CHEVROLET, OLDSMOBILE & PONTIAC):

Intake Manifold to be Removed: Operate air conditioning system for 10 minutes at 1200 RPM to stabilize system. Return engine to normal idle speed, then close compressor suction valve (all the way in) with compressor operating. **Immediately** disconnect clutch wire to stop compressor. Connect and disconnect clutch wire at 5 second intervals four times to pump all Freon out of compressor. *(CAUTION–*Be careful wire does not touch metal while disconnected since it is still energized). Close compressor discharge valve (turn all the way in) and shut off engine. Remove compressor belt. Very slowly loosen screw retaining valve body to compressor. As screw is loosened, work valve body back and forth to break seal and bleed off pressure. *(CAUTION–*High pressure will still exist at discharge valve. If pressure released too rapidly there will be a considerable discharge of Freon and oil). When all pressure has been relieved, remove screw and remove valve body and "O" ring seals. Immediately cover compressor openings. Remove compressor from mounting bracket.

COMPRESSOR INSTALLATION (Valve Body with Lines Not Removed): Reverse removal procedures given for "Removal (To Work on Engine–Intake Manifold Not Removed)" above.

COMPRESSOR INSTALLATION (Valv B dy with Lin s R m v d): Attach compressor to mounting bracket. *(NOTE–*Rear insulator and insulator-to-compressor bracket, and front outer insulator should be in place on mounting bracket. Front inner insulator and front outer insulator bracket should be attached to compressor). Attach ground strap under front outer insulator bracket-to-insulator attaching screw. Remove cover over compressor openings very slowly to bleed off pressure *(CAUTION–*New compressors are charged with a mixture of nitrogen and Freon and 9 ozs. of Frigidaire 525 viscosity oil. If cover removed too rapidly, oil will be blown out violently). Attach valve body to compressor using new "O" ring seals and new 3/8" plain lockwasher on screw (tighten attaching screw to 10-12 ft. lbs.). *(NOTE–*3/8" lockwasher was not used in early production, but should always be used when valve body is re-attached). Install and adjust compressor belt (see ADJUSTMENTS above). Connect compressor clutch wire. Evacuate compressor as follows:

Compressor Evacuation (Using Gauge Set J-5725): With compressor still sealed from system (suction and discharge valve stems turned all the way in) proceed as follows: Remove high pressure relief valve and connect tube and rubber hose in place of relief valve so that oil that pumps out of compressor during evacuation can be collected. Place clean, dry container under end of hose to collect oil *(NOTE–*Tube to be inserted into compressor can be made from a 3/8"-24 bolt by cutting head off and drilling a hole through it). Connect low pressure line of gauge set to gauge fitting on suction valve, Run compressor until gauge shows 28" vacuum, then continue to run for 5 minutes. At end of 5 minutes, with compressor still operating, replace and tighten relief valve. Purge air from compressor head by backing compressor suction valve out (counter-clockwise) and loosening pressure relief valve for approximately 15 seconds. Completely back-seat both compressor suction and discharge valves (back valve stems out). Make Operational Test (see below), add oil and Freon as required.

Compressor Evacuation (Gauge Set Not Available): Turn suction valve stem completely counter-clockwise to open suction hose to compressor and replace cap. Loosen pressure relief valve for approximately 30 seconds to purge air from compressor, then tighten

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1954-55 FRIGIDAIRE & HARRISON (C ntinu d)

relief valve. *(CAUTION–*If air is not bled out of compressor, performance of system will be affected and excessive head pressure may result). Turn compressor discharge valve completely counter-clockwise and replace cap. Install compressor belt and adjust (see ADJUSTMENTS above). Connect compressor clutch wire. Clip clutch and blower wires to compressor bracket.

PARTS REPLACEMENT

DAMAGED COMPRESSOR (1954): Remove compressor (see REMOVAL & INSTALLATION above), remove pulley-clutch assembly and reinstall on replacement compressor.

Pulley-Clutch Removal & Installation: *(CAUTION–*Use only a clean, dry cloth to wipe off clutch parts. Do not use any type of solvent. Do not clean pulley bearing with any type of solvent as it will wash grease out of bearing (factory lubricated and requires no further lubrication). Prevent fingers, dirt, grease, oil, or any foreign matter from coming in contact with ball bearings, frictional or mating surfaces of clutch plates. Do not attempt to dress off frictional lining material on clutch plates). Disconnect and remove clutch actuating arm at compressor and solenoid. Remove clutch cover plate screws, then plate. Pull out two clutch plates, being careful not to lose the three actuating steel balls. Using Truarc pliers No. J-4880, remove snap ring retaining pulley housing on shaft. Remove pulley from compressor shaft. If pulley housing requires replacement, remove Truarc snap ring, using Tool J-4245. Remove bearing from pulley housing. To install, clean all clutch parts. Using a socket or short length pipe, carefully press new bearing into pulley hub and install snap ring with beveled side out. Install pulley and bearing assembly in position on shaft. Install pulley housing snap ring on compressor shaft with concave side of ring out. With compressor upright, install counterweight clutch plate on splined shaft, frictional lining toward compressor. To do this, position the one blind spline of shaft with open spline of inner clutch plate hub. Place three steel balls in tear drop depressions of counterweight plate. Insert teaser spring in bore of compressor shaft. With frictional linlining outward, place actuator plate on top of steel balls, making certain balls are located in tear drop depression of both plates. Plates and steel balls can be installed as an assembly if compressor is not removed. Install clutch cover plate, being sure that the two small holes in cover plate line up with the two locating dowel pins in pulley. Install cover plate-to-pulley lockwashers and screws and tighten to 12-14 ft. lbs. *(NOTE–*Make sure all lockwashers are in place to assure proper balance). Install clutch actuating arm bracket to compressor. Install compressor on car. Adjust clutch (see ADJUSTMENTS).

COMPRESSOR SEAL REPLACEMENT (1954): Remove compressor (see REMOVAL & INSTALLATION). Relieve pressure in compressor through two gauge connections to 2 to 5 lbs. or until a low audible hiss is evident. Remove clutch and pulley assembly from compressor (see above). Remove seal retaining plate and bellows seal. Remove nitralloy ring from shaft using Tool J-5425. Check shaft to see that it is polished and free of paint, corrosion, nicks, burrs, tooling marks, and the like. Flush seal cavity with Frigidaire oil. Wet a cleaning tissue with a good grade of lighter fluid and allow tissue to dry. Then remove any trace of oil or lint. Shaft and shoulder, also, must be clean and dry. Insert nitralloy ring in Seal Centering Tool J-5425 so that synthetic rubber is visible. *(CAUTION–*Do not handle surfaces of nitralloy ring with fingers). Using cleaning tissue wetted with lighter fluid, wipe entire rubber surface, including inner diameter and radius of seal, until all protective oil coating is removed and the rubber is completely clean and dry. Install nitralloy ring on shaft, making certain that neoprene rests evenly and firmly against shaft shoulder *(NOTE–*This can be done by reversing tool so that small tubular end is pressed firmly by hand against inner ring of synthetic rubber). Apply clean Frigidaire oil to nitralloy ring, seat bronze seal that contacts nitralloy ring, and first three turns of bellows seals. Using Seal Centering Tool J-5425, install new bellows seal and gasket. Install retainer plate and screws, tightening screws alternately to insure even pressure against seat. Do not remove centering tool until all screws are tightened. If a major loss of oil has occurred, add oil (see CHECKING & ADDING OIL above). Reinstall compressor, after assembling and installing clutch on compressor. Purge air from compressor by depressing valve stem in high pressure gauge connection for a few seconds. Start engine and, after several minutes, repeat purging operation.

DAMAGED COMPRESSOR (1955): *(NOTE–*If damaged compressor is replaced, replacement compressor name plate must be stamped with numeral 1/8" high indicating Freon capacity of system and is required by law in some states). Remove shut-off valve caps from ends of both pressure lines. Using Tool J-5427, close both hand shut-off valves at the compressor *(CAUTION–*Do not operate compressor with shut-off valves closed. REMOVE IGNITION KEY). Remove high and low pressure valve fitting center bolt and remove fitting from compressor. *(NOTE–*A momentary release of vapor should be expected as the fitting leaves its bore in the compressor. If vapor continues to escape, the spring loaded automatic valve in the compressor is not seating properly. If this is the case, purge Freon vapor pressure by depressing Schrader core in high pressure gauge connection until a low audible hiss is heard (1 or 2 lbs. pressure). Any air in the compressor must be forced out when the unit is reinstalled). Cover pressure openings in both compressor and compressor line fitting with masking tape to keep out dirt. Disconnect clutch coil wires and drive belts. Remove compressor from mounting brackets. *(NOTE–*Gauge Set J-5725 may be used for this operation. If used, purge vapor from compressor until 1 or 2 lbs. remain, allow to stand for about five minutes, observing gauges for any pressure build-up. If build-up occurs, repeat purging operation until there is no longer a build-up). Remove clutch and pulley assembly and clutch coil, reinstall on new compressor.

►*CAUTION:* If there is any possibility that broken parts from the compressor got into the discharge line, condenser should be cleaned and a new dehydrator, filter and receiver assembly should be installed. If condenser cleaned or a new dehydrator, filter and receiver assembly was installed it will be necessary to purge, evacuate, and completely recharge system.

Pulley-Clutch Assembly R m val & Installati n: Remove compressor and follow steps outlined under "Compressor Seal Replacement" below.

Clutch Parts or Coil Replac m nt: Remove compressor and follow steps outlined under "Compressor Seal Replacement" below.

Compressor Seal Replacem nt: Remove compressor, then proceed as follows:

1) Remove pulley screw, lockwasher and dust cover from end of shaft. Remove pulley from shaft, using a puller such as harmonic balancer puller, J-2582-A (Install retaining screw in shaft so that end of large puller screw will bear against head of pulley retaining screw. *CAUTION–*Make certain the puller does not damage the internal threads of the shaft or the inner race of the bearing).

►*NOTE:* Three types of dust covers have been used at the front of the pulley. First type is a metal cap retained by pulley retaining screw. Second type is a rubber cap held in place by a retaining ring. Third type is a felt and steel washer which seats in the counterbore of the pulley and is held in place by the pulley retaining screw and washer.

2) Remove clutch actuating coil retainer.

►*NOTE:* Two types of coil retainers used. On early compressors (prior to 44XB653), remove clutch coil remove clutch coil retainer by bending retainer teeth forward with a small screwdriver. The retainer should be discarded and replaced by same type retainer used on later compressors. On later compressors, back out alternately the three retaining screws until threaded end of screws are flush with inside face of coil housing. Remove coil retainer ring.

3) Remove and discard outer gasket from front of coil. Disconnect coil leads and remove coil from cavity. Remove and discard inner gasket from coil cavity.

►*NOTE:* On early compressors, prior to compressor 44XB653, drill three holes in seal and coil housing. First hole should be diametrically opposite the coil lead port; the two remaining holes should be located one on either side approximately 120° from the first. Holes should be accurately located 9/64" from front face of housing. Use a No. 24 drill.

4) Remove the 6 Phillips head screws that were behind inner gasket and pull seal and coil holder from the compressor (loosen screws by tapping with punch). Press defective seal assembly from holder cavity. Thoroughly clean seal cavity and replace internal "O" ring with a new one coated with clean Frigidaire oil. Press new seal assembly into cavity using Seal Installer J-5922. Replace large external "O" ring seal with a new one coated with clean Frigidaire oil.

5) Force retainer from groove to the rear area of rotating seal seat ring, using small screwdriver. Exercise care not to mar oil pump cover. Remove drive pin from seal seat groove using needle nose pliers. Pull seal seat from shaft and wipe shaft clean with tissue furnished in seal package.

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1954-55 FRIGIDAIRE & HARRISON (C ntinu d)

6) Check shaft spline for burrs or sharp edges. Remove burrs or sharp edges using India Stone No. FT-134 and then clean shaft to remove all stoning or metal dust.

7) Install new "0" ring seal inside the new seal seat and place the seat face down on a piece of oil soaked wiping tissue so as to protect polished face. Force retainer down over seal seat to forward area (Use 1¼" socket to push ring on). Install new seal seat after coating the internal "0" ring gasket with clean Frigidaire il. *(CAUTION*–Use extreme care not to damage "0" ring when starting seal seat over splined end of shaft. Also keep fingers off seal surface)· Align hole in seal seat with one in shaft and insert drive pin. Force retainer into groove.

8) Examine oil pump cover plate to make certain small dowel pin is in proper place, and flush with outer cover. Make certain wave washer is in place.

9) Install housing for seal and coil holder, using care not to damage large "0" ring. Replace 6 Phillips head retaining screws. *(NOTE*–If heads of screws become burred or damaged in removal, install new screws to prevent damage to coil). Install oil slinger with flange outward leaving approximately .010" clearance between seal and slinger. Use Tool J-6086-A to positively position slinger .010" from seal.

10) Place a new inner gasket (neoprene cork with holes) in bottom of seal and coil housing. Install actuating coil and connect leads. Place new outer gasket (fish paper without holes) over coil.

11) Discard clutch coil retainer if removed from early type compressor and procure later type retainer used on compressors after No 44XB653 Position this retainer over outer gasket Use two ½" lengths of 5/16" round rod and two 3" "C" clamps to force coil and retainer ring snugly into coil housing Apply pressure evenly on both "C" clamps *(CAUTION*–No portion of coil housing-to-compressor screw heads should extend beyond inner face of coil housing) While coil and retainer are being held in place by the "C" clamps and 5/16" round rods (used as dowels), insert the three No 8 self-tapping screws removed from later production compressors (or furnished in service package) into holes in housing Tighten screws until heads are snug against side of seal housing In this position the threaded end of each screw will press on the tapered portion of the coil retainer ring and secure parts in their proper position Remove "C" clamps and 5/16" rods Blow out tapping chips with compressed air Fill coil lead wire port with caulking compound to seal against entry of dirt, grease, oil vapors, and the like

12) Remove clutch ring by removing the 6 screws and lockwashers Examine frictional surface for dirt, scoring or other damage Replace if necessary

13) Remove clutch assembly from pulley *(NOTE*–Spacer shims will be found between clutch assembly and pulley These should be inspected and placed aside for later reassembly)

14) Disassemble clutch plate using Tool J-4880 (No 2 Truarc pliers) to remove retaining ring Inspect all parts of assembly for wear and replace if necessary Inspect pulley bearing for wear or tightness Replace if necessary

15) Reassemble clutch To install retaining ring, place ring on spring, expand ring with Tool J-4880 and force downward on ring and spring until ring engages groove Place clutch ring over coil and seal holder with ground surface facing pulley end of shaft

16) Install clutch plate assembly on splined shaft locating pin in hub spline in cut-off spline on shaft, and with clutch spring toward seal cavity Install spacer shims on shaft using the original shims removed during disassembly

17) Install pulley Exert pressure on inner race of bearing only, when pressing pulley on shaft Install dust cover and retaining screw with lockwasher Torque screw to 5-8 ft lbs Install clutch ring to pulley using 6 screws and lockwashers

18) Adjust clutch See ADJUSTMENTS above

1956 FRIGIDAIRE & HARRISON

Buick (1956)
Cadillac (1956)
Ch vr l t V8 (1956)
Oldsm bile (1956)
Packard (1956)
P ntiac (1956)

►CHANGES, CAUTIONS, CORRECTIONS

►*CLUTCH COVER INSTALLATION CAUTION*· To avoid distortion of clutch cover, capscrews should be tightened to 3-5 ft. lbs. only instead of 5-7 ft. lbs. previously specified.

►*BUICK CLUTCH SWITCH CAUTION* Some early clutch switches were incorrectly assembled during manufacture in that switch terminals were inadvertently reversed causing connection terminal to be improperly color coded. In event this has happened, the feed line (brown wire) will be connected to ground, causing 5 ampere fuse to burn out with air conditioner turned off. It is not necessary to replace switch unless contacts are burned. Reverse wires so they are opposite to the color markings on the case.

►*CADILLAC CONTROL SWITCH "SHORTING" CORRECTION* If shorting occurs when toggle switch on control panel is turned "ON", check positioning of dark green wire connector on the terminal post of the temperature control lever. Connector must be installed with flat side of connector up to avoid possibility of its contacting the temperature control lever causing 25 ampere fuse to blow.

►*CADILLAC POOR COOLING OR ENGINE OVERHEATING CORRECTION* May be due to excessive refrigerant in system. To correct, purge Freon from high pressure side of compressor with system operating at 1500 RPM engine speed, until bubbles appear in sight glass. Then add 1 lb. of Freon-12. Check oil level in compressor, add oil as necessary.

►*CLUTCH AIR GAP SHIM CAUTION* There are two sets of shims in the clutch assembly, one set forward and one set to rear of the clutch plate. To adjust air gap, **shims should be added or removed from the rear set only.** Front set of shims controls spacing of the front clutch plate friction facing to its mating surface on the pulley (this spacing should be .010").

►*CADILLAC COMPRESSOR WHINING NOISE CORRECTION* Remove clamp holding liquid and discharge lines, just to rear of radiator shroud. Straighten and align suction and discharge lines (leak test to assure that bending of lines has not caused leaks). Loosen four screws that attach compressor to its front and rear supports. Loosen bolt on block and nut on intake manifold that attach rear support to engine. Loosen compressor belts. Center compressor as much as possible between front and rear brackets, tighten two screws attaching compressor to front support. Tighten bolt and nut that attach rear support to engine. Finally, tighten the two screws that attach compressor to the rear support. Re-tighten compressor belts.

►*CLUTCH SLIPPAGE CORRECTIONS* Check clutch air gap to see that it is within limits of .025-.035". If head pressures are high due to excessive refrigerant in system, proceed as for "Poor Cooling or Engine Overheating Correction" above. Check for oil or grease on clutch friction facings, worn clutch friction facings, and pulley wobble. Check nylon actuating balls for flat spots or distortion.

►*PONTIAC COMPRESSOR NOISE CORRECTION* Move doughnut type rubber spacer which is around discharge hose (just behind radiator-to-fender upper brace) back towards fire wall about 9". This will prevent discharge hose from vibrating against fender skirt. After repositioning this spacer, make sure that screws protruding through the fender skirt just behind the radiator-to-fender taining screws as necessary to protect from chafing discharge hose. Later production cars have two spacers, one as indicated above and one just behind the radiator-to-fender upper brace.

►*CADILLAC 305 HP SHORT CIRCUITING AT FAST IDLE CONTROL CORRECTION* Bend terminals on fast idle solenoid away from possible contact with throttle rod. Jumper wire terminals should be taped

DESCRIPTION: Design and operation of this system is similar to 1954 55 Frigidaire & Harrison and to 1954-Early 1955 Harrison (Pontiac) Air Conditioning

PRECAUTIONS: *Before disconnecting any part of air conditioning system or lines, see "Air Conditioning Service Cautions".*

MAINTENANCE & INSPECTION: *See "1954-55 Frigidaire & Harrison" and "1954-Early 1955 Harrison (Pontiac)" Air C nditi ning*

ADJUSTMENTS: Compressor Belt – Adjust as follows
Buick – With torque wrench at generator pulley, tighten

CONTINUED ON NEXT PAGE

1956 FRIGIDAIRE & HARRISON (C ntinu d)

belts until 25-30 ft. lbs. torque slips generator pulley on belts. *NOTE* - This specification supersedes previous specification of ½" deflection midway between fan and compressor pulleys.

Cadillac – Loosen two generator mounting bolts approximately four turns. Loosen generator adjusting strap screw. Place Fan Belt Adjusting Tool, No. J-3046, over head of front mounting bolt and rotate until arm on tool contacts edge of generator drive end plate. Place a 7/8" socket over the tool and place a 50 ft. lb. torque wrench in socket. Pull outward on torque wrench until 27 ft. lbs. torque is indicated on scale. Tighten generator adjusting strap screw. Remove tool and tighten mounting bolts to 15-18 ft. lbs.

Chevrolet V8 – Loosen compressor brace bolt and compressor bracket pivot bolt. Check to see that lower brace bolt and compressor bracket-to-engine mounting bolts are drawn up tight. Assemble belt tensioning tool J-4435 or similar 50 ft. lb. torque wrench. Position tool on seal and coil housing with lug on tool facing toward rear of car and inserted into unused hole in compressor mounting flange on battery side of electrical connector (*NOTE* - It may be necessary to shift connector in clip slightly to obtain clearance for proper engagement of tool). Apply 30-40 ft. lbs. torque to compressor, tighten brace and bracket pivot bolts.

Oldsmobile – Loosen generator attaching bolts. Place Tool J-4170 under generator between bracket and generator housing. Attach torque wrench to tool and apply torque of 20 ft. lbs. Tighten attaching bolts while holding tension on belt.

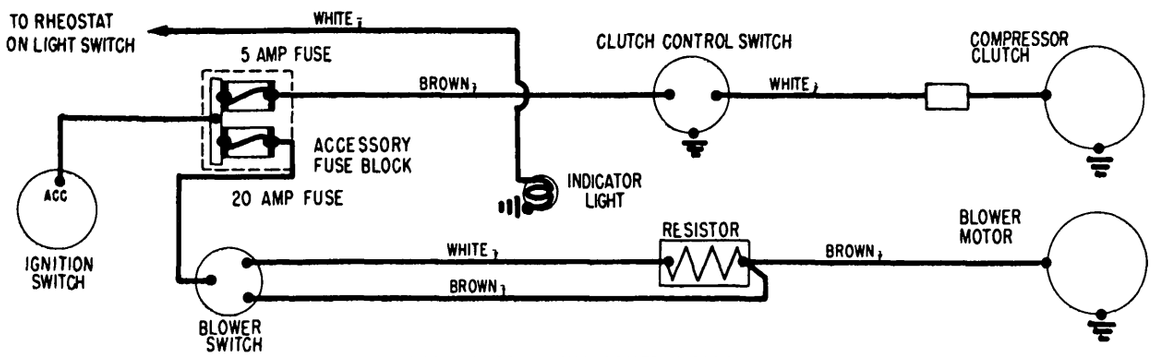
Packard – Using Tool J-5577 and a torque wrench, tighten belts to 58 ft. lbs. Tighten compressor-to-mounting bracket bolts while maintaining this 58 ft. lb. torque.

Pontiac – Loosen three bolts retaining idler pulley to mounting bracket (pump support bracket on power steering equipped cars - heads of bolts are behind pulley). Insert torque wrench in square hole at end of power steering pump (or idler pulley) bracket. Apply 60 ft. lbs. torque if new belt is being installed, 53-57 ft. lbs. if used belt is re-installed.

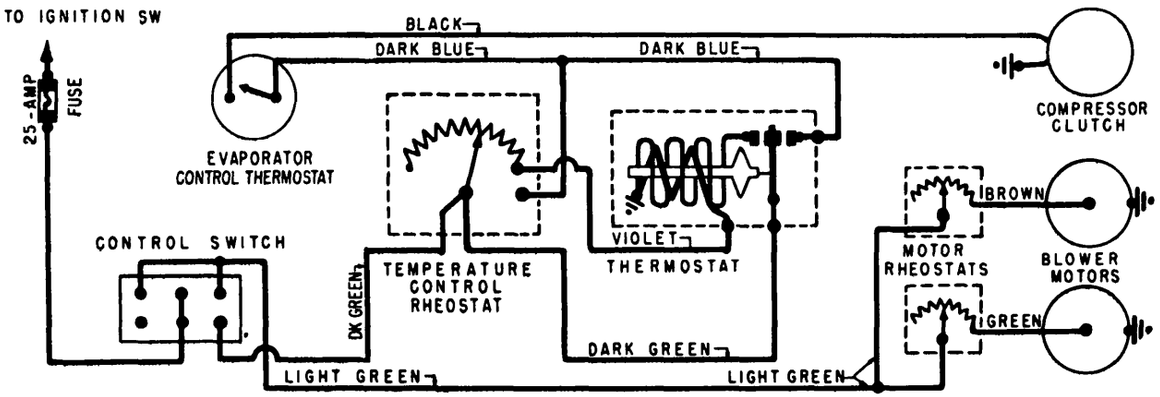
Magnetic Clutch: Energize clutch coil from battery and check clearance between clutch plate armature (not rear pulley cover ring) and coil housing at three different positions. The clearance should be .025-.035". If clearance not correct, it will be necessary to remove pulley and add or remove shims accordingly. Shims are available in the following sizes: .010", .015", .020", .025". By proper selection of shims .005" variance in clearance can be obtained.

Expansion Valve (Buick, Cadillac, Oldsmobile): Remove cap from expansion valve, turn adjusting screw fully clockwise, then counter-clockwise 5 complete turns (Cadillac), 4½ turns (Buick & Oldsmobile). *NOTE* - This supersedes setting of 5 complete turns on Buick. If this does not eliminate ineffective cooling condition, replace expansion valve, assuming that remainder of system is in good operating condition.

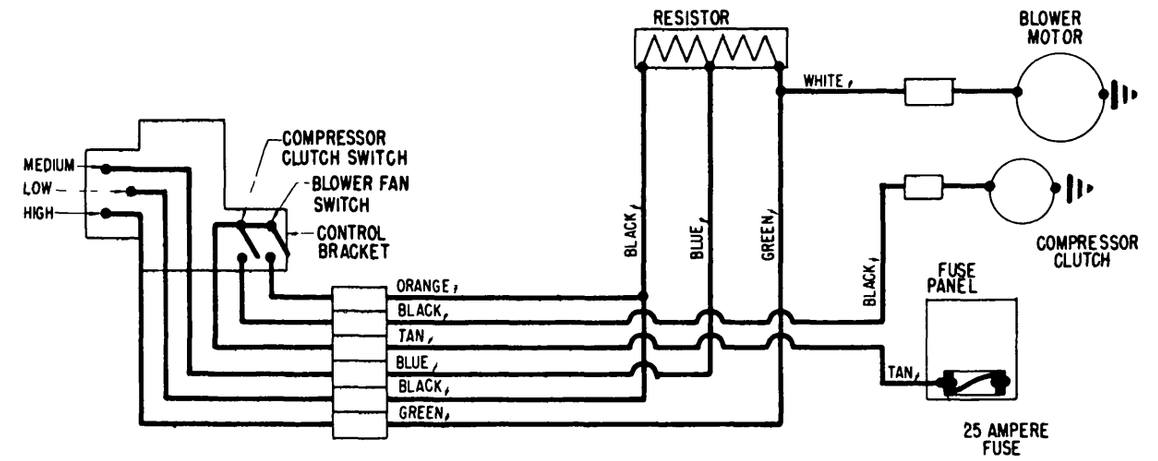
Expansi n Valv (Ch vr l t & P ntiac): If refrigerant is flooding through valve in abnormal quantity (heavy sweating or frosting may occur), close valve adjusting stem ½ turn clockwise. If insufficient refrigerant being supplied to cooling coils, open valve ½ turn counter-clockwise. If necessary, repeat above operation by turning valve in ½ turn increments at a time. *NOTE* - Allow system to balance out before attempting further adjustments. Be sure evaporator is completely de-iced before attempting any adjustment.



BUICK AIR CONDITIONING CONTROL DIAGRAM



CADILLAC AIR CONDITIONING CONTROL DIAGRAM



CHEVROLET AIR CONDITIONING CONTROL DIAGRAM

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1956 FRIGIDAIRE & HARRISON (C ntinued)

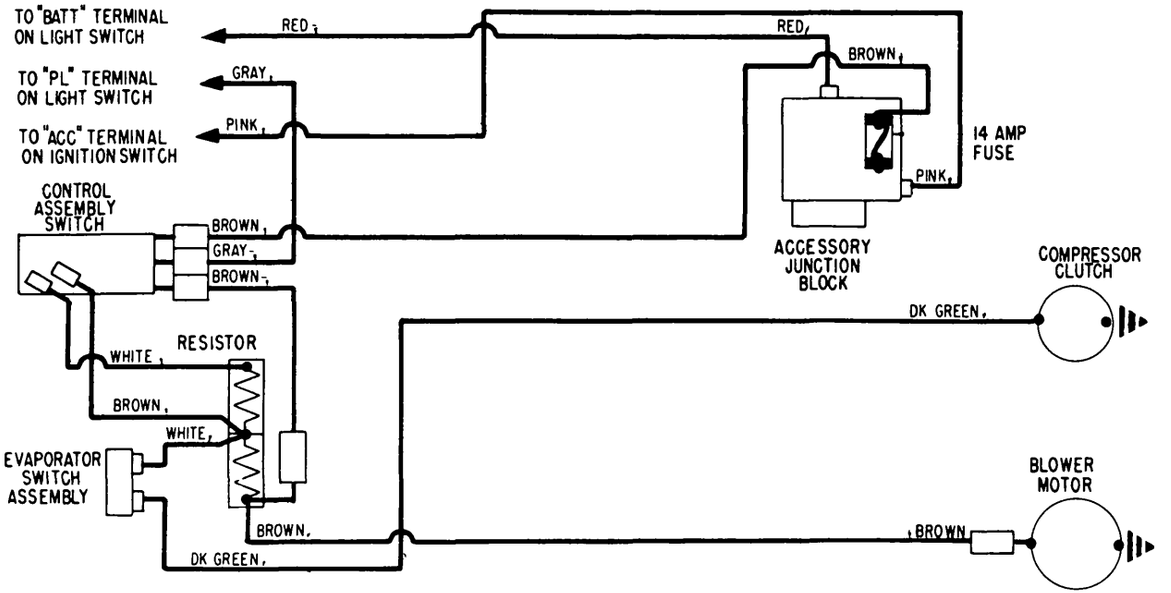
Th rm static Switch (Ch vrolet): *(NOTE* - In full off position, REFR control should be full "UP" and the switch actuating lever fully toward driver's side of car. Adjustment should be made to engage compressor when REFR control is depressed 1/8-1/4"). If icing or frosting condition exists in evaporator (results in poor or no cooling) thermostatic switch is probably set too cold. To adjust remove fiber cover from end of switch assembly and turn adjusting screw one turn clockwise (raises temperature 3° F.). Test operation of unit and check for icing, repeating adjustment as required. Reinstall fiber cover.

"Hot Gas" By-Pass Valv (Buick): Disconnect valve control cable, remove valve control lever and counterbalance spring. Remove nylon cam follower. Connect suction and pressure gauges to compressor. Set engine speed as outlined in table below. Turn slotted screw in valve spring sleeve in or out to give 28-30 lbs. pressure on suction pressure gauge. Reassemble and adjust control cable. *NOTE* - Occasionally a thermostatic expansion valve will stick during long periods of disuse. Rapping sharply on valve housing will usually free needle and place valve in operation.

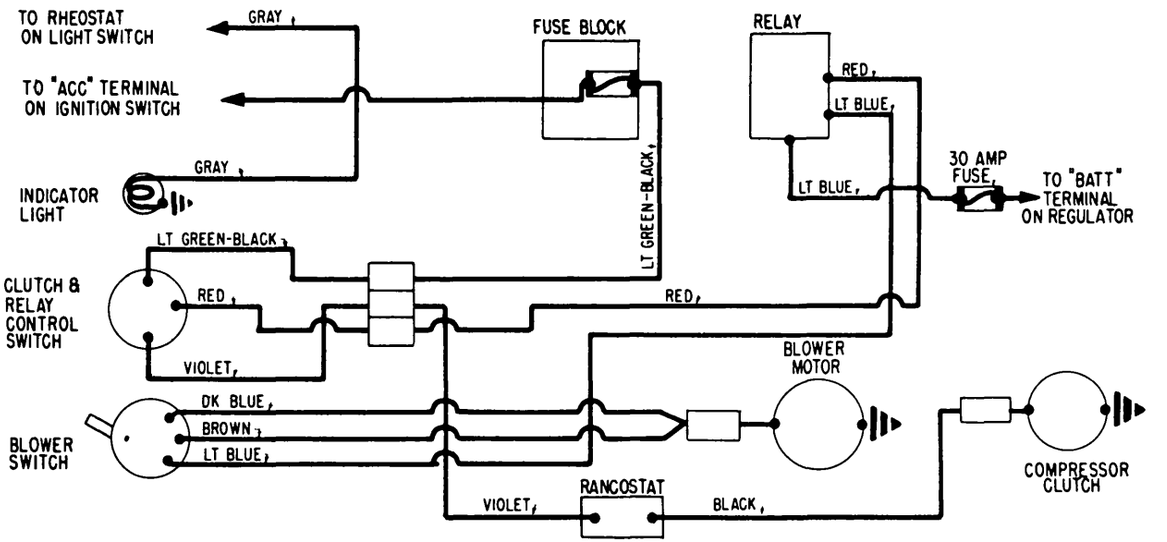
Ambient T mp.	Eng. RPM	Ambient Temp.	Eng. RPM
60	575	100	1300
70	740	110	1550
80	915	120	1800
90	1100		

"H t Gas" By-Pass Valve (Oldsmobile): Remove cap from gauge fitting on low pressure line near evaporator assembly *(NOTE* - Gauge fitting has Schrader valve). Install Adapter, Tool J-5420, on the low pressure gauge line and connect the adapter to the gauge fitting on the low pressure line. Purge the gauge and hose by openi ng the low pressure gauge valve for a few seconds. Start engine and allow to run at 2000 RPM, move refrigeration control lever against the detent, and turn blower speed on "Low". Observe pressure gauge and adjust only if it is not 29-30 psi. If necessary to adjust pressure setting, control cable and lever and cam will have to be disconnected from the by-pass valve in order to insert Tool J-6389 into valve. After valve pressure has been adjusted to 29.5 psi. control cable adjustment will have to be made as indicated below. Turn adjusting scre w clockwise to increase pressure; counter-clockwise to decrease pressure.

C ntr l Cabl Adjustm nt (Oldsmobile) – Check to insure cable is not kinked and operates freely, then disconnect return spring. Place control lever in extreme right position. Disconnect control cable from lever and loosen control cable clamp on the by-pass valve bracket. Loosen lock screw on lever assembly. With lever against stop, position cam so that it just touches the nylon plunger. Tighten lock screw in this position. Install control wire coil over the lever pin and while pushing the cable conduit toward the lever, tighten the cable clamp. Install return spring. Move control to the left and back to the extreme right position. Again check to make sure that cam is against nylon plunger.



OLDSMOBILE AIR CONDITIONING CONTROL DIAGRAM



PONTIAC AIR CONDITIONING CONTROL DIAGRAM

Thermostat Control Cable (Pontiac): Place control lever to "Outside" position. Loosen thermostat control cable clamp (on top of air distributor housing on right side of instrument panel). Hold cable and housing assembly so housing cannot move and slide cable assembly toward right side of car to position temperature valve lever to extreme right position. While holding in this position, tighten cable clamp.

Compressor Clutch & Blower Switch Adjustment (Oldsmobile): Pull air hoses from manifold, remove two air manifold attaching screws, and move manifold towards steering column. From under glove box, loosen two switch capscrews on control assembly. Turn ignition switch to accessory position. Position control lever to "Blower" position. Pivot switch assembly in or out until blower just turns on, then tighten screws. To check adjustment, move control to "OFF" position.

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1956 FRIGIDAIRE & HARRISON (Continued)

Move control lever to right and compare control lever position when blower starts and compressor clutch engages. Blower motor should go on when lever is 7/8" from extreme left position. Clutch should engage when lever is 1¼" from extreme left or "OFF" position.

Clutch & Relay Control Switch Adjustment (Pontiac): Remove radio tuner assembly if car is so equipped. Position air conditioning control lever to "VENT" position and blower switch down for high speed. Loosen two clutch and relay control switch locating bracket screws and pull switch and bracket assembly towards rear of car. Set hand brake and start car. Move switch and locating bracket assembly towards front of car slowly until blower motor operates; hold this position. Tighten clutch and relay control switch locating bracket screws. Move A.C. control switch to "ON" position and check air conditioning operation (compressor clutch coil will energize and operate compressor). Turn off ignition, replace tuner assembly.

Fast Idle Adjustment (Chevrolet): Adjust hand throttle wire guide stop to limit engine speed to 900 RPM with control pulled out and transmission in neutral. Check to see that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not in operation. *CAUTION* - Place parking brake "ON" when necessary to run engine while servicing air conditioning system. Use extreme care to avoid shifting Powerglide equipped vehicles into "D", "L", or "R" positions while fast idle is operating and car is standing still.

COMPRESSOR REMOVAL & INSTALLATION (To Work on Engine): *(CAUTION - See "Air Conditioning Service Cautions" before disconnecting compressor).* Proceed as follows:

Removal (Standard Method): Remove protective caps from gauge fittings of high and low pressure valves on rear end of compressor. Connect charging lines of Pressure Gauge Set to gauge fittings of both valves, with both valves of manifold closed. Remove protective caps and firmly close both valves on rear of compressor by turning valve stems clockwise. Open valves on manifold to discharge all pressure from compressor. Remove any brackets mounted to compressor head flange and mounting bracket. Remove retaining bolt and lockwasher to disconnect valve and mounting plate assembly from rear of compressor. Cover openings in valves and compressor with tape to exclude dirt. Disconnect clutch solenoid wire, then loosen belts and remove compressor from mounting on engine.

Installation (Standard Method): Reverse removal procedures and note the following: (See "Clutch Slippage Corrections" above. If new compressor is installed see note below). Operate compressor for 10 minutes at fast idle, leak test around valve mounting plate. Check system for sufficient Freon charge.

Removal (Optional Method): *See "1954-55 Frigidaire & Harrison" and "1954-Early 1955 Harrison (Pontiac)" Air Conditioning.*

► *NEW COMPRESSOR INSTALLATION CAUTION:* Oil from old compressor should be drained and oil measured. Oil in new compressor should be drained completely and an amount of oil equal to that drained from original compressor should be replaced. **After new compressor is installed, but before it is operated,** purge it of air by loosening pressure relief valve (at top of compressor) until a slight hiss of escaping gas is noted. Bleed for one or two seconds, then tighten pressure relief valve. Operate compressor at fast idle for a few minutes to build up head pressure, then repeat purge. *CAUTION* - Do not loosen relief valve too far or fast, because if it pops out, the whole charge will be lost.

LEAK TESTING: *See "Leak Testing Air Conditioning System".*

TROUBLE SHOOTING: *See "Air Conditioning Trouble Shooting".*

CHECKING, ADDING OIL TO COMPRESSOR & ADDING PARTIAL CHARGE OF REFRIGERANT: *See "1954-55 Frigidaire & Harrison" and "1954-Early 1955 Harrison (Pontiac)" Air Conditioning.*

CAPACITIES: (Buick) 5.5 lbs. (Cadillac) 5 lbs. (Chevrolet) 2.5 lbs. (Oldsmobile) 3¾ lbs. (Pontiac) 5 lbs.

1957-60 FRIGIDAIRE & HARRISON

Buick (1957–60)
Cadillac (1957–60)
Chevrolet (1957–60)
Oldsmobile (1957–60)
Pontiac (1957–60)

►CHANGES, CAUTIONS, CORRECTIONS

► *1957 BUICK COMPRESSOR DISCHARGE VALVE PLATE PRODUCTION CHANGE (To correct a noisy compressor condition):* Beginning with compressor Serial No. 44GC002, a new discharge valve plate, Part No. 5913872 is being used to reduce compressor noise. This plate may be used on 1956 and early 1957 compressors. *NOTE - On 1956 compressors, if the discharge plate is defective and the compressor is not noisy, Discharge Valve Plate, Part No. 5912672 should be used.*

► *1957 BUICK FAN SHROUD PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* The full type fan shroud, Part No. 1178037 used on early air conditioned cars has been replaced by a ring type shroud, Part No. 1174402. Use the ring type shroud for service replacement on cars having the full type shroud. Two mounting brackets, Part No. 1178198 & 1178199 must be used to install the ring type shroud. *See "Radiator Production Change" below.*

► *1957 BUICK RADIATOR PRODUCTION CHANGE:* A new wider radiator is being used on late 1957 air conditioned cars. A new full type fan shroud, Part No. 1179450, and mounting brackets, Part No. 1178198 & 1178199 is used with the wider radiator.

► *1957 BUICK INSUFFICIENT COOLING CORRECTION:* This condition may be caused by the Ranco valve not being locked out due to improper adjustment of the control cable or the lock pin on cam of Ranco valve not being positioned properly. To adjust control cable, loosen cable clamp at valve, and close valve, making sure that cam is in complete engagement with lockpin and holding lockpin up. Set control knob 1/16" from the off position and tighten cable clamp. Check to see that valve is locked out when control lever is in the "off" position. To adjust lockpin (in instances where the valve is not operating properly, allowing warm water to enter heater core and warming the cool air before it enters passenger compartment), bend lockpin on Ranco valve "down" just enough to cause a drag on cam of valve, or when rotating cam clockwise, the cam overcenter spring snaps edge of relieved portion of cam to centerline of lockpin, where further movement of cam to the fully closed position will lock valve closed. *CAUTION - The above lockpin adjustment must be made at room temperature or not more than 70°F.*

► *1957 BUICK AIR CONDITIONING COMPRESSOR VIBRATION AT LOW SPEED (WITH BLOWER ON "LOW"):* This vibration may be reduced by reworking the compressor rear mounting bracket as follows: Remove bracket and use a 5/8" drill to enlarge bracket-to-intake manifold bolt hole. Remove burrs and rough edges. Reinstall compressor bracket using a spacer made from ½" I.D. welded steel tubing cut to a length of 7/32", and a spring washer. Tighten bolt at intake manifold to 10-15 ft. lbs. This will allow engine to move sideways without exerting pressure against bracket.

► *1957 CADILLAC AIR CONDITIONER COMPRESSOR CLUTCH CHANGE:* On later cars, the rear face of clutch cover, Part No. 5916841, is not ground with a finished surface. The unground side, identified by a stamped letter "O", must be installed toward rear of compressor.

► *1958 AIR CONDITIONING COMPRESSOR SAFETY SWITCH NOTE:* A pressure-temperature sensitive switch is connected in compressor feed line on some cars to protect compressor against damage due to clogging. Freon leakage, and excessively high temperatures. When a superheat condition occurs an electrical circuit will be completed to ground. Grounding this circuit blows a 4 amp. fuse in the circuit and disengages the compressor clutch. To prevent blowing of 4 amp. fuse during a momentary unbalance, a temperature sensitive resistor is series connected in line from safety switch to clutch circuit. This resistor (Thermistor) will momentarily delay full grounding of circuit.

► *1958 BUICK FAN PULLEY (AIR CONDITIONED CARS) INSTALLATION CAUTION:* Pulley, Part No. 1185307,

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1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

used on air conditioned cars having a 5/8" water pump shaft should be installed with open face forward. Other fan pulleys should be installed with closed (smooth) face forward

►*CADILLAC SERIES 75 EVAPORATOR FREEZE-UP NOTE:* **To defrost the cooling coil, adjust blower control to its highest position and move temperature lever to extreme right or "Off" position for approximately 5 minutes**

►*1958 COMPRESSOR OIL PRODUCTION CHANGE:* A new compressor oil, "1000 Viscosity" is being used in place of the previous "525 Viscosity" oil in some cars Either of the two types of oil may be used for service replacement when adding oil to compressor. DO NOT use "1000 Viscosity" oil in 1957 or earlier compressors

►*1959 EARLY BUICK AIR CONDITIONER FUSE BLOWING CORRECTION* Replace present 20 amp fuse with a 25 amp fuse If fuse continues to blow, replace blower motor

►*1959 BUICK COMPRESSOR CLUTCH STICKING CORRECTION* If this condition is caused by compressor clutch switch points not closing when control lever is turned to "on" position, operating lever (extending out of switch body) may be contacting body of switch and preventing points from closing To correct, center plastic body on switch If sticking is not eliminated determine if spring tension of switch is not allowing points to close If so, replace switch

►*1959 CADILLAC COMPRESSOR DRIVE BELT REPLACEMENT NOTE* Because of a smaller diameter compressor pulley being used on some models, it is important that the proper drive belt be installed On cars with 5¾" diameter compressor pulleys, use Belt, Part No 1469271 On cars with 5" pulley, use Belt, Part No 1473152

►*1959 CADILLAC SERIES 67 FREON CAPACITY CHANGE (TO CORRECT "HISSING" NOISE IN SYSTEM)* Install 5 lbs of Freon instead of 4 5 lbs previously specified

►*1959 & EARLIER CADILLAC AIR CONDITIONER CHARGING TOOL ADAPTER J-5420 REWORK (TO PERMIT INCREASED CHARGING RATE)* Lengthen depressing tang in center of Tool J-5420 1/16" as follows Dress top of tang for soldering, then place a drop of solder on top of tang File it square and to a height of 1/16"

►*1959 CADILLAC SERIES 67 AIR CONDITIONER "GROWLING" NOISE IN REAR SEAT CORRECTION* To determine if the noise is being transmitted and amplified through the suction line, disengage compressor while noise is occuring If noise stops, suction hose should be replaced by a special hose and muffler, Part No 3146487 *NOTE - Do not confuse growling noise with 'hissing' noise which may develop because of low Freon charge*

►*1959 OLDSMOBILE AIR CONDITIONING COMPRESSOR MOUNTING PRODUCTION CHANGE & VIBRATION CORRECTION* On later units, the rubber mounting at front of compressor has been eliminated and a revised generator bracket is used If vibration occurs in either early or later type units, check for mis-positioned parts that may be grounded and correct as necessary This should correct vibration in later units If repositioning does not correct vibration in early units, install Compressor Mounting Package, Part No 577372

►*1959 OLDSMOBILE "HOOTING" NOISE CORRECTION* This noise may occur at approximately 40-50 MPH and can be corrected by installing a later type low pressure hose, Part No 577372

►*1959 PONTIAC FAILURE OF AIR TO RECIRCULATE INSIDE CAR CORRECTION.* Connect the red striped vacuum hose to diaphragm nearest center of car (extreme upper left diaphragm) Connect the hose with a green band at end to upper center diaphragm

►*1959 PONTIAC REDUCED AIR FLOW (DURING HEAVY ACCELERATION) CORRECTION* Install a new Vacuum Check Valve, Part No 534656 and a Check Valve Retaining Clip, Part No 120526 Make sure end of check valve with groove in "hex" is downward A new carburetor-to-check valve vacuum hose 17½" long (Triple 2-Barrel Carbs), 13" long (2 & 4-Barrel Carbs) should also be installed to permit installation of vacuum valve and clip on air duct and blower assembly with existing screws

►*1960 BUICK FUSE SPECIFICATION CHANGE* Air conditioning fuse changed from 25 to 30 ampere capacity Later cars have 30 ampere fuse Install 30 ampere fuse on earlier cars (especially on heater equipped cars)

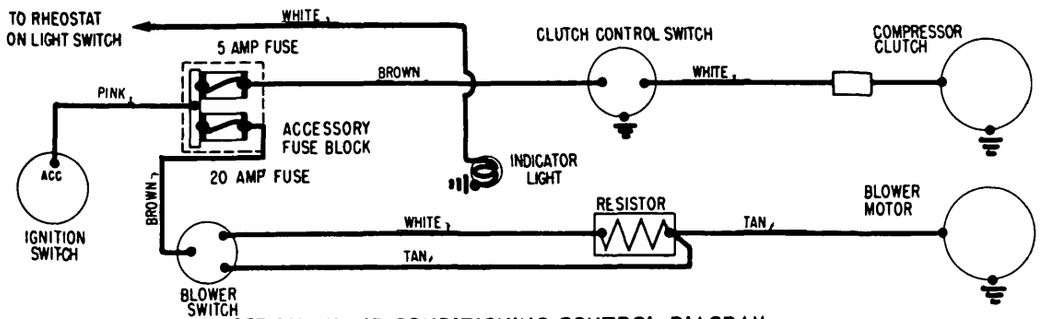
►*1960 BUICK HARD OPERATING CONTROL CORRECTION:* Caused by binding condition in hot gas by-pass valve control To correct replace early control that does not operate correctly with new control Part No 1194686(Identified by brass cap on detent of top lever and an "X" mark on vacuum valve assembly Part No 1194701) *NOTE* - Use a new hot gas valve control wire with new assembly.

►*1960 BUICK ANTI-FREEZE NOTE* Use a permanent type anti-freeze to protect cooling system, and to eliminate boiling on warm day

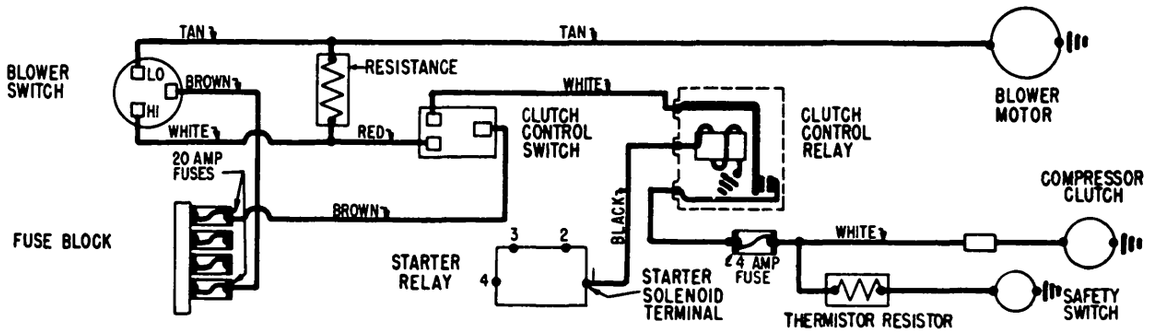
►*1960 CADILLAC COMPRESSOR SEAL REPLACEMENT CAUTION* DO NOT replace seal (after proprolonged inactivity of system) without first charging system (to clear air bubbles in sight glass) and operating system at 1500 engine RPM for approximately 10 minutes to re-establish an oil wetted seal *NOTE* - Seal will restore itself

►*1960 CADILLAC COMPRESSOR PULLEY PRODUCTION CHANGE & 1500 ENGINE RPM NOISE CORRECTION* A 5½" diameter compressor pulley used on some cars effective with Engine No 045000 and all cars effective with Engine No 054000 Use this diameter pulley on earlier cars when beating noise develops Cars prior to Engine No 020567 will also require the installation of a new rear adjustment bracket Part No 1475398 or a rework of old bracket to accommodate ¾" rubber bushings and steel sleeves, in bracket attaching holes

►*1960 CADILLAC CHECK VALVE PRODUCTION CHANGE & ERRATIC VALVE OPERATION CORRECTION* Synthetic rubber ball check assembly Part No 1476097 (identified by black "X" on hex fitting) used effective with Engine No 043375 To correct earlier cars, install new ball check only, Part No 1476098 in original valve fitting assembly



1957 BUICK AIR CONDITIONING CONTROL DIAGRAM



1958 BUICK AIR CONDITIONING CONTROL DIAGRAM

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1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

►*1960 CADILLAC BY-PASS VALVE RELOCATED TO CORRECT COMPRESSOR NOISE:* Effective with Engine No. 069500, by-pass valve attached to fender dust-shield and rubber mounted to reduce compressor noise. To correct earlier cars, isolate by-pass valve valve from compressor by inserting insulating spacer part No. 1475571 between it and compressor. Attach it to compressor with two original screws and use two 5/16" x 24 hex head screws to attach it to by-pass valve.

►*1960 PONTIAC TEMPERATURE REGULATION VALVE & CONTROL CABLE MOUNTING BRACKET PRODUCTION CHANGE:* New bracket eliminates metal to metal contact reducing noise. For new cable adjustment procedure, see "Control Cable Adjustment" below.

DESCRIPTION: Design and operation of this system is similar to previous systems. All units are located in engine compartment or on front of dash (except Cadillac Series 75 which has the evaporator located in luggage compartment). The compressor used on 1958 models, while similar in design to those used in 1957, develops a higher discharge pressure.

►*SHUT-OFF VALVE NOTE:* Hand operated or Schrader type valves are used in intake and discharge lines. *CAUTION - Schrader type valves are opened by special adapters on charging hoses and it is very important that charging hoses be connected to Gauge Set, J-5725 or equivalent, and the set manifold valves be completely closed before making connections to valves.*

SERVICE CAUTION: *Before disconnecting any part of air conditioning system or lines, see "Air Conditioning S rvice Cautions" at beginning of Air Conditioning S ction.*

LEAK TESTING & TROUBLE SHOOTING: *See "Leak Testing & Trouble Shooting" at beginning of Air Conditioning Section.*

ADJUSTMENT

COMPRESSOR BELT: Adjust belt as follows:

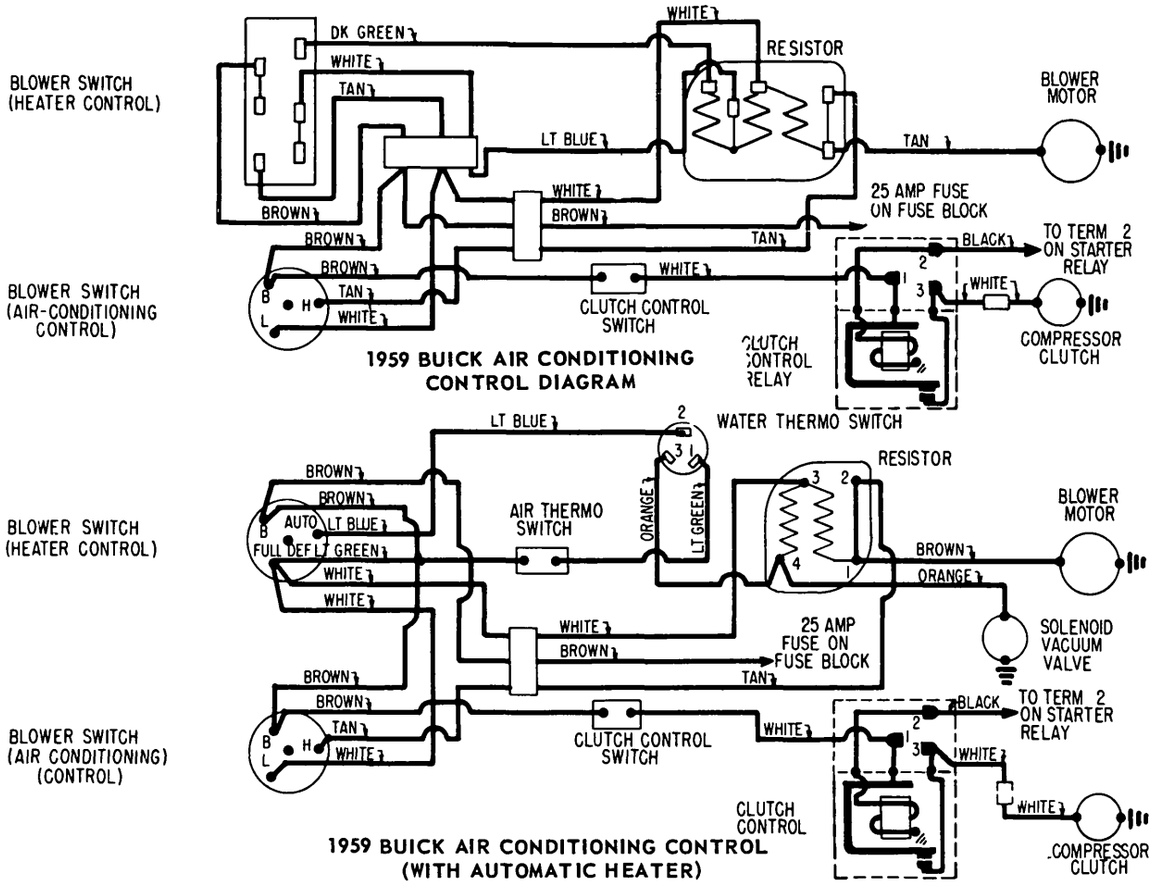
Buick: Adjust drive belts to 3/8" (1957), 1/2" (1958), deflection midway between pulleys. Adjust belt (1959–60) so that 15–20 lbs. torque is required to slip generator belt.

Cadillac: Using Belt Tensioner Gauge, Tool J-6733, install tool on belt and adjust tension so red line on gauge lines up with gauge shoulder.

Chevrolet: (1957–58) – Use Tool 6212 on torque wrench placed on compressor seal and housing with lug of tool facing toward rear of car and inserted into unused hole in compressor mounting flange on battery side of electrical connector. Loosen compressor brace bolt and bracket pivot bolt and apply 30-40 ft. lbs. torque to compressor. Tighten brace and bracket pivot bolts.
(1959–60) – Adjust belt to give 1/2" to 3/4" deflection under 15 lb. load measured midway between compressor and crankshaft pulleys.

Oldsmobile: Loosen generator adjusting link bolt and bracket pivot bolts. Place Tool 33-70 on belt, then pry generator away from engine until pointers on tool

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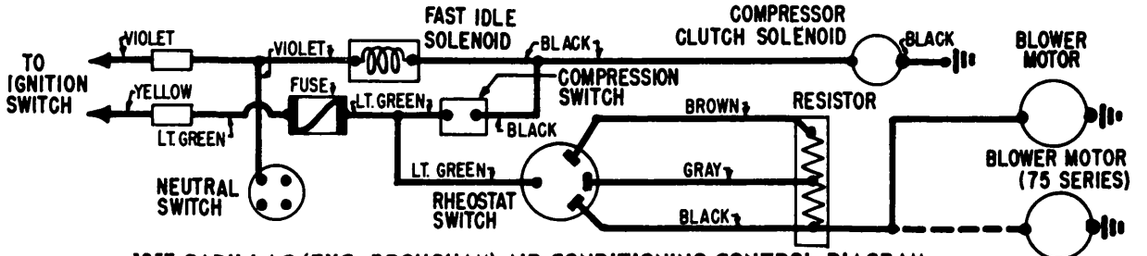


1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

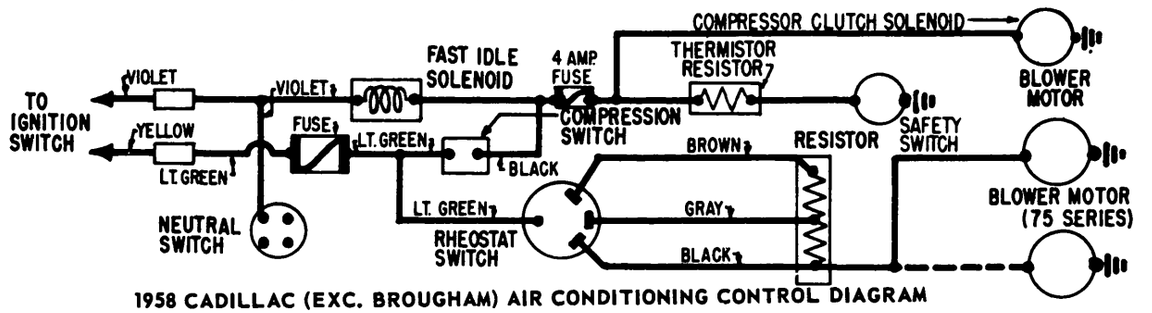
are even with line on tool plunger. Tighten generator link bolt and bracket pivot bolts.

P ntiac (1957): Loosen three bolts retaining idler pulley to mounting bracket (pump support bracket on power steering equipped cars). Heads of bolts are located directly behind pulley. Insert torque wrench in square hole at end of power steering pump (or idler pulley bracket). Apply 35 ft. lbs. torque with wrench to tighten belt. While holding proper torque, tighten retaining bolts securely. *NOTE* - Do not tighten belt unless looseness is indicated by slipping.

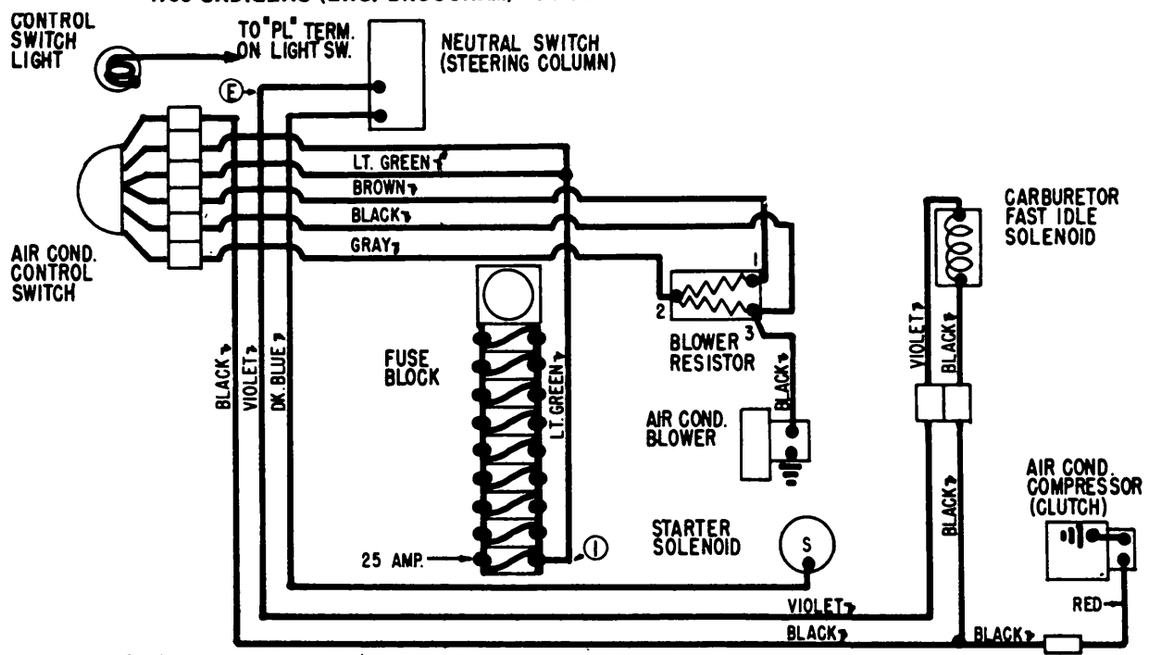
Pontiac (1958): ¼" belt deflection midway between generator and water pump pulleys with a 7½ lb. load applied.



1957 CADILLAC (EXC. BROUGHAM) AIR CONDITIONING CONTROL DIAGRAM



1958 CADILLAC (EXC. BROUGHAM) AIR CONDITIONING CONTROL DIAGRAM



1957-58 CADILLAC ELDORADO BROUGHAM AIR CONDITIONING CONTROL DIAGRAM

NOTE - When installing a new belt, there should be ¼" deflection with a 15 lb. load applied.

(1959–60) –¼" deflection midway between generator and water pump pulleys with a 5–6 lb. load applied, or 100–105 lbs. on Burroughs Belt Tension Gauge.

MAGNETIC CLUTCH: Energize clutch coil from battery and check clearance between clutch plate armature and coil housing at three different locations. The clearance should be .025-.035" (1957), .035-.045" (Others). If clearance not correct, remove pulley and add or remove shims as necessary. Shims are furnished in .010", .015", .020", .025" thicknesses.

EXPANSION VALVE: This valve is preset at factory and cannot be adjusted in the field.

HOT GAS BY-PASS VALVE: (1957 Buick, Cadillac, Oldsmobile; 1958–60 Models): Adjust valve for each car as follows:

Buick: Remove control valve lever, counterbalance spring and nylon cam follower. Connect service (high & low pressure) gauges to compressor. Close gauge set valves and open compressor valves to gauge position. Set engine speed at 1600 RPM, then turn unit on and allow time for stabilization. Turn adjusting screw in or out to obtain 28–30 lbs. (1957), 23–25 lbs. (1958), 25–28 lbs. at 80–90°F (1959–60) reading on suction (low) pressure gauge. *NOTE – If valve has been rebuilt, it may be necessary to add or remove plunger shims to obtain proper adjustment.* Reinstall cam follower, control pin, lever and spring, then readjust and connect cable control cable.

Cadillac (1957): Remove cap from gauge fitting on side of Hot Gas By-Pass Valve. Install adapter J-5420 on low pressure gauge line and connect adapter to gauge fitting. Purge gauge and hose by opening low pressure gauge valve for a few seconds. Start engine and allow to run at 1500 RPM. Move "Temp" lever to coldest setting and set "Air Cond" lever to "low". Check pressure on gauge and adjust only if reading is not 29½-30¼ lbs. To adjust, disconnect return spring and bowden cable, then remove control lever and nylon plunger. Using Tool J-6389, turn adjusting screw clockwise to increase pressure, counterclockwise to decrease pressure, to obtain 30 lbs. pressure. *(NOTE - Turn adjusting scr w ¼ turn and allow time for gauge to settle).* With engine off, remove gauge hose from pressure fitting and replace cap. Adjust control cable *(see below).*

Cadillac (1958–60): Connect both pressure gauges to the compressor and purge lines. Start engine and allow it to operate at 2000 RPM. Move "Temp" lever to coldest setting and "Air Cond." lever to low. Allow system to operate for approximately 5 minutes, then bring the high pressure to 200 lbs. by blocking air flow through condenser or placing a fan front of condenser. When high pressure is at 200 lbs., low pressure should be 30 lbs. (Series 60 & 62), 28 lbs. (Series 75). If not correct, disconnect bowden cable and return spring and return spring and remove control lever by removing retainer clip and sliding pivot pin out. Remove nylon plunger. Use Tool J-6389 and turn adjusting screw clockwise to increase pressure or counterclockwise

CONTINUED ON NEXT PAGE

1957-60 FRIGIDAIRE & HARRISON (C ntinued)

to decrease pressure. *NOTE - Turn adjusting screw ¼ turn and allow time for gauge to settle. Repeat if necessary. This is important as gauge does not immediately indicate actual reading.* With engine turned off, remove gauge hose from pressure fitting and replace cap. Adjust bypass cable.

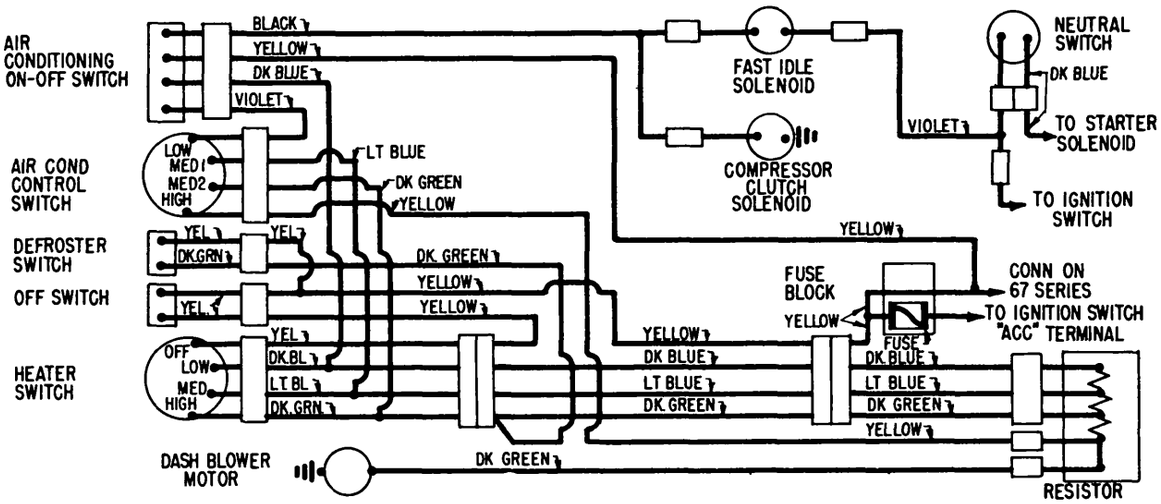
Ch vrolet (1958): Connect gauge set to compressor, then turn hand shut-off valves two turns clockwise. Purge lines by opening gauge set valves a few seconds, then start engine and operate at 1500 RPM. Move COLD lever to extreme right and set AIR lever in down position. Set FAN switch for medium speed. Place paper in front of condenser until head pressure reaches proper operating range (190-230 lbs. at 70° ambient temperature). If valve is properly set, reading on low pressure gauge should be 27 lbs. If pressure reading is incorrect, disconnect return spring and bowden cable from hot gas valve and return clip, pin, lever arm, and nylon spacer from valve. Use Tool J-6389 and slowly adjust valve until low pressure reading is correct. Replace lever and other valve parts and adjust valve operating cable.

Oldsmobile - Remove cap from gauge fitting on low pressure line near the evaporator assembly. Install Adapter J-5420 on low pressure gauge line and connect adapter to gauge fitting on low pressure line. Purge gauge and hose by opening low pressure gauge valve for a few seconds. Start engine and allow to run at 2000 RPM. Move temperature control lever to extreme right position, turn blower speed on "low" and engage "Recirculation" button. Place paper in front of condenser to obtain a head pressure of 200 lbs. Check pressure on low pressure gauge and adjust only if pressure is not 29-30 lbs. To adjust, remove control cable, lever and cam, then insert Tool J-6389 into valve. Adjust pressure to 29½ lbs. by turning screw clockwise to increase pressure, counterclockwise to decrease pressure. Turn engine off, remove gauge hose from pressure fitting and replace cap. Reinstall control lever assembly, then adjust control cable *(see below)*.

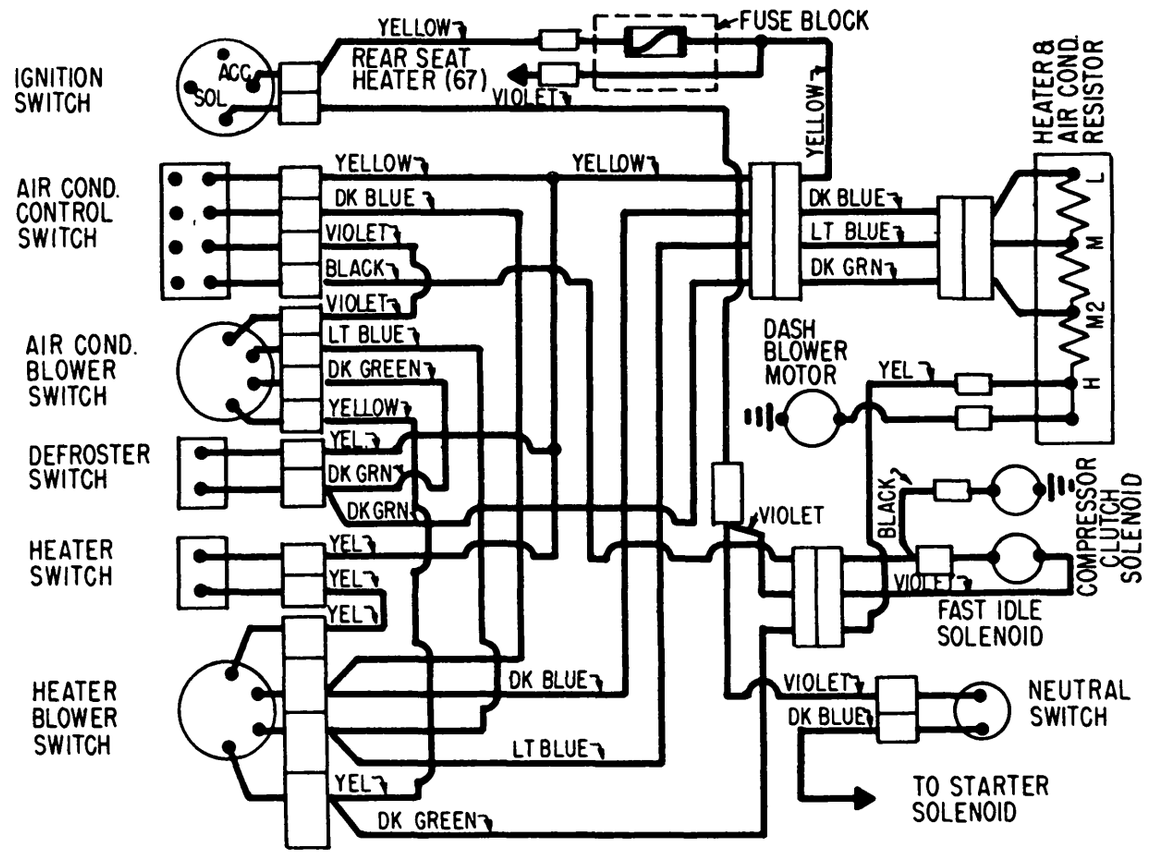
P ntiac (1958): Attach gauge set to evaporator gauge fittings, then operate air conditioning system for five minutes to stabilize it, with temperature control lever fully down and blower control lever down for high speed. If evaporator tank pressure is not 29 lbs., disconnect control cable at lever and remove lever and nylon spacer. Use Tool J-6389 and adjust valve as necessary to give 29 lbs. pressure at evaporator top tank. Replace plunger, lever and control cable. Readjust cable.

(1959–60) – Connect gauge set to compressor, then push temperature control level full down for maximum cooling (valve lever cam should just contact nylon plunger). Depress "Inside" button and position blower to "Hi". Close doors and windows, then start engine and run at 2900 RPM for 3 minutes. Reading on low pressure gauge should be 25–26 lbs. If not within this

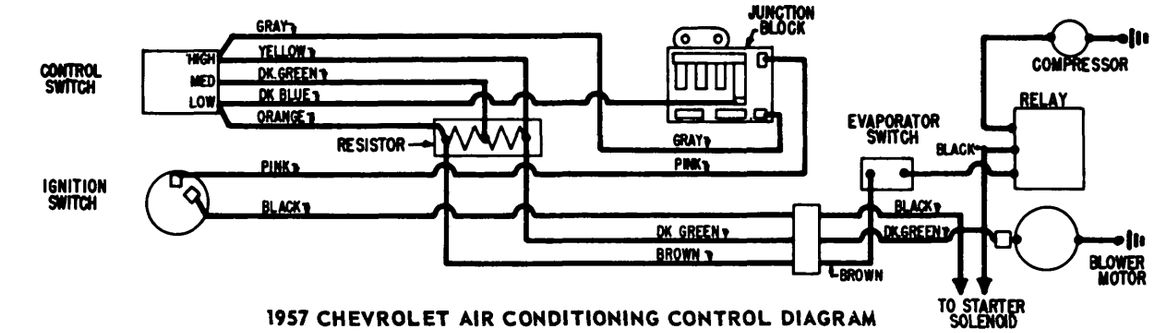
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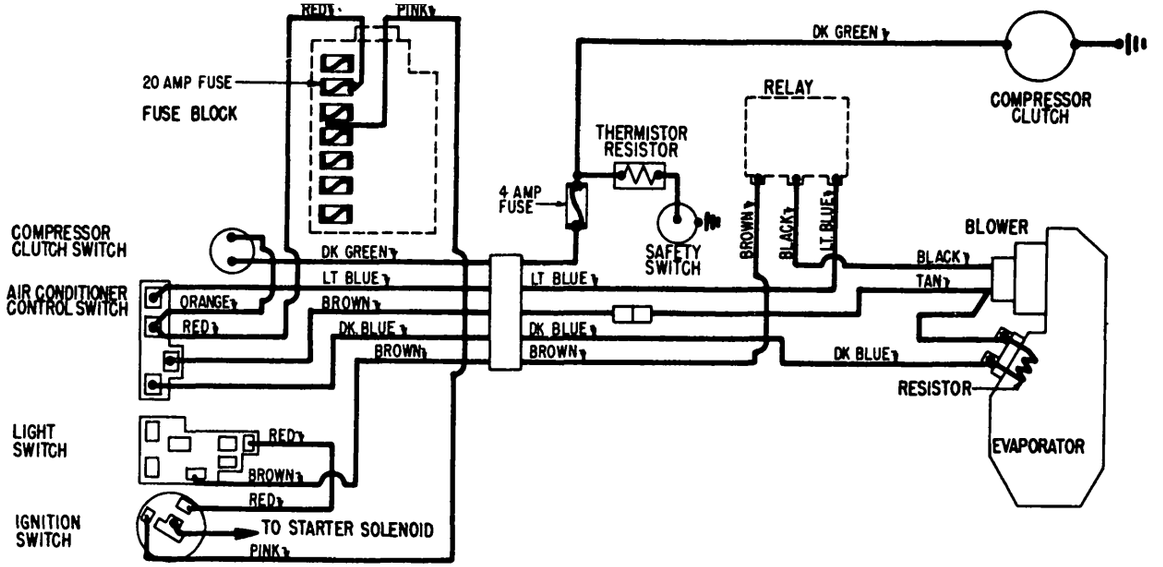
1959 CADILLAC AIR CONDITIONING CONTROL DIAGRAM



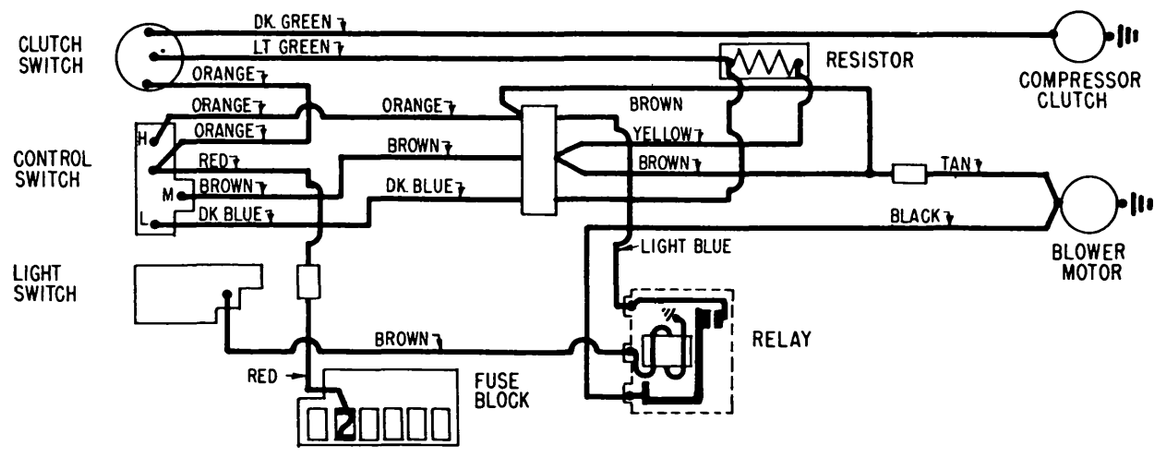
1960 CADILLAC AIR CONDITIONING CONTROL WIRING DIAGRAM



1957 CHEVROLET AIR CONDITIONING CONTROL DIAGRAM



1958 CHEVROLET AIR CONDITIONING CONTROL DIAGRAM



1959-60 CHEVROLET AIR CONDITIONING CONTROL DIAGRAM

1957-60 FRIGIDAIRE & HARRISON (C ntinued)

range, remove valve lever and nylon plunger and adjust valve with Tool J-6389. *NOTE – Make adjustments in small increments and allow time for pressure to stabiliz .*

Control Cable Adjustment (Hot Gas Bypass Valve): Buick - Set temperature control (left hand) lever on lower roll of control panel to "Max.". Disconnect bowden wire loop from pin on lever of hot gas bypass valve and push lever all the way toward dash and release slowly. Lever will stop in "Max." cooling position. Adjust bowden wire sheave so loop matches position of pin on lever. Clamp bowden sheave in position with loop encircling pin and replace spring grip washer.

Cadillac (1957–58) – Be sure cable is not kinked and operates freely, then disconnect return spring. Place "Temp" control lever in extreme forward position. Disconnect control cable from lever on bypass valve and loosen cable clamp on bracket. Loosen lock screw on lever assembly, then with lever against stop, position cam so that it just touches nylon plunger. Tighten lockscrew. Install control wire coil over lever pin and while pushing cable conduit toward lever, tighten cable clamp. Install return spring. Move control lever back and forth to make sure cam is against nylon plunger.

Cadillac (1959–60) – Make sure cable is not kinked and that it operates freely, then disconnect counterbalance spring, bowden cable from lever, and loosen clamp on bypass bracket. Loosen lockscrew on lever assembly, then set lever against stop and position cam so that it just touches nylon plunger. Tighten lockscrew in this position. Set horizontal sliding lever on instrument panel (inside car) to extreme right position. Install bowden cable on lever pin, and while pulling cable conduit away from lever, tighten cable clamp and install counterbalance spring. Move horizontal sliding lever in car back and forward and check to make sure that cam is against nylon plunger.

Chevrolet - Make sure cable operates freely, then disconnect return spring. Move COLD lever on dash control to extreme right to maximum cold position. Remove bowden wire loop from lever arm, then move lever arm toward front of car to end of its free travel. Loosen clamp holding bowden wire sheath and move sheath until wire loop matches position of lever arm pin when pin is held ¼" to rear of the maximum cooling position. Tighten clamp and reinstall wire on lever.

Oldsmobile - Place control lever in extreme right position. Disconnect control cable from lever and loosen cable clamp on bypass valve bracket. Loosen lockscrew on lever assembly. With lever against stop, position cam so that it just touches nylon plunger, then tighten lockscrew. With bypass lever held against its stop, install control wire coil over lever pin while pushing cable conduit toward lever to remove slack. Tighten cable clamp and install return spring. Move control lever to extreme left and back to extreme right position.

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1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

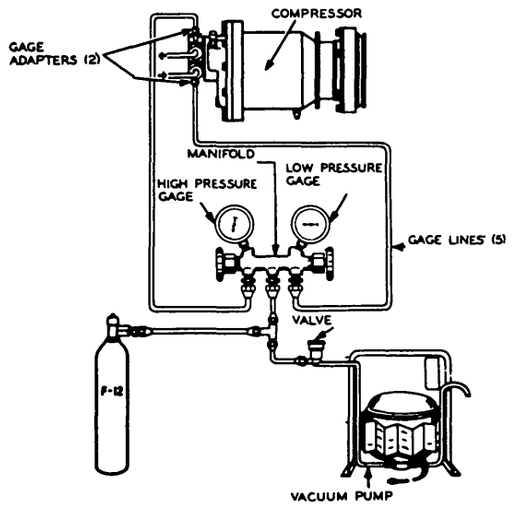
There should now be 1/16-3/32" spring back of lever. Check to make sure cam is just touching nylon plunger.

Pontiac (1957–58) – Back temperature control lever up 1/8" from full down position. Loosen control cable position, then back it up 1/8" Loosen control cable clamp at valve enough to allow cable housing to slide freely, then disconnect control cable from valve lever Move lever fully forward (toward front of car) and allow to return slowly until lever stops With lever in this position slide cable assembly through clamp and attach cable to valve lever While holding cable in this position, tighten clamp

(1959–60) – Disconnect bowden cable loop from valve cam lever and disconnect spring, then pull loop as far forward (toward front of car) as possible. Move lever, on valve forward and return it slowly until lever just contacts nylon plunger (Early cars) or contacts pusher inside valve body extension (Later cars). Hold lever in this position. *NOTE – If cable loop does not extend 1/8" ahead of valve lever pin, loosen bowden cable clamp at valve and slide cable housing as required.* Install bowden cable loop on valve lever and connect spring.

THERMOSTATIC SWITCH (Chevrolet): Switch is preset and sealed Not adjustable *See "Control Cable Adjustment" below*

Control Cable Adjustment (Thermostatic Switch)· Chevrolet 1957 - Adjust cable as required to give full travel of switch lever Adjustment may be necessary at both ends of cable and should be made by loosening clamp screws as required then tightening after proper positioning *NOTE* - In the off position COLD lever should be full "UP" and the switch actuating lever fully up Adjustment should be made to engage compressor when the COLD lever is depressed 1/8-¼"



GAUGE SET INSTALLATION

Compressor Clutch Switch: Buick – Adjust switch position so switch closes when control lever is moved down ¼" (1959), 1/16" (1960), from fully closed position.
Chevrolet (1959–60) – With Outlet Control Knob pushed in, loosen clamp holding bowden cable and move cable until loop on cable matches the pin on lever when lever is pushed as far as it will go toward right side of car, then tighten clamp screw.
Oldsmobile – Adjust switch position so switch closes when control lever is moved ¼" from its extreme left position.
Pontiac – Adjust switch position so switch closes when control lever is moved downward ¼" from full "up" position.

FAST IDLE ADJUSTMENT (Chevrolet): Adjust hand throttle wire guide stop to limit engine speed to 900 RPM with control lever pulled out and transmission in neutral Check to see that fast idle control linkage does not interfere with normal operation of carburetor linkage when fast idle is not operating

THERMOSTAT CONTROL CABLE (Pontiac 1957): Place air conditioner control lever in full right position Loosen thermostat control cable clamp (on top of blower housing under right side of instrument panel) Hold cable and housing assembly so housing cannot move and slide cable assembly toward left side of car to position temperature valve lever to extreme left position While holding in this position tighten cable clamp

MASTER CLUTCH & RELAY CONTROL SWITCH ADJUSTMENT (Pontiac 1957): Remove radio speaker glove box and radio Position air conditioning control lever to "Vent" position and blower switch to right for high speed Loosen clutch and relay control switch locating bracket nut and pull that part of switch and locating bracket assembly held secure by the nuts toward rear of car Set hand brake and move ignition key to "ON" position Move switch locating bracket towards front of car slowly until blower operates then hold in this position and tighten nut to secure bracket Move air conditioning control lever to left end of "COOLER" band turn ignition switch to start car and check air conditioner operation (compressor clutch will energize and operate compressor) Turn ignition switch off and replace radio glove box and radio speaker

SERVICING

GAUGE SET INSTALLATION: Connect gauge set to compressor (see illustration) *NOTE - For purging or adding oil to system Freon tank and Vacuum Pump are not connected to center connection on manifold* Make sure that shutoff valves on gauge set are fully closed and that shutoff valves on compressor head (cars with this type valve) are turned fully COUNTERCLOCKWISE (back seated)

►*CADILLAC NOTE· Low pressur Schrad r type valve is located at Hot Gas Bypass Va lve.*

►*SCHRADER TYPE VALVE CONNECTION CAUTION: On cars using this type valve in place of hand op rated shut off valv s in refrigerant lines at compressor head, it is necessary to connect Adapt rs J-5420 to gaug connecting lines and to make sur that both valv s on gauge set are completely cl s d b for conn cting adapters to Schrader type valv s as th adapt rs will automatically open these valves.*

►*HAND OPERATED SHUT OFF VALVE NOTE:* These are two-way valves. When turned COUNTERCLOCKWISE (back seated), compressor is connected to refrigerant lines and line to gauge fitting is closed. This is the normal operating position. When turned CLOCKWISE (front seated), compressor is closed off from refrigerant lines and open to gauge fitting. When valves are turned to middle position, compressor is open to both refrigerant lines and to gauge fitting. In this position, gauge readings can be taken with system in operation.

►*HIGH PRESSURE GAUGE CAUTION:* Due to increased operating capacity of new compressor, a 600 lb gauge must be used

ALL MODELS

PURGING THE SYSTEM: Connect gauge set (see above), then open both compressor hand shutoff valves ¼ turn clockwise from a full counterclockwise position Remove cap from gauge center connection on manifold,then open high pressure gauge valve, being careful not to open it too far, and slowly discharge vapor through center connection *CAUTION - Op ning valv t o far will cause compressor oil to b discharg d with th Freon* When pressure is reduced below 100 lbs on high pressure gauge, open low pressure gauge valve and continue discharging until 1 to 2 lbs of refrigerant remain in system *NOTE - Valves on gaug s t can be closed from time to time to ch ck remaining pr ssur .* Leave gauge set connected in preparation for evacuating and charging

ALL MODELS (EXC. 1957 PONTIAC)

EVACUATING SYSTEM (With ut Using Vacuum Pump): Connect gauges as indicated in illustration, but substitute a bottle or other suitable container in place of vacuum pump (container will catch the evacuated oil so it may be measured and a like amount of clean oil replaced) *CAUTION - B sure the fitting on discharge valve is open to compressor with no restriction from valve closure, caps, or plugs in attached lin b - fore starting engine* Turn both high and low pressure valves on compressor clockwise to gauge position Leave low pressure gauge valve tightly closed, carefully open high pressure gauge valve and hand shutoff valve (vacuum line valve), being careful to avoid any accidental discharge of liquid Freon 12 Discharge Freon, air, and any oil into bottle Start engine and set at low idle speed and turn air conditioner to maximum cooling position Maintain engine speed at slow idle at all times during evacuation Turn high pressure service valve to shutoff position Operate system at low idle for five minutes then turn off engine and air conditioner and close hand shutoff valve immediately If system holds 25" vacuum for 10 minutes, system is not leak-

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1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

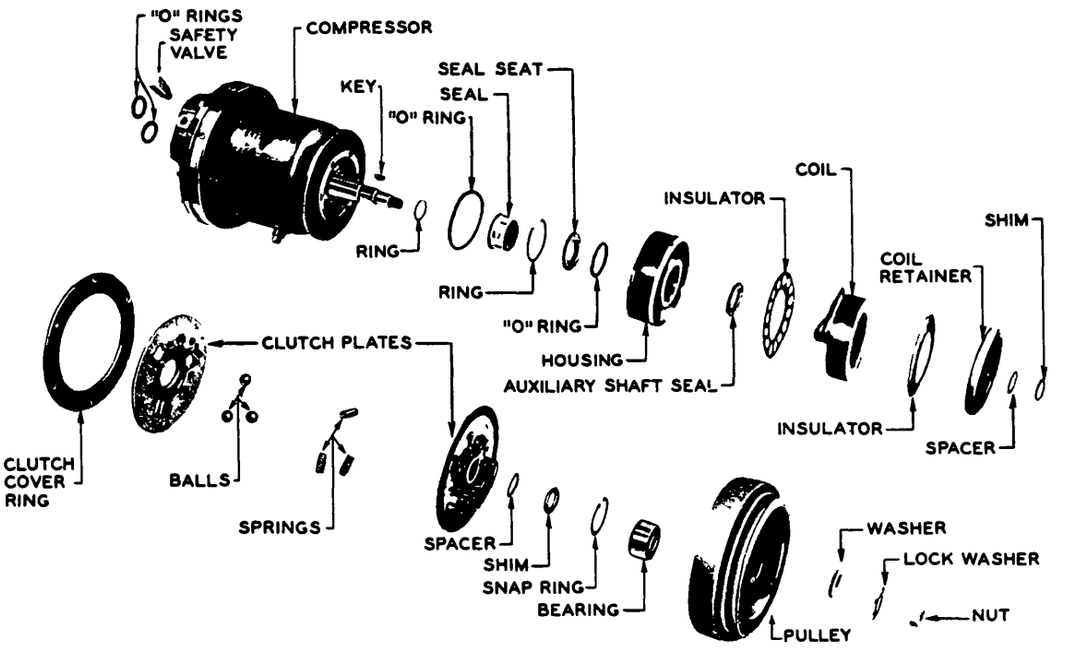
ing. If not, locate and correct leakage. Close high pressure gauge valve, open low pressure gauge valve and charge system with Freon at cylinder pressure, then repeat evacuation as indicated above. Again close high pressure gauge valve and open low pressure gauge valve and then complete charging with correct amount of Freon (see "Charging the System" below).

ALL MODELS (EXC. 1957 PONTIAC)

EVACUATING THE SYSTEM: (Vacuum Pump Method) - With system completely purged and Gauge Set J-5725 installed (see above), open hand shut off valves on compressor head ¼ turn clockwise from the full counterclockwise position. Install center gauge line to tee connector, Tool J-5462-2. Install female connector, Tool J-5462-7 at inlet side of Vacuum Pump, Tool J-5428. Insert flare seat, Tool J-5462-8, into connector, J-5462-7, at vacuum pump. Install shut off valve, Tool J-5462-1, to connector at vacuum pump. Install a gauge line from one side of tee connector to valve at vacuum pump (make sure valve is closed). Install gauge line from remaining tee connection to drum of Freon 12 or to 3 full cans of Freon 12 in Tool J-6272 *(NOTE* - When using a drum, it will be necessary to use fitting, Tool J-5462-9, and reducer, Tool J-5462-4, with lead washer, Tool J-5462-3, between gauge line and drum). Check level of fluid in vacuum pump and add correct oil if necessary. Make sure dust cap on discharge side of vacuum pump has been removed. Open high and low pressure valves on gauge set *(CAUTION - Shut off valve at vacuum pump must be closed).* Start vacuum pump and SLOWLY open shut off valve at pump *(NOTE* - If oil is blown from pump, it must be refilled to proper level). Operate pump to obtain approximately 28" of vacuum for 10 minutes. *NOTE* - If vacuum of 28" cannot be obtained, close valve at pump. Note low pressure gauge to see if vacuum in system holds. If vacuum holds, pump or gauge may be at fault. If vacuum will not hold, charge system with Freon, check for leaks, and repair as necessary, then purge system. When vacuum of 28" has been obtained for 10 minutes, close valve at pump, stop pump and check vacuum to see that it will hold for 3 minutes. If vacuum holds and no leaks are apparent, open Freon container valve to charge system to cylinder pressure, then close valve. Discharge system and again evacuate it. Close gauge valves. The system is now ready for a complete charge.

1957 PONTIAC

EVACUATING THE SYSTEM: (Pontiac) - *(CAUTION - Before removing protective cap from compressor discharg gaug fitting, make sure that the discharge valv is turn d c mplet ly COUNTERCLOCKWISE).* In this system, the evacuated air must be discharged through the compressor relief valve as follows: Using a 1" long 3/8" -24 bolt, drill a hole lengthwise through the bolt center, then cut off the bolt head. Press a 12" length of rubber or plastic hose over end of bolt from which the head was removed. Loosen pressure relief valve slowly, letting pressure in compressor escape completely. Screw the above assembly into compressor in place of relief valve and insert hose into a clean



COMPRESSOR CLUTCH & SEAL ASSEMBLY (TYPICAL)

container to collect any oil that may be lost during evacuation. Connect Gauge Set J-5725 *(see "Gauge Set Installation" above).* Close valves on gauge set, making sure that center connection on gauge set is plugged. Turn compressor low pressure valve 1½ turns clockwise from a fully counterclockwise position. Turn discharge valve all the way clockwise to seal passage to discharge hose. Start engine and operate at normal idle speed. Place air conditioning centered lever to full right position. Compressor will now evacuate the system, pumping air from system out through high pressure relief valve opening on compressor. Check low pressure gauge and operate compressor until gauge shows 26-28" of vacuum. Continue to run compressor for five additional minutes *(NOTE* - If a vacuum of 26" cannot be obtained, a leak is indicated). Check container to see that compressor has not pumped out more than one ounce of oil. If more than this amount has been pumped out, it should be replaced immediately *(see "Adding Oil" above).* *(NOTE* - If a leak in system has been repaired or oil has been added, it will be necessary to again evacuate the system). Replace relief valve in compressor with compressor operating, then stop engine. Purge air from compressor head as follows: Connect Freon drum to center fitting on gauge set and purge air from gauge line by cracking center line connection at gauge manifold momentarily. Turn low pressure valve on compressor fully clockwise. Open high pressure shut off valve on gauge set, then turn high pressure valve on compressor counterclockwise slightly to open passage to compressor. Open valve on Freon drum and while Freon is passing into compressor, loosen pressure relief valve slowly and leave loose approximately fifteen seconds to allow air to be purged from compressor head. Tighten compressor relief valve and close high pressure valve on gauge set. Turn valves on compressor completely COUNTERCLOCKWISE, then CLOCKWISE 1½ turns.

ALL MODELS (EXC. 1957 PONTIAC)

CHARGING THE SYSTEM: With system completely evacuated (gauge set & Freon tank connected), place Freon cylinder in a bucket of hot water (not to exceed 125°F). *CAUTION - Do not heat Freon cylinder ab v 125°F. because the fusible plug in cylinder valv melts at 157°F. and softens at a slightly lower temperature.* Place cylinder and bucket on a suitable scale and record total weight. Open low pressure valve on gauge set (high pressure valve on gauge set closed). Set both high and low pressure service valves on compressor in gauge position. Wearing goggles to protect eyes, fully open Freon cylinder valve and allow Freon vapor to flow into system. Operate engine at slow idle speed until the correct amount of Freon has been charged into the system (see "Freon Capacity Table" below). *NOTE - It may be necessary to reheat water in bucket to maintain required pressure.* Close both valves on gauge set, close valve on cylinder and remove cylinder from bucket. Operate compressor with engine running at 1600 RPM, and check general performance of air conditioner. If performance satisfactory, stop the engine, then firmly back-seat both high and low pressure service valves on compressor. Remove gauge

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1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

lines and replace protective caps over gauge connections and shutoff valves. Check oil level in compressor)see below).

1957 PONTIAC

CHARGING THE SYSTEM (Pontiac): With system completely evacuated, turn both valves on compressor 1½ turns clockwise from a full counterclockwise position. Close both valves on gauge set, then connect center flexible line of gauge set to Freon drum. Place Freon drum in a pail of hot water (maximum 125°F) and place Freon drum and water on scales. Loosen line at center fitting on gauge set and crack valve on Freon drum to evacuate air from line. Retighten line at center fitting, then weigh Freon tank and water on scales. Record the accurate weight, then open Freon drum valve and both valves on gauge set. Allow Freon to charge system until scales show that 4.25 to 4.5 lbs. of Freon have entered system. *(NOTE* - If full charge cannot be attained, close both valves on guage set, connect jumper wire from compressor hot lead to battery terminal, start engine and air conditioning control lever to full right position. Open low pressure valve on gauge set slowly and leave open until full charge of 4.25-4.5 lbs. of Freon is taken in). *(CAUTION* - Check high pressure gauge while charging with compressor running. Shut off engine if pressure exceeds 300 lbs. A large fan placed in front of car will help reduce excessively high head pressure). Close both valves on gauge set (high pressure valve will already be closed if charge was completed by running compressor) and close valve on Freon drum. *(NOTE* - If engine was used to complete Freon charge into the system, close valve on Freon drum to permit compressor to draw any Freon left in line from drum to center fitting of gauge set, then close low pressure valve on gauge set). Operate engine at 1200 RPM with air conditioner control lever turned to full right position and blower on high speed. After five minutes of operation, check appearance of Freon in sight glass. If bubbles are present, open low pressure gauge valve and valve on Freon tank and allow more Freon to enter system. Close valve when sight glass clears up *(CAUTION - In no case should the system be charged with more than 4.5 lbs. of Freon).* When system operating properly, close both valves on compressor fully COUNTERCLOCKWISE, remove gauge set and replace protective caps on valves. Remove jumper wire from compressor.

Model	Freon Capacity
	Capacity
Buick	5 lbs.
Cadillac, 60S, 62 (1957–58)	4 lbs.
Cadillac 75 (1957–58)	4¾ lbs.
Cadillac (1959–60)	4½ lbs.
Chevrolet (1957–58)	4 lbs.
Chevrolet (1959–60)	4½ lbs.
Oldsmobile (1957–58)	4 7/8 lbs.
Oldsmobile (1959)	5 lbs.
Oldsmobile (1960)	5 lbs., 3 ozs.
Pontiac (1957)	4½ lbs.
Pontiac (1958)	4 lbs.
Pontiac (1959)	4¾ lbs.
Pontiac (1960)	5 lbs.

CHECKING & ADDING OIL TO COMPRESSOR: Checking - Operate engine at slow idle for 5 to 7 minutes with system operating, then stop engine. Loosen screw in oil test fitting on side of compressor and allow a slight seepage of oil to escape. Retighten screw for a moment then "crack" open slightly again. If a steady flow of oil is evident, the oil level is either at a safe minimum level of 4 ounces, or above it. When oil test screw is cracked open a second time and no oil escapes, or there is a hissing sound, the oil is below a safe minimum and oil should be added.

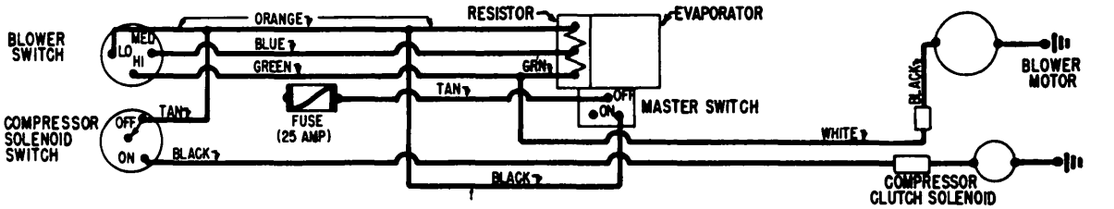
► *1958 COMPRESSOR OIL NOTE:* "1000 Viscosity" oil is being used in some later air conditioning compressors in place of the "525 Viscosity" oil. When adding oil to compressor, either of the two oils may be used for replacement. *DO NOT use "1000 Viscosity" oil in 1957 or earlier compressors.*

1957 MODELS

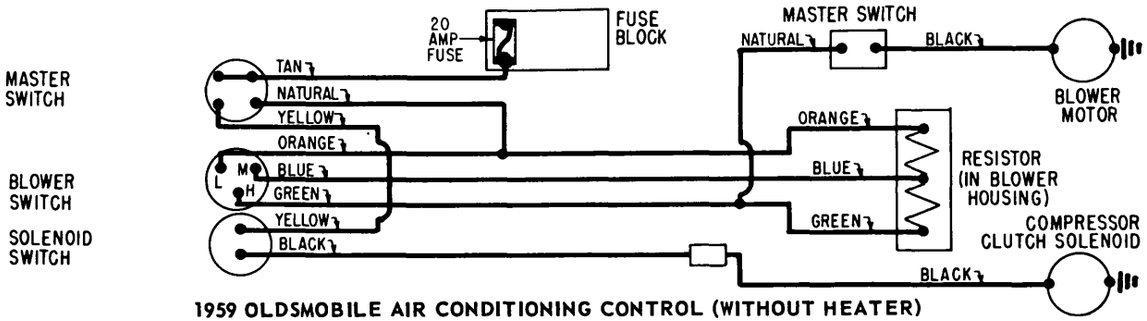
Adding Oil (Buick & Ch vr let): Remove compressor *(see "Compr ssor R moval" bel w)* and place it on a bench. Position a clean container, then remove oil test screw and gasket and drain all oil from compressor. If oil is found to be dirty or contaminated, flush compressor and condenser with liquid Freon which can be obtained by turning drum or can of Freon upside down. If oil is clean, pour 9 ozs. of new Frigidaire 525 viscosity compressor oil into compressor through oil checking fitting. Replace checking screw and install compressor on car. Purge, evacuate, and charge system (see above).

Adding Oil (Cadillac): With Ga uge Set J-5725 connected to compressor (see above), attach oil charging line to center connection of gauge set. Operate engine at slow

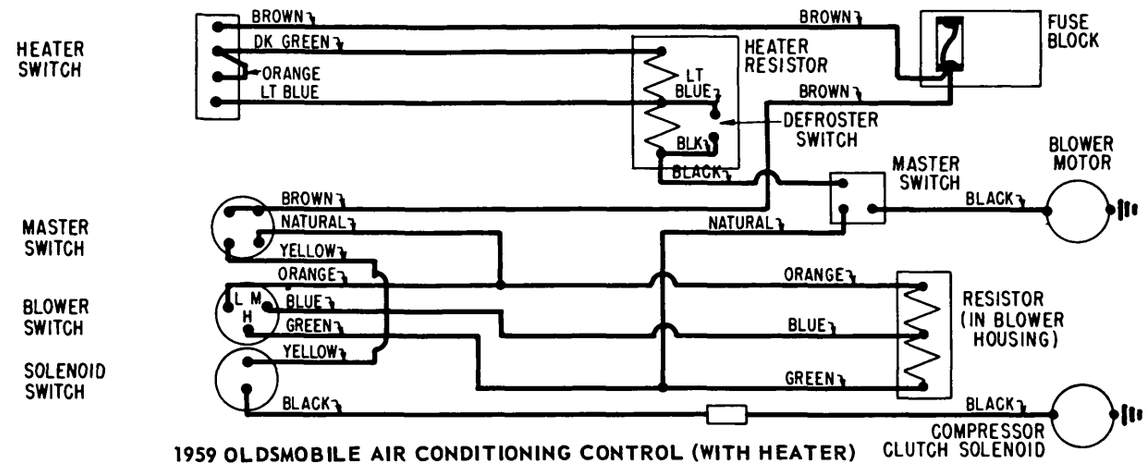
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1957-58 OLDSMOBILE AIR CONDITIONING CONTROL DIAGRAM



1959 OLDSMOBILE AIR CONDITIONING CONTROL (WITHOUT HEATER)



1959 OLDSMOBILE AIR CONDITIONING CONTROL (WITH HEATER)

1957-60 FRIGIDAIRE & HARRISON (Continu d)

idle in "Dr" (Drive) range with Air Conditioner "On", crack open high and low pressure valves on gauge set and allow Freon vapor to purge air out of gauge set and lines. While Freon vapor is still escaping, insert oil charging line to bottom of a graduated bottle of Frigidaire 525 viscosity oil. Close high and low pressure valves on gauge set. Clamp bypass hose between bypass valve and evaporator (this hose does not have the low pressure gauge fitting) using two wooden blocks and a "C" clamp *(CAUTION* - Do not clamp hose more firmly than is required to close off passage of Freon). Clamp the hose between sight glass and evaporator in the same manner. Slowly open low pressure valve on gauge set, allow 2 ounces of oil to be drawn into equalizer line, then close valve. Remove oil charging line and cap center gauge set connection with a dead-head fitting. Open low pressure valve on gauge set, then slowly open high pressure valve on gauge set, allowing Freon pressure to force all oil out of equalizer line into evaporator. Close both gauge set valves and remove hose clamps. Run engine at 2000 RPM in "Park" position for 5 minutes. Recheck oil level and if found to be low, repeat the above, adding 2 ounces more oil.

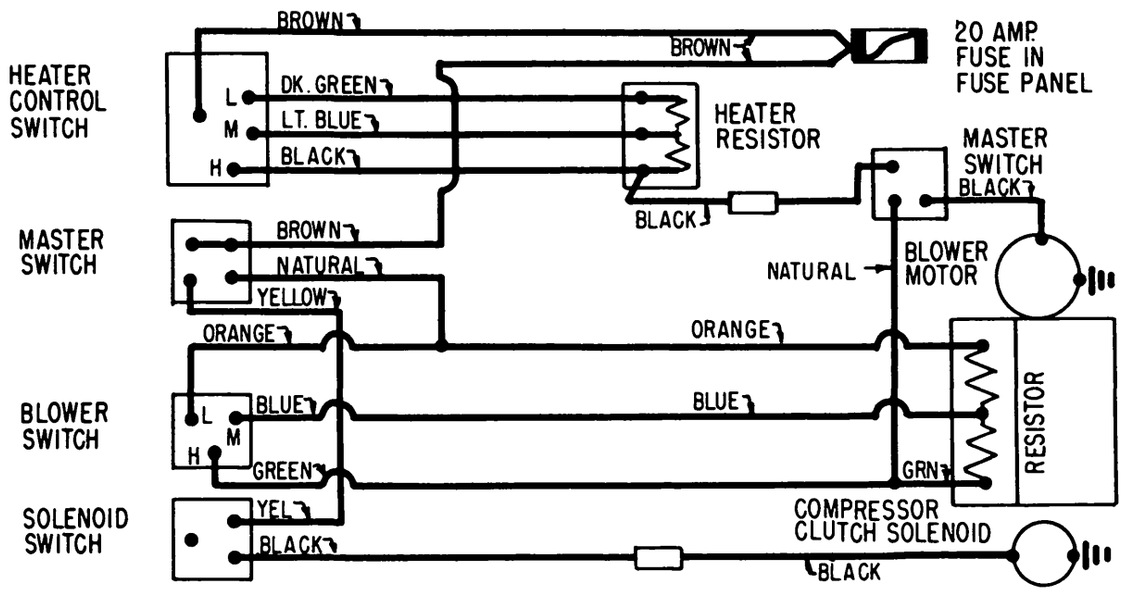
Adding Oil (Oldsm bil & Pontiac): With both valves on compressor head turned fully counterclockwise and valves of gauge set closed, install high pressure hose of gauge set to high pressure valve on compressor. Install plug in center hose on gauge set. Turn compressor high pressure shut off valve two turns clockwise and crack open the high pressure valve on gauge set. Crack open low pressure valve on gauge set to purge air from lines and while vapor is still escaping, connect low pressure hose of gauge set to low pressure hand shut off valve on compressor. Close both valves on gauge set and turn the compressor low pressure hand shut off valve fully clockwise. Remove center hose on gauge set and install oil charging line. *(NOTE* - Use a 10" piece of ¼" copper tube with fittings connected in center opening of manifold). Purge air from oil charging line by cracking high pressure valve on gauge set. While vapor is still escaping from oil charging line insert line to bottom of oil bottle (Frigidaire 525 viscisity oil), allowing vapor to bubble through the oil. Close high pressure valve. Run engine at slow idle, with compressor operating until 10" of vacuum is indicated on gauge. Open low pressure valve on gauge set and allow 2 ounces of oil to enter system, then close valve. Remove oil charging line from gauge set and cap opening. Open high pressure valve on gauge set, then open low pressure valve slowly to allow high pressure to force oil remaining in lines into compressor. Close both valves on gauge set, then turn shut off valve on compressor fully counterclockwise. Run engine at 1500 RPM with compressor operating for 5 minutes, then recheck oil level in compressor. If necessary, repeat the above procedure to add 2 ounces more oil.

1958–60 MODELS

Adding Oil (Buick, Oldsmobile & Pontiac): Install gauge set on compressor and crack open high pressure valve on gauge manifold and discharge valve on compressor (this will purge air from high pressure line). While Freon is escaping from high pressure line through center gauge fitting, close high pressure valve on gauge manifold. To purge air from low pressure line, open low pressure valve on gauge set for a few seconds then close low pressure gauge valve. With high and low pressure valves on gauge set closed, turn low pressure valve on compressor clockwise until seated. Attach oil charging tube to center connection on manifold and insert to bottom of a graduated bottle of compressor oil. Crack open both high and low pressure valves on gauge manifold and allow Freon gas to slowly bubble through the oil. Close both valves at gauge manifold. Position temperature control lever in maximum position and operate engine at slow idle speed for approximately 15 seconds. With engine still operating, close discharge valve on compressor (turn clockwise until seated). Stop engine and check to see if the vacuum will hold. If pressure rises, check for leak in system. If not, open low pressure valve on gauge set about 1½ turns and turn low pressure valve on compressor 1½ turns counterclockwise. The vacuum in compressor will now draw oil from bottle. Allow 2 ounces to be drawn into compressor. Close low pressure valve on gauge set, then remove oil charging line and attach center fitting cap on gauge manifold. Open low pressure valve on gauge set and open high pressure valve on compressor 1½ turns (counterclockwise from fully clockwise position). Open high pressure shutoff valve at manifold slowly to allow high pressure to force remaining oil in manifold and gauge line into compressor. Close both high and low pressure valves on gauge set. Open high and low pressure valves on compressor (fully counterclockwise). Operate system for five minutes and recheck oil level. Continue to add 2 ounces of oil at a time until level in compressor is correct. Remove gauge fittings and replace fitting caps and valve stem caps.

Adding Oil (Cadillac): With Gauge Set J-5725 connected to compressor (see above), attach oil charging line to center connection of gauge set. Operate engine at slow idle in "Dr" (Drive) range with Air Conditioner "On", crack open high and low pressure valves on gauge set and allow Freon vapor to purge air out of gauge set and lines. While Freon vapor is still escaping, insert oil charging line to bottom of a graduated bottle of Frigidaire 1000 viscosity oil. Close high and low pressure valves on gauge set. Clamp bypass hose between bypass valve and evaporator (this hose does not have the low pressure gauge fitting) using two wooden blocks and a "C" clamp *(CAUTION* - Do not clamp hose more firmly than is required to close off passage of Freon). Clamp the hose between sight glass and evaporator in the same manner. Slowly open low pressure valve on gauge set, allow 2 ounces of oil to be drawn into equalizer line, then close valve. Remove oil charging line and cap center gauge set connection with a dead-head fitting. Open low pressure valve on gauge set, then slowly open high pressure valve on gauge set, allowing Freon pressure to force all oil out of equalizer line into evaporator. Close both gauge set valves and remove hose clamps. Run engine at 2000 RPM in "Park" position for 5 minutes. Recheck oil level and if found to be low, repeat the above, adding 2 ounces more oil.

Adding Oil (Chevr l t) - Remove compressor (see "Compressor Removal" below) and place it on a bench. Position a clean container, then remove oil test screw



1960 OLDSMOBILE AIR CONDITIONING CONTROL WIRING DIAGRAM

CONTINUED ON NEXT PAGE

1957-60 FRIGIDAIRE & HARRISON (Continu d)

and gasket and drain all oil from compressor. If oil is found to be dirty or contaminated, flush compressor and condenser with liquid Freon which can be obtained by turning drum or can of Freon upside down. If oil is clean, pour correct amount (see tables following) into oil checking fitting. Replace checking screw and install compressor on car. Purge, evacuate, and charge system.

1957-58 MODELS
Compressor Oil Capacities

Car Model	① Capacity
Buick	16 ozs.
Cadillac Series 60S, 62	② 16 ozs.
Cadillac Series 75, 86	18 ozs.
Cadillac Eldorado Brougham	9 ozs.
Chevrolet	② 16 ozs.
Oldsmobile	16 ozs.
Pontiac	16 ozs.

① - Using 525 viscosity oil.
② - If 1000 viscosity oil used, 13 ozs. of oil will be required for a complete refill.

1959-60 MODELS
Compressor Oil Capacities

Car Model	① Capacity
Buick	12 ozs.
Cadillac (Exc. Series 67 & 68)	13 ozs.
Cadillac (Series 67 & 68)	16 ozs.
Chevrolet	13 ozs.
Oldsmobile	13 ozs.
Pontiac	13 ozs.

① – Fluid measure. *NOTE – 1960 Buick, Cadillac and Pontiac new compressors use 1000 viscosity oil, while all other models use 525 viscosity. 1000 viscosity has has an off-green color, 525 viscosity has a clear light range color. Two viscosities can be mixed in any pr portion.*

COMPRESSOR REMOVAL & INSTALLATION

►*CAUTION: To prevent dirt and moisture entering air conditioning system, it is very important to cap all openings and to complete work on system as soon as p ssible.*

1957 MODELS

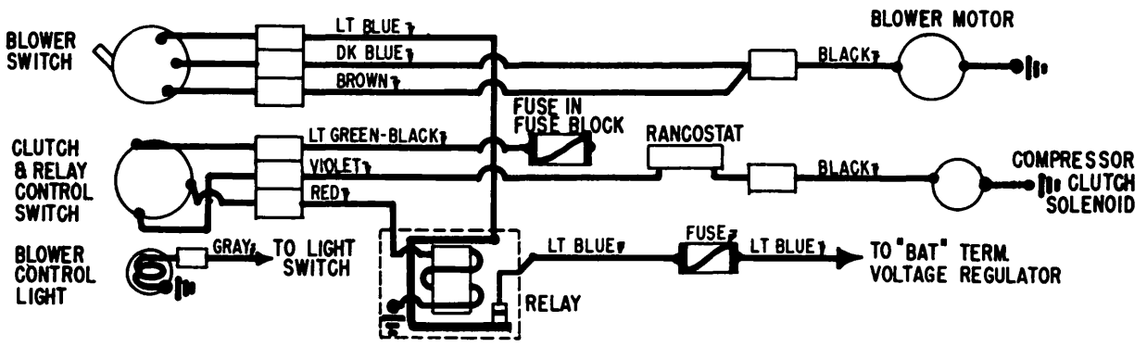
REMOVAL: Buick - Purge Freon from air conditioning system (*see "Purging the System" above*), then disconnect mufflers from brackets. Disconnect hot gas line (from high pressure muffler-to-hot gas bypass valve) at hot gas bypass valve fitting. Remove retaining bolt and washer to disconnect mounting plate and lines from rear end of compressor. Discard "O" rings. Cover openings in lines and compressor with tape, then disconnect clutch solenoid wire. Loosen belt and remove compressor from mounting on engine.

Cadillac: Remove Freon from system by depressing the Schrader core in high and low pressure gauge connection on compressor head. *(NOTE - D press cores v ry sl wly at first t prev nt il frombeing forc d ut of compress r).* Remove high and low pressure line fitting center bolt and remove fitting from compressor. Cover pressure openings in both compressor and pressure line fittings (use a protective plate over compressor openings). Disconnect clutch coil wires and drive belts. Remove two bolts and nuts holding bypass valve to compressor front bracket and move bypass valve, pipe, and hoses away from compressor. Remove compressor from mounting supports.

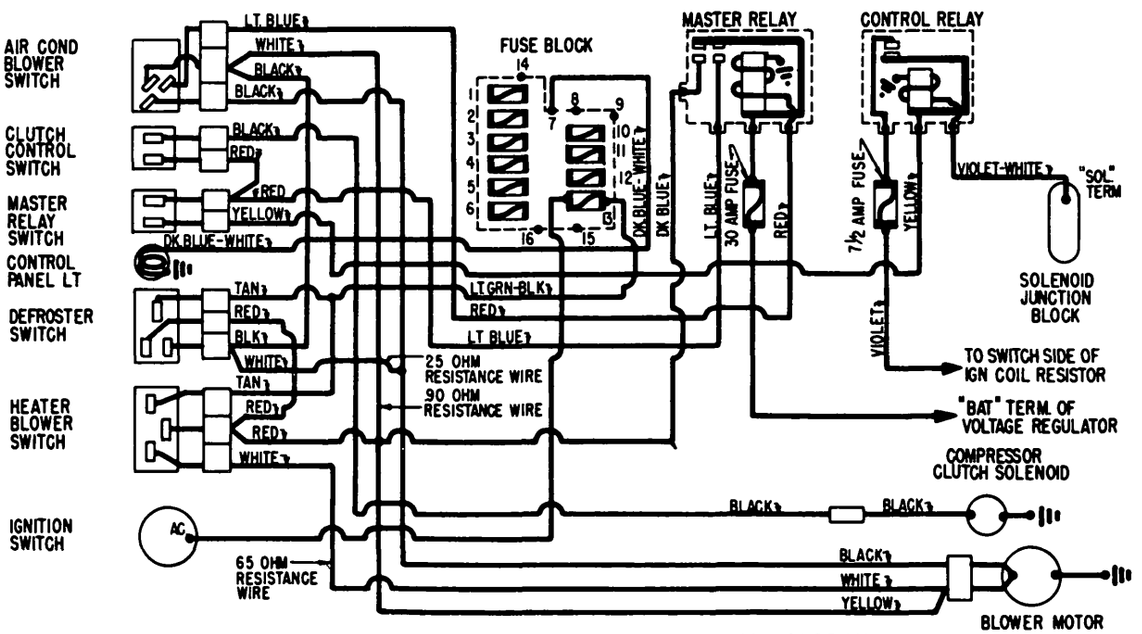
Chevrolet: Purge Freon from air conditioning system (*see "Purging the System" above*). Back off compressor attaching bolt just enough to loosen suction discharge connector and allow pressure inside to escape. Remove bolt and connectors after low side has been completely purged. Disconnect electrical lead to clutch actuating coil. Remove gauge set and replace caps. Remove two refrigerant line retainer-to-radiator support screws and remove retainer. Loosen brace and bracket pivot bolts and detach bolt. Remove brace bolt and swing compressor to highest position. Retighten pivot bolt. Remove the four bolts retaining compressor to mounting brackets and remove compressor assembly.

Oldsmobile: Remove protective caps from compressor high and low pressure hand shut off valves, then turn valves two turns clockwise from fully counterclockwise position to open compressor gauge outlets. Crack open compressor high pressure gauge outlet cap and allow Freon to purge from system until "hiss" is no longer heard; then turn both valves fully clockwise. Disconnect both wires at clutch coil, then remove belts from pulley. Remove bolt holding hand shut off valve assembly to compressor and remove assembly. Remove compressor assembly.

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1957 PONTIAC AIR CONDITIONING CONTROL DIAGRAM



1958 PONTIAC AIR CONDITIONING CONTROL DIAGRAM

1957-60 FRIGIDAIRE & HARRISON (C ntinu d)

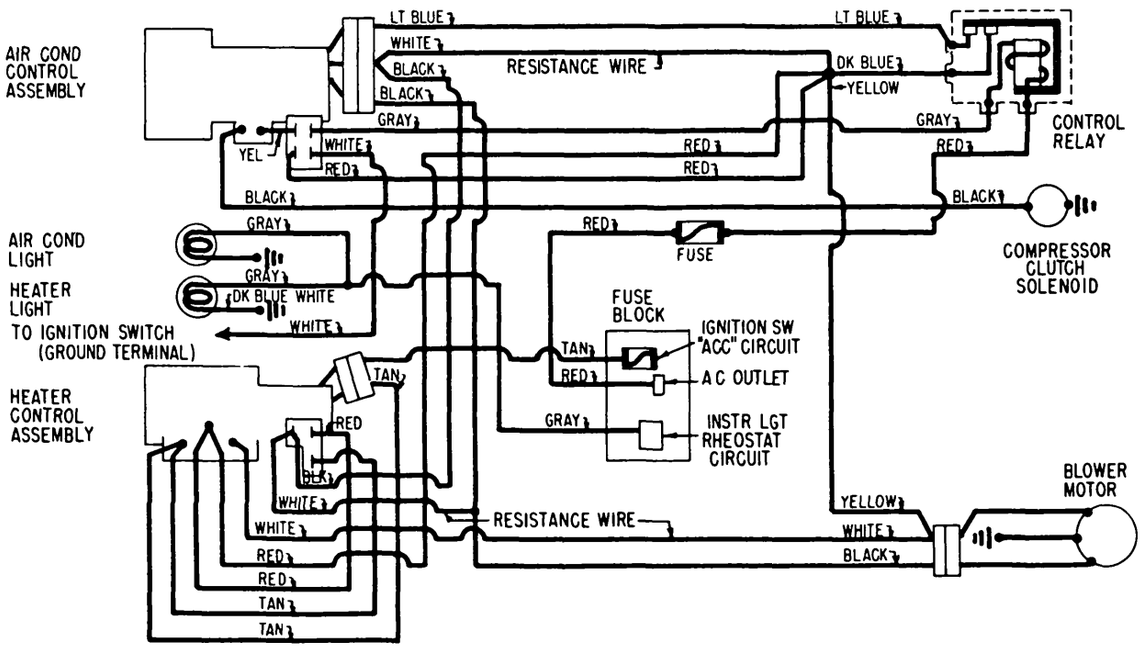
1958–60 MODELS

REMOVAL: Buick - Connect charging lines of gauge set to fittings of both valves on compressor, with both valves of gauge set closed tightly Shut off both valves on compressor by turning valve stem clockwise Open valves on gauge set and discharge all pressure from compressor Remove bolts and lockwashers that retain muffler bracket to compressor head flange, then remove bolt and lockwasher to remove valve retaining plate from rear end of compressor Cover openings in valve and compressor with tape Disconnect clutch solenoid wire, then loosen belt and remove compressor from its mounting on engine

Cadillac: Remove Freon from system by depressing the Schrader core in high and low pressure gauge connection on compressor head. *(NOTE - Depress cores very slowly at first to prevent oil from being forced out of compressor).* Remove high and low pressure line fitting center bolt and remove fitting from compressor. Cover pressure openings in both compressor and pressure line fittings (use a protective plate over compressor openings). Disconnect clutch coil wires and drive belts. Remove two bolts and nuts holding bypass valve to compressor front bracket and move bypass valve, pipe, and hoses away from compressor. Remove compressor from mounting supports.

Chevrolet & Pontiac: Install gauge set, making sure valves on gauge set are closed, and valves on compressor are turned fully counterclockwise Place COLD lever on dash in OFF position Turn both compressor shutoff valves ¼ turn clockwise and note gauge to determine if a pressure exists in both sides of system If a vacuum exists, break vacuum by opening the two gauge valves (with center gauge connection capped) Close both compressor valves fully clockwise If pressure reads higher than 5 lbs on gauges, remove plug from center manifold line and wrap end of line with rags to prevent splashing of refrigerant or oil, then open high pressure gauge valve slowly and allow pressure to reduce to 1 or 2 lbs Close gauge valves and check gauges to make sure pressure does not build up in excess of 5 lbs within 3 minutes If pressure is in excess of 5 lbs repeat above and allow pressure to decrease until it will not build up over 5 lbs Back off compressor connector attaching bolt just enough to loosen low pressure discharge connector and allow pressure inside to escape *NOTE* – On 1959–60 Chevrolet, disconnect high pressure discharge connector to hot gas valve line at hot gas stove and remove hot gas valve bracket to compressor flange and pull hot gas valve and bracket away from compressor On all models, remove bolt and connectors after low pressure side has been purged. Disconnect electrical lead to clutch coil, then loosen brace and pivot bolts and detach belt Remove brace bolt and swing compressor to highest position and tighten pivot bolt. Remove bolts retaining compressor to mounting bracket, and remove compressor

NOTE – Drain and measure oil in compressor if it is to be replaced with a new unit.



1959 PONTIAC AIR CONDITIONING CONTROL DIAGRAM

Oldsmobile . Remove protective caps from compressor high and low pressure hand shut off valves, then turn valves two turns clockwise from fully counterclockwise position to open compressor gauge outlets. Crack open compressor high pressure gauge outlet cap and allow Freon to purge from system until "hiss" is no longer heard, then turn both valves fully clockwise. Disconnect both wires at clutch coil, then remove belts from pulley. Remove bolt holding hand shut off valve assembly to compressor and remove assembly. Remove compressor assembly

1957–60 MODELS

INSTALLATION: Reverse removal procedure, then purge, evacuate and charge the system (see above) *CAUTION - Note the following important points*

Chevrolet (1958): Reverse removal procedure Remove hot gas valve-to-compressor line at hot gas valve then run compressor at approximately 1000 RPM for two minutes then replace line with engine still running Stop engine and immediately back-seat both compressor valves (fully counter-clockwise) *NOTE - On cars with "Super Heat Safety Switch", low pressure compressor valve must be ¼ turn open from the back-seated or fully counter-clockwise position*

Pontiac (1958): Reverse removal procedure and evacuate compressor as follows Slowly open high pressure valve at gauge manifold then start engine and operate compressor for five minutes with engine at idle speed At the end of five minutes, with compressor still running, close valve at manifold Turn low pressure valve on compressor counterclockwise and open high pressure valve at gauge manifold for two or three seconds to permit any air in compressor to be forced out through center outlet of manifold, then tighten high pressure valve at gauge Open both compressor valves fully counterclockwise If necessary, add Freon

COMPRESSOR OVERHAUL

► *OVERHAUL NOTE: Compressor clutch, discharge valve assembly, compressor clutch coil, and shaft seal are the only parts that are recommended for service replacement. The compressor main body assembly should be replaced as a unit if faulty.*

COMPRESSOR CLUTCH: Removal: Remove compressor from car *(see above).* Bend tangs on shaft lockwasher, then loosen the six screws in clutch cover ring. Energize clutch coil with jumper wire from battery to hole compressor clutch and shaft assembly. Remove shaft nut and metal-felt washer. Remove screws and lockwashers securing clutch cover ring to pulley casting *(CAUTION - These screws must be removed at this time to avoid damage to internal parts of clutch. It may also be necessary to remove the three coil retaining screws to allow clutch cover plate to move back).* Remove pulley and ball bearing assembly with Compressor Pulley Puller, Tool J-6351, *(NOTE* - This bearing has a .0001-.0006" press fit onto first step of compressor shaft). Remove hub-to-bearing spacer and shims and set aside. *NOTE* - Spacer and washer and shims may be reused providing original parts are being installed. If new parts are being installed, adjust clearance *(see "Hub-to-Bearing Clearance Adjustment" below).* Check shaft and ball bearing for wear, scoring or pitting. If necessary to replace ball bearing in pulley casting, remove retaining ring and press out bearing. When rein-

CONTINUED ON NEXT PAGE

Form 73 B

1957-60 FRIGIDAIRE & HARRISON (Continued)

stalling, make sure retaining ring is installed with beveled edge toward outside (away from bearing). Remove clutch plate assembly using Clutch Plate Puller, Tool J-6322. Remove woodruff key and air gap adjusting shims and washer *(NOTE* - If same pulley parts are to be reinstalled, the same shims and washers may be used). Disassemble actuating springs from clutch plate and check plate for wear. *(CAUTION - Do not use any cleaning solvents on clutch frictional surfaces).* Check nylon balls, replacing all three if any are damaged.

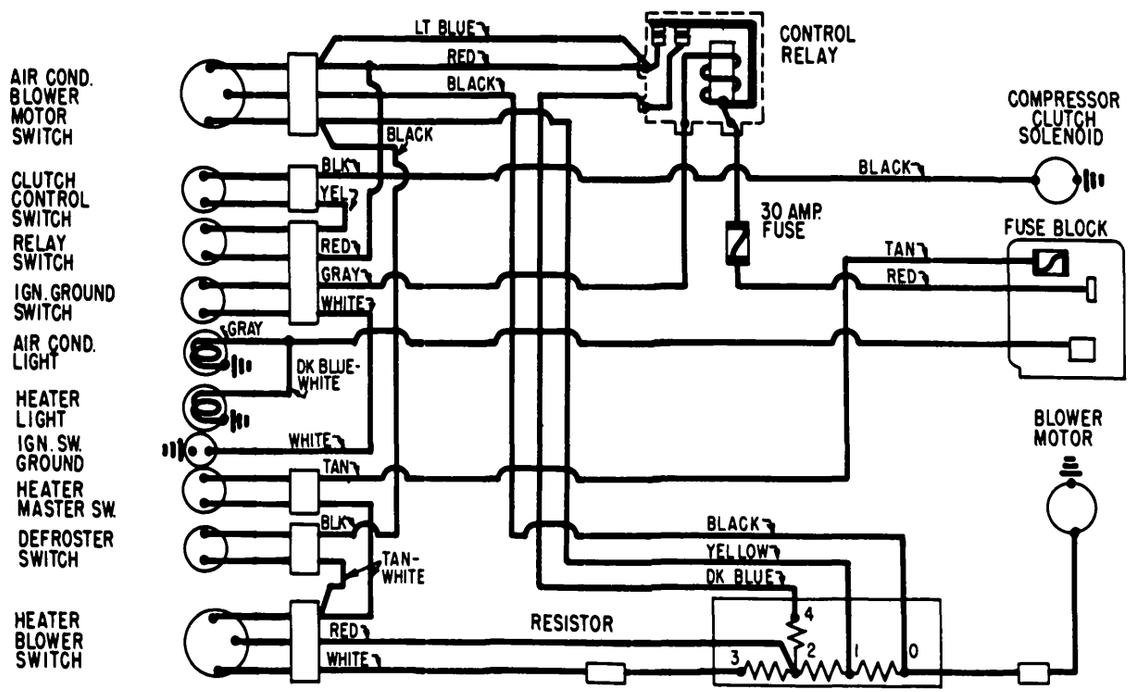
Hub-to-Bearing Clearance Adjustment – Place pulley (with bearing installed) on a flat surface with clutch side of pulley facing up. Select a combination of shims (furnished in .010", .015", .020", .025" thicknesses), and place on inner race of bearing, then place the bearing spacer on the shims. Place clutch plate assembly in the pulley so that hub is in contact with spacer and shims. Press down firmly at center of hub and rotate clutch plate assembly. If a **heavy** drag is felt, thicker shims must be selected in order to provide a VERY slight drag. When **no** drag is felt, thinner shims should be used. When a selection of shims are found that give a VERY slight drag, determine the total thickness of shim pack and add an additional .010" shim thickness to pack which will give the desired .008–.013" clearance between outer clutch plate and pulley.

Installation: Install clutch coil retaining screws and place clutch cover ring against coil and seal housing. Install clutch spacer and air gap control shims on shaft against shoulder. Replace woodruff key, tapping it lightly into place. Reassemble nylon balls and clutch plate springs. Press clutch plate assembly on shaft using Tool J-6323, making certain that clutch cover ring does not get caught between coil housing and rear clutch plate. Replace clutch hub and pulley bearing washer and shims on compressor shaft. Place "free" washer of Tool J-6323 over small end of stud so that small diameter of washer will contact INNER race of bearing. Screw stud of Tool J-6323 onto threaded end of compressor shaft, then press pulley assembly into position. Assemble felt and metal washer, shaft lockwasher, and nut. Tighten nut to 5-7 ft. lbs. and bend up tabs on lockwasher. Assemble clutch cover ring, screws, and lockwashers and tighten to 2 ft. lbs. Energize clutch coil with a jumper lead from battery. Use a nonmagnetic feeler gauge and check air gap between armature and coil housing which should be .025-.035" (1957), .035–.045" (1958–60). Correct with shims.

Clutch Coil & Shaft Seal Replacement: With compressor clutch removed from compressor (see above), disconnect electrical leads of coil from terminal clip and ground screw. Remove three coil retaining screws from housing and remove coil retainer and insulating gasket. Carefully insert a thin screwdriver through wire opening in rear of coil housing and pry coil forward to remove coil from housing. Remove inner insulating gasket and six housing mounting screws. Remove coil and seal from compressor flange and remove seal seat retaining ring. Remove large diameter "0" ring from outer flange of seal housing. Remove shaft seal assembly. Make certain seal drive pin and retainer ring remain in place on shaft. Remove auxiliary shaft seal from seal housing. *(CAUTION - Discard old "0" rings seals and replace with new ones. The shaft seal, metal seal seat, and retainer should be handled very carefully to avoid damage to fine finished surfaces. Lint-free tissues should be used for final cleaning of compressor shaft, seal cavity and parts. Seal cavity in coil housing and around auxiliary seal should be flooded with clean fresh Frigidaire 525 viscosity oil before assembling. All oil seal rings, seal surfaces and parts should also be coated with this oil).* To reassemble, install Shaft Pilot Bushing, Tool J-6320, over compressor shaft and against shoulder of shaft. Apply a light coating of Frigidaire oil to surface of bushing. *(NOTE* - This bushing protects seals during installation). Slide shaft seal and "0" ring into place on compressor shaft. Install "0" ring seal seat and auxiliary seal in coil housing and install large diameter "0" ring seal to outer flange of housing *(NOTE* - Coat inner lip of auxiliary seal heavily with oil before assembly into housing). Install coil housing to compressor flange and install six mounting screws. Add oil to compressor, to specifications shown in tables. *See "Adding Oil".*

VALVE PLATE: Disassembly - Remove compressor from car and place on bench in a vertical position with the pulley end down. Form a protective skirt out of heavy paper and tape securely to compressor shell *(CAUTION- This is very important to prevent oil that will be in head of compressor spilling into the clutch assembly).* Remove twelve head bolts and compressor head. Remove cylindrical suction screen and set aside for reuse *(CAUTION - Be careful not to damage gasket material that is vulcanized to irregular contour and insert portion of casting).* Lift discharge plate (thick one) assembly from off the two dowel pins. It may be necessary to use two screwdrivers under piston reed retainers, or two pairs of pliers, to "break" oil cohesion and release the plate. Remove suction reed plate (thin one). Do not disturb thrust washer at center of assembly.

Reassembly: Place suction reed plate (thin) over the two dowel pins in cylinder so that the 3/16" diameter hole which is approximately ¾" from center of reed, mates with a similar hole in cylinder block. *(NOTE* - This hole is located between two piston bores). Install discharge plate (thick) over the two dowel pins. Remove and discard old large diameter "0" ring located in recess in head casting. Coat new seal with Frigidaire 525 viscosity oil and install in recess groove in head. Place brass ferrule end of suction screen into center of head casting and grasp head so that suction screen will not fall out when head is inverted for assembly. (This can be accomplished by inserting little finger through center opening to hold screen). Hold compressor head over compressor shell flange so dowel holes register as closely as possible to their proper location. Rotate head slightly until exact dowel pin alignment is obtained, then seat head over dowel pins and onto compressor flange *(CAUTION* - If this is not done properly, there is a possibility of damaging gasket material). Install bolts finger tight, then tighten uniformly, by cross-tightening, to 7½-10 ft. lbs.



1960 PONTIAC AIR CONDITIONING CONTROL DIAGRAM

1954-57 LINCOLN & MERCURY AIR CONDITIONING

Linc ln (1954–57)
M rcury (1954–56)

►CHANGES & CORRECTIONS

►*1954 FAN & AIR COMPRESSOR BELT DESIGN CHANGE (To R duc Noise):* Steel Core Belts, Part Nos. EAD-8620-F and EAD-2890-C, are now being cogged with unequal spaces between notches to reduce or eliminate noise. NOTE–New belts will carry same part numbers as the old type but can be identified by a 1" wide red band across back side. Modified belts are available for service.

►*1954 EVAPORATOR DRAIN CORRECTION (To Minimiz Possibility of W t Luggage Compartment):* It is recommended that the three drain traps be removed. These traps are accessible from underneath car and can be removed by merely pulling them off the drain tubes.

►*1954 COMPRESSOR PULSATING NOISE CORRECTION:* Larger internal diameter flexible low pressure valve-to-compressor line, Part No. LE-19971-B, and compressor-to-condenser inlet line, Part No. LE-19972-B, are available to correct above complaint on 1954 models. New lines are installed on 1955 models.

►*1954-55 COMPRESSOR REPAIR CHANGE:* Later 1954 and all 1955 Compressors may be serviced as indicated under "Parts Replacement" below. Those 1954 compressors that may be serviced are identified by a 3/8" diameter tapped hole drilled in the end of the compressor pulley shaft. The decal on the head of 1954 Compressors prohibiting repair may be ignored to the extent indicated above.

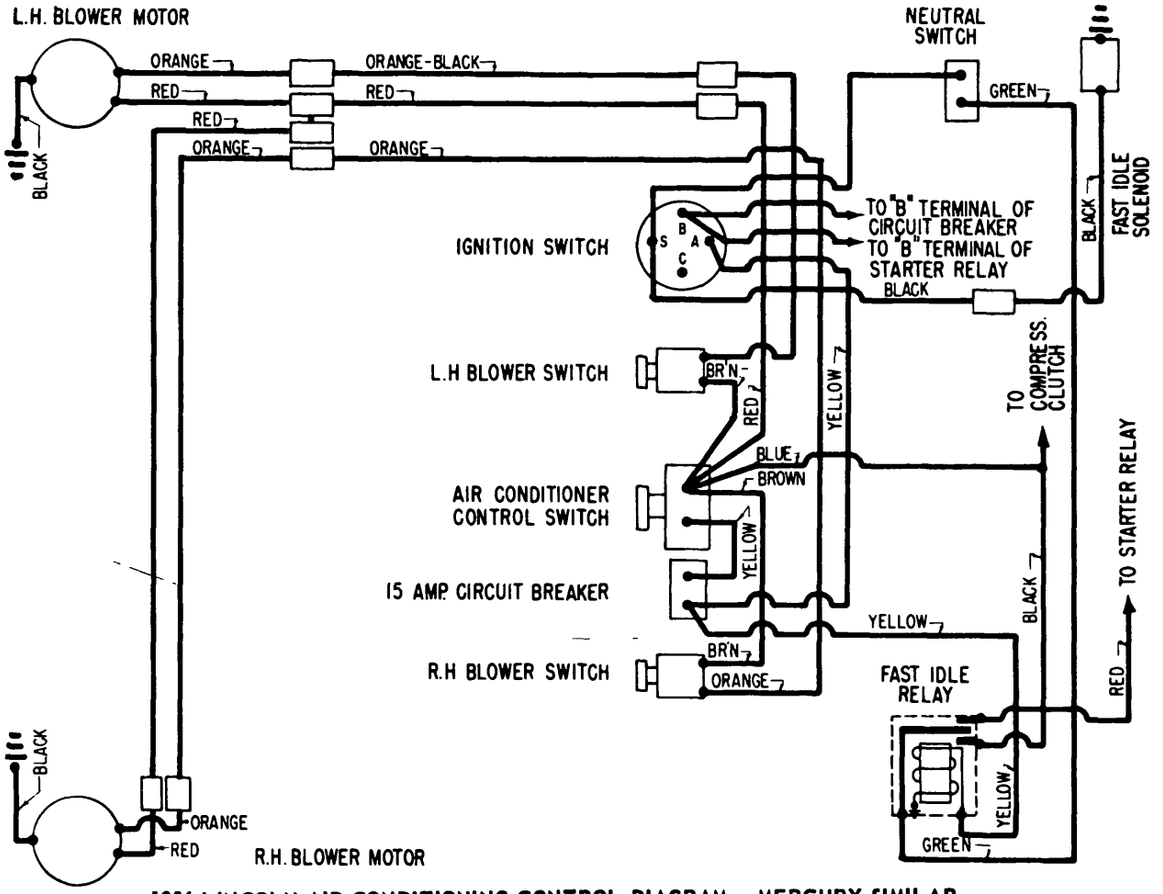
►*1955 OIL BAFFLE INSTALLATION (To Facilitate Checking Compr ssor Oil Level):* Oil baffle is available for installation on all 1955 Air Conditioning units. S *"Ch cking Compr ssor Oil Level" below.*

►*1955 COMPRESSOR PULLEY-TO-SHAFT LOCKING CORRECTION (Early Cars):* Some early production compressor units were not provided with a positive lock between compressor pulley and shaft. Compressors should be checked and, if necessary, modified as follows: Secure large flat washer (Part No. EAA-6278-B) to face of pulley and pulley shaft by screwing bolt 20348-S8, with lockwasher 34807-S8 in place, into tapped hole in end of compressor shaft. Torque to 23-28 ft. lbs.

►*1955 LINCOLN DESIGN CHANGE (High Pressure Service Valve):* Position of valve has been changed over that of 1954. The 1955 High Pressure Valve has been inverted and, for this reason, direction which valve stem must be turned during service operations will be reversed.

►*1956 CLUTCH ASSEMBLY INSTALLATION CAUTION:* When installing clutch assembly to compressor shaft, special self-locking capscrew with nylon insert in threads, 5/16" - 24 x 1", Part No. 358606-S and a flat washer, Part No. 358605-S must be used, otherwise retention of clutch assembly to shaft cannot be assured. Tighten to 18-22 ft. lbs.

►*1956 CIRCUIT BREAKER CAUTION & REPLACEMENT:* If car is allowed to stand in hot sun for extended periods, interior temperature can become extremely high, causing 15 ampere circuit breaker in blower circuit to cycle as soon as blowers are turned on. To correct this condition, 15 ampere circuit breaker can be replaced with a 20 ampere circuit breaker, Part No. B6A-14526-G. If 20 ampere circuit breaker is used it will be necessary to replace 18 gauge blower switch feed wire with a 16 gauge wire.



1956 LINCOLN AIR CONDITIONING CONTROL DIAGRAM – MERCURY SIMILAR

►*GASKET PRODUCTION CHANGE:* Copper gaskets previously used at all connections were discontinued during 1956 production except for gasket between high pressure tube and evaporator. With the one exception connections are between parts made of different metal. **Once a connection is opened, copper gaskets must be used to prevent leaks.** Part Nos. of gaskets required are 354076-S, 77-S, 78-S & 354981-S.

DESCRIPTION

Compression process cycle type, using Freon as refrigerant. Evaporator unit and allied parts are mounted in luggage compartment of car. Beginning in 1956, a magnetic clutch is used and the electrical control system is similar to 1954–55 models except that a wire has been added to supply battery current to magnetic clutch. The dehydrator and receiver are combined into a single unit in 1956 models with no shutoff valves at the receiver. Pump down of system, on these models is not possible. 1956 compressors are not interchangeable with earlier units due to tapered shaft required for magnetic clutch. The system consists of basic groups of elements as follows:

Refrigerating: Compressor–Located to right front side of engine. Operation causes and maintains necessary high pressure in system needed to increase Freon vapor temperature.

Condenser–Located in front of radiator. Condenses refrigerant vapor discharged from compressor, through action of fast moving air over metal surfaces of condenser.

Modulator Valve–Located on top left of condenser. Controls compressor pressure by maintaining a uniform inlet or "low pressure side pressure" by bypassing "high pressure side pressure" to low pressure side of compressor, thereby preventing compressor from reducing pressure in evaporator necessary to permit the vaporization of Freon. Manual control of

CONTINUED ON NEXT PAGE

1954-57 LINCOLN & MERCURY (C ntinued)

valve from lever on dash provides temperature control.

Receiver–Mounted to floor pan beneath rear of car. Stores liquid refrigerant and maintains supply more than that nee ded for normal operation.

Sight Glass–Located in evaporator assembly above expansion valve. Provides a means for determining adequacy of refrigerant charge.

Dehydrator–Mounted beside receiver on floor pan beneath rear of car. Filters and dehydrates Freon as it passes through system.

Expansion Valve–Part of evaporator assembly located in trunk of car. Supplies liquid to evaporator core at same rate that refrigerant is removed from it in a vaporous state.

Evaporator–Part of evaporator assembly located in trunk of car. Container for refrigerant which readily absorbs heat from surrounding area when temperature of refrigerant liquid is reduced. In the core of the evaporator refrigerant is changed from liquid to vapor.

Air Circulating: Blowers–Located in evaporator assembly in trunk of car. These squirrel cage type fans, two in number, are located on each side of car, and force air from refrigerated area in evaporator assembly to ducts leading to car interior.

Discharge Air Ducts–Connected to grille, located on each end of package shelf. Entry point of refrigerated air to interior of car.

Return Air Ducts–Located on either side, at bottom of rear seat. Return point of air to evaporator.

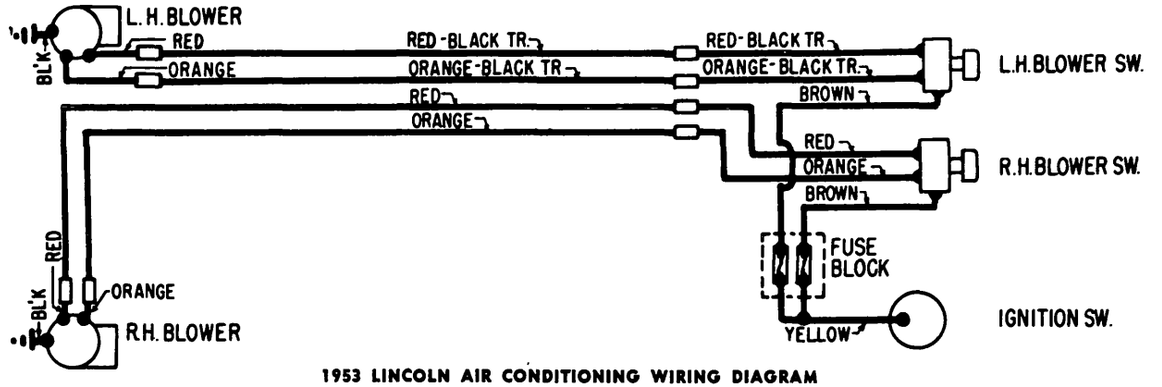
Air Filter–Located on evaporator assembly front. In normal operation air returning to evaporator for recooling causes electrostatic pick up of dust particles.

Control–Control panel consists of two 2-speed controls, one for each blower motor, and a modulator valve control lever. Modulator valve control lever determines degree of coolness when Air Conditioner is "On," position farthest to right providing maximum coolness. Another control element is:

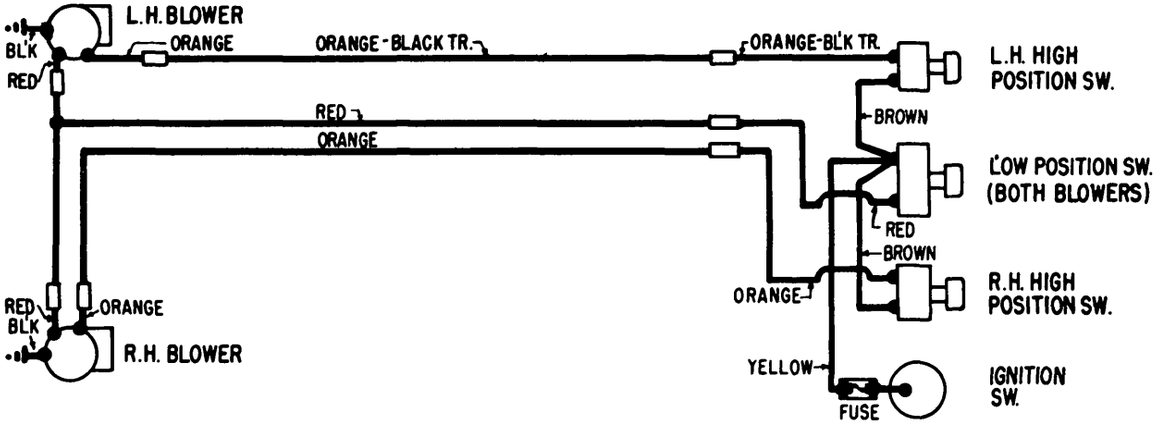
Temperature Tube–Located between expansion valve and outlet of evaporator (low pressure side). If temperature at evaporator outlet falls below predetermined value, substance in temperature tube contracts. This reduces pressure on expansion valve diaphragm which in turn permits a coil spring to force needle towards its seat. This action reduces flow of liquid into evaporator. Result is a slowing up of refrigerating action and a rise in temperature of evaporator. The tube serves to check liquid state Freon to build up in low pressure side with possible resultant damage to compressor. With valve closed the build up of Freon on the high pressure side would result in no refrigeration

OPERATION

With Air Conditioner "On" and engine and compressor operating, heat laden, low pressure Freon is compressed by the compressor and discharged into the condenser where it is cooled to remove the "sensible" heat of compression. The Freon is forced into receiver under pressure when modulator valve is closed. After passing through dehydrator and sight glass Freon enters expansion valve in evaporator assembly. At orifice in expansion valve high pressure liquid Freon changes to low pressure liquid, then enters evaporator core. The "boiling" Freon, while in the evaporator core, absorbs heat from the surrounding air and vaporizes. The vapor is drawn through the low pressure line to compressor where cycle is repeated.



1953 LINCOLN AIR CONDITIONING WIRING DIAGRAM



1954-55 LINCOLN AIR CONDITIONING WIRING DIAGRAM

PRECAUTIONS, LEAK TESTING & TROUBLE SHOOTING

See "Air Conditioning Service Cautions", "Trouble Shooting", and "Leak Tests".

CHECKING & ADJUSTMENT

CHECKING: Bubbles in Sight Glass–Appearance of bubbles in sight glass when engine idling or by-passing is not unusual and does not indicate a shortage of refrigerant. Remove cover from sight glass. Run engine and compressor for 5-10 minutes, with engine at fast idle, temperature control at maximum cold, then observe sight glass for one minute. If no bubbles appear in sight glass (system not by-passing) it may be assumed that there is sufficient Freon-12 in the system, providing cooling system is in working order. If bubbles appear, add Freon-12 to system until bubbles disappear, then add one lb. additional as a safety factor. See "Adding Partial Charge of Refrigerant" following.

Compressor Oil Level & Adding Oil (With ut Oil S p arator - 1954-57): *(CAUTION* - Oil filler plug on compressor should never be removed to check the oil level as a maintenance pr c dure. Should any portion of system be removed and reinstalled or replaced, oil level should be checked nly at time of reinstallation or replacement). To check oil level and add oil, operate system for 30-35 minutes. Turn off engine, and turn both service valves clockwise until seated. Loosen high pressure service valve gauge port cap slightly to to let compressor gas pressure reduce to air pressure (observe "Service Precautions"). Remove oil filler plug, insert a 1/8" diameter rod (do not use coated welding rod) in the oil filler plug hole until it bottoms, holding rod vertically. Rod should show ¾" (Mercury, 7/8" (Lincoln). Add Suniso 4-G Refrigerant Oil as required. Replace oil filler plug, then evacuate and purge compressor (see below).

Compressor Oil Level & Adding Oil (With Oil S parator): Make sure compressor pulley disconnect bolts are in place. Run engine at approximately 1500 RPM, full air conditioning, for 15 minutes in 60°F. ambient (surround-

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1954-57 LINCOLN & MERCURY (C ntinu d)

ing air) temperature or above Check evaporator sight glass for bubbles (see above) to determine if Freon-12 charge is sufficient (save for future reference) Shut engine off and isolate compressor by turning both service valve stems fully clockwise until seated Loosen high pressure service valve gauge port cap slightly to let compressor pressure bleed off (observe "Service Cautions") On Lincoln, disconnect compressor end of the oil separator drain hose On Mercury, remove the cap from drain hose fitting in compressor Insert a clean 1/8" diameter rod (flat on one side for approximately 3" at bottom end—do not use coated welding rod) into compressor crankcase through fitting until it bottoms (approximately 8" will be required to reach bottom) *(NOTE*—Compressor crankshaft may have stopped with counterweights in position to prevent rod from bottoming on compressor base If so remove rod and tap starter to rotate compressor slightly Try dipstick rod again Repeat, if necessary until rod bottoms being careful never to rotate compressor with rod inserted) Oil level, measured from bottom of dipstick rod, should be 1½-2" (Lincoln), 2-2¼" (Mercury) *(NOTE*—This represents 8-12 ozs of oil) Add oil as necessary, to bring oil level to maximum amount specified (Suniso 4-G) If level above normal foaming of oil may be causing a false reading Allow open compressor to set for 15 minutes and recheck If still high remove enough oil to bring oil level to maximum amount specified On Lincoln reconnect oil separator drain hose to compressor fitting using new ¼" gasket On Mercury cars, replace cap on drain hose fitting in the compressor using new ¼" gasket under cap Evacuate and purge compressor (see below)

Evacuating & Purging Compressor—*(NOTE*—Since only Freon vapor is present in the compressor very little Freon is lost when checking and adding oil or when compressor only is removed and reinstalled to work on engine Normally, it will be necessary to purge air and moisture from the compressor and hoses but not evacuate and add Freon-12 (partial charge) unless there is evidence of a low charge of Freon as shown by checking liquid sight glass for bubbles (see CHECKING above) If additional charge of Freon required see "Evacuating Compressor & Adding Partial Charge of Refrigerant" below To purge compressor of air and moisture loosen cap on service port of high pressure valve, open low pressure valve slightly and allow Freon to purge suction hose, compressor, and discharge hose Tighten service port cap Open both service valves fully Run engine at fast idle for at least five minutes (air conditioning fully on) and make "Bubbles in Sight Glass" check (see CHECKING above) If Freon charge low follow procedures under "Evacuating Compressor & Adding Partial Charge of Refrigerant" (see below)

BELT ADJUSTMENT: Adjust compressor belt by pulling idler against belt to allow approximately 1/2" deflection at point midway between water pump and compressor pulley.

AUTOMATIC THROTTLE CONTROL: With engine warm, air conditioning system operating, and transmission in neutral, adjust knurled nut at end of operating rod of the control assembly to obtain idle speed of 800 RPM, tighten locknut Check idle to make sure that it returns to normal whenever air conditioning is turned off or the transmission is shifted out of neutral *NOTE*—Engine idle should be checked and set to specifications before attempting to adjust fast idle device

Compressor Valve Operation (1954-57): Start engine and run with system set at maximum cooling for at least 15 minutes so that compressor crankcase is warm and comparatively free of refrigerant Turn low pressure fender apron valve clockwise until seated With engine running at slow idle, low pressure gauge reading should drop to at least 15" Hg vacuum in a short period of time *(CAUTION*—Compressor crankcase oil will be pumped out of compressor and into system if this test is unduly prolonged). If it is impossible to get this reading, it indicates that either the compressor intake, or the fender apron valve is at fault To determine which valve is at fault, disconnect and cap flexible low pressure hose at fender apron valve fitting. With this line capped, again attempt to pump to 15" Hg. vacuum If it is now possible to attain this reading, the fender apron valve is leaking, if not, the compressor intake valve or hose is leaking When the engine is stopped, the low pressure gauge reading will jump several inches immediately if the discharge valves are not holding The above vacuum reading cannot be reached if the suction valves are not holding.

PRESSURE TESTING SYSTEM

Place temperature control lever on instrument panel in full cold position. Shut off engine for at least 5 minutes before starting test. Check valves located on condenser and right front fender apron to make sure service ports are shut off. This is done by removing valve stem covers and turning stems counter-clockwise until valves seat. Remove protective caps from service ports on condenser and fender apron valves. Clamp Pressure Test Gauge Manifold Tool ACL-53-3 to right hand side of radiator air deflector assembly. Attach high pressure gauge hose to service port on condenser valve, and low pressure gauge hose to fender apron valve service port. Turn both valves on gauge manifold clockwise until seated. Turn stems on both condenser and fender apron valves clockwise 1 1/2—2 turns. Both gauges should read neutral system pressure between 50-80 PSI depending on temperature of surrounding air. (High temperatures give higher readings). If gauge readings are below normal, check all connections and serviced parts for leaks. If system pressure is so low that it is impossible to detect leaks, increase system pressure as follows Attach center hose of Test Gauge Manifold to a fully charged Freon tank. Open tank valve. Turn both valves on gauge manifold counter-clockwise one full turn. Freon will flow until system reaches tank pressure (approximately 50-80 lbs.). Shut off Freon tank valve and turn both manifold gauge valves clockwise until seated. Disconnect center hose from tank. Cap hose. Turn valve stems on both condenser and fender apron valves counter-clockwise until seated. Disconnect both gauge hoses from service ports, cap hoses and ports. Replace condenser and fender apron valve stem protector caps.

EVACUATING THE SYSTEM

If all pressure in system has been released, either for servicing or by accident, it will be necessary to completely evacuate to remove moist air and other contaminants which may have entered when fittings or assemblies were opened. Before evacuating make sure that all connections are tight so that no air will be drawn in. Before proceeding with the evacuation follow procedures under "Pressure Testing System" and "Leak Testing". Leave test gauge manifold attached, as it will be used in evacuating. Turn stems on condenser valve and right front fender apron valve 1 1/2—2 turns in a clockwise direction. Turn both gauge valves about one turn in a counter-clockwise direction and release all system pressure through center hose. When there is no more Freon flowing, connect center hose of gauge manifold to vacuum pump.*(CAUTION—Do not connect center hose to pump when there is still pressure in system. This could be harmful to pump).* Turn condenser valve counter-clockwise until it seats. Turn high pressure gauge valve clockwise until seated. Start vacuum pump and evacuate the system to a minimum of 24" Hg in at least 20 minutes. This will be indicated on the low pressure gauge of the gauge manifold. Turn low pressure gauge valve clockwise and fender valve counter-clockwise until seated. Shut off vacuum pump and disconnect center hose at pump fitting. If it is necessary to remove Pressure Test Gauge Manifold, turn valve stems on both condenser and fender apron valves counter-clockwise until seated. Disconnect both gauge hoses from service ports. Cap hoses and ports. Replace condenser and fender apron valve stem protector caps.

CHARGING THE SYSTEM

If gas pressure has been released either through accident or for servicing, it will be necessary to completely recharge the system. Before recharging system, follow procedures under "Pressure Testing System", "Leak Testing System", and "Evacuating System" in order given. Connect manifold center hose of Pressure Test Gauge Manifold to a charged Freon tank. Open tank valve. Loosen manifold center hose at manifold connection and allow Freon to escape for a few seconds. Retighten center hose connection. Turn low pressure gauge valve about two turns in a clockwise direction. Turn fender apron valve stem slowly about 1-1/2 turns in a counter-clockwise direction. When pressure neutralizes, place manual temperature control lever in full cold position. Start engine Allow engine to run at fast idle Place Freon tank on scale and charge until 7½ lbs (1953), 6½ lbs (1954-57) have passed into system *(CAUTION - If pressure in Freon tank not sufficient to force total lbs. into system it may be necessary to stand tank in pail of hot water. Do not use excessive heat on tank as this could cause an explosion).* When system is fully charged there will be no bubbles visible in the evaporator sight gauge. The pressures will be

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1954-57 LINCOLN & MERCURY (C ntinu d)

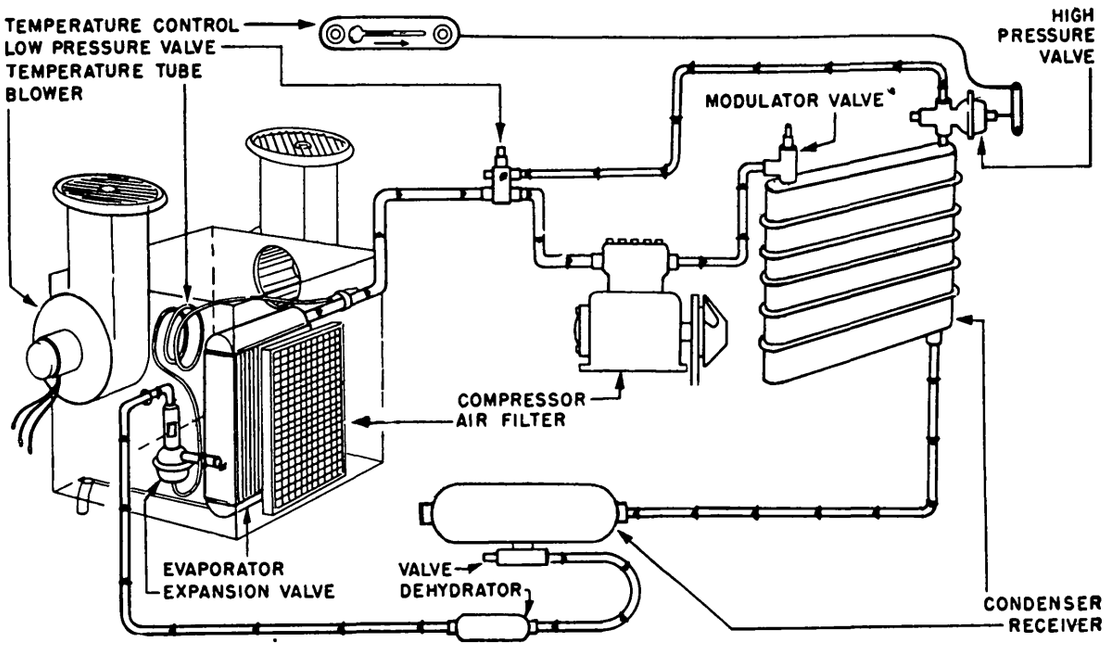
between 25-40 (1953), 20-30 (1954-57) PSI on low side 120-190 (1953), 135-160 (1954-57) on high side To check high and low pressures, engine must be running on fast idle. Fender apron valve and condenser valve must be cracked open. Both valves on gauge manifold must be turned clockwise until seated. To remove Pressure Test Gauge Manifold, turn valve stems on both condenser and fender apron valves counter-clockwise until seated. Disconnect both gauge hoses from service ports. Cap hoses and ports. Replace condenser and fender apron valve stem protector caps.

PUMPING DOWN THE SYSTEM
1954-55 MODELS

When any assembly (except receiver tank or compressor) is to be replaced or serviced, most of Freon charge can be saved by pumping system down. This traps gas in receiver tank. Proceed as follows Raise car and remove valve stem protector caps from both the receiver inlet and outlet valves. Turn stem on receiver outlet valve clockwise until seated. Lower car and start engine. Run engine on high idle for four minutes. At this point, there should be no more Freon visible in the evaporator sight gauge. While engine is still running, turn stem on receiver inlet valve clockwise until seated. Shut off engine. To release pumped down pressure turn receiver outlet valve counter-clockwise until seated. When system has neutralized, turn receiver inlet valve counter-clockwise until seated. Replace receiver valve stem protector covers.

ADDING PARTIAL CHARGE OF REFRIGERANT
ALL MODELS

Before adding a charge, follow procedures outlined under "Pressure Testing System", and "Testing for Leaks". Make sure both gauge valves are turned clockwise and condenser and fender apron valves counter-clockwise until seated. Connect center hose of gauge manifold to a charged Freon tank. Open tank valve. Loosen manifold center hose at manifold connection and allow Freon to escape for a few seconds. Retighten hose connection. Start engine and run at high idle. Turn fender apron valve about 1 1/2 turns in a clockwise direction. Place Freon tank on a scale. Turn low pressure gauge valve 1 1/2 turns in a counter-clockwise direction and add Freon 1/2 lb. at a time until sight glass remains clear at all engine speeds. At this point an additional lb. of Freon may be added as a safety factor. *(CAUTION–If pressure in Freon tank is not great enough to force gas into system, this pressure may be increased by standing tank in a pail of hot water. Do not use excessive heat on tank as this may cause an explosion).* Check system pressure. To check high and low pressures, run engine at fast idle. Open fender apron valve and condenser valve clockwise 1 1/2 turns. Turn both gauge valves clockwise until seated. Pressures should be 20–30 PSI (1954–57) on low side, 135–160 PSI on high pressure side. To remove manifold, turn valve stems on both condenser and fender apron valves counterclockwise until seated. Disconnect both gauge hoses from service ports. Cap hoses and ports. Replace condenser and fender apron valve stem protector caps.



LINCOLN & MERCURY AIR CONDITIONING SYSTEM

EVACUATING A PUMPED DOWN SYSTEM
1954–55 MODELS

Clamp Pressure Test Gauge Manifold Tool 53-3 to radiator air deflector. Remove protector cap from condenser valve stem, and make sure stem is turned in the full counter-clockwise direction. Remove cap from condenser valve service port and low pressure service hose. Connect low pressure gauge hose to condenser valve service port. (NOTE–With system blocked at receiver, it will be necessary to evacuate from the high pressure side. The valve arrangement used in the compressor would block evacuation from the low pressure side. The low pressure gauge must be used, as it is the only one equipped to measure vacuum. Make sure high pressure gauge valve is turned in the full clockwise direction. Connect center hose of gauge manifold to vacuum pump. Start pump. Turn low pressure gauge valve counter-clockwise about two turns. Turn condenser valve stem clockwise about 1-1/2 turns. Evacuate system to a minimum of 24" Hg. after 20 minutes. Turn low pressure gauge clockwise until seated. Release pump down pressure by turning receiver outlet valve counter-clockwise until seated. When system pressure has neutralized, turn receiver inlet valve counter-clockwise until seated. Disconnect vacuum pump, and turn low pressure gauge valve counter-clockwise about 1/2 turn. Allow Freon from system to purge through gauge manifold for a few seconds to clear manifold of any air. Turn low pressure gauge clockwise until seated. Check system pressures and test for leaks (See "Pressure Testing System" and "Testing for Leaks"). If it is necessary to add to the charge of refrigerant, Follow procedures under "Adding A Partial Charge of Refrigerant". If Pressure Test Gauge Manifold is not going to be used further, it may be removed at this time. To remove, turn valve stems on both condenser and fender apron valves counter-clockwise until seated. Disconnect both gauge hoses from service ports. Cap hoses and ports. Replace condenser and fender apron valve stem protector caps.

EVACUATING COMPRESSOR & ADDING PARTIAL CHARGE OF REFRIGERANT
1954-57 MODELS

EVACUATING COMPRESSOR & ADDING PARTIAL CHARGE OF REFRIGERANT (After Checking & Adding Oil or After Re-installation of Compressor). Attach manifold gauge set tank of Freon-12, and a vacuum pump to the system as follows Remove service valve stem covers and make sure that both service valves are at maximum counter-clockwise position Remove service port gauge port covers and attach flexible hoses of gauge set to gauge ports and to a tank of Freon-12 (center line) Turn both manifold gauge valves to the maximum clockwise position Attach vacuum pump to center connection of gauge manifold Place both service valves at maximum clockwise position, and both gauge valves at maximum counter-clockwise position Run vacuum pump until low pressure gauge indicates as close to 30" of vacuum as possible Close pump valve, turn off pump Open Freon-12 tank valve, then check all compressor connections for leaks Shut

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1954-57 LINCOLN & MERCURY (Continued)

Freon tank valve. Turn both service valves to maximum counter-clockwise position. Check quantity of Freon-12 in system (see "Bubbles in Sight Glass" under CHECKING above). Add partial charge of refrigerant as follows:

Adding Partial Charge of Refrigerant: With manifold gauge set attached, open Freon-12 tank valve. Purge air from high pressure hose by loosening high pressure hose at service valve. Tighten connections and set high pressure gauge valve at maximum clockwise position. Set low pressure gauge valve at maximum counter-clockwise position. Loosen low pressure gauge hose slightly at low pressure service valve to purge air from hose. Tighten connection. Set both service valves at center position. Run engine at 1500 RPM with temperature control knob at maximum cold position. Charge system until liquid sight glass shows no bubbles. Continue to charge system until one additional lb. of Freon-12 has been removed from tank. It may be necessary to place Freon-12 tank in a container of hot water (not to exceed 125°F.) to force gas from tank. *(CAUTION*—Never heat Freon-12 tank with torch. A dangerous explosion may result). Set both service valves at maximum counter-clockwise position. Remove gauge set, cap service valve gauge ports and valve stems.

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

1954-57 MODELS

CONDENSER ASSEMBLY WITH MODULATOR VALVE ATTACHED: Removal—Clamp Pressure Test Gauge Manifold Tool 53-3 to radiator air deflector. Remove protector caps from valve stems on condenser valve and fender apron valve. Turn both valve stems counter-clockwise until seated. Remove service port caps. attach high pressure gauge hose to condenser valve service port, and low pressure gauge hose to fender apron valve service port. Make sure both valves on gauge manifold are turned clockwise until seated. check system pressure by turning valve stems on condenser and fender apron valves 1 1/2–2 turns in a clockwise direction. Both gauges should read between 50-80 PSI. If there is pressure in system, pump down system. Disconnect by-pass line at modulator valve fitting, cap line and fitting immediately. Remove cap screw holding by-pass line clamp to top of condenser. Disconnect high pressure hose at condenser valve fitting. Cap hose and fitting immediately. Loosen clamp holding Bowden wire housing to modulator valve mounting bracket. Slip wire down off pin on modulator valve actuating arm. Disconnect high pressure line at fitting on lower right hand corner of condenser assembly. Cap line and fitting immediately. Remove two bolts, nuts and flat washers holding hood lock support to upper radiator braces. Remove four bolts, nuts and washers holding lower hood lock support braces to radiator support and four nuts, bolts and washers holding hood lock support to fender apron. Remove acorn nut holding hood lock support to its rod, then remove support with two lower braces attached. (NOTE—It will be necessary to slip head lamp wiring loom out of clips on the under side of the hood lock support). Remove six cap screws, 3 each side, holding condenser mounting brackets to radiator support assembly. Remove condenser assembly with modulator and condenser mounting brackets attached. (NOTE—When replacing condenser assembly, transfer modulator valve and condenser mounting brackets to new condenser). If it is necessary to remove Pressure Test Gauge Manifold, turn valve stems on both condenser and fender apron valves counter-clockwise until seated. Disconnect both gauge hoses from service ports. Cap hoses and ports. Replace condenser and fender apron valve stem protector caps.

Installation: If Pressure Test Gauge Manifold Tool 53-3 has been removed, install as follows: Clamp manifold assembly to radiator air deflector. Remove protector caps from valve stems on fender apron and condenser valves and turn both stems counter-clockwise until seated. Remove caps from service ports. Attach high pressure gauge hose to condenser valve service port, and low pressure gauge hose to fender apron valve service port. Make sure both valves on gauge manifold are turned clockwise until seated. Place condenser assembly, with mounting brackets and modulator valve attached, in position on radiator support and attach with six mounting cap screws. Place hood lock support, with two lower braces attached, in position on fender apron mounting brackets and install four attaching cap screws. Install acorn nut holding hood lock support to hood lock support rod. Install four bolts, nuts and washers holding lower hood lock support braces to radiator support. Install two bolts, nuts and washers holding hood lock support to upper radiator braces. Slip headlamp wiring loom into clips on underside of hood lock support. Remove caps from high pressure line and fitting on right hand corner of condenser assembly. Using new copper seal, connect line to fitting. Remove caps from modulator valve fitting, and by-pass line. Using new copper seal, connect line to fitting. Remove caps from flexible high pressure hose and condenser valve. Using new copper seal, connect hose to fitting. Secure by-pass line clamp to top of condenser with cap screw and lockwasher. Place manual temperature control in full cold position. Rotate modulator valve actuating arm as far as it will go towards the right hand side without forcing it, and slip Bowden wire loop up over end of actuating arm pin. Clamp Bowden wire housing to modulator valve mounting bracket. Replace dehydrator (see Removal & Installation of Dehydrator Assembly). If system was pumped down, first evacuate (see Evacuating a Pumped Down System). Release pumped down pressure by turning receiver outlet valve counter-clockwise until seated. When system pressure has neutralized, turn receiver inlet valve counter-clockwise until seated. Test entire system for leaks (see Leak Testing Procedure). If there was no system pressure, perform "Pressure Test", "Leak Test" "Evacuate", and "Charge" system in this order. Turn valve stems on condenser valve and fender apron valve counter-clockwise until seated. Remove Pressure Test Gauge Manifold, replace protector caps on condenser valves, fender apron valves, and both valves on receiver. Cap service ports, and manifold hoses.

1954-55 MODELS

COMPRESSOR ASSEMBLY: Removal—Drain radiator and engine block. Disconnect battery ground cable. Remove protector caps from valve stems on condenser valve and fender apron valve. Turn valve stems clockwise until seated. Disconnect water by-pass line at thermostat housing. Remove oil filler cap and oil level indicator. Remove exhaust crossover pipe. Disconnect heater outlet tube at water pump connection and remove cap screw securing heater tube clamp to compressor. Raise car and remove generator as follows: Remove radiator splash shield, loosen generator idler to remove belt tension, loosen generator mounting cap screws, remove generator drive belt. Remove arm, field, and ground wires from connections on generator, remove generator mounting cap screws and generator. Remove two cap screws securing compressor. Note wiring harness clip on rear cap screw. Lower vehicle and disconnect flexible high pressure hose and flexible low pressure hose at compressor fittings. Cap hoses and fittings immediately. Remove exhaust manifold crossover pipe extension. Loosen compressor belt idler arm and remove belt. Remove two cap screws holding compressor to compressor mounting bracket. *(CAUTION—Support compressor assembly to keep it from falling when cap screws are removed).* Remove compressor by lifting up around heater connections and out through engine compartment.

Installation: Place a headless stud in one of the mounting holes in compressor. Place compressor in position in engine compartment with stud through bracket for support. Replace one compressor-to-bracket attaching screw. Remove headless stud and replace second cap screw. (NOTE—Slip oil dipstick tube brace over rear cap screw before installing). Place compressor drive belt in position over compressor and crankshaft pulleys. Connect heater return line to water pump. Secure heater tube clamp to compressor. Connect flexible low and high pressure hoses to compressor. Use new copper seals. Replace exhaust manifold crossover pipe extension, using new gasket. Make sure heater supply line clamp is installed on lower stud before tightening nut. Connect water by-pass line to thermostat housing, using new gasket. Install oil filler cover, and oil level indicator. Raise vehicle and secure compressor idler bracket to compressor with attaching cap screw. Replace two compressor to engine block mounting cap screws. Make sure wiring harness clip is placed on rear cap screw before installing. Place compressor belt over idler wheel. Install generator as follows: Place in position in mounting bracket and install rear cap screw. Install front cap screw with spacer between generator and mounting bracket. Install field, arm, and ground wires. Place generator drive belt in position on pulleys and up over idler wheel. Tighten idler in position, and adjust belt tension by pulling

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1954-57 LINCOLN & MERCURY (Continued)

down on generator assembly and tightening generator mounting screws. Replace generator splash shield. Lower car and adjust compressor belt tension by loosening idler arm attaching cap screws, and pulling idler pulley up against belt. Final adjustment is made by tightening idler arm attaching screws, and turning idler arm adjusting screw down until there is approximately 1/2" deflection of the belt when it is pushed at a point about half-way between the two pulleys. Turn the valve stems on both the condenser and fender apron valves counter-clockwise until seated. Install a new dehydrator assembly (see Removal & Installation of Dehydrator Assembly). Pressure test system (see Pressure Testing System). Leak test system. If bubbles or foaming can be seen in evaporator sight glass with engine running on high idle, add refrigerant (see Adding a Partial Charge of Refrigerant). If there is no charge in system, "Pressure Test", "Leak Test", "Evacuate", and "Charge" in order given.

1956-57 MODELS

COMPRESSOR REMOVAL (To Work on Engine): Isolate compressor by turning both high and low pressure service valves to extreme clockwise position, then loosen cap on high pressure service valve gauge port, and allow gas to escape until compressor and attaching hoses are relieved of refrigerant pressure. *(CAUTION–* Loosen cap a small amount only, and do not remove it until pressure is completely relieved). Raise car on hoist or jacks and remove splash pan. From underneath car, remove generator adjusting bracket bolt. Loosen generator-to-compressor mounting bolts, swing generator inward, and disengage the two belts from generator and compressor pulleys. Disconnect generator leads, remove generator mounting bolts and remove generator from car. Remove generator-to-cylinder block bolt and compressor-to-lower bracket bolt. Lower car and complete operation in engine compartment. Disconnect high and low pressure hoses from compressor. Remove compressor mounting bolts. Loosen angle bracket bolt and remove compressor from engine.

COMPRESSOR INSTALLATION: Reverse removal procedure. Adjust compressor belts (see ADJUSTMENTS above). Connect high and low pressure hoses *(NOTE–* Be sure to replace metal gaskets in hose connections). Evacuate compressor and attaching hoses (see "Evacuating Compressor & Adding Partial Charge of Refrigerant" below).

PARTS REPLACEMENT

1954-55 MODELS

►*NOTE:* Later 1954 and all 1955 Compressors may be serviced as indicated below. Those 1954 Compressors that may be serviced are identified by a 3/8" diameter tapped hole drilled in the end of the compressor pulley shaft. Compressor decals prohibiting repair may be ignored to the extent given below. Early 1954 compressors are serviced by replacement only.

COMPRESSOR SHAFT SEAL: *(NOTE–*A small quantity of oil around the compressor shaft seal is normal. An excessive amount of oil (to the point where it drips) indicates a leak. Always confirm a seal leak by checking with a leak detector). To replace compressor shaft seal, remove compressor and proceed as follows:

1) Remove two 1/8" Allen set screws from pulley hub. Both set screws are in the same hole, one on top of the other. Remove pulley with gear puller. *(NOTE–*The disconnect bolts may be removed from the 1955 pulley and the holes used in conjunction with an appropriate puller. A puller used on a 1954 pulley must grip the rear face of the pulley to prevent damage to the belt surfaces). Remove woodruff key from shaft. Check for and remove any burrs existing on shaft surface.

2) Compress seal bellows to clear snap ring and remove snap ring. Position compressor with pulley shaft upright. Remove seal seat *(NOTE–*White lead is used by manufacturer in assembling pulley to shaft and excessive white lead may cause seal seat to stick. If such a condition exists the seal seat can usually be loosened by tapping lightly to break bond. If this fails, a small gear puller may be used).

3) Clean seal plate and shaft thoroughly with a suitable solvent using care to prevent dirt or solvent from entering compressor. Remove seal bellows assembly. It can be pried free of seal plate with two screwdrivers. Remove "O" ring from groove in seal plate. Using new "O" ring, coat with clean compressor oil and insert into groove in seal plate.

4) Coat mating surfaces of new seal bellows assembly and shaft with compressor oil and reassemble seal bellows to compressor *(NOTE–*Brass cartridge enclosing seal bellows is a light press fit in front plate. The pressure seal is accomplished by the large "O" ring in the seal plate. Brass cartridge must go into front plate perfectly square and the flange must bottom against front plate all the way around). Wet seal seat with clean compressor oil and install with lapped surface towards seal bellows. Replace snap ring. Place woodruff key in compressor shaft slot. Lubricate shaft and pulley bore. Install pulley on shaft so that outer face of pulley hub is flush with end of shaft *(NOTE–* This must be accomplished without putting any pressure on the rear compressor shaft bearing. A puller can be made by using a 3/8"-16x1½" capscrew, nut and large flat washer. Install nut and then washer on capscrew. With washer next to pulley hub, bottom capscrew in tapped hole of shaft and use nut to press pulley into place). Replace both Allen screws in pulley hub.

COMPRESSOR VALVE PLATE: *(NOTE–*Valve plate assembly may be serviced with compressor on or off car. If compressor is removed, it should be serviced in an upright position). Proceed as follows:

1) Isolate compressor and relieve compressor pressure. Remove compressor cylinder head and valve plate *(NOTE–*Cylinder head or valve plate may stick to compressor body. Loosen with hammer and drift. All blows should be in an upward direction to prevent damage to pins that protrude from lower face of valve plate). Inspect valve plate, suction valve leaves and pins carefully. Check to see if tab on valve plate gasket was bearing against bottom surface of leaf rather than top surface. When assembling, use all new gaskets. *(NOTE–*Most valve malfunctions are caused by dirt or foreign particles working their way under the valves, causing them to remain open. Valve plate assembly and suction valve leaves may be cleaned in solvent. After cleaning, inspect valves closely. If there appears to be no damage to the valve plate sealing surface or suction leaves, they may be thoroughly dried, coated with refrigerant oil and reassembled. Use new gaskets. The oil will hold the suction leaves in place on their pins while valve plate is being assembled to the compressor body. Replace any parts that appear damaged. If cylinders, or tops of pistons show damage, compressor must be replaced).

2) To reassemble, coat all pieces with refrigerant oil and assemble in the following order (compressor upright): Valve plate gasket, valve plate with leaves attached, head gasket, and head *(NOTE–*Order of reassembly is important, since tabs on valve plate gasket serve to anchor the suction leaves in place).

SUCTION & DISCHARGE LINE FITTINGS: Fittings are retained to compressor body with two Allen screws. A 7/32" Allen wrench is required to remove a fitting. Use new gaskets whenever a fitting is replaced. Wet gaskets with compressor oil.

SUCTION STRAINER SCREEN: Suction strainer is a finger strainer located in a recess under suction line fitting. After fitting and gasket have been removed, strainer and its gasket can be removed and replaced. Use new gaskets whenever a fitting is replaced. Wet gaskets with compressor oil.

OIL SIGHT GLASS: *(CAUTION–*If a broken or leaking oil sight glass is suspected, it should be thoroughly leak tested. This thorough check is recommended because a broken sight glass is rare and rather difficult to replace).

1955-56 FORD "SELECTAIRE" AIR CONDITIONING

F rd V8 (1955-56)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 FORD SOLENOID BY-PASS VALVE CAUTION:* When air conditioner is serviced, the four Allen head screws at base of solenoid by-pass valve should be checked for tightness Screws must be snug to insure proper sealing. Do not overtighten.

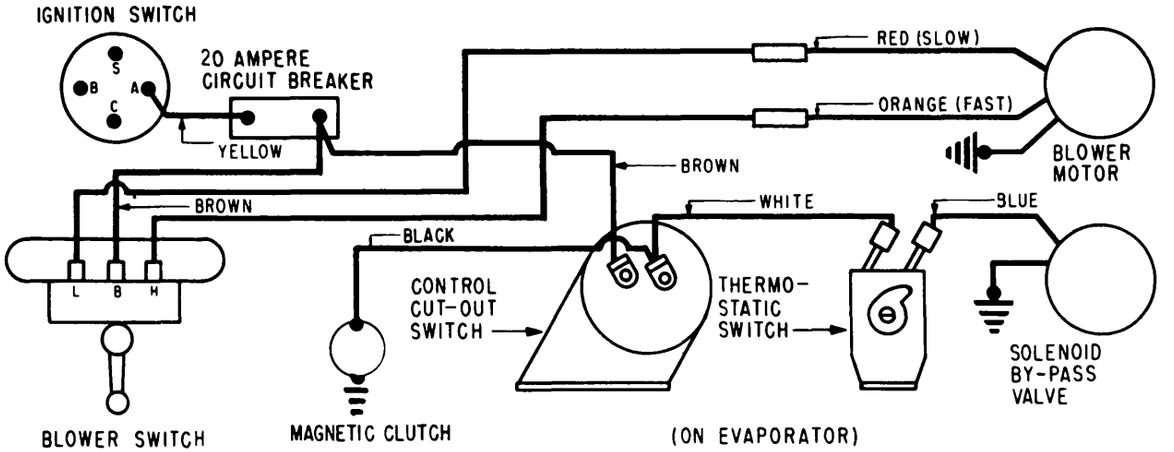
►*1955 OIL BAFFLE INSTALLATION (To Facilitate Ch cking Compr ssor Oil Level):* Oil baffle is available for installation on all 1955 Air Conditioning units. S *"Ch cking Compressor Oil Level" below.*

►*1955 COMPRESSOR PULLEY-TO-SHAFT LOCKING CORRECTION (Early Cars):* Some early production compressor units were not provided with a positive lock between compressor pulley and shaft Compressors should be checked and, if necessary, modified as follows. Secure large flat washer (Part No EAA-6278-B) to face of pulley and pulley shaft by screwing bolt 20348-S8, with lockwasher 34807-S8 in place, into tapped hole in end of compressor shaft Torque to 23-28 ft lbs.

►*1955 FORD SOLENOID BY-PASS VALVE INTERFERENCE WITH HOOD CORRECTION:* If condition encountered it can be corrected, in some instances, by adjustment of rubber bumpers on either side at front of hood If hood bumper adjustment does not provide needed clearance, and less than 1/8" is needed, remove nut on top of by-pass valve and grind off some of bolt and bottom of nut If adjustment of hood bumpers interferes with satisfactory hood-to-fender line, or if grinding nut and bolt will not provide clearance needed, it will be necessary to remove condenser assembly and elongate holes in mounting brackets to obtain proper clearance.

►*1956 ENGINE OVERHEATING CORRECTION:* **1956 Cars With 1956 Air C nditi ning Unit Installed** - Discharge system, remove upper air deflector, grille, and parking lights. Locate and weld or braze the two upper (FDS-19157-A) mounting brackets and two lower (FDS-19158-A) mounting brackets to condenser flanges so short legs of brackets are upward and in position so that mounting bolts can be inserted through flange and bracket holes for mounting to radiator and side deflector flange. Clean welded area thoroughly with wire brush and paint with air dry enamel. Install modified condenser with four bolts, flatwashers, and lockwashers. After installation of other parts evacuate, recharge, pressure test and test system for leaks.

1956 Cars With 1955 Air C nditioning Unit Installed - Remove upper air deflector, grille, and parking lights. Cut two 1 3/8" spacers from a ½" steel pipe for use between condenser and radiator at lower mounting holes. To secure condenser, use two 5/16"-24 x 2" bolts, four 5/16" x 1" O D thick flatwashers and two 5/16" lockwashers. Disregard center mounting bolts and use existing bolts for upper mounting holes. Center bolts should be used to mount radiator only. Install parking lights, grille, and upper air deflector.



1956 FORD AIR CONDITIONING CONTROL DIAGRAM

►*CLUTCH ASSEMBLY INSTALLATION CAUTION:* When installing clutch assembly to compressor shaft, special self-locking capscrew with nylon insert in threads, 5/16"-24 x 1", Part No. 358606-S, and a flatwasher, Part No. 358605-S, must be used, otherwise retention of clutch assembly to shaft cannot be assured. Torque to 18-22 ft. lbs.

►*GASKET PRODUCTION CHANGE:* Copper gaskets previously used at all connections were discontinued during 1956 production. Once a connection is opened, or a leak developes, copper gaskets must be used to prevent leaks. Overtightening to stop leaks should not be attempted.

DESCRIPTION

Compression process cycle type, using Freon-12 as refrigerant. The evaporator assembly and allied parts are mounted on the dash. A solenoid valve functions automatically and is controlled by the setting of a thermostatic switch. 1955 and 1956 units are similar except for the following 1956 design changes

Magnetic Clutch: A magnetic clutch is used in place of the disconnect pulleys formerly used. Electrical control is similar to 1955 models except that a wire has been added from control cutout switch to supply battery current to magnetic clutch. The dehydrator and receiver are combined into a single unit with no shut-off valves at the receiver. Pump down of the 1956 unit is not possible. *NOTE - 1955 and 1956 compressors are not interchangeable due to tapered shaft used for the magnetic clutch.*

Oil Separator: Oil separator is located in low pressure side of refrigerant circuit between evaporator and low pressure service valve. Whenever a refrigerant line is broken for compressor service, it will be necessary to discharge entire system of refrigerant.

Refrigerating: Consists of compressor, condenser, solenoid by-pass valve, check valve, receiver, dehydrator, sight glass, expansion valve and evaporator unit.

Sol n id By-Pass Valv –By-pass valve is located in line between condenser and compressor inlet line. When solenoid is energized (air conditioning "ON"), valve is closed, and compressor will develop maximum pressure difference between high and low sides of compressor, and maximum cooling at the particular compressor speed will be provided Valve is held in closed position, giving full possible refrigeration, until a car speed of approximately 40 MPH is reached, then the by-pass valve begins to control the cooling, depending on the surrounding temperature and humidity. With valve open (solenoid de-energized) pressure on both sides of the compressor will be approximately equal, no refrigerant will flow through the system, and no cooling will result

Check Valve–Check valve is located in high pressure line connecting condenser outlet to receiver inlet. Prevents reverse surges of liquid Freon-12 from receiver into condenser, due to opening and closing of by-pass valve. It also maintains high pressure at expansion valve when by-pass opens, to prevent too great an unbalance in system pressures.

Air Circulating: Consists of blowers and discharge, return and outside air ducts

Control: Consists of control panel (air conditioning and heater controls combined), compressor clutch, thermostatic and control cut-out switches to control cooling.

OPERATION

See "1954–57 Lincoln & 1954–56 Mercury Air Conditioning". Solenoid valve performs same function as modulator valve on Lincoln & Mercury cars.

PRECAUTIONS, TROUBLE SHOOTING & LEAK TESTING

See "Air Conditioning Service Cautions", "Trouble Shooting", and "Leak Tests".

CHECKING & ADJUSTMENT

SEASONAL OPERATION: Cooling system may be permanently shut down by removing two compressor disconnect pulley bolts. This allows pulley to rotate on an integral ball bearing in the pulley, and the compressor will not operate.

CONTINUED ON NEXT PAGE

1955-56 FORD "SELECTAIRE" (Continued)

ADJUSTMENTS: Compressor Belt—Adjust compressor belt (and generator belt) by loosening generator-to-bracket bolt and pulling out on generator so there is approximately ¼" deflection at point midway between water pump and compressor pulley with normal thumb pressure

Control Cable Adjustments (Ford): Air Duct Valve—Set temperature control lever at its extreme left position. With lever in this position, adjust cable leading to right air duct valve so that valve is in the completely closed position (maximum counter-clockwise)

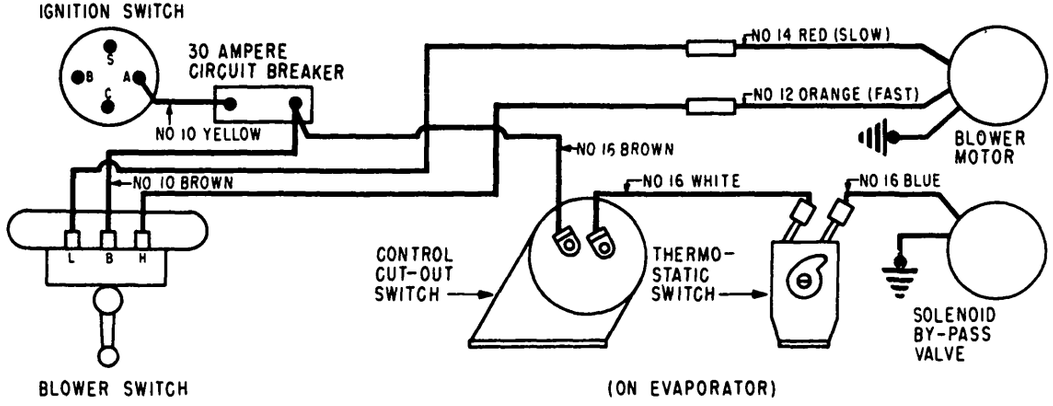
Louvre—Adjust evaporator louvre cable so that the louvres are completely closed when the temperature control lever is in center position (directly under the dot) If evaporator unit has been removed, it will be easier to adjust cable at the evaporator end before installing the evaporator. Only a slight adjustment of the louvre cable is possible at the control unit

Heater Thermostat—With temperature control lever at the center position, adjust heater thermostat cable until heater thermostat is in the closed position (thermostat lever all the way to right).

Evaporator Thermostatic Switch Adjustment: *(NOTE* - The switch is adjusted at time of installation and generally requires no further adjustment. However, in very dry climates such as the Death Valley area, the switch can be set to its very lowest temperature position In higher humidity areas, set switch at index lines to prevent evaporator from icing and clogging air passages Factory setting of control is at scribe mark on control, representing a temperature setting of 28°F. Control may be adjusted to maintain an evaporator temperature of 24-45°F The thermostatic switch operating differential is 6°F at any one setting) To adjust control, remove glove box to gain access to the adjusting screw Turn thermostatic switch adjusting screw clockwise to lower temperature and counter-clockwise to raise it.

CHECKING: Bubbles in Sight Glass—Appearance of bubbles in sight glass when engine idling or by-passing is not unusual and does not indicate a shortage of refrigerant. Remove cover from sight glass Run engine and compressor for 5-10 minutes, with engine at fast idle, temperature control at maximum cold, then observe sight glass for one minute If no bubbles appear in sight glass (system not by-passing) it may be assumed that there is sufficient Freon-12 in the system, providing cooling system is in working order. If bubbles appear, add Freon-12 to system until bubbles disappear, then add one lb. additional as a safety factor. See "Adding Partial Charge of Refrigerant" following.

Compressor Oil Level & Adding Oil (Without Oil Separator): *(CAUTION*—Under no circumstances should oil filler plug on compressor be removed to check oil level **as a maintenance procedure.** Should any portion of system be removed and reinstalled or replaced, oil level should be checked only at time of reinstallation or replacement). To check oil level and add oil, operate system for 30-35 minutes. Turn off engine, and turn both service valves clockwise until seated. Loosen high pressure service valve gauge port cap slightly to to let compressor gas pressure reduce to air pressure (observe "Service Precautions"). Remove oil filler plug, insert a 1/8" diameter rod (do not use coated welding rod) in the oil filler plug hole until it bottoms **holding rod vertically. Rod should show ¾". Add Suniso 4-G Refrigerant Oil as required. Replace oil filler plug, then evacuate and purge compressor (see below).**



1955 FORD AIR CONDITIONING CONTROL DIAGRAM

Compressor Oil Level & Adding Oil (With Oil Separator): Make sure compressor pulley disconnect bolts are in place Run engine at approximately 1500 RPM, full air conditioning, for 15 minutes in 60°F ambient (surrounding air) temperature or above. Check evaporator sight glass for bubbles (see above) to determine if Freon-12 charge is sufficient (save for future reference) Shut engine off and isolate compressor by turning both service valve stems fully clockwise until seated Loosen high pressure service valve gauge port cap slightly to **let compressor pressure bleed off. Next, remove the** cap from drain hose fitting in compressor Insert a clean 1/8" diameter rod (flat on one side for approximately 3" at bottom end—do not use coated welding rod) into compressor crankcase through fitting until it bottoms (approximately 8" will be required to reach bottom). *(NOTE*—Compressor crankshaft may have stopped with counterweights in position to prevent rod from bottoming on compressor base If so, remove rod and tap starter to rotate compressor slightly Try dipstick rod again Repeat, if necessary, until rod bottoms, being careful never to rotate compressor with rod inserted) Oil level, measured from bottom of dipstick **rod, should be 2-2¼".**

(NOTE—This represents 8-12 ozs, of oil) Add oil, as necessary, to bring oil level to maximum amount specified (Suniso 4-G) If level above normal, foaming of oil may be causing a false reading Allow open compressor to set for 15 minutes and recheck If still high, remove enough oil to bring oil level to maximum amount **specified. Replace cap on drain hose fitting in compressor, using new ¼" gasket under cap. Evacuate and purge compressor (see below).**

Evacuating & Purging Compressor—*(NOTE*—Since only Freon vapor is present in the compressor, very little Freon is lost when checking and adding oil, or when compressor only is removed and reinstalled to work on engine Normally, it will be necessary to purge air and moisture from the compressor and hoses but not evacuate and add Freon-12 (partial charge) unless there is evidence of a low charge of Freon, as shown by checking liquid sight glass for bubbles (see CHECKING above) If additional charge of Freon required, see "Evacuating Compressor & Adding Partial Charge of Refrigerant" below). To purge compressor of air and moisture loosen cap on service port of high pressure valve, open low pressure valve slightly and allow Freon to purge suction hose, compressor, and discharge hose Tighten service port cap Open both service valves fully Run engine at fast idle for at least five minutes (air conditioning fully on) and make "Bubbles in Sight Glass" check (see CHECKING above). If Freon charge low follow procedures under "Evacuating Compressor & Adding Partial Charge of Refrigerant" (see below)

MANIFOLD GAUGE SET INSTALLATION

Attach Gauge Manifold to hood lock support panel mounting bracket. Remove service valve stem covers and make sure both service valves are at the maximum counter-clockwise position. Remove service valve gauge port covers, and attach the flexible hoses to the gauge ports and to a tank of Freon-12. Turn both Manifold Gauge valves to the maximum clockwise position. *NOTE*—**The manifold valves are so arranged that when they are in the maximum or closed position, the center manifold connection is shut off from the gauges.**

TESTING THE SYSTEM

TESTING SYSTEM PRESSURES: Attach manifold gauge set. It will not be necessary to attach the Freon-12 tank unless refrigerant is to be added to the system. Set both gauges valves at the maximum clockwise, or closed, position. Set both service valves at the center position. Run engine at 1500 RPM Set temperature

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1955-56 FORD "SELECTAIRE" (Continued)

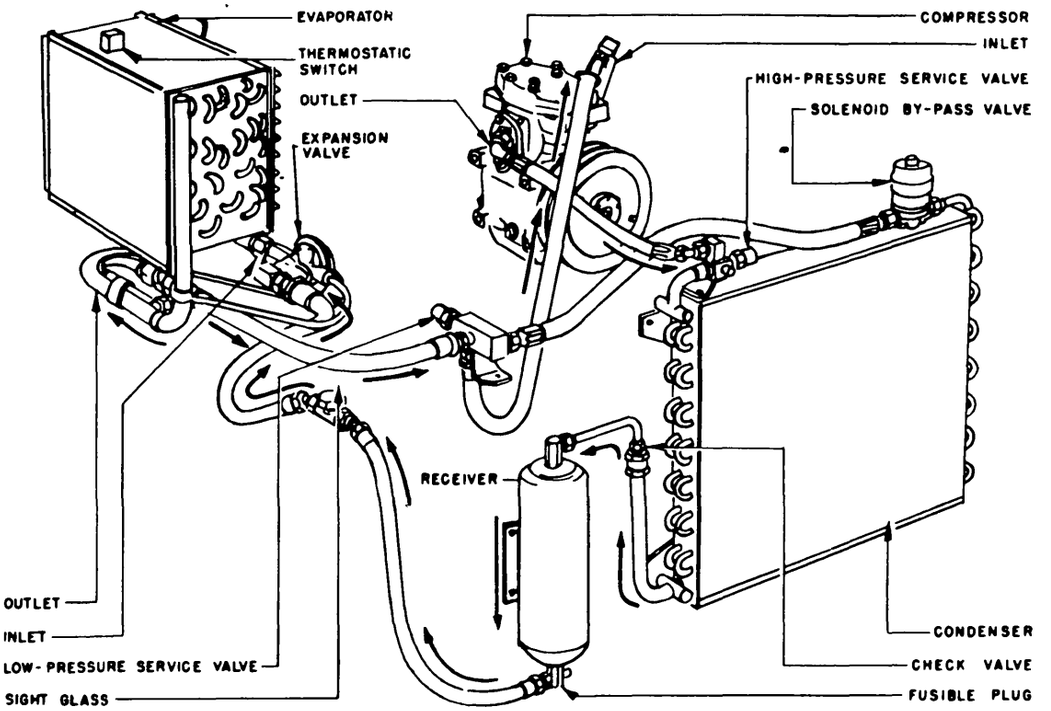
control lever at the maximum cooling position and turn blower to the "High" position. The actual pressures indicated on the gauge will depend on the temperature of the surrounding air. Higher air temperatures will give higher system pressures. The figures given are for an ambient (surrounding air) temperature of 75°F. For every 10°F increase in ambient air temperature, the pressures will increase approximately 17 lbs. The low pressure gauge should indicate a pressure of 16-25 lbs. at 75°F. The high pressure gauge should indicate a pressure of from 100-165 lbs. at 75°F.

TESTING COMPRESSOR PRESSURES: Attach manifold gauge set as indicated for checking system pressures above, but turn low pressure service valve to maximum clockwise position. Run engine at 1500 RPM for a short time. Observe both high and low pressure gauges. Low pressure gauge should indicate a vacuum of 24" minimum. Stop engine and continue to observe gauge pressures. The gauge should hold for several minutes. If the pressures equalize rapidly, the compressor discharge valves are defective. If both gauges hold their indication but values indicated are not normal (vacuum of 24" minimum and high pressure of 60-100 lbs.), the compressor intake screen is probably clogged. If no further work is to be done on the system after making the pressure check, close both service valves by setting them at the maximum counter-clockwise position. Remove manifold gauge set, and replace the service valve gauge port and valve stem caps.

TESTING SYSTEM TEMPERATURES: Place temperature control lever at maximum cooling position. Open one of the instrument panel outlet air valves by pushing on the valve control knob. Place the stem of a thermometer through the right outlet air vent door as far as it will go. Run engine at 1500 RPM. Turn blower switch to "High" position. The thermometer should indicate a temperature of approximately 40°F. with a room temperature of 75°F. and a relative humidity of 50%. The outlet air temperature should be about 35°F. below the surrounding air temperature with 50% relative humidity. In case the humidity is higher than 50%, the temperature differential will be somewhat less. If the humidity is less than 50%, the air outlet temperature will approach closer to the evaporator temperature setting of 32°F.

DISCHARGING THE SYSTEM

Discharge refrigerant from system before replacing any part of the system except compressor or its two connecting hoses. To discharge the system, connect manifold gauge set to system. **Do not connect manifold center connection hose to Freon tank.** Place open end of this hose in a garage exhaust outlet. Set high pressure gauge valve at maximum counter-clockwise or open position. Open the high pressure service valve a slight amount, and allow the refrigerant to discharge from the system. *CAUTION–Do not allow refrigerant to rush out, as the oil in the compressor will be forced out along with it.*



FORD AIR CONDITIONING SYSTEM

EVACUATING THE SYSTEM

Attach manifold gauge set, a tank of Freon-12, and a vacuum pump to the system. Set both service valves to the mid-position. Open both manifold valves. Run vacuum pump until low pressure gauge reads at least 25", and as close to 30" of vacuum as possible. Continue vacuum pump operation 15 minutes to boil any moisture out of system. Close pump valve, turn off pump.

EVACUATING COMPRESSOR & ADDING PARTIAL CHARGE OF REFRIGERANT (After Checking & Adding Oil or After Re-installation of Compressor): Attach manifold gauge set, tank of Freon-12, and a vacuum pump to the system as follows: Remove service valve stem covers and make sure that both service valves are at maximum counter-clockwise position. Remove service port gauge port covers, and attach flexible hoses of gauge set to gauge ports and to a tank of Freon-12 (center line). Turn both manifold gauge valves to the maximum clockwise position. Attach vacuum pump to center connection of gauge manifold. Place both service valves at maximum clockwise position, and both gauge valves at maximum counter-clockwise position. Run vacuum pump until low pressure gauge indicates as close to 30" of vacuum as possible. Close pump valve, turn off pump. Open Freon-12 tank valve, then check all compressor connections for leaks. Shut Freon tank valve. Turn both service valves to maximum counter-clockwise position. Check quantity of Freon-12 in system (see "Bubbles in Sight Glass" under CHECKING above). Add partial charge of refrigerant as follows:

Adding Partial Charge of Refrigerant: With manifold gauge set attached, open Freon-12 tank valve. Purge air from high pressure hose by loosening high pressure hose at service valve. Tighten connections and set high pressure gauge valve at maximum clockwise position. Set low pressure gauge valve at maximum counter-clockwise position. Loosen low pressure gauge hose slightly at low pressure service valve to purge air from hose. Tighten connection. Set both service valves at center position. Run engine at 1500 RPM with temperature control knob at maximum cold position. Charge system until liquid sight glass shows no bubbles. Continue to charge system until one additional lb. of Freon-12 has been removed from tank. It may be necessary to place Freon-12 tank in a container of hot water (not to exceed 125°F.) to force gas from tank. *(CAUTION–Never heat Freon-12 tank with torch. A dangerous explosion may result).* Set both service valves at maximum counter-clockwise position. Remove gauge set, cap service valve gauge ports and valve stems.

►*CAUTION:* If system is low on Freon and cannot be recharged, disconnector bolts should be removed from pulley so that system cannot be operated until proper amount of Freon-12 has been added. *Do not disconnect lines, except as described above, without complete instructions.* Should any part of system become damaged, Freon and lubricating oil will escape. Seal any

CONTINUED ON NEXT PAGE

1955-56 FORD "SELECTAIRE" (Continued)

openings caused by damage with masking tape to prevent entrance of dirt and moisture. Do not steam clean any portion of car adjacent to refrigeration units or lines. Abnormal heat will cause Freon to "boil" resulting in excessive pressure.

ADDING COMPLETE CHARGE OF REFRIGERANT

Evacuate the system. Leave both service valves at the mid-position. Leave low pressure gauge valve at the maximum counter-clockwise or open position. Set high pressure gauge valve at the maximum clockwise or closed position. Set temperature control lever to maximum cold position. Open Freon-12 tank valve. Run engine at 1500 RPM. Weigh 4½ lbs. of Freon-12 into the system. During the charging, the high pressure may build up to an excessive value. This can be caused by an overcharge of refrigerant, an overheated engine or air in system. Never allow the high pressure to exceed 240 lbs. Stop engine, determine cause, and correct it. When the proper charge has entered the system, no bubbles will be seen in the sight glass. The bubbles will begin to disappear when approximately 3½ lbs. of refrigerant are in the system. After the proper charge has been made, close the Freon-12 tank valve, and check the system pressures for proper operation. Set both service valves at the maximum counter-clockwise position. Remove the gauge set, and cap the service valve gauge ports and valve stems.

BLEEDING AIR FROM SYSTEM

Air trapped in the system will cause high pressure to build up excessively. To bleed air from system, attach manifold gauge set to system, set both service valves at center position. Run engine at 1500 RPM with temperature control lever at maximum cold position. If air is trapped in the system, the high pressure may exceed 150-200 lbs., depending on the surrounding air temperature and the amount of air in the system. Turn engine off. Let system stand for 10 or 15 minutes to allow air to collect at the high pressure service valve. Loosen high pressure gauge hose at high pressure service valve slightly, and allow the gas and air to escape for 5-10 seconds. Tighten the connection, start the car, and check the pressure again. Repeat procedure if necessary. After bleeding, check the liquid sight glass to make certain that too much refrigerant was not removed. Put partial charge of Freon-12 in system if necessary (See "Adding Partial Charge of Refrigerant" above).

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

COMPRESSOR REMOVAL (To Work in Engine): Isolate compressor by turning both high and low pressure service valves to extreme clockwise position, then loosen cap on high pressure service valve gauge port, and allow gas to escape until compressor and attaching hoses are relieved of refrigerant pressure. *(CAUTION–* Loosen cap a small amount only, and do not remove it until pressure is completely relieved). Raise car on hoist or jacks and remove splash pan. From underneath car, remove generator adjusting bracket bolt. Loosen generator-to-compressor mounting bolts, swing generator inward, and disengage the two belts from generator and compressor pulleys. Disconnect generator leads, remove generator mounting bolts and remove generator from car. Remove generator-to-cylinder block bolt and compressor-to-lower bracket bolt. Lower car and complete operation in engine compartment. Disconnect high and low pressure hoses from compressor. Remove compressor mounting bolts. Loosen angle bracket bolt and remove compressor from engine.

COMPRESSOR INSTALLATION: Reverse removal procedure. Adjust compressor belts (see ADJUSTMENTS above). Connect high and low pressure hoses *(NOTE–* Be sure to replace metal gaskets in hose connections). Evacuate compressor and attaching hoses (see "Evacuating Compressor & Adding Partial Charge of Refrigerant" above).

CONDENSER, RECEIVER & RELATED PARTS: *(NOTE–* Removal and installation of these parts requires that the system be discharged before removal and recharged after the parts are reinstalled).

Condenser: Condenser can be removed without removing grille assembly or lock support plate. To remove condenser, disconnect solenoid hot lead from connector. Disconnect lines at four fittings and remove four mounting bolts. Remove condenser by lifting it straight up. To install, reverse removal procedure *(NOTE–* Make sure metal gasket is replaced in high pressure service valve connection).

Receiver: Removal of receiver requires removal of right-hand grille bar; however, it is not necessary to remove the lock support plate. Disconnect copper tube from top of receiver, and disconnect hose from fitting at the bottom of the receiver. Remove the four mounting bolts and the receiver from the right-hand side air deflector. Install caps on the two receiver fittings and plugs in the tube and hose fittings to prevent air from entering the receiver and the refrigeration system. To install, reverse removal procedure.

PARTS REPLACEMENT

With the exception of the compressor, replacement rather than repair of the individual unit is recommended by the manufacturer. In the case of the compressor, replacement kits for certain components are available. When such kits are unable to eliminate the trouble, the compressor must be replaced.

COMPRESSOR REPLACEMENT: Isolate compressor. Rause car on hoist or on jacks, and remove splash pan. From underneath car, remove generator adjusting bracket bolt. Loosen two generator-to-compressor mounting bolts, swing the generator inward, and disengage the two belts from the generator and compressor pulleys. Disconnect the three leads from the generator, remove the two generator mounting bolts, and remove the generator from the car. Remove the generator-to-cylinder block bolt and the compressor-to-lower bracket bolt. Lower the car and complete the operation in the engine compartment. Disconnect the suction and discharge hoses from the compressor. Remove the compressor mounting bolts. Loosen angle bracket bolt and remove compressor from engine. With compressor on work bench, remove suction and discharge fittings. Mark the position of each fitting, and remove two retaining screws at each fitting. Remove two pulley disconnect screws, install a puller to pulley, attaching puller to the two disconnect holes. Remove pulley from shaft, then remove key from shaft. Remove retaining bolt and the "S" shaped bracket from compressor. Invert compressor, remove twelve retaining bolt, compressor adapter plate, and gasket. Scrape old gasket from adapter plate. Remove shipping base and screws from replacement compressor, position gasket, and install adapter plate with twelve retaining screws. Install "S" shaped bracket to new compressor (loose). Install suction and discharge fittings (with new gaskets) to compressor. Mount fittings in positions that correspond to the markings on the old compressor, then secure each fitting with two screws. Lubricate shaft and pulley bore with compressor lubricating oil, then install key to compressor shaft. Force pulley on shaft with bolt and large washer by screwing bolt into center of shaft. Install two pulley disconnect bolts. Position new compressor to engine block, and install two compressor mounting bolts. Tighten mounting bolts and angle bracket bolt. Raise car on hoist or jacks, install compressor ty cylinder block bolt and to lower bracket bolt. Connect three leads to generator, mount generator to mounting brackets on compressor, and install bolts (loose). Install generator adjusting bracket bolt but do not tighten. Engage two belts with generator and compressor pulleys, and adjust belt tension. Tighten generator adjusting bracket bolt, then tighten two generator-to-compressor mounting bolts. Install splash pan, and attach generator leads to clip. Lower car, connect suction and discharge hoses to fittings on compressor. Be sure to replace metal gaskets in hose connections. Evacuate compressor and attaching hoses, then cut compressor back into system.

COMPRESSOR BELT REPLACEMENT: Raise car on jacks or hoist, remove splash pan. From underneath car, loosen but do not remove the two generator-to-compressor mounting bolts. Remove, generator adjusting bracket bolt and swing generator inward. Disconnect the two belts from compressor, generator, crankshaft, and water pump pulleys. *(NOTE–The two belts must always be replaced in matched pairs).* Install new belts around compressor, generator, crankshaft, and water pump pulleys. Install generator adjusting bracket bolt, adjust belt tension, then tighten bolt. Tighten generator-to-compressor mounting bolts, install splash pan, and lower car.

COMPRESSOR SHAFT SEAL, VALVE PLATE, SUCTION & DISCHARGE LINE FITTINGS, SUCTION STRAINER SCREEN, OIL SIGHT GLASS REPLACEMENT: See *"1954-55 Parts Replacement" under "1954-57 Lincoln & 1954-56 Mercury" Air Conditioning.*

1957-60 EDSEL, FORD, LINCOLN, MERCURY

Eds l (1958–60)
F rd (1957–60)
Linc ln (1958–60)
M rcury (1957–60)
Thund rbird (1958–60)

►CHANGES, CAUTIONS, CORRECTIONS

►*SERVICE CAUTIONS: Bef re disconnecting any part f th air c nditi ning system or lines, see "Air Conditioning S rvice Cauti ns" at beginning of Air Conditi ning Section.*

►*LEAK TESTING: S "L ak Testing" at beginning of Air C nditioning S ction.*

►*COMPRESSOR REMOVAL (For service work on engine):* If engine work makes it necessary that the compressor be removed, it may be isolated without discharging the complete system. S "Compressor" below.

►*1957 FORD AIR CONDITIONER BLOWER HOUSING WHISTLE CORRECTION:* This whistling noise which occurs with air conditioner operating, can be eliminated by sealing the air bleed in the blower housing air valve. Remove blower housing, then with air valve in cooling position, apply body sealer between valve and flange in the area where the valve is cut off at the corner.

►*1957 MERCURY BLOWER MOTOR BURNING OUT CORRECTION:* This condition may be caused by the cooling tube from blower housing to blower not being installed. If the air conditioner unit does not have the cooler tube, Part No. FEK-17174 must be installed.

►*1958 LINCOLN RIGHT HAND EVAPORATOR ICING SWITCH NOTE:* A few early cars have an icing switch mounted on the right hand evaporator housing. The air conditioning system on this car uses only the icing switch located on left hand evaporator. Right hand switch is not connected or required. It is recommended that the right hand switch be removed and holes plugged if right hand evaporator housing is removed for servicing.

►*1958 LINCOLN AIR CONDITIONING COMPRESSOR VIBRATION CORRECTION:* This condition may be caused by a cracked compressor support bracket. A new compressor bracket, Part No. EDJ-2902-B is being used in production on later cars and should be used on early cars to correct vibration.

►*1958 LINCOLN THERMOSTATIC SWITCH FAILURE TO RETURN "OFF" POSITION CORRECTION:* A new Thermostatic Switch, Part No. FFC-15794-B, identified by a daub of red paint on side of mounting bracket (closest to right vent lever arm) is being used in production and for service replacement to correct conditions where switch does not return to "off" position, resulting in compressor clutch remaining engaged. Poor engine idling usually indicates that air conditioning compressor clutch is engaged.

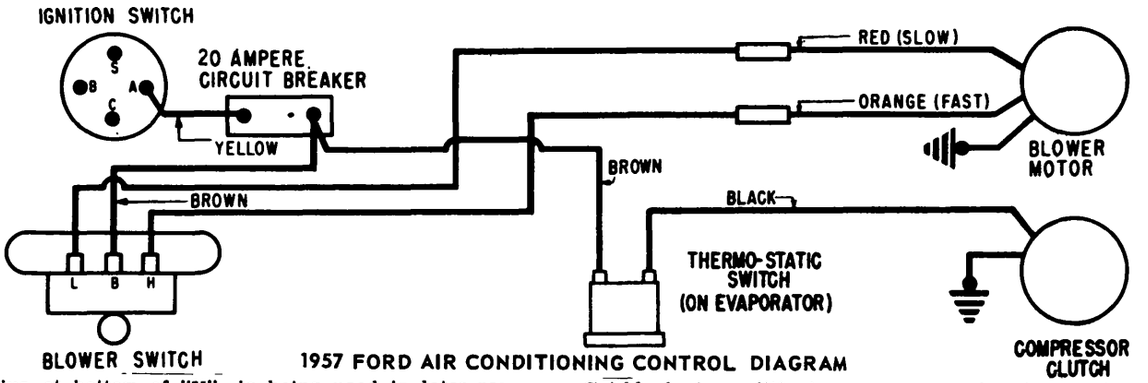
►*1958 LINCOLN & MERCURY COMPRESSOR DRIVE PULLEY CHANGE & BELT TIGHTENING SPECIFICATION CHANGE.* A new drive Pulley, Part No. 5751423 having a decreased depth and an increased radius at bottom of "V", is being used in later production and should be used for service replacement. Belt deflection specifications have been revised (with the new pulley) to ½" deflection between compressor pulley and water pump pulley. The new pulley can be identified by "SSC" stamped on face. Early pulley had an "S", or no mark on face.

►*1958 LINCOLN & MERCURY COMPRESSOR STALLING & BELT SLIPPAGE (WITH HOT ENGINE) CORRECTION:* This condition occurs when compressor clutch is engaged, especially in city traffic with high ambient temperature and results from added force necessary to turn compressor while under a high head pressure. Correct as follows:

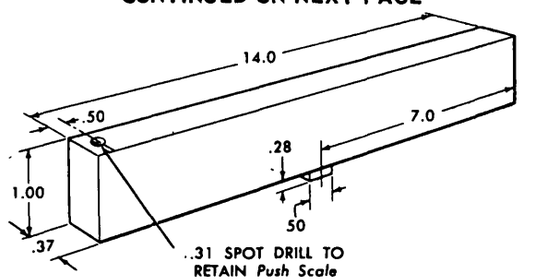
Lincoln - On cars without auxiliary starter, the three wires, two black and one green, attached to coil terminal of ignition switch by one connect should be removed from coil ("IGN") terminal and installed on accessory ("ACC") terminal. *NOTE - This will leave only the red wire which connects to ignition resistor attached to coil ("IGN") terminal of ignition switch.* On cars with auxiliary starter, it will be necessary to install an additional auxiliary starter relay in series with compressor clutch wire. Install Relay, Part No. FDT-11505-A on left front fender apron, approximately 8" to rear of carburetor air cleaner air duct, and connect as follows: Install a wire from yellow wire terminal of existing auxiliary starter relay on right fender apron to forward terminal of new relay field terminal. Cut black air conditioning compressor wire at new relay and install spade connectors to both ends of cut wire. Install these connectors to the two open terminals of new relay. *See wiring diagram below.*

Mercury (Cars with Auxiliary Starter) - Install Relay, Part No. FDT-11505-A on left front fender apron approximately 12" to rear of carburetor air cleaner air intake duct, and connect as follows: Connect a wire from outlet side of neutral start vacuum switch to forward terminal of new relay field terminal. Open black compressor clutch wire at the quick disconnect, reroute

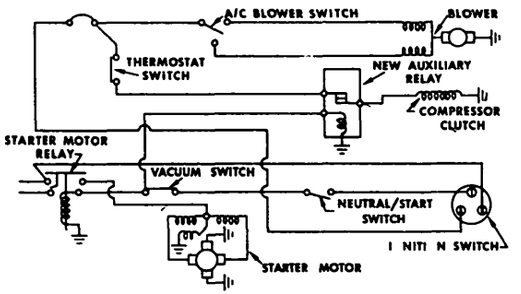
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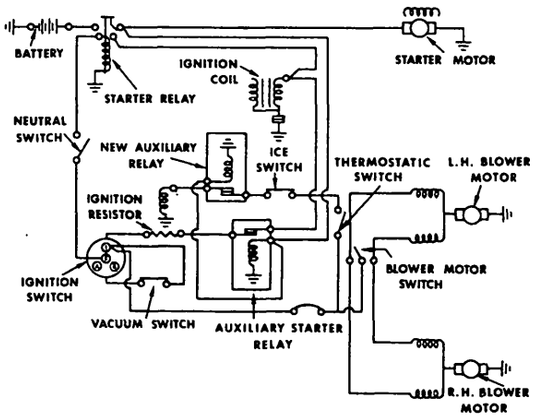
1957 FORD AIR CONDITIONING CONTROL DIAGRAM



1958-59 FORD BELT ADJUSTING TOOL



1958 LINCOLN AIR CONDITIONING WIRING DIAGRAM



1958 MERCURY AIR CONDITIONING WIRING DIAGRAM

1957-60 EDSEL, FORD, LINCOLN, MERCURY (Con.inued)

wire along fender apron, add necessary new wiring to reach new relay and attach spade connectors. Connect to two remaining terminals of relay. See *wiring diagram below.*

►*1959 ERRATIC CLUTCH OPERATION CORRECTION (ALL MODELS):* This condition may be caused by a loosened terminal screw and can be corrected by removing clutch assembly from compressor and tightening the three contact ring retaining screws. To prevent terminal screws from again becoming loose, tighten terminal screw to 6 inch pounds, then solder terminal screw to brass connector with a small amount of rosin core solder.

►*1959 FORD EVAPORATOR FRONT HOUSING PRODUCTION CHANGE & SERVICE REPLACEMENT NOTE:* A new front housing, furnished in SelectAire Field Fix Kit Part No. B9AZ-19A861-A, is being used in production and may be installed on earlier cars. The new housing has a vacuum operated damper valve to prevent air flow from air register louvers when temperature lever on instrument panel is moved to the "heat" position and to provide proper air mixing.

►*1959 MERCURY HEATER CORE NOISE NOTE (EARLY CARS):* A high volume, low frequency vibrating noise (at higher engine RPM) emanating from the heater plenum chamber area can be eliminated by installing the the later type heater core which is identified by the red letters "MC" located on lower tank of heater core.

►*1959 MERCURY REFRIGERANT LEAK CORRECTION:* If leakage is encountered at soldered connections between condenser-to-receiver tube and condenser core extensions, remove condenser and repair leaks with silver solder. To prevent recurrence of leakage, wrap a copper strap around tube and core extension and solder strap in place with soft solder, then fill opening formed by strap with soft solder. *NOTE - Check to make sure there is at least ¾" clearance between horn trumpet and condenser to prevent possible leakage created by horn rubbing condenser. To adjust clearance, remove horn and bend as necessary.*

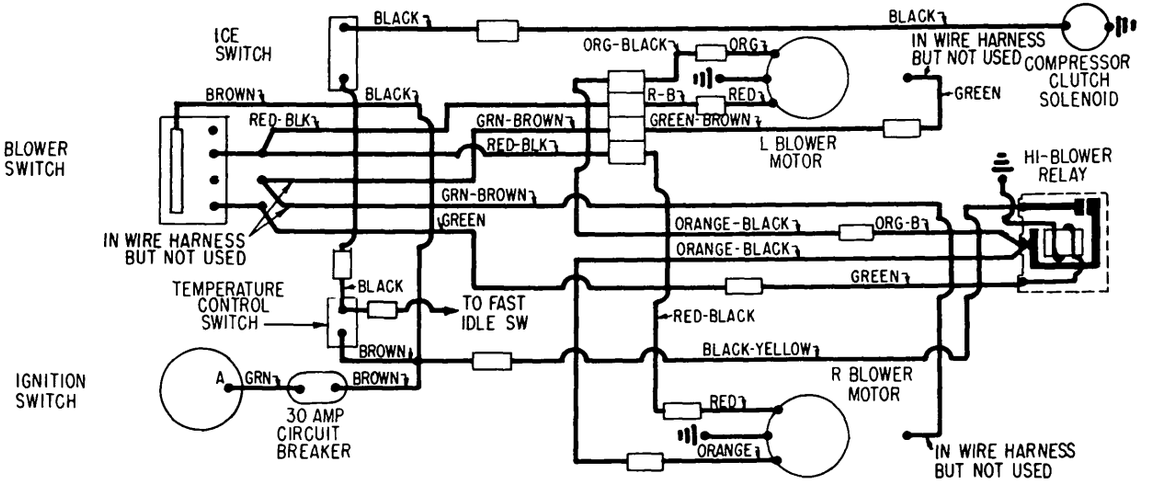
►*1960 EDSEL SELECT AIRE INSUFFICIENT COOLING CORRECTION:* Caused by insulation covering expansion valve diaphragm affecting liquid flow capacity. Insulation should only cover parts that are between evaporator case and inlet connection to valve.

►*1960 AIR CONDITIONING COMPRESSOR IDENTIFICATION:* The 1960 compressors have "BLUE PRINTING" on data plate.

►*1960 YORK COMPRESSOR CRANKSHAFT SEAL IDENTIFICATION:* 1960 seals Part No. COAE-19655 used on 1960 York Compressor Part No. COAE-2875-A have 8 notches in face of spring retainer. Former type has only 4 notches.

►*1960 EDSEL MAGNETIC CLUTCH NOTE:* Warner 2-piece type compressor magnetic clutch used as an alternate in production with Eaton clutch effective Oct. 20th, 1959. Removal procedure is same for both types. *For s rvic data on Warn r typ , se b low.*

►*1960 LINCOLN COMPRESSOR VIBRATION CORRECTION (800-1300 Engine RPM):* "Moan" or "Vibration" may occur under light load with compressor clutch



1959 LINCOLN AIR CONDITIONING CONTROL DIAGRAM

engaged or disengaged. To correct install Compressor Bracket Kit Part No. 58MK-2888-A.

►*1960 LINCOLN BLOWER MOTOR OVERHEATING CORRECTION:* Caused by collapsed ventilation tube. To correct, replace tube with later type (thicker wall) or install spring (.53"±.03" diameter and 6.25±.25" long) in tube.

►*1960 LINCOLN BURNED RUBBER ODOR CORRECTION (Early Cars):* April production cars have blower motor cooling tube shortened eliminating tube contact with hot resistor wires in motor housing. On early cars, reduce the tube extension in motor housing to 1/8" (top), 1/2" (bottom) of tapered end.

►*1960 MERCURY AC TUBE PRODUCTION CHANGE:* Tubes near Voltage Regulator insulated in production effective April 1960 to eliminate accidental damage to electrical equipment. On early cars tape AC tube with electrical tape at a point adjacent to Voltage Regulator.

ADJUSTMENT

DESCRIPTION: Design is similar to 1955-56 Ford "Selectaire" Air Conditioner, except that the solenoid bypass valve and the control cut-off valve have been eliminated. The complete air conditioning unit is located in the engine compartment and on the dash panel. On 1958 Lincoln models, two evaporators are used, one being mounted on each side of the cowl. The oil separator is integral with the compressor unit.

Compressor Belt: Deflection midway between pulleys should be 1/2" with normal thumb pressure for all models except 1958–59 Ford. For these models, see below. *NOTE* – 1960 Lincoln & Mercury prefer the "Tension Gauge Method" when gauge available.

1958–59 Ford – Fabricate tool as indicated in illustration, then proceed as follows: Lay tool across two pulleys so belt deflector block (in center on one side of tool) is centered between pulleys. While holding the one end of tool flat against water pump pulley, force opposite end down by pressing against it with a "push scale" inserted in drilled hole until end of tool contacts compressor pulley. The scale should read 11 lbs., if adjustment is correct. Loosen compressor mounting bolts and slide compressor as necessary for correct adjustment.

SERVICING

►*INTAKE & DISCHARGE SERVICE VALVE NOTE:* On field installed SelectAire and PolarAire air conditioners, the intake & discharge service valves are the "Schrader" type, having fast connect and disconnect fittings. On production models, intake & discharge service valves are hand operated. The low pressure valve is mounted on the compressor and the high pressure valve is located on the upper right corner of the condenser. Rotating the valve stems *COUNTERCLOCKWISE* until fully seated, is the normal operating position. This position also isolates the service valve gauge ports for connecting gauge manifold set. Rotating valve stems *CLOCKWISE* until fully seated, isolates the compressor from the system. *(CAUTION - Do not operate compressor with service valves fully seated clockwise).*

MAGNETIC CLUTCH (Warner): Two-piece design with field coils attached to front seal plate of compressor.
Removal - Same as previous (Eaton) type.
Disassembly - Field coils can be removed by removing three attaching bolts after compressor service valves have been front seated and refrigerant charge relieved.
Installation - To install field coils, first insert centering pilot over compressor shaft and insert three attaching bolts. Torque bolts to 10-13 ft. lbs.
Clutch Bearing Removal & Installation - Remove clutch from compressor and snap ring retaining clutch hub in bearing. Press clutch hub out of pulley bearing (support pulley in belt sheave). Remove snap ring retaining bearing in pulley and press pulley bearing from pulley. *NOTE* - Press from front of clutch towards rear. To reassemble, reverse removal procedure.

COMPRESSOR OIL LEVEL: Ch cking & Filling - Operate engine at 1500 RPM with compressor running for 15 minutes, then turn off engine and isolate compres-

CONTINUED ON NEXT PAGE

1957-60 EDSEL, FORD, LINCOLN, MERCURY (Continued)

sor. Remove oil filler plug from compressor and insert a 1/8" diameter rod in oil filler hole until it bottoms. Oil level on rod should be as indicated in table below. If additional oil required, add Suniso 4-G refrigerator oil to "Tecumseh" compressors, and Suniso 5-G refrigerator oil to "Lehigh" compressors. *NOTE - On some compressors it may be necessary to rotate crankshaft by hand so dip rod will clear counterweight.* Replace filler plug, evacuate and cut compressor back into air conditioning system.

Compressor Oil Level

Model	Oil Level (Dipstick)
Edsel (Vertical Mounted 1958)	7/8"
Edsel (Horizontal Mounted 1958)	1 1/4"
Edsel (1959–60)	3/4–7/8"
Ford (1957–60)	3/4"
Mercury (1957)	3/4"
Lincoln & Mercury (1958–60)	1 1/4–1½"

GAUGE SET INSTALLATION: Remove service valve stem covers and make sure that both service valves are turned fully counterclockwise. Remove service valve gauge port covers, and attach flexible hoses of gauge set to gauge ports. Connect hoses from center fitting on gauge set manifold to tank of Freon 12 and to Vacuum Pump. Turn both manifold gauges to a fully seated clockwise position and close the vacuum pump valve. *(NOTE* - Manifold valves are so arranged that when turned fully clockwise, the center manifold connection is cut off from the gauges, but the gauges continue to read pressures in their respective hoses).

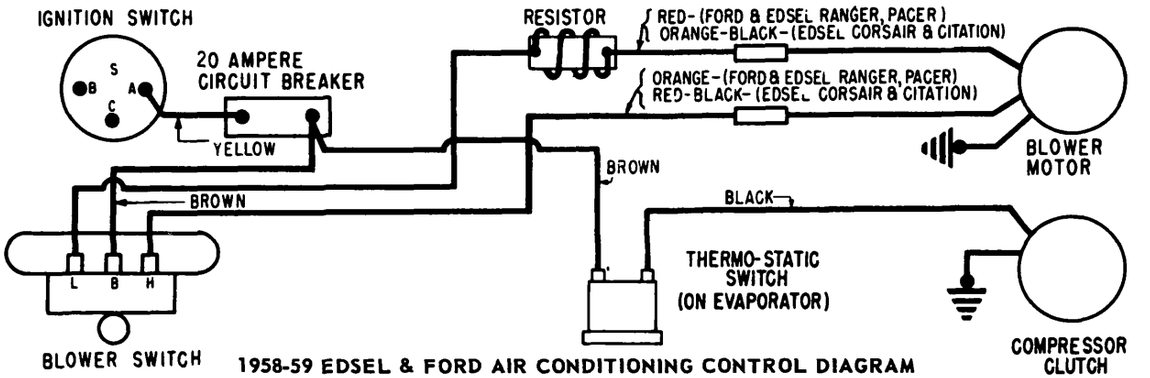
DISCHARGING THE SYSTEM: *(CAUTION - Discharge refrigerant from system before replacing any part of the system, except compressor service valves. Compressor high pressure head).* Connect gauge set to manifold as indicated above (do not connect manifold center connection hoses to Freon tank or to vacuum pump). Place open end of hoses from center connection on manifold in the garage exhaust outlet or into an open area having sufficient air movement to disipate the gas. Set high pressure gauge valve on manifold to open position (fully counterclockwise). Open high pressure service valve a slight amount and allow refrigerant to discharge from system. *(CAUTION - Do not allow refrigerant to rush out, as the compressor oil will be forced along with it).*

EVACUATING THE SYSTEM: Connect the gauge set, tank of Freon 12, and vacuum pump to the system (see *"Gauge Set Installation" above).* Make certain that Freon 12 tank valve is closed tightly. Set both valves to the mid-position (between full clockwise and full counterclockwise positions). Open vacuum pump valve and run pump until low pressure gauge reads at least 25 inches, and as close to 30 inches of vacuum as possible. Continue vacuum operation for 20 to 30 minutes. Close pump valve and turn pump off.

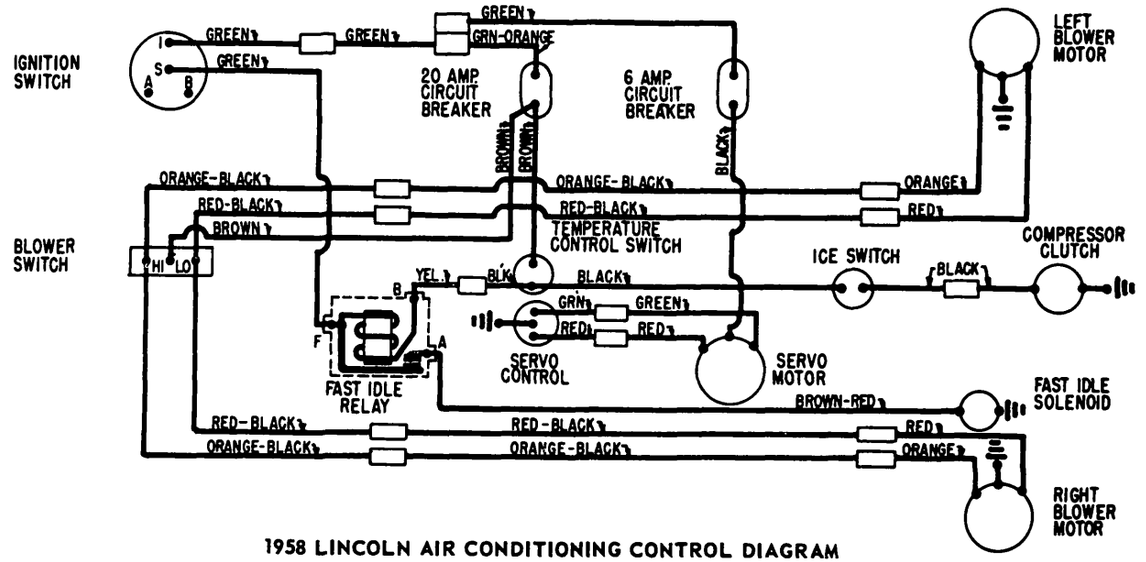
► *FREON CHARGING NOTE:* The correct amount of Freon 12 introduced into the air conditioning system must be accurately determined as follows: Before charging the system (after hoses and lines have been purged of air), place Freon 12 tank in a container of warm water (not to exceed 150°F), then place container and tank on an accurate scale. Weigh the assembly and record its total weight. As Freon enters the system, the exact amount in pounds can be determined.

CHARGING THE SYSTEM (PARTIAL CHARGE): *(NOTE- If a loss of refrigerant is indicated by bubbles appearing in the sight glass, the refrigerant can be brought up to proper charge as follows).* Attach gauge set (see *"Gauge Set Installation" above).* Open both manifold valves and close vacuum pump valve. Open Freon 12 tank valve. Purge air from high pressure hose by loosening the high pressure hose fitting at the service

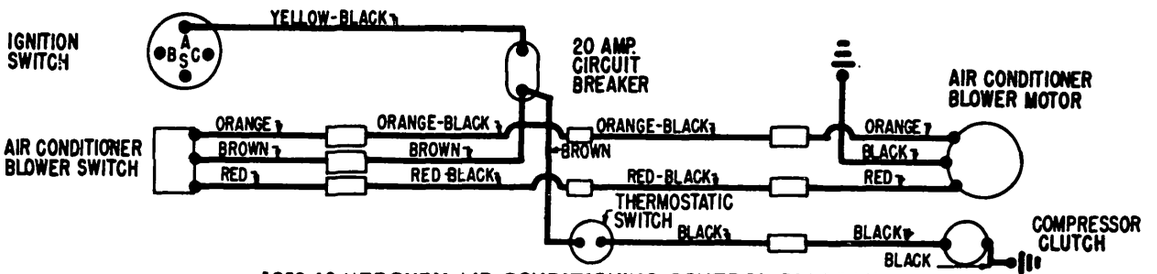
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1958-59 EDSEL & FORD AIR CONDITIONING CONTROL DIAGRAM



1958 LINCOLN AIR CONDITIONING CONTROL DIAGRAM



1958-60 MERCURY AIR CONDITIONING CONTROL DIAGRAM

1957-60 EDSEL, FORD, LINCOLN, MERCURY (Continued)

valve for a few seconds (do not remove hose from fitting). Tighten connections and set high pressure manifold gauge valve at maximum clockwise position. Purge air from low pressure hose in the same manner, then open both service valves to the mid position. With Freon 12 tank setting in a container of warm water (maximum 150°F.), and the assembly on an accurate scale *(see "Freon Charging Note" above)*, operate engine at 1500 RPM with COOLING control lever at maximum cold position and blower on HI. Charge system until an additional ½ pound of Freon 12 has been removed from tank, then close tank valve. Place both service valves at the full counterclockwise position. Remove gauge set, and cap service valve ports and valve stems.

CHARGING THE SYSTEM (COMPLETE CHARGE): Evacuate the system (see above), leaving both service valves at the mid position and the vacuum pump valve closed. Leave low pressure manifold gauge valve at maximum counterclockwise (open) position. Set high pressure manifold gauge valve at maximum clockwise (closed) position. Set COOLING control lever to maximum cold position, and the blower on HI. Open Freon 12 tank valve. Run engine at 1500 RPM and weigh 3½ pounds of Freon 12 into system *(CAUTION - During this operation, do not allow pressure on gauge to exceed 240 lbs.)*. When proper charge has entered system, no bubbles will be seen in sight glass. Close Freon 12 tank valve, and check system for proper operation. Place both service valves at the full counterclockwise position. Remove gauge set, and cap service valve gauge ports and valve stems.

► *HIGH PRESSURE (DURING CHARGING) NOTE: If pressure exceeds 240 lbs., stop engine and check for the cause; which may be due to an overcharge of refrigerant, overheated engine, or air in the lines, with a combination of high surrounding temperatures.*

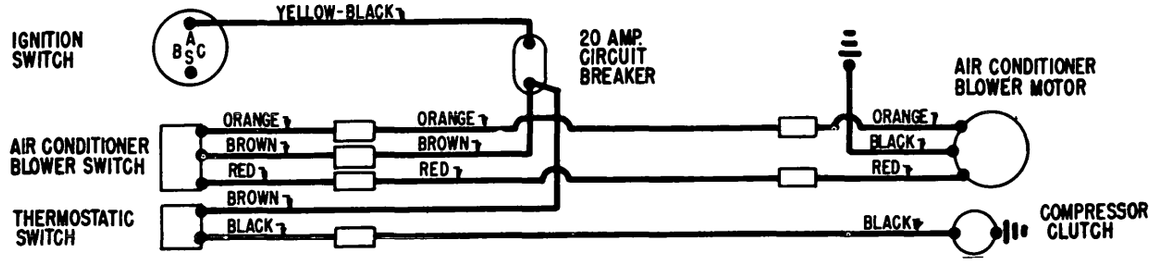
COMPRESSOR: *(NOTE - All compressor service operations, except belt replacement, can be performed only after the unit has been isolated from the rest of the air conditioning system).*

Isolating The Compressor: Turn both high and low pressure service valves to the full clockwise position. Loosen cap on high pressure service valve gauge port, and allow gas to escape slowly until compressor and attaching hoses are relieved of pressure. *(CAUTION - Loosen the cap a small amount only, and do not remove it until pressure is completely relieved).* To cut compressor back into the system, evacuate the compressor and connecting lines at the high pressure service valve gauge port, turn both service valves to maximum counterclockwise position, shut off vacuum pump and cap high pressure service valve gauge port and service valve stems.

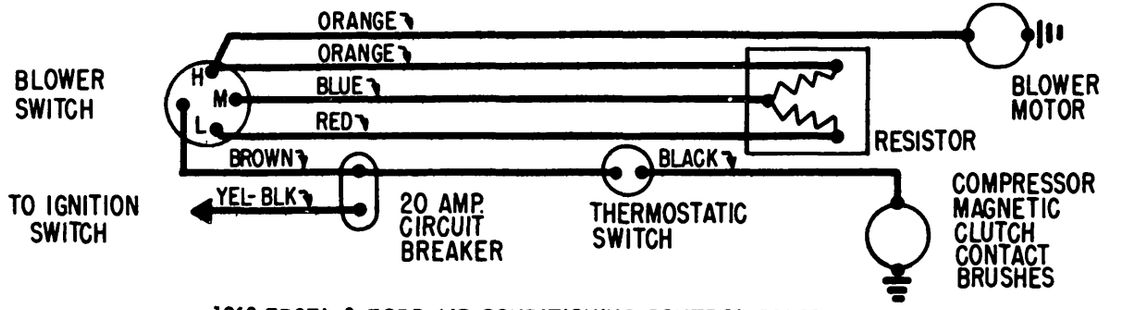
1957 MODELS

Removal: Isolate compressor, then raise car on a hoist and remove generator adjusting bracket bolt from below. Loosen the two generator to compressor mounting bolts, swing generator inward and disengage both

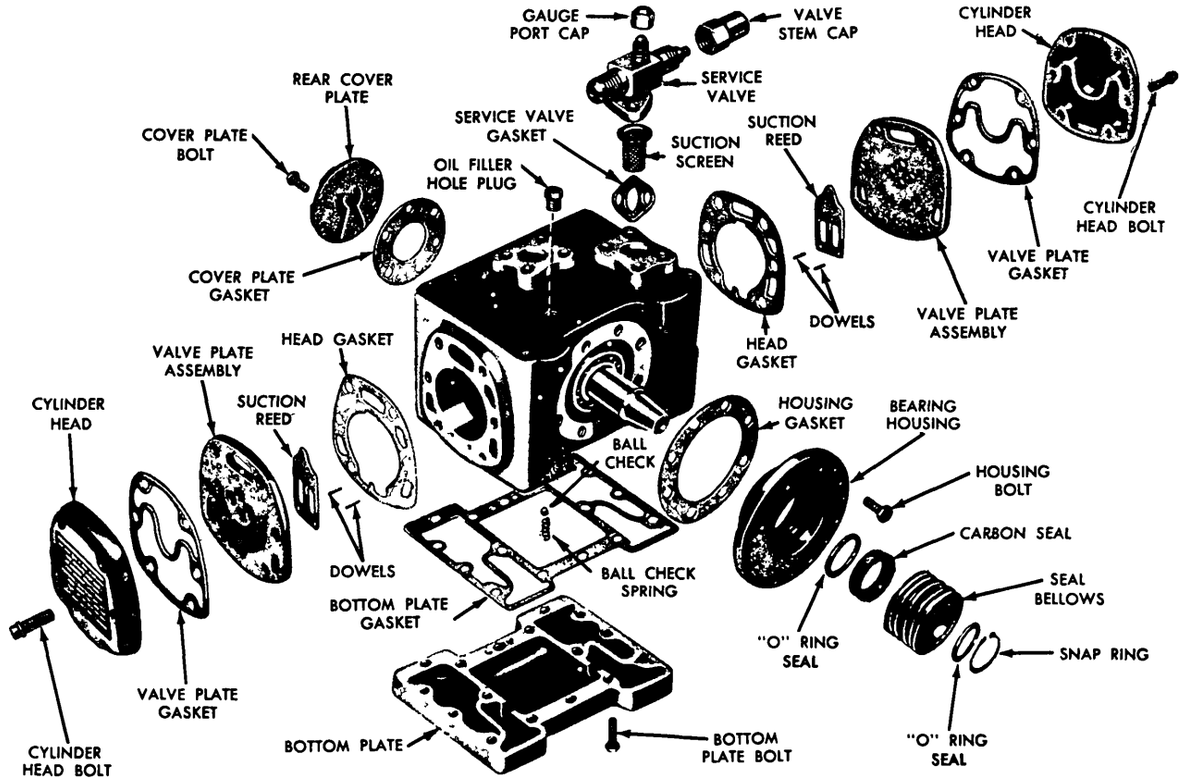
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1957 MERCURY AIR CONDITIONING CONTROL DIAGRAM



1960 EDSEL & FORD AIR CONDITIONING CONTROL DIAGRAM

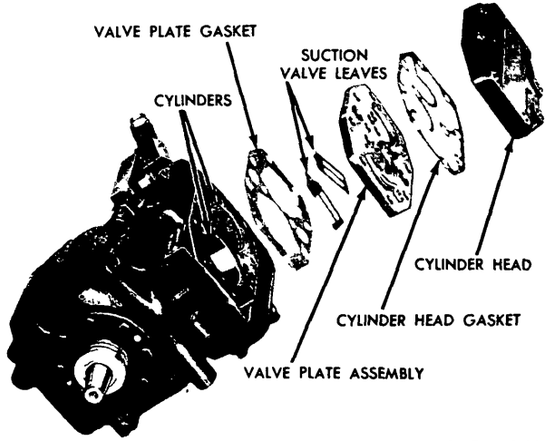


1958 TECUMSEH AIR CONDITIONING COMPRESSOR

1957-60 EDSEL, FORD, LINCOLN, MERCURY (Continued)

belts from generator and compressor pulleys. Disconnect three leads from generator, remove generator mounting bolts, and remove generator from car. Remove compressor to cylinder block bolt and the compressor to lower bracket bolt. Lower car and complete the operation in engine compartment. Disconnect magnetic clutch wire at bullet connector. Disconnect low pressure service valve and discharge hose from compressor. Remove the two compressor mounting bolts, then loosen the angle bracket bolt and remove compressor from car.

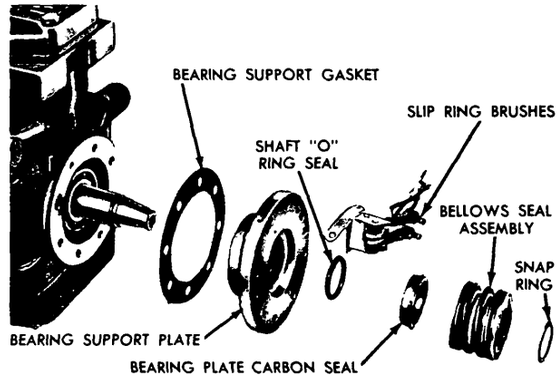
Valve Plate Replacement - *(NOTE - Valve plate may be replaced with compressor on car, after isolating the compressor, as above).* Remove cylinder head bolts and tap cylinder head and valve plate lightly to loosen them, then remove these parts from top of compressor body. *(CAUTION - Be careful not to shear off the valve plate locating pins).* Remove and discard all gaskets and clean gasket shreds from all gasket surfaces. If valves were broken, check piston heads and cylinder walls. Replace complete compressor if damage is evident. Check valve plate for damage, and if necessary, install the entire replacement kit which includes valve plate, valve leaves and the two gaskets. *(CAUTION* - If valve plate and leaves are reused, be sure to replace leaves in their original position on valve plate). Install valve plate gasket on compressor



1957 COMPRESSOR CYL. HEAD & VALVE ASSEMBLY

body, then, before installing valve leaves and plate assembly, dip the valve leaves in clean refrigeration oil, and mount them on valve pins that are pressed into underside of valve plate. Install cylinder head gasket and cylinder head. Install all cylinder head bolts and tighten them finger tight, then tighten bolts ¼ turn at a time to 15-20 ft. lbs. Check oil in compressor and add oil if necessary *(see "Compressor Oil Level" above).* If compressor was not removed from car, cut compressor back into the system *(see "Isolating The Compressor" above).*

Compressor Crankshaft Seal Replacement (Ford) - With compressor removed from car, remove clutch and key from compressor shaft. Use a wheel puller and remove compressor clutch. Remove slip ring brush assembly. Compress bellows assembly with Tool T56P-19670-A, and remove snap ring and bellows assembly. Remove bearing support plate mounting screws. Mount bearing support plate removing tool, T56P-19670-A to the plate, using two threaded holes in plate, and remove plate. Press bearing plate carbon seal from plate and remove "O" ring. Clean all old gasket material from bearing plate and compressor. *(CAUTION - Do not force bearing support plate from its seat with the use of the two screws through the threaded holes in plate).* Lubricate new shaft seal parts with compressor oil. Install new "O" ring seal in bearing plate and carefully insert new carbon seal into place. Attach bearing plate mounting tool to plate, position the new gasket and force bearing plate into position. When plate is nearly in position, rotate it so that the slip ring brush assembly mounting holes are at the top. Install two bearing mounting plate bolts to act as guides, and seat plate with the installing tool. Remove tool and install and tighten mounting plate bolts. Place bellows seal in



COMPRESSOR SEAL ASSEMBLY

position and compress the assembly with mounting tool, then install snap ring. Remove tool and install slip ring brush assembly, key and clutch. Make certain there are no burrs or dirt on compressor shaft before installing key and clutch. Install clutch mounting bolt and washer. Tighten to 18-22 ft. lbs.

Compressor Crankshaft Seal Replacement With Compressor Mounted on Engine (Mercury) - *(NOTE - For seal replacement with compressor removed, see "Ford" above).* Isolate the compressor (see above), then remove both drive belts. Remove capscrew securing magnetic clutch assembly to compressor shaft. Using a soft hammer or suitable pry bar, remove clutch from crankshaft, then remove woodruff key. Remove brush holder assembly from compressor housing, then compress bellows seal assembly with Tool ACL-53-20. Remove snap ring and bellows. Remove capscrews holding bearing support plate to housing, then install Tool ACL-53-20 and remove the bearing support plate. Press bearing plate carbon seal from plate and remove the "O" ring. Lubricate new shaft seal parts in compressor oil, then install a new "O" ring in bearing plate and carefully insert the new carbon seal into place. Attach bearing plate mounting tool (ACL-53-20) to plate and start installation. When plate is nearly in position, rotate it so that slip ring brush assembly mounting holes are at top, then install two bearing plate bolts for guides, and seat the plate with installing tool. Remove tool and install and tighten mounting bolts. *(CAUTION - Be careful when installing plate in housing to prevent tilting carbon ring off center as this will cause it to chip).* Place bellows seal assembly in position and compress bellows with mounting tool, then install snap ring. Remove tool and install slip ring brush assembly, key and clutch. Make sure there are no burrs or dirt on shaft before installing key and clutch. Install clutch mounting bolt and tighten to 18-22 ft. lbs. Cut compressor back into system, then check compressor oil level.

Installation: Place compressor on engine and install the two upper mounting bolts. Tighten the mounting bolts and the angle bracket bolt. Raise car on hoist and install compressor to cylinder block bolt and the compressor to lower bracket bolt. Connect three leads to generator, then mount generator to brackets on compressor and install the bolts. Install generator adjusting bracket bolt but do not tighten it. Engage the two belts with generator and compressor pulleys and adjust belt tension so there is ½" deflection midway between water pump and compressor pulleys, with normal thumb pressure. Tighten generator adjusting bracket bolt, then tighten the two generator to compressor mounting bolts. Lower car and connect low pressure service valve and the discharge hose to compressor, using new gaskets. Check for leaks, evacuate compressor *(See "Isolating The Compressor" above),* then cut back into system.

1958-60 MODELS

Removal: With compressor completely isolated, disconnect clutch feed wire, then remove capscrews retaining service valves to compressor cylinder head. Remove screen and gasket from suction valve and gasket from discharge valve. Loosen bolts securing compressor to mounting bracket and remove drive belt from pulley. Remove bolts securing compressor to mounting bracket and remove compressor.

Cylinder Head & Valve Plate: Removal - Remove cylinder head bolts and washers (on Lehigh compressors, disconnect service valves before removing cylinder head bolts). Tap cylinder head lightly to loosen, then remove these parts from top of compressor. *CAUTION - Be careful not to shear valve plate locating pins.* Remove and discard all gaskets, and be sure to clean gasket shreads from all gasket surfaces. Inspect top of pistons and the cylinders, particularly in case of valve, breakage. If there are score marks, replace compressor assembly. Check valve plate and suction valve leaves for scratches or damage. If these parts are in good condition, they may be reused. If valve plate is damaged, install entire replacement kit which includes valve plate, valve reeds, and two gaskets. When either valve plate

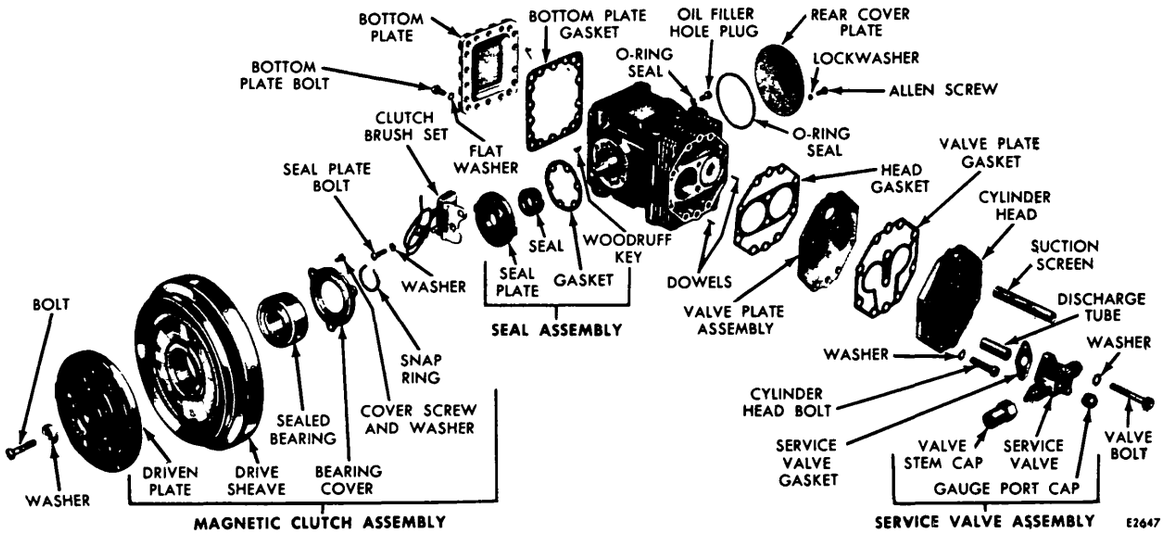
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1957-60 EDSEL, FORD, LINCOLN, MERCURY (C ntinu d)

or reeds is to be reused, wash in clean solvent and dry with air. Check oil for dirt and replace if necessary. *CAUTION - If valve plate and reeds are to be reused, be sure to replace reeds in their original positions on valve plate.*

Installation - Install valve plate gaskets and valve plate. *NOTE - Before installing valve reeds, dip in refrigeration oil and mount them on pins that are press- d into underside of valve plate. Oil will hold reeds to plate during installation.* Install cylinder head and bolts being careful not to damage gaskets. Tighten all bolts finger tight, then tighten bolts a quarter turn at a time to 15-20 ft. lbs. Check oil level in compressor and add oil as necessary.

C mpressor Crankshaft Seal Replacement (Tecumseh Compressor): Before removing compressor from car, energize clutch and loosen clutch mounting bolt. Remove compressor from car and remove clutch and key from shaft. *NOTE - If necessary, use a wheel puller to remove clutch.* Remove slip ring brush assembly, then compress bellows assembly with Tool T56P-19670-A (Ford). Tool ACE-58-20 (Edsel) and remove bellows. Remove bearing support plate screws, then mount same tool as used for bellows removal and remove the plate. Press bearing plate carbon seal from plate and remove "O" ring. Clean all old gasket material from bearing plate and compressor. *CAUTION - Do not force bearing support plate from its seat with the use of two screws through the threaded holes in plate, as this will put undue force on crank rear bearing. Always use removing tool.* Lubricate new shaft seal parts in refrigeration oil, then install "O" ring in bearing plate and carefully insert new carbon seal in place. Attach tool used for removal, to plate and position a new gasket and force bearing plate into position. When plate is nearly in position, rotate it so that two bearing plate mounting bolts may be installed to act as guides, and seat plate with installing tool. Remove tool and install and tighten plate mounting bolts. Place bellows assembly in position and compress bellows with same tool used for removal, then install snap ring. Remove tool and install slip ring brush assembly, key and clutch. Install clutch mounting bolt and washer and tighten to 18-22 ft. lbs.



1958 LEHIGH AIR CONDITIONING COMPRESSOR

Lehigh Compressor - Before removing compressor from car, energize clutch and loosen clutch mounting bolt. Remove compressor from car and remove magnetic clutch (using a wheel puller) and slip ring brush assembly. Remove seal plate bolts, plate and gasket, then remove carbon seal ring and seal housing assembly from crankshaft. Clean all gasket material from seal plate and compressor, and make sure that shaft, seal plate and compressor gasket surfaces are completely clean. Lubricate new seal parts in compressor oil, then position seal assembly on crankshaft, engaging notches in seal with locating pins. Position new gasket on compressor and install seal plate, attaching slip ring brush assembly with two of the seal bolts. Tighten bolts to 6-9 ft. lbs.

Compressor Installation: Reverse removal procedure, then cut compressor back into system. See *"Isolating The Compressor"* above.

MAGNETIC CLUTCH BEARING REPLACEMENT: Bearing can be installed with compressor on cars as follows: Remove compressor drive belt, then remove bolt and flat washer securing clutch to compressor shaft. Remove clutch and key. Remove three bearing retainer screws and retaining plate, then remove snap ring retaining drive plate in clutch bearing. Press driven plate out of bearing, while supporting clutch assembly on flywheel close to pulley. *CAUTION - Early mod l magn tic clutch assembly does n t hav a flywhe l n driv plate assembly; therefore, xtrem car must b us d t prevent distortion of pulley.* Turn clutch over and press roller bearing out of clutch drive plate. *CAUTION - During disassembly and reassembly, be careful not t damage porcelain insulat r, c ils, b aring surfac , and pulley sheave.* Wipe excessive grease from clutch bearing and clean collector rings with solvent. Install new bearing, Part No. B8A-2885-A, then complete reassembly by reversing disassembly procedure.

1954-60 HUDSON, NASH & RAMBLER AIR CONDITIONING

Hudson (1954–57)
Nash (1954–57)
Rambler (1954–58)
Rambler, Exc. American (1959–60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 EVAPORATOR MOISTURE SPILL-OVER CORRECTION*–Effective Serial No.R-735750 "Ambassador" and No. K-630592 "Statesman" Evaporator Core Water Seal & Retainer Assembly Part No. 3141479, Drain Pan Seal Part No. 3141476, and Drain Pan Seal Retainer No. 3141475, have been added in production and *must be installed* on all air-conditioned cars prior to these serial numbers.

►*1954 EVAPORATOR HOUSING CONDENSATION CORRECTION*–Effective Serial No. R-735074 "Ambassador" and No. K-630270 "Statesman", Insulation Part No. 3141290, has been added in production (on inside of evaporator cover) and *must be installed* on cars built prior to these serial numbers. Weatherstrip Cement, Part No. 4990086, is used to cement this insulation to inside of cover.

►*1954 RADIATOR CAP PRODUCTION CHANGE*–Effective Serial No. R-735973 "Ambassador", No. K-630767 "Statesman" and D-193935 "Rambler", 14 lb. radiator cap, Part No. 3141371, is installed in production on all air-conditioned cars.

►*1954 AIR-CONDITIONING SWITCH PRODUCTION CHANGE*–Effective Serial No. R-735892 "Ambassador," No. K-630739 "Statesman", and No. D-196405 "Rambler", an improved Air-Conditioning Switch, Part No. 4383893, is installed on all air-conditioned cars and *must be installed* on all cars built prior to these serial numbers. Permits blowers to have two speeds instead of one. Resistor, Part No. 3142128, is also being installed on blower motor housing on Rambler models.

►*1955 HUDSON & NASH EVAPORATOR COVER DRAIN TUBE & SEALING PRODUCTION CHANGE (To Prevent Condensation On Evaporator Dripping Onto Floor Mat):* Following parts have been incorporated in production to correct above condition and may be installed on earlier models not so equipped Evaporator Cover Upper Gasket Part No 3143397, is used in addition to Seal, Part No 3146246, Evaporator Cover Lower Gasket Part No 3146404 replaces Part No 3143397 as a lower gasket, Evaporator End Gaskets (2), Part No 3146405, replace Part No 3143396. A larger diameter drain tube, Part No 3147430, replaces old type and includes an adapter, Part No 3147429, and a prestite washer, Part No 4363633 which is installed on the flared portion of the adapter Adapter is installed into drain hole in evaporator cover in place of original drain tube and retained in position with a stud type ratchet plate Drain tube hole in floor panel must be enlarged to accommodate the larger hose

►*1955 DEFECTIVE COMPRESSOR REPLACEMENT CHANGE* In case of failure of shaft seals valves, or gasket leaks it is no longer necessary to replace compressor Compressor can be repaired with kits listed below

Kit	Part No.
Seal Kit	See below
Valve Plate Kit	3118919
Gasket Kit	3118920

Seal Kits–Three different kits used during production. Their applications are as follows.

Car Model	To Car Serial No. ①	Seal Kit Part No.
Rambler	D-239276	②3119125
Hudson Hornet 6	X-4478	3119056
Hudson Hornet V8	Y-4609	3119056
Hudson Wasp	W-4385	3119056
Nash Amb 6	R-746827	3119056
Nash Amb V8	V-5948	3119056
Nash Statesman	K-639472	3119056

①–Cars built effective with above serial numbers use Seal, Part No 3119126 (bearing housing cover and seal face assembly not included in kit with seal, as proper type assembly is on compressor and seal only is required)

②–Supersedes Seal Kit, Part No 3118918.

Kit Installation Note–Compressor need not be removed when replacing valve plate and valves, but should be removed when replacing the seal or a gasket In either case, compressor should be evacuated after installation made by leaving service valves closed to lines Leave suction service valve port cap closed and remove discharge service port cap Run compressor 2 to 5 minutes to pump out air that may have entered the compressor Shut off compressor and engine Crack suction service valve to allow Freon-12 to drift through compressor and bleed out of open discharge service valve port This will force out air in cylinder head Install discharge service valve port cap after gas has been allowed to escape for a brief interval Back-seat both service valves, attach gauge set, operate system and check pressures and for normal operation

►*1955 RAMBLER DISCHARGE FLEXIBLE HOSE CLAMP CAUTION (Early Cars)* Clamp fastening discharge flexible hose to front engine crossmember was inadvertently omitted on cars built prior to Serial No D-239769 Hose may be damaged by idler pulley if clamp not installed Parts required are Clamp, Part No 3138580, Screw, Part No GM 180018, Nut, Part No GM 120375, Lockwasher Part No GM 120380

►*1955 EVAPORATOR SEALING CAUTION* Whenever system checked check seal around evaporator cover At lower left and right hand corner of evaporator retainer housing, it is possible that flanged edges leave an opening Seal with suitable waterproof sealer Sealer installed over top edge of bottom seal will also aid in preventing air and water leakage

►*1955 V8 COMPRESSOR BRACE PRODUCTION CHANGE (To Correct Vibration when Compressor Operating):* Compressor Brace, Part No 3146385, became effective at Nash Ambassador V8 Serial No V-10150 and Hudson Hornet V8 Serial No Y-6448 and is available for installation on cars prior to the above serial numbers Brace is installed with large mounting hole of brace to the tapped hole in front side of compressor cylinder head Use screw Part No 3109944, and lockwasher, Part No GM 120384, to secure this end of brace Opposite end of brace is attached with bolt that retains idler pulley or power steering pump bracket to cylinder head

►*1955 COMPRESSOR CLUTCH BRUSH ASSEMBLY PRODUCTION CHANGE:* An improved clutch brush assembly, Part No 3146691, has been incorporated in production and is available to replace original brush assembly, Part No 3143945. New assembly is identified by a daub of green paint located between screw mounting holes on top side of brush mounting bracket.

►*1956 FREON-12 CHARGE CHANGE:* New specifications require that 3 lbs. (Rambler), 3½ lbs. (Others) maximum be charged into system. Two cubic centimeters of anhydrous methanol for each pound of Freon is still required. *NOTE - Above specifications supersede 3½ & 4 lb. charge previously required.*

►*1956 CONDENSATION LEAKS & SPILL-OVER CORRECTION (Rambler):* Effective at car serial number D-329995 a shedder, Part No. 3149919, has been incorporated to an existing baffle on the evaporator retainer backplate. This shedder prevents any condensation held between evaporator fins from being spilled out through forced hot air opening when applying brakes. Part Nos. for service installation are as follows (Shedder) 3149919, (Wire Clip) 3108634, (Two Tinnerman Speed Nuts) 3131-524. Kit No. including all above components is 3209503. Three 1/8" holes must be drilled in the evaporator aluminum endplate at 45° angle toward the shroud. Purpose of holes is to allow water to drain off into shroud.

►*1958 RAMBLER AIR CONDITIONING SYSTEM SIGHT GLASS PRODUCTION CHANGE:* The sight glass has been eliminated on later cars and the following method should be used to check operation of system. Install gauge set on compressor and run system at 1000 RPM with a thermometer in discharge air duct. If system does not refrigerate and suction gauge indicates a low or negative reading, the system may be either restricted or low in Freon charge Check for Freon charge with engine not running by removing suction gauge hose and depressing Schrader valve If vapor does not escape, system is low in charge. Check for leakage at all connections, then purge, evacuate, and recharge system using 3 lbs. of Freon Operate engine at 1000 RPM and check thermometer for temperature decrease and gauges for positive pressure. The system should be cycling normally. If suction pressure indicates a vacuum, and bleeding indicates that charge is not low, then a restriction is indicated and expansion valve should be inspected

►*1958 RAMBLER AIR CONDITIONING COMPRESSOR REAR BEARING PLATE SEAL NOTE:* Compressors having a rear bearing plate with a machined surface and a stamped letter "T" (Top) use an "O" ring seal, while compressors with a rear bearing plate having the word "Top" cast into plate use a gasket. To replace the "O" ring seal, remove compressor, then place it on a bench with shaft downward. Remove plate mounting screws and use two of the screws in tapped holes in plate and back plate off the rear bearing. Remove damaged "O" ring, then soak new "O" ring in refriger-

CONTINUED ON NEXT PAGE

1954-60 HUDSON, NASH & RAMBLER (C nt.)

ant oil and install in recess in plate. Reinstall rear plate and tighten screws diametrically to 12-15 ft. lbs. Evacuate, leak test, and recharge system.

►*1959 RAMBLER V8 COMPRESSOR VIBRATION CORRECTION:* A new compressor-to-cylinder head brace, Part No. 3157607 is available for installation on the above models to eliminate vibration. Install the new brace to compressor at rear left hand corner mounting hole location of compressor base and into existing tapped hole in left hand cylinder head.

►*COMPRESSOR SEAL FAILURE NOTE & INSTALLATION CAUTION:* When installing a new seal, inspect snap ring groove for sharp edges or burrs. Dress front and rear edges of groove with a fine stone to prevent damage to seal during installation. Use a film of refrigerant oil on all service seal kit parts and be careful not to compress the seal assembly more than the snap ring thickness beyond snap ring groove. After installing service seal kit, install the original snap ring between replacement snap ring and seal bellows assembly to increase the seal bellows spring tension to insure a good seal on carbon nose portion of seal assembly.

►*1960 VACUUM CONTROL THERMOSTAT DOES NOT CONTROL MAGNETIC CLUTCH CORRECTION:* Caused by bind in thermostat body and corrected in later models. To correct early models, remove thermostat from brackets and align brackets with a straightedge so that over-center spring contact control will operate freely when thermostat reinstalled.

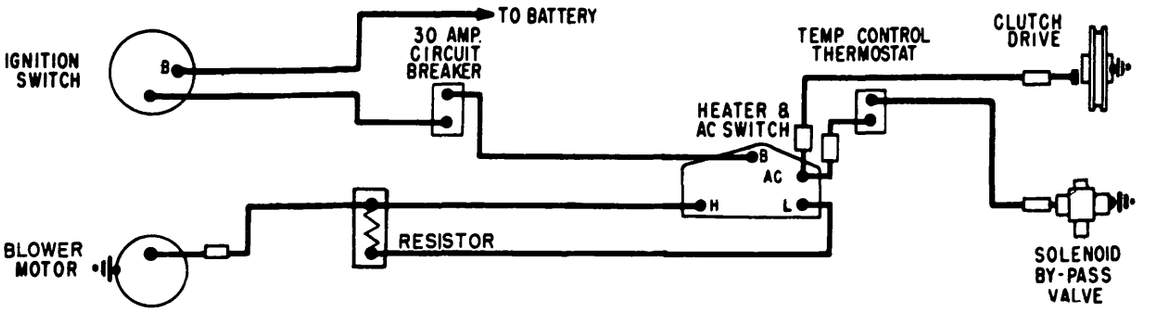
DESCRIPTION

The All Season Air Conditioning System is designed to cool, heat, and defrost with basically the same unit. Basically, the function of the unit as an air conditioner is to filter, cool, dehumidify, and circulate the air within the car. The air conditioner is the compression cycle type, using Freon-12 as refrigerant. Beginning with 1958 Rambler, the Solenoid Bypass Valve is eliminated and the Compressor Magnetic Clutch is controlled directly by the Temperature Control Thermostat. With these changes, the compressor operates only as required by the air conditioning system.

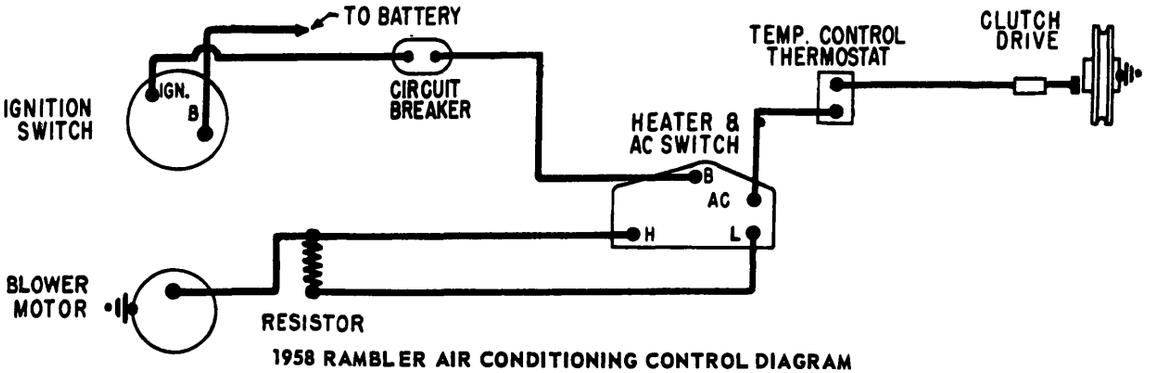
OPERATION

With Air Conditioner Switch "ON" and engine and compressor operating, heat laden, low pressure Freon is compressed by compressor and discharged into condenser where it is cooled to remove the "sensible" heat of compression. The Freon is forced into receiver under pressure when solenoid by-pass valve is energized and closed. After passing through filter and sight glass Freon enters expansion valve in evaporator housing. At orifice in expansion valve, high pressure liquid Freon changes to low pressure liquid, then enters cooling coils. The "boiling" Freon, while in the cooling coils, absorbs heat from the surrounding air and vaporizes. The vapor is drawn through the low pressure line to compressor where cycle is repeated.

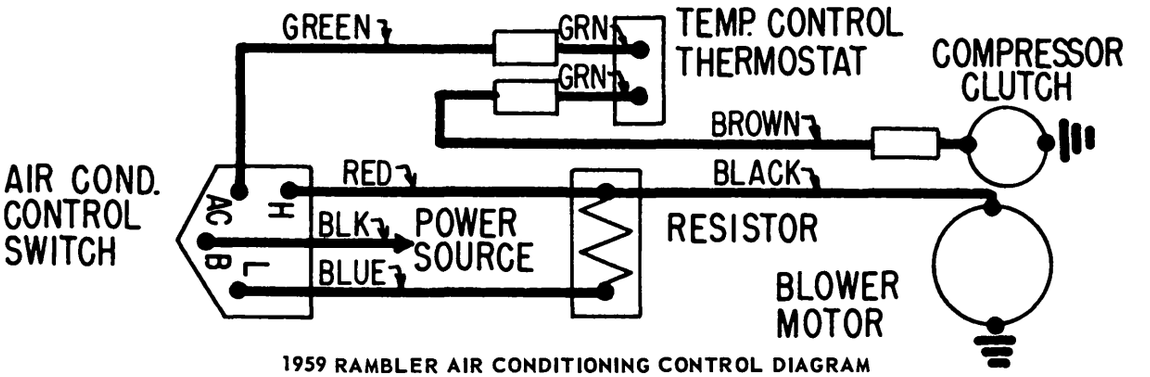
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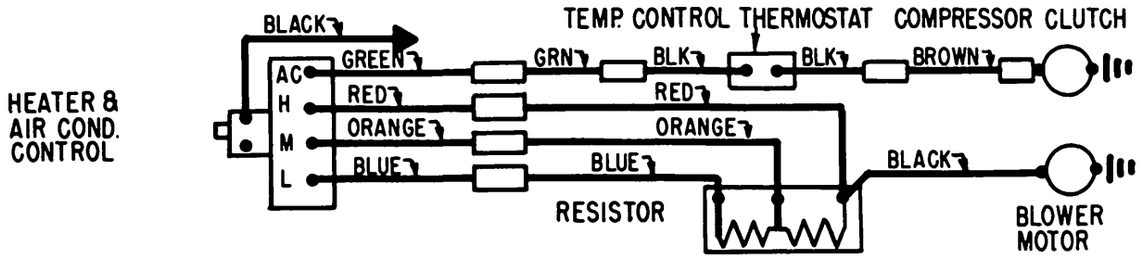
1956-57 HUDSON, NASH & RAMBLER AIR CONDITIONING CONTROL DIAGRAM



1958 RAMBLER AIR CONDITIONING CONTROL DIAGRAM



1959 RAMBLER AIR CONDITIONING CONTROL DIAGRAM



1960 RAMBLER AIR CONDITIONING CONTROL WIRING DIAGRAM

1954-60 HUDSON, NASH & RAMBLER (C nt.)

MAINTENANCE & INSPECTION

►*NOTE*—Manufacturer recommends that any part or unit found faulty in operation be replaced as a unit. No attempt should be made to adjust any of the units except as noted below. Compressors may be repaired as indicated in "Changes, Cautions, Corrections" above and in "Parts Replacement" below.

SEASONAL OPERATION: Winter—It is not necessary to remove air conditioner pully belt. Magnetic clutch prevents operation of compressor when air conditioner is "OFF".

Summ r—Keep condenser core clean of bugs, leaves, dirt, or anything that may catch in condenser core. **Op ration With Car Standing**—Under conditions where system is operated with car standing, for more efficient cooling, run engine well above idle speed, preferably at 750-800 RPM.

ADJUSTMENTS: Compr ss r Belt (1954-57 Models) - The idler shaft or power steering pump (if so equipped), is adjustable by a slotted link to engine. Some models require that compressor mounting bracket be adjusted in addition to idler shaft. Belts require a tight adjustment. Reduce "flex" to a minimum.

C mpr ss r B lt (1958–60 Models) – Use Tool J-6733. Place it on the longest accessible span of belt between two pulleys. Move idler or power steering pump adjusting bracket until index mark on spring loaded plunger lines up with upper edge of gauge.

Magnetic Clutch (All M d ls): Shims are available (.010" thick) to adjust the air gap between the clutch plate and pulley to .010-.040 . Later type clutch plates have three adjusting screws and locknuts to accomplish this adjustment. Torque tighten clutch plate capscrew to 18-20 ft. lbs. and lock in place with lock plate.

PRECAUTIONS, LEAK TESTING & TROUBLE SHOOTING

Se "Air C nditioning Service Cautions", "Trouble Shooting", and "L ak T sts"

CHECKING

►*SCHRADER TYPE VALVE NOTE:* If this type valve used on any installation, use Quick Coupler, Tool J-5420 to connect gauge hose.

BUBBLES IN SIGHT GLASS: Bubbles of vapor passing through sight glass indicate a low or short charge of refrigerant. There is no actual way of determining how much refrigerant is required if sight glass is checked and vapor bubbles are present.

CHECKING PRESSURE-GAUGE MANIFOLD SET (TOOL J-5725): 1) Close both hand valves on gauge manifold set.

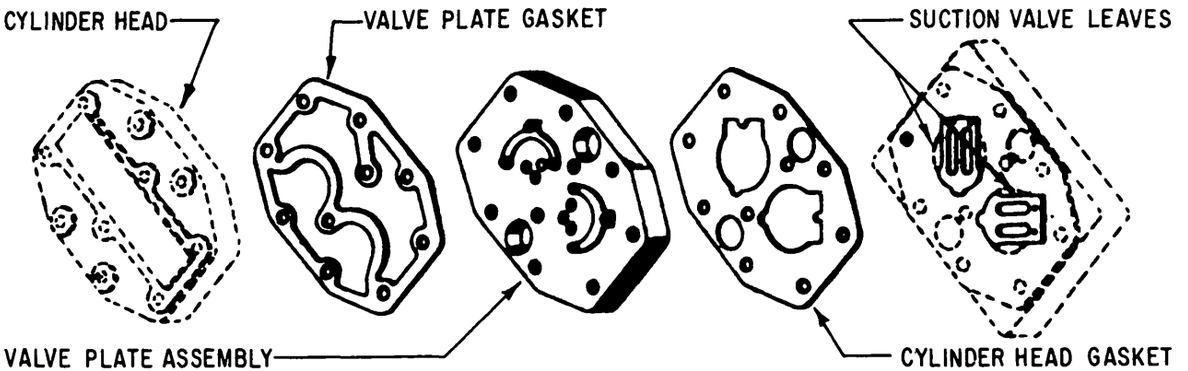
2) Attach a gauge line to high pressure connection on manifold.

3) Open discharge service valve, remove cap from gauge port, and attach gauge line.

4) Cap center connection.

5) Attach a gauge line to low pressure connection on manifold set.

6) Open suction service valve, remove cap from the gauge port and attach gauge line. "Crack" service valves.



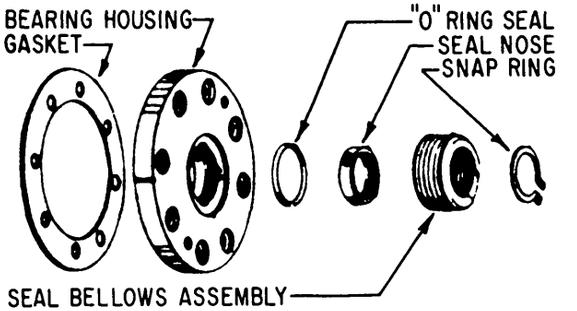
1959-60 RAMBLER COMPRESSOR CYLINDER HEAD & VALVE PLATE

7) Without system operating, both gauge readings should be the same. System is in by-pass cycle and pressures on high and low side are equalized. For example, if ambient temperature is 70°, pressure readings on both gauges should read 70 lbs. gauge pressure. Reference to temperature-pressure table below will give readings for other temperatures.

Temp. of Surrounding Air	Gauge Press. Both Gauges
65°	63 lbs.
70°	70 lbs.
75°	76 lbs.
80°	83 lbs.
85°	90 lbs.
90°	98 lbs.
95°	106 lbs.
100°	115 lbs.
105°	124 lbs.
110°	133 lbs.
115°	143 lbs.
120°	155 lbs.

CHECKING COMPRESSOR OPERATION: Run compressor so that crankcase is thoroughly warmed and comparatively free of refrigerant. Run engine at slow idle; close suction service valve by turning valve stem until it seats. Suction pressure should show 12-18" vacuum in a short time. Shut off compressor and engine. Suction vacuum will rise a few inches quickly if discharge valves are not holding. The above vacuum cannot be reached if suction valves are not holding

CHECKING SYSTEM OPERATION: *(NOTE*—Test is made on road. Long copper tubes to replace gauge lines on Gauge Set J-5725 should be fabricated to enable operator to have gauge set in car). Remove gauge port caps from compressor. Close both hand valves on Gauge Manifold Set (J-5725). Connect gauge lines to Gauge Set and compressor gauge ports. "Crack" service valves. Place thermometers at air discharge outlets. Road test system, operating car at **30 MPH.** Temperatures at air discharge outlets and pressures of system should be as shown in following chart *(NOTE*—Should temperature vary between those given in chart, a mean average should be worked out).



1959-60 RAMBLER COMPRESSOR SEAL ASSEMBLY

Ambient Temp. °F.	Average Disch. Air Temp. °F.	Head Press. PSI	Suct. Press. PSI
Hudson Hornet & Nash Ambassador			
80	47	148	22
85	48	150	22
90	50	155	22
Hudson Wasp & Nash Statesman			
80	52	160	22
85	53	180	22
90	54	200	22
Rambler			
80	45	148	20
85	48	160	20
90	53	175	20

DISCHARGING THE SYSTEM

This procedure should be followed in service operations where components are removed. In subsequent service operations, "Discharging The System" will be mentioned as a step in the procedure.

1) Open discharge service valve by backing stem out all the way.

2) Remove cap from gauge connection. Open system to atmosphere by turning valve stem in one to three turns. *NOTE—Rapid release will cause oil to foam up out of the compressor and should be avoided.*

►*CAUTION*—Compressor lubricant is soluble in Freon-12. To prevent pulling too much oil out of system, release charge slowly so that oil remains as the Freon vapor-

CONTINUED ON NEXT PAGE

1954-60 HUDSON, NASH & RAMBLER (C nt.)

izes into atmosphere. If there is no oil foaming out with the Freon, valve may be opened wider to allow gas to escape more rapidly. *It is advisable to release charge in an open area, other than area in which subsequent service operations, such as testing for leaks, would take place. This prevents contamination of the area with Freon gas and erroneous and false leak detection.*

3) Repeat above operation on suction service valve to assure complete release of charge in system.

EVACUATING THE SYSTEM

The system should be evacuated every time it has been opened for a service operation such as replacement of a part or line. Air and moisture may have entered the system when it was opened. It is advisable to evacuate the system every time a part has been removed from the system; also, whenever a charge has been lost through a leak or loose connection. System should be evacuated prior to charging if it has been standing for a period of time without a charge. To evacuate the system proceed as follows:

1) *CAUTION*—Compressor may be used to evacuate the system. Procedures given below must be followed very carefully to avoid damage to the compressor and its parts. Make certain that system is completely discharged; no Freon gas should be present during this operation.

2) Remove protective caps from both service valve stems. Open suction and discharge service valves to the gauge port fittings by backing the stem out all the way. Remove protective caps from gauge port fittings.

3) Install gauge line, Tool J-5418, from suction service valve port to compound gauge fitting on gauge manifold set (Tool J-5725).

4) Install gauge line from discharge service valve port fitting to high pressure gauge fitting on gauge manifold set.

5) Install gauge line to center connection on gauge manifold set.

6) Close hand valve on compound gauge between gauge and center connection on gauge manifold set (compound gauge will still register low side pressure).

7) Open hand valve on pressure gauge between gauge and center connection on gauge manifold set.

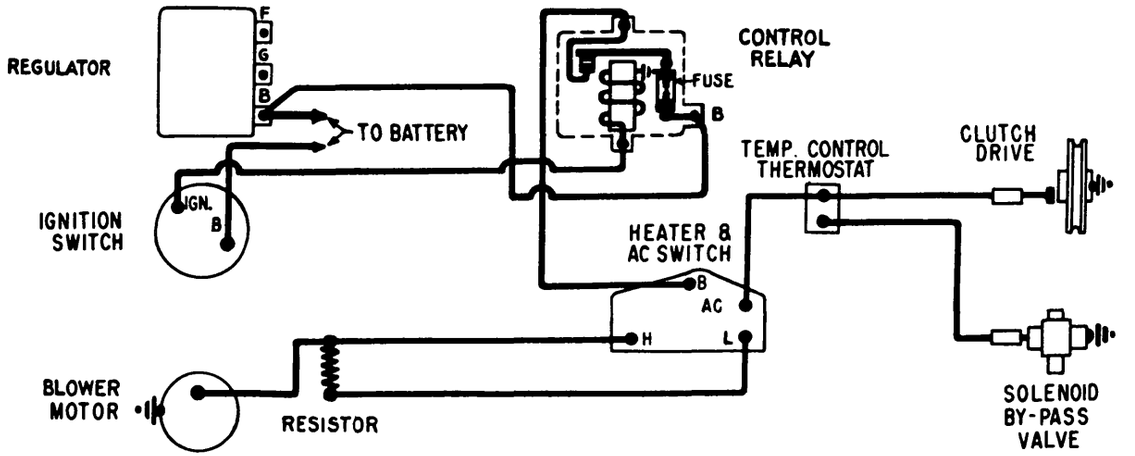
8) Move suction service valve to "cracked" position by turning valve stem in two or three turns.

9) Close discharge service valve by turning valve stem in all the way. Open discharge service valve gauge port to atmosphere by turning hand valve on gauge manifold set. Gauges should register "O" at this time as there is no pressure present in the system.

NOTE—With discharge service valve closed and gauge port open, air pumped out by the compressor is exhausted through open gauge line attached to center connection. With discharge service valve closed, the system is closed off so that as the compressor pumps the system is evacuated back to the closed valve.

10) Check oil level in compressor.

11) Start engine and operate compressor a minute or two at a time for three or four times to slowly reduce



1954-55 RAMBLER AIR CONDITIONING WIRING DIAGRAM

internal pressure. Then run continuously, observing the compound gauge. If compressor is operating satisfactorily, it should pump down to 12-18" vacuum quickly. If not, compressor is defective or there is a leak in the system.

►*CAUTION—Do not run compressor more than 10-15 minutes as it is possible to damage compressor.*

12) After pumping a good vacuum for 10-15 minutes, close hand valve on high pressure gauge on gauge manifold set. Immediately shut system off and stop engine. There should only be a brief interval between these two operations.

13) Return discharge service valve to "cracked" position by turning valve out two or three turns. Both hand valves on the gauge manifold set remain turned off. Vacuum reading on the compound gauge should remain constant at 12-18" or better vacuum.

14) Let system stand for about 10-15 minutes and, if vacuum remains constant, the system is sealed from the atmosphere. If vacuum drops off, there is probably a loose connection or leak in the system. Correct by tightening or replacing and repeat the procedure.

15) Heat a Freon-12 drum with a four pound charge in a container of hot water (125°F) or with rags soaked in hot water. Then attach the drum to the center connection gauge line.

16) Loosen the gauge line fitting to center connection slightly. Crack the drum valve, purging air from the gauge line with Freon vapor. Tighten the gauge fitting and close drum valve.

17) Open the hand valve on the pressure gauge side of the gauge manifold. With the drum in an upright position, crack the drum valve slightly to admit the vaporized Freon gas from top of drum into system. Close drum valve.

18) Note internal pressures which should correspond with that given in table under "Checking" (preceding).

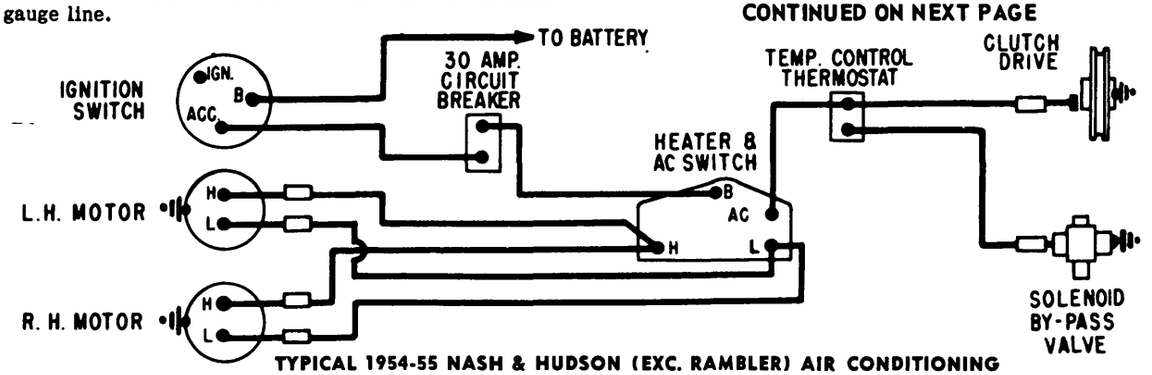
19) Test system for leaks. If leaks found, repeat procedure above after corrections made.

20) Recharge system. See "Adding Refrigerant—Complete Charge" following.

EVACUATING COMPRESSOR

Remove gauge port caps and attach gauge manifold set and lines. Close hand valve on compound gauge and open hand valve on pressure gauge. Start engine and run compressor for 1 or 2 minutes to pump air out of compressor through open hand valve and center gauge line. Stop compressor and engine. "Crack" suction service valve slightly to force air in cylinder head out of compressor with Freon gas. Close hand

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TYPICAL 1954-55 NASH & HUDSON (EXC. RAMBLER) AIR CONDITIONING WIRING DIAGRAM (SINGLE BLOWER IN 1955)

1954-60 HUDSON, NASH & RAMBLER (C nt.)

valve on pressure gauge "Crack" both service valves; operate and check system for pressures and normal operation After running compressor for 10 to 15 minutes, shut off system and check for leaks. Oil around seal at this time does not indicate a seal leak since there is a considerable amount on the new parts when installed. *CAUTION*–Do not put pressure on the crankcase unless pulley and clutch are held firmly in place by spacer, capscrew, and lock plate. Excessive crankcase pressure and a defective snap ring will allow seal to be blown out of compressor

CHARGING THE SYSTEM

►*NOTE:* Normal charge of Freon-12 for system is 3½ lbs. (Hudson & Nash) 3 lbs (Rambler). *CAUTION - Th abov sp cifications supersede previous capacity specifications of 3½ lbs. (Rambler) and 4 lbs. (Hudson & Nash).* For each pound of Freon 2 c.c of Anhydrous Methanol are added to lower the freezing point of any moisture that may be in system. The Anhydrous Methanol is added to compressor crankcase at oil filler plug prior to evacuation in cases where it is not already added to Freon in drum.

Adding Partial Charg : Proceed as follows:

1) Leak test system. Correct conditions as required.
2) Open both suction and discharge service valves to service port fittings by backing valve stem out all the way.
3) Remove cap from discharge service valve port fitting and install gauge line, Tool J-5418, to the fitting and to the high pressure gauge fitting on the gauge manifold set, Tool J-5725.
4) Remove cap from suction service valve port fitting and install a gauge line to the fitting and to the compound gauge fitting on the gauge set.
5) Close gauge hand valves to center gauge fitting.
6) Install a gauge line to center fitting on gauge set.
7) Install gauge line to Freon drum. Check all connections to see that they are tight.
8) Heat Freon drum in bucket of hot water (125°F.) or hot rags wrapped around the drum to vaporize Freon.
9) With drum in upright position, open drum valve slightly.
10) Open gauge hand valves on gauge set; this will open center charging line to each charging line to the compressor.
11) With both service valves to gauge fittings closed, loosen flare nut connections of charging lines at service valves to purge air from lines and gauge set. These should be cracked open only momentarily. Retighten connections.
12) Close hand valve on high pressure gauge (of gauge set) to close gauge to center fitting (gauge will still record pressure on high side when compressor is running and charge installed).
13) Open discharge service valve on compressor by turning valve stem in three or four times to "cracked" position. Open suction service valve to "cracked" position in same manner.
14) Freon drum valve has been cracked slightly until this time. With drum in upright position open valve completely.
15) Operate engine and compressor at slow idle speed.
16) Observe sight glass until a solid liquid column appears. Then add approximately ½ lb. additional refrigerant. Close drum valve.
17) Operate engine for five minutes at approximately 1500-1800 R.P.M.
18) Observe gauges, sight glass, and entire system for proper performance.
19) After unit operates satisfactorily, stop engine, close service valves to service valve port fittings by backing stems out all the way. Disconnect lines, cap fittings, and leave service valves in this position.

Adding Complete Charge: Proceed as follows:

1) Check all connections to see that all flare nuts are tight.
2) Open both suction and discharge service valves to the service port fittings by backing the valve stem out all the way.
3) Remove cap from discharge service valve port fitting and install a gauge line, Tool J-5418, to the port fitting and to the high pressure gauge fitting on gauge manifold set, Tool J-5725.
4) Remove cap from suction service valve port fitting and install a gauge line to the fitting and to compound gauge fitting on the gauge set. Close gauge valves to the center gauge manifold fitting.
5) Install a gauge line to the center fitting on the gauge manifold.
6) Evacuate the system. See "Evacuating The System".
7) After evacuation, install gauge line to Freon drum. Check all connections to see that they are tight.
8) Place drum in upright position, open drum valve slightly.
9) Open gauge hand valves on gauge manifold set. This will open the center gauge line to each gauge line to compressor.
10) Close service valves to gauge port fittings. Loosen flare nut connections of the gauge lines at gauge port fittings on both service valves. This will serve to purge the air from gauge lines and gauge set. These should be cracked open only momentarily. Retighten connections.
11) Close hand valve on compound gauge of gauge set. This will close the gauge to center fitting and to high pressure gauge. The gauge will still record pressure when compressor is running.
12) Open discharge service valve to "cracked" position. Suction service valve remains closed.
13) Full open valve on Freon drum. Heat drum in hot water (125°F.) or with hot rags wrapped around the drum.
14) Charging with liquid refrigerant is done at the high pressure side of the compressor at the discharge service valve. *After heat has been applied to drum, turn off compressor.* Invert drum (vapor in drum will force liquid refrigerant into the system).
15) Close drum valve after complete charge is in system. This can be readily determined by the stopping of the hissing noise as refrigerant is fed into system. Close hand valve on high pressure gauge on gauge set. *NOTE*–Normal charge of system is 4 lbs (Nash & Models). 3½ lbs. (Rambler)
16) Open suction valve to "cracked" position.
17) Turn air conditioner on "High" blower. Run engine at 1500-1800 R.P.M. Observe the sight glass and the high and low pressure gauges. The engine should run 10-15 minutes to normalize system. If no bubbles appear at the sight glass and pressures are normal, shut off engine. NOTE–Head pressure on high pressure side should not exceed 275 lbs. at normal room temperatures. Excessive pressure would indicate air or excessive charge in system. Purge air from system or release excessive charge. See "Air & Moisture in System" for procedures.
18) Leak test system. Correct as required.
19) If system operates normally, close service valves to gauge port fittings. Remove gauge lines and cap gauge port fittings.

CHECKING & ADDING OIL

In normal operation, a small amount of oil is always circulating throughout the refrigeration system. An oil sight glass is provided in the compressor so that splashing oil can be seen when compressor is running. It does not indicate oil level when compressor is stopped. Oil level is determined by stopping compressor and closing suction and discharge service valves to lines. This isolates compressor from rest of system and seals system from atmosphere.

1) Loosen gauge port cap on discharge service valve slightly and let gas in compressor purge to the air slowly until suction pressure gauge shows 0 lbs. Relieve crankcase pressure by loosening oil filler plug slowly. Remove it when the oil has stopped foaming. Using a straight piece of wire as a dipstick, check at oil filler hole, keeping dipstick as near vertical as possible.
2) Add oil to bring it to the recommended level. Use refrigerant type oil of 280 to 300 Seybolt. To avoid adding too much oil, add slowly and check with dipstick; take 2 or 3 readings, each time wiping the dipstick dry. Correct oil level with compressor warm and stopped should be:

Engine	Amount of Oil	Dipstick Reading
6 Cyl. (Compr. Vertical)	9–10 ozs.	1 1/8–1½"
V8 (Compr. Horizontal)	9–10 ozs.	1¼–1 9/16"
(1959–60)	..	1 1/8–1½"

3) Open suction service valve slightly for a few seconds until hissing sound is heard from valve. This allows system to purge air from compressor through discharge service port. Tighten discharge service valve port cap. Open service valves.
4) Install valve stem caps, then operate system for a few minutes. Observe oil splash in sight glass of compressor. There should be oil splash if there is sufficient oil in system.
5) Check refrigerant charge.

►*CAUTION*–Oil in container originally is packed moisture-free and every effort should be made to keep it moisture-free. The oil will quickly absorb moisture with which it comes in contact. Container should not be opened until ready for use, and recapped immediately after use. Tools, tubes, gauge sets, and replacement parts should be kept clean. System should not be open any longer than necessary.

Oil L v l Wh n R placing C mpressor: Precautions should be taken to prevent an over or under charge of oil when compressor is replaced. The oil charge in a

CONTINUED ON NEXT PAGE

1954-60 HUDSON, NASH & RAMBLER (Cont.)

new compressor is sufficient for the entire system. In a system that has been running, there is always some oil circulating through it. When compressor replaced proceed as follows:

1) Purge gas pressure in crankcase of original compressor to 0 lbs. pressure slowly after line valves are closed.

2) Check oil level without running compressor. Running compressor will cause a sudden drop in pressure in crankcase and may cause oil pumping. Oil pressure in crankcase would then be temporarily lowered putting an over charge of oil in the evaporator and giving an erroneous reading when oil level checked.

3) Check oil level in new compressor and add or remove oil from it until oil level is same as it is in compressor to be replaced.

4) Run new compressor 10-15 minutes,recheck oil level.

MOISTURE & AIR IN SYSTEM

Moisture In System: An excessive amount of moisture in the system, above that which can be handled by the Methanol injected into the Freon-12 will cause intermittent refrigeration and quick and serious corrosion of metals used in the system. Too, moisture mixes with oil causing "sludging" which seriously affects the lubricating ability of the oil. The best assurance against moisture is to prevent its entry into the system. This can be done by keeping all components sealed prior to installation and during repair procedures. Should the system be opened, seal openings and lines with plastic caps. If symptoms of moisture are evident in an unopened system, release charge, evacuate system, and recharge.

Air In System: Air which consists of gases that cannot be condensed in the refrigeration system causes excessively high head pressures in the high side of the system and reduces operating efficiency. Install gauge set to determine pressures. The presence of air is always indicated by high head pressure.(NOTE– High head pressure caused by air in system could be confused with an excessive amount of refrigerant which also causes high head pressure; although an excessive amount of refrigerant would still give adequate cooling effect). If system is known to have correct amount of refrigerant, but during operation and using the gauge set the head or high pressure builds up, air is certain to be in the system.

PURGING AIR FROM SYSTEM

Allow system to remain idle for several minutes after compressor has been operating. The air can then be discharged through discharge service valve on compressor. This is done by first making sure that the valve is shut off to the gauge port. Then remove gauge connections. Turn valve stem in toward the "cracked" position for a few moments, thus allowing air to escape through the gauge port. *Cover port opening with cloth when purging system of air to prevent refrigerant and oil from contacting persons or car.* Repeat procedure if necessary. *(CAUTION–*Care should be exercised to be sure that purging is done slowly to prevent drawing oil out of system). Check oil level after bleeding. Air may also be bled from system at receiver. Crack top connection flare nut slightly for a few moments. Close connection and operate engine and compressor. Observe sight glass, and gauges. Check system for satisfactory performance. If operation unsatisfactory, repeat operation.

PURGING EXCESS REFRIGERANT

Install gauge set and operate system to determine pressures. Excessive amount of refrigerant will be indicated by high head pressure although the cooling effect is adequate. Place hand on receiver while system is operating. If entire receiver is cold, the indication is that receiver is filled with liquid refrigernat. Open hand valve to pressure gauge. This will open discharge valve to center gauge line. Freon-12 will vaporize upon entering the atmosphere. *Bleed slowly to prevent oil in the system from foaming and being pulled out of system.* After it is felt that proper amount of refrigerant has been bled off to bring it to normal charge, close hand valve on pressure gauge. Operate system again and observe sight glass and gauge. If not satisfactory, repeat process. *CAUTION–*When bleeding off excess refrigerant, place cloth over gauge line opening to prevent refrigerant or any oil from coming in contact with car or persons.

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

COMPRESSOR: Proceed as follows:

To Perform Engine Repairs: Clean dirt, oil,or any foreign matter from around service valves. Close both service valves. Loosen gauge port cap on discharge service valve and allow gas to escape from compressor slowly. Remove service valve assemblies from compressor. The lines, both high and low pressure, remain attached to service valves. Shift service valves with lines attached carefully to one side. Loosen compressor belt adjusting lever screw and idler shaft adjusting link screw. (If equipped with power steering, the adjusting link is the same as for the idler shaft). Remove compressor belt from compressor pulley and idler shaft or power steering pump pulley. Remove compressor from compressor mounting bracket. The compressor and idler shaft or power steering bracket can be removed from the engine. Upon installation, new gaskets are necessary between service valve assembly bodies and compressor. After compressor is reinstalled, operate system. Purge air from compressor. Check oil level and the charge. Add charge as necessary. CAUTION—Close service valve openings on compressor while it is off car (use platic plugs or tape) to prevent air, moisture, or dirt from entering system.

CONDENSER: Clean all connections of dirt and oil, then discharge system. Drain cooling system and remove radiator from car. Disconnect high pressure line from compressor to inlet connection of condenser (at top of condenser). Use two wrenches of proper size on these connections to prevent twisting of copper lines. Remove splash pan assembly. Disconnect outlet connection from condenser outlet-to-check valve manifold line. Remove condenser from its mounting on radiator air baffles. Remove condenser from below car. Upon reinstallation, install gauge manifold set, evacuate, leak test, and charge the system. Run engine at idle for 10-15 minutes to normalize system. High pressure should not exceed 275 lbs. Should the pressure exceed 275 lbs., there is air in the system. Purge air from system by cracking or slightly opening high pressure gauge to the center connection of the gauge manifold set and *bleed air to atmosphere with system shut down and not operating.*

RECEIVER: Clean all connections of all dirt and oil, discharge system. Disconnect connection from check valve manifold line to receiver inlet. Disconnect connection from receiver outlet. Remove receiver from front engine cross-member. Upon replacement, install gauge manifold set, leak test, and charge system. Start engine and operate at idle for 10-15 minutes to normalize system. Observe gauges. High pressure should not exceed 275 lbs. Should it exceed this amount, purge air from system.

PARTS REPLACEMENT

COMPRESSOR: Follow procedure outlined for "Compressor" under "Removal & Installation To Work In Engine Compartment" above. Purge air from new compressor, check oil level, and charge.

MAGNETIC CLUTCH & FLYWHEEL: Loosen compressor adjusting lever screw and idler shaft, remove compressor belt. Remove compressor mounting bolts and move compressor without shutting off lines or otherwise disturbing remainder of system. Movement required should be sufficient to allow removal of magnetic clutch assembly, remove clutch assembly. *NOTE–* Pulley and center bearing are a tight fit on compressor crankshaft. Brush holder bracket of the magnetic clutch is mounted on front bearing and seal plate of compressor. For adjustment of clutch see "Adjustments" above. Clutch plate cap screw is torque tightened to 18-20 ft. lbs. and locked in place with the lock plate.

COMPRESSOR VALVE PLATE & VALVE: *(NOTE–* Compressor need not be removed when replacing valve plate and valves). Close discharge and suction line valves to isolate compressor. Loosen gauge port cap on discharge service valve and slowly release gas in compressor to atmosphere until there is no pressure present. Remove cylinder head bolts and tap cylinder head and valve plate to loosen and remove. Remove and discard all gaskets and clean gasket surfaces. Examine cylinder walls and top of pistons if there has been any valve breakage. Compressor should be replaced if there are any scores or marks. Always use new gaskets. Before reassembling, dip gaskets in clean refrigerant oil. Replace suction valve leaves (included in replacement kit). Dip valve leaves in clean refrigerant oil. Install suction valve leaves on pins on bottom side of new valve plate. Discharge valves are furnished installed on valve plate. *(NOTE–*Due to position of compressor in the V8 Series, it is necessary to assemble the parts on a bench and install to the compressor. Be sure suction valves are in place on

CONTINUED ON NEXT PAGE

1954-60 HUDSON, NASH & RAMBLER (C nt.)

pins of valve plate when installed). Install valve plate gasket. Install valve plate with suction valves in place on compressor Install cylinder head gasket, cylinder head, and cylinder head bolts Torque tighten cylinder head bolts to 15-20 ft. lbs. Suction and discharge valves remain closed. Evacuate compressor. See "Evacuating Compressor Only" above. *NOTE*– Although a test indicates a leaky valve plate, unless valve plate has been damaged or has been in service a long time, dirt or foreign particles in the system will cause valve plates to appear faulty. Check system to see if oil is clean. Dirt small enough to go through the suction screens can cause valve trouble. Valve plates that appear good may be made to function properly by washing in clean solvent and drying with dry air or clean cloth.

COMPRESSOR SHAFT SEAL: 1) *(NOTE*– A small amount of oil around the seal bearing is normal and does not indicate a seal leak. When seal was originally assembled, all parts were dipped in oil and operation may only be forcing out surplus oil). Run compressor for a short time to warm up compressor and allow the crankcase oil to contain a minimum amount of refrigerant. Shut off system and engine. Close service valves, stems all the way in, to isolate compressor. Loosen gauge port cap on discharge service valve and bleed refrigerant vapor from compressor, leaving line valves on their respective lines. Move lines aside, remove compressor and place on bench.

2) Install plastic plugs in inlet and outlet holes in compressor, or cover with masking tape. Remove clutch and pulley from compressor shaft. Tilt compressor backwards to prevent loss of oil while performing following operations: Remove shaft snap ring with "Truarc" pliers. Remove seal ring seat either by hand or, if tight on shaft, pry off with a screwdriver. Remove seal bellows by forcing a screwdriver behind brass stamped flange at various points and prying it out of seal plate. Remove neoprene "O" ring from seal plate. Discard seal bellows and "O" ring. Wash seal plate and shaft with clean cloth and solvent, and coat both with clean refrigerator oil.

3) Dip new "O" ring in clean refrigerant oil and install in seal plate. Press seal bellows assembly into place It is not a metal-to-metal press fit, but rests only on the neoprene "O" ring in the seal plate and must go in perfectly square and the flange must bottom all the way around against the seal plate Wash seal seat in clean solvent, dip in clean refrigerant oil with neoprene "O" ring in place Press onto shaft evenly with lapped surface toward compressor body After seal face is over spline of shaft, install snap ring over spline with "Truarc" pliers. Do not spread snap ring more than necessary. Slide seal ring and snap ring together only shaft until snap ring snaps into its groove in the shaft. Install flywheel and clutch plate. The capscrew lock plate is installed behind flat washer in clutch hub. Tighten capscrew to 18-22 ft lbs. and lock in place with lock plate.

4) Install compressor on mounting bracket; connect magnetic clutch wire lead. Install belts and adjust brackets and idler shaft or power steering pump to tighten belt tension Install suction and discharge service valves with flexible lines intact to compressor using new gaskets. Torque valve body capscrews to 12-15 ft. lbs The suction and discharge service valve remain closed. Evacuate compressor. See "Evacuating Compressor Only" above.

COMPRESSOR GASKETS: Follow removal and installation procedures outlined above in pars. 1) and 4) for "Compressor Shaft Seal".

OTHER SYSTEM PARTS OTHER THAN COMPRESSOR (Involving Breaking of Refrigerant Lines): Removal and installation of these parts involves discharging, evacuating and recharging system (see procedures above).

1955-60 STUDEBAKER & PACKARD AIR CONDITIONING

Studebaker V8 (1955–60)
Studebaker Six (1958–60)
Packard (1957–58)

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 STUDEBAKER COMPRESSOR SHAFT SEAL REPLACEMENT CAUTION:* Three types of compressor shaft seal kits are used for shaft seal replacement on 1955 Compressors. Proper kit to be used is given in table below

Compressor Serial No.	Housing Flange Thick.	Bellows Seal Type	Studebaker Kit No.
BM9939-1	1/4"	Neoprene	1539718
BM9941-1, 2, 3	1/4"	Neoprene	1539718
BM9941-4, 5, 7, 8, 9	3/8"	Neoprene	1539719
BM9942-3, 4	1/4"	Neoprene	1539718
BM9945-1, 2, 4	1/4"	Neoprene	1539718
BM9948-1, 2, 3, 4	1/4"	Neoprene	1539718
BM9949-1	1/4"	Neoprene	1539718
BM9949-3	3/8"	Neoprene	1539719
BM9950-1	1/4"	Neoprene	1539718
BM9957-1	1/4"	Neoprene	1539718
BM9958-1, 2, 3	1/4"	Neoprene	1539718
BM9959-1	3/8"	Neoprene	1539719
BM9966-1	1/4"	Neoprene	1539718
S9960-1	1/4"	Neoprene	1539718
S9960-2	3/8"	Neoprene	1539719
S9961-1	1/4"	Neoprene	1539718
S9962-1	1/4"	Neoprene	1539718
S9963-1, 2	1/4"	Neoprene	1539718
S9964-1	1/4"	Neoprene	1539718
S9965-1	1/4"	Neoprene	1539718
S9970-1	1/4"	Neoprene	1539718
S9973-1	3/8"	Neoprene	1539719
Others		Metal	1539717

►*AIR CONDITIONER SERVICE NOTE:* It is recommended that any service or repairs required on air conditioner unit by done by a qualified refrigeration service station

►*1960 LARK BLOWER NOISE CORRECTION:* Caused by either a loose fan retaining speed nut or by interference at front of blower fan. To correct, tighten or replace nut and/or remove and reinstall motor on blower housing using a total of two gaskets Part No. 1540092 between motor and housing.

►*1960 CONDENSER PRODUCTION CHANGE:* Condenser Part No. 1545951 is replaced by Condenser Assembly Part No. 1546586 (plus four screws Part No. G-456643). To install, position condenser 3/8-1/2" above radiator lower tank. Use 17/64" drill to bore four holes in radiator support using four holes in condenser supporting bracket for locations.

DESCRIPTION

Similar in design and operation to other systems using Freon-12 as a refrigerant Air from inside car is led through two openings in the rear package shelf to refrigeration unit on ledge of trunk compartment. In the refrigeration unit air passes over the evaporator where it gives up much of its heat to the Freon-12 gas which is flowing through the evaporator coils Humidity from the air condenses on the evaporator coils and drains away The cooled, dried and filtered air is then forced by either or both blowers back into the car through two cold air outlets mounted on the package shelf A magnetic type air compressor clutch controlled by air the temperature control switch is used on 1958 models

Controls: Control panel is mounted beneath and at center of the instrument panel. There are three controls on the panel. The center control, through a modulator valve, regulates the cooling action the system is to furnish: the farther out it is pulled, the cooler will be the air delivered from the outlets The other two controls operate the blower motors The push-pull switches have three positions: "In" is off, first position out is slow blower speed, second position out is high blower speed. Fresh outside air can be admitted by opening one of front window vents or right fender vent (Climatizer cars) with inside vent closed

OPERATION

With engine and compressor operating, heat laden, low pressure Freon is compressed by the compressor and discharged into the condenser where it is cooled to remove the "sensible" heat of compression The Freon is forced into the receiver under pressure when the modulator valve is closed. After passing through dehydrator and sight glass Freon enters expansion valve in evaporator assembly At orifice in expansion valve high pressure liquid Freon changes to low pressure liquid, then enters evaporator coils The "boiling" Freon, while in the evaporator coils, absorbs heat from the surrounding air and vaporizes The vapor is drawn through the low pressure line to compressor where cycle is repeated.

PRECAUTIONS, TROUBLE SHOOTING & LEAK TESTING

See "Air Conditioning Service Cautions", "Trouble Shooting" and "Leak Tests"

CONTINUED ON NEXT PAGE

1955-60 STUDEBAKER (C nt.)

CHECKING & ADJUSTMENT

MAINTENANCE & INSPECTION: Seasonal Operation– Manufacturer recommends that compressor belt not be removed to assure that compressor seals do not dry out. To make system inoperative during winter months, make sure that center control on dash panel is all the way in (1955-57 Models), that air temperature control is in the "off" position (1958 Models.)

Air Filter: Clean at regular intervals. To remove filter, first remove wing nuts and washers from studs near top of blower housing (in trunk compartment). Remove back panel and slide filter out of blower housing. Wash filter in cold, soapy water and rinse in clear water. When reinstalling filter, be sure it is properly positioned under spring clips before sliding it into place.

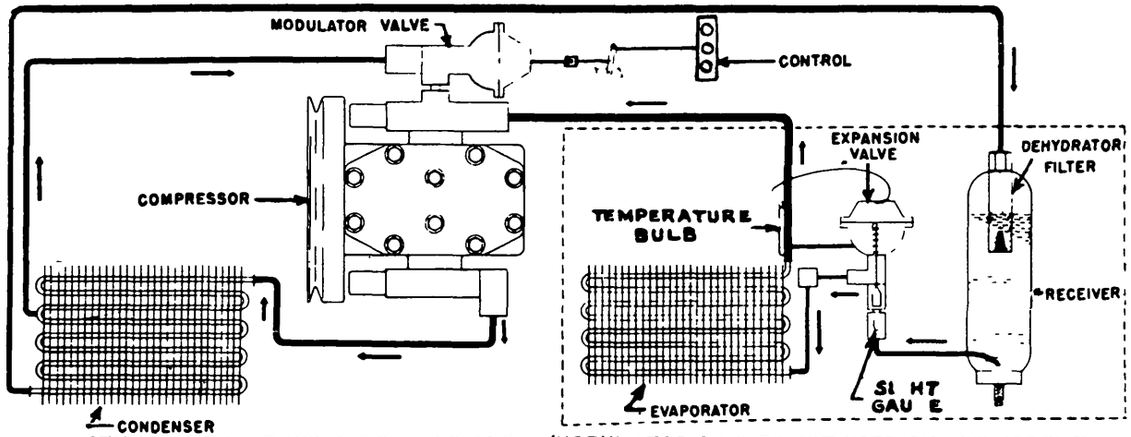
COMPRESSOR DRIVE BELT ADJUSTMENT: To adjust, use an open-end wrench on hexagonal part of left idler pulley shaft (right idler pulley is not adjustable) between pulley and pulley bracket. Loosen shaft slightly, and move pulley to loosen or tighten belt. Drive belt should have a 1/2" deflection midway between compressor and adjustable idle pulley (1955-57 V8 & 1958 Six Cyl. Models); between compressor pulley and fan pulley (1958 V8 Models) when a force of 25 lbs. (1955-57), 20 lbs. (1958) is exerted at that point with a spring scale, pulling outward.

CHECKING: Bubbles in Sight Glass– *(NOTE–*Before checking sight glass, in event blowers are operating properly and system is providing only partial cooling, check temperature control cable adjustment to make sure it provides full movement of lever on modulator valve on compressor). To check for possible refrigerant shortage, turn blower motors off and push temperature control all the way in. Run engine at fast idle for about 5 minutes at 1000 RPM. Pull temperature control all the way out, turn both blowers on high speed. Continue to run engine at fast idle. Check sight glass. If empty, or if bubbles are passing through it, system may be low on refrigerant. System should be checked for leaks and recharged.

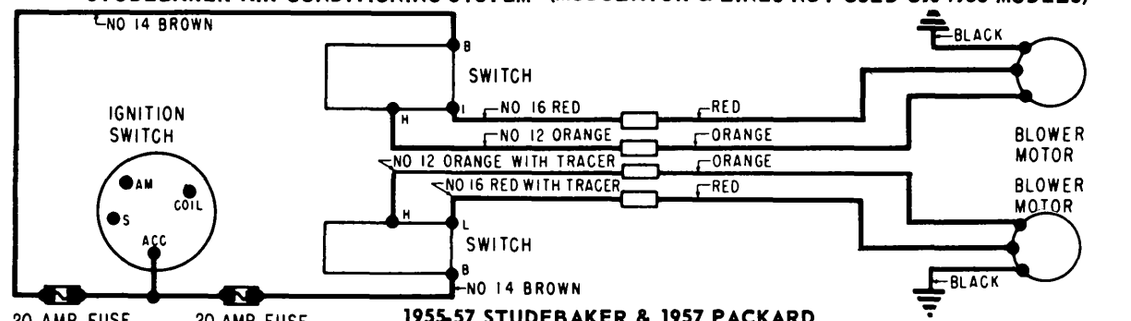
Compressor Oil Level: There should be just enough oil in crankcase of compressor so that splash is visible in compressor sight glass whenever compressor is running. *CAUTION–If compressor filler plug is removed, entire system will have to be purged and recharged.*

REMOVAL & INSTALLATION TO WORK IN ENGINE COMPARTMENT

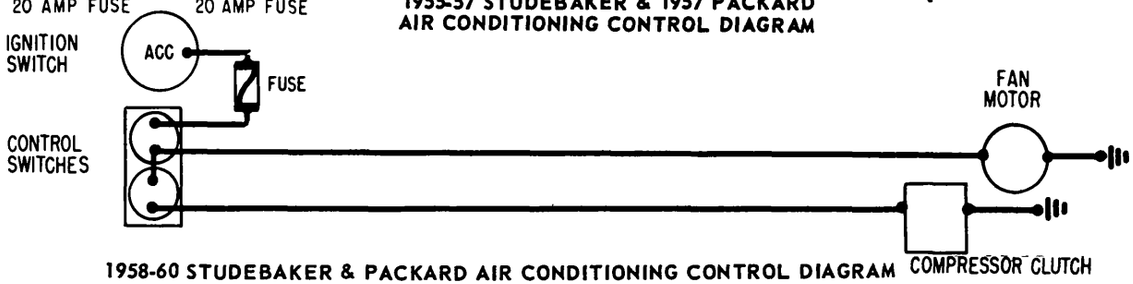
COMPRESSOR & BRACKET REMOVAL & INSTALLATION (To Work on Engine): *(CAUTION–Do not disconnect refrigerant hoses).* Drain radiator, loosen idler pulley (left) and remove compressor drive belt. Remove hand control cable at modulator valve. Remove two capscrews which hold compressor bracket to water pump manifold. The lower screw, which is longer, also retains idler pulley bracket. When screw is removed, do not remove spacer which is between brackets. Take out two Allen-head screws which hold compressor mounting bracket to water outlet fitting, and remove capscrew at base of oil filler pipe. Remove compressor and bracket with hoses still attached, and place assembly on front of right front fender. Keep unit as nearly as possible as when mounted, so that oil in compressor crankcase will not run up past compressor piston. When installing compressor, and before putting on belt, turn drive pulley several times by hand to pump out any excess oil that may have collected at top of piston. After system is in operation, check sight glass for bubbles. *NOTE–*If an excessive amount of bubbles appear in sight glass, system probably does not have sufficient Freon-12. *Do not operate system until proper amount of Freon has been added.*



STUDEBAKER AIR CONDITIONING SYSTEM (MODULATOR & LINES NOT USED ON 1958 MODELS)



1955-57 STUDEBAKER & 1957 PACKARD AIR CONDITIONING CONTROL DIAGRAM



1958-60 STUDEBAKER & PACKARD AIR CONDITIONING CONTROL DIAGRAM

SERVICING

►*AIR CONDITIONER SERVICE NOTE: All service operations except for removal and installation of compressor for engine pairs should be performed by a competent refrigerant service man.*

►*COMPRESSOR REMOVAL NOTE:* For access to engine on Silver Hawk models, the compressor hoses can be released from clamps on body and fender and the compressor can be moved out of the way. On other models, if necessary to remove compressor from its mounting, see *"Compressor Removal" below.*

COMPRESSOR REMOVAL (When Necessary to Disconnect Hoses): Remove caps and close the upper and lower service valves on compressor, then remove capscrews securing the two valves to compressor. Place tape over openings in compressor and valves. Remove compressor from engine compartment. *CAUTION* - Keep compressor in its horizontal position.

Installation: Reverse removal procedure and install new valve-to-compressor gasket. Secure both valves in positions before opening valves. *NOTE-Before installing compressor belt, turn compressor over a few times by hand to discharge any oil that may have collected on top of piston.*

AUTO-LITE ELECTRIC

Chrysler & Imperial (1955-60)
D Soto (1955-60)
Dodge (1955-60)
Packard (1955-58)
Plymouth (1955-60)
Studebaker (1955-58)

DESCRIPTION: Window regulators are individually powered by a reversible electric motor connected to a worm shaft by a flexible shaft or coupling. Motor is controlled by a two-way switch (on trim panel) and a master switch (on left front door) operating either through a relay or directly to motor (see wiring diagrams). The electrically operated tail gate window on station wagon models operates in same manner as door windows and is controlled by a key operated switch in exterior locking handle and by a switch on instrument panel.

REMOVAL & INSTALLATION: Proceed as follows:

Window Lift Motor (Except Studebaker): Remove door handle, escutcheon plate, garnish molding, arm rest and trim panel. Disconnect wires from motor. Remove attaching nuts that hold motor to gear box, pull motor down and away from drive shaft. To reinstall, reverse removal procedure.

Studebaker–Remove regulator assembly (see below). Remove motor-to-regulator bracket capscrews. Slip motor off bracket and disengage motor shaft from coupling. To install, make sure coupling fully engages gear shaft. Then align motor shaft and coupling, slip motor into position. Install retaining capscrews. Install regulator (see below).

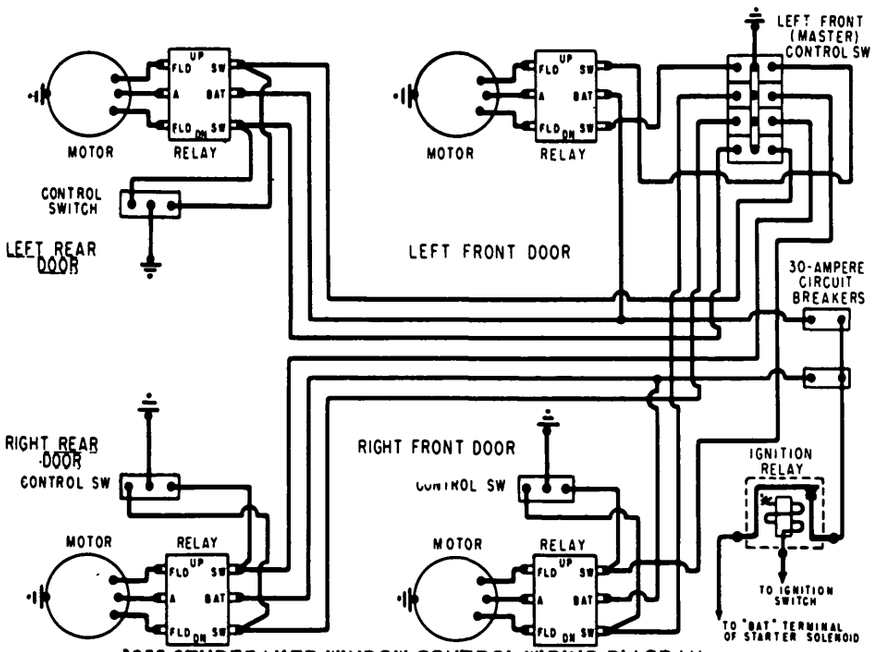
Window Lift Assembly (Except Studebaker): Removal–Disconnect battery, remove garnish molding, door handle and escutcheon plate. Remove arm rest and window lift control switch, then door trim panel. Remove wires from motor. Remove clips from regulator pins holding lower glass channel. Raise glass manually and prop the glass. Raise glass before loosening capscrews so that it is out of working area. Remove four regulator-to-door attaching screws. Remove pivot guide retaining pin. Lower motor and regulator assembly out through opening in door.

►*CAUTION:* If gear box is to be replaced, remove regulator counter balance spring before removing. Counter balance spring has 220° of wrap. Use large pliers when removing. Failure to remove spring before disassembly can result in personal injury.

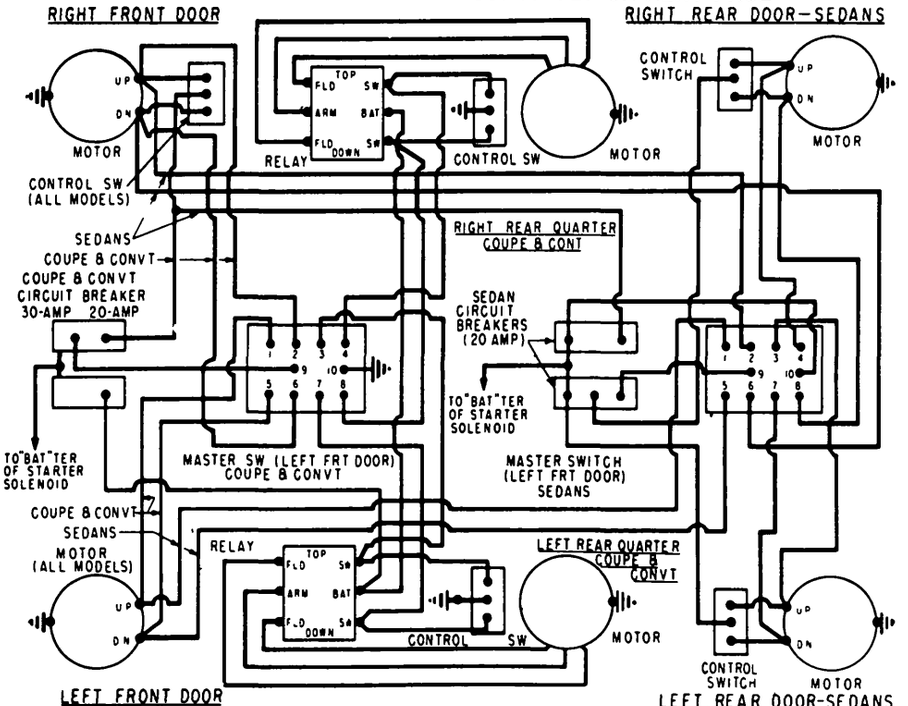
Installation–Place motor and regulator assembly through opening in door, insert intermediate pivot arm pin into guide inside door shell **(there is no clip).** Install four regulator attaching screws finger tight. *(NOTE*–After regulator screws installed, check to see that intermediate pivot arm did not slip out of guide during installation). Remove window prop, lower window and insert control arms into glass channel, using leather washer on each side of channel, secure with clip. Connect motor wires and battery cable, operate window up and down several times and stop glass halfway. Tighten regulator screws. Check operation as follows: Connect an ammeter into circuit and operate window. Ammeter reading should be constant at approximately 14 amps. (all models except rear doors of 4-Door Hardtop models), 20 amps. (rear doors of 4-Door Hardtop models). If ammeter reading fluctuates, there is a bind in glass or linkage. Adjust glass down-stop so window is flush with garnish molding. Install trim panel, garnish molding, and other parts.

Window Lift Assembly (Studebaker): Removal–Raise window, remove door handle and arm rest. Remove trim panel, disconnect wires from switch, then remove trim strip from door. Remove sealing tape from inspection holes and tape edges of large inspection hole with masking or friction tape. Remove window stop bracket bolts, turn bracket as required and remove from door. Remove relay bolts, and remove relay, leaving wires attached. If window is in up position, turn ignition switch on and lower window by holding ground wire to dark green wire at relay terminal. Lower window just enough to expose regulator arms and window lift channel. Turn ignition switch off. On all doors, except President 4-Door rear doors, remove hairpin clip and plain washer from each regulator arm guide pin, then disengage lift channel from guide pins. Lift glass all the way manually and insert a punch or small screwdriver through one of trim strip retainer holes to hold glass up in position. On the President rear door, remove ventilator window assembly on Y6 models, and window rear run on Y4 models. Remove window glass from door to provide clearance within door for regulator removal. Disconnect motor-to-relay wires at relay,

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1955 STUDEBAKER WINDOW CONTROL WIRING DIAGRAM
(STUDEBAKER SEDANS SHOWN–PACKARD SIMILAR)



1955 CHRYSLER, DESOTO, DODGE, PLYMOUTH WINDOW CONTROL WIRING DIAGRAM

AUTO-LITE ELECTRIC

(C ntinued)

remove relay. Loosen idler track rear screw just enough to keep it snug. With a hand inside door, hold idler track or end of regulator arm. *(NOTE*—Because regulator arm which engages idler track is springloaded make certain idler track or end of regulator arm is well supported). Remove idler track front screw and carefully lower arm and track until pivot point can be seen through access hole. Then, while holding end of track, remove track rear screw and lower track until it rests against regulator sector. Remove four regulator-to-door panel screws and lower regulator. Then, by revolving drive coupling, move sector to provide clearance required to permit tipping regulator for removal. On front door regulator, move sector to approximately the center position. On rear door regulator, move sector about 1/3 of its total travel from down position. Shift regulator assembly forward on all doors except President sedan rear door (on this model shift assembly rearward. Keep motor end down. Turn and tip assembly and start regulator arms out through inspection hole. Continue to turn and, at same time, lower ends of regulator arms and lift assembly out of door.

Installation—Apply Lubriplate or high melting point grease to sector gears, idler track, arm guide pins, and balance spring. Place sector in approximately same position as for removal (center position for front doors, 1/3 of its travel from down position for rear doors). Insert motor end through inspection hole. Keep ends of regulator arms down, move assembly into door. As mounting bracket clears edge of inspection hole, lower motor and move assembly forward (rearward on rear door of President). Turn assembly and insert regulator arms in door. On front door, make sure sector clears window front guide channel. Sector must be positioned between guide channel and door inner panel. Position regulator on door panel and install retaining capscrews. Swing idler track into position with arms nearly vertical but with front track screw clear, install but do not tighten front track screw. Lift idler track, using front screw as a pivot, align the bracket with hole in panel, install track rear screw. Tighten both front and rear track screws securely. Connect motor wires to relay. Turn ignition switch on and lower sector and regulator arms by touching ground wire to dark green wire relay terminal. On President rear door, place window glass within door. On Y6 model, install rear ventilator frame assembly; on Y4 model, install window rear run. On all models, except President, remove punch or screwdriver and lower glass carefully. Engage lift channel with regulator guide pins and install plain washers and retaining clips. Hold ground wire on upper terminal of relay and raise window. Position window stop bracket within door and install retaining bolts. Loosen bolts and move stop and bumper down. Lower glass until top of glass is flush with bottom of window opening on all front doors and approximately 2" above bottom of opening on rear door of 4-Door models. Then raise stop until stop bumper contacts lift channel, tighten bolts. Make sure all connections on relay are tight and install relay within door. Install door panel trim strip, connect wires to switch in trim panel, and install trim panel.

OPERATIONAL TEST: Connect ammeter in electrical circuit and operate window. Ammeter reading should be constant and without fluctuation. If reading fluctuates, there is a bind in either glass or linkage.

TROUBLE SHOOTING: Diagnose trouble as follows:

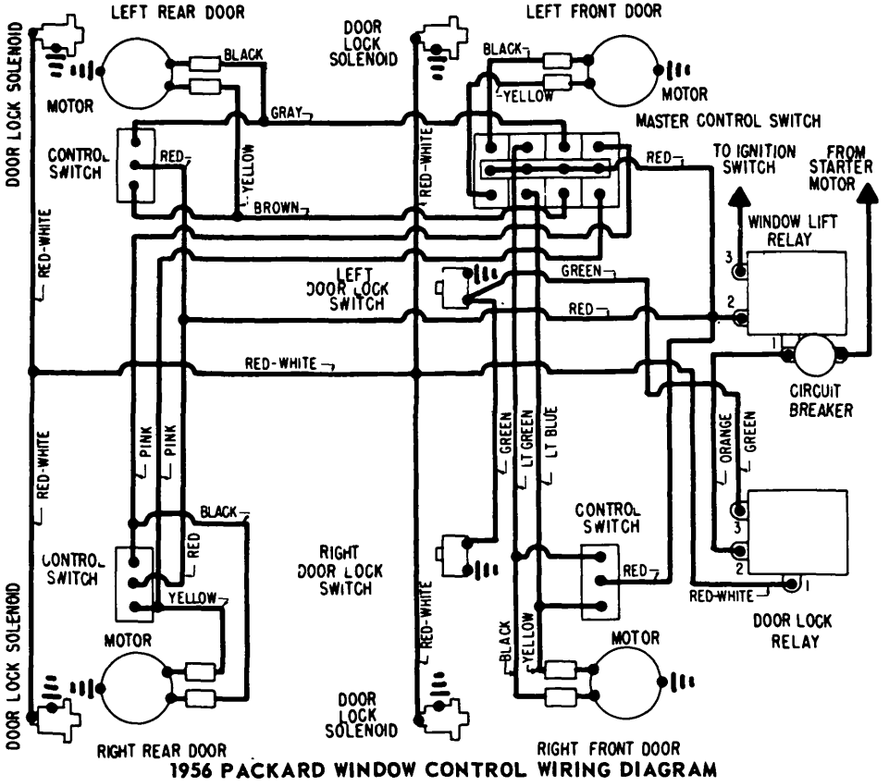
All Windows Inoperative: Loose connection or break in wires from power source; defective ignition switch relay (Studebaker); all circuit breakers defecitve.

Both Right Windows or Both L ft Windows Inop rativ (Studebaker 4-Door Models); B th Fr nt Wind ws Or Both Rear Windows Inoperativ (Oth rs): Faulty circuit breaker or circuit breaker wire.

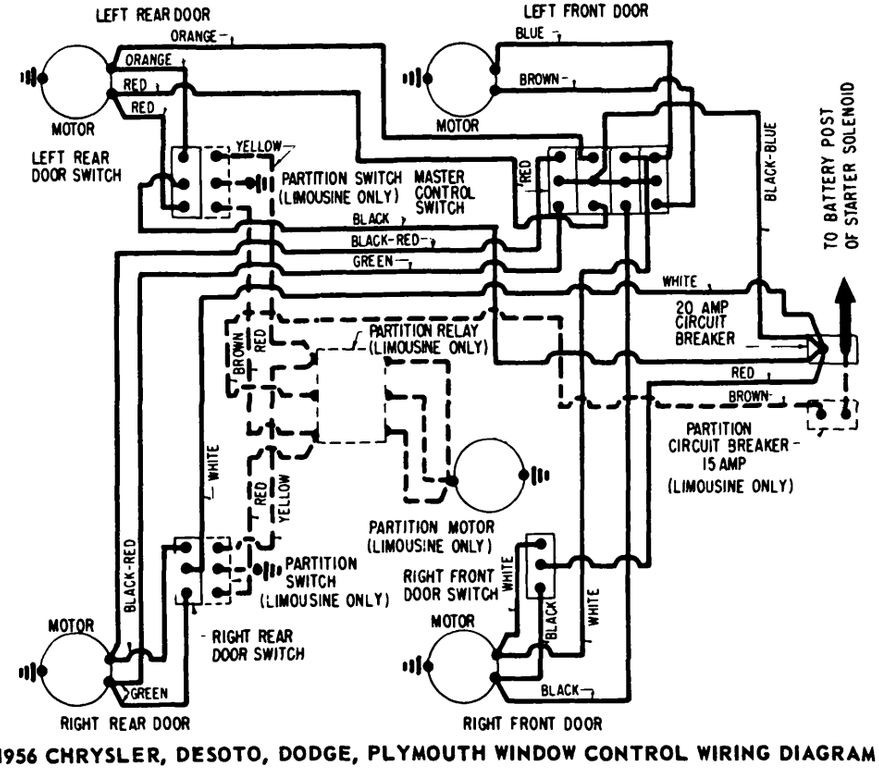
One Window Inoperative: Faulty relay (if so equipped) or operating switch; bind in regulator linkage or window glass; motor burned out.

Window Operable In One Dir cti n Only: *Faulty relay (if* so equipped) or operating switch; broken wire or loose connection; faulty motor.

CONTINUED ON NEXT PAGE



1956 PACKARD WINDOW CONTROL WIRING DIAGRAM



1956 CHRYSLER, DESOTO, DODGE, PLYMOUTH WINDOW CONTROL WIRING DIAGRAM

AUTO-LITE ELECTRIC (Cont.)

Window Operates In Wrong Direction From Master Or Door Switch: Field wires from motor reversed at relay (if so equipped).

Window Operates In Wrong Direction From Either Master Or Door Switch, Correctly From Other Switch: Operating wires reversed at switch.

Window Operates From One Switch Only: Defective switch; broken or grounded wire or loose connection.

Circuit Breaker Cuts In & Out Continuously—Window Will Not Operate: Grounded wires; relay (if so equipped) points stuck; faulty switch.

Window Operates Sluggishly Or Circuit Breaker Cuts In & Out When Window Is Operated: Bind in regulator assembly or window channel; broken wire, loose connection, or partial ground; defective motor.

SERVICE PARTS: Auto-Lite Part Nos. as follows:

WINDOW LIFT MOTOR

1955 Chrysler C70 (12 Volt)

Window	Auto-Lite No.
Doors, Quarters	EMA-4002
Partition	EPG-4001

1955 Chrysler (Exc. C70), DeSoto & Plymouth

Window	Auto-Lite No.
Left Doors	EPA-4002
Right Doors	EPA-4001
Left Quarter (Conv. & Sp. Cl. Cpe.)	EWW-4001
Left Quarter (Others)	EPA-4001
Right Quarter (Conv. & Sp.Cl. Cpe.)	EWW-4001
Right Quarter (Others)	EPA-4002

1955 Dodge

Window	Auto-Lite No.
Left Front Door	EPA-4002
Left Rear Door	EPA-4001
Right Front Door	EPA-4001
Right Rear Door	EPA-4002
Left Quarter (Conv. & Sp. Cl. Cpe.)	EWW-4001
Left Quarter (Others)	EPA-4001
Right Quarter (Conv. & Sp. Cl. Cpe.)	EWW-4001
Right Quarter (Others)	EPA-4002

1956 Chrysler, DeSoto & Plymouth

Window	Auto-Lite No.
L. F. Door	EPJ-4002
R. F. Door	EPJ-4001
L. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4002
R. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4001
L. R. Door (4-Dr. Hardtop)	EPK-4003
R. R. Door (4-Dr. Hardtop)	EPK-4002
Quarter (Exc. Plymouth Club. Cpe.)	EPJ-4003
L. Quarter (Plymouth Club Cpe.)	EPJ-4001
R. Quarter (Plymouth Club Cpe.)	EPJ-4002
Partition	EPG-4001

1956 Dodge

Window	Auto-Lite No.
L. F. Door	EPJ-4002
R. F. Door	EPJ-4001
L. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4001
R. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4002
L. R. Door (4-Dr. Hardtop)	EPK-4003
R. R. Door (4-Dr. Hardtop)	EPK-4002
L. Quarter (Club Coupe)	EPJ-4001
L. Quarter (Conv. & Sp. Club Coupe)	EPJ-4003
R. Quarter (Club Coupe)	EPJ-4002
R. Quarter (Conv. & Sp. Club Coupe)	EPJ-4003

1957 Chrysler (Exc. Imp.), DeSoto & Plymouth

Window	Auto-Lite No.
L. F. Door	EPJ-4005
R. F. Door	EPJ-4004
L. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4005
R. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4004
L. R. Door (4-Dr. Hardtop)	EPZ-4001
R. R. Door (4-Dr. Hardtop)	EPZ-4002
L. Quarter (Exc. Plymouth Sp. Club Cpe.)	EPJ-4004
R. Quarter (Exc. Plymouth Sp. Club Cpe.)	EPJ-4005
L. Quarter (Plymouth Spec. Club Cpe.)	EPZ-4002
R. Quarter (Plymouth Spec. Club Cpe.)	EPZ-4001

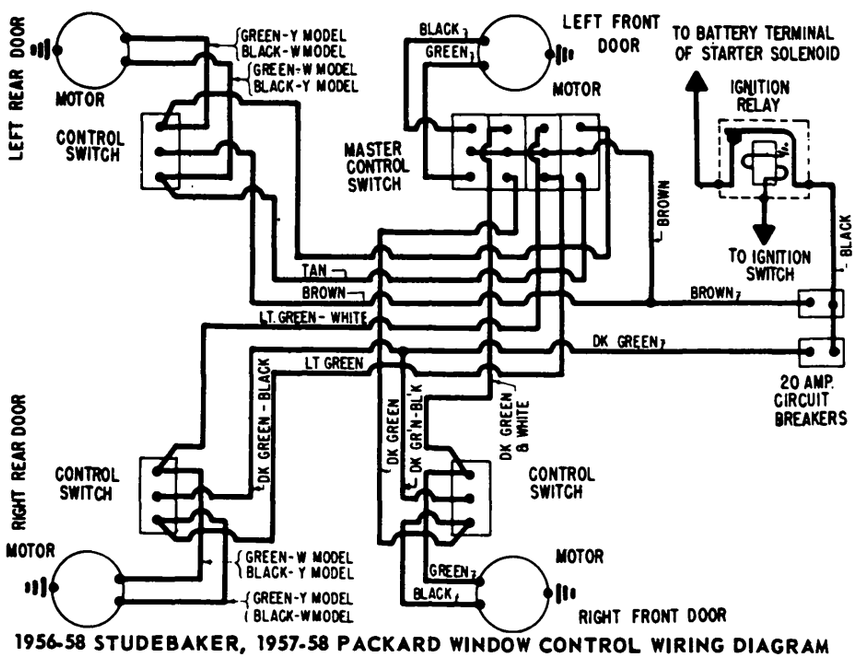
1957 Dodge

Window	Auto-Lite No.
L. F. Door	EPJ-4005
R. F. Door	EPJ-4004
L. R. Door (Exc. Sta. Wgn. & 4-Dr. Hardtop)	EPJ-4005
R. R. Door (Exc. Sta. Wgn. & 4-Dr. Hardtop)	EPJ-4040
L. R. Door (Sta. Wgn. & 4-Dr. Hardtop)	EPZ-4001
R. R. Door (Sta. Wgn. & 4-Dr. Hardtop)	EPZ-4002
L. Quarter (Spec. Club Coupe)	EPZ-4002
L. Quarter (Convertible)	EPJ-4004
R. Quarter (Spec. Club Coupe)	EPZ-4001
R. Quarter (Convertible)	EPJ-4005

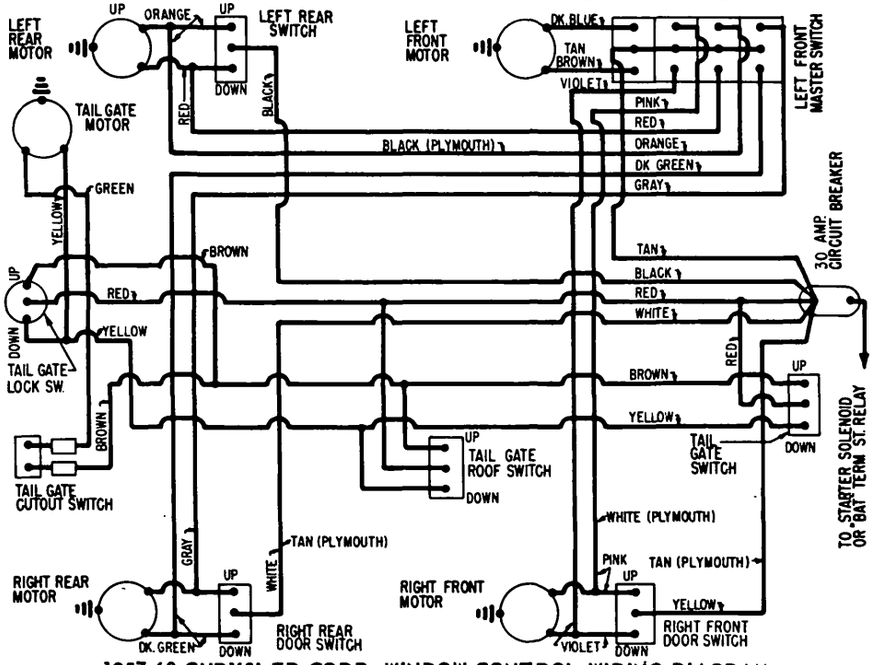
1957-58 Chrysler Imperial

Window	Auto-Lite No.
L. F. Door	EPJ-4102
R. F. Door	EPJ-4103
L. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4102
R. R. Door (Exc. 4-Dr. Hardtop)	EPJ-4103
L. R. Door (4-Dr. Hardtop)	EPZ-4101
R. R. Door (4-Dr. Hardtop)	EPZ-4102
Quarter	EPJ-4003

CONTINUED ON NEXT PAGE



1956-58 STUDEBAKER, 1957-58 PACKARD WINDOW CONTROL WIRING DIAGRAM



1957-60 CHRYSLER CORP. WINDOW CONTROL WIRING DIAGRAM

AUTO-LITE ELECTRIC (C nt.)

1958-59 Chrysler (Exc. Imp.), DeSoto, Dodge, Plymouth

Window	Auto-Lite No.
Front Doors	EPJ-4008
Rear Doors (Exc. 4-Dr Hardtop)	EPJ-4008
Rear Doors (4-Dr. Hardtop)	EPZ-4003
Tail Gate	EPZ 4103
Quarter Windows (Conv.)	EPJ-4008

Window — 1959 Chrysler Imperial	Auto-Lite No.
Front Door	EPJ-4008
Rear Doors	EPJ-4008
4-Dr. Hardtop	EPZ-4003
Quarter Windows	EPJ-4003

Window — 1960 Chrysler Imperial	Auto-Lite No.
Front Doors	EPJ-4104
Rear Doors	EPZ-4004

Window — 1960 Chrysler (Exc. Imp.)	Aut -Lit No.
Front Doors ①	ERK-4001
L. Front Door (Late)	ERL-4002
R. Front Door (Late)	ERL-4001
Rear Door, 4-Dr. Hardtop	EPZ-4201
Quarter Window (Conv.)	ERZ-4002
Suburban Tailgate	EPZ-4104

① - 4-Dr. - Sedan, Hardtop, Suburban, Sub. Hardtop.

Window — 1960 DeSoto	Auto-Lite No.
Front Doors. 4-Dr. Hardtop	ERK-4001
L.Front Door (Late)	ERL-4002
R. Front Door (Late)	ERL-4001
Rear Doors. 4-Dr. Hardtop	EPZ-4201

Window — 1960 Dodge	Auto-Lite No.
Front Doors ②	ERK-4001
L. Front Door (Late)	ERL-4002
R. Front Door (Late)	ERL-4001
Rear Door. 4-Dr.Hardtop, Sub. Hardtop	EPZ-4201
Quarter Window (Conv.)	ERK-4002
Suburban Tailgate	EPZ-4104

② - 2-Dr. Sedan. 4-Dr.-Sedan, Hardtop, Sub., Sub. Hardtop.

Wind w — 1960 Dodge Dart	Auto-Lite N .
Front Doors ③	ERK-4001
R.Rear Door, 4-Dr. Hardtop	EPZ-4201
Quarter Window (Conv.)	ERK-4002
Tailgate - Sta. Wgn.	EPZ-4104

③ - 2-Dr. Sedan. 4-Dr.-Sedan, Hardtop, Sta. Wgn.

Window — 1960 Plymouth	Auto-Lit No.
Front Doors ④	ERK-4001
L.Front Door (Late)	ERL-4002
R. Front Door (Late)	ERL-4001
Rear Door, 4-Dr. Hardtop	EPZ-4201
Quarter Window (Conv.)	ERK-4002
Tailgate, Suburban	EPZ-4104

④ - 2-Dr. Sedan. 4-Dr. - Sedan, Hardtop, Suburban.

1955-58 Studebaker, 1957-58 Packard

Window	Auto-Lit N .
Front & Rear Doors (1955)	EWV 4003
Front & Rear Doors (1956-58)	EPJ 4101

1954 CHRYSLER & DESOTO WINDOW REGULATORS

Chrysler (1954)
DeSoto (1954)

DESCRIPTION: Window regulators are individually powered by a reversible electric motor connected to a worm gear by flexible shaft. Motor is controlled by a two-way switch (on trim panel) and a master switch (on left front door) operating through a relay circuit breaker mounted within the door panel.

REMOVAL & INSTALLATION: Proceed as follows:

Window Lift Door Switch: Chrome bezel of each switch is held in place by four springs. To release bezel, depress springs through notches on side of switch. After removing bezel, remove switch wires and switch. To install, reverse removal procedure using care to make sure that wire terminals are positioned away from each other.

Window Lift: Disconnect battery, remove garnish moulding, door handle control and escutcheon plate. Remove arm rest and window lift control switch, then door trim panel. **NOTE—Check control arm position. If control arm stud locking retainer cannot be easily reached, remove sector gear box. Lower or raise glass manually so that locking retainer can be positioned for removal. On rear doors, reach in through door lock opening, remove retainer.** Raise glass manually and prop glass so that it is out of working area. ***(CAUTION—To avoid personal injury and slipping of preload spring, install gear box to control unit immediately after lowering or raising glass.)*** Remove battery, armature and both field wires from relay, remove relay bracket attaching cap screws. remove relay. Remove regulator-to-door attaching cap screws, remove regulator. To reinstall window lift, reverse removal procedure, with particular attention to following points:

Relay—Be sure relay installed in position marked "down" to allow for proper drainage if water should seep under cover.

Gear Box—Gear box should be reinstalled as soon as control arm clips are removed.

Pivot Arm Type Regulator—Glass and channel assembly should be perfectly lined up in glass run channel. Raise and lower glass and channel assembly manually a couple of times to check for ease of operation and alignment, before control arm is finally assembled to window channel.

SERVICE PARTS: Auto-Lite Part numbers as follows:

WINDOW LIFT (Complete)

Chrysler C62, C63, C64 & DeSoto Models

Left Doors	WLB-4006L
Right Doors	WLB-4006R
Left Quarter	WLB-4006R
Right Quarter	WLB-4006L
Conv., Chrysler Spec. Club Coupe Right	WLB-4007R
Left	WLB-4007L
Partition	WLC-4003

Chrysler C66 (12 Volt)

Left Rear Door	WLD-4001L
Right Rear Door	WLD-4001R
Left Quarter	WLD-4002L
Right Quarter	WLD-4002R
Partition	WLE-4001

WINDOW LIFT MOTOR

Chrysler C62, C63, C64 & DeSoto Models

Doors and Quarters	EWW-4002
Conv., Chrysler Spec. Club Coupe	EWW-4001
Partition	EMC-4002

Chrysler C66 (12 Volt)

Doors and Quarters	EMA-4001
Partition	EMB-4001

WINDOW LIFT RELAY

Chrysler C62, C63, C64 & DeSoto Models

Left Doors	HRZ-4001L
Right Dors	HRZ-4001R
Left Quarter	HRZ-4001R
Right Quarter	HRZ-4001L
Conv., Chrysler Spec. Club Coupe	HRZ-4002
Partition	HRZ-4002

Chrysler C66 (12 Volt)

Doors, Quarters, Partition	RAD-4001

G.M. ELECTRIC

Buick (1954-60)
Cadillac (1954-60)
Chevrolet (1954-60)
Oldsmobile (1954-60)
Pontiac (1954-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 POWER WINDOW FAILURE TO OPERATE CORRECTION:* This condition may be caused by wire damage where it is routed through the front body hinge pillar. In addition, check to make sure the contacts of window control switches are not sticking (this could also cause run down battery). If contacts are sticking it will be necessary to replace the defective switch.

►*1959 CADILLAC "LOCK TYPE" WIRE CONNECTOR SERVICE CAUTION:* The complete power window harness consists of three individual harnesses, each of which are joined to the others with a plastic "lock type" connector located forward of the left hand front hinge pillar and right hand front hinge pillar. These connectors are not designed to be disconnected and should not be pried apart.

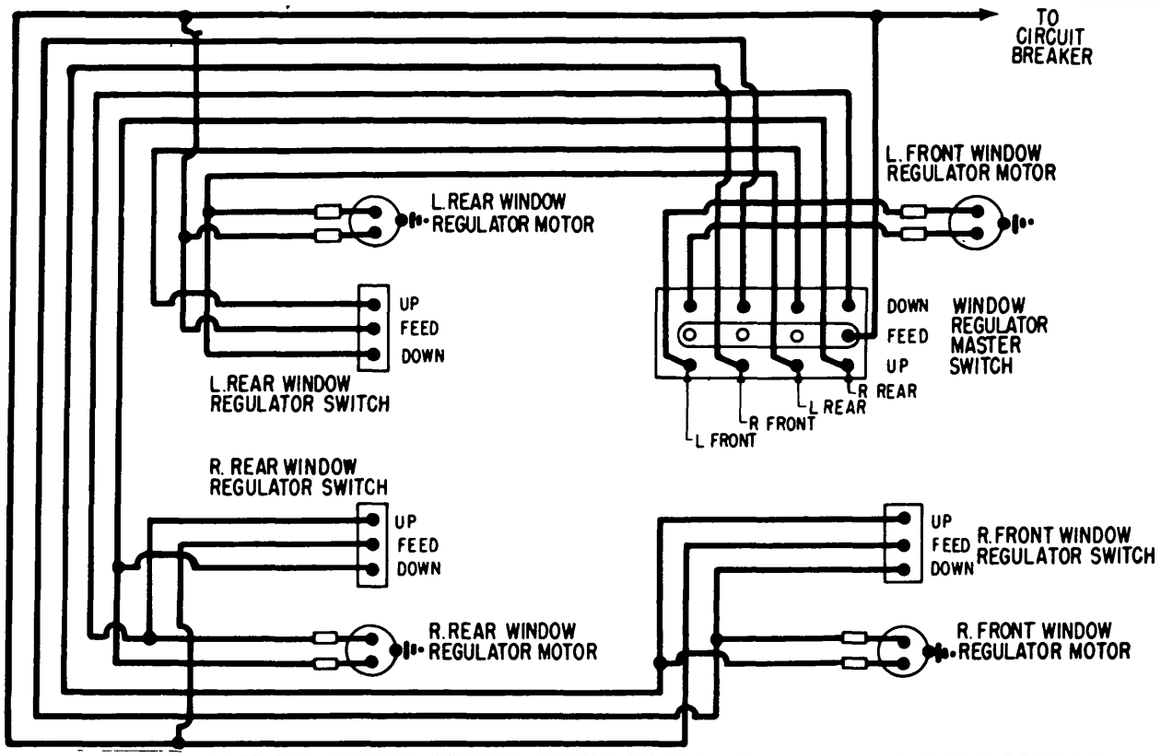
►*1959 PONTIAC SLOW OPERATING TAIL GATE WINDOW (STATION WAGONS) CORRECTION:* If window run channels are properly aligned and the window regulator properly adjusted, the slow operating window may be due to regulator electric motor rubber coupling binding on regulator back plate. If the condition cannot be eliminated by applying a small amount of motor oil to back plate at rubber coupling, install a new regulator assembly, Part No. 4302076, and a new sector plate and bushing assembly, Part No. 4232451.

DESCRIPTION: Door window regulators are individually powered with reversible type motors geared directly to regulator assembly. A two-way switch on door trim panel and a master control switch on left front door control operation of windows. A circuit breaker which is integral with the motor protects against overloading when up or down cycle is completed. Ignition switch must be "ON" or turned to the accessory position for window operation.

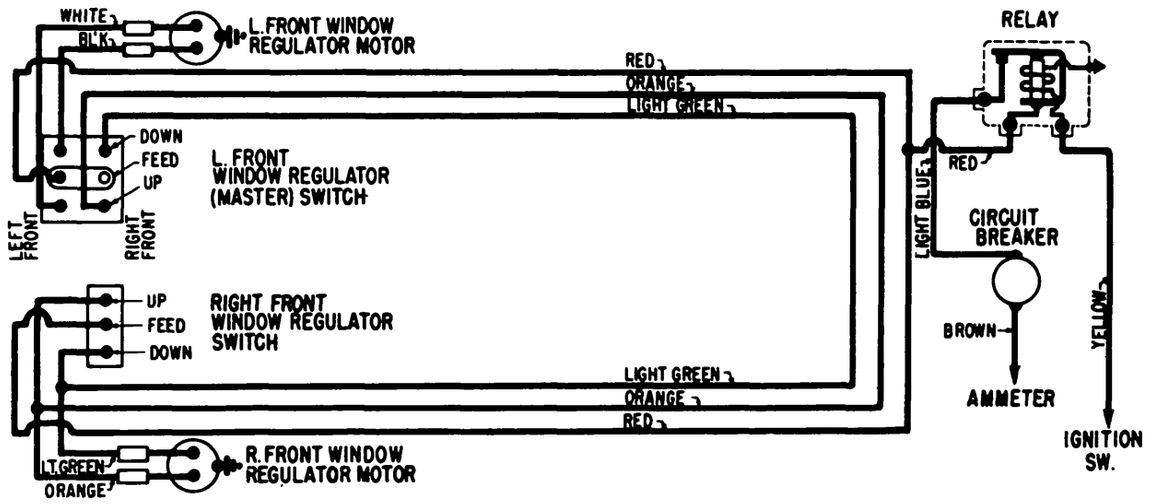
FRONT DOOR WINDOW REGULATOR REMOVAL: Lower window, remove door trim pad (and heater duct on some cars), access hole covers, and tape that covers access hole. Disconnect motor leads from wiring harness. Remove screws securing window assembly to regulator cam. *(NOTE* - On most models it will be necessary to remove window assembly. On others, after disengaging window assembly from regulator cam channel, glass can be propped up in position). *(CAUTION - After window regulator assembly is disengaged from regulator DO NOT OPERATE REGULATOR MOTOR).* Remove ventilator division channel lower adjusting stud and nut. Remove stationary cam attaching screw and cam. Disengage cam from regulator and remove from door. Remove regulator attaching screws and remove regulator from door. To install, reverse removal procedures. Seal inner door panel. *NOTE* - Regulator lift arm should be in the "down" position when installing regulator.

REAR DOOR WINDOW REGULATOR REMOVAL: Lower window, remove door trim assembly and inner panel access hole cover. Insert a screwdriver through access hole which is located in inner panel forward of large inner panel access hole, and carefully spread spring clip on regulator balance arm. At same time insert another screw-driver behind upper edge at front of large inner panel access hole and carefully pry regulator balance arm from window frame pin. Through access hole located above and slightly to the rear of the center of the large inner panel access hole remove window sash channel upper screw, then remove lower screw. Detach cam from regulator lift arm and remove from door. *(CAUTION - After window regulator assembly is disengaged from regulator DO NOT OPERATE REGULATOR MO-*

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TYPICAL 1954-55 G.M. WINDOW CONTROL WIRING DIAGRAM (EXC. 1954 CHEVROLET & PONTIAC)



1954 CHEVROLET & PONTIAC WINDOW CONTROL WIRING DIAGRAM

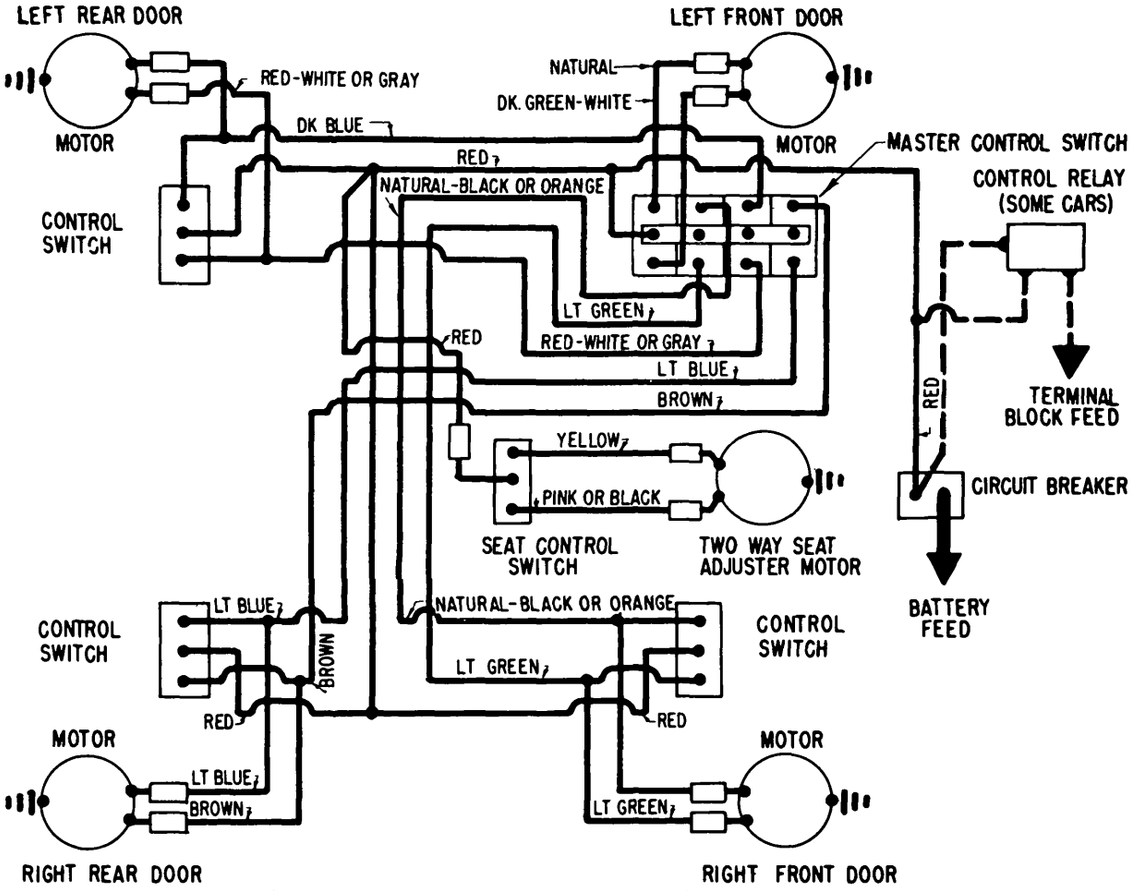
G.M. ELECTRIC (C nt.)

TOR). Lift window to up position, engage female wedge plate with male wedge plate (located on hinge pillar), then prop rear of window in up position. Remove inner panel cam screws, detach cam from regulator balance arm and remove from door. Loosen center guide shoe jam nut, unscrew guide shoe from support and remove shoe from guide. Swing center guide upward to provide clearance for removing regulator. Detach regulator motor lead wires, and regulator attaching screws. Position regulator balance arms in line with lift arm to facilitate removal of regulator through access hole. To install, reverse removal procedures. Make sure regulator balance arm spring clip is properly installed on balance arm.

REAR QUARTER WINDOW REGULATOR REMOVAL: (2-Door Sedan) - First lower the rear quarter window and remove the rear seat cushion and the back, then remove rear quarter window garnish molding, rear quarter arm rest and rear quarter trim assemblies. Detach inner panel water deflector sufficiently to gain access to window lower sash channel cam attaching screws and window regulator attaching screws. Remove arm rest support, then disconnect feed wire plug from motor. Remove window lower sash channel cam attaching screws, then detach cam from roller on regulator lift arm and remove cam. Lift window to "up" position and prop in place. Remove front guide attaching screws and move guide rearward to allow upper end of guide to be started out through access hole, then remove guide assembly. Remove window regulator attaching screws and remove regulator assembly through large access hole. To install, reverse removal procedure.

2-Door Hardtop - Lower rear quarter window, then remove rear seat cushion and back assemblies and rear quarter arm rest and trim assemblies. Remove rear quarter inner panel access hole cover and disconnect the feed wire plug from the motor, then remove the window lower sash channel cam attaching screws. Detach cam from roller on regulator lift arm and remove cam. Lift window and prop in the "up" position. Remove rear quarter window regulator attaching screws, then lower and rotate regulator assembly to maneuver lift arm around front guide assembly. Remove assembly through access hole. To install, reverse removal procedure.

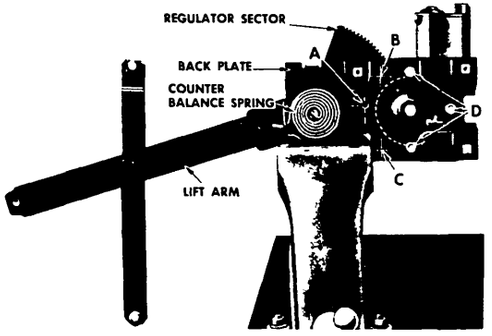
Convertible - Remove rear seat cushion and back, top compartment side trim panel and rear quarter trim assembly. Remove inner panel access hole cover, then operate window to full "up" position and prop in place. Disconnect feed wire plug from motor, then remove regulator attaching screws. Disengage regulator lift arm roller from lower sash channel cam and remove regulator assembly through access hole.



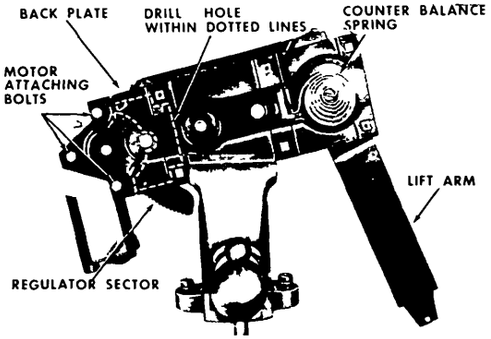
1956-58 TYPICAL G.M. WINDOW CONTROL WIRING DIAGRAM

Front Door Ventilator: Raise door window, then remove door trim assembly and detach inner panel water deflector to gain access to regulator attaching screws. Disconnect regulator motor feed wires at connector, then remove ventilator tee shaft attaching bolt and ventilator regulator attaching screws. Disengage ventilator regulator shaft from ventilator tee shaft and re-

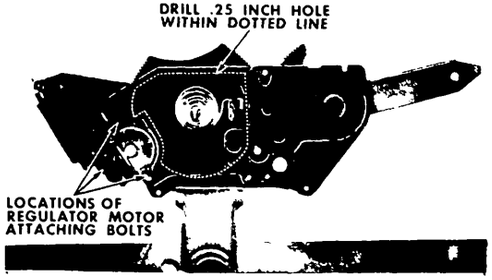
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FRONT DOOR REGULATOR ASSEMBLY



REAR DOOR AND QUARTER WINDOW REGULATOR ASSEMBLY



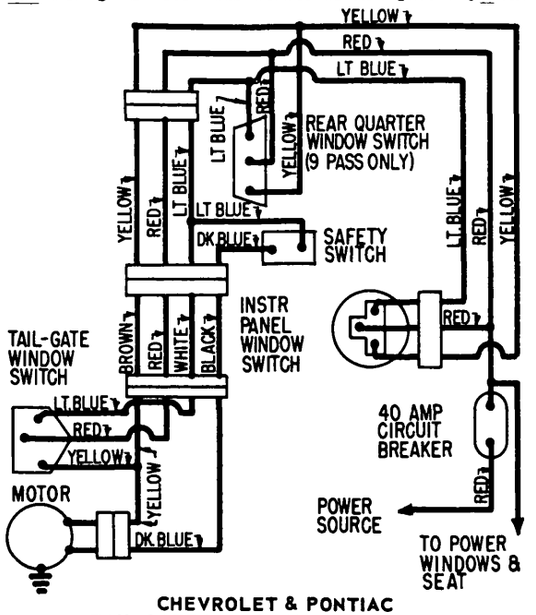
TAIL GATE REGULATOR ASSEMBLY

Form 71 A

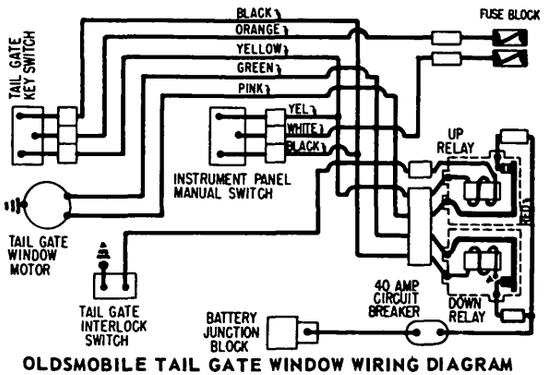
G.M. ELECTRIC (Cont.)

move regulator and motor assembly from door through front access hole. To install, reverse removal procedure.

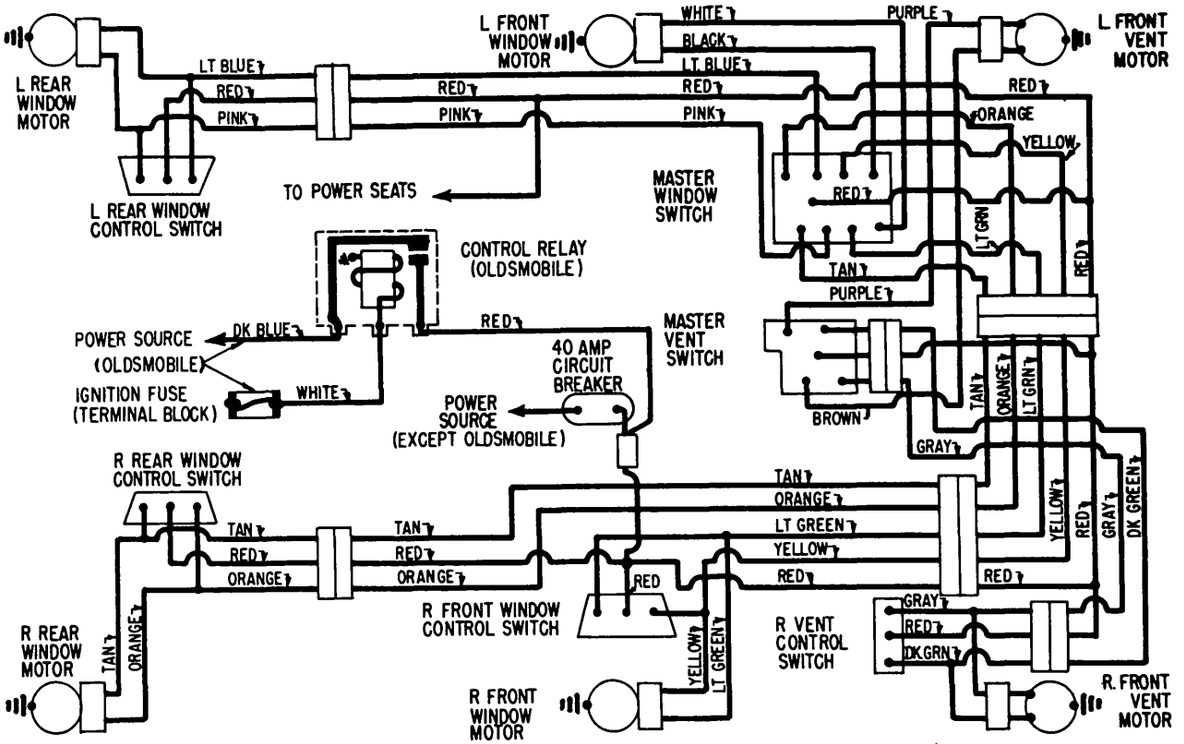
Tail Gat Wind w (Station Wagons): Remove inner cover panel lower retainer and inner cover panel, then remove tail gate skid strips, tail gate inner cover panel finishing moldings and tail gate inner cover panel. Detach or cut gate inner panel water deflector sufficiently to gain access to lower sash channel cam attaching bolts. Remove tail gate inner panel access hole cover. Carefully operate window upward until window sash channel right and left cam attaching bolts are accessible through access holes. Remove sash channel cam attaching bolts, then disengage cams from sash channel and carefully pull window out of gate. Detach tail gate lock remote control right connecting rod from remote control (work through a hole near center of tail gate adjacent



CHEVROLET & PONTIAC
TAIL GATE WINDOW WIRING DIAGRAM



OLDSMOBILE TAIL GATE WINDOW WIRING DIAGRAM



1959-60 G.M. ELECTRIC WINDOW CONTROL DIAGRAM (TYPICAL)

to large access hole), then disconnect harness connector from motor Remove regulator attaching screws and remove regulator through large access hole. To install, reverse removal procedure

REGULATOR MOTOR REMOVAL (WITH REGULATOR ASSEMBLY REMOVED FROM CAR): Clamp regulator and motor assembly securely in a vise, then drill a ¼" hole through back plate at the location indicated in illustrations. *NOTE - Drill the ¼" hole in front door window regulators at either "A", "B" or "C" (see illustration), depending on position of lift arm. On other regulator assemblies, drill the hole within the area outlined by dotted lines in illustration. Do not locate hole less than ½" from edge of back plate or sector.* Insert a 3/16" bolt through hole in back plate and sector and install a nut but do not tighten Remove motor attaching bolts and remove motor assembly from regulator. Clean all chips from regulator and motor pinion gear after drilling. To install, reverse removal procedure. *CAUTION - Be sure to remove temporary nut and bolt from regulator before installing in car.*

DOOR SWITCH ASSEMBLY REMOVAL: Remove garnish or belt finishing molding and door inside handles Disconnect terminal block with attached wires from switch assembly by carefully pulling block to disengage it from switch studs With a suitable tool, pry open the retaining tabs at each end of switch and remove complete switch assembly from trim pad Remove switch from escutcheon by depressing the four tabs with a sharp pointed tool inserted through holes in end of escutcheon and prying them free.

QUARTER WINDOW SWITCH ASSEMBLY REMOVAL: Remove garnish molding and pull trim panel out slightly, then proceed as outlined for "Door Switch Assembly Removal" above.

TROUBLE SHOOTING (ELECTRICAL):

Window Will Not Operate From Immediate Control Switch, But Will Operate From Master Control Switch: Check as follows
1) Feed wire to immediate switch
2) Immediate control switch
3) Motor leads from intermediate switch to motor

Window Will Not Operate From Master Switch But Will Operate From Intermediate Switch: Check as follows
1) Operation of master switch
2) Motor leads from master switch to motor

Window Will Not Operate From Intermediate Nor Master Switch. Operation of Other Windows Is Satisfactory: Check as follows
1) Operation of intermediate and master switches
2) Motor leads from each switch to motor
3) Operation of motor

Windows Will Not Operate From Master Switch But Will Operate From Intermediate Switches: Check as follows
1) Feed wire from circuit breaker to master switch
2) Operation of master switch.

CONTINUED ON NEXT PAGE

Form 74 5

G.M. ELECTRIC (Cont.)

Windows Will Not Operate: Check as follows:
1) Battery
2) Circuit from battery to circuit breaker
3) Circuit breaker.
4) Feed wire from circuit breaker to switches
5) Operation of all switches

TROUBLE SHOOTING (MECHANICAL) & CORRECTIVE MEASURES: Diagnose trouble and correct as follows

Evidence of Pinion Gear Overtravel on Sector Gear: If check of regulator assembly reveals that motor pinion gear jammed at end of regulator sector gear, extra teeth may be filed at end of sector gear *CAUTION*—It is important that extra teeth conform to rest of teeth to prevent recurrence of condition Carefully check added teeth for proper fit with pinion gear teeth

Extreme Sideplay of Sector Gear: If backplate or side of sector gear next to backplate shows that surfaces are contacting on any portion of travel of sector gear, assembly should be replaced (paint will be scraped off at areas of contact)

Lift Arm Pins Too Loose: If any of the lift pins (studs which retain nylon roller to regulator assembly) are loose, they should be tightened to prevent pins from falling off and disengaging window from regulator during operation Tighten by using normal riveting procedure. If they cannot be tightened satisfactorily, replace regulator

Nylon Rollers Binding in Channels: If rollers do not slide easily in their channels, greater clearance can be obtained by filing edge of channel or aligning channel to roller with pliers.

Bent or Distorted Regulator Backplate: Replace regulator assembly.

Lubrication: If operation noisy due to lack of lubrication between coils of counter-balance spring, lubricate between coils with a graphite grease Lubricate all studs with a medium grade oil

1957-58 CADILLAC ELDORADO BROUGHAM

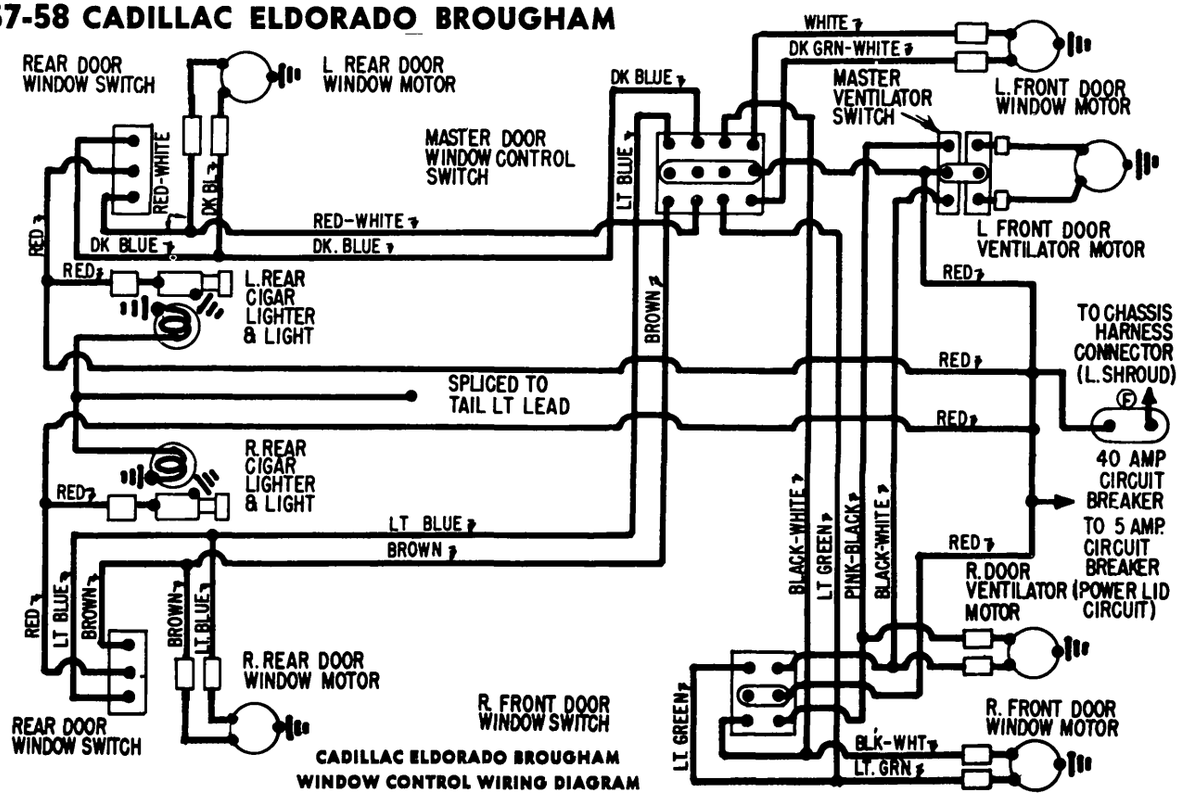
Cadillac Eldorado Brougham (1957-58)

DESCRIPTION: Electrically operated door windows and front door ventilator windows having individual motors. A master control switch on left front door controls all windows Individual window controls are also located on right front and both rear doors. The right front door also includes a control switch for operation of both front door ventilators.

REMOVAL & INSTALLATION: Front Door Window Regulator Assembly - Lower the window and remove door belt finishing molding and door trim finishing panels Remove inner panel access hole cover. Remove window assembly and front guide assembly. *(CAUTION - Do not operate regulator motor after assembly is disengaged from regulator)* Remove front guide-to-rear guide brace rear attaching screws, then disconnect regulator motor lead wires at connector. Remove inner panel cam attaching screws and detach cam from regulator balance arm. Through access holes in door inner panel, remove regulator attaching screws and remove regulator assembly through large access hole. To install the assembly, reverse removal procedure.

Front Door Window Regulator Electric Motor Assembly: Remove window regulator assembly from door (see above), and clamp in a vise. Drill a ¼" hole through back plate and sector within the area immediately above motor assembly (location of hole depends on position of lift arm). *(CAUTION - Do not drill into motor housing. Locate hole not less than ¾" away from edge of back plate or sector).* Insert a 3/16" bolt through back plate and sector and install a nut (do not tighten). Remove three motor attaching screws and remove motor assembly from regulator. To install, reverse removal procedure being sure to remove nut and bolt locking the sector.

Rear Door Window Regulator Assembly: Raise window and remove belt finishing molding and door trim finishing panel. Remove inner panel access hole cover. Through small access hole remove window lower sash channel front cam rear attaching screw. Through small access hole (approx. 1 ½" diameter), remove rear cam rear attaching screw. Lower window to a position where, through the large access hole, the window lower sash channel front cam front attaching screw and rear cam front attaching screw can be removed. Disconnect window regulator motor wiring harness connector. Disengage window lower sash channel front and rear cams from window lower sash channel and from window regulator arms and remove cams from door. Lift window and "prop" it in up position. *(CAUTION - Do not operate regulator motor after assembly is disengaged from regulator).* Remove window lower bumper support from door. Disconnect door lock remote control freewheeling solenoid feed wire at connector. Disengage spring clip and detach remote control connecting rod from remote control. Remove remote control attaching screws, disengage remote control handle shaft from hole in door inner panel and remove assembly through large access hole. Remove window rear guide lower attaching stud and nut. Remove front-to-rear guide brace attaching screws and remove front-to-rear guide brace.. Remove inner panel cam attaching screw, disconnect cam from window regulator arm and remove cam from door. Remove window regulator attaching screws. Position regulator assembly so that motor end of regulator can be started out of access hole first; then remove window regulator assembly from door. To install, reverse removal procedure.



CADILLAC ELDORADO BROUGHAM
WINDOW CONTROL WIRING DIAGRAM

Rear Door Window Regulator Electric Motor Assembly: Remove regulator assembly from door, then proceed as for removal of front door motor assembly. (See above).

TROUBLE SHOOTING & OTHER DATA: *See "G.M. Electric Window Regulators"*

1954 FORD, LINCOLN, MERCURY ELECTRIC TYPE

F rd (1954)
M rcury (1954)
Lincoln (1954)

►***WINDOW REGULATOR ASSEMBLY INTERCHANGEABILITY:*** Two types of electric window regulator assemblies used, "A" and "B." The two assemblies are interchangeable but "B" type only furnished for service. Installation of the two types is different (See Installation below). Arm and plate assembly not an integral part of "A" type but is integral on type "B".

DESCRIPTION: Window regulators are individually powered by a reversible electric motor which operates gear sectors through pinion or worm gears. Motor is controlled by a two-way switch (on trim panel) and a master switch (on left front door) operating through a relay circuit breaker mounted in door panel.

REPLACEMENT ELECTRICAL UNITS: As indicated below:

Window Lift Motor

	Part No.
Type "A"—Right Hand①	FAA-14549-A
Type "A"—Left Hand①	FAA-14553-B
Type "B"—Right & Left Hand②	FAA-14553-A

①—Bracket mounted on window regulator.
②—Stud mounted on window regulator.

Window Control Switches

Single	FAA-14529-A
Multiple	FAA-14540-A

Window Control Relay

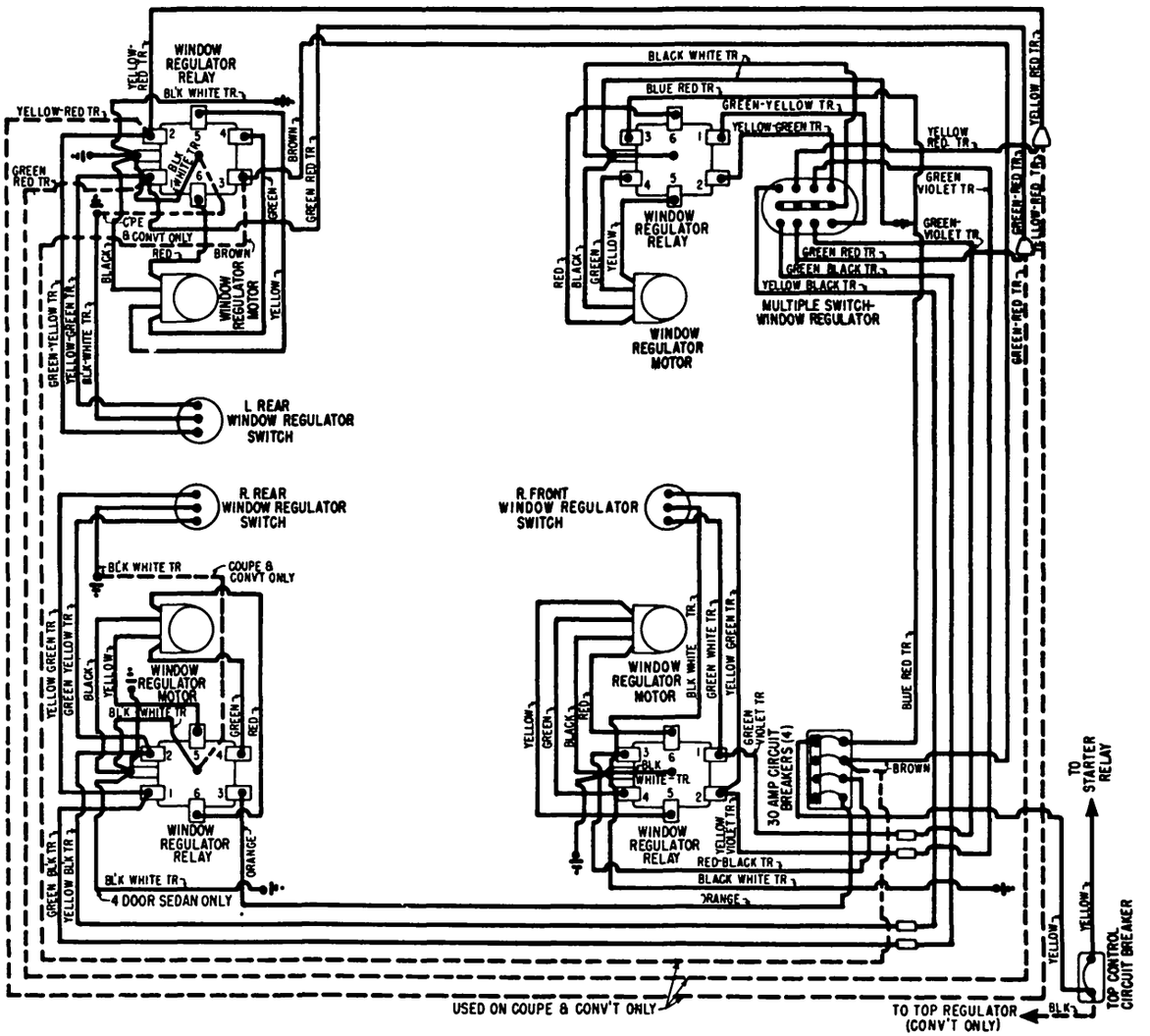
All Models	FAA-14512-A

REMOVAL: Proceed as follows:

Window Lift Door Switch: Lower window glass as far as possible by operating switch on door, then disconnect ground cable from positive battery terminal post. Pry switch from trim panel, remove wires from switch. To install reverse removal procedure.

Arm & Plate Assembly (Type A Front Door): Disconnect battery ground (positive cable) to prevent shorts. Remove two screws that secure arm rest to door panel, remove arm rest Remove inside handles by pressing escutcheon plate or trim panel inward exposing spring type retainer. While holding escutcheon plate or trim panel in this inward position, release the retainer with Tool 21812 and remove the handle. Remove inside lock button. (On Mercury Model 73B, remove the six sheet metal screws along upper edge of door that secure upper garnish moulding to door. Remove garnish moulding. ***Note order in which screws were removed and replace in same order.*** Then remove four sheet metal screws on front door, that secure lower garnish to door. Remove lower garnish moulding. ***Note order in which screws were removed and replace in same order).*** On other models remove garnish moulding. With window glass in closed position, disconnect ground cable from positive battery terminal post. Remove the wires from the switch, and remove switch from trim panel. Remove two sheet metal screws and washers from lower edge of trim panel, pry trim clips free along sides of door, lift up trim panel and remove. Remove inside panel cover plate. Remove two cap screws that secure window stop to inner door panel, remove stop. Lower window to open position, remove two spring type retainers that secure glass channel rollers to arms. Remove rollers from arms. Raise window glass to closed position; wrap several strips of masking tape over top of door and stick the ends to each side of the glass to hold glass in closed position. Remove spring retainer that retains regulator arm to arm and plate assembly. Remove three cap screws that secure arm and plate to inner door panel. Slide assembly toward

CONTINUED ON NEXT PAGE



LINC LN WINDOW REGULAT R WIRING DIAGRAM

1954 FORD, LINCOLN, MERCURY ELECTRIC (C nt.)

regulator to release roller from guide on inner door panel. Lower assembly and remove through door access hole.

Window Regulator Assembly (Type A Front Door): Remove trim panel, inside panel cover plate, window stop, window glass, and spring retainer. Remove four cap screws that secure regulator assembly to inner door panel. Lower assembly and remove through access hole. Remove cover plate with relay attached and disconnect wires from motor to relay.

Motor & Bracket Support Assembly (Type A Front Door): Remove trim panel cover plate, window stop, window glass, spring retainer, and vent window glass. Remove window regulator assembly (above). Clamp window regulator assembly tightly in vise and unload spring by pulling hooked end away from, and up over stop. Remove three screws and lockwashers holding motor and bracket support to regulator assembly, remove motor and gasket. Remove cover and shaft from motor and bracket support. Remove coupling and pinion and shield assembly from regulator assembly.

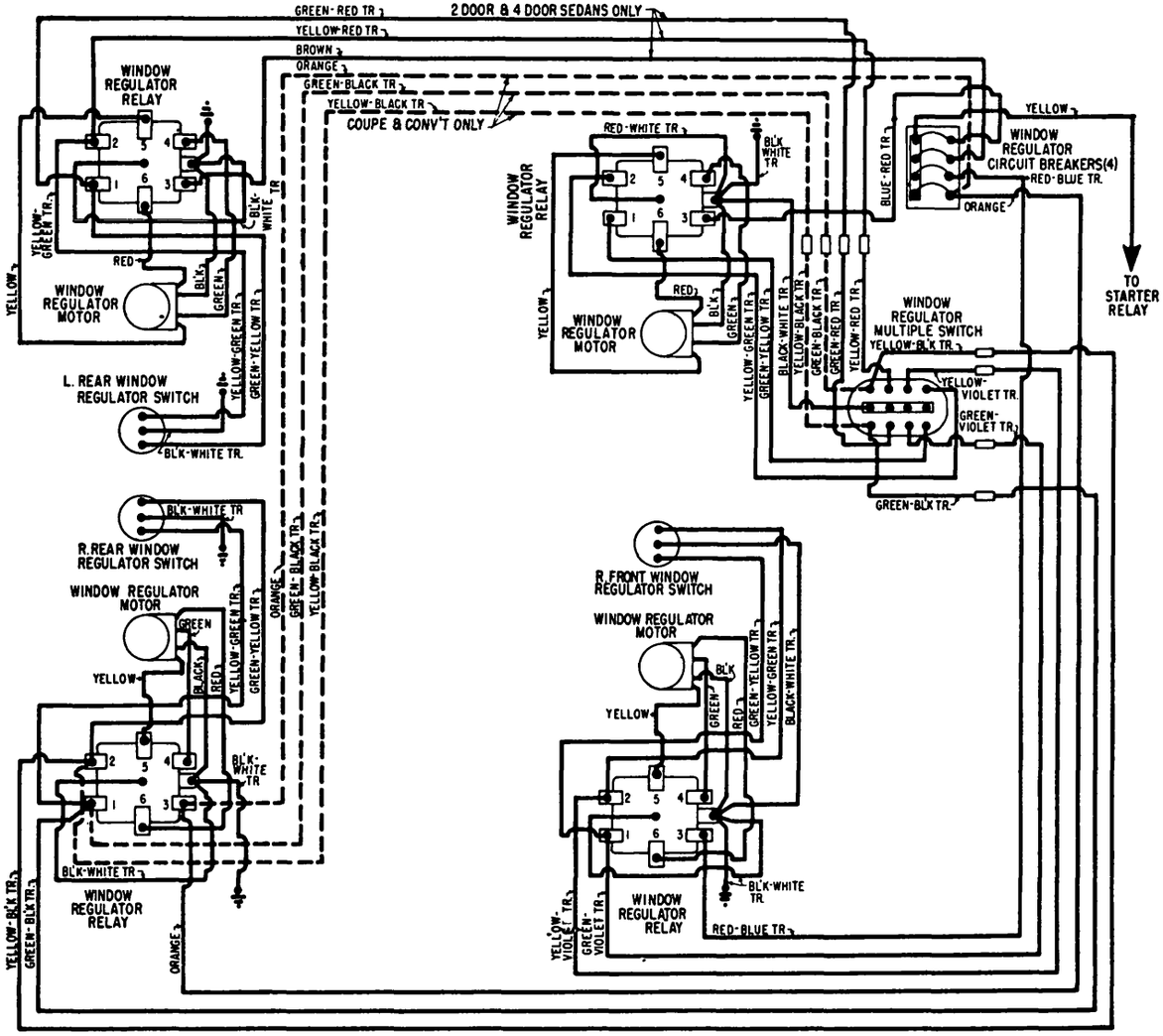
Window Regulator Assembly (Type B Front Door): Remove trim panel, inside panel cover plate, window stop, window glass, spring retainer, and vent window glass. Remove four cap screws that hold window regulator assembly to inner door panel. Lower assembly and remove through access hole. Remove cover plate with relay attached, disconnect wires from motor to relay.

Motor Assembly & Coupling (Type B Front Door): Remove trim panel and inside cover plate. Remove two attaching nuts and washers which hold motor to window regulator assembly. Remove motor and rubber drive coupling through access hole. Remove cover plate with relay attached and disconnect wires from motor to relay.

Drive Assembly (Type B Front Door): Remove trim panel, inside panel cover plate, window stop, window glass, spring retainer, and vent window glass. Remove three cap screws that hold window regulator assembly to inner door panel. Lower assembly and remove through door access hole. Remove cover plate with relay attached. Disconnect wires from motor to relay. Clamp window regulator assembly tightly in vise, and unload spring by pulling hooked end away from, and up over stop. Remove three cap screws and lock washers holding drive assembly to window regulator mechanism, remove drive assembly.

Window Regulator Mechanism (Type A Rear Door): Remove trim panel, inside panel cover plate, window stop and window glass. Remove six cap screws that secure window regulator to door panel. Remove bracket with relay attached. Lower assembly and remove through access hole. Disconnect wires from motor to relay. Clamp window regulator assembly tightly in vise, unload spring by pulling hooked end away from, and up over stop. On Mercury, remove three screws and lockwashers holding motor and bracket support to regulator assembly, remove motor and gasket. Remove coupling, and pinion-shield assy. from regulator assembly.

Window Regulator Mechanism (Type B Rear Door): Remove trim panel, inside panel cover plate, window stop, and window glass. Remove four cap screws that secure window regulator to door panel.



FORD & MERCURY WINDOW REGULATOR WIRING DIAGRAM

Slide regulator arm off track, lower assembly and remove through access hole. (NOTE—Position of wires connecting relay and door switch within door panel is for ease of assembly.) Remove bracket with relay attached. Disconnect wires from motor to relay. Clamp window regulator assembly tightly in vise, unload spring by pulling hooked end away from, and up over stop. Remove two attaching nuts and washers which hold motor to window regulator assembly. Remove motor and rubber drive coupling. (NOTE—Motor and drive coupling may be removed through access hole without removing window regulator assembly.) Remove three cap screws and lockwashers holding drive assembly to window regulator mechanism, remove drive assembly.

Quarter Window Regulator: Remove rear seat cushion, and rear seat back cushion. Pry cover off assist strap, remove assist strap screw, then assist strap. Remove seven sheet metal screws that secure garnish moulding to quarter panel, remove garnish moulding. Remove two screws that secure quarter arm rest, remove arm rest. Pry trim clips free along front edge of trim panel, remove trim panel. Remove two cap screws that secure quarter window stop to quarter window regulator panel, remove stop. Lower window as far as possible. Remove two spring type retainers that secure glass channel rollers to window regulator arms, remove rollers from arms. Window glass is now free and can be lowered to bottom of quarter panel. Remove four cap screws that secure regulator assembly to quarter window regulator panel. Disconnect wires from motor to relay, remove regulator assembly.

INSTALLATION: Reverse removal procedures.

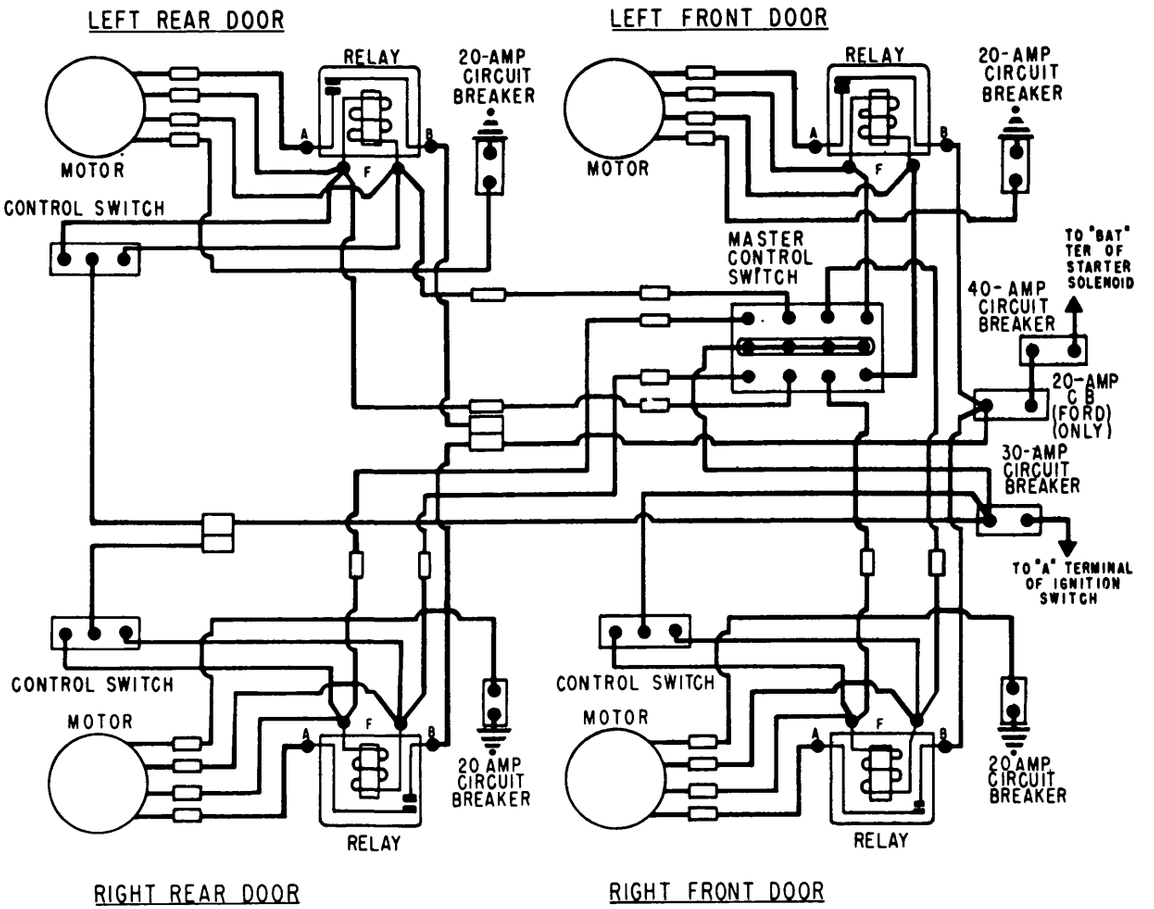
1955-56 FORD, LINCOLN, MERCURY

F rd (1955-56)
Linc ln (1955-56)
M rcury (1955-56)
Thund rbird (1955-56)

►*SAFETY RELAY CAUTION:* If windows can be operated with ignition switch "OFF", check wire connection to relay. Red wire should go to "Bat" terminal on light switch, Black wire should go to "Bat" terminal on starter relay, and Yellow wire should go to circuit breaker. If relay is not found to be by-passed because of improper wire connection, proceed as follows: Bend safety relay to a vertical position, tap relay slightly to open points. With ignition switch turned "ON", operate window a few times. Then turn off ignition switch and attempt operation of windows. If windows can still be operated and further tapping of the relay will not open the points, safety relay is defective and should be replaced.

►*1955 WINDOW LIFT SWITCH REPLACEMENT CAUTION:* Window switches used on 1955 models are identical in appearance, but are constructed differently. Switches used in Ford and Mercury circuits have silver-plated points in order to provide a minimum resistance, while those used in Lincoln circuits have copper-plated points which, if used in Ford and Mercury circuits, would offer too great a resistance and greatly lower efficiency of the motor. See "Window Control Switches" table below.

►*1955 FORD WINDOW LIFT RELAY "FLUTTER" CORRECTION:* If "flutter" or rapid clicking sound noted, proceed as follows: Check door glass alignment. If glass has noticeable sag at rear corner as glass is raised, adjust regulator in elongated holes in inner panel (three holes are on face of inner panel; other hole can be reached through access hole in inner panel) On some early production Thunderbirds it may be necessary to elongate four mounting holes approximately ¼" downward to eliminate sagging condition. If clicking noise continues, relay should be replaced.



1955 FORD & MERCURY WINDOW CONTROL WIRING DIAGRAM

DESCRIPTION: Window regulators are individually powered by a reversible electric motor which operates gear sectors through pinion and worm gears. Motor is controlled by a two-way switch on door trim panel and by a master switch located on left front door. Motor relays are used on all models except 1956 Ford. See Wiring Diagrams.

REMOVAL & INSTALLATION: Proceed as follows:

F rd & Thund rbird: (Except Victoria Quarter Window). Disconnect motor wires at bullet connectors (on Convertible quarter assemblies, disconnect ground wire from circuit breaker on floor pan). Remove motor-to-panel brace on all door assemblies. On rear doors, remove screw that attaches circuit breaker to regulator support bracket and regulator assembly, remove the screws that attach support bracket to the inner door panel, then remove regulator support bracket and circuit breaker. On both door and quarter assemblies partially remove the spring retainers from the roller assemblies in glass channels, and disengage regulator arms from rollers (only one arm and roller on Convertible quarter assembly). On door assemblies, work through the door access hole. Raise window glass manually, wrap several strips of adhesive material over top of door, stick ends to each side of glass. Remove mounting screws that secure regulator assembly to inner door or quarter panel. Slide regulator assembly forward to release roller from guide on inner panel. Remove assembly through access hole. To install, reverse removal procedure.

Ford (Victoria Quarter Window): Disconnect motor ground wire at circuit breaker on floor pan, and other motor wires at bullet connectors. Remove entire glass and regulator panel assembly from body, remove glass from panel. Remove arm link and bushing assemblies in order to disengage the regulator arm from the front track. Remove the four regulator attaching screws from outer side of panel, then remove regulator assembly from panel. To install, reverse removal procedure.

Lincoln (Front Windows): Disconnect battery ground. Remove door locking control rod knob and garnish moulding. Disconnect courtesy light wires at bullet connectors. Remove inside door handle, escutcheon plate, screw attaching arm rest to inner panel bracket, trim panel. Remove access hole cover plate, window glass stop bracket with stop attached, two spring type retainers that connect glass channel rollers to window regulator arms, remove rollers. Raise window to full up position and tape glass securely with masking tape to door glass channel and frame assembly. *(NOTE* - On models without channel and frame assembly, use a rubber wedge to hold window glass in up position). Remove four capscrews that secure regulator assembly to inner door panel. Disconnect motor-to-relay wires at bullet connectors, remove window regulator assembly. To install, reverse removal procedure.

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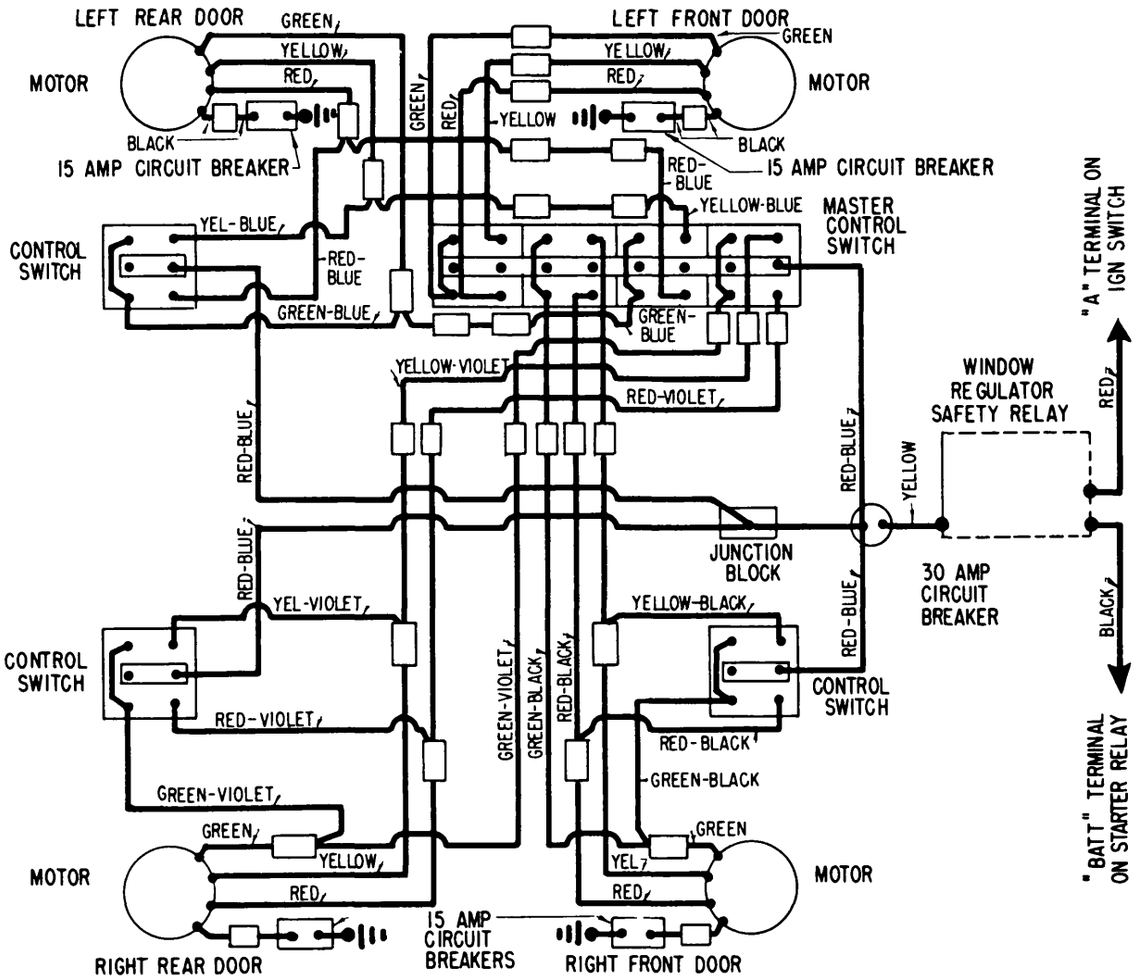
1955-56 FORD, LINCOLN, MERCURY (C ntinu d)

Lincoln (Rear Windows): Lower window to full down position. Disconnect battery ground. Remove door locking control rob knob and garnish moulding, inside door handle, and screw attaching arm rest to inner panel bracket. Pry off trim panel. Disconnect window switch wires from switch. Remove access hole cover plate and window glass stop. Remove two spring type retainers that connect glass channel rollers to window regulator arms, remove rollers. Raise window to full up position and tape glass securely with masking tape to door glass channel and frame assembly. Remove four capscrews that secure regulator to inner door panel. Disconnect wires from motor to relay at bullet connectors. Remove window regulator assembly. To install, reverse removal procedure.

Lincoln (Quarter Windows): Lower quarter window to full down position. Disconnect battery ground. Remove rear seat cushion and rear seat back cushion. Remove sheet metal screws that secure trim panel to quarter panel and remove trim panel. Disconnect wires at bullet connectors from window switch and cigar lighter ground. Remove positive wire from cigar lighter. Remove quarter trim water shield. Disconnect wires from motor to relay at bullet connectors. Remove seven capscrews securing quarter window and panel assembly to quarter panel. Move quarter window and panel assembly to rear and lift front end upward to remove. Remove two nuts securing window glass to glass channel rollers. Remove window glass. Remove four capscrews securing window regulator assembly to regulator panel assembly, remove window regulator assembly. To install, reverse removal procedure.

M rcury (Front Windows): Disconnect battery ground. Remove door locking control rod knob and garnish moulding. Remove inside door handle, door handle escutcheon plate, screws attaching arm rest to inner panel. Remove trim panel from door. Remove wires from switch. Remove vinyl shield, window glass stop, two spring type retainers that connect glass channel rollers to regulator arms, remove rollers. Raise window to full up position and tape glass securely with masking tape to door glass channel and frame assembly. *(NOTE* - Cn models without channel and frame assembly, use a rubber wedge to hold window glass in up position). Remove four capscrews that secure regulator assembly. Disconnect wires from motor to relay at bullet connectors. Remove motor support bracket and relay from inner door panel. Remove regulator assembly through access hole. To install, reverse removal procedure.

M rcury (Rear Windows): Lower window to full down position. Disconnect battery ground. Remove door locking control rod knob and garnish moulding, inside door handle, and arm rest to inner panel attaching screws. Pry off trim panel. Disconnect window switch wires from switch. Remove vinyl shield and window glass stop. Remove two spring type retainers that connect glass channel rollers to window regulator arms, remove rollers. Raise window to full up position and tape glass securely with masking tape to door glass channel and frame assembly. Remove three capscrews that secure regulator assembly to inner door panel. Disconnect wires from motor to relay at bullet connectors. Remove regulator assembly through access hole. To install, reverse removal procedure.



1956 FORD WINDOW CONTROL WIRING DIAGRAM

Mercury (Quarter Windows): Lower window to full down position. Disconnect battery ground. Remove rear cushion and rear seat back cushion. Remove sheet metal screws that secure window garnish moulding, remove moulding. Remove sheet metal screws that secure trim panel to quarter panel and remove trim panel. Disconnect wires at bullet connectors from window switch. Remove vinyl shield. Disconnect wires from motor to relay at bullet connectors. Remove capscrews securing quarter window and regulator panel assembly to quarter panel. Move quarter window and regulator panel assembly to rear and lift front end upward to remove. Remove two nuts securing window glass to glass channel rollers, remove window glass. Remove four capscrews securing window regulator assembly to regulator panel assembly and remove window regulator assembly. To install, reverse removal procedure.

TROUBLE SHOOTING: Diagnose trouble as follows:

Window Will Not Operate From Either Master or Window Switch: Shorted or open lead from starter solenoid; broken ground connection to relay; shorted or open armature or field coil windings.

Window Will Go Up But Not Down, or Down But Not Up When Either Switch Is Activated: Shorted or open coil in relay; loose connections or open motor control circuit.

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1955-56 FORD, LINCOLN, MERCURY (C ntinued)

Window Operation Is Sluggish & Noisy: Motor brushes chipped or improperly seated, excessive armature end play, insufficient clearance between armature and field coils

REMOVAL: Proceed as follows

Window Regulator Assembly (Type B Front Door): Remove trim panel, inside panel cover plate, window stop, window glass, spring retainer, and vent window glass Remove four cap screws that hold window regulator assembly to inner door panel Lower assembly and remove through access hole Remove cover plate with relay attached, disconnect wires from motor to relay

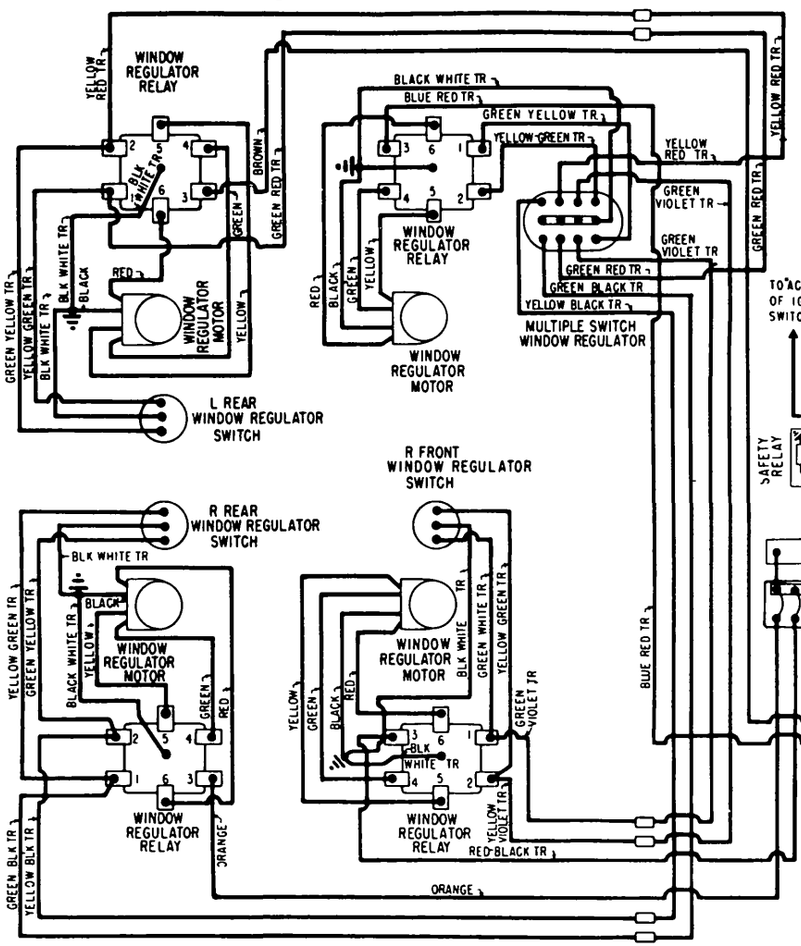
Motor Assembly & Coupling (Type B Front Door): Remove trim panel and inside cover plate Remove two attaching nuts and washers which hold motor to window regulator assembly Remove motor and rubber drive coupling through access hole Remove cover plate with relay attached and disconnect wires from motor to relay

Drive Assembly (Type B Front Door): Remove trim panel, inside panel cover plate, window stop, window glass, spring retainer, and vent window glass Remove three cap screws that hold window regulator assembly to inner door panel Lower assembly and remove through door access hole Remove cover plate with relay attached Disconnect wires from motor to relay. Clamp window regulator assembly tightly in vise, and unload spring by pulling hooked end away from, and up over stop Remove three cap screws and lock washers holding drive assembly to window regulator mechanism, remove drive assembly

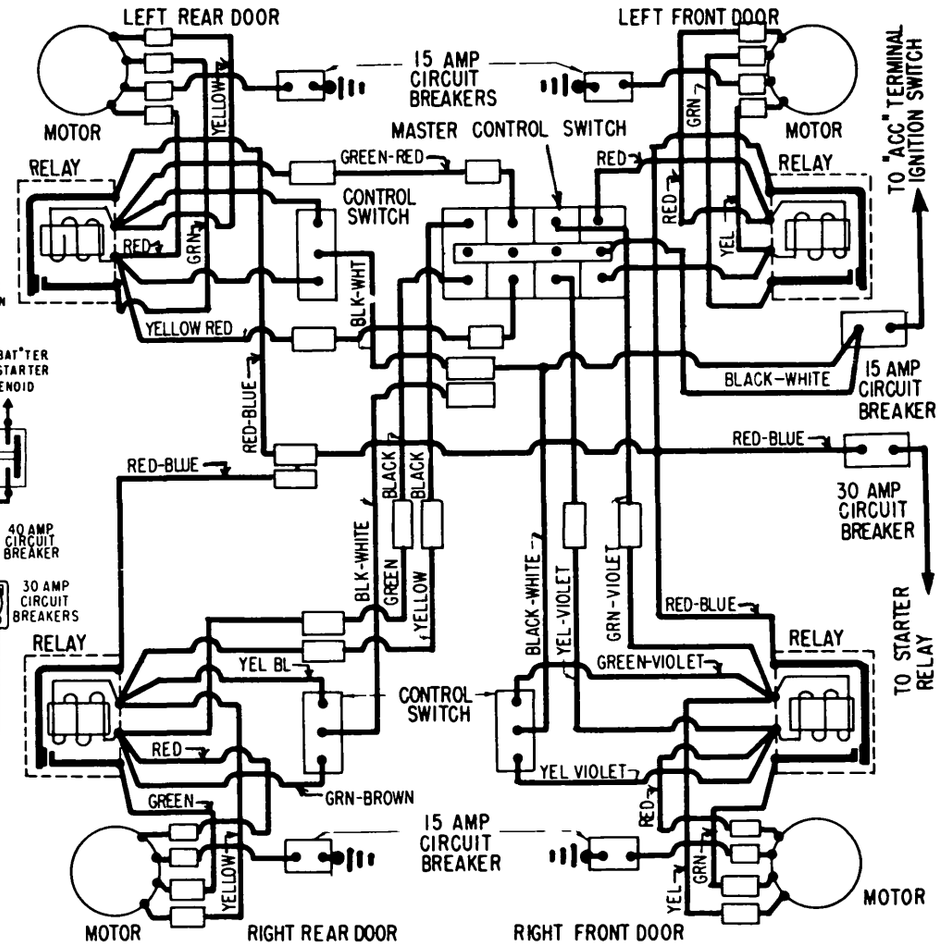
Window Regulator Mechanism (Type B Rear Door): Remove trim panel, inside panel cover plate, window stop, and window glass Remove four cap screws that secure window regulator to door panel. Slide regulator arm off track, lower assembly and remove through access hole (NOTE—Position of wires connecting relay and door switch within door panel is for ease of assembly) Remove bracket with relay attached Disconnect wires from motor to relay. Clamp window regulator assembly tightly in vise, unload spring by pulling hooked end away from, and up over stop. Remove two attaching nuts and washers which hold motor to window regulator assembly Remove motor and rubber drive coupling.

Quarter Window Regulator: Remove rear seat cushion, and rear seat back cushion. Pry cover off assist strap, remove assist strap screw, then assist strap. Remove seven sheet metal screws that secure garnish moulding to quarter panel, remove garnish moulding Remove two screws that secure quarter arm rest, remove arm rest Pry trim clips free along front edge of trim panel, remove trim panel. Remove two cap screws that secure quarter window stop to quarter window regulator panel, remove stop. Lower window as far as possible. Remove two spring type retainers that secure glass channel rollers to window regulator arms, remove rollers from arms Window glass is now free and can be lowered to bottom of quarter panel Remove four cap screws that secure regulator assembly to quarter window regulator panel

INSTALLATION: Reverse removal procedures.



1955 LINCOLN WINDOW CONTROL WIRING DIAGRAM



1956 LINCOLN & MERCURY WINDOW CONTROL WIRING DIAGRAM

1957 FORD, LINCOLN, MERCURY 1956-57 CONTINENTAL

Continental (1956-57)
Ford (1957)
Lincoln (1957)
Mercury (1957)
Thunderbird (1957)

DESCRIPTION: Power windows are operated by a reversible type electric motor combined with each individual window regulator assembly. Front and rear doors (rear quarter windows on 2-door models) are controlled by individual switches located adjacent to each window and by a master control switch located on left front door. *(NOTE* - On Mercury, the master control switch is located on the instrument panel left hand extension). In addition to power door and quarter windows, other power operated windows are used as follows:

Door Vent - Standard on Continental, and optional on Lincoln models.

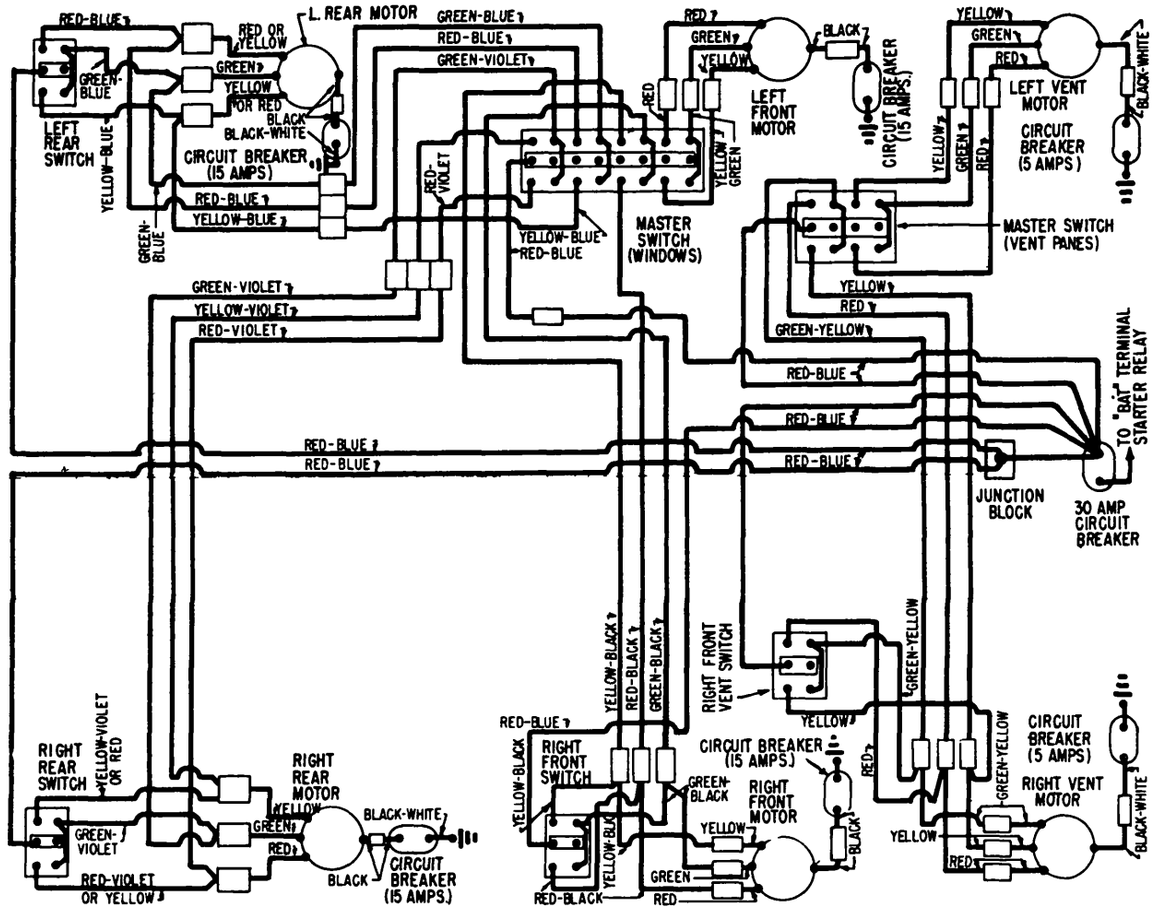
Back Window - Standard on Mercury Turnpike Cruiser. Controlled by a switch on instrument panel left hand extension.

Tail Gate Window - Optional on Mercury Station Wagon models. Controlled by a switch on instrument panel left hand extension and by a key operated switch on tailgate. A limit switch in tailgate prevents operation of window when door is in an open position.

REMOVAL & INSTALLATION (REGULATOR ASSEMBLY): Proceed as follows:

Continental (Door Windows): Disconnect battery ground cable, then remove door lock control rod knob. Remove garnish molding from inner door panel, then loose setscrew on door handle and unscrew handle. Pry door arm rest upper molding from panel and remove rest panel from door *(NOTE* - It will be necessary to work through the access hole to remove inner screws). Remove upper trim panel and water seal. Place window in half closed position and remove access hole plate and lower window stop. Lower window glass and remove two spring retainers securing glass channel rollers to regulator arms, then remove rollers from arms. Raise window to full up position and secure in place with a rubber wedge. Disconnect wires from motor-to-relay at bullet connectors. Remove capscrews from regulator and remove regulator through access hole. To install, reverse removal procedure.

Continental (Quarter Windows): Place glass in full down position, then remove rear seat and seat back cushions. Remove garnish molding and lower arm rest panel. Disconnect wires from window regulator switch, then remove upper trim panel. Remove arm rest panel mounting bracket. Disconnect relay and breaker assemblies from wheelhouse flange, then disconnect lead wires from relay and circuit breaker. Remove lower cover plate and remove nut from window guide lower adjusting screw. Remove capscrews holding regulator panel assembly to quarter panel and remove panel assembly as follows: Free window guide adjusting screw at locking point. Rotate top of regulator panel to rear of quarter panel, disengaging glass from rear glass run. Remove regulator panel assembly from quarter panel. Remove retainers attaching quarter window assembly to guide, and retainers from roller assemblies. Remove window glass from regulator panel assembly. Remove screws holding regulator assembly to panel and remove regulator.



LINCOLN WINDOW CONTROL WIRING DIAGRAM

Continental (Ventilator Window): Proceed as for removal of front door window regulator assembly (see above) for removal of molding and arm rest panel. At this point remove front access hole cover, then remove the four capscrews securing ventilator window motor mounting bracket to door inner panel. *(CAUTION* - Be careful not to drop motor assembly into door). Remove motor and bracket assembly through access hole. To install, reverse removal procedure.

Ford (Front Door Window): Remove door lock push button, garnish molding, door handles, arm rest and door trim panel. Remove plastic water shield, then proceed as follows:

Custom 2 & 4-Door Sedans, Station Wagons - Remove division bar lower retaining screw. On 2-Door models, remove clip, washer and spring retaining regulator arm to scissors arm and plate assembly. On 4-Door models, pull clip out of roller assemblies and remove all roller assembly parts. Raise window and retain in place with a prop or tape. Remove regulator retaining screw, then spring lower end of division bar outward slightly to allow regulator assembly to pass between inner door panel and division bar and remove assembly through access hole. To install, reverse removal procedure.

Town Sedan & Club Sedan - Remove division bar lower bracket screw and the glass stop. On 4-Door models, lower glass and remove roller assembly from glass lower channel. On 2-Door models, remove regulator arm-to-scissors arm and plate assembly clip washer and spring. Raise glass manually and tape to door upper frame. Remove regulator retaining screws, then remove regulator through access hole. To install, reverse removal procedure.

Town Victoria, Club Victoria & Convertible - Remove clip, washer and spring retaining regulator arm to scissors arm and plate assembly. Raise window manually

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1957 FORD, LINCOLN, MERCURY (C ntinued)

and tape in the full up position. Remove regulator retaining screws and remove regulator.

Thund rbird - Remove access hole cover, leaving lower stop attached to the cover. Disconnect regulator arm at the arm and plate assembly. Working through the small access holes, remove four screws attaching regulator to regulator arm supports. Do not remove regulator supports. Pull regulator out through the access hole. Pull clip out of each lower channel roller assembly, remove roller parts, then raise and support the glass. Remove arm and plate assembly retaining screws. Slip equalizer arm roller out of its bracket, then remove arm and plate assembly through the access hole. To install, reverse removal procedure.

F rd (Rear D or Wind w): Remove door lock push button, garnish molding, arm rest, door handles, door trim panel and plastic water shield. Proceed as follows:

Custom 4-D r Sedan & Station Wagons - Disconnect regulator arms from lower glass channel by pulling the hairpin clips and removing parts of the roller assemblies. Raise window and tape it to upper door frame. Remove regulator retaining screws, then pull regulator sideways to slip the equalizer arm roller out of stationary guide, and remove regulator through access hole. Remove roller assembly from equalizer arm pin. To install, reverse removal procedure.

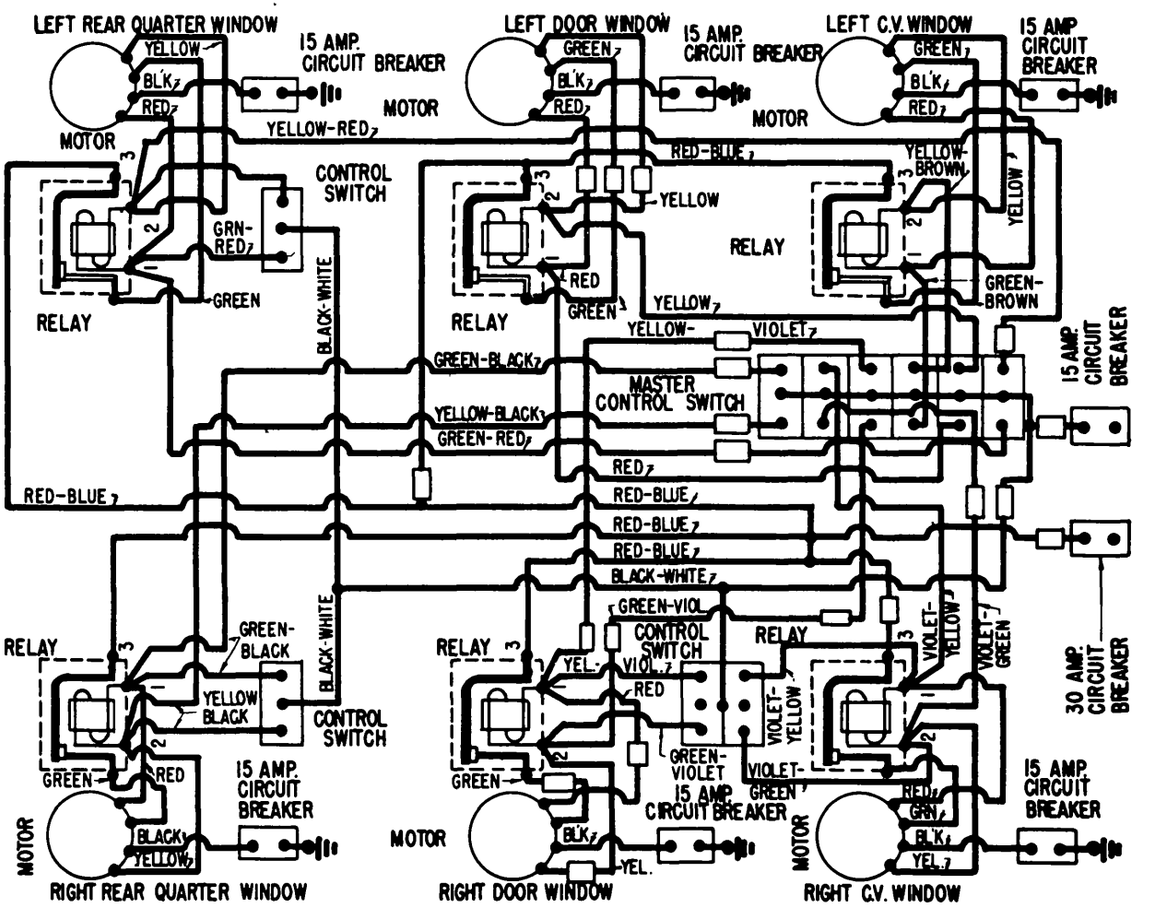
T wn Victoria & Town Sedan - Disconnect regulator arm from arm and plate assembly pivot by pulling the hairpin clip at pivot. Remove regulator retaining screws, then remove regulator through access hole.

F rd (Quart r Wind w): Remove rear seat cushion, arm rest, rear seat back medallion (on Club Victoria), rear seat back, garnish molding and quarter trim panel. Proceed as follows:

Custom 2-D r Sedan - Remove fibre lower access hole cover, and lower the quarter window. Disconnect regulator arm from lower glass channel by removing hairpin clip from roller assembly, and removing all parts of roller assembly. Raise glass and tape in place. Remove regulator assembly retaining screws, then remove regulator through lower access hole. To install, reverse removal procedure.

Club Victoria - Remove fibre lower access hole cover and the upper access hole cover. Lower quarter window so regulator arm is accessible through the upper access hole, then disconnect regulator arm from glass lower channel by pulling the roller assembly hairpin clip and removing parts of the roller assembly. Raise glass to top of opening and tape in position. Remove regulator retaining screws and remove regulator through lower access hole. To install, reverse removal procedure.

Club Sedan - Remove upper and lower access hole covers. Remove front guide adjusting screw nuts and the front guide retaining screws, then pull front guide down to disengage it from guide roller on lower channel, and remove front guide through lower access hole. Lower window so regulator arm is accessible through upper access hole, then disconnect regulator arm from lower channel by pulling the hairpin clip and removing the parts of the roller assembly. Raise quarter window to top position and tape in place. Remove regulator retaining screws and remove regulator assembly through lower access hole. To install, reverse removal procedure.



CONTINENTAL WINDOW CONTROL WIRING DIAGRAM

Convertible - Remove access hole cover and lower the window half way. Disconnect regulator arm from glass lower channel by pulling roller assembly hairpin clip and removing all parts of the roller assembly. Raise glass to the top position and tape in place. Remove regulator retaining screws, then remove regulator assembly through the access opening. To install, reverse removal procedure.

Lincoln (Front Door Windows): Disconnect battery ground cable. Remove door locking control rod knob and inside door handle. Remove screw attaching arm rest to inner panel bracket and remove trim panel from door. Disconnect courtesy light wires at bullet connectors. Remove access hole cover plate, window glass stop bracket with stop attached, two spring type retainers that attach glass channel rollers to window regulator arms, and remove rollers. Raise glass to top position and tape in place. *(NOTE* - On models without channel and frame assembly, use a rubber wedge to hold window glass up). Remove screws securing regulator assembly to inner door panel. Disconnect wires from motor at bullet connectors. Remove regulator assembly through access hole. To install, reverse removal procedure.

Lincoln (Rear Door Windows): Disconnect battery ground cable. Lower window to full down position and remove door locking control rod knob and garnish molding, inside door handle, and screw attaching arm rest to inner panel bracket. Pry off trim panel. Remove access hole cover plate and window glass stop. Raise window to full up position and tape glass in place. Disconnect wires from motor at bullet connectors. Remove screws attaching regulator to door inner panel and remove regulator through access hole. To install, reverse removal procedure.

Lincoln (Quarter Windows): Lower glass to full down position. Disconnect battery ground cable and remove rear seat and back cushions. Remove sheet metal screws retaining trim garnish molding and remove molding. Remove sheet metal screws securing trim panel to quar-

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1957 FORD, LINCOLN, MERCURY (C ntinued)

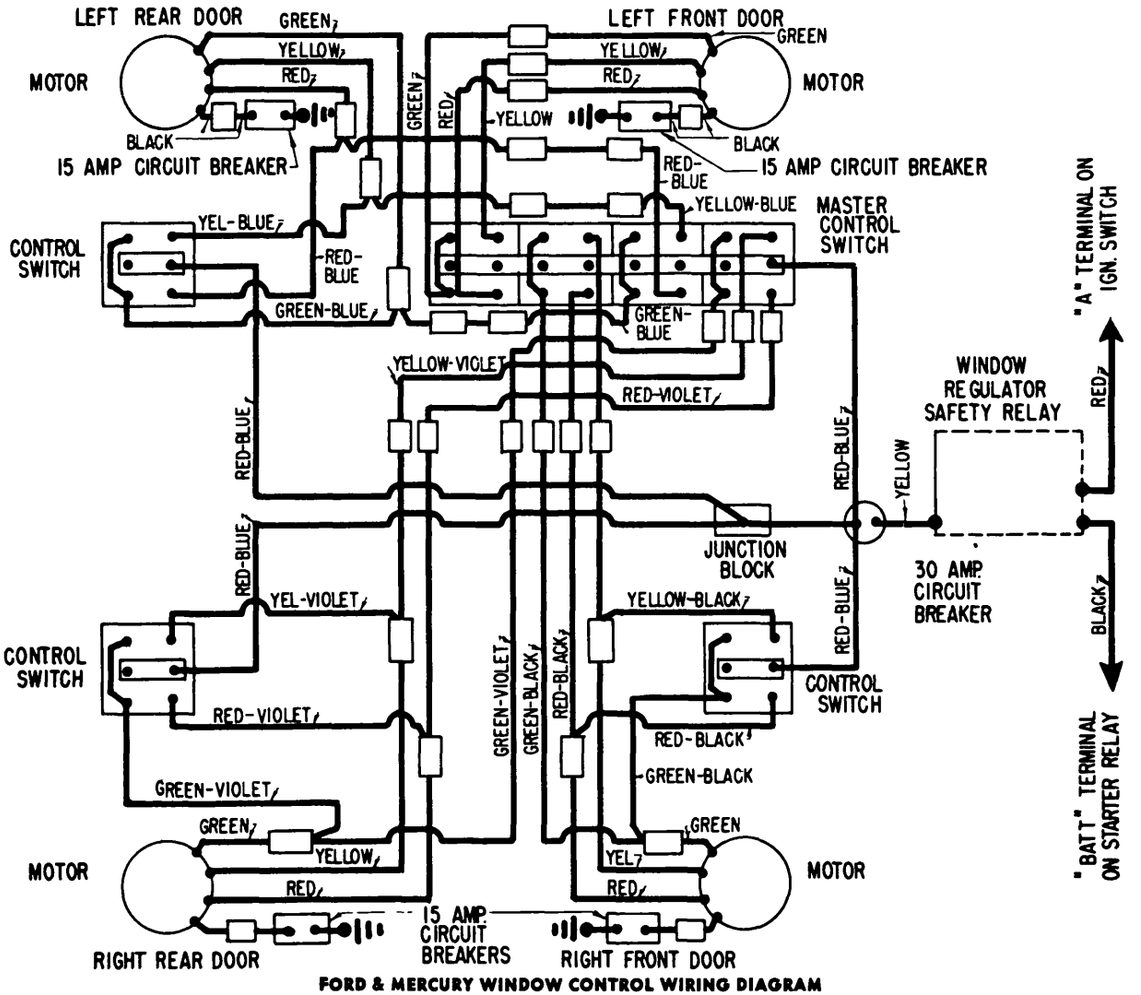
ter panel and remove trim panel. Disconnect wires at bullet connectors from window switch and cigar light ground. Remove positive (hot) wire from cigar lighte r. Remove water shield, then disconnect wires from motor at bullet connectors. Remove capscrews securing quarter window and regulator panel assembly to quarter panel. Move quarter window and regulator panel assembly to rear and lift front end upward to remove. Remove two nuts securing window glass to glass channel rollers and remove window glass. Remove screws securing regulator assembly to panel assembly and remove regulator. To install, reverse removal procedure.

Lincoln (Ventilator Window): Proceed as for removal of front door window regulator assembly (see above) for removal of molding and trim panel. At this point, remove front access hole cover, then remove capscrews securing ventilator window motor mounting bracket to door inner panel. Remove motor and bracket assembly through access hole. To install, reverse removal procedure.

M rcury (Front & Rear Door Windows): Lower window to full down position. Remove inside door handle, then remove garnish molding, edge trim molding, or lower trim molding as necessary. Remove screws securing arm rest finger tip plate to support bracket and screws securing lock control escutcheon to door inner panel. Remove two screws from lower edge of trim panel. Pry trim clips free along sides of trim panel and lift panel to free lower trim clips from retainer at bottom edge of door. On rear doors, disconnect window regulator switch from connector. Remove arm rest support from door inner panel, then peel plastic shield down to lower edge of door. *(NOTE* - To remove motor only, disconnect motor wires at bullet connectors. Remove two nuts and eyelets securing motor assembly and coupling to regulator assembly. Remove motor and coupling through door inner panel access hole). Remove two screws from window lower stop to door inner panel and remove stop. Disconnect motor wires at bullet connectors. With window at full down position, remove two spring type retainers securing window channel roller assemblies to window regulator arms. Separate regulator arm pivots from rollers. Raise window assembly to full up position and retain in place with tape or rubber wedge. Remove screws securing regulator assembly to door inner panel and remove regulator assembly.

Mercury (Quarter Windows): Disconnect battery at ground cable, then proceed as follows:

Convertible - Lower convertible top, then remove rear seat and back cushions. Remove quarter window garnish molding and upper rear quarter trim panel. Remove arm rest panel assembly and disconnect courtesy lamp from panel. Remove quarter front trim panel. Lower quarter window to full down position by operating the switch, then remove wires from switch. Remove plastic shield, then remove spring retainer securing window channel guide roller assembly to regulator arm pivot. Remove two screws securing quarter window guide button retainer assembly and remove retainer and guide button from guide assembly. Remove screws retaining regulator assembly to quarter panel and remove regulator through access hole. To install, reverse removal procedure.



FORD & MERCURY WINDOW CONTROL WIRING DIAGRAM

Other Models (Exc. Convertible) - Remove rear seat and back cushions, then remove window garnish molding. If necessary, remove two screws at lower front of trim panel and one screw at lower edge of trim panel directly below ash tray. Pry trim clips loose from inner quarter panel along forward edge of trim panel and remove panel. Peel off plastic shield, starting at forward edge of inner panel, leaving shield attached at rear edge. Move window to a position where regulator arm is accessible through rectangular access hole. Remove spring type retainer securing window channel roller assembly to window regulator arm pivot. Pull regulator arm free of window guide. Raise window and retain in the full up position with tape or by inserting a screwdriver in slanted slot at upper edge of inner panel. Remove wires from regulator switch, then remove screws securing regulator to inner panel and remove regulator through access hole. To install, reverse removal procedure.

Mercury Turnpike Cruiser (Back Wind w): Remove spare wheel and tire assembly and luggage compartment front lining board. Remove back window housing cover. Lower back window assembly down to approximately one inch above lower stops. Disconnect battery ground cable, then remove spring retainers securing window channel roller assemblies to regulator arms. Push regulator arms forward to separate pivots from rollers. Remove two capscrews securing each lower side run assembly. Remove back window assembly by pulling down and out of lower side run assemblies. Temporarily connect battery ground cable and operate back window switch to lower regulator arms to full down position *(CAUTION D not rais regulat r arms as th y may damage packag tray trim pan l).* Disconnect regulator motor wires at bullet connectors. Remove capscrew securing motor

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1957 FORD, LINCOLN, MERCURY (C ntinued)

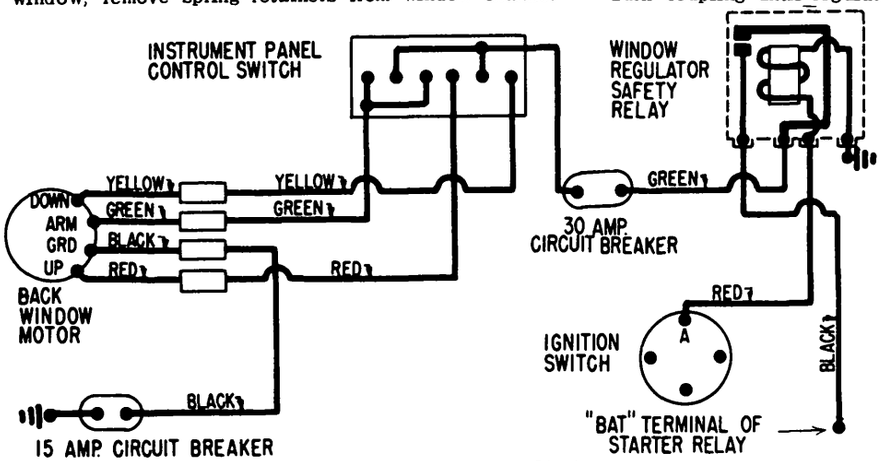
bracket to regulator back panel, then remove screws securing regulator assembly to back panel and remove regulator and motor as an assembly. To install, reverse removal procedure.

M rcury Stati n Wag n (Tailgate Window): Lower tailgate and remove latch handle. Remove three screws securing tailgate lock release control assembly to window lower garnish molding. Remove garnish molding and end spacers. Remove four tailgate skid strips. Remove both side tailgate inner panel lock access hole cover plates and regulator access hole cover plate. Remove plastic shield. *(NOTE* - If motor only is being removed, remove two nuts securing motor to regulator and screw securing motor brace to inner panel. Turn motor coupling manually to raise window to gain access to wires, then disconnect wires at bullet connectors. Remove motor). Depress back window latch with a screwdriver and raise window to full up position. While supporting window, remove spring retainers from window channel guide roller assemblies. Lower window into tailgate approximately two inches. While raising regulator arms for free arm pivots from rollers and window channel guides, remove back window from tailgate. Disconnect wires at bullet connectors and key-switch wires at quick disconnect. Disconnect right side lock control rod from lock release control assembly and disconnect lock trigger release rod from trigger. Move lock control rod and lock release control assembly out to sides. Remove screws attaching regulator assembly to tailgate inner panel and screw attaching motor brace to tailgate. Move regulator assembly to free roller assembly from regulator equalizer arm guide bracket, then remove regulator and motor out of window opening. To install, reverse removal procedure.

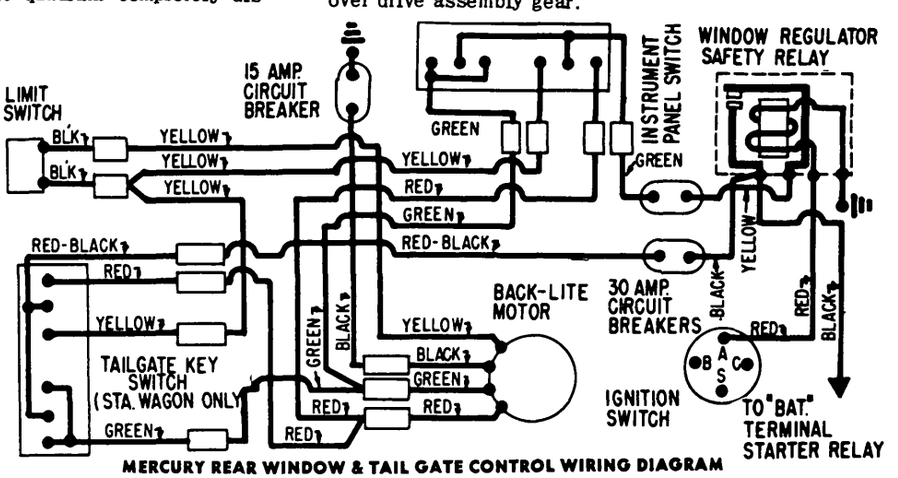
► *MERCURY STATION WAGON TAILGATE KEY-SWITCH & LIMIT SWITCH NOTE: Replacement procedure are the same as for motor and regulator assemblies. See above.*

DISASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Turn coupling until regulator quadrant completely disengages from drive assembly gear, relieving regulator spring tension. *(NOTE - C upling must be turned in direction of least resistanc).* Make sure that regulator arms are held when disengaging quadrant from drive assembly gear to prevent arms from springing. Remove nuts and steel eyelets attaching motor to regulator. Pull motor shaft from coupling and remove motor from regulator. Remove capscrews attaching drive assembly to regulator and remove drive assembly.

REASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Install drive assembly to regulator with capscrews and install coupling on drive assembly shaft. Install motor with motor shaft properly engaged in coupling. Secure motor with steel eyelets and nuts to regulator assembly. To obtain proper torque, tighten the nuts until eyelets on each side of rubber grommet butt together. Pull regulator arms against spring tension so that first tooth of quadrant begins to engage with one tooth of drive assembly gear, then turn coupling to complete engagement of gear teeth. Continue to turn coupling until quadrant travels approximately three-quarters of its distance over drive assembly gear.



MERCURY REAR WINDOW CONTROL WIRING DIAGRAM



MERCURY REAR WINDOW & TAIL GATE CONTROL WIRING DIAGRAM

1958 EDSEL, FORD, LINCOLN, MERCURY

Eds l (1958)
F rd (1958)
Linc ln & C ntin ntal (1958)
M rcury (1958)
Thund rbird (1958)

DESCRIPTION: Power windows are operated by a reversible type electric motor combined with each individual window regulator assembly. Front and rear doors (rear quarter windows on 2-door models) are controlled by individual switches located adjacent to each window and by a master control switch located on left front door. *(NOTE* - On Mercury, the master control switch is located on the instrument panel left hand extension). In addition to power door and quarter windows, other power operated windows are used as follows:

Do r V nt - Standard on all Continental & Lincoln models.

Back Window - Standard on all Continental models and on Mercury Turnpike Cruiser. Controlled by a switch on left front door arm rest (Continental), on instrument panel left hand extension (Mercury).

Tail Gate Window - Optional on Mercury Station Wagon models. Controlled by a switch on instrument panel left hand extension and by a key operated switch on tailgate. A limit switch in tailgate prevents operation of window when door is in an open position.

REMOVAL & INSTALLATION (REGULATOR ASSEMBLY): Proceed as follows:

Edsel (Front Door Window): Remove door lock push button, garnish molding, door handles, arm rest and door trim panel. Remove plastic water shield, then proceed as follows:

2-Dr. & 4-Dr. S dan - Remove division bar lower bracket screw and the glass stop. On 4-Dr. models, lower glass and remove roller assembly from glass lower channel. On 2-Dr. models, remove regulator arm to scissors arm and plate assembly clip, washer and spring. On all models, raise glass manually and tape it to door upper frame. Remove regulator screws, then remove regulator through access hole. *NOTE - If scissors arm and plat must be removed on 2-Dr. models, lower window, remove the two lower glass channel roller assemblies, then remove arm and plate assembly. This may be don without removing regulator or door glass.* To install, reverse removal procedure.

2-Dr., 4-Dr. Hardtop & Convertible - Remove clip, washer, and spring retaining regulator arm to scissors arm and plate assembly. Raise window manually and tape in the up position. Remove regulator retaining screws, then remove regulator. *NOTE - T r m v scissors arm and plat ass mbly, proc d in sam*

CONTINUED ON NEXT PAGE

1958 EDSEL, FORD, LINCOLN, MERCURY (Cont.)

manner as for 2 & 4-Dr. Sedan (above). To install, reverse removal procedures.

Station Wagon - Remove division bar lower retaining screw. On 2-Dr. models, remove clip, washer and spring retaining regulator arm to scissors arm and plate assembly. On 4-Dr. models, pull the clip out of roller assembly, and remove all roller assembly parts. Raise window and prop or tape in the raised position, then remove regulator retaining screws. Spring lower end of division bar outward slightly to allow regulator assembly to pass between inner door panel and division bar, then remove regulator assembly. To install, reverse removal procedures.

Edsel (Rear Door Window): All Models - Remove door trim panel and water shield. Disconnect regulator arms from lower glass channel by pulling hairpin clips and removing all parts of the roller assemblies. Raise window and tape it in the up position. Remove regulator retaining screws, then pull regulator sidewise to slip the equalizer arm roller out of stationary guide, and remove regulator through access hole. To install, reverse removal procedure.

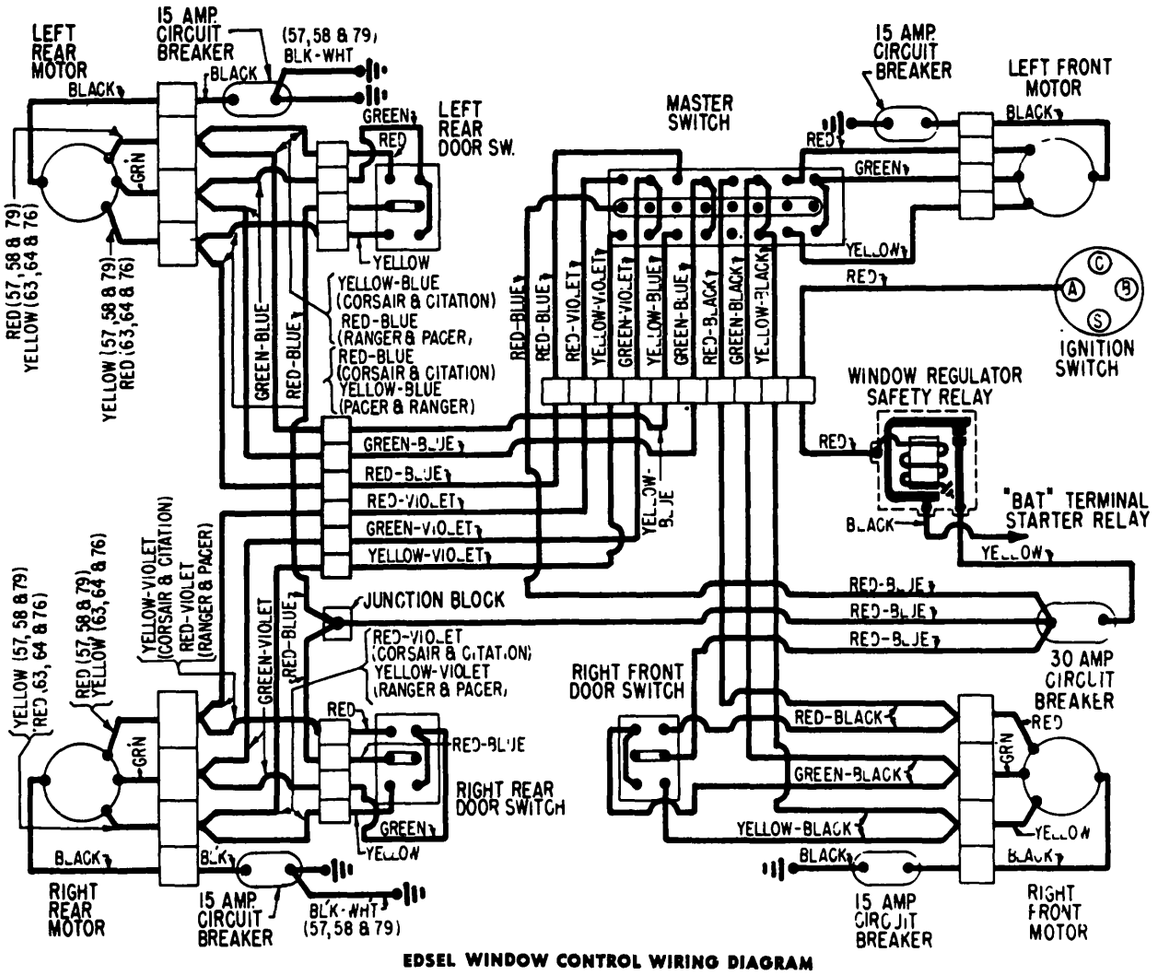
Ford (Front Door Window): Remove door lock push button, garnish molding, door handles, arm rest and door trim panel. Remove plastic water shield, then proceed as follows:

Custom 2 & 4-Door Sedans, Station Wagons - Remove division bar lower retaining screw. On 2-Door models, remove clip, washer and spring retaining regulator arm to scissors arm and plate assembly. On 4-Door models, pull clip out of roller assemblies and remove all roller assembly parts. Raise window and retain in place with a prop or tape. Remove regulator retaining screw, then spring lower end of division bar outward slightly to allow regulator assembly to pass between inner door panel and division bar and remove assembly through access hole. To install, reverse removal procedure.

Town Sedan & Club Sedan - Remove division bar lower bracket screw and the glass stop. On 4-Door models, lower glass and remove roller assembly from glass lower channel. On 2-Door models, remove regulator arm-to-scissors arm and plate assembly clip washer and spring. Raise glass manually and tape to door upper frame. Remove regulator retaining screws, then remove regulator through access hole. To install, reverse removal procedure.

Town Victoria, Club Victoria & Convertible - Remove clip, washer and spring retaining regulator arm to scissors arm and plate assembly. Raise window manually and tape in the full up position. Remove regulator retaining screws and remove regulator.

Thunderbird - Remove trim panel and loosen plastic water shield enough to get to access holes. Block window in the up position, then remove regulator assembly arm retainer clip at arm and plate assembly and remove regulator arm from plate assembly. *NOTE - If arm and plat ass mbly must be r mov d, l w r wind w and disc nnect arms fr m the tw glass r ll r assemblies, then remove arm and plate assembly. This can be done without removing regulator or door glass.* Remove regulator assembly retaining screws and remove regulator assembly. Disconnect wires from regulator motor at bullet connectors. To install, reverse removal procedure.



EDSEL WINDOW CONTROL WIRING DIAGRAM

Ford (Rear Door Window): Remove door lock push button, garnish molding, arm rest, door handles, door trim panel and plastic water shield. Proceed as follows:

Custom 4-Door Sedan & Station Wagons - Disconnect regulator arms from lower glass channel by pulling the hairpin clips and removing parts of the roller assemblies. Raise window and tape it to upper door frame. Remove regulator retaining screws, then pull regulator sideways to slip the equalizer arm roller out of stationary guide, and remove regulator through access hole. Remove roller assembly from equalizer arm pin. To install, reverse removal procedure.

Town Victoria & Town Sedan - Disconnect regulator arm from arm and plate assembly pivot by pulling the hairpin clip at pivot. Remove regulator retaining screws, then remove regulator through access hole.

Ford (Quarter Window): Remove rear seat cushion, arm rest, rear seat back medallion (on Club Victoria), rear seat back, garnish molding and quarter trim panel. Proceed as follows:

Custom 2-Door Sedan - Remove fibre lower access hole cover, and lower the quarter window. Disconnect regulator arm from lower glass channel by removing hairpin clip from roller assembly, and removing all parts of roller assembly. Raise glass and tape in place. Remove regulator assembly retaining screws, then remove regulator through lower access hole. To install, reverse removal procedure.

Club Victoria - Remove fibre lower access hole cover and the upper access hole cover. Lower quarter win-

CONTINUED ON NEXT PAGE

1958 EDSEL, FORD, LINCOLN, MERCURY (C ntinued)

dow so regulator arm is accessible through the upper access hole, then disconnect regulator arm from glass lower channel by pulling the roller assembly hairpin clip and removing parts of the roller assembly. Raise glass to top of opening and tape in position. Remove regulator retaining screws and remove regulator through lower access hole. To install reverse removal procedure.

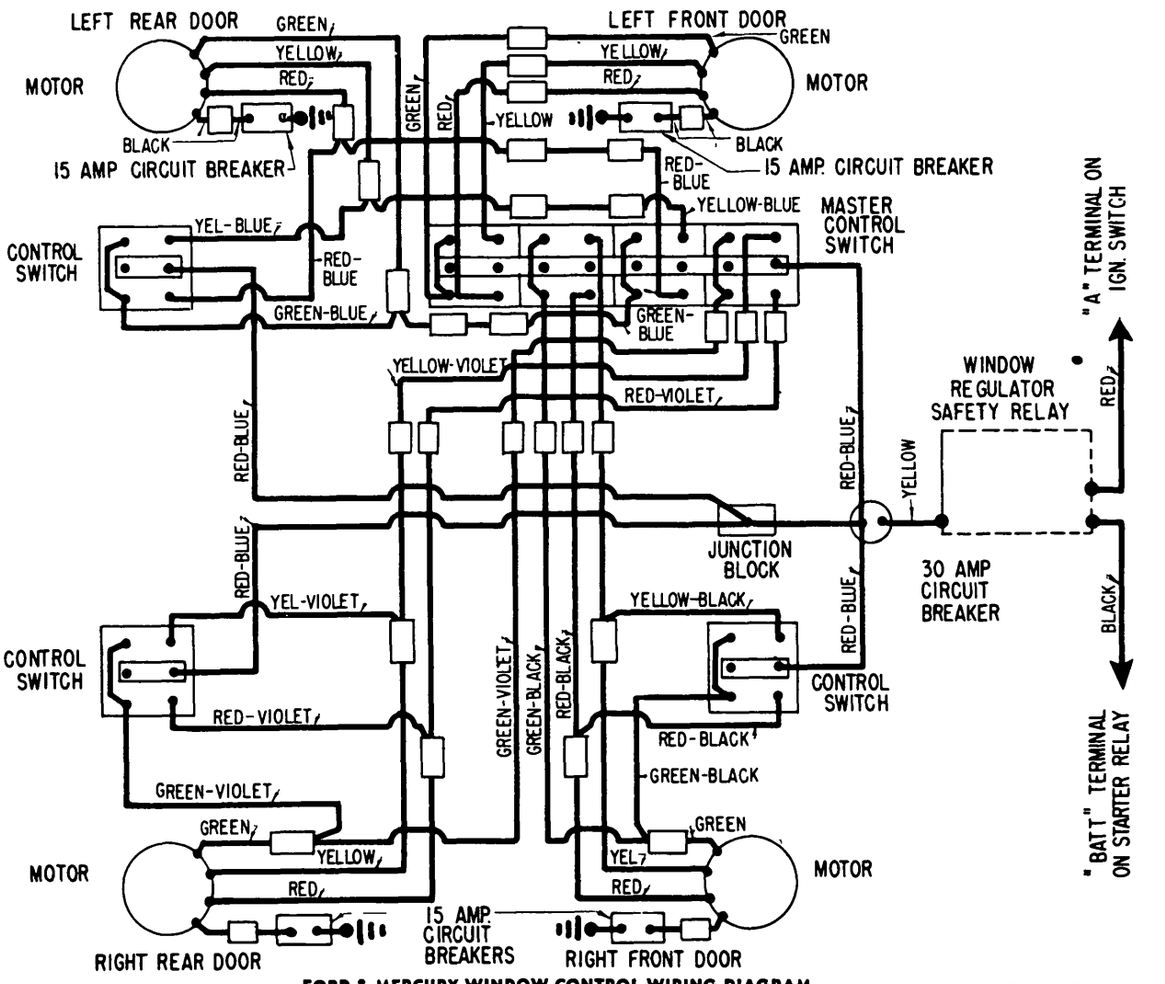
Club S dan - Remove upper and lower access hole covers. Remove front guide adjusting screw nuts and the front guide retaining screws then pull front guide down to disengage it from guide roller on lower channel, and remove front guide through lower access hole. Lower window so regulator arm is accessible through upper access hole, then disconnect regulator arm from lower channel by pulling the hairpin clip and removing the parts of the roller assembly. Raise quarter window to top position and tape in place. Remove regulator retaining screws and remove regulator assembly through lower access hole. To install, reverse removal procedure.

C nv rtibl - Remove access hole cover and lower the window half way. Disconnect regulator arm from glass lower channel by pulling roller assembly hairpin clip and removing all parts of the roller assembly. Raise glass to the top position and tape in place. Remove regulator retaining screws, then remove regulator assembly through the access opening. To install, reverse removal procedure.

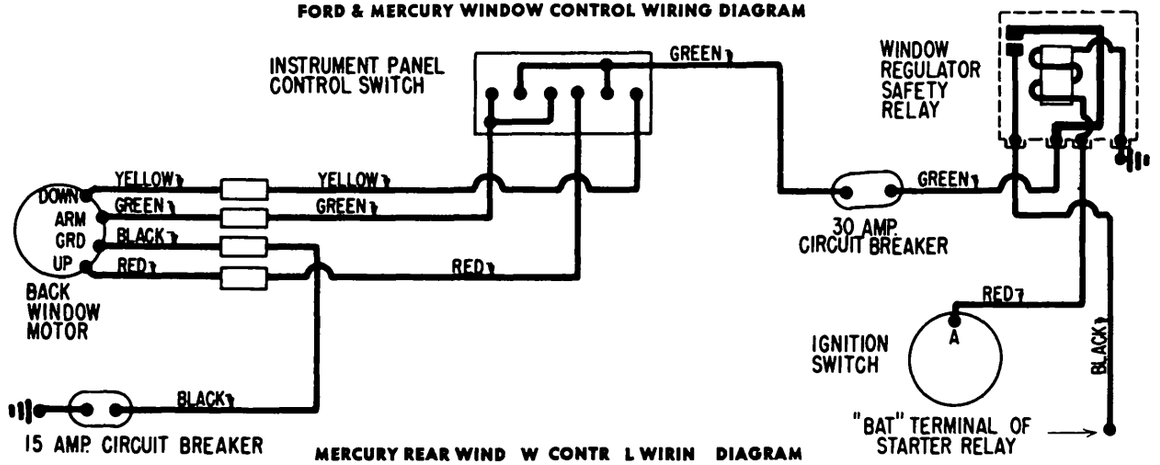
Linc ln & C ntin ntal (Fr nt Door Window): Remove garnish molding and trim panel, then remove window inside spacer assembly. Remove door access cover plate, then remove window lower stop. Remove two spring type retainers securing glass channel rollers to regulator arms, and remove rollers. Raise window and wedge it in the up position and remove two nuts securing motor to regulator assembly. Disconnect rubber coupling by pulling down on motor. Lay motor in bottom of door. Remove lower screw securing regulator motor bracket, then remove three screws securing regulator assembly to door. Pull regulator arm roller out of equalizer arm bracket and remove regulator assembly through access hole in door inner panel. To install, reverse removal procedure.

Linc ln & C ntin ntal (R ar Door Window): Remove garnish molding and trim panel, then remove window inside spacer assembly. Remove door access cover plate, then raise window to top and remove two spring type retainers securing window channel rollers to regulator arms. Lower window and remove rollers. Raise window and wedge it in the up position. Remove window lower stop from center guide, then disconnect wires from regulator motor. Remove screw securing regulator lower bracket, then remove four screws securing regulator assembly to door inner panel. Lower regulator assembly for access to two nuts and washers securing motor to regulator assembly. Remove motor and lay it

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FORD & MERCURY WINDOW CONTROL WIRING DIAGRAM



MERCURY REAR WIND W CONTR L WIRIN DIAGRAM

1958 EDSEL, FORD, LINCOLN, MERCURY (C ntinued)

in bottom of door. Remove regulator assembly through access hole.

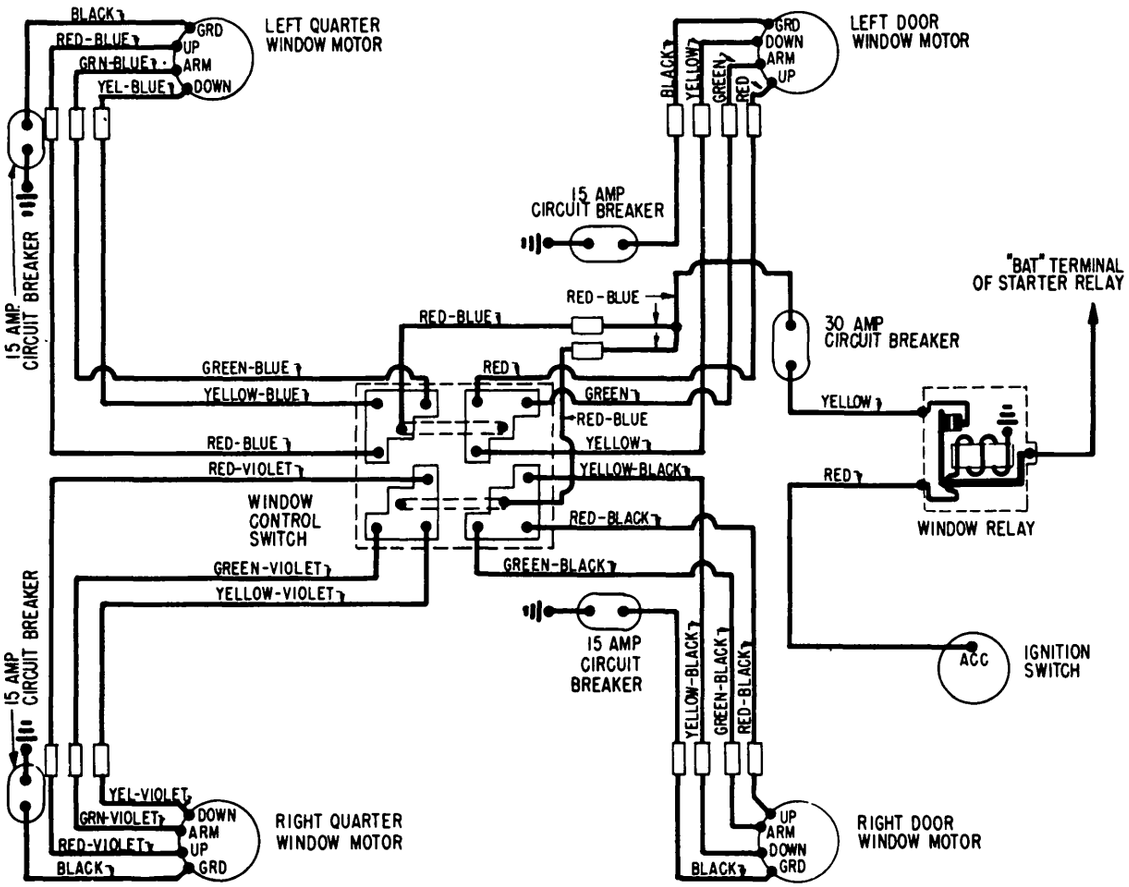
Lincoln & Continental, Exc. Convertible (Quarter Window): Lower quarter window as far as possible, then remove quarter arm rest and bracket, rear seat cushion, seat back cushion and quarter trim panel. Work through access hole in upper front of quarter window regulator panel, and remove two capscrews retaining quarter window front guide-to-door lock pillar reinforcement. Disconnect motor lead wires at bottom of regulator panel. Scribe a line on quarter panel along front of quarter window regulator as a guide for installation. Remove capscrews securing regulator panel assembly to quarter panel, then remove window and regulator panel assembly. Remove capscrews securing U-shaped bracket to rear end of lower window channel and remove guide bracket and plastic button assembly. Remove window channel rollers, then lift rear edge of glass away from regulator arm pivots. Slide U-shaped guide attached to front end of window off of guide channel, then remove window, and regulator assembly. To install, reverse removal procedure.

Lincoln & Continental, Convertible (Quarter Window): Remove garnish molding and trim panel and lower water shield. Remove lower channel roller. Raise window and wedge it in the up position, then remove four screws securing regulator assembly to quarter inner panel. Lower regulator assembly and remove nuts securing motor to regulator. Disconnect rubber coupling by pulling down on motor, and lay motor in bottom of door. Remove regulator through lower access hole. To install, reverse removal procedure.

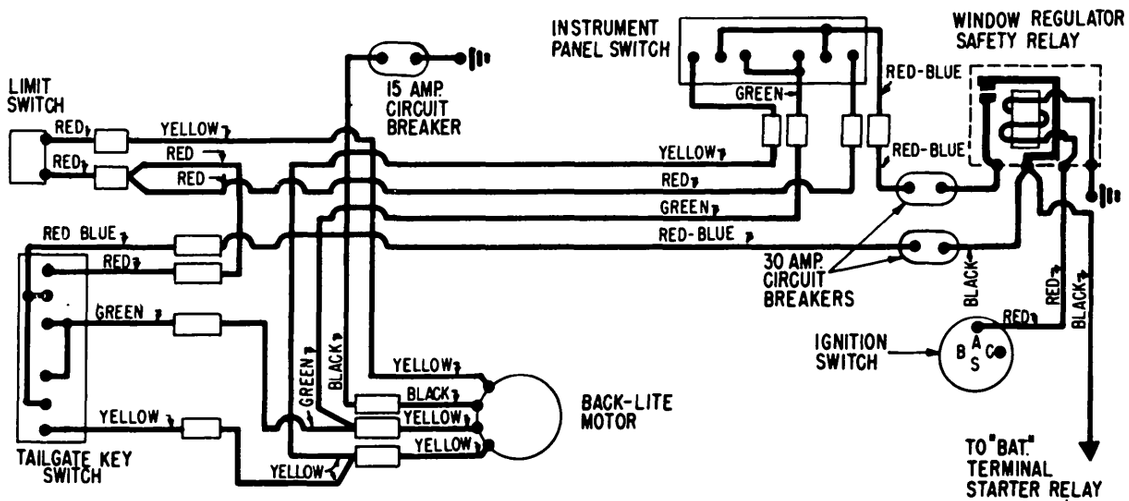
C ntinental, Exc. Convertible (Rear Window): Remove back window inside lower garnish molding and remove rear seat and back cushion. Remove sheet metal screws and capscrews securing back window housing cover panel and remove panel. With window in up position, remove two spring type retainers securing glass channel rollers to regulator arms and remove rollers. Disconnect motor lead wires. Raise window and wedge it in the up position. Remove spare wheel from rear compartment, then remove rear compartment front lining board. Remove screws securing regulator assembly to back window housing, then from inside the car, remove assembly. To install, reverse removal procedures.

C ntinental, Convertible (Rear Window): Remove rear seat and back cushions. Raise back window and open the upper back panel. Remove spring type retainers securing glass channel rollers to window regulator arms and remove rollers. Lower back window assembly to floor pan, then tip window back under regulator panel and remove from car through upper back panel opening. Remove the quadrant pivot bolt from regulator assembly nd slide stabilizer arm from guide channel and remove regulator assembly.

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FORD THUNDERBIRD WINDOW CONTROL WIRING DIAGRAM



MERCURY TAIL GATE WIND W C NTR L WIRIN DIA RAM

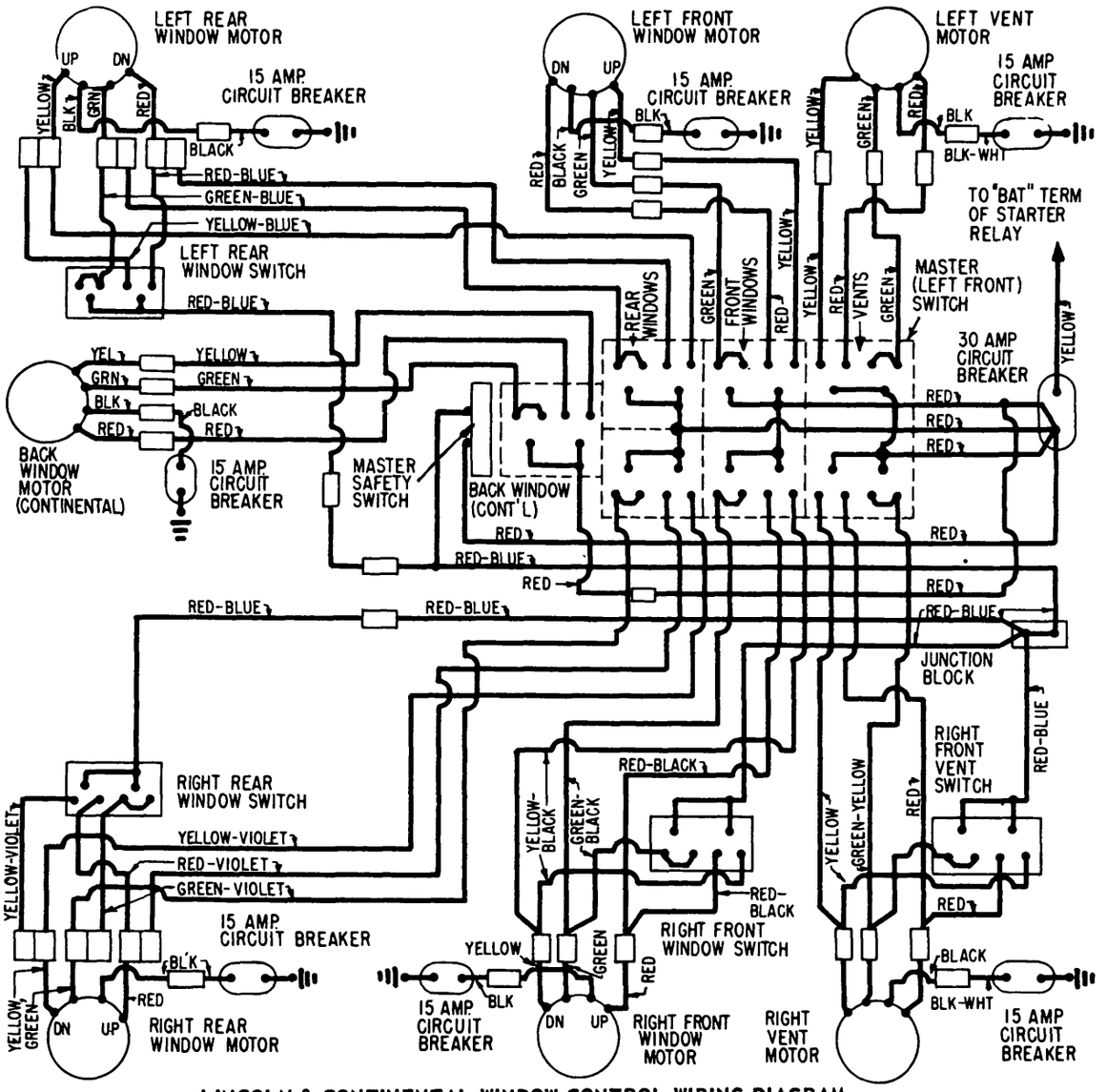
1958 EDSEL, FORD LINCOLN, MERCURY (C ntinued)

M rcury (Fr nt & Rear D r Windows): Lower window to full down position. Remove inside door handle, then remove garnish molding, edge trim molding, or lower trim molding as necessary. Remove screws securing arm rest finger tip plate to support bracket and screws securing lock control escutcheon to door inner panel. Remove two screws from lower edge of trim panel. Pry trim clips free along sides of trim panel and lift panel to free lower trim clips from retainer at bottom edge of door. On rear doors, disconnect window regulator switch from connector. Remove arm rest support from door inner panel, then peel plastic shield down to lower edge of door. *(NOTE* - To remove motor only, disconnect motor wires at bullet connectors. Remove two nuts and eyelets securing motor assembly and coupling to regulator assembly. Remove motor and coupling through door inner panel access hole). Remove two screws from window lower stop to door inner panel and remove stop. Disconnect motor wires at bullet connectors. With window at full down position, remove two spring type retainers securing window channel roller assemblies to window regulator arms. Separate regulator arm pivots from rollers. Raise window assembly to full up position and retain in place with tape or rubber wedge. Remove screws securing regulator assembly to door inner panel and remove regulator assembly.

M rcury (Quarter Wind ws): Disconnect battery at ground cable, then proceed as follows:

C nv rtibl - Lower convertible top, then remove rear seat and back cushions. Remove quarter window garnish molding and upper rear quarter trim panel. Remove arm rest panel assembly and disconnect courtesy lamp from panel. Remove quarter front trim panel. Lower quarter window to full down position by operating the switch, then remove wires from switch. Remove plastic shield, then remove spring retainer securing window channel guide roller assembly to regulator arm pivot. Remove two screws securing quarter window guide button retainer assembly and remove retainer and guide button from guide assembly. Remove screws retaining regulator assembly to quarter panel and remove regulator through access hole. To install, reverse removal procedure.

Other Mod ls (Exc. C nv rtible) - Remove rear seat and back cushions, then remove window garnish molding. If necessary, remove two screws at lower front of trim panel and one screw at lower edge of trim panel directly below ash tray. Pry trim clips loose from inner quarter panel along forward edge of trim panel and remove panel. Peel off plastic shield, starting at forward edge of inner panel, leaving shield attached at rear edge. Move window to a position where regulator arm is accessible through rectangular access hole. Remove spring type retainer securing window channel roller assembly to window regulator arm pivot. Pull regulator arm free of window guide. Raise window and retain in the full up position with tape or by inserting a screwdriver in slanted slot at upper edge of inner panel. Remove wires from regulator switch, then remove screws securing regulator to inner panel and remove



LINCOLN & CONTINENTAL WINDOW CONTROL WIRING DIAGRAM

Mercury Turnpike Cruiser (Back Window): Remove spare wheel and tire assembly and luggage compartment front lining board. Remove back window housing cover. Lower back window assembly down to approximately one inch above lower stops. Disconnect battery ground cable, then remove spring retainers securing window channel roller assemblies to regulator arms. Push regulator arms forward to separate pivots from rollers. Remove two capscrews securing each lower side run assembly. Remove back window assembly by pulling down and out of lower side run assemblies. Temporarily connect battery ground cable and operate back window switch to lower regulator arms to full down position *(CAUTION - Do not raise regulator arms as they may damage package tray trim panel).* Disconnect regulator motor wires at bullet connectors. Remove capscrew securing motor bracket to regulator back panel, then remove screws securing regulator assembly to back panel and remove regulator and motor as an assembly. To install, reverse removal procedure.

M rcury Stati n Wagon (Tailgat Wind w): Lower tailgate and remove latch handle. Remove three screws secur-

CONTINUED ON NEXT PAGE

1958 EDSEL, FORD, LINCOLN, MERCURY (C ntinued)

ing tailgate lock release control assembly to window lower garnish molding. Remove garnish molding and end spacers. Remove four tailgate skid strips. Remove both side tailgate inner panel lock access hole cover plates and regulator access hole cover plate. Remove plastic shield. *(NOTE* - If motor only is being removed, remove two nuts securing motor to regulator and screw securing motor brace to inner panel. Turn motor coupling manually to raise window to gain access to wires, then disconnect wires at bullet connectors. Remove motor). Depress back window latch with a screwdriver and raise window to full up position. While supporting window, remove spring retainers from window channel guide roller assemblies. Lower window into tailgate approximately two inches. While raising regulator arms for free arm pivots from rollers and window channel guides, remove back window from tailgate. Disconnect wires at bullet connectors and key-switch wires at quick disconnect. Disconnect right side lock control rod from lock release control assembly and disconnect lock trigger release rod from trigger. Move lock control rod and lock release control assembly out to sides. Remove screws attaching regulator assembly to tailgate inner panel and screw attaching motor brace to tailgate. Move regulator assembly to free roller assembly from regulator equalizer arm guide bracket, then remove regulator and motor out of window opening. To install, reverse removal procedure.

► *MERCURY STATION WAGON TAILGATE KEY-SWITCH & LIMIT SWITCH NOTE: Replacement procedure are the same as for motor and regulator assemblies. See above.*

DISASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Turn coupling until regulator quadrant completely disengages from drive assembly gear, relieving regulator spring tension. *(NOTE - Coupling must be turned in directi n f least resistance).* Make sure that regulator arms are held when disengaging quadrant from drive assembly gear to prevent arms from springing. Remove nuts and steel eyelets attaching motor to regulator. Pull motor shaft from coupling and remove motor from regulator. Remove capscrews attaching drive assembly to regulator and remove drive assembly.

REASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Install drive assembly to regulator with capscrews and install coupling on drive assembly shaft. Install motor with motor shaft properly engaged in coupling. Secure motor with steel eyelets and nuts to regulator assembly. To obtain proper torque, tighten the nuts until eyelets on each side of rubber grommet butt together. Pull regulator arms against spring tension so that first tooth of quadrant begins to engage with one tooth of drive assembly gear, then turn coupling to complete engagement of gear teeth. Continue to turn coupling until quadrant travels approximately three-quarters of its distance over drive assembly gear.

COMET & FALCON

Comet (1960)
Falcon (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*TAIL GATE WINDOW FAILS TO OPERATE:* Caused by corroded circuit breaker. To correct, replace corroded circuit breaker, locating new circuit breaker at starter motor relay as follows:

1) Disconnect battery cable. Cut off both RED and BLACK circuit breaker wires from right hand bracket. Splice, solder and tape ends. Remove old circuit breaker and seal mounting holes with original screws.

2) Disconnect Black lead wire at starter relay and install Bracket Part No. CIAF-14A066-B and New Circuit Breaker No. COLF-14526-C on starter relay.

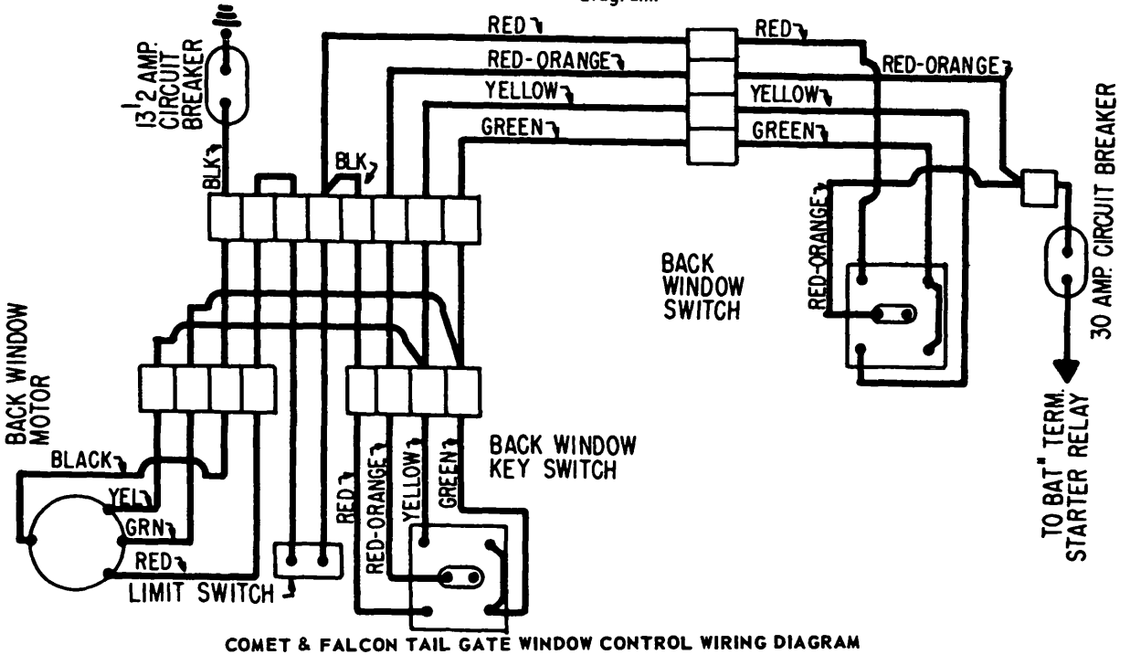
3) Connect original circuit breaker BLACK lead wire (reroute wire as necessary) to new circuit breaker and cut off old BLACK wire lead to starter relay. Reconnect starter relay cable and connect battery cable.

DESCRIPTION: Electrically operated tail gate back window operated by reversible motor and window mechanism mounted in tail gate and controlled by back window (key operated) or instrument panel (toggle) switches. A limit switch located at right side of tail gate pillar post prevents operation of window when tail gate is open. A 30 ampere circuit breaker at right side of dash panel protects wiring harness and a 13½ ampere circuit breaker in motor ground (located on inner lower back panel) protects motor.

REMOVAL & INSTALLATION: Back Window Motor - Lower tail gate, remove cover panel (back window in up position) and disconnect motor wires at "quick-disconnect". Remove motor-to-window regulator drive assembly nuts and pull motor shaft from coupling, then remove motor. To install, reverse removal procedure.

Back Window Regulator Drive - Lower tail gate, remove tail gate cover panel and back window assembly. Disconnect regulator motor wires at "quick-disconnect". Remove window regulator and motor assembly. *CAUTION - The regulator arms must be securely retained when disengaging quadrant from drive assembly gear to prevent counter-spring from unwinding the regular quadrant and causing possible personal injury.* Remove motor-to-regulator drive assembly nuts. Pull motor shaft from coupling and remove motor. Remove drive assembly attaching screws and remove drive. To install reverse removal procedure.

TESTING & TROUBLE SHOOTING: *NOTE* - Use test lamp and known good comparative amperage circuit breakers. Test circuit with tail gate lowered and limit switch held closed momentarily. DO NOT operate motor and regulator with back window in horizontal position for continuous operation. Check wires for continuity to locate shorts or open circuits. S *wiring diagram.*



COMET & FALCON TAIL GATE WINDOW CONTROL WIRING DIAGRAM

1959-60 EDSEL, FORD, LINCOLN, MERCURY

Eds l (1959-60)
F rd (1959-60)
Linc ln & C ntinental (1959-60)
M rcury (1959-60)
Thunderbird (1959-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 LINCOLN & CONTINENTAL (EARLY CARS) POWER WINDOW SWITCH SHORTING CORRECTION:* If the shorting condition is caused by an accumulation of moisture in front door switch case, install a neoprene boot, Part No. B9LF-14A016-B (Single Switch), B9LF-14A016-A (Double Switch) over the replacement switch before installation into switch housing. Later cars have the boot installed in production.

DESCRIPTION: Power windows are operated by a reversible type electric motor combined with each individual window regulator assembly. Front and rear doors (rear quarter windows on 2-door models) are controlled by individual switches located adjacent to each window and by a master control switch located on left front door. *(NOTE* - On Mercury, the master control switch is located on the instrument panel left hand extension). In addition to power door and quarter windows, other power operated windows are used as follows:

D r V nt - Standard on all Continental & Lincoln models.

Back Wind w - Standard on Continental Convertible. This window is controlled by a switch on left front door arm rest.

Tail Gate Wind w - Optional on Mercury Station Wagon models. Controlled by a switch on instrument panel left hand extension and by a key operated switch on tailgate. A limit switch in tailgate prevents operation of window when door is in an open position.

REMOVAL & INSTALLATION (REGULATOR ASSEMBLY): Proceed as follows:

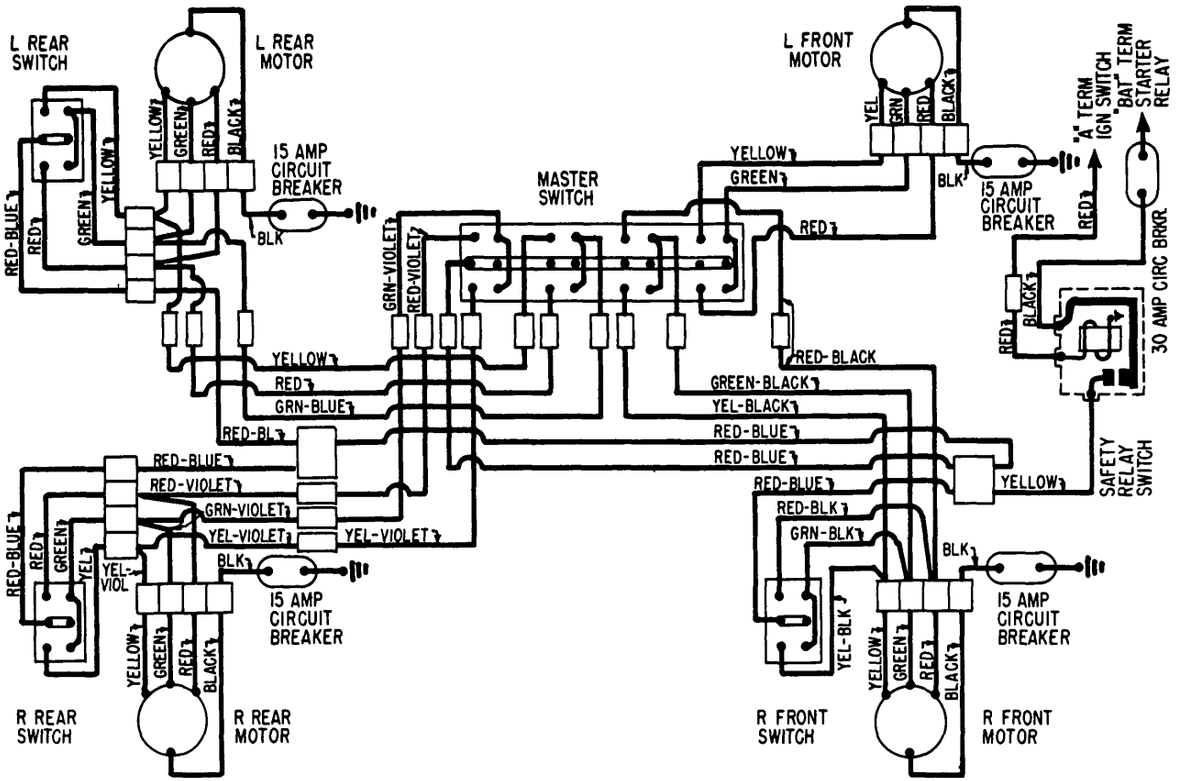
EDSEL

Eds l: Fr nt Door Wind w - Lower window assembly to full down position, then remove trim panel. *NOTE - If window cannot b low red electrically, proceed in sam mann r as for window in full down position.* Disconnect battery ground cable, then remove door trim water shield. *NOTE - If necessary to remove motor only, disconn ct wir s at "quick-disconnects" and remov two nuts s curing motor assembly and coupling to regulator ass mbly and remove motor and coupling through door inner panel access hole.* To remove regulator and motor, remove two screws securing window lower stop to door inner panel and remove stop. Disconnect wires, then with window lowered to full down position, remove two retainers securing window channel roller assemblies to regulator arms. Separate regulator arm pivots from rollers. *NOTE - If window could not be lower d previously, remove screws securing regulator assembly to door inner panel and lower regulator and window as an ass mbly in door to provid acc ss to window chann l roller r tainers.* Raise window assembly to full up position and retain with a rubber wedge. Remove capscrews securing regulator assembly to door inner panel and remove regulator and motor as an assembly from door.

Installation - *NOTE - To install motor only, secure motor and coupling to regulator with two steel eyelets and nuts, then tighten nuts until the two eyelets on each side of rubber grommet in motor mounting flange butt together. Connect motor wires.* To install regulator and motor assembly, snap retainers on rollers and install on channels. *NOTE - Lubricate roller assemblies, channel guides, and center pivot of regulator.* Install regulator and motor as an assembly and secure to door inner panel, then connect motor. Remove rubber wedges and lower window assembly until roller assemblies are in line with pivots on regulator arms. Press regulator arm pivots into roller assemblies until retainers drop into pivot grooves. Temporarily connect battery and check window for proper operation. Complete installation by reversing removal procedure.

Rear Door Window: Raise window to full up position, then disconnect battery ground cable. Remove door trim panel and door water shield. On 4-door hardtop models, remove two screws securing upper stop to inner panel and remove stop. On all models, disconnect motor wires at "quick-disconnects". Use a wire hook and remove retainers from window rollers. Separate regulator arms from rollers and prop window in the up position. Remove screws securing regulator to door inner panel. On 4-door hardtop models remove three screws retaining equalizer arm guide and remove guide, then remove regulator and motor as an assembly through door access hole. On other models, slide equalizer arm out of equalizer arm bracket and remove regulator and motor as an assembly through the access hole.

Installation - Same as for front door windows (above).



FORD & EDSEL WINDOW CONTROL WIRING DIAGRAM

FORD

Ford: Front Door Window - Remove trim panel, and loosen water shield to uncover access holes. On Galaxie and Fairlane Town Sedans and on Station Wagons, disconnect regulator from glass channel roller. On other models, disconnect regulator at arm and plate. On all models, raise the glass by hand and secure it in a raised position. On Galaxie & Fairlane Town Sedans and on Station Wagons, disconnect front run bracket from inner panel to make room for removal of regulator. On all models, remove regulator retaining screws and remove regulator through access hole.

Installation - Reverse removal procedure.

Thunderbird - Remove trim panel and loosen plastic water shield enough to get to access holes. Block window in the up position, then remove regulator assembly arm retainer clip at arm and plate assembly and remove regulator arm from plate assembly. *NOTE - If arm and plate ass mbly must be removed, lower window and disconnect arms from the two glass roller*

CONTINUED ON NEXT PAGE

1959-60 EDSEL, FORD, LINCOLN, MERCURY (C ntinu d)

assemblies, then remove arm and plate assembly. This can be done without removing regulator or door glass. Remove regulator assembly retaining screws and remove regulator assembly. Disconnect wires from regulator motor at bullet connectors. To install, reverse removal procedure

R ar Door Window: Remove trim panel and loosen water shield to uncover access holes. Lower glass about half way, disconnect regulator arms, and support window in raised position Remove regulator retaining screws and slide equalizer arm out of bracket or the guide, then remove regulator through door access hole.

Installation - Reverse removal procedure

Ford 1959 (Quarter Window): Remove rear seat cushion, arm rest rear seat back medallion (on Club Victoria) rear seat back garnish molding and quarter trim panel Proceed as follows

Custom 2-Door Sedan - Remove fibre lower access hole cover and lower the quarter window Disconnect regulator arm from lower glass channel by removing hairpin clip from roller assembly and removing all parts of roller assembly Raise glass and tape in place Remove regulator assembly retaining screws then remove regulator through lower access hole To install reverse removal procedure

Club Victoria - Remove fibre lower access hole cover and the upper access hole cover Lower quarter window so regulator arm is accessible through the upper access hole then disconnect regulator arm from glass lower channel by pulling the roller assembly hairpin clip and removing parts of the roller assembly Raise glass to top of opening and tape in position Remove regulator retaining screws and remove regulator through lower access hole To install reverse removal procedure

Club Sedan - Remove upper and lower access hole covers Remove front guide adjusting screw nuts and the front guide retaining screws then pull front guide down to disengage it from guide roller on lower channel and remove front guide through lower access hole Lower window so regulator arm is accessible through upper access hole then disconnect regulator arm from lower channel by pulling the hairpin clip and removing the parts of the roller assembly Raise quarter window to top position and tape in place Remove regulator retaining screws and remove regulator assembly through lower access hole To install reverse removal procedure

Convertible - Remove access hole cover and lower the window half way Disconnect regulator arm from glass lower channel by pulling roller assembly hair pin clip and removing all parts of the roller assembly Raise glass to the top position and tape in place Remove regulator retaining screws then remove regulator assembly through the access opening To install reverse removal procedure

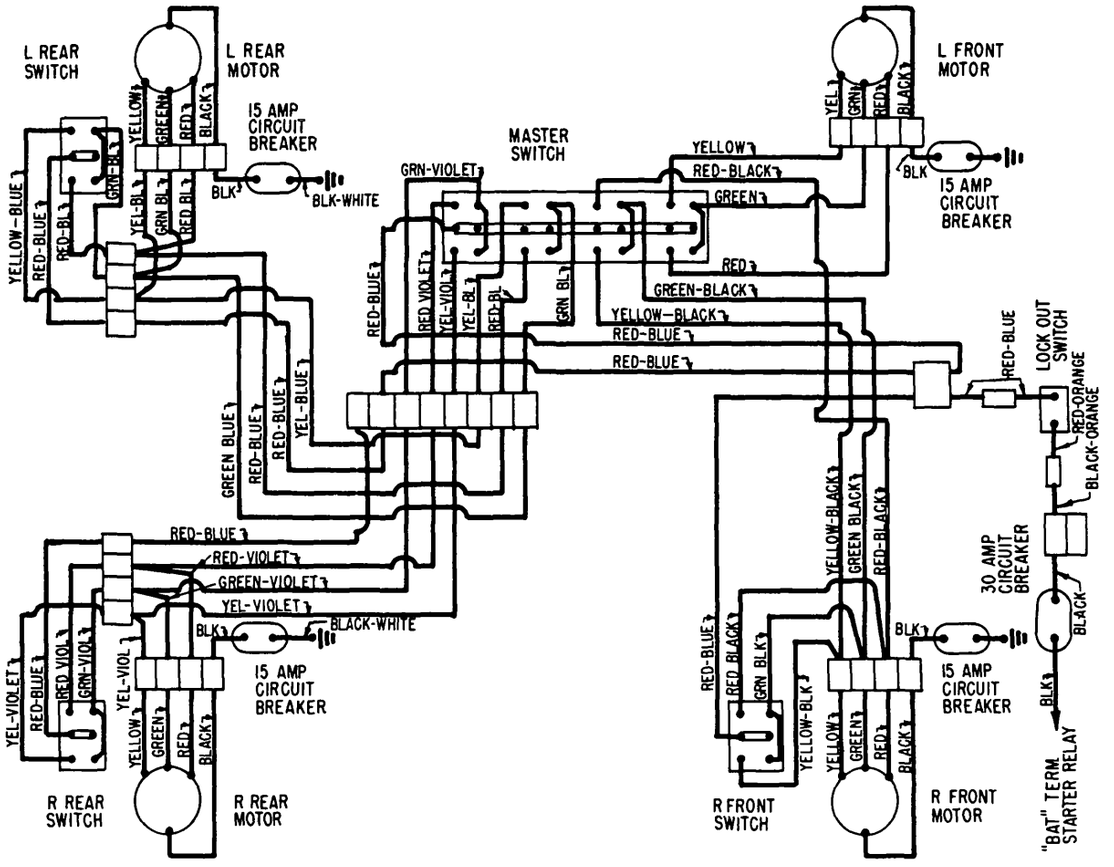
F rd 1960 (Quarter Window): Remove rear seat cushion, seat back, and trim panel. Loosen water shroud to uncover access holes and lower window as necessary to disconnect regulator arms from glass channel("Galaxie" Club Victoria), glass channel rollers (2-Doors) Raise window and support in raised position

2-Door Sedans - Remove regulator screws and slide regulator arm out of equalizer bracket and remove regulator.

Club Victoria - Remove regulator screws and remove regulator.

Convertible & 2-Door Hardtop - Remove rear seat and quarter trim panel Remove regulator to inner panel screws and remove regulator by sliding regulator arm and roller out of glass channel. To install, reverse removal procedure.

Other Models (Exc. Convertible & 2-Door Hardtop) - Remove rear seat and quarter trim panel. Remove quarter window lower stop Lower window and remove window roller retainer clips. Disengage regulator arms from rollers. With window held in full up position, remove motor from regulator, then remove regulator to inner panel retaining screws Slide regulator equalizer arm out of equalizer arm bracket and remove regulator assembly through access hole To install, reverse removal procedure.



MERCURY WINDOW CONTROL WIRING DIAGRAM

LINCOLN & CONTINENTAL

Lincoln & C ntinental (Front Do r Window): Remove garnish molding and trim panel, then remove window inside spacer assembly Remove door access cover plate, then remove window lower stop Remove two spring type retainers securing glass channel rollers to regulator arms, and remove rollers Raise window and wedge it in the up position and remove two nuts securing motor to regulator assembly Disconnect rubber coupling by pulling down on motor Lay motor in bottom of door Remove lower screw securing regulator motor bracket, then remove three screws securing regulator assembly to door Pull regulator arm roller out of equalizer arm bracket and remove regulator assembly through access hole in door inner panel To install, reverse removal procedure

Lincoln & Continental (Rear D r Window): Remove garnish molding and trim panel, then remove window inside spacer assembly Remove door access cover plate, then raise window to top and remove two spring type retainers securing window channel rollers to regulator arms Lower window and remove rollers Raise

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1959-60 EDSEL, FORD, LINCOLN, MERCURY (C ntinu d)

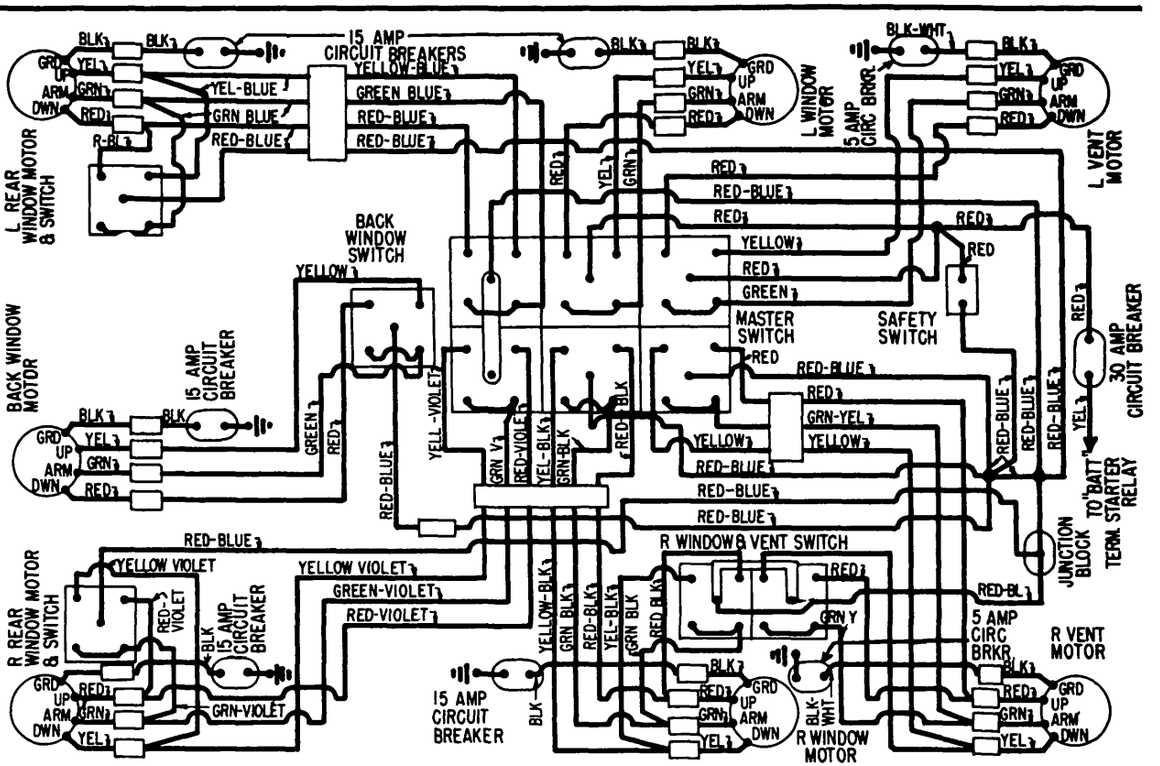
window and wedge it in the up position Remove window lower stop from center guide, then disconnect wires from regulator motor Remove screw securing regulator lower bracket, then remove four screws securing regulator assembly to door inner panel Lower regulator assembly for access to two nuts and washers securing motor to regulator assembly Remove motor and lay it in bottom of door Remove regulator assembly through access hole

Lincoln & Continental, Exc. Convertible (Quarter Window): Lower quarter window as far as possible, then remove quarter arm rest and bracket, rear seat cushion, seat back cushion and quarter trim panel Work through access hole in upper front of quarter window regulator panel, and remove two capscrews retaining quarter window front guide-to-door lock pillar reinforcement Disconnect motor lead wires at bottom of regulator panel Scribe a line on quarter panel along front of quarter window regulator as a guide for installation Remove capscrews securing regulator panel assembly to quarter panel, then remove window and regulator panel assembly Remove capscrews securing U-shaped bracket to rear end of lower window channel and remove guide bracket and plastic button assembly Remove window channel rollers, then lift rear edge of glass away from regulator arm pivots Slide U-shaped guide attached to front end of window off of guide channel, then remove window, and regulator assembly To install, reverse removal procedure

Lincoln & Contin ntal, Convertible (Quarter Window): Remove garnish molding and trim panel and lower water shield Remove lower channel roller Raise window and wedge it in the up position, then remove four screws securing regulator assembly to quarter inner panel Lower regulator assembly and remove nuts securing motor to regulator Disconnect rubber coupling by pulling down on motor, and lay motor in bottom of door Remove regulator through lower access hole To install, reverse removal procedure

Contin ntal, Exc Conv rtible (Rear Window): Remove back window inside lower garnish molding and remove rear seat and back cushion Remove sheet metal screws and capscrews securing back window housing cover panel and remove panel With window in up position, remove two spring type retainers securing glass channel rollers to regulator arms and remove rollers Disconnect motor lead wires Raise window and wedge it in the up position Remove spare wheel from rear compartment, then remove rear compartment front lining board Remove screws securing regulator assembly to back window housing, then from inside the car, remove regulator assembly To install, reverse removal procedures

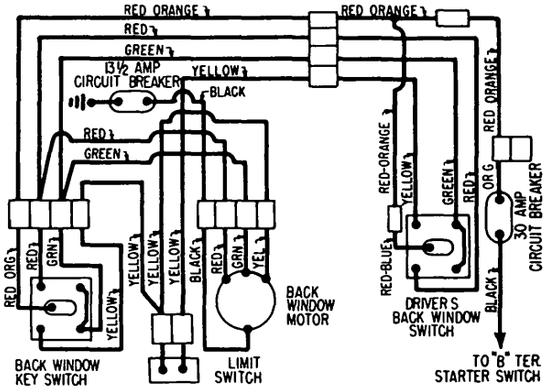
C ntin ntal, C nvertible (R ar Wind w): Remove rear seat and back cushions Raise back window and open the upper back panel Remove spring type retainers securing glass channel rollers to window regulator arms and remove rollers Lower back window assembly to floor pan, then tip window back under regulator panel and remove from car through upper back panel opening Remove the quadrant pivot bolt from regulator assembly and slide stabilizer arm from guide channel and remove regulator assembly



LINCOLN WINDOW CONTROL WIRING DIAGRAM

1959 MERCURY MODELS

Mercury (Front & Rear Door Windows): Lower window to full down position Remove inside door handle then remove garnish molding edge trim molding or lower trim molding as necessary Remove screws securing arm rest finger tip plate to support bracket and screws securing lock control escutcheon to door inner panel Remove two screws from lower edge of trim panel Pry trim clips free along sides of trim panel and lift panel to free lower trim clips from retainer at bottom edge of door On rear doors disconnect window regulator switch from connector Remove arm rest support from door inner panel then peel plastic shield down to lower edge of door (*NOTE* - To remove motor only disconnect motor wires at bullet connectors Remove two nuts and eyelets securing motor assembly and coupling to regulator assembly Remove motor and coupling through door inner panel access hole) Remove two screws from window lower stop to door inner panel and remove stop Disconnect motor wires at bullet connectors With window at full down position remove two spring type retainers securing window channel roller assemblies to window regulator arms Separate regulator arm pivots from rollers Raise window assembly to full up position and retain in place with tape or rubber wedge Remove screws securing regulator assembly to door inner panel and remove regulator assembly



MERCURY TAIL GATE WINDOW CONTROL WIRING DIAGRAM

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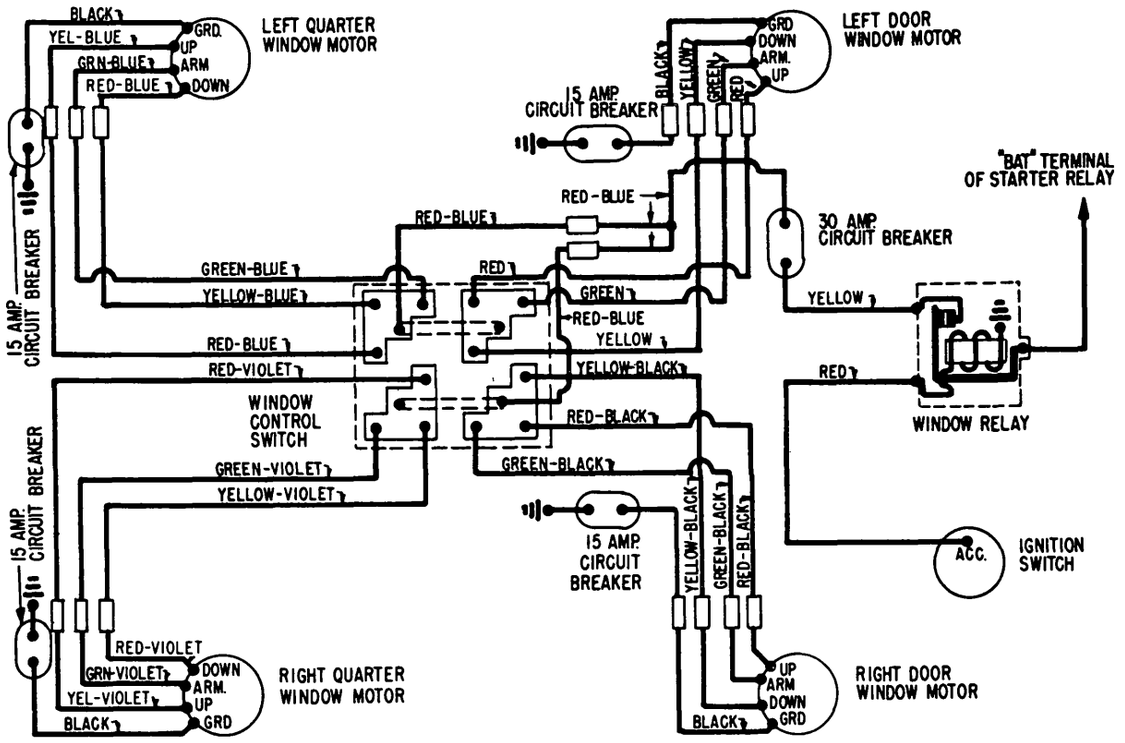
1959-60 EDSEL, FORD, LINCOLN, MERCURY (C ntinu d)

M rcury (Quarter Windows): Disconnect battery at ground cable, then proceed as follows:

C nvertible - Lower convertible top, then remove rear seat and back cushions. Remove quarter window garnish molding and upper rear quarter trim panel. Remove arm rest panel assembly and disconnect courtesy lamp from panel. Remove quarter front trim panel. Lower quarter window to full down position by operating the switch, then remove wires from switch. Remove plastic shield, then remove spring retainer securing window channel guide roller assembly to regulator arm pivot. Remove two screws securing quarter window guide button retainer assembly and remove retainer and guide button from guide assembly. Remove screws retaining regulator assembly to quarter panel and remove regulator through access hole. To install, reverse removal procedure.

Other Models (Exc. Convertible) - Remove rear seat and back cushions, then remove window garnish molding. If necessary, remove two screws at lower front of trim panel and one screw at lower edge of trim panel directly below ash tray. Pry trim clips loose from inner quarter panel along forward edge of trim panel and remove panel. Peel off plastic shield, starting at forward edge of inner panel, leaving shield attached at rear edge. Move window to a position where regulator arm is accessible through rectangular access hole. Remove spring type retainer securing window channel roller assembly to window regulator arm pivot. Pull regulator arm free of window guide. Raise window and retain in the full up position with tape or by inserting a screwdriver in slanted slot at upper edge of inner panel. Remove wires from regulator switch, then remove screws securing regulator to inner panel and remove regulator through access hole. To install, reverse removal procedure.

Mercury Station Wagon (Tailgate Window): Lower tailgate and remove latch handle. Remove three screws securing tailgate lock release control assembly to window lower garnish molding. Remove garnish molding and end spacers. Remove four tailgate skid strips. Remove both side tailgate inner panel lock access hole cover plates and regulator access hole cover plate. Remove plastic shield. *(NOTE* - If motor only is being removed, remove two nuts securing motor to regulator and screw securing motor brace to inner panel. Turn motor coupling manually to raise window to gain access to wires, then disconnect wires at bullet connectors. Remove motor). Depress back window latch with a screwdriver and raise window to full up position. While supporting window, remove spring retainers from window channel guide roller assemblies. Lower window into tailgate approximately two inches. While raising regulator arms for free arm pivots from rollers and window channel guides, remove back window from tailgate. Disconnect wires at bullet connectors and key-switch wires at quick disconnect. Disconnect right side lock control rod from lock release control assembly and disconnect



FORD THUNDERBIRD WINDOW CONTROL WIRING DIAGRAM

lock trigger release rod from trigger. Move lock control rod and lock release control assembly out to sides. Remove s. s attaching regulator assembly to tailgate inner panel and screw attaching motor brace to tailgate Move regulator assembly to free roller assembly from regulator equalizer arm guide bracket, then remove regulator and motor out of window opening. To install, reverse removal procedure.

► *MERCURY STATION WAGON TAILGATE KEY-SWITCH & LIMIT SWITCH NOTE: Replacement procedure are the same as for motor and regulator assemblies. See above.*

1960 MERCURY MODELS

Mercury (Front Door Windows): Lower window assembly to full down position. Disconnect battery ground cable and carefully remove door trim panel and panel water-shield. Remove window lower stop and disconnect motor wires at connector. With window at full down position, remove two retainers that hold window channel roller assemblies to window regulator arms. Separate arm pivots from rollers. Raise and secure window to full up position and remove regulator assembly to inner panel screws and remove regulator and motor from door. To install, reverse removal procedure.

M rcury R ar D r Windows (4-Do r Hardtop & Sta. Wgn.): Raise window to full up position and disconnect battery then remove door trim panel, upper stop, and disconnect motor wires at connector. Remove retainers from window rollers and separate arms from rollers then raise and secure window in up position. Remove center guide then remove regulator and motor through door access hole. To install, reverse removal procedure.

Mercury Rear Door Window (4-D r Sedans): Raise the window to full up position. Disconnect battery ground and remove trim panel. Disconnect motor wires at connector and remove window roller retainers then raise and secure window in up position. Remove regulator from inner panel and slide equalizer out of equalizer bracket and remove regulator and motor through door access hole. To install, reverse removal procedure.

Mercury (Quarter Windows): Remove rear seat and quarter trim panel then proceed as follows:

2-Door Models (Exc. 2-Door S dan) - Remove regulator to inner panel screws, then remove regulator by sliding arm and roller out of glass channel. To install, reverse removal procedure.

2-Door Sedan - Remove quarter window lower stop, lower window, and remove roller retainer clips, then disengage regulator arms from rollers. Secure window in full up position and remove motor from regulator. Remove regulator to quarter panel screws, slide equalizer arm out of equalizer arm bracket and remove regulator through access hole. To install, reverse removal procedure.

M rcury Stati n Wagon (Tail Gat Window) - Lower tail gate, remove tail gate latch handle. Remove window garnish molding assembly, tail gate trim panel and

CONTINUED ON NEXT PAGE

1959-60 EDSEL, FORD, LINCOLN, MERCURY (C ntinu d)

water shield, then remove window assembly Disconnect motor wires at bullet connectors and key switch wires at "quick-disconnect" Disconnect right side lock control rod from lock release assembly and lock trigger release rod from trigger Move lock control rod and lock release control assembly out to sides and remove regulator assembly to tail gate inner panel screws Remove screw, nut and washer securing motor brace to inner panel Move regulator to free roller assembly from equalizer arm guide bracket Remove regulator and motor assembly To install, reverse removal procedure

Back Wind w Switch - Lower tail gate and remove trim panel and peel water shield off to one side Raise window to full up position and secure with prop Disconnect battery ground cable and remove switch and bracket to anchor plate screws Disconnect wires at "Quick-Disconnect" and remove switch and bracket assembly

Back Window Limit Switch - Lower tail gate and peel water shield off to one side Remove limit switch assembly to inner panel screws and remove assembly through access hole Disconnect wires at bullet connector

DISASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Turn coupling until regulator quadrant completely disengages from drive assembly gear relieving regulator spring tension *(NOTE Coupling must be turned in direction of least resistance)* Make sure that regulator arms are held when disengaging quadrant from drive assembly gear to prevent arms from springing Remove nuts and steel eyelets attaching motor to regulator Pull motor shaft from coupling and remove motor from regulator Remove capscrews attaching drive assembly to regulator and remove drive assembly

REASSEMBLY (MOTOR & REGULATOR ASSEMBLY): Install drive assembly to regulator with capscrews and install coupling on drive assembly shaft Install motor with motor shaft properly engaged in coupling Secure motor with steel eyelets and nuts to regulator assembly To obtain proper torque tighten the nuts until eyelets on each side of rubber grommet butt together Pull regulator arms against spring tension so that first tooth of quadrant begins to engage with one tooth of drive assembly gear, then turn coupling to complete engagement of gear teeth Continue to turn coupling until quadrant travels approximately three-quarters of its distance over drive assembly gear

1954-55 NASH & HUDSON ELECTRIC WINDOW REGULATORS

Huds n Wasp & H rn t (1955)
Nash Ambassad r & Stat sman (1954-55)

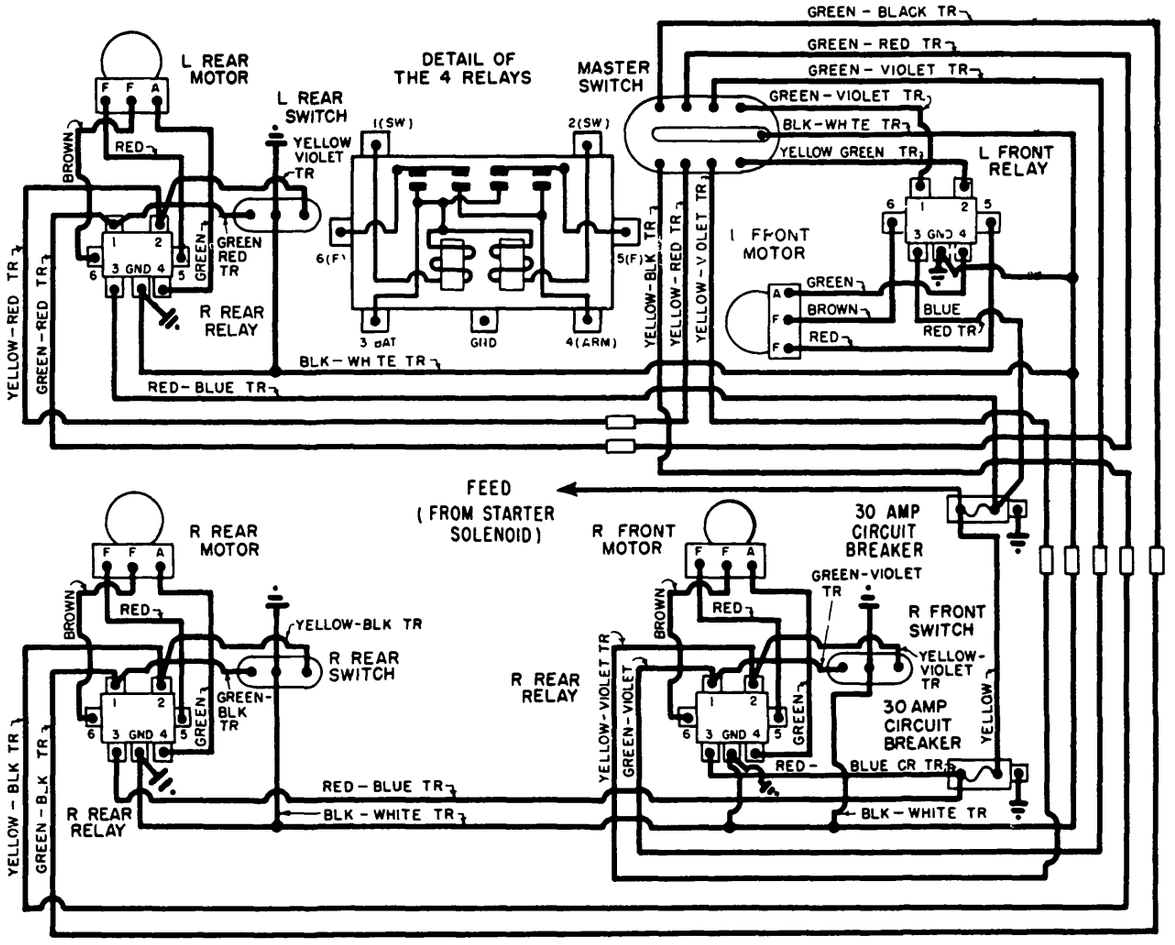
DESCRIPTION: Window regulators are individually powered by a reversible electric motor connected to the window regulator and transmission assembly by a rubber coupling The motor is controlled by a two-way switch (on trim panel) and a master multiple switch (on left front door) operating through a relay mounted within the door panel Two 30 ampere circuit breakers, one mounted to left side of dash behind instrument panel, and the other to the right front body pillar, are in the circuits supplying current to the left and right windows respectively

REMOVAL & INSTALLATION: Proceed as follows

Window Lift Door Switch: Master multiple switch is held in mounting plate by four combination inner and outer retaining springs, one at top and bottom of each end switch unit Single switches are held by two combination inner and outer retaining springs, one at top and bottom of switch To remove, compress retaining springs by inserting pointed tools in notches between switch housing and mounting plate (on master switch—rear first then front) and with prying and pressure action remove switch To install, insert switch springs in notches and press

CAUTION—Inspect all terminals to see that they will not touch the door metal panel.

Individual Switches from Switch Housing—Remove ground bar from all switches in assembly Insert pointed tool into spring retaining holes on each side of housing, compress springs, lift switch from housing End switches can be removed in same manner by lifting end springs to expose hole Individual door switches are retained in single housing in same manner as end switches of master control switches



1954-55 HUDSON & NASH

1956-57 HUDSON & NASH
1958-60 RAMBLER

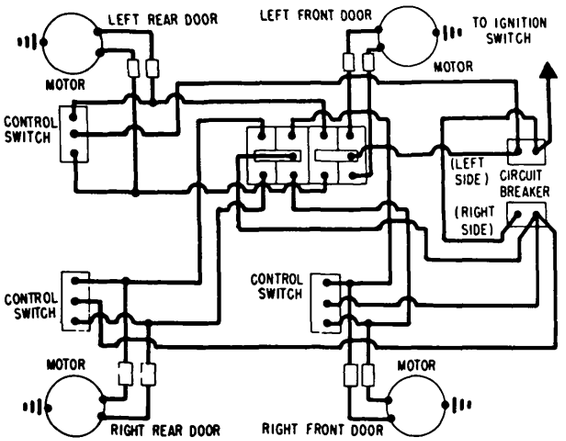
Hudson (1956-57)
Nash (1956-57)
Rambler (1958-60)

►*NOTE:* Two individual window lift systems used: (1) Leece-Neville Motor, (2) American-Bosch Motor.

DESCRIPTION: Window regulators are individually powered by electric motor in each door. Motors are controlled by individual switches on each door panel and a master switch mounted on the left front door panel. All switches are retained to trim panel by spring type retaining clips at top and bottom sides of switch. A 30 ampere circuit breaker mounted under instrument panel protects wiring harness and a 15 ampere circuit breaker is used to protect motor.

REMOVAL & INSTALLATION OF REGULATOR ASSEMBLY: *NOTE* - Regulator and motor must be removed as an assembly.

Front Door Window Regulator: *Ignition key must be in off position.* Remove window control switch assembly and door trim panel. Disconnect regulator arm from cross arm assembly by removing key slotted retainer from grooved stud riveted to cross arm assembly. Move glass to fully raised position and remove circuit breaker to inner panel screw. Disconnect motor to switch wires and remove mounting stud at lower end of center division bar. Remove regulator to door screws, hold division bar toward inner door panel (for clearance), and remove regulator and motor assembly through large opening in inner door panel. To install, reverse removal procedure.



HUDSON, NASH, RAMBLER WINDOW CONTROL
(LEECE-NEVILLE MOTOR)

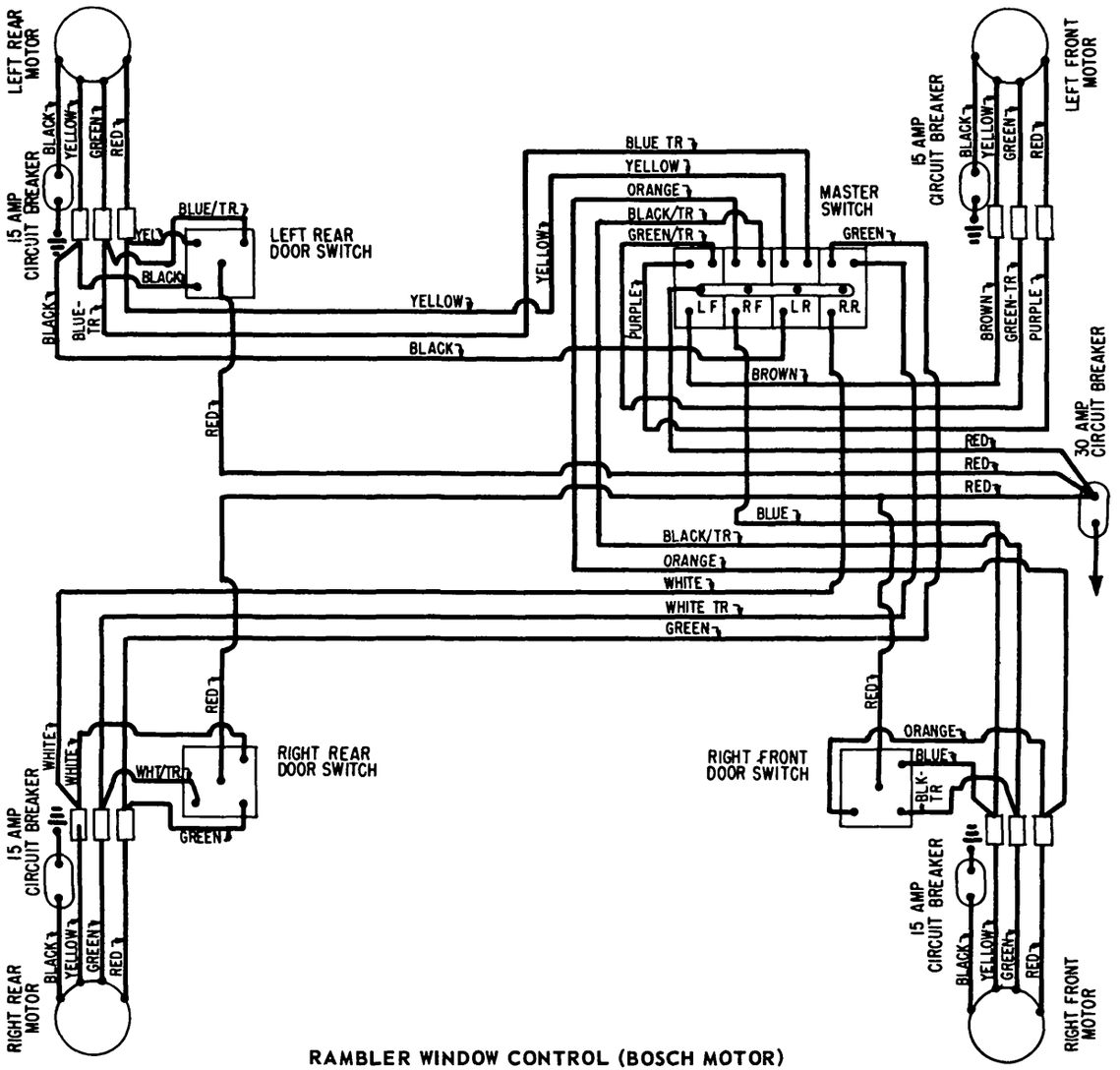
R ar D r Wind w R gulator: *Ignition key must be in off position.* Remove window control switch and door trim panel. Disconnect regulator arms from glass bottom channel by removing retainers and raise glass to fully raised position. Move regulator arms to horizontal position. Disconnect motor wires at connectors and remove circuit breaker from inner door panel. Remove regulator mounting screws and remove regulator and motor assembly through lower rear corner of cutout keeping regulator arms together. Use slight pressure if necessary.

Master Switch: *Ignition switch must be in off position.* Insert putty knife or similar tool at top of switch between switch housing and mounting plate and depress retaining spring by pushing downward on both springs top and bottom. Tilt switch away from panel at top of switch and insert putty knife at retainer locations. When removing switch, tag each wire and mark terminal for proper reassembly.

TROUBLE SHOOTING: All Wind ws Fail To Op rat In Either Direction or Operate Sl wly - Battery low or dead, circuit breaker faulty. Battery ground loose, or terminal in control circuit loose or corroded.

Windows Operate Intermittently - Loose wires on circuit breaker or switches, or circuit breaker faulty.

One Window Fails To Operat - Loose or broken connections at dash circuit breaker and switch in door. Bypass switch and check motor separately.



RAMBLER WINDOW CONTROL (BOSCH MOTOR)

1954 HYDRO-LECTRIC WINDOW & SEAT REGULATORS

Buick, Series 66C & 100 Convertible (1954)
Oldsmobile, Early Super 88 & 98 (1954)
Hudson, 5D & 7D Convertible (1954)
Packard (1954)

►**PRODUCTION CHANGE:** Two different pumps have been used, a low pressure pump (200-210 p.s.i.), and a high pressure pump (250-260 p.s.i.). These pumps can be identified by relief valve plug at rear of pump: low pressure has cadmium plated plug, high pressure a copper plated plug.

DESCRIPTION: This type control consists of an electric motor with direct-connected hydraulic pump which supplies fluid under pressure to a single acting power cylinder incorporated for each window regulator used (additional cylinder located under front seat for front seat adjustment on some models). Fluid is pumped into the cylinders by the motor to raise windows or move seat forward, but windows are lowered and seat moved backward by spring hooked to regulator (switch operates solenoid valve in cylinder only—the motors does not operate). When the switch is in the "off" or center position, the solenoid valve is closed and fluid is trapped in the cylinder to hold windows or seat in desired position. The system has the following control units:

Power Unit—Consists of motor, hydraulic pump, and fluid reservoir assembly. This unit is same as type used for Convertible Top Control on these same cars.

Control Switches—Consist of simple two-way switches (one for each window and one for seat adjuster—duplicate switches for rear window control located on left front door) Switch lever is normally in "off" or center position and must be held in the "up" or "down" ("forward" or "back" for seat adjustment) position while window (or seat) is operating.

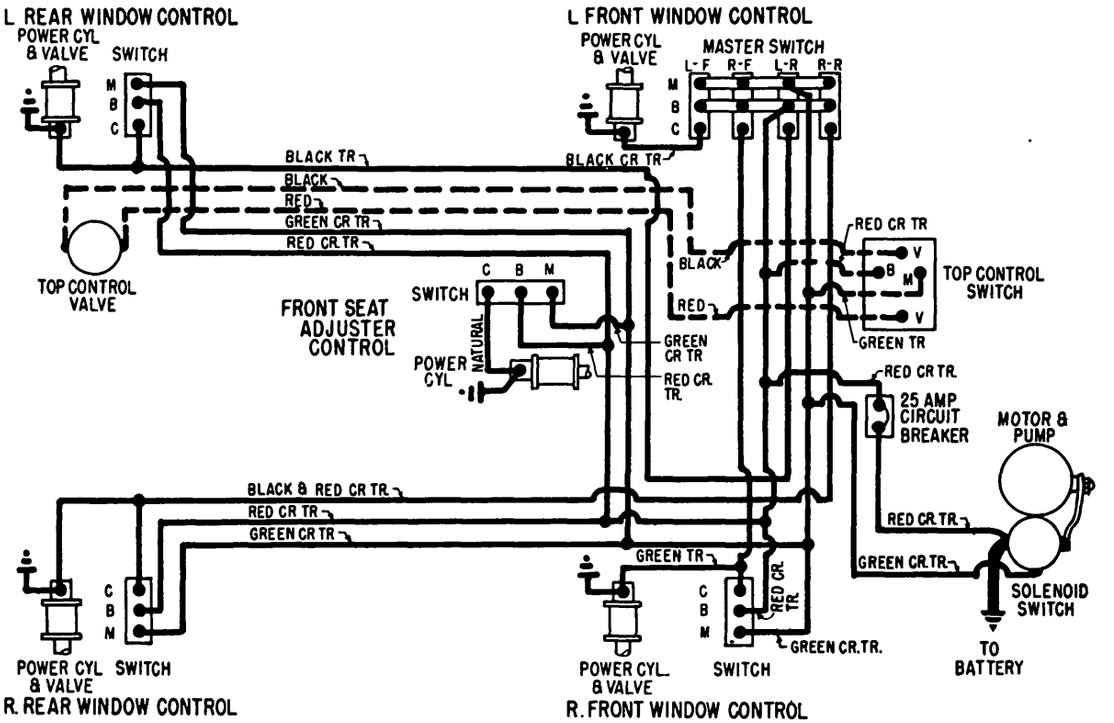
Hydraulic Cylinders (Window Regulator & Seat Adjuster)—Single acting, solenoid valve controlled. Cylinders raise windows or move seat forward. When solenoid valve in cylinder is opened (to lower windows or move seat rearward) power unit does not operate and windows and seat are retracted by springs.

NOTE—This cylinder is a "vented" type, making the periodic changing of hydraulic fluid necessary. Water and other foreign matter will cause sludging and deterioration of fluid. (See Draining & Refilling).

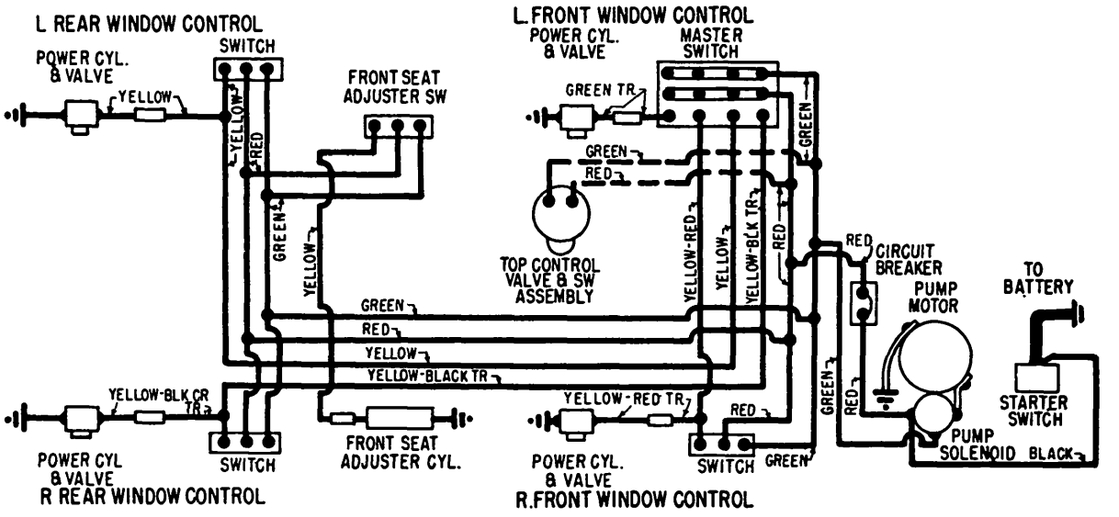
REMOVAL: Control units can be removed for servicing or replacement as follows:

►*CAUTION*—Before any repairs are made to the regulators, hydraulic system or electrical system, battery terminal should be disconnected to avoid injury or damage to the car.

Power Unit: Disconnect battery cable as a safety precaution. Disconnect ground strap and wire at motor. Disconnect hydraulic tubing at pump and cap tubing ends. Remove bolts from rubber mounting, (it may be necessary to remove fluid reservoir for access to lower mounting bolts). Lift unit out.



TPYICAL G.M. CONTROL WIRING DIAGRAM



TYPICAL PACKARD CONTROL WIRING DIAGRAM

Window Regulators: Lower window to extreme open position. Remove switch from trim panel and remove wires from switch (Mark wire to insure correct reassembly). Remove remote control handles and door trim panel. Remove wire from solenoid connection and disconnect fluid line at cylinder (care should be taken to catch any fluid remaining in cylinder), cap end of fluid line tubing. Loosen bolts holding glass channel to regulator arm and slide rollers out of channel. Raise window by hand and secure in raised position by wrapping several

CONTINUED ON NEXT PAGE

1954 HYDRO-LECTRIC WINDOW & SEAT REGULATORS (Continued)

strips of masking tape over top of door and sticking ends to glass. Remove nuts securing regulator assembly to door panel. Regulator can be removed from door through the elongated hole provided.

Removal of Hydraulic Cylinder—Place regulator assembly firmly in vice. Remove lower cylinder retaining clip (Spring type clip or bolted clamp). Remove upper clip or clamp and take cylinder out of assembly. NOTE—Cylinder cannot be repaired, replace complete cylinder assembly if necessary.

Seat Adjuster Regulator Assembly—With seat in extreme rear position, remove front seat cushion and disconnect positive terminal of battery. Disconnect solenoid valve wire at connector in lead from seat actuating switch. Remove nut and washer joining forward end of regulator to support on seat frame, then remove entire seat frame from body. Turn back rear floor carpet and remove screws and seat adjuster cover. Disconnect hydraulic lines from regulator and cap the ends. Remove nut and washer holding rear end of regulator to floor pan support brackets, then remove regulator.

HYDRAULIC MOTOR & PUMP: *See "Hydro-Lectric Motor & Pump".*

HYDRO-LECTRIC TOP CONTROL

Buick (1954-60)
Cadillac (1954-60)
Chevrolet (1954-60)
Chrysler & DeSoto (1954-55)
Dodge (1955). See Note below.
Ford (Late 1954-55).
Oldsmobile (1954-60)
Packard (1955)
Plymouth (1955). See Note below.
Pontiac (1954-60)

►*DODGE NOTE: For type used in 1954, see "Dodge & Plymouth Electric Top Control".*

►*PLYMOUTH NOTE: For type used in 1954 models, see "Dodge & Plymouth Electric Top Control".*

►CHANGES & CORRECTIONS

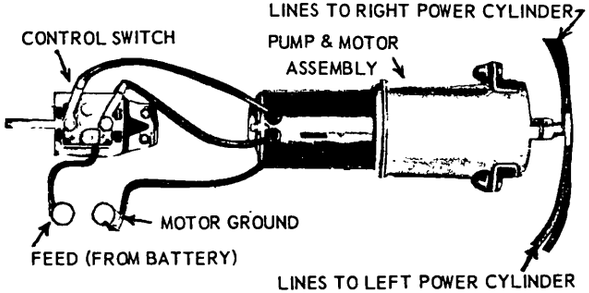
►*1955 MOTOR & PUMP ASSEMBLY PRODUCTION CHANGE:* Early Motor & Pump Assembly was gear type, later assembly is rotor type. Later rotor type may be used to replace the early gear type, but special service adapter hoses must be used when making the installation.

DESCRIPTION: This unit is used on convertible models not having hydraulic window regulators. This assembly consists of a reversible type motor directly connected to a hydraulic pump which supplies fluid under pressure to two double acting hydraulic cylinders. Motor and pump are accessible either through luggage compartment or by removing rear seat (depending on car model). Fluid reservoir is integral with pump and motor assembly and as the system is not vented to atmosphere, it is not necessary to replace hydraulic fluid periodically

CHECKING FLUID LEVEL: With top in raised position, disconnect positive or negative battery cable. Remove pump and motor shield, in rear compartment, and place absorbent material below reservoir. Remove filler plug from reservoir. On motor and pump assemblies installed horizontally, fluid should be at lower edge of filler cap hole. If fluid low, add hydraulic fluid Delco No. 11 (GM Hydraulic Brake Fluid Super No. 11).

REPLACING FLUID (After Repairs): Cylinders and hydraulic system contains more fluid than one filling of reservoir will supply. Check reservoir frequently during refilling of system. Air in system will automatically bleed out with a few operations of top.

CHECKING HYDRAULIC PRESSURES: Remove motor and pump assembly. Install plug in one port and pressure gauge in port to be checked. Actuate motor with an applied terminal voltage of 9.5-11.0 volts. Gauge should show a pressure between 240 and 280 PSI.



PUMP, MOTOR & SWITCH ASSEMBLY

Check pressure in other port. *NOTE* - A difference in pressure readings may exist between pressure port for top of cylinders and for bottom of cylinders. This condition is acceptable if both readings are within the limits of 240-280 PSI. If pressure not within specified limits, unit is defective and should be repaired or replaced.

CHECKING OPERATION OF LIFT CYLINDERS: Remove rear seat cushion and folding top compartment side panel assembly. Operate folding top control switch and observe lift cylinders during up and down cycles for these conditions:

1) If movement of cylinder rods is not coordinated or sluggish when motor is actuated, check hydraulic hoses from the motor and pump to cylinders for kinks.

2) If one cylinder rod moves slower than other, cylinder with slow moving rod is defective and should be replaced.

3) If both cylinder rods move slowly, or do not move at all, check pressure of pump. See "Checking Hydraulic Pressures" above.

REMOVAL & INSTALLATION (Top Lift Cylinder): Raise top to full "UP" position. Disconnect battery positive cable or battery-to-top switch wire. Remove rear seat cushion and seat back (*CAUTION* - In addition to hangers and bend-over tabs, rear seat is secured with a screw at each upper corner). Remove nut and secure end of piston rod to top linkage. Push piston rod down into cylinder to full bottom limit. Remove all retainers from hydraulic tubing leading to cylinder. Remove cotter pin and clevis securing cylinder to floor bracket. Lift top cylinder up through access hole in top compartment and then out through cutout in rear seat back compartment panel. Remove filler cap from reservoir and disconnect tubing from top and bottom of cylinder. Cap ends of hydraulic lines to prevent dripping of fluid. To install, reverse removal procedure. Make sure piston is at bottom of travel when installing. Seal hydraulic fittings with a thread sealing compound, and check fluid level in reservoir.

Motor & Pump Assembly - Raise top to full "UP" position, then remove power unit cover plate shield (behind rear seat or in luggage compartment). Disconnect battery cable or battery to switch wire. *CAUTION - To prevent pressure in system from spraying oil when fittings are loosened, remove fluid fill cap in reservoir and vent the system. Replace filler cap.* Disconnect ground wire and wires to motor, then disconnect hydraulic lines at pump and cap open fittings. Remove pump and motor attaching bolts and remove complete assembly. To install, reverse removal procedure. Seal all hydraulic fittings with a thread sealing compound.

HYDRAULIC MOTOR & PUMP DISASSEMBLY & REASSEMBLY: *See "Hydro-Lectric Motor & Pump".*

HYDRO-LECTRIC PUMP & MOTOR

DESCRIPTION: These pump units consist of a motor, rotary type pump and reservoir assembly of various designs. Pressure regulation of fluid is provided by a relief valve assembly built into the pump housing.

LUBRICATION

DRAINING & REFILLING (Vented Type System): Entire hydraulic system should be drained and refilled with clean fluid at least once each year. Use recommended fuild or high quality brake fluid and proceed as follows: Lower all windows to extreme bottom (if car has seat adjusters, move seat to rear position). Remove ground cable from battery. Remove fluid reservoir and wash with alcohol. On cars with hydraulic top lift units, hold a container under pump unit and manually lower and raise top (with top control knob in proper position) to drain both cylinders. To fill system, fill reservoir to fluid line with recommended fluid, then connect battery and operate top up and down to pump fluid into cylinders. *CAUTION - Add fluid as necessary during this operation as top lift cylinders have a capacity about 2½ tim s greater than reservoir.* With system filled and fluid level in reservoir at fluid level line, operate top up and down until all air is exhausted from lines. Operate seat and all windows to expell any air, then refill fluid reservoir to proper level.

Seal d Typ Syst ms (N t Vented): Not necessary to replace fluid periodically. See "Checking Fluid Level" below.

CHECKING FLUID LEVEL (Sealed Type Systems): With top in raised position, disconnect battery cable. Remove pump and motor shield and place absorbent material below reservoir, then remove filler plug. On motor and pump assemblies that are installed horizontally, fluid should be at lower edge of filler cap hole. On vertically mounted units, fluid should be 2" from top of reservoir.

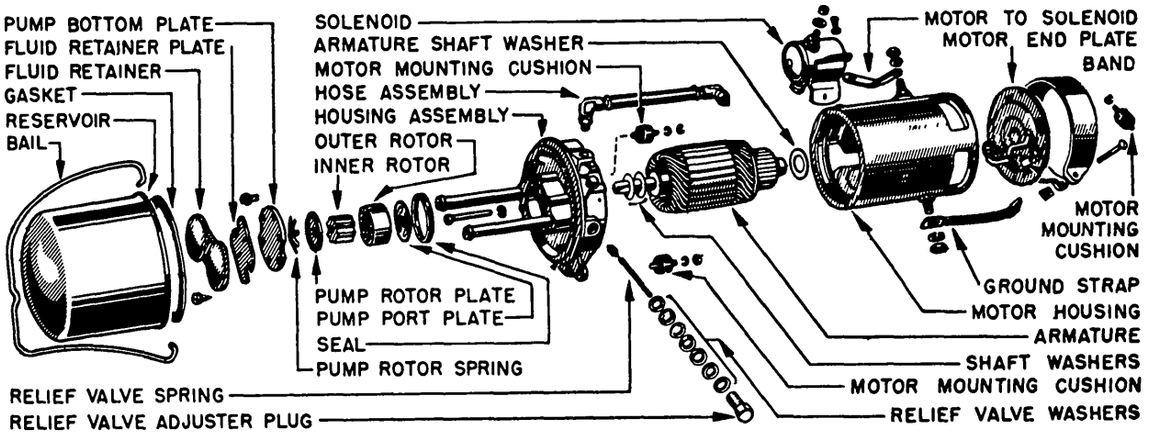
OVERHAUL

1954 MODELS

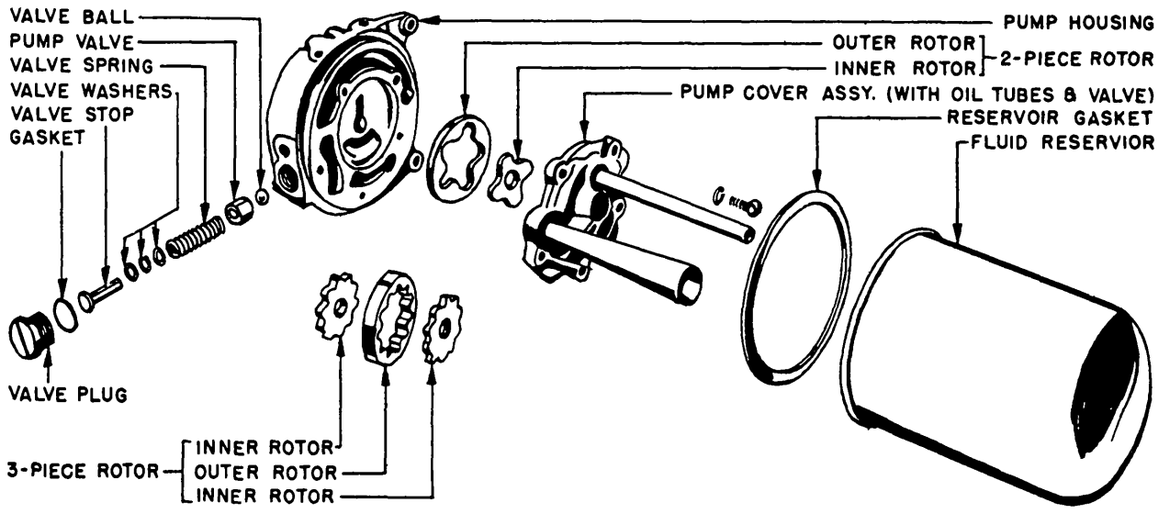
PUMP UNIT DISASSEMBLY: Remove bail and pump reservoir from housing. Remove capscrew securing upper cushion bracket to motor frame and remove bracket. Loosen cover, band and slide off end of motor frame. Remove field brush from holder and take out three cap screws securing motor frame to motor head. Remove motor head. Remove armature. Remove the four cap screws holding pump housing to motor frame and remove the pump. Remove reservoir fluid retainer and retainer plate by taking out two sheet metal screws in retainer. Remove the six cap screws securing pump bottom plate to pump housing and remove bottom plate, then remove rotor spring, plate, inner and outer rotors, port plate and bottom seal. Remove relief valve plug and plug washers (same number and size washers must be replaced when assembling pump), remove relief valve spring and relief valve.

PUMP UNIT REASSEMBLY: Wash all parts in alcohol and examine for wear, scoring and excessive play. Check relief valve for scores and free movement. Replace any parts that indicate wear. Blow all parts dry and blow out all passages in pump housing. Install port plate, inner and outer rotors and rotor plate. Install bottom seal and place rotor spring in position on rotor plate with nib of spring in hole

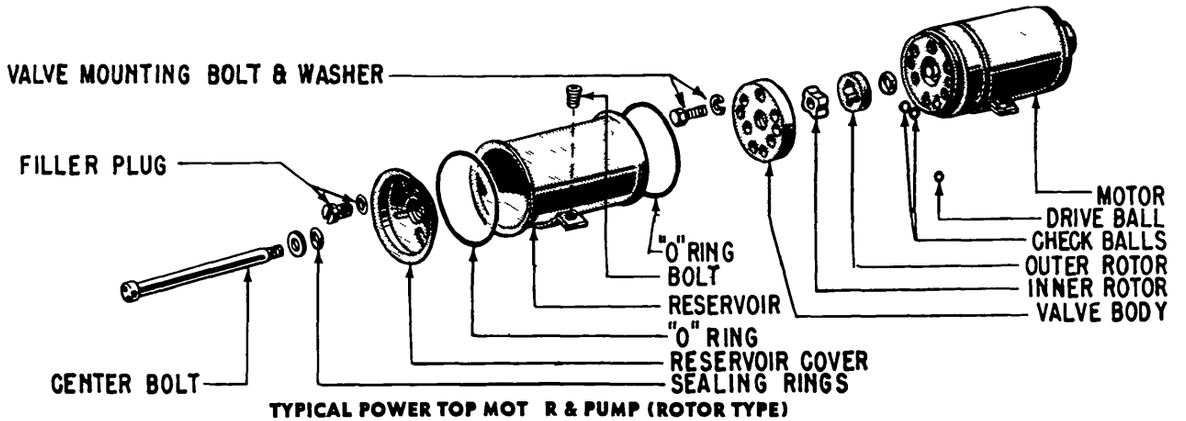
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HYDRO-LECTRIC MOTOR & PUMP ASSEMBLY (DURA PUMP)



HYDRO-LECTRIC PUMP ASSEMBLY (MORAINE PUMP)



TYPICAL POWER TOP MOT R & PUMP (ROTOR TYPE)

HYDRO-LECTRIC PUMP & MOTOR (Cont.)

in rotor plate. Place pump bottom plate in position and secure with six cap screws. Place fluid retainer plate in position between pump inlet tubes, and secure reservoir fluid retainer to retainer plate with two sheet metal screws. Install relief valve, spring, and valve plug with the same amount of washers that were removed. *(CAUTION*—Do not drop or remove these washers as they were put there by the manufacturer to adjust the valve to a minimum fluid pressure of 250-265 lb., P.S.I. ***Under no circumstance should this pressure be changed to provide higher pressure).*** Place pump in position on motor frame with relief plug 180° from solenoid, and secure pump to frame with four cap screws. Install one fibre washer on commutator end of armature shaft and two washers on drive end and install armature in motor frame. Place motor head in position and secure with three cap screws. Lift ends of brush spring and install brushes in holders. Check action of brushes to make sure they move freely under spring tension. Install cover band and tighten band screw. Install upper cushion bracket on motor head, and install fluid reservoir. (See "Draining and Refilling").

INSTALLATION (Of above assemblies): Reverse the removal instructions. NOTE—Align window regulator assembly so that window glass is free in channel in all positions.

1955-60 MODELS

PUMP UNIT DISASSEMBLY: Scribe a line across pump end plate, reservoir tube and tube end plate to insure correct reassembly of parts, then remove reservoir filler plug and drain fluid into a clean container. Remove bolt from reservoir end of assembly and remove end plate and tube (note sealing rings around bolt, reservoir end plate, and between end of reservoir tube and pump assembly.)

PUMP UNIT REASSEMBLY: Reverse removal procedure and make sure that sealing rings are properly installed. Note the scribed line made at disassembly.

AUTO-LITE POWERTOP CONTROL

Chrysler & Imperial (1956-60)
DeSoto (1956-59)
Dodge (1956-60)
Edsel (1958-60)
Ford & Mercury (1956-60)
Packard (1956)
Plymouth (1956-60)
Studebaker (1960)
Thunderbird (1959)

DESCRIPTION: Hydraulic-electric type. System consists of an electric motor, hydraulic pump and two hydraulic cylinders. A valve and port assembly in the reservoir directs flow of fluid in the system. The electric motor is controlled through a circuit breaker and switch. On Thunderbird, top control switch is located in luggage compartment and trunk lid must be raised before top is raised or lowered. For electric trunk lock on this model, see *"Trunk Lid Locks"*.

► *1956 FORD & MERCURY SLOW RAISING OR LOWERING TOP CORRECTION:* If raising or lowering top takes more than 14 seconds, it may be due to collapse of hoses under rear seat. Hoses are secured by two clamps and when tightened can collapse hoses and restrict flow of fluid to and from right hydraulic lift cylinder. To correct, insert flat washer, 1/4" inside diameter and 3/16" thick, between clamp and floor pan. When reinstalling clamps make sure there is sufficient sealer around holes in floor pan.

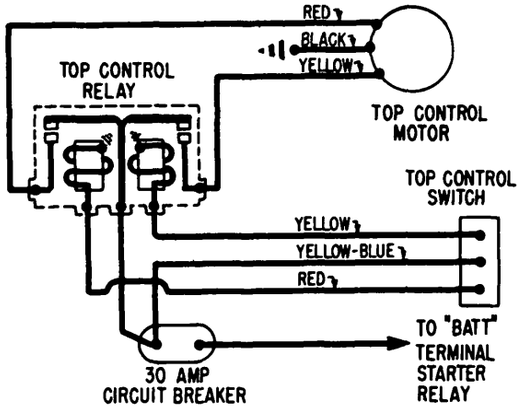
HYDRAULIC MOTOR & PUMP: See *"Hydro-Lectric Motor & Pump"*.

CHECKING FLUID LEVEL: Remove rear seat cushion, then proceed as follows:

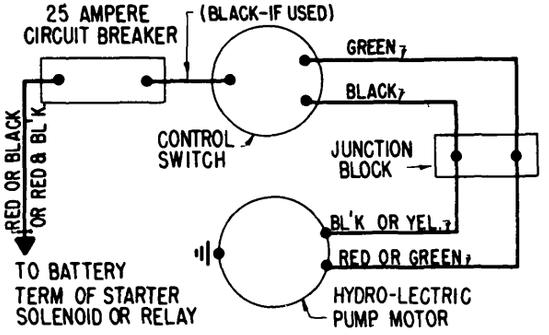
Edsel, Ford & Mercury: Loosen filler plug in end of reservoir. Operate top three times to remove all air from system. With top in "UP" position, remove filler plug and check oil level. If hydraulic fluid does not run from filler hole, add enough hydraulic brake fluid to raise level to edge of filler plug hole.

Thunderbird: Unnecessary to remove rear seat. Top must be lowered when checking fluid level. Check as for Edsel, Ford & Mercury.

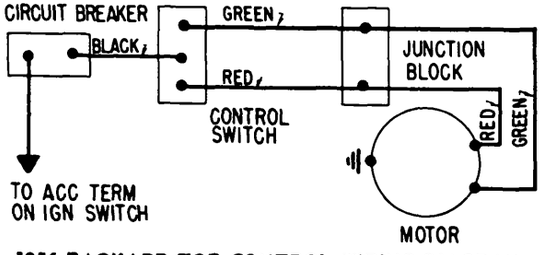
Others: Check fluid level in reservoir. If low, check for a leak due to a broken line or loose connection. Fill reservoir until fluid runs out of filler hole. Use hydraulic brake fluid such as MoPar Super Brake Fluid. After filling reservoir, raise and lower top several times to force out air in system. Always check fluid level when top is "DOWN".



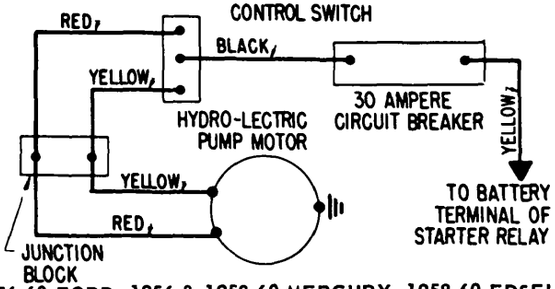
1957 MERCURY TOP CONTROL DIAGRAM



1956-60 CHRYSLER, DODGE, PLYMOUTH & 1956-59 DE SOTO TOP CONTROL DIAGRAM



1956 PACKARD TOP CONTROL WIRING DIAGRAM

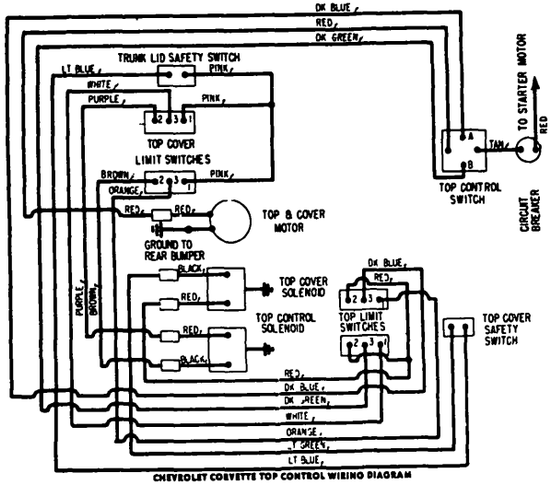


1956-60 FORD, 1956 & 1958-60 MERCURY, 1958-60 EDSEL, 1959 T-BIRD TOP CONTROL DIAGRAM

CHEVROLET CORVETTE

Chevr let Corvett (1956-60)

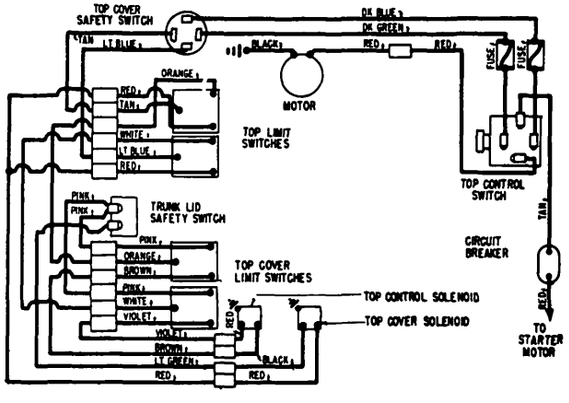
DESCRIPTION: Power operated folding top and folding compartment cover. A safety switch in the rear compartment breaks the folding top circuit and prevents top mechanism from operating while rear compartment lid is open. This prevents damage to finish of either rear compartment or folding top compartment lids. A second safety switch, in the top compartment, prevents operation of the top compartment cover or folding top operating mechanism unless cover is unlatched. Hydraulic motor will run but a by-pass prevents pressure build-up in the system. Raising and lowering operations require about 20 seconds each.



CHEVROLET CORVETTE TOP CONTROL WIRING DIAGRAM

1956 CHEVROLET CORVETTE TOP CONTROL DIAGRAM

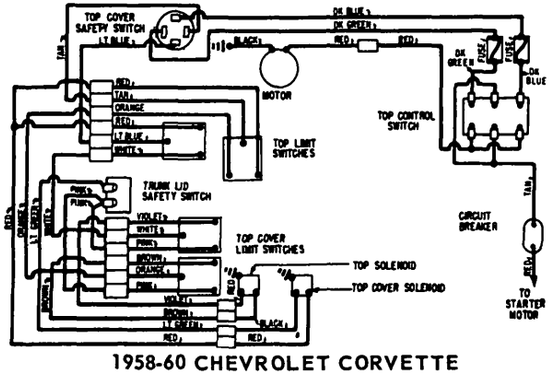
OPERATION: **Raising The Top** - Unsnap top compartment end straps at outer edge of each seat back. Push button located on seat separator panel. This unlatches the folding top compartment and at the same time completes the folding top electrical circuit. *(CAUTION* - Do not attempt to operate top without first unlatching the top compartment cover). **Push** folding top control and hold it in until the folding top compartment-cover opens, the top lifts out, and the cover closes. Push top compartment cover down until it latches. Unhook snap fasteners and allow rear bow to drop. Latch rear bow to the body. Latch header to windshield. Snap both top compartment end straps.



CHEVROLET CORVETTE TOP CONTROL DIAGRAM

1957 CHEVROLET CORVETTE TOP CONTROL DIAGRAM

Lowering The Top: Unlatch header and rear bow. Double check to see that all latches are completely free and not caught in any way. Unsnap both top compartment end straps. Hook rear bow with straps provided. Push button to unlatch top compartment cover. **Pull** the folding top control and hold until top compartment cover opens, the top folds into the compartment, and the cover closes. Push cover to close on latch. Snap top compartment end straps.



1958-60 CHEVROLET CORVETTE TOP CONTROL DIAGRAM

DODGE & PLYMOUTH ELECTRIC TOP CONTROL

Dodg (1954)
Plym uth (1954)

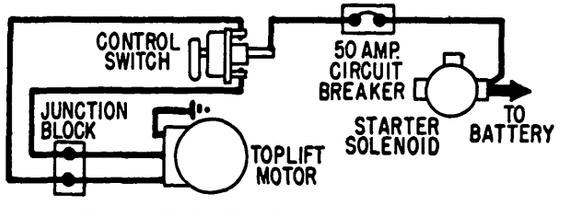
DESCRIPTION: This type top control consists of a reversible type motor, mounted on rear seat riser beneath cushion; a two-way, self-centering switch with circuit breaker, two flexible cables, and two mechanical screw jacks.

►*NOTE—Replacement parts and units are available.*

BROKEN CABLE REPLACEMENT: If cable breaks when top is partially raised or lowered, cycle cannot be completed until cable is replaced because screw jack on failed side will lock and bind. Method of replacement of broken cable varies with position of top at time of cable failure, and whether long or short cable is to be replaced.

Top Up—If short cable fails, remove broken cable. Attach new cable to transmission unit and leave motor end free. Synchronize cables. If long cable fails, remove broken cable. Install new cable and attach both ends. Disconnect short cable at motor. Synchronize cables.

Top Down—If either long or short cable fails, replace. Carefully raise top by momentarily applying power "on" and "off" (this avoids possibility of breaking cable). With locking handle in released position, let top lightly bottom so that dowel pins enter their mating holes. Disconnect short cable at motor end. Synchronize cables.



DODGE & PLYMOUTH TOP CONTROL WIRING

Top Partially Raised: If either long or short cable fails it will be necessary to raise top manually. Do not raise top with screw jacks connected to top linkage. Remove clevis bolts at top of each screw jack, Then raise top to complete "Up" position by hand. Rotate sleeves of screw jacks to their normally extended position. Reconnect with clevis bolts to top linkage. Replace broken cable. Synchronize cables.

TOP OPERATING CABLE SYNCHRONIZATION: Place top all the way up onto header. Disconnect short cable at motor end. Apply power momentarily in direction to raise top with top locking handle in released position. This takes slack out of long cable. Reconnect short cable. To recheck synchronization of cables, run top all the way down. Jack screw sleeves should seat on transmission units. If still not synchronized, repeat procedure.

FORD RETRACTABLE HARDTOP

F rd (1957-59)

►CHANGES, CAUTIONS, CORRECTIONS

►*RETRACTABLE HARDTOP OPERATION CAUTION: DO NOT retract or raise top with the car in motion. To operate top, stop car, place transmission in neutral position before operating top control switch on instrument panel.*

DESCRIPTION: The retractable hardtop has a complete metal roof assembly which may be lowered into luggage compartment automatically through electric power mechanical linkage. The electrical system includes seven reversible motors, ten power relays, eleven limit switches, an actuating switch and a cycle indicator light. Circuit breakers in control circuit feed, motor feed circuits, and in each motor ground feed protect the system. A neutral switch mounted on steering column prevents operation of top when transmission is in any drive range. A three-position spring loaded switch on the instrument panel automatically returns to the "OFF" (Center) position when switch plunger is released.

►*NOTE:* In 1959, a single rear roof lock and motor is used and the deck lock limit switch was eliminated.

OPERATION; Retract Cycle - *NOTE - This cycle starts with roof in erected position and deck lid closed and l cked.*

Deck Lid Unlock - With top control switch in retract position, current flows through roof erect and delay switch, deck open limit switch, and deck unlock power relay, actuating the deck lock motor which unlocks the deck lid through two flexible drive shafts.

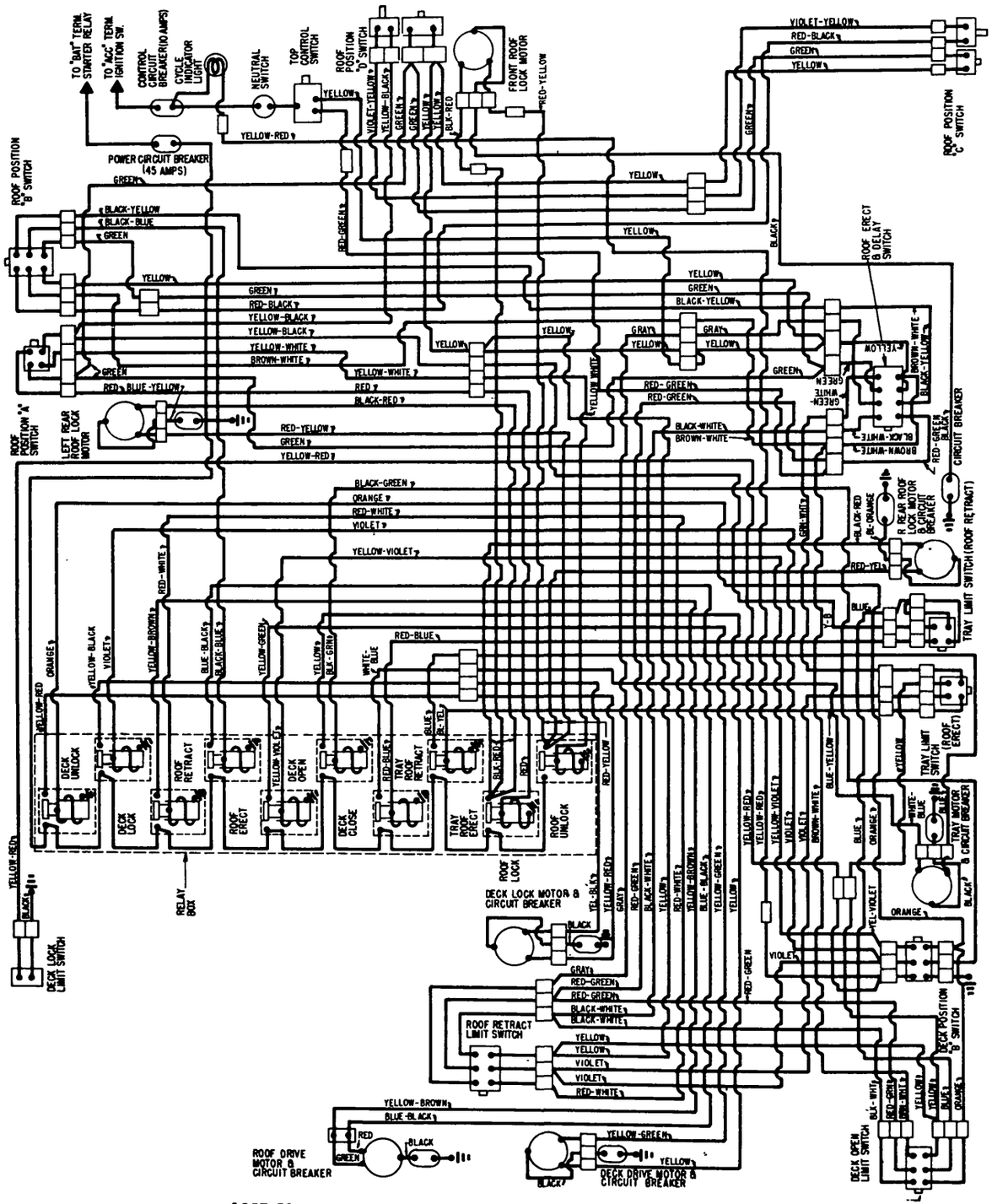
Deck Lid Opening - Mechanical motion of unlocking deck lid actuates the deck position "B" switch and deck lock limit switch allowing current to flow to deck open power relay, actuating deck motor. As deck lid reaches open position, mechanical motion of deck actuates deck open limit switch stopping deck lock motor and deck drive motor.

Package Tray Extend - The actuation of deck open limit switch by the deck (which opens deck motor and deck lock motor circuits) also closes a second set of contacts in deck open limit switch allowing current to flow through tray limit switch (roof retract cycle) to tray power relay (roof retract cycle), actuating tray motor and extending package tray so it is parallel with deck lid. As tray reaches the parallel position, it opens the tray limit switch (retract cycle), stopping tray motor.

Roof Unlock - When tray limit switch (retract cycle) is opened by package tray, another set of contacts in limit switch close, allowing current to flow through roof position "A" switch, to unlock power relay, actuating roof front lock motor and two roof rear lock motors. These motors drive power lock, two at the header and one at each roof quarter, unlocking the roof.

Roof Retract - As roof is raised by the roof locks, the roof position "D" switch, and the roof erect and delay switch are actuated, allowing current to flow through roof retract power relay and actuate the roof motor, retracting the roof. When roof is raised approximately 4" off locks, the rear roof left power link actuates the roof position "A" switch and stops roof lock motors. As roof retracts, front portion of roof is

CONTINUED ON NEXT PAGE



1957-58 FORD RETRACTABLE HARDTOP WIRING DIAGRAM

FORD RETRACTABLE HARDTOP (C ntinu d)

folded under rear roof by means of mechanical linkage. When roof reaches fully retracted position, the roof retract limit switch is actuated, stopping the roof motor.

D ck Lid Closg & L ck - As roof retract limit switch opens, another set of contacts in this switch closes allowing current to flow to deck lock power relay through deck position "B" switch to deck close power relay - actuating deck lid and deck lock motors, closing the deck lid and locking it. As deck lock screws draw deck lid down, the deck position "B" switch is opened, stopping the deck motor. When deck is fully locked, deck position "B" switch and deck lock limit switch are actuated, turning off the cycle indicator light, indicating that deck lid is fully locked and that top control switch can be released, shutting off the deck motor.

Er ct Cycl : *NOTE - This cycle starts with roof in luggag compartm nt and d ck lid closed and locked.*

D ck Lid Unl ck - With top control switch in erect position, current flows through roof retract limit switch, deck open limit switch, to deck unlock power relay actuating the deck lock motor and unlocking the deck lid.

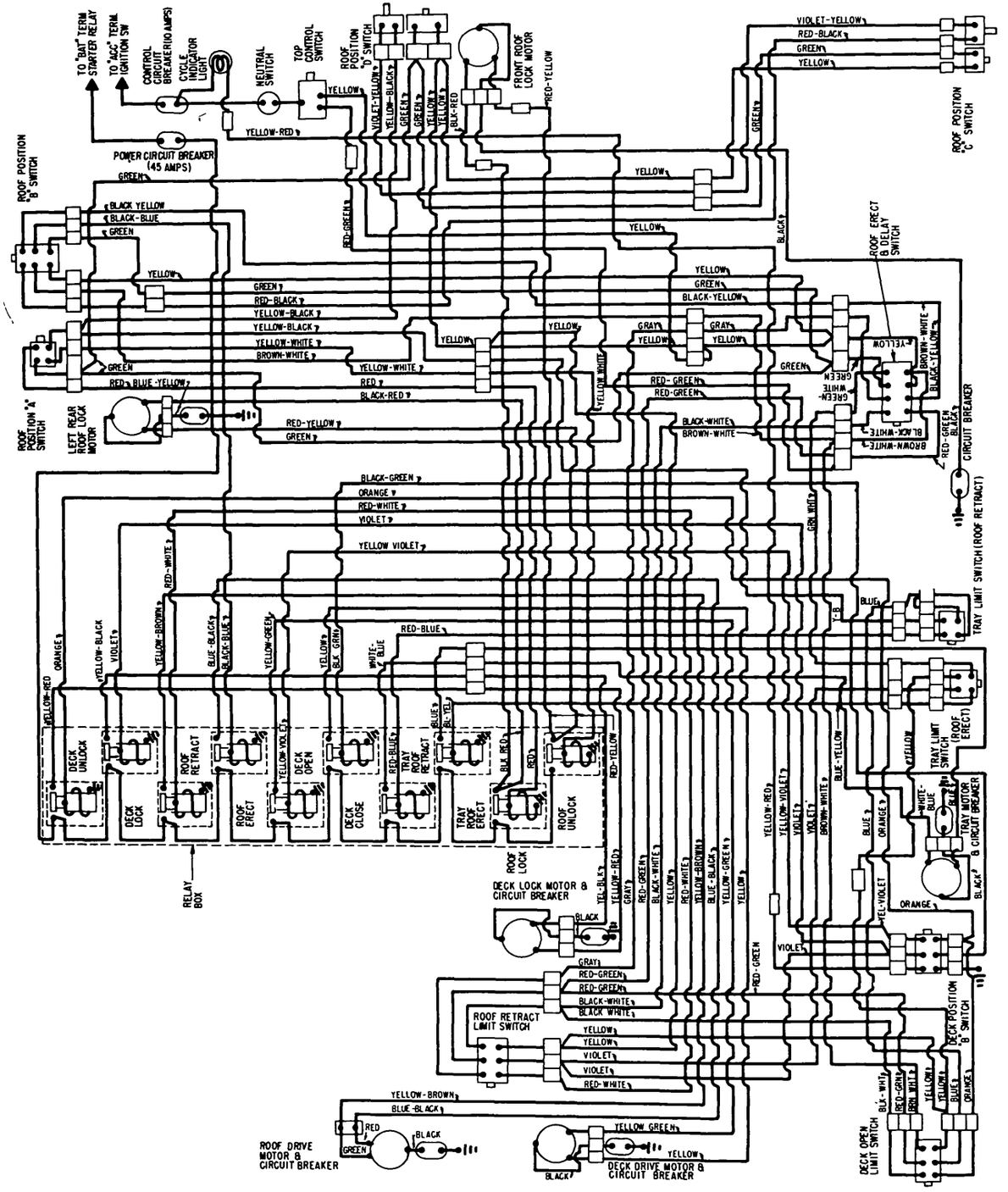
D ck Lid Op ning - As deck lid is unlocked, the deck position "B" switch and deck lock limit switch closes, allowing current to flow to cycle indicator light. At the same time, other contacts in deck position "B" switch close allowing current to flow to deck open power relay, actuating the deck motor, which opens the lid. As deck lid reaches fully open position, it opens the deck open limit switch, stopping deck lock motor and deck motor.

R f Er ct - When the deck open limit switch opens, another set of contacts in the same switch close. This allows current to flow through roof position "B" switch (middle contacts) to roof erect power relay, actuating the roof motor, and erecting the roof. As roof reaches erect position, middle contacts of roof position "B" switch are opened, stopping the roof motor.

R of L ck - When roof reaches a position approximately 4" above the roof locks, the roof position "A" switch closes allowing current to flow through four parallel switches to roof lock power relay, actuating the three roof lock motors. When the left rear lock engages, the roof position "B" switch middle contacts open, stopping the roof motor (erect cycle). The motion of roof locking also opens the roof erect and delay switch (contacts farthest from plunger), roof position "C" switch, roof position "D" switch, and roof position "B" switch (contacts farthest from plunger). When all four of these paralled switches are opened, the roof lock power relay is de-energized, stopping the three roof lock motors.

Packag Tray F ld - As roof reaches erect position, it also closes roof erect and delay switch (contacts closest to plunger), allowing current to flow through tray limit switch (roof erect cycle) to tray power relay (roof erect cycle) actuating the tray motor. This motor folds tray under the deck lid. When tray is completely folded, tray limit switch (roof erect cycle) is opened

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1959 FORD RETRACTABLE HARDTOP WIRING DIAGRAM

FORD RETRACTABLE HARDTOP (C ntinu d)

stopping the tray motor.

Deck Lid Close And Lock - As package tray is folded, a second set of contacts in tray limit switch (roof erect cycle) are closed, allowing current to flow to deck lock power relay and also through deck position "B" switch (middle contacts) to deck close power relay. These two power relays actuate deck lock motor and deck motor, closing and locking the deck lid. As deck lid reaches closed position, the deck position "B" switch (middle contacts) are opened, stopping the deck motor. As deck locks pull deck lid to locked position, the deck position "B" switch (contacts farthest from plunger), and deck lock limit switch are opened. This turns off cycle indicator light showing operator that cycle is completed and that top control switch can be released, stopping the deck lock motor.-

EMERGENCY MANUAL OPERATION: Unlocking Deck Lid - If deck motor fails to operate and it is necessary to gain access to motor, proceed as follows: Place a floor jack under frame rear crossmember and raise car approximately 9". From underside of wheelhouse, remove deck lid lock retaining screws (one on each side). Lift front edge of deck lid about 1", then operate the top control switch to complete opening of deck lid.

Op ning Deck Lid: Unlock deck lid by operating top control switch. If deck lid will not operate, unlock deck lid manually (see above). From underneath lower back panel, remove deck lid lift jack retaining screws (two on each side). *(CAUTION* - Have a helper hold deck lid down while removing the screws, then raise deck lid just far enough so that clevis pins can be removed from top of lift jacks. This must be done to avoid damage to flexible shafts). Complete opening of deck lid manually. *NOTE* - If deck lid locks have been released from wheelhousings, the nut and housing portion of locks will remain attached to deck lid.

Erecting Roof: Open deck lid. Lift forward edge of roof slightly (about 5") and block it in position. Remove roof lift jack-to-roof lift arm bolts. Complete roof erection to the point of roof lock engagement.

Unlocking Roof: *(NOTE* - If locks fail to operate when top is erected, it will be necessary to manually release locks in order to retract roof far enough to remove lock assemblies as follows): Remove windshield upper garnish mouldings, then remove roof lock-to-header screws (two on each side) which can be removed through the access holes in header. This will release locks from header, and locks will remain attached to roof. Remove center panel from roof front section and disconnect header lock motor wires. Manually lift roof at header, then pull out top control switch to continue the retract cycle.

Releasing Quarter Lock - Remove roof quarter trim panel and retainer. Remove two lock-to-roof retaining screws. *(NOTE* - Clearance is provided between quarter panel and roof panel so screws can be removed with a box wrench). This will release lock from roof and lock will remain attached to quarter panel. Disconnect wires from motor, then manually lift rear of roof at both sides. Pull out top control switch to continue retract cycle.

TROUBLE SHOOTING & DIAGNOSIS

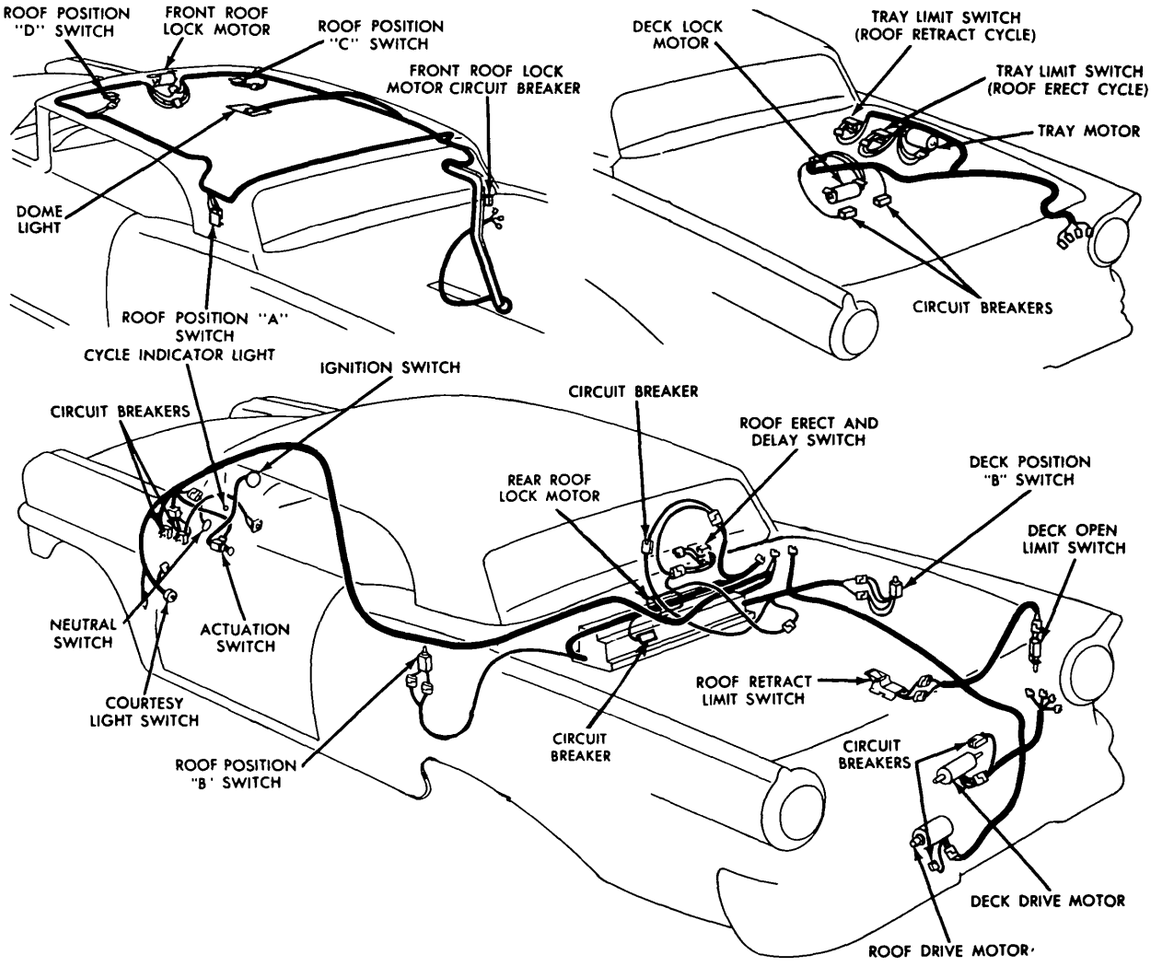
►*DIAGNOSIS NOTE:* Make sure that battery is fully charged. To determine if control circuit is at fault, operate basic motor power circuit of that portion of system that does not operate. Any of the ten basic circuits can be operated by energizing the applicable power relay directly by connecting a wire from hot or common terminal of relay to relay actuating terminal (all relays are housed in a metal box behind rear seat back and are identified as indicated below). Before bypassing a relay, make sure that motor is not stalled against a jammed lockscrew, or running free due to a broken flexible shaft. If bypassing a control circuit does not operate the motor, and no mechanical failure is evident, the power relay may be at fault. Check power relay by connecting a jumper wire from hot terminal of relay to motor feed side of relay. Check circuit breaker in motor ground circuit and in power circuit.

►*STUCK RELAY NOTE:* If a motor continues to run after a particular portion of cycle has been completed, and releasing the top control switch does not stop the motor, a stuck power relay is indicated. Disconnect battery, then replace relay.

►*RELAY IDENTIFICATION NOTE:* Ten relays (five mounted vertically and five horizontally) are enclosed in a metal box behind back of rear seat. With cover removed and looking down on relays (facing rear of car), their location from **left to right** are as follows: (1) - Deck Unlock. (2) - Deck Lock. (3) - Roof Retract. (4) - Roof Erect. (5) - Deck Open. (6) - Deck Close. (7) - Tray (Roof Retract Cycle). (8) - Tray (Roof Erect Cycle). (9) - Roof Lock. (10) - Roof Unlock.

DECK LID WILL NOT UNLOCK (ONE SIDE) Check flexible drive shaft and deck lock assembly.

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FORD HARDTOP MOTOR & SWITCH LOCATIONS (TYPICAL)

FORD RETRACTABLE HARDTOP

(C ntinu d)

DECK LID UNLOCKS, BUT WILL NOT OPEN: Check the following: Deck open power relay. Deck position "B" switch (contacts closest to plunger initiate deck motor when deck lid is locked). Deck motor and circuit breaker. Deck lid flexible drive shafts. Deck lid lift jacks.

DECK LID WILL NOT UNLOCK (BOTH SIDES): Check the following: Control circuit breaker and power circuit breaker. Neutral switch. Top Control Switch. Deck unlock power relay. Deck open limit switch (the contacts closest to plunger). Roof retract limit switch contacts farthest from plunger (on retract cycle). Roof erect and delay switch contacts second from plunger (on erect cycle). Deck lock motor and circuit breaker. Deck lock flexible drive shafts and lock assemblies.

DECK LID UNLOCKS WITH CYCLE INDICATOR LIGHT OUT: Check the following: Cycle indicator light. Deck position "B" switch (contacts closest to plunger initiate deck motor when deck lid is locked).

DECK LID UNLOCKS, BUT WILL NOT OPEN: Check the following: Deck open power relay. Deck position "B" switch (contacts closest to plunger initiate deck motor when deck lid is locked). Deck motor and circuit breaker. Deck lid flexible drive shafts. Deck lid lift jacks.

DECK LID OPENS OR CLOSES ERRATICALLY: Check deck lid assist springs.

DECK LID OPENS, BUT MOTOR WILL NOT STOP: Check the following: Deck open limit switch (contacts closest to plunger opens circuit to deck open power relay). Deck open power relay. Deck unlock power relay.

DECK LID WILL NOT CLOSE: Roof Retract Cycle - Check the following: Roof retract limit switch (middle contacts initiate the deck close cycle). Deck position "B" switch (middle contacts). Deck motor and circuit breaker. Deck lid flexible shafts. Deck lid lift jacks.

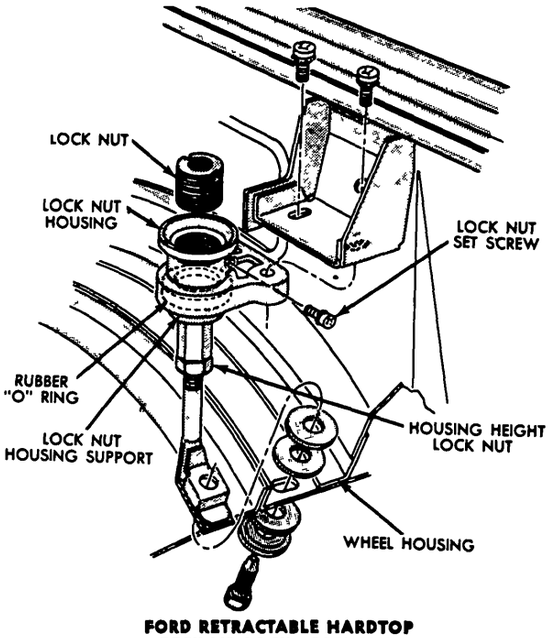
R f Er ct Cycl - Tray limit switch (roof erect cycle); contacts farthest from plunger initiate deck close cycle. Deck position "B" switch (middle contacts). Deck motor and circuit breaker. Deck lid flexible drive shafts. Deck lid lift jacks. Deck close power relay.

DECK LID CLOSES, BUT WILL NOT LOCK: Check the following: Deck lock motor and circuit breaker. Deck lock power relay. Deck lock flexible drive shafts. Deck lock assemblies.

DECK LID WILL NOT UNLOCK (BOTH SIDES): Check the following: Control circuit breaker and power circuit breaker. Neutral switch. Top Control Switch. Deck unlock power relay. Deck open limit switch (the contacts closest to plunger). Roof retract limit switch contacts farthest from plunger (on retract cycle). Roof erect and delay switch contacts second from plunger (on erect cycle). Deck lock motor and circuit breaker. Deck lock flexible drive shafts and lock assemblies.

DECK LID UNLOCKS WITH CYCLE INDICATOR LIGHT OUT: Check the following: Cycle indicator light. Deck position "B" switch (contacts closest to plunger initiate deck motor when deck lid is locked).

DECK LID CLOSES, BUT MOTOR WILL NOT STOP: Check the deck position "B" switch (middle contacts



FORD RETRACTABLE HARDTOP DECK LID LOCK ASSEMBLY

open circuit to deck power close relay as the lock engages).

DECK LID LOCKS WITH CYCLE INDICATOR LIGHT ON: Check the following: Deck position "B" switch (contacts farthest from plunger together with deck lock limit switch energize the cycle indicator light). Deck lock limit switch.

TRAY WILL NOT EXTEND: Check the following: Deck open limit switch (middle contacts initiate tray extend cycle). Tray limit switch (roof retract cycle); contacts closest to plunger. Tray motor and circuit breaker. Tray transmission. Tray power relay (roof retract cycle).

TRAY EXTENDS, BUT MOTOR WILL NOT STOP: Check the following: Tray limit switch (roof retract cycle); contacts closest to plunger limit tray extend travel). Tray power relay (roof retract cycle).

TRAY WILL NOT FOLD: Check the following: Tray motor and circuit breaker. Tray limit switch (roof erect cycle); contacts closest to plunger. Tray transmission. Tray power relay (roof erect cycle). Roof erect and delay switch (contacts closest to plunger initiate tray fold cycle).

TRAY FOLDS, BUT MOTOR WILL NOT STOP: Check the following: Tray limit switch (roof erect cycle); contacts closest to plunger limit tray fold travel. Tray power relay (roof erect cycle).

REAR ROOF LEFT LOCK WILL NOT OPERATE: Check the following: Roof left lock motor and circuit breaker. Roof lock flexible drive shaft. Roof lock assembly.

REAR ROOF RIGHT LOCK ONLY WILL NOT OPERATE: Check the following: Roof right lock motor and circuit breaker. Roof lock flexible drive shaft. Roof lock assembly.

FRONT ROOF LOCKS ONLY (ONE OR BOTH WILL NOT OPERATE): Check the following: Roof front lock motor and circuit breaker. Roof front lock flexible drive shafts. Roof front lock assemblies.

ROOF WILL NOT UNLOCK (ALL LOCKS): Check the following: Tray limit switch (roof retract cycle); the contacts farthest from plunger initiate roof unlock cycle. Roof position "A" switch (contacts with yellow wires). Roof unlock power relay.

ROOF UNLOCKS, BUT WILL NOT RETRACT: Check the following: Roof motor and circuit breaker. Roof retract limit switch (contacts closest to plunger). Roof flexible drive shafts. Roof lift jacks. Roof retract power relay. Roof position "D" switch (switch with the long plunger). Roof position "C" switch (switch with the long plunger). Roof position "B" switch (contacts closest to plunger). Roof erect and delay switch (third set of contacts from plunger).

ROOF PANEL WILL NOT FOLD OR UNFOLD: Check front roof power linkage.

ROOF WILL NOT ERECT: Check the following: Deck open limit switch (contacts farthest from plunger initiate roof cycle). Roof erect power relay. Roof position "B" switch (middle contacts). Roof motor and circuit breaker.

ROOF ERECTS, BUT WILL NOT LOCK (ALL LOCKS): Check the following: Roof position "A" switch (contacts with red and green wires attached, initiate the lock cycle). Roof lock power relay.

ROOF MOTOR WILL NOT STOP: Roof retract cycl - Check roof retract limit switch (contacts closest to plunger limits roof retract travel). Roof retract power relay.

Roof Erect Cycle - Roof erect power relay. Roof position "B" switch (middle contacts stop roof motor when locks engage).

ROOF LOCK MOTORS WILL NOT STOP: Roof lock power realy. Roof position "B" switch (contacts farthest from plunger). Roof erect and delay switch (contacts farthest from plunger). Roof position "C" switch (switch with short plunger). Roof position "D" switch (switch with short plunger). Check roof and roof lock alignment, since misalignment can result in binding and stalled locks.

ADJUSTMENT

NEUTRAL SWITCH: Located on steering column back of instrument panel. Tighten switch actuator and place transmission selector lever or gear shift in neutral. Rotate switch and bracket assembly against actuator with a 1/64" shim held between actuator and switch plunger. Push switch firmly to the end of its travel and tighten mounting screws.

DECK LOCK LIMIT SWITCH: Adjust limit switch so contacts open when there is .045" clearance between male and female lock parts as follows: Disconnect deck position "B" switch wires at a wiring connector. Using an extra locknut, screw on the left deck lock screw to a point of ratchet. Turn ignition switch to "ACC" position and then, back off the locknut from the ratchet point until cycle indicator light comes on. The deck lock limit switch should be adjusted so that the light comes on one-half turn from the ratchet point.

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FORD RETRACTABLE HARDTOP (C ntinu d)

DECK OPEN LIMIT SWITCH: With deck lid in fully open position, place a .100" shim between switch plunger and the actuator on hinge. Adjust switch firmly against shim with the plunger fully depressed, then tighten switch mounting screws.

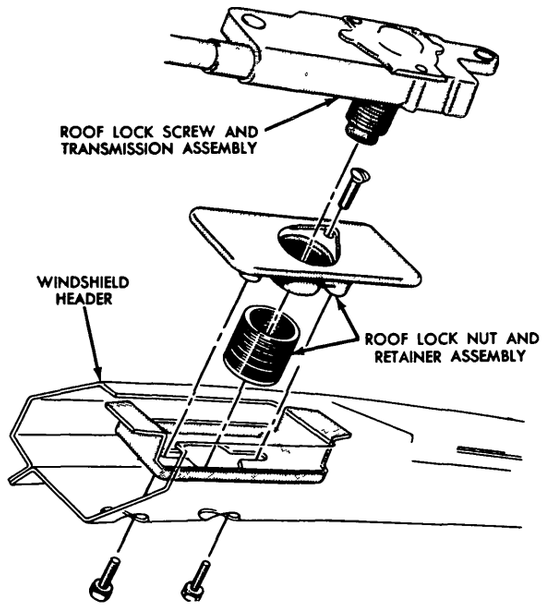
TRAY LIMIT SWITCH (ROOF ERECT CYCLE): With package tray folded to stall point of motor, place a .100" shim between end of switch plunger and actuator part of tray support arm. Then, push the switch to end of its travel against actuator, and tighten switch mounting screws.

TRAY LIMIT SWITCH (ROOF RETRACT CYCLE): With package tray extended to stall point of tray motor against tray stops, insert a .100" shim between tray switch actuator (roof retract cycle) and the end of tray switch plunger. Move actuator toward tray switch (roof retract cycle) until plunger is completely depressed, then tighten actuator attaching screws.

ROOF RETRACT LIMIT SWITCH: With roof completely retracted and firmly on wheelhouse boots, place .100" shim between actuator and the roof control link. Adjust roof retract limit switch and housing forward to limit of its travel, then tighten switch mounting screws.

DECK POSITION "B" SWITCH: Actuator Adjustment - A special tool, Ford No. T57P-15780-A, is required to adjust deck position "B" switch actuator. Position the tool over lockscrew using the 5/8" hole in tool. Press tool firmly against lockscrew shoulder and pivot the tool to line up with deck position "B" switch actuator. Using pliers, bend actuator until it just touches raised portion of tool.

Switch Adjustment: After adjusting switch actuator, adjust switch as follows, using the same tool. It will be necessary to operate the deck lock limit switch by inserting a small screwdriver between the switch plunger and the actuator as the cycle light will not go out until both the deck lock limit switch and deck position "B" switches are actuated. Press tool firmly into locknut and slide switch upward until cycle indicator light goes out. Then, tighten switch mounting screws. *NOTE* - If operation of deck lid discloses that cycle indicator light does not go out when deck lid is fully closed and the locks are ratcheting, or if deck lid "pops" up when opening, the deck position "B" switch actuator may be bent very slightly downward.



FORD RETRACTABLE HARDTOP ROOF HEADER LOCK ASSEMBLY

ROOF ERECT & DELAY SWITCH: Use an extra rear roof lock stationary screw for this adjustment. *(NOTE* - An existing rear roof lock stationary screw can be removed from the car and used, but be very sure to measure the length of exposed threads before removal so that screw may be installed to its original position). Install lockscrew into rear roof locknut to the ratchet point. With a self powered test light, connect the lead to the contacts farthest from switch plunger on roof erect and delay switch, then back out the lockscrew until light comes on. *(NOTE* - Switch should be adjusted so light comes on ¾ turn from ratchet point). point).

ROOF POSITION "B" SWITCH: Adjust this switch in same manner as for Roof Erect & Delay Switch (see above).

ROOF POSITION "C" SWITCH & "D" SWITCH: *(NOTE* - These switches each have two switches mounted side by side, functioning as one switch. One switch, with short plunger, is used for the front roof lock circuit, and the other switch, with long plunger, is for the roof motor circuit). Remove lock screw and switch assemblies from roof front section. Attach a self powered test light to front roof lock circuit switch. Use a spare locknut screwed on lock screw to the point of ratchet, then back off the locknut until test light goes on (light should go on at ¾ turn from ratchet point). If light goes on before ¾ turn, move switch away from linkage; if light goes on after ¾ turn, move switch toward linkage. On roof motor circuit switch, with long plunger, (which is used only on roof retract cycle) the light should go on one full turn before the lockscrew threads disengage. Adjust roof motor switch as necessary, then recheck roof lock switch. *(NOTE* - Actuator pin and switch linkage must be free to assure full return of switch plunger).

ELECTRICAL SPECIFICATIONS

OPERATING CURRENT DRAW: Measured at starter relay terminal with a fully charged battery.

Roof Retract Cycl

Operation	Curr nt Draw
Deck Unlock	16–24 amps.
Deck Open (with deck unlocked)	36–48 amps.
Tray Extend	22–28 amps.
Roof Unlock	60–75 amps.
Roof Retract	8–30 amps.
Deck Close	36–48 amps.
Deck Lock	16–24 amps.

Roof Erect Cycl

Operation	Curr nt Draw
Deck Unlock	16–24 amps.
Deck Open (with deck unlocked)	36–48 amps.
Roof Erect (lift from compartment)	20–40 amps.
Roof Erect (moving roof forward)	10–25 amps.
Roof Locking & Tray Folding	80–120 amps.
Deck Close	36–48 amps.
Deck Lock	16–24 amps.

NO LOAD CURRENT DRAW: With all drive shafts disconnected except for tray motor.

Motor	Curr nt Draw
All (except Roof Motor)	16–23 amps.
Roof Motor	10 amps.

CIRCUIT BREAKERS: Various capacities used as follows:

Circuit	Capacity
Control Circuit	10 amps.
Motor Power Circuit	45 amps.
Roof Motor Ground Circuit	20 amps.
All Other Motor Circuits	15 amps.

1960 FORD THUNDERBIRD TOP CONTROL

Ford Thund rbird (1960)

►*RETRACTABLE SOFT TOP CAUTION:* The cycle is fully automatic with the exception of unfastening the rear window and unlocking the top from the windshield header. Neutral switch is closed only when transmission selector lever is in "N" or "P".

DESCRIPTION: Consists of switch control for locking and unlocking deck lid, opening and closing deck lid, raising and lowering soft top into trunk compartment and removing top from trunk compartment to position for securing it to windshield header. Deck lid and top linkages are powered by hydraulic cylinders receiving pressure from electrically reversible rotor type pump. Pressure controlled by three solenoid valves. Two reversible electrical motors, ten power relays, seven limit switches, an actuating switch and a neutral switch are included in the system. Four circuit breakers, located in Control, Power and Ground of each reversible motor circuits, protect electrical system. Direction of control switch may be reversed (changing direction of motion) at any point in cycle without completing cycle. *S Control and Wiring diagrams.*

OPERATION: R tract Cycle - This cycle starts with top in erected position and deck lid closed and both locked. Top is manually unlocked, rear window is **completely** unfastened, and top control switch is pulled back and held.

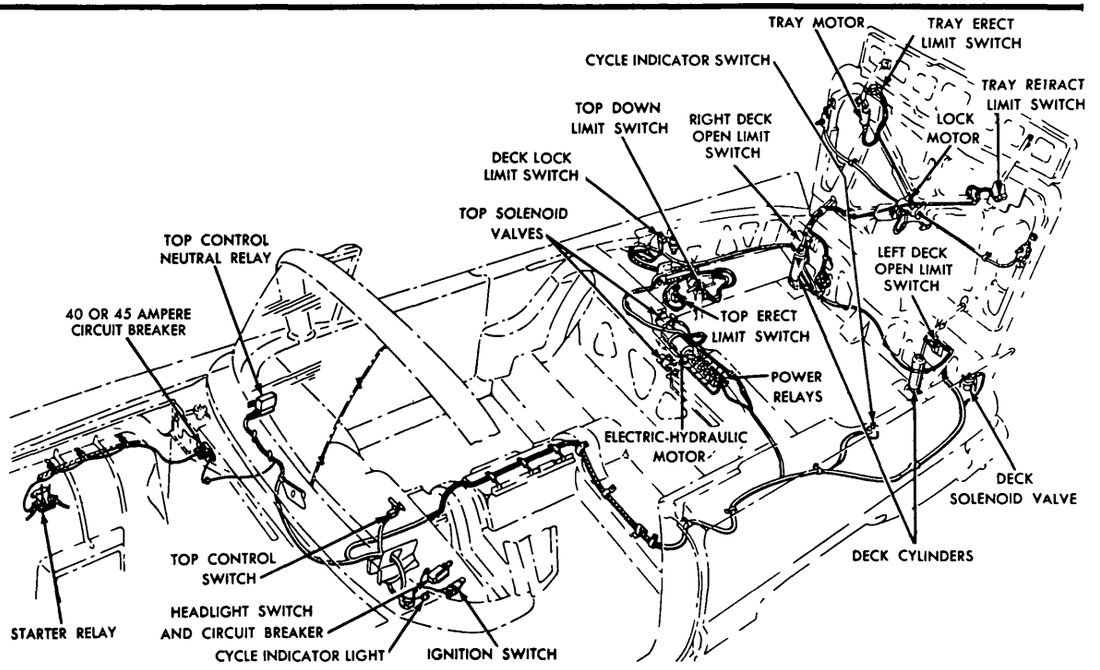
Deck Lid Unlock - Current flows from top control switch through tray retract limit switch, the right hand deck open limit switch, and the deck unlock power relay and actuates the deck lock motor. The motor, through two flexible drive shafts, unlocks the deck lid.

D ck Lid Opening - Mechanical motion of unlocking deck lid actuates deck closing limit switch. Actuation of this switch allows current to flow to the deck open and deck solenoid power relays, actuating electric-hydraulic motor and deck solenoid valve. Hydraulic pressure is delivered to deck solenoid valve and then to the two deck cylinders, raising deck lid.

Packag Tray Extend - When deck lid is fully raised, right hand deck-open limit switch is actuated, opening the deck circuit and closing a second set of contacts. Current flows through right hand deck open limit switch, tray erect limit switch, tray erect power relay. Tray motor is actuated and extends package tray so that it is parallel with deck lid. Mechanical action of tray, as it reaches its travel limit, actuates tray erect relay circuit and closes top down circuit.

T p Retract - Current flows from tray erect limit switch through top retract limit switch to top retract and top solenoid power relays, actuating the electric-hydraulic motor and top solenoid valves. Hydraulic pressure is delivered to top solenoid valves and then to the two top cylinders, lowering top. When top reaches its fully retracted position it actuates the top retract limit switch and de-energizes the top solenoid valves which shut off the hydraulic pressure to top cylinders.

D ck Lid Cl s and L ck - As top retract limit switch opens, the top solenoid valves close another set of contacts in same switch, allowing current to flow to deck lock relay and through deck closed limit switch to deck close and deck solenoid valve power relays.



FORD THUNDERBIRD TOP CONTROL WIRING (SCHEMATIC)

Electric-hydraulic motor is reversed, reversing hydraulic flow, deck solenoid valve is actuated. Hydraulic pressure is delivered to two deck cylinders, lowering deck lid. Deck lid lock motor locks deck. As deck lock screws draw deck lid down, deck closed limit switch is opened, stopping electric-hydraulic motor. Releasing top control switch cuts off current to locking circuit.

Erect Cycle: *NOTE - This cycle starts with top in luggage compartment and deck lid closed and locked.*

Deck Lid Unlock - With control switch pushed forward, current flows through top retract limit switch and the left hand deck open limit switch, the deck unlock power relay, actuating the deck lock motor. The motor drives the deck lock screws and unlocks deck lid.

Deck Lid Opening - Mechanical motion of unlocking deck lid closes deck closed limit switch. Current flows to deck open and deck solenoid power relays, actuating electric-hydraulic motor and deck solenoid valve. Hydraulic pressure is delivered to deck solenoid valve and then to the two deck cylinders, raising deck lid. As deck lid reaches fully open position, left hand deck open limit switch opens and stops deck lock and electric-hydraulic motor.

Top Erection - When left hand open limit switch opens, another set of contacts, in same switch, close. Current then flows through top erect limit switch to top erect and top solenoid power relays, actuating electric-hydraulic motor and top solenoid valves. Hydraulic pressure is delivered to top solenoid valves and then to two top cylinders, raising top. When top reaches fully erected position it opens the top erect limit switch which de-energizes the top solenoid relay and stops electric-hydraulic motor.

Packag Tray Fold - When top erect limit switch opens, another set of contacts in same switch closes. Current then flows through tray retract limit switch and then to top erect limit switch and then to the tray retract power relay which actuates the tray motor. This motor folds tray under the deck lid. When tray is completely folded, tray retract limit switch opens, and thus stops the tray motor.

Deck Lid Close and Lock - As tray retract limit switch opens, another set of contacts in same switch closes, allowing current to flow to deck lock relay and through deck closed limit switch to deck close and deck solenoid valve power relays. The electric-hydraulic motor and deck solenoid valve are actuated. Hydraulic pressure is delivered to the two deck cylinders, lowering deck lid. Deck lock motor locks deck. As deck lock screws draw deck lid down, deck closed limit switch is opened, stopping electric-hydraulic motor. As deck closed limit switch is opened, another set of contacts in same switch is closed. Contact flows to top solenoid valves, holding valves open to permit hydraulic fluid to bleed off excess pressure in top control lines. Releasing top control switch cuts off current to locking circuit and top solenoid valves, completing the cycle.

EMERGENCY MANUAL OPERATION: Unlocking D ck Lid - If deck lock motor fails to operate, manually unlock deck lid to gain access to deck lock motor as follows: Place floor jack under frame rear crossmember and raise car approximately 10". Remove each deck lid lock retaining screw (underside of each wheelhouse). Lift front edge of deck lid about 1 inch and operate top control switch to complete opening of deck lid.

Op ning Deck Lid - Unlock deck lid by operating top control switch or by using the above procedure. Loosen the two straps supporting the fuel tank and lower tank approximately 1 inch. DO NOT remove straps or tank.

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Form 75 B

1960 FORD THUNDERBIRD TOP CONTROL (C ntinued)

From beneath lower back panel, remove both deck cylinder retaining screws from each side. Complete opening of deck lid. If deck lid locks have been released from wheelhousings the nut and housing portion of locks will remain attached to deck lid.

Erecting Top - *NOTE* - It may be necessary to erect top manually if: Electric-hydraulic motor fails; there is an open circuit in motor feed; the top solenoid valves fail; there is an open circuit in the feed line; a top cylinder or linkage fails. Unlock and open deck lid. Energize both top solenoid valves using suitable jumper wires and 12 volt source. If either valve is inoperative, disconnect the hydraulic lines connected to the valves so that there will be no hydraulic block in top cylinders , then manually erect top.

TROUBLE SHOOTING & DIAGNOSIS

►*CONTROL SWITCH ADJUSTMENT NOTE:* Improperly adjusted control switches cause most top problems. To check the adjustment of a switch, insert a 100 ampere scale ammeter into motor feed circuit between circuit breaker on cowl (output terminal) and supply lead (black) running to control relay power strap. Correctly adjusted switches will have current draw as shown in table below (total draw includes overlap of switches).

RETRACT CYCLE

	Motors			Deck	Total
	Tray	Lock	Pump	Sol.	Draw
Unlock Deck		15-20			15-20
Open Deck		15-20	30-40	10	55-70
Extend Tray	15-20				15-20
Retract Roof			30-40	20	50-60
Close Deck		15-20	30-40	10	55-70
Lock Deck		15-20			15-20

ERECT CYCLE

	Motors			Deck	Total
	Tray	Lock	Pump	Sol.	Draw
Unlock Deck		15-20			15-20
Open Deck		15-20	30-40	10	55-70
Erect Roof			30-40	20	50-60
Fold Tray	15-20				15-20
Close Deck		15-20	30-40	10	55-70
Lock Deck		15-20			15-20
Roof Press Relief Ⓒ		15-20		20	35-40

Ⓒ - At deck full lock.

►*DIAGNOSIS NOTE:* Make sure that battery is fully charged. To determine if control circuit is cause of malfunction, operate basic motor or solenoid power circuit of that portion of system that does not work. Any of ten basic circuits can be operated by energizing the applicable power relay directly with a jumper wire from hot bus bar to relay actuating terminal. *NOTE - Molded rubber terminal connector must be partially removed to gain access to actuating terminal.* All power relays are located behind rear seat back. This method of locating faulty circuit by-passes all of the various limit switches and operates a particular motor or solenoid directly. Before by-passing control circuit to operate motor, be sure motor is not stalled against a jammed lock screw or running free because of broken flexible driveshaft. When a motor continues to run after releasing top control switch a defective relay is indicated. If motor or solenoid operates when control circuit is by-passed, make a continuity check of components in that particular control circuit. If motor or solenoid does not operate when control circuit is bypassed and no mechanical failure is evident a power relay is at fault. Relay may be bypassed by connecting jumper wire from bus bar to motor feed at molded rubber connector. If relay not defective, a faulty motor or an open circuit in motor feed is indicated. There may be a faulty circuit breaker or fluid in hydraulic system may be low.

►*TROUBLE CHECK LIST NOTE:* Causes are listed in order of their probable occurance. Items should be checked in order listed.

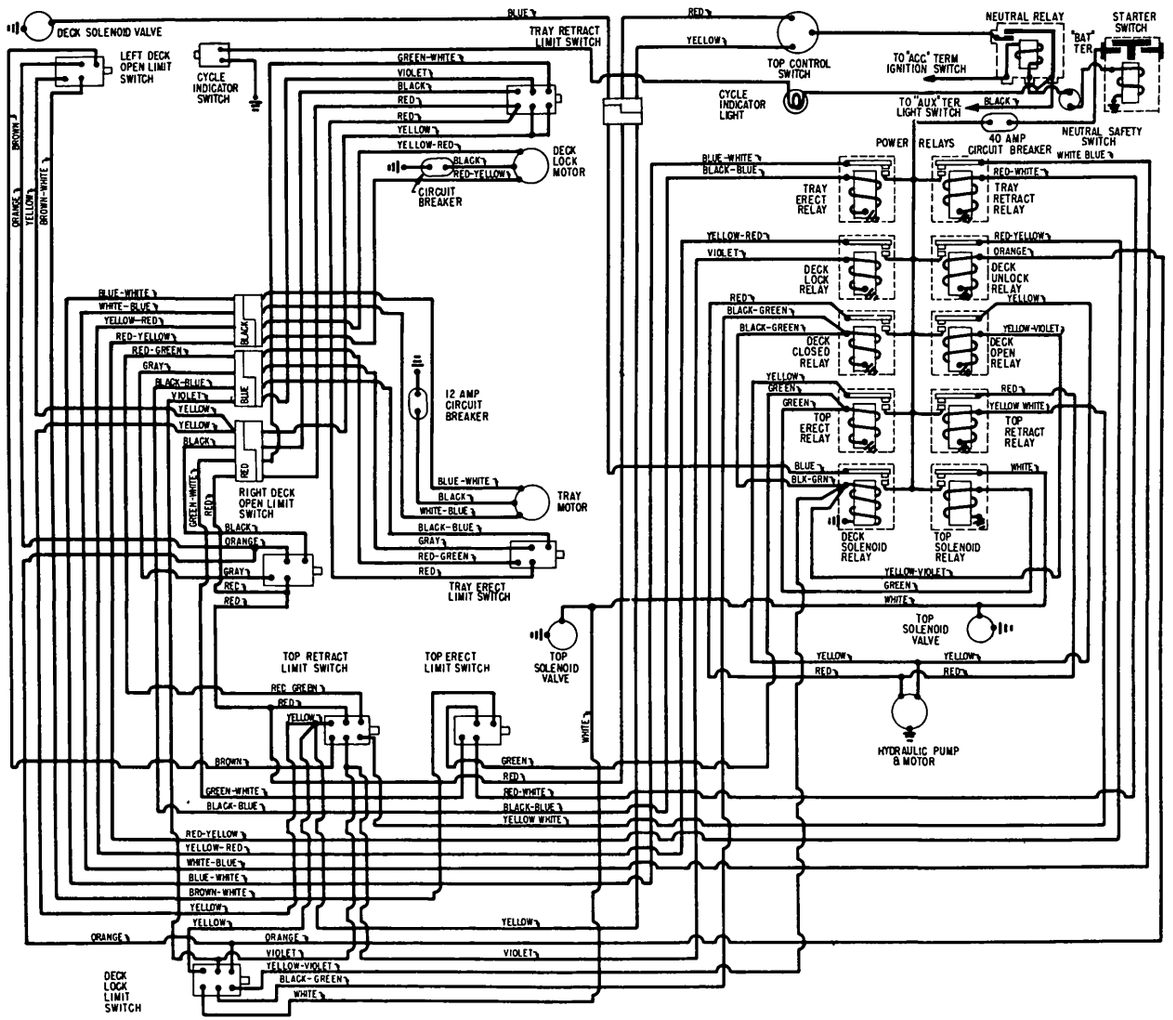
DECK LID WILL NOT UNLOCK: One Side - Check deck lock flexible drive shaft or deck lock assembly.

Both Sides - Check control wiring circuit breaker, power feed circuit breaker, neutral switch, top control switch, deck unlock power relay, tray retract limit switch (top retract cycle only), right hand deck open limit switch (top retract cycle only), top retract limit switch (top erect cycle only), left hand deck open limit switch (top erect cycle only), deck lock motor and circuit breaker, deck lock flexible drive shafts, deck lock assemblies.

DECK LID UNLOCKS BUT WILL NOT OPEN: Check deck open power relay, fluid level at hydraulic pump, deck unlock limit switch, deck solenoid power relay, deck close power relay, deck solenoid valve, or deck lid cylinders.

DECK LID OPENS, BUT HYDRAULIC PUMP WILL NOT STOP (TOP RETRACT CYCLE): Check right hand deck open limit switch, deck open power relay.

CONTINUED ON NEXT PAGE



FORD THUNDERBIRD TOP CONTROL WIRING DIAGRAM

1960 FORD THUNDERBIRD TOP CONTROL (C ntinu d)

DECK LID WILL NOT CLOSE: Top Retract Cycle - Check top retract limit switch, deck close limit switch, deck close power relay, deck solenoid power relay, fluid level at hydraulic pump, deck solenoid valve, deck lid cylinders.

T p Er ct Cycl - Check tray retract limit switch, deck closed limit switch, deck close power relay, deck solenoid power relay, fluid level at hydraulic pump, deck solenoid valve, deck lid cylinders.

DECK LID CLOSES, BUT HYDRAULIC PUMP WILL NOT STOP: Check deck closed limit switch, deck close power relay. *NOTE* - Lock motor will operate until top control switch is released.

TRAY WILL NOT EXTEND: Check right hand deck open limit switch, tray erect limit switch, tray erect power relay, tray motor and circuit breaker.

TRAY EXTENDS, BUT MOTOR WILL NOT STOP: Check tray erect limit switch, tray erect power relay.

TRAY WILL NOT FOLD: Check tray retract limit switch, top erect limit switch, tray retract power relay, tray motor and circuit breaker.

TRAY FOLDS BUT MOTOR WILL NOT STOP: Check tray retract limit switch, tray retract power relay.

TOP WILL NOT ERECT: Check left hand deck open limit switch, top erect limit switch, top erect power relay, top solenoid power relay, top retract power relay, top solenoid valves, fluid level at hydraulic pump, top cylinders.

TOP WILL NOT RETRACT: Check tray erect limit switch, top retract limit switch, top retract power relay, top solenoid power relay, top solenoid valves, fluid level at hydraulic pump, top cylinders.

HYDRAULIC CHECKS

►*NOTE:* Faulty hydraulic system operation can be caused by lack of fluid, leaks, air in system, obstructions or kinks in hoses, or faulty operation of a cylinder or the pump.

Fluid L v l: Retract top, remove filler plug and check fluid level (bottom edge of filler hole). If low, check for leaks, adding heavy duty brake fluid as necessary.

Lift Cylinder Operation: Operate top control switch and observe operation of lift cylinders. If movement of piston rods is sluggish or uneven, check hoses from pump to cylinders for kinks. If one piston rod moves more slowly than the other, the cylinder with the slower rod is defective and should be replaced. If both rods move slowly or do not move at all, disassemble and repair pump.

ADJUSTMENT

Top Down Switch: Lower top to full down position, place a .060" shim between end of switch shaft and roof hinge arm. Adjust switch firmly to the end of its travel against the shim. Tighten mounting screws and remove shim.

Deck Closed Switch Adjustment: Use Tool T57P-15780-A. Pull apart the switch quick disconnect and attach a continuity test light to wires that go to bottom set of contact terminals. Press tool firmly into the lock nut and adjust switch upward until the test light attached to the bottom set of contacts just goes on, then tighten switch mounting screws and remove tool.

Deck Closed Switch Actuator Adjustment: Use Tool T57-15780-A. Position tool over lock screw, press tool firmly against lock screw shoulder. Pivot tool to line up with switch actuator. Bend actuator until it touches raised portion of tool.

Deck Closed Switch Actuator Adjustment: If operation of deck lid discloses that deck lid pops up when opening, the switch actuator may be bent very slightly away from deck lid.

Top Up Switch: Raise top to full up position. Place .060" shim between end of switch shaft and roof hinge arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shim.

Tray Er ct Switch: Extend package tray on the deck lid to end of its travel. Place .060" shim between end of switch shaft and switch actuator on the tray support arm. Adjust switch firmly to the end of its travel against the shim. Tighten switch mounting screws and remove shim.

Tray Retract Switch: Retract the package tray on the deck lid to the end of its design travel. Place .060" shim between end of switch shaft and the switch actuator on tray support arm. Adjust switch firmly to the end of its travel against shim. Tighten switch mounting screws and remove shims.

Deck Open Switches: Both right and left deck open switches are adjusted in same manner. Raise deck lid to full open position, place .060" shim between end of switch shaft and actuator. Adjust actuator so that the switch shaft is fully depressed. Tighten actuator mounting screws and remove shim.

DECK LOCK ADJUSTMENT: *NOTE* - For adequate seal, deck lock screw assembly must be adjusted to engage properly with the lock nut assembly.

Deck Lock Screw Assembly: Loosen two nuts retaining lock screw assembly to deck lid and adjust the assembly fore and aft to align with lock nut assembly.

Deck Lock Nut Housing Support: Loosen two screws retaining lock nut housing support to quarter panel and adjust support side to side to align with lock screw.

Deck Lock Nut Set Screw: Loosen set screw retaining the the locknut in housing assembly and turn lock nut in or out to the required position. The Tool T57P-53510-A may be used to turn lock nut as necessary. *CAUTION* - DO NOT attempt any trial locking of deck unless set screw is properly tightened.

Deck Lock Nut Housing Height: The foot of the lock nut housing assembly may be adjusted up or down from the wheelhouse to insure the correct positioning of the "O" ring. The "O" ring should be centrally located in housing support.

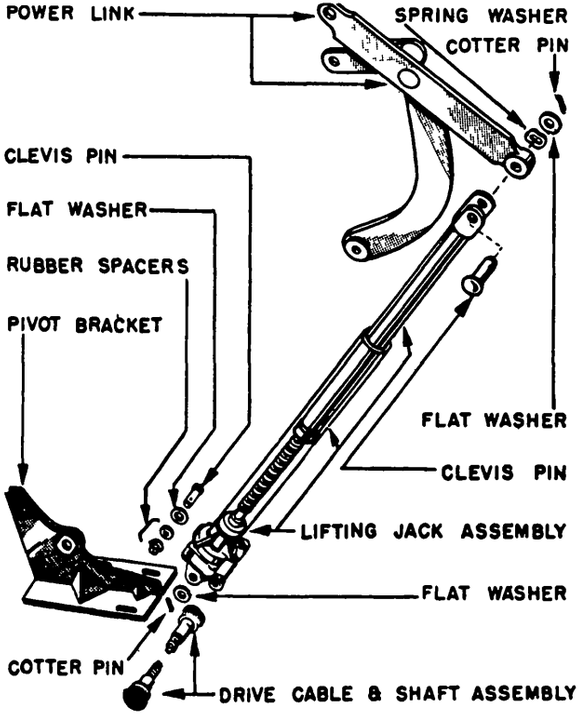
1954-55 LINCOLN & MERCURY ELECTRIC TOP CONTROL

Linc ln & M rcury (1954-55)

DESCRIPTION: This type top control consists of a motor, relay, limit switch, and flexible drive cables that operate two lifting jacks. The reversible type motor has double driving ends to which are attached the drive cables. Each drive cable operates a lifting jack located at each side of the quarter panel. Motor and relay are mounted under rear seat. Motor is operated by switch on instrument panel. Lifting jacks have worm nuts which act as stops, at top and bottom, to limit length of travel. Limit switch, located on windshield header, prevents motor operation when top is locked to windshield header. Limit switch also breaks circuit when contacted with top.

REPLACEMENTS:

Limit Switch: Located along top of windshield header. Raise top off windshield header. Carefully pry limit switch out of hole with screwdriver. Disconnect wire and remove limit switch. Tape wire to prevent shorting. Connect wire to new limit switch. Insert switch on hole and press shoulder until it snaps firmly in hole. Check top operation.



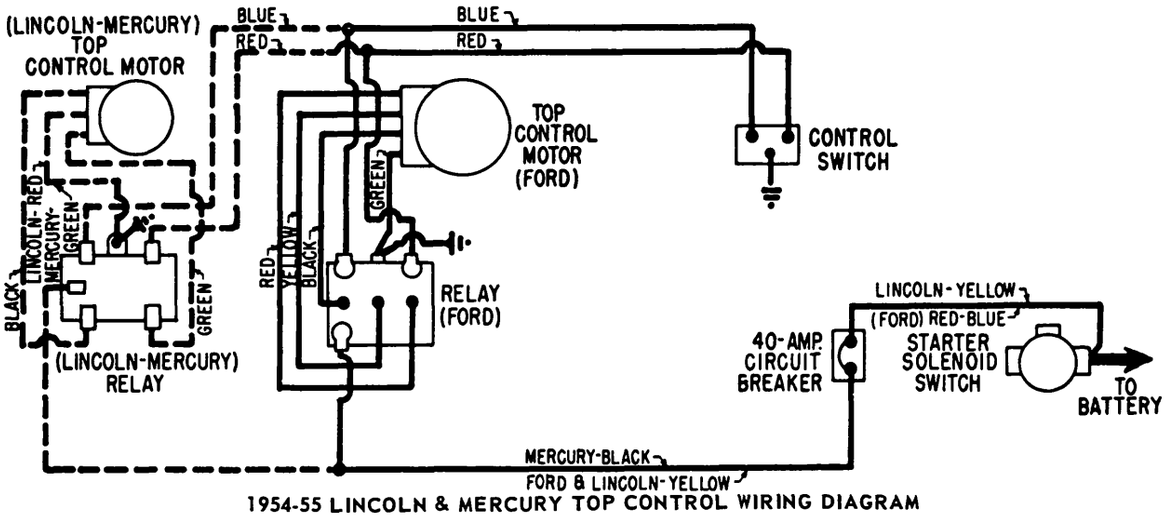
TOP CONTROL ADJUSTING POINTS

Relay: Located on inner side of rear seat riser.

Top Operating Motor: Located under rear seat. Serviced as an assembly. No lubrication required on motor. Disconnect battery cable. Remove rear seat. Disconnect drive cables at each end of motor. Disconnect motor to relay wires at relay terminals. Remove motor mounting screws.

Top Lifting Jack: Raise and lock top header. Remove rear seat and seat back. Remove quarter trim panel. Disconnect drive cable at lifting jack. Remove clevis pin at upper and lower ends of lifting jack. Remove jack. Before installing lifting jack, place rubber spacers in each mounting hole at lower end of lifting jack. Shoulders on both rubber spacers must be on inner side of mounting holes. Align lifting jack with lower pivot bracket. Insert flat washer and clevis pin. Then install flat washer and cotter pin. Align upper end of lifting jack with power link by turning jack screws. Install clevis pin, spring washer, flat washer, and cotter pin. Connect drive cable at lifting jack. Check top operation before installing quarter trim. Install quarter trim panel, seat back, and seat. *CAUTION—Do not apply oil to any points mounted in rubber. A light coat of vaseline is suggested.*

Drive Cable and Shaft Assembly: Drive cable and shaft similar to speedometer drive cable. Lubricate cable with graphite grease when service operations are performed. Loosen knurled retaining nut at each end of cable. Remove assembly. To reinstall, insert driving ends of cable into motor and lifting jack. Tighten knurled retaining nuts.



1954-55 LINCOLN & MERCURY TOP CONTROL WIRING DIAGRAM

TOP MECHANISM ADJUSTMENTS:

Header Bracket Adjustment: Loosen set screws on dowels, located along top of windshield. Rotate dowels to proper height. Tighten set screws, making sure screws are seated in slots on studs, locking dowels in position. If striker plates, on header, need alignment with side header dowels, loosen cap screws, position striker plates by hand, and tighten screws.

Balance Link Adjustment: Loosen six cap screws that secure pivot bracket support to quarter panel. Move pivot bracket up or down, fore or aft as required. Tighten cap screws. To correct sagging or excessive crowning of the side rails at front hinge point, loosen three cap screws that secure balance link adjusting bracket to main pivot bracket support. Turn vertical adjusting screw, on balance link bracket, in to reduce sag and out to reduce excessive crowning. Tighten cap screws securely.

Main Pivot Bracket Adjustment: Space between quarter window and rear side rail is adjusted by loosening two cap screws and bolt that secure header bracket to front side rail. Slide header fore or aft on side rails until arc of rail over quarter window is parallel with top edge of window. Tighten cap screws and bolt. Space between side rail and quarter panel at rear corner of quarter window is adjusted by loosening four cap screws that secure main pivot bracket to main pivot bracket support. Move main pivot bracket in or out as required to obtain proper spacing. To adjust top to stack, lower into folded position, loosen three cap screws that secure balance link adjusting bracket to main pivot bracket support. Turn diagonal adjusting screw, on balance link bracket, out or in to lower stacked position of header. Tighten cap screws.

1956-57 LINCOLN POWER TOP & LATCH CONTROL

Linc ln (1956-57)

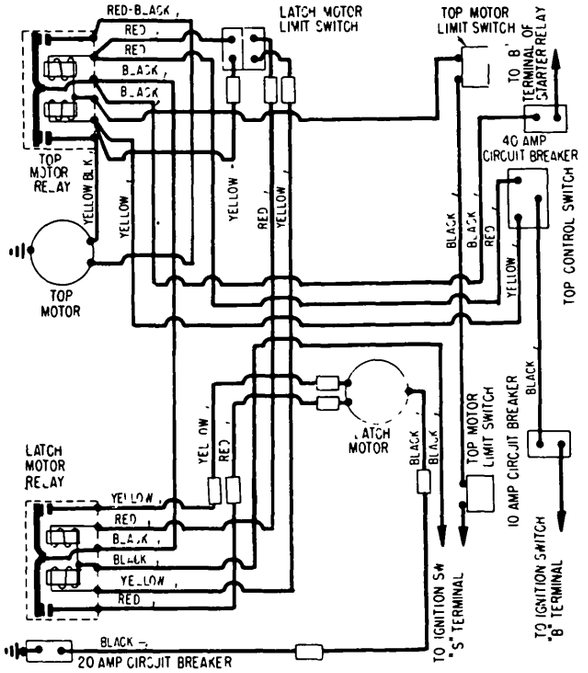
►*SLOW RAISING & LOWERING OF TOP CORRECTION:* If raising or lowering of top takes more than 14 seconds, it may be due to collapse of hoses under rear seat. Hoses are secured by two clamps and when tightened can collapse hoses and restrict flow of fluid to and from right hydraulic lift cylinder. To correct, insert flat washer, ¼" inside diameter and 3/16" thick, between clamp and floor pan. When reinstalling clamps make sure there is sufficient sealer around holes in floor pan.

DESCRIPTION: P w r T p Control – Hydraulic-electric type. System consists of an electric motor, hydraulic pump, and two hydraulic cylinders. A valve and port assembly directs flow of fluid in the system. The electric motor is controlled through a circuit breaker, limit switches, control switch, and relay.

T p Locking Mechanism – Consists of an electric motor and two transmission assemblies which are connected to and driven by the motor through two casing and cable assemblies. These two components are located in the No. 1 top bow and engage and lock into two lock nut housing assemblies which are attached to the inside of the windshield header bar. Locking mechanism is controlled automatically by a limit switch mounted in the left rear top linkage stack compartment.

ADJUSTMENTS: The following adjustments should only be made after top stack adjustment is correct. *Do not overheat motor while making adjustments.*

Locking Mechanism Limit Switch: Adjust limit switch, located in left rear quarter, so locking motor will start just before the No. 1 bow contacts the windshield header bar. Make sure it will operate the motor in the up direction, too.



LINCOLN POWER TOP & LATCH CONTROL WIRING DIAGRAM

Locking Mechanism Nut Housing: Nut housing can be adjusted up and down and slightly from side to side with respect to windshield header bar. In addition, it can be given a certain amount of tilt to rear by installing caster shims between windshield header bar and locknut boss on the nut housing. Locknuts should freewheel or ratchet.

L cking M chanism Transmissi n Ass mbly: Transmission assembly can be moved fore and aft with respect to No. 1 top bow because of floating tapping plate installation and slotted holes. *See Note below.*

Locking Mechanism Locking Screw: Can be adjusted for length by first loosening Allen setscrew in hex head and then turning screw transmission shaft until desired length is obtained. *CAUTION* - Do not attempt any trial locking of top unless Allen setscrew is properly tightened.

►*1956 LOCKING MECHANISM TRANSMISSION ASSEMBLY NOTE:* A new "Floating" type transmission assembly, transmission cover plates, and folding top No. 1 bow are being used on some cars. These parts have been designed so that the transmission assemblies will be able to "float" in the No. 1 bow and center themselves in the locknut assemblies. This will assist to avoid misalignment and binding of lockscrews in locknut assemblies. *CAUTION* - During adjustments of this assembly it is suggested that motor cover assembly be off to permit checking motor temperature. Do not permit motor to become too warm to touch. Allow it to cool.

HYDRAULIC MOTOR & PUMP: *See "Hydro-Lectric M tor & Pump".*

CHECKING FLUID LEVEL: *See "Auto-Lite Electric Top Control".*

SERVICE PARTS: Power Top Motor – Lincoln No. B6A-15667-A.
Locking Mechanism Motor – Lincoln No. B6A-7653508-A.

1958-60 LINCOLN CONTINENTAL CONVERTIBLE

C ntinental C nv rtibl (1958-60)

►CHANGES, CAUTIONS, CORRECTIONS

►*LUGGAGE COMPARTMENT LIGHT REMAINING LIGHTED CORRECTION:* If this light remains lighted when luggage compartment door is closed, install a rubber bumper (similar to that used on household door stop), on switch plunger, and cement it in position. This will provide contact with flange on lower back panel.

DESCRIPTION: This convertible power top is automatically stacked in a covered compartment when retracted, and is locked automatically to windshield header when in a raised position. The center rear window is automatically retractable with operation of the top (window is automatically closed when cycle starts with top in raised position). The system consists of an electro-hydraulic system for retracting and raising the top, an electrically driven jack-screw type lock on windshield header panel, and an electrically operated stacking compartment cover panel and rear window assembly.

OPERATION: Top operation is divided into two cycles; a retract cycle in which top is lowered into stack compartment and the erect cycle in which the top is raised from the stacked position and locked to windshield header, as follows:

Top Retract Cycle: With top in erect position, luggage compartment door closed and transmission selector lever in "N" (Neutral) or "P" (Park) position, the following sequence of automatic operations take place when top control switch is held in "Down" position.

Back Window Closing - Contacts in back window relay close and energize the back window motor which raises back window.

Upper Back Panel Opening - With rear window completely closed, back window "up" limit switch is depressed allowing upper back panel relay and motor to be energized causing panel to open.

Top Lock Motor Unlocking - As upper back panel reaches its highest point, the upper back panel limit switch (No. 2) is depressed which allows top lock motor relay and top lock motor to be energized and operate the jackscrew type lock in windshield header, unlocking the top.

Top Retracting - As top lock motor unlocks the top, the No. 1 bow raises off windshield header allowing the two top control switches to close, causing top motor

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CONTINENTAL CONVERTIBLE (C nt.)

relay and top motor to become energized and retract the top. At a point approximately 6" above windshield header, the left balance link releases the top "up" limit switch and stops action of top lock motor.

Upper Back Panel Closing - As top retracts into stack compartment, the top "down" limit switch is depressed, stopping the top motor and starting the upper back panel motor. The upper back panel motor will continue to operate until top control switch is released.

T p Erect Cycle: This cycle is the reverse of "Top Retract Cycle".

ADJUSTMENT: Disconnect battery cable before making adjustments, then proceed as follows:

Back Window "Up" Limit Switch: *NOTE - This switch is located on back window regulator panel.* Loosen switch mounting bracket and slide switch up or down as required so that window will be fully closed before upper back panel motor is energized, then tighten switch mounting bracket screws.

T p "Up" Limit Switch: *NOTE - Switch is located on left hand quarter panel at main pivot bracket.* Loosen switch mounting bracket screws and adjust switch by sliding it forward or rearward so that top locking motor will stop or start when the No. 1 top bow is approximately 6" from windshield header. Tighten mounting bracket screws.

Luggage Compartment Door Closed Switch: *NOTE - This switch is located on luggage compartment door pening reinforcement on left side of car.* Adjust switch up or down as required so that upper back panel motor cannot be energized unless luggage compartment door is closed. Tighten mounting bracket screws.

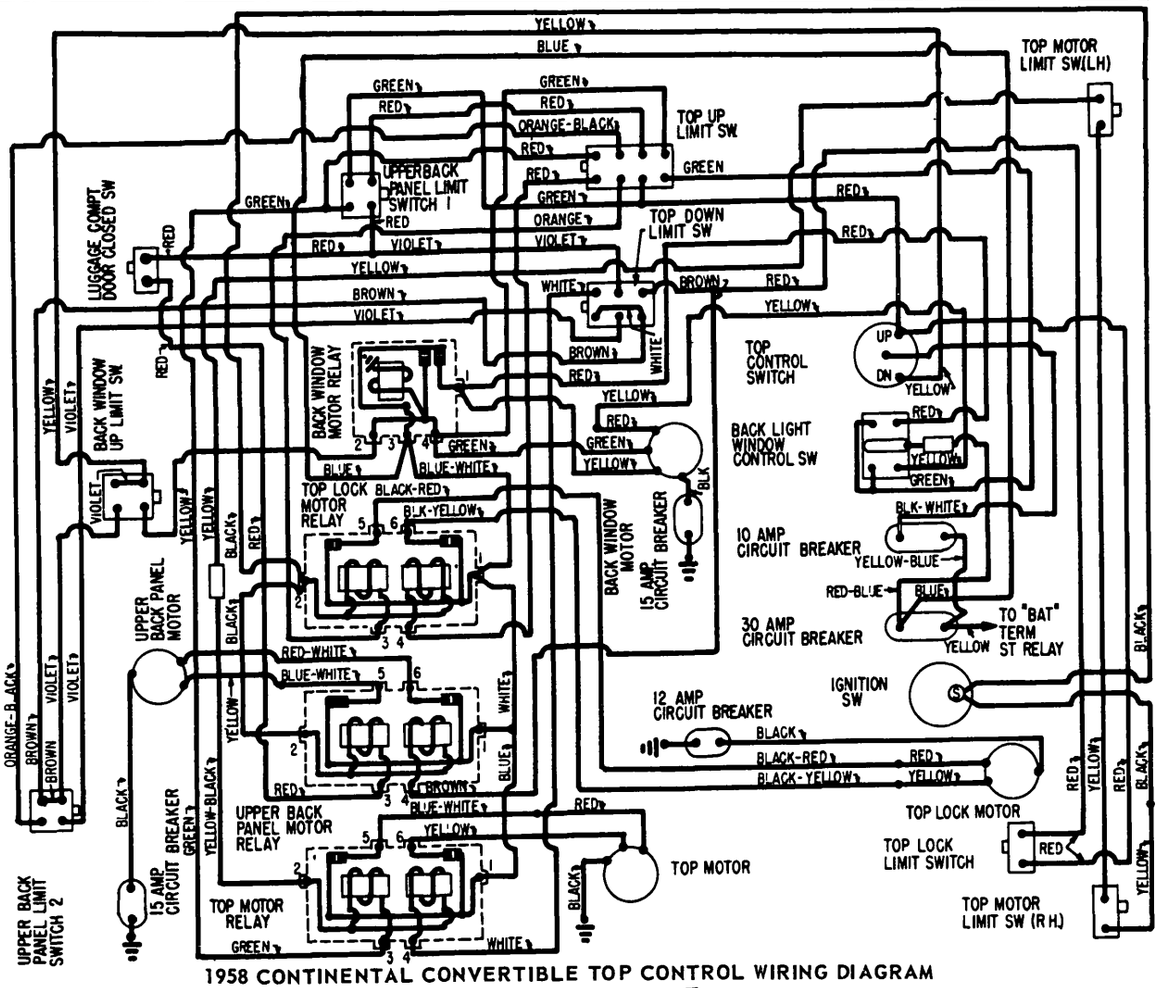
T p Motor Limit Switches (Side Switches on Header): Adjust switches to stop top lift motor just prior to engagement of locking screws. Use a screwdriver and adjust either or both switches by turning switch plungers "in" or "out" as required. *NOTE - It may be necessary to fully depress switch plunger, while turning the plunger, to engage threads of plunger with base of switch.*

Upper Back Panel Limit Switch No. 1 (Left Side): *NOTE - Switch is located on luggage compartment door opening reinforcement near left hinge.* Slide switch forward or rearward as required to stop upper back panel motor when upper back panel is fully open for the **erect** cycle.

Upper Back Panel Limit Switch No. 2 (Right Side): *NOTE - Switch is located on luggage compartment door opening reinforcement near right hinge.* Slide switch forward or rearward as required to stop upper back panel motor when upper back panel is fully open for the **retract** cycle.

T p Down Limit Switch: *NOTE - Switch is located on l ft quarter panel at lower reinforcement.* Slide switch assembly up or down as required so that upper back panel motor will be energized when top is fully retracted.

T p L ck Limit Switch (Cent r Switch on H ad r): Retract the top, then use a screw driver and adjust switch



1958 CONTINENTAL CONVERTIBLE TOP CONTROL WIRING DIAGRAM

by turning switch plunger downward a few turns so that upper back panel will not close at end of the **erect** cycle. Erect top and be sure that lock screws are ratcheting at the same time a good seal is obtained between No. 1 bow and windshield header. *NOTE - Apply silicone to No. 1 bow weather strip before erecting the top. Silicone will be transferred to header at those areas which are sealing properly.* If a good seal is not obtained, or if lock screws are not ratcheting, adjust length of lock screws and/or shim under No. 1 bow weatherstrip. After proper seal and ratcheting effect of lock screws is obtained, begin adjusting top lock limit switch. Adjust switch slowly upward (it will be necessary to operate top after each adjustment to be sure that switch is not over adjusted). Proper adjustment of top lock limit switch will be obtained when the top is sealed and the upper back panel motor is activated. This should occur at the time lock screws begin to ratchet or just slightly before. It may be necessary to adjust upper back panel limit switch No. 2 to delay breaking the circuit to top lock motor. *NOTE - Adjustment of top lock limit switch can be critical t within ¼ turn.*

TROUBLE SHOOTING: Before trouble shooting any condition, make sure that power supply is adequate, then check all circuit breakers, particularly those located behind glove compartment.

TOP RETRACT CYCLE: Check as indicated below:

Back Window Will Not Close: Check motor feed circuit breaker, top control switch feed circuit breaker, back window motor relay, back window motor, back window "up" limit switch, and back window run channel for binding.

Upper Back Panel Will Not Open: Check luggage compartment door closed switch, motor feed circuit breaker, top control switch feed circuit breaker, upper back panel motor ground circuit breaker, upper back panel motor

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CONTINENTAL CONVERTIBLE (C nt.)

relay and motor, top control switch, upper back panel limit switch No. 2, back window "up" limit switch.

Upp r Bock Pan l Op ns & Motor Continues to Run: Check upper back panel motor relay, and limit switch No. 2.

Upp r Back Panel Will Not Close: Check upper back panel motor ground circuit breaker. Upper back panel motor relay and motor. Upper back panel flexible drive cables or jack screws, back window "up" limit switch, top "down" limit switch.

Upper Back Panel Cl ses & Motor Continues to Run: Check upper back panel motor relay, and top control switch.

B th T p L cks Will N t Unlock: Check top lock motor and relay, top lock limit switch, upper back panel switch No. 2, top lock transmissionsm flexible drive cables.

T p L cks Unlock & M t r Continues to Run: Check top lock motor relay, and top "up" limit switch.

T p Will N t Retract: Check top control motor and relay top "down" limit switch, and one or both control limit switches.

T p M t r Runs and T p Will Not Retract: Check hydraulic system, mechanical linkage bind, or back window run channel bind.

TOP ERECT CYCLE: Check as indicated below:

Upp r Back Panel Will Not Open: Check luggage compartment door closed switch, motor feed circuit breaker, top control switch feed circuit breaker, upper back panel motor and relay, top "up" limit switch, top control switch, upper back panel limit switch No. 1.

Upper Back Pan l Mot r Runs & Panel Will Not Open: Check back panel flexible drive cables.

Upper Back Pan l Op ns and Motor Continues to Run: Check upper back panel motor relay and limit switch No. 1.

Upper Back Panel Will Not Close: Check top lock limit switch, upper back panel motor and relay.

Upper Back Pan l M tor Runs and Panel Will Not Close: Check upper back panel flexible drive cables.

Upp r Back Panel Cl ses and Motor Continues to Run: Check upper back panel motor relay, and top control switch.

Top Will N t Rais : Check top control motor and relay, upper back panel limit switch No. 1, and top motor limit switches.

Top M t r Runs and T p Will Not Raise: Check for bind in linkage, and check hydraulic system.

Both T p L cks Will N t Lock: Check top lock motor and relay, and top "up" limit switch.

One T p L ck Will N t Lock: Check for broken drive cable.

REMOVAL & INSTALLATION: *NOTE - If top locking, or upp r back panel lifting mechanism becomes inoperativ , it may be n c ssary to manually unlock or raise th s units for s rvic , as f ll ws:*

Top L ck - Insert a ¼" Allen wrench into hex holes in either top lock transmission assembly. These holes are accessible between No. 1 bow and header. Turn wrench counterclockwise to disengage lock screw from locknut assembly.

Upper Back Panel - Open luggage compartment door and disconnect lift assemblies from upper back panel hinges.

Motor Feed (30 Amp.), Top Control Switch Feed (10 Amp.) Circuit Breaker: Disconnect battery ground cable, then remove glove compartment assembly and cover. Remove circuit breaker from cowl panel.

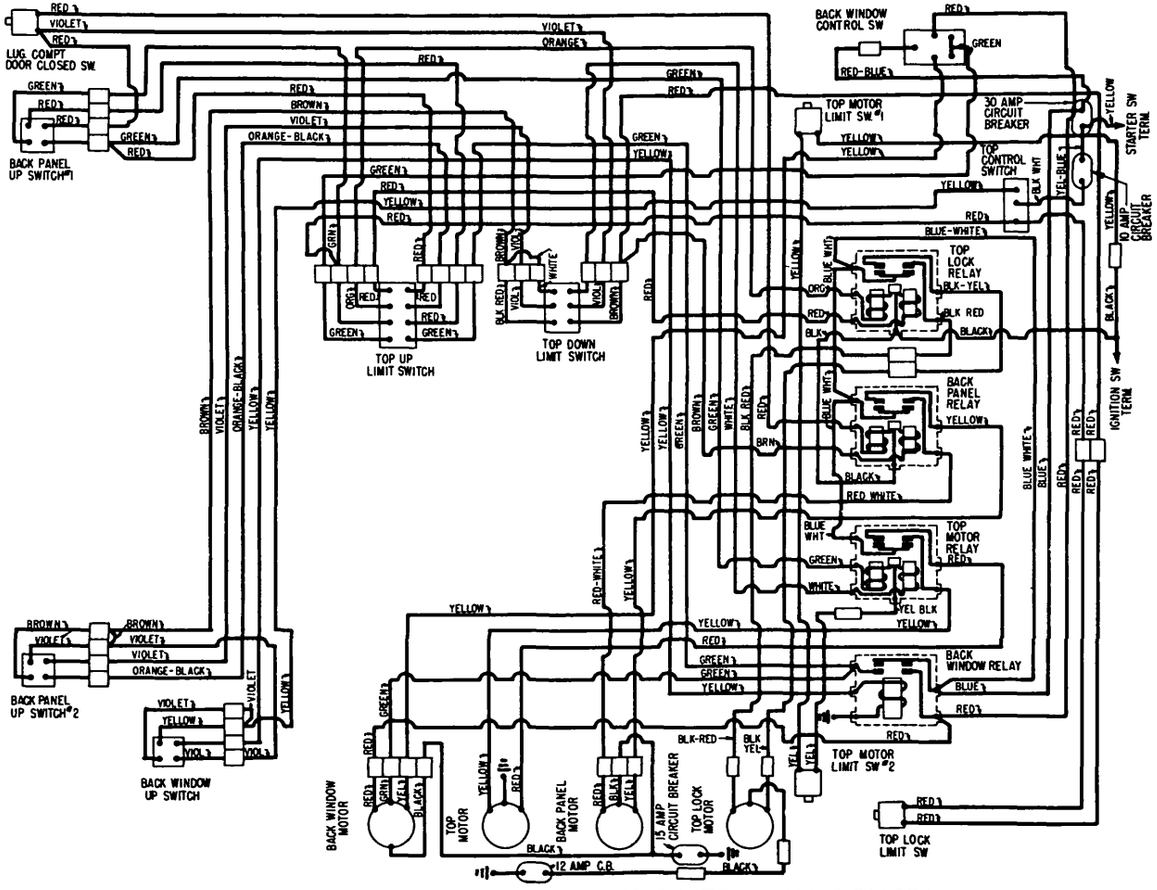
Top Lock Motor Ground (12 Amp.) Circuit Breaker: Disconnect battery ground cable, then remove rear seat cushion and rear seat back. Remove right quarter upper trim panel and arm rest panel. Remove circuit breaker.

Top Lock Limit Switch or Top Motor Limit Switches: Retract top and disconnect battery ground cable. Remove two windshield upper garnish moldings. *NOTE - To remove upper garnish molding, remove sun visor mounting bracket front screws and loosen remaining screw that fastens sun visor mounting brackets.* Working through access holes in windshield header, remove the four screws attaching locknut housing assemblies to windshield header, then remove four screws securing windshield outside top molding and raise molding off header. Remove locknut securing switch to windshield outside top molding. Remove switch, disconnect wires, and replace switch, and adjust switch plunger.

T p "Up" r T p "D wn" Limit Switches: Remove rear seat cushion and rear seat back, then remove left quarter upper trim panel. To remove top "down" switch only, remove left quarter arm rest panel. Disconnect switch at quick disconnect and replace. Adjust switch for proper operation of top assembly.

Top Lock Motor: Retract top and disconnect battery ground cable. Remove top lock motor access hole cover located at center of No. 1 bow. Disconnect drive cables from motor and remove motor.

HYDRAULIC SYSTEM: Fluid Level Check - Check fluid level every 6000 miles. Raise upper back panel and loosen filler plug located in end of reservoir, then operate top three times in retract and erect cycles to bleed any air from system. Remove filler plug and check level with top in erect position, as follows: If hydraulic fluid does not run from filler hole, add fluid, Part No. MK-19542, to raise level to edge of filler plug hole.



1959-60 CONTINENTAL CONVERTIBLE TOP CONTROL WIRING DIAGRAM

AUTO-LITE ELECTRIC 4-WAY SEAT CONTROL

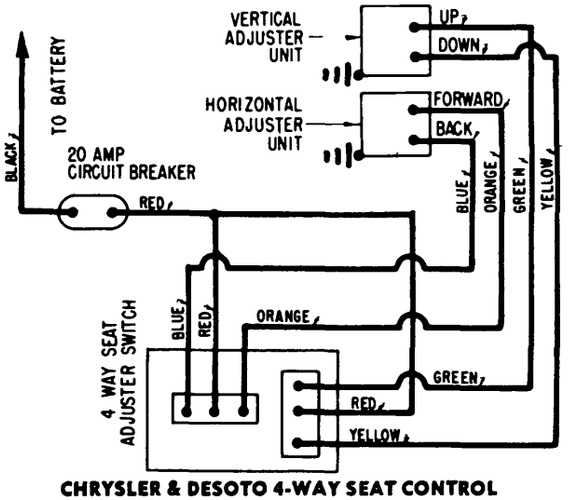
Chrysler (1955-58)
DeSoto (1955-58)
Dodge (1955-58)
Packard (1955-56)
Plymouth (1955-58)

DESCRIPTION: Seat adjusting mechanism is electrically operated, using reversible type motors. Motors operate worm shaft and sleeve through a worm head. Fore-aft and up-down movements are controlled individually, each having a separate but similar system, including a switch, motor, and regulator.

REMOVAL & INSTALLATION: Proceed as follows:

Front Seat Assembly: Remove front cushion, disconnect battery. Disconnect seat adjuster control wires. Remove floor pan-to-seat guide attaching capscrews, remove guide from seat assembly. To install, reverse removal procedure.

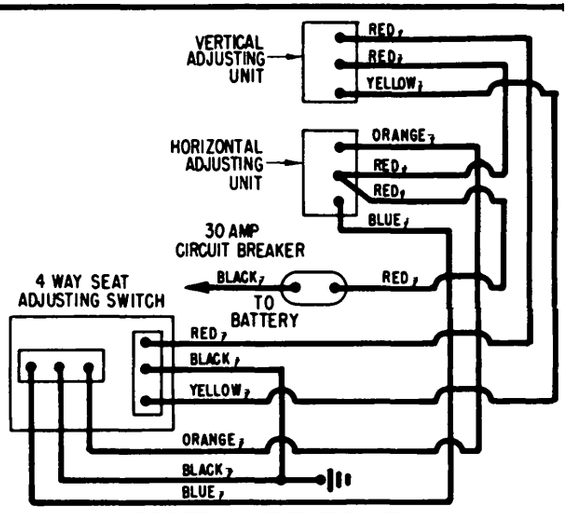
L ft Seat Guide & Vertical Power Unit: Remove front seat cushion. Disconnect battery and seat adjuster control wires to relay. *(CAUTION*–To facilitate removal of vertical bar clevis pin, the front seat assembly should be elevated to highest position of travel and blocked before attempting removal of pin). Remove vertical bar pins attaching vertical power unit shaft and sleeve to front seat frame. Remove power link pin. Disconnect motor lead wires to relay. Remove floor pan-to-seat guide attaching capscrews and remove guide from seat assembly. To reinstall, adjust power unit to the two pins (adjustment made by turning unit coupling). Install rear of unit on rear pin and secure. Raise seat manually, install front end of unit into torque bar, attach clevis pin, and secure *(NOTE*–Length of unit may be varied by turning coupling manually). Reinstall wires and reconnect battery. Check operation of seat and replace seat cushion.



CHRYSLER & DESOTO 4-WAY SEAT CONTROL

Horizontal Power Unit & Shaft Assembly: Remove front seat cushion, disconnect battery and seat adjuster control wires to relay. Remove power unit retaining snap rings, and disconnect relay lead wires to motor. Remove horizontal power unit assembly. *NOTE*–To facilitate removal of horizontal bar clevis pins, lower seat to lowest point before attempting to remove unit. To reinstall, reverse removal procedure.

Seat Tracks: Remove jack assemblies and the two rear and front retaining bolts that hold seat track to floor pan. Slide seat track outward, causing it to disengage from two horizontal torque rods. When removing right track, it will be necessary to disengage one connecting link from a pivot pin. To reinstall, engage torque rods in track assembly. Install rear seat track retaining screws, but do not tighten. Install jacks, operate seat in all directions to properly align seat tracks and torque rods. Tighten front seat track retaining screws, raise seat, and tighten rear seat track retaining screws. *NOTE*–Do not lubricate vertical power unit shaft ball and nut.



DODGE 4-WAY SEAT C NTR L

1954-58 G.M. 2 & 4-WAY ELECTRIC SEAT CONTROL

Buick (1954-58)
Cadillac (1954-58)
Chevrolet (1954-58)
Oldsmobile (1954-58)
Pontiac (1954-58)

►CHANGES & CORRECTIONS

►*1955 CADILLAC REGULATOR PRODUCTION CHANGE (To Reduce Seat "Chuck"):* Effective with Engine No. 57610 (approx.), tensioner springs have been installed between seat frame and seat adjuster to minimize free movement in the seat assembly. These tensioners may be installed on earlier cars to eliminate objectionable noise due to movement of seat adjuster parts. To install tensioner springs, remove front seat assembly with seat adjusters attached, drill and chamfer holes in horizontal equalizing links as follows:

4-Door Sedans–Drill a 5/16" diameter hole 1¾" from arm and link pivot and on centerline of link. Chamfer both sides 1/16" x 45°.

2-Door (With Horizontal Seat Control Only)–Drill a 5/16" diameter hole 1¼" from arm and link pivot (measured on centerline of link) at a point 11/32" from top (widest) edge of link. Chamfer both sides 1/16" x 45°.

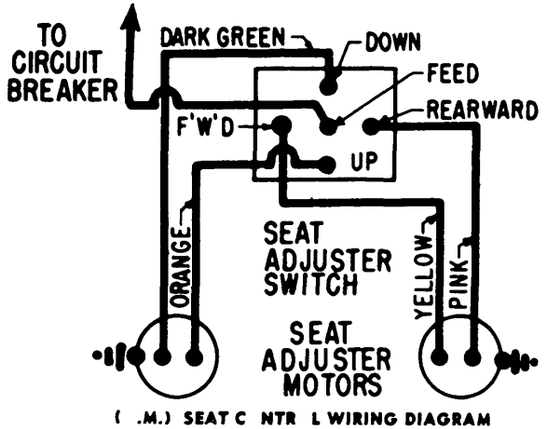
2-D or (With H riz ntal & V rtical Seat Contr l)–Drill a 5/16" diameter hole 1¾" from arm and link pivot and on centerline of link. Chamfer both sides 1/16" x 45°.

On 4-Door Sedans, in addition to hole drilled above, drill another hole 11/32" in diameter in seat frame 1 5/16" rearward of the centerline of the rear attaching hole of the horizontal equalizing rod support. On all cars, install spring retainer, Part No. 4672117, on seat frame as follows: On 2-Door models, remove rear attaching screw of support and secure retainer to seat using same screw. On 4-Door models, secure retainer to frame at drilled hole, using a screw, Part No. 4561558, and nut, Part No. 120368. On all models, install tensioner spring, Part No. 4672116, using a suitable lubricant at spring attaching points. Install seat assembly.

DESCRIPTION: Separate horizontal and vertical seat regulators consist of "jack-screw" type actuators powered by individual reversible type motors which have built in circuit breakers to prevent overloading when operation cycle is completed.

HORIZONTAL SEAT REGULATOR REMOVAL & INSTALLATION: Operate seat to a raised and forward position and disconnect regulator lead wires at connectors. On sedan models, detach tensioner spring from equalizer rod on left side of seat. Turn back carpet, remove regulator floor pan support cover and remove support screws. On sedan models, detach horizontal regulator seat frame support at front of seat. On coupes, remove support screws in floor pan and retaining ring securing regulator to seat front frame rail.

VERTICAL SEAT REGULATOR REMOVAL & INSTALLATION: Operate seat to a raised and forward position and remove retaining ring attaching regulator to floor pan support. Lower seat and detach vertical regulator lead wire connectors and ground wire. From under front of seat, remove regulator support screws then carefully remove regulator from support pin at rear of seat.



(.M.) SEAT C NTR L WIRING DIAGRAM

1957-58 CADILLAC ELDORADO BROUGHAM

Cadillac Eldorad Brougham (1957-58)

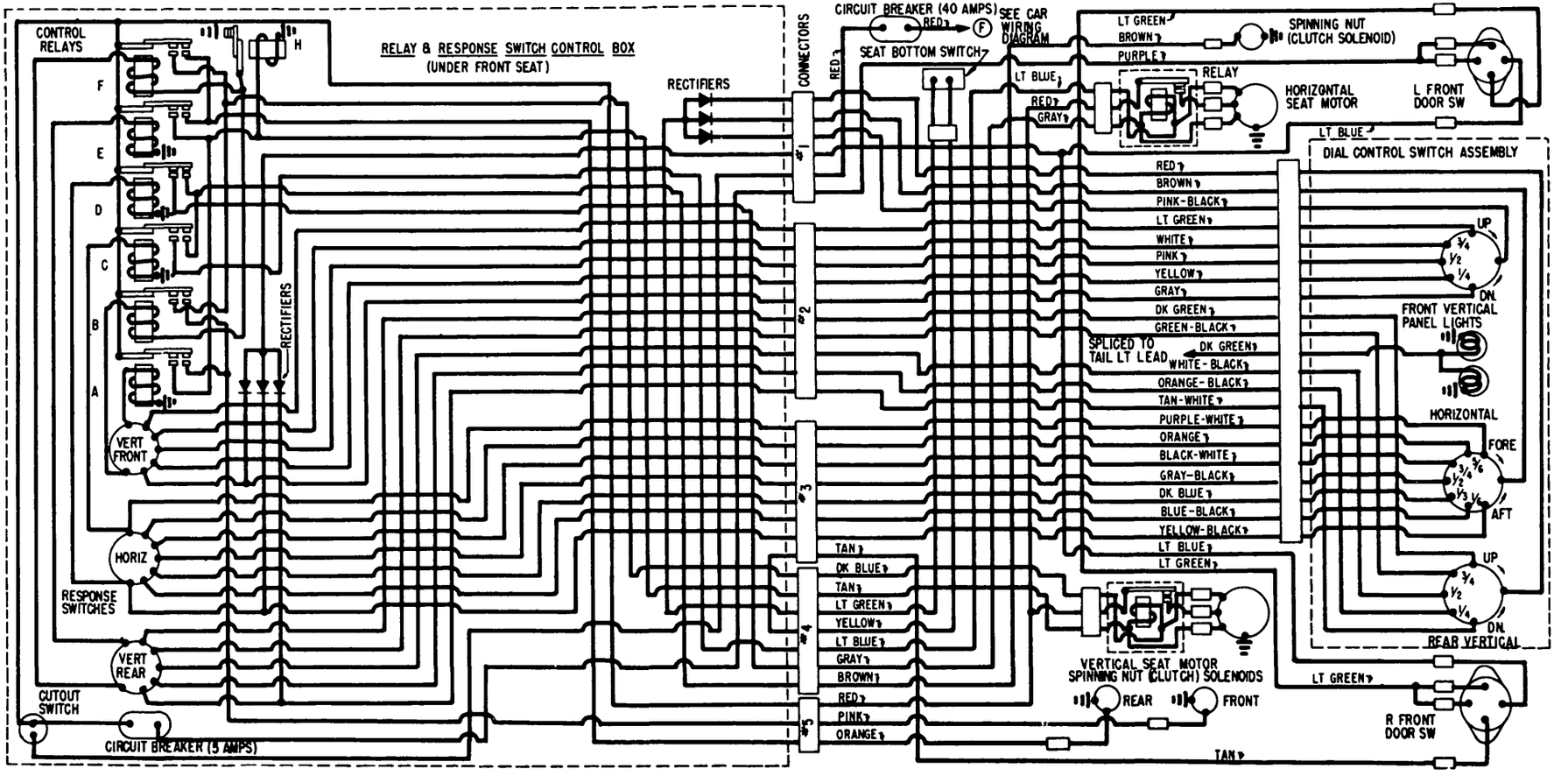
DESCRIPTION: This six-way front seat control consists of two reversible motors for vertical and horizontal seat movement. The right hand assembly controls vertical movement of the front and or rear edge of seat through a jack screw and two spinning nuts (solenoid clutches). The left hand assembly controls horizontal seat movement through a jack screw and one spinning nut (solenoid clutch). The electrical control unit provides automatic movement of the seat to a "favorite" position as determined by the driver. A dial selector control switch installed on left front door arm rest controls front edge and rear edge to five positions, and the horizontal movement to seven positions, by manual operation. Two buttons, one red and one green, over each control knob selects the "favorite" position to two locations when actuated. Opening either front door causes the seat to operate to a full "back" and "down" position. Closing either front door, with a person in the drivers seat causes the seat to automatically return to the selected "favorite" position. A switch on relay control box under front seat at left side is provided to turn off the seat controls.

OPERATION: By Adjusting Dial Selector Control Switch- Current from power source flows through door jamb switches (with door closed), through the seat bottom switch (when closed) and then to the three control knobs of control switch. If the front vertical control knob is adjusted to operate seat to extreme "up" position, the current flows from switch indicator, through the extreme "up" wire circuit to the left half of the response switch bar, thereby energizing relay "A" which energizes the "up" field coil in the vertical motor, and the front vertical spinning nut solenoid (clutch solenoid). The response switch rotates, due to the connecting link being attached to the seat torque tube, until the gap between switch bars opens the circuit between the feed from control switch to response switch. *NOTE* - This principle is used in all operations of the system.

Automatic Operation: With one of the front doors opened, current from the power source is directed from selector control switch to the automatic circuit which simultaneously energizes the extreme "down" and "back" positions and automatically stops when the gap in each of the response switches opens the circuit. When driver enters the car, sits in driving position on front seat cushion and closes both front doors, the current from power source is directed from the automatic circuit to dial control switch circuit; then the seat operates back to its original position (the position seat was in before driver left car).

Vertical Actuator Motor: Operates front and/or rear edge of seat up and down and is located at the left seat adjuster.

CONTINUED ON NEXT PAGE



CADILLAC ELDORADO BROU HAM SEAT C NTR L WIRIN DIA RAM
(SEE FOLL WIN PAGE F R NUMBERED C NTROL PLUGS)

CADILLAC ELDORADO BROUGHAM

(Continued)

Horizontal Actuator Motor: Operates the complete seat assembly forward and rearward and is located at the left seat adjuster.

Front Seat Bottom Switch: Controls circuit from power source to selector control switch. The complete system is inoperative when doors are closed and this switch is open (seat unoccupied). This switch is located in the seat spring construction on drivers side of front seat cushions. When driver sits in the seat, the switch is closed.

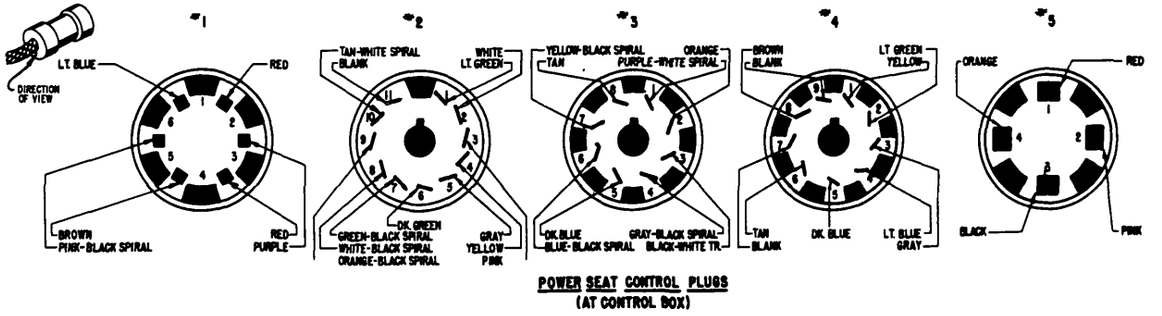
Door Jamb Switches: Directs current from power source to dial selector control switch when doors are closed, and to the automatic circuit when one or both doors are open.

Seat Relay & Response Switch Control Box: This box consists of seven control relays and three response switches. The relays energize actuator motors and spinning nuts (solenoid clutches on jack screws) to operate the seat. Relays must first be energized by current from one of the response switches which in turn is actuated mechanically by linkage connected to the front seat torsion bar. (*NOTE* - There is a response switch for each major movement of seat assembly). Current flows from dial control switch circuit or the automatic circuit, energizing response switches and control relays. The response switch remains energized until feed from power source to relay is broken by action of the response switch mechanical linkage.

Dial Selector Control Switch: Control switch is installed on left front door arm rest and is designed with three switches, each of which energize a particular response switch in the control box. When doors are closed, and the seat bottom switch is actuated (drivers seat occupied), current flows to the three control switches. From control switches, current flows through one side of response switch which energizes the affected relay.

PRE-SELECTION "FAVORITE" SEAT POSITION: (*NOTE* - The seat can also be pre-set for the "favorite" position of a second person. Each of the two persons adjusting the seat to a "favorite" position must choose one color of the two push buttons located above each switch knob to control the seat adjustment, and each person must follow the pre-setting procedure outlined below. Other persons driving the car can manually operate the control knobs to obtain the desired seat position).

Adjustment: Sit in driving position and close both front doors. Choose one color (red or green) for the drivers use in setting controls. Rotate each control knob until arrowhead of the chosen color is lined up with the stationary arrowhead in the outer lens. Depress button of the chosen color behind first control knob, using a dull pointed tool. While holding button down, rotate this control knob until seat is in the desired position. Repeat this procedure with the buttons of the chosen color behind each of the other control knobs.



POWER SEAT CONTROL PLUGS
(AT CONTROL BOX)

CADILLAC ELDORADO BROUGHAM SEAT CONTROL PLUGS

The seat will now return to the "favorite" position of this driver each time he enters the car and indexes the arrowheads of the chosen color.

REMOVAL & INSTALLATION: Front Seat Assembly (Complete) - Remove front seat cushions (see below), then turn back floor carpets to expose pedestal-to-floor pan attaching bolts on each side and remove bolts. Identify wiring for correct installation, then disconnect seat wire harness from seat control box and seat actuator motors and remove complete assembly from body. To install, reverse removal procedure.

Front Seat Cushion, Back & Frame Assembly: Remove seat cushion from seat frame assembly by lifting front edge of cushion upward. Disconnect seat bottom switch wire connectors, then pull cushion forward and remove seat from frame. To remove seat back from frame assembly, remove seat cushion, then remove two screws securing lower edge of seat back to frame. Pull bottom edge of seat back cushion forward and lift upward. Remove back from frame assembly. To remove seat frame from adjusters, remove seat cushion, then remove four bolts securing each seat adjuster to seat bottom frame. Identify wiring for correct installation, then disconnect seat wiring harness from control relay and seat actuator motors and remove frame assembly. To install, reverse removal procedure.

Front Seat Adjuster Assembly: Remove seat assembly (without adjusters and pedestals) from body. Operate seat to a full "up" position. Detach vertical assist spring and remove horizontal anti-chuck spring from adjuster being removed. Support torque tube assembly on side from which adjuster is being removed. Remove three bolts securing torque tube links to adjuster and pedestal. If removing left adjuster, proceed as follows: Remove bolts securing relay box to adjuster, then disconnect wire harness from motor relay and solenoid feed wire from solenoid. If removing right adjuster, remove retaining ring from motor support pin. Disengage adjuster from torque tube links and remove adjuster. If removing left adjuster, remove adjuster and horizontal regulator from body. Remove regulator assembly from left adjuster as a bench operation. To install adjuster, reverse removal procedure.

Vertical Actuator Assembly: Operate seat to full "up" position. Remove complete seat assembly with adjusters and pedestal and place upside down on covered bench. Remove retaining ring from motor support pin. Remove anti-creep springs from spinning nut (solenoid clutch) assemblies. Disengage actuator from support pin, and spinning nut assemblies from between torque tube links and remove from body. To remove spinning nut assemblies, see below. To install reverse removal procedure.

Horizontal Actuator Assembly: Operate seat to full "up" and "rearward" positions. Remove complete front seat assembly with adjusters and pedestal and place upside down on a covered bench. Remove bolts securing torque tube links to spinning nut assembly and disengage anti-creep spring from spinning nut. Remove retaining ring from motor support pin and disengage motor-to-response switch connecting link. Disengage motor from support pin and spinning nut assembly from support; then, remove actuator assembly from seat adjuster. To remove spinning nut assemblies, see below. To install, reverse removal procedure.

Vertical & Horizontal Spinning Nut (Solenoid Clutch) Assemblies: Remove actuator assembly, then, as a bench operation, carefully drive roll pins located in front of spinning nut out of jackscrews. Insert drift punch or suitable tool into one of the spinning nut frame mounting holes. Rotate spinning nut frame slowly until drift punch engages in locking notch in spinning nut; then rotate spinning nut until it runs off jackscrew. (*NOTE* - In cases where the motor operates, it may be actuated to rotate the jackscrew while the spinning nut is held stationary). To install spinning nut, reverse removal procedure and note the following: When installing roll pins into jackscrew, install pins so that the center of protruding end of pin is located between threads of jackscrew threads.

Relay & Response Switch Control Assembly: Remove seat cushion assembly from seat frame. Identify harness connectors for proper installation then disconnect from relay box. Disengage horizontal response switch connecting link from torque tube. In addition, disengage connecting links at outboard side of relay box from torque tube. Remove three relay box attaching screws and remove box from adjuster assembly. To install, reverse removal procedure and note the following: When connecting harness to relay box, line up key in harness plug with slot on relay plug.

1956-58 G.M. & LINCOLN FOUR & SIX-WAY SEAT CONTROL

Buick (1956-58)
Cadillac, Exc. Eldorado Brougham (1956-58)
Linc ln (1956-58) S *"4-Way Seat Note" below.*
Oldsmobil (1956-58) Se *"4-Way Seat Note" below.*
P ntiac (1956-58)

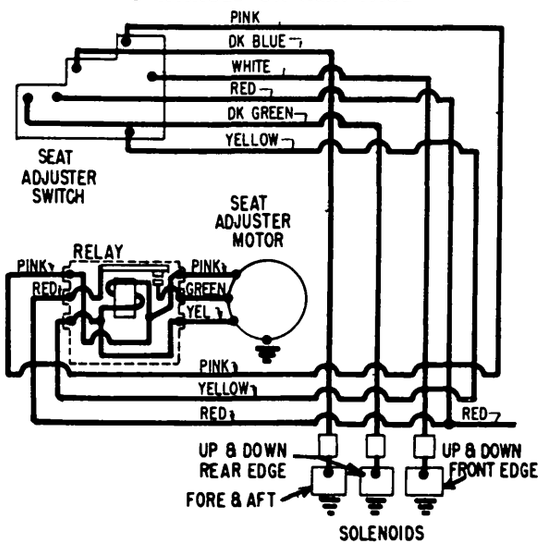
►CHANGES, CAUTIONS, CORRECTIONS

►*1956 CADILLAC SEAT "CHUCK" CORRECTION:* Remove left seat side panel. Remove outer rear hold-down bolt which is ¾" long. Add two .12" thick washers, Part No. 4588818, between floor pan and adjuster assembly. Replace old bolt with new 1¼" long bolt, Part No. 4676744. Correction is made on left seat adjuster assembly only.

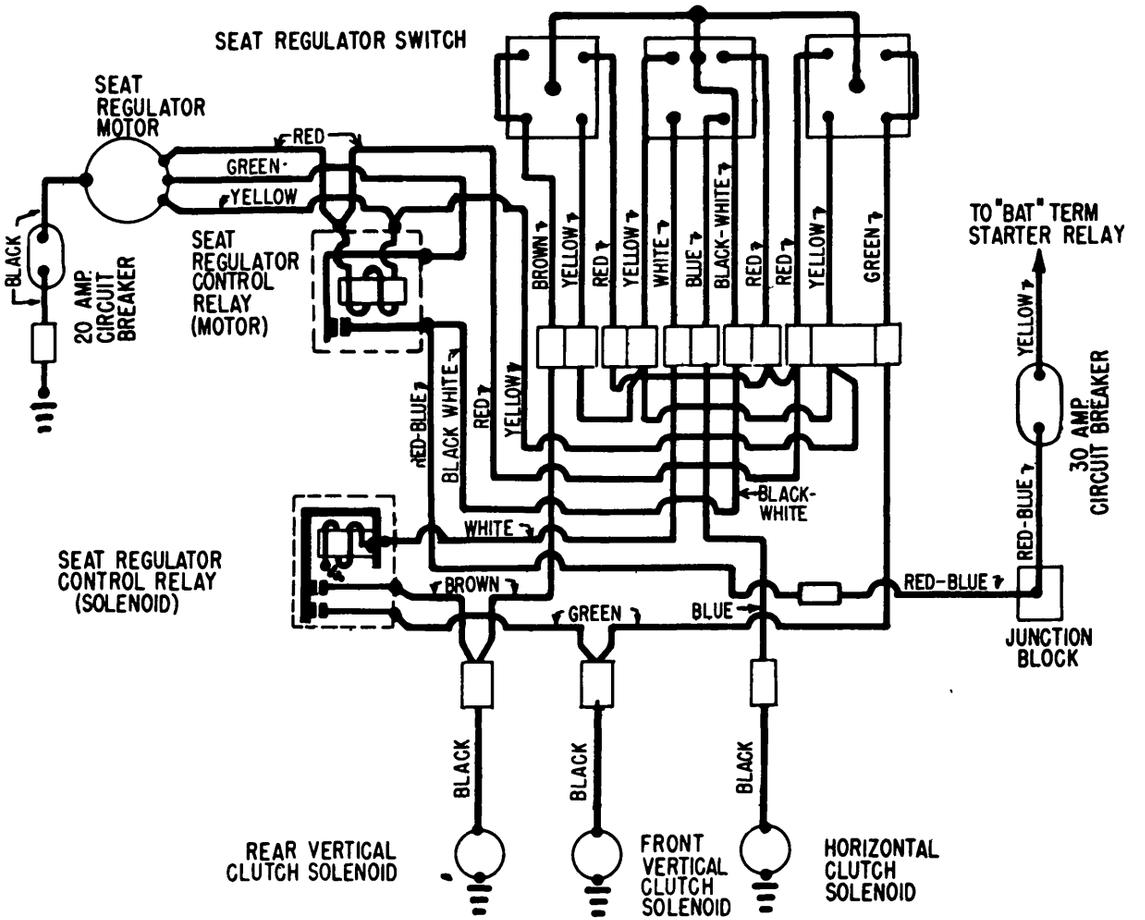
►*ACTUATOR ROLL PIN INSTALLATION CAUTION:* When replacing an actuator spinning nut assembly or an actuator assembly (less spinning nuts) roll pins should be installed so that center of protruding portion of pin is located b tw n threads of the jackscrew. If pin installed in center of a thread there is a possibility pin may shear or cause assembly to jam. When installing roll pins in jackscrew, install pin so that 1/16" of pin protrudes above jackscrew threads.

DESCRIPTION: The 6-Way Seat Adjusters provide horizontal and vertical movement, and forward and rearward tilt. The 4-Way Seat Adjusters provide horizontal and vertical movement only (see "4-Way Seat Control Note" below). The adjusters are operated by an actuator assembly consisting of a reversible motor, gear box, jackscrew and relay. Spinning nut (solenoid clutch) assemblies located on regulator jackscrew transmit movement to seat adjusters through torque tube assemblies and links *(NOTE* - There are three spinning nuts on 6 way seat adjusters, and 2 spinning

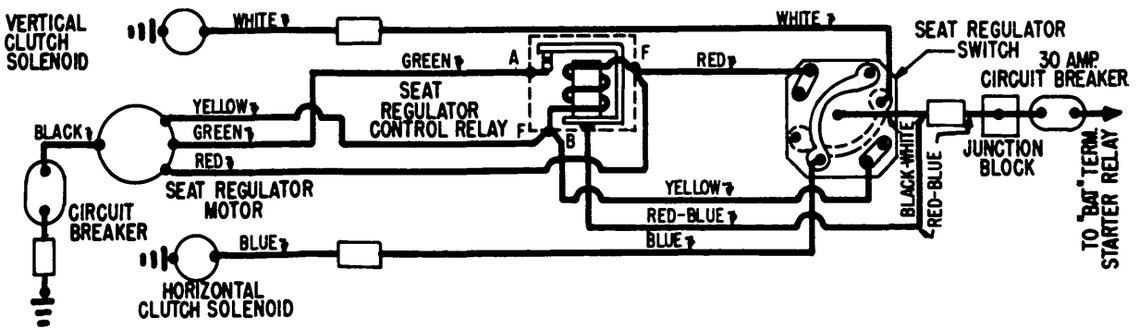
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1956-58 G.M. SIX-WAY SEAT CONTROL WIRING DIAGRAM



1956-57 LINCOLN SIX-WAY SEAT CONTROL WIRING DIAGRAM



1956-57 LINCOLN FOUR-WAY SEAT CONTROL WIRING DIAGRAM

1956-58 G.M. & LINCOLN FOUR & SIX-WAY SEAT CONTROL (C nt.)

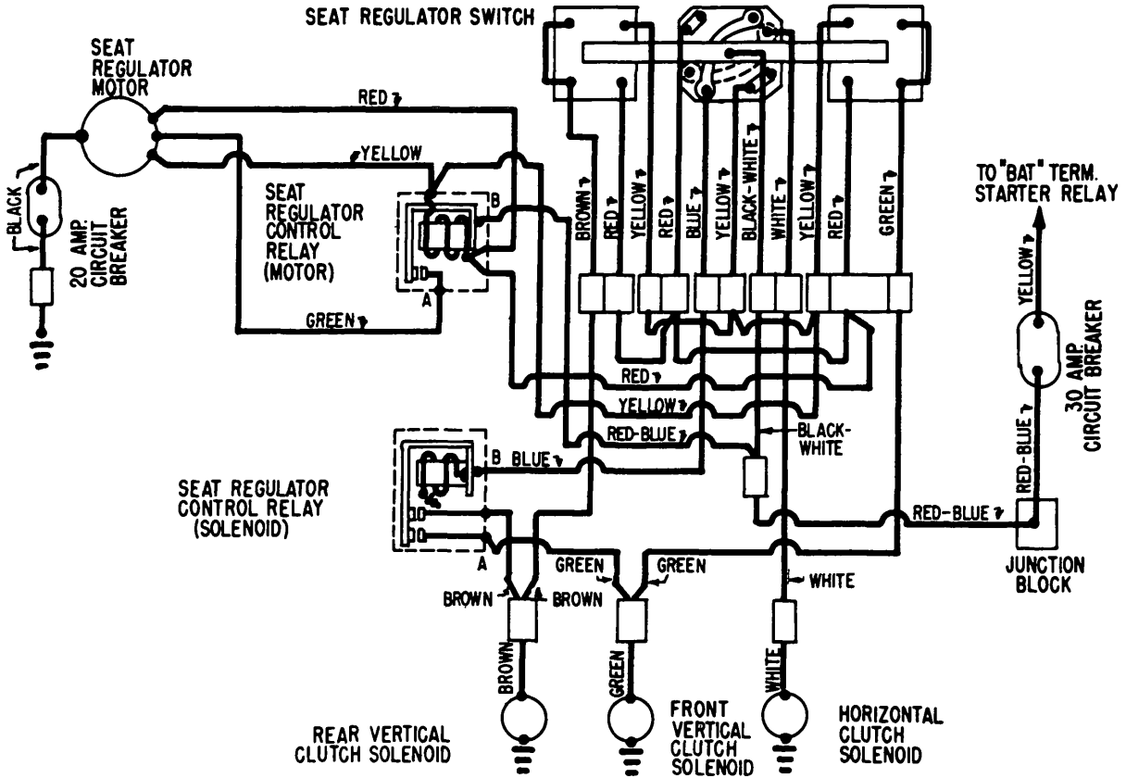
nuts on 4-way seat adjusters). In each of the three spinning nut (solenoid clutch) assemblies, there is a free-wheeling nut mounted in ball bearings which free-wheels with the jackshaft unless locked out of free-wheeling by the solenoid located in spinning nut assembly. When spinning nut is locked out of free-wheeling by solenoid action, the nut assembly moves on jackscrew and transmits movement to seat adjusters through connecting links and torque tube assemblies. Seat regulator is controlled by switches located at left panel of front seat.

►*4-WAY SEAT CONTROL NOTE:* 4-Way Seat Adjusters are basically the same as 6-Way Seat Adjusters. The rear vertical torque tube and the center spinning nut (solenoid clutch) and linkage which operate rear of seat up and down on 6-way seat adjusters are not used on 4-way seat adjusters. The rear of the 4-way adjusters is operated up and down in unison with the front of the adjusters by means of a connecting link to front vertical linkage. Service is the same for both types.

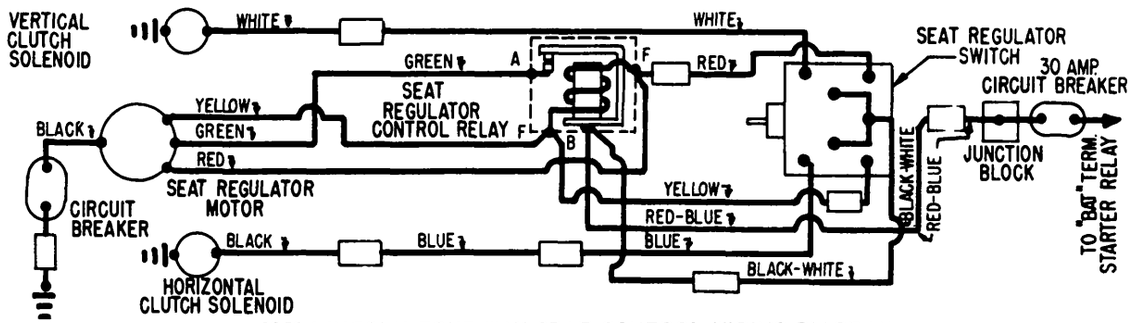
REMOVAL & INSTALLATION: Front Seat Assembly (Including Seat Adjusters & Actuator Assembly): Operate seat to raised position. Under front of seat disconnect adjuster control wire harness from adjuster feed wire harness and detach control harness from clip on floor pan. Disconnect lighter feed wire (where applicable) and detach wire from clip on floor pan. On Cadillac, remove screws securing rear floor carpet to right and left adjusters. On all cars, remove seat adjuster to floor pan bolts, then with aid of helper lift seat assembly, with adjusters and actuator assembly attached, from body. To install, reverse removal procedure. Make sure ground wire is secured under seat adjuster floor pan bolt. When installing seat assembly to body, carefully align seat adjuster attaching holes with attaching holes in floor pan to avoid possible binding of seat adjuster linkages. Seat adjusters should be parallel when properly aligned. Check operation of seat to extreme limit of each position.

Front Seat Assembly (Less Seat Adjusters & Actuator Assembly): Operate seat to fully raised position and midway between full forward and rearward horizontal positions. Remove both right and left seat side panels. Under front of seat disconnect control wire harness from adjuster feed wire harness. Detach lighter feed wire and detach wire from clip on floor pan; remove ground wire from under seat adjuster bolt. At both adjusters remove front and rear seat adjuster-to-seat frame attaching bolts. Tilt seat assembly rearward and remove control wire harness from spring clips along front of seat bottom frame. With aid of helper carefully lift seat assembly (less seat adjusters and actuator assembly) from body. To install, reverse removal procedure. Make sure ground wire is secured under seat adjuster floor pan bolt. Check operation of seat to extreme limit in each position.

Front Seat Adjuster: Remove seat assembly including seat adjusters and actuator assembly (see above). Place seat assembly upside down on a covered bench. Remove seat side panel and counterbalance spring from adjuster being removed. Support torque tube assembly with board between torque tube and seat front and rear rails on side of seat from which adjuster is being removed. Remove cotter keys and washers securing adjuster links to torque tube assembly and cotter key and washer securing torque tube link to adjuster. Remove both front and rear seat adjuster-to-seat frame attaching bolts. Lift adjuster slightly, then carefully work adjuster outboard to disengage it from torque tube. Disengage link from adjuster. If removing right adjuster, remove cotter key and washer and disengage actuator assembly from support pin. To install, reverse removal procedure.



1958 LINCOLN SIX-WAY SEAT CONTROL WIRING DIAGRAM



1958 LINCOLN FOUR-WAY SEAT CONTROL WIRING DIAGRAM

Adjuster Actuator Assembly: Operate seat midway between forward and rearward horizontal positions. Operate front of seat to up position and rear of seat midway between up and down positions. Remove seat assembly including seat adjusters and actuator assembly. Place assembly upside down on covered bench. Remove both right and left seat adjuster counterbalance springs. Check to see that all spinning nut attaching screws are accessible for removal. If screws not accessible, hook up control harness feed wire to power and ground seat frame; hook up control switch, then operate actuator to position spinning nuts so that all screws are accessible. Disconnect the three spinning nut solenoid

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1956-58 G.M. & LINCOLN FOUR & SIX-WAY SEAT CONTROL (Cont.)

feed wires at connectors. Disconnect control harness feed wires from motor relay. Remove anti-creep spring from center spinning nut. Remove shoulder screws securing spinning nuts to mounting supports. Remove cotter key and washer securing actuator to support pin. Raise spinning nut mounting supports to vertical position. Raise front of actuator sufficiently to allow unit to be removed from support pin, then remove actuator assembly from seat. To install, reverse removal procedure. Connect relay and solenoid wires.

Adjuster Actuator Spinning Nut Assembly (Including Solenoids): Remove seat adjuster actuator assembly (see above). Carefully drive roll pins out of jackscrew. Insert drift punch or suitable tool into spinning nut frame mounting hole, rotate spinning nut frame slowly until drift punch engages in locking nut of spinning nut, then unscrew complete spinning nut assembly from jackscrew. To install, reverse removal procedures. *CAUTION - See "Actuator Roll Pin Installation Caution" above.*

Adjuster Actuator Spinning Nut Solenoids: Remove seat assembly (less seat adjusters and actuator assembly). Disconnect solenoid feed wire at connector. Remove solenoid cover carefully bending down tabs at bottom of cap and pulling upward. Remove solenoid plunger, plunger shunt, and shunt spring. Remove nut and washer securing solenoid ground wire to spinning nut frame. Carefully push solenoid forward or rearward and remove from retainer on spinning nut assembly. To install, reverse removal procedure. Solenoid plunger should move up or down freely; if necessary, move solenoid slightly forward or rearward to allow free movement of plunger. Before installing seat assembly, hook up feed wire with control harness and check operation of solenoid.

Control Switch (GM Cars): Remove switch and escutcheon assembly from seat side panel. Through holes in side of switch escutcheon, depress tabs of clips and remove clips securing switch to escutcheon and remove switch. To install, reverse removal procedure.

LUBRICATION: Jackscrew – Thoroughly wipe off old lubrication. Apply Lubriplate No. 630 AA-W (winter grade). Operate adjuster to all positions and to extreme limit. Wipe off excess lubricant.

TROUBLE SHOOTING: Seat Adjuster Motor Does Not Operate – Short or open circuit between power source and motor; defective motor.

Seat Adjuster Motor Operates, Rear Edge of Seat Cannot be Adjusted (Other Operations Normal): Short or open circuit between switch and affected solenoid.

Seat Adjuster Motor Operates, But Seat Adjusters Are Not Actuated: Short or open circuit between switch and affected solenoid; defective solenoid.

Seat Adjuster Motor Operates, Front & Rear Edge of Seat Move Up & Rearward, But Will Not Move Seat Down & Forward: Short or open circuit between one of motor field wires and seat control switch; defective field coil in motor.

Seat Adjuster Motor Operates, Front & Rear Edge of Seat Move Down & Forward, But Will Not Move Seat Up & Rearward: Short or open circuit between one of motor field wires and seat control switch; defective field coil in motor.

1959-60 G.M. 2-WAY SEAT CONTROL

Buick (1959–60).
Cadillac (1959–60).
Oldsmobil (1959–60).

DESCRIPTION & OPERATION: Consists of a single motor located at right front of seat bottom frame which actuates a jackscrew and gearnut at each side of seat. Gearnuts connected by a drive cable and control switch is located at left seat side panel.

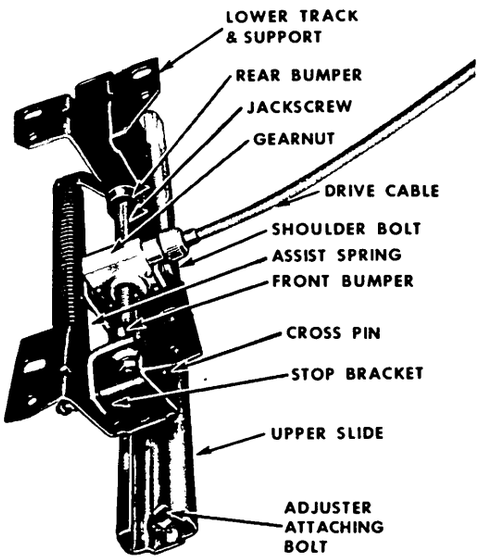
TESTING & TROUBLE SHOOTING: Motor Does Not Operate in Either Direction - Check for current at all wiring connectors. Check for faulty switch by using a jumper wire to bypass switch. Check motor operation with a jumper wire from power source to one motor terminal. Then check other terminal. If motor inoperative, it is faulty.

Motor Operates In One Direction Only - Switch may be defective. Motor feed wires or motor may be faulty. Check as above.

REMOVAL & INSTALLATION: Front Seat Assembly - Disconnect control switch wire harness from feed wire harness and detach switch harness from floor pan. Loosen front door sill plates and turn back carpet. Remove seat adjuster-to-floor pan attaching bolts and remove assembly.

►*INSTALLATION NOTE:* Adjusters must be parallel and "in phase" with each other. If "out of phase" (one adjuster reaches limit of its travel before the other), proceed as follows: Actuate seat until left adjuster reaches limit of its travel in one direction.. Disconnect drive cable and actuate seat until right adjuster reaches corresponding limit. Connect cable and check operation.

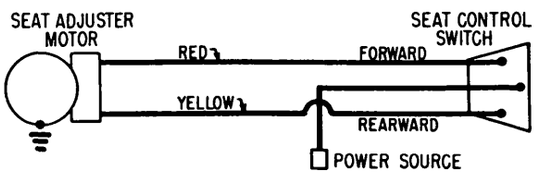
Seat Adjuster - Remove seat assembly and detach drive



G.M. 2-WAY ADJUSTER ASSEMBLY

cable from adjuster being removed. Disconnect assist spring. Remove adjuster-to-seat bottom frame bolts and remove adjuster. To install, reverse removal procedure.

Gearnut & Jackscrew - Remove seat assembly and detach drive cable from gearnut and jackscrew being serviced. Disconnect assist spring. With a clutch type screwdriver remove shoulder bolts holding gearnut to upper slide part of adjuster. Remove retainer holding stop bracket crosspin to adjuster front pedestal and remove crosspin. Remove gearnut and jackscrew assembly. To install, reverse removal procedure. *NOTE* - When installing new gearnut only, remove cotter pin, washers and rubber bumper from rear of jackscrew. To replace jackscrew, remove parts from front end of jackscrew also.



G.M. 2-WAY SEAT WIRING DIAGRAM

Adjuster Plastic Shoes -- Remove front seat assembly and adjuster being serviced. Remove shoulder bolts with a clutch type screwdriver. Slide lower track and support base part of adjuster (with gearnut and jackscrew) forward until it disengages from upper slide assembly. Remove plastic shoes from slots in lower track. To install, reverse removal procedure making sure groove in plastic shoe fits into track with thin part of shoe protruding above track surface.

Actuator Motor - Disconnect drive cable and switch wire harness from motor. Remove bolts holding motor support bracket to weld nuts at front of seat bottom frame and remove motor and bracket. When installing a new motor, transfer ground wire and support bracket from old motor to new one. To install, reverse removal procedure.

1959-60 G.M. 6-WAY SEAT CONTROL (THREE MOTOR TYPE)

Buick (1959-60). ①
Cadillac (1959-60). ①
Chevrolet (1959-60). ①
Oldsmobile (1959-60). ①
Pontiac (1959-60). ①

① – One-motor type also used on 1960 Models. *See "1960 G.M. 6-Way Seat Control (One Motor Type)"*

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 BUICK DRIVE CABLE BREAKING CORRECTION: (Early Cars):* Breakage of right drive cable may be caused by cable catching on hex head inside seat track attaching bolt. To correct, replace this bolt with round head Phillips bolt used on later cars.

DESCRIPTION & OPERATION: Consists of three separate motors with internal circuit breakers and self-locking gear drive for each of the three basic movements of the seat: Vertical at front, vertical at rear, horizontal.

TROUBLE SHOOTING & DIAGNOSIS

All Three Motors Inoperative: Open or short circuit in feed wire to control switch. Switch not grounded.

Two Motors Operate But Other Does Not: Motor faulty or open or short circuit in harness wiring from control switch to affected motor.

ELECTRICAL TESTING

Seat Control Switch: 1) Remove switch to expose terminal block. Check No. 1 (red) terminal with test light. If light does not light but power windows are operative, there is an open or short circuit between left door power window harness and switch block.

2) Connect a jumper wire from red feed wire to following terminal locations:

(a) To raise front edge - No. 1 & 7.
(b) To lower front edge - No. 1 & 2.
(c) To raise rear edge - No. 1 & 5.
(d) To lower rear edge - No. 1 & 3.
(e) To move forward - No. 1 & 6.
(f) To move rearward - No. 1 & 4.
(g) To raise front & rear - No. 1, 5 & 7.
(h) To lower front & rear - No. 1, 2 & 3.

If motors operate with jumper wire, replace switch.

Wiring: With harness connectors disengaged from seat motors, connect a test light at end of wire being checked. Then actuate control switch. If light does not light, wiring is faulty. Check all other wires in same manner.

Seat Motors: Disconnect harness connector from motor being checked and connect a jumper wire from feed wire to one motor terminal. If motor fails to operate, replace it. Check all three motors in same manner.

REMOVAL & INSTALLATION

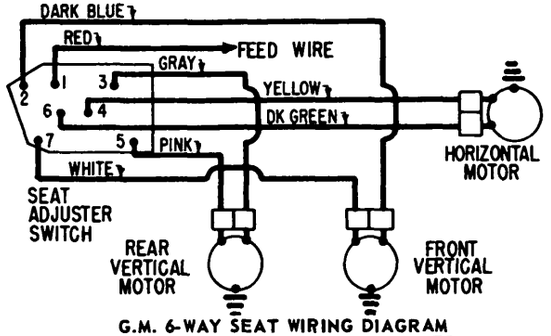
Front Seat Assembly: Removal - Disconnect switch harness from feed wire and detach control switch harness from floor pan. Loosen front door sill plates, turn back carpet, remove adjuster track covers and adjuster attaching bolts. Remove remaining carpet retainers and remove seat assembly.

Installation - Reverse removal procedure making sure adjusters are parallel and "in phase" with each other. If adjusters "out of phase" (one adjuster reaches its maximum travel before the other), proceed as follows:

Horiz ntal Trav l - Operate switch center knob until one adjuster reaches full forward position. Detach drive cable of this adjuster at motor, then operate seat until other adjuster reaches full forward position. Connect drive cable and check operation.

Front V rtical Trav l - Operate switch front knob until front of one adjuster is in full up position (U-link must rest on its stop - see illustration). Disconnect drive cable from gearnut of this adjuster and then operate switch until other adjuster is in full up position. Connect cable and check operation.

Rear Vertical Travel - Operate switch rear knob until rear of one adjuster is fully lowered and disconnect drive cable of this adjuster at gearnut. Operate switch until other adjuster is fully lowered. Connect cable and check operation.



G.M. 6-WAY SEAT WIRING DIAGRAM

Seat Adjuster: Operate seat to full up and full forward position (Cadillac), 5/8" from full forward position (Others). Remove seat assembly (see above), detach drive cables at adjuster and remove adjuster-to-seat bottom frame bolts. Remove adjuster. *NOTE* - If one end of adjuster not up enough to reach attaching bolt, linkage may be disengaged from gearnut at that end of adjuster by removing the shoulder bolts. To install, reverse removal procedure.

Vertical Jackscrew: 1) Remove front seat assembly. Remove seat side panel. Disconnect drive cable at motor of adjuster not being serviced. Connect a power source to feed wire and to seat bottom frame-to-seat adjuster pedestal ground wire and operate rear switch until rear of adjuster is fully lowered (rear vertical gearnut fully rearward)

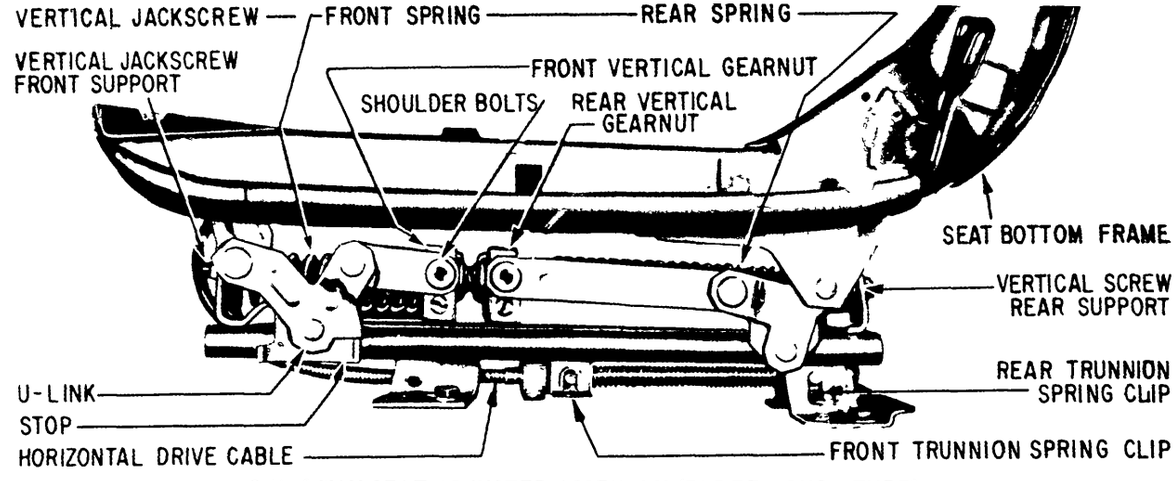
2) Operate front switch so front of adjuster is about half raised and remove cotter pin holding up travel rubber bumpers and washers on vertical jackscrew. Now operate front switch so front of adjuster is fully raised (U-link must rest on its stop). With a clutch type screwdriver remove shoulder bolt from each side of front vertical gearnut. Operate front switch until tension is relieved on vertical jackscrew front spring and remove nut and clip from front of jackscrew. Lift front of jackscrew out of slot and remove spring (turn spring counterclockwise). Replace jackscrew in slot.

3) Operate front switch so front vertical gearnut is fully forward. Operate rear switch so rear of adjuster is fully raised (rear vertical gearnut fully forward). Remove shoulder bolts. Operate rear switch until tension relieved on jackscrew rear spring and remove nut, washer and track cover support from rear of jackscrew. Disconnect remaining two vertical drive cables. Disengage front end of jackscrew and slide it forward until rear end is disengaged. Remove jackscrew with gearnuts and rear spring attached. To install, reverse removal procedure.

Horizontal Jackscrew: Remove seat assembly and pry open spring clip at front end of jackscrew. Disengage jackscrew front trunnion from upper horizontal track. Disengage rear trunnion from adjuster support by removing spring clip at rear of jackscrew. Remove horizontal jackscrew with trunnions attached. Remove drive cable. Remove rear trunnion by rotating trunnion. Remove front trunnion by removing retaining snap ring and flat washer from front (driven) end of trunnion. To install, reverse removal procedure.

Actuator Motors: Front Vertical Or H riz ntal - Disconnect control switch wiring and both drive cables from motor being removed. Remove bolts holding motor support bracket to seat frame bar pinchweld. Remove motor and bracket. To install, reverse removal procedure.

Rear Vertical - Remove front seat assembly and disconnect switch wiring and both drive cables from motor. Remove bolts holding motor support bracket to seat frame bar pinchweld and remove motor and bracket. To install, reverse removal procedure.



G.M. 6-WAY SEAT ADJUSTER ASSEMBLY (THREE-MOTOR TYPE)

1960 G.M. 4-WAY SEAT CONTROL

Buick (1960)
Ch vrol t (1960)
Oldsm bil (1960)
Pontiac (1960)

►CHANGES, CAUTIONS, CORRECTIONS

►*WIRING HARNESS CAUTION:* When Pink and Yellow wires on harness switch block are reversed, seat operation will be reversed to switch control. To correct, use a long pointed tool to release locking tab (in front end of connector) and reverse location of pink and yellow wires. Hold locking tab released while inserting wires.

DESCRIPTION & OPERATION: Consists of 12-volt reversible type shunt wound motor with built-in circuit breaker and relay assembly mounted on motor case. Motor installed at left side of seat assembly and energized by "toggle-type" control switch in seat left side panel. Mechanism consists of transmission assembly (two solenoids and four drive cables), one solenoid controlling vertical movement other solenoid controlling horizontal movement and a main drive cable from motor to transmission assembly. A switch contact energizes one motor and one solenoid simultaneously. Solenoid plunger engages clutch shaft dog with driving gear dog which rotates clutch shaft that rotates drive cables and operates both adjusters. A "Slip Clutch" in clutch and gear assembly releases drive cables at limit of travel. When switch contact broken, spring returns solenoid plunger, disengaging clutch shaft dog and driven gear dog.

TROUBLE SHOOTING & DIAGNOSIS

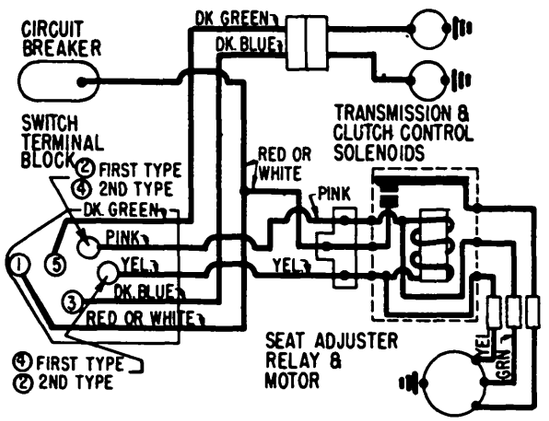
M tor Inoperativ : Short or open circuit between power source or switch and motor, or faulty motor.

M t r Operates But Adjusters Do Not Move: Short or open circuit between switch and affected solenoid.

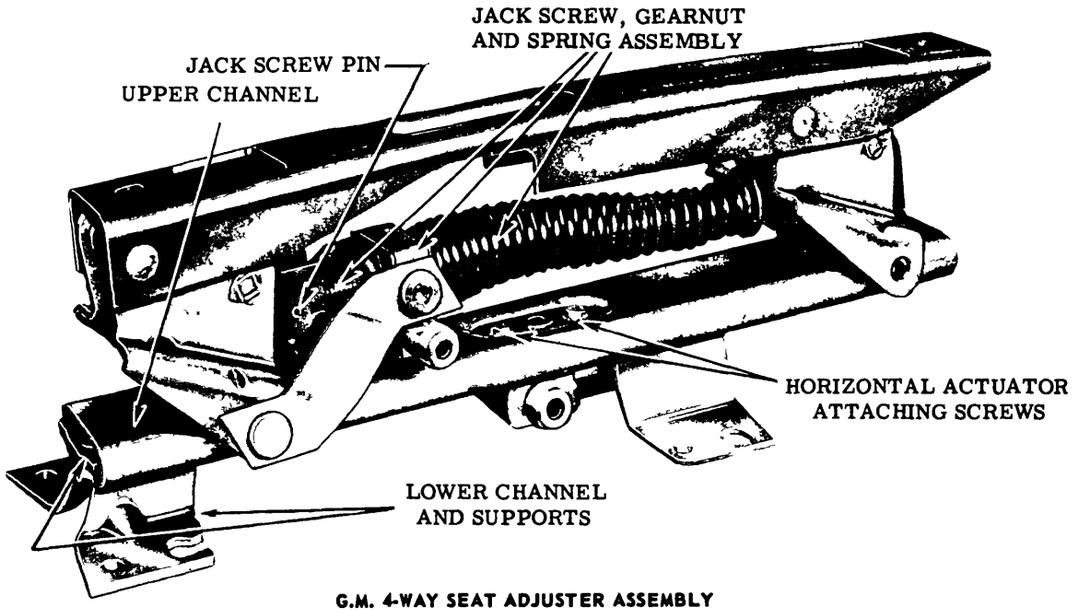
M t r Op rates In On Dir ction Only, Seat Moves Down And F rward, But Do s Not Move Up or Rearward: Short or open circuit between one of motor field wires and seat control switch, defective field coil in motor.

TESTING

Ch cking F ed Circuit Continuity at Seat Control Switch: Connect one light tester lead to feed terminal (Red for Chevrolet, Pontiac and Buick, White for Oldsmobile) and ground other lead to body metal. If tester does not light there is open circuit between switch and relay terminal.



4-WAY SEAT CONTROL WIRING DIAGRAM



G.M. 4-WAY SEAT ADJUSTER ASSEMBLY

Checking Feed Circuit Continuity at Relay on Seat Motor: Disengage the three terminal connector body from seat motor relay terminal. Insert one light tester lead into relay power feed (red or white wire) connector slot on harness and ground other lead. If tester does not light there is no current at end of feed wire. Failure is caused by open or short circuit in feed circuit.

Checking Seat Control Switch: Substitute known good switch or use a 3-way jumper wire and connect to switch block, as given below.

Three-Way Jumper Wire - Connect two ends of two pieces of 12 gauge wire at least 4½" long and insert joined section into feed location in switch block. Insert other ends into a field and a solenoid location in switch block. All locations on wiring diagram are numbered for making tests that follow. *CAUTION:* The last two connections must be made simultaneously. Switch locations to be connected to obtain a specific seat movement are as follows *(see Production Change Note below):*

1) To raise seat, place jumper wire in locations 1,2,5.
2) To lower seat, place jumper wire in locations 1,4,5.
3) To operate seat forward, place jumper wire in locations 1,3,4.
4) To operate seat rearward, place jumper wire in locations 1,2,3.

►*SWITCH BLOCK WIRING HARNESS PRODUCTION CHANGE:* Earlier type harness (not serviced) has wire end of switch block toward front of body. Later type has wire end of switch block toward rear of body. The fi ld fe d l ads for "Rearward & Up Cycle" and "Forward & Down Cycle" ar r v rs d, as shown on wiring diagram. When servicing an early type harness with late type harness it will be necessary to rotate the seat control switch 180° to provide specific seat operation sequence.

REMOVAL & INSTALLATION

Front Seat Assembly: Removal - Disconnect switch harness from feed wire and detach control switch harness from floor pan. Loosen front door sill plates, turn back carpet, remove adjuster track covers and adjuster attaching bolts. Remove remaining carpet retainers and remove seat assembly.

Installation - Reverse removal procedure. Make sure ground wire is securely attached to right seat adjuster and under seat adjuster-to-floor pan attaching bolt. Be sure seat adjusters are in phase with each other. To adjust, see below.

Horizontal Travel - Operate one switch control until one adjuster reaches full forward position. Detach horizontal drive cable from adjuster, then operate seat forward until other adjuster has reached full forward position then connect horizontal drive cable and check seat travel.

Vertical Travel - Operate seat control switch until one adjuster reaches fully raised position. Disconnect vertical drive cable from adjuster and operate seat forward until other adjuster reaches full forward position then connect vertical drive cable and check operation.

Seat Adjuster: Removal - Operate seat assembly to full up and forward position. Remove front seat assembly from body with adjusters, motor and transmission. Detach two power drive cables from adjuster to be removed, remove adjuster.

Installati n - Reverse removal procedure. *NOTE* - Black cable attached to horizontal actuator and yellow cable attached to vertical gear nut. Adjusters must be in phase, *see "Front S at Ass mbly Installati n" abov .*

CONTINUED ON NEXT PAGE

1960 G.M. 4-WAY SEAT CONTROL (C ntinued)

Vertical Jackscrew, Gearnut & Spring: Removal - Operate seat assembly approximately midway between full up and down positions and remove seat assembly. Remove seat adjuster from side on which jackscrew is to be removed. Use a clutch type screw driver or other suitable tool to remove shoulder screws securing linkages to vertical gearnut. Use a drift to drive out jackscrew pin. Move jackscrew, gearnut and spring assembly rearward to disengage front of jackscrew from adjuster frame, then raise front of jackscrew and move assembly forward to remove assembly from seat adjuster. *NOTE* - It may be necessary to manually raise or lower upper portion of adjuster to gain clearance for removal of jackscrew, gearnut and spring assembly. To remove gearnut and spring from jackscrew, actuate or turn gearnut off jackscrew. To install reverse removal procedure.

H riz ntal Actuat r (n Upp r & L w r Chann ls): Remove seat adjuster and remove actuator from adjuster. Slide adjuster lower channel from upper channel and, if required, remove plastic shoes from lower channel track. To install, reverse removal procedure. Be sure all four plastic shoes have been installed on lower track. Apply "Lubriplate" to track portion of upper channel and to teeth on lower channel. Adjust actuator so that drive gear is fully engaged with teeth on lower channel. *NOTE* - When horizontal actuator screws are tightened there should be no free motion between upper and lower channels.

Electric Motor or Drive Cable: Disconnect wire harness connector (under left side of seat) from motor and remove motor support-to-seat frame attaching bolts. Move motor and support assembly towards left side of seat to disengage motor drive cable, then remove motor and support assembly from seat. Motor drive cable can now be removed.

Horizontal & Vertical Cables: Remove front seat assembly from body with adjusters attached. Remove motor and transmission. Detach both horizontal and vertical cables from seat adjuster. Remove screws securing horizontal and vertical cable and place on side of transmission from which cables are being removed and remove cables from seat assembly. To remove one cable from end plate for service replacement, place end plate in a vise and with a suitable tool, remove knock-out plug located adjacent to cable hole. Remove cable from end plate and install new cable. To install horizontal and vertical cables reverse removal procedure.

Adjuster Transmission: Rem val - Remove front seat assembly with adjusters, motor and transmission attached. Disconnect wire harness connector from transmission. Remove horizontal and vertical cable end plate screws and detach cables from transmission. Remove transmission support-to-seat frame attaching bolts then disengage transmission from motor drive cable and remove transmission from seat assembly.

1960 G.M. 6-WAY SEAT CONTROL (ONE-MOTOR TYPE)

Buick (1960). Ⓓ
Cadillac (1960). Ⓓ
Chevrolet (1960). Ⓓ
Oldsmobile (1960). Ⓓ
Pontiac (1960). Ⓓ

Ⓓ – Three-motor type also used. *See "1959-60 G.M. 6-Way Seat Control (Three Motor Type)" in this section.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1960 OLDSMOBILE FUSE PRODUCTION CHANGE & CAUTION:* Late production cars have 25 ampere fuse. Before checking for short in system when early 20 ampere fuse is blown install a 25 ampere fuse as momentary draw may exceed 20 amperes.

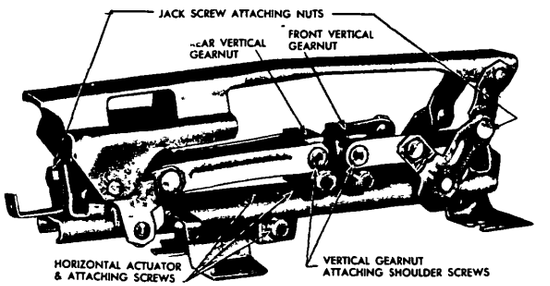
DESCRIPTION & OPERATION: Consists of one 12 volt shunt wound motor coupled to a solenoid controlled transmission assembly which operates seat adjusters by means of flexible cables. Motor is installed on left side of seat assembly and energized by a three-button control switch installed in left seat side panel. When a control switch is actuated the motor and one of the solenoids are energized simultaneously, solenoid plunger engages the clutch shaft with a driving gear. Driving gear rotates the clutch shaft which rotates the drive cables and operates both adjusters. A "Slip Clutch" in clutch and gear assembly releases rotating action of drive cables when they reach limit of travel. A spring returns solenoid plunger to its original position, disengaging clutch shaft from driving gear. No. 1 solenoid controls vertical movement of rear edge of seat. No. 2 solenoid controls horizontal movement of the seat. No. 3 solenoid controls vertical movement of the front edge of seat. A Motor drive cable is installed from motor to transmission assembly.

TROUBLE SHOOTING & DIAGNOSIS

M tor Inoperative: Short or open circuit between power source or switch and motor, or faulty motor.

Seat Adjuster Motor Operates But Seat Adjusters Are Not Activated or Front Edge of Seat Moves Up & Down and F rward & Rearward But R ar Edg f Seat Cannot b Operated: Short or open circuit between switch and affected solenoid or defective solenoid.

Seat Adjust r M tor Op rat s and Seat Adjust rs Move Front and R ar Edge of Seat Up & Forward, But Will Not Move Seat Down & Rearward or Motor Operates and Seat Adjusters Move Front & Rear of Seat Down & Rearward, But Will Not Move Seat Up & Forward: Short or open circuit between one of the motor field wires and seat control switch or defective field coil in motor.



G.M. 6-WAY SEAT ADJUSTER ASSEMBLY

TESTING

►*ELECTRICAL TESTING NOTE:* Before making any extensive checking procedures, check the seat adjuster wiring for proper attachment, see circuit diagram.

Checking Feed Circuit Continuity at Circuit Breaker: Connect one light tester lead to battery side of circuit breaker and ground other side. Circuit breaker is located at left shroud. If tester does not light there is open or short circuit in feed circuit to breaker.

Checking Feed Circuit Continuity at Seat Control Switch: Connect one light tester lead to feed terminal of switch block and ground other lead to body metal. If tester does not light there is an open or short between switch and power source.

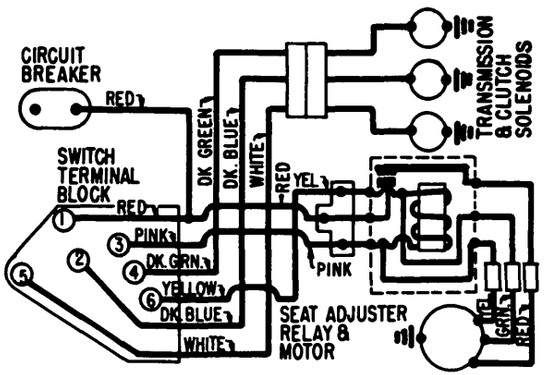
Checking Feed Circuit Continuity at Relay on Seat Motor: Disengage 3-wire connector body from seat motor relay terminal. Insert one light tester lead into relay power feed (red wire) connector slot on the harness and ground other light tester lead. If tester does not light, there is no current at end of feed wire. Failure is caused by an open or short circuit in feed circuit.

Checking Seat Control Switch: Substitute known good switch or use a 3-way jumper wire and connect to switch block, as given below.

Three-Way Jumper Wire - Connect two ends of two pieces of 12 gauge wire at least 4½" long and insert joined section into feed location in switch block. Insert other ends into a field and a solenoid location in switch block. All locations on wiring diagram are numbered for making the tests that follow. *CAUTION:* The last two connections must be made simultaneously.

1) To raise front edge of seat, place jumper in locations 1,6,5.
2) To lower front edge of seat, place jumper in locations 1,3,5.
3) To raise rear edge of seat, place jumper in locations 1,6,4.
4) To lower rear edge of seat, place jumper in locations 1,3,4.
5) To move seat forward, place jumper in locations 1,6,2.
6) To move seat rearward, place jumper in locations 1,3,2.

CONTINUED ON NEXT PAGE



6-WAY SEAT CONTROL WIRING DIAGRAM

1960 G.M. 6-WAY SEAT CONTROL (C ntinued)

REMOVAL & INSTALLATION

Front Seat Removal: Disconnect seat wire harness from feed wire harness (under front seat) and detach control switch harness from clip on floor pan. Loosen both front door sill plates, turn back carpet and remove both seat adjuster track covers and remove four seat adjuster-to-floor pan attaching bolts from each adjuster. Remove carpet retainers at front of seat adjusters. Remove seat assembly with attached adjusters, motor and transmission assembly. To install, reverse removal procedure and make sure ground wire is securely attached at right seat adjuster under seat adjuster-to-floor pan attaching bolt. *CAUTION* - Seat adjusters should be parallel and "in phase" with each other. To adjust see below.

Horizontal Travel - Operate seat control until one adjuster reaches full forward position. Detach horizontal drive cable from adjuster, then operate seat forward until other adjuster reaches full forward position, then connect horizontal drive cable and check horizontal travel of seat.

Front & R ar Vertical Travel - Operate seat control switch until one adjuster reaches fully raised position. Disconnect vertical drive cable and operate seat upward until other adjuster has reached full up position, then connect vertical drive cable and check vertical travel of seat.

Front Seat Adjuster Ass mbly: Removal & Installation - Remove front seat assembly with attached adjusters, motor and transmission and detach three power drive cables from adjuster to be removed. Remove adjuster-to-bottom frame front and rear attaching bolts and remove seat adjuster assembly. To install seat adjuster assembly, reverse removal procedure. Black cable attaches to horizontal actuator, yellow cable to front vertical gearnut, and blue cable to rear vertical gearnut. *NOTE* - Check operation, adjusters must be "in phase", see "Front Seat Assembly" above.

Vertical Jackscrew, Gearnut & Spring: Removal - Remove seat assembly and remove adjuster from side on which jackscrew is to be removed. Use clutch type screwdriver or suitable tool to remove shoulder screws securing linkages to vertical gearnuts. Insert a No. 1 crosshead screwdriver or other suitable tool into drive cable slot in rear vertical gearnut and actuate vertical gearnut forward to release compression of counterbalance spring. *NOTE* - In some cases it may be necessary to actuate front vertical gearnut forward, to provide sufficient room for vertical gearnut forward adjustment to release spring tension. Remove jackscrew sufficiently to disengage from support then disengage rear end of jackscrew from support and remove jackscrew, gearnuts and spring assembly. Spring and spring silencer may now be removed from jackscrew. Turn or actuate gearnuts off jackscrew. To install, reverse removal procedure, making sure jackscrew is installed with unthreaded shoulder at rear of adjuster and gearnuts installed as shown in illustration. Rear vertical gearnut (with large diameter cable attachment) should be installed to the rear and front vertical gearnut (small diameter cable attachment) at the front. Both vertical gearnuts should have cable attachment at bottom and facing inside of adjuster.

Horizontal Actuator or Upper and Lower Channels: Removal & Installation - Remove front seat adjuster and remove screws securing horizontal actuator and remove actuator. Slide seat adjuster lower channel from upper channel and if required, remove plastic shoes from lower channel track. To install, reverse removal procedure. Be sure all four plastic shoes are installed in lower track and apply "Lubriplate" or equivalent to track portion of upper channel and teeth of lower channel. When installing horizontal actuator, adjust actuator so that drive gear is fully engaged with teeth on lower channel. When horizontal screws are tightened there should be no free motion between upper and lower channels.

Electric Motor or Drive Cable: Removal & Installation - Disconnect wire harness connector from motor (under left side of seat) and remove motor support-to-frame attaching bolts. Move motor and support assembly towards left side of seat to disengage motor drive cable then remove motor and support assembly from seat. Motor drive cable may be removed if required by removing the cable and plate from transmission. To install, reverse removal procedure making sure motor drive cable is properly engaged at both motor and transmission.

Horizontal & Vertical Drive Cables: Removal & Installation - Remove front seat assembly with attached adjusters, motor and transmission and detach horizontal and vertical cables from seat adjuster. Remove screws securing horizontal and vertical cable end plate on side of transmission from which cables are being removed and remove cables from seat assembly. Disengage cables from end plate. To install, reverse removal procedure making sure cables are installed to correct gearnuts as shown in illustration.

Adjuster Transmission: Removal & Installation - Remove front seat assembly with attaching parts, motor and transmission and disconnect wire harness connector from transmission. Remove screws securing horizontal and vertical cable end plate on both sides of transmission and detach cables from transmission. Remove transmission support-to-seat frame attaching bolts, then disengage transmission from motor drive cable and remove transmission from seat assembly. To install, reverse removal procedure.

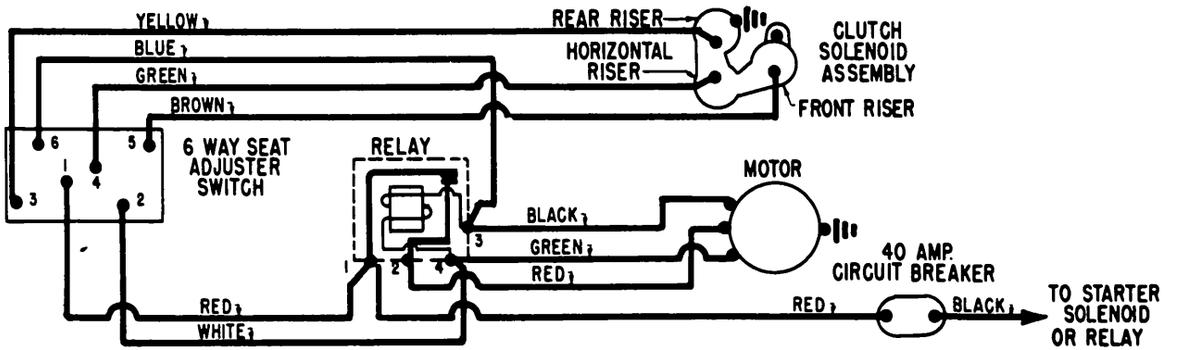
1957-60 CHRYSLER, DE SOTO, DODGE, & PLYMOUTH 6-WAY SEAT CONTROL

Chrysl r & Imp rial (1957–60).
D S t (1957–60).
D dg & Dart (1957–60).
Plymouth (1960).

DESCRIPTION: 6-Way Power Seat operated by a single reversible electric motor located under the front seat. The motor drives a gear assembly which transmits power to slave units located in the seat tracks. Solenoid clutches in the gear assembly, when energized by actuation of the control switches on left side of front seat, engage the flexible drive cables with the gear assembly to operate the seat horizontally, up and down, and tilt it.

FRONT SEAT ASSEMBLY: **Removal** - Disconnect battery and remove front seat assembly (*NOTE* - On hardtop models, remove front seat and cushion as an assembly). Disconnect control wires at switch and disconnect seat adjuster battery wire at circuit breaker in cowl. Remove seat guide attaching stud nuts and remove adjuster. *CAUTION - D not damag flexibl tubing during rem val.*

Installation: Install adjuster and stud nuts. Connect seat adjuster battery wire to circuit breaker on cowl. Form a loop in the wires from relay to clip on floor for horizontal travel. Install front seat assembly. Connect control wires to switch and install front seat cushion of four-door models. Connect battery.



CHRYSLER, IMPERIAL, DE SOTO, DODGE, PLYMOUTH 6-WAY SEAT CONTROL WIRING DIAGRAM

1954-55 FORD, LINCOLN, MERCURY SEAT CONTROLS

Ford (1954–55).
Lincoln (1954–55).
Mercury (1954–55).
Thunderbird (1955).

►CHANGES, CAUTIONS, CORRECTIONS

►*1955 MERCURY REGULATOR MOTOR WIRE CHAFING & SHORTING OUT CORRECTION:* To eliminate possibility of motor wires chafing and shorting out, rubber insulators should be cemented to the floor pan at points of wire contact. Insulators should be made from ¼" sponge rubber cut in 4" squares.

►*1955 THUNDERBIRD SEAT JAMMING IN EXTREME REAR POSITION CORRECTION & PRODUCTION CHANGE:* A change has been made in production to relocate seat track stop which restricts rearward travel and eliminates binding condition in power seat regulator shaft. To correct condition in field, raise seat to extreme upward and forward position. Locate and drill a 1/8" hole through seat track flange on both sides at a point 3 7/8" from forward end of track. *(NOTE*—Use a right-angle drive drill head to drill holes). Install a 1/8" x 1¼" pin (Part No. 353621-S100) through seat track flange. Pin must be installed so that it extends an equal distance on both sides of flange. Lubricate track and check seat operation.

DESCRIPTION: This seat adjusting mechanism is electrically operated, with reversible type motors driving screw-jack type regulators. Fore-aft and up-down adjustments are controlled individually, each having a separate but similar system, including a switch, relay, motor, and regulator. Control switches are located on seat side shield to left of driver (Lincoln), front left side of seat frame (Mercury). Forward switch (Lincoln), left switch (Mercury) controls fore and aft movement, other switch controls up and down movement.

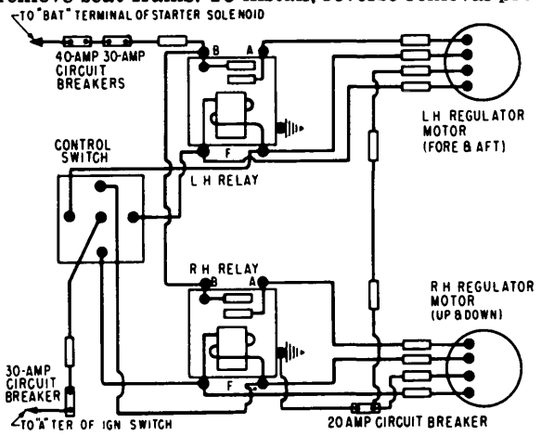
REMOVAL & INSTALLATION: Proceed as follows:

Lincoln Front Seat Assembly: After removing the front seat cushion, pull courtesy lamp wires from connectors at transmission hump, disconnect lead-in wire from relays, then remove four nuts that secure seat tracks to floor pan. Note in which of the three holes of floor bracket the clevis pin is located, then remove self-locking pin and clevis pin that retain fore-aft regulator to floor bracket. Loosen regulator in floor bracket. Note which of mounting holes are positioned over retaining studs, remove seat assembly from car. To reinstall, position front seat so mounting studs are located in same seat track mounting holes as originally. Pin used to secure rear end of fore-aft regulator must be installed through proper bracket holes to insure correct operation of regulator. Center holes in bracket must be used when seat brackets are installed using center mounting holes. Rear holes are used when seat tracks installed using forward holes. Forward holes are used when seat brackets installed using rear holes.

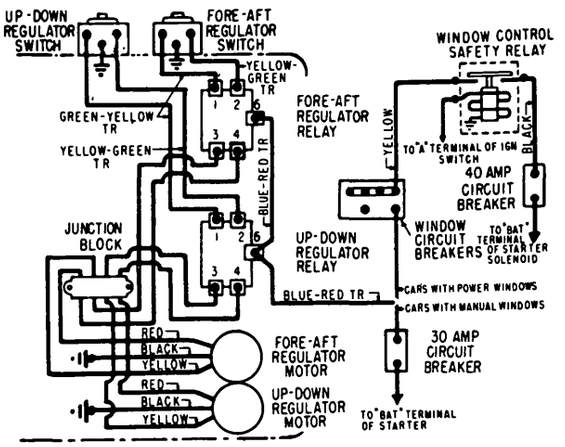
Mercury Front Seat Assembly: (NOTE—Seat cushion is integral with front seat frame). Disconnect battery ground cable to prevent shorts. Remove cap screws (one on each side of track assembly) holding front of seat track assembly to floor pan. Remove nuts and bolts (one on each side of track assembly) holding rear of seat track to floor pan. Remove clevis pin holding fore-aft regulator to floor bracket (may be done from rear and underneath front seat cushion). Tilt seat back, remove ground wires to relays, then remove seat track assembly with seat frame attached. To remove seat frame, remove four nuts, one on each side, front and rear, holding seat frame to seat track, then remove seat frame. To install, reverse removal procedure.

Ford & Thunderbird Front Seat Assembly: Disconnect battery ground cable and remove the two front seat shields. Remove seat track stud bolts from bottom side of floor pan. With the seats in forward po-

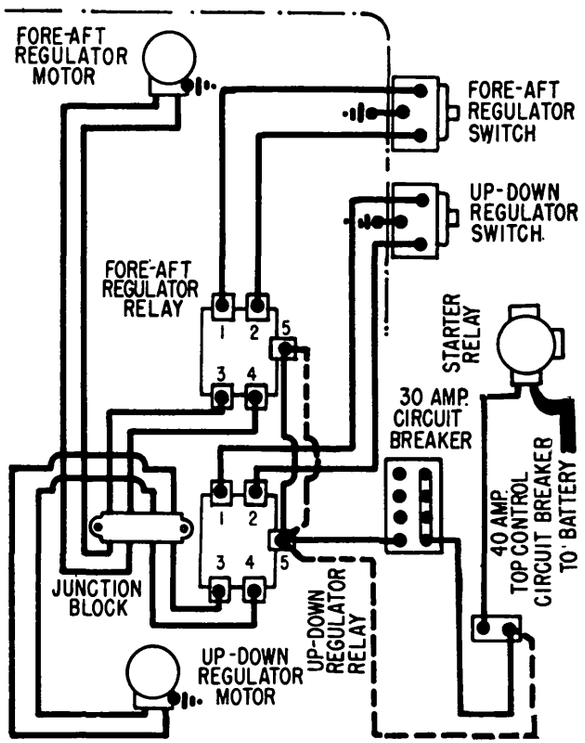
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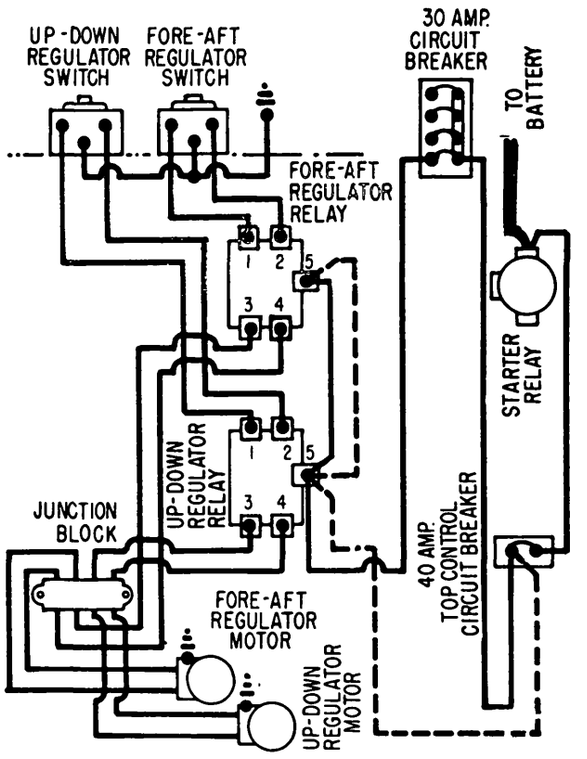
1955 FORD & MERCURY



1955 LINCOLN



1954 MERCURY SEAT CONTROL WIRING DIAGRAM (FORD SIMILAR)



1954 LINCOLN SEAT CONTROL WIRING DIAGRAM

1954-55 FORD, LINCOLN, MERCURY SEAT CONTROLS (C nt.)

sition, remove the clevis pin holding fore-aft regulator to floor pan. Remove seat back and tilt the seat backward. Disconnect wire lead from circuit breaker-to-relay, at the relay. Remove seat track assembly with seat frame attached. To install, reverse removal procedure.

Fore-Aft Regulator: Follow Front Seat Assembly Removal procedures above, then disconnect motor field coil and ground wires from bullet connectors. Remove clevis pin holding regulator to seat frame assembly, remove regulator assembly. To install, reverse removal procedure.

Up-Down Regulator: Follow Front Seat Assembly Removal procedures above, then disconnect motor field coil and ground wires from bullet connectors. Pull large assist spring forward and unhook it from flange on regulator mechanism to release tension. Remove clevis pins holding regulator to seat track and seat frame, remove regulator assembly. To install, reverse removal procedure.

Activating Switches: Disconnect positive cable from battery to prevent shorts. Remove phillips head screws attaching switch mounting panel to seat frame assembly. Pull mounting panel with switches attached from seat frame, disconnect three wires from switch to be removed. Pinch metal clips together which hold switch assembly to mounting panel, pull switch assembly forward out of panel. To install, reverse removal procedure. See Wiring Diagram.

►*THUNDERBIRD ACTIVATING SWITCH NOTE:* Two separate switches are mounted on the floor panel instead of the four-way toggle switch used on conventional models.

Relay Assembly: Disconnect positive cable from battery to prevent shorts. Remove phillips head screws holding relay mounting to seat frame. Pull plate with relays attached forward and disconnect wires to relay which is to be removed. Remove two nuts and bolts holding relay to attaching plate, remove relay. To install, reverse removal procedure. See Wiring Diagram.

TROUBLE SHOOTING: Check as follows:

Seat Will Not Go Forward or Backward or Up or Down: Shorted or open lead from starter relay to circuit breaker.

Seat Will Go Forward or Backward But Not Up or Down (or vice versa): Shorted or open lead from relay to motor; shorted or open armature or field coil winding; open ground connection from motor; shorted or open seat regulator switch connections, or relay coil windings.

Seat Operation Sluggish or Noisy: Motor brushes chipped or improperly seated; excessive armature end play; insufficient clearance between armature and field coils; regulator mechanism binding or has chipped or broken threads.

1956 FORD, CONTINENTAL & MERCURY FOUR-WAY SEAT CONTROL

C ntin ntal (1956-57)
F rd (1956)
M rcury (1956)
Thund rbird (1956)

►*FOUR-WAY SEAT BINDING CORRECTION (FORD & MERCURY):* Check both sides of the horizontal equalizing bar gear for rough or raised areas; file smooth. Carefully remove any burrs on the equalizing bar bearing face. Adequately lubricate all moving parts and contact surfaces. Add ¼" flat washers between seat track and retainer.

DESCRIPTION: Design is similar to assemblies used on 1952-55 Models. Removal, Installation, and Wiring Diagrams are different as indicated below.

REMOVAL & INSTALLATION (Ford, Mercury, Thunderbird): *NOTE* - It is not necessary to remove seat assembly from car in order to replace either the horizontal or vertical regulator assembly, motor, or relay. These parts can be removed from behind and underneath front seat. To replace either seat frame or track assembly requires removal of entire power seat assembly from car.

P w r Seat Ass mbly: Run seat to extreme forward position in order to expose Phillips head mounting screws at forward ends of upper tracks. Disconnect battery ground cable. At each regulator motor, disconnect motor ground wire at bullet connector and disconnect cable-to relay wires from relay. Remove front seat shields. Remove control switch from left hand shield. Loosen and remove seat track mounting bracket stud bolts and nuts from underside of floor pan. Remove seat track assembly (with seat frame attached). To install, reverse removal procedure.

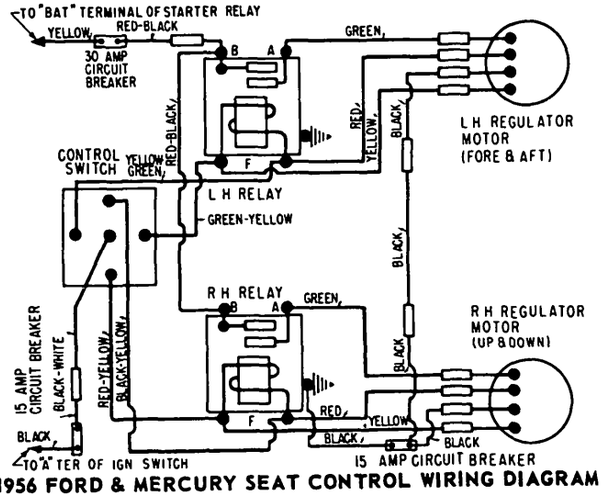
Seat Tracks: With power seat assembly removed from car (see above) remove rolled pin attaching horizontal regulator jack to bracket on seat frame. At both right and left seat tracks, remove the Phillips head screw and stud nut attaching upper track to seat frame. Remove seat frame from track assembly. To install, reverse removal procedure.

R gulator Assembli s: When replacing horizontal regulator, remove left seat side shield, remove nut and bezel that retain control switch or switches to side shield and remove switch from shield. If vertical regulator is to be replaced, remove right seat side shield. Disconnect the assist spring (left for horizontal regulator, right for vertical regulator) using a stiff wire with loop on end. Hook loop of wire to rear loop of spring and pull spring back so as to disengage it from the arm and link assembly. Disconnect motor ground wire at bullet connector and disconnect cable-to-relay wires. Drive rolled attaching pin from each end of regulator assembly with a ¼"x12" drill rod. Remove regulator, motor, and relay as an assembly. To install, reverse removal procedure.

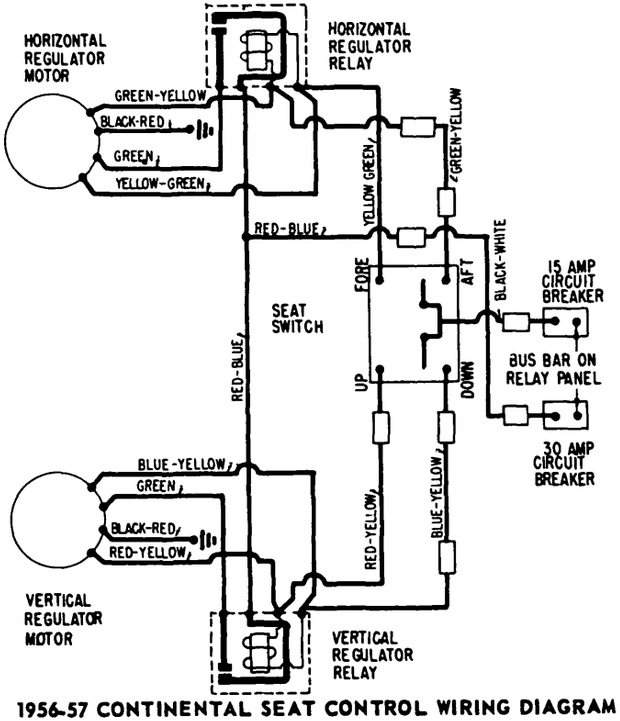
Relays: Remove regulator and motor assembly to which relay is attached. Disconnect motor-to-relay wires and remove relay from motor. To install, reverse removal procedure.

Motors: Remove regulator assembly to which motor is attached. Remove nuts that retain motor to regulator assembly, remove motor. Remove the rubber regulator, drive coupling and relay from motor. To install, reverse removal procedure.

Regulator Shaft, Gear, or Housing Assembly: Remove regulator assembly from seat and remove motor and relay assembly from regulator. Place regulator assembly in a bench vise having soft jaws to retain the jackscrew. Remove regulator gear housing assembly. Remove shaft gear retaining nut from shaft. Place assembly in a press, and press shaft assembly from gear and housing assembly. Remove spacer assembly from shaft, and remove gear and key from housing. To install, reverse removal procedure.



1956 FORD & MERCURY SEAT CONTROL WIRING DIAGRAM



1956-57 CONTINENTAL SEAT CONTROL WIRING DIAGRAM

1957-60 EDSEL, FORD, MERCURY FOUR-WAY SEAT CONTROL

Edsel (1958–60).
Ford (1957–60).
Mercury (1957–60).
Thunderbird (1957).

DESCRIPTION: This 4-Way power seat is operated by a single reversible type electric motor driving two jackscrews. Mechanical type clutches operated by solenoids engage the jackscrews for up and down and fore and aft movement of the seat. Operating the toggle switch located on left side of seat (Ford), left side of instrument panel (Edsel & Mercury), in direction of desired seat movement energizes the reversible motor and the clutch solenoid.

TROUBLE SHOOTING: Seat Will Not Operate in Any Direction: Check for open circuits in all wires. Check circuit breakers and switches. Check for current at green wire terminal on relay (under seat). If current not available, replace relay. On the ground circuit breaker mounted on motor, ground the terminal which has the wire running into the motor and operate seat switch. If motor runs, either the ground circuit breaker or wire between circuit breaker and junction block is defective. If wiring and circuit breaker are not at fault, replace the motor. Check for faulty operating clutch solenoids.

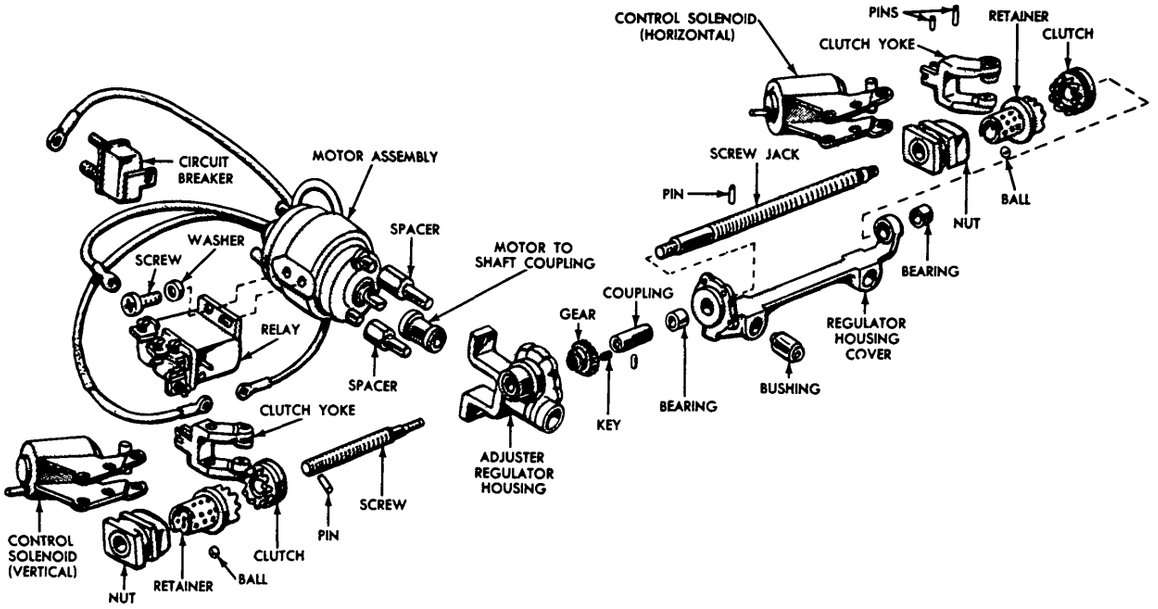
Seat Operates Opposite to Switch: Crossed wires at relay or switch. Check wiring diagram.

Seat Operates Sluggishly: Binding in seat track or jackscrew. If no binding is evident, disconnect wires from solenoid which will allow motor to run free without any load. Connect an ammeter in series with the ground (black) wire at junction block and operate motor. The no-load current draw should be 8-10 amperes at 12.0 volts. If current is less than specified, replace motor.

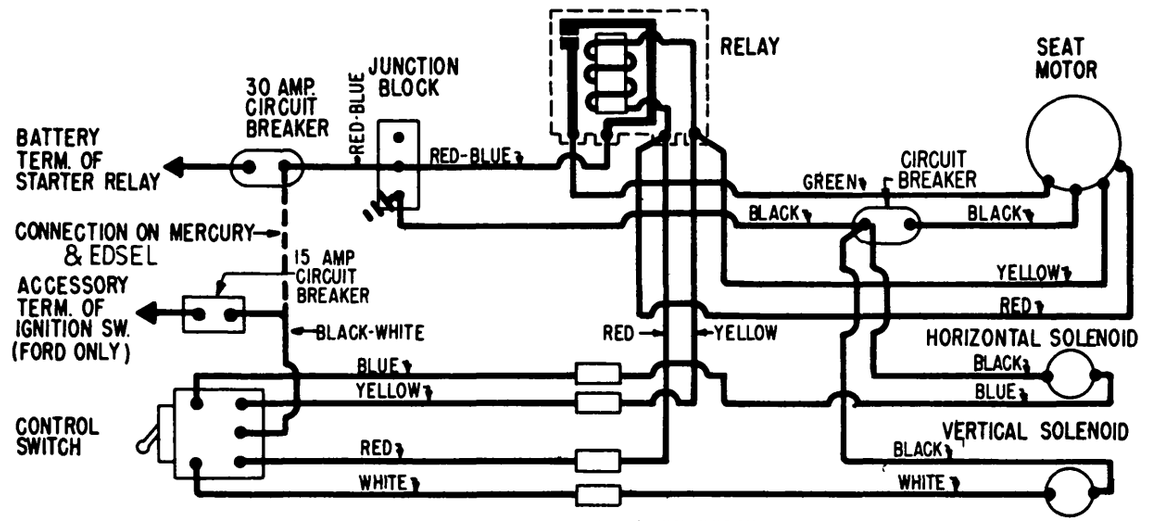
REMOVAL & INSTALLATION: Seat and Seat Track Removal - Remove two front and two rear seat track to floor pan nuts and washers (stud may come with nut). Disconnect wiring at floor pan at center of seat assembly. Remove front seat and tracks from car.

Installation - Position seat with tracks on mounting studs located in floor pan. Reconnect wiring at center of seat. Install washers and nuts to front and rear of seat tracks. to floor pan.

Adjusting Regulator Removal: Remove seat side shields, and side shield rear brackets from rear of seat. Remove two seat-to-seat track nuts and washers at rear of seat. Move seat forward and remove two screws and lockwashers attaching front of seat to tracks. *NOTE - If seat mechanism has failed remove two shoulder b lts and lockwashers attaching horizontal link to rear ball nut of seat regulator and move seat forward manually.*



EDSEL, FORD & MERCURY FOUR-WAY POWER SEAT ASSEMBLY



EDSEL, FORD & MERCURY FOUR-WAY SEAT CONTROL WIRING DIAGRAM

Remove seat from seat tracks, disconnect battery ground cable and seat electrical wiring at multiple connectors at floor pan at center of seat. Remove wiring to vertical equalizer bar clips then remove shoulder bolts from ball nuts. This will disconnect both ball nuts from horizontal link and vertical bar. Remove nut, lockwasher and bolt securing housing cover to seat track to floor pan support bracket. Remove front seat adjusting regulator.

Installati n - Install seat regulator on seat track to floor bracket with retaining bolt. Attach ball nuts to horizontal bar and vertical mounting bracket by disengaging each clutch yoke and rotating worm gear into a position that will permit shoulder bolts and lockwashers to be secured. Connect multiple connectors and clip regulator wiring to vertical equalizer bar assembly. Install seat in position on tracks and install screws and lockwashers at front of seat tracks and nuts and washers at rear of seat tracks. Install side shield brackets, side shields and connect battery ground cable.

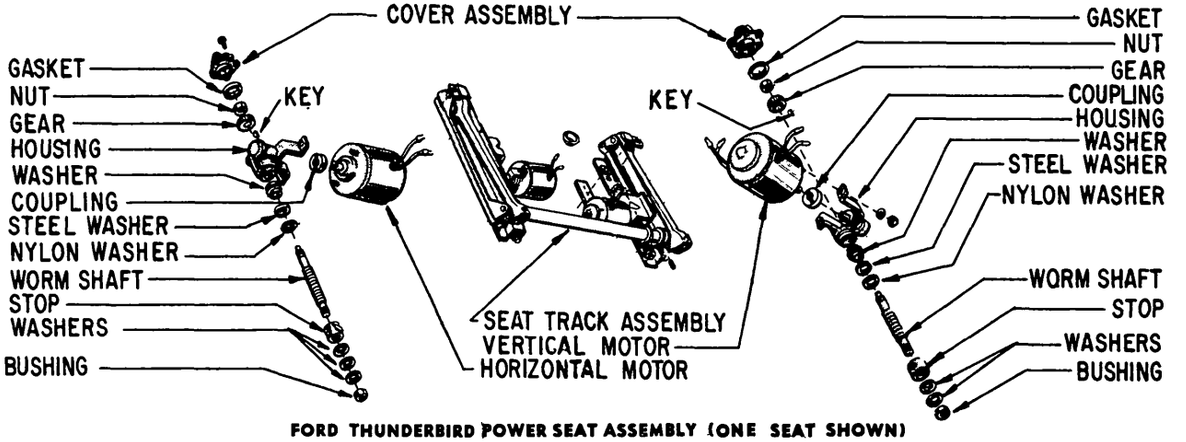
1958-60 FORD THUNDERBIRD SEAT CONTROL

Thunderbird (1958–60).

DESCRIPTION: Each front seat is controlled by a toggle switch which can be operated in four directions. Toggle switch is mounted on each seat cushion side shield. Separate motors are provided for vertical and horizontal movement. The vertical screw assembly transmits the up and down movement to seat track assembly by a vertical equalizer bar. The horizontal screw drives the seat right hand track. The left hand track slides freely and moves as seat right hand track moves, since seat cushion frame links the two seat tracks.

TROUBLE SHOOTING: S at Will Not Operate - 1) Disconnect red-blue band and the black wires (under seat) which lead to junction block under console panel. With a self powered test light, check black wire to see if system is properly grounded. If black wire is not grounded, remove console panel and check connections at junction block and repair as necessary.

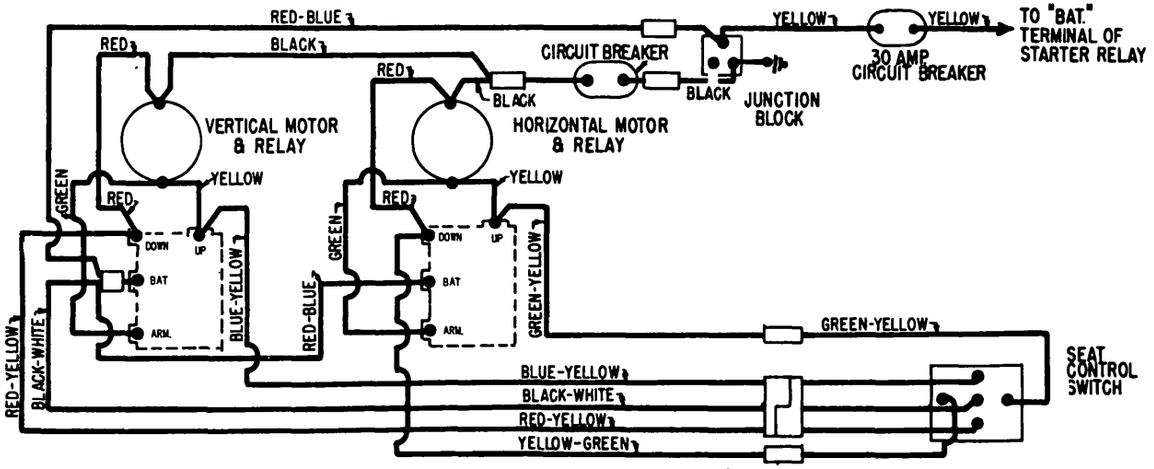
2) Check red-blue band wire for voltage. If voltage not available, check both terminals of 30 amp. circuit breaker located under left side of instrument panel with a voltmeter. If voltage available on both sides of circuit breaker, remove console panel and check terminal of junction block for voltage. If voltage is available at this point, repair or replace wire between junction block and seat assembly. If voltage not available at junction block, trouble is between junction block and circuit breaker.



FORD THUNDERBIRD POWER SEAT ASSEMBLY (ONE SEAT SHOWN)

3) If voltage is available at red-blue band wire, under seat assembly, check connections from red-blue band wire to seat relays for broken or loose wires. If wires are alright, check black wires from each motor to 15 amp. circuit breaker for proper connection. Check circuit breaker.

4) Pull black-white band wire back into switch, and pull other wires out of switch and connect a voltmeter from it to ground. If voltage not available, trouble is in black-white band wire between switch and relay. Plug black-white band wire back into switch and pull other wires out of switch. Check each switch terminal with a voltmeter and operate switch. If there is no voltage at any of the switch terminals when switch is operated, replace switch.



F RD THUNDERBIRD SEAT CONTROL WIRING DIAGRAM (ONE SEAT SHOWN)

Seat Moves in One Plane Only: Test switch (see No. 4 above). Check for broken wires between switch and relay. Check motor relay for proper operation. Check motor ground lead for loose connection.

Seat Operates Opposite to Switch: Check for crossed wires at switch or at relay (see wiring diagram).

REMOVAL & INSTALLATION: Seat Track Assembly Disconnect battery ground cable, then from under car, remove seat track retaining nuts and washers from the four studs. Disconnect wires from under seat which lead to junction block and remove seat assembly. Place seat assembly on a clean bench and remove bolts retaining seat track to seat assembly. Disconnect wires at control switch and remove seat track assembly. To install, reverse removal procedure.

Vertical or Horizontal Motor & Relay: Remove two nuts and washers retaining motor to drive assembly and relay as an assembly. Slide relay bracket and relay off motor retaining bolts, then remove rubber coupling from motor shaft. To install, place rubber coupling and relay and bracket assembly on motor. Place motor on drive assembly, making sure rubber coupling is properly installed on drive gear shaft, and install retaining nuts and washers.

1959-60 LINCOLN & CONTINENTAL FOUR & SIX-WAY SEAT CONTROL

Linc ln & C ntin ntal (1959–60).

DESCRIPTION: The 6-Way Seat Adjusters provide horizontal and vertical movement, and forward and rearward tilt. The 4-Way Seat Adjusters provide horizontal and vertical movement only (see "4-Way Seat Control Note" below). The adjusters are operated by an actuator assembly consisting of a reversible motor, gear box, jackscrew and relay. Spinning nut (solenoid clutch) assemblies located on regulator jackscrew transmit movement to seat adjusters through torque tube assemblies and links *(NOTE* · There are three spinning nuts on 6 way seat adjusters, and 2 spinning nuts on 4-way seat adjusters). In each of the three spinning nut (solenoid clutch) assemblies, there is a free-wheeling nut mounted in ball bearings which free-wheels with the jackshaft unless locked out of free-wheeling by the solenoid located in spinning nut assembly. When spinning nut is locked out of free-wheeling by solenoid action, the nut assembly moves on jackscrew and transmits movement to seat adjusters through connecting links and torque tube assemblies. Seat regulator is controlled by switches located at left panel of front seat.

►*4-WAY SEAT CONTROL NOTE:* 4-Way Seat Adjusters are basically the same as 6-Way Seat Adjusters. The rear vertical torque tube and the center spinning nut (solenoid clutch) and linkage which operate rear of seat up and down on 6-way seat adjusters are not used on 4-way seat adjusters. The rear of the 4-way adjusters is operated up and down in unison with the front of the adjusters by means of a connecting link to front vertical linkage. Service is the same for both types.

TROUBLE SHOOTING: Motor Inoperative At Any Switch Position - Wiring or circuit breakers faulty. Control switch, motor or relay faulty.. Mechanical mechansim binding.

Motor Operates In Some Switch Positions Only: Control circuit wiring or control switch faulty.

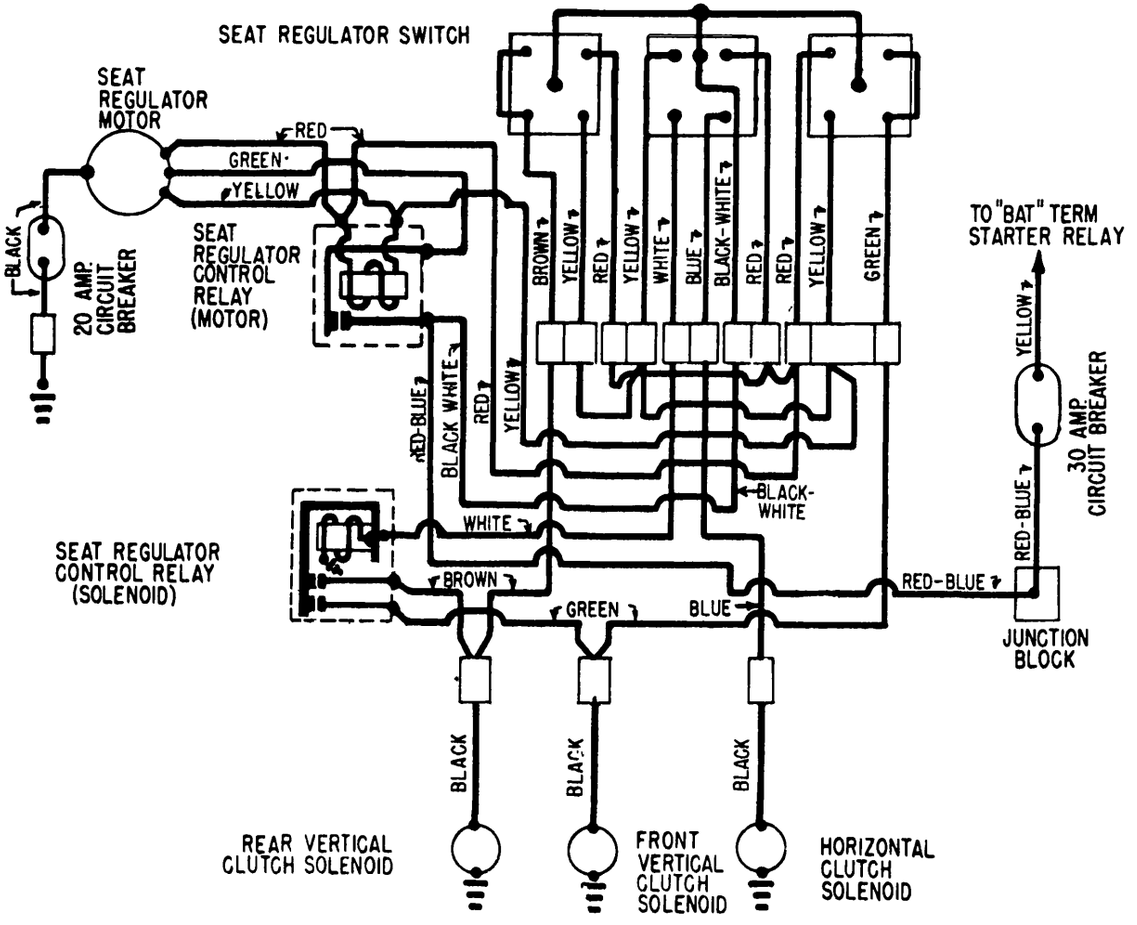
Motor Operates But Jackscrew Does Not: Mechanical mechanism faulty.

Jackscrew Rotates But Seat Does Not Move: Wiring or control switch faulty. Jackscrew shaft nut and solenoid assembly faulty.

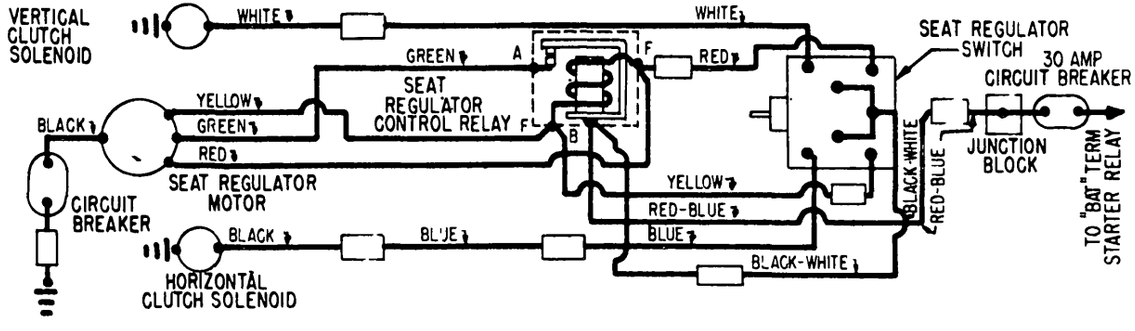
REMOVAL & INSTALLATION: Seat Cushion & Back Assembly - Remove screws holding seat tracks to seat assembly and disconnect switch wiring. Remove assembly. To install, reverse removal procedure.

Seat & Track Assembly - Remove nuts holding track to floor pan and disconnect wiring at junction block. Remove assembly. To install, reverse removal procedure.

►*ACTUATOR ROLL PIN INSTALLATION CAUTION:* When replacing an actuator spinning nut assembly or an actuator assembly (less spinning nuts) roll pins should be installed so that center of protruding portion of pin is located **b twe n** threads of the jackscrew. If pin installed in center of a thread there is a possibility pin may shear or cause assembly to jam. When installing roll pins in jackscrew, install pin so that 1/16" of pin protrudes above jackscrew threads.



LINCOLN SIX-WAY SEAT CONTROL WIRING DIAGRAM



LINC LN FOUR-WAY SEAT C NTR L WIRING DIAGRAM

MERCURY SEAT-O-MATIC SEAT CONTROL

M rcury (1957–59).

DESCRIPTION: Seat-O-Matic Power Seat consists of two electric motors and jackscrew assemblies operating the seat adjusters for vertical and horizontal movement. An electrical control system automatically positions the seat to one of five vertical, or seven horizontal, preset positions when ignition key is turned to the "On" or "Acc" position. The seat will automatically be moved to the extreme rear position when ignition key is turned to the "Off" position.

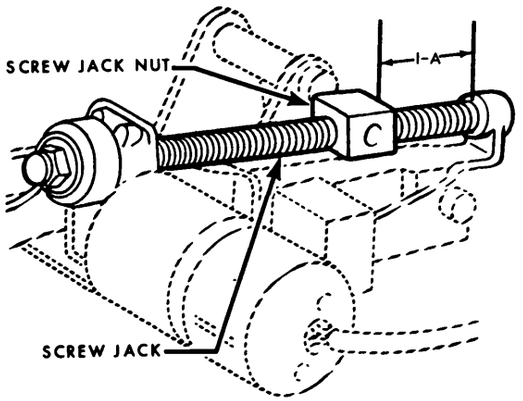
OPERATION: The power seat control components operate as follows:

Seat Relay: The "easy entry" seat relay is located on the left front fender apron and allows the seat to return to extreme rear position by completing the circuit to No. 7 terminal of horizontal motor seat positioning switch when ignition key is turned to "Off" position. When key is turned to "On" position, the relay completes the circuit to seat horizontal positioning switch which then assumes control and moves seat to a pre-selected position.

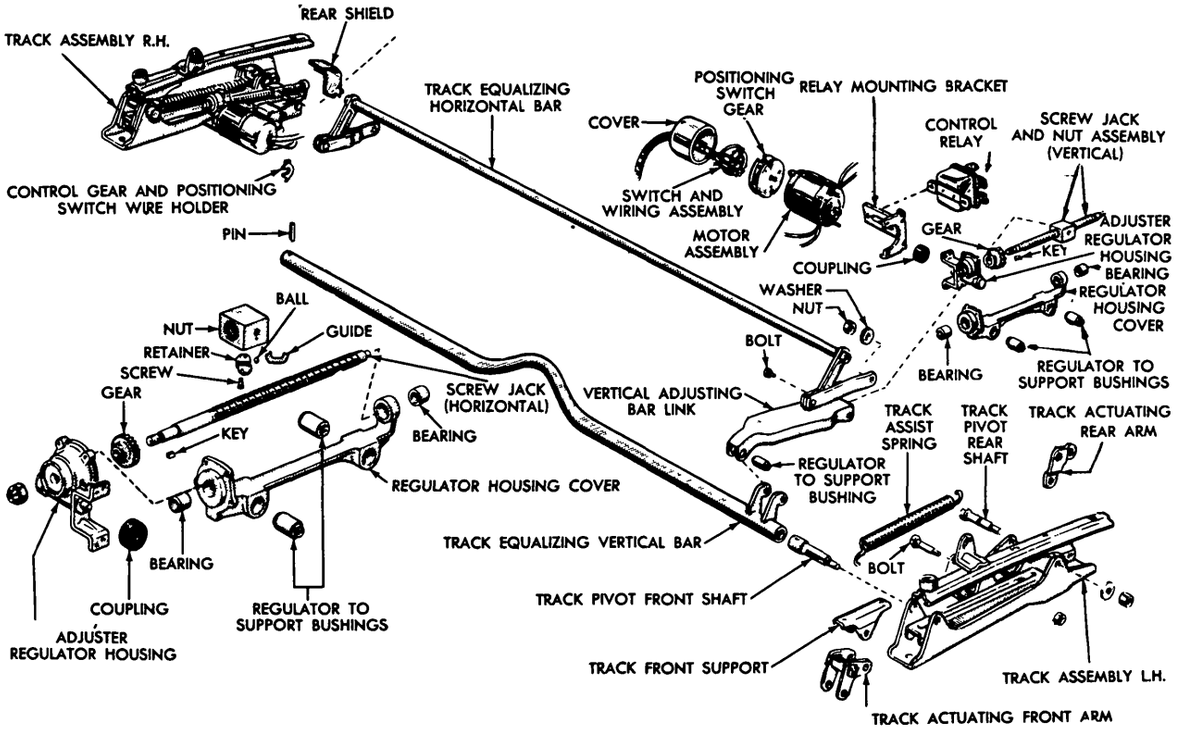
Seat Dial Ç ntr l Switch: This dial control switch on the instrument panel is a combination of two multiple switches. The horizontal switch incorporates seven contacts and is controlled by the outer bezel. These contacts are labeled "1" through "7" on face of control dial. The No. 1 position places seat furthest forward. The vertical switch contacts are labeled "A" through "E", with the "A" placing the seat in its highest position.

Motor S at P siti ning Switch: Horizontal and vertical seat motor positioning switches are the "wafer" type and are mounted under the seat on the rear of their respective motors and are driven through clock-like gear reduction mechanisms. Wafer switches establish position of seat by interrupting seat regulator control

I – HORIZONTAL REGULATOR 6 15/32″
A – VERTICAL REGULATOR 4 5/64″



"I-A" INDEX P SITI N F SCREW JACK



MERCURY SEAT-O-MATIC POWER SEAT ASSEMBLY

relay circuits when seat reaches a pre-selected position.

Seat Regulator Control Relay: This relay completes seat regulator motor armature and field circuits as dictated by seat dial control and motor positioning switches.

TROUBLE SHOOTING: *CAUTION* - Should it be necessary to operate seat regulator motor assemblies independently of seat dial control, extreme caution should be taken to prevent extending the seat past normal extreme positions (dial positions "A" or "E" and "1" or "7"). If seat is extended past these positions, the seat track and associated parts will be damaged. *DO NOT use a jumper wire for locating electrical troubles.*

Seat Will Not Move in Any Direction When Dial Control Positions are Changed: With a test light or voltmeter, check for current at green wire terminal on "easy entry" seat relay. If current not indicated, replace the 10 amp. circuit breaker. If current is indicated, check for current at the No. 3 terminal at either seat regulator control relay. If no current is indicated at this point, replace the 30 amp. circuit breaker.

Seat Will N t M v Up r D wn But Will M v F r and Aft: Check current at terminals No. 2 and No. 5 of vertical regulator control relay with seat control switch in several different positions. If current is available at No. 2 terminal and not at No. 5 terminal, replace seat vertical regulator control relay. If current available at No. 5 terminal, check for current at No. 1 and No. 6 terminals with control switch in several different positions. If current is available at No. 1 terminal and not at No. 6 terminal, replace seat vertical regulator control relay. If current is not available at No. 1 or No. 2 terminals when previous tests are made, check wiring harness and seat control switch for loose connections.

Seat Will Not Move Fore or Aft But Will Move Up and Down: Remove green wire from terminal on "easy entry" seat relay. Temporarily connect green wire to blue wire terminal. Place vertical seat control switch in various positions to check operation. If seat operates, replace "easy entry" seat relay.

Seat Moves Erratically: Motor relays, control switch or positioning switch and wiring faulty.

Motor Operates But Jackscrew Does Not: Coupling between motor and regulator faulty. Adjusting regulator faulty.

Seat M v s Sl wly: Inadequate voltage or mechanical mechanism binding.

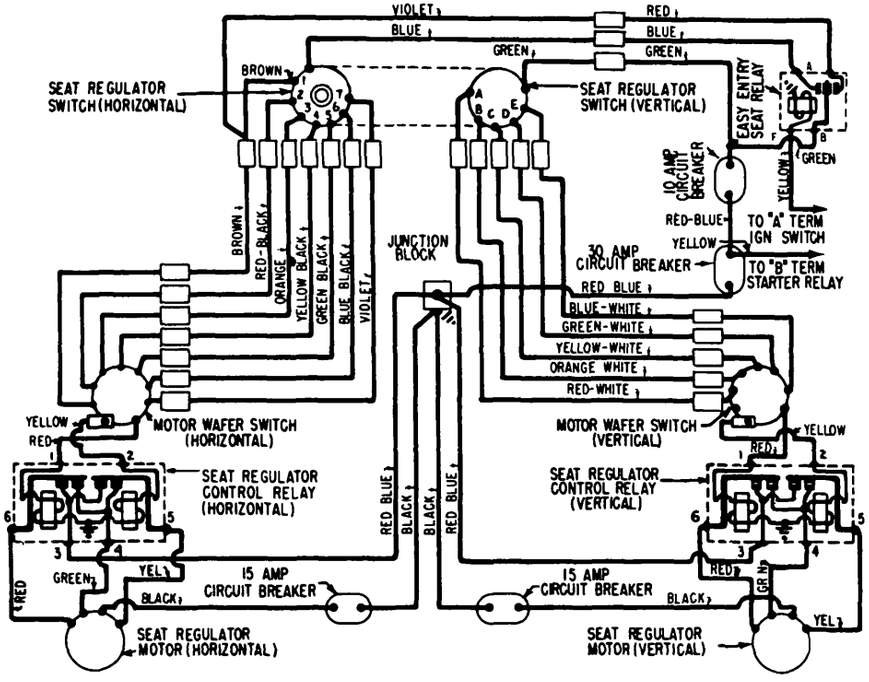
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MERCURY SEAT-O-MATIC (Continued)

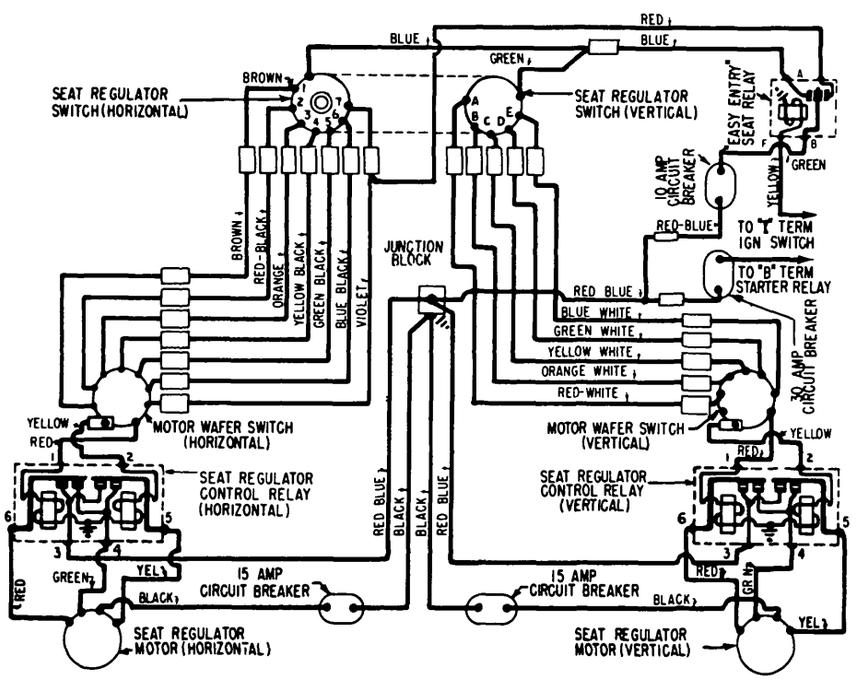
REMOVAL & INSTALLATION: Regulator Motor (Seat-O-Matic) - If either of the regulator motors are removed for any reason other than motor failure, the seat should be placed in the "1-A" position before disassembly is made If either seat motor is replaced because of motor failue, the seat must be positioned manually in the "1–A" position by locating the horizontal regulator screwjack nut 6 15/32", and the vertical regulator screwjack nut 4 5/64" from end of screwjack (see illustration).

Front Seat Assembly: Removal - To remove seat cushion and front seat back from the seat tracks as an assembly, proceed as follows: Remove front seat cushion side shields and remove side shield brackets at rear of seat cushion Remove two nuts securing rear of seat assembly to seat tracks With seat assembly in forward position, remove two screws securing front of seat assembly to tracks (*NOTE* - If seat assembly cannot be moved forward due to failure of seat mechanism, remove nut and bolt securing front seat regulator to frame seat and move seat manually) Tilt seat assembly back or remove from car to gain access to seat assembly mechanism

Installation - Install front seat assembly over seat tracks with rear studs on tracks inserted in seat cushion frame holes. Install two nuts to secure rear of seat assembly to tracks. Install side shield brackets and front seat cushion side shields.



1957-58 MERCURY SEAT-O-MATIC WIRING DIAGRAM



1959 MERCURY SEAT-O-MATIC WIRING DIAGRAM

PONTIAC "MEMORY" SEAT

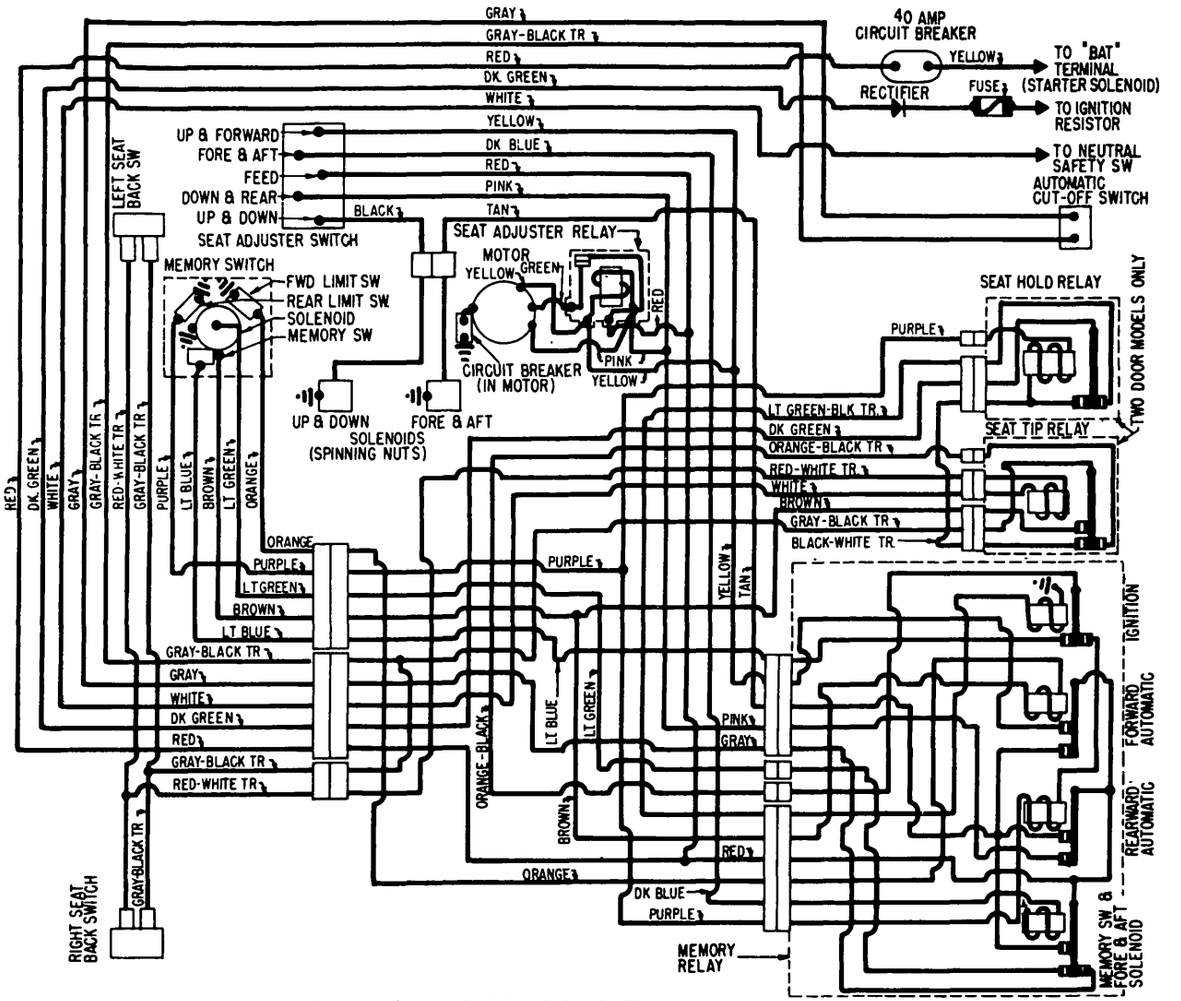
P ntiac (1958)

DESCRIPTION: This power seat control consists of a "Memory" unit connected to power seat actuating motor which automatically actuates the front seat assembly first to full rearward position, then returns seat assembly to any pre-selected horizontal position. The automatic movement of seat may be over-ridden at any time by actuating the manually operated seat control switch assembly located in left side seat panel. A cut-off switch is also provided on instrument panel to temporarily eliminate the automatic memory feature, if desired. When the cut-off switch is in the "Off" position, the seat may be actuated by the manually operated seat control switches in left seat side panel. On 2-Door models, the front seat assembly moves forward when either front seat back is tilted forward (transmission lever in "N" or "P" position). This provides easy entrance or exit for rear seat passengers. Vertical and horizontal movement of seat is accomplished by a reversible type electric motor operating a jackscrew in left hand seat actuator. Two spinning nuts (solenoid clutches) engaging the jackscrew transmit motion to seat actuator on left side and through an equalizer bar to actuator on right side.

OPERATION: On all models, with ignition switch in "Off" position, front seat automatically moves to rear for easy exit or entrance. On 2-door models, with ignition switch either "On" or "Off" (transmission in "N" or "P" position), tipping either of the front seat backs forward causes front seat to automatically move forward to within 1" of maximum forward position. When seat back is placed in normal position, seat will move to full rearward position. On all models, with ignition switch "On", seat will move forward to pre-selected seat position. Automatic operation may be overridden at any time by manually operated seat control switch. Turning automatic switch operation cut-off switch on instrument panel to "Off" position will stop automatic seat movement. Seat may still be adjusted by means of manually operated seat control switch. The last fore-and-aft position selected by manually operated seat control switch becomes the "pre-selected" position for memory control switch. Vertical movement of seat rear edge is controlled by manually operated control switch.

TROUBLE SHOOTING: *NOTE - To check for conditions in m mory circuits, automatic cut-off switch must be in "ON" position and seat should be operated midway b tw n fully forward and rearward positions by m ans of th manual control switch. On 2-Door models, transmission s l ctor lever must be in "N" or "P" positions.*

Seat Will N t Op rat Manually r Aut matically: Check for defective circuit breaker or for short or open circuit between power source and memory relay.



PONTIAC "MEMORY" SEAT CONTROL WIRING DIAGRAM

Seat Adjuster Motor Operates But Seat Will Not Operate Horizontally (Manually or Automatically): Inoperative "fore & aft" solenoid on spinning nut. Relay in memory relay assembly is inoperative.

Seat Will Not Operate Automatically When Ignition Switch is Turned "ON" or "OFF" or When Either Seat Back is Tilted Forward: Faulty automatic cut-off switch or open cut-off switch circuit.

Seat Will Not Operate Automatically When Ignition Switch Turned "ON": Fuse burned out. Short or open circuit in wire from ignition resistor circuit to hold relay. Inoperative memory switch or forward limit switch in memory control switch assembly. Short or open circuit in hold relay or in memory relay.

Seat Will N t Op rat Aut matically R arward Wh n Ignition Switch is Turn d "OFF": Inoperative limit switch on memory control switch. Inoperative relay.

Seat Operates But Does Not Return To Memory Position When Ignition Switch is Turned "ON": Faulty memory control switch solenoid. Memory switch on memory control switch assembly is inoperative.

Memory Position Cannot Be Changed: Faulty memory control switch solenoid. Solenoid clutch is not disengaging or solenoid clutch lever is bent.

Seat Will Not Operate Automatically When Either Seat Back is Tilted Forward (2-Door Models): Neutral safety switch is inoperative. Hold relay, seat tip relay, memory relay or memory control switch is not operating properly. Short or open circuit between relays and memory control switch.

S at Operat s Aut matically Forward Wh n Eith r Seat Back is Tilt d F rward But Will N t Aut matically

CONTINUED ON NEXT PAGE

PONTIAC "MEMORY" SEAT (C nt.)

Return to Rearward Position (2-Door Models): Forward limit switch on memory control switch assembly is inoperative. Hold relay is not operating properly.

REMOVAL & INSTALLATION: Front Seat Assembly (With Actuator Assembly & Memory Unit) - Turn automatic operation cut-off switch "Off", then move seat to extreme raised and forward position with manual seat control switch. *CAUTION - If seat cannot be raised to top position, remove tensioner spring from right seat adjuster upper slide assembly before making any attempt to remove seat assembly. Tensioner spring can be removed from rear of right adjuster assembly after track cover attaching screws and track cover have been removed.* Disconnect seat control wire harness from adjuster feed harness at connector under seat, then detach seat control wire harness-to-floor pan clip. Loosen sill plate and turn back floor covering, then remove adjuster-to-floor pan bolts. Pull entire seat assembly forward to disengage front legs from retainer brackets and carefully remove seat assembly from car. To install, reverse removal procedure and note the following: Carefully align seat adjuster attaching holes in floor pan to prevent binding of linkage. Seat adjusters must be parallel when properly installed. Operate seat through all manual and automatic cycles.

Fr nt Seat Assembly (Without Actuator Assembly & Memory Unit): Move seat to extreme raised and forward position *(see "Front Seat Assembly, with Actuator Assembly & Memory Unit" above)*, then remove front and rear upper slide assembly-to-seat frame attaching bolts at both adjuster assemblies. Tilt seat assembly rearward and remove seat wire harness from clips along front of seat bottom frame. On 2-door models, disconnect front seat back switch wire harness at connector near center of seat, then remove screws attaching double relay assembly to seat frame at left side. Disconnect terminal block from manually operated seat control switch and lift seat assembly (less seat adjusters, actuator assembly, and memory unit) from car. To install, reverse removal procedure.

Actuator Motor Assembly: Turn automatic operation cut-off switch "Off", then, working under front of seat assembly, remove cover plate concealing the two motor-to-motor support attaching screws and remove the nuts. Slide actuator motor away from motor support until motor shaft disengages from rubber coupling. Remove screws securing actuator relay bracket and memory control switch connector link to actuator motor. Disconnect actuator motor-to-actuator motor relay wire connector and remove motor. To install, reverse removal procedure.

Actuator Motor Relay: Working under front of seat assembly, remove nuts attaching relay bracket and memory control switch connector link to actuator motor. Remove wire retaining clip, and disconnect all wire connectors from relay, then remove relay. To install, reverse removal procedure.

Memory Unit Control Switch: Working under front of seat assembly, disconnect control wire harness from seat control wire harness at multiple connector, then remove nuts securing actuator relay bracket and memory control switch connector link to actuator motor. Disengage connector link. Working underneath rear of front seat, remove two bolts and nuts securing memory unit control switch mounting bracket to left seat adjuster, and remove memory unit control switch. To install, reverse removal procedure.

Memory Unit Relay: Working underneath front of seat assembly, disconnect control wire harness connectors from relay. Remove bolt and nut securing plastic hanger strap at inboard end of memory unit relay bracket-to-equalizer tube assembly. Remove bolts securing memory unit relay support bracket to right adjuster and remove relay. To install, reverse removal procedure.

Memory Unit Double Relay - 2-D r Models (Seat H ld Relay & Seat Tip Relay): Working under front of seat assembly, disconnect seat control harness from double relay assembly, then remove two screws attaching relay assembly to seat bottom frame and remove relay assembly. To install, reverse removal procedure. *NOTE - Either of the two relays may be r m v d without removing complete assembly by disc nnecting s at control wire harness connect rs fr m r lay t be r - moved, then removing nut and bolt s curing r lay to double mounting bracket.*

Seat Back Switch (2-Door Mod ls): Tilt seat forward and remove switch attaching screws and carefully push switch upward. Secure ends of wires from sliding back into seat bottom rear bar and remove switch. To install, reverse removal procedure.

Seat Back Switch Wire Harness (2-D r M d ls): Remove front seat assembly (less seat adjusters, actuator assembly, and memory unit), see above, then place upside down on a clean surface. Disconnect seat back switch wire harness from seat control wire harness near center of seat bottom. Remove hog rings and loosen seat trim lower fabric sufficiently for access to seat back switch wire harness attaching clips along rear bar of front seat assembly. Loosen clips to disengage harness. From top of front seat cushion, remove both seat back switches and attach a length of wire to each lead of seat back switch wire harness. Pull harness through seat cushion, then disengage guide wires from harness and remove harness. To install, reverse removal procedure.

STUDEBAKER & PACKARD SEAT CONTROL

Packard (1957-58)
Studebaker (1955-58)

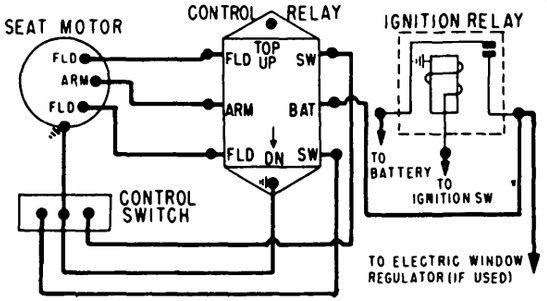
DESCRIPTION: Seat adjusting mechanism is electrically operated, using reversible type motor which turns screw jack. Control of system is through a switch and relay. Seat adjuster provides fore-and-aft movement.

REMOVAL : Proceed as follows:

T rque Tube Assembly: Remove seat cushion. Remove cotter pins and take out clevis pins connecting torque tube arms with torque tube links. Remove torque tube clamps and remove torque tube.

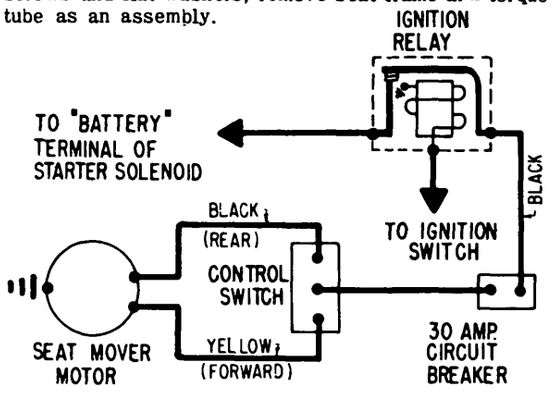
M tor: Remove seat cushion and two motor operating wires at switch. Remove motor-to-adjuster bracket nuts and ground wire. Remove motor by sliding it out of adjuster bracket and flexible connector.

Seat Track: Remove seat cushion. Take out shoulder bolt fastening torque tube link to seat track support. Remove capscrews and washers holding seat track to floor pan. Support seat frame on wooden blocks, take out two seat frame-to-seat track screws, remove track.



1955 SEAT CONTROL WIRING DIAGRAM

Seat Frame: Remove seat cushion. Remove cotter pins and take out clevis pins connecting torque tube arms to torque tube links. Take out frame-to-seat track capscrews and flat washers, remove seat frame and torque tube as an assembly.



1956-58 SEAT CONTROL WIRING DIAGRAM

1957-58 CADILLAC ELDORADO BROUGHAM ELECTRIC DOOR LOCK

Cadillac Eldorado Brougham (1957-58)

DESCRIPTION: Consists of solenoid operated lock assemblies in each door which prevent opening door with outside door handle when actuated by a switch located in each front door panel. To unlock the doors, each door locking lever must be operated separately. The rear door locking assemblies include a solenoid controlled by the neutral switch that causes the inside remote door handles to freewheel when transmission is placed in any drive range, preventing opening of rear doors when car is in motion. A safety interlock switch also included in rear door locking assemblies controls operation of the transmission interlock solenoid which prevents transmission selector lever being placed in a drive range with either of the rear doors in an open position.

TROUBLE SHOOTING: Door Lock Relay Box - (*NOTE* - This relay box is located beneath right side of front seat cushion and incorporates three relays. Power feed is routed from circuit breaker on left shroud). To check operation of relay box, proceed as follows: With light tester, check for current at feed terminal in harness connector. If current is present, connect a 12 gauge jumper wire between relay box No. 1 terminal and power source. With another jumper wire, ground No. 8 wire terminal in relay connector. With light tester check for current at No. 6, No. 7 and No. 4 terminals on lock connector. Tester should light at all three terminals checked. If tester does not light, relay "A" and/or "B" are inoperative. With light tester, check for current at No. 5 terminal on box connector. Tester should light. (*NOTE* - This terminal feeds transmission selector solenoid circuit). With a jumper wire, ground No. 2 terminal on relay box connectors; then with light tester check for current at No. 3 wire terminal on lock connector. Tester should light. If it does not, relay "C" is inoperative.

DIAGNOSIS: Doors Locked not Lock Electrically - Check operation of relay box (see "Trouble Shooting" above).

All Doors Lock Electrically From Left Front Door Switch (but do not operate from right switch): Check feed circuit from relay "C" to right door control switch for open circuit. Check ground lead attachment behind shroud trim panel (*NOTE* - Each control switch has its own ground lead which terminates at right shroud). Check operation of right switch with light tester.

All Doors Lock Without Actuating Control Switches: Check for and eliminate short circuit between relay "C" and one of the control switches.

Three Doors Lock Electrically (the other does not): Check for and eliminate short circuit between relay "C" and the affected lock solenoid. Check engagement of harness connectors. Check operation of solenoid by connecting one end of a jumper wire to hot lead, and the other end to solenoid.

Transmission Selector Lever can be Placed in a Drive Position With Rear Doors Open: Check operation of transmission interlock solenoid. Locate and eliminate short or open circuit between lock relay box and selector lock. Check body harness to lock connector engagement.

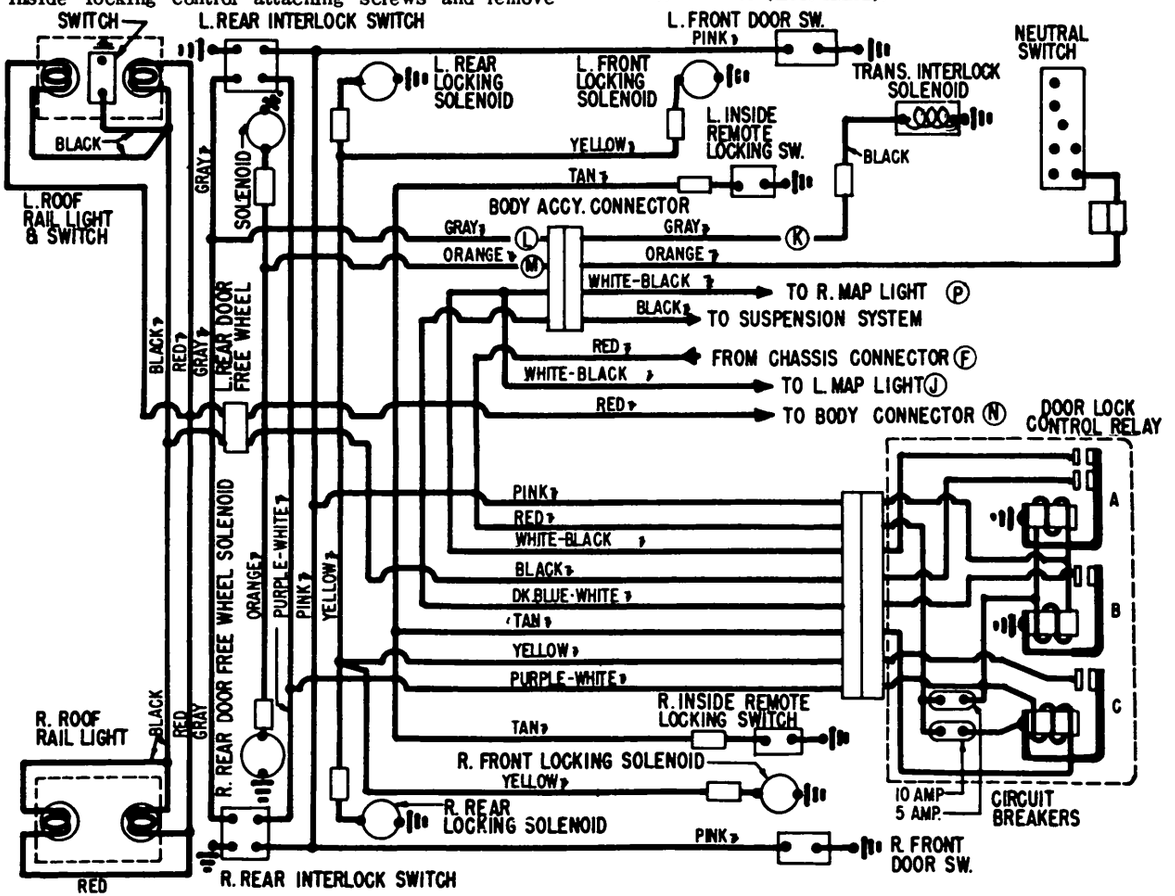
Transmission Selector Lever can be Placed in a Drive Position but Lever is Locked in a "P" or "N" Position When Left Rear Door is Open (roof rail lamps and courtesy lamps do not light): Check and eliminate open circuit between relay box and left rear door lock switch. Check engagement of harness connectors at lock. Check switch actuating mechanism on lock and operation of jamb switch.

Rear Door (or Doors) Open When Remove Control Assembly is Actuated While Shift Lever is in Drive Position: Check for short circuit in freewheeling circuit. Check remote control assembly for mechanical failure. Check operation of solenoid with a jumper wire.

REMOVAL & INSTALLATION: Front Door Inside Locking Control and Switch Assembly - Raise door window and remove door belt finishing molding and door trim finishing panels. Remove inner panel access hole cover. Through large access hole, disengage spring clip and detach inside locking connector rod from lock lever. Disconnect inside locking control switch wires at connectors and detach wires from clips. Remove inside locking control attaching screws and remove control with attached connecting rod and switch from door (switch may be removed from control assembly if necessary). Before installing inside locking control and switch assembly, first install switch and connecting rod to locking control, then lubricate connecting rod attaching point with Lubriplate. To install locking control and switch assembly, reverse removal procedure.

Front & Rear Door Locking Solenoid: Remove door lock assembly, then carefully remove rivet securing lock link to solenoid plunger. Remove solenoid attaching screws and remove solenoid from lock assembly. To install, reverse removal procedure. *NOTE* - Check operation of locking solenoid and adjust as necessary by moving up or down to provide proper locking action.

ELECTRICAL SPECIFICATIONS: Relay - Delco-Remy No. 1116936.
Air Gap - .012". At core with contact points closed.
Contact Gap - .030".
Closing Voltage - 7.0-8.0 volts.
Door Lock Switches: Delco-Remy No. 1119944 (Right Hand), 1119945 (Left Hand).



CADILLAC ELDORADO BROUGHAM DOOR LOCK WIRING DIAGRAM

1958-59 CADILLAC (EXCEPT BROUGHAM) ELECTRIC DOOR LOCK

Cadillac, Series 60S, 62 (1958).
Cadillac, All Series (1959).

►CHANGES, CAUTIONS, CORRECTIONS

►*DOOR LOCK RATTLE CORRECTION:* 1) Caused by interference between solenoid and back plate assembly. To correct, install strips of tape or other insulating material ½" x 1" at both ends of solenoid.

2) Caused by contact between solenoid plunger and solenoid housing. To correct, install rubber ring, Part No. 4168356, around actuator and solenoid plunger as shown in illustration. Later cars have this ring incorporated in production.

DESCRIPTION & OPERATION: Consists of a 2-way actuator solenoid in each door, a lock relay, an unlock relay, and a 2-way switch in each front door. Actuator solenoid is connected to door lock mechanism by a rod at same point manual button in door window frame is connected. Electrical operation will cause pushbuttons to move. To lock doors electrically, depress either switch; to unlock electrically, move switch upward. Electrical operation in no way affects manual operation.

►*NOTE:* Actuator assembly must be removed on front doors when servicing electric window assemblies or heater duct connecting hose, and on rear doors to perform any operation inside door.

TROUBLE SHOOTING & DIAGNOSIS: Possible failures listed as follows:

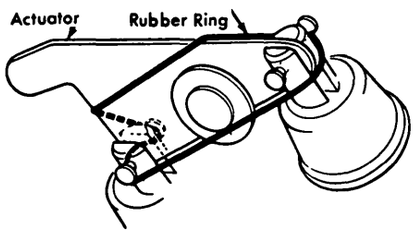
No Door Lock Operates Electrically: Open or short circuit from power source to lock and unlock relays.

All Doors Lock Electrically, But Cannot Be Unlocked Electrically: Open or short circuit between power source and unlock relay. Unlock relay faulty. Faulty circuit breaker. Open or short circuit between unlock relay and main feed to circuit breaker and solenoids.

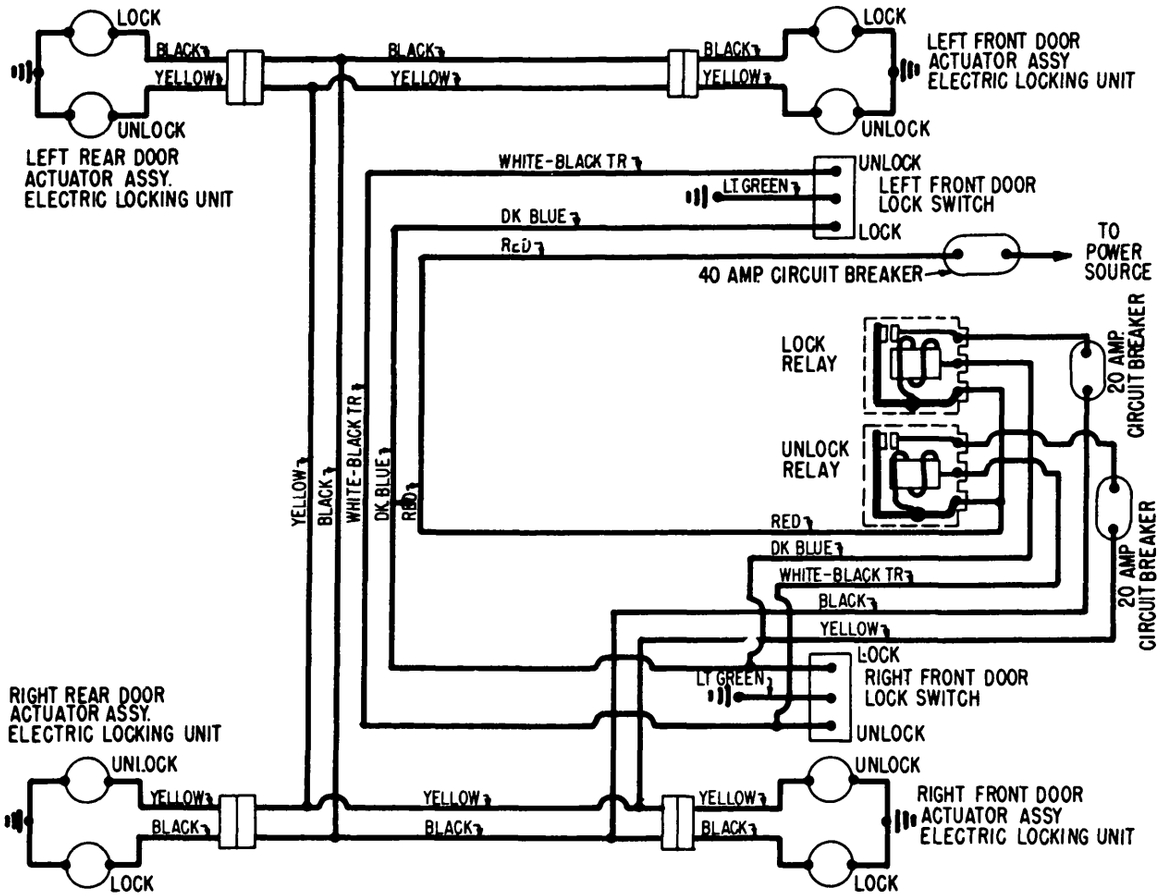
Right Doors Operate Electrically, But Left Doors Do Not Operate From Either Door Control Switch: Open or short circuit between right and left door circuits.

On Door Does Not Operate Electrically, But All Other Doors Operate Correctly: Open or short circuit between right and left door circuits or between lock harness and solenoid connectors. Mechanical bind or failure in solenoid or locking linkage. Solenoid faulty.

All Doors Operate From Right Control Switch, But Not From Left Switch: Open or short circuit from relays to affected switch. Inoperative switch or switch not grounded.



CADILLAC L CK RATTLE C RRECTI N



CADILLAC (EXC. BROUGHAM) DOOR LOCK WIRING DIAGRAM

REMOVAL & INSTALLATION OF ACTUATOR ASSEMBLY: Remove door trim and detach water deflector sufficiently to reach inner rear access panel. Scribe position of actuator assembly and disconnect wires at connector. Disengage spring clip and detach inside locking rod and lock-to-actuator connecting rod from lock. Separate rods. *NOTE - On rear doors simply detach lock-to-actuator connecting rod from lock.* Remove actuator attaching screws and remove actuator assembly with connecting rod attached.

ELECTRICAL TESTING: Power Supply & Feed Circuit Breaker - Check current at feed side of circuit breaker with test lamp. If lamp does not light, connection between power supply and circuit hreaker is faulty. Disconnect wires from output side of circuit breaker and check for current. If lamp does not light, circuit breaker is faulty.

L ck R lays - Check current at relay connector feed (red wire). If lamp does not light, check circuit between relay and feed circuit breaker. Check current at relay lower (winding) terminal. If lamp does not light, relay is defective. Ground lower terminal. Test at upper (contact) terminal. If lamp does not light, relay is defective.

Actuator Solenoids - Gain access to solenoid (see "Actuator Removal" above). Disconnect wiring. With jumper wire from power supply, energize lock solenoid (black wire), then energize unlock solenoid (yellow wire). If solenoid does not operate, it is defective or solenoid or lock linkage binding.

Control Switches & Circuit - 1) Remove door finish molding and detach switch from terminal block. Connect jumper wire from power supply to center (ground) terminal of switch. Check other terminals while operating switch. If lamp does not light, switch is faulty.

2) Check for current at lock (dark blue wire) and unlock (white-black wire) terminals. If lamp does not light, wires or relays are defective.

3) Connect test lamp to power supply and check ground (light green) wire. If lamp does not light, ground wire or connection is defective.

1960 CADILLAC VACUUM DOOR LOCK

Cadillac (1960)

DESCRIPTION & OPERATION: Consists of vacuum storage tank, vacuum lock remote control valve assembly, selector valve, and actuator assemblies. **Vacuum Tank** - Mounted in front of left shroud panel under rear of left front fender. Connected by hose to manifold with check valve in line. A minimum of three complete cycles of operation (lock & unlock) is available immediately after engine has been shut off.

Rem t Control Valv - Mounted at left corner of instrument panel below upper section of panel. Supplies vacuum from tank to lock actuators when selector valve is actuated.

Actuat r Ass mbli s - Located in each door are double acting vacuum diaphragms with vacuum supplied to each side. Diaphragm moves a linkage or bell crank connected to locking lever of lock.

S l ct r Valv - Located on each front door trim panel or arm rest.

►*NOTE:* All vacuum hoses and corresponding actuator ports are color coded, see diagram.

TROUBLE SHOOTING: Condition and cause as follows: **Syst m In p rativ** - Hoses crossed at vacuum supply tank, vacuum supply hose pinched at remote control valve, door valve supply hose pinched at remote control valve, vacuum supply hose disconnected at tank, remote valve or engine, remote valve diaphragm leaking.

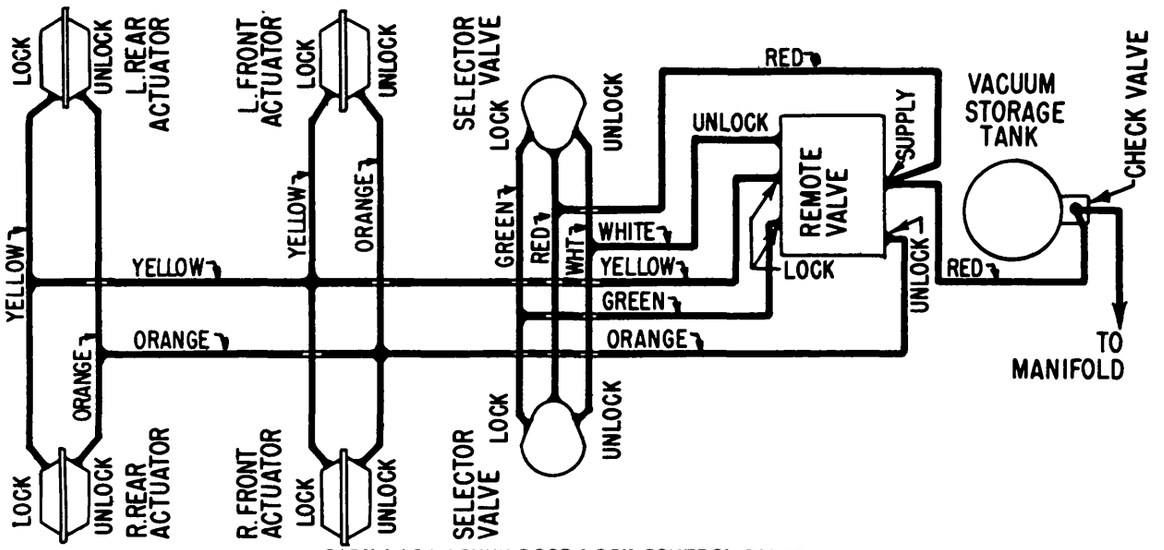
All D ors Can Be L cked But Not Unlocked - Main supply hose crossed with lock supply hose at remote control valve, unlock selector hose or supply hose disconnected at remote valve.

All D ors Can B Unlocked But Not Locked - Main supply hose crossed with unlock hose on remote control valve, lock selector hose or supply hose disconnected at remote valve.

Moving Eith r D r Valve to Unlock or Lock Produces th Opposit Action of All Locks - Door lock selector valve hoses (small) crossed at remote control valve, actuator supply hoses (large) crossed at remote valve.

Moving On f D or Valves to Lock or Unlock Produc s th Opp site Action of the Lock-Valve selector hoses crossed at one door valve, door selector valve reversed in trim assembly.

Syst m Will N t Lock From Door Valve or System Will N t Unl ck Fr m One Door Valve - Lock or unlock selector valve hose pinched or disconnected from affected door valve.



CADILLAC VACUUM DOOR LOCK CONTROL DIAGRAM

Lock Movement on Any Door Not Synchronized with Other Doors - Hoses crossed at affected door lock actuator.

One Door Lock Lags Behind Others When Locked or Unlocked - Lock or linkage binding.

REMOVAL & INSTALLATION: Selector Valve - (Exc. Eldorado, DeVille & Fleetwood Sixty) - 1) Remove door trim panel and carefully disconnect vacuum hoses from selector valve.

2) Carefully disengage valve assembly from door trim panel.

3) Remove selector valve to arm rest escutcheon screws and remove selector valve.

(Eldorado, DeVille & Fleetwood Sixty) - 1) Remove arm rest escutcheon to door trim panel screws and remove escutcheon from door trim.

2) Carefully disengage hoses from selector valve.

3) Remove selector valve to arm rest escutcheon screws and remove selector valve.

Installation - Reverse removal procedure, checking operation before installing trim panel.

Actuator Assembly: 1) On Sedan Models, raise front door window.

2) On all doors of all models, remove door trim panel and water deflector. Carefully disconnect hoses from actuator assembly.

3) On front doors of Sedan Models, work through access hole to disengage spring clips and to detach lock cylinder and remote control rod from lock assembly.

4) On front doors of Other Models, work through access hole to disengage spring clip and detach actuator to lock rod from lock assembly.

5) On all doors of all models, remove actuator assembly to door lock pillar facing screws. On front doors, remove actuator assembly with attaching rod. On rear doors, disengage actuator rod from lock assembly, then remove actuator through access hole.

Control Valve Assembly: 1) Loosen instrument panel upper section for access to control valve assembly attaching screws, see "MISC. ELECTRICAL" on car page.

2) Carefully disconnect vacuum hoses from control valve assembly. Remove control valve assembly to shroud panel screws and remove assembly. To install reverse removal procedure.

Vacuum Tank & Check Valve Assembly: 1) Remove windshield washer and jar.

2) Carefully disconnect check valve to manifold hose and storage tank to remote control valve hose at storage tank.

3) Remove tank to front shroud panel screws and remove tank from body.

Installation - Reverse removal procedure. Start engine and check all operations. Shut off engine. Lock assemblies should operate through a minimum of three complete operations (lock & unlock) before tank supply of vacuum is exhausted.

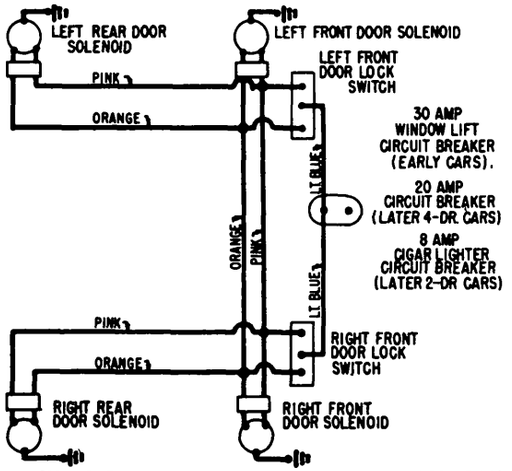
1958 CHRYSLER IMPERIAL ELECTRIC DOOR LOCK

Imperial (1958)

►CHANGES, CAUTIONS, CORRECTIONS

►*DOOR LOCK FAILURE CORRECTION:* If door locks inoperative, this may be caused by solenoid overloading due to lock linkage friction. Free up linkage when installing new solenoid and make sure wiring conforms to recommended change to prevent future overload. See *NOTE* below.

►*WIRING PRODUCTION CHANGE NOTE:* On later 4-door models, feed wire (light blue) connected to 20 amp. circuit breaker. On later 2-door models, feed wire connected to 8 amp. cigar lighter circuit breaker. Both circuit breakers located on bar behind left front kick panel.



CHRYSLER IMPERIAL DOOR LOCK WIRING DIAGRAM

DESCRIPTION & OPERATION: Operated by a push-pull double acting solenoid, attached by a connecting rod to door lock actuating lever in each door. A single pole double throw switch mounted on each front door. Doors may be locked electrically by depressing either switch. Lift switch to unlock. Doors may be locked and unlocked mechanically in the usual manner.

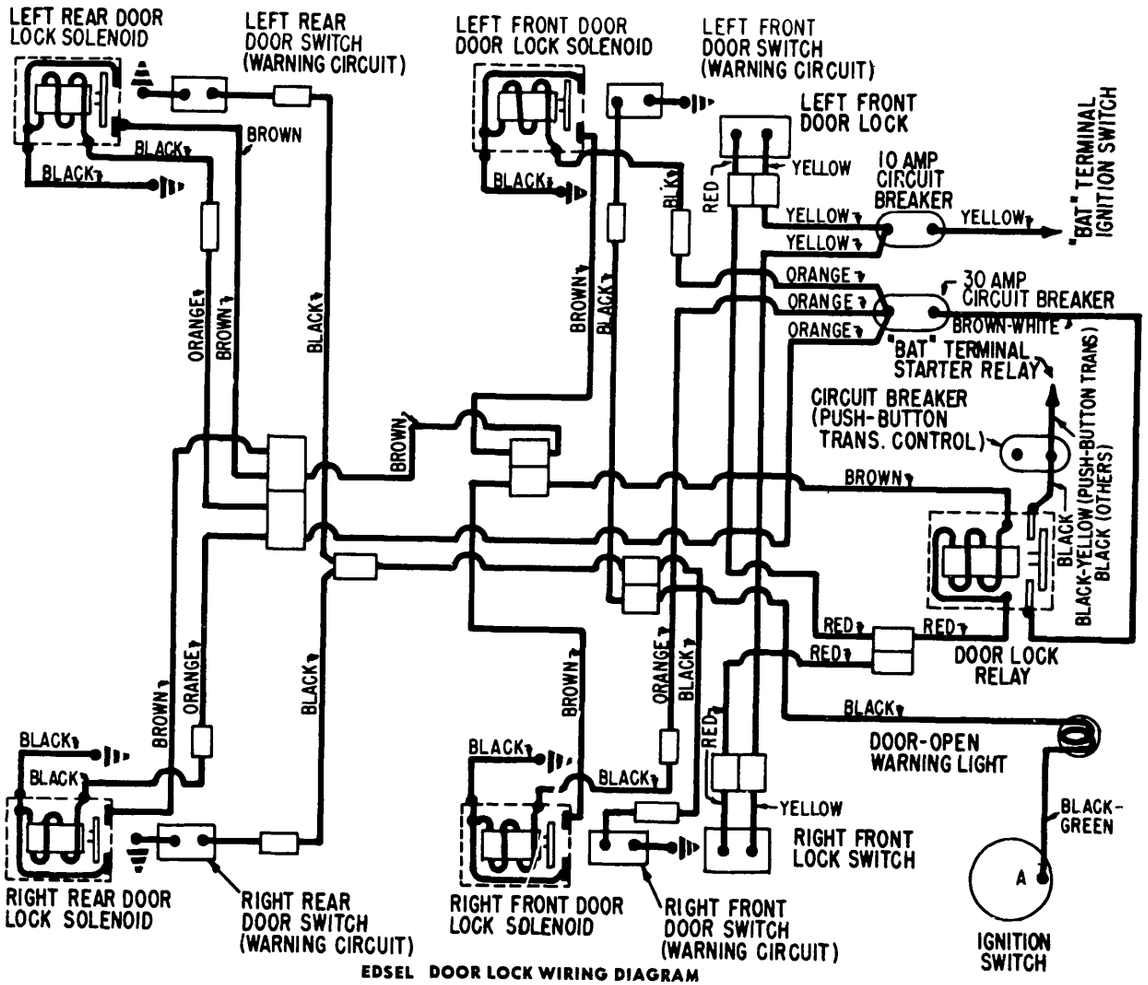
SOLENOID REMOVAL: Remove door trim panel and disconnect lock connecting rod at solenoid. Disconnect wires and remove solenoid.

SOLENOID INSTALLATION: Attach solenoid to door and connect wires. On front doors, adjust connecting rod by turning turnbuckle in or out until solenoid will just pull locking lever into lock. Be sure lever will be pulled out far enough to unlock door. Rear door connecting rods are not adjustable. Install trim panel.

EDSEL ELECTRIC DOOR LOCK

Edsel (1958)

DESCRIPTION & OPERATION: Electric door locks consist of a solenoid in each door, mechanically connected to door locking mechanism; a power relay, and a switch on each front door. When either door switch is operated, relay points close, completing circuit and energizing solenoids which throw the locks. Solenoids remain energized but no current flows through the circuit. Doors are unlocked from inside car in the usual manner. Either door switch may be thrown before leaving the car and then only that door need be locked with key to lock all doors.



EDSEL DOOR LOCK WIRING DIAGRAM

CHRYSLER, DE SOTO, DODGE, & PLYMOUTH VACUUM DOOR LOCKS

Chrysler (Exc. Imperial) (1960)
DeSot (1960)
Dodg (1960)
Plym uth (1960)

DESCRIPTION & OPERATION: Vacuum door lock mechanism is linked to manual door lock at each door. All doors may be locked or unlocked simultaneously by manual vacuum switch. Front doors may be locked inside car by door handle or outside car by key. Rear doors may be unlocked from inside car by remote locking control. When manual switch is in neutral, doors are automatically locked on acceleration when manifold vacuum drops below 8" of Mercury and engine returns to normal driving or idling vacuum. Manual switch position determines which side of Actuator Valve is to be supplied vacuum through Distributor Valve from Vacuum Reservoir. Plymouth has in addition a Deactivator Valve for automatic door locking. The system consists of the following items:

Manual Sel ct r Switch - This switch mounted on instrument panel (plus the Pressure Plate and Valve under seat on Plymouth) are the only vacuum lock controls. This switch has three positions - 1) Down-lock, 2) Up-unlock, 3) Center or neutral.

Vacuum Actuator Unit - Located in each door with a lock actuating arm linked to door lock mechanism. Double acting diaphragm controlled by position of Manual Selector Switch (lock or unlock).

Vacuum Distribut r Valv - Mounted under instrument panel to left of steering column on fire wall. Distributes vacuum to Actuator units as determined by position of Selector Switch.

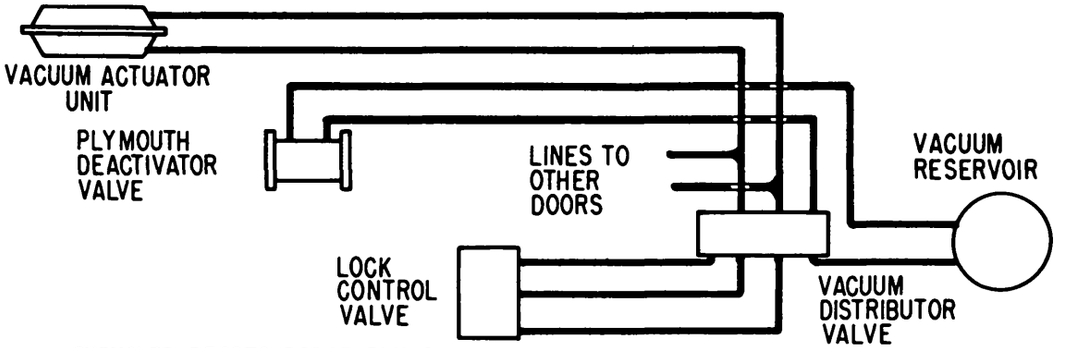
Vacuum Res rvoir - Mounted in engine compartment on right side of radiator yoke. Vacuum reservoir should supply a minimum of three cycles of operation after engine has been shut off.

Deactivator Valv (Seat Switch) - Plymouth Only - Located under drivers seat and allows doors to automatically lock when manifold vacuum drops below 8 inches of mercury. Deactivator Valve also prevents doors from automatically locking when seat unoccupied.

►*HOSE INSTALLATION NOTE:* Hose with "Red Stripe" must go on connection marked "RED". See diagram for locking system layout.

TROUBLE SHOOTING: Condition and cause as follows:

System Inoperative - Caused by disconnected, plugged or pinched hoses. When there is no vacuum on distributor connection to reservoir, replace reservoir. When there is no vacuum at small diameter hose positions on switch, replace switch. When there is no vacuum at main door hose on distributor, replace distributor.



CHRYSLER, DESOTO, DODGE, PLYMOUTH VACUUM DOOR LOCK CONTROL DIAGRAM

Failure to Lock (Unlock Satisfactory) - Hose off red connection on switch, hose off red connection on distributor, faulty distributor (lock valve stuck), hose off fitting in Red line to actuator, broken hose connection on actuator, leak in hose to door.

Failure to Unlock (Lock Satisfactory) - Same cause and correction as "Failure to Lock".

Doors Operate the Opposite to Switch Operation - Hose lines reversed at switch, reversed on distributor or switch mounted in reverse position.

Doors on One Side Lock When Doors on Other Side are Unlocked - Door hose lines at tees in side cowl connected improperly.

One Door Operates Opposite from Other Doors - Hose connected improperly to tee in side cowl, hoses connected improperly on actuator.

One Door Fails to Operate - Faulty actuator linkage, faulty lock.

Automatic System Inoperative (Plymouth Only) - Small hose off tee at manifold, hose off seat valve, hose off automatic connection at distributor, plugged or pinched lines, seat switch button not depressed enough, faulty seat switch or faulty distributor.

REMOVAL & INSTALLATION: Manual Locking Switch - Remove switch to switch plate locknut and disconnect the one large and two small hoses from distributor. Remove switch and hose from back of instrument panel. To install, reverse removal procedure making sure small hose with red stripe is on connection marked with red.

Vacuum Actuator Unit - Remove garnish molding, arm rest, inside door handle, window regulator handle, inside door lock (if on rear door), door trim panel and shower curtain. Disconnect hoses from actuator and remove mounting screws, link clip and actuator. To install, reverse removal procedure making sure red stripe hose is installed on connection marked red.

Vacuum Distributor Valve - Disconnect large hose leading from reservoir and three hoses (one large and two small) leading from manual switch, then the two large hoses leading to doors. On Plymouth only, disconnect small hose leading to deactivator valve. On all models, remove vacuum distributor valve to firewall screws and remove valve. To install, reverse removal procedure, installing large hose with red stripe leading to doors on connection marked red, and small hose with red stripe leading to manual switch on connection marked red.

Vacuum Reservoir - Disconnect large hose leading from engine manifold, and large hose leading to vacuum distributor valve. Remove two support clamp to radiator yoke metal screws and remove reservoir. To install, reverse removal procedure.

Plymouth Deactivator Valve - Remove nut and lockwasher from top of switch, disconnect two hoses and remove valve from seat bracket. To install, reverse removal procedure.

Plymouth Seat Deactivator Valve Bracket - Remove seat cushions, detrim rear edge of cushion and remove clips and bracket. *NOTE - Swivel seat bracket is bolted to seat frame.* To install, reverse removal procedure.

Plymouth Deactivator Plate - Remove seat cushion, unclip plate from spring elements. To install, reverse removal procedure.

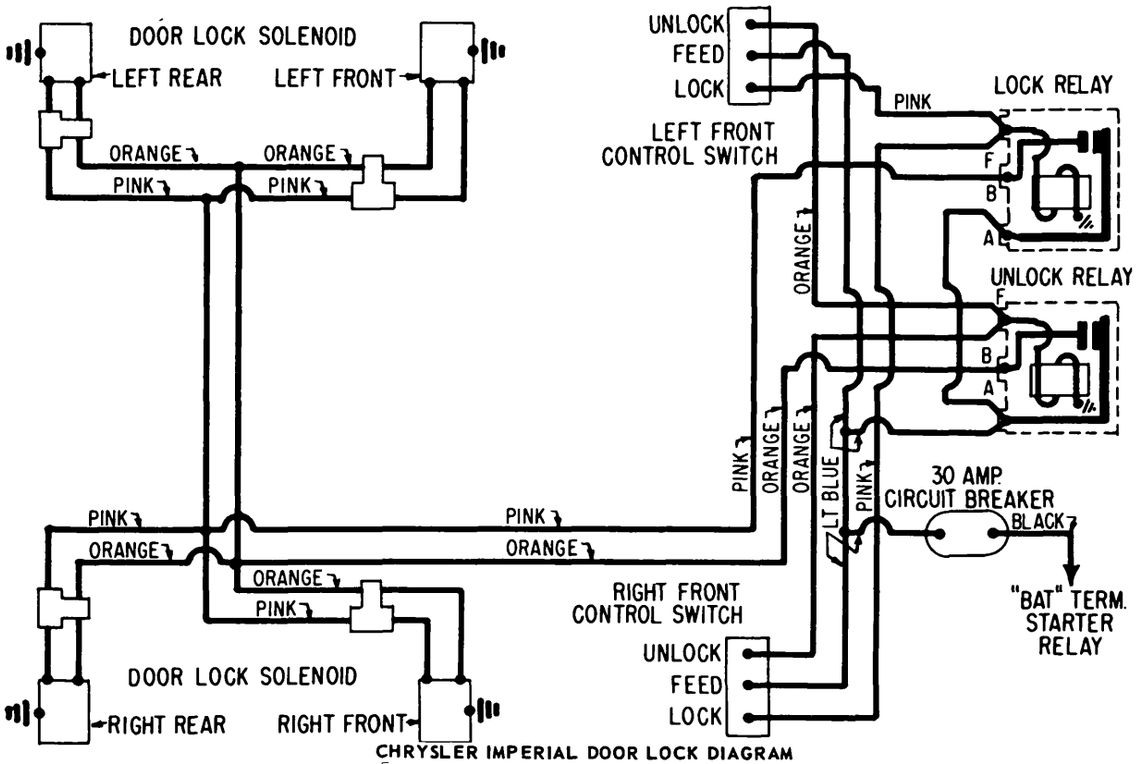
1959-60 CHRYSLER IMPERIAL ELECTRIC DOOR LOCKS

Imperial (1959–60).

DESCRIPTION & OPERATION: Operated by a push-pull double acting solenoid, attached by a connecting rod to door lock actuating lever in each door. A single pole double throw switch mounted on each front door. Switches control lock and unlock relays which actuate solenoids. Doors may be locked electrically by depressing either switch. Lift switch to unlock. Doors may be locked and unlocked mechanically in the usual manner.

SOLENOID REMOVAL: Remove door trim panel and disconnect lock connecting rod at solenoid. Disconnect wires and remove solenoid.

SOLENOID INSTALLATION: Attach solenoid to door and connect wires. On front doors, adjust connecting rod by turning turnbuckle in or out until solenoid will just pull locking lever into lock. Be sure lever will be pulled out far enough to unlock door. Rear door connecting rods are not adjustable. Install trim panel.



CHRYSLER IMPERIAL DOOR LOCK DIAGRAM

1959-60 LINCOLN ELECTRIC DOOR LOCK

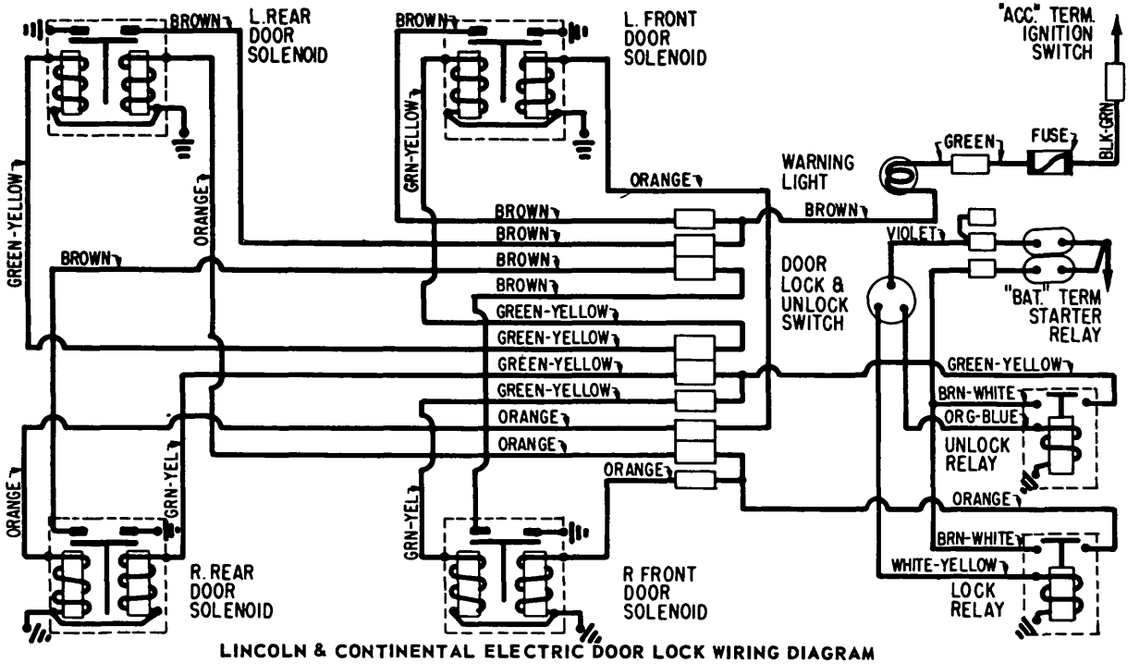
Lincoln & Continental (1959–60).

DESCRIPTION: Same design as used in previous models. Consists of the following units:

Solenoid - In each door to lock and unlock door.
Control Switch - Located in Instrument Cluster.
Warning Lamp - Located in Instrument Cluster.
Lock Power & Unlock Power Relays - Located on dash.

Circuit Breakers - 30 ampere for power circuit, 10 ampere for switch circuit. *NOTE* - 7½ ampere fuse in warning lamp circuit. All located in Power Box.

OPERATION: Warning lamp lights when any of the doors are unlocked and ignition switch is at "ON" or "ACC". It will **not** indicate whether doors are open or closed. Door lock switch circuit and power circuit are not routed through ignition switch and consequently doors can be locked or unlocked at any time by depressing or raising control switch. See Diagram for electric door lock circuit.



LINCOLN & CONTINENTAL ELECTRIC DOOR LOCK WIRING DIAGRAM

Form 76 A

1957-58 LINCOLN ELECTRIC DOOR LOCK

Lincoln (1957-58)

DESCRIPTION: The electric door lock assemblies consist of an electric solenoid connected to the sliding lock bellcrank in each door assembly. When solenoid is actuated by a toggle switch on the instrument panel, solenoid plunger moves out and operates the door lock bellcrank to lock the door. Front doors may be opened by pulling rearward on inside door handles. To open rear doors, the lock control on rear door must be moved to the "unlock" position before door inside handle can be moved manually. By depressing door lock toggle switch on instrument panel, prior to leaving car, the driver need only lock his exit door by key to completely lock car. With the ignition switch "On", or turned to the "Accessory" position, a red indicator light over the toggle switch indicates if all doors are not locked.

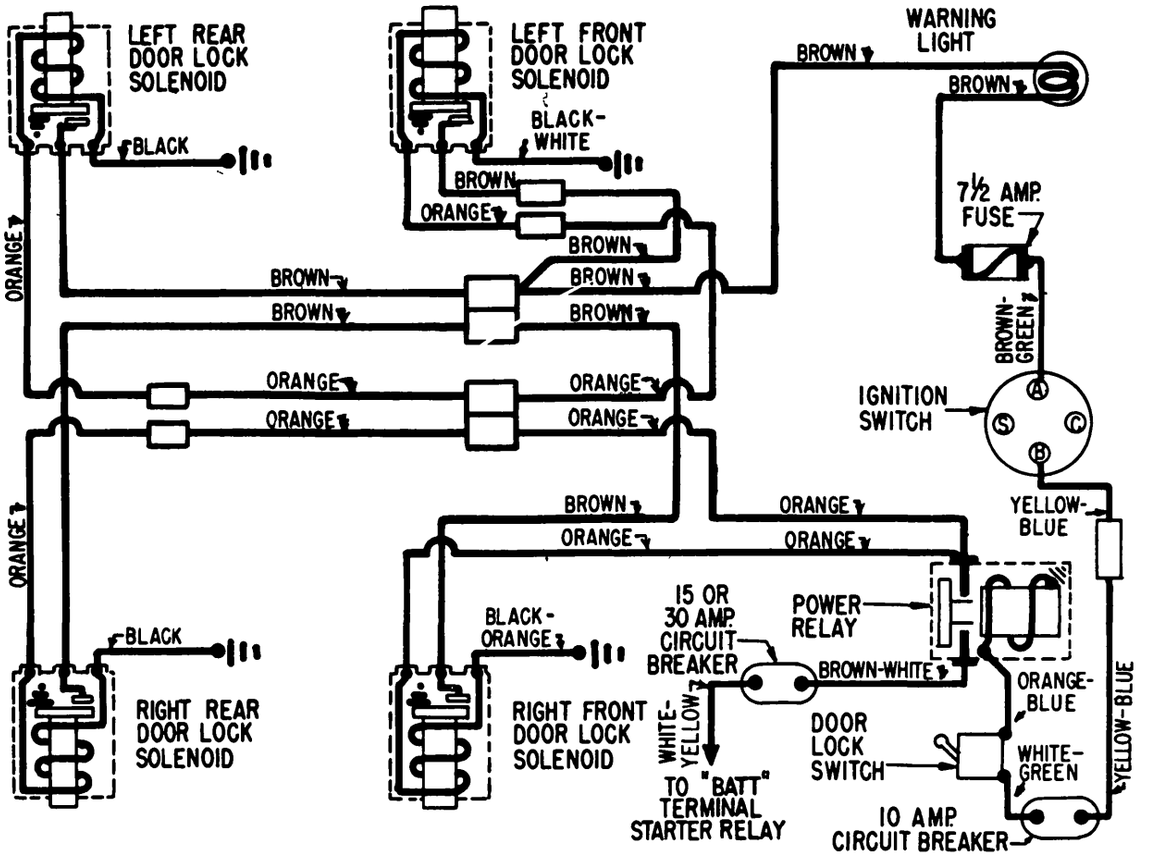
OPERATION: Closing toggle switch on instrument panel allows current to flow through switch to an auxiliary relay on right fender apron. Points in relay will close, sending battery current through the circuit breaker and into solenoids located in each door, energizing them and locking the door. *(NOTE* - When toggle is released, no current flows into solenoid, however, solenoid remains in its energized or locked position, returning to the unlocked position only when inside door handle (front doors), sliding lock control (rear doors) is actuated). When the ignition switch is turned to the "On" position or "Accessory" position and any or all of the doors are not locked, the warning light circuit is closed and the red warning light will come on.

TROUBLE SHOOTING: Warning Light Does Not Operate Wh n Any r All D rs Are Not Locked - Check ignition switch to make sure it is turned to "On" or "Accessory" position. Check warning light wiring to determine if circuit is closed. Bypass solenoids by grounding solenoid-to-warning light wire. If warning light comes on, the solenoid and/or bellcrank is misaligned on door panel, or solenoid is defective. Check rod from solenoid-to-bellcrank as improper bends in this rod will not allow solenoid to extend to its full travel and actuate warning light switch contacts.

On r All D rs Will N t Lock Electrically: Check for open circuit. Bypass the auxiliary relay on right front fender apron with a jumper wire. If door locks, auxiliary relay and or toggle switch is defective. If one door remains unlocked, lock linkage is broken, disconnected or maladjusted. A circuit is open or the solenoid is defective.

ADJUSTMENTS: R m te C ntrol & Link Assembly - Adjusted fore and aft by elongated holes in remote control and link assembly

Bellcrank: Adjusted fore and aft by elongated holes in door inn er panel.



LINCOLN DOOR LOCK WIRING DIAGRAM

Solenoid: Adjusted up and down by elongated holes in door cover plate. To position solenoid, move sliding bellcrank to the "Lock" position (forward). Adjust solenoid up or down as far as it will go without undue tension on solenoid rod. Tighten solenoid attaching screws and test operation of electric lock by depressing switch on instrument panel. Adjust solenoid up or down to obtain correct operation of electric lock and toggle switch indicator light.

REMOVAL & INSTALLATION: Front Door Lock Assemblies - Remove door glass, then remove front cover plate from door inner panel, being careful not to break the solenoid wires (solenoid is attached to cover plate by two screws). Disconnect tie rod from solenoid by removing clip retainer. Remove the two screws holding bellcrank to door inner panel, and remove five screws holding remote control assembly and bracket to door inner panel. Remove the lock cylinder retainer and lock cylinder, then remove outside door handle. Remove lock plate cover and screws holding lock assembly to inner door panel. Remove door window lower stop and brace assembly. Lower the lock assembly, rods, bellcrank, and remote control and link assembly and remove through rear access hole. To install, reverse removal procedure.

Rear Door Lock Assemblies: Raise window to topmost position, then remove inside door handle with Tool 21812-A. Remove garnish molding with door lock control attached. Remove screws holding finger tip plate to door arm rest support, then remove wires from window switch. Remove arm rest support from door inner panel. Remove two screws holding window assembly lower stop bracket to door inner panel and remove bracket with stop attached. Remove front cover plate from door inner panel, being careful not to break solenoid wires. Disconnect rod from solenoid by removing clip retainer. Remove screws holding bellcrank assembly to door inner panel and disconnect bellcrank link from lock assembly by removing clip retainer. Remove bellcrank link and rod. Remove the three screws holding remote control assembly to door inner panel. Disconnect and remove remote control link from lock assembly. Remove outside door handle, then remove the four screws holding door lock assembly and remove lock. To install, reverse removal procedure

Form 76 B

1957-58 CADILLAC ELDORADO BROUGHAM

Cadillac Eldorad Brougham (1957-58)

DESCRIPTION: This electrically operated automatic trunk lid consists of a motor and regulator assembly, power opening & closing unit, and a power control lock assembly. Opening and closing of the lid is controlled by two switches in glove compartment and a two-way (key operated) switch at rear lid lock.

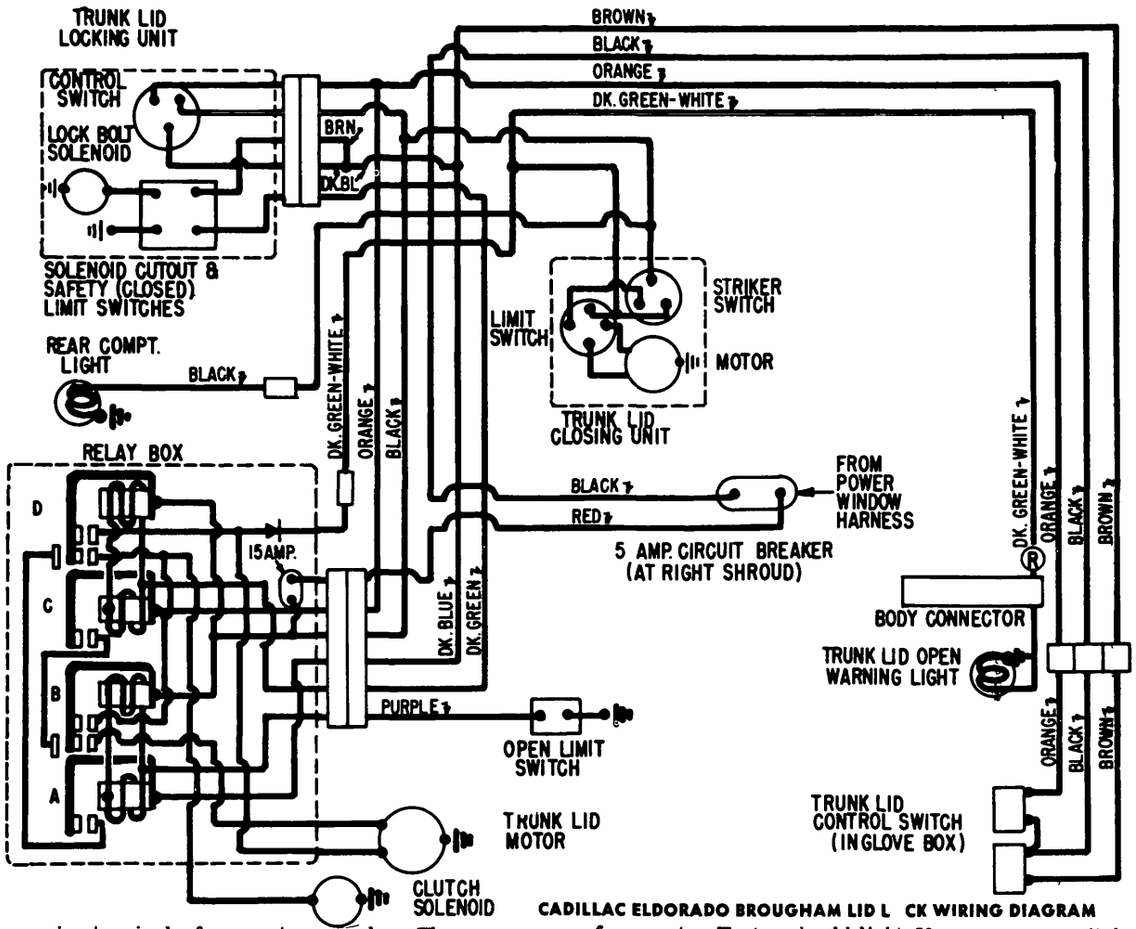
OPERATION: To Open Lid - When control switch in glove compartment or at trunk lid lock is actuated, the lid lock solenoid is energized, retracting the lock bolt. The power closing unit is then energized, extending the striker and opening lid slightly. This action operates a switch and opens the solenoid circuit; at the same time closing the circuit to energize clutch solenoid and motor assembly to open the lid. When lid is fully open, a hinge contacts a limit switch, opening the motor circuit. A warning light on instrument panel indicates when lid is opened.

T Close Lid - Closing is accomplished in a similar manner except that a different set of relays are energized. The lid is lowered sufficiently to enable power closing unit to trip lock bolt and energize power lock unit to lock lid.

TROUBLE SHOOTING: Motor & Regulator Assembly - Disconnect motor and solenoid wire connectors from relay box. Using a 12 gauge jumper wire, connect power source to a motor lead and a solenoid lead. Regulator should raise or lower lid. If motor operates and regulator does not move lid, the clutch solenoid is inoperative. If motor does not operate it is defective. If motor and solenoid operate with a jumper wire, but do not operate with control switches, check for defective or inoperative relay box.

C ntrol Switches, Circuit Breaker & Relay Box Circuits: Disengage harness connector from relay box. With light tester, check for current at red wire terminal of connector. Tester should light. If it does not, there is an open or short circuit between power source and circuit breaker. Insert tester in blue wire terminal connector, then actuate control switch to open lid. Tester should light. If it does not, control switch is inoperative or there is an open circuit between connector and power source to or from control switches. Insert tester in orange wire terminal of connector and actuate control switch to close lid. Tester should light. If it does not, there is an open circuit between connector and power source to or from control switches. To check ground circuit of relay coils, proceed as follows: Make sure the "open" limit switch plunger is not depressed and lid lock bolt is in "open" position. Connect one end of light tester to power source and connect other end to dark green or purple wire terminal of connector. Tester should light. If it does not, ground circuit of relays which control opening of lid is not complete.

Relay Assembly: Disconnect motor and solenoid connector and harness connector at relay box. Connect one end of a 12 gauge jumper wire to power source and the other end to red wire connector on relay. Connect a second jumper wire to body ground and to dark green wire terminal of connector on relay. Then, momentarily connect power source to dark blue wire terminal. With light tester, check for current at yellow wire (opening cycle) motor terminal and solenoid wire terminal on relay box. Tester should light. If it does not, relays "A" and/or "B" are inoperative. Disconnect ground wire from dark green wire terminal and connect it to purple wire terminal of relay connector. Then, momentarily connect power source to orange wire terminal of relay box. With light tester, check for current at black wire (closing cycle) motor terminal and solenoid wire terminal on relay box. Tester should light. If it does not, relays "C" and/or "D" are inoperative.



CADILLAC ELDORADO BROUGHAM LID L CK WIRING DIAGRAM

Lid Power Control Lock Assembly: Disconnect harness connector from lock connector. Use a 12 gauge jumper wire and connect power source to black wire terminal of lock connector. Then, insert key into lock cylinder. Turn cylinder clockwise and with light tester, check for current at dark blue wire terminal. Tester should light. Turn cylinder counterclockwise, and with tester, check for current at orange wire terminal of connector. Tester should light. If it does not, switch is inoperative. Position lock bolt to lid closed position; then, using a 12 gauge jumper wire, connect power source to brown solenoid wire terminal of lock connector. The solenoid should retract lock bolt to lid open position. In addition, check for current at input side of solenoid cut-out switch. Current should be present at only input end of switch when lock bolt is in lid open position. To check operation of lid closing limit switch, connect one end of light tester to power source and other end to dark green wire terminal of lock connector. With lock bolt in lid open position, tester should light. With lock bolt in lid closed position, tester should not light.

Power Closing Unit: Ground one light tester lead and connect other lead to white wire terminal (#1) of limit switch. If tester does not light, fault is in white wire or striker switch. To check switch operation for closing unit, depress switch knob and simultaneously connect light tester to red wire terminal (#2) on limit switch. If tester does not light, fault is in red wire

CONTINUED ON NEXT PAGE

CADILLAC ELDORADO BROUGHAM (C ntinued)

or striker switch. To check warning light on instrument panel (if light is inoperative and does not light up when lid is unlocked) proceed as follows: Remove bulb, and with light tester, check for current at bulb socket. If tester lights, the bulb is defective. If tester does not light, fault is in wire between light socket and limit switch. To check power unit limit switch, ground one tester lead and connect the other lead to white wire terminal of limit switch. If tester does not light, fault is in white wire or striker switch (with striker switch knob in released position) Ground one lead of light tester and connect other lead to red (#2), orange (#3), and green (#4) terminals of limit switch. Check each terminal individually. The tester should not light up. If tester lights at any of these terminals, limit switch is defective. If tester does not light up, depress striker switch knob to simulate a lid closed position. Simultaneously connect light tester lead to green terminal of limit switch. If tester does not light up, limit switch is defective. To check power unit motor, connect one end of a jumper wire to either of the motor leads (orange or green) If motor does not operate, check ground connection. If motor is still inoperative, failure is located in motor.

DIAGNOSIS: Lid Will N t Open Or Close Electrically (n n f r ar c mpartment lid units operate electrically) - Check feed wire from power window harness to circuit breaker for failure. Check circuit for proper operation.

Lid R gulator Ass mbly Will Not Raise or Lower Lid (p w r cl sing unit and solenoid operated lock operate satisfactorily): Check feed from circuit breaker to relay box for open or short circuit Check operation of switches and relay box.

Cl sing Unit D s N t Retract or Extend Striker When Strik r Switch is Actuated (lid regulator assembly rais s and l wers lid): Check circuit between circuit breaker at right shroud side panel and power closing unit for open or short circuit. Check operation of power closing unit.

Trunk Lid Does Not Operate When Instrument Panel Switch is Actuated (operates with switch at lock cylinder only): Check affected circuits for open or short circuit. Check operation of control switch and lock solenoid.

Motor Lowers Lid (will not raise lid): Check feed wire from control switches to relay box for open or short circuits. Check ground circuit from relay box, through open limit switch in hinge box; then through safety limit switch in lock assembly. Check operation of relay box and motor.

Trunk Lid Does Not Raise or Lower (regulator motor operates in both directions): Check circuit from relay to clutch solenoid for failure Check operation of solenoid and check clutch for mechanical failure.

Regulator Motor Continues to Operate After Lid Reaches Full Open Position: Check adjustment of limit switch for proper contact with hinge when lid is opened. Check wire from relay box to limit switch for ground.

REMOVAL & INSTALLATION: Lid Motor & Regulator Assembly - Loosen trunk compartment trim at right hinge, then with a suitable tool disengage retaining ring from pin securing regulator arm and remove pin. Disconnect wire harness from relay box, and disconnect wire leads from limit switches and regulator motor. Remove bolts securing regulator support to floor pan supports and remove complete assembly. To install regulator, reverse removal procedure and connect wires to original locations

Lid Power Closing Unit: Remove access hole cover from trunk lid and disconnect wire harness from power closing unit. Remove four screws securing unit to lid and remove unit from between lid inner panels through access hole. To install unit, reverse removal procedure.

Lid P w r C ntr l Lock Ass mbly: Remove luggage guard attaching screws and remove guard. Disconnect wire harness from connector on lock assembly and scribe location of lock on support. Remove lock cylinder, then remove lock. To install lock, position it within scribe marks and reverse removal procedure.

Lid Lock Cylinder: Remove luggage guard. With a suitable tool, engage hooked end of sliding retainer and disengage it from lock cylinder, then remove cylinder, To install, reverse removal procedure.

Lid Power Closing Unit & Power Lock Adjustment: (*NOTE* - Power closing unit attaching holes are slotted to permit lateral and forward or rearward adjustment) Insert a small quantity of modeling clay at bottom of bolt slot and close lid. Open lid and check amount of engagement of lock bolt with striker as indicated by compression of clay. With a rule, carefully measure distance between base of "U" in clay-to-base of "U" in lock bolt. This dimension should be 1/8-5/32". If not as specified, loosen four power closing unit attaching bolts and adjust as required. (*CAUTION* - Lid lock bolt should contact centerline of power closing unit striker when lid is closed to insure proper operation of closing unit) Check adjustment visually by lowering lid manually until striker contacts lock bolt.

ELECTRICAL SPECIFICATIONS: Relay - Delco-Remy No. 1116925.
Air Gap - 012". At core with points closed.
Contact Gap - 030".
Closing Voltage - 7.0-8 0 volts.
Trunk Control Unit: Delco-Remy No. 4695445.
Lid Unlatch Solenoid - Delco-Remy No. 1119930 (Early), 1119958 (Late):
Current Draw - 34-36 amps. at 10 0 volts.
Lid Motor Actuating Switch: Delco-Remy No. 1119941.
Current Draw - 10 5-11 7 amps. at 9 0 volts.
Transmission Interlock Solenoid: Delco-Remy No.1119917.
Lid Limit Switches: Delco-Remy No. 1998176 & 1998179.

1958-59 EDSEL, LINCOLN & CONTINENTAL ELECTRIC TRUNK LID LOCK

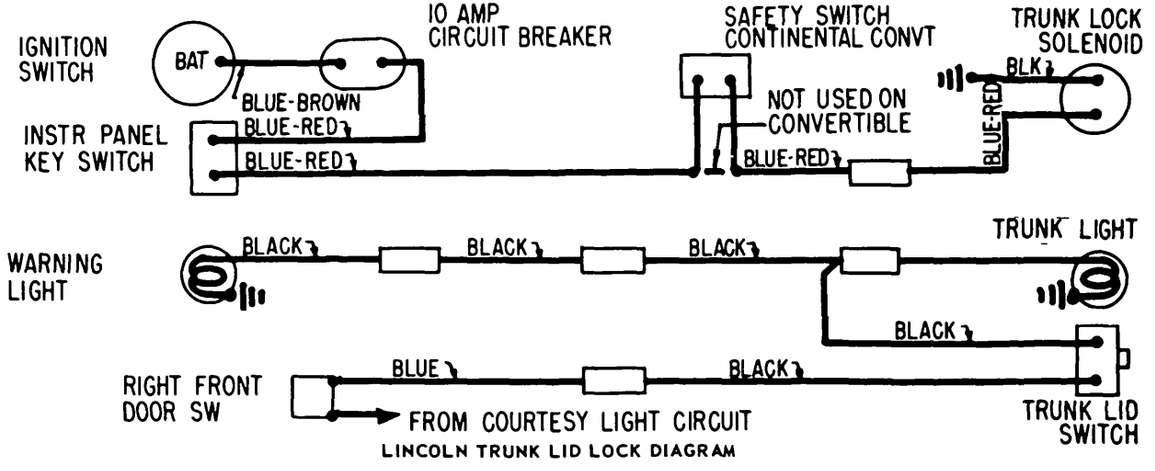
Edsel (1958).
Lincoln & Contin ntal (1958–59).

DESCRIPTION & OPERATION: Unit consists of a solenoid attached to lid lock bolt and a switch on instrument panel When switch is operated, solenoid pulls bolt and unlocks trunk On Continental Convertible models, a safety switch is located in top deck which prevents trunk operation when top is being raised or lowered Lincoln and Continental cars have a warning light on instrument panel in same circuit as luggage compartment light which indicates when trunk is open All trunks may be opened with a key in the usual manner.

STRIKER PLATE ADJUSTMENT: Make this adjustment to insure free operation of lock bolt and to prevent solenoid overload·

Eds l — To adjust vertically, loosen mounting bolts and move striker plate to desired position. To adjust laterally, tilt plate slightly in direction desired

Lincoln & C ntinental - Adjust striker plate vertically for proper operation



LINCOLN TRUNK LID LOCK DIAGRAM

1956-58 CADILLAC (EXCEPT BROUGHAM)

Cadillac, Exc. Eldorado Brougham (1956-58)

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 PARTS PRODUCTION CHANGE & REPLACEMENT NOTE:* Later production units have a metal plate in nylon insulating bushing which covers striker pin to prevent damage to bushing if closing unit and lid lock are misaligned. Use only latest type for service replacement.

►*POWER UNIT FAILURE CORRECTION:* Unit replaced as a unit in case of failure. However, as a temporary fix, trunk lid may be converted to manual control. *For procedure see ADJUSTMENTS below.*

►*TRUNK LID NOT OPENING FREELY CORRECTION:* Caused by lock bolt wedging on striker pin. To correct file top surface of lock bolt slot so that width of slot is .325-.337". Check with 5/16" drill and .013" feeler as a "go" gauge, and a .025" feeler as a "no go" gauge.

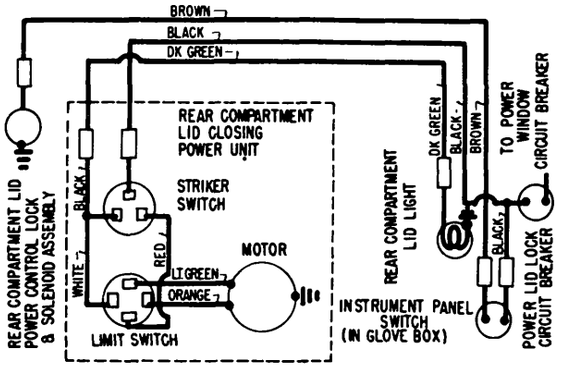
DESCRIPTION: Trunk Lid Lock Unit consists of a power-operated closing unit and a solenoid-operated lock assembly. Closing unit fastens to inside of rear end panel at lid lock position. Its 12-Volt motor operates a jackscrew mechanism which retracts and extends trunk lid striker approximately 1". This action creates a pressurized seal between lowered lid and trunk opening. The solenoid operated lock assembly fastens to rear compartment lid at the normal lid lock position and operates like past model lid locks in that it can be unlocked from the outside with a key. In addition, a remote unlocking solenoid permits unlocking the lid from inside body by means of a switch located in glove compartment.

OPERATION: Locking - When trunk lid is lowered manually to a position approximately 1" above closed position, lid lock bolt engages the lock striker and depresses the striker switch, actuating closing unit motor, causing jackscrew to retract striker, pulling lid shut until proper closing pressure seal is reached. At this pressure a spring-loaded limit switch breaks the circuit and stops motor. Lid remains locked until lock assembly is again actuated.

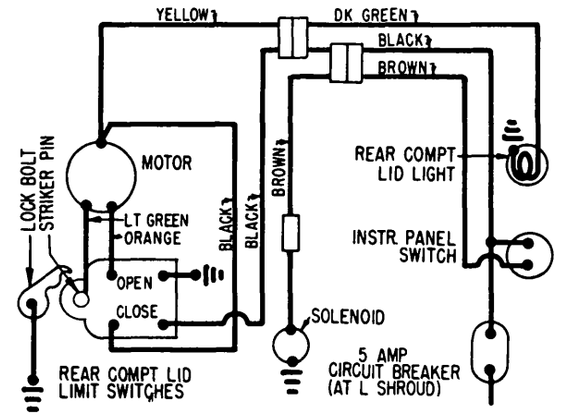
Unlocking 1956-57) – When trunk lid is unlocked by either key or switch, lock bolt is disengaged from the striker, releasing striker switch and completing circuit to reverse action of power closing motor. The motor raises the striker and lid upward approximately 1" to a counterbalanced position. From this position lid may be raised manually. A light on instrument panel signals when lid is unlocked.

Unlocking (1958) – When control button is pushed, solenoid in trunk lid trips lock bolt in lid and Open Limit Switch contacts are closed, grounding "UP" field in motor. Closing Limit Switch contacts are closed, providing current to motor. Motor operates jack screw, raising lid until open limit switch contacts are opened by nylon bushing on striker pin contacting switch cover.

REMOVAL & INSTALLATION: Power Unit - Disconnect multiple connector from wiring harness in trunk. Remove



1956-57 CADILLAC (EXC. BROUGHAM) REAR COMPARTMENT LID LOCK WIRING DIAGRAM



1958 CADILLAC (EXC. BROUGHAM) REAR COMPARTMENT LID LOCK WIRING DIAGRAM

unit cover and scribe location of attaching tabs to insure accurate replacement. Remove attaching bolts and remove unit. Reverse procedure to install.

ADJUSTMENTS: Striker & Lock Bolt Alignment - Place clay over striker and lower the lid until bolt makes an impression in clay. Note relative lateral position of bolt and striker. If necessary, adjust power closing unit horizontally by loosening three attaching bolts and sliding unit to right or left in slotted holes and retightening bolts. Fore and aft adjustment also is possible to obtain proper operation of unit.

Conversion To Manual Control (Continuous Motor Operation) - Open trunk lid and place tip of screwdriver between spring steel contact at striker pin yoke and lower side of insulated striker pin. Unit will be grounded and down cycle will be in operation. When jack screw nut guide screws are about ½-way down, remove screwdriver and disconnect feed wire in connector under floor trim.

Conversion To Manual Control (Momentary) - If motor fails when lid is closed and locked, open with key and disconnect feed wire under floor trim. If motor fails with power unit in any position, proceed as follows:

1) Disconnect feed wire under floor trim. Remove protective shield from jack screw nut housing. Scribe a line on housing ¾" below bottom edge of jack screw nut.

2) Cut green ground wire (closing cycle) close to striker pin yoke. Disconnect and remove all plastic connectors and wires from jack screw nut.

3) Remove two guide screws from each side of jack screw nut. Insert a screwdriver through striker pin yoke and rotate nut downward until bottom edge of jack screw nut is even with scribed mark. *NOTE - Offset side of striker pin yoke must be toward right side of car.* Install guide screws approximately midway in housing slots.

►*NOTE:* Before checking electrical circuits, check for mechanical failure or misalignment.

ELECTRICAL TESTING: Circuit Breaker - Ground one lead of test lamp to body and other to feed ("A") terminal of circuit breaker. If lamp does not light, connection between circuit breaker and power supply is faulty. Check circuit breaker output ("B") terminal. If lamp does not light, circuit breaker is faulty, or a short circuit exists in system and circuit breaker points are open.

►*NOTE:* On some early cars a defective closing limit switch may cause circuit breaker to open; or circuit breaker may be defective, opening feed circuit before closing unit completes cycle.

Power Unit - Remove limit switch cover. Ground one test lamp lead and connect other lead to power unit feed (black) wire. If lamp does not light, failure is between circuit breaker and motor.

Motor - *NOTE - Motor may be checked either in or out of car.* Be sure limit switch cover is in place. Ground "DOWN" cycle by inserting screwdriver between striker pin and spring. When bottom surface of jack screw nut momentarily contacts base, remove screwdriver. Motor should reverse and raise striker pin. *CAUTION - Do not permit nut to contact lower base for more than 5 seconds, as jamming of nut and overheating of field coils will result.* If nut retracted, check upward movement by attaching jumper wire from ground to "UP" cycle ground (orange) wire at nut. Replace motor if it does not operate when these checks performed.

Warning Light - Light on instrument panel should go on when trunk unlocked. With lid open, remove bulb and check for current at socket. If tester lights, bulb is defective. If tester does not light, fault is in green wire between light socket and unit motor.

1959-60 CADILLAC ELECTRIC TRUNK LID LOCK

Cadillac, All S ri s (1959–60).

DESCRIPTION: Unit consists of a power closing unit located in rear end panel and a solenoid operated lid lock on trunk lid with a control switch in glove box which enables trunk lid to be opened from inside car Trunk can be opened also with a key in the usual manner

OPERATION: Locking - When trunk lid is pulled down by hand sufficiently, lid lock bolt actuates trigger switch on closing unit Trigger switch energizes "down" cycle field in motor which retracts striker pin and barrel nut to the lid locked position. When specified load is obtained, lower plunger on limit switch contacts "down" cycle control spring and stops motor **Unlocking** - When lid is opened, either by key or by solenoid (actuated by control switch in glove box), lid lock bolt is retracted and leaf spring of trigger switch is released, energizing "up" field of motor Motor then extends striker pin and barrel nut until limit switch control spring contacts "up" stop and actuates limit switch, stopping motor When striker pin is extended, circuit to instrument panel warning light is completed and light remains on as long as lid is open

REMOVAL & INSTALLATION: Closing Unit - Remove unit guard and disconnect wiring harness plug Mark position of closing unit on support and remove unit To install, reverse removal procedure

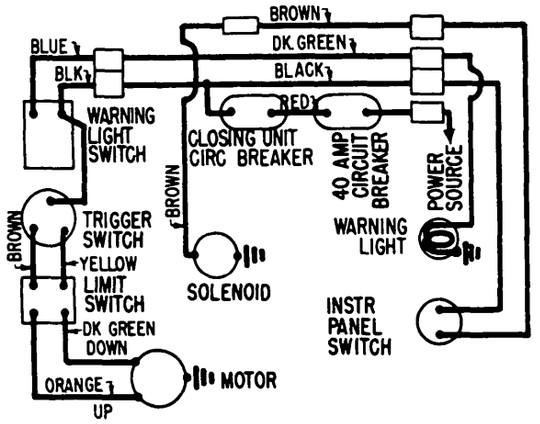
L ck Ass mbly - Remove trunk lid inner panel access hole cover plate Disconnect lock solenoid wire at connector, then remove attaching screws and remove power lock assembly from lid To install, reverse removal procedure

CHECKING & ADJUSTMENTS: Proceed as follows

►*NOTE* Before checking electrical circuits, check for mechanical failure or misalignment

Power Closing Unit· Engagement Check - Partially close trunk lid until lock bolt is just short of contacting closing unit Sight through opening between lid and body and make sure opening in unit is centered with lock bolt housing. To adjust, loosen closing unit attaching screws and move unit horizontally

Circuit Br ak r - Check for current at feed (red) wire



CADILLAC TRUNK LOCK DIAGRAM

If tester light does not light, wire (from power window circuit breaker) is faulty Disconnect black wire from circuit breaker and test output side If light does not light circuit breaker is faulty

Power Unit Connector - Check harness for proper engagement Check current at black wire terminal If no current, a short or open circuit exists between power source and connector

Power Unit - *NOTE - If unit removed from car, ground unit and connect a power source to black wire terminal* Check current at black wire terminal on light switch and at trigger switch If no current, there is an open or short circuit between power source and terminals

Trigger Switch - Check current at black feed wire With leaf spring free, current should exist at feed wire and brown (up cycle) terminal, but not at yellow terminal With leaf spring depressed, there should be current at feed wire and yellow terminal, but not at brown terminal

Limit Switch - **1)** With striker pin and barrel nut fully extended (leaf spring free), there should be current at brown wire (up cycle) on limit switch input side but not at orange wire (up cycle) on switch output side If current present at orange wire, switch is faulty **2)** Depress leaf spring to retract striker pin and nut until motor stops Hold switch depressed There should be current at yellow terminal (down cycle) at input side of switch but not at green wire (down cycle) at output side If current present at green wire, switch is faulty

Motor - From a power source momentarily connect jumper wire to either green or orange wire at output side of limit switch If striker pin and nut are fully extended, energize down cycle (green wire) motor lead If striker pin and nut retracted, energize up cycle (orange wire) motor lead If motor does not operate in either direction it is faulty *CAUTION* - Energize motor leads for a few seconds only as limit switch is being bypassed If motor operated too long, barrel nut will either run off jack screw or stall in down position

Warning Light - Check for current at light connector under instrument panel If tester lights but bulb does not, replace bulb If tester does not light, check current at blue wire of unit connector If tester lights but warning lamp does not, circuit between connector and warn lamp is faulty If tester does not light, circuit or switch in closing unit are faulty

Solenoid Lock Assembly: Harne ss-To-Control Switch - Check current at black wire of harness If tester does not light, there is an open or short circuit between connector and circuit breaker Operative glove box control switch and check current at brown wire of connector If tester does not light, switch is faulty or wiring between switch and connector has an open or short circuit

Harness-To-Solenoid - Operate glove box control switch and check current at solenoid connector If tester does not light, an open or short circuit exists between switch and connector

Solenoid Lock Operation - With lid open, manually place lock bolt in lock position Energize solenoid lead wire with a jumper wire If lock bolt not unlocked, solenoid is faulty or lock linkage defective

FORD THUNDERBIRD ELECTRIC TRUNK LID LOCK

Ford Thunderbird Convertible (1959).

►*EMERGENCY OPENING OF DECK LID* If solenoids or locks are faulty (relay clicks when dash switch operated but trunk does not unlock), lid may be opened by drilling a 1¼" diameter hole in forward side of each wheelhouse panel 5" up from crease line and 2¼" in from depression line Insert a long screwdriver and push solenoid plunger in to release the lock

DESCRIPTION & OPERATION: Unit is an electric rear deck unlocking mechanism, consisting of a switch on instrument panel, lock relay on right side of firewall inside car and a lock solenoid on each side of deck lid Operation of dash panel switch completes circuit and causes solenoids to release deck locks Safety catch on left front side of lid must then be released manually and lid raised by hand

TROUBLE SHOOTING & DIAGNOSIS: Trunk Lid Does Not Open - Lock switch, solenoids, circuit breaker, lock relay, or wiring faulty Latch or striker improperly adjusted Counterbalance springs broken

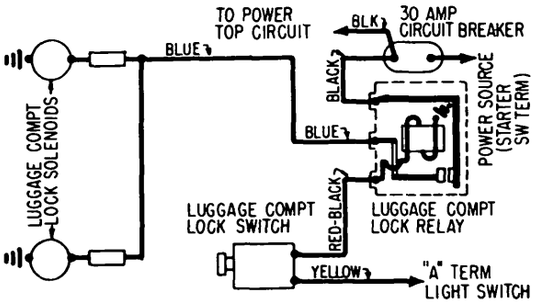
Trunk Lid Does Not Latch - Latch or striker or rear rail area improperly adjusted Trunk lid misaligned

CHECKS & ADJUSTMENTS: Lock Relay Check - Remove terminal connection from bottom of relay and connect a voltmeter from ground to terminal for red-black wire If there is a reading when dash switch operated, relay is faulty If no voltage, wiring between auxiliary terminal of headlight switch and relay is faulty

Dash Panel Switch Check - Turn ignition switch to ACC position and connect a voltmeter from ground to point where yellow wire attached to switch No voltage indicates faulty wiring between switch and headlight switch If reading indicated, connect voltmeter positive lead to red-black wire terminal on switch Operate switch If reading shows, switch is operative If reading shows but relay does not click, wiring between switch and relay is faulty

Lock Solenoid Check - Disconnect blue wire from solenoid and attach a voltmeter from ground to solenoid lead wire No reading indicates faulty wiring from relay If voltage shows but solenoid inoperative, solenoid is faulty

Trunk Lid Alignment - Clearance between all edges of lid and body should be as equal as possible Adjust by loosening lid hinge bolts Move latches laterally to assure proper overlap of striker on latch rotor teeth Check with a piece of putty on top of tooth to be engaged Overlap should be equal to one-half depth of rotor tooth Striker is vertically adjustable Safety catch is adjustable laterally to assure proper overlap



THUNDERBIRD TRUNK LOCK DIAGRAM

CHEVROLET CORVAIR GASOLINE HEATER

Ch vr l t C rvair (1960)

DESCRIPTION: This is a Gasoline Combustion type heater. Entire assembly is mounted on dash panel in front (trunk) compartment and consists of a Heat Exchanger & Burner Assembly, a Combustion Blower Assembly (includes breaker points for burner spark plug ignition system), and the necessary control devices for proper operation. Heater operates as follows:

Heat Exchanger & Burner: Burner consists of a cup shaped mixer chamber with a fuel spray nozzle and spark plug (plug has single insulated electrode with ground electrode mounted directly in cup). The burner is surrounded by a stainless steel heat exchanger which is heated by the combustion gases before they are discharged through the exhaust pipe terminating under the car. Heat exchanger is in turn surrounded by the heater case through which air is circulated before entering the car interior. Cold outside air is drawn in through cowl vent by ventilator blower mounted on end of heater case and, after being heated, is circulated through the passenger compartment.

Burner Fuel System: Fuel for the burner is taken from the fuel pump-to-carburetor line. A pressure regulator in the burner line regulates pressure to 4.0—5.0 lbs. A solenoid fuel valve in the burner assembly controls the fuel flow.

Combustion Blower Assembly: A small motor driven blower mounted on right fender skirt in front compartment supplies air for the burner. A breaker assembly mounted on the end of the motor (two lobe cam and breaker contact assembly) is connected in the heater ignition coil primary circuit to interrupt the circuit and provide a spark at the burner spark plug. *NOTE* – Combustion motor speed is in excess of 3000 RPM so that spark plug fires more than 6000 times per minute.

Control System: Controls on instrument panel are connected to control switch and thermostat mounted in the air distributor. **Fan** control is connected through ignition switch and controls the blowers (combustion and ventilator blower), solenoid fuel valve, and burner ignition circuit. When this control is moved to "Low Blower" or "High Blower", both blower motors will operate. Solenoid fuel valve and burner ignition system will only operate if the thermostat setting is high enough to require heater operation. **Heat** control regulates thermostat operation and thermostat setting can be raised by moving the lever down. **Def** (defroster) control diverts heated air flow to defroster ducts. Other devices operate as follows:

Thermostat – Whenever the air temperature in the heater distributor is below the thermostat setting, thermostat contacts will be closed completing the solenoid fuel valve and burner ignition circuits. Fuel is discharged through the burner nozzle and ignited by the spark plug. As soon as the air temperature is raised to the thermostat setting, thermostat contacts open, fuel is cut off by the solenoid valve, and the ignition system is turned off. As soon as the air temperature drops below the thermostat setting, the cycle is repeated. In service, this on-off operation occurs rapidly so that temperature fluctuations are not noticeable. Heater will burn continuously only in extremely cold temperatures and high speed driving conditions.

Ov rh at Switch – Mounted on heater case and connected in fuel solenoid valve circuit. If temperature rises excessively (due to thermostat not operating), switch contacts will open and break the solenoid circuit so that fuel flow will be cut off. Switch is automatically reset when air temperature drops and will cycle the heater in the same manner as with normal thermostat operation.

Purge Switch – Mounted on top of heater case and connected in combustion blower motor circuit so as to provide an optional closed circuit for the blower. Switch is a temperature-sensitive unit which is automatically energized by heat after the heater has been operating for a few seconds. When heater is turned off (by Fan control or ignition switch), purge switch remains closed for a few seconds and combustion blower continues to operate to purge the system. When the temperature drops, switch contacts open and blower stops.

Solenoid Fuel Valve Relay – Relay is connected in combustion blower motor circuit and solenoid valve circuit. A power failure in the combustion blower motor circuit will cause the relay to open the solenoid valve circuit and cut off the fuel flow to the burner.

Fuses (Heater Wiring): Circuits are protected by the following fuses mounted on fuse block located under left side of instrument panel:

20 Amp r – Entire heater system. Connected in feed wire to control switch. *NOTE* – This is also the Back-up Light circuit fuse.

10 Amp r – Combustion blower motor circuit. *NOTE* – This is also the Glove Box Light and Courtesy Light circuit fuse.

3 Ampere – Heater Control Light. *NOTE* – This is the instrument light circuit fuse.

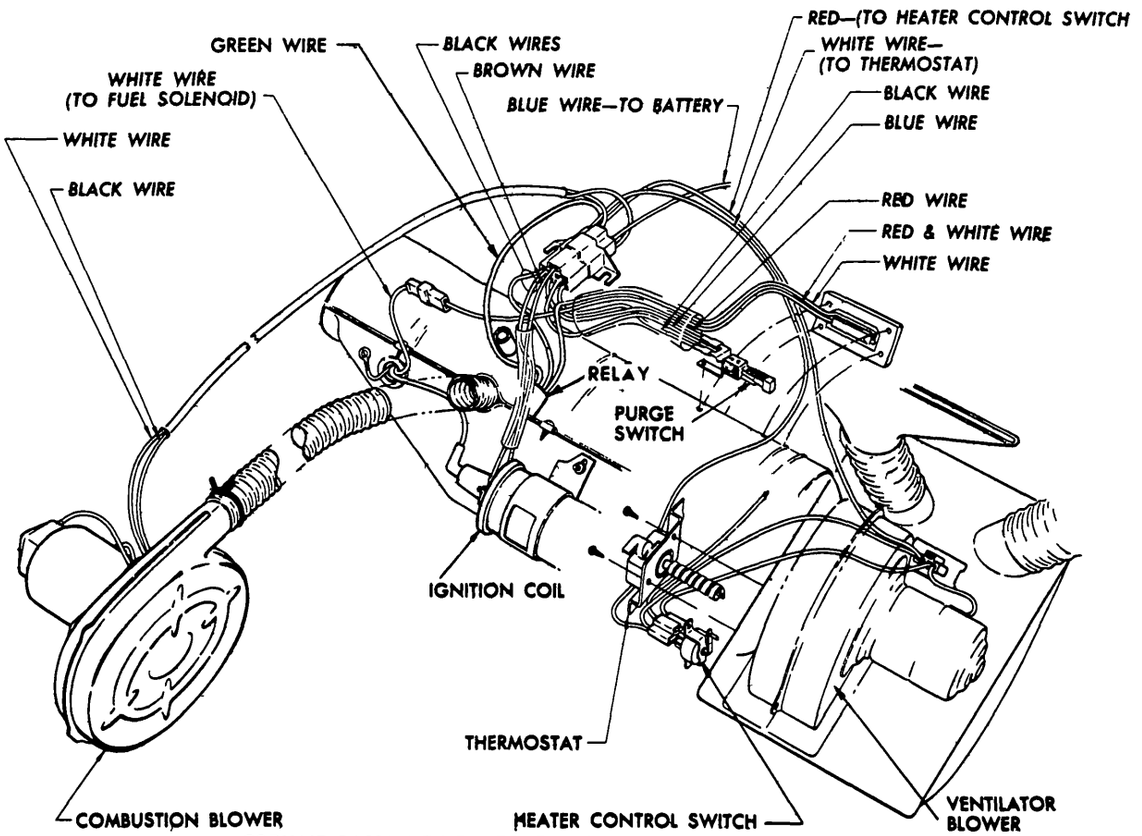
TROUBLE SHOOTING & DIAGNOSIS: *See SERVICING data (following) for adjustment and s rvicing f heater components.*

Heater Fails to Start (Combustion Bl w r d s not p- erate): Fuse blown, Wiring disconnected or open, Combustion Blower Motor defective or not grounded, Fan Control Cable disconnected or out of adjustment, Control Switch defective, Purge Switch defective.

Heater Fails to Start (Combusti n Blow r p rat s): Wiring disconnected or open, Heat Control Cable disconnected or out of adjustment, Thermostat defective, Overheat Switch or Relay defective, Ignition System (breaker points, condenser, coil, spark plug) defective or out of adjustment, Fuel Valve Solenoid defective, Fuel Valve stuck, Nozzle clogged, Fuel Line kinked or damaged, Combustion Blower fan defective or hose disconnected, Heater Exhaust restricted.

Heat r operates but n warm air deliv red: Heater switch wiring disconnected or open, Ventilator Blower defective or ventilating system restricted, Heat Control Cable disconnected or out of adjustment, Thermostat

CONTINUED ON NEXT PAGE



CORVAIR GASOLINE HEATER (PICTORIAL WIRING DIAGRAM)

CHEVROLET CORVAIR HEATER (C nt.)

defective. "Carbon Bridge" formed on spark plug, see Spark Plug "Carbon Bridge" Removal under Ignition Spark Plug below.

Combusti n Bl wer p ration erratic: If blower starts and then stops, check for blown fuse or defective Purge Switch. If blower does not start immediately when control turned on, or stops immediately when control turned off, or does not turn off within 2 minutes after control turned off, check for defective Purge Switch.

H at Output T o Low, Too High, or No Control: Heat control cable disconnected or out of adjustment, Thermostat defective or shorted.

H at Output To L w (& Heater operates continuously): Fuel Line kinked or damaged, Engine Fuel Pump defective (pressure too low), Nozzle clogged *(CAUTION – Nozzle cannot be cl aned and no attempt should b mad to bl w it out with air).*

P pping N is (Wh n Heater Starts): Ignition system defective (weak spark due to defective coil or condenser, breaker points burned or gap wrong, spark plug gap or electrode positioning incorrect, spark plug cable defective), Combustion air insufficient, Nozzle or Solenoid Valve loose or leaking, fuel spray pattern incorrect, fuel pressure incorrect, Purge Switch defective.

Exc ssiv H at r Exhaust Smoke: If smoke noted when heater starts, check for fuel valve leakage. If smoke noted continuously while heater operating, check for: Combustion blower fan defective or air hose leaking, blower operating at slow speed (wiring, motor, or motor ground defective), Nozzle clogged or spray pattern incorrect, Purge Switch defective.

Gas lin Od rs in Car: If raw gasoline odor noted, check for loose fuel line connection at burner casting or solenoid valve cup leakage; if burned gasoline or exhaust fumes noted, check for loose burner clamp or heater exhaust ferrule, corroded exhaust tube or heat exchanger.

SERVICING & ADJUSTMENT: Thermostat, Overheat Switch, Purge Switch, and Relay cannot be adjusted and are serviced by replacement.

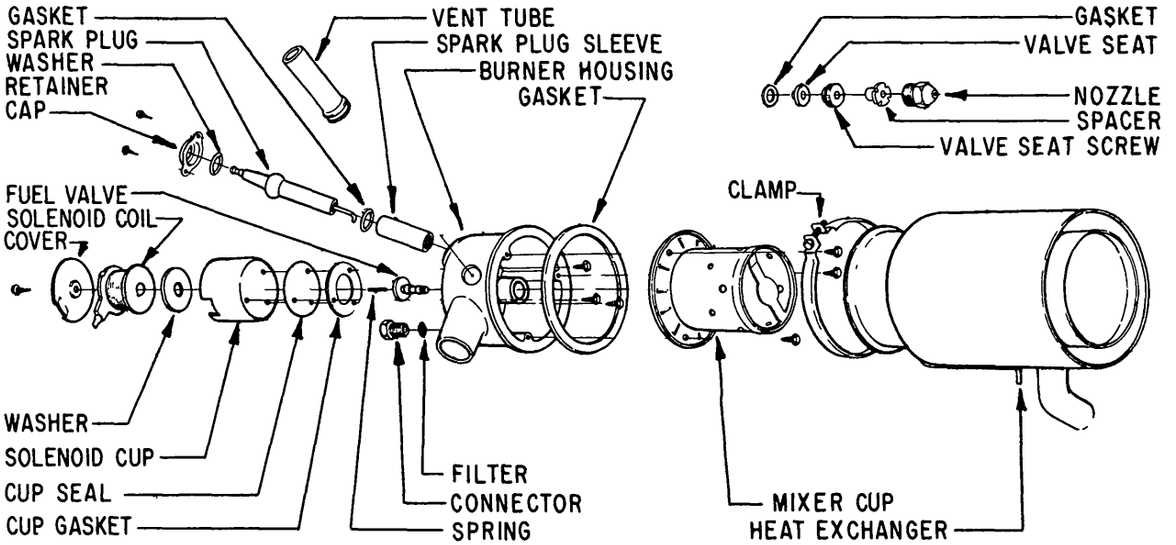
H at r Contr ls: If controls disconnected (for Control Assembly replacement, etc.), connect and adjust cables as follows:

H at Contr l (Th rm stat) Cable – Move heat control knob into **d wn** position within ¼" of cable sheath, attach cable to thermostat with thermostat lever rotated fully clockwise, then adjust cable at heat control end so that control knob stops at extreme top of slot

D fr st r (D f) Cabl – Adjust cable so that control knob is at top of control assembly when defroster diverter door in distribution duct is completely closed.

Fan Cabl – Adjust cable so that control knob is at top of control assembly when air distributor door to blower is completely closed.

Igniti n Break r Ass mbly: For access, disconnect and remove Combustion Blower Assembly, then remove snap-on cap on end of blower motor. Inspect breaker points. If points burned or pitted, install new ignition unit base (breaker point assembly). Check breaker cam and replace if scored or worn. *NOTE – Cam is threaded on end of motor shaft (right hand thread).*



CORVAIR GASOLINE HEATER BURNER (EXPLODED VIEW)

Breaker Gap Adjustment – Gap should be .015—.021" (average of gap on both lobes of cam). If adjustment required, install new cam and recheck gap. If gap still not within limits, replace ignition unit base. Adjust gap on new unit to .018" by turning adjustable contact threaded stud, lock adjustment by soldering contact stud *(CAUTION –* Use only rosin core solder).

Condenser – Capacity .12—.18 mfd. (.15 plus or minus 20%). If condenser defective, replace ignition unit base. Condenser soldered connections must be tight.

Ignition Spark Plug: Access to plug requires removal of burner assembly. Check plug operation (without dismantling heater) as follows: Disconnect lead from Overheat Switch to Solenoid Coil (white wire) to prevent fuel flow *(CAUTION –* Insulate lead from ground). Set **Heat** Control in "High Heat" position, set **Fan** control in "Low" position, turn ignition switch on. Both blowers should operate. Listen for plug operation which should be a light buzzing sound under instrument panel (or disconnect combustion hose from blower, hold hose to ear and listen for buzzing sound). If buzzing sound not heard, service spark plug as follows:

Spark Plug Servicing – Open heater case and remove burner assembly. Remove spark plug by taking out two screws in plug retainer cap, remove cap, withdraw spark plug and sleeve. Clean plug with emery cloth or steel wool, inspect for cracked porcelain or eroded or bent electrodes. When reinstalling plug, assemble two washers and sleeve on plug and insert it in case *(NOTE -* Plug and housing are notched so that it can be inserted only in correct position), install retainer cap.

Spark Plug "Carbon Bridge" Removal - Pull center wire out of heater coil and hold it ¼" from coil center terminal to produce higher voltage necessary for spark to jump gap between wire and terminal, which will remove "Carbon Bridge".

Ground Electrode Alignment & Plug Gap Adjustment – Use Gauge J–8368. To check alignment, insert larger diameter end of gauge into mixer cup and pilot end of gauge into center flanged hole in mixer cup, rotate gauge to align gauge step with ground electrode. Electrode should contact gauge step along entire length of step. Use long nosed pliers to bend electrode. Check gap using opposite (.085") end of gauge. Adjust gap by bending ground electrode **using gr at care not to disturb alignment.** Recheck alignment and gap until both settings are correct.

Final Performance Check – Connect plug lead and check spark visually. *(CAUTION –* Burner must be grounded when making this check). Spark should be a steady, intense, bluish arc.

Solenoid & Fuel Valve: Checking of these units requires removal of burner assembly and should be performed when burner removed for spark plug servicing.

Solenoid Coil Check – Connect burner ground wire to a good ground location. Disconnect and insulate lead at solenoid coil. Touch hot lead from battery to solenoid terminal. A slight "click" should be heard indicating that solenoid has pulled valve off seat. If no click heard, solenoid coil is open or valve is stuck.

Fuel Valve Check – Take out three screws mounting solenoid cup on housing, remove cup **using care not t lose spring located in valve.** Inspect casting for dirt, metal chips, or other foreign material. Inspect valve seat. To remove seat, remove fuel nozzle, rubber spacer behind nozzle, and seat retaining screw (requires Allen wrench). When installing seat, replace gasket which prevents fuel seepage around seat.

AC ELECTRIC TEMPERATURE GAUGE

DESCRIPTION: This is an electric gauge of the 'balanced coil' type and consists of a Dash Unit or recording gauge and an Engine Unit or temperature reacting unit mounted in the cylinder head or engine block in contact with the cooling water in the engine. Dash unit is connected to the 'Gauge' side of the ignition switch (controlled by switch and operative only with switch on) and to the engine unit and each unit is grounded (see wiring diagram). Dash unit consists of two coils at a 90° angle with an armature (on which the pointer is mounted) at the intersection of the coil axis. One coil is connected directly between the 'IGN' (feed) terminal and ground on the gauge case, the other coil being connected between the two gauge terminals (in series with the engine unit). Engine unit consists of a fixed resistance unit which has a high resistance value Cold and a relatively low resistance value Hot (gauge operated by this change in resistance due to temperature changes in the engine—gauge engine unit has no moving parts).

OPERATION: When the ignition switch is turned on with the engine cold, current flows directly through coil 'A' to ground. The high resistance of the engine unit causes a relatively smaller current to flow through coil 'B' (which is connected in series with this resistance) so that the pointer is deflected toward the 'Low' or coil 'A' side of the scale. As the engine warms up, the resistance of the engine unit decreases, allowing an increasingly greater current flow through coil 'B' so that the pointer is drawn over toward the 'High' end of the scale. The balanced action of the two coils compensates for battery voltage variations and in addition an inertia dampener is built in the armature assembly to prevent pointer vibration on rough roads, etc.

SERVICING: All defective units should be replaced.

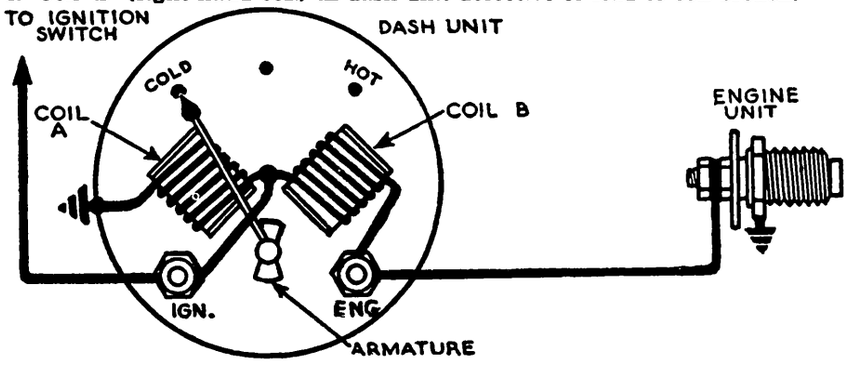
TROUBLE SHOOTING: If gauge operation not satisfactory, check as directed under correct heading in following table, being careful to turn ignition switch off when disconnecting or re-connecting leads on terminals and using extreme care not to reverse connections at dash unit terminals. Do not allow dash unit to be placed in strong electric field which will affect magnetic armature.

Gauge does not register with Ignition Switch turned on:

1. Lead between Ignition Switch and Dash Unit broken or grounded (open or short-circuit). Check by connecting test lead between these two points with regular lead disconnected at both ends.

Gauge register 'Cold' under all conditions:

1. Lead between Dash Unit and Engine Unit broken (open-circuit). Check by connecting test lead between these two units.
2. Coil 'B' (right hand coil) in dash unit defective or lead to coil broken.



Gauge registers 'Hot' under all conditions:

1. Lead between Dash Unit and Engine Unit short-circuited. Check by disconnecting this lead at engine unit terminal and noting gauge reading. If gauge still reads high, this lead is shorted. If gauge reads low, engine unit is shorted and must be replaced.
2. Dash Unit not grounded. Clean all paint from under dash unit mounting flange, tighten mounting screws.
3. Engine Unit burned out. See check under (1) above or install replacement engine unit and note operation.
4. Coil 'A' (left hand coil) in dash unit defective or lead to coil broken.

Gauge registers Inaccurately:

To check, disconnect lead at engine unit terminal, remove engine unit, ground engine unit shell to car frame with test lead, re-connect engine unit, immerse inner end of unit in pan of water at known temperature (use reliable thermometer and heat water as required), note gauge reading.
CAUTION—When making this test, do not completely immerse engine unit in water which may allow leakage within shell or short-circuit lead on terminal.

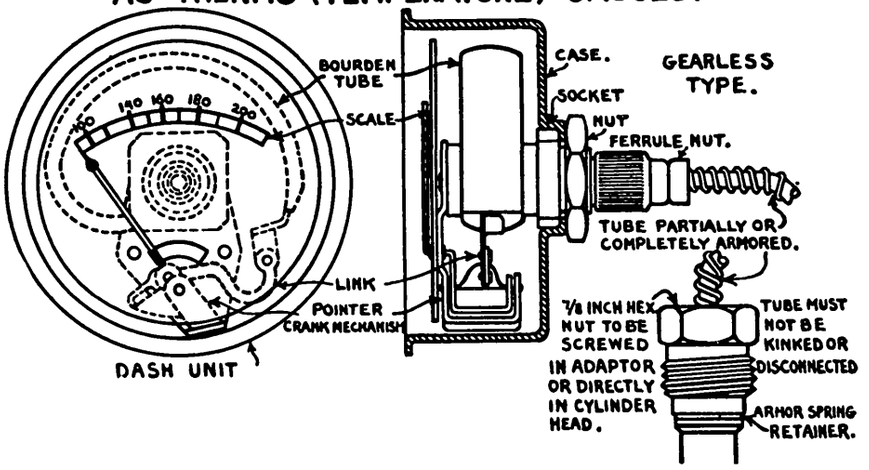
AC TEMPERATURE GAUGE (NOT ELECTRIC)

DESCRIPTION: A.C. Temperature Gauges are of the Bourdon tube type and consist of a dash unit in which the Bourden tube is mounted, together with the gauge pointer and connecting mechanism, and an engine unit or bulb. The units are connected by a hermetically sealed copper tube and the entire assembly is filled with a special liquid. The engine unit is mounted on the cylinder head and is immersed in the cooling water. As the temperature of the water increases the liquid in the bulb is vaporized causing a pressure to be exerted in the Bourden tube. The Bourden tube consists of a curved tube mounted rigidly at one end and connected to the gauge pointer through a crank mechanism or gear system at the other. The pressure within the Bourden tube results in a movement of the free end causing the pointer to move across gauge dial which is calibrated in degrees.

INSTALLATION: Gauges are made in three types; Gearless, in which the gauge pointer is connected to the Bourden tube through a simple crank mechanism; Gear Type,, employing a smaller Bourden tube which is connected to the pointer through a sector and pinion gear system to amplify the tube movement, and a Gear Type Heavy Duty design.

SERVICING: No service operations required and units cannot be repaired. Replace all defective gauges as an assembly (dash unit and engine unit).
CAUTION—Do not cut tubing or attempt to disconnect dash unit or engine unit. The entire assembly is a sealed unit and will not operate satisfactorily if disturbed.

AC THERMO (TEMPERATURE) GAUGES.



AUTO-LITE ELECTRIC TEMPERATURE GAUGE

DESCRIPTION & OPERATION: This is a Gauge of the electric (or magnetic) type consisting of a Dash Unit which registers the temperature of the coolant in the engine and an Engine Unit which is installed in the coolant, and transmits coolant temperatures to the Dash Unit.

Dash Unit—This unit has two magnetic poles. One winding is connected to "IGN" switch and to ground. This winding holds a steady pull on gauge pointer to the left or "Cold" position. The second winding connects to ground through the Engine Unit, and exerts a magnetic pull to the right or "Hot" side of Gauge. The strength of this magnet is determined by the amount of current allowed to pass through the Engine Unit resistor.

Engin Unit—This unit is equipped with flat disc that changes resistance as its temperature changes. The resistance is greatest when it is cold and resistance reduces as temperature rises. The reduction in resistance permits more current to flow to ground through the second winding of the Dash Unit, increasing the pull on the Gauge pointer toward the "Hot" position.

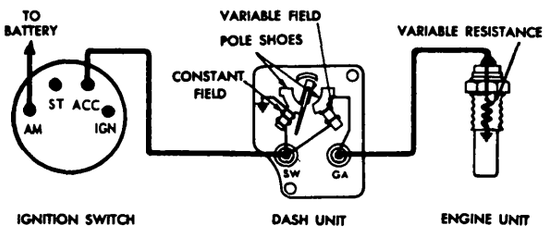
►*CAUTION: Wh n gauge hand fails to move at all, Dash Unit is damag d or has been installed incorrectly. Reinstall corr ctly or r place as necessary.*

TROUBLE SHOOTING: Consists of testing circuits by elimination process. **Follow tests in sequence given and replace any unit found defective.** Turn "IGN" on and off for each test.

1) Remove wire at Engine Unit, gauge pointer should stay at left side (Cold) stop pin.

2) Remove ground wire from Engine Unit. Gauge pointer should move to right (Hot) stop pin.

3) In test (1) if gauge hand does NOT stay at left stop pin, wire is grounded between Dash Unit and Engine Unit, or Dash Unit is defective. Remove wire from "GA" terminal. Wire is defective if pointer now stays at left stop pin, otherwise replace Dash Unit.



AUTO-LITE ELECTRIC TEMPERATURE GAUGE

4) In test (2) should pointer not move to "Hot" position, there is an open circuit in wire between Dash Unit & Engine Unit, the Dash Unit is defective, or no power is reaching Dash Unit. Ground "GA" terminal, if pointer now moves, replace wire. If it does not move, connect test lamp (6 or 12 volt as applicable) between Dash Unit "IGN" terminal and ground. Replace Dash Unit if lamp lights. Test the wire between "IGN" switch and Dash Unit by connecting test lamp to "Accessory" terminal at "IGN" switch and to ground. Test lamp should light.

5) If gauge pointer operates correctly in test (1) & (2) but does not indicate temperature changes correctly, Engine Unit is defective or Dash Unit not calibrated correctly. Use Engine Unit known to be OK. If Dash Unit still fails to indicate correctly, replace Dash Unit.

6) If the gauge pointer stays at right stop pin (maximum) at all times in test (1) & (2), wiring & Dash Unit are OK. Replace Engine Unit.

KING-SEELEY ELECTRIC TEMPERATURE GAUGE (NOT "CV" CONSTANT VOLTAGE TYPE)

DESCRIPTION: Dash unit or receiver same design as for Oil Pressure Gauge. Two types of Engine Units have been used. Both types consist of a heat bulb which is designed to be screwed in the engine block so that cooling water temperature actuates the bi-metal arms within the bulb. A heating coil (connected to dash unit) is wound on the bi-metal arm and connected to the insulated contact at the free end of the arm. The ground contact is mounted on the free end of a second bi-metal arm (Types 5700 & 6540), or on a stationary support (Type 7000). Contacts are normally closed (with arms not flexed) and gauge circuit is completed through heating coil and contacts to ground when the ignition is turned on.

OPERATION:—Types 5700 & 6540. When heating coil in engine unit is energized, the temperature rise tends to flex the arm and open the contacts. This interrupts current flow, allows bi-metal arm to cool off and flex back so that contacts are again closed. This action is extremely rapid and arm has a vibrating motion. Second bi-metal arm is longer and thinner than heater arm so that flexing action, as engine temperature increases, is greater and tends to increase contact pressure and length of time contacts are closed. Consequently current flow in gauge circuit increases in proportion to the rise in engine temperature and this increased current produces a greater deflection of the dash unit bi-metal arm so that a higher reading is indicated on the dial.

Type 7000. This type operates similarly to earlier types (above) except that contact pressure and current are at maximum when engine unit is cold. Increase in engine unit bulb temperature (as engine warms up) tends to flex the bi-metal arm away from the stationary contact support so that contact pressure and length of time contacts are closed tend to decrease. The consequent decrease of current in the gauge circuit causes the dash unit pointer to move toward the "hot" end of the scale.

TESTING & SERVICING:—Manufacturer recommends use of a regular Gasoline Gauge Tank Unit as a test "Sender" to check operation of units which do not operate satisfactorily. Make tests as directed below.

CAUTION—When testing later type temperature gauges (with No. 7000 Engine Unit), dash unit readings will be reversed (HOT with tank unit float in "empty" position, COLD with tank unit float in "full" position).

Testing Sender:—Disconnect lead of Sender unit on car, connect this lead to test Sender and ground this Sender to the car frame. Turn on ignition, move Sender float up to 'full' position and note reading on Receiver. If Receiver reading is correct (after 10-15 seconds time), check following points before replacing Sender unit:

1. Ground. Sender is grounded through case. See that all paint and grease are removed under flange and both surfaces make good contact.

2. Radio By-pass Condenser Shorted. If by-pass condenser is connected at Sender on cars with radio, test for short-circuit by disconnecting condenser and noting gauge operation. If gauge is satisfactory, replace condenser.

If reading secured with test Sender is same as that with Sender on car, check wire connecting Sender and Receiver. Replace if open-circuited or grounded.

Testing Receiver—Disconnect wires on Receiver on car and connect to same terminals on test Receiver. Turn on ignition switch and note reading on gauge. If test Receiver reading is correct, replace Receiver on car. If test Receiver reading is same as car Receiver, repeat tests on Sender and wiring.

SERVICING:—No service operations are required other than to see that wires are properly connected and terminals are tight. No repair operations are possible and defective Senders and Receivers should be replaced.

KING-SEELEY OIL PRESSURE GAUGES (NOT "CV" CONSTANT VOLTAGE TYPE)

DESCRIPTION: This is an electric oil pressure gauge comprising an engine unit, and a dash or recording unit connected by a wire. The dash unit is also connected to the ignition switch (gauge operative only with engine turned on) and the gauge circuit is completed to ground through the engine unit contacts. The dash unit consists of a thermostatic bi-metal arm linked to the instrument pointer around which is wound a heating coil. The engine unit has a similar bi-metal arm and heating coil.

OPERATION: When the engine is operated and oil pressure is built up, the pressure deflects the diaphragm in the engine unit and, with the contacts closed, a current flows through the heating coils of the dash and engine unit. The heating effect of the coil in the dash unit tends to bend the bi-metal arm which is linked to the pointer and record a reading on the gauge. At the same time, the heating coil in the engine unit causes the bi-metal arm to flex to a point where the contacts open and the current is interrupted. When this occurs the bi-metal arm in the engine unit flexes in the opposite direction and again closes the contacts. Contact pressure and length of time (amount of flexing necessary to open contacts) is directly proportionate to the oil pressure in the engine, and as this determines the amount of current flowing in the gauge circuit and the deflection of the bi-metal arm in the dash unit, the dash unit indicates the oil pressure. Contacts open and close at approx. 120 cycles per min. with 25 lbs. pressure.

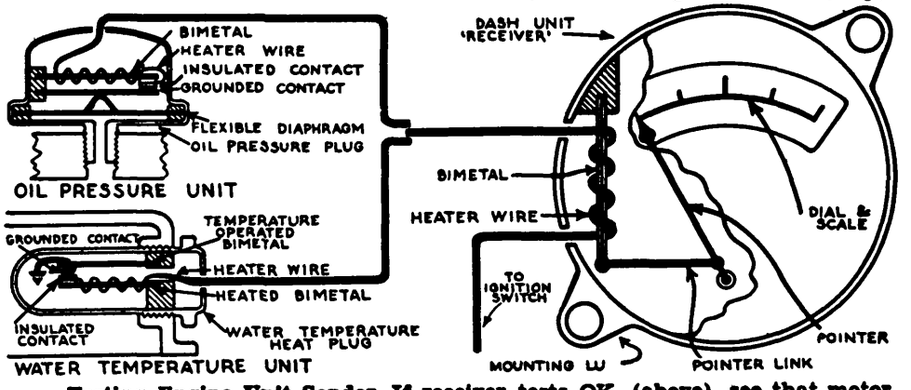
SERVICING: No service operations are necessary other than to see that connections are tight and that lead is properly connected to engine unit. If readings unsatisfactory, check Trouble Shooting Table and Testing (All Units).

Trouble Shooting Table

1. **Gauge pointer is erratic.** Engine unit probably defective.
2. **Gauge reading inaccurate.** Engine unit probably defective.
3. **Gauge does not register.** Engine unit defective or dash unit burnt out
4. **Gauge registers with engine not running (ignition on).** Short-circuit in lead between dash unit and engine unit or short-circuit in dash unit (a short-circuit of this type will usually result in dash unit burning out, resulting in no reading).

TESTING (ALL UNITS):—Use a gasoline gauge tank unit which is known to be OK. for test purposes. Connect flexible test lead to terminal on this test unit and second lead to test unit mounting flange (for ground circuit). Make tests in order as given below before removing units from car.

Testing Dash Unit Receiver. Disconnect engine unit Sender, connect test unit terminal lead to this wire, ground test unit to engine block. Turn on ignition switch. With float of test unit at bottom (tank empty) position, dash unit receiver pointer should be even with lowest mark on dial. Move test unit float rod up to top position. Dash unit receiver pointer should move to top mark on dial (allow one minute for pointer to come to rest). If dash unit receiver does not operate satisfactorily, see that connections at receiver and ignition switch are tight, check line to ignition switch and line to engine unit, then replace receiver. NOTE—When testing temperature gauges, readings will be reversed (Hot reading with test unit float at bottom, Cold reading with float at top).



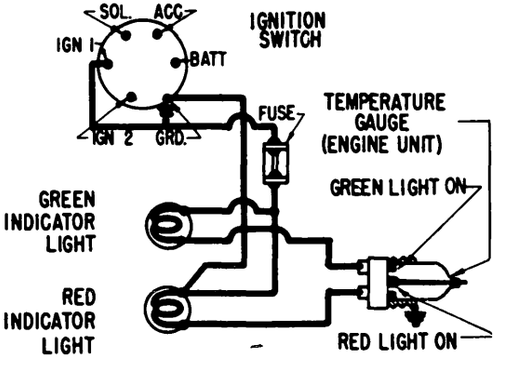
Testing Engine Unit Sender. If receiver tests OK. (above), see that motor unit is well grounded, disconnect and check radio condenser (shorted condenser will cause high reading on dash unit). Then replace engine unit sender.

OIL PRESSURE TELTALE LIGHTS

DESCRIPTION: Consists of an indicator light bulb mounted in instrument cluster which is connected to the ignition switch and grounded through an oil pressure switch mounted on the engine. Light goes on when ignition switch turned on and should go out when oil pressure against pressure switch reaches predetermined pressure. Light must not be on when engine running but may glow at idle speed. *See "Oiling System" on Car Model pages.*

TROUBLE SHOOTING & DIAGNOSIS: Light Off, Ignition On, Engine Stopped – Indicator bulb burned out. Open circuit between ignition switch and light, or between light and pressure switch. Pressure switch not grounded (check for sealing compound on switch threads). Pressure switch stuck (replace switch).

Light On, Engin Running: Circuit grounded between light and pressure switch. Pressure switch shorted. Pressure switch improperly calibrated (increase engine speed to see if light goes out). Oil pressure too low (check engine oiling system for trouble).



OLDSMOBILE TEMPERATURE INDICATOR



OIL PRESSURE TELTALE LIGHT

OLDSMOBILE TEMPERATURE INDICATOR

Oldsmobile (1956–60).

DESCRIPTION: The unit consists of one green and one red indicator light in instrument cluster and a thermal unit at rear of left hand cylinder head. The thermal unit contains a bi-metal strip which is actuated between two terminals within the unit. The thermal unit has three basic positions - cold, normal, and hot.

OPERATION: When the ignition switch key is turned to the start position, a test circuit is closed to determine if red light is functioning properly. When a cold engine is started, the bi-metal strip closes the circuit to the green light, causing the green light to burn indicating that the engine is not up to operating temperature and remains on until the engine reaches operating temperature. If the engine reaches an abnormally high temperature, the bi-metal strip closes the circuit to the red light, causing the red light to burn indicating that the engine temperature is abnormally high.

KING-SEELEY "CV" CONSTANT VOLTAGE OIL & TEMPERATURE GAUGES

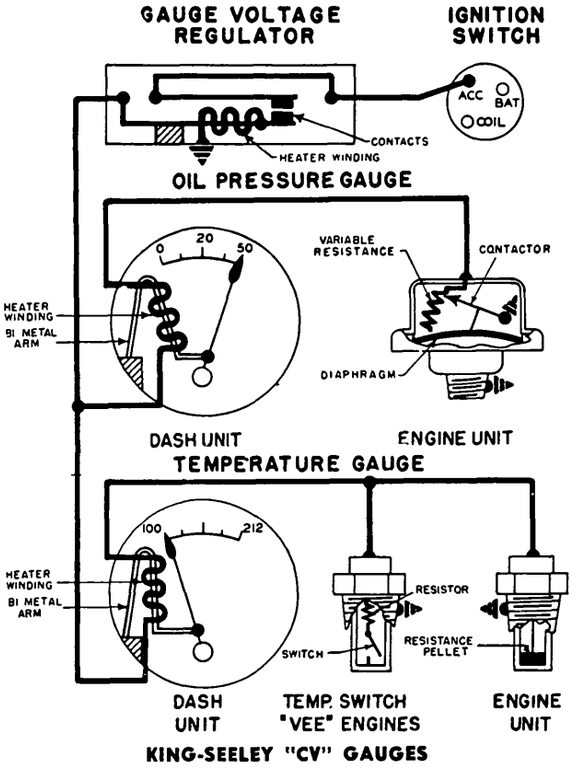
DESCRIPTION & OPERATION: King-Seeley "CV" or constant-voltage gauges differ from previous types in that "CV" engine gauge units (senders consist of variable resistances (rheostats) which regulate the current in the heating coil of the receivers (dash units) and control the deflection of the bi-metal arm linked to the gauge pointer. All dash units are of similar design. The feature of these gauges is the "Gauge Voltage Regulator" which regulates input voltage in the gauge circuits and insures accurate gauge readings regardless of the line voltage fluctuations.

Gauge Voltag Regulator: Consists of a vibrating unit (contacts controlled by bi-metal arm on which a heater winding is located) connected in the line between the ignition switch and the gauges. Regulator produces a pulsating voltage, at an effective constant amperage value, of 5.0 volts for all normal input voltage variations (between 5.6 and 8.0 volts). Input voltages lower than 5.0 volts will result in proportionately lower gauge readings while voltages greater than 8.0 volts will not affect gauge accuracy but will overload regulator contacts and may cause premature wear. Regulator is temperature compensated and is intended to be mounted near the gauge dash units and at approximately the same ambient temperature.

Gauge Indicators (Dash Units): All units are of similar design. Gauge pointer is linked to a bi-metal arm on which a heater coil is wound. This coil is connected in series with the tank or engine unit rheostat so that the gauge reading is in proportion to the current in the circuit (zero reading with maximum resistance and minimum current, high reading with minimum resistance and maximum current).

Oil Pressure Gauge Engine Unit—The rheostat contactor acts as a ground for the gauge circuit and is linked to a diaphragm which is deflected by the engine oil pressure so that it sweeps across the resistance as the diaphragm flexes with the engine oil pressure. When pressure is low, the entire resistance is in the gauge circuit and the current is at a minimum. When pressure rises, resistance is cut out of gauge circuit and the increase in current causes dash unit to read higher.

Temperature Gauge Engine Unit—New design (no moving parts). Gauge circuit is grounded through a small block of special sintered material which has a variable resistance in response to temperature changes. This block is sealed in the end of the engine unit bulb in close contact to the engine coolant. It has a comparatively high resistance when cold so that the current in the gauge circuit is at a minimum. This resistance decreases as the engine temperature increases and the consequent increase in current in the gauge circuit causes the dash unit to read higher.



KING-SEELEY "CV" GAUGES

►**Auxiliary Temperature Gauge Switch (for "V" Engines)**—The regular temperature gauge engine unit is mounted in one block of the engine, and the auxiliary switch is intended to be mounted in the other block as a warning of abnormal temperatures in this block. Switch is connected in parallel with the regular engine unit (see diagram) and consists of a switch (normally open) and resistance. At high temperatures, the switch closes and the resistance is shunted across the regular engine unit and causing the dash unit to read "hot."

TROUBLE SHOOTING: Units should not be removed from the car until testing has been done to determine which units are defective. See Testing (following).

All Gauges read Too High or Too Low—Voltage Regulator defective (see Regulator Test) or not properly grounded (regulator MUST be grounded). Battery voltage at regulator (or ignition switch) below 5.0 volts (check with voltmeter).

►***CAUTION—Gauge Voltage Regulator provides an intermittent voltage averaging 5.0 volts and regulator output voltage can not be tested with a voltmeter.***

One Gauge Reads Too High or Too Low—Test unit as directed below.

TESTING: Use a Fuel Level Gauge Tank Unit which is known to be OK. as a test unit. Connect one test lead to the terminal on the unit and a second test lead to the case to act as a ground wire (CAUTION —unit will not operate if not properly grounded). Make tests as follows:

Voltage Regulator: Requires use of an OK. dash unit also. Connect these test units together (dash unit and tank unit) in normal manner and ground tank unit, connect the other dash unit terminal to the output terminal of the voltage regulator. Check battery voltage (must be within operating limits). Hold tank unit float in Empty position, turn on ignition switch, note reading on test dash unit (should read at low end of scale). Start engine and run at faster than normal idle speed. Gauge reading should not change if voltage regulator functioning normally. Move tank unit to full position. Dash unit gauge should read at upper end of scale. If Voltage Regulator not operating correctly, replace original unit with correct type unit.

Gauge Units: Disconnect lead at engine (sender) unit on car and hook test unit in circuit at this point (CAUTION—make certain test unit is grounded.) Move test unit float to Empty position, turn on ignition switch, note dash unit reading (gauge pointer should be at lower end of scale—Empty, Zero, Cold, etc.). Move float to Full position, gauge pointer should then be at upper end of scale. If dash unit reads OK. in both positions, replace original tank or engine unit with correct type unit. If dash unit does not test OK., connect test unit directly to terminal on dash unit (eliminating the car wire). If dash unit then tests OK., check lead between dash unit and tank or engine unit for broken wire or shorted insulation and replace this wire. If dash unit still does not function correctly, replace original dash unit with correct type unit.

REPAIRING UNITS: Repair or calibration of units is not practical in the field and defective units should be replaced.

1960 CHRYSLER CORP. ELECTRIC TYPE

►CHANGES, CAUTIONS, CORRECTIONS

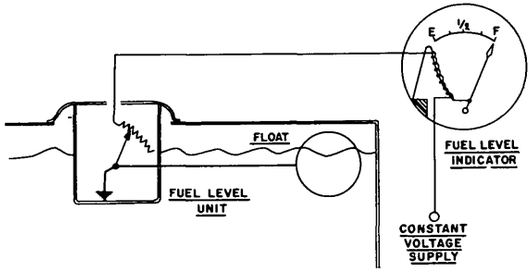
►*1960-61 CHRYSLER & IMPERIAL INACCURATE TEMPERATURE INDICATOR READING CORRECTION (AIR COND. CARS):* May be caused by temperature indicator sending unit grounding on air conditioning compressor. To correct, install special Air Conditioned Car Temperature Indicator Sending Unit, Part No. 2256302.

►*1960-61 CHRYSLER & IMPERIAL INACCURATE FUEL GAUGE READING CORRECTION:* If desh unit, tank unit, and wiring are in good condition, trouble may be caused by high resistance between fuel tank and car body. To correct, install Fuel Tank Grounding Clip, Part No. 2258412, over rubber hose connector of fuel supply line at tank gauge unit. This clip installed in production on 1961 models.

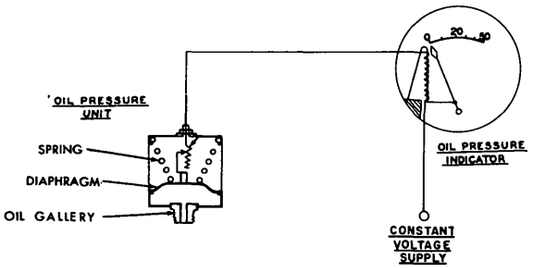
►*1960 CHRYSLER GAUGE VOLTAGE REGULATOR PRODUCTION CHANGE & OIL PRESSURE GAUGE INSTALLATION CAUTION:* External type gauge voltage regulator mounted on speedometer case beginning Serial No. 03148732 with Prefixes 81, 82, 83, 84, 85, 87. New type oil pressure gauge without internal voltage regulator also used. In case of oil pressure gauge failure on later cars, early type gauge, Part No. 2258138, may be installed if short auxiliary wiring to external voltage regulator is removed and instrument panel wiring connected directly to oil pressure gauge.

►*1960 DE SOTO FUEL GAUGE RADIO CONDENSER CAUTION:* A .5 mfd. condenser is installed on fuel gauge on radio equipped cars to suppress rapid clicking noise in radio caused by gauge voltage regulator in fuel gauge. When installing condenser, ground negative side of condenser to fuel gauge and install positive lead at ignition terminal of gauge with a pal nut to allow gauge wiring connection to be installed properly.

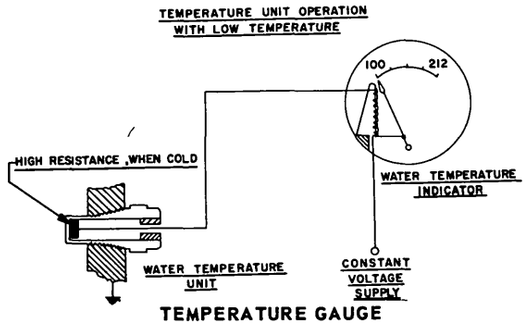
DESCRIPTION: Thermal type, constant voltage units operated by variable resistance type sending units which are sensitive to fuel level, engine temperature, and engine oil pressure. Constant voltage is supplied by a Constant Voltage Regulator built into one of the dash units (except some Chrysler cars – see "Production Change" above) and connected in series to each gauge which provides the same regulator voltage to each gauge regardless of line voltage fluctuations. *See individual Car Model pages for gauge application, part numbers, and to determine which gauge has the internal voltage regulator.* The gauge with the internal constant voltage regulator also may be identified by three terminals marked "A" (output voltage from regulator), "I" (input voltage to regulator), and "S" (connection to gauge sending unit). Other gauges have only "A" and "S" terminals. *NOTE – On Chrysler and Imperial cars with Panel sect Instrument lighting, there is an additional terminal on each gauge for lighting connection.*



GASOLINE GAUGE



OIL PRESSURE GAUGE



TEMPERATURE GAUGE

►*GAUGE TESTER NOTE:* A special Gauge Tester, Tool C-3826, is available for testing gauge dash and sending unit. Procedures for use of tester are detailed below.

►*TESTING CAUTION: DO NOT ground tank or engine sending unit or wire as dash unit will be damaged.*

ALL GAUGES: Trouble – High (against peg), no, or inaccurate reading after ignition switch turned on.

Cause – Defective constant voltage regulator, or open circuit on input side of regulator. Replace dash unit in which regulator is located or correct open circuit in wiring connections.

Testing – Check voltage output at "A" terminal of regulator. Voltage should fluctuate between 0 and 7.0 volts. A steady voltage reading of 12 volts indicates faulty regulator.

FUEL GAUGE: Trouble 1 – Higher or lower fuel level reading than actually exists.

Cause – Defective tank or dash unit. Replace as necessary.

Testing – Connect Tester C-3826 to disconnected tank unit wire and to ground at car body; or connect a known good tank unit to disconnected tank unit wire and to ground at car body. Move tester knob to "L" or tank unit to empty and turn on ignition. Dash gauge unit reading should be "E" to -1/32". With tester knob at "H" or tank unit moved to full, gauge reading should be "F" to +1/32". *NOTE – With tester knob at "M", gauge reading should be Half-way ±1/16".* If dash unit readings are correct, replace tank unit. If dash unit readings are incorrect, replace dash unit.

Trouble 2: Fuel gauge erratic operation.

Cause – Loose or dirty connections, or faulty tank unit.

Testing – Clean and tighten all connections. Test sending unit (see Trouble 1 above). Make sure tank unit is grounded to tank and tank is grounded to frame. *See "Inaccurate Fuel Gauge Reading Correction" above for installation of grounding clip.*

TEMPERATURE GAUGE: Trouble 1 – Higher or lower temperature reading than actual engine temperature.

Cause – Defective dash or engine units.

Testing – Connect Tester C-3826 to disconnected sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and ground. Turn on ignition switch and move tester knob to "L" or tank unit to empty. Dash gauge should read "C" ± 1/8". Move tester knob to "H" or tank unit to full. Dash unit should read "H" ± 1/8". *NOTE – With tester knob at "M", dash unit should read Half-way ±1/8".* If dash unit reads correctly, replace engine unit. If dash unit reads incorrectly, replace dash unit.

OIL PRESSURE GAUGE: Trouble – No or low oil pressure reading.

Cause – Faulty dash or sending unit or engine oiling system.

Testing – Make sure engine oil is at proper level and that engine oiling system is functioning properly *(see Car Model pages for correct oil pressure).* Connect Tester C-3826 to disconnected oil pressure engine sending unit wire and to ground on engine; or connect a known good fuel tank sending unit to disconnected wire and to ground. Move tester knob to "L" or tank unit to empty. Dash gauge unit should show no pressure. Move tester knob to "H" or tank unit to full. Dash unit should show high pressure. If dash unit operates correctly, replace engine unit. If dash unit not correct replace dash unit.

AUTO-LITE WINDSHIELD WIPER "DOUBLE-END" MOTOR

Car Model	Windshield Wiper No.
Chrysler 1954 (C63, C64)	EMG–4102
Chrysler 1954 (C66)	EMK–4101
DeSoto 1954 (S19, S20)	EMG–4102
Dodge 1954 (Special Equip.)	EMG–4102A
Plymouth 1954 (P25 Special Equip.)	EMG–4102B

►***FAILURE TO PARK CORRECTION ("EMG" TYPE WIPERS):*** This condition is noticeable when load on wiper is decreased due to wet windshield and worn blades. Motor will coast past park position and continue to operate until ignition switch turned off. To correct, install a new cam, part of Kit STA-87, and adjust the gap to the maximum limit of .030" by bending the contact base plate (do not bend contact arm) Change both brush springs to Part No. EWF-18 to increase tension on armature. Install new wiper blades and wiper arm springs.

DESCRIPTION: Wiper assembly consists of a two speed shunt wound motor mounted between two gear assemblies, each driving a crank arm.

REMOVAL: Disconnect wires from switch. Disconnect linkage at each motor crank arm. Remove screws attaching wiper mounting bracket to body and remove wiper assembly.

►***CAUTION—Do not move wiper blades across windshield manually. Damage to gear assemblies will result.***

DISASSEMBLY: Remove parking switch and gear case cover, gear retaining nuts, lockwashers, keys and plates. Then remove right and left hand worm follower gears by pressing the crank arm shafts out of heads. The long bolts through motor should be removed, thus allowing heads and armature to be disassembled, after unsoldering field coil lead wires.

INSPECTION: Inspect motor parts for wear or damage. Clean commutators with double or triple "O" sandpaper, or if necessary, turn down and undercut commutator. Undercut should be not deeper than 1/16". Use a very thin hack saw blade. Worn or oil soaked brushes must be replaced. Check the play of armature and crank arm shafts in their bushings and replace worn parts, if any looseness can be found. Replace any worn or damaged gears.

REASSEMBLY: Assemble motor frame, armature and heads, making sure field leads have been resoldered properly. Check armature end play, adjust by installing thrust washers inside head until desired clearance of .005-.010" is obtained. Rap motor frame sharply with a rubber hammer to align bushings, then check to see that armature turns freely. Slide washer over crank arm shaft and then apply a thin film of grease to shaft and install through head. Turn arms so that both point exactly toward the other, then place spring washer and thrust washer over shaft and install gears in position. The holes in the gears must be lined up with flats on shaft (NOTE —Have prick punch mark up, when gears are so marked). Fill gear housing ½ full with a light high temperature non-fibre grease. Install plates, gear case cover and parking switch. (CAUTION—When installing plate (with ramp), the ramp must be directly under plunger in the parking switch.

INSTALLATION: Reverse the Removal instructions given above

PARKING ADJUSTMENT (Except EWJ Type): Adjust by moving arm extending from under parking switch cover. Operate wiper and note parking position when wiper is turned off. Obtain proper parking position by adjusting arm. *(CAUTION*—plate mounting rivet should be tight enough so that plate will not slip and will still allow movement of the adjusting arm.) Make certain that all parts are correctly assembled (see Reassembly above). Adjust switch so that cranks point outward on a line parallel to the motor centerline with tolerances as indicated in table below. Have motor cold and test with loads on each crank arm as indicated in table below.

Motor No.	Parking Adjustment Tolerances℄ Before	After	Crank Arm Load
EMG–4102, A, B	11°	6°	3¾ lbs.
EMK–4101	11°	6°	3¾ lbs.

℄ – Before or after point on line parallel to motor centerline.

PARKING SWITCH: Make sure both contact arms are in good condition and either straight or bent slightly toward each other, and that the spring washers have not been flattened or damaged. Nut on switch should be turned down until push rod just opens the contacts when it is on the high point of the cam. Check to make sure assembly is tight, then turn cam to close contacts. Adjust tension on contact arms to 1.5 to 3 ozs., by hooking scale to contact point and taking the reading just as points open. Adjust by bending contact arm, keeping points aligned.

LUBRICATION: At overhaul, add 10 drops of medium oil to the felts at armature shaft bearings. Drain off excess oil. At assembly, grease crank arm shafts and fill gear chambers ¾ full with ST-294A gear grease. Lubricate pivots with ST-294A grease at yearly intervals.

SPECIFICATIONS: Wiper Motor

Field Current Draw: (EWJ) 2.4-2.9 amperes at 6.0 volts, (EME, EMG) 2.3-2.5 amperes at 6.0 volts, (EMF, EMK) 1.1-1.3 amperes at 12.0 volts.

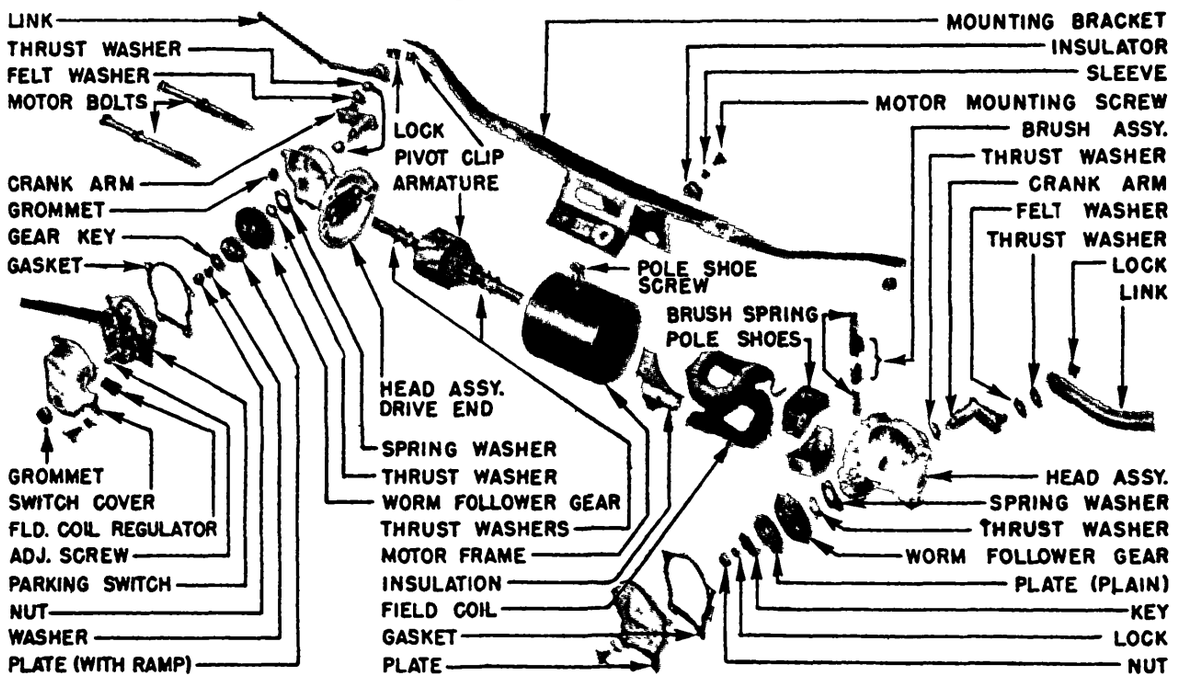
No Load Draw:	Low Speed Amperes	Volts	Approx. RPM
EMG	4.4–4.8	6.0	46
EMK	1.9–2.3	12.0	44
	High Speed℄		
EMG	3.7–4.0	6.0	74
EMK	1.6–2.0	12.0	70

℄ – With resistors in field circuit as follows: 2.8 ohms (EMG), 12.5 ohms (EMK).

Endplay: .005-.010". Use EWJ-81, 81A or 81B thrustwashers as required to obtain this endplay. Place on drive end of armature shaft.

Parking Switch

Contact Pressure: 3-5 ounces.



AUTO-LITE "DOUBLE END" MOTOR WINDSHIELD WIPER

1954 AUTO-LITE WINDSHIELD WIPER "SINGLE-END" MOTOR

Car Model	Windshield Wiper No.
Dodge 1954 (D50, D51)	EMD–4003A
Dodge 1954 (D52, D53)	EMD–4003
Plymouth 1954 (P25 Early)	EMD–4003B
Plymouth 1954 (P25 Late)	EMU–4001

►*DODGE & PLYMOUTH NOTE—See "Auto-Lite Windshield Wipers (Double End Motors)" and "Redmond Windshield Wipers" for other applications.*

►CHANGES & CORRECTIONS

►*"EMU" TYPE WIPER PARKING ADJUSTMENT NOTE: Parking Switch is different than used on other type wipers. See "1955 Single End Windshield Wiper Motors."*

►*WINDSHIELD WIPER NOISE & VIBRATION:* If installation of improved drive parts (above) does not correct this condition, remove and discard rubber grommets, metal ferrules, and attaching nuts and washers from mounting brackets *(CAUTION—*ferrules must be removed from motor mounting studs*)*. Install three new rubber grommets **without** ferrules (Part No. 1540181) in bracket mounting holes, install motor and bracket assembly on mounting studs, assemble new sleeve nuts (Part No. 1527832) and plain washers (Part No. 632258) on studs, tighten nuts securely *(CAUTION—*Do not overtighten these nuts).

DESCRIPTION: Wiper assembly consists of single speed motor mounted on a single gear assembly which drives both wiper arms through a double crank. Parking switch is mounted on gear assembly housing and is operated by plunger and gear plate with ramp.

REMOVAL: Disconnect wires from switch and disconnect wiper link assembly by removing nut from motor crank arm (see illustration) and pulling out link crank arm. Remove screws holding mounting brackets to body and remove wiper assembly.

►*CAUTION—Damage to wiper assembly will result if wiper blades and arms are moved manually.*

DISASSEMBLY: Remove parking switch cover and take out parking switch assembly (part of mounting bracket) and lift out parking switch plunger. Remove nut from gear shaft and then take out lockwasher, gear plate (with ramp) and worm follower gear (see illustration). Carefully press motor crank arm and gear shaft out through front of gear housing. *(CAUTION—Use care when handling the worm follower gears, these are easily damaged).* Remove the long bolts through motor and take off both head assemblies (after unsoldering field coil leads).

INSPECTION: Inspect motor parts for wear or damage. Clean commutators with double or triple "O" sandpaper, or if necessary, turn down and undercut commutator. Undercut should not be deeper than 1/16". Use a very fine hack saw blade. Worn or oil soaked brushes must be replaced. Check play of armature and crank arm shafts in their bushings and replace worn parts. Replace any worn or damaged gears.

REASSEMBLY: Assemble motor frame, armature and heads, making sure field coil leads have been resoldered properly. Check armature endplay, if not .005-.032" (EWR), .005-.030" (EMU) .005-.015" (EMD with spring washer—installed between two bakelite washers—not compressed), adjust by installing correct thickness washer .023", 1/64", 1/32" thick, on armature shaft just inside drive end bearing. Rap the motor frame sharply with a rubber hammer to align bushings, then check to see that armature turns freely. Slide washer over crank arm shaft then apply a thin coating of grease to shaft and install through head. Place spring washer and thrust washer over shaft and install gears in position. The holes in the gear must be lined up with flats on shaft (NOTE—Have prick punch mark up, when gears are so marked). Fill gear housing ½ full with a light high temperature non-fibre grease. Install plate (with ramp), then turn armature shaft until motor crank arm is pointing AWAY FROM MOTOR (ramp on gear plate should be directly under plunger position). Install gear key, lockwasher and nut. Install gasket, then insert plunger in switch assembly and install assembly on housing (make sure plunger is directly over ramp on plate). Install switch cover.

INSTALLATION: Reverse the Removal instructions given above. *See "Windshield Wiper Noise & Vibration" correction under Changes, Cautions, Corrections above.*

BLADE ADJUSTMENT: Wiper blades can be adjusted for position by removing the nut on the pivot shaft and moving the blade arm on the serrated pivot. Minor adjustment can be made by moving the parking switch lever on the motor assembly up which will cause the blades to park closer to the lower windshield moulding. *See Parking Adjustment.*

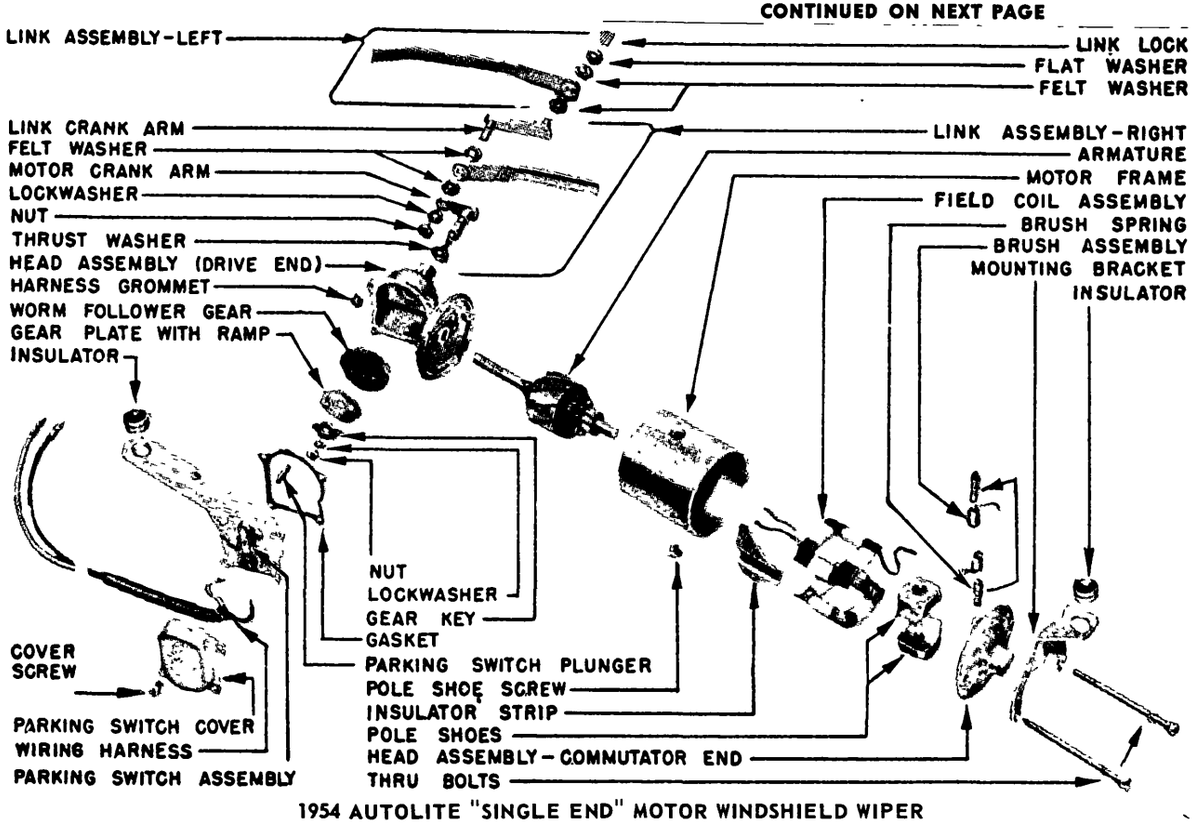
PARKING ADJUSTMENT: *Required whenever position of drive gear and contact switch contact plate disturbed.* Parking switch contact mounting plate can be turned to make adjustments *(CAUTION—*plate mounting rivet should be tight enough so that plate will not slip and will still allow movement of the lever at the side of the gear chamber). Make certain that all parts correctly installed (see Reassembly above), adjust switch so that crank angle and parking angle are correct as follows:

Model	Crank Angle①	②Parking Angle
EMD-4003, 4003B		10° ± 7.5°
EMD-4003A		5° ± 7.5°
EMU-4001		5° ± 5°

①—Angle between crank arms and pivot.

②—Angle between crank arm and centerline of motor. Variation is plus or minus 7.5°.

CONTINUED ON NEXT PAGE



1954 AUTOLITE "SINGLE END" MOTOR WINDSHIELD WIPER

1954 AUTO-LITE "SINGLE END" (C nt.)

LUBRICATION: Lubricate when overhauling and assembling unit. Put 10 drops medium engine oil on felts at armature bearings, drain off excess. Grease crank arm shaft and fill gear chamber ¾ full with light high-temperature non-fibrous grease (ST-294A). Lubricate pivots yearly with this ST-294A grease.

SPECIFICATIONS: **Wiper Motor**

No-Load Current Draw—(EWR) 3.5-5.0 amperes at 7.0 volts, (EWY) 4.0-5.5 amperes at 7.0 volts, (EMD) 5.7-6.1 amperes, (EMU) 5.8-6.3 at 6.0 volts (Cold—70°F).

Field Coil Draw—(EWR) 2.2-2.4 amperes, (EWY) 1.6-1.8 amperes, (EMD) 2.2-2.5 amperes (EMU) 3.2-3.5 amperes. All at 6.0 volts (Cold—70°F).

Parking Switch

Contact Pressure (EWR, EWY) 2-4 ozs., (EMD) 3-5 ozs.

Contact Pressure—(EMU) 16-24 ozs. when pressed to ½" from switch plate.

Plunger Clearance—(EMD) .010-.020", (EWY-EWR) .020-.030" between contact spring arm and end of plunger with plunger in "down" position. Adjust by bending contact mounting bracket.

1955-56 AUTO-LITE WINDSHIELD WIPER "SINGLE END" MOTOR

	Auto-Lite Wiper Motor No.
CHRYSLER	
1955 C67, C68, C69	EMZ-4001
1955 C70	EPF-4001
1956 All Models	EPF-4001
DESOTO	
1955 All Models	EMZ-4001
1956 All Models	EPF-4001
DODGE	
1955 D56, D55-1 Standard	EMU-4101
1955 D56, D55-1 Special	EMZ-4001
1955 D55-2, D55-3	EMZ-4001
1956 D62, 63-1 Standard	EPH-4101A
1956 Others	EPF-4001A
PLYMOUTH	
1955 All Models Standard	EMU-4101
1955 All Models Special	EMZ-4001
1956 All Models Standard	EPH-4101
1956 All Models Special	EPF-4001
STUDEBAKER	
1955 All Models	EBP-4001
1956 All Models	EPS-4001

DESCRIPTION: Wiper assembly consists of motor mounted on single gear assembly which drives both wiper arms through double crank arms. Parking switch is mounted on gear assembly housing and can be adjusted for properly parking the wiper blades. Constant and variable speed motors use same wiper blades, arm assemblies, and pivots. On Convertibles and Sport Coupes, arms (All Models) and pivots (Plymouth only) differ from other models. Reversible variable speed motor has "Off Glass Parking". When switch is turned "OFF", motor reverses direction and parking cams, at pivot pins of intermediate crank arm, rotate 180°, lengthening linkage slightly to park blades against moulding. Linkage shortens when motor runs in wiping direction.

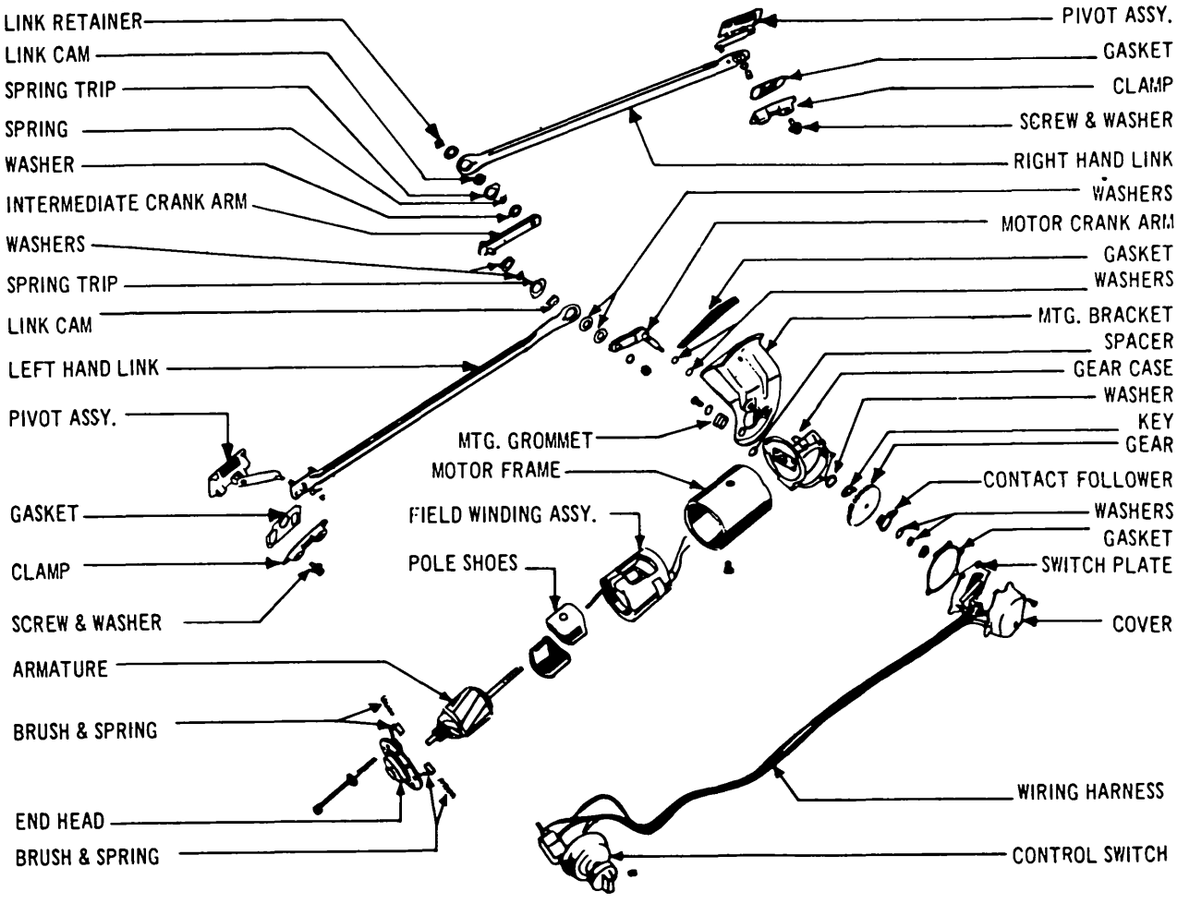
►*CAUTION: To avoid damage to wiper motor gears, DO NOT move wip r blades to clean windshield glass. Lift wiper blad arm outward and away from glass against pivot spring mechanism.*

REMOVAL: **Plym uth**—Remove radio if so equipped. Disconnect wiper links at pivots, remove motor bracket nuts, lower motor, and remove right side. Use care so as not to bend links.

►*WIPER MOTOR REMOVAL CAUTION: (EMZ-4001)*—Wiper should be operated and shut off by disconnecting it at the circuit breaker, or by turning off ignition key. Damage to motor switch and spring parking cam, upon removal of switch cover will result if cranks are in parked position.

Chrysler, DeSoto, Dodge—Disconnect the wiper leads, remove radio if so equipped, remove right hand fresh air door. Remove clips from pivot cranks, (by lifting top tab and sliding sideways). Remove brass spacing

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1955-56 AUTOLITE ELECTRIC WINDSHIELD WIPER

1955-56 AUTO-LITE "SINGLE END" (C nt.)

washer, slip end of link containing nylon ball bushing off pivot crankpin, and remove three windshield wiper bracket retaining nuts. Remove motor and bracket with links as an assembly. Remove thick rubber gasket.

Studebaker - Remove radio, then disconnect wiper motor wires from switch and circuit breaker. Swing cover to one side and remove main link nut and main link. Remove motor from cowl panel flange. Remove clip from main link pin, then remove right connecting link from pin. Remove wiper arms and unscrew driver retaining nuts on outside of cowl and remove spacers. Slip transmissions down through cowl panel and remove drivers and transmissions from car. *NOTE - Left connecting link cannot be removed from main link.*

DISASSEMBLY (Chrysler, DeSoto, Dodge, Plymouth): Wiper Links (Constant Speed)—Remove clip that holds left link to crank pin, bevel washers and link. Right hand link removed in same manner. **(Variable Speed)**—Remove clip that holds left hand link to crank pin, remove bevel washers, link, cam and spring release. Note stop on pivot end of link. Spread ends of coil spring and remove from around pin, remove spring washer. Right hand link removed in same manner.

Variable Speed Wiper Switch—Remove switch cover plate. Note position of cam spring and remove it. Never attempt to disassemble switch while wiper is in parked position. *See "Wiper Motor Removal Caution (EMZ-4001)" above.*

Motor—Disassembly of the motor is accomplished in the same manner as other wipers of the single gear box type. *See "1954 Autolite Windshield Wiper Single End Motor".*

Studebaker: Remove motor through bolts and slip endplate off. The armature may be removed by pulling straight out. Unsolder brush leads and remove brushes and springs. Unscrew retaining screws on parking switch cover and unsolder wires from parking switch. Remove gear retaining nut and take out gear and output shaft.

REASSEMBLY (Chrysler, DeSoto, Dodge, Plymouth): Motor – *See "1954 Autolite Windshield Wiper Single End Motor".*

Variable Speed Wiper Switch—Be sure gear box contains lubricant. Install parking switch cam spring so that it will engage with the nylon drive gear and the top end of spring points in same direction as the crank arm. Install switch plate and cover.

Wiper Links—(Constant Speed). Reverse removal procedure. **(Variable Speed).** Install spring washer, concave surface towards the crank arm. Compress ends of crank pivot coil spring to expand it, then install pivot and spring release. *NOTE*—Springs and spring releases are both interchangeable. Install parking cam so that it will index with spring release and engage ends of spring between the spring release and parking cam in openings at the point of index. *(See Parking Cam Installation Caution below).* Install spring washer, convex surface towards cam assembly, link arm with stop projection on link arms towards the cam assembly. Install retaining bolt and nut. Reassemble the left link and cam assembly in the same manner, locking in place with a clip in place of bolt and nut.

▶*PARKING CAM INSTALLATION CAUTION:* Parking cam is interchangeable, but face of cam marked "L" must be away from the link when installed on left link, or face marked "R" must be away from link when installed on right link. When assembling to the left link, both the "L" on the left crank and on the parking cam should be seen. The same is true of the right link and the letter "R".

Studebaker: Reverse removal procedure. Apply lubriplate to gears.

REINSTALLATION: Work the links up behind the dash panel and attach to pivot crank pins. Install brass spacing washer. Install lock clips on pivot crank pins and make sure wiper bracket to dash panel rubber gasket is in place, then install wiper motor and bracket assembly. *NOTE*—Do not over-tighten retaining nuts excessively compressing rubber gasket as it will permit transmission of wiper noise. Reinstall fresh air door and adjust. Adjust parking position (see below), reconnect wiper motor wires to wiper control switch.

PARKING ADJUSTMENT: Adjust parking cam at the motor switch plate so that blades park as low as possible. Then loosen the blade arms at the pivots. Position the blades against the windshield moulding on variable speed motors and tighten attaching nuts. Position blades on constant speed motors one inch from windshield moulding.

BOSCH ELECTRIC TYPE

Studebaker, All Models (1959–60).Ⓒ

Ⓒ - Vacuum (Link & Crank Arm) and Auto-Lite Electric types also used.

DESCRIPTION: Two speed electric type motor which drives wiper transmissions through conventional link and crank arm assemblies.

ADJUSTMENTS: Wiper Arm Park Position - Operate wiper a few minutes to warm up. Turn hex head bolt on front of wiper drive to obtain desired park position.

Wiper Arm Tension - Attach a scale under wiper arm where connected to blade. Pull scale at right angle until wiper blade is just off glass. Reading should be 7½-8½ ozs. If under 7½ ozs., arm may be freed with oil at end of tension spring. If pressure does not increase, replace arm. If reading over 8½ ozs., arm may be bent to decrease pressure, otherwise replace arm.

TESTING: Blade wipes per minute should be 80-90 single sweeps (low speed), 132–135 single sweeps (high speed). If slow, check for fully charged battery, all electrical connections, proper arm tension. Disconnect main connecting link and check link and transmission assemblies for free operation. Operate motor without load. If motor slow, replace it.

REMOVAL & INSTALLATION: Motor & Link Assembly Removal - Remove radio. Disconnect wires from switch and circuit breaker. Move main link cover to one side and remove retaining nut. Link assembly can now be separated from motor. Remove motor retaining nuts and remove motor. Remove clip from main link pin and remove right connecting link. Remove transmissions through cowl panel.

Motor & Link Assembly Installation - Install motor and connect all wires. Install transmissions, making sure flanges of connecting links face rear of car and links are below transmissions. Start motor, then turn off. Motor will be in park position. Install main link so lugs fit on drive slots. End of left link must be to left of center of main link, and pin must be to right. Install main link retaining nut and right connecting link.

Dash Switch Removal - Remove knob and unscrew spanner nut. Pull switch out and disconnect wires. When installing, circuit breaker must be toward right side of car.

OVERHAUL: Motor Disassembly - Remove motor through bolts and end plate. Pull armature out. Unsolder brush leads and remove brushes and springs. Remove parking switch cover screws and unsolder switch leads. *CAUTION - Drive gear and shaft are pressed together. Do not separate.*

Motor Reassembly - Install armature, solder brush leads and install brushes, springs and end plate. Resolder parking switch leads and install switch and cover.

1957-60 AUTO-LITE ELECTRIC

CHRYSLER & IMPERIAL	Aut lit Wip r M t r N .
Chrysler 1957–58	EPV–4001A
Chrysler 1959–60	EPV–4001G
Imperial 1959	EPV–4001F
Imperial 1960	EPV–4001G
DE SOTO	
Firesweep 1957–58	EPW–4001
Others 1957–58	EPV–4001A
Firesweep 1959①	EPW–4001C
Others 1959	EPV–4001G
Single Speed 1960	EPW–4001C
Variable Speed 1960	EPV–4001G
DODGE & DART	
6 Cyl. & V8 1957	EPW–4001
6 Cyl. 1958	EPW–4001
V8 1958	EPW–4001A
Special Equip. 1957	EPV–4001B
Special Equip. 1958	EPV–4001A
Single Speed 1959①, 1960	EPW–4001C
Variable Speed 1959–60	EPV–4001G
PACKARD	
1958	EPS–4001A
PLYMOUTH	
Single Speed 1957–58	EPW–4001
Variable Speed 1957–58	EPV–4001A
Single Speed 1959①	EPW–4001B
Variable Speed 1959	EPV–4001D
Single Speed 1960	EPW–4001C
Variable Speed 1960	EPV–4001G
STUDEBAKER	
1957	EPS–4001
1958, 1959②③, 1960③	EPS–4001A
VALIANT	
Single Speed 1960	EPW–4002
Variable Speed 1960	ERQ–4001

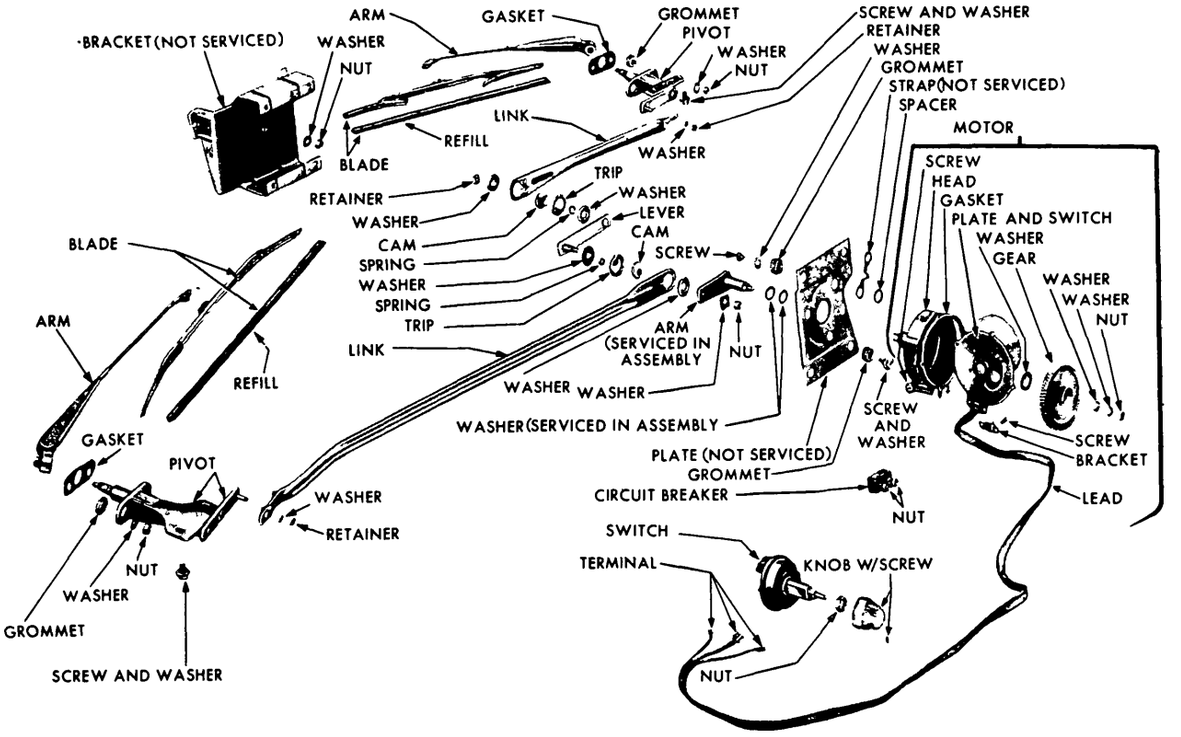
① – General Industries type also used.

② – Vacuum type also used on 6 Cyl. cars.

③ – Bosch electric type also used.

DESCRIPTION: Single and Variable types used, similar in design and operation to previous models. Both types use the same wiper blades, arm assembly and pivots. *NOTE* - Convertible and Sport Coupe blades, arms and pivots are different. Variable speed type has "Off Glass Parking" accomplished by reversing motor, and use of parking cams at pivot pins of intermediate crank arm.

►*WINDSHIELD CLEANING CAUTION:* Do not move wiper blades across glass to clean glass. Raise blades and arms outward and away from glass against pivot spring mechanism to save damage to wiper motor gears.



AUTO-LITE ELECTRIC WINDSHIELD WIPER ASSEMBLY

►*WIPER MOTOR REMOVAL CAUTION (Variable Speed Type):* Wiper should be operated and shut off by disconnecting it at circuit breaker, or by turning off ignition key. Damage to motor switch and spring parking cam, upon removal of switch cover, will result if cranks are in parked position.

REMOVAL: Chrysler, DeSoto, Dodge, Plymouth - Remove glove compartment door and glove compartment, then remove bolts attaching wiper motor bracket to the cowl-to-instrument panel brace. Disconnect wires at wiper motor and links at pivot cranks. *NOTE - Clips are removed by lifting top tab and sliding it sideways out of engagement with groove in pivot crank.* Remove spacer washer and remove link from pivot crank. Slide wiper motor with links far enough toward left so right hand link will clear glove compartment opening, then remove the assembly, being careful not to bend links.

Studebaker - Remove radio (if so equipped), then disconnect wiper motor wires from switch and circuit breaker. Swing cover (located on face of rotating disc) to one side and remove main drive link nut, then remove main link from drive shaft. Disconnect motor from cowl panel and cowl panel flange and remove motor. Remove clip from main link and remove right hand connecting link, then remove wiper arms. Remove driver retaining nuts on outside of cowl and remove spacers and gaskets. Slip drivers down through cowl and remove driver and connecting link assemblies.

NOTE - Left hand connecting link cannot be removed from main link. Driver and connecting links for each side are serviced as a unit. Do not attempt to disassemble driver.

Valiant - Disconnect battery cable and remove glove compartment door, and glove compartment. Pry speaker grille away from instrument panel and remove speaker to instrument panel screws and lower speaker for access to wiper motor bracket. Disconnect wiper motor wires, remove headlamp switch, and remove four screws attaching instrument cluster and pull top instrument cluster forward for clearance to wiper pivot on left side. Disconnect speedometer cable at speedometer and wiper motor wires at switch. Remove two wiper motor bracket-to-cowl panel bolts and one bolt at instrument panel-to-cowl brace. Disconnect links at pivot cranks (lift top tab of clip and slide it sideways). Remove spacing washer and link. Slide wiper with links to left so right link clears glove compartment opening and remove wiper bracket, wiper, and links as an assembly. DO NOT bend links.

Disassembly f Links (Exc. Studebak r): *CAUTION* - Wiper motor should be operated, then shut off by turning off ignition key. Motor must not be disassembled

CONTINUED ON NEXT PAGE

1957-60 AUTO-LITE ELECTRIC (C ntinu d)

when cranks are in parked position or damage to motor switch and contact follower will occur when cover is removed. *NOTE - When switch plate on variable speed motor is removed, position crank arm 180° from park position. This is done to disengage the spring follower from tang on switch plate.* Remove clip holding left hand link to crank arm and remove bevel washers and link. Remove parking cam and spring release then remove coil spring by spreading ends. Disassemble right hand link in same manner after removing crank arm to lever nut and the spacer washers located between link crank arm and lever.

Disassembly of Motor: (Constant Speed) - Remove switch plate and remove motor crank nut, washer and motor crank arm. Lift out nylon gear and remove end head through-bolts and carefully pull off end head. Remove armature.

(Variable Speed) - Remove end head through-bolts and pull out end head using care so as not to break the lead wire to the brush holder. Remove switch plate and the cover screws. Rotate armature in reverse so that the tang in switch plate will disengage the gear follower to permit removal of plate assembly. Remove crank arm nut, washers, crank arm, gear and armature in that order.

Reassembly: Motor - Make sure gear box is 1/2 full of long fibre grease. Correct indexing of contact plate (constant speed motor) or the contact follower (variable speed motor) on the nylon gear is important. After armature, nylon gear, and crank arm are installed, index the contact plate (constant speed motor) on the nylon gear with the slot pointing in same direction as the motor crank arm. Install the contact follower (variable speed motor) with open end pointing in same direction as motor crank arm. *NOTE* - To adjust armature endplay, bottom adjusting screw then back out 1/4 turn.

Wiper Links - Install spring washer, concave surface toward crank arm. Install crank pivot coil spring on pivot (springs are not interchangeable). Install spring release (releases are not interchangeable). Install parking cam to index with spring release and engage spring ends, between the release and parking cam in the openings at point of index. The face of cams marked "L" and "R" must be away from links when installed. When assembling the left link the "L" on left crank and on parking cam should be seen. The cam marked "R" is installed in the same manner. Install spring washer, convex surface toward cam assembly. Install link arm with stop projection on link arm toward cam assembly. Install the retaining bolt and nut. Assemble left link and cam assembly in same manner locking in place with a clip.

Wiper Pivot Replacement: Remove wiper blade. Disconnect link from pivot and remove pivot retaining plate pivot and gasket. Install new gasket and pivot with retaining plate. Install Bellville washer so convex surface is against head of bolt. Tighten retaining bolts to 75 in. lbs. torque and install wiper blade.

Installation: Attach links to pivot crank pins. Install spring washer and lock clips on crank pins. Install wiper motor and bracket assembly making sure rubber mounting gasket is in place. Tighten mounting bolts to 25 ft. lbs. Reinstall radio, glove box and door.

Adjustm nt: Adjust parking cam at motor switch plate so that blades park as low as possible, then loosen blade arms at pivots. Position blades against windshield moulding on variable speed motors and tighten pivot attaching nuts. Position blades of constant speed motors one inch from windshield moulding.

TROUBLE SHOOTING: Wip r Op rat s Sl wly - High resistance in brush to commutator contact, or carbon deposits in slots. Check armature commutator and brushes. High resistance in ground connection, or defective control switch.

Wiper Fails to Operate - Linkage binding, defective switch, motor, or open or grounded wiring.

Wiper Blades Not Parking Off Glass - Broken link spring, link spring not releasing, link spring not engaging stop on linkage, parking switch out of adjustment.

Blades Slap Windshield M lding - Improperly installed link spring trip. Parking cam in line 180° out of place. Leads at switch reversed.

Blades Chatter - Twisted arm or wrong type blades used.

Motor Will Not Park - Follower pin in parking switch plate is bent too low and is not breaking contact. Contact spring leaf on parking switch plate is distorted causing excessive tension and not breaking contact. Dirty or worn contact points.

CHEVROLET & PONTIAC ELECTRIC

1955-57 Chevrolet Pass. Cars & Trucks
1955-60 Chevrolet Corvette
1956-58 Pontiac

DESCRIPTION & OPERATION: Wiper assembly consists of a single electric motor, auxiliary drive and two transmissions (Electric motor interchangeable with Vacuum type). Transmission incorporates spring loaded pulleys for wiper adjustment. Motor auxiliary drive incorporates two drums to which cables are attached. Wiper motor and auxiliary drive assembly are mounted on engine side of dash and can be removed individually or as a single assembly. Motor controlled by knob on dash panel. Turn knob clockwise for "Low" or "High" speed positions, and counter-clockwise to park wipers.

►*CAUTION: Do not move wiper blades by hand through normal path of operation as damage to mechanism will result.*

►*1956 DESIGN CHANGES:* On 1956 models, a wire spring and pawl replaces coil spring used to load drive assembly disc on 1955 models. 1956 drive assembly does not include ear used on 1955 models. Instead spring loaded pawl projects from periphery of disc. Switch assembly mounting screw sizes have been changed from No. 6-32 x ½" to No. 8-32 x 3/8", thereby limiting the amount of switch adjustment possible.

►*1957 CHEVROLET WIPER PRODUCTION CHANGE:* Cars produced after Dec. 1st. 1956, have "Slow-Park" type wipers. A new type drive gear returns blade to park position slowly. Motor and switch assembly are identical to previous type with the exception that the early Series 1957 wiper switch has five contacts (No. 5 contact not used) and later series have only four contacts. When servicing the switch, there are only two wires to unsolder and they should be installed as follows: Hold switch in its installed position, with switch mounting bracket downward and away from you. The **black** lead should be soldered to upper left switch connection and **red** lead to lower right connection.

ADJUSTMENT: Three adjustments are required as follows:

Switch Adjustment: Remove switch housing cover. Move latch assembly switch arm against fiber cam until switch contacts snap to low speed position. Further lateral movement of latch switch arm should separate contacts Nos. 1 and 2 and hold contacts Nos. 3 and 4 closed, thus forming high speed circuit. If latch assembly switch arm travel is insufficient to perform above functions, move contacts into their low and high speed positions, loosen two switch mounting screws and shift switch assembly as required. When unit is stopped, breaker arm should contact fiber cam and move it sufficiently to snap switch contacts into their parked position. If motor does not stop when dash control is turned to "OFF" position, switch assembly mounting screws should be loosened again and switch shifted toward breaker arm. (*NOTE* - On later models using No. 8-32 x 3/8" switch mounting screws, amount switch assembly can be moved is very limited. If necessary, breaker arm may be bent toward fiber cam). Minimum clearance between arm and cam guide should be 1/32".

Armature Endplay Adjustment: Connect a DC ammeter in the circuit, start wiper, and note ampere draw. Tighten armature endplay adjusting screw located in end of cast motor housing until a rise in current draw is noted, then back off adjusting screw slowly until ampere draw returns to initial reading. Back off screw an additional 1/8 turn as a safety factor. To lock adjustment, either restake or tighten jam nut.

Drive Assembly Endplay Adjustm nt: Use endplay washers beneath snap ring on drive assembly shaft.

TROUBLE SHOOTING: *CAUTION - Disconnect unit from source of power before removing switch cover.*

Unit Will N t Turn On: No voltage at wiper unit; unit improperly grounded; defective soldering at switch terminals; defective motor; contacts 3 & 4 not making contact

CONTINUED ON NEXT PAGE

CHEVROLET & PONTIAC ELECTRIC (C ntinu d)

when unit turned on, or contacts dirty, circuit breaker contacts dirty, or defective circuit breaker.

Unit Will Not Shut Off: Failure of oscillating arm to trip contacts 3 & 4, poor fit between oscillating arm and oscillating shaft slot allowing excessive circular play of oscillating switch arm, jumper between contacts 2 & 4 shorted to ground.

Sl w Sp d Operation in Both Slow & Fast Positions: Switch breaker arm which is operated by external switch slide not opening contacts 1 & 2, short between switch cover and switch assembly, switch fiber cam not seated properly in slot and failing to open contacts 1 & 2.

Normal Fast Operation in Both Slow & Fast Speed Positions: Speed control contacts 1 & 2 not making contact at low speed position (resistor is in circuit in both slow and fast positions of switch).

Exc ssive Spe d in High Speed Positions, Slow Speed Satisfact ry: Switch assembly resistor open.

Excessive Speed in Both Low & High Speed Positions: Defective soldering of black shunt field lead to switch assembly, open shunt field.

REMOVAL & INSTALLATION: **Motor** - Loosen screw securing Bowden wire to motor and remove cable. Disconnect feed wire from under dash panel. Remove mounting screws. *NOTE* - Ground wire is mounted under one of auxiliary drive mounting screws. To install, reverse removal procedure.

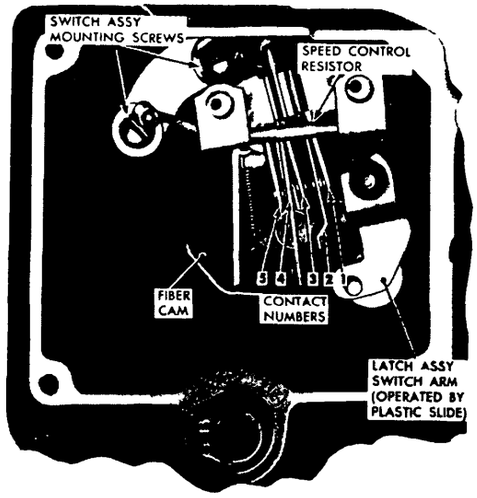
► *INSTALLATION CAUTION:* Shims between motor unit and dash panel hold drive unit in proper alignment. Incorrect number of shims, or no shims at all, cause bind in drive resulting in sluggish operation or complete stoppage. Note number of shims before removing motor.

Auxiliary Drive & Transmission Removal: See *"Vacuum Windshield Wipers (Cable Operated)"*.

OVERHAUL: Proceed as follows

Switch: Rem val & Disassembly - Remove switch cover (*CAUTION* - Disconnect unit from source of power before removing switch cover). Remove switch assembly mounting screws and lift out switch to extent of slack in connecting wires. Complete removal of switch assembly by placing a hot soldering iron against three lead connections to switch. Code connection points to insure proper re-installation. Remove switch breaker arm from end of oscillating shaft by removing plastic retainer. *CAUTION* - Do not remove latch assembly switch arm.

Cl aning & Inspection - Check switch contacts for foreign material or deformation. Clean contacts with cloth dampened with carbon tetrachloride or remove small imperfections with emery paper. Replace switch, if contacts broken. Check for foreign matter bridging insulators at base of switch. Should any insulator be broken or oil soaked, replace by removing the two screws holding contacts and insulators and replacing insulators with like thicknesses of tag board or other non-conducting gasket material. Check to see that breaker arm fiber contact surface is in good condition.



CHEVROLET & PONTIAC ELECTRIC WINDSHIELD WIPER CONTROL

Reassembly & Installation - (*NOTE* - If work is to be done on oscillating and drive section, delay reassembly of switch components until that work is completed). To reinstall and reassemble, reverse removal procedure. Solder green wire to terminal closest to mounting bracket, red wire to center terminal, and black wire to terminal closest to resistor side of switch.

Oscillation & Drive Assembly· Removal & Disassembly - Perform all operations given under "Removal & Disassembly of Switch" except that it is not necessary to unsolder leads. Remove snap ring and any washers from drive assembly shaft. Remove screws and lockwashers securing oscillating and drive section cover (*CAUTION* - Check to see that latch assembly is not in park position). Carefully tap both the oscillating shaft on which breaker arm (previously removed) was attached and the drive assembly shaft out of housing from switch compartment side with soft drift. To separate oscillating mechanism from connecting rod, remove "E" type retaining ring from drive pin and lift out oscillating mechanism. To complete disassembly of oscillating and drive section, remove snap ring and separate remainder of parts. *NOTE* - Further disassembly of cover and linkage should not be attempted since these parts are furnished only as assemblies for service. Do not attempt to remove latch assembly toggle or arm. If necessary, latch spring can be replaced with toggle installed.

Cleaning & Inspection - Clean all parts except nylon gear with cleaning solvent and dry with air. Check all parts for deformations and repair or replace as necessary. Check nylon gear for worn or broken teeth. Clean cover and connecting rod linkage of all old lubricant and check for bent parts. Replace if defective.

Reassembly & Installation - Connect spring to drive disc as follows

1955 Models - Insert inner tang of coil spring into slot in hub of drive disc and force spring flush with disc. Wrap spring around hub approximately ½ turn and hook behind pin on disc.

1956 & Later Models - Position pawl on pin in drive disc, then place wire spring on pawl and catch hooked end under offset end of pawl. Straight leg of pin should then be forced against side of disc center nub. Install drive disc and spring on nylon gear. Place cam and drive pin and yoke on disc. Be sure drive pin is cradled in slot on yoke.

Install drive disc and spring on nylon gear. Place cam and drive pin and yoke on disc. Be sure drive pin is cradled in slot on yoke.

1955 Models - Insert cushion in yoke before assembling above parts.

To complete assembly of oscillation components, place endplay washers and retaining washer on lug and secure with snap ring. Measure total endplay within unit with a feeler gauge and add or remove washers until total endplay is .008" or less. Lubricate between yoke, cam and drive pin, disc and at all pivot points on cover linkage with light oil. Then place a light grease coating on armature shaft, nylon gear teeth, and on linkage pivot points previously oiled. DO NOT GREASE TOGGLE OR ARM. Insert drive pin through connecting rod and secure with "E" type retainer. Check to see that toggle is **not** in parked position, then insert oscillating shaft and gear shaft through bores in housing. Tap as required to fully seat shafts. Secure cover with screws and lockwashers. Install breaker arm in slot of oscillating shaft and secure with plastic retainer. Re-install switch components as described under "Switch Reassembly & Installation". Place endplay washers as required on end of gear shaft until total endplay is approximately .010", then complete installation by installing snap ring.

Motor· (*NOTE* - For Removal & Installation see above).

Disassembly - Remove two tie bolts securing case to housing. Remove endplay adjusting screw and locknut.

1958-59 CHEVROLET (EXCEPT CORVETTE) ELECTRIC

Ch vr l t Pass Cars & Trucks (1958).
Chevrolet Trucks (1959).

DESCRIPTION & OPERATION: Wiper consists of a 2-speed reversible motor and a switch relay mounted in a single casting. Motor is rotary type and reverses rotation to park wiper blades. Motor driving mechanism rotates 360° during operating and the drive is of link and arm type.

►*"CLUNK" NOISE AT END OF BLADE TRAVEL CORRECTION:* May be caused by loose armature endplay adjusting screw, resulting in excessive backlash between armature worm gear and drive gear. To correct, remove intake grille assembly and right hand linkage (upper) rod from drive arm. Loosen adjusting screw locknut and tighten adjusting screw finger tight. Drive arm should move only slightly in either direction.

CHECKING & ADJUSTING (ON CAR): Dash Control - To operate wiper in high speed without dash control, disconnect polarized connector from relay and connect jumper wire from relay "A" terminal to ground. To operate in low speed, ground both "A" and "B" terminals of relay. If wiper operates, dash control is defective.

Linkage - No adjustment is possible. Check to see that linkage is connected properly and there is no binding.

Body Wiring - Check for proper voltage at relay "C" terminal. Check grounding claw on wiper housing for solid contact. Check polarized connector for proper connection.

MOTOR: Removal - Remove wiper blade and arm assemblies. With Wiper Transmission Tool J-5449, remove spacer spanner nut, spacer, and gasket from transmission assembly. Remove cowl vent grille. Remove clip retaining transmission link arms to wiper motor driving mechanism. Unplug connector from relay. Remove screws holding motor to dash panel and remove motor with drive mechanism as an assembly.

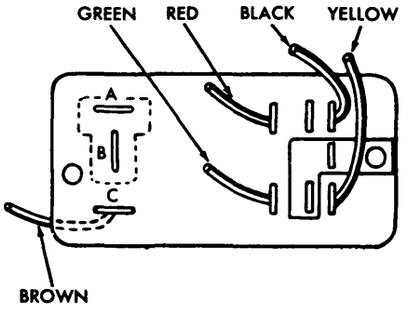
Testing - Motor may be tested on the bench in the ordinary manner with growler and ohmeter. *NOTE - When operating motor on bench with no load, it will continue to recycle and will not shut off. A slight hand pressure at knurled fitting on which blade arms attach, or at motor drive arm will overcome recycling condition at no load.*

RELAY: Checking - 1) Inspect all external wire connections, then remove screws and lift relay from housing. Check all internal connections. Make sure plunger does not bind in housing. Check for dirt or corrosion on contacts.

2) Connect a power supply to yellow lead terminal and a jumper wire from "A" terminal to ground. If relay armature does not pull in and relay contacts 1 and 3 do not close against contacts 7 and 8, relay is defective and should be replaced.

3) Disconnect power supply. Contacts 1, 2 and 3 should close against contacts 4, 5 and 6. If they do not, relay armature is binding or spring is faulty. Replace relay.

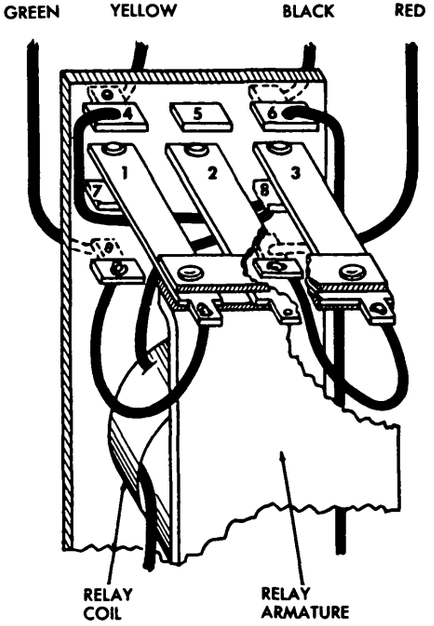
ARMATURE ENDPLAY ADJUSTMENT: Connect an ammeter in series with external feed wire at relay terminal "C". Loosen endplay screw locknut. Operate wiper by connecting feed wire to power supply and grounding "A" and "B" terminals (off car), by turning on wiper switch (on car). Tighten endplay adjusting screw until current starts to rise, then back off screw until current draw returns to normal (see below). Back off screw an additional 1/8 turn and tighten locknut.



RELAY CONNECTIONS (EXTERNAL)

Current Draw (Wet Windshield): 2.5-3.5 amps.
Gear & Shaft Endplay: .002-.006".

►*INSTALLATION NOTE:* When installing wiper blades with motor in "Park", blades should be ½" below glass. Install arms to wiper transmissions and lift blades into place on windshield.



RELAY CONNECTIONS (INTERNAL)

1960 G.M. ONE-SPEED ELECTRIC WINDSHIELD WIPER & WASHER

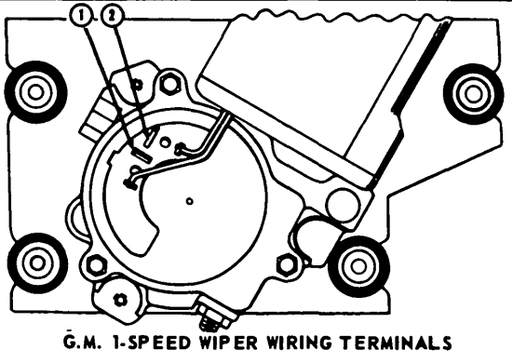
Buick (1960)
Chevrolet Pass. Cars (1960)
Chevrolet Trucks (1960)
Corvair (1960)
Oldsmobile (1960)
Pontiac (1960)
NOTE - 2-Speed type also used on some models

DESCRIPTION: Single speed rectangular shaped shunt type 12-volt motor similar in design to previous models. Washer (optional) mounts on gear housing section of wiper and is driven by wiper motor.

ADJUSTMENTS, TROUBLE SHOOTING & OVERHAUL:
Washer – *See "1959-60 G.M. Two-Speed Electric Windshield Wiper & Washer" in this section.*

Wiper – *See "1959 G.M. One-Speed Electric Windshield Wiper" in this Section.*

Gearbox Disassembly & Reassembly - Remove crank arm retaining nut, crank arm, steel cap, retaining ring and endplay washers. Remove gear box cover or washer pump and pull gear and shaft out of gear box. Remove terminal board assembly and unsolder motor leads as required.



G.M. 1-SPEED WIPER WIRING TERMINALS

1959 G.M. ONE-SPEED ELECTRIC WINDSHIELD WIPER

Buick (1959).
Chevrolet Pass. Cars (1959).
Oldsmobile (1959).
Pontiac (1959).

►*NOTE: 2-Speed type also used.*

DESCRIPTION & OPERATION: Single speed shunt type electric motor attached to a gear box containing gear and shaft assembly and parking switch. Motor armature has a worm shaft which drives gear and shaft assembly. Crank arm drives wiper transmissions through two connecting link arms. An automatic reset circuit breaker mounted internally on motor brush plate protects motor. Unit operated by a dash switch and an internal parking switch. Parking switch is a set of holding contacts (connected across dash switch and controlled through wiper gear) which keep motor circuit closed when dash switch turned off until wiper blades reach predetermined park position.

ADJUSTMENTS: Armature Endplay Adjustment - Loosen endplay adjusting screw locknut and tighten adjusting screw finger tight. Back off ¼ turn and tighten locknut.

Gear Shaft Endplay Adjustment - Remove crank arm, seal cap and retaining ring and add or remove endplay washers on gear shaft to obtain .005" maximum endplay.

Repositioning Wiper Blades - Remove wiper arm and blade assemblies. Operate wiper motor for an instant, then shut off. Crank arm should be parallel with front of dash. If not, restart motor for an instant. Install blades approximately 1¼" above windshield reveal molding.

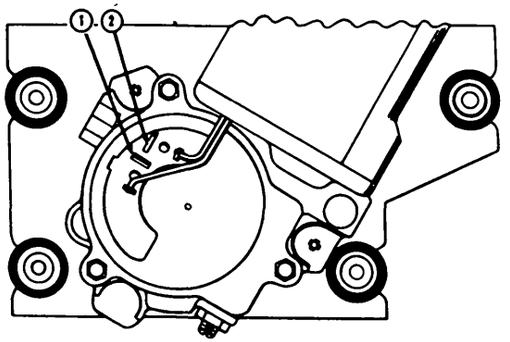
TROUBLE SHOOTING & DIAGNOSIS: Make the following checks in the order detailed below:

On Car Checks: 1) Connect a jumper wire from motor frame to ground. If wiper operates, unit ground claw connection is faulty.

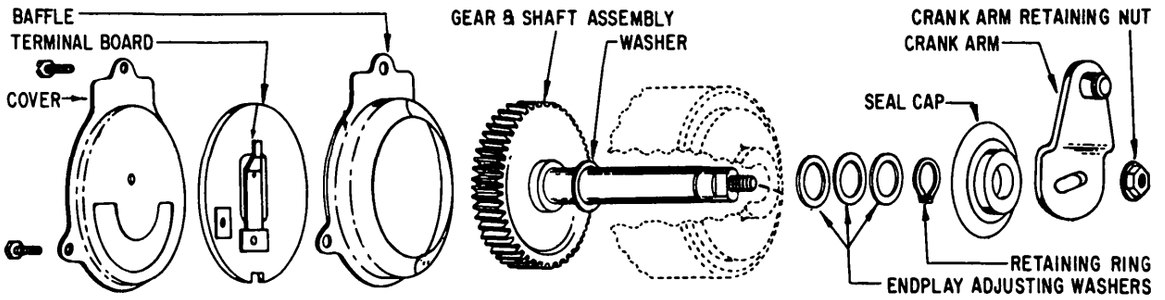
2) With ignition on, check voltage at feed wire No. 2 terminal on motor (terminal closest to edge of motor housing). No voltage indicates faulty wiring.

3) Connect power supply to No. 2 terminal and ground No. 1 (center) terminal. If wiper operates, dash switch is faulty.

4) Disconnect transmission link arms from crank arm. If wiper operates, transmissions or linkages are faulty. If wiper does not operate, proceed with "Off Car Checks" below.



G.M. 1-SPEED WIPER WIRING TERMINALS



G.M. 1-SPEED WIPER GEAR BOX ASSEMBLY (EXPLODED)

Off Car Checks: Wiper Inoperative - Loosen armature endplay adjusting screw and check operation. If wiper operates, adjust endplay (see above). If wiper does not operate, disassemble motor *(see "Overhaul" below)* and proceed as follows: Check circuit breaker contacts, all solder connections, and brushes for free operation. Check armature for open, grounded or shorted condition. Check field coil for open or grounded condition. Disassemble gear box *(see "Overhaul" below)* and check gear for broken or stripped teeth.

Wiper Blades Fail To Park - Caused by defective parking switch contacts. To inspect and clean, remove gear box cover, baffle, and terminal board.

Wiper Will Not Shut Off - Make sure motor lead connected to No. 1 terminal is not grounded on motor frame. Make sure parking switch contacts are not stuck together.

OVERHAUL: Motor Disassembly - Unsolder motor leads from terminal board and remove motor tie bolts. Remove end plate assembly and pull out armature (rubber thrust disc, thrust plate, felt washer and steel ball will also come out). Tap motor frame lightly to free from gear box. Lift brush plate and circuit breaker assembly away from frame and unsolder leads.

Motor Reassembly - Reverse disassembly procedure, installing all parts in same order as removed. Lubricate thrust ball and worm gear with a cam and ball bearing lubricant. When motor attached to gear box, make sure crank arm operates freely. If not, remove motor from gear box and realign.

Gear Box Disassembly & Reassembly - Remove crank arm retaining nut, crank arm, steel cap, retaining ring and endplay washers. Remove gear box cover, terminal board and baffle and slide gear and shaft assembly out of box. To reassemble, reverse disassembly procedure and make sure shaft endplay does not exceed .005".

1959 G.M. WINDSHIELD WASHER (ONE-SPEED WIPER TYPE)

Buick (1959).
Chevrolet Pass. Cars (1959).
Oldsmobile (1959).
Pontiac (1959).

►*NOTE: For washer used with 2-speed windshield wiper, see "G.M. 2-Speed Electric Windshield Wiper & Washer".*

DESCRIPTION & OPERATION: Used in conjunction with single speed windshield wiper. Unit consists of a permanent magnet type motor mounted on plastic washer bottle cover, a centrifugal pump located in a sealed reservoir, a pressure switch and washer bottle. When dash switch washer button is pushed, washer pump circuit is completed and wiper motor is turned on. Pump motor operates until all fluid is pumped out of pump reservoir and then it automatically shuts off, allowing reservoir to refill from bottle. Wiper unit must then be turned off manually.

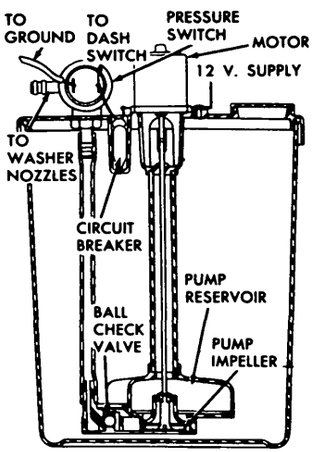
►*TESTING CAUTION:* When running washer off car for testing, there must be fluid in jar or unit will be damaged permanently. When washer installed on car, pressure switch and circuit breaker will protect unit.

TESTING: 1) Turn ignition on and check voltage at washer battery terminal (terminal closest to filler opening). No reading indicates faulty wiring. Check all wire connections at pump motor, circuit breaker and pressure switch.

2) Connect a jumper wire from switch terminal (terminal on pressure switch next to motor) to ground for 3-4 seconds. If washer does not operate, washer pump assembly is faulty. If washer completes cycle after jumper removed, dash switch is faulty. If washer stops immediately when jumper removed, pressure switch is faulty.

►*SERVICE NOTE: All further service of unit is by replacement.*

SPECIFICATIONS: Operating Voltage - 12 volts.
Pump Pressure - 7-9 lbs. at 12 volts.



WINDSHIELD WASHER (1-SPD. WIPER)

G.M. TWO-SPEED ELECTRIC WINDSHIELD WIPER & WASHER

Buick, All Series (1959–60).
Cadillac, All Series (1959–60).
Chevrolet Pass. Cars (1959–60).
Oldsmobile, All Series (1959–60).
Pontiac, All Series (1959–60).

►*NOTE: Single speed type used on some cars.*

►CHANGES, CAUTIONS, CORRECTIONS

►*1959 BUICK WINDSHIELD WASHER SQUIRTING ON SHARP TURNS CORRECTION:* Install Correction Kit, Part No. 1388734 (4 plastic reducers and two .060" I.D. hoses). Instructions furnished in kit.

►*1959 CADILLAC ELECTRIC SHOCK & WIPER SHUT-OFF CORRECTION:* On cars before Engine No. 003000, if electric shock occurs when operating wiper control or if wipers shut off when turning switch to "high" position, wiper switch is improperly grounded. To correct, remove wiper switch and disassemble bakelite switch from case escutcheon. Enlarge mounting holes in switch to 3/16" and scrape paint from counterbores in escutcheon mounting screw-instrument panel holes. Reassemble switch using two 6-32 x 5/8" recess head screws to hold bakelite switch to escutcheon.

►*1959 CADILLAC WINDSHIELD WASHER DELAYED DISCHARGE & LOSS OF WATER ON SHARP TURN CORRECTION (Early Cars):* On cars before Engine No. 039346, install new windshield washer valve outlet assembly, Part No. 4906230, without removing windshield wiper motor as follows: Remove carburetor air cleaner and disconnect three hoses from valve assembly. Remove valve attaching screws with a ¼" drive ratchet, 2" extension and ¼" socket. Position new assembly so two small outlet tubes are toward engine and lip of rubber cup is in groove in assembly housing. Reassemble and check washer-wiper operation.

►*1959 CADILLAC WASHER SPRAY HEIGHT VARIANCE CORRECTION (Coupes & 4-Window Sedans):* If windshield lower reveal molding interferes with water spray, install spacer, Part No. 1473820, between windshield wiper transmission escutcheon and outside air intake grille. Spacer installed on coupes and 4-window sedans effective Engine No. 075500.

►*1959 CADILLAC ELDORADO BROUGHAM WINDSHIELD WIPER PARTS INTERCHANGEABILITY CAUTION:* Two types wiper motor-to-transmission links (adjustable and non-adjustable) used in production. When replacing links, use same type as removed from car.

►*1959 PONTIAC WIPER TRANSMISSION NOISE CORRECTION:* Caused by too much endplay in idle shaft or reversing link shaft. To correct, install Service Package, Part No. 4906066, which contains shims and retaining rings for endplay adjustment.

►*1959 PONTIAC WINDSHIELD WASHER SQUIRTING ON SHARP TURNS CORRECTION:* Install new valve outlet assembly, Part No. 4906230. *See "Cadillac Delayed Discharge & Water Loss Correction" above for installation procedures and cautions.*

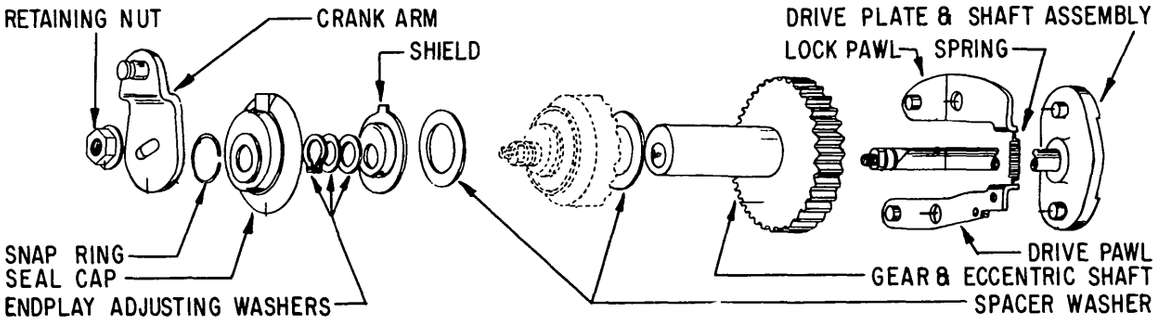
DESCRIPTION: Consists of a two-speed compound motor and a gear box section containing gear mechanism and relay control which operate wiper transmissions, with conventional link and crank arm assemblies for wiper arm operation. Different types used as follows: **Cam-O-Matic (Buick, Cadillac, Oldsmobil) -** Similar to previous design with a cam on each wiper transmission which applies constant pressure to wiper arm and allows it to cover a larger area. The motor used is ½" longer than standard 2-speed motor. The windshield washer pump is mounted as part of motor assembly and is driven by it.

Two-Speed "Overlap" (Pontiac) - Wiper blades are offset and overlap in park position because of a double drive pin in wiper transmission and longer arms and blades. Motor is like Cam-O-Matic motor. Washer pump (when used) is intregal part of motor assembly..

Two-Speed Type (Chevrolet, Oldsmobile, Pontiac) - Conventional type operation. Motor is ½" shorter than Cam-O-Matic motor. Washer pump (when used) is intregal part of motor assembly.

►*OLDSMOBILE IDENTIFICATION NOTE:* Two-speed motor has daub of white paint on motor case; Cam-O-Matic has daub of red paint.

OPERATION: Windshield wipers operate in conventional manner. When wiper operates normally, washer pump is held in idling position by a relay mechanism in washer assembly housing. When washer button on instrument panel is pushed, relay circuit is closed, actuating pump which starts to pump water. At same time, wiper dash control switch is automatically turned to "Lo" position. *NOTE - If wiper turned on before button pushed, wiper will continue to operate at speed originally selected.* Washer pump continues through one complete cycle (mechanically controlled), pumping a pre-determined amount of water on to windshield. At end of cycle pump shuts off automatically. Wipers must then be turned off manually.



G.M. 2-SPEED WIPER GEAR BOX ASSEMBLY (EXPLODED)

TROUBLE SHOOTING & DIAGNOSIS

Wiper Inoperative: No power supply at motor or ground strap loose or disconnected. Dash switch faulty. Wiper latching mechanism binding. Relay control or motor faulty

Wiper Will Not Shut Off: Wiper latching mechanism binding or relay control switch faulty.

Excessive Speed In "Hi", But Normal In "Lo": Loose connection between motor black field lead and wiper terminal board. Resistor on terminal board open. Motor shunt field open.

Op rates in "L " Only: Dash switch faulty. Black lead between dash switch and wiper terminal board grounded. Motor black lead internally grounded.

Op rat s in "Hi" Only: Dash switch faulty. Black lead between dash switch and motor open.

Operates At Low Speed With Switch In "Hi": Resistor on terminal board faulty.

Transmission Noisy: Excessive endplay in idle shaft and/or reversing link.

CHECKING & ADJUSTMENT

ON CAR: Make the following checks and adjustments:

Wiper Linkage: Remove necessary body parts to gain access to crank arms and transmission link rods. Disconnect link arms from crank arm and operate transmission manually to locate binding or defective transmission.

Crank Arm Installation - Slotted hole in crank arm must engage rectangular shoulder on transmission shaft. To check, look through left vent opening in cowl! Nut holding crank arm must be from flush to one thread below end of transmission shaft. *NOTE -* Arm must be installed with motor in park position (link end of arm toward left side of car).

Body Wiring: Make sure wiring properly connected to wiper unit and dash switch. Motor ground strap must be connected securely under motor cover screw and to body. Turn on ignition and check voltage at No. 2 (center) terminal of terminal board. Check washer voltage at No. 4 (brown lead) terminal which connects to washer pump.

Wiper Dash Switch: Make sure switch is mounted securely. Operate wiper independently of switch by connecting a power supply (12 volts) to No. 2 (center) terminal and a jumper wire from No. 1 (furthest from drive end) terminal. Wiper should operate in "Hi". Check "Lo" operation by connecting an additional jumper wire from No. 3 terminal to ground.

Washer Dash Switch: Operate wiper independently of switch at "Lo" speed (see above) and connect a power supply (12 volts) to either washer pump terminal. Connect a jumper wire from other terminal to ground. If pump operates, washer button switch or line is faulty. If pump does not operate, pump is faulty.

Wiper Motor Armature Endplay Adjustm nt: Loosen adjusting screw locknut and tighten adjusting screw finger tight. Back off setscrew ¼ turn and tighten locknut.

Drive Gear Assembly Endplay Adjustm nt: Add or remove endplay spacer washer located between seal cap and eccentric shaft (on drive shaft) to obtain endplay of .006" (exc. Pontiac), .005" (Pontiac).

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G.M. TWO-SPEED ELECTRIC WINDSHIELD WIPER & WASHER (C ntinued)

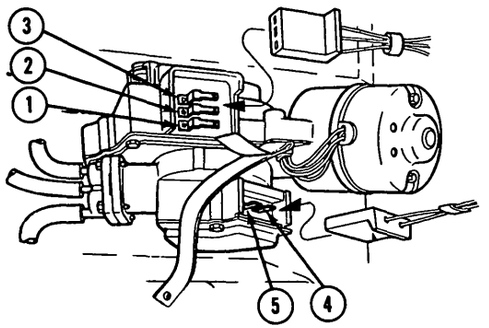
OFF CAR: Make the following checks and adjustments

Relay C ntr l Latch Mechanism: Remove gear box cover or washer pump assembly to gain access Disconnect yellow lead from relay control switch and manually operate relay armature to check that latch arm and attaching parts operate freely

R lay C ntrol Ass mbly: 1) Connect a power supply to wiper as follows Positive lead to No 2 (center) terminal, negative lead to housing No voltage at switch terminal indicates open lead circuit breaker or broken brown or green lead

2) Leave power supply connected and connect a jumper wire from No 1 (upper) terminal to housing If relay armature fails to pull in, relay coil is open or weak Also recheck for binding in latch mechanism

3) Leave power supply connected and check voltage at switch terminal where yellow lead attaches If relay pulls in but there is no voltage reading, switch is faulty Now disconnect jumper wire between No 1 terminal and housing and make sure relay armature moves away from coil pole *NOTE - If gear mechanism is in full park position, disconnect coil spring betwe n gear assembly drive and lock pawls so pressur of drive pawl switch actuator against switch tab is released* Relay switch is faulty if there is no voltage at switch terminal (yellow lead)



G M. 2-SPEED WIPER WIRING TERMINALS

4) With power supply still attached as in **3)** above, manually push switch stop tab toward relay coil If voltage reading still obtained, switch is faulty

Motor Ch cks: Disassemble motor *(see OVERHAUL below)* but leave field assembly in housing Proceed as follows

Armature - Check armature with a growler for open or shorted condition Check between armature lamina and commutator with 250 volts A C for 1 second If there is high arcing when test prod removed from lamina, armature is grounded

Cas & Brush Ass mbly - Inspect for worn brushes, brushes not binding, defective brush springs, loose solder joints, faulty circuit breaker contacts

Fi ld Ass mbly - 1) Disconnect yellow lead from relay control switch and connect ohmmeter between yellow lead and internal field lead brush holder No reading indicates open series field Connect ohmmeter between yellow lead and black motor lead No reading shows open shunt field

2) With yellow lead still disconnected from relay control switch, be sure steel case and brass ground strap are not touching housing, and check between yellow lead and field lamina for 1 second with 250 volts A C If high arcing occurs when prod removed from field lamina, field is grounded

Operational Checks· Reassemble motor *(see OVERHAUL below)* and connect ground strap to housing

"Lo" Speed - Connect power supply to No 2 terminal and ground housing Connect jumper wires from No 1 and No 3 terminals to ground

"Hi" Speed - Disconnect jumper wire from No 3 **Stop** - Disconnect jumper wire from No 1 terminal

REMOVAL & INSTALLATION

Wiper Transmission Removal: Remove wiper blade and arm assemblies, shaft and escutcheon retaining nuts and escutcheon from transmission shaft Remove air intake grille Remove retainer clip from wiper motor shaft and lift off links Remove transmission retaining screws and remove transmission by sliding toward opposite side of car Install by reversing procedure

Wiper Motor Assembly Removal· Remove wiper arm and blade assemblies, escutcheon assemblies and ventilator grille Pull hoses from washer pump Lift transmission drive links from motor drive shaft Disconnect all wires from motor and pump Remove attaching screws and remove motor To install, reverse removal procedure

Washer Pump: Removal - Remove wiper unit and remove screws holding pump and cover assembly to gear box and remove pump

Installation - Make sure slot in pump cam arm fits over pin on wiper drive plate Install and tighten attaching screws

►*WASHER PUMP OVERHAUL CAUTION* Pump assemblies **are not** to be disassembled, but are serviced as an assembly only However, inlet and outlet valve cover assembly can be replaced

OVERHAUL

Motor Disassembly: 1) Remove motor tie bolts and armature endplay adjusting screw Tap steel case lightly to loosen it from die cast housing and motor field Insert a tool through armature adjusting screw hole and push against end of armature shaft to back off case This holds commutator between brushes until armature is separated from case Make a wire spring and insert behind brush leads to hold brushes away from commutator Remove armature from case and install Brush Retainer J-7890 (Part No 5096576) to hold brushes Remove felt washer, thrust plate and rubber thrust disc

2) Remove field coil assembly if necessary with Special Puller J-7844 as follows Cut black and yellow leads extending through case in a convenient place Cut internal field leads about 2" from brush holder Make a reference mark on side of housing and field for reassembly Install puller in motor housing so puller flanges straddle sides of coil and base plate is flat side up in case Remove coil by turning puller screw clockwise

Mot r R ass mbly· 1) Install new field coil assembly (if removed) as follows Splice new field leads to those cut at disassembly Make a reference mark on new coil in same place as mark on old coil Align coil and housing and push coil in until it bottoms on ridge

2) Assemble in case rubber thrust disc, thrust plate and felt washer in same order as removed Be sure steel ball is in commutator end of armature shaft (retain with high melting point grease) and install armature shaft in case Remove Brush Retainer, Tool J-7890 Hold armature in case and start armature worm shaft through field and housing bearing until it starts to mesh with worm gear (armature may be rotated slightly)

3) Rotate case to align case holes with housing holes Push case on to field until it stops (do not pinch any wire leads) Install motor tie bolts Install armature endplay adjusting screw finger tight, back off ¼ turn and tighten locknut

Gear Box: Relay Control & Latch Mechanism Disassembly - Remove gear box cover or washer pump assembly from gear box Disconnect coil spring, remove "E" ring and lift latch and follower assembly off pivot pin and relay armature Remove stop assembly retaining screw so stop assembly can be removed for clearance Remove relay control assembly from gear box and unsolder leads

Relay Control & Latch Mechanism Reassembly - Solder green and yellow leads to control switch and relay coil lead to wiper terminal board

Drive Gear Mechanism Disassembly - Remove crank arm retaining nut, crank arm and rubber seal Remove retaining ring, endplay washers, shield and spacer washer Remove relay control and latching mechanism (see above) Remove gear mechanism from gear box and slide spacer washer off eccentric shaft Slide drive plate and shaft assembly out of gear assembly, remove lock and drive pawls and coil spring

Drive Gear Mechanism Reassembly - Assemble lock and drive pawls to shaft and drive plate assembly Assemble and install parts in gear and eccentric shaft *CAUTION - Hold gear and drive plate together as no retainer is used* Connect coil spring between lock and drive pawls Install spacer washer on eccentric shaft of gear and install gear mechanism in housing Install relay control and latching mechanism, spacer washer, shield, endplay washers, retaining ring, rubber seal, crank arm and retaining nut *NOTE - Crank arm must be installed so it 'points' to side of drive plate opposite to side on which coil spring is located* Shaft endplay should be 006" (Exc Pontiac), 005" (Pontiac)

Switch Control Assembly Replacement: Remove retaining screws and tilt control to disengage armature arm from latch mechanism Raise switch slightly and unsolder green and yellow wires Slide terminal board out and unsolder red wire Remove latch and follower spring and install new switch part way Solder yellow wire to terminal closest to motor and green wire to other terminal Thread red wire under latch mechanism and solder to top terminal of board Install latch and follower spring and switch attaching screws

Thermal Circuit Breaker Replacement: To replace circuit breaker, motor case assembly must be replaced

Terminal Board & Resistor Assembly Replacement: Unsolder black brown and red wires from terminals Replace unit and resolder black wire to terminal closest to resistor brown wire to center terminal, and red wire to top terminal

SPECIFICATIONS· Current Draw - 3 0-4 5 amps (bench test – no load) 3 5-5 0 amps (wet windshield)

Blade Wipes Per Minute - 35-45 ("Lo"), 70-85 ("Hi")

FORD MOTOR CO. ELECTRIC TYPE

C m t (1960).
Edsel (1958–60).
Falcon (1960).
Ford Pass. Cars (1959–60).
Ford Trucks (1959–60).
Lincoln & Continental (1960).
Mercury (1958–60).
Thunderbird (1960).

►*NOTE·* Vacuum type also used on 1958–59 models.

►CHANGES, CAUTIONS, CORRECTIONS

►*1958 EDSEL ELECTRIC WIRING NOTE·* If motor found wired directly to power source, reroute through accessory terminal of ignition switch.

►*1959 EDSEL & FORD CAR CONTROL CABLE BINDING CORRECTIONS* 1) If control knob has excessive "spring back" at full "on" position, adjust cable at motor

2) If knob binds or hard to operate, check washer control cable nylon sliding block at motor Block must slide freely in cable guide If not, loosen guide retaining nut and allow guide to align itself with sliding block

3) If fast speed not obtained with knob in full "on" position, bend control valve cable attaching tab toward retaining nut just enough to obtain fast speed

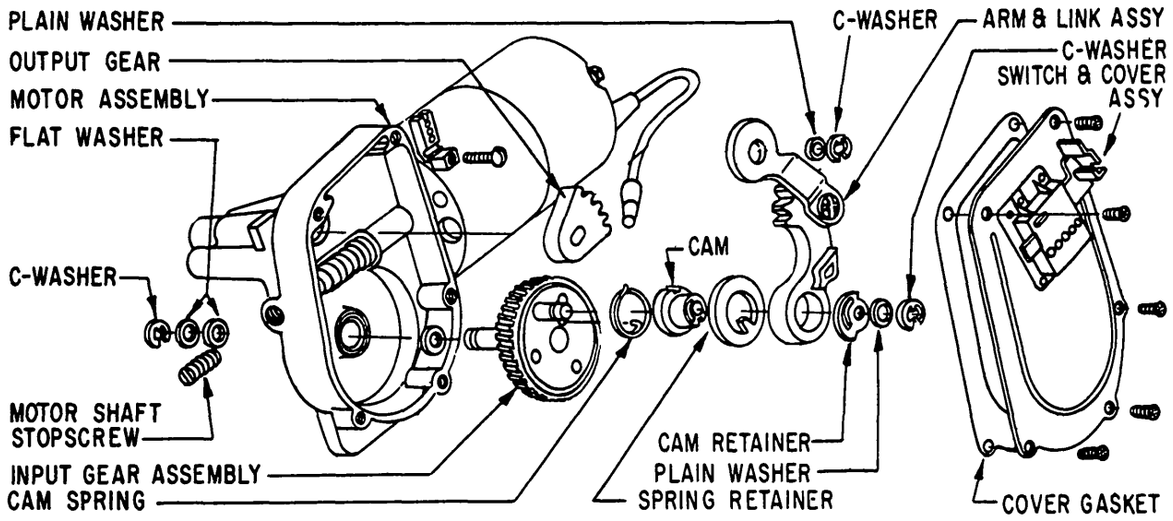
►*1958 MERCURY NO HIGH SPEED OPERATION CORRECTION* On early cars, remove shoulder in recess which holds cable. Place cable in recess of mounting pad with cable armor flush with end of pad and control in "OFF" position. Tighten cable.

►*1959 MERCURY "POSITIVE PARK" PRODUCTION CHANGE* New "positive park" motor assembly, Part No B9MY-17504-A, used in later production cars New motor has a new arm and link assembly, Part No B9MF-17A464-B, and output gear, Part No B9MF-17A556-A, to permit longer motor operation after dash switch turned off so blades do not coast into park position New gear and arm and link assembly must be used together, but are interchangeable with previous units

►*1960 EDSEL, FORD, FALCON, WIPER BLADE SIZE CAUTION:* A 15" wiper blade Part No. CODB-17528-C is used with all Falcon (Electric & Vacuum) wiper motors, and with Edsel and Ford Electric Wiper Motor only. A 13" wiper blade Part No. COAB-17528-C is used with an Edsel or Ford Vacuum Wiper Motor.

►*1960 NOISY ELECTRIC WINDSHIELD WIPER SYSTEM:* Caused by excessive armature endplay. To correct, remove motor with wires attached and install a lead from motor to ground Turn ignition switch to "ACC" position and turn wiper to high speed. Turn armature endplay adjusting screw clockwise until motor starts to slow down, indicating a bind, then turn screw counterclockwise approximately 1/8 turn *CAUTION* - DO NOT disconnect ground lead until wiper motor has been turned off.

►*1960 MERCURY WINDSHIELD WIPER AUXILIARY DRIVE BODY ASSEMBLY PRODUCTION CHANGE AND DRIVE BODY DRIVE COUPLING BREAKAGE CORRECTION:* New stronger Auxiliary Drive Body Assembly Part No COMB-17579-B used in late March production and should be used for replacement when auxiliary drive body drive coupling breakage is experienced.



FORD MOTOR CO. WINDSHIELD WIPER DRIVE GEAR ASSEMBLY (EXPLODED)

►*1960 EDSEL WINDSHIELD WIPER BLADE PRODUCTION CHANGE & CHATTER CORRECTION:* Late type wiper blades are graphite impregnated (No change in Part No.) and will produce a black smudge (for identification) when rubbed across a paper. Use late type blade to reduce wiper blade chatter.

►*1960 LINCOLN WIPER PATTERN NOTE:* When wipers do not clean center of blade area it is due to insufficient spring tension in wiper arm. To increase spring tension, remove arm and blade. Carefully raise cover plate and move spring to second hole of spring anchor DO NOT bend cover plate. *CAUTION* - When installing arm on pivot shafts (when arm has guide and cam) hold end of shaft from falling down into pivot housing and damaging cables.

►*1960 MERCURY ERRATIC WINDSHIELD WIPER OPERATION CORRECTION:* Caused by auxiliary drive tension lugs retracting under load. To correct, remove glove box, radio, and wiper arms, then increase cable tension by prying out on lugs on auxiliary drive and installing two screws 8-15 x 5/8"

DESCRIPTION: Electric and Vacuum motors used to drive either cables or links, through auxiliary drives. Cables or links operate arm and pivot mounted on cowl panel. Service data for each type follows

ADJUSTMENT

Motor Control Cable: Edsel (1958) – Control switch has only enough travel to operate motor switch from stop to stop and cable must be adjusted properly to obtain proper operation. Proceed as follows Loosen cable armor retaining screw at motor end of cable. Hold sliding switch in "OFF" position (end of switch nearest armor retaining screw). Move cable firmly until end washer contacts inside shoulder of switch actuating bracket. Hold cable and release sliding switch. If switch moves toward "ON" position, cable armor is too long. To shorten, remove (with a file) the cable stop shoulder cast in recess in bracket. Retest. Tighten cable armor retaining screw.

All Other Models – Loosen setscrew holding cable to motor and move motor switch plate to "off". Place cable housing against stop in motor mounting and tighten setscrew. Check for free operation.

Drive Cables: Lincoln & Thunderbird - Loosen wing or clamp nut on auxiliary drive. Adjust cable tension Tighten nut

Mercury - Release Auxiliary drive spring clip so lug tensioners are released Cables will be automatically tensioned. Lock clip and make sure prongs are engaged in lugs. *See "1960 Erratic Op ration Corr ction" above.*

Wiper Arm Park Position Adjustm nt· F rd Cars - Turn wiper on for a moment, then shut off With pivot shafts in park position, install blade and arm assemblies so blades are flat against lower edge of windshield

Ford Trucks - Operate wiper for a moment, then shut off Install wiper blades to arms so blades are parallel to bottom of windshield For fine adjustment, turn parking stud projecting through motor cover to left to advance blade park position, to right to retard blades

Mercury - Turn wiper on for a moment, then shut off so pivots are in park position Install arm and blade assemblies so blades are near bottom of windshield

TROUBLE SHOOTING & DIAGN SIS

Wipers Inoperative· Loose, shorted or open wiring, broken control cable, faulty motor Auxiliary drive or transmissions faulty

Wipers Erratic Or Inoperativ · Cables improperly installed, cables too slack, slipping, frayed or kinked

Wipers Stop Immediately Wh n Dash Switch Turned Off: Control cable improperly adjusted, coordinator binding, switch plate bent

One Wiper Inoperative One cable disconnected at auxiliary drive or slipping on transmission

One Wiper Makes Sh rt Sw p· Drive cables loose *Replace auxiliary drive*

Wip r Control Binding Or Hard T Op rate· Control cable improperly routed or adjusted Coordinator binding

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FORD MOTOR CO.
ELECTRIC TYPE (Continued)

Wipers Will Not Stop When Control Knob Turned Off: Switch slide not returning to off position, control cable kinked or binding.

REMOVAL & INSTALLATION

►*NOTE:* Electric & Vacuum motors removed and installed in similar manner.

Wiper Motor: Comet & Falcon - Disconnect negative battery cable at battery and loosen cable control retaining screws at motor. Disconnect washer control cable if so equipped. Remove motor to auxiliary drive mounting bolts and remove motor. To install, reverse removal procedure.

Edsel - Disconnect battery ground cable at battery, and remove radio and spot cooler. Disconnect windshield washer cable. Remove motor to dash panel screws and remove motor. To install, reverse removal procedure.

Ford Pass. Car - *NOTE - On SelectAire Conditioned Cars, remove glove box liner, radio speaker assembly, radio and right defroster nozzle to instrument panel brace.* Remove motor through radio speaker opening. To remove motor, disconnect links and remove two mounting bolts and lower motor. Disconnect wire at bullet connector. To install, reverse removal procedure.

Ford Truck - Detach connecting links then remove two motor mounting screws and remove motor. To install, reverse removal procedure.

Lincoln - Loosen setscrew securing control cable to slide valve on wiper motor. Remove cable from valve. Remove vacuum and washer hoses from motor and remove motor to auxiliary drive screws and remove motor. To install, reverse removal procedure.

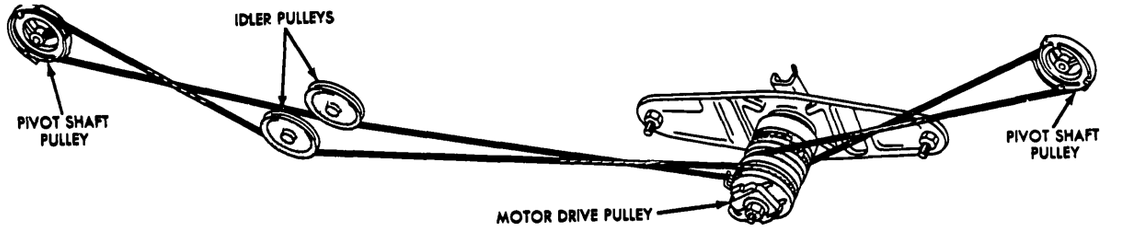
Mercury - Disconnect motor wires at "quick-disconnect". Remove motor to cowl mounting screws and remove motor from auxiliary drive. To install, reverse removal procedure.

Thunderbird - Remove glove box and right defroster air duct. Remove motor bracket to bracket mount nuts, disconnect pivot shaft cables. Disconnect vacuum hoses and control head cable and remove motor. *NOTE* - Before installing motor, compress tension arms to facilitate cable installation.

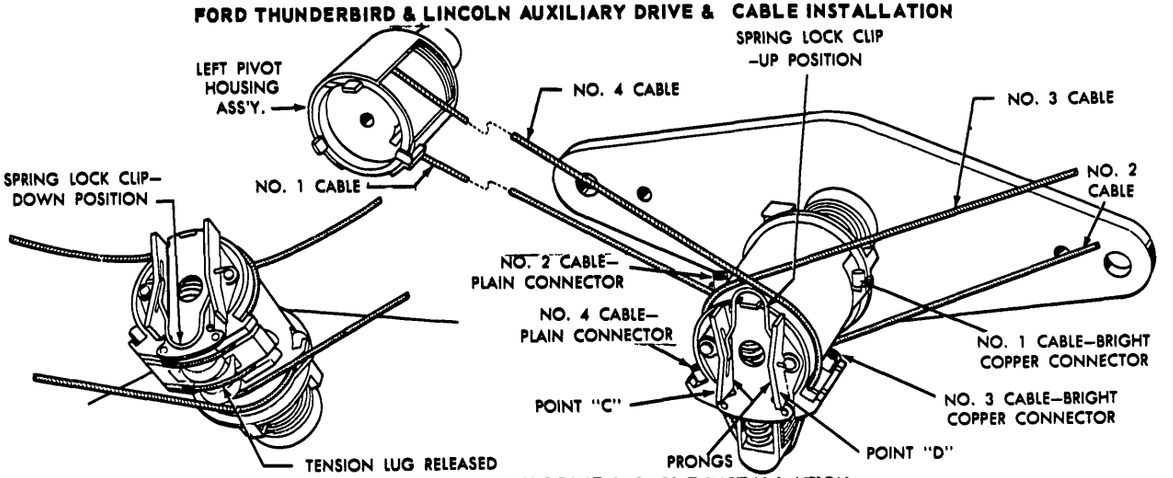
Auxiliary Drive: Edsel & Ford Pass. Cars - Disconnect battery ground cable and remove wiper motor from dash panel. Remove fresh air grille and screen. Remove wiper arm to auxiliary drive spring type retainers and remove auxiliary drive to dash panel screws and remove drive. To install, reverse removal procedure.

Lincoln - Remove wiper motor, instrument panel lower extension and remove glove box compartment and cover. Loosen nut on rear of auxiliary drive, press cables downward to compress spring loaded cable tensioners and retighten nut. Remove cables, making note of position of each cable for reinstallation. From engine side of dash, remove auxiliary drive mounting screws and remove drive. To install, reverse removal procedure.

Mercury - Disconnect battery and remove glove box and radio. Place spring clip on back of drive in down position. Push tension lugs up into auxiliary drive (to lock in released position) then lift cable ends from auxiliary drive. Remove windshield wiper motor and two screws securing auxiliary drive assembly to cowl panel and remove auxiliary drive and rubber gasket. To install, reverse removal procedure.



FORD THUNDERBIRD & LINCOLN AUXILIARY DRIVE & CABLE INSTALLATION



MERCURY AUXILIARY DRIVE & CABLE INSTALLATION

Pivot Shaft Assembly: Thunderbird - Remove wiper blade assembly, pivot shaft mounting nuts and slide pivot assembly out through mounting hole. Disconnect cables from motor drive pulley and remove assembly. *NOTE* - Remove speedometer to get at left pivot shaft assembly and remove it through speedometer mounting hole. To install, reverse removal procedure.

Edsel – Disconnect battery and remove wiper arm and blade assembly. Remove pivot retaining nut and retainers holding pivot to motor. Disconnect arm from motor and remove arm and pivot assembly from under instrument panel.

Ford Cars – Remove wiper arms and blades. Remove connecting links from drive arm. Remove pivot attaching nuts, spacers and washers. Remove pivot.

Lincoln - Remove wiper arm and blade. Remove retainer nut, seal and washer nozzle assembly from pivot shaft. Remove pivot to engine side of cowl retaining nut and remove instrument panel lower extensions. Remove glove compartment and glove compartment cover. Loosen nut on auxiliary drive, press down on cables to compress spring loaded cable tensioner and tighten nut. Remove cables from auxiliary drive, noting position of each cable for reinstallation. Remove wiper pivot to windshield lower reinforcement and remove pivot. To install, reverse removal procedure.

Mercury - Disconnect battery and remove glove box and radio. Put spring lock clip on auxiliary drive in down position. With long screwdriver, reach under instrument panel and push up tension lugs on auxiliary drive to lock them in released position and lift off cable. Remove wiper arms and blades. Remove windshield belt molding and retainers from cowl and remove cowl vent grille. Remove round nut from pivot housing and two pivot-to-cowl capscrews (9/32" - 12 point socket). Remove right pivot through glove box opening. On Auto. Trans.. cars, remove left pivot by reaching under instrument panel to left of steering column above panel brace. On Synchro-mesh cars, left pivot must be moved away from mounting hole and tipped downward to clear clutch pedal mounting bracket.

OVERHAUL

►*OVERHAUL NOTE:* Edsel & Ford Pass. Cars & Truck, Mercury drive mechanisms only are serviced. Motors are serviced by replacement.

►*TESTING CAUTION:* To avoid shorting of motor when testing, make sure wiper drive arm is attached to motor drive shaft with proper nut and lockwasher.

Gearbox Disassembly (Edsel, Ford, Mercury): Remove gear housing cover plate and gasket. *NOTE - It is not necessary to remove wires from switch when servicing gear housing.* Remove output shaft retainer and remove spacer washer. Remove crankpin shaft retainer and remove spacer washer and stop plate. Remove arm and gear segment assembly. Remove crankpin bearing cam and remove spring retainer and outer spacer shims and remove ring gear and inner spacer shims. Remove wiper arm lever nut and lock washer. Remove wiper arm lever and spacer, then remove output shaft and gear assembly. Tap output gear with fibre hammer to remove it from shaft. Worm drive and armature assembly is not serviced.

CONTINUED ON NEXT PAGE

FORD MOTOR CO. ELECTRIC TYPE (Continued)

Assembly - Apply petrolatum jelly to all moving parts during reassembly. Tighten motor removable end cover screws and turn armature shaft stop screw to obtain endplay of .005-.007". Reverse disassembly procedure, installing washer on input gear shaft and installing gear in housing so that crankpin is positioned along bottom of housing. Install a flat washer and "C" washer to secure gear to housing. Use feeler gauge to check input gear endplay and add flat washers as necessary to obtain endplay of .005-.010". Install output shaft arm so that rectangular hole is toward motor, and the output gear on output shaft with gear teeth facing motor. Gear must bottom on shaft. Install cam on input gear crankpin so the cam stop is facing the input gear pawl. Make sure gear teeth of arm and link assembly are properly meshed with input shaft. They are correct when upper tooth of arm and link gear is meshed with upper valley of output gear. Use feeler gauge between flat washer and link to check endplay (.005-.010"). Insert flat washer as necessary to correct. *NOTE* - Before attaching motor assembly to cowl, check operation of motor by connecting wiring quick disconnect in engine compartment to motor wiring, then turning on control switch and grounding motor. *CAUTION - Turn switch to "Off" position so motor will stop in "park" position.*

Ford Truck Fibre Gear Replacement - Remove drive arm fastening nut and lockwasher. Remove cover fastening screws and cover, then carefully remove gasket and position gasket and parking switch out of way. Tap lightly on threaded end of drive shaft with soft headed hammer to remove drive arm, then remove drive shaft assembly and cam. Remove cam from drive shaft assembly (save cam for reuse). Clean housing of old grease. *NOTE - DO NOT permit cleaning fluid to enter bearings or motor housing.* Place 1/3 ounce of lubricant into armature worm cavity and around worm. Apply lubriplate to drive shaft and fill space between bearings with lubriplate. *DO NOT place grease in area behind fibre gear.* Place cam on end of new drive shaft with dot on cam facing outward. Reverse disassembly procedure, holding drive arm in vise while tightening nut and with tab on switch plate halfway between the two stops (directly above worm). *CAUTION* - When replacing drive shaft only, DO NOT operate motor while arm is removed.

1954-60 VACUUM WINDSHIELD WIPER LINK & CRANK ARM

Checker (1960).
Chevrolet Pass. Cars (1958).
Chevrolet Trucks (1954-59).
Edsel (1958-59).
Ford Pass. Cars & Thunderbird (1954-59).
Ford Trucks (1954-59).
Hudson (1954-57).
Mercury (1954-56).
Nash (1954-57).
Rambler (1954-60).
Studebaker (1954-59).
Willys (1954-56).

►*NOTE: Electric type wipers used on some cars.*

►CHANGES, CAUTIONS, CORRECTIONS

►*FORD PASS. CAR WIPER ARM TENSION ADJUSTMENT:* If wiper arm tension insufficient to wipe clean, remove wiper arm and blade assembly. If wiper arm has two adjustment holes, pry coil spring cover out of arm and move spring to second hole in spring clip. Install cover, arm and blade.

►*1959 FORD TRUCK WIPER HOSE CHAFING CORRECTION:* If plastic air hose chafed by wiper linkage, reroute hose below linkage and instrument panel wiring and then through the dash panel opening 1½" to left of tachometer cable hole.

DESCRIPTION: Wiper consists of single motor unit connected to right and left hand wiper arm shafts by flat or round metal links. Motor control valve is either integral with motor or is a separate remote control depending on car application.

MOTOR REMOVAL: On all models, except those indicated below, the windshield wiper motor can be removed by disengaging links from motor and then disconnecting motor controls and vacuum line. Remove screws attaching motor to cowl or dash panel and remove motor. *NOTE - On some cars it may be necessary to remove radio, air ducts, or radio grille.*

Chevrolet Trucks — Disconnect vacuum line and remove retainers holding arms to motor. Remove attaching screws and lower motor. Remove control conduit clamp screw and remove control wire.

Edsel (1958) - Remove fresh air ducts, radio and speaker, and speaker grille. Detach control cable and vacuum line and remove motor.

Edsel (1959) — Remove retainers holding pivot arms to motor and disconnect arms from motor. Disconnect control cable, and washer control cable. Remove motor.

Ford (1958) - Remove cowl ventilator grille and weatherstrip assembly. Disconnect pivot shaft links from motor shaft arm, then remove motor mounting bolts and remove motor.

Rambler (1956-58, Except American) - Open heater control valve and drain about 2 quarts of coolant from radiator. Disconnect heater hoses and remove heater core. Remove rain baffle below motor. Disconnect control cable and vacuum hose. Remove motor attaching screws and remove motor.

Rambler (5901) - Unhook link from motor retainer and remove link. Remove screws holding motor to mounting bracket and remove vacuum hose. Remove control cable and remove motor.

Rambler (5910,20,80) - Remove heater hopper box cover, slide core out and lay on left side of car (unnecessary to disconnect hoses). Remove baffle below motor. Disconnect control cable, armor, and vacuum hose. Remove motor. When installing, be sure armor of control cable is butted against shoulder in recess of control cable mounting bracket.

Nash & Hudson (1955-57) - Remove wiper motor access hole cover, then remove wiper in usual manner.

Studebaker - Remove radio, wiper arms and disconnect vacuum hose at motor. Loosen valve control cable clamp screw and remove cable from valve. Remove connecting links from drive arm. Remove motor.

INSTALLATION: Reverse removal procedure.

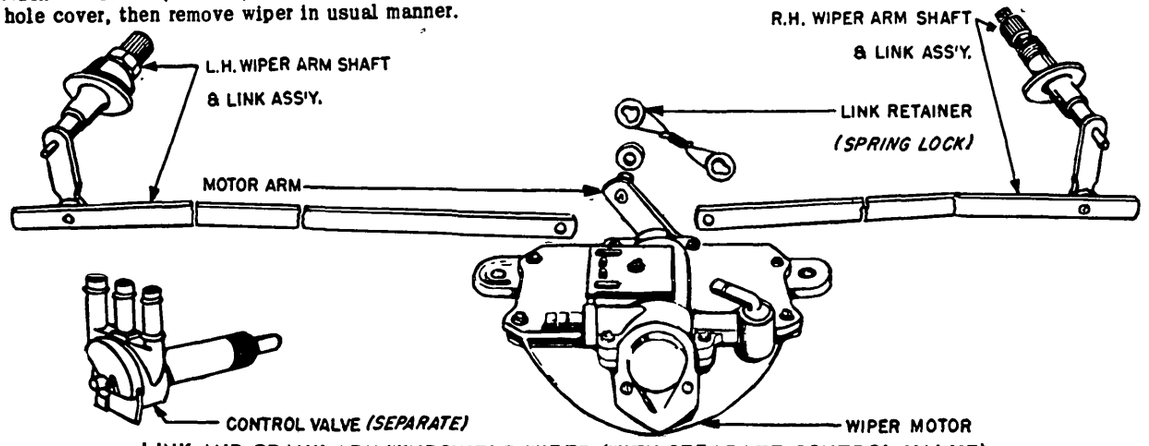
PIVOT SHAFT REMOVAL: Edsel - Disconnect battery and remove wiper arm and blade assembly. Remove pivot retaining nut and retainers holding pivot to motor. Disconnect arm from motor and remove arm and pivot assembly from under instrument panel.

Ford Pass. Cars - Remove wiper arms and blades. Remove connecting links from drive arm. Remove pivot attaching nuts, spacers and washers. Remove pivot.

Rambler (All) - Remove cowl ventilator air intake cover. Remove wiper blades and arms. Disconnect pivot link from motor. Remove mounting nuts and washers and remove pivot assemblies.

Studebaker - Remove wiper arms, retaining nuts, spacers, and gaskets at top of cowl. Then remove pivot arms from under instrument panel.

ADJUSTMENTS: Chevrolet Trucks - Loosen motor mounting screws. When motor operating arm is vertical, shift motor so both wiper arm operating levers are vertical. Tighten mounting screws. When operating levers are vertical, blades should be vertical. If not, shift position of blade arms on serrated shafts.



LINK-AND-CRANK ARM WINDSHIELD WIPER (WITH SEPARATE CONTROL VALVE)

1954-55 CABLE OPERATED VACUUM WINDSHIELD WIPER

Buick, All Series (1954–55).
Cadillac, All Series (1954–55).
Chevrolet Pass. Cars (1954–55).
Hudson (1954).
Lincoln (1954–55).
Oldsmobile, All Series (1954–55).
Packard (1954–55).
Pontiac, All Series (1954–55).

►CHANGES, CAUTIONS, CORRECTIONS

►*1954 BUICK SLOW OPERATING WIPER MOTOR CORRECTION:* If wiper operates slowly with wiper control knob in full "on" position, and with glass wet, the condition may be caused by insufficient travel of control valve on wiper motor. Correct by loosening screw on housing which clamps outer control cable to motor housing, and with control knob in fully "on" position, adjust outer cable toward motor until plastic motor control valve seats against motor casting. Hold valve in this position and tighten clamp screw on housing.

►*1954 BUICK SERIES 40, 60, 100 WIPER BLADE CHANGE:(To Reduc Rocking at Outer End of Blades):* The condition can be corrected by installing new wiper blades, Part No. 566213.

►*1954 CADILLAC WIPER BLADE TENSION ADJUSTMENT NOTE (T Prevent Damage to Glass):* Adjust cable tension as outlined below, then check for twisted wiper arm as follows: Wet windshield and operate wiper, stopping it when blades are in the straight up and down position. Remove wiper blade, allowing arm to rest against windshield glass. The end of the wiper arm must rest flat against the glass. If it does not, hold wiper arm close to inner end with pliers and twist outer end as necessary to make it lay flat. Install wiper blades and operate wiper, with the windshield wet, to be sure that metal portion of blade does not touch glass in any position.

►*1954 BUICK WINDSHIELD WIPER OVERTRAVEL CORRECTION (T Pr v nt Damage to Glass):* Check wiper blade at "park" position and make sure it is resting against windshield rubber channel. With windshield wet, measure the distance of maximum travel of outer tip of blade. This distance should not be greater than 27¼" measured in a horizontal line from center of rear view mirror to tip of blade (do not follow curvature of windshield glass). If distance is greater, remove and reinstall wiper transmission in correct position.

►*CHEVROLET TRANSMISSION TOOL CHANGE (For Us n1955 Mod l Cars):* To use Tool J-5449 on 1955 models, it will be necessary to drill a 5/8" hole, 1-5/8" deep, from large end of tool, and relocate the 3/16" hole in handle to 1-7/8" from larger end of tool and at right angles to old hole. New Tool No. J-5449-A will remove wiper transmission spacer nut from outside transmission escutcheon on this model.

DESCRIPTION: Drive is through auxiliary pulleys and cable to windshield wiper transmission at each side of windshield (Except Chevrolet & Pontiac which have a drum or spiral drive to wiper transmission). Cable tensioners are located in pulley brackets on all models except 1953 and later Chevrolet & Pontiac, and 1954 and later Buick, Cadillac, Oldsmobile. Windshield washer connections and vacuum line connections are provided on some motors, and piping on some housings for windshield washer operation.

CABLE TENSION ADJUSTMENT: *NOTE - Three types of tensioners have been used and are adjusted as follows:*

Automatic Adjusting Type Tensioner (1950-55 Models Except 1953 & Later Chevrolet & Pontiac, and 1954 & Later Buick, Cadillac & Oldsmobile): Located in pulley brackets and identified by spring and ratchet on bracket assembly. Cable tension is automatically maintained and adjustment is not required.

Semi-Automatic Type Tensioner (1954-55 Buick, Cadillac & Oldsmobile, 1955 Chevrolet & Pontiac): On early 1954 models, remove windshield wiper blade and arm assemblies. Hold serrated transmission shaft and loosen screw in end of shaft 3/4 turn. Tap screw lightly. On later models (without screw in end of transmission shaft) push base of wiper arm inward, where it fits over end of transmission shaft. *(NOTE* - On cars with Cam-O-Matic Control, remove cam from beneath wiper arm so transmission shaft can be moved inward). Internal springs in transmission pulleys will automatically adjust cable tension.

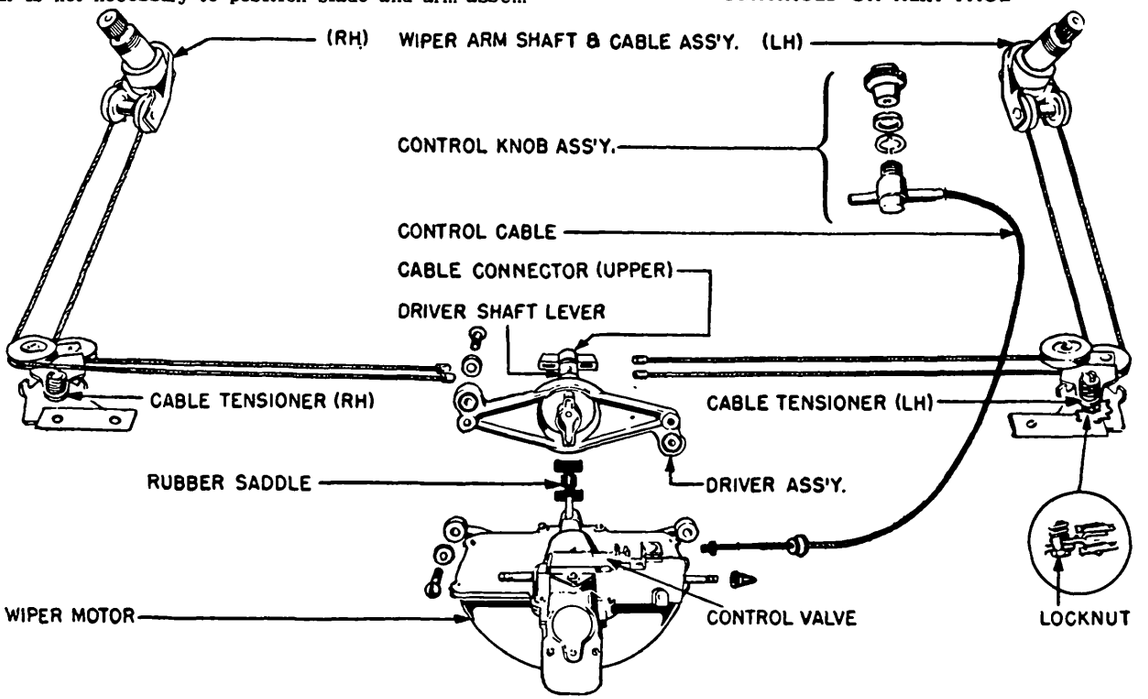
1953-54 Chevrolet & Pontiac - On Early 1953 Models with arm type drive (later models have drum type drive) move the wiper arms by hand, midway in their travel arc. With the arms in this position, the motor auxiliary drive lever should be in vertical position *(NOTE* - it is not necessary to position blade and arm assemblies on later models with drum type drive). Remove arms and blades and loosen screw in end of transmission shaft 3/4 turn. Tap screw lightly to insure full tension. From under cowl, take cables between thumb and finger and increase finger pressure until one notch movement can be felt or heard. While holding cables in this position retighten the tension screw. *(NOTE* - Two men are required for this operation). Repeat the above operation on opposite wiper transmission.

CAM-O-MATIC CONTROL ASSEMBLY: Consists of a cam located on transmission shaft and cam follower on wiper arm, plus new control switch which operates both the wiping range and speed.

Wiper Arm Removal & Installation: Raise upper section of wiper arm and blade assembly to disengage cam follower from cam, carefully pry or pull arm from transmission shaft. Remove spanner nut, wiper arm cam, and transmission escutcheon from transmission shaft. To install, reverse removal procedure, making sure that key on bottom of wiper arm cam is located in keyway in bottom of transmission escutcheon.

Wiper Control Assembly Removal & Installation (1955 Buick & Cadillac): Detach wiper control cable from wiper motor at front of dash. Remove control knob by pulling it out from instrument panel, then remove "super-speed" control knob. Remove spanner nut from wiper control shaft, push wiper control forward through instrument panel. Tag hoses for proper replacement before removing them from the assembly. To install

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TYPICAL CABLE OPERATED WINDSHIELD WIPER

1954-55 CABLE OPERATED VACUUM WINDSHIELD WIPER (C nt.)

wiper control assembly, reverse above procedure. "Super-Speed" hose from vacuum line attaches to "steel" colored connector. Hose from motor attaches to "Copper" colored connector. Handles of both control knobs should be in vertical position when wiper is in "off" position and in normal speed range. *NOTE* - When removing wiper motor, the "Super-Speed" vacuum hose must be disconnected from front of motor, and reattached after installation of motor.

WIPER MOTOR REMOVAL & INSTALLATI CN: Disconnect vacuum tube (and washer tube if used) and control cable. Remove attaching screws and withdraw motor from auxiliary drive assembly. To install, reverse removal procedure.

WIPER TRANSMISSION & CABLE ASSEMBLY REMOVAL: On models with "Adjustable Type" tensioner, loosen locknut on bracket and move pulley mounting toward center of car. Hold in this position and tighten locknut. On models with "Automatic Type" tensioner, apply a slight pressure to ratchet spring and rotate upper section holding pulleys, until locking pin hole is in line with similar hole in lower section. Insert a pin punch in holes to hold tension in the slack position. On models with "Semi-Automatic Type" tensioner, loosen screw in end of transmission shaft (first type), or push in on transmission shaft (later type), have helper carefully pull on transmission cables to obtain slack, and while holding cables, tighten screw in transmission shaft or release pressure on shaft to lock tensioner in the slack position. Remove transmission. Before disconnecting cables from auxiliary drive, mark location of cables for correct reassembly. Note following for special procedures required on different models.

1953-55 Chevrolet: Remove transmission shaft escutcheon nut using Tool J-5449 (1953-54), J-5449-A (1955). See Tool Modification Note above. Remove glove box and heater defroster duct.

1954-55 Cadillac: Remove upper section of instrument panel for access to transmission. Remove transmission spanner nut using Tool J-5659.

1952-54 Hudson: Remove glove box for access to right hand transmission.

1952-55 Lincoln: For removal of right hand transmission, remove the defroster outlet.

1954-55 Oldsmobile: Remove glove box for access to right hand transmission. Use Tool J-5610 to remove escutcheon spanner nut and escutcheon.

WIPER TRANSMISSION & CABLE ASSEMBLY INSTALLATION: Reverse the removal procedure and note the following:

1953 & Later Chevrolet & P ntiac: On models with a drum type auxiliary drive, rotate the drive counterclockwise and attach right transmission cables, copper end to copper drum and steel colored to steel drum. Rotate drum auxiliary drive clockwise and attach left transmission cables to their respective drums. Adjust cable tension.

LUBRICATION: Use light oil on pulley bearings at tensioners and wiper housings. Coat cables with light grease only on portions travelling over pulleys or drums.

1956-60 VACUUM WINDSHIELD WIPERS (CABLE OPERATED)

Buick (1956-58)
Cadillac (1956-58)
Chevrolet (1956-57)
Edsel (1958)
Ford & Thunderbird (1957-59).℄
Lincoln & Continental (1956-59).℄
Mercury (1957-59).℄
Oldsmobile (1956-58)
Packard (1956)
Pontiac (1956-58)
Willys (1957)

℄ – Electric type also used on 1959 models.

►*1956 CADILLAC BLADE OVERTRAVEL CORRECTION:* May be caused by positioning of equalizer spring assembly on serrated shaft of transmission pulley. Assembly should be installed so that surface of rubber guard over tang end of spring is 1/8-1/4" from the stop tab. If gap is incorrect, remove lock ring, remove and install spring assembly in specified position. This condition may occur on either or both transmission pulleys.

►*1956 CADILLAC BLADE FAILURE TO RETURN TO PARK POSITION CORRECTION:* Condition is usually due to interference between coupler shaft and coupler retainer plate. To correct, remove coupler retainer plate and file contacting surfaces between plate and shaft.

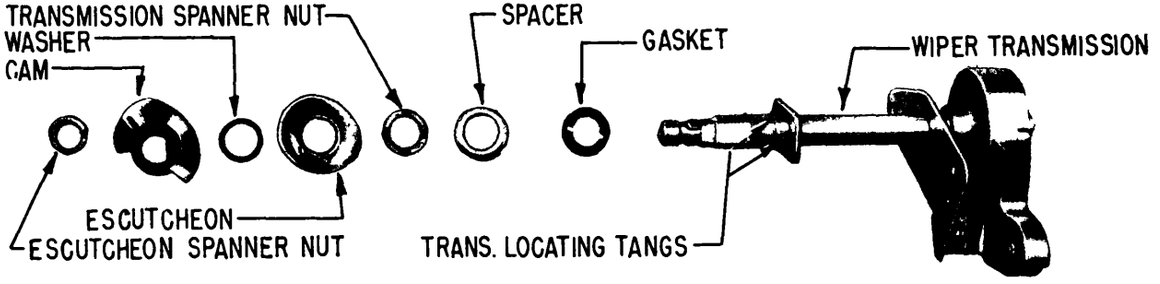
►*1956 CADILLAC FAILURE OF WIPER MOTOR TO SHUT OFF:* If wiper blades continue to operate with wiper switch in "OFF" position or if they begin to operate when the ignition switch is turned "ON", Windshield Washer Pump, Part No. 1464887, must be replaced. This condition is caused by the vacuum by-passing through the hydrostatic valve.

►*1957 BUICK WIPER CAM PRODUCTION CHANGE:* To improve cleaning action, install new type wiper cam, No. 4726069 (right), No. 4726070 (left). New type cams are used in later production cars.

►*1957 PONTIAC CABLE ADJUSTMENT AND WIPER INSTALLATION NOTE:* Excessively loose cables can be corrected as follows:

1) Install Cable Tighteners Part No. 4726957 as necessary on each cable on each side.

2) When cable tighteners will not take up all slack, check and relocate wiper transmission. Remove wiper arm and blade assembly. Relocate transmission base flush with shroud inner panel. Use body sealer on body side of gasket and locate transmission with key in notch of body panel. Install spacer and spanner nut on outside of body, then install support attaching screws on inside of body and attach cables to auxiliary drive. Install blade and arm assembly.



"CAM-O-MATIC" WIPER TRANSMISSION ASSEMBLY

►*1957 BUICK WIPER ARM SPRING NOTE:* When splines on end of shaft are visible under wiper arm, remove arm for inspection and install retaining spring (if missing). Spring is Buick Part No. 1172260 (Trico No. 81021).

►*1957 CADILLAC WIPER ARM TENSION NOTE:* If blades do not wipe complete area, check arm tension by removing blade and attaching an ounce spring scale to tip of arm with arm in center of blade travel. 10.5 to 12.5 ounces should be required to lift blade off glass. Replace arm if tension not up to specifications.

►*1957 MERCURY WIPER CABLE BREAKAGE CORRECTION:* Check tensioner pulley for freedom of rotation. Bend cowl trough (in tensioner area) to provide 3/8" clearance for pulley to rotate. Failure to rotate causes cable to fray and break.

►*1957 BUICK WIPER OPERATION CORRECTIONS:* When wipers operate with hesitation or erratic action check the following items:

1) Cam-O-Matic wiper arm black nylon plastic guide for wear, cracked, or damage. If defective replace wiper arm assembly.

2) Wiper arm must be fully seated on splines, *see "Wiper Arm Spring Note" above*.

3) Distance from top of blade vertically down to rubber windshield seal with blade at furthest travel of outboard stroke (wide stroke operation), should be 8" (Std.), 11" (Cam-O-Matic). Replace wiper auxiliary drive Part No. 4716598 (Std.), No. 4716685 (Cam-O-Matic). *NOTE* - Drive pulley diameter stamped on face of pulley, 1.76" (Std.), 1.94" (Cam-O-Matic).

4) Vacuum pump should register 22" at 1600 engine RPM with vacuum line disconnected from check valve and connected to gauge. If below specifications, replace vacuum side of oil pump.

5) Check for bind in transmission shaft by removing blade and operating wiper transmission at wide stroke.

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1956-60 VACUUM WINDSHIELD WIPERS (CABLE OPERATED) (Con..)

Shaft should move in and out approximately ¼". If bind present in shaft, replace transmission.

6) Cable must be free, with no bind or contact with other items. Drive pulley must be clear of cowl, drive adjusted to remove bind or cowl panel opening enlarged. There should be no interference between pulley tab and pulley guard. If interference noted replace transmission

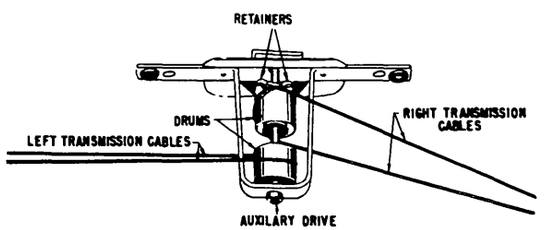
►*1958 MERCURY WIPERS OPERATE WHEN OFF CORRECTION & REPLACEMENT NOTE:* Caused by dirt between slide pins and guides of coordinator, making coordinator stick. To correct, wash slide pin and guides in solvent and lubricate with powdered graphite.

►*1959 MERCURY BLADE CHATTER CORRECTION:* May be caused by broken wiper arm torsion strut. If strut broken replace wiper arm with late type, Part No. PB9M-17526-7A, having improved strut and identified by riveted cover plate.

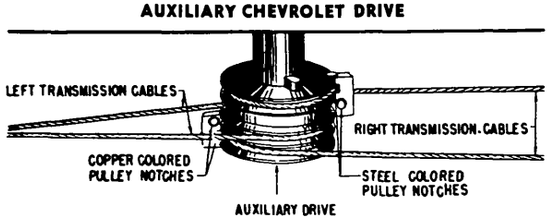
►*1959 MERCURY CONTROL CABLE BINDING CORRECTION:* Caused by improper routing, kinks, or corrosion. To correct, cut off about 16" of cable rubber sheathing at motor end and lubricate exposed cable armor with penetrating or light engine oil. A small amount of silicone lubricant may be applied to motor switch. If cable kinked, replace it. Cable should be routed under power brake booster assembly.

►*1959 MERCURY AUXILIARY DRIVE REPLACEMENT NOTE:* Revised auxiliary drive assembly used in later production should be used for all service replacement. New drive identified by tension lug locking prongs being secured to pins by peening instead of "C" washers used previously.

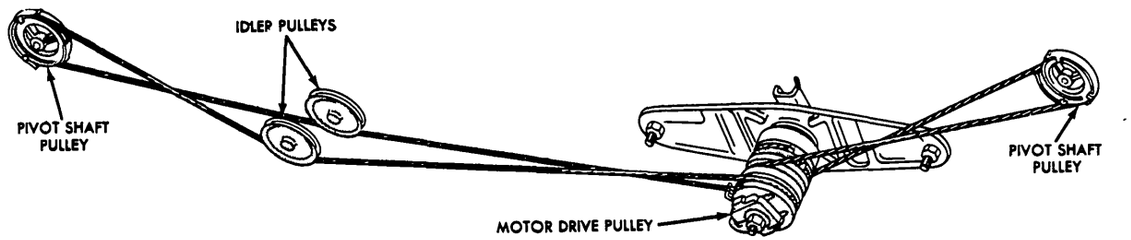
►*1958 PONTIAC WIPERS OPERATE WHEN OFF CORRECTION (Cars with W/S Washers):* Caused by diaphragm in washer jar pump valve swelling under moisture condensation and opening vacuum passage to coordinator. To correct, remove hose from top connector on jar and attach vacuum hose to draw off moisture. Adjust regulating screw to make valve close. Washer jar may also be moved to a warmer part of engine compartment (such as right side of fan shroud).



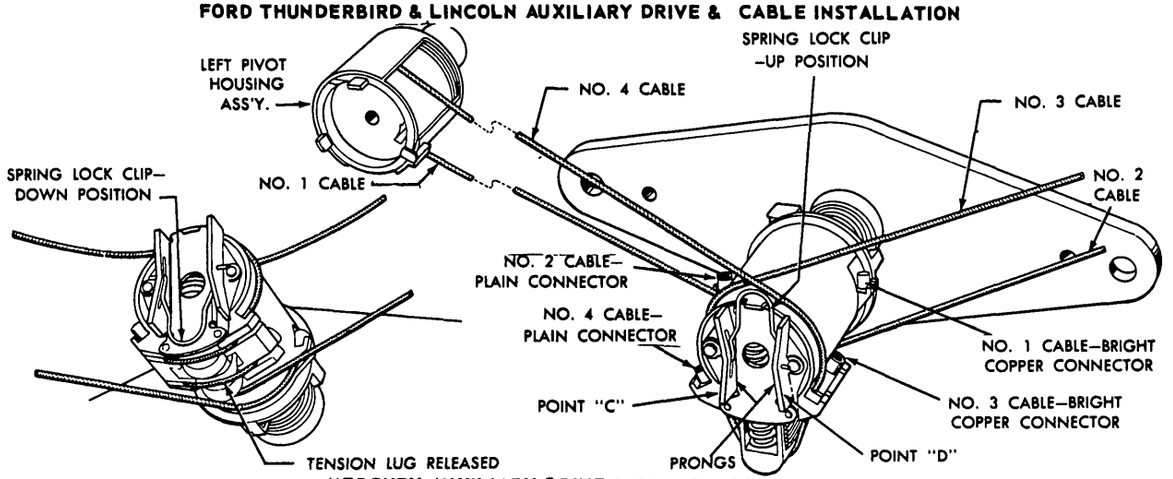
AUXILIARY CHEVROLET DRIVE



AUXILIARY DRIVE (BUICK, CADILLAC, LDSM BILE, P NTIAC)



FORD THUNDERBIRD & LINCOLN AUXILIARY DRIVE & CABLE INSTALLATION



MERCURY AUXILIARY DRIVE & CABLE INSTALLATION

DESCRIPTION: Drive is through auxiliary pulleys and cable to windshield wiper transmission at each side of windshield. Tensioners are located within each wiper transmission, auxiliary drive, or in pulley brackets depending upon model.

CABLE ADJUSTMENT: Buick, Cadillac, Chevrolet, Oldsmobile & Pontiac (Except CAM-O-MATIC Equipped Cars) - Push in on end of transmission shaft. Spring-loaded pulleys will unlock and tension cables.

Cam-O-Matic Equipped Cars - Remove arm and blade assembly by raising upper section of wiper arm to disengage cam follower from cam. With wiper arm in raised position, carefully pull or pry arm from transmission shaft. Push in on end of transmission shaft. Spring-loaded pulleys will unlock and tension cables.

1956–59 Lincoln, Continental & Thunderbird – Loosen wing nut or clamp nut and adjust cable tension. Tighten nut.

Mercury – Release auxiliary drive spring lock clip so lug tensioners are released. Cables will be automatically tensioned. Lock clip and make sure prongs are engaged in lugs.

REMOVAL & INSTALLATION: Wip r M t r - Remove screws securing motor to auxiliary drive, detach control cable and vacuum hose from motor, remove motor. On Thunderbird, remove glove box and right defroster air duct also. To install, reverse removal procedure.

Auxiliary Drive Assembly: Buick & Cadillac - Remove upper section of instrument panel. Remove arm and blade assemblies (Cam-O-Matic). (See ADJUSTMENT for Cam-O-Matic removal). Obtain slack in cables by pushing in on end of transmission shaft. With helper inside car to pull on cable to hold slack, release end of transmission shaft to lock cable in slack position. Observe attachment of transmission cables at auxiliary drive pulleys to assure proper reassembly, disconnect cables from auxiliary drive pulleys. Remove screws securing auxiliary drive, remove auxiliary drive assembly. To install, reverse removal procedure.

Chevrolet, Oldsmobile & Pontiac - Remove instrument panel compartment box. Obtain slack in cables by pushing in on end of transmission shaft. With helper inside car to pull on cable to hold slack, release end of transmission shaft to lock cable in slack position. Observe attachment of cables to auxiliary drive, then detach cables from pulleys or drums. Remove screws securing wiper motor, remove motor. Remove screws securing drive to dash, remove auxiliary drive. To install, reverse removal procedure.

1956-57 Continental - Remove lower insulator panels and carpet and screws securing control tower to tunnel brackets. Remove glove box liner and screws from check straps. Remove screws securing glove box hinge to brace. Disconnect spring at firewall. Slide check arms from glove box door. Remove glove box. Remove screws securing control tower to firewall and screws on right

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1956-60
VACUUM WINDSHIELD WIPERS
(CABLE OPERATED) (Cont.)

hand side securing control tower to instrument panel brace. Remove screws securing speaker frame to lower control panel. Lower control tower using care not to kink bowden wires. Remove antenna lead, hot wires and two speaker leads, remove radio. Loosen wing nut on idler puller and retract tension on cables, disconnect cables. Remove capscrews securing auxiliary drive to firewall, remove auxiliary drive. To install, reverse removal procedure.

Ford, Mercury - Remove cowl top ventilator grille and weather strip assembly (Ford), fresh air intake grille and rubber seal (Mercury). Remove idler pulley water shield (Ford), rubber plugs from tensioner access holes (Mercury), and remove tensioners.

1956–58 Lincoln & 1958–59 Thunderbird – Remove screws securing auxiliary drive to cowl and remove auxiliary drive. To install, reverse removal procedure.

1959 Lincoln – Remove wiper motor, center, right and left lower instrument panel extensions, glove box and cover. Loosen nut at rear of drive and press cables down and retighten nut to hold cables slack. Remove cables, noting position on drive. Remove auxiliary drive.

►*MERCURY AUXILIARY DRIVE TESTING NOTE:* If either tension lug on auxiliary drive can be retracted into drive housing when spring lock clip is up, drive is faulty and must be replaced.

Wiper Transmissions: Buick & Cadillac - Remove wiper blade and arm assembly (see ADJUSTMENT for Cam-O-Matic removal). Remove upper section of instrument panel. Obtain slack in cables by pushing in on end of transmission shaft. With helper inside car to pull on cable to hold slack, release end of transmission shaft to lock cable in slack position. Observe attachment of transmission cables at auxiliary drive pulleys to assure proper installation, then disconnect cables from auxiliary drive pulleys. Remove transmission spanner nut, escutcheon, cam, and reveal molding clip. Remove transmission support bolts, rubber gasket and retainer nuts. Disconnect windshield washer hose, and carefully pull transmission down through shroud panel and remove from body. To install, reverse removal procedure. *NOTE* - Copper-colored cable ends must be installed to copper-colored pulley notches and steel-colored cable ends to steel-colored pulley notches.

Chevrolet, Oldsmobile & Pontiac - Remove wiper blade and arm assemblies. Remove instrument panel glove box. Obtain slack in cables by pushing in on end of transmission shaft. With helper inside car to pull on cable to hold slack, release end of transmission shaft to lock cable in slack position. Observe attachment of transmission cables to auxiliary drive, then disconnect cables from pulleys or drums. Remove escutcheon spanner nut. Lift esctucheon from body, disconnect washer hose and remove escutcheons. Remove transmission spacer spanner nut. On inside of body pull each transmission down through shroud panel, remove from body. To install, reverse removal procedure. *NOTE* - Right transmission cables are crossed.

1956-57 Continental (Right Hand) - Remove wiper arm, nut, and gasket. Remove cowl trim panel, glove box liner, defroster nozzle and windshield wiper hose. Remove capscrew securing transmission to brace and remove transmission. Remove capscrew and special bolt securing spacer to cowl top, remove spacer. To install, reverse removal procedure.

1956-57 Continental (Left Hand) - Remove three screws securing wiper switch plate to underside of instrument panel, and eight screws securing courtesy light plate to instrument panel. Remove wiper arm, nut and gasket and remove washer hose. Remove capscrew securing transmission to brace and remove transmission. Remove capscrews and special bolt securing spacer to cowl top and remove spacer. To install, reverse removal procedure.

1956-57 Lincoln - Remove wiper arm and blades. Remove nut and spacer securing transmission to cowl top On right side, remove defroster outlet. Remove glove compartment box. Pull cable tensioner toward center of car and lock in this position with drift pin through hole provided. Remove drive cable from auxiliary drive, remove transmission. To install, reverse removal procedure. When installing, be sure to rig cables properly on pulleys before connecting to auxiliary drive. Take drift pin out of cable tensioner and allow pulleys to take up slack.

1958 Lincoln - Remove wiper arms and blades, then remove retainer nut and guide, seal, and washer nozzle assembly from pivot shaft. Remove nut holding pivot to engine side of cowl. Remove all instrument panel lower extensions, glove compartment and door. Relieve tension on cables and remove from auxiliary drive. Remove pivot.

1957 Ford & Mercury - Lift off wiper arms and blades. Remove idler pulley water shields (Ford), rubber plugs from tensioner access holes (Mercury), and remove tensioners. Disconnect cables from motor pulley. Remove pivot attaching nuts, spacers and washers and lower pivot assembly into cowl compartment.

1958 Edsel & Mercury - Remove wiper arms and blades, cowl top ventilator grille and the weatherstrip assembly. Remove fresh air intake grille (Mercury). Remove rubber plugs from tensioner access holes. Remove attaching screws and remove tensioners and pivots.

NOTE - Tensioner winds to tight st positi n wh n cables removed and must be r s t b for cabl s install d. To reset, clamp tensioner in a vise, hold leaf spring away from ratchet and wind spring until locking pin hole is in line with hole in bracket. Insert a pin to hold tensioner temporarily.

1958–59 Thunderbird – Remove wiper blades and arms, pivot shaft mounting nuts and slide pivots out of mounting holes. Disconnect cables from motor drive pulley and remove pivots. *NOTE* – To remove left pivot assembly, speedometer must be removed.

1959 Lincoln – Remove wiper arms and blades. Remove retainer nut, guide, seal and washer nozzle assembly from pivot shaft. Remove nut holding pivot to engine side of cowl. Remove all instrument panel lower extensions, glove compartment and door. Relieve tension on cables and remove from auxiliary drive. Remove pivot.

1959 Mercury – Disconnect battery and remove glove box and radio. Pull spring lock clip on auxiliary drive in down position. With long screwdriver, reach under instrument panel and push up tension lugs on auxiliary drive to lock them in released position and lift off cable. Remove wiper arms and blades. Remove windshield belt molding and retainers from cowl and remove cowl vent grille. Remove round nut from pivot housing and two pivot-to-cowl capscrews (9/32" – 12 point socket). Remove right pivot through glove box opening. On Auto. Trans. cars, remove left pivot by reach-under instrument panel to left of steering column above panel brace. On Synchro-mesh cars, left pivot must be moved away from mounting hole and tipped downward to clear clutch pedal mounting bracket.

Cable Tensioner (1956-57 Lincoln): Remove defroster outlet from right side. Remove glove compartment box. Pull cable tensioner toward center of car and lock in this position with a drift pin through hole provided. Remove drive cable from auxiliary drive. Remove two capscrews that secure tensioner to cowl panel and remove tensioner. To install, reverse removal procedure.

REDMOND ELECTRIC TYPES

D dg Six (1954).
Plym uth (1954).
Stud bak r C mmand r (1954–55).
Stud bak r Champi n (1954–55). Optl.

►***DODGE & PLYMOUTH NOTE—See "Auto-Lite Windshield Wiper (Single End Motors) and (Double End Motors)" for other applications.***

DESCRIPTION: Wiper consists of motor mounted on a single gear assembly which drives both wiper arms through a double crank. Parking switch is mounted on gear assembly housing. System is protected by circuit breaker in control switch.

PARKING ADJUSTMENT: ***Required when drive gear position in housing disturbed.*** Place shaft in housing so that crank arm points to left and downward at an angle of about 30° with crank lever horizontal or approximately parallel to center line of motor. With arm and lever in this position, high side of parking index cam must be toward left (viewing face of gear with housing cover removed). ***See Blade Adjustment also.***

BLADE ADJUSTMENT: Blades can be placed in proper operating position by loosening attaching nuts and moving arm on serrated mounting. A further MINOR adjustment can be made by moving the parking switch lever of the motor assembly DOWNWARD (this will park blades closer to the lower windshield moulding).

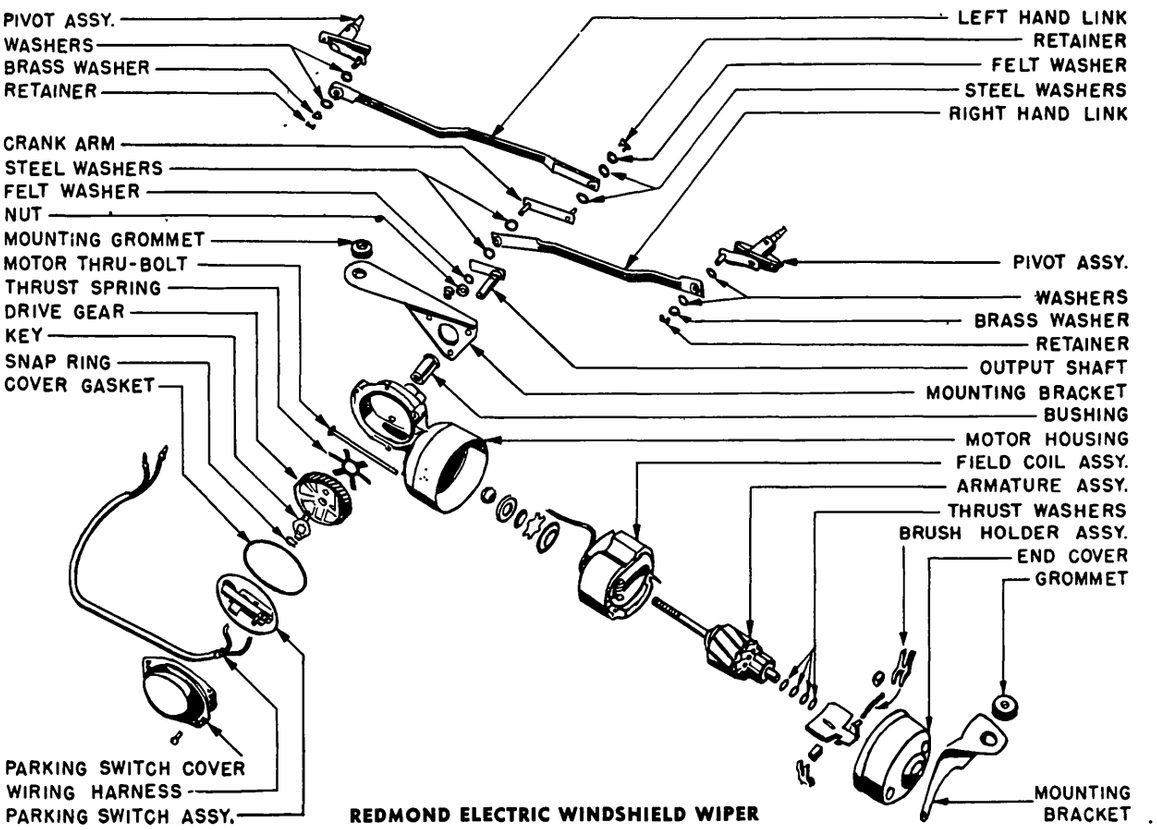
REMOVAL: Remove radio, disconnect wires from switch. Disconnect wiper linkage, using care not to damage it, then remove screws holding brackets to body and remove wiper assembly.

►***CAUTION—Keep hands and fingers away from windshield wiper operating linkage when wiper motor is running. Power of wiper motor is sufficient to cause serious personal injury.***

TESTING WIPER MOTOR: With motor removed, ground case and connect one lead wire to a 6-volt battery. When one of wires is connected to battery, motor should run continuously; connecting other wire should cause it to complete one cycle and park.

RECONDITIONING WIPER MOTOR: Disassemble wiper motor, remove gear box cover. Inspect for wear, corrosion or damage. Clean armature commutator with 00 or 000 sandpaper or, if necessary, turn down commutator. Replace worn or oil soaked brushes. Check armature and crankshaft in their respective bushings, replace worn parts if any looseness detected. End play in armature shaft is controlled by a thin thrust washer in end plate. Inspect gears for worn or broken teeth and replace those showing damage or excessive wear. Be sure parking switch contact is clean and dry.

Refacing Commutator: If commutator rough, out-of-round, burned or bakelite is even with or extends above surface of commutator, commutator should be turned down. **Remove only enough metal to give smooth, clean surface.** Be sure commutator is clean and free from oil or grease. A dirty, greasy commutator will cause high resistance and greatly impair efficiency of wiper. Assemble frame, armature and head, being careful to raise brushes to allow entrance of commutator. Rap motor frame several times with rubber hammer to align brushes.



REDMOND ELECTRIC WINDSHIELD WIPER

INSTALLATION: When installing motor be sure not to tighten attaching studs too tightly. Rubber mounting will be distorted and cause metal-to-metal contact resulting in wiper motor noise. Place drop or two of machine oil on each of felt washers in linkage assembly. Check to see that ground strap on housing and mounting bracket is in place. Be sure linkage is properly positioned when replacing motor. Each arm is identified as being either right or left (stamped "R" or "L").

TROUBLE SHOOTING: Check as follows:

Wiper Motor Will Not Run: Test for defective switch, inspect for binding linkage, defective motor, loose or defective wiring.

Wiper Operates Slowly: Check for high resistance in brush to commutator contact, or carbon deposits in slots, high resistance in ground connection, pivot shaft binding; defective control switch, worn or damaged motor.

Wiper Motor Runs and Stops: Inspect for faulty or defective wiring, check for linkage binding. Operating arm should be parallel with crank arm.

SERVICE PART NUMBERS: **Mot r**

Dodge & Plymouth ..... Mopar No. 1473226
Studebaker ..... Studebaker No. 297824